DataHub1000
User Manual

SolaX Power Network Technology (Zhejiang) Co., Ltd.

320101034804

Contents

1 Safety

The DataHub produced by SolaX Power Network Technology (Zhejiang) Co., Ltd. has been designed and tested strictly in accordance with relevant safety regulations. The safety instructions must be followed when installing and maintaining the electrical and electronic equipment. Improper operation will cause personal injury and property damage to the operator and the third party.

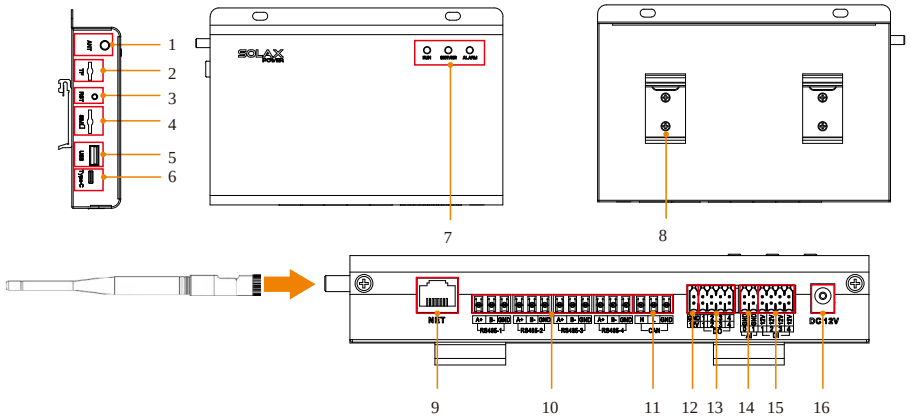
- Children should be supervised to ensure that they do not play with DataHub;
- Please do not open the top cover. Touching or replacing the components without authorization of SolaX may cause personal injury or damage to DataHub. SolaX does not assume any responsibility and warranty;
- Static electricity may damage the electronic components; therefore, appropriate anti-static measures should be taken.

2 Overview of DataHub

2.1 Introduction

DataHub, a special equipment of the monitoring platform of photovoltaic power generation system, has realized many functions, with details as follows: interface aggregation, data acquisition, data storage, output control, and centralized monitoring and centralized maintenance of inverters, electricity meters, environmental monitors and other equipment in photovoltaic power generation systems.

2.2 Appearance



(1) Antenna jack
(2) TF card socket (TF)
(3) RST button (RST)
(4) SIM card socket (SIM)
(5) USB socket (USB)
(6) TYPE-C socket
(7) LED indicator (RUN, SERVER, ALARM)
(8) Rail clip
(9) NET socket (NET)
(10) RS485 socket (RS485)
(11) CAN socket (CAN)
(12) 12V power output (12V/GND)
(13) DO socket (DO)
(14) AI socket (AI)
(15) DI socket (DI)
(16) 12V power input (DC12V)

2.3 LED Indicator

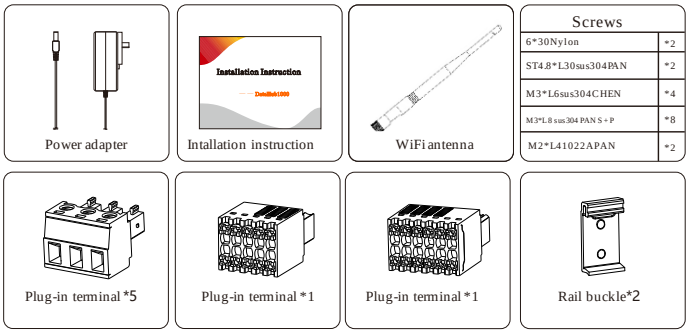
Sign	Status	Explanation
RUN (GREEN)	Flash	The program runs normally.
	Always on or always off	The program runs abnormally.
SERVE (GREEN)	ON	The network connection is normal.
	OFF	The network connection isn't normal.
ALARM (RED)	ON	Device alarms
	OFF	No alarm

3 Installation

3.1 Packing List

After receiving the package of DataHub, please check whether the accessories are complete and there is no obvious damage to the appearance. If there is any damage or items missing, please contact the dealer.

Packing List



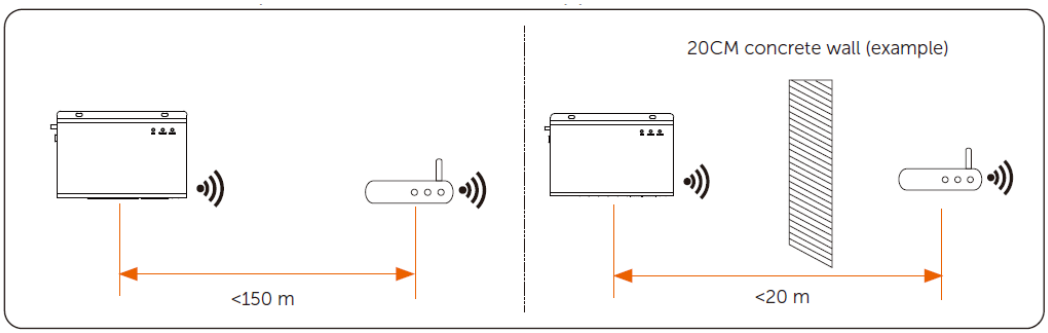
Line Specification	
RS485	Cross-sectional area 0.2mm ²~2.5mm ²(24AWG ~ 14AWG) dual-core or multi-core cables
DO/DI/AI	Cross-sectional area 0.2mm ²~1.5mm ²or (24AWG ~ 16AWG) dual-core or multi-core cables
NET Cable	Cat 5e or higher standard network cable

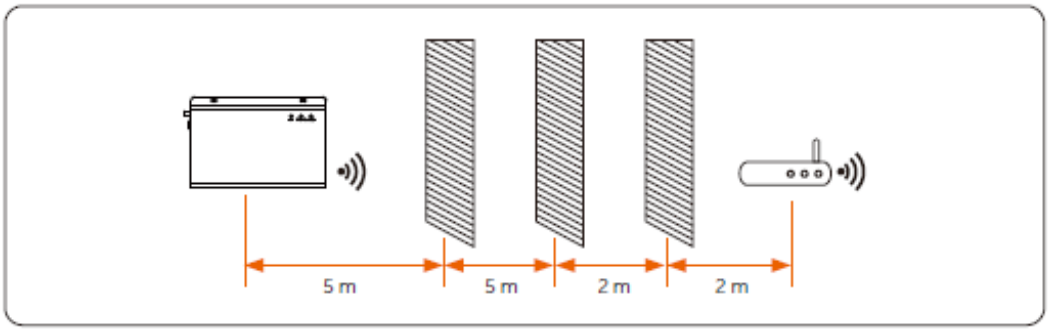
3.2 Device Installation

3.2.1 Preinstallation Check

For Wi-Fi mode, the longest connection distance between the router and the equipment should be no more than 150 meters; if there is a wall between the router and the equipment, the longest connection distance is 20 meters; the number of walls between the equipment and the router should be less than 3.

For LAN mode, the requirements above are not applicable.

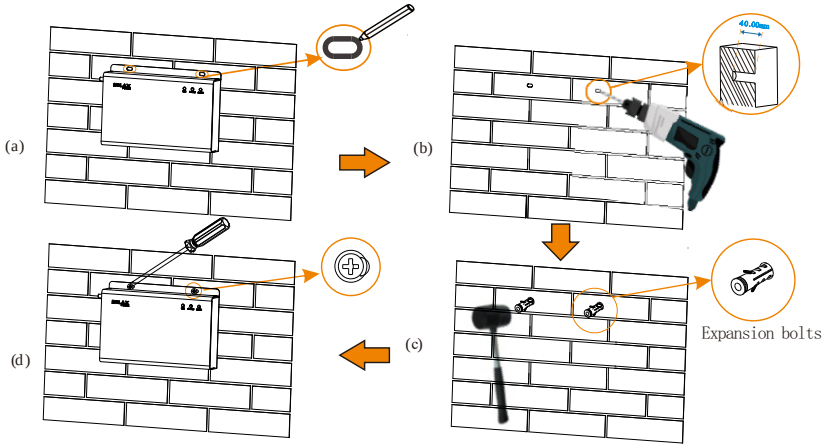




Note: When the Wi-Fi signal is weak, please install a Wi-Fi signal booster at the appropriate location.

3.2.2 Indoor Wall Mounting

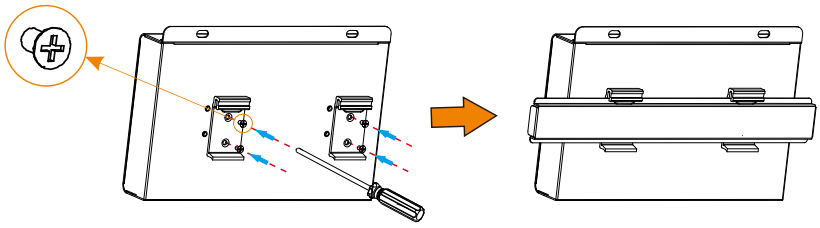
1) Choose a flat and solid indoor wall to drill for installation;
2) Hang the DataHub on the wall with the cable connection area facing down.



3.2.3 Guide Rail Mounting

1) Use the four M3*L6 screws in the accessory bag to fix the buckle on the DataHub.
2) Please prepare 35mm standard rail (effective length ≥230mm) and install it firmly.

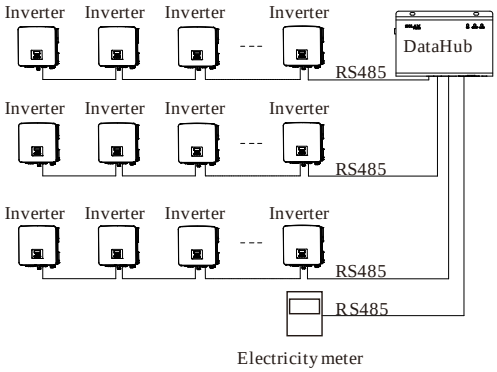
Note: The outdoor installation must be in a waterproof housing.



4 Electrical Connection

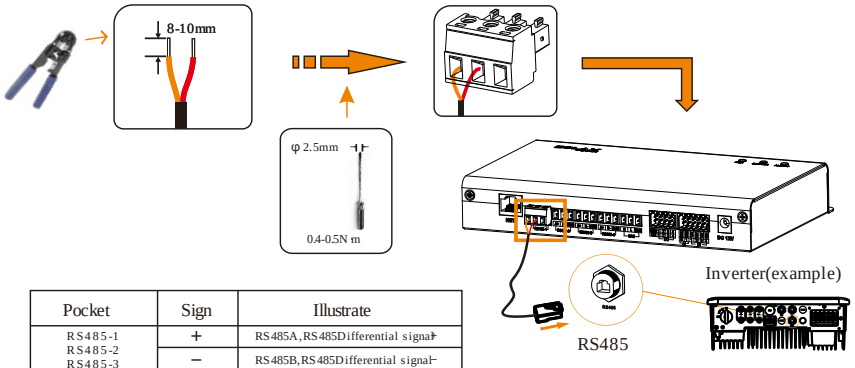
4.1 Inverter Connection

1) The inverter is connected to the DataHub through the RS485. For the connection method of the inverter, please refer to the inverter installation manual;
2) It is recommended that the number of devices connected to each channel of RS485 is less than 20;
3) The baud rate, communication protocol and verification method of the inverters connected to the same RS485 port of DataHub must be consistent, and the communication addresses of the inverters must be consecutive and not repeated.



4.2 Installation of RS485

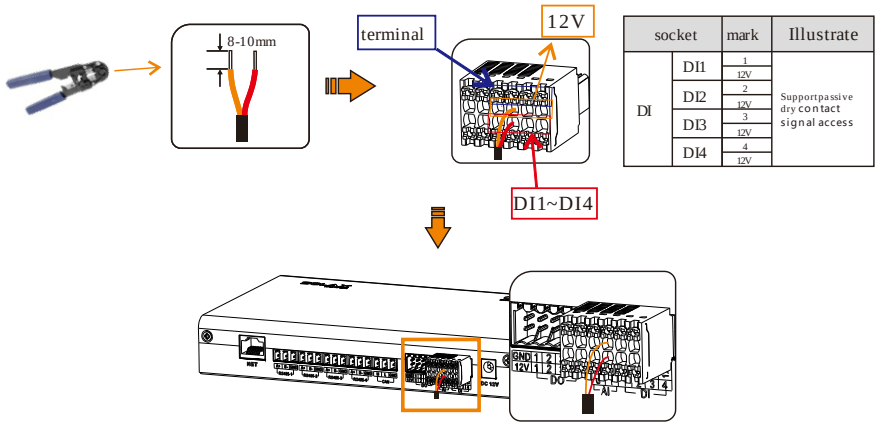
Make sure that RS485+ is connected to DataHub's RS485+, RS485- is connected to DataHub's RS485-, RS485 GND is connected to the GND of DataHub.



Pocket	Sign	Illustrate
RS485-1 RS485-2 RS485-3 RS485-4	+	RS485A,RS485Differential signal+
	−	RS485B,RS485Differential signal−
	GND	Ground wire

4.3 Installation of DI Signal Cable

DataHub can access DI signals such as remote control and alarms through the DI port.

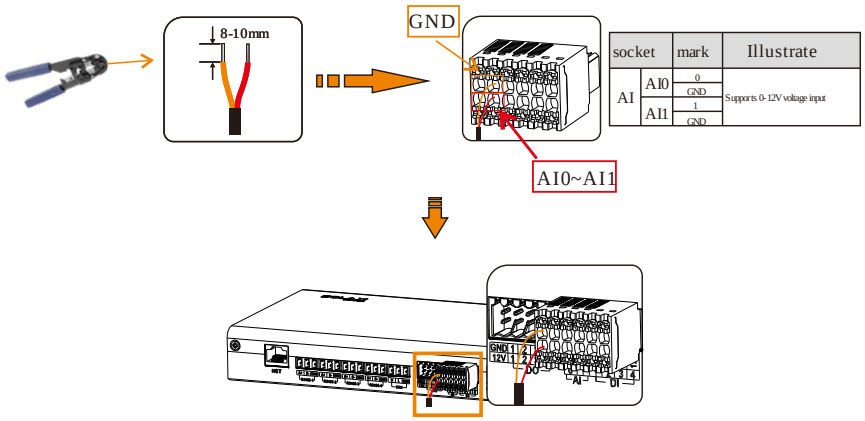


socket		mark	Illustrate
DI	DI1	1 12V	Supportpassive dry contact signal access
	DI2	2 12V	
	DI3	3 12V	
	DI4	4 12V	

4.4 Installation of AI Signal Cable

Installation advice：

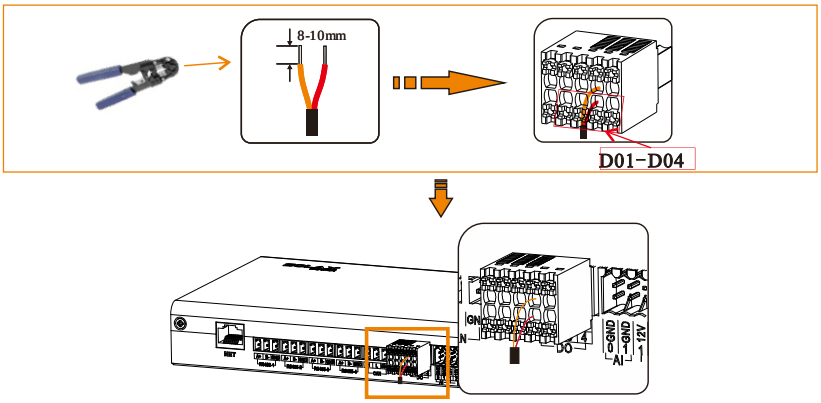
- It is recommended that the transmission distance does not exceed 10 m;
- AI port 0 and AI port 1 are connected to AI signal +, and GND is connected to AI signal–.



socket		mark	Illustrate
AI	AI0	0 GND	Supports 0-12V voltage input
	AI1	1 GND	

4.5 Installation of DO Signal Cable

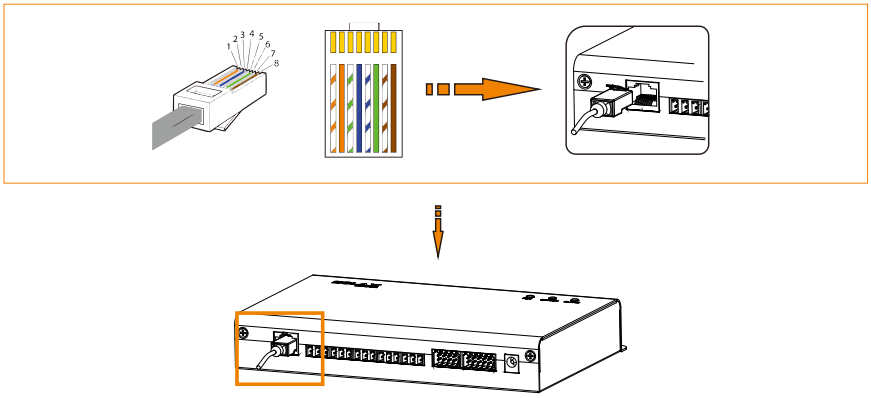
The DO port supports 30V signal voltage in maximum. The contact of four-group output is on by default.



