

HPS SYSTEM

Commissioning Guide

Standard Operating Procedures & Best Practices

ATESS ENERCOLLEGE

Technical Support Document

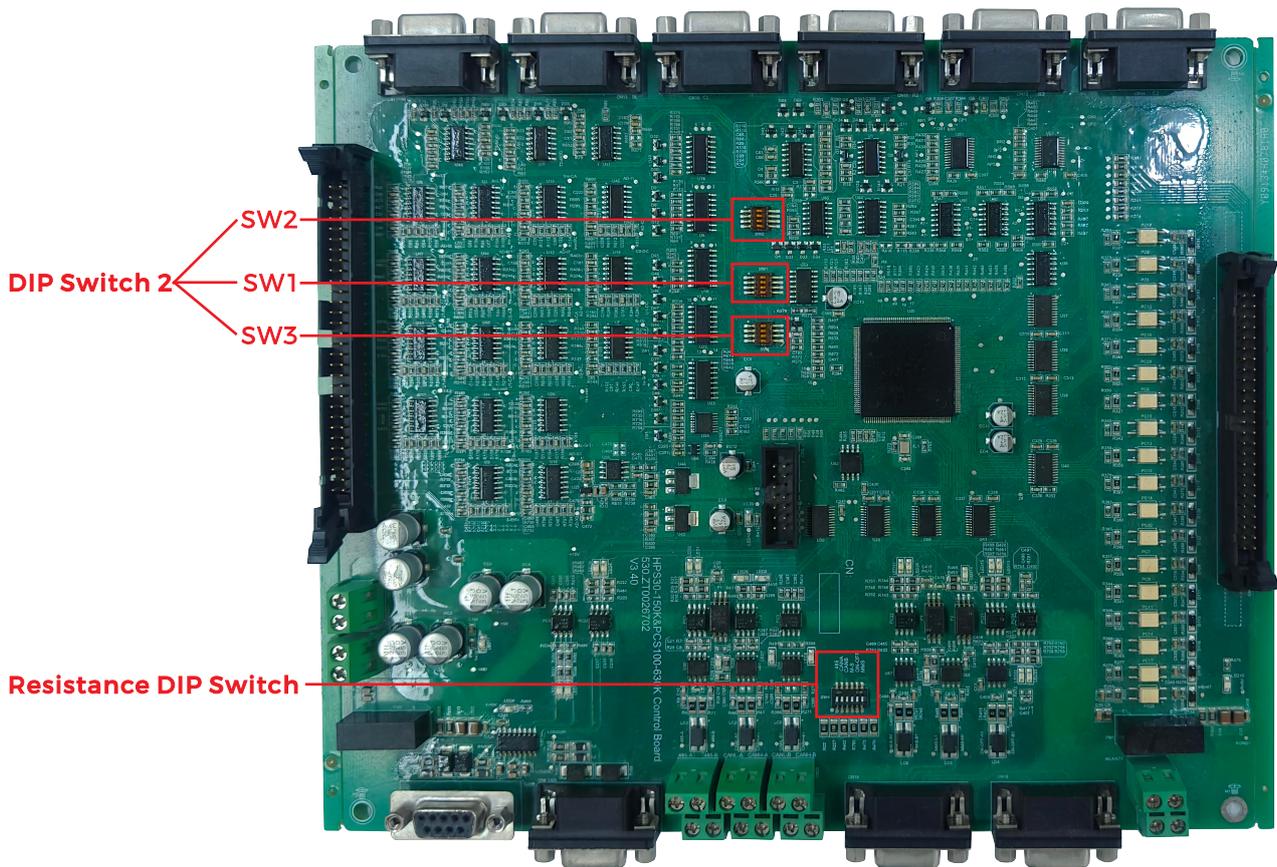
1 Introduction

To ensure correct and systematic commissioning of the ATESS HPS50-150 hybrid inverter, please follow the steps provided in this guide. Typically, we follow the standard debugging process, which involves checking the DIP switch, powering on the machine, setting parameters, and then running the system.

2 Inspect the DIP Switch

1. Inspect the DIP Switch 2

Please check the DIP Switch 2 on the Control board according to the data in the table to ensure that it is consistent with the corresponding model requirements in the table.



Control Board

DIP SWITCH 2:			
MODEL	SW1 State	SW2 State	SW3 State
HPS50	2,4 ON	2,4 ON	2,4 ON
HPS100	1,4 ON	1,4 ON	1,2,4 ON
HPS120	2,3,4 ON	2,3,4 ON	1,4 ON
HPS150	3,4 ON	3,4 ON	4 ON

DIP SWITCH 2 chart

2. Inspect the Resistance Dip Switch

- a. The DIP SWITCH is a connection control switch with communication matching resistance(120Ω).
- b. “ON” indicates connection resistance and “off” indicates no connection with the resistance.



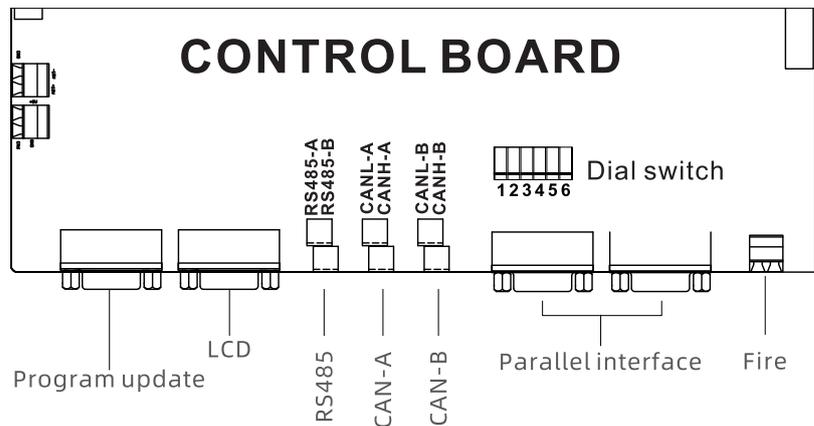
Resistance DIP SWITCH

NO.	Name	Description
1	485	Single HPS: ON (resistor in). Multiple devices: ON at both ends, OFF for all middle units.
2	CANA	Standard setup (single BMS): HPS side: ON (120 Ω resistor in) BMS side: ON.
3	CANB	Single ATS/BYPASS: it's the end (resistor ON); flip DIP ON in one more unit only. ≥2 ATS/BYPASS: CANA connect its own HPS/PCS; all CANB resistors OFF. ATS/BYPASS chatter: link their CANB buses.
4	M-S	Single HPS: OFF (no resistor).
5	ON-OFF	Parallel devices: ON at both ends, OFF in between.
6	MMS	If unstable, check bus ends ≈ 60 Ω with meter.

- c. Use the multimeter to measure whether the actual resistance meets the requirements. (Note that the resistance can be measured only after the power is powered off.)
- d. The value of the communication resistance of each port should be about 60Ω. If the resistance value is too high, you can turn on the corresponding Resistance DIP SWITCH and measure it again.



Communication port



3 Power-Up

Before powering on, check the wiring of the inverter's PV, battery, grid/generator, load, and other connections to ensure correct phase sequence and secure wire connections.

1. Keep the Switch knob to OFF state.



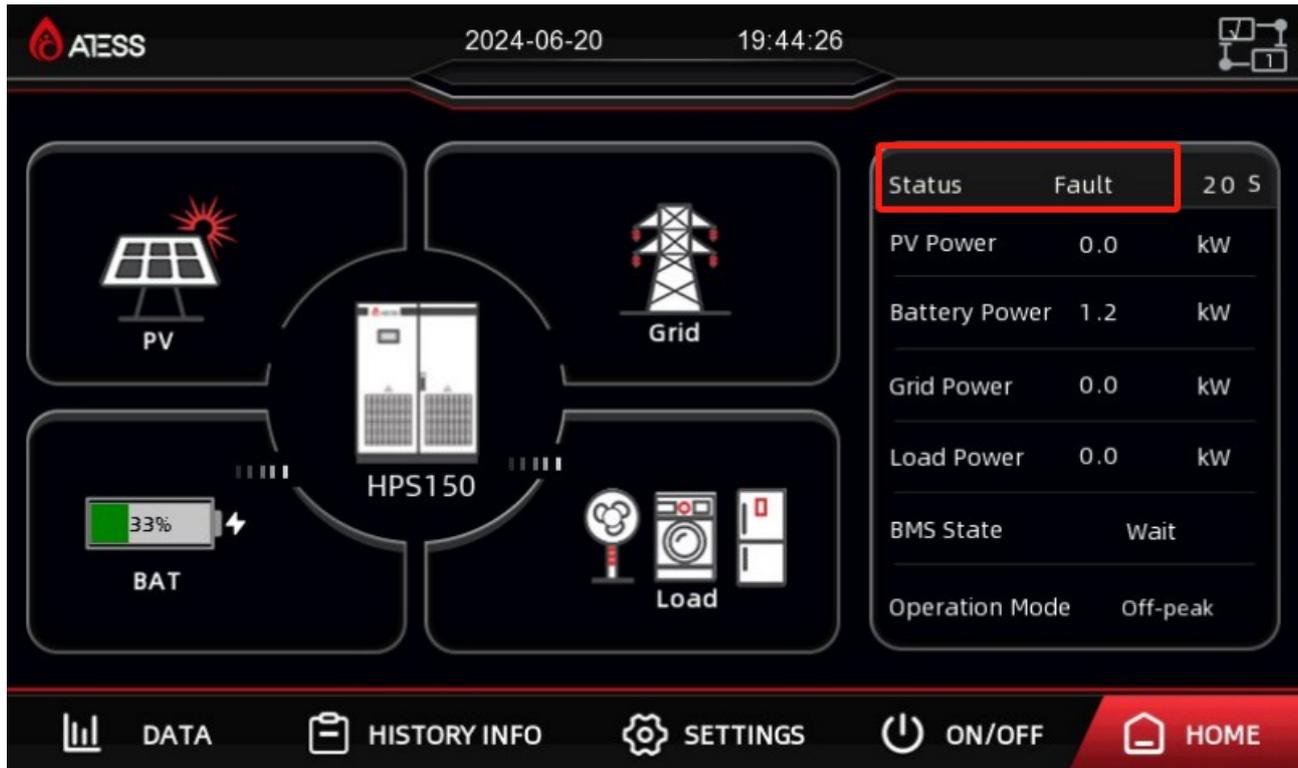
Switch Knob

2. Turn on the Battery Breaker, The screen will light up.



Battery Breaker

3. The HPS is "Fault" state on the homepage. We need check the parameters before running the system.



4 Parameters setting

1. Product Information

This page shows basic product information and the data of manufacturing, including "Manufacturer", HPS "Serial Number", "Hardware Version"; "Software Version".



