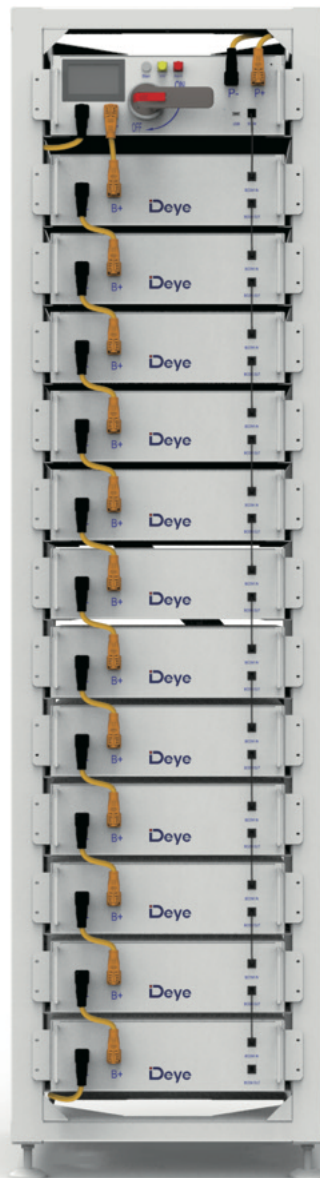


Installation and Operation Instructions

LITHIUM STORAGE SYSTEM

BOS-G



CONTENT

1. Important information in the manual	4
1.1 Scope	4
1.2 Description of BOS-G	4
1.3 Meaning of symbols	5
1.4 General safety information	7
1.5 Disclaimer	7
1.6 Proper use	8
1.7 Quality certificate	8
1.8 Requirements for installation personnel	9
2. Safety	10
2.1 Safety rules	10
2.2 Safety information	11
3. Transport to the end customers	11
3.1 Provisions on Shipping of Battery Modules	11
3.2 Permissible and Impermissible Storage Positions of a Packaged Battery module	12
4. Preparation	13
4.1 Tools required	13
4.2 Auxiliary tools and materials required	13
5. Description and Installation of BOS-G	14
5.1 Installation precautions	14
5.2 BOS-G product description	14
5.3 Product data	15
5.4 Description of rack	15
5.5 Installation of rack	16
5.6 Description of battery module	17
5.7 Description of high-voltage control box	17
5.8 Description of battery module in rack	18
5.9 Installation of the battery module to the rack	20
5.10 Startup steps of BOS-G	21
5.11 External 12V power supply of high-voltage control box	21
6. BOS-G's user interface	22
6.1 Main interface	22
6.2 Description of user interface	22
6.3 User interface	24
6.4 Maintenance interface	24
7. Instructions for HVESS-Monitor use	25
7.1 Main page	25
7.2 Function list	25
7.3 Function description	26
8. BOS-G's fault description	35
9. Summary of fault types in BOS-G's screen and HVESS-Monitor	38

10. Maintenance and upgrade	40
10.1 Maintenance of BOS-G	40
10.2 USB's upgrade	41
11. Battery module storage	41
12. Disposal	42
13. Appendix	43
13.1 Circuit diagram for on grid system with 12V supply	43
13.2 System Circuit Diagram	44
14. Legal notice	45

1. IMPORTANT INFORMATION IN THE MANUAL

1.1 Scope

The installation and operation manual applies to the modular battery energy storage system. Please carefully read this installation and operation manual to ensure the safe installation, preliminary debugging, and maintenance of BOS-G. Installation, preliminary debugging, and maintenance must be carried out by qualified and authorized personnel. Please keep this installation and operation manual and other applicable documents near the battery energy storage system, so that all personnel 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. In this case, please contact our after-sales service personnel, hotline: +86 0574 8612 0560, email: service-ess@deye.com.cn.

