



HPS100KTL

Hybrid Energy System

User Manual

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1 About this Manual

This chapter describes the overview of this manual and safety symbols, can help users to have a better understanding of the manual.

1.1 Contents

This manual applies to ATESS HPS100KTL hybrid energy system, the manual contains:

Safety instruction

Attention that needs to be paid when operating and maintaining ATESS HPS100KTL

Product description

The role inverter plays in the energy storage system and structure, principle, protection, operation mode, storage and package size of the ATESS HPS100KTL.

Installation

Inverter installation conditions, tools, and the inverter mechanical and electrical installation, the communication connection and inspection.

Commissioning

Inspection before commissioning and procedure to turn on/off inverter.

HMI

Information displayed on the inverter LCD touch-screen and setting instruction.

Routine maintenance

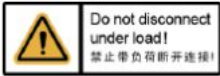
Daily maintenance of the inverter, the replacement of some spare parts and waste disposal instruction.

Appendix

Technical data, warranty policy and contact information./

1.2. Symbols explanation

In order to ensure the personal and property safety of the user during installation, or optimally efficient use of this product, symbols are used highlight the information. The following symbols may be used in this manual, please read carefully, in order to make better use of this manual.

Symbol	Symbol name	Implication
	Risk of electric shock	This inverter contains high voltage during operation. All relative operations must be proceeded by the professional electricians.
	Delay discharge	There will be residual voltage in the inverter, it takes 5 mins to completely discharge.
	Overheated	It's forbidden to touch the shell of inverter during running due to overheating.
	Refer to user manual	A reminder for the operator to check the user manual that goes with the inverter.
	PE terminal	Connect the inverter with PE terminal for earthing protection
	Operation warning	Do not disconnect the DC input directly when the inverter is running
	CE certified	This product is complied with CE certification standard.

2 Safety Instructions

Inverter installer and service personnel must be trained and familiar with the general safety requirement when working on electrical equipment. Installer and service personnel should also be familiar with the local laws and regulations and safety requirements.

- Read this manual carefully before operation. The equipment will not be under warranty if failing to operate according to this manual.
- Operation on the inverter must be for qualified electrical technician only.
- When inverter operating, don't touch any electrical parts except for the touchscreen.
- All electrical operation must comply with local electrical operation standards.
- Warranty service for the inverter does not contain module maintenance.
- Permission from the local utility company is required before installing the Energy Storage system and only professional personnel are qualified for the operation.

2.1 Correct installation

Proper installation requires following all the instructions in the user manual involving transportation, mounting, wiring and commissioning. ATESS does not cover warranty for the inverter damage due to improper use.

- Note the instruction in this chapter and after
- Follow the manual
- Refer to relevant data and technical spec

2.2 Operator

Inverter installer and service personnel must be trained and familiar with the general safety requirement when working on electrical equipment. Installer and service personnel should also be familiar with the local laws and regulations and safety requirements.

2.3 Inspection and storage

The inverter should be carefully check before signing the document from the transportation company. Check the received items against delivery note, and if there is any defect or damage, immediately notify the transportation company. If necessary, you can seek help from ATESS Customer Service Department.



Note:

ATESS HPS100KTL can be stored in a dry room to protect the internal circuits against dust and moisture.

2.4 Transportation

Transportation should follow the transportation methods described in the user manual. The inverter's weight and center of gravity should be taken into account during transportation. The center of gravity is marked on the box.



Caution, risk of danger

During the process of moving and lifting the inverter, the operator must be qualified. The inverter should be placed vertically and the inclination cannot be more than 10 degrees. It is not allowed to place the inverter upside down or transport in a vertical position. Incorrect lifting and transportation can lead to serious injury, property loss and damage to the inverter.

2.5 Installation

Hybrid inverter is with IP65 protection level and designed for wall-mounting installation. Installation of the inverter must be according to information included in this manual especially on Chapter 4.

2.6 Repair and maintenance



Repair and maintenance can only be carried out after disconnecting the DC and AC breakers for at least 5 minutes. Only professional technical personnel are qualified for the operation.

Disconnect breaker

Getting PV and BAT switch to disconnect inverter from battery and solar array, and Getting GRID input switch to disconnect inverter from grid. Make sure inverter cannot be connected with power source. Test with multi-meter and make sure all switch and breaker without voltage potential. Even inverter is disconnected from grid and battery, PV, some component inside inverter such as capacitor is still with energy stored and is dangerous when capacitor discharge, so at least 20 minutes later check with multi-meter that BUS line is without voltage potential, then operate accordingly.

Maintenance and modification

Only personnel with ATESS authorization are qualified for the maintenance and modification. And to ensure personal safety, use original accessories provided by the manufacturer only. Otherwise, electrical safety and EMC might not comply with the required standard.

Function and safety parameters

Don't change the parameters of the inverter without authorization from the local utility and ATESS Energy Technology Co., Ltd. Otherwise, it might lead to injury or equipment damage and the warranty of the inverter will be invalid.

2.7 Inverter EMC and noise level

Electromagnetic compatibility (EMC) is the requirement for electrical equipment that it can operate normally in the electromagnetic environment and does not cause unacceptable environmental impact itself. So EMC represents the quality characteristics of electrical equipment:

Hybrid inverter can generate certain noise and electro-magnetic radiation, according to EMC and noise level, the inverter is qualified for installation and operation in industrial environment.

2.8 Important note

Information

Note 1: Static electricity can cause damage to the inverter

Electrostatic discharge may cause unrecoverable damage to inverter internal components! When operating the inverter, operator must comply with anti-static protection regulations!

Note 2: Restriction



The inverter cannot be directly used to connect the life support equipment and medical equipment!

Item 3: Precautions

Make sure installation tools or other unnecessary items are not left inside the inverter before starting up.

Item 4: Maintenance notice

Maintenance can only be carried out after the inverter totally discharged.

3 Product Description

3.1 Energy Storage system

ATESS HPS100KTL hybrid inverter is designed for energy storage system, it converts DC current generated by battery bank into AC current and feed into the load/grid, also it can take power from solar or grid to charge battery .

3.2 Circuit diagram of the inverter

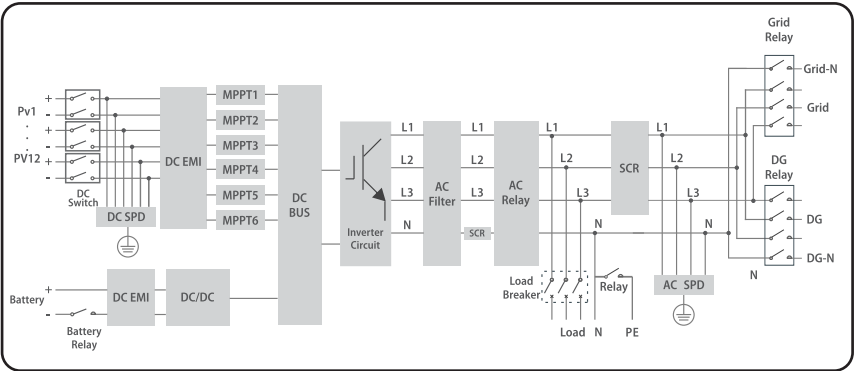


Figure 3-2-1 ATESS HPS-TL circuit diagram

3.3 Product specification

3.3.1 Input parameter

Inverter model	HPS100KTL
Max. PV power	150KW
Max. PV open-circuit voltage	1000V
PV MPPT voltage range	125V-850V
Bat input voltage range	150V-900V
Bat Max.charge/discharge current	200A

3.3.2 Output parameter

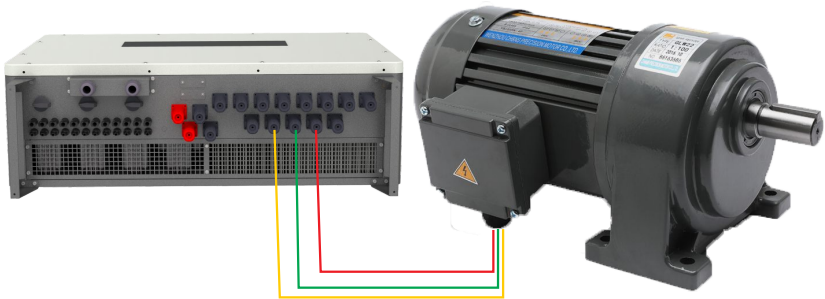
Energy storage controller model	HPS100KTL
Rated AC output power	100kW
Rated AC output current	144A
Rated AC output frequency	50HZ
Rated AC voltage	400V
Power factor	0.8lagging-0.8leading

3.3.3 Important notes

Note1: Usage restrictions



- A. If the load connected to the inverter is a motor and the output voltage waveform is not distorted, then HPS100KTLcan only drive a 12HP motor.
- B. If you want the HPS100KTL to drive more motors, you need to connect the VFD between the HPS100KTL and the motor.



3.4 The layout of the main parts

3.4.1 External layout

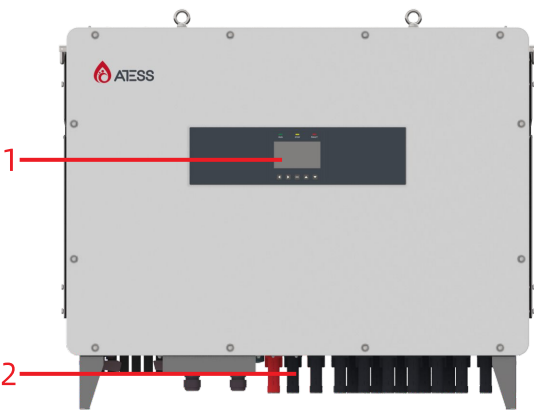


Figure 3-4-1-1 Inverter appearance

No.	Name	Description
1	Display	Inverter setting, browsing and operation status display
2	Cable inlet and outlet	For input and output power cable conneciton

Indicator

There are 3 LED indicators on the inverter which is used to display the current status of the inverter.

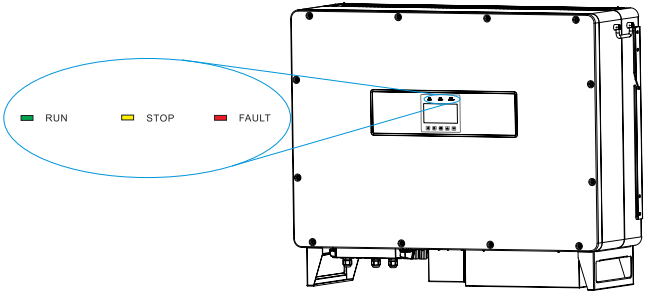


Figure 3-4-1-2 LED indicators

LED	Description
RUN	Lit when inverter is in normal operation
STOP	Lit when inverter is stopped
FAULT	Lit when inverter is in fault condition

Cable inlet and outlet

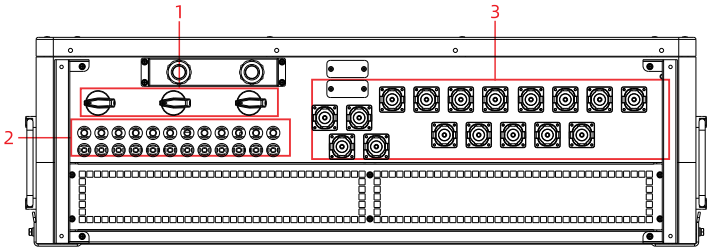
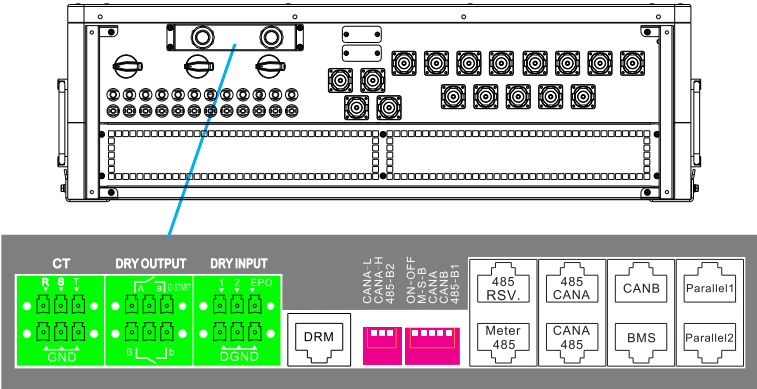


Figure 3-4-1-3 Inverter cable inlet and outlet

No.	Port	Description
1	SWITCH I	PV DC switch
2	INPUT I	PV cable gland
3	BAT/LOAD/GRID/GEN	Cable gland for BAT/LOAD/GRID/GEN

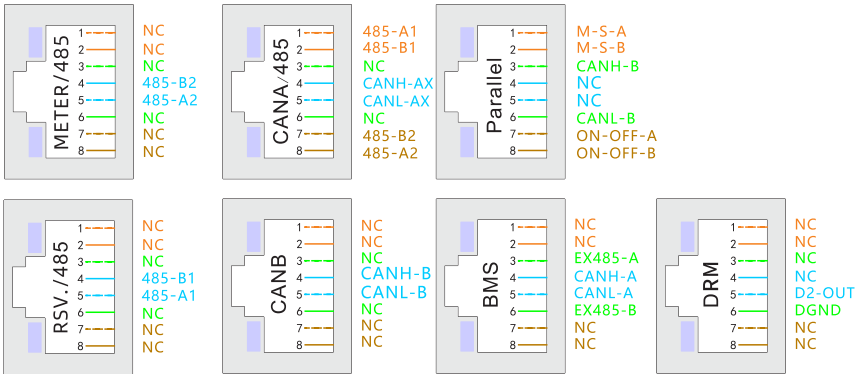
Communication port



SWITCH Details

No.	Name	Description
1	ON-OFF	Parallel matching resistance (120 Ω)
2	M-S-B	Parallel matching resistance (120 Ω)
3	CANA	CAN matching resistance (120 Ω)
4	CANB	Parallel matching resistance (120 Ω)
5	485-B1	Meter/485 matching resistance (120 Ω)
6	485-B2	RSV./485 matching resistance(120 Ω)
7	CANA-H/CANA-L	Parallel battery communication switch

RJ45 terminal



HPS100KTL COM Board Interface Description

Port Name	Port Explanation
485 Meter	485 communication port for the meter
CANA	Battery data sharing port
BMS	Battery communication port
CANB	AC coupling communication port
Parallel1/2	Parallel communication port
DRY INPUT	Dry contact input port
DRY OUTPUT	Dry contact output port
CT	CT connection port
ON-OFF/M-S-B/CANA/ CANB/485-B1/485-B2	Termination resistor DIP switch

For applications and detailed wiring, see Section 4.6.1.

DC/AC breaker

ATESS HPS100KTL doesn't have build-in AC and DC breakers, customers need to add their own breakers. The cable length from the external DC/AC breaker to the HPS should be less than 3 meters.

The AC main switch can be used to disconnect the AC interface of the inverter from the grid. The DC main breaker can be used to make the DC interface of the inverter disconnected from the battery assembly. If you use AC main breaker under load , the components of the inverter will be subjected to considerable voltage. Frequent use of the AC main switch can result in individual components damage due to voltage and may cause inverter failure.

