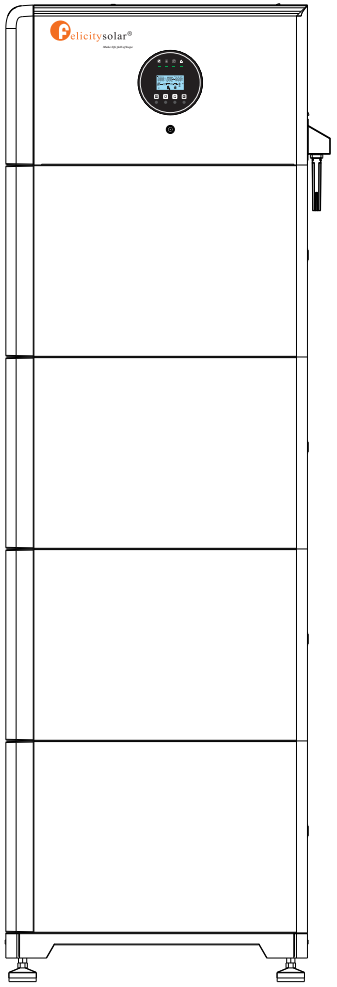
5KW ALL IN ONE
Energy Storage System

358-010420-00

Felicitysolar®

Make life full of hope

USER GUIDE



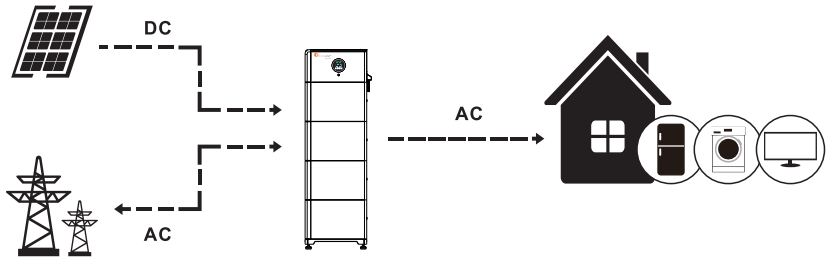
Contents

Energy Storage System

INTRODUCTION

This energy storage system can provide power to connected loads by utilizing PV power, utility power and battery power and store surplus energy generated from PV solar modules for use when needed. When the sun has set, energy demand is high, or there is a black-out, you can use the energy stored in this system to meet your energy needs at no extra cost. In addition, this energy storage system helps you pursue the goal of energy self-consumption and ultimately energy-independence.

Depending on different power situations, this energy storage system is designed to generate continuous power from PV solar modules (solar panels), battery, and the utility. When MPP input voltage of PV modules is within acceptable range (see specification for the details), This energy storage system is only compatible with PV module types of single crystalline and poly crystalline. Do not connect any PV array types other than these two types of PV modules to the energy storage system. Do not connect the positive or negative terminal of the solar panel to the ground. The following figure is a typical simple diagram of energy storage system.



AI100-5048 & AI100-B5 ESS Features

- Wide PV voltage input range (90VDC-450VDC)
- Maximum PV input current increases to 20A.
- Battery charging current up to 100A
- Pure sine wave output
- Built-in MPPT solar charge controller
- Configurable input voltage range for home appliances and personal computers via LCD setting
- Configurable battery charging current based on applications via LCD setting
- Configurable AC/Solar Charger priority via LCD setting
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload / Over temperature/ short circuit protection
- Lithium battery activation function.
- Cold start function
- Supports parallel connection of one to four battery packs (AI100-B5) for expansion
- External WIFI for mobile monitoring (requires APP)

IMPORTANT SAFETY WARNING

Before using the inverter, please read all instructions and cautionary markings on the unit and this manual. Store the manual where it can be accessed easily. This manual is for qualified personnel. The tasks described in this manual may be performed by qualified personnel only.

General Precaution

Conventions used:

WARNING! Warnings identify conditions or practices that could result in personal injury;

CAUTION! Caution identify conditions or practices that could result in damage to the unitor other equipment connected.

WARNING!
Before installing and using this inverter, read all instructions and cautionary markings on the inverter and all appropriate sections of this guide.

WARNING!
Normally grounded conductors may be ungrounded and energized when a ground fault is indicated.

WARNING!
This inverter is so heavy that it should be lifted by at least two persons.

CAUTION!
Before attempting any maintenance or cleaning or working on any circuits connected to the inverter, disconnecting AC, DC and battery power from the inverter can reduce the risk of electric shock. Merely turning off controls will not reduce this risk because internal capacitors can remain charged for 5 minutes after disconnecting all sources of power.

CAUTION!
Do not disassemble this inverter by yourself. It contains no user-serviceable parts. Attempt to service this inverter by yourself may cause electric shock or fire and will void the warranty from the manufacturer.

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Do not disassemble this inverter by yourself. It contains no user-serviceable parts. Attempt to service this inverter by yourself may cause electric shock or fire and will void the warranty from the manufacturer.

CAUTION!
To avoid fire and electric shock, make sure that existing wiring is in good condition and that the wire is not undersized. Do not operate the damaged Inverter or substandard wiring.

CAUTION!
In high temperature environment, the surface of this inverter could be hot enough to cause skin burns if accidentally touched. Ensure that this inverter is away from normal traffic areas.

CAUTION!
Use only recommended accessories from installer. Otherwise,dis qualified tools may cause fire, electric shock, or injury to persons.

CAUTION!
To reduce risk of fire hazard, do not cover or obstruct the cooling fan.

CAUTION!
Do not operate the Inverter if it has undergone a sharp blow, been dropped, or damaged in any way. If the Inverter is damaged, please call for an RMA (Return Material Authorization) request.

CAUTION!
AC breaker, DC switch and Battery circuit breaker are used as disconnect devices and these disconnect devices shall be easily accessible.

Safety Guidance

Warning marks inform users of conditions which can cause serious physical injury or death, or damage to the device. They also tell users how to prevent the dangers. The warning marks used in this operation manual are shown below:

	● After receiving this product, first confirm the product package is intact. If any question, contact the logistic company or local distributor immediately. ● The installation and operation of inverter must be carried out by professional technicians who have received professional trainings and thoroughly familiar with all the contents in this manual and the safety requirements of the electrical system.
	● Do not carry out connection/disconnection, unpacking inspection and unit replacement operations on the inverter when power source is applied. Before wiring and inspection, users must confirm the breakers on DC and AC side of inverter are disconnected and wait for at least 5 minutes.
	● Ensure there is no strong electromagnetic interference caused by other electronic or electrical devices around the installation site. ● Do not refit the inverter unless authorized. ● All the electrical installation must conform to local and national electrical standards
	● Do not touch the housing of the inverter or the radiator to avoid scald as they may become hot during operation.
	● Ground with proper technics before operation.
	● Do not open the surface cover of the inverter unless authorized. The electronic components inside the inverter are electrostatic sensitive. Do take proper anti-electrostatic measures during authorized operation.
	● The inverter needs to be reliably grounded.
	● Ensure that DC and AC side circuit breakers have been disconnected and wait at least 5 minutes before wiring and checking.
	● Caution! Risk of electric shock. Energy storage timed discharge for 5 minutes.
Note	● The procedures taken for ensuring proper operation.

Transportation precautions

When this product leaves the factory, it is already in the best electrical and mechanical condition. During transportation, the original packaging or appropriate packaging of the product must be used to ensure the safety of the equipment during transportation. The transportation company is responsible for the damage caused to the machine during transportation. When taking delivery, please make a thorough inspection of this product. If you find any packaging problems that may cause damage to the product, or if you find any visible damage to the product, notify the responsible shipping company immediately. If necessary, you can ask your installer or our company for help

Box identification protection

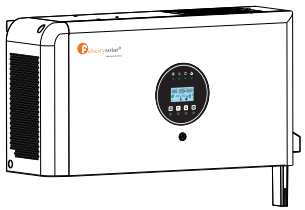
1. The label on the container contains important information for safe operation. Alteration or damage is prohibited
2. There is a nameplate on the side of the box, which contains important parameter information related to the product, it is strictly prohibited to alter and damage
3. The label must not be covered, please wipe it regularly so that it is always visible

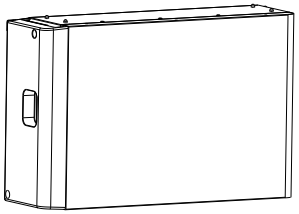
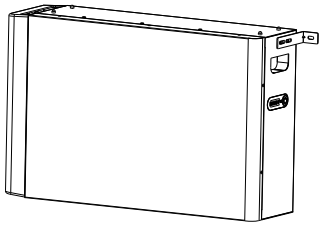
Storage specification

If the AI100-5048 All In One Energy Storage System is not put into use immediately, the storage requirements must be met

1. Before storage, charge it to 50-70% of its capacity, and then turn off the device for storage
2. In order to keep the battery healthy, please fully charge and discharge it every six months
3. When using or storing, ensure proper ventilation
4. Keep away from flammable and explosive materials or gases. Keep in a clean and dry environment
5. It is strongly recommended that dust and debris from the outside of the equipment be cleaned frequently with a dry soft cloth
6. Keep away from children and pets
7. When using or storing the device, do not stack anything on top of the device
8. Avoid exposing the device to rain, humidity, or direct sunlight

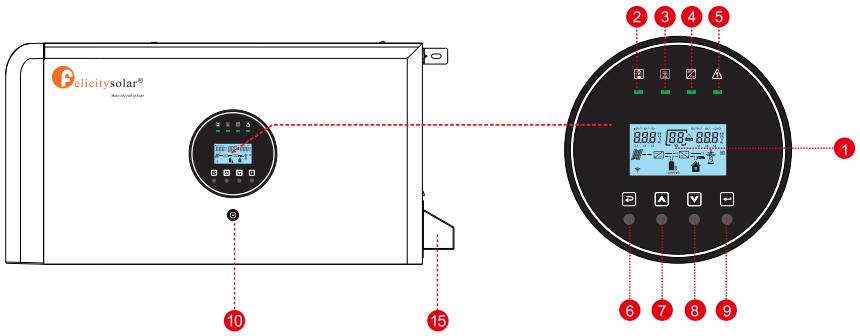
Product Appearance

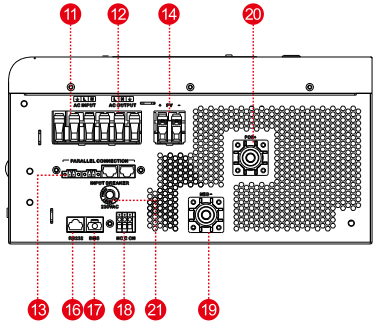
AI100-5048 Inverter	
	
Left-hand display	Right side display

AI100-B5 lithium battery	
	
Left-hand display	Right side display

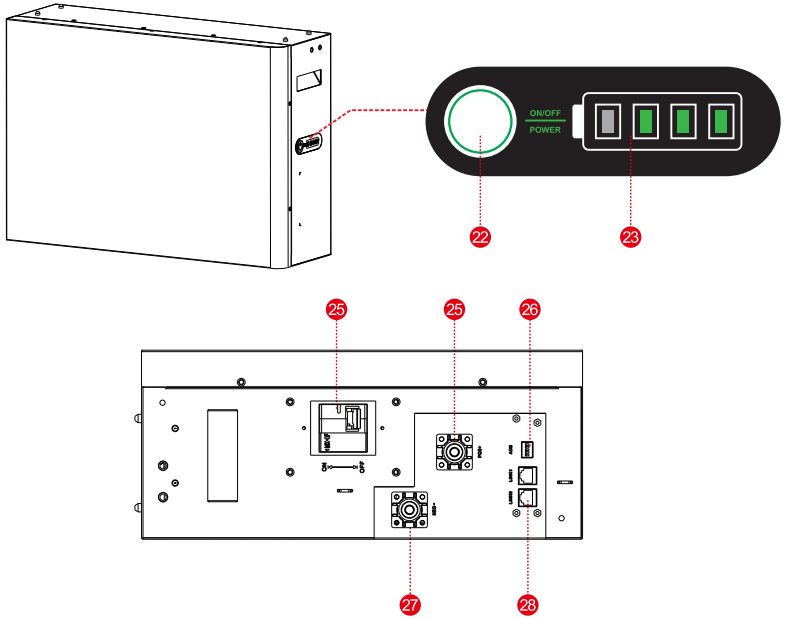
Product overview

AI100-5048 Inverter





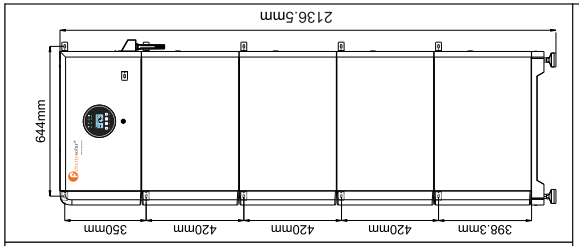
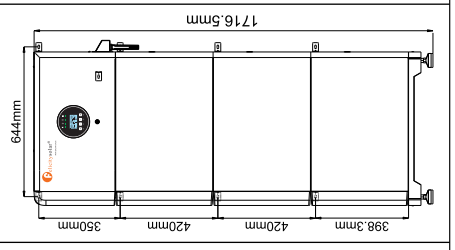
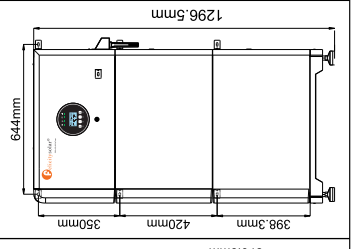
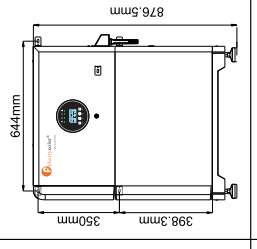
AI100-B5 lithium battery



1.LCD display
2.Charging indicator
3. Utility bypass indicator
4.Inverter indicator
5.Fault or warning indicator
6.ESC button
7.UP button
8.DOWN button
9.ENTER button
10.Switch
11.AC input port
12.AC output port
13.Parallel connection port
14.PV input connection port
15.WIFI input connection port
16.RS-232 Communication port
17.BMS Communication port *
18.Dry contact
19.Battery Negative -
20.Battery Positive +
21.AC input fuse
22.ower On/Charging indicator
23.LED display
24.Breaker
25.Battery Positive +
26.Communication port
27.Battery Negative -
28.Communication port

* 17 The BMS communication port only supports Felicitysolar batteries

All In One Energy Storage System parameters

Model								
	Rated Output Power	The number of lithium battery packs	Total battery capacity	Environmental Protection Rating	Operating Temperature	Range Storage Temperature	Total height	Weight
	5000W	4	20KWh	IP20	-10°C ~ 50°C	-15°C ~ 60°C	2136.5mm	198.9Kg
		3	15KWh				1716.5mm	154.4Kg
		2	10KWh				1296.5mm	109.9Kg
		1	5KWh				876.5mm	65.4Kg

SPECIFICATIONS

Model	AI100-5048 ESS
Rated Output Power	5000VA
	5000W
Nominal DC Input Voltage	48VDC
Input Voltage Waveform	Sinusoidal (utility or generator)
Nominal Input Voltage	230Vac
Low Line Voltage Disconnect	170Vac±7V (UPS); 90Vac±7V (Appliances)
Low Loss Voltage Re-connect	180Vac±7V (UPS); 100Vac±7V (Appliances)
High Line Voltage Disconnect	280Vac±7V
High Line Voltage Re-connect	270Vac±7V
Max AC Input Voltage	280Vac
Nominal Input Frequency	50Hz / 60Hz (Auto detection)
Low Line Frequency Disconnect	40±1Hz
Low Line Frequency Re-connect	42±1Hz
High Line Frequency Disconnect	65±1Hz
High Line Frequency Re-connect	63±1Hz
Output Voltage Waveform	As same as input waveform
Output Short Circuit Protection	Line mode: Circuit Breaker Battery mode: Electronic Circuits
Efficiency (Line Mode)	>95% (Rated R load, battery full charged)
Transfer Time (Single unit)	10ms typical (UPS); 20ms typical (Appliances)
Transfer Time (Parallel)	50ms typical
Pass Through Without Battery	Yes
Max. Bypass Overload Current	40A
Max. Inverter/Rectifier Current	40A/5000W
Utility Charge Mode Specifications	
Nominal Input Voltage	230Vac
Input Voltage Range	90~280Vac
Nominal Output Voltage	230Vac
Max. Charge Current	100A

Charge Current Regulation	10-100A (Adjustable unit is 1A)	
Over Charge Protection	Yes	
Solar Charging & Grid Charging		
Max. PV Open Circuit Voltage	500V	
PV Voltage Working Range	90V-450V	
Max. Input Power	6000W	
Max. Solar Charging Current	100A	
Max. Charging Current(PV+Grid)	100A	
Max. Input Current	25A	
Min. Startup Voltage	95V	
Charge Algorithm		
Algorithm	Set according to BMS	
Battery Type Setting	Lithium	57.6V（default）,Follow BMS adjustment

