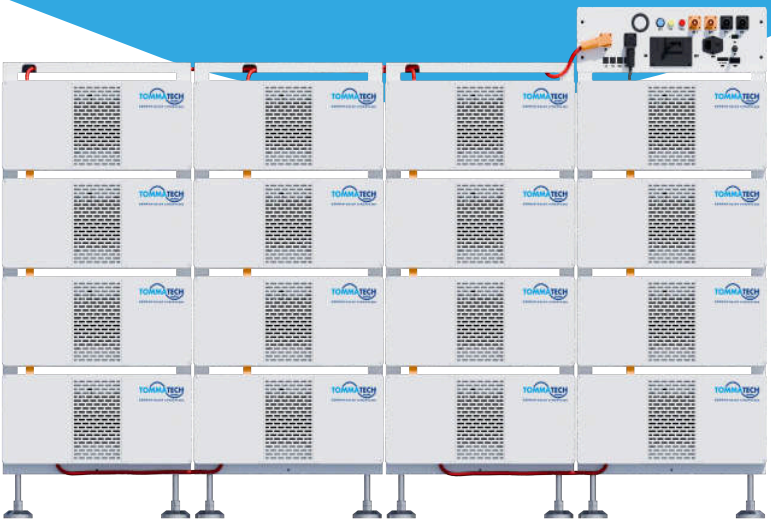
Installation and Operation Instructions

TOMMATECH GmbH
GERMAN-based company

Lithium-ion Rechargeable Battery System



Hera Indoor

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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. 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.

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Model	System energy (kWh)	Rated DC power (kW)	Depth of Discharge	Composition
Hera Indoor 80.3kWh	80.3	40.19	90%	Hera Indoor 16.08kWh*5+Hera Indoor BMS*1
Hera Indoor 96.4kWh	96.4	48.23	90%	Hera Indoor 16.08kWh*6+Hera Indoor BMS*1
Hera Indoor 112.5kWh	112.5	56.26	90%	Hera Indoor 16.08kWh*7+Hera Indoor BMS*1
Hera Indoor 128.6kWh	128.6	64.30	90%	Hera Indoor 16.08kWh*8+Hera Indoor BMS*1
Hera Indoor 144.6kWh	144.6	72.34	90%	Hera Indoor 16.08kWh*9+Hera Indoor BMS*1
Hera Indoor 160.7kWh	160.7	80.38	90%	Hera Indoor 16.08kWh*10+Hera Indoor BMS*1
Hera Indoor 176.8kWh	176.8	88.42	90%	Hera Indoor 16.08kWh*11+Hera Indoor BMS*1
Hera Indoor 192.9kWh	192.9	96.46	90%	Hera Indoor 16.08kWh*12+Hera Indoor BMS*1
Hera Indoor 208.9kWh	208.9	104.49	90%	Hera Indoor 16.08kWh*13+Hera Indoor BMS*1
Hera Indoor 225.0kWh	225.0	112.53	90%	Hera Indoor 16.08kWh*14+Hera Indoor BMS*1
Hera Indoor 241.1kWh	241.1	120.57	90%	Hera Indoor 16.08kWh*15+Hera Indoor BMS*1
Hera Indoor 257.2kWh	257.2	128.61	90%	Hera Indoor 16.08kWh*16+Hera Indoor BMS*1

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5I·yƎŜNJH It may cause an electric shock.

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

5I·yƎŜNJH If the instructions are not observed, death or severe injury may occur.

² I·NJyƛyƎH If the instructions are not observed, a loss may occur.

! ǘǘŜyǘƛ2yH This symbol represents information on the device use.

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

! ǘǘŜyǘƛ2yH ¢KŜ NJƛǎ] 2ŦŎKŜYƛŎI·f ōdzNJyǎ

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 pack to severe impact.

• Do not open, disassemble or mechanically change the battery pack.

• In case of contact with an electrolyte, wash the affected area with clean water immediately and seek medical advice promptly.

! ǘǘŜyǘƛ2yH ¢KŜ NJƛǎ] 2Ŧ ŜĚLJf2ǎƛ2ƴ

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 pack in explosive or high-humidity areas.

• Store the battery pack in a dry place within the temperature range specified in the data sheet.

• Do not open, drill through or drop the battery cell or pack.

• Do not expose the battery cell or pack to high temperatures.

• Do not throw the battery cell or pack into the fire.

• When the lithium battery catches fire after being plugged in with AC power, unplug the power supply first to prevent electric shock during firefighting.

• If there is an open flame, use carbon dioxide or ABC dry powder fire extinguisher to put out the fire, and then cool down by using the nearby fire hydrant or pouring water until no white smoke appears and the battery is completely cooled down. After extinguishing the fire, continue to monitor the battery for at least 1 hour to prevent re-ignition.

• If there is no open flame but a large amount of white smoke comes out of the battery, it is recommended to use a 6L portable water-based fire extinguisher (if any), and then cool down by using the nearby fire hydrant or pouring

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water until no white smoke appears and the battery is completely cooled down. After extinguishing the fire, continue to monitor the battery for at least 1 hour to prevent re-ignition.

• Do not use defective or damaged battery packs.

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• 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.

b2 2LJŜyŦ/NŜH 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.

² Ŝl·N ăl·ŦŜúè ƎƧƎƎtŜăH Wear safety goggles when working on the equipment.

C2ftƨ2ø úKŜ Yl·ydzl·fH When working and operating the equipment, the installation and operation manual provisions must be observed.

MΦП DŜyŜNJl·f {l·ŦŜúè LyŦ2NJYl·úʌ2y

5l·yƎŜNJH Failure to comply with the safety information leads to life-threatening situations.

1. Improper use can cause death. Operators of the product must read this manual and observe all safety information.

2. Operators of the product 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.

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1.5 Disclaimer

TommaTech GmbH 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 Installation environment

⚠ **Danger!**

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.

⚠ **Danger!**

Do not store any flammable or explosive materials in equipment area.

⚠ **Danger!**

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.

⚠ **Warning!**

Install the equipment in an area far away liquids. Do not install it under areas prone to condensation, such as under water pipe and air exhaust vent, or area prone to water leakage or may be submerged in water, such as air conditioner vents, or ventilation vents . Ensure that no liquid enters the equipment to prevent faults or short circuits.

⚠ **Warning!**

To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

o Your product is designed for indoor use. To prolong the battery's lifespan, please try to avoid direct sunlight exposure, direct rainwater impact, snow cover, and being close to fire sources, etc

• The installation and usage environment must meet relevant international,the local laws and regulations.The user is obliged to protect the battery system against fire or other hazards.

• Keep out of the reach of children.

• Do not install the equipment in places that are unventilated without proper fire fighting facilities, or difficult for firefighters to access.

• Do not install the equipment in an easily accessible position because the temperature of the enclosure and heat sink is high when the battery system is running.

• Do not install the battery system on a moving object, such as ship, train, or car.

• Ensure that the equipment is installed in a clean, dry and well ventilated area with proper temperature, humidity and altitude range.Check for more data in the “Technical Specifications” section.

• Do not install the equipment in an environment with magnetic dust, volatile or corrosive gases, infrared and other radiations, organic solvents, conductive metal,or salty air.

• Do not install the equipment in an area conducive to growth of microorganism such as fungus or mildew.

• Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.

• The product should, in principle, be installed at least 15 ft (4.57 m) away from heat sources. This distance may be reduced by 100 mm if a fire barrier or other equivalent protective measure is in place.

• 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 3,000 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 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).

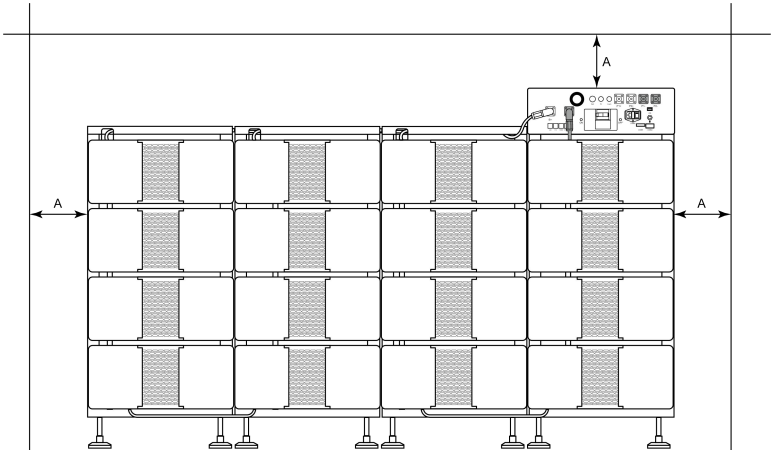
• Used in medical devices.

