Hello There.

Let's Help Get You Started.

Storage S2 Installation Manual

AIO-10KWH1P2S-CE

Inverter: AIO-10KWH1PINV-CE

Battery: AIO-10KWH1PBM-CE

Release Version: 4.3

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Contents

1. Statement and Declaration

The LAVO Storage S2 (AIO) unit primarily consists of two components: a hybrid inverter and a variable number of battery modules. The number of battery modules can range from 1 to 4, while the hybrid inverter can also operate independently without any battery modules. However, the inverter was not tested to Section 5 of AS/NZS 4777.2:2020 for multiple inverter combinations and/or multiple phase inverter combinations. Therefore, such combinations should not be used, or external devices should be utilised in accordance with the requirements of AS/NZS 4777.1.

The battery modules (AIO-10KWH1PBM-CE) are only compatible with the hybrid inverter (AIO-10KWH1PINV-CE). More details on parameters, please go to "8.3. Product Parameters".

The pictures in this manual are for reference and may differ slightly from the final products due to updates. The content may also be periodically updated or revised without notice. Without special agreement, the document content cannot replace the safety precautions in the product label.

1.1. About The Manual

In this document, you can get valuable product messages including product illustration, installation, electrical cable connection, after-installation check, storage, and cycle maintain, emergency measures and typical troubleshooting.

Please read this manual carefully before any operations. The authorised personnel should be familiar with the file content to know about the product features, functions and safety and electrical precautions.

Please keep this manual readily available in case of an emergency. Do not operate the product before reading through.

1.2 Target Group

Professional and experienced industrial workers who understand the relative local laws and regulations that can conduct installation and product maintain in a suitable way.

1.3. Product Model Description

1.4 Trademarks

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1.5 Copyright

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1.6 Limitation of Liability

LAVO shall not be liable for any repercussions, such as battery damage or property loss resulting from force majeure occurrences during the normal use and storage by the customer or from actions that deviate from the instructions below:

- No modification should be done on the product including, but not limit to disassembling, altering or reproducing.
- Only individuals who have been authorised, trained, tested and certified are permitted to perform standard product operation including installation and cyclic maintenance, in accordance with relevant local regulations.
- Do not attempt to hit, drag, pull, squeeze, crush, drop, penetrate on the product or give weight in any ways.
- Do not immerse the product in water.
- Do not try to heat the product.
- Do not touch the electrolyte.
- Do not disassemble the battery modules or try to access the battery cells.
- Do not put anything into the product.
- Power off before normal repair and maintenance.

- Any defect that is unable to be detected by the existing technology at the time a product enters the market.
- Please carefully read through these instructions before installation and use.

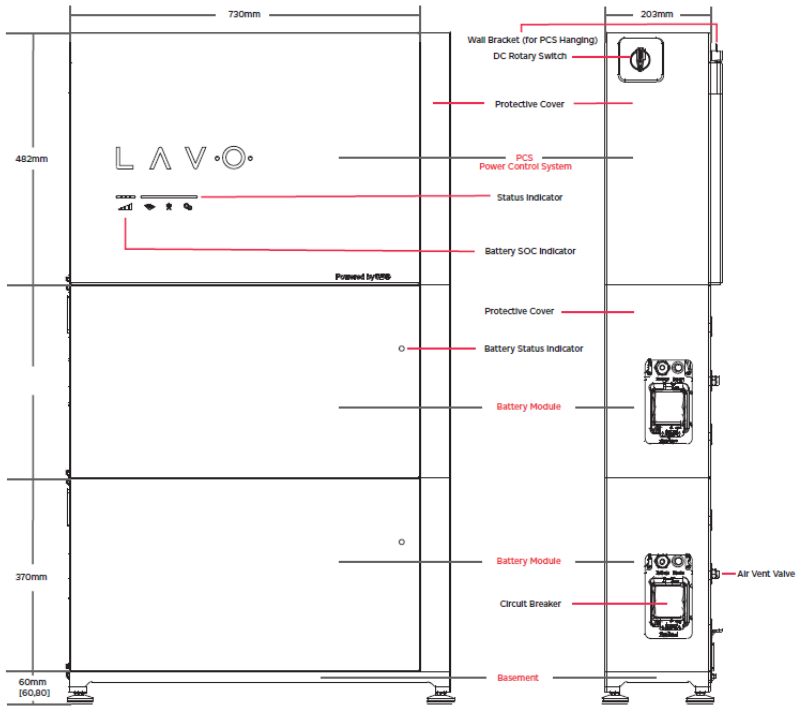
1.7 Version

The latest version contains all the updates.

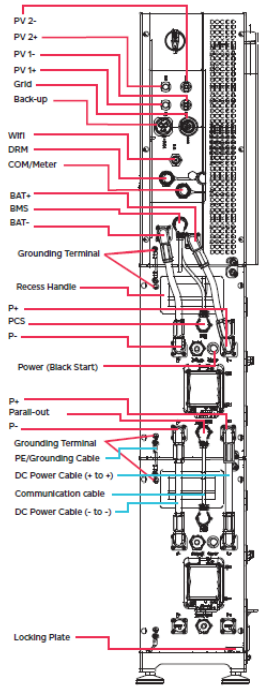
Version	Time	Notes
V1.0	19-10-2023	Initial Version (PCS: AIO Performance, Battery Module: SOC)
V2.0	09-11-2023	Product Appearance Update: SOC removed from BM to PCS
V2.1	15-12-2023	Adding Statement on multi-device parallel support, RCD relative, product parameter
V3.0	02-02-2024	Change: 1. Layout of functional ports on PCS 2. Remove Debug port 3. Packing List 4. Installation Steps Update: System (PCS Electric) Connection Diagram
V3.1	21-05-2024	Adding Minimum installation distance from heat source in 4.1 the installation requirement table; Data of depth of discharge in 8.3
V3.2	07-06-2024	Change Revise the statement and declaration for product details; Add recommended breakers (RCBO/RCD) in 5.7 and update the diagram accordingly; Update the parameters in section 8.3; Add DRM Connection; Operation Modes Introduction; Update System (PCS Electric) Connection Diagram
V4.0	11-11-2024	Change Overall format and deleting duplicated content 2.4 Status Indicators and Ports; 3.4 Installation Tools Preparation; 3.5 Personal Safety Gear; Minimum installation distance from heat source in 4.1;

		4.3 Electrical Connection; 6.1 Warehouse Storage; 7 Safety, Regulation & General Service; 8.2 Product Parameters Adding 2.1 AIO-10KWH1P2S-CE series Diagram; 2.3 Operation Modes Introduction; 4.5 Battery Connection; Delete 8.1 Emergency Measures and combine with 7 Safety, Regulation & General Service.
V4.1	26-11-2024	Update 4.5 Battery Connection
V4.2	04-12-2024	Update 4.5 Battery Connection; 5.1 Power On Procedure; 5.2 Shutdown Procedure.
V4.3	09-12-2024	Update 4.5 Battery Connection; 5.1 Power On Procedure; 5.2 Shutdown Procedure.

2 Product Overview



Front View
(With Protective Cover on the Right)



Right View
(With Protective Cover)

Right View
(No Protective Cover)

Component Module	Item	Description	Function
PCS (AIO-10KWH1P-INV-CE)	PV+	Positive	Positive terminal of PV array
	PV-	Negative	Negative terminal of PV array
	Grid	Grid Connection	Grid On scenario: power supply to or from grid
	Back-up	Loads Connection	Residential loads connection (Uninterrupted power supply)
	Wifi	Communication	Wireless communication/Wifi dongle connection
	DRM	Communication	DRED (Demand Response Enabling Device) connection

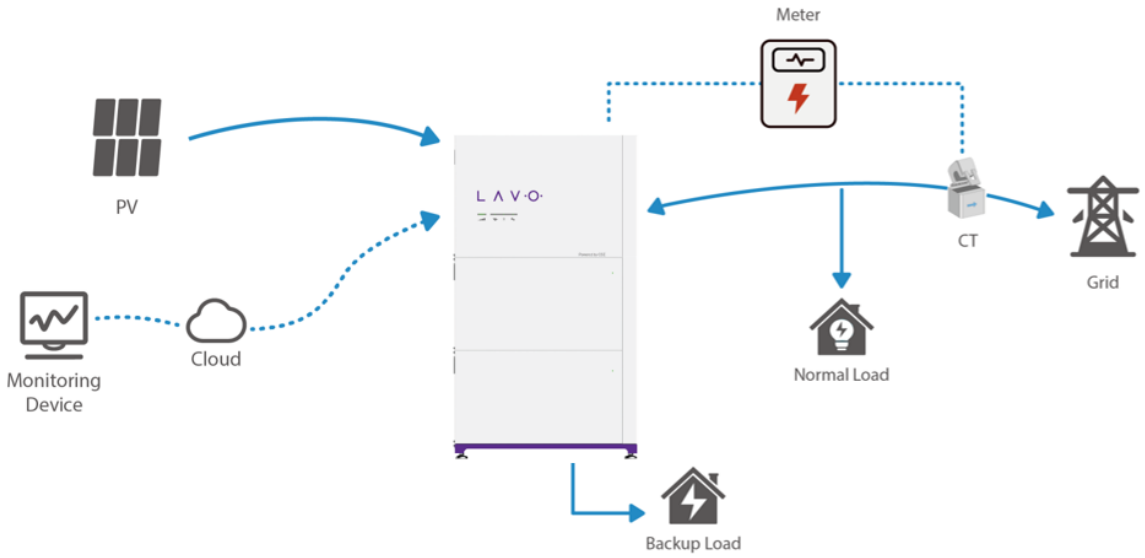
	Meter	Communication	Meter external-connection
	BAT+	Positive	Positive terminal for battery module
	BAT-	Negative	Negative terminal for battery module
	BMS	Communication	Communicate with a BMS (Battery Module System)
	DC Rotary Switch	Power Control	PCS power on/off
Battery Module (AIO-10KWH-1PBM-CE)	P+	Positive Electrode	Positive terminal of a voltage
	P-	Negative Electrode	Negative terminal of a voltage
	PCS	Communication	Communicate with a PCS
	Parallel-out	Communication	Communicate between battery modules
	Power	Wake Up Button	Sleep: 6s; Wake-up: 3s
	Circuit Breaker	Power Control	Battery power on/off
	Battery Status Indicator	Battery Running Status	Green: Normal; Red: Alarm

Note:

- DRM terminal is for Australian only as to meet the local requirement that each PCS should be connected with a DRED respectively in a dongle ad-hoc scenario.

2.1 AIO-10KWH1P2S-CE series Diagram

AIO-10KWH1P2S-CE series is designed with BACK-UP versions for customer to choose based on the local rules.



NOTE
1. Please control the home loads and make sure it's within the "BACK-UP output rating" under BACK-UP mode, otherwise the inverter will shut down with an "overload fault" warning. 2. Please confirm with the LOCAL grid operator whether there are any special regulations for grid connection.

2.2 Dimensions

Product Unit	Model	Dimension (W*D*H) (±3mm)	Weight (±1kg)
PCS	AIO-10KWH1PINV-CE	730*203*482	33
Battery Module	AIO-10KWH1PBM-CE	730*203*370	51
Base			4.8

2.3 Operation Modes Introduction

AIO-10KWH1P2S-CE series normally has the following operation modes based on your configuration and layout conditions.

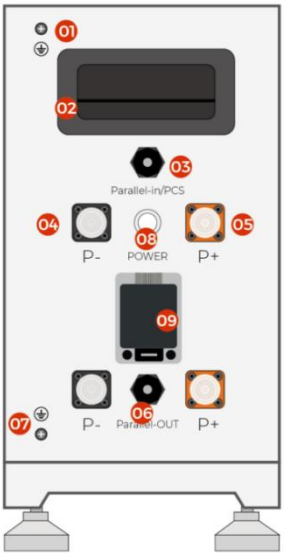
Working Mode	Details	Designation	Definition
Self-Consume Mode	In the 'Mode Setting' menu, select 'Self-Consume mode' which prioritizes PV energy for local loads, then battery charging, and finally feeding excess energy into the grid. This default mode increases self-consumption rate and has various scenarios based on PV energy. There is self-Used Discharge Power and self-Used Charge Power setting.	Wealthy PV Energy	Excess PV energy powers loads, charges battery, then feeds excess energy into the grid when PV energy is abundant.
		Limited PV Power	PV energy is used for loads first, then battery is used for any shortfall, and finally grid energy will fill remaining gaps.
		No PV Input	The inverter preferentially uses the battery to power the load, and when the battery is out of power, the grid is used to continue working.
		No grid, but have PV and battery	The inverter preferentially uses the PV to power the load, and charge the battery with excess power; if there is no enough PV, the battery will be used for any shortfall until the battery SOC is below the value which you set in the APP.
Peak Load Shift Mode	Navigate to 'Mode Setting' and choose 'Peak Load Shift '. This mode allows control of inverter charging and discharging with customized parameters. Charge and discharge frequency: one time	During the charging time	If there is sufficient sunlight, it will be used to charge the battery first, and then supply power to the loads; if there is excess power, it will feed the power into the grid; if there is no enough sunlight, the battery will be charged from the grid.

	or daily Charging start time: 0 to 24 hours Charging end time: 0 to 24 hours Discharge start time: 0 to 24 hours Discharge end time: 0 to 24 hours	During the discharging time	If there is sufficient sunlight, the system powers the loads first; if there is insufficient sunlight, the battery supplies the power to the loads first until the battery is consumed to the SOC value; if the load's power demand is less than the battery's capacity, the battery supplies power to the load first and then feeds any excess power into the grid.
Backup Mode	In the 'Mode Setting' menu, choose 'Backup' for faster battery charging with priority on PV energy.	When PV, Grid, Battery is available	When there is sufficient sunlight, the device first charges the battery; if there is still excess, it will supply power to loads, and feeds the power into the grid with excess power.
		No PV	It will get power from the grid to charge battery fully.
VPP Mode	In the 'Mode Setting' menu, choose 'VPP' for power grid dispatch in some countries.		

NOTE
If the anti-reverse function is set to enable, when the system is in Self-consume, Peak load shift, or Backup mode, it will not feed power to the grid.

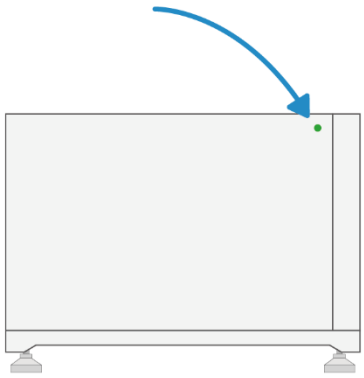
2.4 Status Indicators and Ports

2.4.1 Battery (AIO-10KWH1PBM-CE)



Object	Description	Object	Description
1	PE	6	Communication Port-OUT
2	Handle	7	PE
3	Communication Port-IN/PCS	8	Power ON/OFF
4	Battery Negative -	9	DC Breaker
5	Battery Positive +		

Description for LED



NOTE
The battery needs to be fully charged at least once a month to ensure the accurate SOC calculation.

2.4.2 Inverter (AIO-10KWH1PINV-CE)

Object	Description
1	DC switch
2	PE
3	PV1~PV2 Input
4	Backup Load Output
5	Grid Output
6	Wi-Fi Module
7	DRM (Demand Response Enabling Device)
8	Meter Communication Port
9	BMS Communication Port with Battery
10	Battery Negative -
11	Battery Positive +
12	PE
13	Battery SOC
14	PV Light
15	Grid Light
16	Inverter Light

NOTE

DRM terminal is for Australian only as to meet the local requirement that each PCS should connected with a DRED respectively in a dongle ad-hoc scenario.

