EN-Manual

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High Voltage Battery System

Battery-Box HVE

6.4, 8.5, 10.7, 12.8-1, 12.8-2,

15.0, 17.1-1, 19.2, 17.1-2, 19.3, 21.4, 23.5

User Manual

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Legal provisions

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Under some statutes, the exclusion of implied warranties may not apply in all cases, so the above exclusion may not apply.

Before transporting, storing, installing, operating, using, deactivating, or/and maintaining the equipment, please read this installation manual, strictly follow the contents of the installation manual, and follow all safety precautions indicated on the equipment and in the installation manual. In this installation manual, "equipment" refers to the products, software, components, spare parts, and/or services related to this installation manual.

The "Danger", "Warning", "Caution", and "Notice" items in the installation manual do not represent all the safety precautions that should be followed. You also need to comply with relevant international, national, or regional standards, as well as industry practices.

This equipment should be used in an environment that meets the design specifications. Otherwise, equipment failures, abnormal equipment functions, or component damage that may occur are not within the scope of equipment quality assurance; Otherwise, Shenzhen BYD Electronics Co., Ltd. shall not be liable for compensation for potential personal injury, property damage, etc.

All operations such as transportation, storage, installation, operation, use, shutdown, and maintenance should comply with applicable laws, regulations, standards, and specifications.

Reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations of device software are prohibited. It is not allowed to study the internal implementation logic of the device, obtain the source code of the device software, or infringe intellectual property rights in any way. It is also not allowed to disclose the results of any device software performance testing.

This document does not supersede and is not intended to supersede any local, state, provincial, federal, or national laws, regulations, or codes applicable to the installation, electrical safety, and use of the battery module. BYD is not responsible for compliance or non-compliance with such laws or regulations when installing the battery module.

Specifications are subject to change without notice. Every effort has been made to keep this document complete, accurate and current. However, without advance notice, BYD may need to make some improvements in specific situations. BYD shall not be liable for any damage caused by this document, including but not limited to omissions, errors, typographical errors, miscalculations, or tabulation errors in this document.

All trademarks are recognized.

Limited warranty letter

You can download the latest warranty documents from the www.bydenergy.com on the Internet.

Product datasheet

You can download the latest product datasheet from the www.bydenergy.com on the Internet.

Service guide

You can download the latest Service Guide from a www.bydenergy.com on the Internet.

BYD Company Limited

3009, BYD Road, Pingshan, Shenzhen, P.R.China.

Manufacturer

Shanwei BYD Auto Co., Ltd.

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1. Information on this document

Disclaimer

When installing, operating, and maintaining the equipment, read this manual first and follow all safety precautions in the equipment and manual.

BYD shall not be liable for any of the following circumstances.

- Equipment damage caused by force majeure events such as earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather, etc;
- Not operating under the usage conditions described in this manual;
- The installation and usage environment does not comply with relevant international, national, or regional standards;
- Non qualified personnel carry out equipment installation and use;
- Not following the operating instructions and safety warnings in the product and documentation;
- Unauthorized disassembly, alteration of products, or modification of software code;
- Damage caused by you or your authorized third-party transportation;
- Damage caused by storage conditions not meeting product documentation requirements;
- The materials and tools you provided do not meet the requirements of local laws, regulations, and relevant standards;
- Damage caused by your or a third party's negligence, intent, gross negligence, improper operation, or reasons not attributable to our company;

* Reverse engineering, decompilation, disassembly, adaptation, implantation, or other derivative operations of the device software are prohibited. It is forbidden to study the internal implementation of the device, obtain the source code of the device software and steal intellectual property rights in any way. It is forbidden to disclose any performance test results of the equipment software.

1.1 Validity

This document is valid for the Battery-Box HVE 6.4、8.5、10.7、12.8-1、12.8-2、15.0、17.1-1、19.2、17.1-2、19.3、21.4、23.5

1.2 Target groups

Instructions in this document may only be performed by qualified personnel with the following skills:

- Understand how batteries work and operate.
- Understand the working principle and operation method of the inverter.
- Know and comply with locally applicable connection requirements, standards and directives.
- Understand and follow this document and related system documentation, including all safety instructions.
- Training to handle hazards associated with the installation and operation of electrical equipment and batteries.
- Training on installation and commissioning of electrical equipment.
- Personnel involved in special scenarios such as high-altitude operations and special equipment operations must have special operation qualifications required by the local country/region.

Failure to do so will void any manufacturer's warranty, guarantee, or liability unless you can prove that the damage was not due to non-compliance.

1.3 Content and structure of this document

This document contains safety information and instructions, scope of delivery, battery module overview, installation, electrical connection, commissioning, operation, decommissioning, expansion, troubleshooting, maintenance and storage, battery module disposal, technical parameters and contact information. Read this document before performing any action on the battery module.

1.4 Loading and unloading requirements

Batteries need to be handled in accordance with local laws, regulations and industry standards. Improper loading and unloading can result in shorting or damage to the battery, which can lead to leakage, rupture, explosion, or fire. Transportation requirements.

1.5 Transport requirements

- Before shipment, the battery must be checked to ensure that it is intact and free from unusual odors, smoke, fire, etc. Otherwise, shipment is prohibited.
- Packing must be secure. The product must be handled with care during transportation, and moisture-proof measures shall be taken. Considering the influence of external environment (such as temperature, transportation, storage, etc.), the specifications and parameters shall be subject to the date of manufacture.
- The following conditions must be prohibited during transportation: direct contact with rain, snow or immersion in water; falling or mechanical shock; Inverted or tilted.

1.6 Declaration of conformity

The battery modules described in this document comply with applicable local directives. The certificate is available in the Downloads area of the www.bydenergy.com.

1.7 Warning level

The following levels of warning messages may appear when handling the battery module.

DANGER

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates a situation that could result in property damage if not avoided.

1.8 Documentation symbols

QUALIFIED PERSON
Describe activities performed by qualified personnel only.

1.9 Abbreviations and definitions of terms

No.	Designation	Explanation
1	HVE	BYD Battery-Box HVE
2	BCU	Battery Control Unit
3	BIC	Battery Information Collector
4	BMS	Battery Management System
5	BMU	Battery Management Unit
6	BYD	Shenzhen BYD Lithium Battery Co., Ltd.
7	SOC	State of Charge
8	Smart WIFI/LAN Module	WIFI/LAN/Bluetooth Module as an option

2. Security

Disclaimer

BYD shall not be liable for any functional failure, component damage, personal safety accident or property loss caused by the following reasons:

- The customer fails to charge the battery in time, resulting in loss of battery capacity or other irreversible damage.
- Falling, leaking or other damage caused by improper handling or connection.
- The user does not set the battery operation management parameters correctly.
- The customer or third party changes the battery usage scenario without consulting BYD.
- Mix the batteries provided by BYD with other batteries, including but not limited to: mixing with batteries of other brands, mixing with batteries of different rated capacities, etc.
- The working environment or external power supply parameters can not meet the requirements of the normal working environment, causing direct damage to the battery.
- The customer has not properly maintained the battery in accordance with the owner's manual.
- Out of warranty batteries.
- Battery damage due to the use of an inverter other than BYD (Technical Information).
- Do not use accessories with recommended specifications.

2.1 Intended use

Battery-Box HVE works with photovoltaic systems for residential use. It is a high-voltage lithium-ion battery storage system with a control module that can operate in grid-connected, off-grid, and stand- by modes via compatible inverter.

The battery system doesn't have wireless communication function, it is connected with the Smart WiFi/ LAN Module to implement wireless functionality, and the Smart WiFi/ LAN Module has obtained network security certification.

The battery system can be connected to the Internet via Smart WiFi/LAN Module component on the inverter for maintenance and firmware updates.

The battery system can only be used as a fixed device.

The battery system is suitable for indoor and outdoor use under the conditions described in

Section 5.1.

The battery system can only be operated with a compatible inverter.

Model of inverter supported by energy storage
BYD Power Box SH3-6K
BYD Power Box TH5-15K

The battery system is not suitable for:

- Powering life-sustaining medical equipment;
- Train, elevator and other control equipment may cause personal injury;
- Computer systems of social and public importance;
- Location near medical equipment;
- Equipment similar to that described above.

Please ensure that no personal injury would occur due to the power outage of the battery system.

Alterations, such as alterations or modifications, to the battery are not permitted unless written permission is obtained from BYD. Unauthorized changes will invalidate warranty and warranty claims.

BYD shall not be liable for any damage caused by such changes. The type label should always be attached to the battery module.

2.2 Important safety instructions

The battery modules are designed and tested to meet international safety requirements. However, to prevent personal injury and property damage and to ensure long-term operation of the battery module, please read this section carefully and always observe all safety information.

2.2.1 Battery module leakage

If the battery module leaks electrolyte, avoid contact with the leaking liquid or gas. Electrolyte is corrosive and may cause skin irritation and chemical burns on contact. If you come in contact with leaking material, perform the following steps:

Accidental inhalation: Evacuate the contaminated area and seek medical attention immediately.
Eye exposure: Rinse eyes with running water for 15 minutes and seek immediate medical attention.
Skin contact: Wash the affected area thoroughly with soap and water and get medical help immediately.
Ingestion: Induce vomiting and seek medical help immediately.

2.2.2 Fire fighting measures

When the battery module is put into a fire, the battery module may catch fire. In the event of a fire, make sure there is an ABC or CO_2 fire extinguisher nearby. Do not use water to extinguish the fire. Firefighters need to wear full protective clothing and self-contained breathing apparatus when fighting fires.

2.2.3 Guidelines for the handling and storage of battery modules

The battery module and its components shall be protected from damage during transportation and handling

- Do not hit, pull, or step on the battery module.
- Do not insert extraneous objects into any part of the battery module.
- Do not place the battery module in a fire.
- Do not immerse the battery module in water or seawater.
- Do not handle strong oxidizing agents.
- Do not short-circuit the battery module.
- The battery module cannot be stored at high temperatures (≥50°C).
- The battery module cannot be stored directly in the sun.
- The battery module cannot be stored in a high humidity environment.
- Do not use cleaning solvents to clean battery module.
- Do not open or damage the battery. The released electrolytes are harmful to the skin and eyes and should be avoided.
- Do not stand, lean, or sit on the battery.
- Before touching any conductor surface or terminal, measure the voltage at the point of contact to confirm that there is no risk of electric shock.

- The terminal shall not be damaged during transportation. It is forbidden to lift the battery through the terminal bolt.
- Batteries must be stored separately in the package. Avoid storing the battery with other items. It is strictly prohibited to store in the open air and stack too high.
- Do not use a damaged battery (dropped, bumped, or otherwise damaged, such as a dent in the case).
- Do not store a damaged battery near a good product. Damaged battery storage locations shall not contain flammable materials. Only professionals can access it.
- Damaged batteries should be monitored during storage to ensure there are no signs of smoke, flame, electrolyte leakage, or heat.

2.2.4 Warning of electric shock

DANGER

Danger to life due to electric shock when live components or DC cables are touched

The DC cables connected to an inverter may be live. Touching live DC cables results in death or serious injury due to electric shock.

- Disconnect the battery system and inverter from the voltage source and mark to ensure that they cannot be reconnected before operating the equipment.
- Do not remove the terminal block with the connected DC wire from the slot under load.
- Wear appropriate personal protective equipment when performing all work on the battery system.
- Comply with all safety information from the inverter manufacturer.

2.2.5 Overvoltage warning

DANGER

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (e. g. in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices and inverters in the same network are integrated into the existing surge protection.
- When laying network cables or other data cables outdoors, it must be ensured that a suitable surge protection device is provided at the transition point of the cable from the outdoor battery system or inverter to the interior of the building.

