MH2000_User Manual(EN)

1. Read before using

This manual is valid for the following models:

Product Name	Models
Micro Hybrid inverter	TSOL- MH2000、TSOL- MH2000(800)

The following safety symbols are used in this manual. Before installing or operating the system, familiarize yourself with these symbols and their meanings.

Identification	Explanation
	**Danger:**Danger indicates a dangerous situation that may cause fatal electric shock, other serious personal injury, or fire danger.
	**Warning:**Warnings indicate such instructions must be fully understood and followed to avoid potential safety hazards, including unit damage or personal injury.
	**Note:**Notes indicate that the described operation should not be performed. Before continuing, readers should stop using and fully understand the explained operation.

The symbols on the MH2000 are listed below and illustrated in detail.

Label	Description
	Please read the installation manual first before installation, operation, and maintenance.
	This device SHOULD NOT be disposed in residential waste.
	This device fulfills the requirements of the Radio Equipment Directive.
RoHS	This device complies with the RoHS Directive.
	This symbol indicates the presence of high voltage and the risk of electric shock.
	To avoid electric shock or injury, do not touch or use the inverter for 3 minutes after turning off the inverter or disconnecting it from the power grid.

Read the manual and other related documents before any operation of the unit is carried out. Documents must be stored carefully and be available at all times. All rights to the content of this manual are owned by TsunESS Co., Ltd. (hereinafter “TSUN”). This document cannot be modified, distributed, reproduced or published in any form or by any means without prior written permission from TSUN. Content may be periodically updated or revised due to product development. The information in this manual is subject to change without notice. The latest manual can be acquired and downloaded at www.tsun-ess.com.

Safety Instructions

Statement:

Before installing, operating, and maintaining the unit, please read this manual first and follow all safety precautions marked on the unit and in the manual.

The "instructions", be followed, but only serve as a supplement to all safety precautions. Our company does not assume all "precautions", "warnings", and "dangers" in the manual could represent all safety precautions that would against responsibility for violating general safety operation requirements or violating safety standards for design, production, and use of the unit.

This unit should be used in an environment that meets the design specifications, otherwise it may cause unit malfunction, resulting in unit functional abnormalities or component damage, personal safety accidents, property losses, etc., which are not within the scope of product warranty assurance.

Local laws, regulations, and specifications should be followed when installing, operating, and maintaining the unit. The safety precautions in the manual are only a supplement to local laws, regulations, and norms.

Our company shall not be responsible for any of the following situations.

- Not operating within the usage conditions specified in this manual.
- The installation and use environment exceed the provisions of relevant international or national standards.
- Unauthorized disassembly, modification of products, or modification of parameter or product firmware.
- Failure to follow the operating instructions and safety warnings in the product and documentation.
- Product damage caused by abnormal natural phenomena (force majeure, such as earthquakes, fires, storms, etc.).
- Transportation damage caused by unauthorized transportation.

Damage caused by storage conditions not meeting requirements stated in this manual.

This equipment could radiate radio frequency energy which might cause interference to radio communications if you do not follow the instructions when installing and using the equipment. But there is no guarantee that interference will not occur in a particular installation. If this equipment causes interference to radio or television reception, the following measures might resolve the issues:

1. Relocate the receiving antenna and keep it well away from the equipment.
2. Consult the dealer or an experienced radio / TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

Danger:

- In the event of a fire, evacuate the building or equipment area and press the fire alarm bell, or call the fire alarm number. Under any circumstances, it is strictly prohibited to re-enter a burning building.
- Do not disassemble or modify the MH2000 without prior written permission from Tsun.

2. Product Overview

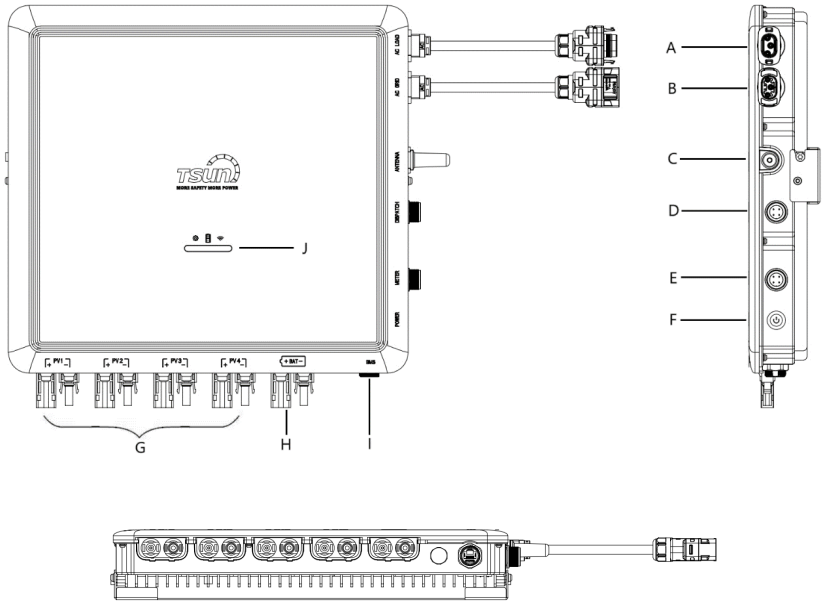
2.1 System introduction

MH2000 is a micro energy storage solution specifically designed for balcony and residential photovoltaic (PV) setups. The product's highlight lies in its bidirectional charging and discharging technology, which not only enables solar energy storage but also intelligently

dispatches grid power. Paired with a smart meter, it achieves zero-export compliant electricity consumption and automatically adapts to multiple working modes.

MH2000 is compatible with various PV microinverter systems and can be seamlessly integrated into existing balcony or residential PV systems without the need to replace any equipment.

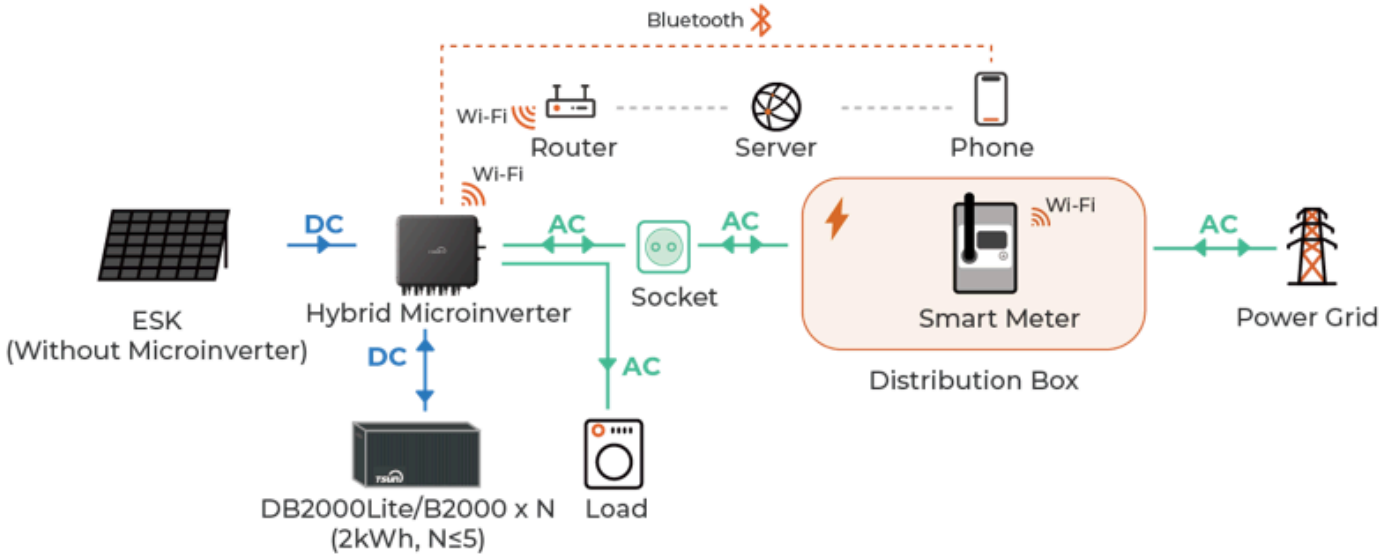
MH2000 enables off-grid emergency power supply (EPS), which provides backup power for lighting and household appliances in the event of sudden power outages. Additionally, MH2000 can serve as a portable power source to meet users' various off-grid power needs. The plug-and-play design provides users with flexibility and convenience.



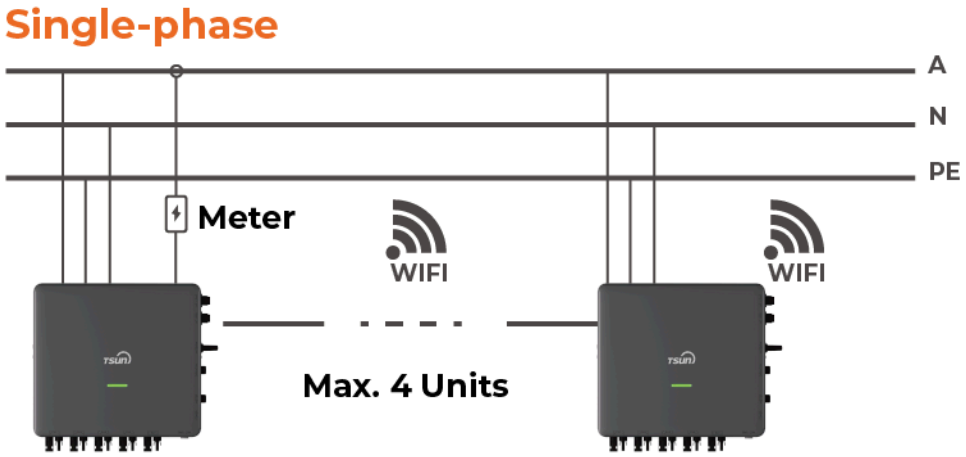
A	AC Load	**F**	Power Button
B	AC Grid	**G**	PV inputs (4 sets of PV+/I
C	WiFi Antenna	**H**	Battery Power
D	For Remote Dispatch	**I**	Battery communication I
E	For RS485 Meter	**J**	Indicator

2.2 System Diagram

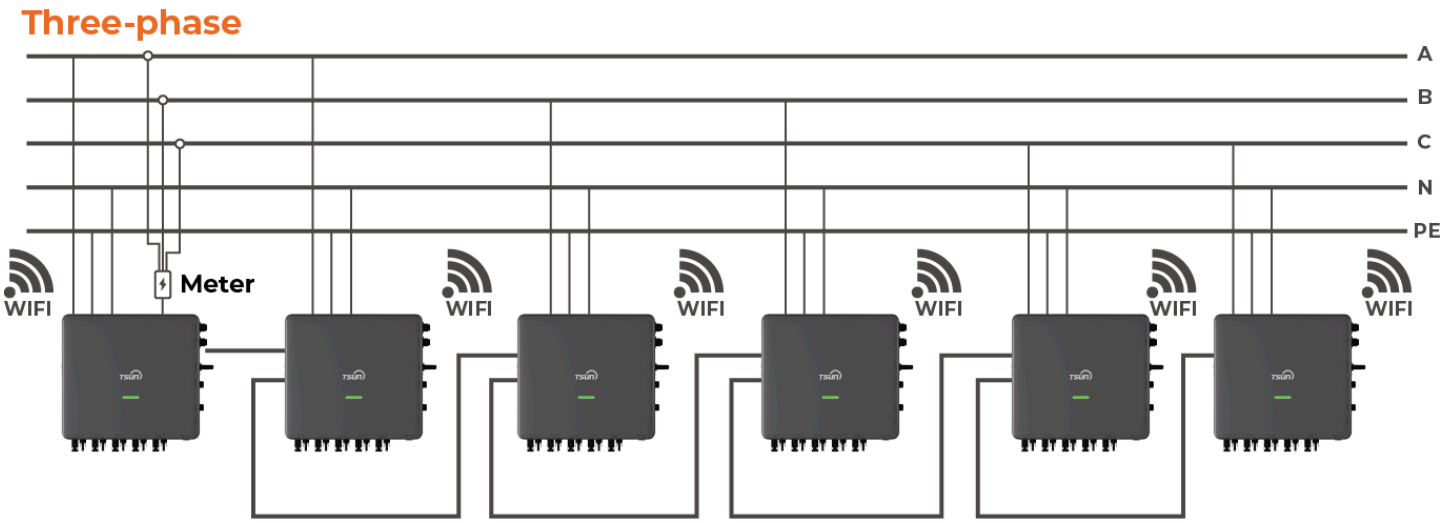
The system can be used in Off-Grid and On-Grid Hybrid Solar systems, suitable for home users and balcony scenarios.



Single-phase Grid-tied Parallel Operation Schematic Diagram



Three-phase Grid-tied Parallel Operation Schematic Diagram



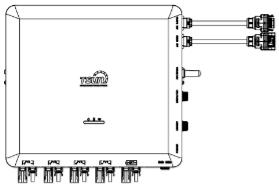
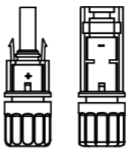
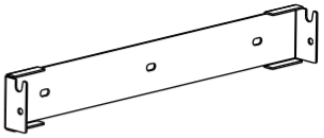
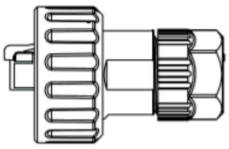
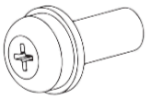
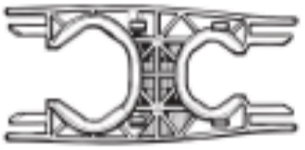
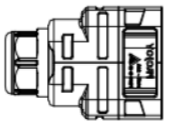
3. How to install

3.1 Pre-installation

After receiving the product, please check that all items listed below are included and undamaged.

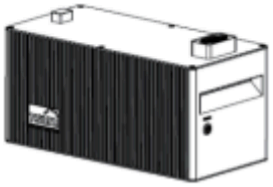
Please make sure to properly store the removal tools, protective covers, and other accessories.

3.2 Packing List

			
MH2000 × 1	RS485 Connector × 2	Battery Connector × 1	Wall bracket set × 1
			
BMS Connector Terminal	AC Connection Cable (On-Grid) × 1	AC Connector (On-Grid)× 1	Quick Installation Guide × 1
			
Screw	Bolt	MC4 Removal Tool	Removal Tool
			
Expansion Bolt	AC Connector (Off-Grid)		

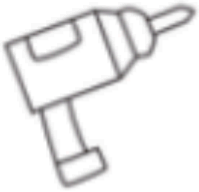
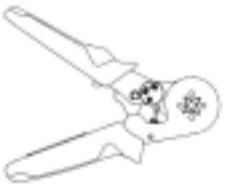
3.3 Optional Accessories

The following accessories must be ordered separately:

			
B2000/DB2000Lite	Smart Meter	DC cable	Power Strip
			
Battery Cable	RS485 Cable（Dispatch）	RS485 Cable（Meter）	

3.4 Installation Tools

The following tools are recommended for use the installation process. Other auxiliary tools can be used on-site as needed.

			
Electric Drill	Slotted Screwdriver	Protective Eyewear	Protective gloves
			
Safety shoes	Dust mask	Phillips Screwdriver	Wire Crimping Tool

3.5 Installation steps

3.5.1 Selecting the mounting location

1. The device should be installed in a location away from direct sunlight.
2. The device should be installed on a sturdy surface appropriate for its size and weight.
3. The device shall be installed either vertically or with a backward tilt not exceeding 15°.

