
User Manual



CONTENT

1. Safety Requirement	1
2. Product Introduction	2
2.1 Package info	2
2.2 Appearance	3
2.2.1 ESS system	3
2.2.2 HV Box.....	4
2.2.3 Battery Module	4
3. Battery system installation steps.....	5
3.1 Installation preparation.....	5
3.1.1 Site planning.....	5
3.1.2 Tool meter preparation.....	5
3.1.3 Handling and unpacking inspection.....	6
3.2 Battery cluster installation.....	7
3.2.1 Rack installation	7
3.2.2 Battery module installation	8
3.2.3 Connect copper bars	10
3.2.4 Connect COM cables among batteries and HV box.....	11
3.2.5 Connect cables among ESS and inverter (take Deye for instance)	12
3.2.6 Connect cables between inverter & AC busbar cabinet (optional).....	13
3.2.7 Check after installation	14
4. Start system	14
4.1 Start with grid.....	14
4.2 Start without grid	14
5. Technical data.....	15
5.1 Battery module	15
5.1.1 General data	15
5.1.2 BMU.....	16
5.1.3 Interface Definition.....	16
5.2 HV Box.....	17
5.2.1 General data	17

5.2.2 Electrical Equipment.....	17
5.2.3 Interface definition and description.....	18

1. Safety Requirement

This document is used for quick start-up of the Battery

The information in this user manual is subject to change without notice due to product updates or other reasons. we have the right to explain the details of the change.

Validity

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The information in this user manual is subject to change without notice due to product updates or other reasons. we have the right to explain the details of the change.

Safety

The ES C-Series is a high voltage DC system, and it must be operated by authorized person. Read all safety instructions carefully before operating any work and them at all times when working on the system.

Incorrect operation or work may cause injury or death to the operator or a third party, damage to the system hardware and other properties.

Note before installation

- ① Check the battery to see if it has an intact appearance, complete contents, and the correct model.
- ② use insulating tools and wear personal protective equipment (PPE) when operating the equipment.
- ③ Follow the installation, operation, and configuration instructions. The manufacturer shall not be liable for equipment damage or personal injury if you do not follow the instructions.

Note in installation and maintenance

- ① The DC cables connected to the system may be live. Touching non-insulation live DC cables' parts may result in death or serious injury due to electric shock.
- ② Disconnect the battery from a voltage source and make sure it cannot be reconnected before checking on the battery.
- ③ Do not remove any power cable on load (in charging or discharging status).
- ④ wear suitable personal protective equipment for all work on the system.

Check before power on

- ① The equipment is installed in a clean and flat place that is well-ventilated and easy to operate.
- ② Ensure that the PE cable, the battery power copper bar, the inverter power cable, the communication cable, and the AC cable are connected correctly and securely. 3. Cable ties are intact, and routed properly and evenly.

Target group

Instructions in this document can only be performed by qualified persons who must have the following knowledge and skills:

knowledge of basic electrical systems and safety requirements.

knowledge of lithium batteries work and PCS.

knowledge of following local connection requirements and safety regulations.

knowledge and skills in the installation and commissioning of solar or battery energy storage system.

2. Product Introduction

2.1 Package info

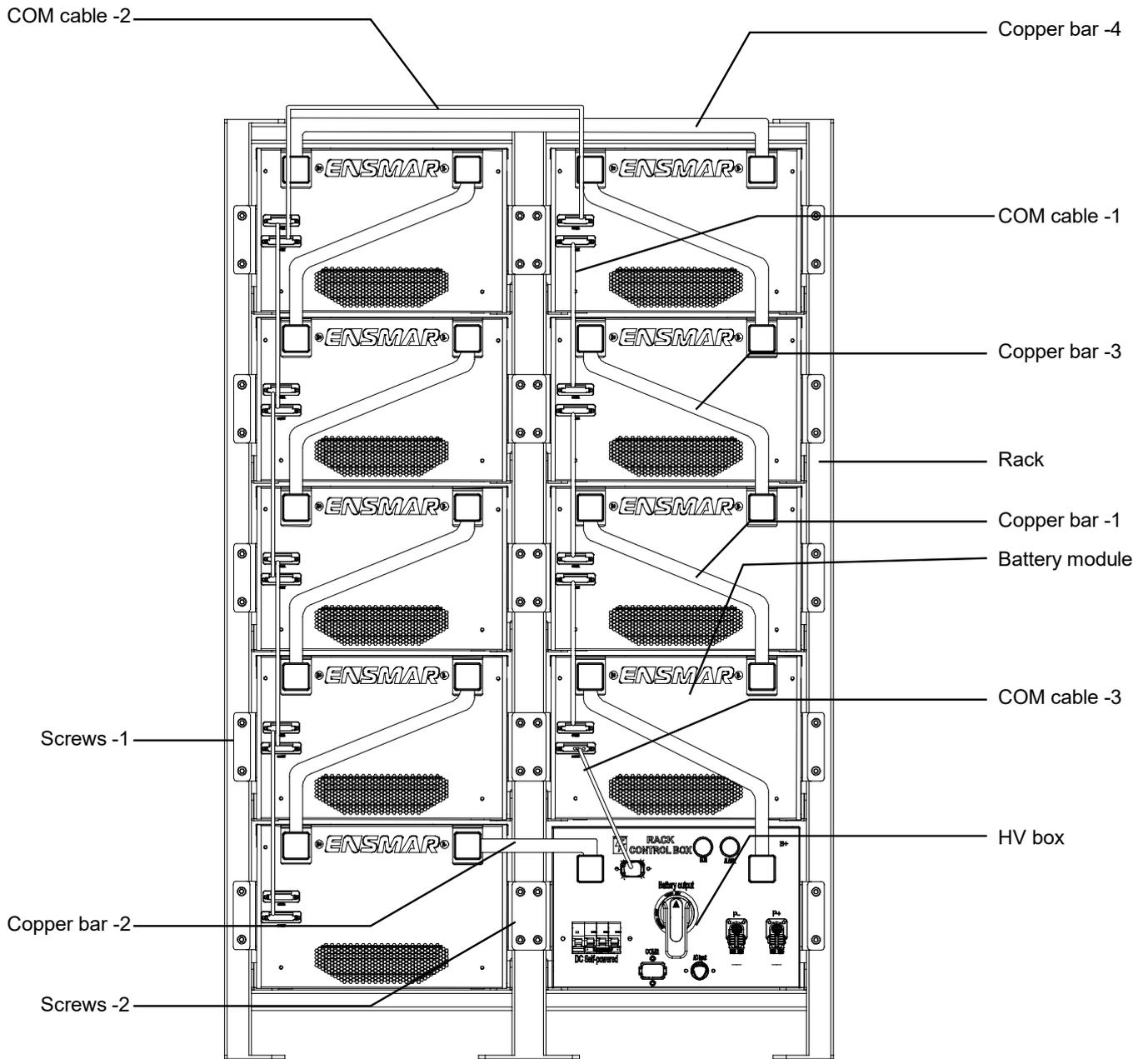
Please confirm product packaging is not damaged before unpacked, and product is good without accessories missing after unpacked, otherwise, please contact the supplier immediately.

