CyberPower

USER'S MANUAL

PowerPanel® Battery Management

Rev. 1

SAVE THESE INSTRUCTIONS

Please read this manual and follow the instructions for installation and use.

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Chapter 1 Overview

Keeping 100% system uptime is crucial for today's businesses. Batteries are used to provide critical backup power to maintain normal operation when power failure happens. CyberPower Battery Management System provides a proactive approach to manage and monitor a battery system attached to a network, eliminating the risk of downtime by ensuring the batteries are optimally charged and ready for use (e.g. UPS system).

PowerPanel® Battery Management is a server-based software system that adopts the client-server architecture, allowing users to remotely access the system through a web browser on a computer. See Figure 1.1 for the application scenario. It consists of third party lead-acid batteries, CyberPower Probes for measuring the battery parameters (e.g. impedance, voltage, and temperature), CyberPower Battery Manager (BM) for collecting the detailed information on every battery and sending them to the PowerPanel® Battery Management.

PowerPanel® Battery Management provides 24/7 battery monitoring and real-time status alarm to users by email. Users can manage multiple BMs in one site and configure remotely in the system. For long-term battery health analysis, PowerPanel® Battery Management saves historical record of battery voltage, impedance, and temperature at a 20-minute interval to trace log and draw the historical trend. Furthermore, PowerPanel® Battery Management can perform charge equalization of every battery in a string, thus extending the battery lifespan and maximizing the battery performance. PowerPanel® Battery Management also provides daily and monthly statistical report for analysis.

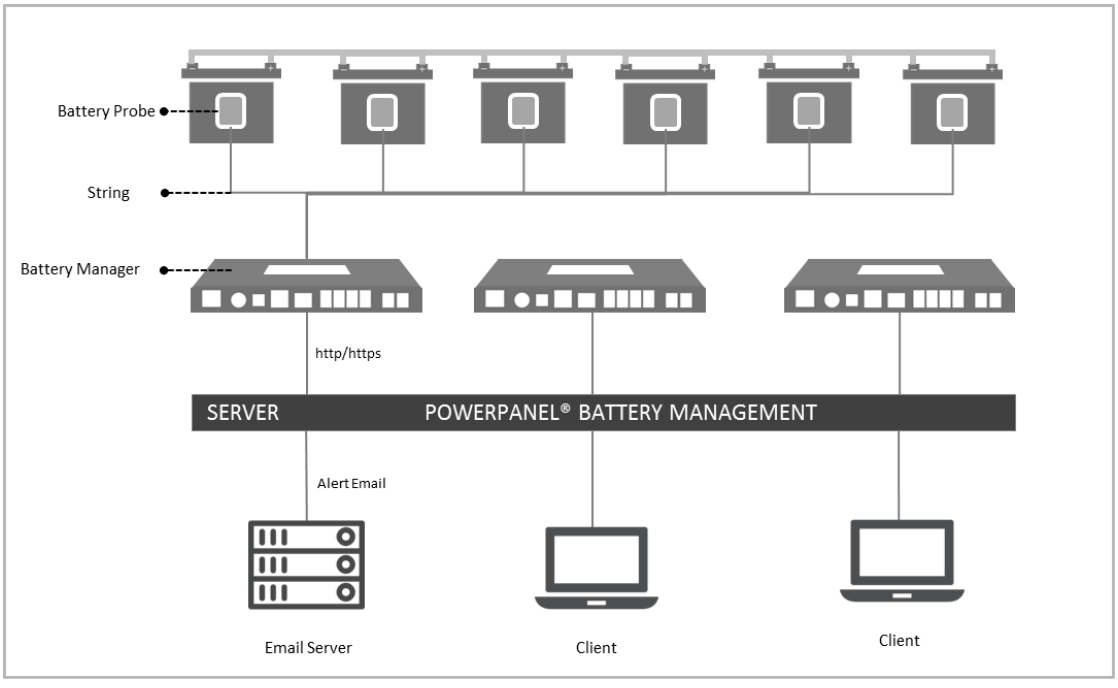


Figure 1.1 Application Scenario

Chapter 2 Getting Started

2.1 Prerequisites

2.1.1 Hardware Requirements

For 5,000 Batteries

- Higher than Core 4-compatible CPU.
- Minimum of 16GB RAM recommended; more memory generally improves responsiveness.
- Minimum of 300GB free space.

2.1.2 Operating System

64-Bit Versions:

- Windows Server 2012 R2 (Need to update to latest version)
- Windows Server 2016

2.1.3 Web Browser

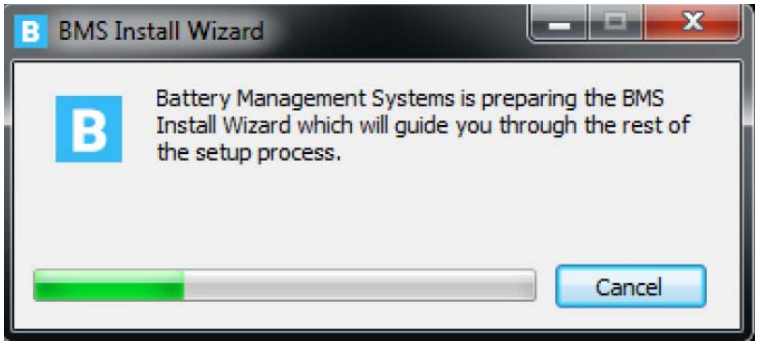
Google Chrome.

2.2 Installation

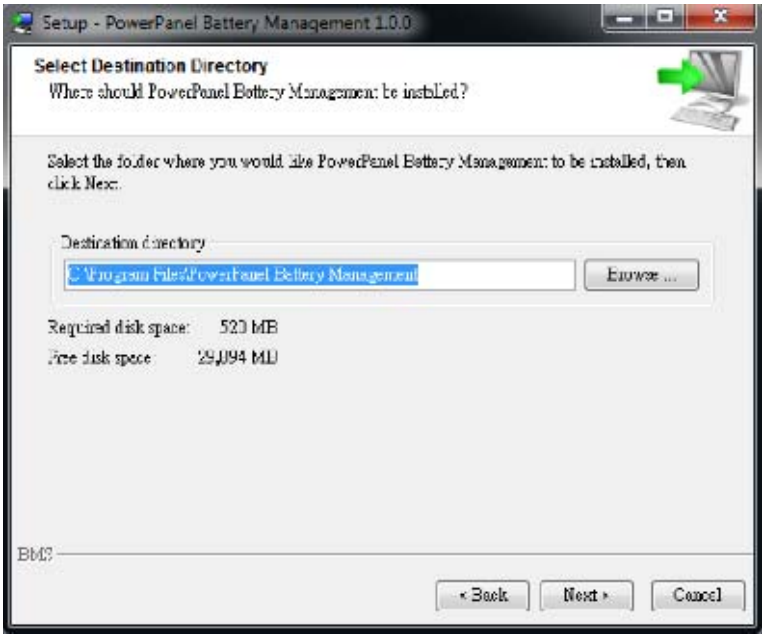
1. Click to open the PowerPanel® Battery Management installation file.

2. Follow the on-screen prompts to install PowerPanel® Battery Management:

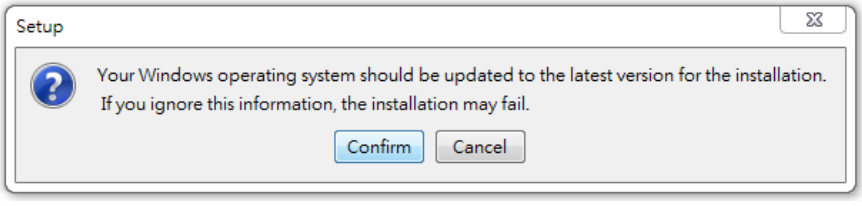
   (1) Click **Next** to continue.



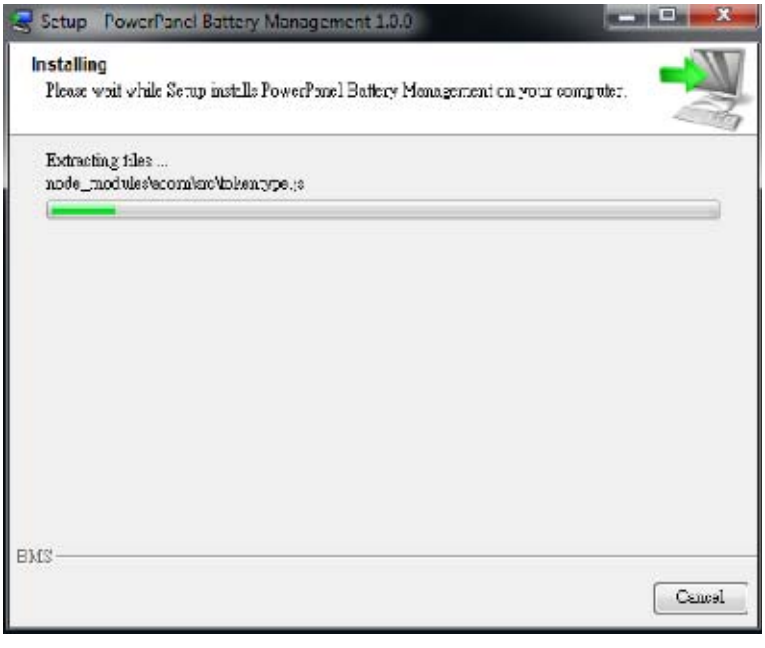
   (2) Select the installation folder and Start Menu folder then click **Next**.



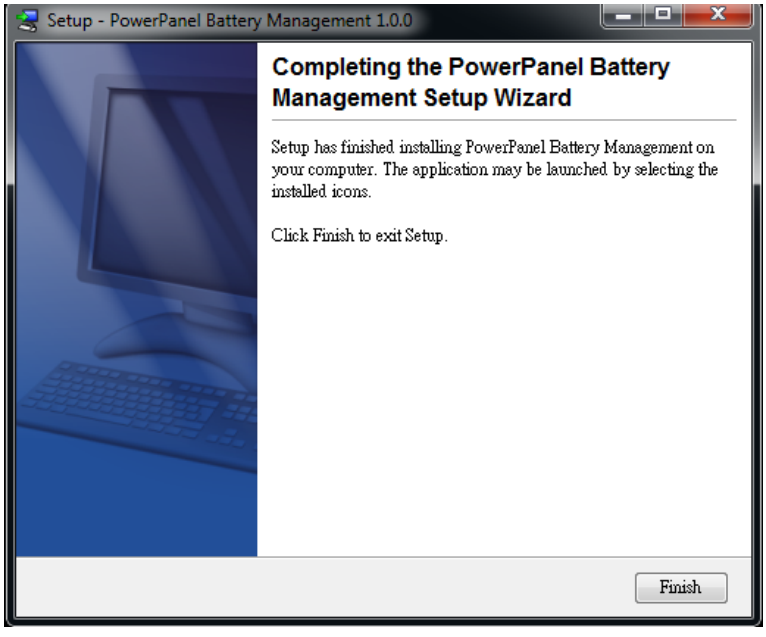
(3) Check the windows operating system version.



(4) The installation begins.



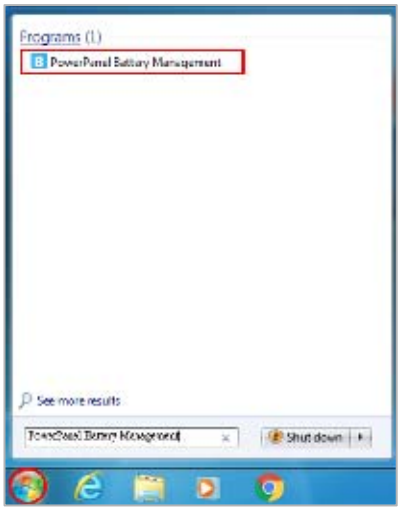
(5) When the installation has completed, click **Finish**.



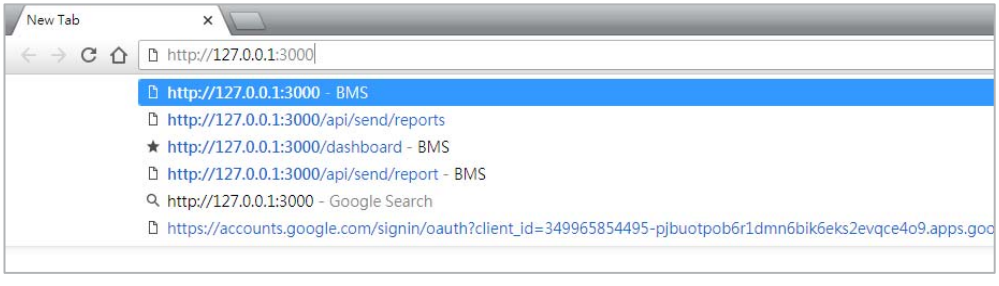
2.3 Opening PowerPanel® Battery Management

There are three ways to open PowerPanel® Battery Management：

1. Go to Start > Search bar > PowerPanel Battery Management.

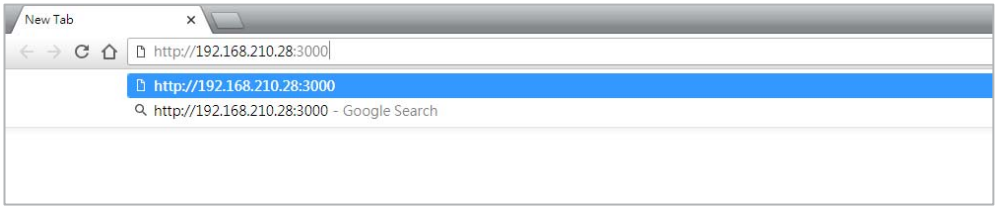


2. In the localhost, type http://127.0.0.1:3000 into browser search bar.



3. In the client, type http://localhost_IPaddress:3000 into browser search bar.

   For example: The localhost IP is 192.168.210.28



Chapter 3 Using PowerPanel® Battery Management

3.1 Log in

After opening the PowerPanel® Battery Management in the web browser, enter a Username and Password to log in. See Figure 3.1. The default username and password are admin/admin.

