



Power Box Ai-LB 5K

Installation Manual

Version:V01

For the latest Power Box installation documents in all supported languages, visit:
www.solplanet.net

⚠ WARNING

Read this entire document before installing or using Power Box . Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage Power Box, potentially rendering it inoperable.

PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at AISWEI, we reserve the right to make product modifications at any time.

The images provided in this document are for demonstration purposes only. Depending on product version and market region, details may appear slightly different.

ERRORS OR OMISSIONS

To communicate any inaccuracies or omissions in this manual, please contact AISWEI.



ELECTRONIC DEVICE: DO NOT THROW AWAY

Proper Disposal of batteries is required. Refer to your local codes for disposal requirements

MADE IN CHINA

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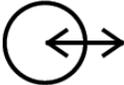
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IMPORTANT SAFETY INSTRUCTIONS:

This manual contains important instructions for the Power Box that must be followed during installation and maintenance of the system.

Power Box installation and service require knowledge of high voltage electricity and should only be performed by AISWEI Certified Installers. AISWEI assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warning and cautions must be followed when using Power Box.

These symbols indicate important safety information in this guide or on the equipment:

Symbol	Explanation
	Indicates a hazardous situation which, if not avoided, could result in injury or death.
	Indicates a hazardous situation which, if not avoided, could result in minor injury or damage to the equipment.
NOTE	Indicate an important step or tip that leads to best results, but is not safety or damage related.
	Indicates components that present risk of electrical shock.
	Indicates location of combined input/output connector on the equipment.
	Indicates location of grounding connection on the equipment.
	Discharge time is 5 minutes from de-energization.
	Indicates that user should refer to operating or installation instructions before proceeding.

General Information:

 **WARNING**

Reading this entire document before installing or using Power Box. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death or can damage Power Box, potentially rendering it inoperable.

 **WARNING**

A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.

 **WARNING**

Power Box installation must be carried out only by AISWEI Certified Installers who have been trained properly.

 **WARNING**

Power Box is heavy. Use of Lift equipment is recommended.

 **WARNING**

Use Power Box only as directed.

 **WARNING**

Do not use Power Box if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.

 **WARNING**

Before beginning the wiring portion of the installation, ensure that Power Box is switched off, and open any associated circuit breakers and disconnect switches (if applicable for the installation).

 **WARNING**

Do not attempt to open, disassemble, repair, tamper with, or modify Power Box. Power Box and its components are not user serviceable. Batteries in Power Box are replaceable. Contact the AISWEI Certified Installer who installed the system for any repairs.

 **WARNING**

To protect Power Box and its components from damage when transporting, handle with care. Do not impact, Pull, drag, or step on Power Box. Do not subject Power Box to any strong force. To help Prevent damage, leave Power Box in its shipping packaging until it is ready to be installed.

 **WARNING**

Do not insert foreign objects into any part of Power Box.

 **WARNING**

Do not expose Power Box or its components to direct flame.

 **WARNING**

Do not install Power Box near heating equipment.

 **WARNING**

Do not immerse Power Box or its components in water or other fluids.

 **CAUTION**

Do not use solvents to clean Power Box, or expose Power Box to flammable or harsh chemicals or vapors.

 **CAUTION**

Do not use fluids, parts or accessories other than those specified in this manual including use of non-genuine AISWEI parts or accessories, or parts or accessories not purchased directly from AISWEI or a AISWEI-certified party.

 **CAUTION**

Do not place Power Box in a storage condition for more than one (1) month, or permit the electrical feed on the Power Box to be served for more than one (1) month, without placing Power Box into a storage condition in accordance with AISWEI's storage specifications.

 **CAUTION**

Do not paint any part of Power Box, including any internal or external components such as the exterior shell or casing.

 **CAUTION**

Do not connect Power Box directly to photo voltaic (PV) solar wiring.

 **CAUTION**

When installing Power Box in a garage or near vehicles, keep it out of the driving path. If possible, install Power Box on a side wall and/or above the height of vehicle bumpers.

Environmental Conditions:

 **WARNING**

Install Power Box in a location that prevents damage from flooding.

 **WARNING**

Operating or storing Power Box in temperatures outside its specified range might cause damage to Power Box.

 **WARNING**

Do not expose Power Box to ambient temperature above 50 °C or below -10 °C.

 **CAUTION**

Ensure that no water sources are above or near Power Box, including downspouts, sprinklers, or faucets.

 **CAUTION**

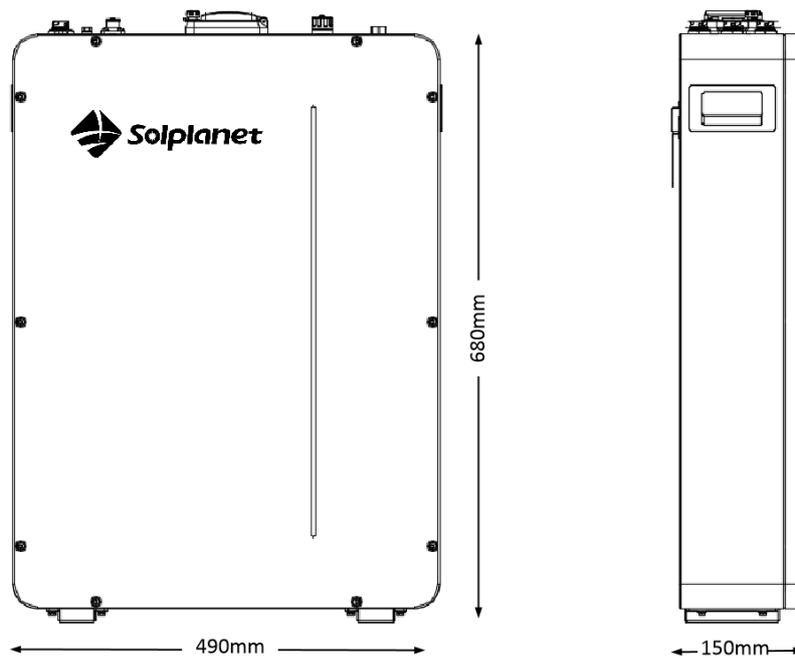
Ensure that snow does not accumulate around Power Box.

Revision History:

Date	Revision	Description	Owner
2022-09-16	V1.0	Initial Release	Jin Hu
2022-10-25	V1.1	1. Update packing list 2. Update storage temperature: -20 to 60°C	Jin Hu
2022-11-18	V1.2	1.Optimize storage temperature 2.Optimize installation steps	Jin Hu

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1. Specification



Technical Parameters	Ai-LB 5K
Cell Type	LiFePO4
Battery unit Model inside	LB51100A
Number of Battery Units	1 set of LB51100A
Rated Capacity	100Ah
Rated Battery Energy	5.12 kWh
Rated Voltage	51.2 V
Working Voltage Range	44.8-57.6 V
Usable Battery Capacity	5.12 kWh
Parallel Quantity ¹	8 sets in parallel (40kWh)
Nominal Current (Recommended) ²	0.5C,50A
Battery Depth of Discharge	90%
Battery Max Charge/Discharge Power	2.56kW/2.56kW
Available SOC Range	0% ~ 100%
SOC Transportation Range	50%
Operating Temperature	Charging Temperature: 0°C~55°C; Discharge Temperature: -20°C~55°C
Storage Temperature ³	-10°C ~ 50 °C
Working Humidity	5~95%RH

