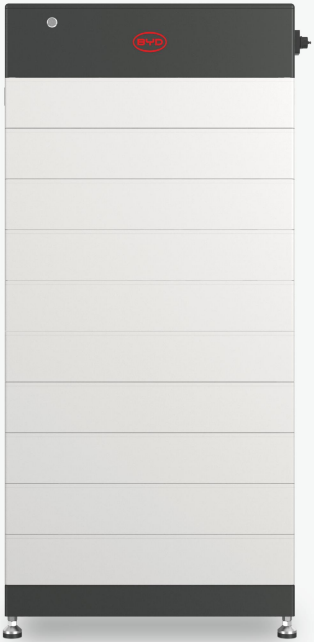
EN-Manual

Jun-2025 Version1.1



High Voltage Battery System

Battery-Box

HVB 5.9, 8.9, 11.8, 14.8, 17.8, 20.7, 23.7, 26.7, 29.6

User Manual

Legal Provisions

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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.

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

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Manufacturer

Shanwei BYD Auto Co., Ltd.

Table of Contents

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.

- Do not operate under the conditions described in this manual.
- The installation and use environment does not comply with relevant international, national or regional standards.
- Unauthorized disassembly, alteration of the product or modification of the software code.
- Not following the safety instructions and precautions in the product and manual.
- Damage caused by abnormal natural environment (force majeure, such as earthquake, fire, wind, flood, mudslide, etc.).
- Losses due to customer transportation.
- Damage due to storage conditions not meeting the requirements of this manual.
- Hardware or data damage due to negligence, mishandling, or intentional damage by the customer.
- System damage caused by third parties or customers, including damage caused by improper transportation and installation that does not meet the requirements of this manual, and damage caused by adjustment, alteration, or removal of identification marks that do not meet the requirements of this manual.

* 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 HVB 5.9, 8.9, 11.8, 14.8, 17.8, 20.7, 23.7, 26.7, 29.6

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.

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.

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.

1.5 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.

1.6 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.

1.7 Documentation Symbols

QUALIFIED PERSON

Describe activities performed by qualified personnel only.

1.8 Abbreviations and Definitions of Terms

No.	Designation	Explanation
1	HVB	BYD Battery-Box HVB
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 For detailed operation, please refer to the user manual of the Smart WIFI/LAN Module

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 in the configuration list (Technical Information).
- Do not use accessories with recommended specifications.

2.1 Intended Use

Battery-Box HVB 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 on grid, off grid and on grid + backup modes via compatible inverter.

The battery system can be connected to the Internet and firmware updates via Smart WiFi/LAN Module.

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.

Battery system can only be used with the compatible inverters. A list of these inverters (BYD Battery-Box HVB HVM+ HVS+ Technical Information) can be found in the www.bydenergy.com.

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.

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 Firefighting 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 CO2 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 Battery Modules Handling and Storage Guide

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.

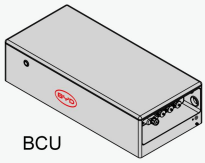
NOTICE

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 and Base Package



BCU
x 1

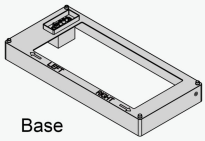
Terminal
resistor x 1

Screw M4*8
x 2

Knob screw
x 2

Communication
terminal x 2

Foot
x 4



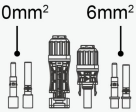
Base
x 1

Hanger1
x 2

Screw M5*16
x 2

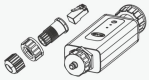
Expansion
screw M8 x 2

QSG
x 1



MC4 wiring
terminal x 1

Connector
special tool x 1



Smart WiFi/ LAN Module
x 1

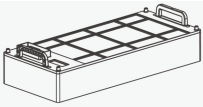
Screw M5*16
x 2*

Plastic rivet
x 2*

Hanger2
x 2*

*(for HVS+ / HVM+ only)

3.2 Battery Module Package

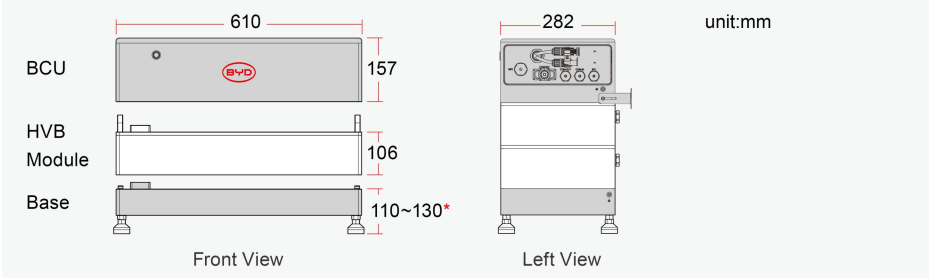


HVB module x 1

MSDS x 1

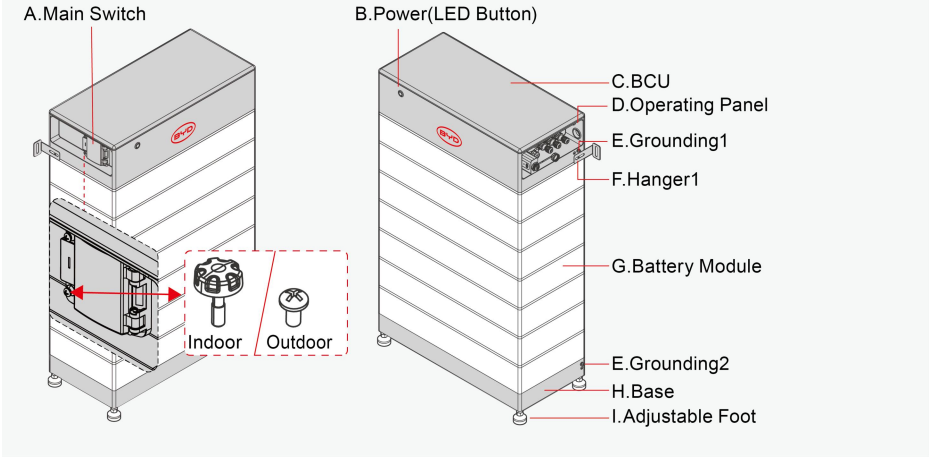
4 Battery System Overview

4.1 Structure Dimension Drawing

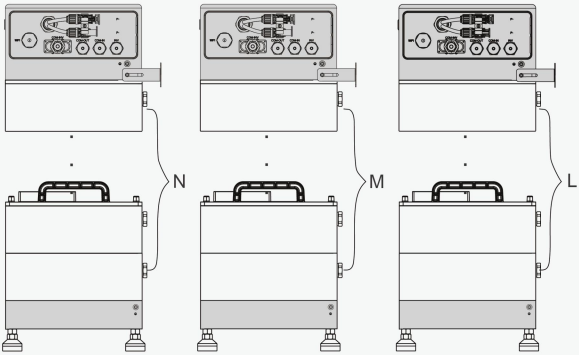


*The four feet of the base support adjustment within a height range of 110-130mm to adapt to possible tilts of the ground.

4.2 Battery System Description



4.3 Battery System Scalability



2≤N≤10

L= M = N √

L ≠ M or L ≠ N or M ≠ N X

Max 3 towers in parallel

HVB 5.9 HVB 29.6 3 x HVB 29.6

Maximum capacity of **89.07** kWh

4.4 Interface

BYD Energy

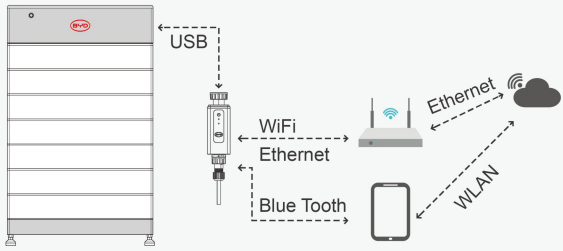
Through the APP, you can realize intelligent battery management, including remote data monitoring, firmware upgrade and troubleshooting.

