Gateway Server User Manual

2024/09/30 V3.3.8 ©3EGREEN

Contents

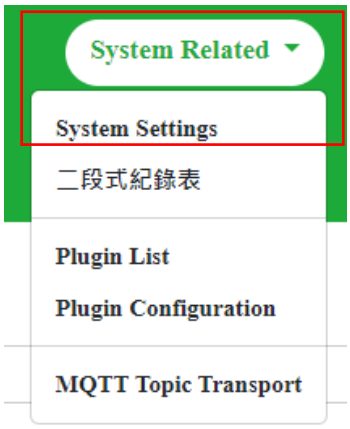
Chapter 1 Gateway Server User Manual

1.1 Server Settings

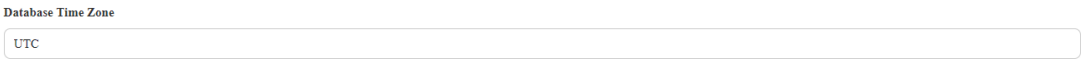
You may use [domainName]) or (URL localhost:3000) IP:3000

1.2 Basic Settings

1. To set Time zone “Click "System Settings"

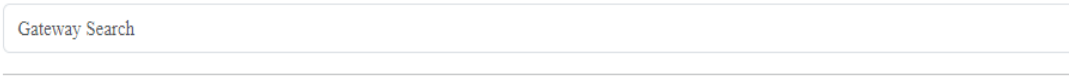


2. Change time zone: For example, for Taiwan, please fill in 8



1.3 Ensure that the Gateway and Hook are Connected

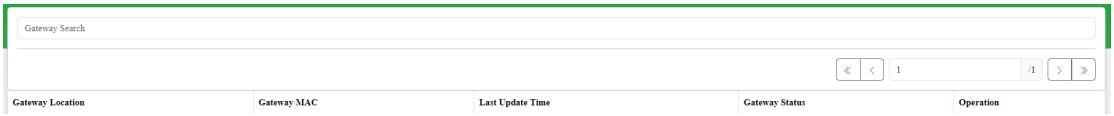
1. On Gateway Related Click "Gateway List": See example below.



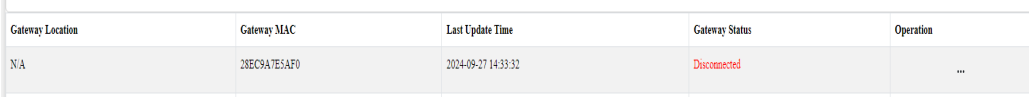
2. Confirm the gateway connection status (for gateway connection settings, please refer to the gateway connection settings document):

Click the "..." icon on the right side of the table to modify the gateway alias (e.g. Pillar A Gateway).

2.1 The gateway status is divided into "connected" and "disconnected". If it is not connected, no data will be uploaded for more than 10 minutes.

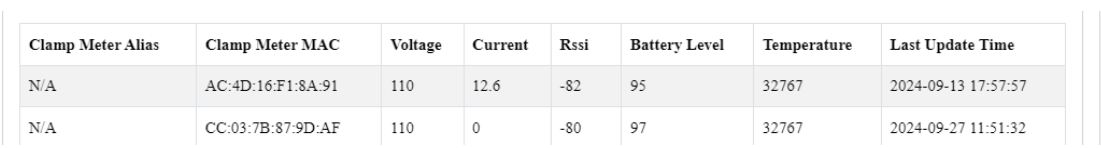


3. Click "Clamp Meter List" (this page has been hidden, if you need to use it, please enter the URL directly, xxx.3egreen.cloud/#/dashboard/clamp-meter-list):



Gateway Location	Gateway MAC	Last Update Time	Gateway Status	Operation
N/A	28EC9A7E5AF0	2024-09-27 14:33:32	Disconnected	...

4. Confirm the connection status of the connected hook：Next on the operation click the three dots. See example below.



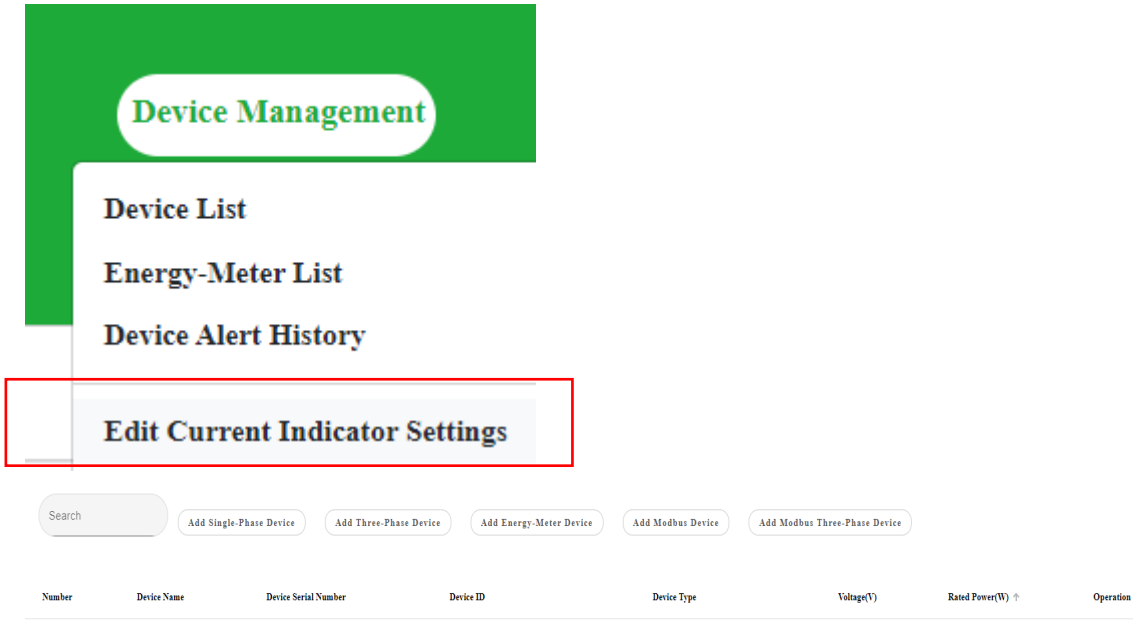
Clamp Meter Alias	Clamp Meter MAC	Voltage	Current	Rssi	Battery Level	Temperature	Last Update Time
N/A	AC:4D:16:F1:8A:91	110	12.6	-82	95	32767	2024-09-13 17:57:57
N/A	CC:03:7B:87:9D:AF	110	0	-80	97	32767	2024-09-27 11:51:32

1.4 Setting up single-phase and three-phase devices

Special note: Please set the single-phase first, then the three phase! Once the three phase is successfully bound to the single-phase device, the single-phase device will change from a "single phase smart current indicator" to a "phase sub-device" !

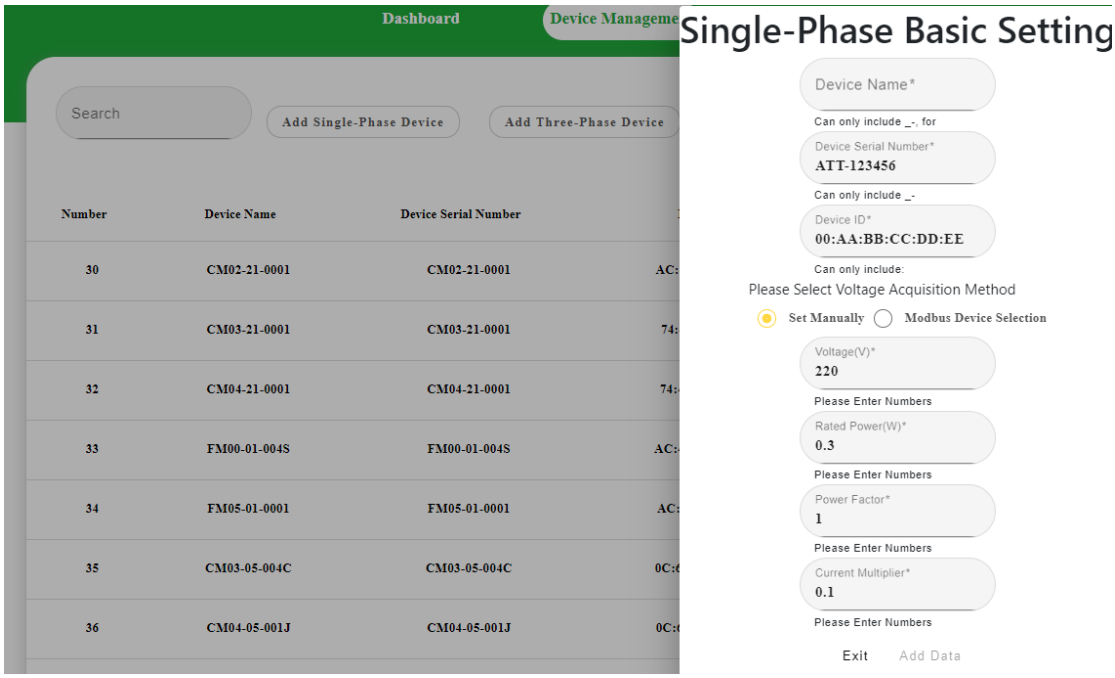
The power calculations displayed in the system are based on the device (s) configured on this page.

1. Click "Edit Current Indicator Settings":



2. Click "Add Single-Phase Device":

Enter the device name (customized: e.g. machine_1, can only contain _ and -, required), device serial number (custom: e.g. eqp_1, can only contain _ and -, required), device identification code (MAC Address, required), voltage acquisition method (Modbus device acquisition requires filling in the slicer ID, register address, and setting the corresponding Modbus device, please see the next section for details), voltage value (custom, required), rated power (average reasonable power, required), power factor (involves power calculation, required), current multiplier (default value), disconnection reminder notification (default value).