Standard Charging Current	0.5C (50A)
Maximum Charging Continuous Current	0.5C (50A)
Rated DC Power	2.56kW
IP Grade	IP65
Recommended Indoor/Outdoor Usage	Indoor/ Outdoor
Weight	~57Kg (Not included wall mount)
Dimensions [W*D*H]	490x150x680mm (Excluding connector)
Communication	CAN/RS485/Dry Contact/WiFi
Certificate (LB51100A)	TUV/IEC 62619/IEC62040/IEC61000/UN38.3
Certificate (Ai-LB 5k)	TUV/IEC 62619/IEC62040/IEC61000/UN38.3
Calendar Life ⁴	10 Years
Cable Specification	Ai-LB 5K
Battery Cable Rating	100 A, each cable
Battery Cable Type	25 mm ² OR 4AWG

¹: For more parallel, please contact the engineer of supplier

²: Performance may be de-rating in extreme ambient environmental conditions

³: Recommended storage temperature 10℃~30℃;

⁴: Working Condition 0.5 C @ 25 deg C, 80% DoD, 1 cycle per day

2. Technical parameters

Key parameters are listed below

CASE:

NO.	Key Item	Specification	Remark
2.1	Material	SGCC Steel, 1.2mm Thickness	
2.2	Surface	Paint, Dove blue (RAL5014) ,Fine sand grain	
2.3	Weight	~12.7Kg	Refer to actual measurements
2.4	IP Level	IP65	
2.5	Dimension	WDH: 490x150x680mm	Excluding connector

Bracket:

NO.	Key Item	Specification	Remark
2.6	Material	SGCC Steel, 1.5mm Thickness	
2.7	Surface	Paint,Dove blue (RAL5014) , Fine sand grain	

2.8	Weight	~0.5Kg	Refer to actual measurements
2.9	Dimension	WDH: 350x9x80mm	

Output Connector:

NO.	Key Item	Specification	Remark
2.10	Positive	PSR6XBB	Orange 5.7mm
2.11	Negative	PSR6XAB	Black 5.7mm
2.12	Communication	3*RJ45	

Power Box Panel Interface

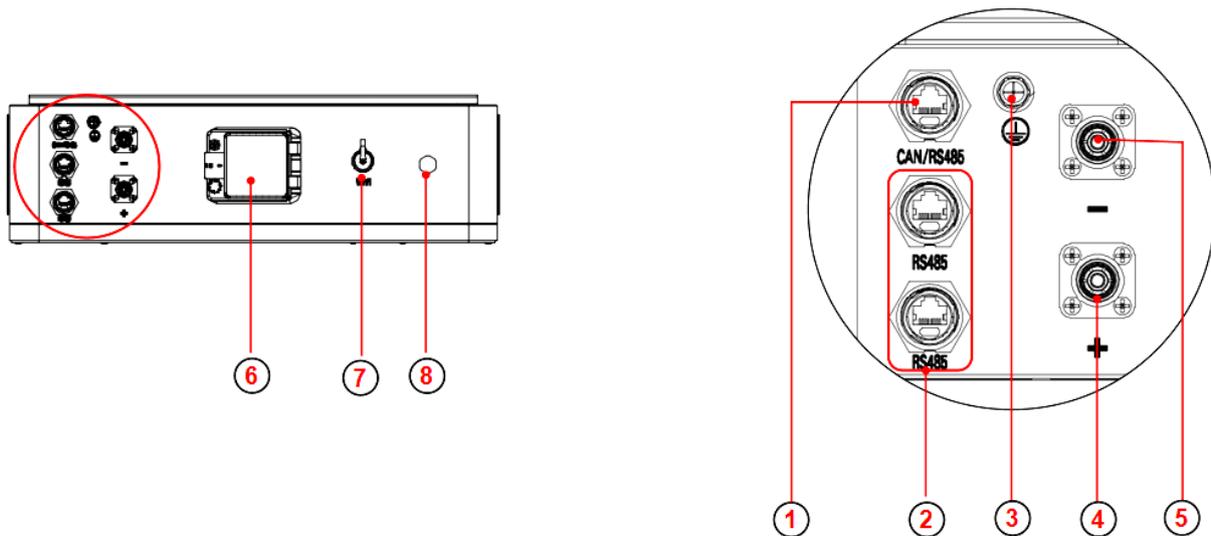
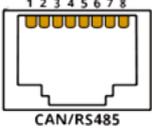
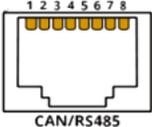


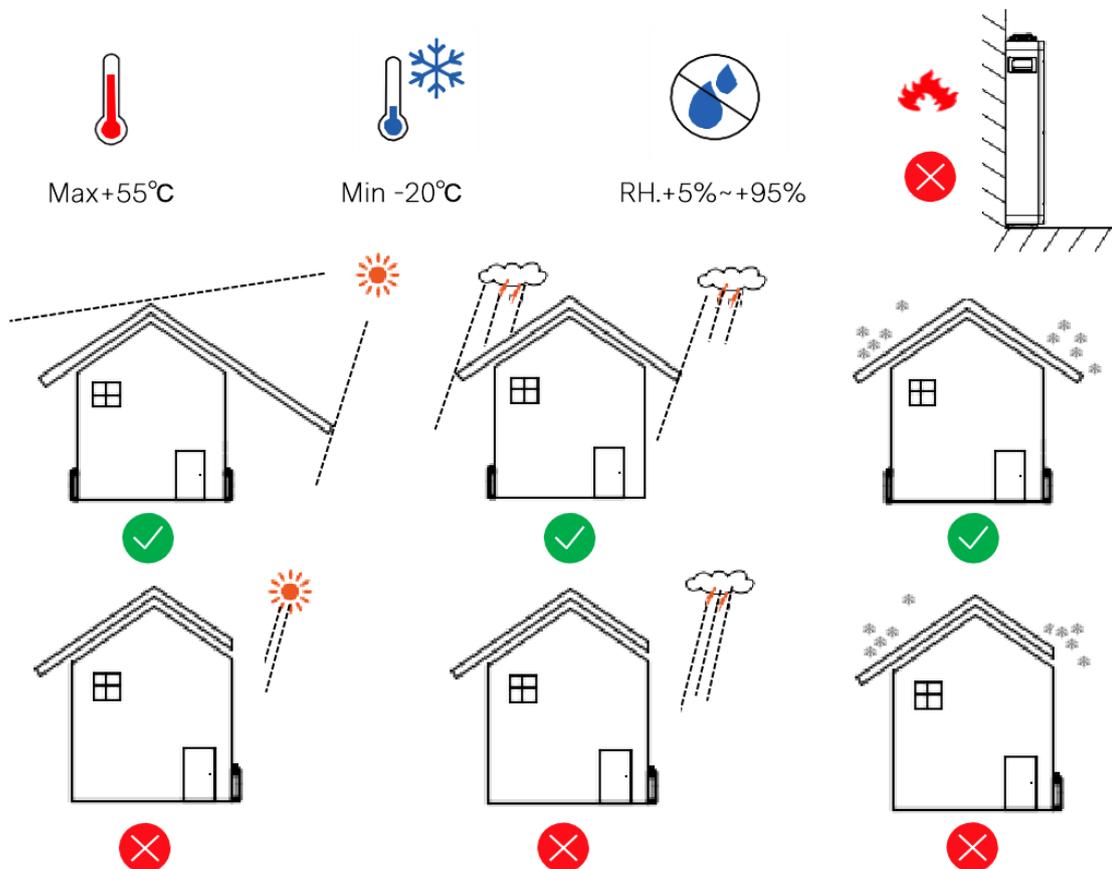
Fig. 2.1 Power Box Panel Interface

Item	Name	Model	Description	Remarks
1	1xCAN/RS485	RJ45 	Pin 1: NA Pin 2,7: RS485-A Pin 3,6: RS485-B Pin 4: CAN-H Pin 5: CAN-L Pin 8: GND	CAN To PCS
2	2xRS485	RJ45 	Pin 1, 4, 5: NC Pin 2, 7: RS485-A Pin 3, 6: RS485-B Pin 8: GND	RS485 Internal Connection
3	GND Screw	M6	Yellow-Green, 10 AWG	
4	1xPositive pole	PSR6XBB	Orange 5.7mm	Positive DC Output
5	1xNegative pole	PSR6XAB	Black 5.7mm	Negative DC Output
6	Breaker	NDB1-125, 2Px1	125A	
7	1xWIFI Socket			Function(Optional)
8	Vent valve			

