Gotion

Lithium Phosphate Battery System
Gotion HOME 2.0

This manual introduces Gotion HOME 2.0 from Gotion. Gotion HOME 2.0 is a low voltage Lithium-Ion Phosphate Battery storage system. Please read this manual before you install the battery and follow the instructions carefully during the installation process. In case of any confusion, please contact Pylontech immediately for advice and clarification.

Contents

1. Safety

The Gotion HOME 2.0 is a high voltage DC system, operated by skilled/qualified personnel only. Read all safety instructions carefully prior to any work and observe them at all times when working with the system.

Incorrect operation or work may cause:

- injury or death to the operator or a third party;
- damage to the system hardware and other properties belonging to the operator or a third party.

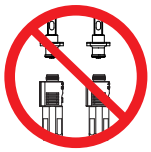
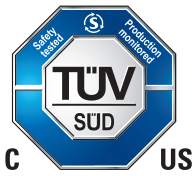
Skills of Qualified Personnel

Qualified personnel must have the following skills:

- training in the installation and commissioning of the electrical system, as well as the dealing with hazards;
- knowledge of this manual and other related documents;
- knowledge of the local regulations and directives.

1.1 Symbols

	Danger	Lethal voltage! · Battery strings will produce HIGH DC power and can cause a lethal voltage and an electric shock. · Only qualified person can perform the wiring of the battery strings.
	Warning	Risk of battery system damage or personal injury · Do not pull out the connectors while the system is working! · De-energize from all multiple power sources and verify that there is no voltage.
	Caution	Risk of battery system failure or life cycle reduces.
	Symbol in label	Read the product and operation manual before operating the battery system!
	Symbol in label	Danger! Safety!
	Symbol in label	Warning electric shock!
	Symbol in label	Do not place near flammable material.

	Symbol in label	Do not reverse connection the positive and negative.
	Symbol in label	Do not place near open flame.
	Symbol in label	Do not place at the children and pet touchable area.
	Symbol in label	Recycle label.
	Symbol in label	Label for Waste Electrical and Electronic Equipment (WEEE) Directive (2012/19/EU).
	Symbol in label	The certificate label for Safety by CSA
	Symbol in label	The certificate label for Safety by TÜV SÜD.

1.2 Abbreviations Used in this Manual

Abbreviation	Designation
Gotion	Hefei Gotion High-Tech Power Energy Co., Ltd.
QC	Quality Control
BMS	Battery Management System
PCS	Power Conversion System
SOC	State of Charge
UPS	Uninterruptible Power Supply
BESS	Battery Energy Storage System
EMS	Energy Management System
PMU	Power Management Unit
CMU	Control Management Unit

1.3 General Safety Instructions

	• Danger: Batteries deliver electric power, resulting in burns or a fire hazard when they are short circuited, or wrongly installed. • Danger: Lethal voltages are present in the battery terminals and cables. Severe injuries or death may occur if you touch the cables and terminals.
	• Warning: Do not open or deform the battery module, otherwise the product will be out of warranty scope. • Warning: Whenever working on the battery, wear suitable personal protective equipment (PPE) such as rubber gloves, rubber boots and goggles. • Warning: Gotion HOME 2.0 system working temperature range:-20℃~45℃; Optimum temperature: 10℃~35℃. Out of the working temperature range may cause the battery system over / low temperature alarm or protection which will further lead to the cycle life reduction. It will affect the warranty terms as well. • Warning: For battery installation, the installer shall refer to local installation standard for operation.
	• Caution: Improper settings or maintenance can permanently damage the battery. • Caution: Incorrect inverter parameters will lead to a further faulty/damage to battery.

Caution:

1. It is very important and necessary to read the user manual carefully before installing or using the battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, or can damage battery, potentially rendering it inoperable.
2. If the battery is stored for long time, it is required to charge them every six months, and the SOC should be no less than 90%.
3. Battery needs to be recharged within 12 hours, after fully discharged.
4. Do not expose cable outside.
5. Do not remove the battery. As a result, the battery electrolyte may leak, which may result in a fire or explosion, and personal injury

1.4 Safety Instructions Before Connecting the Battery

Caution:

1. After unpacking, please check product and packing list first, if the product is damaged or lack of parts, please contact the local retailer.
2. Before installation, be sure to cut off the grid power and make sure the battery is in the switched-off mode.
3. Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device.
4. It is prohibited to connect the battery with AC power directly.
5. Battery system must be well grounded and the resistance must be less than 100mΩ.
6. Please ensure the electrical parameters of battery system are compatible to related equipment.
7. Keep the battery away from water and fire.

1.5 Safety Instructions in Using the Battery

Caution:

1. If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down in advance.
2. It is prohibited to connect the battery with different type of battery.
3. It is prohibited to put the batteries working with faulty or incompatible inverter.
4. It is prohibited to disassemble the battery (QC tab removed or damaged).
5. In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited.

2. System Introduction

2.1 Product Introduction

Gotion HOME 2.0 is a low voltage battery storage system based on lithium iron phosphate battery, which is one of the new energy storage products developed and produced by Gotion. It can be used to provide reliable power for various types of equipment and systems. Gotion HOME 2.0 enables multiple strings parallel operation feature, which provides tremendous flexibility in system design and configuration. Gotion HOME 2.0 is especially suitable for those application scenes which require flexible capacity extension, high power output, limited installation space, restricted load-bearing and long cycle life.

2.2 Specifications

NOTE: The above picture is just for reference. The quantity of the battery modules is based on your practical system.

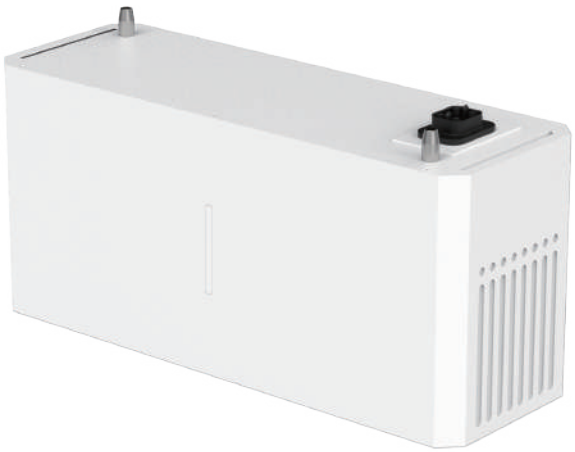
2.2.1 System Parameters

2.2.1.1 Single String System Parameters

Project	Parameter			
Type	HBD51.2 -02C05L	HBD51.2 -02C10L	HBD51.2 -02C15L	HBD51.2 -02C20L
Number of battery module	1	2	3	4
Nominal capacity	100Ah	200Ah	300Ah	400Ah
Nominal energy	5.12kWh	10.24kWh	15.36kWh	20.48kWh
Nominal voltage	51.2V			
Operating voltage range	43.2V-56.8V			
Maximum Charging Voltage	56.8V			
End of discharging Voltage	43.2V			
Nominal charge/ discharge current	50A	40A	60A	80A
Max charging current	50A(0~35℃) 20A(35~45℃)	100A(0~35℃) 40A(35~45℃)	100A(0~35℃) 60A(35~45℃)	100A(0~35℃) 80A(35~45℃)
Max discharging current	50A(0~35℃) 20A(35~45℃)	100A(0~35℃) 40A(35~45℃)	100A(0~35℃) 60A(35~45℃)	100A(0~35℃) 80A(35~45℃)
Max power output	2.5KW	5KW		
Standard charging method	Charge at the standard charging current until the voltage of any battery reaches 3.55V, stop charging, and let it stand for 30min.			
Charging operating temperature	0 ° C ~45 °C (When the battery temperature is lower than 5 ° C, the heating film opens to heat.)			
Discharging operating temperature	-20~45℃			
Humidity	5-95%			
IP Rating	IP65			
Salt mist rating	Severity Level 2			
Type of cooling	Natural cooling			
Altitude	< 3000m			
Dimension(W x D x H)	705±1×239±1 ×528±1mm	705±1×239±1 ×846±1mm	705±1×239±1 ×1164±1mm	705±1×239±1 ×1482±1mm
Weight	67±2kg	121±2kg	176±2kg	231±2kg
Communication	CAN、RS485			
Approval standards	IEC62619/IEC60730 /EMC/ IEC63056/UL1973/UL60730/UN38.3			

* In high(>45℃) or low temperature (<10℃) environment, the charging and discharging power of the battery system will be limited according to BMS operation logic.

2.2.2 Battery Module Specifications

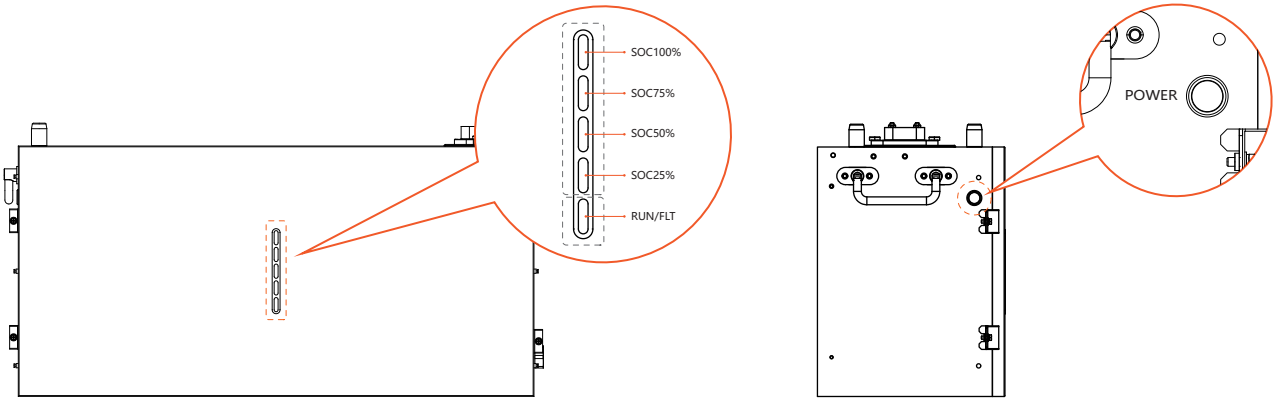


2.2.2.1 Battery Module Parameters

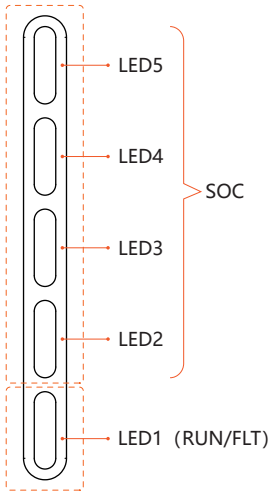
Project	Parameter
Type	HPD51.2-02C05
Cell Technology	Li-ion (LFP)
Battery Module Capacity	5.12kWh
Battery Module Voltage	51.2V
Battery Module Capacity	100Ah
Battery Module Serial Cell Quantity	16
Battery Cell Voltage	3.2V
Battery Cell Capacity	100Ah
Dimension (W*D*H)	705±1*239±1*318±1mm
Weight	53.7±2kg
Operation Temperature	-20~45℃
Storage Temperature	-20~60℃
Transfer Certificate	UN38.3

* In high(>45℃) or low temperature (<10℃) environment, the charging and discharging power of the battery system will be limited according to BMS operation logic.

2.2.2.2 Battery Module Display Panel



Indicator light

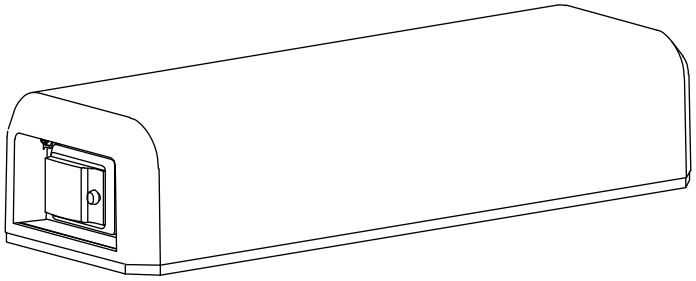
Functional region	State	Instructions
	SOC (LED2-LED5)	“SOC” battery indicator is white. LED2：25%SOC；LED3：50%SOC；LED4：75%SOC；LED5：100%SOC；
	RUN (LED1)	The running indicator is steady on, ”RUN”indicator is white. ”FLT” light off
	FLT (LED1)	When the system is faulty, the fault light is on and the running indicator is off.“FLT”indicator is red.
	Power on self test	The visual effect is a bright spot moving up and down in the display area led2-led5, and so on. During this process, the running indicator blinks every 200ms.
	Charge/discharge state	The running indicator is steady on; The SOC indicator is normally displayed based on the power level, and the indicator with the highest power level blinks every 500ms
	Holding state	The running indicator is steady on; The SOC indicator is normally steady on according to the power level. The indicator with the highest power level is steady on and does not blink.

