MERITSUN®

Residential Energy Storage Powerwall 2 Product User Manual

Join our community

Preface

The manual is intended to provide detailed information of product information, installation, application, trouble shooting, precautions and maintenance of the energy storage system.. Please read this manual carefully and follow all safety precautions seriously before any moving, installation, operation and maintenance to ensure correct use and high performance of operation on the machine.

The use of the energy storage system must comply with local laws and regulations on grid-tied power generation.

The manual needs to be kept well and be available at all times.

There may be data deviation because of product improving. Detailed information is in accordant with the final product.

MERITSUN®
The Best Power in the Sun

Content

Content

MERITSUN®
The Best Power in the Sun

1. Information on this Manual

Validity

This manual is valid for the following devices:
MeritSun All-in-One Powerwall 2 M5000E / MI0000E / M3500U

Scope

This manual describes the assembly, installation, operation and troubleshooting of this unit. Please read this manual carefully before installations and operations.

Target Group

This document is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified persons must have the following skills:

- Knowledge of how a MeritSun All-in-One Powerwall 2 works and operates
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document and all safety information

Safety Instructions

WARNING: This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

Energy storage integrated machines are designed and tested strictly in accordance with relevant international safety standards. As an electrical and electronic device, all relevant safety regulations must be strictly complied during installation, operation, and maintenance. Incorrect use or misuse may result in:

- Injury to the life and personal safety of the operator or other people.
- Damage to the machine or other property belonging to the operator or other people.
- This chapter mainly various warning symbols in operation manual and provides safety instructions for the installation, operation, maintenance and use of energy storage integrated machines. Statement

Safety Instructions

Our company shall not be liable for any consequence caused by any of the following events.

- Damage caused by transportation.
- The storage conditions do not meet the requirements specified in the manual, resulting in damage.
- Incorrect storage, installation, and use.
- Unqualified personnel install and operate the machine.
- Failure to comply with the operation instructions and safety precautions in this manual.
- Operate in extreme environments which are not covered in this manual.
- Exceed the operation range of parameters that specified in the technical specification.
- Unauthorized dis-assembly, modification, or modification of the software code.
- Device damage caused by abnormal natural environment (force majeure, such as lightning strikes, earthquakes, fires, storms, etc.)
- Warranty expiration without extension of the warranty service.
- Installation or use in environment which are not specified in related international standards

Features

- MPPT solar charge controller
- Pure sine wave AC output
- Overload, short circuit and deep discharge protection
- Configurable AC/ solar input priority via LCD setting
- Compatible to mains voltage or generator power
- WIFI/ GPRS remote monitoring (optional)

MERITSUN®
The Best Power in the Sun

1.1 Warning Signs

Warning signs are used to warn you about the conditions that may cause severe injury or damage to the device. They instruct you to exercise caution to prevent danger. The following table describes the warning signs used in this manual.

Sign	Name	Description	Abbreviation
 Danger	Danger	Serious physical injury or even death may occur if related requirements are not followed.	
 Warning	Warning	Physical injury or damage to the devices may occur if related requirements are not followed.	
 Forbid	Electric Discharge	Damage may occur if related requirements are not followed.	
 Hot Side	Hot Side	Sides of the device may become hot. Do not touch	
Attention	Attention	Steps to take for ensuring the proper running of the device.	Attention

Safety Guide

	• 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 the machine must be carried out by professional technicians who have received professional training, 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 machine 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 machine unless authorized. • All the electrical installation must conform to local and national electrical standards
	Do not touch the housing of the machine or the radiator to avoid scald as they may become hot during operation
	Ground with proper technical before operation

1.2 Safety Guide

	Do not open the surface cover of the machine unless authorized. The electronic components inside the machine are electrostatic sensitive. Do take proper anti-electrostatic measures during authorized operation.
	The machine 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.

Note: Technical personnel who can perform installation, wiring, commissioning, maintenance, troubleshooting and replacement of the energy storage inverters must meet the following requirements:

- Operators need professional training.
- Operators must read this manual completely, and master the related safety precautions.
- Operators need to be familiar with the relevant safety regulations for electrical systems.
- Operators need to be fully familiar with the composition and operating principle of the entire energy storage system, and related standards of the countries/regions in which the project is located.
- Operators must wear personal protective equipment.

MERITSUN®
The Best Power in the Sun

1.3 Transportation and installation

- Keep the package and unit complete, dry and clean during storage and transportation.

This machine Is heavy. Please remove and Install It with at least two people.

, Ib ensure the normal and safe operation of the energy storage integrated machine and avoid personal injury, please select proper handling and installation tools, and take mechanical protection measures to protect personal safety such as wearing smashing shoes, coverall and so on.

- Only qualified electricians are allowed to install the machine.
- Do not put and install the machine on or close to flammable or explosive materials.
- Do not install the machine in a place where children and ottier people can easily touch it.
- Ib avoid a risk of electric shock, please remove rings, bracelets, and other metal jewelry on your hands before installation and electrical connection.
- The solar cell modules exposed to the sunlight may generate dangerous voltage. Users must cover the cell modules with fully light shading materials before electrical connection.
- The Input voltage of the machine should not exceed the maximum Input voltage, otherwise damage may occur.
- The machine is not suitable for the positive or negative grounding s 玲terns of solar cell modules.
- Ensure the proper grounding of the Inverter.
- Ensure reliable installation and electrical connection.

Note: Our Hybrid inverter machine are only for crystalline silicon solar modules.

Grid-tied operation

* Only qualified electricians are allowed to operate the machine under the permission of local power departments.
*All electrical connections must meet the electrical standards of the countries/regions in which the project is located.
*Ensure reliable installation and electrical connection before operation.
*Do not open the cover of the machine when the machine is working or any circuit is connecting to the machine.

1.4 Maintenance and replacement

*Only qualified electricians are allowed to perform the maintenance, inspection, and component replacement of the machine.
* Please contact the distributor or manufacturer for maintenance.
* In order to avoid irrelevant personnel from entering the maintenance area during maintenance, temporary warning signs must be placed to warn non-professionals to enter or use fence for isolation.
*Before carrying out any maintenance operations, all input power to the machine must be disconnected first, and wait for at least 5 minutes until the internal partsof the machine are fully discharged.
*Please follow the electrostatic protection norms, and take correct protective measures because there are mostly electrostatic sensitive circuits and devices in the machine.
*Do not use parts and components not provided by our company during maint nance.
*Restart the machine after eliminating the faults and problems which may affect the safety and performance of the machine.
*Do not get close to or touch any charged metal conductor parts of the grid or running system, otherwise electric shock or fire may occur. Please do not ignore the warning icons and instructions with "electric shock".

1.4 Maintenance and replacement

*Do not dispose of the machine together with household waste. The user has the responsibility and obligation to send it to the designated organization for recycling and disposal.