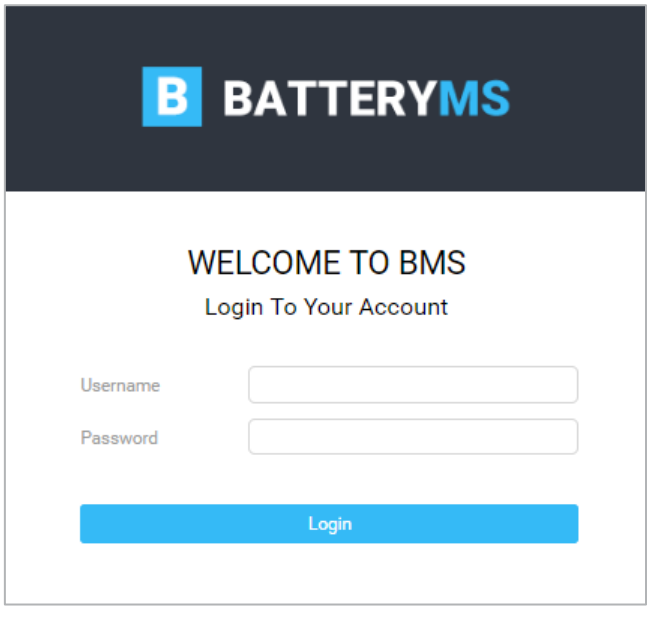


Figure 3.1 Log in page

3.2 Understanding the User Interface

The figure below (Figure 3.2) shows the main user interface of PowerPanel® Battery Management. The web page can be split into four areas and the features are described in Table 3.1.

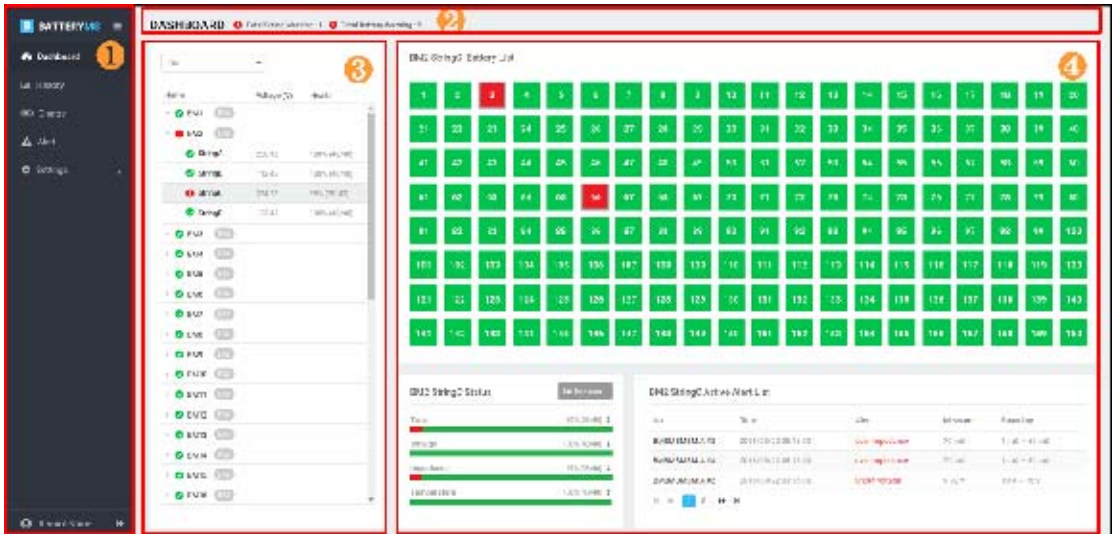


Figure 3.2 User Interface

Table 3.1 Main Interface Feature description

No	Description
1	Main function list. Click to open the function page or the sublist.
2	Page title. On dashboard page, string and battery health status will also be displayed. Please see the details in 3.4.
3	Data filter. Filter different conditions from the database. The results will be displayed in the display panel (4).
4	Display panel. The filtered information will be displayed in this area (3).

3.3 Add a BM into PowerPanel® Battery Management

To monitor batteries, add the BM into the PowerPanel® Battery Management first. Follow below steps to add and set up a BM.

1. Go to Settings > BM.

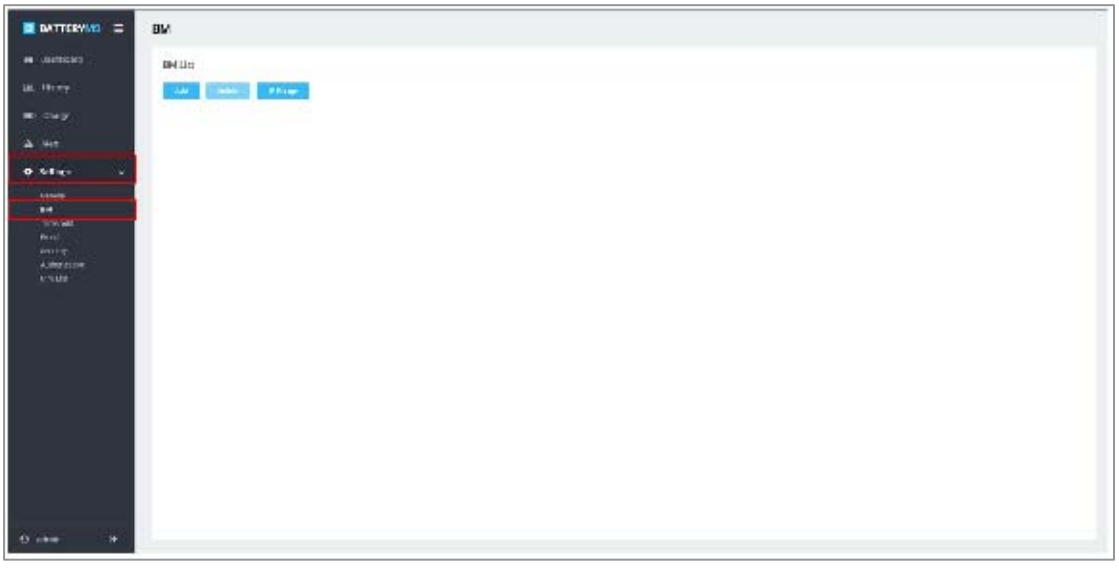


Figure 3.3 Settings > BM page

2. Select **Add** to add a BM by entering the BM device's IP (Figure 3.4), or select **IP Range** to add multiple BMs by scanning an IP range (Figure 3.5).

Note: PowerPanel® Battery Management can manage BMs in the intranet.

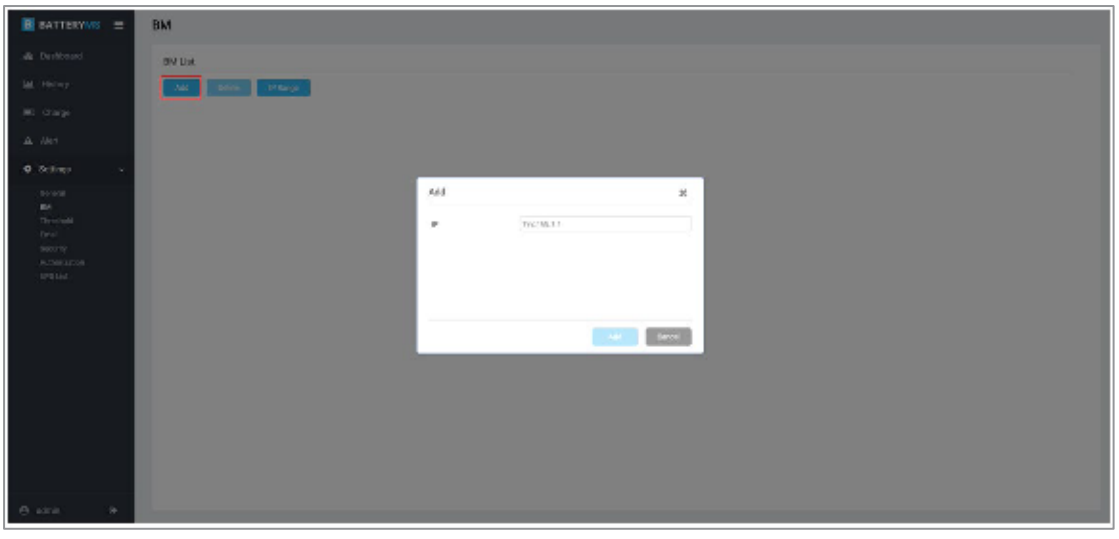


Figure 3.4 Add function on BM page

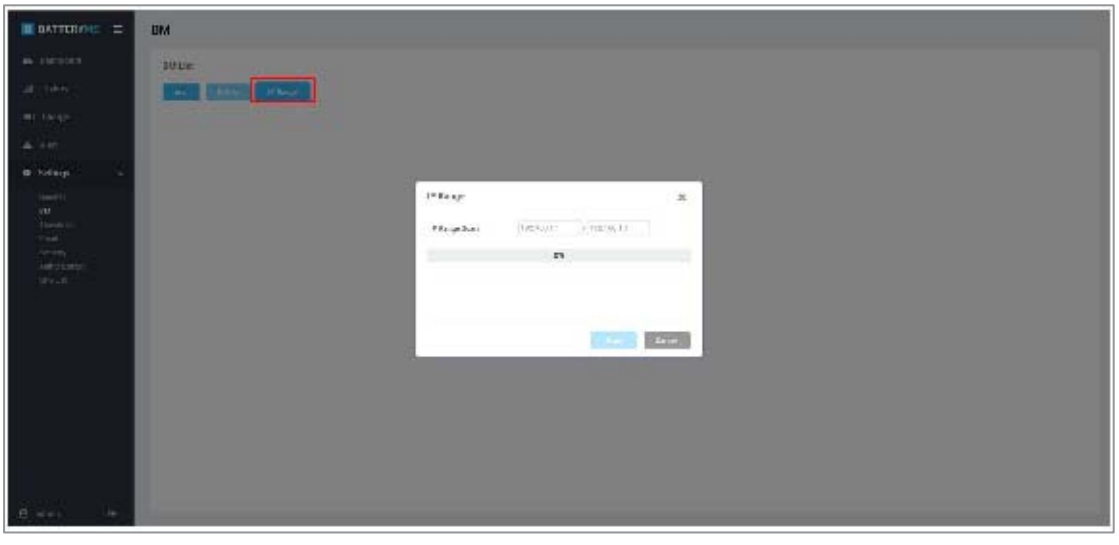


Figure 3.5 IP Range function on BM page

3. Click **Save**, the progress bar will show at the top of the page.
4. When the adding succeeds, the BM will be listed on the page. Click the triangle beside the BM to display its configuration (Figure 3.6).
5. Click to set the BM's configuration and pair the strings with the UPS (Figure 3.7).

Note: Build the UPS list before pairing the strings with the UPS. Go

to Settings > UPS List and add UPS (Figure 3.8). See 3.9.2 for the details.

6. Go to Dashboard and start to monitor the batteries (Figure 3.9). System allows 25 BM devices installed in PowerPanel® Battery Management for free, and each BM supports 4 strings of 50 batteries each (totally 200 batteries).

   Note: When the BM is added successfully, PowerPanel® Battery Management will auto sync the historical data saved in BM into the database. The color block will temporarily stay in gray on the Dashboard until the synchronization finishes.