4. The device should be installed in a well-ventilated location.
5. The ambient temperature should be between -40°C and 65°C. High ambient temperatures may result in derating (reduced inverter output power).
6. Relative humidity should be less than 90% with no condensation.
7. The device should be installed away from flammable and explosive materials.

NOTE

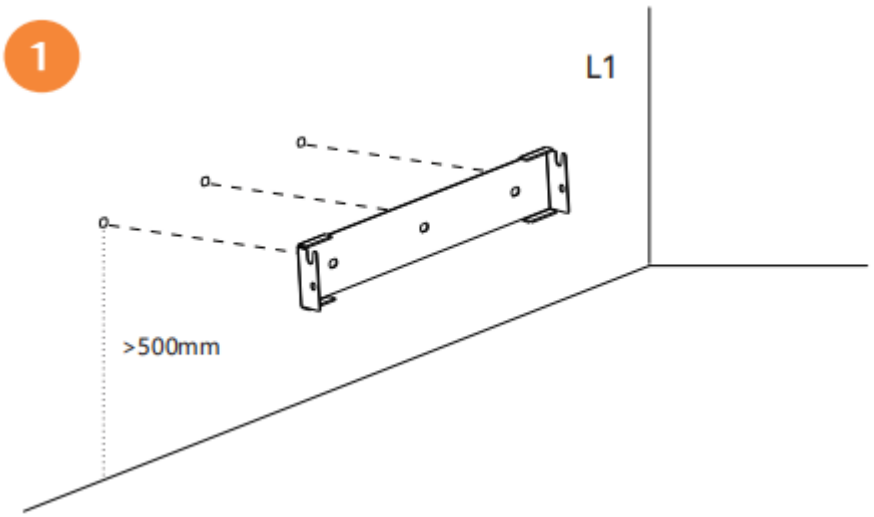
Ensure no electrical connections are made before installation. To avoid electric shock or other injuries, do not drill into any electrical parts or pipe installations.

For installations in Germany, professional electricians are required if the power exceeds 800 W.

Step 1: Installing the Bracket

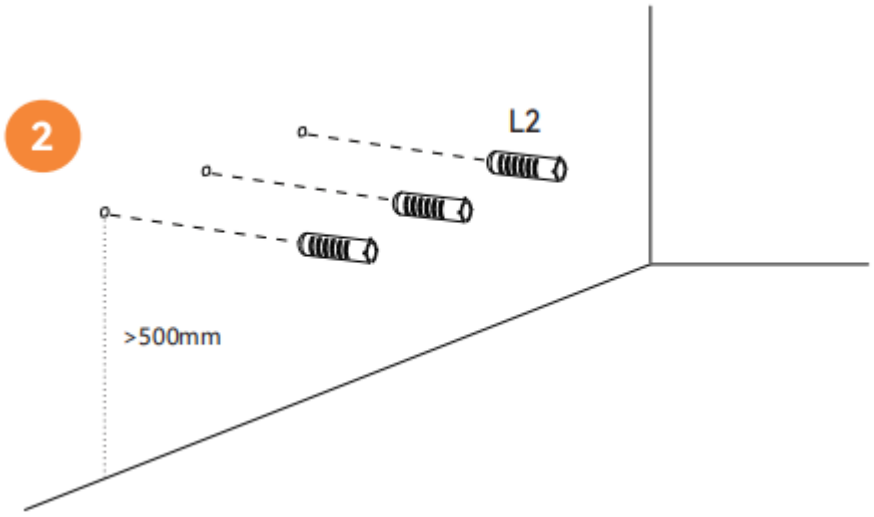
1. Drill Pilot Holes

Place Bracket (L1) against the wall, mark the positions of the three holes,and ensure the product is installed at a height of at least 500 mm above the ground.



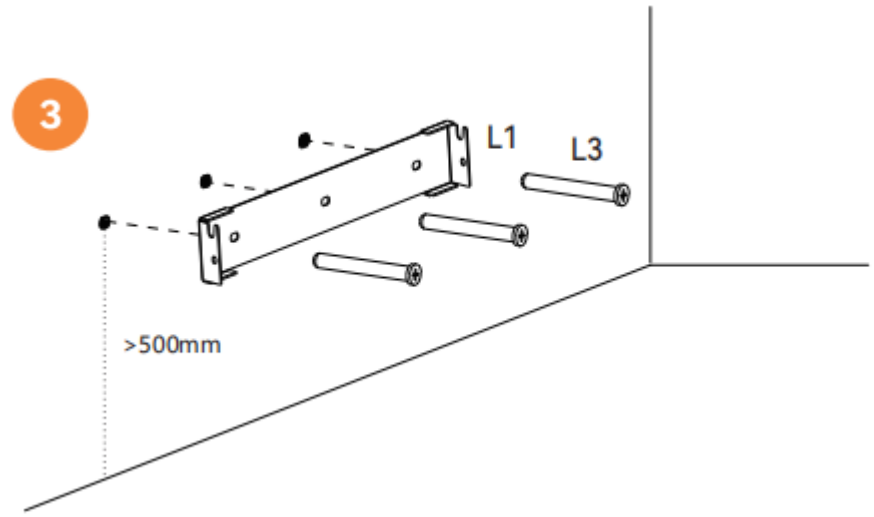
2. Secure the Expansion Bolts

Insert the expansion bolts (L2) fully into the drilled holes.



3. Mount the bracket and secure it

Place Bracket (L1) in position, then tighten Bolt (L3) with a Phillips screwdriver.

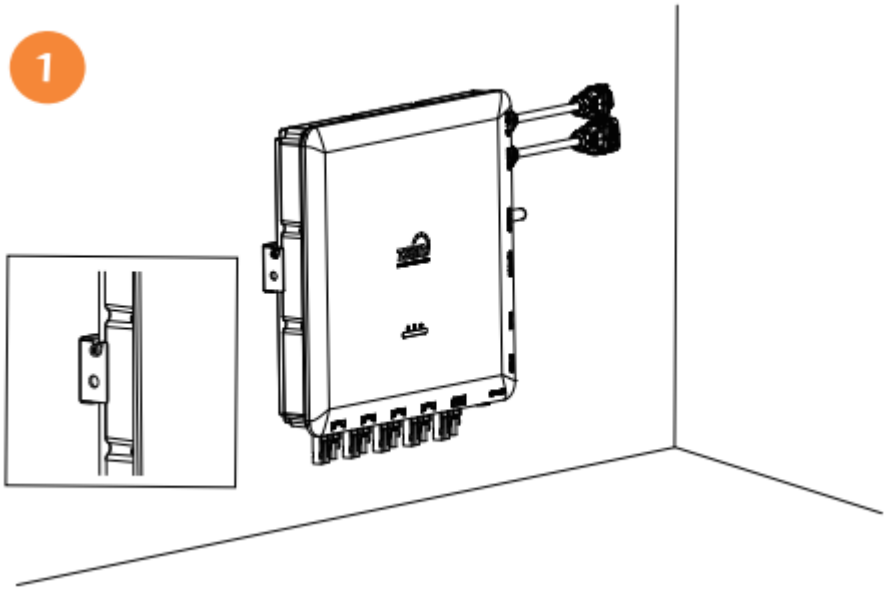


Step 2: Installing the MH2000

Please remove the MH2000 with both hands and do not pull it out directly with only one hand.

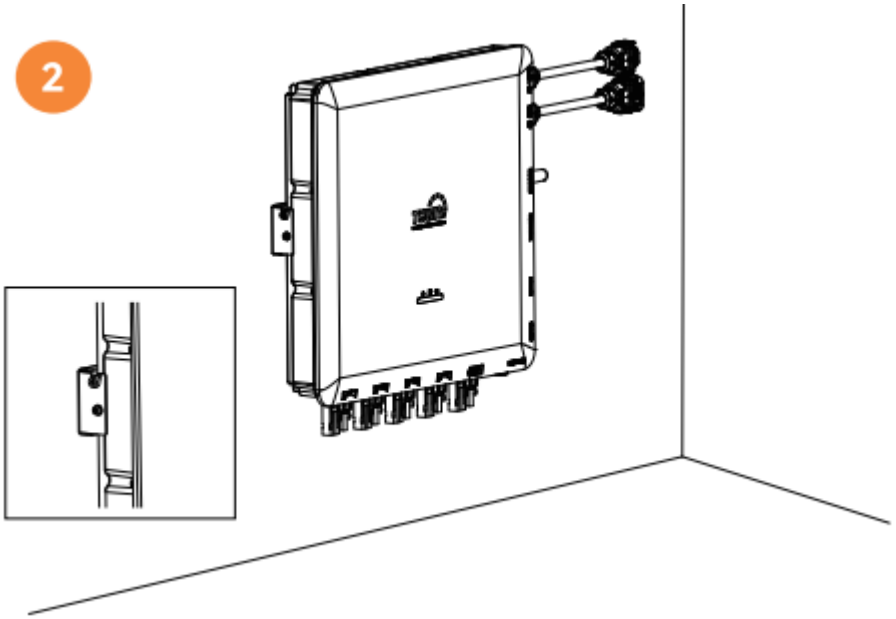
1. Place the MH2000

Lift the MH2000 with both hands and slide it down along the wall into the fixed wall bracket until it is fully seated in place. At this point, the first set of screws will engage with the grooves of the bracket, as shown in the detailed view on the right.



2. Install the second set of screws

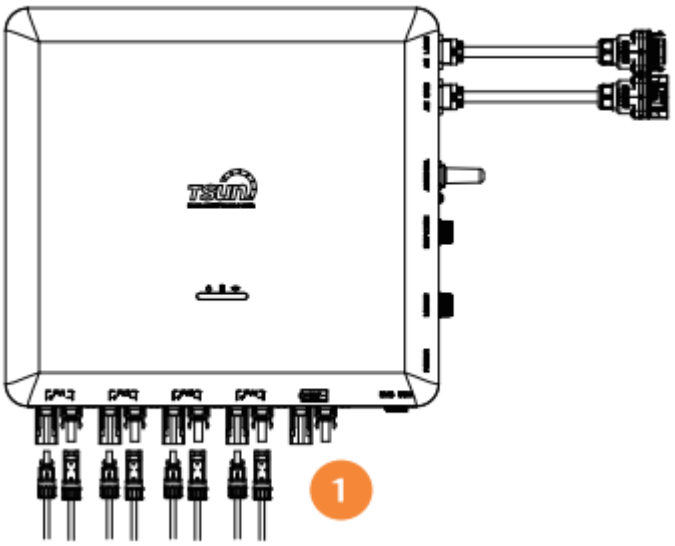
After the MH2000 is properly secured, install the other set of screws into the second screw holes on both sides of the chassis heatsink to fasten the equipment, as shown in the detailed view on the right.



Step 3: Connecting the Cables

1. Connect the DC connector

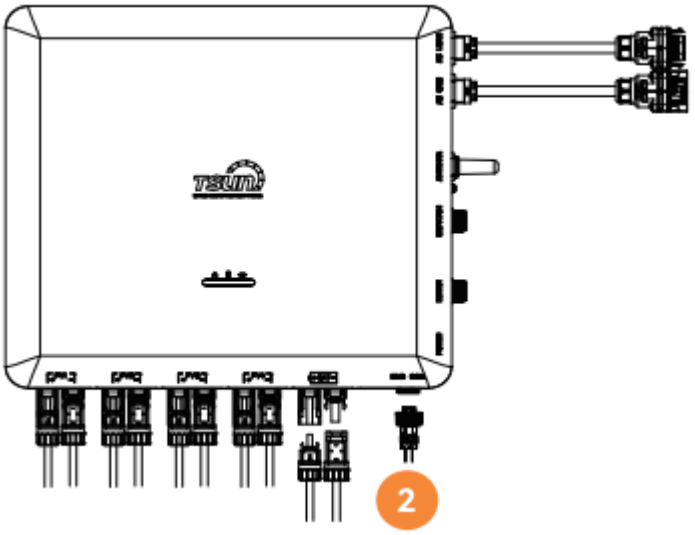
Connect the PV panels to the connector(s).



2. Connect the battery terminal(s) on the MH2000 side

Unscrew the dust cap from the battery cable connector, then insert the terminals of the battery connection cable into the device's battery port and BMS COM port, respectively.

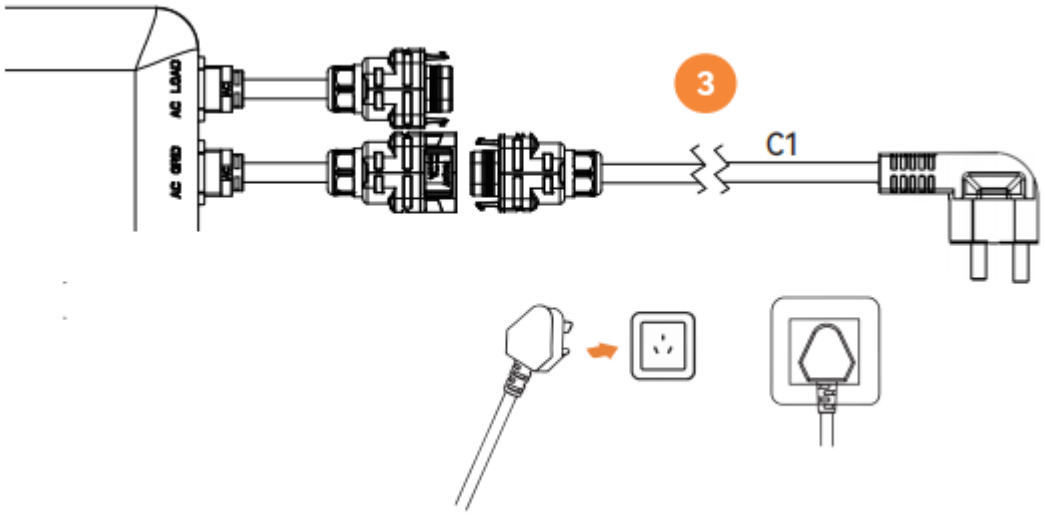
*【BMS COM Port Description】 See Section 3.5.2.



3. Connect the network cable

Connect the AC on-grid cable (C1) to the device's on-grid output port (AC Grid), then plug it into the socket.

*If the standard AC connector (grid-tied) is provided, please refer to 【Instructions for Assembling AC Connection Cables】 in Section 3.5.3.

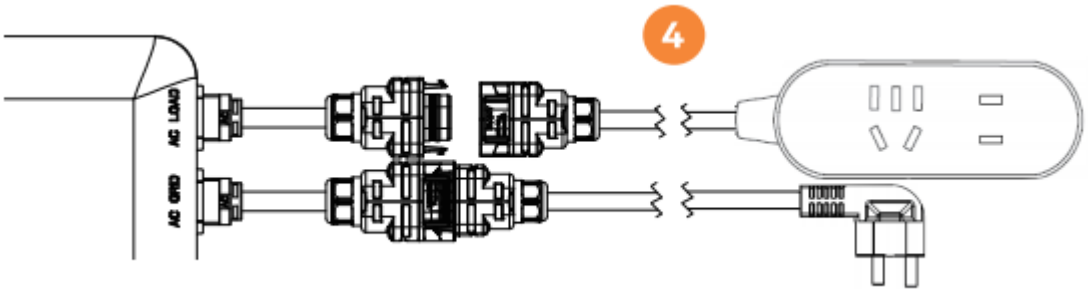


4. Connect the power strip

If the optional accessory--power strip--is purchased, connect it to the device's off-grid output port（AC Load）as shown in the figure on the right.