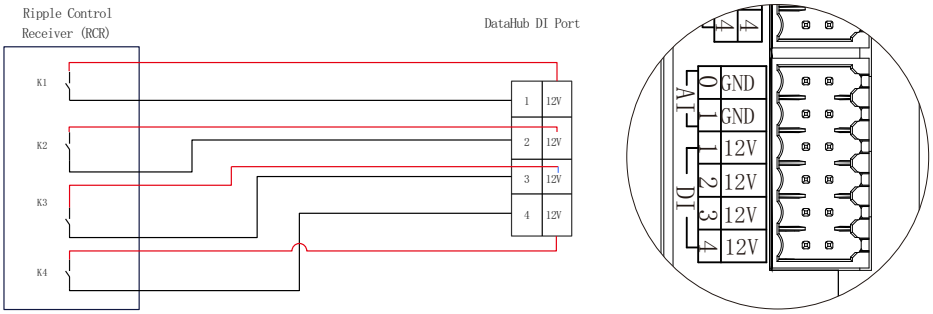
socket		mark	Illustrate
DO	DO1	1 1	Max. load 30V/2A
	DO2	2 2	
	DO3	3 3	
	DO4	4 4	

4.6 Installation of Network Cable

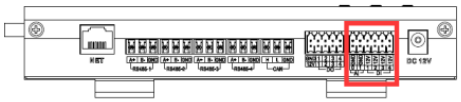
- Use Cat 5e or higher specifications and Shielded crystal head connectors to prepare the network cable.
- The communication distance does not exceed 100 m.
- When crimping the network cable, ensure that the shielding layer of the network cable is properly connected to the metal shell of the RJ45 connector.

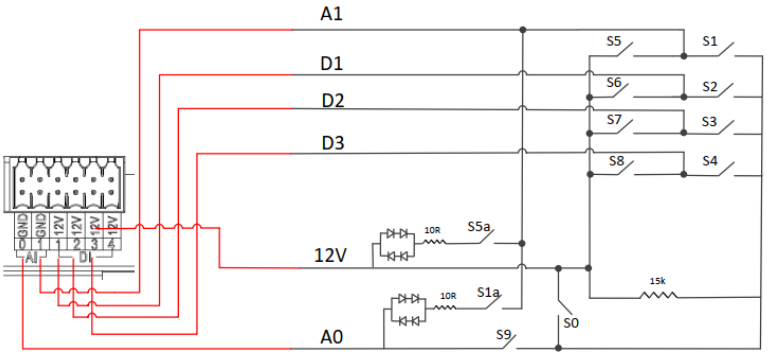


4.7 Connecting to Ripple Control Receiver



4.8 Connecting to DRED





5 Configuration Function

5.1 Login

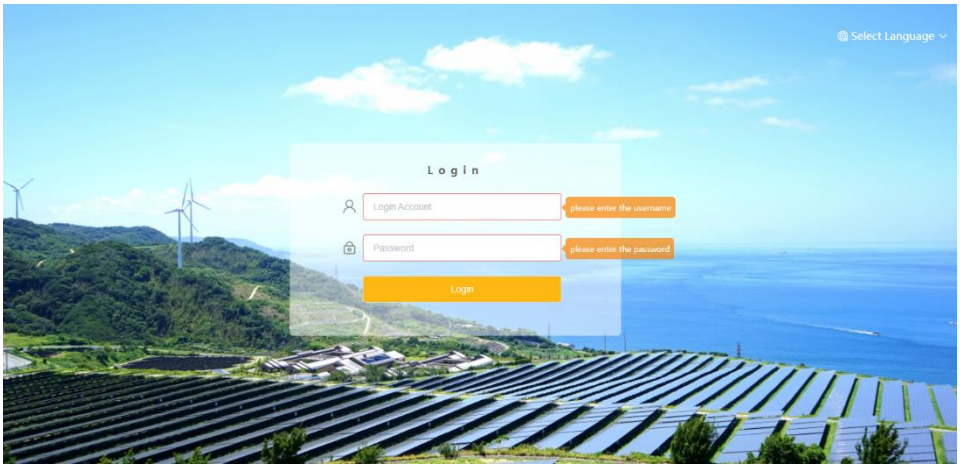
Local login: connect the computer to the DataHub hotspot (WiFi _xxxxxxx; xxxxxxx refers to the Registration No. of DataHub), and use the computer to access 192.168.10.10 to enter the login interface.

LAN login: please refer to 5.7.1 Internet setting.

Administrator account: admin, initial Password: (the same as Registration Number).

User account: user, initial Password: 123456.

Visitor account: visitor, initial Password: 123456.



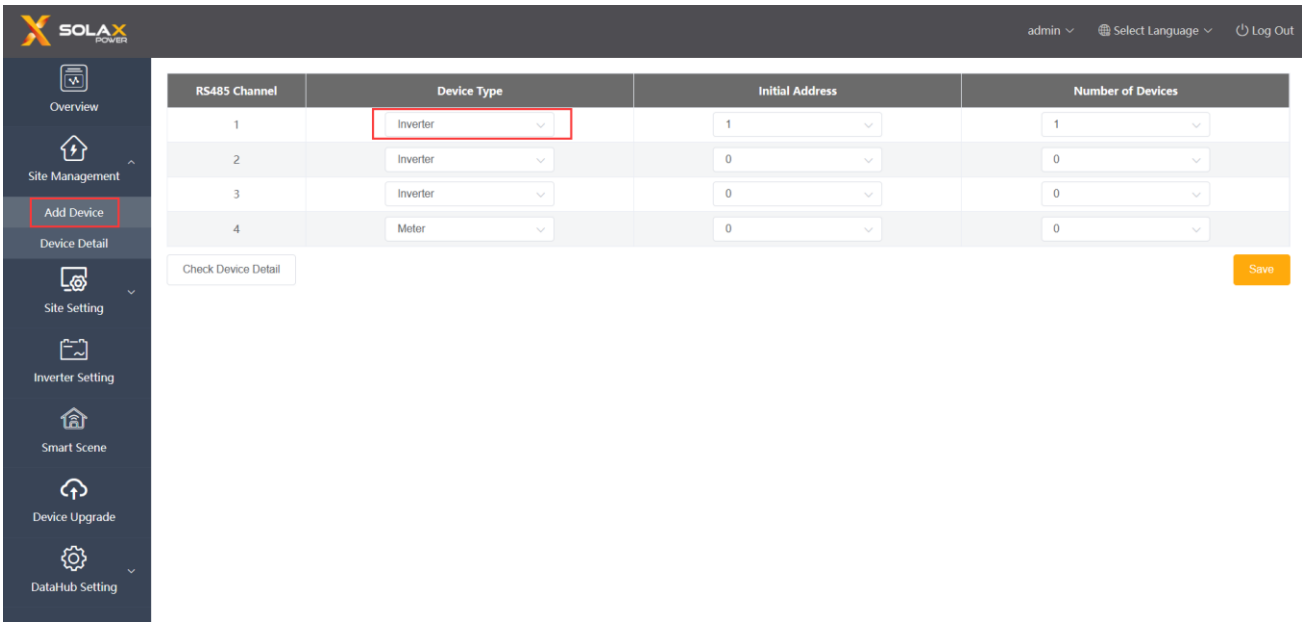
*Note: To remotely monitor or set the device, please access http:// www.solaxcloud.com and follow the user guide on the website to finish the registration. When connecting via hotspot (WiFi _xxxxxxx), please check "Auto-connect".

5.2 Site Management

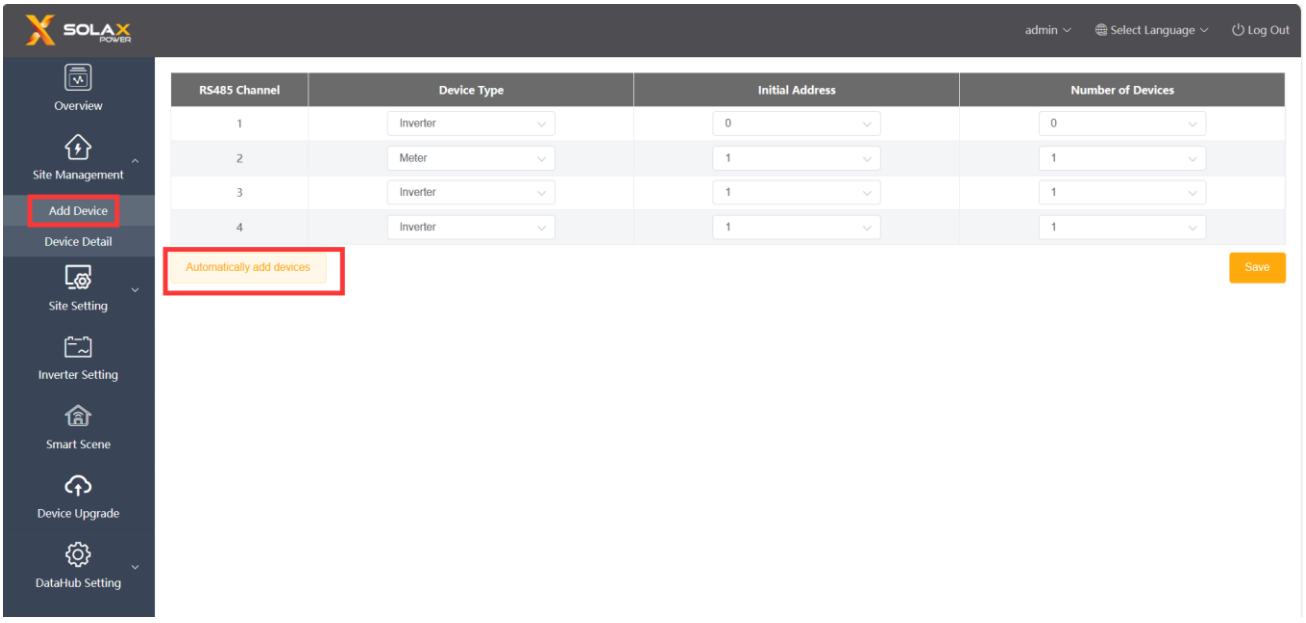
5.2.1 Add Device

The devices supported by DataHub are as follows: Inverters, EV Charger, Electricity Meters, and Environmental Monitors.

Select the device type under the serial port, set the starting address and the number of devices under the serial port, and save these settings.



Automatically add device: By this function, users can add new devices without setting inverter modbus address. To enable this function, users need to select device quantity and click “Add device automatically”. DataHub will distribute Modbus address to devices automatically and add these devices.



*Note:

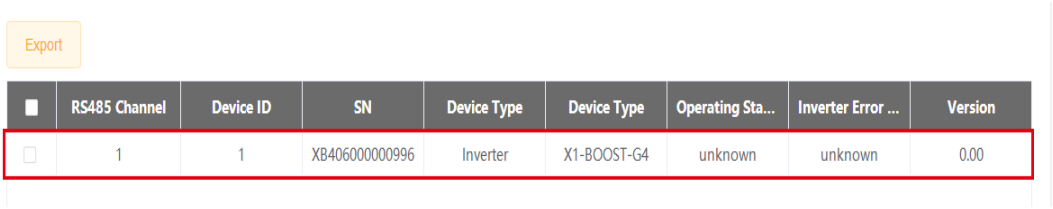
1.Please refer to Appendix 1 to check whether the baud rate of the model is 19200 or not. If the baud rate is not 19200, please refer to 5.6.3 Serial port setting for more details of setting baud rate.

2.When connecting to X3-MIC-G2, please make sure the meter is disabled.

3.Currently, automatically add device function is only applicable to X3-FTH, and one string 485 is capable of supporting a maximum of five devices. If the number of devices searched is inconsistent with the actual quantity, please click automatically add device again until all devices are found.

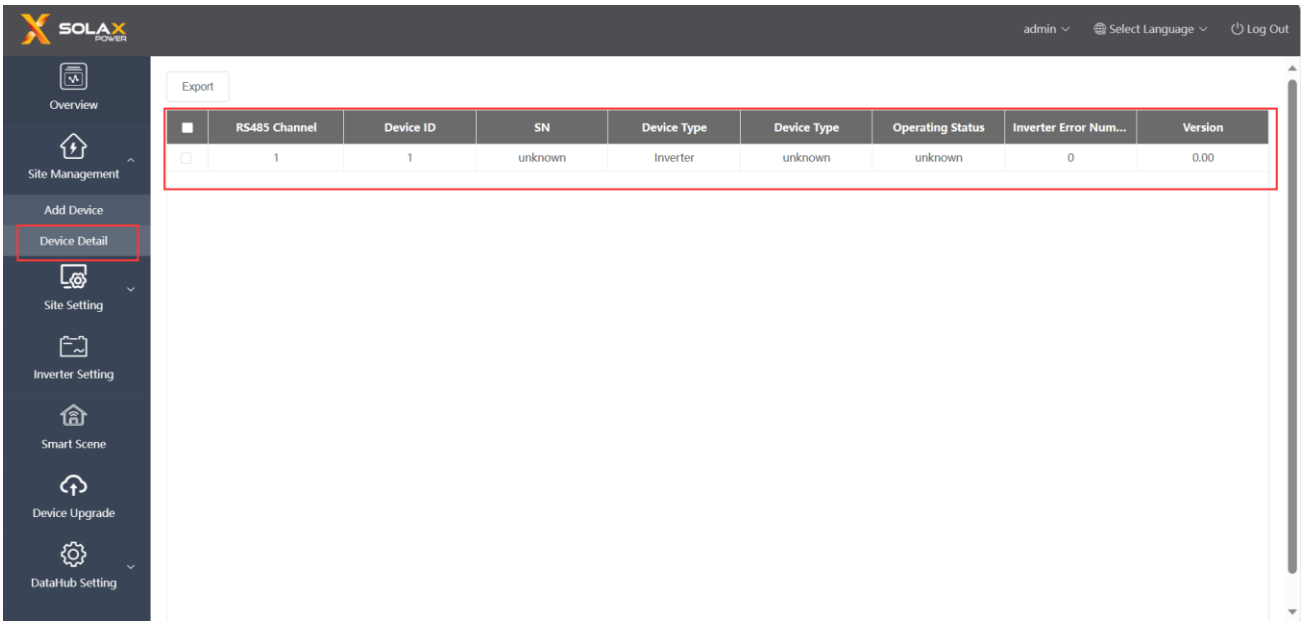
4.Please check the power intake and consumption on meter on the "Overview" interface.

The device details will pop up. Please confirm whether the model is correct or not and then Click "Save".



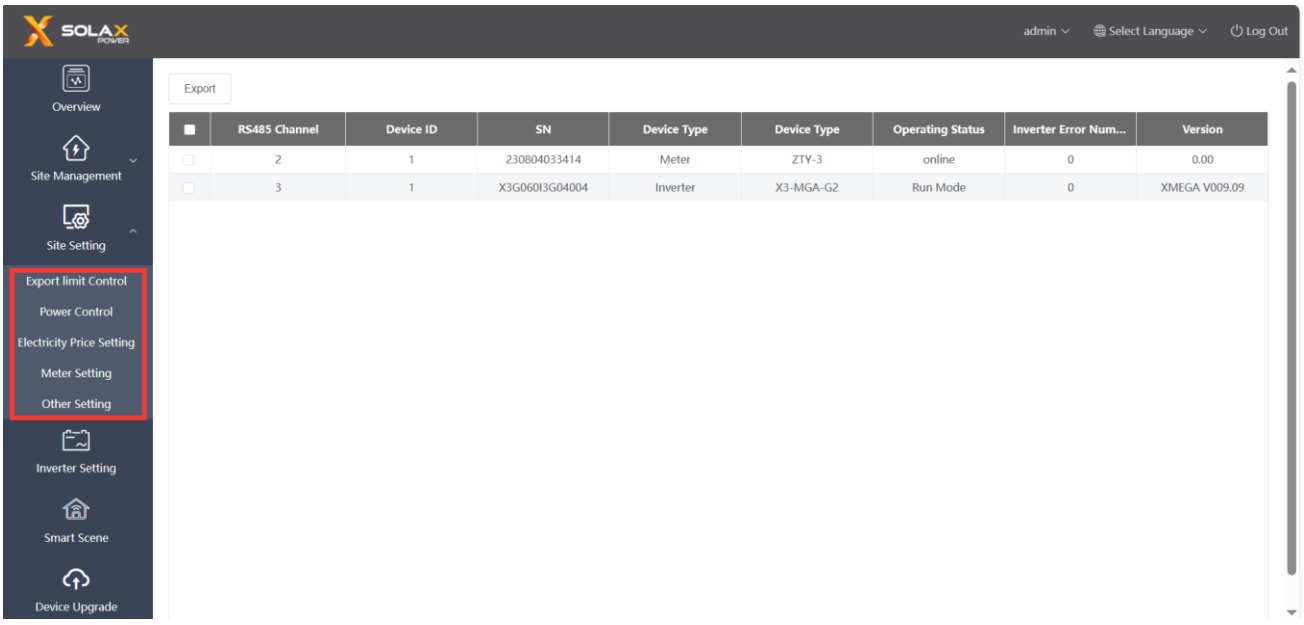
5.2.2 Device Detail

Click the corresponding device to query the device data, or select the device to export the device data.