- 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.

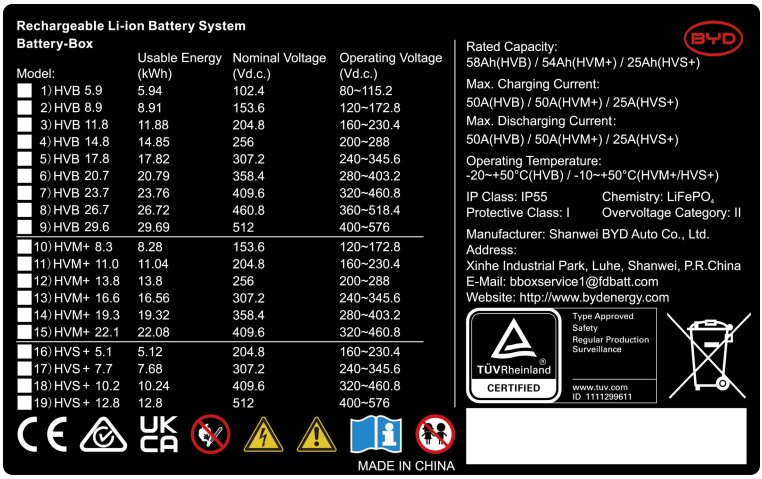
Scan the QR code below to obtain the corresponding video manual.

4.5 Symbols

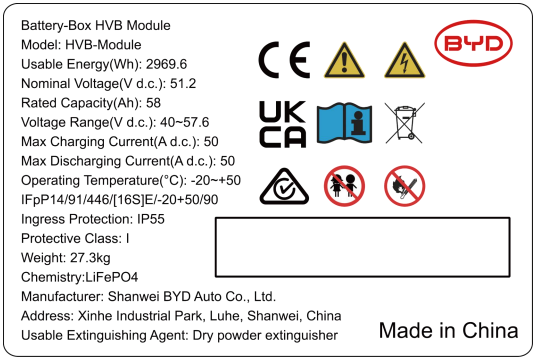
Symbol	Explanation
	Observe the documents Observe all documents supplied with the system.
	WEEE designation Do not dispose of the system together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	CE marking The system complies 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
	The product has been tested and certified by TUV Rheinland.
	UKCA marking The product complies with the regulations of the applicable laws of England, Wales and Scotland.

4.6 Nameplate Label

BCU



Module



4.7 Warning Label

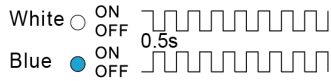
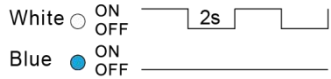
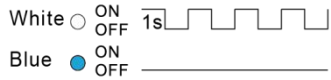
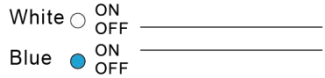
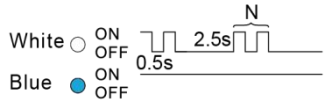
WARNING

1. If any faults are found on the lithium-ion battery, immediately take it out of service and contact the manufacture's customer service department.
2. Do not short-circuit or reverse polarity. Do not expose to temperatures above 55℃, keep out of direct sunlight, keep away from strong heat sources or fire. Improper use can result in overheating, or explosion.
3. When installing or removing the lithium-ion battery, there is a risk of accidents and injuries from electricity. Do not place any foreign objects or tools on the lithium-ion battery, to prevent short-circuit of the battery.
4. Lithium-ion batteries that are damaged or in uncertain conditions shall only be handled by special trained and authorized lithium-ion battery technican. When handling or servicing lithium-ion batteries that are damaged or in uncertain conditions, wear personal protective equipment (e. g. safety goggles, gas mask, safety gloves, safety shoes, helmet) and follow the manufacture's instructions.

NOTICE

If lithium-ion battery Is not used for a long period of time, it can become damaged through discharge. Recharge battery at least every 6 months (when in storage). once discharged, recharge battery within 7 days.

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

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

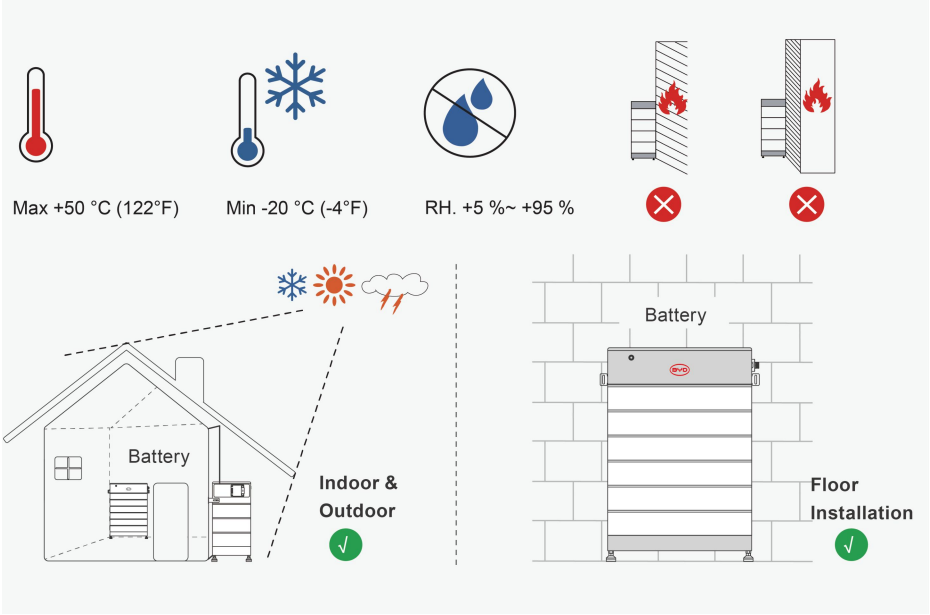
- When installing the battery, dropping or mechanical shock may cause internal damage to the device. If these situations occur, it is strictly prohibited to continue to use, otherwise it may cause potential safety hazards.
- After the battery is dropped, if there is obvious smell, damage, smoke, fire 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.
- The altitude of the installation location shall be less than 4000 meters.
- The ambient temperature shall be between -20°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 35 ~ 65mm.

- 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

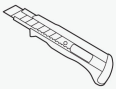

Network wire clamp

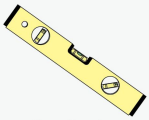

Heat gun

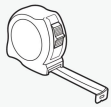

Phillips Screwdriver Bit

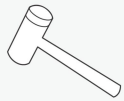

Wrench

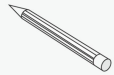

Hydraulic clamp

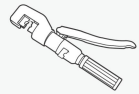

Knife


Gradienter


Tape measure


Rubber mallet


Pen


Drill


DC Cable

Current input ≥ 30A
8AWG / 10mm² Ø:6.5-7.5mm

Current input < 30A
10AWG / 6mm² Ø:5.2-6mm


Data Cable
CAT5E Ø:5-6mm


OT Terminal
10mm²-M5


PE
8AWG / 10mm²


Heat shrink tube
Ø:8-10mm

5.1.5 Safety Gear & Required Personnel


Insulated gloves


Safety shoes


Goggles


1 qualified installers

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.