*If the standard AC connector (off-grid), i.e. C2, is provided, please refer to 【Instructions for Assembling AC Connection Cables】 in Section 3.5.3.

After connecting the cable, connect the other end to a power strip (for household loads). Don’ t connect it directly to the power grid.



*Note:

1. Each solar panel must be connected to the same channel.
2. Do not split the positive and negative DC cables into two different input channels; otherwise, the microinverter may be damaged and the warranty shall be void.
3. The open-circuit voltage of the PV panel shall not exceed 60 V.
4. The off-grid output power shall not exceed 2 kW.
5. All connectors must be installed in the correct positions for proper operation.

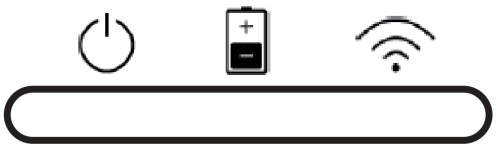
3.5.2 Buttons & Indicators & BMS COM Port Description

1. **Button Functions**

After wiring is completed, the MH2000 will start up automatically. Complete the network configuration process using the TSUN Smart APP within 30 minutes after the MH2000 is powered on (see the Monitoring System section for details).

Buttons	Action	Function
Power button	Press down(to engage)	Power on the Device
	Press again	Power off the Device

2. Indicator Status Explanation



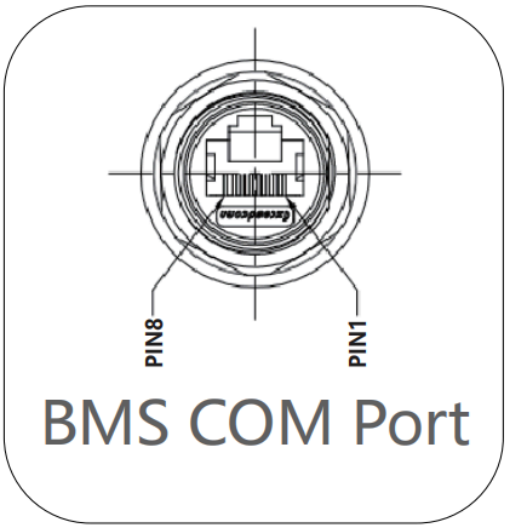
	Steady On
	Blinking once per second
	Blinking once every 5 seconds
	Off

Indicator	Indicator Status	Description
SYSTEM		Normal on-grid power generation or off-grid operation or PV charging
		The device is powered off
		System failure (overvoltage, overload, overcurrent, etc.)
		System standby
BATTERY		Battery connection and communication normal
		Battery not connected
		Battery connection but communication abnormal
WI-FI		WiFi connected
		WiFi not configured
		WiFi connection abnormal

3. BMS COM Port Description（Battery communication Port）

RJ45-Stecker (untere Seite)	Funktion
1	

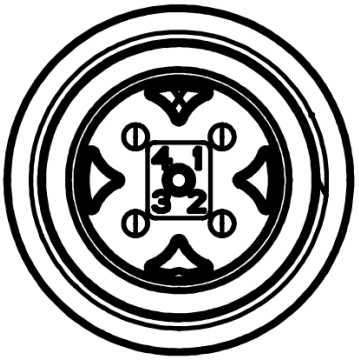
2	
3	
4	CAN-H
5	CAN-L
6	
7	RS485-A
8	RS485-B



Note: Pin 4/5 functions unsupported temporarily

4. **Definition of Remote Dispatch & RS485 Meter Interface**

Port	Definition
1	VCC
2	GND
3	A
4	B



3.5.3 Instructions for Assembling AC Connection Cables

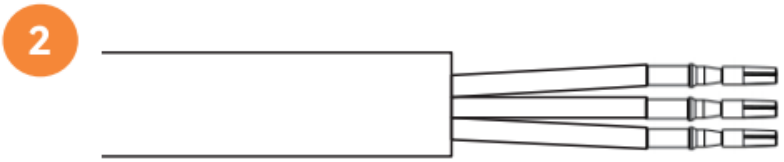
1. Cable Cutting and Stripping

Select a cable of ⩾ 3-core, 1.0 mm^2 (10A) based on the system size, cut it to the required length, and strip the excess cable insulation.



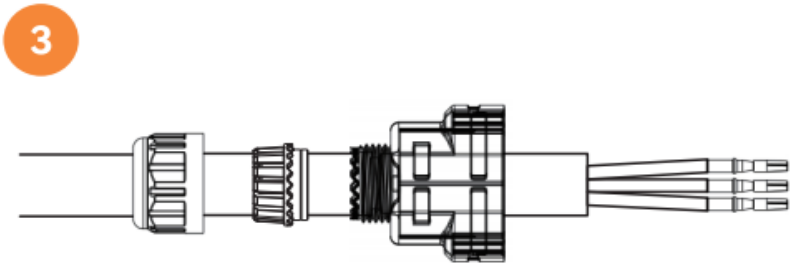
2. Crimping the Metal Pin

Remove the metal pins from the AC terminal package and crimp them with a dedicated tool.



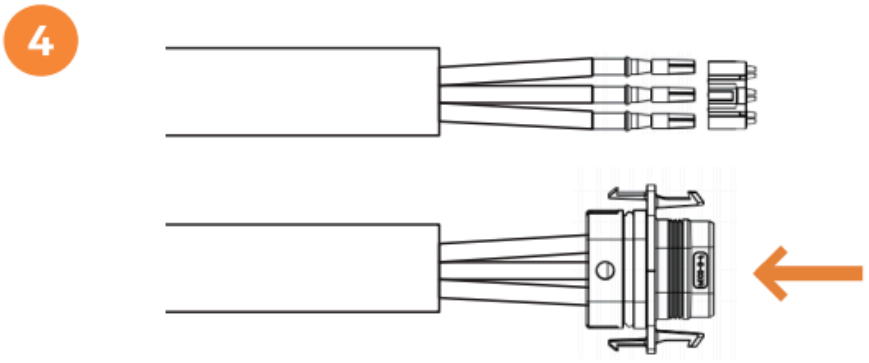
3. Connect the Cable to the Housing

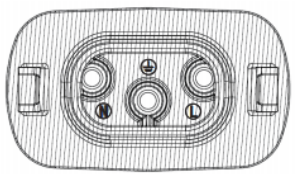
Pass the AC cable through the housing of the AC connector in the order shown in the figure on the right.



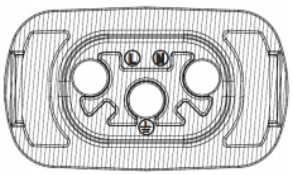
4. Connect the Metal Pins to the Inner Housing

Insert the metal pins into the designated live wire (L), neutral wire (N), and ground wire (PE) ports, respectively.(All three ports are marked on the physical unit; please check along the direction of the arrows.)





Female Connector

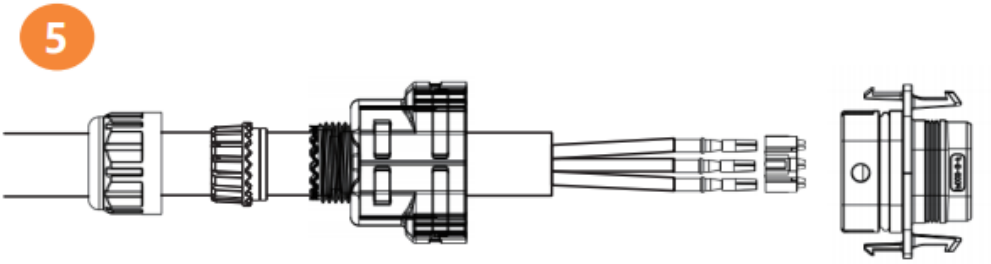


Male Connector

L:	Live Wire	(Brown)
N:	Neutral Wire	(Blue)
PE:	Ground Wire	(Yellow-Green)

5. Overall Assembly

Insert the assembled inner housing into the outer housing, then complete the assembly of the AC terminal's housing.



3.5.4 Smart Meter Installation

The installation of the meter needs to be done by a professional. Please refer to the smart meter's Quick Installation Guide (QIG) or User Manual for detailed steps.

3.5.5 Power Off and Disassemble the Whole System

1. Press the Power button once to turn off the whole system
2. Disconnect the AC end cable from the socket
3. Disconnect the solar modules from the unit’ s PV input ports

4. Monitoring System

4.1 End-user

4.1.1 APP Basic setting

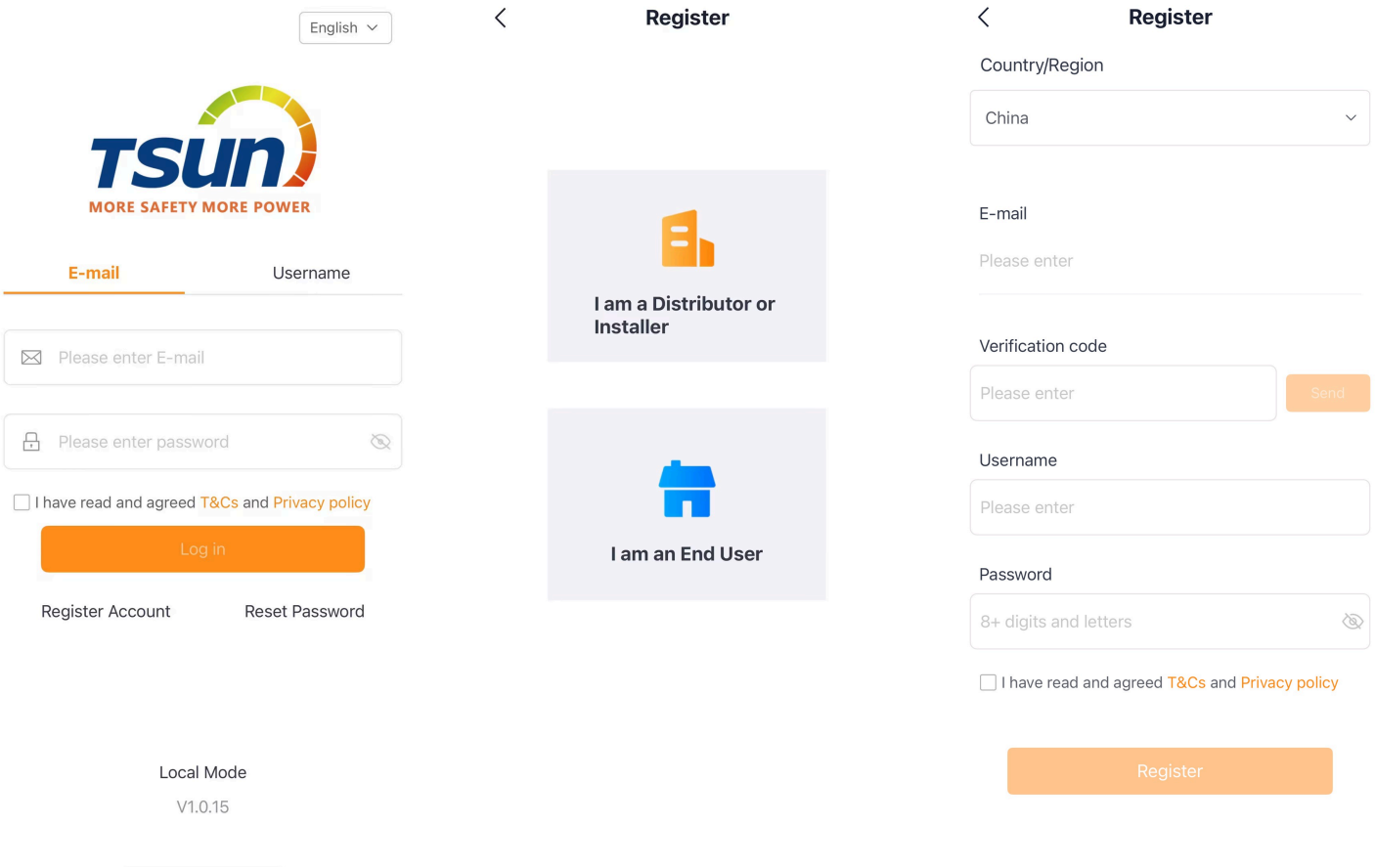
Get it on Google Play

Download on the APP Store

Download "TSUN Smart" and install it on your smart phone.

Step 1 Register an account

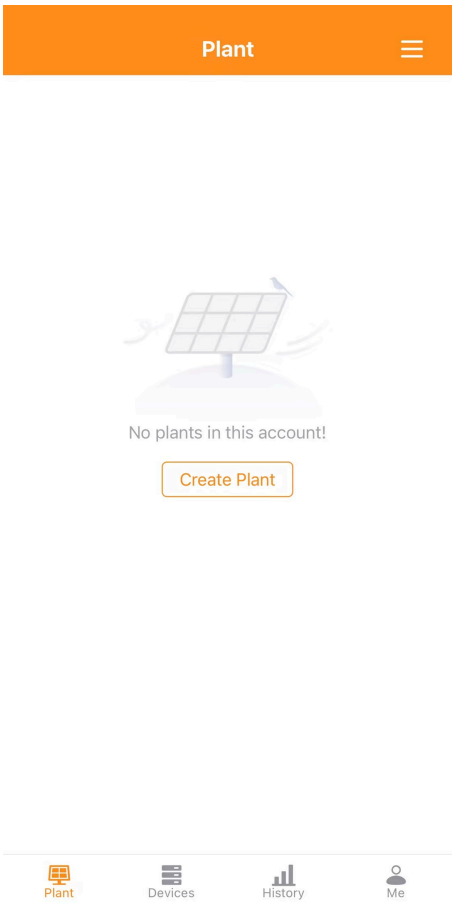
1. Click "Register" to create your account
2. Select "End-user"
3. Fill in all registration details, read the T&Cs, and accept Privacy Policy



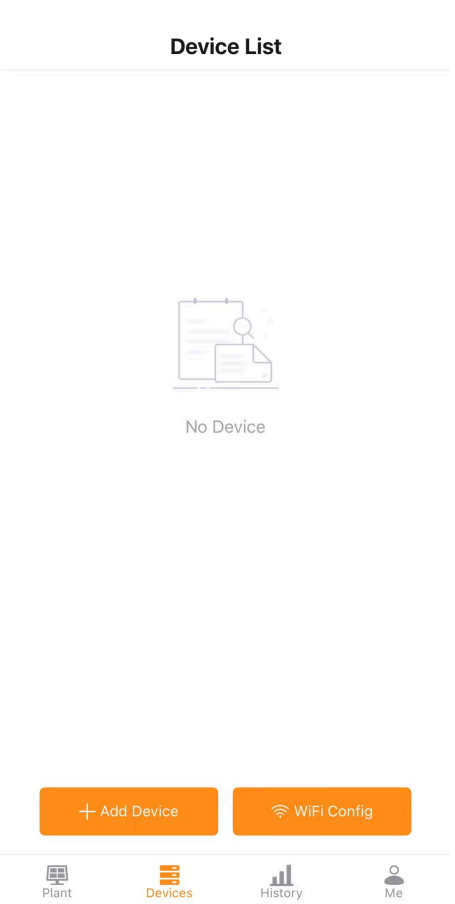
Step 2 Creat Plant & Add device

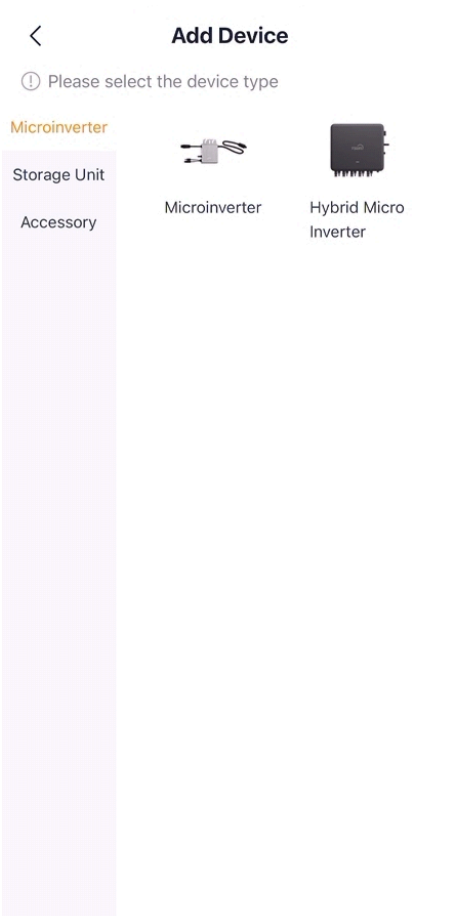
1. Click "Create Plant"
2. Fill in all details
3. Select " Device " from the main menu
4. Click " Add Device " and scan the QR code

