ATESS | ENERCOLLEGE

HPS SYSTEM
Commissioning Guide

Standard Operating Procedures & Best Practices--HPS15-50KTL

ATESS ENERCOLLEGE

Technical Support Document

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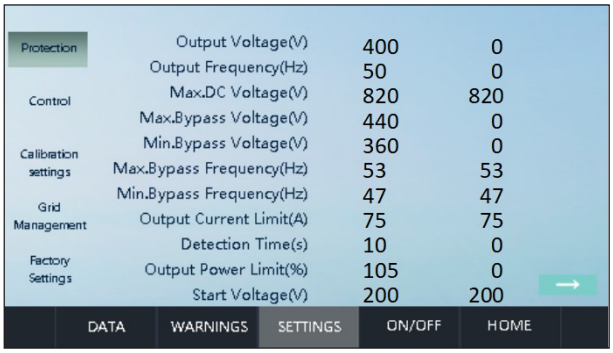
1 Introduction

To ensure correct and systematic commissioning of the ATESS HPS15-50KTL hybrid inverter, please follow the steps provided in this guide. Typically, we follow the standard debugging process, which involves setting protection and controlling parameters, and then turning on the system.

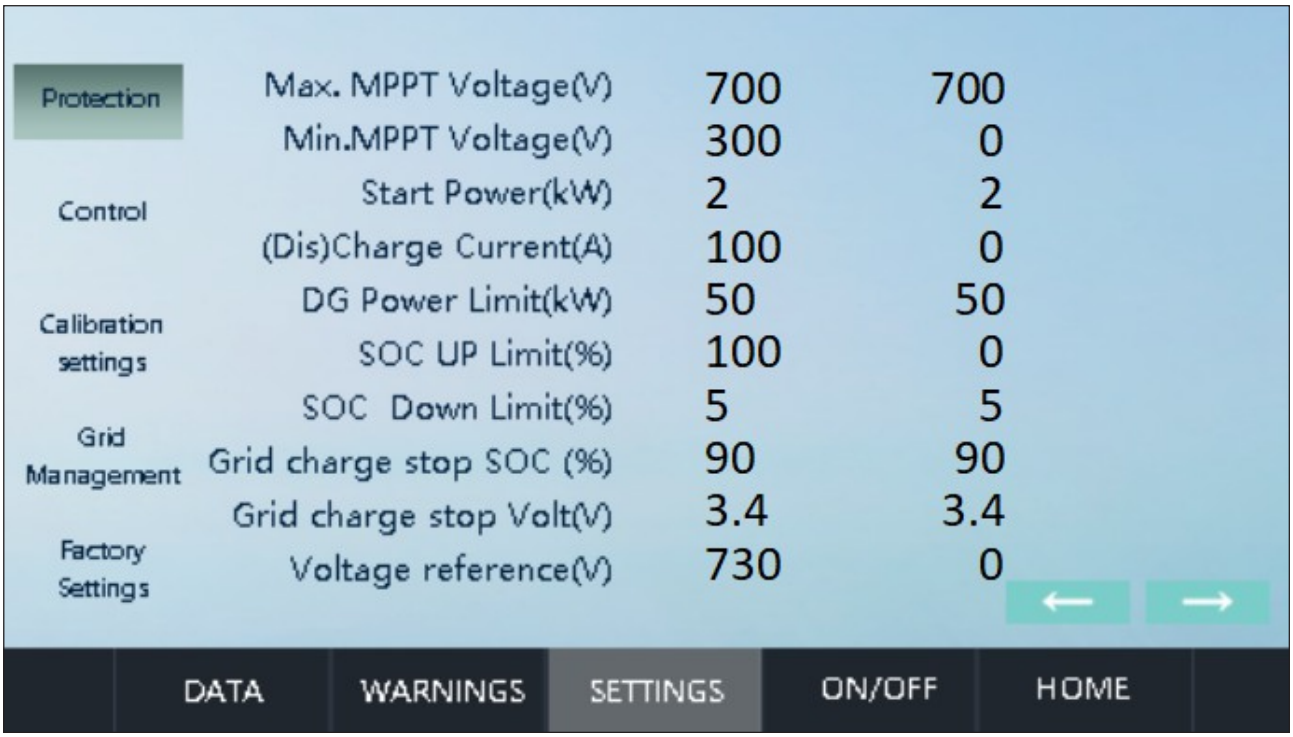
2 Protection Parameters Setting

2.1 Output & Grid Protection Parameter Setting



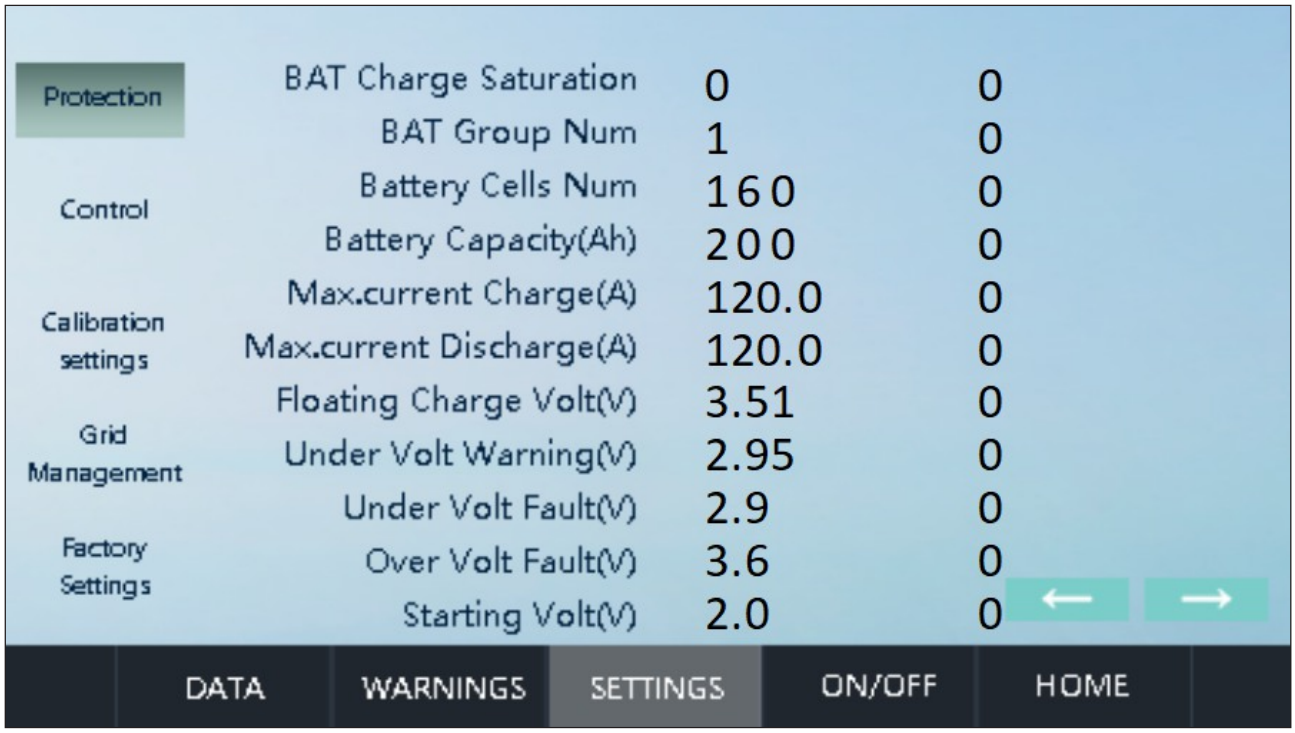
Item	Description
Output Voltage	Set the off-grid output voltage, you can set 380 or 400, which can be changed according to actual needs, and you need to power off and restart after the change to take effect.
Output Frequency	Set the AC output frequency, you can set 50 or 60, you can change it according to actual needs, and you need to power off and restart after the change to take effect.
Max.DC Voltage	PV voltage upper limit protection value, when the PV voltage is greater than the set value, the machine PV over voltage fault.
Max.Bypass Voltage	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.Bypass Voltage	The lower limit of the grid voltage, below which it will cut into off-grid mode, and the default setting is 90%.
Max.Bypass Frequency	The upper limit of the grid frequency, beyond which it will switch to off-grid mode, the default setting is rated +3.
Mix.Bypass Frequency	Lower grid frequency, below which it switches into off-grid mode, with the default setting of -3.
Output Current Limit	The upper limit of the output current, above the upper limit the energy storage controller will shut down, The default is 1.2 times the rated grid current.
Detection Time	Boot detection time, default preset 10 seconds.
Output Power Limit	Percentage of AC output power in constant power discharge mode. it can be set to 1%-120%, the default setting is 105%, and it is recommended not to exceed 110%.
Start Voltage	Grid-connected power on voltage. The default is 200V.