5.3 Floor Installation

Procedure:

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 35~65mm.

4. Adjust the feet to ensure that the battery remains horizontal (**Tilt is not allowed!**).

5. Install the battery modules on the base first, then stack the battery modules one by one, and finally install the BCU on the top of the battery module.

There is electricity in the blind socket, please do not touch it!

6. Mark the position of the drill holes with the hanger1.

7. Move the BCU aside and then drill holes at the marked locations.

Please cover the blind socket to avoid falling dust.!

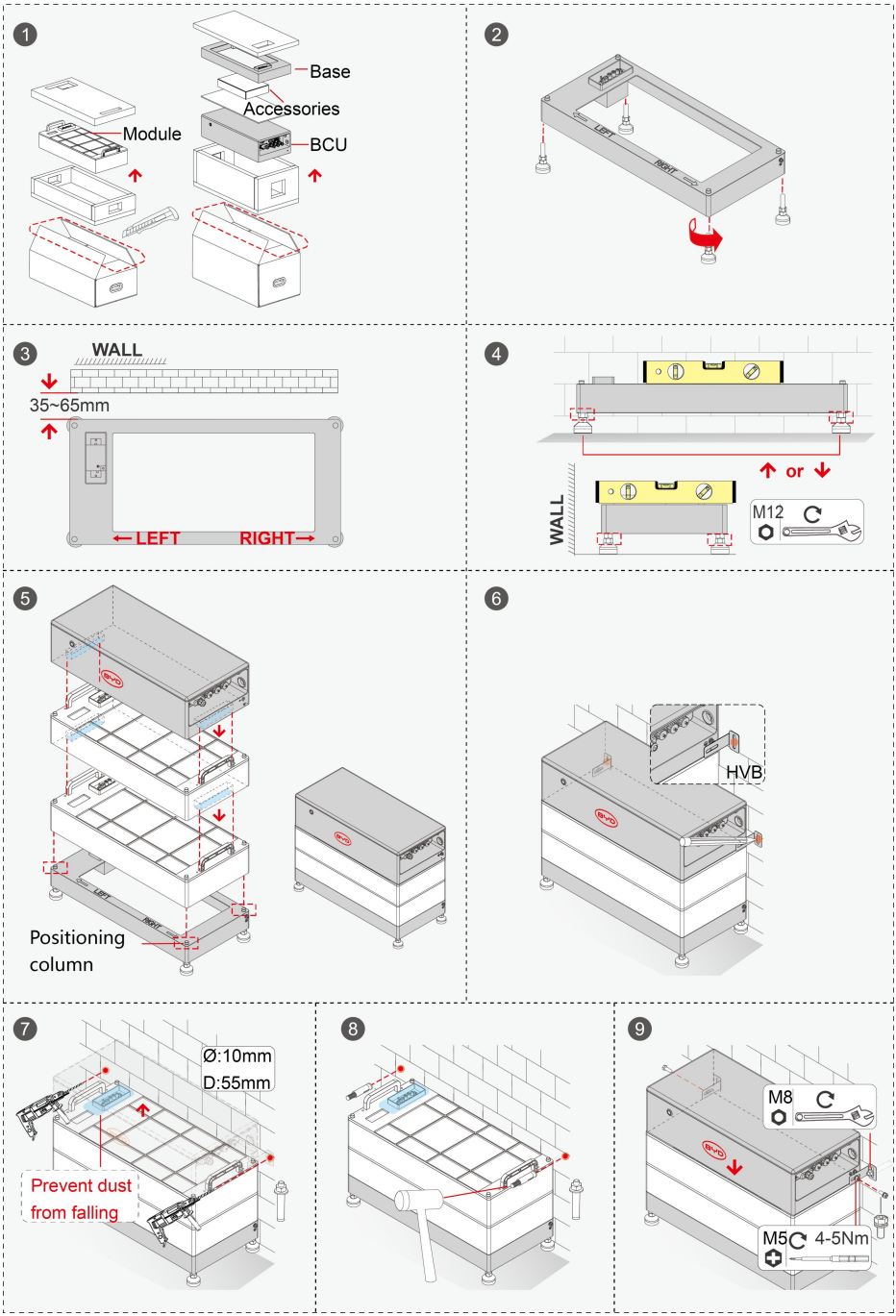
8. Hammer the two expansion screws into the holes with a rubber mallet, loosen the screw part of the expansion screw and remove it.

9. Move the BCU to the initial position to make the mounting holes of the foot piers are aligned with the drilled holes, and then tighten the screws.

NOTICE

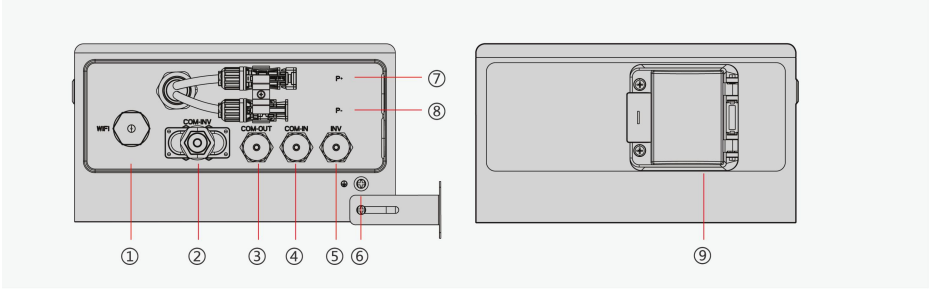
Damage to the battery system due to under voltages

- 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.


1
Base
Accessories
Module
BCU
2
LEFT
RIGHT
3
WALL
35~65mm
←LEFT
RIGHT→
4
or
WALL
M12
5
Positioning column
6
HVB
7
Ø:10mm
D:55mm
Prevent dust from falling
8
9
M8
M5 4-5Nm