5.3 Sits Setting

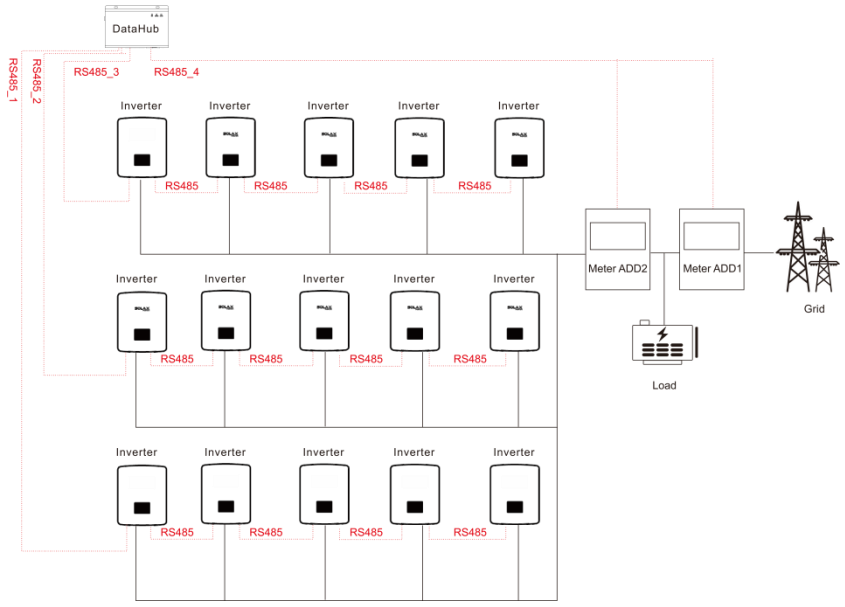
"Site Setting" is equipped with three modules, which are "Export Limit Control", "Power Control", "Electricity Price Setting", "Meter Setting" and "Other Setting". The "Export Limit Control" and the "Power Control" are mutually exclusive so that only one can be enabled.



5.3.1 Export Limit Control

The purpose of the “Export Limit Control” is to limit the power supplied to the grid. The inverter generates electricity to the grid when the power source is positive, and takes electricity away from the grid when the power source is negative.

Before using the “Export Limit Control” function, make sure that two meters have been connected to the DataHub. The purpose of two meters is to control speed and stability. Please refer to the schematic diagram for the specific wi ring mode (as shown below).



The control mode includes “Total” and “Per Phase”.

“Total”: The Site Limit is the total export power (the combined production mimus the combined consumption) on all the phases combined. Reverse current on one phase will count as negative power and can compensate for another phase.

“Per Phase”: For three phase inverter connections, the inverter sets the limit on each phase to 1/3 of the total site limit. Use this mode if there is a limit on each individual phase.

**Note:*

1.The output of device will be abnormal when connecting to three phase three wire under “Per Phase” mode. If tw o meters cannot be installed or other circumstances arise, please contact our presale service, we will provide you w ith suitable installation suggestion according to specific local conditions.

2.For “Export Limit Control” function, please ensure that the meter is correctly connected to DataHub.

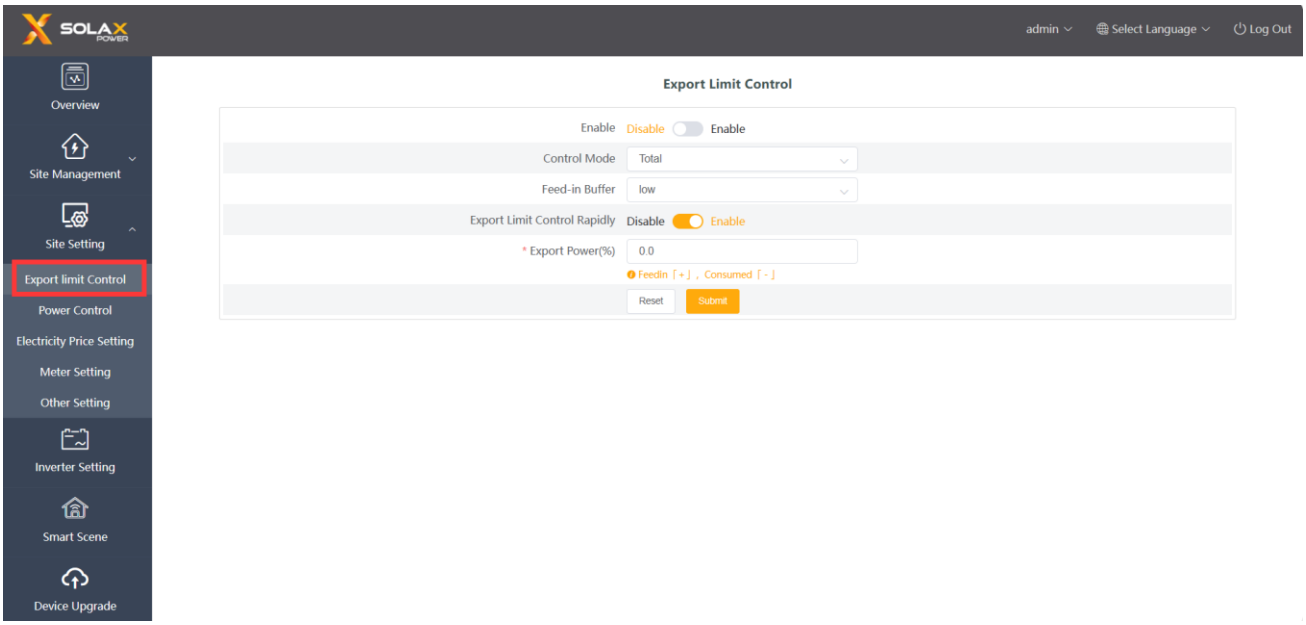
3.The equipment output may be abnormal if “Per Phase” is used for three-phase and three-wire connection.

4.Inverter shutdown after DataHub communication loss: After communication loss, the inverter will shut down in 10s (triggered once a DataHub communication succeed).

Inverter startup after DataHub communication connection: After communication connected, the inverter will start up (triggered when all DataHub communication completed).

Please refer to 5.4.3 "Parameter Setting" to enable DataHub communication loss shutdown and DataHub communication connection startup. The corresponding Modbus addresses are respectively: 6152 and 6153; Set value: "0": Disable, "1": Enable.

DataHub communication refers to: i) The communication between DataHub and inverters; ii) The communication between DataHub and meters.

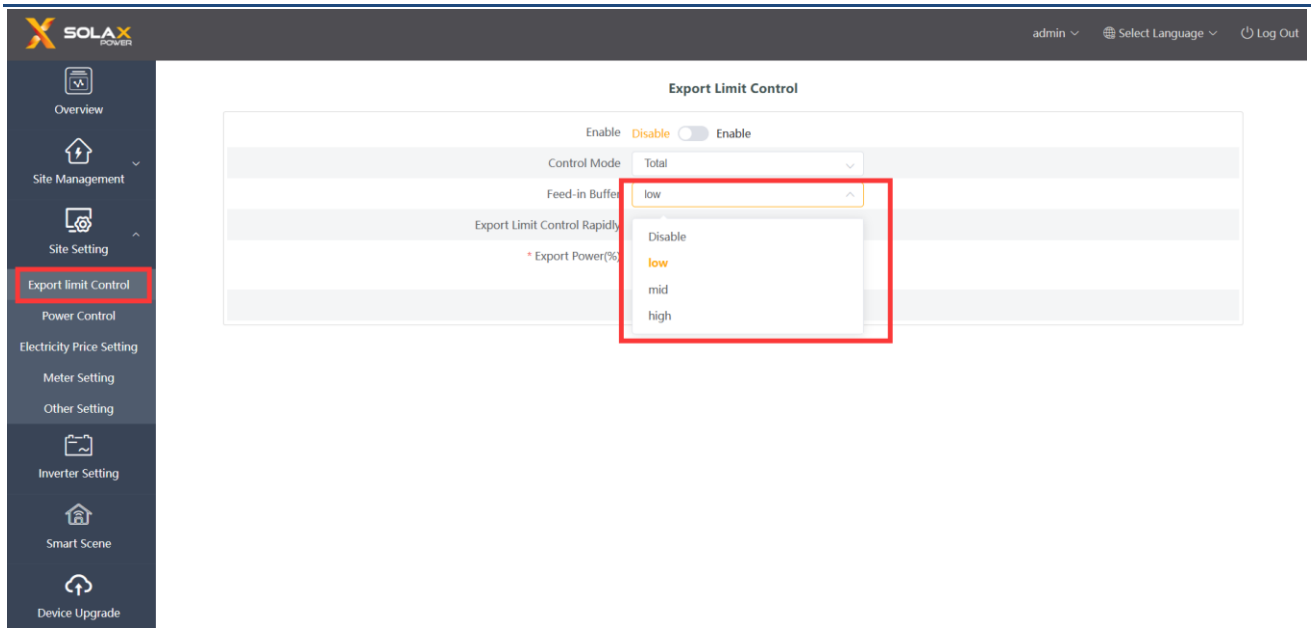


"Feed-in Buffer" is divided into 4 gears: "Disable", "Low", "Mid", "High".

The representative threshold values for each gear are respectively: 1%, 2.5%, 4.5% and 6.5%.

The definition of those threshold values is:

1. Except for "Disable", when the load in other 3 gears is stable, taking power from the grid [the total power of grid-connected inverter * threshold value] is preferred; In the "Disable" gear, when the load is stable, the output power of grid-connected inverter ranges from [taking 1% of power] to [selling 1% of power]. [Selling 0% of power] cannot be guaranteed, but less power will be taken from the grid.
2. When the load fluctuates within the range of [the total power of grid-connected inverter * threshold value], the power of grid-connected inverter will not drop to 0 directly; Otherwise, the power of grid-connected inverter will drop to 0 immediately and then the power will increase slowly.

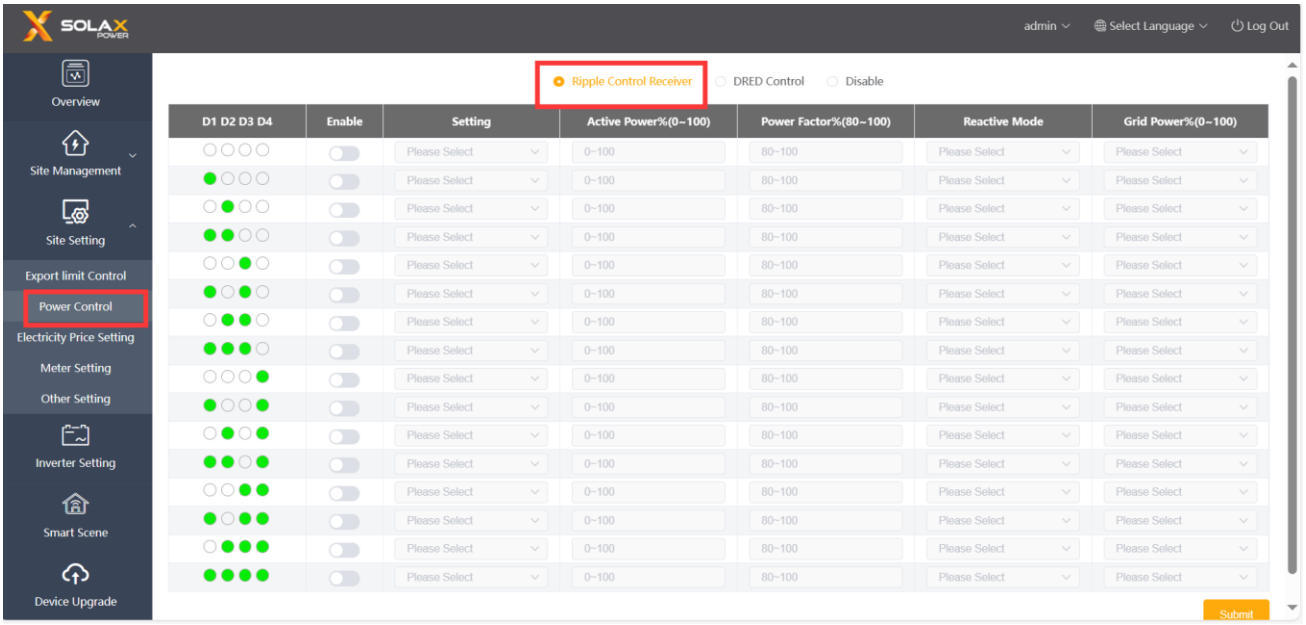


5.3.2 Power Control

Power control includes “Ripple Control Receiver” and “DRED Control” disable.

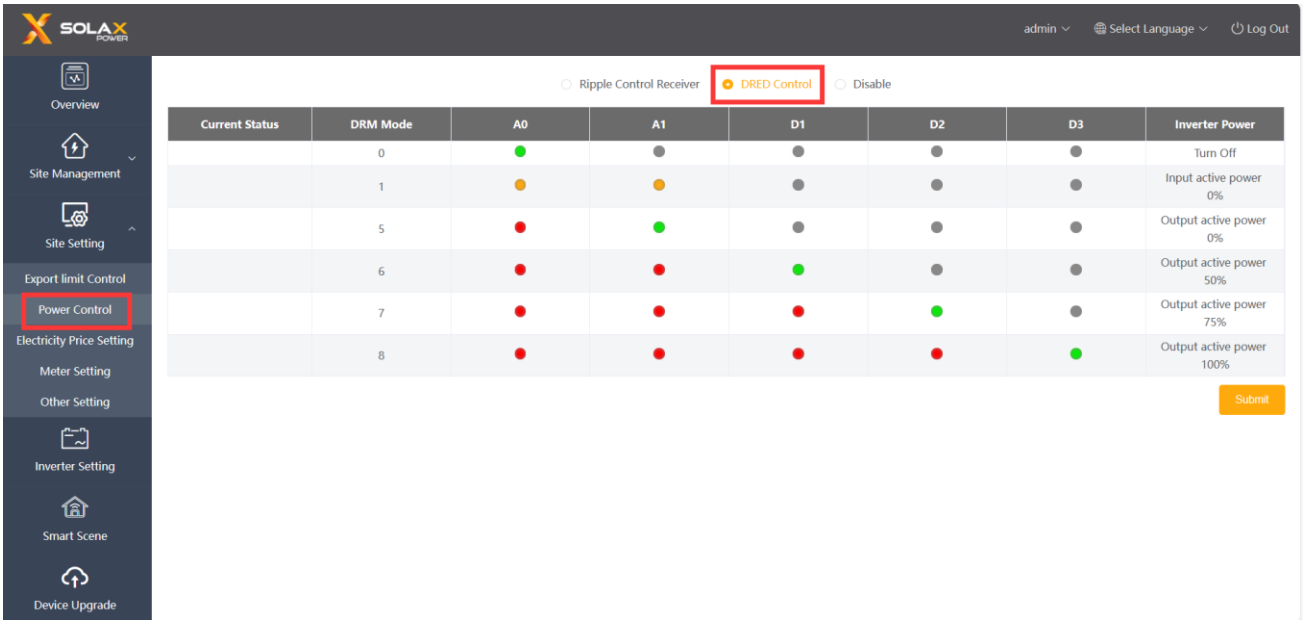
The “Ripple Control Receiver” is to control the input active power and reactive power, output active power and reactive power of the inverter and inverter off according to the high or low input of the DI port.

The green one indicates the high input of power; the white one indicates the low input of power. There are a total of 16 situations for users to set the active and reactive power according to each situation.



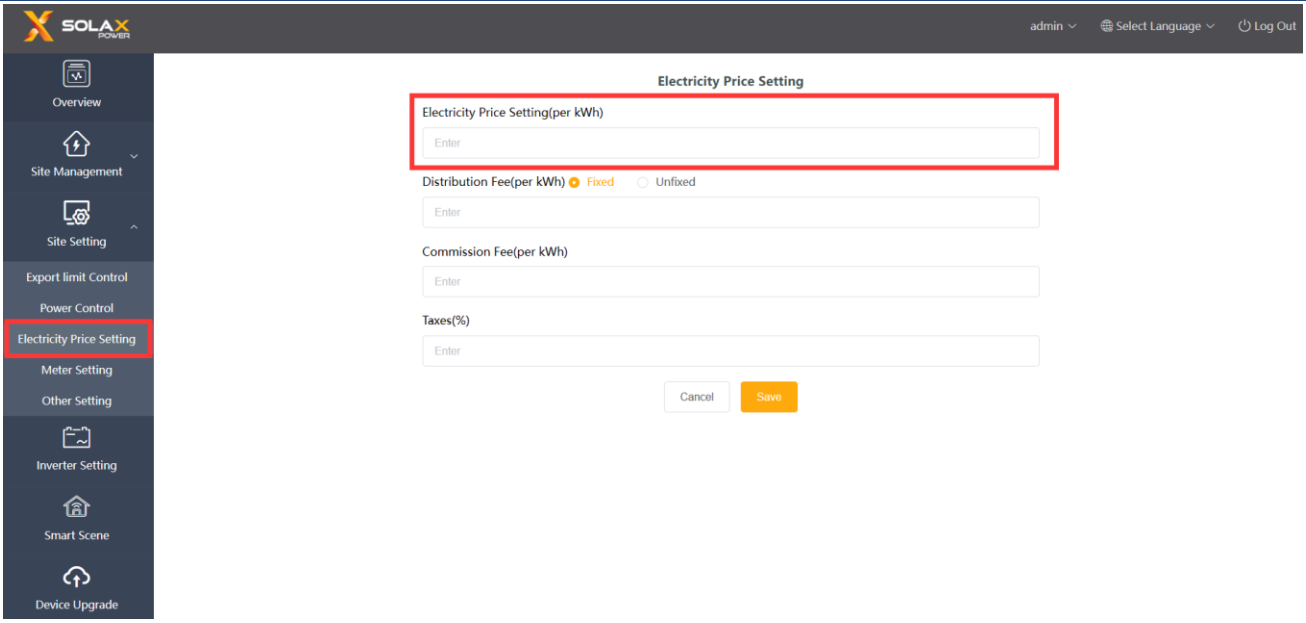
DRED control is applied to set the active power according to high or low input of the A0, A1, D1, D2 and D3 of DI ports.

