PowerPack LV
Energy Storage System

User Manual

BlauHoff

Table of contents

1A - Manual PowerPack LV

P. 3 – P. 48

Residential Energy Storage System

BlauHoff
PowerPack LV
Reference Manual

Table of Contents

1.Introduction

The purpose of this reference manual is to describe the Power Pack LV Series components, its functions, and the environment in which it can be operated properly. So that the user can understand the use scope and provide the necessary information for maintenance of the Power Pack LV Series when they need to.

1.1. Lithium iron phosphate Battery

The lithium iron phosphate battery is an energy storage product. It can be used to support reliable power for various types of equipment and systems. The product especially suitable for applications of high power, limited installation space, and restricted load-bearing and long cycle life. The lithium iron phosphate battery (LiFePO4 or LFP) is the safest of the mainstream lithium battery types.

LFP is the chemistry of choice for very demanding applications. Some of its features are:

◆ Rugged - It can operate in deficit mode during long periods of time.

◆ For use in residential dwelling units and commercial buildings, indoor and outdoor.

◆ High round trip efficiency.

◆ High energy density - More capacity with less weight and volume.

◆ High charge and discharge currents - Fast charge and discharges are possible.

◆ Flexible charge voltages.

◆ The whole module is non-toxic, pollution-free, and environment-friendly.

◆ Cathode material is made from LiFePO4 with safety performance and long cycle life.

1.2. Power Pack LV Series

Multiple battery stacks are allowed to be connected in parallel to expand capacity and power to meet the requirements of longer power supporting duration and higher power consumption. A single LFP cell has a nominal voltage of 3.2V.

BlauHoffe product has a built-in BMS battery management system, which can manage and monitor cell's information including voltage, current and temperature.

◆ Battery management system (BMS) has protection functions including over-discharge, over-charge, and over-current and high/low temperature.

◆ The system can automatically manage charge and discharge state and balance current and voltage of each cell.

◆ Flexible configuration, multiple battery modules can be internal for expanding voltage and Capacity.

◆ Adopted self-cooling mode rapidly reduced system entire noise.

◆ The module has less self-discharge, up to 3 months without charging it on shelf, no

memory effect, excellent performance of shallow charge and discharge.

◆ Working temperature range is from -20℃to 50℃, (Charging 0℃~50℃, discharging -20℃~50℃) with excellent discharge performance and cycle life.

◆ Small volume, light weight, plug-in embedded design module, easy to install and maintain.

2.Safety Precautions

It is very important and necessary to read the user manual carefully (in the accessories) before installing or using battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage battery, potentially rendering it inoperable.

Observe these instructions and keep them located near the Li-ion Battery for future reference.

For more information about this product, please contact the

Work on a Li-ion Battery should be carried out by qualified personnel only.

2.1. General warnings

While working on the Li-ion Battery wear protective eyeglasses

Any uncovered battery material such as electrolyte or powder on the skin or in the eyes must be flushed with plenty of clean water immediately. Then seek medical assistance. Spillages on clothing should be rinsed out with water.

Explosion and fire hazard. Terminals of the Li-ion Battery are always alive; therefore, do not place items or tools on the Li-ion Battery. Avoid short circuits, too deep discharges, and too high charge currents. Use insulated tools. Do not wear any metallic items such as watches, bracelets, etc. In case of fire, you must use a type D, foam, or CO2 fire extinguisher.

Do not open or dismantle the battery. Electrolyte is very corrosive. In normal working conditions contact with the electrolyte is impossible. If the battery casing is damaged do not touch the exposed electrolyte or powder because it is corrosive.

Li-ion batteries are heavy. If involved in an accident, they can become a projectile! Ensure adequate and secure mounting and always use suitable handling equipment for transportation.

Handle with care because an ion battery is sensitive to mechanical shock.

Do not expose cable outside, all the battery terminals must be disconnected.

Please use caution when it's placed around children or pets.

Do not use cleaning solvents to clean battery.

⚠️ Do not expose battery to flammable or harsh chemicals or vapors.

⚠️ Do not paint any part of battery; include any internal or external.

⚠️ Do not drop, deform, impact, cut or spearing with a sharp object.

⚠️ Do not wet the battery and avoid of direct sunlight.

⚠️ Do not use a damaged battery.

⚠️ Please contact the supplier within 24 hours if there is something abnormal.

⚠️ Any foreign object is prohibited to insert into any part of battery.

⚠️ The warranty claims are excluded for direct or indirect damage due to items above.

⚠️ Recharge and maintain the battery pack regularly every three months to ensure the battery is in the best condition.
Don't store the battery at 0% SOC for over one month, this may result in permanent damage to the battery and violet the warranty.

⚠️ It is prohibited to connect the battery with different type of battery.

⚠️ It is prohibited to put the batteries working with faulty or incompatible inverter.

⚠️ It is prohibited to disassemble the battery (QC tab removed or damaged).

⚠️ Please do not open, repair, or disassemble the battery except trained technicians. We do not undertake any consequences or related responsibility which, because of violation of safety operation, or violation of design, production, and equipment safety standards.

2.2. Charge and discharge warnings

⚠️ If the battery is stored for a long time, it is required to charge them every three months, and the SOC should be no less than 90%.

⚠️ Battery needs to be recharged within 12 hours, after fully discharged.

⚠️ Do not connect battery with PV solar wiring directly.

Use only with BMS approved by the supplier.

If charged after the Lithium Battery was discharged below the "Discharge cut-off voltage", or when the Lithium Battery is damaged or overcharged, the Lithium Battery can release a harmful mixture of gasses such as phosphate.

The temperature range over which the battery can be charged is 0°C to 50°C. Charging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.

The temperature range over which the battery can be discharged is -20°C to 50°C. Discharging the battery at temperatures outside this range may cause severe damage to the battery or reduce battery life expectancy.

2.3. Transportation warnings

If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down; The battery must be transported in its original or equivalent package and in an upright position. If the battery is in its package, use soft slings to avoid damage.

Do not stand below a battery when it is hoisted.

Never lift the battery at the terminals or the BMS communication cables, only lift the battery at the handles.

Battery packs need to be packed before they can be shipped, during transportation, severe impact, extrusion, direct sunlight and rain should be avoided.

NOTE :

●*Batteries are tested according to UN Handbook of Tests and Criteria, part III, sub section 38.3 (ST/SG/AC.10/11/Rev.5).*

●*For transport the batteries belong to the category UN3480, Class 9, Packaging Group II and must be transported according to this regulation. This means that for land and sea transport (ADR, RID & IMDG) they must be packed according to packaging instruction P903 and for air transport (IATA) according to packaging instruction P965. The original packaging complies with these instructions.*

2.4. Disposal of lithium batteries

Batteries marked with the recycling symbol must be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer.

Batteries must not be mixed with domestic or industrial waste.

Do not throw a battery into fire.

2.5. Emergency Situations

(1). Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below. Inhalation: Evacuate the contaminated area and seek medical attention.

Contact with eyes: Rinse eyes with flowing water for 15 minutes and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water and seek medical attention.

Ingestion: Induce vomiting and seek medical attention.

(2). Fire

NO WATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

(3). Wet Batteries

If the battery pack is wet or submerged in water, do not allow any person access, and then contact an authorized dealer for technical support.

(4). Damaged Batteries

Damaged batteries are dangerous and must be handled with extreme care. They are not suitable for use and may cause danger to persons or property. If the battery pack appears to be damaged, place it in the original container and return it to an authorized dealer.

NOTE:

●*Damaged batteries may leak electrolyte or produce flammable gas.*

●*In case a damaged battery needs recycling, it shall follow the local recycling regulation to process, and using the best available techniques to achieve a relevant recycling efficiency.*

2.6. Before Connecting

◆ After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.

◆ Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode.

◆ Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.

◆ It is prohibited to connect the battery and AC power directly.

◆ The embedded BMS in the battery is designed for 48V DC, please DO NOT connect battery in series.

◆ Battery system must be well grounded, and the resistance must be less than 1oumu.

◆ Make sure the grounding connection set correctly before operation.

◆ Please ensured the electrical parameters of battery system are compatible to related equipment.

◆ Keep the battery away from water and fire.

3.Component's Introduction and Daily Usage

3.1. Whole Cluster

Figure 3.1. Overall system diagram of five battery modules

The form below is for Power Pack LV 15S.

No.	Items		Parameters						
1	Model		Power Pack LV						
2	Controller Module		BLH-LV-Powerpack-BMU						
3	Battery Module Type		BLH-Powerpack-4.8						
4	Battery Module Chemistry		LiFePO4						
5	Battery Module QTY		2	3	4	5	6	7	8
6	Nominal Capacity (Ah)		200	300	400	500	600	700	800
7	Nominal Energy(kWh)***		9.60	14.4	19.2	24.0	28.8	33.6	38.4
8	Voltage	Nominal(V)	48.0						
		Recommend Charging(V)	53.25						
		Max. Charging(V)	55.5						
		Discharge Cut-off(V)	40.5						
9	Current	Max. Charging(A)	180	270	300	300	300	300	300
		Max. Discharging(A)	180	270	300	300	300	300	300
		Peak for 10s(A)	300	300	500	500	500	500	500
10	Weight (Approx.)		304lbs	416lbs	527lbs	639lbs	750lbs	862lbs	972lbs
11	Dimensions(L*H*W)		735*1040 *400mm@24.0 kwh (Each module has a height of 135.5mm)						
12	Communication		RS485, CAN, Wi-Fi, RS232						
13	Cycle Life		8000 times@60%DOD						
14	Designed Calendar Life		≥10 years						
15	Safety Function		Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections						
16	Parallel Capability		Maximum 15 Cluster (Recommended 6 Cluster)						

The form below is for Power Pack LV 16S.

No.	Items		Parameters						
1	Model		Power Pack LV						
2	Controller Module		BLH-LV-Powerpack-BMU						
3	Battery Module Type		BLH-Powerpack-5 BLH-PowerPack-5-Heated						
4	Battery Module Chemistry		LiFePO4						
5	Battery Module QTY		2	3	4	5	6	7	8
6	Nominal Capacity (Ah)		200	300	400	500	600	700	800
7	Nominal Energy(kWh)		10.24	15.36	20.48	25.6	30.72	35.84	40.96
8	Voltage	Nominal(V)	51.2						
		Recommend Charging(V)	56.8						
		Max. Charging(V)	59.2						
		Discharge Cut-off(V)	43.2						
9	Current	Max. Charging(A)	180	270	300	300	300	300	300
		Max. Discharging(A)	180	270	300	300	300	300	300
		Peak for 10s(A)	300	300	500	500	500	500	500
10	Weight (Approx.)		311lbs	425lbs	540lbs	655lbs	769lbs	884lbs	999lbs
11	Dimensions(L*H*W)		735*1040 *400mm@24.0 kwh (Each module height 135.5mm)						
12	Communication		RS485, CAN, Wi-Fi, RS232						
13	Cycle Life		8000 times@60%DOD						
14	Designed Calendar Life		≥10 years						
15	Safety Function		Over-charge, Over-discharge, Over-current, Low/High-temperature, Low-voltage, Short-circuit Protections						
16	Parallel Capability		Maximum 15 Cluster (Recommended 6 Cluster)						

3.2. Main Controller

1. Component introduction
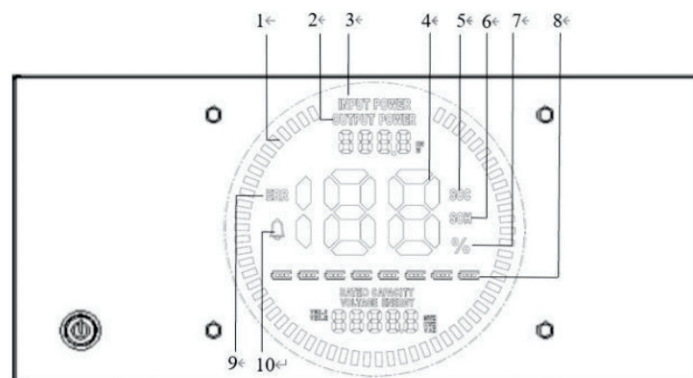
Figure 3.2.1Controller module positive

No.	Instructions	NO.	Instructions
1	Animated streamline	6	Battery state of health (SOH)
2	Discharge power	7	Numerical percentage
3	Charging power	8	Number of modules
4	Numerical information	9	Fault (error)
5	Battery state of charge (SOC)	10	Alarm (warning)
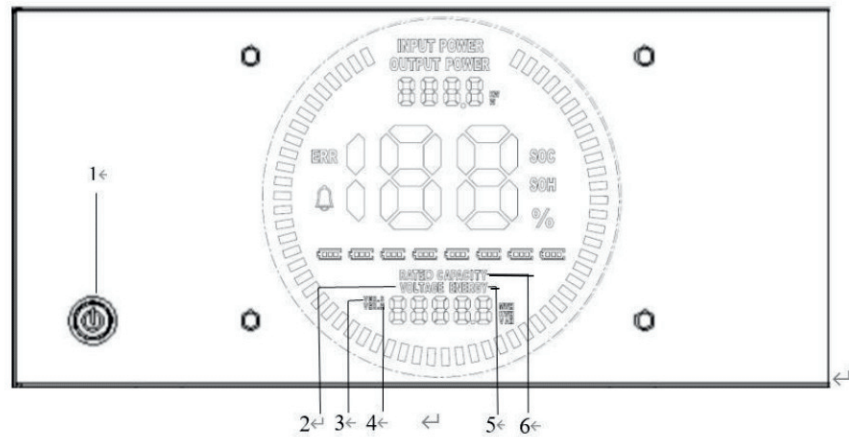
Figure 3.2. 2Controller module positive

No.	Instructions	NO.	Instructions
1	Power switch	4	Hardware version
2	Current voltage level	5	Energy throughput
3	Software version	6	Capacity of a new battery
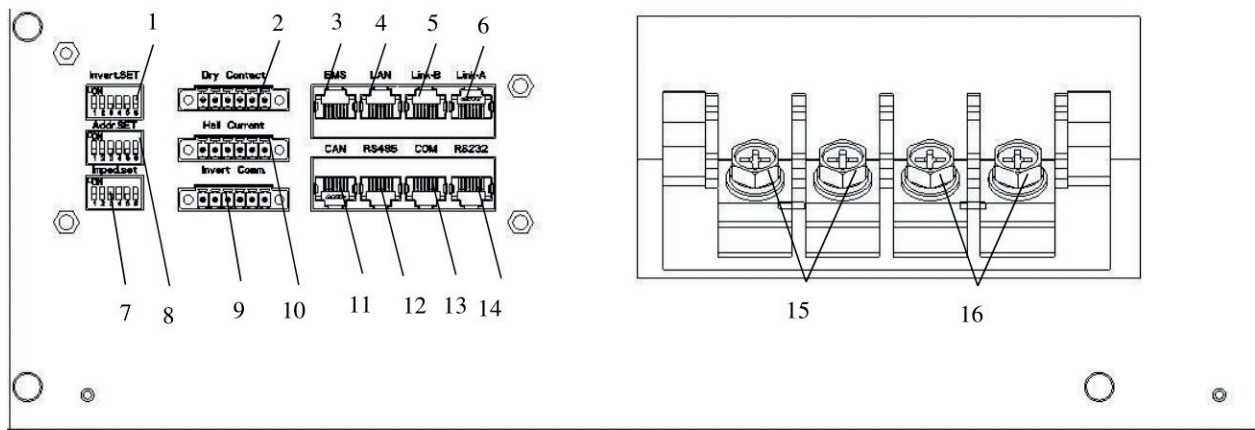
Figure 3.2.3Interface definition of Controller module

| No.	Component	Function
1	Inverter protocol dialing switch	Set address to communicate with inverter
2	Dry Contact (Reserved）	Reserved port
3	Reserved	Reserved port
4	Reserved	Reserved port
5	Parallel communication port B	Port to parallel another cluster
6.	Parallel communication port A	Port to parallel another cluster
7.	Imped.SET	Set resistance to match circuit
8	Address Dial Switch of Cluster	Set address of cluster for paralleling
9	Inverter CAN /RS485communication port	The communication port which can fit with both of CAN and RS485 protocol for inverter
10	Hall Current (Reserved）	Reserved port
11	Inverter CAN communication port	The communication port which can fit with CAN for inverter
12	Inverter RS485communication port	The communication port which can fit with RS485 protocol for inverter
13	CAN upgrade communication port	The port for upgrade in CAN protocol
14	RS232 communication interface	The port for communication in RS232 protocol
15	Charge discharge negative electrode	Negative electrode of cluster
16	Charge discharge positive electrode	Positive electrode of cluster

Power switch

Power switch: turn on/off the input and output of the whole system.

Display screen

Display screen: the interface can observe the operation status information SOC, SOH, charging and discharging power, alarm fault indication, charging and discharging status display and system status indication of the whole system.

Address dial switch
Dial switch: 6-digit dial switch, address "0" and "1", as shown in the figure. After setting, you need to restart the system and activate it.
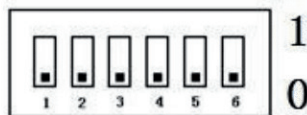
When the system groups are in parallel, the communication between two levels is needed. Both master and slave packets need hardware address configuration, and the hardware address can be set through the dial switch on the board. The definition of switch is shown in the table below.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	The host computer can monitor the operation of other systems by setting the main package
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Cluster 2
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Cluster 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Cluster 4
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Cluster 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Cluster 6
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Cluster 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Cluster 8
9	ON	OFF	OFF	ON	OFF	OFF	Set to the slave Cluster 9
10	OFF	ON	OFF	ON	OFF	OFF	Set to the slave Cluster 10
11	ON	ON	OFF	ON	OFF	OFF	Set to the slave Cluster 11
12	OFF	OFF	ON	ON	OFF	OFF	Set to the slave Cluster 12
13	ON	OFF	ON	ON	OFF	OFF	Set to the slave Cluster 13
14	OFF	ON	ON	ON	OFF	OFF	Set to the slave Cluster 14
15	ON	ON	ON	ON	OFF	OFF	Set to the slave Cluster 15

2. Status code

Status code: When the system status code is displayed as protection information, only the value will be displayed. When the system status code is displayed as fault information, error and warning code will be displayed. The definition of alarm is shown in the table below:

Warning Code (Sigh like " ")	
1	Single Overvoltage Protection
2	Single low voltage protection
3	Charge overcurrent protection
4	Discharge overcurrent protection
6	Battery charging high temperature protection
7	Cell discharge high temperature protection
8	Battery charging low temperature protection
9	Cell discharge low temperature protection
11	High ambient temperature protection
12	Overpressure protection
21	Parallel failure protection
22	Relay over temperature protection
23	Copper busbar over temperature protection
24	Low insulation protection
51	Total voltage overcharge protection
52	Total voltage over-discharge protection
53	Low ambient temperature protection
54	MOS over temperature protection
55	MOS low temperature protection

Error Code (Sign like "Err")	
5	Short circuit protection
13	Discharge circuit failure
14	Charge circuit failure
15	Cell failure
16	NTC out-of-school failure
17	Voltage acquisition out-of-calibration fault
18	Hall sensor failure
19	External device communication interruption fault
20	Internal device communication interruption failure
25	The communication between the screen and the device was lost
26	Microelectronics failure

NOTE:

● *When the system is charged, the display streamline gathers in the middle, and when it is discharged, the display streamline disperses to both sides.*

3. Imped.SET

Switch: 6 switches, "0"and "1", refer to picture right. The settings will be active only after restart the battery.
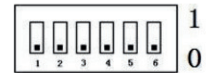
After assembling the product, dial the sixth bit of this dip code by 1, which is in the form of 000001, the purpose is to maintain the communication stability of the device.
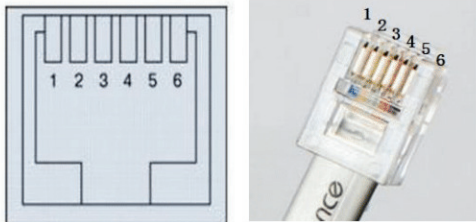
4. Link A / Link B communication port

Link A / B communication port:(RJ45 port) the definition of link A and B are same. RS485 interface is used for parallel communication between the Controller modules, and up to 15 devices can be connected in parallel.

Port definitions	RJ45 Pin	Function
	1	RS485-B
	2	RS485-A
	3	RS485-GND
	4	NC (NO connect)
	5	NC (NO connect)
	6	RS485-GND
	7	RS485-A
	8	RS485-B
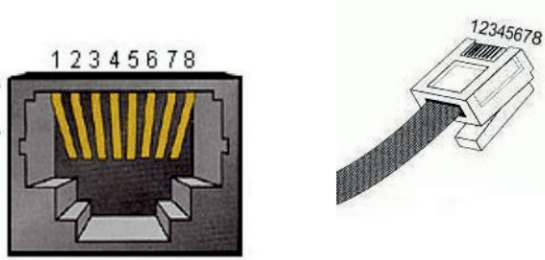
5. RS232 communication port

RS232 communication port: (RJ45 port) comply with RS232 protocol (baud rate: 9600), for manufacturers or professional engineers debugging or service.

Port definitions	RJ45 Pin	Function
	1	NC (NO connect)
	2	RS232-GND
	3	RS232-TX
	4	RS232-RX
	5	RS232-GND
	6	NC (NO connect)

6. COM communication port

COM communication port:(RJ45 port) Connect the monitoring host computer to query the data and monitor the running status of the system.

Port definitions	RJ45 Pin	Function
	1	RS485-B
	2	RS485-A
	3	CAN -GND
	4	RS485-GND
	5	RS485-GND
	6	CAN -GND
	7	CAN-L
	8	CAN-H

3.3. Battery Module

Components of Battery Modules
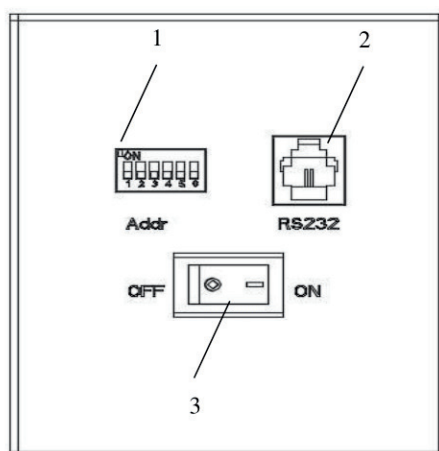

Figure 3.3. Battery module interface definition
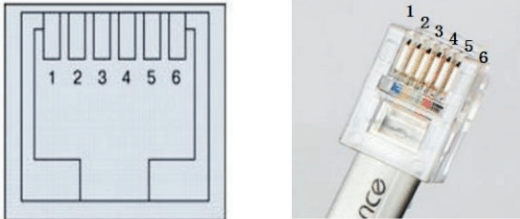
No.	Instructions	NO.	Instructions
1	Address Dial Switch of Battery Module	2	RS232 communication interface
3	Power switch		

Power switch

Power switch: turn on / off the input and output of the whole battery module.

RS232 communication port

RS232 communication port: (RJ11 port) comply with RS232 protocol (baud rate: 9600), for manufacturers or professional engineers debugging or service.

Port definitions		RJ11 Pin	Function
		1	NC
		2	RS232-GND
		3	RS232-TX
		4	RS232-RX
		5	RS232-GND
		6	NC

Address dial switch

ADD Switch: 6 ADD switches, "0"and "1", refer to graph below. The settings will be active only after restart the battery.
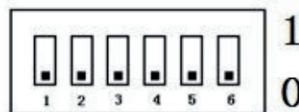
When the battery communicates with the inverter, the address of the battery pack must be set to 1, and the address of the parallel slave should be greater than 1.

The master control is the host, and the FS battery is the slave. The host broadcasts the voltage of the parallel bus. After the slave is powered on, check whether there is voltage at the port.

Otherwise, turn off the discharge MOSFET and turn on the Controller.

1. Refresh the dialing address when waking up from sleep, otherwise the address before shutdown will be used for startup judgment.

2. 0 does not participate in parallel operation or single machine operation (MOS does not close under any state); The hardware address can be set through the dial switch on the board. The definition of switch is shown in the following table.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Set to the slave Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Pack 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 4
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Pack 6
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Pack 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 8

Battery anode and Battery cathode

Positive and negative connection: the battery modules are connected in parallel through the connecting terminals, and finally the Controller module is connected in parallel. The power cable adopts waterproof connector. When connecting the power plug, its corresponding interface must be aligned.
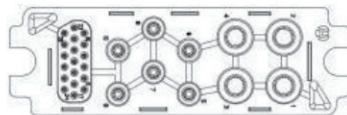
The waterproof box

To open the water-proof box of battery module, users need to loosen the screws on both sides firstly, and then users need to press down the pick which is in the middle lower part of the waterproof box. The outer cover can be opened in that way.