Power button

Button	Action	
	Short Press	Tap to turn on the BMS control panel power supply. the battery module self-test, led2-led5 flashes repeatedly. After the self-test is completed, the corresponding SOC power indicator is displayed, and the relay is disconnected.

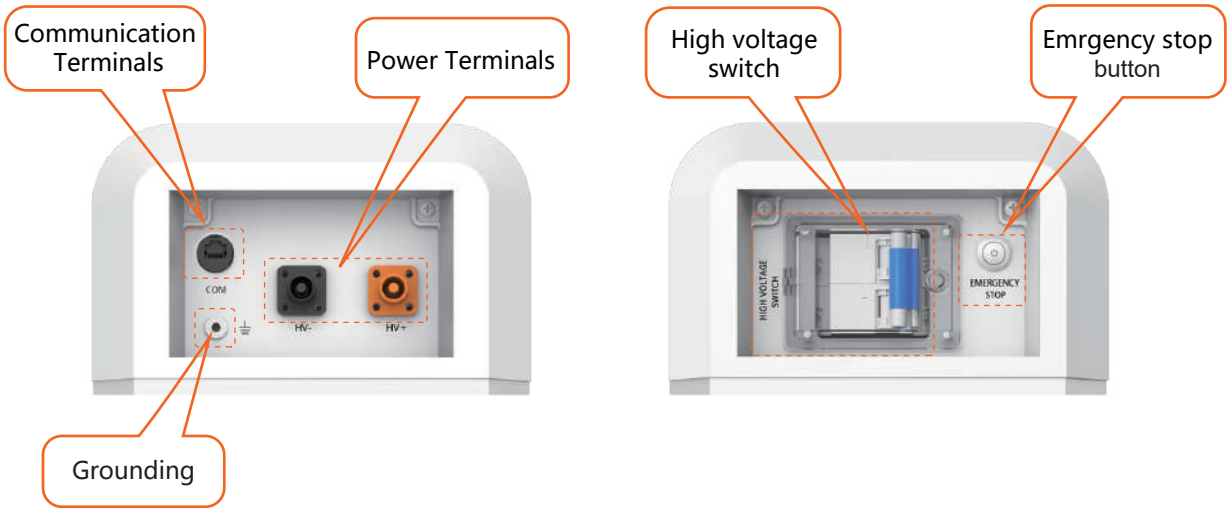
2.2.3 Integrated top cover specifications

2.2.3.1 Integrated top cover Parameters



Project	Parameter
Type	HHD51.2-02C05
System Operation Voltage(VDC)	43.2-56.8
Charge Current(Amps, Max)	100
Discharge Current(Amps, Max)	100
Dimension (W*D*H, mm)	705±1*239±1*150±1mm
Weight (kg)	9.16±1
Communication Protocol	CAN/RS485
Operation Temperature	-20~45℃
Storage Temperature	-20~60℃

2.2.3.2 Integrated top cover interface panel



High voltage switch (under the protection cover)

ON: High voltage switch ON, able to turn on battery system by Emrgency stop button.

OFF: High voltage switch OFF, able to turn off system completely, no power output.

Caution:

If the power switch is tripped off due to over current or short circuit, be sure to wait more than 30mins, then you can turn it on again; otherwise it may cause damage to the switch.
NOTE: After using the power switch, lock the

Emrgency stop button

Caution:

Start button: Press the button for less than 1 secs to close the relay and turn on the battery system.
Multiple battery modules are connected in parallel, and the top battery module is the main control module. Press the power switch of the battery module from the bottom up, and the battery module enters the self-test.High voltage switch ON, able to turn on battery system by Emrgency stop button.

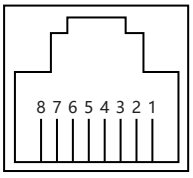
Communication Terminals (RS485 / CAN)

CAN Communication Terminal: (RJ45 port) follows CAN protocol, for communication between battery system and inverter.
RS485 Communication Terminal: (RJ45 port) follows MODBUS 485 protocol, for communication between battery system and inverter.

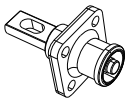
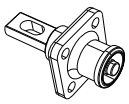
Definitions of RJ45 Port PIN

NO	CAN	RS485
1	----	RS485-A
2	----	RS485-B
3	----	----
4	CAN-H	----
5	CAN-L	----
6	----	----
7	----	----
8	----	----

RJ45 Port



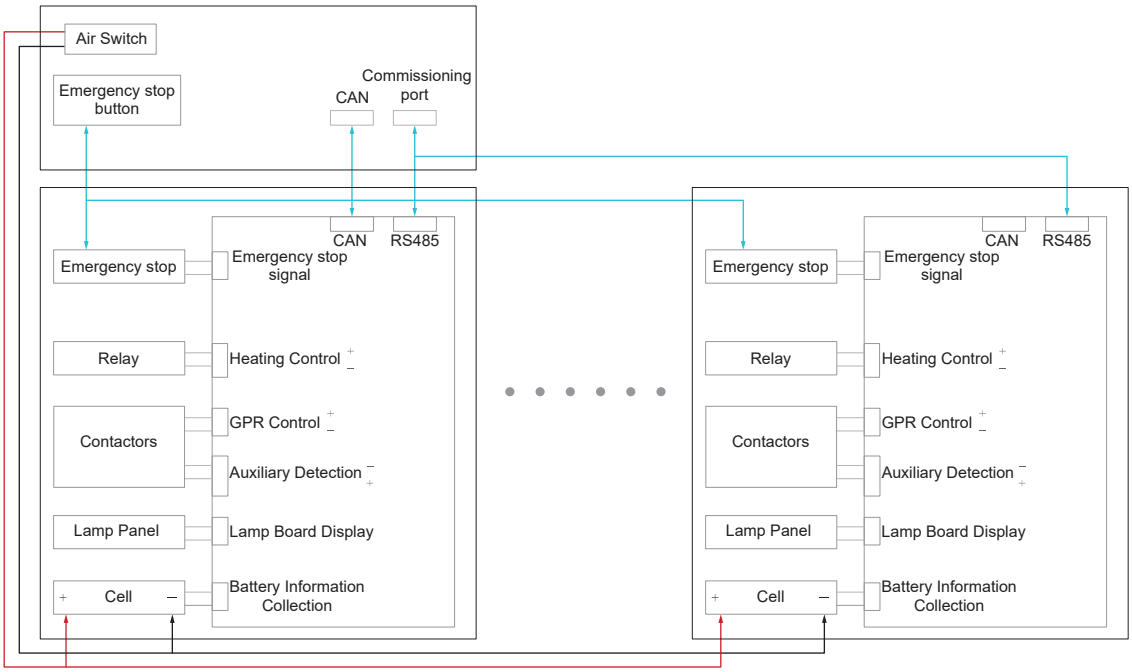
Power Terminals

Diagram	Connector	Colour	Explain
	HV+	Orange	The positive terminal of the battery system is connected to the PCS.
	HV-	Black	The negative terminal of the battery system is connected to the PCS.

Caution:

Beware of reversing the wiring harness between the positive and negative terminals, which may cause system faults or security risks.

2.3 System Diagram



3. Installation

3.1 Tools

The following tools are required to install the battery pack:

 Wire Cutter	 Crimping Modular Plier	 Cable Ties
 Sleeve Piece	 Electric Screw Driver	 600VDC Multimeter
 Adjustable Wrench	 Screw Driver Set	

NOTE

Use properly insulated tools to prevent accidental electric shock or short circuits.

If insulated tools are not available, cover the entire exposed metal surfaces with available insulated alternatives, except their tips, with electrical tape.

3.2 Safety Gear

It is recommended to wear the following safety gear when dealing with the battery pack.

Insulated gloves

Safety goggles

Safety shoes

3.3 System Working Environment Checking

3.3.1 Cleaning

Danger: Before installation and system power on, the dust and iron scurf must be removed to keep a clean environment.

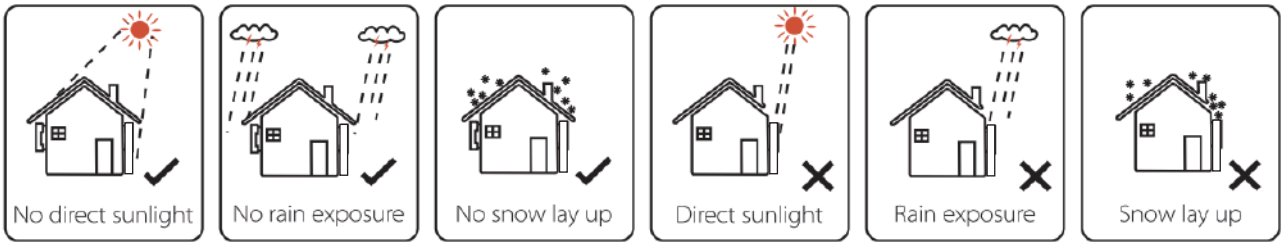
The system cannot be installed in desert area without an enclosure to prevent from sand.

Danger: Battery module has active DC power at terminals all the time. Be careful to handle the modules.

3.3.2 Temperature

Gotion HOME2.0 system working temperature range: -20℃~45℃; Optimum temperature: 10℃~35℃.There are no mandatory ventilation requirements for battery module, but please avoid of installation in confined area. The aeration shall avoid high salinity, humidity or temperature.

Caution: The IP rating of Gotion HOME2.0 system is IP65. But please avoid frost or direct sunlight. Out of the working temperature range will cause the battery system high / low temperature alarm or protection which will further lead to the cycle life reduction. According to the environment requirements, a cooling system or heating system should be installed when necessary.



3.3.3 Fire-extinguisher System

Danger: Fire-extinguisher system must be equipped for safety purpose.

The fire system needs to be checked regularly to ensure a normal working status. Regarding to the using and maintenance requirements, please follow local fire equipment guidance.

3.3.4 Grounding System

Danger: Before the battery installation, make sure the grounding point of the installation site is stable and reliable. If the battery system is installed in an independent equipment cabin (e.g. container), the grounding of the cabin must be stable and reliable.

The resistance of the grounding system must be ≤100mΩ

3.3.5 Clearance

Minimum clearance to heat source shall be more than 2 meters.

Minimum clearance between battery strings shall be more than 0.4 meters.

3.4 Handling and Placement

Warning: The battery system power terminals has DC voltage. It must be installed in a restricted access area;

Warning: Gotion HOME2.0 is a low voltage DC system, operated by qualified and authorized personnel only.

3.4.1 Handling and placement of the battery module

Warning: Single battery module is 53.7kg. The battery module must be handled by more than 2 personnel if there're no handling tools.

3.4.2 Handling and placement of the base

The weight of the base is light, which a single person can handle with.

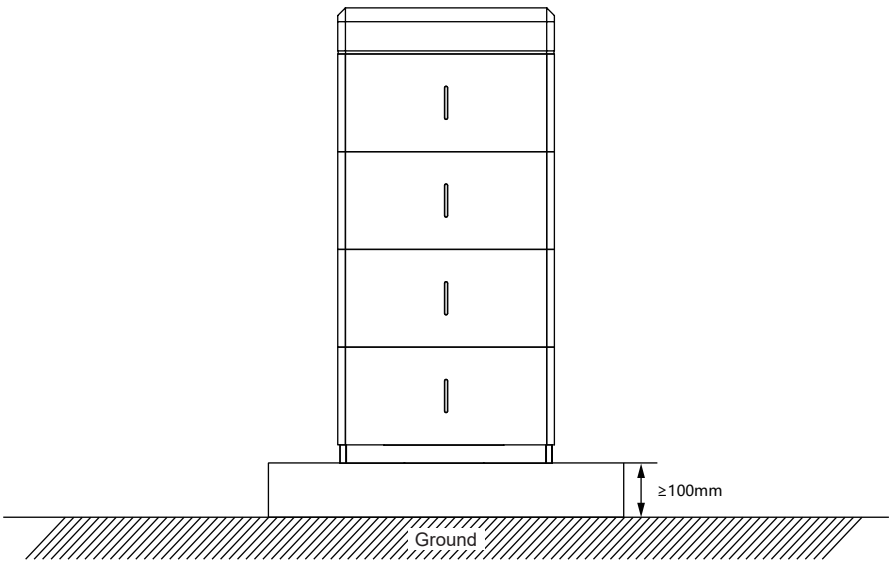
3.4.3 Requirements of installation site

A. Gotion HOME2.0 system working temperature range: -20℃~45℃; Optimum temperature: 10℃~35℃. Do not expose the battery system to direct sun light. It is suggested to build sunshade equipment. In cold area a heating system is required.

