

MESS-10-16K

Low-Voltage Integrated PV -Storage-Charging-Diesel ESS

User Manual



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About the manual

This manual provides essential product information and detailed installation instructions for the MESS-10-16K low-voltage stacked energy storage integrated machine. Prior to installation or use, carefully read the entire manual and strictly follow all procedures. Should you have any questions regarding the requirements, instructions, or safety measures, contact FENGRUI Company immediately. Please note that any damage resulting from human error or non-compliance with this manual will void the warranty.

NOTE :

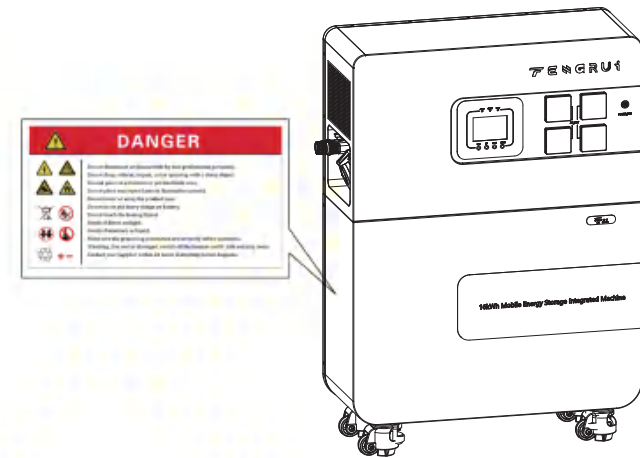
This manual is only applicable to the MESS-10-16K low-voltage stacked energy storage integrated machine

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1. Safety

1.1 Battery pack label symbol

There are some electrical symbols related to electrical safety on the battery, please make sure you fully understand these symbols before installation.



Before installing or operating the battery pack, please read the user manual first.

-  Battery voltage may cause shock.
-  Ensure correct polarity.
-  Keep away from open flames/flammables.
-  Avoid mechanical abuse (drop/impact/cut/puncture).
-  Keep away from children.
-  Keep away from ignition sources.
-  Do not dispose with household waste.
-  Battery is recyclable.

1.2 Important safety instructions

For safety reasons, please carefully read the safety precautions and instructions in this manual before installation. FENGRUI Company shall not be liable for any losses caused by violation of the instructions in this manual.

In the document, we use the following symbols to highlight important information: When using the battery pack, these warnings and precautions must be followed.



Warning

Indicates a dangerous situation that, if not avoided, may result in injury or death.

- Due to the active chemical properties of batteries, there is a high risk of electric shock, fire, and even explosion when exposed to ventilated air. When lithium metal is exposed to air, it will explode due to a violent oxidation reaction with oxygen. Please follow appropriate preventive measures:

- *Do not squeeze/puncture.
- *Do not throw into fire.
- *Do not expose to direct sunlight.
- *Keep connectors away from conductive objects/wires.
- *Do not open/disassemble/modify without FENGRUI approval.
- *Keep away from children.

- Battery pack is heavy. Suggest using lifting equipment.
- Do not touch internal components while running. Ensure power switch and battery breaker are OFF before maintenance.
- Read the manual before installing or using the battery. Non-standard operation may cause electric shock, serious injury, or death.
- Use the battery pack according to the instructions.



Warning

Indicates a dangerous situation that, if not avoided, may result in minor injury or equipment damage.

- Electric shock hazard. Do not remove the cover plate; it contains non-removable parts. Please consult staff.
- When the photovoltaic panel is exposed to light, it provides direct current voltage to the device.
- Do not use cleaning solvents to clean the battery pack, or expose the battery pack to flammable or irritating chemicals or vapors.
- Do not store the battery pack for more than one month. If stored, cut off the power supply of the battery pack, ensure the battery level is above 50%, and recharge/maintain it within 90 days.

