IPSM-C101 Controller

Revision History

No.	Version	Date	Description	Revised by
1	V1.00	2023-09-25	Content and structure	XXX
2	V1.01	2024-07-01	Update the content of IPSM-C101 V1.01 version.	LiboWang

Product Overview

Product description

Controller is a new generation of Telecom DC power system controller designed, powered by 24V-60V DC voltage, provides southbound communication interfaces, such as CAN, RS485. Supports rectifier , solar , wind energy , DC/DC and DC/AC and other common power conversion module management, supports a variety of energy power supply priority scheduling, supports battery fine management, supports BMS integration of various Modbus protocols, supports other common RS485 and CAN interface smart module integration.

Controller provides 2 USB interfaces, which can realize local import and export of configuration parameters, local upgrade of controller and southbound sub-device software, and expansion of communication methods such as wifi, Bluetooth, 4G, 5G, and zigbee, etc.

Controller provides northbound communication interfaces, such as RS485, Ethernet and Digital Output. Through the northbound interfaces, real-time system status query, configuration parameter query and setting, remote control, configuration parameter import and export, controller software and southbound sub-device software remote upgrade can be realized, so as to realize unattended site.

Tab 2-1 Name and model

Name	Model	Remarks
Controller	IPSM-C101	

Performance specifications

Tab 2-2 Performance specification table

Item	Parameters	description
Rated input voltage	48 Vdc	24~60Vdc

Maximum current	300 mA	
Standby Power Consumption	≤7W	
Output voltage	12V	
Output current	100mA(MAX)	
Safety	Passed the CE certification	
RE	Class B (EN 55032)	
CE	Class B (EN 55032)	
CS	Criterion:A(EN 55035)	
RS	Criterion:A(EN 55035)	
Surge	Line-line ±0.5 KV	Power supply port
	Line-PE 2KV/12Ω	Power supply port
	Line - PE 2KV/12Ω	FE,North RS485, Limited shielded network cable
MTBF	>=0.1Million H	With the Telcordia SR332, method 1 reliability, at 25℃
ROHS	ROHS R6	The material is ROHS2.0 compliant with lead-free soldering

Environmental specifications

Tab 2-3 Environmental specification table

Item	Parameters	description
Operating temperature	-40℃~+70℃	Note: LCD Operating temperature range -20℃ ~ +70℃
Storage temperature	-40℃~+70℃	Note: LCD Storage temperature range -20℃ ~ +70℃
Operating humidity	5% ~ 95%	(MAX 50°C No condensation)
Storage humidity	5% ~ 95%	(MAX 50°C No condensation)
Altitude	0 ~ 4000m	Working temperature derating in 3000m~4000m environment, every 200m, working temperature drop by 1°C
Protection	IP20	with the backboard

Mechanical specifications

Tab 2-4 Mechanical specification table

Item	Parameters	description
Dimensions	85mm(H) × 40.5mm(W) × 230mm(D)(±0.5mm)	For slot design, please contact us for 3D model of the module
Weight	≤1Kg	Without packaging

Main features

Controller has the following main features.

Tab 2-5 Main features

No.	classify	Feature description
1	Data sampling &Management	Rectifier data sampling and management
2		Solar Module data sampling and management
3		Wind Module data sampling and management
4		DC/DC Module data sampling and management
5		DC/AC Module data sampling and management
6		HVDC Module data sampling and management
7		Narada lithium battery Pack data sampling
8		SHOTO lithium battery pack data sampling
9		Any lithium battery based on Modbus/YDT-1363 protocol of RS485 or CAN interface
10		Jiangsu Yaao battery inspection instrument data sampling
11		Smart AC meter or self-developed AC metering board data sampling
12		Smart DC meter data sampling
13		Smart DG data sampling
14		Smart ATS data sampling
15		Climate unit data sampling
16		Smart CB data sampling and management
17		Energy statistics

18	GUI	LCD menu management
19		Web applications based on HTTPS protocol
20	Northbound Protocol	SNMP V3(Supports GET/SET/WALK and 4 Trap servers)based IPV4 and IPV6
21		YDT-1363
22		Modbus Protocol
23	Battery Management	Boost/Float Charging Management
24		Current Limit Management
25		Temperature compensation
26		LVD
27		Battery Test(Auto/Manual)
28		Midpoint voltage sampling
29		SOC calculation
30		Load Shifting
31		Lithium battery management
32	Energy Management	Energy input priority management
33		Rectifier module ECO management
34		Rectifier module drying management
35	DG Management	Turn on and off according to battery SOC
36		Turn on and off according to DC Voltage
37		DG Test
38		Remaining fuel capacity calculation
39	Environmental data	Temperature, humidity, tilt, vibration, water leakage, smoke, access control (DI), and U-bit (U-bit Controller is not implemented and is recorded by the NMS)

40	Logs Management	50000 pieces of history data records
41		200000 pieces of history alarm records
42		5000 pieces of Battery Test records
43		5000 pieces of energy logs
44		100000 pieces of event logs
45		Daily power record 1 year
46		Duration Log Logs record 1 year
47		10000 pieces of battery charging records
48		10000 pieces of battery discharging records
49		Extremum recording
50		Historical data records cannot be viewed on the LCD. Other logs can be viewed on the LCD
51		The preceding log records can be viewed on the Web UI
52		All the preceding log records can be exported to excel files in text format on the Web
53		All the above log records can be exported as excel files in text format on USB flash drives
54	Alarm Management	Alarm blocking
55		Alarm relay linked to DO
56		Alarm Severity (Major, Minor, Info, Blocked) Note: Blocked alarms are not displayed, but you are required to record historical alarms to facilitate fault tracing
57		Dry contact input alarms
58	Language	Chinese/English/Others
59	Software update	Controller local online update via USB
60		Power conversion module local online update via USB
61		Contoller software online update via Web (based on https, Multi-site simultaneous updates can be made via NMS)
62		Power conversion module software online update via Web (based on https, Multi-site simultaneous updates can be made via NMS,The same site is updated module by module)

63	Configure parameters	Configuration file imported via web as a CSV file
64		Configuration file Exported via web as a CSV file
65		Configuration file imported via USB as a CSV file
66		Configuration file Exported via USB as a CSV file
67	Others	Multi-tenant management
68		Manual control mode
69		IPv4/IPv6 dual-stack
70		Automatic calibration time based on NTP protocol
71		Mail sending based on the SMTP protocol
72		Support TFTP protocol
73		Support 4G/5G networks
74		Support NB-IOT networks
75		Wifi hotspot available
76		Support Bluetooth communication
77		Support Zigbee communication
78		Support GPS positioning
79		Support Beidou Navigation Satellite System
80		USB expansion RS485
81		USB expansion RS32

Appearance and panel

This chapter will briefly introduce the features of the LEDs and keys on the panel of the controller.

Appearance

Fig 3-1 Appearance

Front panel

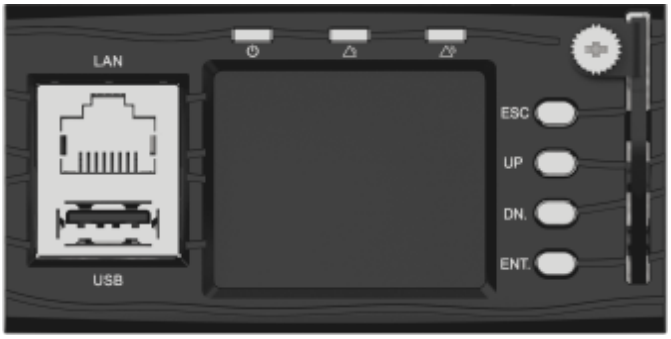

Fig 3-2 Operation panel

Tab 3-1 Description

NO.	Description
1	LAN Port
2	USB Port
3	Running LED

4	Minor Alarm LED
5	Major Alarm LED
6	Handle
7	Button

LCD and LEDs

The definitions of the LEDs are shown in Tab 3-2.

Tab 3-2 LED description

Indicating signs	LED color	State	Significance
Running LED	Green	Always off	Controller failure or no DC power input
		Always on	The controller is running normally.
Minor alarm LED	Yellow	Always on	There is at least one minor alarm
		Always off	There is no minor alarm
Major alarm LED	Red	Always on	There is at least one major alarm
		Always off	There is no major alarm

Controller provides a 160*128px TFT LCD (Liquid Crystal Display).

USB port

The Northbound USB port is defined as shown in Tab 3-3 .

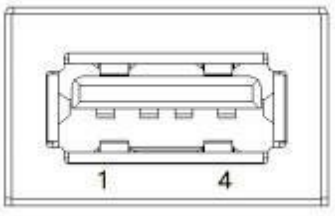

Fig 3-3 Northbound USB port

Tab 3-3 USB port description

Pin#	1	2	3	4
signal name	VCC	D-	D+	GND

Northbound LAN port

The definition of LAN port is shown in Tab 3-4.

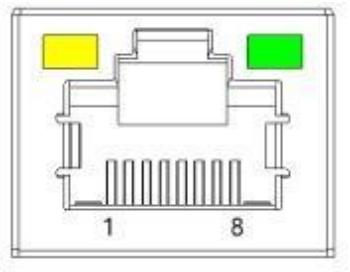

Fig 3-4 Northbound USB port

Tab 3-4 LAN port description

Pin#	1	2	3	4	5	6	7	8
signal name	-	-	RXD-	-	-	RXD+	TXD-	TXD+

Features

Analog signal sampling

Tab 4-1 lists the signals directly collected by the hardware circuit.

Tab 4-1 Analog signal sampling

Signal Name	Signal Type	Measurement Range	Measurement Range	Remarks
DC Bus Voltage	AI	0~60V	1	Detection accuracy ≤±0.5%
Battery Voltage	AI	0~60V	2	Detection accuracy ≤±0.5%
Battery Midpoint Voltage	AI	0~60V	2	Detection accuracy ≤±0.5%
Battery Current	AI	0-6000A	1	Default configuration with a 25mv shunt, detection deviation is ±2A within current range less than 10A; when the current is greater than 10A, detection accuracy deviation ≤± 1%

Signal Name	Signal Type	Measurement Range	Measurement Range	Remarks
Load Current	AI	0~6000A	4	Default configuration with a 25mv shunt, detection deviation is ±2A within current range less than 10A; when the current is greater than 10A, detection accuracy deviation ≤± 1 %
Temperature	AI	\	3	Sampling deviation ≤± 2 ℃ (NTC)
Ambient Humidity	AI	\	1	Detection accuracy deviation ≤±2%
DG fuel	AI	\	1	Detection accuracy deviation ≤±2%

Digital signal sampling

The controller has 8 available digital inputs. The digital input should be dry contact signal and there is no polarity between two contacts, interchangeable. Each digital input can be defined as NO or NC.

Tab 4-2 Digital signal sampling

Signal Name	Signal Type	Measurement Range	Measurement Range	Remarks
Button	DI		4	
Load Fuse	DI		5	
Battery Fuse	DI		2	
Dry Contact Input (DI)	DI	\	12	Can be defined as NC/NO, used for detecting signals such as fuses, AC surge protectors, DC surge protectors, door magnets, water immersion, smoke, etc., can also be used for other dry contact signal detection

System Control

Tab 4-3 System Control

NO.	Control Name	Set range	Default
1	Control Mode	Auto Control Manual Control	Manual Control
2	LVD Control	ON OFF	ON
3	DO Control	Opened Closed	Opened
4	Battery Manual MGT	Float Charge Boost Charge Battery Test Battery Short Test	Float Charge
5	Output Voltage		0
6	Rect Limit Point		0
7	Solar Limit Point		0
8	Modules Control	ON OFF	ON
9	DG Control	Stopped Running	Stopped

Digital Output Control

Tab 4-4 Hardware output signals

Signal Name	Signal Type	Quantity	Remarks
Buzzer	DO	1	
LLVD	DO	4	
BLVD	DO	1	
DO	DO	8	
LED	DO	3	

Alarm Management

Tab 4-5 Alarm list

No.	Alarm Name	Raise Conditions	Clearing Conditions	Alarm handling

1	DC Under Voltage Alarm	DC voltage ≤ "DC Under Voltage"	DC voltage ≥ "DC Under Voltage "+0.25	1. Check whether the AC power failure occurs. If the AC power failure occurs, restore the AC power supply. 2. Check whether the "DC Under Voltage " is correct(default value is 47V). If not, adjust it based on the actual situation. 3. Check whether the load current of the power supply system exceeds the current capacity of the power supply system. If yes,add more rectifier modules or reduce the load of the power supply system. 4. Check whether the DC voltage is manually lowered. If yes, confirm the cause and restore the voltage to normal after the operation is complete. 5. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module.
2	DC Over Voltage Alarm	DC voltage ≥ "DC Over Voltage "	DC voltage ≤ "DC Over Voltage "-0.25	1. Check if the "DC Over Voltage " is correct(default value is 58.5V). If not, adjust the value based on the actual situation. 2. Check if the output voltage is manually raised. If yes, confirm the cause and restore the voltage to normal after the operation is complete. 3. Remove the rectifier modules one by one and check whether the alarm is cleared. If the alarm persists, re-install the rectifier. If the alarm is cleared, replace the faulty module.
3	Temp 1 Low Alarm	Temp Sensor 1 is set to "Battery", and battery temperature 1 ≤ "Battery 1 Temp Low".	Temp Sensor 1 is set to "No" or battery temperature 1 ≥ "Battery 1 Temp Low" +3	1. Check whether the "Batt 1 Temp Low"is correct (default value is -33 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.

4	Temp 1 High Alarm	Temp Sensor 1 is set to "Battery", and battery temperature 1 ≥ "Battery 1 Temp High".	Temp Sensor 1 is set to "No" or battery temperature 1 ≤ "Batt 1 Temp High"-3	1. Check whether the "Batt 1 Temp High"is correct (default value is 55 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system.This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
5	Temp 1 High+ Alarm	Temp Sensor 1 is set to "Battery", and battery temperature 1 ≥ "Battery 1 Temp High+".	Temp Sensor 1 is set to "No" or battery temperature 1 ≤ "Batt 1 Temp High+"-3	1. Check whether the "Batt 1 Temp High+"is correct (default value is 60 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
6	Temp 2 Low Alarm	Temp Sensor 2 is set to "Battery", and battery temperature 2 ≤ "Battery 2 Temp Low".	Temp Sensor 2 is set to "No" or battery temperature 2 ≥ "Battery 2 Temp Low" +3	1. Check whether the "Batt 2 Temp Low"is correct (default value is -33 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.

7	Temp 2 High Alarm	Temp Sensor 2 is set to "Battery", and battery temperature 2 ≥ "Battery 2 Temp High".	Temp Sensor 2 is set to "No" or battery temperature 2 ≤ "Batt 2 Temp High"-3	1. Check whether the "Batt 2 Temp High"is correct (default value is 55 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
8	Temp 2 High+ Alarm	Temp Sensor 2 is set to "Battery", and battery temperature 2 ≥ "Battery 2 Temp High+".	Temp Sensor 2 is set to "No" or battery temperature 2 ≤ "Batt 2 Temp High+"-3	1. Check whether the "Batt 2 Temp High+"is correct (default value is 60 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
9	Temp 3 Low Alarm	Temp Sensor 3 is set to "Battery" or "Env", and the temperature of Sensor 3 ≤ "Sen.3 Temp Low".	"Temp Sensor 3" is set to "No", or the temperature of Sensor 3 ≥ "Sen.3 Temp Low" +3	1. Check whether the "Sen.3 Temp Low"is correct (default value is -33 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.

10	Temp 3 High Alarm	Temp Sensor 3 is set to "Battery" or "Env", and the temperature of Sensor 3 ≥ "Sen. 3 Temp High".	"Temp Sensor 3" is set to "No", or the temperature of Sensor 3 ≤ "Sen.3 Temp High" -3	1. Check whether the "Sen. 3 Temp High"is correct (default value is 55 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the temperature sensor.
11	Temp 3 High+ Alarm	Temp Sensor 3 is set to "Battery" or "Env", and the temperature of Sensor 3 ≥ "Sen. 3 Temp High+".	"Temp Sensor 3" is set to "No", or the temperature of Sensor 3 ≤ "Sen.3 Temp High+" -3	1. Check whether the "Sen. 3 Temp High+"is correct (default value is 60 ° C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.

12	Temp 4 Low Alarm	Temp Sensor 4 is set to "Battery" or "Env", and the temperature of Sensor 4 ≤ "Sen.4 Temp Low".	"Temp Sensor 4" is set to "No", or the temperature of Sensor 4 ≥ "Sen.4 Temp Low" +3	1. Check whether the "Sen.4 Temp Low"is correct (default value is -33 °C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
13	Temp 4 High Alarm	Temp Sensor 4 is set to "Battery" or "Env", and the temperature of Sensor 4 ≥ "Sen. 4 Temp High".	"Temp Sensor 4" is set to "No", or the temperature of Sensor 4 ≤ "Sen.4 Temp High" -3	1. Check whether the "Sen. 4 Temp High"is correct (default value is 55 °C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.

14	Temp 4 High+ Alarm	Temp Sensor 4 is set to "Battery" or "Env", and the temperature of Sensor 4 ≥ "Sen. 4 Temp High+".	"Temp Sensor 4" is set to "No", or the temperature of Sensor 4 ≤ "Sen.4 Temp High+" -3	1. Check whether the "Sen. 4 Temp High+"is correct (default value is 60 °C) . If not, adjust the value based on the actual situation. 2. Check if climate system of enclosure is good. If climate system faulty, then repair climate system. This alarm is automatically cleared when the battery temperature returns to normal. 3. Check whether the climate system in the area where the temperature sensor is located is faulty. If yes, rectify the fault. This alarm is automatically cleared when the temperature is restored to the acceptable range. 4. Check whether the temperature sensor is faulty. If yes, replace the faulty temperature sensor.
15	Env Hum. Low	Humidity ≤ "Env.Humidity L"	Humidity ≥ "Env.Humidity L"+2	There is no impact on the system and should be ignored.
16	Env Hum. High	Humidity ≥ "Env.Humidity H"	Humidity ≤ "Env.Humidity H"-2	1. Check whether the "Env.Humidity H"is correct (default value is 95%RH) . If not, adjust the value based on the actual situation. 2. Check whether the humidity in the cabinet is normal. If the humidity is abnormal, handle the alarm. 3. Check whether the humidity sensor is faulty. If yes, replace the faulty humidity sensor.

17	Input Ph. Fail-A	When the controller is powered on, one of the following conditions is met: 1. No rectifier module is Installed on phase A 2. All rectifier modules on phase A communicate fail 3. The input voltage of phase A ≤ Phase Loss Voltage	At least one rectifier is Installed A phase communicates normally and A phase input voltage ≥ "Phase Loss Voltage" + 10	1. Check whether the input cable is loose. If yes, tighten the input cable. 2. Check whether the input circuit breaker is switched off. If yes, handle the back-end circuit fault and turn on the circuit breaker. 3. Check whether the input voltage of the power system ≤ 80VAC. If yes, rectify the power grid fault.
18	Input Under Voltage-A	The system is powered by mains and A phase input voltage ≤ "Input Under Voltage"	At least one rectifier is Installed A phase communicates normally and A phase input voltage ≥ "Input Under Voltage" + 10	1. Check whether the "Input Under Volt"is correct (default value is 180V ,HVDC input is 115V) . If not, adjust the value based on the actual situation. 2. Check whether the A phase input voltage is less than "Input Under Voltage". If yes, rectify the A phase input fault.
19	Input Over Voltage-A	The system is powered by mains and A phase input voltage ≥ "Input Over Voltage"	At least one rectifier is Installed A phase communicates normally and A phase input voltage ≤ "Input Over Voltage" -10	1. Check whether the "Input Over Volt"is correct (default value is 280V ,HVDC input is 405V) . If not, adjust the value based on the actual situation. 2. Check whether the A phase input voltage is greater than "Input Over Voltage". If yes, rectify the A phase input fault.

20	Input Ph. Fail-B	When the controller is powered on, one of the following conditions is met: 1. No rectifier module is Installed on phase B 2. All rectifier modules on phase B communicate fail 3. The input voltage of phase B ≤ Phase Loss Voltage	At least one rectifier is Installed B phase communicates normally and B phase input voltage ≥ "Phase Loss Voltage" + 10	1. Check whether the input cable is loose. If yes, tighten the input cable. 2. Check whether the input circuit breaker is switched off. If yes, handle the back-end circuit fault and turn on the circuit breaker. 3. Check whether the input voltage of the power system is less than 80V AC. If yes, rectify the power grid fault.
21	Input Under Voltage-B	The system is powered by mains and B phase input voltage ≤ "Input Under Voltage"	At least one rectifier is Installed B phase communicates normally and B phase input voltage ≥ "Input Under Voltage" + 10	1. Check whether the "Input Under Volt"is correct (default value is 180V ,HVDC input is 115V) . If not, adjust the value based on the actual situation. 2. Check whether the B phase input voltage is less than "Input Under Voltage". If yes, rectify the B phase input fault.
22	Input Over Voltage-B	The system is powered by mains and B phase input voltage ≥ "Input Over Voltage"	At least one rectifier is Installed B phase communicates normally and B phase input voltage ≤ "Input Over Voltage" -10	1. Check whether the "Input Over Volt"is correct (default value is 280V ,HVDC input is 405V) . If not, adjust the value based on the actual situation. 2. Check whether the B phase input voltage is greater than "Input Over Voltage". If yes, rectify the B phase input fault.

23	Input Ph. Fail-C	When the controller is powered on, one of the following conditions is met: 1. No rectifier module is Installed on phase C 2. All rectifier modules on phase C communicate fail 3. The input voltage of phase C ≤ Phase Loss Voltage	At least one rectifier is Installed B phase communicates normally and C phase input voltage ≥ "Phase Loss Voltage" + 10	1. Check whether the input cable is loose. If yes, tighten the input cable. 2. Check whether the input circuit breaker is switched off. If yes, handle the back-end circuit fault and turn on the circuit breaker. 3. Check whether the input voltage of the power system is less than 80V AC. If yes, rectify the power grid fault.
24	Input Under Voltage-C	The system is powered by mains and C phase input voltage ≤ "Input Under Voltage"	At least one rectifier is Installed C phase communicates normally and C phase input voltage ≥ "Input Under Voltage" + 10	1. Check whether the "Input Under Volt"is correct (default value is 180V ,HVDC input is 115V) . If not, adjust the value based on the actual situation. 2. Check whether the C phase input voltage is less than "Input Under Voltage". If yes, rectify the C phase input fault.
25	Input Over Voltage-C	The system is powered by mains and C phase input voltage ≥ "Input Over Voltage"	At least one rectifier is Installed C phase communicates normally and C phase input voltage ≤ "Input Over Voltage" -10	1. Check whether the "Input Over Volt"is correct (default value is 280V ,HVDC input is 405V) . If not, adjust the value based on the actual situation. 2. Check whether the C phase input voltage is greater than "Input Over Voltage". If yes, rectify the C phase input fault.

26	Power Input Failure	Meet one of the following conditions: 1. For single-phase system, A phase voltage ≤ 60V.For three-phase system,A,B and C phase voltage are all ≤ 60; 2. The system does not install any rectifier module 3. All rectifier modules communicate fail	At least one rectifier module communicates normally and input voltage ≥ 75.(For single-phase system,A phase input voltage ≥ 75.For three-phase system,A, B, and C phase voltage are all ≥ 75.)	1. Check whether the input cable is loose. If yes, tighten the input cable. 2. Check whether the input circuit breaker is switched off. If yes, handle the back-end circuit fault and turn on the circuit breaker. 3. Check whether the input voltage of the power system is less than 60V AC. If yes, rectify the power grid fault.
27	Module Input Voltage Low			
28	Module Input Voltage High			
29	Module Current Imbalance			
30	Multi Module Fault	The number of overtemperature, module failure, fan failure, overvoltage protection, current imbalance, or communication fail modules ≥ 1	The number of overtemperature, module failure, fan failure, overvoltage protection, current imbalance, or communication fail modules ≤ 2	1. Remove the module and check whether the connector in the slot is damaged or deformed. If yes, repair or replace the connectors in the enclosure and slot. 2. Reinstall the module. If the alarm persists, the module may be faulty. replace the faulty module. 3. Restart the controller. If the alarm persists, the controller may be faulty. Replace the faulty controller.

31	Module Comm Fail	Failed to receive data packets from the rectifier module for 10 consecutive times	Received the rectifier packet correctly	1. Check whether the rectifier is removed. If yes, re-install the rectifier. 2. If the rectifier is installed, remove and re-install it. 3. If the alarm persists, replace the faulty rectifier.
32	Module Input Fail	The rectifier module meets any of the following conditions: 1. The input voltage ≤ 80vac; 2. The input voltage ≥ 303 vac The solar module meets any of the following conditions: 1. The input voltage ≤ 0V 2. The input voltage ≥ 430v; 3. Reverse polarity of input wiring	The rectifier module meets the following conditions: The input voltage ≥ 90vac and ≤ 290vac; The solar module meets the following conditions: The input voltage ≥ 60V and ≤ 45V, and the input wiring polarity is correct;	1. Check whether the input cable is loose. If yes, tighten the input cable. 2. If it is a Solar module,Check if the input voltage of the module is less than 110VDC.If yes,the solar input is faulty. If it is a Solar module,Check whether the input voltage of the AC input is less than 80 VAC. If yes, rectify the power grid fault. 3. Check whether the rectifier module is faulty. If yes, replace it. 4. Check whether the photovoltaic input cable is loose. If so, fix the input cable. 5. Check whether the Solar module is faulty. If yes, repair or replace it. 6. Check whether the solar module is faulty. If yes, replace it.
33	Module Temp High	The temperature of module air inlet ≥ 75 ℃	The temperature of module air inlet ≤ 65 ℃	1. Check whether the temperature of the module air inlet is greater than 75 ° C. If not, replace the faulty module. 2. Check whether the cabinet climate system is faulty. If yes, rectify the fault.

34	Module HW Fault	Meet any one of the following conditions: 1. Module hardware failure; 2. Module output voltage ≥ 60.5v; 3. Input voltage of rectifier ≥ 303v 4. 0v ≤ input voltage of solar module ≤ 5v or input voltage of solar module ≥ 430v	All of the following conditions are met: 1. The module hardware is normal; 2. Input voltage of rectifier ≤ 290v 3. Input voltage of solar module≤0v or 5v ≤ input voltage of solar module ≤ 45V	Check whether the fault indicator on the rectifier panel is steady red. If yes, remove the moduleand re-install it when the indicator is off. If the alarm persists, replace the faulty module.
35	Module Protection	Meet any of the following conditions: 1. Fan failure 2. The air inlet temperature ≥ 75 ℃ 3. Ambient temperature sensor failure	All of the following conditions are met: 1. The fan is normal; 2. The air inlet temperature ≤ 65 ℃; 3. The ambient temperature sensor is normal.	1. Check whether the AC or PV input voltage is greater than the maximum operating voltage of the module(Rectifier: 303Vac , Solar module: 430Vdc). If yes, rectify the power supply fault and restore the power supply. 2. Check whether the AC or PV input voltage is less than the lowest operating voltage of the module(Rectifier:80Vac , Solar module: 110Vdc). If yes, rectify the fault and restore the power supply. 3. Check whether the ambient temperature is greater than 75 ℃ . If yes, check and rectify the fault of the climate system. 4. Remove the faulty rectifier and re-install it until the indicator is off. If the alarm persists, replace the faulty rectifier.
36	Module Fan Fault	Fan failure	Fan is normal.	1. If conditions are available,replace the fan of the faulty module onsite. 2. If conditions are not available, replace the faulty module onsite.
37	Module Derated	The module power limiting function is enabled	The power limiting function of the module is disabled	Disable the power limiting function by issuing the command to the module

38	Modeule Load Share			
39	Module Out Over Vol	The output voltage of the module ≥ 60.5v	The output voltage of the module ≤ 60.5v	1. Check whether "Output Over Voltage" is correct (the default value is 58V). If not, adjust "Output Over Voltage" based on the actual situation. 2. Check whether the output voltage is manually raised. If yes, confirm the cause and restore the voltage to normal after the operation is complete. 3. Remove the rectifier modules one by one and check whether the alarm is cleared. If the alarm persists, re-install the rectifier. If the alarm is cleared, replace the faulty module.
40	Module Off			
41	Inverter Comm Fail			
42	Inverter DC CAN Fail	Monitoring data cannot be received when the DC CAN communication exceeds 60 seconds	The CAN communication on the DC side continues to receivedata for 2.5 seconds	Check whether the CAN bus of the power system is correctly connected
43	Power Grid Input Voltage Fail	The grid voltage is greater than 280V or less than 175V for 200 ms	The grid voltage is less than 270V or greater than 185V for 5ms	Check whether the input voltage is normal
44	Power Grid Input Freq Fail	The power grid frequency is greater than 53.2Hz or less than 46.8Hz for 200 ms	The power grid frequency is less than 53Hz or greater than 47Hz for 5ms	Check whether the input frequency is normal
45	Bus Voltage Fail	Bus voltage is greater than 450V or less than 225V for 5ms	Bus voltage is less than 430 V or greater than 245V for 5ms	Contact manufacturer analysis
46	Inverter DC Over Voltage	Dc output voltage is greater than 63V for 500ms	Dc output voltage is less than 60V for 50 ms	Contact manufacturer analysis

47	Inverter DC Protection	The fault signal on the inverter side is transmitted to the DC side	Inverter trouble-free	Contact manufacturer analysis
48	Inverter DC Under Voltage	The DC input voltage is less than 39.5V for 300 ms	The Dc input voltage is greater than 43 V for 10 ms	Contact manufacturer analysis
49	Inverter DC Over Current	The peak DC input current is greater than 130 A	The peak DC input current is less than 130A	Contact manufacturer analysis
50	Inverter Output Over Vol	The Inverter output voltage RMS greater than 242V for 200ms	The inverter output voltage RMS is less than 231 V for 5 ms	Contact manufacturer analysis
51	Inverter Output Under Vol	The inverter output voltage RMS is less than 198V for 15s	The inverter output voltage RMS is greater than 209V for 5ms	Contact manufacturer analysis
52	Inverter Output Over Load	The inverter output with load exceeds 105% for at least 10s, 125% for at least 2s, 150% for at least 0.25s	The inverter output with load is less than 105% lasts for at least 10s	Whether the AC load exceeds the rated load
53	Inverter Amb Temp High	The ambient temperature is greater than 75° for 10s	The ambient temperature is less than 65° for 1 second	Whether the vent of the module is blocked and the ambient temperature is normal
54	Inverter Address Conflict	The inverter AC side receives data from the module whose ID is the same as its own.	The inverter AC module does not receivedata from the module with the same ID.	Check whether the module is properly inserted and locked
55	Inverter Inter Temp High	Inverter DC MOS NTC temperature sampling is greater than 130° for 2s; The temperature of the inverter AC heat sink is greater than 105° for 2 seconds	Inverter DC MOS NTC temperature sampling is less than 120° for 2s; The temperature of the inverter AC heat sink is less than 95° for 2 seconds	Whether the vent of the module is blocked and the ambient temperature is normal

56	Inverter Fan Fault	The set fan speed is 4000 revolutions higher than the feedback speed	The error between the set speed and the feedback speed of the fan is within 4000 revolutions	Check whether the fan terminals are connected and whether the fan blades are blocked
57	Inverter SCI Comm Fault	The inverter cannot receive data from the AC within 5 seconds	The inverter receives data from the AC within 5 seconds	Contact manufacturer analysis
58	Inverter Short Out	The inverter output voltage RMS is less than 50 V and the output current RMS is greater than 7.5A for 10s	The inverter output voltage RMS is greater than 50V or the output current RMS is less than 7.5A for 600s	Whether the AC output side of the module is short-circuited
59	Inverter Emer Stop	The SCram signal is detected at the DC side of the inverter for 50ms	On the DC side of the inverter, the SCram signal is detected at a high level for 50ms	Whether the module presses the SCram signal
60	Inverter Fault	MOS NTC temperature sampling on the inverter DC side is less than -40° for 5s; The bus voltage in inverter AC 3s cannot reach the peak voltage of the grid -100V	MOS NTC temperature sampling on the inverter DC side is greater than -40 ° for 5s; The inverter AC 3s bus voltage is soft to the peak voltage of the grid -100V	Contact manufacturer analysis
61	Inverter Off			(The inverter is not faulty)
62	DI 1 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
63	DI 2 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.

64	DI 3 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
65	DI 4 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
66	DI 5 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
67	DI 6 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
68	DI 7 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
69	DI 8 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
70	DI 9 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.

71	DI 10 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
72	DI 11 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
73	DI 12 Alarm	Determine by the DI status	Determine by the DI status	1. Check whether alarm cable is loose. If yes, tighten the cable. 2. Check whether the related equipment is faulty. If yes, replace it. 3. Check whether related devices are faulty. If yes, rectify the fault.
74	LLVD1 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.
75	LLVD2 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.

76	LLVD3 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.
77	LLVD4 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.
78	BLVD Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.
79	Battery 1 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.

80	Battery 2 Fuse Alarm	The voltage of the collection point ≥ 400 mV	The collection point voltage ≤ 100mV	1. Check whether the circuit breaker or fuse is switched off. If yes, switch on the circuit breaker or replace the faulty breaker after the back-end circuit fault is handled. 2. Check whether the circuit breaker or fuse alarm cable is loose. If yes, tighten the alarm cable. 3. Check whether circuit breaker is broken or not. If yes, replace the circuit breaker.
81	Battery Unavailable	The DC voltage increase or decrease more than 2V and the current of the battery is less than 2A and more than -2A in 0s and Battery Fuse Alarm is not raised and Battery 2 Fuse Alarm is not raised and last for 0s	1. The current of the battery is more than 2A or is less than -2A and last for 0s 1. Battery Fuse Alarm or Battery 2 Fuse Alarm is raised	1. If the battery is not installed, please install at least a pack of battery 2. If the batteries protect themself, please unlock the battery 3. The battery is damaged, please replace the battery
82	Boost Charge	The battery is in boost charge state	The battery is not in boost charge state	Normal battery management status, no need action to deal with.
83	Battery Test	The battery is in stable test state	The battery is not in stable test state	Normal battery management status, no need action to deal with.
84	Battery Discharge	The battery is discharging	The battery is not discharging	1. If the AC input is abnormal,restore AC input power. 2. If some rectifiers are broken, then need replace them.
85	Battery Current Imbalance Alarm	This alarm is raised when the current difference between batteries ≥ "Battery Current Imbalance" or the DC voltage ≤ "End Test Voltage" during a short test.	It will be automatically cleared after 5 minutes	1. Check whether battery positive and negative cables are loose. If yes, tighten the cables. 2. Check whether the batteries are seriously aged. If yes, replace the batteries.

86	Battery Test Fail	This alarm is generated when the difference between the DC voltage and "End Test Voltage" ≤ 0.5V during a stable test.	It will be automatically cleared after 5 minutes	1. Check whether the parameters "End Test Voltage" (default value is 45.2V DC), "End Test Time" (300min), and "End Test Capacity"(70%) are correctly set. If they are incorrect, adjust them based on actual situation. 2. Check whether the batteries are seriously aged. If yes, replace the batteries.
87	LLVD1	meet any of the following conditions: 1, LVD is enabled and DC voltage ≤ LVD voltage and the battery is not in test state and the battery is discharging 2, LVD is enabled and LVD Mode is "Time Mode" and the duration of Mains failand PV input fail is longer than LLVD Time 3, LVD is enabled and LVD Mode is "Cap Mode" and the battery is discharging and SOC ≤ LLVD Capacity	meet any of the following conditions: 1, LLVD is disabled 2, DC voltage is greater	1. Check whether the AC input is faulty. If the AC input is faulty, restore the AC input power supply. 2. Check whether LLVD1 is manually disconnected. If yes, connect it manually. 3. Check whether LLVD x Voltage is correct (default value is 45 V DC and 44V DC) . If yes, adjust it based on the actual situation. 4. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module. 5. Check whether the load current exceeds the current capacity of the power system. If yes, increase the capacity of the power system or reduce the load of the power system.

88	LLVD2	meet any of the following conditions: 1, LVD2 is enabled and DC voltage ≤ LVD2 voltage and the battery is not in test state and the battery is discharging 2, LVD2 is enabled and LVD Mode is "Time Mode" and the duration of Mains failand PV input fail is longer than LLVD2 Time 3, LVD2 is enabled and LVD Mode is "Cap Mode" and the battery is discharging and SOC ≤ LLVD2 Capacity	meet any of the following conditions: 1, LLVD2 is disabled 2, DC voltage is greater	1. Check whether the AC input is faulty. If the AC input is faulty, restore the AC input power supply. 2. Check whether LLVD2 is manually disconnected. If yes, connect it manually. 3. Check whether LLVD x Voltage is correct (default value is 45 V DC and 44V DC) . If yes, adjust it based on the actual situation. 4. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module. 5. Check whether the load current exceeds the current capacity of the power system. If yes, increase the capacity of the power system or reduce the load of the power system.
89	LLVD3	meet any of the following conditions: 1, LVD3 is enabled and DC voltage ≤ LVD3 voltage and the battery is not in test state and the battery is discharging 2, LVD3 is enabled and LVD Mode is "Time Mode" and the duration of Mains failand PV input fail is longer than LLVD3 Time 3, LVD3 is enabled and LVD Mode is "Cap Mode" and the battery is discharging and SOC ≤ LLVD3 Capacity	meet any of the following conditions: 1, LLVD3 is disabled 2, DC voltage is greater	1. Check whether the AC input is faulty. If the AC input is faulty, restore the AC input power supply. 2. Check whether LLVD3 is manually disconnected. If yes, connect it manually. 3. Check whether LLVD x Voltage is correct (default value is 45 V DC and 44V DC) . If yes, adjust it based on the actual situation. 4. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module. 5. Check whether the load current exceeds the current capacity of the power system. If yes, increase the capacity of the power system or reduce the load of the power system.

90	LLVD4	meet any of the following conditions: 1, LVD4 is enabled and DC voltage ≤ LVD4 voltage and the battery is not in test state and the battery is discharging 2, LVD4 is enabled and LVD Mode is "Time Mode" and the duration of Mains failand PV input fail is longer than LLVD4 Time 3, LVD4 is enabled and LVD Mode is "Cap Mode" and the battery is discharging and SOC ≤ LLVD4 Capacity	meet any of the following conditions: 1, LLVD4 is disabled 2, DC voltage is greater	1. Check whether the AC input is faulty. If the AC input is faulty, restore the AC input power supply. 2. Check whether LLVD4 is manually disconnected. If yes, connect it manually. 3. Check whether LLVD x Voltage is correct (default value is 45 V DC and 44V DC) . If yes, adjust it based on the actual situation. 4. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module. 5. Check whether the load current exceeds the current capacity of the power system. If yes, increase the capacity of the power system or reduce the load of the power system.

91	BLVD	meet any of the following conditions: 2. BLVD is enabled and DC voltage ≤ BLVD voltage and the battery is not in test state and the battery is discharging 3. BLVD is enabled and LVD Mode is "Time Mode" and the duration of Mains failand PV input fail is longer than "BLVD Time" 4. BLVD is enabled and LVD Mode is "Cap Mode" and the battery is discharging and SOC ≤ BLVD Capacity 5. "Over Temp BLVD En" is enabled and the battery temperature ≥ "Battery x Temp High+" 6. "Under Temp BLVD En" is enabled and the battery temperature ≤ "Battery x Temp Low"	meet any of the following conditions: 7. BLVD is disconnected due to low DC voltage and BLVD is disabled 8. BLVD is disconnected due to low DC voltage and BLVD is enabled and DC voltage ≥ BLVD volt and (AC input is normal or PV input is normal) 9. BLVD is disconnected due to high temperature and "Over Temp BLVD En" is disabled 10. BLVD is disconnected due to high temperature and the battery temperature ≤ "Battery x Temp High+" -3 11. BLVD is disconnected due to low temperature and "Under Temp BLVD En" is disabled 12. BLVD is disconnected due to low temperature and the battery temperature ≥ "Battery x Temp Low" +3	1. Check whether the AC input is faulty. If the AC input is faulty, restore the AC input power supply. 2. Check whether BLVD is manually disconnected. If yes, re-connect it manually. 3. Check whether BLVD Voltage is correct (default value is 43.5 V DC) . If yes, adjust it based on the actual situation. 4. Check whether the capacity of the power system cannot meet the load requirements because the rectifier module is faulty. If yes, replace the faulty rectifier module. 5. Check whether

92	Battery Voltage Imba	Based on the midpoint voltage, if the voltage difference between the upper and lower exceeds 1.5V, this alarm is generated	Based on the midpoint voltage, if the voltage difference between the upper and lower ≤ 0.5, the alarm is cleared	1. Check whether the midpoint voltage detection line is loose; 2. Check whether the battery is faulty.
93	Battery Charge Over	The battery charging Current ≥ (Charge Current Limit+0.2)*Battery Capacity	The battery charging Current ≤ (Charge Current Limit+0.18)*Battery Capacity	1. Check whether the Module XX Comm Fail alarm exists. If yes, remove and reinstall the rectifier. If the alarm persists, replace the faulty module. 2. Remove and reinstall the controller. If the alarm persists, replace the controller.
94	ECO	The system is in ECO mode	The system is not in ECO mode	This is energy saving management and should be ignored

95	ECO Pause	The system automatically exits the ECO state if any of the following conditions occurs: 13. Both Mains and PV input failure 14. DC under voltage 15. Batteries are in testing 16. Batteries are discharging 17. Battery fuses failure 18. BLVD disconnect 19. Any rectifier module alarms (e.g., communication interruption) Note: When the system exit ECO due to the preceding reasons and any rectifier is turned off, the number of ECO exceptions increases by . If the number of ECO exceptions reaches 0 within hour, ECO Pause alarm occur.	The alarm is cleared after 2 hours.	1. If the AC input is failure, restore the AC power supply. 2. If the battery is being tested, wait until the test is complete and enter ECO mode again. 3. If any rectifier alarm occur,handle the alarms according to the alarm content. 4. If the battery circuit breaker is switched off, switch it on again. 5. If BLVD is disconnected, handle the fault. 6. If the number of working modules in the system is not greater than "Min Rect Num", increase the number of rectifier modules.
96	Manual Mode	The system is in manual control mode	The system is in automatic control mode	If manual control is no longer required, change the Sys Control Mode to "Auto" or wait 30 minutes for Sys Control Mode switch to "Auto" automatically.

97	BMS Comm Fail	Failed to receive data packets from the BMS for 10 consecutive times	Received the BMS packet correctly	1. If the BMS is removed, re-install the it. 2. If the rectifier is installed, remove and re-install it. 3. If the alarm persists, replace the BMS.
98	BMS Warning	Any bit of the Warning word is set to "1"	All bits of Warning word is set to "0"	Handle fault according to the alarm
99	BMS Protect	Any bit of the Protect word is set to "1"	All bits of Protect word is set to "0"	Handle fault according to the alarm
100	BMS Fault	Any bit of the Fault word is set to "1"	All bits of Fault word is set to "0"	Handle fault according to the alarm
101	Minor Alarm	Active alarms contain minor alarms	Active alarms do not contain minor alarms	Handle fault according to the alarm
102	Major Alarm	Active alarms contain major alarms	Active alarms do not contain major alarms	Handle fault according to the alarm
103	Temp Sensor 1 Fault	"Temp Sensor 1" is set to "Battery" and the temperature 1 ≥ 90° C or ≤ -50° C	"Temp Sensor 1" is set to "No" or the temperature 1 ≤ 80° C and ≥ -40° C	1. Check whether" Temp Sensor 1" is setting correctly. If no, set parameters correctly. 2. If the cables of the temperature sensor are loose, tighten the cables. 3. If the sensor is faulty, replace the faulty sensor.
104	Temp Sensor 2 Fault	"Temp Sensor 2" is set to "Battery"and the temperature 2 ≥ 90° C or ≤ -50° C	"Temp Sensor 2" is set to "No" or the temperature 2 ≤ 80° C and ≥ -40° C	1. Check whether" Temp Sensor 2" is setting correctly. If no, set parameters correctly. 2. If the cables of the temperature sensor are loose, tighten the cables. 3. If the sensor is faulty, replace the faulty sensor.
105	Temp Sensor 3 Fault	" Temp Sensor 3" is set to "Battery" or "Env" and the temperature 3 ≥ 90° C or ≤ -50° C	"Temp Sensor 3" is set to "No" or the temperature 3 ≤ 80° C and ≥ -40° C	1. Check whether" Temp Sensor 3" is setting correctly. If no, set parameters correctly. 2. If the cables of the temperature sensor are loose, tighten the cables. 3. If the sensor is faulty, replace the faulty sensor.

106	Temp Sensor 4 Fault	" Temp Sensor 4" is set to "Battery" or "Env" and the temperature 4 ≥ 90° C or ≤ -50° C	"Temp Sensor 4" is set to "No" or the temperature 4 ≤ 80° C and ≥ -40° C	1. Check whether" Temp Sensor 4" is setting correctly. If no, set parameters correctly. 2. If the cables of the temperature sensor are loose, tighten the cables. 3. If the sensor is faulty, replace the faulty sensor.
107	Heavy Load	Total load current/total rated output current of all turned on modules > Heavy Load Ratio	Total load current/total rated output current of all turned on modules < Heavy Load Ratio-5%	1. Check whether"Heavy Load Ratio" is set correctly(default value is 100%). If no, set parameter correctly. 2. Check whether the load current exceeds the current capacity of the power system. If yes,install more rectifiers to increase the capacity of power system.
108	Input Breaker Open	Judge according to circuit breaker status detection	1. Power input failure; 20. The input circuit breaker is switched off; 21. No rectifier module is Installed in the system;	1. Check whether the power grid input voltage ≤ 85V. 2. Check whether the system input circuit breaker is switched off. 3. Check whether the rectifier works properly.
109	Fuel Level Low	The fuel level ≤ the low fuel alarm threshold	The fuel level ≥ the low fuel alarm threshold+10%	1. If the fuel level ≤ the alarm threshold, add fuel. 2. If the low fuel alarm threshold is incorrectly set,correct it. 3. If the sensor wiring is loose, tighten it. 4. If the sensor is faulty, replace it.
110	Module Address Error	The module cannot detect the hardware address or the module address conflicts or the address ≥ 32	The module detects the address and the address has no conflict and the address ≤ or equal to 32	1. Remote reset controller 2. Re-plug the module 3. Re-plug the controller 4. Check and make sure the dialing code of the address board is correct 5. Check and make sure the address lines are in good contact
111	BMS Cell Over Voltage Alarm	Single maximum voltage ≥ 3600 mV, duration: 1000mS	Single maximum voltage ≤ 3300 mV, duration: 1000mS	Charging, the LED charging alarm display
112	BMS Cell Under Voltage Alarm	Single minimum voltage ≤2900mV, duration: 1000mS	Single minimum voltage ≥3100mV, duration: 1000mS	Discharge, the LED discharge alarm is displayed

113	BMS Cell xx Over Voltage Alarm			
114	BMS Cell xx Under Voltage Alarm			
115	BMS Pack Over Voltage Alarm	Total voltage ≥(3600mv * battery string number), duration: 1000 mS	Total voltage ≤(3300mv * battery string number), duration: 1000 mS	Charging, the LED charging alarm display
116	BMS Pack Under Voltage Alarm	Total voltage ≤(2900mV * battery string number), duration: 1000 mS	Total voltage ≥(3100mV x battery string number), duration: 1000 mS	Discharge, the LED discharge alarm is displayed
117	BMS Hi Charge Current Alarm	Charging current ≥55A, duration: 1000mS	Charging current ≤50A, duration: 1000mS	LED charging alarm display
118	BMS Discharge Current Alarm	Discharge current ≥100A, duration: 1000mS	Discharge current ≤95A, duration: 1000mS	LED discharge alarm is displayed
119	BMS Charge Over Temp Alarm	Single maximum temperature ≥50℃, duration: 4000mS	Single maximum temperature ≤45℃, duration: 4000mS	LED charging alarm display
120	BMS Charge Under Temp Alarm	Single minimum temperature ≤0℃, duration: 4000 mS	Single minimum temperature ≥3℃, duration: 4000 mS	LED charging alarm display
121	BMS Discharge Over Temp Alarm	Single maximum temperature ≥50℃, duration: 4000mS	Single maximum temperature ≤45℃, duration: 4000mS	LED discharge alarm is displayed
122	BMS Discharge Under Temp Alarm	Single minimum temperature ≤0℃, duration: 4000 mS	Single minimum temperature ≥3℃, duration: 4000 mS	LED discharge alarm is displayed

123	BMS Cell Over Temp Alarm			
124	BMS Cell Under Temp Alarm			
125	BMS Cell xx Over Temp Alarm			
126	BMS Cell xx Under Temp Alarm			
127	BMS Env Over Temp Alarm	Ambient temperature ≥60 ° C, duration: 4000mS	Ambient temperature ≤55 ° C, duration: 4000mS	Charging, the LED charging alarm display Discharge, the LED discharge alarm is displayed
128	BMS Env Under Temp Alarm	Ambient temperature ≤-25 ° C, duration: 4000mS	Ambient temperature ≥-10 ° C, duration: 4000mS	Charging, the LED charging alarm display Discharge, the LED discharge alarm is displayed
129	BMS PCB Over Temp Alarm	MOS temperature ≥90℃, duration: 4000mS	MOS temperature ≤85℃, duration: 4000mS	Charging, the LED charging alarm display Discharge, the LED discharge alarm is displayed
130	BMS SOC Low Alarm	SOC≤10%, duration: 4000 mS	SOC≥15%, duration: 4000 mS	LED discharge alarm display
131	BMS Diff Voltage Alarm	Single Diff Voltage ≥800 mV, duration: 4000mS	Single Diff Voltage ≤500 mV, duration: 4000mS	Charging, the LED charging alarm display Discharge, the LED discharge alarm is displayed
132	BMS Cell Temp Unbalance Alarm			
133	BMS Cell Over Voltage Protect	Single maximum voltage ≥ 3700 mV, duration: 1000 mS	Single maximum voltage ≤ 3340 mV, duration: 1000 mS	Stop charging, LED overcharge protection display
134	BMS Cell Under Voltage Protect	Single minimum voltage ≤2700 mV, duration: 1000 mS	Single minimum voltage ≥3000 mV, duration: 1000 mS	Stop discharge, LED discharge under voltage protection display

135	BMS Cell xx Over Voltage Protect			
136	BMS Cell xx Under Voltage Protect			
137	BMS Hi Voltage Alarm			
138	BMS Lo Voltage Alarm			
139	BMS Short Circuit Fail	Discharge current ≥280.11A, duration: 105 us	Charge release	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
140	BMS Open Circuit Alarm			
141	BMS Hi Battery Temp	Single maximum temperature (charging)≥55℃, duration: 4000 mS	Single maximum temperature (charging)≤50℃, duration: 4000 mS	Stop charging, LED charging temperature/overcurrent/differential pressure protection display
142	BMS Lo Battery Temp	Single minimum temperature (charging) ≤0℃, duration: 4000 mS	Single minimum temperature (charging) ≥3℃, duration: 4000 mS	Stop charging, LED charging temperature/overcurrent/differential pressure protection display
143	BMS Discharge Over Temp Protect	Single maximum temperature ≥60℃, duration: 4000mS	Single maximum temperature ≤55℃, duration: 4000mS	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
144	BMS Discharge Under Temp Protect	Single minimum temperature ≤-20℃, duration: 4000mS	Single minimum temperature ≥-15℃, duration: 4000mS	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
145	BMS Hi Charge Current Protect	Charging current ≥60A, duration: 4000mS	Discharge cancellation	Stop charging, LED charging temperature/overcurrent/differential pressure protection display

146	BMS Hi Discharge Current Protect	Discharge current ≥105A, duration: 1000mS	Charge release	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
147	BMS Charge Over Current Protect2	Charging current ≥120A, duration: 1000mS	Discharge cancellation	Stop charging, LED charging temperature/overcurrent/differential pressure protection display
148	BMS Discharge Over Current Protect2	Discharge current ≥120A, duration: 500mS	Charge release	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
149	BMS Current Protect			
150	BMS PCB Over Temp Protect	MOS temperature ≥105℃, duration: 4000mS	MOS temperature ≤95℃, duration: 4000mS	Charging, then stop charging, LED charging temperature/overcurrent/differential pressure protection display Discharge, then stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
151	BMS Cell Temp Unbalance Protect			
152	BMS Cell Voltage Unbalance Protect			
153	BMS ANTI-THEFT	Moving Angle > 40°	The command of the upper computer is removed	Charging, then stop charging, LED charging temperature/overcurrent/differential pressure protection display Discharge, then stop discharge, LED discharge temperature/overcurrent/differential pressure protection display

154	BMS Sample Error	The AFE communication is abnormal	The AFE communication is normal	Charging, then stop charging, LED charging temperature/overcurrent/differential pressure protection display Discharge, then stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
155	BMS Temp Sense Disconnect	The number of cell temperature inefficiencies is > 0 || Current sampling temperature AD value ≥ 4000 || The AD value is greater than or equal to 4000 || MOS temperature AD value ≥ 4000 || The ambient temperature AD is greater than or equal to 4000, Duration: 5000 ms	Cell temperature invalid number == 0 && Current sampling temperature AD < 4000 && The equilibrium temperature AD is less than 4000 && MOS tube temperature AD value < 4000 && The ambient temperature AD is < 4000 && Current sampling temperature AD value > 100 && The AD value is greater than 100 && MOS temperature AD value > 100 && The ambient temperature (AD) is greater than 100, Duration: 5000 ms	Charging, then stop charging, LED charging temperature/overcurrent/differential pressure protection display Discharge, then stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
156	BMS Inversed Graft Error			

157	BMS Chg Mos Error	The charging MOS is disconnected and the charging current limit is not enabled, and the charging current is > 1A. Duration: 5000ms	The charging MOS is closed or the charging current limit is enabled, and the charging current is > 1A. Duration: 5000 ms	Stop charging, LED charging temperature/overcurrent/differential pressure protection display
158	BMS Disg Mos Error	Discharge MOS disconnected, discharge current > 1A, duration: 5000ms	Discharge MOS is closed, discharge current > 1A, duration: 5000 ms	Stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
159	BMS CB Alarm			
160	BMS Breaker			

161	BMS Temp Sense Short	The number of cell temperature inefficiencies is > 0 || Current sampling temperature AD value ≤ 100 || Equilibrium temperature AD ≤ 100 || MOS temperature AD value ≤ 100 || Ambient temperature AD ≤ 100 Duration: 5000 ms	Cell temperature invalid number == 0 && Current sampling temperature AD < 4000 && The equilibrium temperature AD is less than 4000 && MOS tube temperature AD value < 4000 && The ambient temperature AD is < 4000 && Current sampling temperature AD value > 100 && The AD value is greater than 100 && MOS temperature AD value > 100 && The ambient temperature (AD) is greater than 100 Duration: 5000 ms	Charging, then stop charging, LED charging temperature/overcurrent/differential pressure protection display Discharge, then stop discharge, LED discharge temperature/overcurrent/differential pressure protection display
162	HEX Comm Fail			
163	DCDU Comm Fail			
164	DG Turned on			

Southbound Smart Devices

Tab 4-5-1 Southbound smart devices list

Smart devices	Communication port	Communication protocols	Remarks

Rectifier	CAN1	I-Power CAN protocol	40 modules each
Solar module	CAN1	I-Power CAN protocol	
Wind module	CAN1	I-Power CAN protocol	
HVDC module	CAN1	I-Power CAN protocol	
DC/DC module	CAN2	I-Power CAN protocol	12 modules each
DC/AC module	CAN2	I-Power CAN protocol	
Lithium battery	Configurable, default RS485-2	The Modbus protocol of any BMS manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	20 groups, only BMSs of the same protocol can be connected at the same time.
Battery inspection instrument	Configurable, default RS485-2	The Modbus protocol of any battery inspector manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	10 groups, only BMSs of the same protocol can be connected at the same time.

Smart AC meters	Configurable, default RS485-3	The Modbus protocol of any smart meter manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	1
Smart DC meters	Configurable, default RS485-3	The Modbus protocol of any smart meter manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	1
Smart DG	Configurable, default RS485-3	The Modbus protocol of any intelligent oil engine manufacturer realizes protocol docking through parameter configuration, and non-Modbus protocol needs to be customized and developed.	1

Smart ATS	Configurable, default RS485-3	The Modbus protocol of any intelligent ATS manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	1
Climate	Configurable, default RS485-3	The Modbus protocol of any Climate manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	2
Air conditioner	Configurable, default RS485-3	The Modbus protocol of any BMS manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed and transparently transmitted.	2
Smart CB/DCDU	Configurable, default RS485-3	The Modbus protocol of any Smart CB manufacturer can be connected through parameter configuration, and the non-Modbus protocol needs to be customized and developed.	64

Hybrid Energy Management

The controller supports numerous energy input sources such as DG, solar panels, mains and so on. This hybrid power solution allows you to optimize the operation of the site, to achieve maximum efficiency at all times.

By reasonably setting Charging parameters, Load Shifting parameters, Partial Charge parameters, and DG Power Priority parameters, the controller implements the following energy input priority management:

- Green energy - >Mains -> Battery -> DG(default)
- Green energy -> Mains -> DG -> Battery
- Green energy -> DG -> Mains -> Battery
- Green energy -> Battery -> Mains -> DG
- Green energy -> Battery -> DG -> Mains

AC Power Priority	DG Power Priority	Partial Charge	Load Shifting	Priority
Disabled	Disabled	Disabled	Disabled	**PV > Mains > Batt > DG (Default priority)**
Enabled	Disabled	Disabled	Disabled	**PV > Mains > DG > Batt**
Enabled	Enabled	Disabled	Disabled	**PV > DG > Mains > Batt**
Disabled	Enabled	Enabled	Disabled	**PV > Batt > DG > Mains**
Disabled	Disabled	Enabled	Disabled	**PV > Batt > Mains > DG (Partial Charge)**
Disabled	Disabled	Disabled	Enabled	**PV > Batt > Mains > DG (Load shifting)**

Green Energy -> Mains -> Battery -> DG

Setting "Solar Delta Voltage", "Load Shifting", "Partial Charge", "AC Power Priority"and "DG Power Priority" to their default values will achieve the energy supply priority as follows: Green energy -> Mains -> Battery -> DG.

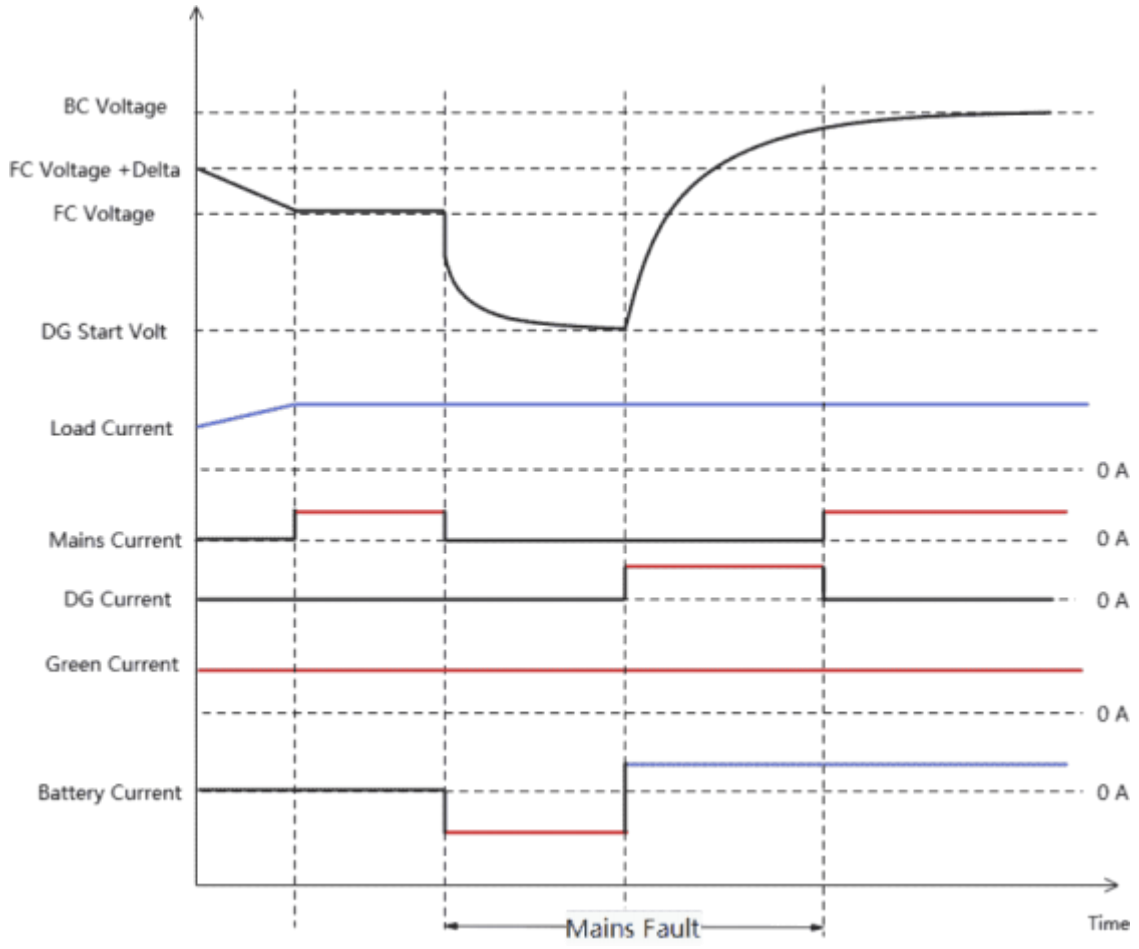

Fig 4-1 Green energy->Mains->Battery->DG Priority Diagram

Green Energy -> Mains -> DG -> Battery

Setting "Solar Delta Voltage", "Load Shifting", "Partial Charge", and "DG Power Priority" to their default values, and setting "AC Power Priority" to "Enabled" will achieve the energy supply priority as follows: Green energy ->Mains -> DG-> Battery.

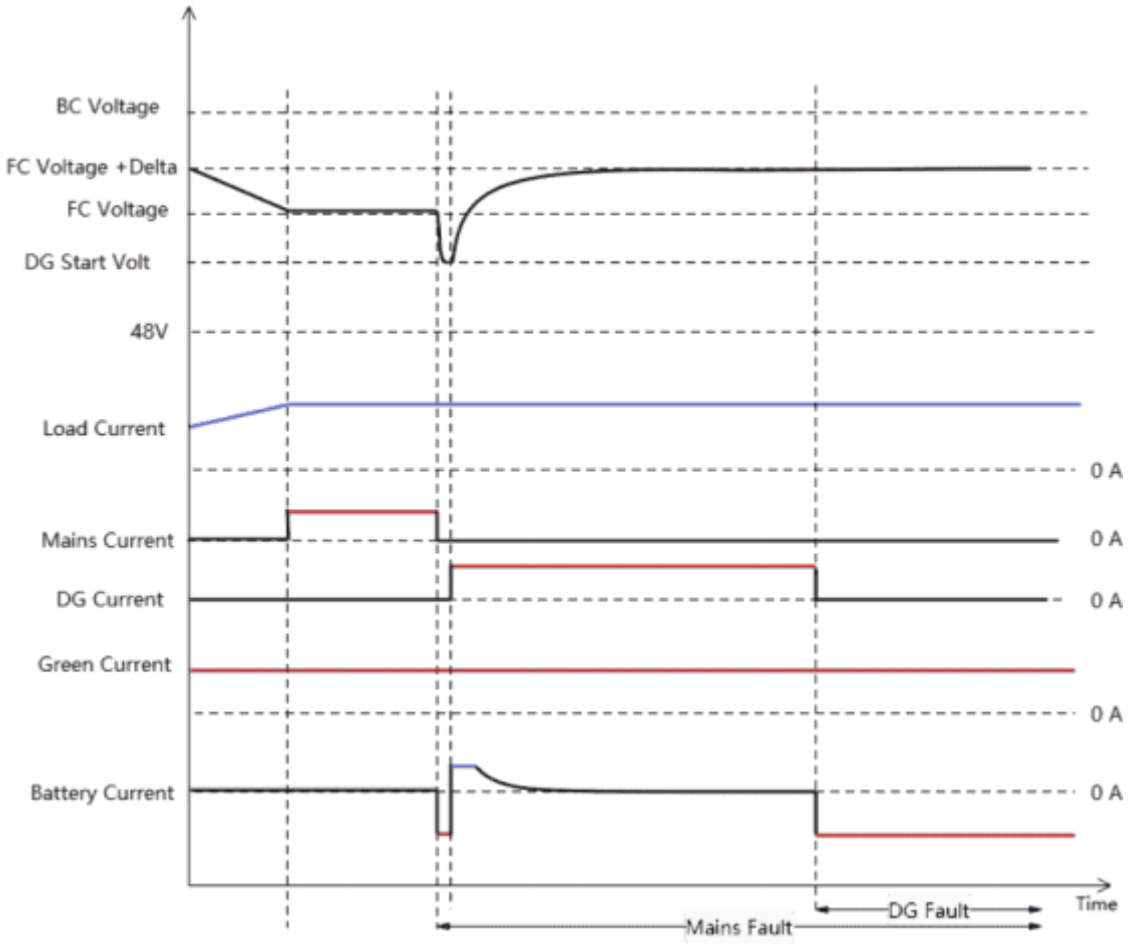

Fig 4-2 Green energy->Mains->DG->Battery Priority Diagram

Green Energy > DG > Mains > Battery

Setting "Solar Delta Voltage", "Load Shifting", and "Partial Charge" to their default values, setting "AC Power Priority" to "Enabled",and setting "DG Power Priority" to "Enabled" will achieve the energy supply priority as follows: Green energy -> DG-> Mains -> Battery(by setting the ATS to generator priority mode).

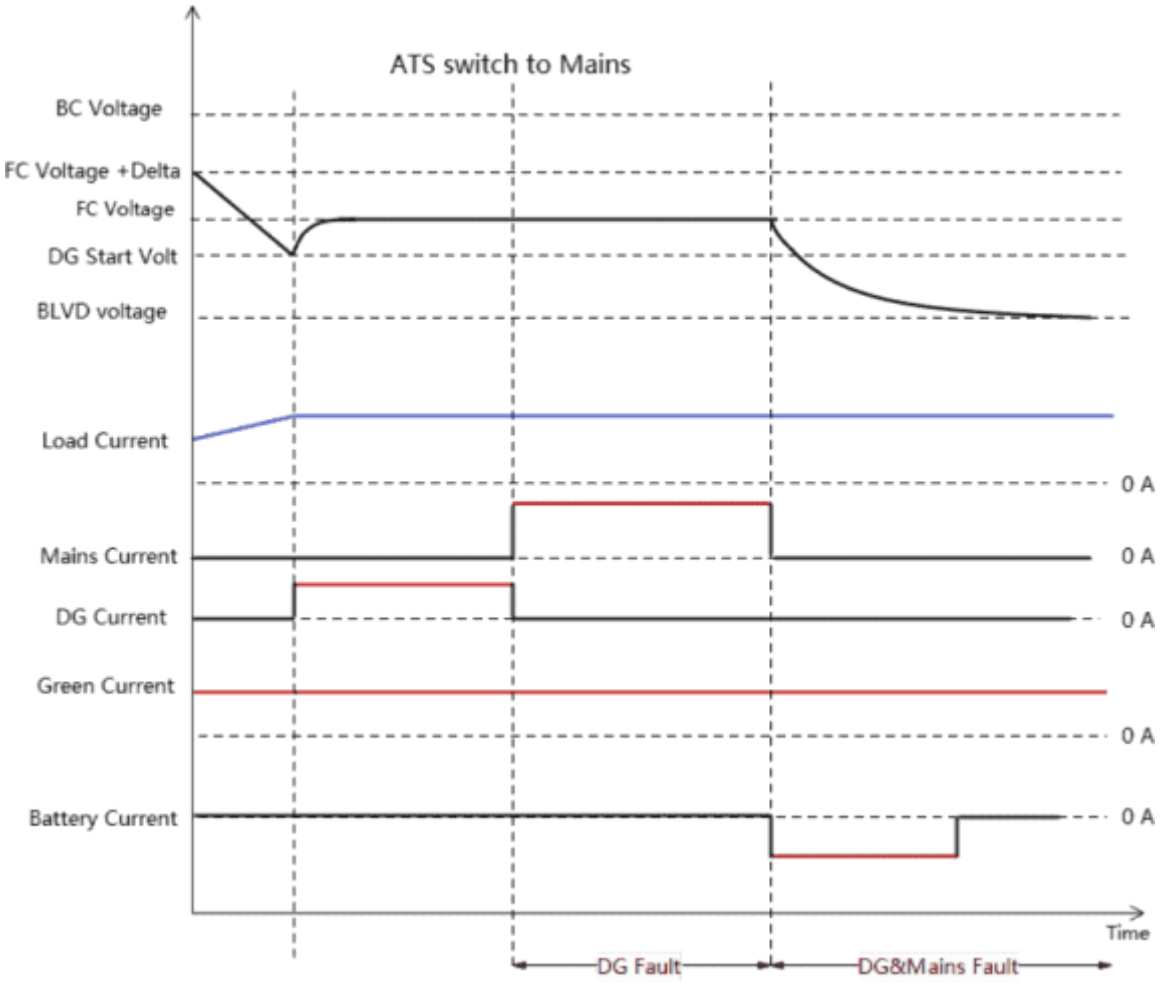

Fig 4-3 Green energy->DG->Mains->Battery Priority Diagram

Green Energy -> Battery -> Mains -> DG

The purpose of battery secondary priority discharge is to minimize the use of non-green energy sources such as grid electricity and DG, thus achieving energy conservation and emission reduction. Battery secondary discharge has two modes: Load Shifting and Partial Shaving. Please refer to sections 4.8 and 4.9 for more details.