B. Gotion HOME2.0 system must not be immersed in water. The battery base cannot be exposed to rain or other water sources. As a suggestion, the base's height shall be ≥ 100mm above the ground.

C. The support surface should have sufficient load capacity to support the weight of whole battery system (100~300kg).

D. Gotion HOME2.0 system bust be installed on a fixed and flat support surface.



NOTE, The above illustration is just for reference. The quantity of the battery modules is based on your practical system.

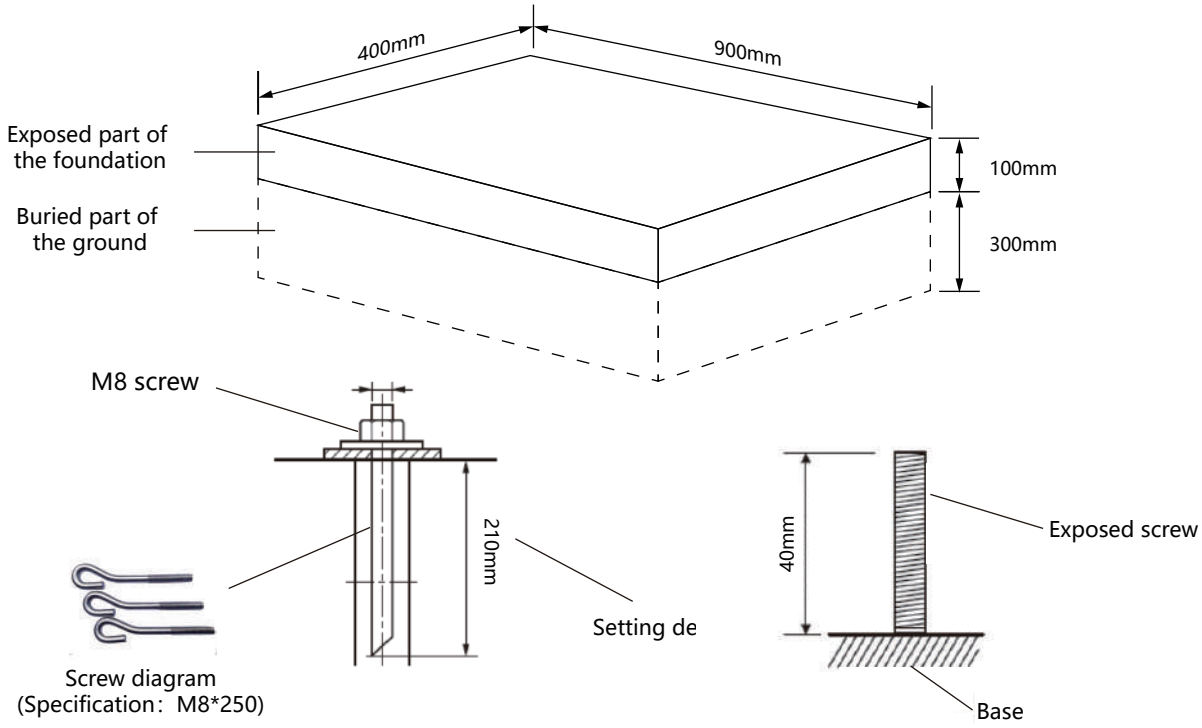
3.4.4 Packing List

Battery module packing		
Item	Description	Quantity
1	HPD51.2-05C05 battery module	1
2	Battery module left side trim	1
3	Battery module right side trim	1
Integrated top cover packing		
1	HHD51.2-02C05 Integrated top cover	1
2	Base (691*236*60 mm)	1
3	2M black external communication cable (RJ45)	1
4	2M HV+ orange external power cable	1
5	2M HV- black external power cable	1
6	2M Orange grounding cable	1
7	Locating pin for battay pack	8
8	Connecting fixture for battery module	8
9	Connecting fixture for wall	2
10	M4 screws for fixing locating pin	8
11	M4 screws for fixing the decorating parts	16
12	M5 screws for fixing between battery module	32
13	M5 screws for fixing battery module and wall	2
14	M6 expansion bolts	2
15	Product Manual	1
16	Warranty card	1

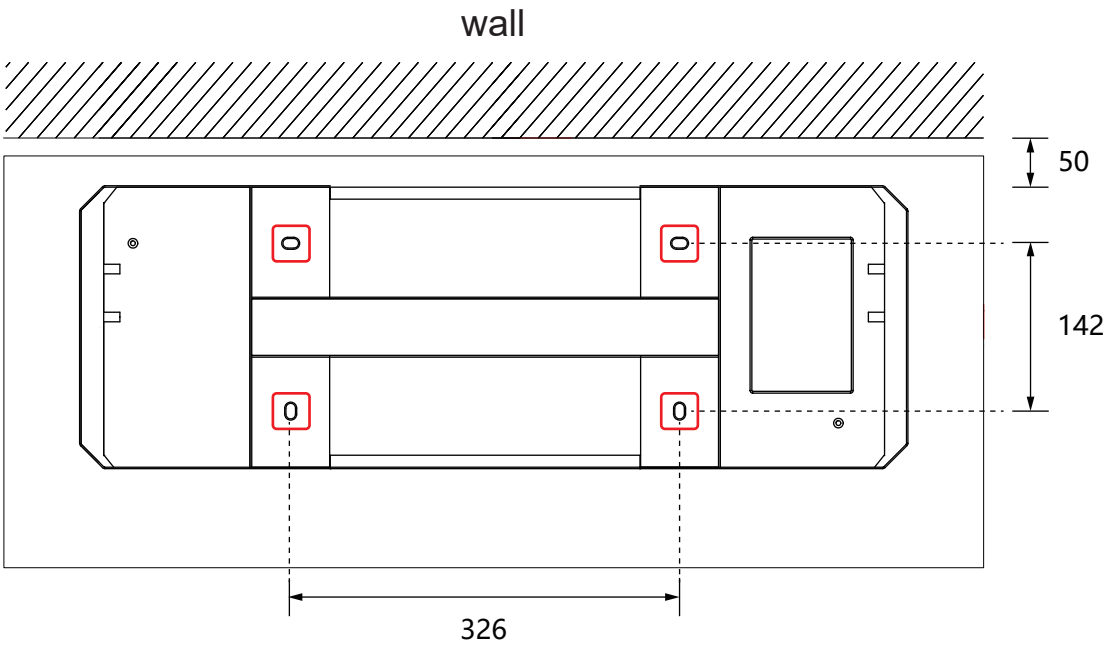
NOTE: No additional kits are needed for Gotion HOME 2.0 installation.

3.4.5 Mounting and Installation of the Battery Rack Basement

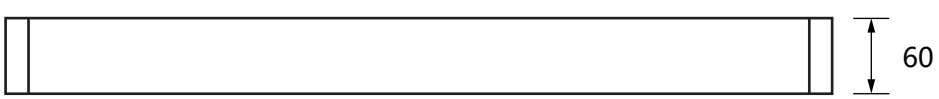
3.4.5.1 Build the foundation in advance



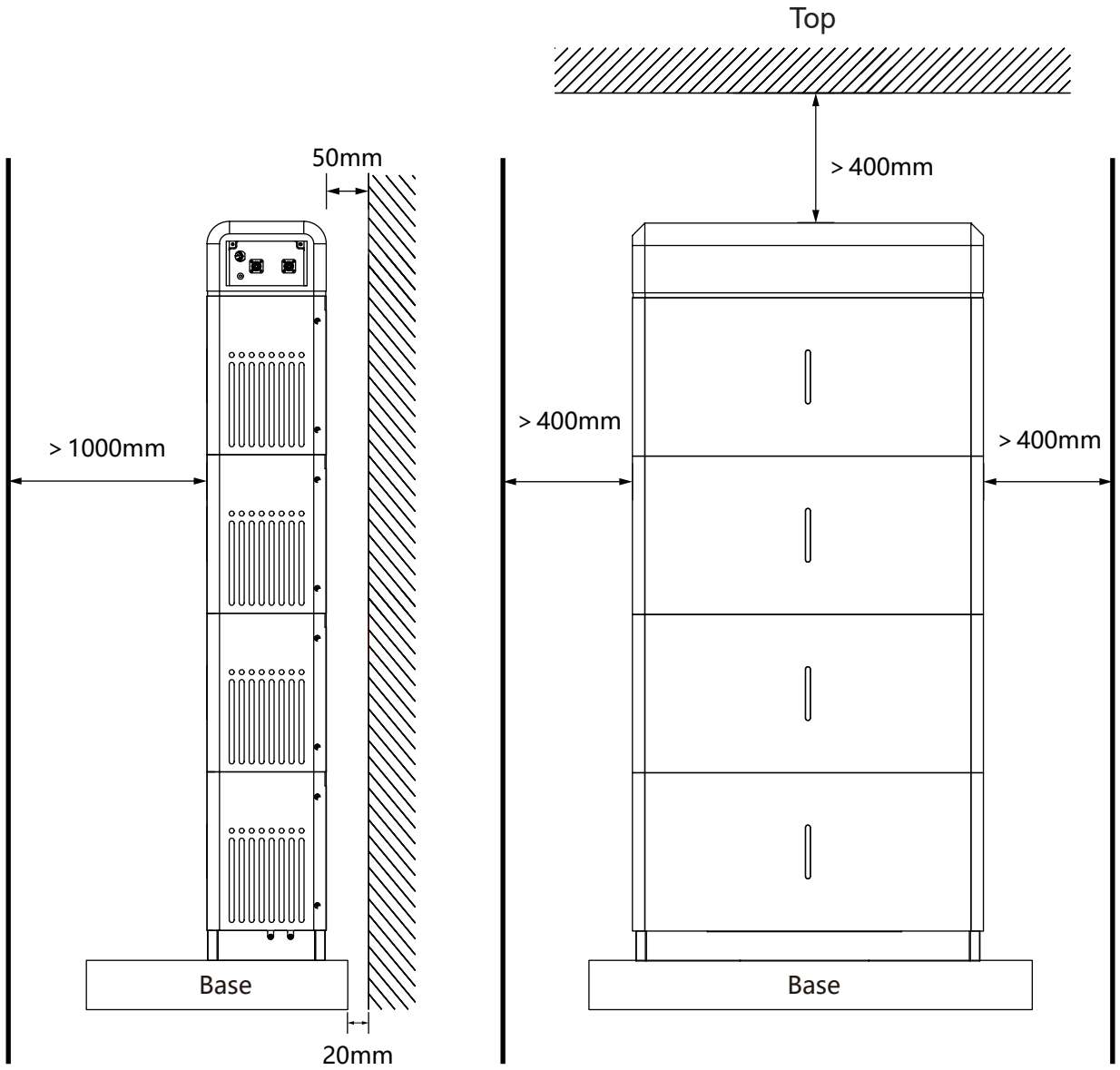
3.4.5.2 The base must be fixed securely on the support surface with 4pcs M8×60 expansion bolts.