1.2 Description of BOS-G

Model	System energy (kWh)	Composition
BOS-G	15.36	BOS-GM5.1*3+HVB750V/100A*1
	20.48	BOS-GM5.1*4+HVB750V/100A*1
	25.6	BOS-GM5.1*5+HVB750V/100A*1
	30.72	BOS-GM5.1*6+HVB750V/100A*1
	35.84	BOS-GM5.1*7+HVB750V/100A*1
	40.96	BOS-GM5.1*8+HVB750V/100A*1
	46.08	BOS-GM5.1*9+HVB750V/100A*1
	51.2	BOS-GM5.1*10+HVB750V/100A*1
	56.32	BOS-GM5.1*11+HVB750V/100A*1
	61.44	BOS-GM5.1*12+HVB750V/100A*1

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 power 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.

Symbols on equipment:

The following types of warning, prohibition, and mandatory symbols are also used on the equipment.



Attention! The risk of chemical burns

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

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



Attention! The risk of explosion

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

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



Caution! Hot surface

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



No open fire! It is prohibited to handle open flames and ignition sources near the energy storage system.



Do not insert any objects into the opening in the housing of the energy storage system!
No objects, such as screwdrivers, may be inserted through openings in the casing of the storage system.



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 BOS-G must read this manual and observe all safety information.
2. Operators of BOS-G 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 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, disassembly 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 in an enclosed space. The working environment temperature range of BOS-G is $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$, and the maximum humidity is 85%. The battery module shall not be exposed to the sun or placed directly beside the heat source.
- The battery module shall not be exposed to a corrosive environment.
- When installing the battery energy storage system, ensure that it stands on a sufficiently dry and flat surface with sufficient bearing capacity. Without the manufacturer's written approval, the installation site's altitude shall not be higher than 2,000 meters. The output power of the battery 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 and to prevent its 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. According to local applicable regulations and standards, the room must be separated by the T60 fire door. 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.

The use of the BOS-G system is prohibited in the following circumstances:

- Mobile use on land or in the air (use on water only with the manufacturer's consent and with the manufacturer's written consent).
- Used in medical devices.
- Used as a UPS system.

1.7 Quality Certificate

The quality certificate can be downloaded from www.deyeess.com.

1.8 Requirements for Installation Personnel

All work shall comply with local applicable regulations and standards.

The installation of BOS-G can only be completed by electricians with the 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.
- Installation video of BOS-G can be found at www.deyeess.com or contact us via email: service-ess@deye.com.cn.

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.

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

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



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

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

3. TRANSPORT TO THE END CUSTOMERS

3.1 Provisions on Shipping of Battery Modules:

It is necessary to comply with the relevant regulations and provisions on roads for shipping lithium-ion products in the corresponding countries.



It is prohibited to smoke in the vehicle during transportation or in the vicinity during loading and unloading.



The dangerous goods transport vehicles shall meet relevant regulations concerning road transportation and shall be equipped with two tested CO₂ fire extinguishers.



It is forbidden for the freight forwarder to open the outer package of the battery module. Use only approved lifting equipment to move the battery cabinet system. Use only the hanging lug on the top of the battery cabinet as the connection point. When lifting, the angle of the sling must be at least 60°.



Improper vehicle transportation can cause injury. Improper transportation or improper transportation locks may cause the load to slip or overturn, resulting in injury. The cabinet shall be placed vertically to prevent it from sliding in the vehicle, and a fixing belt shall be used.



A tilting of the battery rack may cause injury. The maximum weight of a single battery rack of BOS-G can reach 628 kg. When tilted, they may overturn, causing injury and damage. Ensure that the battery cabinet is on a stable surface and that it does not tilt due to load or force.



The battery energy storage system can be damaged, if not properly transported. The battery module can only be transported vertically. Note that these parts may be top-heavy. Failure to follow this instruction may result in damage to the part.