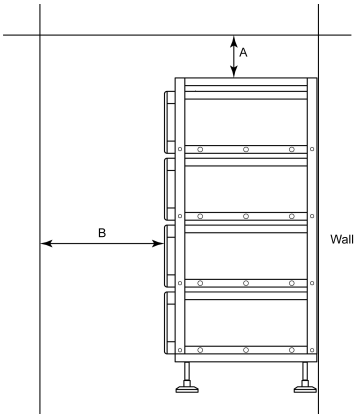
• Used as a UPS system.

Minimum product installation distance

The minimum distance A to the surrounding building when the battery is installed is 100mm.

The minimum distance B to the surrounding building when the battery is installed is 1000mm.





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The quality certificate can be downloaded from http://www.tommatech.de.

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All work shall comply with local applicable regulations and standards.

The installation of the product 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.

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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.

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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.

LƳLƴƻLJŜǸ 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.

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

STOP ² I-ǸyƛyƎH 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.

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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 CO_2 fire extinguishers.

⚠ It is forbidden for the freight forwarder to open the outer package of the battery pack. 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. 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 pack 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 pack. The battery storage rack is not designed to be transported with the installed battery packs. Always transport the battery pack and the battery rack separately. Once the battery pack 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 packs may cause injury. The single battery pack is heavy. 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 pack, 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.

A single cluster of battery packs is sufficiently heavy. 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.

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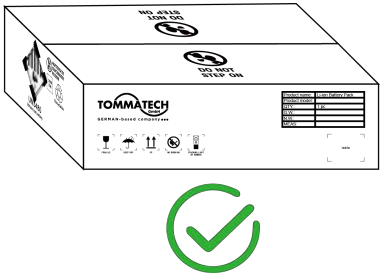
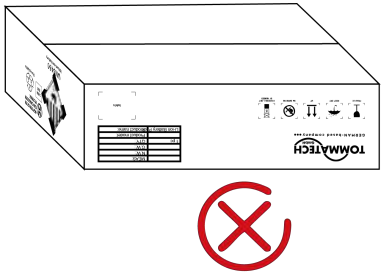
3.2 Delivery Posture

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





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

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The product is a high-voltage lithium-ion battery system. It is characterized by high integration, good reliability, long service life, wide working temperature range, etc. The battery energy storage system is modular. 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.

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Cell Chemistry	LiFePO			
Battery Module Energy (kWh)	16.08			
Battery Module Nominal Voltage (V)	51.2			
Battery Module Capacity (Ah)	314			
Battery Module Number	Hera Indoor 80.3 kWh	Hera Indoor 128.6 kWh	Hera Indoor 208.9 kWh	Hera Indoor 257.2 kWh
Battery Module Qty in Series (Optional)	5 (Min)	8	13	16 (Max)
System Nominal Voltage (V)	256	409.6	665.6	819.2
System Operating Voltage (V)	208-292	332.8-467.2	540.8-759.2	665.6-934.4
System Energy (kWh)	80.38	128.61	209.00	257.23
System Usable Energy (kWh)	72.27	115.74	188.01	231.48
Max. DC Power(kW)	46.08	73.73	119.81	147.46
Max. Charge/Discharge Current (A)*1	180			
Working Temperature (℃)	Charge：0 ~ 55 Discharge：-20 ~ 55			
Status Indicator	Yellow：Battery High Voltage Power On Red：Battery System Alarm			
Communication Port	TCP / RS485 / CAN			
Humidity	5% ~ 85%			
Altitude	≤ 3000m			

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IP Rating of Enclosure	IP20
Dimension (W×D×H, mm)	2150 × 1136 × 800
Installation	Rack Mounted
Storage Temperature (℃)	0 ~ 35
Recommend Depth of Discharge	90%
Cycle Life	25±2° C, 0.5C / 0.5C, EOL70%≥6000
Certification	CE / IEC62619 / IEC62040 / UN38.3

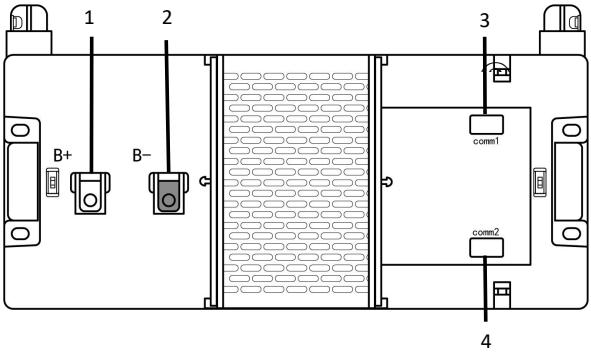
1.The current is affected by temperature and SOC.

2.Made in China.

4.4 Preparation

Please prepare No. 8 socket, No. 10 socket and cutting pliers for fastening screws on the side of the cluster holder to lock the power line.

4.5 Description of Battery Pack



No.	Name	Description
1	B+	Battery module positive pole
2	B-	Battery module negative pole
3	COMM1	Connection position of battery module communication and power supply input
4	COMM2	Connection position of battery module communication and power supply output

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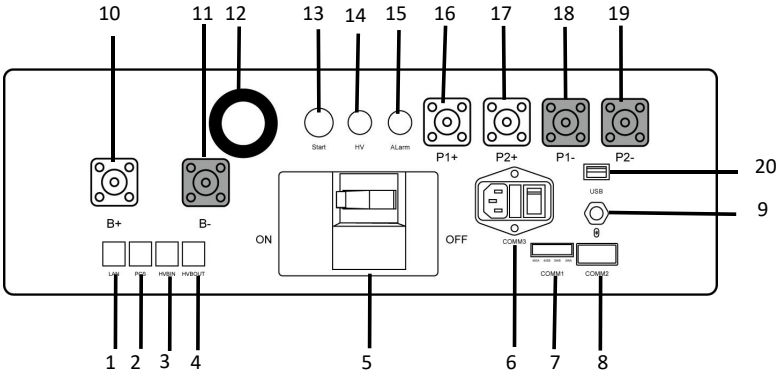
4.6 Description of High-Voltage Control Box



No.	Name	Description
1	Ethernet	Features not yet developed.
2	PCS COM	PCS COM battery communication terminal: used to output battery information to the PCS.
3	IN COM	Connection position with previous BMS-TT-HERA-ID-16KWH communication output.
4	OUT COM	Connection position with next BMS-TT-HERA-ID-16KWH communication input.
5	DC circuit breaker	It is used to manually control the connection between the battery rack and external devices.
6	COMM3	COMM3 is a multi-function interface integrating power input, fuse protection, and a power switch. It features a 10A/250V~ standard power socket, a 250V-only fuse holder for overcurrent protection, and a slide switch to control power supply. This port must be connected to the power supply of 3A, 50-60Hz, 200~240V when this equipment is in use, otherwise the fan can not rotate normally.

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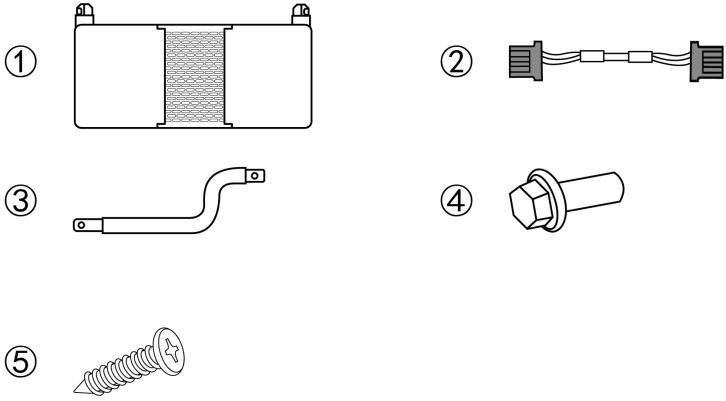
7	COMM1	485communication and emergency power-off trigger interface
8	COMM2	Communicative connection with the first battery module; and providing 12VDC power for the first battery module.
9	Bluetooth	The mobile APP connects to the data acquisition rod of the energy storage system.
10	B+	Battery common positive connection position (orange).
11	B-	Battery common negative connection position (black).
12	Display screen	Display SOC and fault codes.
13	START	A start switch of 12VDC power inside the high-voltage control box.
14	HV light indicator	High-voltage hazard indicator (yellow).
15	ALRM light indicator	Battery system fault alarm indicator (red)Y.
16	PCS1+	First PCS positive connection position (orange).
17	PCS2+	Second PCS positive terminal connection position (orange).
18	PCS1-	First PCS negative connection position (black).
19	PCS2-	Second PCS negative connection position (black).
20	USB	BMS upgrade port and storage expansion port.