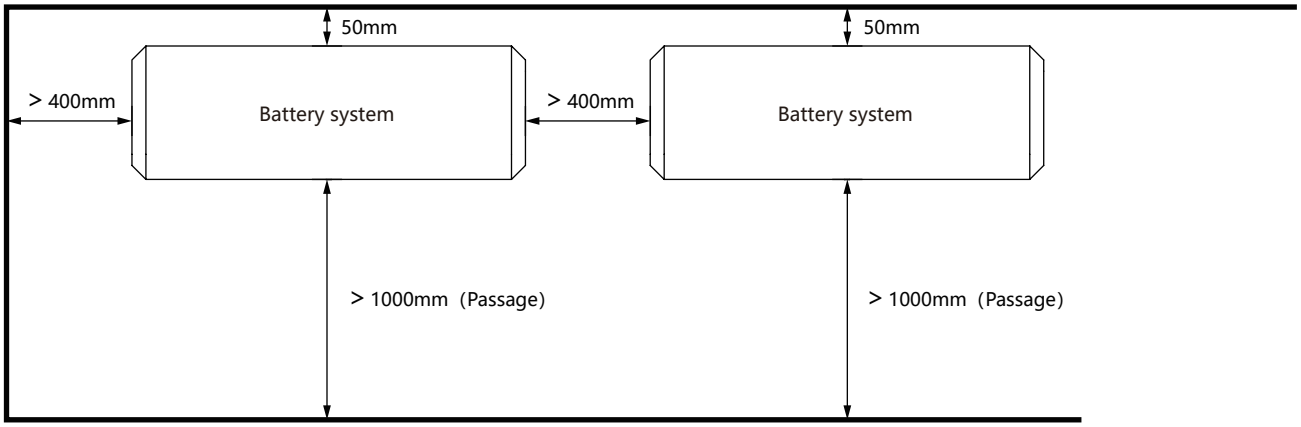
Battery rack base holes' (circled in red) bitmap (unit: mm)



Battery rack basement bitmap (unit: mm)



Installation position diagram



Parallel installation diagram

NOTE: Minimum system installation volume 42m³

3.4.6 Installation of the Battery Module onto the Base

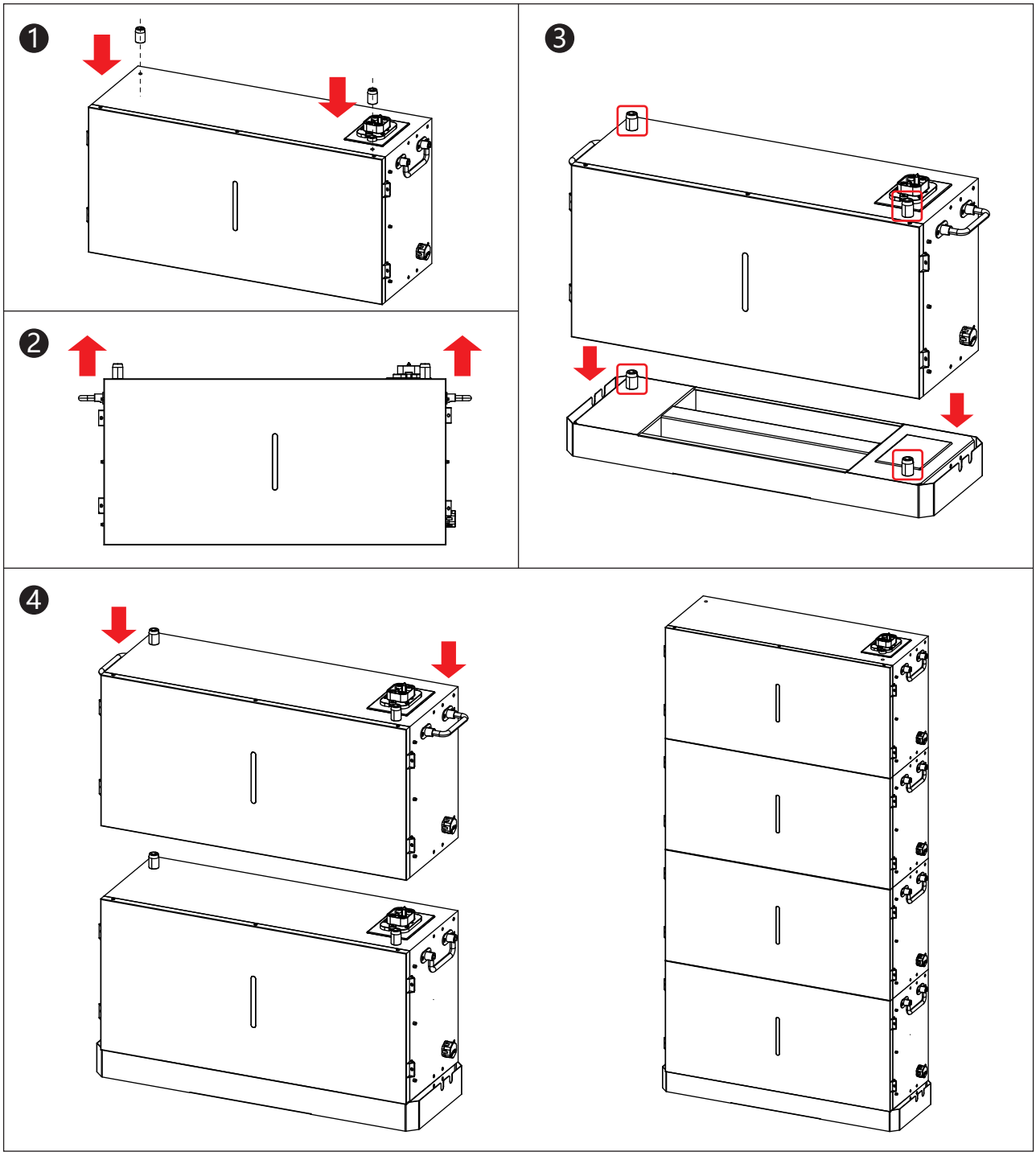
Warning: Single battery module is 53.7kg. The battery module must be handled by more than 2 personnel if there're no handling tools.

1.Secure the positioning pins to the battery pack and base using M4 screws.

2.Lift the two handles on the battery module as blow, making sure the battery not tilting to one side.

3.Adjust to keep the Locating pin of the battery (circled in red) align with the Locating pin of the base (circled in red). Slowly put down the battery, fitting it properly onto the base.

4.Continue to install the left battery modules one by one onto the existing battery.

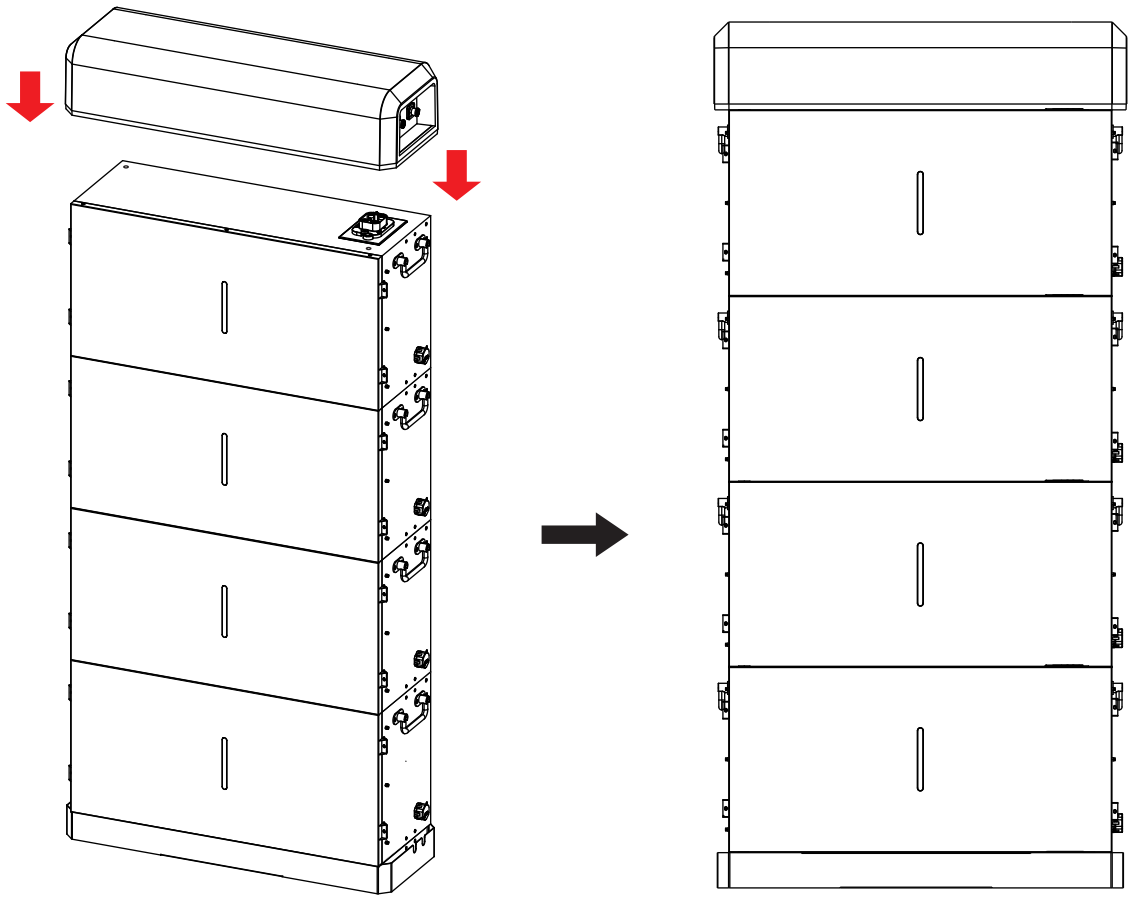


NOTE: Max. 4 battery modules to be installed in one system.

3.4.7 Battery Modules and Integrated top cover Pile up

Danger: When Battery Modules and Integrated top cover Pile up, Ensure that the power button on each battery module is turned off.

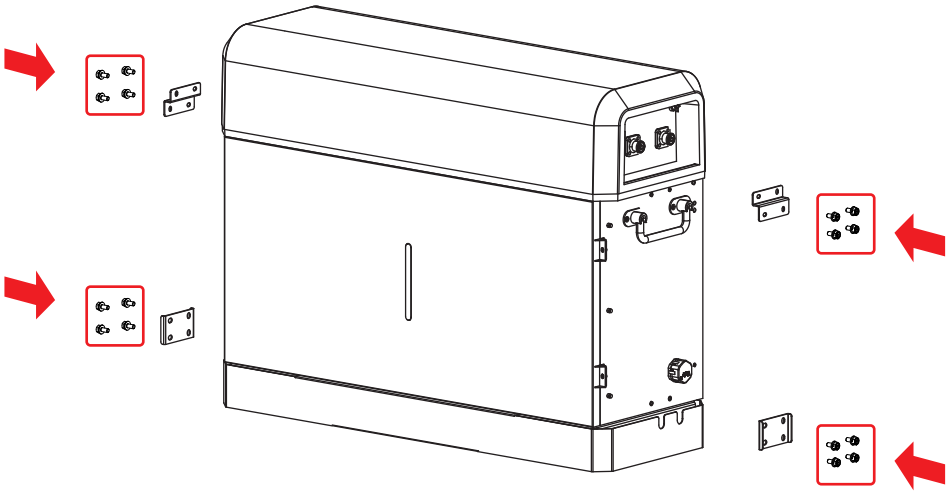
1. After installation of the Integrated top cover, adjusting to make its connector align with the connector of the battery module.
2. Slowly place down the Integrated top cover on the installed battery module.