MERITSUN®
The Best Power in the Sun

2. Products modules

Product name	Model	Rated output power (W)
Single phase (L, N, and PE)		
Single-phase energy storage integrated machine	5kW	5000
	10kW	10000
	5kW-US	3500

2.1 Dimensions

Model	H(mm)	W(mm)	D(mm)
M5000E (5kw/5kwh)	1200	535	190
M10000E (5kw/10kwh)	1600	535	190
M3500U (3kw/5kwh)	1200	535	190

3. Product overview

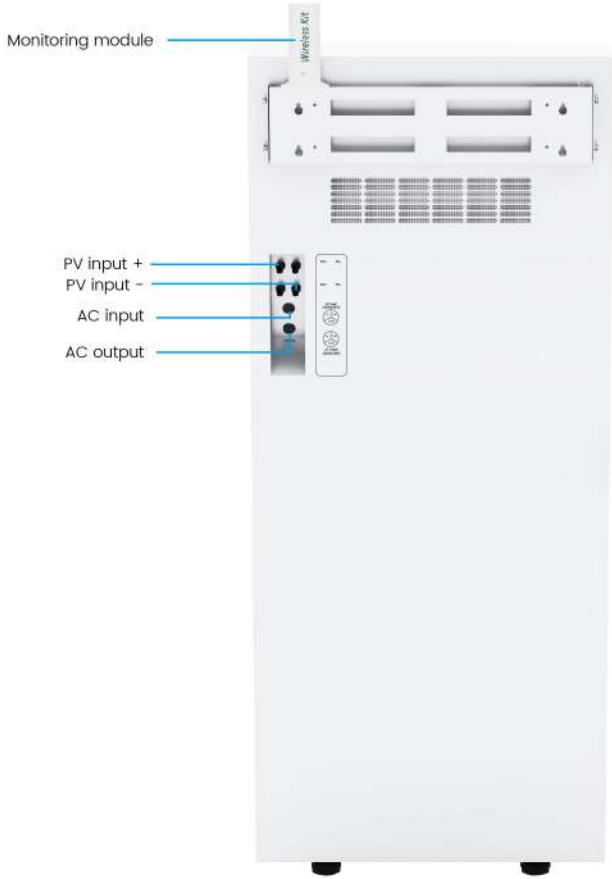
This chapter mainly describes the appearance, packaging accessories and other information of energy storage integrated machines.

3.1 Product appearance

M5000E/M3500U 5kwh
MeritSun Powerwall 2

M10000E 10kwh
MeritSun Powerwall 2

3.1 Product appearance



3.3 Accessories list

A

D

B

E

C

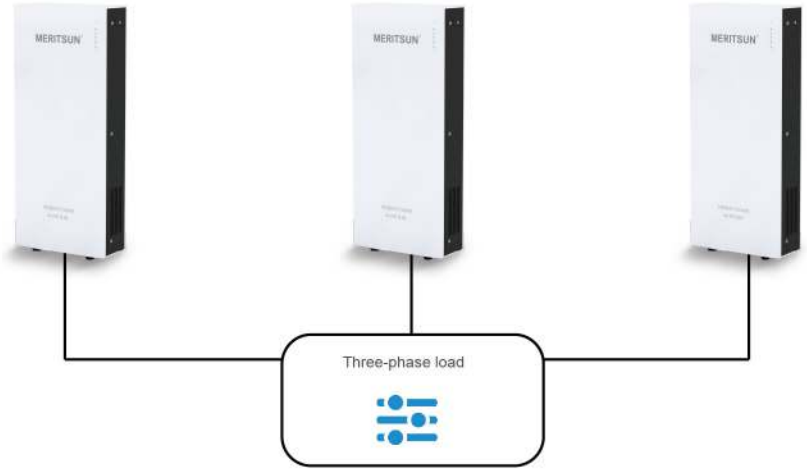
F

NO	Name
A	MC4 terminal
B	MC4 terminal
C	MC4 terminal
D	M10*40 hex assembling bolts
E	Monitoring module
F	AC terminal

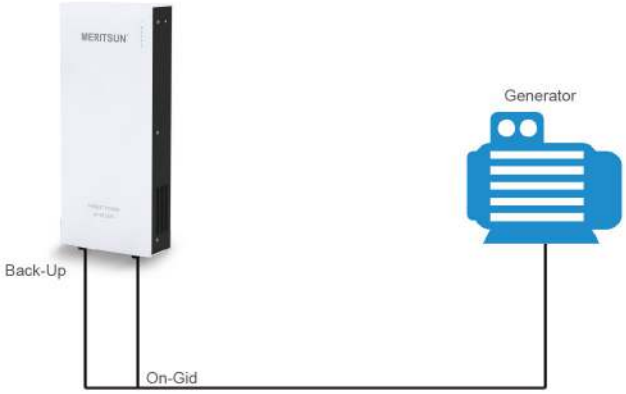
MERITSUN®
The Best Power in the Sun

3.4 Safety Guide

Single PV string cannot connect to muti-inverters



3.4 Safety Guide



On-grid or back-up side cannot connect any ac generator

MERITSUN®
The Best Power in the Sun

4.0 Installation tools

Installation tools

Species	Tools and instruments		
Installation	 Impact drill (bit 10mm)	 Steel tape	
	 Torque socket wrench (sleeve opening:13mm, suitable for M8)	 Hot air heating gun	
	 safety shoes	 Safety gloves	 Safety goggles

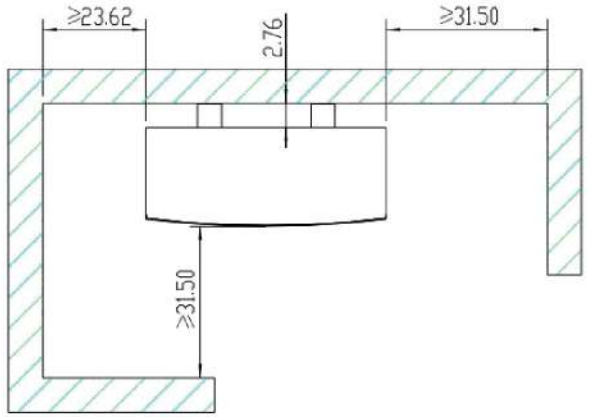


Figure 4.2 Installation spacing(unit : IN)
In order to ensure good ventilation of the energy storage integrated machine, please reserve enough installation spacing around the machine during installation.

4.1 Installation tools

Vertical √

Forward Leaning ✗

Backward ✗

Horizontal ✗

Invert ✗

MERITSUN®
The Best Power in the Sun

4.2 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 a 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	Torque Value
5KVA	8 AWG	1.4~ 1.6Nm

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 with manufacturer of air conditioner that if it's equipped with time-delay function before installation. Otherwise, this off grid solar inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

4.3 PV 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 a 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	Torque Value
5KVA	8 AWG	1.4~ 1.6Nm

4.3 PV Connection

Model	Typical Amperage	Cable Size	Torque Value
5KVA	80A	6 AWG	1.4~ 1.6Nm

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. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

Solar Charging Mode	
INVERTER MODEL	5KVA
Batty Voltage	48V
Max. PV Array Open Circuit Voltage	145Vdc max
PV Array MPPT Voltage Range	60~115Vdc
Min. battery voltage for PV charge	34Vdc

MERITSUN®
The Best Power in the Sun

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.

