USER MANUAL

MS6-3050

3kW 5kWh All-in-One Solar Energy Storage Unit

CONTENTS

1. ABOUT THIS MANUAL

Purpose

This manual describes the assembly, installation, operation and troubleshooting of this solar ESS (energy storage system). Please read this manual carefully before installations and operations. Keep this manual accessible for future reference.

Scope

This manual provides safety and installation guidelines as well as information on tools and wiring.

The following cases are not within the scope of warranty

1. Out of warranty.
2. ESS was damaged caused of transport, remissness and other external reasons;
3. ESS was damaged caused of irresistible natural disasters;
4. The electrical power supply or operate environment is not in accordance with requirements in this document.

2. SAFETY INSTRUCTIONS

WARNING

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

1) Before using this unit, please read all instructions and cautionary markings on the unit and sections of this manual.
2) Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
3) To reduce risk of electric shock, disconnect all wirings and breakers before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
4) For optimum operation of this ESS, please follow required spec to select appropriate cable size. It's very important to correctly install and operate this ESS.
5) Be very cautious when working with metal tools on or around the internal batteries. A potential risk exists when drop a metal tool to spark and short circuit batteries or other electrical parts and could cause an electricity spark, smoky or fire.
6) Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to INSTALLATION section of this manual for the details.

7) GROUNDING INSTRUCTIONS- This ESS should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this ESS.
8) NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
9) Warning!! Only qualified service persons are able to service this device. If errors still persist after following troubleshooting table, please send this ESS back to local dealer or service center for maintenance.

3. INTRODUCTION

MS6 is a household photovoltaic energy storage system that can provide power for various electrical appliances at home or in office, including electrical appliances such as tube lights, fans, refrigerators and air conditioners. And it provides uninterrupted power supply for electrical devices when utility grid fails.
This is a multi-function solar ESS, combining functions of inverter, solar charger and LiFePO4 battery to offer uninterruptible power support within portable size. Its comprehensive LCD display offers user-configurable and easy-accessible button operation.

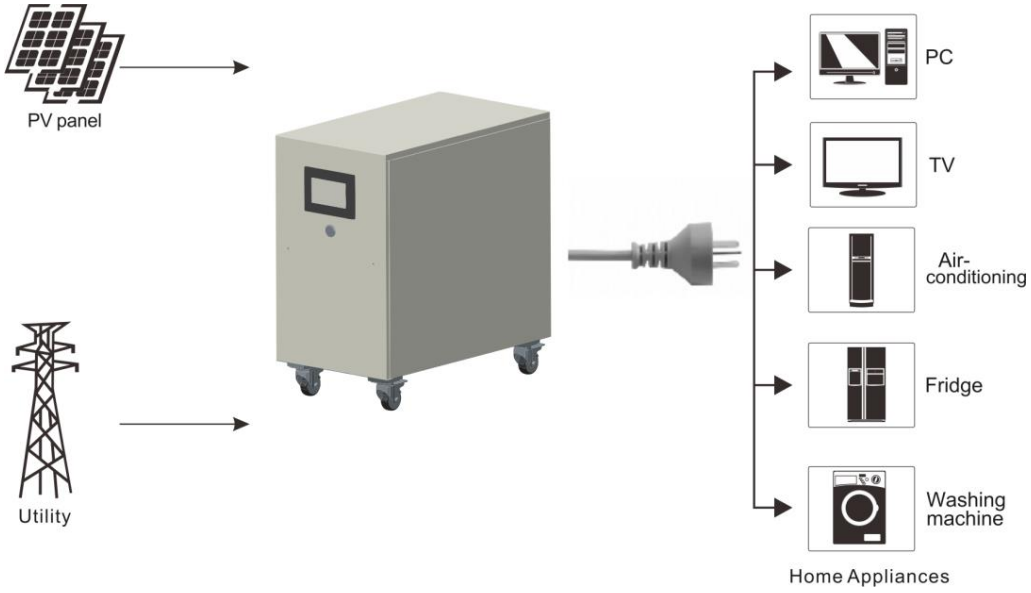
3.1 Features

- Pure sine wave inverter
- Compatible to mains voltage or generator power
- Auto restart while AC is recovering
- Overload, over temperature, short circuit protections
- Smart battery charger design for optimized battery performance
- Cold start function