4.7 Description of Battery Module in Rack

4.7.1 Battery Pack



No.	Description		quantity
①	16.08kWh battery module (general)	Standard	1
②	Communication cable) CAT5E FTP 24AWG black	Standard	1
③	Copper bar	Standard	1
④	Bolt	Standard	4
⑤	Screw	Standard	4

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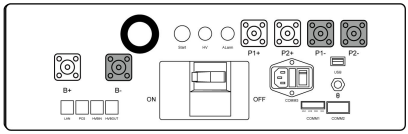
4.7.2 High Voltage Control Box

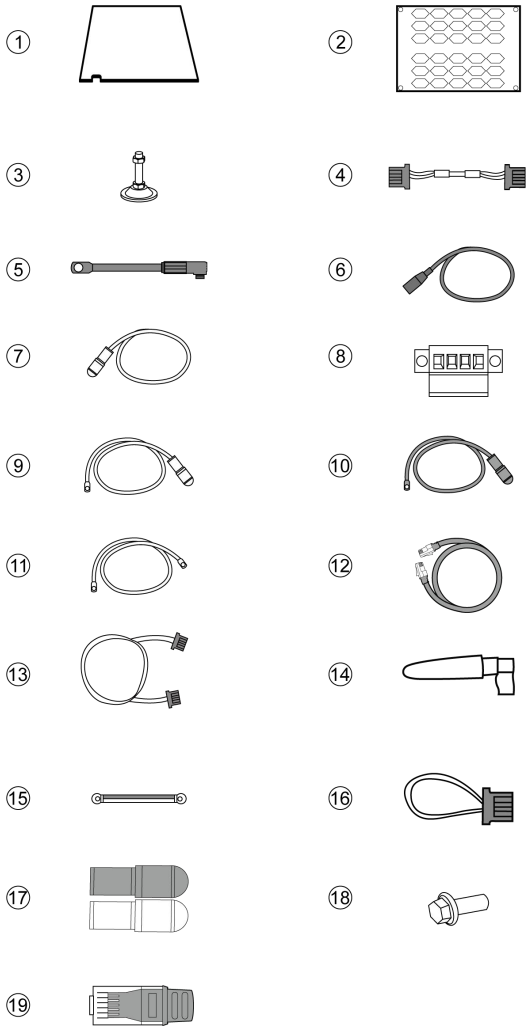
①



②

No.	Description		quantity
①	High-voltage control box 1000V/180A	Standard	1
②	User manual	Standard	1

4.7.3 Accessory bag



NOTE: The standard cables shown as No. 9 and No. 10 may vary depending on the type of accessory set supplied.

If the accessory set is intended for the inverter, the cable configuration will differ from the accessory set intended for the PCS.

For detailed specifications, please refer to the table below.

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No.	Description		quantity
①	Cover	Standard	3
②	Base	Standard	4
③	Leveling foot	Standard	16
④	Communication cable CAT5E FTP 24AWG black	Standard	1
⑤	180 mm negative power cord of high-voltage control box UL 10269 1AWG black	Standard	1
⑥	Auxiliary power supply cable	Standard	1
⑦	The positive power cord of the high-voltage control box	Standard	1
⑧	Emergency power-off interface	Standard	1
⑨	For Hera PCS (100 / 125 kW): Connected to external PCS positive power cord (EPCable3.0), UL 10269, 1AWG, red	Standard	1
	For Trio Hybrid Maxi Series Hybrid Inverter (30-125 kW): Connected to inverter positive power cord (EPCable3.0), UL 10269, 3AWG, red	Standard	2
⑩	For Hera PCS (100 / 125 kW): Connected to external PCS negative power cord (ENCable3.0), UL 10269, 1AWG, black	Standard	1
	For Trio Hybrid Maxi Series Hybrid Inverter (30-125 kW): Connected to inverter negative power cord (ENCable3.0), UL 10269, 3AWG, black	Standard	2
⑪	1000mm power cable between the two battery racks	Standard	3
⑫	Connected to external PCS communication cable (ECOM Cable2.0)	Standard	1
⑬	1000mm communication cable between the two battery racks	Standard	3
⑭	Light baton	Standard	1
⑮	Ground cable	Standard	4

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⑯	120Ω terminal resistor A	Standard	1
⑰	Terminals that connect the positive and negative terminals of external PCS connectors	Standard	1
⑱	Bolt	Standard	24
⑲	120Ω terminal resistor B	Standard, used to terminated with the HVBOUT port on the last high-voltage box when two and more high-voltage boxes are in parallel.	1

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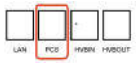
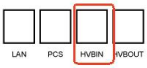
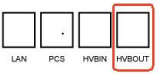
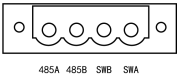
Definition of external interfaces on the front panel of the high voltage box

Definition of PCS communication interface		Racks in parallel IN		Racks in parallel OUT		Definition of the COMM1 interface	
1		1	BMS_CANL	1	BMS_CANL	1	485A
2		2	BMS_CANH	2	BMS_CANH	2	485B
3		3	DI+	3	DO+	3	SWB
4	PCANH	4	DI-	4	DO-	4	SWA
5	PCANL	5		5			
6		6		6			
7		7		7			
8		8		8			
							

Defines the external interface of a battery pack

Definition of the battery module interface			
Comm1		Comm2	
1	INT_CANL	1	INT_CANL
2	DO-	2	DO-
3	DI-	3	DI-
4	PGND	4	PGND
5	FAN-	5	FAN-
6	INT_CANH	6	INT_CANH
7	DO+	7	DO+
8	DI+	8	DI+
9	BMU_L+	9	BMU_L+
10	FAN+	10	FAN+

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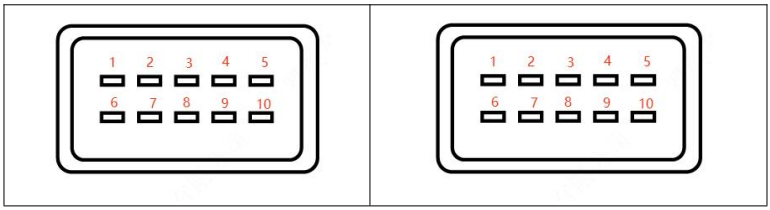

1 2 3 4 5
6 7 8 9 10
1 2 3 4 5
6 7 8 9 10

4.8 Assembly and wiring

CAUTION!

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.

CAUTION!

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

CAUTION!

Remember that this battery is heavy! Please be careful when lilting out from the package.

CAUTION!

When connecting to PCSs or being in parallel mode, please use cables provided in the unpacking list. If other cables must be used in special cases, ensure they meet FCC standards.

CAUTION!

When connecting cables, observe the installation diagram and pay attention to the direction of the communication cables. Otherwise, the products may not work properly due to incorrect cable installation.

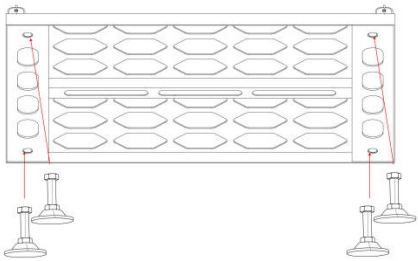
CAUTION!

Operators should wear insulation gloves before operation.