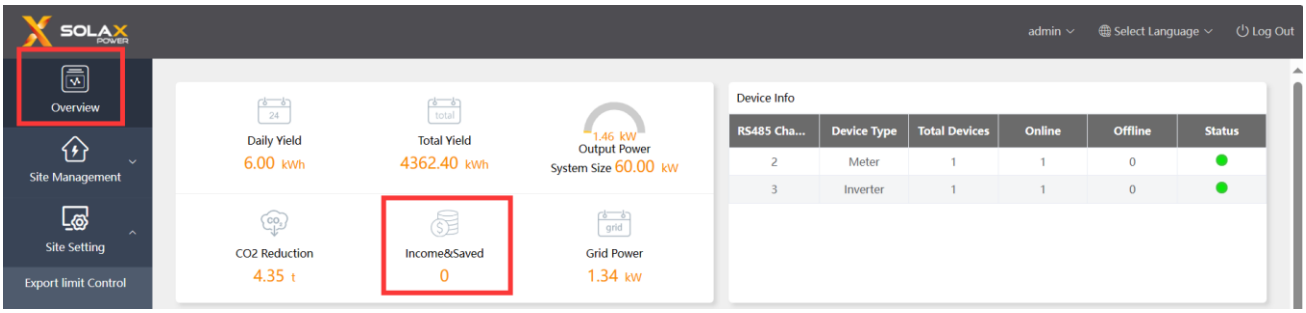
Mode	Operate	Explanation	Note
DRM0	Close S9,S0	Inverter shutdown	
DRM1	Close S9,S1, disconnect S0	Close S1，charging power is 0%	When two or more DRM modes work at the same time, take the optimal result that can satisfy both of them.
DRM5	Close S9,S5	Inverter does not output active power	
DRM6	Close S9,S6	The active power output by the inverter does not exceed 50% of the rated power	
DRM7	Close S9,S7	The active power output by the inverter does not exceed 75% of the rated power	
DRM8	Close S9,S8	The active power of the inverter output power starts to recover. Description: The inverter outputs according to the active power percentage set by DataHub.	



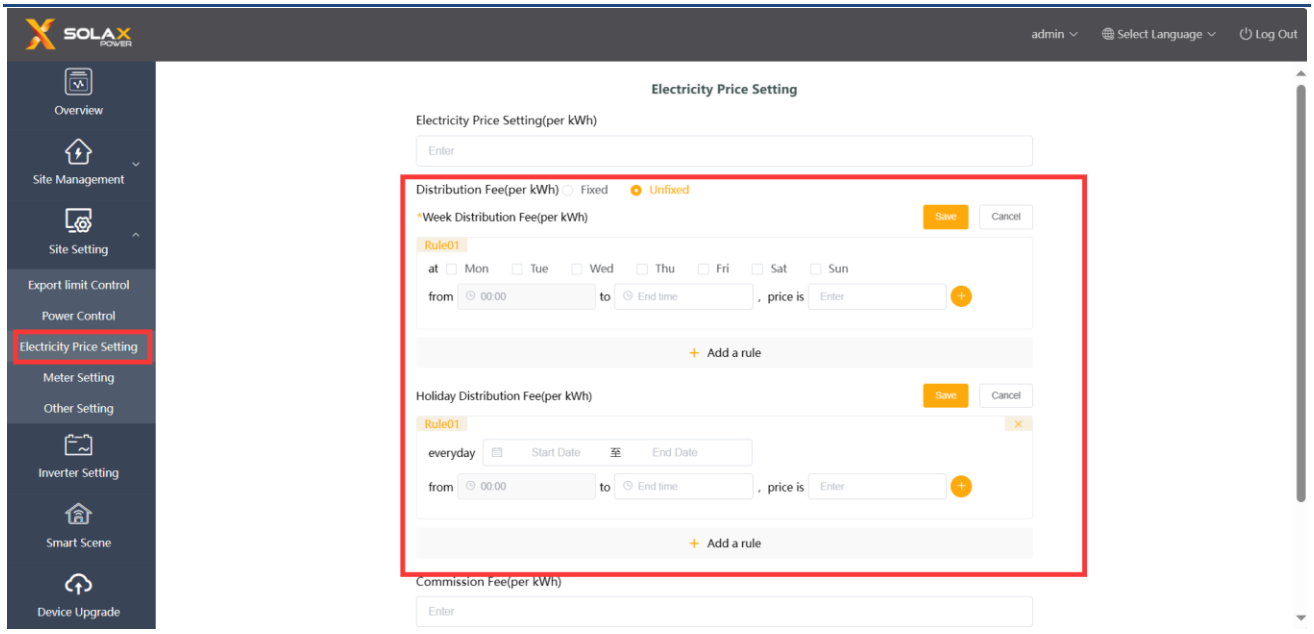
5.3.3 Electricity Price Setting

Electricity Price Setting: Set the electricity price to calculate the benefit, which is displayed on the Overview interface as “Income&Saved”.

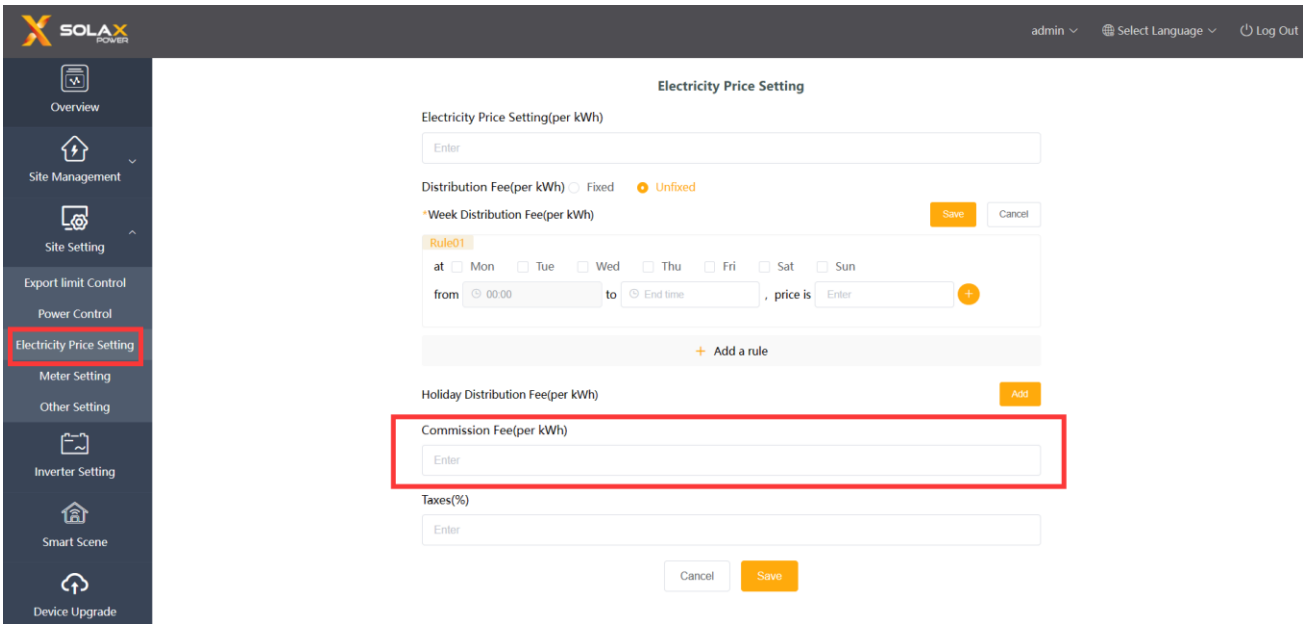




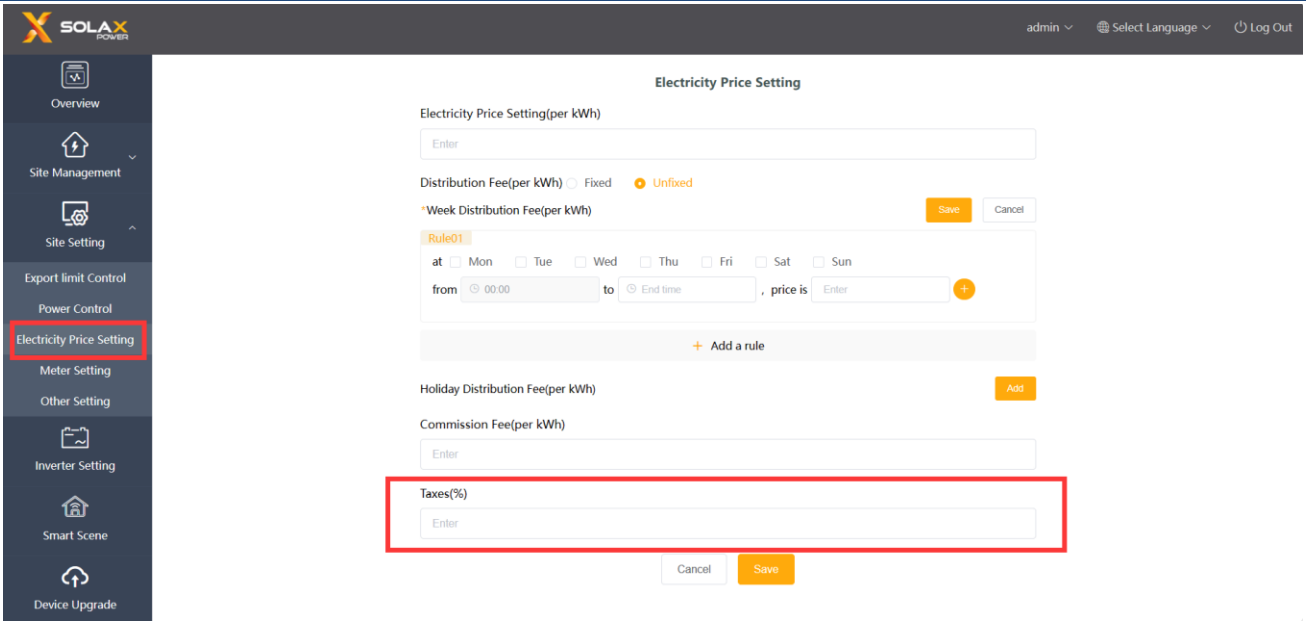
Distribution Fee: Distribution Fee Refers to fees of the electric grid infrastructure, including “Fixed” and “Unfixed” ones. Under the “Unfixed” mode, users can choose “Week Distribution Fee” and “Holiday Distribution Fee” to set the calculating rules, with the Holiday calculating rules have higher superiority.



Commission Fee: Commission charge that the seller has to pay when selling electricity to the grid.



Taxes: The ratio of total fees that the buyer has to pay as taxes.



Equation:

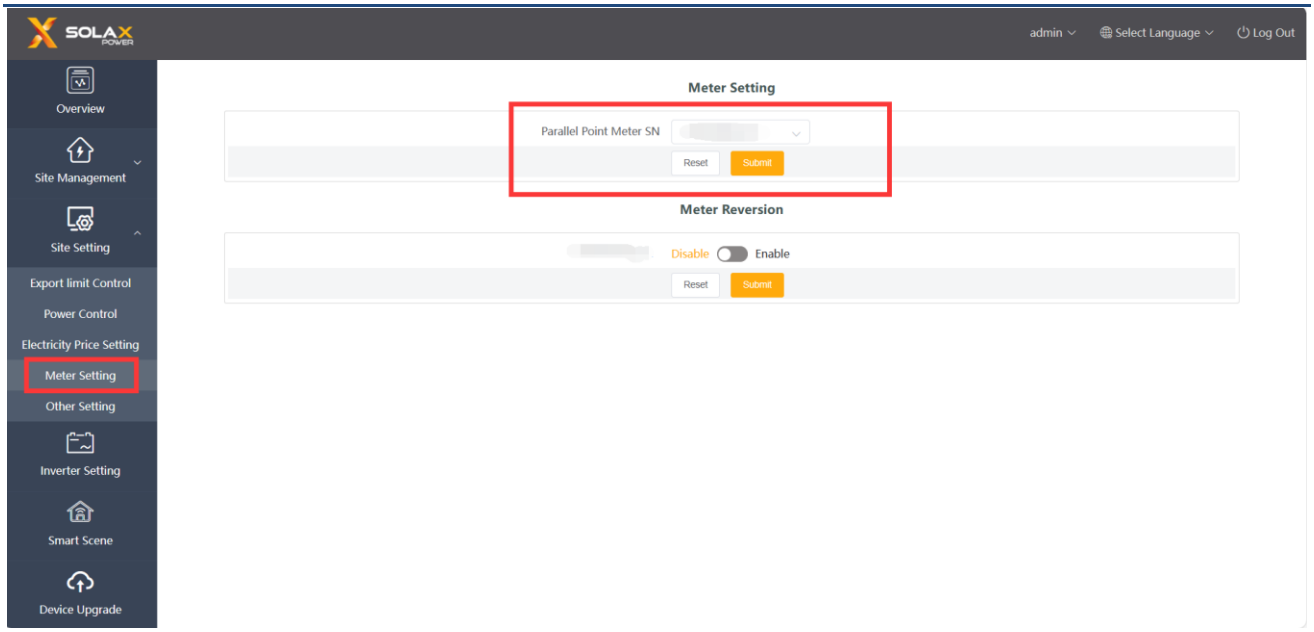
The price of buying electricity = (electricity fees + distribution fees) * (1+taxes rate)

The price of selling electricity = fees of selling electricity – commission fees

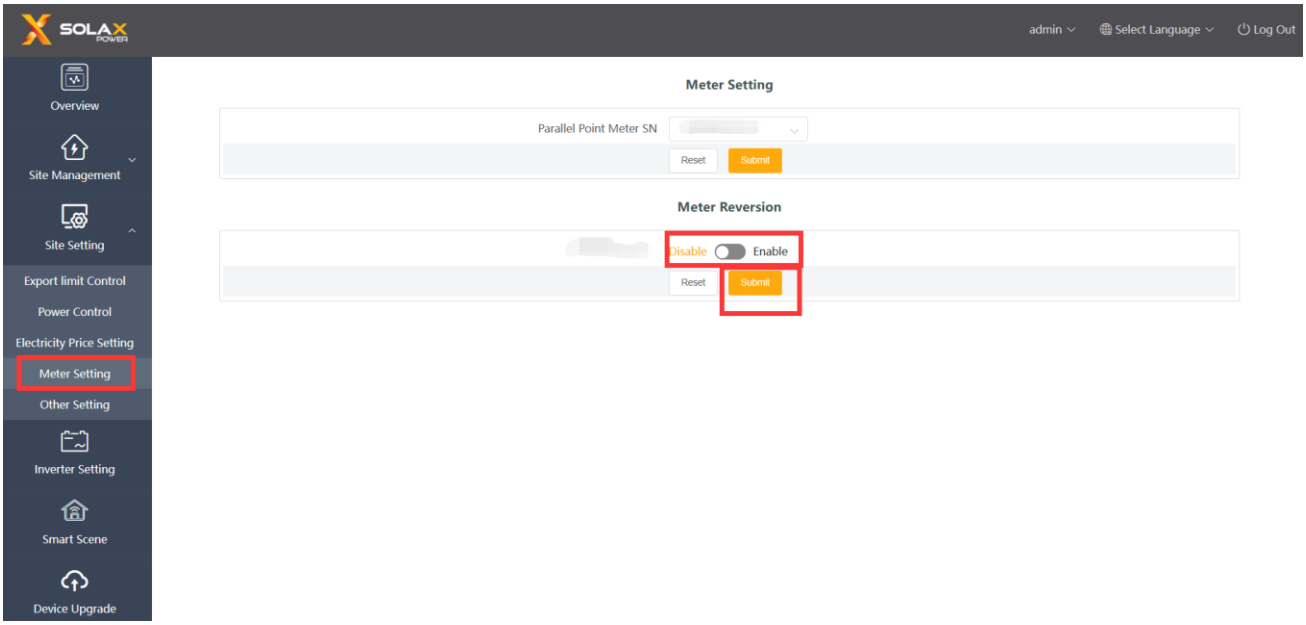
**Note: Distribution Fee, Commission Fee and Taxes are parameters used to set region electricity price in the Smart Scene.*

5.3.4 Meter Setting

Meter Setting: This function is designed for setting parallel point meter. The grid-connected power of the homepage will use the value of the meter by default, and its data will also be uploaded to cloud platform and used in export control function. For multiple-meter connection, please manually select “Parallel Point Meter SN”.