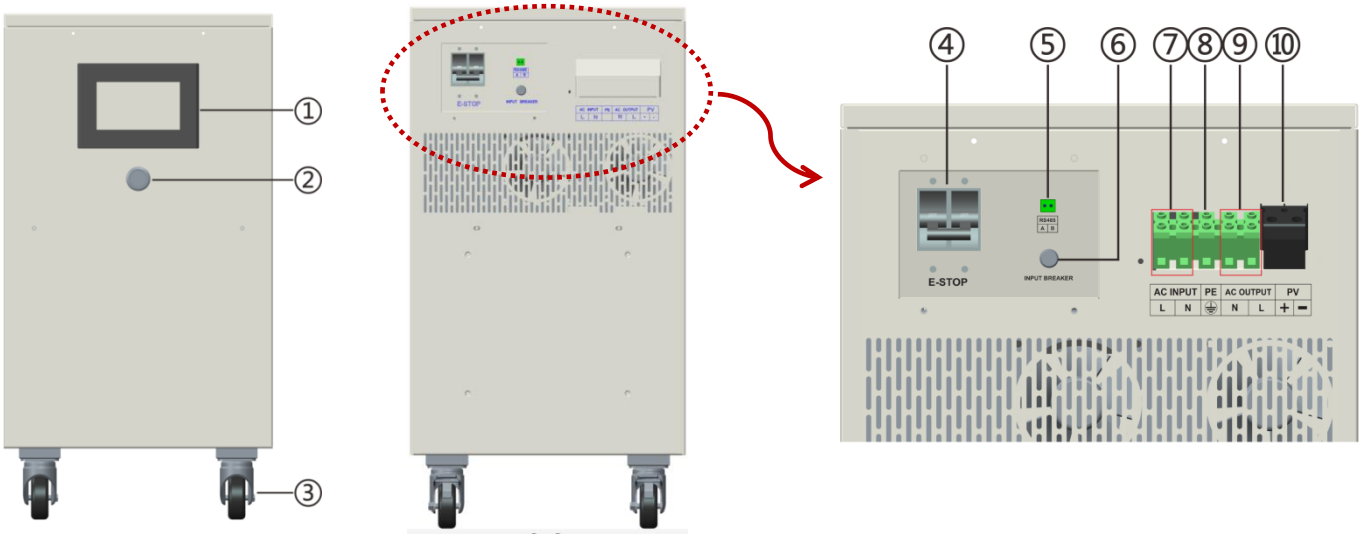
3.2 Basic System Architecture

The following illustration shows basic application for this unit. It also includes following devices to have a complete running system: 1) Generator or Utility (optional); 2) PV modules (optional)

Consult with your system integrator for other possible system architectures depending on your requirements. This unit can power all kinds of appliances at home or in office within its power rating, including motor-type appliances such as tube light, fan, refrigerator and air conditioner, etc.



3.3 Product Overview



①	LCD Display	⑥	Input Circuit Breaker
②	Power ON/OFF Button	⑦	AC Input Terminals
③	Castor	⑧	Ground Terminal
③	Battery Breaker	⑨	Ac Output Terminals
④	RS485 Communication Port	⑩	Solar Input Terminals

4. INSTALLATION

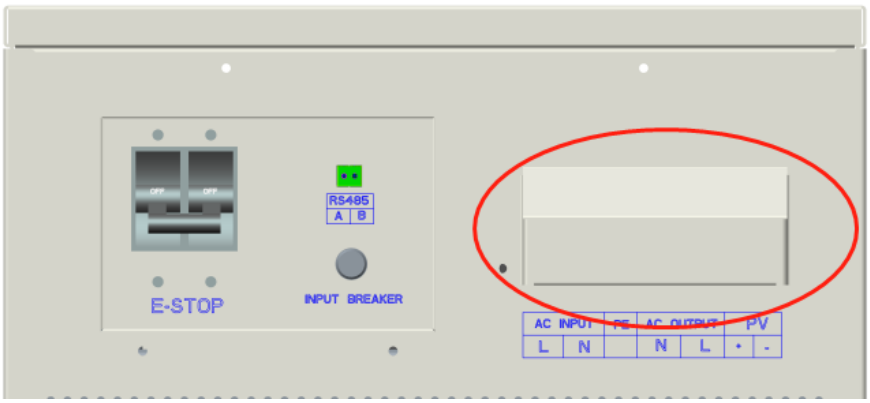
4.1 Unpacking & Inspection

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. You should have received the following items inside of package.