3.4. Inverter

3.4.1 Supported brands

At present, the energy storage products of our company have completed matching tests with some series inverters of the following brands, and we will continue matching tests with inverters of other companies. Please check our official website for the latest list of supporting brands.

3.4.2 Inverter matching list

The list tab only lists the inverter manufacturers one of the same series products, general inverter manufacturers in the same series of other products, the communication protocol are the same, so our battery can be communicated with the other products of same series inverter, if encounter a series of products can't communication, please contact us.

The following inverter matching list may not be up to date. The list may change according to the software version upgrade, and the reference manual may does not change immediately according to the software version upgrade. Therefore, if the user wants to get the latest inverter matching support, please browse our official website to check the relevant documents.

The inverter manufacturer may upgrade its software version, which may cause problems in the communication between our battery and the inverter. Therefore, before communicating with the inverter, please confirm whether the software version of the inverter is consistent with the list. If not, please contact us.

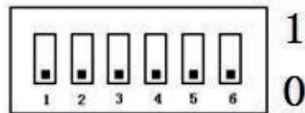| Inverter			Communication mode
Brand	Type	Protocol Version	
DEYE	SUNSYNK-5K-SG01LP1	V1.5	CAN
Growatt	SPF 12KT HVM	V1.22	RS485
	SPH3000	V1.26	CAN
Goodwe	GW5048-EM	V1.5	CAN
GreenCell	PV1800 VHM	V1.04.04	CAN
Li_PLUS	ZRStandard	V1.2	CAN
Must	PV1800 VHM	V1.04.04	CAN
Sol-ark	Sol-ark-12k	V1.31	CAN
Studer	Xtender-XTH-8000-48	V1.0.3	Xcom-CAN
Sofar	HYD5000-ES	V6.0	CAN
Solis	RHI-5K-48ES	V1.2	CAN
SMA	S16.0H-12	V2.0	CAN
Sermatec	SMT-5K-TL-UN	V1.2	CAN
Schneider	Conext TM Gateway	V2.0	CAN

Victron	MultiPlus-II	V6.0	CAN

3.4.3. Inverter protocol dialing switch

ADD Switch: 6 ADD switches, "0"and "1", refer to picture below.
When the host is connected to the inverter, the host computer needs to communicate. Hardware address configuration is required on the host, and the hardware address can be set through the dial switch on the board.

1. Inverter protocol setting function of dial switch 0 ~ 28: The inverter communication protocol can be changed directly by setting the dial switch, the definitions are shown in the following table.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	OFF	OFF	OFF	OFF	OFF	OFF	Monitoring Software setting mode
2	OFF	ON	OFF	OFF	OFF	OFF	Studer_Xtender
3	ON	ON	OFF	OFF	OFF	OFF	Sofar_LV
4	OFF	OFF	ON	OFF	OFF	OFF	Solis_LV
5	ON	OFF	ON	OFF	OFF	OFF	Goodwe_LV
6	OFF	ON	ON	OFF	OFF	OFF	Victron_color control
7	ON	ON	ON	OFF	OFF	OFF	SMA_LV
8	OFF	OFF	OFF	ON	OFF	OFF	Sermatec_LV
9	ON	OFF	OFF	ON	OFF	OFF	Reserved
10	OFF	ON	OFF	ON	OFF	OFF	Growatt_SPF
11	ON	ON	OFF	ON	OFF	OFF	Li_PLUS
12	OFF	OFF	ON	ON	OFF	OFF	Schneider_Gateway

13	ON	OFF	ON	ON	OFF	OFF	SOL-ARK_LV
14	OFF	ON	ON	ON	OFF	OFF	Phocos-AnyGrid
15	ON	ON	ON	ON	OFF	OFF	AFORE-LV
16	OFF	OFF	OFF	OFF	ON	OFF	Voltronic Power
17	ON	OFF	OFF	OFF	ON	OFF	DEYE
18	OFF	ON	OFF	OFF	ON	OFF	Growatt_SPH
19	ON	ON	OFF	OFF	ON	OFF	Reserved
20	OFF	OFF	ON	OFF	ON	OFF	Reserved
21	ON	OFF	ON	OFF	ON	OFF	SAJ-LV
22	OFF	ON	ON	OFF	ON	OFF	SMA-LV
23	ON	ON	ON	OFF	ON	OFF	Reserved
24	OFF	OFF	OFF	ON	ON	OFF	Fronius
25	ON	OFF	OFF	ON	ON	OFF	Lux
26	OFF	ON	OFF	ON	ON	OFF	Reserved
27	ON	ON	OFF	ON	ON	OFF	GreenCell
28	OFF	OFF	ON	ON	ON	OFF	Reserved
29	ON	OFF	ON	ON	ON	OFF	Must
30	OFF	ON	ON	ON	ON	OFF	MEGAREVO-LV
31	ON	ON	ON	ON	ON	OFF	Aiswei-LV

3.4.4. Connection with inverter

This section will introduce how to connect the different brands inverter with our products. Inverters manufacturers may upgrade their products, resulting in hardware communication interface changes. If communication is not possible in the application according to the following wiring method, please contact with us.

The CAN/RS485 communication port of CENTRAC relates to the communication interface of inverter.

Connect to the DEYE inverter	Connect to the Goodwe inverter
Connect to the Growatt-SPF inverter	Connect to the Growatt-SPH inverter
Connect to the GreenCell inverter	Connect to the Must inverter
Connect to the Sol-ark-12k inverter	Connect to the Sofar inverter
Connect to the Solis inverter	Connect to the SMA inverter
Connect to the Sermatec inverter	Connect to the Studer inverter

Connect to the SAJ inverter	Connect to the Victron inverter
Connect to the Lux power inverter	Connect to the Afore inverter

a. If you are using the pin order select box, please refer to the table above to set the dial switch, according to the inverter brand.

b. For example, if you want to match a Deye inverter, you should dial 4 high and 5 low on the CAN side as shown in the following figure.
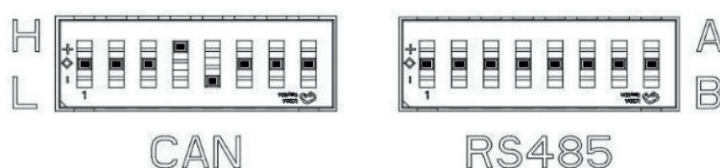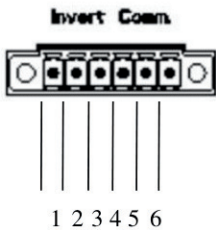
c. If the inverter brand is not shown in the table, please refer to the inverter manual or consult BlauHoff's engineer.

NOTE:

● *The above CAN and RS485 communication connections are not connected the ground wire, in the application of relatively large interference, it is recommended to connect the ground wire, the ground wire connection method is a single-ended shielding line.*
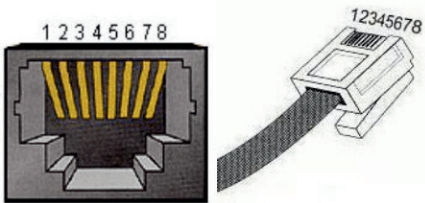
3.4.5 Inverter CAN/RS485 communication port

Inverter CAN/RS485 communication port: (3.81mm port) follows can protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with External inverter PC and other equipment.

Port definitions	6Pin	Function
Invert Comm. 1 2 3 4 5 6	1	RS485-B
	2	RS485-A
	3	RS485 -GND
	4	CAN-L
	5	CAN-H
	6	CAN -GND
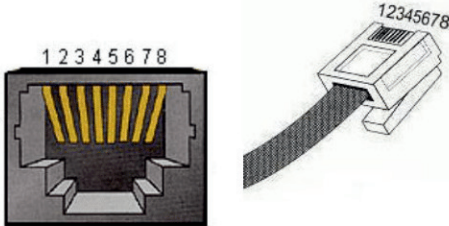
Inverter RS485 communication port

The rear panel RS485 communication port: (RJ45 port) follows can protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with External inverter PC and other equipment.

Port definitions	RJ45 Pin	Function
	1	RS485-B
	2	RS485-A
	3	RS485-GND
	4	NC (NO connect)
	5	NC (NO connect)
	6	RS485-GND
	7	RS485-A
	8	RS485-B

Inverter CAN communication port

Rear panel CAN communication port: (RJ45 port) follows can protocol and RS485 protocol. For the output system information, the system master uses this interface to communicate with the external inverter PC and other equipment.

Port definitions	RJ45 Pin	Function
	1	CAN-H
	2	CAN-L
	3	CAN -GND
	4	NC (NO connect)
	5	NC (NO connect)
	6	CAN -GND
	7	CAN-H
	8	CAN-L

3.5 Power on and power off the whole cluster

To power on the whole cluster, user needs to set address dial switch of controller and battery module at first. Users need to up-toggle the rightmost resistance switch which is "6" in.

Imped.SET as well.

And then user need to toggle switch of the battery module and press on power button of the main controller.

In the third step, user needs to observe the screen of the controller. If there is no reappearing pear on the screen and the number of modules is correct, the battery can operate normally. If there are any errors, please detect the battery again according to status code which user can find in 3.2 section.

To power off the cluster, user need to press on the power button again. Make sure the light extinguished after pressed the button.

3.6. Automatic Matching Identification Function of Dial Switches 56 ~ 88:

Special functions of the inverter dip switch: Different dip switches have special functions.

Code	Dial Switch	Mode	Explanation	Remarks
56		Wi-Fi Config Mode	The hotspot of the device will be turned on under this mode and will be off after exiting this mode. 0 means the hotspot is being turned on 1 means the hotspot is on and you can find it on your phone 2 means the Z-Cloud APP has connected to the device 3 means the Wi-Fi name and password has been received from the APP	1) It may take up to 1 min from 0 to 1 2) It will go back to 0 if no phone is connecting to the hotspot for too long, you need to exit and enter this mode again 3) When you push Wi-Fi info from the APP, the screen will show 3 for 1 second and then jump to 0 quickly, this is normal.
60		Wi-Fi Status mode	Check the WIFI status: 0 means the device is not connected to any Wi-Fi router 1 means the device is connected to the Wi-Fi router 2 means the device is connected to the server	1) It may take up to 1 min from 0 to 1 2) It may take up to 5 min from 1 to 2
61		Info Mode	The Screen will show the hardware and software version of the EMS, BMS and Modules 101 means EMS 102 means BMS 1~8 means module 1~8	1) only works on Gen3 BMS
62		BMS Detection mode	Let the master BMS detect how many BMS is installed	1) detection may take up to 1 min 2) please wait for at least 25 seconds before changing back to normal mode, otherwise it won't be affected.
63		Module Detection mode	Let the BMS detect how many modules is installed	1) detection may take up to 1 min 2) please wait for at least 25 seconds before changing back to normal mode, otherwise it won't be affected.
80	No need to set	Update Mode	The BMS is being updated, the process will be indicated from 1 to 100	It may take up to 1 min
81	No need to set	Update Mode	Module 1 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
82	No need to set	Update Mode	Module 2 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
83	No need to set	Update Mode	Module 3 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
84	No need to set	Update Mode	Module 4 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
85	No need to set	Update Mode	Module 5 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
86	No need to set	Update Mode	Module 6 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
87	No need to set	Update Mode	Module 7 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
88	No need to set	Update Mode	Module 8 is being updated, the process will be indicated from 1 to 100	It may take up to 4 min for each module
70	No need to set	Download Mode	Downloading the firmware for EMS, the process will be indicated from 1 to 100	It may take up to 15 min for the downloading, depending on the internet condition.
71	No need to set	Download Mode	Downloading the firmware for BMS, the process will be indicated from 1 to 100	It may take up to 15 min for the downloading, depending on the internet condition.
72	No need to set	Download Mode	Downloading the firmware for Module, the process will be indicated from 1 to 100	It may take up to 15 min for the downloading, depending on the internet condition.

4.Safe Handling of Lithium Batteries Guide

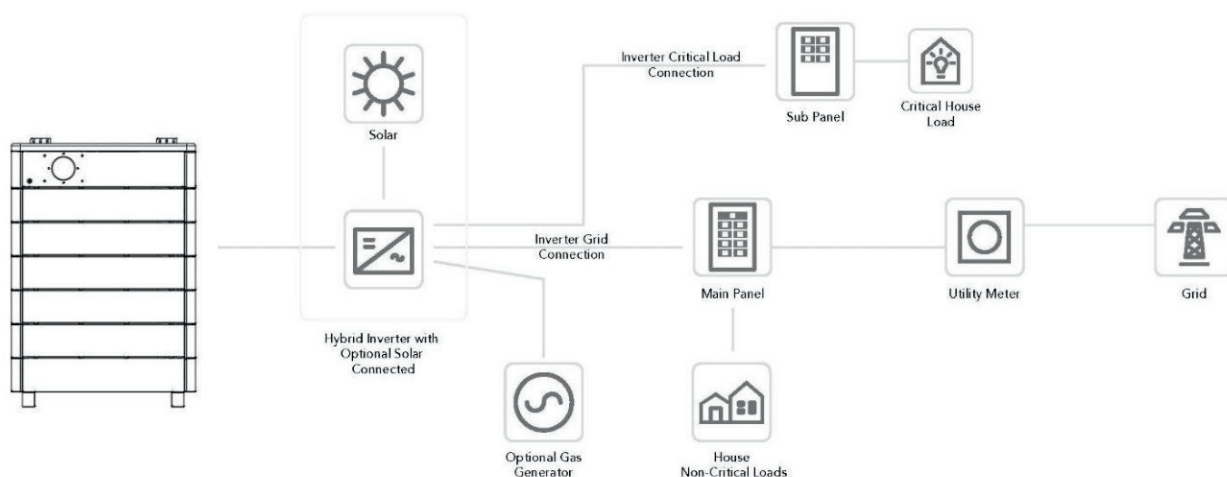## 4.1. Schematic Diagram of Solution

Figure 4.1. Schematic diagram of solution

4.2. Be Familiar with system

Be careful when unpacking the system. The whole system is heavy. Don't lift it with a pole. There are sliding wheels under the system to move. The weight of the battery can be found in the chapter "specifications".

Familiar with batteries. The battery poles are located on the right side of the battery. The battery polarity is shown on the left side of the battery. The positive pole is represented by "+" and the negative pole by "-".

Figure 4.2. Side view of the whole system

4.3. Precautions before Installation

Before installation, be sure to read the contents in Chapter 1 Safety Precautions, which is related to the operation Safety of installation personnel, please pay attention to.

4.4. Safety Gear

It is recommended to wear the following safety gear when dealing with the battery pack:

| Insulated gloves | Safety goggles | Safety shoes |

4.5. Tools

The following tools are required to install the battery pack:

| Wire cutter | Cable clamp | Screwdriver |

M12*120 Embedded Expansion Bolts × 4 Expan

M6*80Embedded Expansion Bolts*6

NOTE:

●*Use properly insulated tools to prevent accidental electric shock or short circuits.If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.*

5.Installation
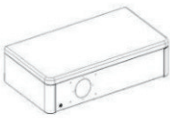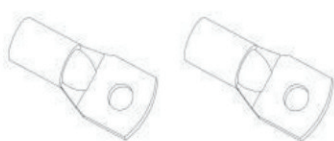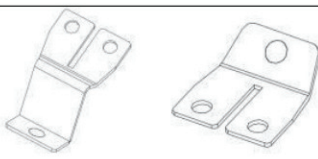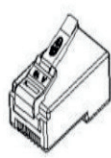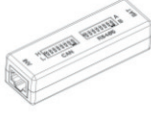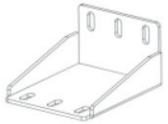
5.1. Package Items

Unpacking and check the Packing List:
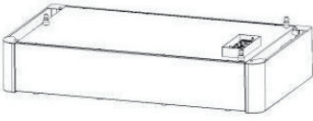
1）Packing List

After receiving the complete system, please check to ensure that all the following components are not lost or damaged Broken.

The required form of components for master and base installation is given below.

Main Controller case×1	Base	Battery terminal × 2
Controller fixing bracket×2	M8*18x2	M5*16x6
M4*10x8	M3*12x3	User's manualx1
Positive and negative terminals×1	Registered jack × 2	RJ45 wire for paralleling × 1
RJ45 wire for Sol-Ark inverter × 1	Antenna × 1	Cable × 1
Pin order select box (optional) × 1	Internal 6-angle wrench × 1	Limit bracket × 2

The required form of components for battery module installation is given below.

Battery case	Fixed frame
M3*12 × 3	M4*12 × 4
Side panels × 2	

The form below indicates the screwdriver and torsion for corresponding screw:

Screw type	Screwdriver	Torsion
M3×12	5mm cross screwdriver	0.55±0.055 N.m
M4×10	5mm cross screwdriver	1.20±0.12 N.m
M5×16	5mm cross screwdriver	2.80±0.28 N.m
M8×18	M8 sleeve	12±1.2 N.m

2）Connector

Each system will be equipped with a positive connector and a negative connector. The two connectors are not connected to the cable, and users can wire according to the actual application needs.

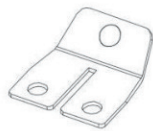Positive connector   Negative connector

| Inverter Power	Quantity of Battery Modules	Cable specification	
		AWG	mm^2
5kW	1	4	25
9kw	2	1/0	50
12kw-14kw	3	3/0	70
15kw	4-8	4/0	95

● *When installing the cables for the first time, check how much heat the cables generate. See the Power Pack LV table and the Inverter table for details.*

● *One battery cluster can only support a maximum of 15kW. When the inverter is greater than 15kW, multiple PowerPack clusters can be used. Please consult the Blauhoff team for specific solutions.*

● *Safety and compliance with regulations require the installation of independent DC overload protector or disconnecting device between battery and inverter. Even if disconnecting devices are not required in some applications, overload protection is still required. Refer to the table below for typical amperes as the required fuse or circuit breaker standard. Ring terminal*

Warning! All wiring must be performed by professionals. ⌐P¬̣SEP⌐ *warning! It is very important to connect the battery with proper cable for the safe and efficient operation of the system. To reduce the risk, use the correct cable and terminal sizes recommended below.*

3）Each system will be equipped with a positive terminal and a negative terminal. The two connectors are not connected with cables, so users can connect wires according to actual application needs.
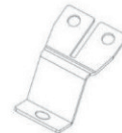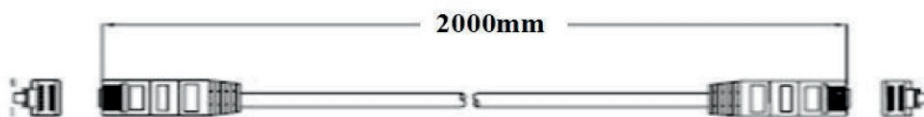

Positive connector   Negative connector

4）Communication connecting line between system and inverter (Optional)

5）Pin order select box (optional)

Set the pin order of the communication cable of battery and inverter, cooperate with 2 standard network cable.

5.2. Installation Location

Make sure that the installation location meets the following conditions:
◆ The area should be avoided with touching water.

◆ The -P version is required if it will be installed in the place close to the sea.

◆ The floor is flat and level.

◆ There are no flammable or explosive materials.

◆ The ambient temperature is within the range from 0°C to 50°C.

◆ The temperature and humidity are maintained at a constant level.

◆ There is minimal dust and dirt in the area.

◆The distance from heat source is more. than 2 meters.

◆The distance from air outlet. of inverter is more than 0.5 meters.

◆Do not install outside directly.

◆Do not cover or wrap the battery case or cabinet.

◆Do not place at a child or pet touchable area.

◆The installation area shall avoid of direct sunlight.

◆There are no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid of high salinity, humidity, or temperature.

◆For household installation, only single row unit installation is allowed, and the installation capacity is limited to 40KWH.

◆Non-household application scenarios can be installed in multiple rows units, with each row installed at a spacing of 1.5 meters and above.

⚠ **CAUTION**

If the ambient temperature is outside the operating range, the battery pack stops operating to protect, itself. The optimal temperature range for the battery pack to operate is 0°C to 55°C. Frequent exposure, to harsh temperatures may deteriorate the performance and life of the battery pack.

5.3. Installation

A. Stack the whole cluster

(1) According to the current number of modules, make sure the corresponding dimensions. The figure below indicates specific dimensions.
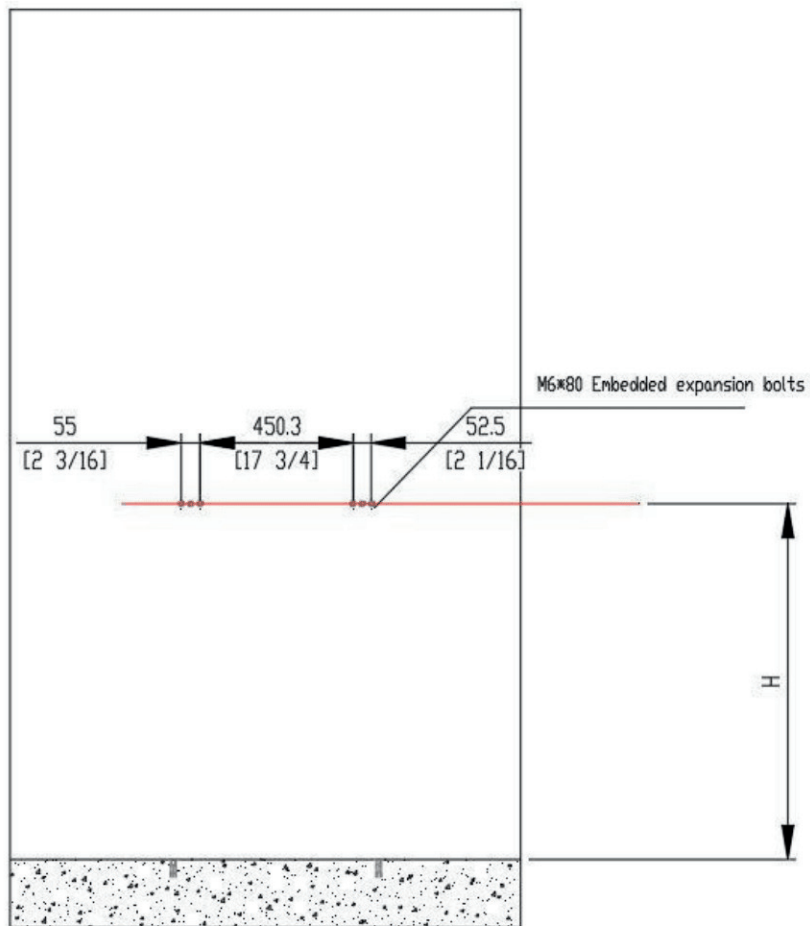
Number of Modules	Height in inch (±0.197inch)	Height (±5mm)
2	30.5	775.5
3	35.9	911.0
4	41.2	1046.5
5	46.5	1182
6	51.9	1317.5
7	57.2	1453
8	62.5	1588.5

(2) Pre-embed the expansion bolts based on the dimensions as the graph below showed.