2.2 PV & Battery Regulation Parameter Setting



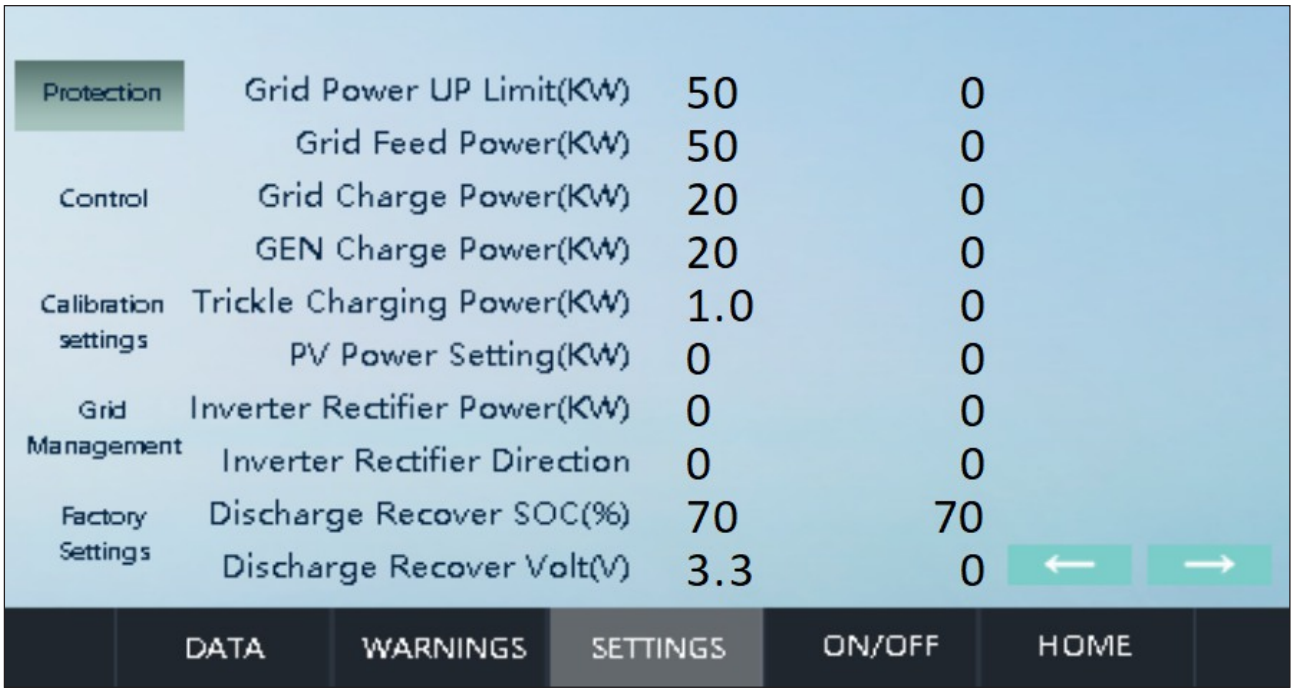
Item	Description
Max.MPPT Voltage	PV voltage limit.
Min.MPPT Voltage	The lower limit of PV voltage
Start Power	Photovoltaic on-power, when the PV power is less than the set power-on power, the MPPT will reset.
(Dis) Charge current	The size of the battery charge and discharge current.
DG Power Limit	Only the "Generator Mode" mode is in effect, which is the upper limit of the engine power. The default maximum setting is 1.2 times the rated power.
SOC UP Limit/ SOC Down Limit	Only when the battery has BMS, the current battery SOC is lower than the lower limit, low voltage alarm will be reported. when it is higher than the upper SOC limit, low voltage alarm will be eliminated.
Grid charge stop soc(%)	When the current soc reach this setting value, the Grid will stop charge battery, only has the function when the battery has BMS.
Grid charge stop volt(V)	When the current cell voltage reach this setting value, the grid will stop charge battery.
Voltage reference	The bus voltage sets the reference value, the default is 730V.

2.3 Battery Configuration & Protection Parameter Setting



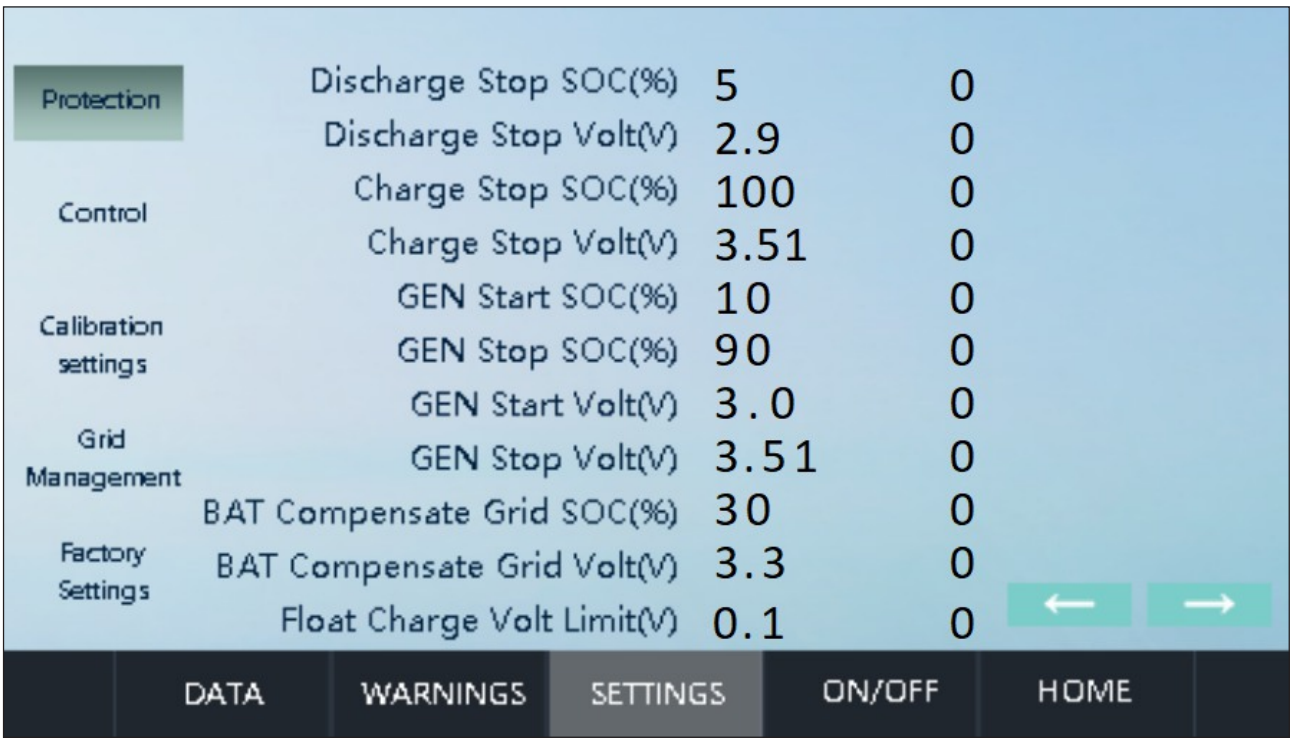
Item	Description
BAT Charge Saturation	Reserved.
BAT Group Num	The number of battery modules connected in parallel. For example,2V/200Ah, 240 in series and 2 in parallel, the number of groups is set to 2.
BAT Cells Num	The number of cells in each string of the battery pack. For example, 2V/200Ah, 240 in series and 2 in parallel, the number of units is set to 240.
BAT Capacity	Capacity of single battery,in Ah. For example, 2 V/200Ah, 240series and 2 parallel,the capacity is set to 200Ah.
Max.current Charge Max.current Discharge	Battery current protection value. Used to determine whether the battery is overcurrent.
Floating Charge Volt	Battery float voltage. When the cell voltage reaches this setting,the charging current approaches 0 A.
Under Volt Warning	The value of the cell voltage when the battery is undervoltage. When the battery is low voltage, it will enter the single PV mode in the off-grid state, which can only charge the battery, and trickle charge the battery in the grid-connected state.
Under Volt Fault	The value of the cell voltage during battery undervoltage protection. When the battery voltage is less than or equal to the set value, theenergy storage controller will stop.Over Volt Fault: Voltage of the overvoltage protection unit of the battery. When the battery voltage reaches the set value, the energy storage controller will stop.
Starting Volt	When the voltage of the battery unit of the energy storage controller is greater than the set value, the energy storage controller can start to operate,otherwise,the "No Bat Fault" will be reported.