Figure 3.6 BM List

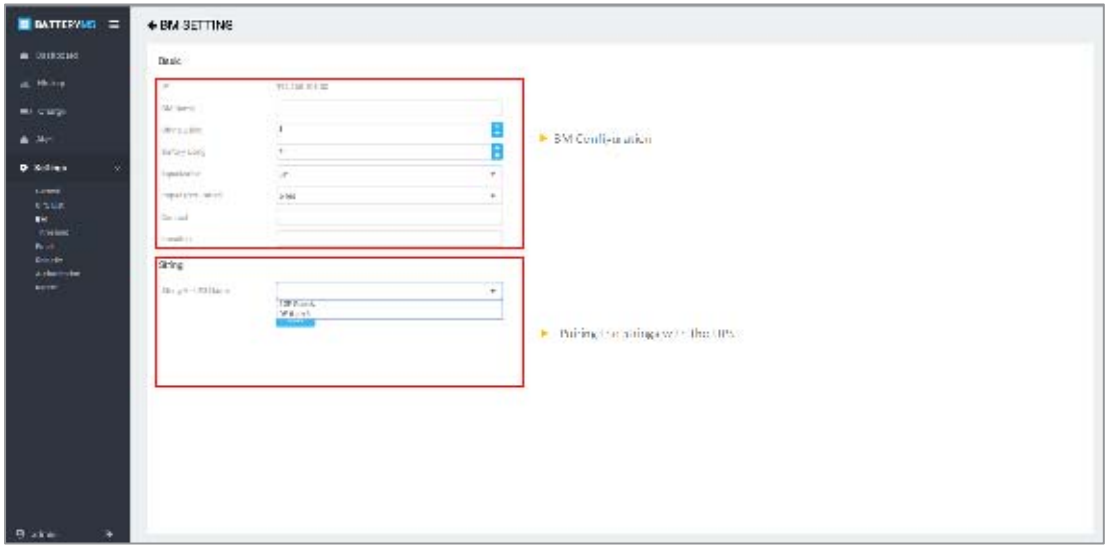


Figure 3.7 BM configuration

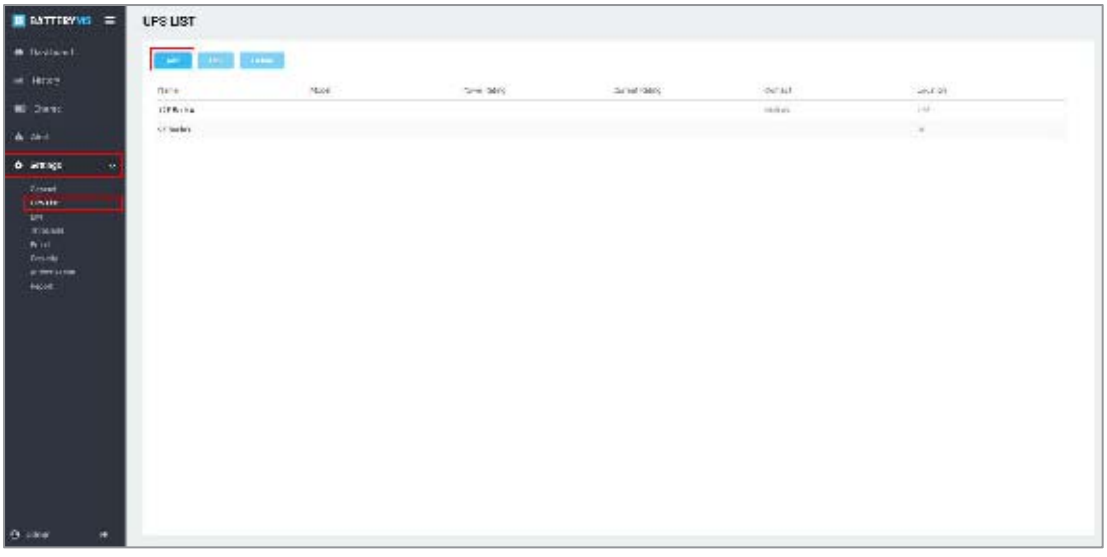


Figure 3.8 Add UPS

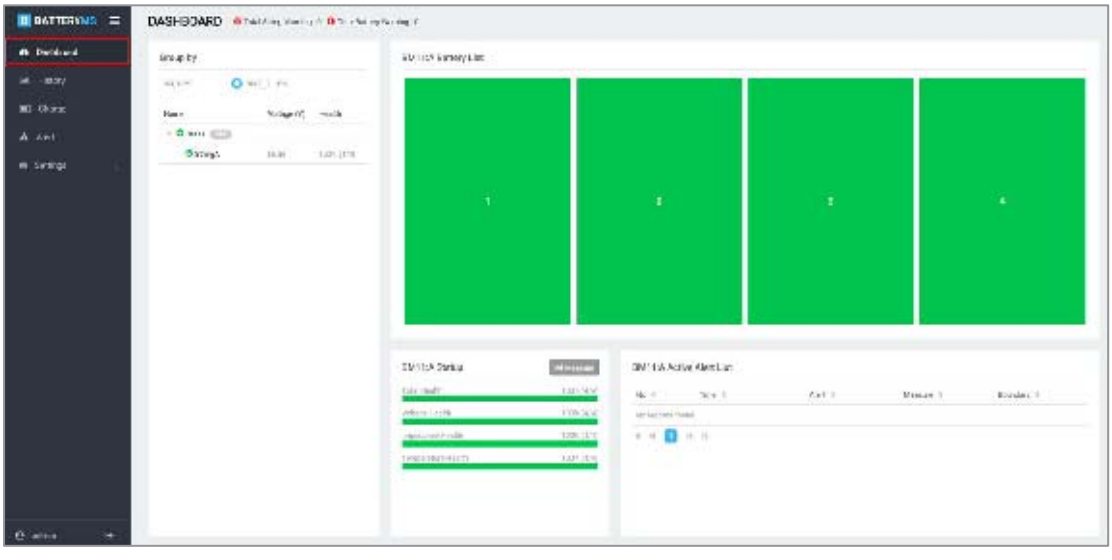


Figure 3.9 Dashboard-BM Monitoring

3.4 Monitor the Battery

PowerPanel® Battery Management builds clear device structure to display multiple BMs in Dashboard (Figure 3.10). PowerPanel® Battery Management also defines three colors to show different device status. The details of status are described in Table 3.2. Useful statistics are also available on the page, helping users get the overall battery health status at a glance.

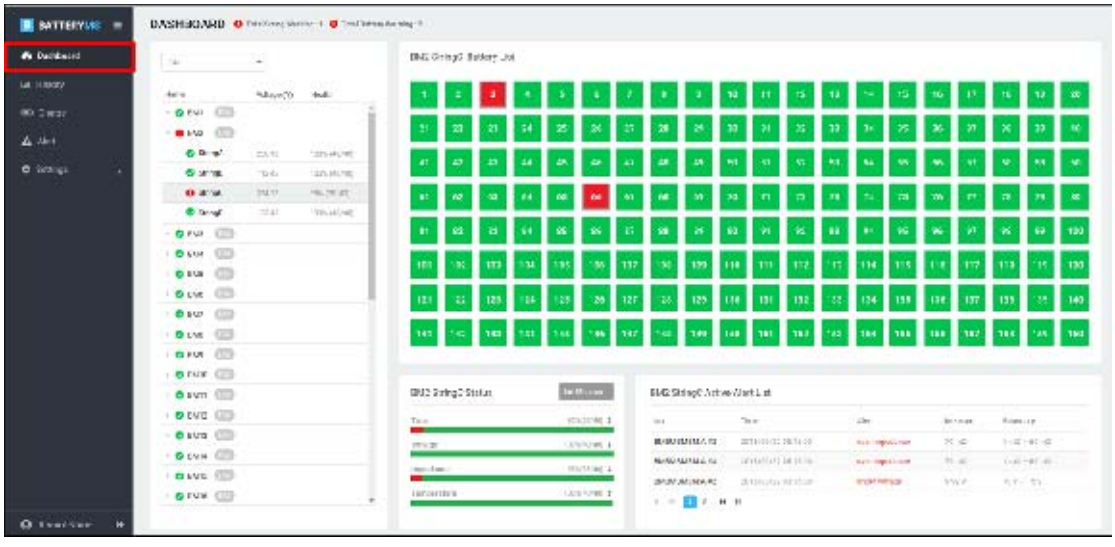


Figure 3.10 Dashboard

Table 3.2 The color definition of device status

Color	Status
Green	Normal status. The communication is normal and the value is not over or under the threshold.
Red	Warning status. The communication is normal but the value is over or under the threshold.
Gray	Communication lost.

The dashboard is split into distinct areas. On the top-left corner, the numbers of total warning strings and warning batteries are displayed (1 in Figure 3.11). On the left side, string list grouped by BM or UPS is displayed (2 in Figure 3.11). Each device is displayed in colors to show its status. Users can easily spot a string that has a problem or view its string voltage and battery health. The right area displays the detailed information of the string selected on the left side. It also splits into three parts (3, 4, 5 in Figure 3.11). The upper area displays all batteries of the selected string in color to show their status (3 in Figure 3.11). At the bottom area, battery parameter statistics and the active alert list of the selected string are displayed (4 and 5 in Figure 3.11).

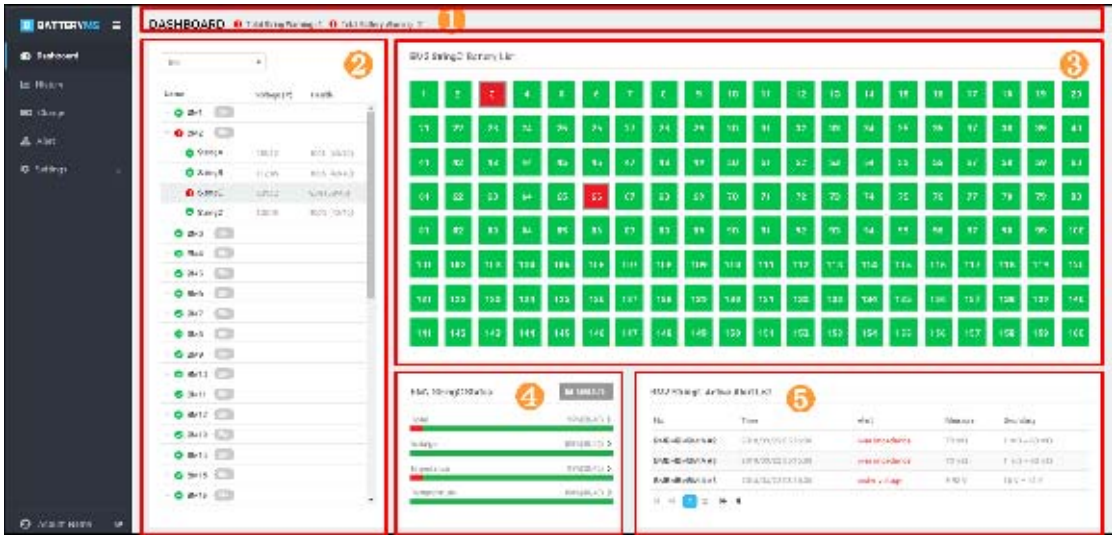


Figure 3.11 Distinct areas in the Dashboard

All BMs added in the PowerPanel® Battery Management are displayed in the Dashboard. PowerPanel® Battery Management detects the battery data every 10 seconds. Users can monitor the battery health

directly with the statistic on the top-left corner. Take Figure 3.12 for example, 2 batteries and 1 string are in warning status. With this information, users can check the below device list to find out which BM and strings have problems. PowerPanel® Battery Management provides BM mode and UPS mode to display the string structure. Figure 3.13 and Figure 3.14 show the difference between these two modes.

Note: Before using UPS mode, check if the string has already been paired to the UPS. Please see the details in 3.9.2 and 3.9.3.

The warning devices are shown in red. Click the triangle next to the warning BM or UPS (Figure 3.15) to find out which string has problems. Next to the string, the displayed voltage is the sum of the battery voltage connected to the string, that is, the string total voltage (Figure 3.16). The health is the ratio of the normal battery to the total battery in a string (Figure 3.17). Click the string and its details will show on the right area. On the battery panel, users can immediately know which battery has a problem by its color. Move the cursor to the battery block and it will display the value of voltage, impedance, temperature, equalization and the alert content (Figure 3.18). The parameter statistics is shown below the battery panel and described in Table 3.3. In the same area, the Measure feature allows further analysis of the string data (Figure 3.19). On the bottom of the right side, PowerPanel® Battery Management keeps the active alert events on the dashboard for checking the problem easily.