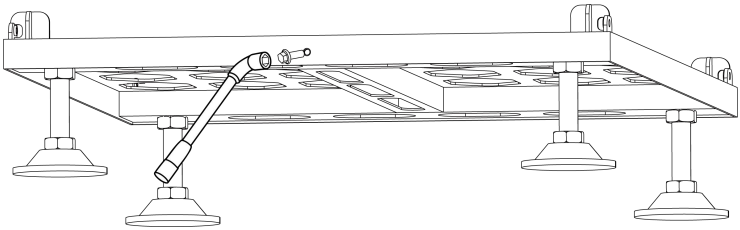
CAUTION!

At least 4 installation personnel are required to install the product.

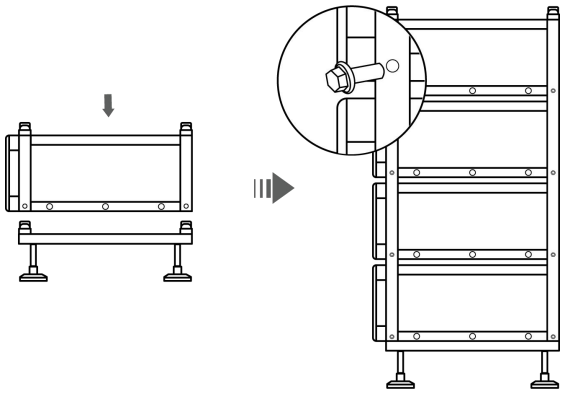
1. Take out the base and attach four leveling feet to the base,ensuring the ground where they are placed is level.



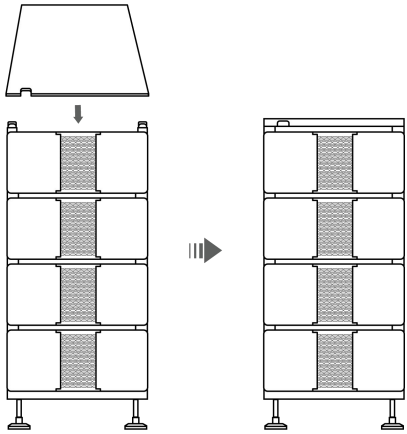
2. Connect one end of the ground cable to the base with a screw and the other end to the ground bar at the installation site using a wrench.



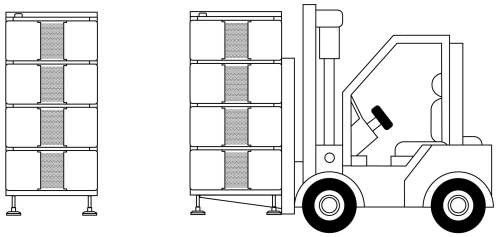
3. Stack four battery packs one by one from bottom to top. Secure every battery pack using 4 bolts.



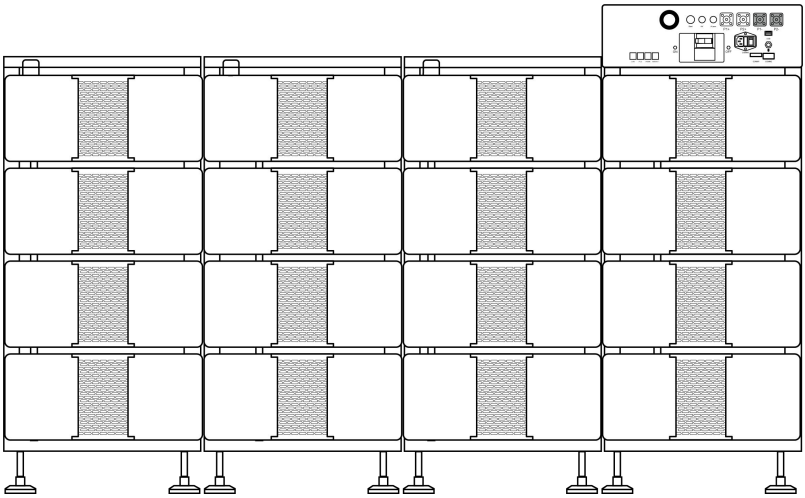
4. Mount the cover.



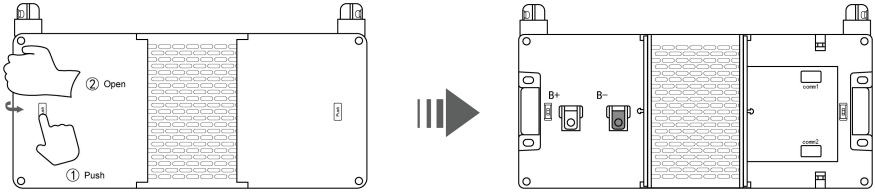
5. After the first cluster of batteries are installed, the second cluster of batteries should be installed at a distance of at least 1 meter away. After the installation, use a forklift to move the second cluster of batteries to the right of the first cluster.



6. Repeat the preceding steps for the third cluster of batteries, third cluster of batteries and high voltage control box.



7. Apply force to the front panel by pressing the “PUSH” until its edges lift up. Grip the edge of the front panel and pull it open to the desired angle as needed. This opening mechanism significantly simplifies subsequent wiring operations.Open the front panel on the right side of the battery pack using the same method.



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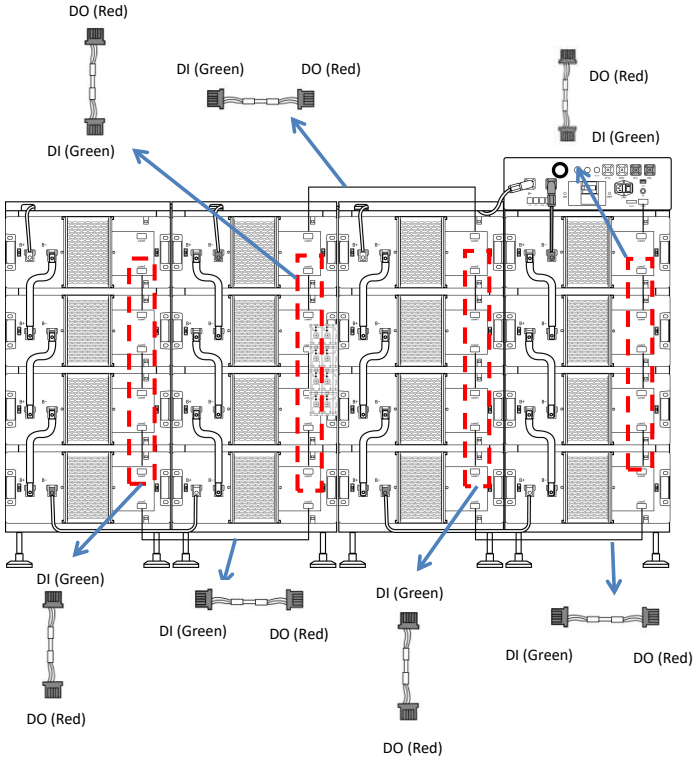
8. Preform cable connection according to these two pictures below.



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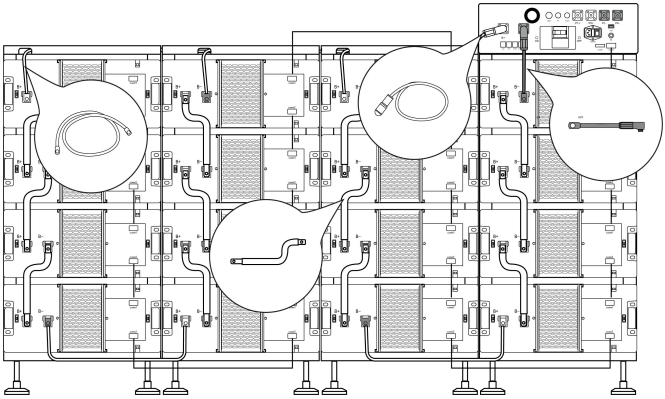
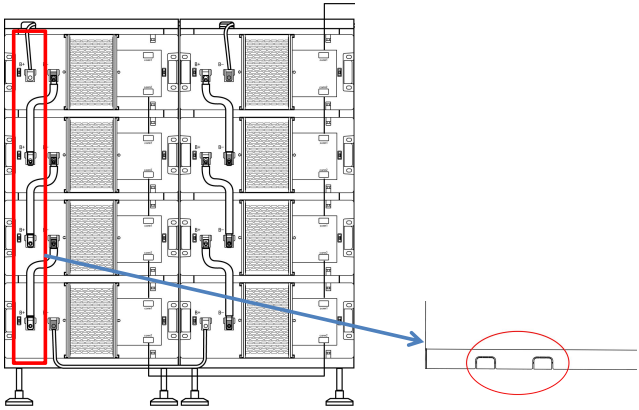
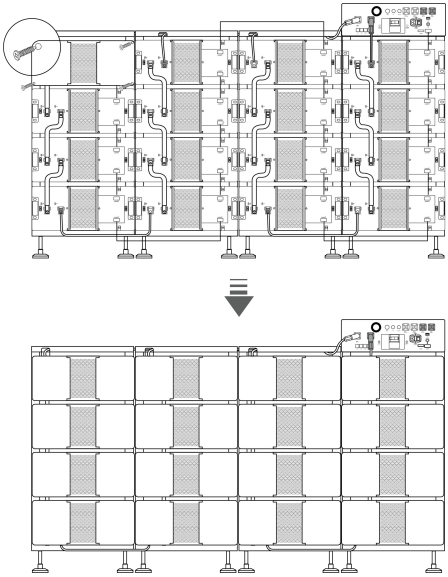


9. There are two holes on the top and bottom surfaces of each battery pack, which can be opened according to wiring requirements.