2.4 Power Flow & EMS Control Parameter Setting



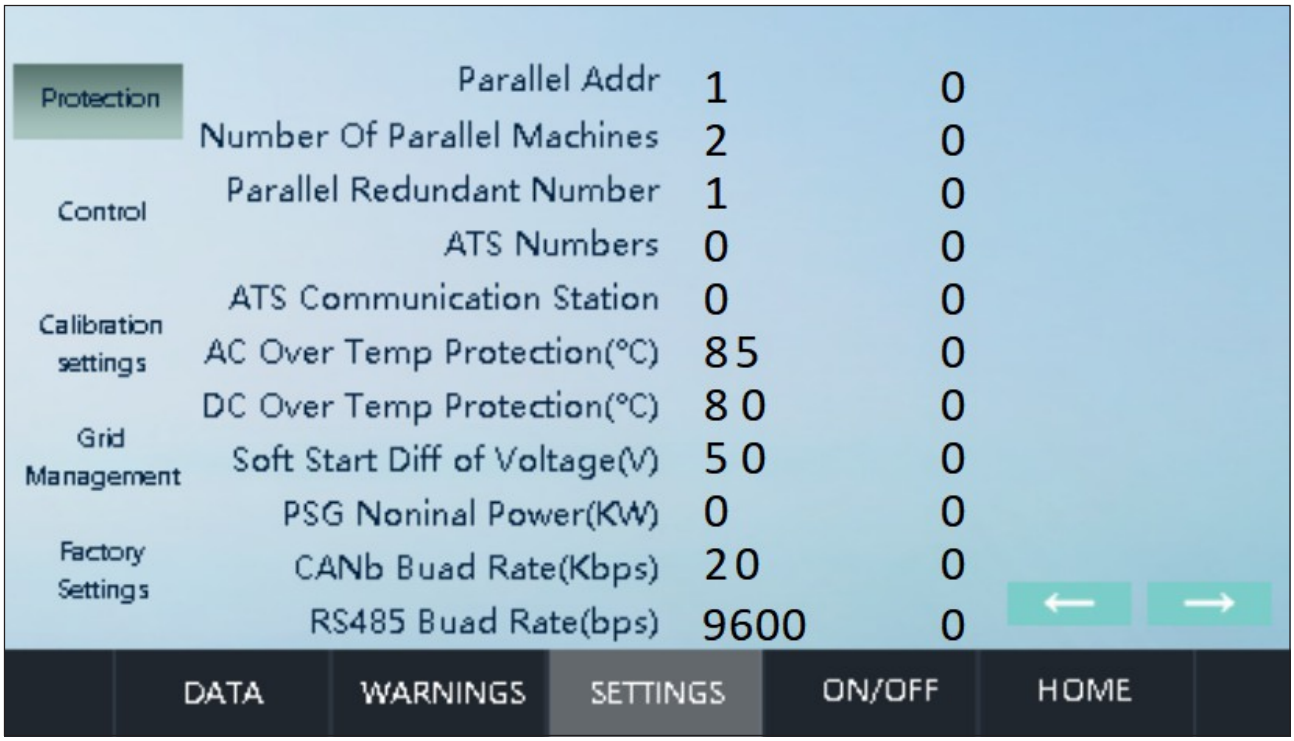
Item	Description
Grid Power UP Limit	The maximum power drawn from the grid.
Grid Feed Power	The maximum power fed to the grid.
Grid Charging Power	The power grid charges the battery.
GEN Charging Power	The maximum power of the generator rechargeable battery. Max.20 kw.
Trickle Charging Power	When the battery discharges to the end of the discharge or triggers the low voltage alarm, the battery stops discharging, and the power grid loads and charges the battery according to the set power.
PV Power Setting	It only works in EMS mode and is used to set the PV maximum power.
Inverter Rectified Power	Only active in EMS mode, set the power of machine rectification or inverter.
Inverter Rectified Direction	Only valid in EMS mode, set "0" direction to rectification,set "1" direction to inverter.
Discharge Recover SOC Discharge Recover Voltage	It is only used for "peak period"of "load priority" and economic mode in grid-connected state. And when that discharge of the battery is stop, judging whet the discharge of the battery is resumed.