3. Send

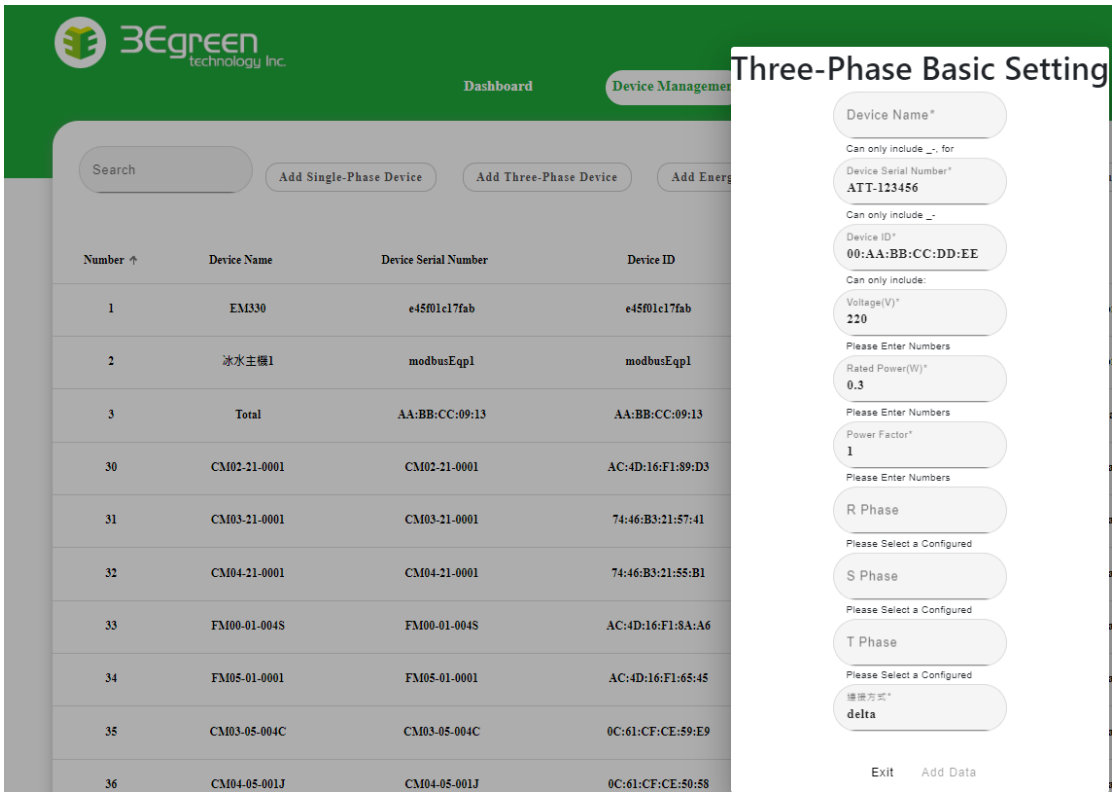
You will see the set device. Click the edit and delete icons to perform related operations:

4. Click "Add three-phase device":

Enter the device name (e.g., chiller, required), device serial number (customized: eg eqp1, can only contain _ and -, required), device identification code (customized, required), voltage setting value (required), rated power (reasonable power, required), voltage value (customized, required), power factor

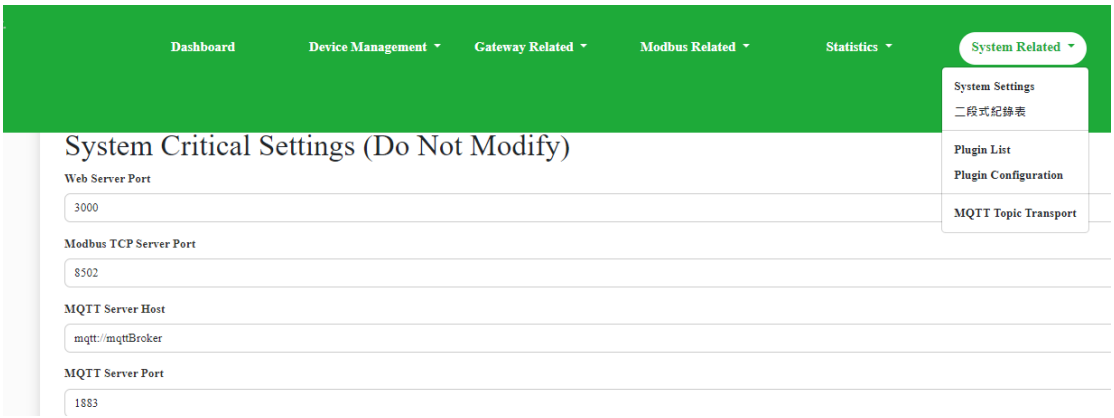
(required), R phase (MAC Address, will automatically bring in the set single-phase device, it is recommended to use the selection method, required), S phase (MAC Address, input method is the same as R phase, required), T phase (MAC Address, input method is the same as R phase, required), connection method (delta or y, as default), disconnection reminder notification (as default).

REMARKS: The device type of the device corresponding to the R, S, and T phases will be converted to a "phase sub-device" to serve as the basis for calculating the power of the three-phase device.

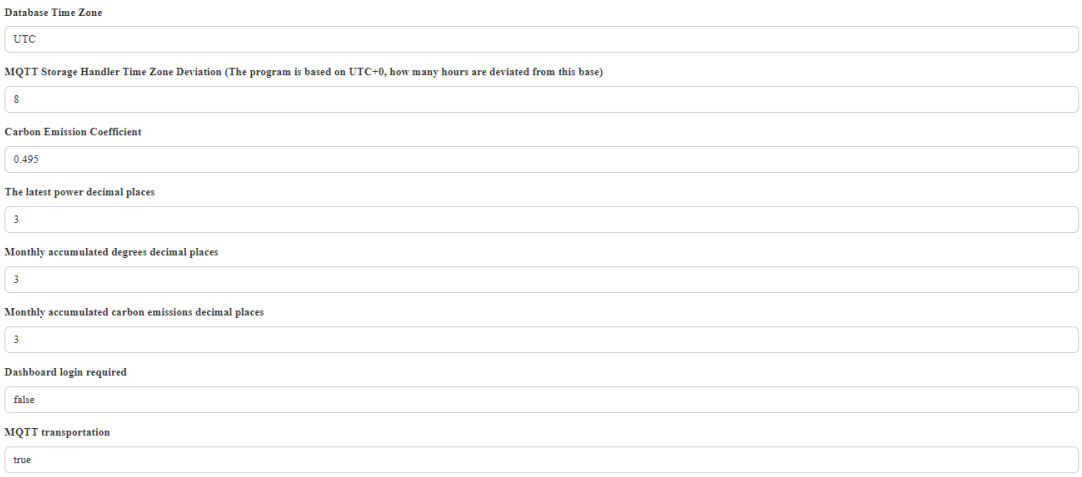


1.5 Setting the Alert Function - 1 - Basic Settings

1. Click "System Related", and then click "System Settings" in the drop-down box.



2. Fill in "Email Account" (Sender Email, required), "Email Password" (Gmail, etc. will need it, optional), "Email SMTP Host" (e.g.: smtp.gmail.com, required), "Email SMTP Port" (e.g.: 587, required), Email Notification List (required, if there are multiple emails, remember to press Enter to enter), click Save Settings to send and save.



Alert Related Settings

Email Account

wenyuan.3egreen@gmail.com

Email Password

••••••••••••••••••

Email SMTP Host

smtp.gmail.com

Email SMTP Port

587

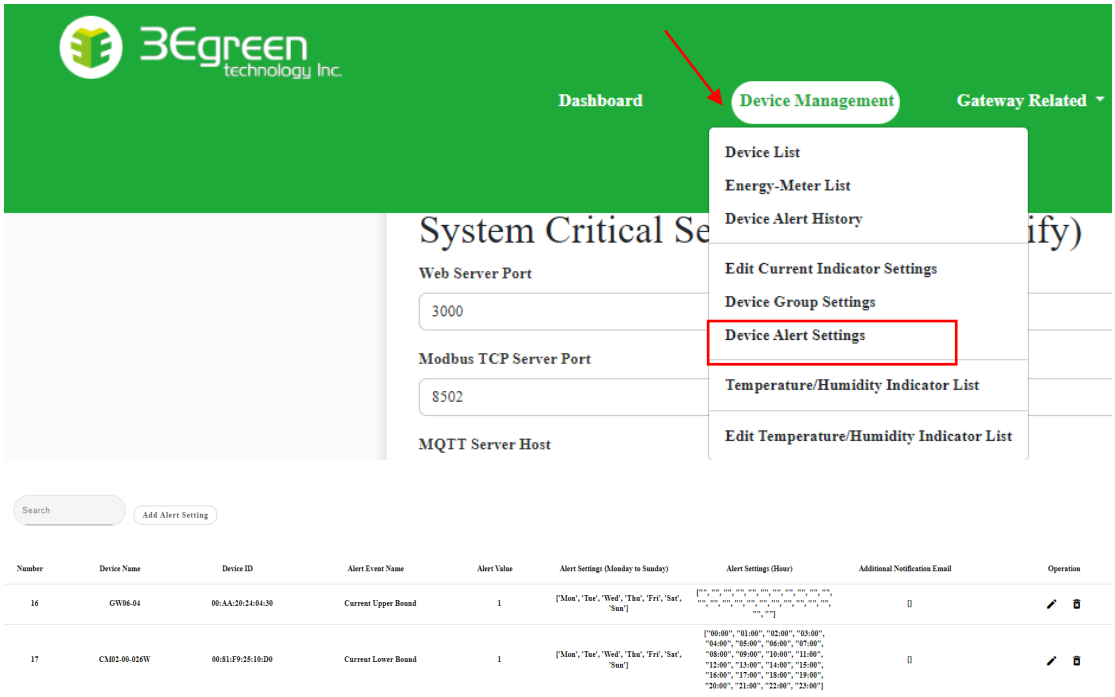
Email Notification List

Please Enter Email (Press Enter after input)