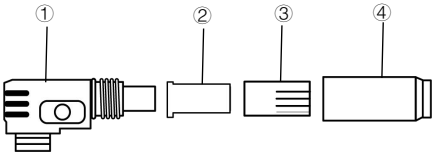


10. Secure the front panel of every battery pack using 4 screws.



4.9 Wiring Instructions

4.9.1 Package contents



1： Socket Package

2： Grommet

3： Gripping Jaw

4： Nut

4.9.2 Plug Assembly Instruction

Step1：Strip off the jacket of the cable.

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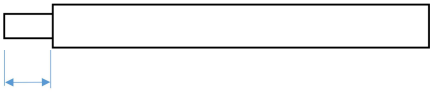
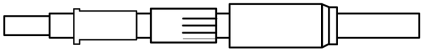
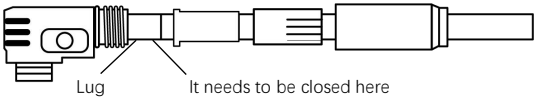


A:The length of the stripped wire of the plug(See table I)

Step2：Put the nut, the Grommet and the gripping jaw on the cable as shown.



Step3：Insert the conductor into the lug.



Step4：Crimping the lug as shown (A 1~2mm horn is left out of the tail cable to prevent crushing the conductor).

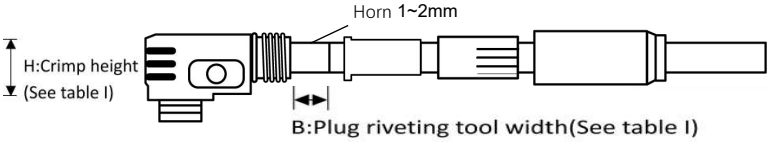


Table I

No.	Electric current	The length of the stripped wire of the plug A (mm)	Plug riveting tool width B (mm)	Suggested crimp height of the plug H (mm)	Compression ratio	Cable square (mm^2)	Cable outside diameter (mm)
1	100	13~14	6~7	6.5±0.2	75%~80%	16	7.5~9
2	120	13~14	6~7	7.3±0.2	75%~80%	25	9~10.3

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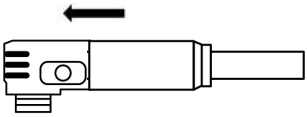
Notes: The recommended crimp sizes are only for reference. The customer should adjust them according to cable specification and crimp tool and test results including temperature rise and metallographic analysis and pullout force.

Step5：Push the seal, the jaw and the nut into the socket, then screw it.



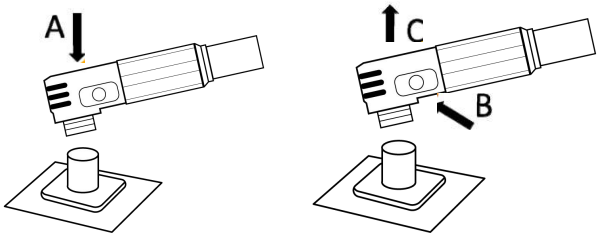
Step6：Schematic diagram of matching plug and socket.

(Warning：Do not disconnect under load)

① After install the socket, we can mate directly, you don't need press the button. It is install over when you hear a sound. (Pre-pull the socket up, unable to come out, to ensure that the assemble is in place.)

② Before you pull out the plug, please turn off the power first.

③ Press the button and then pull out the plug.



Power-storage connector

The connector can only be used in combination, for indoor use only.

Safety notes:

1.Only qualified electrical professionals may install and operate the product.

2.Do not disconnect the connector under load.

3.The product can only be used in the situation of overvoltage protection devices.

4.Only allow to connect “+” with “+”, and “-” with “-”.

Warning: Risk of burns

The connector heats up during operation.

It can heat up to 115℃, depending on the environmental conditions. In this case, the user is responsible for attaching warnings.

4.10 Battery cluster connected to PCS

For the Australian Market, an over-current protection and isolation device that isolates both positive and negative conductors simultaneously is required between the battery system and PCS. The circuit breaker (over-current protection and isolation device) selection requirements are as follows:

Type: DC Circuit Breaker

Pole Number: 2P (Recommended)

Rated Voltage: 1000V (Recommended)

Rated Current: 200A (Recommended)

Battery cluster connected to PCS

Notice:

- The length of the communication line between the PCS and the battery should not exceed 30m.
- When connecting to inverters or being in parallel mode, please use cables provided in the unpacking list. If other cables must be used in special cases, ensure they meet relevant standard.

1. For 100/125 KW PCS:

Power Cable and Terminal Configuration

Connection Point	Terminal Model	Cable Specification	Quantity
Attach to PCS BAT+	SC50-10	42mm²	1
Attach to PCS BAT-	SC50-10	42mm²	1

Single battery cluster connected to PCS

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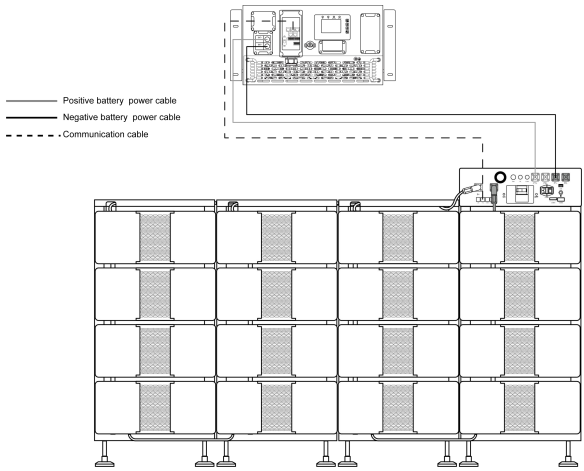
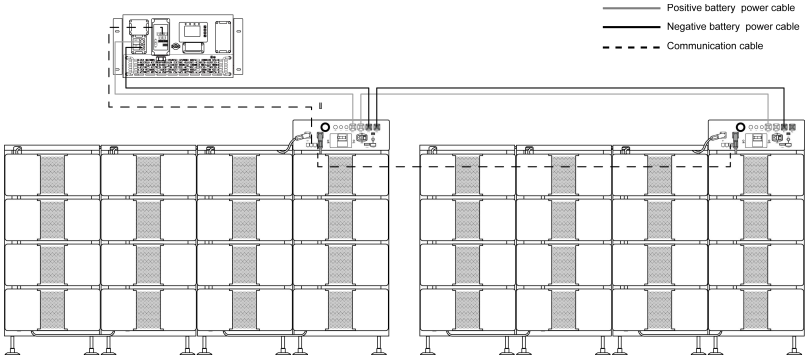
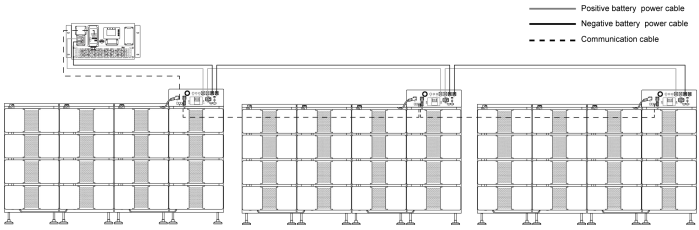