2.2.6 Caution of weight

CAUTION

Risk of injury due to weight of the battery module

Injuries may result if the battery module is lifted incorrectly or dropped while being transported or installed.

- Carefully transport and lift the battery module. Consider the weight of the battery module.
- Wear appropriate personal protective equipment when performing all work on the battery system.

2.2.7 Property loss notification

NOTICE

Damage to the BCU due to sand, dust and moisture ingress

Sand, dust and moisture penetration can damage the BCU and impair its functionality.

- Only open the BCU if the humidity is within the thresholds and the environment is free of sand and dust.

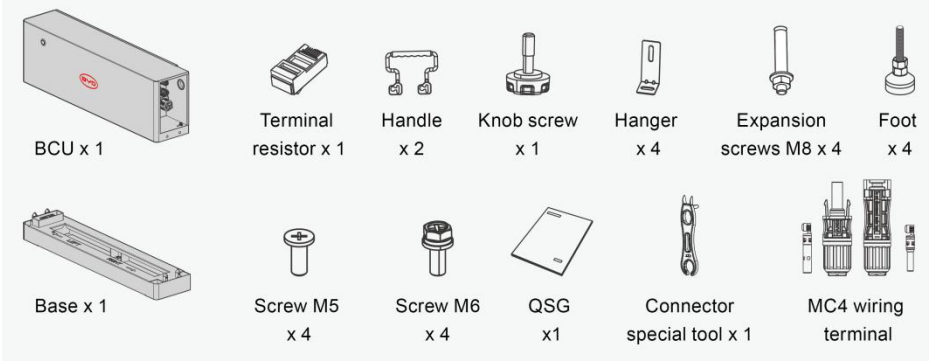
NOTICE

Low voltage can damage the battery system

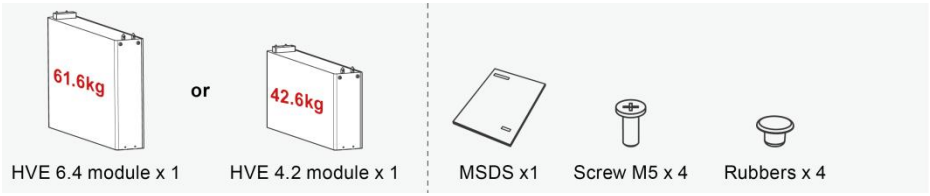
- If the battery system does not start at all, please contact BYD's local after-sales service team within 48 hours. Otherwise, the battery may be permanently damaged.

3. Scope of delivery

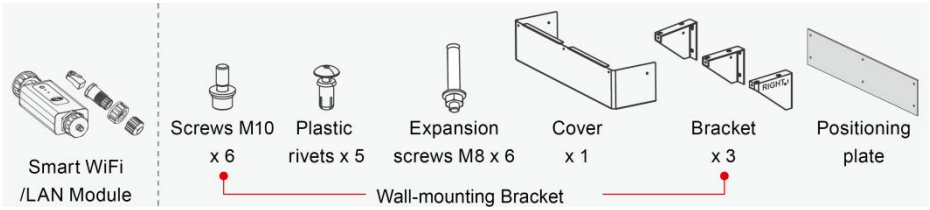
3.1 BCU + Base



3.2 Battery module



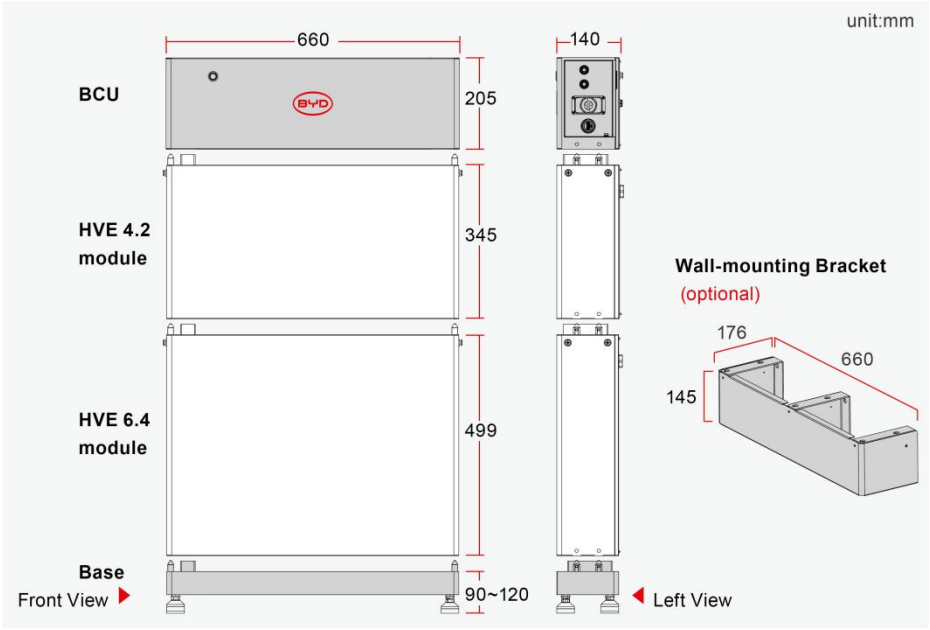
3.3 Optional accessories



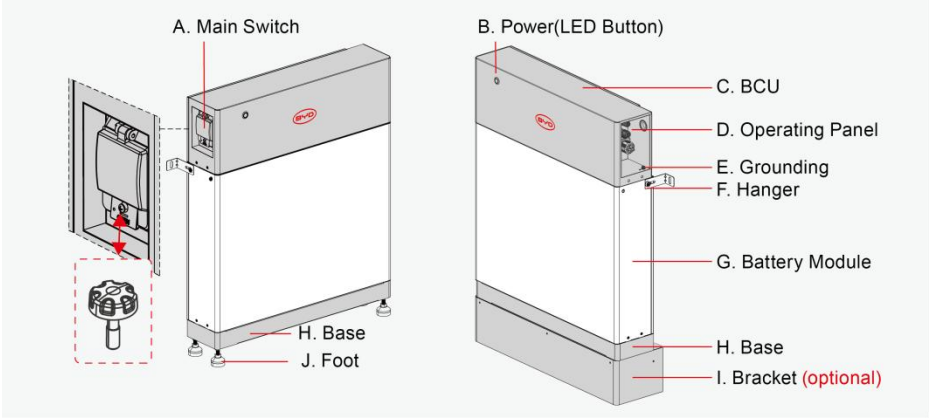
4. Battery system overview

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

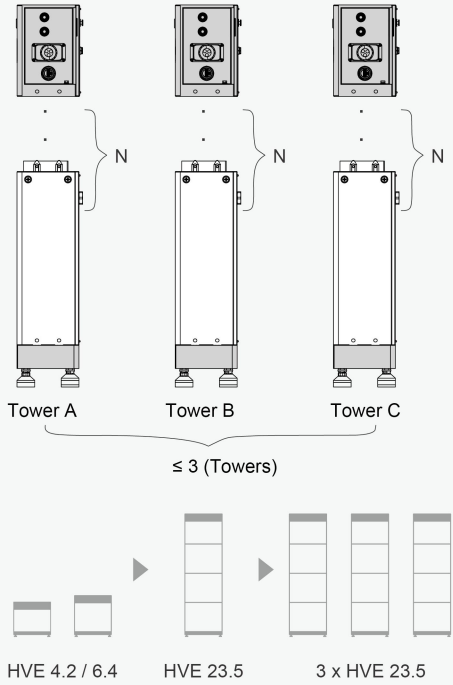
4.1 Structure dimension drawing



4.2 Battery system description



4.3 Battery system scalability



1≤ N ≤4

Product Model:

A = B = C √

A ≠ B or A ≠ C or B ≠ C X

Maximum capacity of **70.74** kWh

One to four battery modules form a tower（Maximum: 3 x module6.4 + 1 x module4.2）, and up to 3 tower can be connected in parallel.

4.4 Interface

BYD Energy

Through the APP, you can realize intelligent battery management, including remote data monitoring, firmware upgrade and troubleshooting.

- Android users : Search for “BYD Energy” on Google Play
- iPhone users : Search for “BYD Energy” in the App Store

iOS Android

Configuration steps:

The battery system doesn't have a wireless communication function. Through the USB, the battery system supports the expansion of connection with the Smart WiFi/LAN Module to implement the wireless function, and the Smart WiFi/ LAN Module had obtained individual cyber security certification in accordance with EN 18031 series.

For detailed configuration steps, please refer to the user manual and APP instructions,
Website: www.bydenergy.com.

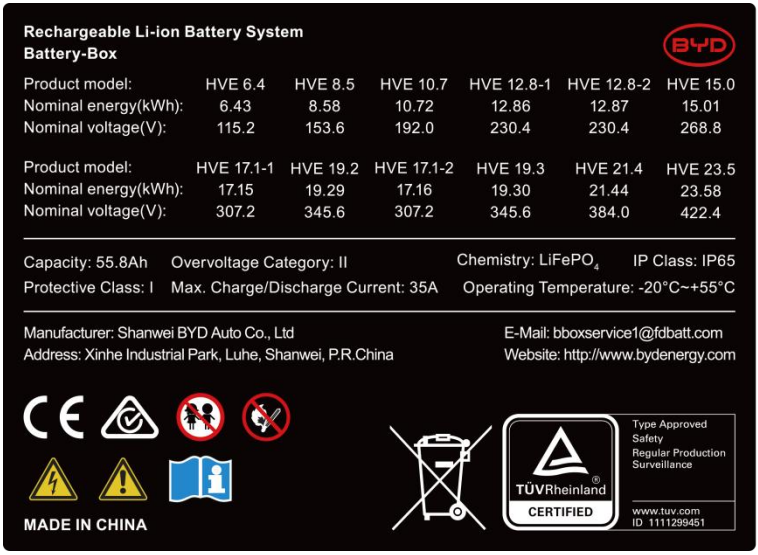
Scan the QR code below to obtain the corresponding video manual.

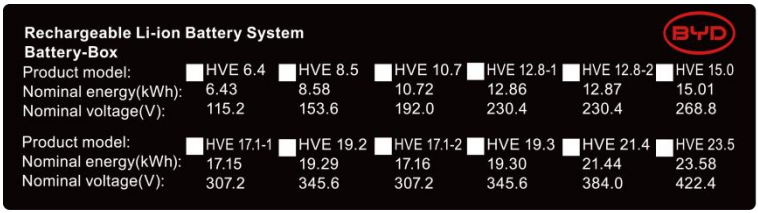
4.5 Symbols

Symbol	Explanation
	Observe the documents Observe all documents supplied with the system.
	WEEE designation Do not dispose of the system together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	CE marking The system complies with the requirements of the applicable EU directives.
	Keep the battery modules away from open flame or ignition sources.
	Beware of electrical voltage.
	Beware of a danger zone This symbol indicates that the system must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Keep the battery modules away from children.
	Grounding conductor This symbol indicates the position for connecting a grounding conductor.
	This side up.
	Handle with care.
	Keep dry.
	RCM (Regulatory Compliance Mark), a brief guide to electrical equipment approvals in Australia/RCM
	The product has been tested and certified by TUV Rheinland.