Save Settings

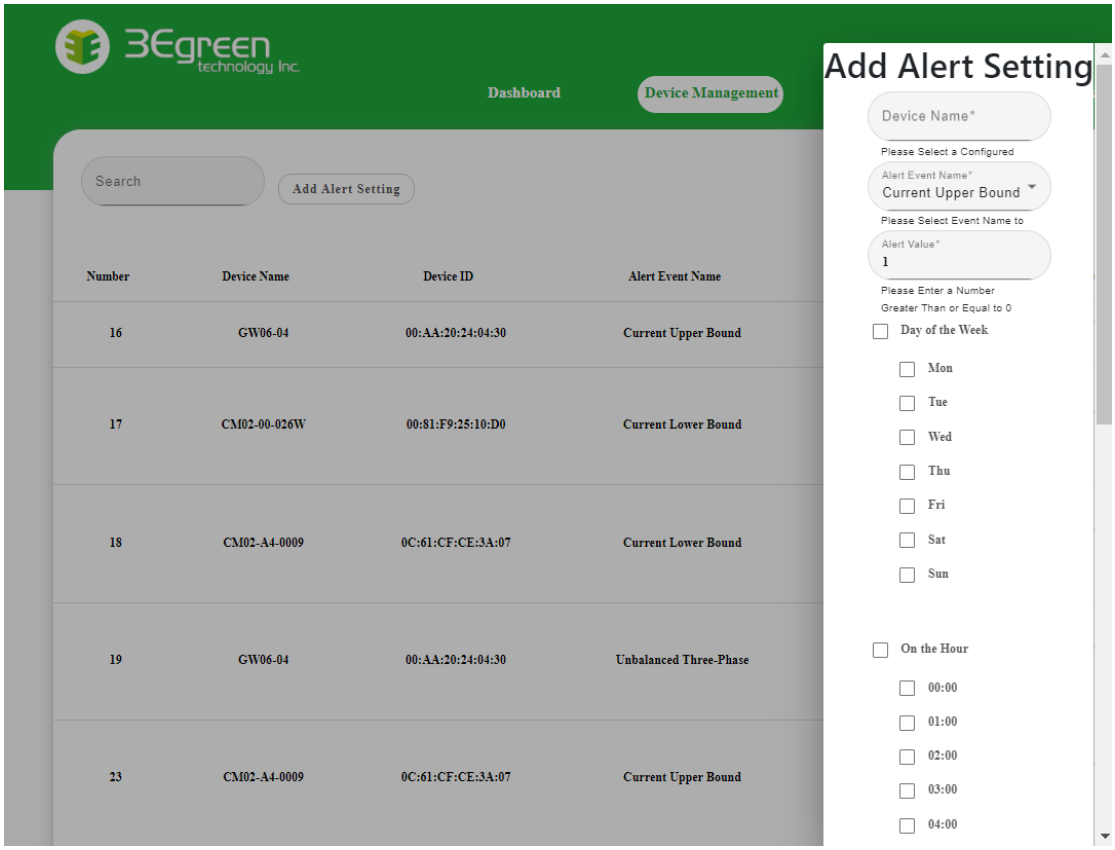
1.6 Setting the Alert Function - 2 - Detailed Settings

1. Click "Device Management" and select "Device Alert Settings" from the drop-down box.



2. Click the "Add Alert Settings" button in the upper left corner.

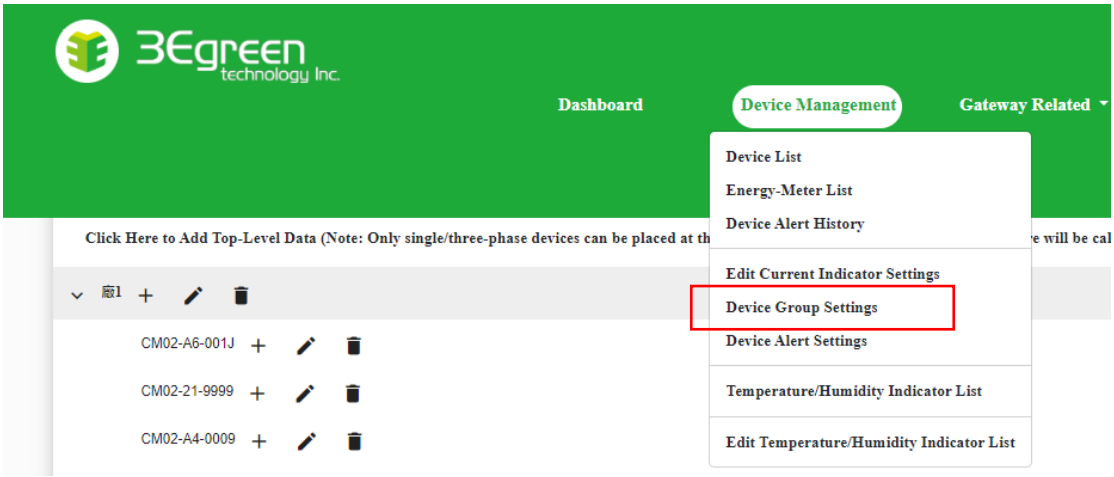
3. In the pop-up window, select "Device Name" (the single-phase and three-phase devices set in the system will be automatically brought out, and the phase sub-device will be eliminated, which is required), select "Alarm Event Name" (the current system only supports the upper limit of current value, the lower limit of current value, and three-phase imbalance, which are required), fill in the "Alarm Value" (the default setting for three-phase imbalance is 20%, which is required), check "Alarm Date" (Monday to Sunday can be checked, and the alarm will be issued only when the corresponding time is met after selecting, which is not required), check "Alarm Hours" (00:00-23:00 can be checked, and the alarm will be issued only when the corresponding time is met after checking, which is not required), Email (Press Enter after entering the email, this field is for additional notification of personnel for this device, which is not required), Remarks (not required), click "Add Data" below the alarm settings to save.



4. You can "edit" and "delete" the corresponding alert settings. p.s. When the warning setting is still in place, directly removing the single-phase and three-phase settings may result in no warning or other unexpected errors, so special attention should be paid.

1.7 Setting Groups (linked demand detection and multi-layer plant power usage pages)

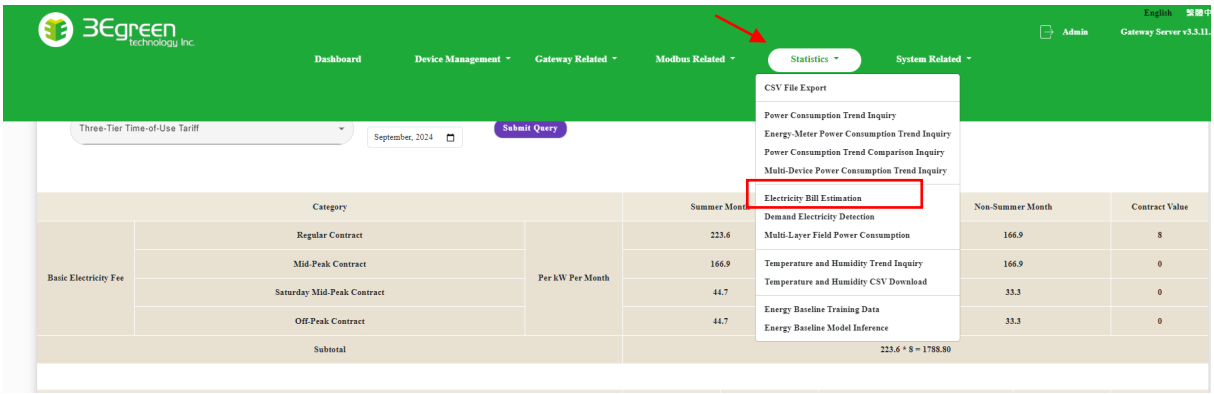
1. Click "Device Management" and select "Device Group Settings"



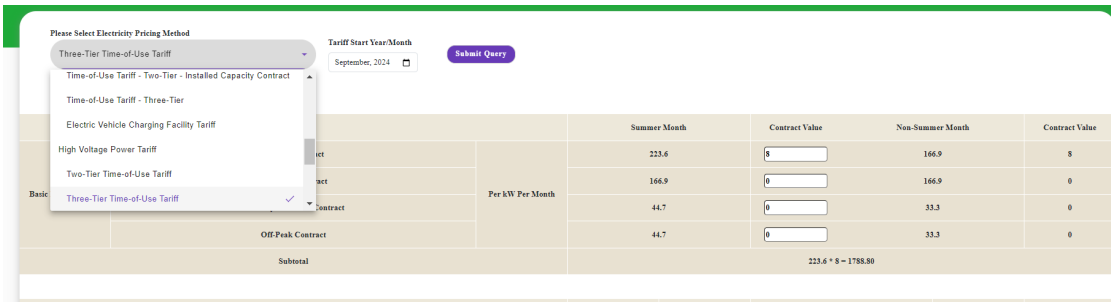
3. Click the + in the upper left corner to add the highest-level data, click the + sign after the highest level to add the next level data... and so on. After clicking the + sign, the set single-phase and three-phase devices will be automatically brought in for selection. The number of layers can be unlimited, but at least one set single-phase and three-phase device must be set/selected at the bottom level to avoid system abnormalities, and it is recommended to set up 3~4 layers at most to express all relationships, such as company name/factory/workshop/line.