NO.	Items	Qty
A	MS6-3050 ESS	1
B	User Manual	1
C	Warranty Card	1

4.2 Preparation

Before connecting all wirings, please take off terminal cover by removing two screws as shown below.



4.3 Mounting the Unit

Consider the following points before selecting where to install.

- Do not mount the ESS on or near flammable construction materials.
- Mount on a solid surface.
- For proper air circulation to dissipate heat generated by the unit, allow a clearance of approx. 200 mm to the side and approx. 300 mm behind the unit.
- The ambient temperature should be between 0 c and 55 c to ensure optimal operation.
- The recommended installation site is against the wall.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and to have enough space for removing wires.

4.4 AC Input & Output Connection

CAUTION!!

Before connecting to AC input power source, please install a separate AC breaker between ESS and AC input power source. This will ensure the ESS can be securely disconnected during maintenance and fully protected from over current of AC input. The recommended spec of AC breaker is 32A for 3KW, 40A for 4KW and 50A for 5-5.5KW.

CAUTION!!

There are two terminal blocks with "IN" and "OUT" markings. Please do NOT-misconnect input and output connectors.

WARNING! All wiring must be performed by qualified personnel.

WARNING!

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

Suggested cable requirement for AC wires

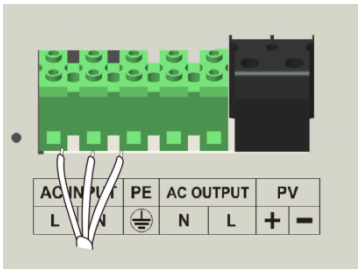
Model	Position	Gauge	Torque Value
MS6-3050	AC Input	12AWG	1.2~ 1.6Nm
	AC Output	12AWG	1.2~ 1.6Nm

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

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

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

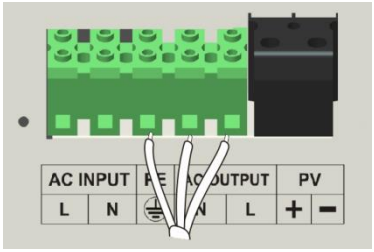
3. Insert AC input wires according to polarities indicated on terminal block and tighten the terminal screws. Be sure to connect PE protective conductor“⏚”first.

⏚—Ground (yellow-green) L—LINE (brown or black) N—Neutral (blue)	

WARNING!!

Be sure to that AC power source is disconnected before attempting to hardwire it to the unit.

5. Then, insert AC output wires according to polarities indicated on terminal block and tighten terminal screws.Be sure to connect PE protective conductor “⏚”first.

⏚—Ground (yellow-green) L—LINE (brown or black) N—Neutral (blue)	

Make sure the wires are securely connected.

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 ESS are worked in parallel operation.

CAUTION: Appliances

Such as air conditioner are required at least 2~3 minutes to restart because it's required to have enough time to balance refrigerant gas inside of circuits. If a power shortage occurs and recovers in a short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it's equipped with time-delay function before installation. Otherwise, this ESS will trig overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner.

4.5 PV Connection

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

WARNING! All wiring must be performed by qualified personnel.

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

Model	Typical Amperage	Cable Size	Torque
MS6-3050	40A	8AWG	2.0~2.4 Nm

PV Module Selection

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

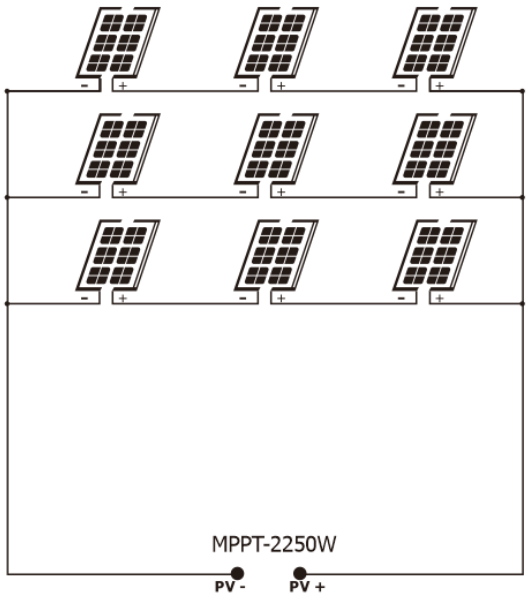
1. Open circuit Voltage (Voc) of PV modules does not exceeds max. PV array open circuit voltage of inverter.