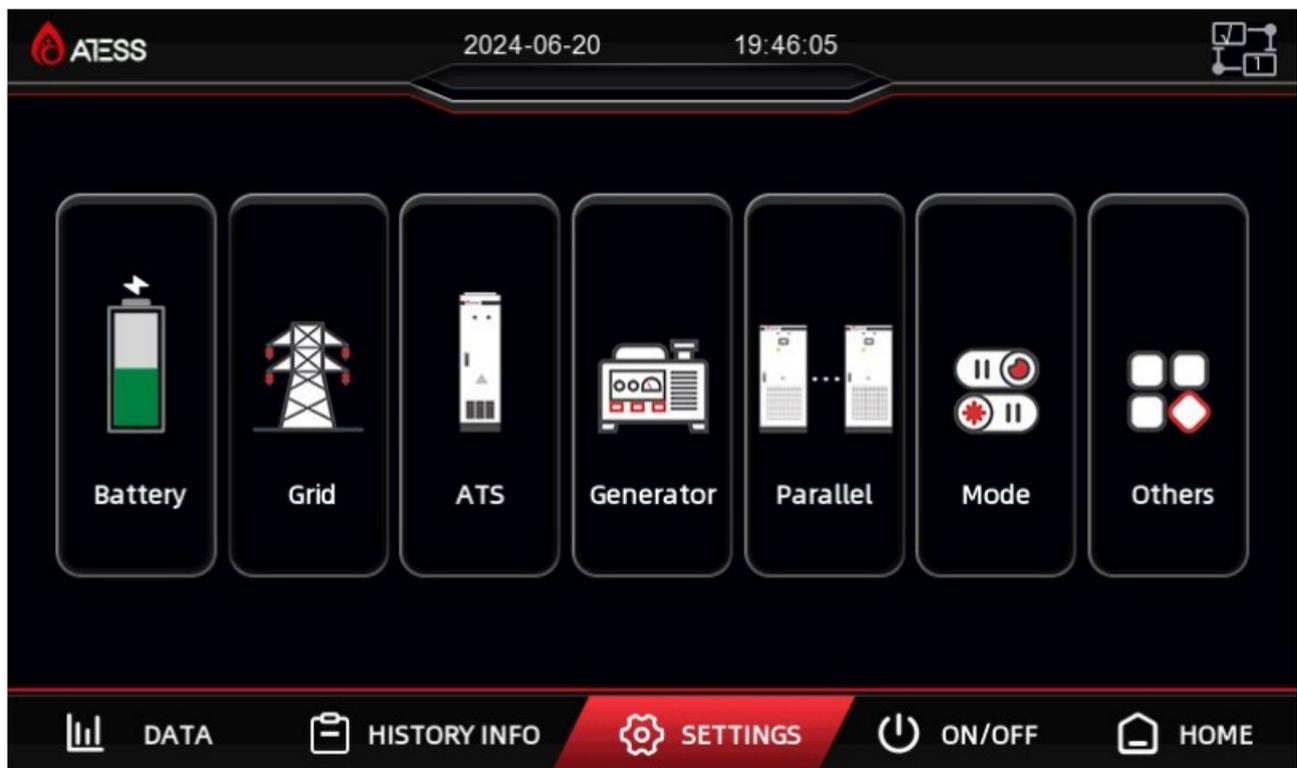
2. Time Setting

In this page, you can set the current local time.



3. Maintenance

This page displays the complete set of maintenance, covering Battery parameters, Grid parameters, ATS settings, Generator (GEN) parameters, HPS Parallel settings, working modes, and any additional parameters grouped under Others.



4. Battery Setting

There are 4 pages covering all battery-related parameter settings, and different items on each page correspond to corresponding parameter settings.

4.1

Name	Current Value	Set Value
No. of Battery Racks	1	1
No. of Battery Cells	300	300
Battery Capacity(Ah)	100	100
Float Limit Set	0.10	0.10
Float Voltage(V)	2.300	2.300
BAT Charge Current(A)	10	10

Item	Description
No. of Battery Racks	The racks number in the system
No. of Battery cells	The cells number in one group
Battery Capacity(Ah)	The battery capacity in one battery cell
Float Voltage(V)	The HPS will stop charging when the actual cell voltage reach this value. the default setting is 3.5.
Float Limit Set	When the actual battery cell voltage reach this value, the HPS will limit the charging current. The default setting is 0.1.
BAT Charge Current(A)	The charge current of battery

Noted: the default setting is according to the general lithium iron phosphate, The parameters must be set according to the actual battery specifications.

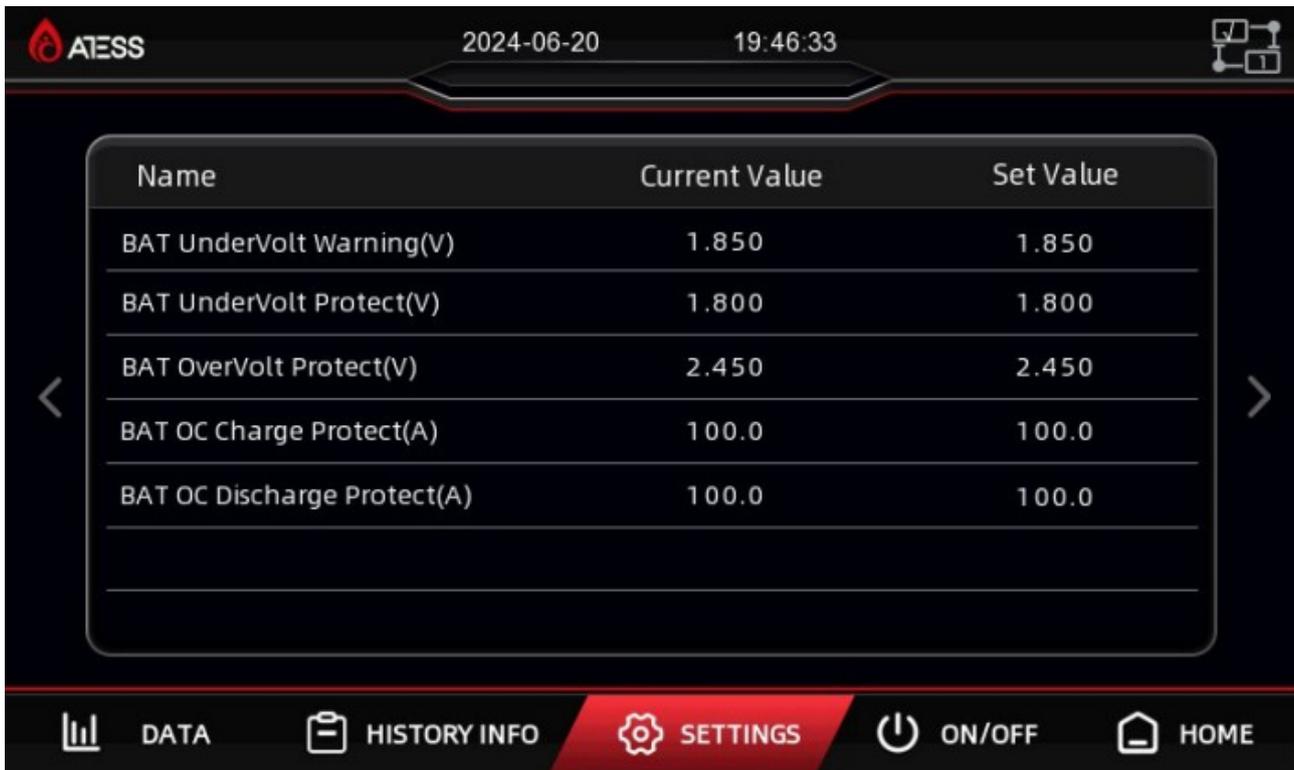
4.2



Item	Description
Discharge Cut-off Volt(V)	The HPS will stop discharging when the battery cell voltage reaches this value. The default is 3.0.
Discharge Cut-off SOC	Same logic as Discharge Cut-off Volt(V), but judged by SOC. The default is 20.
Re-discharge SOC	Only take a function on load first mode
Charge Cut-off SOC	When the actual battery SOC reaches this value, the HPS will stop charging.
BAT Saturation	The default is 1.
Trickle charge set(KW)	The default is 1.

Noted: the default setting is according to the general lithium iron phosphate, The parameters must be set according to the actual battery specifications.

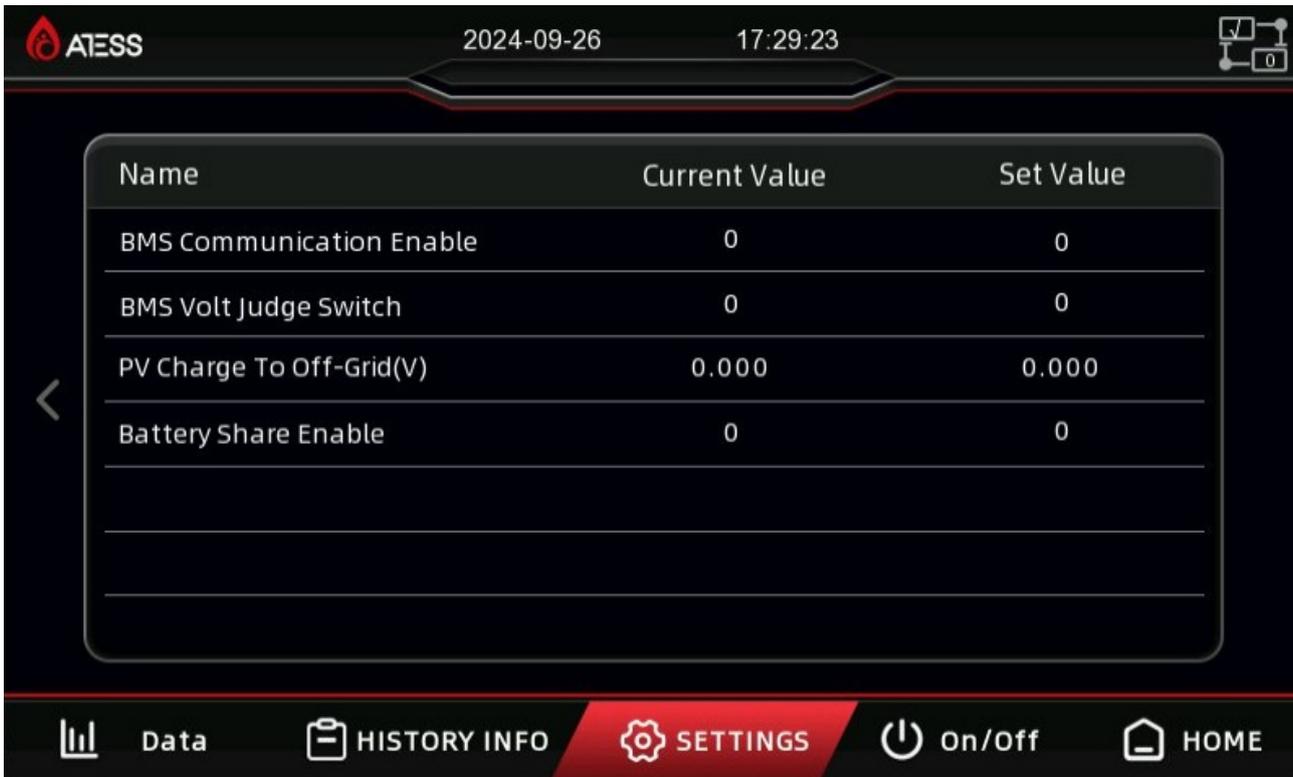
4.3



Item	Description
BAT UnderVolt Warning(V)	The default is 2.95.
BAT UnderVolt Protect(V)	The default is 2.85.
BAT OverVolt Protec(V)	The default is 3.6.
BAT OC Charge Protect(A)	According to the current limitation by BAT and HPS configuration.
BAT OC Discharge Protect(A)	

Noted: the default setting is according to the general lithium iron phosphate. The parameters must be set according to the actual battery specifications.