1.3 Personal protective equipment

Wear the following safety equipment correctly for installation work. Installation personnel must meet relevant standards, such as IEC60364, or local legal requirements.



goggles



earplug



insulating
gloves



Safety
gloves

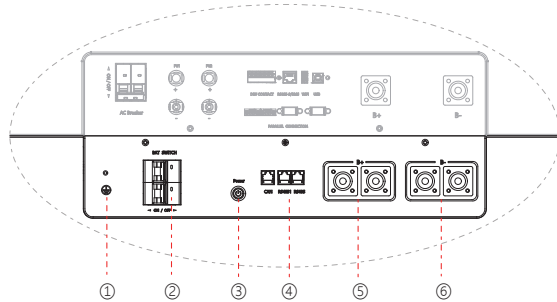


safety
shoes

2. Product Introduction

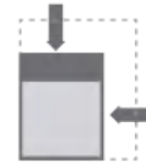
2.1 Overview of battery pack

Energy storage battery pack is a device used for storing electrical energy, consisting of multiple individual batteries combined with a battery management system (BMS). It plays a key role in modern energy management, especially in balancing grid supply and demand, increasing the utilization of renewable energy, and improving the response speed of the power system.



①	grounding	④	CAN and RS485 communication positive
②	circuit breaker battery	⑤	electrode of battery
③	switch	⑥	negative electrode of battery

Main functions



Compact size, easy to install

The lightweight and stackable design makes indoor installation easier and faster.



Safety

The battery pack uses LFP battery cells to store energy, with a built-in BMS monitoring its operation and preventing the battery from exceeding design limits.



Scalability

By adding battery modules, the capacity of the battery pack can be increased.

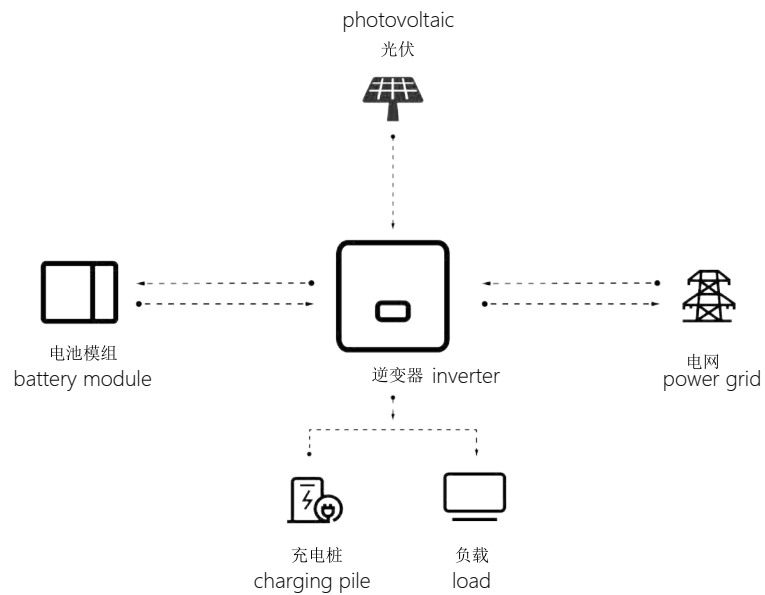


High compatibility

The battery pack is compatible with multiple inverters.

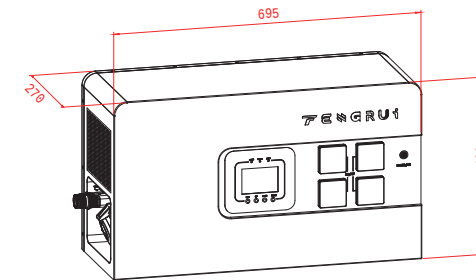
2.2 Technical data

The MESS-10-16K battery pack is designed for charging and discharging to provide maximum energy independence for your home and potentially save on your electricity bills.

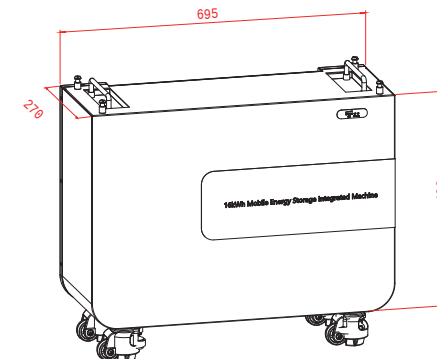


2.2.1 Dimensions and Weight

	length (mm)	width (mm)	height (mm)	weight (kg)
Inverter size :	695	270	400	29.2



Battery box size :	695	270	493	116.4
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2.2.2 Battery pack parameters