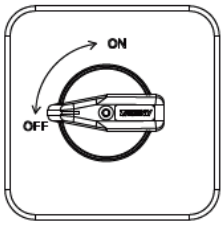
2.4.3 Status Indicators

Status Indicators show the working status of your PV panel, Grod, and the PCS in a power storage and supply system.

		Item/Color	Green	Green Flash	Red
Hybrid Inverter		LB Inverter	Running	Diagnostic/Update	Fault
		Grid	Running	Diagnostic/Update	Fault
		PV Panel	Running	Diagnostic/Update	Fault
Battery		Battery	Running		Fault

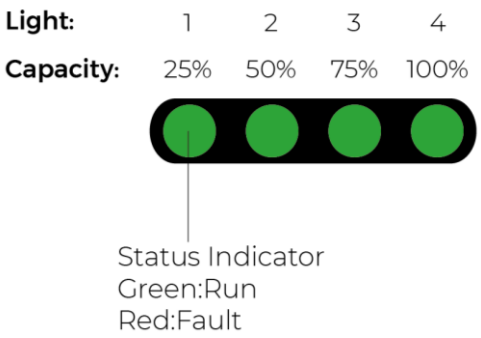
2.4.4 DC Rotary Switch

DC rotary switch you have on the final product may be different from the picture below in order to meet the requirements of your local regulations.

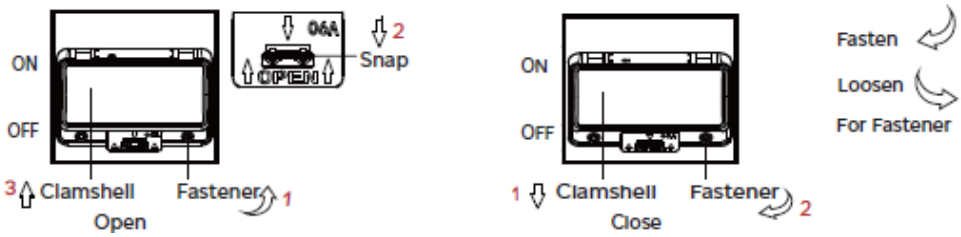


2.4.5 SOC Indicator

SOC indicator shows the valid capacity of battery modules.
Color: Green
Color Status: Solid and Flash



2.4.6 Circuit Breaker



3 Preparation Before Installation

In this chapter, you will understand the product transportation process, how to unpack the product and some valuable tips for pre-installation.

The battery module is about 51kg per unit. Please ensure you have coworkers to support if you are unable to hold or carry the product by yourself to prevent injuries. Please ensure you have appropriate clothing, equipment, and support to carry the product and install as outlined below.

In large scale transportation, hosting tools are suggested.

3.1 Transportation

The product has cleared UN38.3 (Section 38.3 of the Seventh Revised Edition of the Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria) and SN/T 0370.2-2009 (Part 2: Performance Test of the Rules of the Inspection of packaging for Exporting Dangerous Goods). The product is classified as class 9 dangerous goods, and shall be transported in accordance with the following:

- Prohibit piling up with other objects.
- Prohibit mixing up with explosive, inflammable, or toxic objects.
- Maintain original packaging and keep labels complete and recognisable
- Prevent from direct exposure to sunlight, rain, condensation and mechanical damage
- Use van-type vehicle including container and metallic van-type. Platform vehicle and convertible are prohibited.
- Maintain temperature between -20°C and 45°C, and keep humidity within 5%-95% RH during the storage.
- To ensure the modules are safeguarded against movement, falls or impacts, utilise protective moving equipment such as straps and bubble wrap during transportation. This will help secure the products in position.
- Vehicle in the middle of unloading should berth near dock. Vehicles waiting to be unloaded should keep a safe distance of 6m from warehouse. The vehicle prohibits debris stacking and should stay away from other vehicles.
- Carriers should be equipped with extinguishers designed specifically for lithium batteries, which are used together with fire protection water and sand.

- The transportation must be carried out by trained professionals. All operations during the process must be recorded.
- A damaged box or rattles during transport may indicate a rough handling. Describe the damages on the delivery receipt before signing. If an obvious damage such as package hold or serious impact is found, please contact LAVO.
- The battery module can only be transported in an upright position.

3.2 Check Before Unpacking

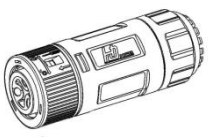
Check the following items before unpacking the product:

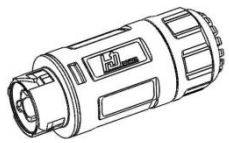
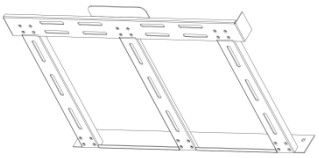
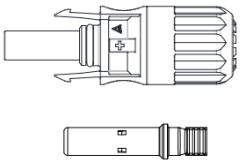
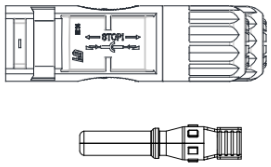
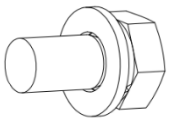
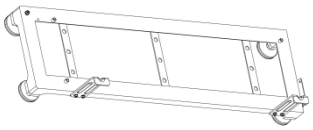
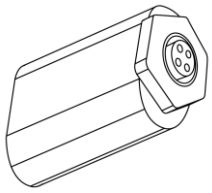
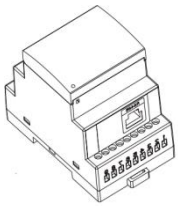
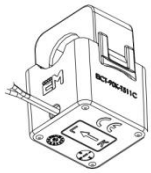
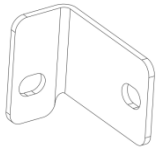
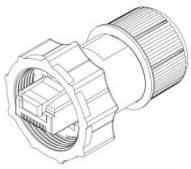
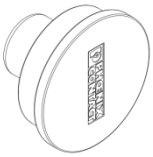
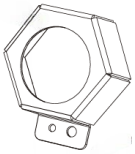
- Check the outer packing box for damage, such as holes, cracks, deformation, and other signs of equipment damage. If any damage is found, do not sign or unpack the package and contact LAVO as soon as possible.
- Check the product messages printed on the packaging. If the product model is not what you requested, do not sign or unpack the package and contact LAVO immediately.

3.3 Unpacking

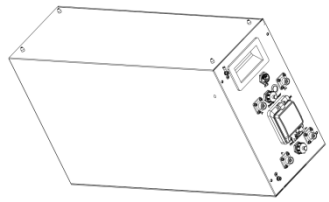
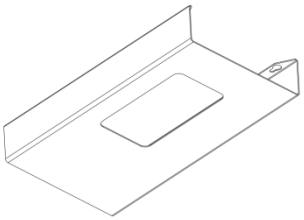
- After unpacking, check to ensure you have the correct model number, complete contents and the product is intact. Contact LAVO as soon as possible if damage is found.
- Locate the recessed handles on both sides of the battery module and align them horizontally by adjusting their positions.
- Check packing list to make sure you have the required parts.
- Keep product units and spare parts for installation.

PCS Packing List

AIO-10KWH1P2S-CE		
		
Inverter*1	Grid Connector*1	Paper Work*1

		
Back-up Connector*1	PE Cable*1	Inverter Mounting Bracket*1
		
PV Connector (+) *2	PV Connector (-) *2	Hex Flange Screw*5
		
Basement*1	Self-tapping Screw*5	Expansion Anchor Bolt*5
		
Wifi Dongle*1	Meter (Single Phase)*1	Current Transformer (CT)*1
		
L-shaped Mounting Bracket*1	UT Terminal*2	Communication Connector*2
		
Rubber Cover*2	Anti-pull Plate*1	Anti-pull Cover*1

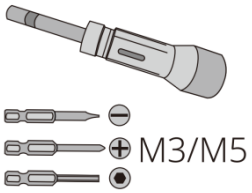
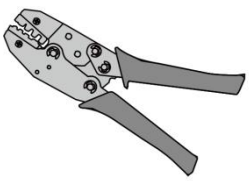
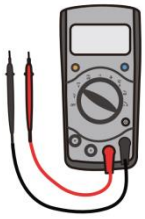
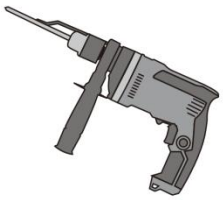
Battery Packing List

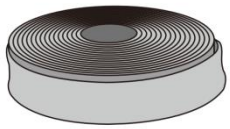
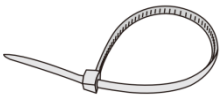
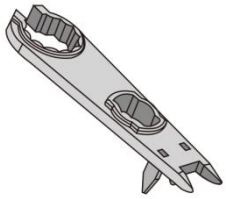
AIO-10KWH1PBM-CE		
		
Battery Module*1	Communication Cable*1	Paper Work*1
		
DC Power Cable*2	PE Cable*1	PACK Protective Cover*1

NOTE
Packing List in package box shall take priority as spare parts may already be fixed with product unit that will not be listed.

3.4 Installation Tools Preparation

Tools listed below are for reference only, please get more as you need.

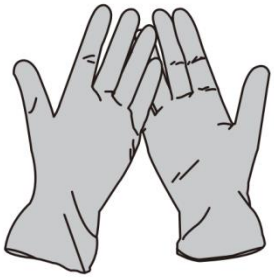
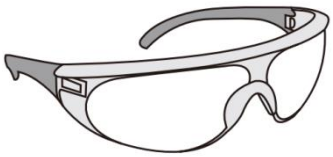
			
Diagonal Pliers	Torque Wrench	Cable Crimper	Wire Stripper
			
Voltmeter	Heat Gun	Drill	Ruler

			
Heat Shrink Tubing	Rubber Mallet	Rolling Strip	Marking Pen
			
DC Wrench			

In order to protect the operator and installers' safety, please select and use suitable tools and measuring instruments that are certified for precision and accuracy.

3.5 Personal Safety Gear

When dealing with the battery, the following safety gears should be equipped. Installers must meet the relevant requirements of UL or the domestic legislation and other relevant international standards.

		
Insulated glove	Safety goggles	Safety shoes

4 Installation

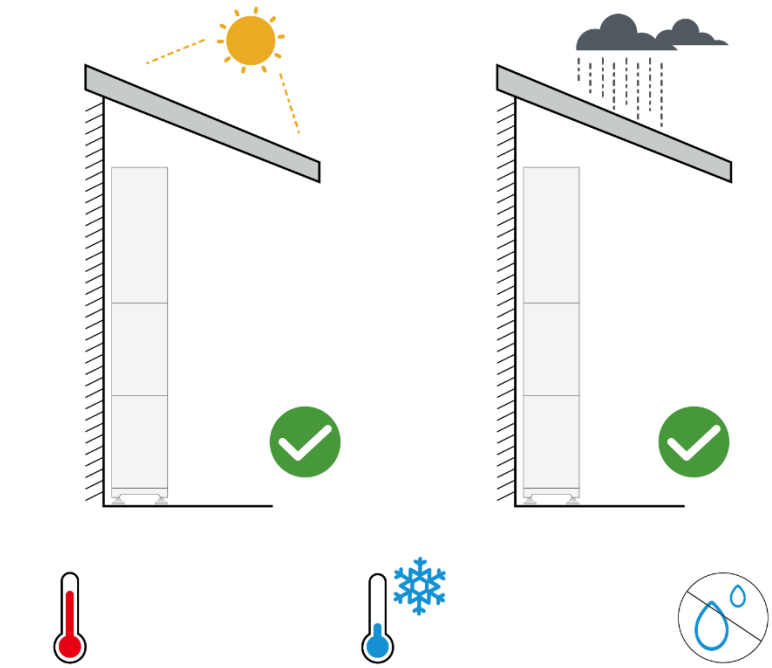
This equipment supports a ground-wall mounting type only with clearance from heart sources. The space can be reduced as you prefer thus it won't have any influence on product maintenance. Keep the equipment stable to avoid tipping which can result in product damage and personal injuries.

NOTE
During transportation, turnover, installation and other operations, you must meet the laws, regulations and relevant standards of the country or region where you are located. Before installation, move the system to the installation site. To avoid personal injury or equipment damage, pay attention to the following: 1. Assign personnel according to the weight of the device. Otherwise, personnel may be injured if the device exceeds the weight that can be carried by the human body. 2. Wear safety gloves to avoid injury. 3. Ensure that the device is balanced to avoid falling.

4.1 Installation Requirements

Item	Requirements	
Operator	Electrical experts or trained and qualified people with professional tools.	
	Utilise protective equipment and clothing.	
	Conduct under the guidance of relative local regulations and laws.	
Overvoltage Category	II (DC)	III (AC)
Pollution Degree Classification	PD2 (Inside)	PD3 (Outside)
Optimum Working/Environment Temperature	-10~55°C (45~55°C derating)	
Relative Humidity (RH)	0-95%, non-condensation	
Altitude	≤ 3000m	
Location	Indoor or outdoor (IP65)	
	Flat floor surface and a solid wall – only for ground mounting	

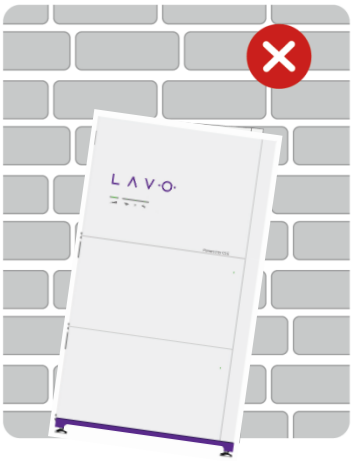
	Keep the system at least 3m away from heat sources
Ventilation Space	≥ 300mm space around
Fire Fighting	Battery specialized fire extinguishers or other firefighting devices and materials should be reachable within 5 minutes in a round trip
More	Do not expose the product directly to sunlight, rain, snow or spray
	Do not disassemble the product without authorisation
	Do not hit, drag or jump on the product
	Do not immerse the product in water
	Do not heat the product
	Store the product out of reach of children or pets to avoid accidental operation
	Do not install the inverter in a place with corrosives such as corrosive gas and organic solvent, etc.
	Ensure the installation is not near the television antenna or antenna cable
	Keep the installation location away from direct cool air
	Avoid installation in areas with potential explosion hazards
	Install away from areas with highly flammable materials



Max. +55℃ Min. -10℃ RH 0%~+95%

The wall hanging the inverter should meet conditions below:

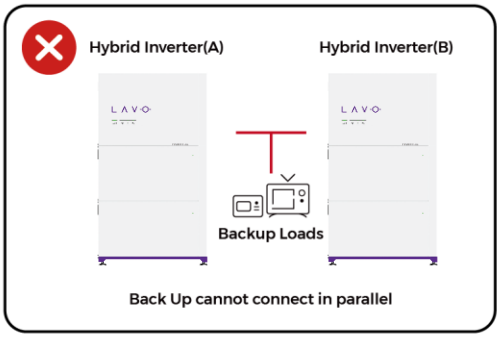
1. Solid brick/concrete, or strength equivalent mounting surface;
2. Inverter must be supported or strengthened if the wall's strength isn't enough (such as wooden wall, the wall covered by thick layer of decoration) Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation.
3. The slope of the wall should be within ± 5°.
4. Make sure the installation position does not shake.