4.4



Item	Description
BMS Communication Enable	Set 1 for HPS communication with battery; otherwise set to 0.
BMS Volt Judge Switch	When you want to use the cell voltage for judgment, it is set to 1; otherwise set to 0.
PV Charge TO Off-grid(V)	In PV only mode, if the battery cell voltage reaches the set value, it will automatically switch to Off-grid mode.
Battery Share Enable	Parallel HPS takes effect. It is set to 0 when the battery is connected separately to HPS, and it is set to 1 when the battery is connected as a whole.

Noted: the default setting is according to the general lithium iron phosphate. The parameters must be set according to the actual battery specifications.

5. Grid Setting

This page covers all parameter of Grid setting, and different items on each page correspond to corresponding parameter settings.

Name	Current Value	Set Value
Max. Import from Grid(kW)	240	240
Max. Export to Grid(kW)	0	0
Max. Grid Charge Power(kW)	60.0	60.0
Grid Charge Cutoff SOC	80	80
Grid Charge Cutoff Volt(V)	2.450	2.450
Zero Export Enable	1	1
Grid & PV Charge Enable	1	1

Item	Description
Max. Import from Grid(kW)	Maximum import power from the Grid.
Max. Export to Grid(kW)	Maximum export power to the Grid.
Max. Grid charge power(kW)	Maximum charging power from the grid.
Grid Charge Cutoff SOC/Volt	The grid will stop charging the battery when the SOC/Volt reaches the set value.
Zero Export Enable	Set 1 for HPS not to allow export power to the Grid. Set 0 for HPS allows export power to the Grid.
Grid&PV Charge Enable	When set to 1, Grid or GEN is available to charge the battery with PV simultaneously. PV will charge the battery with priority.

6. ATS setting

This page covers all parameter of ATS setting, and different items on each page correspond to corresponding parameter settings.



The screenshot shows the ATESS settings interface. At the top, it displays the date 2024-06-20 and time 19:47:04. The main content is a table with three columns: Name, Current Value, and Set Value. The table lists five parameters: ATS Enable, ATS Com No.Enable, ATS Com No., ATS Units, and ATS CanA Baud Rate(kbps). The bottom navigation bar includes icons for DATA, HISTORY INFO, SETTINGS (highlighted), ON/OFF, and HOME.

Name	Current Value	Set Value
ATS Enable	1	1
ATS Com No.Enable	0	0
ATS Com No.	1	1
ATS Units	1	1
ATS CanA Baud Rate(kbps)	20	20

Item	Description
ATS Enable	When ATS form ATESS, set to 1; when the ATS is not from ATESS, set to 2.
ATS Com NO.Enable	First, set this value to 1, and then modify the ATS Com address. After modification, you must set this value back to 0.
ATS Com No.	Set the ATS communication address.
ATS Units	Number of ATS.
ATS CanA Baud Rated(Kbps)	The default setting is 20Kbps.

7. ATS setting: 2HPS+2ATS

Step1:

For both HPS:

Set "ATS Enable" to 1.

Set "ATS Units" to 2.

Set "CanA Baud Rate(Kbps)" to 20Kbps.

Step2:

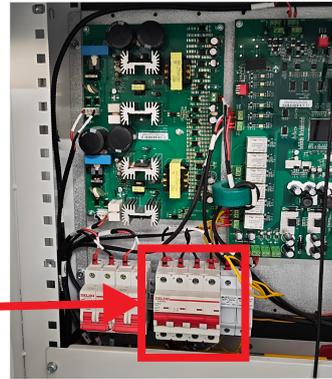
Turn on the "Power Switch" of ATS1.

Turn off the "Power Switch" of ATS2.

ATS1 is ON.

ATS2 is OFF.

Power Switch



Step3:

For HPS1:

Set "ATS Com NO. Enable" to 1.

Then set "ATS Com No." to 1.

Step4:

For HPS1:

Check the "ATS software Version" page.

(If the version is correct, it indicates HPS1 communicates with ATS1 successfully).

Finally, set "ATS Com NO. Enable" to 0.

Step5:

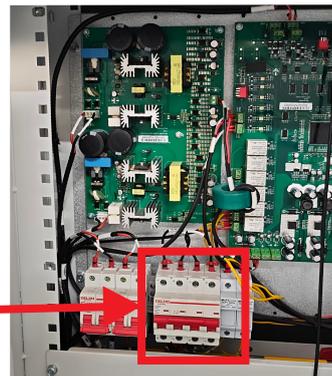
Turn off the "Power Switch" of ATS1.

Turn on the "Power Switch" of ATS2.

ATS1 is OFF.

ATS2 is ON.

Power Switch



Step6:

For HPS2:

Set "ATS Com NO. Enable" to 1.

Then set "ATS Com No." to 2.

Check the "ATS software Version" page, like "Step 4".

Finally, set "ATS Com NO. Enable" to 0.

Turn on the "Power Switch" of ATS1.

8. Gen setting

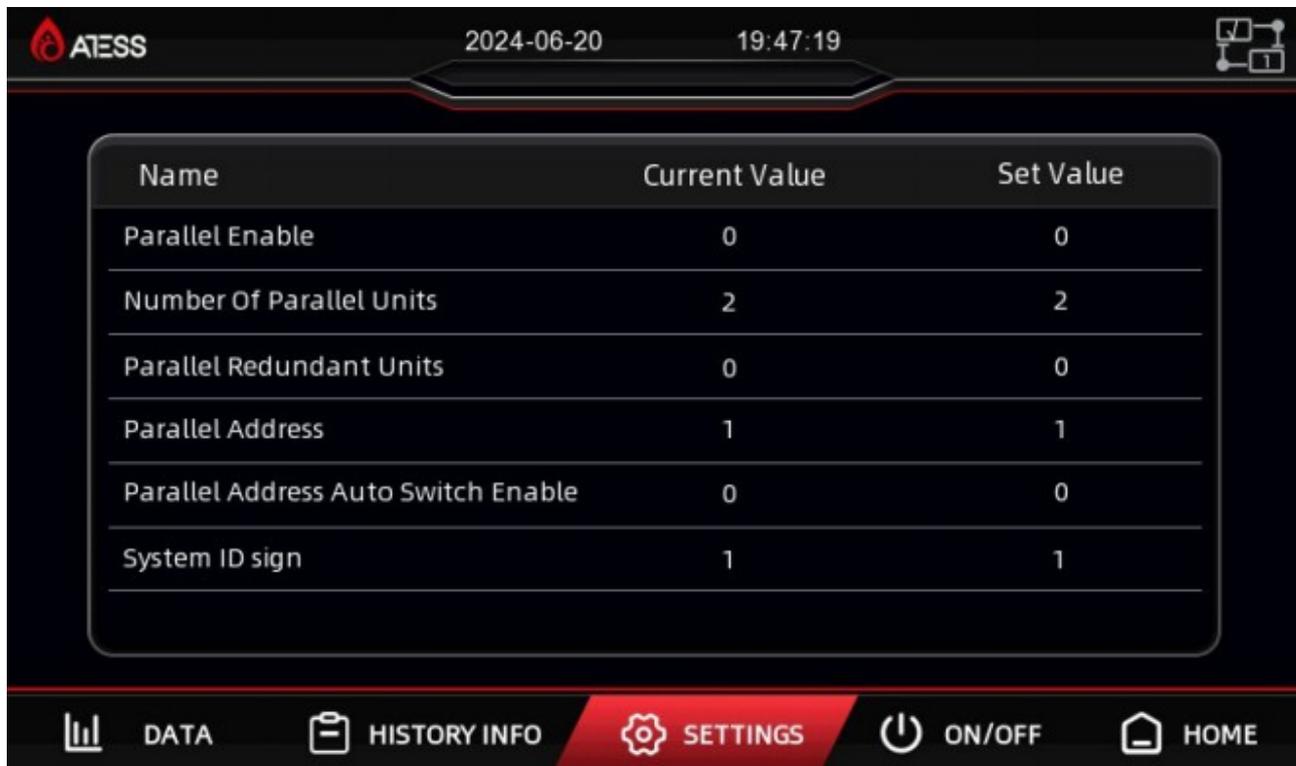
This page covers all parameter of Gen setting, and different items on each page correspond to corresponding parameter settings.

Name	Current Value	Set Value
GEN Enable	0	0
Max. GEN Power (kW)	240	240
Max. GEN Charge Power(kW)	0.0	0.0
GEN Off SOC	80	80
GEN On SOC	30	30
GEN Manual Control	0	0

Item	Description
GEN Enable	Set to 1 when GEN connects to the “AC input” of HPS, and when it works with ATS too.
GEN Enable	Rated power of the generator.
GEN Enable	Maximum power of the generator to charge the battery.
GEN Off SOC	DG mode and BMS enable is 1, when the recent SOC is larger than the set value, HPS will send a dry contact signal to switch off the GEN.
GEN On SOC	In the off-grid mode, when the current SOC is less than the set value, HPS will send a dry contact signal to turn on the GEN.
GEN Manual Control	Gen manual switch, Set 1 for HPS sends the dry contact signal to turn on the GEN. Set 0 is to turn off GEN.

9. Parallel setting

This page covers all parameter of Gen setting, and different items on each page correspond to corresponding parameter settings.