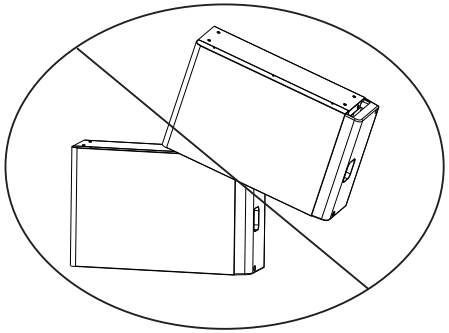
AI100-5048 Inverter parameters

Model	**AI100-5048**
Rated Output Power	5000VA
	5000W
Nominal DC Input Voltage	48VDC
Output Voltage Waveform	Pure sine wave
Nominal Output Voltage	230Vac±5%
Nominal Output Frequency (Hz)	50±0.3Hz/60Hz±0.3Hz (Adjustable)
Parallel capability	Yes,up to 12 units
Peak Efficiency	93%
Over-Load Protection (SMPS load)	10.5s@105~125% load 7.5s@125~150% load 5.5s @>150% load
Surge Rating	2* rated power for 5s
Capable of Starting Electric	Yes
Output Short Circuit Protection	Yes
High DC Input Alarm & Fault	62V±0.4V
High DC Input Recovery	60V±0.4V
Number of battery packs stacked	≤4
Cooling mode	Air cooling
General Specifications	
Relative humidity	5%~95%
Environmental Protection Rating	IP20
Altitude	<2000m
Operating Temperature	-10C°~50C°
Range Storage Temperature	-15C°~60C°
Net Weight (Kg)	17.8kg
Product Size (D*W*H)	710x350x180mm
Package Dimension (D*W*H)	792x507x278mm

AI100-B5 lithium battery parameters

Model	AI100-B5
Usable Capacity	5.12kWh
Battery Type	LiFePO4
Nominal Voltage	51.2V
Operating Voltage	44.8-57.6V
Recommend Charge/Discharge Current[1]	≤100A
Recommend Charge/Discharge Power[1]	≤5,000W
Maximum Charge/Discharge Current(15s)	150A
Maximum Charge/Discharge Power(15s)	7,500W
Depth of Discharge(DOD)	≥ 95%
Scalability	Up to 15 units in parallel(76.8kWh)
Communication	RS485 / CAN
Protection Level	IP21
Cycle Life[2]	≥ 6,000 Cycles
Charging Temperature Range	0-55 ℃
Discharging Temperature Range	-20-55 ℃
Display	LED
Installation	Floor-Mounted
Protection	Built-in smart BMS, Breaker, Fuse
Warranty	5 Years
Net Weight	45Kg
Gross Weight	49.5Kg
Product Dimension	660x420x180mm
Package Dimension	805x520x280mm
[1] Recommend charge/discharge current/power is affected by temperature and SOC.	
[2] Test conditions: 0.2C Charging/Discharging @25°C, 80% DOD.	

WARNING! Once it is found that the battery pack has been violently hit during transportation, or fallen from a height, or the appearance is obviously damaged, do not continue to use the battery pack, its internal damage may occur, otherwise there may be battery leakage, electric shock and other safety hazards! Please contact after-sales personnel!

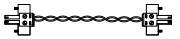


AI100-5048 Inverter accessories


AI100-5048 unit x 1

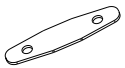

Manual x 1
Parallel Manual x 1


Parallel communication cable x 1


Current sharing cable x 1


RJ45 Terminal x 1


Expansion bolt x 2


fixed plate x1


Machine feet x 4

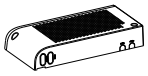
Cables x 2


Mounting screw x6

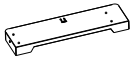

WIFI module fixing screw x2


Wall mounted fasteners x2

Inverter communication cable x1


inverter protective cover x1


WIFI module x1

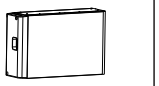

pedestal x1


Cable mounting screw x2


Guarantee card

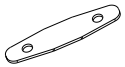
Lithium battery communication cable (extended) x1

AI100-B5 Lithium battery accessories


AI100-B5 unit x 1


Parallel communication cable x1

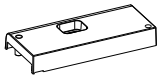

Wall mounted fasteners x2


fixed plate x1


Mounting screw x6


Expansion bolt x 2

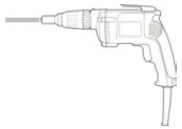
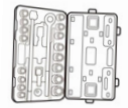
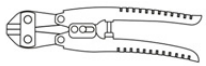

Cable mounting screw x2

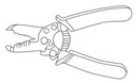
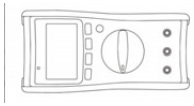
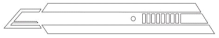
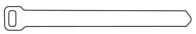

Parallel communication cable x1

Cables x 2

Recommended installation tools

The following tools are for reference only, if you have additional needs, please purchase them yourself.

Serial number	Reference picture	Description	Function
1		cable drilling tool An 8mm drill bit is required	cable drilling tool An 8mm drill bit is required
2		Torque socket wrench	Remove and install screws
3		Torque wrench	Remove and install screws
4		Screwdriver combination set	Remove and install the AC port screws
5		Cable cutter	Cut the cable

6		Wire stripping pliers	Wire stripping
7		Multimeter (DC voltage range ≥1000V DC)	Check whether the cable connection is correct, whether the positive and negative battery terminals are correct, and whether the grounding is reliable
8		Marking pen	Punch marks for use
9		Tape measure	Measuring distance
10		Spirit level	Verify that the base and backplane are level
11		Utility knife	Cutting material
12		Wire stripping pliers	Wire stripping
13		Insulated rubber tape	Wound exposed wire
14		Cable tie	Finishing line
15		Antistatic gloves	Wear when handling and installing machines
16		Protective glasses	Wear when punching
17		Mask	Wear when punching
18		Safety shoes	Wear when handling and installing machines

INSTALLATION REQUIREMENTS

Installation environment requirements

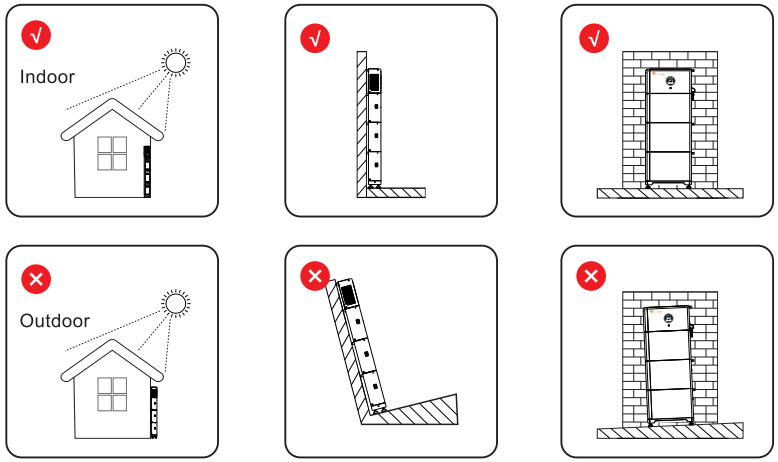
- Do not mount the inverter on flammable construction materials.
- Mount on a solid surface
- This energy storage system might make noises during operation which may be perceived as a nuisance in a living area.
- Dusty conditions on the unit may impair the performance of this inverter.
- The ambient temperature should be between 0°C and 40°C and relative humidity should be between 5% and 85% to ensure optimal operation.
- The recommended installation is vertical adherence.
- For proper operation of this energy storage system, please use appropriate cables for grid connection.
- The pollution degree of the energy storage system is PD2. Select an appropriate mounting location. Install the inverter and battery modules in a protected area that is dry, free of excessive dust and with adequate air flow. Do NOT operate it in the place where the temperature and humidity is beyond the specific limits. (Please check the specs for the limitations.)
- The inverter should be installed in the position where the disconnection means is easily accessible.
- This inverter is designed with IP20 protection for indoor applications only.
- Regularly clean the fan filter.

Installation Angle requirement

1.The system is equipped with bases. The bases are placed on a level ground. The bases are stacked in layers

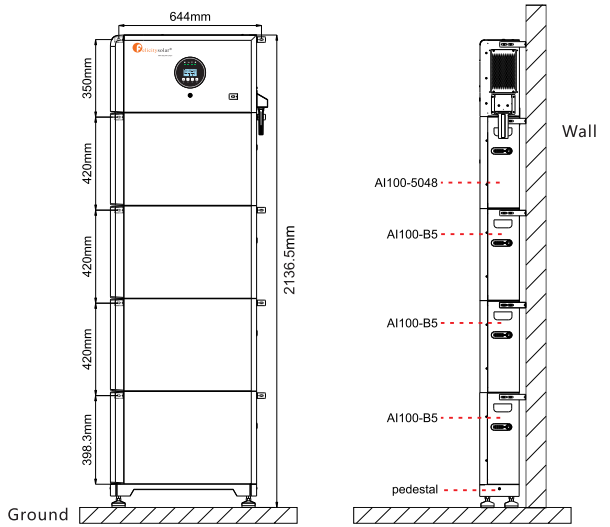
2.Install the system near the wall. Secure both sides of the devices on each floor to the wall using supports

3.After the system is installed, it is perpendicular to the horizontal floor

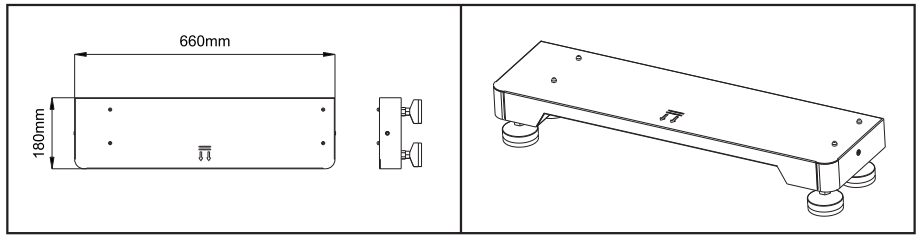


Installation space requirement

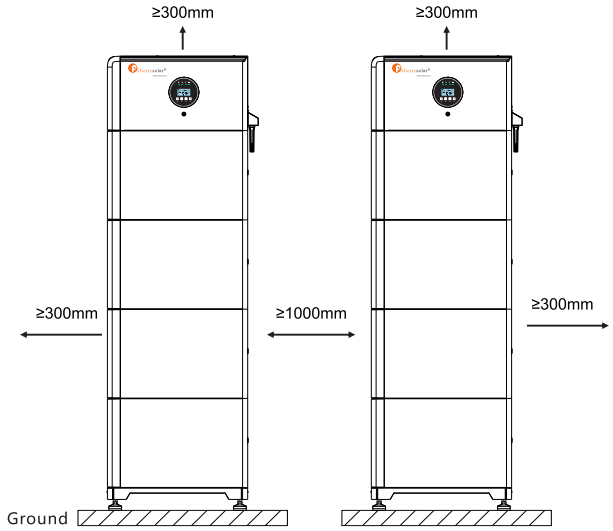
Schematic diagram of a single AI100-5048 ESS



Pedestal size

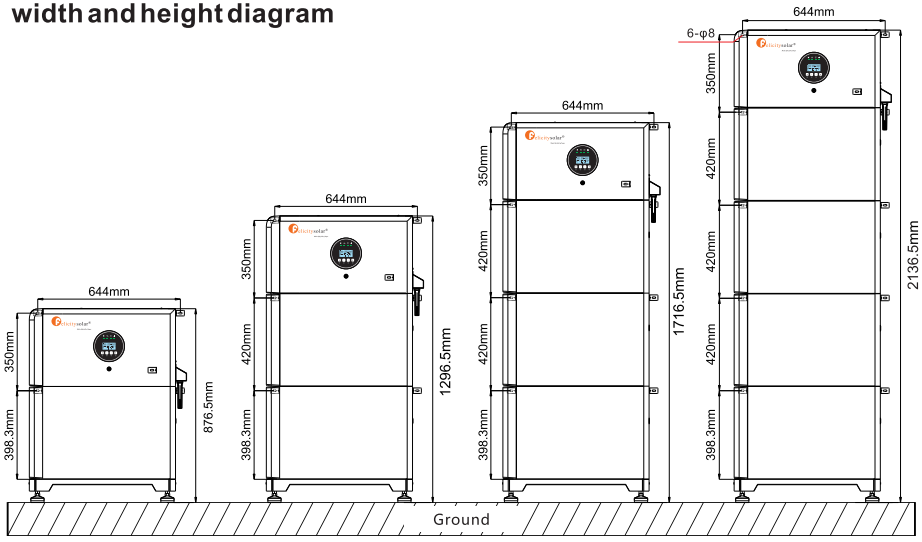


Multiple AI100-5048 ESS diagrams



Attention! To ensure a good heat dissipation environment when multiple systems are used side by side, ensure that the distance between the two systems is not less than 1000mm

Single AI100-5048 with different numbers of AI100-B5 length, width and height diagram



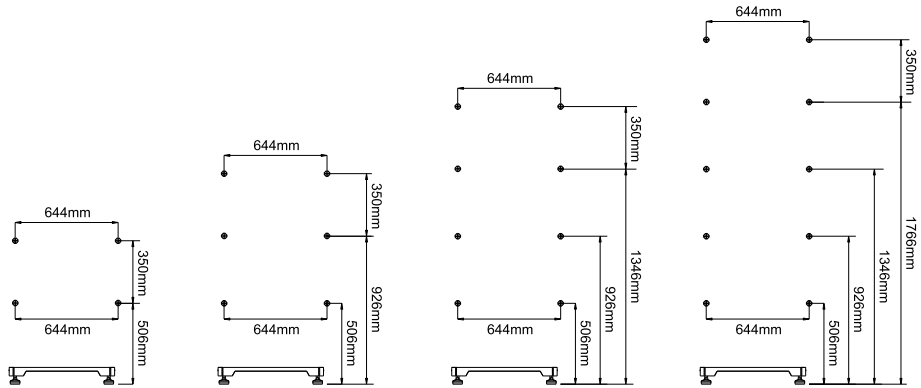
Attention! Users can choose their own combinations according to the requirements of the actual installation environment.
Attention! Do not install the wall with water pipes and wires in the wall to avoid damage to the drilling hole and cause danger

Installation Procedure

Attention! Inverters and lithium battery packs are heavy, please carefully remove them from the packaging.
Attention! Please choose a flat and suitable concrete floor or other non-combustible and hard surface.
Attention! Only installation personnel are allowed to enter the installation area

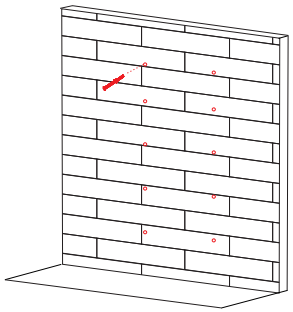
Step 1: Punch holes

Drill holes with a φ8mm drill bit and the hole depth is about 50mm. Drill holes according to the following hole spacing (Select the number of holes based on stack requirements).



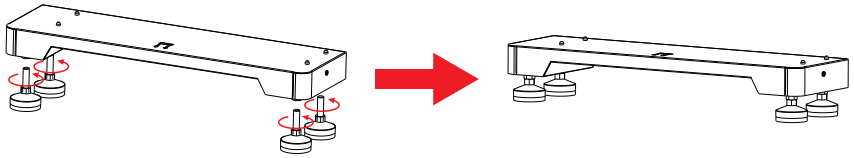
Step 2: Install expansion bolts

Remove the Expansion bolt from the AI100-B5 lithium battery kit and insert it into the drilled hole to secure it.



Step 3: Assemble the base

Take out the AI100-5048 inverter Pedestal and Machine feet accessories, fix the machine feet to the four feet of the base in turn, and then turn the machine feet clockwise until it cannot be turned. Place the base behind the mounting foot horizontally on the ground where the AI100-5048 ESS is to be installed.

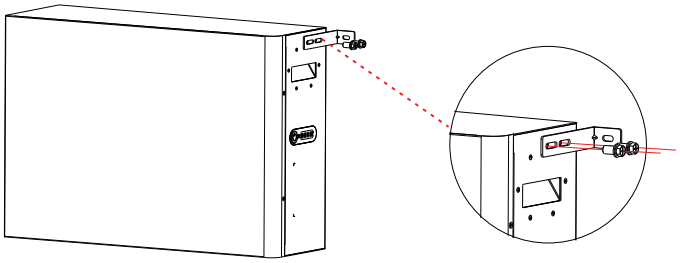


Attention! If the ground is not level enough, level can be assisted by the level and counterclockwise rotation of the machine foot.