Part list:

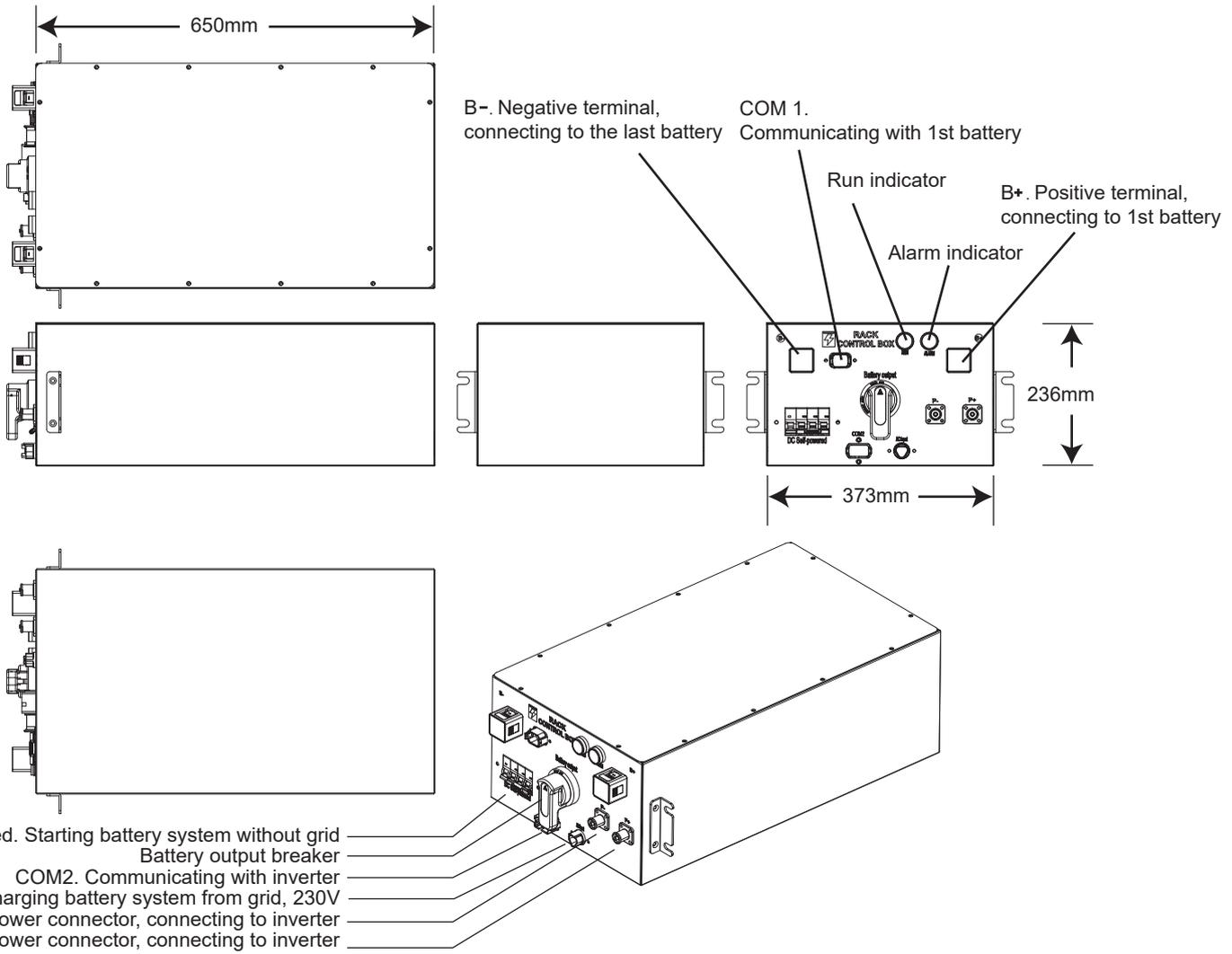
No.	Item	Q'ty per cluster	Remark
1	Battery module	9	51.2V/280Ah/0.5C
2	HV Box	1	
3	Copper bar -1	1	T2, positive, between the 1st battery and HV box
4	Copper bar -2	1	T2, negative, between the last battery and HV box
5	Copper bar -3	7	T2, between batteries
6	Copper bar -4	1	T2, between batteries, bridging 2 columns at least
7	Screws -1	40	M6*20, SUS304, stainless steel hexagonal
8	Screws -2	20	M8*20, SUS304, stainless steel hexagonal
9	COM cable -1	7	L300mm, between batteries
10	COM cable -2	1	L800mm, between batteries, bridging 2 columns
11	COM cable -3	1	L350mm, between the 1st battery and HV box
12	AC busbar cabinet	1	1800*800*500
13	Debugging CAN box	1	Monitor battery
14	Power harness	1	Connect AC-in of HV box and grid, charging batteries from grid
15	Power cable (+)	1	Positive, red, between HV box and inverter
16	Power cable (-)	1	Negative, red, between HV box and inverter
17	External harness	1	
18	hook	2	Plug in side holes of batteries so as to move them
19	Rack	1	