6 Electrical Connections

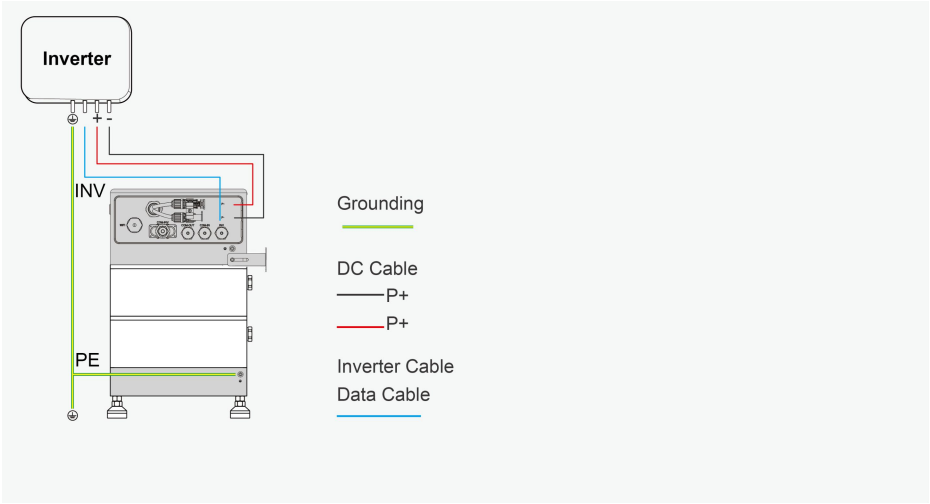
6.1 Functional Area Overview



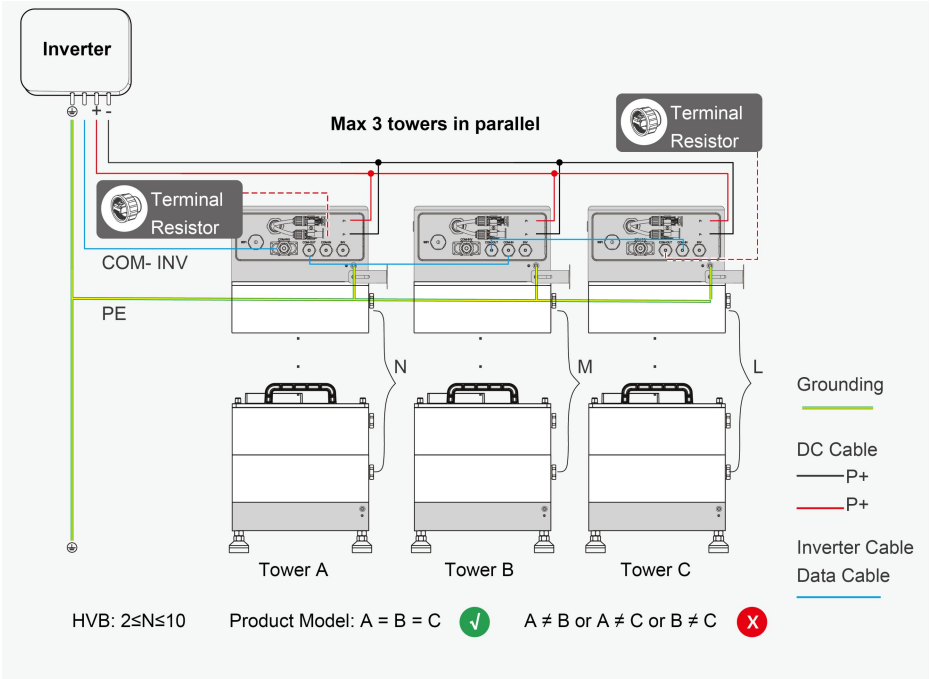
No.	Terms	Description
①	WIFI	Port for smart WIFI/LAN module
②	COM - INV	Port for an inverter data cable
③	COM - OUT	OUT port for parallel tower connection
④	COM - IN	IN port for parallel tower connection
⑤	INV	Port for an inverter data cable
⑥	Grounding	Grounding connection
⑦	P+	Connect to positive terminal of external device
⑧	P-	Connect to negative terminal of external device
⑨	MAIN Switch	Power on/power off

6.2 Topology Diagram

6.2.1 One Battery System



6.2.2 Three Battery Systems



When multiple battery systems work in parallel, terminal resistors must be installed：

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.

6.3 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.

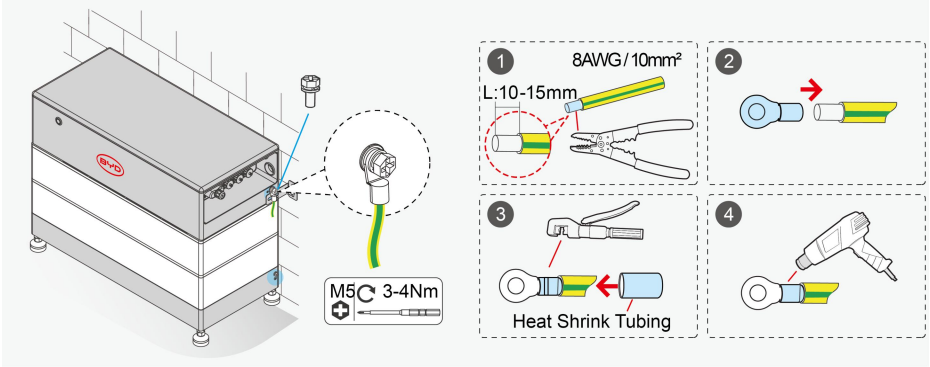
PE and Terminal Requirements:

- Terminals, 5mm.
- Minimum terminal cross-section: 10 mm²
- The cross section of the earth terminal must comply with the applicable local standards and directives
- PE section ≥ 10 mm²
- PE material: copper wire terminal
- OT Terminal: 10 mm²-M5

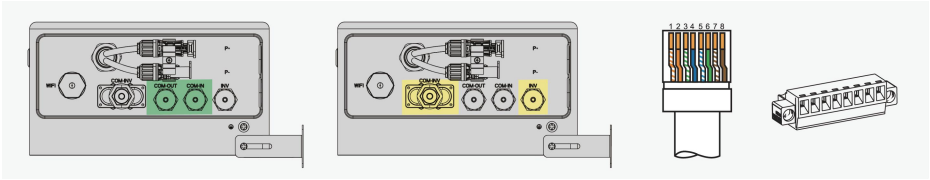
Steps:

1. Connect the ground wire and the OT terminal together.

2. Fix the ground wire on the BCU and tighten it (torque, 3-4 Nm).



6.4 Data Cable Connection



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

6.4.1 Inverter Cable Connection between Inverter and One Battery System

QUALIFIED PERSON

There are two communication modes for connecting HVB to the inverter, one of which can be selected for connection.

Option A: RJ45

Option B: 8-Pin Terminal

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

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.

- 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: 10 meters.

Option A: RJ45

Steps:

1. Unscrew the waterproof cover on the INV connector..

2. Pass the communication wire through the waterproof cover.Please cut off the cable, arrange the cable position, and crimp the RJ45 connector with the network cable clamp.

3. Insert the RJ45 connector into the INV port of the BCU and tighten the waterproof cover.

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

Option B: 8-Pin Terminal

Steps:

1. Remove the external waterproof cover on the COM - INV.

2. Connect the quick connector terminal.

A: Pass the communication line through the external waterproof cover.

B: Loosen the screw of the quick-insertion terminal with a screwdriver.

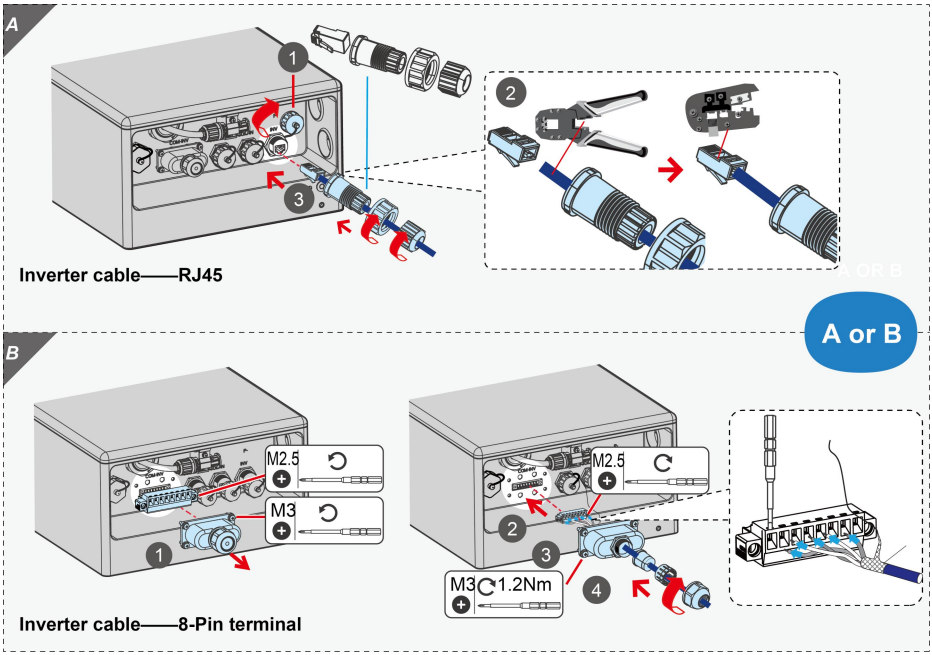
C: Insert the harness into the quick-connect terminal, and then tighten the screw.