1.8 Electricity Price Setting (linked with demand detection and multi-layer plant area electricity usage page)

1. Click "Statistics" and select "Electricity Bill Estimation" from the drop-down box.



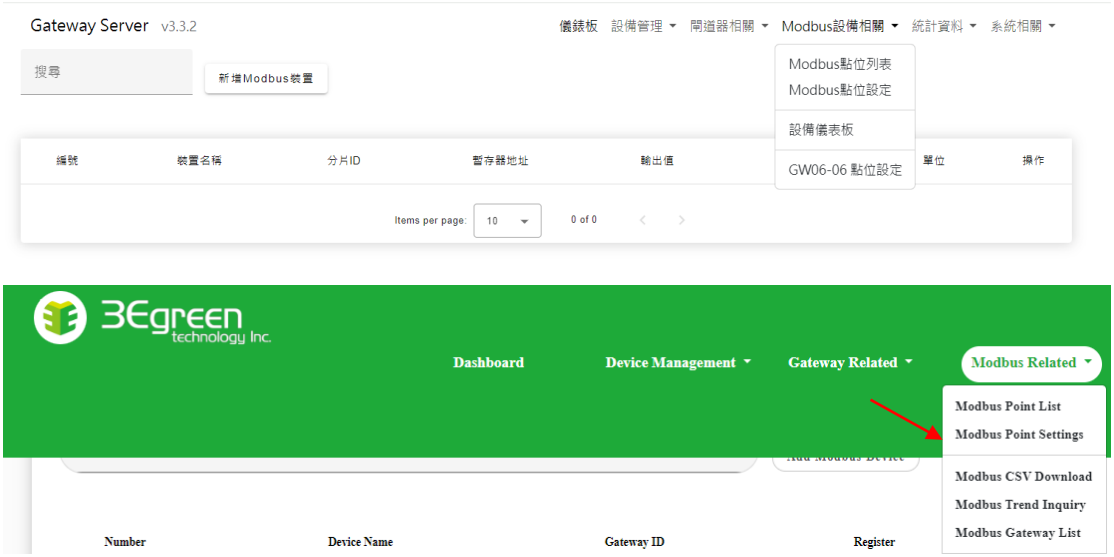
2. Select the type of contract signed with Taipower (e.g. high voltage electricity price/two-stage time price, low voltage electricity price/time price-three-stage…etc.), and fill in the contract value signed with Taipower.



3. Click "Submit Query"

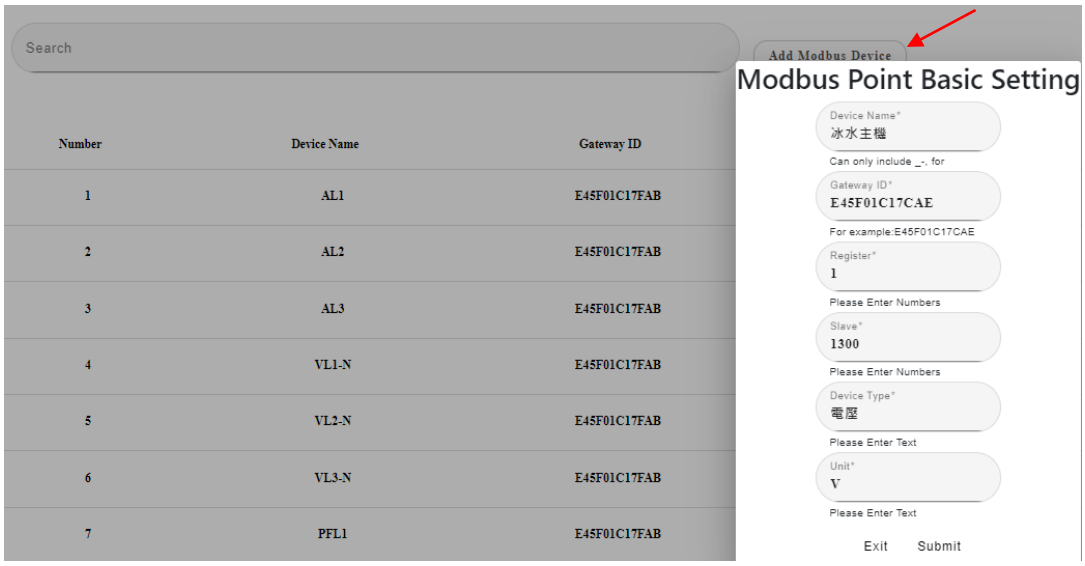
1.9 Modbus Device Configuration

1. Click "Modbus Point Settings":



2. Click "Add Modbus Device":

Enter the device name, shard ID (slave), register address (register), device type (custom), unit (custom), disconnection reminder notification (default).



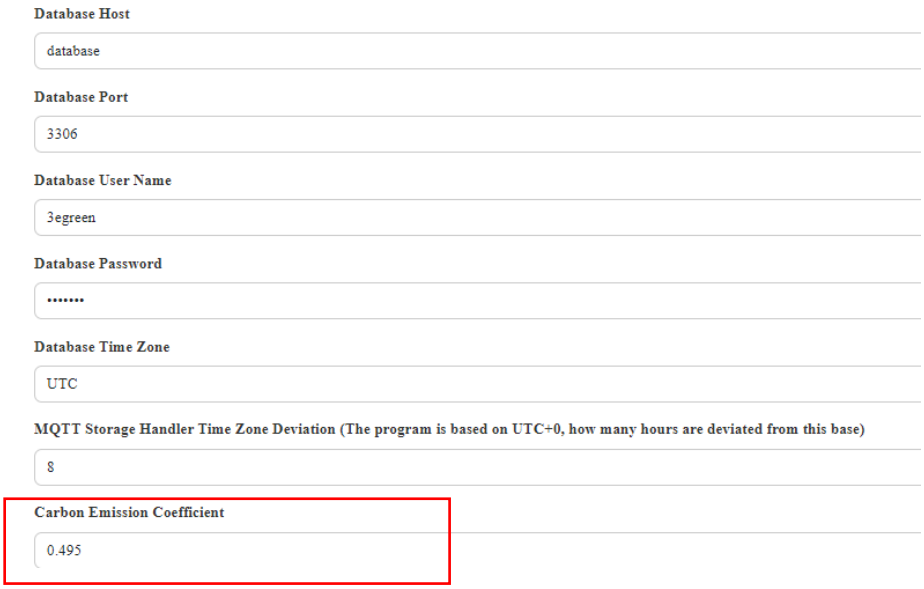
3. Send

You can see the configured Modbus devices and their corresponding output values. Click the edit and delete icons to perform the corresponding operations.

Number	Device Name	Value	Unit	Connection Status
1	AL1	0.000	A	Disconnected
2	AL2	0.000	A	Disconnected

1.10 Final Inspection System Settings

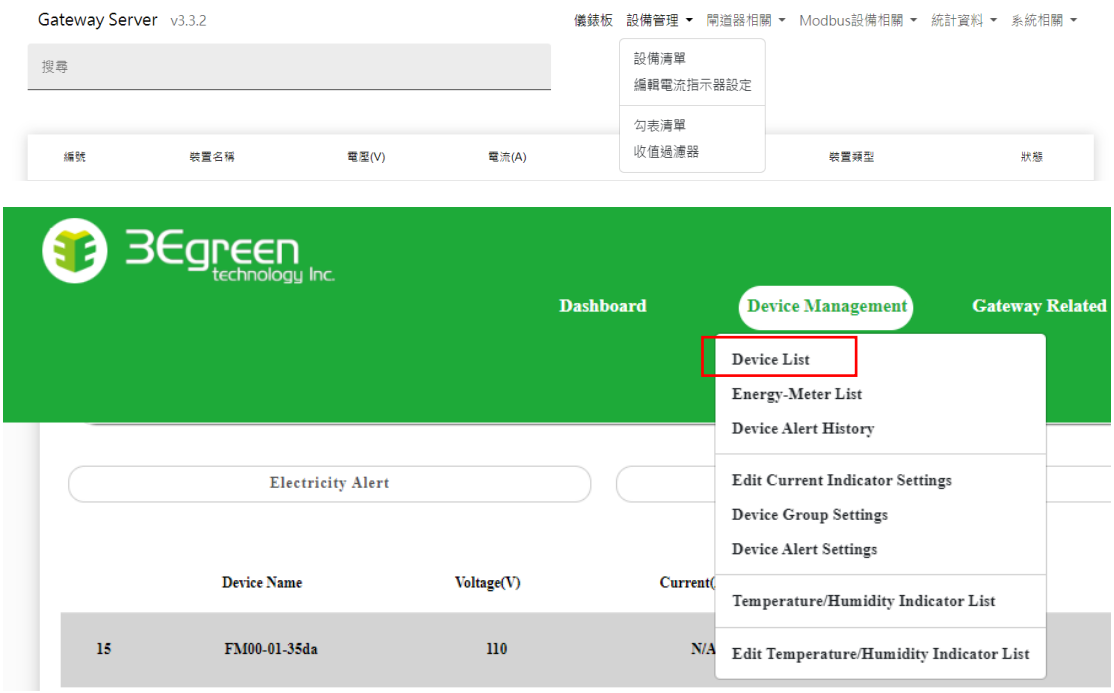
1. Check whether the "Database User" and "Database Password" are set correctly.
2. Check if the carbon emission coefficient is correct, the default is 0.495



Chapter 2. Device List Settings

2.1 Setting Device List

1. Click "Device Management" and select "Device List" from the drop-down box:



2.You can see the set single-phase and three-phase connection status, real-time current and power, updated every 1 minute.

Specifications:

2.1 Connection status is divided into (Disconnected/Connected/Sleep (currently not supported on Raspberry Pi).

2.2 The phase sub-device of the three-phase setting will be displayed in a collapsed manner and will expand after clicking.