Figure 3.12 Battery Health in the whole system

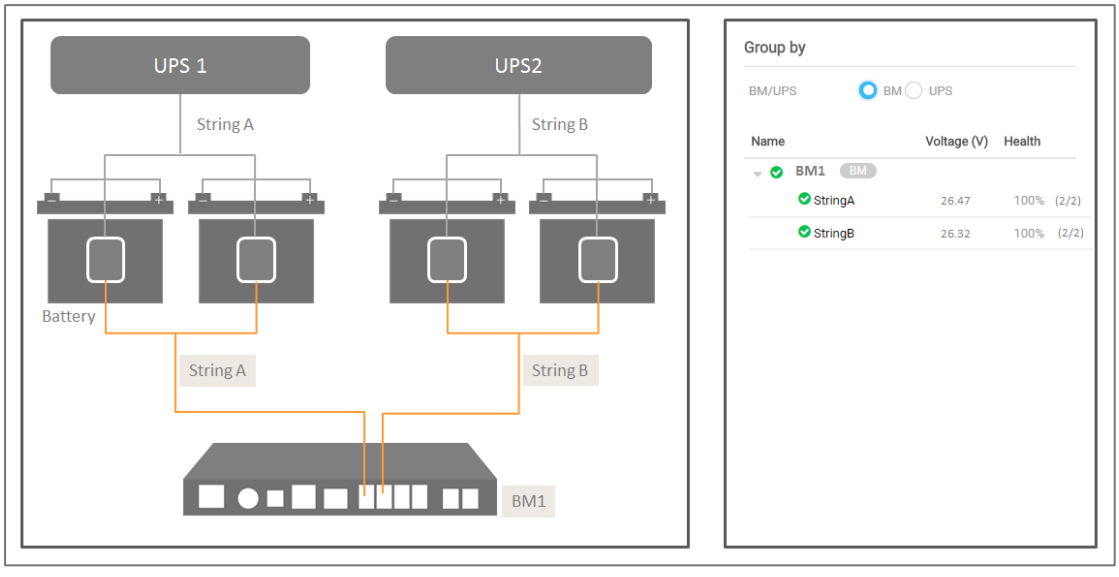


Figure 3.13 BM Mode

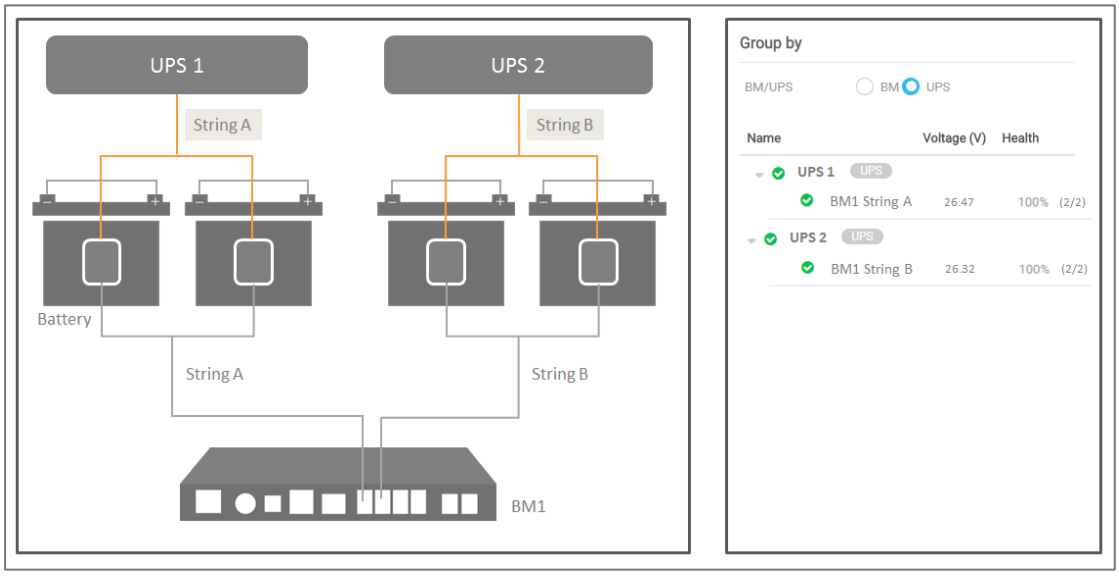


Figure 3.14 UPS Mode

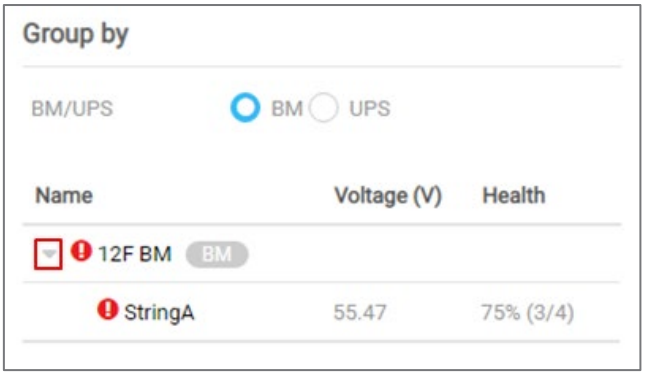


Figure 3.15 Open the string list

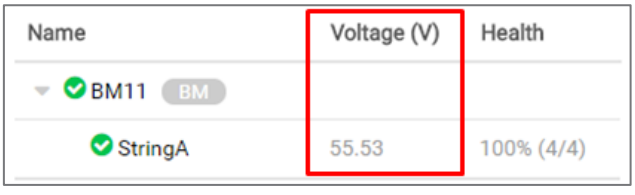


Figure 3.16 The string voltage

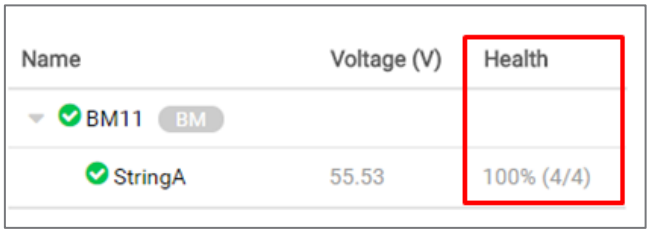


Figure 3.17 The string health

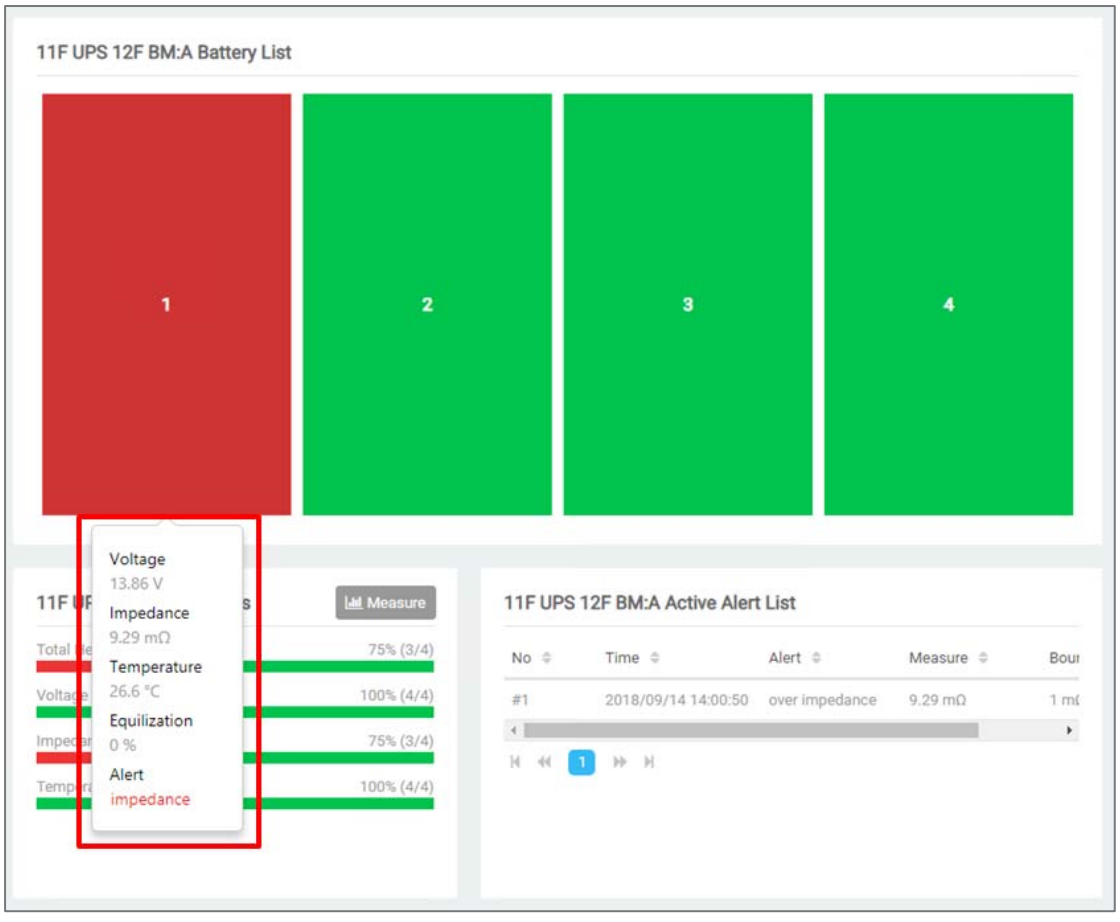


Figure 3.18 Battery monitoring value

Table 3.3 The string health statistic

Statistic	Description
	The ratio of the normal battery to the total battery.
	The ratio of the voltage normal battery to the total battery.
	The ratio of the impedance normal battery to the total battery.
	The ratio of the temperature normal battery to the total battery.

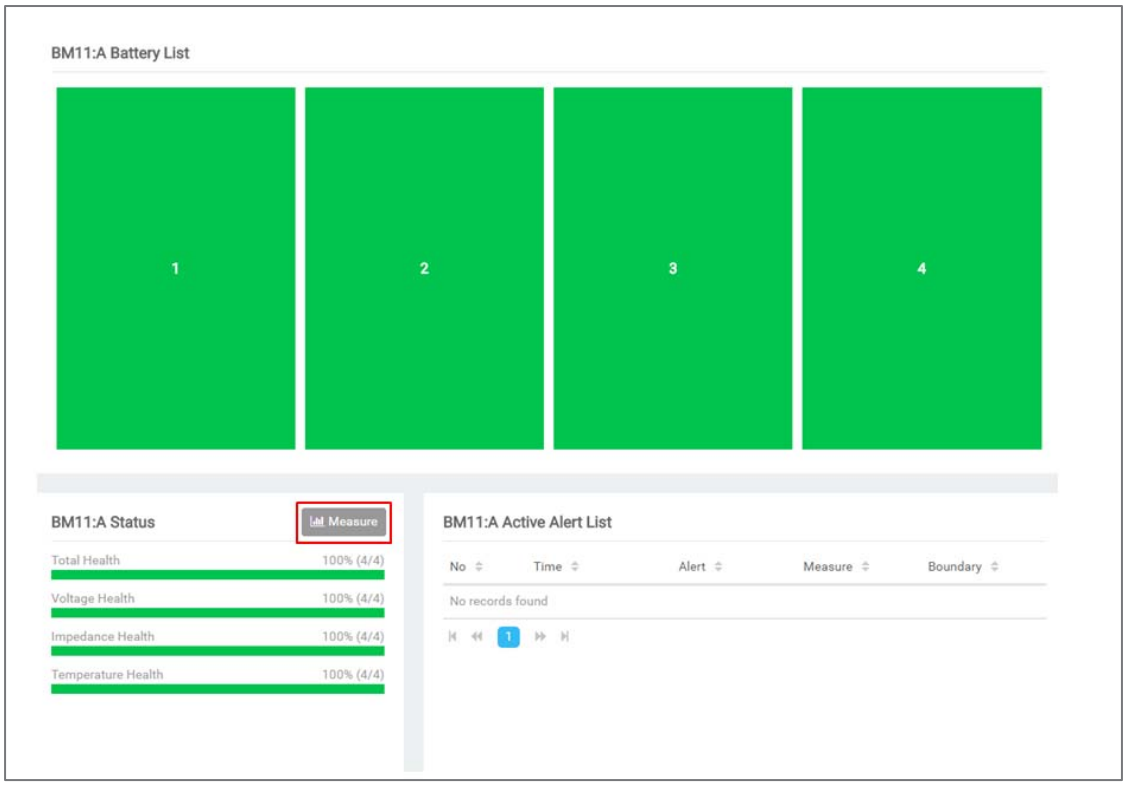


Figure 3.19 Measure function

The Measure feature is used to display real-time battery values of the string. There are three bar charts to display the battery value of the string with different parameters. The different parameters are displayed in distinct colors. Blue is for voltage, orange is for impedance, and green is for temperature. On this page, it splits into two parts. One is the bar chart area, the other is the parameter summary of the string (Figure 3.20).

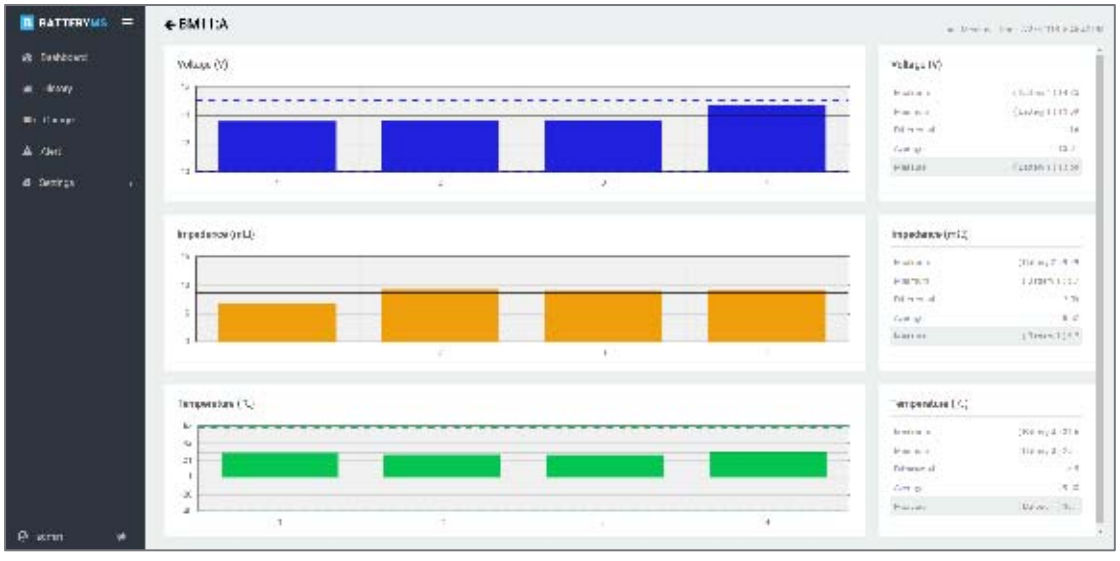


Figure 3.20 Measure function

In the bar chart, the X-axis is the battery number of the string. The black lines in the chart are the average parameter and the dotted lines are the parameter thresholds. However, there is no dotted line in the impedance bar chart because the batteries in the string may have different impedance thresholds.