2.2 Appearance

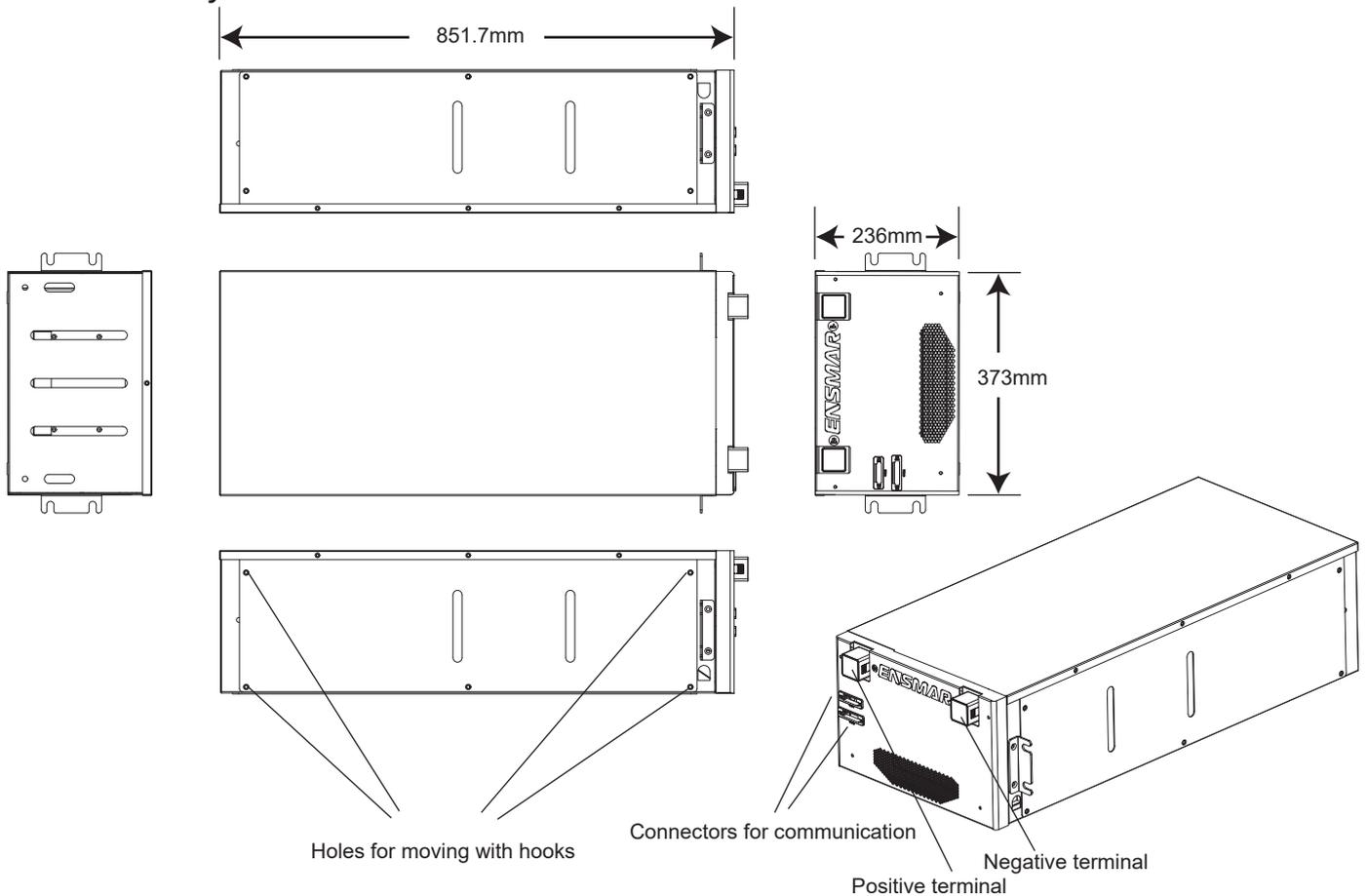
2.2.1 ESS system



2.2.2 HV Box



2.2.3 Battery Module



3. Battery system installation steps

3.1 Installation preparation

3.1.1 Site planning

3.1.1.1 Installation environment

Do not install the battery clusters in a high, low-temperature, or wet place that exceeds the specifications.

Keep the battery clusters away from water sources, heat sources, and flammable and explosive materials.

Avoid installing battery clusters in environments with direct sunlight, dust, volatile gases, corrosive substances, and excessive salts.

It is not allowed to install the battery clusters in a working environment with metallic conductive dust.

3.1.1.2 Space reservation

Reserve certain operation and ventilation space around the rack.

Reserve at least 2000mm of operation and ventilation space in front.

Reserve at least 500mm of operation space at the top.

Reserve at least 100mm of ventilation space on the back.

3.1.2 Tool meter preparation

Note:

Use insulation tools to separate signal lines from strong current or high voltage lines to avoid electric shock.

Table 1.1 Installation tool list

Photo	Name	Photo	Name
	Impact drill		Torque socket wrench
	Torque wrench		Diagonal plier
	crimping plier		wire stripper
	Torque screwdriver		Multimeter
	cable tie		Insulating tape
	Herringbone ladder		Rubber hammer

Table 1.2 personal protective equipment list

Photo	Name	Photo	Name
	safety gloves		safety shoes
	protective goggles		Dust mask

Table 1.3 Mechanical equipment list

Photo	Name	Q'ty	Description
	Electric forklift	1 unit	Load-bearing 3T
	Manual forklift	1 unit	Load-bearing 2T

3.1.3 Handling and unpacking inspection

Note:

To avoid turnover, fix the racked box to the forklift with a rope before moving.

Move the rack carefully, as any impact or drop may cause damage to the rack. Once the box is placed, carefully remove the packaging to avoid scratching the rack. Keep the rack stable during the disassembly and assembly.

If the rack installation environment is poor and long-term storage is required after unpacking, please take dust-proof measures.

Ship the battery modules separately.

operating steps

step 1. Use a forklift to transport the rack, battery module, and related accessories to the specified location.

step 2. Check whether the appearance and packaging of the rack, battery module, and related accessories are intact.

step 3. Remove the outer packaging.

step 4. Check whether the rack, battery module, and related accessories are intact.

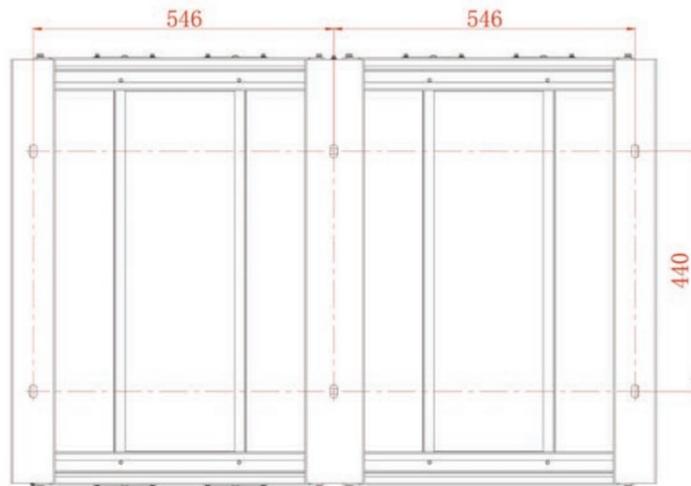
step 5. After confirming the rack is intact, move it to the specified location.

3.2 Battery Cluster installation

3.2.1 Rack installation

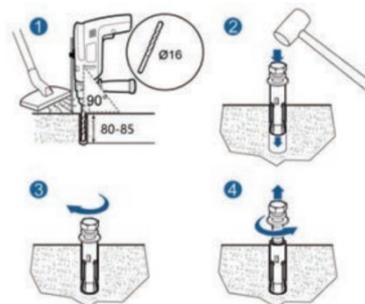
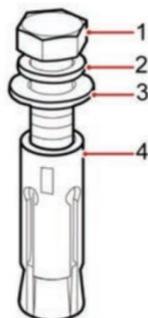
Operating steps

step 1: Determine the rack installation position, and mark the mounting holes on the installation ground according to the drawing



step 2: use an impact drill to drill holes in the mounting holes of the expansion bolts and then install four M12 expansion bolts into the mounting holes.

- (1) M12 bolt;
- (2) Spring washer;
- (3) Flat washer;
- (4) Expansion tube



- ① punch holes in the concrete floor with an impact drill to a depth between 80 mm and 85 mm.
- ② Tighten the expansion bolt slightly and place it vertically into the hole. Hit the expansion bolt with a rubber hammer until the expansion tube is all in the hole.
- ③ pre-tighten the expansion bolts.
- ④ unscrew the bolts and remove the spring washers and flat washers.

step 3: Move the rack to the mounting location.

step 4: Thread four M12x120 expansion bolts through the rack base holes, insert them into the expansion bolt mounting holes in the ground, and tighten the expansion bolts.

3.2.2 Battery module installation

3.2.2.1 Install the battery module and the HV box

Note:

Before installing the battery, please read the battery-related safety precautions carefully.

wear insulating gloves and use insulating tools during installation.

please place the battery correctly to avoid vibration and shock.

when installing the battery module, place it from bottom to top and left to right to prevent the center of gravity from tipping over.