D: Insert the wired quick connector into the COM - INV port of the BCU and tighten the screw.

3. Install the outer waterproof cover (torque, 1.2 Nm).

4. Tighten the external waterproof cover in turn (torque, 1.2 Nm).

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


A
1
2
3
Inverter cable——RJ45
A or B
B
M2.5
M3
1
M2.5
2
3
M3
1.2Nm
4
Inverter cable——8-Pin terminal

6.4.2 Data Cable Connection between Multiple Towers

This only applies when there are multiple towers in parallel. Data Cable Requirements: The length and quality of the cable affects 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: 20 m.

Steps:

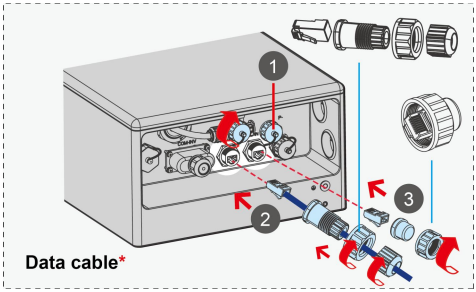
1. Remove the IN & OUT external waterproof cover.

2. Plug the RJ45 connector into the OUT port of the first tower's BCU and the IN port of the second tower's BCU.

3. Repeat step 2 for the following columns.Cover the terminating resistors on the multiple towers, see 6.2.2in this manual.Assemble the outer waterproof cover.

* Data Cable & terminal resistor are used for parallel connection

* Connect terminal resistor, Plug the terminal resistor into the “**IN**” port of the master module and the “**OUT**” port of the last slave module



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: 10mm2. Select the correct option based on the application and the inverter manufacturer's requirements.
- Maximum cable length: 10m

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. Loosen the iron sheets fixing the positive and negative poles of the DC input terminal.

8~9. 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.

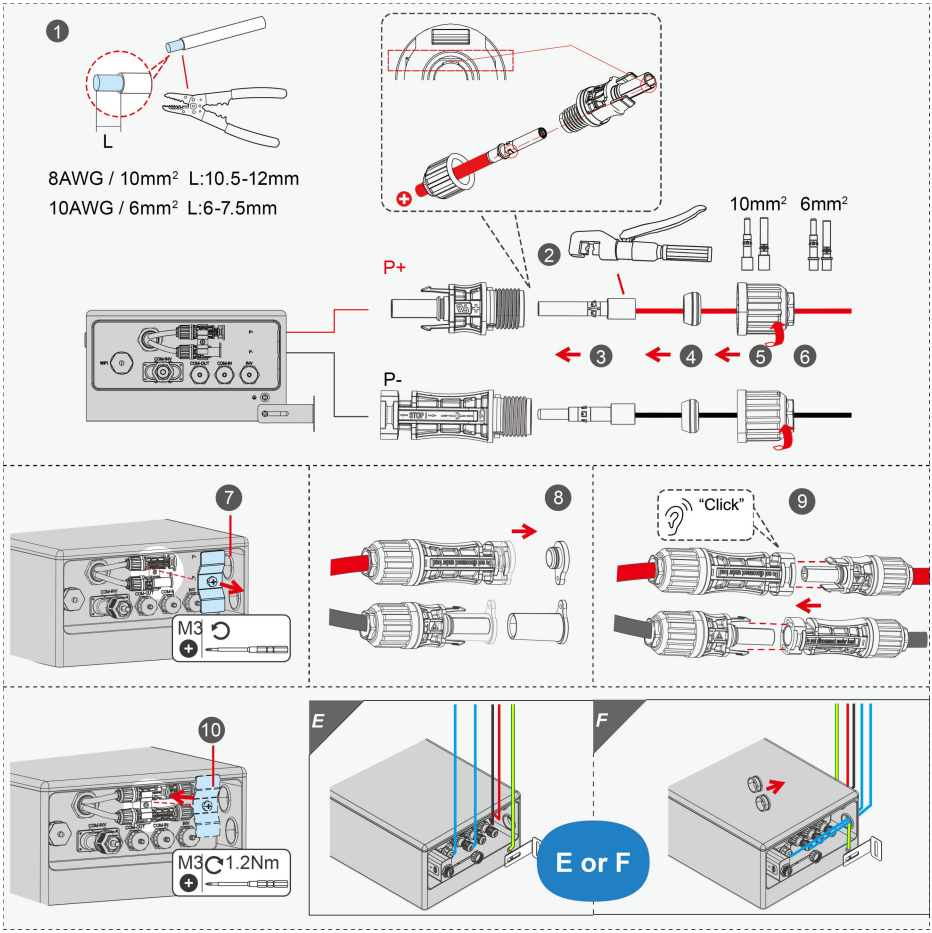
10. Tighten the iron sheets fixing the positive and negative poles of the DC input terminal (torque, 1.2 Nm).

Outgoing Line Mode

There are two outlet types:

Option E: Side outgoing line

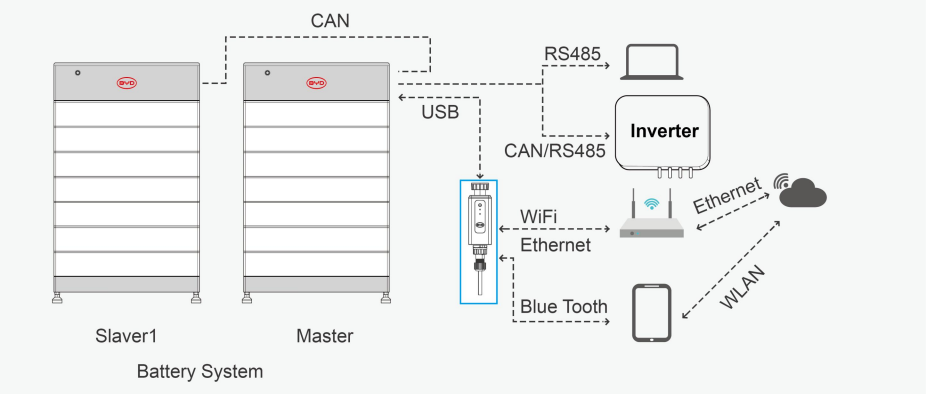
Option F: Back outgoing line



6.6 BYD Smart WIFI/LAN Module Installation

6.6.1 Inverters + HVB

- If the battery does not have the Smart WIFI/LAN Module, the battery cannot connect to the Internet.
- (RJ485-USB) adapter is required for after-sales and debugging .
- If multiple battery systems are operating in parallel simultaneously, the Smart WIFI/LAN Module only needs to be installed in one battery system.In this case, it should be installed on the battery system that connected to the inverter via communication cables.



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 (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.

We recommend that you install the Smart WIFI/LAN Module and complete the network configuration simultaneously when installing the battery system, to enable real-time monitoring of the battery's working status and ensure the battery operates in an optimal software environment.

- Connection to the Internet is not mandatory, but is recommended.