During transportation, the battery storage rack may be damaged when it is installed with the battery module. The battery storage rack is not designed to be transported with the installed battery modules. Always transport the battery module and the battery rack separately. Once the battery module is installed, do not move the battery rack, and do not lift it by a lifting device.



If possible, do not remove the transport packaging before arrival at the installation site. Before removing the transport protector, check if the transport packaging is damaged, and check the impact indicator on the outer packaging of the battery converter. If the impact indicator is triggered, the possibility of transport damage cannot be ruled out.



Improper transportation of battery modules may cause injury. The single battery module weighs 44 kg. If it falls or slips, it may cause injury. Only use suitable transport and lifting equipment to ensure safe transport.



Wear safety shoes to avoid the danger of injury. When transporting the battery rack and battery module, their parts may be crushed due to their heavy weight. Therefore, all persons involved in transportation must wear safety shoes with toe caps. Please observe the safety regulations for transportation at the end customer's site, especially during loading and unloading.



During transportation and installation of unpacked battery storage cabinets, the risk of injury increases, especially on sharp metal panels. Therefore, all personnel involved in transportation and installation must wear protective gloves.

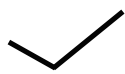


The maximum weight of a single rack of BOS-G can reach 628 kg. We suggest that at least 2-3 people work together to install the battery rack. The lifting device is helpful for heavy parts, and the pulley or cart for light parts. Be careful not to damage the case. The number of battery modules stacked shall not be more than 8.

Check whether the delivery is complete.

3.2 Permissible and Impermissible Storage Positions of a Packaged Battery Module

The battery module can only be transported in an upright position. Please note that the battery rack may be very top-heavy.



4. PREPARATION

4.1 Tools required

TOOL	USE
PHILIP2# crosshead screwdriver	<ul style="list-style-type: none"> • Fix the upper and lower tripods to the side beam and the cross beam. • Install and connect the side beam/cross beam. • Fix the L-shaped bracket to the side beam. • Fix the base assembly to the side beam. • Fix the diagonal brace to the beams on both sides. • Fix the base to the side or cross beam. • Install the ground wire. • Install the hanging lug on the battery module/high-voltage control box. • Fix the battery module and the high-voltage control box on the rack.
10mm hexagon socket	<ul style="list-style-type: none"> • Fix the expansion screw
24mm wrench	<ul style="list-style-type: none"> • Adjust the height of the base and tighten the nut.

4.2 Auxiliary Tools and Materials Required

AID/MATERIAL Auxiliary tools/materials	USE
Fastening materials (M4*12 M6*12 screws, M6*100 expansion screws, M6 nuts)	<ol style="list-style-type: none"> 1. Assemble the battery racks and fix them on the wall or connect the two racks. 2. Assemble the battery modules and high-voltage control boxes, and fix them to the racks.

5. DESCRIPTION AND INSTALLATION OF BOS-G BATTERY

5.1 Installation Precautions



WARNING! Possible damage to the building due to static overload

1. The total weight of the battery storage system is 628kgs. Ensure that the installation site has sufficient bearing capacity.
2. When selecting the installation site, consider the transportation route and necessary site cleanup.

