User Manual





S22

S22-M-H / S22-M-AC / S22-S

In order to prevent improper operation before use, please carefully read this manual.

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1. Introduction

The document describes the installation, commissioning, maintenance and troubleshooting of the following micro storage system listed below.

S22 = S22-M + S22-S

S22-M = S22-M-H or S22-M-AC

Please read the document carefully before you use the product to ensure that you completely understand the product and can correctly use it. After reading, please keep the document properly for future reference.

2. Symbols

	Symbol Explanation CE mark. The inverter complies with the requirements of the applicable CE guidelines.
	Caution, risk of electric shock.
	Do not place nor install near flammable or explosive materials.
	Install the product out of reach of children.
	Prohibit the use of water to extinguish fires.
	Prohibition of private maintenance.
	Prohibit connector reversal.
	Read the instruction manual before starting installation and operation.
	Do not dispose of the product with household wastes.
	Caution, risk of electric shock, energy storage timed discharge.

	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Danger of high voltages. Danger to life due to high voltages in the inverter!

3. Safety

Installers should be familiar with this manual before performing any maintenance or installation on the system.

- Recommend to check the new batteries mounted on-site comply to the warranty scope.
- Do not open the product to repair or disassemble.
- Do not install with other batteries or cells.
- In case of fire, use only dry powder fire extinguisher. Liquid extinguishers should not be used.
- Do not use product in high static environment where the protection device might be damaged.
- Recommend to store the product out of reach of children and animals.
- Do not expose the product to open flame.
- Store in a cool and dry place with ample ventilation.
- Do not store the product near water sources.
- Avoid the presence of flammable debris around the battery, such as cotton, fabric, haystacks, etc. which may be ignited by sparks and then lead the fire source to the battery, thus causing the battery to burn.
- Avoid the presence of hot or flammable objects around the battery, such as hydraulic bottles (natural gas, oxygen, etc.), heat pumps and so on.
- Please avoid direct sunlight, rain exposure, snow laying up during installation and operation.

4. Product Information

1. S22-S is the battery module, and S22-M-H includes inverter, MPPTs and battery module; S22-M-AC includes inverter, battery module.
2. S22-M-H or S22-M-AC contains the controller of the entire system, so each system must have one S22-M-H or S22-M-AC.

4.1 S22-M-H Specifications

Specifications for S22-M-H	
PV INPUT	
Max. input power (W)	2600
Max. input voltage (V d.c.)	60
MPPT voltage range (V d.c.)	10~60
Nominal voltage (V d.c.)	38
Max. input current (A d.c.)	20/20/20/20
Isc PV (A d.c.)	25/25/25/25
BATTERY	
Battery type	LFP ($LiFePO_4$)
Expandable battery quantity	4
Battery energy (kWh)	2.11
Nominal capacity (Ah)	60
Battery rated voltage (V d.c.)	35.2
Voltage range (V d.c.)	31.9~40.1
Max.charge/discharge current (A d.c.)	60/60
Warm up function	Optional
AC INPUT	
Max. apparent power (VA)	1200
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Max. input current (A a.c.)	5.4
AC OUTPUT	
Rated power (W)	800
Rated apparent power (VA)	800
Max. apparent power (VA)	800
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Rated output current (A a.c.)	3.6/3.5/3.3
Power factor	0.8 leading to 0.8 lagging
EPS OUTPUT	
Max. apparent power (VA)	1200
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Max. output current (A a.c.)	5.4
Max. bypass output current (A a.c.)	10
Max. bypass output power (W)	2200
Power factor	0.8 leading to 0.8 lagging
GENERAL DATA	
Topology	Isolated
Ingress protection	IP65
Protective class	Class I
Overvoltage category	III (AC side), II (DC side)

Operating temperature range (°C)	-20~55
Dimensions (W×D×H) (mm)	420*285*255
Weight (kg)	26.5±5%

4.2 S22-M-AC Specifications

Specifications for S22-M-AC	
BATTERY	
Battery type	LFP ($LiFePO_4$)
Expandable battery quantity	4
Battery energy (kWh)	2.11
Nominal capacity (Ah)	60
Battery rated voltage (V d.c.)	35.2
Voltage range (V d.c.)	31.9~40.1
Max.charge/discharge current (A d.c.)	60/60
Warm up function	Optional
AC INPUT	
Max. apparent power (VA)	1200
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Max. input current (A a.c.)	5.4
AC OUTPUT	
Rated power (W)	800
Rated apparent power (VA)	800
Max. apparent power (VA)	800
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Rated output current (A a.c.)	3.6/3.5/3.3
Power factor	0.8 leading to 0.8 lagging
EPS OUTPUT	
Max. apparent power (VA)	1200
Nominal voltage (V a.c.)	220/230/240
Nominal frequency (Hz)	50/60
Max. output current (A a.c.)	5.4
Max. bypass output current (A a.c.)	10
Max. bypass output power (W)	2200
Power factor	0.8 leading to 0.8 lagging
GENERAL DATA	
Topology	Isolated
Ingress protection	IP65
Protective class	Class I
Overvoltage category	III (AC side), II (DC side)
Operating temperature range (°C)	-20~55
Dimensions (W×D×H) (mm)	420*285*255
Weight (kg)	25.8±5%

4.3 S22-S Specifications

Specifications for S22-S	
Battery type	LFP ($LiFePO_4$)
Rated capacity (Ah)	60
Nominal energy (kWh)	2.11
Nominal voltage (V d.c.)	35.2
Voltage range (V d.c.)	31.9~40.1
Max.charge/discharge current (A d.c.)	40/40
Ingress protection	IP65
Protective class	Class I
Operating temperature range (°C)	-20~55
Warm up function	Optional
Dimensions (W×D×H) (mm)	420*220*270
Weight (kg)	23.0±5%

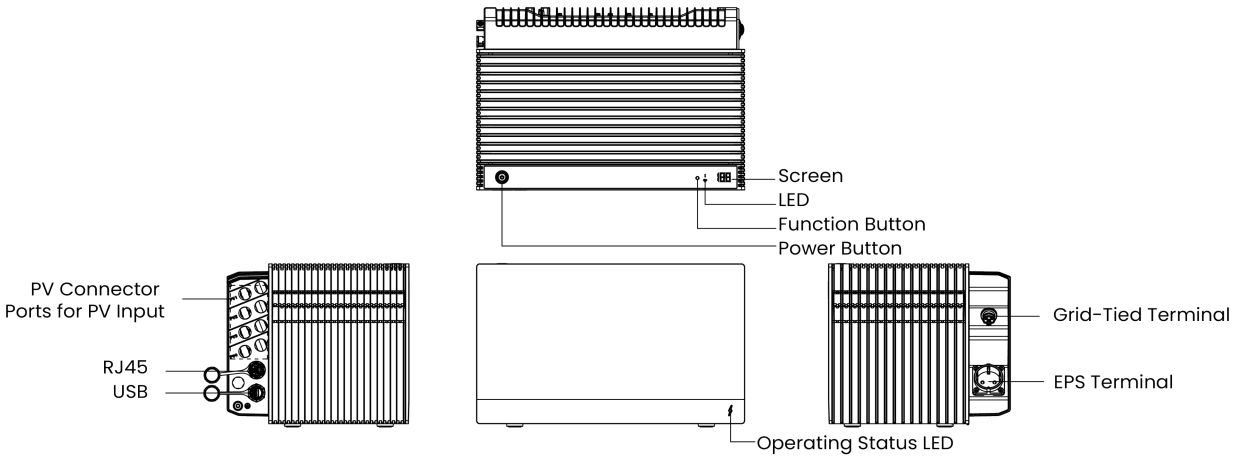
5. Product Features

5.1 System Features

The product has been fitted with multiple protection systems to ensure the safe operation of the system. Some of the protection systems include:

- Inverter protection: Over voltage, Over current, External short circuit, Over temp, In rush current, Insulation impedance, Anti - islanding protection.
- Battery Protection: Over voltage, Over current, Over temp, Under voltage, Under temp.
- The product contains the following Interface to allow it to connect and operate efficiently.

S22-M Features:



PV Connector Ports for PV Input 1~4 (Only applicable to S22-M-H)

Connect each set of PV modules to each set of PV input ports in S22-M-H.

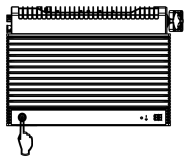
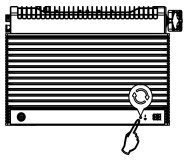
RJ45

Connect to the smart meter through RS485 communication. If you use wireless meter, you don't need to connect it.

USB

Connect to a USB flash drive to upgrade firmware.