Keep "Solar Delta Voltage", "AC Power Priority", and "DG Power Priority" at their default values, and set "Partial Charge" and "Load Shifting" to "Enabled" will achieve the energy supply priority as follows:

Green Energy -> Battery -> Mains -> DG.

1, Realize through cyclic discharge method

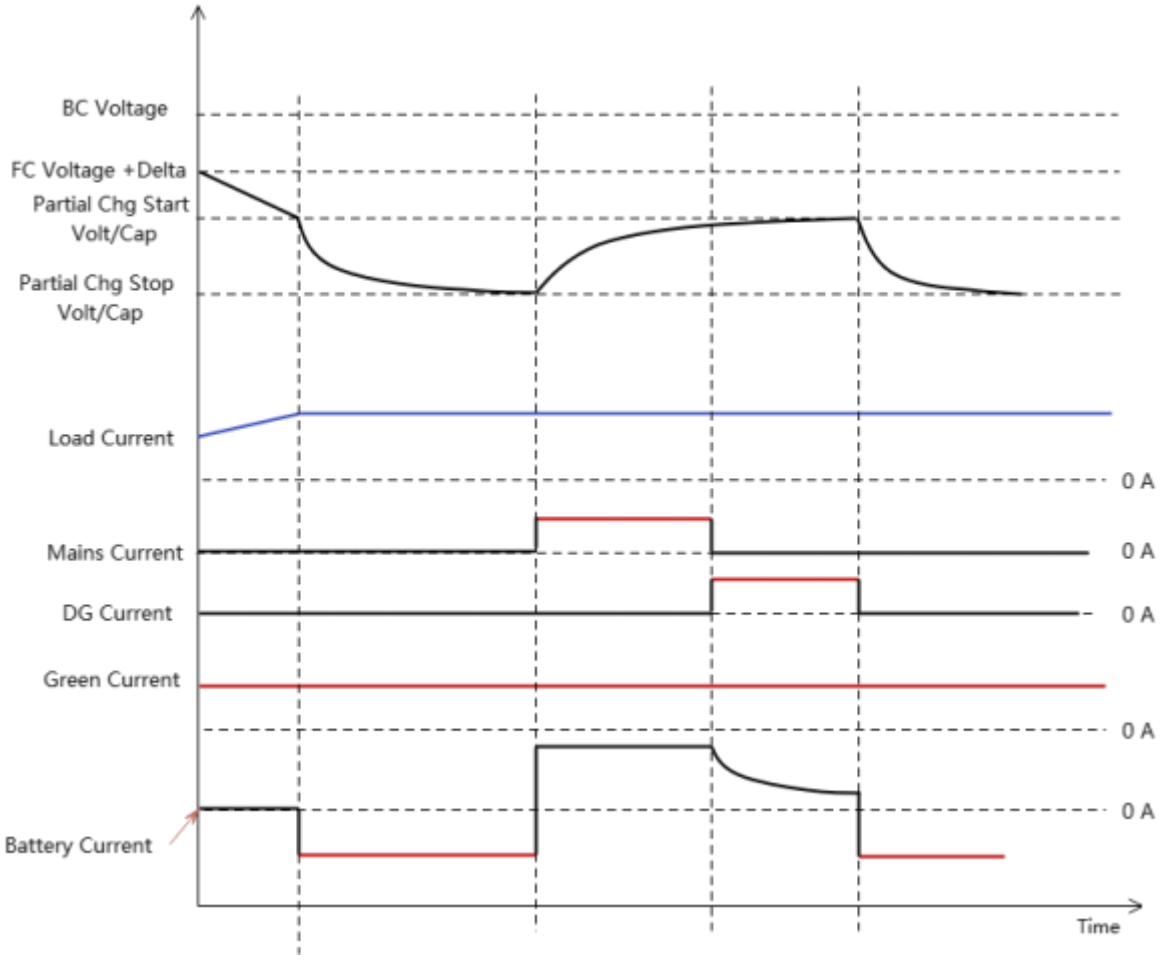

Fig 4-4 (Cyclic discharge) Green Energy->Battery->Mains->DG Priority Diagram

2, Realize through load shifting method

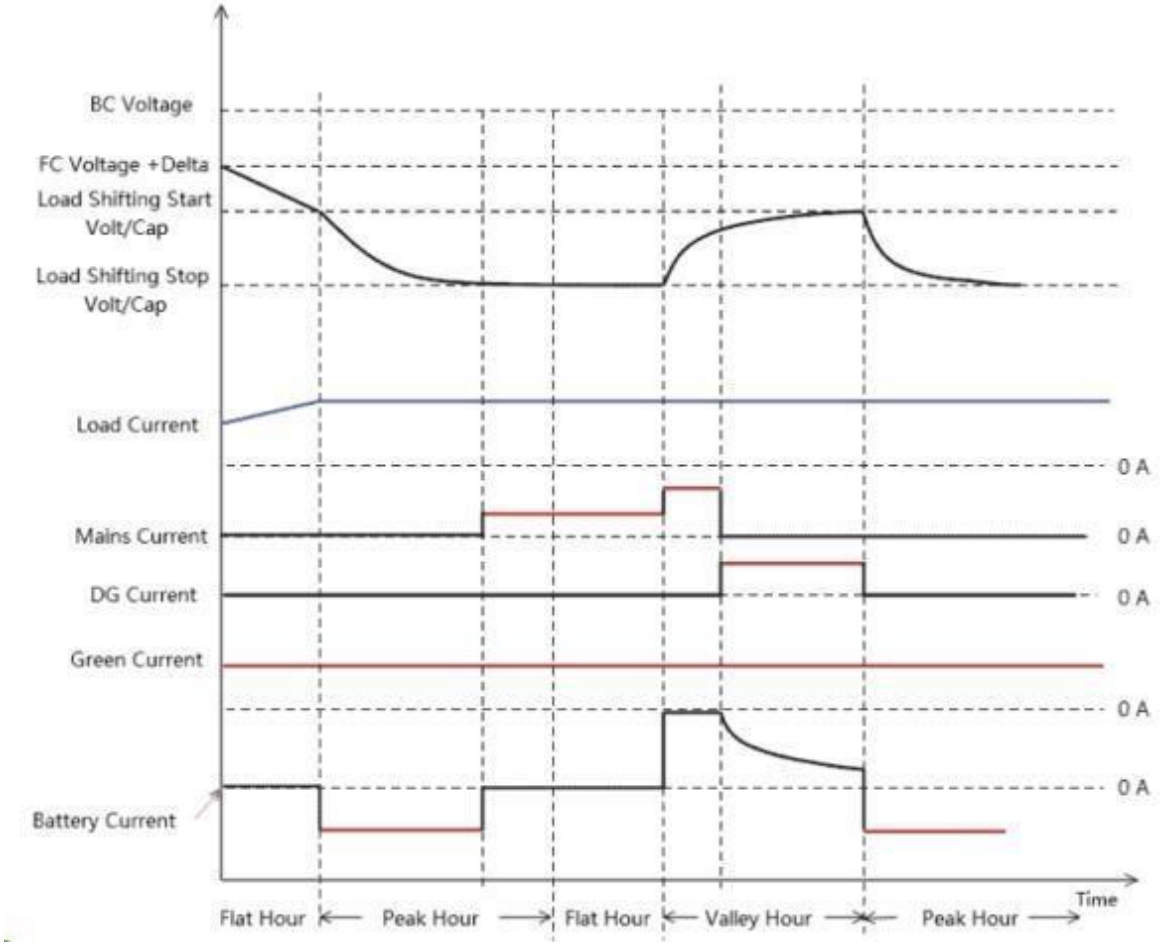

Fig 4-4 (Load shifting) Green Energy->Battery->Mains->DG Priority Diagram

Green Energy -> Battery -> DG -> Mains.

Keep "Solar Delta Voltage", "AC Power Priority" and "Load Shifting" at their default values, set "Partial Charge" and "DG Power Priority" to "Enabled". will achieve the energy supply priority as follows: Green Energy -> Battery -> DG -> Mains

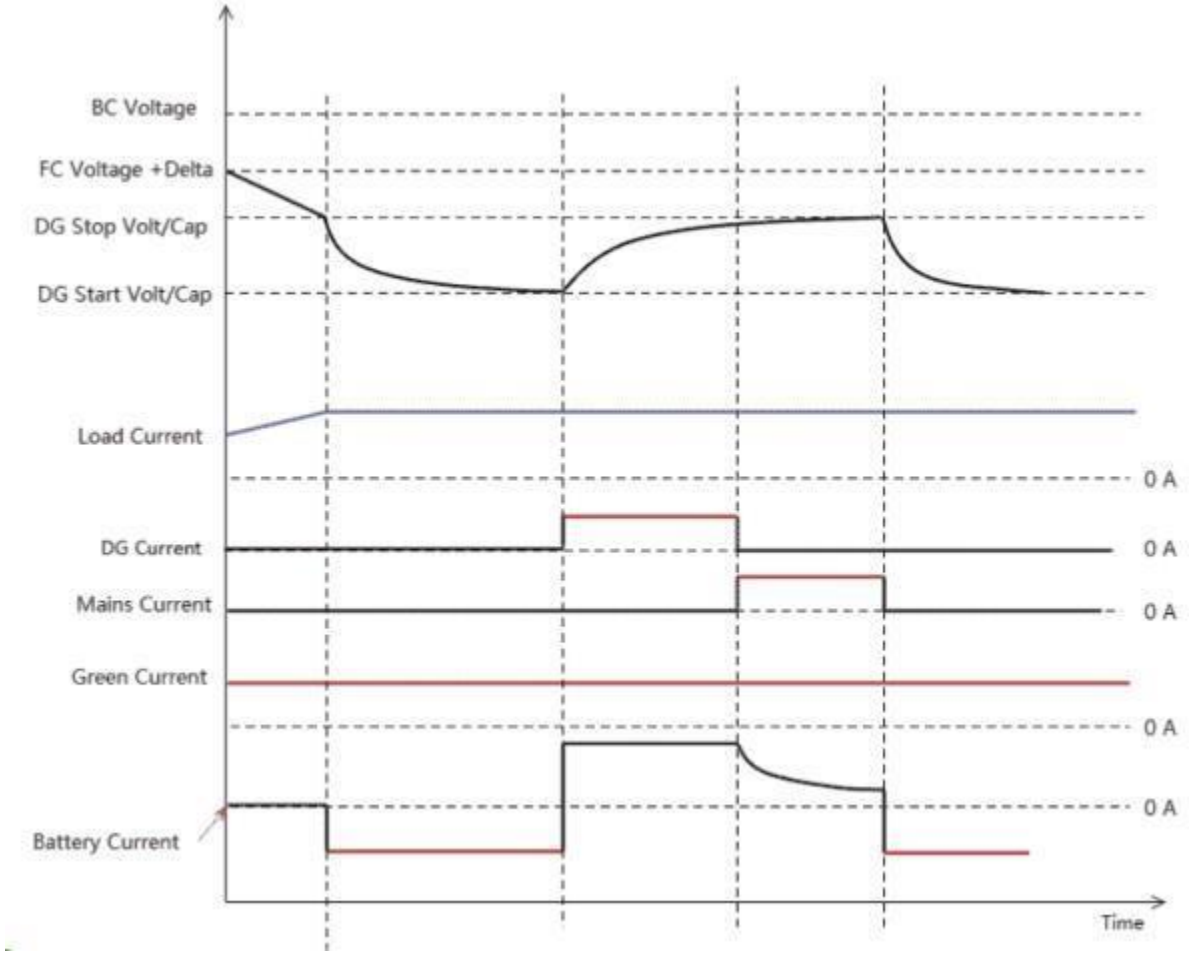

Fig 4-5 Green Energy -> Battery -> DG -> Mains Priority Diagram

Battery Management

Tab 4-6 Battery Management Status Transition Table

Pre-Migration Status	Post-Migration Status	Migration Conditions

Float Charge	Short Test	All of the following conditions (relationship of "AND") are met: 1. The "DC Voltage" is higher than the test stop voltage. 2. The battery capacity exceeds the test stop capacity. 3. Short test enabled and reach short test cycles. 4. The battery status is normal.
Short Test	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. The battery status is abnormal. (See remarks for details. The test end cause is "Battery status is abnormal" and the test result is "invalid") 2. Short test end. (Test end cause is "time has arrived" and test result is "success") 3. When the DC voltage reaches the test stop voltage, the test end cause is "Battery status is abnormal", and the test result is "invalid". 4. Current difference between battery strings > Battery current imbalance threshold for 30 seconds. (An uneven battery current alarm is generated, and the alarm is automatically cleared 5 minutes later. The test end is caused by uneven current and the test result is Failed.)

Float Charge	Constant Current Test	All of the following conditions (relationship of "AND") are met: 1. The "DC Voltage" is higher than the test stop voltage. 2. The battery capacity exceeds the test stop capacity. 3. The battery status is normal.(See remarks for details.) 4. The test type parameter is "Const Current Test Period" and the test period is up or the test type parameter is "Scheduled constant current test" and the scheduled test time is up. Note: The default scheduled test time is 1970-01-01 00:00:00. If the scheduled test time is different from the default value, the constant current test will be started if the current test time is longer than the scheduled test time, and the scheduled test time will be changed to 1970-01-01 00:00:00. Otherwise, the constant current test will not be started. The scheduled test time needs to be set again before the next constant current test is started.

Constant Current Test	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. The test type is set to "Disabled".(The test end cause is "manual termination" and the test result is "invalid"). 2. The battery status is abnormal. (See remarks for details. The test end cause is "Battery status is abnormal" and the test result is "invalid") 3. The battery current is less than the current of constant current test for 1 minute (the test end cause is "underload" and the test result is "invalid"). 4. Constant current test end. (Test end cause is "time has arrived" and test result is "success") 5. The battery SOC is less than the battery test stop capacity (the test end cause is "Capacity reached" and the test result is "success") 6. The DC voltage is lower than the battery test stop voltage. (If the filter is 5s, a battery test failure alarm is generated, and the alarm is automatically cleared 5 minutes later. The test end cause is Voltage Reached and the test result is Failed.)

Float Charge	Boost Charge	If any of the following conditions (relationship of "OR") are met: 1. The battery status is normal and the periodic equalization type is Periodic equalization and the periodic equalization period is equal, or the battery status is normal and the periodic equalization type is Scheduled Boost and the Scheduled Boost time is up. 2. The battery status is normal and the automatic equalization is allowed and the battery current lasts for 3 minutes greater than the transfer equalization current (the charging cause is "undersupply"). 3. The battery status is normal and the automatic equalization is allowed and the battery SOC is below the equalization capacity (the charging cause is "under voltage"). Note: The reserved equalization time is 1970-01-01 00:00:00. If the reserved equalization time is different from the default value, the equalization time is enabled if the current time is greater than the reserved equalization time, and the reserved equalization time is changed to 1970-01-01 00:00:00. Otherwise, the equalization time is not enabled. The scheduled equalization time needs to be manually set again before the next equalization time is started.

Boost Charge	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. Set periodic equalization and automatic equalization to "Disabled" (the charge end reason is "manualstop"). 2. The battery status is abnormal (see remarks for details. The charging end cause is "Battery status is abnormal"). 3. The equalized charge duration is longer than the equalized charge protection duration. (End cause: Timeout). 4. The periodic equalization duration is greater than the periodic equalization duration (End cause: Timed equalization time is up). 5. The battery current is less than the floating charge current and the steady current equalization time is up to (the end cause is "full").
Float Charge	Normal Test	All of the following conditions (relationship of "AND") are met: 1. The "DC Voltage" is higher than the test stop voltage. 2. The battery capacity exceeds the test stop capacity. 3. The test type is "Normal Test" and (test cycle or scheduled test time). 4. The battery status is normal.(See remarks for details.) Note: The default scheduled test time is 1970-01-01 00:00:00. If the scheduled test time is equal to the default value, the test period takes effect. When the test period reaches, the constant current test is started. If the scheduled test time is not the default value, the current test time is longer than the scheduled test time, and the scheduled test time is changed to 1970-01-01 00:00:00. Otherwise, the common test is not started. The scheduled test time needs to be set again before the next common test is started.

Normal Test	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. The test type is set to "Disabled".(The test end cause is "manual termination" and the test result is "invalid"). 2. The battery status is abnormal. (See remarks for details. The test end cause is "Battery status is abnormal" and the test result is "invalid") 3. Normal test end. (Test end cause is "time has arrived" and test result is "success") 4. The battery SOC is less than the battery test stop capacity (the test end cause is "Capacity reached" and the test result is "success") 5. The DC voltage is lower than the battery test stop voltage. (Battery test failure alarm is generated, and the alarm is automatically cleared 5 minutes later. The test end cause is Voltage Reached and the test result is Failed.)
Float Charge	Load Shifting	All of the following conditions (relationship of "AND") are met: 1. Load Shifting is "Enabled". 2. The battery status is normal.(See remarks for details.) 3. It is currently in the peak period of electricity consumption. 4. The last battery test was successful.

Load Shifting	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. Load Shifting is "Disabled". 2. The battery status is abnormal. (See remarks for details.) 1. The DC voltage is less than the "Shifting End volt" and is in the normal section and the normal section allows charging. 2. The SOC is smaller than the "Shifting End SOC" and is in the normal period and the normal period allows charging 5.It is currently in the valley period of electricity consumption.
Float Charge	Partial Charge	All of the following conditions (relationship of "AND") are met: 1. Load Shifting is "Disabled". 2. Partial Charge is "Enabled". 3. The battery status is normal.(See remarks for details.) 4. The DC voltage is greater than or equal to the "Partial Chg Start Voltage" 1. SOC greater than or equal to "Partial Chg Start SOC" 2. The number of times that day from "Float Charge" to "Partial Charge" state is less than "Partial Charge Num".

Partial Charge	Float Charge	If any of the following conditions (relationship of "OR") are met: 1. Partial Charge is "Disabled". 2. Load Shifting is "Enabled". 3. The battery status is abnormal. (See remarks for details.) 1. The DC voltage is less than the "Partial Chg End volt". 2. The SOC is smaller than the "Partial Chg Stop SOC".

Battery State Management

In the work environment, if the station does not connect the BMS to the power monitoring but to the FSU, then the total battery capacity will need to be manually set the parameter "Battery Capacity".For more setting operations by LCD or Web, refer to 5.6.4 Battery Manual MGT and 6.5.2 Battery Settings .

Float Charge

"Float charge" is a working state of the battery, the "DC Voltage" is generally constant, only slightly higher than the end voltage of the battery, by the power system to provide a small amount of current to compensate for the loss of the local role of the battery, so that it can often maintain in the charging state without overcharging. In the float charge mode, the Controller adjusts the output voltage of the power module to the float charge voltage (54.5V by default) and fine-tunes the output voltage based on the following conditions to implement the warm-up function. The following conditions (relationship between "and") are met:

- Enable the warm-up function (set to Enable);
- Configure the battery temperature sensor and the battery temperature sensor works properly.
- No any one of the following alarms is raised: "DC Under Voltage Alarm", "DC Over Voltage Alarm", "Module Comm Fail","Power Input Failure","BLVD","Battery Temp Alarm(Low,Hight,Hight+)","Battery Fuse Alarm","BMS Temp Sense Disconnect".
- Temperature compensating algorithm: output voltage = float charging voltage + (temperature compensating center point - battery measurement temperature) * temperature compensating coefficient.
- The difference between the output voltage and the float charging voltage does not exceed 2V.
- The output voltage does not exceed the boost charg voltage.

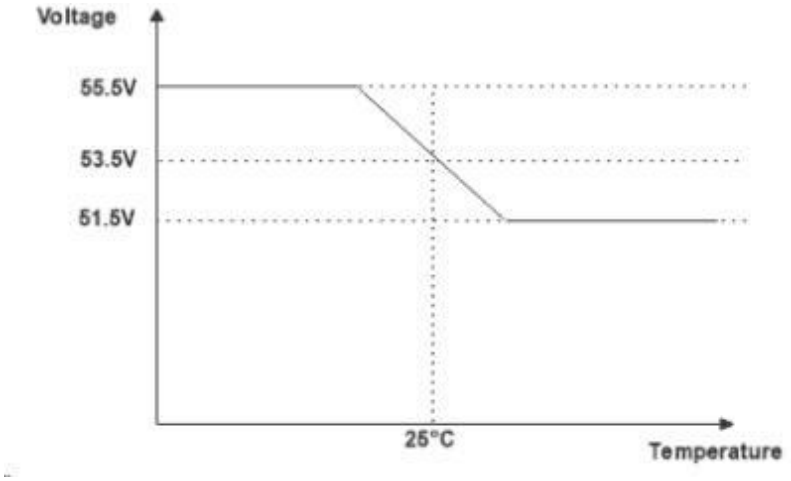

Fig 4-6 Temperature compensation diagram

Boost Charge

Both are fully automatic "Boost Charge" and planed "Boost Charge". Automatic "Boost Charge" is a way to quickly recharge the battery when it is low SOC. The battery is in the float charge state without high current charge and discharge for a long time, the activity of the plate will gradually decline, and the battery will be charged once at a regular time to improve the activity of the battery plate, so that each plate of the battery is more balanced, and the battery life will be extended.

In the "Boost Charge" state, the Controller adjusts the output voltage of the PSU to the equalized charge voltage (56.4V by default) to charge the battery. Fig 4-7 shows the "Boost Charge" process.

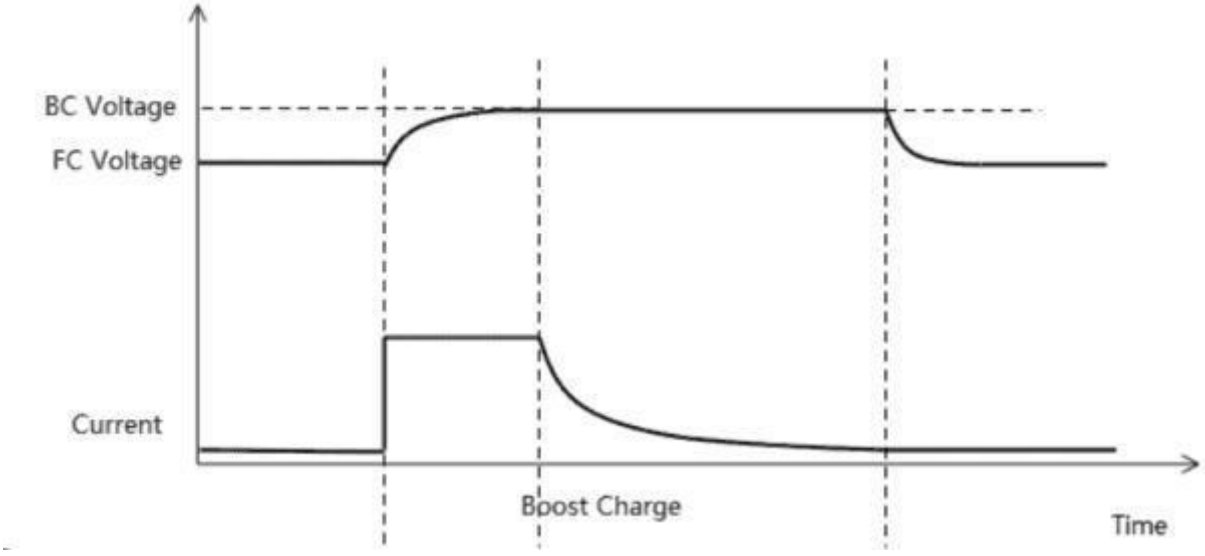

Fig 4-7 Boost Charge Process

Short Test

Short tests are regular maintenance work to periodically test whether the current is equalized between battery packs. In the short test state, the Controller adjusts the output voltage of the power module to the test Stop voltage (45.2V by default)-1V, so that the battery is discharged and the load is completely powered by the battery. If the current difference between battery strings is always less than or equal to the threshold of battery current imbalance during the short test period (the short test time parameter can be set), the short test passes. If the current difference between battery strings is greater than the battery current imbalance threshold for 30 seconds, an uneven battery current alarm is raised. The alarm is automatically cleared 5 minutes later. The cause of the test is uneven current, and the test result is Failed. If the "DC Voltage" reaches the test stop voltage, the test end cause is

Abnormal battery status and the test result is invalid. For details about test results and related records, refer to Tab 4-6.

Constant Current Test

Battery constant current test is a maintenance work to test battery performance and aging degree. In the constant current test state, Controller adjusts the output voltage of the power module to the "Floating Voltage" (default 54.5V), and adjusts the current limiting point of the power module to maintain the battery discharge current near the "Const Current Test Current" (default 0.2C10). If the load is less than the set value for 1 minute, the test is invalid and exits the constant current test. Figure 4-8 shows the constant current test process. Tab 4-6 describes the test results and related records.

If the test result is invalid, the SOH is not calculated. If the test result is Succeeded or failed, the SOH is calculated.

The formula is $SOH = \frac{Actual discharge capacity}{Standard battery capacity}*100%$.

NOTE:

The risk of constant current test is that if the battery is configured in the customer parameters, but the battery is not connected and there is no battery alarm, the system will breakdown due to the depth of the module current limiting.

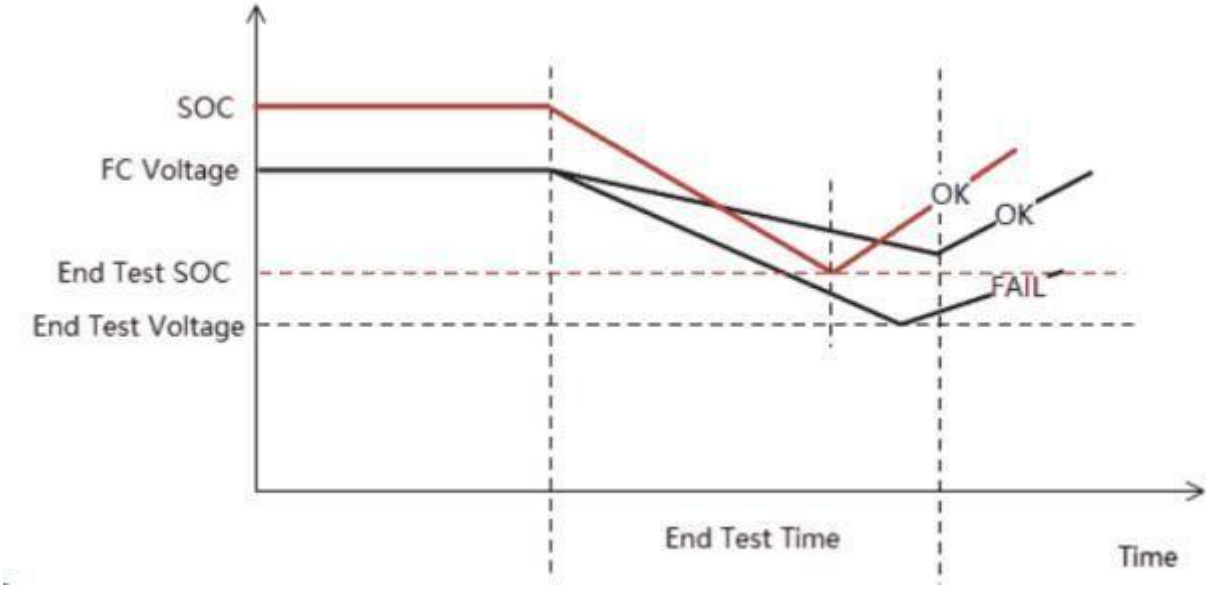

Fig 4-8 Constant current test procedure

Normal Test

The common battery test is another kind of maintenance work to test the battery performance and aging degree. In the normal test state, the Controller adjusts the output voltage of the power module to the "Test Stop Voltage" (default 45.2V)-1V, so that the battery is discharged and the load is completely powered by the battery. Verify that the voltage can be maintained after the battery is discharged in the desired period of time, or after the expected amount of electricity is released. The difference between the common test and the constant current test is whether the battery is constantly discharged. The common test process is the same as that of the constant current test, as shown in Fig 4-8. Tab 4-6 lists the test results and related records.

If the test result is invalid, the SOH is not calculated. If the test result is Succeeded or failed, the SOH is calculated.

The formula is $SOH = \frac{Actual discharge capacity}{Standard battery capacity}*100%$.

NOTE:

In the Normal Test, the battery discharge current is not constant, the SOH calculation accuracy is low, and the battery can only be qualitatively judged.

Temperature Compensation

The process of charging and discharging the battery is the chemical reaction process of the battery, in the process of charging/discharging the battery, the chemical reaction is sometimes too strong or gentle, so that the battery can not work normally. In order to ensure the normal progress of energy conversion and protect the health of the battery, it is necessary to carry out "temperature compensation". The two main factors that affect the intensity of battery chemical reaction are temperature and charging voltage.

The intensity of the chemical reaction of the battery is closely related to the temperature, under the condition of the same charging voltage, the battery temperature increases, the chemical reaction is more intense, the battery temperature decreases, and the chemical reaction is more gentle.

At the same temperature, the battery charging voltage increases, the chemical reaction is more intense, the charging current increases, the float charging voltage of the battery decreases, the chemical reaction is more gentle, and the charging current decreases.

The application scenarios of the communication power supply are diverse, and the ambient temperature of the battery is greatly changed, which has a great impact on the chemical reaction inside the battery. The effect of temperature change on the battery can be weakened by adjusting the "Float Voltage".

For batteries with 48 V communication power supply, the float charge voltage is calculated as follows:

$DC Voltage set value = Float Voltage - (Battery temp-temp Comp Center) * Temp Comp Coef/1000$

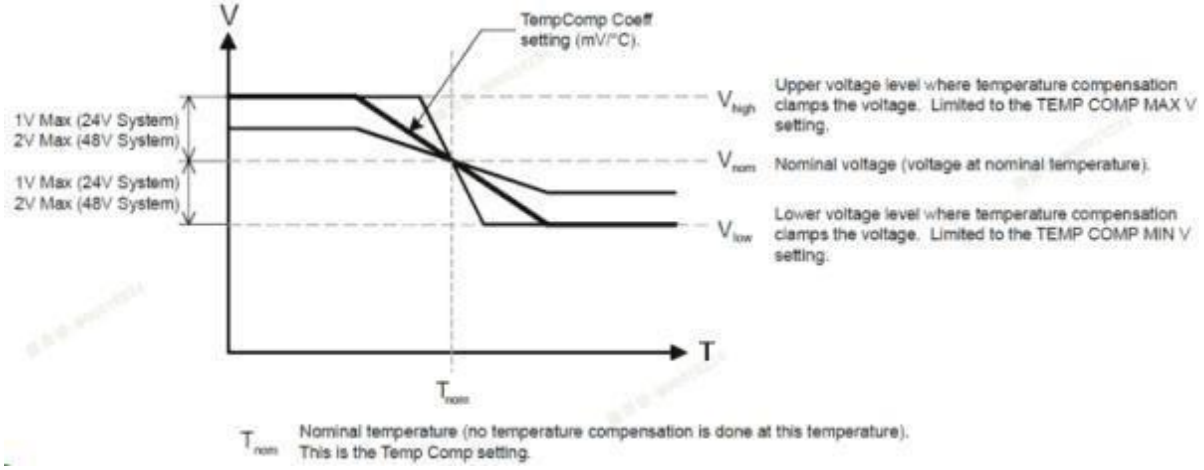

Fig 4-9 Temperature compensation algorithm

Current Limitation

In the Float Charge, transfer Boost Charge pre-limit state and Boost Charge state, by adjusting the current limit point of the module (including rectifier, solar and wind), the battery charging current is close to the charge current limit point, but does not exceed the value. If it exceeds the value for some reason (such as load fluctuation), the battery charging current is not exceeded. It will "pull" the charging current back to the current limit point(0.9~1* current limit point) within 1 to 2 cycles (10s to 20s).

Current limiting is classified into two modes: unified current limiting and separate current limiting. In unified current limiting mode, the Controller sends the same current limiting point to all power modules through broadcast commands. The logic of unified current limiting mode is relatively simple, but the green energy module cannot preferently carry loads during battery current-limiting charging.

Separate current limiting means that the Controller delivers a separate current limiting value to the rectifier module and another current limiting point to the PV and wind power modules so that the PV and wind power modules carry as much load as possible.

For more details about settings of "Current Limitation", refer to Tab 4-7.

Tab 4-7 Battery status Transition Status migration table

Pre-Migration Status	Post-Migration Status	Migration Conditions
Controller Boot	Float Charge	Take the bus voltage -0.5 and the maximum voltage of the module starter as the initial voltage, carry out current-limiting voltage regulation, and gradually adjust the output voltage to the target voltage (the maximum value of the floating charge voltage and the maximum voltage of the module starter voltage), and complete the state migration if any of the following conditions are met: 1. Charging current greater than 1.5 * charging limit point * Nominal battery capacity (default 1.5*0.1*100Ah). 2. Power module starting mode is Walk-in, delay Walk-In time (s). 3. Power module starting mode is Pocl, delay 180s. 4. Power module starting mode is Immed, delay 2s.
Float Charge	Controller Boot	The Controller is restarted or removed when the system is running normally.

Energy input recovery	Float Charge	With the bus voltage -0.5 as the initial voltage, the current limiting voltage is carried out, and the output voltage is gradually adjusted to the target voltage (the maximum value of the floating charge voltage and the module starter voltage). The state migration is completed if any of the following conditions are met: 1. Charging current greater than 1.5 * charging limit point * Nominal battery capacity (default 1.5*0.1*100Ah). 2. Power module starting mode is Walk-in, delay Walk-In time (s). 3. Power module starting mode is Pocl, delay 180s. 4. Power module starting mode is Immed, delay 2s.
Float Charge	Energy input recovery	The energy input is abnormal during normal system operation.
End Of Test	Float Charge	Take the bus voltage as the initial voltage, perform current-limiting voltage regulation, and gradually adjust the output voltage to the floating charge voltage. If the charging current is greater than 1.5 * charge current limiting point * Nominal battery capacity (1.5*0.1*100 Ah by default) or the transition has lasted for 2 minutes, the state migration is completed.
Float Charge	End Of Test	For details, see Table 4-6.
Float Charge	Start of Boost Charge	The bus voltage is the initial voltage, and the output voltage is gradually adjusted to the default "Boost Charge" voltage of 56.4V. If the charging current is greater than 1.5 * charge current limit point * nominal battery capacity (1.5*0.1*100 Ah by default) or the transition has lasted for 1 minute, the status transition is complete.
Start of Boost Charge	Float Charge	For details, see Table 4-6.

Load Shifting	Float Charge	Take the bus voltage as the initial voltage, perform current-limiting voltage regulation, and gradually adjust the output voltage to the floating charge voltage. If the charging current is greater than 1.5 * charge current limiting point * Nominal battery capacity (1.5*0.1*100 Ah by default) or the transition has lasted for 2 minutes, the state migration is completed.
Float Charge	Load Shifting	For details, see Table 4-6.
Partial Charge	Float Charge	Take the bus voltage as the initial voltage, perform current-limiting voltage regulation, and gradually adjust the output voltage to the floating charge voltage. If the charging current is greater than 1.5 * charge current limiting point * Nominal battery capacity (1.5*0.1*100 Ah by default) or the transition has lasted for 2 minutes, the state migration is completed.
Float Charge	Partial Charge	For details, see Table 4-6.

LLVD

Tab 4-8 Load power status migration table

Pre-Migration Status	Post-Migration Status	Migration Conditions

LLVDx Connection	LLVDx Disconnection	If any of the following conditions are met, generate a load power off alarm and wait for 20 seconds before performing the power off action: 1. LLVDx is allowed AND battery is not in transition state AND battery is not in testing state AND bus voltage is less than LLVDx power off voltage AND battery current is less than -2A for 1 minute AND duration of this condition is at least 30 seconds. 2. LLVDx is allowed AND battery is not in transition state AND battery is not in testing state AND time-based power off mode AND no AC input AND battery current is less than -10A for 1 second AND duration exceeds power off time. 3. LLVDx is allowed AND battery is not in transition state AND battery is not in testing state AND capacity-based power off mode AND no AC input AND battery current is less than -2A for 1 minute AND SOC is less than power off capacity.
LLVDx Disconnection	LLVDx Connection	If any of the following conditions are met: 1. LLVDx is prohibited. 2. Bus voltage is greater than LLVDx power on voltage AND there is energy input AND a delay of 2.5 seconds has been reached. 3. No AC input before power off AND AC input is restored for 1 minute.

NOTE:

- The battery test here includes short test, constant current test and normal test.
- The Controller application program is controlled according to the power status of the battery stored in the storage media without loss of power failure.
- The user manual indicates that the smart lithium battery can only select the capacity and time power-off mode.

BLVD

Tab 4-9 Battery power-on and power-off status migration table

Pre-Migration Status	Post-Migration Status	Migration Conditions

BLVD Connection	BLVD Disconnection	If any of the following conditions are met, generate a battery power off alarm and wait for 20 seconds before performing the power offaction: 1. BLVD is allowed AND battery is not in transition state AND battery is not in testing state AND battery current is less than 1A for 1 minute AND bus voltage is less than battery power off voltage AND duration of this condition is at least 30 seconds. 2. BLVD is allowed AND battery is not in transition state AND battery is not in testing state AND battery current is less than 1A for 1 minute AND time-based power off mode AND no AC input AND duration exceeds power off time. 3. BLVD is allowed AND battery is not in transition state AND battery is not in testing state AND battery current is less than 1A for 1 minute AND capacity-based power off mode AND no AC input AND SOC is less than power off capacity. 4. High-temperature power off is allowed AND battery temperature sensor is configured AND battery temperature is higher than the over-temperature point. 5. Low-temperature power off is allowed AND battery temperature sensor is configured AND battery temperature is lower than the low-temperature point.

BLVD Disconnection	BLVD Connection	If any of the following conditions are met: 1. In the case of low voltage power off, BLVD is prohibited. 2. In the case of low voltage power off, BLVD is allowed AND bus voltage is greater than battery power on voltage AND there is energy input AND a delay of 2.5 seconds has been reached. 3. In the case of low voltage power off, BLVD is allowed AND no AC input before power off AND AC input is restored for 1 minute. 4. In the case of high-temperature power off, high-temperature power off is prohibited. 5. In the case of high-temperature power off, high-temperature power off is allowed AND battery temperature is less than over-temperature point - 3. 6. In the case of low-temperature power off, low-temperature power off is prohibited. 7. In the case of low-temperature power off, low-temperature power off is allowed AND battery temperature is greater than low-temperature point + 3.

NOTE:

- The battery test here includes short test, constant current test and ordinary test.
- The Controller application program is controlled according to the power status of the battery stored in the storage media without loss of power failure.
- The user manual indicates that the smart lithium battery can only select the capacity and time power-off mode.

Load Shifting

The purpose of Load Shifting is to reduce the use of electricity during peak hours, and use the low price of electricity during trough hours to charge the battery, so as to achieve the purpose of reducing operating costs. Tab 4-10 lists the parameters related to Load Shifting.

Tab 4-10 Load Shifting related parameters

Parameter Name	Range	Default Value
Load Shifting Enable	0: Enabled / 1: Disabled	Disabled
Flat Charge Enable	0: Enabled / 1: Disabled	Disabled

Shifting End SOC	30-100	50
Shifting End Voltage	max(30,LLVD 1 SOC)~100	50
Peak Period 1		0:00 - 0:00
Peak Period 2		0:00 - 0:00
Peak Period 3		0:00 - 0:00
Peak Period 4		0:00 - 0:00
Valley Period 1		0:00 - 0:00
Valley Period 2		0:00 - 0:00
Valley Period 3		0:00 - 0:00
Valley Period 4		0:00 - 0:00
Peak Period 1 Tariff		0
Peak Period 2 Tariff		0
Peak Period 3 Tariff		0
Peak Period 4 Tariff		0
Valley Period 1 Tariff		0
Valley Period 2 Tariff		0
Valley Period 3 Tariff		0
Valley Period 4 Tariff		0

"Solar Delta Voltage" and "Partial Charge Enable" retain the default values, "Load Shifting" is set to "Enable", "DG Power Priority" is set to "No", "DG Stop Voltage" are set to the same value, "DG Stop SOC" are set to the same value. Set the same value for "Engine starting voltage" and "off-peak cutoff voltage", set the same value for "DG Start Voltage" and "Shifting End Voltage", set the corresponding peak and trough periods, and set the parameters of "Flat Charge Enable" (Note: Nor mal period refers to the period outside the peak and trough), if the system is configured with a constant voltage type battery, the battery type should be set to "Mixed".

If "Flat Charge"is set to Disabled, Controller sets the battery status to "Priority discharge" during the user's specified peak period, and adjusts the output voltage of the rectifier module to the "Shifting End Voltage", so that green energy and batteries can supply power to loads. If the SOC is smaller than the "Shifting End SOC", the battery can supply power to loads. Adjust the output voltage of the rectifier module to the current "DC Voltage"(greater than or equal to the "Shifting End Voltage"). When the output energy of the green energy is greater than the load energy consumption, the green energy supplies power to the load and the battery at the same time. When the output energy of the green energy is less than the load energy consumption, the green energy and the rectifier module supply power to the load at the same time, and the battery is not charged or discharged.

If "Flat Charge" is set to "Enabled", Controller sets the battery status to "priority discharge state" and adjusts the output voltage of the rectifier module to "Shifting End Voltage" during the peak period set by the user, so that green energy and battery can supply power to the load. When the SOC is less than "Shifting End SOC" and the current peak period is still, the output voltage of the rectifier module is

adjusted to the current bus voltage (greater than or equal to "Shifting End SOC"). When the output energy of the green energy is greater than the load energy consumption, the green energy will supply power to the load and the battery at the same time; when the output energy of the green energy is less than the load energy consumption, the green energy will supply power to the load and the battery. The green energy and rectifier module supply power to the load at the same time, and the battery is not charged or discharged. When the time enters the normal period, set the battery to the "Float Charge" state to charge the battery.

The Controller puts the battery in the "Float Charge" state to charge the battery during the user's set usage period. Tab 4-6 shows the switch between off-peak state and float charge. Fig 4-10 shows the off-peak power mode process.

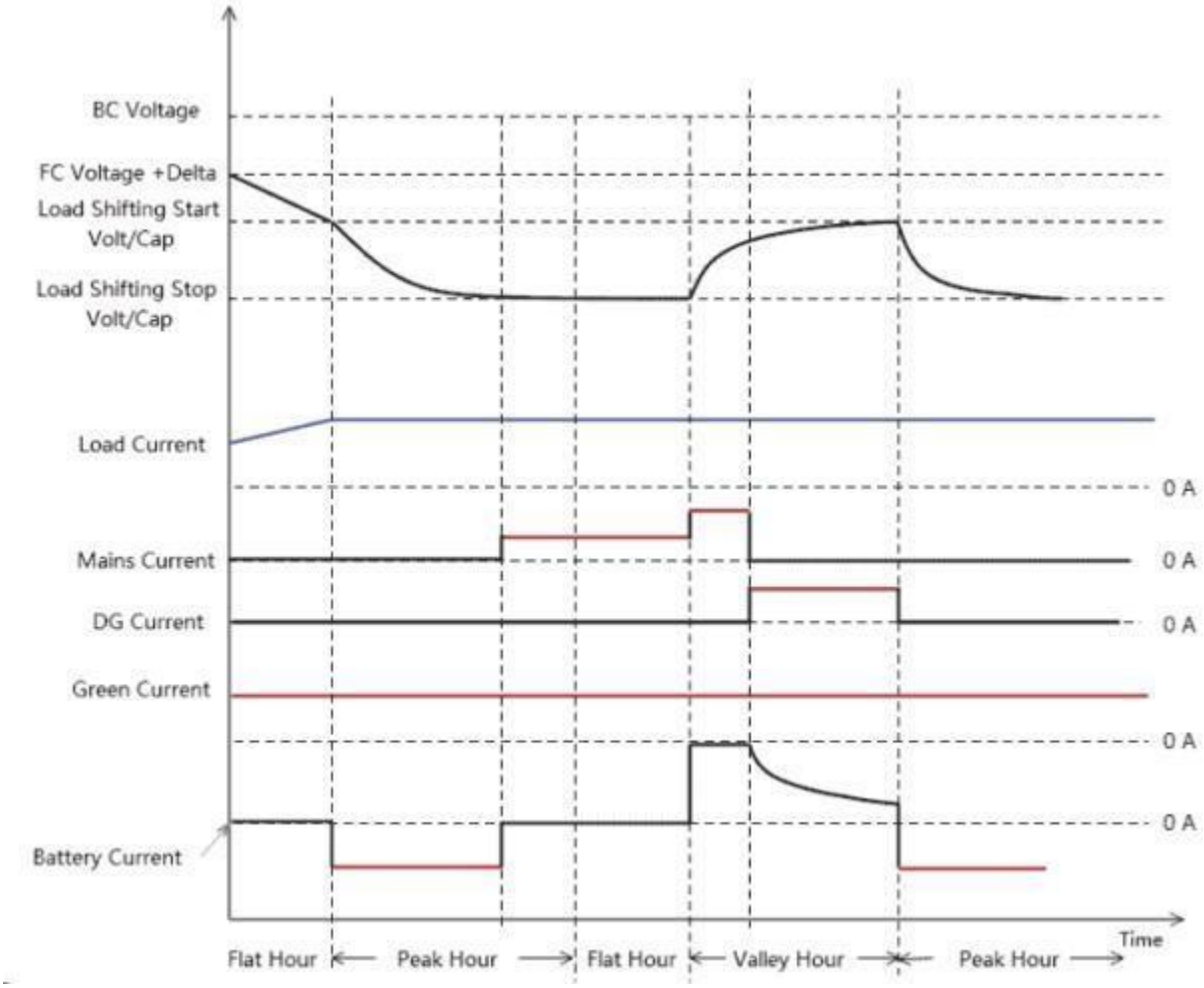

Fig 4-10 Process diagram of Load Shifting

Partial Charge

The fuel combustion efficiency of the DG is higher when the load rate is higher, so the fuel combustion efficiency of the oil machine is the highest when the load is powered and the battery is charged at the same time when the DG is turned on, so when the photovoltaic energy is insufficient, the battery is discharged first. After the battery is discharged to a certain extent, the DG is started again, and the load is powered and the battery is charged at the same time to improve the fuel combustion efficiency. This is the battery "Partial Charge" mode. Some customers hope that the scenario of mains + PV also has a battery cycle discharge mode. Tab 4-11 lists the parameters related to the battery cyclic discharge mode.

Tab 4-11 Parameters related to the battery cycle discharge mode

Parameter Name	Range	Default Value

Partial Charge Enable	0: Enabled / 1: Disabled	Disabled
Partial Charge Num	1-10	2
Partial Chg Start SOC	50-100	70
Partial Chg Start Voltage	Partial Chg Stop Voltage - Boost Voltage	51
Partial Chg End SOC	10-100	20
Partial Chg End Voltage	42 - Partial Chg Start Voltage	47.5

If the system is configured with a constant voltage type battery, the battery type should be set to "Mixed".

1) Keep "Solar Delta Voltage", "Load Shifting Enable", and "DG Power Priority" at their default values, and set "Partial Charge Enable" to "Enable". Controller will adjust the output voltage of the rectifier module to the value of "Partial Chg End Voltage" - 1V, allowing the green energy and battery to supply power to the load. When the bus voltage drops to "Cycle Discharge End Voltage" or the SOC is less than "Partial Chg End SOC", Controller will switch the battery to "Float Charge" mode and adjust the output voltage of the rectifier module to the "Float Voltage" to charge the battery. This enables the priority of energy supply: Green energy -> Battery -> Mains -> DG, as shown in Fig 4-11.

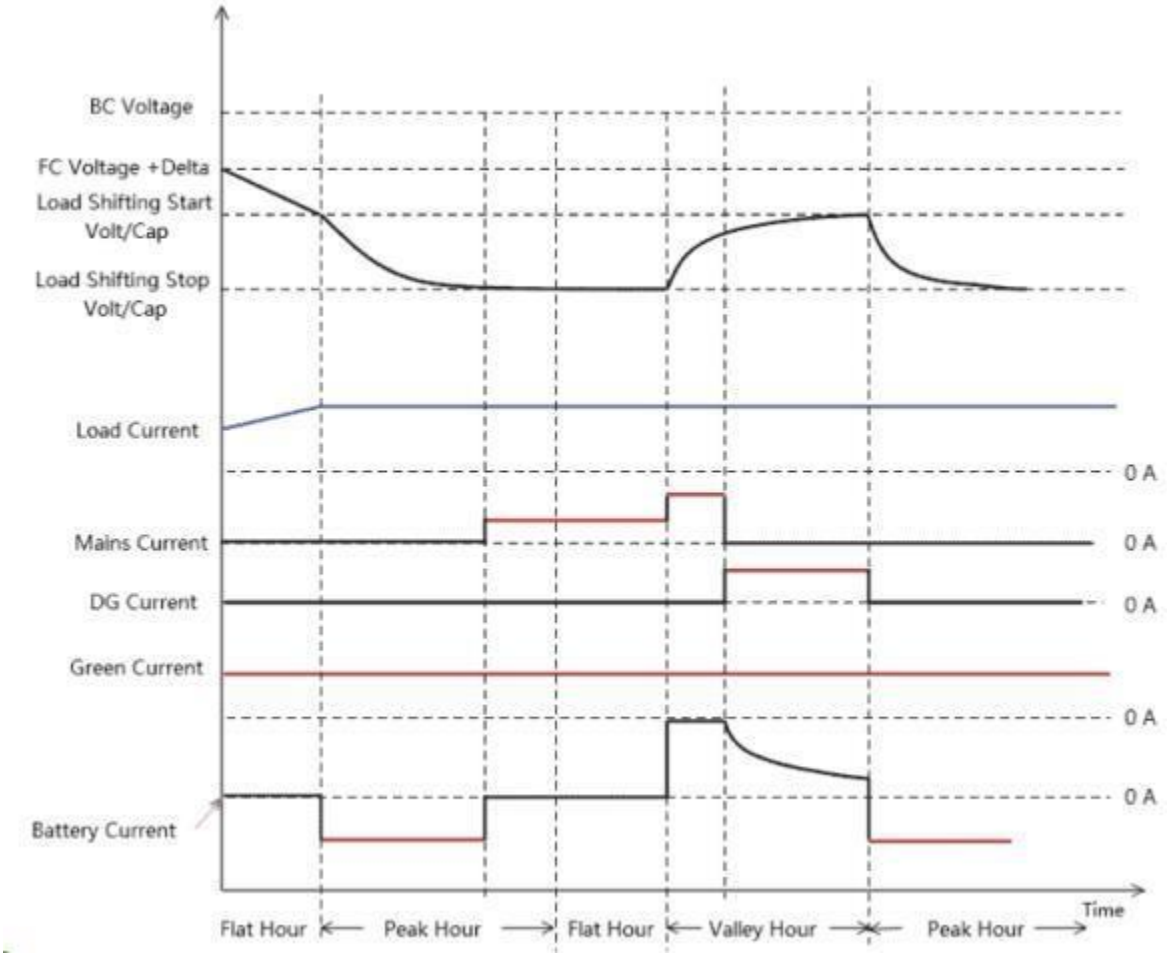

Fig 4-11 Green Energy -> Battery -> Mains -> DG Priority Diagram

2) Keep "Solar Delta Voltage" and "Load Shifting Enable" at their default values, set "Partial Charge Enable" to "Enable", set "DG Power Priority" to "Yes". Set "Partial Chg End Voltage" and "DG Start Voltage" to the same value. The green energy and battery will supply power to the load. When the "DC Volt" drops to the "D" or the SOC is less than the "DG Start SOC", Controller will start the generator.

This achieves the energy supply priority: Green energy -> Battery -> DG -> Mains (set the ATS to generator priority mode), as shown in Fig 4-12.

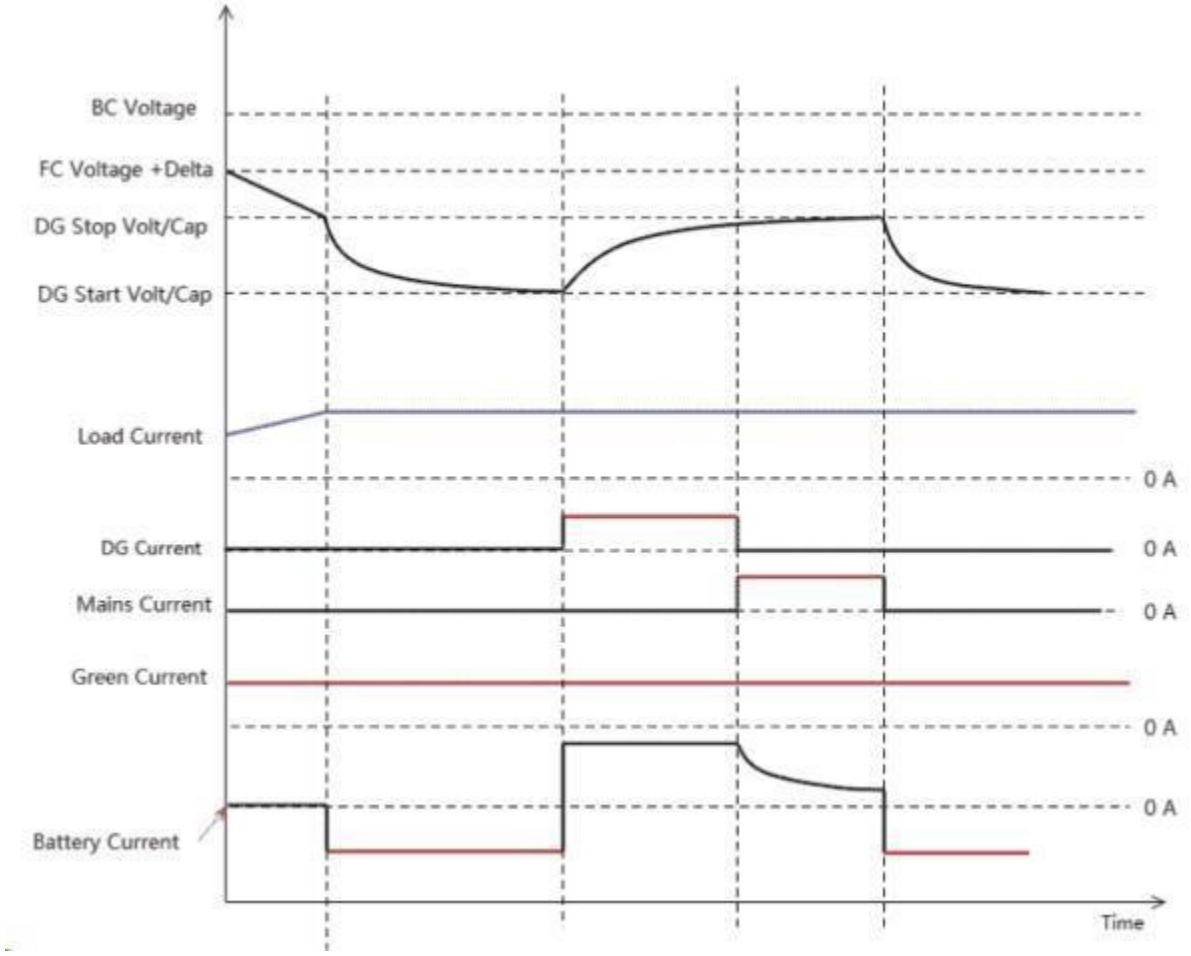

Figure 4-12 Green Energy -> Battery -> DG -> Mains Priority Diagram

Peak Shaving

There are different electricity rate standards for different AC input circuit breaker capacity. In order to reduce the overall operating cost, AC input power is strictly limited, and the "Peak Shaving" function comes into being. Tab 4-12 lists the parameters related to the Peak Shaving.

Tab 4-12 Peak Shaving related parameters

Parameter Name	Range	Default Value
Peak Shaving Enable	0:Enabled/1:Disabled	Disabled
AC Rated Capacity	1.0~999.0	200 kW
AC CB Rated Current	1~10000	500 A
AC CB Derated Coef	10~100	80 %
AC Rated Phase Voltage	60~300	220 V
Peak Shaving End SOC	15~90	30
Mixed Shaving End SOC	15~90	15
Peak Shaving LLVD Enable	0:Enabled/1:Disabled	Enabled

VPP Management

In order to provide different volumes of mains power for different times of day, the Controller provides VPP function, including an enhanced version of Peak Shaving. The VPP function is based on the mains capacity in different periods. The VPP function takes effect only when the mainspeak clipping function is enabled and the latest battery test is successful. Tab 4-13 lists the VPP parameters.

Tab 4-13 VPP Management related parameters

Parameter Name	Range	Default Value
VPP Enable	0:Enabled/1:Disabled	Disabled
VPP Period 1		0:00-0:00
VPP Period 2		0:00-0:00
VPP Period 3		0:00-0:00
VPP Period 4		0:00-0:00
VPP Period 1 Capacity	1.0~999.0	200 kW
VPP Period 2 Capacity	1.0~999.0	200 kW
VPP Period 3 Capacity	1.0~999.0	200 kW
VPP Period 4 Capacity	1.0~999.0	200 kW

ECO Management

The Controller module can control the switching of the rectifier module, adjust the rectifier module load rate, so that the system is in a better conversion efficiency to achieve energy saving; When the system is in the power saving state and at least one module is powered off, a Power Saving alarm is raised. The energy saving Fault alarm is raised for more than 10 times within 1 hour, and the energy saving Fault alarm is automatically cleared 12 hours later. The energy saving function is not started again within 12 hours unless the system restarts after a power failure.

In manual mode, the power saving management is not enabled. If you need to enable the power saving management, perform it in automatic mode.

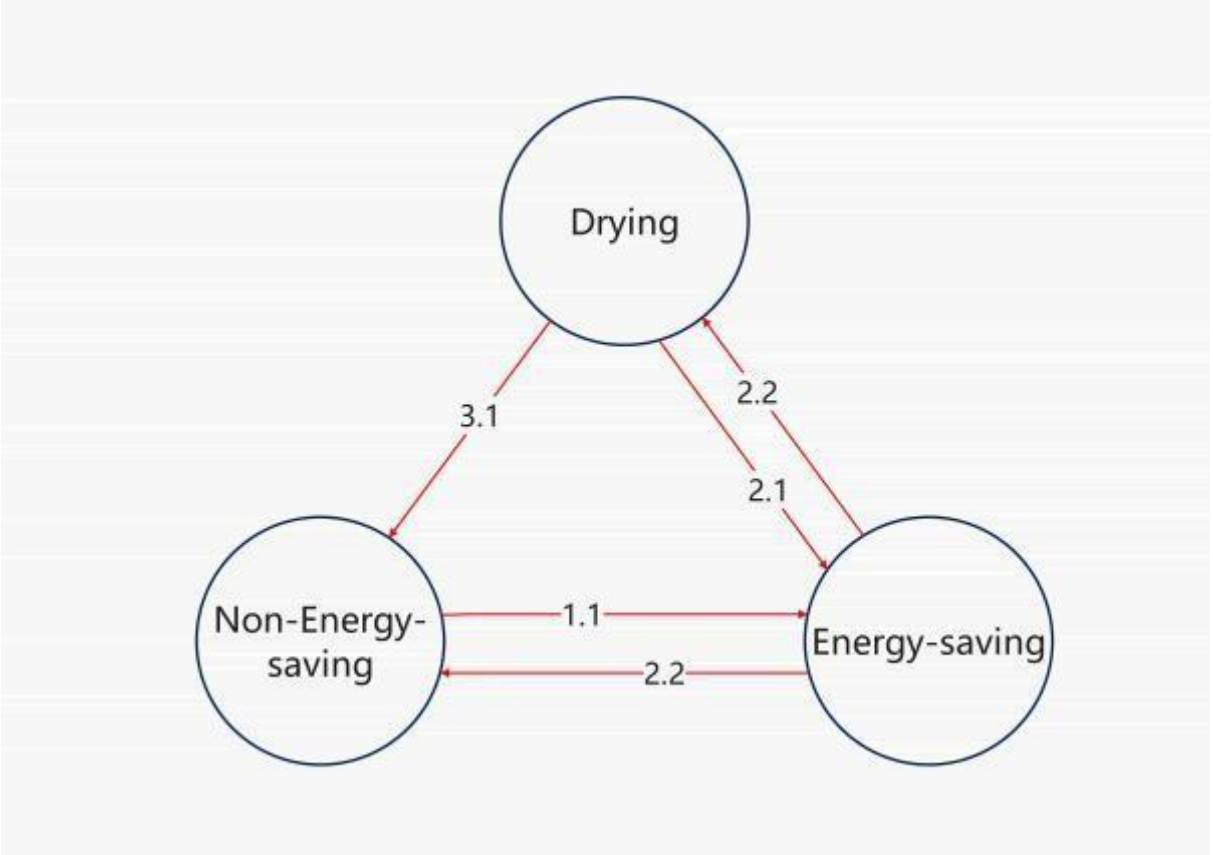

Fig 4-13 Power saving management state machine

Tab 4-14 Energy saving management status migration table

Previous State	Next State	Migration Conditions
Non-Energy-saving	Energy-saving	All of the following conditions must be met (AND relationship) to satisfy the energy-saving condition: 1. ECO enabled 2. Automatic control mode 3. AC input available (refer to 4.10.1 for details) 4. Battery not in test 5. No alerts from any rectifier modules 6. Battery not discharging 7. Battery fuse normal 8. Battery not de-energized 9. No undervoltage on main bus 10. Battery not in pre-limiting current state during startup or AC input limit state 11. Energy-saving fault delay time reached
Energy-saving	Non-energy-saving	Any of the following conditions must be met (OR relationship): 1. Energy-saving enable set to disable (energy-saving failure count cleared) 2. Switched to manual mode (energy-saving failure count cleared) 3. Energy-saving exception (refer to 4.9.3.5 for details)

Energy-saving	Drying	Period rotation allowed AND drying period reached
Drying	Energy-saving	Drying duration reached
Drying	Non-energy-saving	Any of the following conditions must be met (OR relationship): 1. Energy-saving enable set to disable (energy-saving failure count cleared) 2. Switched to manual mode (energy-saving failure count cleared) 3. Energy-saving exception (refer to 4.9.3.5 for details)

DG Management

The DG Status can be set on LCD and Web. Controller allows the DG management.

Tab 4-15 DG management state transition table

Previous State	Next State	Energy Priority	Migration condition

DG Stop	DG Run	Green energy -> Battery -> DG -> Mains Green energy -> DG -> Mains -> Battery	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. The oil level is normal 3. Battery status is normal (see remarks) 4. DG priority 5. Insufficient green energy
		Green energy -> Mains -> DG -> Battery	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Configuration:Green energy -> Mains -> DG -> Battery 5. Insufficient green energy 6. Mains power outage (ATS signal)
		Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Daily Control: Enabled 5. Daily start time reached

	Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Monthly Control: Enabled 5. Monthly start date reached 6. Monthly start time reached
	Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Mains power outage (ATS signal) 5. The battery is in a cyclically uniform state before the AC power failure
	Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Mains power outage (ATS signal) 5. Battery discharge 6. Voltage start enable 7. Main bus voltage lower than battery priority termination voltage (formerly "DG start voltage")

		Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The DG DI、 DO、ATS is configured 2. Normal oil level 3. Battery status is normal (see remarks) 4. Mains power outage (ATS signal) 5. Battery discharge 6. Capacity start enable 7. Battery capacity lower than battery priority termination capacity (formerly "DG start capacity")

DG Run	DG Stop	Regardless of the priority	The DG DI、DO、ATS is not configured
		Regardless of the priority	DG running time timeout protection time(Except for DG Power Priority)
		Regardless of the priority	Battery management status:Partial Charge or Load Shifting
		Regardless of the priority	All of the following conditions are satisfied(" AND "relation): · Low oil level shutdown enabled · Low oil level warning
		Green energy -> Battery -> DG -> Mains Green energy -> DG -> Mains -> Battery	All of the following conditions are satisfied(" AND "relation): 1. AC power outage (<60V) 2. Delay 60s
		Green energy -> Battery -> DG -> Mains Green energy -> DG -> Mains -> Battery	All of the following conditions are satisfied(" AND "relation): 1. Mains Normal (ATS Signal) 2. The AC voltage is normal 3. Delay 60s
		Green energy -> Battery -> DG -> Mains Green energy -> DG -> Mains -> Battery	Green energy is abundant
		Green energy -> Mains -> DG -> Battery	Sufficient green energy or normal mains power (ATS signal)
		Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. If the DG is started by "Daily Control" 2. Not in "Daily Work Period"

Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. If the DG is started by "Monthly Control 2. Reaching "Monthly Work Duration"
Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. Capacity control: Enabled 2. Busbar voltage > DG Stop Voltage 3. Battery capacity > DG Stop SOC 4. Delay > DG Stop Delay
Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. Current control: Enabled 2. Busbar voltage > DG Stop Voltage 3. Battery Current > DG Stop Current, and Battery current > -2 4. Delay > DG Stop Delay
Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The AC voltage is normal 2. Mains Normal (ATS Signal) 3. Delay 30s

Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. DG run time > DG operational downtime(The default is 5min) 2. The DG DI signal is a shutdown 3. AC power outage (<60V)
Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. DG run time > DG operational downtime(The default is 5min) 2. The DG DI signal is a shutdown 3. The AC voltage is normal 4. Delay 30s
Green energy - > Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. DG run time > DG operational downtime(The default is 5min) 2. The DG DI signal is a running 3. AC power outage (<60V) 4. Delay 120s

		Green energy -> Battery -> Mains -> DG Green energy -> Mains -> Battery -> DG	All of the following conditions are satisfied(" AND "relation): 1. The output of the rectifier module is the smallest (meet any of them: (1) the total output current of the rectifier module < the rated total current * 2% and the battery current > -2 (2) The total output current of the rectifier module < = the rated total current * 1% and the output of the PV module >total load) 2. Busbar voltage> target voltage [value when DG Power Priority: Min (DG Stop Voltage, Partial Charge Start Voltage) -0.5V, otherwise, value: DG Stop Voltage] 3. Number of PV working modules > 0 4. Delay > Rectifier Output Min Stop DG(default 10 min). Note: green energy is sufficient, turn off the DG

NOTE 1:

The abnormal battery status listed in Tab 4-15 indicates that the battery is in any of the following states or combinations:

1. Power-on transition (pre-current limiting) state
2. Test status
3. Peak discharge state
4. Priority discharge state
5. Constant current test state
6. Test the state of float charge transition (pre-current limit)

NOTE 2:

There is a difference between AC power failure and mains power failure. Ac power failure refers to the mains power failure and the oil engine

NOTE 3:

Non-intelligent oil control needs to use two DI, one DI to detect the oil machine running, another DI to detect the ATS state, and one to start and stop the oil machine DO control signal. In a pure oil engine scenario, the ATS is not configured. You can short-circuit the DI signal corresponding to the ATS.

Data Records

The controller can periodically record the key data information about the power system. For example, the controller records the system output voltage and the total load current every 5 minutes. Data records period can be set, and the part record content can also be set based on site requirements.