5.2 BOS-G Product Description



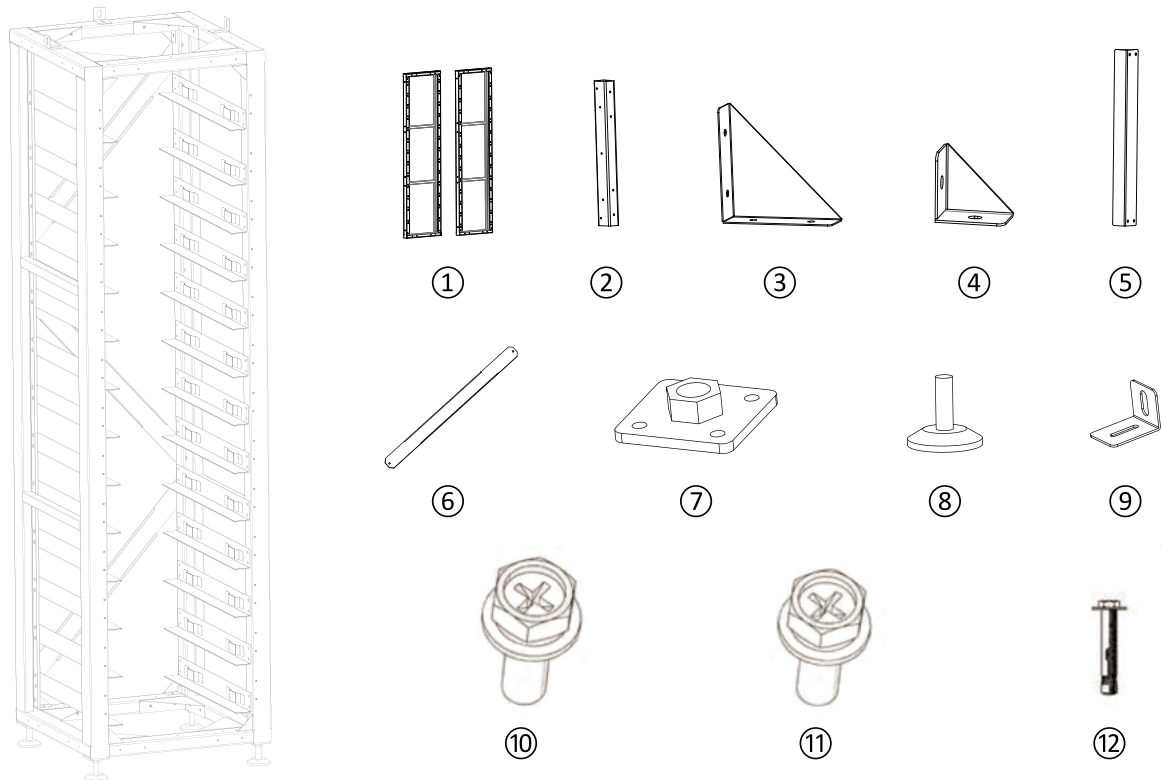
BOS-G is a high-voltage lithium-ion battery system. It provides a reliable backup power supply for supermarkets, banks, schools, farms and small factories to smooth the load curve and achieve peak load transfer. It can also improve the stability of renewable systems and promote the application of renewable energy.

It is characterized by high integration, good reliability, long service life, wide working temperature range, etc. The battery energy storage system is modular. Each battery module has a capacity of 5.12 kWh. It can support up to 12 battery modules in series. Its total energy can be expanded from 15.36 kWh to 61.44 kWh.

5.3 Technical Data

The energy of the battery system (12 battery modules)	61.44kWh
Charge-discharge rate (Max)	1C
Battery cell chemistry	LiFePO4
Maximum charging/discharging current	100A
Module capacity	100Ah
Working voltage	538~691V
Working temperature	Charge: 0~55℃/Discharge:-20~55℃
Humidity	5% - 85% (RH)
The altitude of the installation site	≤ 2000 m
Dimensions (W x D x H)	13th floor: 589x590x2240 mm
Warranty period	10 years
The total weight (12 battery modules, 1 rack)	628 kg
Weight of each battery module/battery rack	44 kg 85 kg
Case protection grade	IP20
Certification	CE/IEC62619/UN38.3/UL1973

5.4 Description of Rack



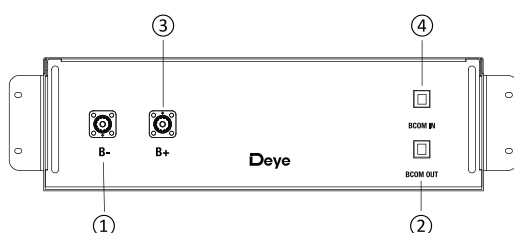
No.	Description
①	Side beam
②	Crossbeam
③	Big tripod
④	Small tripod
⑤	L-bracket assembly
⑥	Diagonal brace
⑦	Bottom plate parts
⑧	Base
⑨	Rack fastener
⑩	M4*12 outer hexagon cross combination screw
⑪	M6*12 outer hexagon cross combination screw
⑫	M6*100 expansion screw