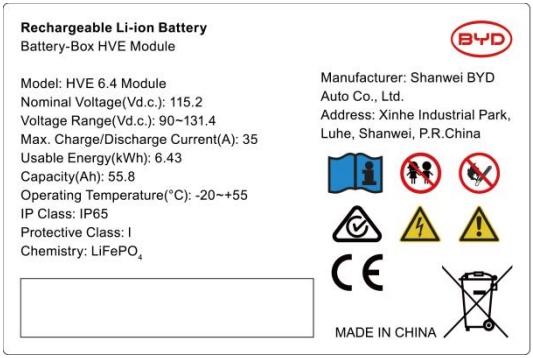
4.6 Nameplate label

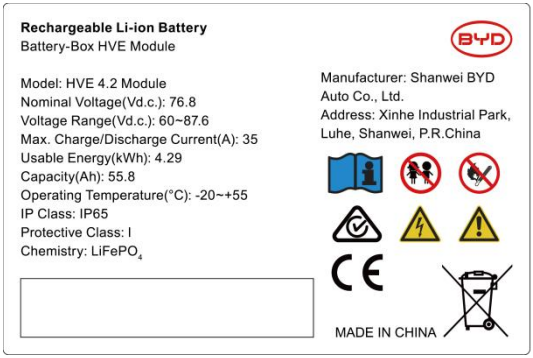
BCU Nameplate



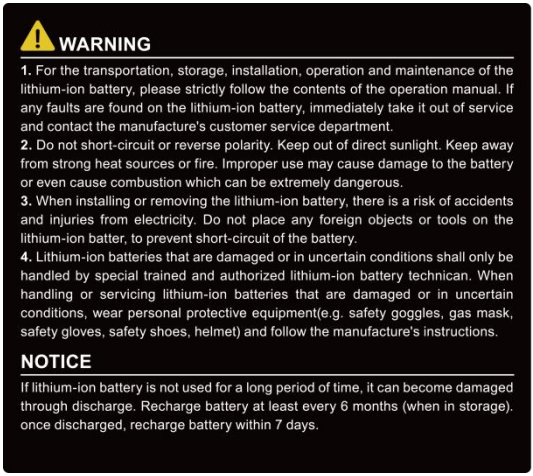


Battery Module Nameplate

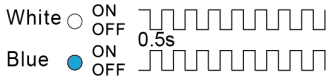
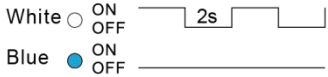
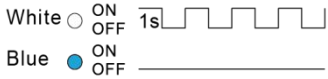
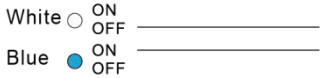
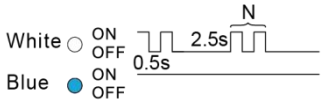




4.7 Warning label



4.8 LED indicator

Indicator	Status	Description
Flashing white and blue alternatively		The battery system is initiating
Flashing white slowly		The battery system is charging
White light flashing		The battery system is discharging
Constant white		Idle (the battery system is either charging nor discharging).
Constant blue		BCU failure
Blue light flashes a certain number of times		Counting from top to bottom, flashing N times, represents the Nth battery module failure, N represents 1-4 battery modules

The specific logic of LED lights can be found in the checklist.

5. Installation

5.1 Instruction

5.1.1 Installation requirements

- It is strictly prohibited to install, use and operate outdoor equipment and cables (including but not limited to handling equipment, operating equipment and cables, plugging and unplugging signal interfaces connected to the outdoors, working at heights, outdoor installation, opening doors, etc.) in severe weather such as lightning, rain, snow and strong winds above force 6.
- Before installing the battery, check that the packaging is intact. Batteries with damaged packaging cannot be used.
- Pay attention to the positive and negative terminals during installation. Do not short the positive and negative terminals.
- Be sure to tighten the screws during installation and check them regularly.
- After installation, the remaining packing materials, such as packaging, foam board, plastic, ties, etc., should be removed.

5.1.2 Emergency measures for battery falling

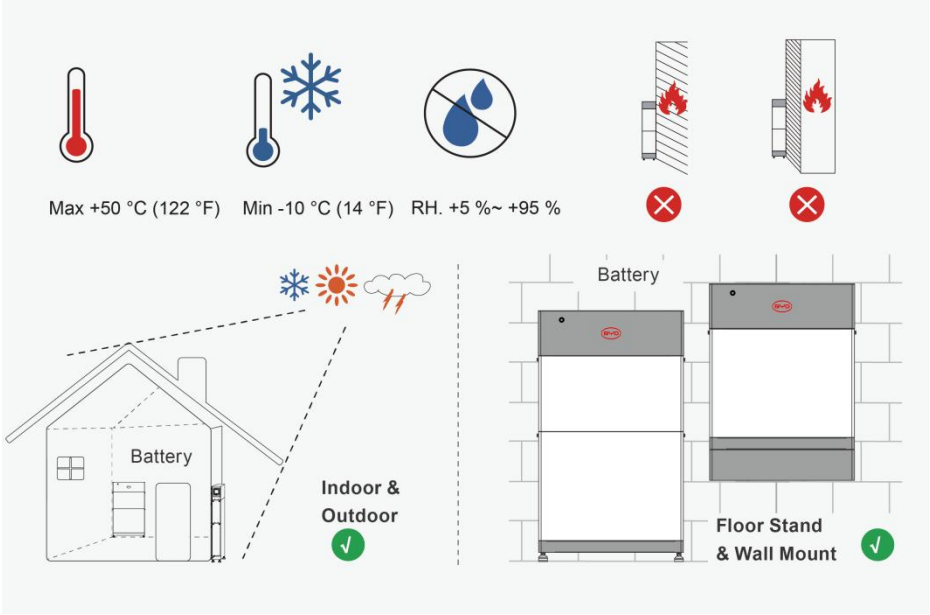
- When installing the battery, dropping or mechanical shock may cause internal damage to the device. If these situations occur, it is strictly prohibited to continue to use, otherwise it may cause potential safety hazards.
- After the battery is dropped, if there is obvious smell, damage, smoke, fire and other phenomena, immediately evacuate the personnel and contact professionals. Use fire fighting facilities to extinguish fire under the guidance of professionals.
- After the battery is dropped, if there is no obvious smell, smoke or fire, and there is no obvious deformation or damage, please contact a professional to move it to an open and safe place or contact a recycling company for disposal.

5.1.3 Installation and operating environment

- The installation and operating environment needs to comply with local laws and relevant international, national and regional standards for lithium-ion products.
- The installation and use environment shall comply with local laws and regulations and the provisions of relevant international, national and regional standards for lithium-ion products.

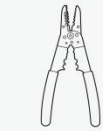
- It is the duty of the person using the equipment to protect it from fire or other damage.
- A solid supporting surface (such as concrete or masonry) must be provided.
- The installation position shall not be entered or touched by children, and shall be far away from daily work, living and other areas.
- The mounting location must be suitable for the weight and dimensions of the battery system.
- The installation location shall not be exposed to direct sunlight, rain and snow.
- The level of the installation site shall be higher than highest water level in the history of the area and at least 300 mm above the ground. The installation site shall not be located in low-lying areas.
- The installation position shall be far away from the fire source and heat source, and inflammable and explosive articles shall not be placed around the equipment.
- Garage installation shall be away from the direction of the vehicle. It is recommended to install the energy storage wall higher than bumper of the vehicle body to avoid accidental collision.
- It is forbidden to install in places that are airtight, unventilated, without proper fire fighting facilities or difficult for firefighters to reach.
- It is forbidden to be installed in moving scenes such as ships, trains and automobiles.
- For areas with frequent natural disasters such as floods, debris flows, earthquakes and typhoons, corresponding preventive measures should be taken for installation.
- It is forbidden to install and operate the equipment beyond the scope specified in the technical indicators, otherwise the performance and safety of the equipment will be affected.
- Wall-mounted walls must be solid and load-bearing (such as concrete or masonry).
- The altitude of the installation location shall be less than 4000 meters.
- The ambient temperature shall be between -10°C and + 50°C.
- The ambient humidity should be between 5% and 95%.Energy storage will be corroded when installed in salt areas. Do not install it outdoors in salt areas.Salt damage area refers to the area within 500m from the coast or affected by the sea breeze.The area affected by the sea breeze varies according to meteorological conditions (e.g. Typhoon, seasonal wind) or topography (with dams, hills).
- The distance between the back of the installation position and the wall shall be 19 ~ 44mm.

- The distance from the side of the installation position to the wall shall be greater than 300 mm.
- The distance between systems at the installation position shall be 300 ~ 600mm.

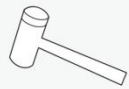


5.1.4 Tools & additional accessories (not included in the scope of delivery)

You may need to use the tools in the following table during the installation process.


Wire Stripper

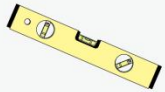
Network wire clamp


Rubber mallet

Phillips Screwdriver Bit

Wrench

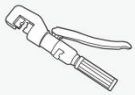
Knife


Gradienter

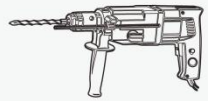
Tape measure

DC terminal crimping tool

Heat gun


Hydraulic clamp

Pen


Drill

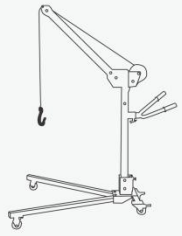
Hexwrench

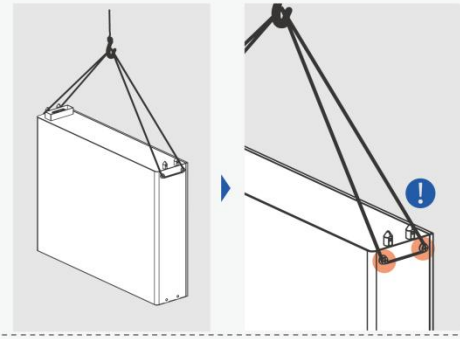
Ratchet wrench

Recommended use batterys ≥3

Ladder

or


Lifting device



DC Cable
10AWG / 6mm²
Ø:5.2-6mm

RJ45
Connector

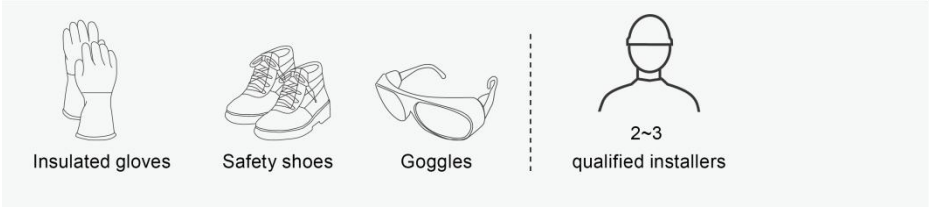
Data Cable
CAT5E Ø:5-6mm

OT Terminal
6mm²-M5

PE
10AWG / 6mm²

Heat shrink tube
Ø:6-8mm

5.1.5 Safety gear & required personnel



5.2 Procedure of installation

QUALIFIED PERSON

DANGER

Danger to life from electric shock due to live DC cables or connectors at the battery system

The DC cables connected to the battery system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

CAUTION

Risk of injury due to weight of the battery module

Injuries may result if the battery module is lifted incorrectly or dropped while being transported or installed.

- Carefully transport and lift the battery module. Consider the weight of the battery module.
- Wear appropriate personal protective equipment when performing all work on the battery module.work on the battery system.

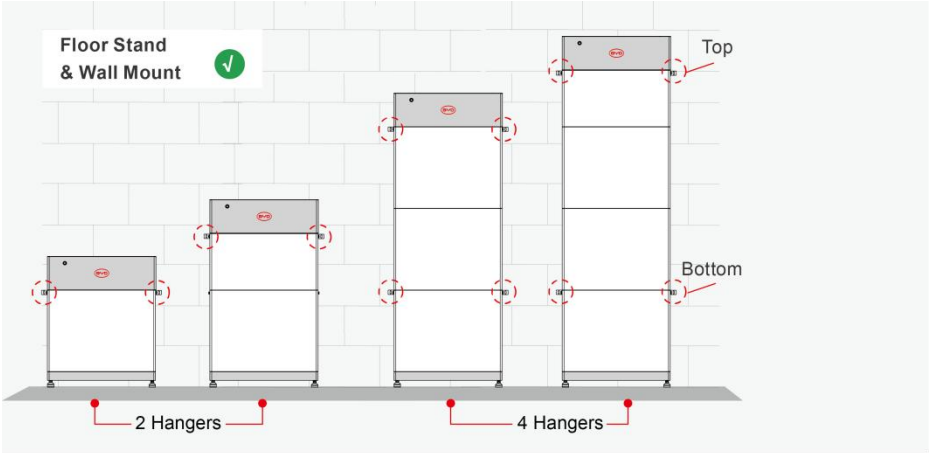
Inspection before installation:

Product packaging: Before removing the energy storage packaging, inspect the packaging for visible damage, such as holes, cracks, or other internal Signs of possible damage, and check the energy storage model.If there is any abnormal packaging or the energy storage model does not match, do not open it and contact your dealer as soon as possible.