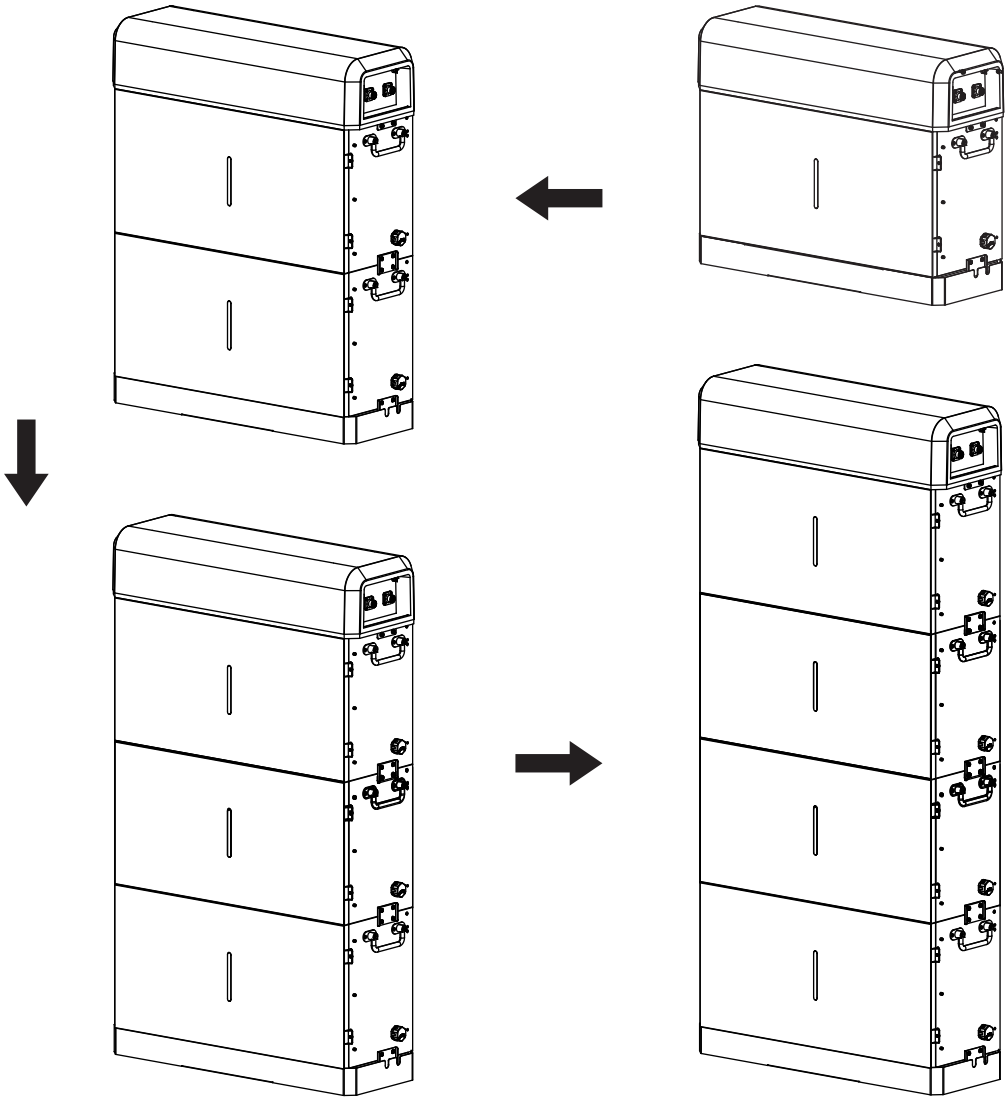
NOTE: The above picture is just for reference. The quantity of the battery modules is based on your practical system.

3.4.8 Installation of the Metal Connecting Fixture for the System

In Integrated top cover's package, there are 8pcs metal connecting fixture.With 8*M5 screw fix these metal connecting fixture at both flanks sides of the battery modules (see the illustration on the below).

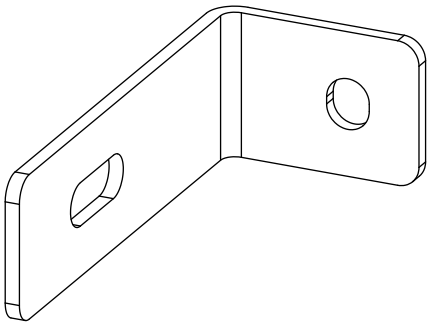


Please follow the illustrations below to install the metal connecting fixture for your practical system.



3.4.9 Installation of the Anti-Toppling Brackets for the System

Gotion HOME2.0 system is equipped with two anti-toppling brackets as follows.



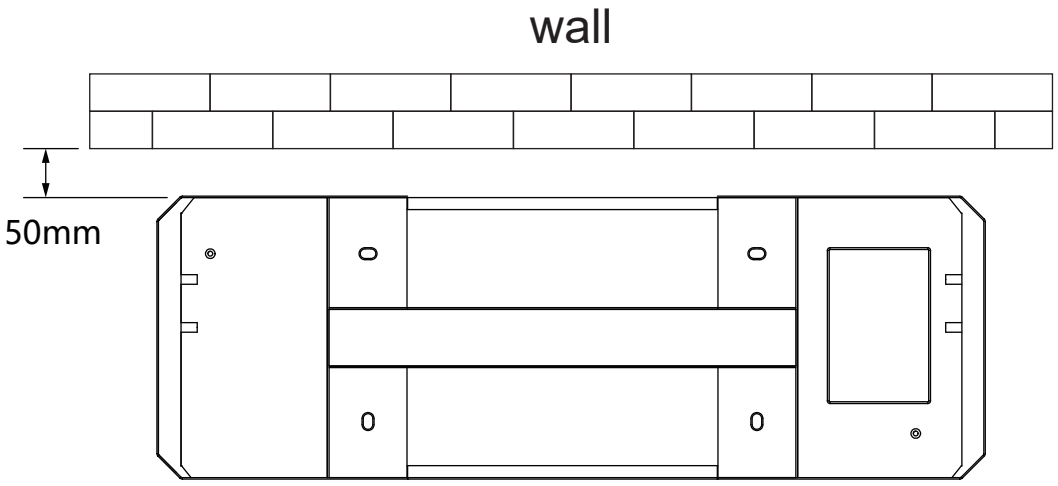
Such brackets act as an alternative of ground mounting of the battery system. Customers can choose either of the following methods for the system installation:

- ground mounting with 4*M8 expansion bolt to the support surface (see section 3.4.5).
- bracket mounting with 2*M6 expansion bolt to the wall (Battery system still needs to be placed on the support surface for supporting the overall weight.)

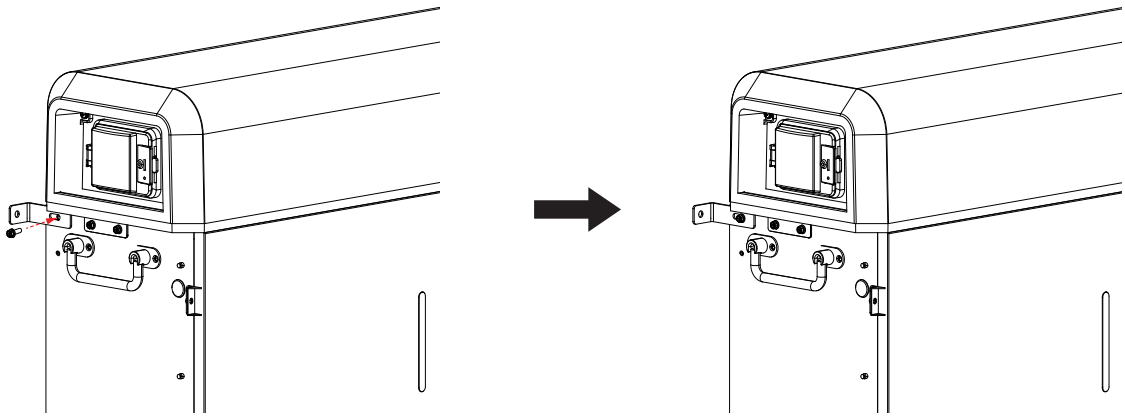
As long as the installation area meets the requirement of the installation site (see section 3.4.3), in either case the installation stability is guaranteed.

The detailed installation process with such brackets are as follows:

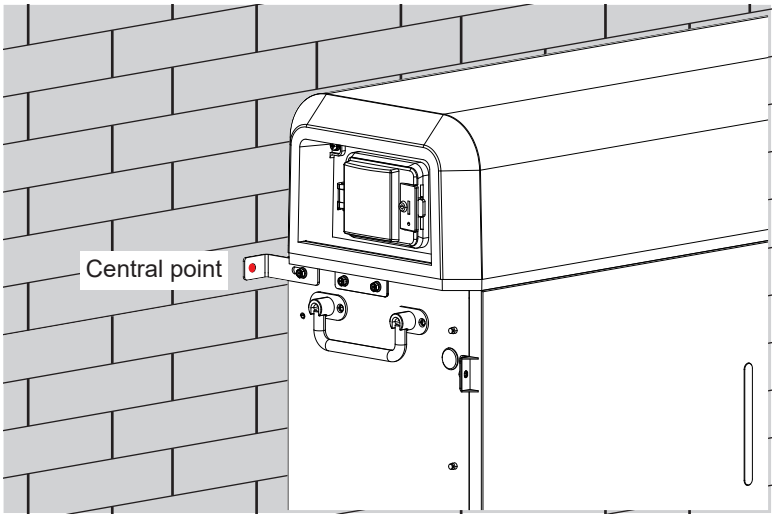
1. Put the base along the wall and reserve 50mm distance between back of the base and the wall.



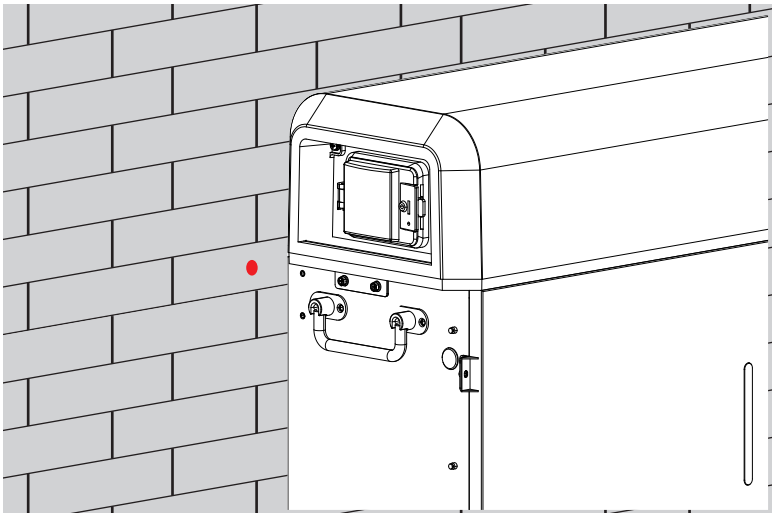
2. Follow the illustrations below, firstly fit the anti-toppling brackets on back sides of the battery module, then use M5 screws to fix.



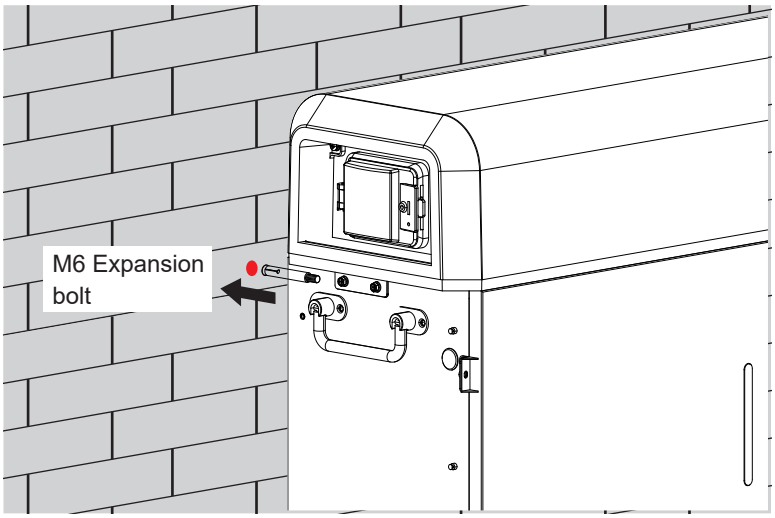
3. Mark the central points of the slotted holes at both sides on the wall.



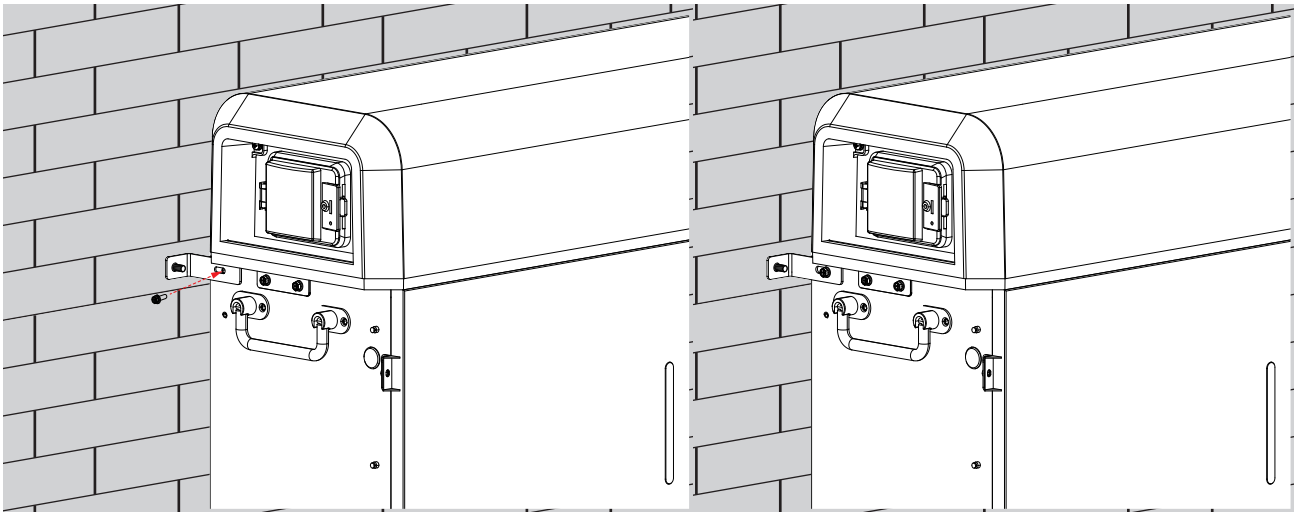
4. Dismantle the brackets on both sides. Aligning the central points, drill two holes (≥60mm depth) in the wall with a drilling tool, and clean the holes.