Tab 4-16 Data record definition

Record type	Save quantity	Preservation mechanism	LCD View	USB Export	Web View	Web Export
History Data	50000 pieces	The Controller is saved when the Controller is started, the alarm changes, or the historical data storage interval reaches 36,492 KB.	×	√	√	√
History Alarm	200,000 pieces	If any active alarm is cleared, the storage space is expected to be 6,360 KB.	√	√	√	√
History Event	100,000 pieces	The Controller startup, parameter change, manual control, Controller software update, Controller software rollback, power module front software update, and power module rear software update occurred	√	√	√	√
Energy Log	1 year	When the event is recorded, the estimated space is 3,572K.	×	√	√	√
Work Time Log	1 year	One piece per day, with an estimated space of 4,929 K.	×	√	√	√
Charge Log	5000 pieces	One item per day and the estimated space is 56K.	×	√	√	√

Battery Test Log	5000 pieces	One charge record is saved for every equalized charge startup. One discharge record is saved for every battery discharge alarm. The estimated space occupied is 224 KB.	×	√	√	√
DG Log	5000 pieces	When the battery test starts, a test record is added. When the test ends,the test result, end time, end cause, and discharge capacity are updated. The required space is 288 KB.	×	√	√	√

LCD GUI

Buttons

Pages Structure

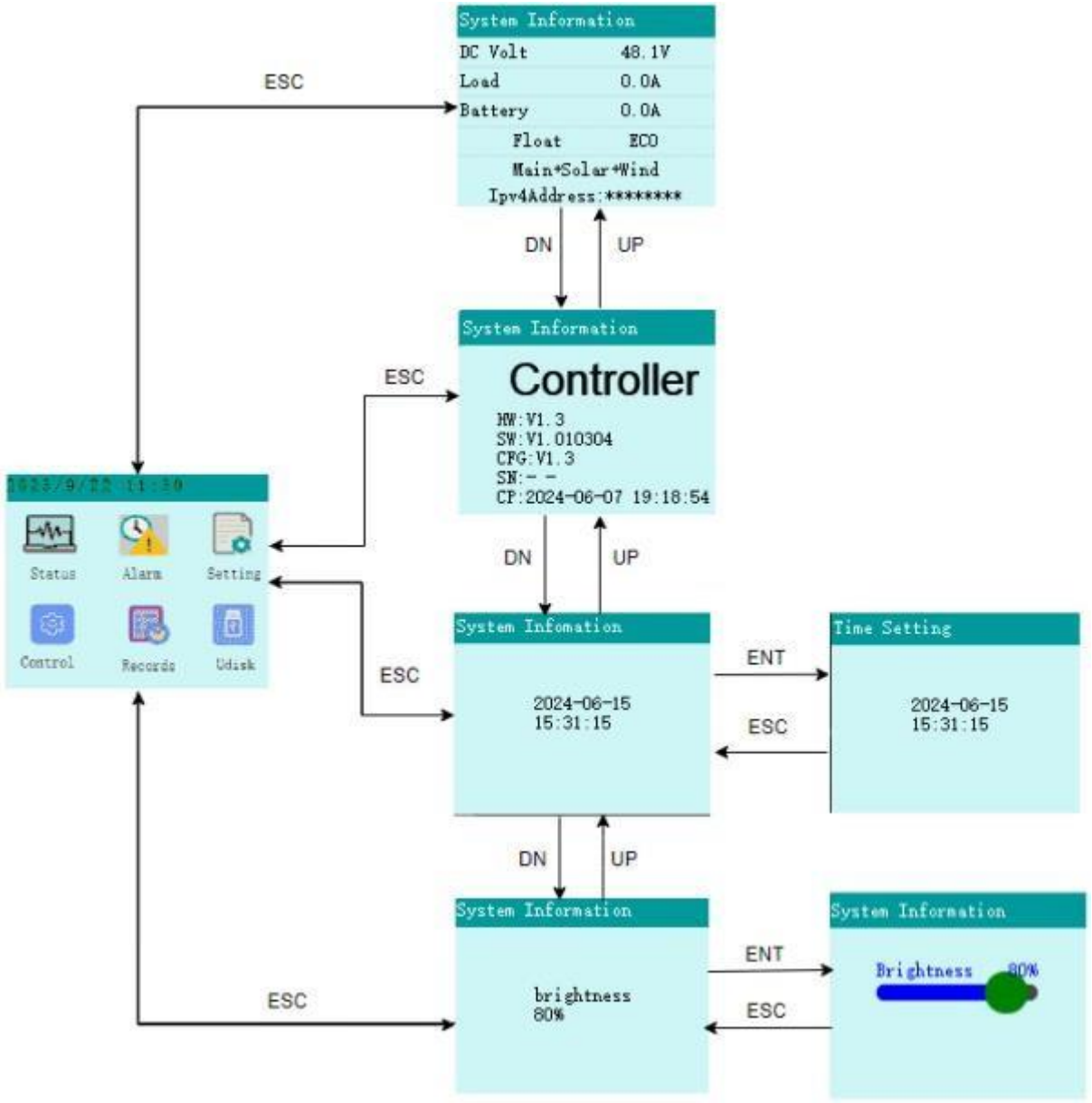

Fig 5-1 Home Page

Status Pages

Fig 5-2 Status

AC Input Status

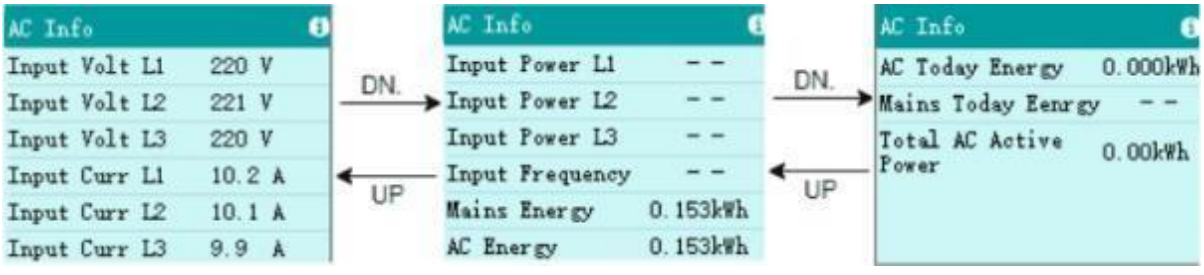

Fig 5-3 Three Phase

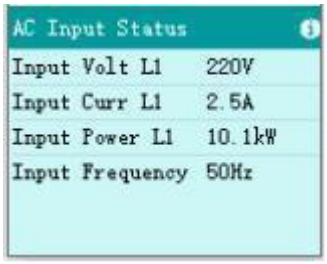

Fig 5-4 Single Phase

DC Input Status

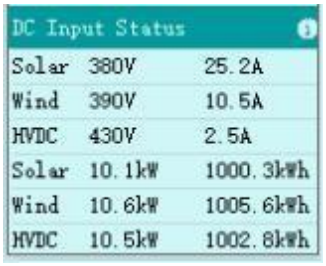

Fig 5-5 DC Input

Power Conversion Module Status

The power conversion module status is shown in Figure 5-6.

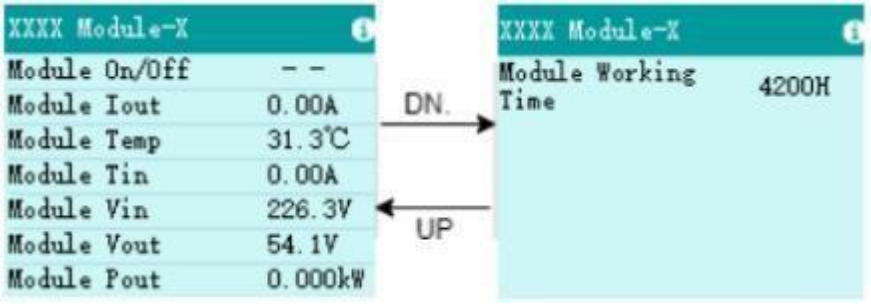

Fig 5-6 XXX Module

The inverter module status is shown in Figure 5-7.