Attention! Because the rotary leveling Angle of the machine foot is limited, in order to ensure the stability of the base, please try to choose a horizontal ground for AI100-5048 ESS installation.

Step 4: Assemble the AI100-B5 wall mounting accessories

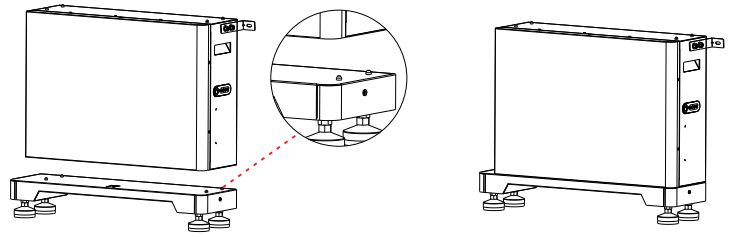
Remove the Wall mounted Fasteners from the AI100-B5 lithium battery kit and attach them to both sides of the battery pack. Mounting screw can be used to secure the fasteners



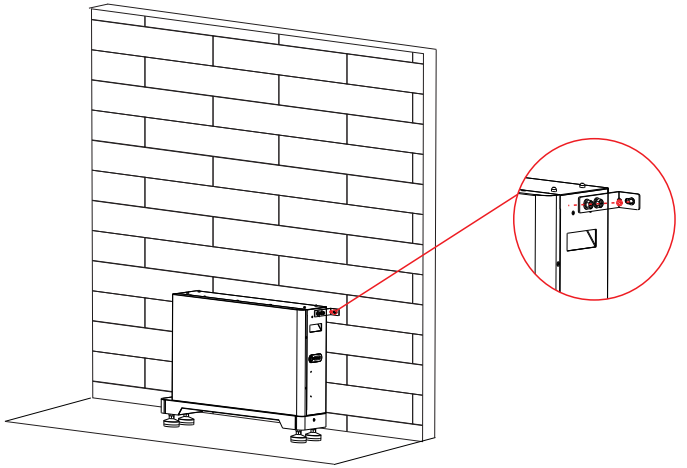
Step 5: Install AI100-B5

Remove the nuts and spacers from the Expansion bolt in step 2.

Place the AI100-B5 lithium battery with the wall mounting assembly on the base, push the wall mounting assembly through the expansion screws on the wall, and reinstall the nuts and gaskets to tighten and secure.



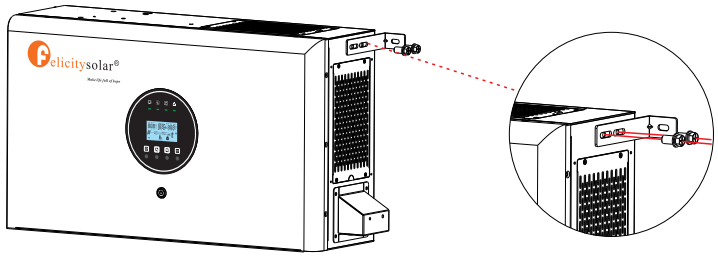
NOTE: Please pay attention! The top of the base and the top of the battery pack are assisted by four positioning posts



Attention! If you have more than 1 set of AI100-B5 installed, you can repeat steps 4 and 5 until all lithium battery packs are installed.

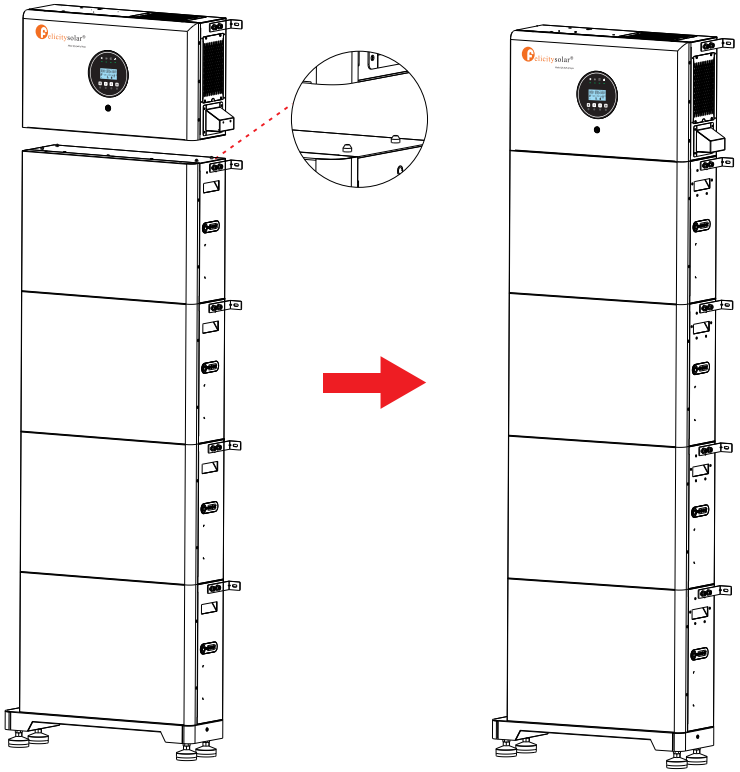
Step 6: Install the AI100-5048 wall mounting accessories

Remove the Wall mounted Fasteners from the AI100-5048 inverter kit and attach them to both sides of the inverter, which can be secured using a Mounting screw



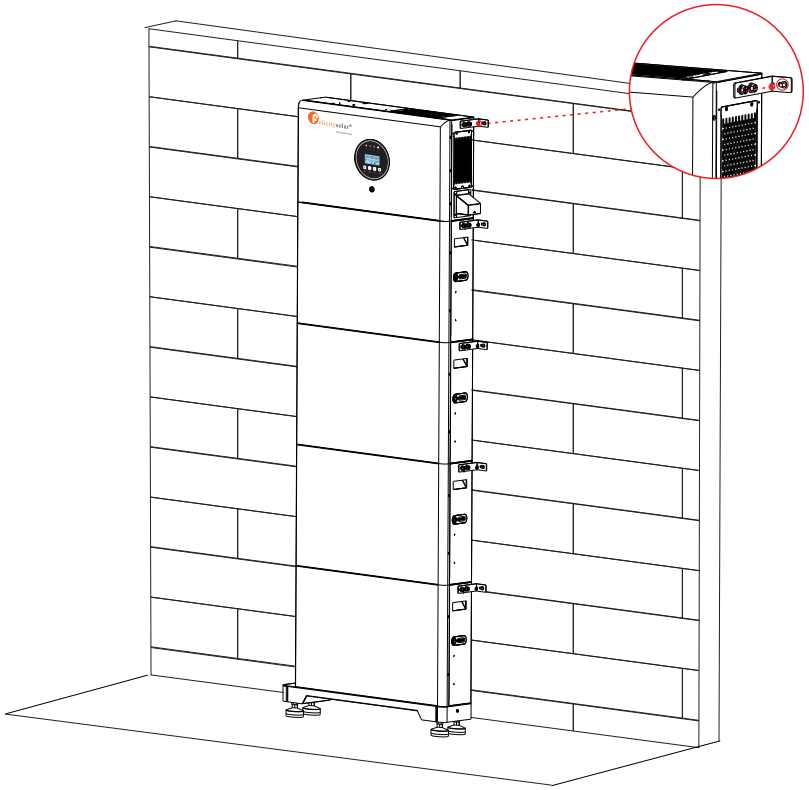
Step 7: Install the AI100-5048

Remove the nuts and spacers from the Expansion bolt in step 2.



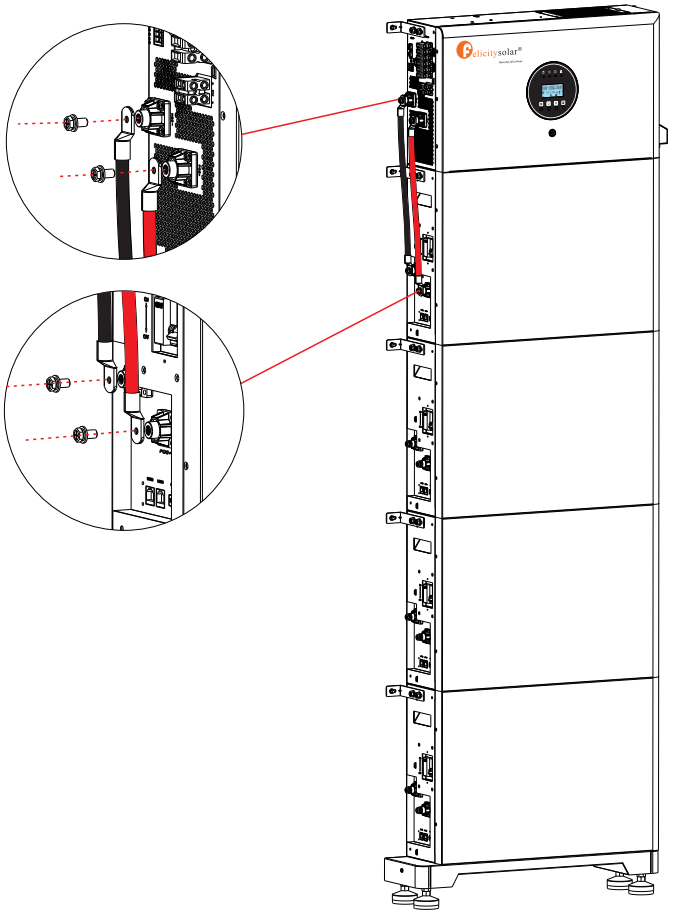
NOTE: Please pay attention! The top of the battery pack has four positioning posts to assist installation

Place the AI100-5048 inverter with the wall mount assembly installed on top of the last installed AI100-B5 lithium battery pack, push the wall mount assembly through the expansion screws on the wall, and reinstall the nuts and gaskets to tighten and secure.



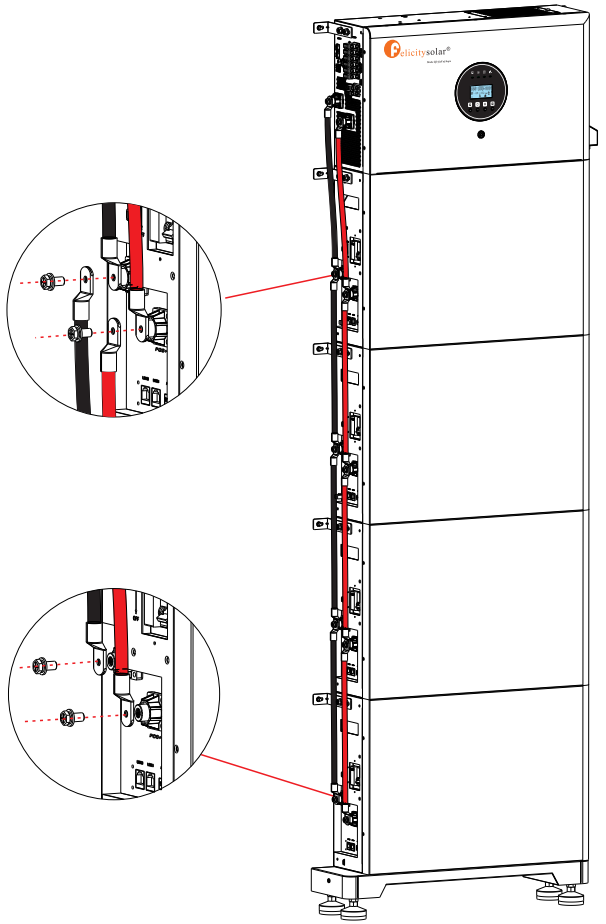
Step 8: Connect the DC cables of the AI100-5048 and AI100-B5

Take out the DC Cables and Cable fixing screw in the AI100-5048 accessories, and fix the two ends of the red wire in the DC cable to the DC wiring port marked with (POS+) on the red base of the inverter and lithium battery respectively. Secure both ends of the other black cable to the DC wiring port marked with (NEG-) on the black base of the inverter and the lithium battery.



Step 9: Connect the DC cables of the AI100-B5 and AI100-B5

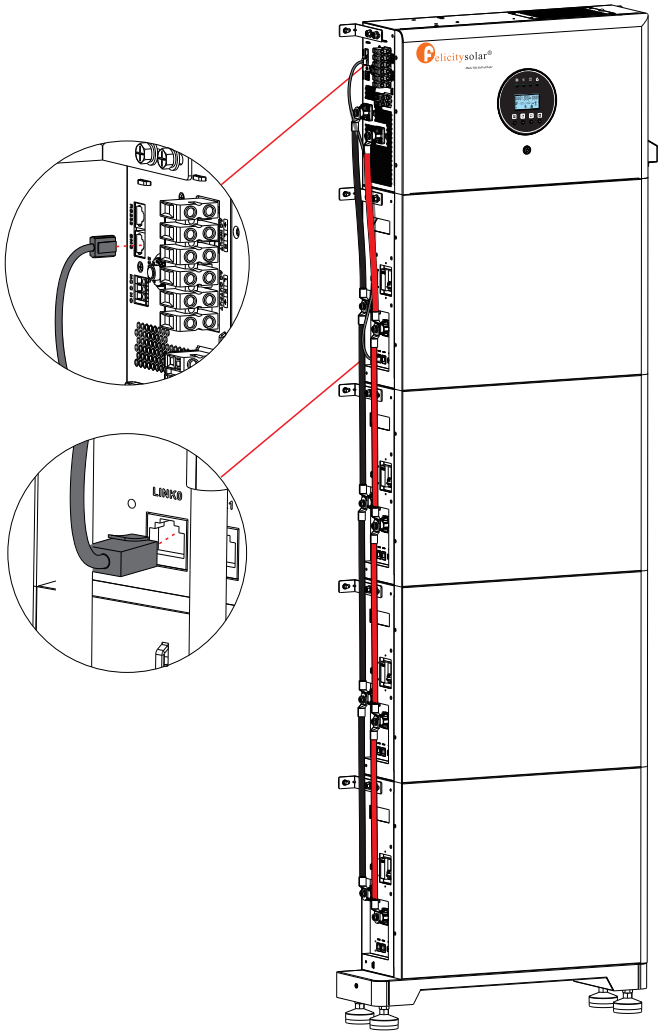
Take out the DC Cables in the AI100-B5 accessories, fix both ends of the red cable of the DC cable to the DC cable port marked with (POS+) on the red base of the lithium battery, and fix both ends of the other black cable to the DC cable port marked with (NEG-) on the black base of the lithium battery.