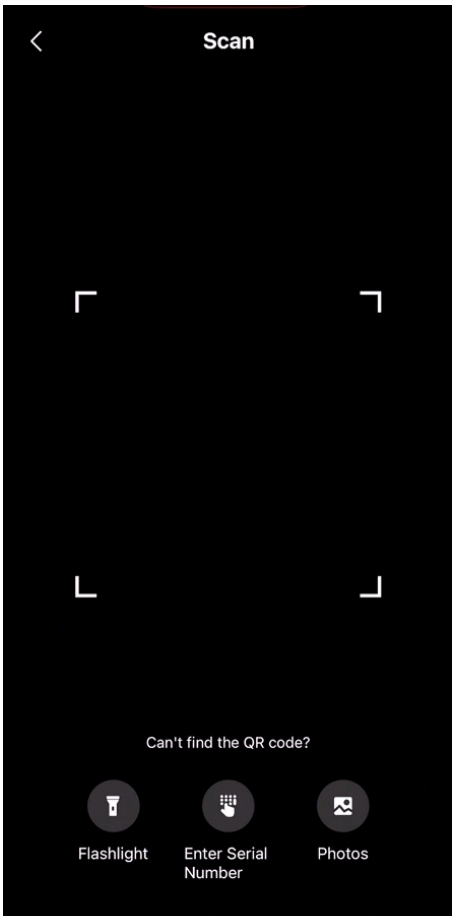
Note:Check the QR code on the back side of your Hybrid Microinverter

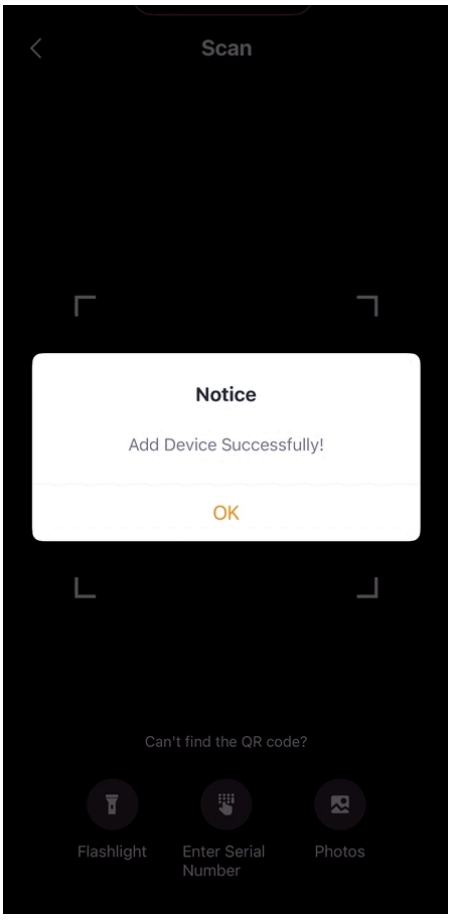








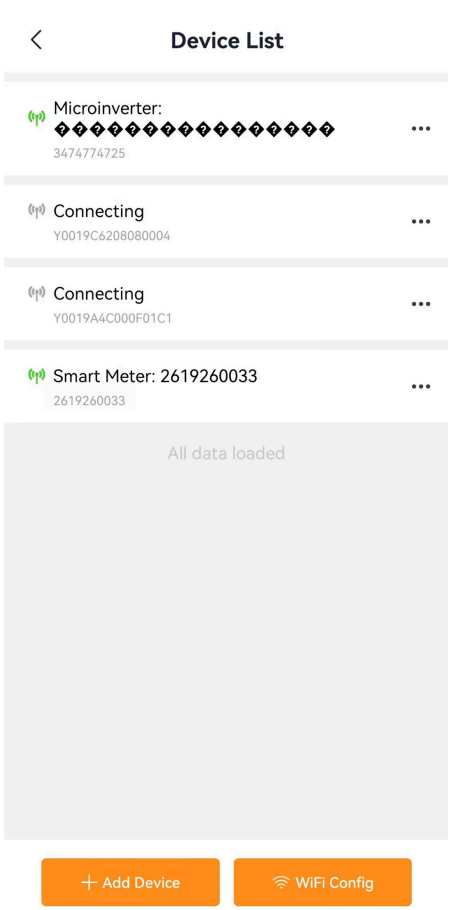


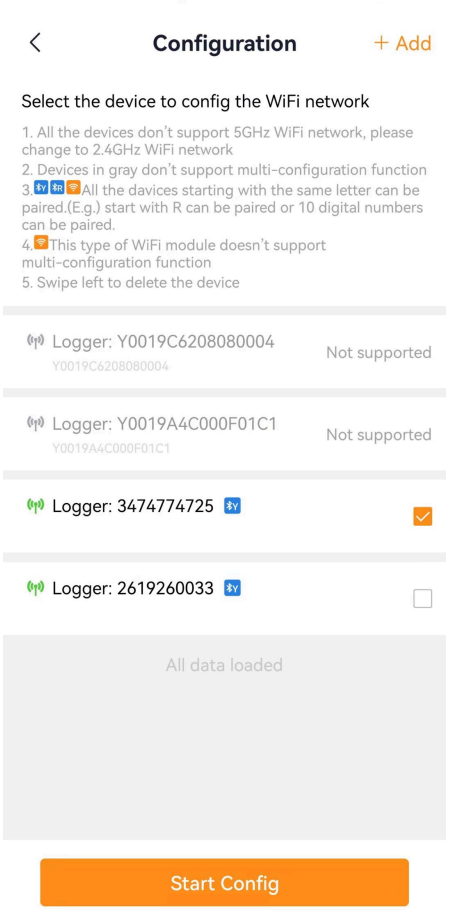


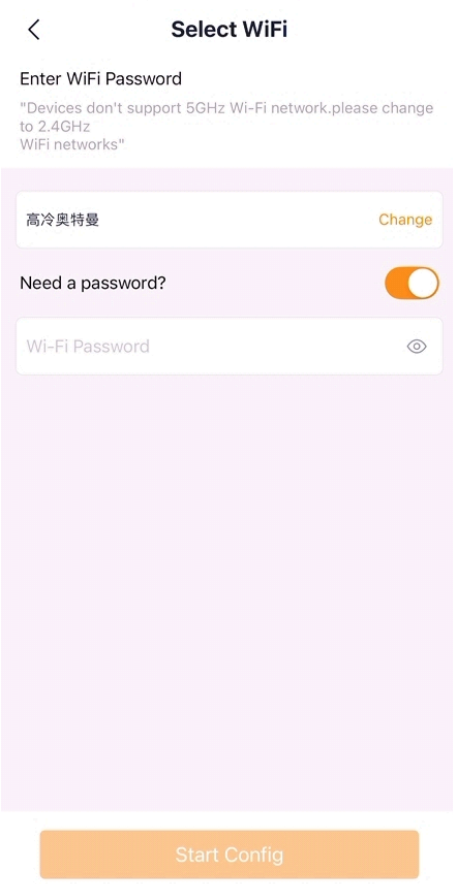
Step 3 WIFI configuration

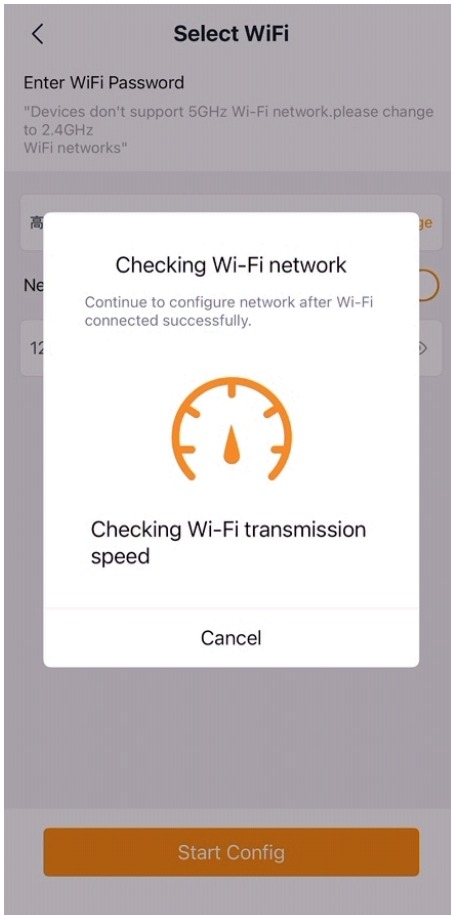
1. Click “WiFi Config"on the Device list page
2. Select microinverters and click " Start Config "

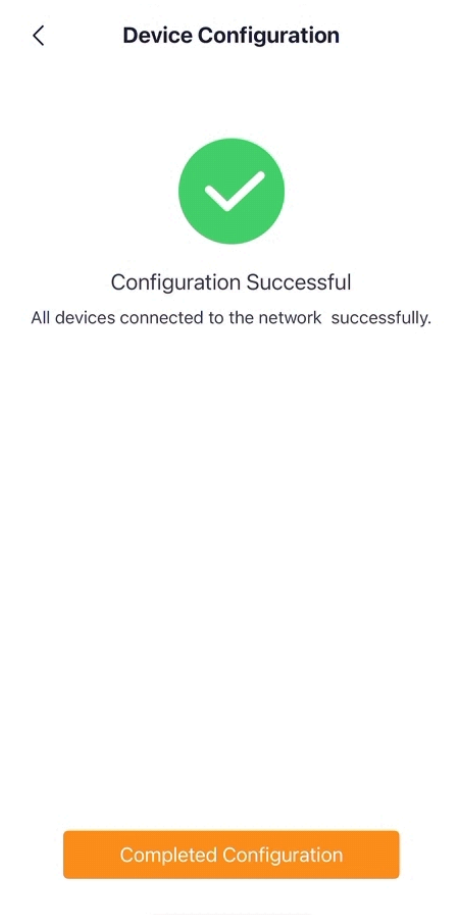
3. Wait for the network configuration
4. Relevant data will be shown on the home page in 10 mins

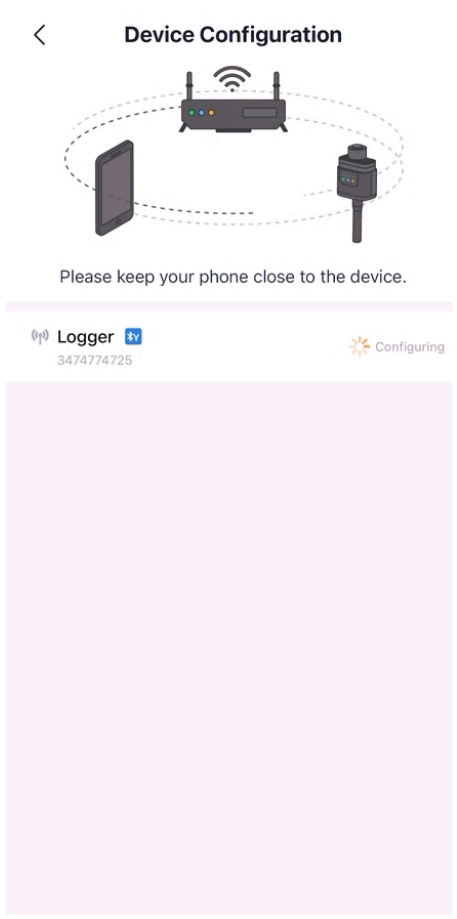


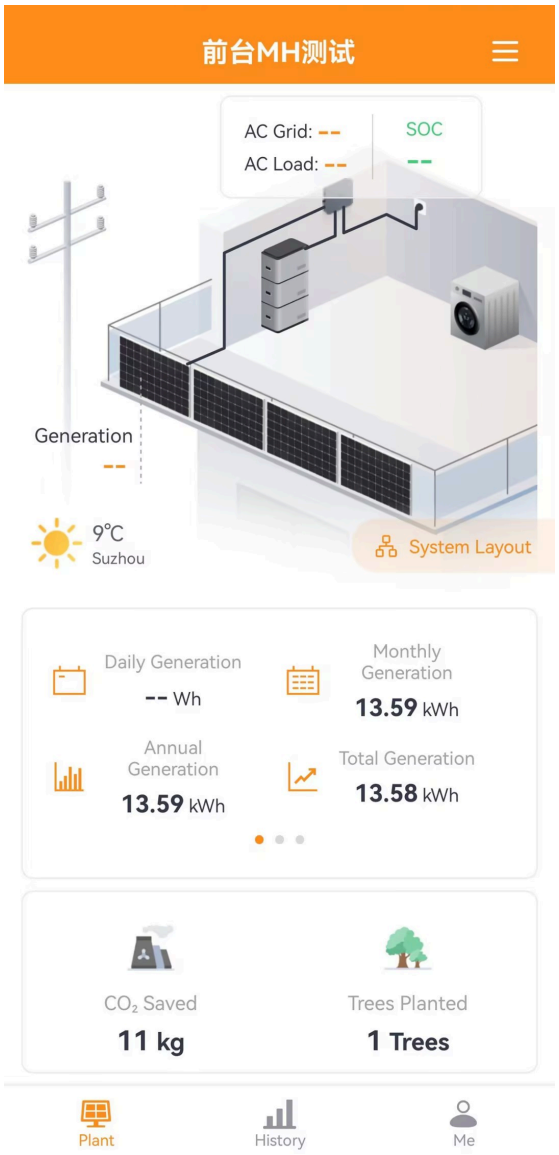












During the network configuration process, use only the 2.4GHz network. If an error is displayed on the page, check the following possible causes and try again:

- Verify that the WiFi password is correct and ensure the WiFi name contains no special characters; only numbers and English letters are allowed.
- Confirm that the WiFi and router operate on the 2.4GHz band only; the device cannot connect to the 5GHz network.
- The WiFi signal strength for the 2.4GHz band must show at least two bars on your phone.
- A router can connect a maximum of 9 devices (including not only the MH2000 but also mobile phones, computers, etc.). Check if the number of connected devices has exceeded 9.
- Ensure that the WLAN on your phone is enabled.
- Try to reduce the distance between your phone and the device.
- The WiFi configuration will be successfully completed in approximately 10 seconds, and the MH2000 data will be uploaded to the server in about 5-10 minutes.

For more functional applications, please refer to the instructions in the APP.