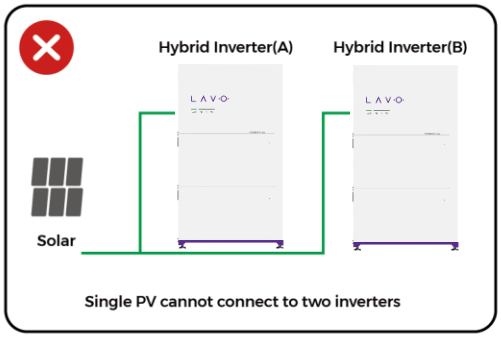


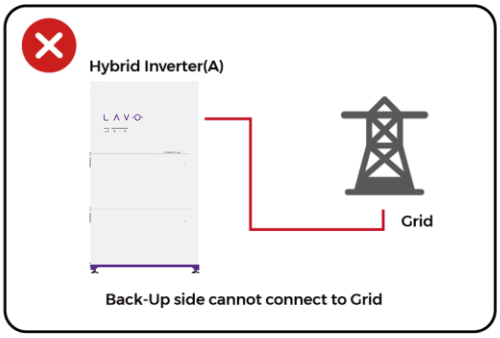
The installation space:

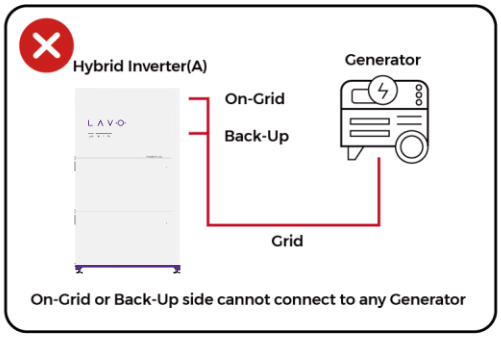
4.1.1 Unacceptable Installations

Please avoid the following installations which will damage the system:







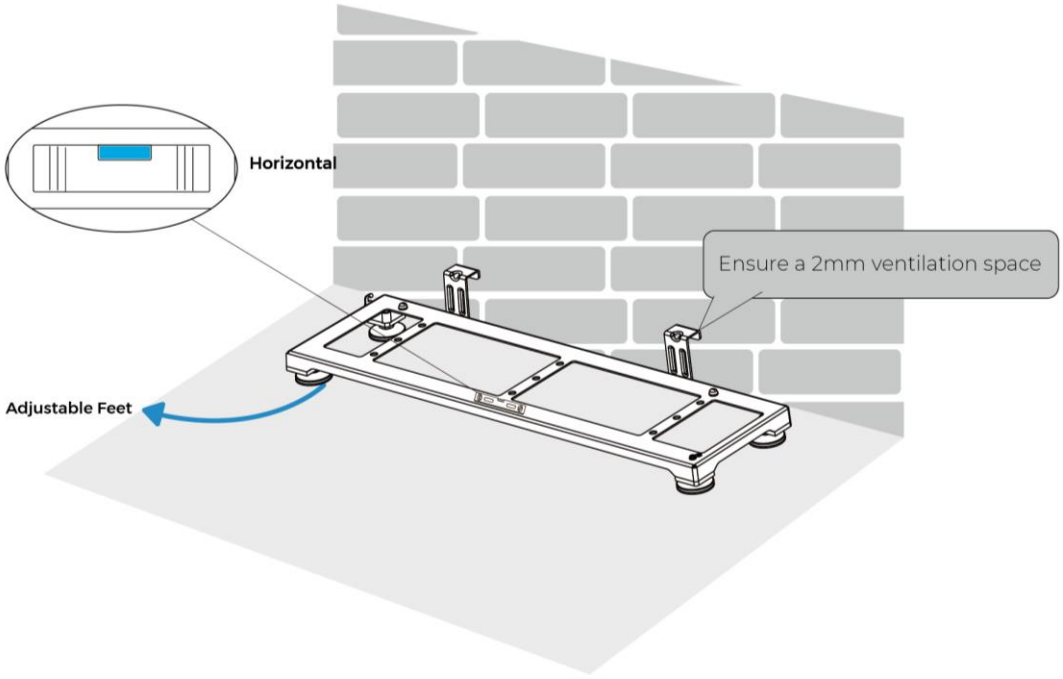


4.2 Installation Steps

4.2.1 Ensure a Flat Installation Surface

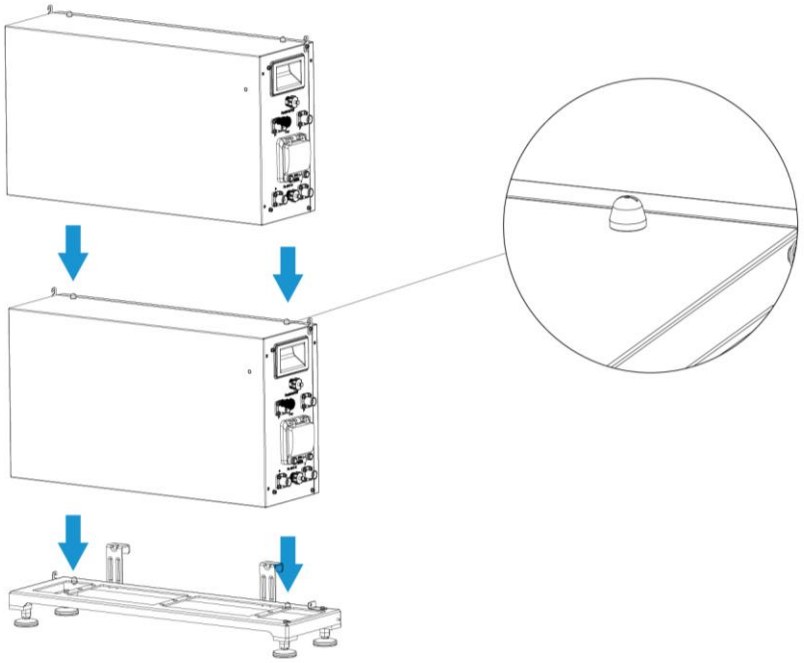
The product is suggested to be installed on a flat floor within less than 8mm per 2 square meters with a wall behind for support and mounting. If the floor is not smooth, please adjust the adjustable feet to remain an install flatness. Adjustable feet screwed under the basement together as a spare part is supplied, packaging together with the inverter.

STEP 1: Get the basement out and make it equipped with adjustable feet with screwdriver if they are not screwed together;
STEP 2: Put the basement at a proper installation location;
STEP 3: Put a horizontal ruler on the basement and adjust the feet until the liquids in the ruler keeps still in the centre.

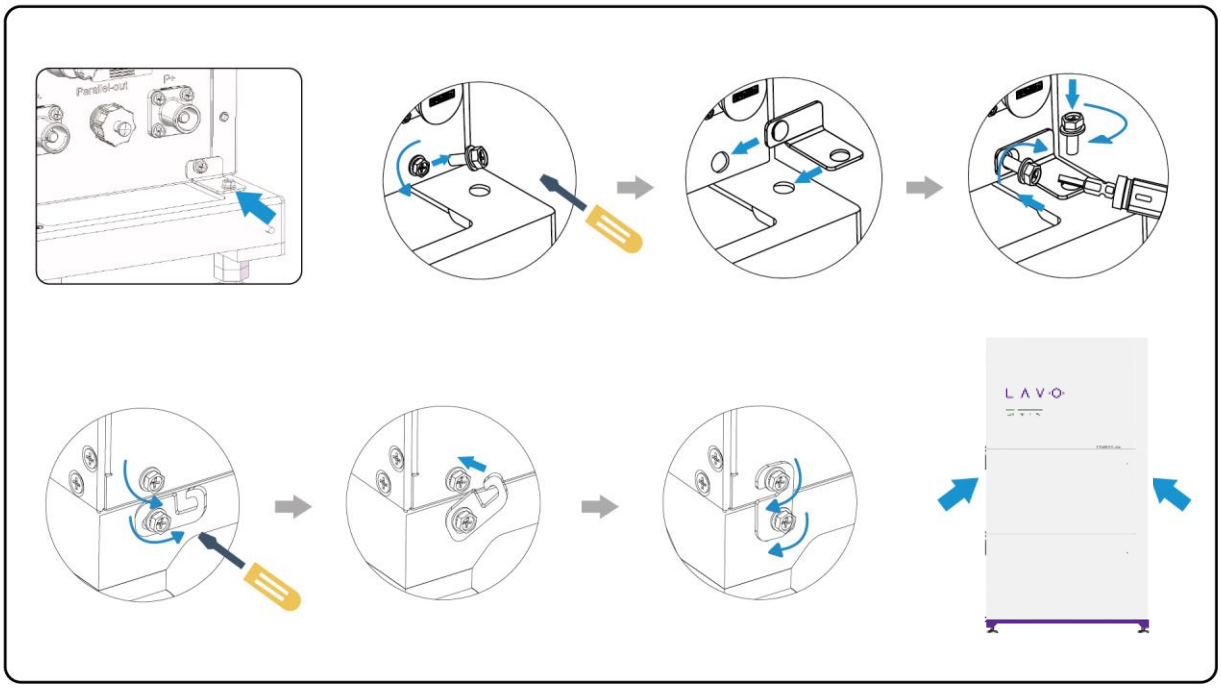


4.2.2 Get the Battery Module Stacked

STEP 1: Put the battery module (a module) on the basement by aligning the positioning pillars (on the Basement) and holes (on the Battery Module);



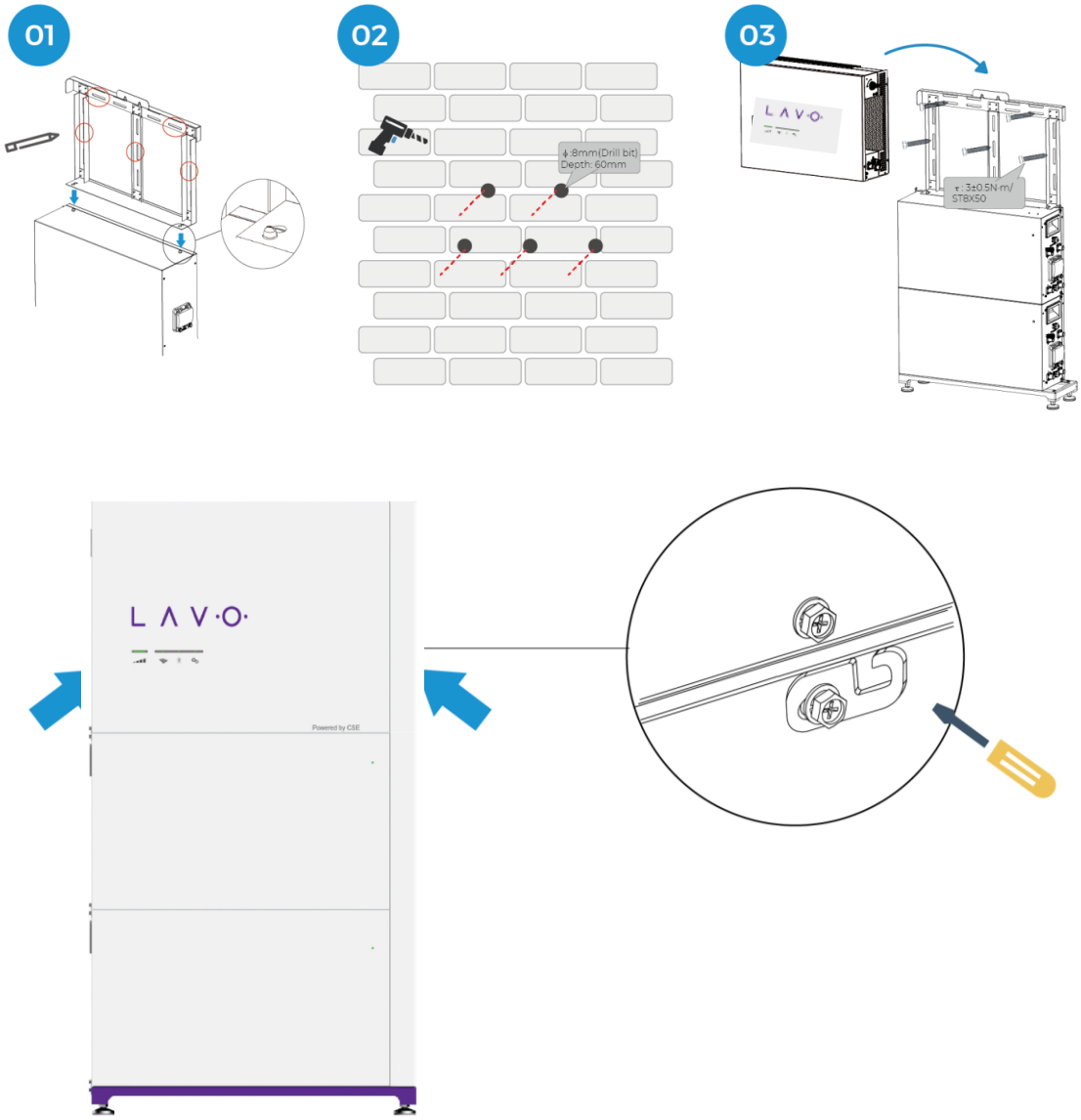
STEP 2: Fix the module and the basement with an L-shaped mounting bracket;
STEP 3: Lock the module and the basement together with a locking plate;
STEP 4: Get other modules stacked by aligning the positioning pillars and holes;
STEP 5: Lock between modules on both sides.



4.2.3 Install the Inverter

After 5.2.2, we've got the battery modules fixed with the basement in the desired position, now we'll begin with inverter stacking, wall mounting and locking.

STEP 1: Get the inverter wall mounting bracket and the inverter;
STEP 2: Connect the wall mounting bracket with the fixed battery module by aligning the positioning pillars (Battery Module) and holes (mounting bracket);
STEP 3: Pre-drill positioning;
STEP 4: Drill and fix;
STEP 5: Put the inverter on the mounting bracket;
STEP 6: Lock between the fixed PCS and the battery module with locking plates on both sides;



After all the operations above, you've successfully finished the product installation physically, then we will begin with electrical connections in 6.3, please go and follow the instructions.

4.3 Electrical Connection

WARNING

Before the electrical connection, turn off the DC switch and AC output switch of the inverter to ensure that the device is powered off. Live operation is strictly prohibited, otherwise, electric shock and other hazards may occur.