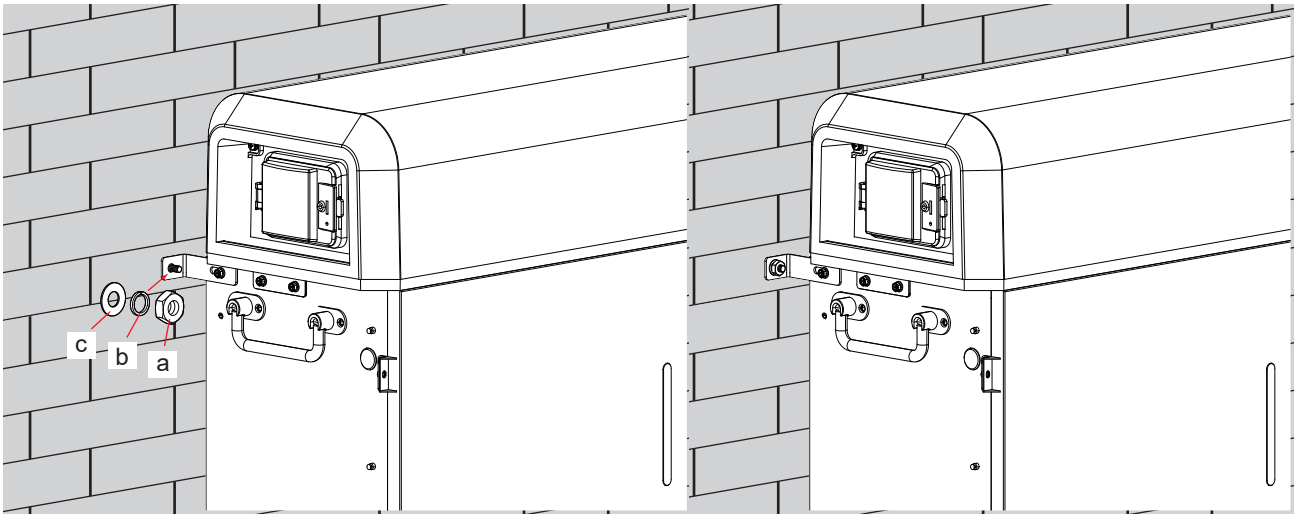
5. Embed the two M6 expansion bolts into the holes respectively.



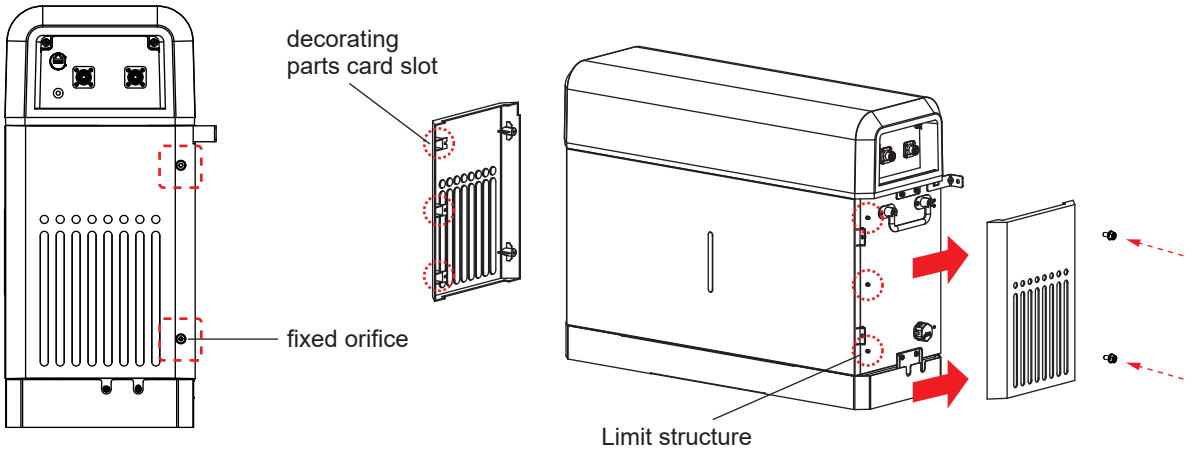
6. Fit the brackets across the M6 expansion bolts on both sides, then fix the brackets on the Integrated top cover with M5 screws.



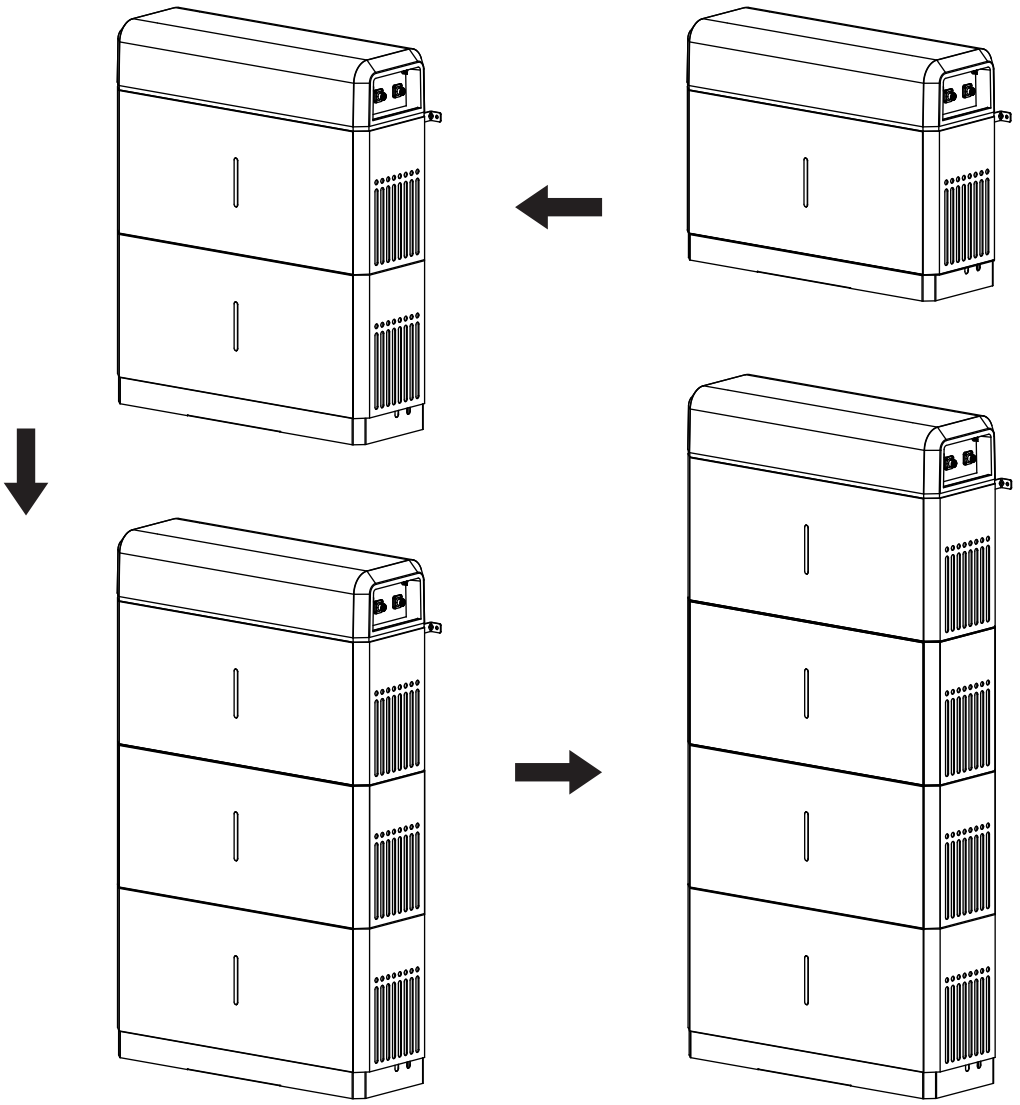
7. Fix the M6 nut (a) across the 8mm flat gasket (c) and spring washer (b), with 8~10N.m torque. Repeat this step for the other bracket.



8. In battery module's package, there are 2pcs the decorating parts.With 4*M4 screw fix these decorating parts on both sides of the battery modules (see the illustration on the below).
NOTE:push the trim card slot into the limit column from front to back to fix it.



Please follow the illustrations below to install the decorating parts for your practical system.



3.5 Cables Connection

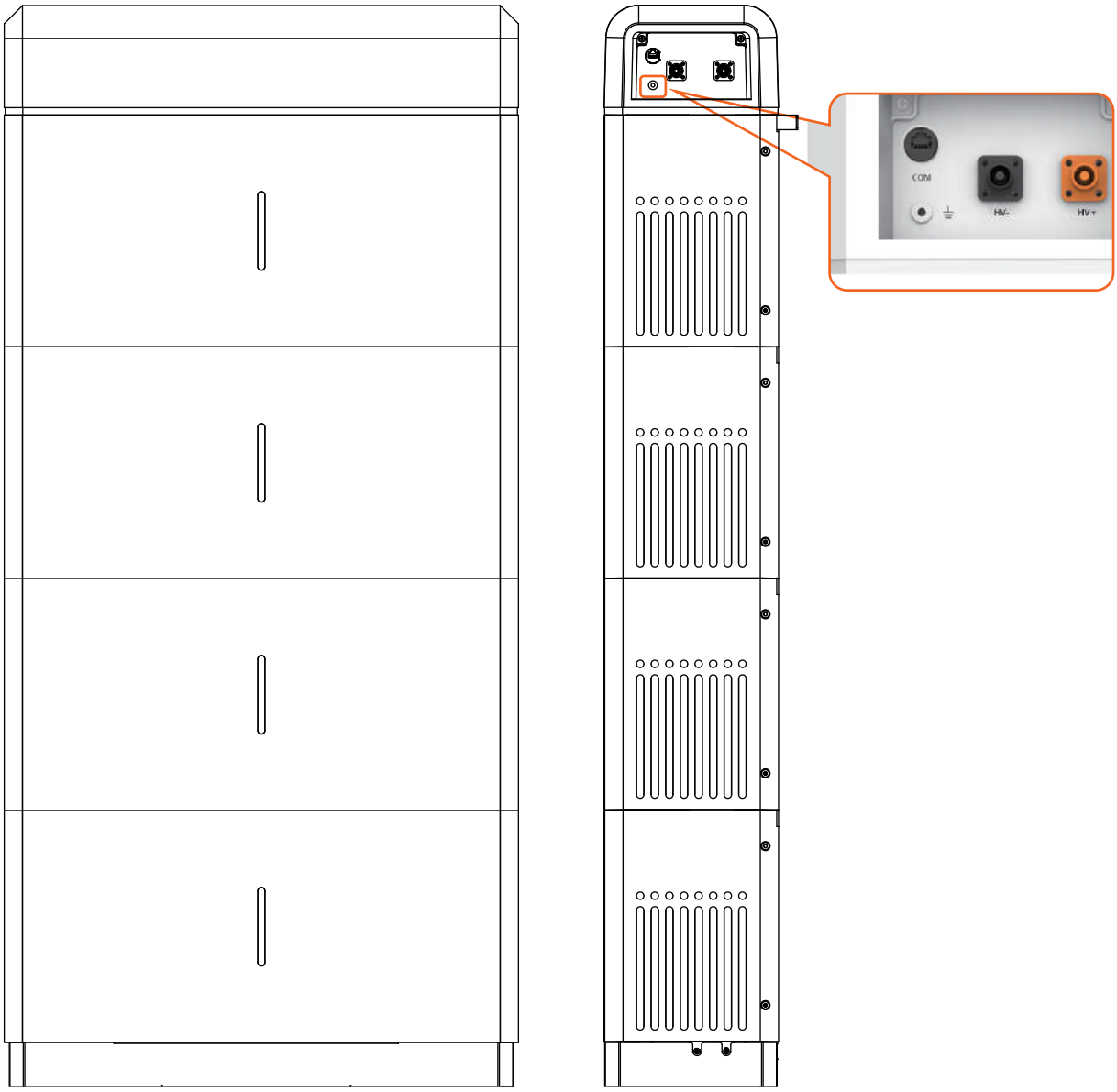
Danger: The battery system is low voltage DC system. Make sure the grounding is fixed and reliable.

