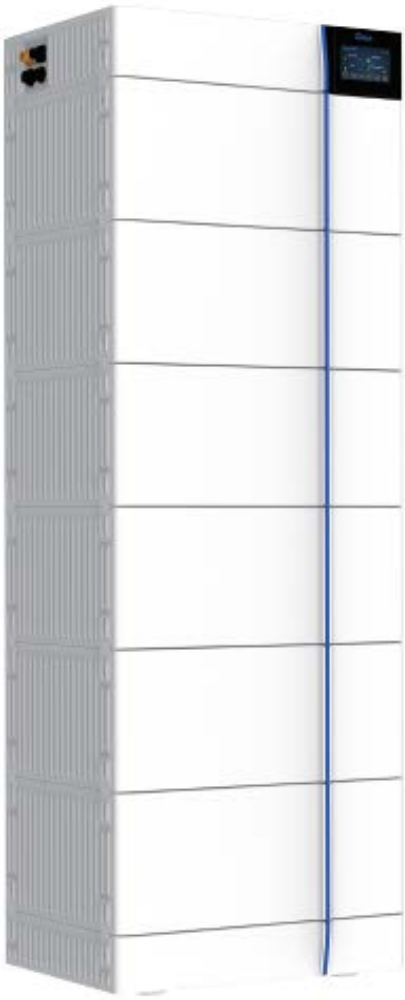
Assembly and operating instructions

High-voltage battery system

GB-L



Version: V1.1

1. IMPORTANT INFORMATION IN THE MANUAL

1.1 Scope

This installation and operation manual applies to the modular battery energy storage system. Please read this installation and operation manual carefully to ensure safe installation, initial troubleshooting, and maintenance of the GB-L. Installation, initial troubleshooting, and maintenance must be performed by qualified and authorized personnel. Please keep this installation and operation manual and other applicable documents near the battery storage system so that all persons involved in installation or maintenance have access to this installation and operation manual at all times. This installation and operation manual only applies to countries that meet the certification requirements.

Please observe applicable local laws, regulations, and standards. Standards and legal requirements of other countries may not comply with the regulations and specifications in this manual. In this case, please contact our customer service department. Hotline: +86 510 8595 9369 , Email: info@sunova-solar.com .

1.2 Description of the GB-L

Model	Construction	
GB-L	GB-L	8/204.8Vdc/8.18kWh
	GB-L	12/ 307.2 Vdc / 12.27 kWh
	GB-L	16/ 409.6 Vdc / 16.36 kWh
	GB-L	20/ 512 Vdc / 20.04 kWh
	GB-L	24/ 614.4 Vdc / 24.56 kWh

1.3 Explanation of symbols

The manual contains the following warning types:

Danger!Risk of electric shock. Even if the system is disconnected from the mains,the voltage-free State with a time delay.

Warning!Failure to follow the instructions may result in damage.

Danger!Failure to follow these instructions may result in death or serious injury.

Danger!This symbol indicates instructions for using the device.

The following warning, prohibition and mandatory symbols must be observed.

Caution! Danger of chemical burns

If the battery is damaged or fails, the electrolyte may leak, which can cause

among other things, the formation of a

a small amount of hydrofluoric acid, among other effects. Contact with these liquids can

cause chemical burns.

- Do not subject the battery module to strong shocks.
- Do not open, disassemble or mechanically modify the battery module.
- In case of contact with an electrolyte, wash the affected area immediately with clean water and seek

See a doctor immediately.

Caution! Danger of explosion

In case of operating errors or in case of fire, the lithium-ion battery may ignite and cause serious

cause injuries.

- The battery module must not be installed or operated in explosive or high humidity areas

become.

- The battery module should be stored in a dry place within the temperature range specified in the data sheet

be set up.

- Battery cells/modules must not be opened, punctured or dropped.
- Battery cells/modules must not be exposed to high temperatures.
- Battery cells/modules must not be thrown into fire.
- If the battery catches fire, it must be extinguished with a CO2 fire extinguisher. If there is a fire in the vicinity of the battery

burning must be extinguished with a dry powder extinguisher.

- Defective or damaged battery modules must not be operated.

Caution! Hot surface

- In the event of a malfunction, the parts become very hot and contact may cause serious injury.
- If the energy storage system is defective, take it out of service immediately.
- If the defect is obvious, special care should be taken when operating the appliance.

No open fire!

The use of open flames and ignition sources is prohibited near the energy storage system.

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

Do not insert objects such as screwdrivers through the housing openings.

Wear protective goggles!Wear protective goggles when working on the system.

Follow the manual!

When working and operating the system, the provisions of the installation and operating instructions must be observed

be observed.

1.4 General safety instructions

Danger!Failure to follow safety instructions may result in life-threatening situations.

1. Improper use can result in death. The operator of the GB-L must

Read the manual and follow all safety instructions.

2. The operator of the GB-L must comply with the requirements of this manual.

3. This manual cannot describe all possible situations. Therefore, applicable standards and

relevant occupational health and safety regulations always take priority.

4. Installation may also involve residual risks in the following cases:

- Improper installation.
- The installation is carried out by personnel who are not professionally trained or instructed

been.

- Failure to follow the warnings and safety instructions in this manual.

If you have any questions, please contact SUNOVA customer service.

1.5 Disclaimer

SUNOVA SOLAR TECHNOLOGY CO., LTD is not liable for personal injury, property damage or

Product damage and consequential damage.

- Violation of the provisions of this manual.
- Improper use of the product.
- Unauthorized or unqualified personnel repair the product, disassemble the frame and perform other operations

out of.

- Use of unauthorized spare parts.

・ Unauthorized modifications or technical interventions on the product.

1.6 Proper use

・ The battery energy storage system may only be installed and operated under roof or indoors.

The temperature range of GB-L's working environment is -20°C -55°C,and the highest relative humidity is 90%. The battery module must not be exposed to sunlight or directly next to a heat source be set up.

・ The battery module must not be exposed to corrosive environments.

・ When installing the energy storage system, ensure that it is installed on a dry and flat

The subsurface must be sufficiently load-bearing. Without the written consent of the manufacturer, the

The installation site must not exceed 2,000 m. The nominal output power of the battery decreases with altitude away.

・ In flood areas, it is essential to ensure that the battery module is installed at a suitable height so that it cannot be submerged.

・ The battery energy storage system should be installed in a fireproof room. This room must not contain no fire source and must be equipped with a proper, independent fire alarm system

Similar fire protection requirements also require other room openings (e.g. windows).

Compliance with the instructions given in this manual is also part of proper

Use.

1.7 Requirements of the assembly personnel

All work must be carried out in accordance with regulations.

The GB-L may only be installed by qualified electricians with all the following qualifications become:

・ Training in dealing with dangers and risks associated with the installation and operation of electrical installations and systems and batteries.

・ Training in assembly and troubleshooting of electrical systems.

・ Knowledge of technical connection conditions, standards, guidelines, regulations and laws.

・ Knowledge of handling lithium-ion batteries (transport, storage, disposal, risks).

・ Compliance with this document and other relevant documents.

・ The GB-L installation video can be found atwww.sunova-solar.com , Email: info@sunova-solar.com

2. SECURITY

2.1 Safety rules

To avoid damage to property and personal injury, when working on dangerous, live

The following rules must be observed for components of the battery energy storage system:

- It is ready for use.
- It must not be possible to restart it.
- There must be no voltage present.
- Grounding and short-circuit protection
- Adjacent live parts must be covered or shielded.

2.2 Safety instructions

Damage to parts or short circuits can result in electric shock and death. Connecting

Battery terminals can cause short circuits and allow current to flow. This must be done under all circumstances

be avoided. Therefore, please follow these instructions:

- Work with insulated tools and gloves.
- Do not place tools or metal parts on the battery module or high-voltage regulator.
- When handling the battery, make sure to remove watches, rings and other metal objects.
- The system must not be installed or operated in explosive or high humidity areas

become.

- When working on the energy storage system, turn off the charge controller first and then the battery.

Make sure that both cannot be switched on again for the time being.

Improper Handling of the Energy storage system can fatal be. The use of the

Battery energy storage system beyond its intended purpose is not permitted as it involves high risks

can cause.

Improper handlingwith the energy storage system can result in danger to life, serious injuries or

e[STOP]ad to death.

Warning! Improper handling may damage the battery cell.

- Do not expose the battery module to rain or immerse it in liquids.
- Do not expose the battery module to corrosive environments (e.g. ammonia and salt).

- Troubleshooting of the energy storage system should be carried out no later than six months after delivery.

3. SCOPE OF DELIVERY

3.1 Package GB-LBS and GB-L

① GB-LBS x1 (high-voltage regulator)

② Socket GB-L x1

③ ECOM cable x1

4 PE cable x1

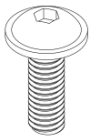
5 EP cable 2.0 x1

6 EN cable 2.0 x1

⑦ Wall mounting plate x2

⑧ Screw(M4*8）x8

⑨ Housing mounting plate x4



⑩ Screw(M4*12）x8

⑪ Handle x2

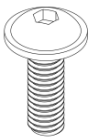
⑫ Expansion screws(M6*100）x2

⑬ User manual x1

3.2 Battery pack GB-L

1 GB-LM4.0 x1

② Housing mounting plate x4



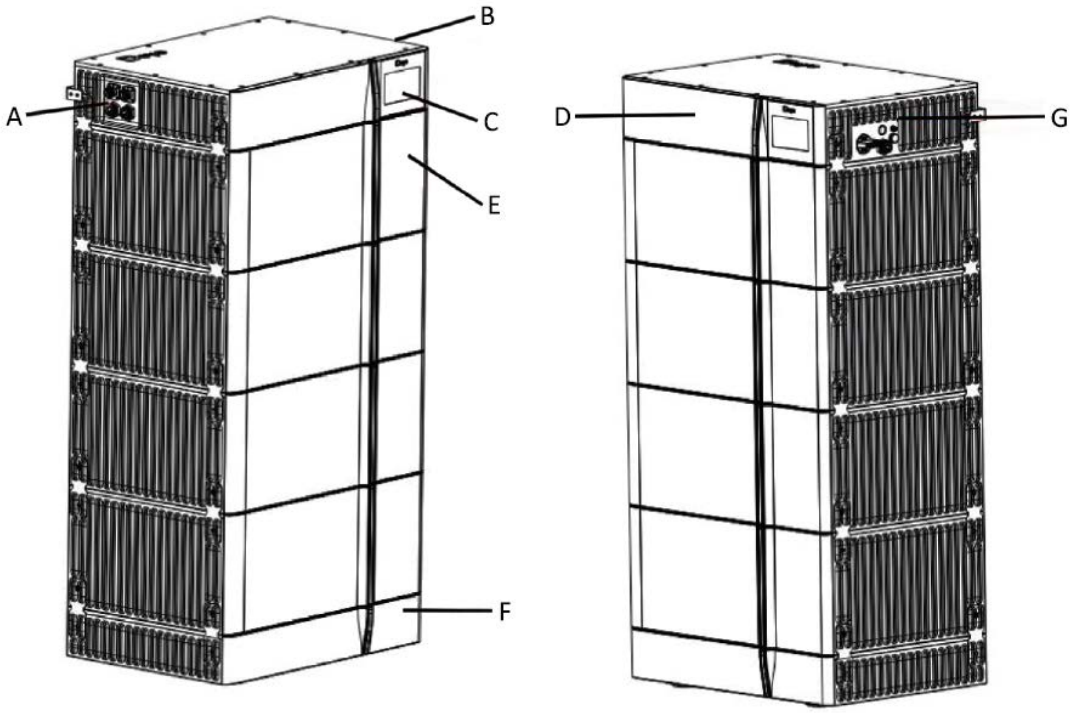
③ Screw(M4*12） x8

Package GB-LBS with base GB-L	
1	High-voltage regulator(GB-LBS**x1**)
2	Battery socket (socket GB-L**x1**)
3	Communication cable 2 m (ECOM cable 2.0**x1**)
4	PE cable 2 m (PE cable 2.0**x1**)
5	Plus cable 2 m (EP-Kabel2.0**x1**)
6	Negative cable 2 m (EN-Kabel2.0**x1**)
5	Wall mounting plate**x2**
5	Retaining screw ⑦ for GB-LBS (M4*8)**x8**
⑨	Mounting on upper and lower housing (housing mounting plate**x4**)
6	Retaining screws ⑨ for two housings (M4*12)**x8**
⑪	Carrying aid (handle**x2**)
3	Expansion screws for wall mounting ⑦ (M6*100)**x2**
⑬	User manual**x1**
Package GB-LM4.0	
1	Battery module (GB-LM4.0**x1**)
2	Mounting on upper and lower housing (housing mounting plate**x4**)
3	Retaining screws ② for two housings(M4*12） **x8**