The battery module is heavy and needs to be transported and lifted with a lifting platform with

protection around it; if conditions are limited, 4 people are required to move it at the same time. The installation method of the main control box is the same as the battery module.

Operating steps

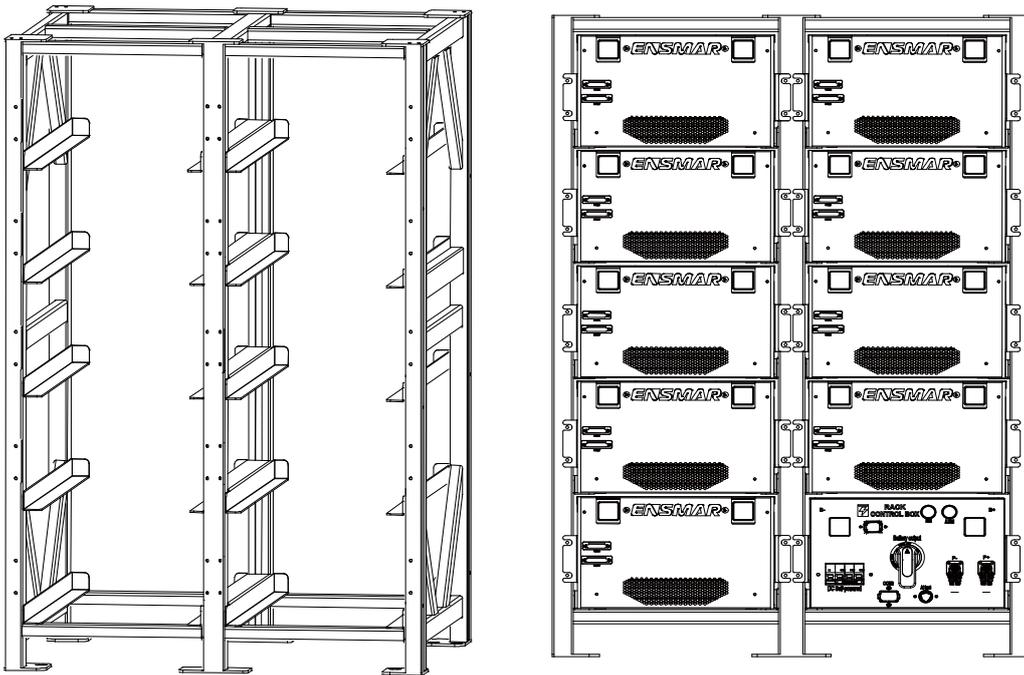
step 1: Remove the wooden box and move the battery module to a flat pallet.



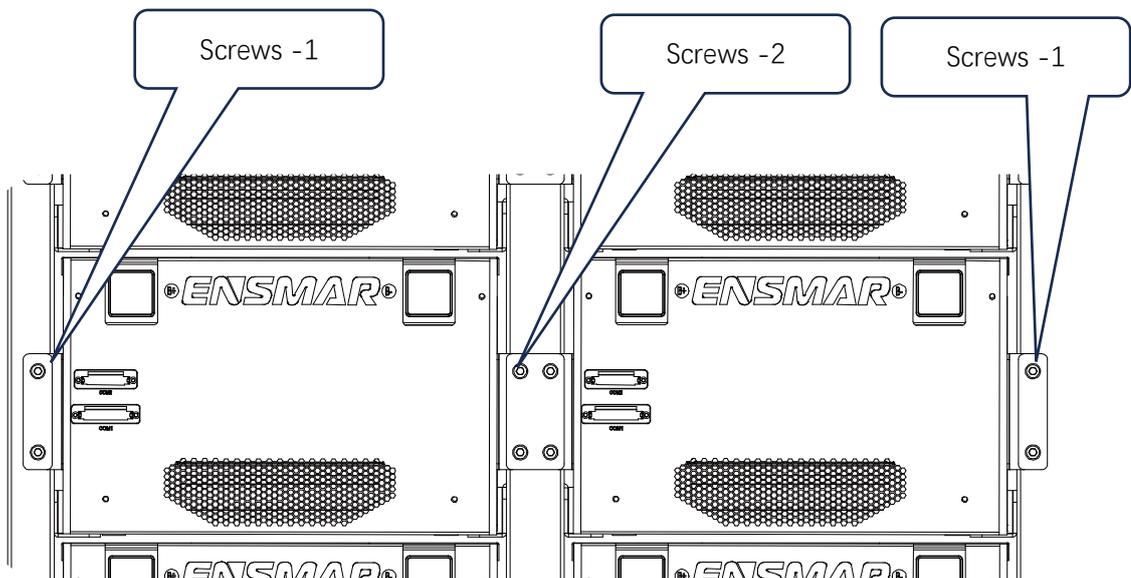
step 2: use an electric forklift to move the battery module to the front of the rack and raise the battery module to the corresponding height.



step 3: push the battery module inside the rack.