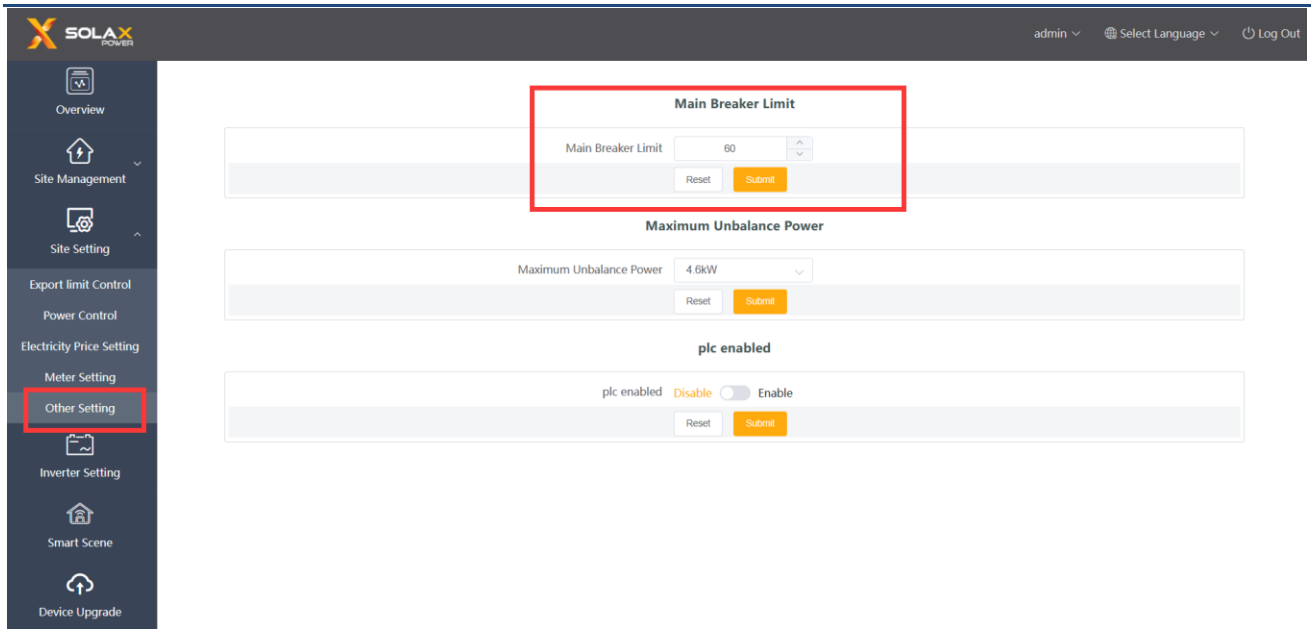


Meter Reversion: If user's meter is connected reversely, they don't have to rewire, just turn on the "enable" switch and submit.

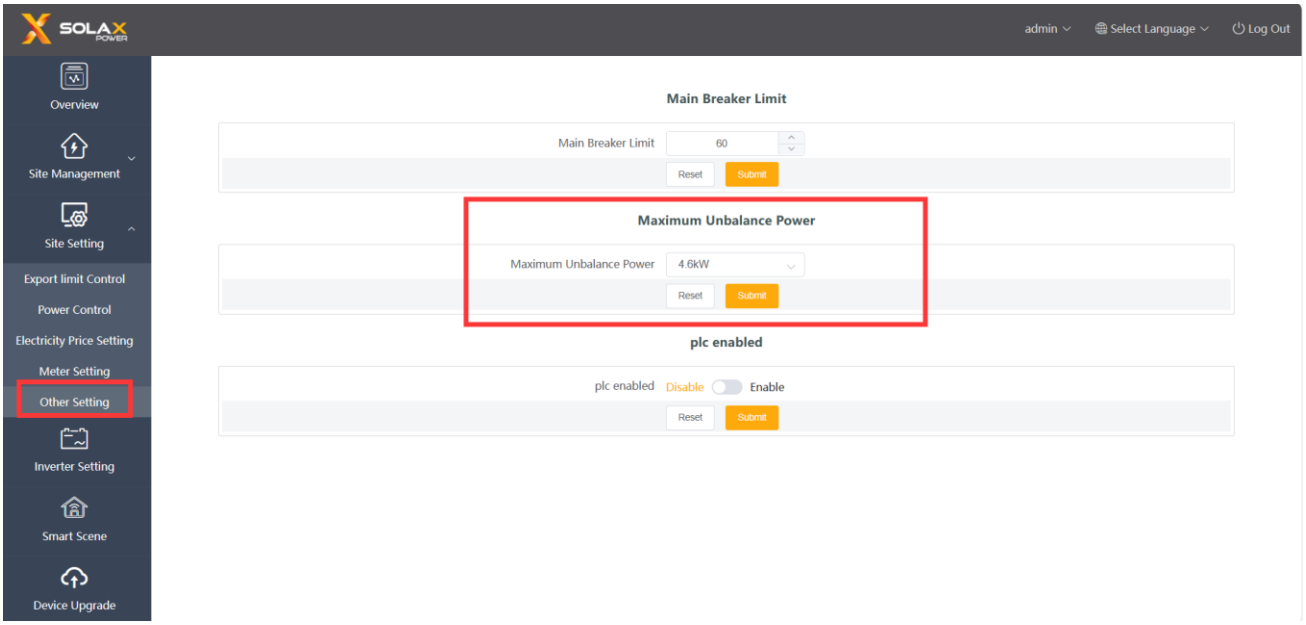


5.3.5 Other Setting

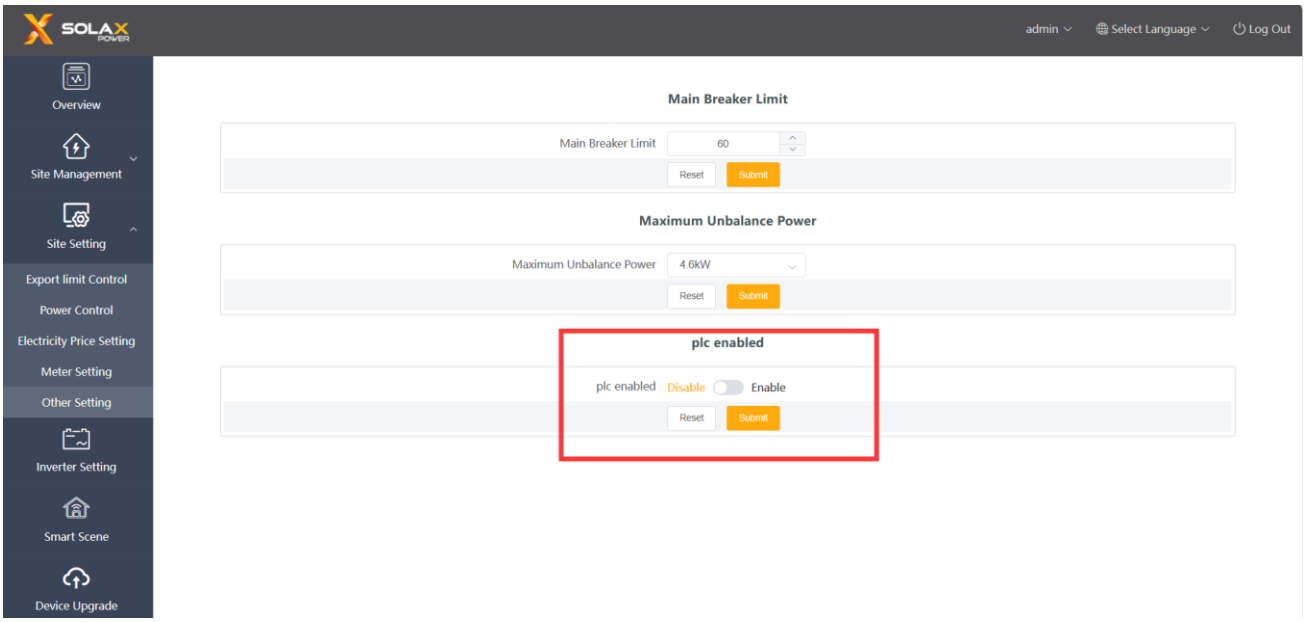
Main Breaker Limit: Valid only when the EV charger is available. By controlling the charging power of EV charger, limit the current taken from the grid no more than the set value.



Maximum Unbalance Power: Valid only when the EV charger is available. By controlling the charging power of EV charger, limit the power differences between each phase no more than the set value.



Plc enabled: Used with plc box of our company. If the plc box is used, turn on the “enable” switch and submit; If the plc box is not used, DataHub will not found equipment even the “Enable” switch is turned on.

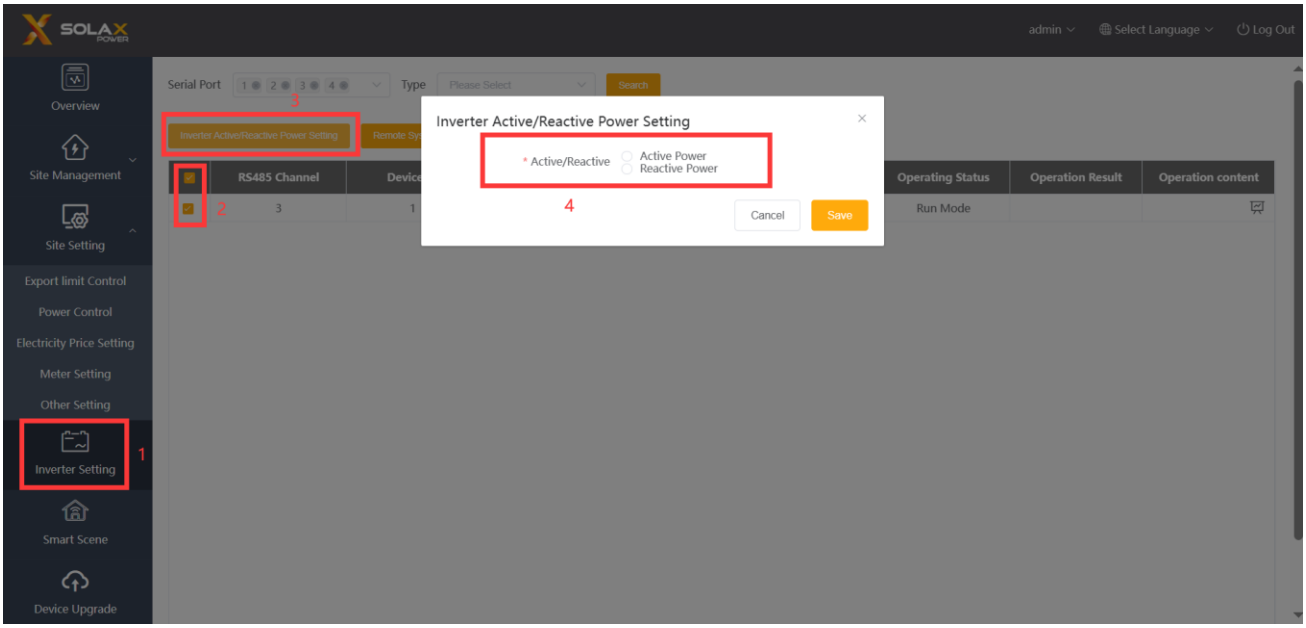


5.4 Inverter Setting

There are three functions under "Inverter Setting": “Inverter Active/Reactive Power Setting”, “Remote System Switch” and “Parameter Setting”.

5.4.1 Inverter Active/Reactive Power Setting

Remotely set the active or reactive power of the inverter. The reactive power mode is divided into “OverExcited”, “UnderExcited”, “Fixed Reactive Power” and “Disable” terms. (multiple selections are available)



5.4.2 Remote System Switch

Remote control of inverter switching. (Can be operated in batches)

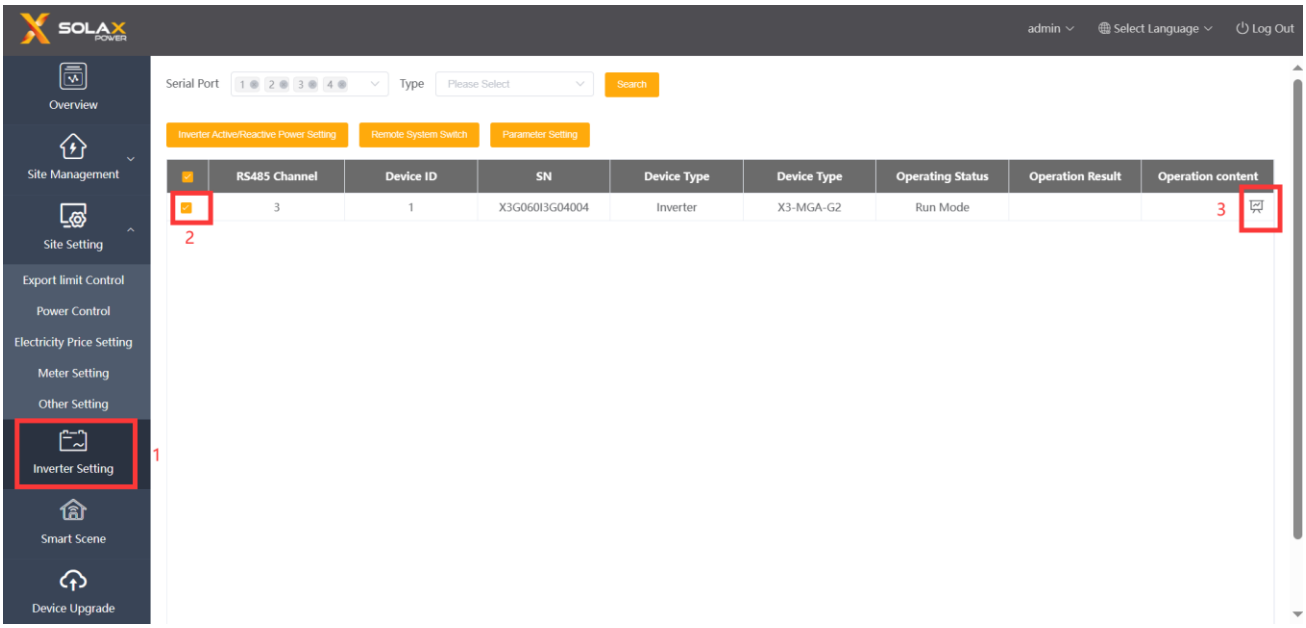
5.4.3 Parameter Setting

Professionals can read and write the inverter through the inverter's “Modbus Opcode”, under which there are “READ_HOLDING_REGISTERS”, “READ_INPUT_REGISTERS”, “WRITE_SINGLE_REGISTER”and“WRITE_MULTIPLE_REGISTERS”. (Can be operated in batches)

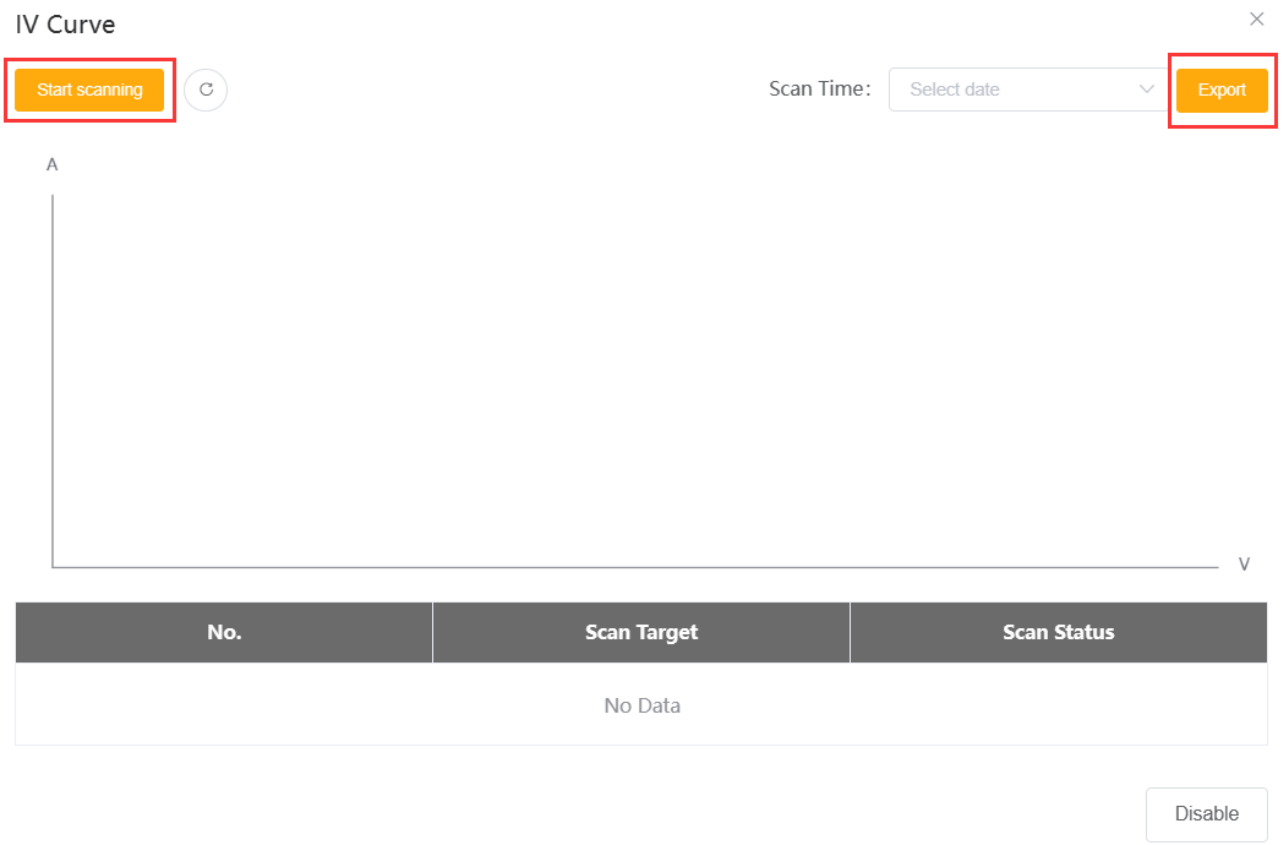
5.4.4 IV Curve Scanning

This function can collect the corresponding PV power of different PV voltage in each PV.

i) Click the icon in the operation content, and the IV curve scanning interface will pop up.