2.5 Charge/Discharge Strategy Parameter Setting



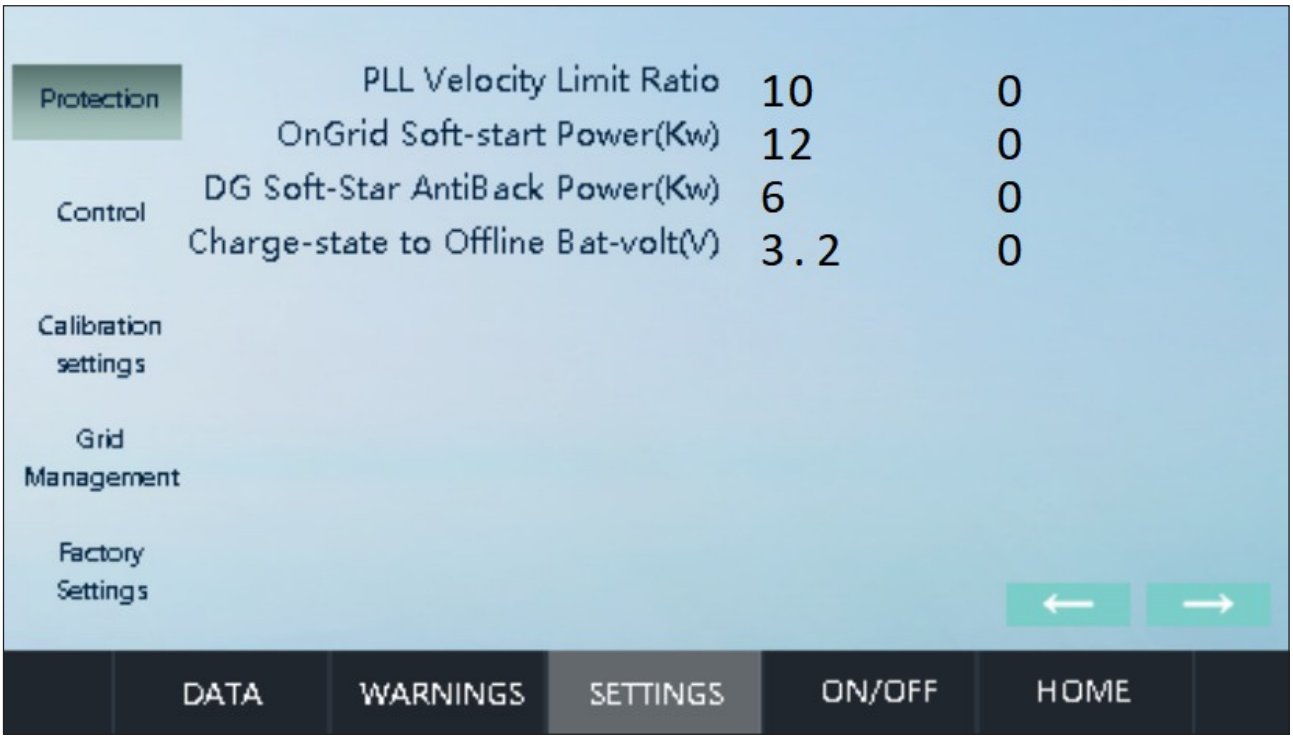
Item	Description
Discharge Stop soc Discharge Stop Voltage	Only used for "load first" and 'peak period" in economic mode, the battery will stop discharging when the battery voltage or SOC reaches the discharge cutoff voltage or SOC.
Charge Stop soc Charge Stop Volt	Only used for "battery first" and "valley periods of economic mode, the battery will stop charging when the battery voltage or SOC reaches the charging cutoff voltage or SOC.
GEN Start SOC GEN Start Voltage	When the generator is enabled, when the battery voltage or SOC reaches the set generator starting voltage or SOC, the inverter controls the dry contact to start the oil engine.
CEN Stop SOC GEN Stop Voltage	When the generator is enabled, when the battery voltage or SOC reaches the set generator stop voltage or SOC, the inverter controls the dry contact to turn off the generator.
BAT Compensate Grid SOC BAT Compensate Grid Volt	Used only for Load Priority and Peak Period in Economy Mode. When the battery voltage or SOC is greater than the set value, the priority is to load the battery. On the contrary, priority is given to the grid with load.
Float Charge Volt Limit	When the cell voltage > (Floating Charge Volt-Float Charge Volt Limit), the battery begins to enter the float state. The charging current decreases gradually, and the charging current is 0 A when the floating charge voltage is reached.

2.6 Parallel System & Temperature Protection Parameter Setting



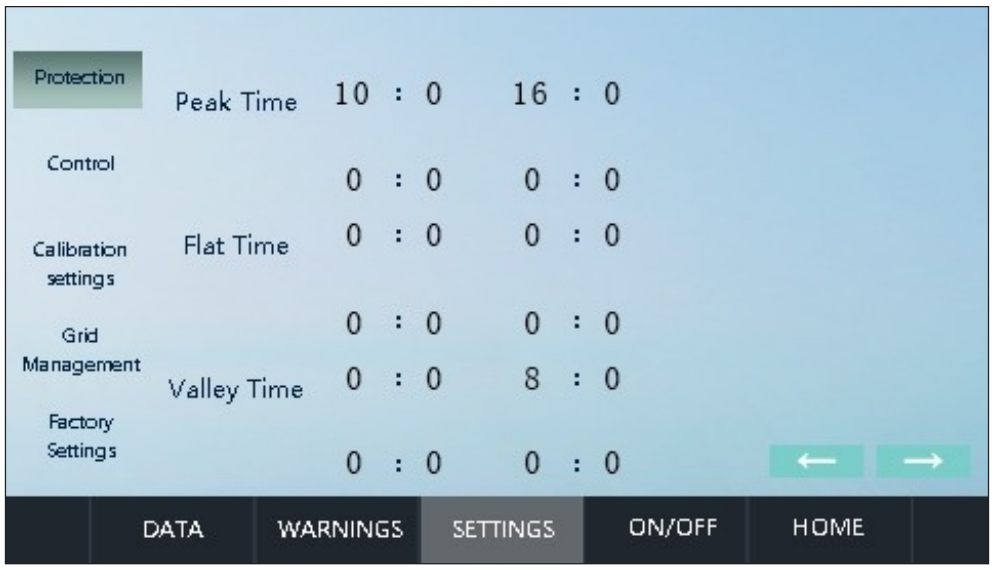
Item	Description
Parallel Addr	The device address of the parallel system, set '1' as the host, other as the slave.
Number of Parallel Machines	The total number of devices in the parallel system is set to 2 for 2 devices in parallel, 3 for 3 devices, and so on.
Parallel Redundant Number	Maximum fault quantity of parallel system: when it is set as 0, all devices will be transferred to fault when any device of parallel system fails; when it is set as 1, other devices will still operate normally when the fault quantity is not more than 1.
ATS Number	The number of ATS connected. Default value is 1.
Trickle Charging Power	When the battery discharges to the end of the discharge or triggers the low voltage alarm, the battery stops discharging, and the power grid loads and charges the battery according to the set power.
ATS Communication station	ATS communication station number. Default value is1.
AC Over Temp Protection	AC temperature protection, over the temperature value shutdown. The default is 85°C.
DC Over Temp Protection	DC temperature protection, over the temperature value shutdown. The default is 85°C.
DC Start Diff of Voltage(V)	When the voltage difference between the bus voltage and the battery voltage is less than this value during battery soft start, a DC soft start fault is reported. The default is 50V.
PSG Noninal Power(KW)	When connecting a grid-connected inverter, set the rated power of the grid-connected inverter.
CANb Buad Rate(Kbps)	Set the CANb Buad rate, the default is 20.
Rs485 Buad Rate(bps)	Set the RS485 Busd rate, the default is 9600.

2.7 On-Grid/Off-Grid Transition Parameter Setting



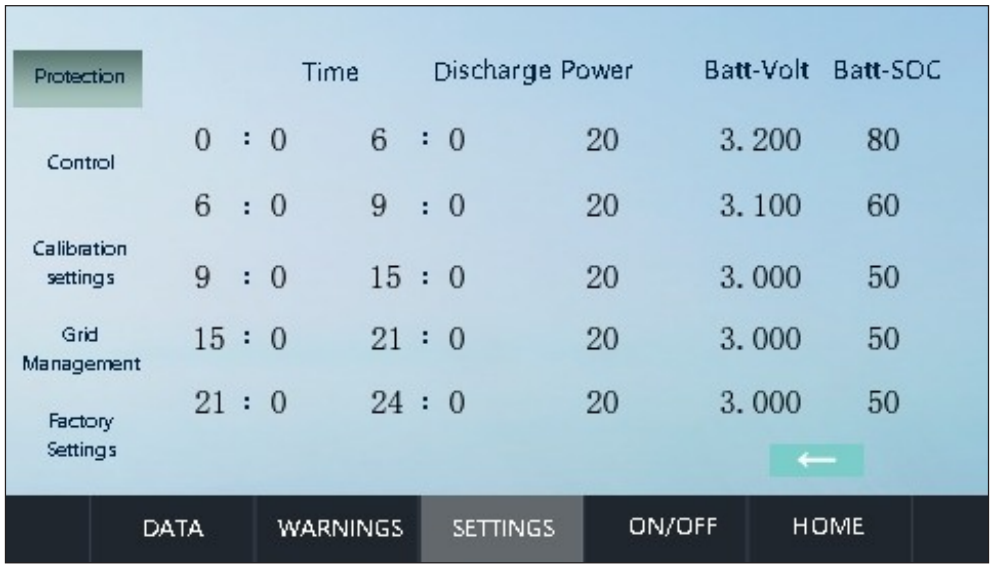
Item	Description
PLL Velocity Limit Ratio	Phase-locked loop parameters when switching from off-grid to on-grid, the default is 10.
OnGrid Soft-start Power(KW)	When grid-connected soft start is enabled, if the present off-grid load power is greater than this value, a load soft start will be performed when switching to grid-connected mode; otherwise, a soft start will not be performed.
DG Soft-Star AntiBack Power(Kw)	During the process of switching generator modes, after determining that the grid connection soft start conditions are met, the system performs a load-bearing soft start from that power point to prevent backflow into the generator during soft start.
Charge-state to Offline Bat-volt(V)	In single PV mode, when the voltage of a single battery cell is charged to a value higher than this, the system switches to off-grid mode. The default is 3.2V.