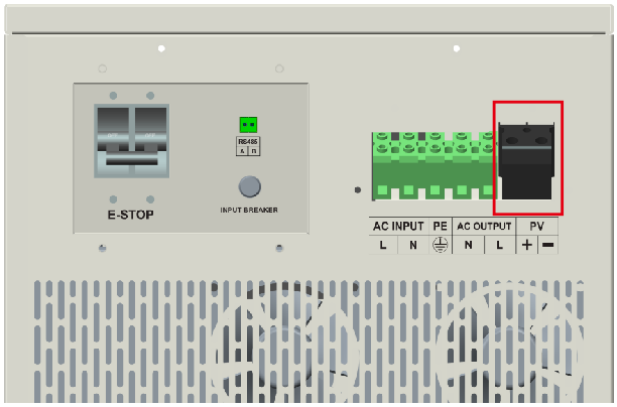
2. Open circuit Voltage (Voc) of PV modules should be higher than min. battery voltage.

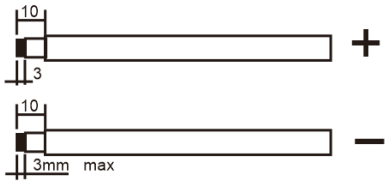
3. Max. Power Voltage (Vmpp) of PV modules should be close to best Vmp (max power point voltage) of inverter or within Vmp range to get best performance. If one PV module cannot meet this requirement, it's necessary to have several PV modules in series connection, refer to below table.

Model	MS6-3050
Inverter power	3000W
Solar charging Power	4200W
Max. PV Array Open Circuit Voltage	145Vdc
PV Array MPPT Voltage Range	60~115Vdc
Min. battery voltage for PV charge	34Vdc

Solar panel installation schematic







Please follow below steps to implement PV module connection:

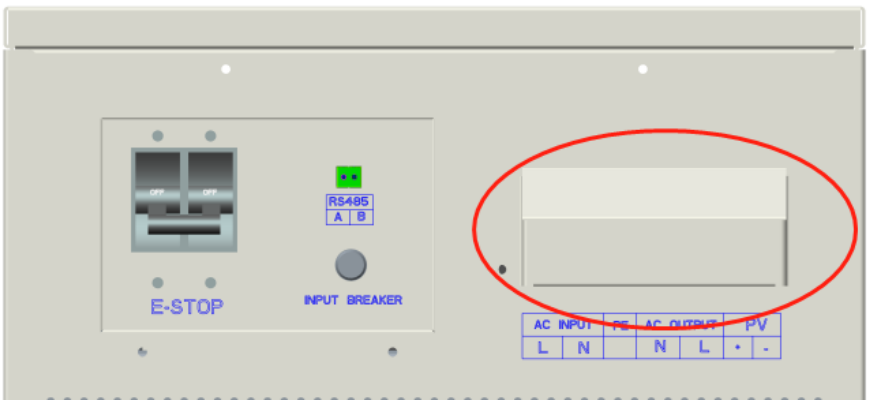
1. Remove insulation sleeve 10 mm for positive and negative conductors

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.

Final Assembly

After connecting all wirings, please put terminal cover back by screwing two screws as shown below.

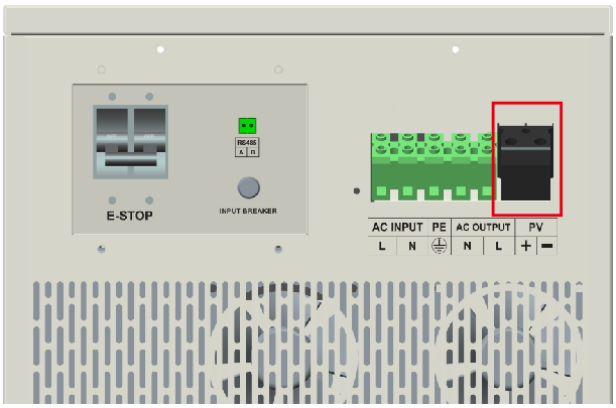


5. OPERATION

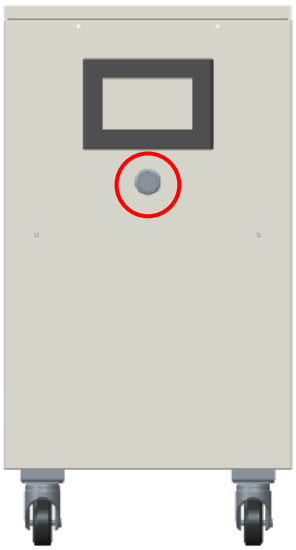
5.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, turn on battery break and switch (located on the button of the case) to turn on the unit.