176.5 ±5MM
[6 15/16]

310
[12 3/16]

603
[23 3/4]

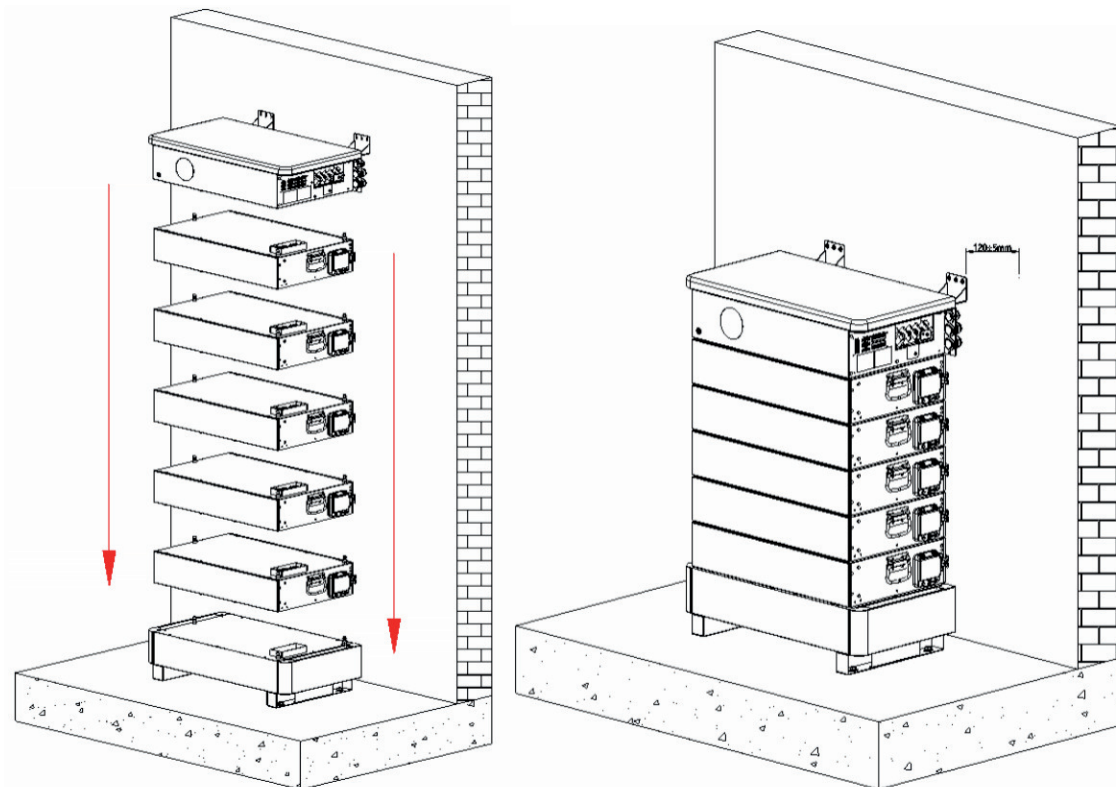M12*120 Embedded expansion bolts
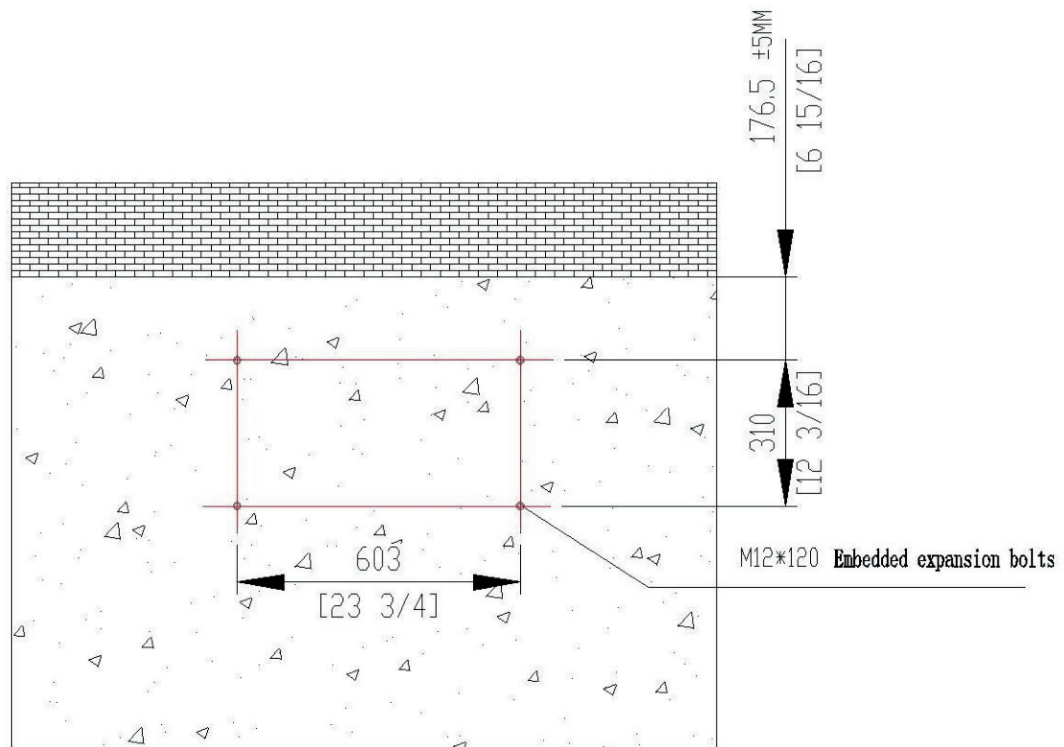
(3) Set down the base, make sure that the base is 120mm away from the wall first, and then lock the screws.

120 ±5MM
[4 3/4]
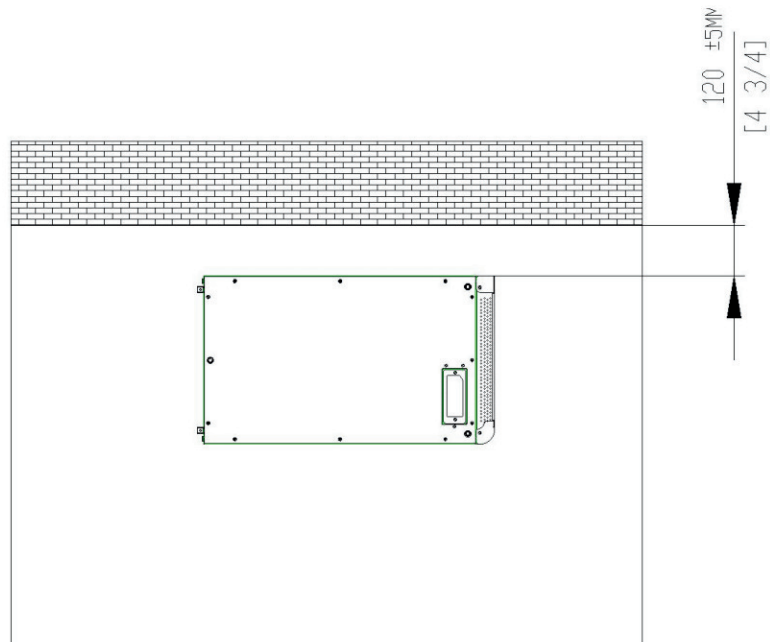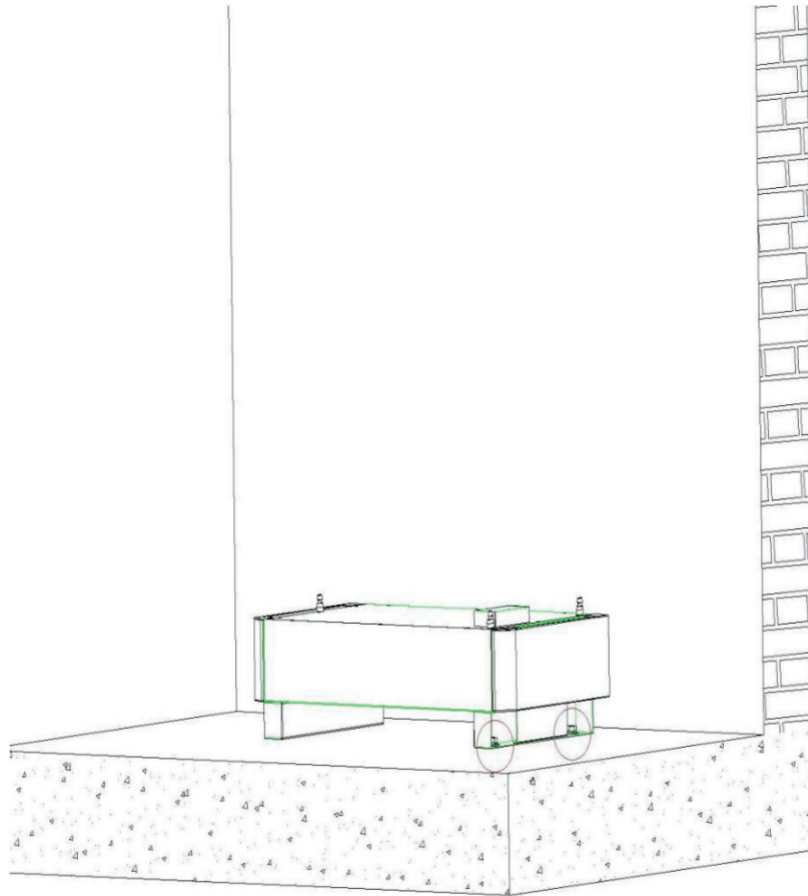
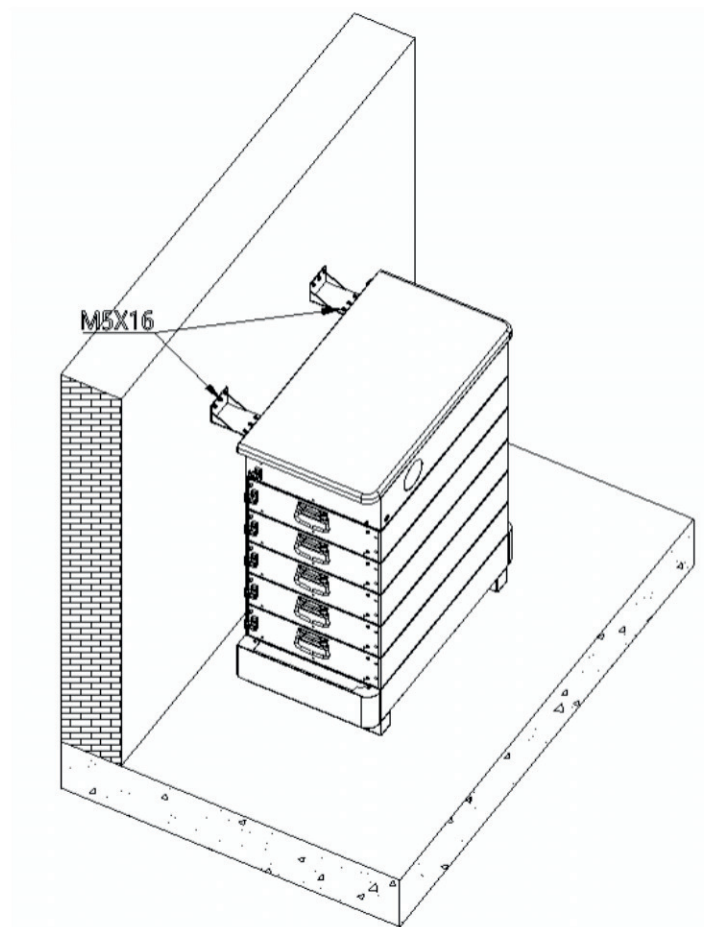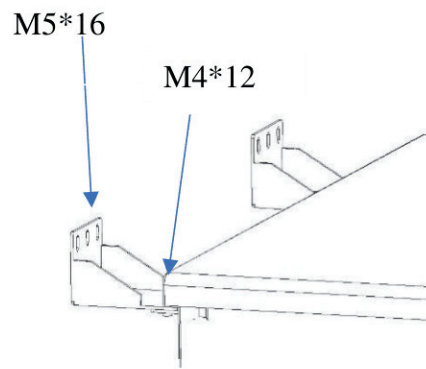(4) Align and stack the required modules and cover the controller finally.

(5) Assemble and lock the controller fixing bracket according to the position of holes on the wall as the graph below shows. After this step, check whether the cluster is 120±5mm away from the wall and whether the height of cluster can match the holes on the wall one more time.

M5*16

M4*12

M5X16

(6) As for grounding, user needs to connect the grounding wire to the controller fixed bracket which be indicated as the graph shows below.
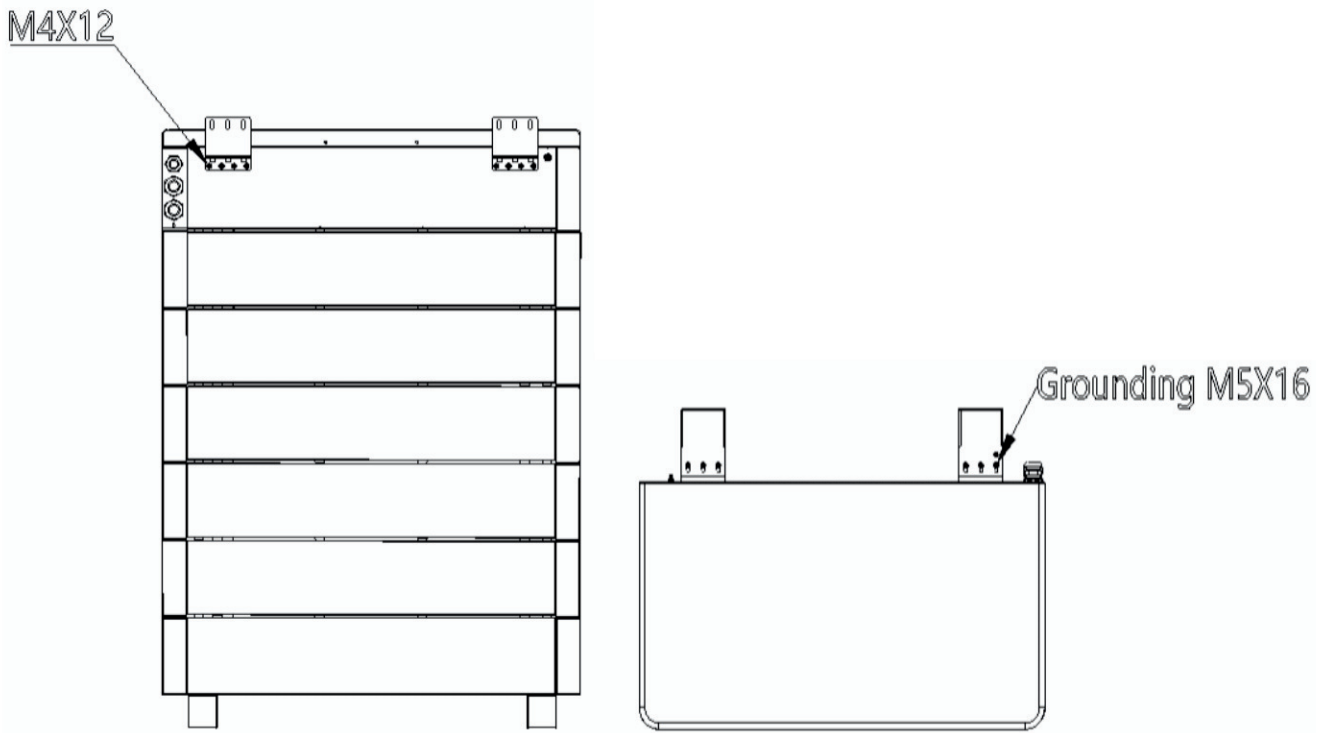
(7) Turn on the battery's power and controller's power and wait for the screen to return to normal (soc and soh are not 0, and all the battery icons are solid, no blinking and error message, etc.).Turn the dial address to 63 which users can find in section 3.4 on main controller to automatically identify the inverter and set the protocol after it is turned on. Confirm that thestacking is successful and turn off the main control power and the breaker of PDB.

(Power Switch)
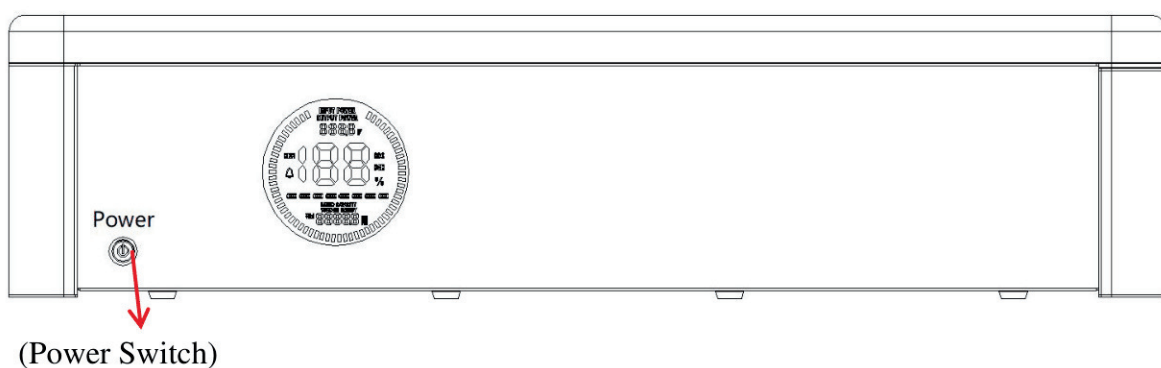
NOTE:
●*Do not turn off the power of slave modules.*

●*Before starting the system, the operator should strictly check the connection terminal to ensure that the terminal is firmly connected, check whether the battery address is set correctly, and whether the inverter switches are in the off state. Do a good job in safety protection and turn on the inverter in the following order, when installing the system, the battery module bottom insulation skin remove the lower connector of the battery module is covered by a PC piece, which should be torn off before installation.*

(8) Make sure that the controller power is off, connect the battery to the inverter, pay attention to the distinction between positive and negative electrodes and the connection of the communication cable, and connect the WIFI antenna. After confirming that the connection is correct, communicate with the inverter and check whether the functions of charging and discharging is normal. The details of connection can be found in chapter 3.

(9)   Please install the fixing bracket on the left side of the system. Take out the fixing bracket and screws from the accessory bag.

First, place the fixing bar in the corresponding position between the main control and the battery module. According to the hole position indication, pass the M3 screw through the holes of the fixing bar and the module, and then tighten it with a screwdriver.

Then align the two fixing brackets with the side holes. From top to bottom, tighten the side holes of the battery module one by one with M4 screws.

After the above steps, the fixing bracket is installed. Please check whether each connection part is firm to ensure that the equipment is installed firmly, safely and reliably.
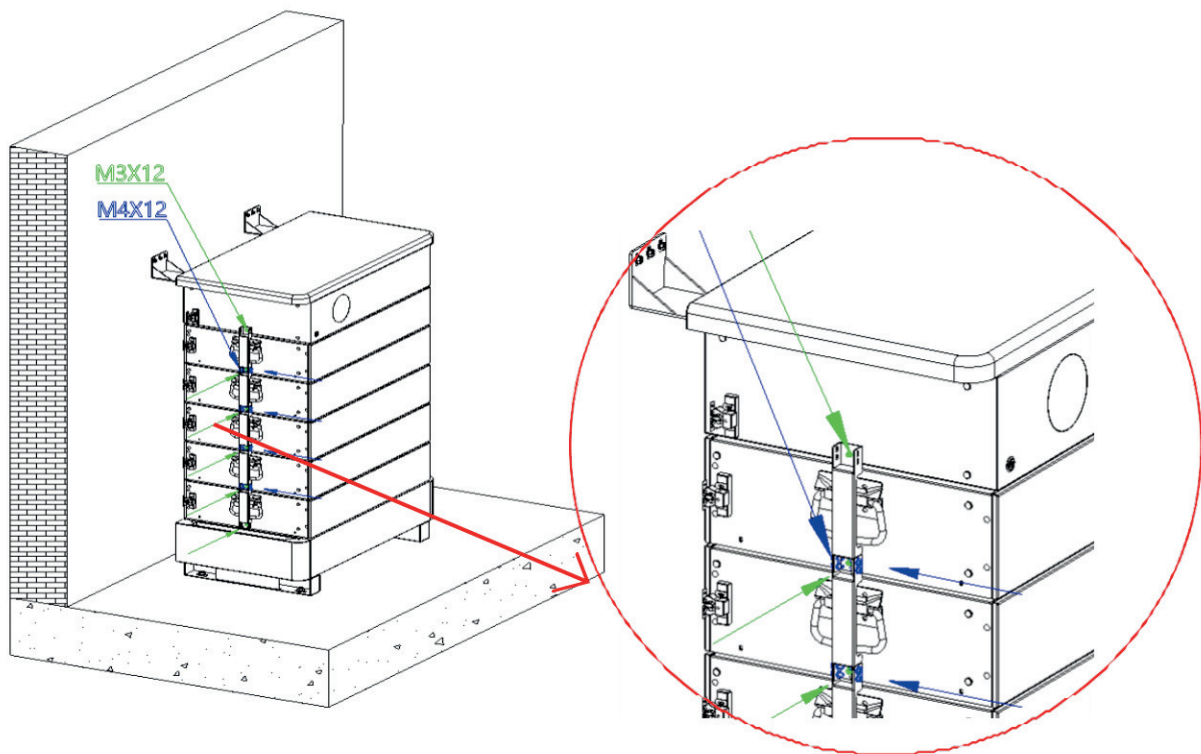
(10) After confirming that all the steps mentioned above are correct, secure the side cover with screws.
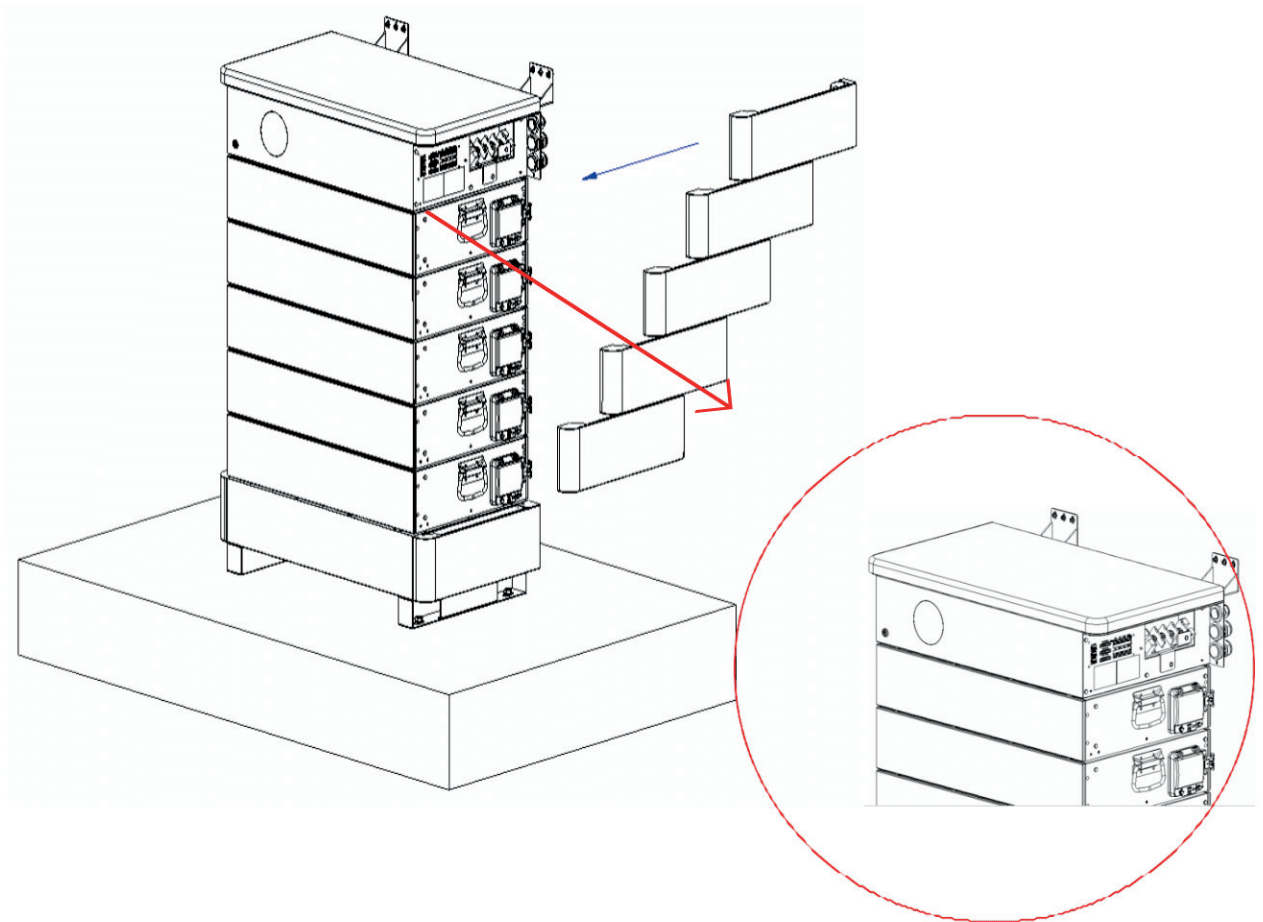
5.4. Parallel connection (Optional)

(1) Check all connection terminals and communication lines carefully.