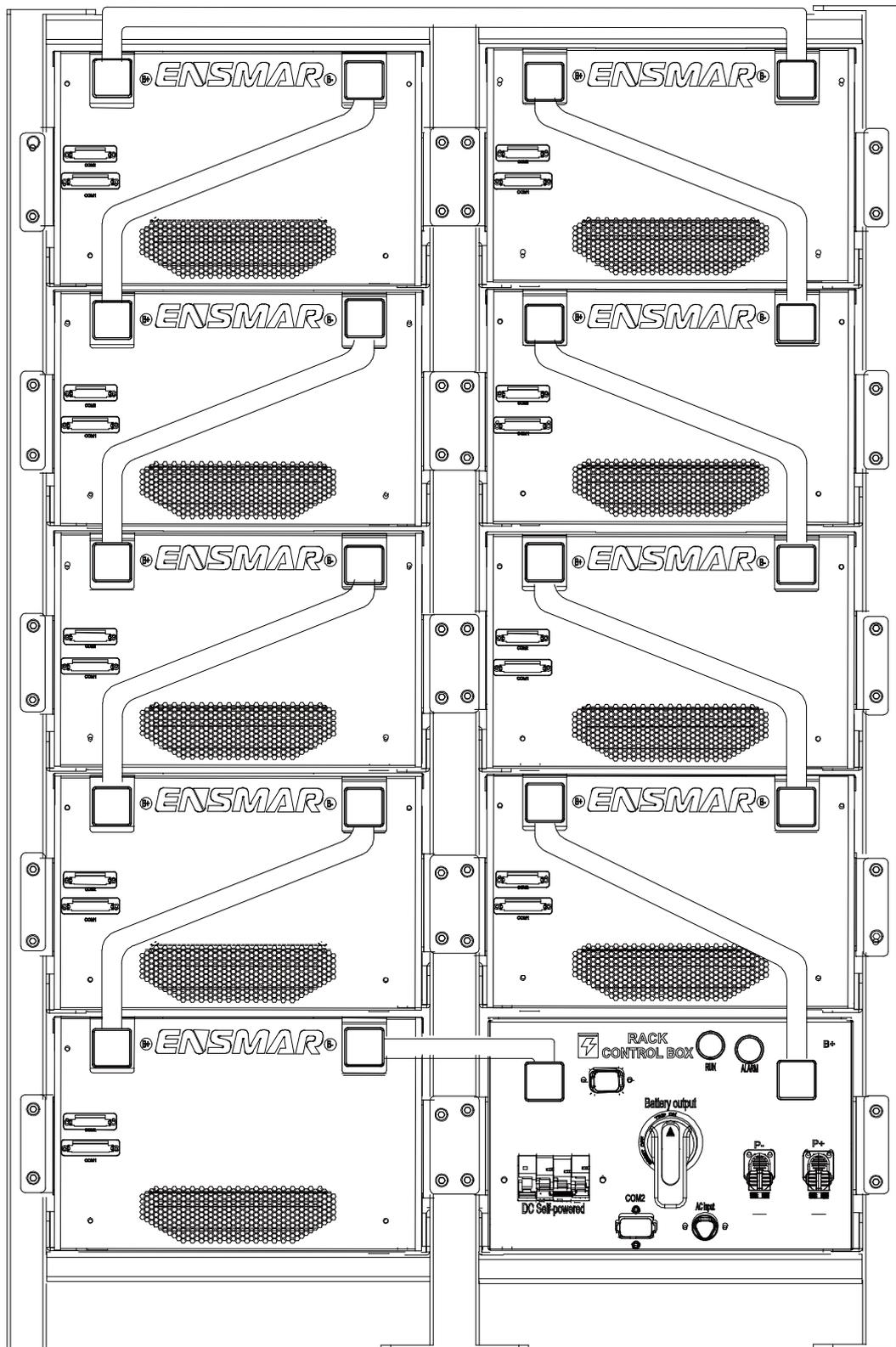


step 4: Fix the battery module to the rack with screws.