3. Installation preparation

3.1 Requirements for Installation Location

- ✧ A solid support surface must be available (e.g., concrete or masonry).
- ✧ The installation location must be inaccessible to children.
- ✧ The installation location must be suitable for the weight and dimensions of the Power Box.
- ✧ The installation location must not be exposed to direct solar irradiation.
- ✧ Keep away from metal conductive dust.
- ✧ Keep away from water source, heat source and inflammable and explosive articles
- ✧ The installation location must not be close to the fire.
- ✧ The altitude of the installation location should be less than 3000m.
- ✧ The operating temperature should be between $-20\text{ }^{\circ}\text{C} \sim +55\text{ }^{\circ}\text{C}$.
- ✧ The ambient humidity should be between 5-95%.



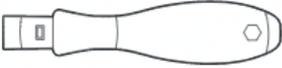
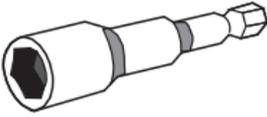
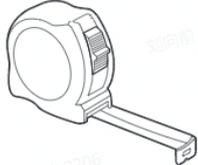
NOTE

Power Box includes a mounting bracket , that supports the unit in floor-mount configuration, and includes

shims to level the unit in floor-mount configurations. Do not use other hardware to anchor Power Box to the floor.

3.2 Tools

The tools in the following table could be needed during the installation

		
Torque screwdriver	Phillips-screwdriver bit	Hex-key bit
		
Phillips-head screwdriver	Torque wrench	Wrench
		
Cylinder screwdriver bit	Scissor	tie
		
level	Electric Drill	Tape measure
		
Hammer	Twist drill	Marker pen

3.3 Safety Gear

Wear the following safety gear when dealing with the battery system. Installation personnel must meet the relevant requirements of international standards.

		
Insulated gloves	Safety goggles	Safety shoes

3.4 Dimensions and Space Requirements

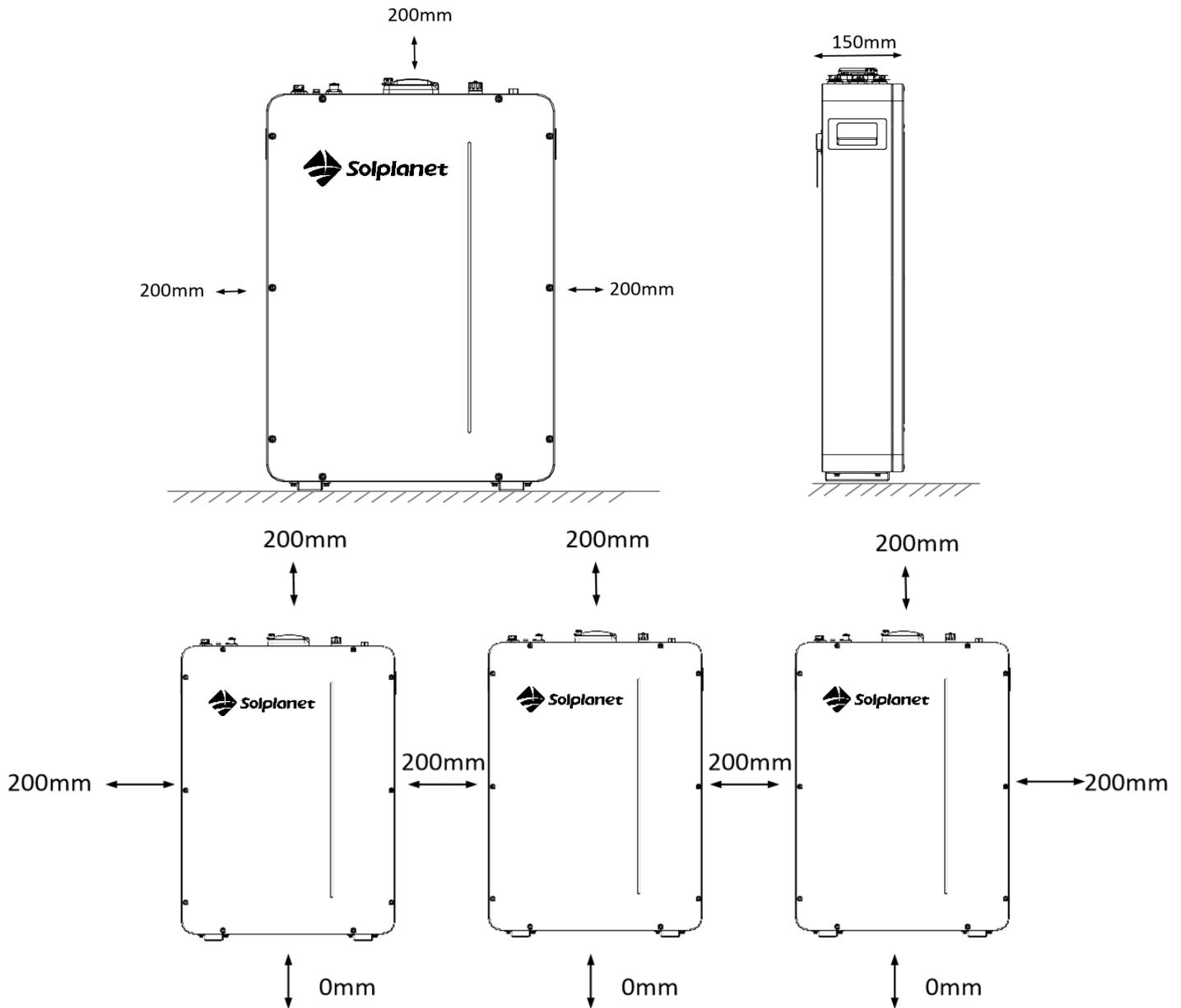


Fig. 3.4.1 Space Requirements Schematics

Space Requirements	
Min. clearance from left side	200 mm
Min. clearance from right side	200 mm
Min. clearance above Power Box	200 mm

Min. clearance between side-by-side Power Box	200 mm
Min. clearance at the bottom	0 mm
Max. slope	+/- 2 degree side-to-side +/- 5 degree front-to-back

3.5 Unpacking Inspection

When the equipment arrives at the installation site, loading and unloading should be carried out according to the rules and regulations, to prevent from being exposed to sun and rain.

Before unpacking, the total number of packages shall be indicated according to the shipping list attached to each package, and the case shall be checked for good condition.

In the process of unpacking, handle with care and protect the surface coating of the object.

Open the package, the installation personnel should read the technical documents, verify the list, according to the configuration table and packing list, ensure objects are complete and intact, if the internal packing is damaged, should be examined and recorded in detail.