Two battery clusters connected to the PCS



Three battery clusters connected to the PCS



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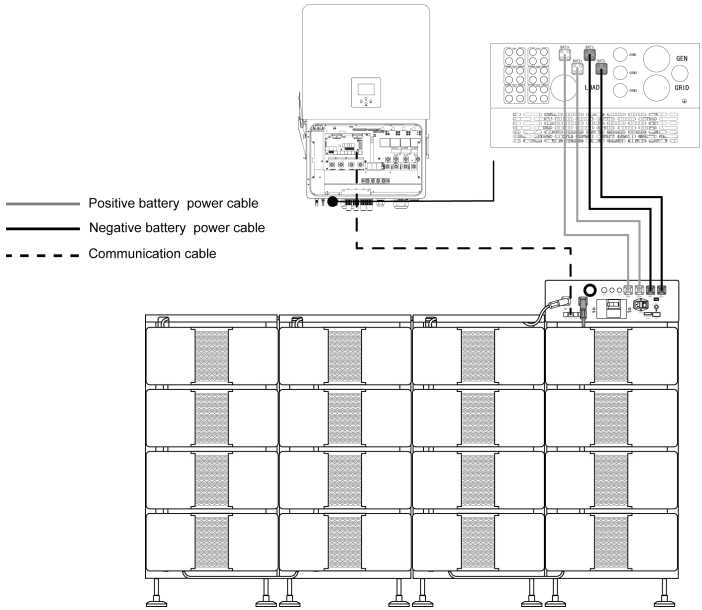
2. For 80 KW PCS:

Power Cable and Terminal Configuration

Connection Point	Terminal Model	Cable Specification	Quantity
Attach to PCS BAT+	SC25-6	26mm²	2
Attach to PCS BAT-	SC25-6	26mm²	2

One battery clusters connected to the PCS:



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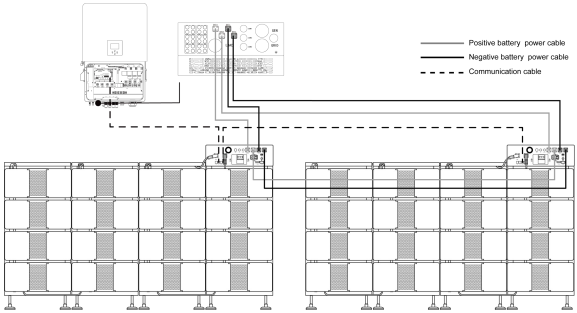
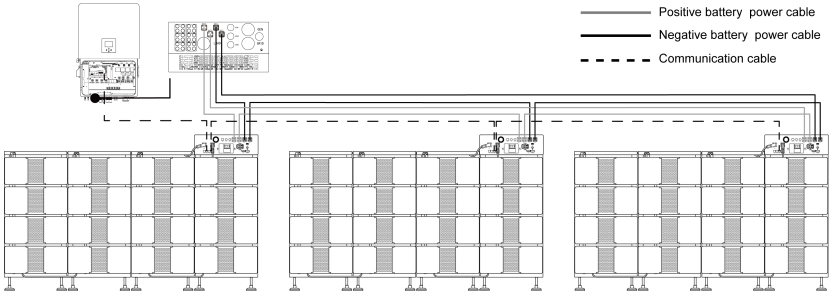
Two battery clusters connected to the PCS:



Three battery clusters connected to the PCS:



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4.11 System startup and shutdown

Startup procedure

① After making sure all the necessary connections are secured correctly and firmly, turn the circuit breaker handle from “OFF” to “ON” position on the HV control box.

②Press the start button.

③Wait for the system to initialize. The start-up sequence is completed when the yellow HV indicator lights up.

④ Then close the circuit breaker between the PCS and the battery.

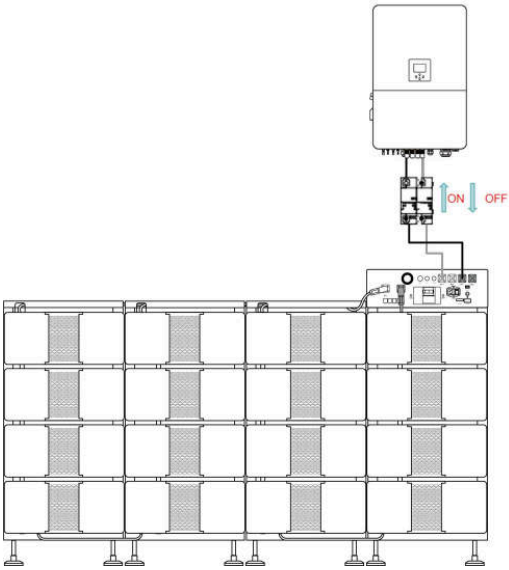
Shutdown procedure

①Press the start button again .

②Wait for the relays within to open (which you can hear) and the yellow HV indicator to go off, after which you can turn the circuit breaker handle from “ON” to “OFF” position.

③Then open the circuit breaker between the PCS and the battery.

④The power-off sequence is now completed.



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5. Troubleshooting

Different types of faults are below:

	Fault types	Trigger conditions	
System faults	Charge over-current alarm	/	
	Charge over-current protection	Charging current exceeds 176A for 2 minutes; or exceeds 210A for 5 seconds; or exceeds 235A for 0.5 seconds.	
	Discharge over-current alarm	/	
	Discharge over-current protection	Discharge current exceeds 176A for 2 minutes; or exceeds 210A for 5 seconds; or exceeds 235A for 0.5 seconds.	
	Charge overtemperature alarm	Exceeding the parameter set value and set time (Maximum cell temperature >50°C, 5s)	
	Charge overtemperature protection	Exceeding the parameter set value and set time (Maximum cell temperature >55°C, 2s)	
	Discharge overtemperature alarm	Exceeding the parameter set value and set time (Maximum cell temperature >50°C, 5s)	
	Discharge overtemperature protection	Exceeding the parameter set value and set time (Maximum cell temperature >55°C, 2s)	
	Charge under temperature alarm	Exceeding the parameter set value and set time (Minimum cell temperature <5°C, 5s)	
	Charge under temperature protection	Exceeding the parameter set value and set time (Minimum cell temperature <0°C, 2s)	
	Discharge under temperature alarm	Exceeding the parameter set value and set time (Minimum cell temperature <-10°C, 5s)	
	Discharge under temperature protection	Exceeding the parameter set value and set time (Minimum cell temperature <-20°C, 2s)	
	Excessive differential voltage alarm	Exceeding the parameter set value and set time (Voltage difference >500mV, 2s)	
	Excessive differential voltage protection	Exceeding the parameter set value and set time (Voltage difference >800mV, 2s)	
	Excessive differential temperature alarm	Exceeding the parameter set value and set time (Temperature difference between highest and lowest >10°C, 2s)	
	Excessive differential temperature protection	Exceeding the parameter set value and set time (Temperature difference between highest and lowest >15°C, 2s)	
	SOC too high	/	
	Cell overvoltage alarm	Exceeding the parameter set value and set time (Maximum cell	To maintain consistency, cut off the charging immediately when the full charge

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		voltage >3.62V, 1s)	calibration rated voltage of 3.6V is reached. When the voltage drops to 3.35V, restart it with the turned-off red light indicator. All protective red light indicators are always on!
	Cell overvoltage protection	Exceeding the parameter set value and set time (Maximum cell voltage >3.65V, 1s)	
	Cell undervoltage alarm	Exceeding the parameter set value and set time (Minimum cell voltage <2.7V, 2s)	
	Cell undervoltage protection	Exceeding the parameter set value and set time (Minimum cell voltage <2.5V, 2s)	
	Pre-charge resistor overtemperature alarm	Exceeding the parameter set value and set time (Precharge resistor temperature >55°C, 2s)	
	Pre-charge resistor overtemperature protection	Exceeding the parameter set value and set time (Precharge resistor temperature >85°C, 2s)	
	Insulation level 1	Exceeding the parameter set value and set time (Insulation resistance <500MΩ, 3 times)	
	Insulation level 2	Exceeding the parameter set value and set time (Insulation resistance <100MΩ, 3 times)	
	Heating film overtemperature alarm	/	
	Heating film overtemperature protection	/	
	BMS connector overtemperature alarm	Exceeding the parameter set value and set time (Maximum temperature of BMS connector >75°C, 2s)	
	BMS connector overtemperature protection	Exceeding the parameter set value and set time (Maximum temperature of BMS connector >85°C, 2s)	
	BMU connector overtemperature alarm	Exceeding the parameter set value and set time (Maximum temperature of BMU connector >75°C, 2s)	
	BMU connector overtemperature protection	Exceeding the parameter set value and set time (Maximum temperature of BMU connector >85°C, 2s)	
	Power loop overtemperature alarm	/	
	Power loop overtemperature protection	/	
	SOC too low	Exceeding the parameter set value and set time (SOC is 0%)	
	Total voltage too high alarm	Exceeding the parameter set value and set time (Total voltage >57.6V*N (N=current system PACK	