The screenshot shows the ATESS control interface with the following settings table:

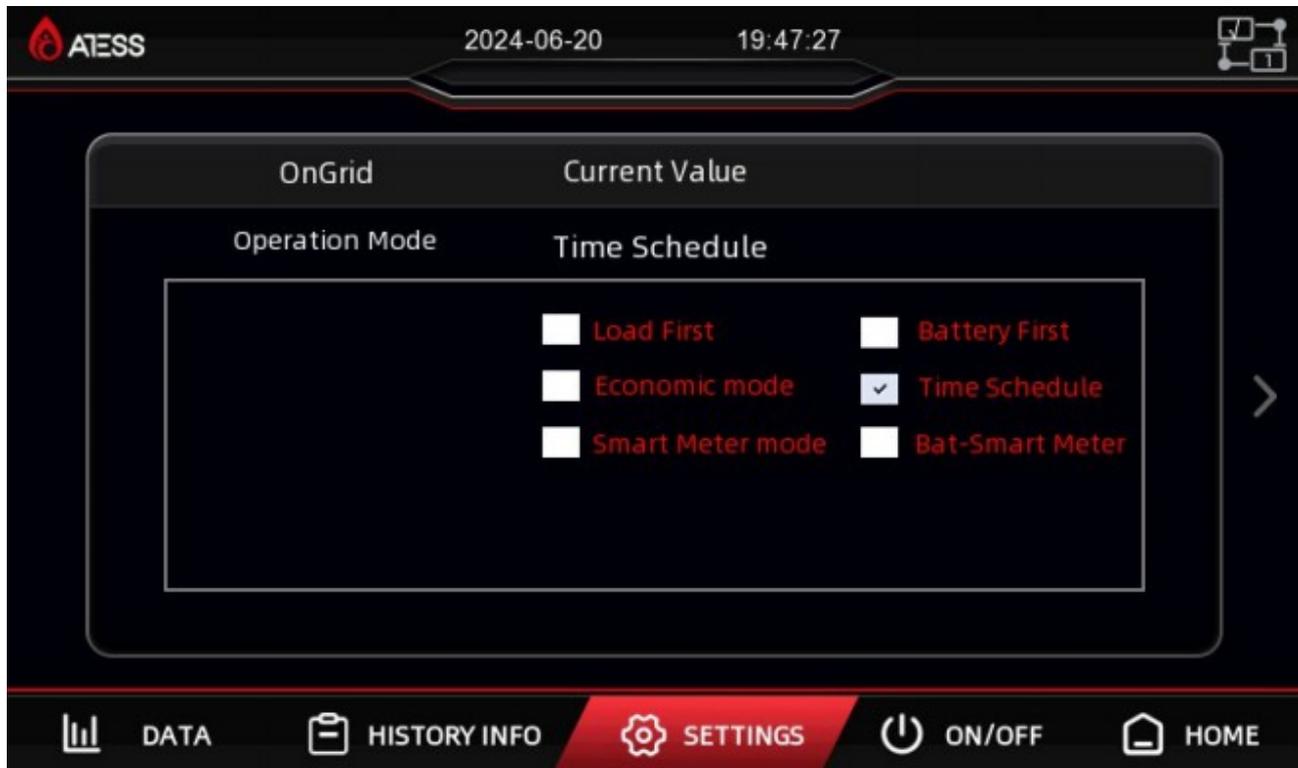
Name	Current Value	Set Value
Parallel Enable	0	0
Number Of Parallel Units	2	2
Parallel Redundant Units	0	0
Parallel Address	1	1
Parallel Address Auto Switch Enable	0	0
System ID sign	1	1

The interface also shows the date 2024-06-20, time 19:47:19, and navigation buttons for DATA, HISTORY INFO, SETTINGS (highlighted), ON/OFF, and HOME.

Item	Description
Parallel Enable	Set 1 for activation parallel function; all the HPS need to be set to 1.
Number of Parallel Units	Set 2 if 2 HPS, set 3 if 3 HPS.
Parallel Redundant Units	The system will issue a warning when the actual fault HPS number is greater than the set value.
Parallel Address	HPS1 set 1, HPS2 set 2...
Parallel Address Auto Switch Enable	Set 1 for all HPS in the parallel system.
System ID sign	Set the same non-zero number for all machines, including the ATESS battery. The default setting is 1.

10. Mode setting

In this page, you can set the operation mode.



11. Other setting

11.1 This page describes other settings related to “Island Protect Level”, “485 Baud Rated”, and “CanB Baud Rated”.

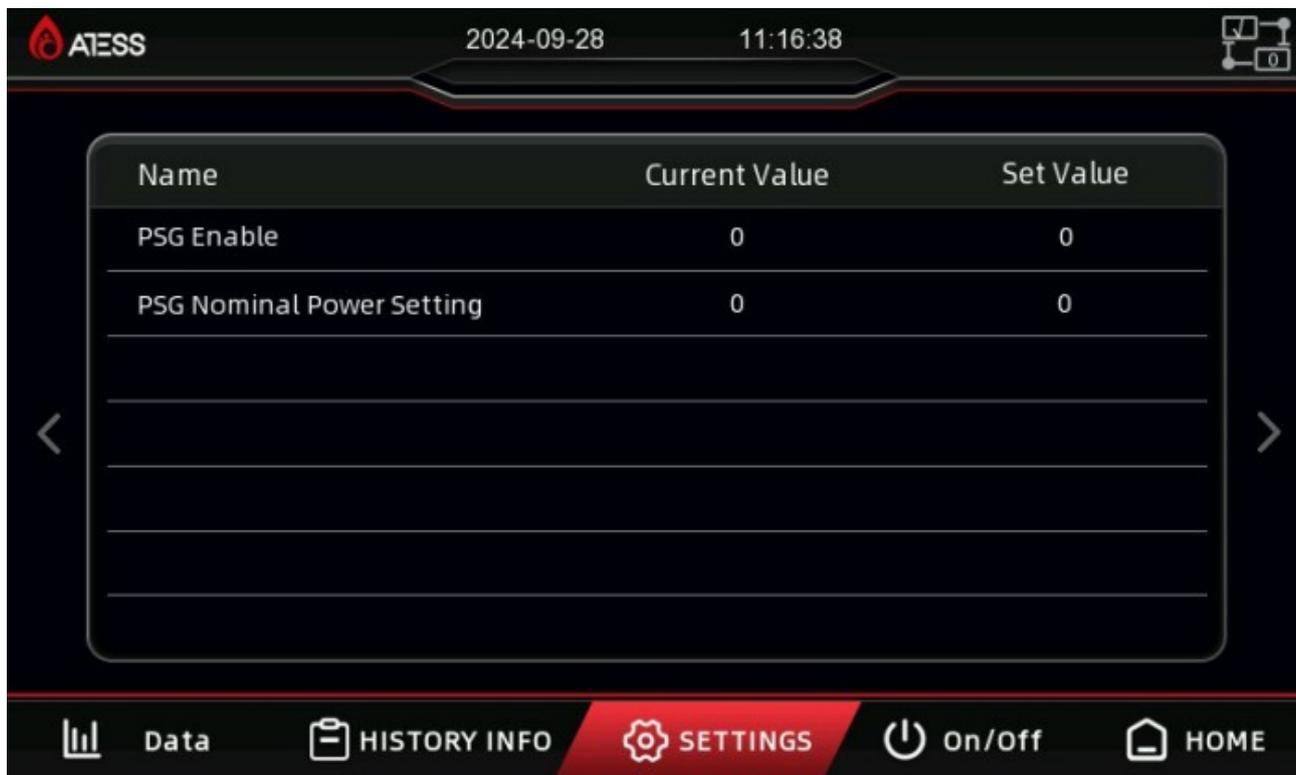


The screenshot shows the ATESS settings interface. At the top, it displays the date 2024-06-20 and time 19:48:10. The main content is a table with three columns: Name, Current Value, and Set Value. The table lists several settings, including Check Time (S), Meter Com No., Meter CT ratio, BAT to Non-Critical Enable, Island Protect Level, 485 Baud Rate(bps), and CanB Baud Rate(kbps). The 'SETTINGS' menu item is highlighted in red at the bottom of the interface.

Name	Current Value	Set Value
Check Time (S)	20	20
Meter Com No.	1	1
Meter CT ratio	200	200
BAT to Non-Critical Enable	0	0
Island Protect Level	0	0
485 Baud Rate(bps)	9600	9600
CanB Baud Rate(kbps)	20	20

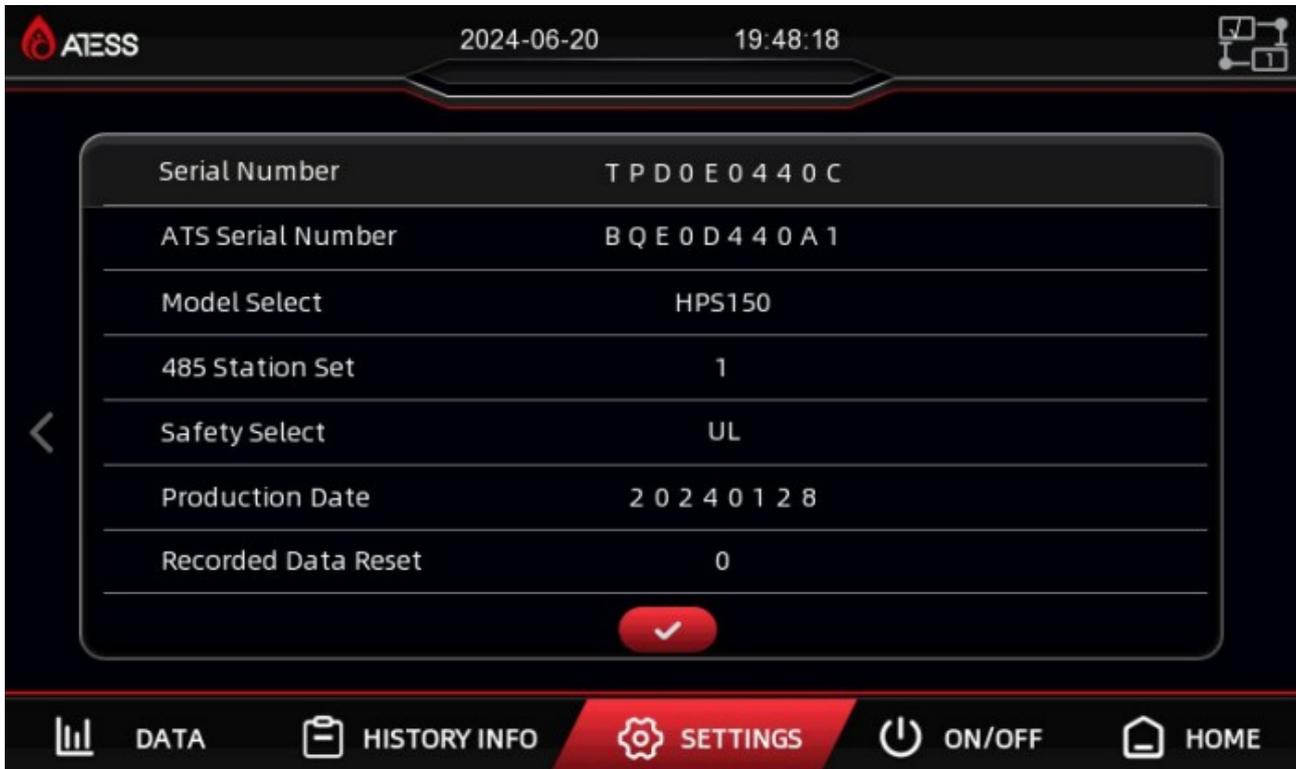
Item	Description
Island Protect Level	The protection function of preventing the HPS switch to OFF-Grid mode when the Grid is unavailable. Input range from 0-9, 0 indicates off, 1-9 indicate the levels, it is recommended not to set too high. The default setting is 1.
485 Baud Rated(bps)	The default setting is 9600.
CanB Baud Rated(kbps)	The default setting is 20.