Step 1: Turn on battery break

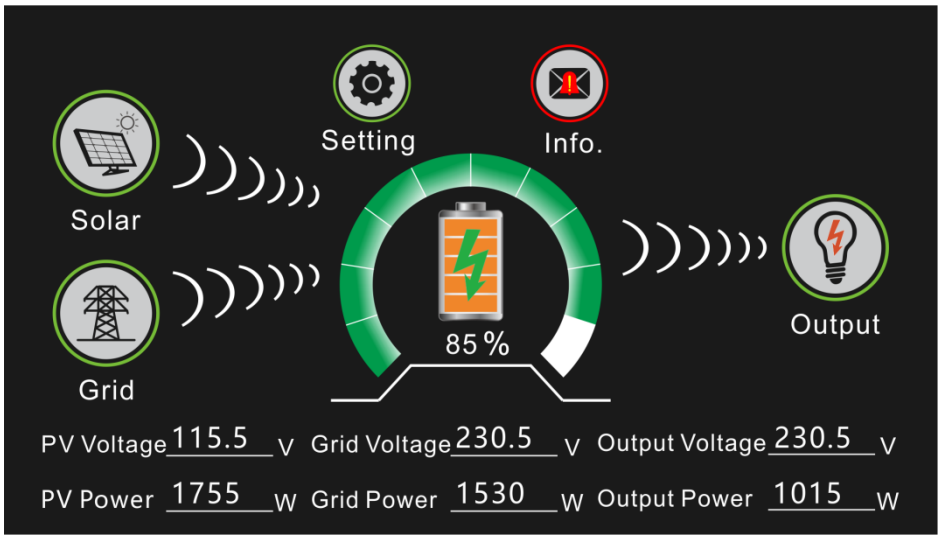


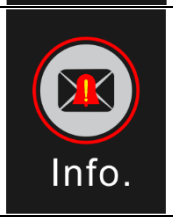
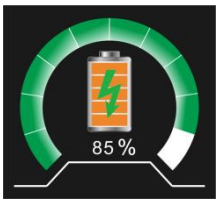
Step 2: Press the on/off switch about 3 second, the LCD will be lighted up and system standby



5.2 Operation and Display Panel

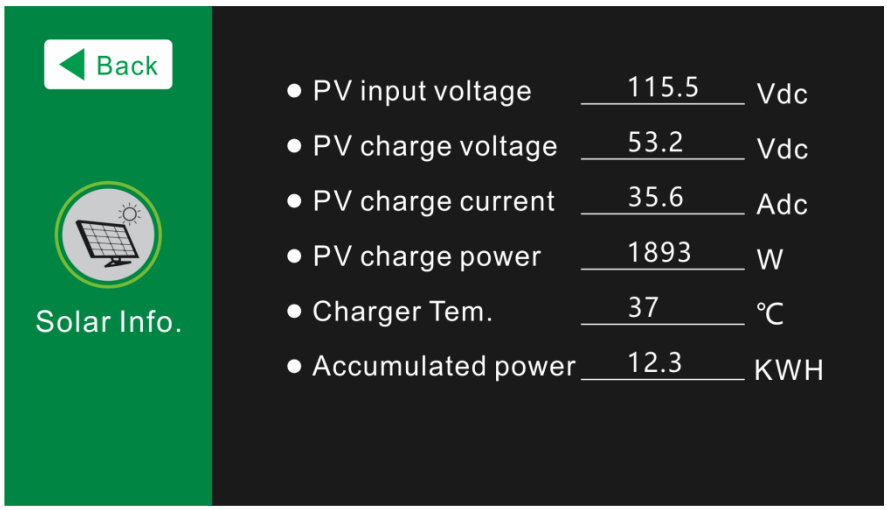
5.2.1 SYS ICO illustrate



	Solar charger information		SYS Setting
	Grid input information		SYS Fault information
	Output information		Direction of energy flow
	Battery information		