2.8 Time-of-Use Period Parameter Setting



Item	Description
Peak Time	Only in effect in the "Economic Mode" and is used to set the time period range of peak, flat, and valley periods.The peak period is the time of the highest electricity price per day.The valley period is the time period of the lowest electricity price per day.
Flat Time	
Valley Time	

9. Multi-stage charge and discharge" mode parameter setting interface



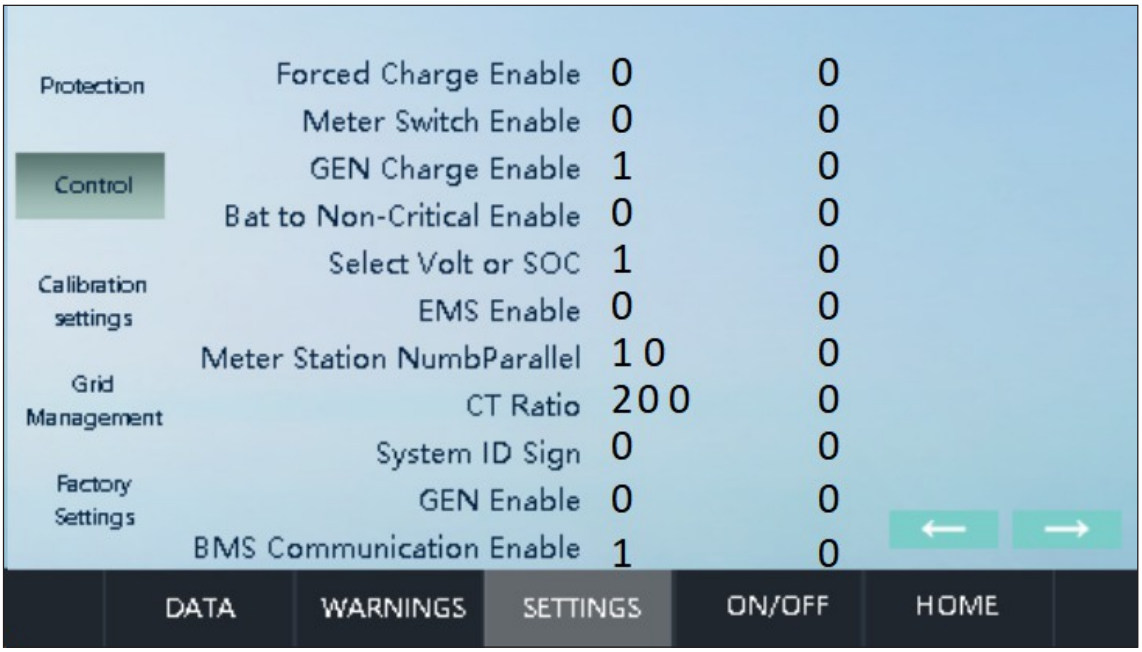
Item	Description
Time	Used to set the usage period.
Discharge power	The maximum discharge power limit of the battery.
Batt Volt, Batt SOC	When the battery cell voltage or battery SOC is greater than the set value, the machine runs the load priority logic, and the priority battery discharge with load; When less than the set value, the machine runs battery priority logic and priority grid discharge with load.

3 Control Parameters Setting

3.1 Time-of-Use Period Parameter Setting

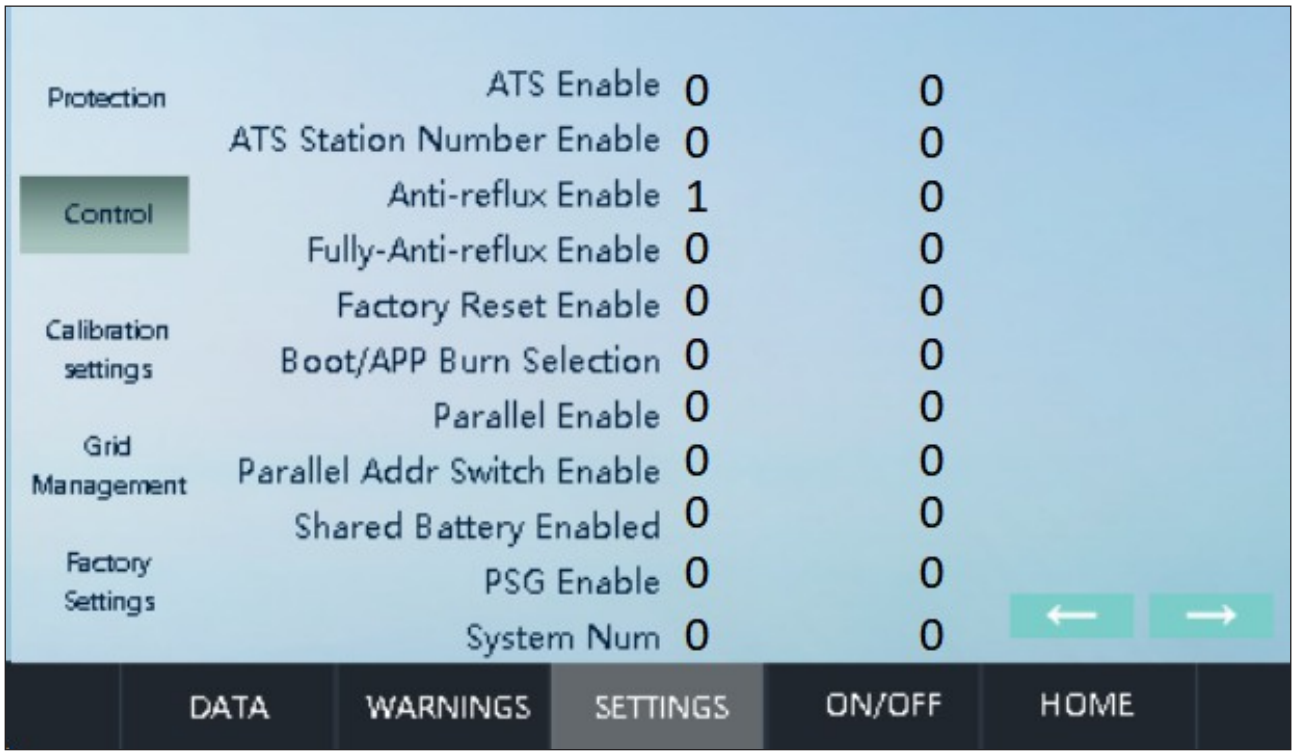
Item	Description
Island Protect Enable	A protection function that prevents the energy storage controller from correctly cutting into the off-grid mode under abnormal grid conditions.
Grid Manage Enable	Reserved.
DG/Grid Soft-start Enable	When set to 1, only the loaded soft-start for switching to generator mode is enabled, When set to 2, the loaded soft-start for switching to either generator mode or grid mode is enabled. The default value is 0.
DG Manual Control	When the generator function is enabled, this parameter can be used to manually control the generator's dry-contact start/stop signal.Setting it to 1 will start the generator, and setting it to 0 will stop the generator After the parameter is set once and the generator responds, the parameter becomes invalid. The default value is 0.
Insulation Impedance	Reserved.
GFDI Ground Select	Reserved.
Grid PV Charge Enable	When set to 1, the grid and PV can charge the battery at the same time; in generator mode, the generator and PV can charge the battery at the same time. When set to 0, if PV is connected, the grid will not charge the battery; if there is no PV, the grid can charge the battery.
LVRT Enable	Reserved.
P Regulation Enable	Reserved.
Q Regulation Enable	Reserved.
Manual Adjustment Enable	Reserved.