4.1.2 Working Mode

Self-use Mode

1. Battery Backup Function

Set the battery backup capacity percentage.

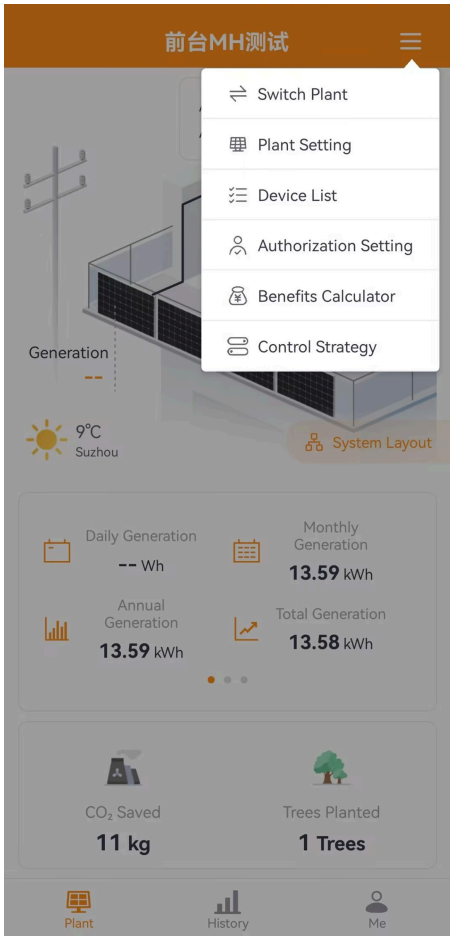
2. Smart Meter

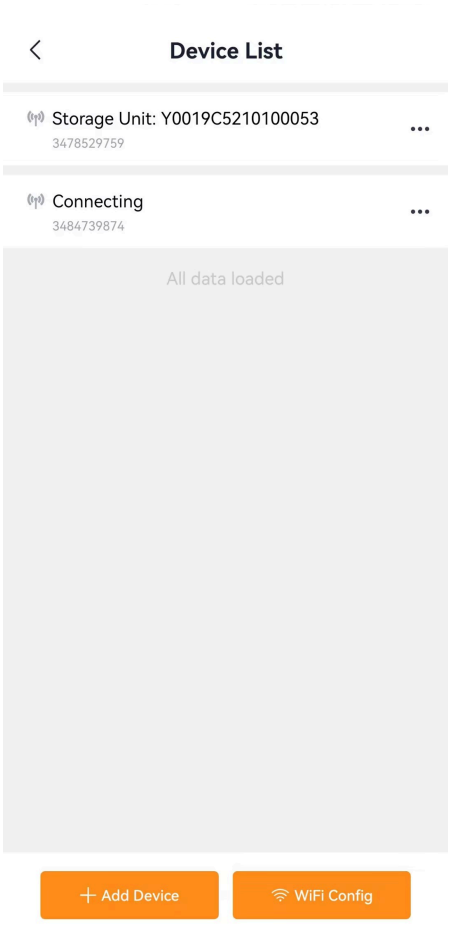
Select the type of installed corresponding smart meter; If the zero-export function needs to be enabled, select the required type and set the specified grid-export power value.

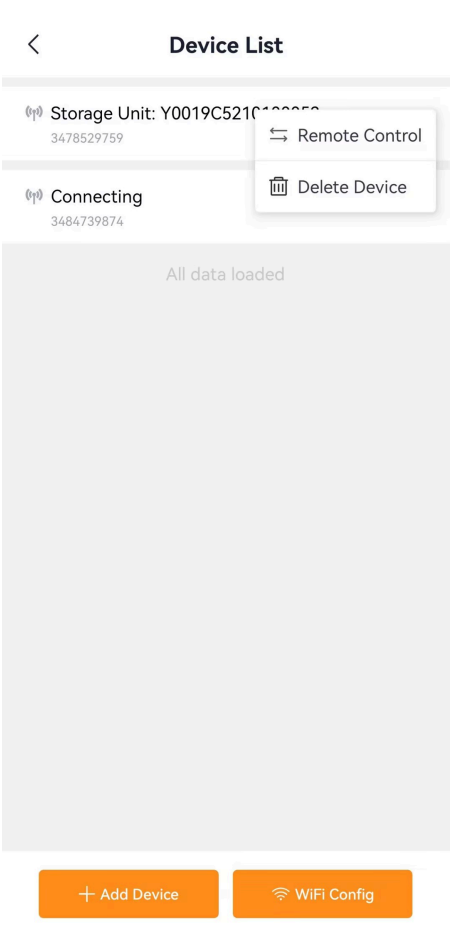
3. Work Mode

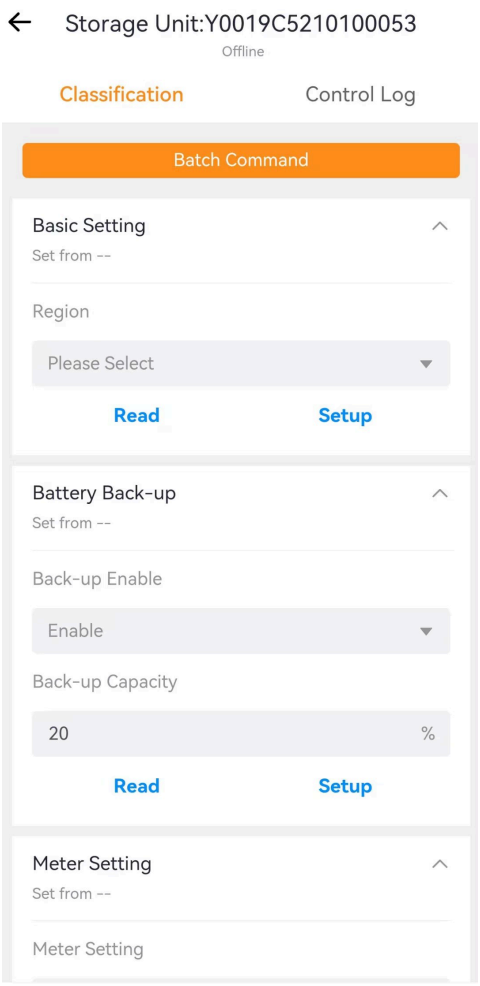
Select the "Self-use Mode"

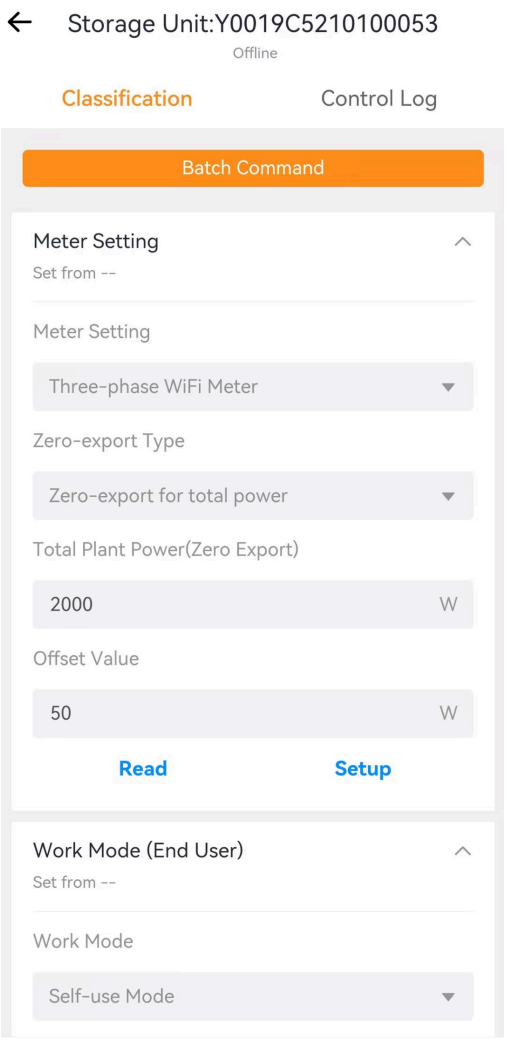
4. After setting all the above parameters, click "Setup" at the bottom of the page.









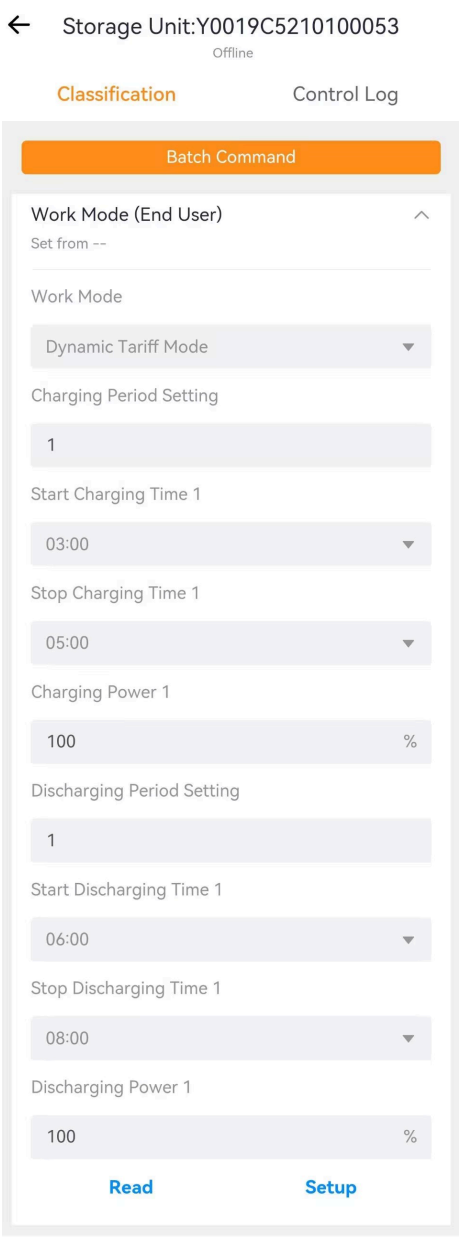


Dynamic Tariff Mode

1. For Smart meter & Battery Backup Function settings, refer to the relevant instructions in the "Self-use Mode".
2. Select the "Dynamic Tariff Mode"

Set the start time, end time, and charging/discharging power percentage for the corresponding time periods. (A maximum of 6 time periods can be configured for the charging/discharging schedule)

3. After setting all the above parameters, click "Setup" at the bottom of the page.



4.2 Distributor and Installer

4.2.1 APP Basic setting

Get it on Google Play

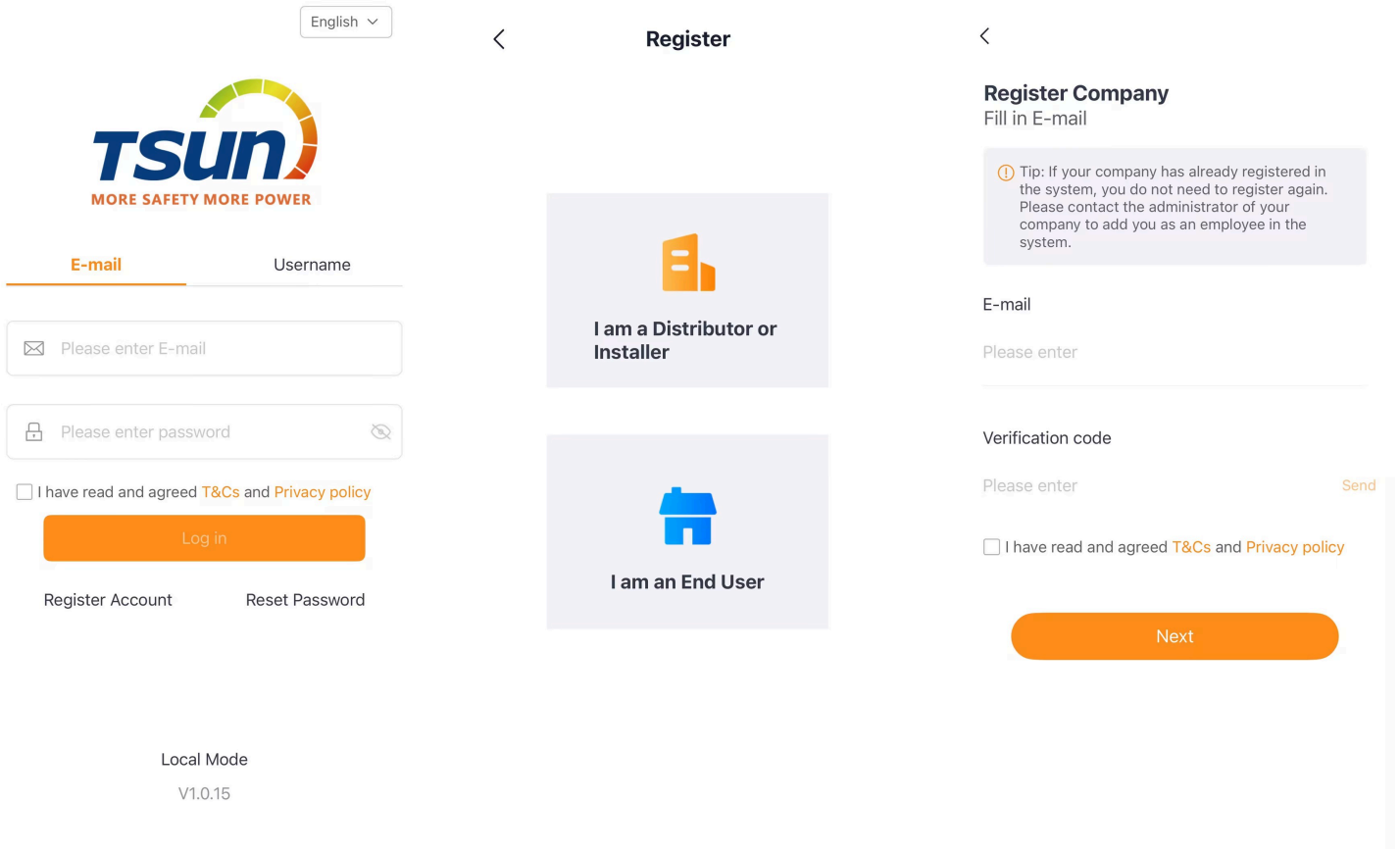
Download on the APP Store

Download "TSUN Smart" and install it on your smart phone.