Power Button

Button	Action	Function
	Press for 2 seconds (in power off state)	Turn on the battery
	Press for 2 seconds (in power on state)	Enable/disable EPS output
	Press for 5 seconds (in power on state)	Turn off the battery
	Press for 2 seconds (in screen off state)	Light up the screen
	Press for 2 seconds (in screen on state)	Switch the screen page
	Press for 20 seconds	Reset bluetooth and WiFi

Screen LED

OLED screen displays inverter data, PV data, battery data, fault information, etc.

After 10 minutes, the OLED screen will turn off until the function button is pressed again.

Network connection status and meter connection status:

Icon	Status	Description
!	Icon is on	Meter is disconnected
!	Icon is off	Meter is connected
	Icon is on	WiFi connected and connected to the cloud
	Icon is off	WiFi not connected or not connected to the cloud

Operating Status LED

Status	Red	Green	Description
Self check	/	■	Green light flashing
Charge	/	◆	Dual lights flashing quickly
Discharge/Idle	/	●	Green light always on
Fault	●	/	Red light always on

Symbol	Status
■	LED flash display (on: 0.5s, off: 0.5s)
/	LED off display
●	LED on display
◆	LED flash display (on: 2s, off: 1s)

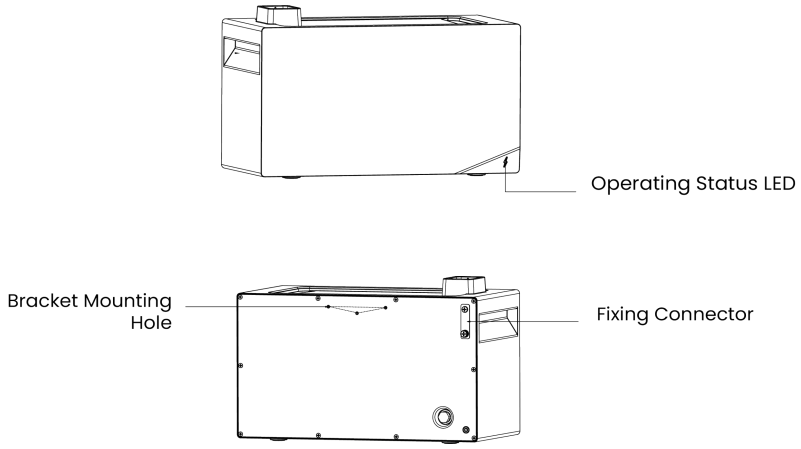
Grid-Tied Terminal

Connect to grid.

EPS Terminal

Connect to backup load.

S22-S Features:



Operating Status LED

The LED displays the running or fault status of the product. The displayed information is the same as that of the S22-M.

Bracket Mounting Hole

Fix the product to the wall together with bracket.

Fixing Connector

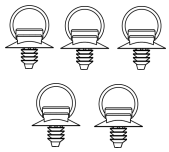
The bracket: Its function is to secure two vertically stacked finished products, enhancing their stability.

6. Installation

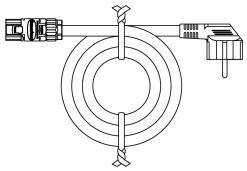
6.1 Items in the package

Please check if the following items are including with the package:

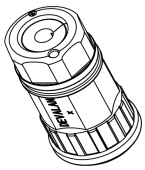
For S22-M



Cable tie buckles*5



AC cable*1



Sealing head*1

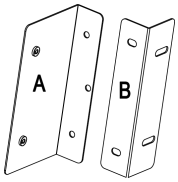


PV connector puller*1
(Only applicable to S22-M-H)

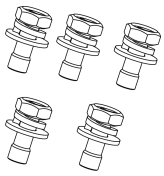


Installation guide*1

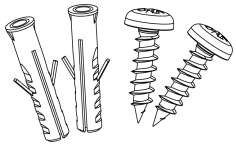
For S22-S



Bracket A and B*1



Mounting screw pack(M4*10) *5



Expansion tube*2 &
Expansion screw(M6*40) *2

6.2 Tools

The following tools will be required to installation.



6mm magnetic phillips screwdriver



Hammer drill @φ8mm



Marker

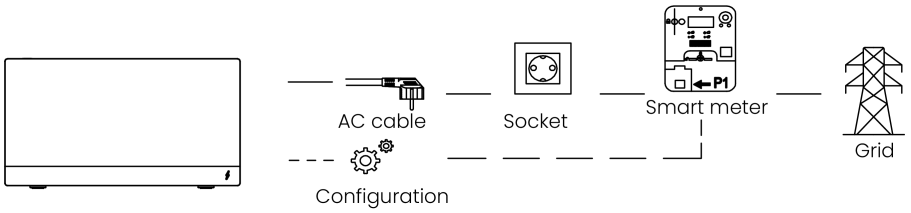


Rubber mallet

6.3 Installation Steps

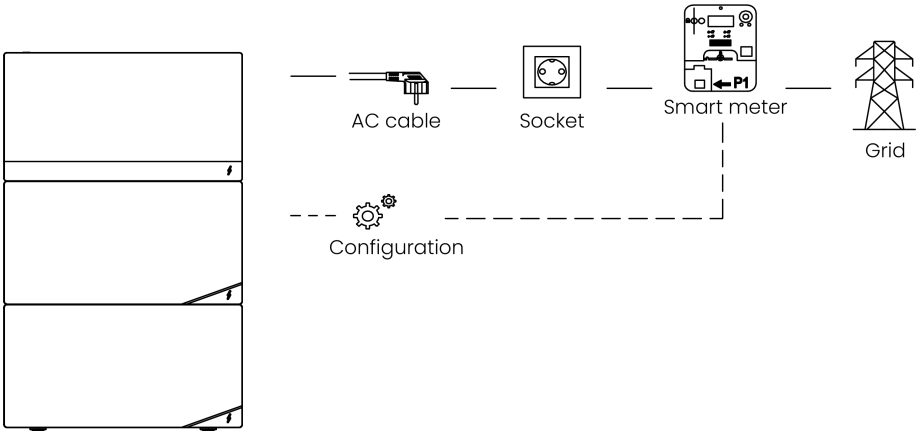
Scenario 1 - Use S22-M-AC alone:

The following figure shows an example of a single S22-M-AC.



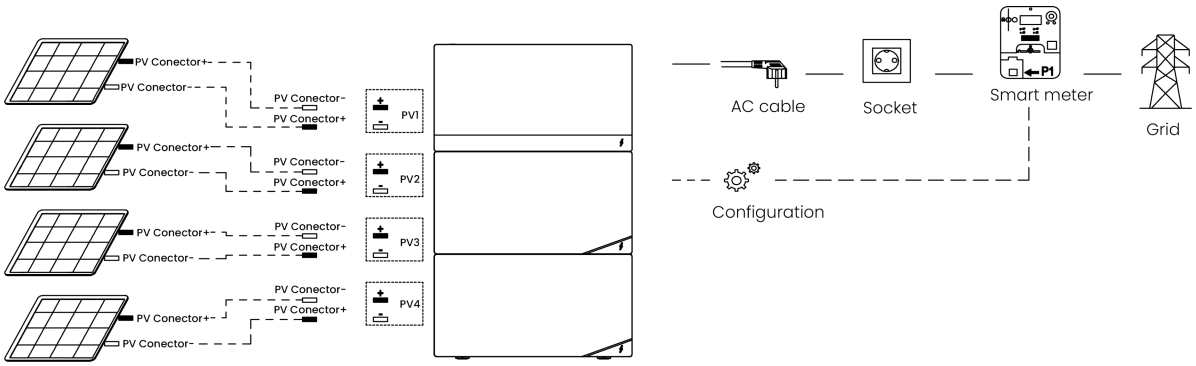
Scenario 2 - Use S22-M-AC and S22-S stacked:

The following figure shows an example of one S22-M-AC paired with two S22-S.



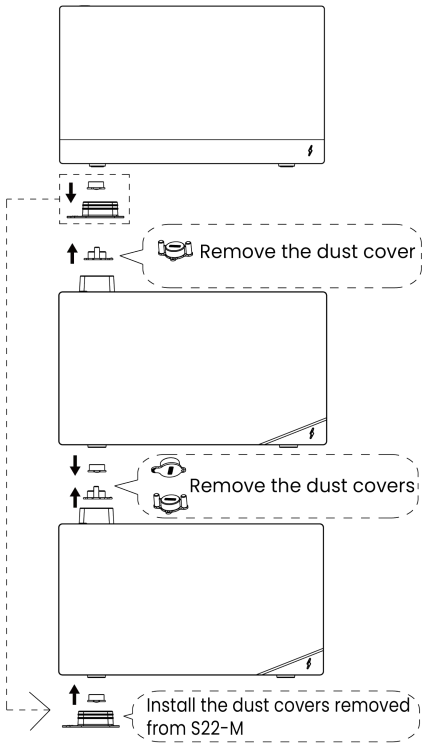
Scenario 3 - Use S22-M-H and S22-S stacked:

The following figure shows an example of S22-M-H paired with four PV panels.