2.3 The judgment of Disconnected is that the system has not received data for more than 6 minutes.

2.4 Three-phase judgment criteria: Connected > Sleep > Disconnected

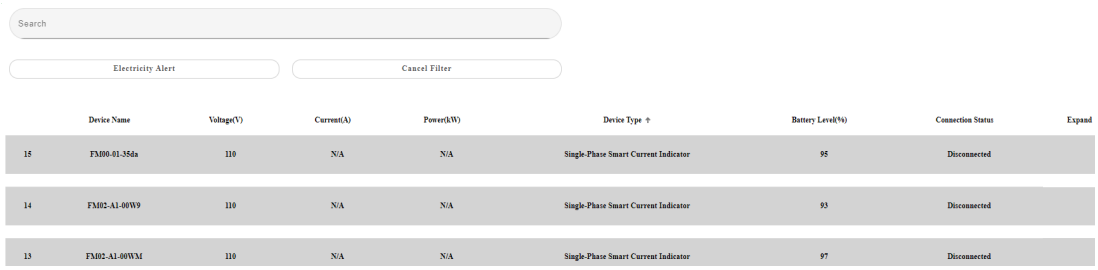
2.5 Three-phase power formula:

$$\sum_{i=1\sim3} \frac{(PowerFactor_i \times indivual\ current\ _i \times three-phase\ voltage\ setting)}{1.732}$$

2.6 Click on the three-phase device to see the bound phase sub-devices.

2.7 Click "Power Reminder" on the upper left to filter out three-phase and single-phase devices with lower power. Click "Cancel Filter" to restore the original page.

2.8 Click on the Column header to sort or use the Search Box to search.



Chapter 3. Modbus Point List

3.1 Modbus Point List Settings

1. Go to Modbus Related and Click "Modbus Point List":

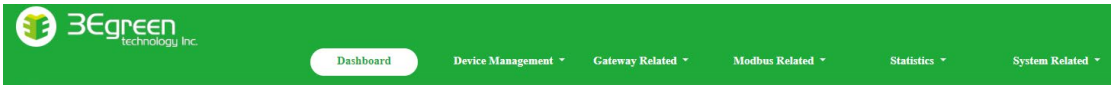
2. You can see the Modbus connection status of the setting, the real-time value, updated every 1 minute.

Number	Device Name	Value	Unit	Connection Status
1	AL1	0.000	A	Disconnected
2	AL2	0.000	A	Disconnected

Chapter 4. Cloud Dashboard

4.1 Cloud Dashboard Homepage

1. Click Dashboard:



Specifications:

1.1 Updated every minute, you can see the total electricity trend (kw) per minute, real-time electricity consumption (kw), cumulative electricity consumption this month (kwH), cumulative carbon emissions this month (kg), and warning quantity.

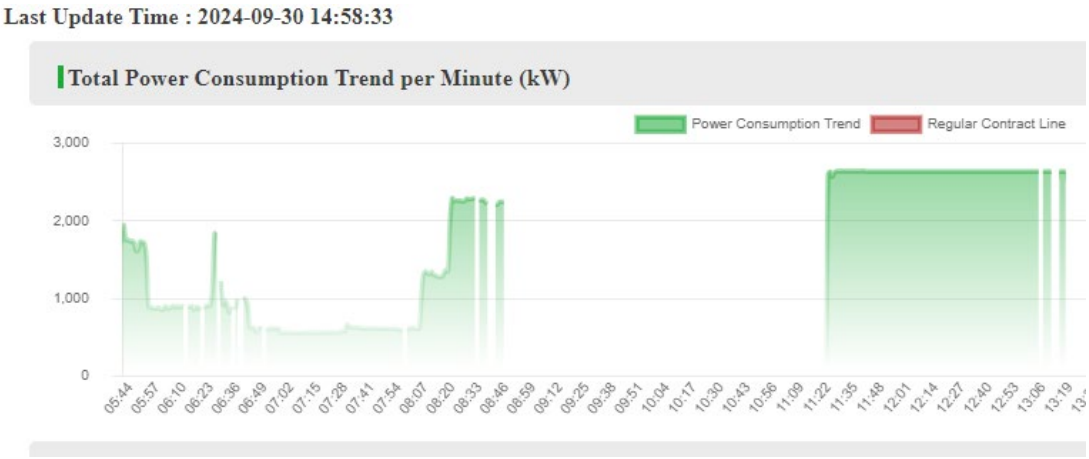
1.2 If the system does not receive any data within 1 minute, the line will be disconnected, and a blank frame will be generated.

1.3 KwH calculation formula：$\sum_{i=1\sim n}\frac{kw}{60}$Carbon emission calculation

1.4 formula：*kwH Xcarbon emission coef ficient set by the system*

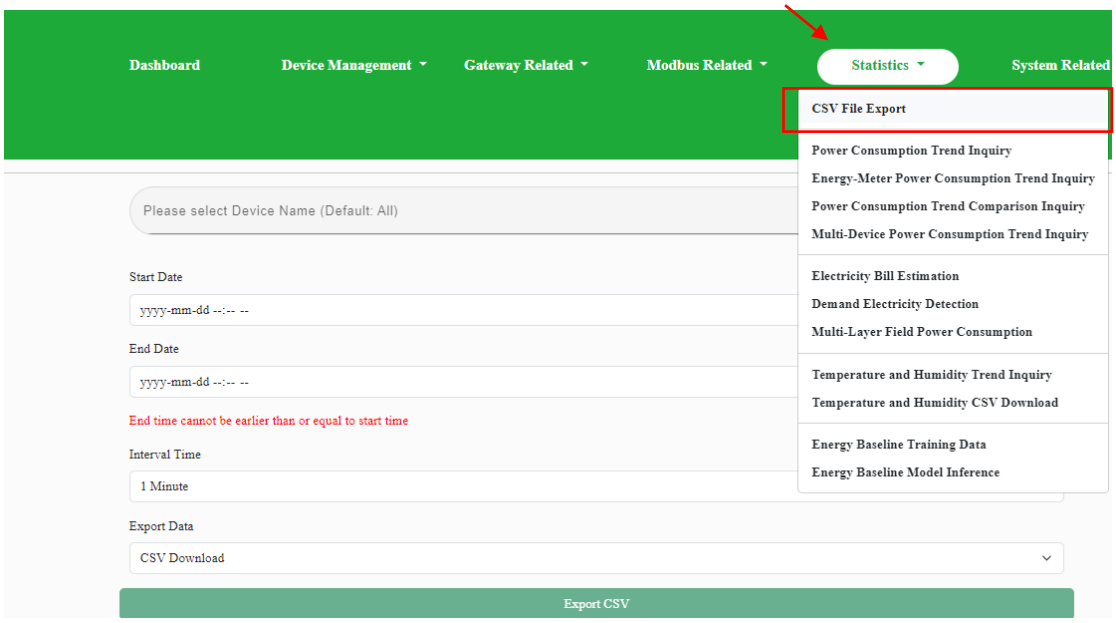
Diagram operation method:

1. The scroll wheel can be used to zoom in and out and holding down the left mouse button can "circle" the area you want to view.
2. Ctrl+ left mouse button to drag horizontally.



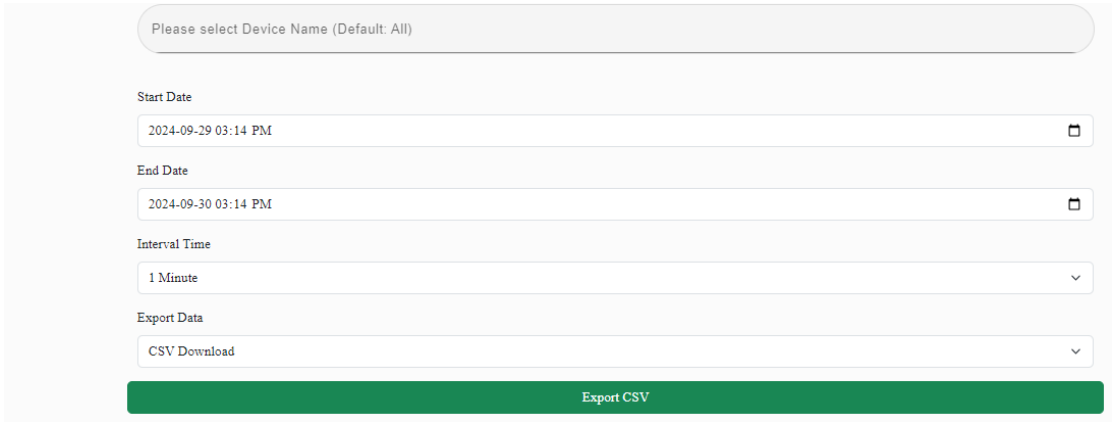
4.2 CSV File Export

1. Go to Statistics, Click "CSV file export":



2. Download options:

Device name (leave blank to select all, multiple selections are allowed), start date, end date, interval, export data type, export data table.

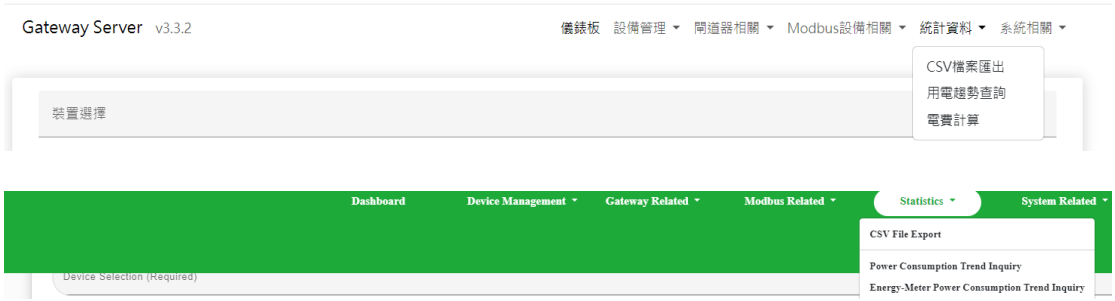


3.MQTT-Sort by MAC CSV format

	A	B	C	D	E	F	G	H	I
1	Device ID	MACAddress	Time Stamp	Current	Voltage	Power(kw)	Temperatu	Rssi	Battery
2	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:20	8	110	0.88	N/A	-78	88
3	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:21	8	110	0.88	N/A	-77	88
4	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:22	8	110	0.88	N/A	-78	88
5	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:23	8	110	0.88	N/A	-78	88
6	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:24	8	110	0.88	N/A	-78	88
7	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:25	8	110	0.88	N/A	-78	88
8	CM02-A4-0009	0C:61:CF:CE:3A:07	2024/9/29 15:26	8	110	0.88	N/A	-78	88