3.5 Working mode

HPS100KTL is designed with flexible working modes:

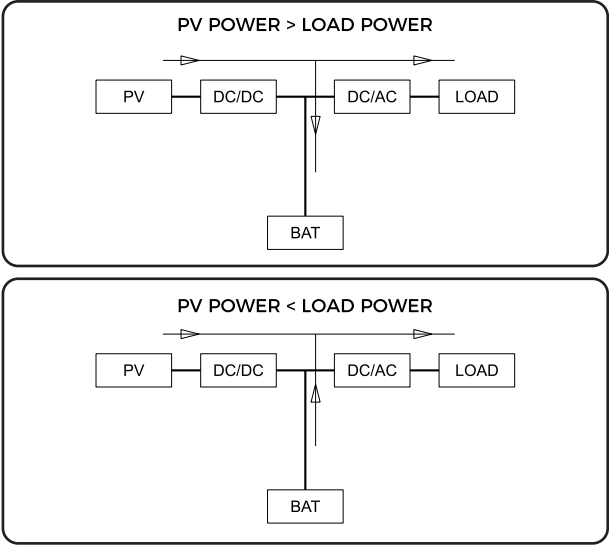
3.5.1. Off-grid mode

● **PV POWER >LOAD POWER**

When the PV power is greater than the load power, the PV gives priority to the load and the remaining power charges the battery.

● **PV POWER <LOAD POWER**

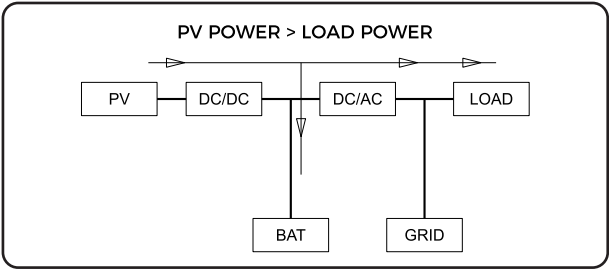
When the PV power is less than the load power, the battery discharges automatically. If the battery discharges to the undervoltage protection point, the HPS stops the AC output and transfers to the PV charging mode only, and the battery is charged to a certain level and resumes discharging.



3.5.2 On-grid load first mode

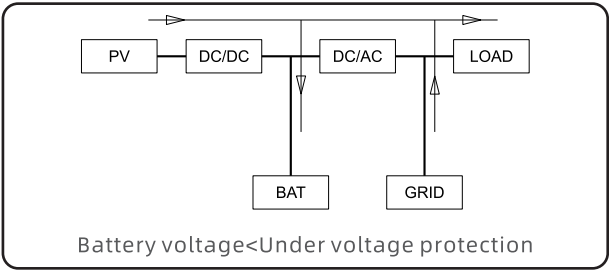
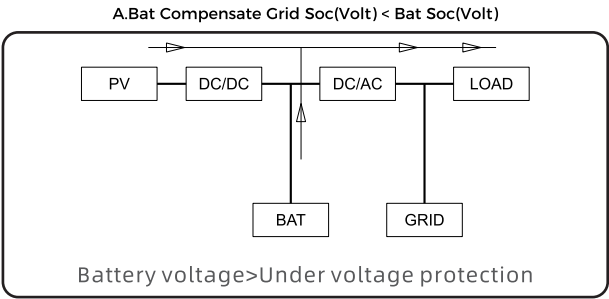
● **PV POWER > LOAD POWER**

When the PV power is greater than the load power, the PV gives priority to the load and the remaining power charges the battery.

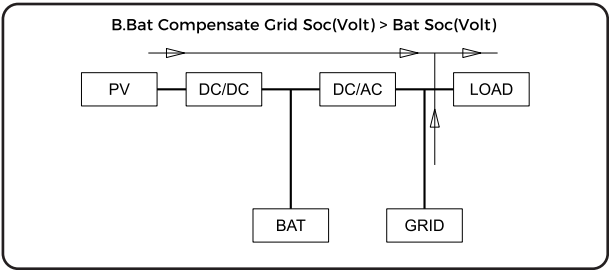


● PV POWER < LOAD POWER

Automatic battery discharge. If the battery is discharged to the undervoltage protection point, the PV and the grid together to the load power supply, in order to protect the battery, will use small power energy to the battery trickle charging, the battery charging to a certain level can be restored to the power supply.



Grid supplies the load.



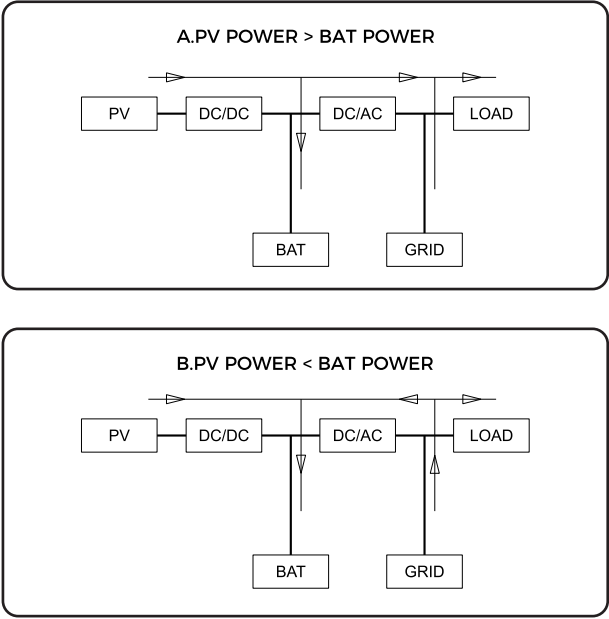
3.5.3 On-grid backup priority mode

Grid-connected battery priority mode

When the PV power is greater than the charging power, the PV gives priority to charging the battery and the surplus power is supplied to the load;

When the PV power is less than the charging power, the PV prioritises charging the battery and the grid supplies the load, while the grid also charges the battery.

If the grid-connected backup mode is not discharged or switched to other modes, in order to maintain the electrochemical activity of the battery, current-limited charging for one week, and then enter the battery discharge state, the battery discharge power is 20% of the rated output power.

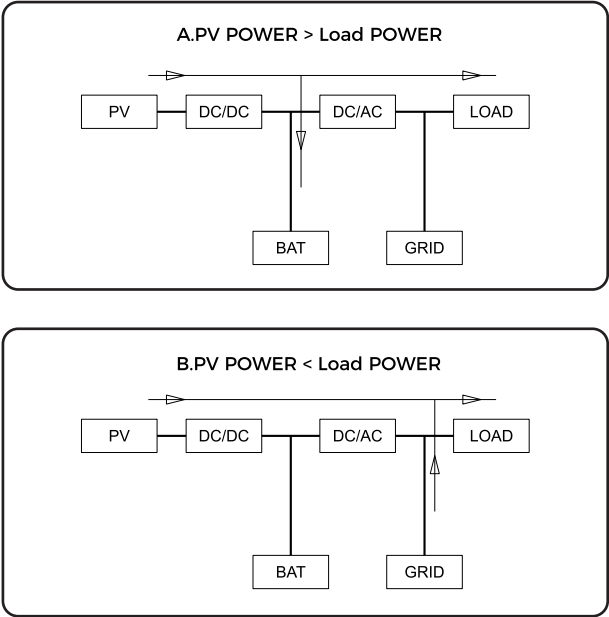


3.5.4 On-grid Economy Mode

On-Peak: Running Load Priority Mode

Off-Peak: Running Battery Priority Mode

Mid-Peak: The grid does not charge the battery and the battery does not discharge to carry the load. When the PV power is greater than the load power, the PV carries the load and the residual power charges the battery; when the PV power is less than the load power, the PV and the grid carry the load together.

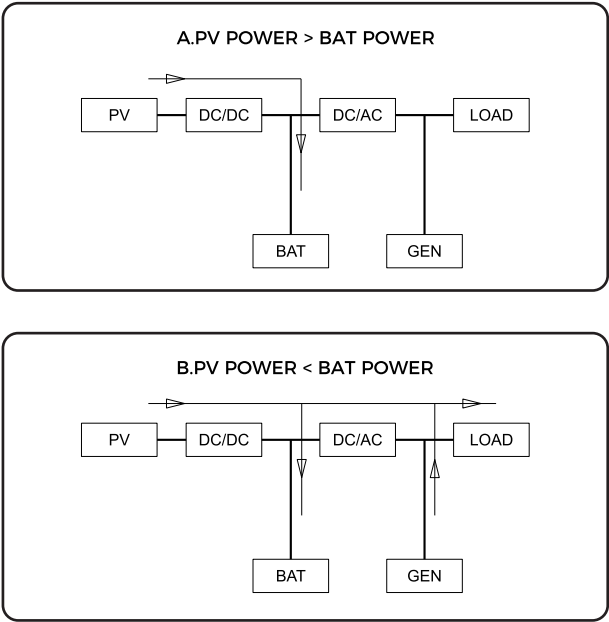


3.5.5 Generator Mode

When the PV power is greater than the battery charging power, the PV power is only used to charge the battery.

When the PV power is less than the battery charging power, priority is given to charging the battery; the generator supplies power to the load and optionally charges the battery.

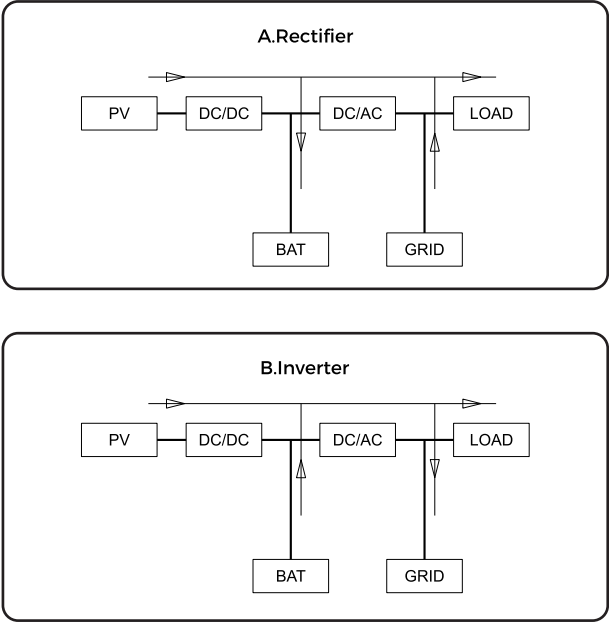
Tanker on and off is controlled by tanker dry contact, SOC screen for tanker on and off can be set.



3.5.6 EMS mode

In EMS mode, the HPS is fully controlled by the EMS for charging and discharging, and the machine's built-in standard work logic fails.

Controlled power has PV power, inverter rectifier power (when not connected to the grid, only PV power can be controlled, inverter power is automatically adjusted according to the load). When set to inverter, DC output to AC, when set to rectifier, AC to charge the battery.



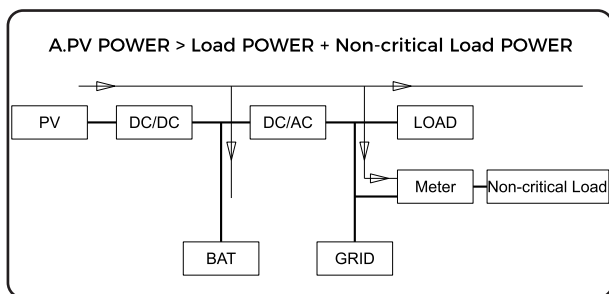
3.5.7 Smart Meter Mode

1) When the PV is greater than the sum of the critical loads, non-critical loads and battery charging power, the PV supplies power to the critical loads and non-critical loads, and the surplus power charges the battery:

a) The anti-reverse current enable is activated and the excess PV power may not be sent to the grid.

b) Anti-reverse current enable is not activated, excess PV power may be fed to the grid (feed power can be set).

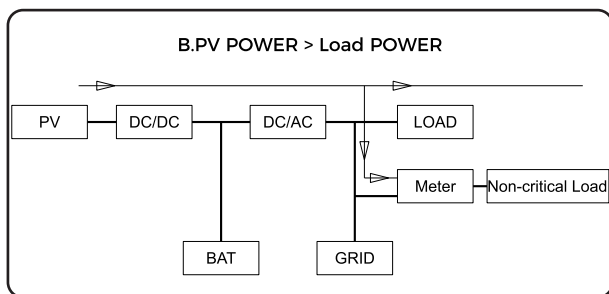
2) When PV is greater than critical loads and non-critical loads, but less than the sum of charging power of critical loads, non-critical loads and batteries, PV supplies power to critical loads and non-critical loads, and the remaining power charges the batteries.



3) When the PV is greater than the critical load, but less than the critical load and non-critical load, the PV gives priority to the critical load, and the surplus power is supplied to the non-critical load:

a) The battery sends power to the meter to enable activation, and the battery and PV together supply power to the non-critical loads;

b) The battery sends power to the meter to enable inactivation, and the PV and the grid jointly supply the non-critical loads.

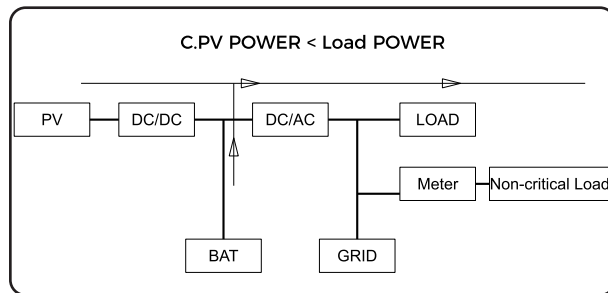


4) The PV is less than the critical load, and the PV and battery together supply power to the critical load:

a) The battery enables activation to the non-critical load, and the battery or the battery and the grid jointly supply power to the non-critical load.

b) Battery enablement to the non-critical load is not activated and the grid supplies power to the non-critical load.

Note: The sum of the inverter power of the PV and the battery must not exceed the rated power of the HPS.

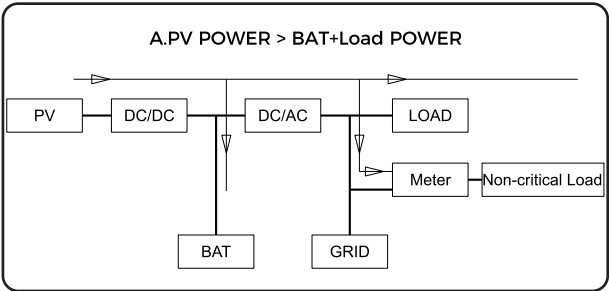


3.5.8 BAT-Smart Meter Mode

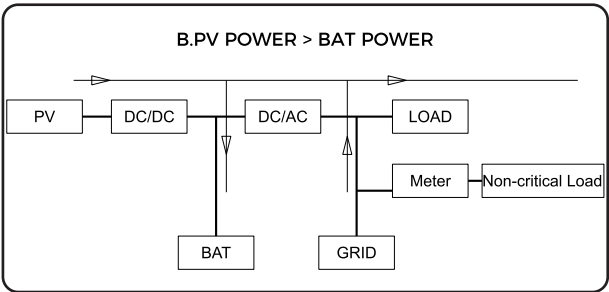
1) When the PV power is greater than the sum of the battery charging power and the critical load power, the PV prioritises charging the battery and supplying power to critical and non-critical loads:

a) The anti-reverse current enable is active and the excess PV power may not be sent to the grid.