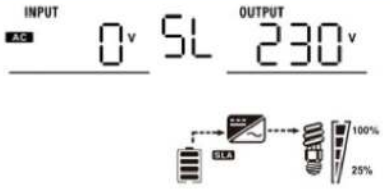
The default off-grid mode of powerwall 2 is factory default.
If you need to set the inverter, please refer to the operation as follows

5. LCD Setting and Display

Setting Program: Please refer to Program 23
Parallel in single phase
Step 1: Check the following requirements before commissioning:

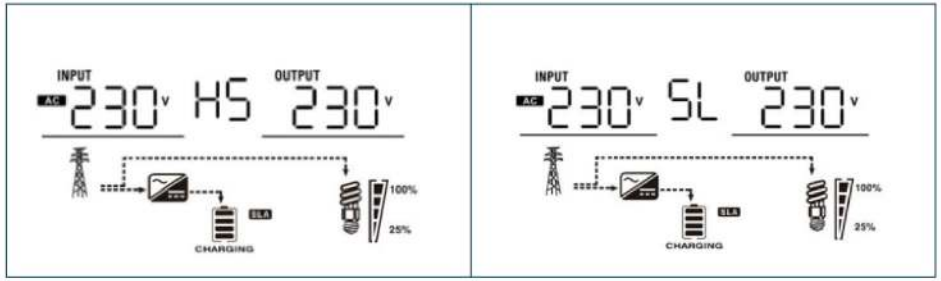
- Correct wire connection
- Ensure all breakers in Line wires of load side are open and each Neutral wires of each unit are connected together.

Step 2: Turn on each unit and set "PAL" in LCD setting program 23 of each unit. And then shut down all units. NOTE: It's necessary to turn off switch when setting LCD program. Otherwise, the setting can not be programmed.
Step 3: Turn on each unit.

LCD display in Master unit	
	

NOTE: Master and slave units are randomly defined. LCD display in Slave unit

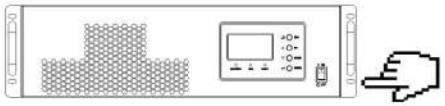
Step 4: Switch on all AC breakers of Line wires in AC input. It's better to have all inverters connect to utility at the same time. If not, it will display warning 15.



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.

5.1 Operation

Power ON/OFF

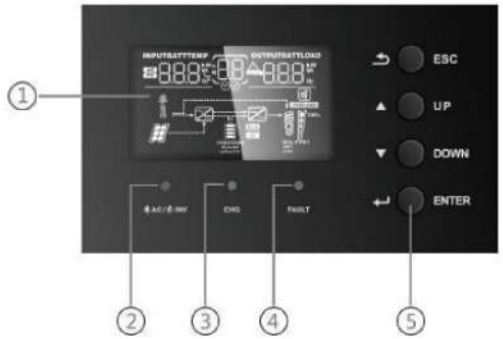


Once the unit has been properly installed and the batteries are connected well, simply press On/Off switch (located on the button of the case) to turn on the unit.

Operation and Display Panel

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

1. LCD display
2. Status indicator
3. Charging indicator
4. Fault indicator
5. Function buttons



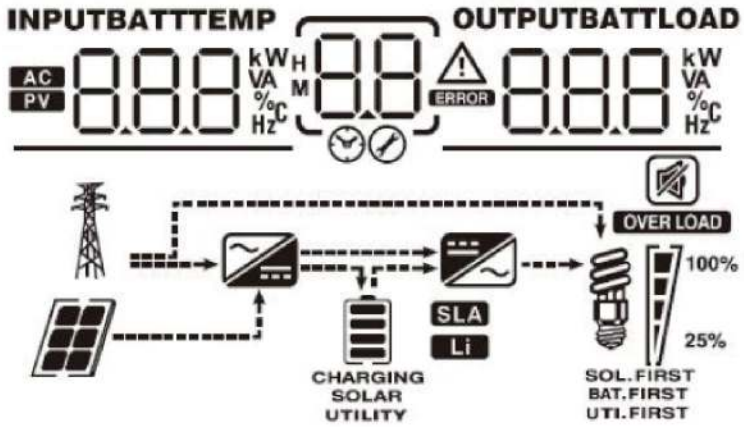
5.2 LED Indicator

LED Indicator			LED Indicator
☀ AC / ☀ INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
☀ CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
⚠ FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

Function Buttons

Button	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

LCD Display Icons



Icon	Function Descrintion
Input Source Informatio	
AC	
PV	
8.8.8 kW VA % °C Hz	Indicate input voltage, input frequency, PV voltage, battery voltage and 8.8.Bi charger current.
Configuration Program and Fault Information	
88	Indicates the setting programs.
88 ⚠	Indicates the warning and fault codes. 88 ⚠ Warning: flashing with warning code. 88 Fault:lighting with fault code
Output Information	
OUTPUTBATTLOAD 8.8.8 kW VA % °C Hz	Indicate output voltage, output frequency, load percent, load in VA, load inWatt and discharging current.
CHARGING	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
SOLAR UTILITY	These two signs indicate the charge priority. SOLAR indicates solar first. SOLAR UTILITY indicate utility first. SOLAR blinking indicates solar only; SOLAR and UTILITY" UTILITY both on indicates combined charaina.

In AC mode, it will present battery charging status.

Status	Battery voltage	Battery voltage
Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom two bars will be on and the other two bars will flash in turns
	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns
	2.167 V/cell	Bottom two bars will be on and the other two bars will flash in turns
Floating mode. Batteries are fully charged.		4 bars will be on.

MERITSUN®
The Best Power in the Sun

In battery mode, it will present battery capacity.

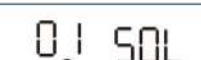
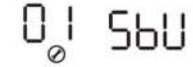
Load Percentage	Battery Voltage	LCD Display
Load >50%	< 1.717V/cell	
	1.717V/cell ~ 1.8V/cell	
50%> Load > 20%	1.8 ~ 1.883V /cell	
	> 1.883 V /cell	
	< 1.817V/cell	
	1.817V/cell ~ 1.9V/cell	
	1.9 ~ 1.983V/cell	
	> 1.983	
Load< 20%	< 1.867V /cell	
	1.867V /cell ~ 1. 95V /cell	
	1.95 ~ 2.033V /cell	
	> 2.033	

Load Information				
OVER LOAD	Indicates overload.			
100% 25%	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%~24%	25%~49%	50%~74%	75%~100%
				
	Indicates unit connects to the mains.			
	Indicates unit connects to the PV panel.			
BYPASS	Indicates load is supplied by utility power.			
	Indicates the utility charger circuit is working			
	Indicates the DC/AC inverter circuit is working.			
SOL.FIRST BAT.FIRST UTI.FIRST	These three signs indicate the output priority. SOL.FIRST indicates solar first. BAT.FIRST BAT.FIRST indicates battery first. UTT.FIRST indicates utility first.			
Mute Operation				
	Indicates unit alarm is disabled.			

MERITSUN®
The Best Power in the Sun

After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN"
button to select setting programs. And then press "ENTER" button to confirm the selection or ESC button to
exit.

Setting Programs

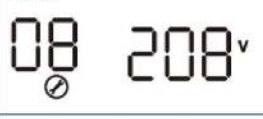
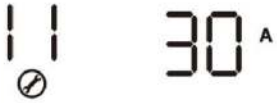
Program	Description	Setting Option	
01	Output source priority: To config-ure load power source priority	Solar first	
		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power the loads at the same time. Utility provides power to the loads only when any one condition happens: - Solar energy is not available - Battery voltage drops to either low-level warning voltage or the setting point in program 12.	
		Utility first (default)	
		Utility will provide power to the loads as first priority. Solar and battery energy will provide power to the loads only when utility power is not available.	
		SBU priority	
		Solar energy provides power to the loads as first priority. If solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.	