Step1 Register an account

1. Click "Register" to create your account
2. Select "Distributor or Installer"

3. Fill in all registration details, read the T&C and Privacy Policy

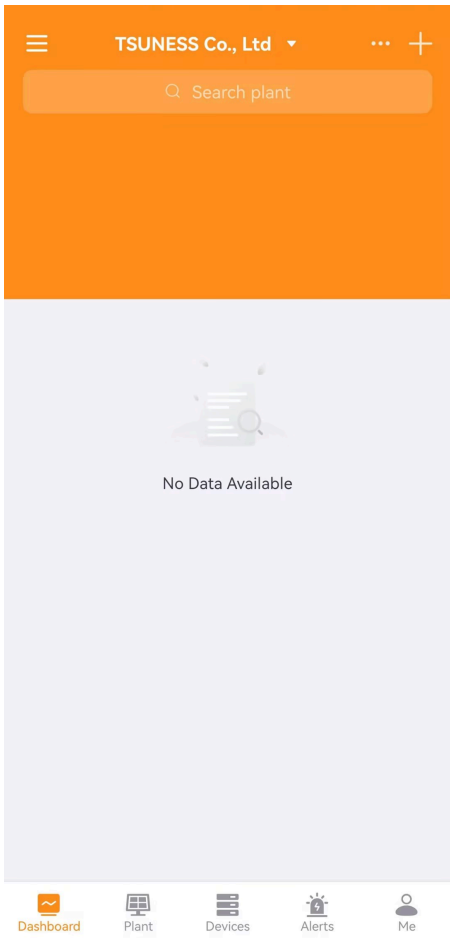


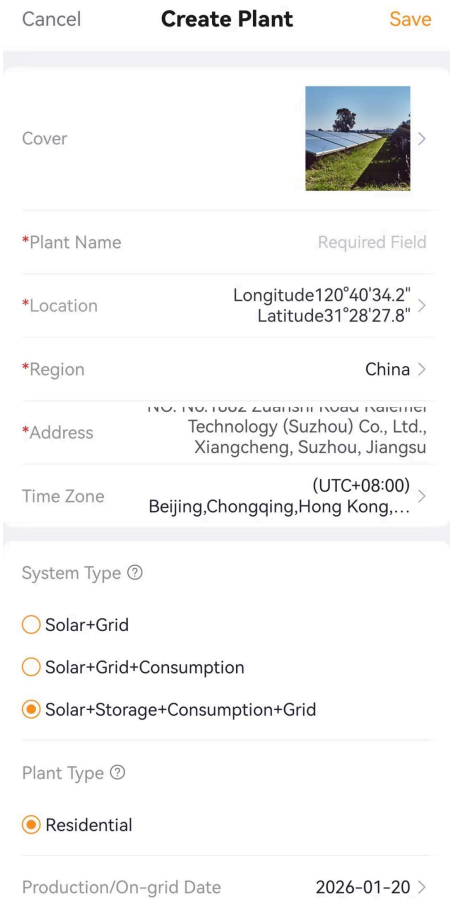
Step2 Add device

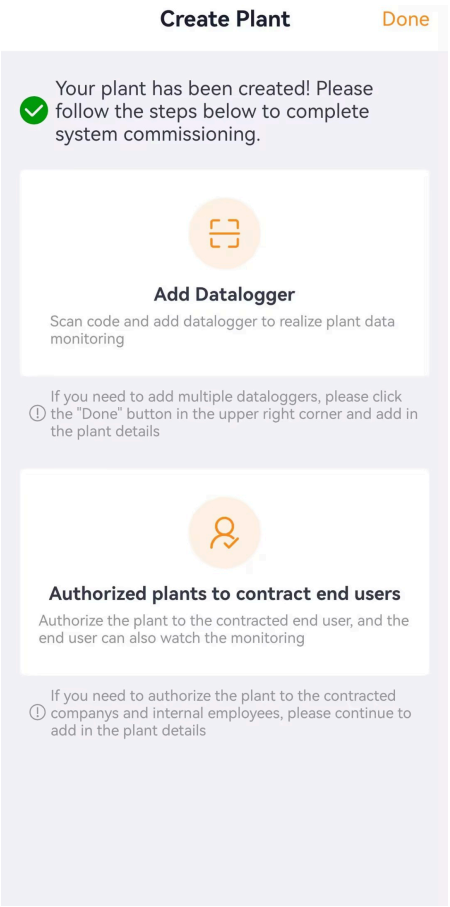
1. Click"+"and create a plant
2. Fill in all details
3. Click "Add Datalogger" and scan the QR code

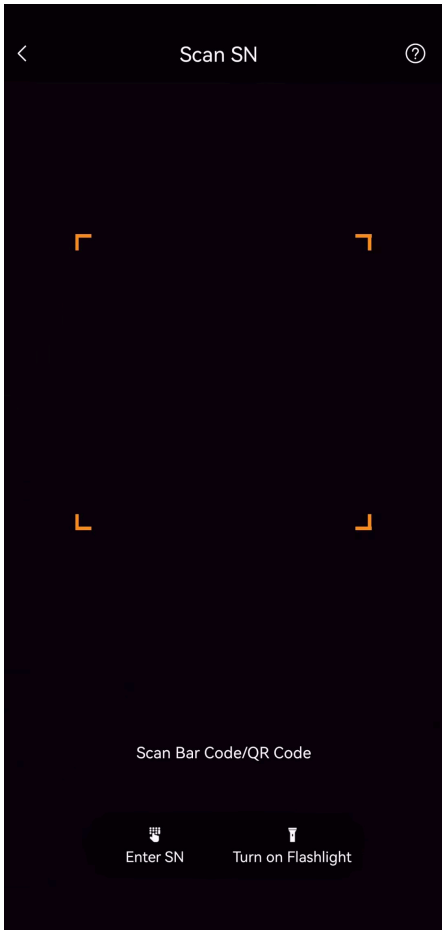
Note:Check the QR code on the back side of your Hybrid microinverter

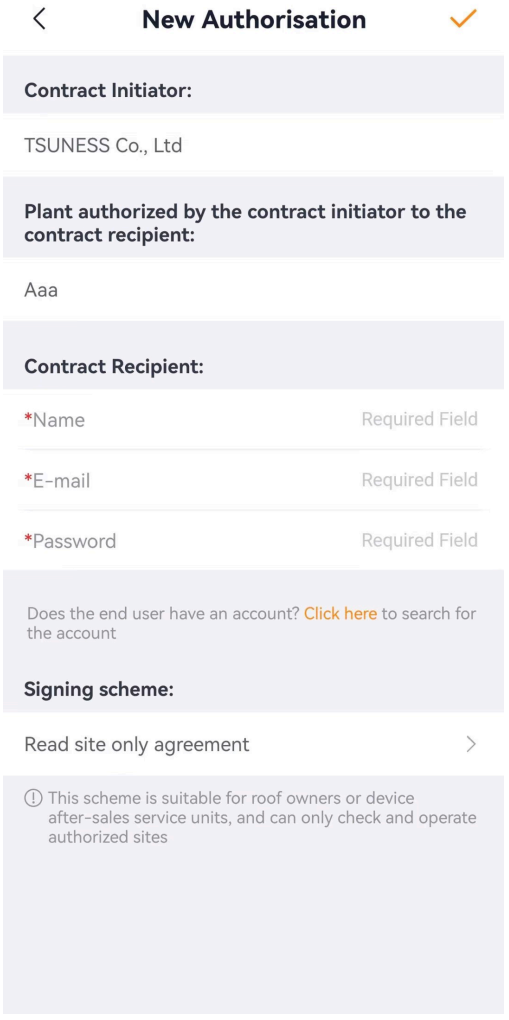
4. Click "Authorization" and fill in all details for end-user





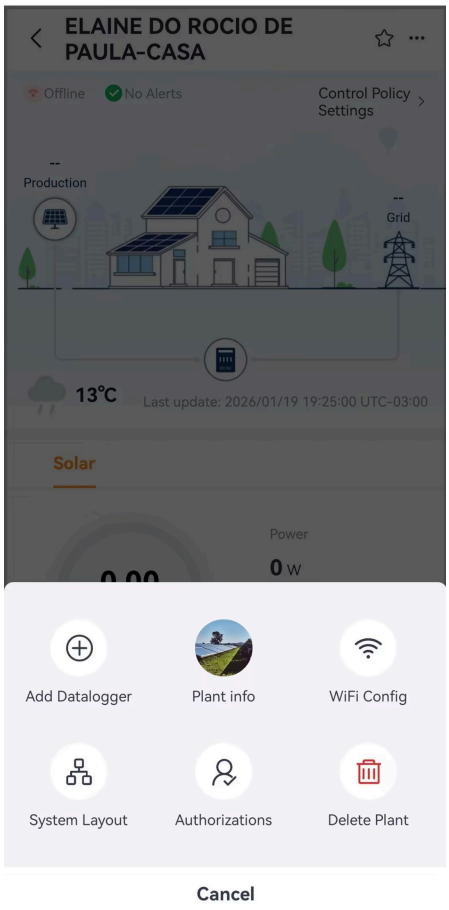


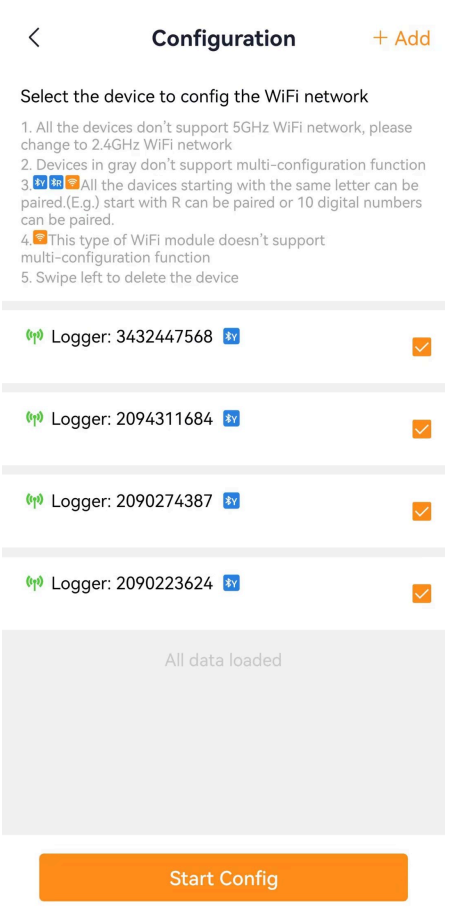


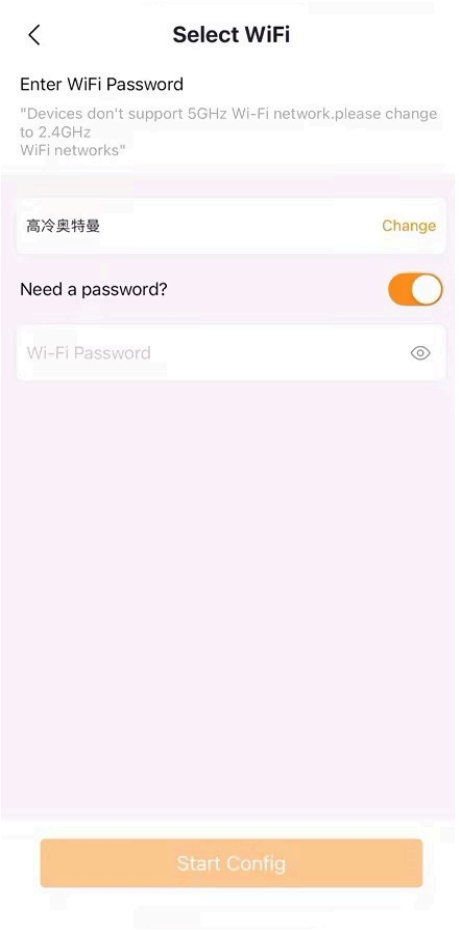


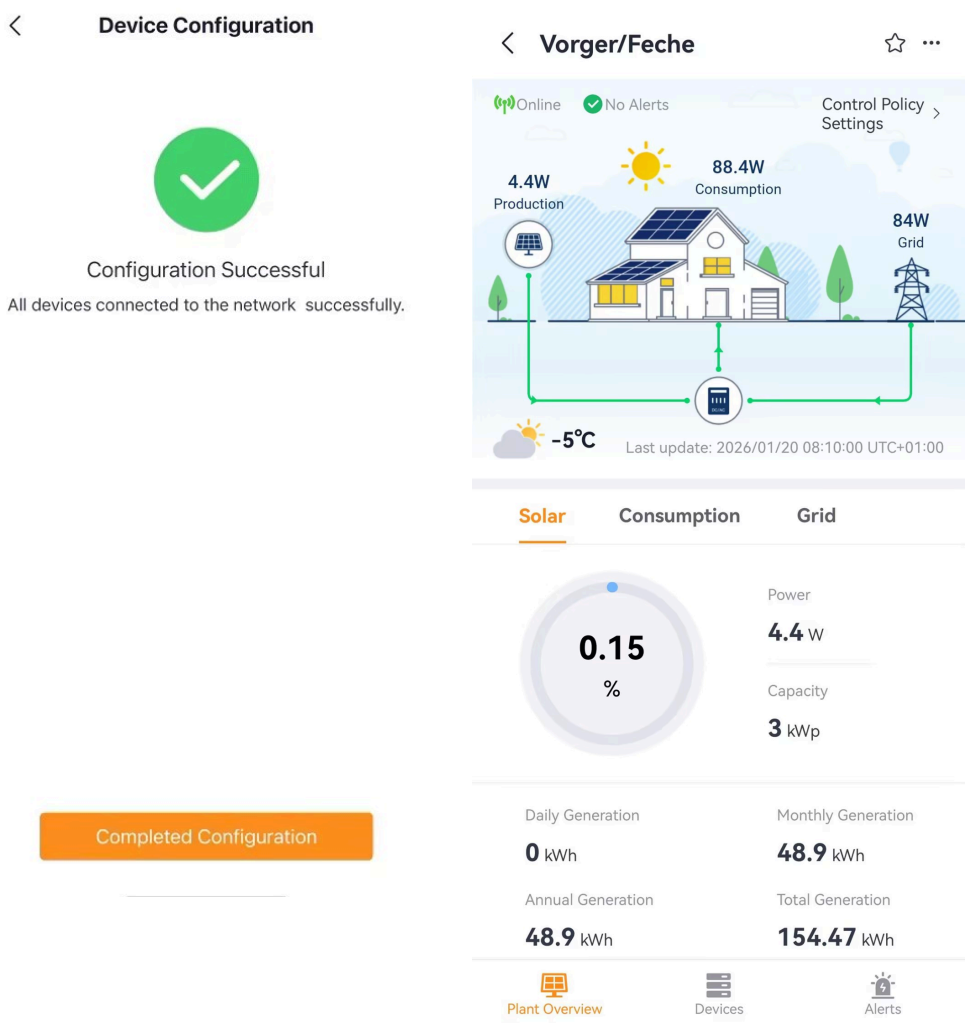
Step3 WiFi Configuration

1. Click "..." in the top-right corner
2. Click "WiFi Config" on the plant page
3. Select microinverters and click "Start Config"
4. Select WiFi and enter the password
5. Wait for the network configuration
6. Relevant data will be shown on the homepage in 10 mins