The parameter summary of the bar chart is described in Table 3.4.

Table 3.4 Summary of bar chart

Item	Description
Maximum	The maximum value in the string.
Minimum	The minimum value in the string.
Differential	The value of the maximum minus the minimum.
Average	The average parameter in the string.
Measure	The value of the battery clicked in the bar chart area.

3.5 Historical Trend

One of the most important aims of PowerPanel® Battery Management is to check the power supply reliability of the batteries in order to maintain the power system's stability. PowerPanel® Battery Management provides the History feature to help users review the battery performance by comparing the now data to the historical data. PowerPanel® Battery Management uses the trending graphic to display the information about the battery health (Figure 3.21).

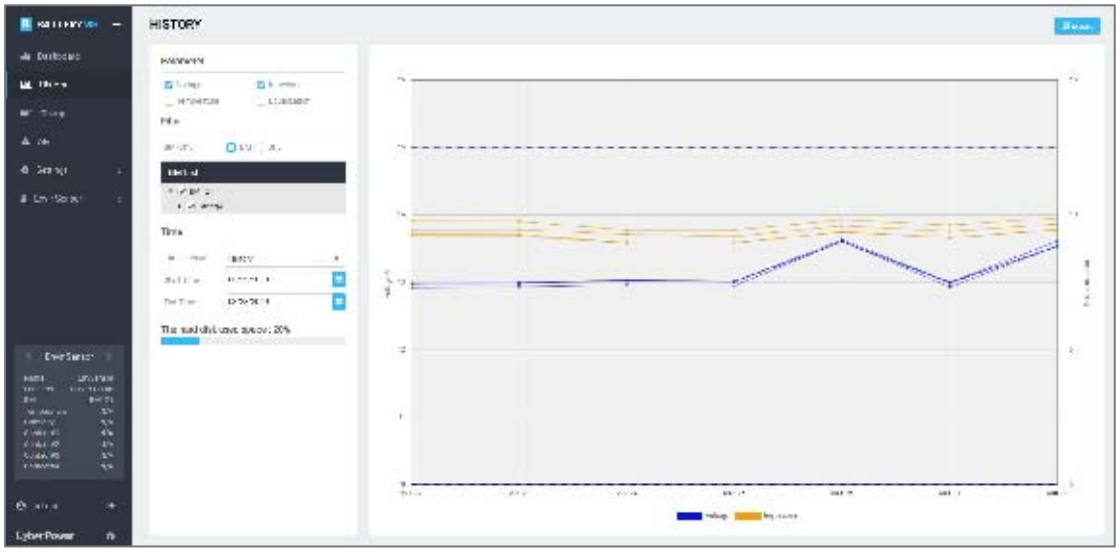


Figure 3.21 History

On the history page, there is a data filter to select the data from database (1 in Figure 3.22) and then the data trend will be drawn on the right side (2 in Figure 3.22). The data selected in the filter can be output by the Export function for further analysis (3 in Figure 3.22).

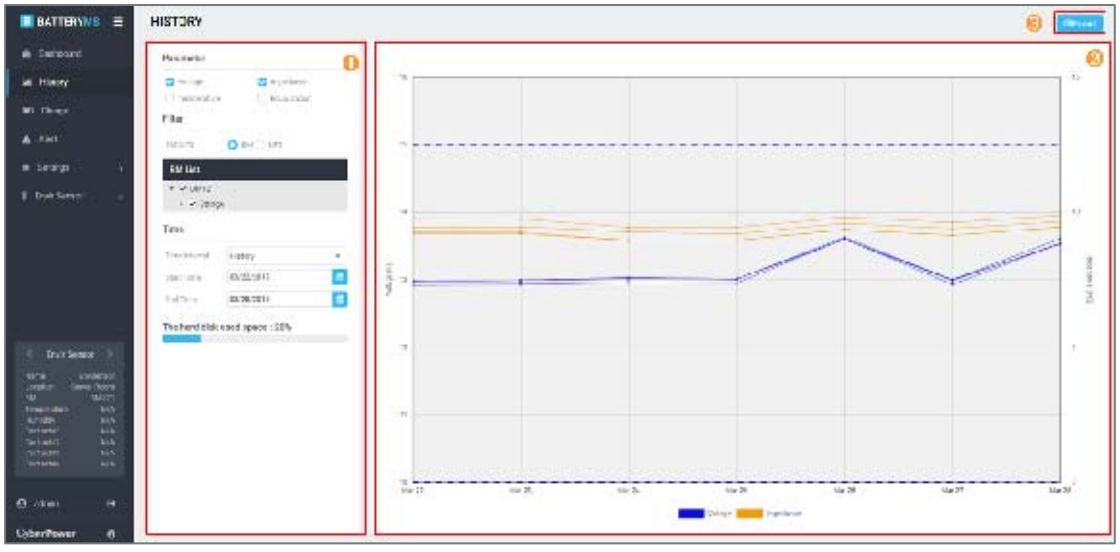


Figure 3.22 Distinct areas on History page

PowerPanel® Battery Management provides double Y-axis to analyze the relationship between two parameters. In the filter area, PowerPanel® Battery Management allows users to select two parameters (1 in Figure 3.23), a particular battery (2 in Figure 3.23) and decide the data period for analysis. There are two kinds of time interval to show the historical data (3 in Figure 3.23). Select **Today** mode to display today's recorded data of each battery. After a day ends, all battery data recorded during a day will be rolled up into an average at midnight every day. The past battery data still can be exported from **Data Management** (See 3.10.10). The average data rolled up at midnight every day can be read in the **History** mode. In the graphic, the thresholds of the parameters are added as the dotted line to assist users in comparing the battery performance. The displayed colors here are the same as defined with the Measure feature. Moving the cursor to the dots on the lines will display the data details. Scroll the mouse wheel to zoom in or out the graphic. PowerPanel® Battery

Management also provides the data storage space analysis to help users manage battery data (4 in Figure 3.23).

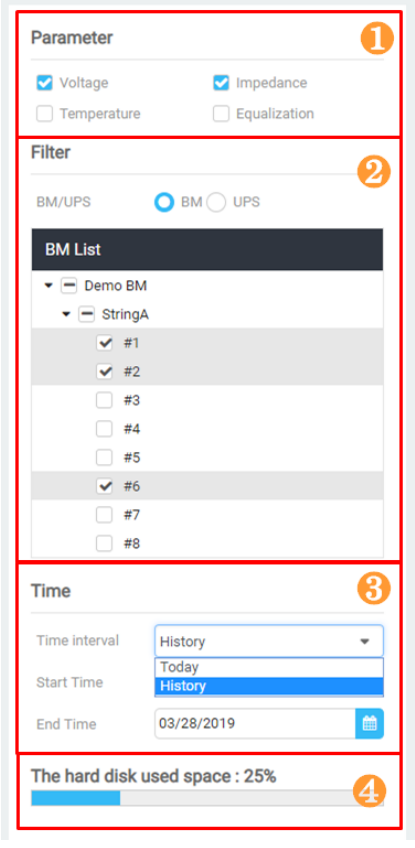


Figure 3.23 History Filter

3.6 Charge balance

Each individual battery within a string may have differences which cause the different voltage level when it is being charged. The unbalanced voltage level in the string will minimize the power capacity and the battery lifespan seriously. To prevent this damage, PowerPanel® Battery Management uses the Charge feature to monitor the battery voltage and report battery problems immediately (Figure 3.24).

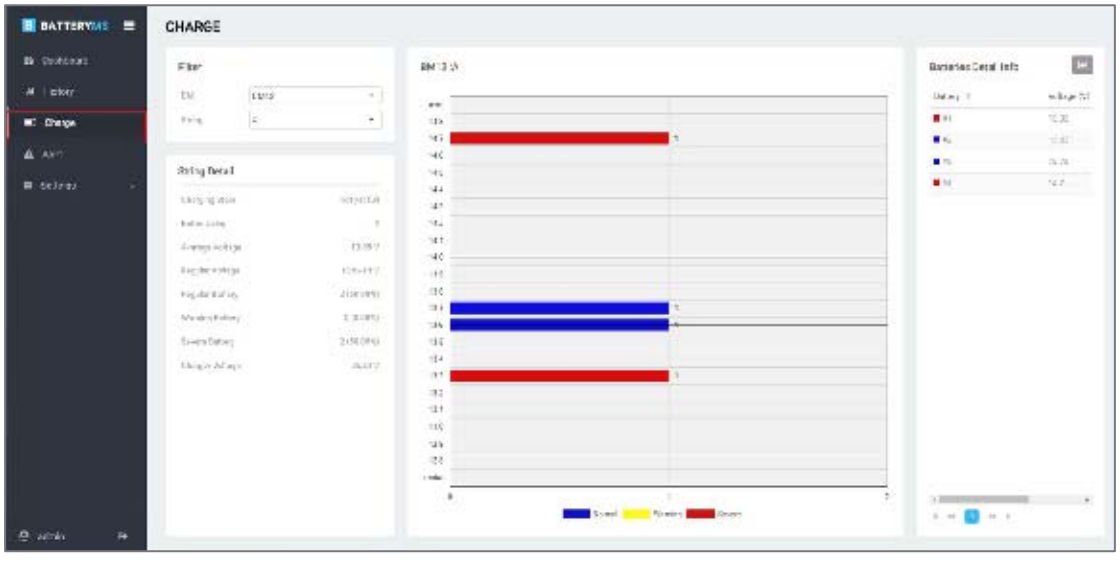


Figure 3.24 Charge

There are four distinct areas on this page. Users can use the string filter (1 in Figure 3.25) to select the string for analysis and the page content will change accordingly. The string details (2 in Figure 3.25) show overall voltage information of the selected string. The voltage distribution of the batteries in the selected string (3 in Figure 3.25) uses different colors to show the analysis result. On the right side is the battery voltage information listed with color blocks to show the analysis result and the History hyperlink (4 in Figure 3.25).

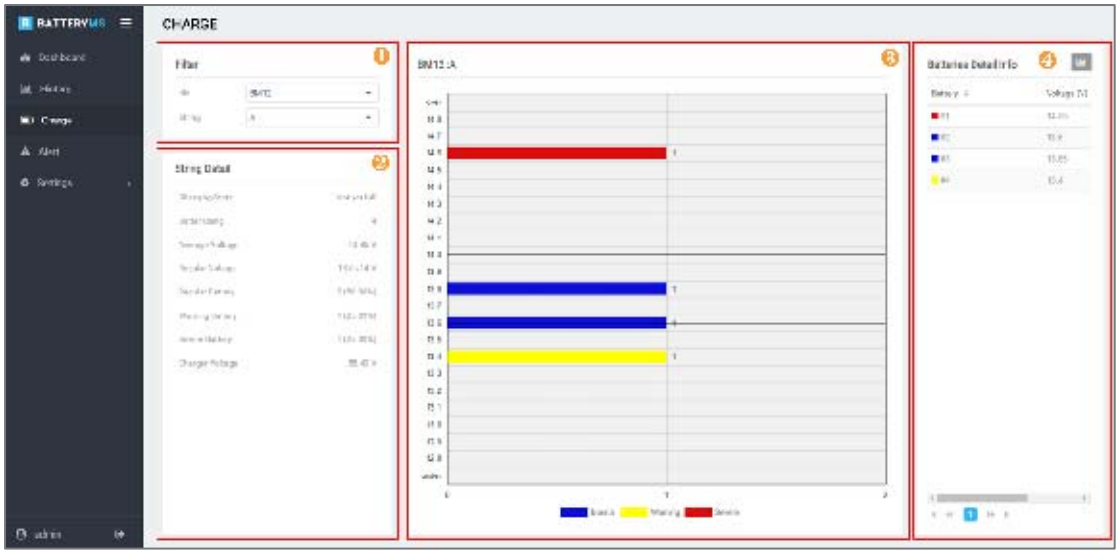


Figure 3.25 Distinct areas on Charge page

After selecting a string, the voltage statistic is displayed in the String Detail. The String Detail description is shown in Table 3.5. If the battery voltage is far under or over the string average voltage, the battery health is bad. If a battery stays in severe voltage status for a long time, use the history hyperlink to trace the battery historical data and evaluate the battery replacement.

Table 3.5 String Detail on Charge page

Item	Description
Charging State	The judgment of the battery voltage state.
Battery Using	Number of batteries in the selected string.
Average Voltage	The average voltage of the selected string.
Regular Voltage	Value of battery voltage in normal range.
Normal Battery	Number of battery in normal voltage range.
Warning Battery	Number of battery in warning voltage range.
Severe Battery	Number of battery in severe voltage range.
Charger Voltage	The charger voltage in the selected string.

3.7 Alert Events

PowerPanel® Battery Management provides alert service to notify users of abnormal battery events. Users can set the alert level of each battery parameter and then PowerPanel® Battery Management will monitor and collect the parameter values every 10 seconds. If any parameter is out of the normal range, PowerPanel® Battery Management will make an alert record and send the alert mail to the users at the same time. Users can find out the faulty battery and get the real-time analysis immediately with PowerPanel® Battery Management (Figure 3.26).