Specification	Parameter
Cell Chemistry	LFP/314Ah
Rated Energy (kWh)	16kWh
Pack Configuration	1P16S
Max. Output Current(A)	16S1P
Rated Voltage(V)	51.2V
Operating Voltage Range (VDC)	44.8V-57.6V
Display	LCD Display
IP Rating	IP21
Cycle Life	6000 Cycles

2.2.3 Environmental Requirements

MESS-10-16K

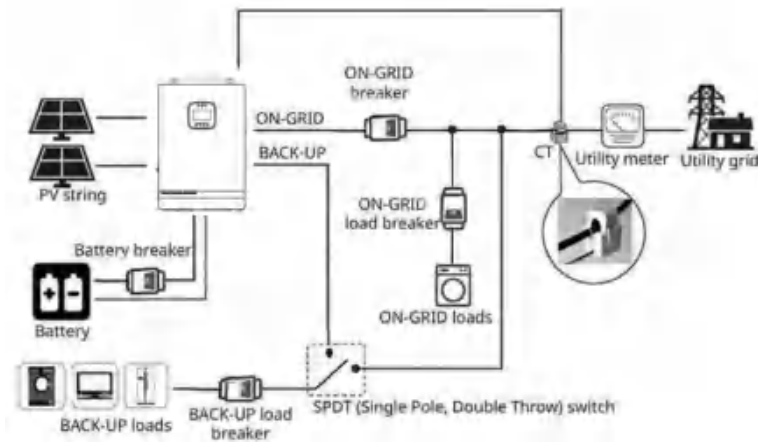
Working temperature range	-10°C~50°C
Best operating temperature	5~50°C
Storage temperature range	0~35°C
Humidity	5%-95%
Altitude	3000m
Cooling strategy	natural convection



Warning

Unqualified cables may cause problems.

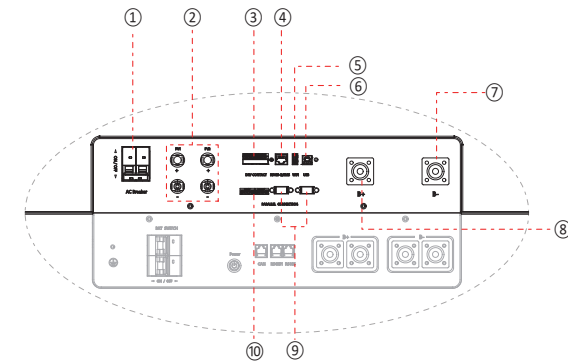
2.3 Introduction to Inverter Applications



The above picture shows the application scenario of the device (specific usage functions depend on the scenario application). A complete application system consists of the following components:

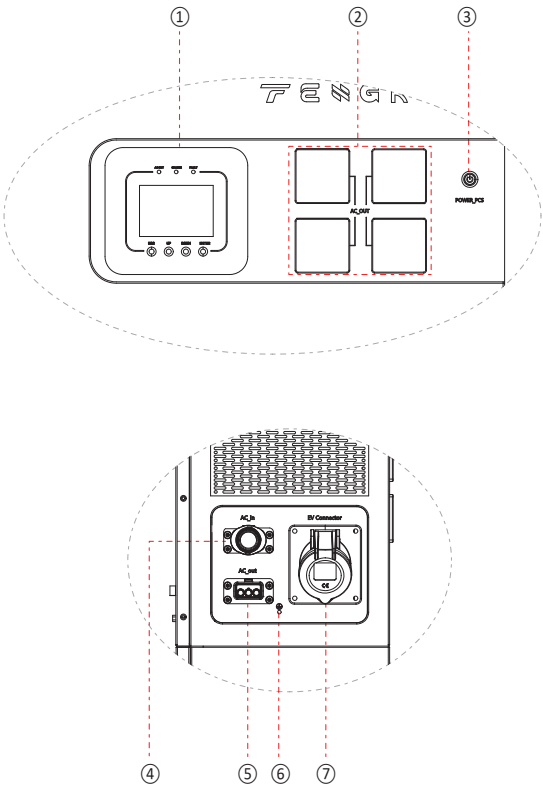
- 1、Photovoltaic array: Photovoltaic input. Sunlight generates DC power via the photovoltaic effect, which charges the battery through an inverter or converts directly to AC output to power load devices.
- 2、Municipal power or diesel engine: AC input powers loads while charging the battery. When AC input is lost, the inverter automatically switches to the battery and photovoltaic array to power the load, achieving uninterrupted power supply (i.e., the load will not malfunction due to power loss).
- 3、Battery pack: Implements energy storage and release functions according to system requirements. Supports lithium and lead-acid batteries (configuration required).
- 4、Household load: Supports linear and nonlinear load applications, including computers, refrigerators, air conditioners, TVs, water heaters, and other household equipment.
- 5、Inverter : Realizes energy conversion and safety management for the entire system.
- 6、WiFi or GPRS : Enables remote monitoring and management via computers or mobile APP.