5.5 Installation of Rack

- ① Take out two side beams and upper and lower crossbeams to form a rectangular frame, connect with side beams and crossbeams using big tripods and small tripods, and then fix big and small triangular supports with side beams and crossbeams using M6*12 outer hexagon cross combination screws and a PHILIP2 # screwdriver.
- ② Use a PHILIP2 # screwdriver and M6*12 outer hexagon cross combination screws to fix the L-bracket assembly horizontally on the side beam.
- ③ Fix the diagonal brace on two side beams using M6*12 outer hexagon cross combination screws and a screwdriver.
- ④ Fix the four bottom plates on four corners of the lower rack using the M6*12 outer hexagon cross combination screws and a PHILIP2# screwdriver.
- ⑤ Screw the base into the bottom plate and fix it with a PHILIP2# screwdriver or by hand.
- ⑥ To fix the rack on the wall, use a PHILIP2# screwdriver to install the rack fastener at the M6 screw hole above the rack and fix it with M6*12 outer hexagon cross combination screws. Fix the other side of the rack with the wall using M6*100 expansion screws. To fix two racks together, install the rack fastener at the M6 screw hole above the rack, and fix them together with M6*12 outer hexagon cross combination screws and M6 nuts.

Note: Please read the manual for reference.

5.6 Description of Battery Module



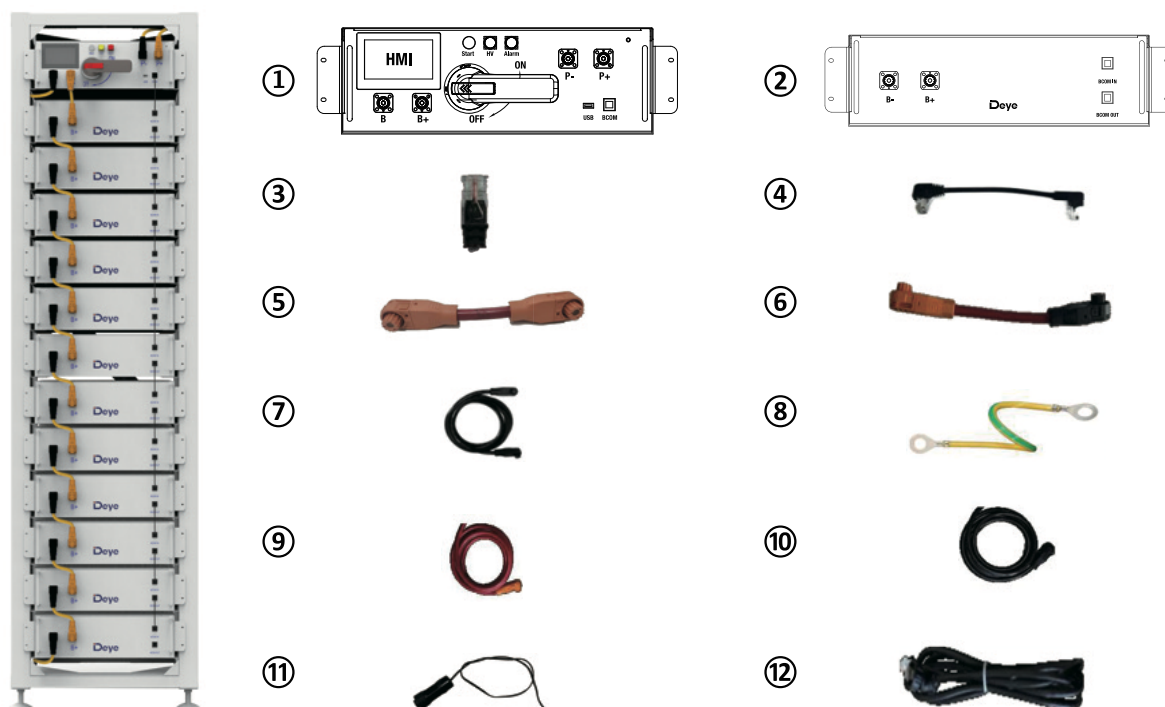
No.	Name	Description
①	B-	Battery module negative pole (black)
②	BCOM OUT	Connection position of battery module communication and power supply output
③	B+	Battery module positive pole (orange)
④	BCOM IN	Connection position of battery module communication and power supply input