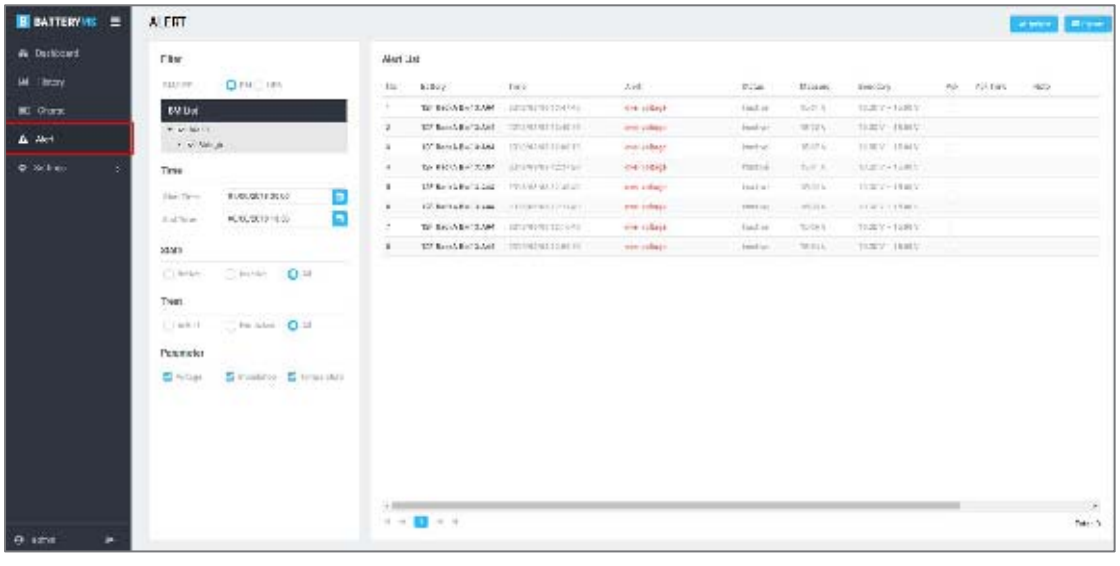


Figure 3.26 Alert

On the Alert page, there are three distinct areas. Alert event filter (1 in Figure 3.27) provides several conditions for filtering the alert events. Alert List (2 in Figure 3.27) displays the events filtered according to the filtering conditions on the left side. After reviewing the alert list, users can make some notes and then Update or Export (3 in Figure 3.27) the alert events for further analysis.

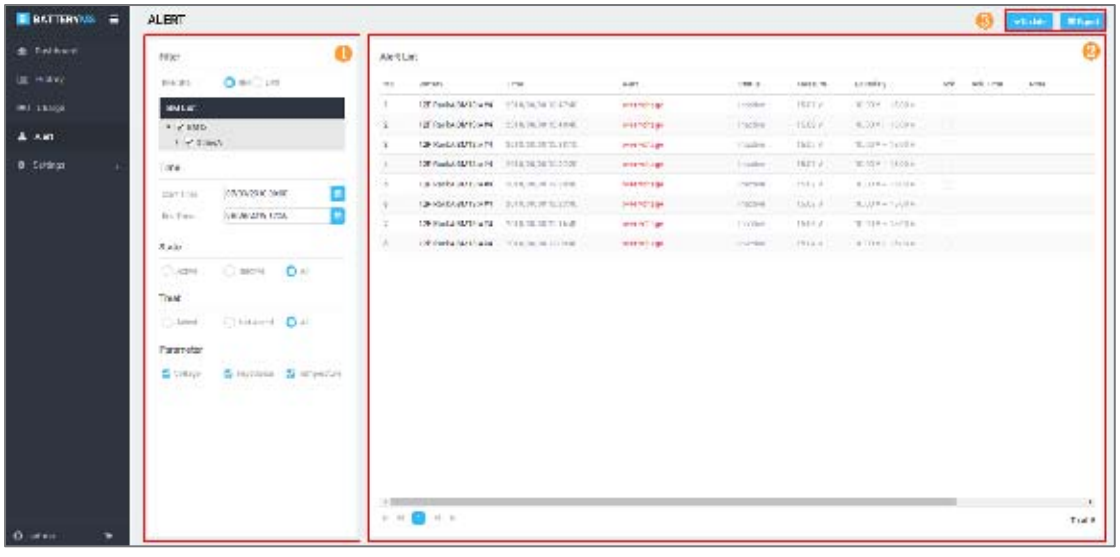


Figure 3.27 Distinct areas on Alert page

PowerPanel® Battery Management will show all battery alert events happening in the past month in the default setting. However, PowerPanel® Battery Management allows user to select different conditions, such as the specified battery, event period, and so on. The filter items are described in Table 3.6. After completing the filtering, the result will be displayed. The event with active state means it is underway. If the problem has been confirmed, users can check the Ack box and click **Update** (Figure 3.28). At the same time, users can leave some comments of the event in the text box (Figure 3.29). After update, the event will turn to Acked state and the Acked time and comments will be displayed (Figure 3.30).

Table 3.6 Alert filter items description

Item	Description
BM/UPS	The modes of displaying the string structure.
Time	The time period of the alert events.
State	Active: The alert event is underway. Inactive: The alert event is dismissed.
Treat	Acked: The alert event has been acknowledged. Not Acked: The alert event has not been acknowledged.
Parameter	The alert event's type.

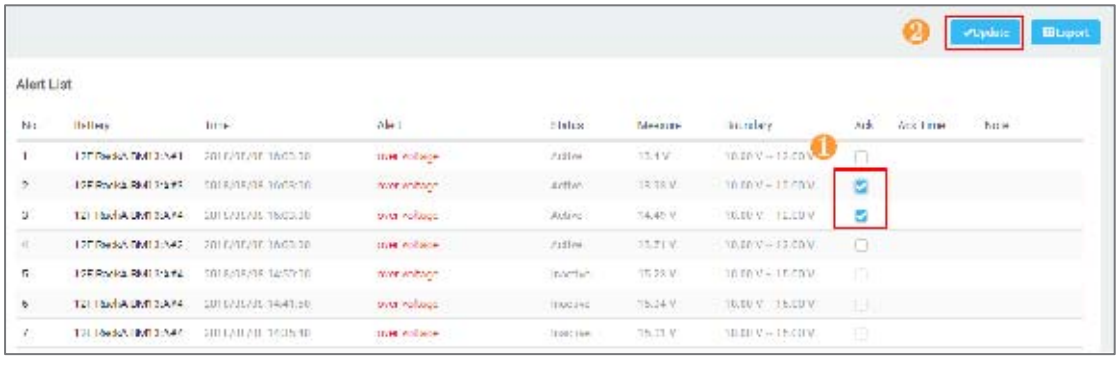


Figure 3.28 Check the Ack box

Figure 3.29 Text box

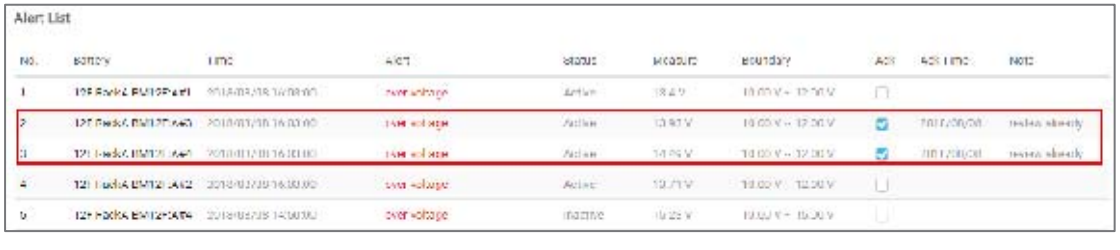


Figure 3.30 Acked event

3.8 Report

PowerPanel® Battery Management provides two types of periodic reports: Daily Report and Monthly Report. It calculates the analytical data from each BM for checking the battery performance during the time.

3.8.1 Daily Report

Daily Report shows the daily information of the whole PowerPanel® Battery Management. It calculates the data at the end of the day and sends out report according to the sending time. See 3.10.8 for configuring the sending time.

Daily Report can be divided into three parts. First is the UPS list. All of the UPSs in the PowerPanel® Battery Management will be summarized with the state, string health, battery health, location and the contact information in the daily report. The second part is the string details of the UPS, including string status, battery health, overall voltage, and the maximum and minimum value in voltage, impedance, temperature, and equalization in the string. The last part of the daily report is the total number of daily alert event and the last three alert details (Figure 3.31).

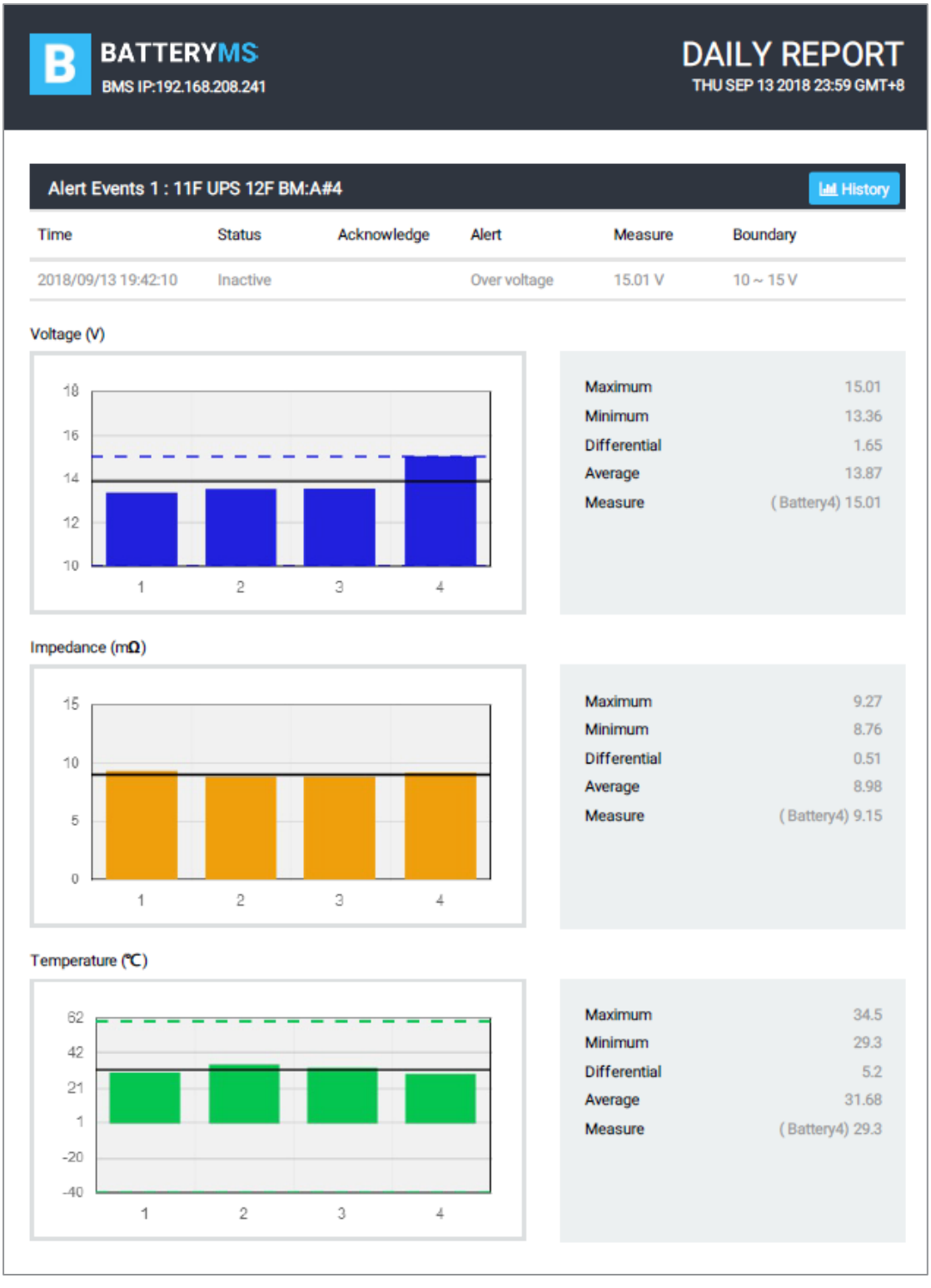


Figure 3.31 Daily report

3.8.2 Monthly Report

Monthly Report shows the monthly information of the whole PowerPanel® Battery Management. It calculates the data at the end of the month and sends out report according to the sending time. See 3.9.8 for configuring the sending time.

Monthly Report can be divided into three parts. First is the UPS list. All of the UPSs in the PowerPanel® Battery Management will be summarized with the state, string health, battery health, location and the contact information in the monthly report. The second part is the UPS's statistics, including the monthly statistics of string voltage, battery voltage, battery impedance, and battery temperature (Figure 3.32). The last part is the alert event statistics, displayed with a pie chart of the alert type and the alert detail list below (Figure 3.33).