2.3.1 Overview of Inverter



①	AC input overload protector	⑥	USB communication port
②	PV port	⑦	negative electrode of battery
③	Dry node port	⑧	positive electrode of battery
④	RS485-2/BMS	⑨	Parallel communication port
⑤	WIFI	⑩	Uniform current port

- 1、Segmented charging and discharging functionality.
- 2、Anti-islanding grid-connected function (PV-grid hybrid power supply), configurable grid-connected modes.
- 3、Supports operation without battery. Solar and mains power can supply load devices simultaneously.
- 4、Built-in lithium battery with dual activation function, triggered by mains or PV input.
- 5、Energy-saving mode to reduce no-load losses.
- 6、4 selectable charging modes: solar-only, mains-first, solar-first, hybrid charging.
- 7、2 output modes: utility bypass & inverter output. Uninterrupted power supply.
- 8、Comprehensive protections: short-circuit, over/under-voltage, overload, reverse current. 360° all-around safety.
- 9、Full digital voltage/current dual-loop control; advanced SPWM technology; pure sine wave output.
- 10、Advanced MPPT technology, efficiency up to 99.9%.



①	LCD	⑤	50A AC output socket
②	10A/16A Communication output port	⑥	Grounding
③	Inverter switch	⑦	Car charging port
④	50A AC input socket		

2.3.2 Inverter parameters

Model	Model Name	FRI48120V150-500P
Working temperature range	Operating Temperature Range	-10~55℃
Communication output:		AC Output:
Rated power	Rated Power	12000VA/12000W
Rated voltage	Rated Voltage	230Vac
Rated current	Rated Current	52.2A
Battery output:		Battery Input:
Voltage range	Voltage Range	40-60Vdc
Maximum current	Max. Battery Current	260A
Communication input:		AC Input:
Rated voltage range	Rated Voltage Range	170-280Vac
Rated frequency	Rated Frequency	50 Hz/60 Hz
Maximum by pass current	Max. AC Bypass Current	60A
Maximum charging current	Max. AC Charge Current	150A
Photovoltaic output:		PV Input:
Maximum output power	Max. Input Power	6000W+6000W
Maximum open circuit voltage	Max. Open Voltage	500vdc
MPPT Input voltage range	MPPT Input Voltage Range	90-450Vdc
Maximum input current	Max. Input Current	22A+22A
Maximum charging current	Max. Charge Current	150A
Battery charging current:		Battery Charge Current:
Maximum charging current	Max. Charge Current	150A

3. Installation

3.1 Prepare

3.1.1 Installation materials and tools

Before starting the installation process, ensure that all necessary tools and materials are in place to avoid any inconvenience on site. These tools are used for installing battery packs.



冲击钻
Impact drill



十字绝缘力矩螺丝刀
Cross insulation torque screwdriver



内六角绝缘力矩螺丝刀
Internal hexagonal insulation torque screwdriver



绝缘力矩套筒扳手
Insulation torque socket wrench



内六角扳手
Hex key



斜口钳
Diagonal cutting pliers



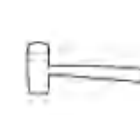
液压钳
Hydraulic pliers



剥线钳
Wire stripper



拆卸扳手
Dismantling wrench



橡胶锤
Rubber mallet



剪线钳
Wire cutter



压线钳
Crimping tool

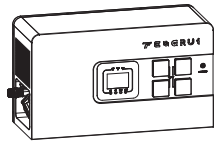
3.1.2 Installation location

Ensure that the installation location meets the following conditions

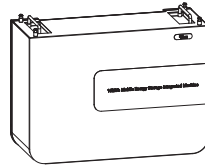
- It is recommended to set up a location at least 1000 meters away from the coast to avoid saltwater and moisture.
- The floor must be flat.
- There are no flammable or explosive materials nearby.
- The optimal ambient temperature is between 15 °C and 30 °C.