⚠	**Attention!** If you have more than 2 sets of AI100-B5 installed, you can repeat this step until all the lithium battery DC cables are connected together. **Attention!** Ensure that all the DC ports of the AI100-5048 and AI100-B5 are connected to each other through DC cables

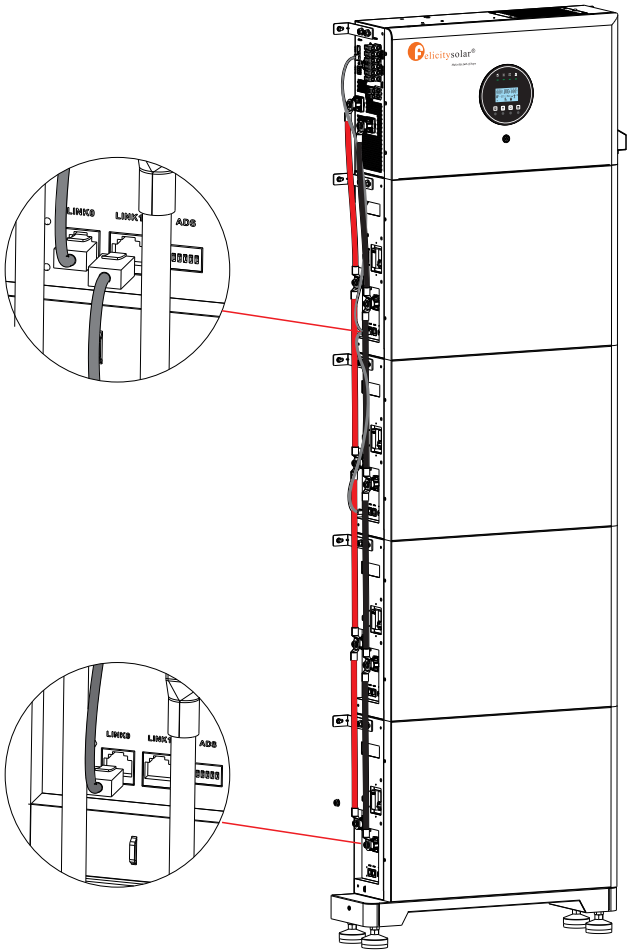
Step 10: Connect the communication cables of AI100-5048 and AI100-B5

Take out the Inverter communication cable in the AI100-5048 accessory and insert one end into the inverter BMS port and the other end into either of the LINK0/LINK1 ports of the lithium battery



Step 11: Connect the communication cables of AI100-B5 and AI100-B5

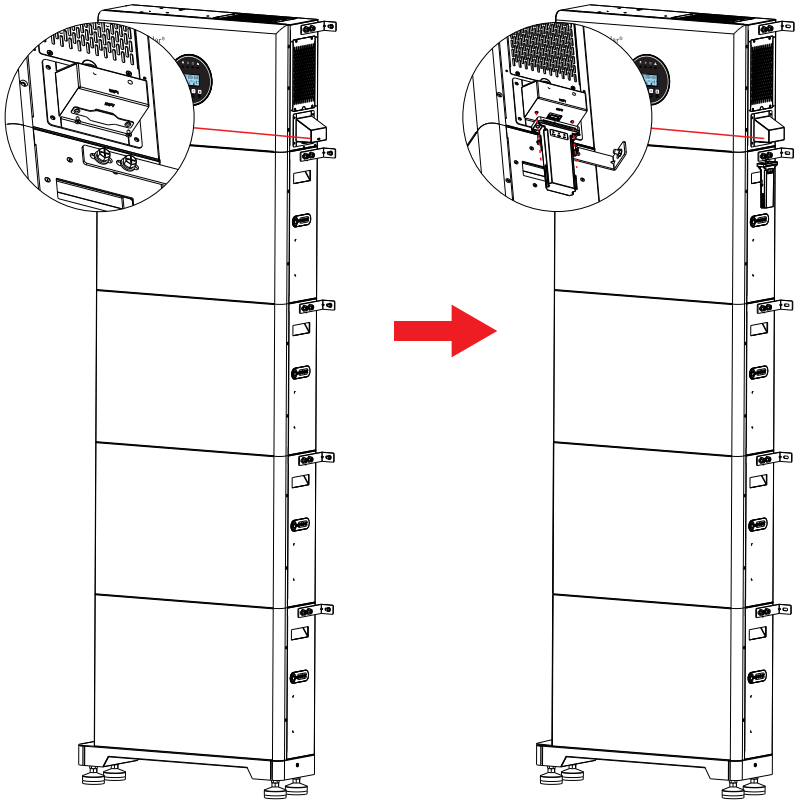
Take out the Parallel communication cable from the AI100-B5 accessory and plug each end into either port of the two lithium battery LINK0/LINK1 to be connected



⚠	**Attention!** If you have more than 2 sets of AI100-B5 installed, you can repeat this step until all the lithium batteries are connected together via communication cables. **Attention!** Make sure all AI100-B5s are connected together via communication cables

Step 12: Install the WIFI module

Take out the WIFI Module and WIFI Module mounting screw in the AI100-5048 accessories, use a Phillips screwdriver to remove the fixing screw of the baffle plate at the WIF interface on the side of the inverter, and remove the baffle plate. Plug the WIFI module into the USB port with the WIFI identifier. Fix the WIFI module to the inverter with a fixing screw.



AC Input/Output Connection

CAUTION!! Before connecting to AC input power source, please install a separate AC breaker between inverter and AC input power source. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 50A for 5KVA.

CAUTION!! There are two terminal blocks with "IN" and "OUT" markings. Please do NOT mis-connect input and output connectors.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It's very important for system safety and efficient operation to use appropriate cable for AC input connection. To reduce risk of injury, please use the proper recommended cable size as below.

Suggested cable requirement for AC wires

Model	Gauge	Cable (mm^2)	Torque Value
5KVA	8~10AWG	8~5	1.4~ 1.6Nm

Please follow below steps to implement AC input/output connection:

1.Before making AC input/output connection, be sure to open DC protector or disconnector first.

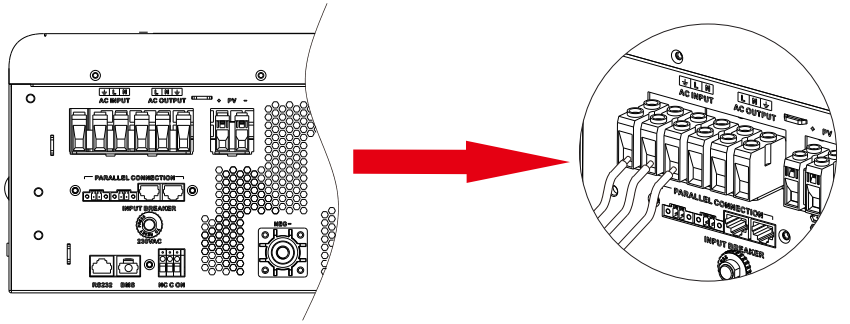
2.Remove insulation sleeve 10mm for six conductors. And shorten phase L and neutral conductor N 3 mm.

3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor ( ) first.

→Ground (yellow-green)

L→LINE (brown or black)

N→Neutral (blue)



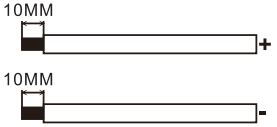
⚠	**WARNING:** Installation must be performed with care due to high battery voltage in series.

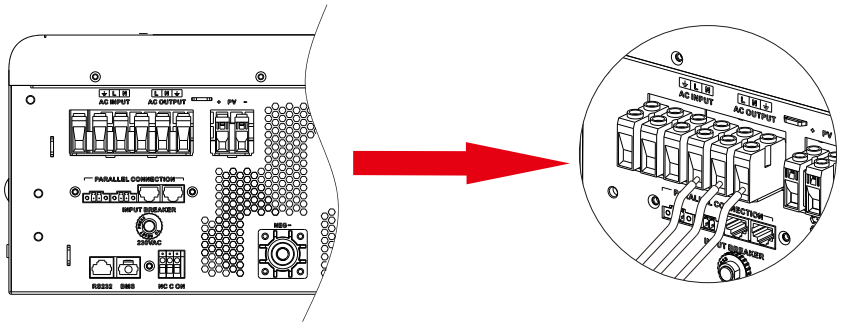
4. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws. Be sure to connect PE protective conductor ( ) first.

→Ground (yellow-green)

L→LINE (brown or black)

N→Neutral (blue)





5. AC Input/output Connection

CAUTION: Important Be sure to connect AC wires with correct polarity. If L and N wires are connected reversely, it may cause utility short-circuited when these inverters are worked in parallel operation.
CAUTION: Appliances such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this inverter/charger will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

PV Connection

CAUTION: Before connecting to PV modules, please install separately a DC circuit breaker between UPS and PV modules.

WARNING! All wiring must be performed by qualified personnel.

WARNING! It'' very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Cable Size	Cable (mm²)	Torque
5KVA	9~11AWG	4~6	1.4~1.6 Nm

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

1.Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.

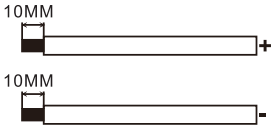
2.Max. power voltage (Vmp) should be during PV array MPPT voltage range.

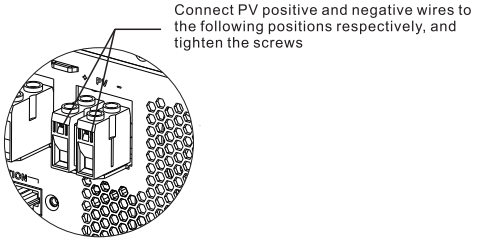
Solar Charging Mode	
INVERTER MODEL	5KVA
Max. PV Array Open Circuit Voltage	500V
PV Array MPPT Voltage Range	95Vdc~430Vdc

Please follow below steps to implement PV module connection:

1.Remove insulation sleeve 10 mm for positive and negative conductors.

2.Check correct polarity of connection cable from PV modules and PV input connectors. Then, connect positive pole (+) of connection cable to positive pole (+) of PV input connector. Connect negative pole (-) of connection cable to negative pole (-) of PV input connector.



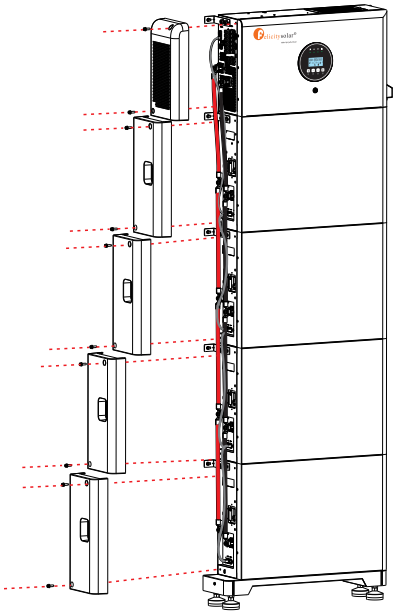


3. Make sure the wires are securely connected.

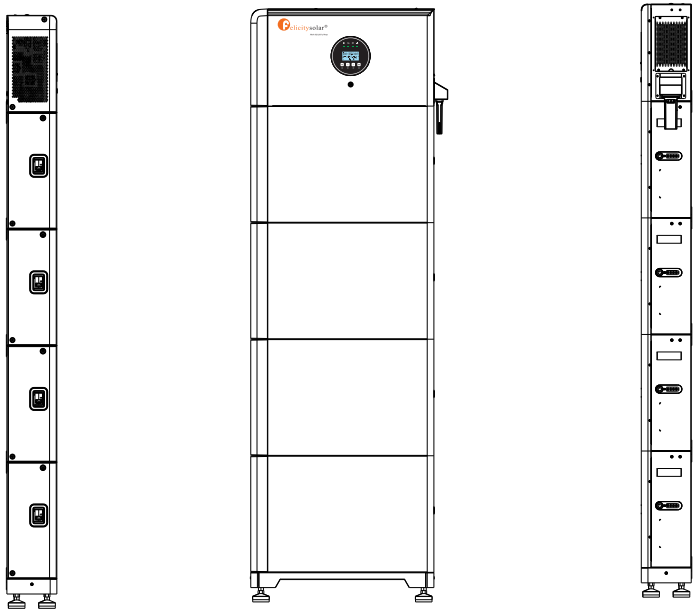
⚠	Use the multimeter in the recommended tool to check whether AC input, output, DC, and PV cables are properly connected. Ensure that there are no open connections between the lines, which facilitates subsequent power-on operations.

PROTECTIVE COVER INSTALLATION

After connecting all cables, take out the white inverter protective cover and battery protective cover and Fixing screws in the AI100-5048 and AI100-B5 accessories screw) and fix it to the side through a screwdriver as shown in the picture below



Final assembly diagram



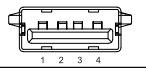
Description of internal pins of external interfaces

Dry Contact Signal

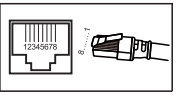
There is one dry contact (3A/250VAC) available on the UPS.

Unit Status	Condition	Dry contact port: NC C NO	
		NC & C	NO & C
Power Off	Unit is off and no output is powered.	Close	Open
Power On	Battery voltage < Setting value in Program 12	Open	Close
	Battery voltage > Setting value in Program 13 or battery charging reaches floating stage	Close	Open

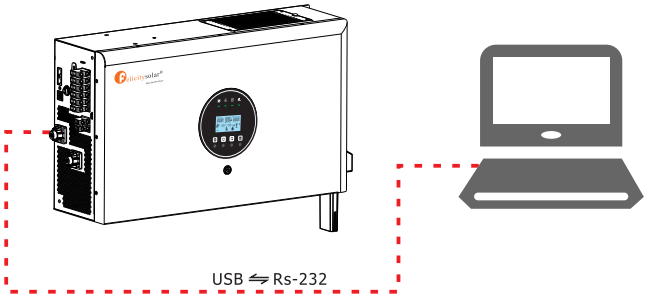
Pin Assignment for WIFI Communication Port

	Pin1	Pin2	Pin3	Pin4	
WiFi	+VCC	RS232_TXD	RS232_RXD	GND	

Pin description of RS232 communication interface

	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	
RS232	RS232TX	RS232RX	+12V	GND	NC	NC	NC	GND	

NOTE: If there is a need to upgrade the AI100-5048ESS firmware library, please contact the after-sales personnel, refer to the following AI100-5048 and computer connection methods, and follow the after-sales instructions for online operation



Attention! WiFi and RS232 cannot be connected at the same time

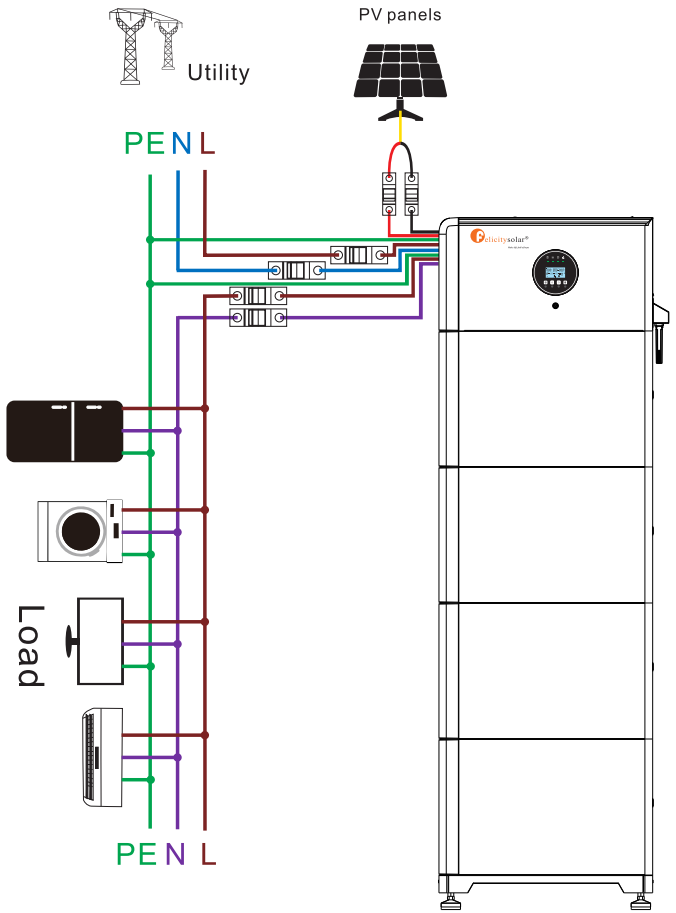
Attention! Users need to purchase their own RS232 conversion USB interface cable to connect the computer

The AI100-5048 ESS is connected to the mains power grid, solar photovoltaic panels, and household loads

Step 1: Connect the cable connecting the AC input to the power transmission network through the AC circuit breaker

Step 2: Connect the cable connecting the AC output to the household load grid via the AC circuit breaker

Step 3: Connect the cable connecting to the PV input to the outdoor solar panel through the DC circuit breaker



⚠	**Attention!** Before connecting, ensure that all AC circuit breakers and DC circuit breakers are off **Attention!** Before connecting the solar photovoltaic panel, please ensure that the hood or other opaque cover is completely covered to avoid electric shock damage caused by light irradiation. **Attention!** Make sure that the positive and negative polarity of the solar photovoltaic panel is correctly connected

AI100-5048 ESS Power-on and commissioning

Check before power-on

Before starting the inverter for the first time, you need to perform the following checks.

1.Check and verify that all equipment has been reliably installed.

2.PV+ and PV- wires are securely connected with correct polarity and voltage within the accessible range.

3.BAT+ and BAT cables are securely connected with correct polarity and voltage.

4.Check whether the DC switch and AC circuit breaker are in the OFF state.

5.The AC circuit breaker is selected in accordance with this manual and local standards.

6.The power grid and load cables are securely and correctly connected.

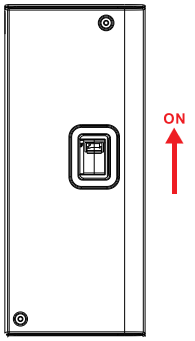
7.All safety signs and warning labels are securely affixed and clearly visible.

8. Please remove the visor or other opaque cover of the solar photovoltaic panel, so that the solar photovoltaic panel is fully exposed to sunlight.

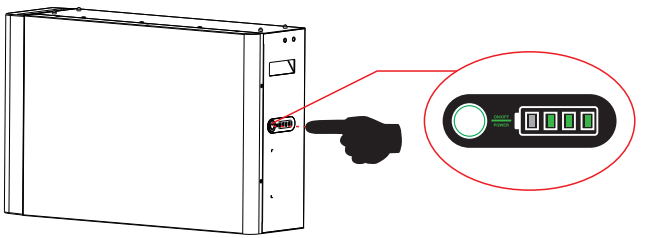
System power on

Step 1: Start AI100-B5

Please flip the DC break switch ON the side of all AI100-b5 lithium batteries from OFF to ON, as shown in the figure:

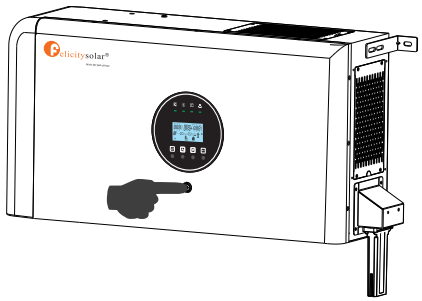


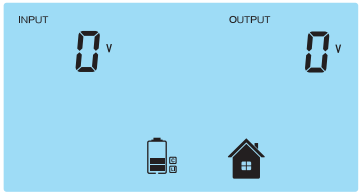
Press the start button on the side of all AI100-B5 successively, as shown in the figure, when the power indicator lights up, it indicates that the start is successful.