4. DESCRIPTION OF THE BATTERY SYSTEM

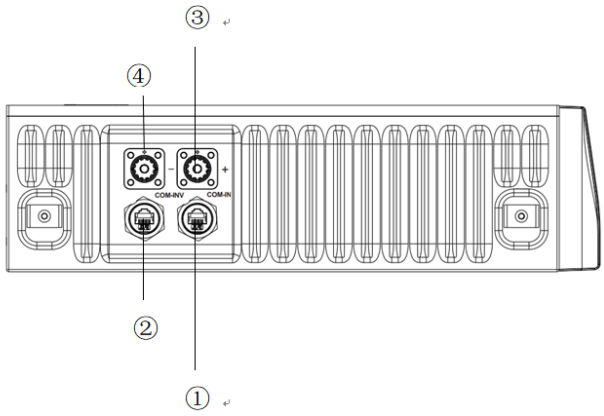
The GT4000-B battery system serves as a connected battery in an inverter system for temporarily storing excess PV energy.

A	Control panel 1
B	GB-LBS (high-voltage regulator)
C	HMI
D	LED
E	GB-L (battery module)
F	Socket GB-L (battery socket)
G	Control panel 2



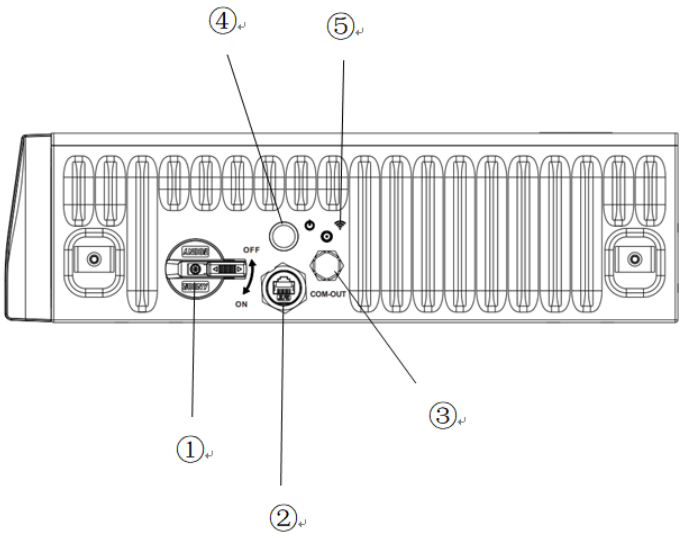
4.1 Control panel

1）Overview of control panel 1



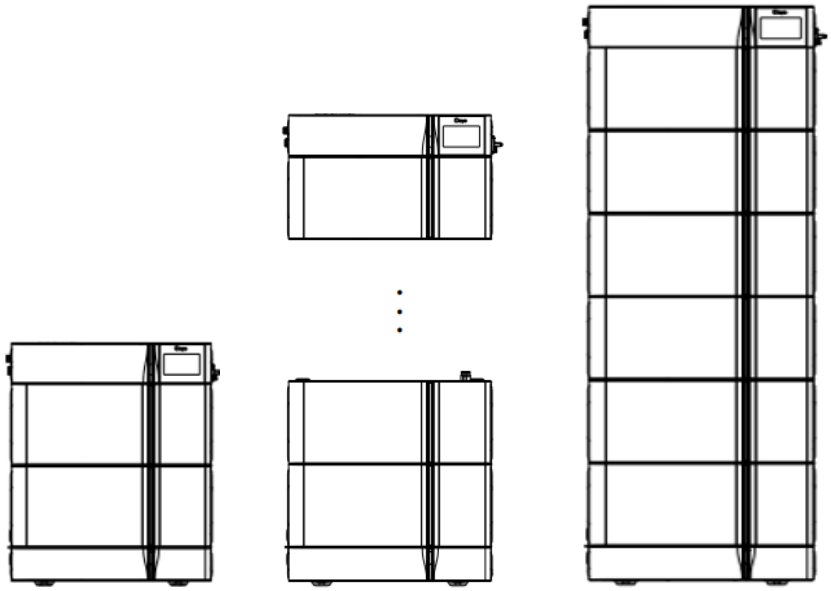
No.	name	Description
1	COM IN	Connection position of the battery module
2	COM INV	Connection position of the inverter
3	B+	Battery module positive pole (orange)
4	B-	Battery module negative pole (black)

2）Overview of control panel 2



No.	name	Description
1	DC SWITCH	High-voltage switch
2	COM OUT	Connection position of the battery module
3	safety valve	/
4	LED button	Low-voltage switch
5	Wi-Fi	Wi-Fi connection

4.2 Number of battery modules suitable for GB-L



2 modules **2 modules ⩽ N ⩽ 6 modules** **6 modules**

Note: In a parallel connection, at least two and a maximum of six modules are required.

5.INSTALLATION

5.1 Specifications for the installation environment

① Installation on a dry, horizontal and flat surface with sufficient load-bearing capacity (for

Example: concrete or masonry).

② The installation site must not be higher than 2000 m (the rated output power of the battery

with height).

③ In flood areas, it is important to ensure that the battery module is installed at a suitable height

so that it cannot be submerged.

4 The installation site must not contain any fire source and must be equipped with a proper, independent

be equipped with a fire alarm system.

⑤ It must not be exposed to corrosive environments.

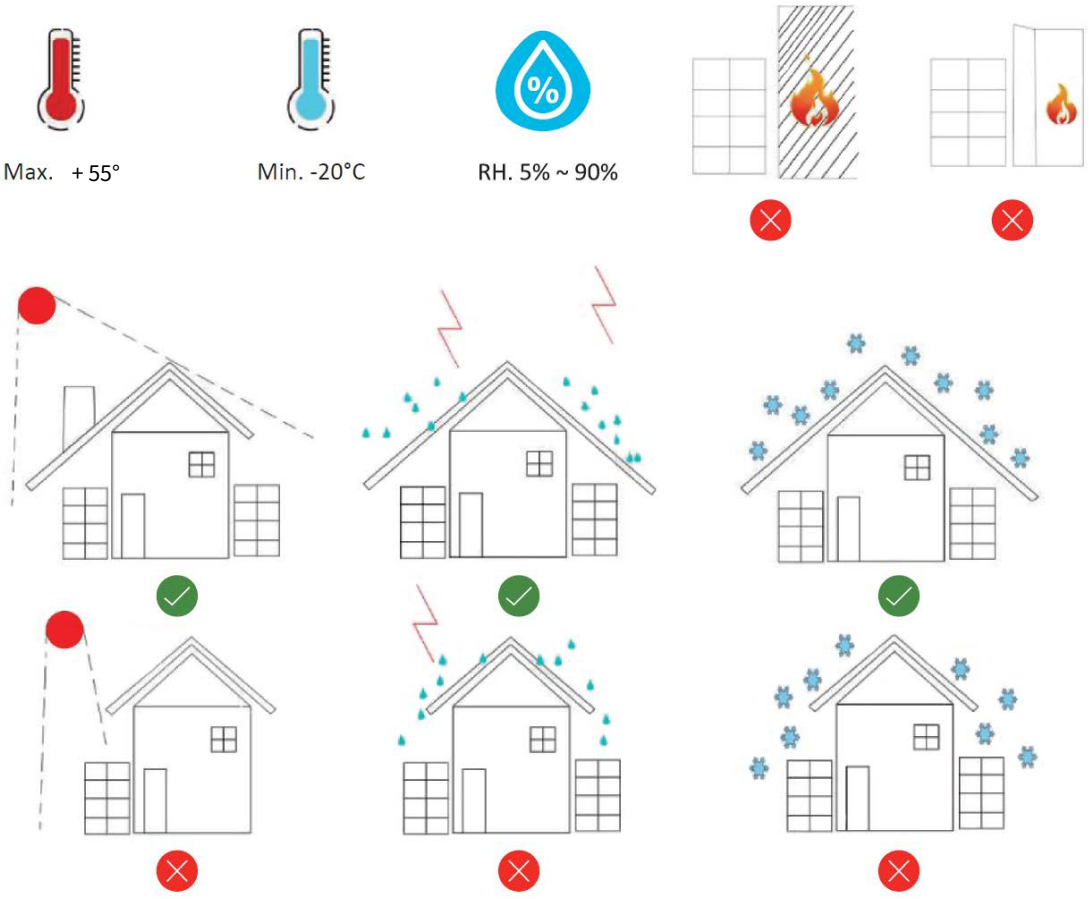
6 The operating temperature range is -20°Cup to 55°C.

⑦ The highest relative humidity is 90%.

⑧ Do not expose to sunlight or place directly next to a heat source.

⑨ The installation location should not be within reach of children and elderly people.

⑩ The location of the installation site should correspond to the weight and size of the battery.

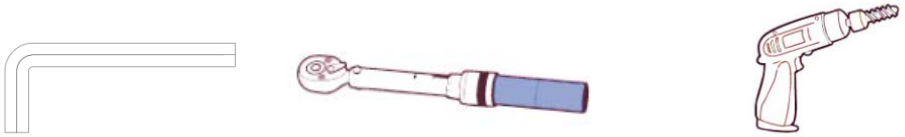


5.2 Tool requirements

1. Wear the following protective equipment during assembly.

Gloves　　Safety glasses　　Safety shoes

2.To assemble the battery system you need the following tools



1　socket wrench　　② Allen key　　③ Electric drill

DANGER!

・Since DC cables and connectors on the battery system pose a shock hazard, do not touch the stripped cable end.

・If the battery module is incorrectly lifted or dropped during transportation or installation, it may cause personal injury due to its weight.

・Transport and lift the battery module carefully. Consider its weight.

・Personnel working on the battery system should wear approved personal protective equipment.

Note: Before installation, switch off the high-voltage regulator.

Note: Gloves, safety goggles and safety shoes must be worn during assembly.

5.3 Assembly processes

DANGER!