3.1.3 Packaging inspection

Verify and ensure that the following quantities match the order and that there are no parts damaged or broken during transportation. You can check it in the unpacking inspection guide provided below.



Inverter



Battery pack



Dowel pin × 4



Caster wheel × 4



Grounding cable



Positive electrode
connected to copper bar



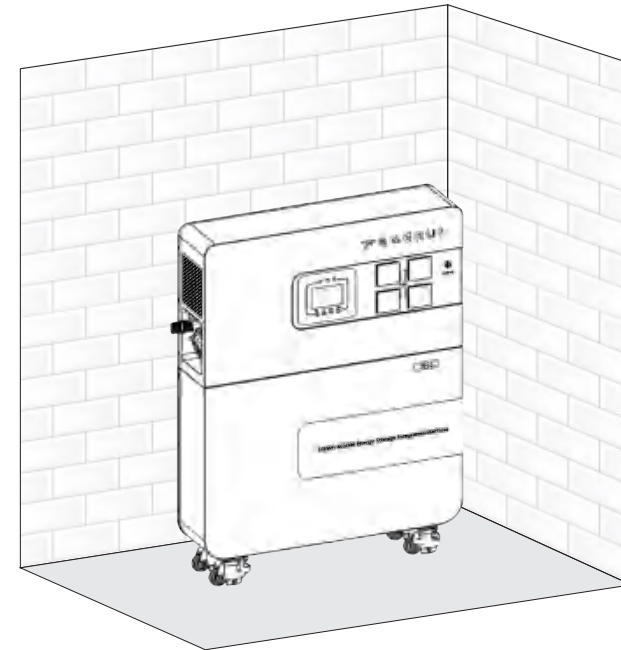
Parallel network cable



Negative electrode
connected copper bar

3.2 Start Installation

3.2.1 Installation space



NOTE :

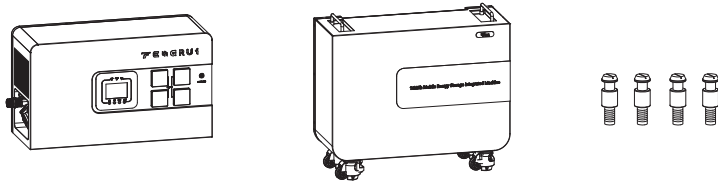
Ensure that this product is always exposed to ambient air. This product is cooled by natural convection, and if it is completely or partially covered, it may cause the battery pack to stop working.

3.2.2 Stacked battery pack

Check and ensure that the following quantities meet the order requirements and that there are no parts damaged or lost during transportation.

Step1

- Place the base on the floor



NOTE :

WSL48100 can be installed on the ground and walls.

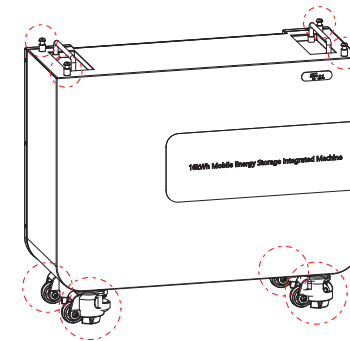


Warning

Ensure the ground is level, use horizontal tools when necessary, and stay away from standing water.

Step2

- Install the Fuma wheel and positioning pin of the battery pack.

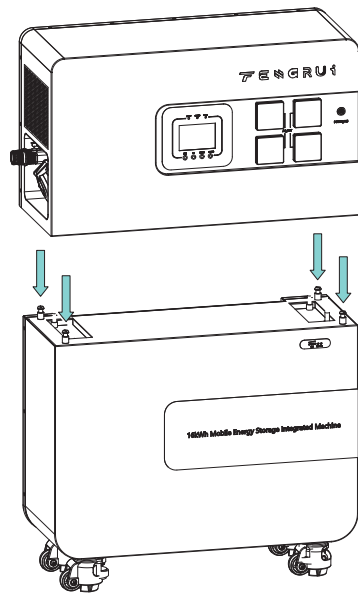


NOTE :

Ensure that the roller fixing screws and positioning pin screws are tightened.