(2) The master control address shall be set to "1" for communication between the master control and the inverter (a host system can be configured with up to 15 slave systems). Turn off the Controller switch before connecting the inverter.
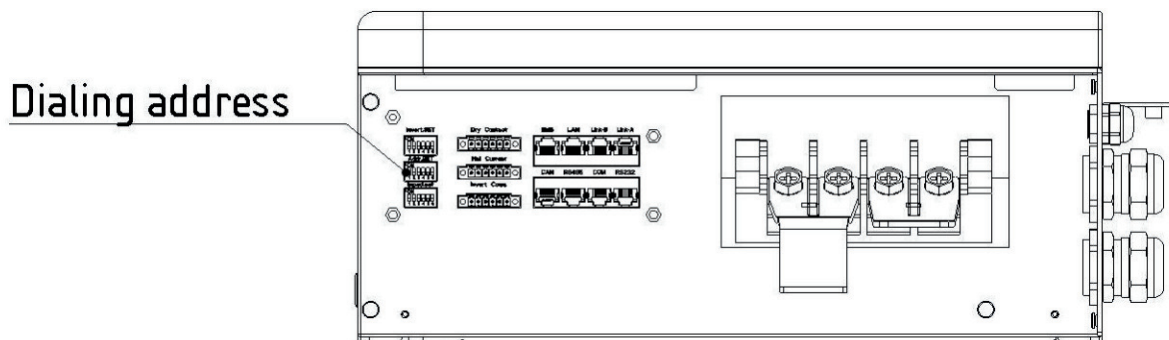
(3) Connect the parallel port of the slave to the communication cable of the host, connect the positive pole of the slave to the positive pole of the host, connect the negative pole of the slave to the negative pole of the host, connect the parallel cable of the slave to the host, and finally connect the communication cable of the host to the frequency converter.

Inverter
Communication

Inverter Positive
Inverter Negative
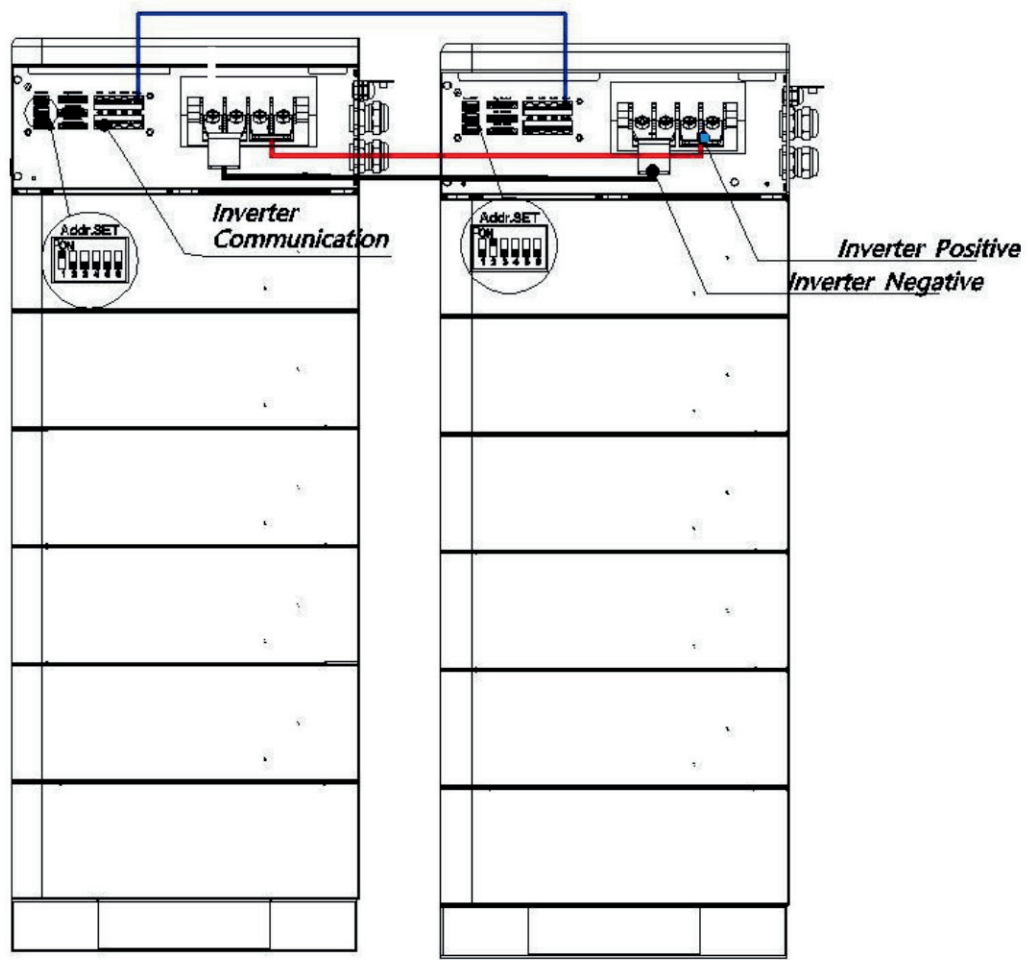
(4) Limit the distance between the two units to be no less than 300mm, and the recommended distance is 500mm.

300mm
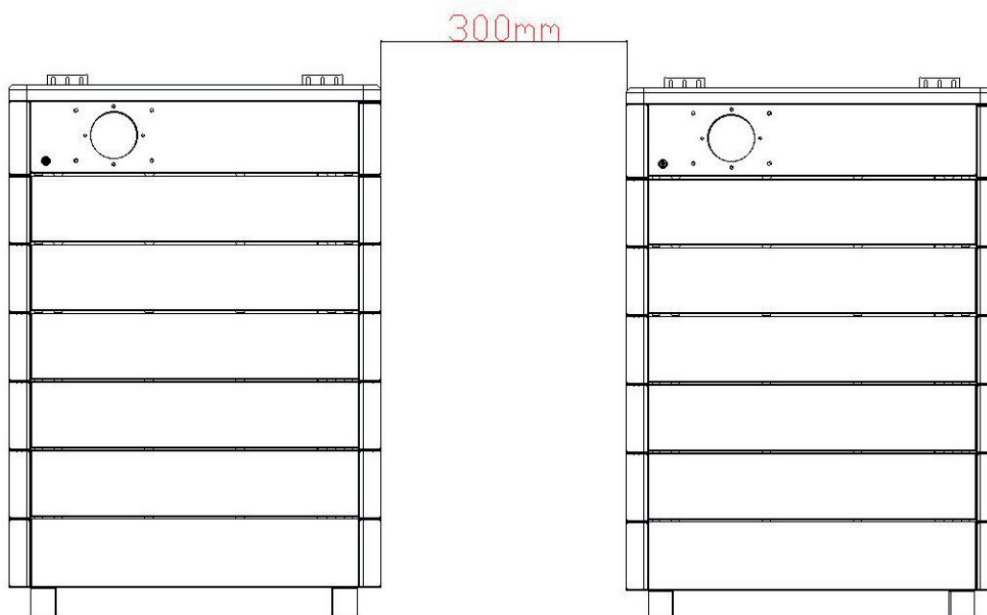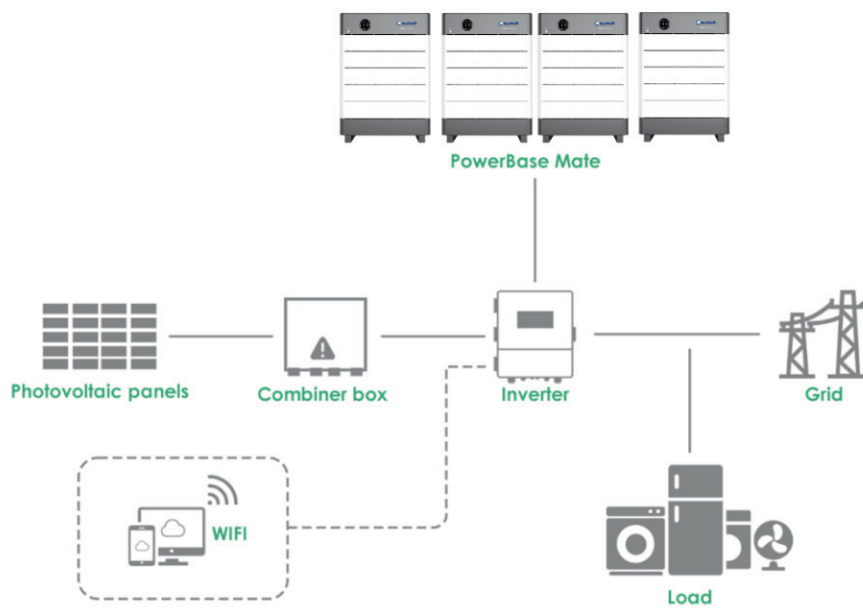
Figure 5.4. Schematic diagram of parallel solution

⚠️ Note: after installation, please do not forget to contact the supplier to register online for full warranty

NOTE:
● In order to avoid current pulse during start-up, the predischarge function should be added to high voltage system. All connected batteries should be turned on first, and then the circuit breaker between high voltage system and inverter should be turned on.
● Circuit breaker shall be installed between high voltage system and inverter to protect system safety. All installation and operation must comply with local electrical standards.

6.Trouble Shooting Steps

6.1. Problem Determination Based On

1) Whether the system can be opened.

2) If the system is turned on, check whether the display is on.

3) If the display goes off, check whether the system can be charged/discharged.

6.2. Preliminary Determination Steps

1) The system cannot be turned on and the system display is not illuminated. If the external switch of the system is turned on and the external power supply voltage exceeds 48V, the system still cannot be started and operated, please contact the dealer.

2) The system can be turned on, but the display shows a fault and cannot be charged or discharged. If the red light is on, it indicates that the system is abnormal. Please check the following values:

a) Temperature: Above 50℃ or under -20℃, the system could not work in.

Discharging Above 50℃ or under 0℃, the system could not work in charging.

b) Current: If current is greater than 300A, battery protection will turn on.

Solution: Check whether current is too large or not, if it is, to change the settings on power Supply side.

c) High Voltage: If charging voltage above 55.5V, battery protection will turn on.

Solution: Check whether voltage is too high or not, if it is, to change the settings on power supply side.

d) Low Voltage: When the battery discharges to 40.5V or less, battery protection will turn on.

Solution: Charge the battery for some time.

Excluding the four points above, if the faulty is still cannot be located, turn off battery and repair.

6.3. The Battery Cannot be Charged or Discharged

1) Cannot be charged:

Disconnect the power cables, measure voltage on power side, if the voltage is 53~54V restart the battery, connect the power cable and try again, if still not work, turn off battery and contact distributor.

2) Unable to discharge:

Disconnect the power cables and measure voltage on battery side, if it is under 44V please charge the battery; if voltage is above 48V and still cannot discharge, turn off battery and contact distributor.

2A - Intern installateurs manual

P. 49 – P. 69

Blauhoff PowerPack LV/HV

User Manual

BLH PowerPack is een stapelbaar accupakket.
Het accupakket bestaat uit een voetplaat, tussenliggende batterijen en BMU
(Battery Management Unit).

Aandachtspunt!
Voordat de powerknop, accuschakelaars en breakers worden geactiveerd,
moeten alle dipswitch instellingen gedaan zijn. Wanneer dit niet juist gedaan is,
kunnen opstartproblemen ontstaan. Vragen hierover, neem contact op met
Blauhoff.

Inhoudsopgave

Opstelling omvormer en PowerPack.

De omvormer en PowerPack moeten vlak naast elkaar staan.

Dat betekent dat PowerPack links van de omvormer staat. De reden is dat de DC kabels een maximale lengte mogen hebben. Foto volgt.

BMU doos uitpakken.

Handige manier om te starten met uitpakken is de doos, waarin Battery Management Unit en de bodemplaat in zitten, ondersteboven neer te zetten. Hierdoor kan begonnen worden met de bodemplaat. De BMU blijft dan nog even veilig in de doos.

Let op: in deze doos zitten nog andere onderdelen. Zoals muurbeugels, extenders etc.

Start met het positioneren van de voetplaat. Zorg dat de voetplaat 12cm van de wand wordt geplaatst. Deze afstand is nodig voor de kabelrouting en de muurbeugels te kunnen plaatsen.
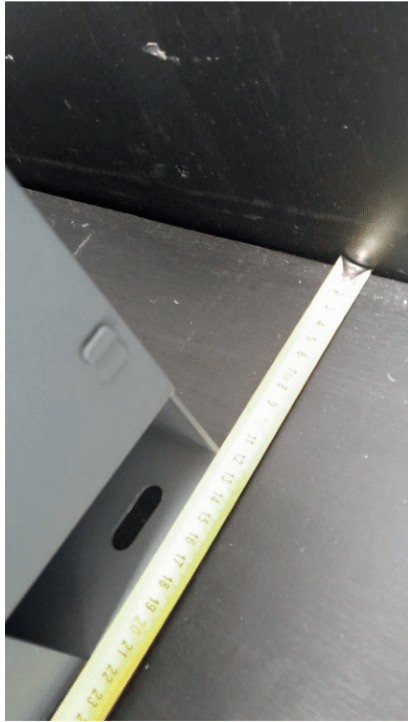
Afdichten voetplaat.

Voor het afdichten van de doorgang in de voetplaat wordt de grote harde zwarte sticker gebruikt van één van de batterijen. Deze sticker zit aan de onderzijde van iedere accu.

Snij deze op maat.

Plaats de harde sticker op de opening en druk deze aan.

Stapelen accu's.

Aan de onderzijde van de accu zit een beschermende sticker. Deze verwijderen.

Op de connector aan de bovenzijde zit een beschermkap. Deze verwijderen.

Klemmen accu's.

De accu's worden op een lichte manier aan elkaar geklemd dmv M3 schroeven.

Klemmen BMU

Duw BMU naar beneden alvorens deze vast te schroeven. Van belang om op blijvende manier contact te maken.

Beugels linkerzijde.

Alleen aan de linkerzijde worden beugels geplaatst aan het accupakket. Zorg dat de beugel geplaatst is zoals op foto. Beugel over de handvaten.

Tip: Maak een ketting van de beugels door bij iedere beugel 1 schroefje aan de zijkant van de beugel te plaatsen.

BMU plaatsen.

BMU is de bovenste unit waarop de DC kabels en communicatiekabel aangesloten worden.

Om te zorgen dat het PowerPack niet kan kantelen moet de BMU middels beugels aan de muur worden bevestigd.

De twee muurbeugels worden aan de achterzijde van BMU bevestigd mbv de bijgeleverde schroefjes.

Voordat de BMU op de accu's wordt geplaatst, is het handig om de kleine beugels alvast te plaatsen. Doe dit door BMU op zijkant te leggen.

Extenders Low Voltage.

Om de dc kabels te monteren zijn extenders bijgeleverd.

DC kabels LV.

DC kabel heeft 2 kabelschoen ogen. Eén met M10/m8 en één met M8.

In ieder geval moet M8 aan de zijde van de accu worden gemonteerd.

Het transparante kapje kan niet meer geplaatst worden.

DC Kabels HV.

Verwijder het rechter zijpaneel.

DC Kabels HV monteren. Gebruik de originele kabel met aangeperst oog.

Transparante plaat weer terugplaatsen.

!! Deze transparante isolatieplaatjes moeten terug geplaatst worden ivm

bescherming tegen aanraking, hoge spanning!

DC Breaker.

Dc-kabels vanaf de PowerPack gaan via de DC breaker naar de omvormer.

Plaats op de soepele kern adereindhulzen voor een juiste montage.

Breek uit de voorgeperforeerde opening of boor deze uit voor de juiste maat.

Bevestig volgens voorschrift de kabel in de behuizing van de breaker.

Dipswitch instellingen Low Voltage (LV).

Op de foto zijn de dipswitch instellingen zichtbaar voor een LV BMU.

Inverter SET: 1-5
Addr SET: 1
Imped SET: 6

Bovenste dipswitch: (inv set)

ON	OFF	OFF	OFF	ON	OFF

Middelste: (addr set)

ON	OFF	OFF	OFF	OFF	OFF

Onderste: (impd set)

OFF	OFF	OFF	OFF	OFF	ON
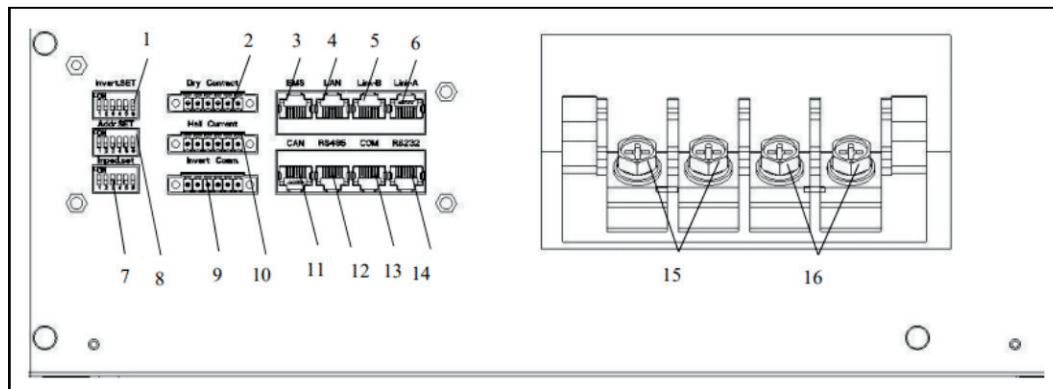
Dipswitch instellingen High Voltage (HV).

Inverter SET: 1-4-6
Addr SET: 1
Imped SET: 1-6

Accu dipswitch LV en HV.

Iedere accu heeft een uniek adres nodig. De dipswitch instelling is binair.

Voor zowel bij HV als LV is de dipswitch instelling gelijk.

De juiste instelling van iedere batterij is nodig om de BMU juist te laten werken.

Te zien is de onderste batterij van 6 stuks. Dipswitch 2 en 3 staat omhoog wat binair 6 betekent.

Zie ook tabel.

#1	#2	#3	#4	#5	#6	
ON	OFF	OFF	OFF	OFF	OFF	Set to the slave Pack1
OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Pack2
ON	ON	OFF	OFF	OFF	OFF	Set to the slave Pack 3
OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 4
ON	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 5
OFF	ON	ON	OFF	OFF	OFF	Set to the slave Pack 6
ON	ON	ON	OFF	OFF	OFF	Set to the slave Pack 7
OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 8

BlauHoff

Inverter BMU-kabel LV en HV.

Aansluitingen op de utp connector.

De communicatiekabel tussen BMU PowerPack en omvormer wordt in de poort (bij LV inv-can) (bij HV can) gestoken, andere zijde van de kabel wordt in de BMS poort van de omvormer gestoken.
Aan de communicatiekabel zitten labels.

Eventueel kun je de juiste zijde van de communicatiekabel ontdekken, zie foto's van de utp connector.
Kijk ook naar onderstaande tekening.
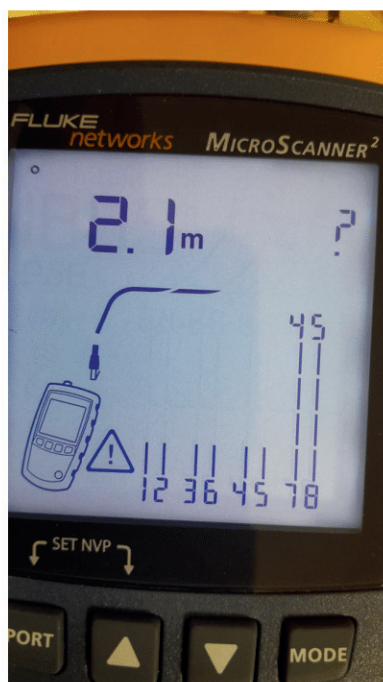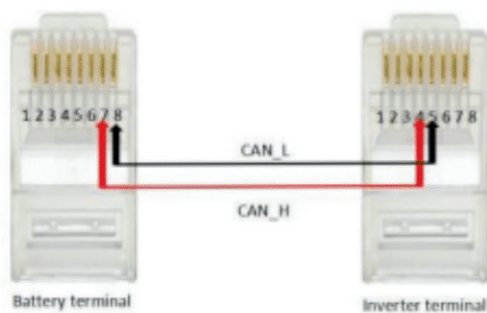
Communicatie kabel BMU PowerPack naar omvormer HV en LV.

Connector BMU.

Wanneer halfbruin en bruin aan de rechterzijde (7&8) van de connector zitten wordt deze zijde in het BMU van PowerPack gestoken.

Connector omvormer.

Halverwege (4&5) de connector, halfbruin en bruin, deze moet in de BMS poort van de omvormer.

Communicatie kabel BMU LV.

Aansluiten in "inv-can"
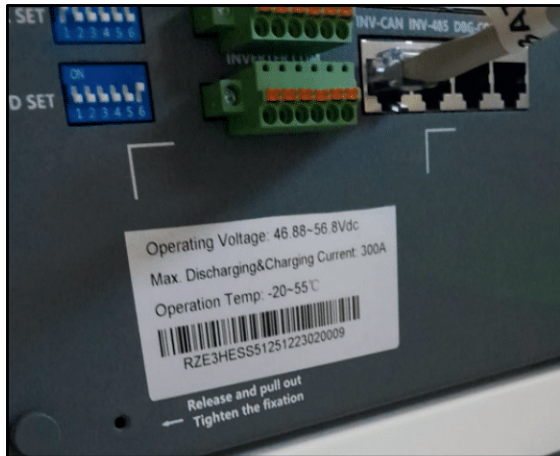
Communicatie kabel BMU HV.

Aansluiten in "can"

Initialiseren/detecteren aantal batterijen HV en LV.

BMU moet weten hoeveel batterijen het pakket bevatten.

De dipswitch aanpassen terwijl BMU in bedrijf is.

Onthouden welke instelling de rode dipswitch heeft, maak bijvoorbeeld foto hiervan.

Zet de dipswitch Inverter SET alles omhoog.
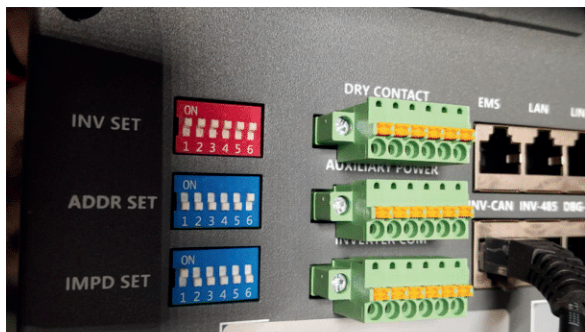
Display laat 63 zien. Na enige tijd komt het aantal batterijen in het display. In dit geval komt het getal 6 in het display te staan.

Wacht minimaal 30 seconden om de dipswitch instelling weer in de originele stand te zetten. Op de foto is de Low Voltage instelling voor de rode dipswitch

In display zijn in dit geval 6 groen accu symbolen te zien.

Tijdens deze setting de BMU aan laten staan. Dus niet uitzetten.

Om te testen of BMU inderdaad de werkelijke hoeveelheid accu's detecteert,
de power uit zetten,
even wachten,
power knop indrukken zodat BMU weer opstart,
check of juiste hoeveelheid accu's zijn gedecteert.

Let op: Wanneer de juiste hoeveelheid accu's niet wordt gedetecteerd, controleer de dipswitch op iedere accu of deze de juiste setting heeft.

WIFI

WIFI Signaal.

WIFI signaal 2,4Ghz. Wanneer initialiseren niet lukt, zorg dat 5Ghz signalen tijdenlijk uit worden gezet.

WIFI antenne LV

Wifi antenne op linker achterzijde van BMU plaatsen / schroeven.

WIFI antenne HV

Wifi antenne kabel met connector monteren aan de zijkant waar ook de HV kabels en dipswitchen zijn gesitueerd.
Voer de kabel door de bovenste wartel naar buiten. De antenne heeft een magnetische voet.

APP Z-Cloud

Om de status van de PowerPack te zien is het downloaden van Z-Cloud noodzakelijk.
Installeer en volg de aanwijzingen van de app.
Gebruik de rode dipswitch voor de instelling, aanwijzing volgt in de app. Aangegeven wordt dat de rode dipswitch op 0-0-0-1-1-1.
In display is dan zichtbaar 56.

Power on/off protocol

Power on

De procedure om complete systeem aan te zetten is van belang.

Te volgen stappen:
- aanzetten omvormer
- wachten totdat deze gereed is
- dc breaker
- batterij switchen moeten aan staan
- power switch BMU

Power off

- omgekeerde volgorde
- niet nodig om batterij switchen uit te zetten

Buitenopstelling

Batterijen hebben baat bij de juiste bedrijfstemperatuur. Zo rond tussen de 10 en 35 graden celsius.
Buitenopstelling met geïsoleerde ruimte en kleine verwarming maakt al een beter klimaat.
Leverbaar zijn heated voor buiten opstelling en non heated voor binnen opstelling.