4.2.2 Working mode

Self-use Mode

1. Work Mode

Select the "Self-use Mode"Battery Backup Function

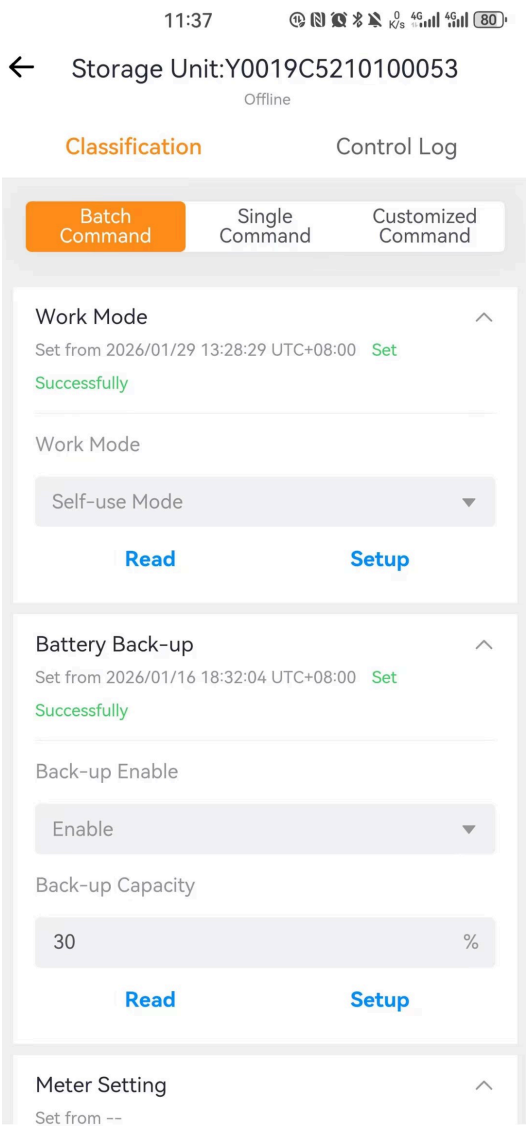
2. Battery Backup Function

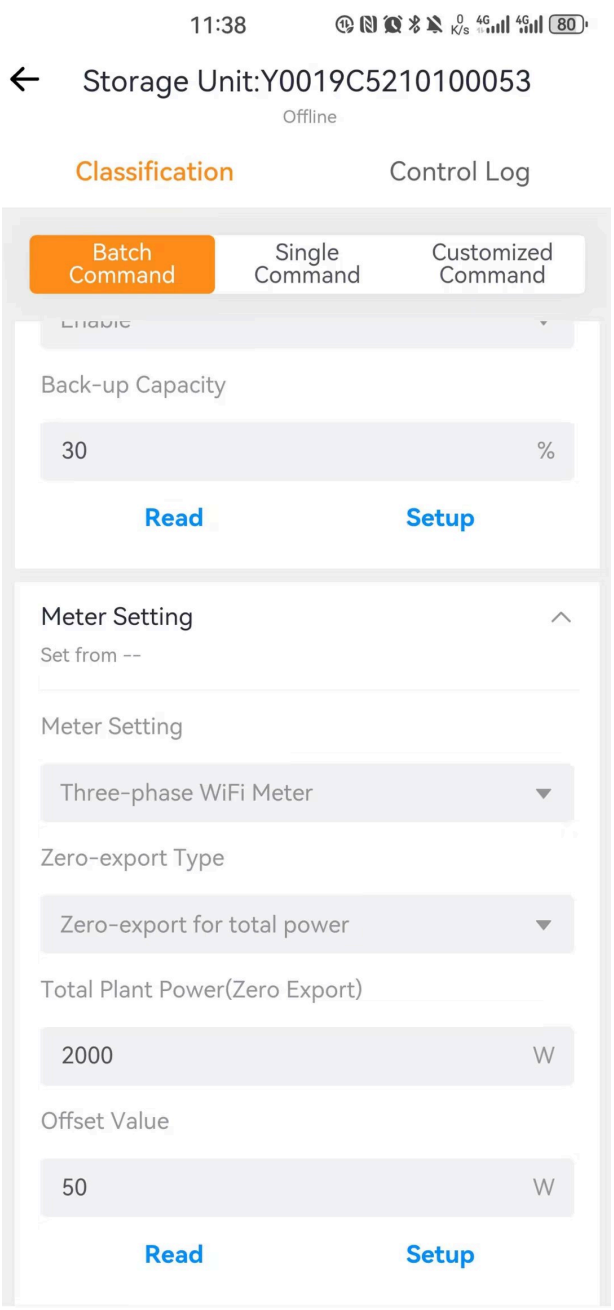
Set the battery backup capacity percentage.

3. Smart Meter

Select the type of installed corresponding smart meter; If the zero-export function needs to be enabled, select the required type and set the specified grid-export power value.

4. After setting all the above parameters, click "Setup" at the bottom of the page.



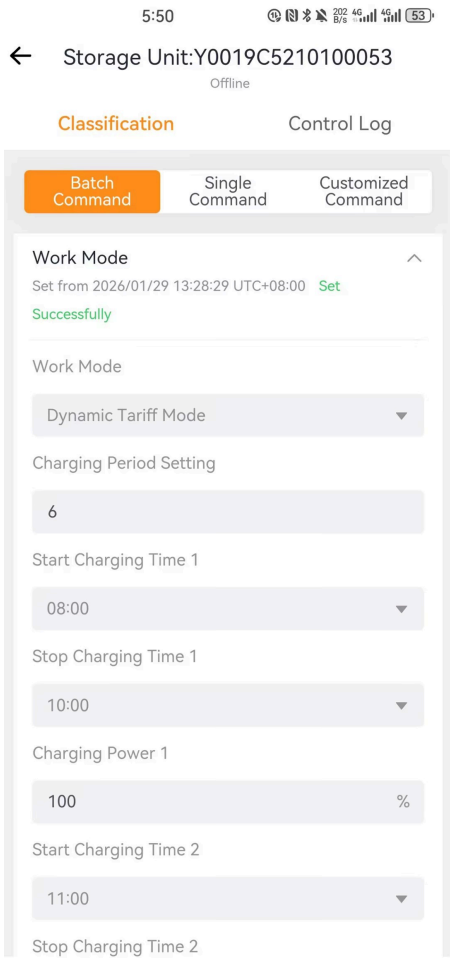


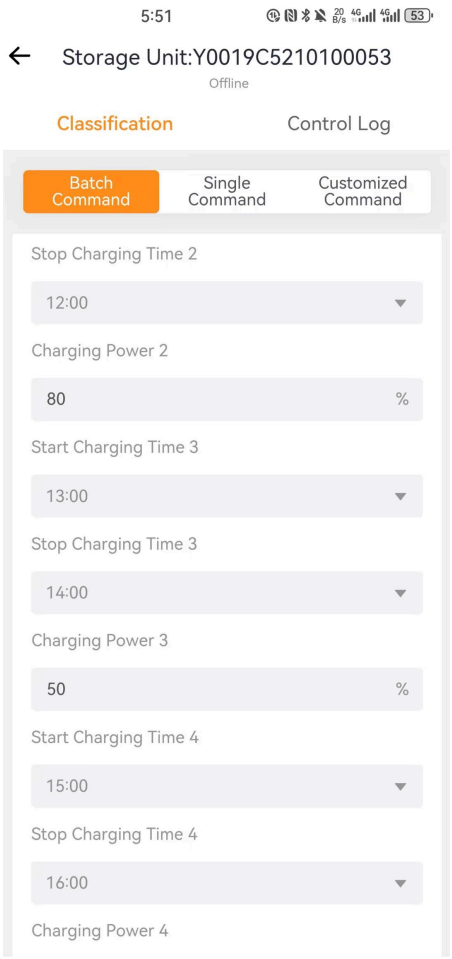
Dynamic Tariff Mode

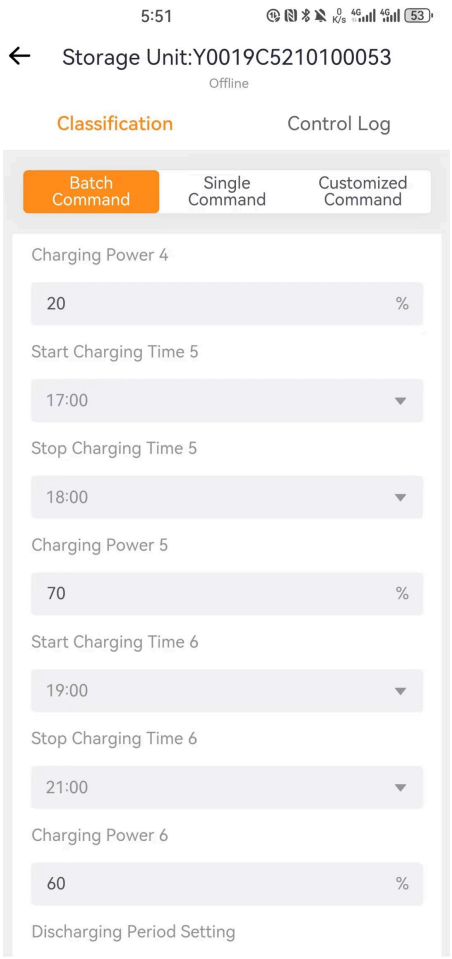
1. For Smart meter & Battery Backup Function settings, refer to the relevant instructions in the "Self-use Mode".
2. Select the "Dynamic Tariff Mode"

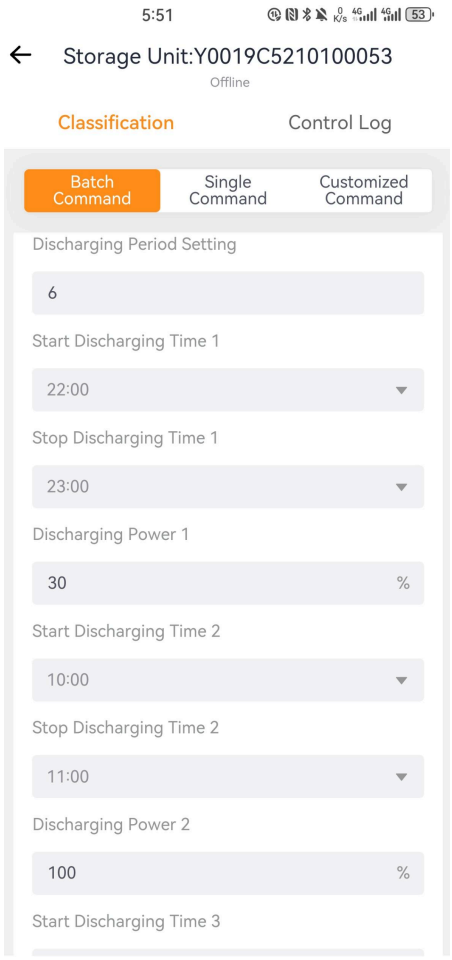
Set the start time, end time, and charging/discharging power percentage for the corresponding time periods. (A maximum of 6 time periods can be configured for the charging/discharging schedule)

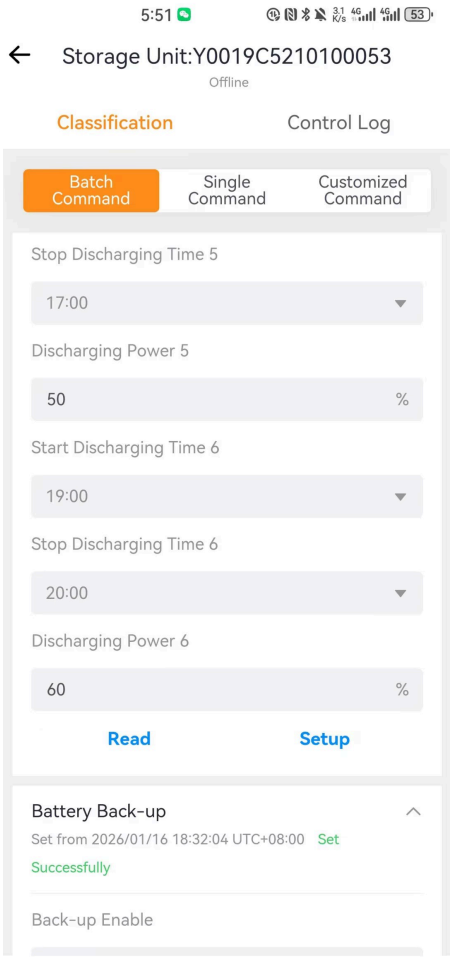
3. After setting all the above parameters, click "Setup" at the bottom of the page.

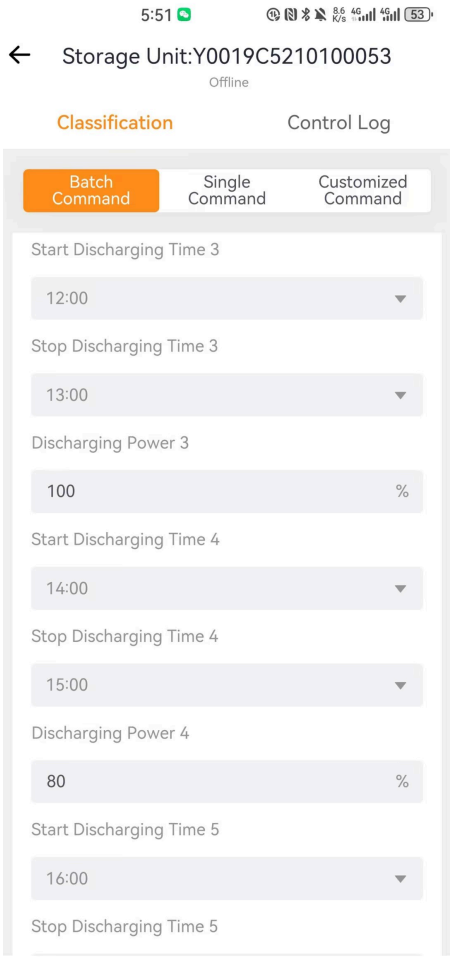

5:50
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Work Mode
Set from 2026/01/29 13:28:29 UTC+08:00 Set
Successfully
Work Mode
Dynamic Tariff Mode
Charging Period Setting
6
Start Charging Time 1
08:00
Stop Charging Time 1
10:00
Charging Power 1
100 %
Start Charging Time 2
11:00
Stop Charging Time 2


5:51
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Stop Charging Time 2
12:00
Charging Power 2
80 %
Start Charging Time 3
13:00
Stop Charging Time 3
14:00
Charging Power 3
50 %
Start Charging Time 4
15:00
Stop Charging Time 4
16:00
Charging Power 4


5:51
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Charging Power 4
20 %
Start Charging Time 5
17:00
Stop Charging Time 5
18:00
Charging Power 5
70 %
Start Charging Time 6
19:00
Stop Charging Time 6
21:00
Charging Power 6
60 %
Discharging Period Setting


5:51
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Discharging Period Setting
6
Start Discharging Time 1
22:00
Stop Discharging Time 1
23:00
Discharging Power 1
30 %
Start Discharging Time 2
10:00
Stop Discharging Time 2
11:00
Discharging Power 2
100 %
Start Discharging Time 3


5:51
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Stop Discharging Time 5
17:00
Discharging Power 5
50 %
Start Discharging Time 6
19:00
Stop Discharging Time 6
20:00
Discharging Power 6
60 %
Read
Setup
Battery Back-up
Set from 2026/01/16 18:32:04 UTC+08:00 Set
Successfully
Back-up Enable


5:51
Storage Unit:Y0019C5210100053
Offline
Classification
Control Log
Batch Command
Single Command
Customized Command
Start Discharging Time 3
12:00
Stop Discharging Time 3
13:00
Discharging Power 3
100 %
Start Discharging Time 4
14:00
Stop Discharging Time 4
15:00
Discharging Power 4
80 %
Start Discharging Time 5
16:00
Stop Discharging Time 5

Forced Mode

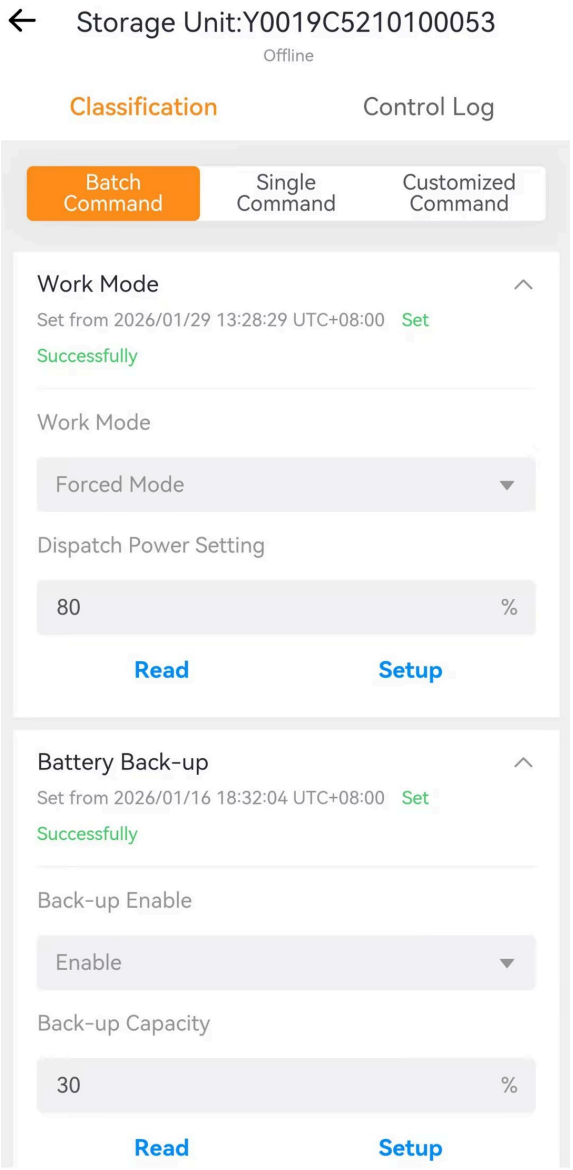
1. Set the dispatch power percentage

This percentage represents the operating power of the battery (based on the battery's rated power).