Inspection of deliverables: After unpacking the energy storage overpack, check the deliverables for completeness and for any visible external damage.If any items are missing or if there is any damage, contact your dealer.

Please refer to Chapter 3 for the deliverables.

5.3 Quantity and location of hanger



Please install on top and/or bottom battery!

When ≥ 3 modules are installed, 4 hangers must be used!

	Number of Modules	1~2	3~4
Number of Hanger	Floor Stand	Hanger x 2	Hanger x 4
	Wall Mount	Hanger x 2	Hanger x 4

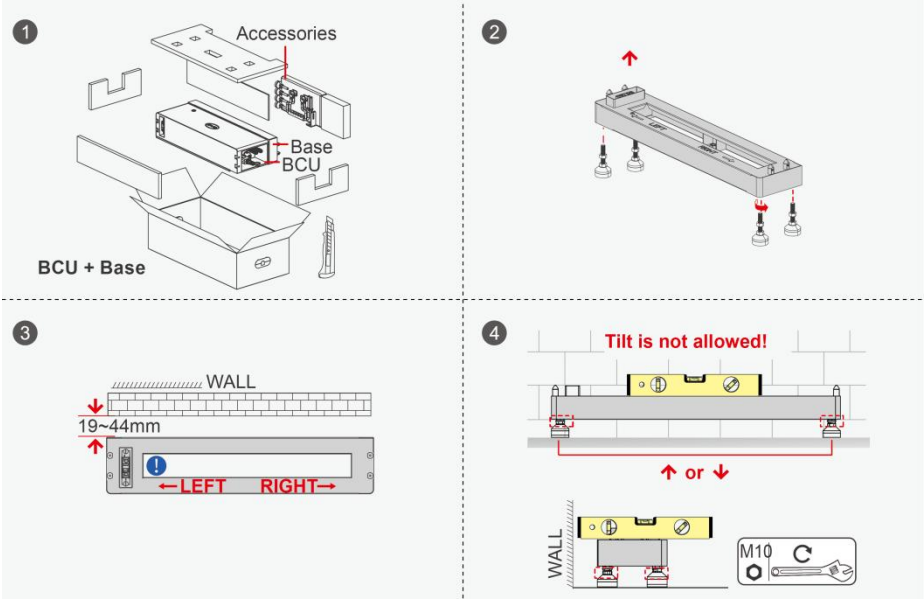
5.4 Floor installation

The bearing capacity of the ground must be greater than or equal to 800kg/m²

Steps:

Install the feet

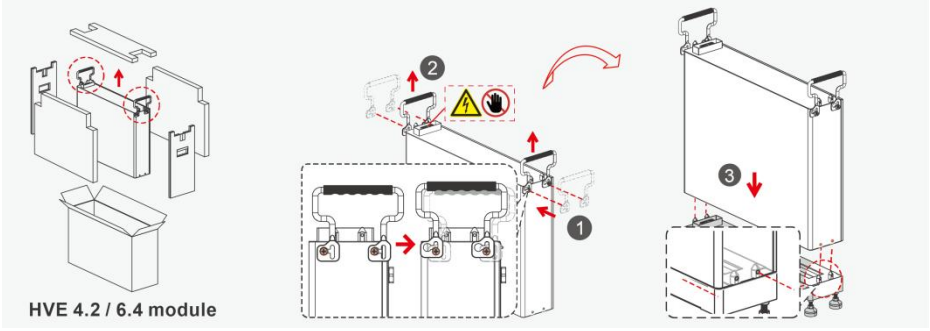
1. Open the box and remove the BCU, Base and accessories.
2. Install the feet to the base.
3. Please follow the **LEFT** and **RIGHT** markings on the base, put the battery module along the wall, and keep a distance of 19~44mm.
4. Adjust the support feet with the help of a spirit level (**Tilt is not allowed!**).



Install the module

1. Remove the battery module from its packaging using handles.

2~3. Install battery module on the base.(**There is electricity in the blind socket, please do not touch it!**)



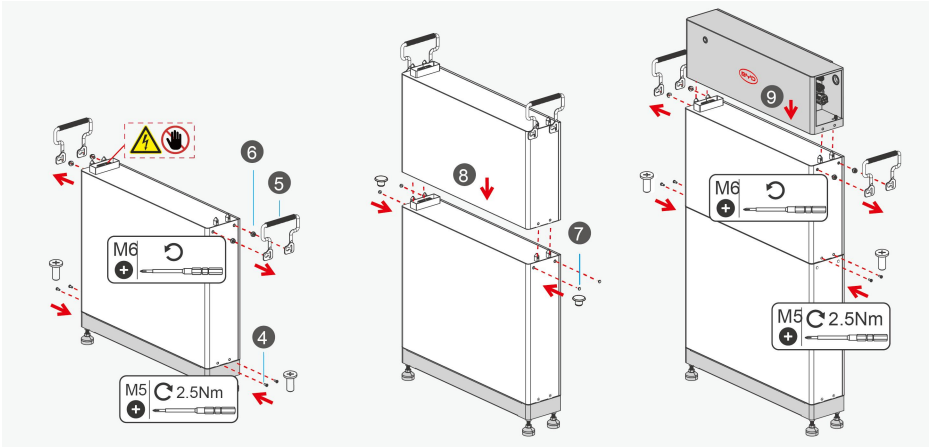
4. Fasten battery module to the Base by screws M5.

5~6. Remove the handle and M6 screw.(**Suggest placing the M6 screw properly for future maintenance and use**)

7. Install the rubber plug at the position where the handle screw was removed.

8. Stack the battery modules one by one.(**When installing multiple modules with different power levels, it is recommended to place the HVE6.4 module below**)

9. Install the BCU on top of the battery module.



When it is necessary to install 3 or more battery modules in one tower, it is recommended to connect the cables on the BCU first. Please refer to Chapter 6 for detailed cable connection procedure.

10. Fasten the BCU to the battery module by screws M5.

11. Mark the position of the drill holes.

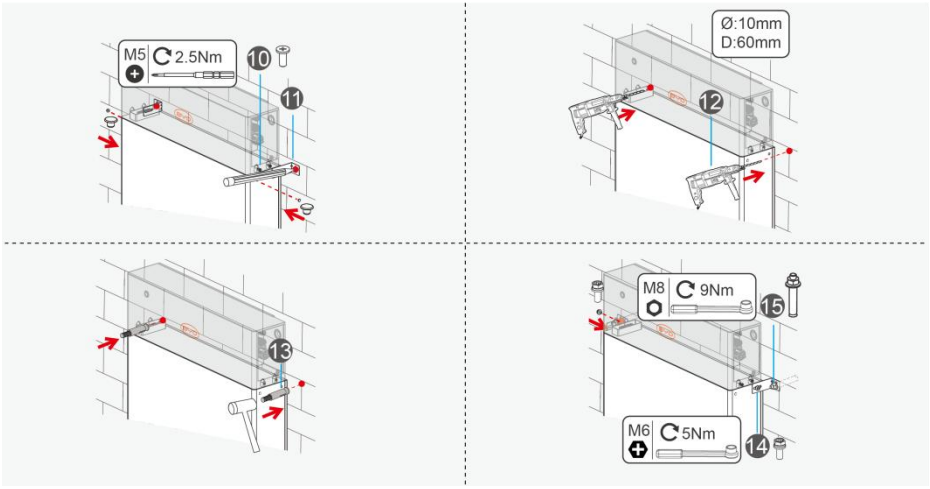
12. Drill holes at the marked locations.

Please note that there may be power cables or other power supply lines (such as gas or water) in the wall. When drilling, you may damage the lines. Please make sure that there are no lines on the wall first.

13. Hammer the two expansion screws into the holes with a rubber mallet.

14. Fasten hangers to the battery module by M6 screws.

15. Then fix the battery module to the wall.



5.5 Wall mount (Optional)

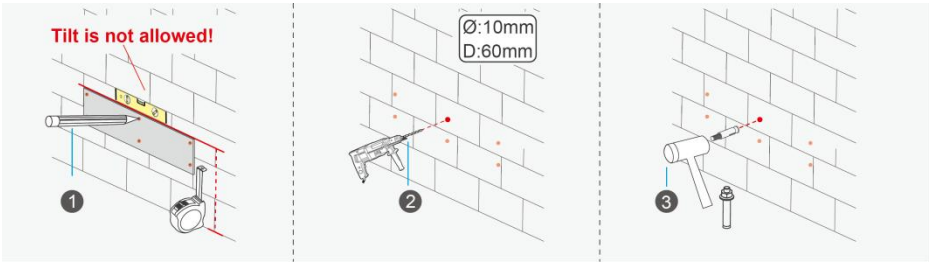
Concrete walls and brick walls are recommended!

Steps:

1. Use a marking card to mark the position of the drilling hole.
2. Drill holes at the marked locations.

Please note that there may be power cables or other power supply lines (such as gas or water) in the wall. When drilling, you may damage the lines. Please make sure that there are no lines on the wall first.

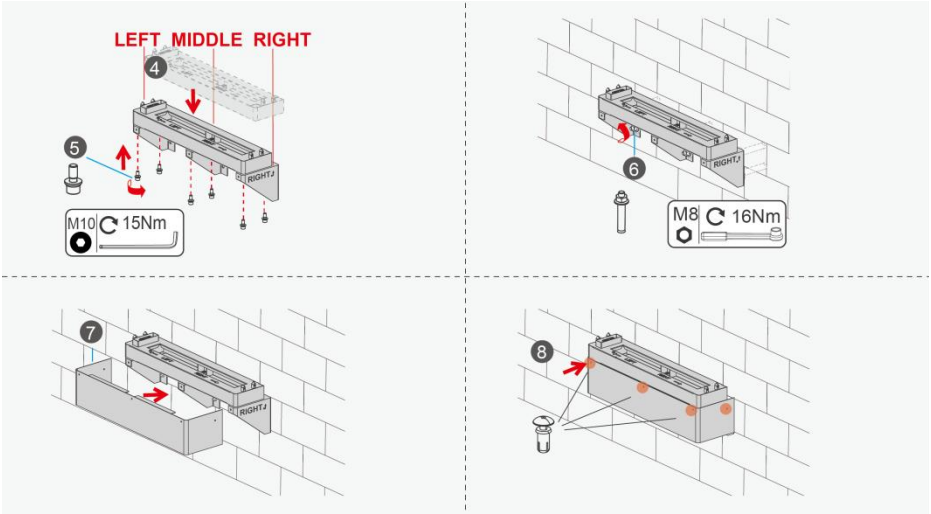
3. Hammer the two expansion screws into the holes with a rubber mallet.



4~5. Please follow the **LEFT**, **MIDDLE** and **RIGHT** markings on the bracket, Fasten bracket to the Base by screws M10.