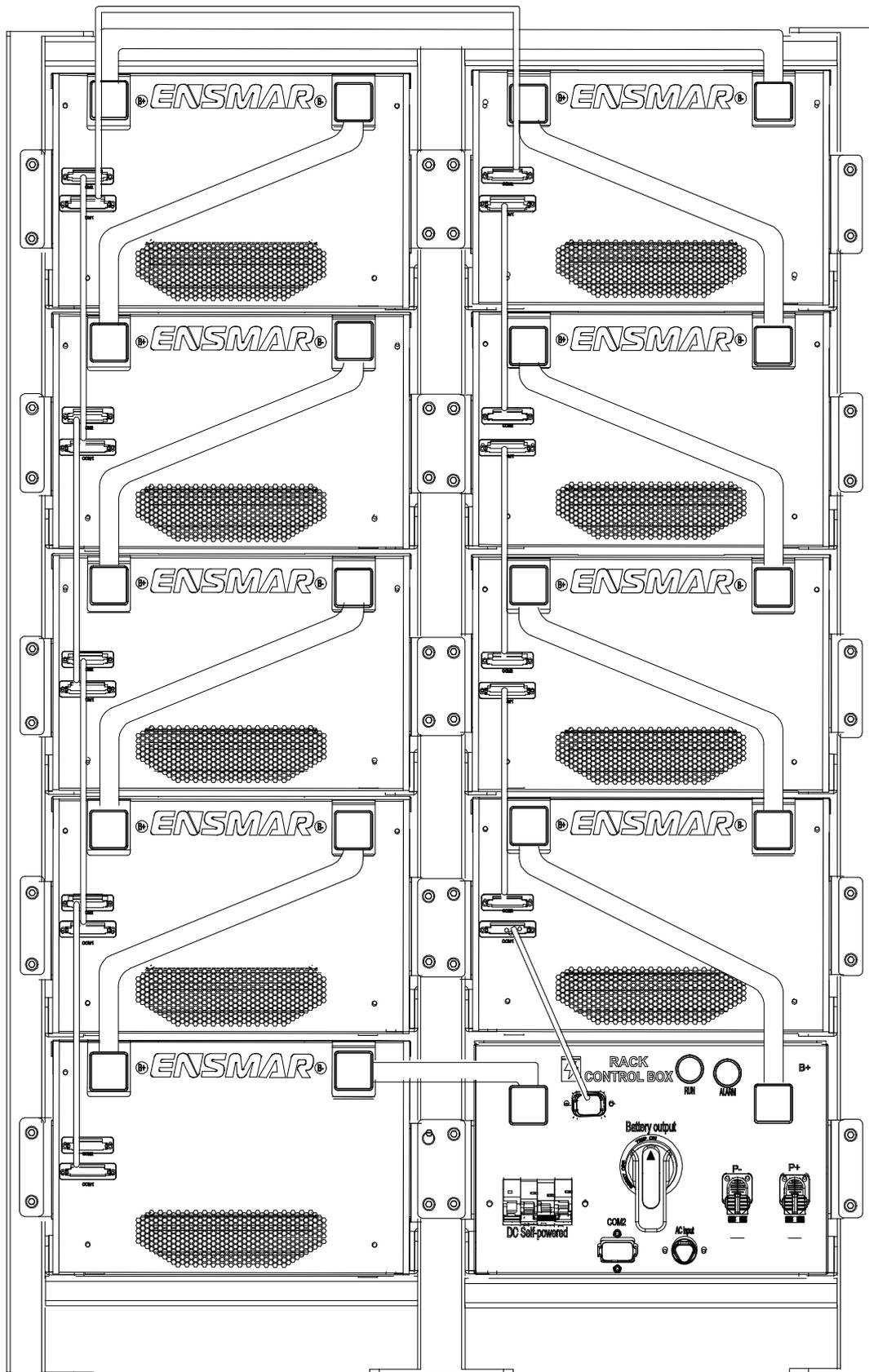


3.2.3 Connect copper bars

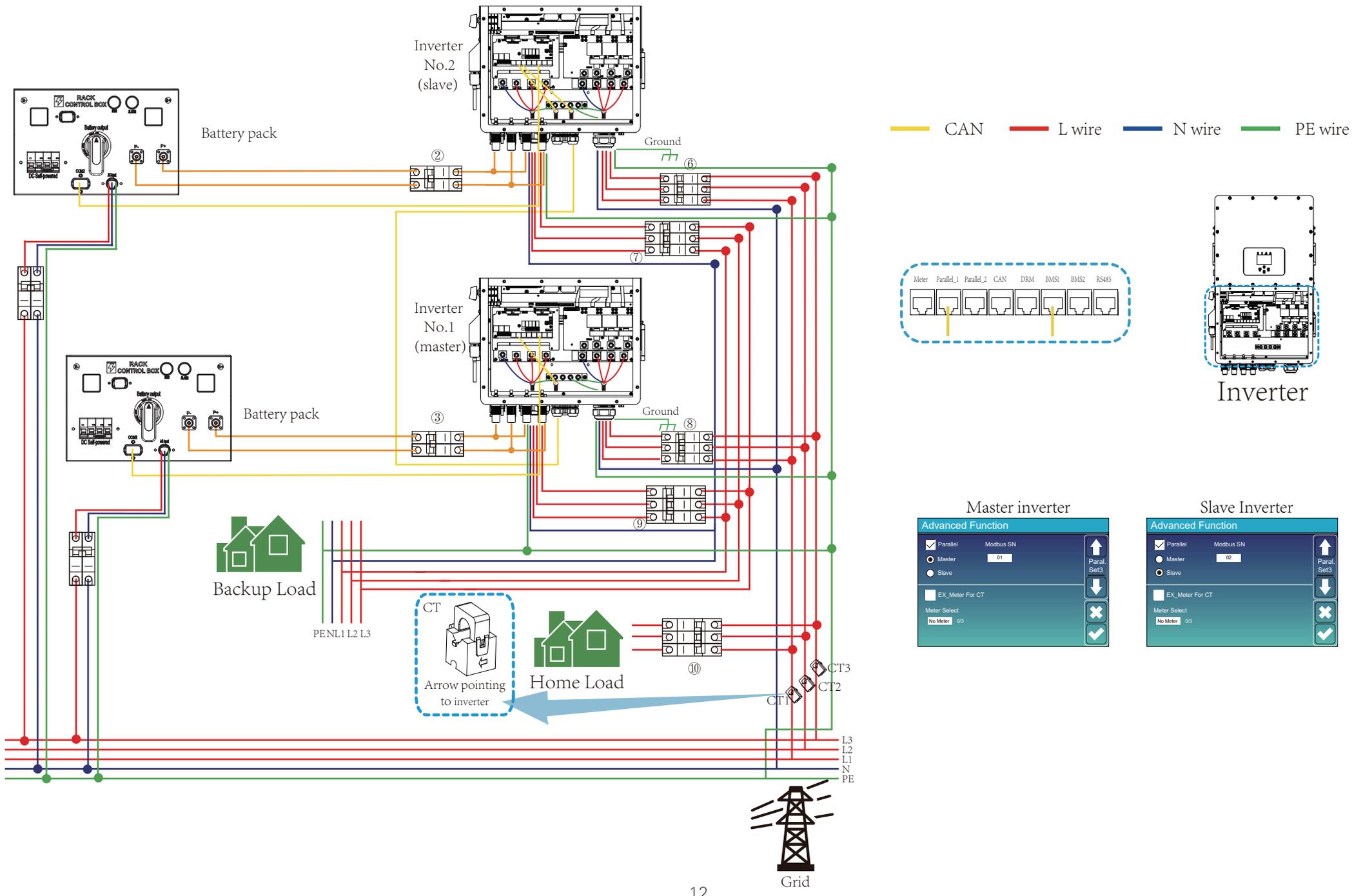
Connect copper bars among batteries and HV box