11.2 This page describes other settings related to “PSG Enable”, “PSG Nominal Power Setting”.



Item	Description
PSG Enable	Set to 0 when disabled; Set to 1 when the communication way between the HPS and the inverter is through 485 or 232, convert 485. Set to 2 when the communication way is through CAN.
PSG Nominal Power Setting	The rated power of the PV inverter.

11.3 This page describes other settings related to “Serial Number”, “ATS Serial Number”, “485 Station Set”.



Item	Description
Serial Number	HPS equipment serial number, on the nameplate of the ATS.
ATS Serial Number	ATS equipment serial number, on the nameplate of the ATS.
485 Station Set	Rs485 communication address setting. If it is a parallel system, you must set it to 1.

5 Run the system

Before powering on, check the wiring of the inverter's PV, battery, grid/generator, load, and other connections to ensure correct phase sequence and secure wire connections.

a. Turn on the system

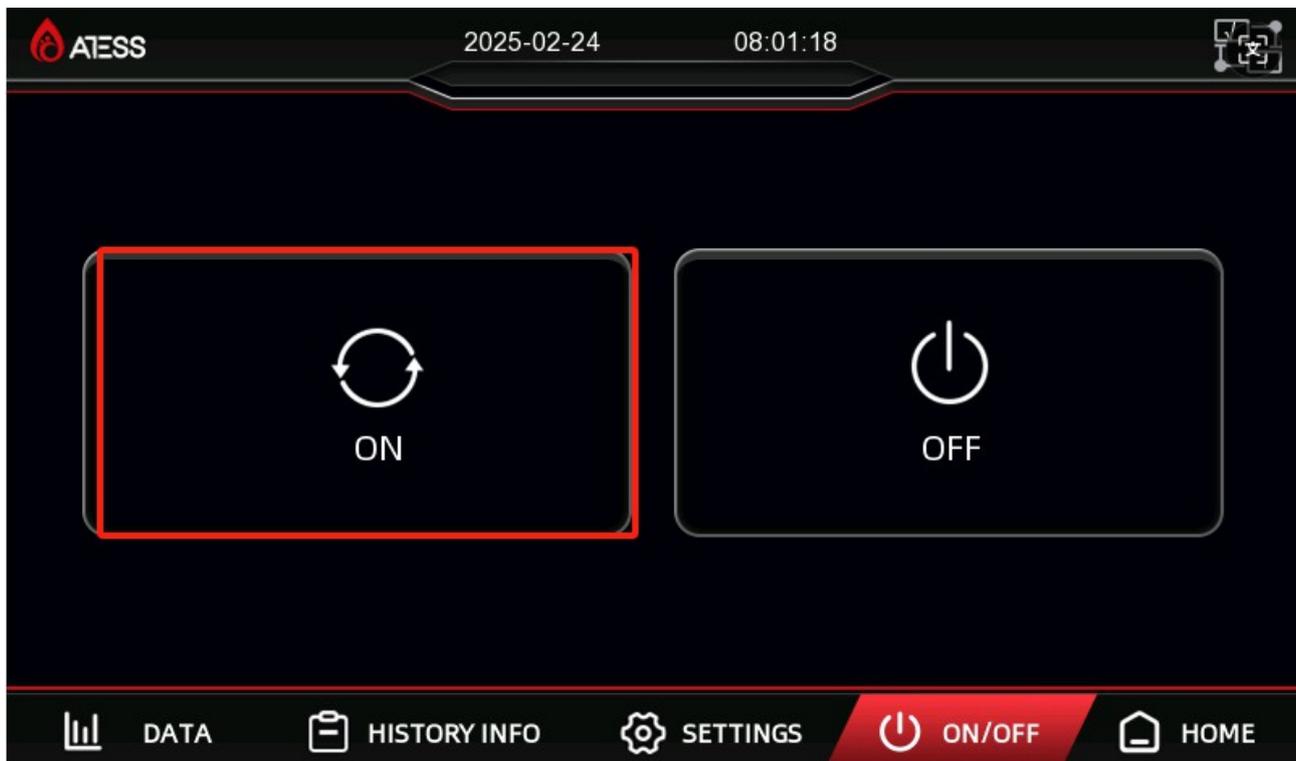
Step1:

Turn on the Switch Konb.



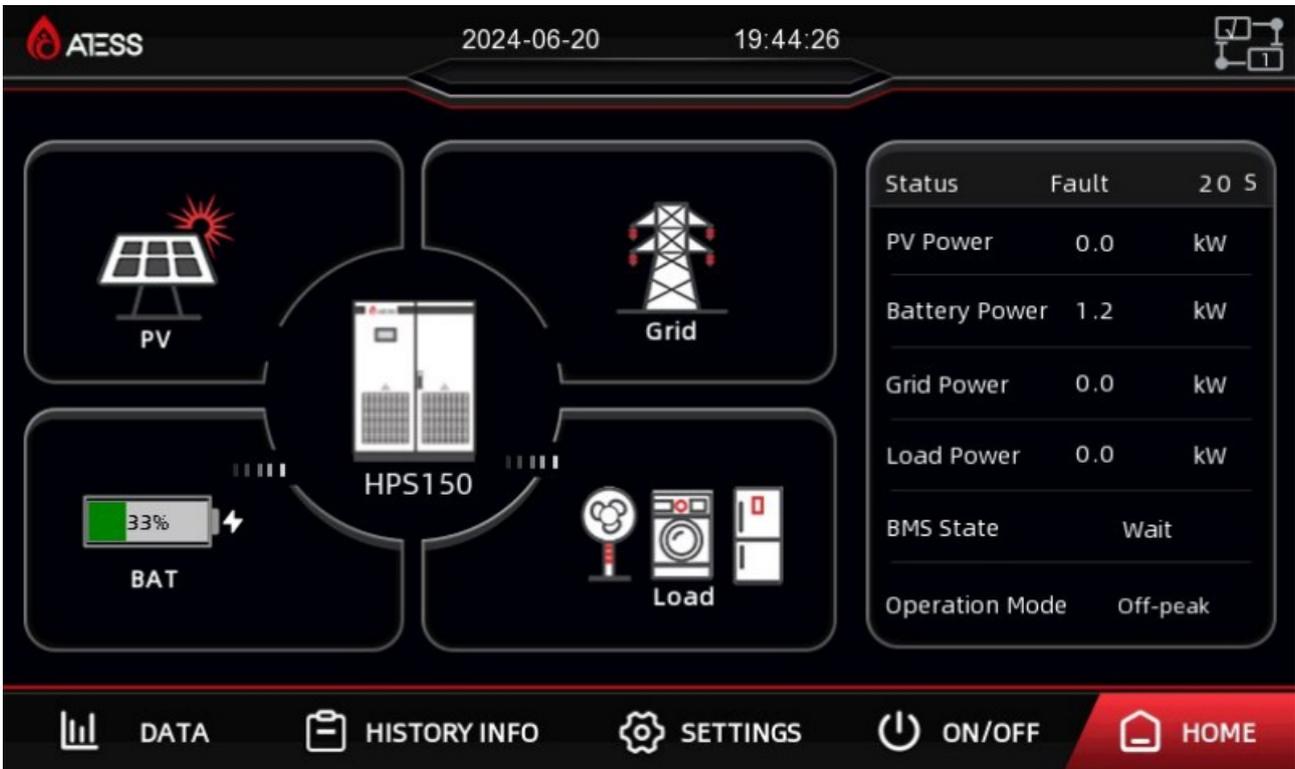
Step2:

Turn on the ON button on the screen.

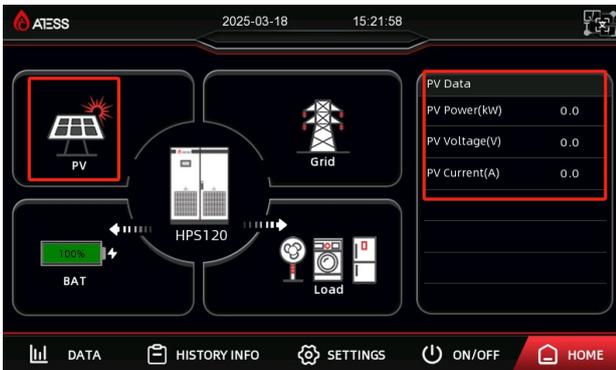


b. OFF Grid test: Homepage

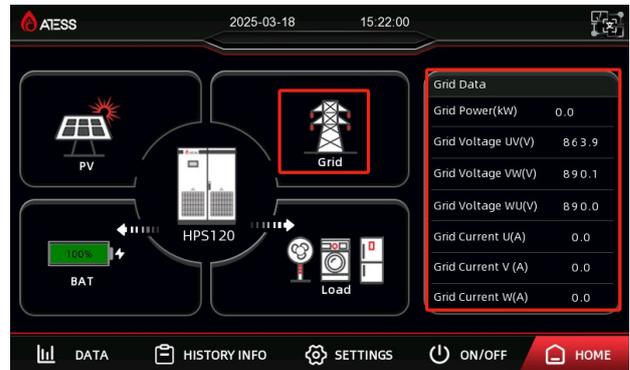
Check if the Status and the Operation Mode are correct.
 Check if the values are correct for PV, BAT, Grid, and Load.