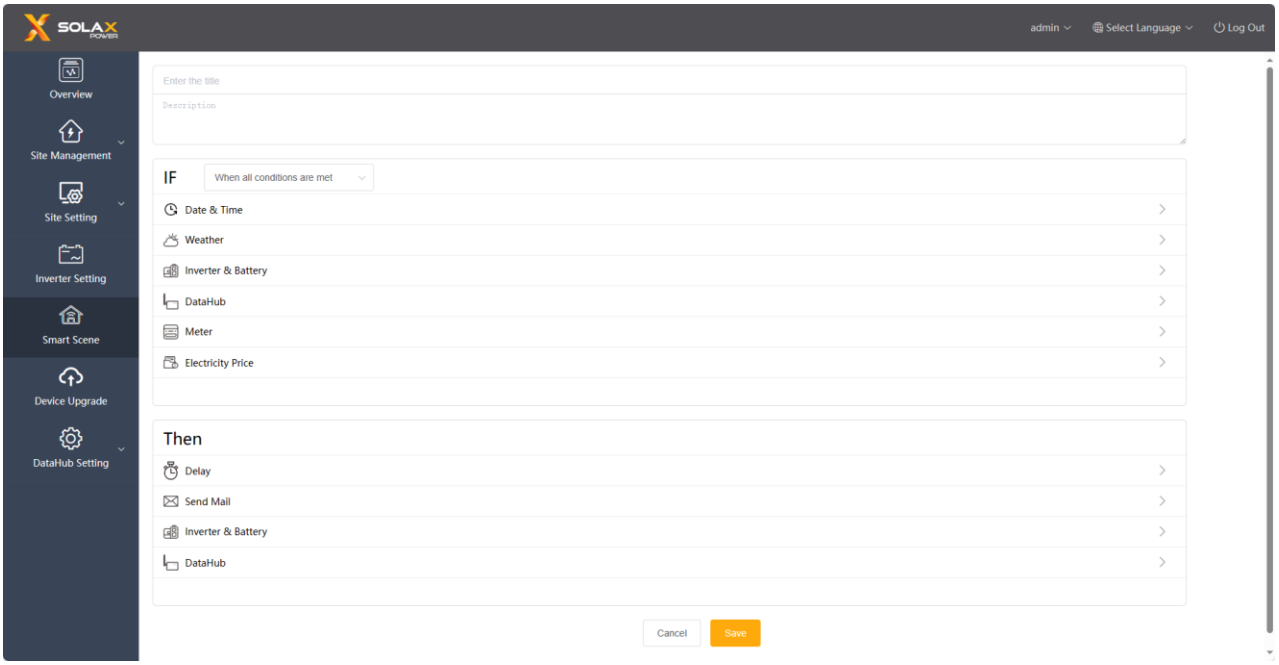
ii) Select “Start scanning” and wait for a while until the IV curve displays. The user can also export the curve by clicking “Export”.



**Note: The "IV Curve" is exclusive for X1-BOOST-G4 and X1-MINI-G4.*

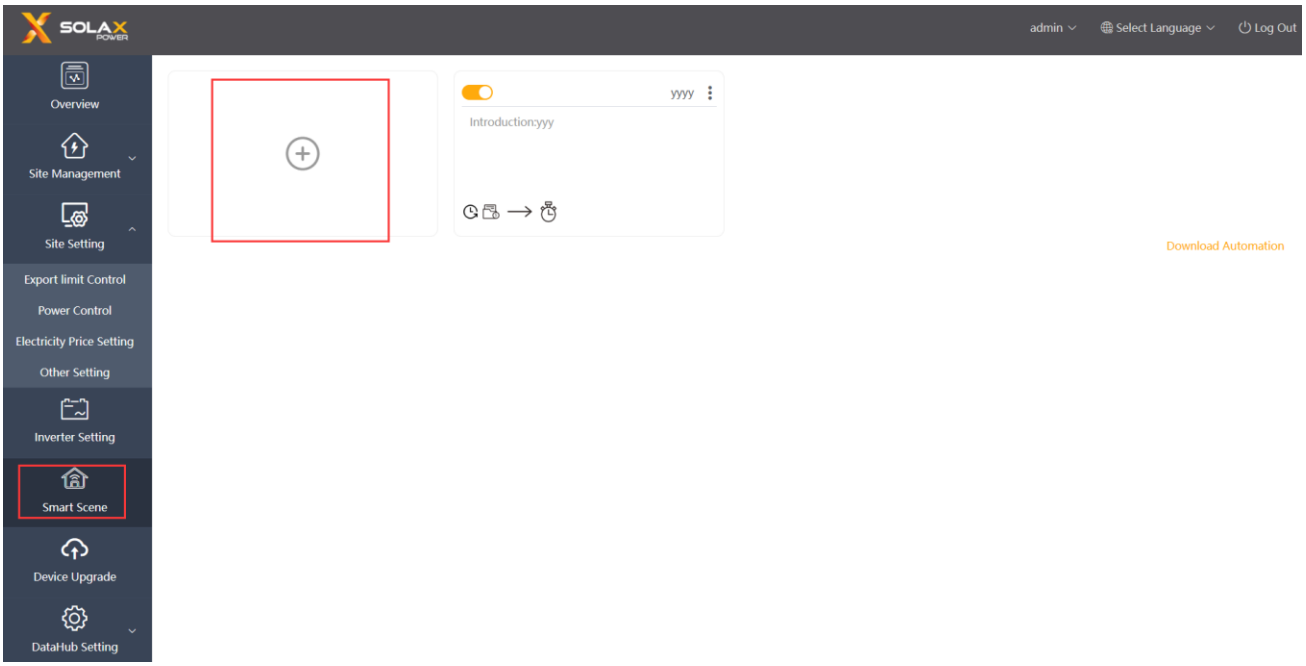
5.5 Smart Scene

The Smart Scene function on the Datahub web page comes pre-loaded with a variety of conditions and executable instructions. Users can customize "IF-Then" function based on their actual needs to create automatically executed custom scenes. When the "IF" condition is met, the user-defined "Then" instruction will be executed automatically. "IF" conditions include Date & Time, Weather, Inverter & Battery, DataHub, Meter, and Electricity Price. "Then" instructions include Delay, Send Mail, Inverter & Battery, DataHub. With DataHub as the center, the equipment in the system and third-party elements are connected to create a smart control scene.

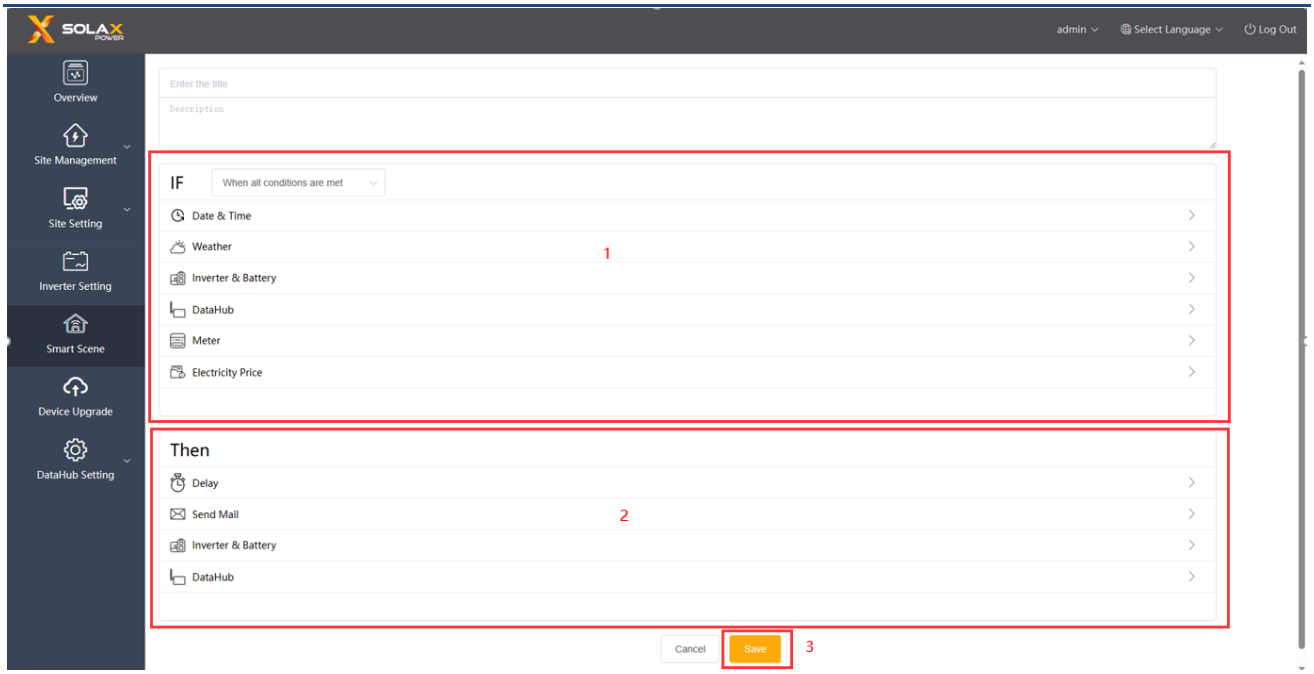


5.5.1 Create a Smart Scene

i) Click the icon ⊕ to create a scene.



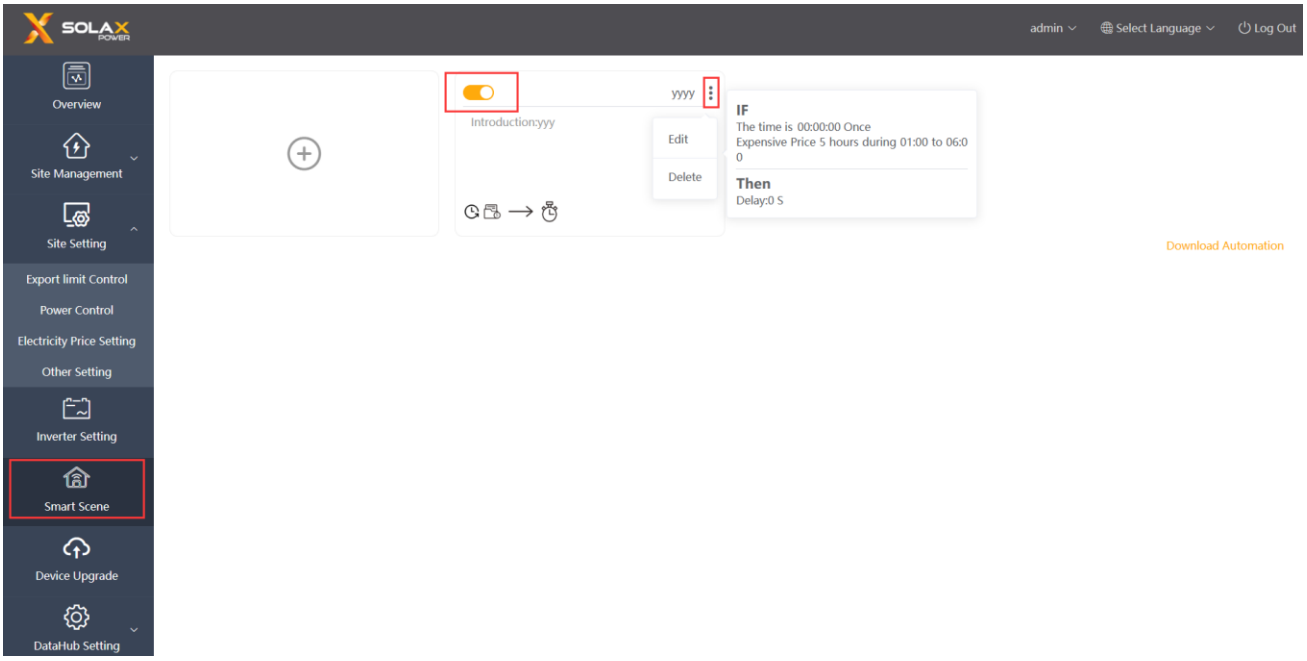
ii) Set the “IF” and “Then” conditions and click “Save” to finish the setting.



Note: There is no limit to the number of conditions and instructions you can set. Users can add multiple combinations of these conditions and instructions.

iii) Hover the cursor over the icon to view the scene content. Click to edit or delete the scene.

Disable/enable the automatic control scene by clicking the icon  .

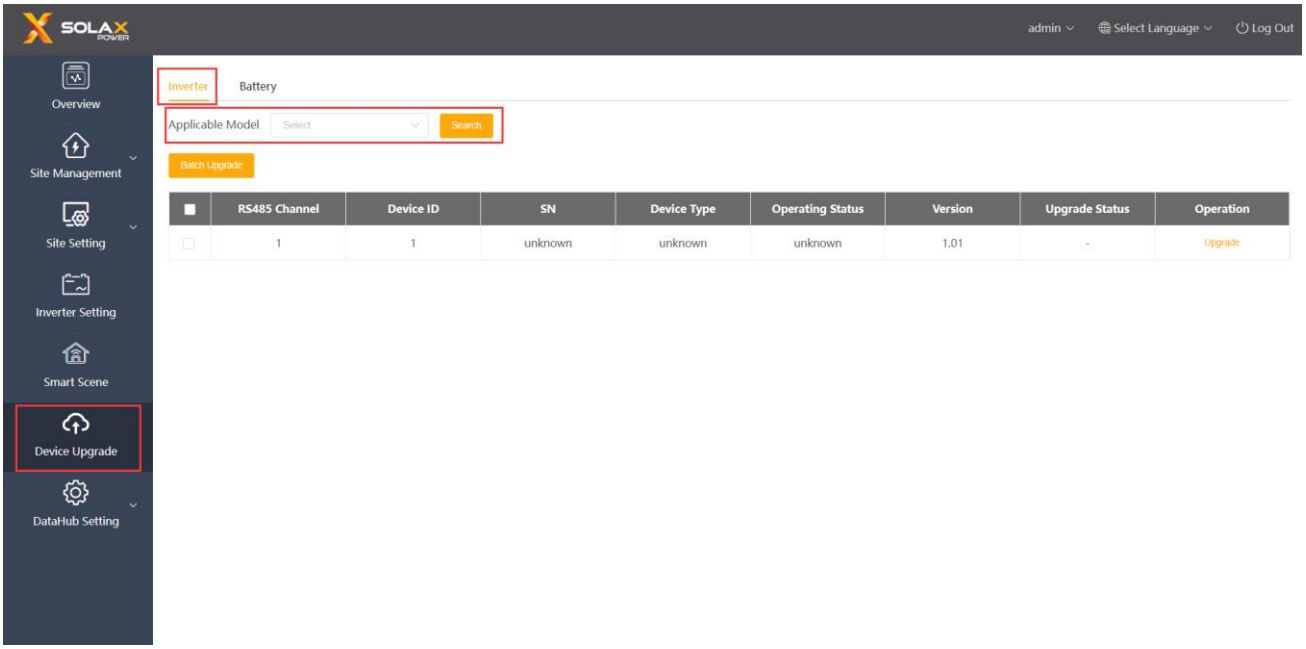


5.6 Device Upgrade

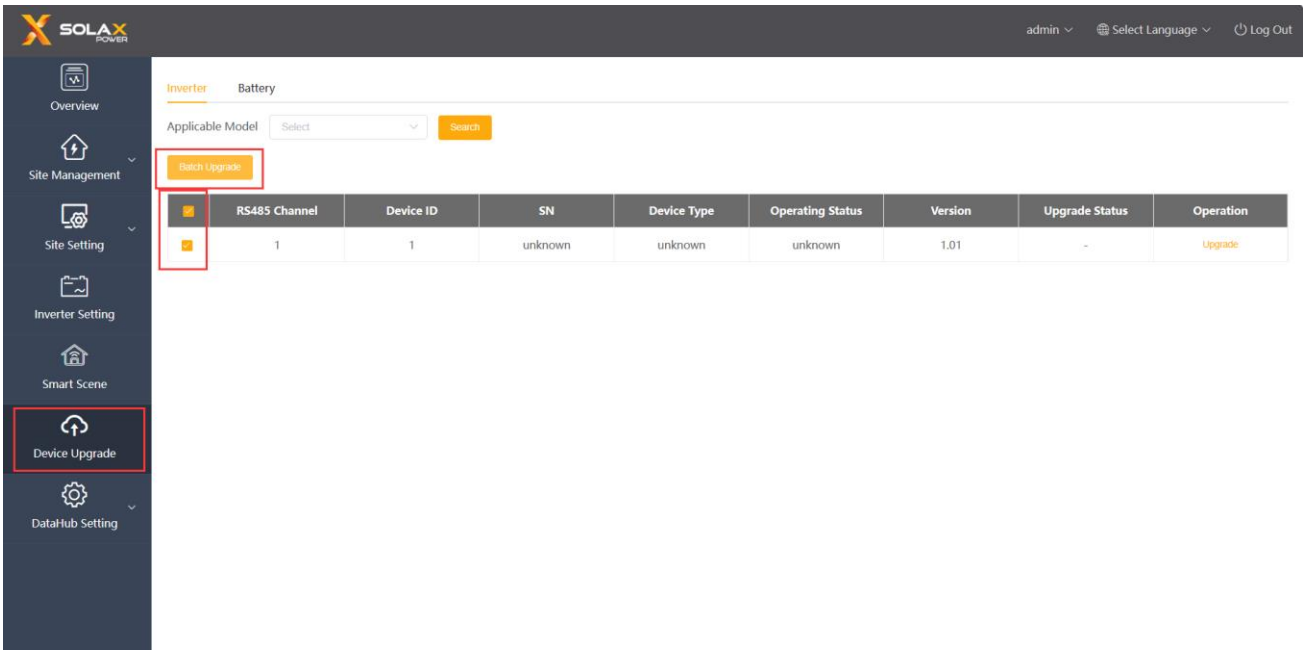
Device Upgrade includes inverter upgrade and battery upgrade.