3.2.4 Connect COM cables among batteries and HV box.

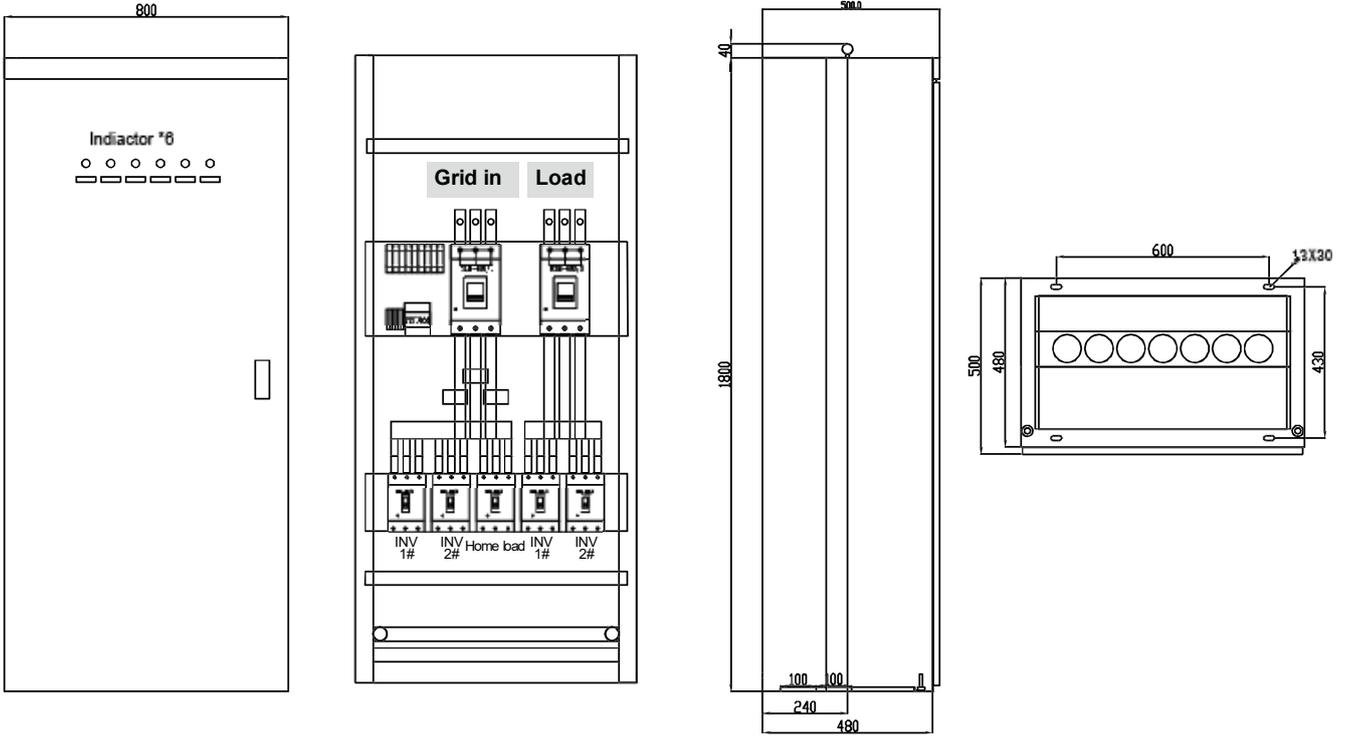


3.2.5 Connect cables among ESS and inverter (take Deye for instance).

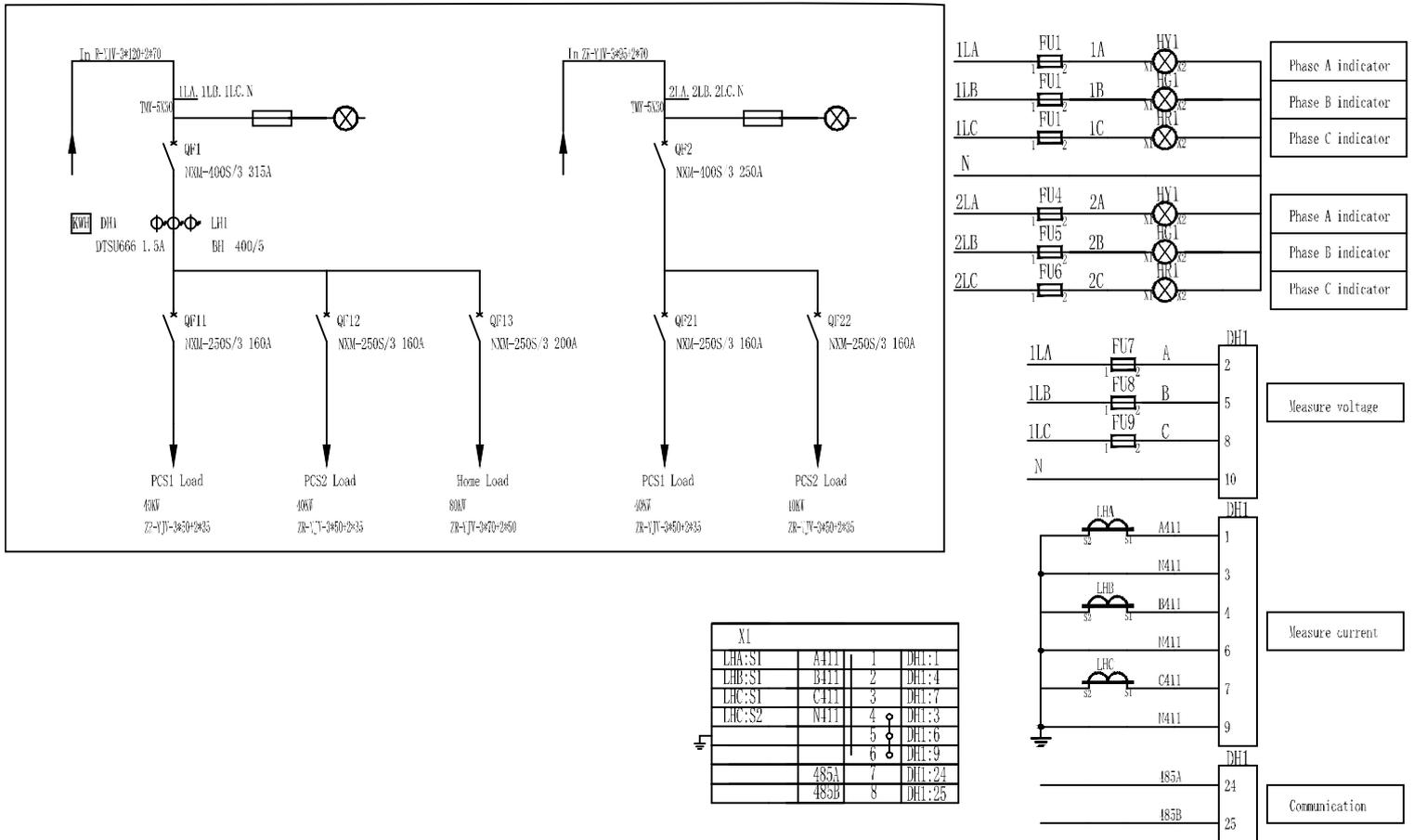


3.2.6 Connect cables between inverter & AC busbar cabinet (optional).

Structure Overview



Circuit diagram



3.2.7 Check after installation

No.	Item	Acceptance criteria
1	The rack is installed firmly	The rack is installed firmly, and will not tip over due to vibration.
2	The cables are well arranged	The cable arrangement is reasonable and meets the user requirements.
3	The cables are clearly marked	Both ends of the cable need to be marked, and the markings are simple and easy to understand.
4	The cable tie is well arranged	The cable tie shall be even, and no sharp corners at the shear.
5	Cables are connected firmly	The connecting cables between the batteries are fixed, and the screw fastening needs to ensure that the spring washer is flattened.
6	Reliable grounding	The resistance between the rack ground wire and the machine room ground bar is less than 0.1Ω.
7	The battery cable is connected correctly	The polarity of the battery cluster and inverter connection ends is correct.

4. Start system

4.1 Start with grid

Step 1. Switch on inverter

Step 2. Switch on battery system

Step 3. Close breaker of AC combiner cabinet.



WARNING

The system may take 2-3 minutes before run after breaker is closed.

4.2 Start without grid

Step 1. Switch on inverter;

Step 2. Close "DC Self-Powered" Switch;

Step 3. Wait 2-3 minutes before system run normally;

Step 4. Turn off "DC Self-Powered" in 1-2 minutes after system runs normally, otherwise battery system may get damaged.

5. Technical data

5.1 Battery module

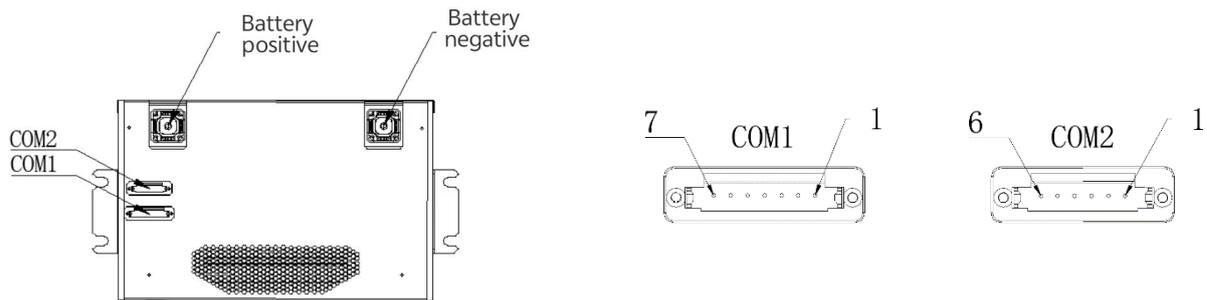
5.1.1 General data

No.	Item	Specification	Remark
1	Module	ES C-48280	
2	Dimension	866mm*376mm*239mm (±5)	(L×W×H)
3	Nominal Capacity	280Ah@0.5C,25°C	
4	Nominal Voltage	51.2V (16cells)	Shipment Capacity @ 40% SOC
5	Working Voltage Range	44.8V~56.8V	
6	Max. Continuous Charge and Discharge Rate	0.5C@25°C	≤160A
7	Nominal Weight	110kg	±3kg
8	Nominal Energy	14.336kWh	
9	* Insulation Standard	> 1GΩ(1000VDC)	Battery box insulation resistance
10	* Pressure Standard	3110VDC	No breakdown or flashover
11	Max. Charging Voltage of Single Cell	3.65V	
12	Min. Discharge Voltage of Single Cell	2.5V	
13	Max. Instantaneous Charge and Discharge Current	180A@5S	Time Interval > 10min
14	Cycles	≥5000 times	25°C±2°C 0.5C @90%DOD 80%EOL
15	Protection Grade	IP21	
16	Working Temperature	Discharge -20°C ~ 50°C	
		Charge 0°C~45°C	
17	Storage Temperature	-30°C ~ 45°C	
18	Storage Humidity (RH)	5% ~ 95%	
19	Operating Humidity (RH)	≤85%	
20	Work Efficiency	≥94%	25°C±2°C 0.5C @90%DOD 80%EOL

5.1.2 BMU

No.	Name	Specification	Remark
1	BMU	BMU-B30-16-104	
2	Supply Voltage	DC9~32V	
3	Communication Mode	isoSPI +RS485	
4	Cell Voltage Collection Range	0~5V	
5	Voltage Collection Accuracy of Single Cell	±3mV	2.5V~4.5V, -30°C~85°C
6	Cell Temperature Collection Range	-40~125°C	
7	Temperature Collection Accuracy of Single Cell	±2°C	-30~85°C
8	Sampling Quantity	Voltage 16 cells; Temperature 12 cells	
9	Ability of Equalization	100mA	Passive equalization