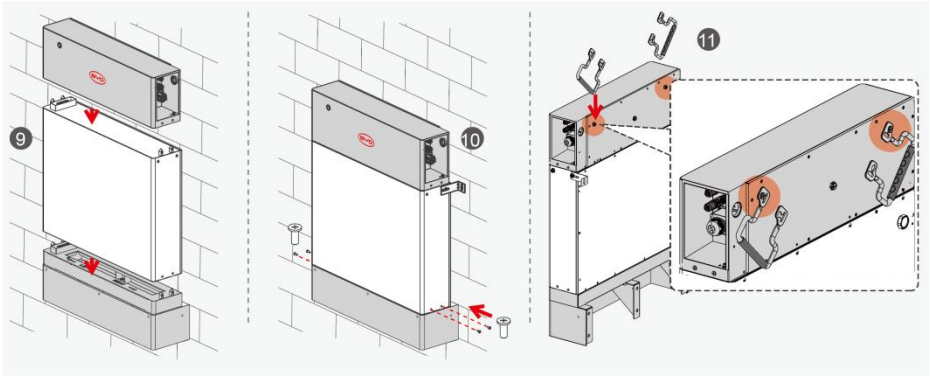
6. Fix the bracket on the wall.

7~8. Install the trim cover and secure with the plastic rivets plug.



9~10. Refer to the module and BCU installation method to install the module and BCU.

11. Storing the handle on the back of the BCU.



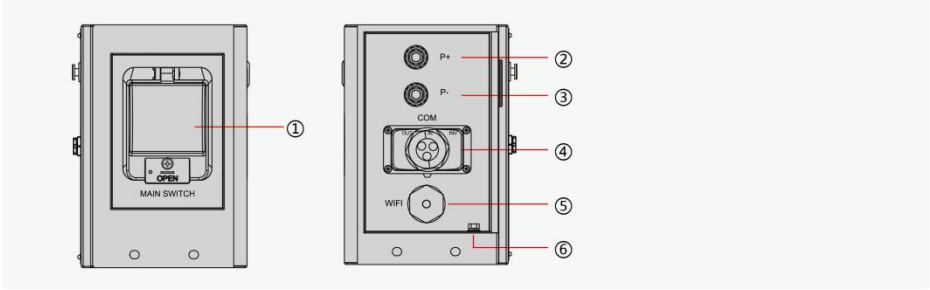
NOTICE

Damage to the battery system due to under voltages

- If the battery is installed, it should be set into operation within a month, or checked regularly, otherwise there might be damage to the batteries.

6. Electrical connections

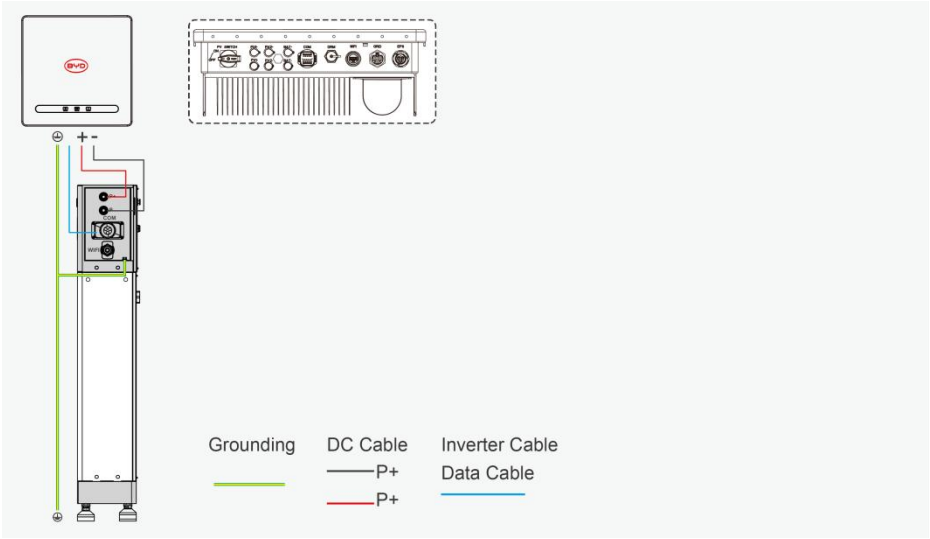
6.1 Functional area overview



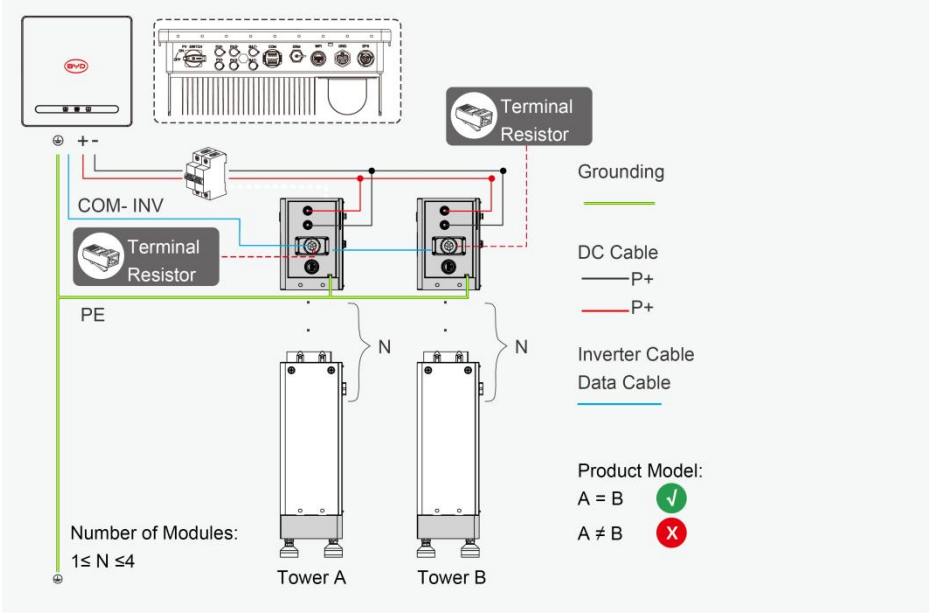
No.	Terms	Description
①	MAIN Switch	Power on/power off.
②	P+	Connect to positive terminal of external device.
③	P-	Connect to negative terminal of external device.
④	COM—INV	Port for data cable in, Connect to inverter.
	COM—OUT	Port for data cable out.
	COM—IN	Port for data cable in.
⑤	WIFI	Port for smart WIFI/LAN Module
⑥	Grounding	Grounding connection.

6.2 Topology diagram

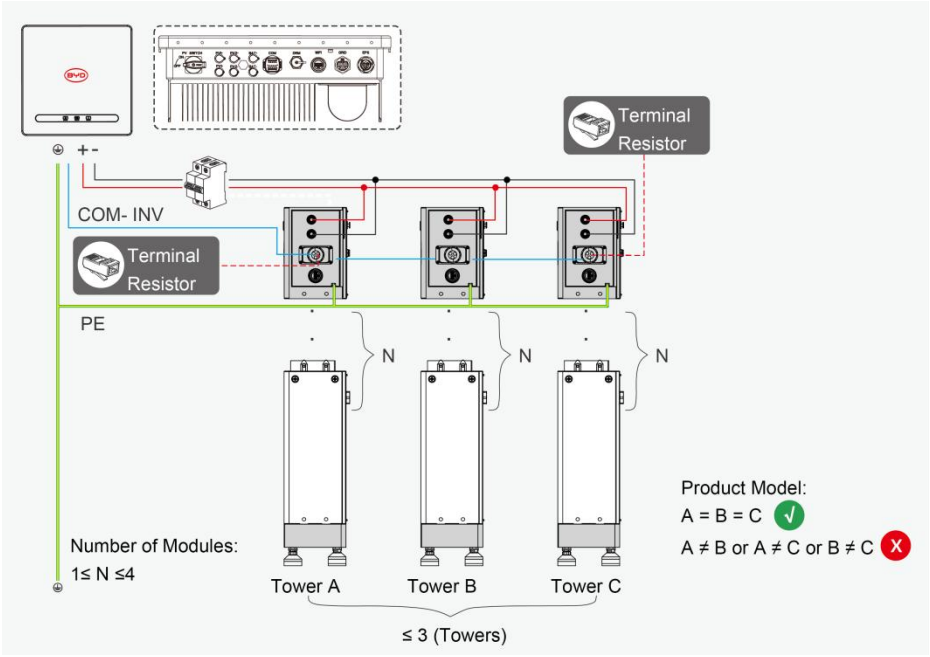
6.2.1 One battery system



6.2.2 Two battery systems



6.2.3 Three battery systems



6.3 Grounding connection

When installing, the grounding wire must be installed first; when removing the equipment, the grounding wire must be removed last.

Additional required installation materials (not included in the scope of delivery): PE with terminals.

PE and terminal requirements:

- Terminals, 5mm.
- Minimum terminal cross-section: 10AWG / 6mm²
- The cross section of the earth terminal must comply with the applicable local standards and directives.
- PE section ≥ 6 mm²
- PE material: copper wire terminal
- OT-Termal: 6-5

Steps:

1. Turn off the switch on the BCU.

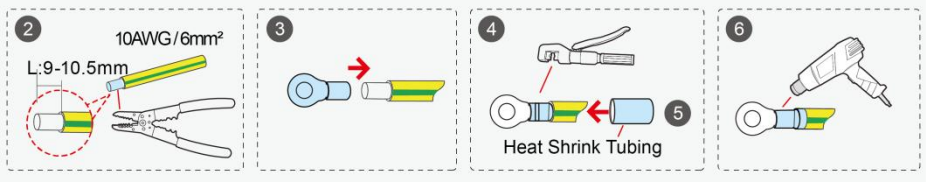
2. Peel off the plastic of the grounding cable so that the stripped length (L in the figure below) is 9-10.5mm.

3. Thread the cable through the heat shrink tubing and insert the OT terminal onto the cable.

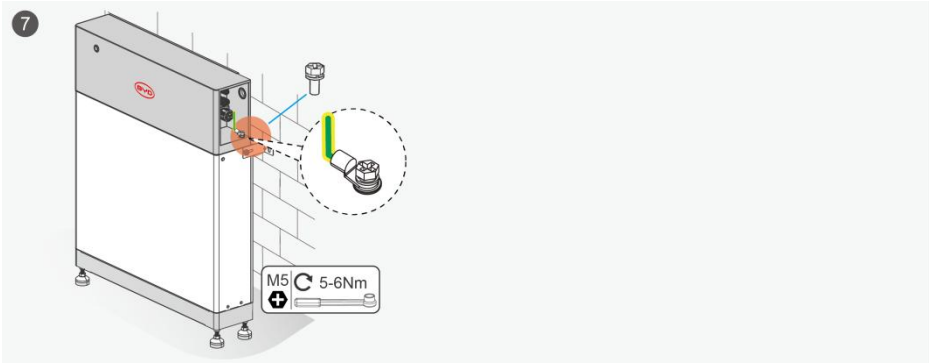
4. Squeeze the tube of the wire with a wire clamp.

5. Get the heat shrink tubing back to cover the connection part of the cable and the conductor.

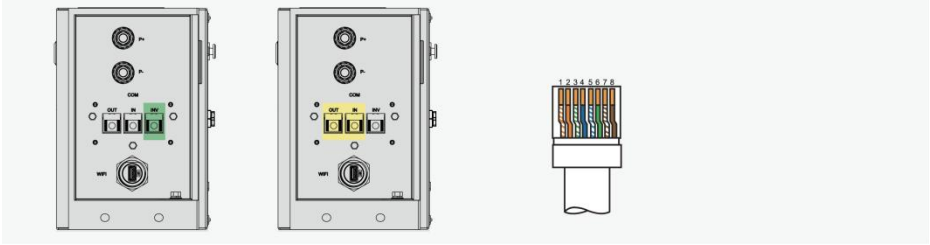
6. Blow the heat shrink tubing with hot air.