4.3 Current Trend Inquiry

1. On Statistics Click “Power Consumption Trend Inquiry”.



2. Options:

Device selection (single-phase or three-phase device that has been set, required), data start time (required), data end time (required), can choose every minute or every hour (default is every minute) Specification:

1. Three-phase power formula: $\sum_{i=1\sim3} \frac{(PowerFactor_i \times \mathrm{I} \times \mathrm{V})}{1.732}$

2. The three-phase device will show the power trend of itself and the phase sub-devices.

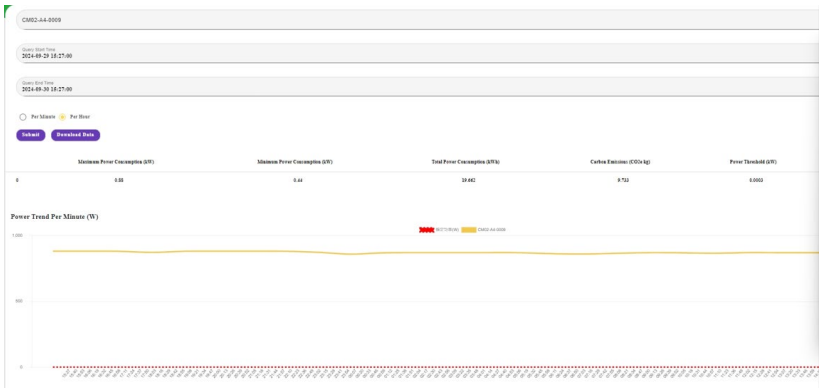
3. The hourly calculation is the average result of each hour. Therefore, if the current fluctuation varies greatly every hour, it will be different from the result calculated every minute.

Reference image for operation mode:

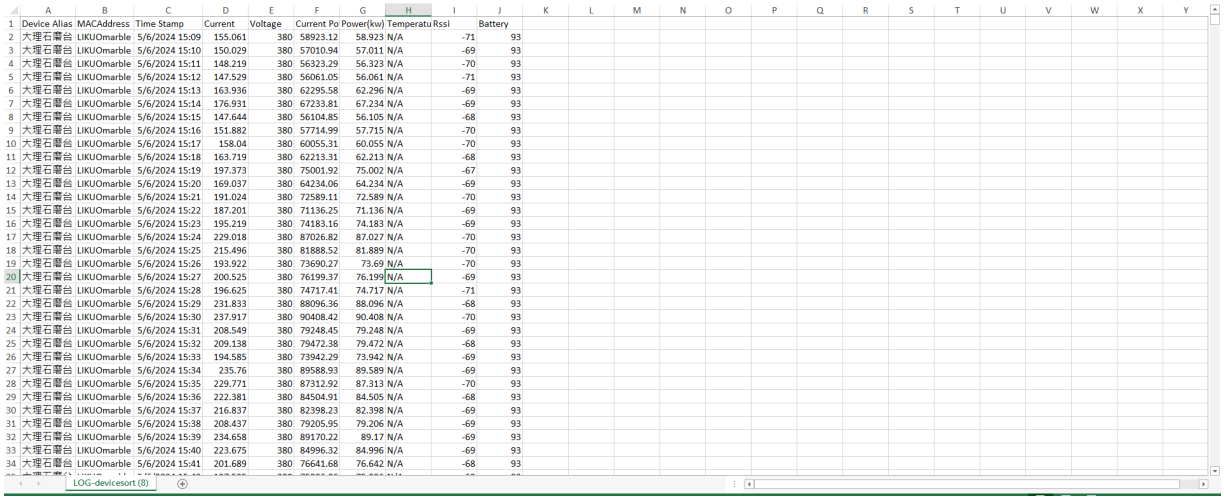
1. The scroll wheel can be zoomed

2. Press and hold the left mouse button to "circle" the area you want to view

3. Ctrl+ mouse button to drag horizontally



3. Download data (same as CSV download, sorted by device).

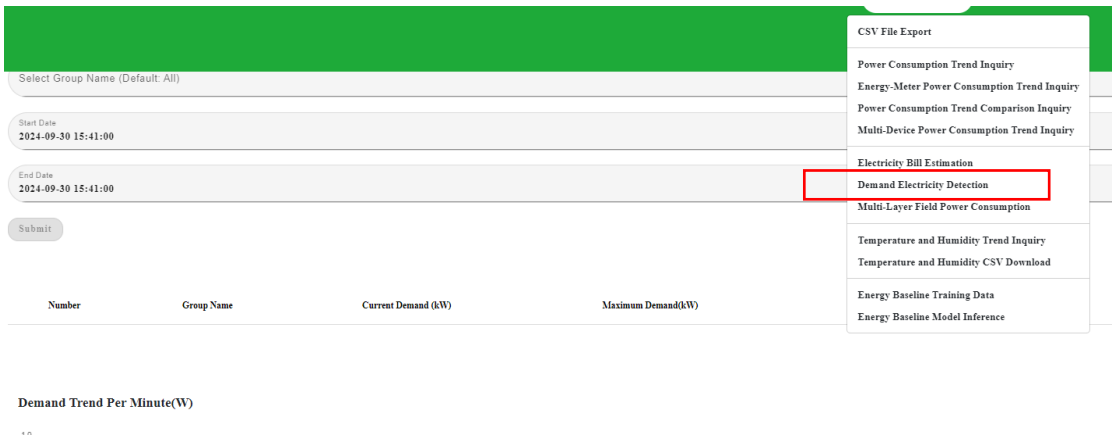


	A	B	C	D	E	F	G	H	I	J
1	Device Alias	MACAddress	Time Stamp	Current	Voltage	Current Po	Power(kw)	Temperatu	Rssi	Battery
2	大理石雷台	LIKUOmarble	5/6/2024 15:09	155.061	380	58923.12	58.923	N/A	-71	93
3	大理石雷台	LIKUOmarble	5/6/2024 15:10	150.029	380	57010.94	57.011	N/A	-69	93
4	大理石雷台	LIKUOmarble	5/6/2024 15:11	148.219	380	56323.29	56.323	N/A	-70	93
5	大理石雷台	LIKUOmarble	5/6/2024 15:12	147.529	380	56061.05	56.061	N/A	-71	93
6	大理石雷台	LIKUOmarble	5/6/2024 15:13	163.936	380	62295.58	62.296	N/A	-69	93
7	大理石雷台	LIKUOmarble	5/6/2024 15:14	176.931	380	67233.81	67.234	N/A	-69	93
8	大理石雷台	LIKUOmarble	5/6/2024 15:15	147.644	380	56104.85	56.105	N/A	-68	93
9	大理石雷台	LIKUOmarble	5/6/2024 15:16	151.882	380	57714.99	57.715	N/A	-70	93
10	大理石雷台	LIKUOmarble	5/6/2024 15:17	158.04	380	60055.31	60.055	N/A	-70	93
11	大理石雷台	LIKUOmarble	5/6/2024 15:18	163.719	380	62213.31	62.213	N/A	-68	93
12	大理石雷台	LIKUOmarble	5/6/2024 15:19	197.373	380	75001.92	75.002	N/A	-67	93
13	大理石雷台	LIKUOmarble	5/6/2024 15:20	169.037	380	64234.06	64.234	N/A	-69	93
14	大理石雷台	LIKUOmarble	5/6/2024 15:21	191.024	380	72589.11	72.589	N/A	-70	93
15	大理石雷台	LIKUOmarble	5/6/2024 15:22	187.201	380	71136.25	71.136	N/A	-69	93
16	大理石雷台	LIKUOmarble	5/6/2024 15:23	195.219	380	74183.16	74.183	N/A	-69	93
17	大理石雷台	LIKUOmarble	5/6/2024 15:24	229.018	380	87026.82	87.027	N/A	-70	93
18	大理石雷台	LIKUOmarble	5/6/2024 15:25	215.496	380	81888.52	81.889	N/A	-70	93
19	大理石雷台	LIKUOmarble	5/6/2024 15:26	193.922	380	73690.27	73.69	N/A	-70	93
20	大理石雷台	LIKUOmarble	5/6/2024 15:27	200.525	380	76199.37	76.199	N/A	-69	93
21	大理石雷台	LIKUOmarble	5/6/2024 15:28	196.625	380	74717.41	74.717	N/A	-71	93
22	大理石雷台	LIKUOmarble	5/6/2024 15:29	231.833	380	88096.36	88.096	N/A	-68	93
23	大理石雷台	LIKUOmarble	5/6/2024 15:30	237.917	380	90408.42	90.408	N/A	-70	93
24	大理石雷台	LIKUOmarble	5/6/2024 15:31	208.549	380	79248.45	79.248	N/A	-69	93
25	大理石雷台	LIKUOmarble	5/6/2024 15:32	209.138	380	79472.38	79.472	N/A	-68	93
26	大理石雷台	LIKUOmarble	5/6/2024 15:33	194.585	380	73942.29	73.942	N/A	-69	93
27	大理石雷台	LIKUOmarble	5/6/2024 15:34	235.76	380	89588.93	89.589	N/A	-69	93
28	大理石雷台	LIKUOmarble	5/6/2024 15:35	229.771	380	87312.92	87.313	N/A	-70	93
29	大理石雷台	LIKUOmarble	5/6/2024 15:36	222.381	380	84504.91	84.505	N/A	-68	93
30	大理石雷台	LIKUOmarble	5/6/2024 15:37	216.837	380	82398.23	82.398	N/A	-69	93
31	大理石雷台	LIKUOmarble	5/6/2024 15:38	208.437	380	79205.95	79.206	N/A	-69	93
32	大理石雷台	LIKUOmarble	5/6/2024 15:39	234.658	380	89170.22	89.17	N/A	-69	93
33	大理石雷台	LIKUOmarble	5/6/2024 15:40	223.675	380	84996.32	84.996	N/A	-69	93
34	大理石雷台	LIKUOmarble	5/6/2024 15:41	201.689	380	76641.68	76.642	N/A	-68	93