2B - Cloud Platform & APP Guideline

P. 70 – P. 85

Could Platform&APP Guideline

Blauhoff PowerPack Series is built-in WiFi functionality allows connection to mobile devices and cloud platforms on computers, enabling remote monitoring, OTA upgrades, and letting users track system status, health reports, and fault alarms for worry-free maintenance.

The platform accounts are divided into 4 levels: Distributor, Installers, Installer sub-accounts, and End-user, so that distributor and installers can manage their customer groups separately.

The upper-level accounts can assign devices to the lower-level accounts, and the installers only have management rights to the assigned devices.

Steps:

1. • Login
2. • Create Account
3. • Assign Equipment
4. • Improve Information
5. • Download APP
6. • Battery Distribution Network
7. • Online and Running
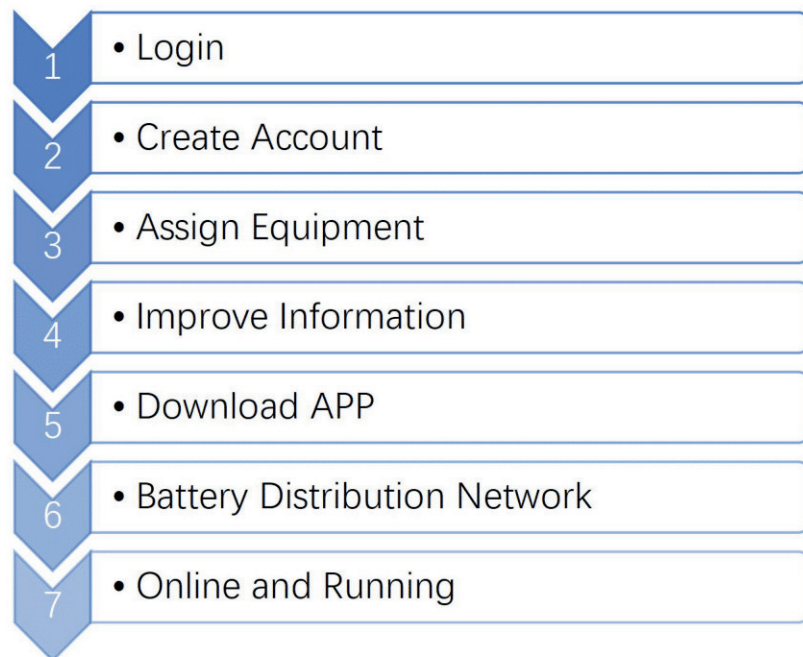
Specific Steps:

1. Login：

Could Platform ENERGR MONITORING website:

https://www.greenenergy-cloud.com/

Login Page: Go to the web link of Cloud Platform, then insert your account and password to check the real-time data.

If you forget the initial password, please contact your installer or distributor.
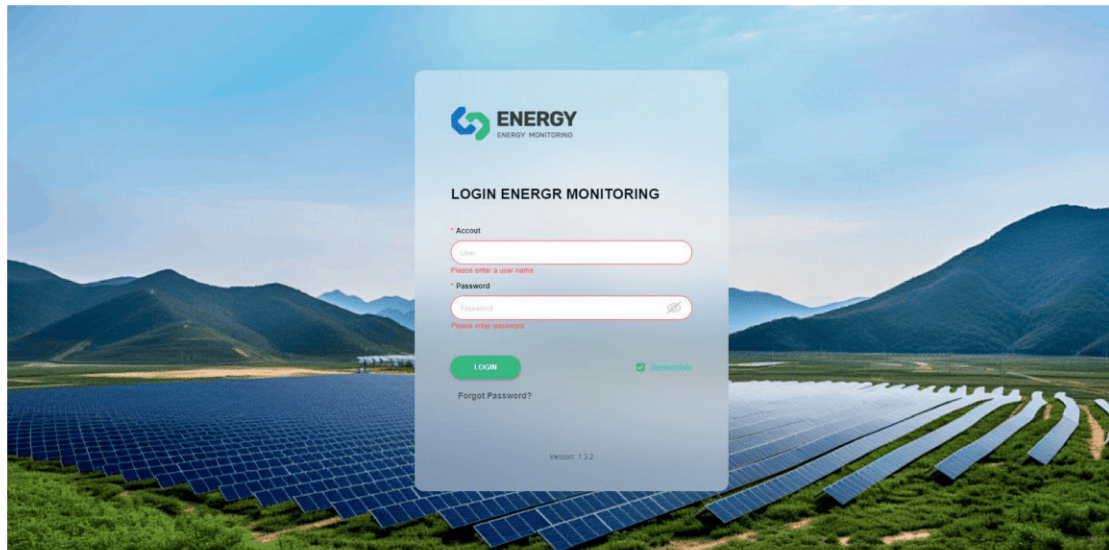
2. Create Account：

For Distributor and Installer account, click User Management to create new user Installer sub-accounts.
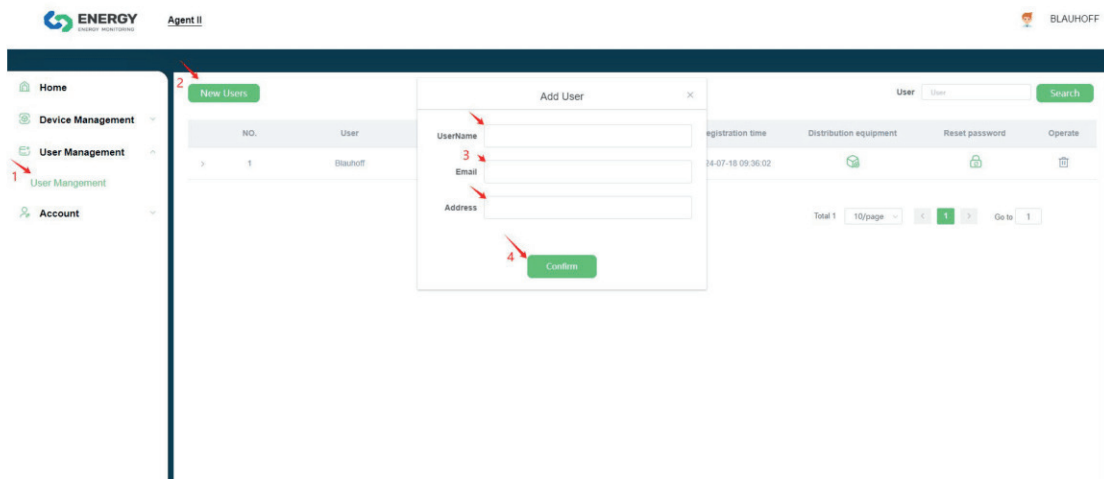
Create a terminal account in the installer sub-account.

Fill in the user's name, E-mail and address, click "Confirm" to automatically generate a End-user account, the default password is 123456789

(Ps. When the installer sub-account has no lower level, it can be used as a terminal account.)
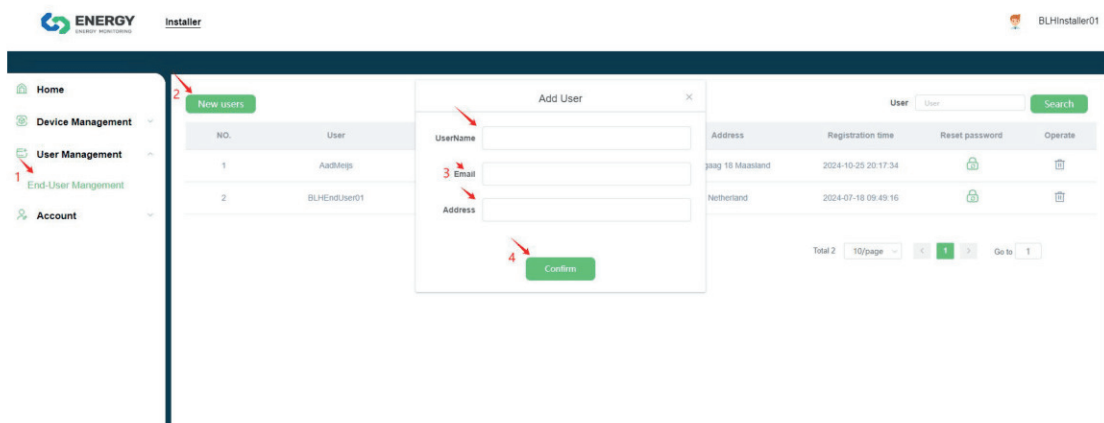
3. Assign Equipment:

For Distributer and Installer account assign equipment to next level, click User Management page and select the responding next level account. Then select the Distribution Equipment button.
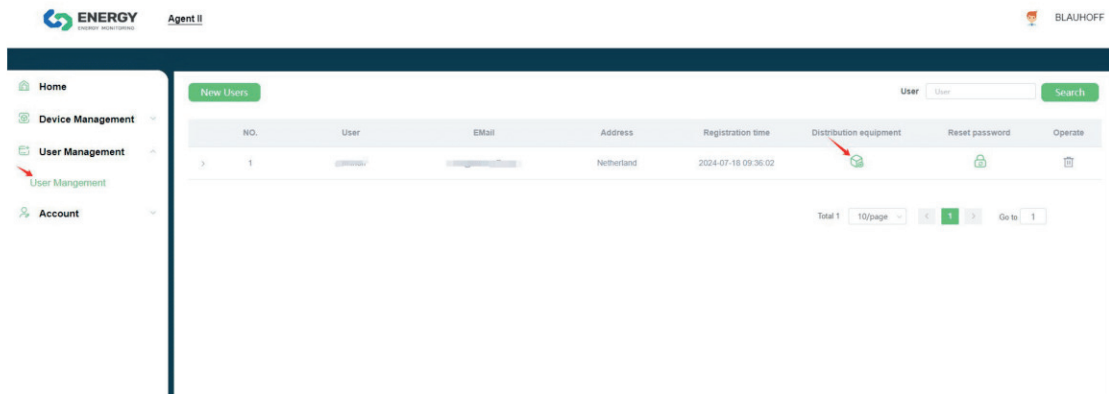
Select the device corresponding to the serial number on the label of the product

master and click Confirm to

assign.
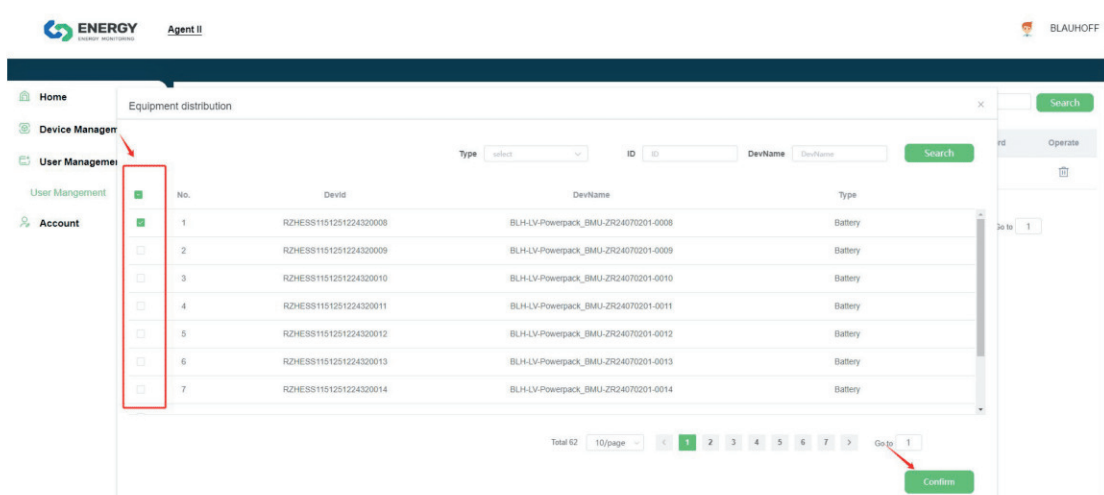
For Installer Sub account, select the Device List page and click the button on the

right.

(PS. The button is gray, indicating that the device has been assigned.)
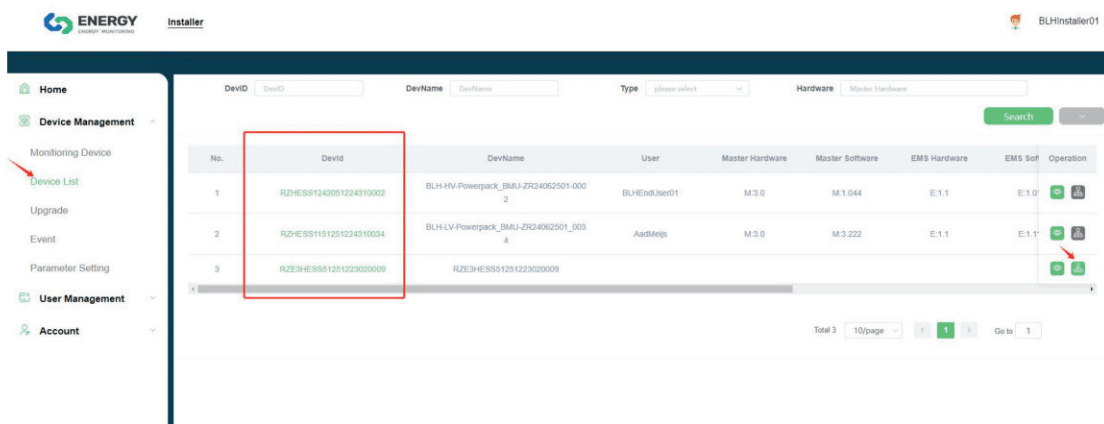
When you turn to the allocation page, select the corresponding user, and click "Confirm".
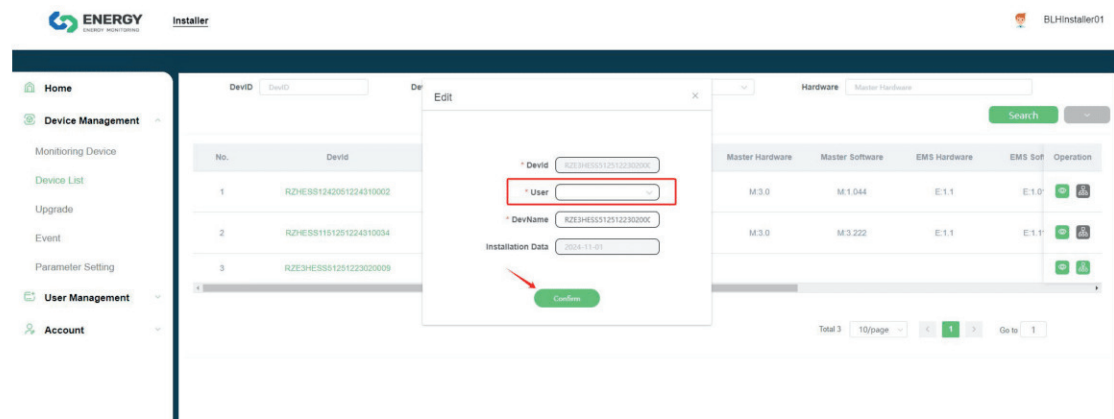
4. Improve Information:

Click on the account personal information, corresponding to enter the country, regional address and e-mail information, click on the confirmation.

5. Download APP

For Android phones, please search and download the Z_Cloud in GooglePlay. Or you can scan the QR code to down load the APP directly.

For iPhone, please search and download the Z_Cloud in APP Store.
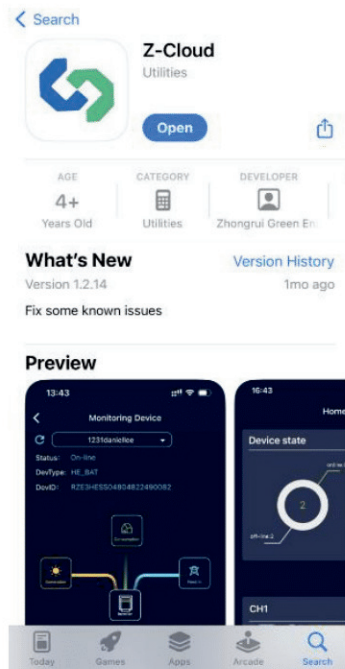
6. Battery Distribution Network:

Click Get Started button. Enter the End-User's account and password to login
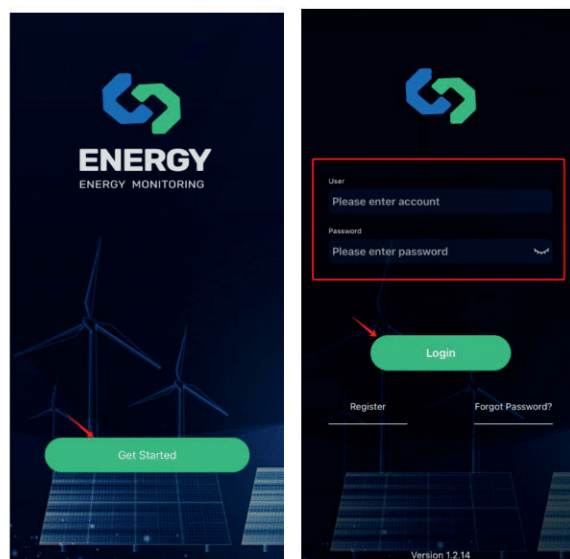
Select "Toolbox" Page and click "Network"
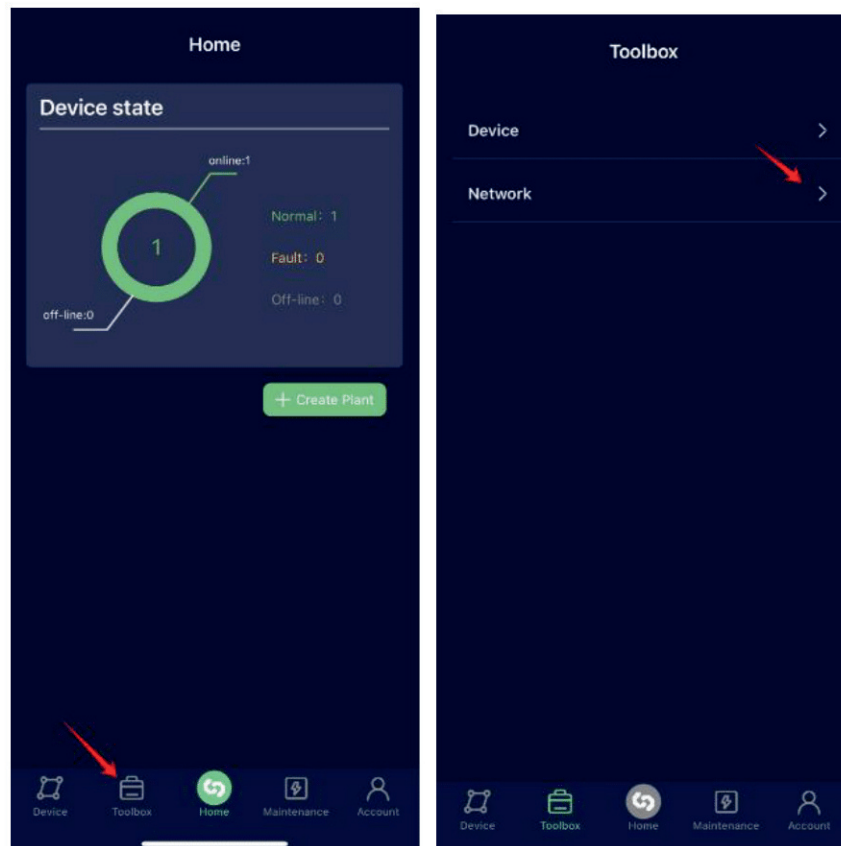
Slecet Wifi Model on Choice Model Page.
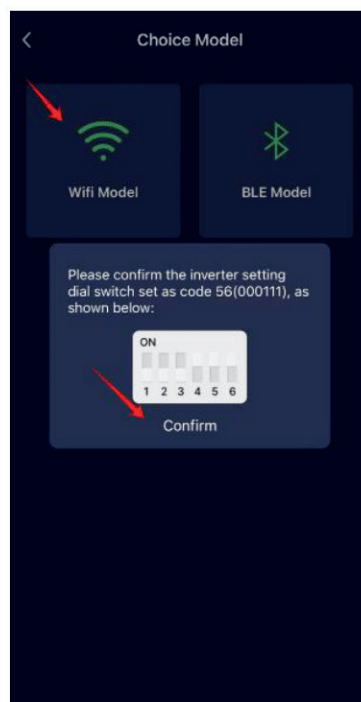
Screw the battery antenna into the antenna connection port firmly.

Power on the battery. Set the inverter dip switch of the battery to 456 on to turn

the battery hotspot.
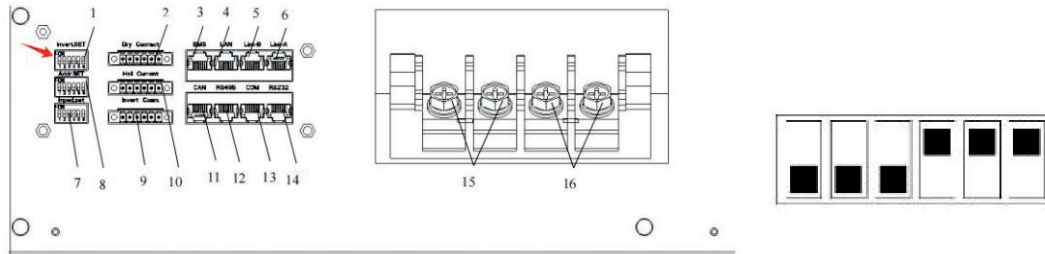
Read the tips and click "Connected, Next Step", and jump to the Wifi connection

page.
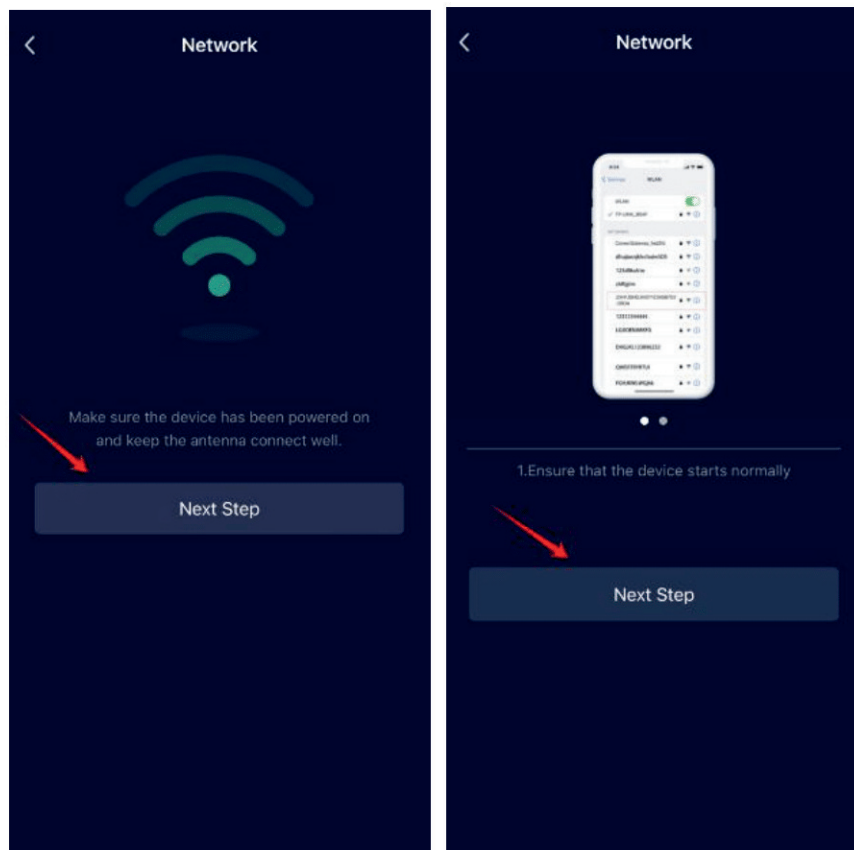
The connection device comes with WIFI, the WIFI name is the Main control serial

number, and the password is **12345678**

After confirming the connection, return to the APP and automatically jump to the

WIFI configuration page.

Enter the on site WIFI name and password, then click "Confirm" to configure

the network. And then you are all set!
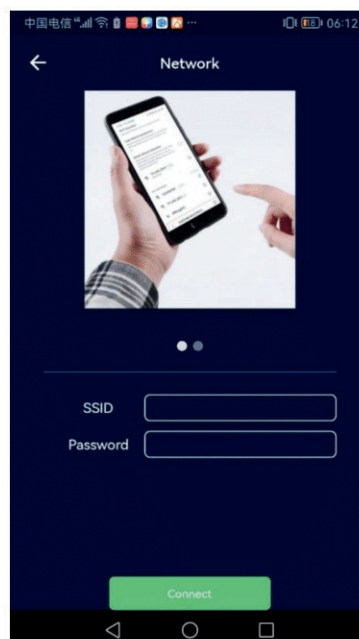
During network configuration, the main control display screen will display the

network configuration status.