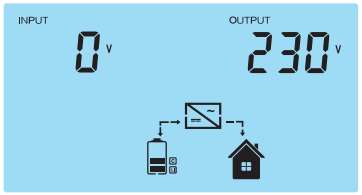
Step 2: Start AI100-5048

After all AI100-B5s are started, press the Start button on the front of AI100-5048, and the button will receded, as shown in the figure, when the display lights up, it indicates that the power supply is connected and starting





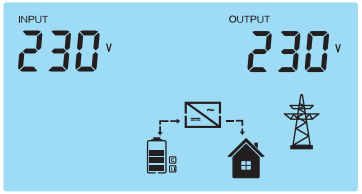
Wait 15 to 20 seconds after the display displays the following information, the AI100-5048 is started successfully



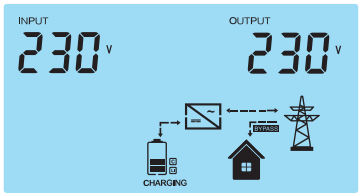
⚠	**Attention!** During the waiting process, if a fault or warning occurs, check the fault code table in the instructions and rectify the fault according to the corresponding operations. If the fault persists or a warning persists, contact after-sales personnel. If no fault or warning occurs, proceed to the next step.

Step 3: Connect the mains power grid

Turn on the AC circuit breaker at the AC input end. If the following information is displayed, the mains power grid is successfully connected. The value on the left of the display displays the input voltage of the current mains power grid



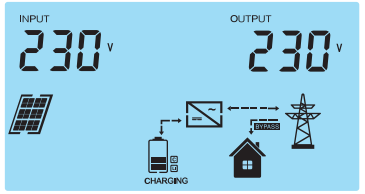
Wait 10 to 15 seconds for the display to display the following information, indicating that the mains power grid is connected to the system and works according to the default program Settings.



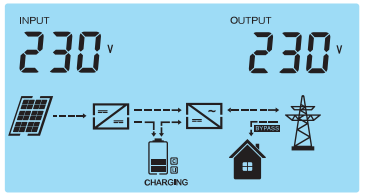
⚠	**Attention!** During the waiting process, if a fault or warning occurs, check the fault code table in the instructions and rectify the fault according to the corresponding operations. If the fault persists or a warning persists, contact after-sales personnel. If no fault or warning occurs, proceed to the next step.

Step 4: Connect the PV solar panels

Turn on the DC circuit breaker at the PV input end. When the light is sufficient and the output voltage of the solar photovoltaic panel meets the minimum input voltage, the following information is displayed, indicating that the solar photovoltaic panel is successfully connected to the system.



Wait for 5-10s until the display displays the following information, indicating that the solar photovoltaic panel is connected to the system and works according to the default program Settings



⚠	**Attention!** During the waiting process, if a fault or warning occurs, check the fault code table in the instructions and rectify the fault according to the corresponding operations. If the fault persists or a warning persists, contact after-sales personnel. If no fault or warning occurs, proceed to the next step.

Step 5: Output load access

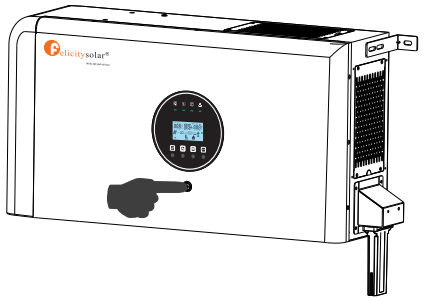
After all the above operations are completed, please close the switch of the AC circuit breaker at the AC output end, and the household load will be connected to the system and can be used normally.

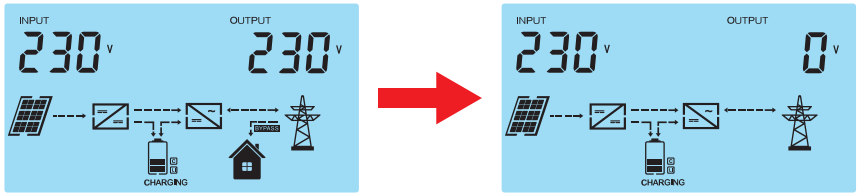
⚠	**Attention!** During the waiting process, if a fault or warning occurs, check the fault code table in the instructions and rectify the fault according to the corresponding operations. If the fault persists or a warning persists, contact after-sales personnel. If no fault or warning occurs, proceed to the next step.

System power off

Step 1: Shut downtheA1100-5048

Press the start button on the front of the AI100-5048. At this time, the button will bounce back. Wait for 3-5 seconds.



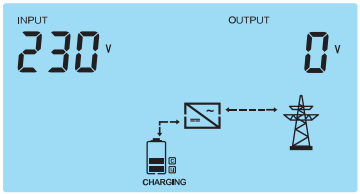


Step 2: The output load is disconnected

Turn off the AC circuit breaker at the AC output

Step 3: Disconnect the PV solar photovoltaic panel

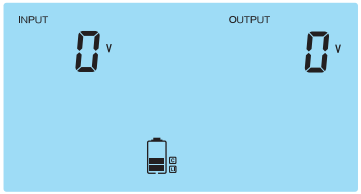
Turn off the DC circuit breaker at the PV input end. Wait 5 to 10s for the following information to be displayed, indicating that the solar photovoltaic panel is disconnected from the system.



Step 4: The mains network is disconnected

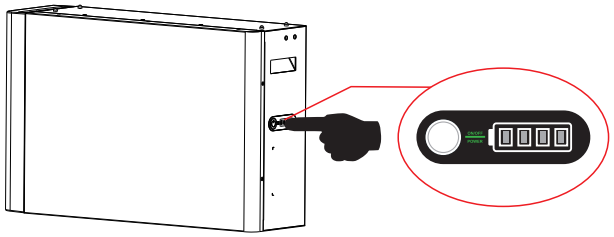
Turn off the DC circuit breaker at the AC input end. Wait 5 to 10s for the following information to be displayed, indicating that the solar photovoltaic panel is disconnected from the system.

Wait 10-30 seconds for the display to go off, indicating that the AI100-5048 is powered off.

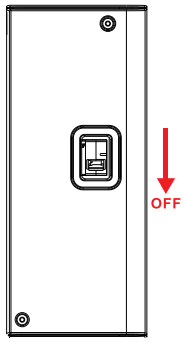


Step 5: Shut down AI100-B5

Press the start button on the side of AI100-B5 for 2-3s and then let go, as shown in the figure, when the power indicator and the on/off light are off at the same time, it indicates that the shutdown is successful.



Please flip the DC break switch ON the side of all AI100-b5 lithium batteries successively, and flip it from ON to OFF, as shown in the figure:



⚠	**Attention!** If you want to remove the system after the system is shut down, to ensure personal safety, wait 5-10 minutes before performing the operation

WIFI configuration

NOTE: Before the WIFI configuration, please complete the system startup operation in "AI100-5048 ESS power-on Commissioning" to make the system work.

Fsolar APP

Step 1: Download the APP

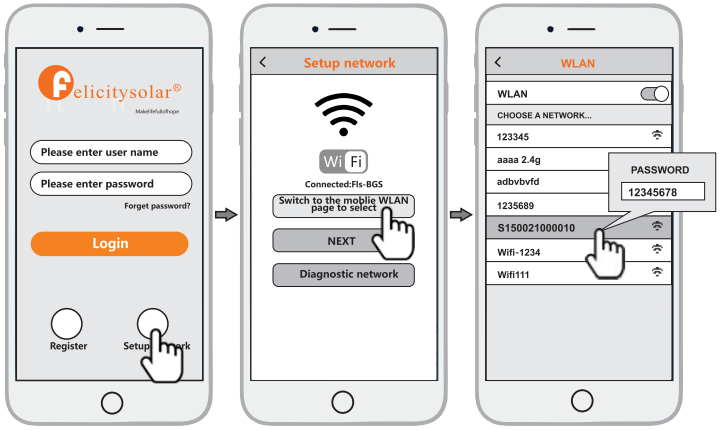
Scan the QR Code on the right side and download the APP.

Step 2: Configure the network

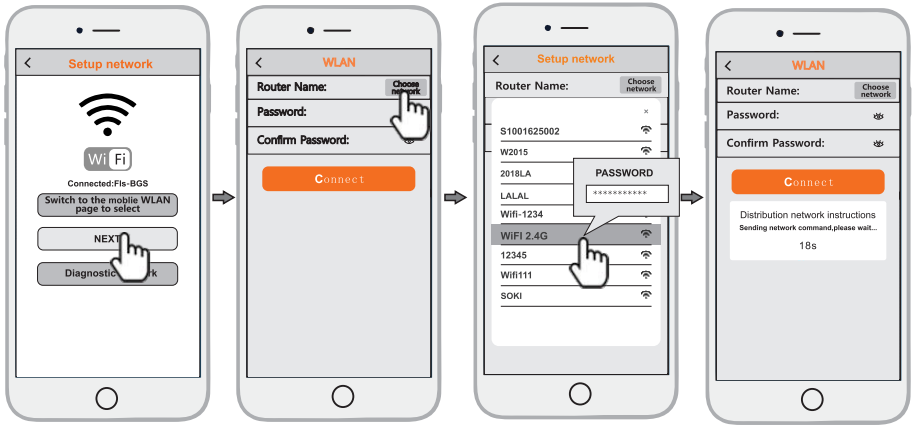
Connect to Smart WiFi module wireless network Scan the QR Code on the right side and download the APP.

(1) Run the APP, enter the login page, click the Setup network button to enter the network configuration page.

(2) On the network configuration page, click the switch to moble WLAN page to selection button to enter the mobile phone WLAN page.



(3) On the WLAN page of the mobile phone, find the corresponding wireless network name (SSID) of the Smart WiFi module, starting with S(e.g. Snnxxxxxxxxx, the xxxxxxxxx is the same as the last 10 bytes of the Smart WiFi module serial number), enter the module wireless network password (default password: 12345678), and connect to the wireless network of the Smart WiFi module.



Configure the network:

(1) After the mobile WLAN is connected to the wireless network of the Smart WiFi module, return to the network configuration page of the APP and click the NEXT button to enter the WiFi network page.

(2) On the WiFi network page, click the choose network button, select the router wireless network to which the Smart WiFi module needs to connect, enter the router wireless network password and click the Connect button.

(3) And then wait for the Smart WiFi module to connect to the router's wireless network, which will take some time.

Note: if the LED status of NET is always on, it indicates that the Smart WiFi module has been correctly connected to the server. Otherwise, the Smart WiFi module is not connected to the server. Then you can use the diagnostic function of the APP or according to the fault appendix to troubleshoot the problem.

Step 3: Register an account & Add devices

After the Smart WiFi module is connected to the server, it will transmit the data of the solar device to the server. And after the plant is created, users can view and manage the solar device via the APP or web browser.

Manage device via APP:

Register an account Run the APP, enter the login page, click the register button, fill in the relevant information, and register an account.

Adding devices

(1) After logging into the APP with an account, enter the home page, click the Device button to enter the device interface.

(2) Click the + button to enter the Add Device page, and fill in the relevant information as required.

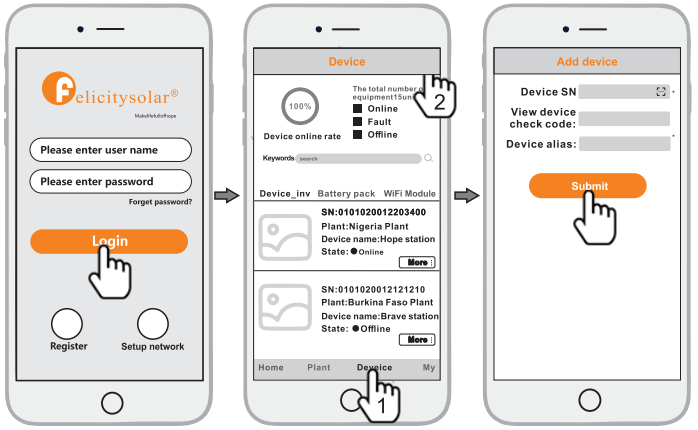
Note: Device SN refers to a solar device serial number, such as an inverter serial number.

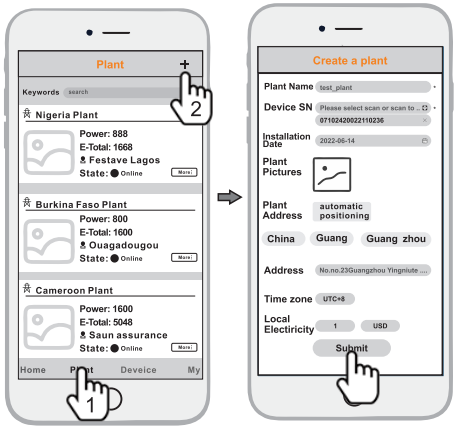
Adding plant

(1) After adding the device, click the Plant button to enter the plant interface.

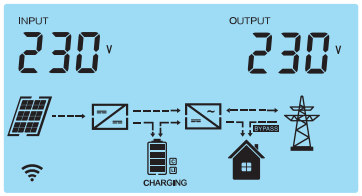
(2) Click the + button to enter the page of adding the plant fill in relevant information as required and finally click the Submit button to add the plant.

Manage the device via a web browser, please refer to: https://shine.felicitysolar.com .





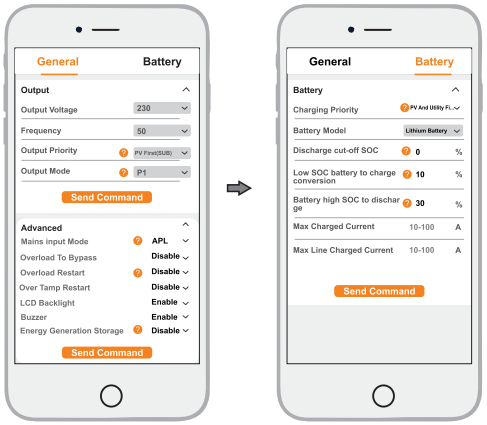
AI100-5048 If is displayed at the lower left corner of the display, the WIFI module is successfully connected to the system and starts working. Users can operate and set through the APP according to their own needs.



⚠	**Attention!** If the WIFI module still fails to work after all WIFI configuration steps are completed, handle the problem according to the WIFI troubleshooting table. If the problem still fails to work, contact after-sales personnel in time.

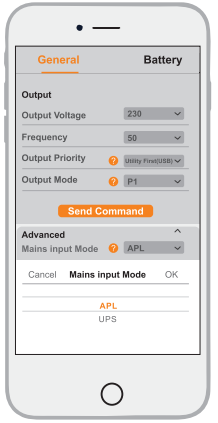
Step 4: Set up the added device through the APP

Open the established "power Station" Find "Device" Open the associated AI100-5048 device, click the "..." in the upper right corner of the screen. Menu bar option, click Remote control to enter the setting interface. You can enter General and Battery to set inverter and lithium battery parameters respectively.

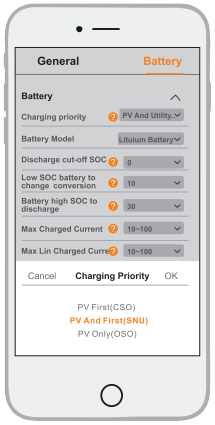


⚠	**Attention!** Only the highlighted part of the Settings can be set through the APP, and the gray part of the Settings can only be set through the screen setting function.

The procedure for setting General is as follows:

Set item	Picture indication	Set item function and operation description
Output Voltage	Output voltage 230 V	The current output voltage of AV is 230V by default, which cannot be set. If you want to change it to other output voltage values, please refer to the following LCD operation process description.
Frequency	Frequency 50 V	The current output voltage frequency of the AC is the default value of 50HZ, which cannot be set. If you want to change the output voltage to another value, see the following LCD operation process description.
Output Priority		The current output priority of the inverter is the Utility First(USB) default mode, you can use this setting to change it to PV First(SUB) mode or Battery First(SBU) mode.
Mains Input Made		the current Utility input range setting of the inverter is the default mode of APL. APL should be selected, when the utility is not well.