Packing list is as follows

Item	Serial number	Specification	Quantity	Figure	Note
Battery System	①	Ai-LB5K 490x150x680mm	1		Standard
Wall - mount	②	Backplane	1		Standard
Accessory Bag	③	Expansion Bolts:M6x80	2		
	④	Hexagonal wrench	1		
	⑤	RJ45 waterproof wiring cover	3		
Output Cable (CA03-A)	⑥	Power Cable Negative⑥-1: PSR6XAB Black Plug Cable, 25mm ² /L1.5m Positive⑥-2: PSR6XBB Red Plug Cable, 25mm ² /L1.5m	2		Standard
	⑦	Communication cable to Inverter Black/L1.5m/Double RJ45 Plug	1		

	⑧	Ground Cable Yellow,Green/L1m/Double OT M6	1		
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4. Installation For Single Use

4.1 System Cable Connection Diagram

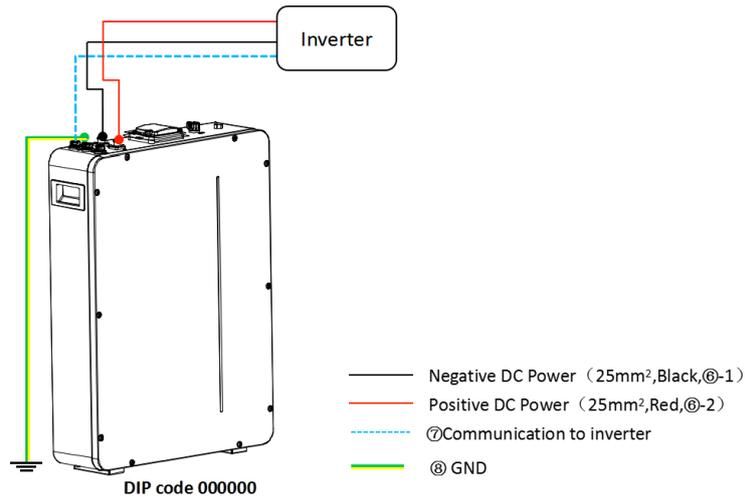


Fig. 4.1.1 Single-Set System Cable Connection Diagram (5kWh,Output Power 2.5kW)

4.2 Battery Ai-LB5K Fixation

NOTE

Make sure breaker on the enclosure is off.

4.2.1 Determine the installation position of the battery, and draw the installation hole position on the installation surface according to the drawing:

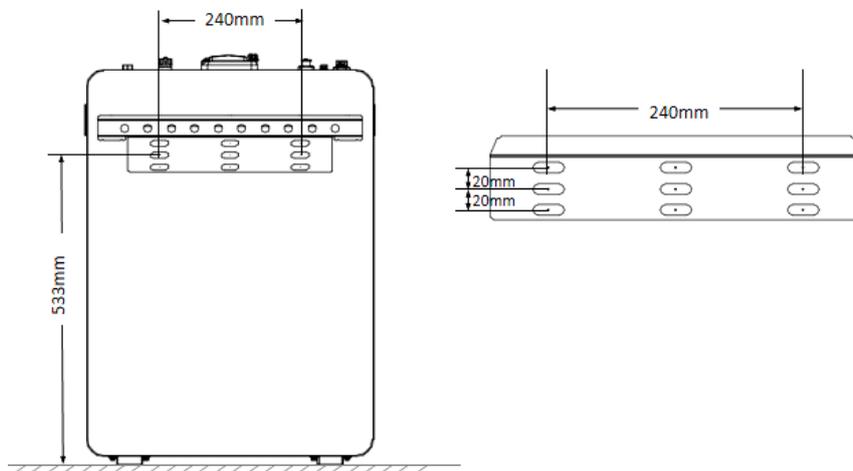


Fig. 4.2.1 Installation hole size

4.2.2 Installing Backplane

- a) Remove the ②backplane and ③expansion bolts(M6x80) from the packing box.
- b) Use an impact electric drill to drill holes on the cement floor, and the drilling depth is between 80mm and 85mm.
- c) Tighten the expansion bolt slightly and put it vertically into the hole. Knock the expansion bolt with a rubber hammer until all the expansion pipes enter into the hole.
- d) Pre-tighten the expansion bolt.
- e) Screw out the bolts and remove the spring washer and flat washer.
- f) Fix the ②backplane on the wall with expansion screws

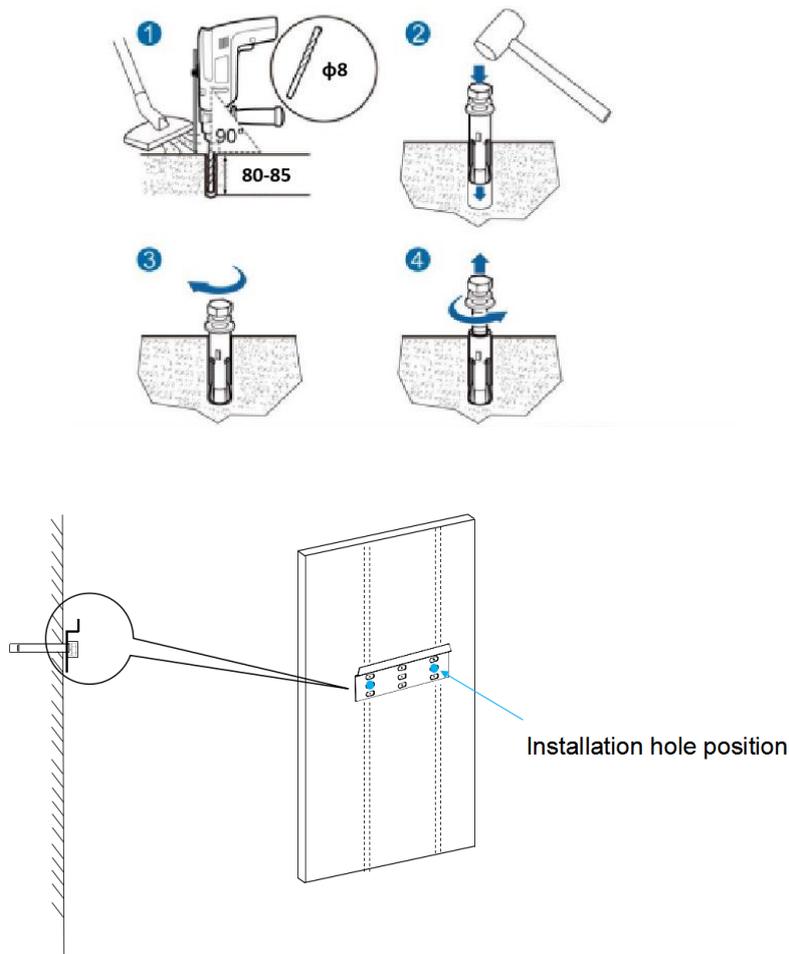


Fig. 4.2.2 Installing Backplane

4.2.3 Installing Ai-LB5K battery

Lift the ①Ai-LB5K and hang it on the ②Backplane

The following image gives the indication of how it would be when single set installed.