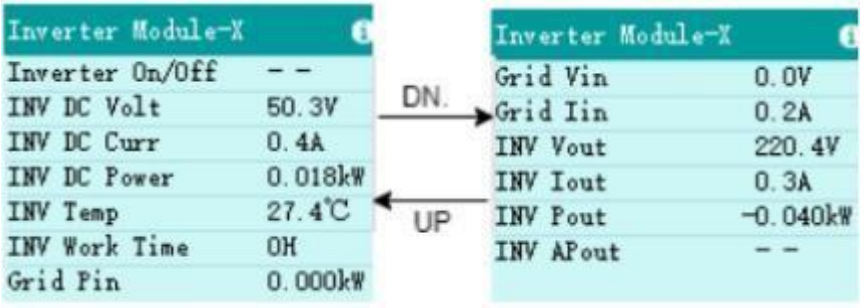

Fig 5-7 Inverter Module

Module Status

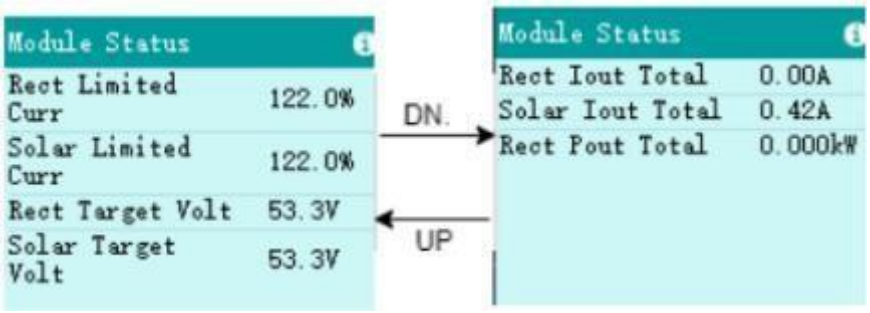

Fig 5-8 Module Status

Battery-x Status

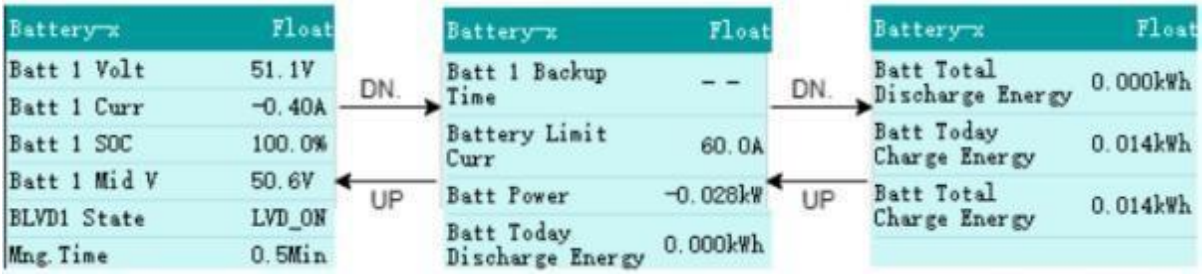

Fig 5-9 Battery-x

Li-Battery Status

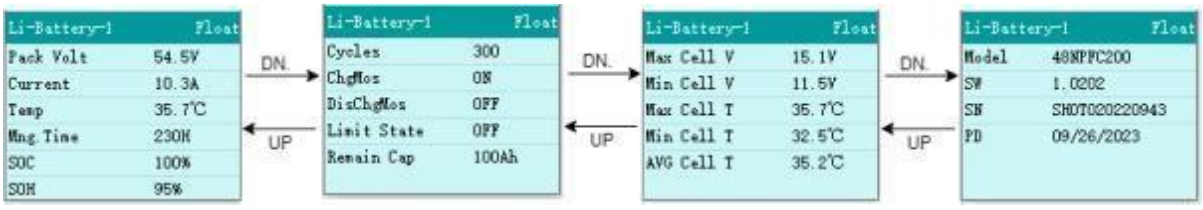

Fig 5-10 Li-Battery

Load Status

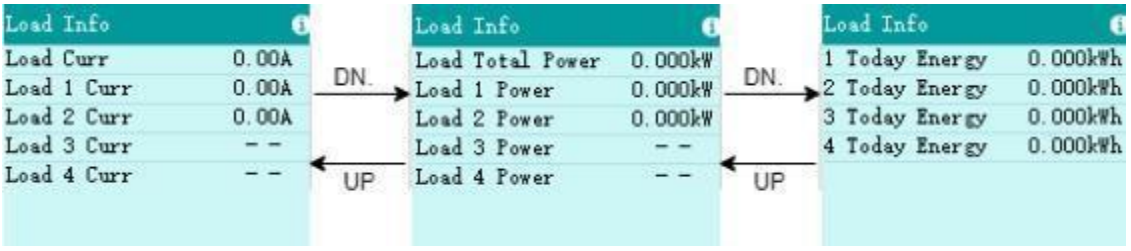

Fig 5-11 Load Status

DG Status

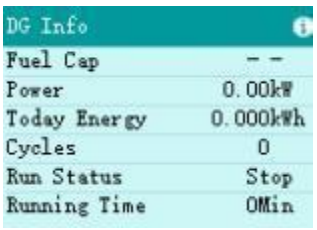

Fig 5-12 DG Status

Solar Status

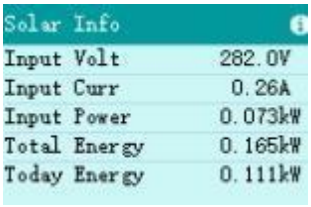

Fig 5-13 Solar Status

Wind Status

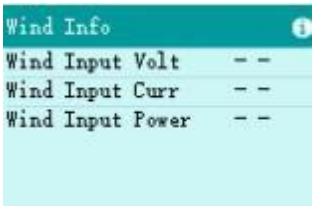

Fig 5-14 Wind Status

Ambient Status

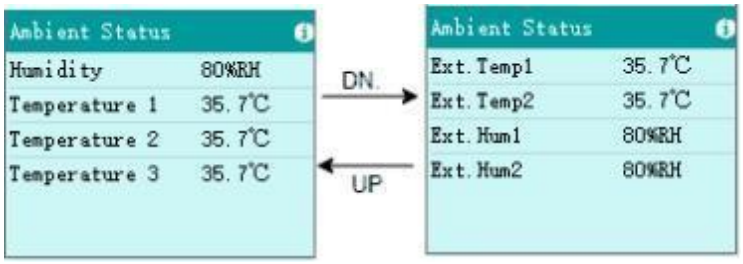

Fig 5-15 Ambient Status

Active Pages

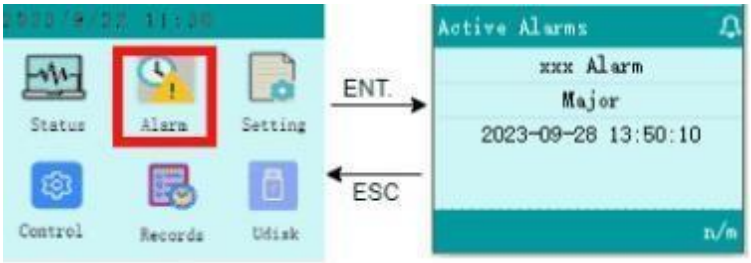

Fig 5-16 Active Alarm

Setting Pages

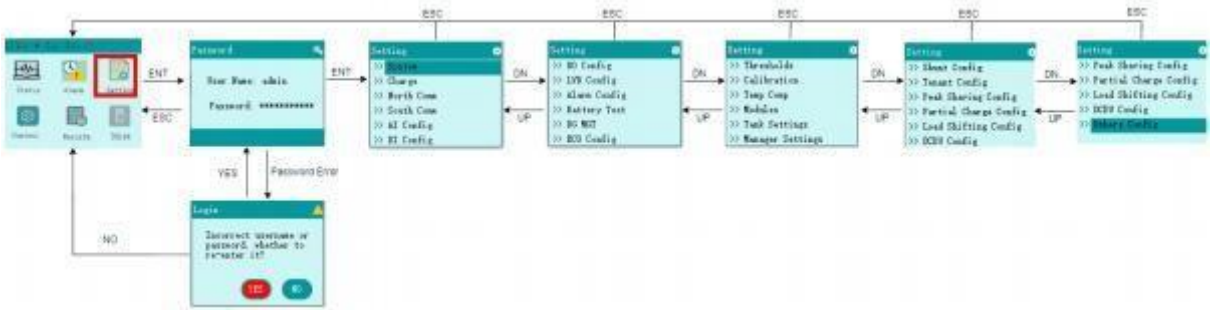

Fig 5-17 Setting

System

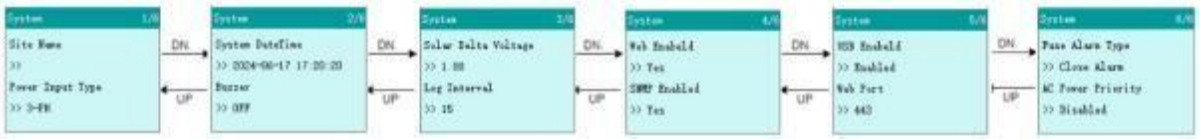

Fig 5-18 System

Charge

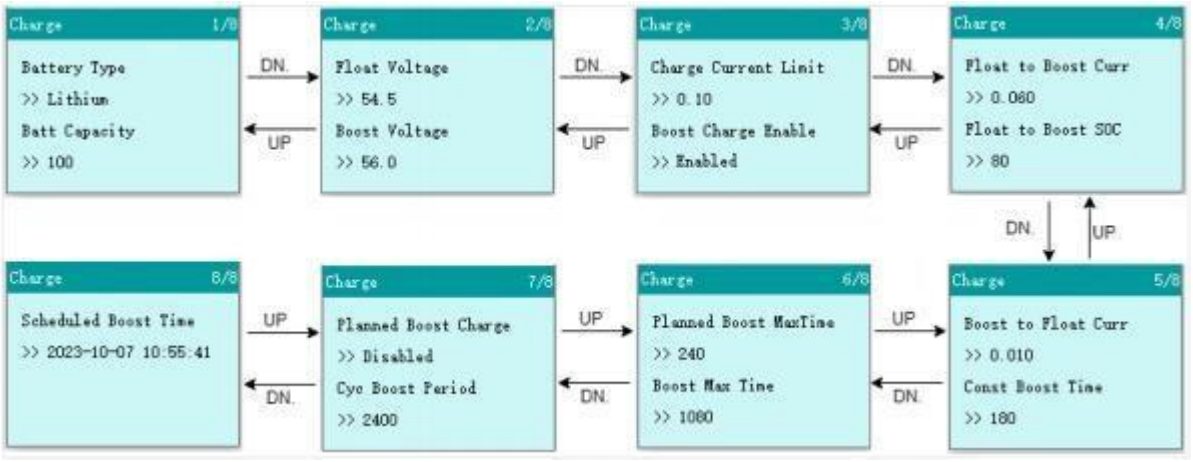

Fig 5-19 Charge

North Comm

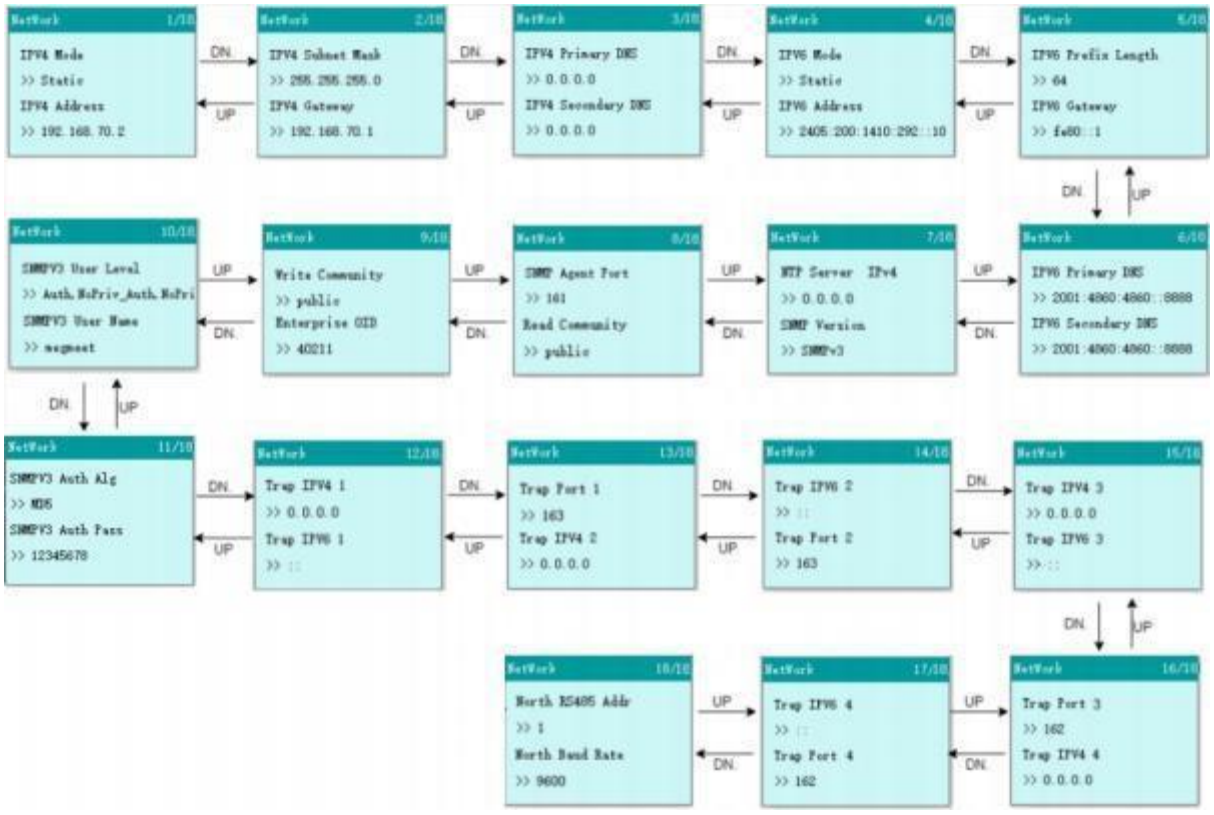

Fig 5-20 North Comm

South Comm

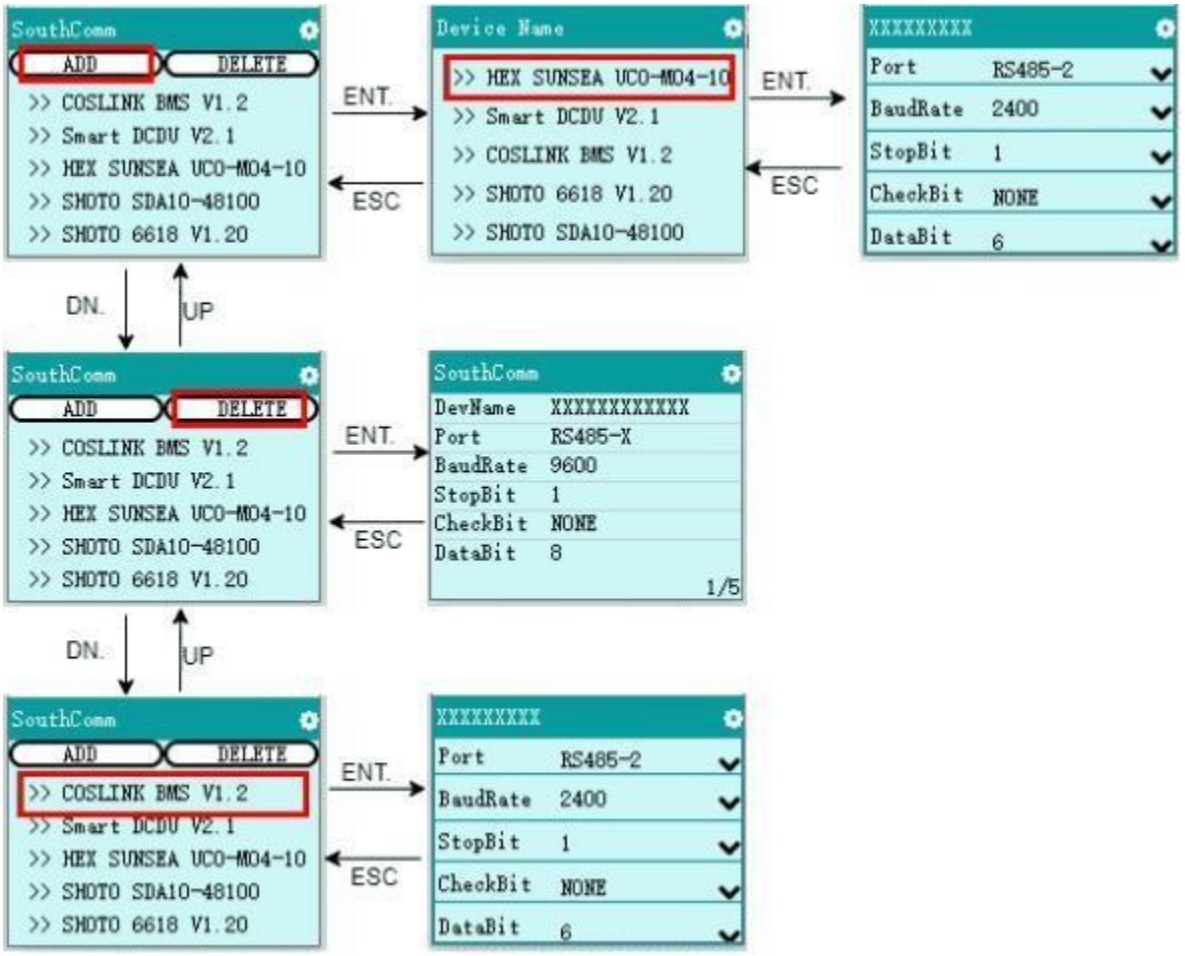

Fig 5-21 South Comm

AI Config

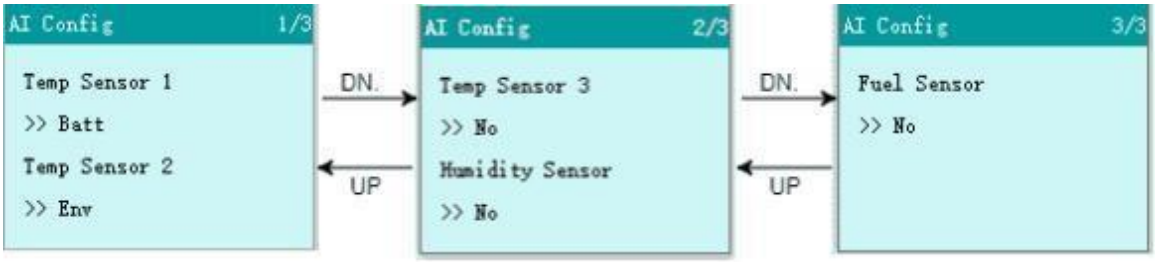

Fig 5-22 AI Config

DI Config

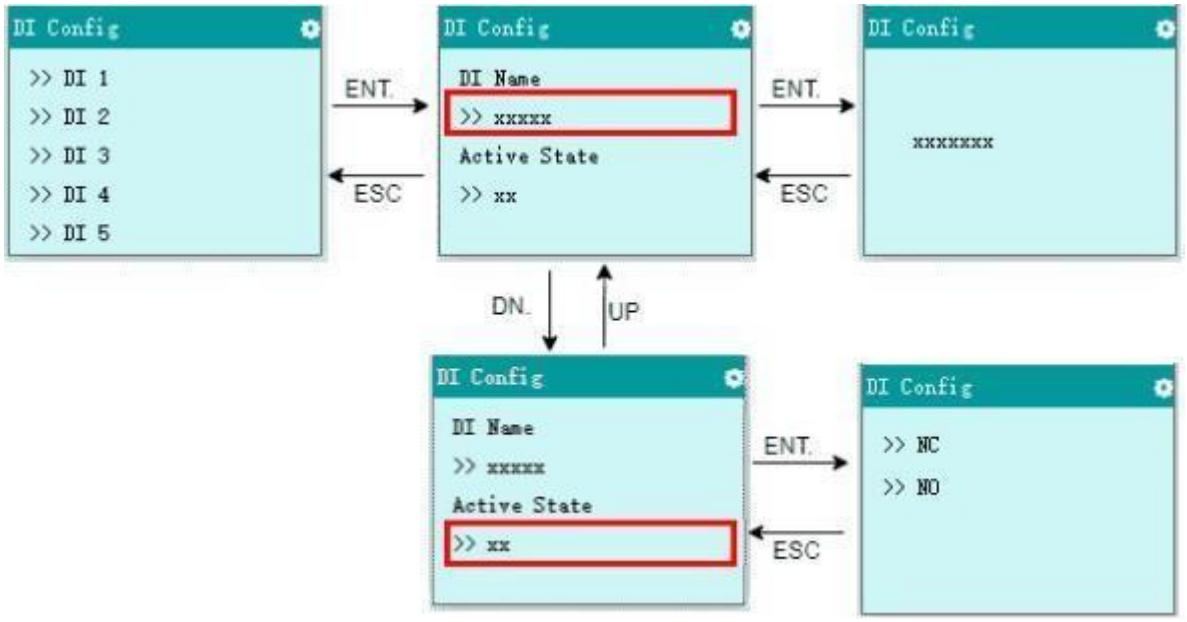

Fig 5-23 DI Config

DO Config

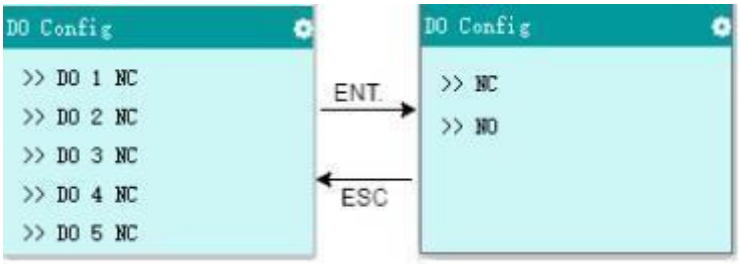

Fig 5-24 DO Config

LVD Config

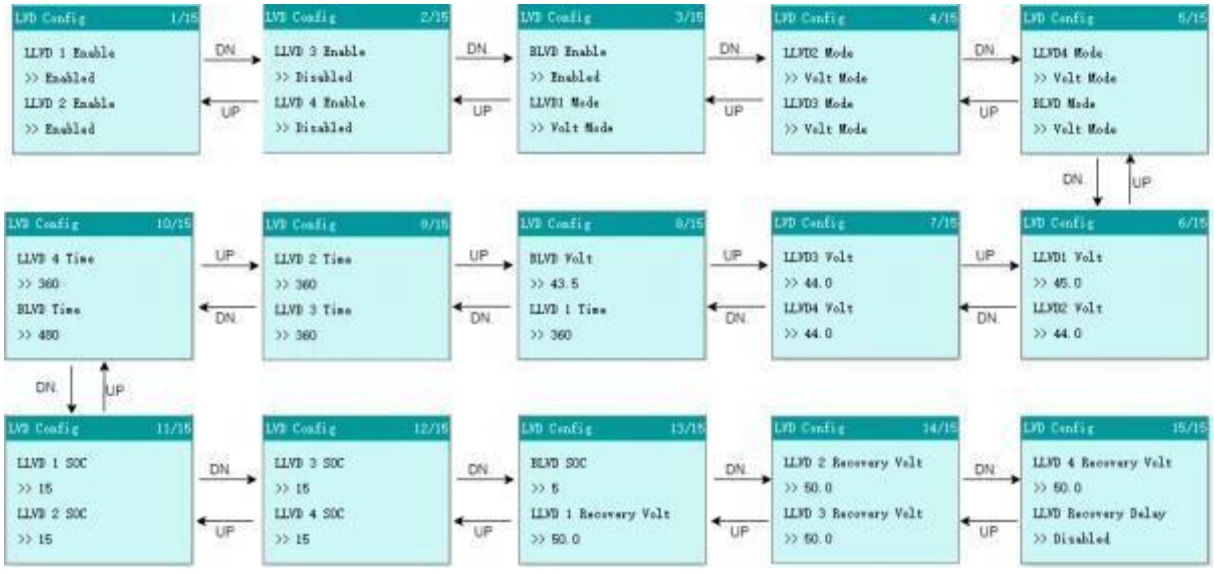

Fig 5-25 LVD Config

Alarm Config

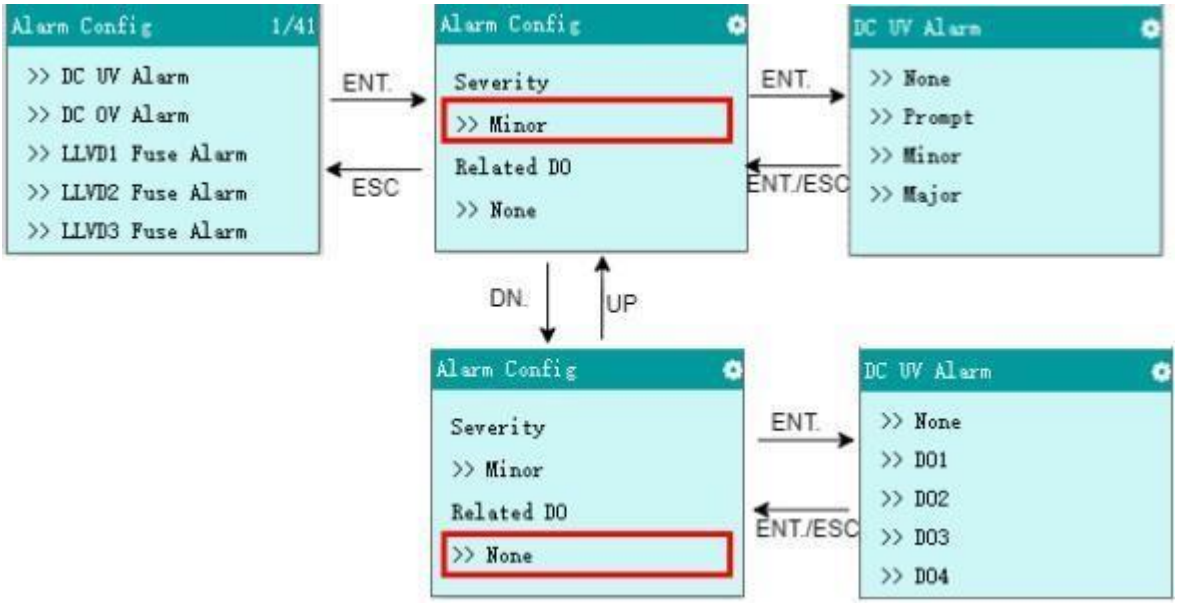

Fig 5-26 Alarm Config

Battery Test

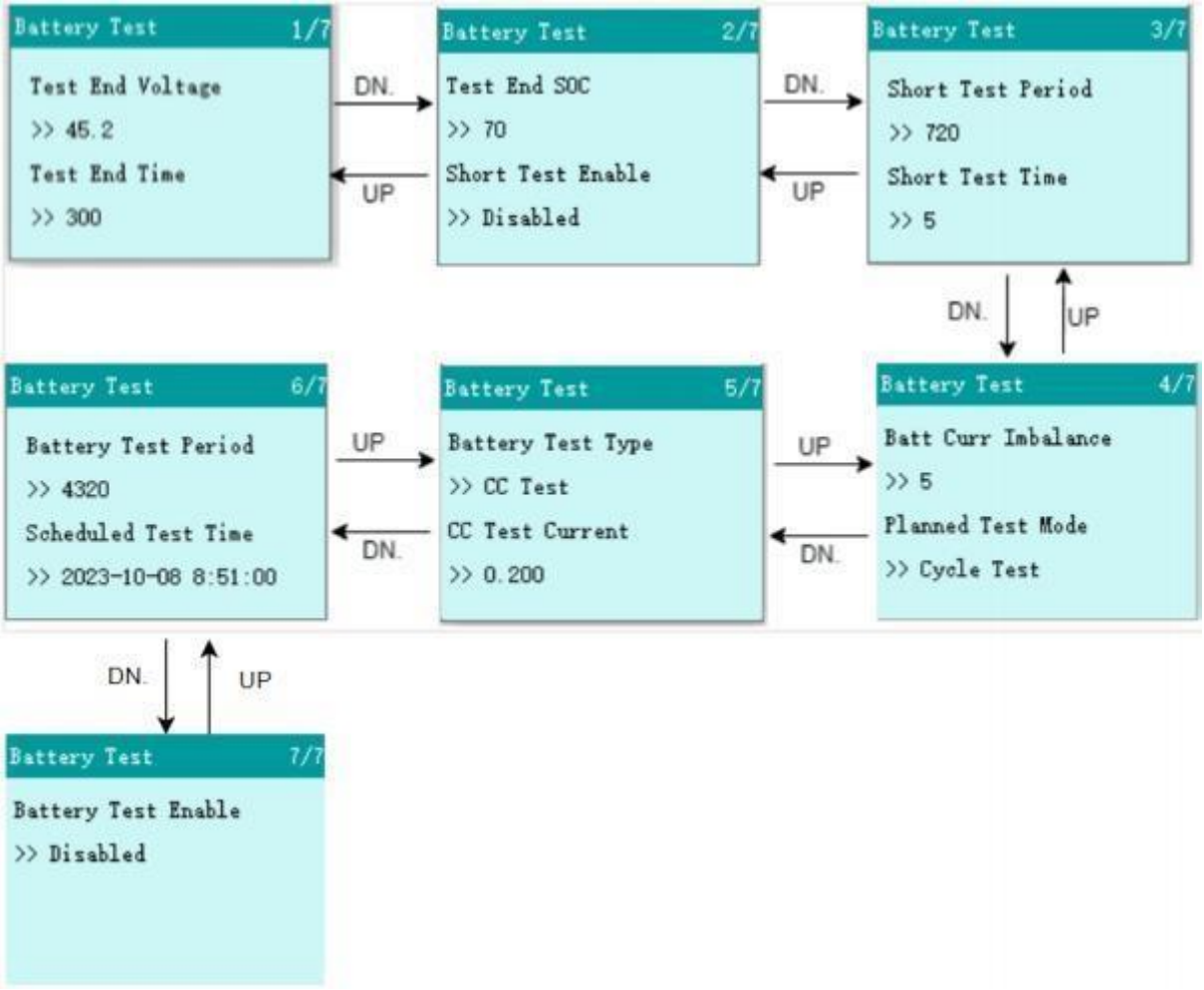

Fig 5-27 Battery Test

DG MGT

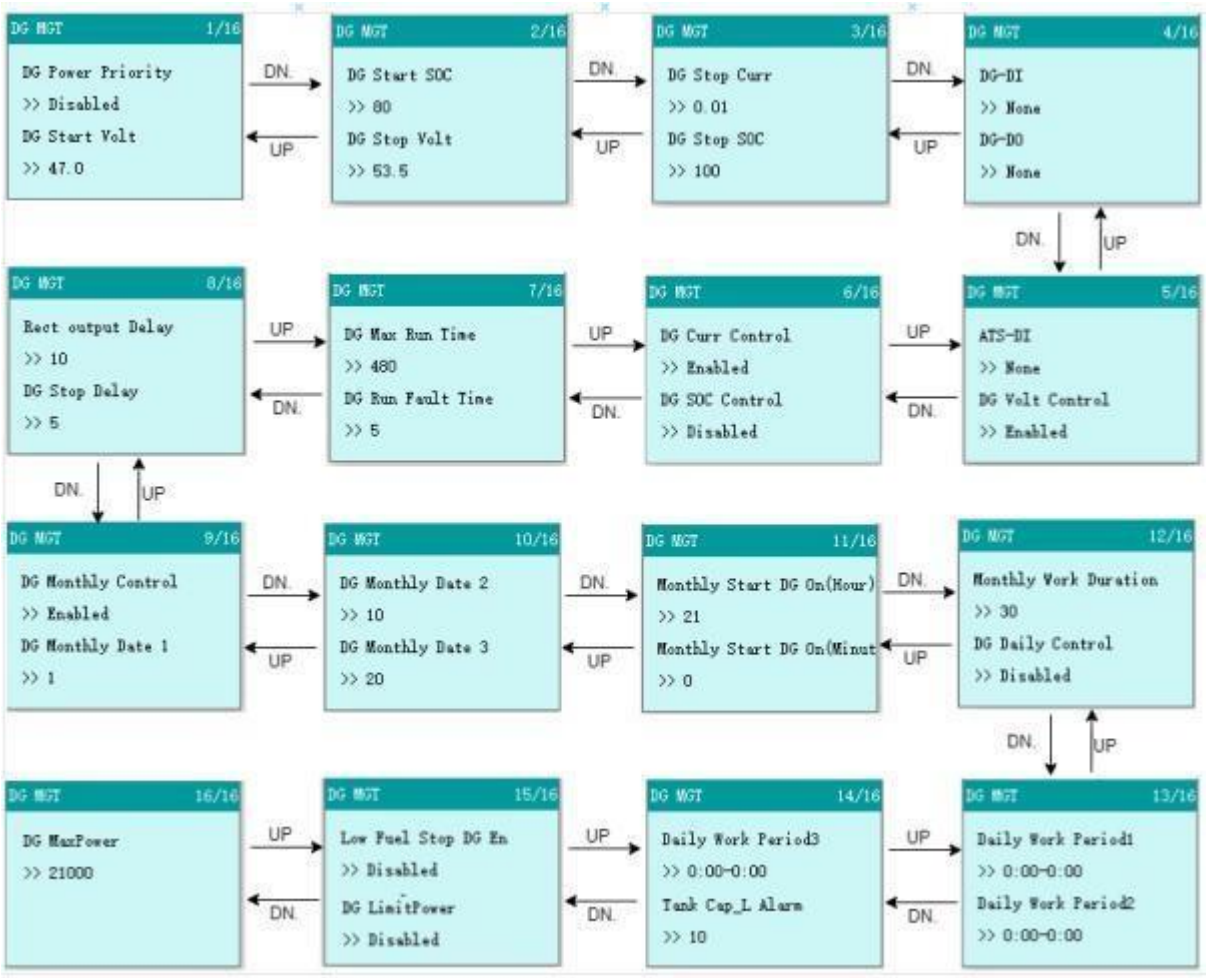

Fig 5-28 DG MGT

ECO Config

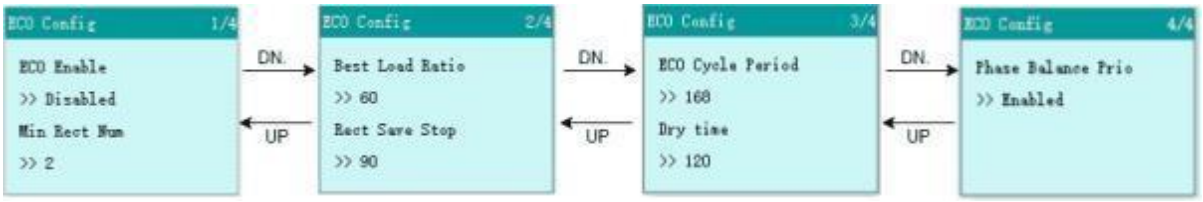

Fig 5-29 ECO Config

Thresholds

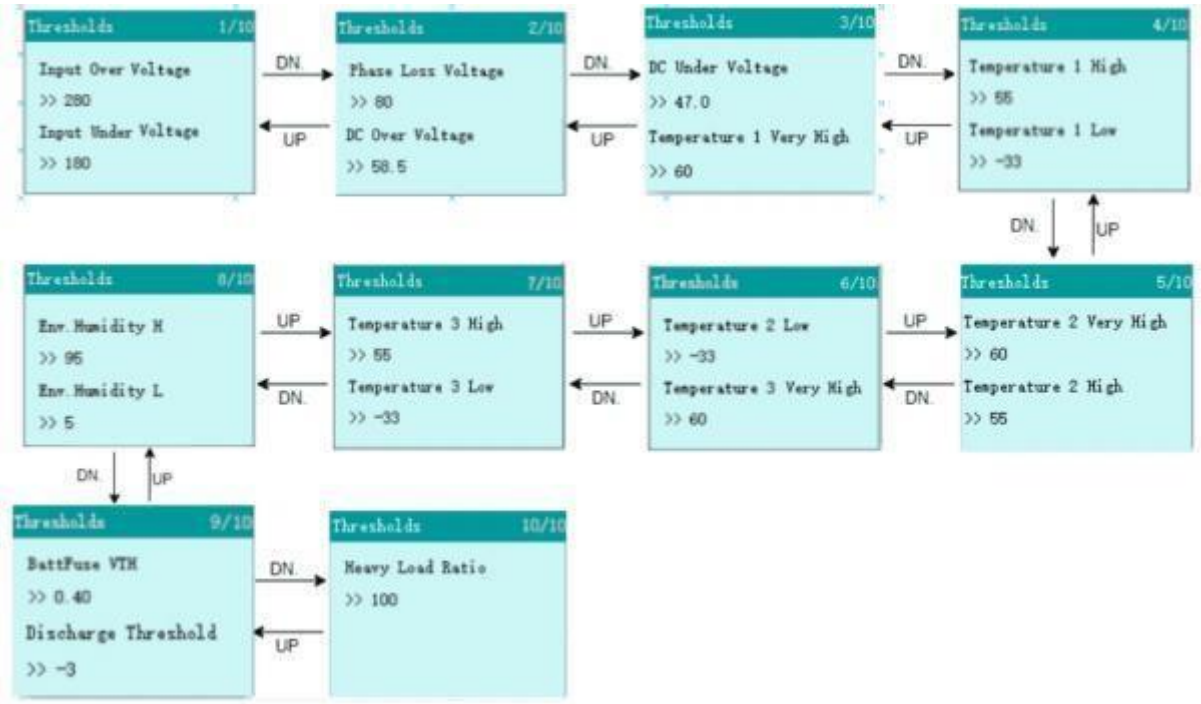

Fig 5-30 Thresholds

Calibration

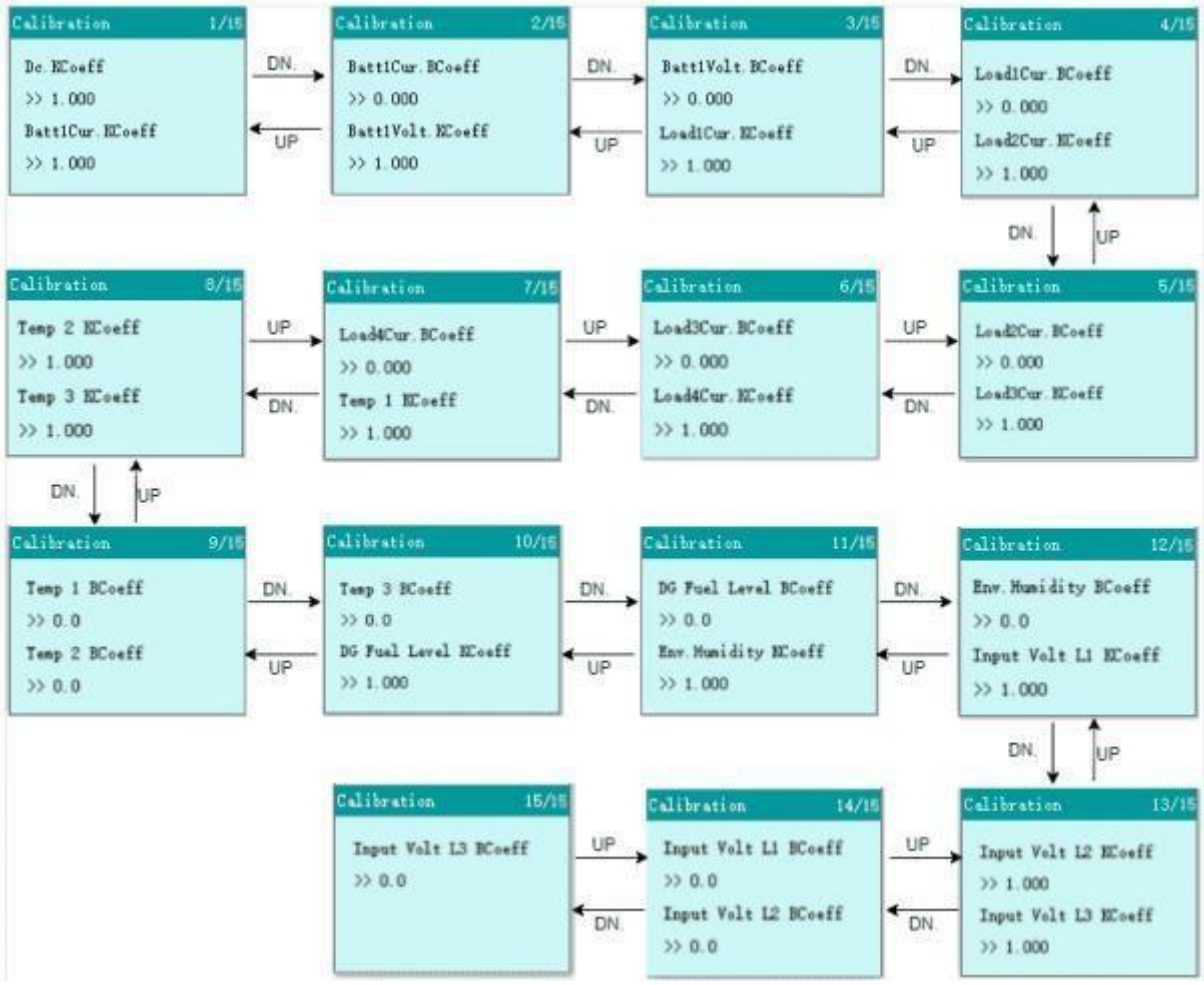

Fig 5-31 Calibration

Temp Comp

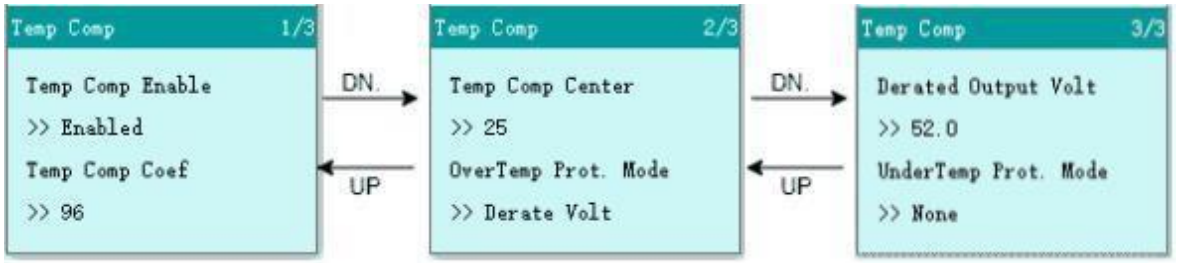

Fig 5-32 Temp Comp

Modules

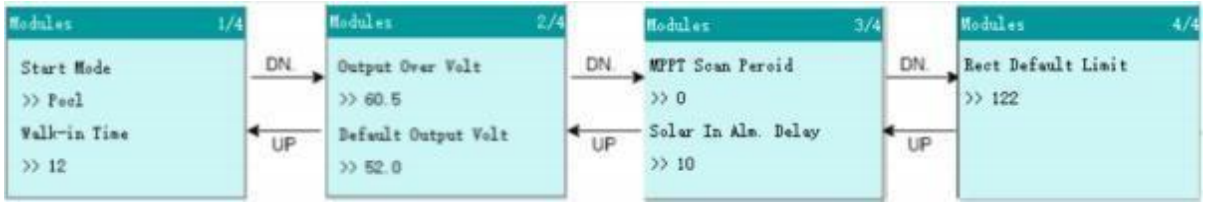

Fig 5-33 Modules

Tank Settings

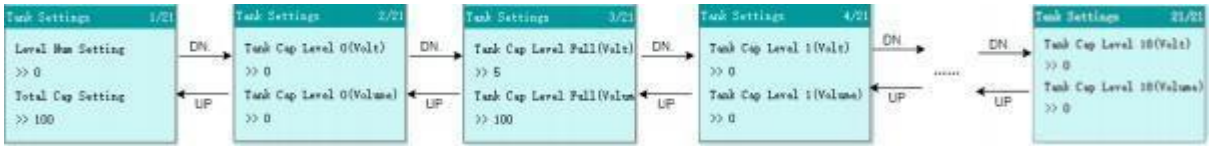

Fig 5-34 Tank Settings

Shunt Config

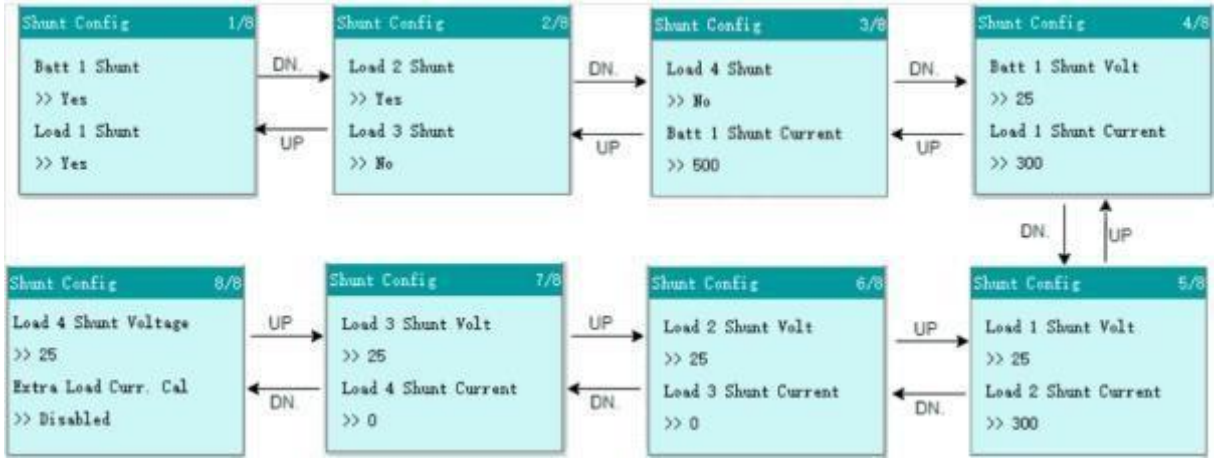

Fig 5-35 Shunt Config

Tenant Config

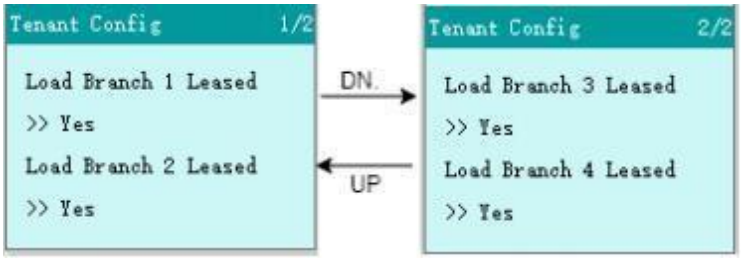

Fig 5-36 Tenant Config

Peak Shaving Config

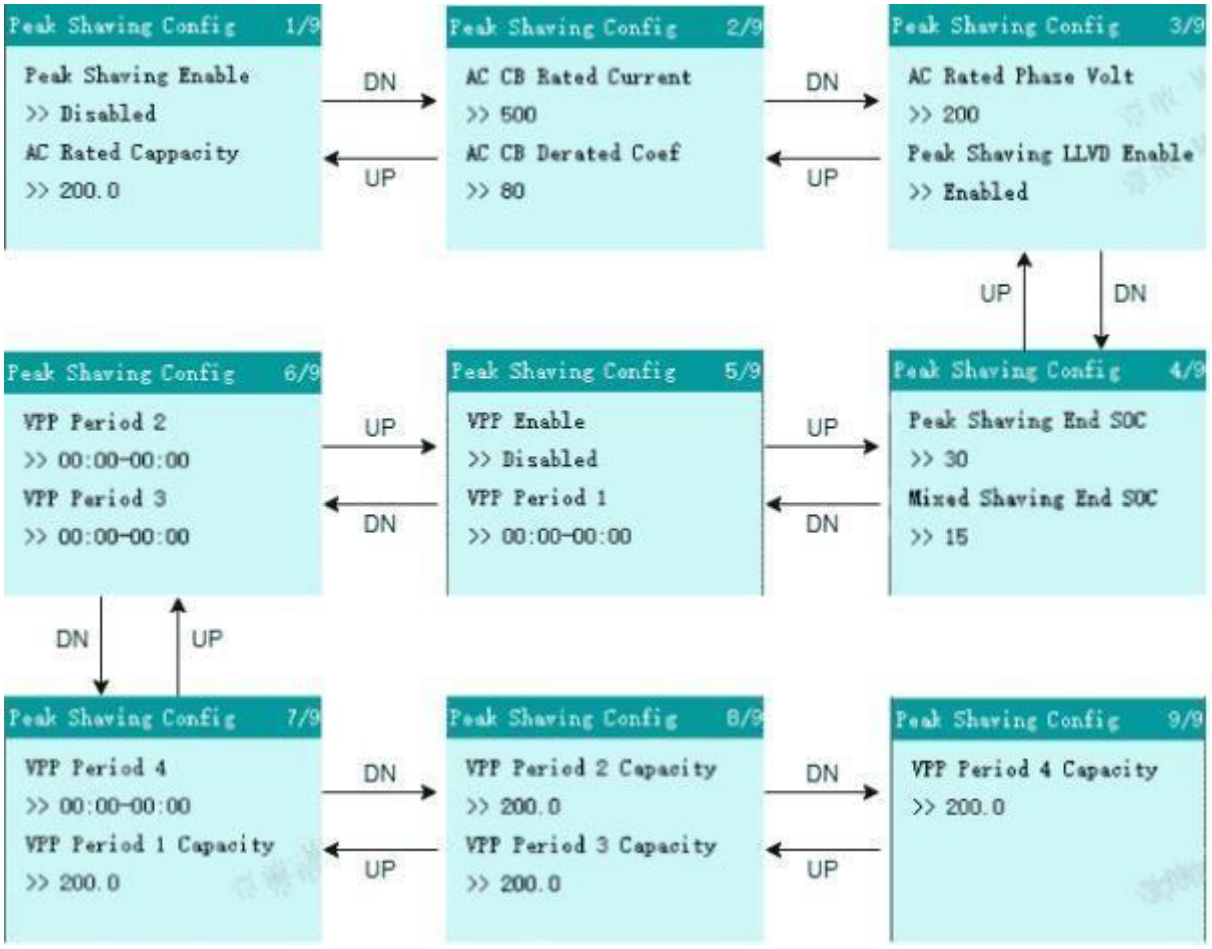

Fig 5-37 PeakShaving Config

Partial Charge Config

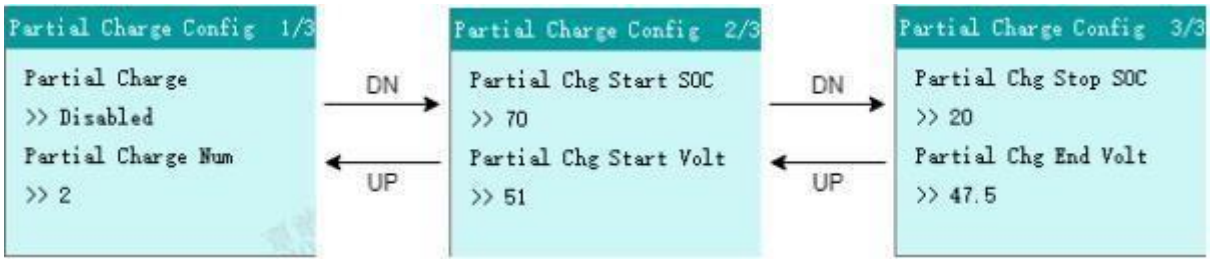

Fig 5-38 PartialCharge Config

Load Shifting Config

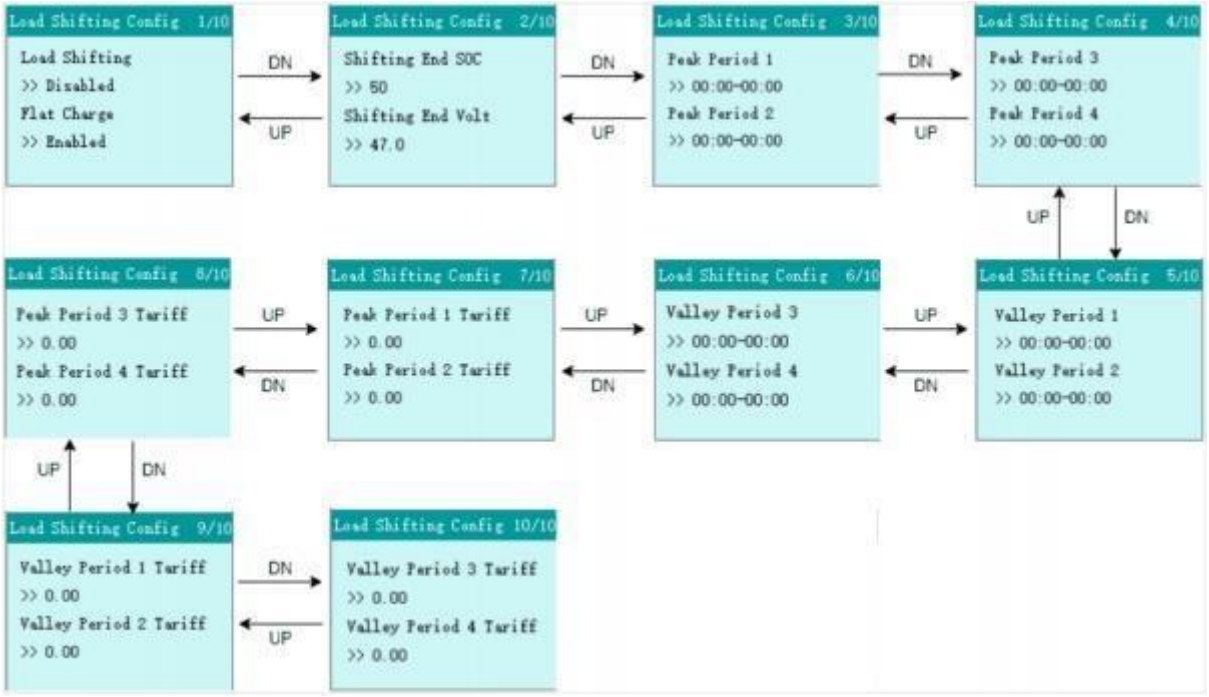

Fig 5-39 LoadShifting Config

DCDU Config

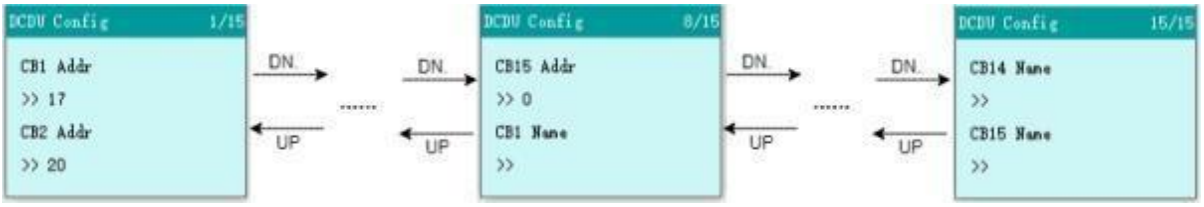

Fig 5-40 DCDU Config

Others Config

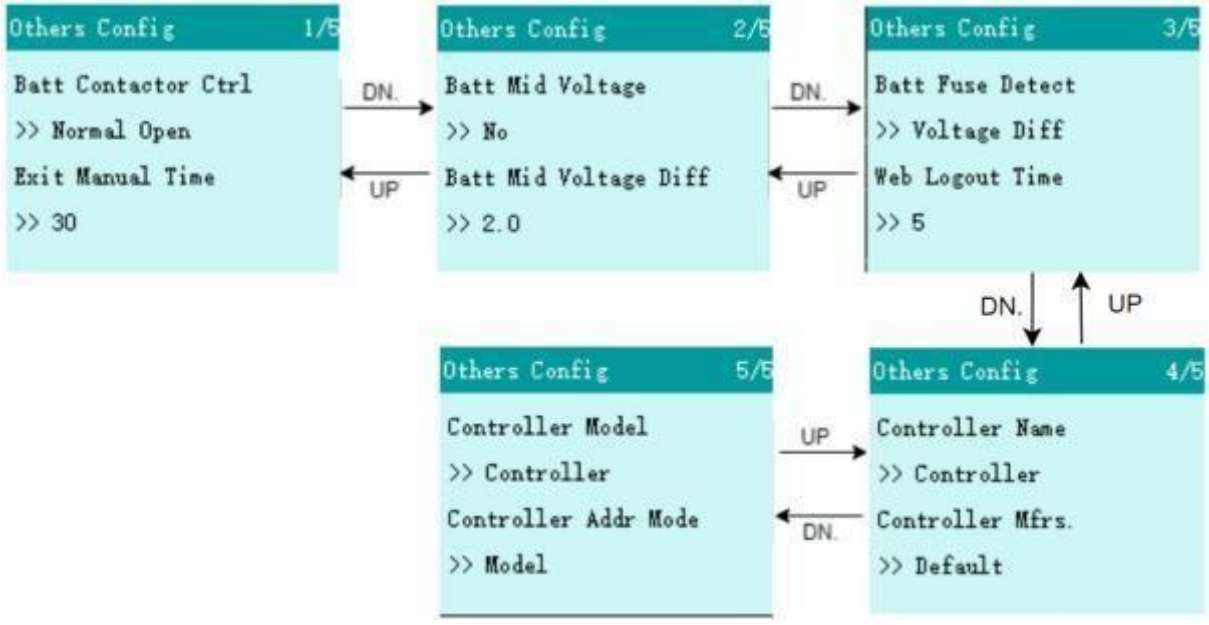

Fig 5-41 Others Config

Control Pages

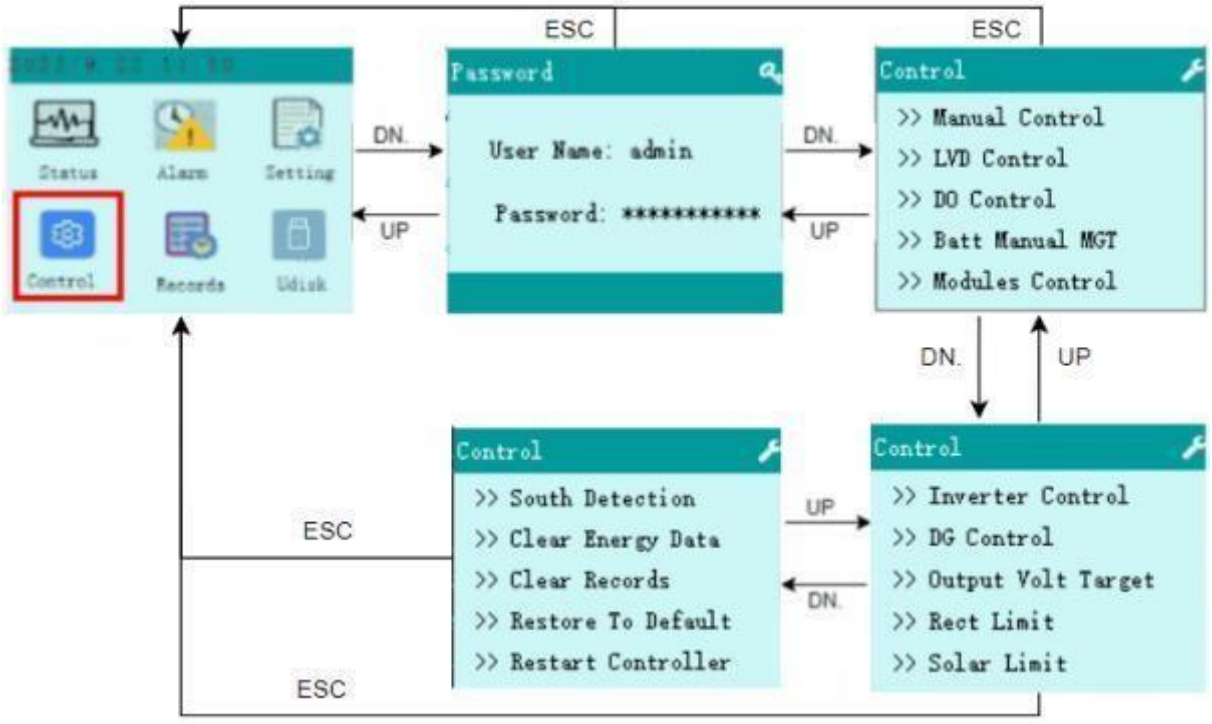

Fig 5-42 Control Pages

Manual Control

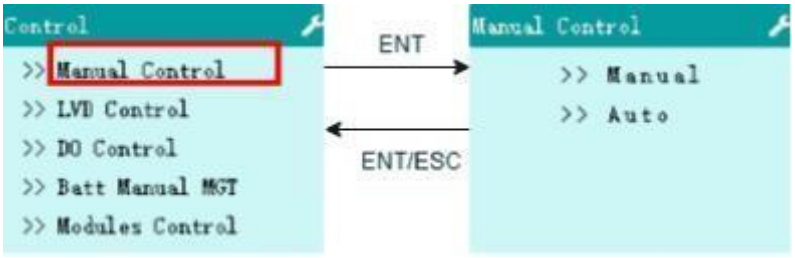

Fig 5-43 Control Mode

LVD Control

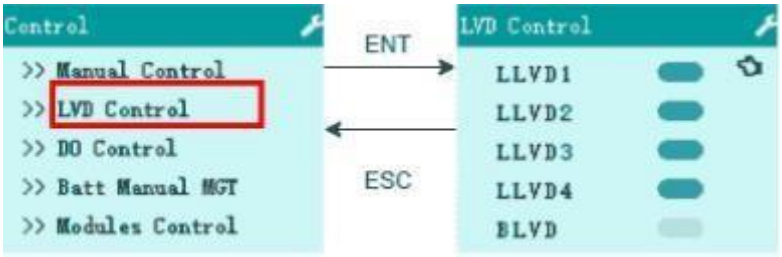

Fig 5-44 LVD Control

DO Control

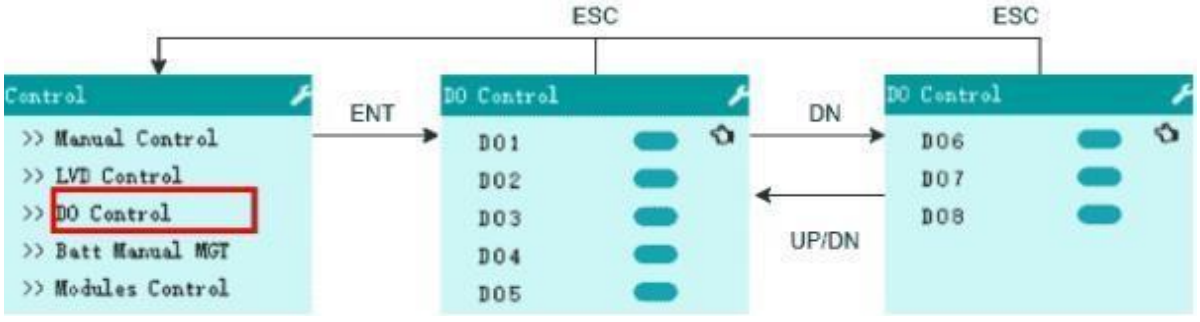

Fig 5-45 DO Control

Batt Manual MGT

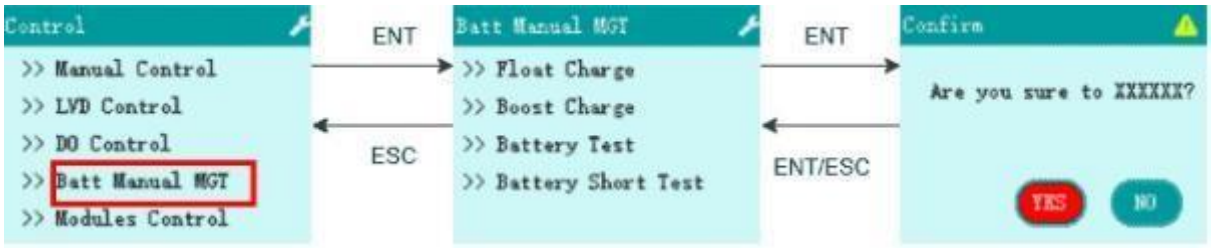

Fig 5-46 Batt Manual MGT

Modules Control

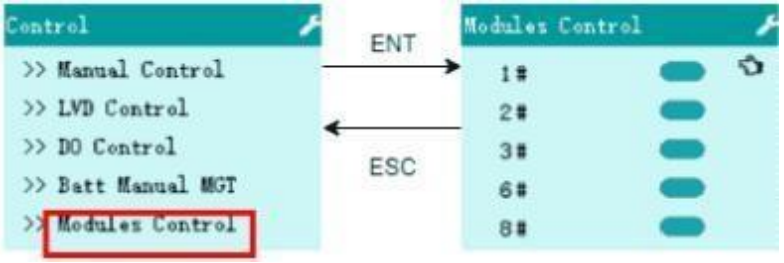

Fig 5-47 Modules Control

Inverter Control

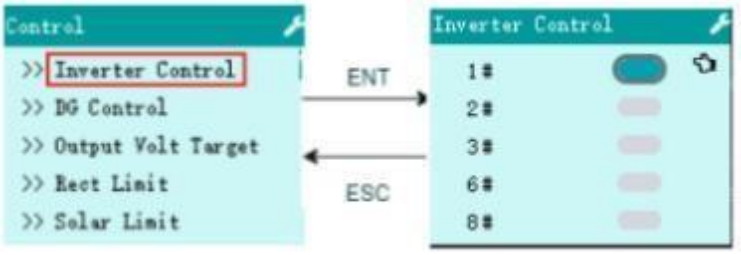

Fig 5-48 Inverter Control

DG control

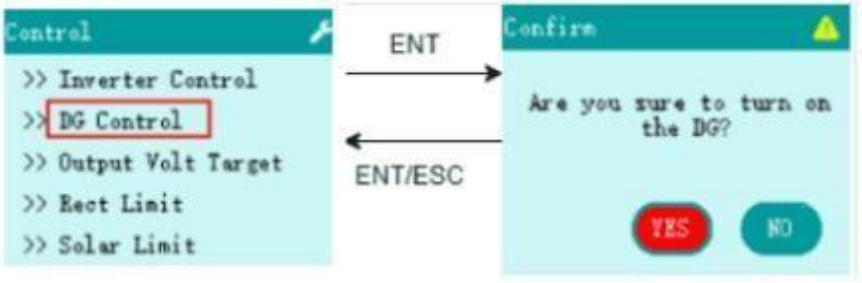

Fig 5-49 DG Control

Output Volt Target

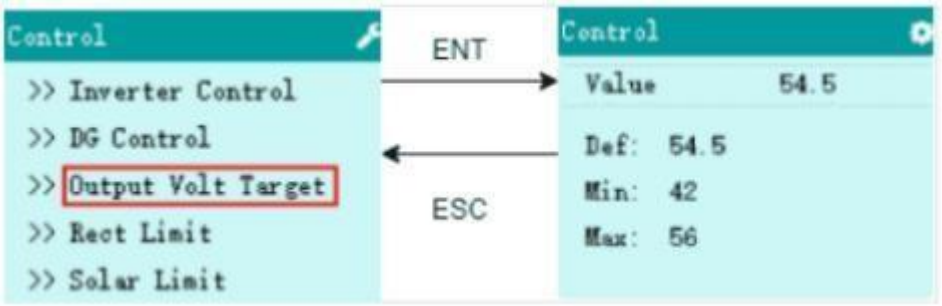

Fig 5-50 Output Volt Target

Rect Limit

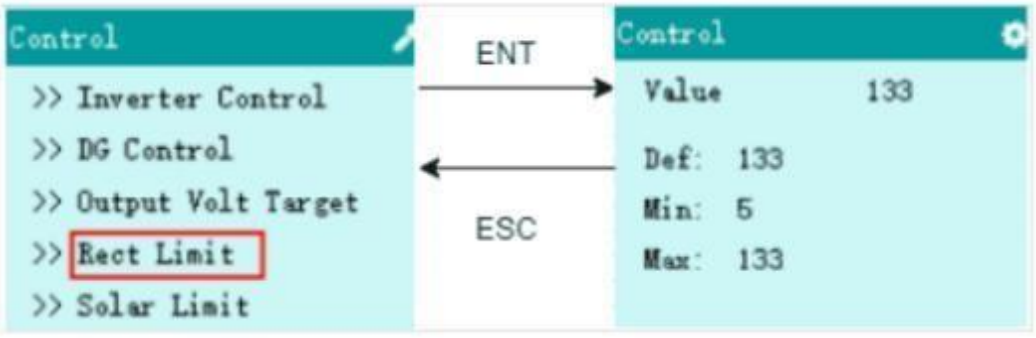

Fig 5-51 Rect Limit

Solar Limit

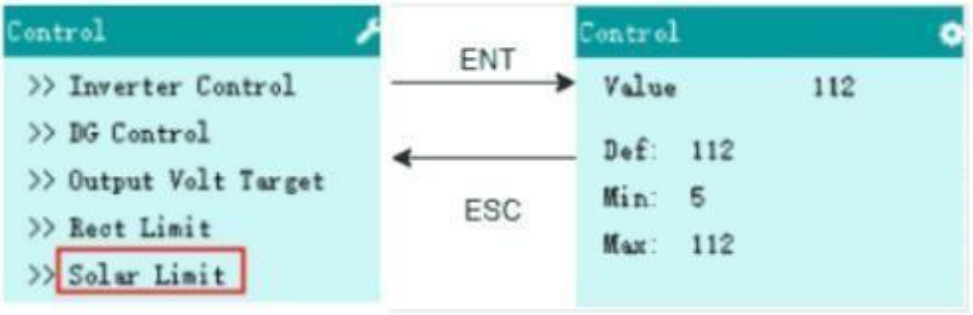

Fig 5-52 Solar Limit

South Detection

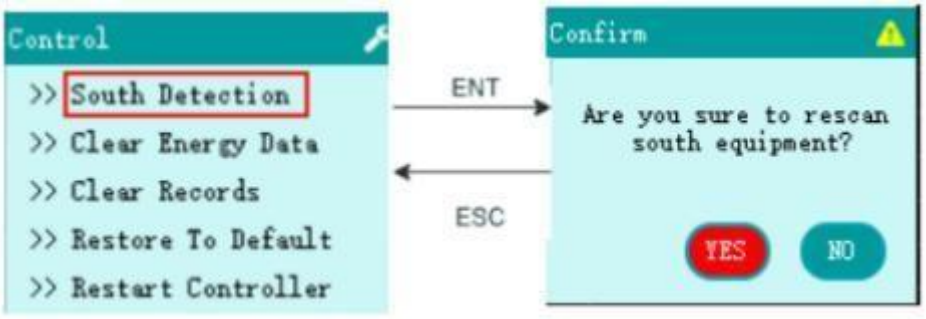

Fig 5-53 South Detection

Clear Energy Data

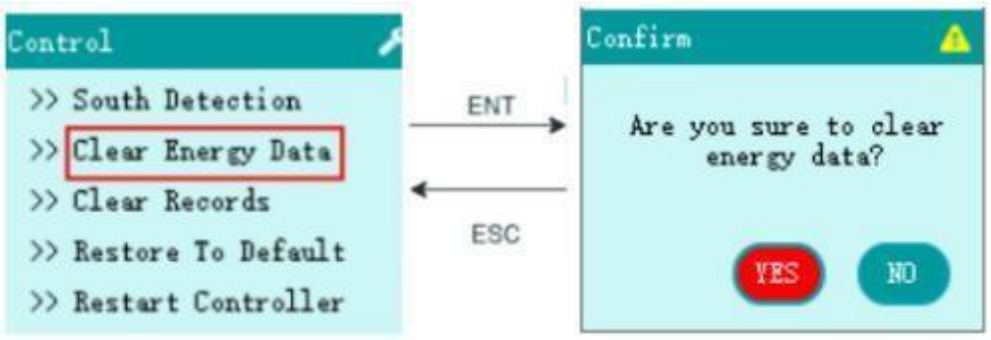

Fig 5-54 Clear Energy Data

Clear Records

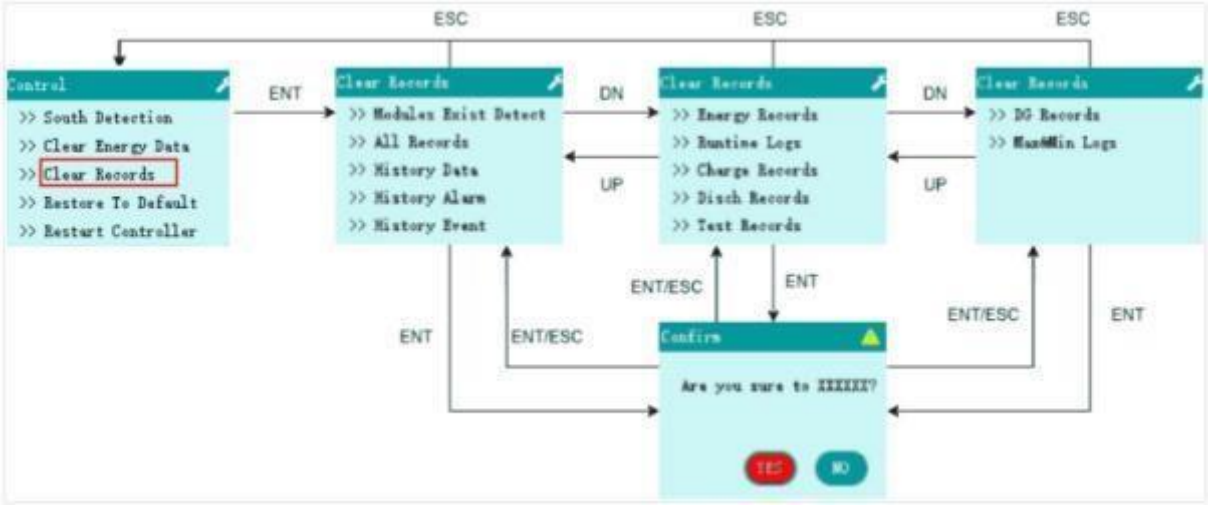

Fig 5-55 Clear Records

Restore To Default

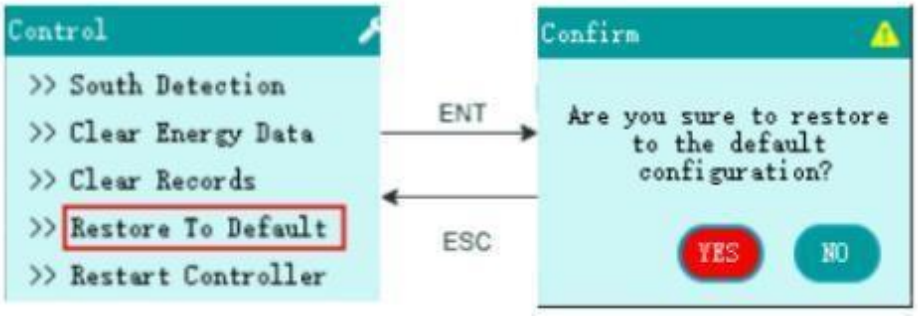

Fig 5-56 Restore To Default

Restart Controller

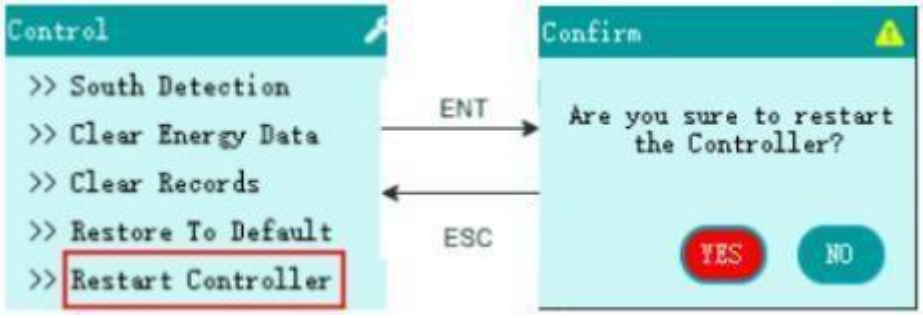

Fig 5-57 Restart Controller

Record Pages

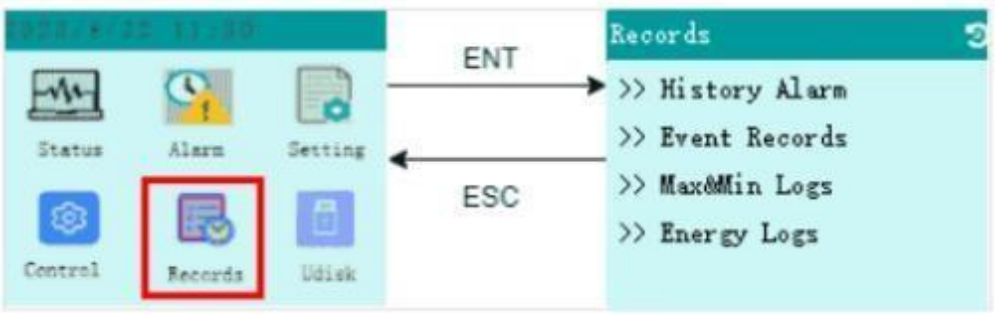

Fig 5-58 Record Pages

History Alarm

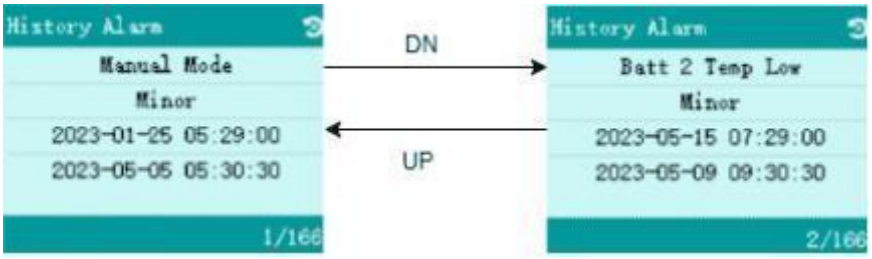

Fig 5-59 History Alarm

Event Records

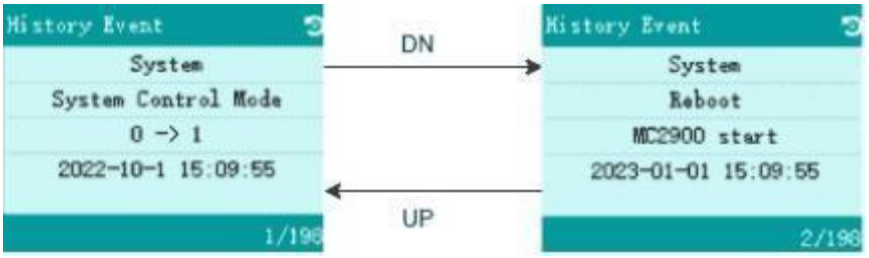

Fig 5-60 Event Records

Max&Min Logs

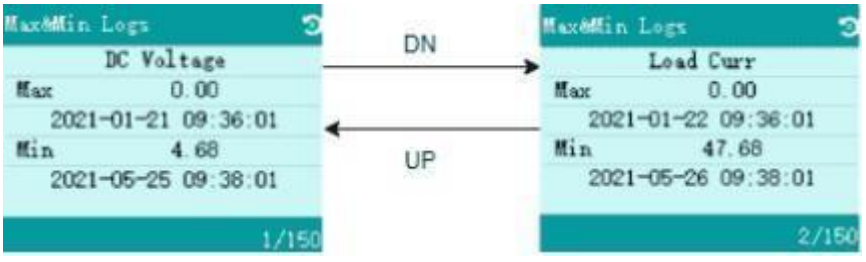

Fig 5-61 Max&Min Logs

Energy Logs

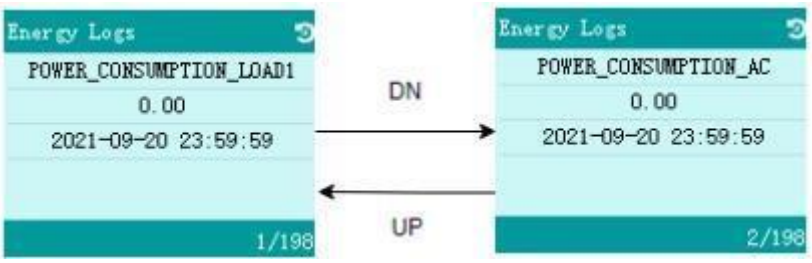

Fig 5-62 Energy Logs

U disk Pages

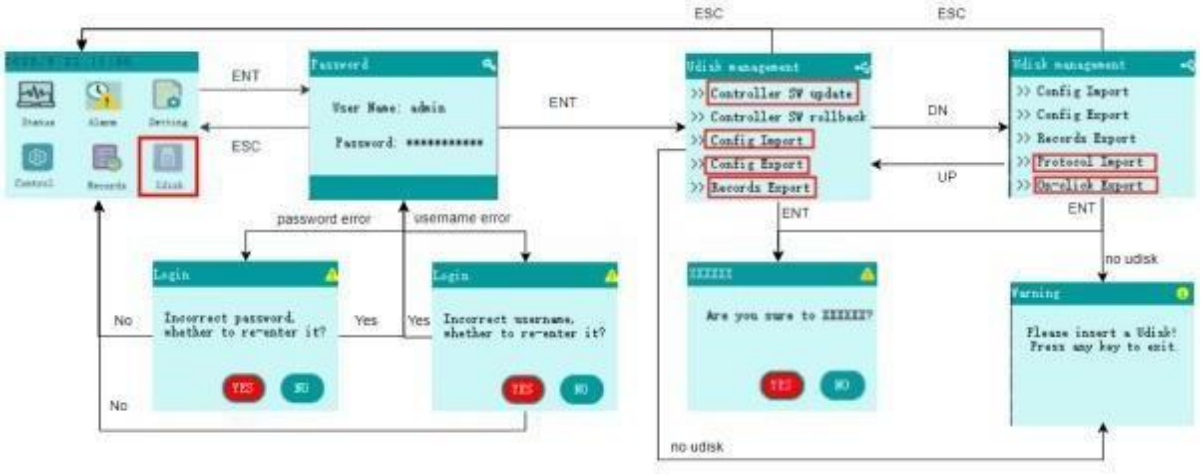

Fig 5-63 U disk Pages

Web GUI

Login Page

Web login default account admin password 654321

Fig 6-1 Login Page

Overview Page

Fig 6-2 Overview Page

Status Pages

Input Page

Fig 6-3 Input Page

Load Page

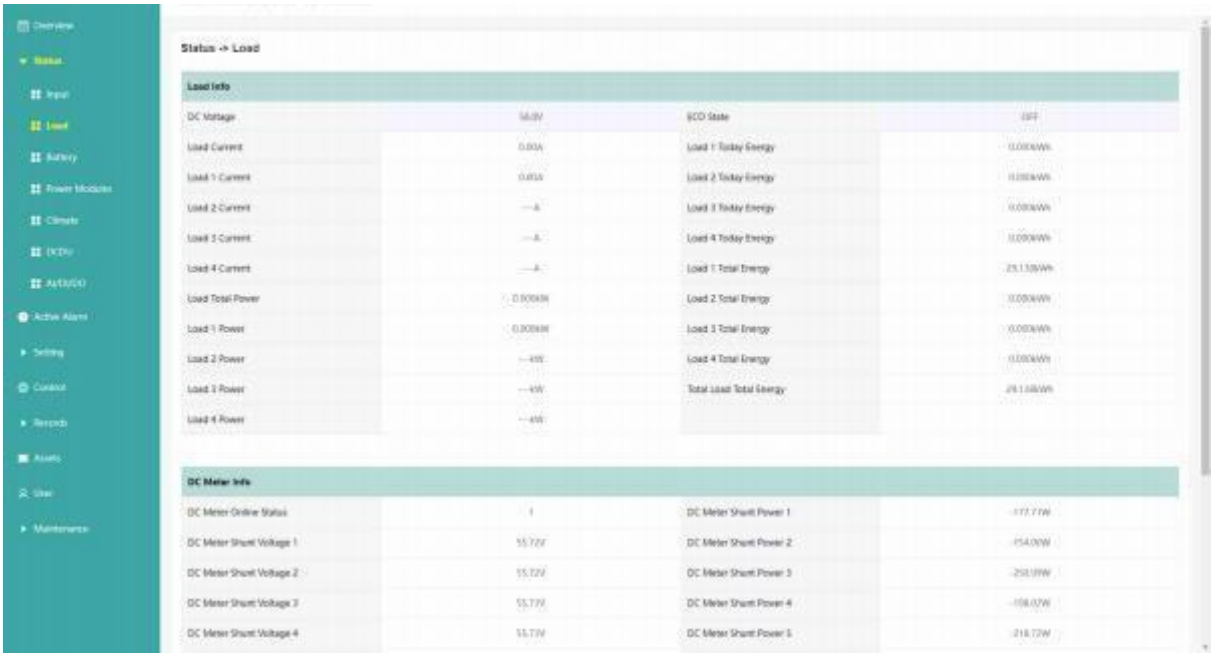

Fig 6-4 Load Page

Battery Page

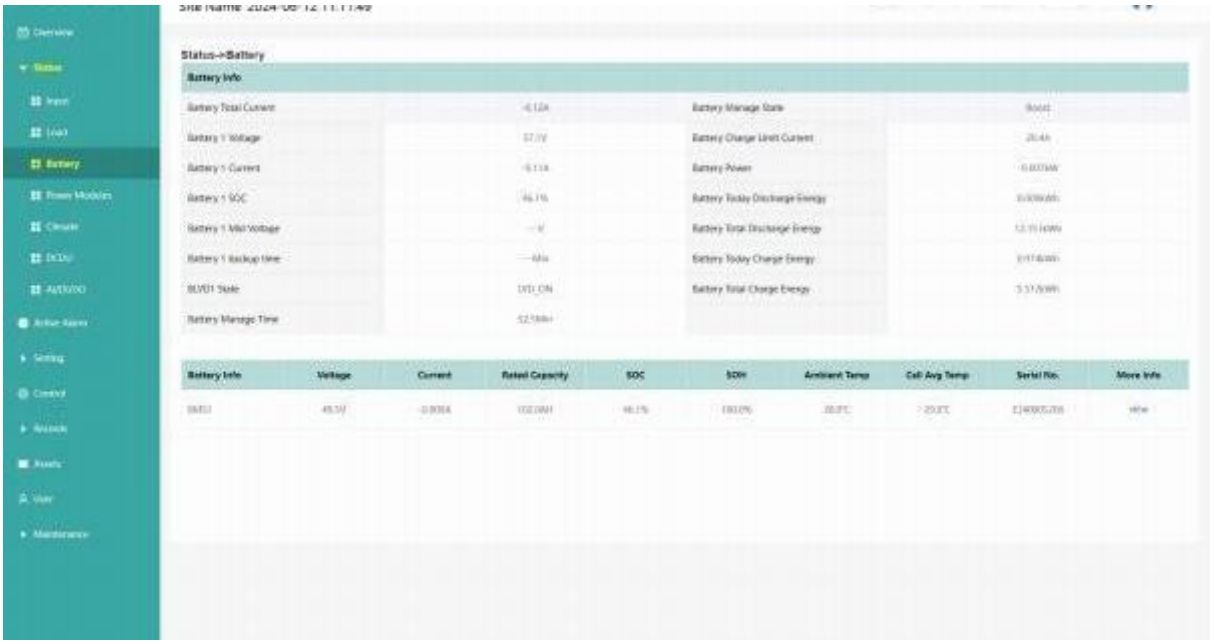

Fig 6-5 Battery Page

Power Modules

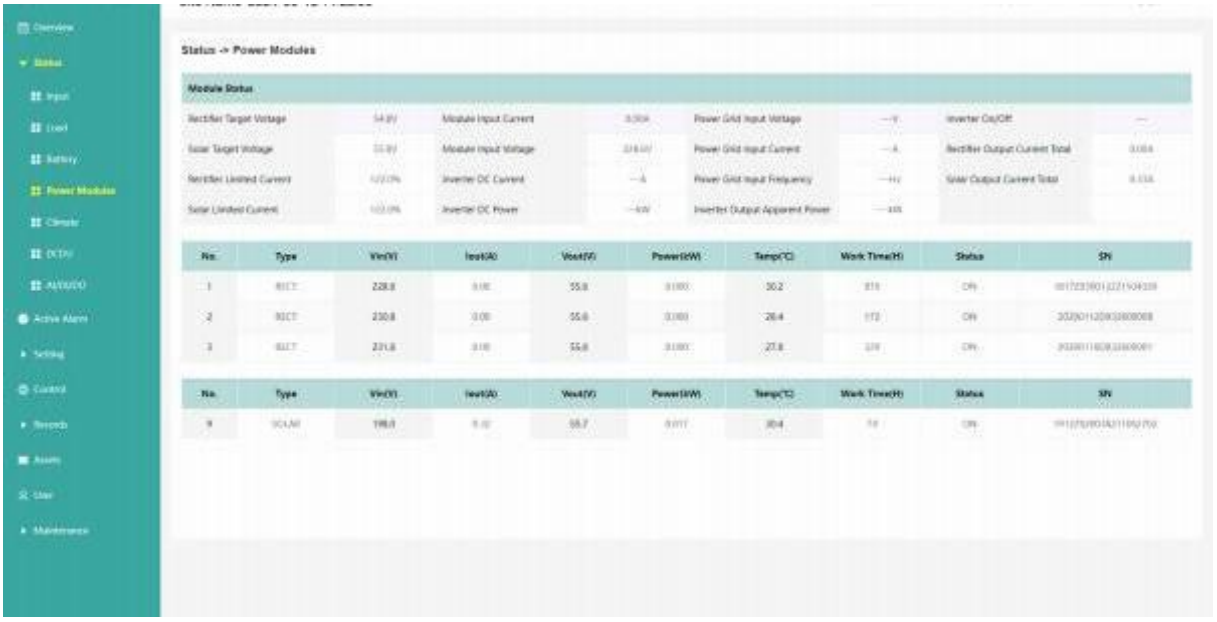

Fig 6-6 Power Modules Page

Climate Page

Fig 6-7 Climate Page

DCDU Page

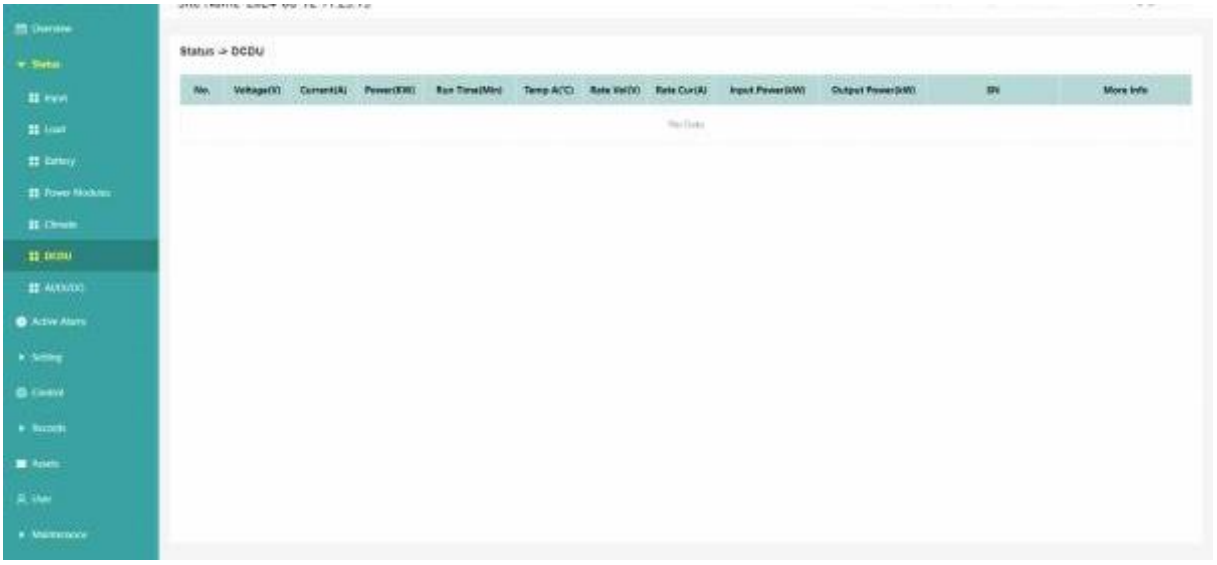

Fig 6-8 DC_DU Page

AI/DI/DO Page

Fig 6-9 AI/DI/DO Page

Active Page

Fig 6-10 Active Alarm

Setting Pages

System Settings

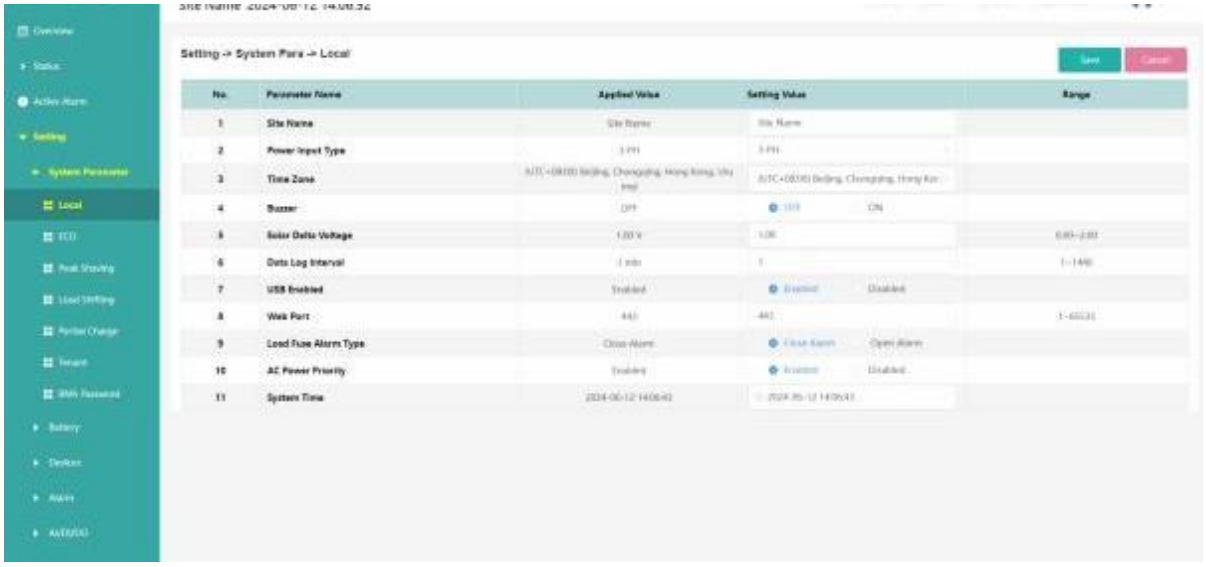

Fig 6-11 Local Page

ECO Settings

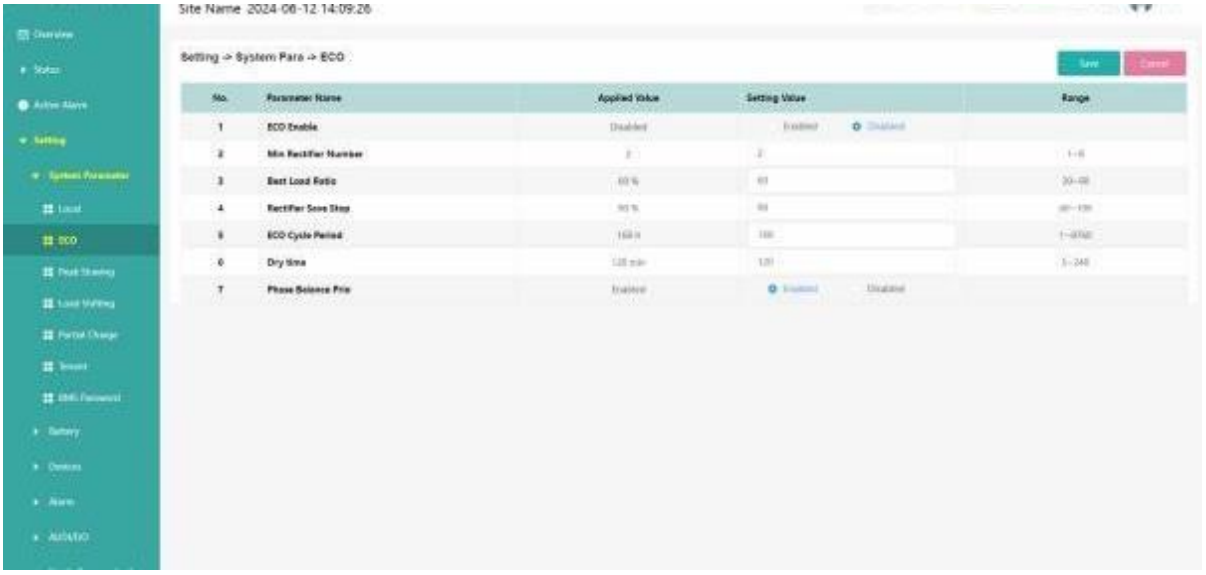

Fig 6-12 ECO Page

Peak Shifting Settings

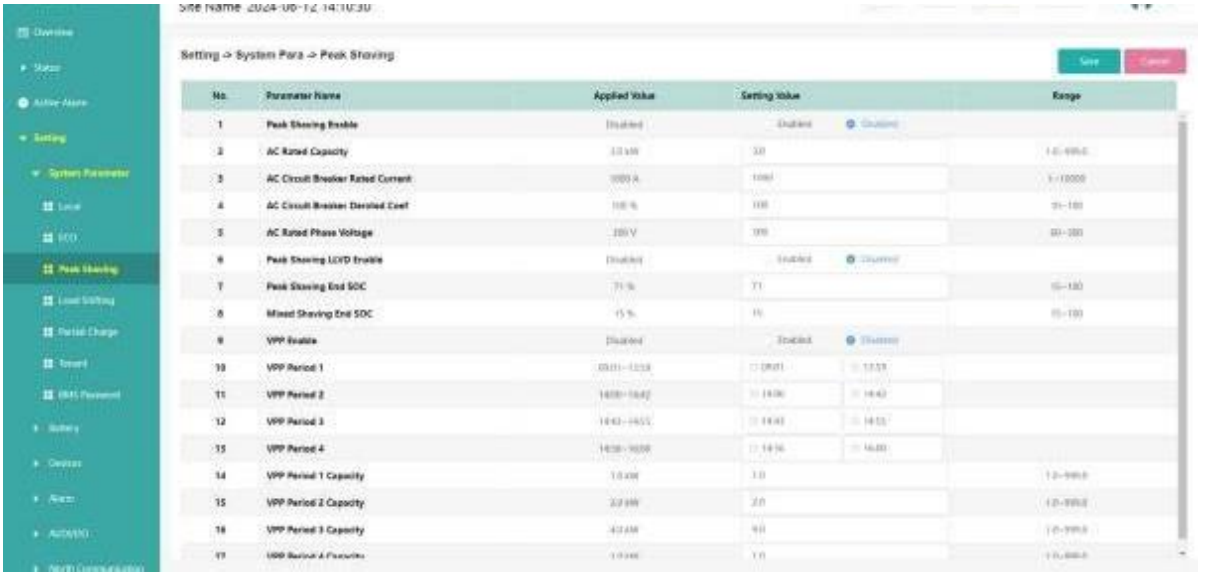

Fig 6-13 Peak Shifting Page

Load Shifting Settings

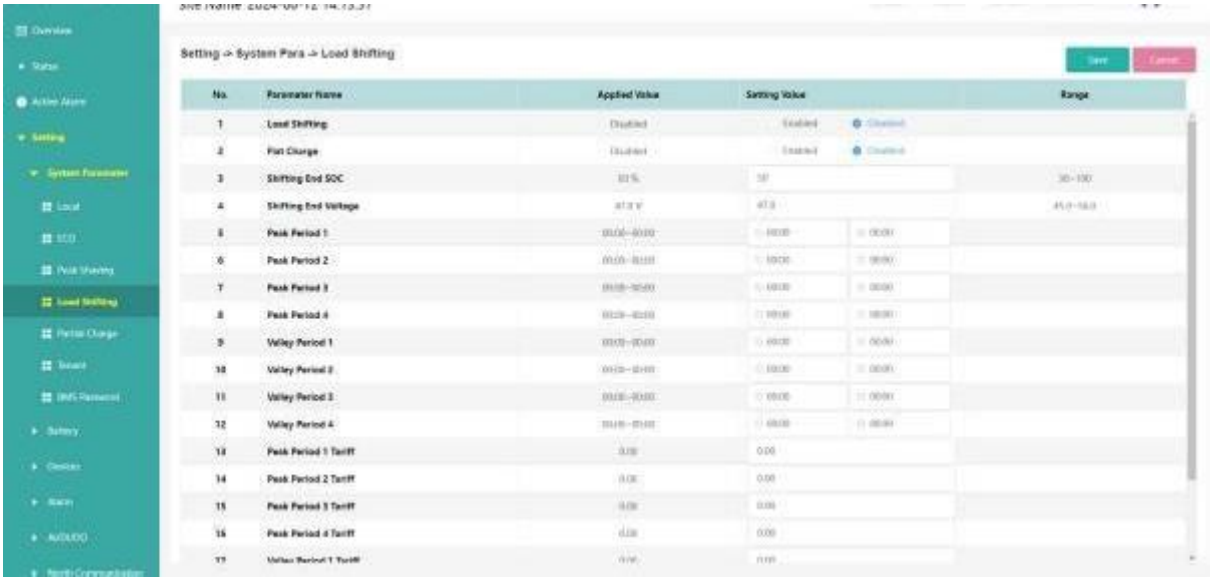

Fig 6-14 Load Shifting Page

Partial Charge Settings

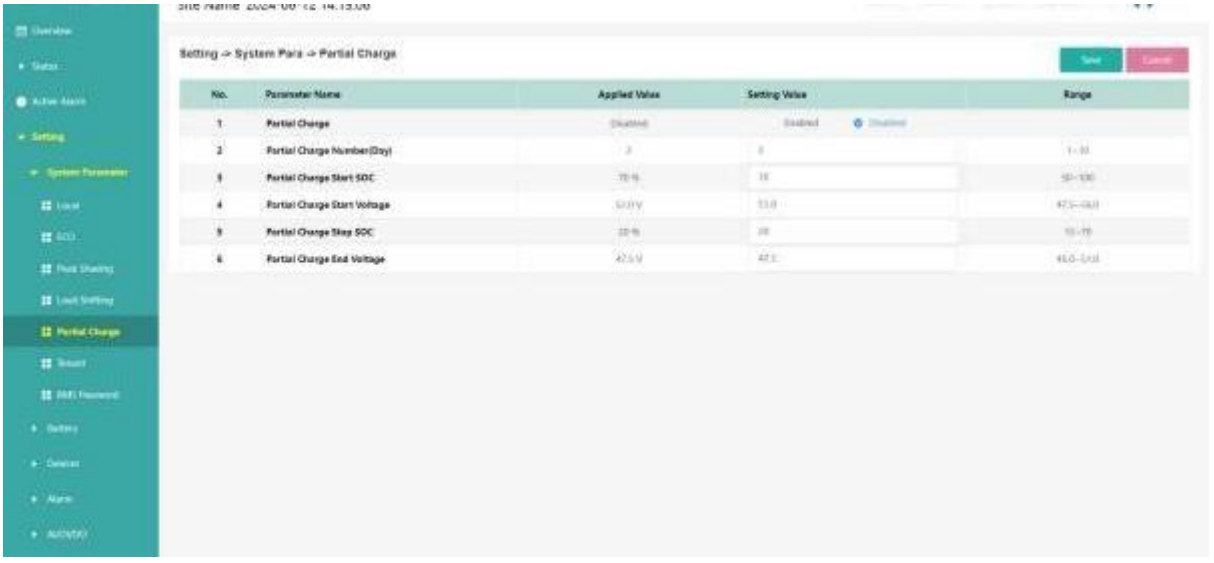

Fig 6-15 Partial Charge Page

Tenant Settings

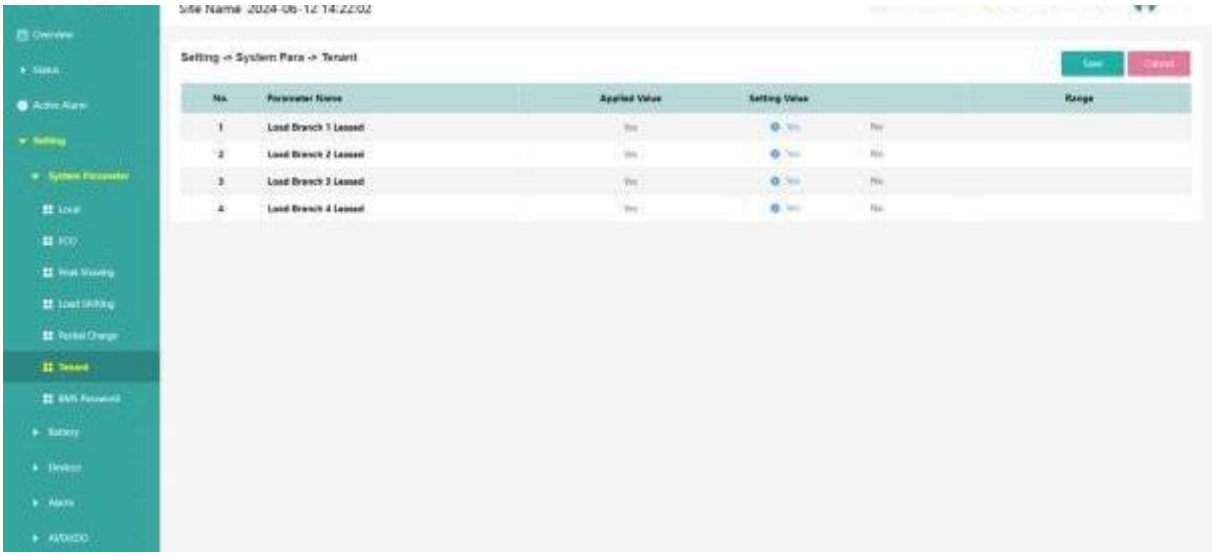

Fig 6-16 Tenant Page

BMS Password

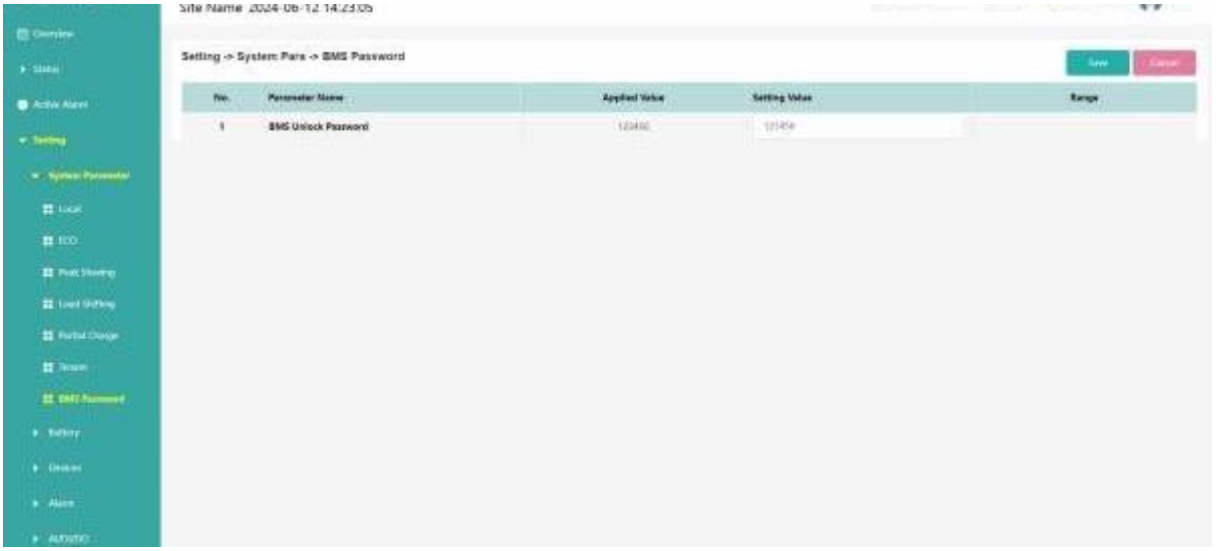

Fig 6-17 BMS Password

Battery Settings

Battery Charge Settings

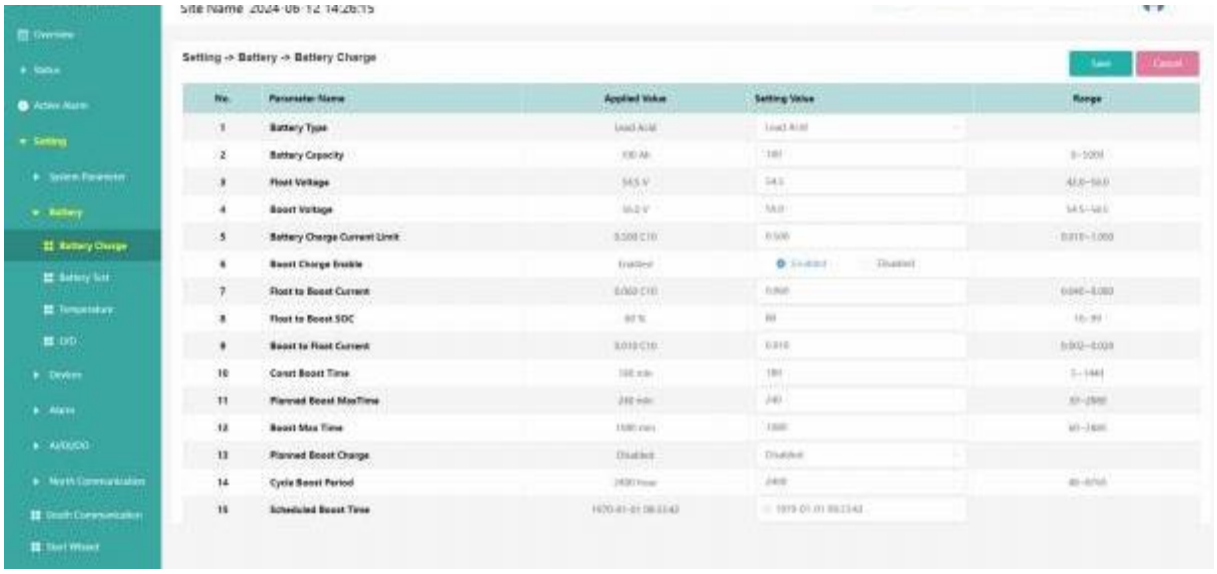

Fig 6-18 Battery Charge

Battery Test Settings

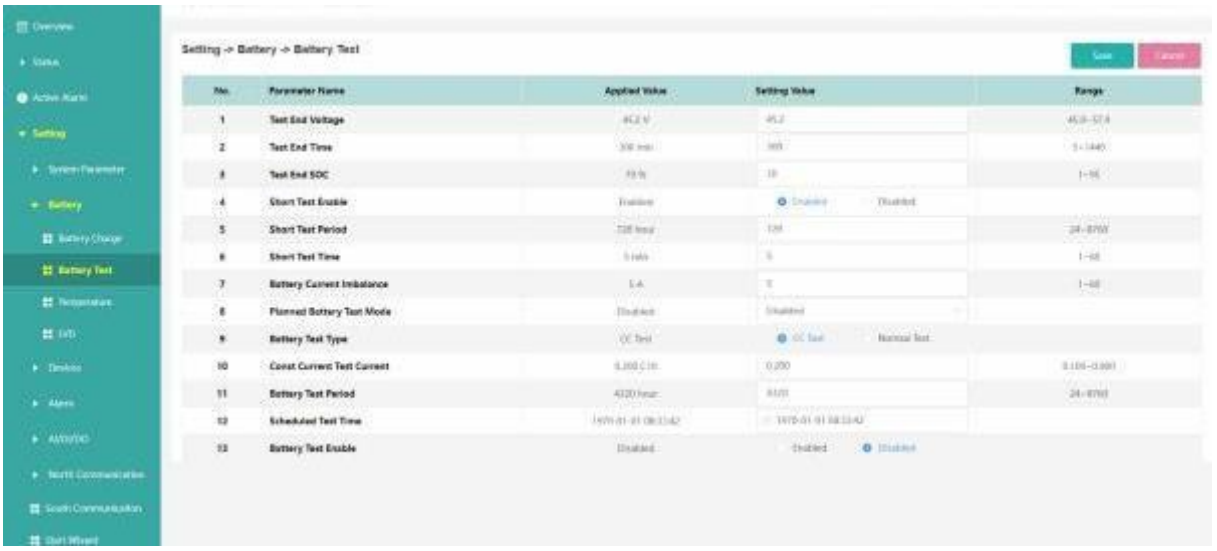

Fig 6-19 Battery Test

Temperature Protection Settings

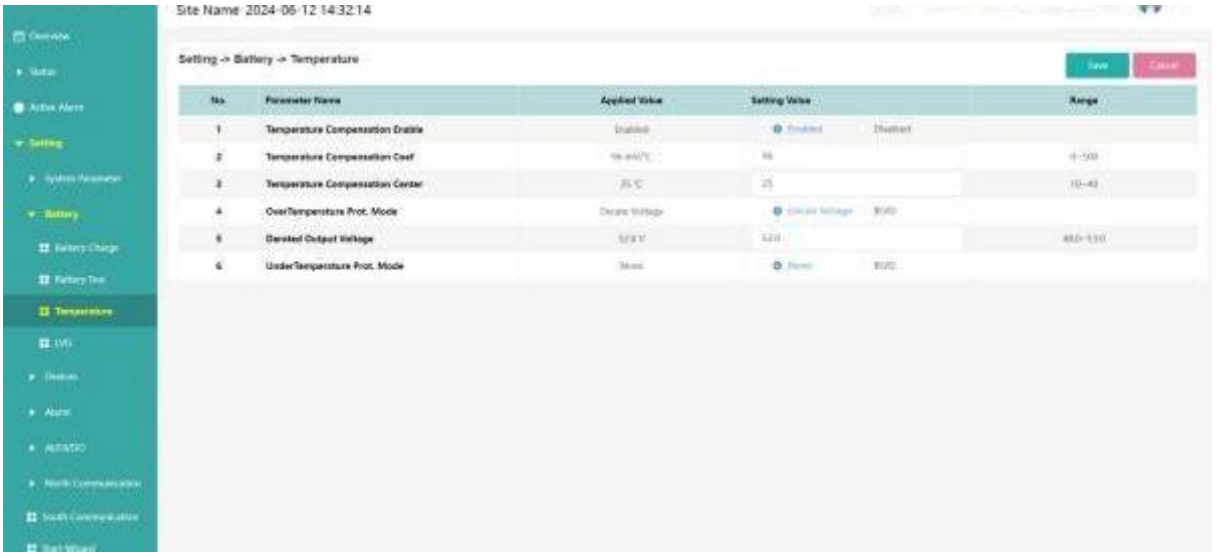

Fig 6-20 Temperature

LVD Settings Settings

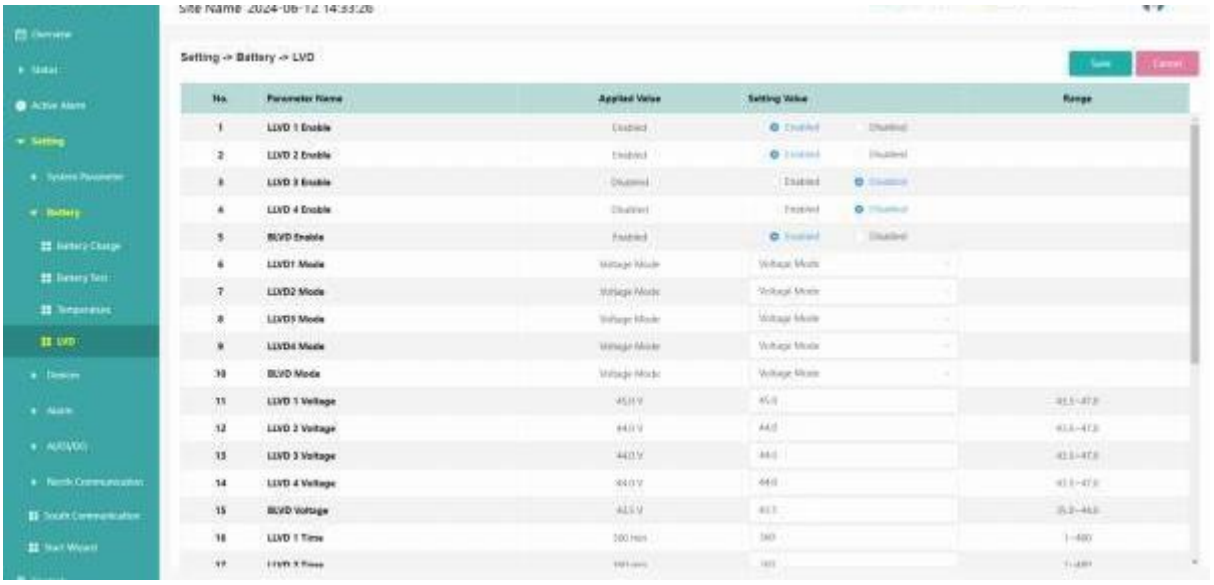

Fig 6-21 LVD

Devices Settings

Power Modlue Settings

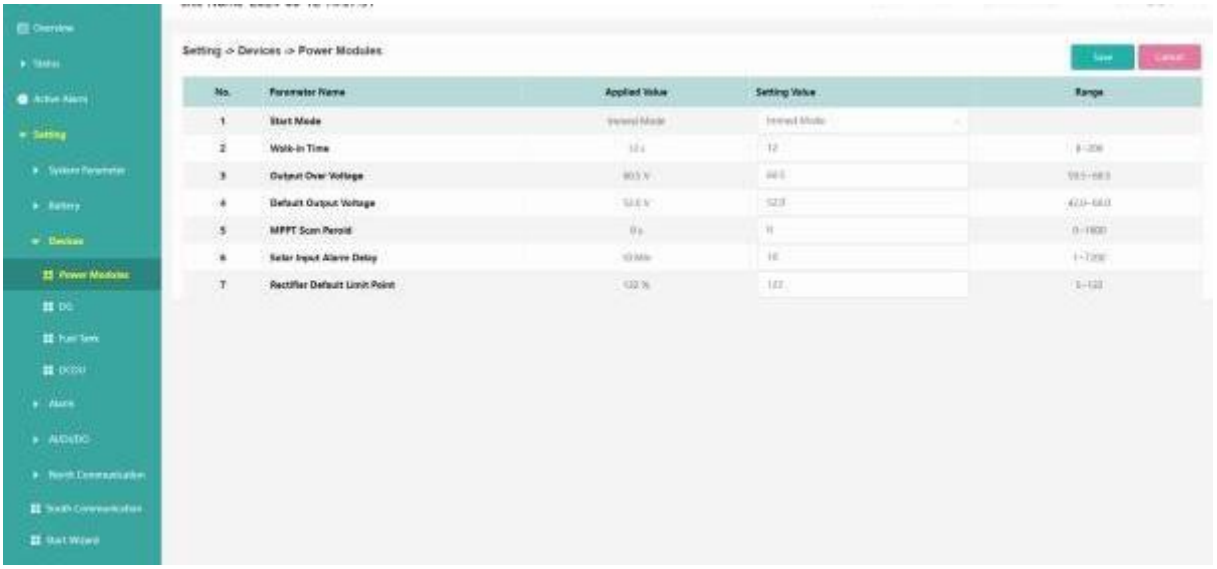

Fig 6-22 Power Modules

DG Settings

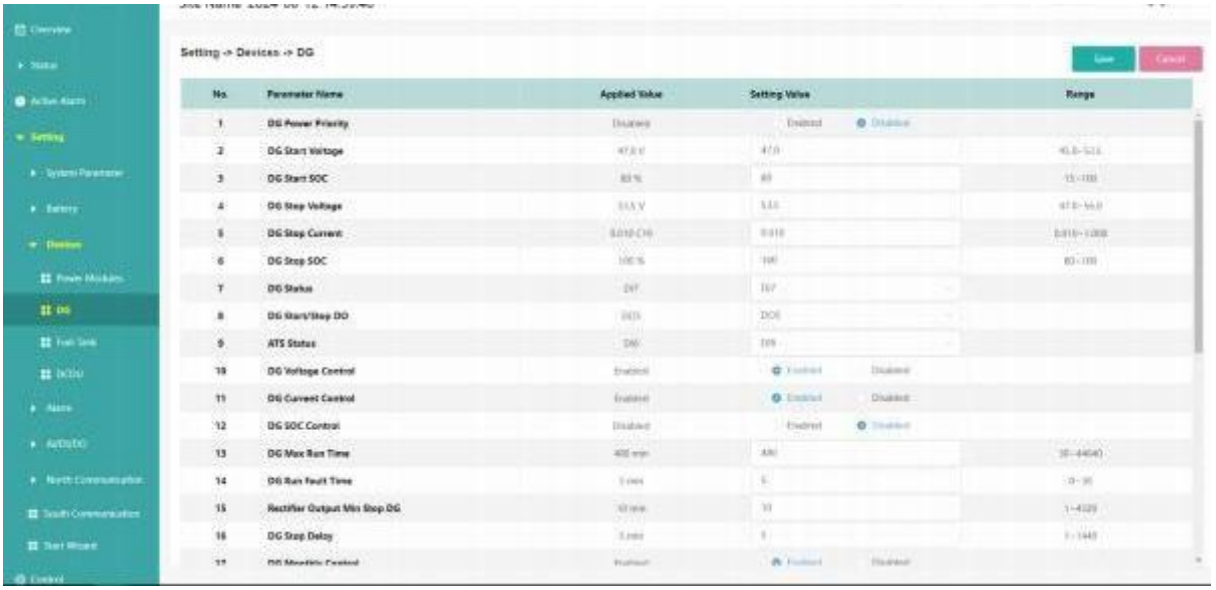

Fig 6-23 DG Settings

Fuel Tank

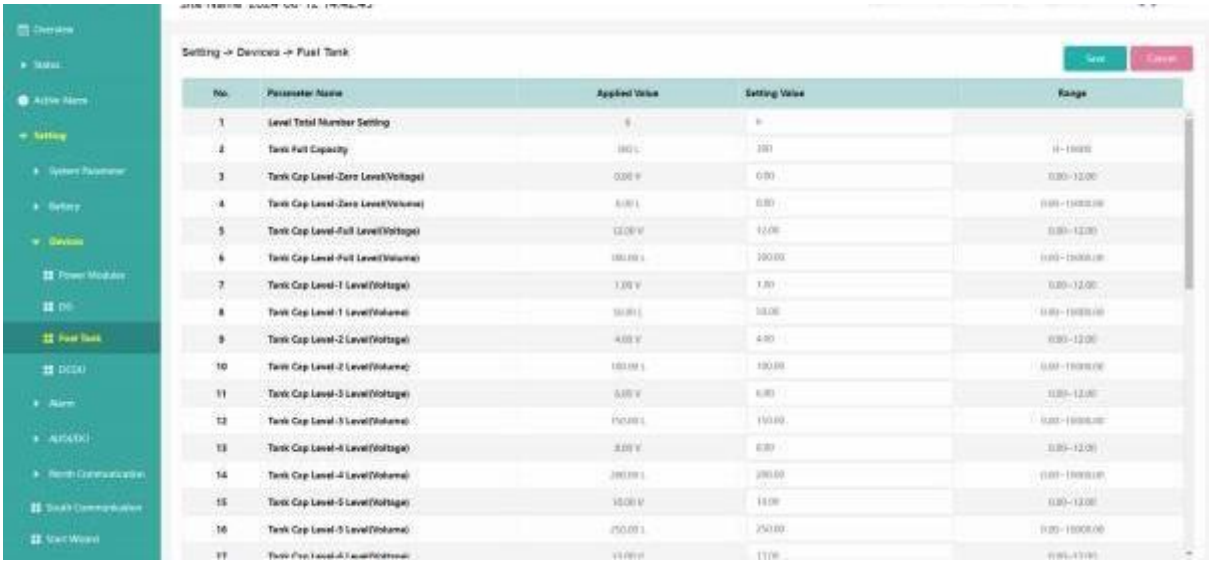

Fig 6-24 Fuel Tank

DCDU

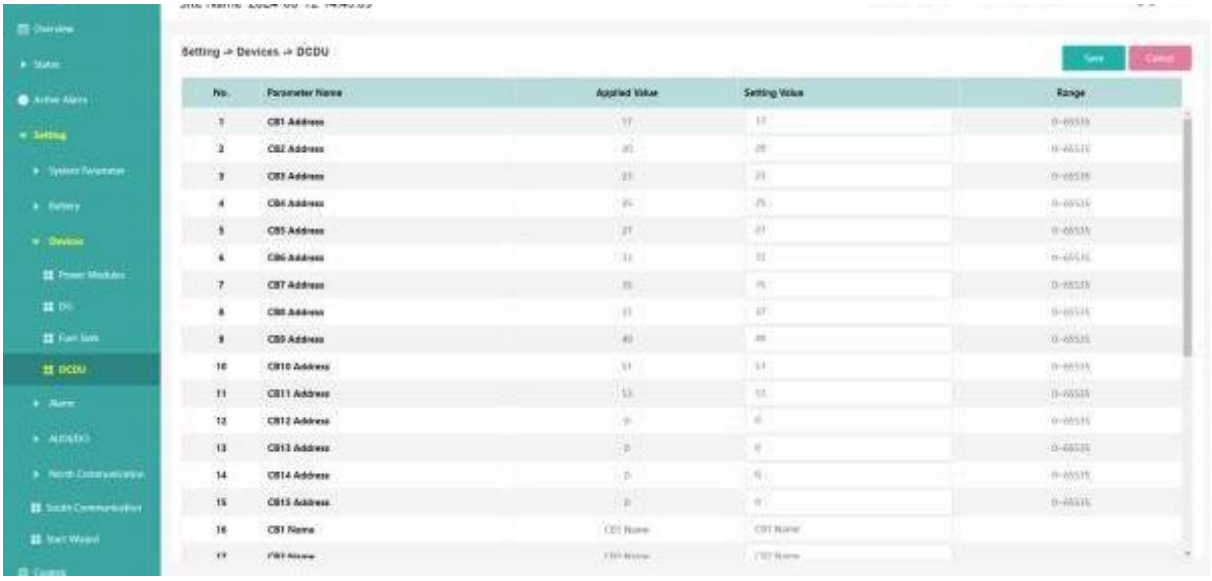

Fig 6-25 DCDU

Alarm Settings

Alarm Config