1 Before assembly, it is essential to put on safety shoes to avoid foot injuries.

2 A battery module weighs over 30 kg. When stacking, the carrying tool should be handled by two people.

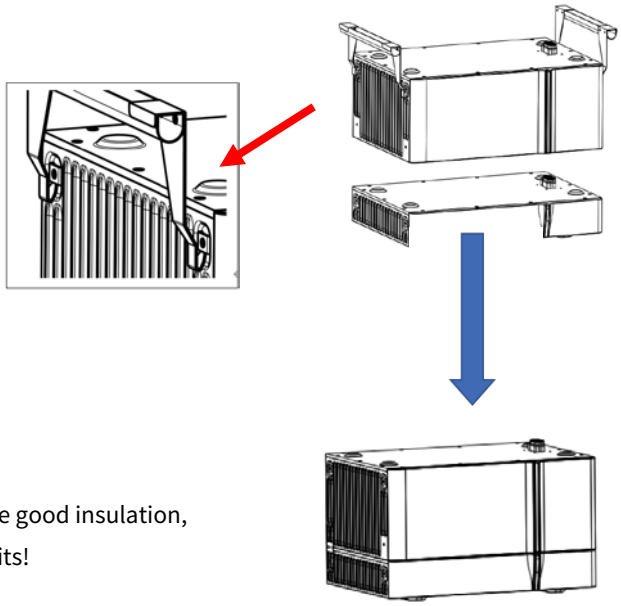
3 The battery module may only be carried with the handle for a maximum distance of 10 m.

4 Before using the carrying tool, its reliability must bebe controlled.

⑤ The relative humidity during installation is between 5% and 90%.

5.3.1 Assembly steps

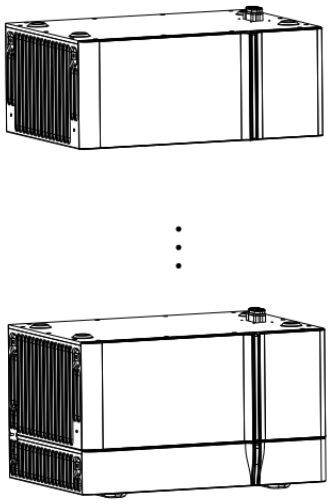
① Remove the base and battery module from the packaging. Place the base on a hard floor,Lift the battery module onto its top with one hand.



DANGER!

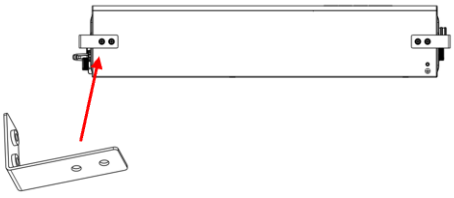
When it's placed on the base, its connector is live. Ensure good insulation, especially due to the risk of high voltage and short circuits!

2 Stack the corresponding connectors on the bottom of the battery module. You can stack 2 to 6 modules in a single battery system.

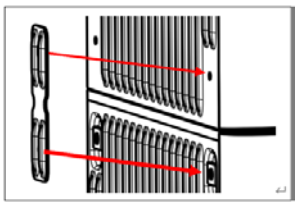


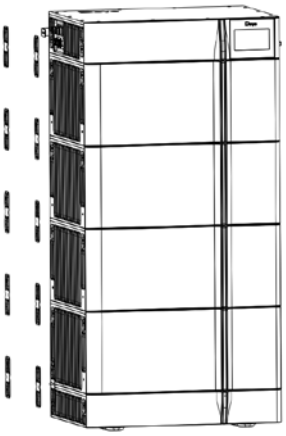
③ Remove the high-voltage regulator from the packaging and mount the wall mounting plate on its prepared hole using M4*8 screws.

4 Finally, attach it to the top layer of the battery module.

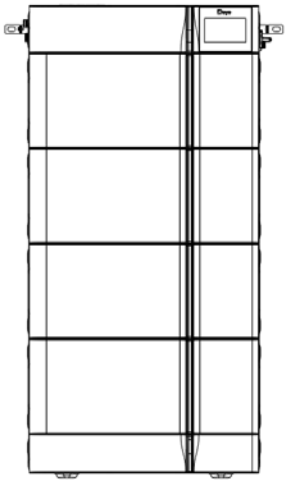


5 Fasten the housing bracket with M4*12 hexagon screws between the base and the battery module, between the battery modules, between the battery module and the high-voltage regulator.



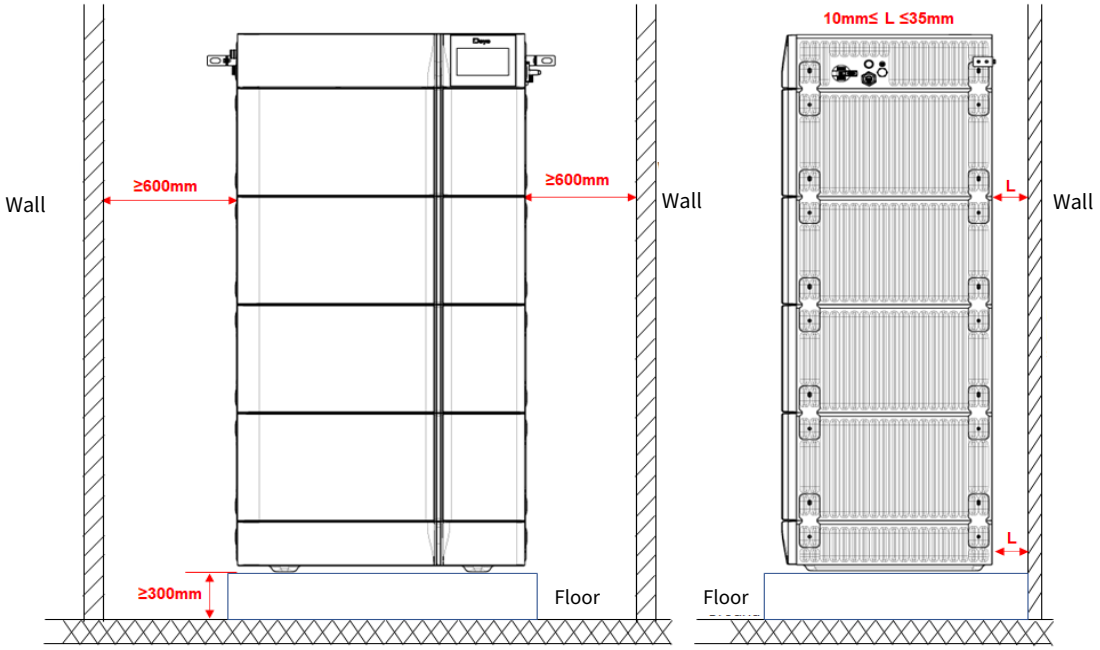


6. Place the high-voltage regulator on one side of the wall. Mark the mounting hole locations. Use an electric drill to drill two holes 100-110 mm deep into the wall. Attach the high-voltage regulator to the wall and use a suitable hammer to drive the expansion screws into the holes.



5.3.2 Selecting the installation location

The installation location should correspond to the dimensions shown in the following figure:



5.4 Interface assignment

Pin assignment COM INV	Pin assignment COM IN		Pin assignment COM OUT	
485B-	1	BMS_CANL	1	BMS_CANL
485A+	2	BMS_CANH	2	BMS_CANH
	3	DI+	3	DO2+
PCANH	4	DI-	4	DO-
PCANL	5		5	
	6		6	
485A+	7		7	
485B-	8		8	

5.5 Batteries in parallel connection

DANGER!

① The power cables between the combination box and the inverter must be the same length.

② If no SUNOVA combination box is provided, the parallel connection must meet the following requirements.

a) For outdoor use, at least IP 55.

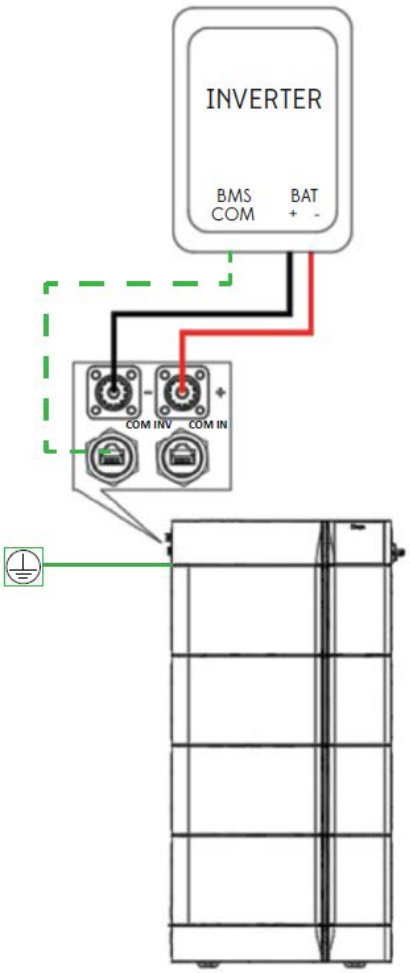
b) Maximum operating voltage: 1000 V DC

c) Maximum output current: 50 A DC

d) Breaking current: 50 A DC.

③ The total length of the power cables between each battery group and the inverter should be no more than 20 meters.

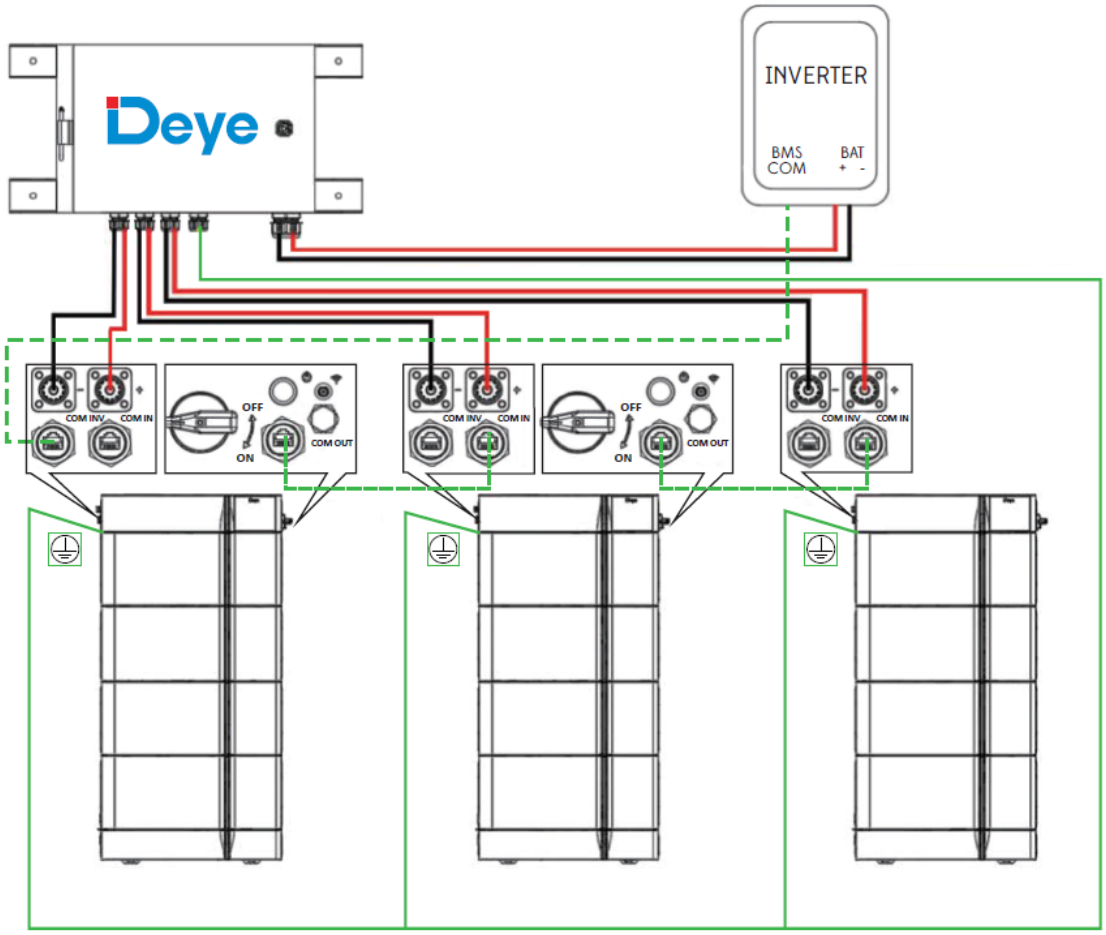
5.5.1 Single battery system



5.5.2 Multiple battery system

If several battery modules are to be connected in parallel, refer to the following figure.