5.7 Description of High-Voltage Control Box



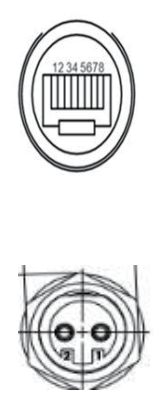
No.	Name	Description	Position
①	B-	Connection position of the common negative pole of the battery (black)	Front
②	B+	Connection position of the common positive pole of the battery (orange)	Front
③	Air switch	Used to manually control the connection between the battery rack and external devices.	Front
④	USB	BMS upgrade interface and storage expansion interface	Front
⑤	BCOM	Communicative connection with the first battery module; and providing 12VDC power for the first battery module.	Front
⑥	Human-machine interface (HMI)	Display some important battery information.	Front
⑦	START	A start switch of 12VDC power inside the high-voltage control box	Front
⑧	HV light indicator	High-voltage hazard indicator (yellow)	Front
⑨	ALRM light indicator	Battery system fault alarm indicator (red)	Front
⑩	PCS-	Connection position of PCS negative pole (black)	Front
⑪	PCS+	Connection position of PCS positive pole (orange)	Front
⑫	Grounding wire identification	Connection to the battery rack and the ground point	Front
⑬	OUT COM	Connection position with next HVB-100A750V communication output	Rear
⑭	IN COM	Connection position with previous HVB-100A750V communication input	Rear
⑮	PCS COM	Communication interface with charging and discharging equipment	Rear
⑯	POWER	Connection position of external 12VDC power supply	Rear

5.8 Description of Battery Module in Rack




No.	Description	
①	High-voltage control box 750V/100A	
②	5.12kWh battery module (general)	
③	120ohm terminal resistor	
④	Communication cable (110 mm for battery module, 140 mm for high-voltage control box)	Standard
⑤	220 mm positive power cord of high-voltage control box	Standard
⑥	200 mm power cord of battery module	Standard
⑦	The negative power cord of the high-voltage control box	Standard
⑧	140 mm ground wire A (ground wire B for external connection of battery rack is not provided)	Standard connecting cable A (connecting the high-voltage control box)
⑨	Connected to external PCS positive power cord (EPCable5.0)	Optional
⑩	Connected to external PCS negative power cord (ENCable5.0)	Optional
⑪	Connected to external 12V power cord (EPWR Cble5.0)	Optional
⑫	Connected to external device communication cable (ECOM Cable5.0)	Optional

Definition of PCS communication interface		Racks in parallel IN		Racks in parallel OUT		Definition of power	
1	485B-	1	BMS_CAN L	1	BMS_CAN L	1	12V
2	485A+	2	BMS_CAN H	2	BMS_CAN H	2	GND
3		3	DI+	3	DO2+		
4	PCANH	4	DI-	4	DO-		
5	PCANL	5		5			
6		6		6			
7	485A+	7		7			
8	485B-	8		8			