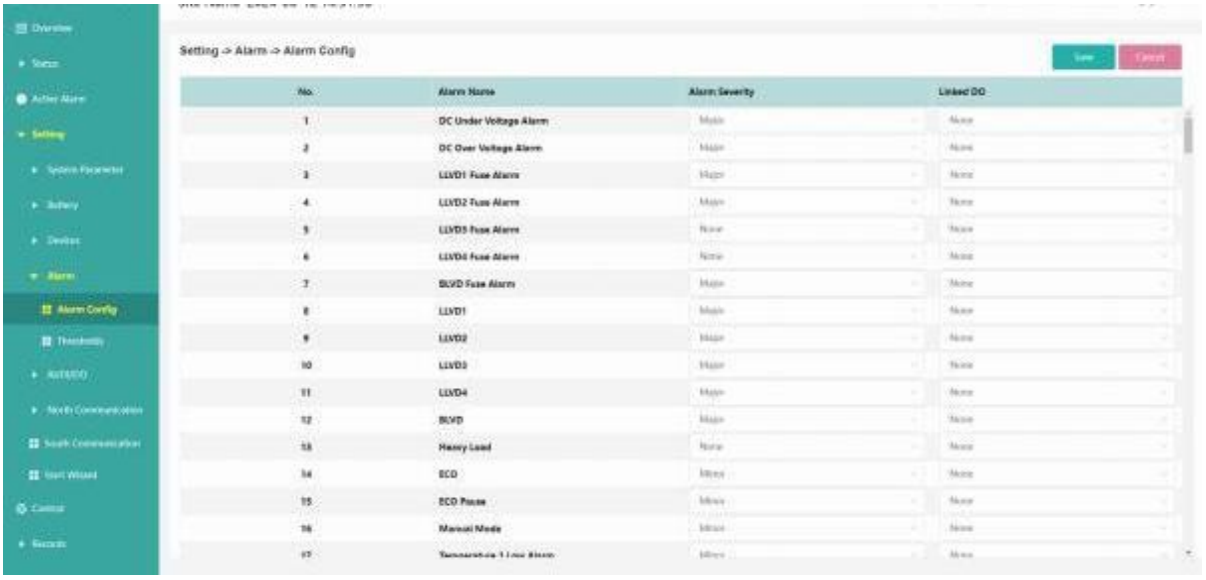

Fig 6-26 Alarm Config

Alarm Thresholds Settings

Fig 6-27 Thresholds

AI/DI/DO Settings

Analog Config

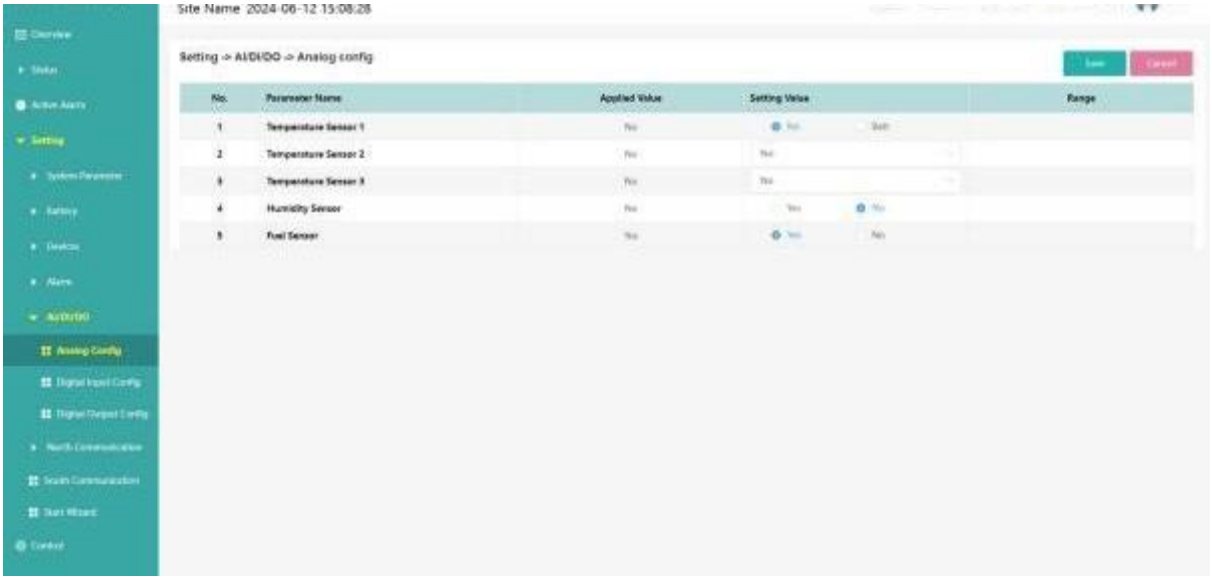

Fig 6-28 Analog Config

Digital Input Config

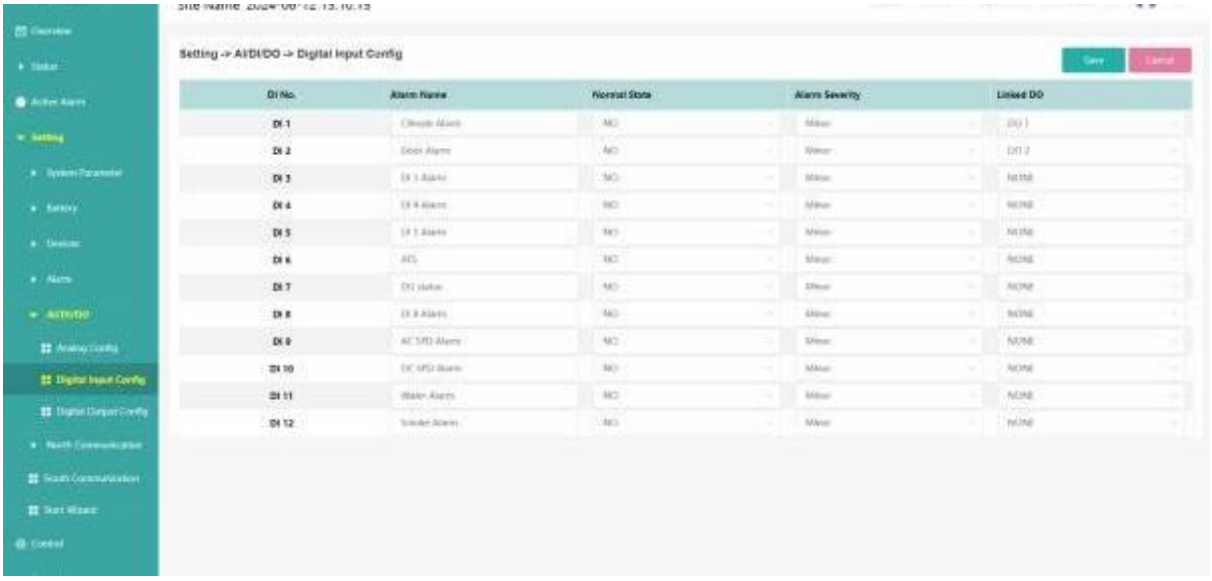

Fig 6-29 Digital Input Config

Digital Output Config

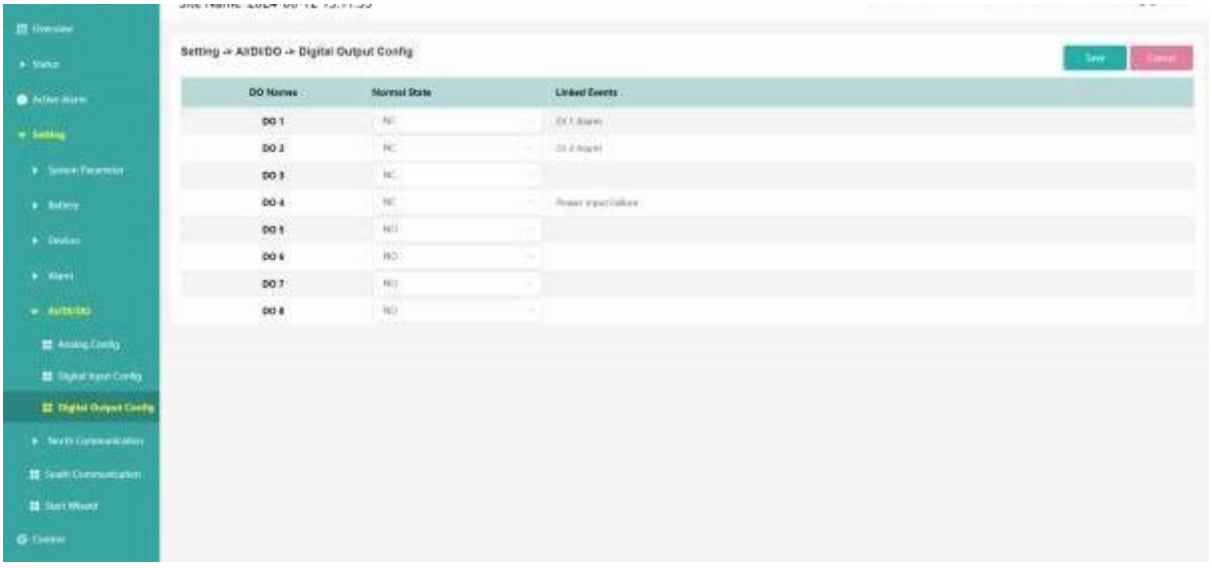

Fig 6-30 Digital Output Config

Northbound Communication

Network Settings

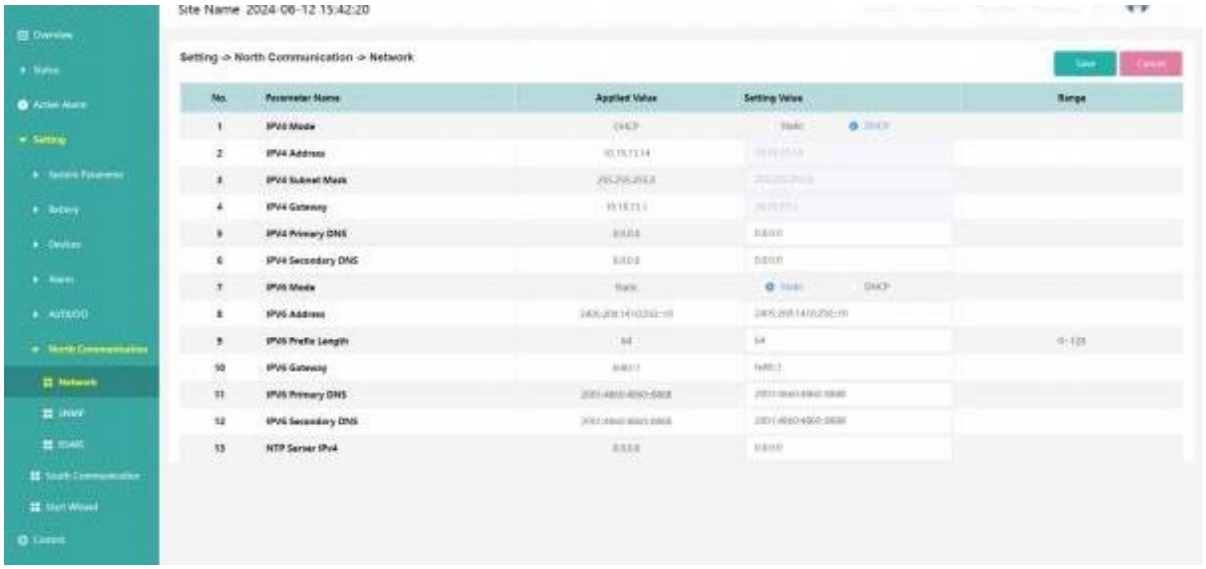

Fig 6-31 Network

SNMP Settings

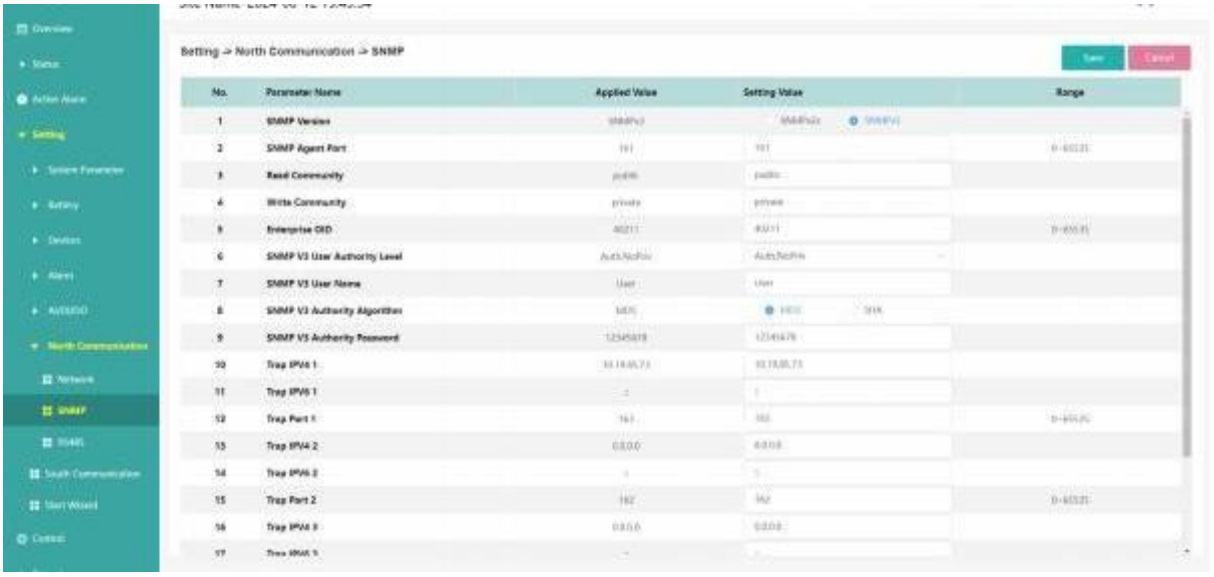

Fig 6-32 SNMP

RS485 Settings

Fig 6-33 RS485

South Communication

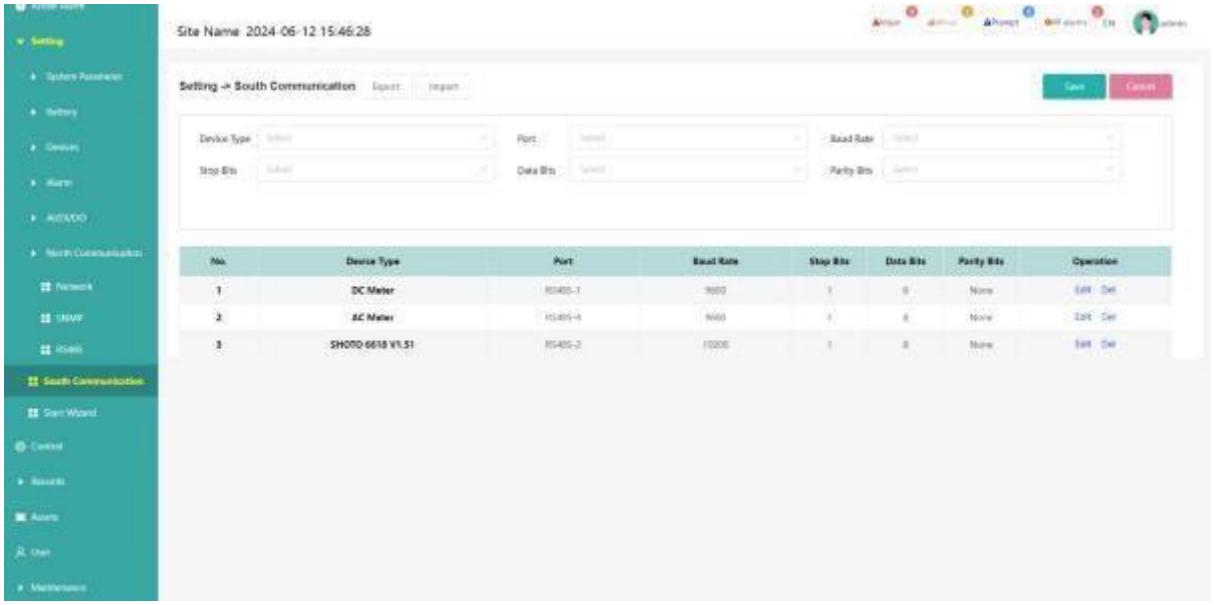

Fig 6-34 South Communication

Start Wizard

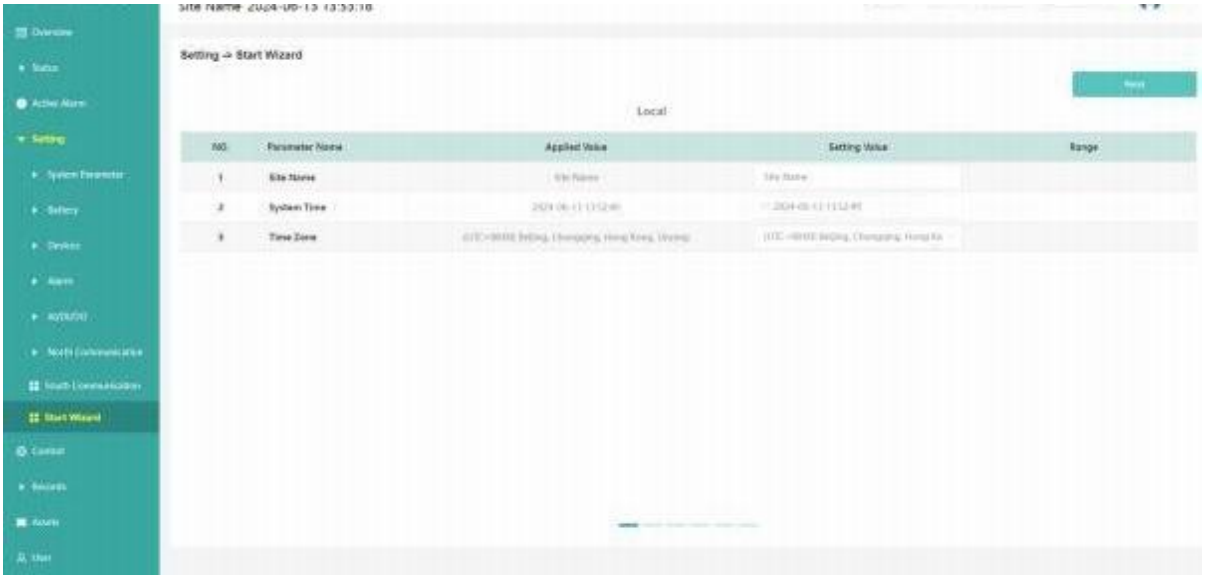

Fig 6-35 Start Wizard

Control Page

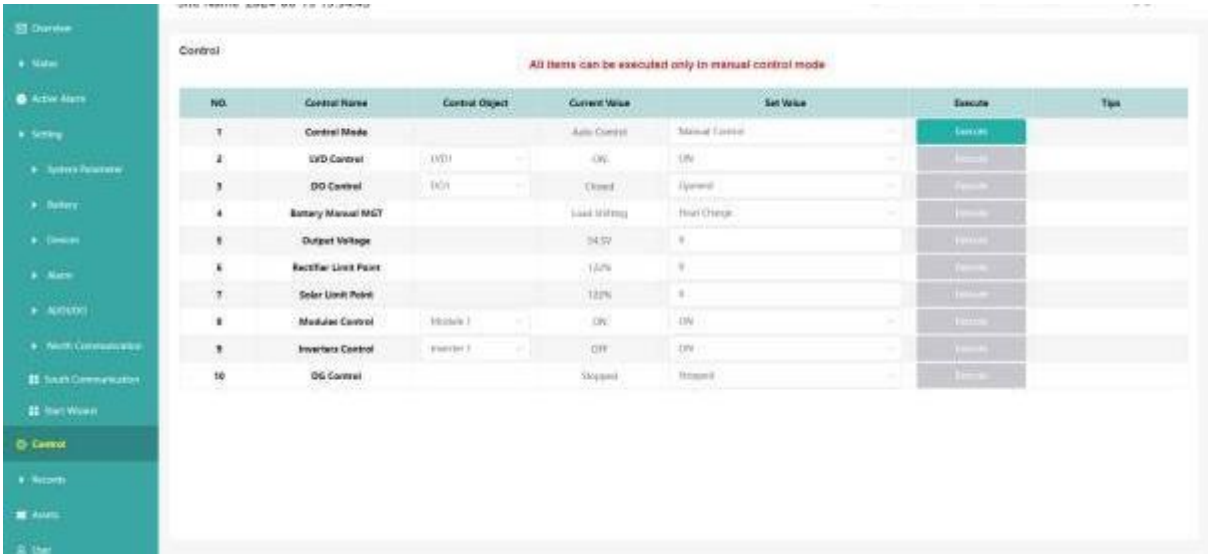

Fig 6-36 Control

Record Pages

System History Data

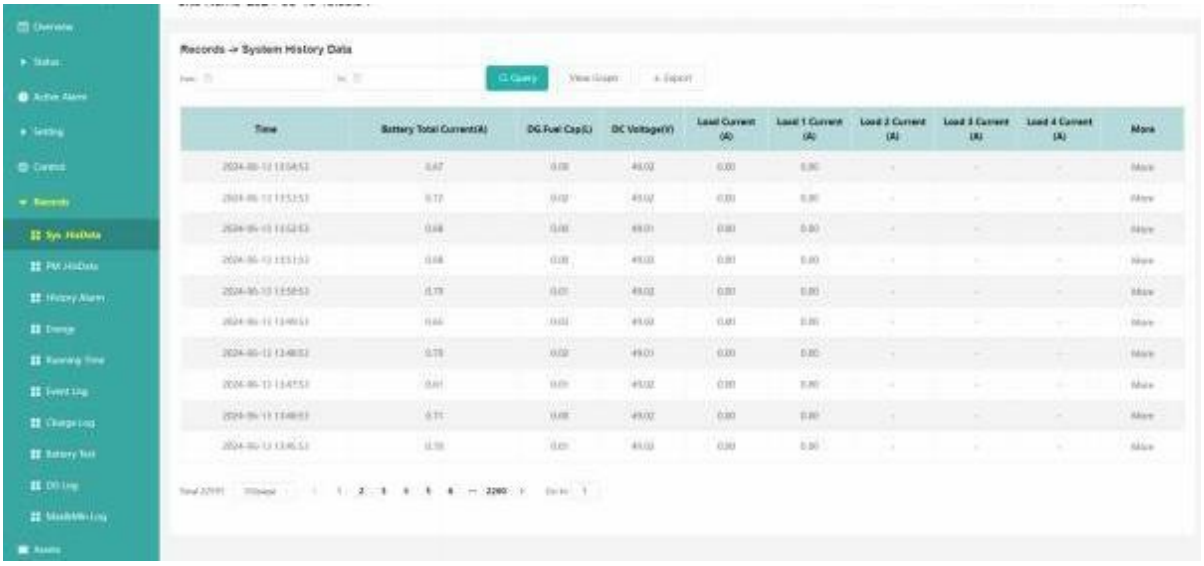

Fig 6-37 System History Data

Power Modules History Data

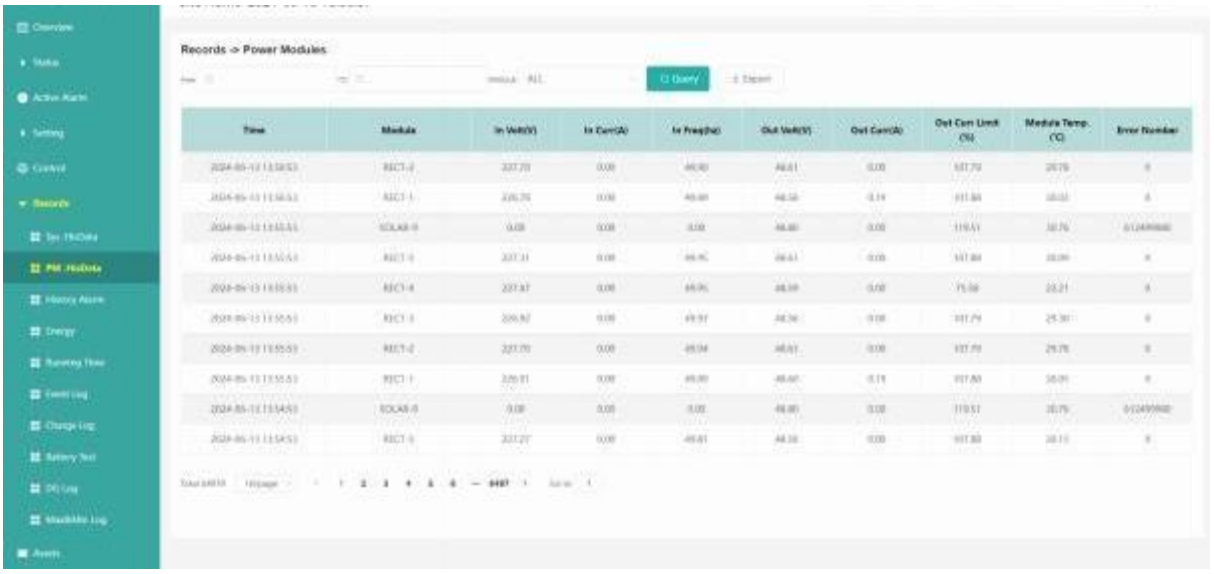

Fig 6-38 Power Modules History Data

History Alarm

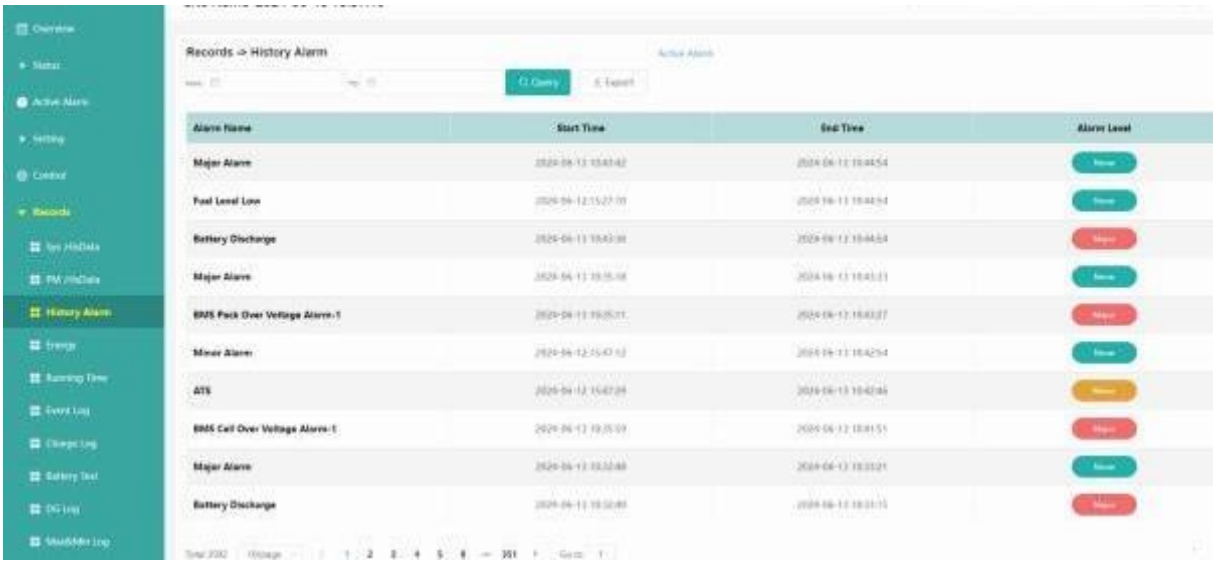

Fig 6-39 History Alarm

Energy

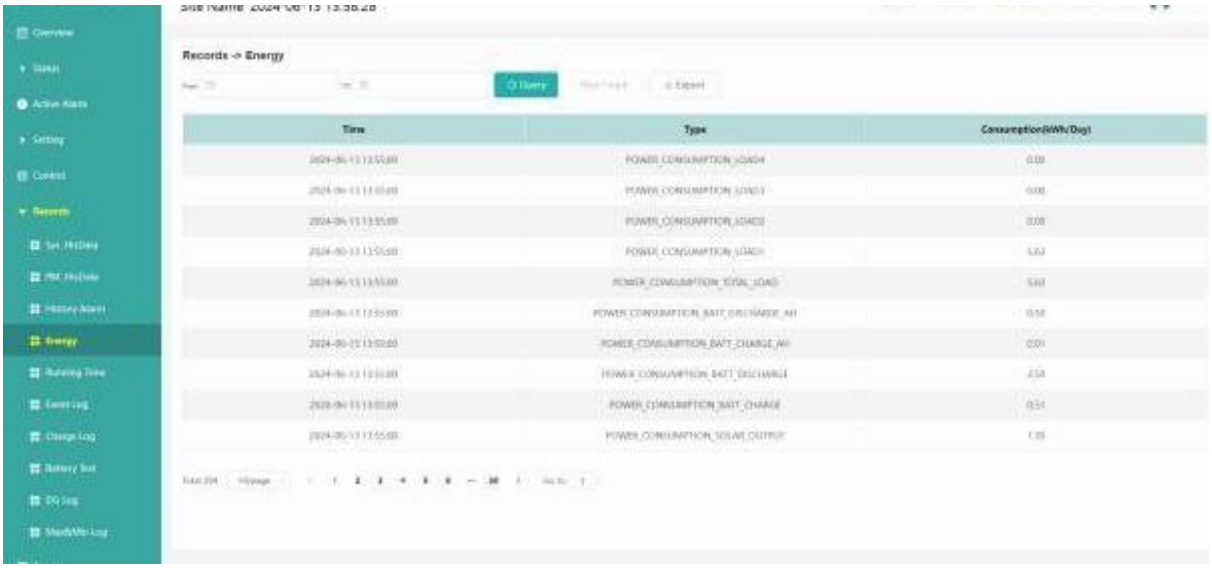

Fig 6-40 Energy

Running Time

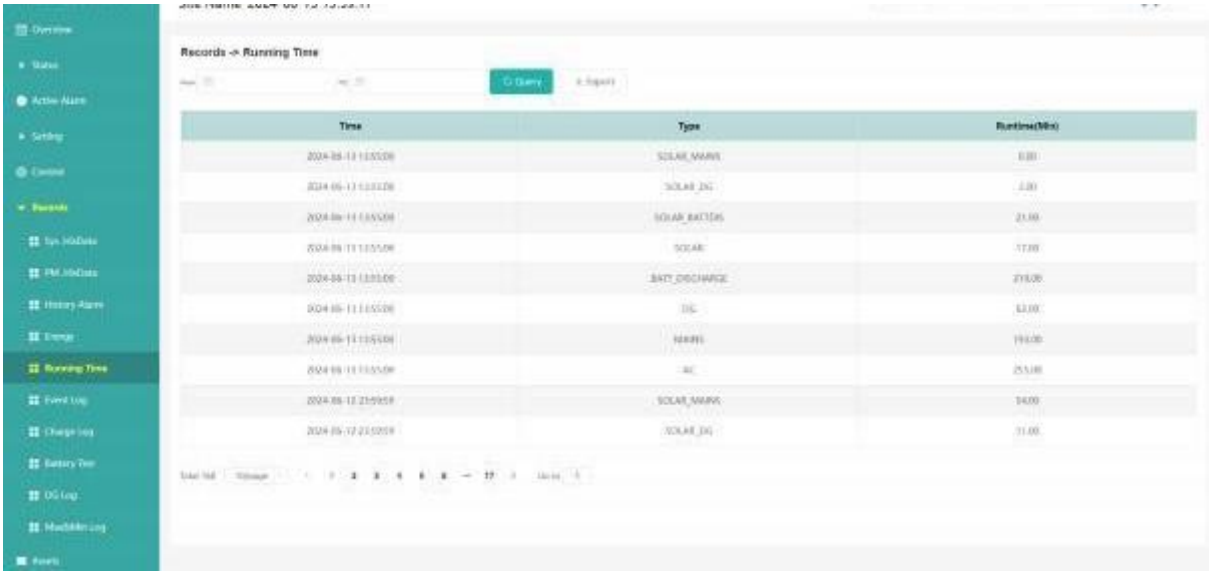

Fig 6-41 Running Time

History Event log

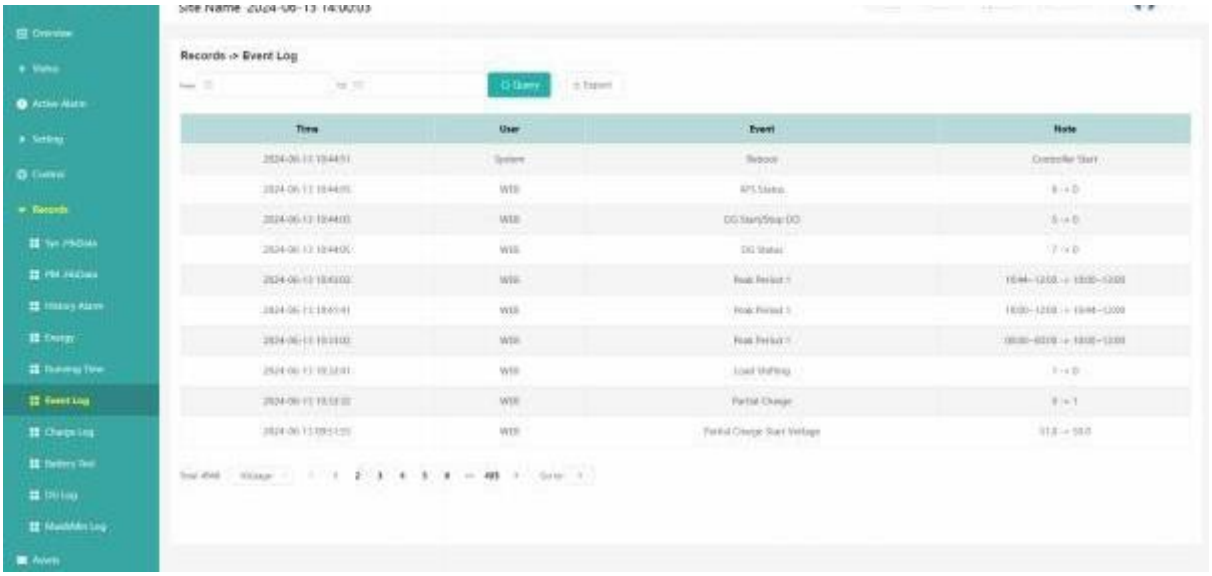

Fig 6-42 Event log

Charge Log

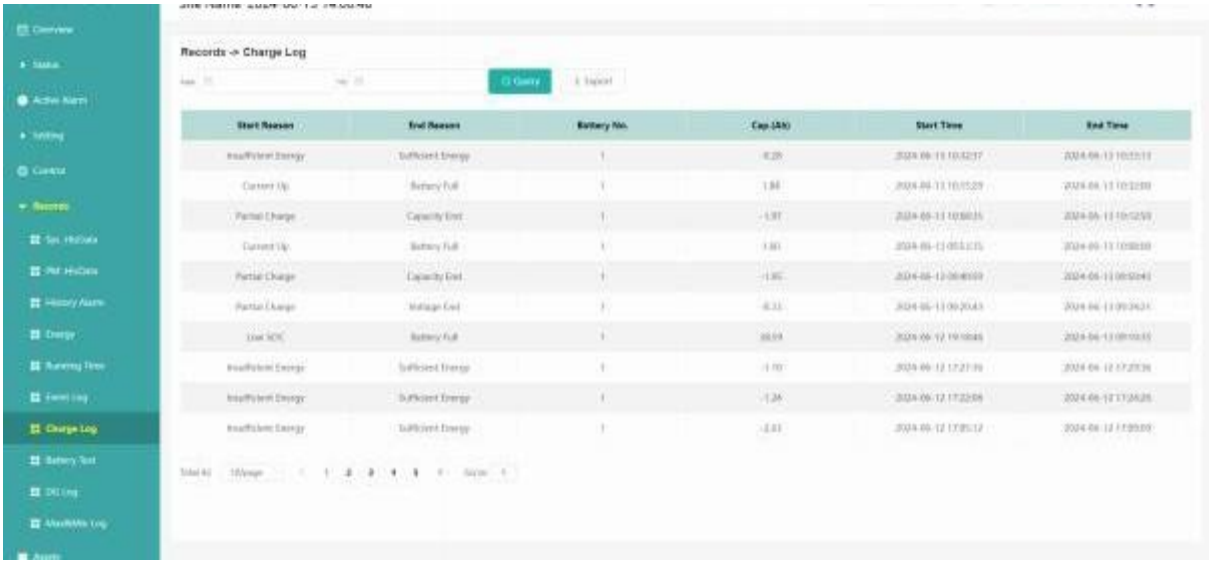

Fig 6-43 Charge log

Battery Test

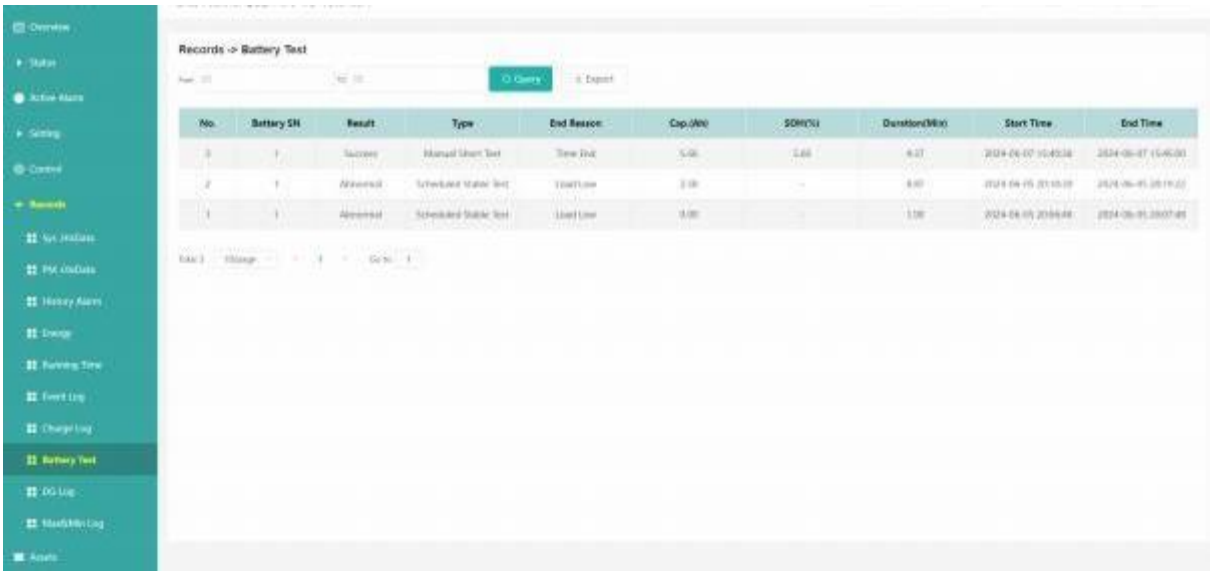

Fig 6-44 Battery Test

DG Log

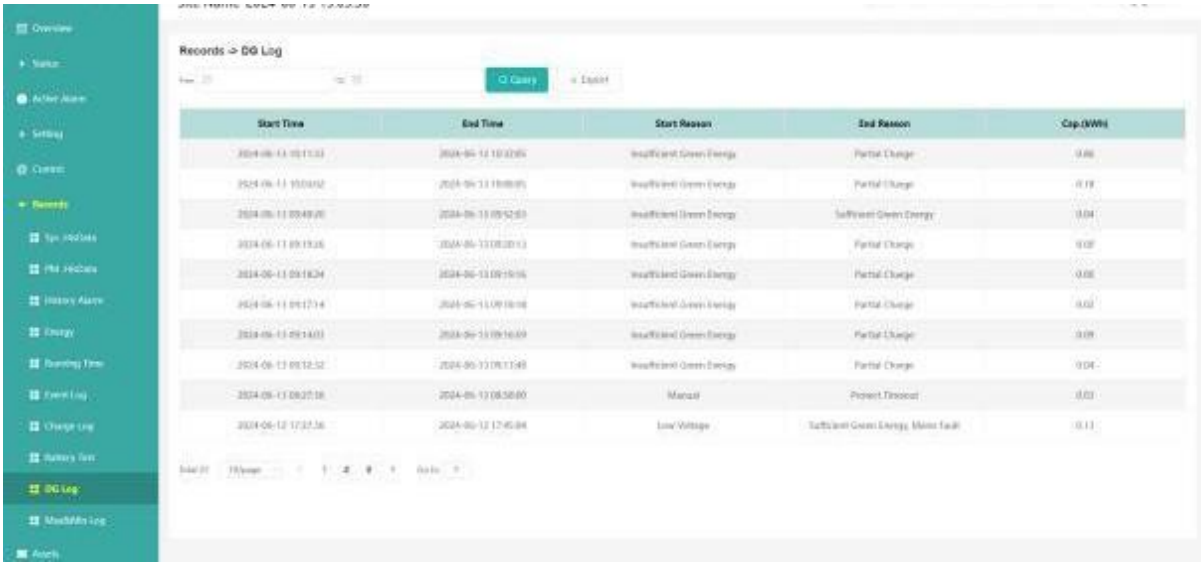

Fig 6-45 DG Log

Max&Min Log

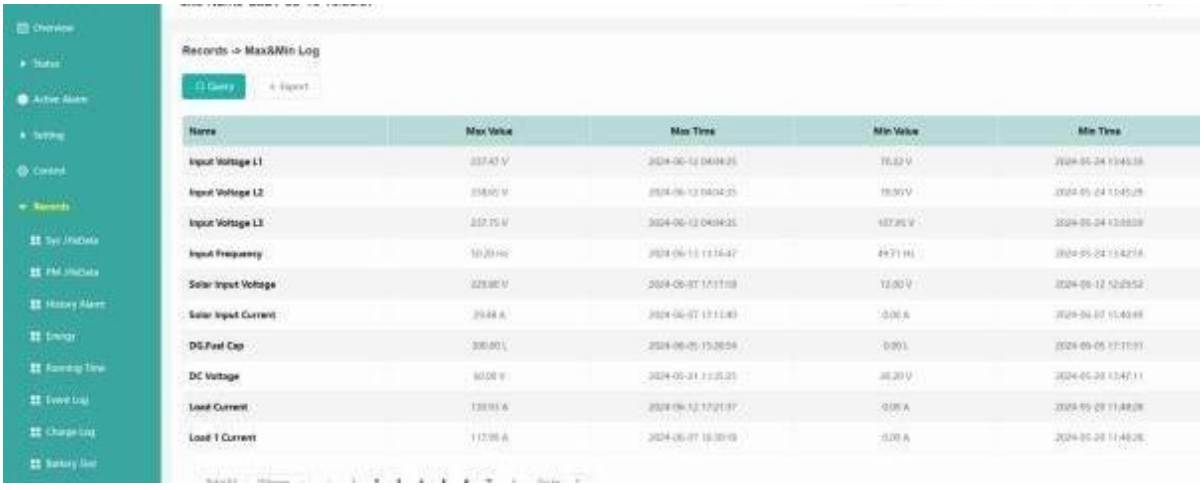

Fig 6-46 Max&Min Log

Asset Info

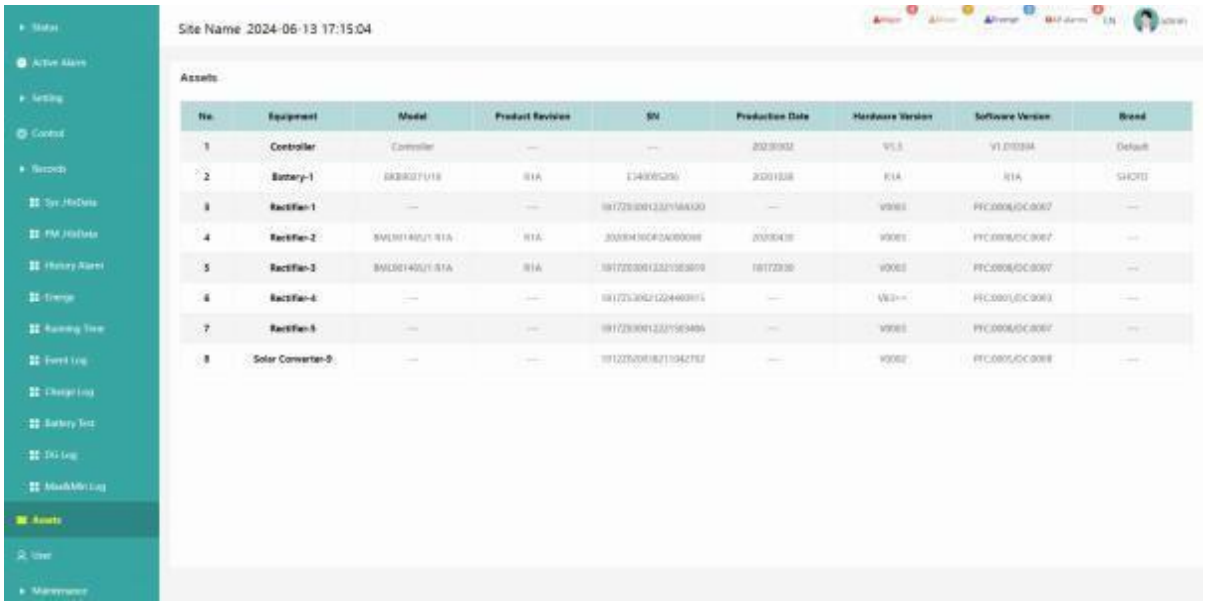

Fig 6-47 Asset

User Info

Fig 6-48 User

Maintenance

Download/Upload

Fig 6-49 Download/Upload

Controller SW

Fig 6-50 Controller SW

Module Software

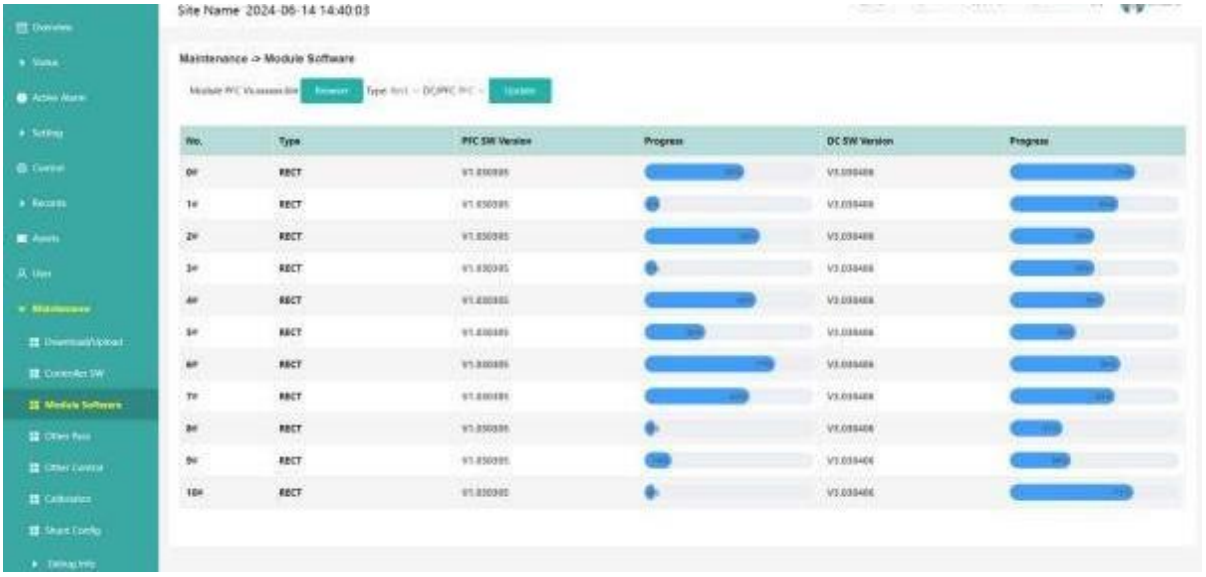

Fig 6-51 Module Software

Other Para

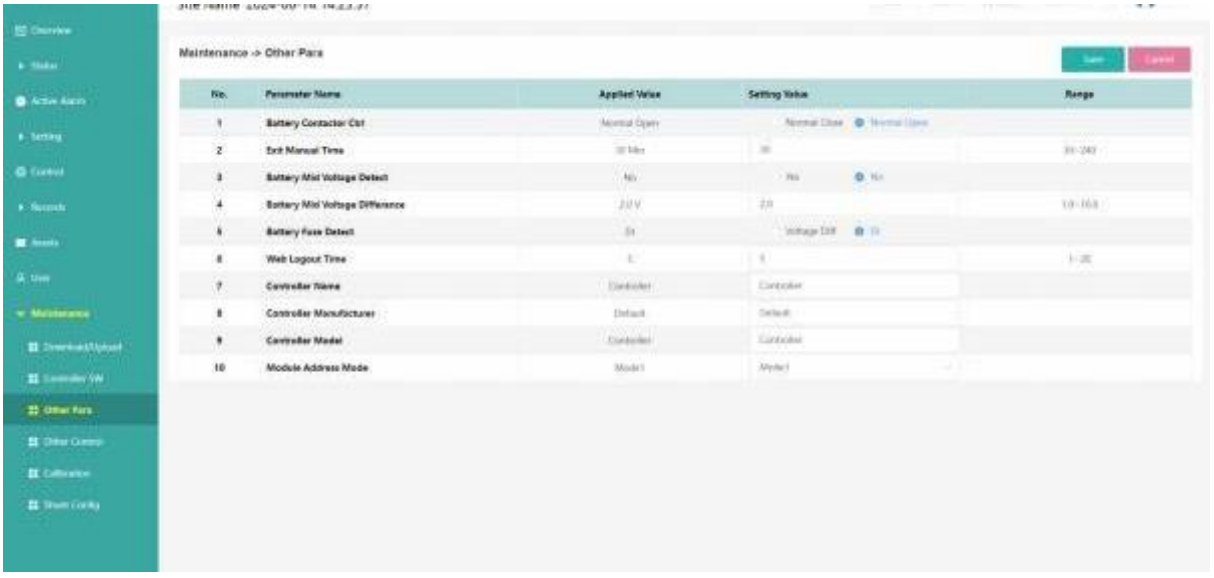

Fig 6-52 Other Para

Other Control

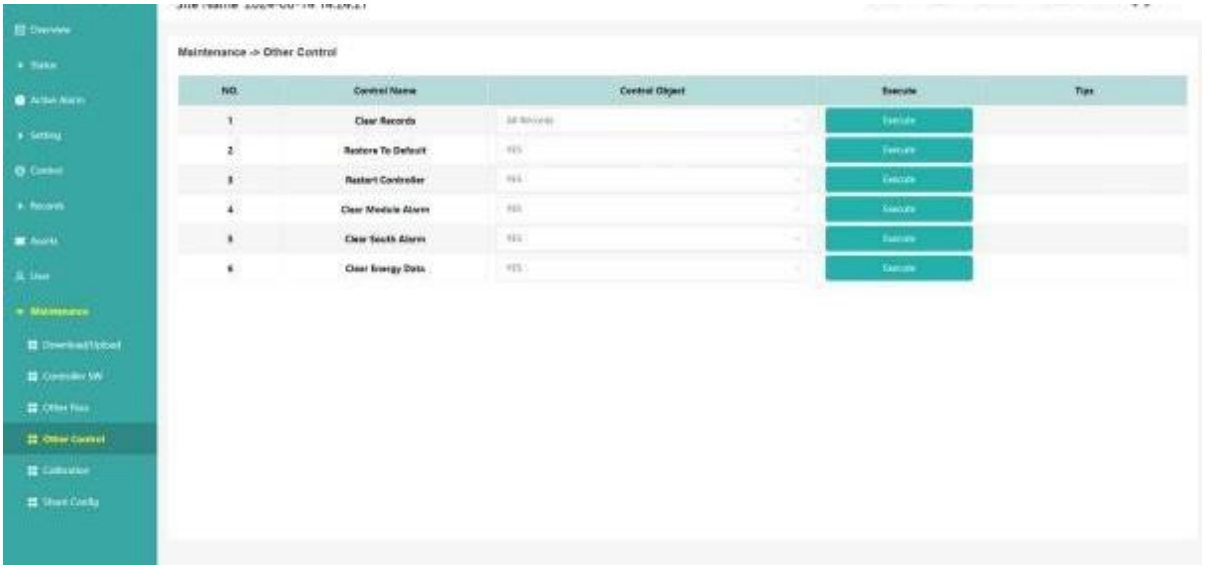

Fig 6-53 Other Control

Calibration

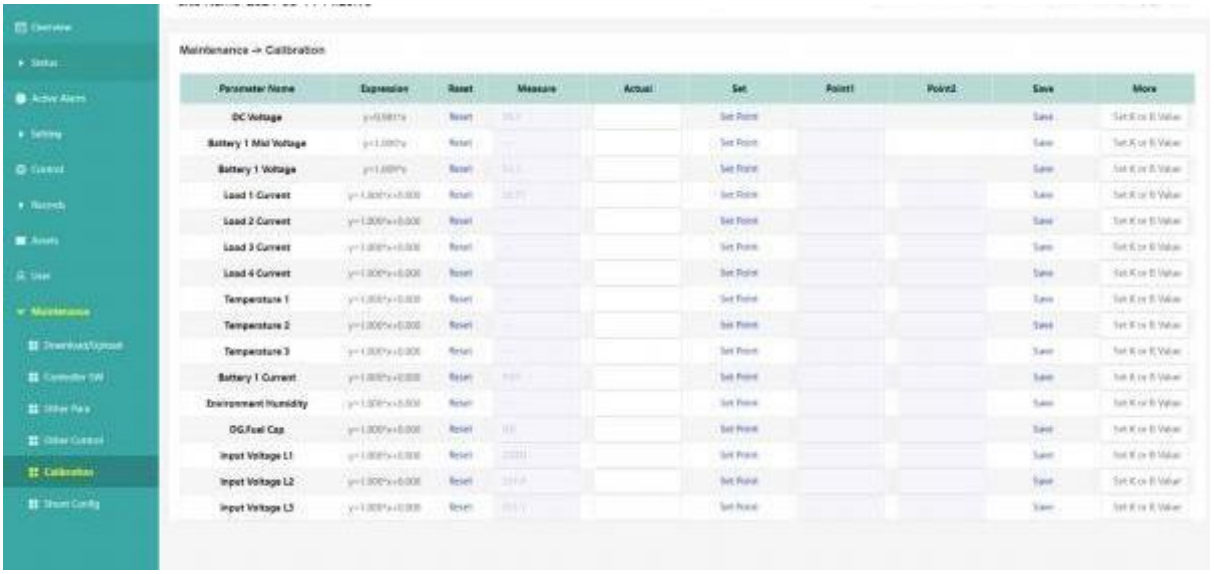

Fig 6-54 Calibration

Shunt Config

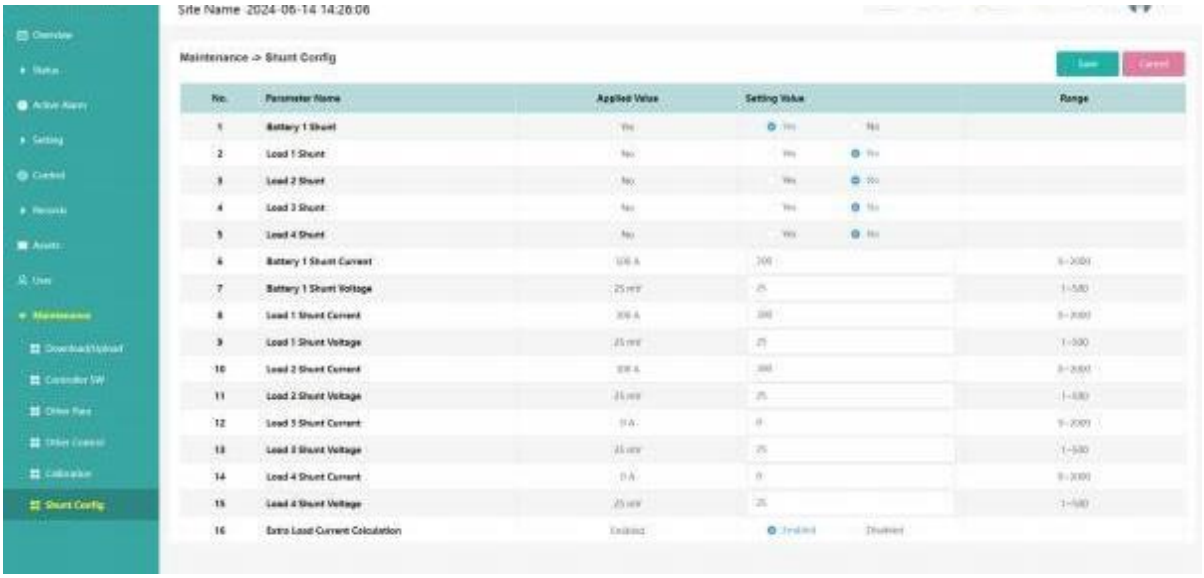

Fig 6-55 Shunt Config

Common operation

Installation Common Operations

Battery Parameter Configuration

Background Information

The battery parameters are the basic data for battery management of the Controller , which need to be set according to the number and capacity of the actually connected battery strings .

NOTE:

If the battery parameters are incorrectly set, the charge and discharge management of the battery will be affected, and the battery service life will be affected.

Tab 7-1 Battery Parameter

Parameter	Illustrate	Defaults	Range
Batt1 Capacity	· If the system has two battery shunts, set the battery capacity according to the battery capacity on each shunt. · If only one battery shunt is set in the system, Batt2 Capacity does not need to be set; **Note:** · Please check the schematic to check the number of battery shunts. • The batteries controlled by a battery shunt are called a string of batteries. · If only one string of batteries is connected to the shunt, set it according to the actual battery capacity; · If multiple sets of batteries are connected to the same shunt and if the capacity of each set of batteries is the same, the capacity of multiple sets of batteries is based on the capacity of a single set of batteries x the number of sets, for example, two sets of 100 Ah batteries, the battery capacity is set to 100 x 2 = 200 Ah; · If multiple sets of batteries are connected to the shunt and if any set of batteries has a different capacity, the capacity of the multiple sets of batteries shall be set according to the minimum capacity * Number of batteries, for example, 3 sets of batteries, 1 set is 50 Ah, 1 set is 100 Ah, and 1 set is 200 Ah, the battery capacity is set to 50 * 3 = 150 Ah. Batteries of different capacities are connected in parallel, and the charging of the batteries is slow, so this configuration is not recommended.	100 Ah	12~5000

Parameter	Illustrate	Defaults	Range
Float Voltage	Float charge voltage for lead-acid batteries. For lithium batteries, if float charging is not required, set this voltage as boost charging voltage;	54.5	42 ~ Boost Charge Voltage
Boost Voltage	Boost charge voltage for lead-acid/lithium battery.	56	Float Charge Volt ~ 58.5
Charge Current Limit	This is the maximum charging current that should be allowed into the battery at any time, as regards to the nominal capacity of the battery. For example, a value of 0.2C10 means that the charging current is limited to 20% of the battery's nominal capacity. Note: C10 means the nominal capacity of the battery.	0 .1 C 10	0.1 ~ 1C 10

LCD operation

The steps for battery parameters setting are detailed in Fig 7-3.

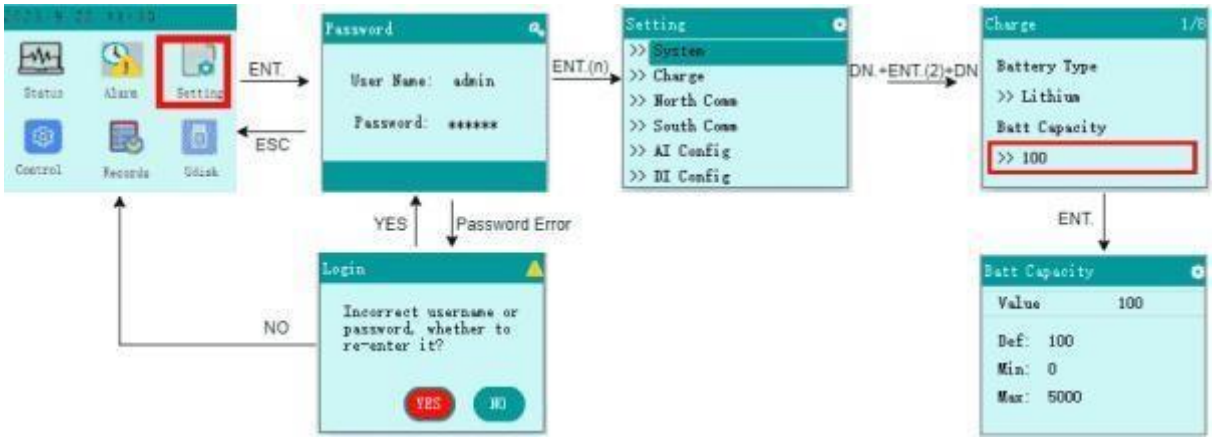

Fig 7-3 battery parameters setting on LCD

Web operation

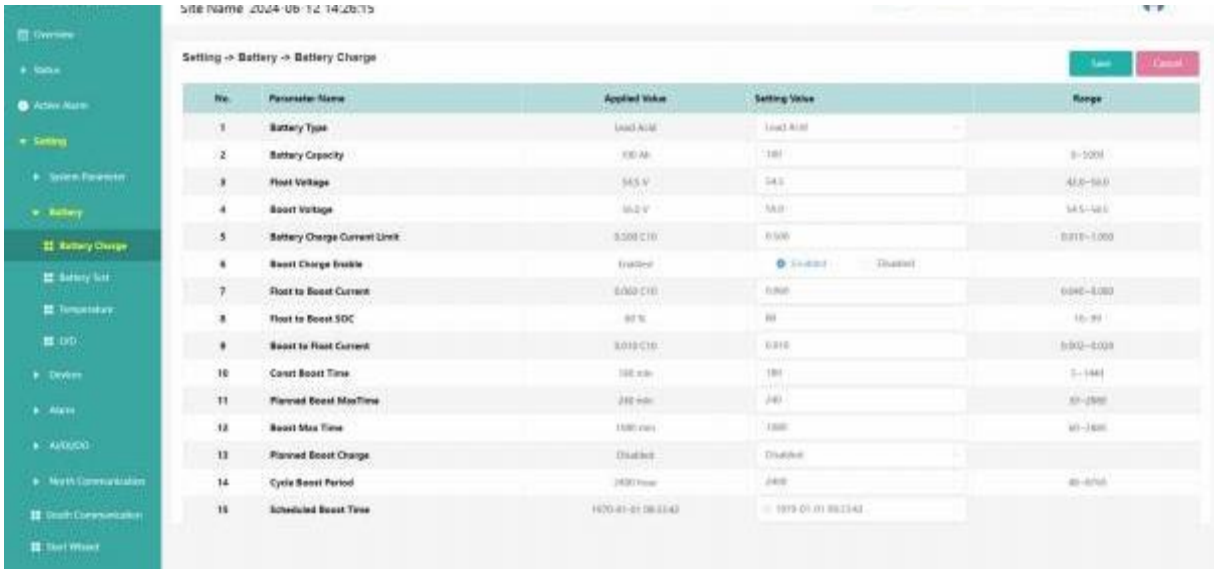

Fig 7-4 Battery Charge settings on Web

----The End

Date and Time Configuration

Background Information

Set the system date and time according to the actual local time zone and time.

NOTE:

If the controller power off for more than five days, the date and time will be reset to default. You need to set them again after powering on the controller.

LCD operation

The steps for date and time setting on the LCD are detailed in Fig 7-5.

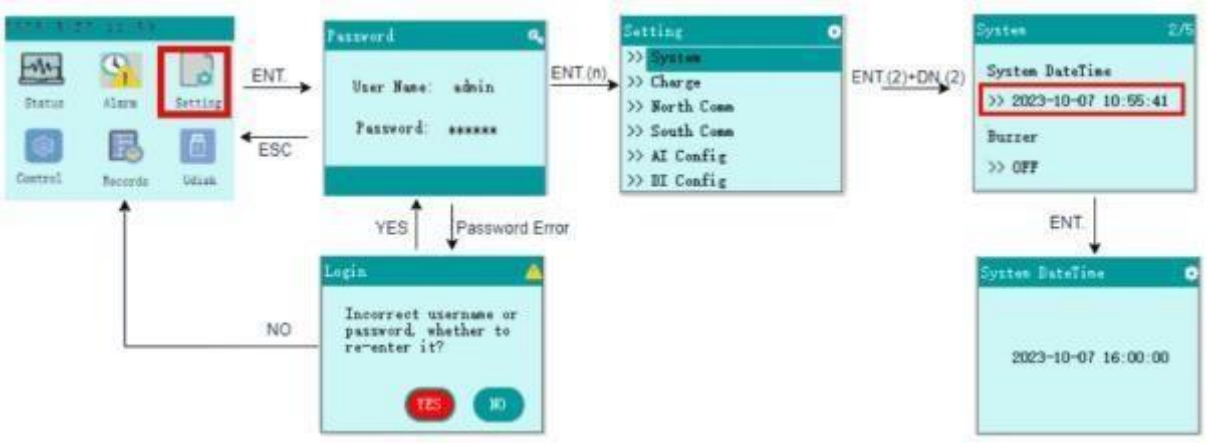

Fig 7-5 Date and time setting on LCD

NOTE:

Use the UP and DN keys to switch between the year, month and day.

Web operation

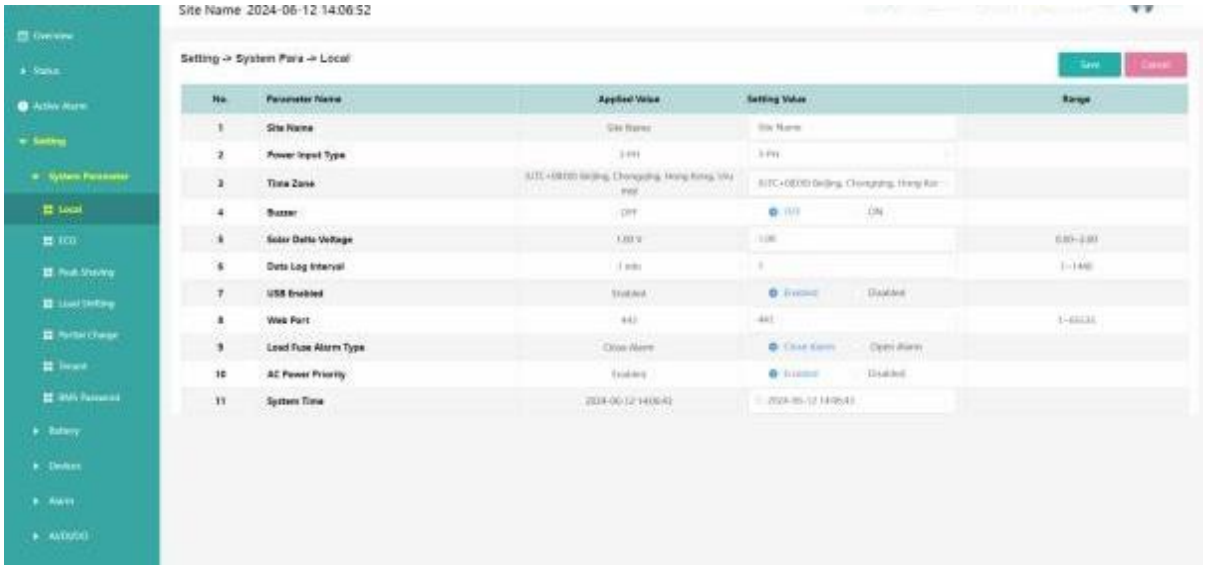

Fig 7-6 Date and time setting on web

----The End

Alarm Sound Configuration

Background Information

Users can enable or disable the alarm sound on the LCD or Web . When the alarm sounds, press any key can pause the alarm sound.

LCD operation

The steps for alarm sound setting on LCD are detailed in Fig 7-7.

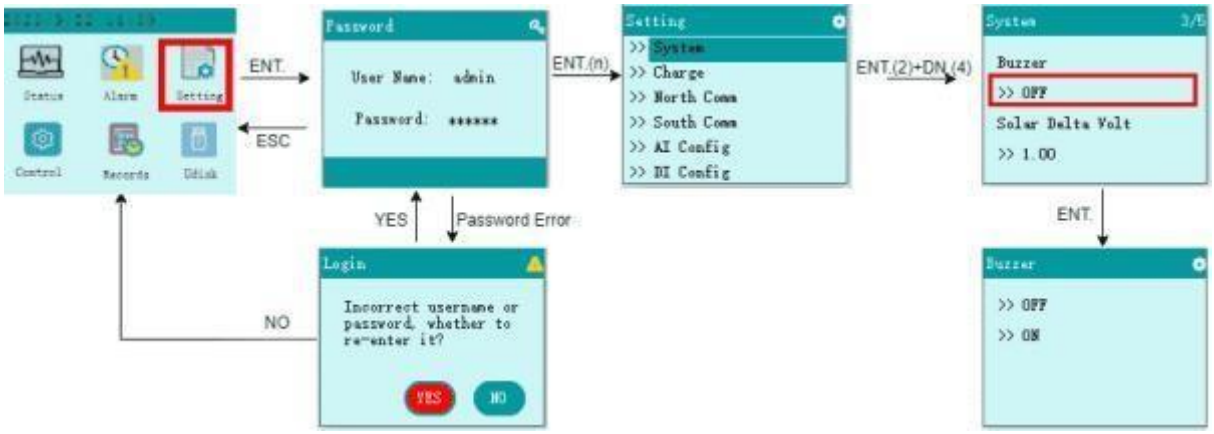

Fig 7-7 Alarm Sound Setting on LCD

Web operation

The steps for alarm sound setting on Web page are detailed in Fig 7-8.

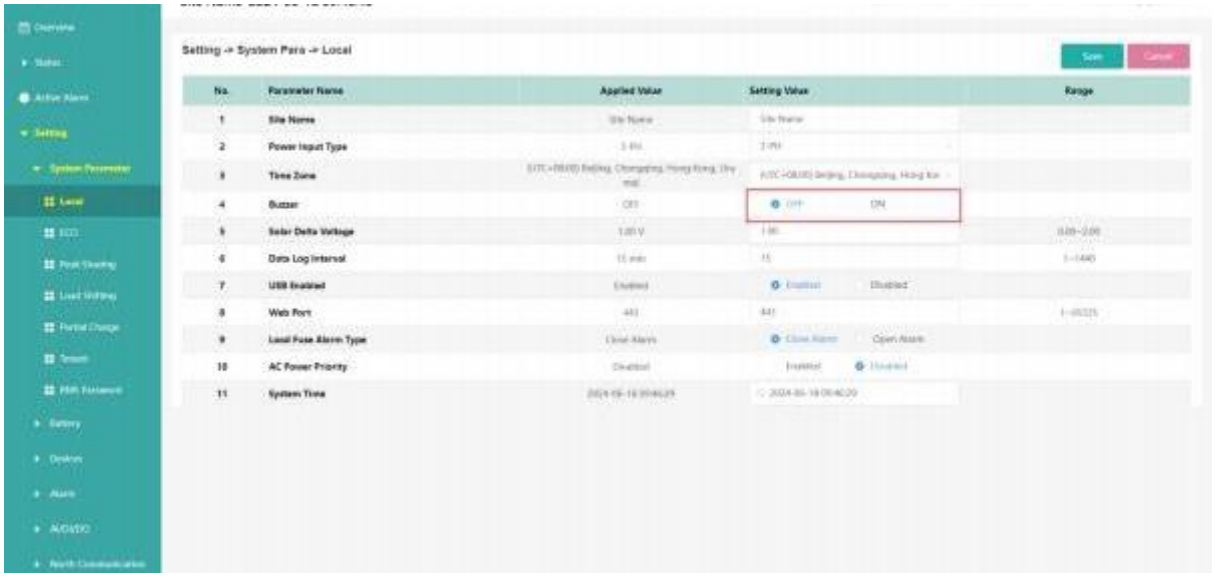

Fig 7-8 Alarm sound setting on Web

----The End

Alarm Configuration

Background Information

Alarms are classified into four severity: Major, Minor, Prompt and None. Users can set the severity of each alarm .