7. Remove the nut from the grounding point, install the PE wire, and then tighten the original nut with a Phillips screwdriver (torque 5-6Nm).



6.4 Data cable connection



No.	1	2	3	4	5	6	7	8
INV	RS485A	RS485B	IGND	CAN_H	CAN_L	NC	PCS_EN+	PCS_EN-
IN/ OUT	Unused	Unused	Unused	Unused	Unused	Unused	CAN_L	CAN_H

6.4.1 Inverter cable connection between inverter and one battery system

QUALIFIED PERSON

Additional required installation materials (not included in the scope of delivery), one data cable

Data cable requirements:

The length and quality of the cable affect the quality of the signal.

Observe the following cable requirements：

- Cable category: CAT5, CAT5e or higher
- Plug type: CAT5, CAT5e or higher metal shield RJ45
- Shield: Yes
- UV protection for outdoor use
- Straight-through cable
- Maximum cable length: 3 meters.

Steps:

Read the inverter port name on the battery system and the inverter manual to decide whether to modify the data cable. The definition of the inverter port on the battery system can be seen above.

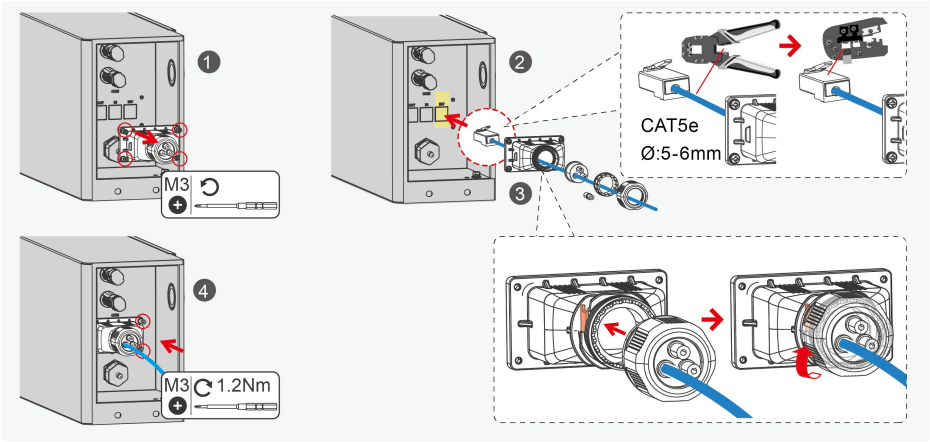
1. Detach the external cable gland.

2. Put the cable through all the part of the external cable glands and the wiring hole.Please cut the cable, arrange the cable position, and crimp the RJ45 connector with the network cable clamp.

3. Insert the RJ45 connector into the BCU INV port.

4. Assembling the external cable glands (torque, 1.2 Nm).

5. Insert the other end of the connector into the corresponding port of the inverter.



6.4.2 Data cable connection between multiple towers

This only applies when there are multiple towers in parallel. Additional required installation materials (not included in the scope of delivery)

The length and quality of the cable affect the quality of the signal.

Observe the following cable requirements:

- Cable category: CAT5, CAT5e or higher
- Plug type: CAT5, CAT5e or higher metal shield RJ45
- Shield: Yes
- UV protection for outdoor use
- Straight-through cable
- Maximum cable length between two towers: 3 meters.

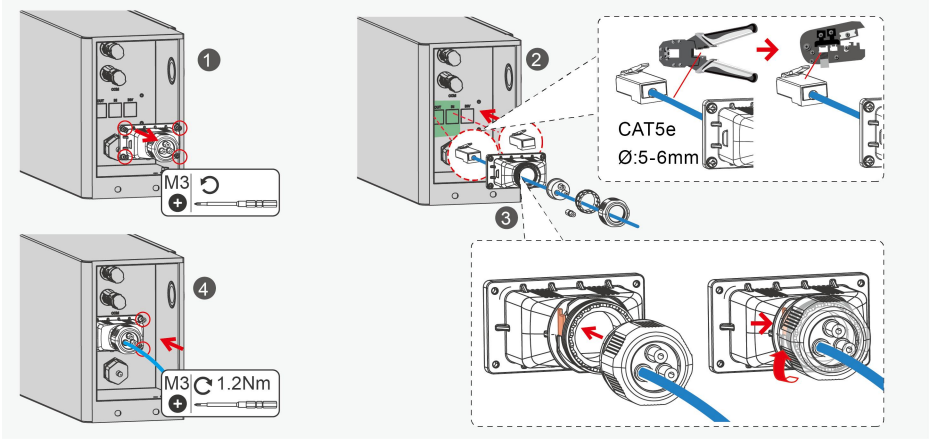
Steps:

1. Detach the external cable gland.

2. Plug the RJ45 connector into the output port of the BCU of the first tower and into the input port of the BCU of the second tower.

3. Repeat step 2 for the following columns. Cover the terminal resistors on the multiple towers, refer to the 6.2.2-6.2.3 in this manual.

4. Assembling the external cable glands.



6.4.3 Installation terminal resistor

Steps:

Insert the terminal resistors into the remaining input and output ports of the BCU. Two (2) or more BCU require two (2) terminal resistors.

Individual one battery system do not require terminal resistors.

6.5 DC connection

QUALIFIED PERSON

DANGER

Danger to life from electric shock due to live DC cables or connectors at the battery system

The DC cables connected to the battery system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

When connecting multiple towers, the length of the positive power cable should be approximately equal for all towers, and the negative power cable should also be approximately equal. A combiner box is required to combine these cables. Follow your local, state, provincial, federal, or national laws, regulations, and inverter manufacturer's instructions to select the appropriate combiner box.

Additional required installation materials (not included in the scope of delivery): Two DC cables (connecting battery system and inverter)

Cable requirements:

- Conductor section: 6mm^2. Select the correct option based on the application and the inverter manufacturer's requirements.
- Maximum cable length: 3 meters

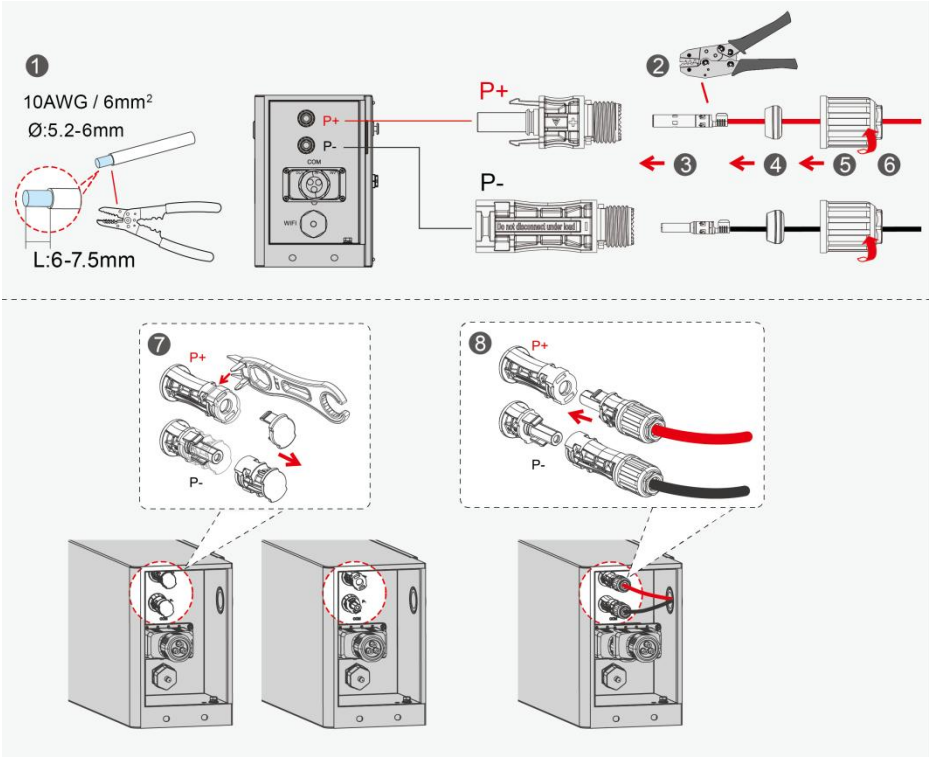
Steps:

1. Use wire strippers to strip the insulation layer of the positive and negative cables to an appropriate length.

2. Put the insulation layer of the positive and negative cables into the corresponding metal terminals, and crimp them tightly with crimping pliers.

3~6. Insert the crimped positive and negative cables into the corresponding insulating shells, Tighten the plastic nuts at the end of the insulating shell of the positive and negative connectors.

7~8. Remove the protection plugs of the positive and negative poles of the DC input terminal of the inverter. Insert the positive and negative connectors into the positive and negative poles of the DC input terminal of the inverter.

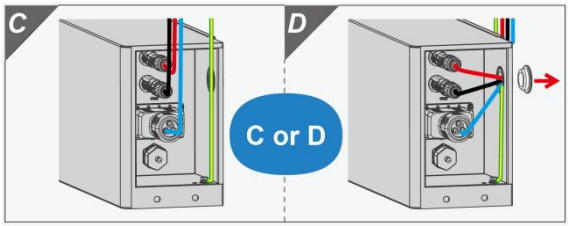


Outgoing line mode

There are two outlet modes:

C. Side outgoing line

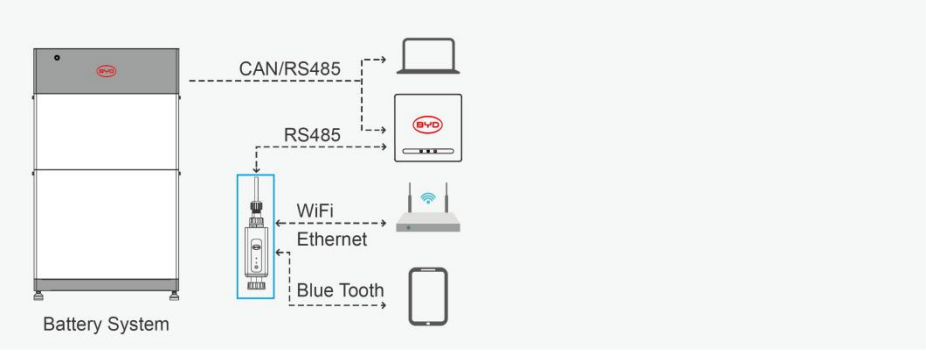
D. Back outgoing line



6.6 BYD smart WIFI/LAN module installation (optional)

6.6.1 BYD Inverter + HVE

- The battery system doesn't have a wireless communication function. Through the USB, the battery system supports the expansion of connection with the Smart WiFi/LAN Module to implement the wireless function, and the Smart WiFi/ LAN Module had obtained individual cyber security certification in accordance with EN 18031 series.
- The communication stick is an accessory included with the inverter
- A household energy storage system requires only one communication stick.
- Communication rod is installed on the inverter.



6.6.2 Installation procedure

QUALIFIED PERSON

DANGER

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (eg. in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices and inverters in the same network are integrated into the existing surge protection.
- When laying network cables or other data cables outdoors, it must be ensured that a suitable surge protection device is provided at the transition point of the cable from the outdoor battery system or inverter to the interior of the building.