After the individual battery modules are connected, connect the positive and negative connection cables of the high-voltage regulator of each group to the external distribution box.



A notice:

① The maximum number of battery groups should not exceed 16.

② Before the final inspection of the battery circuit, all battery switches must be turned off.

6. COMMISSIONING

6.1 Switching on the battery system

Specifications:

- Battery and inverter must be correctly installed and secured.
- All cables must be connected correctly.
- Before commissioning, see chapter 7.1 Configuring the battery packs.

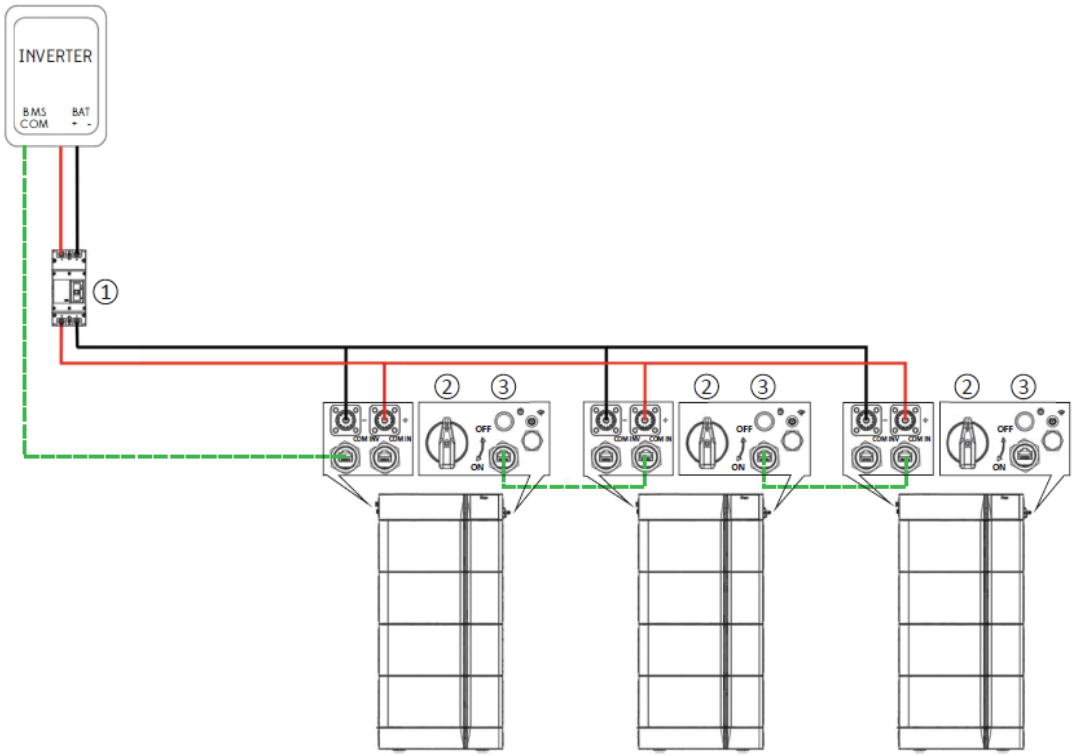
Steps:

1 Turn the external circuit breaker between the high-voltage controller and the inverter from OFF to ON.

2 Turn the high-voltage circuit breaker on the high-voltage regulator from OFF to ON.

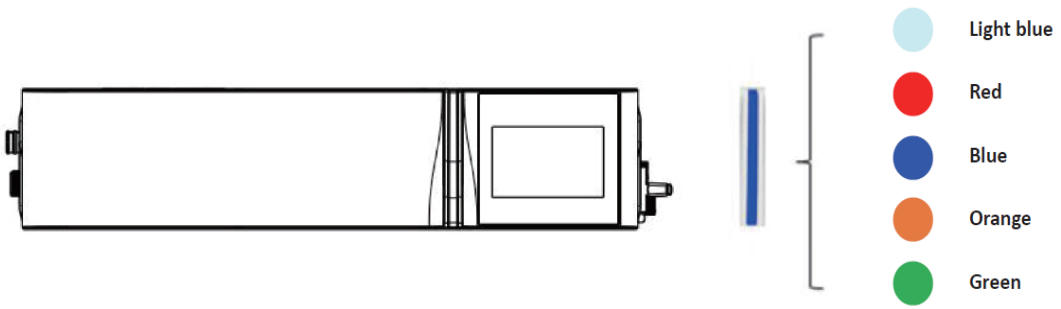
3 Turn the low voltage switch of the high voltage regulator from OFF to ON.

4 After powering on, the system enters test mode, with the ribbon slowly flashing light blue. After the self-test, the light blue light changes to solid blue, indicating the battery system is working.



If the battery system does not start functioning,**PLEASE CONTACT OUR REGIONAL CUSTOMER SERVICE WITHIN 48 HOURS.**

6.2 Function of the indicator lights



Self-control	Light blue light, normal flashing speed If it flashes for more than 1 minute, restart the battery or contact the maintenance service.

Mistake	The red light is constantly on when there is a fault
Normal	The blue light is constantly on. If communication with the inverter cannot be established, the light switches into flashing mode.
alarm	Constant orange when the isolation alarm is triggered.
charge	Green light, normal flashing speed
A notice:	If the low-voltage alarm is triggered for an individual battery cell or battery pack, the light will flash orange at a slow rate. If the voltage of an individual battery cell is between 2.3 V and 0 V, the light will turn off and not turn on again until the charge level exceeds 15%.

In addition to the LED lights, the battery status informationcan be accessed via the screen and main unit. SUNOVA can also read this information remotely via a Wi-Fi connection.

6.3 Switching off the battery system

Steps:

① Turn the low voltage switch of the high voltage regulator from ON to OFF and wait 2 seconds until the blue light goes out.

② Turn the high-voltage protection switch of the high-voltage regulator from ON to OFF.

3 Turn the external circuit breaker between the high-voltage controller and the inverter from ON to OFF. If two or three battery systems are connected in parallel, first turn off the first battery that has a communication port to the inverter, then turn off all the others.

7. SECURITY CONCEPT

1. The battery system cannot be switched on if the battery is incomplete or not installed correctly.
2. The system will automatically shut down if the battery is not in contact with the inverter for 24 hours.
3. The system will automatically shut down if there is an error in the installation of the battery or inverter for 10 minutes.
4. The system will automatically shut down if the voltage is too low for 60 seconds.

7.1 Configuration of the battery packs

Steps:

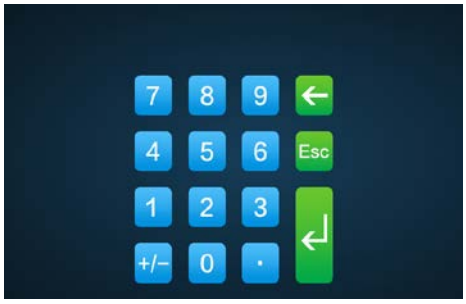
① After connecting the battery cables, set the circuit breaker on the high-voltage regulator from OFF to ON.

② Press the start button and wait until the screen lights up.

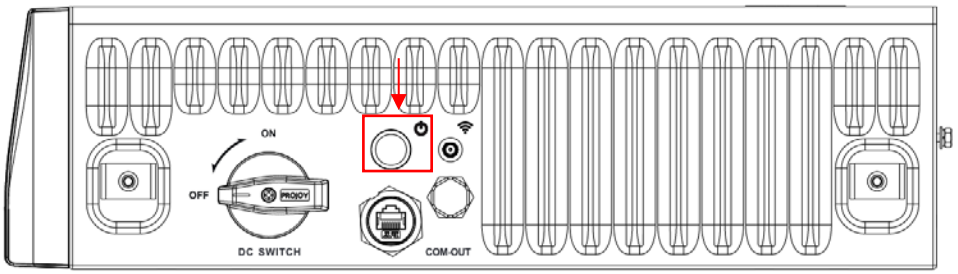
③ Click the icon  on the screen, the password confirmation screen of the maintenance system. Enter the password "123" and click OK to

to open the configuration interface.

4 Click "BMU No" at the bottom left, enter the number of battery packs in the system and click "OK" to complete the configuration of the number of battery packs.



5 After setting, you must restart the device.



7.1.1. Basic parameters

WLAN display	・No Wi-Fi icon on the screen indicates that there is no Wi-Fi signal. ・The flashing Wi-Fi icon on the screen indicates that the Wi-Fi is currently connecting.

	• The Wi-Fi icon on the screen indicates that the Wi-Fi is connected.
System maintenance icon	Click this icon to open the system maintenance screen.
Tension	Total battery voltage
Electricity	Current of the battery, where the positive value corresponds to the discharge and the negative value to the charge
SOC	Percentage of remaining battery power
Total energy	Cumulative discharge energy

7.1.2. Error display:

When the corresponding error type occurs, the red background indicator on the screen will light up. For details, see Section 6.2.

OV	Overvoltage
UV	Undervoltage
OT	Overtemperature
ISO	Insulation fault, there is a risk of leakage current
OC	Charging in case of overcurrent
OF	Other errors

Aside from that:

1. If communication between the battery and the inverter is not established, the light flashes light blue. First, check the communication between the inverter and the battery.

2. When the battery system starts up, the light bar flashes light blue, indicating the battery system is in self-check mode. If the light remains light blue for more than approximately 15 seconds, a malfunction has occurred.

3. If the red light is on, the battery system is faulty. You can check the error information on the screen.

4. The battery system can resolve the error itself within a certain period of time; if this is not possible, restart the battery. If the error persists after restarting, contact customer service.

8. MAINTENANCE AND STORAGE

8.1 Cleaning

The battery system should be cleaned regularly. If the battery case becomes dirty, remove any dust with a soft, dry brush or feather duster. To clean the case,

No solvents, abrasives or corrosive liquids may be used.

8.2 Storage

If the battery energy storage system is not used for an extended period of time, the following table should be followed to maintain battery performance. After charging, turn off all energy storage system switches to minimize power consumption.

Ambient temperature when storing	**Relative humidity of the Storage environment**	**Storage period**	**SOC**
Below -10°C	/	Not permitted	/
- 10 - 25°C	5% - 70%	⩽12 months	25%⩽ SOC ⩽ 60%
25 - 35°C	5% - 70%	⩽6 months	25%⩽ SOC ⩽ 60%
35 - 50°C	5% - 70%	⩽3 months	25%⩽ SOC ⩽ 60%
Over 50°C	/	Not permitted	/

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

9. DISPOSAL

For information on battery module disposal, please contact us. Service hotline: +86 510 8595 9369, email: info@sunova-solar.com . For more information, please visit http://www.sunova-solar.com.