3.2 Battery / Meter / EMS Control Parameter Setting



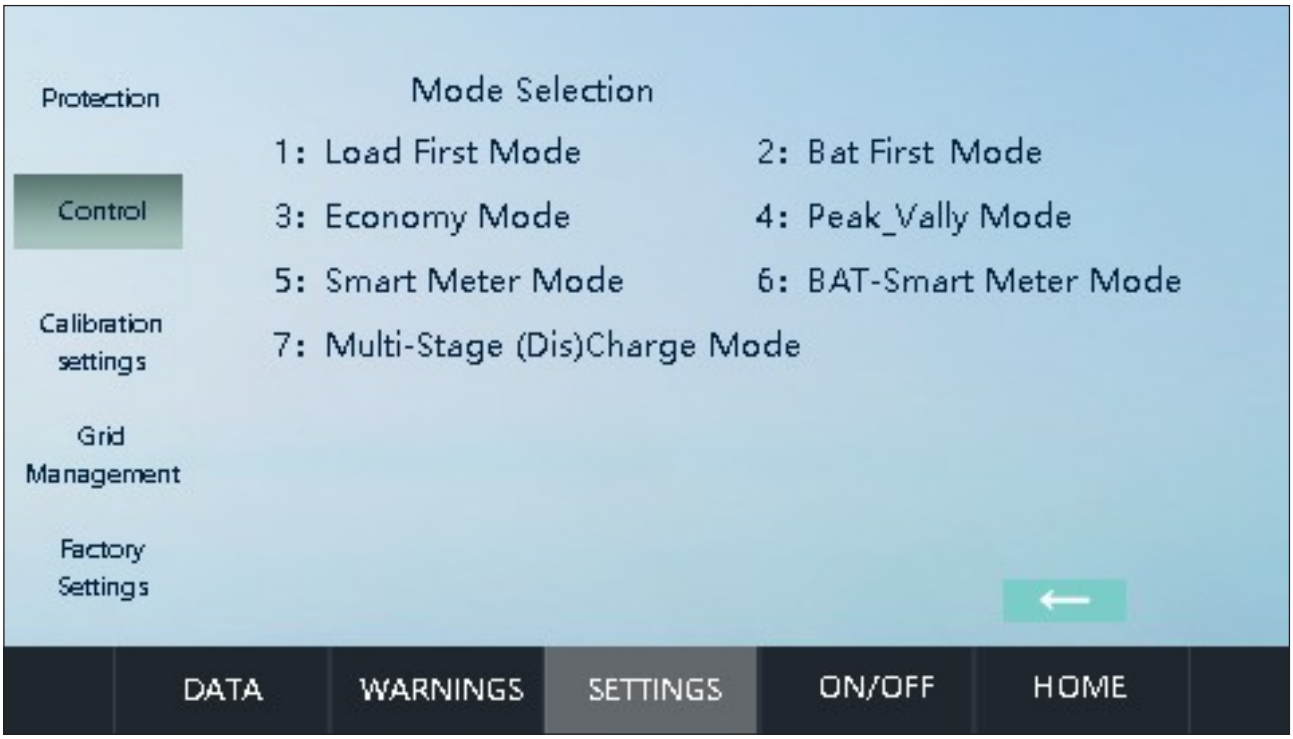
Item	Description
Forced Charge Enable	Set to 1 when using batteries produced by ATESS, otherwise set to 0.
Meter Switch Enable	Set to 0 when the meter is connected and the collect or produced by ATESS is connected; Connect only the meter to 1.
GEN Charge Enable	When set to 1, the generator can charge the battery; When set to 0, the oil generator cannot charge the battery.
Bat to non-critical Enable	Only when the "smart meter" mode is connected to the meter and is active, and it is set to 1, the battery can supply power to the grid-sideload; When set to 0, the battery cannot supply power to the grid-side load.
Select Volt or SOC	When set to 0, use battery voltage control; When set to 1, battery SOC control is used.
EMS Enable	Enter "EMS mode" when set to 1, exit "EMS mode" when set to 0.
Meter Station Number Parallel	Set the 485 communication address of the meter.
CT Ratio	The ratio of meter CT.
System ID Sign	Used for the server to identify the energy storage system, the same set of parallel system set the same number, otherwise set a different number, the stand-alone system is set to 0.
GEN Enable	When the grid input end of the energy storage controller is connected to the generator, the generator enable needs to be set to 1, otherwise it is set to 0.When the generator is connected with ATS, it can not be enabled to be 1.
BMS Communication Enable	Set to 1 when the machine is in BMS communication with the battery; otherwise, set to 0.

3.3 ATS / Anti-Reflux / Parallel Control Parameter Setting



Item	Description
ATS Enable	When the energy storage controller is used with the ATS produced by ATESS, the ATS enable needs to be modified to 1. ATS from other manufacturers is set to 2. The default is 0.
ATS Station Number Enable	Reserved.
Anti-reflux Enable	When set to 1, the machine does not feed the grid; when set to 0,the machine can feed the grid.
Factory Reset Enable	When setting 1, clear the power information recorded on the data page.The parameter settings are not modified.
Boot/APP Burn Selection	Reserved.
Parallel Enable	When set to 1, the parallel function is enabled, and all devices participating in the parallel function are set to 1.
Shared Battery Enable	When used in parallel. If connected to the same battery set1,otherwise set 0. The Default value is 0.
PSG Enable	When set to 1, the function for enabling the grid-tied inverter access is activated.The default value is 0.
System Num	Reserved.