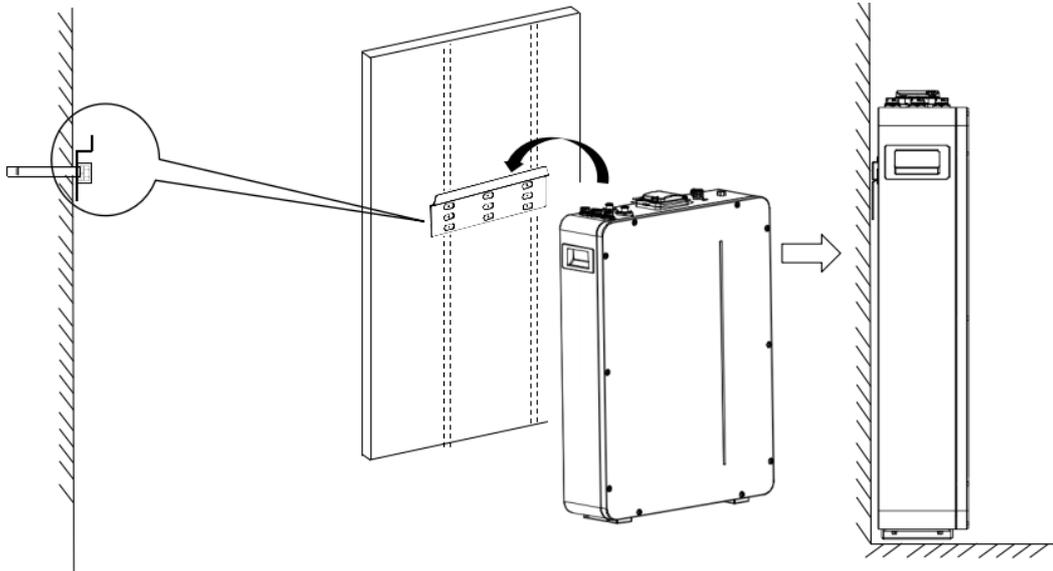
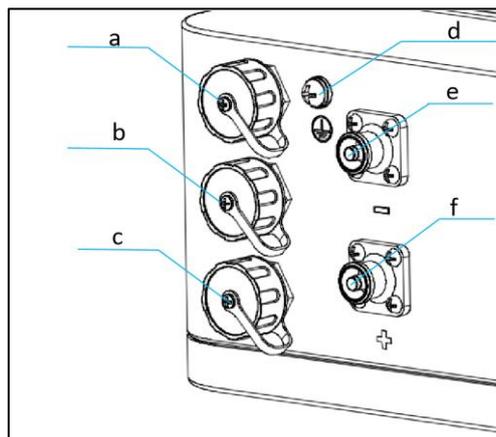


Fig. 4.2.3 Installation battery

4.3 Cable Connection For Single Use

4.3.1 Overview of the Connection Area



Item	Name	Model
a	CAN/RS485	RJ45
b	RS485	RJ45
c	RS485	RJ45
d	GND	M6
e	Negative Port	PSR6XAB
f	Positive Port	PSR6XBB

Before connecting the communication cable and power cable, you should first understand the interface definition of the internal battery-LB511000A

(1) Battery panel interface definition

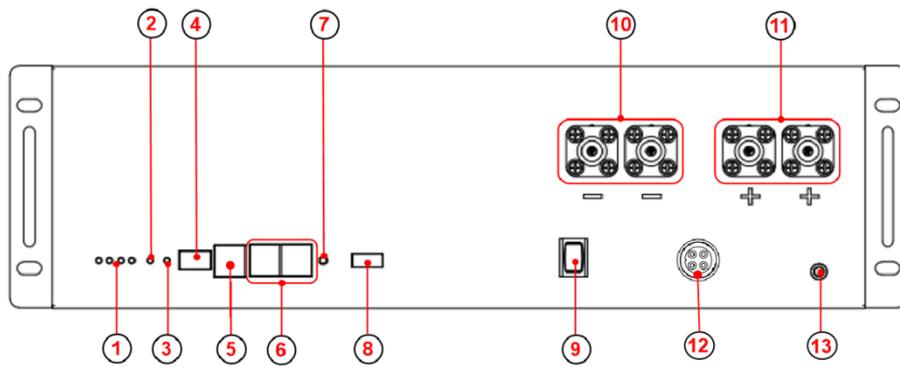


Fig. 4.3.1 Front Panel Interface

Table 4-1 Interface Definition

Item	Name	Model	Remarks
1	SOC LED x4		
2	Alarm LED		
3	RUN LED		
4	Dialer		
5	Communication port	RJ45	CAN To PCS, RS485 Internal Connection
6	Communication port *2	RJ45	RS485 Internal Connection
7	Reset		Wake up the system from malfunction status
8	Dry Contact		
9	Power On/Off Switch		
10	Port Negative x2	PSR6XAB	Black 5.7, 25 mm ²
11	Port Positive x2	PSR6XBB	Orange 5.7, 25mm ²
12	WIFI		
13	GND	M6	Yellow-Green, 10 AWG

(2) Port CAN/RS485 and RS485 of Battery

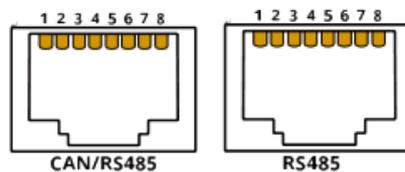


Fig. 4.3.2 CAN/RS485 and RS485 connections

Table 4-2 RJ45 Port Definition

	Description
CAN/RS485x1	Pin 1: NA Pin 2,7: RS485-A Pin 3,6: RS485-B Pin 4: CAN-H Pin 5: CAN-L Pin 8: GND

RS485x2	Pin 1, 4, 5: NC Pin 2, 7: RS485-A Pin 3, 6: RS485-B Pin 8: GND
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Table 4-3 Communication Cable Requirements

Cable Gauge	Strip Length	Maximum Cable Length
CAT5 or better (24 AWG)	RJ-45 connector	45 m

Table 4-4 Power Cable Requirements

Size	Outer Diameter	Max. Voltage	Max. Current
21-33 mm ²	10-12 mm	1000 V	120 A

Table 4-5 DC Breaker Recommendation

The following circuit breaker models (purchased separately) are supported:

Circuit Breaker Model	Rating	Certificate	Remark
Nader NDB1-125	100 A	CCC, CE, CB, TUV, UL1077	For single set use

NOTE

A DC Breaker is required for each positive and negative terminal connecting, when multiple sets are connected in parallel, the DC Breaker needs to be selected according to the actual current.

Procedure:

Step1. Ground cable connection

Ground cable connection: use a screwdriver to fix the ⑧ ground wire terminal to the battery ground point refer to Fig. 4.3.3.

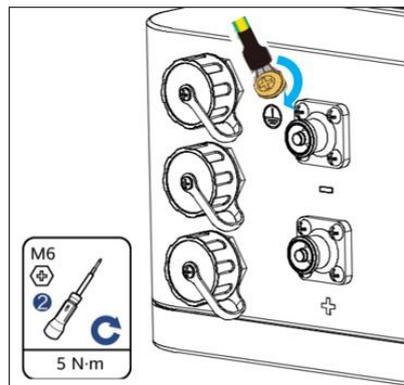


Fig. 4.3.3 Ground cable connection

Step2. Communication cable connection

Procedure:

1. Make sure the breaker is off.
2. Take off the RJ45 waterproof cover.

3. Pass the communication cable through the RJ45 wiring cover.
4. Plug the communication cable to the corresponding RJ45 port.
5. Tighten RJ45 wiring cover.
6. Connect the other end of the communication cable to the inverter refer to Fig. 4.1.1.