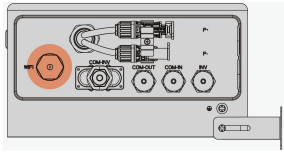
Connect the Smart WiFi/LAN Module to the BCU

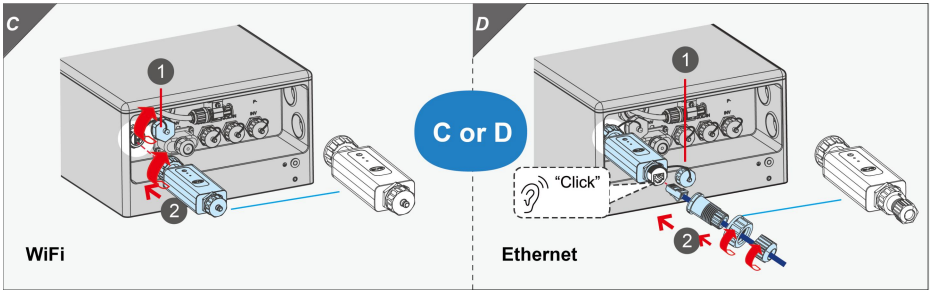
Installation option

There are two outlet modes:

Option C: WIFI

Option D: 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.
- The operation panel is well fixed.

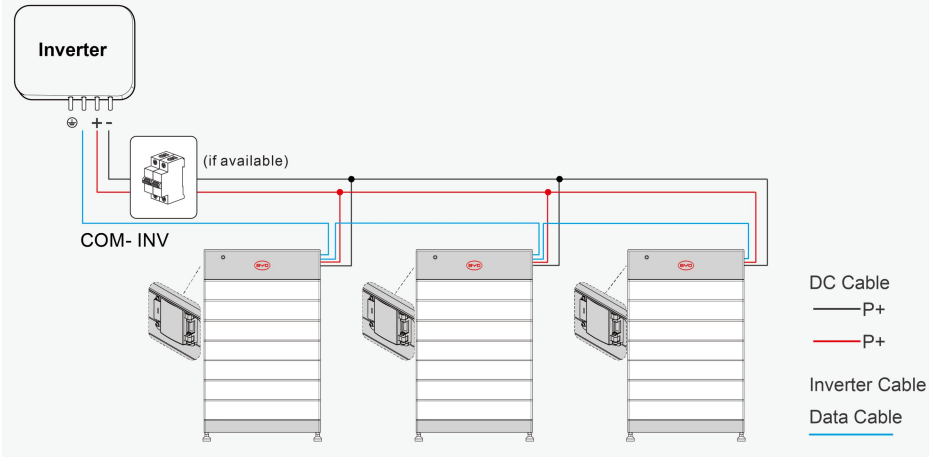
Steps:

1. Turn on the air switch between the battery and the inverter (if any).

2. Push the air 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

Inverter + HVB

- Automatic adaptation of the inverter and battery;
- Refer to the 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.

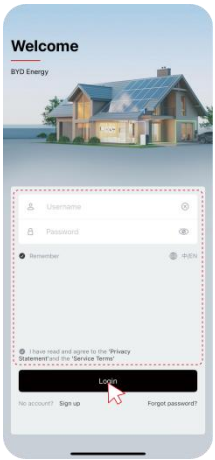
2. Check the box in front of "Please read the Privacy Statement and Terms of Service carefully before agreeing to use this application and check to indicate that you have agreed", and then click the "Register" or "Login" button (please register the installer's company account for the first time, if the company has an account, you can log in directly).

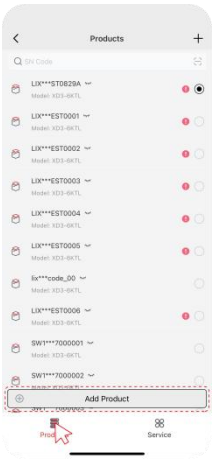
3. Select the all-in-one product after entering the interface.

4. Click the scanning entrance, scan QR code of the WiFi stick connected to the inverter, and connect to Bluetooth to obtain the product information.

5. Set the installed city in the setting-configuration information to obtain the grid connection regulations.

6. 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.

7.3 Turn on and Commission the Inverter

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

7.3.1 On Grid Applications

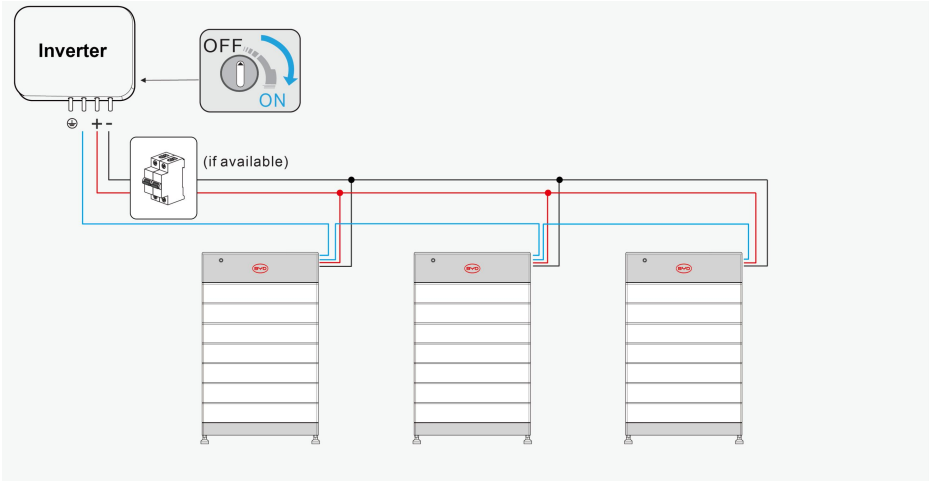
Steps:

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:

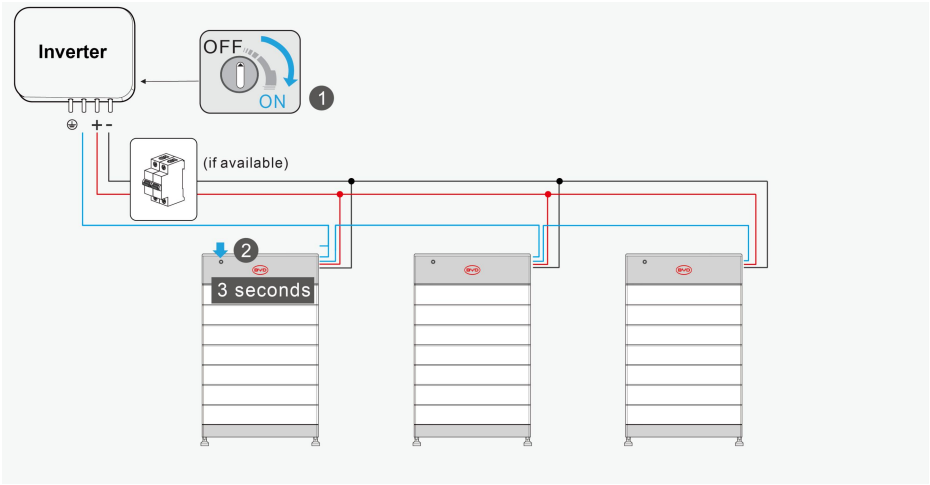
1. Install and connect the inverter according to its instructions.