"0" means the battery hotspot is being turned on.

"1" means the battery hotspot is on and you can find it on your phone.

"2" means the ENERGR MONITORING APP has connected to the battery.

"3" means the WiFi name and password has been received from the APP.
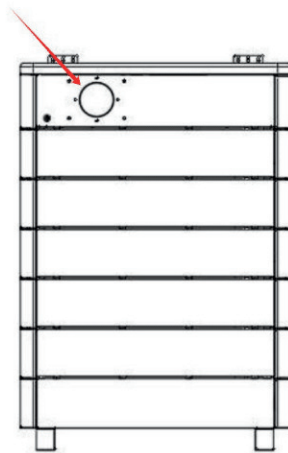
7. Online and Running

Click Device Page and select the device to view the battery data in the real time.
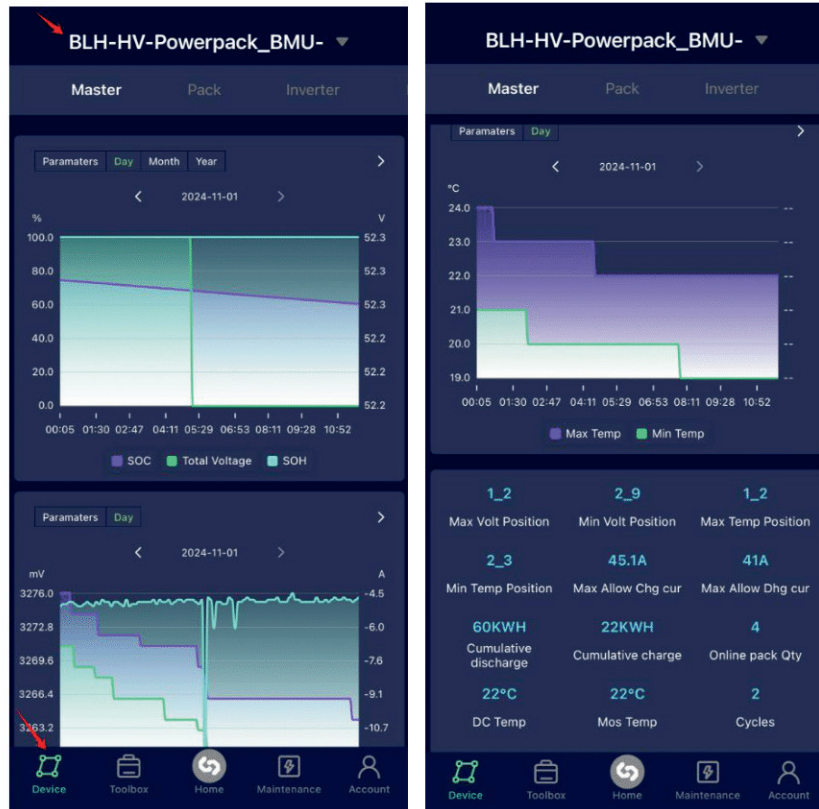
Click Monitoring Device on the cloud platform to view battery data at the same time.
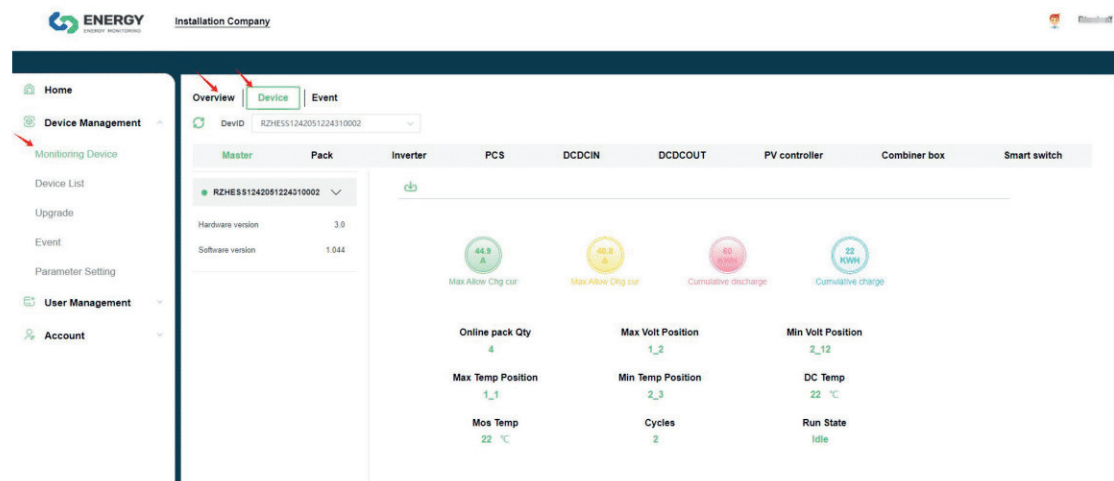
FAQ：

1. How to use the QR Code?

Each installer automatically generates a QR code, and the mobile app user registers an account independently, scans the QR code and binds with the QR code installer.

2. Firmware Upgrade

Click the Upgrade page on the cloud platform, check the product that needs to be upgraded according to the device serial number, and click Upgrade. The device has to be online. (The device has to be online.)
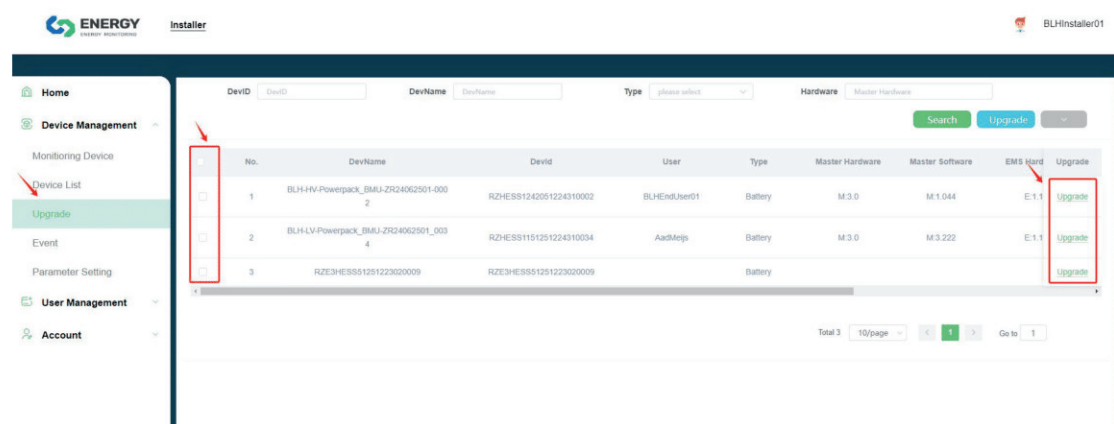
When there are too many device, search the Device through name or ID to find directly.

If you need multiple devices upgrade in a time, please check the check box and click "Upgrade", it will appear whether the command is being sent or not.

Make sure the device is online and click "Upgrade" for upgrading.

1	henryhome	DA02020413	HE_BAT	Off-line	Upgrade

You can see the latest firmware information to determine whether to upgrade, if

so, click "Update Now" in the lower right corner to update

Latest Version ×

Master: 3.193
　Upgrad:Characters to victron
Pack: 3.034
　Upgrade something about heating
EMS: 1.039
　勿删

Update Now
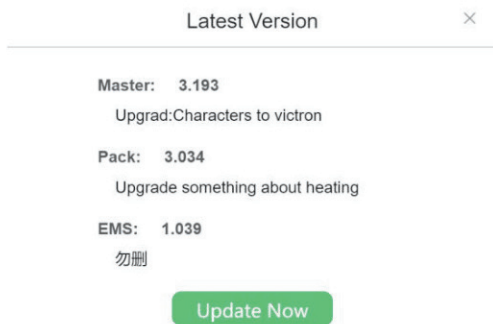
3. Why the battery network configuration failure?
The APP only supports **2.4G** signals. When using mixed signals of 2.4G and 5G, the product may not be able to connect to the Cloud Platform stably.

4. How to check whether the network configuration is successful?
Set the dial switch to 3456on to check the WiFi status.
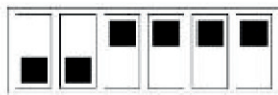
"0" means the battery is not connected to any WiFi router.
"1" means the battery is connected to the WiFi router.
"2" means the battery is connected to the server.

5. How to use the EMS Tool 1.0.18(computer software) to configure the network.
Contact the supplier to install the software, click the EMS Info page, and fill in the information accordingly as below.
SoftAP ssid: main control serial number
SoftAP pwd: 12345678
Sta ssid: client onsite wifi account
Sta_pwd: client onsite wifi password
type: HE_BAT
key: 1ff6d9a0-1705-11ed-b56c-a58cf89ccf09
id: main control serial number
period(s): 5
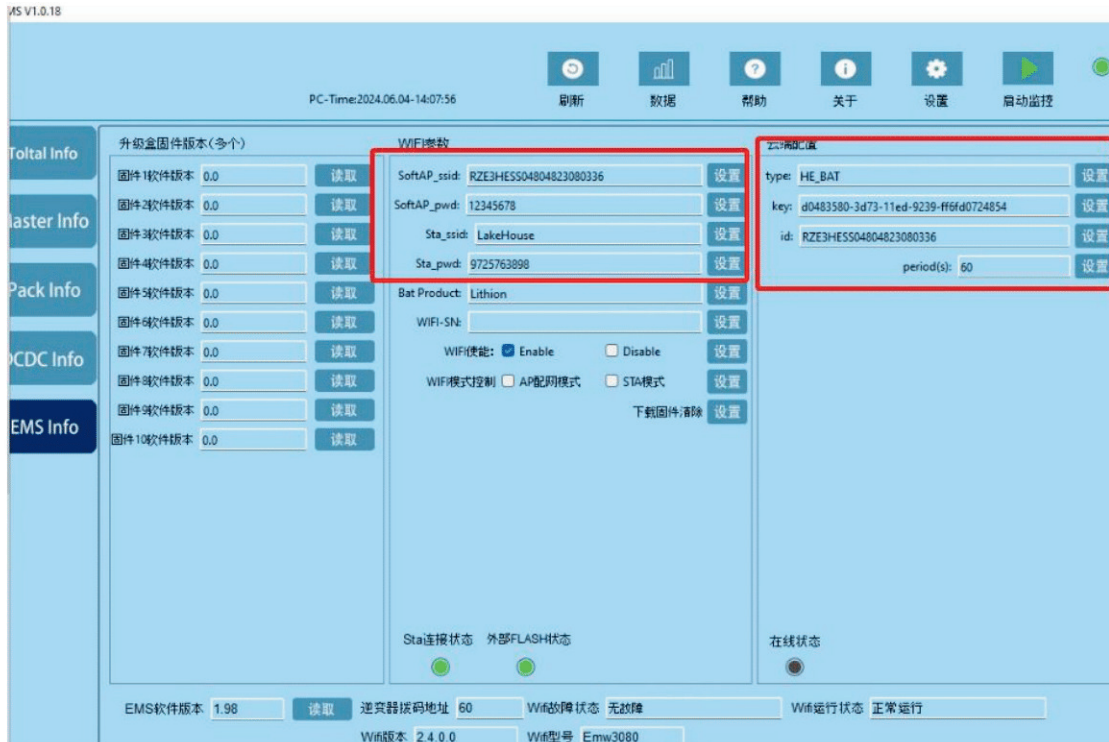
6. How to change the password?

Login the cloud platform, click Account, pull down the navigation bar and select Password. Enter your old password and new password, and then confirm your new password again. Finally, click Confirm to change the password.
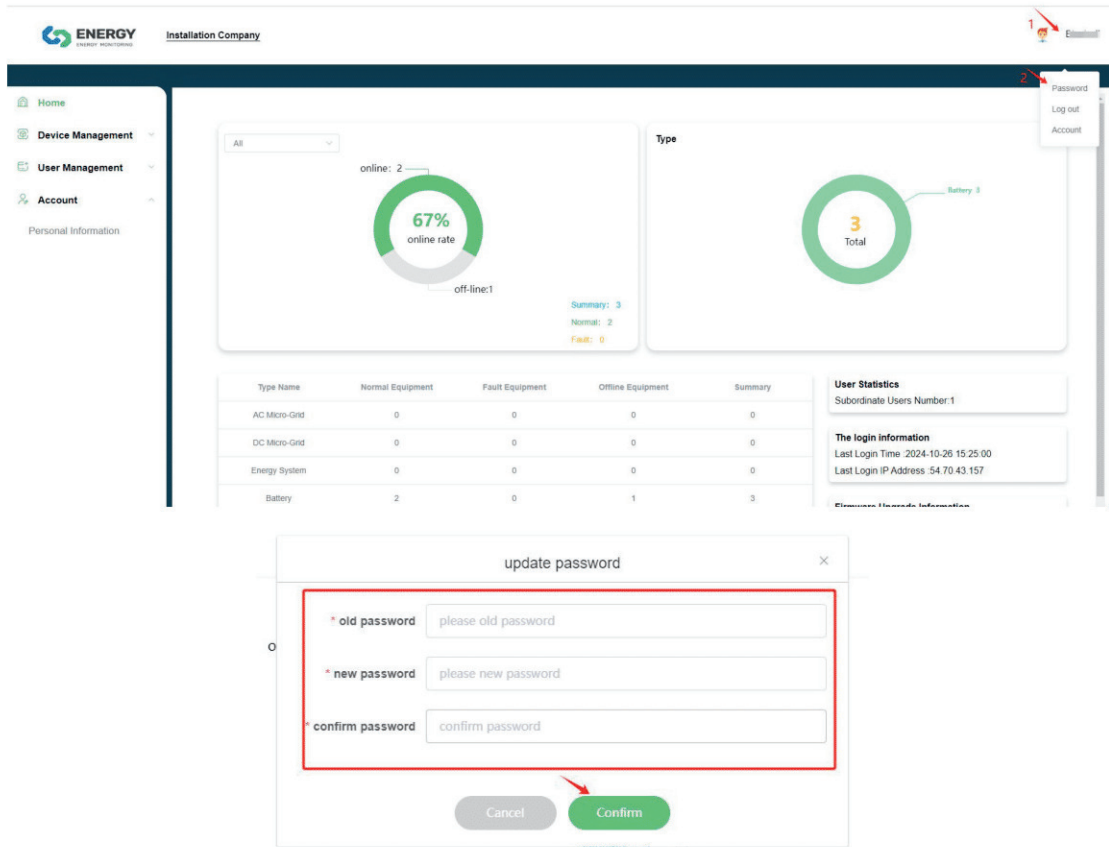
2C - EMS Tool Guideline

P. 86 – P. 91

EMS Tool Guidline on Adjusting Battery Pack QTY

EMS Tool is the computer software, used to monitor the BLH PowerPack LV Series operation statues and set the battery parameter. Since the main control is set to 4pcs battery modules by default, it is convenient for direct installation. If the actual number of battery modules used is different, please use the EMS Tool to modify it.

Steps:

1. Prepare the Tools

- Please ask your supplier to assist the EMS Tool software installation, prepare the RS232 cable and laptop. Connect the RS232 crystal terminal to BMU DBG-232 port and USB connect the laptop USB Port. Make sure the RS232 connection is well.

2. Setting Battery Module Dial Switch

- Please use the screwdriver to ensure the battery module dial switch is turn on/down completely as the following chart.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Set to the slave Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Pack 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 4
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Pack 6
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Pack 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 8

3. Login EMS Tool

- Open the EMS Tool software, then choose the language based on your demand and select Protocol to LOW Voltage Protocol. Then Enter the password **202002**

- After that, choose the port number and then click Open COM and Monitor ON.Click Refresh to update the battery information.

  (PS. If the EMS Tool can not shows information, please contact your supplier for assistance.)
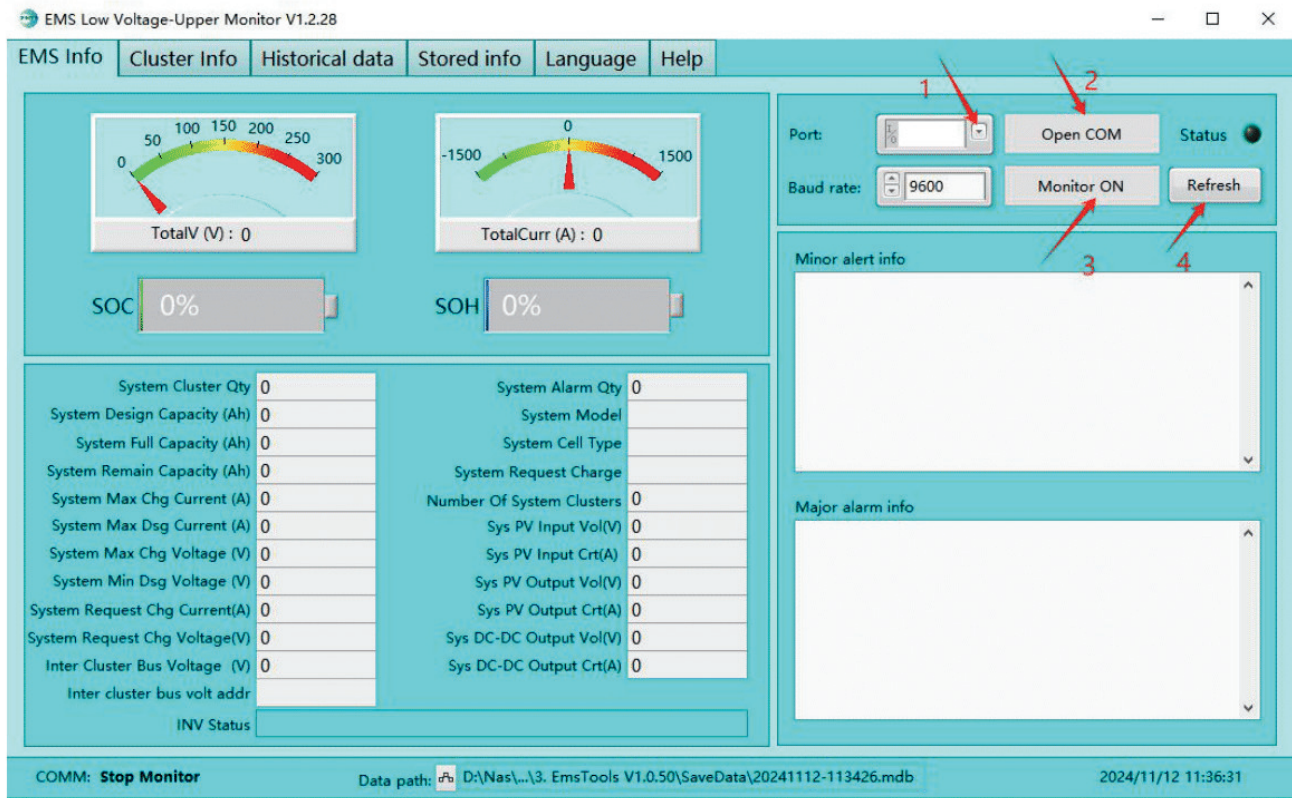
4. Adjusting Battery Pack QTY

- Please click Cluster Info in the Navigation Bar and select SystemSet Button.

- Enter the Admin Password and System Set Password. Please ask your supplier for the password.
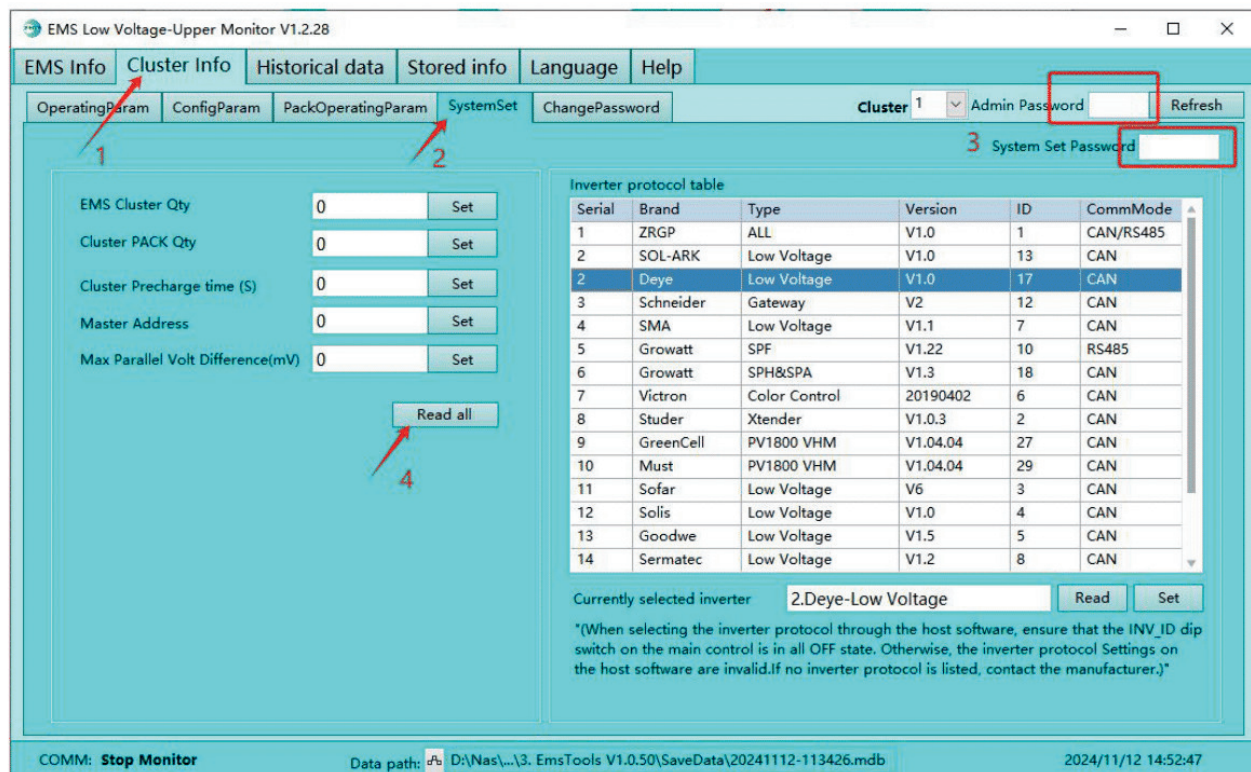
- When you click Read all, the EMS Tool will shows the SystemSet information. Please modify the actual Cluster Pack QTY and click Set to confirm the setting.
- After setting, please power off the BMU and all batteries module from top to bottom. Then turn on from bottom to the top and restart the BMU.
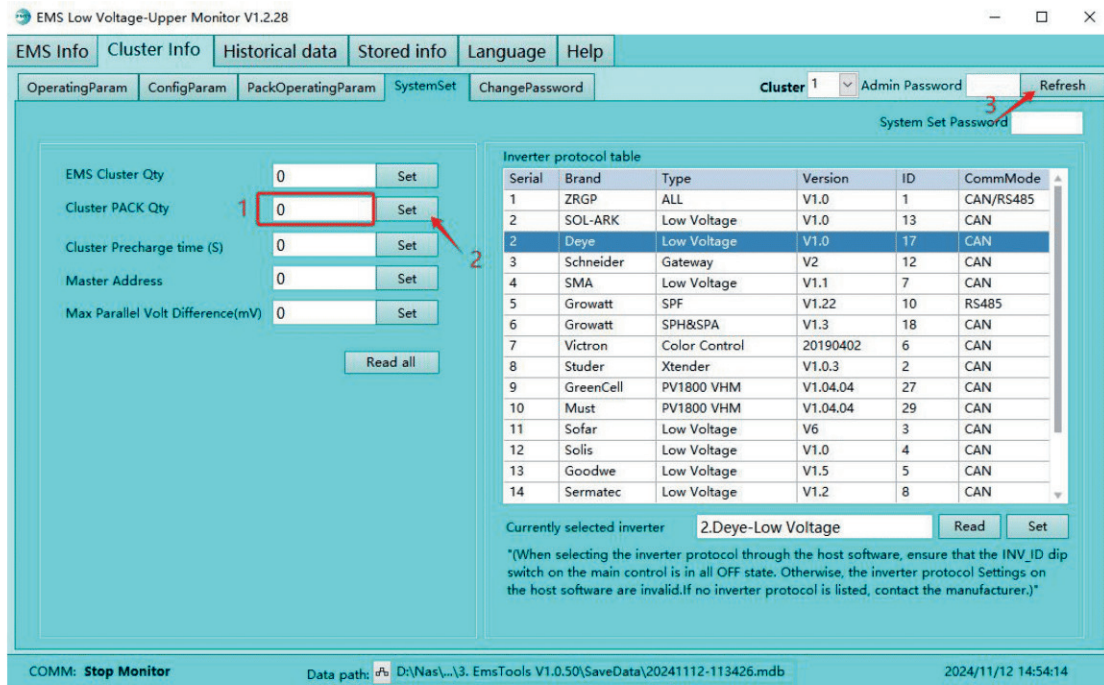
- Through the battery display you can check the battery statue and you can click the TMS Tool Refresh to update and ensure setting well.