Connection to the Internet is not mandatory, but is recommended，It can also be configured on BYD inverters

Additional required installation materials (not included in the scope of delivery):

- Smart WIFI/LAN Module

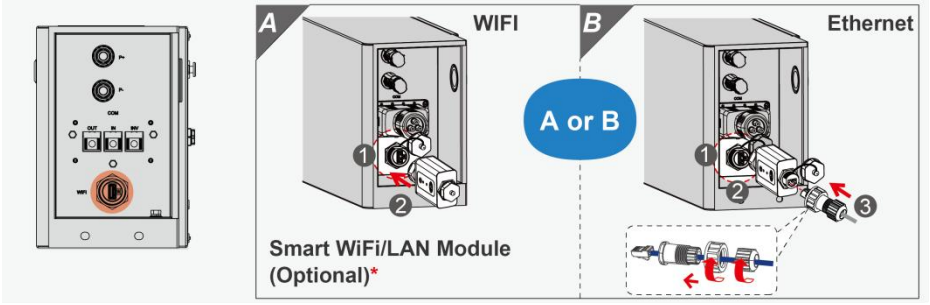
Steps: Connect the Smart WiFi/LAN Module to the BCU

Installation option

There are two outlet modes:

A. WIFI

B. Ethernet



7. Configuration

7.1 Open the battery system

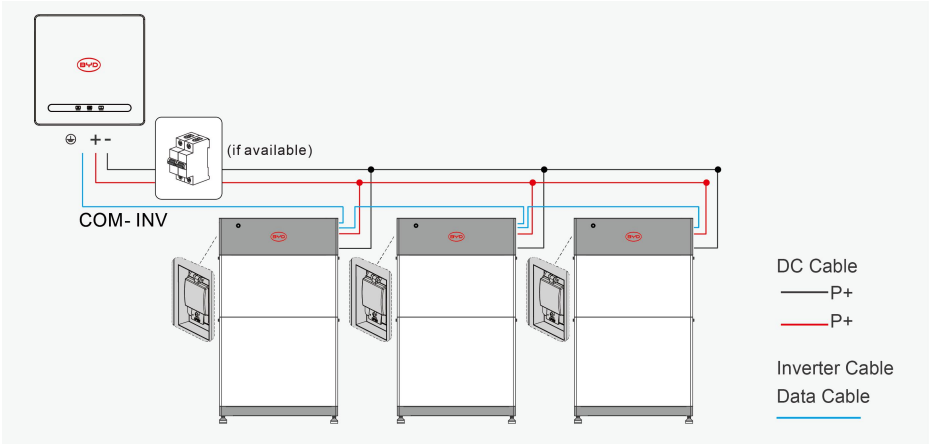
QUALIFIED PERSON

Requirements:

- The power line connection between the battery system and the inverter must be closed.
- The inverter must be installed correctly.
- All cables must be properly connected.

Steps:

1. Turn on the air switch between the battery and the inverter (if any).
2. Push the Main Switch from "OFF" to "ON".
3. The LED starts blinking for a while (0.5 seconds white and 0.5 seconds blue alternating) and then changes to white, which means the battery system is ready to work.
4. If the battery system cannot be opened, please read Chapter 11 Troubleshooting and Service Guide and Checklist.If the problem still cannot be solved, please contact our local after-sales service team within 48 hours.



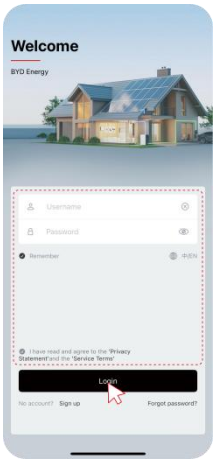
7.2 Configuration of battery system

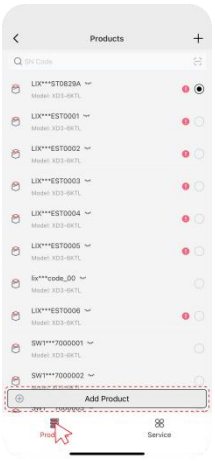
BYD inverter + HVE

- Automatic adaptation of BYD inverter and battery;
- Refer to BYD Inverter User Manual and APP < BYD Energy > User Manual for configuration steps.

Steps:

1. Download BYD Energy from Google Play or App Store. The battery system requires the latest version of firmware to operate.Therefore, make sure that your device (phone, Ipad, etc.) has downloaded the latest firmware, otherwise your device may not be able to access the Internet during the configuration process.
2. Check the box in front of "Please read the Privacy Statement and Terms of Service carefully before agreeing to use this application and check to indicate that you have agreed", and then click the "Register" or "Login" button (please register the installer's company account for the first time, if the company has an account, you can log in directly).
3. Select the all-in-one product after entering the interface.
4. Click the Add Product button, scan bar code on the inverter side, identify the product serial number, and add the product.
5. Click the device information to enter the product details, click the Bluetooth icon to enter the Bluetooth configuration interface, and click the inverter serial number.
6. Set the installed city in the setting-configuration information to obtain the grid connection regulations.
7. Set the installation time in Settings-Basic Information.





1. If BYD Energy is stuck somewhere, restart it.

2. Note that the SOC of the battery may not be accurate until it is fully charged and discharged after configuration.

3. Please ensure that the power line and communication line between the battery and the inverter are connected correctly, otherwise the accurate data of the product can be obtained normally.

7.3 Turn on and commission the inverter

The steps are different for on-grid and off-grid applications.

7.3.1 Grid-connected applications

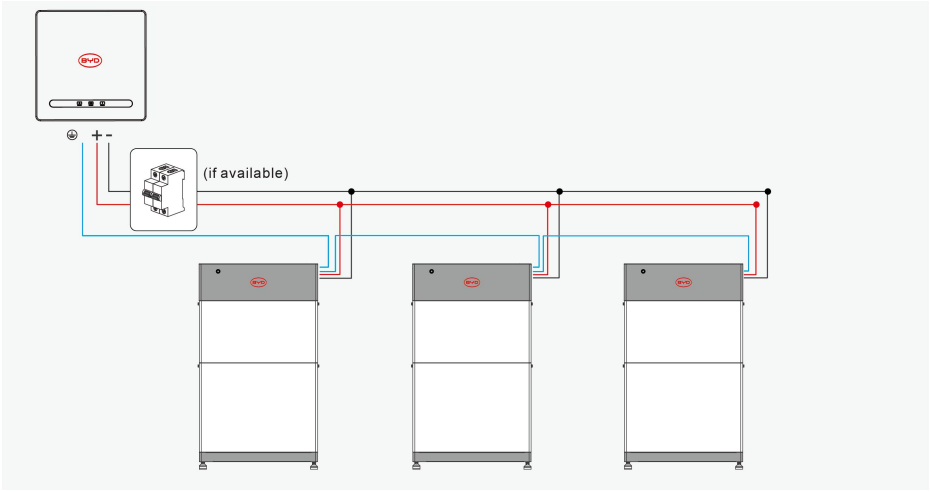
Steps:

1. Install and connect the inverter according to its instructions.

2. Turn on the inverter.

3. Configure and debug the inverter according to the instructions of the inverter.

If the battery information can be read correctly on the inverter, it means that the connection is OK. If the LED is blinking blue, and/or some battery errors are displayed on the inverter, refer to Chapter 11 Trouble- shooting in this manual and read the Service Guide and Checklist.



7.3.2 Off-grid applications

Steps:

1. Install and connect the inverter according to its instructions.

2. Turn on the air switch between the inverter and the battery (if there is one);

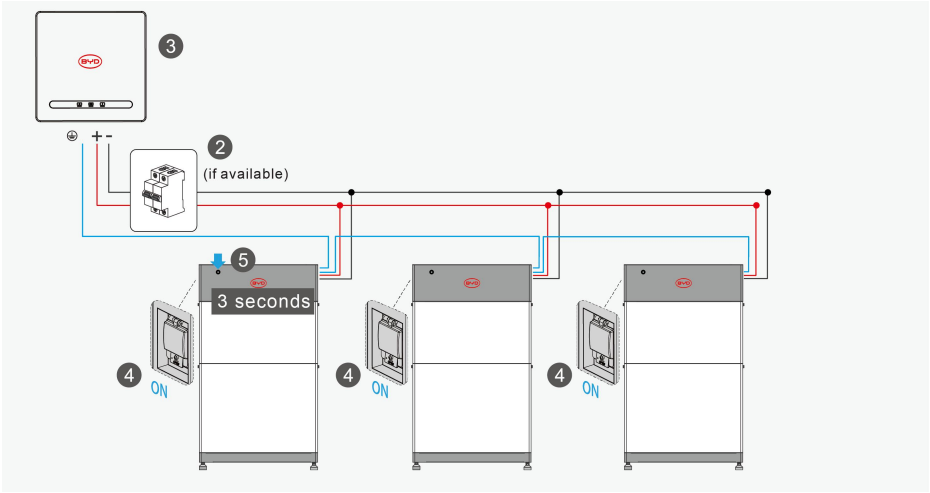
3. Turn on the inverter.

4. Turn on the battery system

5. Black start: press the LED button on the main system BCU for 3 seconds.

6. Configure and debug the inverter according to the instructions of the inverter.

If the battery information can be read correctly on the inverter, it means that the connection is OK. If the LED is still blinking blue, and/or some battery errors are displayed on the inverter, refer to Chapter 11 Troubleshooting in this manual and read the Service Guide and Checklist.



8. Operation

8.1 Start the battery system

8.1.1 Grid-connected applications

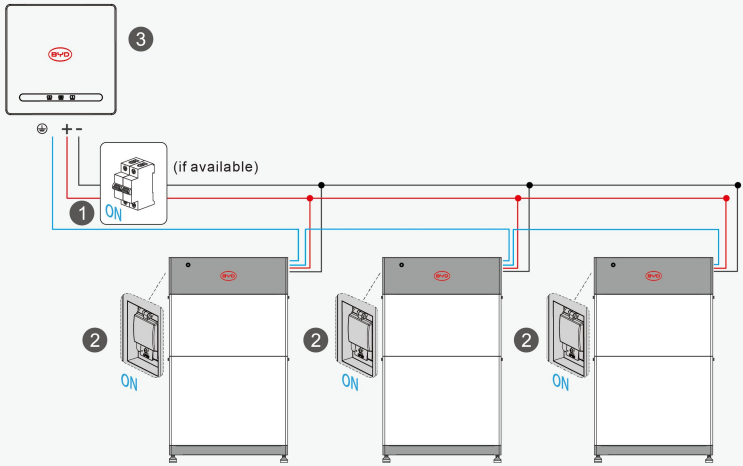
To ensure that the battery system works well with the inverter, follow the correct procedure to start them.

Steps:

1. Turn on the air switch between the inverter and the battery (if there is one);

2. Turn on the battery system;

3. Turn on the inverter.



Switch On Process:
① Switch between Battery and Inverter (if available); ② Battery; ③ Inverter

8.1.2 Black start function

To ensure that the battery system works well with the inverter, follow the correct procedure to start them.