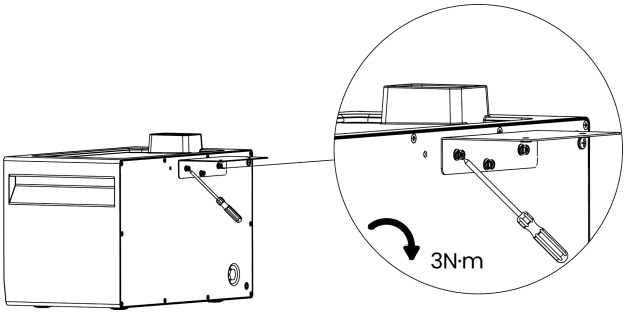


Note: The following installation steps are applicable for installing extended batteries.

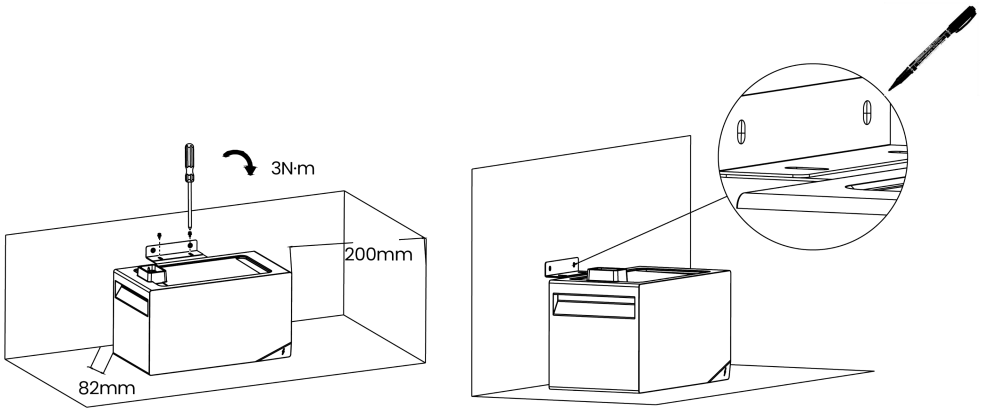
Step 1: Install the dust covers of the bottom S22-S and remove the other dust covers.



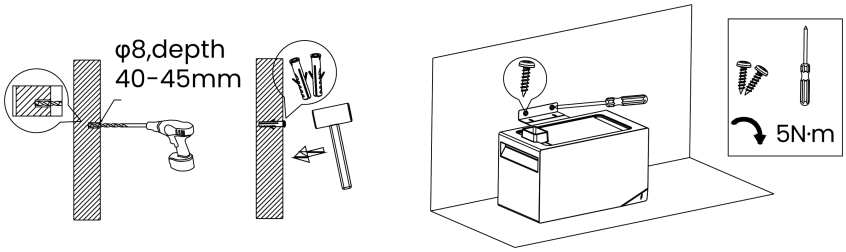
Step 2: Lock bracket A to the rear cover of the battery with screws (M4*10).



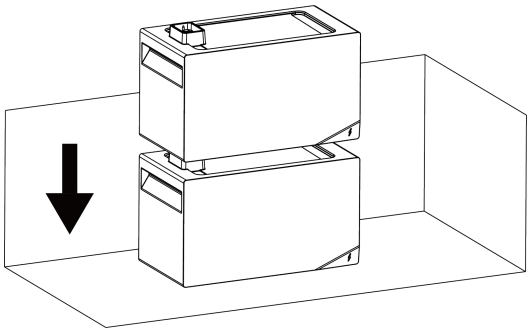
Step 3: Lock bracket B to bracket A and move the battery to a suitable position against the wall and mark the bracket holes on the wall with a marker.



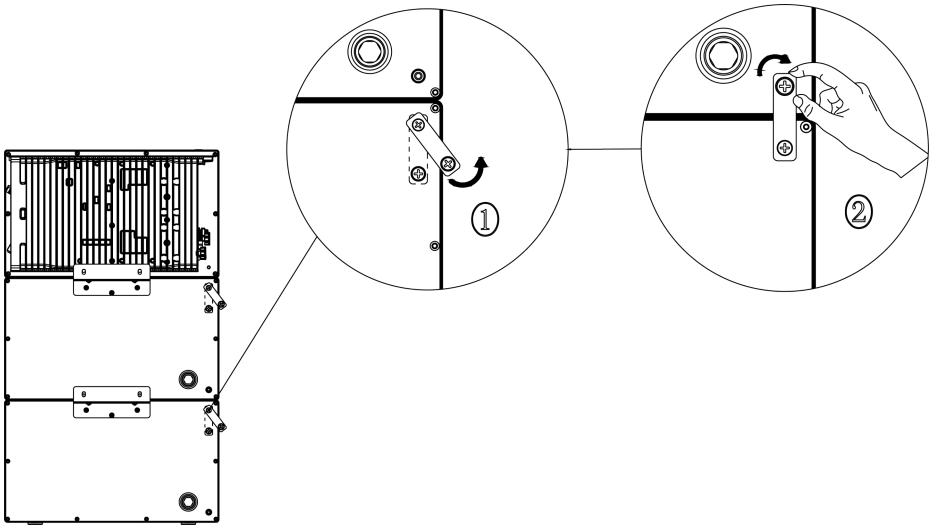
Step 4: Remove the battery before drilling.
Drill φ8*40mm or deeper holes at the two markers, hammer the expansion tubes into the holes, and then use a screwdriver to fasten the two M6*40 expansion screws to the bracket B.



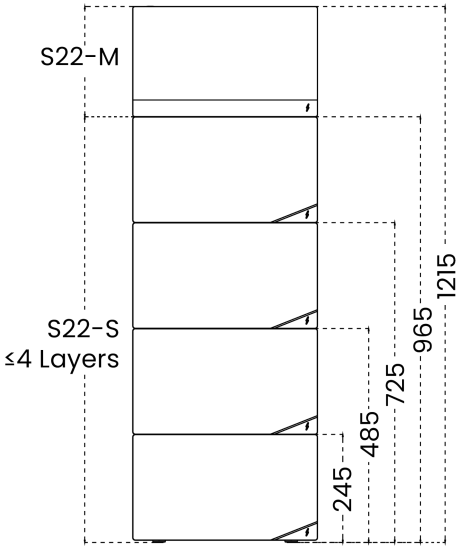
Step 5: Install the required stacked battery in the orientation shown in the figure.



Step 6: Rotate the fixing connector to the corresponding hole of the upper battery and tighten the screw to fix it.

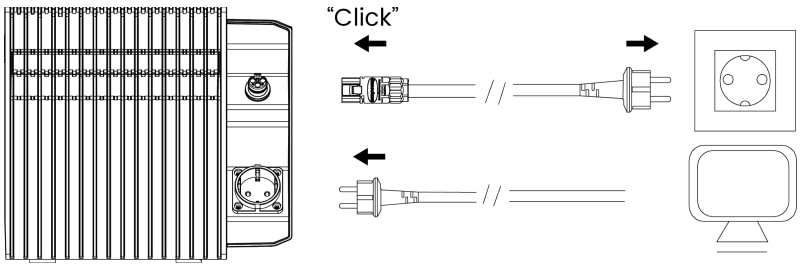


Note: Ensure that each system has only one unit of S22-M and a maximum of four units of S22-S.

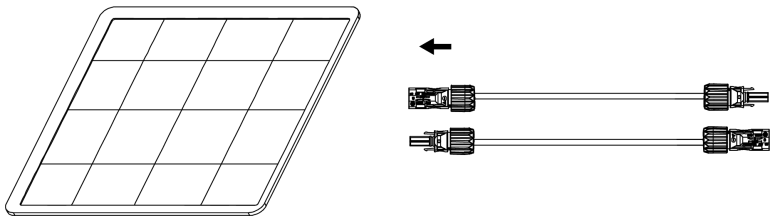


6.4 Electrical Connections

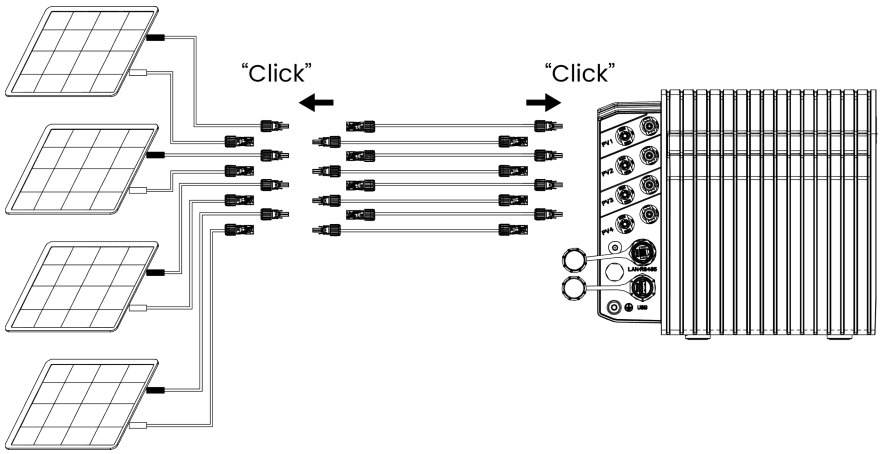
Step 1: Connect S22-M to a home outlet using the included AC Cable.