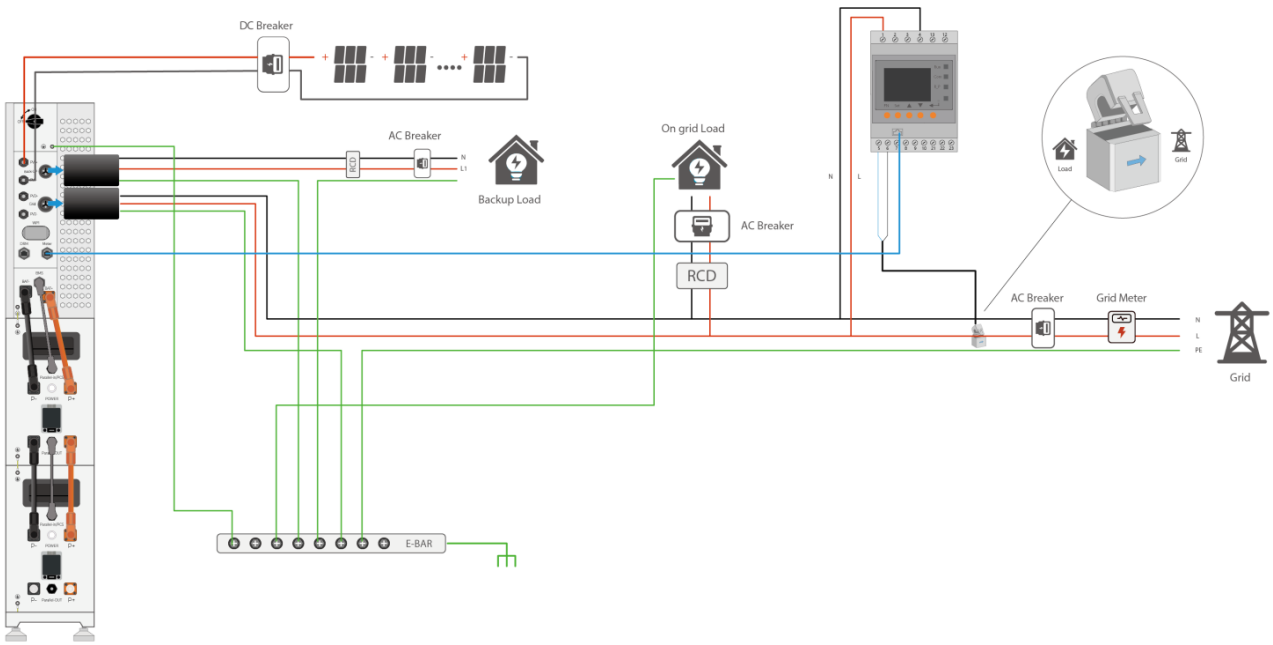
1. All operations, cables, and components used during electrical connections must comply with local laws and regulations.
2. If the cable withstands too much tension, the cable may be improperly connected. Reserve a certain length of the cable before connecting it to the inverter port.

CAUTION

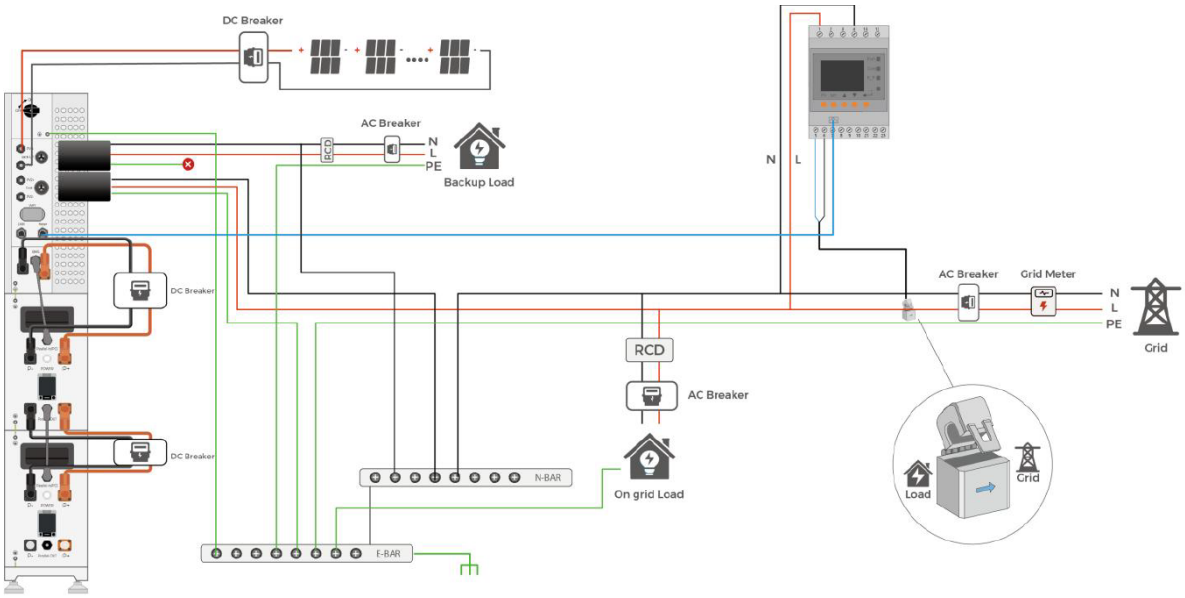
When making electrical connections, wear personal protective equipment such as safety shoes, protective gloves, and insulation gloves as required.

1. Only professionals are allowed to perform electrical connection related operations.
2. The cable colors in the figure are for reference only. The cable specifications must comply with local regulations.

General wiring diagram of system:



Australia and New Zealand wiring diagram of system:

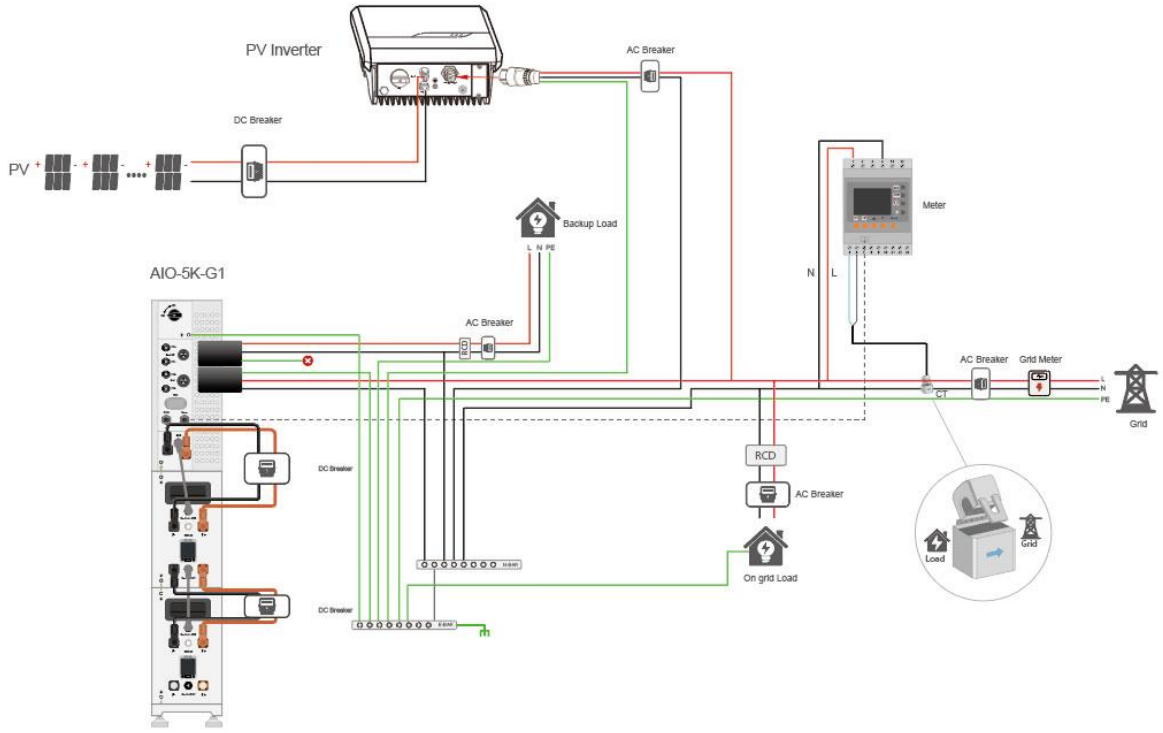


CAUTION
• All switches and RCD devices in the figure are for reference only and the specific installation shall be subject to local regulations!

NOTE
The arrow on the CT points to the power grid, showing as above. If the CT connector is improperly connected, the inverter cannot read the data correctly, so that the relevant working conditions cannot be realised normally. The CT must be installed before all loads.
Breakers Recommended: • Rated Current (Grid On): ≤ 63A • Rated Current (Back-up): 32A • Breaking Capacity: > 3kA • Earth-leakage Sensitivity: 30mA • Earth-leakage Protection Class: Type A • Voltex RCBO6-1-32U, IIClipsal RCBE 232/30S • DC Breaker (Battery): >100A, 75-100V
It is recommended to utilise a forementioned RCBO or similar ones for installation. Determine whether an AC circuit breaker with greater overcurrent capacity is required based on actual conditions.

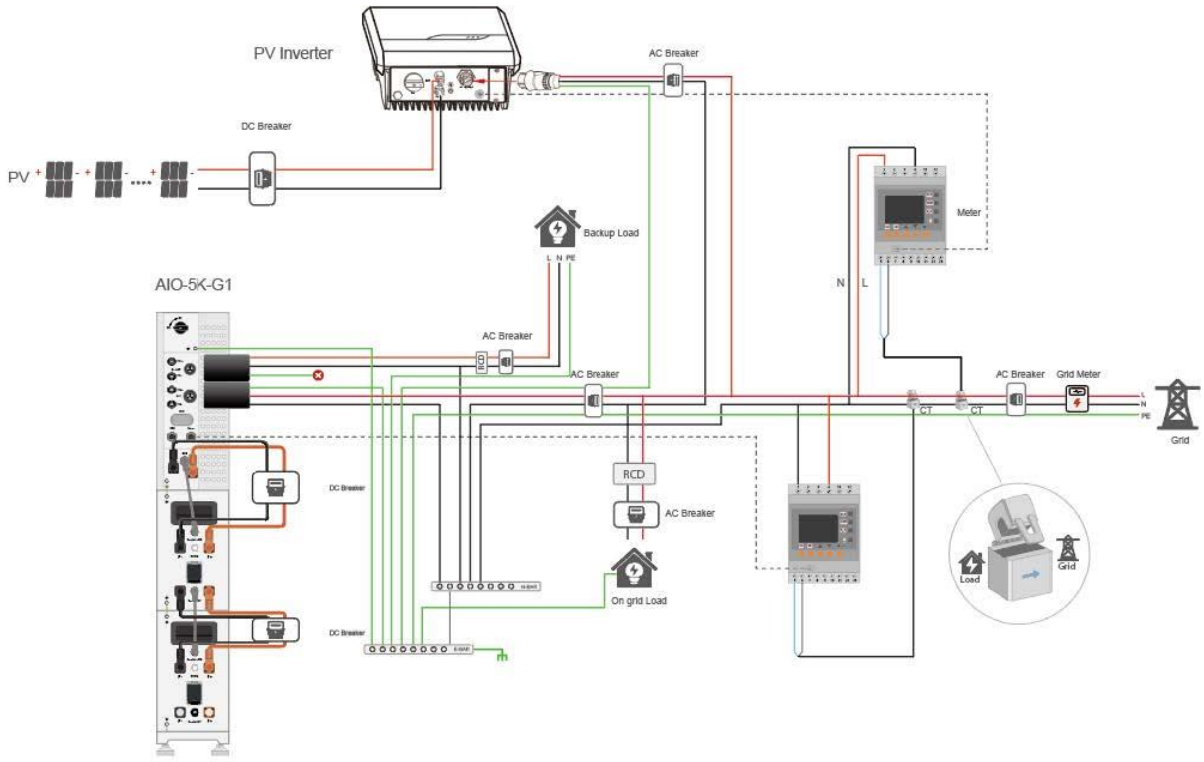
4.4 AC Coupling

AC Couple usage scenario wiring diagram 1:



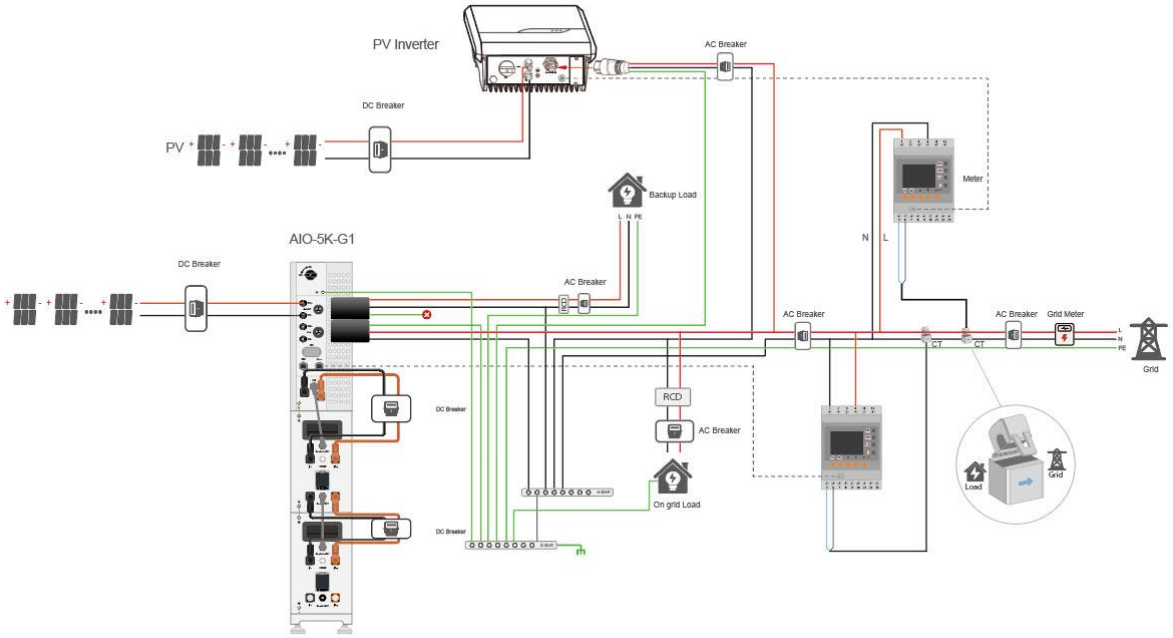
NOTE
AC Couple operating scenario description: 1. The original photovoltaic inverter does not have anti backflow function, and after installing AIO, the entire household does not have anti backflow function. 2. The electricity meter can be placed on both the front and rear sides of the household air switch.

AC Couple usage scenario wiring diagram 2:



NOTE
AC Couple operating scenario description: 1. The original photovoltaic inverter has anti backflow function, and the whole household anti backflow function is implemented by the original photovoltaic inverter system. 2. The new AIO does not enable the anti backflow function. 3. The electricity meter can be placed on both the front and rear sides of the household air switch.

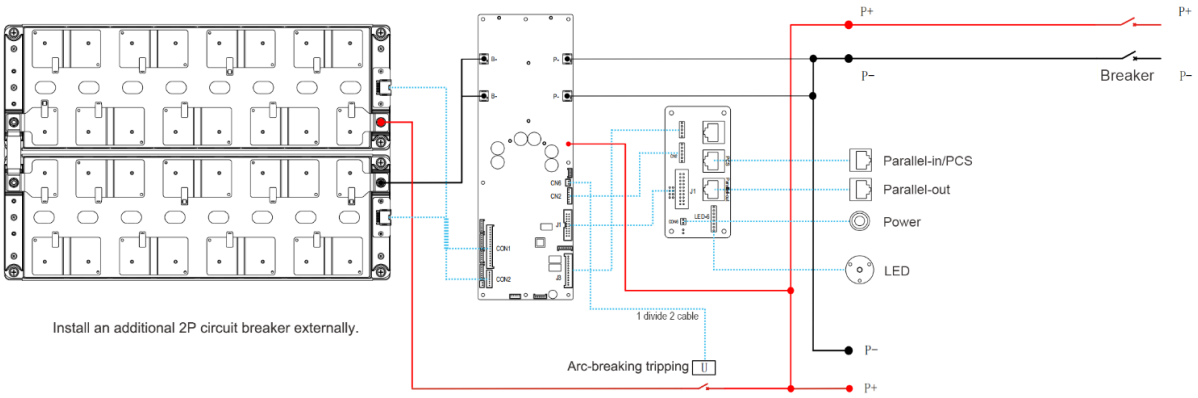
AC Couple usage scenario wiring diagram 3:



NOTE
AC Couple operating scenario description: 1. The original photovoltaic inverter has anti backflow function, which can prevent excess electricity from flowing back to the grid, and the newly installed AIO is connected to the PV. 2. After the installation of AIO, the entire household still has anti backflow function to ensure that excess electricity does not flow back into the grid. 3. Photovoltaic power generation prioritizes supplying household loads, and excess electricity is stored in the batteries of the AIO system. If the batteries are full, the original inverter and the anti backflow function of the newly installed AIO will limit the return of electricity to the grid.