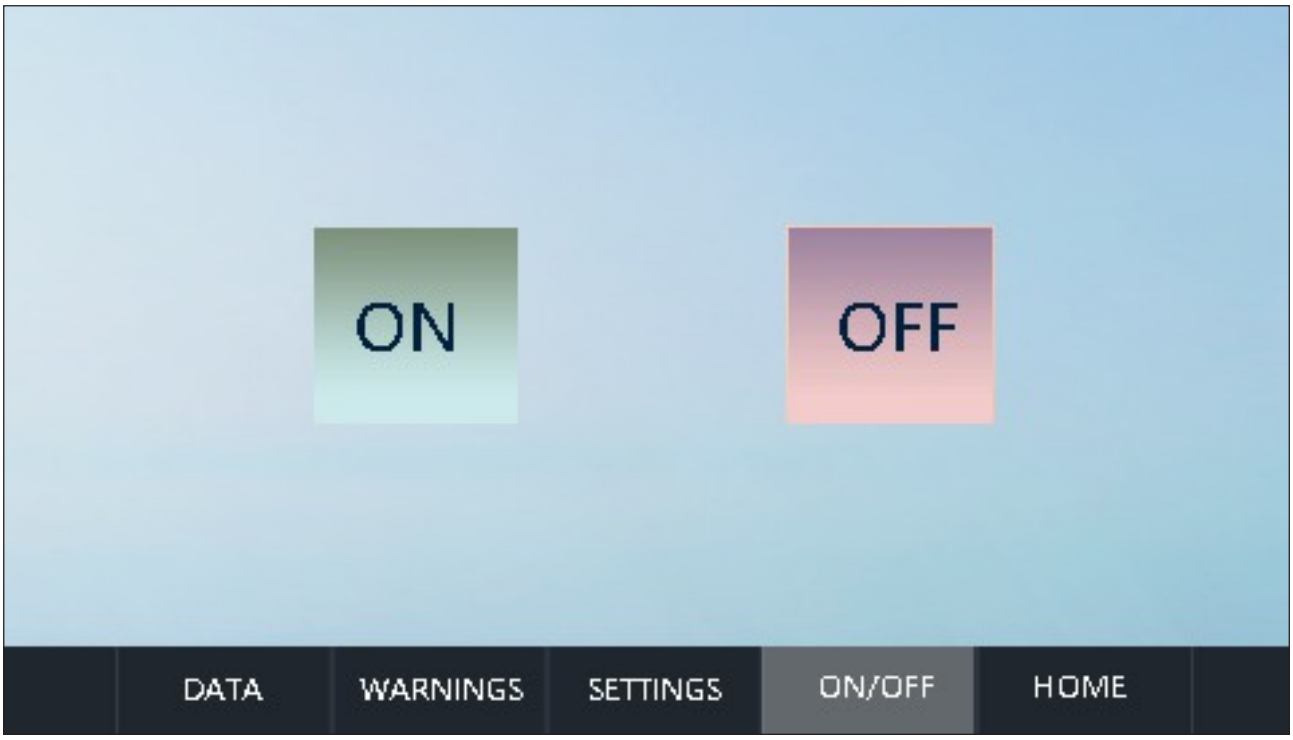
3.4 Operation Mode Selection Parameter Setting



Item	Description
Mode Selection	Set the mode of inverter operation.
1	Load First Mode.
2	Bat First Mode.
3	Economy Mode.
4	Peak Vally Mode.
5	Smart Meter Mode.
6	BAT-SmartMeter Mode.
7	Multi-Stage (Dis)charge Mode.