Step3

- Stack the inverter box onto the battery box.



NOTE :

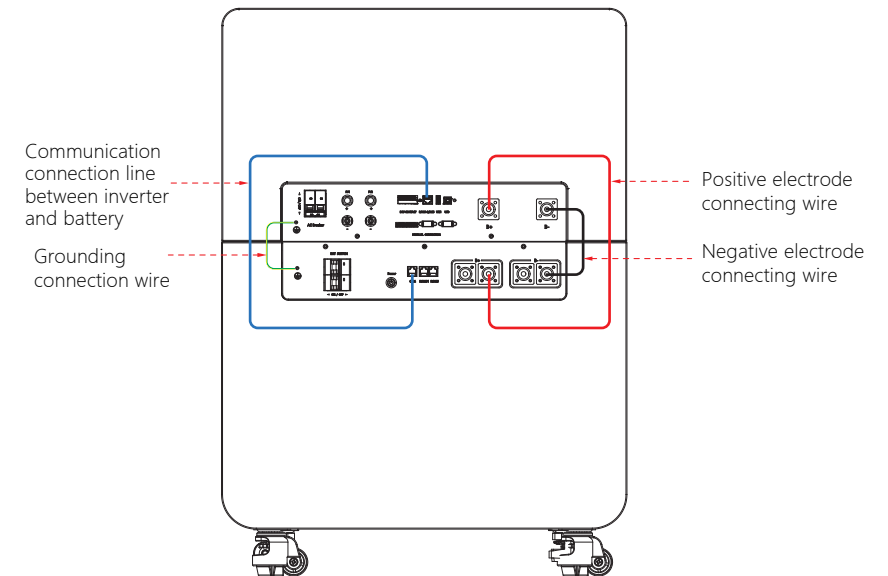
The positive and negative power lines are connected to the converter and cannot be reversed.

3.2.3 Cable connection



Warning

Ensure that the inverter is turned off, and then connect the battery pack to the inverter.



NOTE :

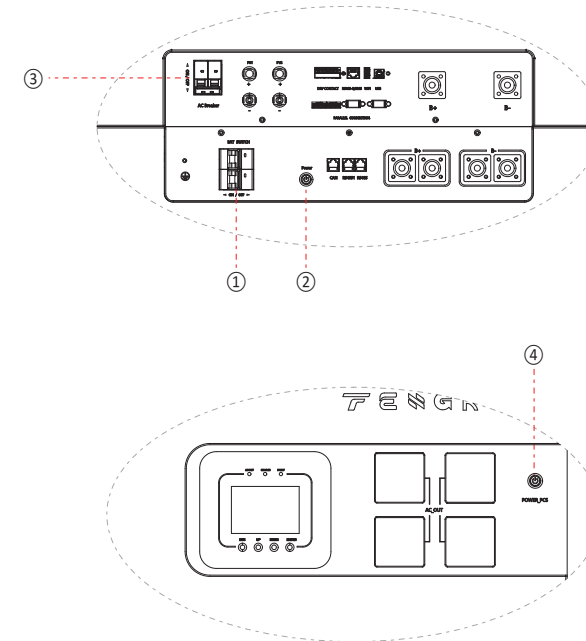
*Do not reverse polarity. Reverse polarity connection will cause serious damage to the battery pack.

*The battery must communicate with the inverter to function properly.

*Ensure each wire is connected to the corresponding interface, otherwise battery damage may occur.