4.5 Battery Connection

Battery connection overview



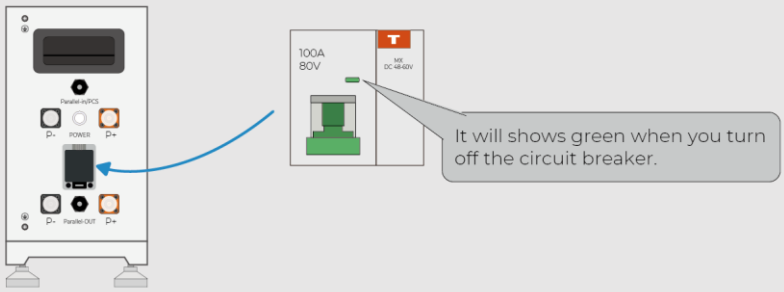
Battery connection

NOTE

Our battery energy storage system is configured external 2P DC breaker kits, including an isolation box for each battery module.

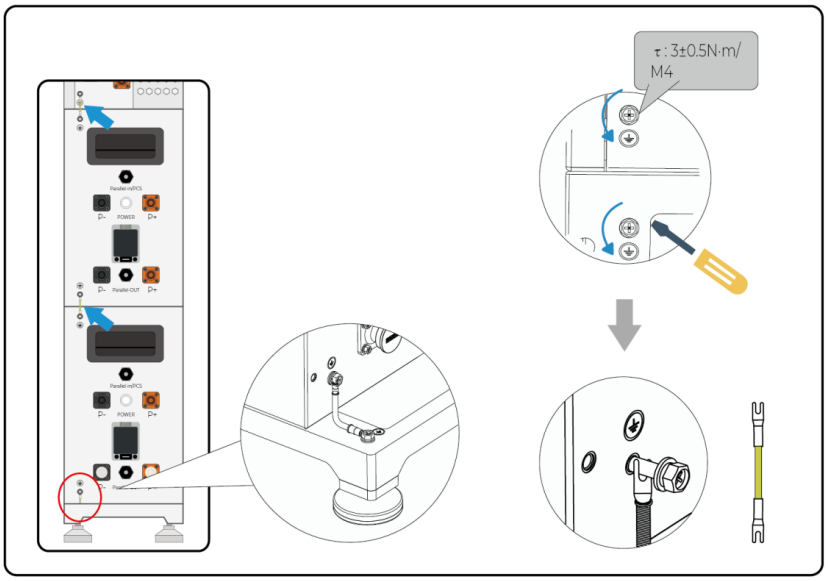
WARNING

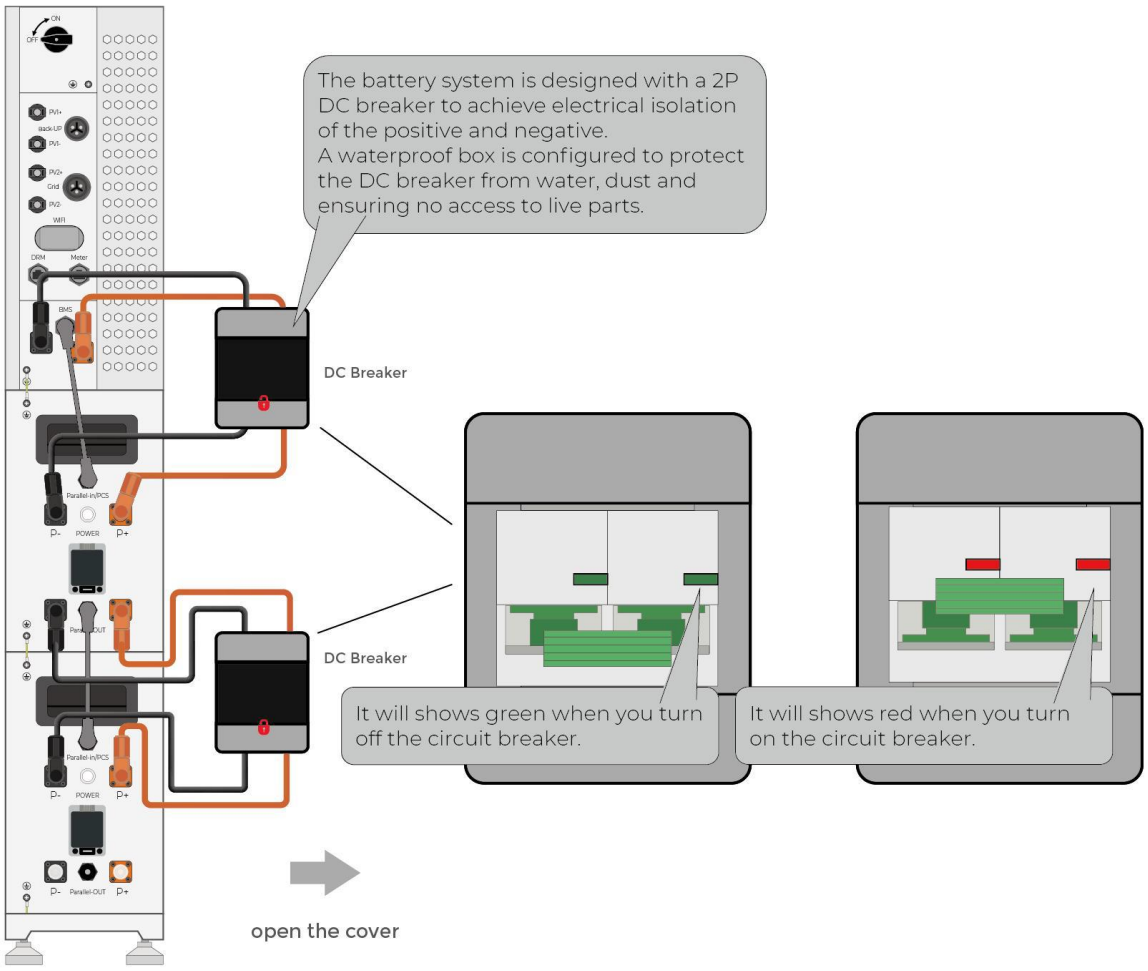
Before connection, make sure the DC breaker on the battery is being off, showing as below picture:



In normal repair or cycle maintenance, after manually powered off the equipment, a multimeter is suggested to ensure that there is no electricity anymore or just wait for 5 minutes before operation.

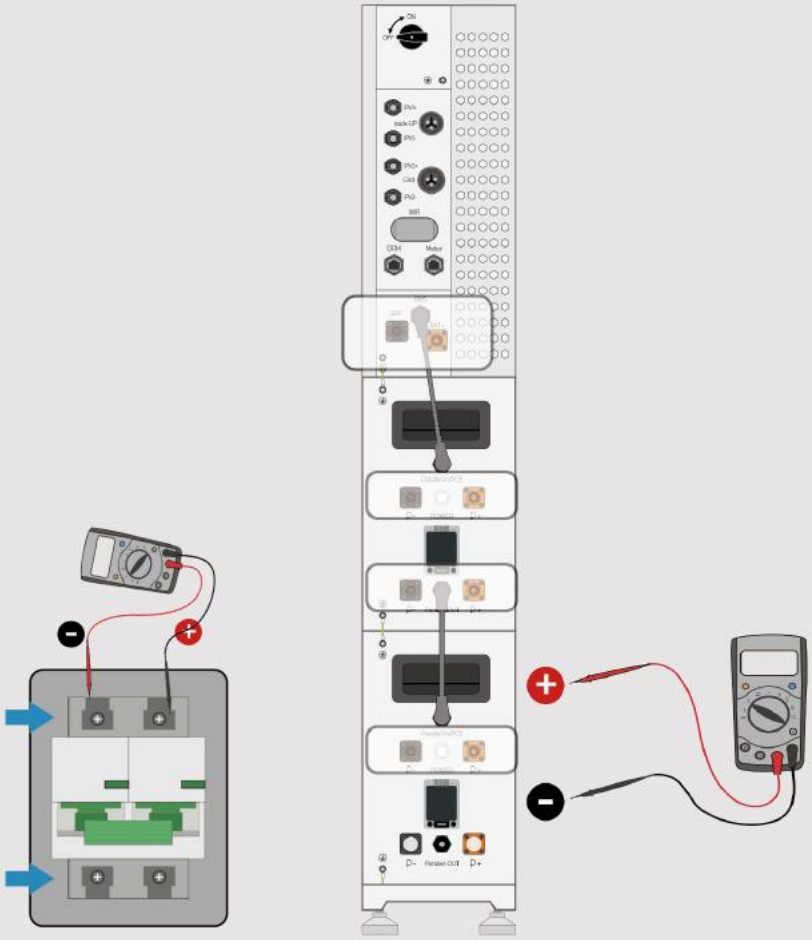
Step 1: Confirm the DC rotary switch is off (PCS OFF);
Step 2: Confirm the DC breaker switch is down (Battery OFF);
Step 3: Connect the communication cables, PE cables and power cables between batteries.





NOTE
Place cover lids over the terminals that do not have any connections. An external DC circuit breaker is required. Make sure you connect both the positive and the negative conductors to the 2P DC breaker.

For more safety, it's better to use voltage meter to test the both sides of two poles on the DC breaker and battery positive and negative terminal on the battery pack to check whether there still has voltage, showing like picture as below:



WARNING
Positive and negative wires are not allowed to reverse.

4.6 PV Connection

Hybrid can be connected in series with 2-strings PV modules for inverter. Select PV modules with excellent function and reliable quality. Open-circuit voltage of PV connected in series should be less than Max. DC input voltage; operating voltage should be conformed to MPPT voltage range.

Before connecting PV panels/strings to the inverter, please make sure:

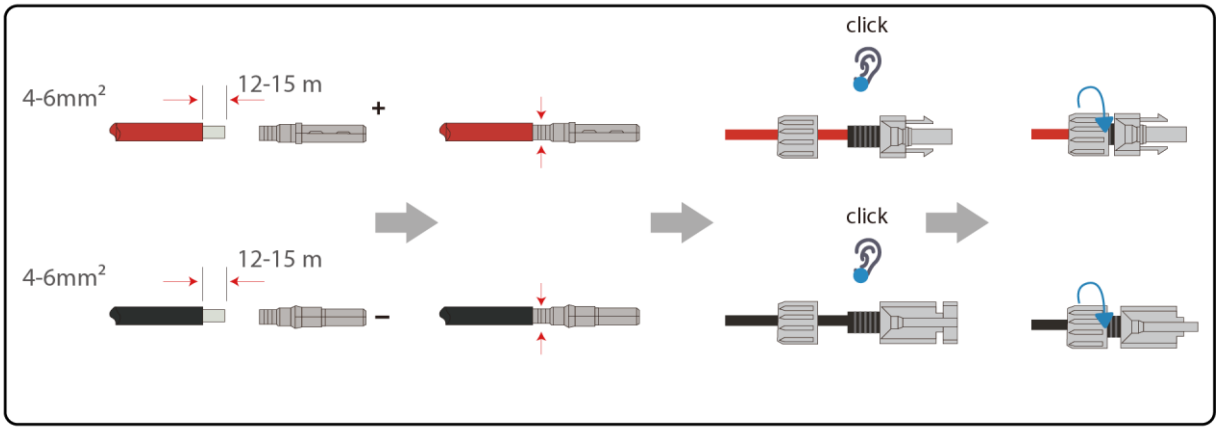
1. Use the right PV connectors in the accessory box.
2. The voltage, current, and power ratings of the PV strings are within the allowable range of the inverter. Please refer to the Technical Data Sheet for

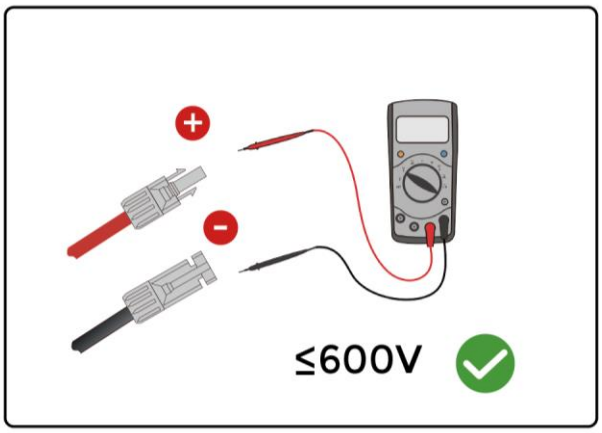
voltage and current limits

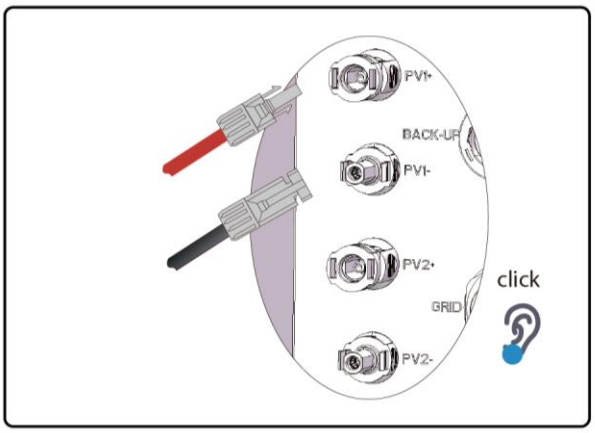
3. Make sure the PV switch of the inverter is in the “OFF” position during wiring.
4. PV strings could not connect to the EARTH conductor.

Step 1: Choose the 10 AWG wire to connect with the cold-pressed terminal. Remove 12~15mm of insulation from the end of wire.

Step 2: Connect PV cables to PV terminals.







4.7 Grid Connection

Step 1: Check the grid voltage.

1. Check the grid voltage and compare with the permissive voltage range (Please refer to technical data);
2. Disconnect the AC breaker from all the phases.