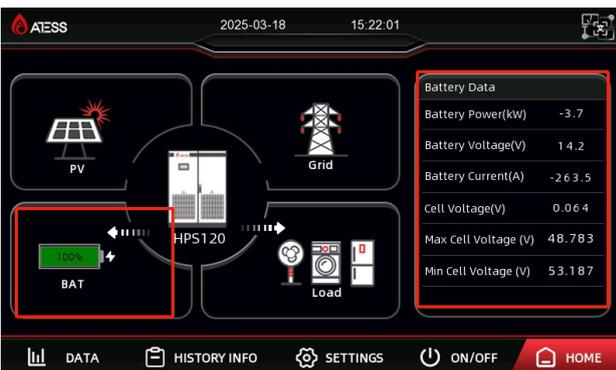
Homepage



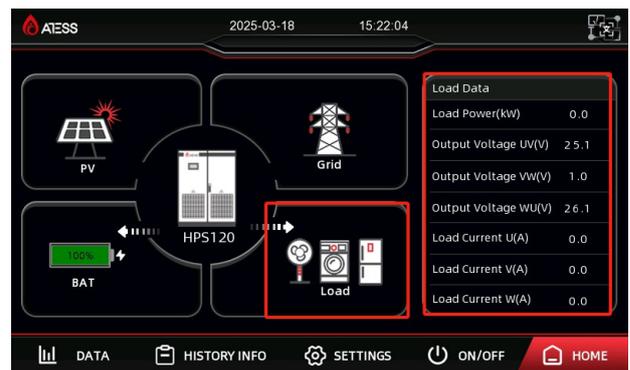
PV



Grid



BAT



Load

6 Test the system

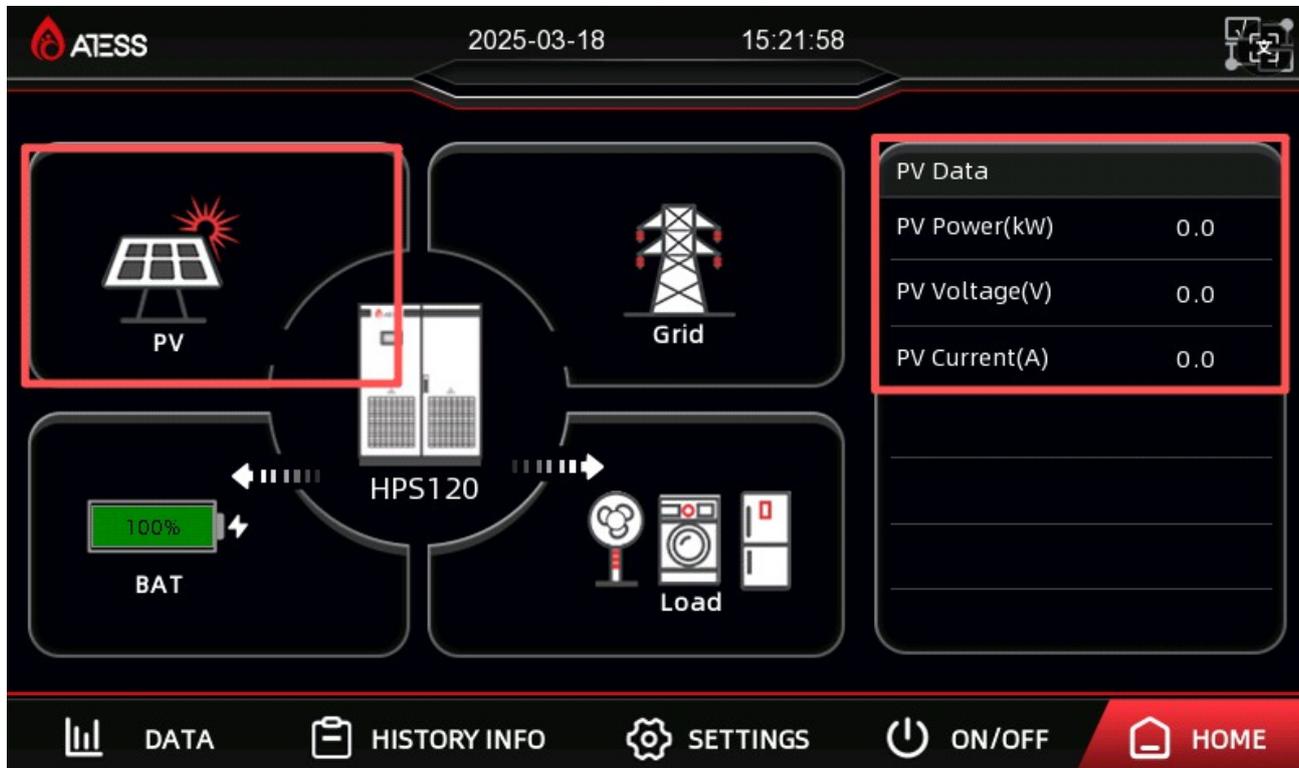
1. Battery charge/discharge cutoff function test

● Charging Test

① Test when in Off-grid mode:

Close the PV circuit breaker and test the photovoltaic charging.

a. Observe whether the PV voltage, PV current, battery cell voltage, and battery charging current are normal.



b. When the cell voltage reaches the float charge current limit point, observe whether the charging current is limited.





c. When the cell voltage reaches the float charge voltage, observe whether the inverter stops charging.



d. When the actual SOC reaches the charging cutoff SOC, observe whether the inverter stops charging which the BMS State will display Forbidden Charge or Wait.



2025-03-18 15:18:12

Name	Current Value	Set Value
Discharge Cut-off Volt(V)	2.750	2.750
Discharge Cut-off SOC	0	0
Re-discharge SOC	20	20
Charge Cut-off SOC	100	100
BAT Saturation	2	2
Trickle charge Set(kW)	50.0	50.0

DATA HISTORY INFO **SETTINGS** ON/OFF HOME



2025-03-18 15:17:09

PV Grid HPS120 BAT Load

Status	Failure	1 0 S
PV Power	0.0	kW
Battery Power	-3.7	kW
Grid Power	0.0	kW
Load Power	0.0	kW
BMS State	Wait	
Operation Mode	Battery First	

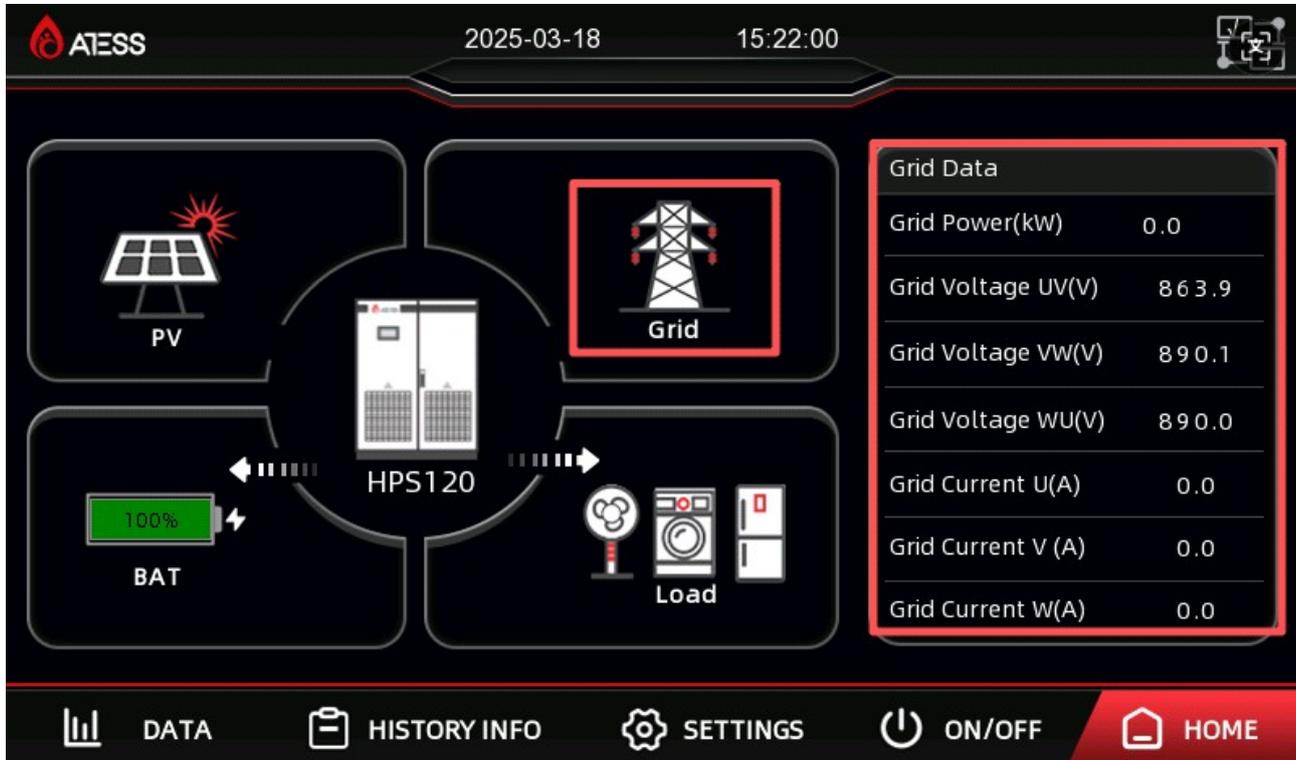
DATA HISTORY INFO **SETTINGS** ON/OFF HOME

- Charging Test

② Test when in On-grid mode:(The PV needs to be disconnected for convenient battery testing)

Set the operating mode to Battery First, close the grid circuit breaker, and let the inverter run in On-grid mode.

a. Observe whether the grid voltage, grid charging current, grid charging power, battery cell voltage, and battery charging current are normal.



b. When the actual SOC reaches the Grid charge cutoff SOC/Voltage, observe whether the inverter stops charging.

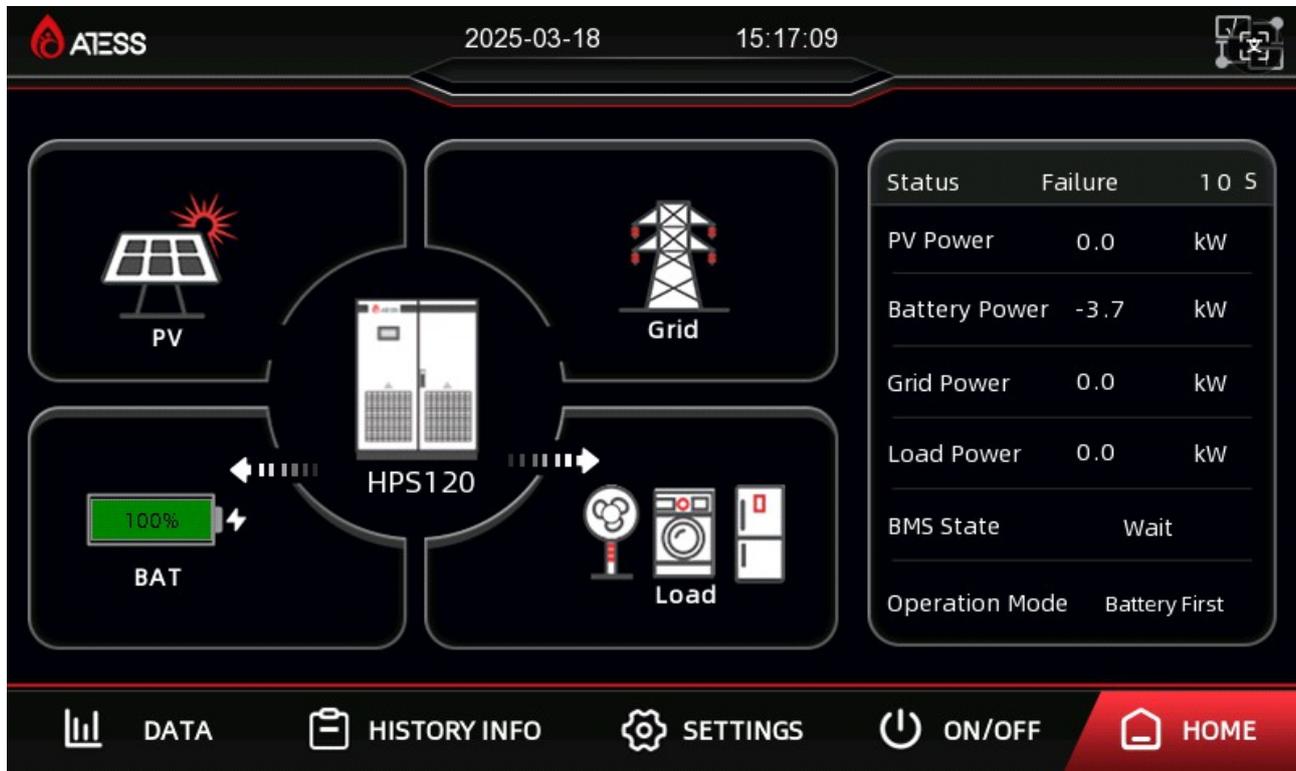


- Discharging Test

① Test when in Off-grid mode (The PV needs to be disconnected for convenient battery testing):

Close the load circuit breaker, connect the load to the inverter system, and test the inverter's discharge status.

a. Observe whether the SOC, voltage, current, etc. of the battery are normal during discharge.



b. When the battery cell voltage reaches the BAT Under-voltage-warning(V), observe whether the system switches from off-grid mode to single PV charging mode. At this time, the inverter AC output voltage will stop.