After that, the Battery Pack QTY is setting completed!

The EMS Tool can also check the whole system information. Including SOC, SOH, and if there are alarm. You can use it to check and read the battery history data. If you need to modify the parameter settings, please communicate with the supplier to confirm before modifying.

Thanks for reading!

2D - Upgrade Guideline by CAN

P. 92 – P. 99

Upgrade Guideline by CAN Box

This guideline introduces how to upgrade the BLH PowerPack Series by CAN Box. Please contact your supplier to check the firmware version and assist in the upgrade.
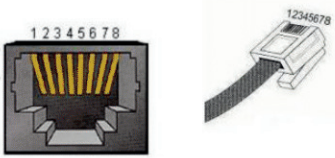
Please follow the **Notification** when upgrading the battery to ensure the upgrade is successful.

1. Do not turn off any module during upgrade following the steps.
2. Do not minimize the upgrade software and do not let other software cover the upgrade software when doing upgrade.
3. Do not let the screen of operating computer sleep and keep the screen working when doing upgrade.
4. Do not touch the CAN box in case of lose connection during upgrade.

Steps:

1. Prepare the Tools and Software

- Please prepare the CAN box with communication cable. The serial number of the RJ 45 crystal terminal is **7L8H**. Plug the RJ45 connector to the BMU Debug COM port and USB connect to the laptop USB port.

Port definitions	RJ45 Pin	Function
	1	RS485-B
	2	RS485-A
	3	CAN -GND
	4	RS485-GND
	5	RS485-GND
	6	CAN -GND
	7	CAN-L
	8	CAN-H

2. Updgrade EMS and Master by UpgradeTools-en V1.6

- Open the UpgradeTools-en V1.6.

- Chose the Device Type to **USBCAN2** and BaudRate **500Kbps** firstly, then click the **OpenDevice** button. Then choose the Firmware at the Firmware Location.
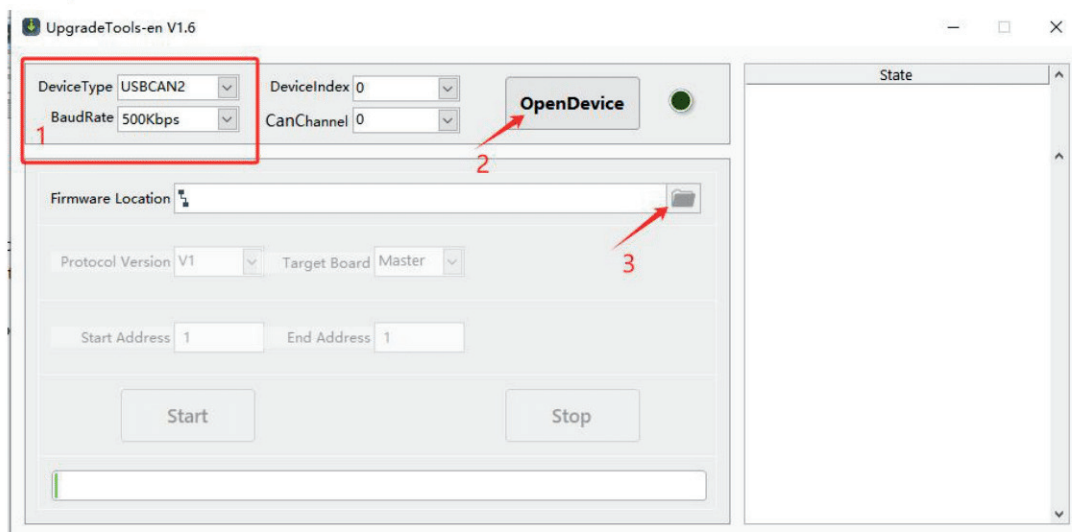
- Please enter the firmware, which can ask the supplier to supply in advance. Select **V2** in the Protocol Version and **EMS** in the Target Board and click **Start**.

(Ps. Please choose and upgrade the EMS frist and then Master. Contact your supplier to check and send the latest firmware before upgrading)
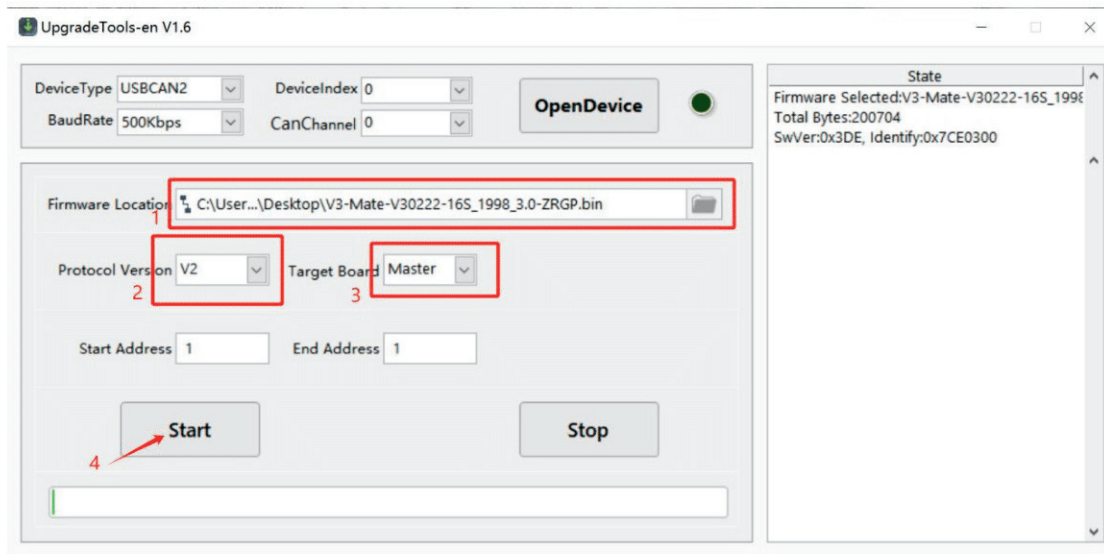
- Through the state, you can see that the upgrade is complete.
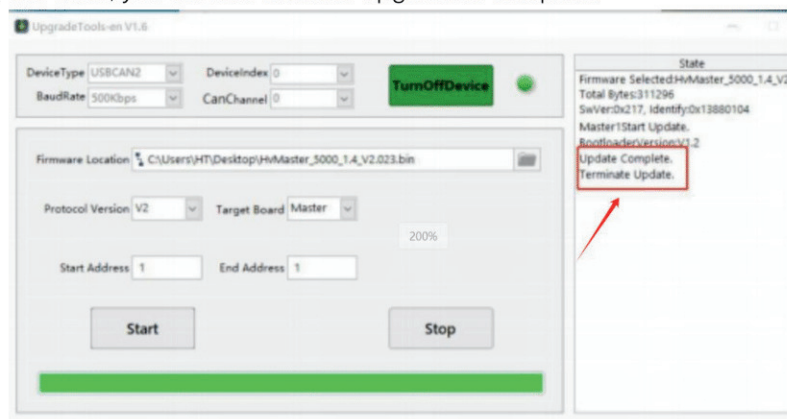
- Follow the same steps to upgrade the "Master". The setting is same, enter the Master firmware document, select Master in the target board and click start.

3. Upgrade Battery module by COM IAP

- Setting Battery Module Dial Switch. Please use the screwdriver to ensure the battery module dial switch is turn on/down completely as the following chart.

Address Coding	Dial Code Switch Position						Definition
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Set to the slave Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Set to the slave Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Set to the slave Pack 3
4	OFF	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 4
5	ON	OFF	ON	OFF	OFF	OFF	Set to the slave Pack 5
6	OFF	ON	ON	OFF	OFF	OFF	Set to the slave Pack 6
7	ON	ON	ON	OFF	OFF	OFF	Set to the slave Pack 7
8	OFF	OFF	OFF	ON	OFF	OFF	Set to the slave Pack 8

- After EMS and Master upgrade, please power off the BMU and all batteries module from top to bottom. Then only turn on the battery module from bottom to the top. Keep the BMU power off.
- Open the software COM_IAP_host 2.6., then click Project1 and run it.

- Chose the COM port. (Usually only one COM port will be presented and just select it). Click the open COM button, then enter the upgrade firmware file.
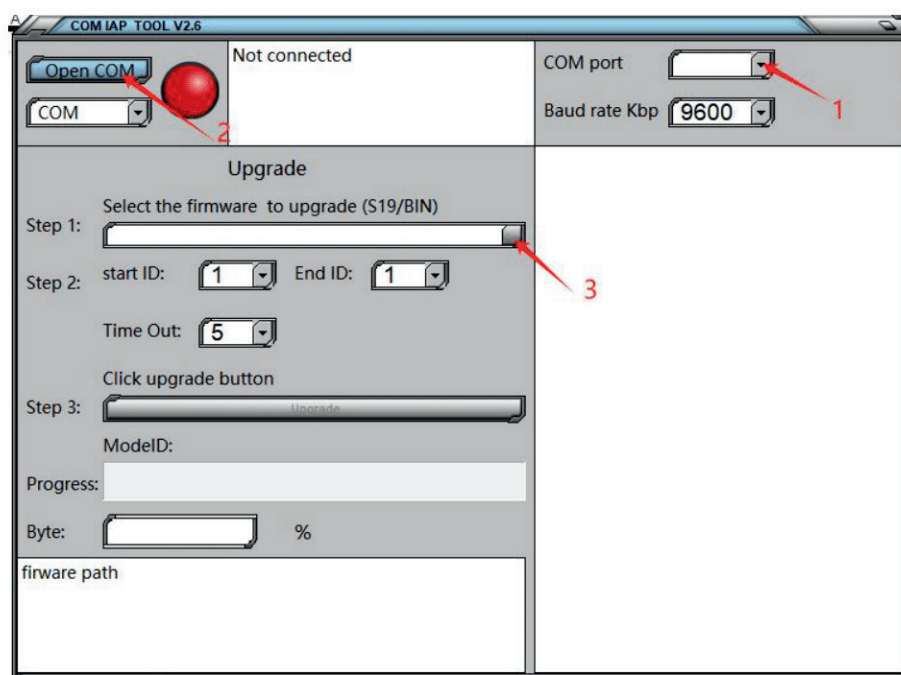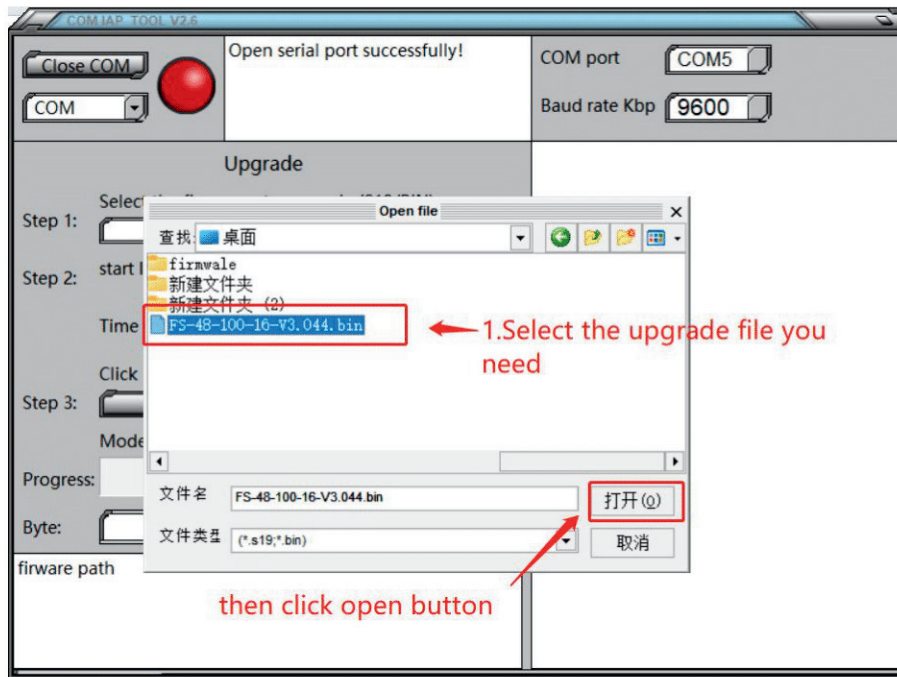
- Set the start ID as 1 and END ID as N and then just click the upgrade button. Click the upgrade button and begin the upgrade.

  (PS. N equals the number of battery packs you actually use and need to upgrade quantity, max is 8. For example, when it's 4 batteries in one cluster. Set strat ID as 1 and END ID as 4.)
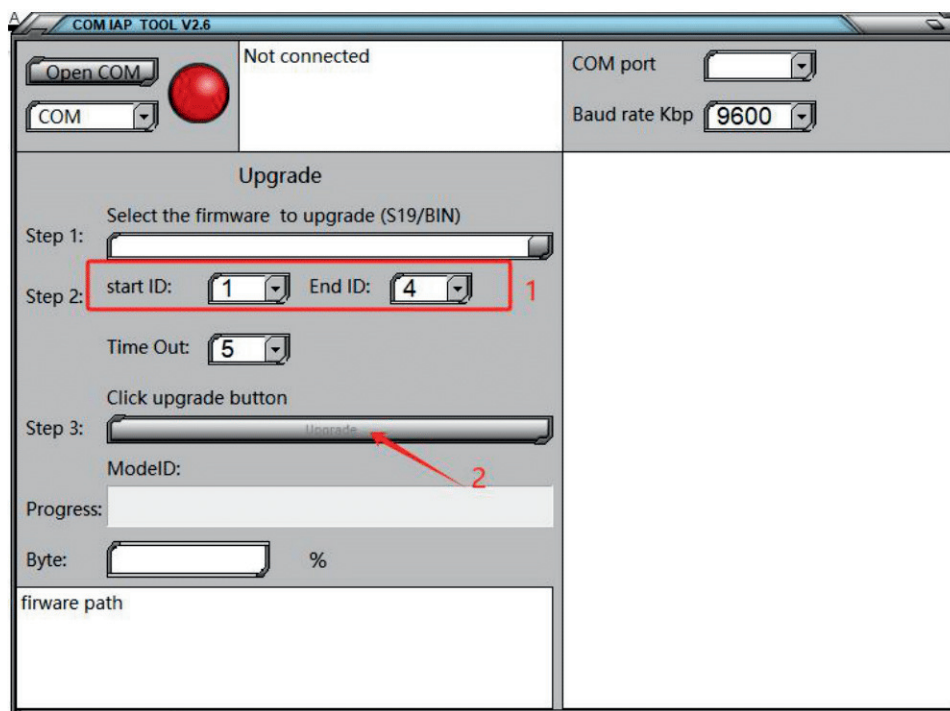
- Through the Upgrade Status Diagram, you can see the battery module is update successfully. The software will upgrade all battery modules together.

- Set the start ID as 1 and END ID as N and then just click the upgrade button. Click the upgrade button and begin the upgrade.

  (PS. N equals the number of battery packs you actually use and need to upgrade quantity, max is 8. For example, when it's 4 batteries in one cluster. Set strat ID as 1 and END ID as 4.)
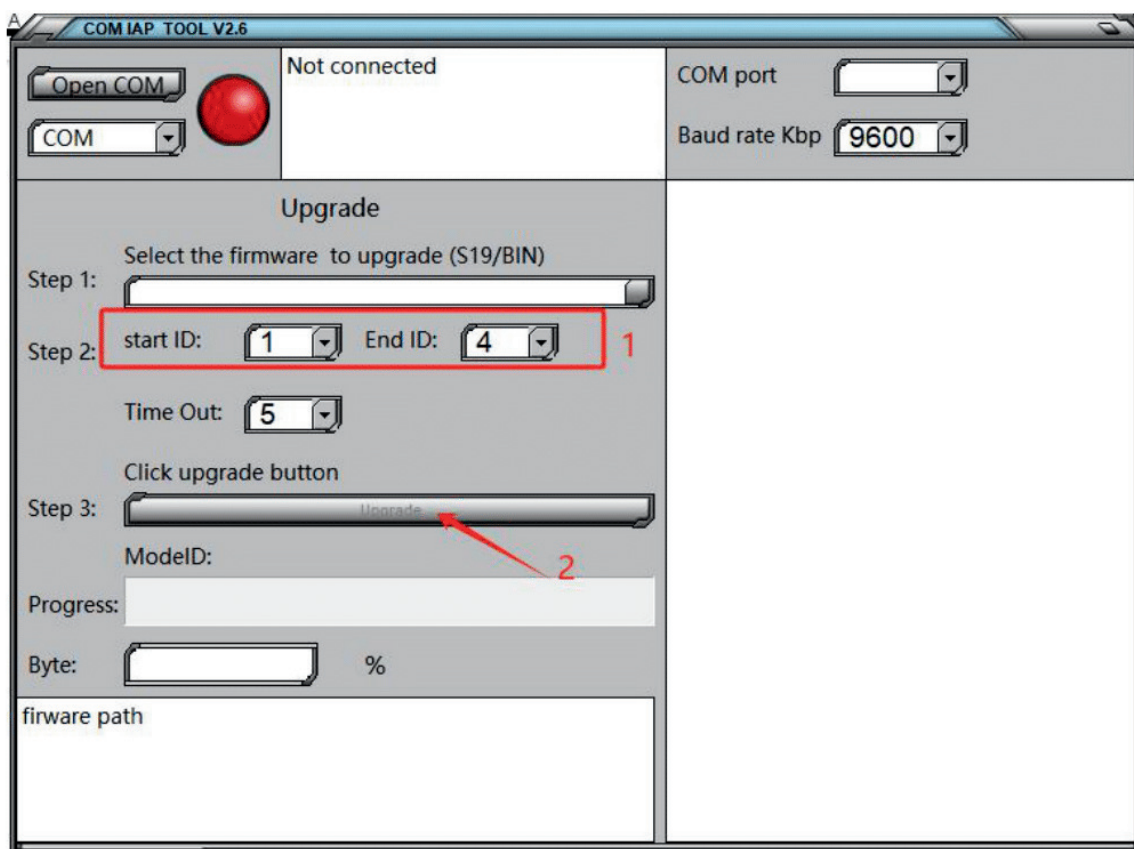
- Through the Upgrade Status Diagram, you can see the battery module is update successfully. The software will upgrade all battery modules together.
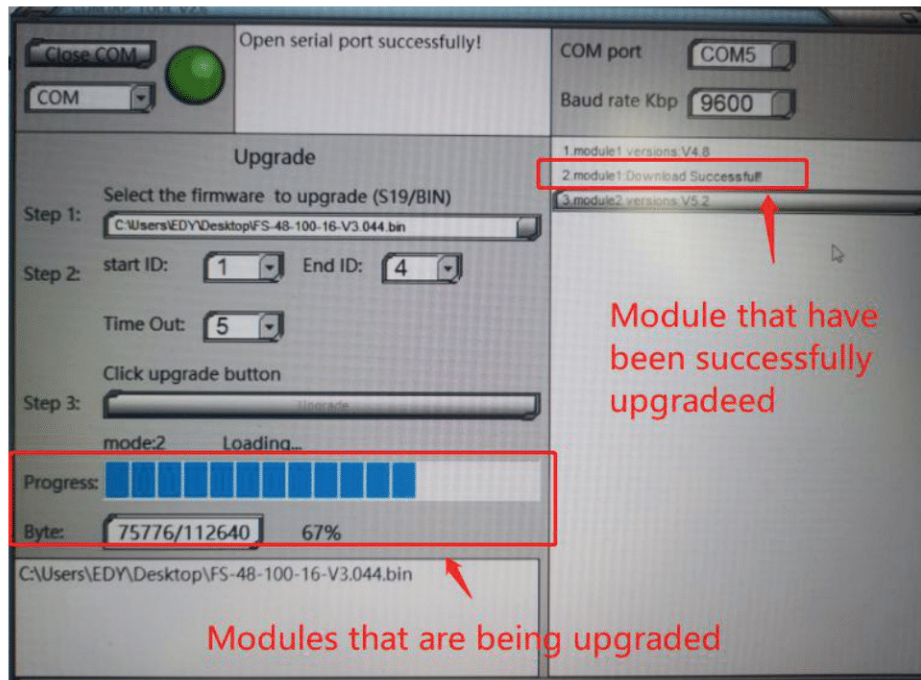
- After upgrade, please restart the system. The firmware version can be check by setting inverter dial switch to "101111", the BMU screen will show the hardware and software version of the EMS, Master, and BMS.
- 101 means EMS
- 102 means BMS
- 1~8 means battery module 1~8

Then the upgrade is completed. Thanks for your reading!