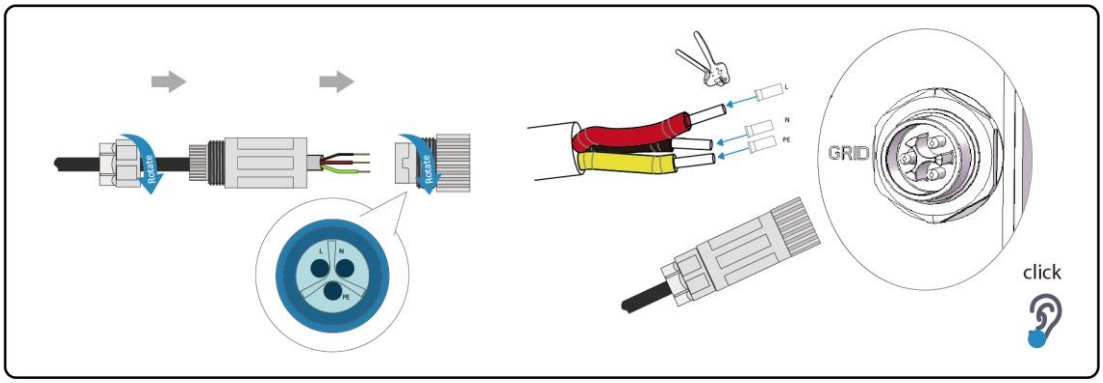
Step 2: Grid cables selection

Use the right pin terminal from the accessory box. Press the connectors on cable

conductor core tightly. (Remove 10mm of insulation from the end of wire.)

Model	AIO-10KWH1P2S-CE
Cable	10AWG

Step 3: Cross the Grid cables through the grid port, connect cables to Grid terminals.



4.8 Back-up: Load Connection

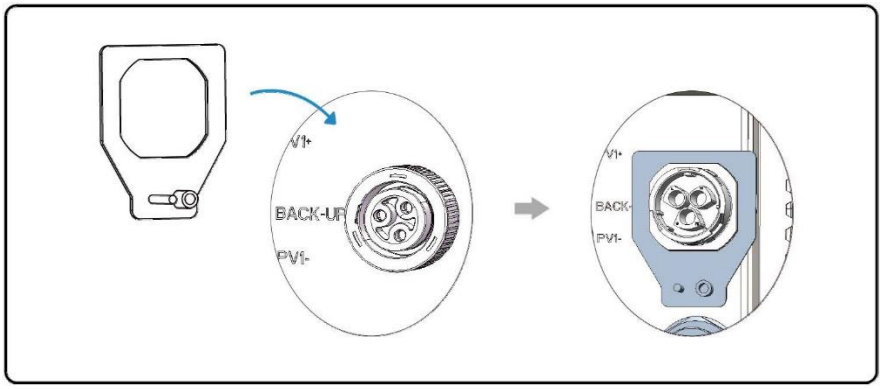
Inverter has On and Off grid function, the inverter will deliver output power through AC port when the grid is on, and it will deliver output power through back-up port when the grid is off.
Load port: important load.
1). For inverter, the standard PV installation typically consists of the connecting the inverter with both panels and batteries.
2). Hybrid inverters are able to supply overload output as its “Back-Up”. For details, please refer to the technical parameters of inverter. And the inverter has self-protection dreading at high ambient temperature.
3). For complicated application, or Special load, please contact after-sales team.

NOTE
In case of discrepancies between wiring mode of local policy and the operation guide above, especially for the wiring of neutral line, grounding, please contact us before any operation!

Step 1: Make BACK-UP wires.

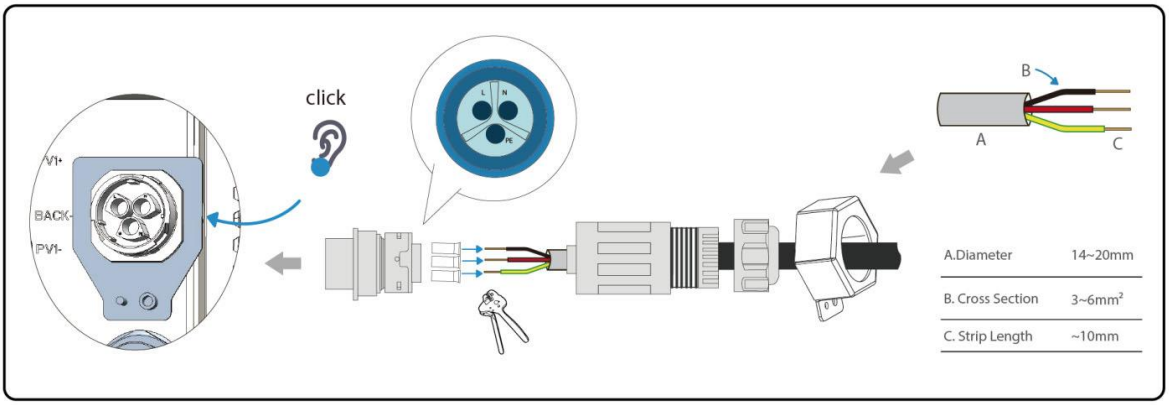
Model	AIO-10KWH1P2S-CE
Cable	10AWG

Step 2: Put the anti-pull plate on the BACK-UP port of the inverter.



Step 3: Pass the backup cables through anti-pull cover, the backup terminal in sequence

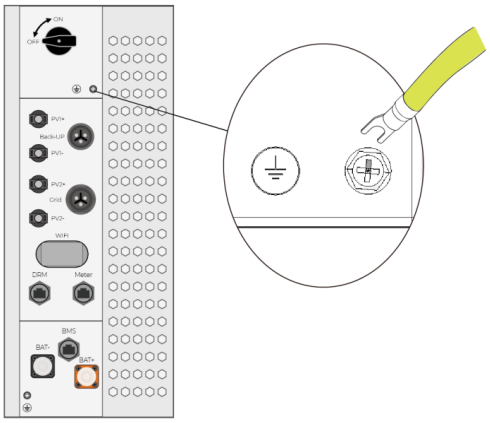
Step 4: Plug back-up terminal into the port and secure the anti-pull plate to the cover using screw M4



WARNING
• Make sure the BACK-UP load power rating is within BACK-UP output rating, otherwise the inverter will shut down with an “over load” warning. • When an “over load” is appeared, adjust the load power to make sure it is within the BACK-UP output power range, then return the inverter. • For the nonlinear load, please make sure the inrush power should be within the BACK- UP output power range. • You have to enable the EPS function by APP; if not, there is no voltage output.

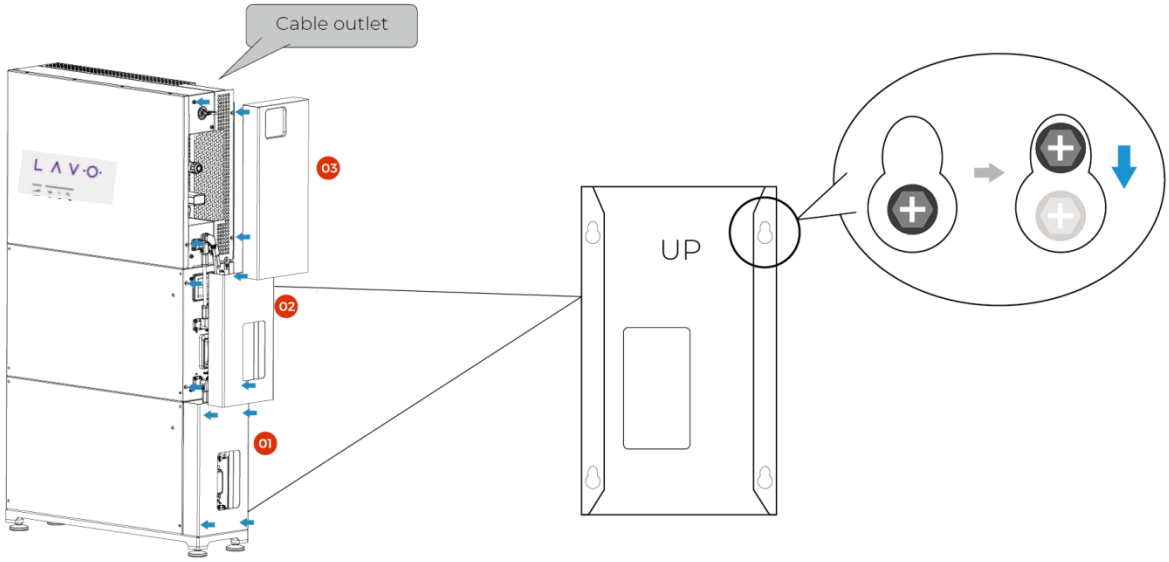
4.9 Protective Cover Connection

WARNING
The protective grounding of the shell cannot replace the PGND cable of the AC output outlet. Ensure that the two PGND cables are reliably connected.



4.9.1 Install Protective Cover

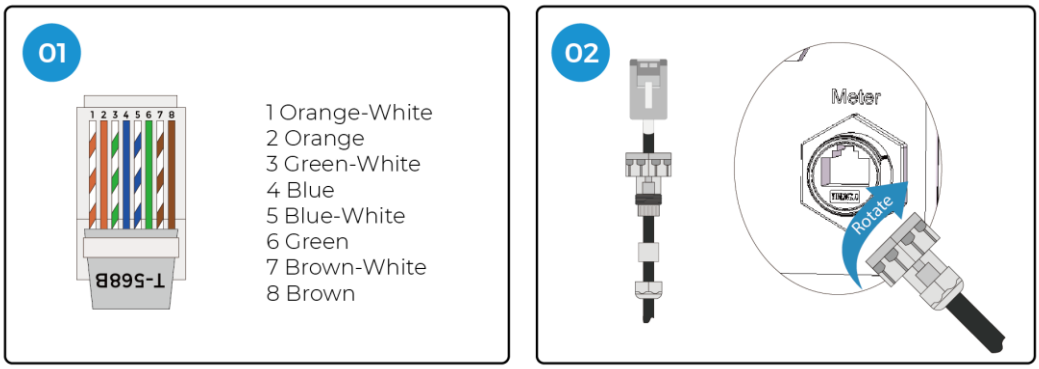
Before installing the protective cover, ensure that all installation, cables, and auxiliary devices are properly installed, and then power on and off to check the operation. If the running check passes, turn off the power supply and install the protective cover.



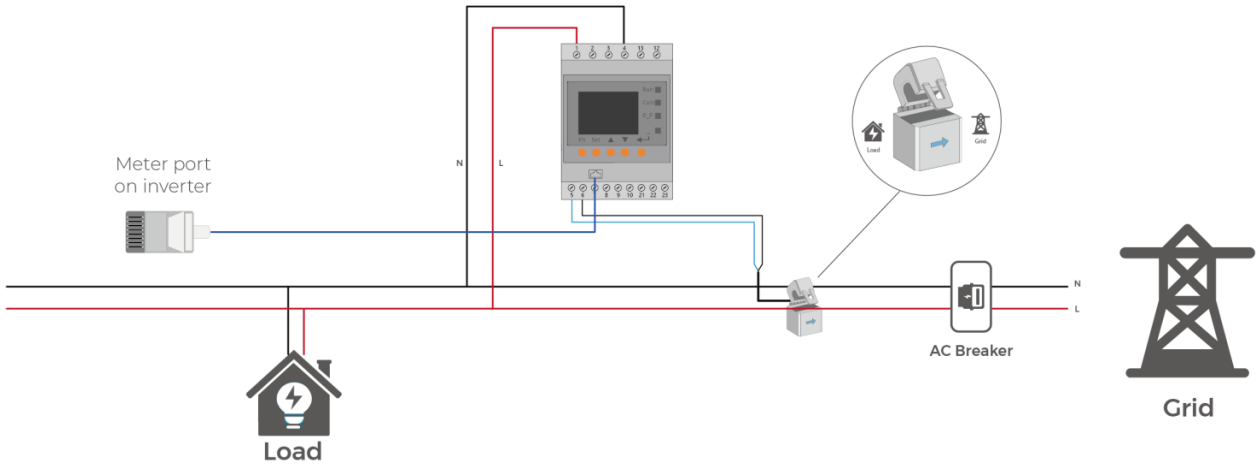
4.10 Meter and CT Installation

CT is short for “current transform”, and it is used to detect Grid current.

Step 1: Get the connector together with RJ45 header in parts bag then unscrew it;
Step 2: Thread the cable through the connector;
Step 3: Strip a distance of 12~15mm;
Step 4: Rearrange the sequence of color-coated copper wires in the standards of TIA568B;
Step 5: Attach the 8 wires inside the cable to 8 pins in RJ45 header and crimp;
Step 6: Plug into the data port labeled Meter on the PCS firmly;
Step 7: Screw the connector clockwise to fix it on the data port;
Step 8: Connect the cables for meter.



Step 9: Find the power terminal 1 and 4 (1 for L and 4 for N) on the meter;
Step 10: Connect the power terminal with a house power supply terminal correspondingly while the cable for connection between the meter and the grid that should be prepared by your own (Cable: 2.5~4mm2/10AWG);
Step 11: Get the opened CT circle through the grid cable (L) that connecting between the grid terminal on the AIO and the house power supply terminal;

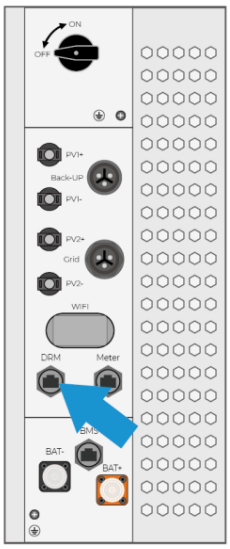


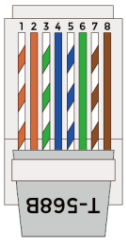
NOTE
If CT is not installed or installed reversely, the functions of “Anti-reflux”, “Self-use”, “Peak-shift” will not be realised. The direction of the arrow on the CT points from this inverter to the GRID!

4.11 DRM Connection

A Demand Response Enabling Device (DRED) can be connected to the S2 by a plug-in communication port labeled as DRM on the right side of PCS. Wire-crimping steps are the same as a normal comm. cable with a connector.

To enable or disable a DRM function, please go to your LAVO Life APP >> Parameter >> Factory Data >> DRM.
The hybrid inverter will detect and initiate a response to all supported demand response commands within 2s and will continue to respond while the mode remains asserted.





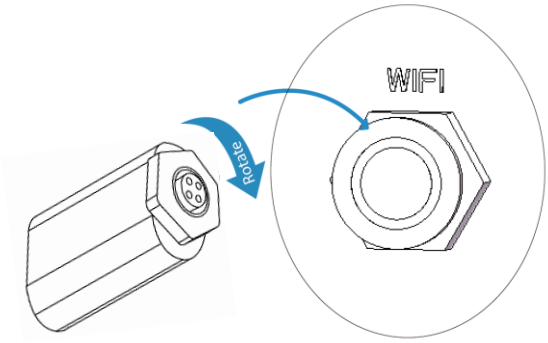
PIN	1	2	3	4
Function Description	1/5	2/6	3/7	4/8

PIN	5	6	7	8
Function Description	0	RefGen	Short Internal	

4.12 Wi-Fi Dongle Connection

Inverter provides a Wi-Fi port which can collect data from inverter and transmit it to monitoring-website by Wi-Fi.

Wi-Fi Connection:
Step 1: Plug Wi-Fi into “Wi-Fi” port at the bottom of the inverter.
Step 2: Build the connection between the inverter and router.
Step 3: Create a user account online. (Please check the Wi-Fi user manual for more details).