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		count), 1s)
	Total voltage too high protection	Exceeding the parameter set value and set time (Total voltage >58.4V*N (N=current system PACK count), 1s)
	Total voltage too low alarm	Exceeding the parameter set value and set time (Total voltage <44.8V*N (N=current system PACK count), 2s)
	Total voltage too low protection	Exceeding the parameter set value and set time (Total voltage <41.6V*N (N=current system PACK count), 2s)
	Discharge relay adhesion	Discharge relay control command open, but actual feedback indicates discharge relay closed, 3s
	Charge relay adhesion	Charge relay control command open, but actual feedback indicates charge relay closed, 3s
	Heating relay adhesion	Heating circuit voltage high detected after heating relay disconnection, 3s
	Limit protection	Exceeding the parameter set value and set time (Condition 1: Maximum cell voltage ≥3.8V) Condition 2: (Minimum cell voltage ≤1.5V and no voltage acquisition fault) or (Maximum cell temperature ≥65°C) or (Minimum cell temperature ≤-30°C and no temperature sensor disconnection fault) or (Connector temperature ≥90°C) lasting 2s Extreme protection triggered if either Condition 1 or Condition 2 is met
	Abnormal power supply voltage	Exceeding the parameter set value and set time (Supply voltage >14V or supply voltage <10V, 5s)
	Master positive relay adhesion	Main positive relay has no close command, but actual feedback indicates main positive relay closed, 3s
	Fuse Blown	No high voltage detected after loop relay closure, 5s
	Repeated BMU address fault	BMU with the same number
	Repeated BMS address fault	BMS with the same number
	INTER-CAN BUS communication failure	Loss of communication between BMS
	PCS-CAN BUS communication failure	The heartbeat message of the PCS is not received for a long time
	RS485 communication failure	/
	RS485 communication abnormal	/
	External（FUSE）total voltage acquisition fault	/

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	Internal total voltage acquisition fault	The difference between the acquired internal total voltage and the accumulated internal total voltage exceeding the set value（10V，5s）
	SCHG total voltage acquisition fault	/
	Cell voltage acquisition fault	Battery voltage sampling disconnection
	Temperature acquisition failure	BMS NTC sampling disconnection or BMU NTC sampling disconnection or battery temperature sampling disconnection
	Current acquisition fault	Exceeding the parameter set value and set time (Acquired charging current >500A or discharging current >500A, 3s)
	Current module fault	Current module reverse connection (charging current and voltage drop, or discharging current and voltage rise, 60s) or current module not configured (shunt sampling type configured incorrectly)
	Main positive relay drive failure fault	Control main positive relay close, but actual feedback indicates open, 5s
	Charging relay drive failure fault	Control charging relay close, but actual feedback indicates open, 5s
	Discharging relay drive failure fault	Control discharging relay close, but actual feedback indicates open, 5s
	Heating relay drive failure fault	Heating circuit low voltage detected after heating relay connection, 5s
	EEPROM storage failure	EEPROM write failure during self-test
	RTC clock fault	The external RTC failed to enable the charging function
	Pre-charge failure	Pre-charge timeout，4s
	Charging voltage too low	The minimum cell voltage is lower than the set value
	BMU lost	BMU message not received for a long time，10s
	Abnormal number of BMU	The difference between the acquired internal total voltage and the accumulated internal total voltage exceeding the set value(27.2V,5s)
	Mot total pressure acquisition abnormal	DC circuit is closed, but MOT total voltage <10V, 5s
	BMS connector temperature acquisition abnormal	BMS connector north positive terminal temperature, BMS connector south positive terminal temperature, BMS connector south negative terminal temperature, BMS connector north negative terminal temperature, precharge resistor temperature reads 0 for 20s (BMS NTC acquisition disconnected)

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	BMU connector temperature acquisition abnormal	BMU connector minimum temperature reads 0 for 20s (BMU NTC acquisition disconnected)
	PACK fan fault	Fan detected not rotating during startup
	PACK thermal runaway fault	Condition 1: Maximum cell temperature exceeds 65°C Condition 2: Voltage drop rate exceeding 25%/s or temperature rise rate exceeding 1°C/s occurs continuously more than 30 times Both Condition 1 and Condition 2 must be met for thermal runaway to occur
	PACK fire protection fault	Battery pack detects aerosol discharge
	TCP connection failure	/
	W5500 SPI communication failure	/
	LC communication loss	/
	BMU software version discrepancy fault	BMU software version mismatch
	BMU AFE communication failure	BMU and AFE acquisition chip communication failure
	BMU cell type mismatch fault	Battery type filled in battery pack does not match battery type filled in high-voltage box during system power-on self-test
	Single cluster emergency power-off fault	Emergency power-off signal read from DI is at low level, 2s
	Bluetooth initialization failure fault	Bluetooth initialization failed 10 times
	Environmental controller communication loss	/
	Air conditioning communication loss	/
	Air conditioning alarm	/
	Lightning protection	/
	Exhaust valve alarm	/
	Lead-acid battery fault	/
	Cabin-level combustible gas fault	/
	Battery compartment door open fault	/
	Aerosol feedback fault	/
	Environmental control board smoke sensor fault	/

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	Environmental control board temperature sensor fault	/
	Environmental control board emergency stop fault	/
	Environmental control board water immersion fault	/

6. Screen displays the logic

1. After startup, the screen is on for 20 seconds and then off. Each time the touch screen is lit behind the scenes for 20 seconds, and then turned off until the next touch.
2. The first 2s of boot, the screen shows all.
3. The fault code starts from F001 in ascending order.
4. Each fault is displayed for 5s, and then switch to the next fault.
5. If all faults are rectified, keep the previous fault on the screen for 5 seconds and clear the screen.

Note: For more information, please contact us.

F001	ALARM_ID_SUM_OVER_VOLT_LEV_2	Overvoltage
F002	ALARM_ID_SUM_LOW_VOLT_LEV_2	The total voltage is too low
F003	ALARM_ID_CHG_OVER_TEMP_LEV_2	Charging temperature is too high
F004	ALARM_ID_DSG_OVER_TEMP_LEV_2	High discharge temperature
F005	ALARM_ID_CHG_LOW_TEMP_LEV_2	The charging temperature is too low
F006	ALARM_ID_DSG_LOW_TEMP_LEV_2	The discharge temperature is too low
F007	ALARM_ID_OVER_DIFF_VOLT_LEV_2	Excessive voltage difference
F008	ALARM_ID_OVER_DIFF_TEMP_LEV_2	Excessive temperature differentials
F009	ALARM_ID_CELL_OVER_VOLT_LEV_2	Cell overvoltage
F010	ALARM_ID_CELL_LOW_VOLT_LEV_2	Cell undervoltage
F011	ALARM_ID_PRE_CHG_RES_OVER_TEMP_LEV_2	The temperature of the precharge resistance is too high
F012	ALARM_ID_NORTH_CONNECTOR_OVER_TEMP_LEV_2	The temperature of the BMS connector is too high
F013	ALARM_ID_SOUTH_CONNECTOR_OVER_TEMP_LEV_2	The BMU connector temperature is too high.
F014	ALARM_ID_CHG_OVER_CUR_LEV_2	Charging current fault
F015	ALARM_ID_DSG_OVER_CUR_LEV_2	Discharge current fault
F016	ALARM_ID_SOC_OVER_LEV_2	High SOC fault
F017	ALARM_ID_INSULATION_FAILURE_TWO	Insulation fault
F018	ALARM_ID_HEAT_OVER_TEMP_LEV_2	The heating film is too high
F019	ALARM_ID_SOC_LOW_LEV_2	The SOC is too low