3A – Inverter Matching List + Cables

P. 100 – P. 107

Compatibility Statement of Battery

Comapany Name	BlauHoff
Postal Address:	Van Heemstraweg 123, 6651 KH Druten, The Netherlands
Tel:	0031 (0)850711875
E-mail	info@blauhoff.com
web:	www.blauhoff.com

declare that this statement is issued under our sole responsibility and belongs to the following product:

Product Lines	Picture	Description
PowerPack LV		Master Controller Model : BLH-LV-Powerpack-BMU Battery Model : BLH-Powerpack-5 Nominal Capacity: 5.12kWh, 10.24kWh～Max 614kWh Nominal Voltage: **51.2V** Max. Charge/Discharge Current: 1C
PowerPack HV		Master Controller Model : BLH-HV-Powerpack-BMU Battery Model : BLH-Powerpack-5 Nominal Capacity: 5.12kWh, 10.24kWh ~ Max 327.68kWh Nominal Voltage: **380V** Max. Charge/Discharge Current: 0.96C

Power Pack HV
Matching List (High Voltage)

Inverter Company	Product	Model
Deye	Hybrid Inverter	SUN-6K-SG01HP3-EU-AM2
		SUN-8K-SG01HP3-EU-AM2
		SUN-10K-SG01HP3-EU-AM2
		SUN-12K-SG01HP3-EU-AM2
		SUN-15K-SG01HP3-EU-AM2
		SUN−20K-SG01HP3-EU-AM2
		SUN−5K-SG01HP3-US-AM2
		SUN−8K-SG01HP3-US-AM2
		SUN−10K-SG01HP3-US-AM2
		SUN−15K-SG01HP3-US-AM2
		SUN−25K-SG01HP3-EU-BM2
		SUN−30K-SG01HP3-EU-BM3
		SUN−40K-SG01HP3-EU-BM4
		SUN−50K-SG01HP3-EU-BM4
		SUN−20K-SG01HP3-US-BM3
		SUN−25K-SG01HP3-US-BM3
		SUN−30K-SG01HP3-US-BM4
Sol-Ark	Hybrid Inverter	Sol-Ark 30K-3P
		Sol-Ark 60K-3P
Solis (Ginlong Technologies Co.,Ltd)	Hybrid Inverter	S6-EH1P11.4K-H-US
		S6-EH3P10K-H-EU
Growatt	Hybrid Inverter	SPH4000-10000TL3 BH-UP
SOFAR	Hybrid Inverter	HYD 5KTL-3PH
		HYD 6KTL-3PH
		HYD 8KTL-3PH
		HYD 10KTL-3PH
		HYD10KTL-3PH-A*
		HYD 15KTL-3PH
		HYD 20KTL-3PH
GoodWe	ET Inverter	GW5KN-ET
		GW6.5KN-ET
		GW8KN-ET
		GW10KN-ET
		GW5K-ET
		GW6.5K-ET
		GW8K-ET
		GW10K-ET
Afore	Hybrid Inverter	AF3K-TH、AF4K-TH、AF5K-TH、AF6K-TH、AF8K-TH、AF10K-TH AF12K-TH、AF15K-TH、AF17K-TH、AF20K-TH、AF25K-TH、AF30K-TH AF3K-THP、AF4K-THP、AF5K-THP、AF6K-THP、 AF8K-THP、AF10K-THP、AF12K-THP

Tel: 0031 (0)850711875
Mail: info@blauhoff.com
Web: www.blauhoff.com
Add: Van Heemstraweg 123, 6651 KH Druten, The Netherlands

Object of the statement described above is compatible with the inverters in the following table

Inverter Company	Product	Model
SunWays	Hybrid Inverter	STH-3KTL-HSS
		STH-3.6KTL-HSS
		STH-4.2KTL-HS
		STH-4.6KTL-HS
		STH-5KTL-HS
		STH-6KTL-HS
		STH-7KTL-HS
		STH-8KTL-HS
		STH-4KTL-HT
		STH-5KTL-HT
		STH-6KTL-HT
		STH-8KTL-HT
		STH-10KTL-HT
		STH-12KTL-HT
		STH-15KTL-HT-CN
		STH-17KTL-HT-CN
		STH-20KTL-HT-CN
		STH-25KTL-HT-CN
		STH-30KTL-HT-CN
		STH-33KTL-HT-CN
		STR-4KTL-HT
		STP-5KTL-HT
		STR-6KTL-HT
		STR-8KTL-HT
		STR-10KTL-HT
		STR-12KTL-HT
		STR-3KTL-HS
		STR-3.6KTL-HS
		STR-4.6KTL-HS
		STR-5KTL-HS
		STR-6KTL-HS
		STR-7KTL-HS
		STR-8KTL-HS
ATESS	Hybrid Inerter	HPS30
		HPS50
		HPS100
		HPS120
		HPS150
SerMatec	Hybrid Inverter	SMT-10K-TL-TH
REVO	Hybrid Inverter	REVO E Plus 3K-24
		REVO E Plus 3.2K-48
		REVO E Plus 5.5K-48
INVT	Hybrid Inverter	BD6KTL-RH1N
		BD8KTL-RH1N
		BD10KTL-RH1N
		BD12KTL-RH1N
		R7K6L1
SAJ	Hybrid Inverter	H2-3K-S2
		H2-3.6K-S2
		H2-4K-S2
		H2-5K-S2
		H2-6K-S2
		H2-5K-T2
		H2-6K-T2
		H2-8K-T2
		H2-10K-T2
Thinkpower	Hybrid Inverter	EPH4KTL
		EPH5KTL
		EPH6KTL
		EPH8KTL
		EPH10KTL
		EPH12KTL

Tel: 0031 (0)850711875
Mail: info@blauhoff.com
Web: www.blauhoff.com
Add: Van Heemstraweg 123, 6651 KH Druten, The Netherlands

Object of the statement described above is compatible with the inverters in the following table

Power Pack LV
Matching List (Low Voltage)

Inverter Company	Product	Model
Deye	Hybrid Inverter	SUN-3.6K-SG01LP1-EU
		SUN-5K-SG01LP1-EU
		SUN-6K-SG01LP1-EU
		SUN-7.6K-SG01LP1-EU
		SUN-8K-SG01LP1-EU
		SUN-5K-SG01LP1-US
		SUN-6K-SG01LP1-US
		SUN-7.6K-SG01LP1-US
		SUN-8K-SG01LP1-US
		SUN-3.6K-SG03LP1-EU
		SUN-5K-SG03LP1-EU
		SUN-6K-SG03LP1-EU
		SUN-3K-SG04LP1-EU
		SUN-3.6K-SG04LP1-EU
		SUN-5K-SG04LP1-EU
		SUN-6K-SG04LP1-EU
		SUN-3.6K-SG05LP1-EU
		SUN-5K-SG05LP1-EU
		SUN-6K-SG05LP1-EU
		SUN-7.6K-SG05LP1-EU
		SUN-8K-SG05LP1-EU
		SUN-5K-SG04LP3-EU
		SUN-6K-SG04LP3-EU
		SUN-8K-SG04LP3-EU
		SUN-10K-SG04LP3-EU
		SUN-12K-SG04LP3-EU
Studer	Xtender Inverter	XTS 1400-48
		XTM 2600-48
		XTM 4000-48
		XTM 6000-48
		XTH 8000-48
Victron Energy (Communicate with Color Control)	Multi Plus-II Inverter	48/3000/35-32
		48/5000/70-50
		48/8000/110-100
		48/10000/140-100
	Quattro Inverter	48/3000/35-50/50 120V
		48/5000/70-100/100 120V
		48/10000/140-100/100 120V
	EasySolar-II GX Inverter	48/3000/35-32 MPPT 250/70 GX
	Multi Plus-II GX Inverter	48/3000/35-32
		48/5000/70-50
	Multi Plus Inverter	48/500/6
		48/800/9
		48/1200/13
		48/1600/16
		48/2000/25

Object of the statement described above is compatible with the inverters in the following table

Inverter Company	Product	Model
Phocos	Any-Grid Hybrid Inverter	PSW-H-5KW-230/48V
		PSW-H-3KW-230/48V
		PSW-H-5KW-120/48V
		PSW-H-3KW-120/48V
		PSW-H-6.5KW-120/48V
		PSW-H-8KW-230/48V
Sermatec	Hybrid Inverter	SMT-5K-TL-LV
		SMT-10K-TL-LV
		SMT-10K-TL-TH
Green Cell	INVSOL Inverter	INVSOL04
Growatt	SPF Inverter	SPF 4000T DVM
		SPF 5000T DVM
		SPF 6000T DVM
		SPF 8000T DVM
		SPF 10000T DVM
		SPF 12000T DVM
		SPF 6000T DVM-MPV
		SPF 12000T DVM-MPV
		SPF 4000T HVM
		SPF 5000T HVM
		SPF 6000T HVM
		SPF 8000T HVM
		SPF 10000T HVM
		SPF 12000T HVM
		SPF 3500 ES
		SPF 5000 ES
		SPF 3000TL LVM-48P
		SPF 3000TL LVM-ES
		SPF 2000TL HVM-48
		SPF 3000TL HVM-48
		SPF 5000TL HVM-48
		SPF 5000TL HVM-48P
	SPH Inverter	SPH 3000
		SPH 3600
		SPH 4000
		SPH 4600
		SPH 5000
		SPH 6000
		SPH 3000TL BL-UP
		SPH 3600TL BL-UP
		SPH 4000 TL BL-UP
		SPH 4600TL BL-UP
		SPH 5000TL BL-UP
		SPH 6000TL BL-UP
	SPA Inverter	SPA 1000TL BL
		SPA 2000 TL BL
		SPA 3000TL BL

BlauHoff

Tel: 0031 (0)850711875
Mail: info@blauhoff.com
Web: www.blauhoff.com
Add: Van Heemstraweg 123, 6651 KH Druten, The Netherlands

Object of the statement described above is compatible with the inverters in the following table

Inverter Company	Product	Model
Must	VHM Inverter	PV 18-3048 VHM
		PV18-4048 VHM
		PV18-5048 VHM
		PV18-5548 VHM
SMA	Sunny Island Inverter	S14.4M
		S16.0H
		S18.0H
SOFAR	48V Battery Inverter	ME3000SP
		HYD3000-ES
		HYP3600-ES
		HYD4000-ES
		HYD4600-ES
		HYD5000-ES
		HYD6000-ES
		HYD3000-EP
		HYD3680-EP
		HYD4000-EP
		HYD4600-EP
		HYD5500-EP
		HYD6000-EP
Solis (Ginlong Technologies Co.,Ltd)	RAI Inverter	RAI-3K-48ES-5G
	RHI Inverter	RHI-3K-48ES-5G
		RHI-3.6K-48ES-5G
		RHI-4.6K-48ES-5G
		RHI-5K-48ES-5G
		RHI-6K-48ES-5G
	Hybrid Inverter	RAI-3K-48ES-5G
		S6-EH1P6K-L-PRO
Luxpower	LV-6K	LXP-6K Hybrid
GoodWe	ES Inverter	GW3648D-ES
		GW5048D-ES
	SBP Inverter	GW3600S-BP
		GW5000S-BP
	EM Inverter	GW3048-EM
		GW3648-EM
		GW5048-EM
Sol-Ark	Hybrid Inverter	Sol-Ark-5K-P
		Sol-Ark-8K-P
		Sol-Ark-12K-P
Schneider	Hybrid Inverter	XW Pro 8548
		XW Pro 6848 NA 120/240
		XW Pro 6848 NA 120 V
		SW 4020 120/240
		SW 4048 120/240
		SW 4024 230
		SW 4048 230
		XW+ 7048 E
		XW+ 8548 E

Object of the statement described above is compatible with the inverters in the following table

Inverter Company	Product	Model
Sunsynk	Hybrid Inverter	SUNSYNK-.3.6K-SG01LP1
		SUNSYNK-3.6K-SG02LP1
		SUNSYNK-3.6K-SG03LP1
		SUNSYNK-5K-SG01LP1
		SUNSYNK-5K-SG02LP1
		SUNSYNK-5K-SG03LP1
		SUNSYNK-8K-SG01LP1
		SUNSYNK-8K-SG02LP1
ATESS	Hybrid Inverter	HPS30
		HPS50
		HPS100
		HPS120
		HPS150
Thinkpower	Hybrid Inverter	EPH4KTL
		EPH5KTL
		EPH6KTL
		EPH8KTL
		EPH10KTL
		EPH12KTL
MEGAREVO	Hybrid Inverter	R3KL1-G2
		R3K6L1-G2
		R4KL1-G2
		R4K6L1-G2
		R5KL1-G2
		R6KL1-G2
		R8KL1-G2
SAJ	Hybrid Inverter	H1-3~6K-S2
AISWEI	Hybrid Inverter	ASW-6000-H-S2
Afore	Hybrid Inverter	AF1K-SL-0、AF1.5K-SL-0、AF2K-SL-0、AF2.5K-SL-0、AF3K-SL-0
		AF3.6K-SL-0、AF4K-SL-0、AF4.6K-SL-0、AF5K-SL-0、AF5.5K-SL-0、AF6K-SL-0
		AF1K-SL-1、AF1.5K-SL-1、AF2K-SL-1、AF2.5K-SL-1、AF3K-SL-1、AF3.6K-SL-1
		AF3K-SL、AF3.6K-SL、AF4K-SL、AF4.6K-SL、AF5K-SL、AF5.5K-SL、AF6K-SL
		AF4K-SLP、AF4.6K-SLP、AF5K-SLP、AF5.5K-SLP、AF6K-SLP

Inverter	Battery Solution	Module QTY	Voltage(V)	Max Current(A)	Cable Recommend
PowerPack LV					
10kw	1set * PowerPack LV 15kWh	3pcs Battery +1BMU	40.5~55.5	270	AWG3/0 or AWG4/0
12kw	1set * PowerPack LV 15kWh	3pcs Battery +1BMU	40.5~55.5	270	AWG3/0 or AWG4/0
15kw	1set * PowerPack LV 15kWh	3pcs Battery +1BMU	40.5~55.5	270	AWG4/0
PowerPack HV					
10kw	1set * PowerPack HV 15kWh	3pcs Battery +1BMU	240-420	39	AWG6
15kw	1set * PowerPack HV 15kWh	3pcs Battery +1BMU	240-420	39	AWG6
20kw	2set * PowerPack HV 15kWh	6pcs Battery +2BMU	240-420	39	AWG6
25kw	2set * PowerPack HV 15kWh	6pcs Battery +2BMU	240-420	39	AWG6
30kw	2set * PowerPack HV 15kWh	6pcs Battery +2BMU	240-420	39	AWG6
40kw	3set * PowerPack HV 15kWh	9pcs Battery +3BMU	240-420	39	AWG6
50kw	4set * PowerPack HV 15kWh	12pcs Battery +4BMU	240-420	39	AWG6

4A - Certifications

P. 108 – P. 120

CSA GROUP™

Certificate of Compliance

Certificate:	80104270	**Master Contract:**	301721
Project:	80128137	**Date Issued:**	2022-12-02

Issued To: **Blauhoff B.V.**
Van Heemstraweg 123,
6651 KH Druten,
The Netherlands

Attention: Bas Moll

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: *Iris Gao*

CSA® C US

PRODUCTS

CLASS 3701-88 - BATTERIES - Electrical Energy Storage System - Certified to US Standard.
CLASS 3701-08 - BATTERIES - Electrical Energy Storage System.

Table 1 The Input Ratings for ESS with hybrid inverters:

Energy Storage System Model	ESS PV Input Ratings		
	Max Current, A	Voltage Range, V	Input Power, W
BLH-PBMX-5S-SA12	20A*2	150~500	6500W*2

Master Contract: *301721*
Report*: 80104653*
Project: *80104653*

Jun 10, 2022

Bas Moll
Owner
Blauhoff B.V.
Van Heemstraweg 123, 6651 KH Druten, The Netherlands
T. 0031 (0)850711875

Subject: *Li-ion battery module, model BLH-Powerpack-5* (UL 9540A Test Report)

Dear Mr Bas Moll:

We are pleased to inform you that testing of your product per UL 9540A has been completed. Applicable test(s) was witnessed at CSA partner lab Shanghai Huahui Testing Co.,Ltd . Module level of test(s) was conducted on the sample you provided and the results are enclosed in the test report.

> Note: This Test Report is not an Authorization to apply the CSA Mark to the product. The results contained in the report(s) provided are contingent upon the characteristics of the actual sample(s) used in the investigation. In the absence of a continuing inspection service, CSA provides no assurance, expressed or implied, that the contents of the report are applicable to reproductions of the sample(s). Use or reproduction of the CSA name, logo, or trademark is not permitted without the prior written consent of CSA. No references can be made to this report when using the results of this investigation for the purposes of advertising, promotion or litigation, without the prior written consent of CSA.

Please examine the enclosed documents and contact me if you have any questions or would like us to make any changes.

On behalf of CSA, I would like to thank you for your business and offer our services for your future needs.

Yours truly,

Joseph Zhou
CSA –CCIC-CSA International Certification Co., Ltd. Kunshan Branch
Building 8, Tsinghua Science Park, No. 1666 Zu chongzhi Rd (S) , Kunshan, Jiangsu (215347)

Encl. [*UL 9540A Test Report*]
   Att.1 - UL 1642 Certificate_Cell Model CB27173204EA
   Att.2 - UL 1973 Certificate_Module No.BLH-Powerpack-5
   Att.3 - Test Video_1
   Att.4 - Test Video_2
   Att.5 - Test Video_3

CERTIFICATE

of Conformity

EC Council Directive 2014/30/EU

Certificate No.:XK2409013019C

Applicant   : **Blauhoff B.V**

   Van Heemstraweg 123, 6651 KH Druten, The Netherlands

Manufacturer   : **Blauhoff B.V.**

Product   : **Lithium Ion Battery**

Model/Type No : **BLH-Powerpack-5, BLH-Powerpack-5-Heated**

Brand Name   : **N/A**

   EN IEC 61000-6-3:2021

Test   **EN IEC 61000-6-1:2019**

   :

Standard   **EN 61000-3-3:2013+A2:2021+AC:2022**

   EN IEC 61000-3-2:2019+A1:2021

The certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical report is at the applicant disposal. This is to certify the tested sample that is in conformity with all provisions of above EMC directive. It is only valid in connection with the test report number XK2409013019E.

The certificate does not imply the assessment of the production and does not permit using the SiCT's logo without permission.

CE

Authorized Signer: _Andy Wang_

Andy Wang Manager

Date: September 13, 2024

Shenzhen SiCT Technology Co., Ltd.

202, Building 3, No.111 Huanguan Middle Road, Songyuanxia Community,
Guanhu Street, Longhua District, Shenzhen, Guangdong, China
E-mail: info@sict-lab.com.cn   Http:// www.sict-lab.com.cn

危险物品
DANGEROUS GOODS

海运运输条件鉴别报告书

Identification and Classification Report for Sea Transport of Goods

本报告本年度有效
有效期至 **2024 年 12 月 31 日**

样品名称：	锂离子蓄电池
Sample name：	**Lithium-ion Battery**
样品型号：	
Sample model：	**BLH-Powerpack-5-Heated**
委托单位：	
Applicant：	**Blauhoff B.V.**

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co.，Ltd.

<div style="border:2px solid red; color:red; text-align:center">

危险物品
DANGEROUS GOODS

</div>

海运运输条件鉴别报告书

Identification and Classification Report for Sea Transport of Goods

<div style="border:1px solid red; color:red; text-align:center">
本 报 告 本 年 度 有 效
有效期至 2024 年 12 月 31 日
</div>

样品名称：   锂离子蓄电池

Sample name：   **Lithium-ion Battery**

样品型号：

Sample model：   **BLH-powerpack-5**

委托单位：

Applicant：   **Blauhoff B.V.**

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co.，Ltd.

材料安全数据表

Material Safety Data Sheet

本 报 告 本 年 度 有 效
有效期至 **2024** 年 **12** 月 **31** 日

样品名称：　　　　　　　锂离子蓄电池

Sample name：　　　　**Lithium-ion Battery**

样品型号：

Sample model：　　　　**BLH-powerpack-5**

委托单位：

Applicant：　　　　　　**Blauhoff B.V.**

签发时间 Date of issue：　　2023.12.11

Written by　　　　　　　Approved by

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co.，Ltd.

中国认可
国际互认
检测
TESTING
CNAS L5138

UN38.3 检测报告
UN38.3 Test Report

样品名称：

Sample name：   锂离子蓄电池

       Lithium-ion Battery

样品型号：

       BLH-Powerpack-5-Heated

Sample model：

委托单位：

       Blauhoff B.V.

Applicant：

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co., Ltd.

天 溯 ®
Tian Su

材料安全数据表

Material Safety Data Sheet

本 报 告 本 年 度 有 效
有效期至 **2024** 年 **12** 月 **31** 日

样品名称：   锂离子蓄电池

Sample name：   **Lithium-ion Battery**

样品型号：

Sample model：   **BLH-Powerpack-5-Heated**

委托单位：

Applicant：   **Blauhoff B.V.**

签发时间 Date of issue：   2023.12.11

Written by   Approved by

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co.，Ltd.

报告专用章
Report Seal
(01-03)

中国认可
国际互认
检测
TESTING
CNAS L5138

UN38.3 检测报告
UN38.3 Test Report

样品名称：

锂离子蓄电池

Sample name：

Lithium-ion Battery

样品型号：

BLH-powerpack-5

Sample model：

委托单位：

Applicant：

Blauhoff B.V.

深圳天溯计量检测股份有限公司

Shenzhen Tiansu Calibration and Testing Co., Ltd.

CSA GROUP™

Certificate of Compliance

Certificate: 80186667

Project: 80186667

Master Contract: 301721

Date Issued: 2024-07-05

Issued To: **Blauhoff B.V.**

Van Heemstraweg 123,

6651 KH Druten,

The Netherlands

Attention: Bas Moll

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.

Issued by: Ky Huang
Ky Huang

PRODUCTS
CLASS - C370112 - BATTERIES Battery System for use in Stationary Applications
CLASS - C370182 - BATTERIES Battery System for use in Stationary Applications - Certified to US Standards

Secondary lithium-ion battery system for use in Stationary Electrical Energy Storage Application, Power Base Mate HV Series, the detailed Model name and Electrical Ratings are noted as below:

Certificate of Compliance

Certificate:	80082107	**Master Contract:**	301721
Project:	80104273	**Date Issued:**	2022-05-30

Issued To: **Blauhoff B.V.**

Van Heemstraweg 123,
6651 KH Druten,
The Netherlands

Attention: **Bas Moll**

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US

Issued by: Scola Chen
Scola Chen

PRODUCTS

CLASS - C370112 - BATTERY SYSTEM for use in Stationary Applications
CLASS - C370182 - BATTERY SYSTEM for use in Stationary Applications - Certified to US Standards

Battery Pack System for use in Stationary Electrical Energy Storage Application, Lithium-ion, BLH-Powerpack Series, the detailed Model name and Electrical Ratings are noted as below:

Bas Moll
Owner
Blauhoff B.V.
Van Heemstraweg 123, 6651 KH Druten, The Netherlands
T. 0031 (0)850711875

Subject: *Li-ion battery module, model BLH-Powerpack-5* (UL 9540A Test Report)

Dear Mr Bas Moll:

We are pleased to inform you that testing of your product per UL 9540A has been completed. Applicable test(s) was witnessed at CSA partner lab Shanghai Huahui Testing Co.,Ltd . Module level of test(s) was conducted on the sample you provided and the results are enclosed in the test report.

> Note: This Test Report is not an Authorization to apply the CSA Mark to the product. The results contained in the report(s) provided are contingent upon the characteristics of the actual sample(s) used in the investigation. In the absence of a continuing inspection service, CSA provides no assurance, expressed or implied, that the contents of the report are applicable to reproductions of the sample(s). Use or reproduction of the CSA name, logo, or trademark is not permitted without the prior written consent of CSA. No references can be made to this report when using the results of this investigation for the purposes of advertising, promotion or litigation, without the prior written consent of CSA.

Please examine the enclosed documents and contact me if you have any questions or would like us to make any changes.

On behalf of CSA, I would like to thank you for your business and offer our services for your future needs.

Yours truly,

Joseph Zhou
CSA –CCIC-CSA International Certification Co., Ltd. Kunshan Branch
Building 8, Tsinghua Science Park, No. 1666 Zu chongzhi Rd (S) , Kunshan, Jiangsu (215347)

Encl.   [*UL 9540A Test Report*]
      Att.1 - UL 1642 Certificate_Cell Model CB27173204EA
      Att.2 - UL 1973 Certificate_Module No.BLH-Powerpack-5
      Att.3 - Test Video_1
      Att.4 - Test Video_2
      Att.5 - Test Video_3

5A - Datasheets PowerPack

P. 121 – P. 123

PowerPack
LV

Features

Lift-up Mobility

- From 5.12kWh to 614.4kWh
- Between 2 to 8 battery modules can be used in single stack to give
  10.24 to 40.96kWh usable capacity
- Up to 15 stacks can be connected in parallel to give a maximum
  614.4kWh usable capacity
- Additional module or parallel stack can be added to increase capacity

Safety Guaranteed

- LFP battery, cobalt free, environmentally friendly
- Maximized safety, cycle life, and power output

Wide-range Application Scenarios

- Suitable for emergency-backup and off-Grid
- Self-consumption optimization for Residential and commercial

BlauHoff

BlauHoff

PowerPack LV

Main Control Module	BLH-LV-Powerpack-BMU						
Battery Module	BLH-Powerpack-5						
Battery Module QTY	2	3	4	5	6	7	8
Usable Energy (kWh)[1]	10.24	15.36	20.48	25.6	30.72	35.84	40.96
Max Countinuous Power (kW)[2]	9.0	13.5	15.0				
Max Peak Current (A)[3]	200,10s	300,10s	400,10s	500,10s			
Nominal Voltage (V)	51.2						
Operating Voltage Range (V)	43.2-58.4						
Communication	CAN/RS485/RS232/WIFI						
L×W×H (mm)	735×400 (L*W)						
	646	781.5	917	1052.5	1188	1323.5	1459
Net Weight (kg)	141	193	245	297	349	401	453
Protection Level	IP55						
Cycle Life	8000 times, @25°C, 60%DOD						
Warranty[4]	10 years						
Operating Temperature[5]	-20℃ to +55℃ (Charge 0℃ to +55℃)						
Certification	CE/UKCA/UL 1973/UL9540/UN 38.3/MSDS						
Scalability	Max.15 systems in parallel						
Application	ON Grid (Self consumption/ON Grid+Backup/Backup) and Off Grid						

[1] Test conditions: 100% DOD, 0.2C charge & discharge @+25℃. System Usable Energy may be variant with different inverter brands.

[2] Main circuit breaker maximum current capability.

[3] In off-grid applications, the main circuit breaker should be bypassed, use a separate circuit breaker with a large current capacity.

[4] Conditions: Refer to Power Base Mate warranty.

[5] -20℃ ~ 15℃ / 50 ℃~55℃ will be derating.

Compatible Inverter Brands:

victron energy
SMA
Growatt
GOODWE
phocos

SOFAR SOLAR
Deye
solis inverters
Schneider Electric
STUDER

Sol-Ark
MUST Power Systems
SAJ
LUXPOWERTEK
SUNSYNK

Green Cell
SERMATEC
Afore 艾伏

Your own power, a good feeling!

BlauHoff

Battery solutions for home and industry usage.

info@blauhoff.nl

www.blauhoff.nl

0031 (0)850711875

Mercuriusweg 1a, 4051 CV, Ochten, Nederland