The procedure for setting Battery is as follows:

Set item	Picture indication	Set item function and operation description
Charging Priority		The current charging priority of the inverter is the PV And Utility First(SNU) default mode. You can change it to the PV First(CSO) mode or Pv only(OSO) mode by using this setting item.
Max Charged Current	Max Charged Current 10~100 A	The default value of the current maximum charging current for PV and mains is 60A, which can be modified between 10-100A according to your needs.
Max Line Charged Current	Max Line Charged Current 10~100 A	The current maximum charge current of the AC is 30A by default, which can be modified between 10-100A according to your needs.

Attention! The above Setting instructions only help you to simply set the basic functions. After the above setting operation is completed, the system can work according to your basic needs. If you want to set the comprehensive function, please refer to the detailed description in the "Setting Page" section.

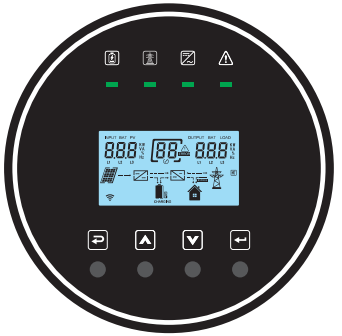
WIFI Troubleshooting table

LED Status			Indicate	Troubleshooting
PWR	COM	NET		
ON			Normal power supply	Normal
ON	ON		Normal communication with solar device	Normal
ON		ON	Normal communication with the data server	Normal
ON	Fast Flash		Upgrading the solar device	Normal
OFF			Abnormal power supply firmware	1.Power supply of usb-a port is abnormal 2. Check whether the screws are tightened 3.Smart WiFi module failure
ON	OFF or Slow Flash		Abnormal communication with the solar device	1.Check that the screws are tightened 2.Check whether the USB port connection is abnormal

ON		Flash	Abnormal communication with the router or the data server	1.Check the router information 1) Confirm whether to configure wireless information to connect to the router 2) The router name should consist of English letters and numbers, it does not support special symbols 3) Confirm whether the router connected to the Smart WiFi module can connect to the Internet 2.Check if you filled in the correct name and password of the router when configuring it 3.Confirm whether the signal quality between the Smart WiFi module and the router is good

OPERATION AND DISPLAY PANE

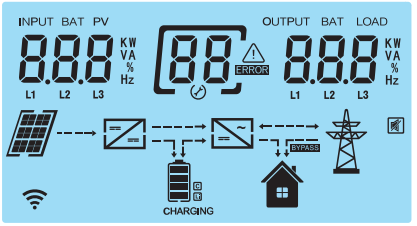
The operation and display panel, shown in below chart, is on the front panel of the UPS. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



Function Key	Icon	Description
ESC		To previous page
UP		To go to previous selection
DOWN		To go to next selection
ENTER		To confirm the selection or go to next page

LED Indicator	Icon	Description
Battery		Charging the battery, the LED light flash. If battery is full, the LED light will always-on. The battery is not charged, the LED light will go out.
Utility		Inverter running in utility mode, the LED will always-on. Inverter is not running in utility mode, the LED will go out.
Inverter		Inverter running in off-grid mode, the LED light will always-on. Inverter is not running in off-grid mode, the LED light will go out.
Fault		If inverter in fault event, the LED light will always-on. If inverter in warning event, the LED light will flash. Inverter work normally, the LED light will go out.
Buzzer Information		
Buzzer beep	Turn on/off the inverter, the buzzer will last for 2.5s. Press any button, the buzzer will last for 0.1s. Hold on the "ENTER" button, the buzzer will last for 3s. If in fault event, the buzzer will keep going. If in warning event, the buzzer will beep discontinuous (Check more information on the chapter of "Warning Code Table").	

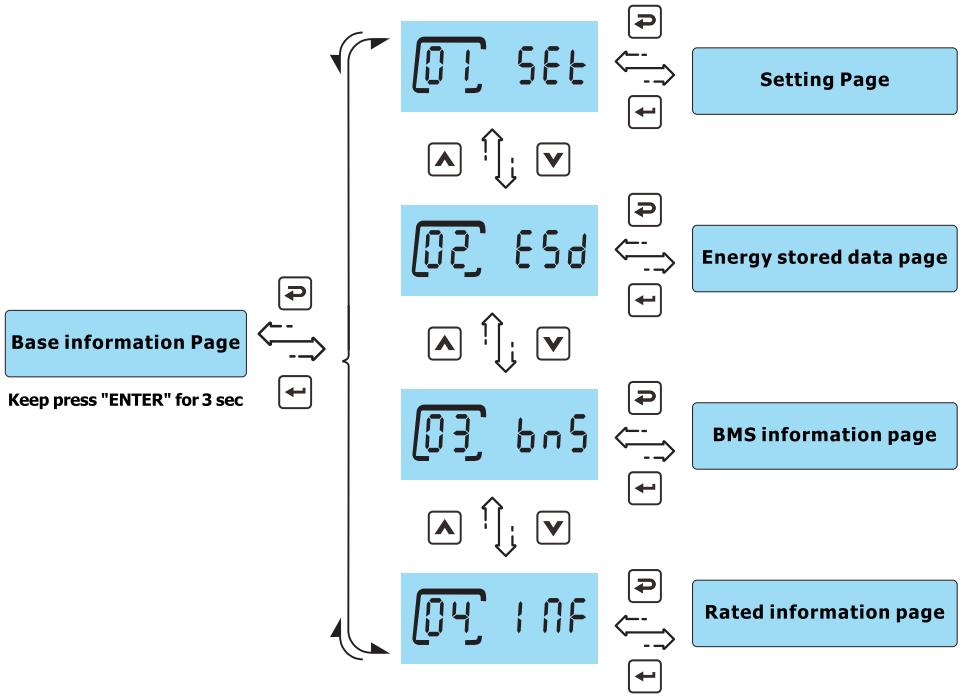
LCD Display Icons



Icon	Function description
Input Source Information	
INPUT BAT PV KW VA % Hz	Indicate input voltage, input frequency, PV voltage, PV power, battery voltage and charger current.
Configuration Program and Fault Information	
	Indicates the setting programs.
ERROR	Indicates the warning and fault codes. Warning: flashing with warning code. Fault: ERROR lighting with fault code

Output Information	
OUTPUT BAT LOAD KW VA % Hz	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.
Battery Information	
	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100%.
Li	Indicates Lithium battery type.
C	Indicates communication is built between inverter and battery.
Mode Operation Information	
	Indicates the utility.
BYPASS	Indicates load is supplied by utility directly.
	Indicates the inverter/charger is working.
	Indicates the PV panels.
	Indicates PV MPPT is working.
	Indicates the WIFI link
	Indicates the first AC output
Mute Operation	
	Indicates unit alarm is disabled.

LCD operation flow chart

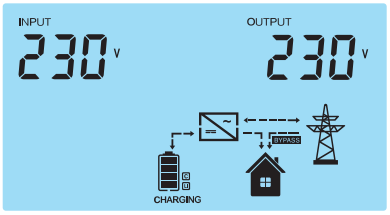


On base information page, pressing and holding "ENTER" key for 3 sec, the unit will enter parameters page. Press "UP" or "DOWN" key to switch the selection and press "ENTER" key to enter selected page. Press "ESC" key to back to previous page.

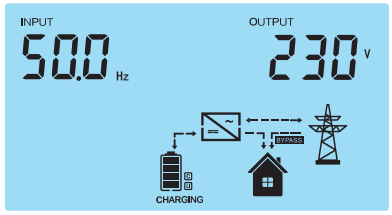
Base information Page

The base information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

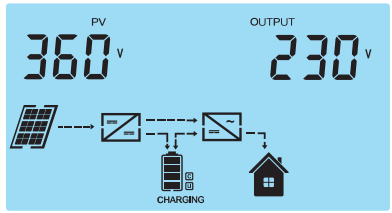
Input voltage / Output voltage
Utility voltage is 230V, output voltage is 230V



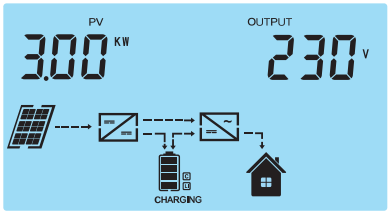
Input frequency / Output voltage
Utility frequency is 50.0Hz, output voltage is 230V



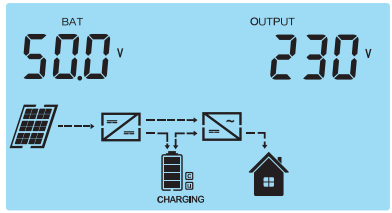
PV voltage / Output voltage
PV voltage is 360V, output voltage is 230V



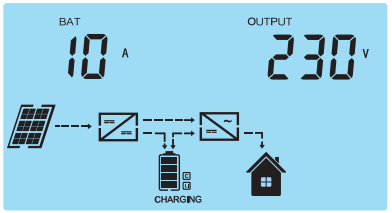
PV power / Output voltage
PV power is 3.00kW, output voltage is 230V



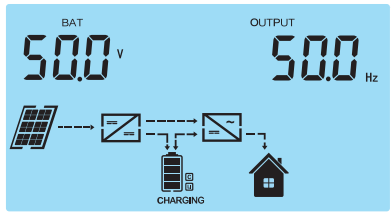
Battery voltage / Output voltage
Battery voltage is 50.0V, output voltage is 230V



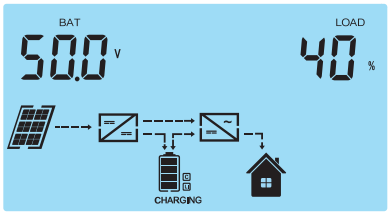
Charging current / Output voltage
Charging current is 10A, output voltage is 230V



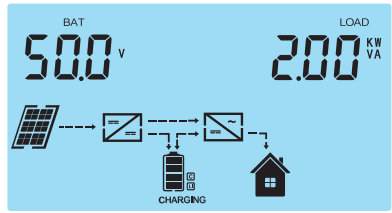
Battery voltage / Output frequency
Battery voltage is 50.0V, output frequency is 50.0Hz



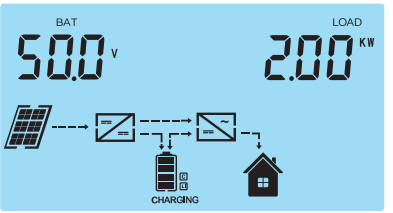
Battery voltage / Load percentage
Battery voltage is 50.0V, load percentage is 40%

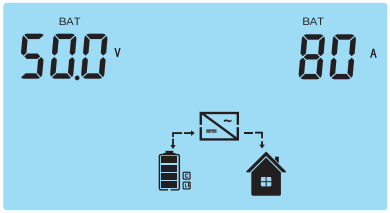
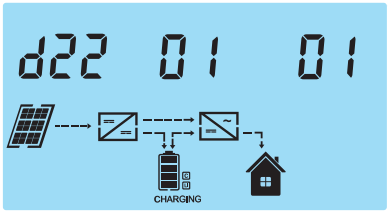
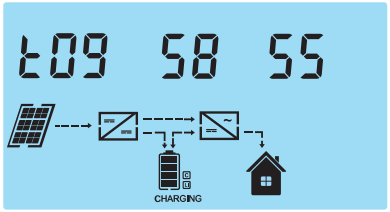


Battery voltage / Load VA
Battery voltage is 50.0V, output wattage is 2.00kVA



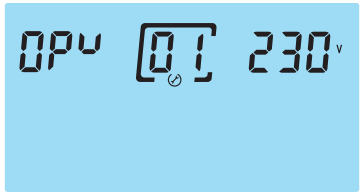
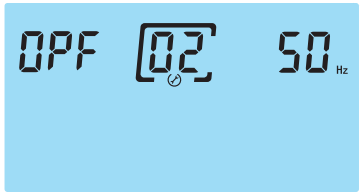
Battery voltage / Load wattage
Battery voltage is 50.0V, output wattage is 2.00kW

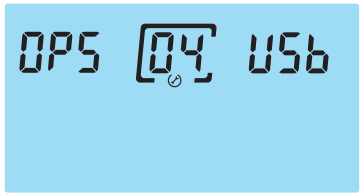
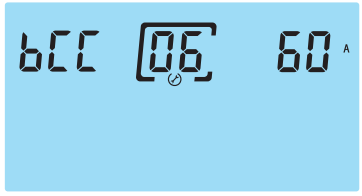
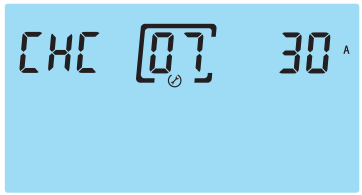


Battery voltage / Discharging current Battery voltage is 50.0V, discharging current is 80A 	**Date** 2022-01-01 
Time 09: 58: 55 	

Basic function setting Step Operation description

Before performing the following Settings, follow the instructions in "LCD operation flow chart" to enter the corresponding Settings.

Set item display	Set item function and operation description
	Setting item 1: Output voltage setting The current inverter AC output voltage default value is 230V, you can use this setting item to set it to 220V or 240V according to your own needs. For details, refer to the "01" Setting code description in the "Setting Page" table.
	Setting item 2: Output frequency setting The current inverter AC output voltage frequency default value is 50HZ, you can use this setting item to set it to 60HZ according to your own needs. For details, refer to the "02" Setting code description in the "Setting Page" table.

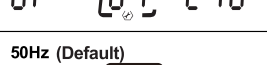
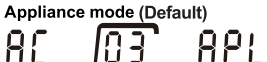
	Setting item 4: Output mode setting The default inverter AC output mode is Utility >>PV>>Battery (USB). You can set it to PV >>Utility >> Battery (SUB) or PV >> Battery >>Utility (SBU) based on your requirements. For details, refer to the "04" Setting code description in the "Setting Page" table.
	Setting item 5: Charging priority setting The current default value of the inverter charging priority is PV and Utility. You can set it to PV first or PV Only according to your own needs. For details, refer to the "05" Setting code description in the "Setting Page" table.
	Setting item 6: Set the maximum charging current of the mains and PV The default value of the current inverter PV and the maximum charging current of the mains is 60A. You can set it between 0 and 100 according to your own needs through this setting item. For details, refer to the "06" Setting code description in the "Setting Page"
	Setting item 7: Set the maximum charging current of the mains The current maximum charging current of the inverter is 30A by default. You can set it between 0 and 100 according to your own needs through this setting. For details, refer to the "07" Setting code description in the "Setting Page" table.

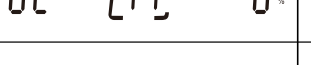
	Attention! The above Setting instructions only help you to simply set the basic functions. After the above setting operation is completed, the system can work according to your basic needs. If you want to set the comprehensive function, please refer to the detailed description in the "Setting Page" section.

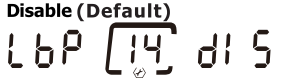
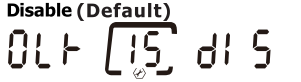
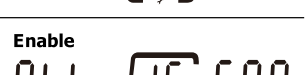
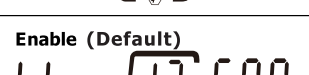
Setting Page

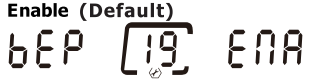
Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

Setting items:

		Selectable option	
00	**Exit setting**		
01	**Output voltage setting**	**220V** 	Output voltage configuration
		230V (Default) 	
		240V 	
02	**Output frequency setting**	**50Hz (Default)** 	Output frequency configuration
		60Hz 	
03	**Utility input range setting**	**Appliance mode (Default)** 	APL should be selected, when the utility is not well.
		UPS mode 	
04	**Output source priority**	**Utility >> PV >> Battery (Default)** 	Utility provides power to the loads first. PV and battery will provide power to loads only when utility is not available.
		PV >> Utility >> Battery 	PV provides power to the loads first. If PV is not sufficient, utility will supply power the loads at the same time. Battery will provide power to loads only when utility is not available.
		PV >> Battery >> Utility 	PV provides power to the loads first. If PV is not sufficient, battery will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to the setting point in program 12.

05	**Charger priority**	**If UPS is working in utility mode, charger priority can be set as below. However, when UPS is working in Battery mode, only PV can charge battery.**	
		PV first 	PV will charge battery first. Utility will charge battery only when PV is unavailable.
		PV and Utility (Default) 	PV and utility will charge battery together.
		PV Only 	Only PV can charge the battery.
06	**Max charging current (Utility charge current + PV charging current)**	**Default: 60A** 	Setting range is from 10A to 100A. Increment of each click is 1A.
07	**Max utility charging current setting**	**Default: 30A** 	Setting range is from 10A to 100A. Increment of each click is 1A.
11	**Low DC cut-off voltage or Low SOC**	**If battery power is only power source available, All-in one Hybrid inverter system will shut down. If PV energy and battery power are available, All-in one Hybrid inverter system will charge battery without AC output. If PV energy, battery power and utility are all available, All-in one Hybrid inverter system will transfer to line mode and provide output power to loads.**	
		Default: 0% 	The range is set from 0% to 90%, with an increment of 5% per click.
12	**Setting battery voltage point back to utility when selecting "SBU priority" in program 4**	**Default: 10%** 	The range is set from 5% to 95%, with an increment of 5% per click.