Step 2: Find the PV connector ports of your solar panels.

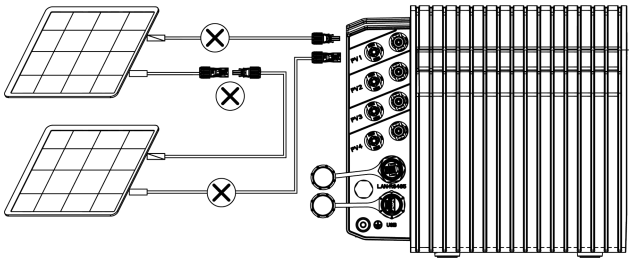


Step 3: Connect each PV module directly to the same set of PV input ports. Please ensure that the connection is securely fastened.

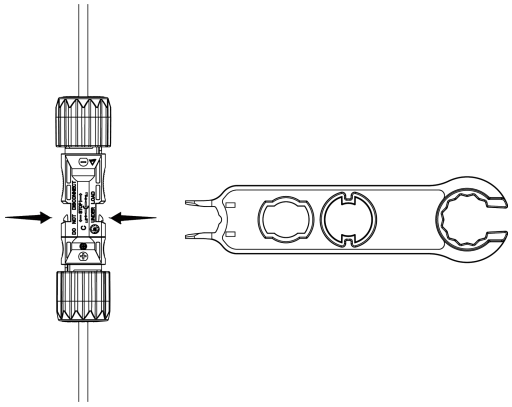


Note:

- Ensure that unused PV ports on S22-M-H are sealed with waterproof caps.
- When connecting PV modules in parallel, please check the specifications of the PV modules and ensure that the total short-circuit current does not exceed 25A.
- Never connect the same set of PV connectors to different sets of PV input ports.
- Never connect PV modules in series because this causes the input voltage to exceed 60V and will damage the equipment.

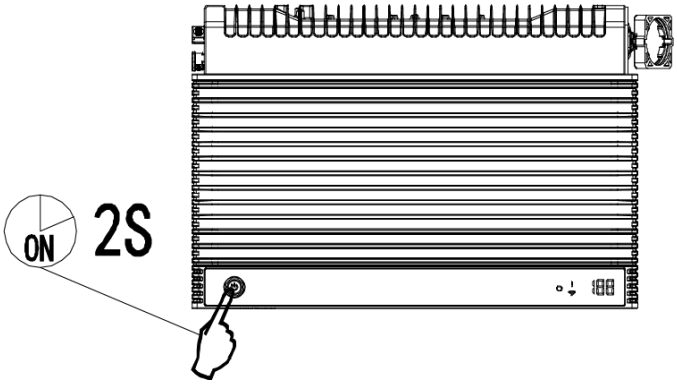


Step 4: If you want to unplug the PV connector: After ensuring the system is turned off, use the included wrench to safely remove the PV connector.



6.5 Turn on the system

Press and hold the power button on the S22-M for 2 seconds to power on and enable network pairing. If pairing is successful, the ”WiFi“ LED of the S22-M will light up.

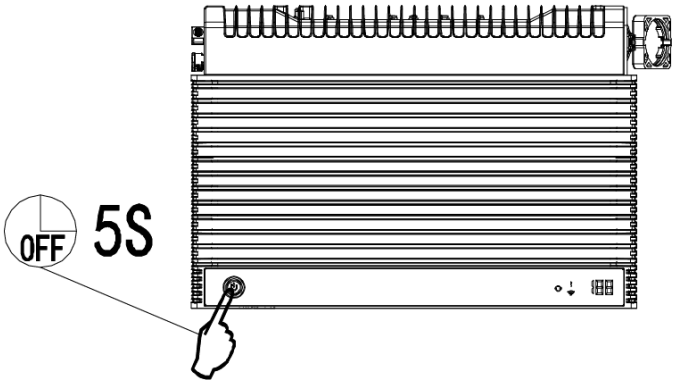


6.6 Adding an Expansion Battery

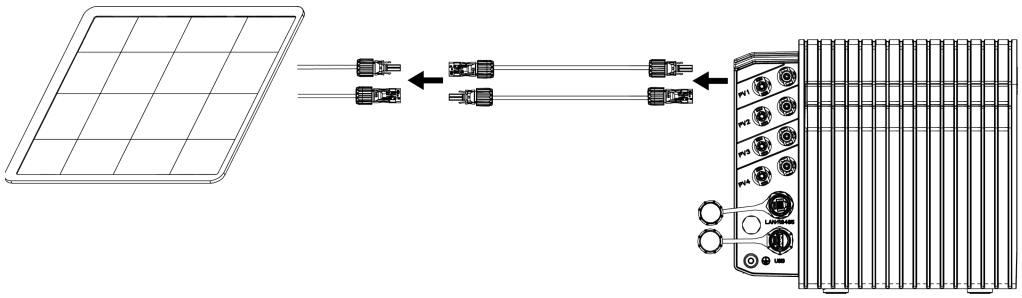
To protect yourself and the equipment, ensure the system is powered off before installing or adding expansion batteries. Installation while the system is powered on is not covered under warranty.
Follow the steps below to add an expansion battery to the system. The example system includes one S22-M and two expansion batteries.

Step 1: Disassemble the System.

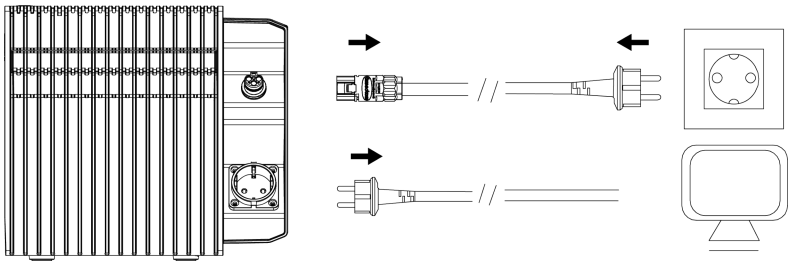
1. Ensure S22-M is turned off. To turn it off, press the power button for 5 seconds.



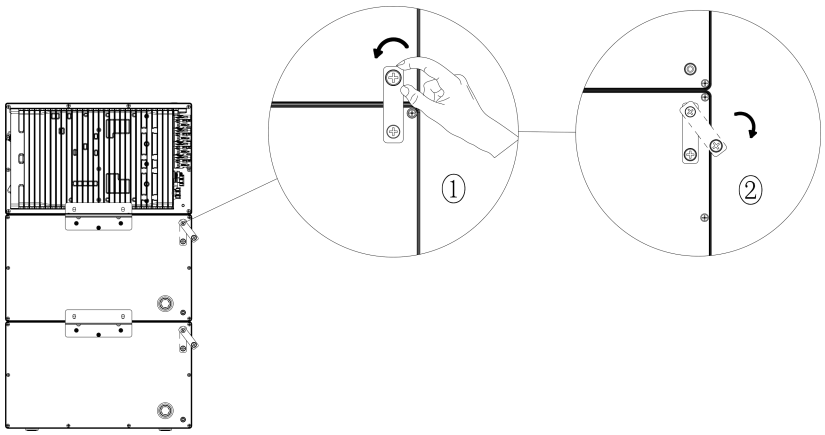
2. Disconnect S22-M-H from PV.



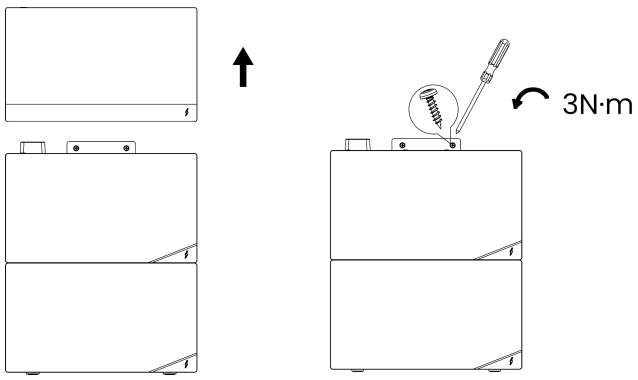
3. Unplug S22-M from the home outlet and any connected device.