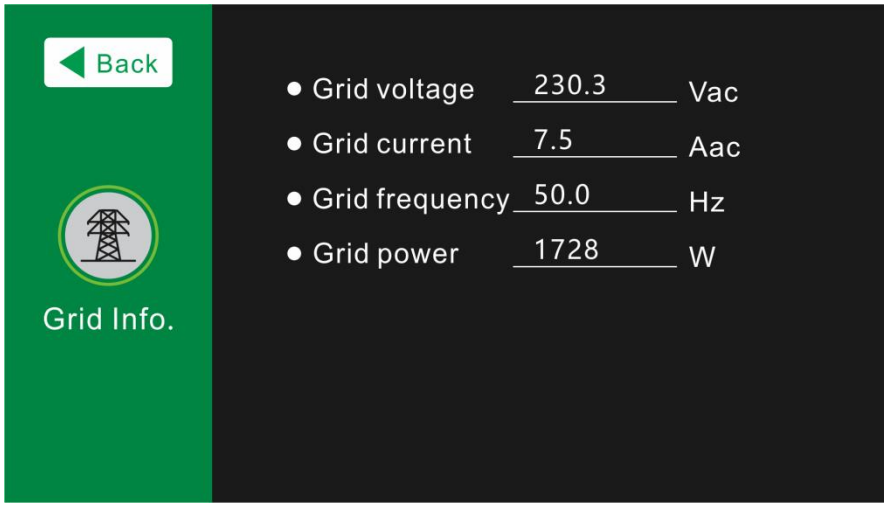
5.2.1 SYS interface information

Touch  to check solar PV input inforamtion



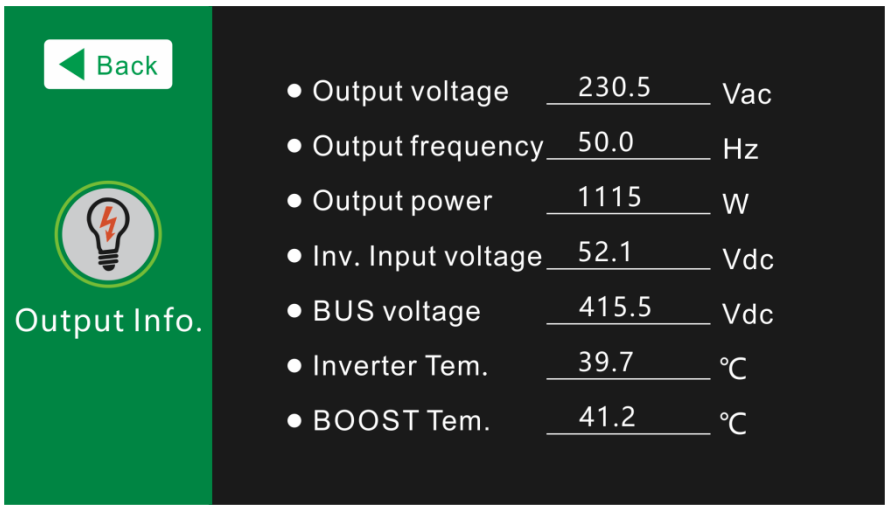
Touch 

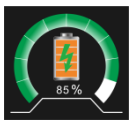
to check grid AC input information



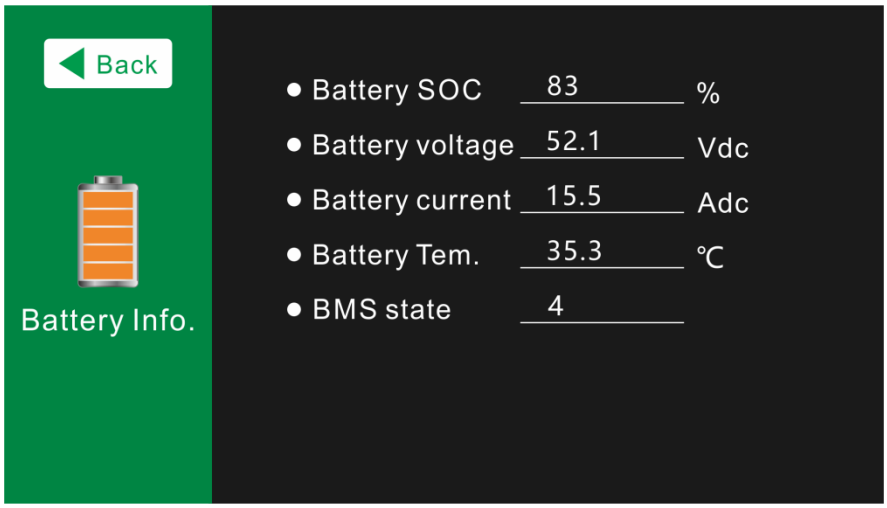
Touch 

to check output information