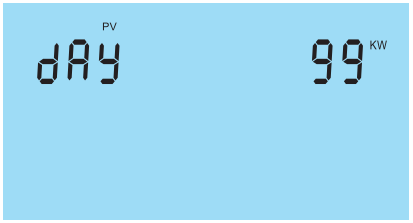
13	Setting battery voltage point back to battery mode when selecting "SBU priority" in program 4	Default:30% 	The range is set from 10% to 100%, with an increment of 5% per click.
14	Overload bypass function	**Disable (Default)**  **Enable** 	If it is enabled, the inverter will switch to utility mode if overload happens in battery mode.
15	Overload restart function	**Disable (Default)**  **Enable** 	If it is enabled, the inverter will auto restart when overload occurs.
16	Over temperature restart function	**Disable (Default)**  **Enable** 	If it is enabled, the inverter will auto restart when over temperature occurs.
17	Backlight of LCD	**Disable** 	If selected, LCD backlight will be off after no button is pressed for 60s.
		Enable (Default) 	If selected, LCD backlight will be always-on.
18	Auto return to the first page of display screen	**Disable** 	If selected, the display screen will stay at latest screen user finally switches.
		Enable (Default) 	If selected, it will automatically return to the first page of display screen (Input voltage/ output voltage) after no button is pressed for 60s.

19	Buzzer Alarm	**Disable** 	If selected, buzzer is not allowed to beep.
		Enable (Default) 	If selected, buzzer is allowed to beep.
21	Energy stored data for PV and Load	**Disable (Default)** 	If selected, inverter will esase all historical data of PV and Load energy, and stop record historical data for PV and Load energy.
		Enable 	If selected, inverter will record historical data for PV and Load energy. NOTE: Before selected, please double check if date and time is correct, if incorrect, please set date and time in program 22~27.
22	Time setting- Year	**Year** 	Setting rage is from 22 to 99.
23	Time setting- Month	**Month** 	Setting rage is from 1 to 12
24	Time setting- Day	**Day** 	Setting rage is from 1 to 31
25	Time setting- Hour	**Hour** 	Setting rage is from 0 to 23
26	Time setting- Minute	**Minute** 	Setting rage is from 0 to 59
27	Time setting- Second	**Second** 	Setting rage is from 0 to 59

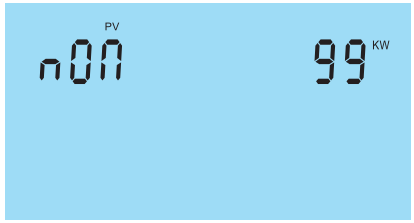
Energy stored data Page

The energy stored data will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

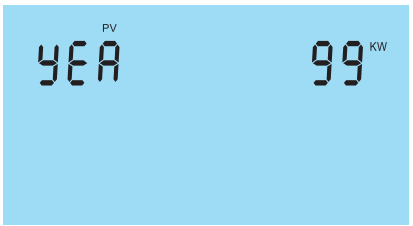
PV generated energy today
99 kWh



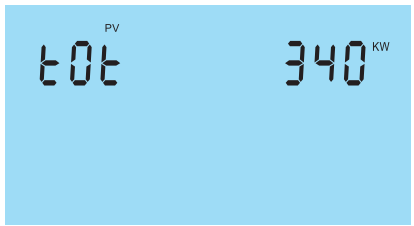
PV generated energy this month
99 kWh



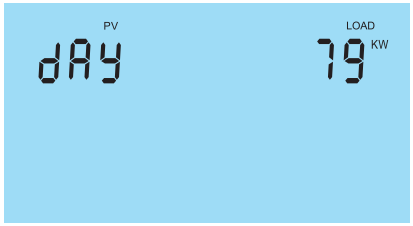
PV generated energy this year
99 kWh



PV generated energy current in total
340 kWh

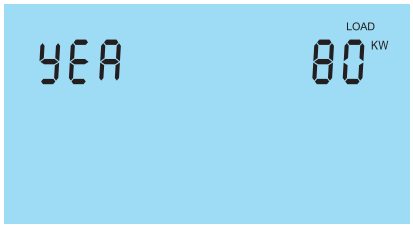


Load consumed energy today
79 kWh

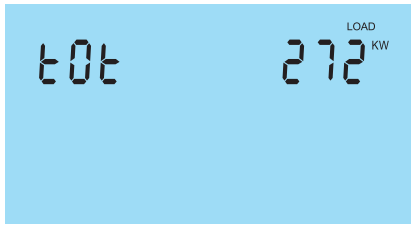


Load consumed energy this month
79 kWh

Load consumed energy this year
80 kWh



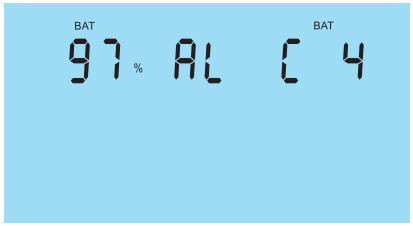
Load consumed energy in total
272 kWh

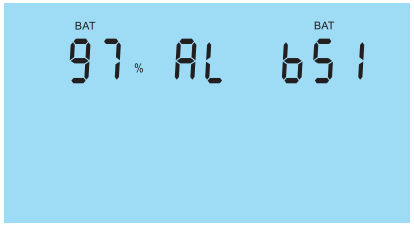


BMS information Page

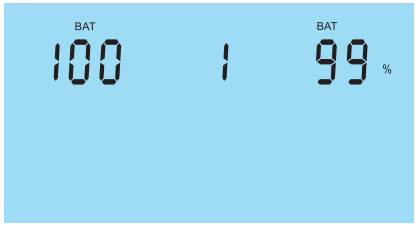
The BMS information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

Mean SOC/ Battery pack number / BMS status PV generated energy this month
Mean SOC is 97%, Connected Battery pack number is 4, BMS status is 51 (Check detail in warning code table). If BMS status occurred, it will be rolled with battery pack number automatically.

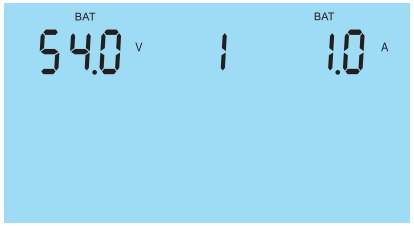




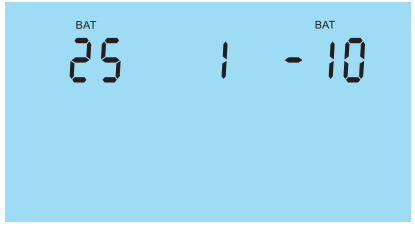
BMS version / SOC
BMS version is 100, SOC is 99% on battery pack of address 1



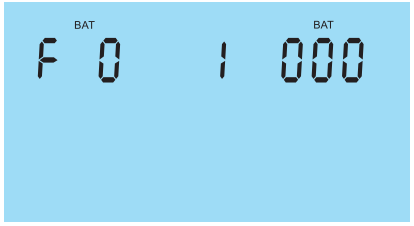
BMS voltage / current
BMS voltage is 54.0V, current is 1A on battery pack of address 1



BMS highest temerpature / lowest temerpature
BMS highest temerpature is 25°C , lowest temerpature is -10°C on battery pack of address 1



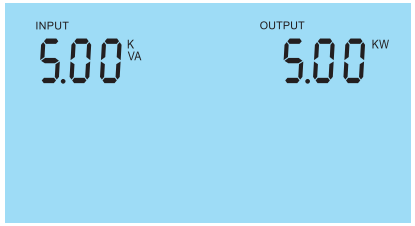
BMS fault code / flag
BMS fault code is 0, flag is 000 on battery pack of address 1



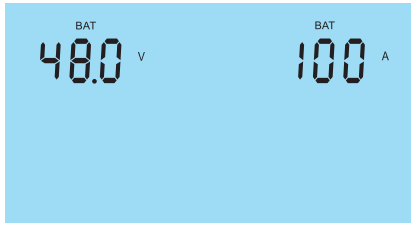
Rated information Page

The rated information will be switched by pressing "UP" or "DOWN" key. The selectable information is switched as below order:

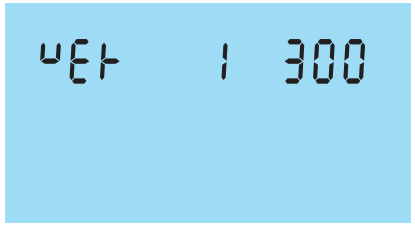
Rated VA / WATT
Rated VA is 5KVA, WATT is 5KW



Rated battery voltage / Max. charge current
Rated battery voltage is 48V, Max. charge current is 100A



Firmware version
Firmware version is 1300



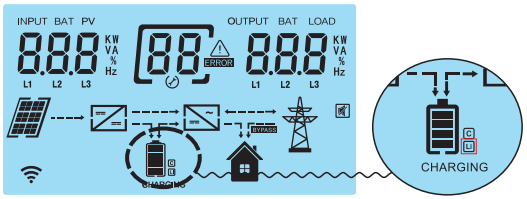
Lithium Battery Communication

It's allowed to connect lithium battery and build communication only which it has been configured. Please follow bellow steps to configure communication between lithium battery and Inverter.

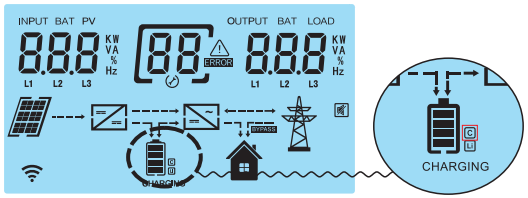
1. Connect power cables between lithium battery and Inverter. Please pay attention to the terminals of positive and negative. Make sure the positive terminal of battery is connected to the positive terminal of Inverter, and the negative terminal of battery is connected to the negative terminal of Inverter.
2. The communication cable is bundled with lithium battery. Both sides are RJ45 port. One port is connected to the BMS port of Inverter and another one is connected to the COMM port of lithium battery.
3. Configure battery type to "Lib" in LCD setting No. 08.

The battery type is Lib

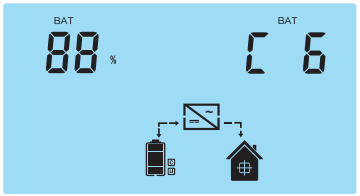
And then LCD will show you "Li" icon.



4. Power up lithium battery and Inverter. Wait a moment, if the communication is built between them, LCD will show you "C" icon as below.



5. Roll LCD real time information pages by pressing "UP" or "DOWN" button, as below page, you can see the parameters of SOC and battery pack units in the communication system.



This page means SOC is 88% and battery pack units are 6.

PARALLEL INSTALLATION GUIDE (ONLY APPLICABLE TO AI100-5048)

1. Introduction

This All-in one Hybrid inverter system can be used in parallel with two different operation modes.
1. Parallel operation in single phase with up to 12 units. The supported maximum output power is 60KW/60KVA.
2. Maximum 12 units work together to support three-phase equipment. 10 units support one phase maximum. The supported maximum output power is 60KW/60KVA and one phase can be up to 50KW/50KVA.

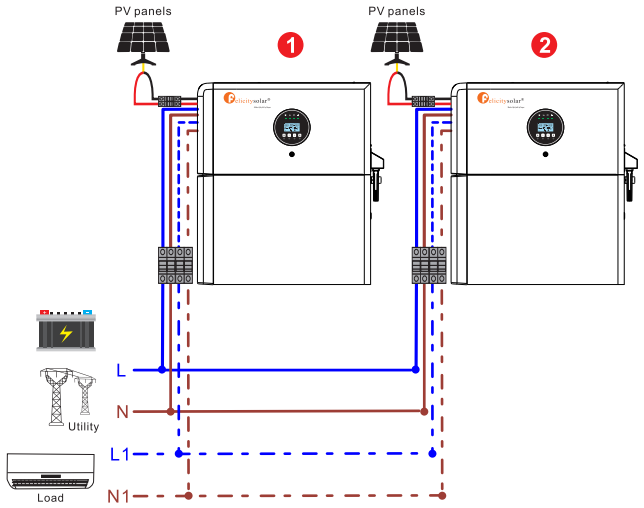
NOTE 1: If this unit is bundled with share current cable and parallel cable, this inverter is default supported parallel operation. You may skip section 2.

NOTE 2: Under parallel operation modes, battery must be connected with All-in one Hybrid inverter system.

NOTE 3: Before starting up All-in one Hybrid inverter system, please connect all N wires of AC output together.

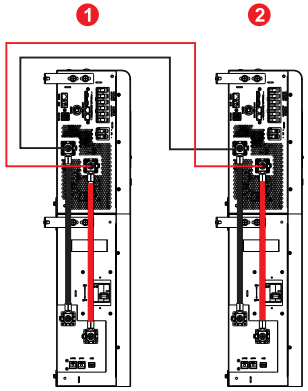
Two AI100-5048 ESS are connected in single phase

Step 1: Connect electrical cables
Please refer to the following figure, AC input, AC output, PV solar photovoltaic panel input interface to connect the corresponding

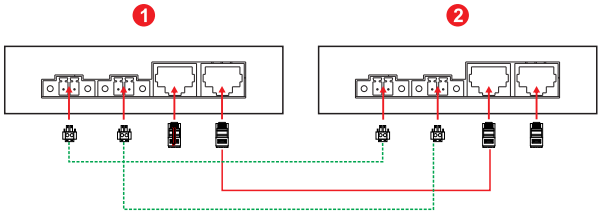


⚠	Attention! Multiple AI100-5048ESS PV solar panels in parallel are independently input a single AI100-5048ESS, it is prohibited to parallel multiple PV+ and PV- together!

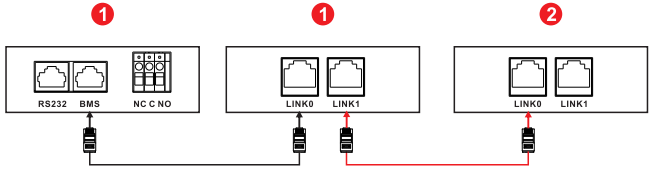
Step 2: Connect DC cables
Connect DC cables in parallel by referring to the figure. Prepare the required extension cables by referring to the DC cable specifications provided in the operating instructions of the single machine.



Step 3 Connect the AI100-5048 in parallel with communication cables
Take out Parallel communication cable and Current sharing cable from AI100-5048 accessories respectively and connect them according to the following figure



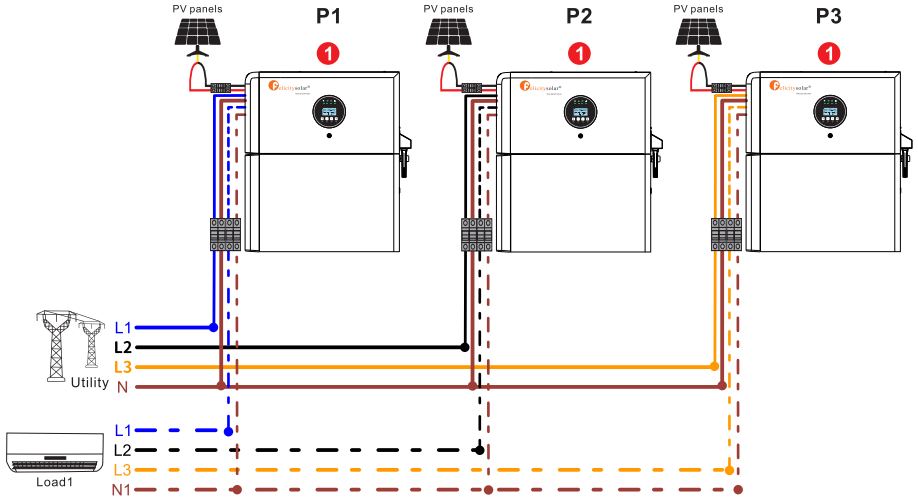
Step 4: Connect the AI100-B5 communication cables in parallel
Take out the lithium battery communication cable and Parallel communication cable from the AI100-B5 accessories respectively and connect them according to the following figure.