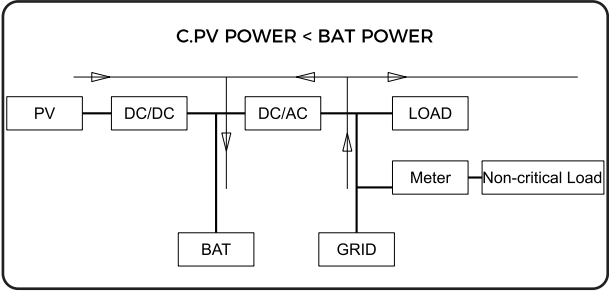
b) Anti-reverse current enable is off, excess PV power can be fed to the grid and the feed power can be set.



2) When the PV power is greater than the battery charging power, but less than the sum of the battery charging power and the critical load power, the PV gives priority to charging the battery, the excess PV power is fed to the critical load, and the grid feeds the remaining load.



3) When the PV power is less than the battery charging power, the grid gives priority to charging the battery and supplying the loads at the same time.



3.5.9 Muti-Stage (Dis)Charge Mode

(1) During non-set time periods, the system runs load priority mode.

(2) During the set time period

a. If the current voltage (SOC) is higher than the set value, the system operates in load priority mode, in which case the PV and the battery can be fed to the grid, and the feed power can be set.

b. If the current voltage (SOC) is lower than the set value, the system operates in battery priority mode.

3.5.10 On/Off-grid switch

Operation logic: When grid power on, HPS can switch into on-grid mode automatically, when grid power off, HPS can switch into off-grid mode automatically.

3.5.11 Fault mode

When the HPS energy system fails, the inverter will immediately disconnect the AC/DC contactor and enters into the fault mode, so as to ensure the safety of the system. Inverter continuously monitors fault status and will not enter charge and discharge mode until the fault is eliminated.

3.5.12 Permanent fault mode

When the HPS energy system fails, the inverter will immediately disconnect the AC/DC contactor and enters into the Permanent fault mode, so as to ensure the safety of the system. For example: inverter module failure etc. please contact your local dealer or ATESS directly when inverter enters permanent fault mode, repairmen on site is not allowed without authorization of ATESS.

3.6 Battery setting

Battery is an important part of energy storage system, strict protection is needed in the whole operation process. Protection threshold need to be set on HPS to ensure safe operation of battery, parameters including: battery quantity and unit quantity, capacity, charge current, discharge current, over voltage protection, under-voltage protection and so on. Battery parameter setting need to be done by professional personnel. Improper setting of battery will affect the normal working.

3.7 Storage

If there is a long time before installation or operation, the ATESS HPS100KTL should be stored appropriately.

- The packaging should be restored to its original state.
- Retain the desiccant in the packaging.
- The ATESS HPS100KTL can only be stored when it is stopped and all the doors are closed in a dry room to protect the internal circuits against dust and moisture.
- Storage temperature range: -40~60 °C
- Storage relative humidity range: 5 %~95 %
- Operating temperature range: -40~60 °C
- Operating relative humidity range:5 %~95%
- Max. altitude:2000 m



CAUTION

- Strictly prohibited storage without packing!
- Avoid storage in direct sunlight!
 - Keep upright and no stacking on top of the crate.

3.8 Packaging information

No.	Name	Unit	Quantity
1	Inverter main unit	pcs	1
2	Wall-mounting accessory	set	1
3	Expansion bolt	set	4
4	User manual	pcs	1
5	Certificate	pcs	1
6	PV array terminal	set	1
7	M5 Hex Wrench	pcs	1
8	M6 Hex Wrench	pcs	1
9	Waterproof Cover Unlocking Tool	pcs	2
10	5m Parallel Communication Cable	pcs	2
11	Current Transformer (CT)	pcs	3
12	CT Sampling Cable	pcs	3

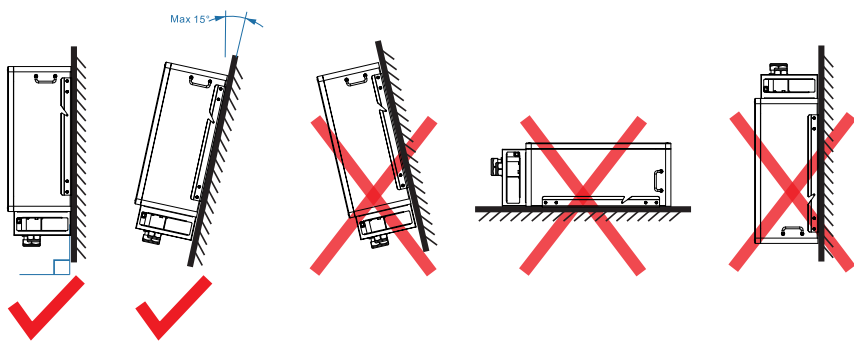
Table 3-8-1 Packaging information

4 Products Installation

4.1 Installation condition requirements

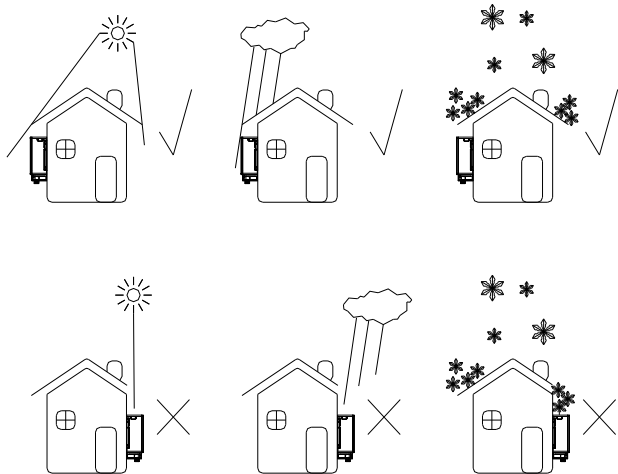
To ensure normal operation of the machine, the installation environment is required as follows:

- A. The wall for mounting HPS should be solid and able to bear the weight of HPS in the long term.
- B. Installation space should be sufficient to cover HPS dimension, HPS dimension and installation gap please see below photo.
- C. Do not install HPS on flammable or heat vulnerable materials or buildings.
- D. Do not install HPS in a space without good ventilation or dusty, it will cause low cooling fan efficiency, then reduce HPS efficiency, the fan and fan cover should be checked and cleaned every 6 months.
- E. To avoid overheat and power derating, please do not expose HPS under the sun
- F. Environment temperature around HPS should be $-40\sim 60\text{ }^{\circ}\text{C}$.
- G. HPS can be installed on vertical or tilted surface as shown in below figure:

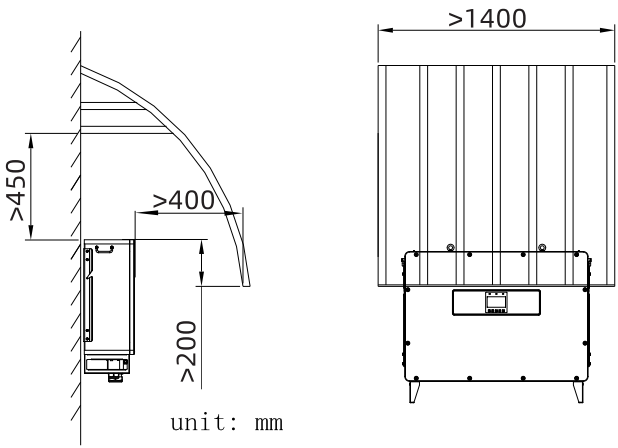


4.2 Installation environment

Although HPS is with IP65 protection level, it is not recommended to install it under direct sun or direct rain/snow to ensure long term performance, below installation environment for reference:

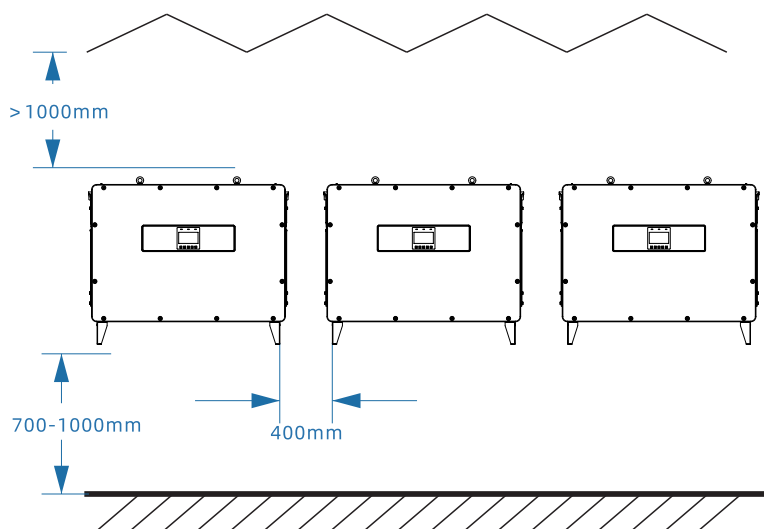


To avoid inverter life span decrease, it is recommended to install shading shield on top of inverter, distance between inverter and top shield please refer to below figure:



4.3 Space requirement

When installing HPS, reasonable distance should be kept for maintenance and ventilation, please refer to below figure:



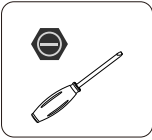
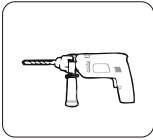
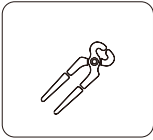
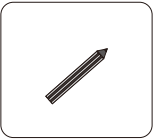
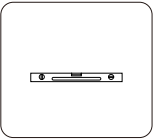
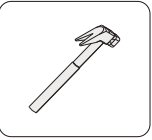
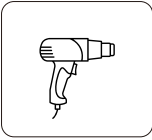
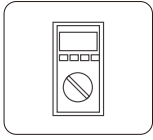
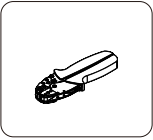
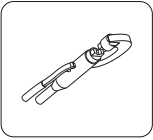
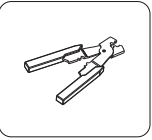
Warning:



When environment temperature is too high, inverter derating is normal operation, but if derating occurs frequently, please check inverter heat dissipation surface or consider to move inverter to area with better ventilation. If fan is dirty please clean, if inverter inner fault please seek for professional service.

4.4 Tools for installation

Tools and spare parts required for installation is as follows:

				
Slotted screwdriver	Cross screwdriver	Percussion drill	Wire cutter	Work gloves
				
Work shoes	Spanner	Marker	Level	Rubber hammer
				
Heat gun	Multimeter≥1100 Vdc	RJ45 crimping plier	Hydraulic crimper	Wire crimper

4.5 Mechanical installation

4.5.1 Installation of wall-mounting kit



Before installing the wall-mounting kit, please check and make sure there's no electric cable and gas pipe in the location of installation.

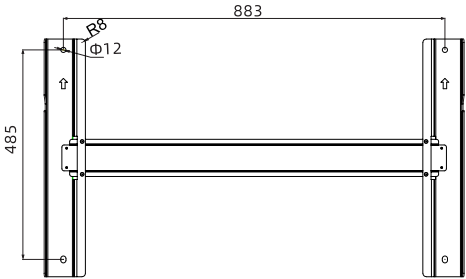


Figure 4-5-1-1 installation gap

Steps:

A: Please drill the hole according to the hole mask.

B: Please install the expansion bolt as shown.

C: Please install the wall hanger as shown in the picture.

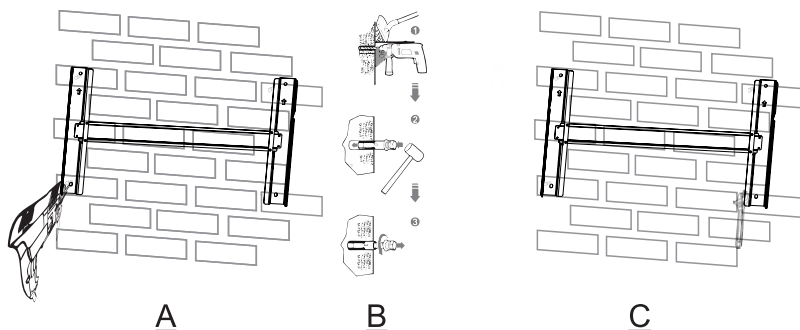


Figure 4-5-1-2 bracket installation



Note: wall-mounting bracket must be installed first before installing HPS

4.5.2 Installing HPS

Install HPS and stand-alone wiring diagrams, as well as parallel wiring diagrams

A. keep the inverter balance when hanging it to the bracket.

B. Tighten the fixing screw.

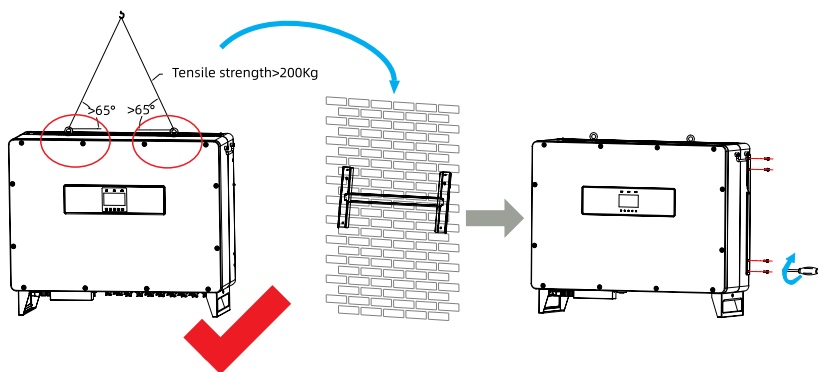


Figure 4-5-2-1 Hanging of inverter (Correct example)

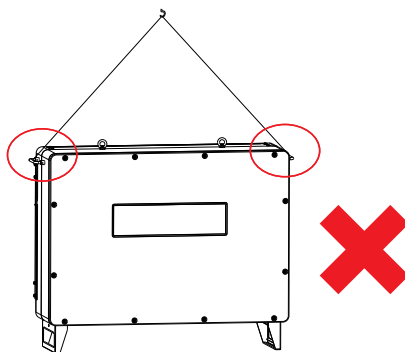


Figure 4-5-2-2 Hanging of inverter (Incorrect example)



Lifting by the handles is strictly prohibited.