4. If applicable, remove the wall-mounted bracket from the first expansion battery cover below the S22-M.

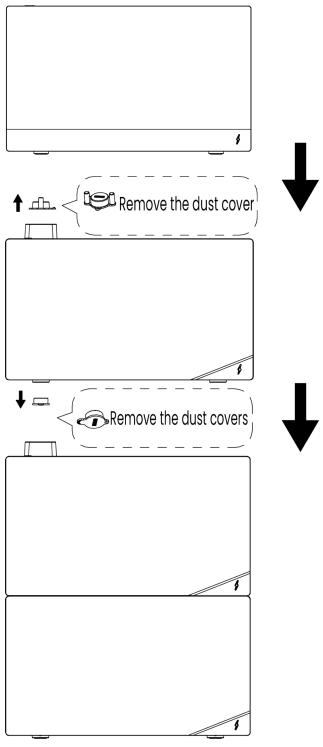


5. If applicable, remove the fixing bracket from the back cover of the extended battery.



Step 2: Mount the Expansion Battery.

1. Unfasten the screws(if applicable) and remove the dust cover.
2. Stack the new expansion battery under S22-M.
3. Please follow the assembly process in sections 6.3 and 6.4 to complete the assembly.



7. APP Configuration

Use the FoxCloud2.0 application to remotely monitor and control your S22 storage system. Please note that the user interface images displayed are for illustration purposes and may differ from your actual view based on the software version.

7.1 Download the App

Download the FoxCloud2.0 on App Store and Google Play.

Download on the App Store

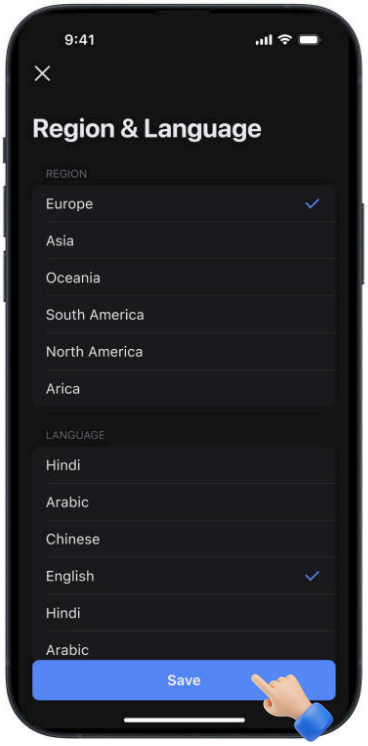
GET IT ON Google Play

7.2 Configuration Guide

Step 1: Select your region.

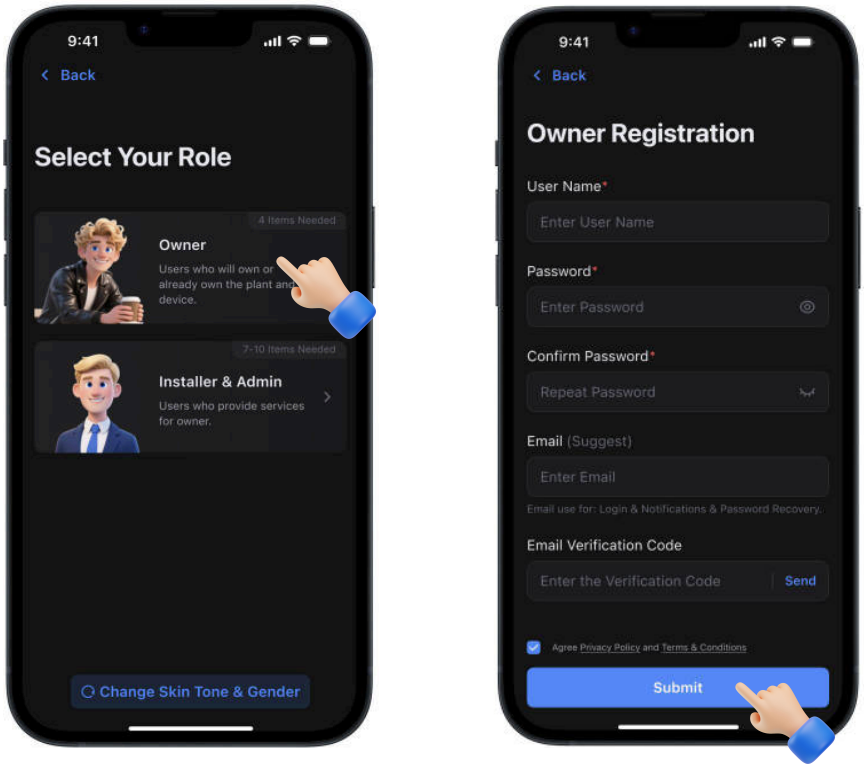
Open FoxCloud2.0 and click “Register”. Then select your region.





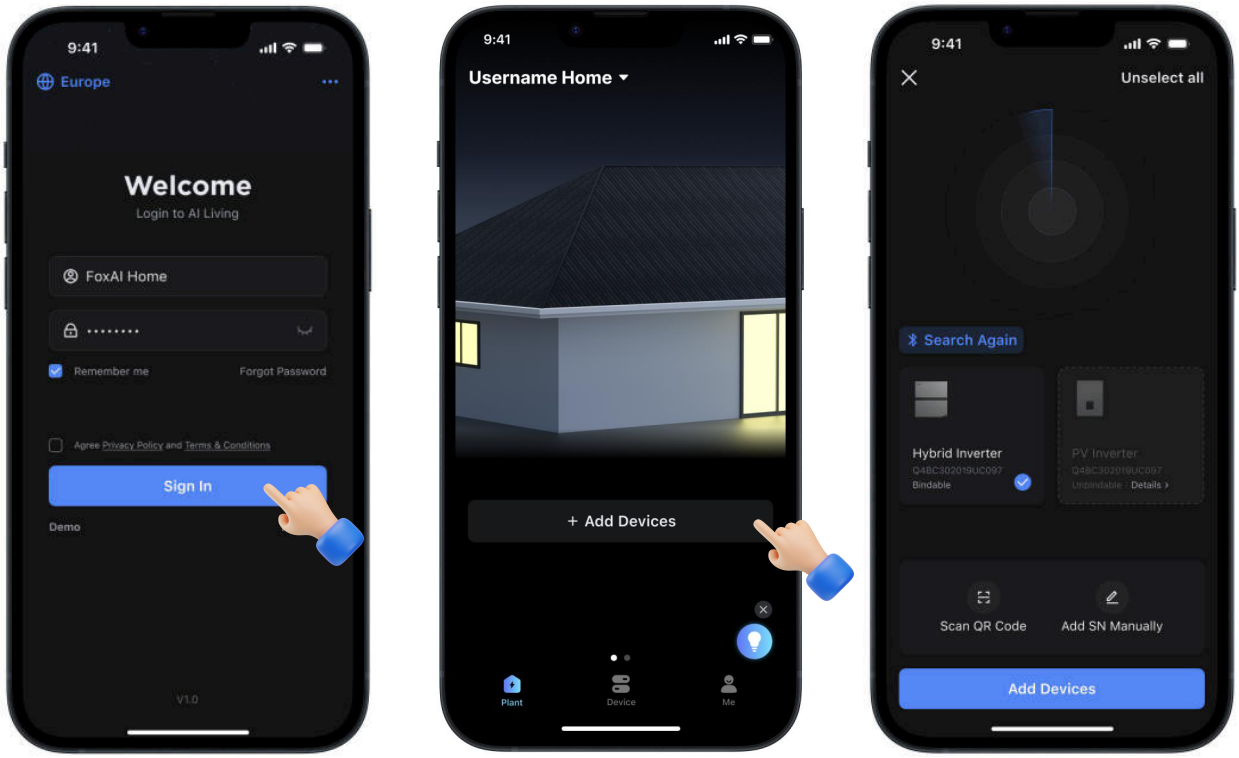
Step 2: Create an account.

Click “Create an account”. Then choose your role (Enduser) and enter the basic information.