Danger: No short circuit or reverse connection of the battery system's positive and negative ports.

Caution: Wrong communication cables connection will cause the battery system failure.

3.5.1 Grounding

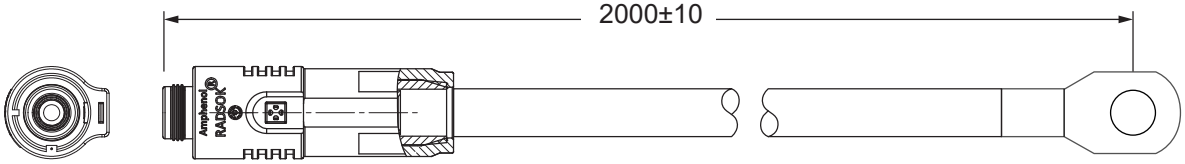
Warning: The Gotion HOME 2.0 modules has 1 grounding points a follows.
Grounding cable must be≥10AWG. The cable shall be copper with yellow-green color.



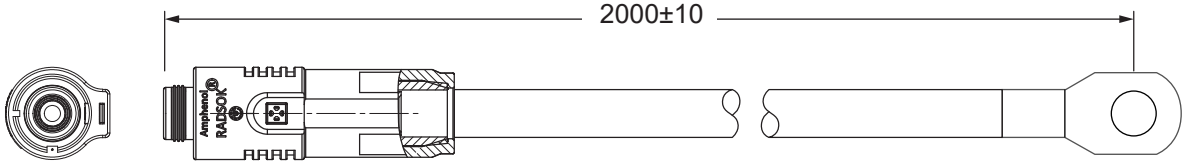
3.5.2 Cables

NOTE: Communication cable uses RJ45 connector and water-proof cover(M19-RJ45) matched with controller connection port.

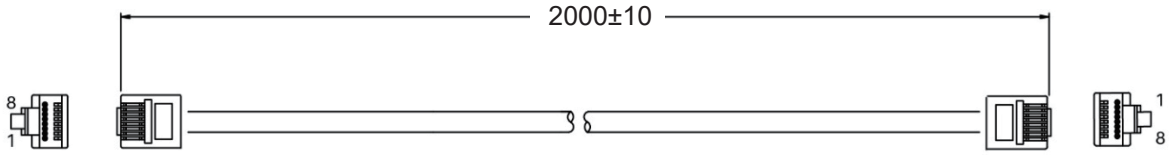
1. HV+ orange external power cable



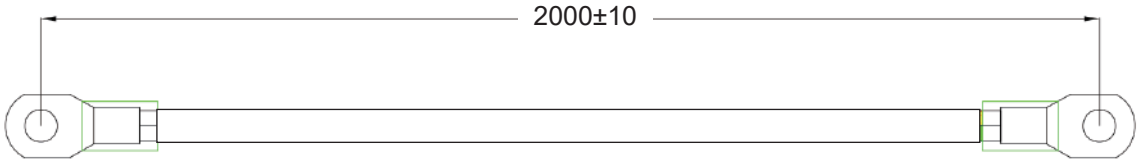
2. HV- black external power cable



3. Black external communication cable (RJ45)



4. Orange grounding cable

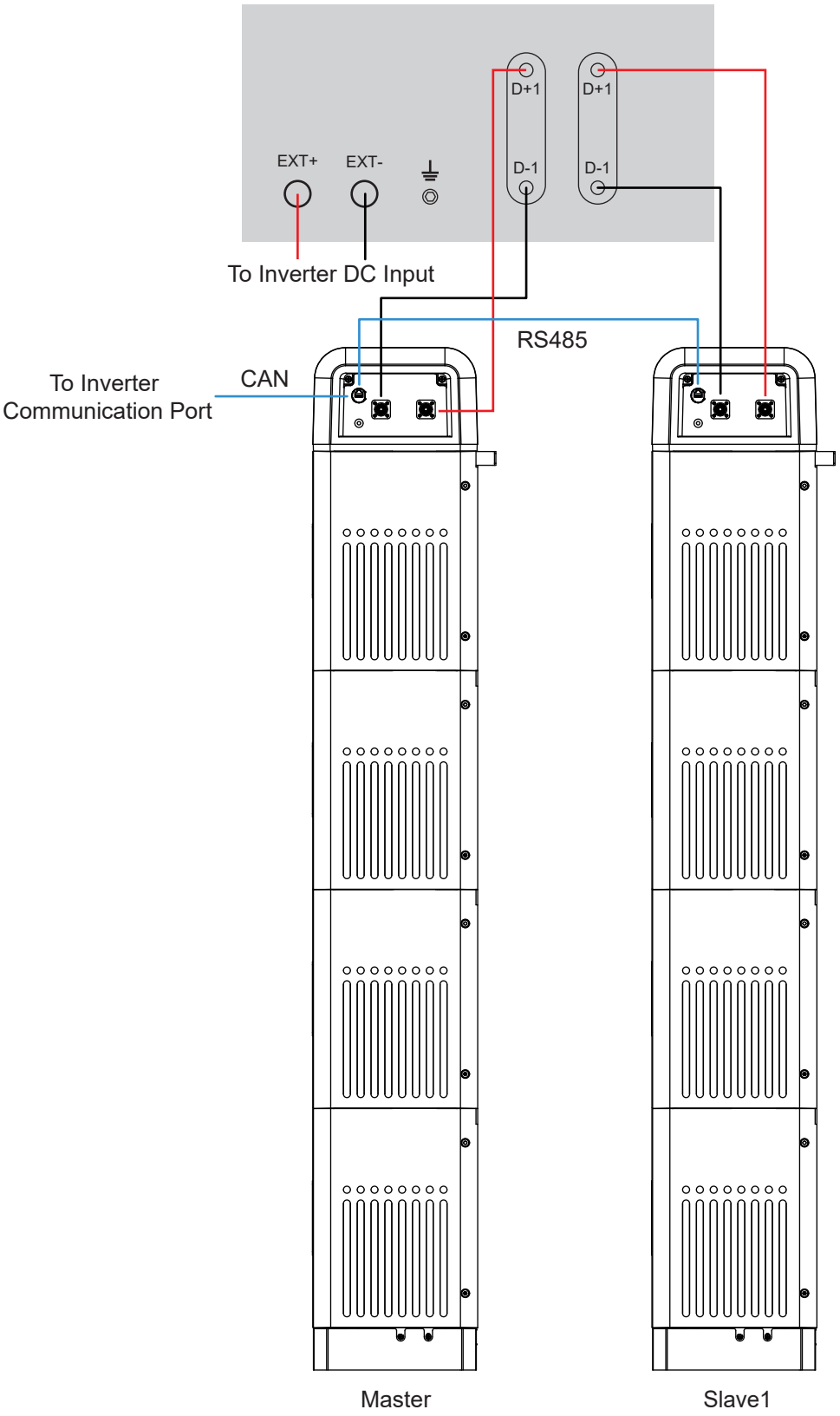


3.5.3 Multi-strings' Battery Wiring Diagram

3.5.3.1 Electrical Wiring

Wiring diagram of 2 strings` system

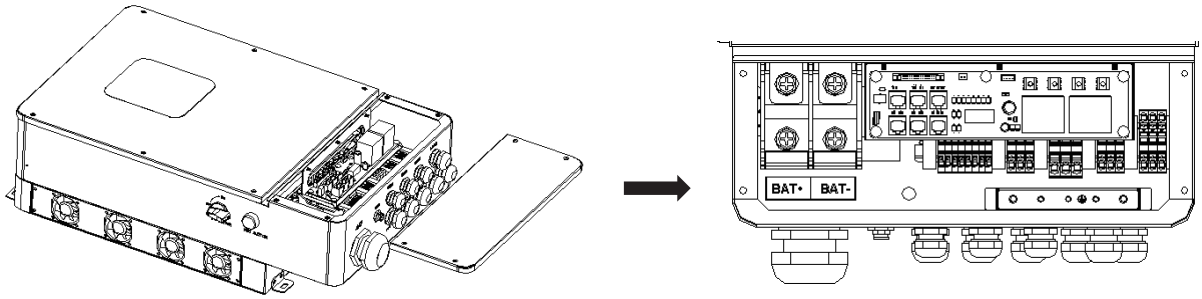
It`s suggested to use Combiner box for up to 2 battery systems(20kwh) in parallel.



NOTE: Make sure to have the D+ & D- plugs into the combiner box properly.

3.5.4 Inverter Connection

Remove the cover screws by Allen Wrench and remove the cover. Remove the waterproof cover by a flat blade screwdriver. Wiring box conduit plugs, Conduit plugs are provided for 1 inch conduit fittings. If used conduit fitting is not 1 inch, an appropriate conduit adaptor should be used.



NOTE:Pass the corresponding conduit and fasten the joint.

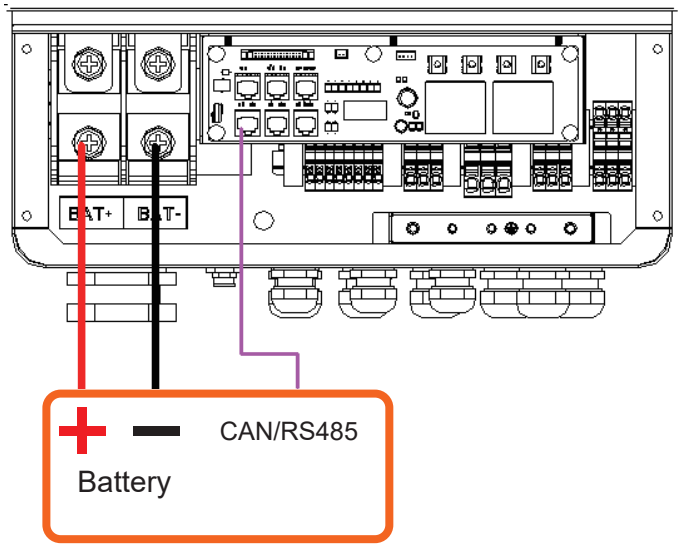
Charging & discharging system of Hybrid series inverter is designed for 48V lithium battery. Before choosing battery, please note the maximum voltage of battery cannot exceed 60V and the battery communication should be compatible with Hybrid inverter.

Battery breaker

Before connecting to battery, please install a no-polarized DC breaker to make sure inverter can be securely disconnected during maintenance.

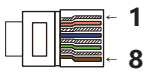
Model	R5KLNA	R6KLNA	R7K6LNA	R8KLNA	R10KLNA
Current[A]	160A		250A		300A

Inverter connection diagram



3.5.5 BMS PIN Definition

Communication interface between inverter and battery is RS485 or CAN with a RJ45 connector.



	PIN	1	2	3	4	5	6	7	8
CAN	Definition	X	X	X	BMS_CANH	BMS_CANL	X	X	X
RS485	Definition	X	X	X	X	X	GND	BMS_485A	BMS_485B

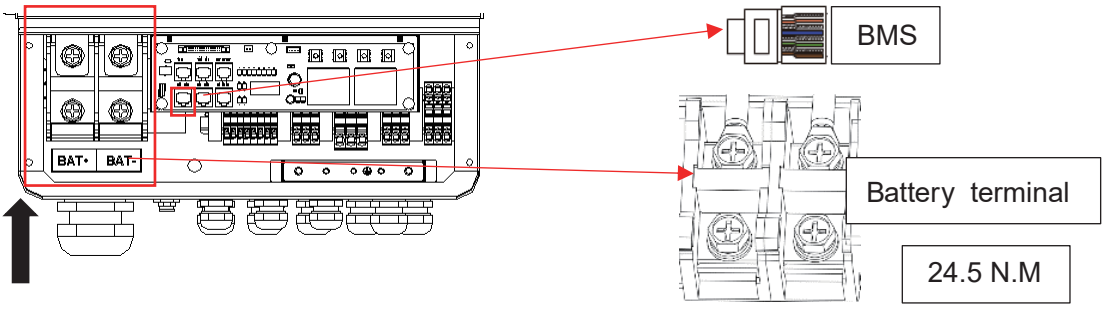
NOTE: When using RS485 protocol, please note that PIN2 must be disconnected!