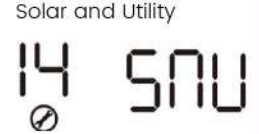
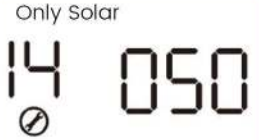
Setting Programs

02	Maximum charging current: To configure total charging current for solar and utility chargers. (Max. charging current = utility charging current + solar charging current)	 48V 5KVA model: default 60A, 10A~140A settable (If Li is selected in Program 5, this program can't be set up)	
03	AC input voltage range	 Appliance (default)	If selected, acceptable AC input voltage range will be within 90~280VAC
		 UPS	If selected, acceptable AC input voltage range will be within 170~280VAC
		 Generator	If selected, acceptable AC input voltage range will be within 90~280VAC
04	Power saving mode enable/disable	 Saving mode disable (default)	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.
		 Saving mode enable	If enabled, the output of inverter will be off when connected load is pretty low or not detected.

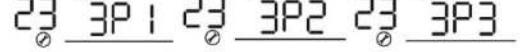
MERITSUN®
The Best Power in the Sun

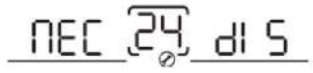
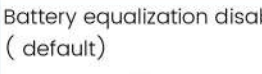
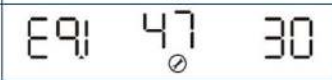
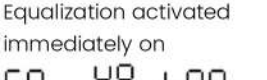
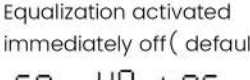
05	Battery type	AGM (default) 	User-Defined  If "User-Defined" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 19, 20 and 21.
		Flooded 	
		Lithium  (Only suitable when communicated with BMS)	
		User-Defined 2 (suitable when lithium battery without BMS communication)  If "User-Defined 2" is selected, battery charge voltage and low DC cut-off voltage can be set up in program 19, 20 and 21. It is recommended to set to the same voltage in program 19 and 20(full charging voltage point of lithium battery). The inverter will stop charging when the battery voltage reach this setting.	
06	Auto restart when overload occurs	Restart disable (default) 	Restart enable 
	Auto restart when over temperature occurs	Restart disable (default) 	Restart enable 

08	Output voltage	230V (default) 	220V 
		240V 	208V 
09	Output frequency	50Hz (default) 	60Hz 
10	Number of series batteries connected	 48V 5KVA model: default 30A, 10A~60A Settable (If Li is selected in Program 5, this program can't be set up)	
11	Maximum utility charging current	 48V 5KVA model: default 30A, 10A~60A Settable (If Li is selected in Program 5, this program can't be set up)	
12	Setting voltage point back to utility source when selecting "SBU priority" or "Solar first" in program 01	 48V model: default 46.0V, 44.0V~51.2V Settable	
13	Setting voltage point back to battery mode when selecting "SBU priority" or "Solar first" in program 01		

14	Charger source priority: To configure charger source priority	If this off grid solar inverter is working in Line, Standby or Fault mode, charger source can be programmed as below:	
		Solar first 	Solar energy will charge battery as first priority. Utility will charge battery only when solar energy is not available.
		Utility first 	Utility will charge battery as first priority. Solar energy will charge battery only when utilitv oower is not available.
		Solar and Utility 	Utility will charge battery as first priority. Solar energy will charge battery only when utilitv oower is not available.
		Only Solar 	Solar energy will be the only charger source no matter utility is available or not.
		If this off grid solar inverter is working in Battery mode or Power saving mode, only solar energy can charge battery. Solar energy will charge battery if it's available and sufficient.	
15	Alarm control	Alarm on (default) 	Alarm off
16	Backlight control	Backlight on (default) 	Backlight off

17	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
18	Overload bypass: When enabled, the unit will transfer to line mode if overload occurs in battery mode.	Bypass disable (default) 	Bypass enable 
19	Bulk charging voltage (C.V voltage). If self-defined is selected in program 5, this program can be set up	 48V model: default 56.4V, 48.0V~58.4V Settable	
20	Floating charging voltage. If self-defined is selected in program 5, this program can be set up	 48V model: default 54.0V, 48.0V~58.4V Settable	
21	Low DC cut-off voltage. If self-defined is selected in program 5, this program can be set up	 48V model: default42.0V, 40.0V~48.0V Settable	

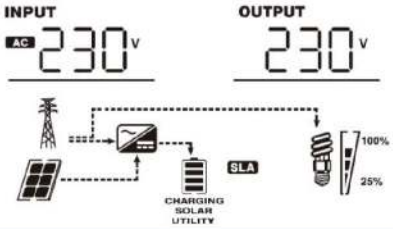
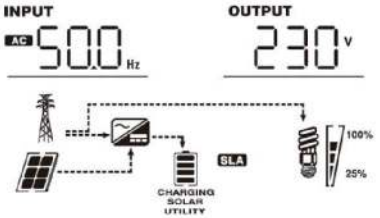
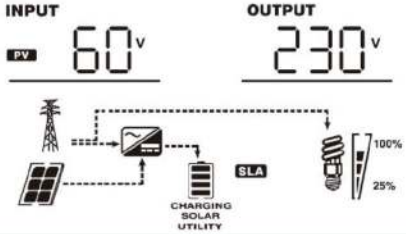
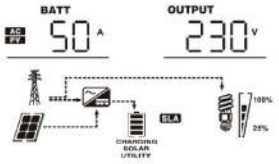
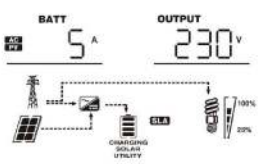
22	Solar power balance. When enabled, solar input power will be automatically adjusted according to connected load power.	Solar power balance enable (Default): 	If selected, solar input power will be automatically adjusted according to the following formula: Max. input solar power = Max. battery charging power+ Connected load power.
		Solar power balance disable: 	If selected, the solar input power will be the same to max. battery charging power no matter how much loads are connected. The max. battery charging power will be based on the setting current in program 2. (Max. solar power = Max. battery charging power)
23	AC output mode *This setting is only available when the inverter is in standby mode (Switch off).Power saving function will automatically be disable when in parallel operation	Single mode 	When not parallel operation
		Single phase: 	When the units are used in parallel with single phase
		Three phase:3Pl,3P2,3P3  It requires 3 inverters to support three-phase equipment, 1 inverter in each phase. Please select "3Pl" for the inverters connected to L1 phase, "3P2" for the inverters connected to L2 phase and "3P3" for the inverters connected to L3 phase. Do NOT connect share current cable between units on different phases.	