5.1.3 Interface Definition



Sr No.	COM1	COM2
1	DC24V+	DC24V+
2	DC24V-	DC24V-
3	IN-IPA	OUT-IPA
4	IN-IMA	OUT-IMA
5	RS485A1	RS485A2
6	RS485B1	RS485B2
7	NC	/

5.2 HV Box

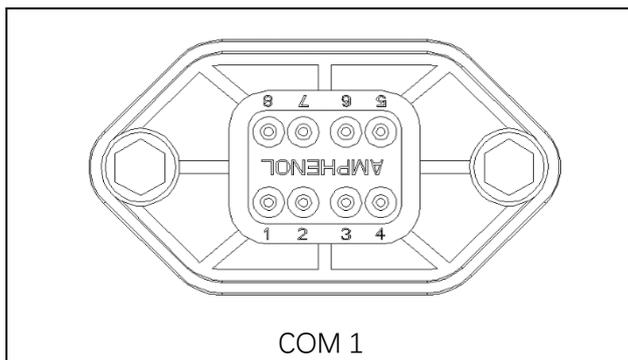
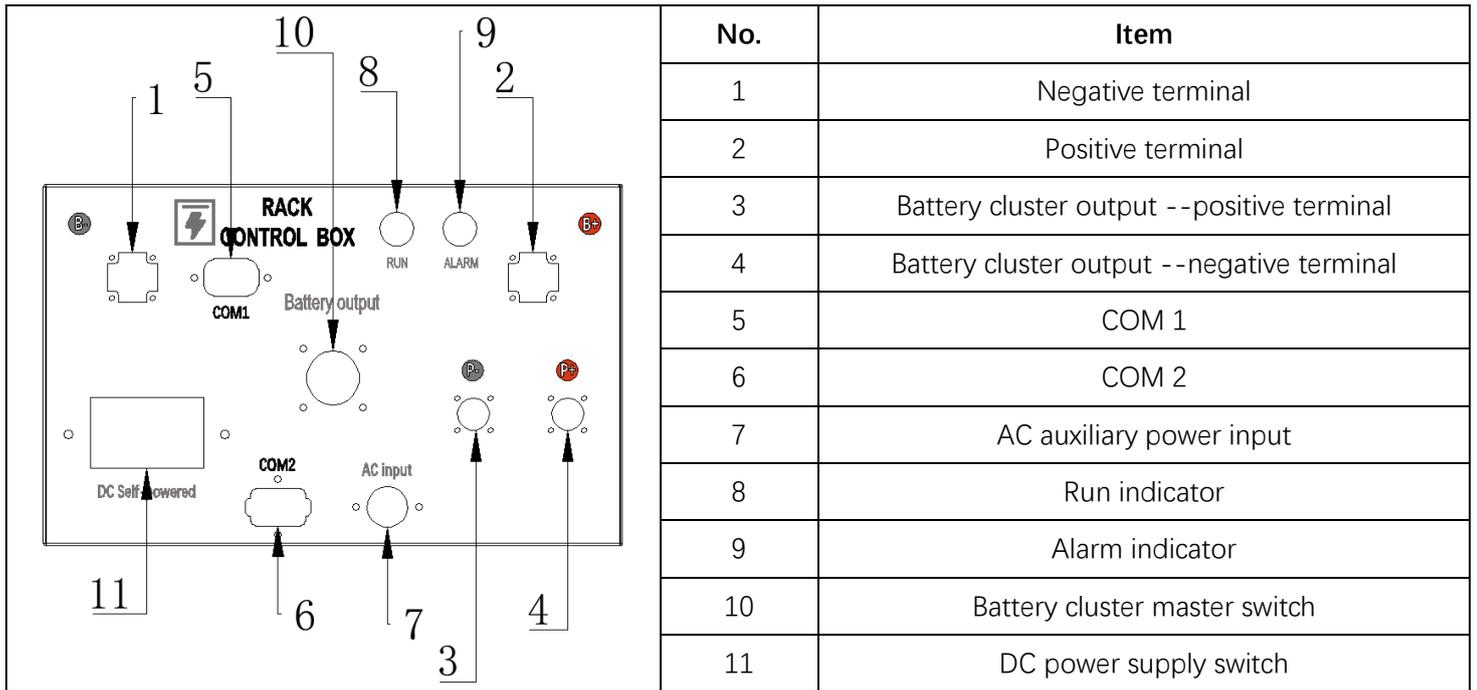
5.2.1 General data

No.	Item	Specification	Remark
1	Module	High-Voltage Box	
2	Dimension	650*370*234mm (±5)	(L×W×H)
3	Nominal Capacity	160A	
4	Max. Running Current	200A	
5	Rated Voltage	DC1000V	
6	Rated Weight	25kg	
7	Auxiliary Power Access Method	Dc power supply/AC220V	
8	* Insulation Standard	> 1GΩ(1000VDC)	Battery box insulation resistance
9	* Pressure Standard	3110VDC	no breakdown or flashover

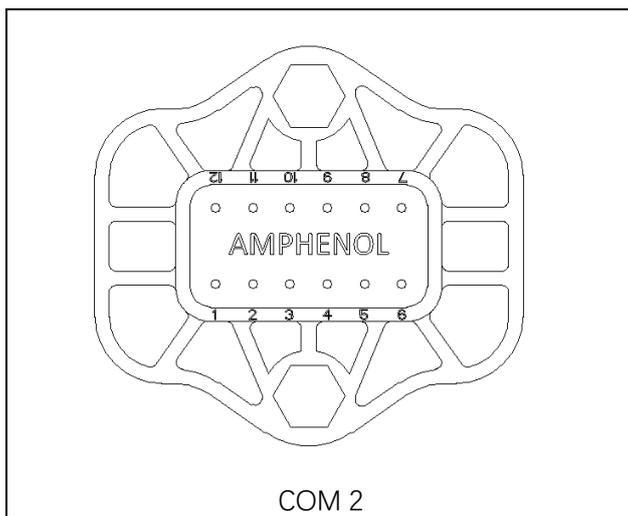
5.2.2 Electrical Equipment

No.	Electrical Equipment	Remark
1	Plastic-case circuit breaker	Protect and emergency disconnect the entire circuit
2	Dc contactor	Control circuit on/off
3	BCU	Control device
4	Connector	Power cable input and output
5	Pre-charge resistor	Pre-charge circuit
6	Shunt	Current acquisition
7	Fuse	Protect the entire circuit
8	DCDC	Convert power from the battery side to DC24V
9	ACDC	Convert power from AC side to DC24V

5.2.3 Interface definition and description



Jack No.	Item
1	DC24+
2	DC24-
3	IM1
4	IP1
5	RS485A
6	RS485B
7	Plug
8	Plug



Jack No.	Item
1	DC24+
2	DC24-
3	PCS/BAU-CANH
4	PCS/BAU-CANL
5	Debugging-CANH
6	Debugging-CANL
7	RS485A2
8	RS485B2
9	Dry contact+
10	Dry contact-
11	RS485A3
12	RS485B3