4.6 Electrical installation

4.6.1 Electrical Parallel Wiring Diagrams

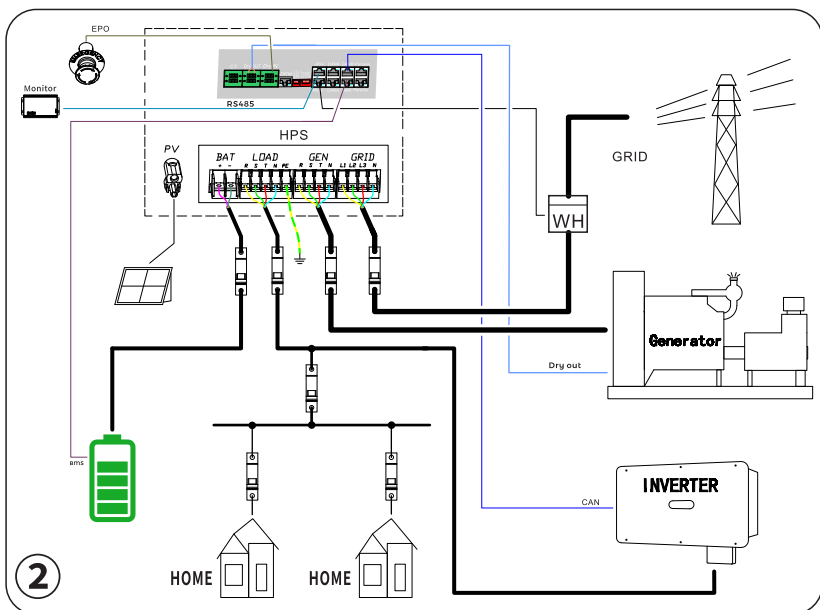
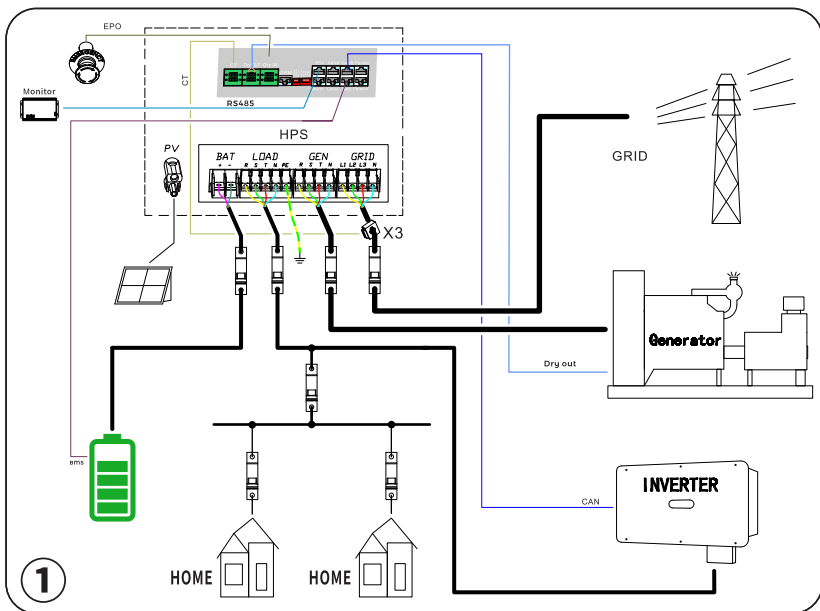
The wiring diagrams are as follow.

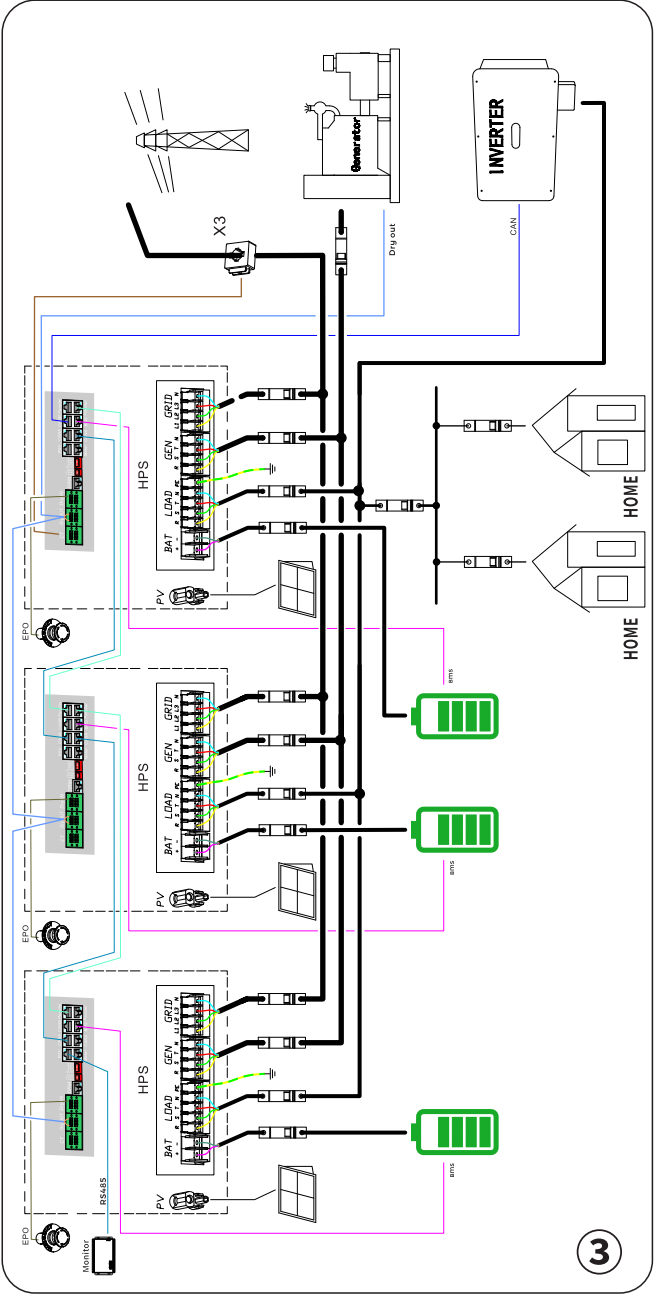
- ① Single-unit CT-based Anti-reverse Solution
- ② Single-unit Meter-based Anti-reverse Solution
- ③ Parallel System with Independent Battery CT and Anti-Reverse Solution
- ④ Parallel System with Independent Battery Meter and Anti-Reverse Solution

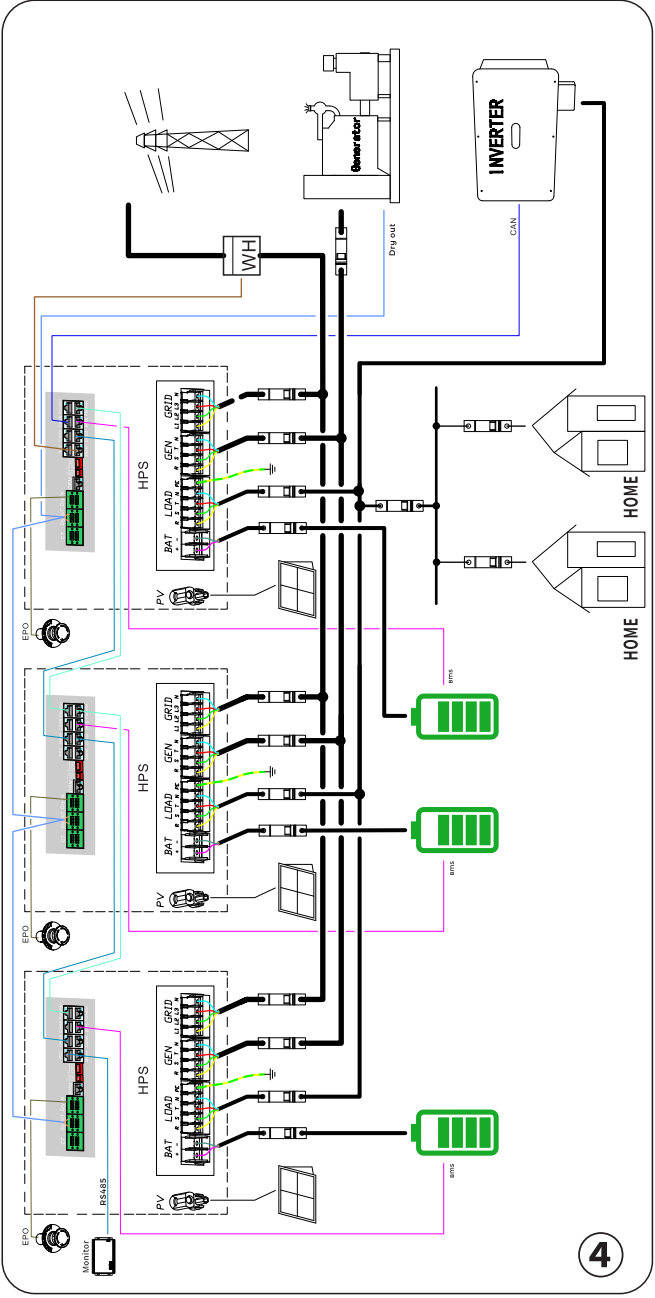


Parallel System Wiring Requirements for Power Lines:

When using HPS100KTL in a parallel system, please ensure that the power cables for the generator, battery, load, grid, and PV are of the same length and cable type. This is to ensure balanced current flow between the units during parallel operation.







4.6.2 Input and output requirements



NOTICE

Caution, risk of danger

- There is a danger of electrical shock of high voltage in inverter’s operation; only electricians of professional skills can operate.
- All connections with this equipment shall be done under non-voltage state.
- The inverter may be damaged if input or output terminal is ncorrectly plugged.

Failure of acting upon this information may cause serious.

1) Battery

Battery string voltage should not exceed 900V, or else inverter will be in faulty mode.

2) Three-phase grid

Inverter will continuously inspect whether the grid satisfy the grid connected conditions. The following is the grid limit for satisfaction of local Grid connected conditions (requirements in different countries may vary, the value can be setup and please refer to local grid connected regulations for details), and the grid is three-phase grid. Meanwhile, it shall be permitted by local power supply department before install Grid-connected inverted power.

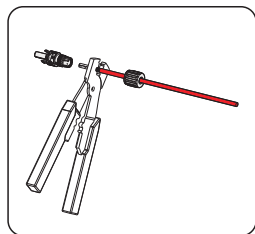
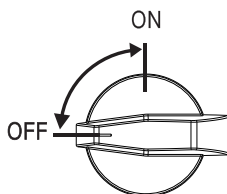
Model	ATESS HPS100KTL
Grid Voltage Limit	360V~440V
Grid Frequency Limit	47HZ-51.5HZ/57HZ-61.5HZ

Cable (Cu)	Cable Diameter Requirements (mm²)	Aperture
Model	ATESS HPS100KTL	
PV +-	Input cable with each at least 4 mm²	/
BAT +-	Cable with each at least 50 mm²	M6, 7N*m
Grid input L1 L2 L3	Input cable with each at least 50 mm²	M6, 7N*m
GEN input R S T	Input cable with each at least 50 mm²	M6, 7N*m
Load output U V W	Input cable with each at least 35 mm²	M6, 7N*m
Communication Wire	0.25mm², shielded twisted pair is recommended	M2,0.2N*m
Earth Wire	More than 6 mm².Green and yellow is recommended	M6, 7N*m
N wire	25/35 mm² cables are recommended; the appropriate size shall be selected based on the load imbalance.	M6, 7N*m

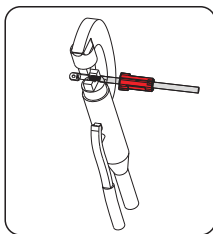
4.6.3 Preparation before cable connection

The specific steps are as follows:

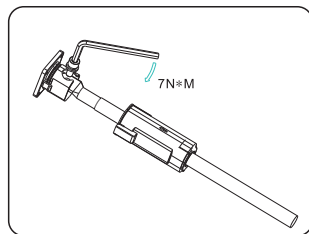
Turn off the AC and DC switches. As shown in the figure below, the PV switch is in the "OFF" state.



Strip Wire



Crimp Terminal



Tighten Screw

1. Strip PV Wire: Slide the nut onto the PV cable and use a wire stripper to expose the inner conductor.
2. Crimp Terminal: Slide the housing onto the cable, insert the bare wire into the terminal, and crimp securely with a crimping tool.
3. Fasten Copper Lug: Reverse-lock the copper lug onto the terminal and use a hex key to tighten it to a torque of 7 N*M.

4.6.4 DC side wiring

NOTICE

Caution, risk of danger



1. ATESS HPS100KTL of AC and DC, do not have switches or circuit breakers, customers need to add their own switches.
2. The positive and negative of the battery shall not be connected in reverse. A multimeter shall be used to determine the polarity first, and then connect into the corresponding input ends of the inverter. Specific procedures are as follows:

Step 1: Cut off the distribution circuit breaker at the DC side, and ensure that no voltage on the wire at DC side.

Step 2: Confirm the battery positive and negative voltage within range with a multimeter.

Step 3: Confirm the negative and positive pole with a multimeter

Step 4: Peel the insulation layer of cable

Step5: Fix cable lug

1. Place the stripped copper core into the crimping holes of the cable lug

2. Press the cable lug with the terminal crimping machine. The number of crimps should be more than two

Step 6: Fix heat shrinking tube

1. Choose heat shrink tube according to cable size, and cut about 5cm

2. Fix the tube to cable, cover the lug hole

3. Use air heater to blow the tube and make it shrink

Step 7: Connect the "Bat+" end of the energy storage controller to the positive terminal of the battery pack with a cable.

1. Pass the cable through the PG waterproof connector.

2. Secure the copper noses at the ends of the wiring to the "Bat+" end of the energy storage controller and the positive terminal of the battery pack.

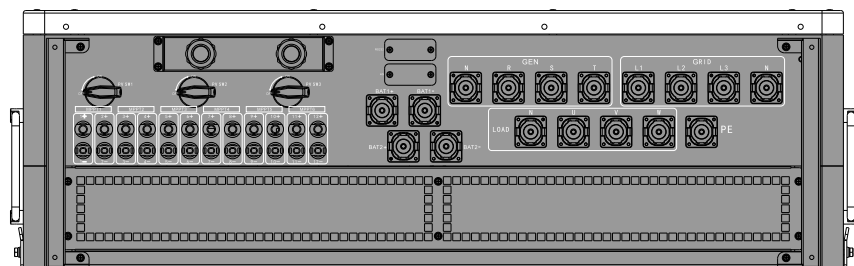
3. Fasten the bolt with a screwdriver or wrench

Step 8: Connect the "Bat -" end of the energy storage controller to the negative terminal of the battery pack by cable according to the method of step 7.

Step 9: Connect the "PV+" end of the energy storage controller to the positive pole of the battery board by cable according to the method of step 7.

Step 10: Connect the "PV-" end of the energy storage controller to the negative pole of the battery board by cable according to the method of step 7.

Step 11: Make sure the wiring is secure; tighten the PG waterproof connector



4.6.5 AC side wiring



NOTICE

Caution, risk of danger

When connecting the AC grid, cut off the circuit breaker at the AC side to ensure that the AC wire connecting to terminals has no electricity.

Connect AC grid:

- 1) Cut off the circuit breaker at AC side, to ensure that the AC wire connecting to terminals has no electricity. Confirm it with a multimeter.
- 2) Confirm the phase sequence of grid
- 3) Peel the insulation layer of cable
- 4) Thread the cable through the waterproof cover first, then crimp the cable lug.
- 5) Fix heat shrink tube
1. Choose heat shrink tube according to cable size, and cut about 5cm
2. Fix the tube to cable, cover the lug hole
3. Use air heater to blow the tube and make it shrink
- 6)

The diesel generator should be connected to the HPS terminals GEN-R, GEN-S, GEN-T and GEN-N, and the grid should be connected to terminals Grid-L1, Grid-L2, Grid-L3 and Grid-N.