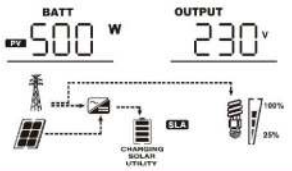
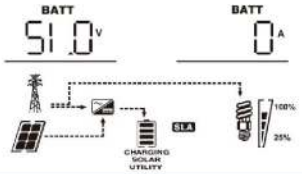
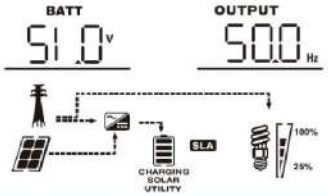
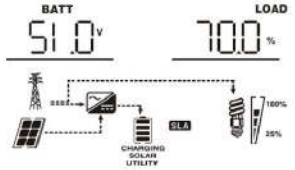
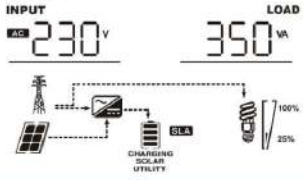
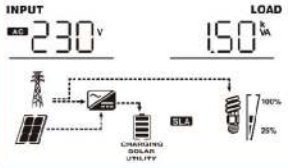
24	Allow neutral and grounding of AC output is connected together:When enabled, inverter can deliver signal to trigger grounding al and box to short grounding(for neutral and grounding for expansion)	Disable: Neutral and grounding of AC output is disconnected. (Default) 	
		Enable: Neutral and grounding of AC output is connected. 	
		This function is only available when the inverter is working with external grounding box. Only when the inverter is working in battery mode, it will trigger grounding box to connect neutral and grounding of AC output.	
43	Battery equalization	Battery equalization enable 	Battery equalization disable (default) 
		If "Flooded" or "User-Defined" is selected in program 05, this program can be set up.	
44	Battery equalization voltage	 Default 58.4V, 48.0V~58.4V Settable	
45	Battery equalized time		Default 60min, 5min~900min Settable
46	Battery equalized timeout		Default 120min, 5min~900min Settable
47	Equalization interval		Default 30days, 1 days~90 days Settable
48	Equalization activated immediately	Equalization activated immediately on 	Equalization activated immediately off(default) 
		If equalization function is enabled in program 43, this program can be setup. If "On" is selected in this program, it's to activate "E9battery ".If "Off" equalization is selected, immediately it will cancel and LCD main equalization page will function shows until next activated equalization time arrives based on program 47 setting. At this time, will not be shown in LCD main page.	

MERITSUN®
The Best Power in the Sun

5.3 Display Information

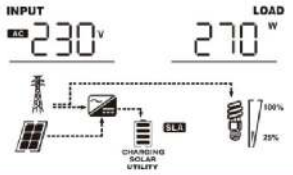
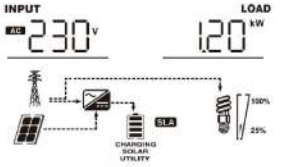
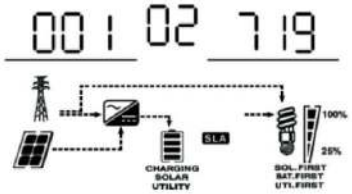
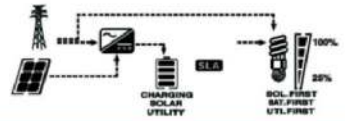
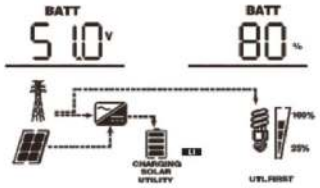
The LCD display information will be switched in turns by pressing "UP" or "DOWN" key. The selectable information is switched as below order: input voltage, input frequency, PV voltage, MPPT charging current, MPPT charging power, battery voltage, output voltage, output frequency, load percentage, load in VA, load in Watt, DC discharging current, main CPU Version and second CPU Version.

Setting Information	LCD display	
Input voltage/Output voltage (Default Display Screen)	Input Voltage=230V, output voltage=230V 	
Input frequency	Input frequency=50Hz 	
PV voltage	PV voltage=60V 	
Charging current	Current ≥ 10A 	Current < 10A 

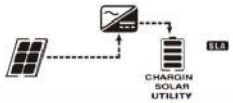
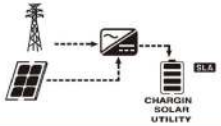
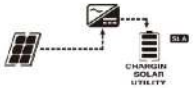
Setting Information	LCD display	
MPPT Charging power	MPPT charging power=S00W 	
Battery voltage/ DC discharging current	Battery voltage=51.0V, discharging current=0A 	
Output frequency	Output frequency=50Hz 	
Load percentage	Load percent= 70% 	
Load in VA	When connected load is lower than lkVA, load in VA will present xxx VA like below chart. 	When load is larger than lkVA (ea lKVA), load in VA will present x.x kVA like below chart. 

E9

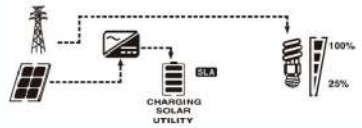
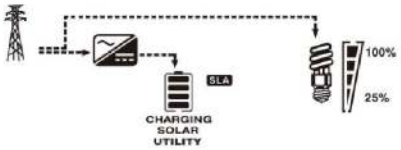
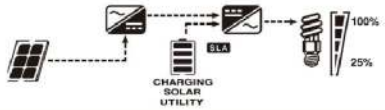
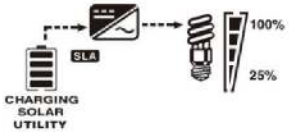
MERITSUN®
The Best Power in the Sun

Setting Information	LCD display	
Load in VA	When load is lower than lkW, load in W will present xxx W like below chart. 	When load is larger than lkW (ea lKW), load in W will present x.x kW like below chart. 
Main CPU version checking (For models with MPPT controller)	Main CPU version 001-02-719 	
Secondary CPU version checking (For models with MPPT controller)	Secondary CPU version 002-00-719 	
Battery SOC	Battery SOC=80% 	

5.4 Operating Mode Description

Operation mode	Description	LCD display
Standby mode / Power saving mode Note: *Standby mode: The inverter is not turned on yet but at this time, the inverter can charge battery without AC output. *Power saving mode: If enabled, the output of inverter will be off when connected load is pretty low or not detected.	No output is supplied by the unit but it still can charge batteries.	Charging by utility and PV energy. 
		Charging by utility. 
		Charging by PV energy. 
		No charging. 
Fault mode Note: *Fault mode: Errors are caused by inside circuit error or external reasons such as over temperature, output short circuited and so on.	PV energy and utility can charge batteries.	Charging by utility and PV energy. 
		Charging by utility. 
		Charging by PV energy. 
		No charging. 

MERITSUN®
The Best Power in the Sun

Line Mode	The unit will provide output power from the mains. It will also charge the battery at line mode.	Charging by PV energy 
		Charging by utility 
Battery Mode	The unit will provide output power from battery and PV power.	Power from battery and PV energy. 
		Power from battery only. 