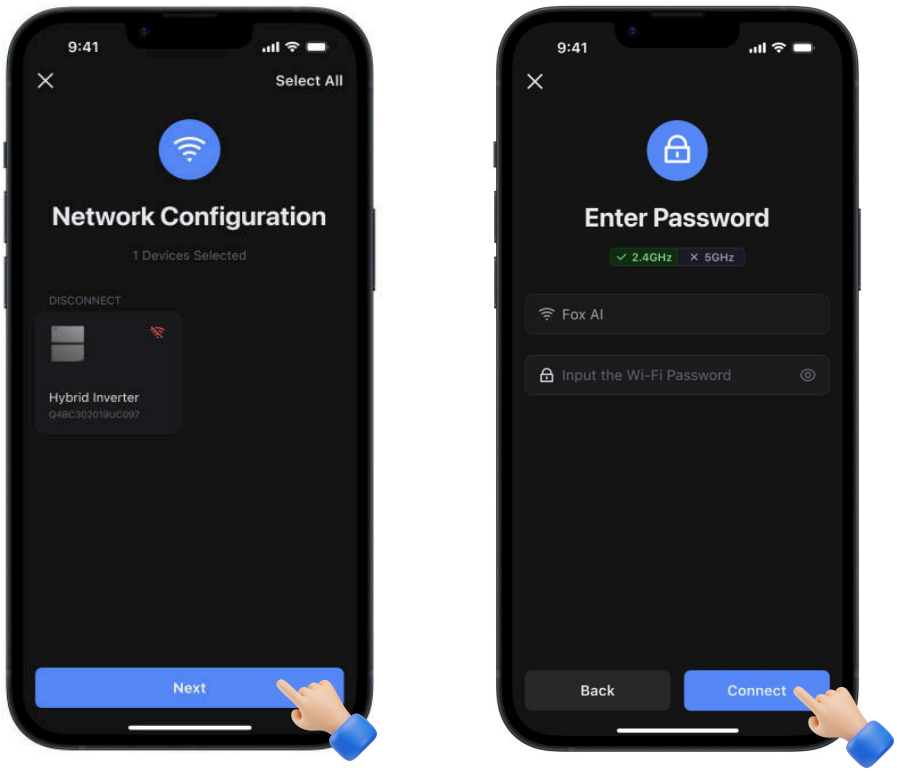
Step 3: Log in and Add devices.

Wait for the system to search for devices. Once the search is complete, click “Add Devices”.

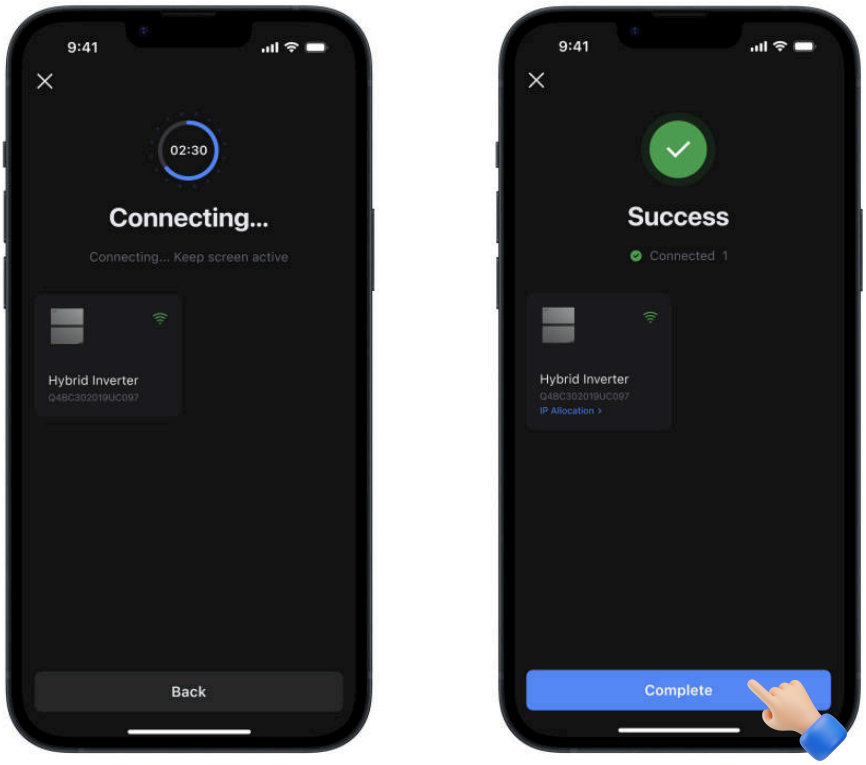


Step 4: Connect to network.

Select the device(s) that you want to connect to the network. Select the Wi-Fi, enter password and click “Connect”.

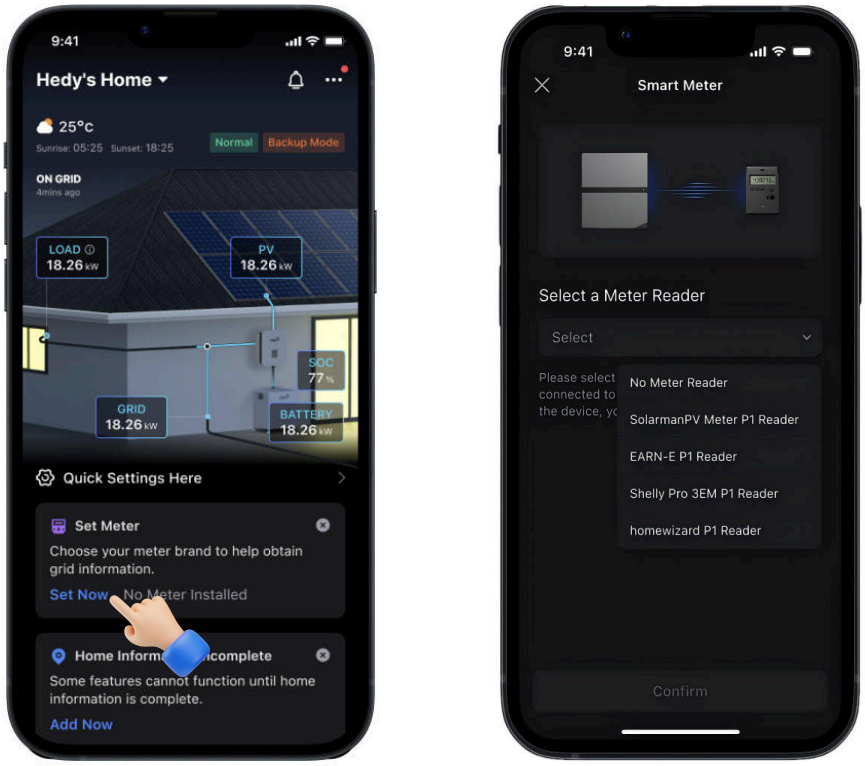


Please wait for a while during the connection process. After successfully adding the device(s), click "Complete".



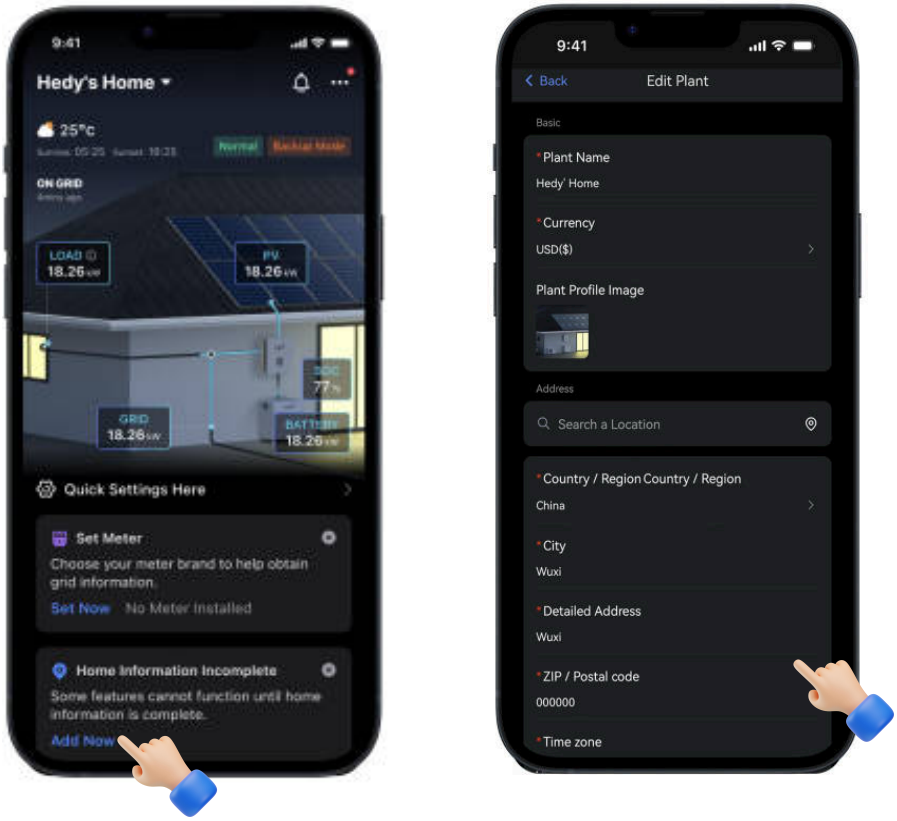
Step 5: Configure the Meter.

Choose a meter brand the balcony battery connected. Then click “Confirm”.