Observe the legal disposal regulations for batteries. Damaged batteries must not be disposed of

Before disposal, contact your installer or distributor. The battery must not be

Do not expose to moisture or direct sunlight.

DANGER:

1. Do not dispose of batteries and rechargeable batteries with household waste!

You are legally obliged to return used batteries and accumulators.

2. Used batteries may contain harmful substances that, if stored or handled improperly, may harm the environment.

or harm your health.

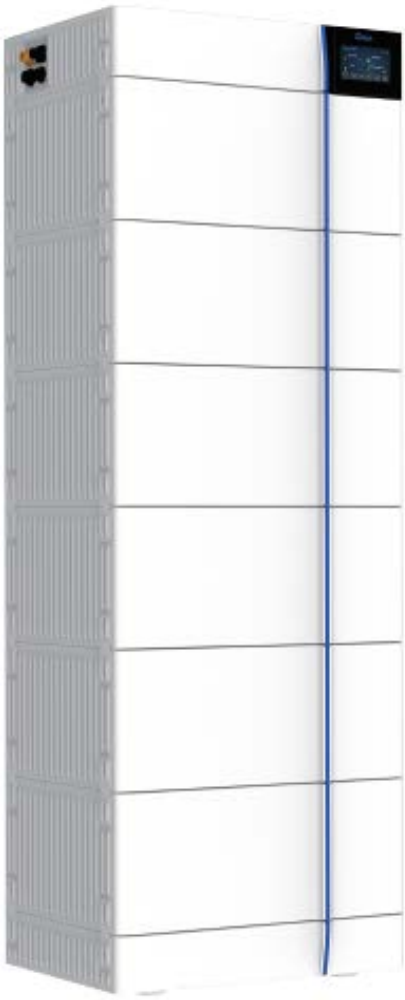
3. Batteries also contain iron, lithium and other important materials that can be recycled.


Li-ion

Installation and Operation Instructions

High-Voltage Battery System

GB-L



version：V1.1

1. IMPORTANT INFORMATION IN THE MANUAL

1.1 Scope

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

This installation and operation manual only applies to countries meeting the certification requirements. Please observe the applicable local laws, regulations, and standards. Standards and legal provisions of other countries may be inconsistent with the provisions and specifications in this manual.
Content may be updated or modified periodically due to product update iterations. The manual is subject to change without prior notice.
The latest manual can be acquired via service-ess@deye.com.cn (www.deyeess.com).

1.2 Description of GB-L

Model	Composition
GB-L	GB-L 8 / 204.8Vdc / 8.18kWh
	GB-L 12 / 307.2Vdc / 12.27kWh
	GB-L 16 / 409.6Vdc / 16.36kWh
	GB-L 20 / 512Vdc / 20.04kWh
	GB-L 24 / 614.4Vdc / 24.56kWh

1.3 Meaning of Symbols

This manual contains the following types of warnings:

Danger!It may cause an electric shock.

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

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

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

Attention!This symbol represents information on the device use.

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

Attention! The risk of chemical burns

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

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

Attention! The risk of explosion

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

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

Caution! Hot surface

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

No open fire!

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

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

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

Wear safety goggles!Wear safety goggles when working on the equipment.

Follow the manual!

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

1.4 General Safety Information

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

1. Improper use can cause death. Operators of GB-L must read this manual and observe all safety information.

2. Operators of GB-L must comply with the specifications in this manual.

3. This manual cannot describe all conceivable situations. For this reason, applicable standards and relevant Occupational health and safety regulations are always given priority.

4. In addition, the installation may involve residual hazards in the following circumstances:

- Incorrect installation.
- The installation is carried out by personnel who did not receive relevant training or guidance.
- Failure to observe the warnings and safety information in this manual.

If there are any questions, please contact Deye ESS after service.

1.5 Disclaimer

DEYE ESS TECHNOLOGY CO., LTD shall not be liable for personal injury, property loss, product damage and subsequent losses under the following circumstances.

- Failure to comply with the provisions of this manual.
- Incorrect use of this product.
- Unauthorized or unqualified personnel repair the product, disassemble the rack and perform other operations.
- Use of unapproved spare parts.
- Unauthorized modifications or technical changes to the product.

1.6 Proper Use

・ The battery energy storage system can only be installed and operated under the roof or indoors. The working environment temperature range of GB-L is -20°C~60°C,and the maximum humidity is 90%. The battery module shall not be exposed to the sun or placed directly next to the heat source.

・ The battery module shall not be exposed to a corrosive environment.

・ When installing the battery energy storage system, ensure that it stands on a sufficiently dry and flat surface with sufficient bearing capacity. Without the manufacturer's written approval, the installation site's altitude shall not higher than 2,000 meters. The rated out put power of the battery will decreases with the altitude.

・ In areas where flooding may occur, care must be taken to ensure that the battery module is installed at a suitable height to prevent contact with water.

・ The battery energy storage system must be installed in a fireproof room. This room must have no fire source and must be equipped with an independent fire alarm device, which complies with local applicable regulations and standards. Similar fire-proof requirements apply to other openings in the room (such as windows).

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

1.7 Requirements for Installation Personnel

All work shall comply with local applicable regulations and standards.

The installation of GB-L can only be completed by electricians with all following qualifications:

・ Trained in dealing with hazards and risks associated with the installation and operation of electrical equipment, systems, and batteries.

・ Trained on installation and debugging of electrical equipment.

・ Understanding and complying with the technical connection conditions, standards, guidelines, regulations, and laws applicable.

・ Knowledge of handling lithium-ion batteries (transportation, storage, disposal, hazard source).

・ Understanding and complying with this document and other applicable documents.

2. SAFETY

2.1 Safety Rules

To avoid property damage and personal injury, the following rules shall be followed when working on the

hazardous live parts of the battery energy storage system:

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

2.2 Safety information

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

For this reason, follow these instructions:

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

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

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

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

- Do not expose the battery module to rain or soak it in liquid.
- Do not expose the battery module to a corrosive environment (such as ammonia and salt).
- The battery energy storage system shall be debugged no later than six months after delivery.

3. SCOPE OF DELIVERY

3.1. GB-LBS and GB-L Base package

② GB-LBS x1(high voltage control box)

② GB-L Base x1

③ ECOM Cable 2.0 x1

4 PE Cable 2.0 x1

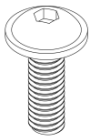
5 EP Cable 2.0 x1

6 EN Cable 2.0 x1

⑦ Wall Fixing Plate x2

5 Screw(M4*8）x8

⑨ Box fixing plate x4



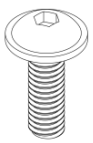
6 Screws(M4*12）x8

⑪ movable handle x2

3 Expansion screws(M6*100）x2

⑬ Operating Manual x1

3.2. GB-LM4.0 battery package



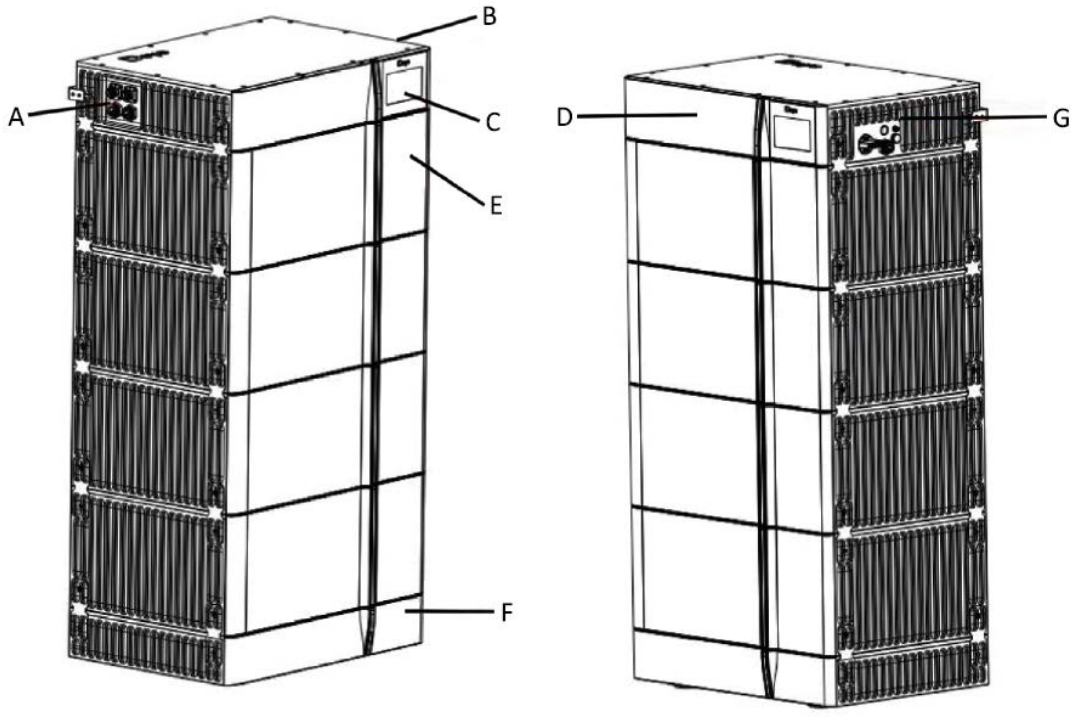
2 GB-LM4.0 x1　　2 Box fixing plate x4　　3 Screw(M4*12) x8

GB-LBS and GB-L Base package	
1	High-voltage control box**(**GB-LBS**x1**)
2	Battery base (GB-L Base**x1**)
3	2meters communication cable (ECOM Cable2.0**x1**)
4	2 meters PE cable (PE Cable2.0**x1**)
5	2meters positive power cable (EP Cable2.0**x1**)
6	2meters Negative power cable (EN Cable2.0**x1**)
5	Wall Fixing Plate**x2**
5	Screw to fix ⑦ on GB-LBS (M4*8)**x8**
⑨	Fix the upper and lower boxes (Box fixing plate**x4**)
6	Screws to fix ⑨ on two boxes (M4*12)**x8**
⑪	Move the battery box (movable handle**x2**)
3	Expansion screws to fix ⑦ on wall (M6*100)**x2**
⑬	Operating Manual**x1**
GB-LM4.0 package	
1	Battery module (GB-LM4.0**x1**)
2	Fix the upper and lower boxes (Box fixing plate**x4)**
3	Screws to fix2on two boxes(M4*12) **x8**

4. BATTERY SYSTEM INTRODUCTION

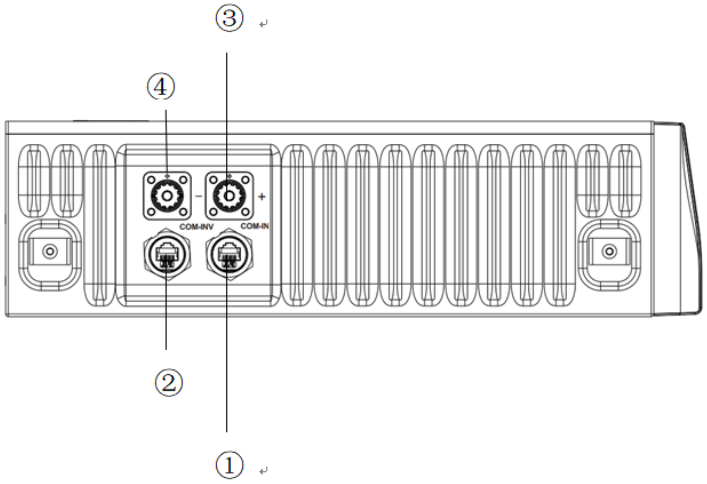
The Battery System GB-L is used as a connected battery for the intermediate storage of excess PV energy in an inverter system.