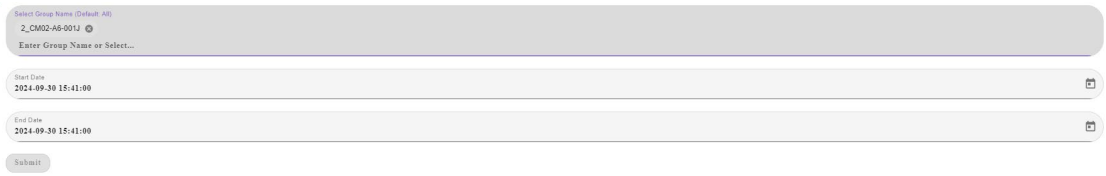
LOG-devicesort (8)

4.4 Demand Electricity Detection

1. Click "Statistics" and select "Demand Electricity Detection" from the drop-down box.



2. Select the configured group (all selected by default), start time (required), end time (required), and click Submit.

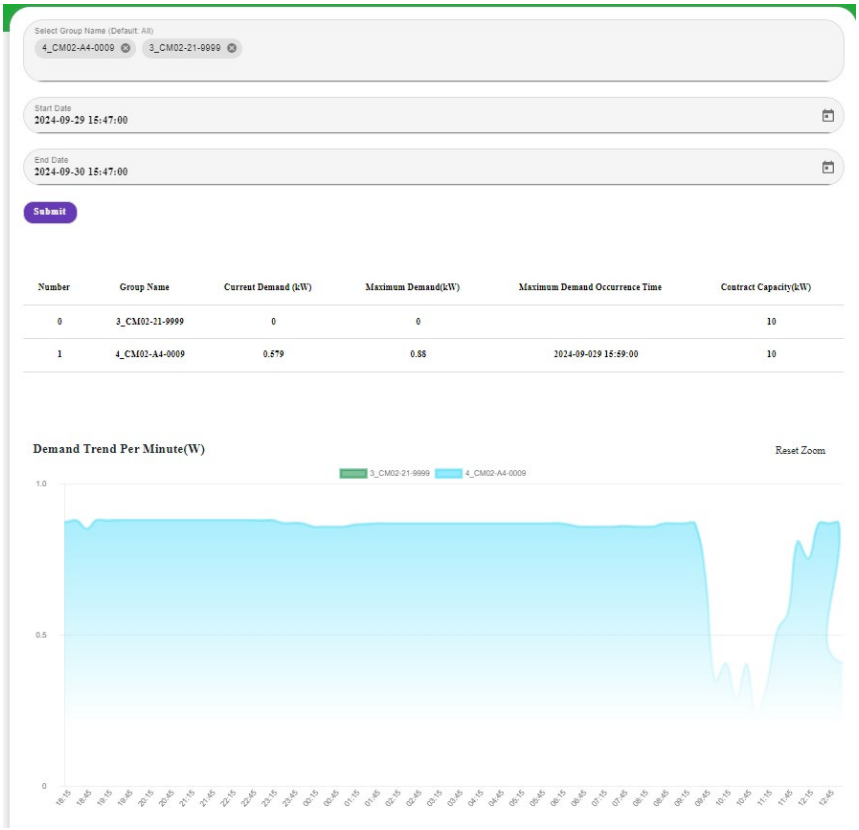


3. After submission, it includes a presentation table and a curve graph

Specifications:

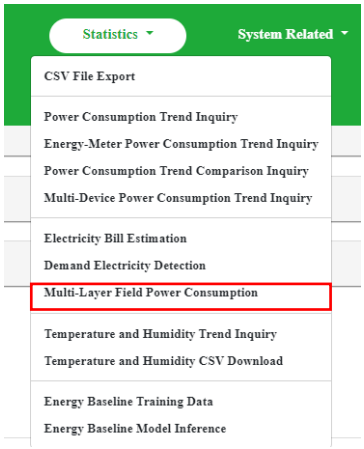
1. The selected group will show the demand in the table and curve.
2. Demand calculation formula: $\sum_{i=1\sim15}\frac{kw_i}{15}$, which means the average power every 15 minutes.

3. The interval between each line is 15 minutes.

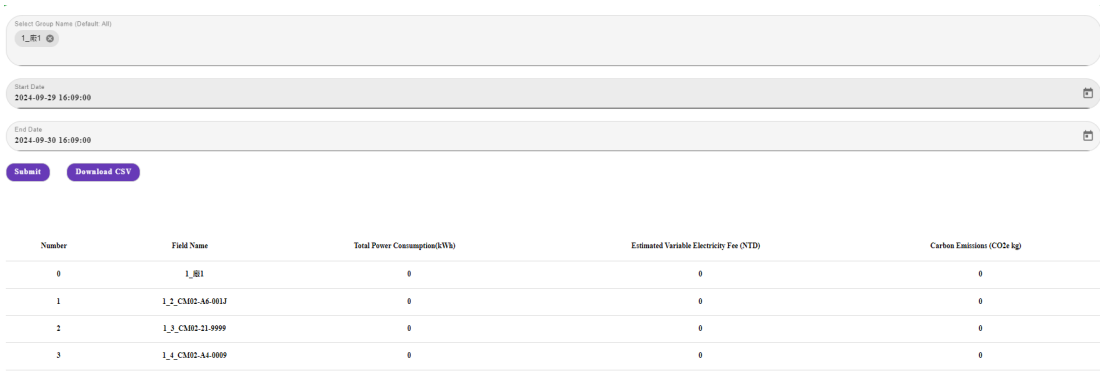


4.5 Multi-layer Field Electricity

1. Click "Statistics" and select "Multi-Layer Field Power Consumption" from the drop-down box.



2. Select the group name (required), start date (required), end date (required).



3. After pressing Submit, a chart of the selected group and its sub-layers will appear, including only the pie chart of the sub-layers of the group (for easy comparison of the power usage of the sub-layers).
Specifications: (Note the example below is for Taiwan Utility Provider: Taipower)

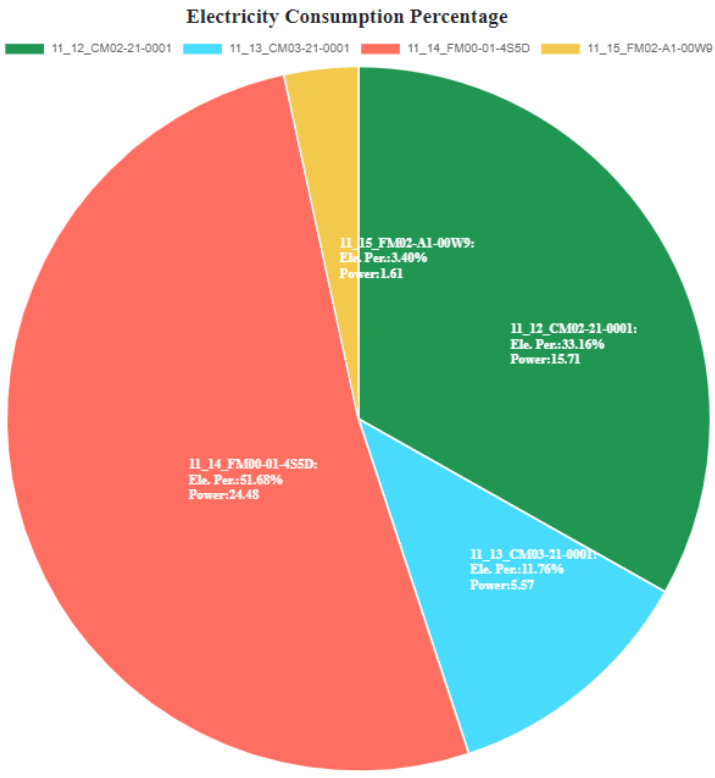
1. The estimated mobile electricity bill refers to the Taipower contract type selected in the setting stage to calculate the mobile electricity bill. For detailed electricity bill calculation formula, please refer to Taipower's official website and the "Electricity Bill Trial Calculation" page of this system.

https://www.taipower.com.tw/upload/6638/2023033115202259611.pdf

2. The KwH and carbon emission calculation formulas are the same as IV. Cloud Dashboard.

3. The pie chart shows the percentage of electricity consumption (kwH), and text prompts of percentage and electricity will be added to the pie chart.

Number	Field Name	Total Power Consumption(kWh)	Estimated Variable Electricity Fee (NTD)	Carbon Emissions (CO2e kg)
0	11_field_1	47.37	176.25	23.46
1	11_12_CM02-21-0001	15.71	53.15	7.78
2	11_13_CM03-21-0001	5.57	31.23	2.76
3	11_14_FM00-01-4S5D	24.48	83.61	12.12
4	11_15_FM02-A1-00W9	1.61	8.26	0.8



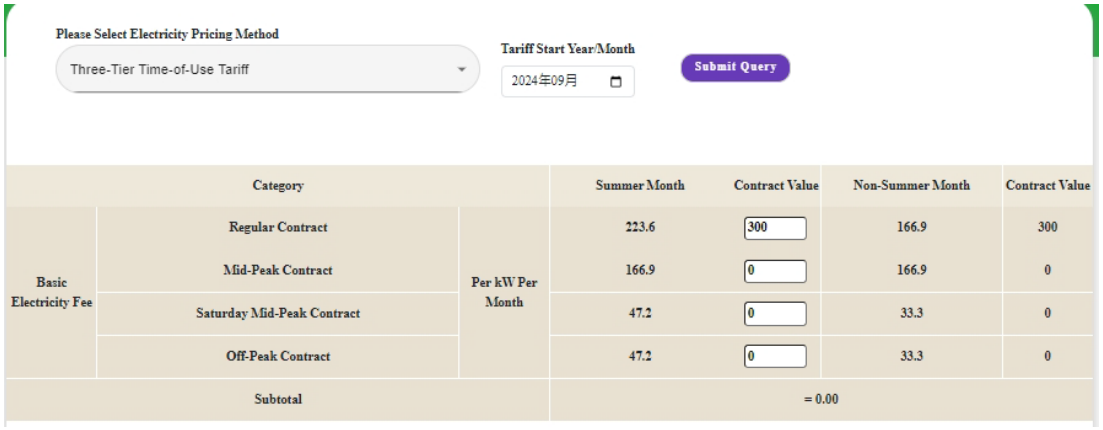
4. Click Download CSV to get the CSV file of the middle table.