Fault Code	Fault Event	Icon on
1	Fan is locked	
2	Over temperature	
3	Battery voltage is too high	
4	Battery voltage is too low	
5	Output short circuited is detected by internal converter comoonents.	
6	Output voltage is too high.	
7	Overload time out	
8	Bus voltage is too high	
9	Bus soft start failed	
51	Over current or surge	
52	Bus voltage is too low	
53	Inverter soft start failed	
55	Over DC voltage in AC output	
56	Battery connection is open	
57	Current sensor failed	
58	Output voltage is too low	
60	Negative power fault	
81	CAN fault	
82	Host loss	

MERITSUN®
The Best Power in the Sun

5.5 Warning Code

Warning Code	Warning Event	Audible Alarm	Icon flashing
1	Fan is locked when inverter is on.	Beep three times every second	
2	Over temperature	Beep once every second	
3	Battery is over-charged	Beep once every second	
4	Overload	Beep once every 0.5 second	
7	Output power derating	Beep twice every 3 seconds	
10	Solar charger stops due to low battery	Beep once every second	
12	Solar charger stops due to hiqh PV voltage	Beep once every second	
13	Solar charger stops due to overload	Beep once every second	
14	Parallel input utility grid different	Beep once every second	
15	Parallel input phase error	Beep once every second	
16	Parallel output phase loss	Beep once every second	
17	BMS communication error	Beep once every second	
20	BMS communication error	Beep once every second	
33	BMS communication loss	Beep once every second	
34	Cell over voltage	Beep once every second	
35	Cell under voltage	Beep once every second	
36	Total over voltaqe	Beep once every second	
37	Total under voltaoe	Beep once every second	
38	Discharge over current	Beep once every second	
39	Charge over current	Beep once every second	

Warning Code	Warning Event	Audible Alarm	Icon flashing
40	Discharge over temperature	Beep once every second	
41	Charge over temperature	Beep once every second	
42	Mosfet over temperature	Beep once every second	
43	Battery over temperature	Beep once every second	
44	Battery under temperature	Beep once every second	
45	System shut down	Beep once every second	

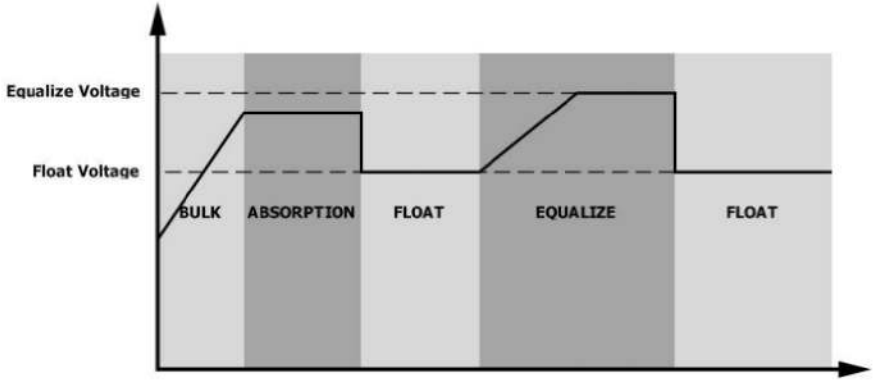
5.6 Battery Equalization

Equalization function is added into charge controller. It reverses the buildup of negative chemical effects like stratification, a condition where acid concentration is greater at the bottom of the battery than at the top. Equalizationalso helps to remove sulfate crystals that might have built up on the plates. If left unchecked, this condition, called sulfation, will reduce the overall capacity of the battery. Therefore, it's recommended to equalize battery periodically.

How to Apply Equalization Function

You must enable battery equalization function in monitoring LCD setting program 43 first. Then, you may apply this function in device by either one of following methods:

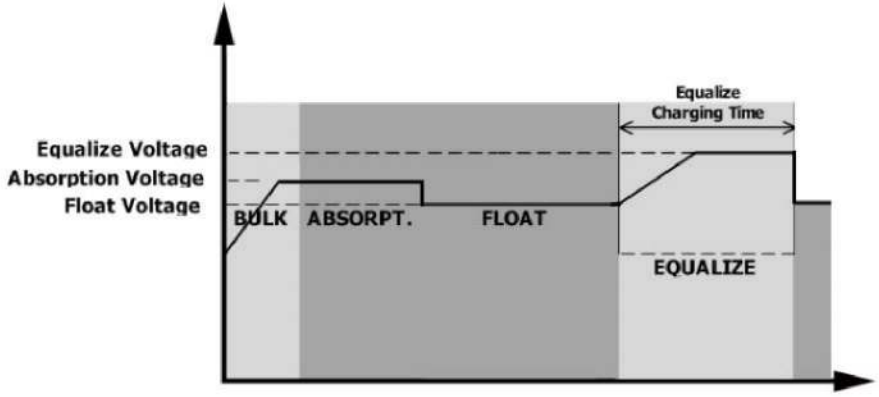
1. Setting equalization interval in program 47 .
2. Active equalization immediately in program 48.



MERITSUN®
The Best Power in the Sun

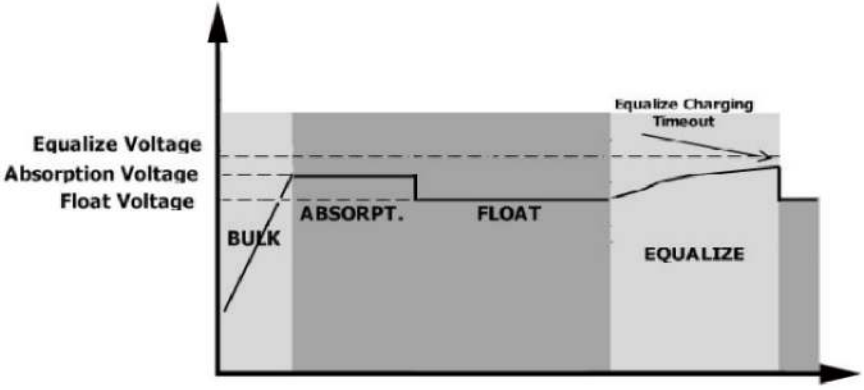
When to Equalize

In float stage, when the setting equalization interval (battery equalization cycle) is arrived, or equalization is active immediately, the controller will start to enter Equalize stage.



Equalize charging time and timeout

In Equalize stage, the controller will supply power to charge battery as much as possible until battery voltage raises to battery equalization voltage. Then, constant-voltage regulation is applied to maintain battery voltage at the battery equalization voltage. The battery will remain in the Equalize stage until setting battery equalized time is arrived.



MERITSUN®
The Best Power in the Sun

5.7 Trouble Shooting

Problem	LCD/LED/Buzzer	Exolanation	What to do
Unit shuts down autnmatically during startup process.	LCD/LEDs and buuer will be active for 3 seconds and then complete off.	The battery voltage is too low (<1.91V/Cell)	1. Re-charge battery. 2. Replace battery.
No response after power on.	No indication.	1. The battery voltage is far too low. (< 1.4V /Cell) 2. Battery polarity is connected reversed.	1. Check if batteries and the wiring are connected well. 2. Re-charge battery. 3. Replace battery.
Mains exist but the unit works in battery mode.	Input voltage is displayed as O on the LCD and qreen LED is ftashinq,	Input protector is tripped	Check if AC breaker is tripped and AC wiring is connected well.
	Green LED is nashing.	Insufficient quality of AC power. (Shore or Generator)	1. Check if AC wires are too thin and/or 1Do long. 2. Check if generator (if applied) is working well or if input voltage range setting is correct. (UPS/Appliance)
	Green LED is flashing.	Set "Solar First" as the priority of output source.	Change output source priority to Utility first.
When it's turned on, internal relay is switching on and OFF repeatedly.	LCD display and LEDs are flashing	Battery is disconnected.	Check if battery wires are mnnected well.