Tab 7-2 Alarm Severity

Warning level	Description
Major	After this type of alarm occurs, the communication function will fail. No matter at anytime, the user should take immediate measures to deal with it. The power system lights up the red alarm display light and emits sound alarm.
Minor	After this type of alarm occurs, it will seriously affect the working performance of the power system. No matter at anytime, the user should take measures to deal with it immediately. The power system lights up the red alarm display light and emits sound alarm.
Prompt	After this type of alarm occurs, the power system can temporarily maintain normal DC output. If it occurs during the duty time, it is required to take immediate measures to deal with it. If it does not occur during the duty time, it is required to deal with it at the beginning of the duty time. The power system lights up the yellow alarm indicator.
None	After the occurrence of such alarm, no sound and light indication will be raised.

And the alarm can be linked to the DO. When the linked alarm status changes, the DO status also changes. The Controller allows any alarm to be configured to be linked to a relayoutput (DO). Multiple alarms can be linked to one output dry contact. The default dry contact settings are shown in Tab 7-3.

Tab 7-3 Alarm name and default settings

No.	Alarm Name	Alarm Description	Default
1	Climate Alarm	Digital input 1 alarm, the user can define the alarm name and alarm mode	1
2	Door Alarm	Digital input 2 alarm, the user can define the alarm name and alarm mode	2
3	Load 1 fuse	Load 1 fuse/Branch disconnection alarm	3
4	Load 2 fuse	Load 2 fuse/Branch disconnection alarm	3
5	AC Failure	System AC input power outage	4

LCD operation

The steps for alarm severity setting on LCD are detailed in Fig 7-9.

Fig 7-9 alarm severity setting on LCD

Web operation

Step 1 : Click the "Setting" menu and select the ”Alarm Config“ from the "Alarm“ directory on Web page.

Step 2 : In this page ,you can configure alarm severity and linked DO.

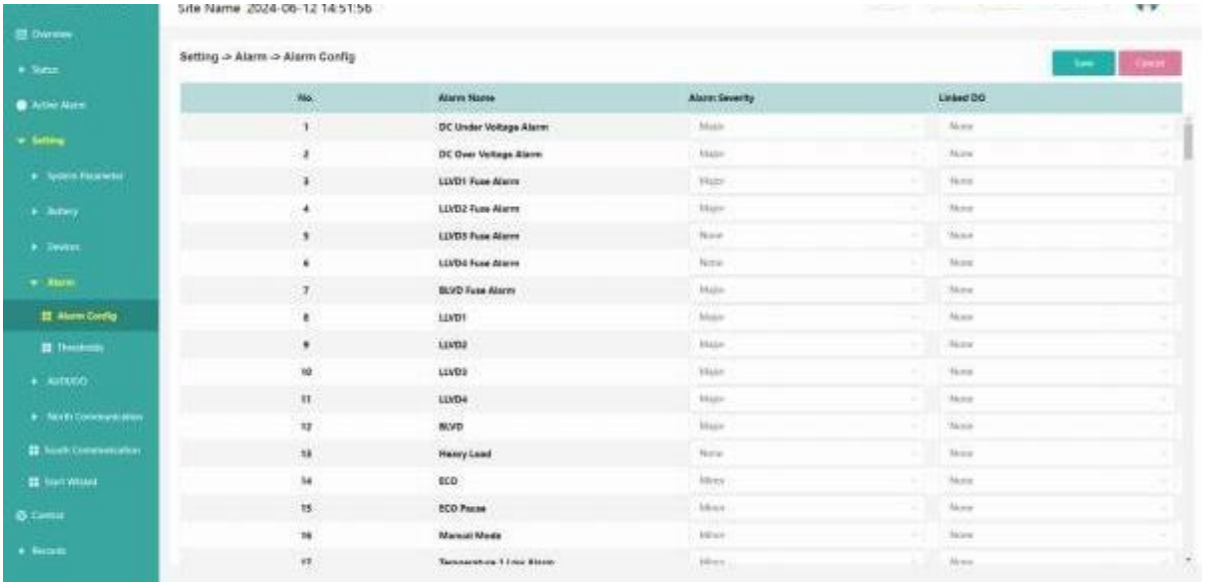

Fig 7-10 Alarm Configuration on Web

----The End

AI Configuration

Controller supports 5 analog sensors, and the purpose of each sensor can be configured, and each sensor can be set to detect ambient or battery temperature.

Temperature sensors 1 , 2 , 3 can be set as battery temperature sensors or no sensors; sensors 4 be set as Humidity Sensor by default and sensors 5 be set as Fuel Sensor by default .

DI Configuration

Background Information

The name of DI alarm can be set on LCD and Web. The DI name can only be set in English letters, but cannot be set in Chinese. The DI name supports up to 15 English characters. And the NO and NC status of each DI can be also set on LCD and Web. NO means that the DI is in the normal state when it is disconnected, and no alarm will be raised; similarly, NC means that the DI is in the normal state when it is connected, and there will be no alarm.

LCD operation

The steps for DI Name setting on LCD are detailed in Fig 7-11.

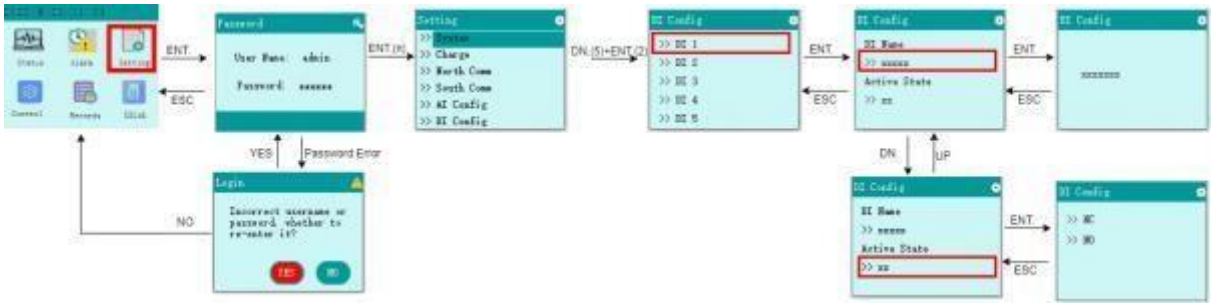

Fig 7-11 DI Name setting on LCD

Web operation

Step 1 : Click the "Setting" menu and select the "Digital input Config" from the "AI/DI/DO" directory on Web page.

Step 2 : In this page ,you can type in the name and set normal state ,alarm severity and linked DO.

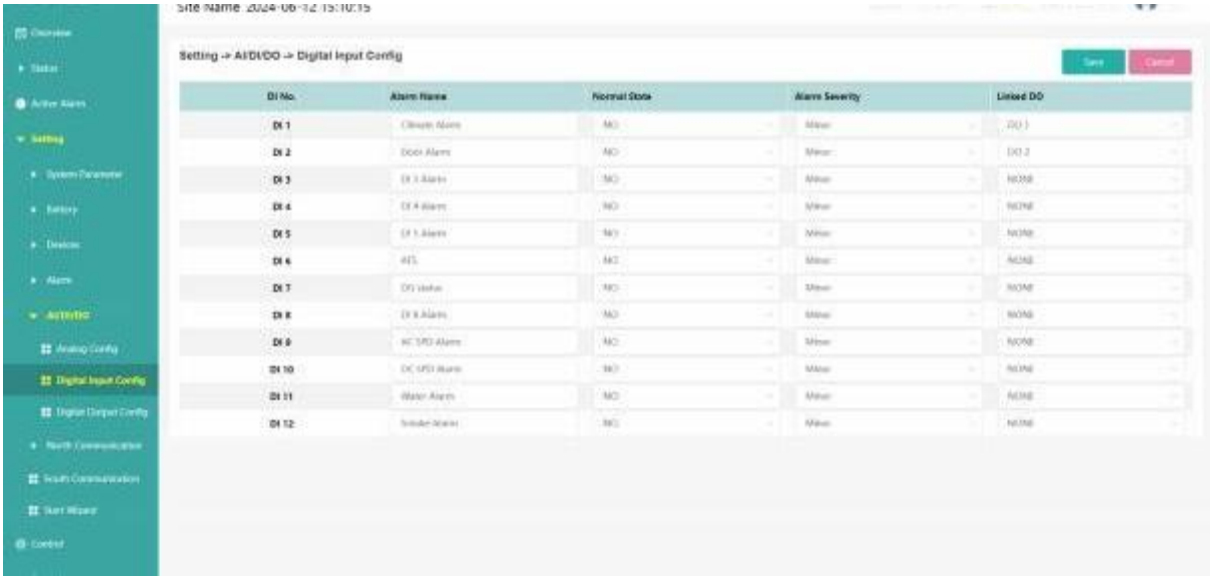

Fig 7-12 Digital input Config Settings on Web

----The End

DO Configuration

Background Information

The NO and NC status of DO can be set on LCD and Web. Controller allows any dry contact modify the normally open and normally closed state through configuration. If the output state of the dry contact is set to normally open by default, when the dry contact has no alarm, the node of the output relay is open, that is, normally open without alarm; When the dry contact generates an alarm, the node of the output relay is closed, that is, normally closed alarm.

Tab 7-4 Dry Contact output default state setting

No.	Default State
Dry Contact Output 1	NC
Dry Contact Output 2	NC
Dry Contact Output 3	NC
Dry Contact Output 4	NC
Dry Contact Output 5	NC
Dry Contact Output 6	NC
Dry Contact Output 7	NC
Dry Contact Output 8	NC

LCD operation

The steps for DO NO/NC setting on LCD are detailed in Fig 7-13.

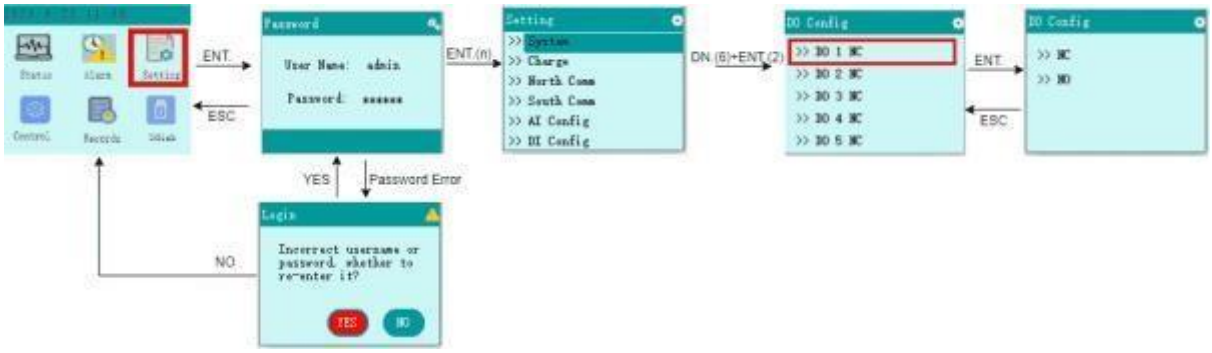

Fig 7-13 DO NO/NC setting on LCD

Web operation

Step 1 : Click the "Setting" menu and select the ”Digital output Config“ from the "AI/DI/DO“ directory on Web page.

Step 2 : In this page,you can select the NO and NC status of the DO, and the "Linked Events" are configured in "Alarm Config".

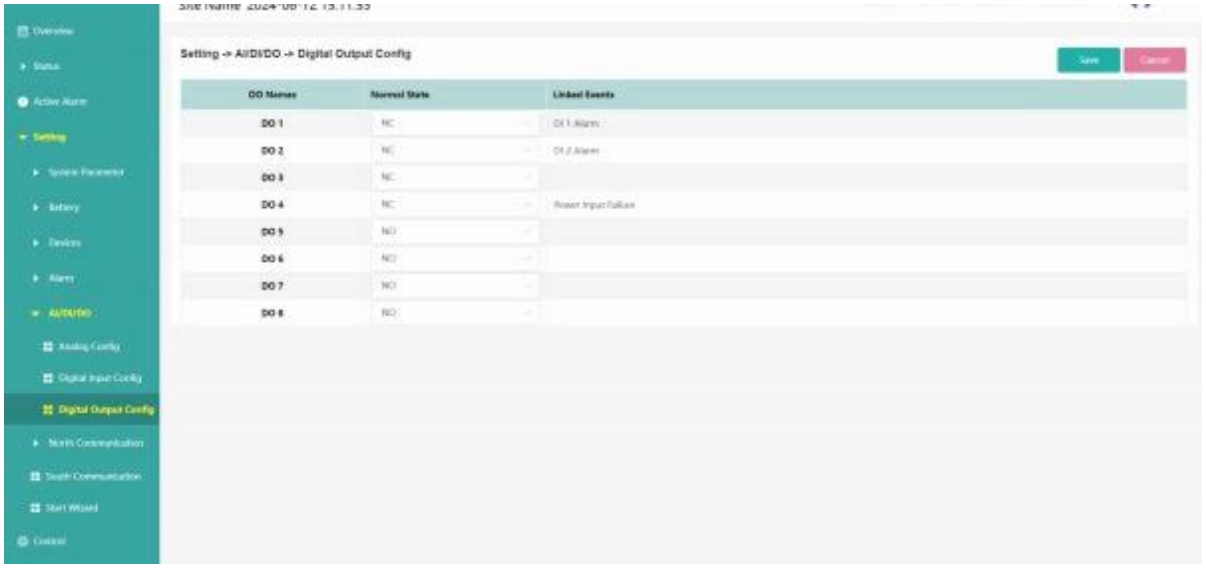

Fig 7-14 Digital output Config on Web

----The End

DG Configuration

Background Information

The DG Status can be set on LCD and Web. Controller allows the DG management.

Tab 7-5 DG management state transition table

Pre-migration state	Post-migration state	Migration condition

DG Stop	DG Run	All of the following conditions are satisfied(" AND "relation): 1. The DG DI is configured 2. The oil level is normal 3. The battery is in the state of recharge 4. DG priority
		All of the following conditions are satisfied(" AND "relation): 1. The DG DI is configured 2. Normal oil level 3. Daily startup is allowed 4. Daily startup time is reached
		All of the following conditions are satisfied(" AND "relation): 1. The DG DI is configured 2. Normal oil level 3. Monthly start allowed 4. Monthly start date reached 5. Monthly start time reached
		All of the following conditions are satisfied(" AND "relation): 1. The DG DI is configured 2. Normal oil level 3. AC power outage 4. Battery status is normal (see note) 5. Battery discharge 6. Battery was in cyclic charging state before AC power outage
		All of the following conditions are satisfied(" AND "relation): 1. DG DI configuration 2. Normal oil level 3. AC power outage 4. Normal battery status 5. Battery discharge 6. Voltage start enable 7. Main bus voltage lower than battery priority termination voltage (formerly "DG start voltage") 8. Delay 30 seconds

		All of the following conditions are satisfied(" AND "relation): 1. The DG DI is configured 2. Normal oil level 3. AC power outage 4. Normal battery status 5. Battery discharge 6. Capacity start enable 7. Battery capacity lower than battery priority termination capacity (formerly "DG start capacity") 8. Delay 30 seconds
DG Run	DG Stop	The DG DI is not configured
		DG running time timeout protection time
		All of the following conditions are satisfied(" AND "relation): 1. Low oil level shutdown enable 2. Low oil level warning
		All of the following conditions are satisfied(" AND "relation): 1. Low oil level shutdown enable 2. Low oil level warning
		All of the following conditions are satisfied(" AND "relation): 1. Daily start 2. Daily start runtime exceeded 1. Monthly start 2. Monthly start runtime exceeded
		All of the following conditions are satisfied(" AND "relation): 1. Capacity shutdown enable 2. Main bus voltage greater than battery recharge termination voltage (previously "Shutdown voltage") 3. SOC greater than battery recharge termination capacity (previously "Shutdown capacity") 4. Delay greater than set value

LCD operation

The steps for DI of DG status setting on LCD are detailed in Fig 7-15.

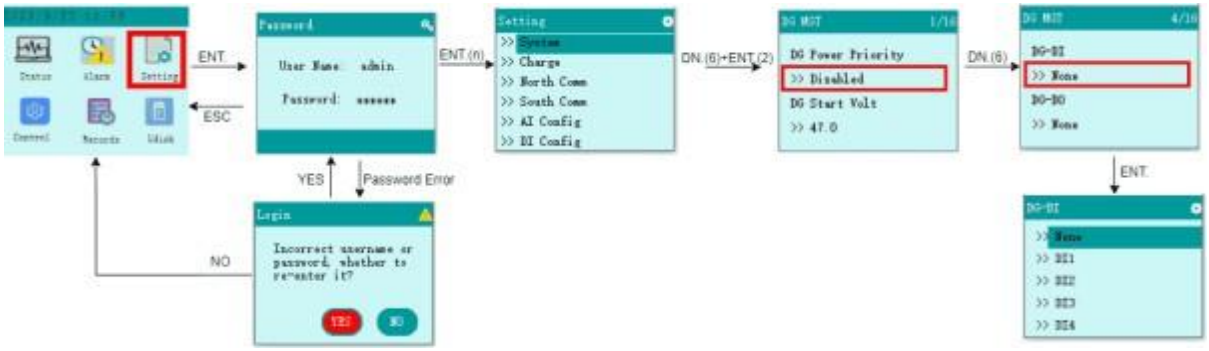

Fig 7-15 DI of DG status setting on LCD

Web operation

Step 1 : Click the "Setting" menu and select the ”DG“ from the "Devices“ directory on Web page.

Step 2 : In this page, you can set the state of various DG to manage the power of the first priority.

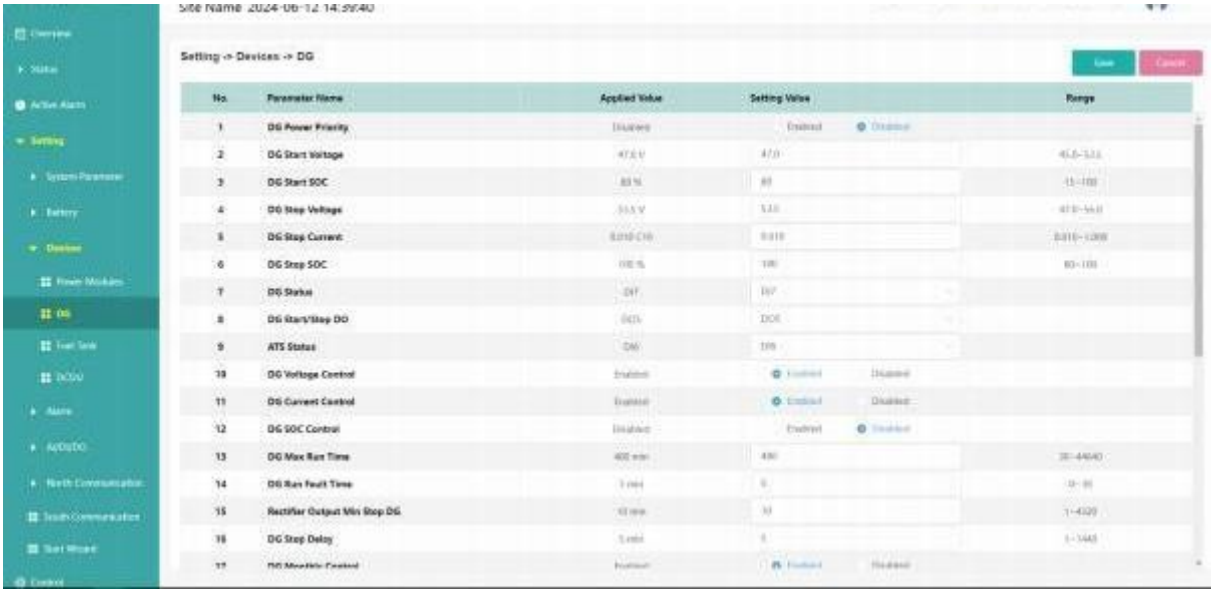

Fig 7-16 DG Management on Web

----The End

Northbound Communication Settings

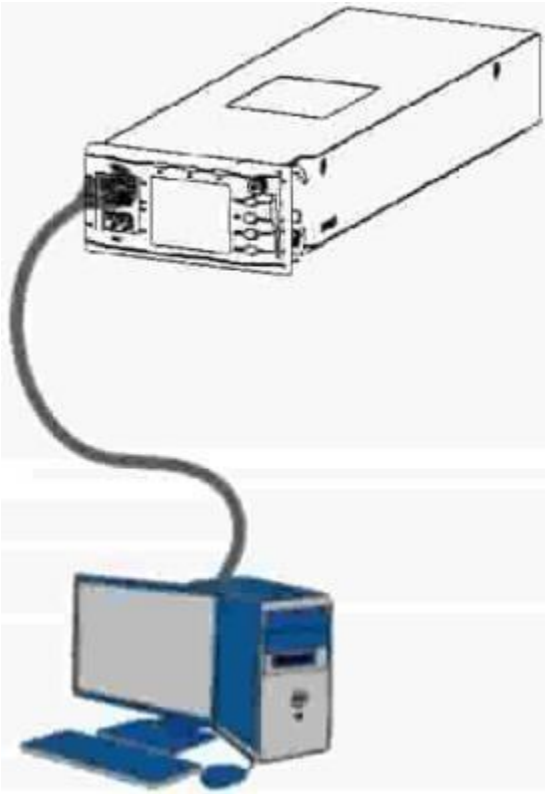

Fig 7-17 Network connection diagram

Step 1: Connect the network port of Controller to the network port of the PC through the network cable shown in Fig 7-18.

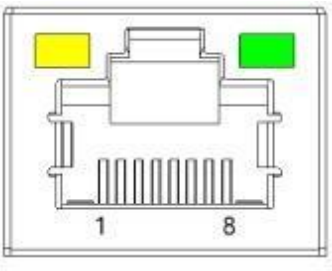

Fig 7-18 Northbound port

Tab 7-6 LAN port description

Pin#	1	2	3	4	5	6	7	8
signal name	-	-	RXD-	-	-	RXD+	TXD-	TXD+

Step 2: Set the IP address, subnet mask and gateway address. Detail in 6.5.6 Northbound Communication.

NOTE:

For the connection of the RS485 port, the controller is integrated in the backplane. After the controller is inserted into the enclosure, the connection is complete. For details about how to set parameters on the LCD, see 5.5.3 North Comm. For details about how to set parameters on the web, see 6.5.6.3 RS485 Settings.

Southbound Communication Settings

For the connection of the RS485 port, the controller is integrated in the backplane. After the controller is inserted into the enclosure, the connection is complete. For details about how to set parameters on the LCD, see 5.5.4 South Comm. For details about how to set parameters on the web, see 6.5.7 Southbound Communication .

Maintenance Common Operations

Backup Configuration

Background Information

Before maintenance, it is recommended to backup configuration first. If the controller parameters are changed incorrectly, you can import the backup configuration file to overwrite the incorrect parameters. In addition, if you have replaced a new controller, just import the original configuration file, no need to set parameters.

LCD operation

The steps for Exporting the configuration on LCD are detailed in Fig 7-19.

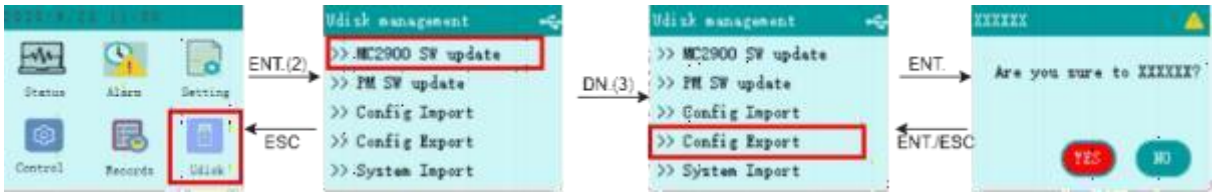

Fig 7-19 Config Export on LCD

Web operation

Step 1 : Login in Controller Web page through Chrome web browser.

Fig 7-20 Overview Page

Step 2 : Click the "Maintenance" menu and select the "Download/Upload" directory on Web page.

Fig 7-21 Download/Upload Page

Step 3 : Select the configuration file you want to export and click "Export".

Fig 7-22 Export Configuration File on Web

----The End

Software update

Background Information

Controller supports a variety of software update methods, Controller can update the software online on the Web, or through the U disk to copy the update package to the Controller software update. If you want to cancel this upgrade, the Controller also supports version rollback, which allows to go back to the last upgraded software version.

LCD operation

The steps for updating the software on LCD are detailed in Fig 7-23.

Fig 7-23 Software Update on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Controller SW" directory on Web page.

Fig 7-24 Controller Software Update Web

Step 2 : Confirm whether the current SW version is needed to upgrade on this page, and click the "Update".

Fig 7-25 Controller Software Update on Web

Step 3 : In the Computer folder, select the `powernew.tar.gz` you want to upgrade, click the "Open", The controller will start to upgrade.

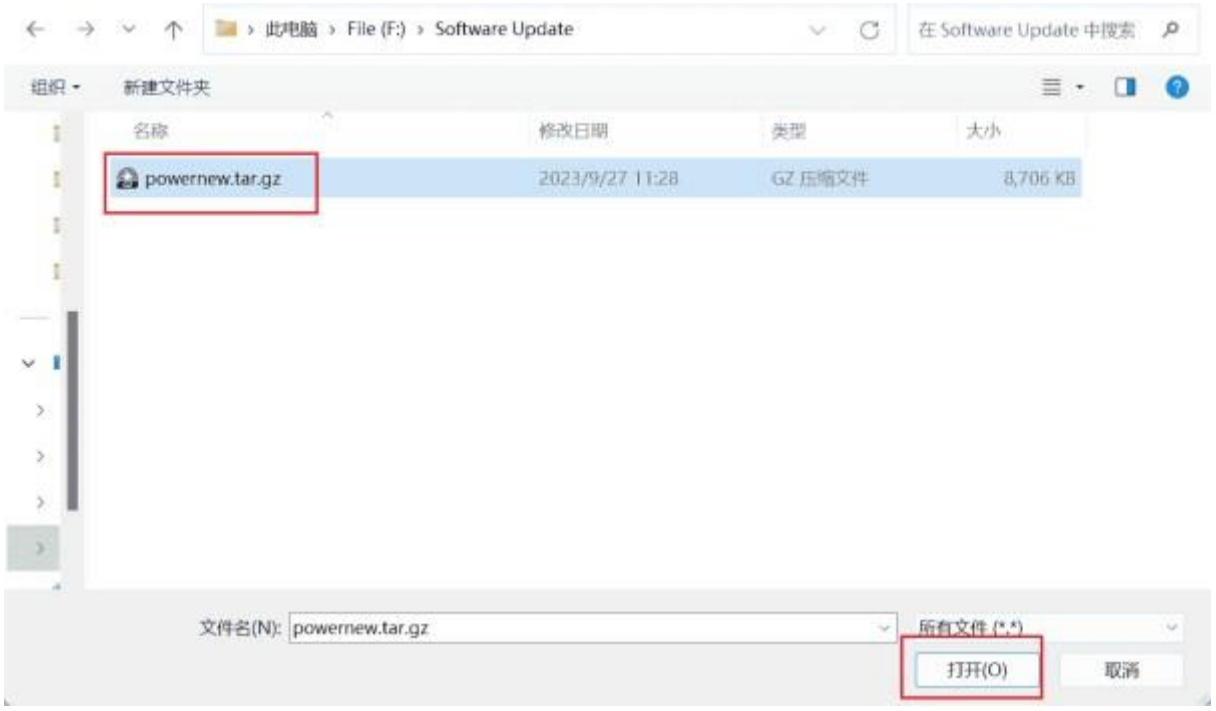

Fig 7-26 Controller Software Update on Web

Step 4 : When the progress bar shows 100% and the controller is upgraded, click "OK" to complete the upgrade.

Fig 7-27 Controller Software Update on Web

Step 5 : If you want to cancel this upgrade, click the "Rollback", the controller will go back to the last upgraded software version.

Fig 7-28 Controller Software Rollback

NOTE:

- Make sure there is only 1 web page is opened.
- Do not stay this page more than 3 mins without any action, otherwise click "Start App" to return to homepage, perform upgrade process again from step.

Update Fail Dealing Process

Background Information

During Upgrade, there might be some special condition lead to update fail, such as unstable network. If upgrade failure happens, please refer to below steps to check Controller status and do related action.

Phenomenon 1: Chrome show the reminder "can not access this page".

Phenomenon 2: Chrome no response more than 5 minutes.

Fig 7-29 Upgrade Fail

Step 1 : Try web visit again.

Close and re-open the web browser,visit Controller again. If the new page can visit Controller meanwhile jump to homepage automatically, then please update again details in 7.4.2 Software update. If the preceding operations still fail, go to Step 2.

Step 2 : Run "Ping" command to visit Controller

1. If request timed out, please check whether the network is good and stable.

```
C:\>ping 10.184.65.22

Pinging 10.184.65.22 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.184.65.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Fig 7-30 Time Out

2. If response is OK, the web service of Controller is dead, go to Step3.

```
C:\>ping 10.184.65.21

Pinging 10.184.65.21 with 32 bytes of data:
Reply from 10.184.65.21: bytes=32 time=21ms TTL=120
Reply from 10.184.65.21: bytes=32 time=10ms TTL=120
Reply from 10.184.65.21: bytes=32 time=10ms TTL=120
Reply from 10.184.65.21: bytes=32 time=14ms TTL=120