	A	B	C	D	E
1	position	groupName	totalPower	totalElePrice	totalCarbon
2	0	1_場區1	60.47	225.52	29.92
3	1	1_2_測試三相	22.09	79.12	10.93
4	2	1_3_測試三相	22.09	79.12	10.93
5	3	1_4_小電流	16.29	67.28	8.06

data

4.6 Electricity Bill Calculation

1. Click "Statistics" and select "Electricity Bill Estimation" from the drop-down box.



Please Select Electricity Pricing Method: Three-Tier Time-of-Use Tariff

Tariff Start Year/Month: 2024年09月

Submit Query

Category			Summer Month	Contract Value	Non-Summer Month	Contract Value
Basic Electricity Fee	Regular Contract	Per kW Per Month	223.6	300	166.9	300
	Mid-Peak Contract		166.9	0	166.9	0
	Saturday Mid-Peak Contract		47.2	0	33.3	0
	Off-Peak Contract		47.2	0	33.3	0
Subtotal			= 0.00			

2. Select the "Electricity Price Starting Year/Month", the rest should have been selected/filled in during the initial setup phase.

3. Will calculate the contract electricity bill, mobile electricity bill and penalty, as well as the total amount for the month.

Specification:

1. The electricity price is automatically calculated based on the data collected by the system in the current month. For the contract electricity fee/mobile

electricity fee and default penalty formula, please refer to Taipower's official website formula or for Overseas customers your local utility provider.

https://www.taipower.com.tw/upload/6638/2023033115202259611.pdf

Category						Summer Month	Power(kWh)	Amount	Non-Summer Month	Power(kWh)	Amount
Variable Electricity Fee	Monday to Friday	Peak Time	Summer Month	16:00-22:00	Per kWh	7.03	0	0.00	-	-	-
		Mid-Peak Time	Summer Month	09:00-16:00 22:00-24:00		4.39	0	0.00	-	-	-
			Non-Summer Month	06:00-11:00 14:00-24:00		-	-	-	4.11	0	0.00
		Off-Peak Time	Summer Month	00:00-09:00		1.91	0	0.00	-	-	-
			Non-Summer Month	00:00-06:00 11:00-14:00		-	-	-	1.75	0	0.00
	Saturday	Mid-Peak Time	Summer Month	09:00-24:00		2.04	0	0.00	-	-	-
			Non-Summer Month	06:00-11:00 14:00-24:00		-	-	-	1.89	0	0.00
		Off-Peak Time	Summer Month	00:00-09:00		1.91	0	0.00	-	-	-
			Non-Summer Month	00:00-06:00 11:00-14:00		-	-	-	1.75	0	0.00
	Sunday and Off-Peak Days	Off-Peak Time		All Day		1.91	0	0.00	1.75	0	0.00
Subtotal											

Electricity Calculation

Month	Month Classification	Contract Electricity Fee	Variable Electricity Fee	Excess Penalty	Total Amount of the Month
8	Summer Month	67080	0	0	67080

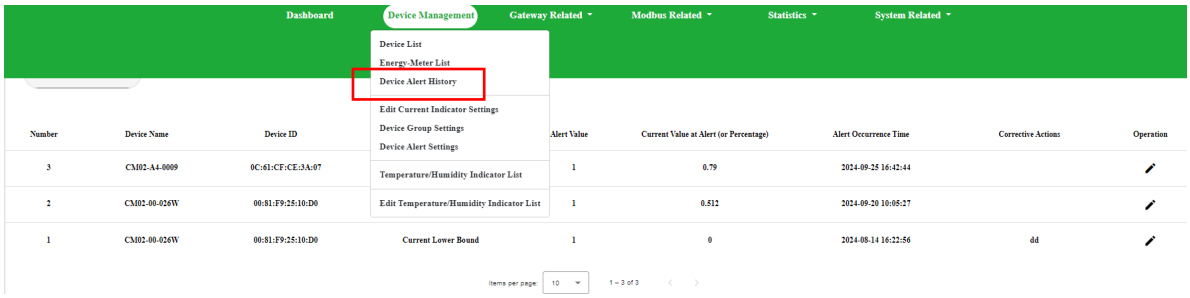
Estimate of Maximum Demand Excess Penalty

Occurrence Time	Maximum Demand(kW)	Contract Capacity(kW)	First Stage Excess Penalty	Second Stage Excess Penalty	Total Excess(kW)
	0	0	0	0	0

The estimated electricity fee amount is for reference only. The actual electricity fee amount is subject to the Taipower bill.
When calculating electricity fees, the operations are all less than two decimal places. The actual web page displays two decimal places, so there will be an error of ±0.01.

4.7 Device Alert History

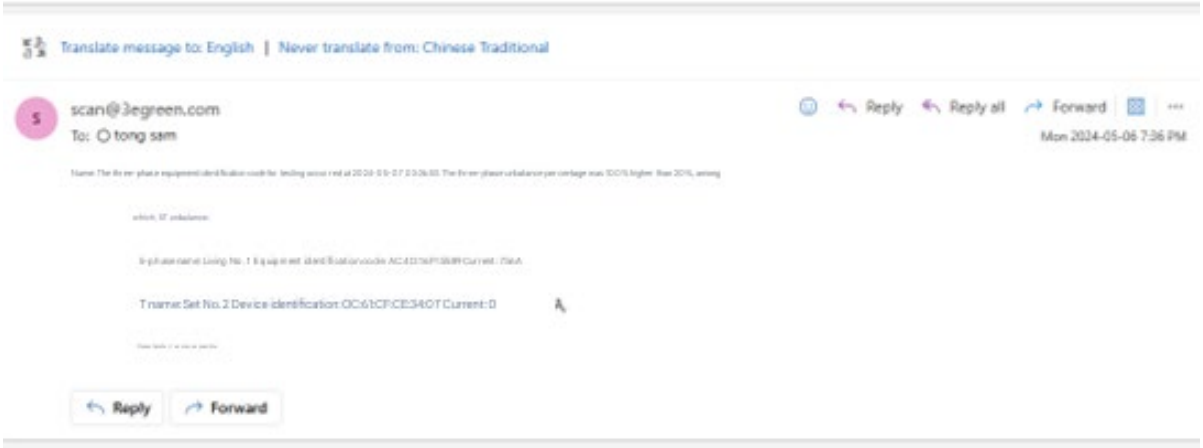
1. Click "Device Management" and select "Device Alert History" from the drop-down box.

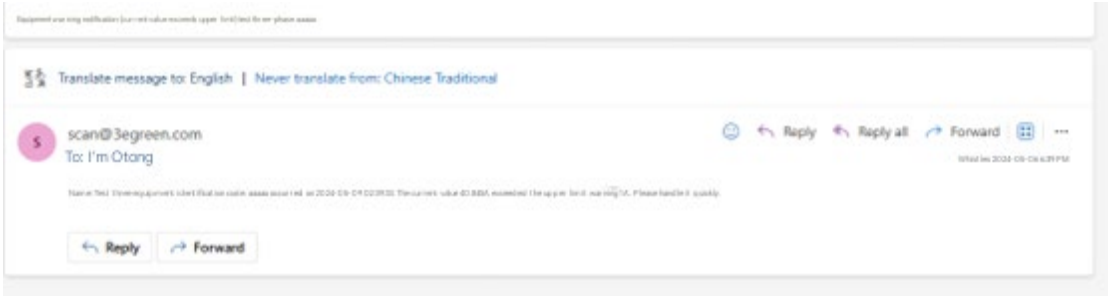


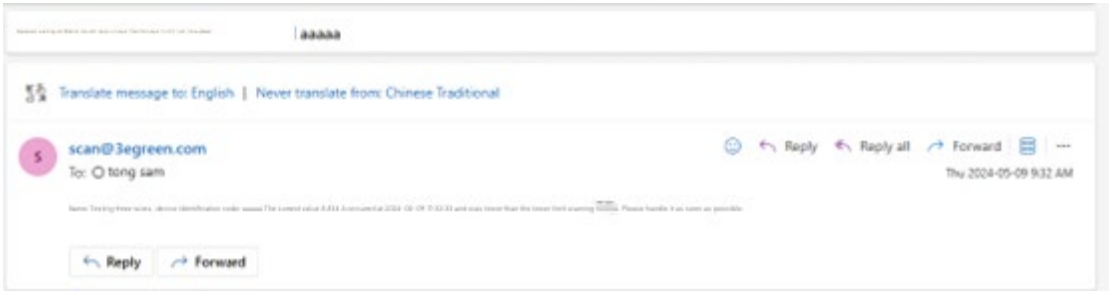
2. When the trigger alarm occurs, the current value or (percentage) and the time when the alarm occurs will be recorded.

Specifications:

1. When an alert occurs, the user must edit the improvement measures before the alert is closed. Otherwise, the alert will be sent once a day for three consecutive days, which means a total of four emails will be received (unless the device is turned off, the current value is 0, or other abnormal conditions cause the connection to be disconnected).
2. After editing the improvement measures, if there is an abnormal situation again, a new event will be generated, and the sending logic is as shown in 1.
3. Three email formats for reference will be available in the future.







4.8 API Service

Adress http://localhost:3000/api-docs/#/

Power related: API

https://docs.google.com/spreadsheets/d/1BQGnjffXtZa5fTWKM6TbLzO875oZ6gQ3992bvzrvj3Q/edit?userstoinvite=z11711017@gmail.com&sharingaction=manageaccess&role=writer#gid=1384142561