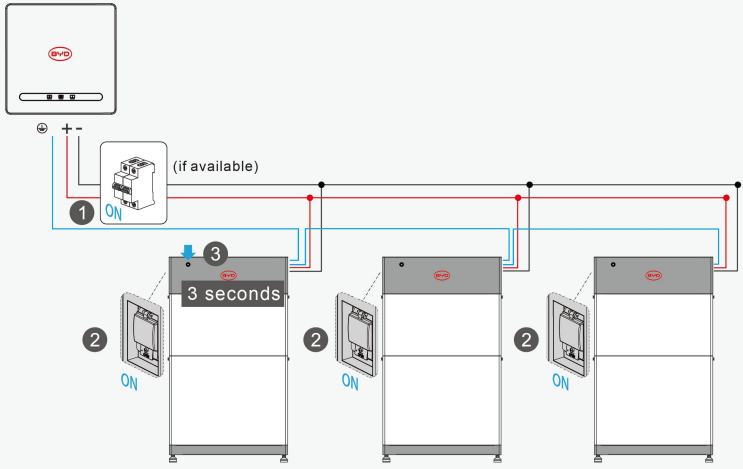
Steps:

1. Turn on the switch between the inverter and the battery (if there is one);

2. Turn on the battery system;

3. Switch on the inverter;

4. Black start: Press the LED button of the main system for 3 seconds.



Switch On Process:
① Switch between Battery and Inverter (if available); ② Battery; ③ Black Start

8.2 Shut down the battery system

Steps:

The procedure to switch off the battery system is:

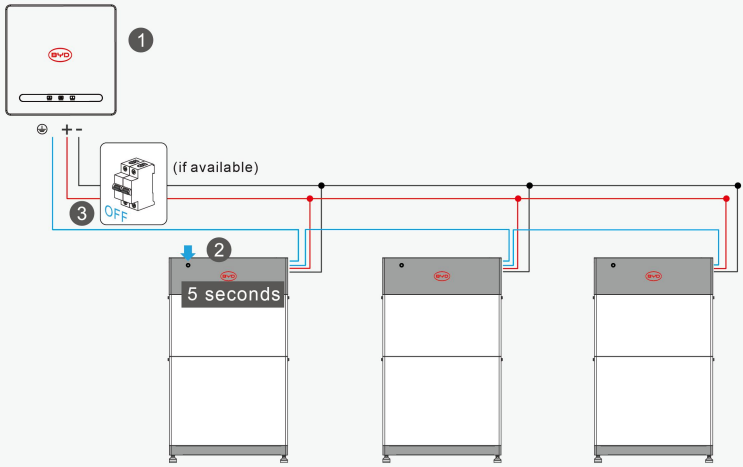
1. switch off the inverter;

2. switch off the battery;

3. switch off the air switch between the battery and the inverter if there is any.

The correct way to switch off the battery system is to press the LED Button for 5 seconds on the BCU, but not to pull down the air switch of BCU.

If two or three battery systems are connected in parallel, only the LED Button on the master system needs to be pressed. The slave system(s) will be turned off automatically



Switch Off Process:
① Inverter; ② Battery; ③ Switch between Battery and Inverter (if available)

8.3 Safety design

When the battery system loses communication with the inverter, it can remain in standby mode for 24 hours; if the duration exceeds 24 hours, the battery system will shut down.

8.4 Protective Devices

If the HVB battery system configuration list is not met, the battery module can protect itself (shut down). If external protection is required, follow local, state, provincial, federal, or national laws, regulations, and the inverter manufacturer's instructions.

9. Disassembly

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DANGER

Danger to life from electric shock due to live DC cables or connectors at the battery system

The DC cables connected to the battery system may be live. Touching the DC conductors or the live components leads to lethal electric shocks.

- Do not touch non-insulated cable ends.

CAUTION

Risk of injury due to weight ofthe battery module

Injuries may result if the battery module is lifted incorrectly or dropped while being transported or installed.

- Carefully transport and lift the battery module. Consider the weight of the battery module.
- Wear appropriate personal protective equipment when performing all work on the battery module.work on the battery system.

Steps:

1. Switch off the inverter.
2. Turn off the battery system.
3. Turn off the air switch (if any) between the inverter and the battery system.
4. Unplug all cables from the battery system.
5. Loosen the interlocking screw between the battery module and the BCU, and then remove the BCU.
6. Loosen the screws on the pull wall between the battery module and the wall, and then remove the pull wall.
7. Loosen the interlocking screws between the battery modules, and then remove the upper battery module (if any).
8. Loosen the interlock screw between the battery module and the base, and then remove the battery module.

9. Loosen the screws between the wall hanger and the base, loosen the screws between the wall hanger and the wall, and then remove the wall hanger (if any).

If you want to store or transport battery modules, modularize the system. Use the original packaging or packaging appropriate for the weight and dimensions of the system. Dispose of battery modules in accordance with applicable local e-waste disposal regulations.

10. Capacity expansion

The battery module can be expanded at any time. The original SOC of the new battery module is around 30%.To avoid capacity loss, a SOC difference of approximately 5% is recommended.
If the SOc difference is >5%, the battery system will initiate self-adjustment of the SOC. The duration of self-adjustment depends on the SOC diference between the old and new battery module, with a maximum time not exceeding 30 days.

Steps:

1. Turn off the inverter.

2. Shut down the battery system.

3. Turn off the air switch (if any) between the inverter and the battery system

4. Remove the BCU.

5. Add the new module on top of the other battery modules

6. Place the BCU back on top of the new battery module.

7. Turn on and configure the battery system.

8. Switch on the inverter.

11. Fault guide

11.1 LED failure indication

Indicator	Status	Description
Lights off	White ON OFF Blue ON OFF	Hibernation / Shutdown / Power-Down State
Blue light is always on	White ON OFF Blue ON OFF	Failure / master communication timeout / slave communication timeout
Blue light flashes at 0.5Hz	White ON OFF Blue ON OFF 2s	Battery protection state

Please refer to the "Fault List" for specific details

11.2 Service guide

In addition to the LED light, we can also get the fault information of the battery through the mobile phone application. Please refer to the latest Service Guide for detailed steps. Website: www.bydenergy.com.

The battery module cannot be turned on/off. Check that the system has been built according to the Battery module HVE Technical Information. If the problem still cannot be solved, please contact the local BYD after-sales service within 48 hours.

NOTICE

Battery module is damaged due to too low voltage.

- If the battery module does not start at all, please contact BYD's local after-sales service within 48 hours. Otherwise, the battery may be permanently damaged.

12. Storage

Cleaning

It is recommended that the battery system be cleaned periodically. If the enclosure is dirty, please use a soft, dry brush or a dust collector to remove the dust. Liquids such as solvents, abrasives, or corrosive liquids should not be used to clean the enclosure.

The battery module shall be stored in an environment with a temperature range from -10°C to + 50°C and periodically charged according to the following table. After a long period of storage, the charging temperature shall not exceed 0.5C (C-rate is a measure of the rate at which a battery is charged and discharged relative to its maximum capacity) to 30% SOC.

Storage temperature	Storage humidity	Storage time	SOC
＜-10°C	/	Not allowed	/
-10~25°C	5%~70%	≤ 12 months	20%≤SOC≤60%
25~35°C	5%~70%	≤ 6 months	25%≤SOC≤60%
35~50°C	5%~70%	≤ 3 months	20%≤SOC≤60%
Above 50°C	/	Not allowed	/

NOTICE

Module damage due to undervoltage.

- When the temperature is higher than 25°C, the overdischarged system shall be charged within 7 days.
- When the temperature is higher than 25°C, the system with excessive discharge shall be charged within 15 days.

13. Maintenance and replacement

- Do not perform maintenance on the equipment unless you are familiar with the contents of this manual and have the proper tools and test equipment.
- Professional technicians and operators shall be fully trained and have knowledge of safe opera- tion and maintenance of the equipment. They should take adequate precautions and personal protective equipment while operating.
- Before the equipment is repaired, the power must be cut off and the safety precautions in this manual and other relevant documents must be strictly observed.
- During maintenance, try to avoid irrelevant personnel entering the site.
- The unit cannot be powered up again until all faults have been resolved. Failure to do so may result in more problems or damage to the device.
- Do not open the cover without authorization, otherwise there is a risk of electric shock. Any faults caused by the above reasons are not covered by the warranty.
- Replace the battery with the same type.
- Immediately after completing maintenance, check to make sure no tools or other parts are left in the equipment.
- When the battery is idle for a long time, it must be stored and charged according to this manual.

14. Disposal of battery module

Modules must be disposed of in accordance with applicable local regulations for the disposal of electronic waste and used batteries.

- Do not dispose of the battery module with household waste.
- Avoid exposing the battery to heat or direct sunlight.
- Avoid exposing the battery to high humidity or corrosive environments.

For more information, please contact.

15. Technical parameters

PERFORMANCE

	HVE 6.4	HVE 8.5	HVE 10.7	HVE 12.8-1
Battery Module	HVE 4.2 Module (4.29 kWh, 76.8 V, 42.6 kg), HVE 6.4 Module (6.43 kWh, 115.2 V, 61.6 kg)			
Number of Modules	1 (6)	2 (4+4)	2 (4+6)	2 (6+6)
Usable Energy [1]	6.43 kWh	8.58 kWh	10.72 kWh	12.86 kWh
Nominal Voltage	115.2 V	153.6 V	192.0 V	230.4 V
Operating Voltage	90 ~ 131.4 V	120 ~ 175.2 V	150 ~ 219 V	180 ~ 262.8 V
Dimensions(H/W/D)(mm)	794 x 660 x 140	986 x 660 x 140	1139 x 660 x 140	1292 x 660 x 140
Weight	73.1 kg	96.7 kg	115.7 kg	134.7 kg

	HVE 12.8-2	HVE 15.0	HVE 17.1-1	HVE 19.2
Number of Modules	3 (4+4+4)	3 (4+4+6)	3 (4+6+6)	3 (6+6+6)
Usable Energy [1]	12.87 kWh	15.01 kWh	17.15 kWh	19.29 kWh
Nominal Voltage	230.4 V	268.8 V	307.2 V	345.6 V
Operating Voltage	180 ~ 262.8 V	210 ~ 306.6 V	240 ~ 350.4 V	270 ~ 394.2 V
Dimensions(H/W/D)(mm)	1331 x 660 x 140	1484 x 660 x 140	1637 x 660 x 140	1791 x 660 x 140
Weight	139.3 kg	158.3 kg	177.3 kg	196.3 kg

	HVE 17.1-2	HVE 19.3	HVE 21.4	HVE 23.5
Number of Modules	4 (4+4+4+4)	4 (4+4+4+6)	4 (4+4+6+6)	4(4+6+6+6)
Usable Energy [1]	17.16 kWh	19.30 kWh	21.44 kWh	23.58 kWh
Nominal Voltage	307.2 V	345.6 V	384.0 V	422.4 V
Operating Voltage	240 ~ 350.4 V	270 ~ 394.2 V	300 ~ 438 V	330 ~ 481.8 V
Dimensions(H/W/D)(mm)	1677 x 660 x 140	1830 x 660 x 140	1983 x 660 x 140	2136 x 660 x 140
Weight	181.9 kg	200.9 kg	219.9 kg	238.9 kg

GENERAL DATA	
Max.Charge and Discharge Current [2]	35 A
Peak Charge and Discharge Current [2]	70 A,10 s
Scalability	Max. 3 in Parallel (70.74 kWh)
Installation Mode	Floor Stand (standard) / Wall Mount (optional)
Installation Scene	Indoor & outdoor installation
Communication	CAN / RS485
Round-trip Efficiency	≥ 95%
Applications	On Grid / On Grid + Backup / Off Grid
Operating Temperature	-20 °C to +55°C
IP Class	IP65
Cooling	Natural Convection
Storage Humidity	5%~95%
Altitude [3]	< 4000 m
Warranty [4]	15 Years
Accessories (Optional)	BYD Smart WIFI/LAN module, Wall-mounting Bracket
Certification	IEC 62619 / IEC 62040 / IEC 62477-1 / EN 61000-6-1/2/3/4 / EN 301489-1 / EN 301489-17/ EN 300328 / EN 62311 / VDE-AR-E 2510-50 / RCM / CEC / REACH / RoHS / UN38.3
Compatibilities	BYD Power-Box SH3-6K, BYD Power-Box TH5-15K

[1] DC Usable Energy, Test conditions: 0.2C charge & discharge at + 25°C.

[2] Charge derating will occur between -10°C and +10°C, discharge derating will occur between -20°C and +10°C.

[3] The output power may be affected by altitude. Please refer to the user manual for details.

[4] Conditions apply. Refer to BYD Battery-Box HVE Limited Warranty Letter.

16. Contact information

South Africa

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bboxservice1@fdbatt.com Telephone: +27 21 140 3594

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