5.6.1 Inverter Upgrade

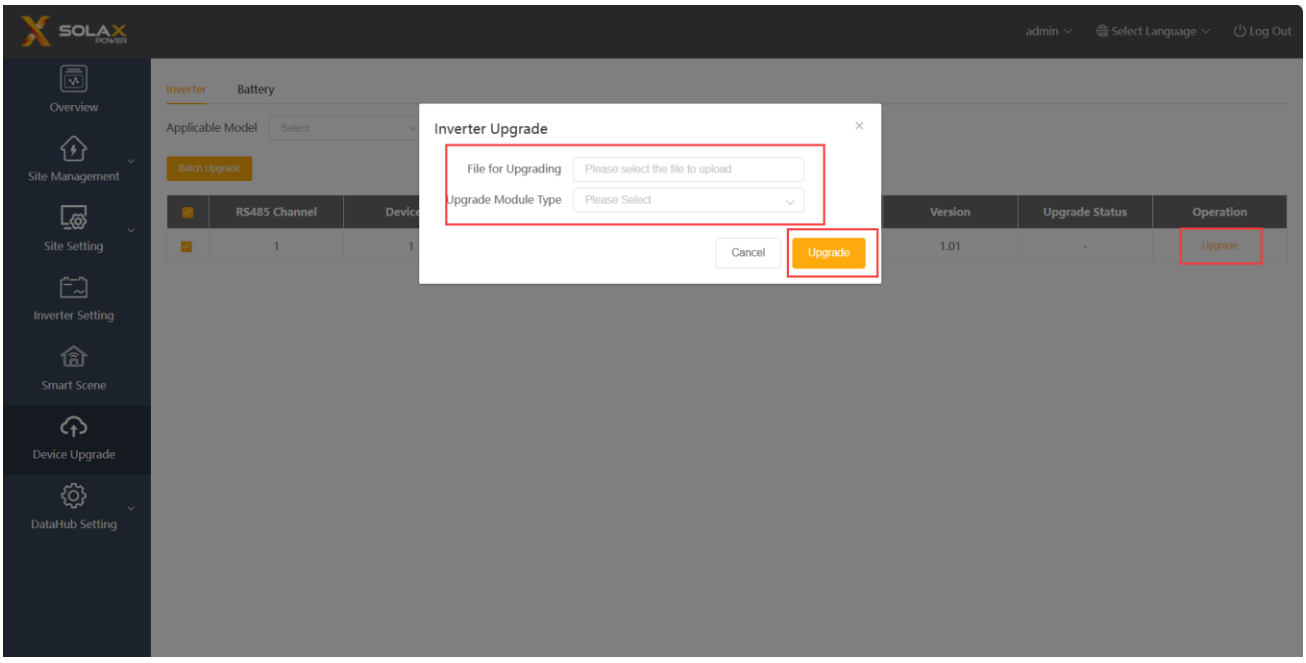
No inverters are selected by default for the Applicable Model. In this case, if users click “Search”, all models that DataHub is connected with will be acquired. If users click “Search” after selecting one of these models, all the connected inverters of that type will be searched.



For Batch Upgrade, please screen applicable models first. Otherwise, the system will notify the users to select applicable models.



Upgrade Operation: Click “Upgrade” button under the “Operation” bar, then the “Inverter Upgrade” interface will pop up. Select the file to upload for upgrading, and then select “Upgrade Module Type” (including ARM, MDSP, SDSP, ARC, ARM+DSP, PLC_SELF and PLC_ARM). Afterwards, upgrade the inverter..



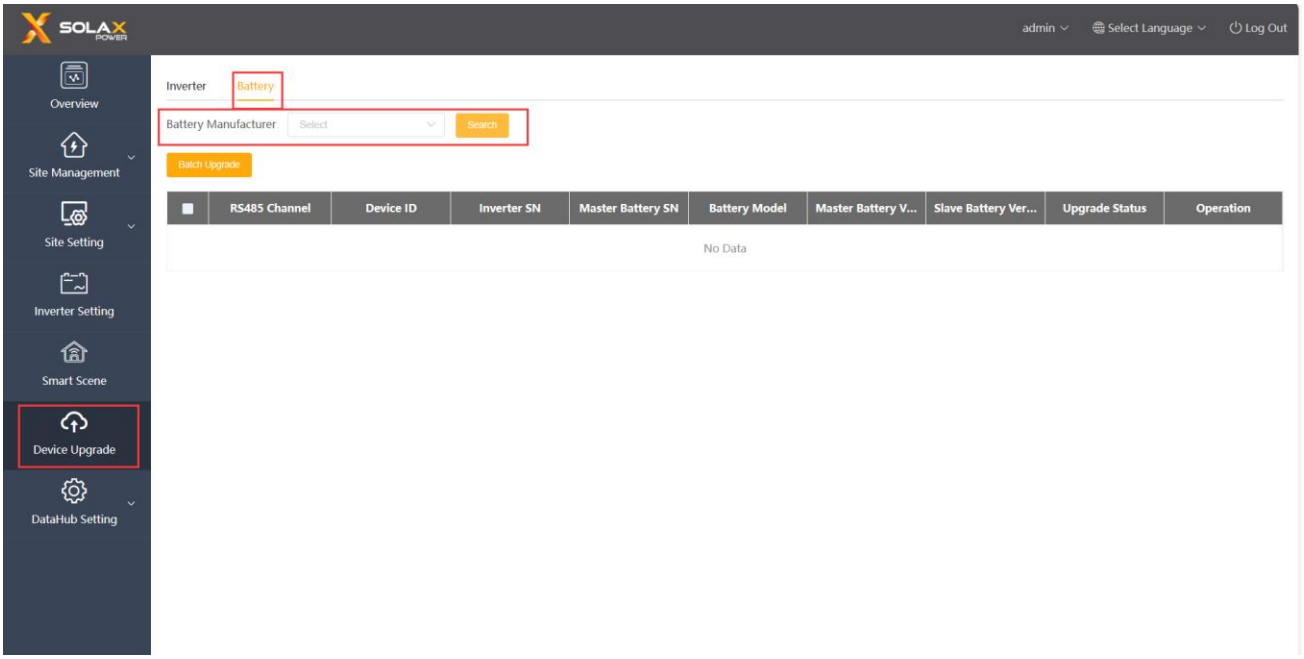
**Note: Inverter upgrade take a long time (about 15-30 min). During upgrading, no data will be uploaded.*

Check the upgrade process in “Upgrade Status”.

5.6.2 Battery Upgrade Tab Page

Battery Manufacturer: Users can screen the brand of connected battery by this function. If searching directly without selecting any brand, all battery information will be displayed.

The upgrading logic of battery is similar to that of inverters: first select the upgrade file, and then chose BMS_M (Battery Management System_Master) and BMS_S (Battery Management System_Slave) modules to upgrade battery version. The upgrade progress and result are displayed in the Upgrade Status bar, consistent with the inverter logic.



5.7 Datahub Setting

5.7.1 Internet Setting

Wired connection: connect the DataHub and router via network cable.

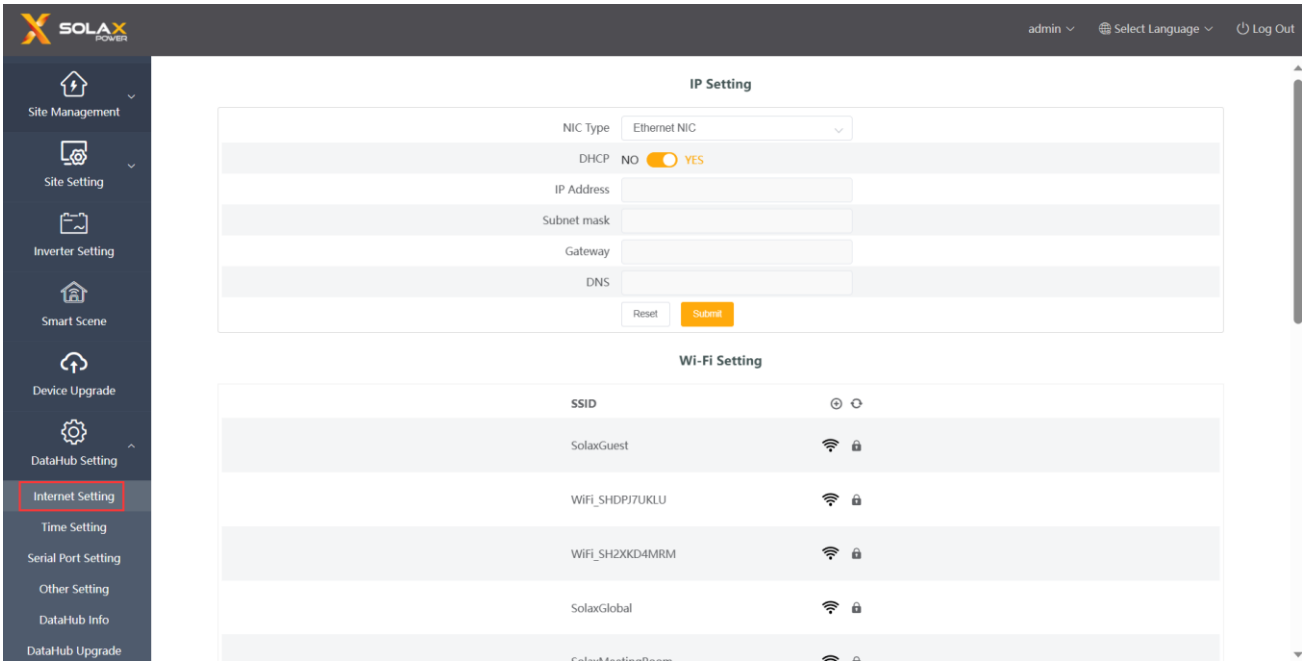
Wireless connection: After local login, please enter “System Setting”-“Internet Setting”-“WiFi Setting” to select the WiFi and enter the password.

Connect the computer and DataHub to the same WiFi, and then visit http://datahub.local/ to log in. If the user cannot access, please install the Bonjour SDK, or log in through the DataHub LAN IP address. For the current IP address, please refer to “System Setting”-“System Information”.

If there is no feedback of wireless connection within 30 seconds, please disconnect and reconnect the DataHub hotspot (WiFi_XXXXXX). If the current connection is via WiFi and WiFi address already appears in the system information, it means the WiFi is successfully connected and you can login via LAN. Otherwise, try wireless connection again.

Fixed IP: If the user needs to fix the IP after completing wired or wireless connection via DHCP, select the correct network card type, turn off the automatic acquisition of IP address, and set the “IP Address”, “Subnet Mask”, “Gateway” and “DNS”.

Note: Ordinary users do not need to perform any operations if they do not need a fixed IP.



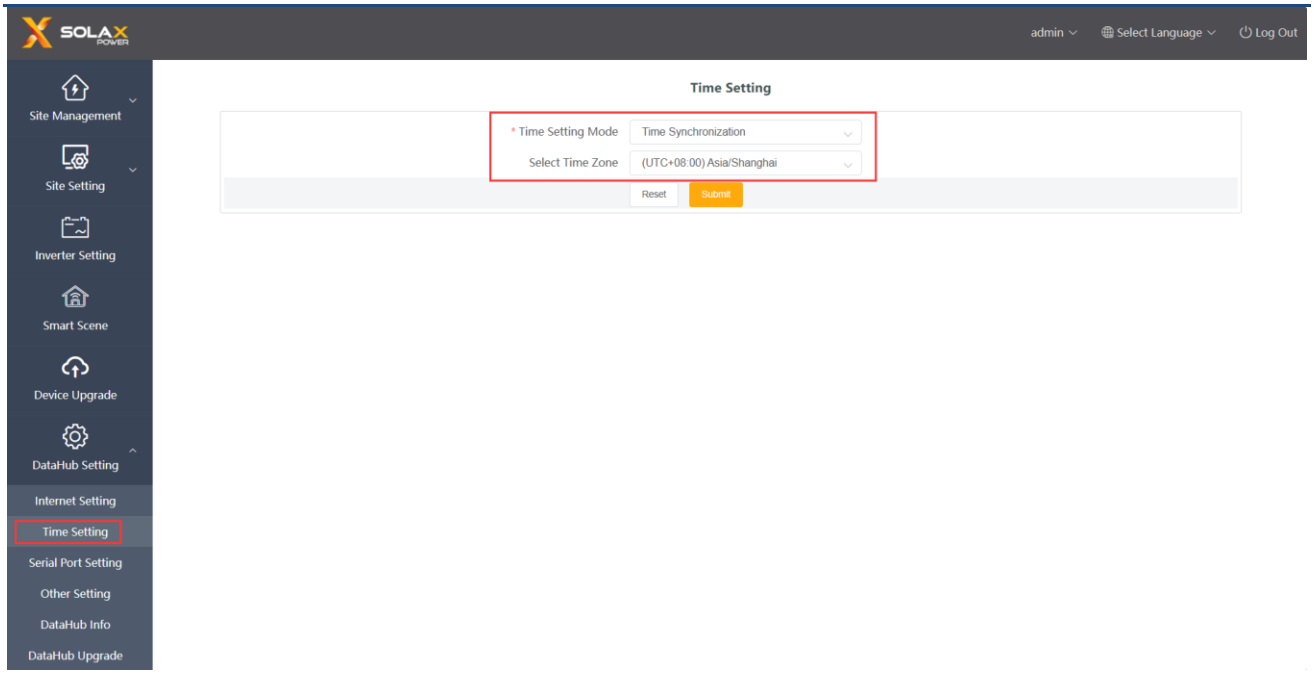
5.7.2 Time Setting

The time setting is to set the DataHub system time，including “Time Synchronization”, ”SolaXCloud Synchronization” and “Other Server Synchronization”.

“Time Synchronization”: The system corrects the time automatically.

“SolaXCloud Synchronization”: The platform of SolaX sends a synchronization command to change the time of system.

“Other Server Synchronization”: The IEC104 server sends a synchronization command to change the time of system.

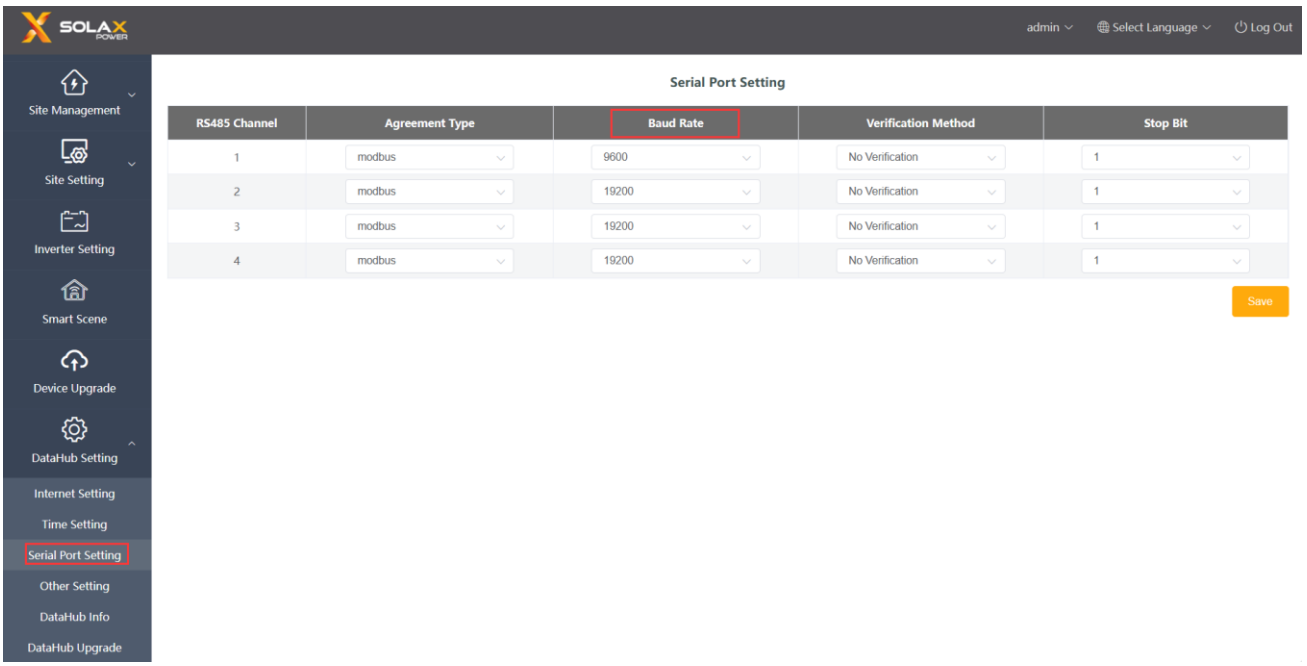


Note: When using SolaXClound to set the time, please switch to "SolaXCloud Synchronization" mode.