A	Operating Panel 1
B	GB-LBS (high voltage control box)
C	HMI
D	LED
E	GB-LM4.0 (battery module)
F	GB-L Base(battery base)
G	Operating Panel 2



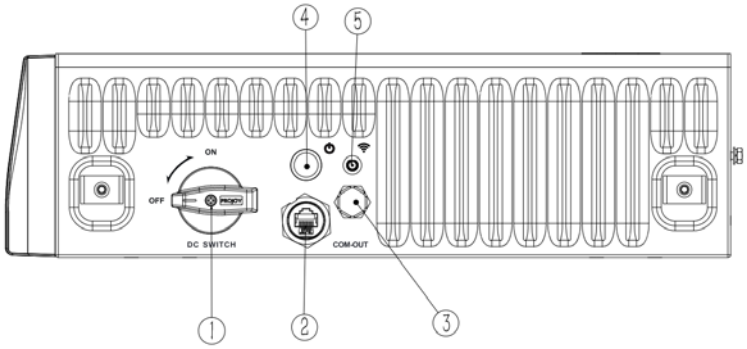
4.1 Operating Panel

1）Operating Panel 1 interview



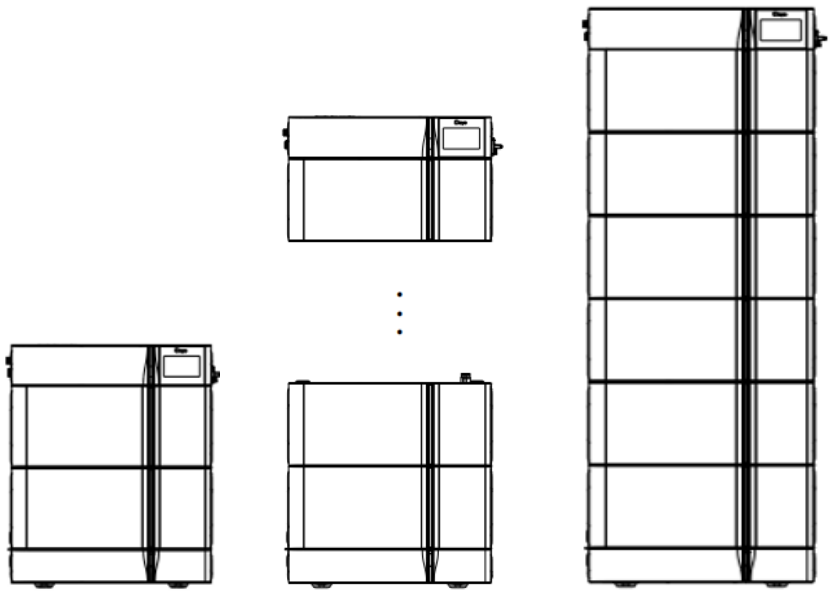
No.	name	Description
1	COM IN	Connection position of battery module
2	COM INV	Connection position of inverter
3	B+	Battery module positive pole (orange)
4	B-	Battery module negative pole (black)

2）Operating Panel 2 interview



No.	name	Description
1	DC SWITCH	High-voltage DC switch
2	COM OUT	Connection position of battery module
3	safety valve	/
4	LED button	Low Voltage DC Switch
5	WIFI	WIFI connection

4.2 Number of battery modules supported by GB-L



2 modules **2 modules≤N≤6 modules** **6 modules**

Note: Minimum two battery modules are required and Maximum Six modules in one parallel.

5.INSTALLATION

5.1. Installation Place Requirement

① Installed on the surface with enough dryness, horizontal and flat, and has sufficient carrying capacity. (For example, concrete or masonry).

② The altitude of the installation location must not be higher than 2000 meters. (The output power of the battery will decrease with the height of the altitude).

③ If in the flood area, you must pay attention to ensure that the battery is installed at an appropriate altitude prevent contact with water.

④ Ensure there is no fire source, and it must be equipped with an independent fire alarm device.

⑤ Cannot be exposed to corrosive environments.

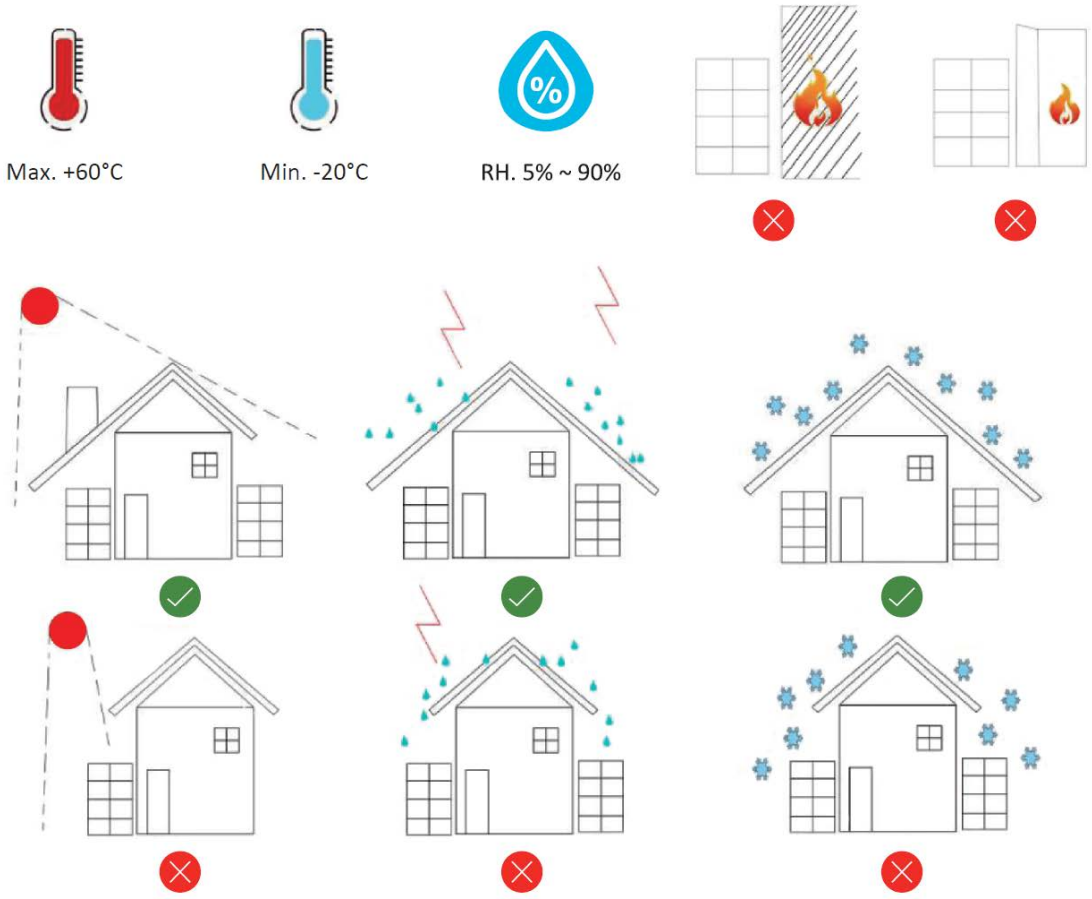
⑥ The working temperature range should be -20°Cto 60°C.

⑦ The maximum environmental humidity is 90%.

⑧ Can't be exposed to the sun or beside the heat source directly.

⑨ The installation site must be away from the children and the old.

⑩ The installation position must be compatible with the weight and size of the battery.

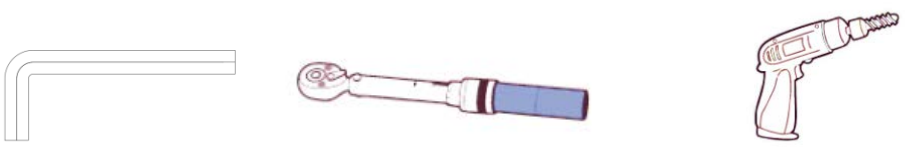


5.2 Tool Requirements:

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

Gloves Goggles Safety Shoes

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



2 socket head wrench 2 External hexagonal wrench 3 electric drill

ATTENTION!

・Because the DC cable or connector on the battery system may cause electric shock or life threatening, do not contact the end of the non-insulating cable.

・If the battery module incorrectly lifts or falls in the process of transportation or installation, it may cause the risk of injury due to the weight of the battery module.

・Carefully transport and lift the battery module. Consider the weight of the battery module.

・For those who work for the battery system, please wear qualified personal protection equipment.

Note: Before the battery is installed, please switch off the Switch on the high Voltage Control Box. Note: Wear gloves, goggles and safety shoes before installation.

5.3 Installation steps

CAUTION!

① Before installation, please make sure to wear the safety shoes to prevent foot injury.

② The weight of a battery module is over 30kg. Please use the movable tool with two workers to complete stacking work.

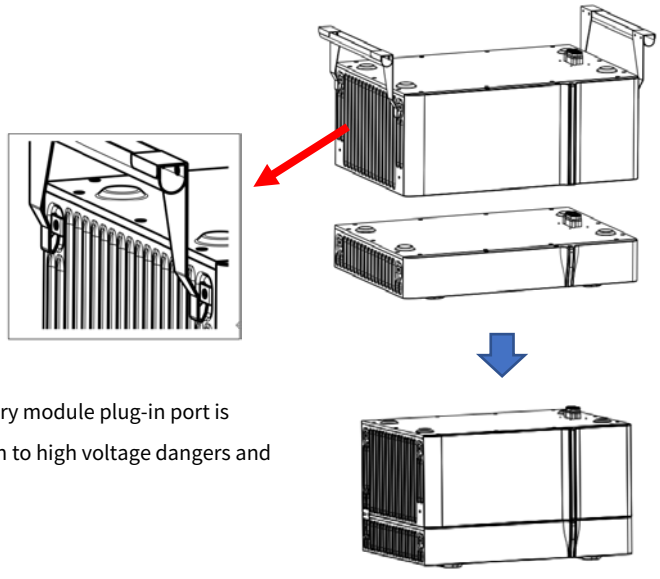
3 Do not use the movable handle tool to carry the battery module when the distance is≥10m.

④ Before using the transport tools, check whether theyare reliable.

5 The installation humidity ranges from 5% to 90%

5.3.1 Product Installation Steps

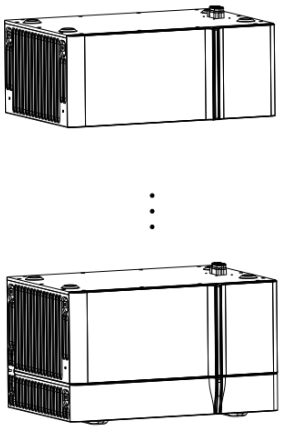
① Take out the base and battery module. Place the base on hard floor,lift the battery module on top of the base using a movable handle tool.



CAUTION!