Note: In single PV Charge mode, close the PV circuit breaker and observe the PV charging status. When the cell voltage reaches the single PV to off-grid voltage, observe whether the system mode changes from single PV to off-grid mode. At this time, the inverter's AC output returns to normal.

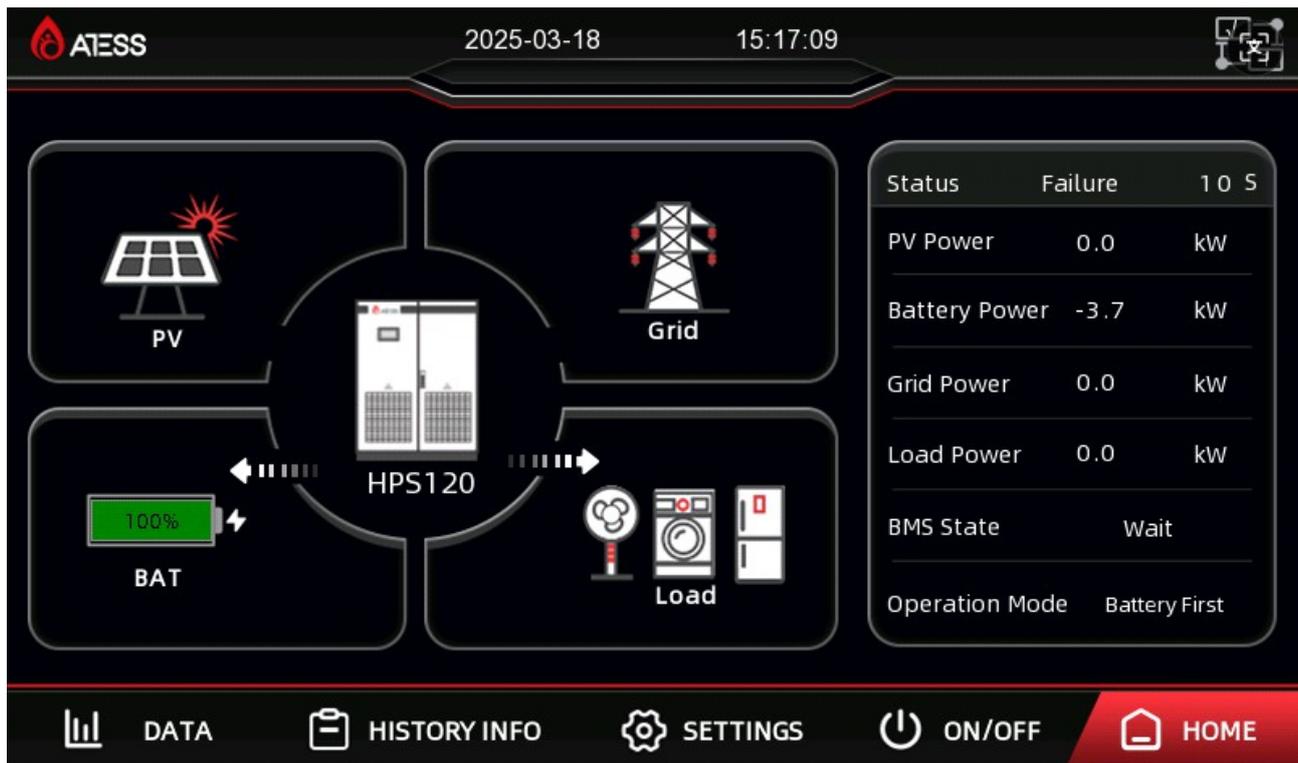


● Discharging Test

② Test when in On-grid mode (The PV needs to be disconnected for convenient battery testing):

Set the operating mode to Load First mode, close the grid circuit breaker, and let the inverter run in On-grid mode.

a. Observe whether the SOC, voltage, current, etc. of the battery are normal during discharge.



b. When the battery discharges to Discharge stop SOC/Voltage, observe whether it stops discharging. At this point, the power grid will carry loads and simultaneously trickle charge the battery with a small power.



ATESS 2025-03-18 15:18:12

Name	Current Value	Set Value
Discharge Cut-off Volt(V)	2.750	2.750
Discharge Cut-off SOC	0	0
Re-discharge SOC	20	20
Charge Cut-off SOC	100	100
BAT Saturation	2	2
Trickle charge Set(kW)	50.0	50.0

DATA HISTORY INFO SETTINGS ON/OFF HOME

c. When the battery's SOC reaches the Re-discharge SOC, observe whether the battery will discharge again.



ATESS 2025-03-18 15:18:12

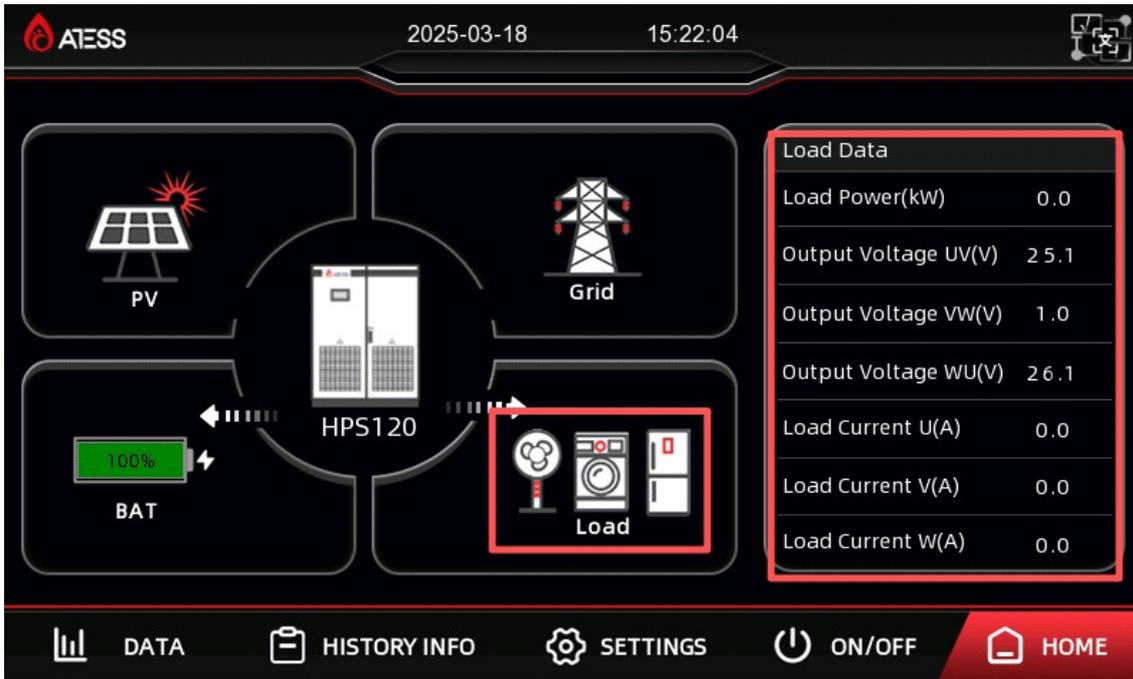
Name	Current Value	Set Value
Discharge Cut-off Volt(V)	2.750	2.750
Discharge Cut-off SOC	0	0
Re-discharge SOC	20	20
Charge Cut-off SOC	100	100
BAT Saturation	2	2
Trickle charge Set(kW)	50.0	50.0

DATA HISTORY INFO SETTINGS ON/OFF HOME

2. Load Test when in Off-grid mode

Run the system in off-grid mode and observe whether the system is operating normally:

- Gradually increase the load until the maximum load is reached, and observe whether the inverter output voltage, output current, and output power are normal.



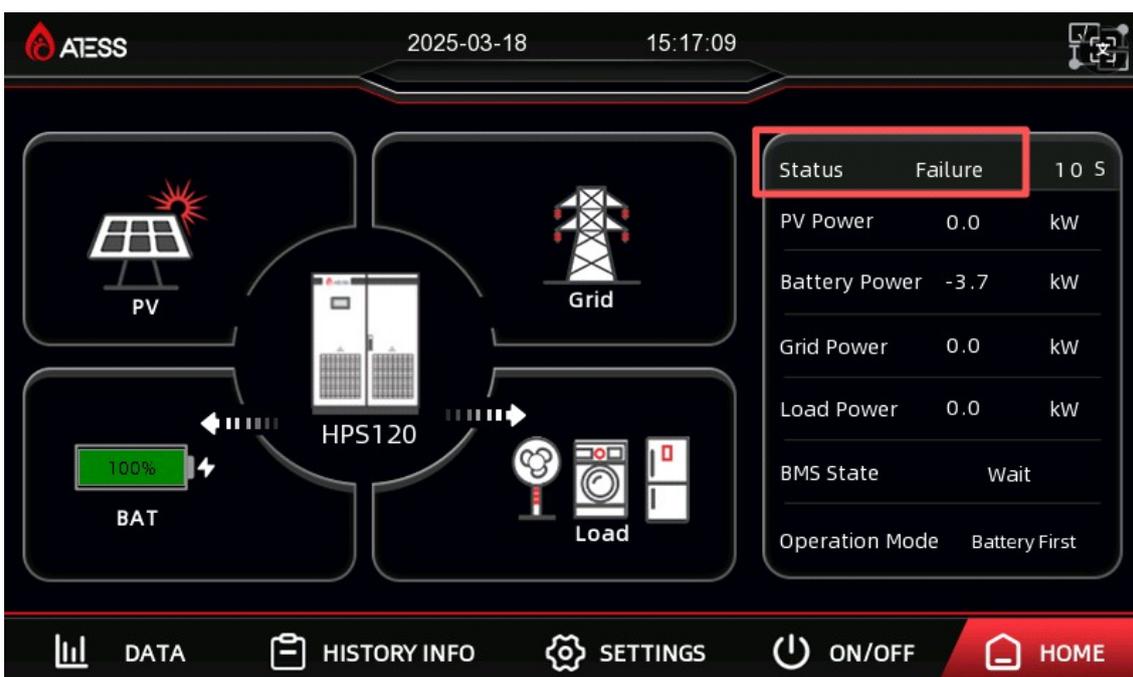
- Pay particular attention to the voltage when applying an impulsive load.