F020	ALARM_ID_DSG_RELAY_ADHESION	Discharge relay adhesion
F021	ALARM_ID_POS_RELAY_ADHESION	Total positive relay bonding
F022	ALARM_ID_CHG_RELAY_ADHESION	The charging relay is glued
F023	ALARM_ID_HEAT_RELAY_ADHESION	The heating relay is glued
F024	ALARM_ID_ULTIMATE_PROTECTION	Ultimate protection
F025	ALARM_ID_POWER_SUPPLY_FAULT	Abnormal supply voltage
F026	ALARM_ID_FUSE_BLOWN	Blown fuse
F027	ALARM_ID_BMU_ADDR_REPEAT	The BMU repeatedly fails
F028	ALARM_ID_BMS_ADDR_REPEAT	The BMS is faulty repeatedly
F029	ALARM_ID_INTERNAL_COMM_ERROR	The internal CAN communication fails
F030	ALARM_ID_PCS_CAN_COMM_FAIL	The PCS CAN communication fails
F031	MBMS_SAM_SIG_ID_PCS_ERROR_STATE	The PCS RS485 communication fails
F032	ALARM_ID_PCS_RS485_COMM_ERROR	The PCS RS485 communication is abnormal
F033	ALARM_ID_FUSE_VOLT_SAMP_ERROR	The FUSE total voltage collection is abnormal
F034	ALARM_ID_BAT_VOLT_SAMP_ERROR	The internal total voltage collection is abnormal
F035	ALARM_ID_MOT_VOLT_SAMP_ERROR	The Mot total voltage collection is abnormal
F036	ALARM_ID_HTP_VOLT_SAMP_ERROR	The total heating voltage collection is abnormal
F037	ALARM_ID_CELL_VOLT_SAMPLE_ERROR	Voltage collection fault
F038	ALARM_ID_TEMP_SAMPLE_ERROR	Temperature acquisition fault
F039	ALARM_ID_CURRENT_SAMPLE_ERROR	Current acquisition fault
F040	ALARM_ID_CURRENT_MODULE_FAULT	Current module fault
F041	ALARM_ID_POS_RELAY_DRIVE_FAULT	Total positive relay drive failure
F042	ALARM_ID_CHG_RELAY_DRIVE_FAULT	Charging relay drive failure
F043	ALARM_ID_DSG_RELAY_DRIVE_FAULT	Discharge relay drive failure
F044	ALARM_ID_HEAT_RELAY_DRIVE_FAULT	Heating relay drive failure
F045	ALARM_ID_EEPROM_ERROR	The EEPROM storage is faulty
F046	ALARM_ID_PRECHAGE_ERROR	The precharge failed
F047	ALARM_ID_CHG_VOLT_LOW	The charging voltage is too low

F048	ALARM_ID_BMU_COMM_ERROR	The BMU communication is faulty
F049	ALARM_ID_BMU_NUMBER_ERROR	The number of BMUs is abnormal
F050	ALARM_ID_MBMS_NTC_BREAKLINE_ERROR	Temperature collection of the BMS connector is abnormal
F051	ALARM_ID_BMU_NTC_BREAKLINE_ERROR	The temperature collection of the BMU connector is abnormal
F052	ALARM_ID_PACK_THERMAL_RUNAWAY	PACK thermal runaway fault
F053	ALARM_ID_PACK_FIRE_FAULT	PACK fire failure
F054	ALARM_ID_TCP_CONNECT_FAIL	TCP connection failure
F055	ALARM_ID_W5500_SPI_COMM_FAIL	The W5500SPI communication fails
F056	ALARM_ID_LC_COMM_LOST	LC communication loss
F057	ALARM_ID_PACK_AFE_COMM_ERROR,	BMU AFE communication fails
F058	ALARM_ID_BLE_INIT_FAULT	Description Bluetooth initialization failed
F059	ALARM_ID_CELL_TYPE_MISMATCH_ERROR	The battery type does not match
F060	ALARM_ID_SINGLE_CLUSTER_POWER_DOWN	Single cluster emergency power-off

7. Maintenance and upgrade

Warning! Improper decommissioning may cause damage to the equipment and/or battery inverter.

Before maintenance, ensure the product is decommissioned according to relevant provisions.

Note: All maintenance work shall comply with local applicable regulations and standards.

The USB disk port of your equipment has the functions of upgrading firmware and recording battery data, which can be used as an auxiliary tool.

To ensure safe operation, all plug connections must be checked. If necessary, relevant operators shall press them back into place at least once a year.

The following inspection or maintenance must be carried out once a year:

• General visual inspection

• Check all tightened electrical connections. Check the tightening torque according to the values in the following table. Loose connections must be retightened to the specified torque.

Connection mode	Tightening torque
High-voltage control box grounding	4.5Nm
Fixing the lug of the high-voltage control box	6 Nm
Fixing the lug of the battery module	6 Nm

• Using the monitoring software, check whether the SoC, SoH, battery voltage and temperature of the battery module are abnormal.

• Shut down and restart the product once a year.

Note: If the system is installed in a polluted environment, maintenance and cleaning must be carried out at short intervals.

Note: Clean the battery rack with a dry-cleaning cloth. Ensure that no moisture comes into contact with the battery connections. Do not use solvents.

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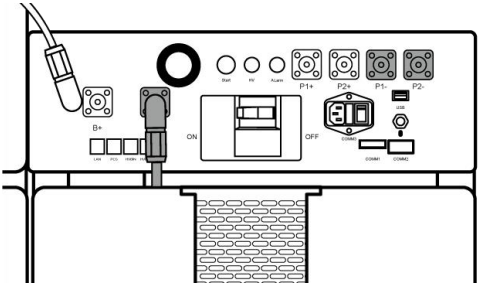
8. Battery Module Storage



A. To ensure the battery service life, the storage temperature shall be kept between 0°C~35°C.

B. The battery shall be cycled at least once every 6 months.

C. To minimize self-discharge in a long storage period, cut off the connection between the HVB and batteries by disconnecting one end of the positive HVB power cord as the picture shows. This will interrupt the use of the 12 V power supply installed in the HVB and prevent the battery from self-discharging.

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9. Disposal

For details related to the disposal of battery modules, please contact us. For more information, please visit http://www.tommatech.de.

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.

For more information, please visit http://www.tommatech.de. Do not dispose of batteries as household waste!

10. Legal notice

Installation and Operation Manual for Hera Indoor

Subject to technical changes.

TommaTech GmbH

Legal Statement

The information contained in the document is the property of TommaTech GmbH.

All information shall not be published in whole or in part without the written permission of TommaTech GmbH.

11.EU Declaration of Conformity

CE

Within the scope of the EU directives

Restriction of the use certain hazardous substances 2011 / 65 / EU (ROHS) Radio Equipment Directive 2014/53/EU (RED)

TommaTech GmbH. confirms herewith that the products described in this document are in compliance with the fundamental requirements and other relevant provisions of the above mentioned directives .

Annex I-Manufacturer Self Declaration

The electrochemical performance and durability parameters
Product Model：Hera Indoor 16.08kWh

Parameters	Value	Test method
Rated Capacity	314Ah	Actual measurement@25℃±3℃ ①0.5C charge ②rest30min ③0.5C discharge
Capacity Fading	6000 Cycles, fade≤30%	Actual measurement@25℃±3℃ ①0.5C charge ②rest30min ③0.5C discharge，90%DOD
Power	8038W	@25℃±3℃ charge and discharge@ 20%~80%SOC
Power Fading	10 years,fade≤30%	/
Internal Resistance	≤0.0013Ω	Actual measurement@25℃±3℃ ①0.5C CC 3.65V,CV 0.05C, Cut ②Discharge to 50%SOC,rest 3h，V0 ③discharge 0.5C,10s，V1 ④(V0-V1)/157
Increased internal Resistance	10 years,Increased≤30%	/
Energy efficiency	95%	Actual measurement@25℃±3℃ ①0.5C CC 3.65V ②Discharge to 2.5V，E0 ③0.5C CC 3.65V，E1 ④E0/E1
Energy efficiency Fading	10 years,fade≤3%	/
Cycle Life	≥6000@70%SOH, 10 years	Actual measurement@25℃±3℃ ①0.5C charge ②rest30min ③0.5C discharge，90%DOD

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