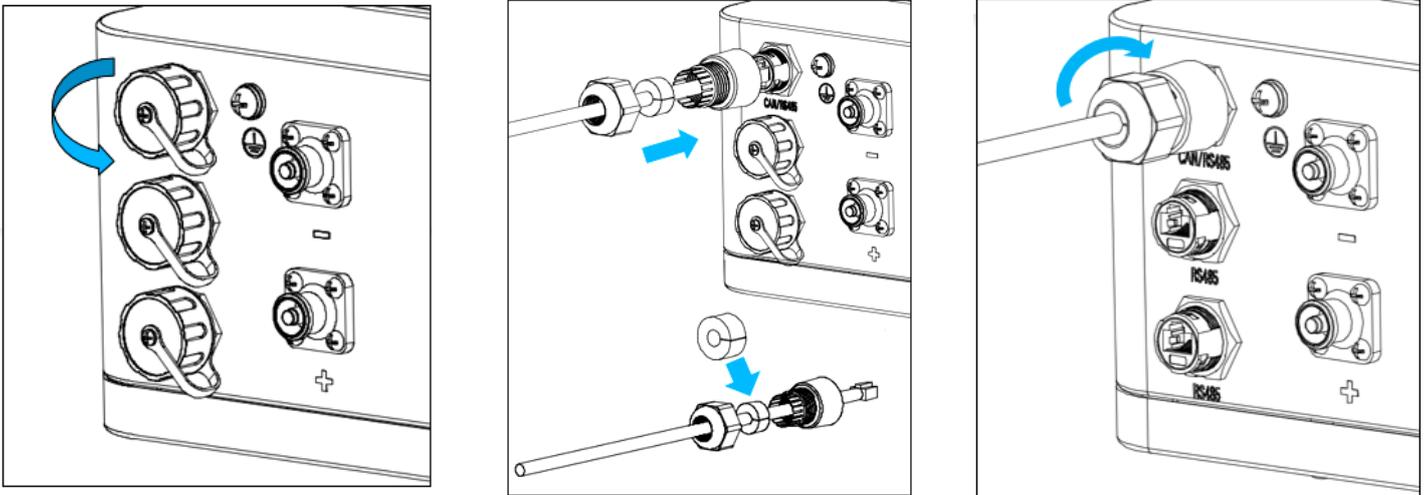


Fig. 4.3.4 Communication cable connection

Step3. Power cable connection

Procedure:

1. Make sure the breaker is off.
2. Plug the quick plug end of the power cable into the corresponding socket.

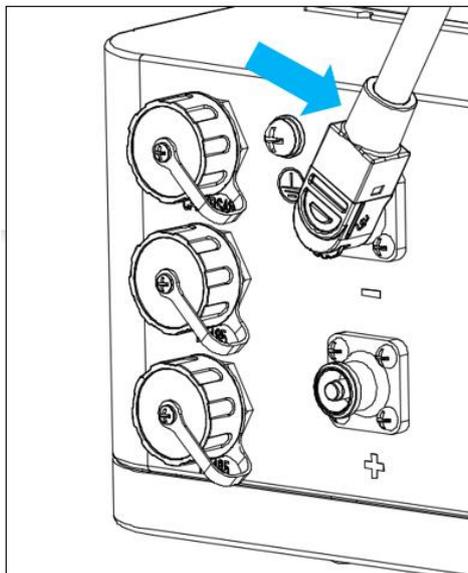


Fig. 4.3.5 Power cable connection

Additional:Quick Plug Crimp Guide

(1) Material List



Plug



Isolation Cap



Tail-hood

- (2) Put wire through isolation cap and Tail-Hood.

(3) Swipe outer isolation layer of DC cable.



(4) The red is used for the positive, and the black is



for negative , The end of the cable is bunched at the terminal using a wire clamp.

(5) Tighten the isolation cap and plug contact.

(6) Put the positive and negative plug on to the system and tighten it.



(7) Use isolation cap for unused DC plug.

4.4 Turn On the System

Step1. Open the circuit breaker protective cover and turn on the circuit breaker to “ON” side refer to Fig. 4.4.1
(Ensure that the inverter is connected to the PV module)

Step2. When battery establishes communication with the Inverter, the inverter can read the battery information.

Step3. Close the protective cover of the circuit breaker.(Reverse the procedure for the open protective cover).

Step4. End.