Attention! When multiple AI100-5048 ESS single-phase systems are connected in parallel, only one AI100-5048 inverter is allowed to establish a communication relationship with all the other AI100-B5s!
Attention! A single AI100-5048 ESS can choose the number of parallel AI100-B5 lithium batteries according to their own needs, (the picture only shows the AI100-5048 and 1 AI100-B5 system) A single system supports up to 4 AI100-B5 in parallel (for specific connection methods, please refer to the single machine instruction manual)
Attention! In multiple AI100-5048 ESS parallel connections, the total number of AI100-B5 parallel connections must not exceed 15!
Attention! Before starting the inverter, ensure that all NEG (-) and POS (+) lines of the battery are connected together separately.
Attention! Do not connect the AC input N line to the AC output N line.

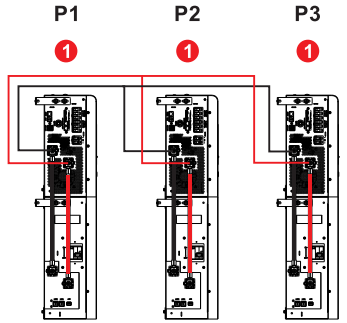
Three phase each AI100-5048 ESS phase in parallel

Step 1: Connect electrical cables
Please refer to the following figure, AC input, AC output, PV solar photovoltaic panel input interface to connect the corresponding

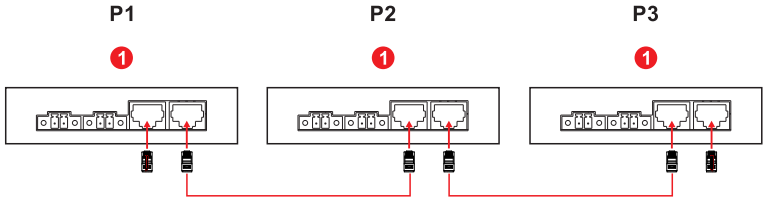


Attention! Multiple AI100-5048ESS PV solar panels in parallel are independently input to a single AI100-5048ESS, and multiple PV+ and PV- are prohibited in parallel
Attention! No equalizing cable is allowed between AI100-5048 with different phases. Otherwise, the inverter may be damaged
Attention! P1:L1-phase,P2:L2-phase, P3: L3-phase

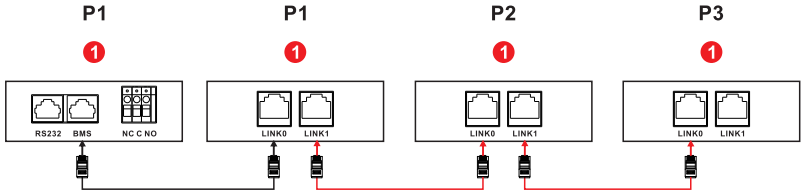
Step 2: Connect lithium battery DC cables
Connect DC cables in parallel by referring to the figure. Prepare the required extension cables by referring to the DC cable specifications provided in the operating instructions of the single machine.



Step 3 Connect the AI100-5048 in parallel with communication cables
Take out Parallel communication cable and Current sharing cable from AI100-5048 accessories respectively and connect them according to the following figure



Step 4: Connect the AI100-B5 communication cables in parallel
Take out the lithium battery communication cable and Parallel communication cable from the AI100-B5 accessories respectively and connect them according to the following figure.



Attention! When multiple AI100-5048 ESS three-phase systems are connected in parallel, only one AI100-5048 inverter is allowed to establish a communication relationship with all the other AI100-B5s!
Attention! A single AI100-5048 ESS can choose the number of parallel AI100-B5 lithium batteries according to their own needs, (the picture only shows the AI100-5048 and 1 AI100-B5 system) A single system supports up to 4 AI100-B5 in parallel (for specific connection methods, please refer to the single machine instruction manual)
Attention! In multiple AI100-5048 ESS parallel connections, the total number of AI100-B5 parallel connections must not exceed 15!
Attention! Before starting the inverter, ensure that all NEG (-) and POS (+) lines of the battery are connected together separately.
Attention! Do not connect the AC input N line to the AC output N line.

LCD Setting and Display

Setting Program

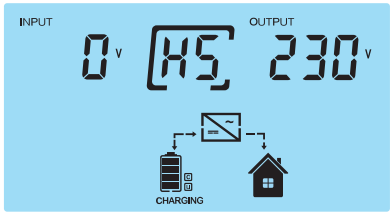
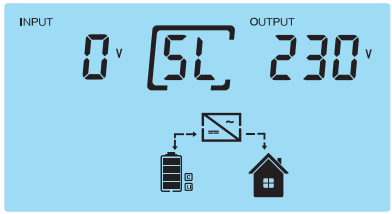
28	AC output mode	Single 	When the units are used in parallel with single phase, please select "PAL" in program 28. It is required to have at least 3 All-in one Hybrid inverter system or maximum nine All-in one Hybrid inverter system to support three-phase equipment. It's required to have at least one All-in one Hybrid inverter system in each phase or it's up to ten inverters in one phase. Please select "3P1" in program 28 for the inverter connected to L1 phase, "3P2" in program 28 for the inverter connected to L2 phase and "3P3" in program 28 for the inverter connected to L3 phase. **Do NOT** connect share current cable between units on different phases. Before starting up All-in one Hybrid inverter system, please connect all N wires of AC output together.
		Parallel 	
		L1 Phase 	
		L2 Phase 	
		L3 Phase 	

Commissioning

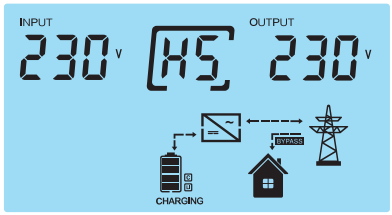
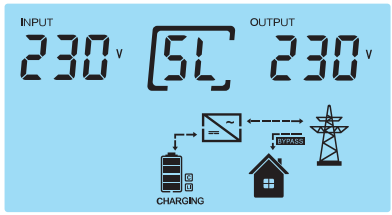
Parallel in single phase

Step 1: Check the following requirements before commissioning:
- Correct wire connection.
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 28 of each unit. And then shut down all units.
NOTE: To be safe, it's better to turn off switch when setting LCD program.
Step 3: Turn on each unit.

LCD display in Master unit	LCD display in Slave unit
	

NOTE: Master and slave units are randomly defined.
Step 4: Switch on all AC breakers of Line wires in AC input. It's better to have all inverters connect to utility at the same time. However, these inverters will automatically restart. If detecting AC connection, they will work normally.

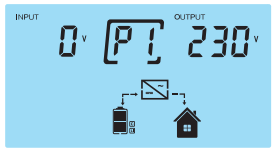
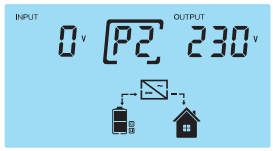
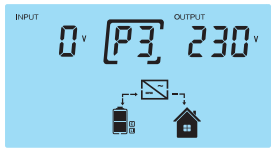
LCD display in Master unit	LCD display in Slave unit
	

Step 5: If there is no more fault alarm, the parallel system is completely installed.
Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.

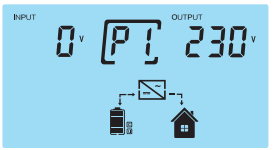
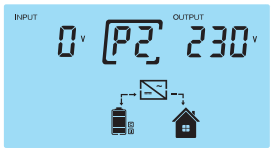
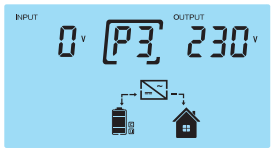
Support three-phase equipment

Step 1: Check the following requirements before commissioning:
- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on all units and configure LCD program 28 as P1, P2 and P3 sequentially. And then shut down all units.
NOTE: To be safe, it's better to turn off switch when setting LCD program.
Step 3: Turn on all units sequentially.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step 4: Switch on all AC breakers of Line wires in AC input. If AC connection is detected and three phases are matched with unit setting, they will work normally. Otherwise, the AC icon will flash and they will not work in line mode.

LCD display in L1-phase unit	LCD display in L2-phase unit	LCD display in L3-phase unit
		

Step 5: If there is no more fault alarm, the system to support 3-phase equipment is completely installed.
Step 6: Please switch on all breakers of Line wires in load side. This system will start to provide power to the load.
Note 1: To avoid overload occurring, before turning on breakers in load side, it's better to have whole system in operation first.
Note 2: Transfer time for this operation exists. Power interruption may happen to critical devices, which cannot bear transfer time.

Warning Code Table

When fault event happens, the fault LED is flashing. At the same time, warning code, icon is shown on the LCD screen.

Warning Code	Warning Information	Audible Alarm	Trouble Shooting
01	Fan is locked.	Beep three times every second	Check if the Fans wiring connected well. Replace the fan.
02	Overload	Beep twice every second	Reduce the loads.
03	Low battery	Beep once every second	The battery voltage is too low, it should be charging.
50	BMS firmware version is not matched.		Upgrade the firmware of BMS.
51	BMS doesn't allow inverter to charge battery.		Inverter will stop charging battery automatically.
52	BMS doesn't allow inverter to discharge battery.		Inverter will stop discharging battery automatically.
53	BMS require inverter to charge battery.		Inverter will charge battery automatically.
54~65	BMS detect something wrongs happened.		If the code is keeping for long time, please contact with your installer.
80	BMS communication fault	Beep once every second	Check if the communication line is connected well. If there is no problem with the line connection, please wait 1-3 minutes, if the fault still cannot be eliminated, please contact the after-sales personnel.

FAULT CODE TABLE

When fault event happens, inverter will cut off output, and the fault LED is solid on. At the same time, fault code, icon and ERROR are shown on the LCD screen.

Fault Code	Fault information	Trouble Shooting
01	Bus voltage is too high	AC Surge or internal components failed. Restart the unit, if the error happens again, please return to repair center.
02	Bus voltage is too low	Restart the unit, if the error happens again, please return to repair center.
03	Bus soft start fail	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
04	Inverter soft start fail	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
05	Over current or surge detected by Software	Restart the unit, if the error happens again, please return to repair center.
06	Over current or surge detected by hardware	Restart the unit, if the error happens again, please return to repair center.
07	Output voltage is too low	Reduce the connected load. Restart the unit, if the error happens again, please return to repair center.
08	Output voltage is too high	Restart the unit, if the error happens again, please return to repair center.
09	Output short circuited	Check if wiring is connected well and remove abnormal load.
10	Overload time out	Reduce the connected load by switching off some equipment.
11	Battery voltage is too high	Check if spec and quantity of batteries are meet requirements.
12	Over current happen at DCDC circuit	Restart the unit, if the error happens again, please return to repair center.
13	PV voltage is too high	Reduce the number of PV modules in series.
14	Short circuited happen at PV port	Check if wiring is connected well.
15	PV power is abnormal	Reduce the number of PV modules.
16	Over current happen at PV port	Restart the unit, if the error happens again, please return to repair center.
17	Fan is locked	Check if wiring is connected well. Replace the fan.
18	Over temperature happen at PV circuit	The temperature of internal PV converter component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.

19	Over temperature happen at battery circuit	The temperature of internal battery converter component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
20	Over temperature happen at inverter circuit	The temperature of internal inverter component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
21	The inner temperature over	The inner temperature is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
22	DCDC current sensor failed	Restart the unit, if the error happens again, please return to repair center.
23	No.2 DCDC current sensor failed	Restart the unit, if the error happens again, please return to repair center.
24	Inverter current sensor failed	Restart the unit, if the error happens again, please return to repair center.
25	OP current sensor failed	Restart the unit, if the error happens again, please return to repair center.
26	Sharing current sensor failed	Restart the unit, if the error happens again, please return to repair center.
27	The AC input and output wires are inversely connected	1. Please check AC input and output wires are connected correctly. 2. If this error happens during parallel installation, please check wires connection. If they are connected correctly, please funish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer.
28	Single unit is installed to parallel system	1. Please check if single unit is installed to parallel system. 2. If this error happens during parallel installation, please check wires connectiotn. If they are connected correctly, please funish parallel installation first, and then restart inverters. 3. If the problem remains, please contact your installer.
29	DC/DC soft start fail.	Restart the unit, if the error happens again, please return to repair center.
31	Over temperature happen at convert H circuit	The temperature of internal convert H component is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
32	Over temperature happen at LLC TX	The temperature of internal DC/DC TX is over the limitation. Check whether the air flow of the unit is blocked or whether the ambient temperature is too high.
33	Over current happen at LLC circuit	Restart the unit, if the error happens again, please return to repair center
35	Overvoltage occurs in BUS	AC surge or PV surge or internal components failed. Restart the unit, if the error happens again, please return to repair center.

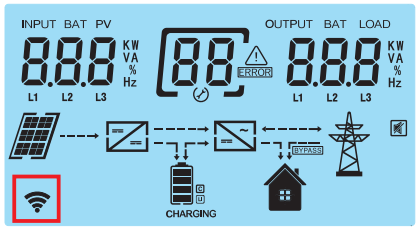
40	CAN data loss	1. Check if communication cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
41	Host data loss	
42	Synchronization data loss	
43	Current feedback into the inverter is detected.	1. Restart the inverter. 2. Check if L/N cables are not connected reversely in all inverters. 3. For parallel system in single phase, make sure the sharing cables are connected in all inverters. For supporting three-phase system, make sure the sharing cables are connected in the inverters in the same phase, and disconnected in the inverters in different phases. 4. If the problem remains, please contact your installer.
44	The firmware version of each inverter is not the same.	1. Update all inverter firmware to the same version. 2. Check the version of each inverter via LCD setting and make sure the CPU versions are same. If not, please contact your installer to provide the firmware to update. 3. After updating, if the problem still remains, please contact your installer.
45	The output current of each inverter is different.	1. Check if sharing cables are connected well and restart the inverter. 2. If the problem remains, please contact your installer.
46	AC output mode setting is different.	1. Switch off the inverter and check LCD setting program 28. 2. For parallel system in single phase, make sure no 3P1, 3P2 or 3P3 is set on program 28. For supporting three-phase system, make sure no “PAL” is set on program 28. 3. If the problem remains, please contact your installer.

THE WI-FI OPERATION GUIDE IN APP

Introduction

Wireless communication between the off-grid inverter and the APP can be realized through the Wi-Fi module.The APP supports Android and iOS devices.

Delivers device status during normal operation.
Allows device Settings to be configured on the APP.
Notifies users when a warning or alarm occurs.
Allows users to query inverter history data.



The status of the Wi-Fi sign on the LCD display
After the APP is successfully connected,Wi-Fi indicator light remains constantly on

Download and install APP

Operating system requirement for your smart phone:

iOS system supports iOS 11.0 and above

Android system supports Android 5.0 above

APP Download
Please scan the following QR code with your smartphone to download the App.

The QR code supports Android system and iOS system

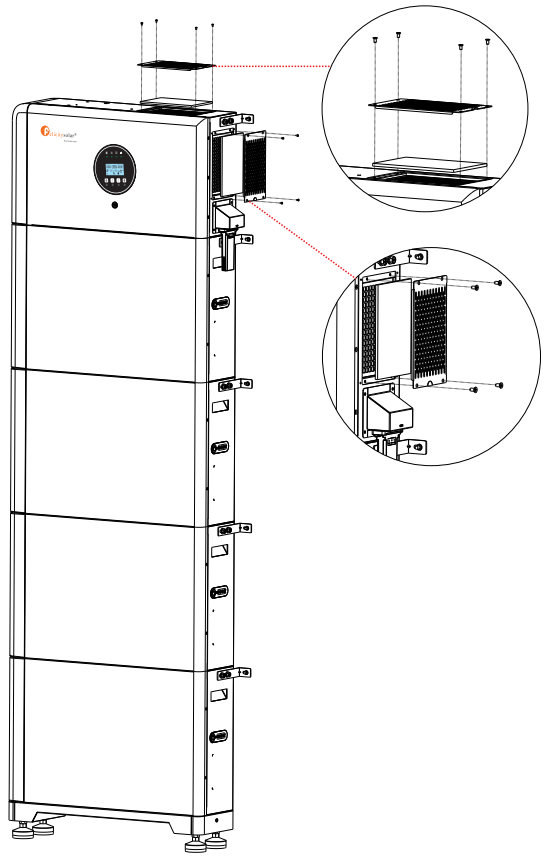
Operation Manual
Please scan the following QR code with your smartphone to view the App Operation Manual

The QR code supports Android system and iOS system

Air filter cleaning

Periodically clean the air filter at the air inlet of the chassis on both sides of the inverter to prevent the air inlet from being blocked, which affects the heat dissipation performance of the machine. You can refer to the following operation instructions to disassemble and clean:

Remove the screws fixing the outer cover of the air filter on both sides, take out the black dustproof cotton inside, clean it, and keep it dry. After cleaning, put it back to the original position, cover the outer cover of the air filter, and reinstall the screws.



⚠	Attention! If you clean the dust-proof cotton with water, make sure that the dust-proof cotton is thoroughly dry before being put back into the machine for use! No water inside the machine! Otherwise it will cause damage to the machine and affect the use!