2. Turn on the inverter.

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

4. 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 On Grid Applications

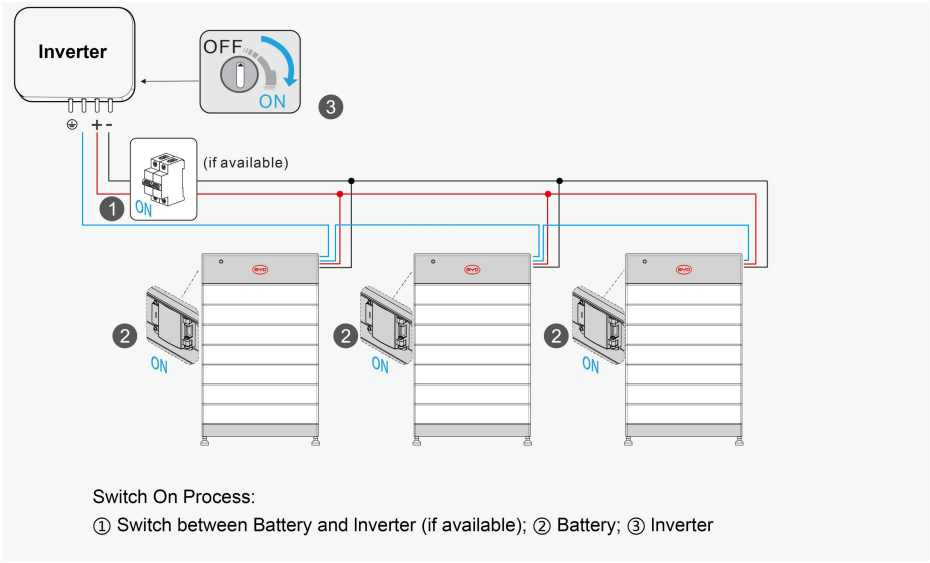
To ensure that the battery system works well with the inverter, follow the correct procedure to start them.

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 Off Grid Applications

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

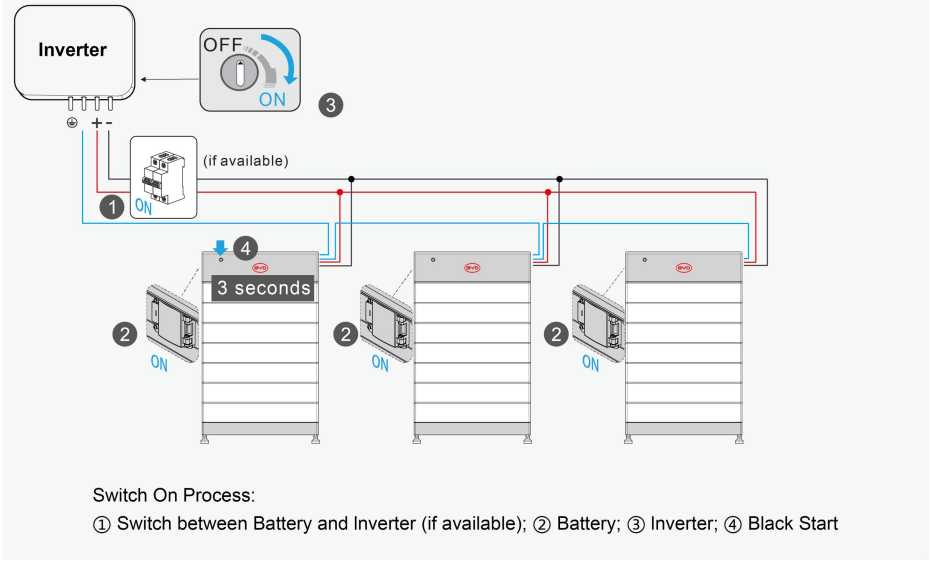
Steps:

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 Inverter; ④ Black Start

8.2 Shut Down the Battery System

Steps:

The procedure to switch off the battery system is:

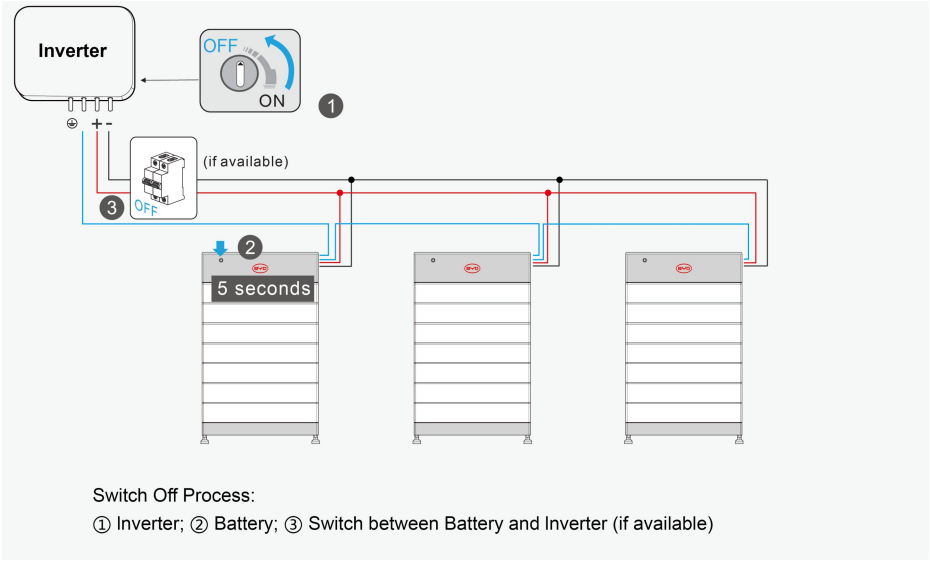
1. switch off the inverter;

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.

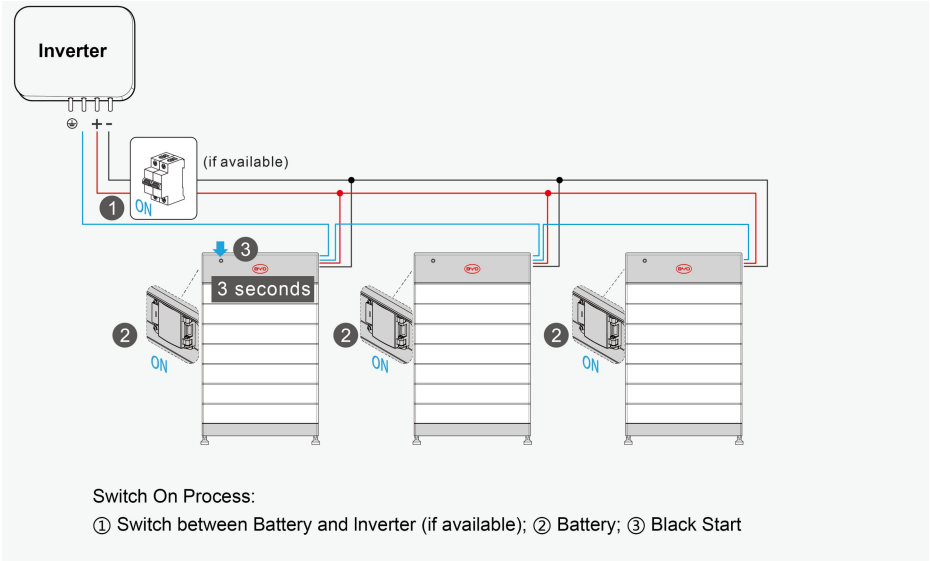
If two or three battery systems are connected in parallel, only the LED Button on the master system needs to be pressed. The slave system(s) will be turned off automatically



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

8.3 Black Start Function

The battery system can support the black start function of the compatible inverter. Different inverters are triggered in different ways. Please follow the user manual of the inverter.



Switch On Process:

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

8.4 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.

8.5 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

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 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.

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. And the battery system cannot fully discharge all stored energy during the SOC self-adjustment period. The duration of self-adjustment depends on the SOC difference 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.