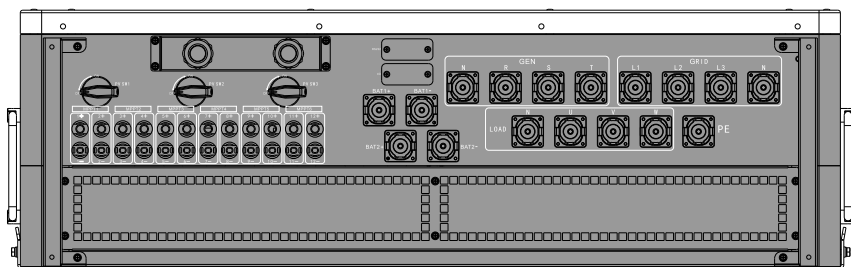


Figure 4-6-1-1 AC output cable connection

4.6.6 Earthing

Inverter must be earthing well for safety; Please make sure of the connection between PE in power distribution cabinet and PE terminal in the inverter good; and make sure the earthing cable more than 6mm² and the earthing resistance must below 4 OHM.

Inveter earthing busbar please refer to above photo cable inlet and outlet are on the bottom of inverter, after finishing connection, tighten the cable tighten gland.



Note: the PE busbar is for grounding inside inverter, please do not change to avoid electric shock risk

4.7 Communication

The HPS series hybrid energy storage system has multiple communication modes. When users need to monitor the operation status of the energy storage and discharge system, RS485 serial port or CAN communication mode or WIFI or 4G can be used for power supply.

4.7.1 RS485

Users can directly use the RS485/RS232 converter for host computer communication. The HPS communicates with the HPS through RS485, and finally communicates with the PC through the RS485 to RS232 datalogger, runs the monitoring software in the PC, and monitors the running status of the single/multiple energy storage controllers in real time.

RS485 communication line uses terminal blocks at both ends, and RS485 communication lines are made by parallel connection of terminals at both ends. The length should not exceed 1000 meters. As shown in Figure 4-7-1-1.

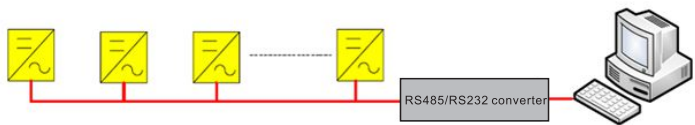


Figure 4-7-1-1 PC monitor through RS485

4.7.2 CAN communication

Rate of CAN communication is between 100K and 500K, and the shielded twisted pair is used for communication to ensure communication quality.

4.7.3 4G communication

4G is an optional configuration, need to buy 4G communication module.

4.8 Installation inspection

Before the inverter is put into operation, it shall be inspected for installation. Two working men or more shall inspect to ensure correct installation of all installation according to the following table.

Mechanical inspection	
☐	Inverter's bottom is fixed, and the support is stable and reliable.
☐	Enough space is left around inverter.
☐	The ambient temperature, humidity and ventilation satisfy requirements.
☐	Smooth flow of cooling air.
☐	Complete and reliable sealing protection of cabinet.
☐	No deformation and damage to inverter.

Electrical Installation Inspection	
☐	Complete and firm grounding of inverter.
☐	Grid voltage matching the rated input voltage of inverter.
☐	Correct phase sequence of grid connection, and tightening torque meeting requirements.
☐	Correct connection of DC input anode and cathode, and tightening torque meeting requirements.
☐	Correct connection of communication lines, and maintaining a certain distance to other cables.
☐	Mechanical Installation Items Inspection
☐	Other Inspections
☐	All useless conductive parts tied with insulating ribbon.
☐	No tools, spare parts, conductive dust generated from drilling or other matters left inside the cabinet.
☐	No condensed humidity or icing inside the cabinet.

Table 4-8 Installation Inspection List

5 Pilot Operation

The chapter will introduce the procedure of pilot operation, including checking battery voltage, input and output connecting, other preparation working.

5.1 Relevant requirements

Before pilot operation, the installation conditions of the equipment shall be examined thoroughly, in particular whether voltages at DC and AC ends are consistent with inverter's requirements, and whether the polarity etc. are correct. Inspect if the system connection meets requirements in relevant standards or codes and if the system is grounded well.



CAUTION!

Before pilot operation, all switches at AC side and DC side shall ensure to be cut off.

5.2 Inspection

5.2.1 Inverter inspection

Before power on the inverter, please carry out inspections as the following procedures:

Step 1: Inspect inverter's installation and wiring conditions based on the Installation

Inspection List in Table 4-8

Step 2: Ensure the AC&DC circuit breakers are cut off

5.2.2 Grid voltage inspection

Inspect whether the three phases of the inverter is correctively connected with the three phase sequence of the grid. Inspect whether the line voltage and frequency are within the prescribed range, and record the value. If possible, measure the phase THD (Total Harmonic Distortion), and inspect the curve. If distortion is serious, the inverter may fail to operate.

**CAUTION!**

When connecting the load, make sure that the three-phase of the load is corresponding to the three-phase of the HPS, otherwise it will cause the motor to reverse.

5.2.3 DC side voltage inspection

The DC side consists of two parts, from the confluence box or the DC distribution cabinet to the HPS and from the storage battery to the HPS. Ensure that the direct current from the confluence box or DC distribution cabinet is connected to the PV terminal of HPS and is in sequence.

- Make sure the DC input polarity is correct.
- Measure and record each DC (open circuit) voltage. The voltage value of each channel should be almost the same and should not exceed the maximum allowable DC voltage value.
- Battery voltage check, battery parameter setting check

5.3 Power on steps

First power-on

Step 1: Close AC circuit breaker

Step 2: Close DC circuit breaker

Step 3: PV DC switch to ON position

Step 4: Click start on inverter display and wait till 'grid connecting

Note: when system is powered, 60S later about display will lit

Manual turn-off

During operation, you can click the shutdown button on the LCD, at this time the inverter stops working and stops sending power to the grid



Warning:

- After manually shutting down, you must press the power button on the LCD, otherwise cannot start automatically.
- Still powered after manual shutdown

5.4 Pilot operation completion

The following procedures shall be carried out after the inverter is normally in operation.

Procedure 1: Inspect whether abnormality exists in the inverter, such as excessive noise, excessive heat, abnormal smell or smoke.

Procedure 2: Measure whether inverter voltage, current and THD are stable.

Procedure 3: Operate LCD control panel and inspect whether it displays normally and accurately.

By now, the pilot operation of inverter is fully completed, and we can enter the daily operational maintenance.

5.5 Power off steps



CAUTION!

After the inverter is completely powered off, the general DC switch at battery side and the Grid switch at grid side still maintain voltage. If operations are needed, please be sure to cut off the outer power completely, and wait for not less than 20 minutes

1. Click the OFF button on LCD or turn the off-on knob from ON to OFF;
2. Cut off DC SWITCH;
3. Cut off GRID switch and load switch



During the power-off process, the energy storage controller sends an alarm as normal. You can continue the power-off step

6 HMI

6.1 Introduction to touch screen

Users can view the operation information of the energy storage controller on the LCD touch screen, as well as set the operating parameters of the energy storage controller. For ease of operation, the following is a distribution diagram of the LCD menu logic structure.

After the LCD is powered on, enter the boot interface, and about 15S enter the interface home page. At this time, you can start to operate the relevant keys for information review and parameter setting.

The upper right of each page shows the communication status between the LCD and the energy storage controller control board, the station number of the communication end where the energy storage controller is located, the system time, etc.

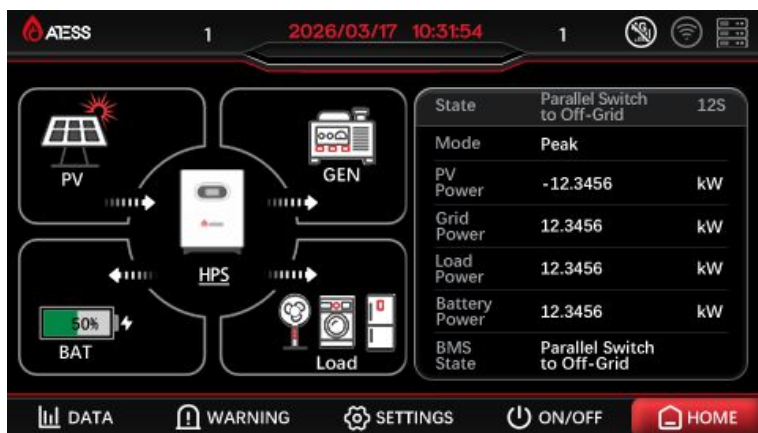
At the bottom of each page are five common function buttons: "Operating Data", "Historical Data", "System Settings", "Power On/Off", and "Home". With these five common keys, users can operate easily and quickly. On the left side of the interface, the submenu buttons corresponding to the above five commonly used keys are displayed, and the selected buttons are marked in green.

Operating Data	Warnings	System Settings	On/Off	Home
	Current fault	Language Settings		
	History fault	Time setting		
		Device information		
		Equipment maintenance		

6.2 Touch screen operation

6.2.1 Main page

Click the [HOME] button at the bottom of any other interface to enter this page.



a. In the top middle part of the screen is the date and time. If the device is connected to the internet, the screen will obtain the latest date and time from the server. If the device is not connected to the internet, the date and time need to be set correctly manually because the fault information and charging/discharging records will use this time. If the time is incorrect, it will affect the viewing of the fault information and charging/discharging records.

b. On the upper right of the screen is the network symbol, on the left is the Bluetooth symbol, indicating that the device is waiting to connect to the APP via Bluetooth. In the middle is the WIFI symbol, indicating that the device is waiting to connect to the server via WIFI. On the right is the server connection symbol. If it is on, it means the device has connected to the server.

c. The icons on the left side of the main screen include PV, grid, battery, load and inverter. By clicking on the icons on the left, the relevant parameters will be displayed on the right side. For example, after clicking the PV icon, the voltage and current of each PV path will be shown on the right side.

d. At the bottom of the main screen, from left to right, they are DATA, WARNING, SETTINGS, ON/OFF, and HOME. Clicking on DATA allows you to enter the DATA page to view the voltage, current, power, etc. data of the device during operation. Clicking on WARNING enables you to enter the WARNING page to view the faults that occurred with the device. You can compare the fault table to view the fault information. Clicking on SETTINGS takes you to the SETTINGS page to set the device parameters. Clicking ON/OFF leads you to the ON/OFF page to turn on and off the device.

6.2.2 Power On/Off

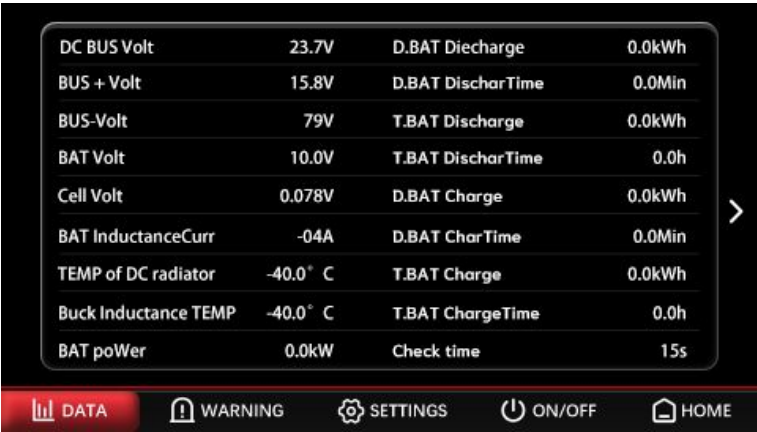
Boot: Click "ON" to boot the system.

Shutdown: Shut down, click "OFF" to shut down.



6.2.3 Operating Data

Operational data: Displays the current energy storage generation parameters and real-time data including grid voltage, grid frequency, grid current, battery voltage, battery current, temperature in the chassis, and total power generation time (real-time update).



6.2.4 System settings

Language settings: Select the interface language under this page, currently only two languages, Chinese and English.



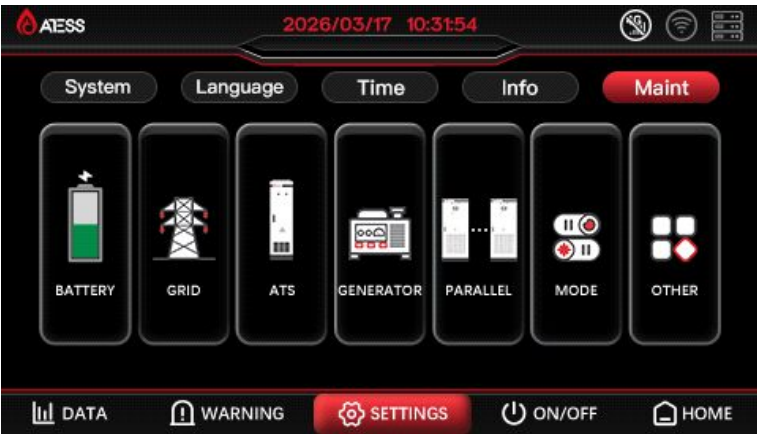
Time: Set the system time under this page (you can modify it here when the time and date displayed by the LCD do not correspond to the actual local time date).



Information: The manufacturer, serial number, software and hardware version information, and factory date information are displayed under this page, which only shows that it cannot be modified.



Maintenance: The interface requires a password to log in, the password is provided by technical support, only electricians or maintenance personnel who are fully familiar with the composition and working principle of the entire equipment system can operate this item, so as not to cause damage to personal safety and energy storage controller performance, please operate with caution.



Protection parameters

Battery	CurrentValue	Setvalue	Return
BAT Group Num	1	0	
BAT Cell Num	7	0	
BAT Group Capacity (Ah)	79	0	
BAT (Dis)Charge Current (A)	99	0	
BAT Char Current Limit (A)	118.0	0	
BAT Dishar Current Limit (A)	100	0	
Float Charge Volt (V)	3.520	0	

Battery group num: The number of battery modules connected in parallel. If 2V/200Ah, 240 strings are 2 merged, the number of groups is 2.

Battery cell num: The number of individual cells of the battery module.

BAT Capacity: single battery capacity, unit Ah. If 2V/200Ah, 240 series 2 merge, the capacity is 200Ah.

BAT discharge current: the size of the battery discharge current.

BAT. Charge cur limit, BAT discharge cur limit: battery current protection value. Used to determine whether the battery is over-current.

Float Charge Volt: After the battery is fully charged, it maintains a constant voltage to keep the battery's power level stable, which is used to counteract self-discharge and prevent overcharging.

Battery	CurrentValue	Setvalue	Return
BATUnder Volt Warning (V)	2.300	0	
BAT Under Volt Protect (V)	2.000	0	
BAT Over Volt Protect (V)	3.500	0	
BAT Start Volt (V)	1.000	0	
Discharge Recovery SoC (%)	21	0	
Discharge Recovery Volt (V)	3.000	0	
Discharge Cut-off SOC (%)	30	0	

BAT Under Volt Warning ,BAT Under Volt Protect: To prevent the battery voltage from being too low, an alarm or fault report will be triggered when the battery voltage drops below this value.