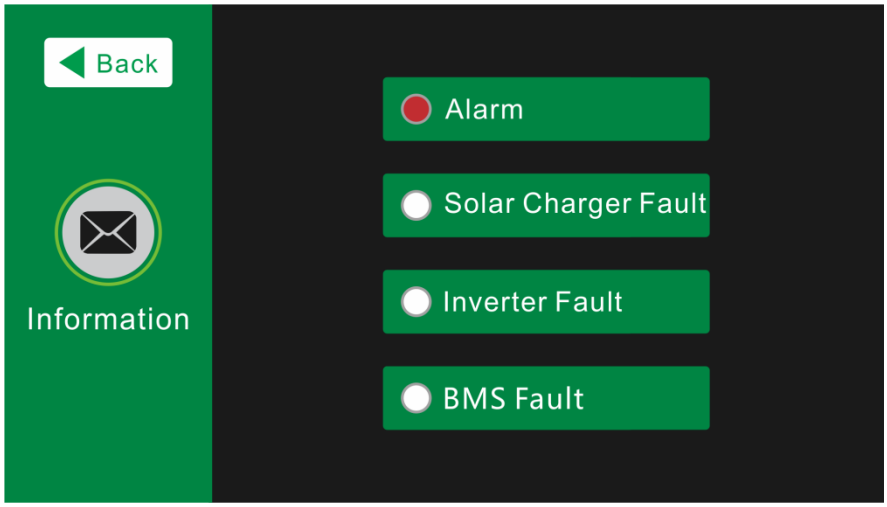
Touch 

to check battery information



Touch 

to check system failure information; touch  for more details



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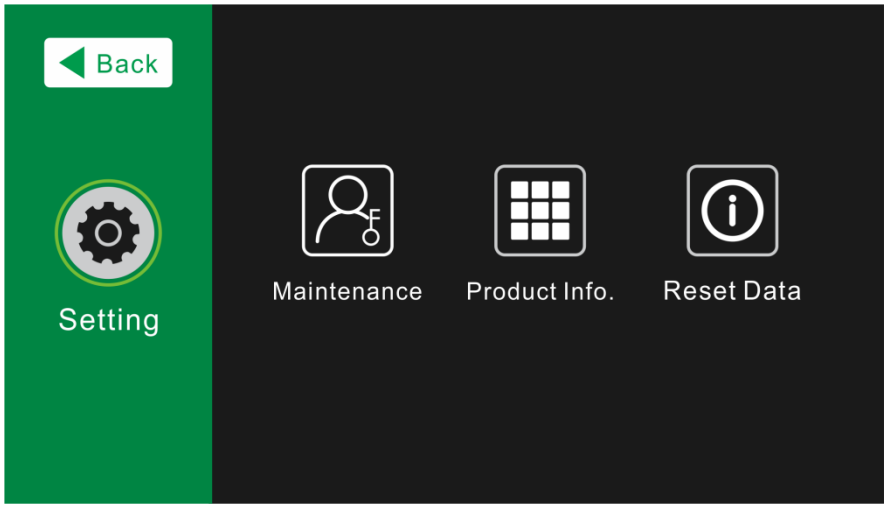
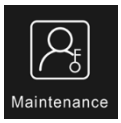
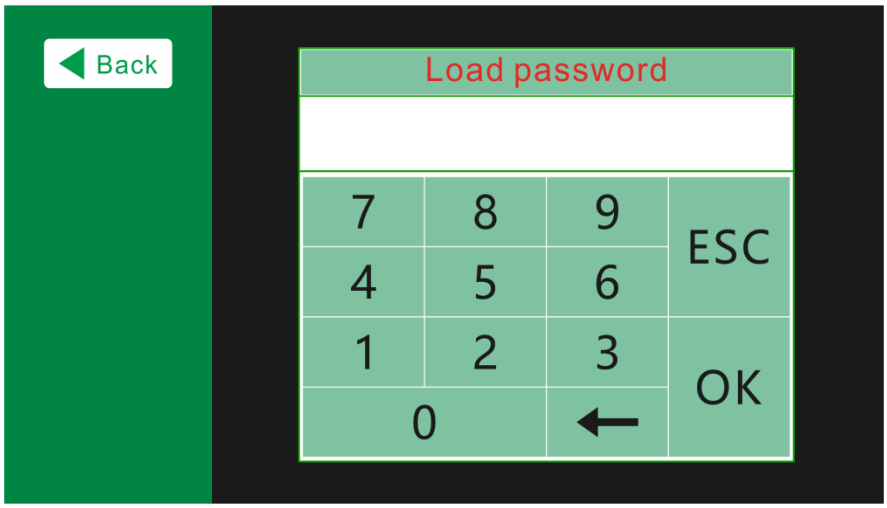
to check and set system parameters