Caution: The battery communication can only work when the battery BMS is compatible with the inverter.

Power Connection Battery:

Choose the 1 AWG wire and strip the cable to 15mm. Select two O-terminals with an aperture of M10. Insert the stripping line into the O-terminal and clamp it with a crimping clamp.

Cross the battery cable although the battery port. Connect battery cable to battery terminal



NOTE: Positive and negative wires are not allowed to reverse.

4. Operation

4.1 System Power On

4.1.1 Single String System Power On

Warning: Double check all the power cables and communication cables. Make sure the voltage of the inverter/PCS matches the voltage of the battery system. Check to make sure all the power switches are OFF.

System Power On Procedure:

1. Check the grounding is connected.
2. Check all the cables are connected correctly.
3. If necessary, turn on the switch for battery on the inverter or the switch between inverter and battery system. If possible, turn on AC or PV power source to wake up the inverter.
4. Turn on the power switches on the side of the battery module from the bottom up.Battery takes 10-30s for self-checking.
5. Open the protection cover of “High Voltage Switch” on the Integrated top cover. And turn on High Voltage Switch.
6. Finally, press the “START/STOP Button”, the battery module relay closes, and the system can output normally.

If the inverter is powered by AC or PV source, most types inverters can set up communication with battery system automatically, in this case, the battery system will close relay and system is ready for work.

Caution: If the breaker is tripped off due to over current or short circuit, be sure to wait more than 30mins, then it can be turned on again; otherwise it may cause damage to the breaker.

Warning: If there is any failure during the self-check process, be sure to debug the failure prior to next step. If the “RUN/FLT” LED shows red from the beginning, it means there is failure in the battery string. In this case,need troubleshoot the fault first.

Caution: During the first time starting, the system requires full charge process for SOC calibration purpose.

Caution: After long time storage without charging, it is suggested to fully charge the whole Battery Energy Storage System (BESS) prior to installation. Depending on the SOC level, regularly every 6 months’ full charge is requested during continuous operation as well. it will be handled automatically by the communication between BESS and external device.

4.1.2 Multi-strings System Power On

Warning: Double check all the power cables and communication cables. Make sure the voltage of the inverter/PCS matches the voltage of the battery system. Check to make sure all the power switches are OFF.

System Power On Procedure:

1. Check the grounding is connected.
2. Check all cables are connected correctly, especially the comunication line between master and slave strings.
3. If necessary, turn on the switch for battery on the inverter or the switch between inverter and battery system. If possible, turn on AC or PV power source to wake up the inverter.
4. Turn on the power switches on the side of the battery module from the bottom up.Battery takes 10-30s for self-checking.
5. Open the protection cover of “High Voltage Switch” on the Integrated top cover. And turn on High Voltage Switch.
6. Finally, press the “START/STOP Button”, the battery module relay closes, and the system can output normally.

If the inverter is powered by AC or PV source, most types inverters can set up communication with battery system automatically, in this case, the battery system will close relay and system is ready for work.

4.2 System Power Off

Danger: When any failure occurs or there is a need for service, the battery storage system must be powered off at first.

System Power Off Procedure:

1. Turn off inverter or power supply on DC side.
2. Turn off the switch between PCS and battery system.
3. Turn off the “START/STOP Button” of the all BMSs.

Caution: Before replace the battery module for service, make sure to charge/discharge the existing battery module voltage similar to the replaced one. Otherwise the system needs long time to do balance for this replaced battery module.

Caution: When restart is required for any troubleshooting steps, make sure to restart the entire system (every BMS within the system). Please do not only restart partially of the BMS within the system, which will further lead to error.

5. System Debug

This system debug is for BESS

(Battery Energy Storage System). BESS debug can’t be performed alone. It must be operated with configured inverter, UPS, PCS and EMS system together.

Debug Step	Instructions
Preparations for debug.	Turn on the BESS, referring to Section 4. It is NOT ALLOWED to turn on the load before turning on the whole BESS. Remark: Except the BESS, if other equipment has its own system power on procedure, be sure to follow its specific operation manual.
Working together with inverter	(1) Check the communication cable connection and make sure the cable order on battery and inverter side are matched. All undefined pins are suggested to be empty. (2) Check the baud rate of inverter. (3) Check the terminal resistance. (4) If necessary, check the setting on inverter or control box has right parameters and brand of battery. And check the information of BESS shown on inverter is correct.

6. Maintenance

6.1 Trouble Shooting

Danger: The Gotion HOME 2.0 is a high voltage DC system, operated by qualified and authorized personnel only.

Danger: Before checking the failure, be sure to check all the cables connection and check if the BESS can be turned on normally.

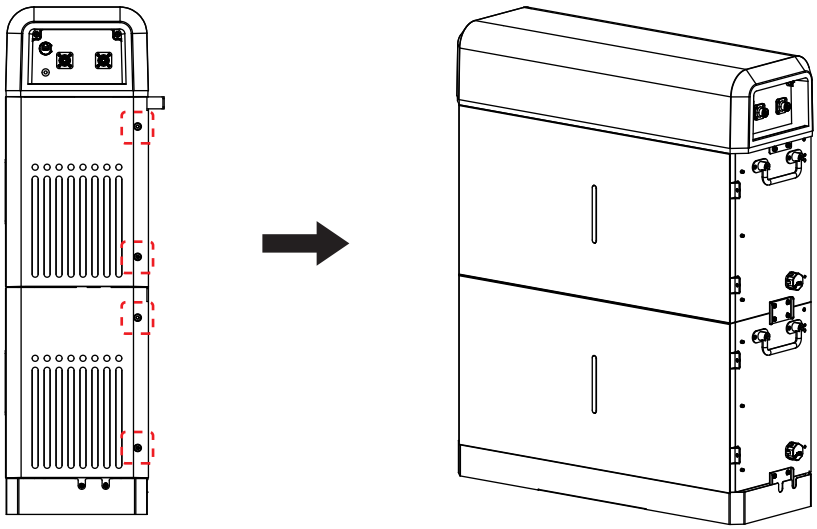
6.2 Replacement of Main Components

Danger: The Gotion HOME 2.0 is a high voltage DC system, operated by qualified and authorized personnel only.

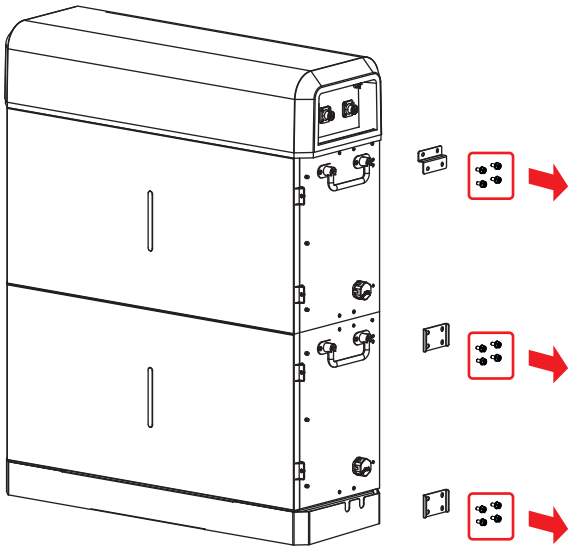
Danger: Before replacing the main components, turn off the maintenance battery string's power first. Make sure the HV+ and HV- terminals are without power. Refer to section 4.2 for turning off process.

6.2.1 Replacement of Battery Module

1. Charge existing module to full (SOC 100%). Make sure new battery module is 100% SOC as well.
2. Turn off the whole battery string's power. Make sure to confirm the HV+ and HV- terminals are without power. Refer to section 4.2 for turning off process.
3. Dismantle HV+ and HV- Power cables, Communication cable and Grounding cable.
4. Dismantle the decorating parts fix screws on the left and right.Remove the decorating parts.



5. Dismantle the fix metal brackets as follows.



6. Remove Integrated top cover and each battery module one by one.

Warning: Single battery module is 53.7kg. If there are no handling tools, at least more than 2 people are needed to handle with it.

7. Pile up the new battery module. And install back the battery modules and control module.
8. Fix back the two screws on the control Module's. And Install back the fix metal brackets.
9. Install back Grounding cable, Communication cable and the HV+ and HV- Power Cables.
10. Turn on this battery string. Refer to section 4.1.

6.2.2 Replacement of Integrated Top Cover

1. Turn off the whole battery string's power. Make sure to confirm the HV+ and HV- terminals are without power. Refer to section 4.2 for Power Off process.
2. Dismantle HV+ and HV- Power cables, Communication cable and Grounding cable.
3. Dismantle the integrated top cover's fix screws on the left and right (same as 5.2.1).
4. Dismantle the metal connecting fixture (same as 5.2.1).
5. Remove the integrated top cover.
6. Pile up the new integrated top cover.
7. Fix back the two screws on the integrated top cover's. And Install back the fmetal connecting fixture.
8. Install back Grounding cable, Communication cable and the HV+ and HV- Power Cables.
9. Turn on this battery string. Refer to section 4.1 for Power on process.

6.3 Battery Maintenance

Danger: Battery maintenance can ONLY be done by qualified and authorized personnel.

Danger: Some maintenance items must be turned off at first.

6.3.1 Voltage Check

[Periodical Maintenance] Check the voltage of battery system through the monitor system. Check if the system voltage is abnormal. For example: Single cell's voltage is abnormally high or low.

6.3.2 SOC Check

[Periodical Maintenance] Check the SOC of the battery system through the monitor system. Check if the battery string SOC is abnormal.

6.3.3 Cables Inspection

[Periodical Maintenance] Visually inspect all the cables of the battery system. Check if the cables are broken, aging or loose.

6.3.4 Balancing

[Periodical Maintenance] The battery strings will become unbalanced if not being fully charged for a long time. Proposal: every 3 months do the balancing maintenance (charge to full), normally it will be done automatically through communication between system and external device.

6.3.5 Output Relay Inspection

[Periodical Maintenance] Under low load condition (low current), switch the output relay to OFF and ON to hear the clicking sound, which means this relay can be turned off and on normally.

6.3.6 History Inspection

[Periodical Maintenance] Analyze the history records to check if there is an accident (alarm and protection) or not, and analyze the reasons.

6.3.7 Shutdown and Maintenance

[Periodical Maintenance]

Some battery function must be restarted before the EMS maintenance. ESS maintenance shall be done at least once every 6 months.

6.3.8 Recycle and disposal

Damaged batteries may leak electrolyte or produce flammable gas.

- In case a damaged battery needs recycling, follow the local recycling regulations to process, and use the best available techniques to achieve recycling efficiency.
- If the battery system is to be disposed of, contact the dealer where it was purchased or the installer.The SOC of the discarded products will be adjusted to 0% , and the dealer will look for a qualified solid waste recycling company to deal with it.Do not dispose of hazardous materials without permission.

7. Remarks

7.1 Storage

For long-term storage, e.g. if it needs to be stored for a long time (more than 6 months), the battery modules are highly suggested to be stored in the temperature range of 10~35°C, relative humidity <65% and corrosive-gas-freed environment. Before storage the battery should be charged to 50~55% SOC.

It is recommended to discharge and charge the battery every 3 months, charge to full and discharge to 50%. The longest discharge and charge interval shall not exceed 12 months.

⚠ **Caution:** If you don't follow the above instructions for long term storage, the battery cycle life will decrease heavily.

7.2 Capacity Expansion

A new battery module can be added onto the existing system at any time. Please make sure the existing system is being fully charged before adding a new module. In a serial connection system, the new module, even has a higher SOH, shall follow the system's worst SOH condition module to perform.

8. Shipment

Before shipment, single battery module will be pre-charged to 100%SOC or according to customer requirements. After delivered on-site, the remaining battery capacity is determined by the storage time and condition.

- The battery modules meet the UN38.3 certificate standard.
- In particular, local rules and policies (e.g. ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road) for the product transportation shall be complied with.