BAT Over Volt Protect: Prevent the battery voltage from exceeding the limit. If the battery voltage rises above this level, a fault will be reported.

BAT Start Volt: Only when the voltage of a single battery cell is greater than this value, can it be considered to be connected to the battery.

Discharge Recovery SOC, Discharge Recovery Volt: The current battery's SOC or voltage must be greater than this value before it is permitted to be discharged.

Discharge Cut-off SOC: When the state of charge (SOC) of the battery is lower than this value, discharging is not permitted.

Battery	CurrentValue	Setvalue	Return
BAT Cut-off Volt (V)	2.950	0	
Charge Cut_off SOC (%)	99	0	
Charge Cutoff Volt (V)	3.520	0	
BMS Communication Enable	1	0	
BAT SOC or Volt	1	0	
Float Charge Volt Limit (V)	0.20	0	
Soft Start Diff of Voltage (V)	50	0	

BAT Cut-off Volt: The battery is not allowed to discharge when its voltage is lower than this value.

Charge Cut-off SOC, Charge Cut-off Volt: When the state of charge (SOC) or voltage of the battery exceeds this value, charging is not permitted.

BMS Communication Enable: 1 - Communicating with the battery. 0 - no communicating.

BAT SOC or Volt: 0 - Through voltage control. 1-Through SOC control

Float Charge Volt Limit: When the difference between the battery voltage and the float charging voltage is less than this value, the charging current will be restricted.

Soft Start Diff of Voltage: Used for controlling the soft start of the bus voltage.

Battery	CurrentValue	Setvalue	Return
Charge-state to Offline Bat-V (V)	2.800	0	
Trickle Charge Set (kw)	1.6	0	

Charge-state to Offline Bat-v: Only when the battery voltage exceeds this value will the off-grid mode be activated and the battery start discharging.

Trickle Charge Set: When the battery voltage reaches the discharge cut-off voltage, it will charge at this voltage level.

Grid	CurrentValue	Setvalue	Return
Output Volt (V)	400	0	
Output Freq (Hz)	50	0	
Output Power Limit (%)	105	0	
Max Import from Grid (kw)	100	0	
Max Export to Grid (kw)	35	0	
Zero Export Enable	0	0	
Grid Charge Power (kw)	96.0	0	

Output Volt: Set the off-grid output voltage, you can set 380 or 400, which can be changed according to actual needs, and you need to power off and restart after the change to take effect.

Output freq: Set the AC output frequency, you can set 50 or 60, you can change it according to actual needs, and you need to power off and restart after the change to take effect.

Output Power Limit: The maximum percentage of power fed into the power grid.

Max Import from Grid: The maximum power obtained from the power grid.

Max Export to Grid: The maximum power fed into the power grid.

Zero Export Enable: 1-Cannot feed power back to the power grid.

Grid Charge Power: The power for charging the battery by drawing electricity from the power grid.

Grid	CurrentValue	Setvalue	Return
Grid & PV Charge Enable	0	0	
Max Grid Volt (V)	440.0	0	
Min Grid Volt (V)	340.0	0	
Max Grid Freq (Hz)	51.00	0	
Min Grid Freq (Hz)	48.00	0	
Grid Charge Stop SOC (%)	99	0	
Grid Charge Stop Volt (V)	3.300	0	

Grid & PV Charge Enable: 1 - The power grid and PV can charge the battery simultaneously.

Max Grid Volt: The upper limit of the grid voltage, beyond which it will be cut into off-grid mode, which is set by 110% of the rated value.

Min Grid Volt: The lower limit of the grid voltage, below which it will cut into off-grid mode, and the default setting is 85%.

Max Grid Freq: The upper limit of the grid frequency, beyond which it will switch to off-grid mode, the default setting is rated +2.

Min Grid Freq: Lower grid frequency, below which it switches into off-grid mode, with the default setting of -2.

Grid Charge Stop SOC, Grid Charge Stop Volt: When the battery voltage reaches the set SOC or voltage value, the process of drawing power from the grid to charge the battery will be stopped.

Grid	CurrentValue	SetValue	Return
BAT to Non-Critical Enable	1	0	
Parallel Addr Switch Enable	0	0	

BAT to Non-Critical Enable: 1 - Powering non-critical loads using battery energy.

Parallel Addr Switch Enable: Reserved.

Generator	CurrentValue	SetValue	Return
Max GEN Power (kw)	11	0	
Max GEN Charge Power (kW)	6.0	0	
GEN Enable	1	0	
GEN Charge Enable	0	0	
GEN Start Volt (V)	4.000	0	
GEN Start SOC (%)	61	0	
GEN Stop Volt (V)	4.000	0	

Max GEN Power: The maximum power obtained from the generators.

Max GEN Charge Power: The power for charging the battery by drawing electricity from the generators.

GEN Enable: 1 - When there was no power grid, we used diesel generators.

GEN Charge Enable: 1 - When using the generator, it is permitted to charge the battery.

GEN Start Volt, GEN Start SOC: When the battery's Volt or SOC is lower than this value, start the generator.

GEN Stop Volt: Turn off the generator when the battery voltage exceeds this value.

Generator	CurrentValue	SetValue	Return
GEN Stop SOC (%)	1	0	
GEN Manual Control	0	0	
GEN CombinedLoad Enable	0	0	
GEN DisCharge Stop SOC (%)	0	0	
GEN Discharge Restore SOC (%)	0	0	
GEN Output Loadpower (kw)	0	0	
GEN Output LoadPower (%)	0	0	

GEN Stop SOC: Turn off the generator when the battery SOC exceeds this value.

GEN Manual Control: Manually switch on the generator. This is one of the conditions for controlling the generator.

GEN Combined Load Enable: 1 - Generator and battery operating in parallel to supply power.

GEN Discharge Stop SOC: When the battery's SOC drops below this level, it will not discharge. Instead, the load will be solely powered by the generator.

GEN Discharge Restore SOC: When the battery's SOC exceeds this value, resume discharging and operate in parallel with the generator to supply power.

GEN Output Loadpower(KW): The combined load capacity of the generators

GEN Output LoadPower(%): Generator combined load-sharing ratio.

Parallel	CurrentValue	Setvalue	Return
Number of parallel units	1	0	
Parallel Redundant	0	0	
Parallel Addr	1	0	
Parallel Enable	0	0	
Battery Share Enable	0	0	

Number of parallel units: The total number of devices in the parallel system, 2 devices are set to 2 and 3 are set to 3.

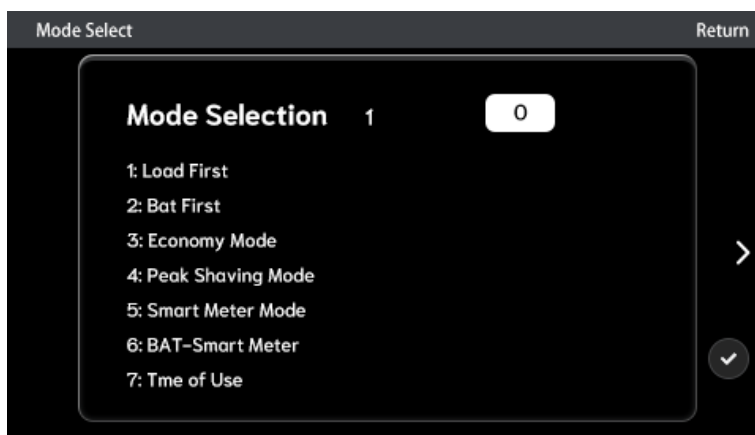
Parallel Redundant: The maximum number of faults that can be faulted in the parallel system can only be set to 0 or 1. When set to 0, when any device in the parallel system fails, all devices will be transferred to the fault; Set to 1, when the number of faults is not greater than 1, other devices still operate normally (the maximum number of supported faults is 1).

Parallel addr: The sequencing of this equipment in the parallel system.

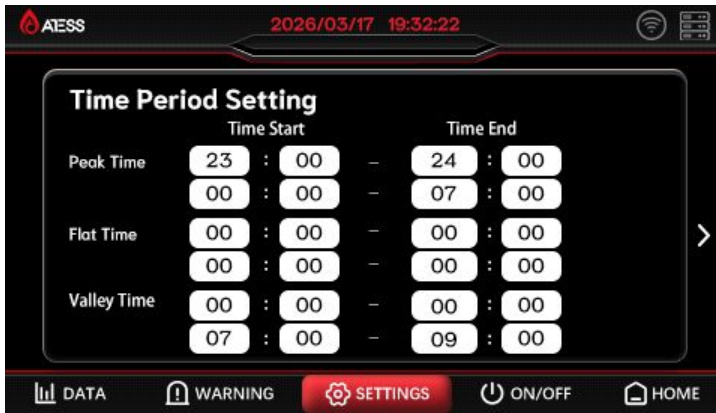
Parallel Enable: If set to 1, the parallel function is enabled, and all devices participating in parallel must be set to 1.

Battery Shared Enable: If set to 1, The redundant system shares one battery.

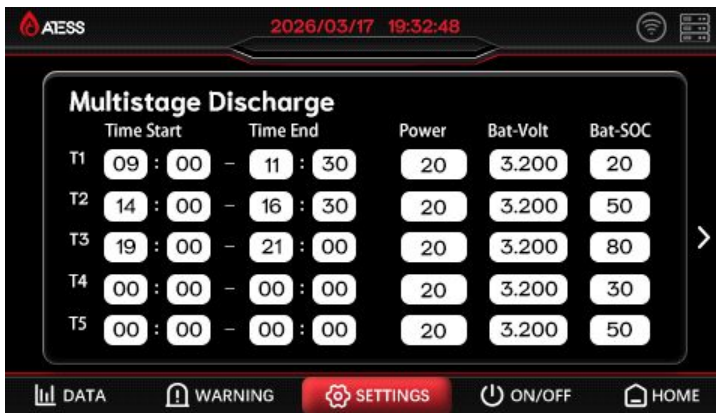
Mode Selection



- 1: load priority Mode
- 2: battery priority Mode
- 3: economy Mode
- 4: peak shaving and valley filling Mode
- 5: smart meter Mode
- 6: battery smart meter Mode
- 7: multi-stage charge and discharge Mode



Peak Time, Flat Time, Valley Time: Only in effect in the "Economic Mode" and is used to set the time period range of peak, flat, and valley periods.



"Multi-stage charge and discharge" mode parameter setting interface:

Time: Used to set the usage period.

Power: The maximum discharge power limit of the battery.

Batt Volt, Batt SOC: When the battery cell voltage or battery SOC is greater than the set value, the machine runs the load priority logic, and the priority battery discharge with load; When less than the set value, the machine runs battery priority logic and priority grid discharge with load.

Other	CurrentValue	SetValue	Return
COM 485 Addr	1	0	
CANb Baud Rate (kbps)	20	0	
Meter Com Switch Enable	0	0	
Meter or CT Switch	0	0	
Meter Com Addr	0	0	
Meter CT ratio	10	0	
INV Enable	0	0	

COM 485 Addr: RS485 communication address.

CANb Baud Rate: The baud rate setting of CANb.

Meter Com Switch Enable: 1 - The 485A port is used for the communication of the electricity meter. 2-The 232 port is used for the communication of the electricity meter.

Meter or CT Switch : 1 - Meter , 2 - CT.

Meter Com Addr: The 485 address of the electricity meter.

Meter CT ratio: Electric meter or CT ratio.

INV Enable: 0 disable , 1 communication by RS485, 2 - communication by CANb.

Other	CurrentValue	SetValue	Return
INV Power (kw)	0	0	
Freq Shift Enable	0	0	
RS485 Baud Rate (bps)	9600	0	
Device ID Sign	2	0	
HPS SN	LYTEST1234	0	
ATS SN		0	

INV Power: The power used as a grid-connected inverter.

Freq Shift Enable: 1 - Frequency drift function usage.

RS485 Baud Rate: The baud rate of RS485.

Device ID Sign: Used to identify the same set of parallel systems.

HPS SN: The serial number of HPS.

ATS SN: Reserved.

6.2.5 Alarm Information



The parameters on this page are displayed for alarm information, which are divided into current faults and historical faults.

Date	Tme	Current Fault	Return
2026/08/10	17:20:33	AC_NoUtility_Fault	
2026/08/10	17:20:33	LcdEmergencystop	
2026/08/10	17:20:33	AC_WU_UnderVolt_Rmt_Warning	
2026/08/10	17:20:33	AC_VW_Undervolt_Rmt_Warning	
2026/08/10	17:20:33	AC_UV_Undervolt_Rmt_Warning	

Date	Tme	History Fault	Return
2026/08/10	17:20:33	AC_UV_UnderVolt_Rmt_Warning	
2026/08/10	17:20:33	AC_VW_UnderVolt_Rmt_Warning	
2026/08/10	16:57:58	AC_WU_UnderVolt_Rmt_Warning	
2026/08/10	16:57:58	LcdEmergencyStop	
2026/08/10	16:57:58	AC_NoUtility_Fault	
2026/08/10	00:00:37	AC_UV_UnderVolt_Rmt_Warning	
2026/08/10	00:00:36	AC_VW_UnderVolt_Rmt_Warning	
2025/06/15	00:00:36	AC_WU_UnderVolt_Rmt_Warning	
2025/06/10	00:00:36	LcdEmergencyStop	

Alarm information: The fault reported by the energy storage inverter is displayed, the fault time is displayed on the left, and the corresponding fault name is displayed on the right.

6.3 LCD display information schedule

6.3.1 General history failure table

No.	Description	Solution
1	PV_Reseverd_Failure	1.Check if the photovoltaic input is connected in the wrong direction 2.Restore and check whether it is normal.
2	EEPROM_Write_Failure	Check if the device is undergoing remote upgrade. If not, restart the device.
3	EEPROM_Read_Failure	Check if the device is undergoing remote upgrade. If not, restart the device.
4	RISO_Failure	Check if the connection to the PE point is normal.
5	BAT_MainContactor_Failure	1.Check whether the signal line connection is normal. 2.Restore and check whether it is normal.
6	AC_BypassOverPower_Failure	1.Check whether the load exceeds the rated power. 2.Restore and check whether it is normal.
7	AC_U_BypassOverPower_Failure	1.Check whether the load exceeds the rated power. 2.Restore and check whether it is normal.
8	AC_V_BypassOverPower_Failure	1.Check whether the load exceeds the rated power. 2.Restore and check whether it is normal.
9	AC_W_BypassOverPower_Failure	1.Check whether the load exceeds the rated power. 2.Restore and check whether it is normal.
10	BAT_Reseverd_Failure	1.Check whether the battery connections are correct. 2.Restore and check whether it is normal.
11	PV2_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
12	BL_OCP_Fault	1.Check whether the load is within the specified range. 2.Restart and check whether it is normal.
13	PV_OCP_Fault	1.Check whether the load is within the specified range. 2.Restart and check whether it is normal.
14	BMS_Communicate_Fault	1.Check whether the BMS connection is stable. 2.Check whether the BMS data is abnormal.