4. Debug

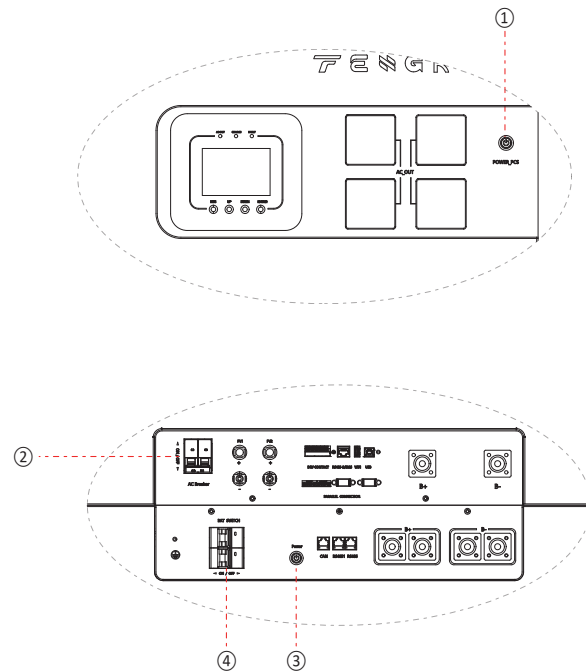
4.1 Turn on the device



- Once the device is installed correctly and the battery connection is good, simply follow the steps below to turn on the device.

- ① Open the DC circuit breaker
- ② Press the battery button
- ③ Open communication space
- ④ Press the inverter button

4.2 Turn off the device

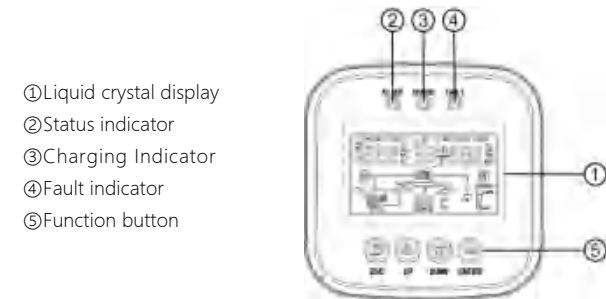


● When not in use, follow the steps below to turn off the device.

- ① Press the inverter button
- ② Close the communication gap
- ③ Press the battery switch
- ④ Close the DC circuit breaker

4.3 Operation and display panel

The operation and display panel, as shown in the figure below, is located on the front panel of the inverter. It includes 3 indicator lights, 4 function keys, and an LCD display screen that displays operational status and input/output power information.



- ① Liquid crystal display
- ② Status indicator
- ③ Charging Indicator
- ④ Fault indicator
- ⑤ Function button

Indicator light introduction:

Indicator light	Color	Description
AC OUT	Green	Always on: mains power output
		Flashing: Inverter output
CHARGE	Yellow	Flashing: Fast Charging
		Always on: Floating Charge
FAULT	Red	Flashing: Fault state

Introduction to operation buttons:

Function key	Description
ESC	Enter/Exit Settings Menu
UP	Previous choice
DOWN	Next choice
ENTER	Under the settings menu, select/enter the option

※ For more detailed operations, please refer to the inverter user manual.

5 Maintenance

To maintain optimal long-term work performance, it is recommended to conduct project inspections twice a year:

- 1、 Confirm that the airflow around the inverter will not be obstructed, and remove any dirt or debris from the heat dissipation port.
- 2、 Check exposed wires for insulation damage due to sun exposure, friction, dryness, or insect/rodent damage. Repair or replace wires if necessary.
- 3、 Verify instructions and displays are consistent with device operation. Pay attention to any faults or incorrect displays and take corrective measures if necessary.
- 4、 Check wiring terminals for corrosion, insulation damage, high temperature, or signs of burning/discoloration, and tighten terminal screws.
- 5、 Check for dirt, nesting insects, and corrosion, clean as required, and regularly clean the insect proof net.
- 6、 If the lightning arrester has expired, replace it promptly to prevent lightning damage to the inverter and the user's other equipment.

Our company is not liable for damages caused by the following reasons:

- a) Damage caused by improper use or use in the wrong location.
- b) Photovoltaic module open circuit voltage exceeds maximum allowable voltage.
- c) Damage caused by working temperature exceeding the specified operating temperature range.
- d) Unauthorized personnel disassembling and repairing inverters.
- e) Damage caused by force majeure; Damage during transportation or handling of inverters.



Warning

Before conducting any inspection or operation, please ensure that the inverter is disconnected from all power sources and that the capacitors are fully discharged to avoid the risk of electric shock.