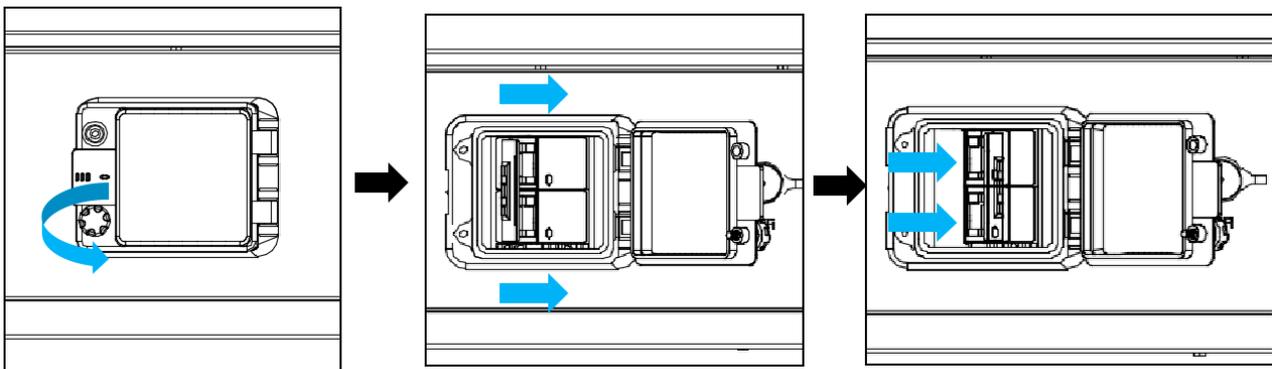


Fig. 4.4.1 Procedure for opening the circuit breaker protective cover

5. Installation For Parallel Use

5.1 System Cable Connection Diagram

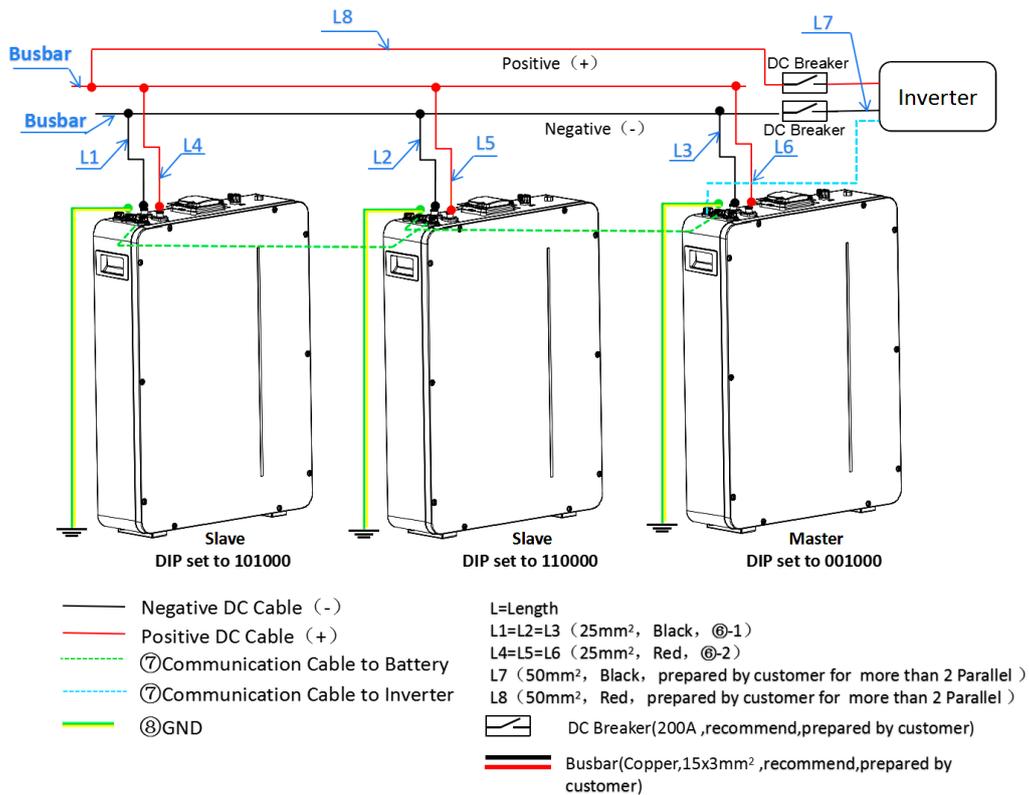


Fig. 5.1.1 Multi-Sets Connection (Example:3 Parallel,15kWh,Output Power 7.5kW)
(Battery ΔV should be less than 3V at first Parallel installation)

5.2 Battery Fixation and Front Panel Removal

5.2.1 Fix the battery refer to 4.2.1 to 4.2.3.

5.2.2 Take down battery front panel refer to 5.2.1.

5.2.3 Turn the switch to “OFF” to turn off the internal battery refer to 5.2.2.

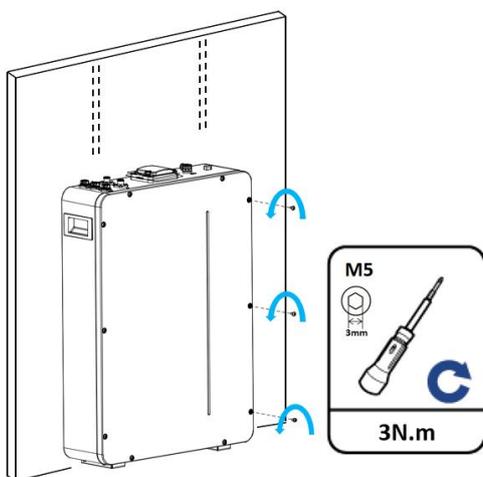


Fig.5.2.1 Take down battery front panel

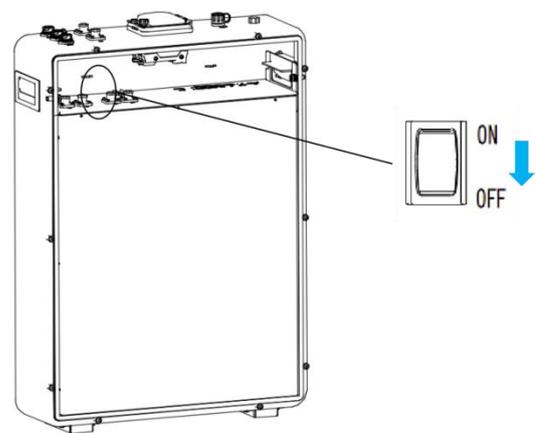


Fig5.2.2 Turn off the internal battery

5.3 Cable Connection For Parallel Use

5.3.1 Ground cable connection

Procedure:

Use a screwdriver to fix the ⑧ ground wire terminal to the battery ground point refer to Fig. 5.1.1.

5.3.2 Communication cable connection

Multi-Sets in Parallel (LB51100A inside,3 Parallel as an example)

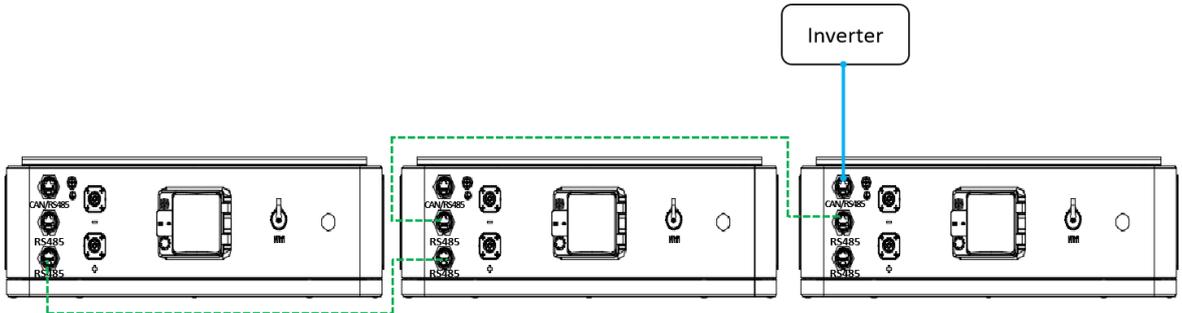


Fig. 5.3.1 Communication cable connection

Procedure:

Connect the communication cable to the corresponding connector refer to Fig. 5.3.3

5.3.3 Power Cable Connection

Procedure:

Connect the power cable to the corresponding connector refer to Fig. 5.1.1

5.4 Set up Master Pack and Slave Pack

Ai-LB 5K is consisted of 1 set of LB51100A . Master Pack and Slave Pack LB51100A can be used as single unit as well as multi-units (in parallel) mode. The customer must inform supplier if multi-units mode is required. The Master Pack can be used individually, but Slave Pack cannot be used individually.

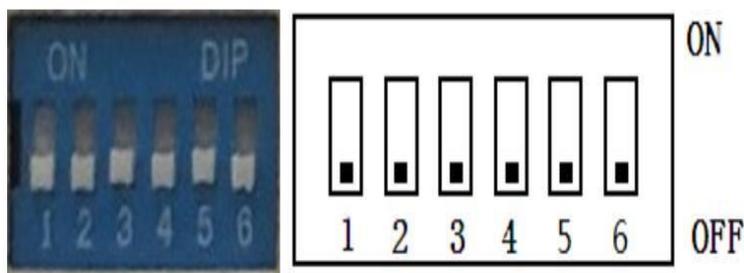


Fig. 5.4.1- Dial Diagram Setting

Master/Slave dial code diagram:

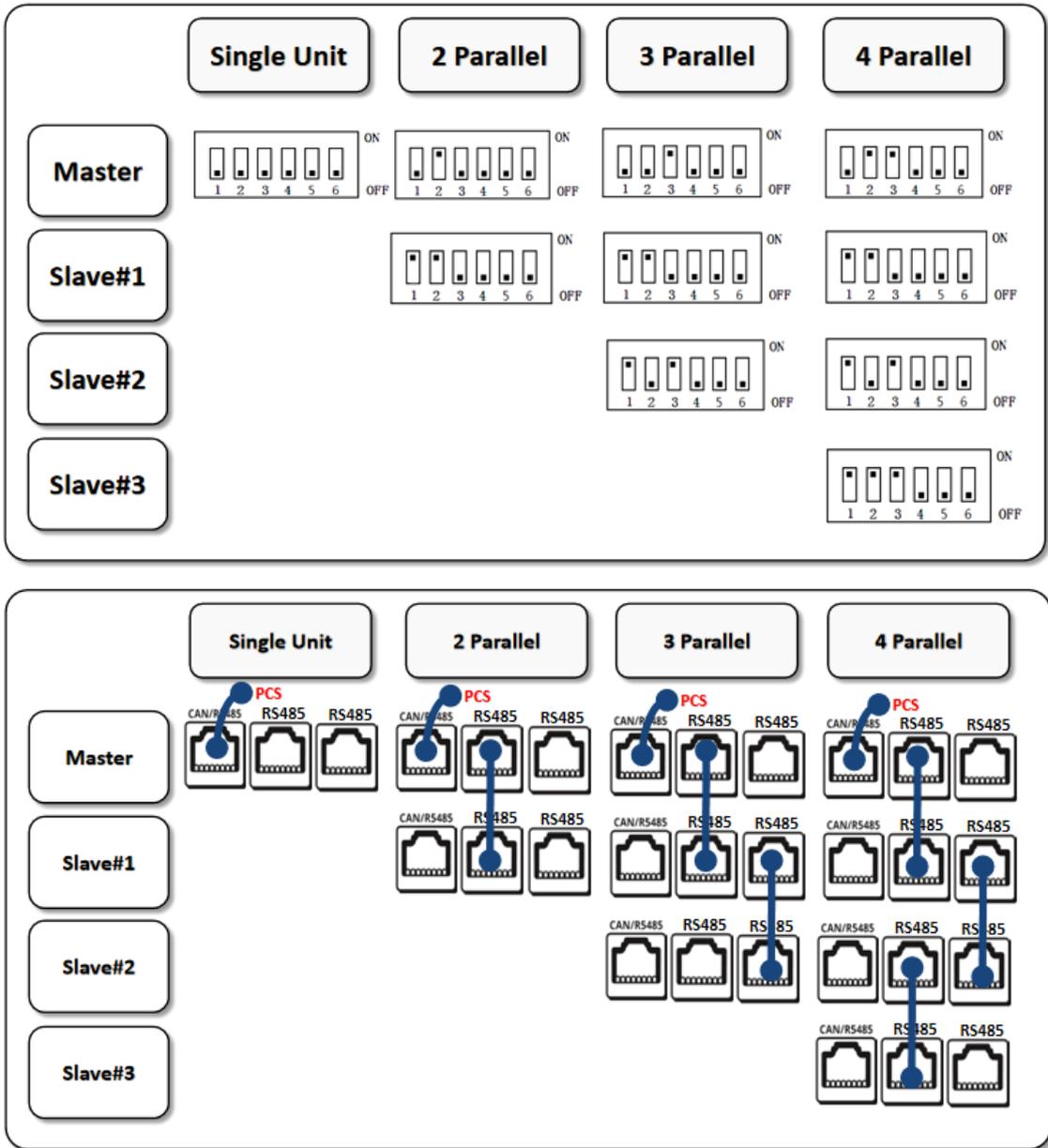


Fig. 5.4.2- Communication port connecting
(If more than 4 LB51100A in parallel, please contact the engineer of supplier.)

Procedure:

1. Make sure the breaker and the internal battery switch are off.
2. Set the dial code refer to the Fig. 5.4.2.

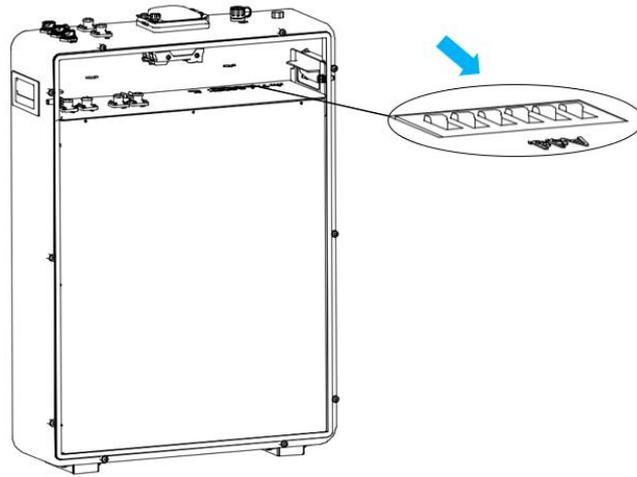


Fig. 5.4.3 Dial Diagram Setting Process

5.5 Turn On the System

1. Arrange the communication/power cable properly.
2. Ensure that all conduit or cable gland junctions are properly dealt.
3. Switch on button to “ON” side on each LB51100A inside .
4. Turn on the circuit breaker to “ON” side.
5. When battery establishes communication with the Inverter, the inverter can read the battery information.

5.6 Reinstall the Front Panel and Close the Protective Cover.

1. Install the front panel refer to 5.6.1.
2. Close the protective cover of the circuit breaker (Reverse the procedure for the open protective cover).
3. End.

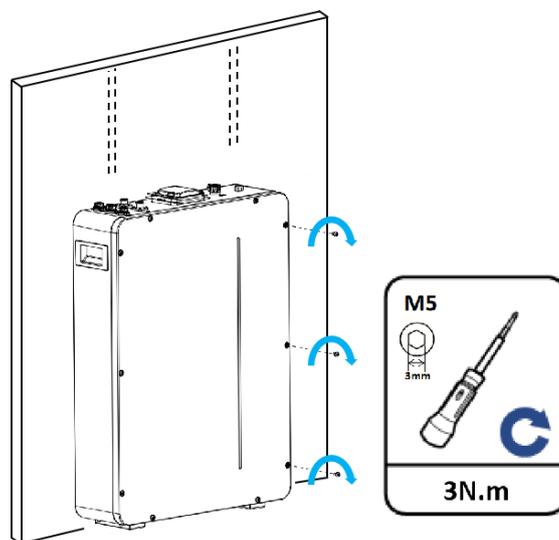


Fig.5.6.1 Install the front panel

5.7 Trouble Shooting

If Ai-LB 5K is not working correctly, perform the following steps:

- (1) For single use, please consult the engineer ;
- (2) For parallel use, please check the status of the LED on the panel of LB51100A. The indication status can be referred in **LB51100A User's Manual** in battery package.

5.8 Technical Support

Further support can be achieved via AISWEI Service Team. Please contact the sales person when needed. The following information is useful to have ready when contacting AISWEI:

- ✧ Owner Name
- ✧ Power Box part number and serial number
- ✧ Brief description of the issue

5.9 Maintenance

Power Box does not require pre-scheduled preventative maintenance. The only maintenance required by an owner is to keep the unit free and clear of debris, especially around the air intake and exhaust.

To clean Power Box ,use a soft, lint-free cloth. If needed, the cloth can be dampened with mild soap and water only. Do not use cleaning solvents to clean Power Box, or expose Power Box to flammable or harsh chemicals or vapors.

6. Transportation and Storage

Transportation

It is forbidden to encounter serious vibration and shock during transportation.

Storage

If the system is not placed to use, the system must be properly stored. Otherwise, if any issues, AISWEI shall not be liable.

It should be stored in 60% SoC status.

It should be stored at ventilation environment, Temp. < 35 °C, ROH <65%.

It should be stored avoiding humid condition.

It should be stored in place where they can be monitored by professionals.

NOTE

A proper inspection shall be conducted every 3 months, to ensure no over-discharge of the battery (SoC is long time less than 0%) occurs. At over-discharge status, the battery would behavior as:

- The battery could not start-up when turning the power switch to the ON position;
- The battery output voltage is less than 40V when turned on;
- Indicators are off and battery can not communicate to the upper computer via RS485/USB converter.

Please contact the technical person where you purchase the battery from immediately once the above abnormal issues occur. And actions in terms of re-charging the battery (to the SoC 50%) is required before the field installation.

7. Disclaimer

It should be noted that supplier shall not be liable if any necessary materials are added to this user's manual without further inform of customers.