Problem	LCD/LED/Buzzer	Exolanation	What to do
Buzzer beeps continuously and red LED is on.	Fault code 01	Fan fault	Replace the fan.
	Fault code 02	Internal temperature of component is over 100°C.	Check if the air flow of the unit is blocked or the ambient temperature is too high.
	Fault code 03	Battery is over-charged.	Return to repair center.
		The battery voltage is too high.	Check if spec and quantity or batteries are meet requirements.
	Fault code 05	Output short circuited	Check if wiring is connected well and remove abnormal load.
	Fault code 06/58	Output abnormal (Inverter voltage below than 190Vac or is higher than 260Vac)	1. Reduce the connected load. 2. Return to repair center
	Fault code 07	Overload error. The inverter is overload 110% and time is up.	Reduce the connected load by switching off some equipment.
	Fault code 08/09/53/57	Internal comoonents failed.	Return to reoair center.
	Fault code 51	Over current or surae	Restart the unit, if the error happens again, please return to repair center.
	Fault code 52	Bus voltage is too low	
	Fault code 55	Output voltaqe is unbalanced	
	Fault code 56	Battery is not connected well or fuse is burnt.	If the battery is connected well, please return to repair center.

Problem	LCD/LED/Buzzer	Exolanation	What to do
Buzzer beeps continuously and red LED is on.	Fault code 60	Negative power fault	1. Check if the AC output connects to the grid. 2. Check if the output voltage setting in Program 8 or all the Inverters in paralllel are the same. 3. Check if the current sharing cables are connnected well in the same parallel phases. 4. Check if all neutral wires of all each units in a parallel system are connnected 1Dgether. 5. If problem still exists, please return to repair center.
	Fault code 80	CAN fault	1. Check whether the parallel communication cables are connected well. 2. If problem still exists, please return 1D repair center.
	Fault code 81	Host loss	

MERITSUN®
The Best Power in the Sun

6. WiFi Monitor

Step1 .Connection between inverter and CubeWiFi module
Plug CubeWiFi into the WiFI/GPRS port.

6.1 Connection between inverter and CubeWiFi module

6.2 Download APP

Step 2. Download PVbutler APP

Re-connect your cellphone to your own WLAN WiFi, scan the QR code as below to download PVbutler APP, or go to the website: http://server.pvbutler.com

download and install it.

Android & iOS

6.3 Registration and Adding Datalogger

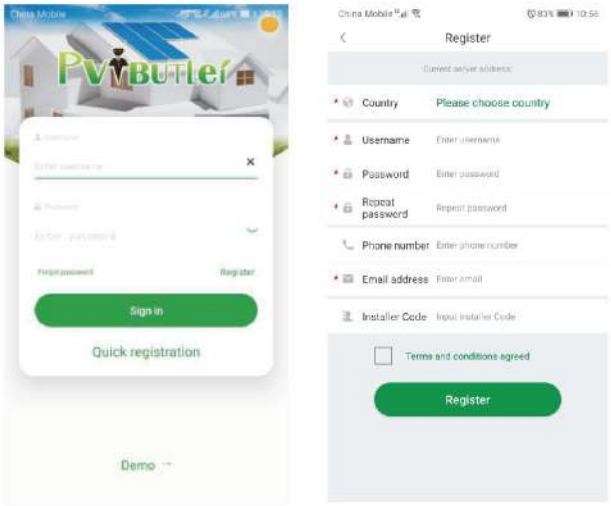
Step 3. Registration and Adding Datalogger

1. Registrate your account in "PVbutler" APP.

Open PVbutler APP, click "Register" on login page. Select country and city, then click "Next" enter next page.

Note: If you select a wrong country and city, the system time may be wrong. Fill out the required information,

then click "Next", it will guide you to the "Addplant"page.



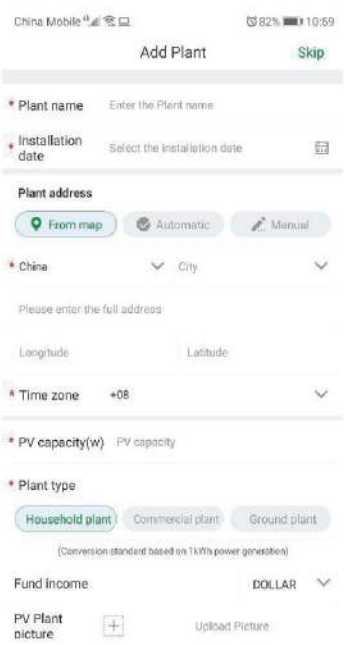
6.4 Add your solar inverter (CubeWiFi box) into your "PVbutler" account.

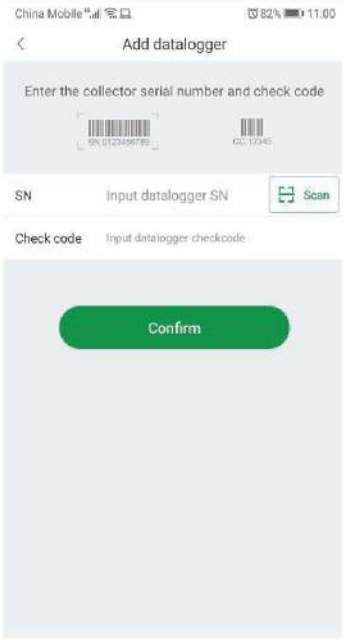
2. Add your solar inverter (CubeWiFi box) into your "PVbutler" account.

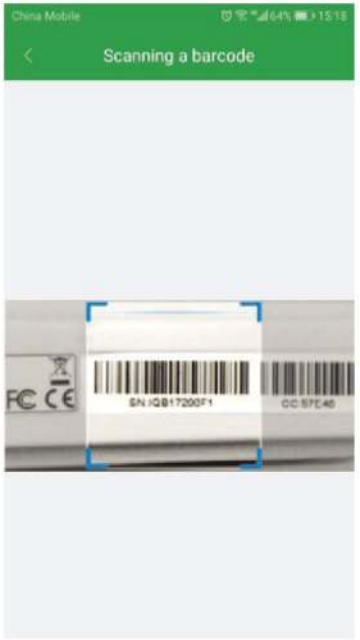
After finishin adding the Plant, it will switch to the "Add datalogger" page. On "Add datalogger" page, scan or

input the CubeWiFi serial number into "Datalog SN" box and input the check code into "Datalogger Checkcode"

box, then click "Register", it will move you to the "Set CubeWiFi" page.