No.	Description	Solution
15	PV2_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
16	BL_OCP_Fault	1.Check whether the load is within the specified range. 2.Restart and check whether it is normal.
17	PV_OCP_Fault	1.Check whether the load is within the specified range. 2.Restart and check whether it is normal.
18	BMS_Communicate_Fault	1.Check whether the BMS connection is stable. 2.Check whether the BMS data is abnormal.
19	INT_PV2_OverCurr_Fault	Check whether the photovoltaic system is short-circuited.
20	BMS_Fault	Check whether the Battery is abnormal.
21	BAT_OCP_Fault	1.Check whether the load is within the specified range. 2.Restart and check whether it is normal.
22	INT_BUS_unbalance_Fault	Check whether the three-phase load is balanced.
23	PV1_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
24	INT_PV1_OverCurr_Fault	Check whether the photovoltaic system is short-circuited.
25	INT_BAT_OverCurr_Fault	1.Check the battery settings parameters. 2.Check whether the load is within the specified range.
26	INT_INV_OverVolt_Fault	Check whether the load is within the specified range.
27	INT_INV_OverCurr_Fault	1.Check whether the load is within the specified range. 2.Check whether the wiring is properly connected.
28	INT_BL_OverCurr_Fault	Check whether the three-phase load is balanced.
29	INT_BUS_OverVolt_Fault	1.Check whether the load is within the specified range. 2.Check whether the relevant parameter settings are correct.
30	AC_NoUtility_Fault	Check the grid voltage.
31	AC_GridPhaseSeque_Fault	Check whether the phase sequence of the grid input wiring is correct.
32	AC_Volt_Unbalance_Fault	Check the grid voltage.
33	AC_Curr_Unbalance_Fault	1.Check whether the three-phase load is balanced. 2.Check whether the load is within the specified range.
34	INV_A_OCP_Fault	Check whether the load is within the specified range.

No.	Description	Solution
35	INV_B_OCP_Fault	Check whether the load is within the specified range.
36	AC_Volt_Unbalance_Fault	Check the grid voltage.
37	AC_Curr_Unbalance_Fault	1.Check whether the three-phase load is balanced. 2.Check whether the load is within the specified range.
38	INV_A_OCP_Fault	Check whether the load is within the specified range.
39	INV_B_OCP_Fault	Check whether the load is within the specified range.
40	INV_C_OCP_Fault	Check whether the load is within the specified range.
41	AC_WU_OverVolt_Fault	Check whether the relevant parameter settings are correct.
42	AC_WU_UnderVolt_Fault	Check whether the relevant parameter settings are correct.
43	AC_VW_OverVolt_Fault	Check whether the relevant parameter settings are correct.
44	AC_VW_UnderVolt_Fault	Check whether the relevant parameter settings are correct.
45	AC_UV_OverVolt_Fault	Check whether the relevant parameter settings are correct.
46	AC_UV_UnderVolt_Fault	Check whether the relevant parameter settings are correct.
47	AC_OverFreq_Fault	Check whether the relevant parameter settings are correct.
48	AC_UnderFreq_Fault	Check whether the setting value for the lower limit of the output frequency is correct.
49	PV1_CurrHigh_Fault	Check whether the photovoltaic system is short-circuited.
50	PV2_CurrHigh_Fault	Check whether the photovoltaic system is short-circuited.
51	AC_GridCurr_High_Fault	Check whether the load is within the specified range.
52	AC_L1Curr_High_Fault	Check whether the load is within the specified range.
53	AC_Overload_Fault	Check whether the load is within the specified range.
54	BAT_OverTemp_Fault	Contact a professional for inspection.

No.	Description	Solution
55	AC_OverTemp_Fault	Reduce power in a short period of time.
56	DC_OverTemp_Fault	Reduce power in a short period of time.
57	AC_BypassOverPower_Fault	Check whether the load is within the specified range.
58	AC_U_BypassOverPower_Fault	Check whether the load is within the specified range.
59	AC_V_BypassOverPower_Fault	Check whether the load is within the specified range.
60	AC_W_BypassOverPower_Fault	Check whether the load is within the specified range.
61	EPO_Stop	Check whether the load is within the specified range.
62	KeyEmergencyStop	Check whether the load is within the specified range.
63	LcdEmergencyStop	Shut down via the screen or the server.
64	NO_Bat_Fault	No connection to the battery or incorrect battery parameter settings.
65	BAT_MainContactor_Fault	Check the re-inspection signal.
66	AC_U_Overload_Fault	Check whether the load is within the specified range.
67	AC_V_Overload_Fault	Check whether the load is within the specified range.
68	AC_W_Overload_Fault	Check whether the load is within the specified range.
69	GFDI_Ground_Fault	Reduce the voltage of photovoltaic cells.
70	AC_Contactor_Fault	Check whether the relay is normal.
71	PV_Thunder_Fault	Check whether the PV lightning protection relay is functioning properly.
72	AC_Thunder_Fault	Check whether the AC lightning protection relay is functioning properly.
73	INT_PV3_OverCurr_Fault	Check whether the photovoltaic system is short-circuited.
74	INT_PV4_OverCurr_Warning	Check whether the photovoltaic system is short-circuited.

No.	Description	Solution
75	INT_PV5_OverCurr_Warning	Check whether the photovoltaic system is short-circuited.
76	INT_PV6_OverCurr_Warning	Check whether the photovoltaic system is short-circuited.
77	PV4_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
78	DC_SoftStart_Fault	Check whether the relevant parameter settings are correct.
79	INV_SoftStart_Fault	Check whether the relevant parameter settings are correct.
80	INT_L1_OverCurr_Fault	Check whether the load is within the specified range.
81	Batt_OverVolt_Fault	Check the battery voltage setting parameters.
82	Batt_UnderVolt_Fault	Check the battery voltage setting parameters.
83	Batt_OverCurr_Fault	Check the battery current setting parameters.
84	Batt_OverCharge_Fault	Check the battery current setting parameters.
85	Fan_1_Fault_Warning	Check the fan connection cable.
86	Fan_2_Fault_Warning	Check the fan connection cable.
87	Temp_Derating_Warning	Reduce power in a short period of time.
88	Batt_UnderVolt_Warning	Check the battery voltage setting parameters.
89	Parallel_Uneven_Flow_Warning	Check whether the length and resistance of the connection lines are the same.
90	PSG_Communication_Warning	Check the communication lines.
91	AC_WU_OverVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.
92	AC_WU_UnderVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.
93	AC_VW_OverVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.
94	AC_VW_UnderVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.

No.	Description	Solution
95	AC_UV_OverVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.
96	AC_UV_UnderVolt_Rmt_Warning	Check the voltage setting parameters and the actual voltage.
97	AC_OverFreq_Rmt_Warning	Check the parameters for the grid frequency setting.
98	AC_UnderFreq_Rmt_Warning	Check the parameters for the grid frequency setting.
99	PV5_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
100	Hps_10min_5times_StopAlarm	Clicking the power button will automatically clear it.
101	Parallel_PLL_Signal_Fault	Check whether the parallel signal lines are properly connected.
102	Parallel_Switch_Signal_Fault	Check whether the parallel signal lines are properly connected.
103	CANb_Communication_Fault	Check whether the parallel signal lines are properly connected.
104	Parallel_Redundant_Fault	Check whether the Parallel parameter settings are correct.
105	PV3_OverVolt_Fault	Reduce the voltage of photovoltaic cells.
106	PV3_Curr_High_Fault	Check whether the photovoltaic system is short-circuited.
107	BATModule_OverTemp_Fault	Reduce power in a short period of time.
108	Meter_Communication_Fault	1.Check whether the connection of the electricity meter communication line is normal. 2.Check whether the parameters of the electricity meter are set correctly.
109	EPO_Stop	Check whether the EPO is functioning properly.

Table 6.3.1 General history failure table

6.3.2 Severe history failure table

No.	Description
1	PV_Reseverd_Failure
2	IGBT_Failure
3	EEPROM_Write_Failure
4	EEPROM_Read_Failure
5	AC_MainContactor_Failure
6	AC_SlaveContactor_Failure
7	GFDI_Failure
8	GFCI_Failure
9	RISO_Failure
10	BAT_MainContactor_Failure
11	AC_BypassOverPower_Failure
12	AC_U_BypassOverPower_Failure
13	AC_V_BypassOverPower_Failure
14	AC_W_BypassOverPower_Failure
15	BAT_Reseverd_Failure
16	Reseverd_Failure

Table 6.3.2 Severe history failure table

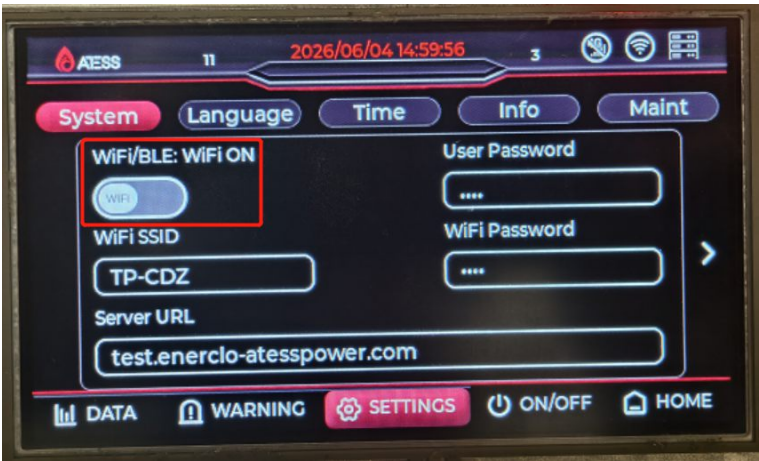
6.3.3 Inverter status

No.	Description
0	wait
1	check
2	Grid mode
3	malfunction
4	Permanent failure
5	Off-grid mode

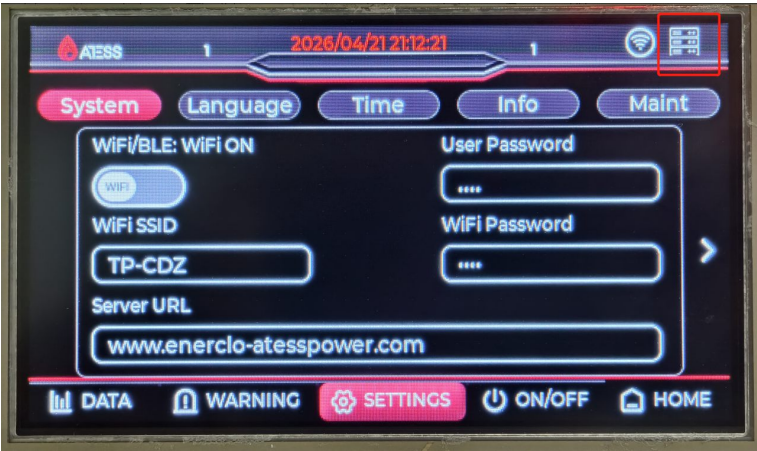
6.4 Inverter Network Configuration

Method 1: Set WiFi Parameters via Screen

a. On the HPS screen, tap the "Settings" option. Set the Server URL to www.enerclo-atesspower.com and the Server Port to 5279 (on the second page). Then, enter the WiFi name (SSID) and WiFi password (default login password is 1234) on the HPS screen. Tap the WiFi/BLUETOOTH toggle button to switch to WiFi ON to start connecting.

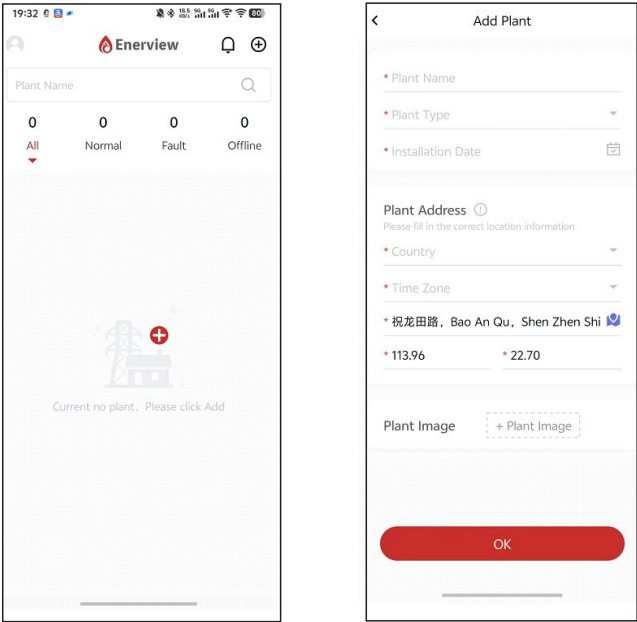


b. Wait 1-5 minutes. Once connected successfully, a network icon will appear in the upper right corner of the screen.