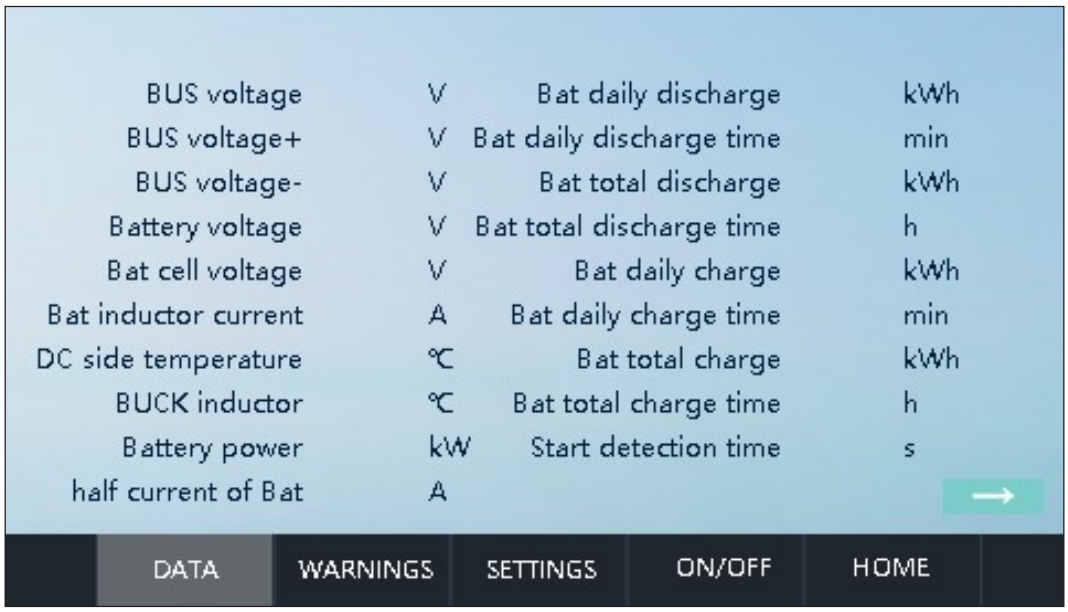
4 Turn on the System

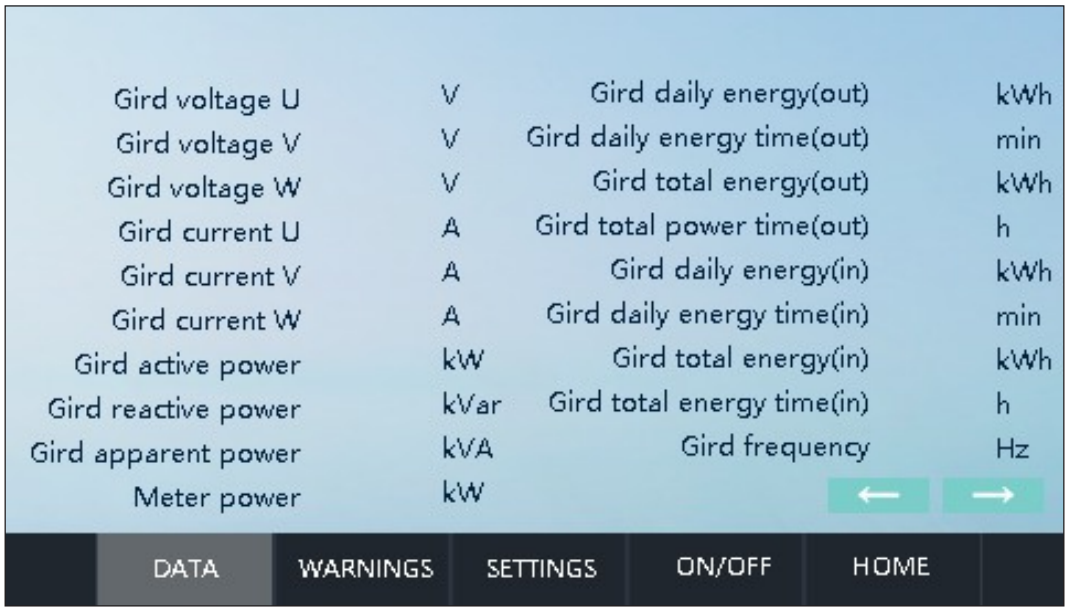
4.1 System ON/OFF Operation Interface

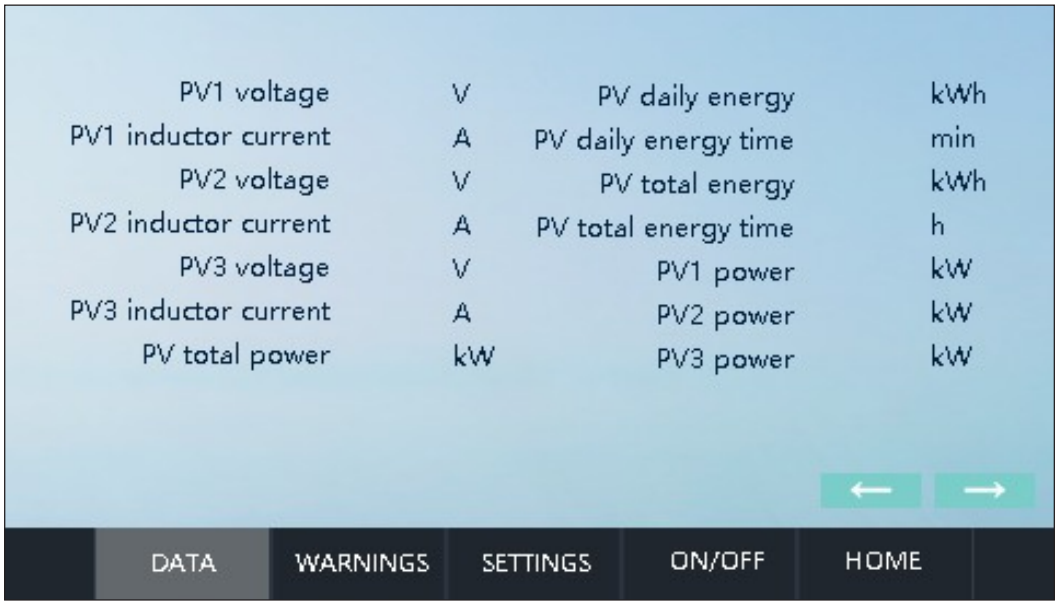


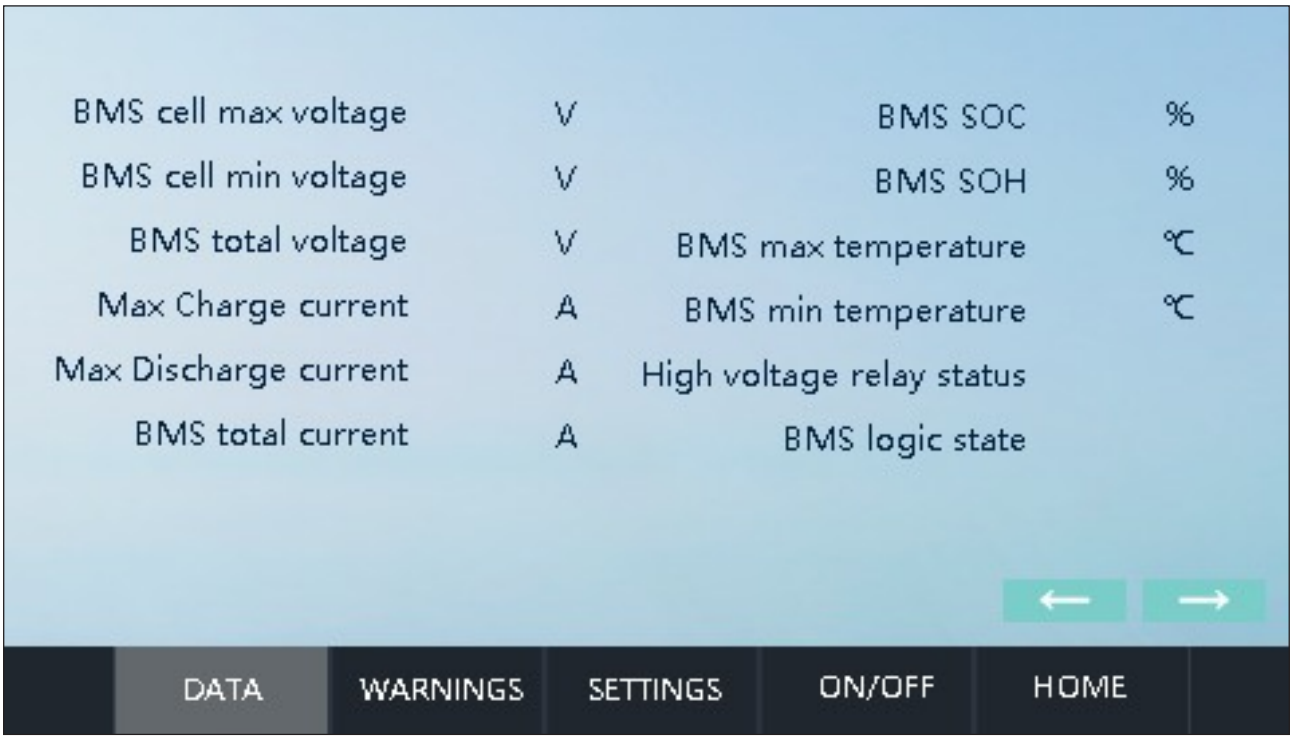
Click the [ON/OFF] button in any other interface to enter this page. in this page, the main ones are: boot button, shutdown button. Used to select the power on or off operation.
Boot: Click "ON" to boot the system.
Shutdown: Shut down, click "OFF" to shut down.

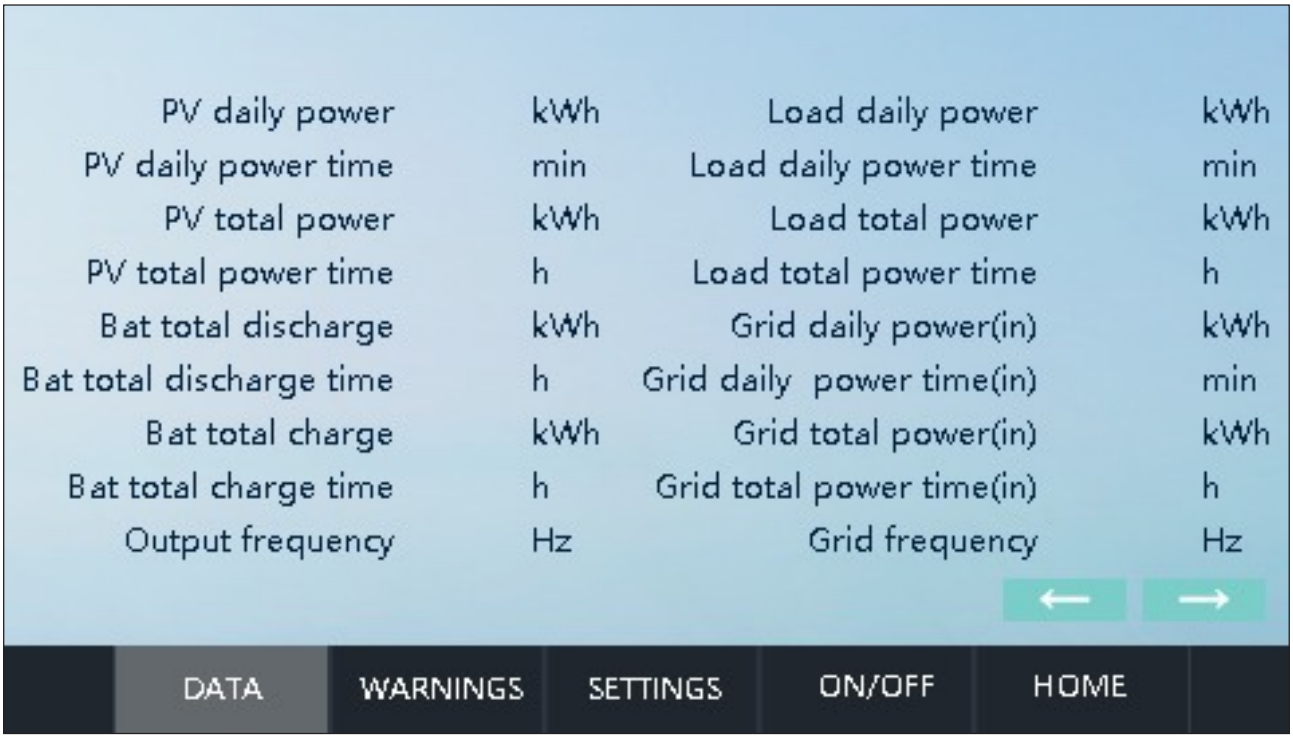
4.2 Data Monitoring Interface











Click the [DATA] button at the bottom of any other interface to enter the sub menu of"Run Data". The sub menus are: operating data, charge and discharge amount.

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).