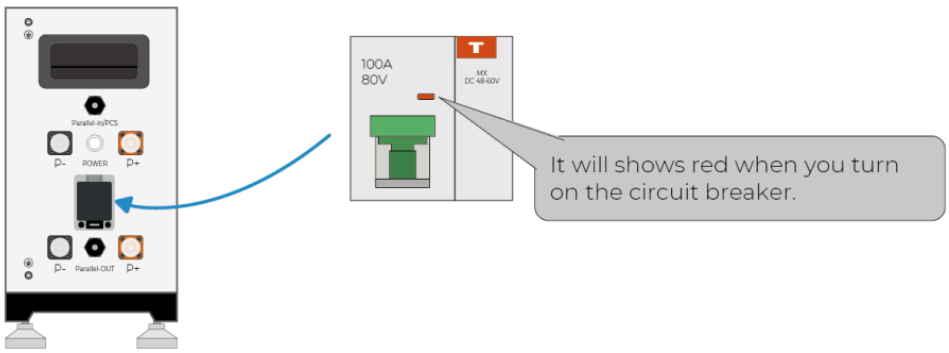
NOTE
Dongle lights on after PCS power on if it is properly connected.

5 After Installation Checklist

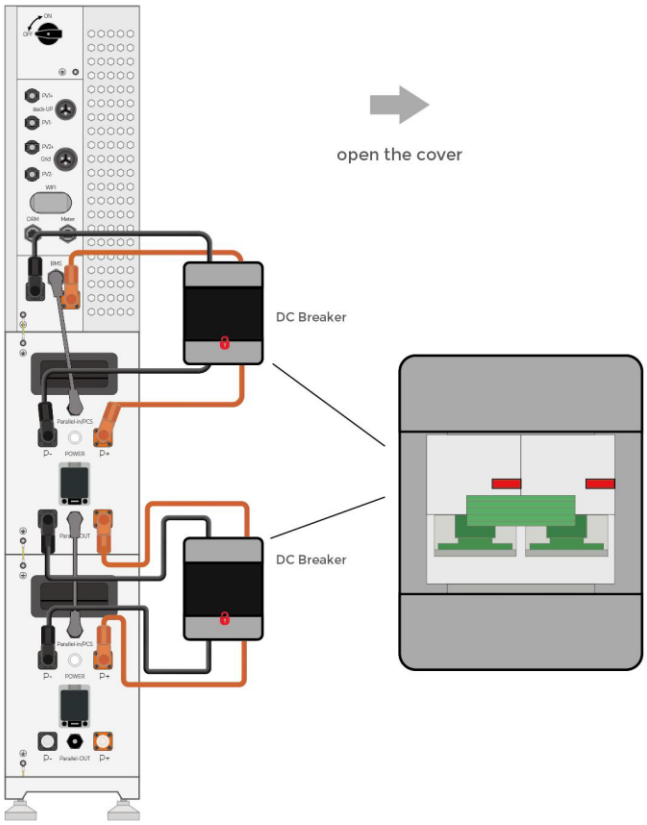
We've almost finished the installation process. Open the cable and Wi-Fi connection is successful, it is time to examine power on and power off guide.

5.1 Power On Procedure

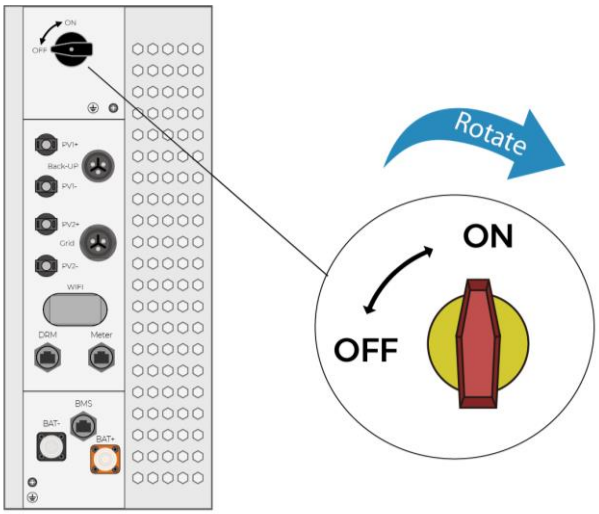
Step 1: Turn on the battery breaker.



Step 2: Turn on the external DC breaker.



Step 3: Turn on the PV switch.



Step 4: Turn on the grid breaker.

Step 5: If the back-up load is applied, turn on the backup breaker.

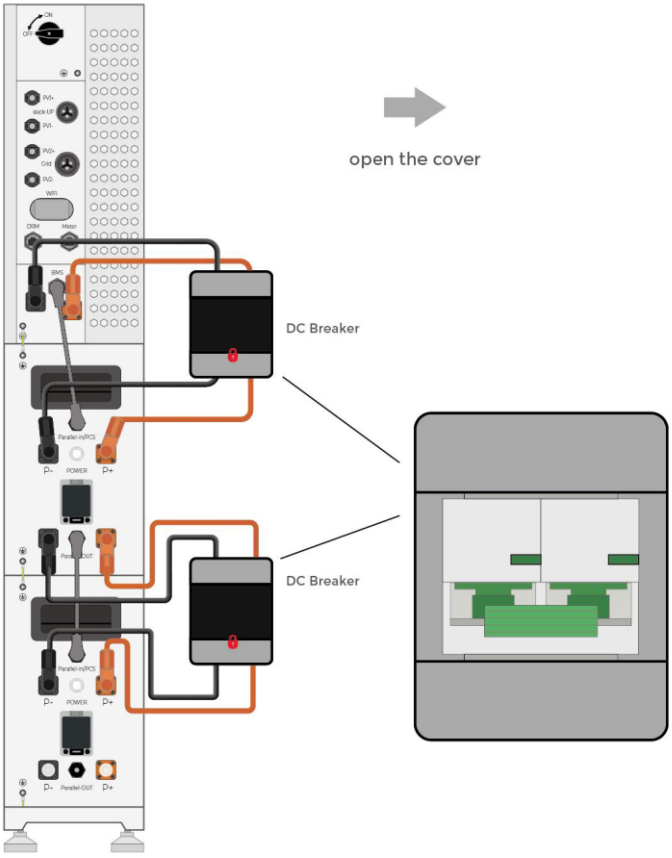
Step 6: Configure the WIFI stick.

CAUTION
Make sure the WIFI connected is 2.4GHz; if not, it will not work.

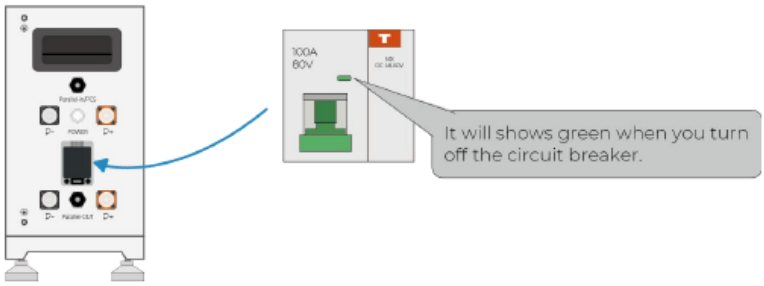
NOTE
If the indicator is green, the system has started successfully. When the DC or communication cable is improperly connected or the cable quality is poor, the indicator will not be on.

5.2 Shutdown Procedure

Step 1: If the backup load is applied, turn off the backup load first and then turn off the backup breaker.
Step 2: Turn off the grid breaker.
Step 3: Turn off the PV switch.
Step 4: Open the external DC breaker covers and turn off the breakers.



Step 5: Open the battery breaker covers and turn off the battery breakers.



WARNING
If you need to perform other operations after the power is off, use a multimeter to check whether the power is off or wait at least 5 minutes.

5.3 Install the LAVO Storage S2 Applications

LAVO monitoring platform supports both APP and web monitoring. Users can monitor detailed running information like generating capacity, system data, and send commands, set parameters.

LAVO S2 App
Scan the QR code and download the LAVO S2 App

LAVO Commissioning Guide
Scan the QR code and download the LAVO S2 file

NOTE
• The APP is physically bound to the system via a Wi-Fi module installed on the inverter. Before using APP, make sure the WIFI dongle is connected. • The customers' LAVO Life account has already been set up during the pre-installation process.

6 Storage and Maintenance

6.1 Warehouse Storage

If the system is not to be installed immediately or removed from operation and needs to be stored for a long period, please choose an appropriate location to store it.

Instructions for storage are:

1. Keep a dry clean storage place with proper ventilation. Specifically, with a relative humidity of 5%~95% RH. If ambient temperature ranges from -30°C to -20°C or 45°C to 60°C, storage period lasts for seven days. If ambient temperature ranges from -20°C to 45°C, storage period lasts for six months. The temperature of the system stored is recommended in the range of 15°C to 45°C.
2. It is not recommended to store battery modules in 7-meter-height warehouse. Modules should be placed not higher than 2 meters from floor.
3. Modules with safety deficiencies and regular modules must be stored in separate areas divided by a wall or within distinct fire protection zones.
4. Avoid potential electrical fire hazards. Ensure electrical conduits, switch boxed, and sockets are intact. Keep a distance of 0.5 meters from floor-standing air conditioning and dehumidifiers clear of flammable materials. Opt for cold light sources in the warehouse. If spotlights are used, maintain a minimum of 1 meter distance from other flammable materials.
5. Warehouse should be labelled with smoking ban. Smoking points should be reasonably designed with a fire-retardant wall separating warehouse. There should be no cigarette use near the warehouse, including placing of cigarette butts on ground.
6. Warehouse should have mice protective measures, like plugging up holes and caves, timer-connected mouse expeller, floor baffler against mouse sealing door slot with less than 10mm gap.
7. Warehouse should use fire retardant materials. Prohibit inflammable materials like plastic or canvas.
8. Warehouse should be equipped with fire detector, watch-keeper, and surveillance video cameras and videos should be kept for at least 1 month.
9. Module performance is vulnerable to chemical corrosion, strong acid, strong base, electrochemical corrosion, salt spray and radiation.

10. Do not expose the system to water.
11. The product box should be upright and not stacked upside down when storing the battery box.
12. If the battery needs to be stored for over 3 months, the main breaker of the battery is suggested to be disconnected. Otherwise, the battery would be discharged at a minimum rate and its capacity will be reduced depending on storage time. The battery self-consumption will be less than 5W.
13. If the battery will be stored for over 6 months, it is suggested to connect the battery with an inverter and commission the system.

6.1.1 Fire Extinguish Device

- Battery sites must be equipped with multiple varieties of battery fire extinguishers, including fire sand, blanket and power extinguishers.
- It is recommended to deploy a micro fire station with firefighter uniforms, helmets, fire protection masks, safety gloves, and at least one set of first aid kit including medical devices and drugs.

6.1.2 Smoke Discharge

- Equip the room with independent fans that run 24 hours/7days and has a failure alert function. Fans should coordinate with smoke detectors or gas concentration detectors.
- The ventilation capability should not be less than 12 times per hour and wind speed should exceed 0.5 meters per second.
- Fan portfolio includes axial flow fan on wall (effective distance less than 5 meters), fan with fixed air hose, and mobile fan with flexible aluminium foil. The combination of wall fan and mobile fan is recommended.

6.1.3 Fire Retardant Buildings

- Warehouse and plant should use level two fire retardant materials, such as rock wool colour steel plate, plasterboard and iron rain-shed.
- Inflammable materials like foam and plastics are prohibited.

6.1.4 Separate Storage

- Do NOT store lithium batteries with inflammable or toxic objects.
- Design various fire protection zones. Store normal modules and modules with safety deficiencies separately.

6.1.5 Recharge

- Keep the shipment module SOC less than 30% and charge the module if it has been stored for more than 5 to 6 months.
- Set CV to 54V and CC to 45A and charge the module for 1.5 hours until module terminal blocks are measured between 53.3V to 54V.

6.2 Maintenance Cycle

Maintenance Cycle	Items
Every 6 Months	Fully charge the battery and then discharge it to 25~50% if the battery is not in use.
	Check the wall mounting bracket and the locking plate and fix them if they are not tight enough.
	Check whether the enclosure is broken. Repair the painting or contact after-sales service if anything is broken.
	Check whether there is an exposed cable. Replace the exposed cable or contact after-sales service for help.
	Check whether there is debris accumulation around the battery to avoid affecting heat dissipation.
	Check for water and pest to avoid prolonged intrusion.
Every Year	Turn the DC switch on and off 10 consecutive times to make sure it is working properly.
	Check whether all the unused terminals and port are properly sealed. If not, please seal them.

7 Safety, Regulation & General Service

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

7.1 General Safety

LAVO battery is designed with multiple safety strategies to prevent hazards resulting from failures. However, LAVO cannot guarantee their absolute safety in uncertain situations.

- All installation operations should be performed by trained and authorised technical personnel who are familiar with local standards and electric systems. Learn about the product before installation.
- Do not use the battery of the master box if it is defective, broken or damaged.
- Do not disassemble, modify, or replace any part of the battery or the master box without LAVO's authorisation.
- Do not hit, drag, pull, squeeze, crush, drop, penetrate on the product or give weight in any ways into any part of the battery system.
- Keep the equipment stable to avoid it falling over, which can result in equipment damage and personal injuries.
- Protect the battery system from damage during transportation and storage to meet LAVO's requirements. And the details during the transportation should be recorded.
- The battery may explode when the ambient temperature exceeds 150°C. Do not place the battery in a high temperature environment.
- Contact after-sales service immediately if the battery is unable to start. Otherwise, the battery might be damaged permanently.
- Do not move the battery system if it is connected with external battery modules. Contact after-sales service if the battery needs to be replaced.

7.1.1 Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If one is exposed to the leaked substance, action as below:

- **Inhalation:** Evacuate the contaminated area and seek medical attention immediately.
- **Eyes contact:** Rinse eyes with flowing water for 15 minutes, and seek medical attention immediately.
- **Skin contact:** Wash the affected area thoroughly with soap and water, and seek medical attention immediately.
- **Ingestion:** Induce vomiting as soon as possible, and seek medical attention immediately.

7.1.2 Fire

In case of a fire, make sure that an ABC or carbon dioxide extinguisher is nearby and do not use water to extinguish the fire.

WARNING
The battery pack may catch fire when heated above 150°C.

If a fire breaks out where the battery is installed, action as below:
1. Extinguish the fire before the battery catches fire.
2. If the battery has caught fire, do not try to extinguish the fire. Evacuate people immediately.

WARNING
If the battery catches fire, it will produce poisonous gases. Do not approach.

7.1.3 Wet Battery

If the battery is wet or submerged in water, do not try to access it. Contact LAVO for technical assistance.

7.1.4 Damaged Battery

If the battery is damaged, please contact LAVO for help as soon as possible. Damaged batteries are dangerous and must be handled with extreme caution. Damaged batteries are not suitable for use and may pose a danger to people or property. If the battery seems to be damaged, return it to LAVO.

CAUTION
Damaged batteries might export electrolyte or flammable gas, so contact LAVO for advice and information immediately and we will deal with it.

7.2 Safety Symbols & Warnings

The product is designed, manufactured, and tested as per international safety standards. However, as an electrical and electric product, it must be installed, operated, and maintained strictly according to related safety notices.

If you have any problems, please contact LAVO. Please DO NOT install or repair the product by anyone who is not certified by local authority.

We are not responsible for any damage or loss caused by misuse or misunderstanding of the information in the manual.