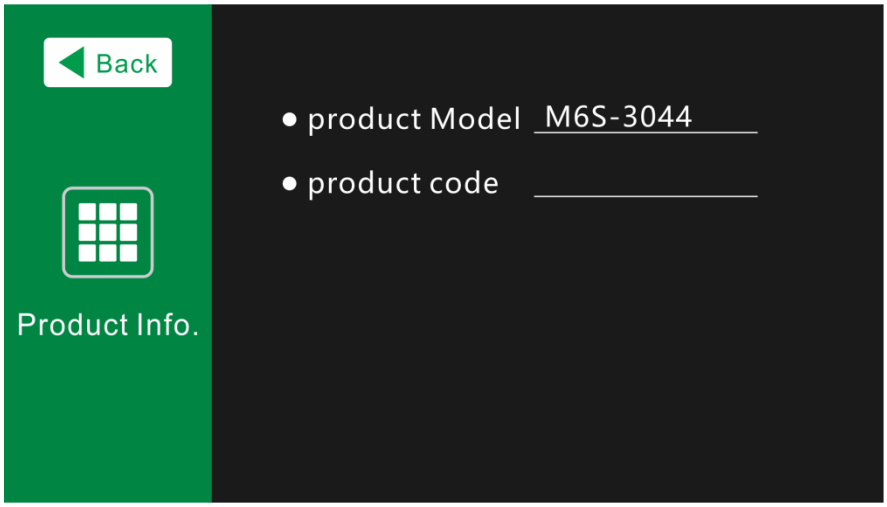
Touch 

for distributor or factory install or debugging; passwords will be requried



Touch 

for product information



Touch 

to expunge PV generation information

6. SPECIFICATIONS

MODEL	MS6-3050
AC INPUT	
Nominal Input Voltage	100V/110V/120V
AC Input Voltage Range	(90V~140V) ±2%
Nominal Input Frequency	50Hz/60Hz (auto detection)
Over Load or Short Circuit Protection	Circuit Breaker
Efficiency	>95% (Rated R load, battery full charged)
Transfer Time	10ms typical
AC OUTPUT	
Rated Output Power	3000W
Output Voltage Waveform	Pure Sine Wave
Output Voltage Regulation	100Vac±5%
Output Frequency	60Hz or 50Hz
Peak Efficiency	91%
Overload Protection	(102% < load <110%) ±10%, 5 minutes; (110% < load < 125%) ± 10%, 10 seconds; (Load >125% ±10%), 5 seconds;
SOLAR INPUT	

Rated Power	4200W
MPPT Charger	YES
Solar Charging Current	40A
Max. PV Array Open Circuit Voltage	145Vdc max
PV Array MPPT Voltage Range	60-115Vdc
Min Battery Voltage for PV Charge	40Vdc
BATTERY	
Battery Capacity	5kWh (51.2V 100Ah)
Battery Type	LiFePO4
High Battery Recovery Voltage	54.4Vdc
High Battery Cut-off Voltage	58Vdc
Low Battery Voltage Recovery	44.8Vdc
Battery Discharge Cut-off voltage	40.8Vdc
Environment	
Working Environment Temperature	-15°C~55°C
Working Environment Humidity	5%~95% (No condensation)
Store Environment Temperature	-25°C~60°C
Dimensions	550x330x580mm
Net Weight	70kg
Gross Weight	100kg