5.7.3 Serial Port Settings

Serial port settings is to set the baud rate of the four serial ports of DataHub, the default value of the baud rate is 19200. The user can change the baud rate under the serial port according to the model.

Note: The baud rate of the model under the serial port is consistent, and it is consistent with the serial port baud rate set by DataHub. The default value of the stop bit is 1.



5.7.4 Other Setting

The “Platform Setting” is the setting to upload the data to the platform, the data is sent to SolaXCloud by default, and the other is sent to the IEC104 server.

The “Database Storage Setting” is a path for inverters to store data. There are two storage paths including the “Default” and the “TF Card”. The “Default” is to store data on the DataHub.

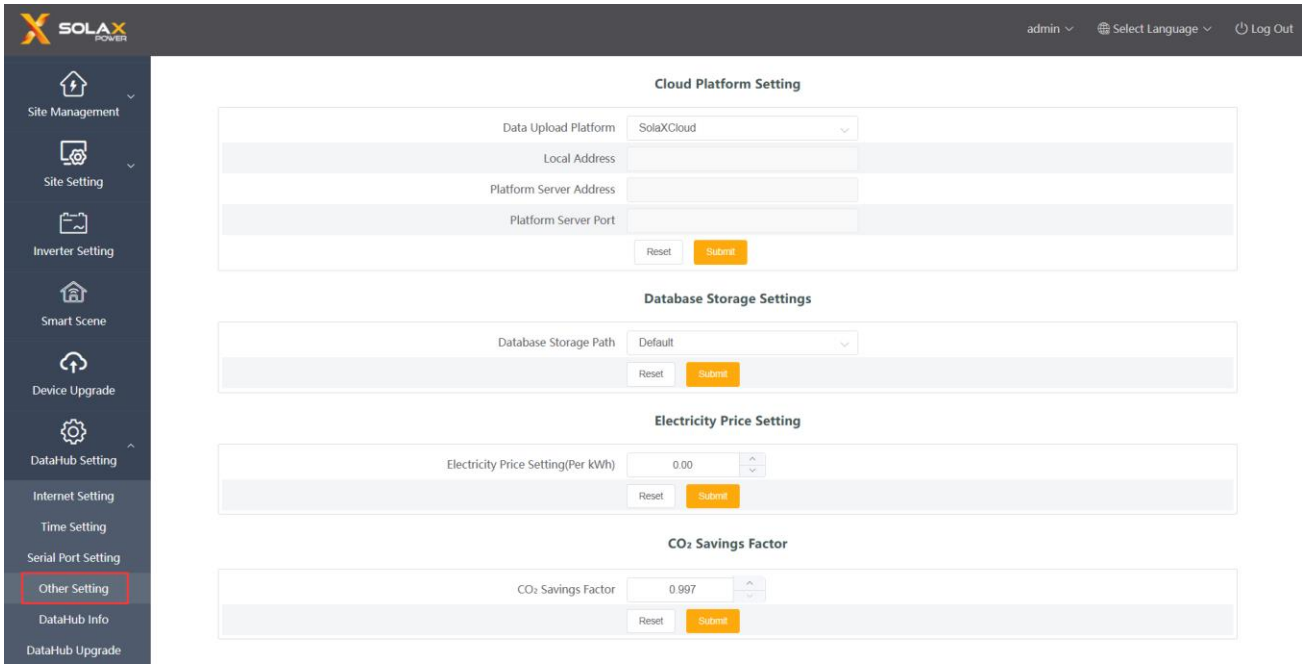
Electricity price setting: Calculate the income through the electricity price and display it in the overview interface.

“CO_2 Savings Factor”: Calculate the amount of CO_2 through the coefficient and display it in the overview interface.

Note：

It is recommended to use a TF card with a capacity of 16G;

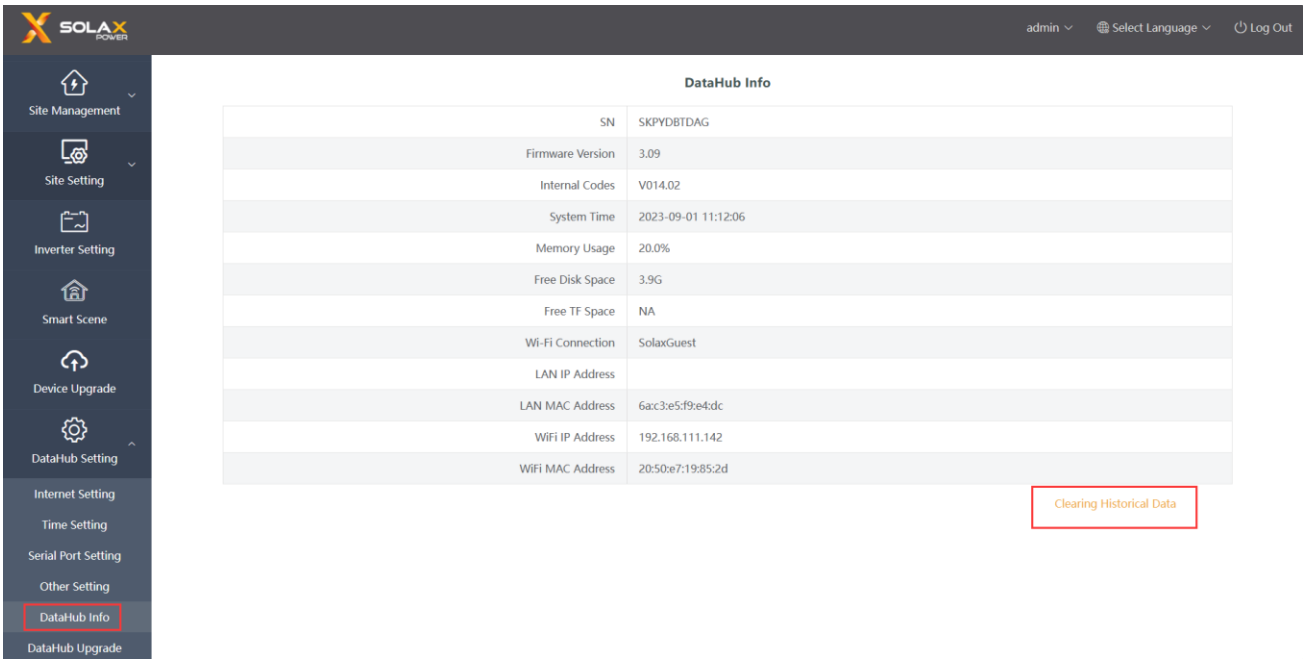
If the database storage path is a TF card, the TF card cannot be pulled out when the system is running. If you want to pull out the TF card, you need to change the storage path to the default, and then pull out the TF card. (It is recommended to unplug after power off)



5.7.5 DataHub Information

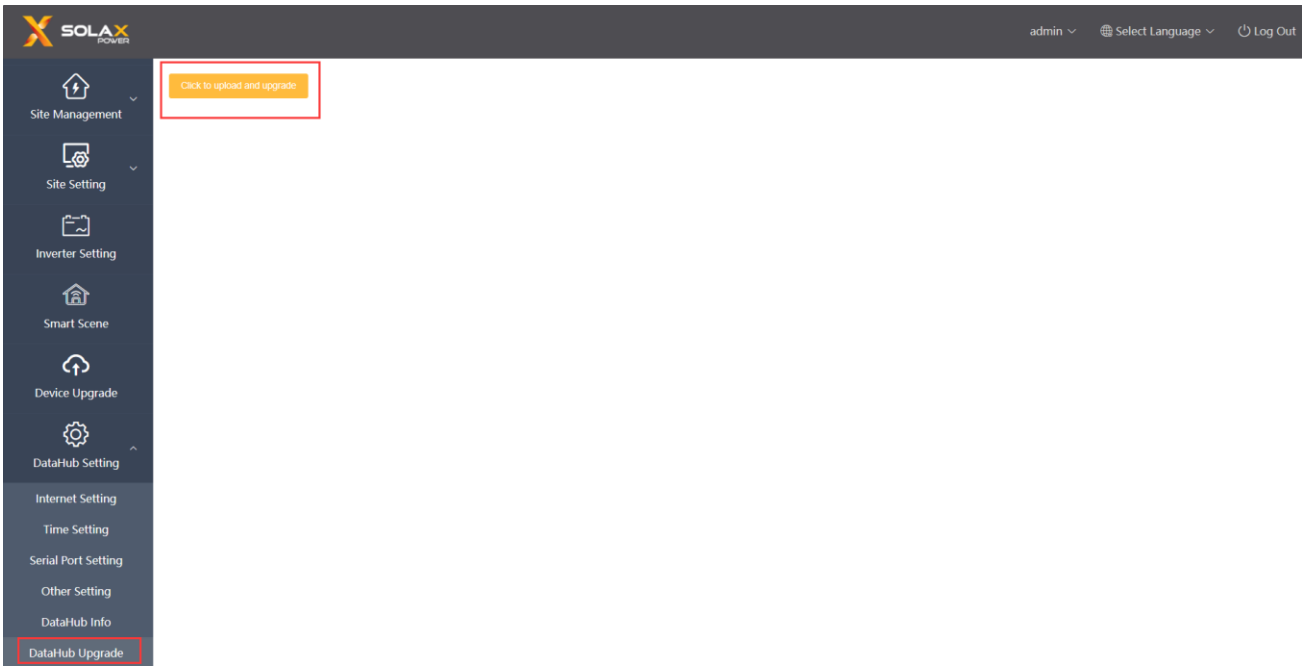
“Datahub Information” displays the basic information of DataHub, including “Registration Number”, “Firmware Version”, “Internal Codes”, “System Time”, “Memory Usage”, “Free Disk Space”, “Free TF Space”, “Wi-Fi Connection”, “LAN IP Address”, “LAN MAC Address”, “WiFi IP Address” and “WiFi MAC Address”.

Clear historical data: Clear the historical data of the device.



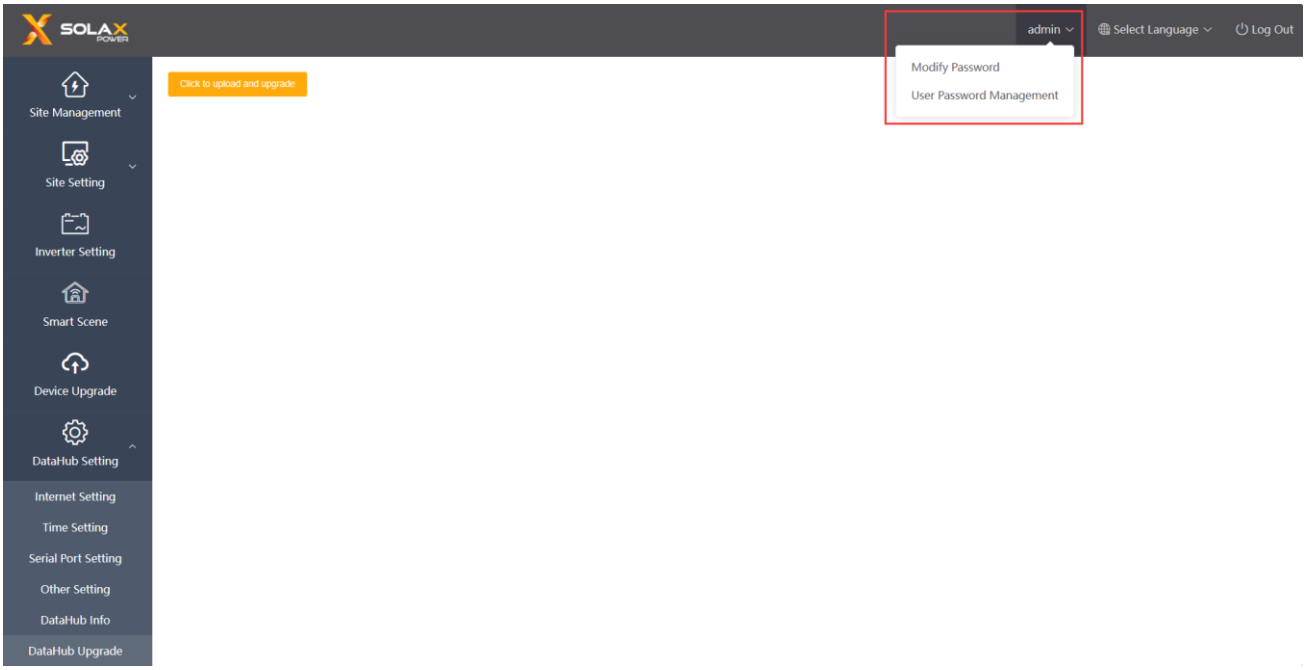
5.7.6 DataHub Upgrade

Click the “Click to Upload and Upgrade” button to upload and upgrade the DataHub, then select the upgrade file and wait for the upgrading. (Only one file can be uploaded at a time, and the interface needs to be refreshed for continuous operation.)



5.8 Password Modification

The system provides two methods for modification: “Modify Password” and “User Password Management”.



5.9 System Resetting

System resetting restores the system to factory settings, the historical data and the configuration information of DataHub will be cleared.

Operation: press and hold the “Recover” button for 10 seconds until all three LEDs are off, and then release it. After completing the above operations, the service restarts and the system reset is complete.

6 Technical Specifications

Product	DataHub1000
Hardware	
Power adapter	100-240V 50/60HZ 1.5A AC Input 12V 2A DC Input
Rated power	24W
Data transfer interval	5min
Storage capacity	8G/16G TFcard
The number of managed devices	60
Communication	
Ethernet	10/100M
Wireless module	WiFi 2.4GHz
Access network	WiFi
Interface	RS485*4, CAN*1, NET*1
Communication distance	wireless <10 m, LAN < 100m
DRM interface	Australia only
USB interface	1 USB Interface (For local upgrade and parameter setting)
Dry Contactor	AI*2, DI*4, DO*4 (Reserved for external expansion)
General parameters	
Dimensions (length*width*height)	205*124*33
Weight	410 g
Operating Temperature Range	-20°C ~ +60°C
Degree of Protection	IP20
Installation method	Wall-mounted, rail-mounted
Indicator light	LED
standard	
Certification	RED/FCC/CE

7 Certified Quality Assurance

7.1 Certification mark

7.2 Warranty

SolaX grants a standard 24-month warranty, if it is otherwise stipulated in the contract, the contract shall prevail.

7.3 Warranty Conditions

In case the product is operated according to the above instruction, SolaX will provide after-sales service during the product warranty period if any failure (error) is caused by product quality.

7.4 Exclusion of Liability

Warranty claims are excluded for direct or indirect damage due to:

1) Warranty period for the product or accessories have expired, but not extended;
2) Failure to operate the product in accordance with the installation and maintenance requirements described in the relevant manual;
3) Failure or damage caused by not operating, storing and using in the specified working environment;
4) Failures or damages caused by unforeseen unexpected factors, human factors or force majeure; and
5) Other failures or damages not caused by DataHub's own quality problems.

8 Contact Us

If you have any question or any technical question about DataHub, please contact us through the following methods, we will serve you wholeheartedly.

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FAX: +86 571 56075753
EMAIL: service@solaxpower.com
WEB: www.solaxpower.com

Appendix 1 Matched Model

Matched model	Baud rate
J1-ESS-HB	19200
X3-Hybrib-G4	19200
X1-Hybrid-G4	19200
X1-Fit-G4	19200
X3-Fit-G4	19200
X1-IES	19200
X3-IES	19200
X3-ULT	19200
X3-MIC-G2	9600
X3-PRO-G2	9600
X3-FTH	9600
X3-MGA-G2	9600
X3-FORTH	9600
X3-MEGA-G2	9600
X1-BOOST-G4	9600
X1-MINI-G4	9600
X1-SMART-G2	9600
3S-IS	9600
DTSU-666 (meter)	9600
DTSU-666 CT (meter)	9600
EM300/EM700 (meter)	9600