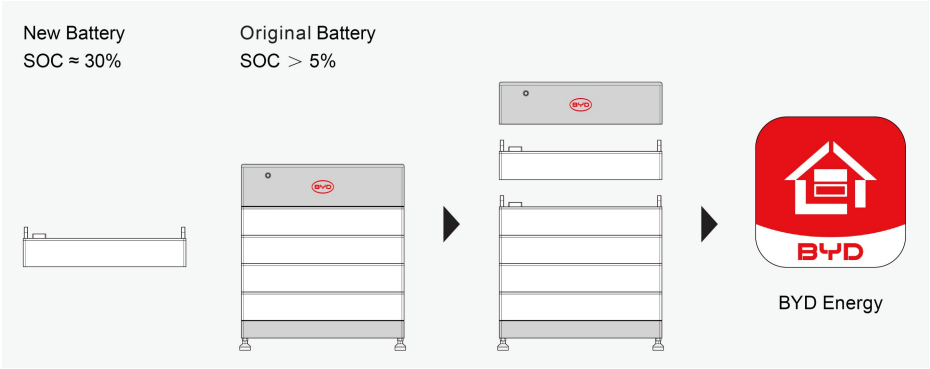
4. Remove the BCU.

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.

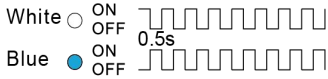
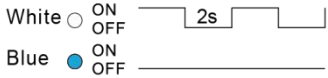
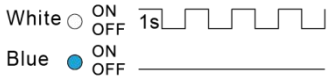
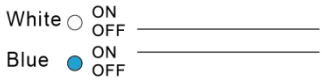
8. Switch on the inverter.



Please make sure the Original Battery isn't under forced charging(SOC>5%)

11 Fault Guide

11.1 LED Failure Indication

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

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 HVB 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 -20°C to + 50°C and periodically charged according to the following table. After a long period of storage, the charging current shall not exceed 50A (It 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
＜-20°C	/	Not allowed	/
-20~25°C	5%~70%	≤ 12 months	25% ≤ SOC ≤ 60%
25~35°C	5%~70%	≤ 6 months	25% ≤ SOC ≤ 60%
35~50°C	5%~70%	≤ 3 months	25% ≤ SOC ≤ 60%
Above 50°C	/	Not allowed	/

NOTICE

Damage to the system due to under voltages.

- Charge the over-discharged system within seven days when the temperature is above 25°C
- Charge the over-discharged system within fifteen days when the temperature is below 25°C.

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 operation 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 BYD.

15 Technical Parameters



PERFORMANCE	HVB 5.9	HVB 8.9	HVB 11.8
Battery Module	HVB Module (2.97 kWh, 51.2 V, 27.3 kg)		
Number of Modules	2	3	4
Usable Energy [1]	5.94 kWh	8.91 kWh	11.88 kWh
Nominal Voltage	102.4 V	153.6 V	204.8 V
Operating Voltage	80 ~ 115.2 V	120 ~ 172.8 V	160 ~ 230.4 V
Dimensions (H/W/D)	479 x 610 x 282 mm	585 x 610 x 282 mm	691 x 610 x 282 mm
Weight	68.7 kg	96 kg	123.3 kg



	HVB 14.8	HVB 17.8	HVB 20.7
Number of Modules	5	6	7
Usable Energy [1]	14.85 kWh	17.82 kWh	20.79 kWh
Nominal Voltage	256.0 V	307.2 V	358.4 V
Operating Voltage	200 ~ 288 V	240 ~ 345.6 V	280 ~ 403.2 V
Dimensions (H/W/D)	797 x 610 x 282 mm	903 x 610 x 282 mm	1009 x 610 x 282 mm
Weight	150.6 kg	177.9 kg	205.2 kg



	HVB 23.7	HVB 26.7	HVB 29.6
Number of Modules	8	9	10
Usable Energy [1]	23.76 kWh	26.72 kWh	29.69 kWh
Nominal Voltage	409.6 V	460.8 V	512.0 V
Operating Voltage	320 ~ 460.8 V	360 ~ 518.4 V	400 ~ 576 V
Dimensions (H/W/D)	1115 x 610 x 282 mm	1221 x 610 x 282 mm	1327 x 610 x 282 mm
Weight	232.5 kg	259.8 kg	287.1 kg

GENERAL DATA	
Max Output Current [2]	50 A
Peak Output Current [2]	98 A, 15 s
Scalability	Max. 3 in Parallel (89.07 kWh)
Installation Mode	Floor installation
Communication	CAN / RS485
Round-trip Efficiency	≥ 95%
Applications	On Grid / On Grid + Backup / Off Grid
Operating Temperature	-20°C to +50°C
IP Class	IP55
Storage Humidity	5%~95%
Altitude	< 4000 m
Battery Cell Technology	Lithium Iron Phosphate (cobalt-free)
Warranty [3]	15 Years
Accessories	BYD smart WIFI/LAN Module

[1] DC Usable Energy, Test conditions: 100% DOD, 0.2C charge & discharge at + 25°C. System Usable Energy may vary with different inverter brands.

[2] Power derating will occur between -20°C and 10°C.

[3] Conditions apply. Refer to BYD Battery-Box HVB Limited Warranty Letter.

[4] Please refer to the compatible list for the required number of modules for each inverter.

16 Contact Information

South Africa

AFRIPLUS ENERGY GROUP (PTY)LTD

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

Address: The Pavilion, Corner of Dock & Portswood Road, V&A WATERFRONT, 8001, CAPE TOWN

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Alps Power Pty Ltd

service @alpspower.com.au Telephone: +61 2 8005 6688

Address: 14/47-51 Lorraine St Peakhurst NSW 221 www.alpspower.com.au

Europe

EFT-Systems GmbH service@eft-systems.de

Telephone: +49 9352 8523999 +44 (0) 2037695998(UK)

+34 91 060 22 67(ES) +39 02 873683(IT)

Address: Bruchtannenstraße 28, 63801 Kleinostheim, Germany www.eft-systems.de

BYD Global Service

bboxservice@byd.com

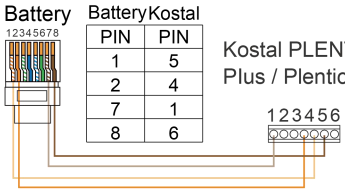
Telephone: +86 755 89888888-47175

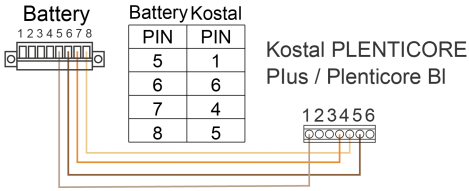
Address: No.3009,BYDRoad,Pingshan,Shenzhen,518118,P.R.China www.bydenergy.com

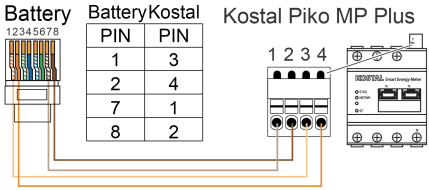
Appendix Connection Options with Inverters

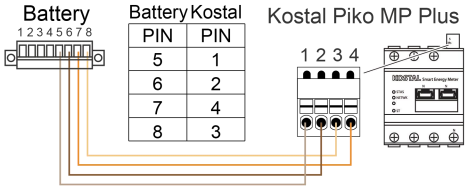
Please first check if the planned configuration is already released according to the latest Battery-Box HVB Compatible Inverter List, before the installation.

Connection with Kostal









Connection with Kaco