Note: The impact load must meet the inverter's power requirements for handling such loads; otherwise, an additional frequency converter is needed.

3. Off-grid to On-grid switching Test

When the system is operating in Off-grid mode, close the grid circuit breaker to test the Off-grid to On-grid switching process.

- When grid connection is successful, the operating Status will be displayed On-grid in the upper right corner of the Homepage of the screen.



- Observe whether the grid voltage, current, power, etc. are normal.

4. On-grid to Off-grid switching Test

When the system is operating in On-grid mode, manually shutting off the grid circuit breaker simulates a power outage to test the system's On-grid to Off-grid switching process.

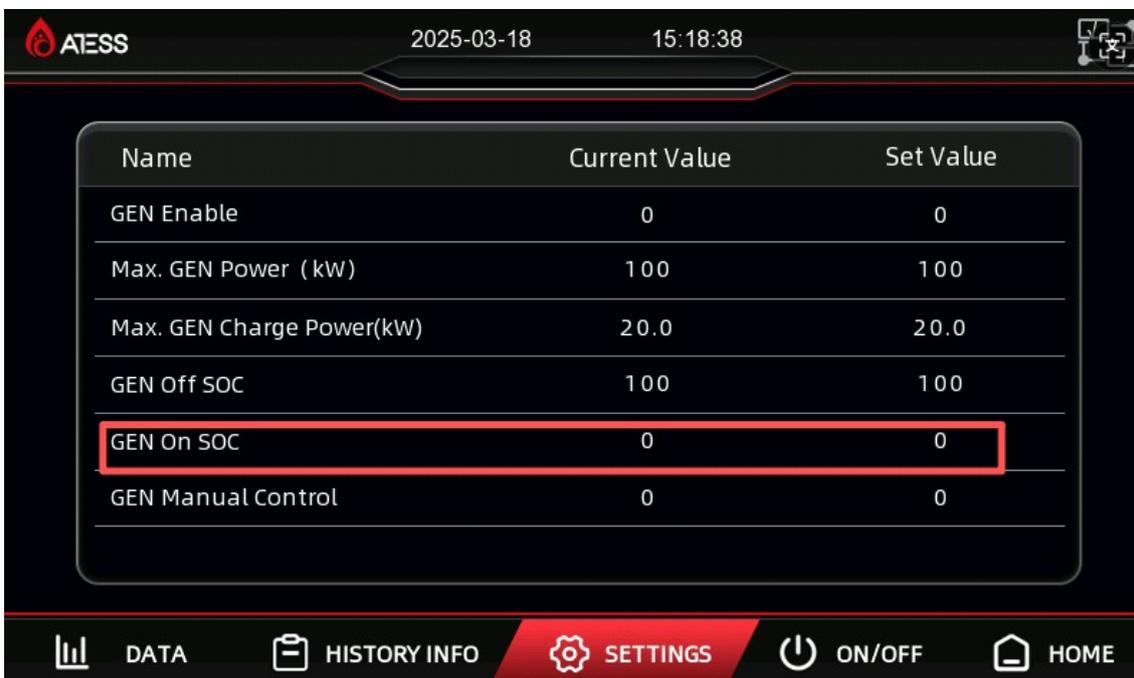
- When the power grid shuts off, the load power is provided by the inverter output. Observe whether the output voltage is stable and normal at the moment of switching.
- Observe whether the load operation is normal during the switching process.

5. Generator Start automatically Test

Before the Test, the generator needs to be switched to Auto-start mode, and the generator signal wiring needs to be correctly connected to the generator dry contact of the inverter.

● Generator Start-up Test

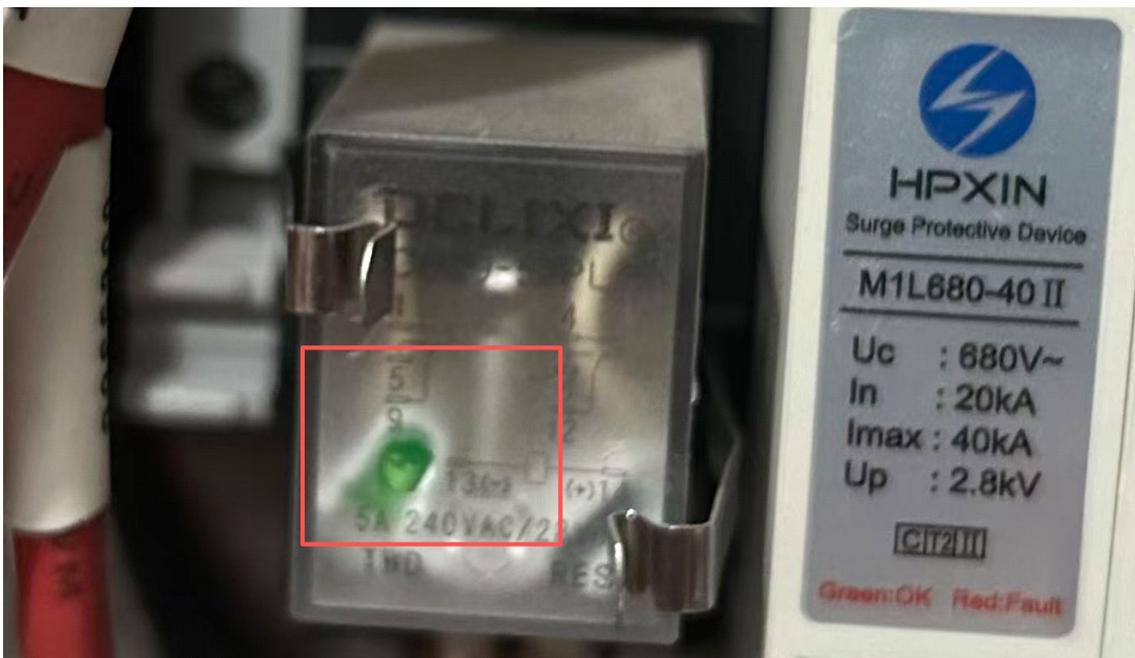
- When the system is in Off-grid mode, if the GEN On SOC is set on the screen to be higher than the actual SOC value, the inverter will send a start signal to the generator. Observe whether the indicator light on the generator dry contact is lit. If it is lit, it means that the start signal has been sent successfully.



The screenshot shows the ATESS control interface with the following data:

Name	Current Value	Set Value
GEN Enable	0	0
Max. GEN Power (kW)	100	100
Max. GEN Charge Power(kw)	20.0	20.0
GEN Off SOC	100	100
GEN On SOC	0	0
GEN Manual Control	0	0

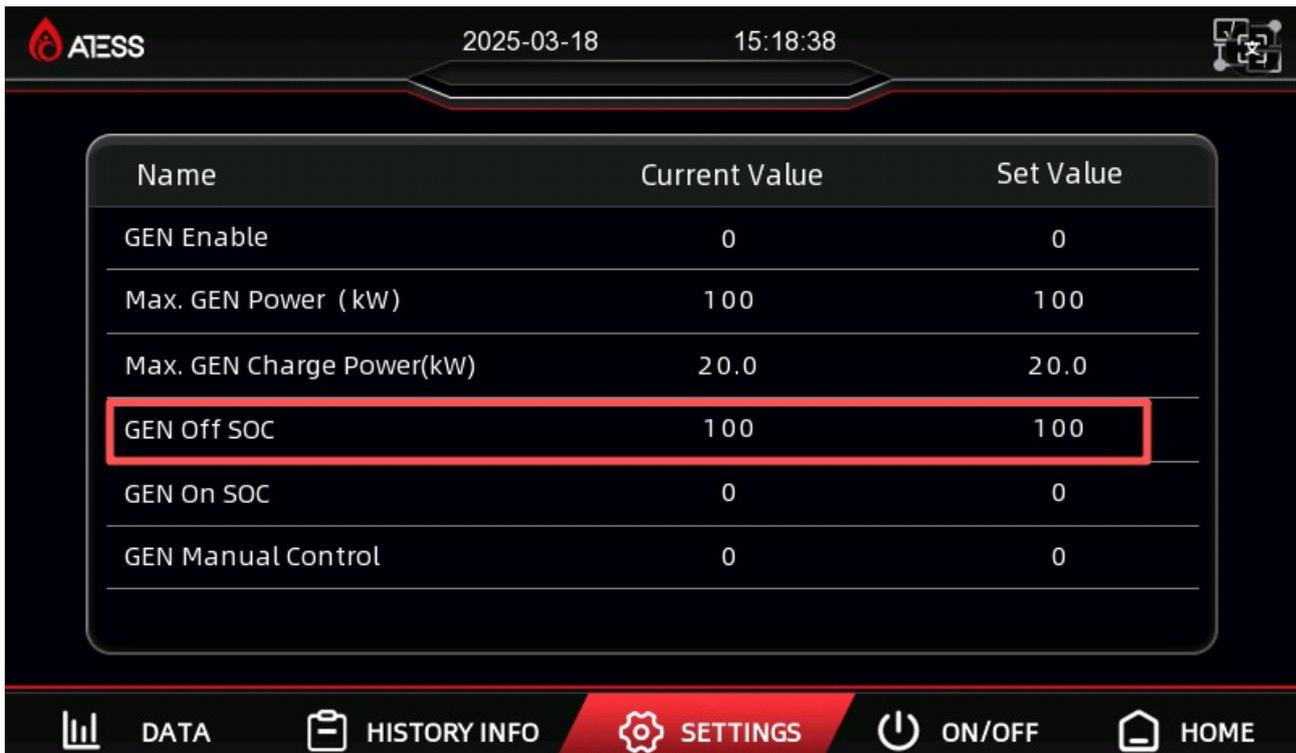
The interface also shows the date 2025-03-18, time 15:18:38, and navigation buttons for DATA, HISTORY INFO, SETTINGS (highlighted), ON/OFF, and HOME.



- b. When the generator receives the start signal, it will start automatically. After the generator starts, it will connect to the inverter system. Observe whether the Generator mode is displayed on the main screen.
- c. When the inverter is running in generator mode, observe whether the generator voltage, current, power, etc. are normal, and whether the load is operating normally.

● Generator shutdown test

- a. When the system is in Generator mode, set the GEN off SOC below the current SOC value on the screen.. Observe whether the indicator light turns off . If it is off, it means that the generator shutdown signal was successfully sent.



Name	Current Value	Set Value
GEN Enable	0	0
Max. GEN Power (kW)	100	100
Max. GEN Charge Power(kW)	20.0	20.0
GEN Off SOC	100	100
GEN On SOC	0	0
GEN Manual Control	0	0

- b. When the generator receives a shutdown signal, it will shut down. The moment the generator shuts down, the system will switch to Off-grid mode, which is equivalent to switching from On-grid to Off-grid mode. For details, please refer to test 4.