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

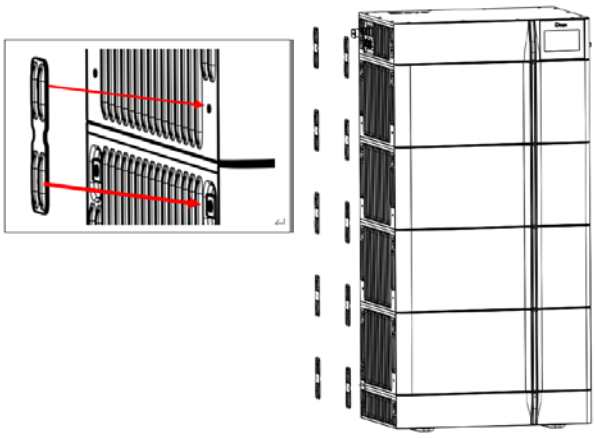
2 Stack the corresponding connection ports at the bottom of the battery module. The number of stackable battery modules for a single battery system ranges from 2 to 6.



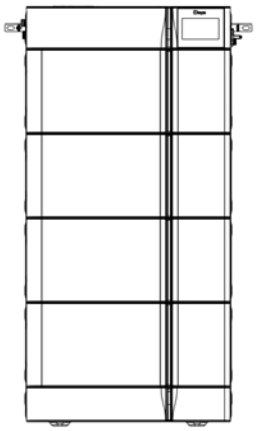
③ Take out the high voltage box, and install the wall fixing plate on the pre-mounting hole of the high voltage box with M4*8 screws,

④ Finally, install the high voltage box to the top layer of the battery module.

5 Use M4*12 hex socket screws to install the box fixing plate between the base and the battery module, between the battery modules, between the battery module and the high voltage box as well.

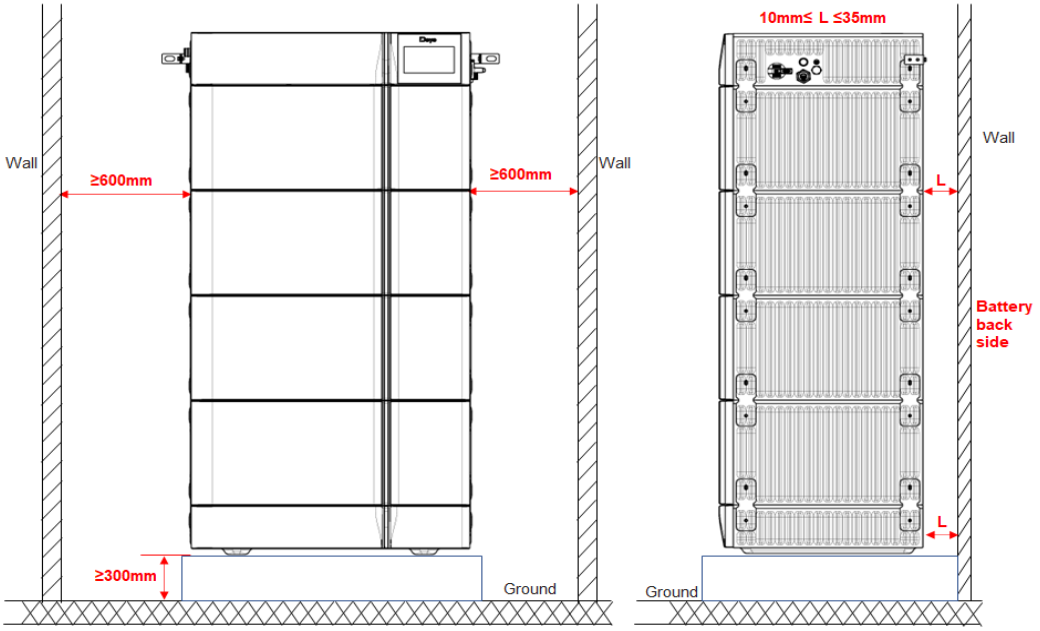


6 Place the high voltage box on one side of the wall, mark the positions of fixing holes, drill two holes in the wall with a depth of 100-110mm using the electrical drill, secure the high voltage box to the wall and install expansion bolts in the holes with a proper hammer.



5.3.2 Selection of installation sites

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



5.4 Definition of Interface

Port definition of Com inv	Port definition of COM IN		Port definition of COM OUT	
485B-	1	BMS_CANL	1	BMS_CANL
485A+	2	BMS_CANH	2	BMS_CANH
	3	DI+	3	DO2+
PCANH	4	DI-	4	DO-
PCANL	5		5	
	6		6	
485A+	7		7	
485B-	8		8	

5.5 Batteries in parallel

CAUTION!

① The length of the power cables between the combiner box and the inverter should be same.

② If the DEYE combiner box is not used, the parallel connection device should meet the following requirements.

a) No less than IP 55 for outdoor use.

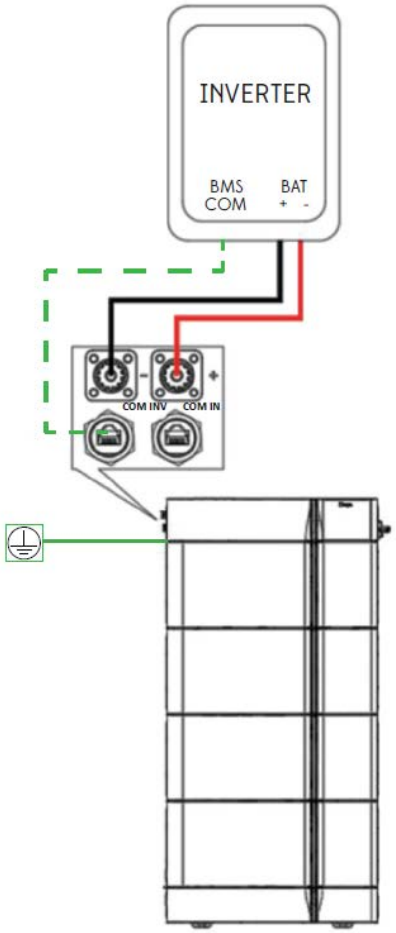
b) Maximum Operating Voltage, 1000V DC

c) Maximum Output Current,50A DC

d) Breaking current, 50A DC.

③ The total power cable length between each batteryclusterand the inverter should be less than 20 meters.

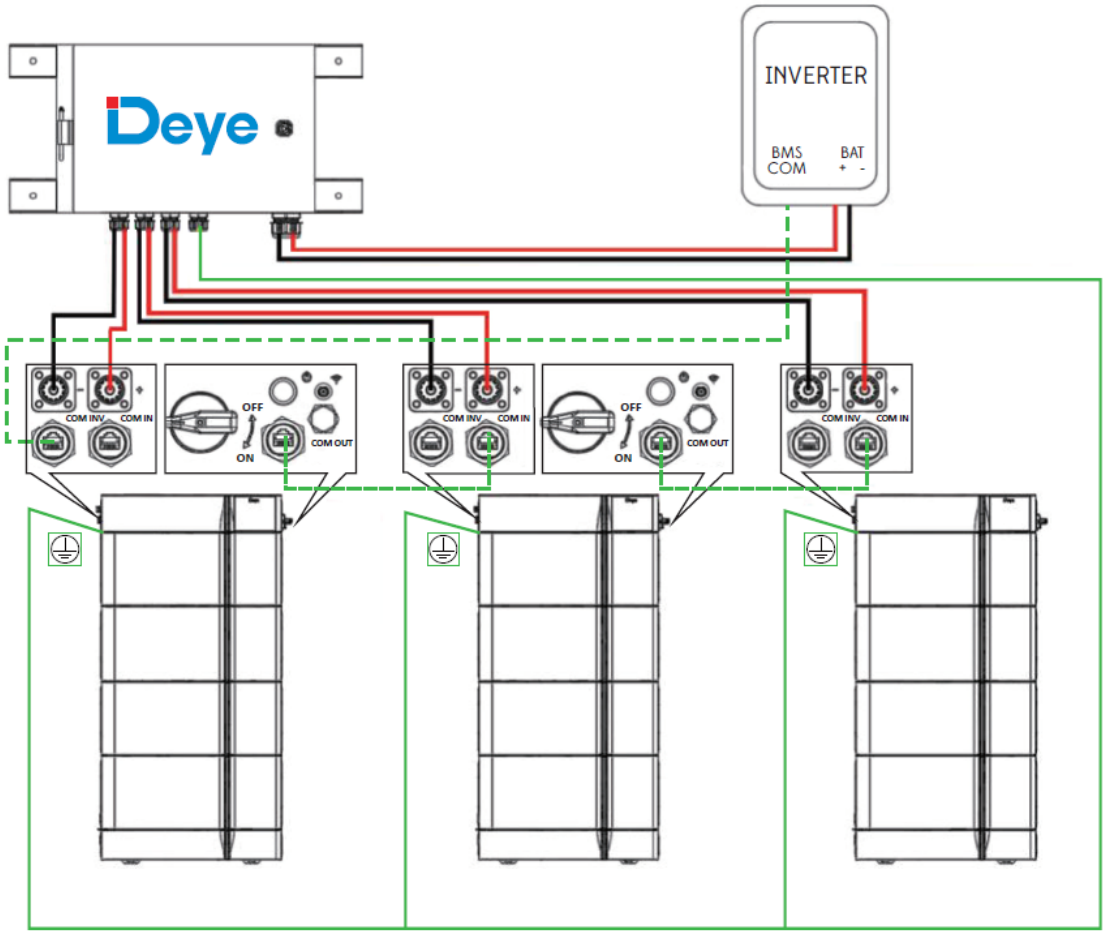
5.5.1 Single Battery System



5.5.2 Multiple Battery System

If multiple battery modules need to be connected in parallel, please refer to the following figure.

After single cluster battery modules are connected, takes positive and negative connection cables from each cluster battery's high voltage box connect to the external junction box.



Note:

③ The maximum number of battery clusters shall not exceed 16.

④ Before verifying that the battery system is fully connected, ensure that all battery switches are off.

6. COMMISSIONING

6.1 Switch on the Battery System

Requirements:

- The battery and the inverter must be properly installed and fixed。
- All cables must be correctly connected.
- Before commissioning, refer to 7.1 chapter Configuring Battery Packs.

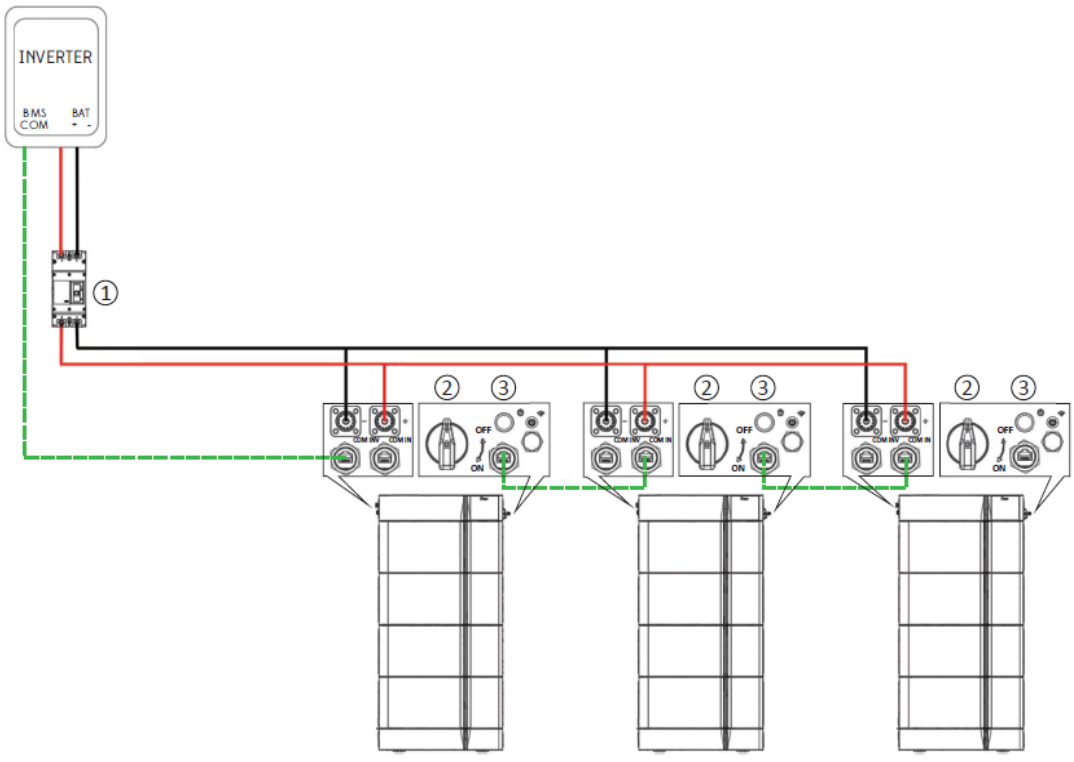
Steps:

① Turn the external protection switch between the high voltage box and the inverter from OFF to ON.