7.2.1 Symbols Explanation

	The system will be touchable or operable after at least 10 minutes disconnected, in case of any electrical shock.		Install the product out of reach of children.
	Danger of high voltage and electric shock!		Do not place nor install near flammable or explosive materials.
	Danger of hot surface and burn injury!		In case of electrolyte leakage, keep leaked electrolyte away from eyes or skin.
	Earth line!		Disconnect the equipment before carrying out maintenance or repair.
	The wasted products must be sent to the authorised collecting center!		Do not connect the Pack's positive (+) and negative (-) terminal reversely.
	Refer to the operating instructions.		Take care! This module is heavy enough to cause serious injury.
	Danger! Serious physical injury or even death may occur if not		Observe precautions for handling electrostatic discharge

	follow the relative requirements.		sensitive devices.
CE	CE mark: The inverter complies with the CE directive.		Do not use the Pack beyond specified conditions.

7.2.2 Safety Warning

Warning	The system must be installed according to the local standards and related standards for an electrical enterprise. Please follow the instructions in this manual to use and operate the system.
Danger	Keep the DC circuit breaker of PV is OFF. High voltage will be generated by the PV array exposed under sunshine. All the cables must be connected firmly.
Danger	PV negative (PV-) and battery negative (BAT-) on the system side are not grounded as default design. Connecting PV- or BAT- to the ground are strictly forbidden.
Danger	1. High voltage is a hazard. Make sure the system device is away from children. 2. Any touch with the device or terminal may cause electric shock or fire. Please follow all the safety instructions. 3. Damaged devices or system faults may cause electric shock. Make sure that you have checked the package and the device before installation to avoid unnecessary damage or loss.
Caution	Be aware of the hot surface while the device is running.
Warning	Do not open the inverter cover or change any components without our authorisation, otherwise the warranty commitment of the inverter will be invalid.
Warning	1. Grounding the PV generator. 2. Comply with the local requirements for grounding the PV modules and the PV generator. It is recommended to connect the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of system and persons

⚠ Warning	1. Ensure input DC voltage ≤Max. DC voltage. Over voltage may cause damage. 2. Permanent damage to the inverter or other losses, which will not be included in warranty!
⚠ Warning	1. Authorised service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter. 2. Do not operate the inverter when the device is running.

7.2.3 Battery Handing Guide

- Use the battery pack only as directed.
- If the battery is defective, appears cracked, broken, or otherwise damaged, or fails to operate, contact LAVO immediately.
- Do not attempt to open, disassemble, repair, tamper, or modify the battery.

The battery is not suitable for users to use by themselves.

- To protect the battery and its components from damage when transporting, handle them with care.
- Do not subject it to any strong force.
- Do not insert foreign objects into any part of the battery pack.
- Do not use cleaning solvents to clean the battery.
- The battery cannot be connected directly to the SELV circuit.

7.3 Installers

AIO-10KWH1P2S-CE is suggested to be installed by skilled workers or electricians. A skilled worker is defined as a person who has been trained and is a certified electrician or qualified with all of the following skills and experience:

- Knowledge of the functional principles and operation of on-grid AIO-10KWH1P2S-CE.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices.
- Knowledge of and adherence to this manual and all safety precautions and best practices.

7.4 Scrap Battery

For scrap batteries, please deal with local laws or regulations to recycle or scrap.

8 Appendix

8.1 Troubleshooting

Perform troubleshooting according to the following methods. Contact the after-sales service if these methods do not work. Collect the information below before contacting the after-sales service, so that the problems can be solved quickly.

- Inverter information like serial number, software version, installation date, fault frequency, etc.
- Installation environment, including weather conditions, whether the PV modules are sheltered or shadowed, etc. It is recommended to provide some photos and videos to assist in analysing the problem.
- Utility grid situation.

No.	Error	Cause	Solutions
1	Relay Err.	1. The relay is abnormal or short-circuited. 2. The control circuit is abnormal. 3. The AC cable connection is abnormal, like a virtual connection or short circuit.	1. Disconnect PV input switch and check the AC cable, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
2	GFCI Device Err	The sampling of the GFCI CT is abnormal.	Contact the after-sales service.
3	Fan Err	1. The fan power supply is abnormal. 2. Mechanical exception. 3. The fan is aging and damaged.	Contact the after-sales service.
4	Eeprom Err	The internal memory Flash is abnormal.	Contact the after-sales service.
5	Lost Com.M<->S Err	Communication internal Inverter is abnormal.	Contact the after-sales service.

6	ISO Err	The grounding impedance of PV system is below the allowable range.	1. Check whether the PV input cables are broken. 2. Check whether the module frames and the metal bracket are securely grounded. 3. Check whether the AC side is properly grounded.
7	Temp.High Err	1. The inverter is installed in a place with poor ventilation. 2. The ambient temperature is too high. 3. A fault occurs in the internal fan of the inverter.	1. Check the ventilation and the ambient temperature at the installation point. 2. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation. 3. Contact the after-sales service if both the ventilation and ambient temperature are normal.
8	Temp.Low Err	1. The inverter is installed in a place with poor ventilation. 2. The ambient temperature is too low.	Contact the after-sales service.
9	Bus Volt.High Err	1. The PV voltage is too high. 2. The sampling of the BUS voltage is abnormal.	1. Disconnect PV input switch and check the PV voltage, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.

10	GFCI Err	The input insulation reactance to the ground is below the allowable range when the inverter is operating.	1. Check whether the working environment of the inverter meets the requirements. For example, the fault may occur due to high humidity on rainy days. 2. Make sure that the components are properly grounded and the AC side is properly grounded.
11	DCI Err	The machine detects that the DC component of the internal output current exceeds the normal range.	Check the components and wiring.
12	HWBus Volt.High Err	The hardware of the BUS circuit is abnormal.	Contact the after-sales service.
13	HWPV Curr.High Err	The hardware of the PV circuit is abnormal.	Contact the after-sales service.
14	HWInv Curr.High Err	The hardware of the inverter circuit is abnormal.	Contact the after-sales service.
15	Inv Short Err	1. Short circuit in power grid input. 2. Backup output. 3. The hardware is abnormal.	1. Disconnect PV input switch, check the AC cable and load, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
16	Over Load Err	1. Overload. 2. Circuit abnormality.	Contact the after-sales service.

17	PV1 Volt.High Err	Excess PV modules are connected in the series, and the open-circuit voltage is higher than the operating voltage.	1. Check whether the PV string input voltage is consistent with the value displayed on the LCD. 2. Check whether the PV string voltage meets the maximum input voltage requirements.
18	PV2 Volt.High Err	Same as above.	Check the voltage and contact support if necessary.
19	PV1 Curr.High Err	1. Temporary abnormality is caused by environmental factors. 2. Internal components of the inverter are damaged.	Contact the after-sales service.
20	PV2 Curr.High Err	Same as above.	Contact the after-sales service.
21	Inv Curr.High Err	1. The sampling of the inverter is abnormal. 2. Internal components of the inverter are damaged. 3. Overload.	Contact the after-sales service.
22	Grid Volt.High Warn	The utility grid voltage is out of the allowed range.	1. Make sure that the grid voltage is within the allowed range. 2. Make sure that the phase sequence of the AC cables is connected correctly, and the neutral wire and PE cable are connected properly and firmly.

			3. Contact the after-sales service if the grid voltage is within the permissible range.
23	Grid Volt.Low Warn	The utility grid voltage is out of the allowed range.	Same as Grid Volt.High Warn.
24	Grid Freq.High Warn	Utility grid exception. (The actual grid frequency change rate does not meet the requirement of the local grid standard.)	1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid frequency is within the permissible range. Contact the local power company if the grid frequency exceeds the permissible range. 3. Contact the after-sales service if the grid frequency is within the permissible range.
25	Grid Freq.Low Warn	Utility grid exception.	Same as Grid Freq.High Warn.
26	Grid Loss Warn	1. Utility grid power fails. 2. The AC cable is disconnected.	1. The alarm is automatically cleared after the grid power supply is restored. 2. Check whether the AC cable is connected.
27	Grid Volt.10min Warn	Voltage in the power grid exceeds allowed range for 10 mins.	1. Make sure that the grid voltage is within the allowed range.

			2. Make sure that the phase sequence of the AC cables are connected correctly, and the neutral wire and PE cable are connected properly and firmly. 3. Contact the after-sales service if the grid voltage is within the permissible range.
28	Over Load Warn	1. Overload 2. Circuit abnormality	1. Disconnect PV input switch, check the AC cable and load, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
29	Bat Input Short Err	1. Battery input short circuit. 2. Circuit abnormality.	1. Disconnect PV input switch, check the battery cable, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
30	Bat Volt.High Err	Battery voltage above allowable range.	1. Disconnect PV input switch, check the battery, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
31	BusSoftTimeOut Err	Inverter is abnormal.	1. Disconnect PV input switch, then reconnect 5 minutes later.

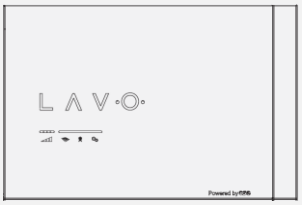
			2. Contact the after-sales service.
32	Lost Com.M<->S Err	Communication internal Inverter is abnormal.	Contact the after-sales service.
33	Bus Volt.High Err	1. The PV voltage is too high. 2. The sampling of the BUS voltage is abnormal.	1. Disconnect PV input switch and check the PV voltage, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
34	BUS Volt.Consis Err	1. The judgment results of the master-slave control chip are inconsistent. 2. Chip is abnormal.	Contact the after-sales service.
35	Out Insert Err	Misconnection of power grid to load interface.	1. Disconnect PV input switch, check the load cable and load, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
36	Inv Wave Err	1. Overload. 2. Inverter is abnormal.	Contact the after-sales service.
37	CHG1 Curr Err	The instantaneous value of charging current is too high.	1. Disconnect PV input switch, then reconnect 5 minutes later. 2. Contact the after-sale service.
38	CHG2 Curr Err	Inverter is abnormal.	Contact the after-sales service.
39	Grid Volt.Consis Warn	1. The judgment results of the master-slave control chip are inconsistent. 2. Chip is abnormal.	Contact the after-sales service.

40	Grid Freq.Consis Warn	1. The judgment results of the master-slave control chip are inconsistent. 2. Chip is abnormal.	Contact the after-sales service.
41	Bms Com Lost Warn	BMS communication link is abnormal.	1. Disconnect PV input switch, check the BMS communication link, check communication protocol settings, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
42	Battery Open Warn	1. The battery is not reliably connected. 2. The battery voltage is too low.	1. Disconnect PV input switch, check the battery cable and battery voltage, then reconnect them 5 minutes later. 2. Contact the after-sales service if the problem persists.
43	Battery Dod Warn	The battery voltage is too low.	Same as Battery Open Warn.
44	Battery Low Warn	The battery voltage is too low.	Same as Battery Open Warn.

8.2 Product Parameters

Manufacturer Information

	Manufacturer Information
Name	CSE Energy & Technology Co., Ltd
Address	Building S4, No. 777 Sizhuan Road, Shanghai, China
TEL	+86-21-5080 9880
E-mail	service@solarcse.com
Website	www.solarcse.com

Model	AIO-10KWH1PINV-CE	AIO-10KWH1P-CE			
System Schematic					
Unit Number (PCS/Battery)	1/0	1/1	1/2	1/3	1/4

General Data	
AIO Dimensions W*D*H (mm)	730*203*1282
AIO Weight (kg)	139.8
Communication	CAN/RS485/DRM
Communication with Portal	Wifi/Bluetooth
Human-machine interface	LED/APP
Ingress Protection	IP65
Noise Emission (dBA)	<29
Self-consumption at Night (W)	<10
Battery Pack Topology	Non-isolated
Heat Dissipation Method	Natural
Working Temperature Range (Charging)	0~50℃
Working Temperature Range (Discharging)	-10~55℃
Optimum Working Temperature	10~35℃
Relative Humidity (RH)	0~95%, Non-condensation
Warranty	10 years
Altitude (m)	≤3000
Mounting Method	Stacked Ground-mounted
Certification Standard	IEC62109-1/2, IEC61000-6-1/3, AS 4777 etc.

PV Input Data	
PCS Model	AIO-10KWH1PINV-CE
PCS Dimensions W*D*H (mm)	730*203*482
PCS Net Weight (kg)	33

Max. Input Power (Wp) @ STC	10000
Max. Input Voltage (V)	600
MPPT Voltage Range (V)	120~550
MPPT Start-up Voltage (V)	120
MPPT Max. Input Current (A)	13.5
MPPT Max. Short Circuit Current (A)	15
No. of MPPT Trace Paths	2
No. of PV Strings Per MPPT Tracker	1
PV Interface	MC4
AC Output Data (Grid On)	
Max. Output Apparent Power (VA)	5000
Rated Output Power (W)	5000
Max. Output Power (VA)	5000
Rated Output Current (A) @230Vac	21.7
Max. Output Current (A)	22.7
Rated Output Voltage/Range (V)	230/180~280
Rated Output Frequency/Range (Hz)	50/60
Power Factor (cosΦ)	From 0.8 leading to 0.8 lagging
Output the Connection Phase	1/1
Max. output fault current (A)	42
Max. output overcurrent protection (A)	29
THD (%)	<3
AC Input Data	
Rated Input voltage (V)	230
Max. Input current (A)	42
Rated Input frequency (Hz)	50/60
AC Output Data (Back-up)	
Rated Output Power (VA)	5000
Peak Output Power (VA)	6000 @10s

Rated Output Voltage/Range (V)	230/180~280
Rated Output Frequency/Range (Hz)	50/60
THD (%)	<3

Battery Data				
Battery Model	AIO-10KWH1PBM-CE			
Parallel Number of PACK	1	2	3	4
Type of Battery	LiFePO4			
Total Capacity (Ah)	106	212	318	424
Total Energy (kWh)	5.427	10.854	16.281	21.708
Rated Capacity (Ah)	104	208	312	416
Rated Energy (kWh)	5.324	10.649	15.974	21.299
Depth of Discharge	90%			
Usable Energy (kWh)	4.792	9.584	14.377	19.169
Rated Input Voltage (V)	51.2			
Rated Current (A)	50	100		
Rated Power (W)	2560	5120		
Working Voltage Range (V)	43.2~57.6			
Max. Charging Current (A)	50	100		
Max. Charging Power (W)	2560	5120		
Max. Discharging Current (A)	50	100		
Max. Discharging Power (W)	2560	5120		
Battery Module Dimensions W*D*H (mm)	730*203*370			
Battery Module Weight (kg)	51	102	153	204
Working Temperature (Charging)	0~50℃			
Working Temperature (Discharging)	-10~55℃			
Optimum Working Temperature	10~35℃			
IP Rating	IP 65			
Installation	Stack Mounting			
Communication	CAN/RS485			
Remote Update	Yes			
Parallel Number	4P			

Related Humidity (RH)	0~95%
Altitude (m)	≤3000
Cycle Life (25℃/0.5C)	6000 Cycles/70%SOH
Design Life (25℃/0.5C)	10 Years/70%SOH
Efficiency	
Max. Efficiency	96.9%
European Efficiency	96.2%
Max. Battery Discharge Efficiency	94.3%
Protection Device	
AC Short-circuit Protection	Integrated
Overload Protection	Integrated
Residual Current Detection	Integrated
Battery Reverse Protection	Integrated
Pollution Class	PD2(inside), PD3(outside)
Anti-island Protection (RoCoF)	Integrated
AC Surge Protection	Integrated
DC Surge Protection	Integrated
DC Over/Under-voltage Protection	Integrated
AC Over/Undervoltage Protection	Integrated
AC Over/Underfrequency Protection	Integrated
Valley Peak Time Setting	Integrated
Ground Fault Monitoring	Integrated