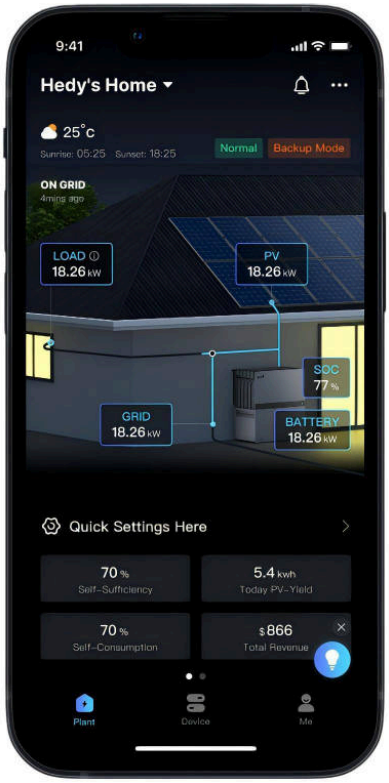
Step 6: Complete home information.

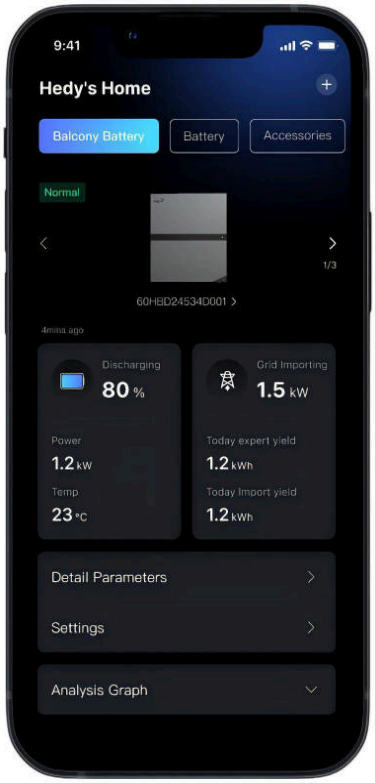
Fill in the required information and click “Confirm” to complete home information.



Step 7: Finish.

After creating a plant, device data will come online within 3-5 minutes. Please wait and swipe down to refresh this page.



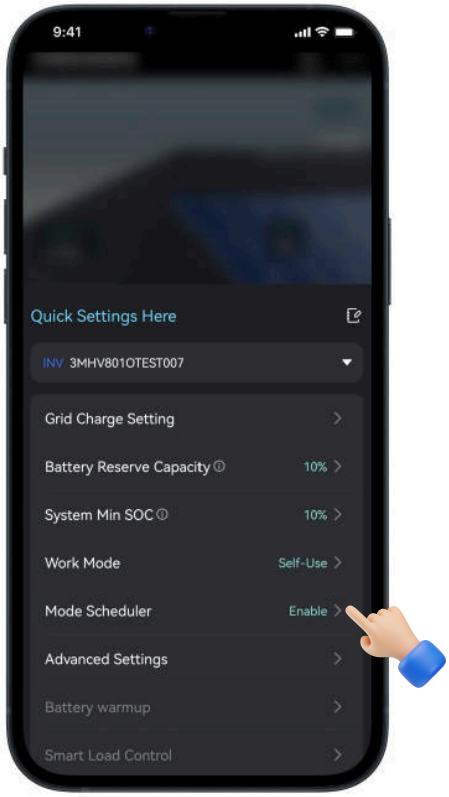


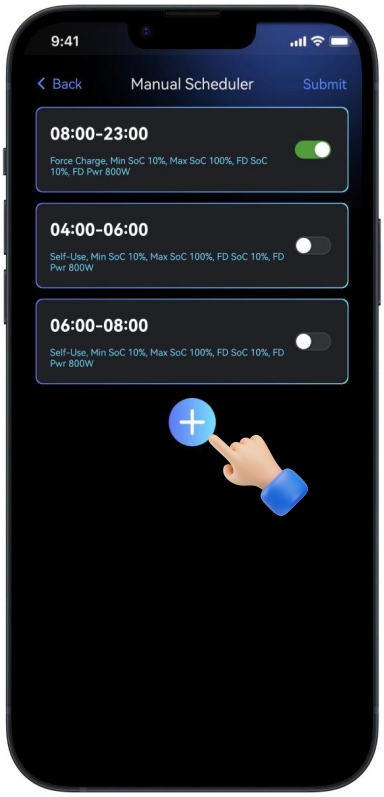
7.3 Set Operation Mode

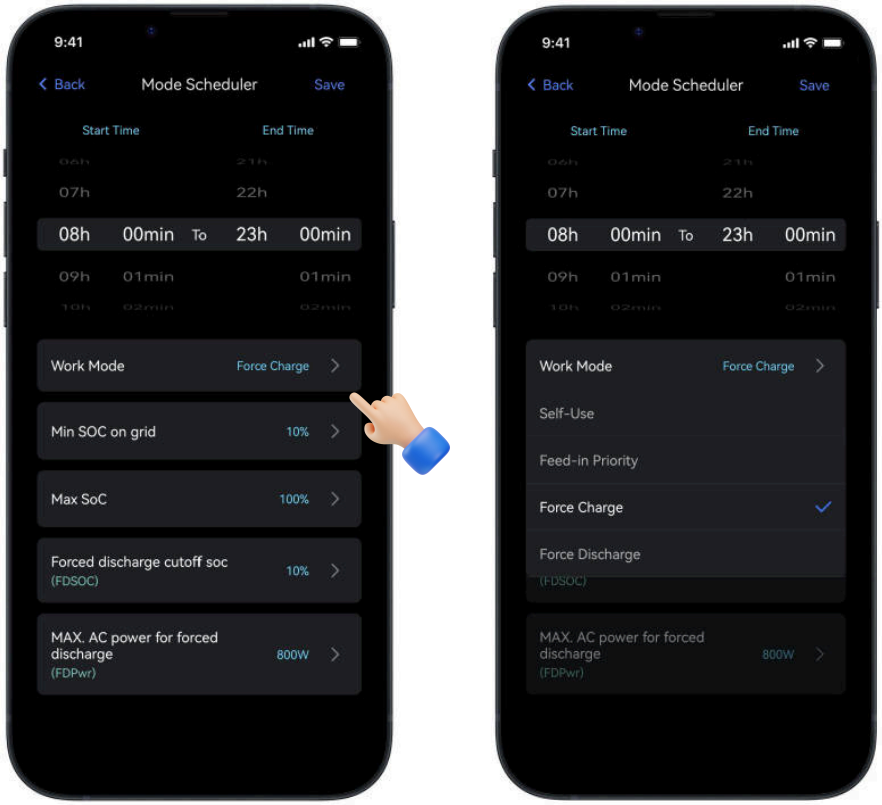
Scheduler mode

When scheduler mode segmented time mode is enabled, the system will work according to the time period set by the platform. Users can set the Start Time, End Time, Work Mode, Min SOC, Max SOC, Max AC Power.

Work mode	Description
Invalid	During this time period, the inverter is in zero power discharge state.
Self-use	During this time period, the inverter operates in Self-use mode.
Feed-in	During this time period, the inverter operates in Feed-in mode.
Charge	During this time period, prioritize charging the battery, and the charging power of the inverter is the set power. Battery won't discharge during charging time period.
Discharge	During this time period, set the inverter to discharge at the set power. Battery won't charge during discharging time period.