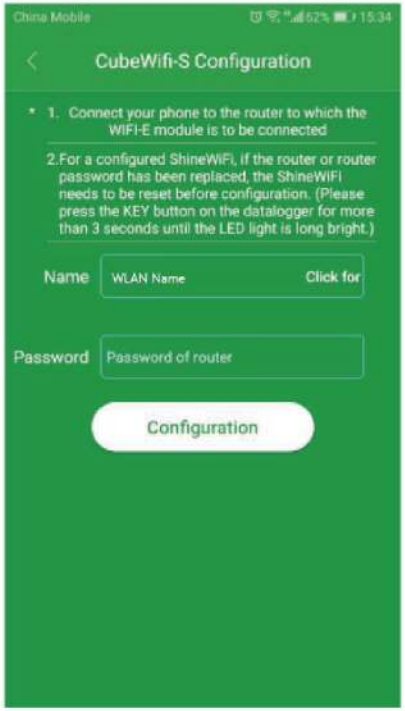


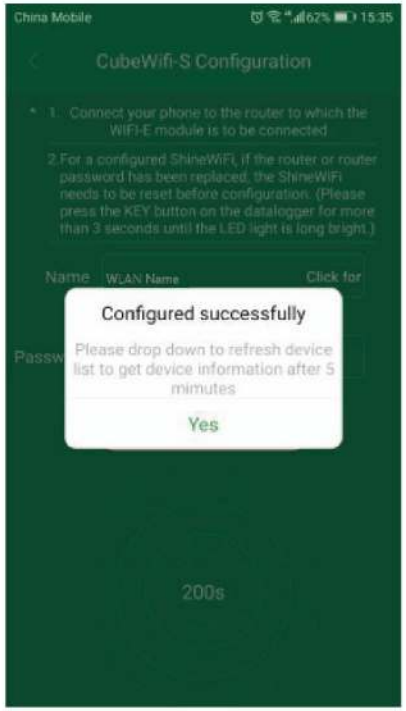




6.5 Connect Your Solar Inverter to the Your Local WiFi Network.

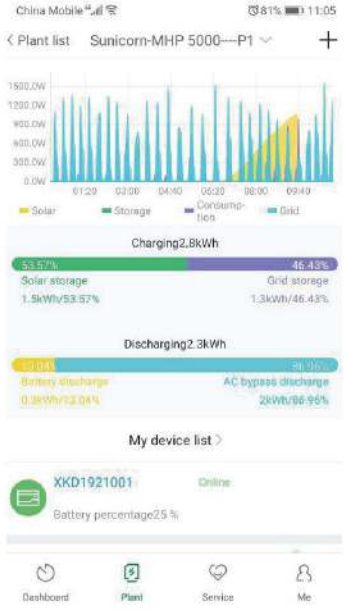
3. Connect your solar inverter to the your local WiFi network.
Fill in your local WiFi network and password, then click "Configuration", after successful configuration, a note
will pop up "Configured successfully", then it will move to the "My Plant" page.
Note: There are 3 LEDs on CubeWiFi, only the blue LED flashing indicates the CubeWiFi module is successfully
connected to the router and PVbutlerserver.





6.6 Start Morntoring Your Solar System

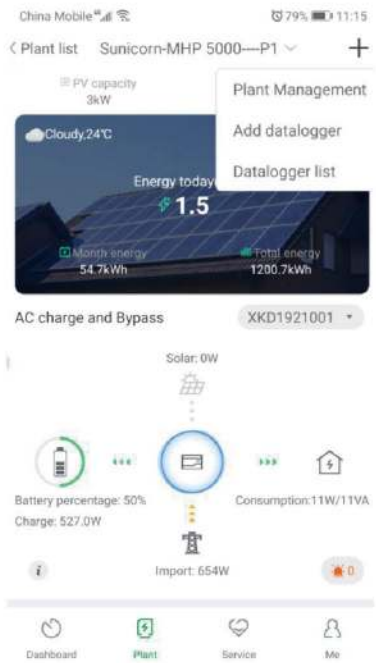
4. Start morntoring your solar system:
After successful configuration, it will move to the "My plant" page, select the inverter in the device list to check the inverter update information. Choose the device from "My device list", you will enter the device page where you can check the device status, records, and do remote setting and control.

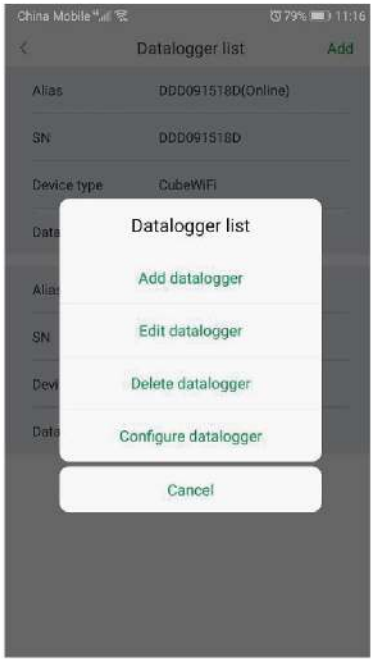


6.7 Add/Check/Configure/Delete Your Solar System

5. Add/check/configure/delete your solar system.
Click the "+" sign on the right top side of the "My Plant" page. There are 3 options.
1) "Add datalogger" is for adding a new CubeWiFi module to this account.
2) "Check datalogger" is to check the CubeWiFi you have added in this account.
After choosing "Check datalogger", it will move to "Datalogger list" page. Long press the serial number, it will show a dialog with 3 options.
a) "Change device alias" is used to change the name of the device
b) "Configure datalogger" is used for configuring the connection of the CubeWiFi module to the router.
c) "Delete datalogger" is used to remove the CubeWiFi module from this account.
3) "Add plant" is used to add a new plant page to this account.

6.7 Add/Check/Configure/Delete Your Solar System





6.8 Reset CubeWiFi to Factory Settings

Step 4. Reset CubeWiFi to Factory Settings
When you have changed your home router password, or changed to a new router, you need to reset CubeWiFi to
factory settings and reconfigure it. Press the KEY button for 6 sec, until all three LEDs long light up, then login to
your PVbutler account, click the "+" on right top of this page, long press this datalogger serial number to reconfigure.

MERITSUN®
The Best Power in the Sun

6.8 Reset CubeWiFi to Factory Settings

	Indicate	Troubleshooting
All three LEDs are dark	CubeWifi can not find inverter via USB port	1.Try to reconnect CubeWiFi to the inverter USB port 2.Try to restart the inverter
After configuration, only Red LED flashes	CubeWiFi can't connect to the home router	1. Check router information a) Router name should consist of English letters and numbers, it does not support special symbols b) For safety reason, please use encrypted wireless network c) It does not support public network that use secondary authentication 2. Check if you filled in the correct name and password of the home router when configuringit
After configuration, Only Green LED flashes	CubeWiFi already connected to the home router, but not connected to PVbutler server	1. Check if home router is connected to the internet 2. Check if the router firewall allows to select port 5279 and 5280
After configuration, Only Blue LED flashes	CubeWiFi communication OK with inverter, home router, and PVbutler server	Normal working state
Red LED always ON	CubeWiFi module error	Need to replace with a new CubeWiFi
Green LED always ON	CubeWiFi module in switching mode	No response if you press the KEY button during this period
Blue LED always ON	CubeWiFi module is in AP mode	Debug mode, short press the KEY button toquit

MERITSUN®
The Best Power in the Sun

6.8 Reset CubeWiFi to Factory Settings

LED State	Indication
ALL three LED off	CubeWiFi not connected well with inverter USBport
Only Red LED flashes	CubeWiFi and inverter communication is OK
Only Green LED flashes	CubeWiFi, inverter and router communication is OK
Only Blue LED flashes	CubeWiFi, inverter, router and server communication isOK

CubeWiFi KEY Button Description

Operation	Description
When CubeWiFi is powered on, press the KEY button. (CubeWiFi LED will change from flash to alwaysON)	CubeWiFi will enter to AP mode (.AP mode is a debug mode, only allowed for the professional)
When CubeWiFi in AP mode, press The KEY button of CubeWiFi (CubeWiFi LED will change from always ON to flash)	Quit AP mode
Long press the KEY button for More than 6 sec (CubeWiFi All LEDs always ON)	Reset CubeWiFi to Factorysettings