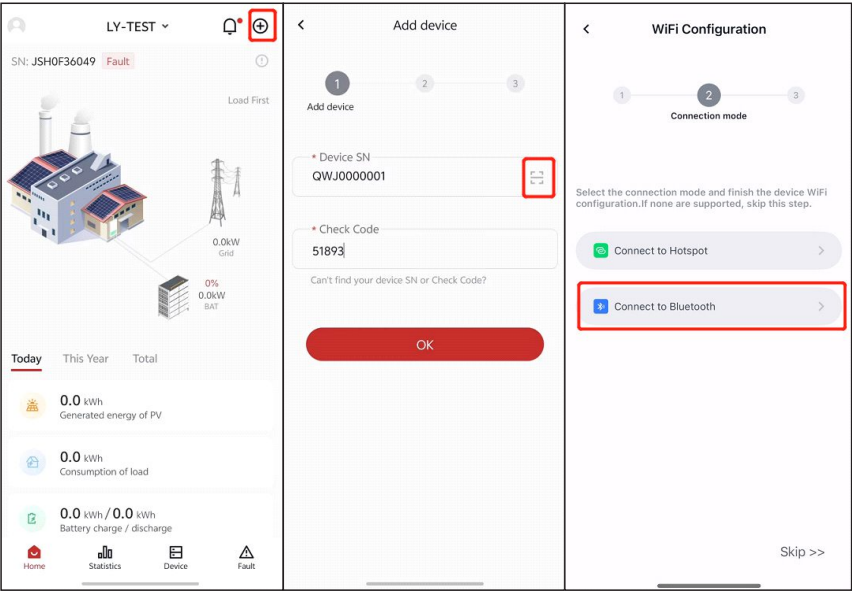


Method 2: Configure Network via App

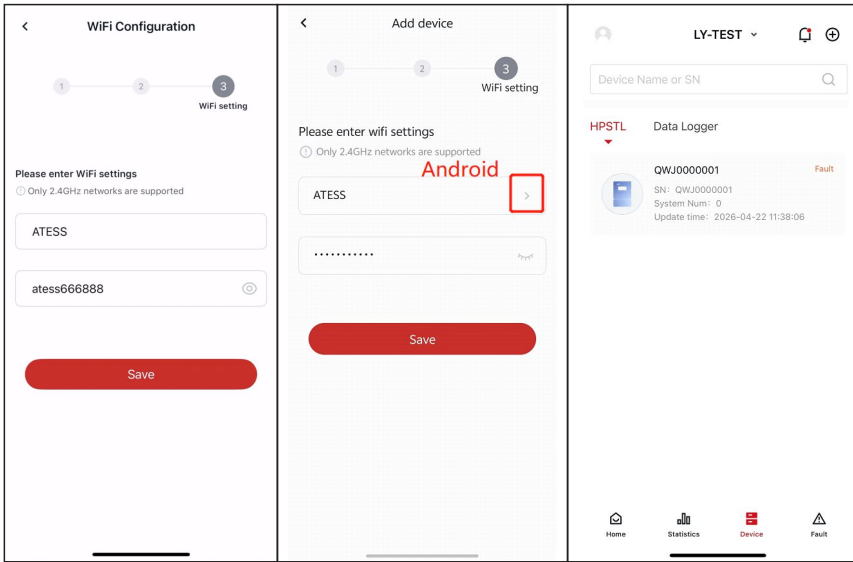
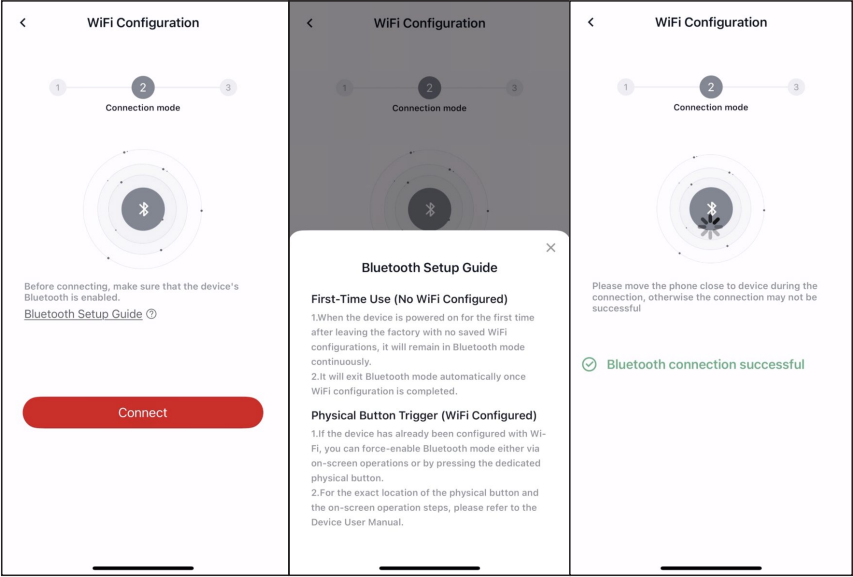
a. Open the Enerview Pro app and go to the home page. Select "Add Site" and fill in the site information. If the site already exists, skip this step.



b. Select the site, tap "Add Device" in the upper right corner, then tap "Scan" or manually enter the SN number and CC verification code (located on the left side of the unit). After successful addition, follow the steps to tap "Connect Bluetooth". The Bluetooth name is the SN number.



c. After tapping "Connect", the APP will search for the data logger's Bluetooth signal and connect. Once connected successfully, the APP will automatically jump to the network configuration page. Enter the correct WiFi name and password (Android phones support searching for WiFi name lists). After entering the name and password, verify they are correct, then tap "Settings". Wait 1-5 minutes, and you will be able to go online and view device information.

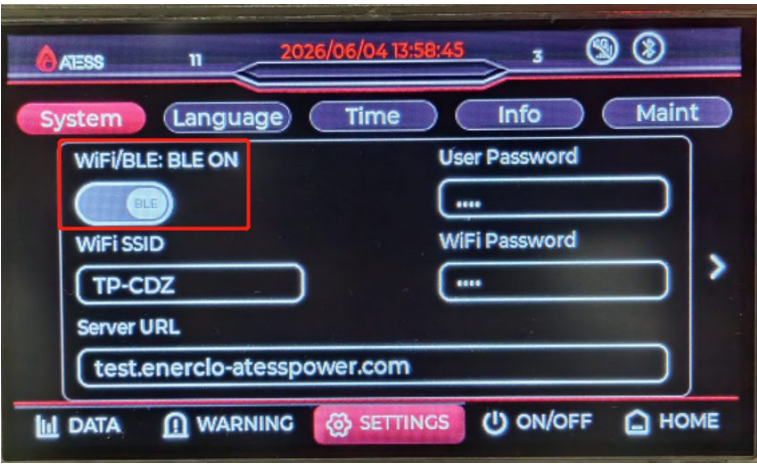


Remarks:

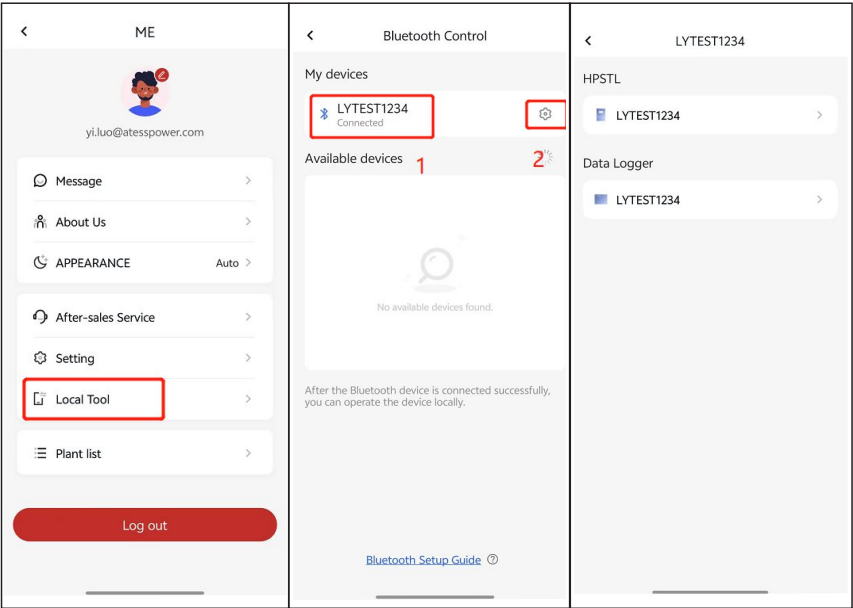
- 1. Some routers have two WiFi bands: one is 2.4GHz and the other is 5GHz. Most households use only 5GHz WiFi as their default. However, the inverter can only connect to 2.4GHz WiFi. Therefore, if you have set up WiFi but the inverter cannot connect to the network, please contact the homeowner or check their router to see if they are using 5GHz WiFi. Make sure to use 2.4GHz WiFi to connect the inverter.
- 2. It is recommended that the router be no more than 10 meters away from the inverter, and ideally positioned directly facing it.
- 3. When the WiFi signal strength is below -75 dBm, the inverter will be unable to connect to WiFi. If the WiFi signal is weak, an AP repeater is recommended to increase signal strength, which can expand the WiFi signal range.

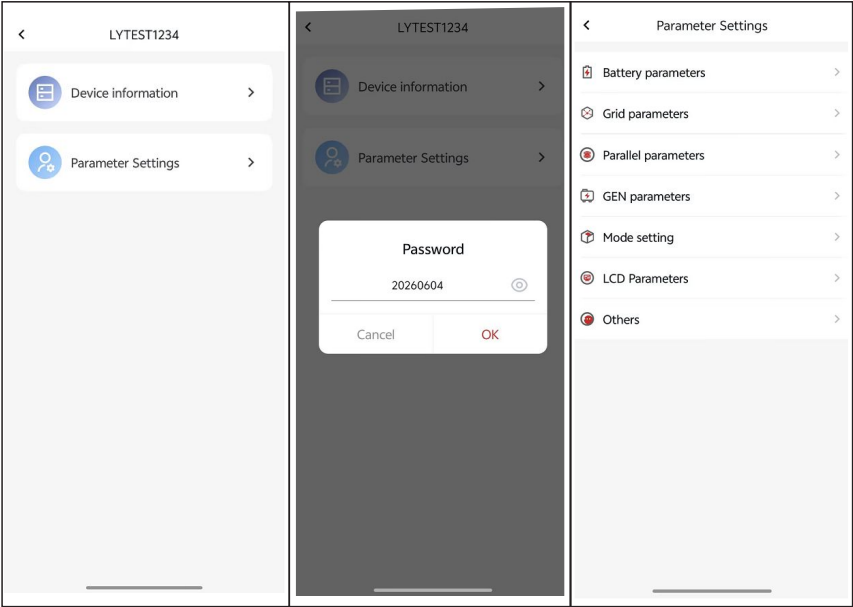
6.5 Setting Parameters via Bluetooth

- a. On the screen, tap the WiFi/BLE toggle button to switch to BLE ON.

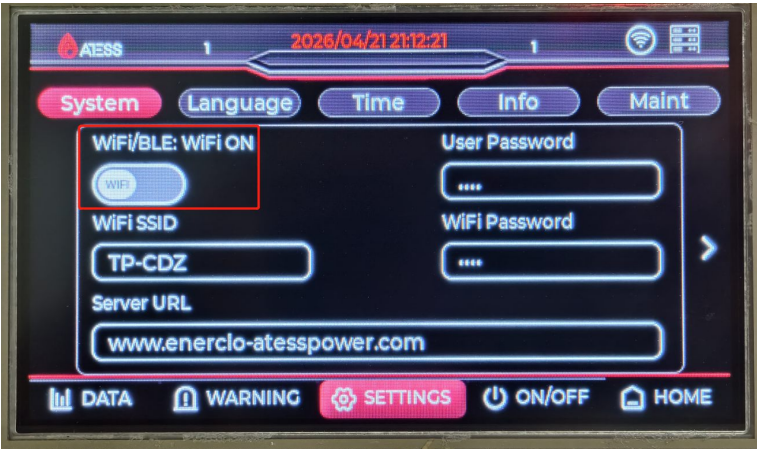


b. Open the Enerview Pro APP. Select ME → Local Tool → Bluetooth Control. After connecting to the device successfully, tap "Settings". The devices include Data Logger and HPSTL. Select the device you want to modify. The password is the current date (example: 20260604). You will then enter the parameter settings page to modify parameters.





c. After completing parameter modifications, tap the WiFi/BLE toggle button on the screen to switch back to WiFi ON. The device will reconnect to the network.



7 Routine Maintenance

7.1 Fan Maintenance

To ensure that the inverter works normally, you need to clean the air filter regularly. When the inverter is working in a high temperature environment, good ventilation and heat dissipation can effectively reduce the probability of load shedding. The inverter is equipped with a cooling fan. When the internal temperature of the inverter is high, the fan works to reduce the internal temperature. If the inverter is low in output due to excessive temperature, the following are possible causes and countermeasures.

- The fan is clogged and the fan and fan cover need to be cleaned.
- The fan is damaged and the fan needs to be replaced.
- Inverter installation location is poorly ventilated, and the appropriate installation location should be selected according to basic installation requirements



WARNING:

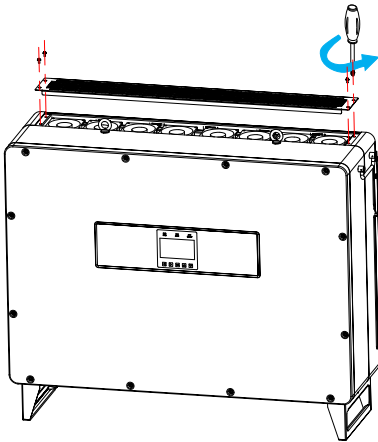
Do not use a gas pump to clean the fan, as this may cause damage to the fan.

Fan cleaning or replacement:

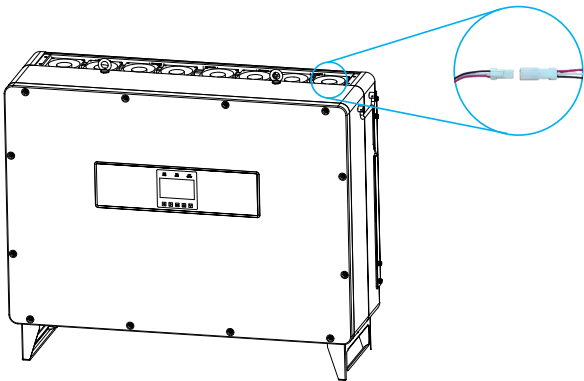
1. Before cleaning or replacing the fan, please make sure that the DC side and AC side of the inverter have been disconnected.

- Turn off the DC side switch.
- Unplug the DC input terminal (user needs to use a tool to disconnect the DC connection).
- Disconnect the AC open.

2. Rotate the screw counterclockwise with an M4 Phillips screwdriver.



3. Disconnect the fan connector and remove the fan as shown below



4. Clean the fan and steel mesh or replace the fan

Cleaning fan and steel mesh

- Clean the fan and steel mesh with a gas pump or other tools.
- Remove each fan separately for cleaning if necessary. Replace the fan
- Use a Phillips screwdriver to remove the fan that needs to be replaced.
- Replace the brand new fan, arrange the wire harness and fix it with a cable tie.

5. Reinstall the fan mounting plate and inverter.

7.2 Regular maintenance

Maintenance item	Period
Read data from the datalogger	Monthly
Check if the cable connection is loose	Monthly
Manual inspection of AC and DC circuit breakers	Monthly
LCD stop function	Monthly
Check if there is abnormal noise during the running of the machine	Weekly
Check battery components for abnormalities, swelling, smoke	Daily



The energy storage controller must be regularly maintained to ensure its normal operation and service life.
The recommended routine maintenance cycle and work contents are shown in Table 7-2.

7.3 Waste treatment

The energy storage controller will not pollute the environment, and the constituent materials and components of the product will meet the environmental protection requirements. ATESS shall, according to environmental protection requirements, be treated according to local regulations when the energy storage controller is used.

8 Appendix

8.1 Specification

Model	ATESS HPS100KTL
Dimension (W/H/D)	960x680x300mm
Weight	138kg
Environment temperature	-40 °C... +60 °C
Protection degree	IP65
Standby consumption	<20W
Cooling	Forced-air
Noise emission	<65dB(A)@1m
Display	Touch screen
Communication interface	RS485/CAN/WIFI/4G

8.2 Warranty

The warranty period of this product is one year. If the contract stipulates otherwise, the contract shall prevail. During the warranty period, ATESS products shall promptly present the invoice and date of purchase of the products to ATESS Service personnel during maintenance. At the same time on the product the nameplate logo should be clearly visible, otherwise it will not be repaired.

Warranty condition

ATESS will repair or replace the product free of charge during the warranty period; the faulty machine after replacement shall be owned by ATESS; the customer shall reserve a certain amount of time for ATESS to repair the faulty machine.

Liability exemption

The following circumstances arise, the company has the right not to carry out quality assurance:

1. Products without the ATESS logo.
2. The product or component has exceeded ATESS Warranty period.
3. Failure or damage caused by non-product working environment or incorrect installation, storage and use (such as excessive temperature, too low temperature, too humid or dry, high altitude, unstable voltage or current, etc.)
4. Failure or damage caused by the installation, repair, modification or disassembly of non-ATESS after-sales service personnel, except for after-sales commission.
5. Failure or damage caused by the use of non-ATESS components; due to accidents or human causes (operational errors, scratches, handling, bumps, improper voltage access, etc.)
6. Failure or damage, transportation damage; failure or damage caused by force majeure such as natural disasters (such as earthquakes, lightning strikes, fires, etc.); other failures or damages caused by the quality problems of ATESS machines (including components) themselves.



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