② Turn the high voltage isolation switch of the high voltage box from OFF to ON.

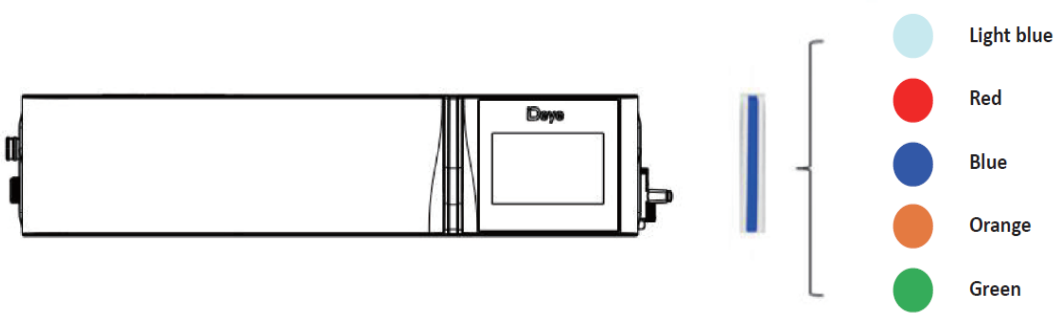
③ Turn the low voltage button switch of the high voltage box from OFF to ON.

④ After startup, the system enters the self-check mode, the color belt is light-blue breathing light. After the self-check, the light-blue breathing light changes to blue and the battery system starts to work properly.



If it is failed to switch on the battery system.**CONTACT OUR LOCAL AFTER-SALE SERVICE WITHIN 48 HOURS.**

6.2Light meaning



Self-check	Light blue light, breathing at normal rate If the duration exceeds 1 minute, restart the battery or contact maintenance personnel.
Fault	the red light is steady on when the system fails
Normal	The blue light is steady on by default. If inverter communication is not available, the light switches to the breathing mode.
alarm	Orange light, the light is always on when the insulation alarm is triggered.
Charging	Green light, breathing at normal rate.
Note:	If single battery cell under voltage alarm or battery pack under voltage alarm is triggered, The light will flash at slow rate with orange color.If one single battery cell voltage is between 2.3V and OV, the light will be turn off and turn on again when SOC is above15%.

In addition to the LED lights, the battery faultinformation can be obtained through the screen and the master device. DEYE can also read this information through remote WLAN connection.

6.3. Switch off the battery system

Steps:

① Turn the low voltage switch of the high voltage box from ON to OFF, and wait for 2 seconds until the blue button light goes off.

② Turn the high voltage isolation switch of the high voltage box from ON to OFF.

③ Turn the external protection switch between the high voltage box and the inverter from ON to OFF

If two or three battery systems are connected in parallel, please firstly switch off the first battery which has a communication connection to the inverter, and then switch off all the other batteries.

7. SAFETY DESIGN

1.The battery system cannot be turned on if the battery is incomplete or is not installed properly.

2.The system will automatically shut down if the battery does not communicate with the inverter for 24 hours.

3.The system will automatically shut down if the battery or inverter installation error occurs for 10 minutes.

4.The system will automatically shut down if the voltage is too low within 60 seconds.

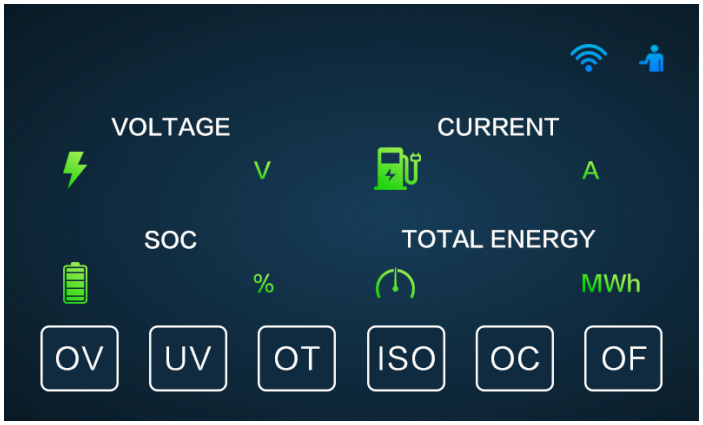
7.1 Procedure for configuring battery packs

Steps:

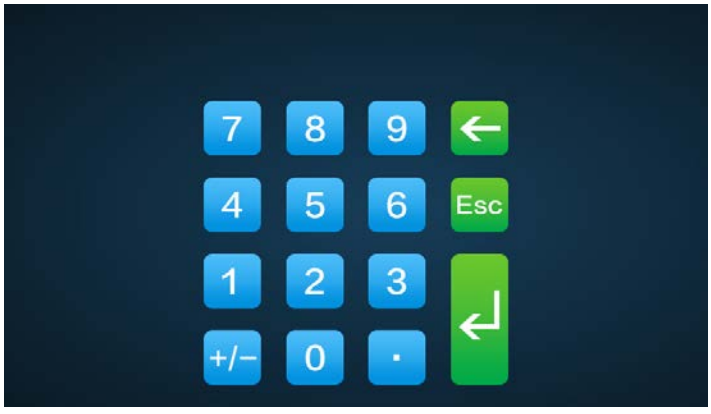
① After connecting the battery cables, The isolate switch button on the high-voltage control box to turn OFF to ON.

② Press the start button and wait for the screen to light up.

③ Click the icon on screen to enter the maintenance system password confirmation interface.

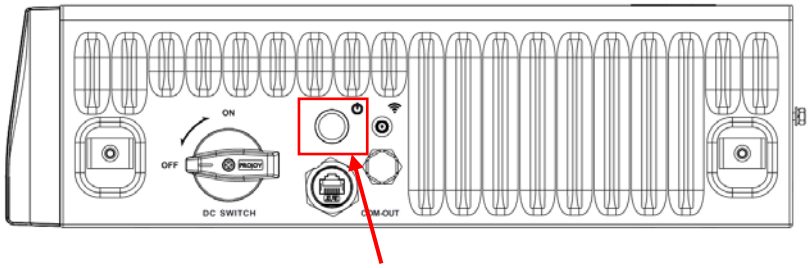


④ Enter the password 123 and press the Confirm key to enter the main interface of system maintenance. The operation shall be performed by a professional.



5 Click “BMU No” in the lower left corner, enter the number of battery packs in system and click “OK” to finish configuring the number of battery packs.

⑥ After the setting is successful, you need to restart.



7.1.1. Basic Parameters

Wi-Fi icon	• No Wi-Fi icon on the screen indicates no Wi-Fi signal. • The flashing Wi-Fi icon on the screen indicates the Wi-Fi is in connecting. • The Wi-Fi icon on the screen indicates the Wi-Fi is connected.
System maintenance icon	Click this icon to enter the system maintenance interface.
Voltage	Total battery voltage
Current	Battery current, the positive value representing discharging, the negative value representing charging
SOC	Percentage of battery remaining energy
Total energy	Accumulated discharging energy

7.1.2. Fault Indication:

When the corresponding fault type occurs, the red background indicator on the screen will light up. Refer to 6.2 for details.

OV	Overvoltage
UV	Undervoltage
OT	Overtemperature
ISO	Insulation failure, there is a risk of leakage current
OC	Charging over current
OF	Other faults

In addition：

1. If the communication between the battery and the inverter is not connected, the breathing light will be light-blue. Please check the communication between the inverter and battery first.
2. When the battery system starts, the breathing light belt is light blue and breathing flashes, and the battery system is in the state of self-check. If the light blue color remains for a long time ⩾15s, the system is in an abnormal state and cannot work.
3.When the red light is on, it indicates that the battery system is faulty. You can check the faulty information on the screen.
4. The battery system can repair the fault within a certain time itself; If the fault cannot be rectified, restart the battery. If the fault still exists after restart, contact after-service or technical support.

8. MAINTENANCE AND STORAGE

8.1 Cleaning

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

8.2 Storage

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

Storage environment temperature	**Relative humidity of the storage environment**	**Storage time**	**SOC**
Below-10°C	/	Not allowed	/

- 10-25℃	5%-70%	⩽12 months	25%⩽SOC⩽60%
25-35℃	5%-70%	⩽6 months	25%⩽SOC⩽60%
35-50℃	5%-70%	⩽3 months	25%⩽SOC⩽60%
Above 50℃	/	Not allowed	/

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

9. DISPOSAL

For details related to the disposal of battery modules, please contact us. Service hotline: +86 0574 8612 0560, Email: service-ess@deye.com.cn . For more information, please visit http://deyeess.com.

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

Attention:

1. Do not dispose of batteries and rechargeable batteries as domestic waste!

You are legally obliged to return used batteries and rechargeable batteries.

2. Waste batteries may contain pollutants that can damage the environment or your health if improperly stored or handled.

3. Batteries also contain iron, lithium and other important raw materials, which can be recycled.

231013008

www.deyeinverter.com

EU Declaration of Conformity

Product:Rechargeable Li-ion battery system
Models:GB-LX(X=8,12,16,20,24)

Name and address of the manufacturer:NINGBO DEYE ESS TECHNOLOGY CO., LTD
No. 18,Zhenlong 2 Road,Binhai Economic Development Zone,Cixi,Ningbo,Zhejiang,China

This declaration of conformity is issued under the sole responsibility of the manufacturer. Also this product is under manufacturer's warranty.
This declaration of conformity is not valid any longer: if the product is modified, supplemented or changed in any other way, as well as in case the product is used or installed improperly.

The object of the declaration described above is in conformity with the relevant Union harmonization legislation: The Electromagnetic Compatibility (EMC) Directive 2014/30/EU; the restriction of the use of certain hazardous substances (RoHS) Directive 2011/65/EU.

References to the relevant harmonized standards used or references to the other technical specifications in relation to which conformity is declared:

EMC:	
EN IEC 61000-6-1:2019	●
EN IEC 61000-6-3:2021	●

宁波德业储能科技有限公司
NINGBO DEYE ESS TECHNOLOGY CO.,LTD

Nom et Titre / Name and Title:

KunLei Yu
Test Manager

Au nom de / On behalf of:
Date / Date (yyyy-mm-dd):
A / Place:

NINGBO DEYE ESS TECHNOLOGY CO., LTD.
2023-10-13
Ningbo, China

NINGBO DEYE ESS TECHNOLOGY CO., LTD
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