A positive value indicates the device input (charging power).

A negative value indicates the device output (discharging power).

2. For Smart meter & Battery Backup Function settings, refer to the relevant instructions in the "Self-use Mode" section.
3. After setting all the above parameters, click "Setup" at the bottom of the page.



Dispatch Mode

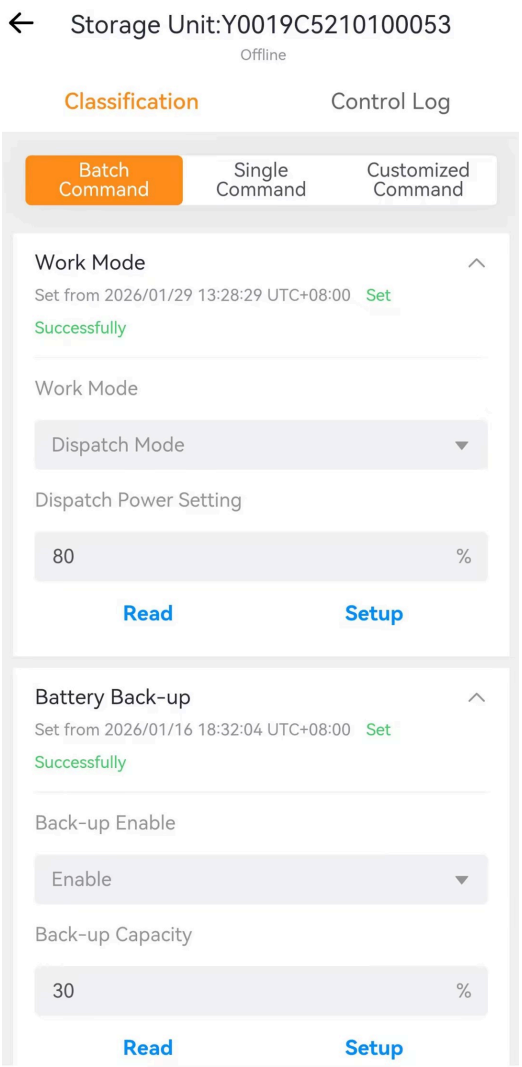
1. Set the dispatch power percentage.

This percentage represents the overall operating power of the MH2000.

A positive value indicates the device input (charging power).

A negative value indicates the device output (discharging power).

2. For Smart meter & Battery Backup Function settings, refer to the relevant instructions in the "Self-use Mode".
3. After setting all the above parameters, click "Settings" at the bottom of the page.



5. Alarm & FAQS

5.1 Alarm

The following table details the possible causes for MH2000 warnings and their solutions.

Error	Error cause	Measures
Battery Communication Error (Not applicable to lead-acid batteries)	1. The battery is not connected to the main unit 2. The cable is damaged 3. The communication function of the battery or the host is	1. Check that the cable is properly connected 2. Check the cable for damage 3. If it is normal, please contact the dealer or after-sales service

	abnormal	
Battery Overvoltage and Undervoltage	1. The battery is overcharged 2. The battery is running out of power 3. Battery failure	1. Check whether the battery SOC is within the safe range; if not, charge or discharge 2. If the SOC is normal, please contact the dealer or after-sales service
Battery Overcurrent	1. The battery's output power is excessively high 2. Short circuit at the output of the battery 3. Host failure	1. Check whether the load and grid-connected power are too large 2. Check whether the battery output is short-circuited 3. If it is normal, please contact the dealer or after-sales service
Battery Error (Not applicable to lead-acid batteries)	1. Battery BMS failure 2. Battery system failure	Please contact the authorized dealer or after-sales
Battery Reverse Polarity Fault	1. The positive and negative terminals of the battery are connected in reverse	Please contact the dealer or after-sales
Device Temperature Protection	1. The ambient temperature of the host is excessively high or low 2. Internal failure of the host	1. Check whether the ambient temperature is within the allowable use range 2. If the ambient temperature is normal, please contact the dealer or after-sales service
AC Abnormality	1. The grid is over, undervoltage or no power grid 2. The power grid frequency is overfrequency or underfrequency	1. Check the status of the power grid and the wiring. If it occurs occasionally, you may wait for the power grid to return to normal 2. If it is triggered for a long time, please contact the electricity operator
Inverter Overvoltage and Undervoltage	1. The inverter has an overvoltage or low voltage fault 2. Host failure	1. Disconnect the power grid and attempt to start the device in off-grid mode 2. Check if the grid voltage is too high/low, and try to power off and restart the device after the grid voltage returns to normal 3. If it is normal, please contact the dealer or after-sales service

Off-Grid Overcurrent Alarm	1. The power of the load connected to the off-grid port exceeds its rated limit 2. Not connected to the grid 3. Host failure	1. Check whether the off-grid load exceeds the allowable power range 2. Check whether the host is connected to the grid 3. If it is normal, please contact the dealer or after-sales service
PV Overvoltage	1. The component configuration is improper 2. The component is not properly connected to the device 3. Component failure 4. Host failure	1. Check whether the PV is connected to the host normally 2. Check whether the PV output voltage exceeds the device's allowable range 3. Check if the component is working properly 4. If it is normal, please contact the dealer or after-sales service
PV Overcurrent	1. The component configuration is inappropriate 2. Component failure 3. Host failure	1. Check whether the PV output current exceeds the allowable use range 2. Check if the component is working properly 3. If it is within the scope, please contact the dealer or after-sales service
PV Wiring Error	1. The positive and negative terminals of different components are connected to the same input. 2. Host failure	1.Please shut down the battery and disconnect the power grid, correctly connect the PV modules, and restart the device 2. If it does not recover after restarting, please contact the dealer or after-sales service.
Off-Grid Short Circuitt	1. The connection cable on the off-grid side is damaged 2. Electrical appliances on the off-grid side are faulty 3. Host failure	1.Check if the off-grid side connection line is short-circuited. 2.Check whether the off-grid appliances are short-circuited. 3.If it is normal, please contact the dealer or after-sales service

5.2 FAQS

1. Q: What precautions should I take before replace batteries?

A: When replacing batteries, it is necessary to shut down the system to protect yourself and the machine. Performing this operation while the device is powered on is not covered by warranty. Please follow the steps below for proper installation:

a. Turn off the Hybrid Micro storage.

b. Disconnect the Hybrid Micro storage and the solar panels.

c. After turning off the Hybrid Micro storage, install the batteries to the Hybrid Micro storage.

d. Connect solar panels for normal use.

2. Q: Are there any other precautions that need to be taken when installing and using the product?

A: Ensure that the AC outlet is properly grounded.

3. Q: Can I change the battery by myself?

A: No. If the battery connected to the Hybrid Micro storage does not function properly or its operating conditions do not meet expectations, please contact the TSUN customer service team for further help.

4. Q: How to make sure the unit is safely grounded?

A: The included AC cable already ensures that the device is safely grounded, so there's no need to worry.

5. Q: Are microinverters required to use Hybrid Micro storage?

A: Hybrid Micro storage does not require a microinverter. A microinverter and a photovoltaic controller are already integrated into its design.

6. Q: Can the Hybrid Micro storage charge batteries using the household power grid?

A: Yes, the Hybrid Micro storage can charge your batteries using your home's AC power. It can be scheduled to charge during off-peak hours to reduce electricity costs, and it will also automatically charge using AC power when the battery level is low and solar power is insufficient, preventing battery damage and ensuring that you have some reserve energy available.

7. Q: How do I use Hybrid Micro storage to achieve zero-power function?

A: You need to buy our optional accessory smart meter, which prevents energy backflow to the public grid by adjusting the output power of the Hybrid Micro storage, matching the household load in real-time. This achieves the purpose of not feeding energy into the public grid, which is the zero-export function.

8. Q: How does the smart meter help Hybrid Micro storage achieve zero energy waste?

A: The smart meter monitors the total household electricity consumption, enabling the Hybrid Micro storage to continuously adjust its output power. It enables real-time and precise electrical

discharge for your home, helping you achieve efficient energy use without waste.

6. Product Maintenance

- During normal operation, check that the environmental and logistics conditions are suitable. Ensure that these conditions have not changed over time, that the device is not exposed to adverse weather conditions, and that it has not been covered by foreign objects.
- DO NOT use the device if any faults are detected; restore normal conditions before resuming use after the fault has been rectified.
- The firmware version can be checked by using the monitoring system.
- Avoid temporary repairs. All repairs should be performed using only genuine spare parts.

7. Warranty Service

This Warranty is subject to the following conditions:

- The products must be installed and correctly commissioned by an authorized and licensed electrician. Proof of the product's correct commissioning may be required (such as a certificate of compliance). Claims for failures due to incorrect installation or commissioning are not covered by this Warranty.
- If the product or any of its parts is replaced or repaired under this warranty, the remaining period of the original warranty shall apply. The replaced product or parts do not come with a new voluntary warranty.
- The product must have its original serial number and rating labels intact and readable.
- This Warranty does not cover any product that has been completely or partially disassembled or modified, except where such disassembly is carried out by TSUNESS.
- The terms of this Warranty may not be amended except in writing by an authorized officer of our company.
- A commissioning report signed by both the end user and the installer must be provided, including product commissioning and operation instructions.

Exclusions

1. TSUNESS makes no warranties, whether express or implied, oral or written, regarding any warranty coverage other than those expressly stated in this Limited Factory Warranty.
2. The Factory warranty does not cover damages arising from:

- Transport damage;

- Failure to comply with the User Manual, maintenance regulations, and maintenance intervals;
- Modifications, changes, or attempted repairs, except as conducted by an Authorized Dealer;
- Improper use or incorrect operation;
- Insufficient ventilation of the covered product;
- Failure to observe the applicable safety regulations;
- Force majeure;

3. This Factory Warranty does not cover cosmetic defects that do not directly affect energy production or impair the product's form, fit, or function.
4. Claims exceeding the scope of this Limited Factory Warranty, particularly claims for compensation for direct or indirect damages caused by the defective device, costs incurred from disassembly and reinstallation, or loss of profits, are expressly NOT covered by this Factory Warranty.
5. Under no circumstances shall TSUNESS Co., Ltd be held responsible or liable for any personal injuries resulting from the use of the system, or for any other damages (whether direct, indirect, incidental, or consequential), even if TSUNESS Co., Ltd has been notified of such damages.

8. Appendix

Product Certificates

Model	**TSOL-MH2000**	**TSOL-MH800**
PV Input (PV)		
Recommended Module Power (Wp)	300 ~ 700+	300 ~ 700+
Quantity of PV Module	1 ~ 4	1 ~ 4
Start up Voltage @Rated condition (V)	22	22
Operating Voltage Range per Input (V)	16 ~ 60	16 ~ 60
Max. Input Voltage per Input (V)	60	60
Short Circuit Current per Input (A)	20	20
Max. Input Current per Input (A)	18	18
Quantity of MPPTs	4	4

Quantity of DC Inputs (MC4)	4	4
Battery (DC)		
Battery Type	LiFePO4	LiFePO4
Nominal Voltage (V)	51.2	51.2
Operating Voltage Range (V)	20~ 60	20~ 60
Max. Discharge Power (W)	2000	800
Max. Discharge Current (A)	45	45
Max. Charge Power (W)	2000	800
Max. Charge Current (A)	45	45
AC Port (On-grid)		
Max AC Output Power (W)	2000	800
Max. AC Output Current (A)	10	4
Max. AC Input Power (W)	2000	800
Max. AC Input Current (A)	11	11
Nominal AC Voltage (V)	220 / 230 / 240, L / N / PE	220 / 230 / 240, L / N / PE
Nominal AC Frequency (Hz)	50 / 60	50 / 60
Power Factor	> 0.99 default	> 0.99 default
THDI	⩽ 3 % @100 % Load	⩽ 3 % @100 % Load
AC Port (Off-grid)		
Max. AC Output Power (W)	2000	2000
Max. AC Output Current (A)	10	10
Nominal AC Voltage (V)	220 / 230 / 240, L / N / PE	220 / 230 / 240, L / N / PE
Nominal AC Frequency (Hz)	50 / 60	50 / 60
Switch Time (ms)	< 10	< 10
Peak Output Apparent Power (VA)	150 % 2 s	150 % 2 s
Efficiency		

Peak Inverter Efficiency	97.00%	97.00%
EU Efficiency	96.70%	96.70%
MPPT Efficiency	99.90%	99.90%
Battery Charge / Discharge Efficiency	95 % / 95 %	95 % / 95 %
Mechanical Data		
Dimensions (Wx H x D mm)	360 x 320 x 51	360 x 320 x 51
Weight (kg)	11	8
General Data		
Communication	WiFi (Bluetooth) + 2 × RS485	WiFi (Bluetooth) + 2 × RS485
Ingress Protection	IP65	IP65
Cooling	Natural Convection	Natural Convection
Operating Ambient Temperature Range	-40 °C ~ 65 °C	-40 °C ~ 65 °C
Relative Humidity	0 ~ 95 %, Non condensing	0 ~ 95 %, Non condensing
Max. Operating Altitude Without Derating (m)	2000	2000

TSUNESS Co., Ltd declares that the radio equipment (Micro inverter) complies with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:https://wwwtsun-ess comFile/$random-2023-07-15-061950--45dN$MO

OPERATING FREOUENCY(the maximum transmitted power)

2412MHz-2472MHz(EIRP <20dBm)

2402MHZ-2480MHz(EIRP<10dBm)

List of matching battery packs

Hybrid Microinverter	Type	Battery Brand	Battery Model	F
MH2000	Lead-acid（VRLA）	--	--	--
	Lithium iron phosphate（LiFePO4）	TSUN	TSOL-DB2000Lite	
	Lithium iron phosphate（LiFePO4）	TSUN	TSOL-DB2000Elite	
	Lithium iron phosphate（LiFePO4）	TSUN	TSOL-DB4000Elite	
	Lithium iron phosphate（LiFePO4）	HUAYOU	HYLV-100-C	
	Lithium iron phosphate（LiFePO4）	DIANSHIHUI	ELESHELL5K	
	Lithium iron phosphate（LiFePO4）	DYNESS	DL5.0CPro	
	Lithium iron phosphate（LiFePO4）		Powerbox G2	