Figure 3.32 Monthly report-1

BATTERYMS

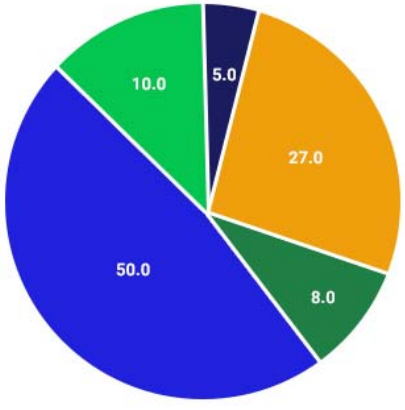
BMS IP: 192.168.208.52

MONTHLY REPORT

THU FEB 01 2018 ~ SUN FEB 28 2018 GMT+8

Alert Statistic

Overall Alert Analysis



Alert Type	Percent (%)	Frequency
Over Impedance	27.0	14/50
Over Temperature	8.0	4/50
Over Voltage	50.0	25/50
Under Impedance	0.0	0/50
Under Temperature	10.0	5/50
Under Voltage	5.0	3/50

Over Impedance Over Temperature Over Voltage
Under Impedance Under Temperature Under Voltage

Over Impedance

Date& Time	State	Battery	Value	Boundary	Ack Time
2018/2/28 12:27:00	Inactive	BM1:A #11	71	0~50	2018/2/26
2018/2/28 20:02:00	Inactive	BM1:B #12	65	0~50	
2018/2/27 02:48:00	Inactive	BM1:A #13	56	0~50	2018/2/21
2018/2/27 20:01:00	Inactive	BM1:B #14	55	10~50	
2018/2/27 12:41:00	Inactive	BM1:A #16	56	0~50	2018/2/11

Over Temperature

Date& Time	State	Battery	Value	Boundary	Ack Time
2018/2/25 02:46:00	Active	BM1:A #11	71	0~60	2018/2/26
2018/2/24 02:45:00	Inactive	BM1:B #12	65	0~40	
2018/2/19 17:03:00	Inactive	BM1:A #13	56	10~50	2018/2/21
2018/2/13 12:30:00	Inactive	BM1:B #14	55	10~50	2018/2/15

Figure 3.33 Monthly report-2

3.9 Environment Monitoring

PowerPanel® Battery Management supports environmental sensor, providing real-time monitoring and event alert to ensure the safety of the operational environment (Figure 3.34).

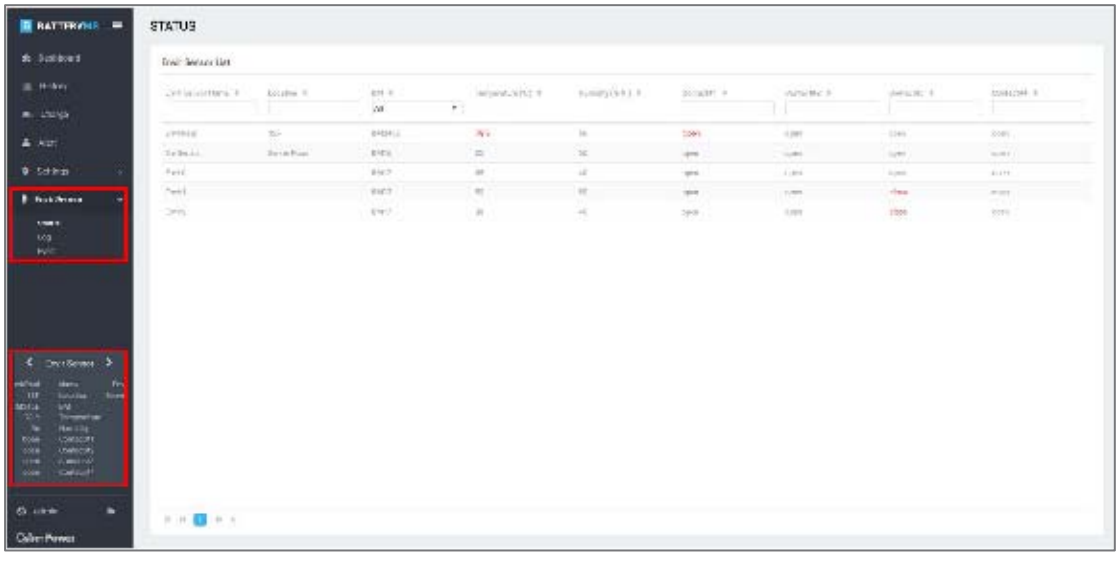


Figure 3.34 Environment monitoring

3.9.1 Status

The real-time information of environmental sensors is displayed on the Status page. PowerPanel® Battery Management shows the humidity, temperature, and the dry contacted device information in the list (2 in Figure 3.35). The same information is also displayed in the carousel on the bottom left corner (3 in Figure 3.35). It allows users to monitor the battery and the environment status at the same time. If the monitored value is out of the normal range, the text color will show in red. The search bar/ drop-down menu under the table heading allows users to filter the data from the database (1 in Figure 3.35).

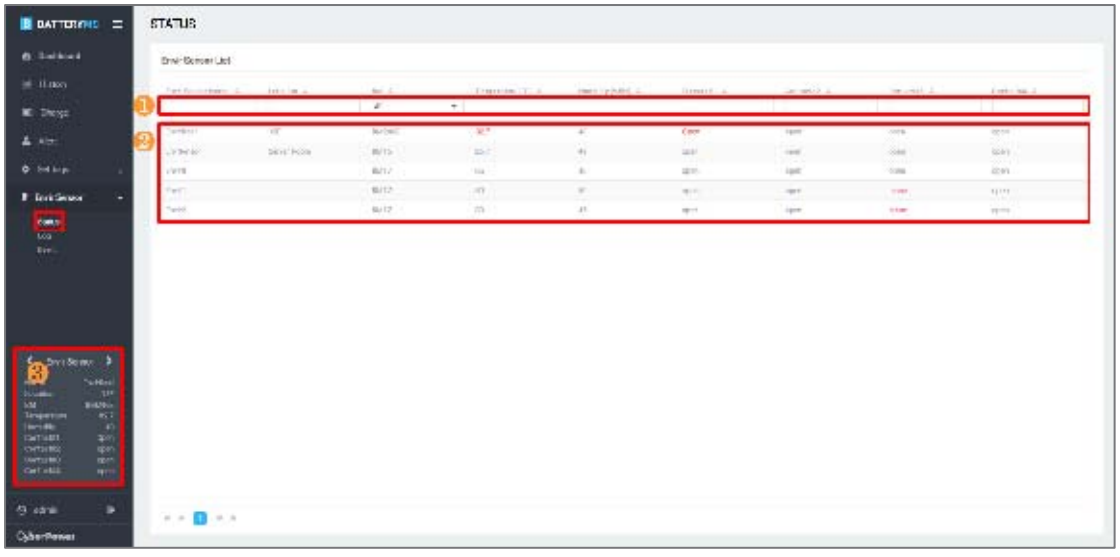


Figure 3.35 Environment status

3.9.2 Log

PowerPanel® Battery Management records the environmental sensor data on the Log page every 10 minutes. There is a data filter to select the data from database (1 in Figure 3.36) and then the data will be shown in the list on the right side (2 in Figure 3.36). If the data is out of the normal range at the recorded moment, the text color will show in red. The data selected in the filter can be output by the Export function for further analysis (3 in Figure 3.36).

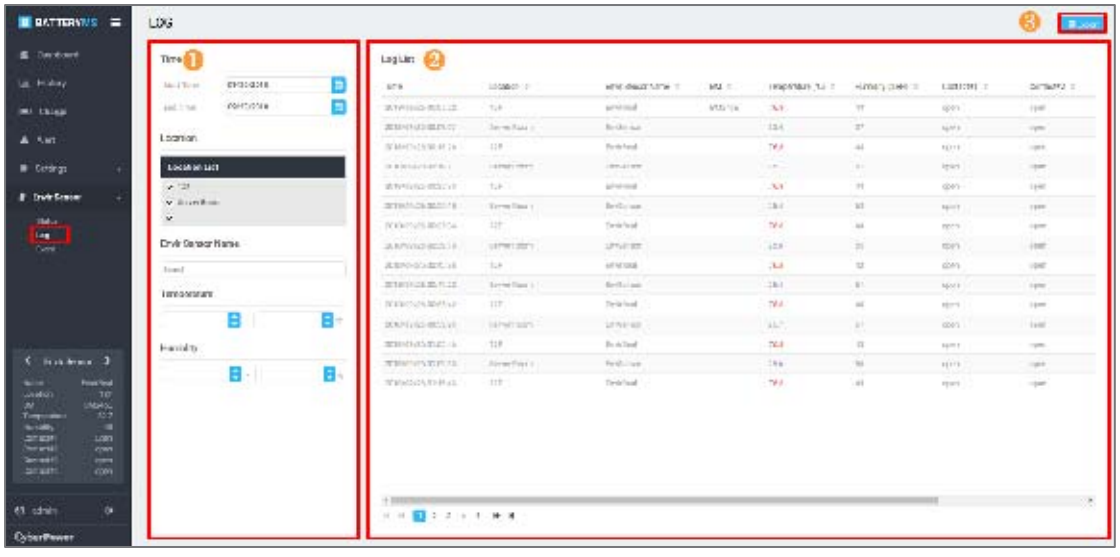


Figure 3.36 Environment log

3.9.3 Event

PowerPanel® Battery Management provides environmental sensor alert service to notify users of the abnormal environmental events. Users can set the alert level of each environmental sensor parameter and then PowerPanel® Battery Management will monitor and collect the parameter values every 10 seconds. If any parameter is out of the normal range, PowerPanel® Battery Management will make an event record and send the alert mail to the users at the same time.

On the Event page, there are three distinct areas. Alert event filter (1 in Figure 3.37) provides several conditions for filtering the alert events. Event List (2 in Figure 3.37) displays the events filtered according to the filtering conditions on the left side. After reviewing the event list, users can Export (3 in Figure 3.37) the alert events for further analysis.

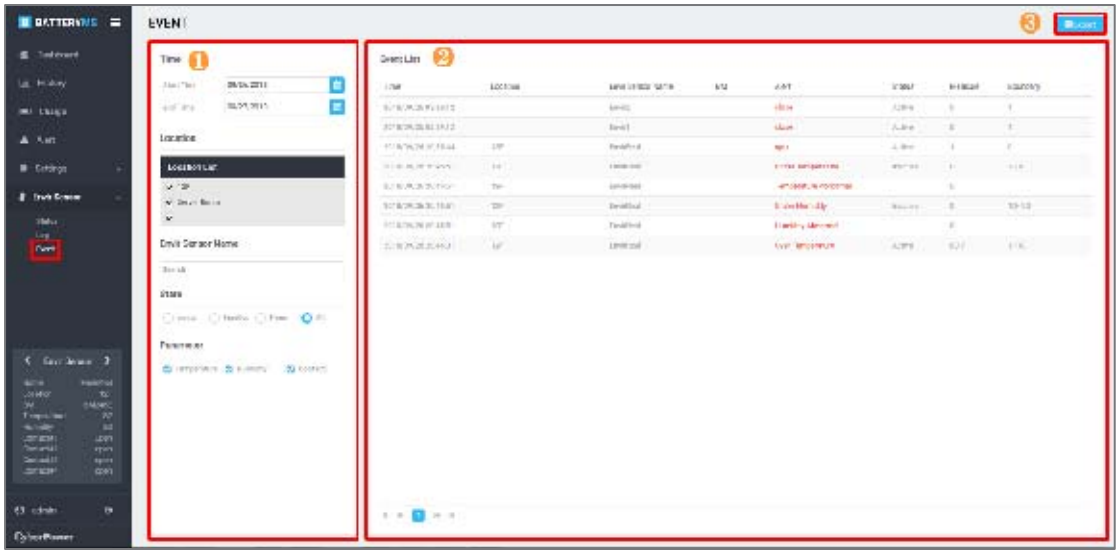


Figure 3.37 Environment event

There are three types of events for the environment sensor. The typical event is evaluated with the parameter threshold. It may be recorded as over or under parameter in the list (3 in Figure 3.38). If the dry contacted device is abnormal, it will also be recorded into Event (1 in Figure 3.38). If the environmental humidity or temperature has a huge variation during a short time, PowerPanel® Battery Management will record it in the Event to prevent an environmental accident from happening (2 in Figure 3.38). Please see the 3.10.9 for the definition of the variation.

Figure 3.38 Event type

3.10 Configure the PowerPanel® Battery Management

In this section, all of the PowerPanel® Battery Management setting features are introduced and users can follow the description to maintain the PowerPanel® Battery Management's normal operation.

3.10.1 General

General feature allows users to change the account/password and the temperature unit (Figure 3.39).