Ping statistics for 10.184.65.21:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 21ms, Average = 13ms
```

Fig 7-31 Normal network connection

Step 3 : Restart Controller

Perform the upgrade according to Section 7.4.2 Software update. If the upgrade still fails, the Controller may have problem, suggest change a new Controller.

Import configuration file

LCD operation

The steps for importing configuration file on LCD are detailed in Fig 7-32.

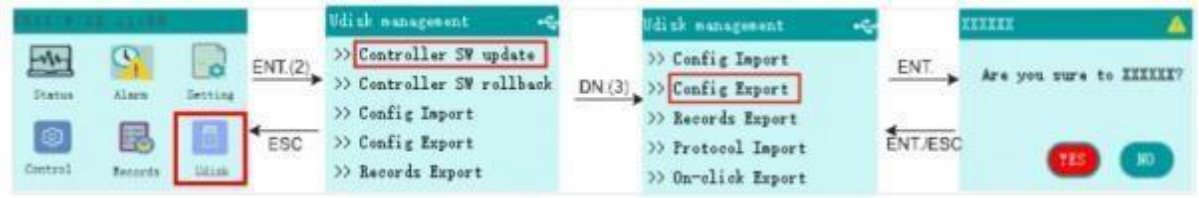

Fig 7-32 Import configuration file on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Configuration File" directory on Web page.

Fig 7-33 Configuration File Page

Step 2 : Click "ADD" button,and then select file.

Fig 7-34 Configuration File Page

Exporting System History Data

LCD operation

The steps for exporting system history data on LCD are detailed in Fig 7-35.

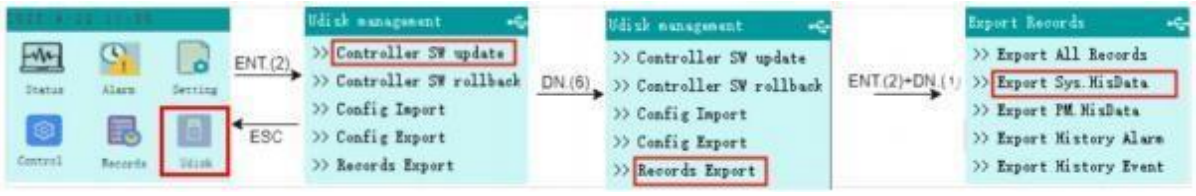

Fig 7-35 Exporting System History Data on LCD

Web operation

Step 1 : Click the "Record" menu and select the "Sys.Hisdata" directory on Web page.

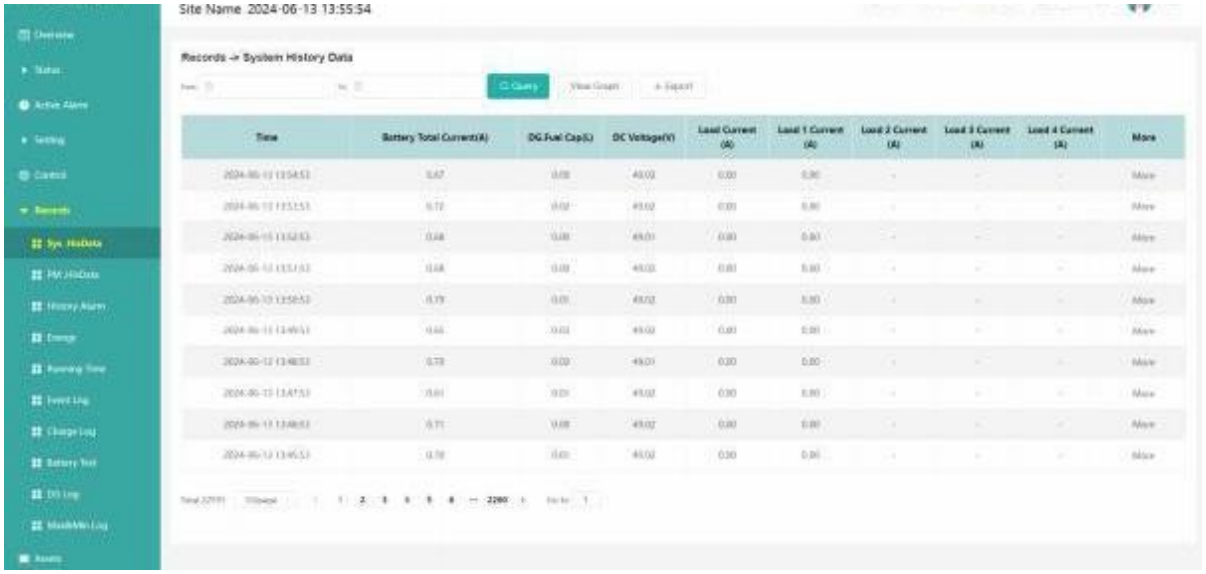

Fig 7-36 Start Exporting System History Data

Step 2 : Click the "Export" button

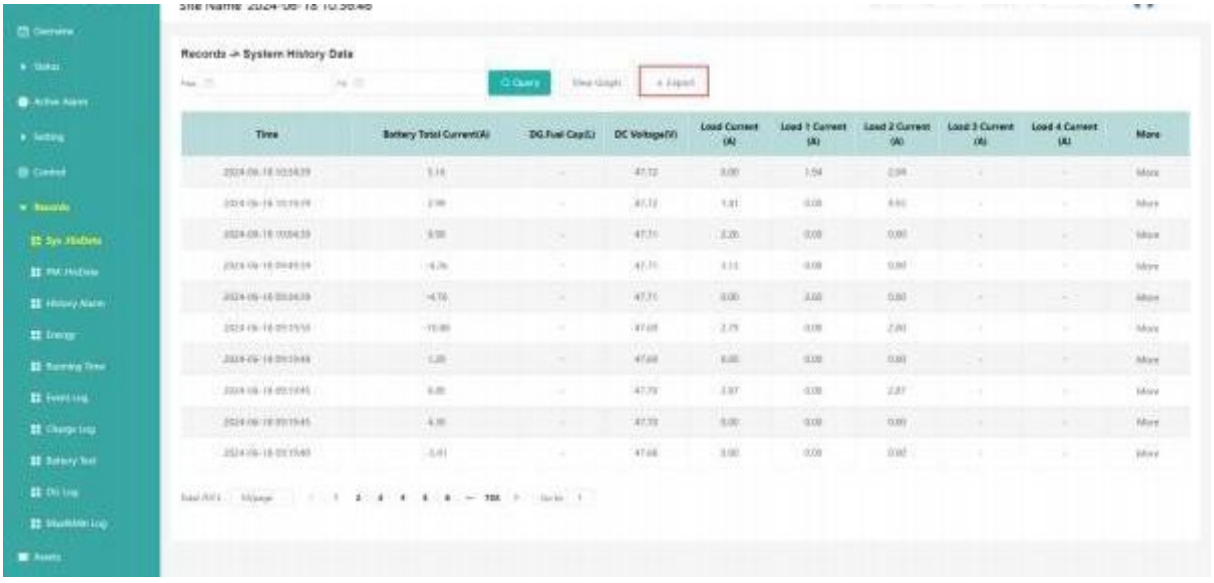

Fig 7-37 Exporting System History Data

Step 3 : When the progress bar shows 100% and the controller is upgraded, click "OK" to complete the download.

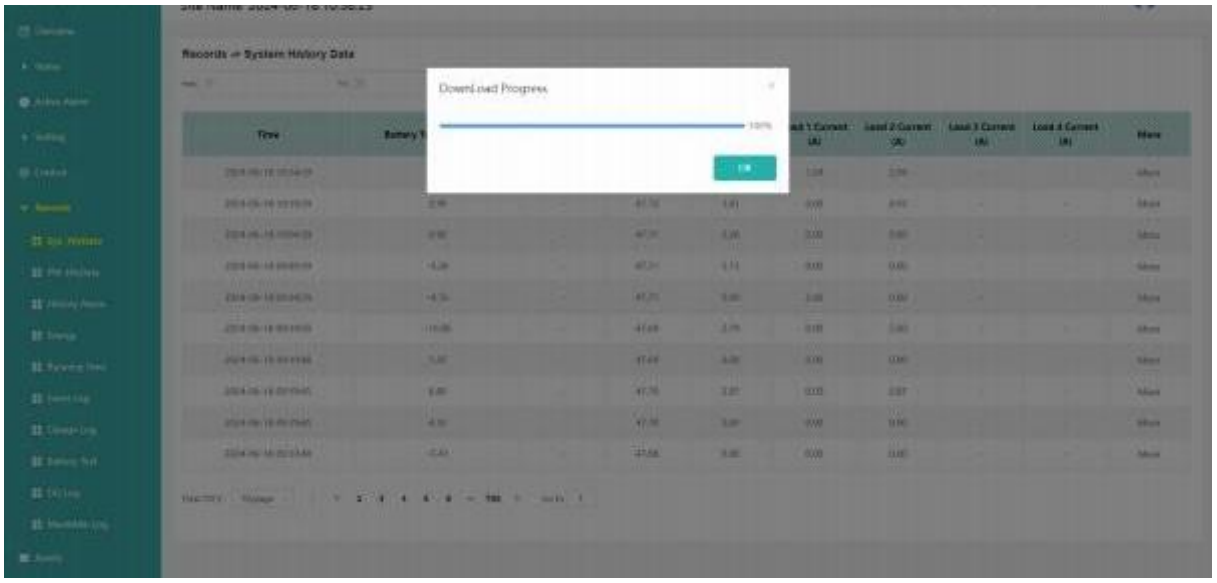

Fig 7-38 Download Exporting System History Data

Step 4 : In the download management page of the browser, you can see the download System history data file.

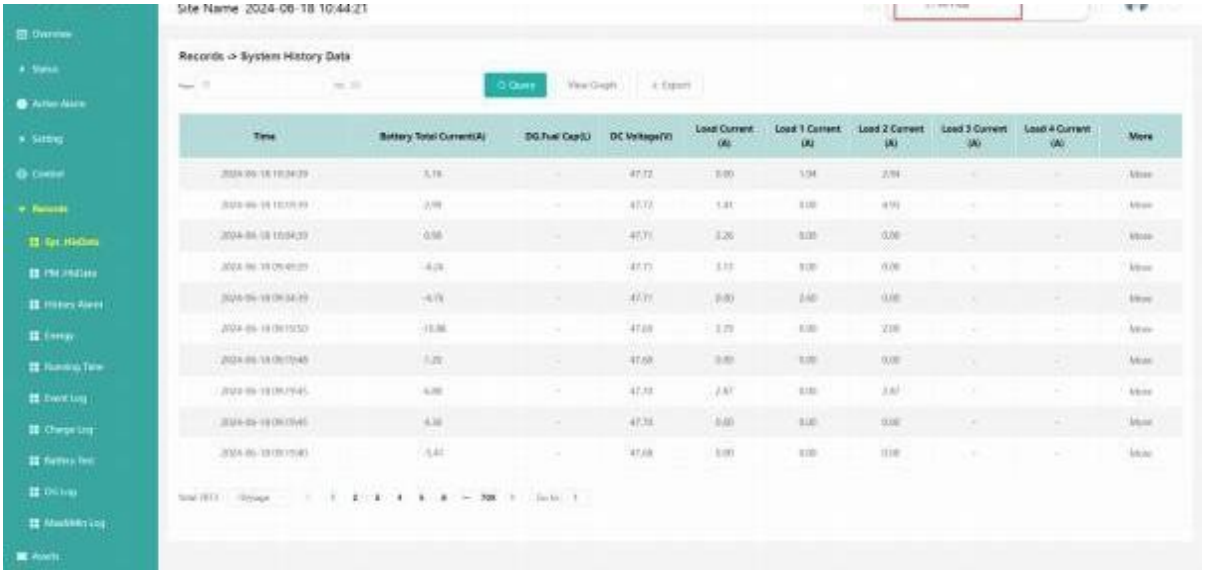

Fig 7-39 Exporting System History Data Successfully

----The End

Restore factory configuration

Background Information

After the "restore factory configuration" operation, all parameter values are reset to factory default values . It is recommended to backup the configuration before restoring the factory configuration.

LCD operation

The steps for restoring the factory configuration on LCDare detailed in Fig 7-40.

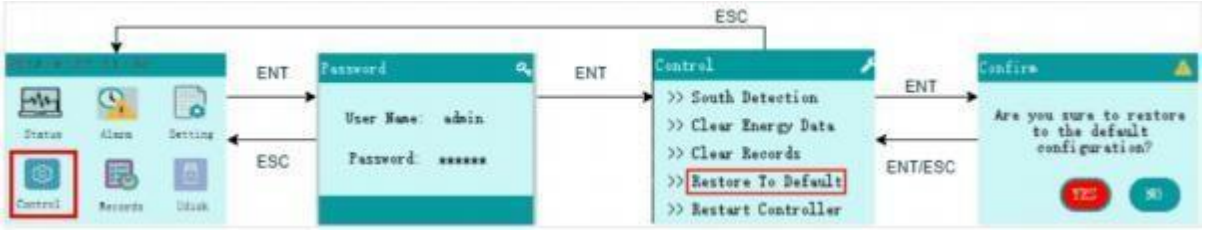

Fig 7-40 restoring the factory configuration on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Other Control" directory on Web page.

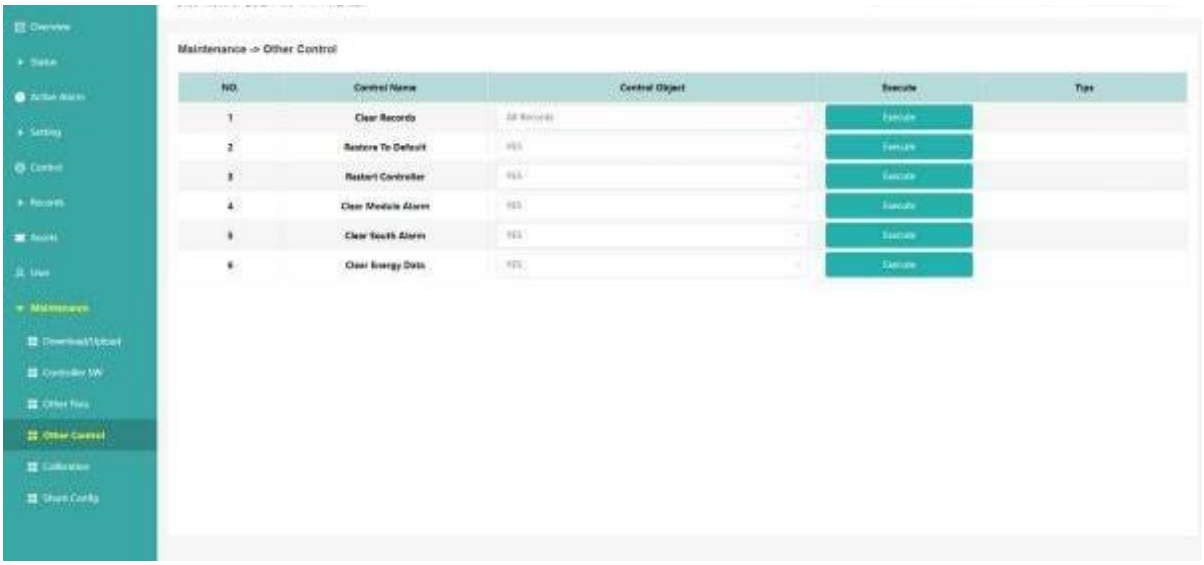

Fig 7-41 Restoring the factory configuration on Web

Step 2 : Select "Restore To Default",click the "Execute " button, the controller will restart and restoring the factory configuration.

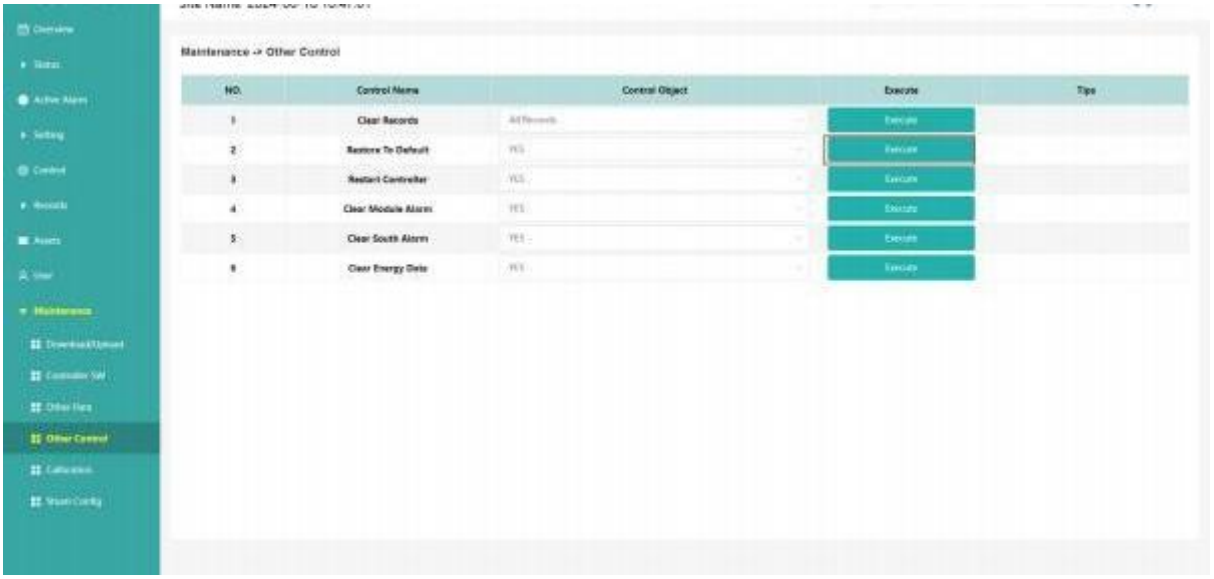

Fig 7-42 Restoring the factory configuration on Web

NOTE:

After the "restore factory configuration" operation, all parameter values are reset to factory default values . It is recommended to backup the configuration before restoring the factory configuration.

----The End

Restart the controller

Background Information

Restart function can be set on Web and LCD.

LCD operation

The steps for restoring the factory configuration on LCD are detailed in Fig 7-43.

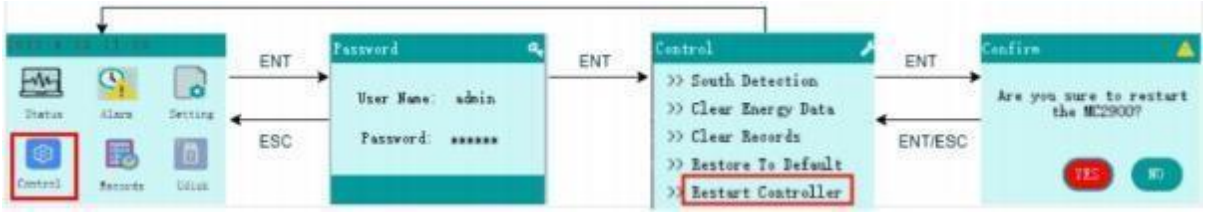

Fig 7-43 Restart the controller on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Other Control" directory on Web page.

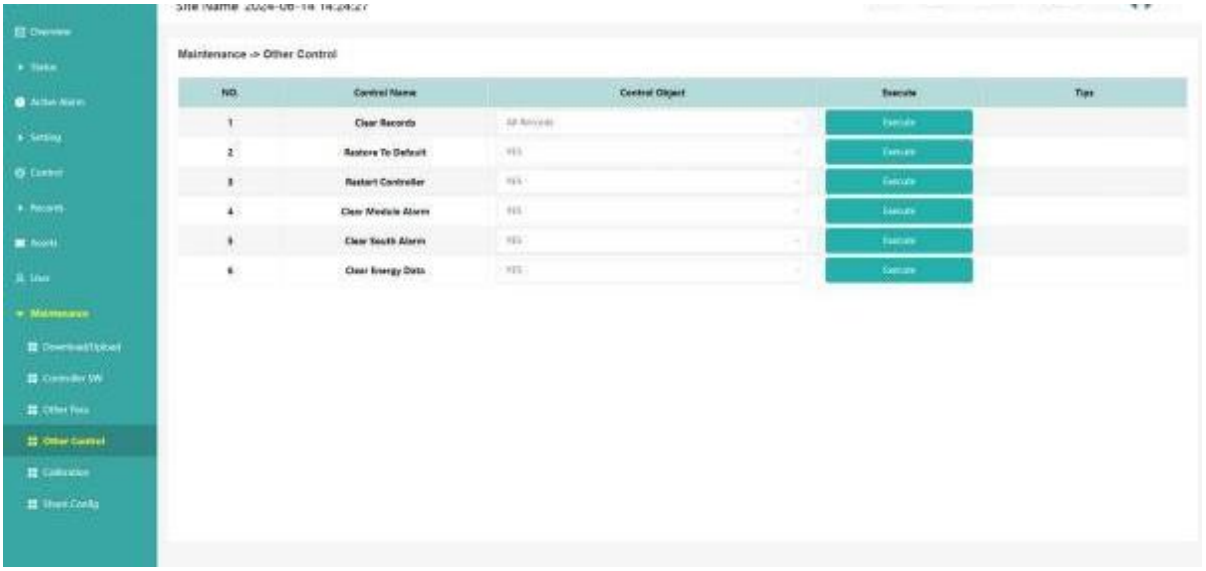

Fig 7-44 Restart the controller on Web

Step 2 : Select "Restart Controller", click the "Execute " button, the controller will restart.

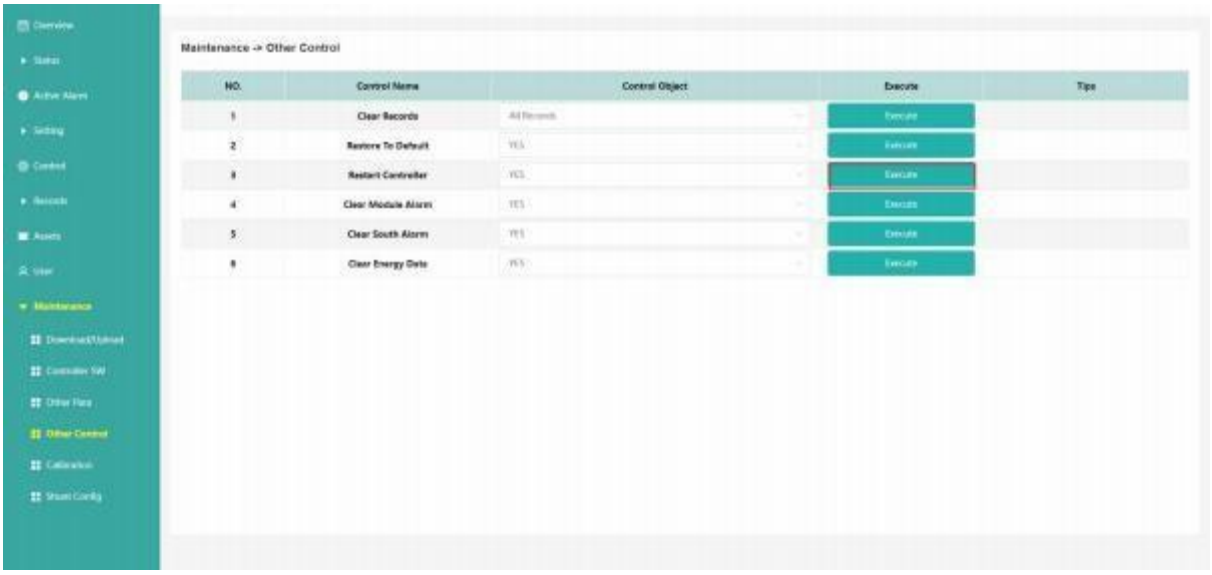

Fig 7-45 Restart the controller on Web

----The End

User Management

Background Information

Web users are divided into four roles: Supervisitor, Administrator, Operator, Guest. The permission allocation of each role is shown in Tab 7-7.

Supervisitor > Administrator > Operator > Guest

1. Supervisitor can add, delete, change and check the username, password and role of Administrator, Operator and Guest.
2. Administrator can add, delete, change and check their own username, password, role.
3. Administrator can't add, delete, change and check other Administrator' username, passwords, and roles.
4. Administrator can add, delete and change the username, password and role of the Operator and Guest.
5. Operator and Guest can only change their own username and passwords.

The supported strings for users and passwords are as follows:

User Name: `- ._[a-z][A-Z][0-9]`

Password : `!"#$%& '()*+ ,- ./ : ;<=>?@[\]^_`{ |}~[a-z][A-Z][0-9]`

Tab 7-7 User role permission assignment table

Permission\Role	Supervisitor	Administrator	Operator	Guest
Status & Alarm View	√	√	√	√
Parameter Export	√	√	√	
Record Export	√	√	√	
Normal Parameter Setting	√	√	√	
Calibration Parameter Setting	√	√	√	
Manual Control	√	√	√	
Parameter Import	√	√	√	
Clear Module Alarms	√	√	√	
Restore Default Parameters	√	√	√	
Clear History Records	√	√	√	
Software Update	√	√	√	
User Management	√	√		
Restore Factory Settings	√	√		
Protocol Configuration	√			

Web operation

Step 1 : Click the "User" menu on Web page.

Fig 7-46 User Management on Web

Step 2 : Click the "ADD" button to create a new username.

Fig 7-47 Create a New Username

Step 3 : Add the username and password, select the permission and click "OK" to add the user successfully.

Fig 7-48 Select the Permission

Step 4 : New user added successfully.

Fig 7-49 Added User Successfully

----The End

Modify LCD password

Background Information

To ensure safety, when performing related control and setting operations on the LCD, a password is required. It is recommended to update the password regularly.

The password can be composed of numbers, uppercase letters and lowercase letters. The maximum length is 4 characters.

LCD operation

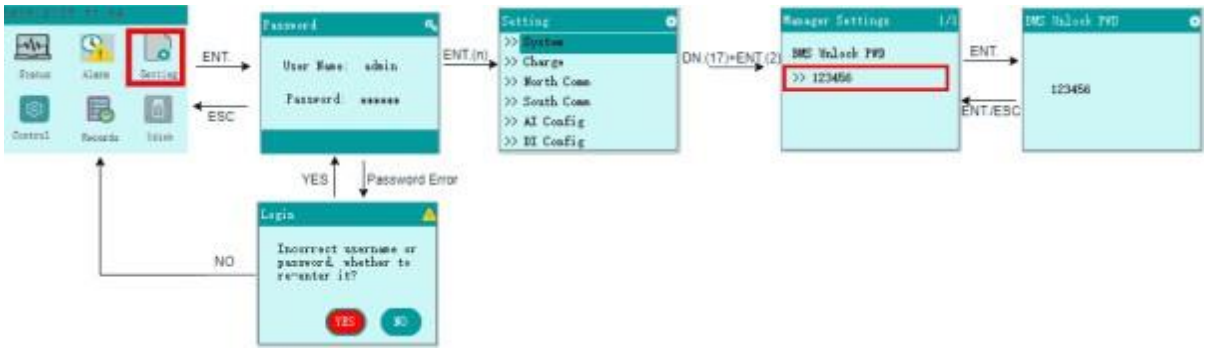

Fig 7-50 Modification password on LCD

View active alarms

LCD operation

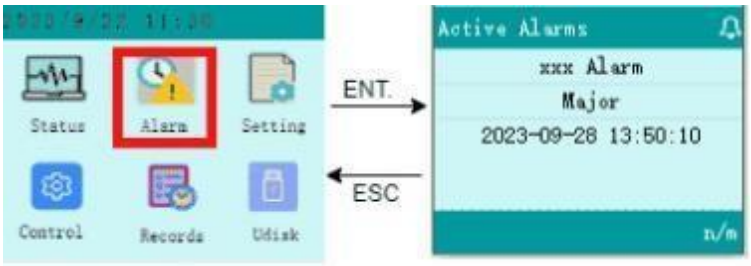

Fig 7-51 View active alarms on LCD

Web operation

Fig 7-52 View active alarms on Web

----The End

View history alarms

Background Information

History alarms means the cleared alarms.

LCD operation

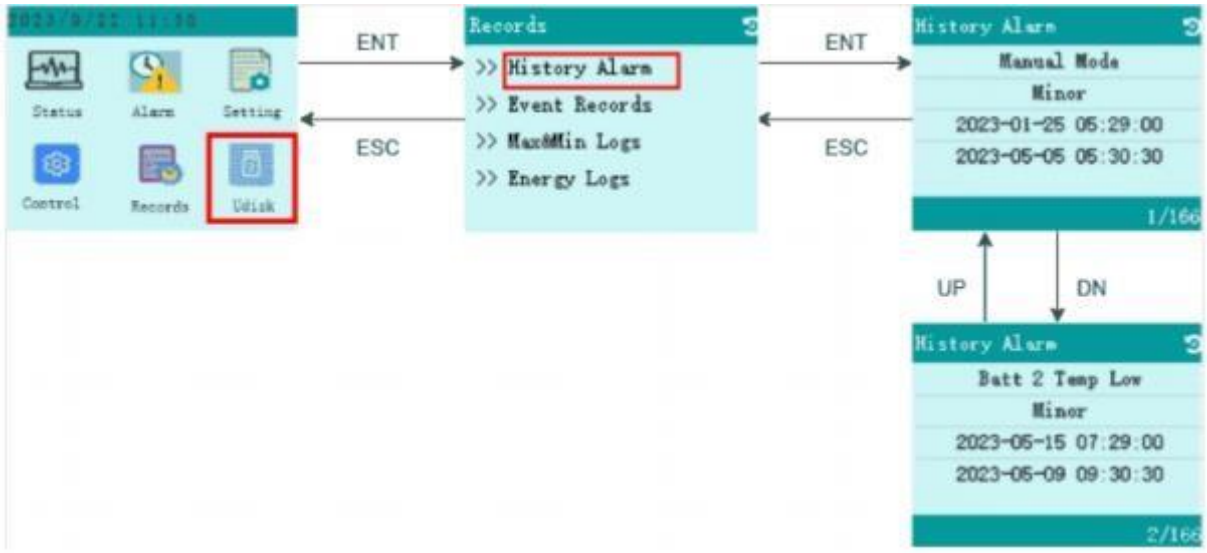

Fig 7-53 View history alarms on LCD

Web operation

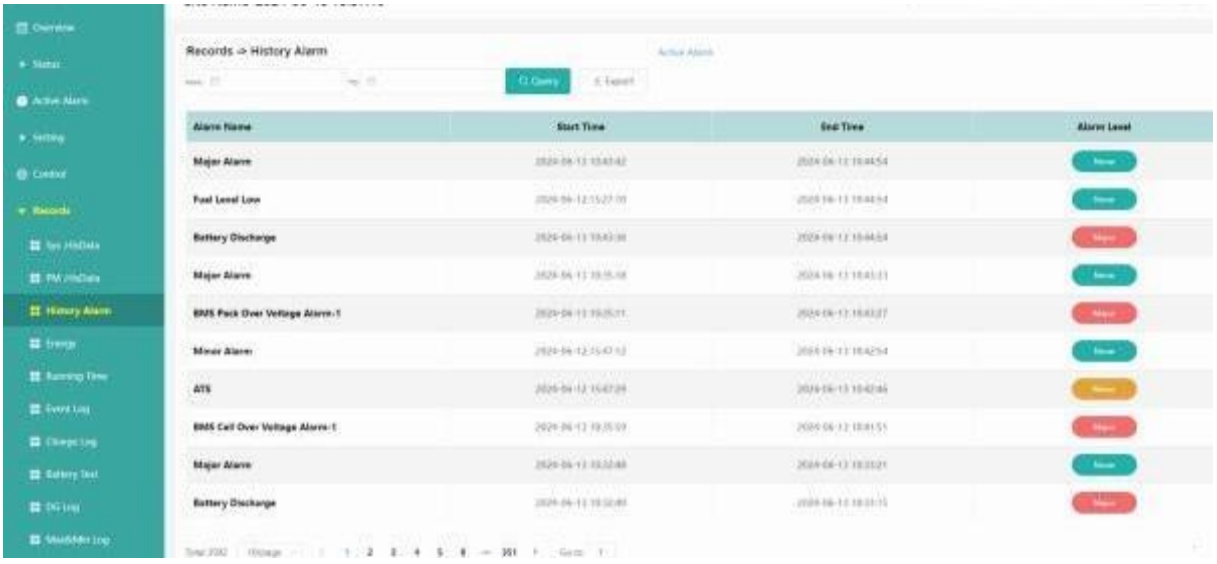

Fig 7-54 View history alarms on Web

----The End

Clear history alarms

LCD operation

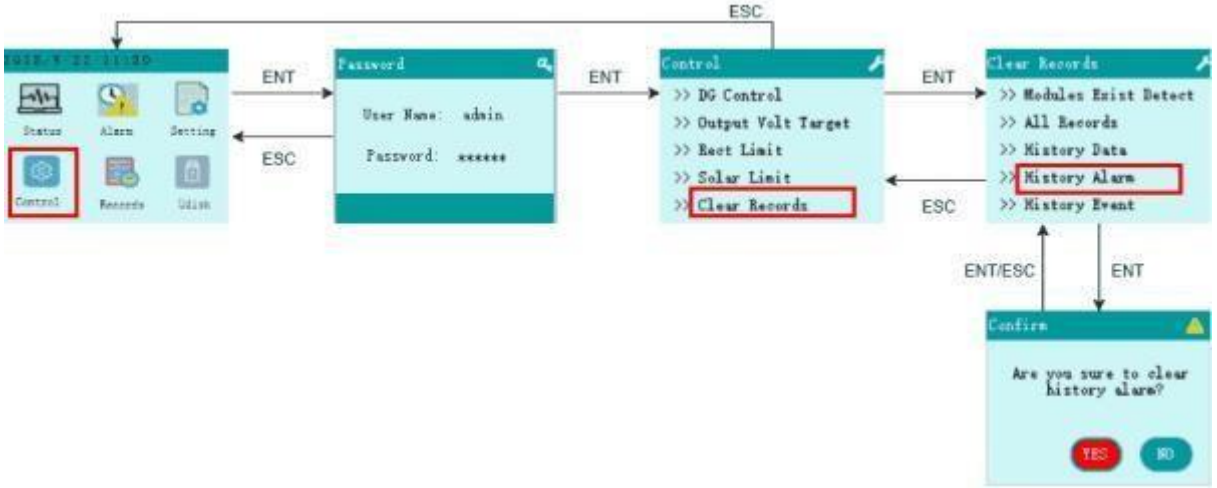

Fig 7-55 Clear history alarms on LCD

Web operation

Step 1 : Click the "Maintenance"menu, then click the "Other Control" button;Select "History Alarm" from the "All Records" drop-down box.

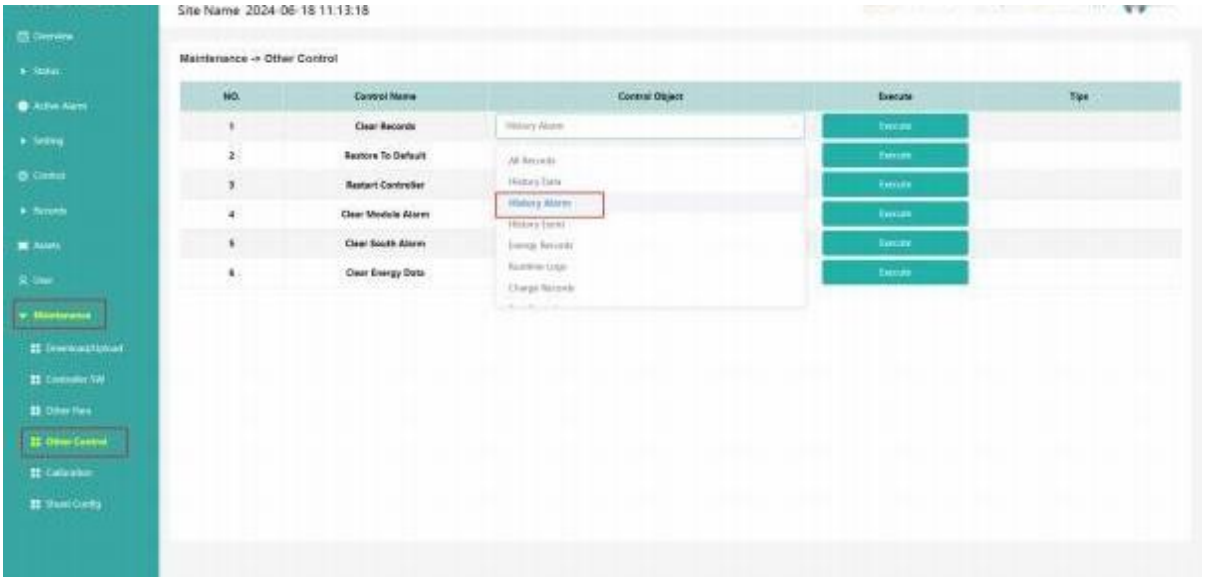

Fig 7-56-1 Clear history alarms on Web

Step 2 : Then click the "Execute" button.

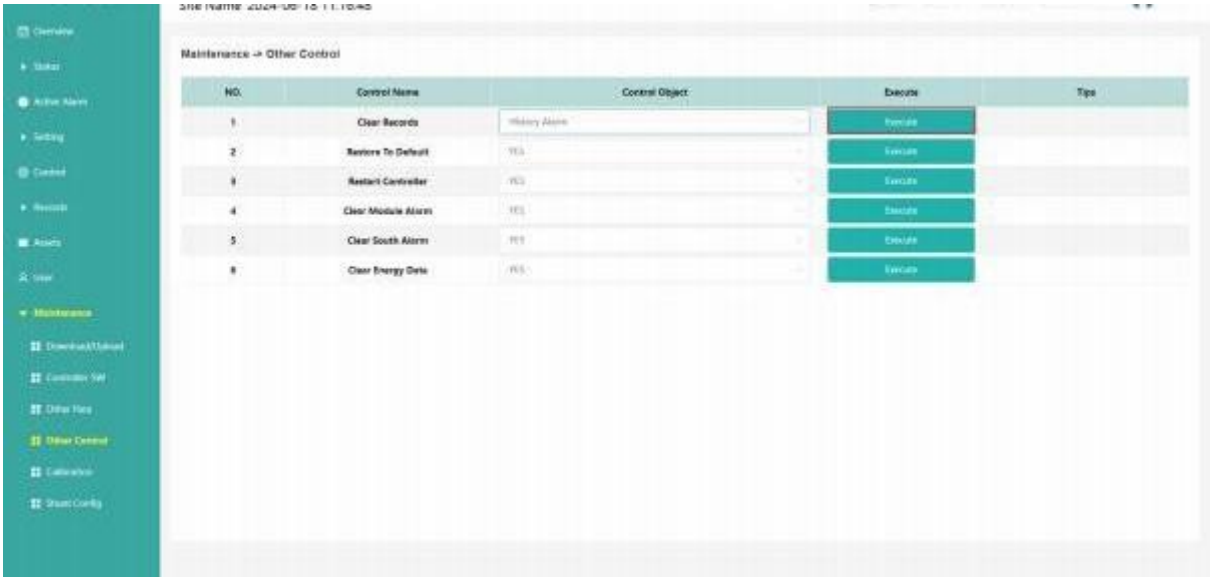

Fig 7-56-2 Clear history alarms on Web

----The End

Auto/Manual Mode Management

NOTE:

- To switch to manual mode, there cannot be any of active alarm
- After switching to manual control mode, it will automatically switchback to automatic control mode after 30 minutes(settable), and you can also manually switchback to automatic control mode at anytime.

LCD operation

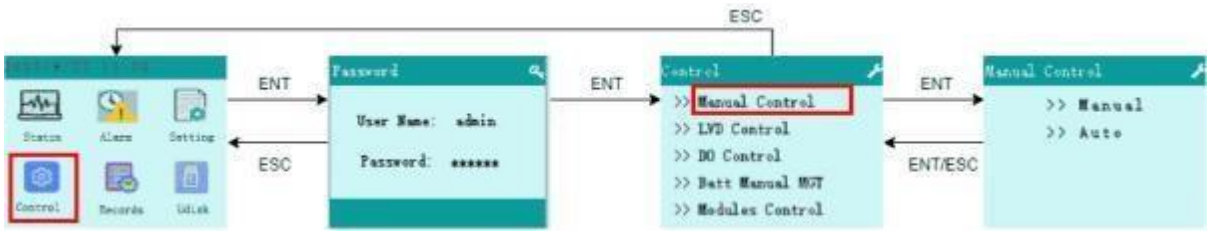

Fig 7-57 Auto/Manual Control Mode switching on LCD

Web operation

Step 1 : Click the "Control"menu, select "Control Mode"and click "Execue" button.

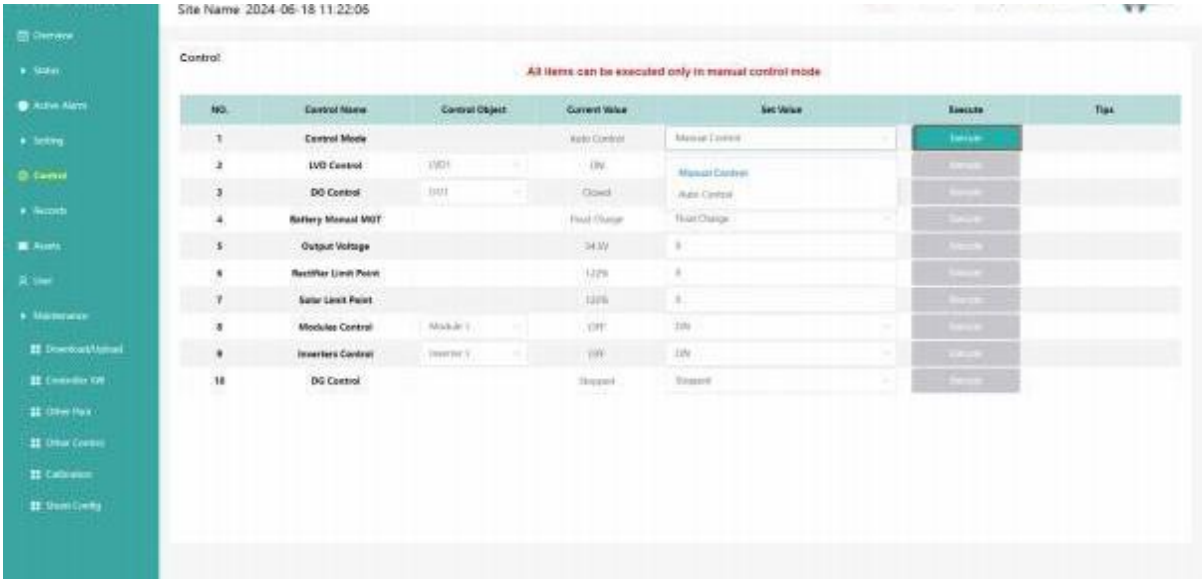

Fig 7-58 Auto/Manual Control Mode switching on Web

----The End

Boost/Float charging switching

NOTE:

- To switch to manual mode, there cannot be any of active alarm
- In manual control mode, the user can manually control the Boost and Float charging of the battery. After the user starts the Boost charging manually, the battery remains in the Boost charging state even if the Controller returns to the automatic control mode, and when the condition for switching to Float charging is reached (such as the Boost charging protection time is up, etc.), it will automatically switch to the Float charging state.
- In manual control mode, the controller does not automatically switch between Float and Boost charging states

.

LCD operation

Step 1 : Set the "Sys Control Mode" to "Manual".

Step 2 : Manually control Boost charging and Float charging state of the battery.

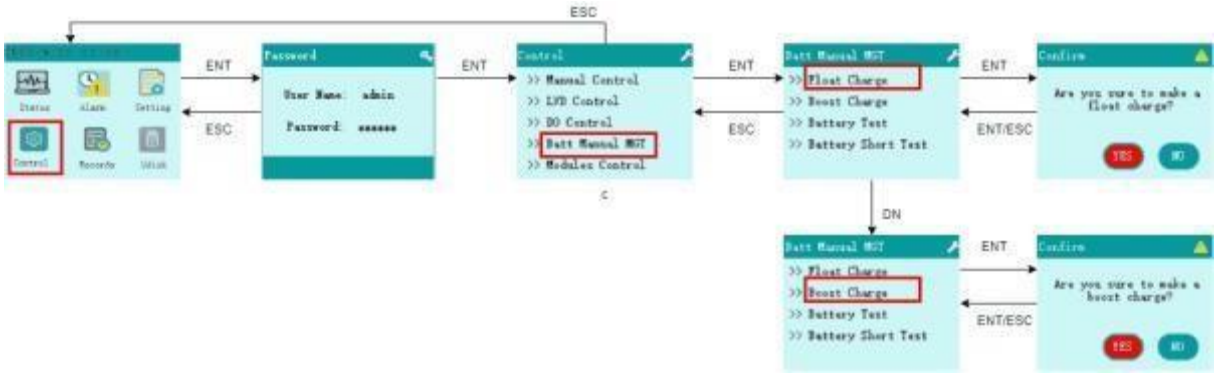

Fig 7-59 Boost/Float charging switching on LCD

BLVD Configuration

Battery connection and disconnection

Background Information

In manual control mode, the user can manually control connection or disconnection of the battery.

NOTE:

If the battery isdisconnected, when AC failure, all loads will be disconnected. Please be cautious.

LCD operation

Step 1 : Set the "Sys Control Mode" to "Manual".

Step 2 : Manually control connection and disconnection of the battery.

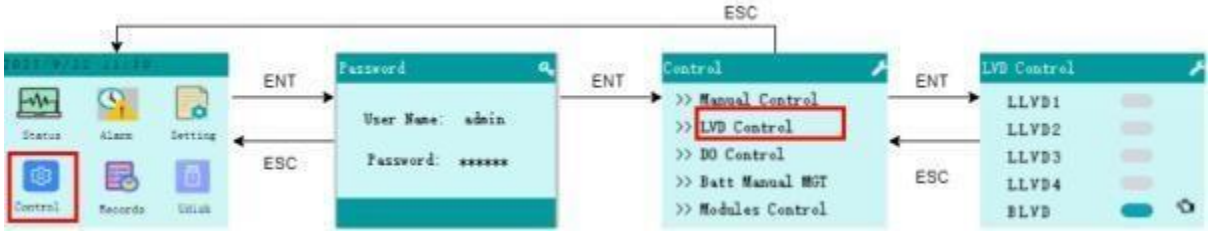

Fig 7-60 Battery connection and disconnection control on LCD

Web operation

Step 1 : Click the "Control" menu, select "BLVD Control".

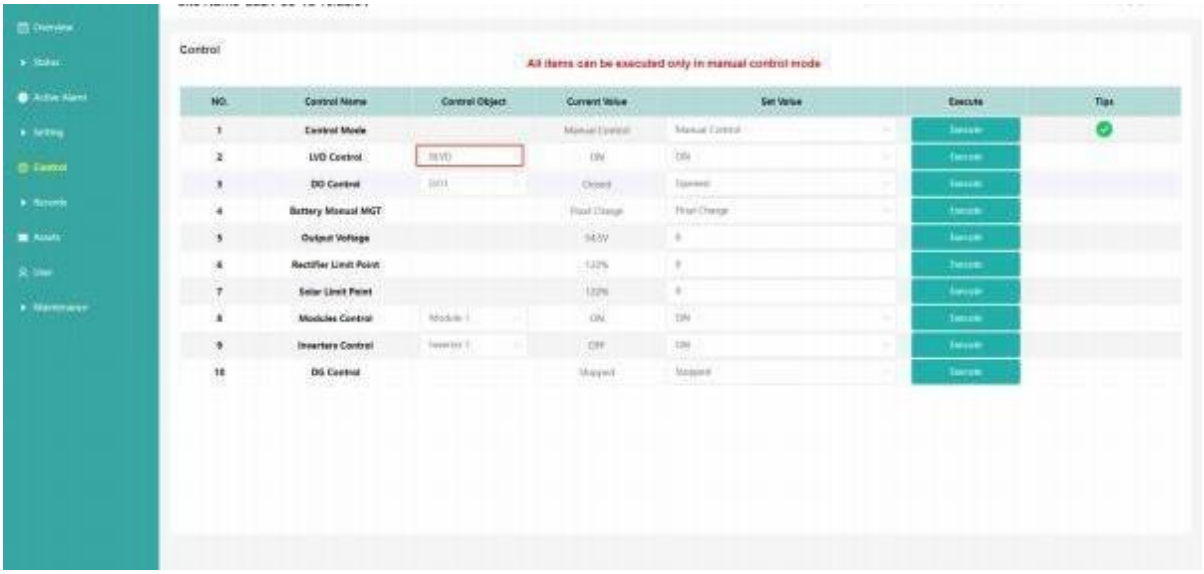

Fig 7-61 Battery connection and disconnection control on Web

Step 2 : Select the state you want to control,click the "Execute" button.

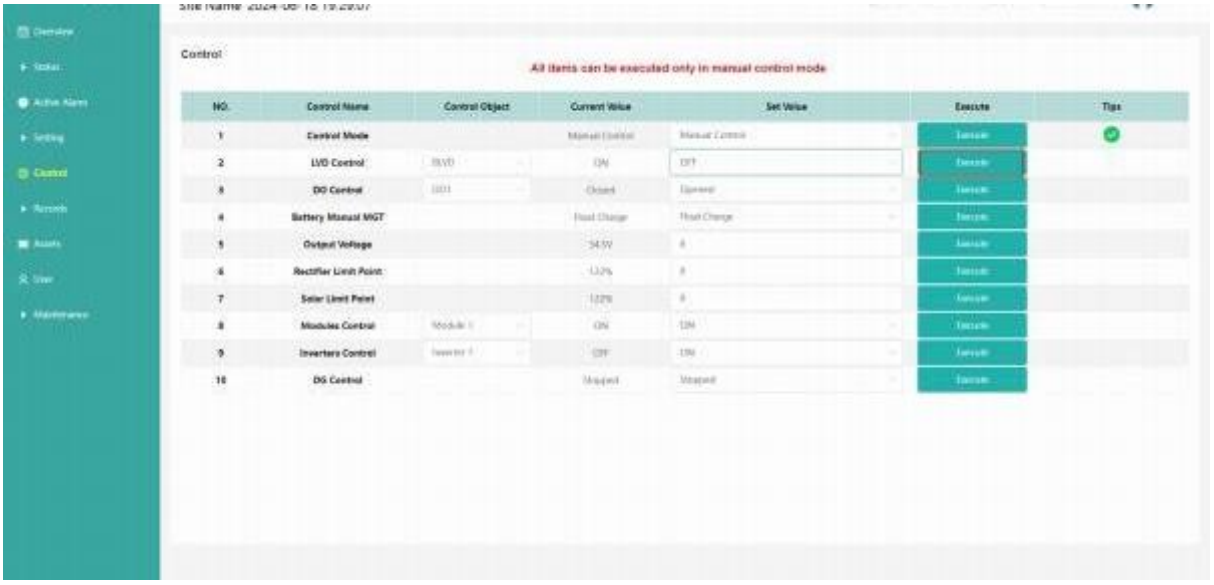

Fig 7-62 Battery connection and disconnection control on Web

----The End

LLVD Configuration

Load connection and disconnection

Background Information

In manual control mode, the user can manually control connection or disconnection of the Loads.

NOTE:

This operation will cause the loads to disconnect, please be cautious.

LCD operation

Step 1 : Set the "Sys Control Mode" to "Manual".

Step 2 : Manually control connection and disconnection of the loads.

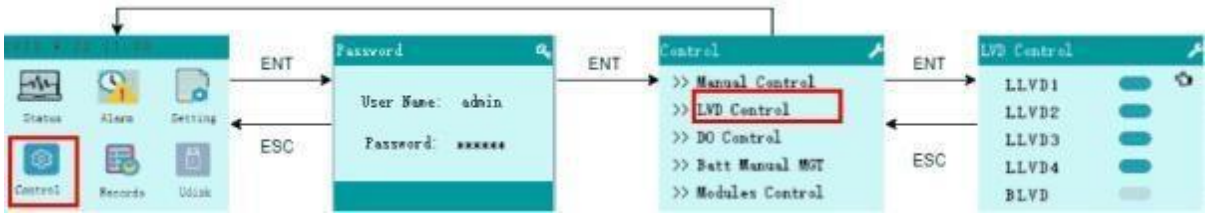

Fig 7-63 Loads connection and disconnection control on LCD

Web operation

Step 1 : Click the "Control" menu, select "LVDx Control".

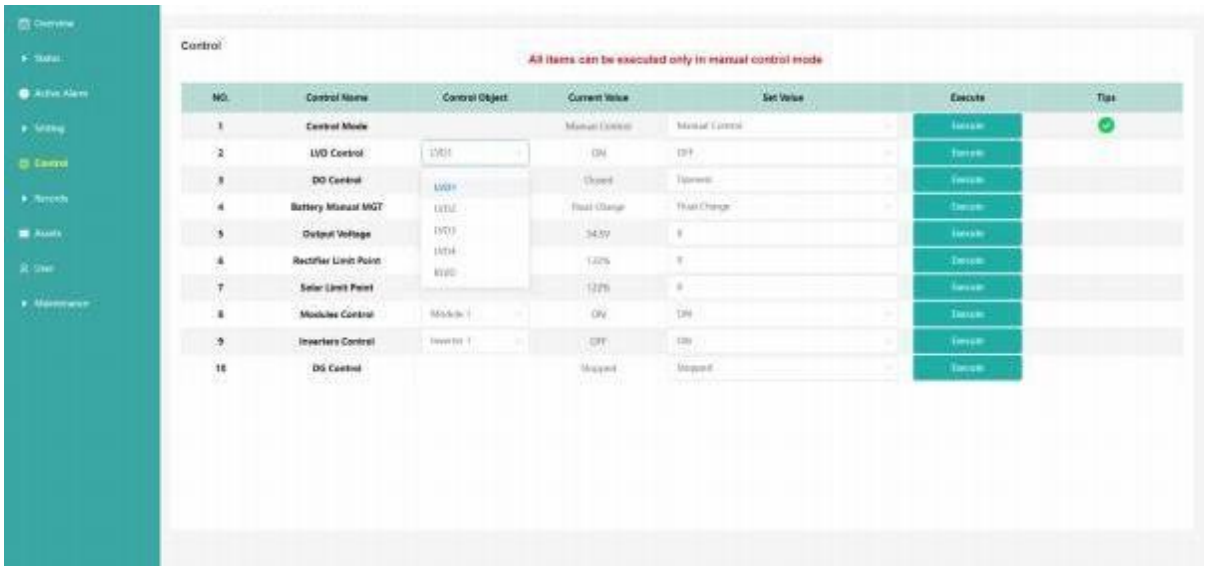

Fig 7-64 Loads connection and disconnection control on Web

Step 2 : Select the LVDx and state you want to control,click the "Execute" button.

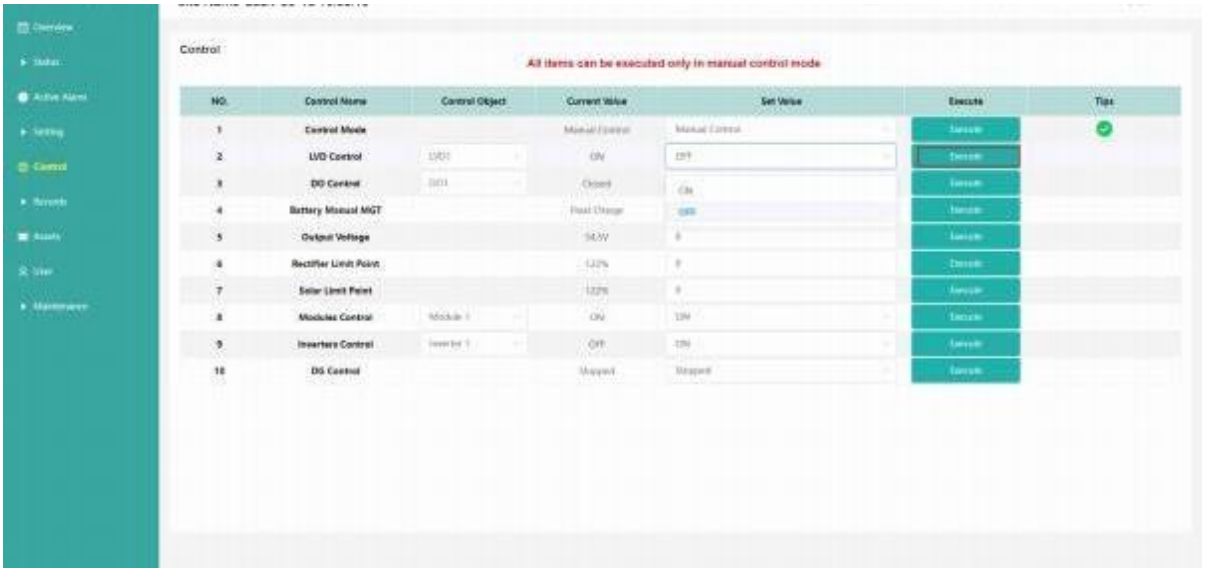

Fig 7-65 Loads connection and disconnection control on Web

----The End

Manually turn off/on the modules

Background Information

In manual control mode, the user can manually turn on/off the modules.

NOTE:

- Turn off rectifier/solar module will reduce the total power output of the system and may cause loads disconnected, please be cautious.
- Turning on/off operation cannot be completed while the yellow light of the module is flashing.

LCD operation

Step 1 : Set the "Sys Control Mode" to "Manual".

Step 2 : Manually turn on/off the modules.

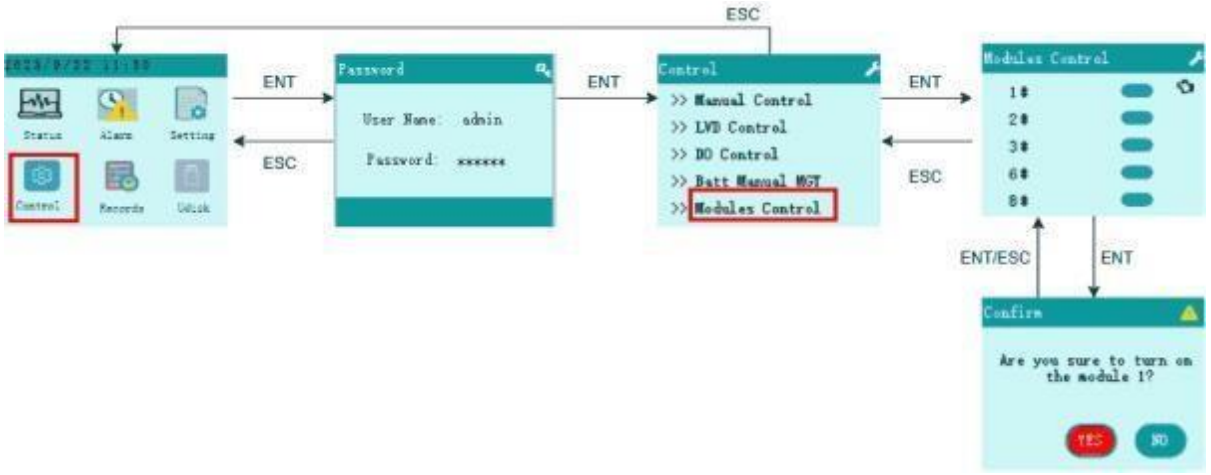

Fig 7-66 Manually turn on/off the modules on LCD

Web operation

Step 1 : Click the "Control"menu, go to the Control page,and use the mode of manual control;

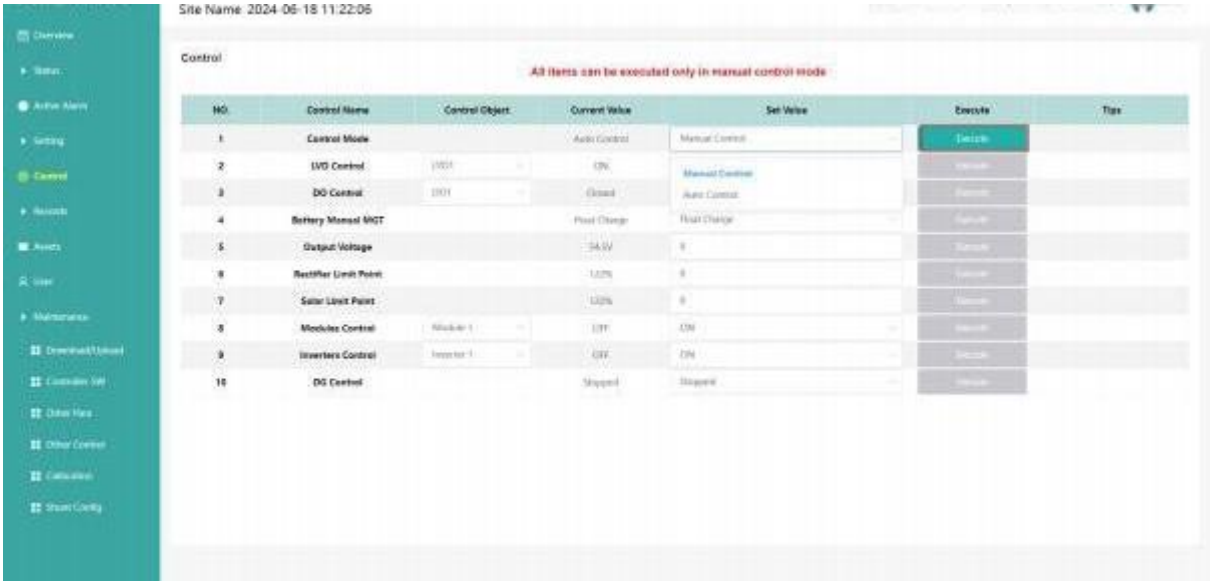

Fig 7-67 Control Page

Step 2 : Select "Manual x" and click "OFF" or "ON" from the "Set Value" list.

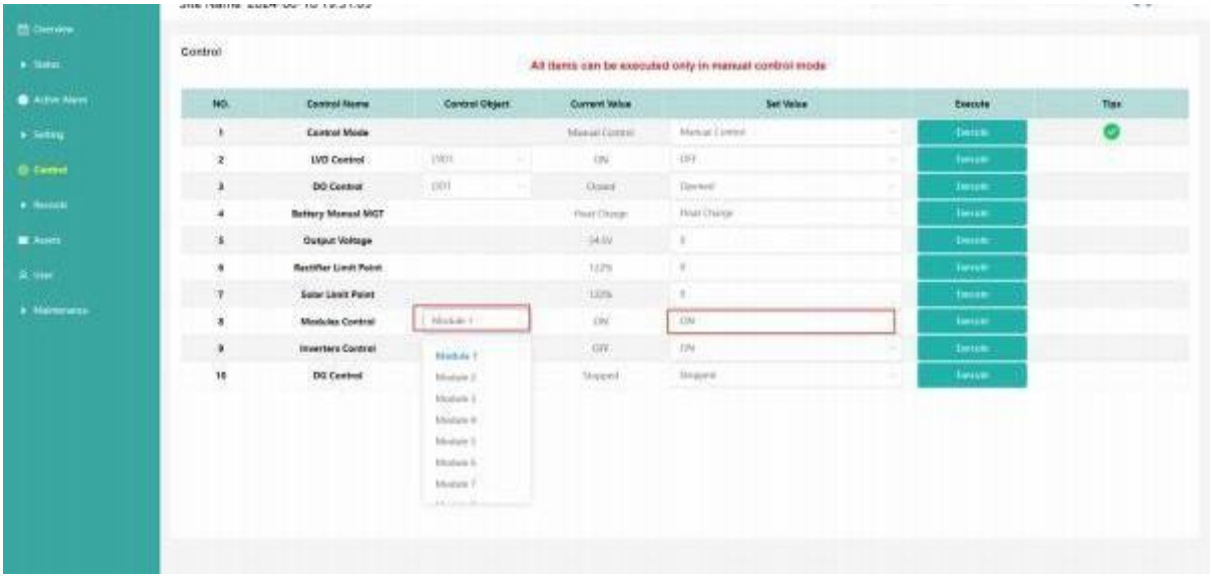

Fig 7-68 Turn On/Off

Step 3 : Then click the "Execute" button.

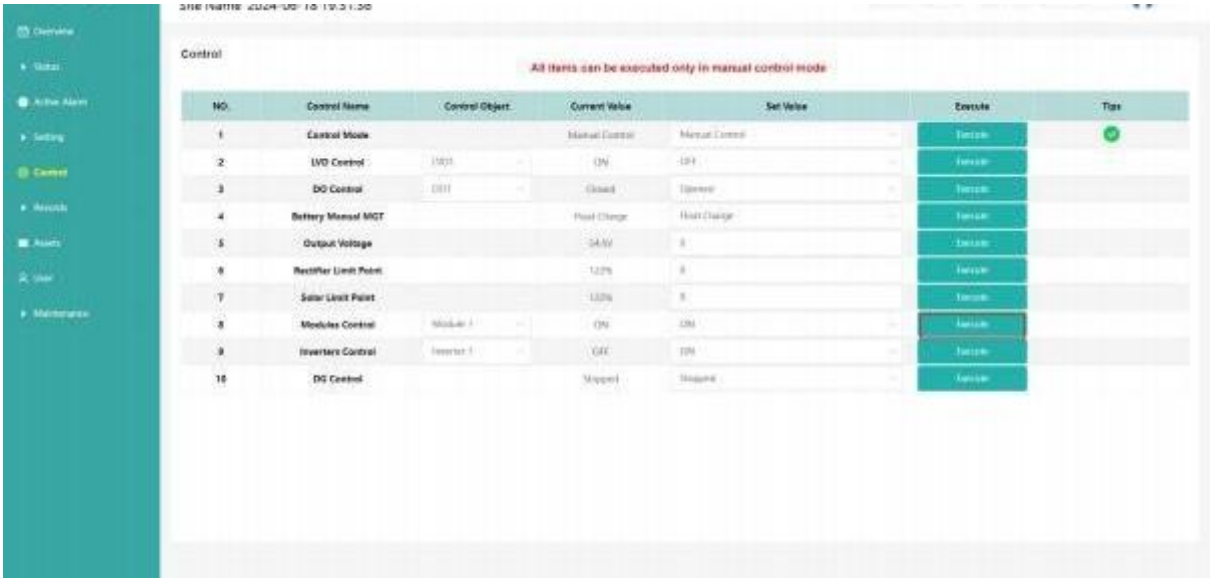

Fig 7-69 Click Execute Button

----The End

Hybrid Energy Management Settings

Background Information

The controller supports numerous energy input sources such as DG, solar panels, mains and so on. This hybrid power solution allows you to optimize the operation of the site, to achieve maximum efficiency at all times.

By reasonably setting Charging parameters, Load Shifting parameters, Partial Charge paramet ers, and DG Power Priority parameters, the controller implements the following energy input priority management:

- Green energy - >Mains -> Battery -> DG
- Green energy -> Mains -> DG -> Battery
- Green energy -> DG -> Mains -> Battery
- Green energy -> Battery -> Mains -> DG
- Green energy -> Battery -> DG -> Mains

More details refer to 4.6. Hybrid Energy Management

Green energy - >Mains -> Battery -> DG

Setting "Solar Delta Voltage", "Load Shifting", "Partial Charge", "AC Power Priority" and "DG Power Priority" to their default values will achieve the energy supply priority as follows: Green energy -> Mains -> Battery -> DG.

LCD operation

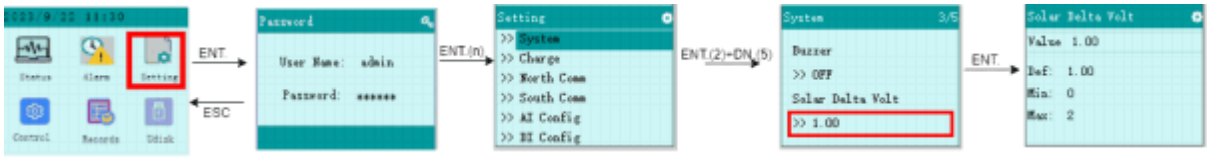

Fig 7-70 Solar Delta Voltage

Fig 7-71 Load Shifting

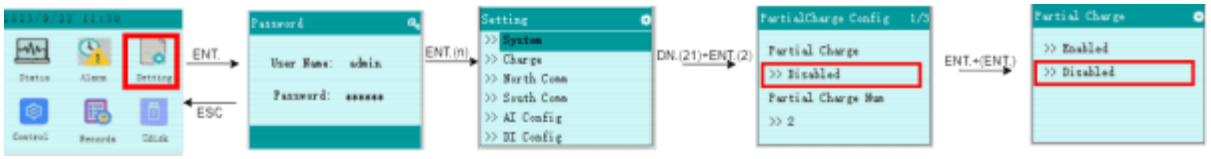

Fig 7-72 Partial Charge

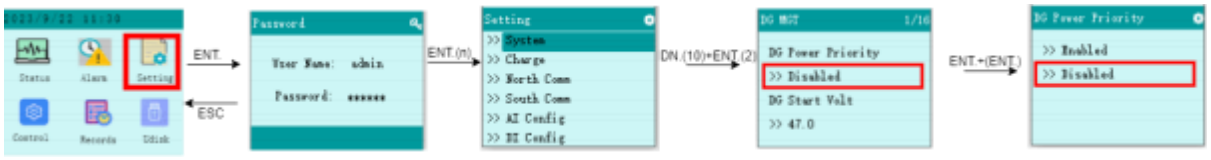

Fig 7-73 DG Power Priority

Fig 7-73-1 AC Power Priority

Web operation

Step 1 : Setting "Solar Delta Voltage" to default values.

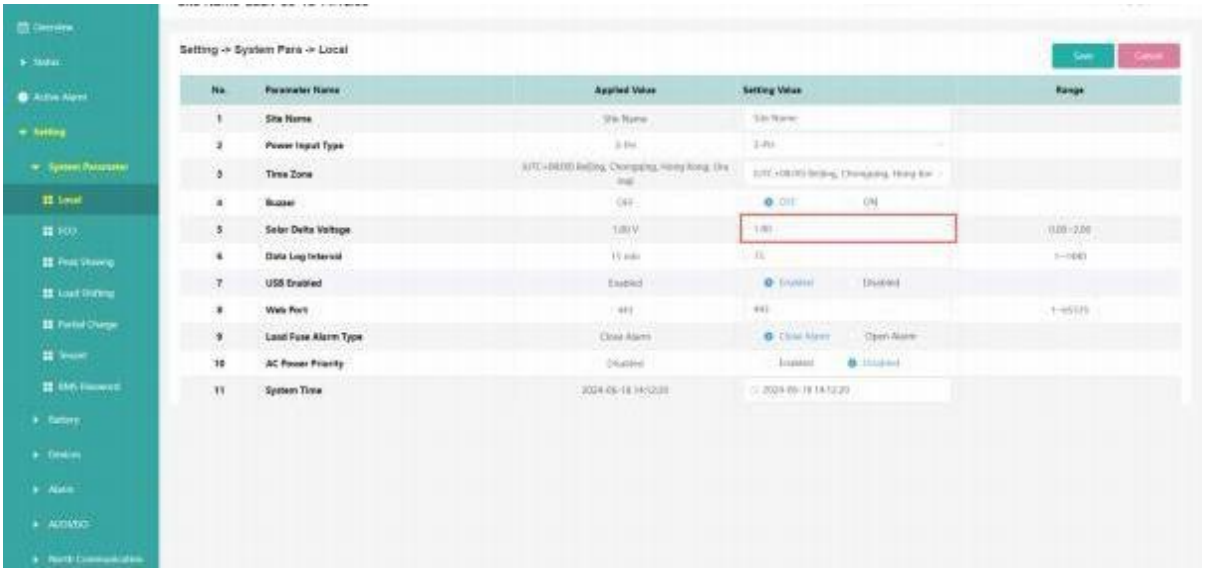

Fig 7-74 Solar Delta Voltage

Step 2 : Setting "Load Shifting" to default values.

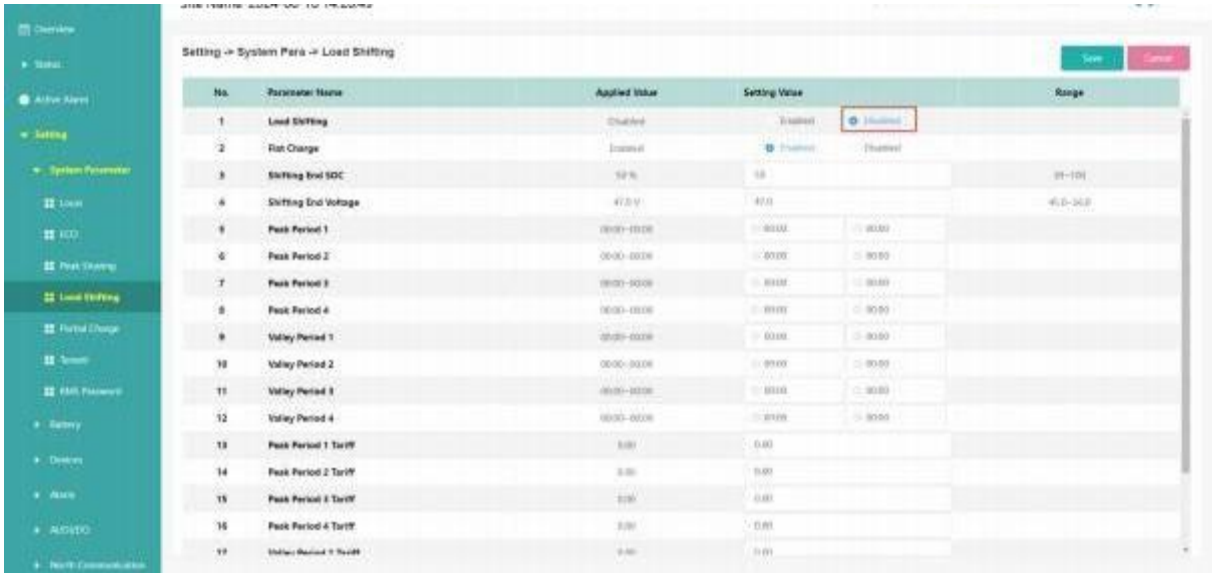

Fig 7-75 Load Shifting

Step 3 : Setting "Partial Charge" to default values.

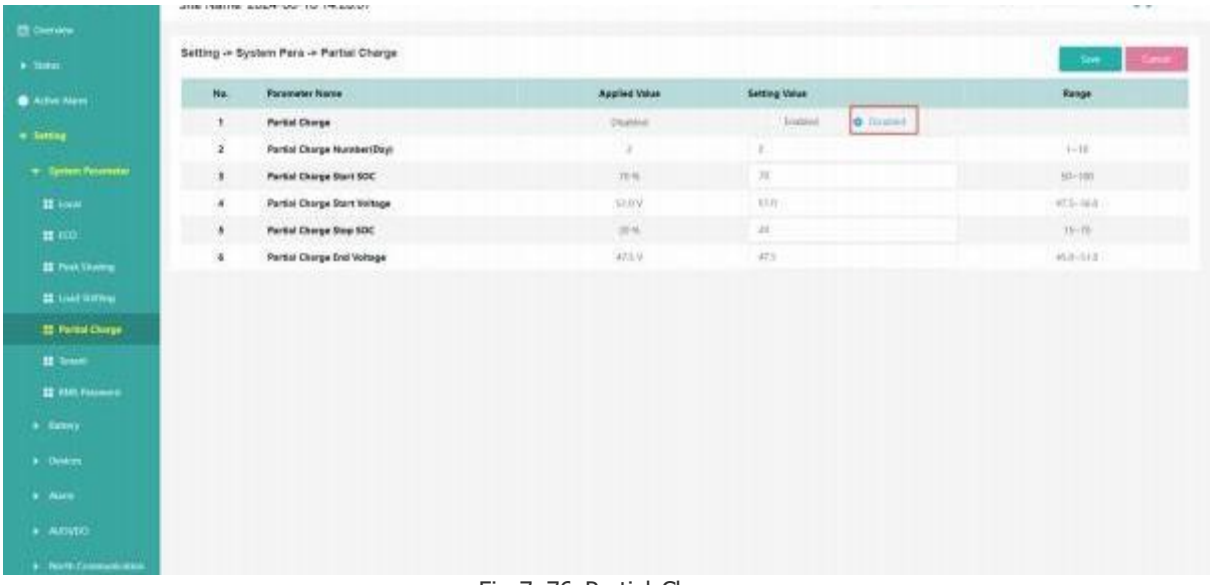

Fig 7-76 Partial Charge

Step 4 : Setting "DG Power Priority" to default values.

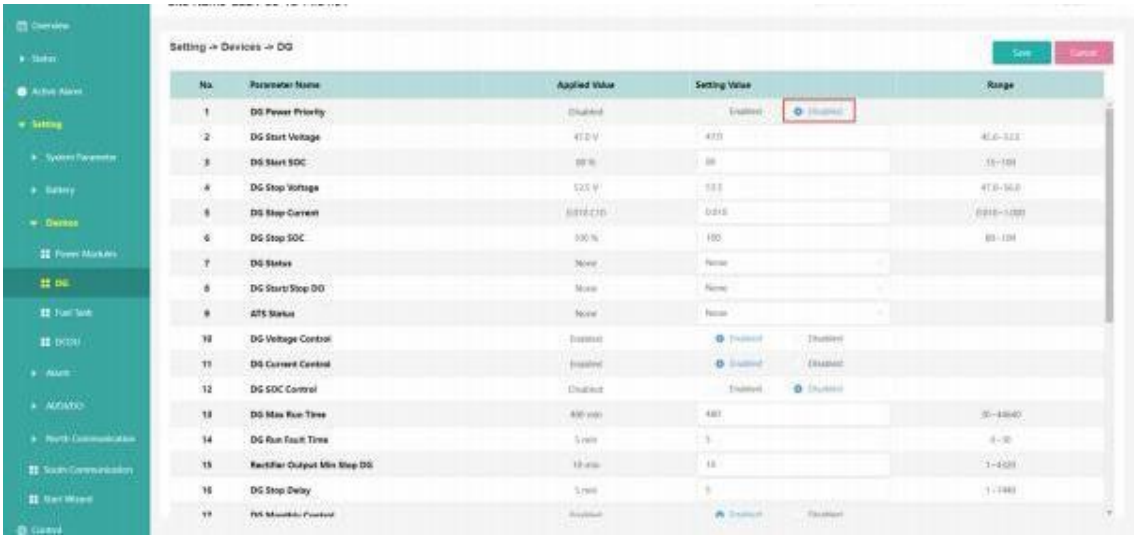

Fig 7-77 DG Power Priority

Step 5 : Setting "AC Power Priority" to default values.

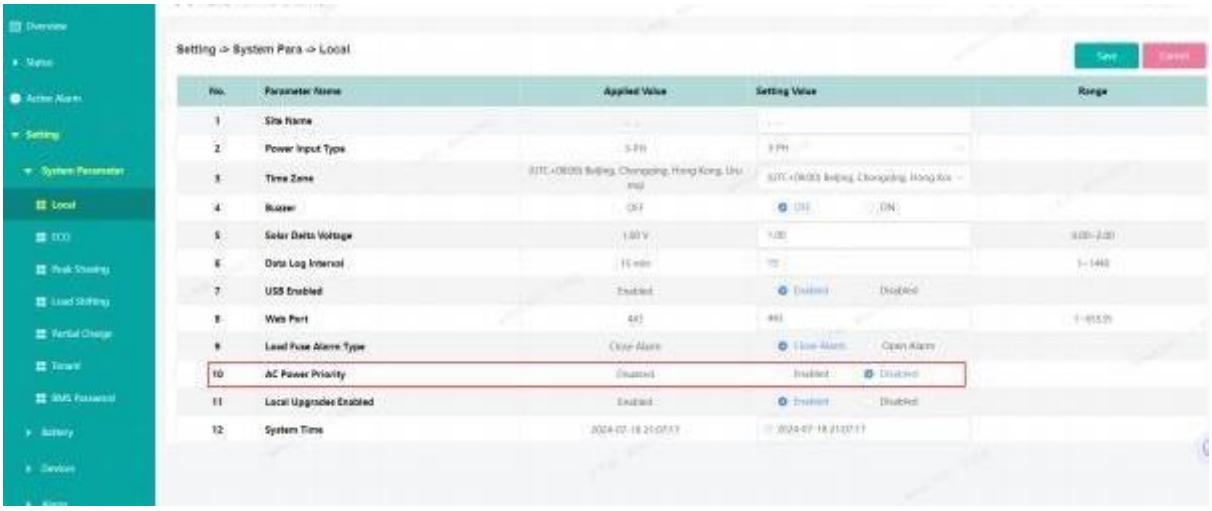

Fig 7-77-1 AC Power Priority

Green energy -> Mains -> DG -> Battery

Setting "Solar Delta Voltage", "Load Shifting", "Partial Charge", and "DG Power Priority" to their default values, and setting "AC Power Priority" to "Enabled" will achieve the energy supply priority as follows: Green energy ->Mains -> DG-> Battery.

LCD operation

Fig 7-78 AC Power Priority

Web operation

Setting "AC Power Prioritye" to "Enabled" .

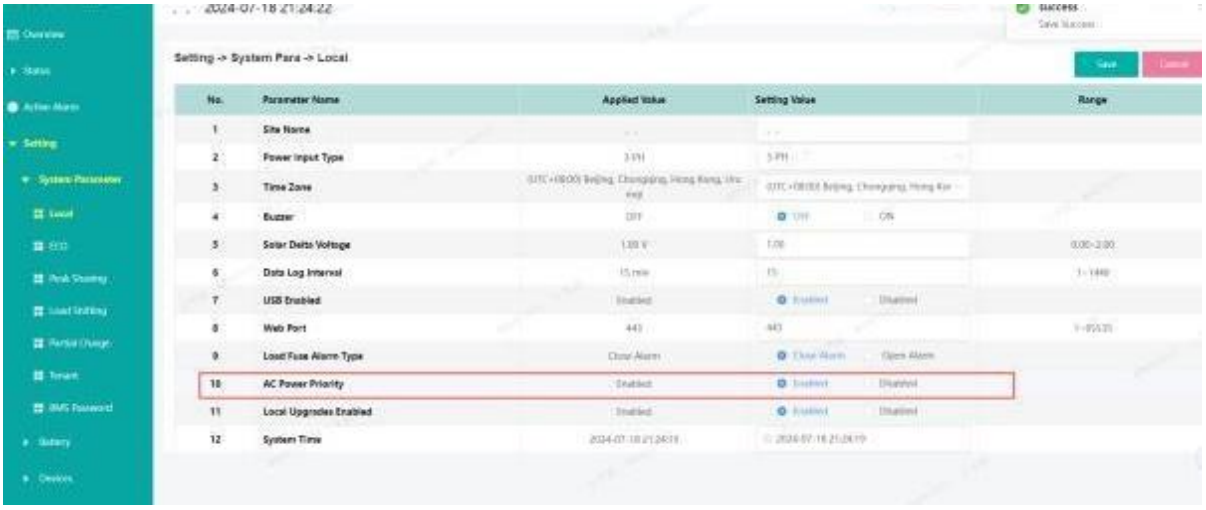

Fig 7-79 Setting "AC Power Priority"

Green energy -> DG -> Mains -> Battery

Setting "Solar Delta Voltage", "Load Shifting", and "Partial Charge" to their default values, setting "AC Power Priority" and "DG Power Priority" to "Enable" will achieve the energy supply priority as follows: Green energy -> DG-> Mains -> Battery.

LCD operation

Set the parameters according to the LCD operation in Fig 7-78 AC Power Priority, and add the following operations:

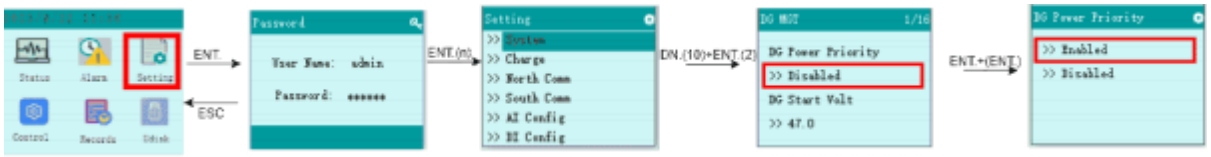

Fig 7-81 DG Power Priority

Web operation

Set the parameters according to the LCD operation in Fig 7-79 Setting "AC Power Priority", and add the following operations:

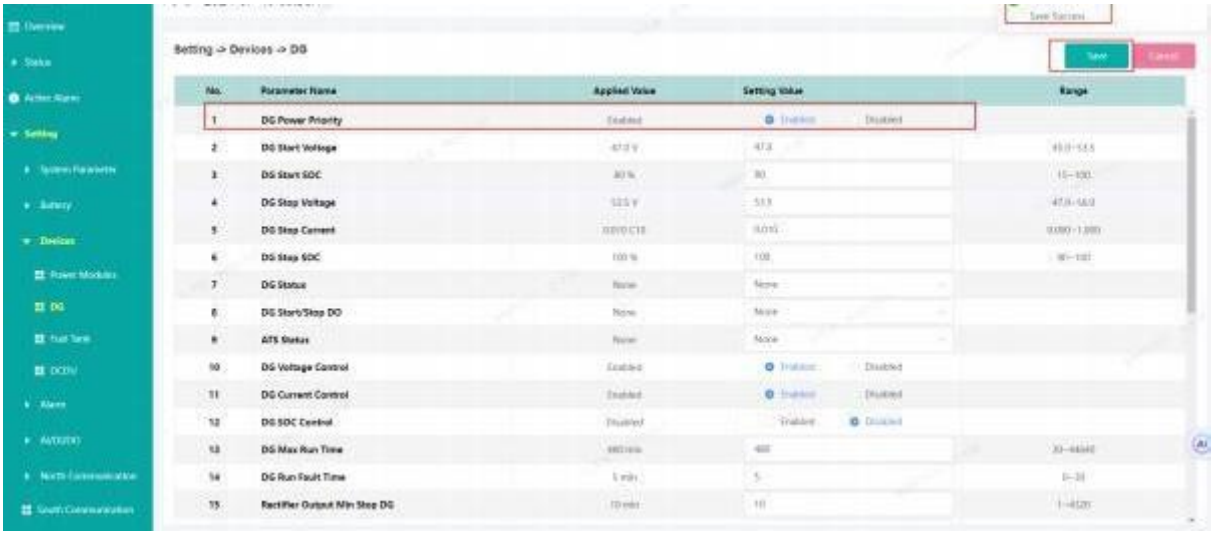

Fig 7-82 Setting "DG Power Priority" to "Enable"

Green energy -> Battery -> Mains -> DG

Keep "Solar Delta Voltage", "AC Power Priority", and "DG Power Priority" at their default values, and set "Partial Charge", "Load Shifting" to "Enabled" will achieve the energy supply priority as follows: Green energy -> Battery -> Mains -> DG.

LCD operation

Set the "Partial Charge", "Load Shifting" of the LCD operation described in Fig 7-71 Load Shifting and Fig 7-72 Partial Charge to "Enabled", and keep other operations consistent.

Web operation

Set the "Partial Charge", "Load Shifting" of the Web operation described in Fig 7-75 Load Shifting and Fig 7-76 Partial Charge to "Enabled", and keep other operations consistent.

Green energy -> Battery -> DG -> Mains

Keep "Solar Delta Voltage" "AC Power Priority" and "Load Shifting" at their default values, set "Partial Charge" and "DG Power Priority" to "Enabled" will achieves the energy supply priority: Green energy -> Battery -> DG -> Mains.

LCD operation

Set the "Partial Charge" and "DG Power Priority" of the LCD operation described in Fig 7-72 Partial Charge and Fig 7-73 DG Power Priority to "Enabled", and keep other operations consistent.

Web operation

Set the "Partial Charge" and "DG Power Priority" of the LCD operation described in Fig 7-76 Partial Charge and Fig 7-77 DG Power Priority to "Enabled", and keep other operations consistent.

ECO Setting

Background Information

The rectifier efficiency is usually lower in a light load state than a heavy load state. When the load rate is about 60%, the rectifiershall reach its best efficiency. To save energy, Controller will turn on or turn off the rectifiers to ensure the rectifiers in a higher efficiency state. This is the ECO function.

In order to prevent the turned off rectifiers from being damaged due to condensations, Controller will turn on all rectifiers to dry for a whileevery few days.

The system will exit ECO mode under the following conditions:

- Both Mains and Solar input failure.
- DC under voltage.
- Battery is in testing.
- Battery is discharging.
- Battery fuse failure.
- BLVD is disconnected.
- Any rectifier module alarms (e.g., communication failure).

Tab 7-8 ECO Setting related parameters

Parameter name	Default value	Setting range	Setting description
ECO Enable	Disable	Enable/Disable	Enable: Can use ECO function Disable: Can't use ECO function Note: Only can be set as 'Enable' if system has battery and no large load current shock appears.

Best Load Ratio	60%	30-Rect Save Stop(<=90)	Best Load Ratio is also known as rectifier best operating-point. At the best operating-point, the rectifier module operates at a relatively high efficiency and is subject to more suitable stresses. For energy saving, the power supply system should try to make the rectifier module load / rated capacity ratio as close as possible to the best operating-point. **Note: Load / Rated capacity = Rectifier real output current / Rectifier rated current * 100%**.
ECO Cycle Period	168h	1~8760H	In order to prevent the rectifier that has been shutdown for a long time from being damaged by condensation, the IPSM-C101 will turn on all rectifiers at regular intervals (called ECO Cycle Period) and let all rectifiers work for a while (called Dry time) to achieve the drying effect.
Min Rect Num	2	1~Rect Slot Number	The minimum number of rectifier working.
Dry time	120 min	5~240min	In order to prevent the rectifier that has been shutdown for a long time from being damaged by condensation, the IPSM-C101 will open all rectifiers at regular intervals (called ECO Cycle Period) and let all rectifiers work for a period of time (called drying time) to achieve the drying effect. All rectifier modules work together for a while before shutting down redundant rectifier modules one by one.
Rect Save Stop	90%	Best Load Ratio~100%	React Save Stop is also known as system energy-saving point. If load / rated capacity ratio more than system energy-saving point, the power supply system exit energy-saving mode.

Phase Balance Prio	Enable	Enable/Disable	Enable: In ECO mode, AC three-phase voltage balance is considered first, rectifier efficiency is considered second, and rectifier running time is considered third. Disable: In ECO mode, rectifier efficiency is considered first, and rectifierslot is considered second. Rectifier modules off from a lowerslot, and rectifier modules on from a higher slot.

LCD operation

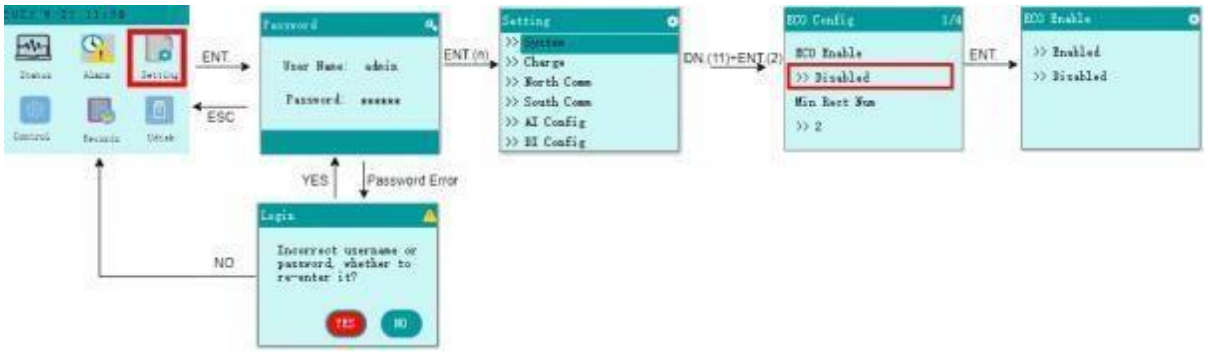

Fig 7-88 ECO setting on LCD

Web operation

Click the "Setting" menu and select the ”ECO“ from the "System Para“ directory on Web page.

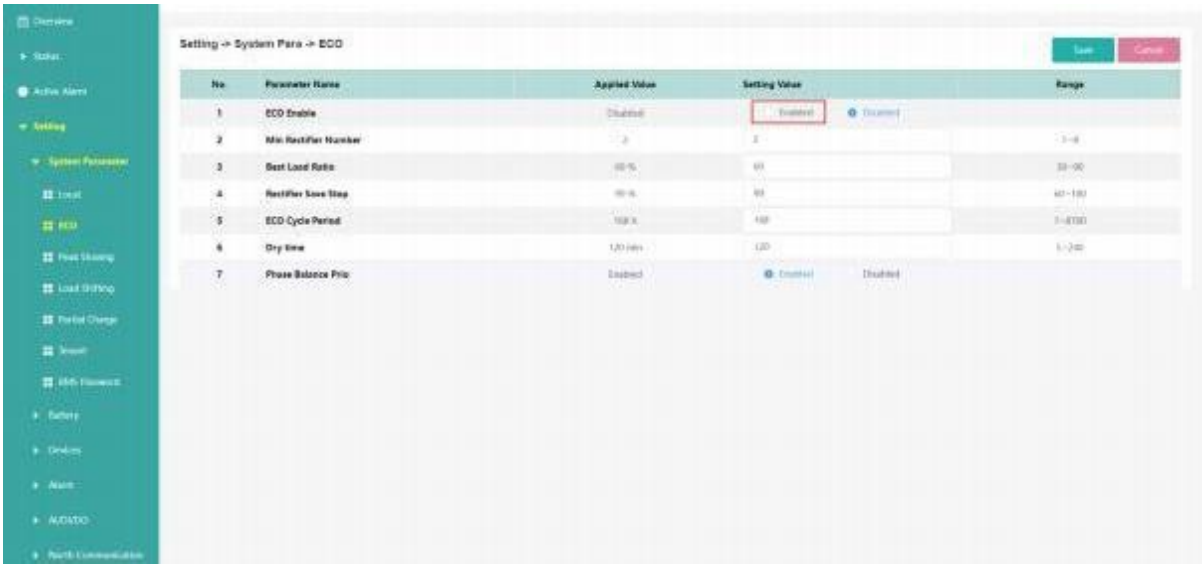

Fig 7-89 ECO setting on Web

Calibration Parameter Settings

Generally, calibration parameters are calibrated on the web page. The setting on the LCD needs to calculate the value of k and b by yourself, and then set.

NOTE:

Before entering new calibration data, please wait for 5 seconds to ensure the stability of the sampling data, and then press "Set".

Output Voltage Calibration

System voltage is calibrated by single point method. The calibration factor needs to be reset before calibration.

LCD operation

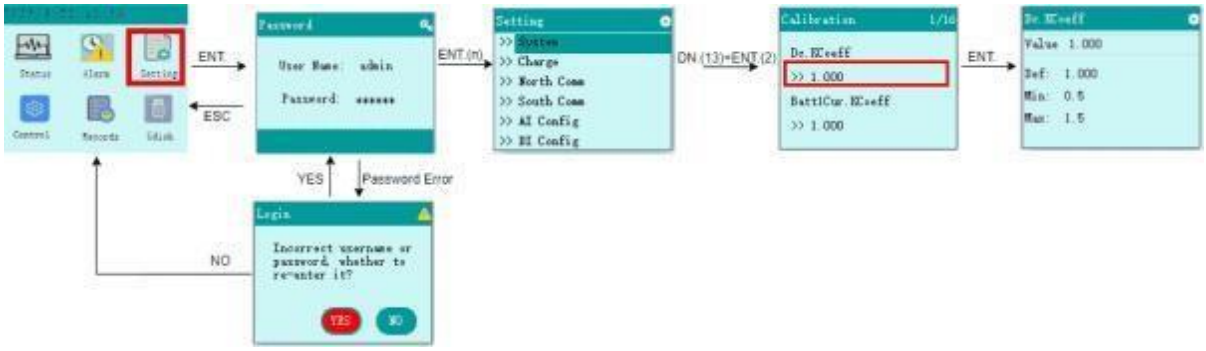

Fig 7-90 Output Voltage Calibration on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Calibration" directory on Web page.

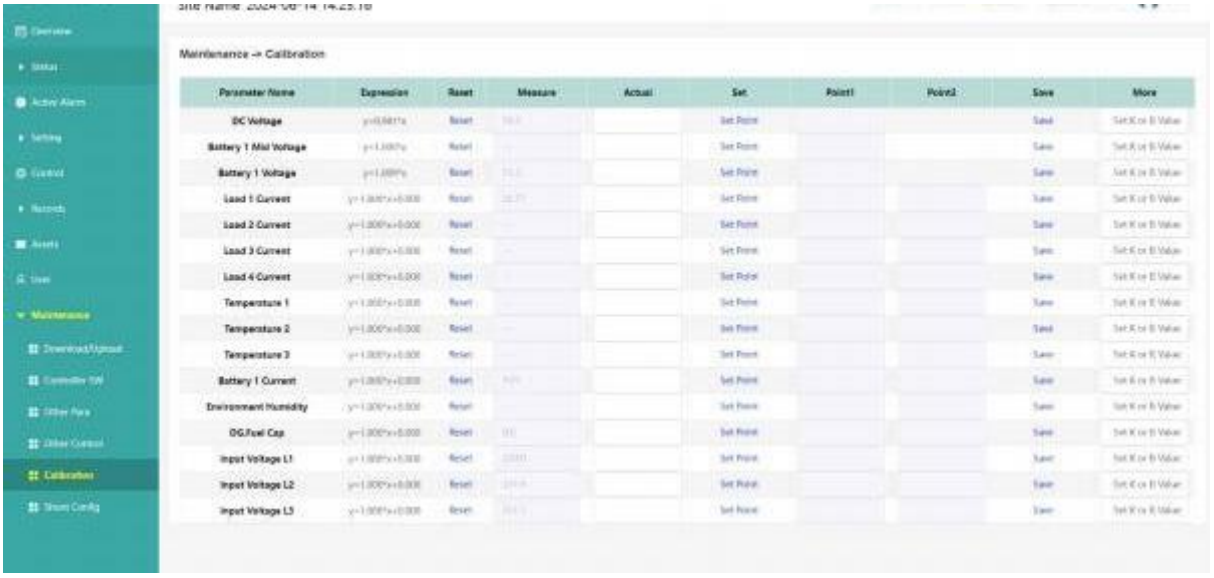

Fig 7-91-1 DC Voltage Calibration on Web

Step 2 : The actual system voltage will be measured by multimeter, and enter the value into the box, press "Set Point" and "Save".

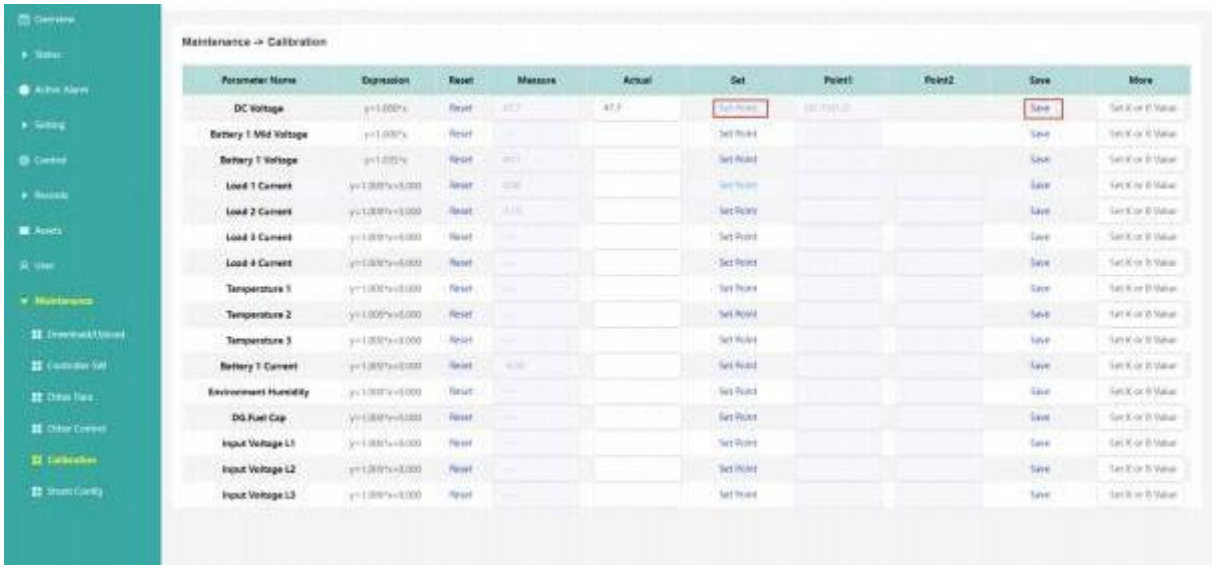

Fig 7-91-2 DC Voltage Calibration on Web

NOTE:

The actual system voltage = The sampling system voltage * k, that is K = The actual system voltage/ The sampling system voltage.

Load Current Calibration

In general, If there is no loadshunt in your power system,the load current can be calculated by the sum of the current of the rectifier or solar and the current of the battery,you need not calibrate load current.Load shunt is also set to disable.

If there is any loadshunt in your power system, you can set loadshunt to enable. Load current is also calibrated by two point calibration method. Refer to battery current calibration.

LCD operation

LCD doesn't support software update feature.

Web operation

Step 1 : Click the "Maintenance" menu and select the "Calibration" directory on Web page.

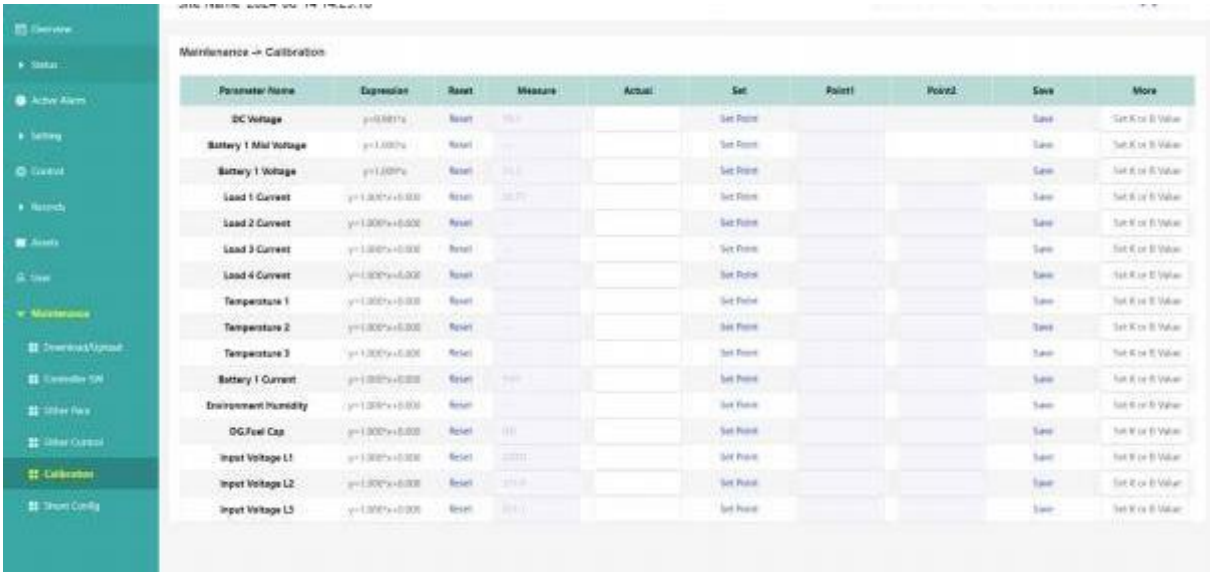

Fig 7-92-1 Load Current Calibration on Web

Step 2 : First reset "Reset Calibration Parameter Type",click the "Reset".

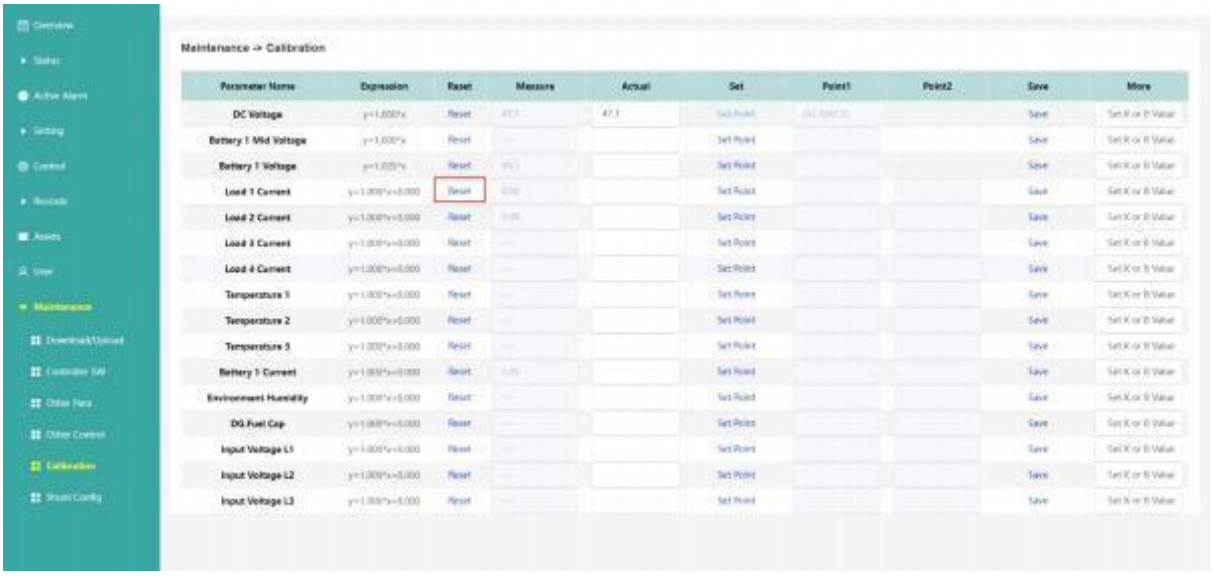

Fig 7-92-2 Load Current Calibration on Web

Step 3 : The actual system voltage will be measured by multimeter, and enter the value into the box, press "Set Point" and "Save", you need to measure the current at two points.

Fig 7-92-3 Load Current Calibration on Web

NOTE:

If you want to recalibrate load current, you must first reset "Reset Calibration Parameter Type", and press "Reset" to restore the linear coefficients to the initial value y=1x+0. Than you can recalibrate load current by two point calibration method.

----The End

Battery Current Calibration

LCD operation

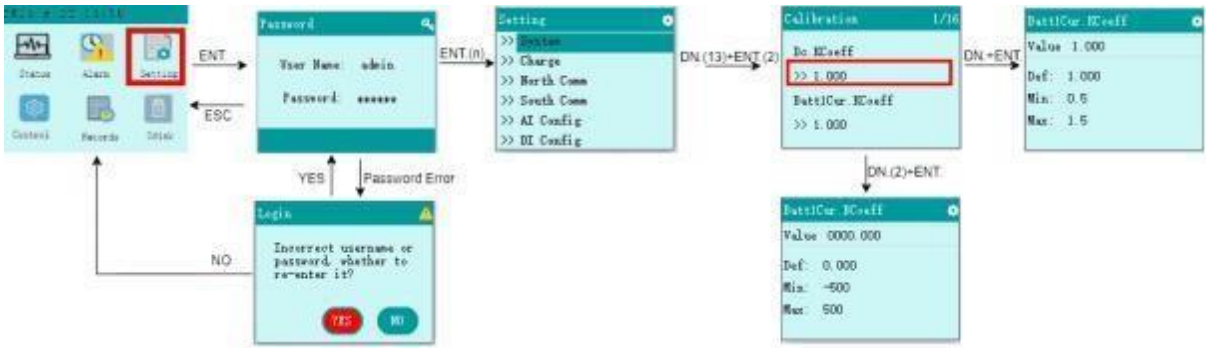

Fig 7-93 Battery Current Calibration on LCD

Web operation

Step 1 : Click the "Maintenance" menu and select the "Calibration" directory on Web page.

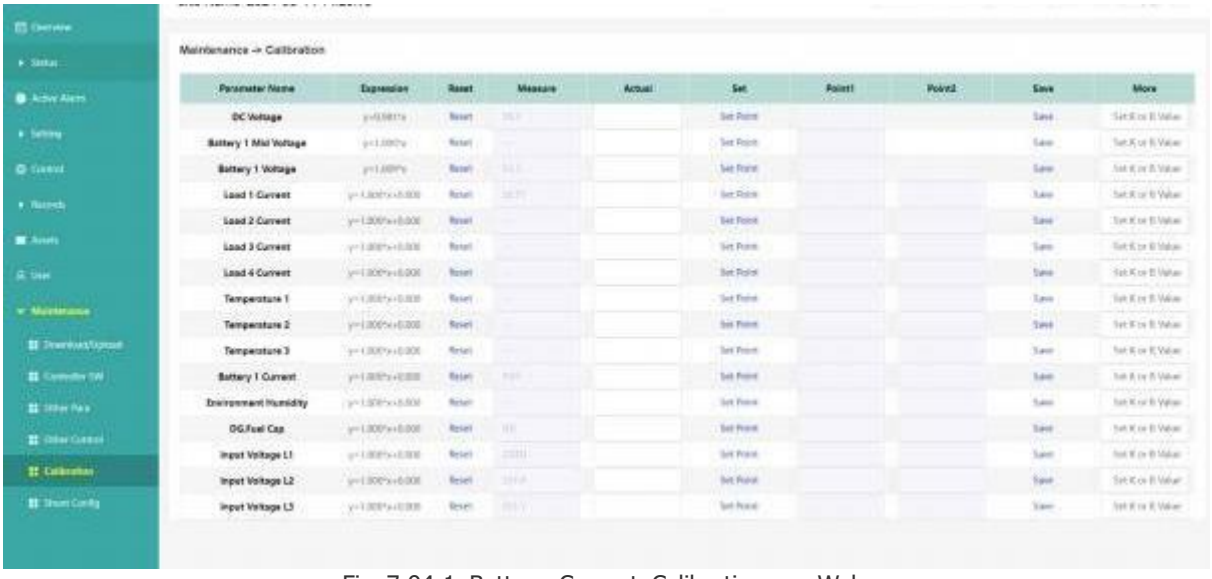

Fig 7-94-1 Battery Current Calibration on Web

Step 2 : First reset "Reset Calibration Parameter Type",click the "Reset".

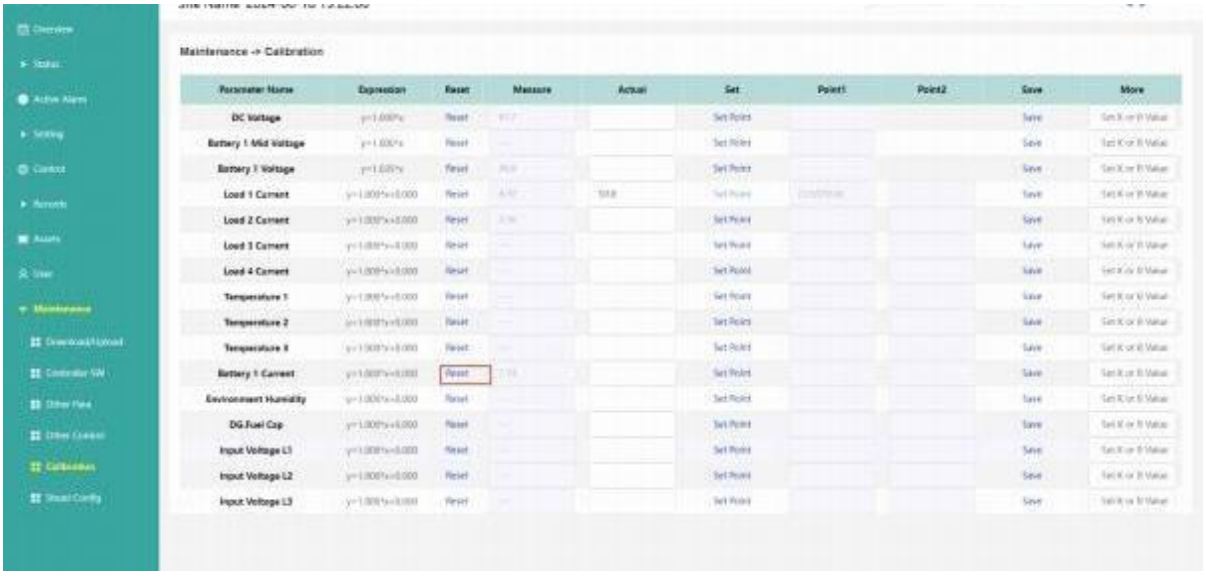

Fig 7-94-2 Battery Current Calibration on Web

Step 3 : The actual system voltage will be measured by multimeter, and enter the value into the box, press "Set Point" and "Save", you need to measure the current at two points.

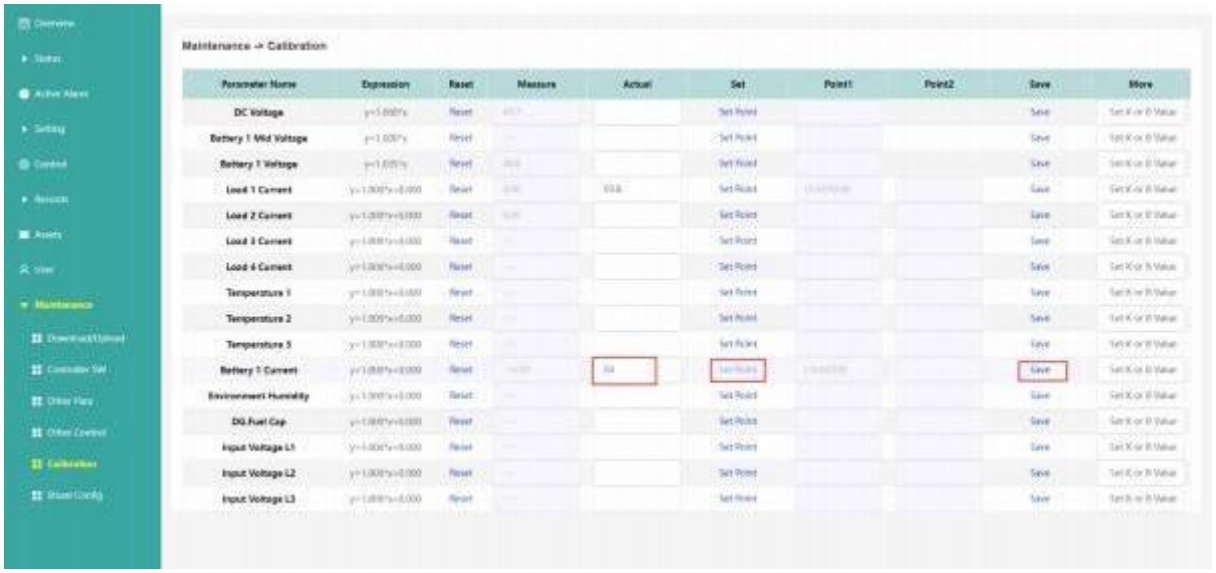

Fig 7-94-3 Battery Current Calibration on Web

NOTE:

If you want to recalibrate battery current, you must first reset "Reset Calibration Parameter Type", and press "Reset" to restore the linear coefficients to the initial value y=1x+0. Than you can recalibrate battery current by two point calibration method.

----The End

Other common operations

Change Logo

Background Information

Controller allows you to change the web logo. The image format must be "png".As for the imagesize, it is recommended to use 220*40, images that do not meet this standard will be stretched and may affect the effect.

Web operation

Step 1 : Click the "Maintenance" menu and select the "Controller SW" directory on Web page.Then click the button of Change Logo.

Fig 7-95-1 Change Logo on Web

Step 2 : Select the prepared background image in the pop-up window.

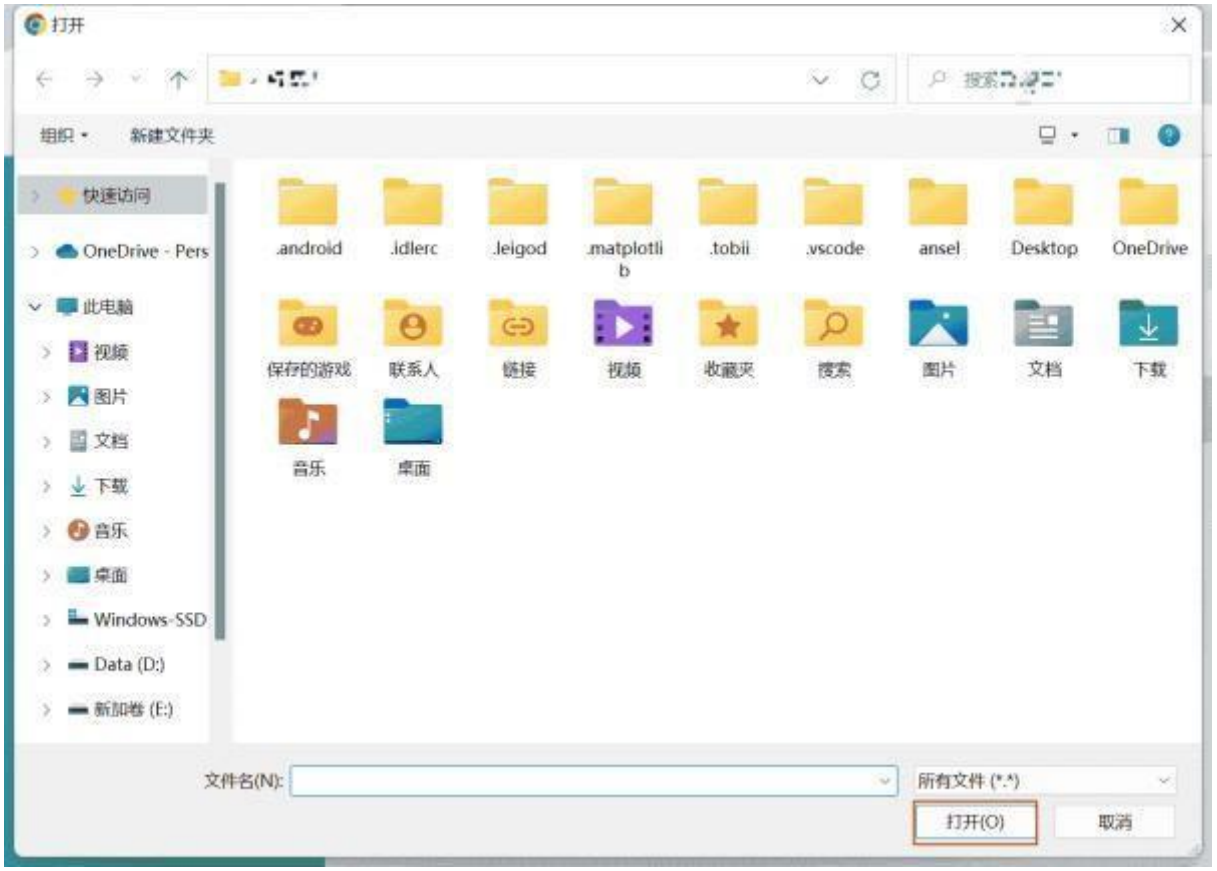

Fig 7-95-2 Change Logo on Web

Step 3 : Wait for the progress bar to complete and automatically restart.

Fig 7-95-3 Change Logo on Web

----The End

Installation and maintenance

Safety Precautions

Wear Anti-static gloves or an Anti-static wriststrap when installing or replacing the Controller to avoid damage to components.

Controller Installation

This chapter mainly introduces the correct use methods in some applications of the controller, and some precautions during application.

NOTE:

- Do not put your hand into the controllerslot to prevent electric shock.
- Non-professional personnel cannot plug or replace the controller with power on.

Step 1 :take out the controller from the package, please check the appearance and quality of the controller,if there is any problem, please contact to us.

Step 2 : loosen the screw on the handle of the controller (turn counterclockwise a few turns to loosen the screw), pivot the handle 90 degrees to the open position.

Step 3 :hold the handle on the front panel of the controller, support the controller with your hand, and slowly push the controller into the slot.

Step 4 : slowly push the controller until the front panel of the controller is flush with the panel of the power distribution sub-rack.

Step 5 :tighten the fixing screws on the front panel of the controller clockwise to lock the controller on the power distribution frame.

Step 6 : Import the configuration file,details in 7.4.4.

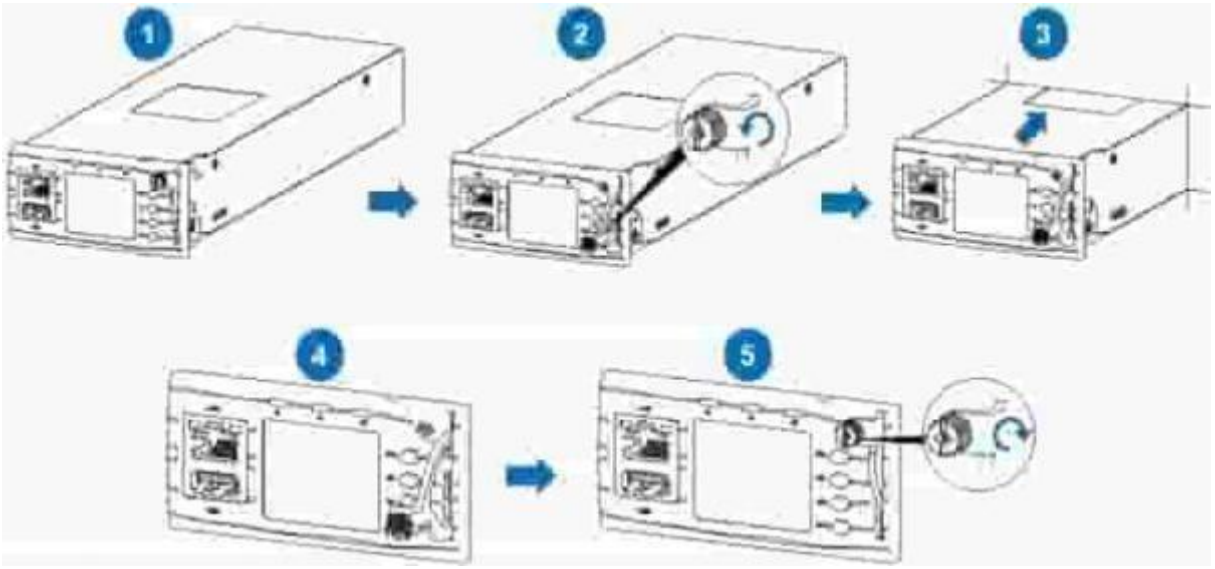

Fig 8-1 Installing Controller

NOTE:

- Please wear anti-static gloves or anti-static wriststrap when picking up or installing the controller to avoid damaging the parts.
- After unpacking the controller in the indoor scene, it is recommended to power on it within 7 days. If it cannot be powered on in time, the controller needs to be placed in an indoor, dry and non-corrosive gas environment.

- After unpacking the controller in outdoor scenarios, it is recommended to power on it within 24 hours. If it cannot be powered on in time, the controller needs to be placed in an indoor, dry, and non-corrosive environment.
- After the controller was installed, be sure to fix the controller and the slot firmly through the fixing screws on the panel. Otherwise, vibration during the operation of the product, etc., It will cause the module to come out of the slot, resulting in damage to the controller.
- After the controller was installed,Import the configuration file,details in 7.4.4

Controller Replace

Background Information

Controller can be hot swapped.

Preset

- Prepare the cabinet door key;
- Confirm that nothing wrong with the new Controller

Steps

Step1 : Connect the ground wire of the anti-static wriststrap, and wear the anti-static wriststrap and anti-static gloves.

NOTE:

Please record the software version of the old Controller, if the old Controller has been damaged and cannot be viewed, you can return the old Controller and the barcode to us.

Step 2 : Pull out the communication cables on the panel of Controller ;

Step 3 : Loosen the locking nail on the Controller panel;

Step 4 : Pull the handle outwards to take out the Controller from the frame ;

Fig 8-2 Pulling the Controller operation diagram

Step 5 : Insert the new Controller, tighten the fastening screws, and fix the Controller;

Fig 8-3 Inserting the Controller operation diagram

Step 6 : Reconnect the communication cables of Controller ;

Step 7 : Import the configuration,details in 7.4.4 .

Appendix A - Parameter Table

Local

Tab 9-1 System related parameters

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Site Name				NO
Power Input Type	0:1-PH 1:3-PH 5:HVDC	1	Set according to system actual configuration, choose single phrase,three phrase or HVDC	NO

Time Zone	0:(UTC-12:00) International Date Line West 1:(UTC-11:00) Coordinated Universal Time-11 2:(UTC-10:00) Aleutian Islands 3:(UTC-10:00) Hawaii 4:(UTC-09:30) Marquesas Islands 5:(UTC-09:00) Alaska 6:(UTC-09:00) Coordinated Universal Time-09 7:(UTC-08:00) Baja California 8:(UTC-08:00) Coordinated Universal Time-08 9:(UTC-08:00) Pacific Time (US & Canada) 10:(UTC-07:00) Arizona 11:(UTC-07:00) Chihuahua, La Paz, Mazatlan 12:(UTC-07:00) Mountain Time (US & Canada) 13:(UTC-07:00) Yukon 14:(UTC-06:00) Central America 15:(UTC-06:00) Central Time (US & Canada) 16:(UTC-06:00) Easter Island 17:(UTC-06:00) Guadalajara, Mexico City, Monterrey 18:(UTC-06:00) Saskatchewan 19:(UTC-05:00) Bogota, Lima, Quito, Rio Branco 20:(UTC-05:00) Chetumal 21:(UTC-05:00) Eastern Time (US & Canada) 22:(UTC-05:00) Haiti 23:(UTC-05:00) Havana 24:(UTC-05:00) Indiana (East) 25:(UTC-05:00) Turks and Caicos 26:(UTC-04:00) Asuncion 27:(UTC-04:00) Atlantic Time (Canada) 28:(UTC-04:00) Caracas 29:(UTC-04:00) Cuiaba 30:(UTC-04:00) Georgetown, La Paz, Manaus, San Juan 31:(UTC-04:00) Santiago 32:(UTC-03:30) Newfoundland 33:(UTC-03:00) Araguaina 34:(UTC-03:00) Brasilia 35:(UTC-03:00) Cayenne, Fortaleza 36:(UTC-03:00) City of Buenos Aires	104		NO

37:(UTC-03:00) Greenland
38:(UTC-03:00) Montevideo
39:(UTC-03:00) Punta Arenas
40:(UTC-03:00) Saint Pierre and Miquelon
41:(UTC-03:00) Salvador
42:(UTC-02:00) Coordinated Universal Time-02
43:(UTC-01:00) Azores
44:(UTC-01:00) Cabo Verde Is.
45:(UTC+00:00) Coordinated Universal Time
46:(UTC+00:00) Dublin, Edinburgh, Lisbon, London
47:(UTC+00:00) Monrovia, Reykjavik
48:(UTC+00:00) Sao Tome
49:(UTC+01:00) Casablanca
50:(UTC+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
51:(UTC+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague
52:(UTC+01:00) Brussels, Copenhagen, Madrid, Paris
53:(UTC+01:00) Sarajevo, Skopje, Warsaw, Zagreb
54:(UTC+01:00) West Central Africa
55:(UTC+02:00) Amman
56:(UTC+02:00) Athens, Bucharest
57:(UTC+02:00) Beirut
58:(UTC+02:00) Cairo
59:(UTC+02:00) Chisinau
60:(UTC+02:00) Damascus
61:(UTC+02:00) Gaza, Hebron
62:(UTC+02:00) Harare, Pretoria
63:(UTC+02:00) Helsinki, Kyiv, Riga, Sofia, Tallinn, Vilnius
64:(UTC+02:00) Jerusalem
65:(UTC+02:00) Juba
66:(UTC+02:00) Kaliningrad
67:(UTC+02:00) Khartoum
68:(UTC+02:00) Tripoli
69:(UTC+02:00) Windhoek
70:(UTC+03:00) Baghdad
71:(UTC+03:00) Istanbul
72:(UTC+03:00) Kuwait, Riyadh
73:(UTC+03:00) Minsk
74:(UTC+03:00) Moscow, St.

Petersburg
75:(UTC+03:00) Nairobi
76:(UTC+03:00) Volgograd
77:(UTC+03:30) Tehran
78:(UTC+04:00) Abu Dhabi, Muscat
79:(UTC+04:00) Astrakhan, Ulyanovsk
80:(UTC+04:00) Baku
81:(UTC+04:00) Izhevsk, Samara
82:(UTC+04:00) Port Louis
83:(UTC+04:00) Saratov
84:(UTC+04:00) Tbilisi
85:(UTC+04:00) Yerevan
86:(UTC+04:30) Kabul
87:(UTC+05:00) Ashgabat, Tashkent
88:(UTC+05:00) Ekaterinburg
89:(UTC+05:00) Islamabad, Karachi
90:(UTC+05:00) Qyzylorda
91:(UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
92:(UTC+05:30) Sri Jayawardenepura
93:(UTC+05:45) Kathmandu
94:(UTC+06:00) Astana
95:(UTC+06:00) Dhaka
96:(UTC+06:00) Omsk
97:(UTC+06:30) Yangon (Rangoon)
98:(UTC+07:00) Bangkok, Hanoi, Jakarta
99:(UTC+07:00) Barnaul, Gorno-Altaysk
100:(UTC+07:00) Hovd
101:(UTC+07:00) Krasnoyarsk
102:(UTC+07:00) Novosibirsk
103:(UTC+07:00) Tomsk
104:(UTC+08:00) Beijing, Chongqing, Hong Kong, Urumqi
105:(UTC+08:00) Irkutsk
106:(UTC+08:00) Kuala Lumpur, Singapore
107:(UTC+08:00) Perth
108:(UTC+08:00) Taipei
109:(UTC+08:00) Ulaanbaatar
110:(UTC+08:45) Eucla
111:(UTC+09:00) Chita
112:(UTC+09:00) Osaka, Sapporo, Tokyo
113:(UTC+09:00) Pyongyang

	114:(UTC+09:00) Seoul 115:(UTC+09:00) Yakutsk 116:(UTC+09:30) Adelaide 117:(UTC+09:30) Darwin 118:(UTC+10:00) Brisbane 119:(UTC+10:00) Canberra, Melbourne, Sydney 120:(UTC+10:00) Guam, Port Moresby 121:(UTC+10:00) Hobart 122:(UTC+10:00) Vladivostok 123:(UTC+10:30) Lord Howe Island 124:(UTC+11:00) Bougainville Island 125:(UTC+11:00) Chokurdakh 126:(UTC+11:00) Magadan 127:(UTC+11:00) Norfolk Island 128:(UTC+11:00) Sakhalin 129:(UTC+11:00) Solomon Is., New Caledonia 130:(UTC+12:00) Anadyr, Petropavlovsk-Kamchatsky 131:(UTC+12:00) Auckland, Wellington 132:(UTC+12:00) Coordinated Universal Time+ 1 2 133:(UTC+12:00) Fiji 134:(UTC+12:45) Chatham Islands 135:(UTC+13:00) Coordinated Universal Time+ 1 3 136:(UTC+13:00) Nuku alofa 137:(UTC+13:00) Samoa 138:(UTC+14:00) Kiritimati Island			
Buzzer	1:OFF 0:ON	0	OFF: close voice alarm function ON: open voice alarm function	NO

Solar Delta Voltage	0~2	1	Set the threshold of voltage difference between solar module and rectifier module. Make the solar module work at priority. (suitable for mixed system of rectifier module and solar module)	YES
Data Log Interval	1~1440	15		NO
USB Enabled	0:Enabled 1:Disabled	0		NO
Web Port	1~65535	443		NO
Load Fuse Alarm Type	0:Close Alarm 1:Open Alarm	0		NO
AC Power Priority	0:Enabled 1:Disabled	0		NO
System Time		2023-12-31 0:00:00		NO

Configuration Parameter:

Analog Config

Tab 9-2 Analog Config

Parameter	Setting Rang	Default value	Setting description	Restore default parameters

Temp Sensor 1	1: No 0: Battery	0	No: Disable sensor 1 for battery temperature. Battery: Enable sensor 1 for battery temperature. Set according to user need. Temperature compensation function can be used for VRL battery if the power system has battery temperature sensor 1.	NO
Temp Sensor 2	1: No 0: Battery 2: Env	2	No: Disable sensor 2 for battery temperature. Battery: Enable sensor 2 for battery temperature. Set according to user need. Temperature compensation function can be used for VRL battery if the power system has battery temperature sensor 2.	NO
Temp Sensor 3	1: No 0: Battery 2: Env	1	No: Disable sensor 3 for battery temperature. Battery: Enable sensor 3 for battery temperature. Set according to user need. Temperature compensation function can be used for VRL battery if the power system has battery temperature sensor 3.	NO

Humidity Sensor	0: Yes 1: No	1		NO
Fuel Sensor	0: Yes 1: No	1		NO

Digital Input Config

Tab 9-3 Digital Input Config

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
DI 1	0: Normal Close 1: Normal Open	1		NO
DI 2	0: Normal Close 1: Normal Open	1		NO
DI 3	0: Normal Close 1: Normal Open	1		NO
DI 4	0: Normal Close 1: Normal Open	1		NO
DI 5	0: Normal Close 1: Normal Open	1		NO
DI 6	0: Normal Close 1: Normal Open	1		NO
DI 7	0: Normal Close 1: Normal Open	1		NO
DI 8	0: Normal Close 1: Normal Open	1		NO

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
DI 9	0: Normal Close 1: Normal Open	1		NO
DI 10	0: Normal Close 1: Normal Open	1		NO
DI 11	0: Normal Close 1: Normal Open	1		NO
DI 12	0: Normal Close 1: Normal Open	1		NO

Digital Output Config

Tab 9-4 Digital Output Config

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
DO 1	0: Normal Close 1: Normal Open	0	If is set to NC(Normal Close), closed when normal, opened when associated alarm occurs;If is set to NO(Normal Open), opened when normal, closed when associated alarm occurs.	NO
DO 2	0: Normal Close 1: Normal Open	0		NO
DO 3	0: Normal Close 1: Normal Open	0		NO

DO 4	0: Normal Close 1: Normal Open	0		NO
DO 5	0: Normal Close 1: Normal Open	0		NO
DO 6	0: Normal Close 1: Normal Open	0		NO
DO 7	0: Normal Close 1: Normal Open	0		NO
DO 8	0: Normal Close 1: Normal Open	1		NO

Shunt Config

Tab 9-5 Shunt Config

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Battery 1 Shunt	0: Yes 1: No	1	Set according to actual power system. Battery shunt should be set as 'No' if system doesn'tsample via shunt.	NO
Load 1 Shunt	0: Yes 1: No	1	Set according to actual power system. If all load shunt is set to 'No' the total load current is equal to the sum of module currents minus the sum of battery currents.	NO
Load 2 Shunt	0: Yes 1: No	1		NO

Load 3 Shunt	0: Yes 1: No	1		NO
Load 4 Shunt	0: Yes 1: No	1		NO
Battery 1 Shunt Current	0~2000	1	Set according to actual power system.	NO
Battery 1 Shunt Voltage	1~500	1		NO
Load 1 Shunt Current	0~2000	1	Set according to actual power system. **Note**: These two parameters will be invalid if all load shunt is configured as No.	NO
Load 1 Shunt Voltage	1~500	1		NO
Load 2 Shunt Current	0~2000	1		NO
Load 2 Shunt Voltage	1~500	1		NO
Load 3 Shunt Current	0~2000	1		NO
Load 3 Shunt Voltage	1~500	1		NO
Load 4 Shunt Current	0~2000	1		NO
Load 4 Shunt Voltage	1~500	1		NO
Extra Load Current Calculation	0: Enabled 1: Disabled	1	Set according to actual power system.	NO

Calibration Parameter:

Adjust Coeff

Tab 9-6 Adjust Coeff

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Dc.KCoeff	0.5~1.5	1.000	The actual DC bus voltage = The sampling DC bus voltage * k, that is K = The actual DC bus voltage/ The sampling DC bus voltage.	NO
Battery1 Mid Voltage KCoeff	0.001~5	1	The actual Battery Mid Voltage age = The sampling Battery Mid Voltage * k+B, that is K = (The actual Battery Mid Volttage - B)/ The sampling Battery Mid Voltage.	NO
Battery1 Mid Voltage BCoeff	-50~50	0	The actual Battery Mid Voltage = The sampling Battery Mid Voltage * k+B, that is B = The actual Battery Mid Voltage - k * The sampling Battery Mid Voltage.	NO