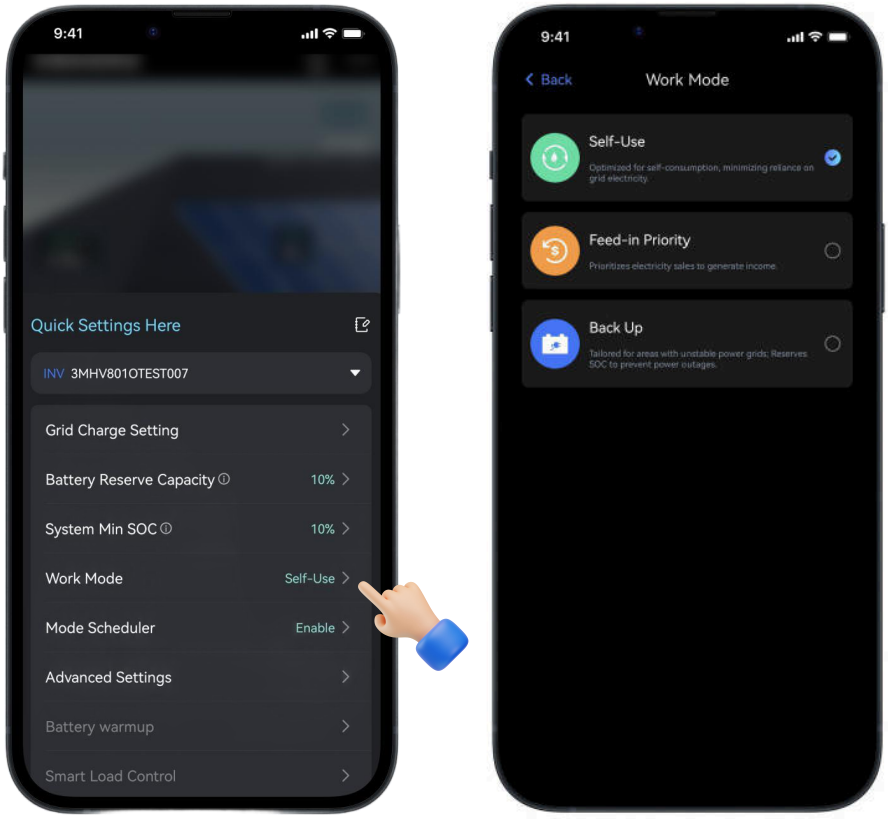






Work mode

Work mode	Description
Self-use	Priority: Load > Battery > Grid 1. When there is PV power, the PV energy is prioritized for use by the load. After meeting the load power, the excess power is used to charge the battery, and when there is more excess PV energy, it is fed back to the grid. When the PV power is insufficient for the load power, the remaining power is supplied from the battery. 2. When there is no PV energy or AC model, the load power is provided by the battery.
Feed-in priority	Priority: Load > Grid > Battery 1. When there is PV power, the PV energy is prioritized for use by the load. After meeting the load's usage requirements, excess power is prioritized for grid connection. When there is excess PV power after grid connection, charge the battery. When the PV power is insufficient for the load power, the remaining power is supplied from the battery. 2. When there is no PV energy or AC mode, the load power is provided by the battery.
Back up	1. On-grid state, PV energy is given priority to charging the battery. When the PV power is higher than the charging power, the remaining PV power is used by the load. When there is excess PV power, it will be fed to the grid. When the remaining power of the PV system after deducting the charging power is lower than the load power or when there is no PV power, the battery does not discharge. 2. Off-grid state, the battery discharges normally to supply power to the EPS load.
Easy mode	1. Easy mode is only for use when there is no electricity meter. The default virtual load power is 200W, and the virtual load power can be set; its operating logic is consistent with that of Selfuse.


9:41
Quick Settings Here
INV 3MHV801OTEST007
Grid Charge Setting
Battery Reserve Capacity
10%
System Min SOC
10%
Work Mode
Self-Use
Mode Scheduler
Enable
Advanced Settings
Battery warmup
Smart Load Control
9:41
Back
Work Mode
Self-Use
Optimized for self-consumption, minimizing reliance on grid electricity.
Feed-in Priority
Prioritizes electricity sales to generate income.
Back Up
Tailored for areas with unstable power grids; Reserves SOC to prevent power outages.

8. Troubleshooting and Maintenance

8.1 Maintenance

1) Please recharge batteries that have been stored for more than 6 months in a timely manner.
2) For the first installation, the interval among manufacture dates of battery modules shall not exceed 3 months.
3) Regularly check whether the service environment of the battery meets the requirements, and the installation position should be far away from the heat source.
4) The battery module should be stored in an environment with a temperature range between -20°C~55°C, and charged regularly according to the table below with no more than 0.5 C(C-rate is a measure of the rate at which a battery is discharged relative to its maximum capacity) to the SOC of 50% after a long time of storage.

Storage environment temperature	Relative humidity of the storage environment	Storage time	SOC
Below -20℃	/	Not allowed	/
-20~0℃	10%~90%	≤ 1 months	20%≤SOC≤50%
0~35℃	10%~90%	≤ 6 months	20%≤SOC≤50%
35~55℃	10%~90%	≤ 1 months	20%≤SOC≤50%
Above 55℃	/	Not allowed	/

NOTICE
● If the battery is stored over one year, 5% - 8% of the capacity may lose irreversibly.

5) Every year after installation. The connection of power connector, power cable and screw are suggested to be checked. Make sure there is no loose, no broken, no corrosion at connection point. Check the installation environment such as dust, water, insect etc.

8.2 Storage with Low SOC

After the product is powered off, static power consumption and self-discharge loss may occur in internal modules. Therefore, charge batteries in a timely manner and do not store the product in low SOC. Otherwise, the product may be damaged due to over discharge, and battery modules need to be replaced.

Storage in low SOC may occur in the following scenarios:

- The power button on the power control module is off.
- The batteries cannot be charged due to a system fault after discharge.
- The batteries cannot be charged due to incorrect configurations in the system.
- The batteries cannot be charged due to no PV input and long-term mains failure.

Regardless of scenarios, the batteries must be charged within the longest interval corresponding to the SOC when the batteries are powered off. If the batteries are not charged within the specified interval, they may be damaged due to over discharge.

Storage environment temperature	Power-Off SOC before storage	Maximum charge interval
0~35 ℃	0% ≤ SOC < 5%	7 days

Note: When the battery SOC decreases to 0%, charge the batteries within seven days. Permanent battery faults caused by delayed charge due to customer reasons are beyond the warranty scope.

8.3 Troubleshooting

When the red/green LED is flashing or normally on, it does not mean that the product is abnormal, it may be just an alarm or protection. Please check the fault information in the below table for the detailed faulty definition before any trouble-shooting steps. In general, the alarm indication is normal without manual intervention. When the alarm triggering state is removed,product will automatically return to normal use.

Fault code	Fault definitions	Solutions
7194	Battery over temperature protection	After waiting for the battery to cool down naturally, it will automatically restore. If the fault persists for more than 3 hours, please contact the local dealer and the technical team.
7112/7144	MPPT Insulation fault	Please check if the insulation of electric wires is damaged.
7117/7149	MPPT BAT Short Current	Please check whether the input meets the specifications of solar charging. Remove the PV input or restart the product to resume normal operation.
7173	Battery fuse fault	Please contact the local dealer and technical team.
7053	INV BAT DUV	Please ensure timely recharging. If the problem persists after 2-3 hours of recharge, please contact the local dealer and the technical team.
7197	Battery under voltage	
7193	Battery under temperature protection	Please move the product to a warmer spot or connect it to PV power before use.
7015	INV OP	Restart the product, if this phenomenon appears repeatedly after restoring for several times, please contact the local dealer and technical team.
7186	Battery Current Sensor Fault	
7187	Battery Temperature Sensor Fault	
7188	Battery Volt Sensor Fault	
7189	Battery Other Fault	
7199	Battery internal communication fault	
7200	Communication failure between battery and PCS	
7217	Battery Parallel address fault	
7222	Battery AFE Communication fault	
7228	Battery Permanent failure of battery under voltage	
7016	INV OC	Restore automatically, if this phenomenon appears repeatedly after restoring for several times, please contact the local dealer and the technical team.
7022	DCDC Pre-Charge Fail	
7023	DCDC Start Fail	
7024	PFC Start Fail	
7039	Bus UV	
7040	Bus OV	
7048	INV temperature sample fail	
7050	INV BAT ODC	
7051	INV BAT OCC	

7052	INV BAT Sample Fail	
7056	INV BAT COV	
7067	Off grid Start Fail	
7068	Off grid OP	
7069	Off grid Short Current	
7070	Off grid OC	
7071	Off grid UV	
7072	Off grid OV	
7100	INV AC HW OV	
7104	INV Self check Fail	
7118/7150	MPPT BAT OC	
7172	Battery PreCharge Fault	
7191	Battery Hardware Protect	
7195	Battery discharging over current	
7196	Battery charging over current	
7198	Battery over voltage	
7223	Battery Short current	
7120/7152	MPPT BAT OV	Restore automatically, if this phenomenon appears repeatedly after restoring for several times, please check the specification parameters of the PV plate firstly, if the PV parameters are within the specification, please contact the local dealer and the technical team.
7133/7125/ 7165/7157	PV Back flow	
7134/7126/ 7166/7158	PV OC	
7135/7127/ 7167/7159	PV UV	
7136/7128/ 7168/7160	PV OV	
7047	INV OT	The environment temperature is too high, it will restart automatically after cooling down.
7175	Battery temperature difference fault	Please avoid external heat sources affecting the battery, such as direct sunlight.After waiting for the battery to cool down, it can automatically recover.
7123	PV low light protection	This is just a reminder message, caused by unstable sunlight.
7132/7124/ 7164/7156	PV OT	Turn off the product and place it in an open area for 2-3 hours. After cooling, the product will continue to work normally.

Exclusion

The warranty shall not cover the defects caused by normal wear and tear, inadequate maintenance, handling, storage faulty repair, modifications to the product by a third party other than manufacturer or agent, failure to observe the product specification provided herein or improper use or installation, including but not limited to the following.

- Damage during transport or storage.
- Incorrect Installation of battery into product or maintenance.
- Use of product in inappropriate environment.
- Improper, inadequate, or incorrect charge, discharge or production circuit other than stipulated herein.
- Incorrect use or inappropriate use.
- Insufficient ventilation.
- Ignoring applicable safety warnings and instructions.
- Altering or attempted repairs by unauthorized personnel.
- In case of force majeure (ex: lightning, storm, flood, fire, earthquake, etc.).
- There are no warranties-implied or express-other than those stipulated herein. Manufacturer shall not be liable for any consequential or indirect damages arising or in connection with the product specification, inverter,MPPTs, battery or pack.

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