Definition of the high-voltage control box interface		Definition of the battery module interface					
Definition of BMS-BMU communication interface		Definition of the upper BMU interface			Definition of the lower BMU interface		
1	BMU_CANL	1	BMU_CANL	1	BMU_CANL		
2	BMU_CANH	2	BMU_CANH	2	BMU_CANH		
3	DO+	3	DI+	3	DO+		
4	DO-	4	DI-	4	DO-		
5	GND	5	GND	5	GND		
6	GND	6	GND	6	GND		
7	12V	7	12V	7	12V		
8	12V	8	12V	8	12V		



5.9 Installation of the Battery Module to the Rack



Insufficient or no grounding may cause an electric shock. Device malfunctions, and insufficient or no grounding may cause device damage and life-threatening electric shocks.



Note: Before installing the battery, please turn the manual switch of the high-voltage control box to the off position.

- ① Install the lug on the battery module and high-voltage control box.
- ② Insert the first battery module into the battery module rack at the bottom cluster rack; then in the order from bottom to the top, continue the installment in the same way till it reaches the twelfth floor. On the thirteenth floor, insert the slide of the cabinet at the top of the rack into the high-voltage control box.
- ③ After the battery module and control box is inserted into the rack, use M4*12 outer hexagon cross combination screws to fix all the lugs of the battery module and control box on the side beam in turn.
- ④ After the battery module is placed in the control box, take out a 140 mm communication cable to connect the communication port of the battery module and the high-voltage control box, and 11x110mm communication cables to connect the battery module communication port (IN-OUT) from top to bottom. (12 communication cables in total).

★ The communication port (OUT) of the battery module at the bottom is not connected to the communication cable. Instead, this port is sealed with a 120ohm terminal resistor.
- ⑤ Take out a 220 mm positive power cord and connect the positive pole of the battery module at the top to the positive pole of the high-voltage control box. Take out 11x200mm battery module power cords and connect the power ports (B- to B+) in a top to bottom order to form a series circuit. For aesthetics, connect the negative power pole of the first battery module to the negative power pole of the high-voltage control box from the bottom of the battery module to the back of the rack. On the back of the rack, a plane-head-shaped tie is used to secure the cable harness. (12 power cords in total)

⑥ Take out the external positive power cord EPCable5.0 and external negative power cord ENCable5.0, and plug them into PCS interfaces, respectively.

⑦ Take out the ground wire A and connect one end of it to the M4 rivet nut of the high-voltage control box panel, and the other end to any M6 screw hole of the cross beam above the rack. Take out the ground wire B (user need to prepare in advance) and connect one end of it to any M6 screw hole of the cross beam under the rack, and the other end to the customer's grounding point. (The length of the ground wire B is determined based on the customer's condition.)

5.10 Startup Steps of BOS-G

After connecting the battery cables, press the air switch button on the high-voltage control box to turn OFF to ON, and then press the START button. After the screen lights up, wait for about 8 seconds until the yellow HV light indicator comes on. (The specific working time is subject to the HV light indicator's lighting-up time.)

5.11 External 12V Power Supply of High-Voltage Control Box

To operate the high-voltage control box with an external 12V power supply, please contact our service personnel. Hotline: +86 0574 8612 0560, Email: service-ess@deye.com.cn.

In the factory configuration, the high-voltage control box is supplied with working voltage from an internal power supply unit. If your plan requires an external 12V power supply, an adaptive version and a high-voltage control box can be provided as requested. Please contact our after-sales service personnel for details.

6. BOS-G' User Interface

6.1. Main Interface







The default interface will appear after powering on. If the screen is not touched for more than 13 minutes, it will darken and the default interface replaces the other interface. Click this screen to enter the user interface.



6.2 Description of User Interface



(1) Basic Parameters


 Wi-Fi Icon	<ul style="list-style-type: none"> • 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 discharge, the negative value representing charge
 SOC	Battery remaining energy
 Total energy	Accumulated discharging energy

(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 current leakage
OC	Charging overcurrent
OF	Other faults

6.3 User Interface

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



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