Battery1 Voltage KCoeff	0.001~5	1	The actual Battery Mid Voltage age = The sampling Battery Mid Voltage * k+B, that is K = (The actual Battery Mid Volttage - B)/ The sampling Battery Mid Voltage.	NO
Battery1 Voltage BCoeff	-50~50	0	The actual Battery Voltage = The sampling Battery Voltage * k+B, that is B = The actual Battery Voltage - k * The sampling Battery Voltage.	NO
Load1Cur.KCoeff	0.5~1.5	1	The actual Load 1 current = The sampling Load 1 current * k+B, that is K = (The actual Load 1 current - B)/ The sampling Load 1 current.	NO

Load1Cur.BCoeff	-80~80	0	The actual Load 1 current = The sampling Load 1 current * k+B, that is B = The actual Load 1 current - k * The sampling Load 1 current.	NO
Load2Cur.KCoeff	0.5~1.5	1	The actual Load 2 current = The sampling Load 2 current * k+B, that is K = (The actual Load 2 current - B)/ The sampling Load 2 current.	NO
Load2Cur.BCoeff	-80~80	0	The actual Load 2 current = The sampling Load 2 current * k+B, that is B = The actual Load 2 current - k * The sampling Load 2 current.	NO
Load3Cur.KCoeff	0.5~1.5	1	The actual Load 3 current = The sampling Load 3 current * k+B, that is K = (The actual Load 3 current - B)/ The sampling Load 3 current.	NO
Load3Cur.BCoeff	-80~80	0	The actual Load 3 current = The sampling Load 3 current * k+B, that is B = The actual Load 3 current - k * The sampling Load 3 current.	NO
Load4Cur.KCoeff	0.5~1.5	1	The actual Load 4 current = The sampling Load 4 current * k+B, that is K = (The actual Load 4 current - B)/ The sampling Load 4 current.	NO
Load4Cur.BCoeff	-80~80	0	The actual Load 4 current = The sampling Load 4 current * k+B, that is B = The actual Load 4 current - k * The sampling Load 4 current.	NO

Temperature 1 KCoeff	0.5~1.5	1	The actual Temperature 1 = The sampling temperature 1 * k+B, that is K = (The actual Temperature 1 - B)/ temperature 1	NO
Temperature 2 KCoeff	0.5~1.5	1	The actual Temperature 2 = The sampling temperature 2 * k+B, that is K = (The actual Temperature 2 - B)/ temperature 2	NO
Temperature 3 KCoeff	0.5~1.5	1	The actual Temperature 3 = The sampling temperature 3 * k+B, that is K = (The actual Temperature 3 - B)/ temperature 3	NO
Temperature 1 BCoeff	-20~20	0	The actual sensor 1 temperature = The sampling sensor 1 temperature +B, that is B = The actual sensor 1 temperature - k * The sampling sensor 1 temperature.	NO
Temperature 2 BCoeff	-20~20	0	The actual sensor 2 temperature = The sampling sensor 2 temperature +B, that is B = The actual sensor 2 temperature - k * The sampling sensor 2 temperature.	NO
Temperature 3 BCoeff	-20~20	0	The actual sensor 3 temperature = The sampling sensor 3 temperature +B, that is B = The actual sensor 3 temperature - k * The sampling sensor 3 temperature.	NO

Battery1 Current KCoeff	0.001~5	1	The actual Battery Mid Voltage age = The sampling Battery Mid Current * k+B, that is K = (The actual Battery Mid Volttage - B)/ The sampling Battery Mid Current.	NO
Battery1 Current BCoeff	-50~50	0	The actual Battery Mid Voltage = The sampling Battery Mid Voltage * k+B, that is B = The actual Battery Mid Current - k * The sampling Battery Mid Current.	NO
DG Fuel Level KCoeff	0.5~1.5	1	The actual DG Fuel Level = The sampling DG Fuel Level * k+B, that is K = (The actual DG Fuel Level - B)/ The sampling DG Fuel Level .	NO
DG Fuel Level BCoeff	-20~20	0	The actual DG Fuel Level = The sampling DG Fuel Level +B, that is B = The actual DG Fuel Level - k * The sampling DG Fuel Level .	NO
Env.Humidity KCoeff	0.5~1.5	1	The actual environment humidity= The samplingenvironment humidity * k+B, that is K = (The actual environment humidity - B)/The sampling environment humidity.	NO
Env.Humidity BCoeff	-20~20	0	The actual environment humidityl = The sampling environment humidity +B, that is B = The actual environment humidityl - k * The sampling environment humidity.	NO

Input Voltage L1 KCoeff	0.5~1.5	1	The actual Input Voltage L1 = The sampling Input Voltage L1 * k+B, that is K = (The actual Input Voltage L1 - B)/ The sampling Input Voltage L1.	NO
Input Voltage L2 KCoeff	0.5~1.5	1	The actual Input Voltage L2 = The sampling Input Voltage L2 * k+B, that is K = (The actual Input Voltage L2 - B)/ The sampling Input Voltage L2.	NO
Input Voltage L3 KCoeff	0.5~1.5	1	The actual Input Voltage L3 = The sampling Input Voltage L3 * k+B, that is K = (The actual Input Voltage L1 - B)/ The sampling Input Voltage L3.	NO
Input Voltage L1 BCoeff	-200~200	0	The actual Input Voltage L1 = The sampling Input Voltage L1 * k+B, that is B = The actual Input Voltage L1 - k * The sampling Input Voltage L1.	NO
Input Voltage L2 BCoeff	-200~200	0	The actual Input Voltage L2 = The sampling Input Voltage L2 * k+B, that is B = The actual Input Voltage L2 - k * The sampling Input Voltage L2.	NO
Input Voltage L3 BCoeff	-200~200	0	The actual Input Voltage L3 = The sampling Input Voltage L3 * k+B, that is B = The actual Input Voltage L3 - k * The sampling Input Voltage L3.	NO

Temperature Compensation

Tab 9-7 Temperature Compensation

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Temperature Compensation Enable	0: Enabled 1: Disabled	0	Disable: Close temperature compensation function **Note:** The temperature compensation function fail when all battery sensor is set as 'no'; The temperature compensation function is invalid when battery type is set to lithium battery mode. When rectifier communication fail or DC over/under voltage, temperature compensation function will be invalid. When any battery temperature sensor is fault or disconnect, temperature compensation function will be invalid. When there are multiple temperature sensors, select the lowest temperature from temperature compensation	YES
Temperature Compensation Coef	0~500V/℃	96mV/℃	Float charge voltage decrease value = (Battery temperature measuring value-Temp Comp Center) × Temp Comp Coef	YES

Temperature Compensation Center	10~40℃	25℃	Battery temperature compensation reference center point.	YES
OverTemperature Prot. Mode	0: Derate Voltage 1: BLVD	0		YES
Derated Output Voltage	48~53	52		YES
UnderTemperature Prot. Mode	0: None 1: BLVD	0		YES

Battery Test

Tab 9-8 Battery Test

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Test End Voltage	max(BLVD Voltage, LLVD 1 Voltage, 43.1)~57.9	45.2 V		YES
Test End Time	5~1440	300 min		YES
Test End SOC	1~95	70%		YES
Short Test Enable	0: Enabled 1: Disabled	1		YES
Short Test Period	24~8760	720 hour		YES
Short Test Time	1~60	5 min		YES
Battery Current Imbalance	1~60	5		YES
Planned Battery Test	1: Disabled 2: Cycle Test 3: Scheduled Test	1		YES
Battery Test Type	2: CC Test 4: Normal Test	1		YES
Const Current Test Current	0.1~0.9	0.2		YES
Battery Test Period	24~8760	4320		YES

Scheduled Test Time		2022-1-1 0: 00: 00		YES
Battery Test Enable	0: Enabled 1: Disabled	0		YES

Alarm Thresholds

Tab 9-9 Alarm Thresholds

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Input Over Voltage	Input Under Voltage~500	280		YES
Input Under Voltage	Phase Loss Voltage~Input Over Voltage	180		YES
Phase Loss Voltage	50~min(Input Under Voltage, 80)	80		YES
DC Over Voltage	DC Under Voltage~60	58.5		YES
DC Under Voltage	LLVD 1 Voltage~ DC Over Voltage	47		YES
Temperature 1 Very High	Temperature 1 High ~100	60		YES
Temperature 1 High	10~ Temperature 1 High+	55		YES
Temperature 1 Low	-40~10	-33		YES
Temperature 2 Very High	Temperature 2 High ~100	60		YES
Temperature 2 High	10~ Temperature 2 High+	55		YES
Temperature 2 Low	-40~10	-33		YES
Temperature 3 Very High	Temperature 3 High ~100	60		YES
Temperature 3 High	10~ Temperature 3 High+	55		YES
Temperature 3 Low	-40~10	-33		YES

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Environment Humidity High Threshold	50~100	95		YES
Environment Humidity Low Threshold	0~50	5		YES
BatteryFuse VTH	0.1~0.5	0.4		NO
Discharge Threshold	-10~-2	-3		NO
Heavy Load Ratio	50~120	100		YES

Settings Parameter:

Charge Settings

Tab 9-10 Charge Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Battery Type	0: Lead Acid 1: Lithium 2: Mixed	1		YES
Battery Capacity	0~5000	100	Bat Capacity is known as the nominal capacity of the battery. You should set this parameter according to the actual battery configuration. If you have multiple batteries in parallel, It should be set to the sum of the battery rated capacity of the installation.	YES

Float Voltage	42～Boost Voltage	54.5	In the FC state, all rectifiers output voltage according to the set float voltage. The float voltage mus be less than boost voltage.	YES
Boost Voltage	Float Voltage~58.5	56	In the BC state, all rectifiers output voltage according to the set boost voltage. The boost voltage must be greater than the float voltage.	YES
Battery Charge Current Limit	0.01~1	0.1	This is the maximum charging current that should be allowed into the battery at anytime, as regards to the nominal capacity of the battery. For example, a value of 0.2C10 means that the charging current is limited to 20% of the battery's nominal capacity. Note: C10 means the nominal capacity of the battery	YES
Boost Charge Enable	0: Enabled 1: Disabled	1	Enable: meet boost condition, transfer to boost charge automatically. Disable: transfer to boost charge isn't allowed. **Note:** The boost function is invalid when battery type is set to lithium battery mode.	YES

Float to Boost Current	0.040~0.080	0.06	The monitoring module will control the system enter the BC state when the battery capacity decreases to the value of To Boost Capacity, or when the charge current reaches the To Boost Current. The charge voltage will be the Boost	YES
Float to Boost SOC	10~99	80		YES
Battery Fuse Num	1~2	2	Set the number of battery fuses in the system.	
Boost to Float Current	0.002~0.02	0.01	'Boost To Float Current' is also known as constant boost current. When the system is on boost charge status, if charge current is less than 'Boost To Float Current' setting values, system will enters constant boost charge status. When the system is on constant boost charge status, if charge timer is more than 'Const Boost Time' setting values, system enters the float charge status.	YES
Const Boost Time	5~1440	180		YES

Planned Boost MaxTime	30~2880	240	To set cyclic boost charging. 'Per.Boost Interval' means interval time between twice timing boost charge. Battery charging voltage is ' Boost charge voltage' Setting value. Charge time is 'Per.Boost Duration' setting value.	YES
Boost Max Time	60~2880	1080	During boost charge, monitor module will force system turns to float charge to secure system when boost charge time reaches to the value of 'boost charge protection time'	YES
Planned Boost Charge	1: Disabled 2: Cycle Boost 3: Scheduled Boost	1		YES
Cyc Boost Period	48~8760	2400		YES
Scheduled Boost Time		2022-1-1 0: 00: 00		YES

DCDU Settings

Tab 9-11 DCDU Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
CB1 Addr	0~65535	17		NO
CB2 Addr	0~65535	20		NO
CB3 Addr	0~65535	23		NO
CB4 Addr	0~65535	25		NO
CB5 Addr	0~65535	27		NO
CB6 Addr	0~65535	33		NO
CB7 Addr	0~65535	35		NO

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
CB8 Addr	0~65535	37		NO
CB9 Addr	0~65535	49		NO
CB10 Addr	0~65535	51		NO
CB11 Addr	0~65535	53		NO
CB12 Addr	0~65535	0		NO
CB13 Addr	0~65535	0		NO
CB14 Addr	0~65535	0		NO
CB15 Addr	0~65535	0		NO
CB1 Name				NO
CB2 Name				NO
CB3 Name				NO
CB4 Name				NO
CB5 Name				NO
CB6 Name				NO
CB7 Name				NO
CB8 Name				NO
CB9 Name				NO
CB10 Name				NO
CB11 Name				NO
CB12 Name				NO
CB13 Name				NO
CB14 Name				NO
CB15 Name				NO

DG Settings

Tab 9-12 DG Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
DG Power Priority	0: Enabled 1: Disabled	1		YES
DG Start Voltage	max(LLVD 1 Voltage, LLVD 2 Voltage, LLVD 3 Voltage, LLVD 4 Voltage)~DG Stop Voltage	47	Start DG when the system output voltage is less than the setting value	YES
DG Start SOC	max(LLVD 1 SOC, LLVD 2 SOC, LLVD 3 SOC, LLVD 4 SOC)~100.0	80		YES
DG Stop Voltage	DG Start Voltage~Boost Voltage	53.5	When the bus voltage is greater than the stop voltage, it will determine whether to stop the oil machine.	YES
DG Stop Current	0~Boost to Float Current	0.01	When the 'DG Current Control' is set to 'Enable', and the battery current is less than the 'DG Stop Current, the DG will be stopped.	YES
DG Stop SOC	DG Start SOC~100	100		YES

DG Status	0: None 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5 6: DI6 7: DI7 8: DI8 9: DI9 10: DI10 11: DI11 12: DI12 13: DI13 14: DI14 15: DI15 16: DI16 17: DI17 18: DI18 19: DI19 20: DI20	0	Digital Input x is used to detect the running state of DG.	YES
DG Start/DG Stop	0: None 1: DO1 2: DO2 3: DO3 4: DO4 5: DO5 6: DO6 7: DO7 8: DO8	0	Digital output x is used to start or stop DG.	YES

ATS Status	0: None 1: DI1 2: DI2 3: DI3 4: DI4 5: DI5 6: DI6 7: DI7 8: DI8 9: DI9 10: DI10 11: DI11 12: DI12 13: DI13 14: DI14 15: DI15 16: DI16 17: DI17 18: DI18 19: DI19 20: DI20	0	No digital Input is used to detect the state of Mains.	YES
DGVoltage Control	0: Enabled 1: Disabled	0	When set to 'Enable', the system will judge whether start DG according to system output voltage.	YES
DG Current Control	0: Enabled 1: Disabled	0	When set to 'Enable', the system will judge whether stop DG according to battery current.	YES
DG SOC Control	0: Enabled 1: Disabled	1		YES
DG Max Run Time	max(30,Monthly Work Duration)~44640	480	The maximum operating time of the DG, exceeding the set value will stop the DG.	YES

DG Run Fault Time	0~30	5	Failure delay of the DG. When the DG running time meets the set value, it will judge whether to stop the DG according to the DG signal and ac condition.	YES
Rect Output Min Stop DG	1~4320	10	The output delay of the rectifier module is minimum. When the output of the rectifier module is minimum and the delay time meets, the DG is stopped.	YES
DG Stop Delay	1~1440	5	When the 'DG Stop Cap' or 'DG Stop Curr' condition is satisfied, stop DG after the delay time arrives	YES
DG Monthly Control	0: Enabled 1: Disabled	0	When set to 'Enable', the system will judge whether start DG according to the monthly starting time.	YES

DG Monthly Date 1	1~31	1	When the 'DG Monthly Control' is set to 'Enable', start DG at 21:00 PM on the DG monthly day of every month by default. DG monthly day can be set up to 3 different dates, means starting DG three times a month. DG monthly day can also be the same, means starting DG once a month, users can choose freely.	YES
DG Monthly Date 2	1~31	10		YES
DG Monthly Date 3	1~31	20		YES
Monthly Start DG On(Hour)	0~23	21	Merged with DG Monthly Date 1	YES
Monthly Start DG On(Minute)	0~59	0		YES
Monthly Work Duration	30~min(DG Max Run Time, 4320)	30		YES
DG Daily Control	0: Enabled 1: Disabled	1		YES
Daily Work Period1		0: 00-0: 00		YES
Daily Work Period2		0: 00-0: 00		YES
Daily Work Period3		0: 00-0: 00		YES
Tank Cap_L Alarm	0~50	10	Low diesel capacity	YES

Low Fuel Stop DG En	0: Enabled 1: Disabled	1	When set to "Enable", the system will judge whether to stop DG according to the Fuel level.	YES
DG LimitPower	0: Enabled 1: Disabled	1	When set to "Enable", the system will turn on the diesel engine power limit function	YES
DG MaxPower	500~60000	21000	Diesel maximum power	YES

ECO Settings

Tab 9-13 ECO Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
ECO Enable	0: Enabled 1: Disabled	1	Enable: Can use ECO function Disable: Can't use ECO function **Note:** Only can be set as 'Enable' if system has battery and no large load current shock appear	YES
Min Rectifier Number	1~Rect Slot Number	2	The minimum number of rectifier working.	YES

Best Load Ratio	30~min(Rect Save Stop, 90)	60	Best Load Ratio is also known as rectifier best operating-point. At the best operating-point, the rectifier module operates at a relatively high efficiency and is subject to more suitable stresses. For energy saving, the power supply system should try to make the rectifier module load / rated capacity ratio as close as possible to the best operating-point. **Note: Load / Rated capacity ratio = Rectifier real output current / Rectifier rated current * 100% .**	YES
Rect Save Stop	Best Load Ratio~100	90	React Save Stop is also known as system energy-saving point. If load / rated capacity ratio more than system energy-saving point, the power supply system exit energy-saving mode.	YES

ECO Cycle Period	1~8760	168	In order to prevent the rectifier that has been shutdown for a long time from being damaged by condensation, the Controller will turn on all rectifiers at regular intervals (called ECO Cycle Period) and let all rectifiers work for a while(called Dry time) to achieve the drying effect.	YES
Dry time	5~240	120	In order to prevent the rectifier that has been shutdown for a long time from being damaged by condensation, the Controller will open all rectifiers at regular intervals (called ECO Cycle Period) and let all rectifiers work for a period of time (called drying time) to achieve the drying effect. All rectifier modules work together for a while before shutting down redundant rectifier modules one by one.	YES

Phase Balance Prio	0: Enabled 1: Disabled	0	Enable: In ECO mode, AC three-phase voltage balance is considered first, rectifier efficiency is considered second, and rectifier running time is considered third. Disable: In ECO mode, rectifier efficiency is considered first, and rectifierslot is considered second. Rectifier modules off from a lower slot, and rectifier modules on from a higher slot.	YES

Load Shifting

Tab 9-14 Load Shifting

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Load Shifting	0: Enabled 1: Disabled	1		YES
Flat Charge	0: Enabled 1: Disabled	0		YES
Peak Period 1		0: 00-0: 00		YES
Peak Period 2		0: 00-0: 00		YES
Peak Period 3		0: 00-0: 00		YES
Peak Period 4		0: 00-0: 00		YES
Valley Period 1		0: 00-0: 00		YES
Valley Period 2		0: 00-0: 00		YES
Valley Period 3		0: 00-0: 00		YES
Valley Period 4		0: 00-0: 00		YES
Peak Period 1 Tariff		0		YES
Peak Period 2 Tariff		0		YES
Peak Period 3 Tariff		0		YES

Peak Period 4 Tariff		0		YES
Valley Period 1 Tariff		0		YES
Valley Period 2 Tariff		0		YES
Valley Period 3 Tariff		0		YES
Valley Period 4 Tariff		0		YES

LVs Settings

Tab 9-15 LVs Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
LLVD 1 Enable	0: Enabled 1: Disabled	0	Enable: Can use load 1～4 disconnect function Disable: Can't use load 1~4 disconnect functio	YES
LLVD 2 Enable	0: Enabled 1: Disabled	0	Enable: Can use load 1～4 disconnect function Disable: Can't use load 1~4 disconnect functio	YES
LLVD 3 Enable	0: Enabled 1: Disabled	1	Enable: Can use load 1～4 disconnect function Disable: Can't use load 1~4 disconnect functio	YES
LLVD 4 Enable	0: Enabled 1: Disabled	1	Enable: Can use load 1～4 disconnect function Disable: Can't use load 1~4 disconnect functio	YES
BLVD Enable	0: Enabled 1: Disabled	0	Enable: Can use battery LVD function Disable: Can't use battery LVD function	YES

LLVD1 Mode	0: Voltage Mode 1: Time Mode 2: Cap Mode	0	Voltage Mode: LVD according to voltage. Time Mode: LVD according to voltage and Mains failure time at the same time, which will come earlier. Cap Mode: LVD according to voltage and battery capacity at the same time, which will come earlier. Note:In either mode, LLVD will be disconnected when the DC voltage is less than the LLVD voltage.	YES
LLVD2 Mode	0: Voltage Mode 1: Time Mode 2: Cap Mode	0	Voltage Mode: LVD according to voltage. Time Mode: LVD according to voltage and Mains failure time at the same time, which will come earlier. Cap Mode: LVD according to voltage and battery capacity at the same time, which will come earlier. Note:In either mode, LLVD will be disconnected when the DC voltage is less than the LLVD voltage.	YES

LLVD3 Mode	0: Voltage Mode 1: Time Mode 2: Cap Mode	0	Voltage Mode: LVD according to voltage. Time Mode: LVD according to voltage and Mains failure time at the same time, which will come earlier. Cap Mode: LVD according to voltage and battery capacity at the same time, which will come earlier. Note:In either mode, LLVD will be disconnected when the DC voltage is less than the LLVD voltage. .	YES
LLVD4 Mode	0: Voltage Mode 1: Time Mode 2: Cap Mode	0	Voltage Mode: LVD according to voltage. Time Mode: LVD according to voltage and Mains failure time at the same time, which will come earlier. Cap Mode: LVD according to voltage and battery capacity at the same time, which will come earlier. Note:In either mode, LLVD will be disconnected when the DC voltage is less than the LLVD voltage.	YES
BLVD Mode	0: Voltage Mode 1: Time Mode 2: Cap Mode	0		YES

LLVD 1 Voltage	BLVD Voltage~ min(DC Under Voltage, LLVD 1 Recovery Voltage, Partial Chg End Voltage, Shifting End Voltage) Reference range (35~52)	45	When the DC voltage is less than this setting voltage, load 1 contactor will be disconnected.	YES
LLVD 2 Voltage	BLVD Voltage~ min(DC Under Voltage, LLVD 2 Recovery Voltage, Partial Chg End Voltage, Shifting End Voltage) Reference range (35~52)	44	When the DC voltage is less than this setting voltage, load 2 contactor will be disconnected.	YES
LLVD 3 Voltage	BLVD Voltage~ min(DC Under Voltage, LLVD 3 Recovery Voltage, Partial Chg End Voltage, Shifting End Voltage) Reference range (35~52)	44	When the DC voltage is less than this setting voltage, load 3 contactor will be disconnected.	YES
LLVD 4 Voltage	BLVD Voltage~ min(DC Under Voltage, LLVD 4 Recovery Voltage, Partial Chg End Voltage, Shifting End Voltage) Reference range (35~52)	44	Whenthe DC voltage is less than this settng voltage, load 4 contactor will be disconnected.	YES

BLVD Voltage	35~min(LLVD 1 Voltage, LLVD 2 Voltage, LLVD 3 Voltage, LLVD 4 Voltage) Reference range (35~52)	43.5	When the DC voltage is less than this setting voltage, BLVD appears.,The battery contactor will be disconnected	YES
LLVD 1 Time	1~BLVD Time	360	When the duration time of Mains and Solar Input failure exceeds this setting time, load 1 contactor will be disconnected.	YES
LLVD 2 Time	1~BLVD Time	360	When the duration time of Mains and Solar Input failure exceeds this setting time, load 2 contactor will be disconnected.	YES
LLVD 3 Time	1~BLVD Time	360	When the duration time of Mains and Solar Input failure exceeds this setting time, load 3 contactor will be disconnected.	YES
LLVD 4 Time	1~BLVD Time	360	When the duration time of Mains and Solar Input failure exceeds this setting time, load 4 contactor will be disconnected.	YES
BLVD Time	LLVD 1 Time~3600	480	When the duration time of Mains and Solar Input failure exceeds this setting time, battery contactor will be disconnected.	YES

LLVD 1 SOC	BLVD SOC~ min(Partial Chg Stop SOC, Shifting End SOC)	15	When the remaining battery capacity is less than this setting value, load 1 contactor will be disconnected.	YES
LLVD 2 SOC	BLVD SOC~ min(Partial Chg Stop SOC, Shifting End SOC)	15	When the remaining battery capacity is less than this setting value, load 2 contactor will be disconnected.	YES
LLVD 3 SOC	BLVD SOC~ min(Partial Chg Stop SOC, Shifting End SOC)	15	When the remaining battery capacity is less than this setting value, load 3 contactor will be disconnected	YES
LLVD 4 SOC	BLVD SOC~ min(Partial Chg Stop SOC, Shifting End SOC)	15	When the remaining battery capacity is less than this setting value, load 4 contactor will be disconnected.	YES
BLVD SOC	0~LLVD 1 SOC	5	When the remaining battery capacity is less than this setting value, battery contactor will be disconnected.	YES
LLVD 1 Recovery Voltage	max(42,LLVD 1 Voltage)~ min(DC Over Voltage, 58.5)	50	When the DC voltage is greater than this setting voltage, load 1 contactor will be connected.	YES
LLVD 2 Recovery Voltage	max(42,LLVD 2 Voltage)~ min(DC Over Voltage, 58.5)	50	When the DC voltage is greater than this setting voltage, load 2 contactor will be connected.	YES

LLVD 3 Recovery Voltage	max(42,LLVD 3 Voltage)~ min(DC Over Voltage, 58.5)	50	When the DC voltage is greater than this setting voltage, load 3 contactor will be connected.	YES
LLVD 4 Recovery Voltage	max(42,LLVD 4 Voltage)~ min(DC Over Voltage, 58.5)	50	When system voltage is greater than this setting voltage, load 4 contactor will be connected.	YES
BLVD Recovery Voltage	max(42, BLVD Voltage)~ min(DC Over Voltage, 58.5)	50	When the DC voltage is greater than this setting voltage, battery contactor can be connected.	YES
LLVD Recovery Delay	0: Enabled 1: Disabled	1		YES

Module Settings

Tab 9-16 Module Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Start Mode	0: Walk-In 1: Immed Mode 2: Pocl	2	1.Walk-In: The module output voltage slowly rises to the float charging voltage. 2. Immed Mode: The module output voltage immediately rises to the float charge voltage. 3. Pocl: The controller controls the module output voltage to rise slowly from 42V to the float charging voltage. This startup mode is recommended.	YES
Walk-in Time	8~200	12	The module output voltage slowly rising time.	YES

Output Over Voltage	59.5~60.5	60.5	Set the over voltage protect point of the module. Be careful, this value is not generally recommended to change.	YES
Default Output Voltage	Start Voltage~min(Output Over Voltage, 60)	52	The default output voltage of the module, to which the module adjusts its own output voltage when communication with the controller fails	YES
MPPT Scan Peroid	0~1800	300	The scan tracking cycle of the maximum power point of the solar module	YES
Solar Input Alarm Delay	1~7200	10		YES
Rect Default Limit Point	5~122	122		YES

Tank Settings

Tab 9-17 Tank Settings

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Level Total Num Setting		0		YES
Tank Full Capacity	0~10000	100		YES
Tank Cap Level Zero Level(Voltage)	0~5	0		YES
Tank Cap Level Zero Level(Volume)	0~10000	0		YES
Tank Cap Level Full Level(Voltage)	0~5	5		YES
Tank Cap Level Full Level(Volume)	0~10000	100		YES
Tank Cap Level 1 Level(Voltage)	0~5	0		YES
Tank Cap Level 1 Level(Volume)	0~10000	0		YES

Tank Cap Level 2 Level(Voltage)	0~5	0		YES
Tank Cap Level 2 Level(Volume)	0~10000	0		YES
Tank Cap Level 3 Level(Voltage)	0~5	0		YES
Tank Cap Level 3 Level(Volume)	0~10000	0		YES
Tank Cap Level 4 Level(Voltage)	0~5	0		YES
Tank Cap Level 4 Level(Volume)	0~10000	0		YES
Tank Cap Level 5 Level(Voltage)	0~5	0		YES
Tank Cap Level 5 Level(Volume)	0~10000	0		YES
Tank Cap Level 6 Level(Voltage)	0~5	0		YES
Tank Cap Level 6 Level(Volume)	0~10000	0		YES
Tank Cap Level 7 Level(Voltage)	0~5	0		YES
Tank Cap Level 7 Level(Volume)	0~10000	0		YES
Tank Cap Level 8 Level(Voltage)	0~5	0		YES
Tank Cap Level 8 Level(Volume)	0~10000	0		YES
Tank Cap Level 9 Level(Voltage)	0~5	0		YES
Tank Cap Level 9 Level(Volume)	0~10000	0		YES
Tank Cap Level 10 Level(Voltage)	0~5	0		YES
Tank Cap Level 10 Level(Volume)	0~10000	0		YES
Tank Cap Level 11 Level(Voltage)	0~5	0		YES

Tank Cap Level 11 Level(Volume)	0~10000	0		YES
Tank Cap Level 12 Level(Voltage)	0~5	0		YES
Tank Cap Level 12 Level(Volume)	0~10000	0		YES
Tank Cap Level 13 Level(Voltage)	0~5	0		YES
Tank Cap Level 13 Level(Volume)	0~10000	0		YES
Tank Cap Level 14 Level(Voltage)	0~5	0		YES
Tank Cap Level 14 Level(Volume)	0~10000	0		YES
Tank Cap Level 15 Level(Voltage)	0~5	0		YES
Tank Cap Level 15 Level(Volume)	0~10000	0		YES
Tank Cap Level 16 Level(Voltage)	0~5	0		YES
Tank Cap Level 16 Level(Volume)	0~10000	0		YES
Tank Cap Level 17 Level(Voltage)	0~5	0		YES
Tank Cap Level 17 Level(Volume)	0~10000	0		YES
Tank Cap Level 18 Level(Voltage)	0~5	0		YES
Tank Cap Level 18 Level(Volume)	0~10000	0		YES

Set DI Name

Tab 9-18 Set DI Name

Parameter	Default value	Setting description	Restore default parameters
DI 1 Name	Climate Alarm		NO
DI 2 Name	Door Alarm		NO
DI 3 Name	DI 3 Alarm		NO
DI 4 Name	DI 4 Alarm		NO

Parameter	Default value	Setting description	Restore default parameters
DI 5 Name	DI 5 Alarm		NO
DI 6 Name	DI 6 Alarm		NO
DI 7 Name	DI 7 Alarm		NO
DI 8 Name	DI 8 Alarm		NO
DI 9 Name	AC SPD Alarm		NO
DI 10 Name	DC SPD Alarm		NO
DI 11 Name	Water Alarm		NO
DI 12 Name	Smoke Alarm		NO

Tenant

Tab 9-19 Tenant

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Load Branch 1 Leased	0: Yes 1: No	0		NO
Load Branch 2 Leased	0: Yes 1: No	0		NO
Load Branch 3 Leased	0: Yes 1: No	0		NO
Load Branch 4 Leased	0: Yes 1: No	0		NO

Partial Charge

Tab 9-20 Partial Charge

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Partial Charge	0: Enabled 1: Disabled	1		YES
Partial Charge Num	1~10	2		YES
Partial Chg Start SOC	max(Partial Chg Stop SOC,50)~100	70		YES
Partial Chg Start Voltage	Partial Chg End Voltage~Boost Voltage	51		YES
Partial Chg Stop SOC	max(10,LLVD 1 SOC)~min(Partial Chg Start SOC,100)	20		YES

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Partial Chg End Voltage	max(42,LLVD 1 Voltage)~Partial Chg Start Voltage	47.5		YES

Peak Shaving

Tab 9-21 Peak Shaving

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Peak Shaving Enable	0: Enabled 1: Disabled	1		YES
AC Rated Capacity	1.0~999.0	200		YES
AC CB Rated Current	1~10000	500		YES
AC CB Derated Coef	10~100	80		YES
AC Rated Phase Voltage	60~300	220		YES
Peak Shaving LLVD Enable	0: Enabled 1: Disabled	0		YES
Peak Shaving End SOC	15~90	30		YES
Mixed Shaving End SOC	15~90	15		YES
VPP Enable	0: Enabled 1: Disabled	1		YES
VPP Period 1		0: 00-0: 00		YES
VPP Period 2		0: 00-0: 00		YES
VPP Period 3		0: 00-0: 00		YES
VPP Period 4		0: 00-0: 00		YES
VPP Period 1 Capacity	1.0~999.0	200		YES
VPP Period 2 Capacity	1.0~999.0	200		YES
VPP Period 3 Capacity	1.0~999.0	200		YES

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
VPP Period 4 Capacity	1.0~999.0	200		YES

Northboud Communication

Tab 9-22 Northboud Communication

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
IPV4 Mode	0: Static 1: DHCP	0		NO
IPV4 Address		192.168.70.2		NO
IPV4 Subnet Mask		255.255.255.0		NO
IPV4 Gateway		192.168.70.1		NO
IPV4 Primary DNS		0.0.0.0		NO
IPV4 Secondary DNS		0.0.0.0		NO
IPV6 Mode	0: Static 1: DHCP	0		NO
IPV6 Address		2405: 200: 1410: 292: : 10		NO
IPV6 Prefix Length	0~128	64		NO
IPV6 Gateway		fe80: : 1		NO
IPV6 Primary DNS		2001: 4860: 4860: : 8888		NO
IPV6 Secondary DNS		2001: 4860: 4860: : 8888		NO

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
NTP Server IPv4		0.0.0.0		NO
SNMP Version	0: SNMPv1 1: SNMPv2c 2: SNMPv3	2		YES
SNMP Agent Port	0~65535	161		YES
Read Community		public		YES
Write Community		public		YES
Enterprise OID	0~65535	40211		NO
SNMP V3 User Authority Level	0: NoAuth,NoPriv_NoAuth,NoPriv 1: Auth, NoPriv_Auth,NoPriv 2: Auth,Priv_Auth,Priv	1		YES
SNMP V3 User Name		user		YES
SNMP V3 Authority Password		12345678		YES
SNMP V3 Private Password		12345678		YES
Trap IPV4 1		0.0.0.0		NO
Trap IPV6 1		: :		NO
Trap Port 1	0~65535	163		YES
Trap IPV4 2		0.0.0.0		NO
Trap IPV6 2		: :		NO
Trap Port 2	0~65535	162		YES
Trap IPV4 3		0.0.0.0		NO
Trap IPV6 3		: :		NO
Trap Port 3	0~65535	162		YES
Trap IPV4 4		0.0.0.0		NO

Parameter	Setting Rang	Default value	Setting description	Restore default parameters
Trap IPV6 4		: :		NO
Trap Port 4	0~65535	162		YES
Trap Community		public		
North RS485 Addr	1~255	1		YES
North Baud Rate	0: 2400 1: 4800 2: 9600 3: 19200 4: 38400	2		YES

User Manager Settings

Tab 9-23 User Manager Settings

Parameter	Default value	Setting description	Restore default parameters
BMS Unlock Password	123456		NO

Others Parameter

Appendix B - Troubleshooting

Enter boot loader mode after startup

Fault description

After startup, the controller enter bootloader mode, the green LED flashes quickly, and the LCD does not light up.

Possible causes

- The user triggered an update of the softwareonline.
- An incorrect Application bin file causes the controller to start more than 10 times in a row, and the interval between 2 adjacent starts is less than 35 seconds;
- The unstable power supply of the controller causes the controller starts more than 10 times in a row, and the interval between two consecutive starts is less than 35 seconds;

Troubleshooting steps

Start with Step 1 and proceed step by step in 7.2.3.

Inaccurate DC current sampling

Fault description

The load, battery current sampling values and actual values are inconsistent.

Troubleshooting steps

- Check whetherthe parameter settings of the shunt are consistent with the parameters of the shunt actually installed in the system;
- There are several shunts installed in the system, Whether it is consistent with the number of shunts set on the controller;
- Check whethercurrent sampling calibration has been completed in the system;
- Check whetherthere is any modules that cannot communicate with the controller.

Inaccurate DC voltage sampling

Fault description

The DC voltage sampling value and actual value is inconsistent.

Troubleshooting steps

- Please Confirm where is the actual voltage measured. If it is measured at the load port, there will be a voltage drop at the DC due to the load current. The DC voltage sampling cable is generally close to the output of the modules, which will be different from the measured voltage from the system port.
- Compare the DC voltage sampling value with the module output voltage value to confirm whether the DC voltage sampling is normal;
- Check whether the DC voltage calibration has been completed in the system;

Not all online modules can be displayed

Fault description

The number of modules on LCD and Web is inconsistent with the actual number of modules.

Troubleshooting steps

- Check whether the number of slots set in the controller is the same as the number of actual systemslots;
- Check whether the System Power Mode is inconsistent with the actual power input source;
- Check whether there is any module with flashing yellow light;
- If there is a yellow flashing rectifier module, check that the CAN cable of the module is normal, if the CAN cable is not normal, please do the corresponding treatment, if the CAN cable is normal, the rectifier module may be faulty and need to be replaced.

Solar module output is not prioritized

Fault description

The solar moduleshave no output power or the output power is little, and the rectifier module has a large load.

Troubleshooting steps

- Check whether the "Solar Delta Voltage" is set appropriately, details in 9.4.3.

- Check whether the "System Power Mode"setting has PV;
- Check whether the sunlightis sufficient, and whether the sunlightcan ensure greater power output by the solar module
- Check whether the solar modules have raised alarms;

The DG cannot start normally

Fault description

The DG startup condition is met, but the DG does not start.

Troubleshooting steps

- Check whether all DG-related parameters are set correctly.
- Check whether the startup conditions of the DG are met;
- Check whether the control mode and related wiring of DG startup are correct;
- Check alarms, such as low fuel alarm;
- Check whether the ATS signal is normal;
- Check whether the DG has mechanical failure;

Appendix C - Role permissions

The supported strings for users and passwords are as follows:

User Name: `- ._[a-z][A-Z][0-9]`

Password : `!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~[a-z][A-Z][0-9]`

Tab 10-1 User role permission assignment table

Permission \ Role	Supervisitor	Administrator	Operator	Guest
Status & Alarm View	√	√	√	√
Parameter Export	√	√	√	
Record Export	√	√	√	
Normal Parameter Setting	√	√	√	
Calibration Parameter Setting	√	√	√	
Manual Control	√	√	√	
Parameter Import	√	√	√	
Clear Module Alarms	√	√	√	
Restore Default Parameters	√	√	√	
Clear History Records	√	√	√	
Software Update	√	√	√	

User Management	√	√		
Restore Factory Settings	√	√		
Protocol Configuration	√			

Appendix D - Abbreviations

Tab 10-2 Abbreviations

A	
AC	Alternating current
B	
BLVD	Battery low voltage disconnected
C	
CAN	Control area network
D	
DC	Direct current
DG	Diesel generators
E	
ESD	Electrostatic discharge
ECO	Energy Conservation Optimization
H	
HMI	Human Machine Interface
I	
IP	Internet Protocol
L	
LCD	Liquid crystal display
LLVD	Load low voltage disconnected
S	
SNMP	Simple Network Management Protocol