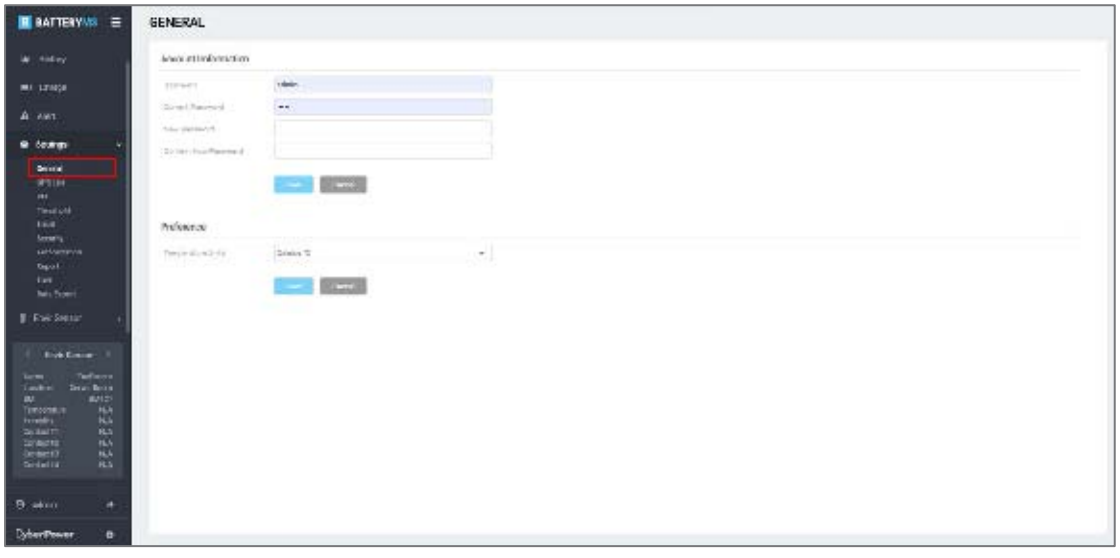


Figure 3.39 General

3.10.2 UPS List

The UPS connecting with the batteries can be managed in **UPS List** (Figure 3.40). UPS in the PowerPanel® Battery Management is used to build the relation between the UPS and battery strings. If users want to assign the string to a specific UPS, add the UPS first. Then users can build the connection in the BM setting function (See 3.9.3 for detail).

All of the UPS are manually added into PowerPanel® Battery Management by users. The function details are showed in Table 3.7 and the UPS contents are described in Table 3.8

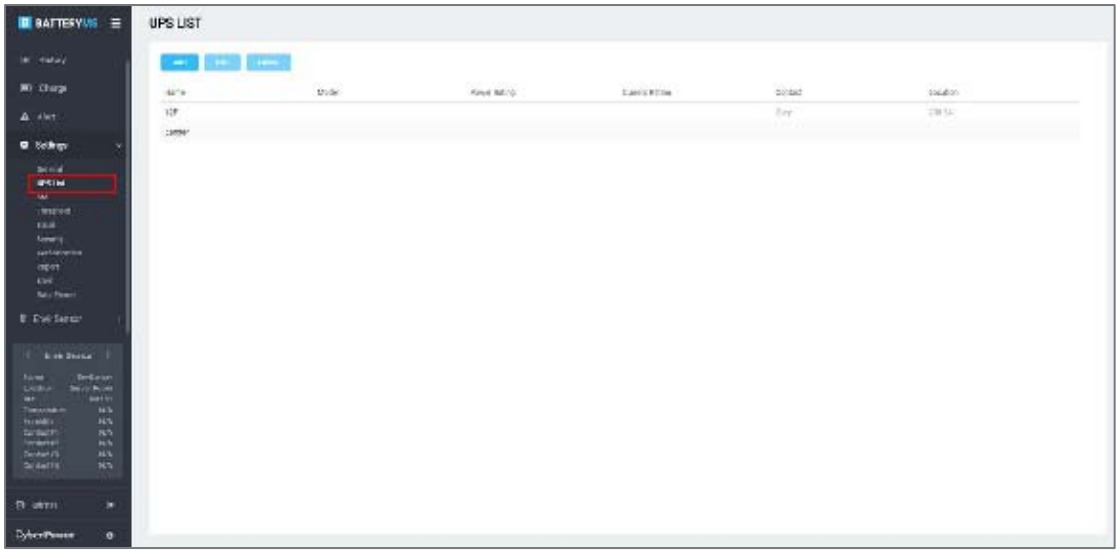


Figure 3.40 UPS List

Table 3.7 UPS List function description

Item	Description
Add	Click to add a UPS into the PowerPanel® Battery Management.
Edit	Click to edit the selected UPS in the table.
Delete	Click to delete the selected UPS in the table.

Table 3.8 UPS content description

Item	Description
Name	The displayed name of the UPS.
Model	The model name of the UPS.
Power Rating	The power rating of the UPS.
Current Rating	The current rating of the UPS.
Voltage Rating	The voltage rating of the UPS.
Contact	The manager of the UPS.
Location	The location of the UPS.

3.10.3 BM

BM feature allows users to manage multiple BM devices. The BM page shows all BM devices in the table and users can click to edit the details or add a new device.

Add BM

There are two ways to add a BM into the PowerPanel® Battery Management. One is to click **Add** (1 in Figure 3.41) and enter the BM's IP for search, and then the BM will be found and listed in the table. The other is to click **IP Range** (3 in Figure 3.41) and enter the IP range for search, and then the BM in the IP range will be found and listed in the table. The function details are shown in and the BM contents are described in.

Setting of string structure in the UPS

The setting of string structure in the UPS is configured with the Setting function (4 in Figure 3.41). Click setting and the UPS drop-down lists beside the string are available for pairing (Figure 3.42).

Note: Build the UPS list before pairing the strings with the UPS. See 3.9.2 for details.

Merge String

In order to increase the number of batteries in a string, BMS supports Merge String feature to help users expand batteries in a string. Merge String feature is configured with the Setting function (4 in Figure 3.41). Click Setting and merge string drop-down lists are available for configuration (Figure 3.43). There are two configurations with the merge string function. One is to merge all strings in one string (Figure

3.44Figure 1.1). This configuration allows 200 batteries per string. The other is to combine two strings in one (Figure 3.45). This configuration allows 100 batteries per string.

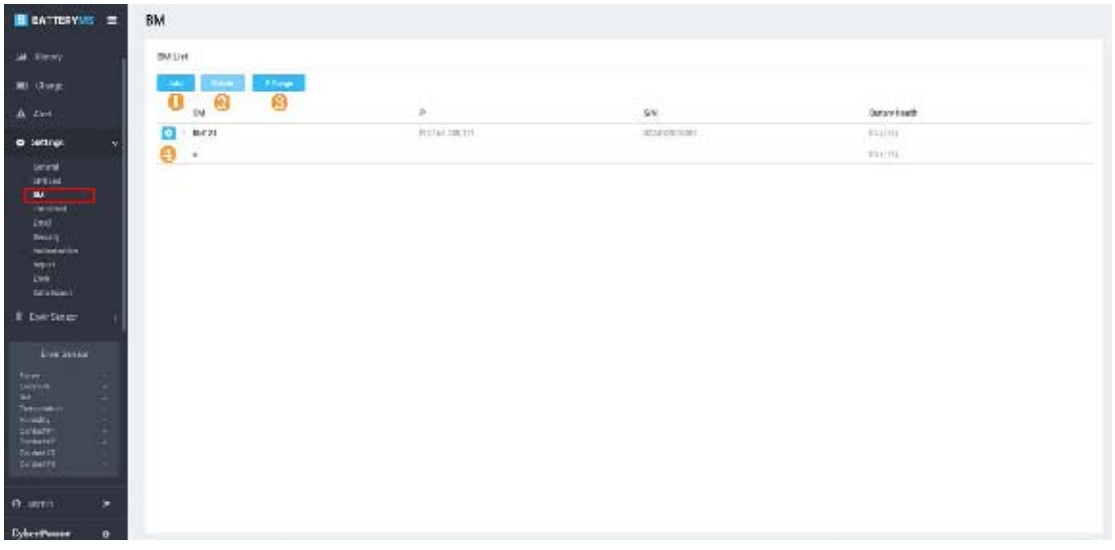


Figure 3.41 BM

Table 3.9 BM function description

Item	Description
Add	Click to add a BM into the PowerPanel® Battery Management.
Delete	Click to delete the selected BM in the table.
IP Range	Click to add the BM through scanning the IP range.
	Click to edit the BM.

Table 3.10 BM content description

Item	Description
IP	The IP of the BM.
S/N	The serial number of the BM.

Item	Description
BM Name	The displayed name of the BM.
Merge String	The configuration of the merge string function.
String Using	Number of used strings in the BM.
Battery Using on a String	Number of connected batteries per string.
Equalization	Turn the equalization feature on or off.
Impedance Period	The impedance detecting period in the BM.
Contact	The manager of the BM manager.
Location	The location of the BM.
String – UPS Name	The UPS name of the string.

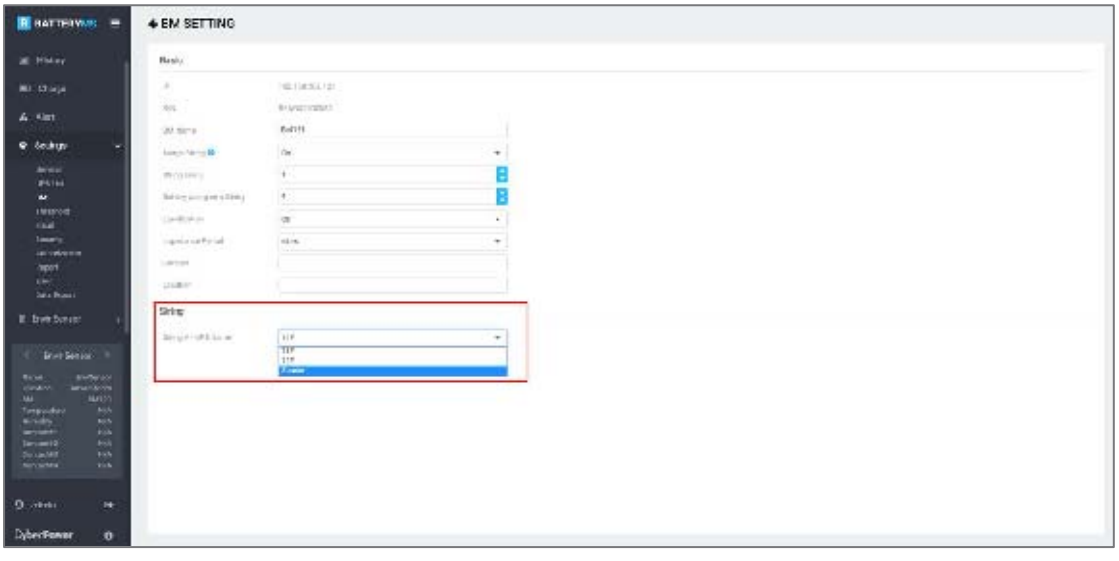


Figure 3.42 Configuration of string structure in UPS

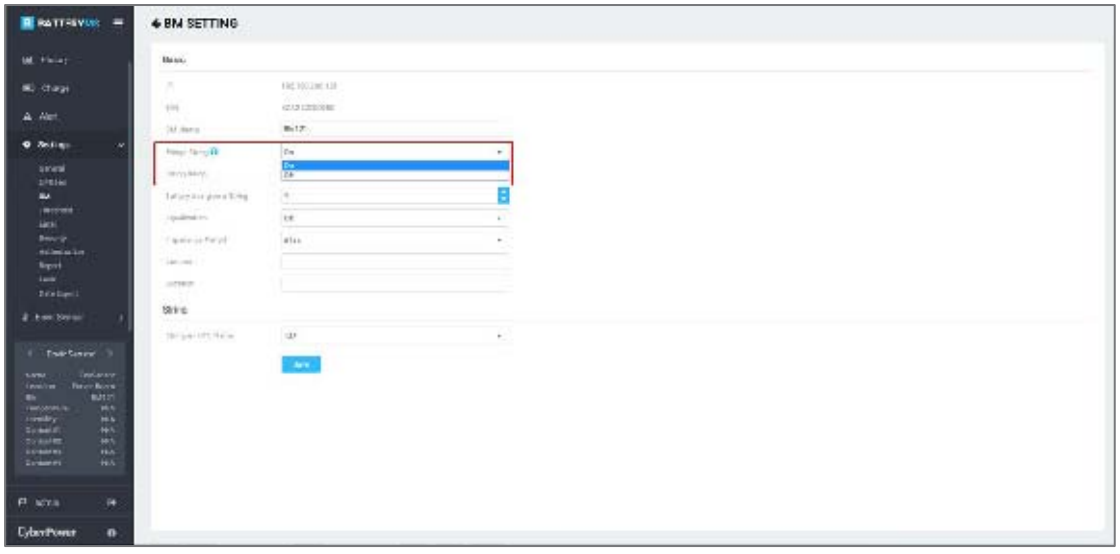


Figure 3.43 Merge String

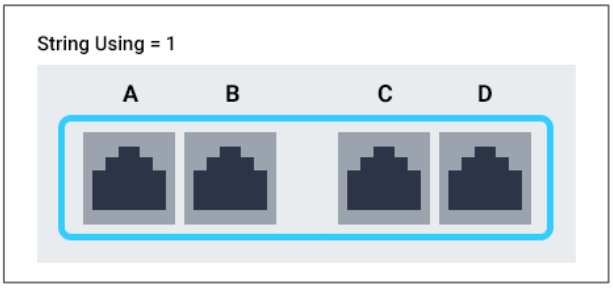


Figure 3.44 All strings merging in one string

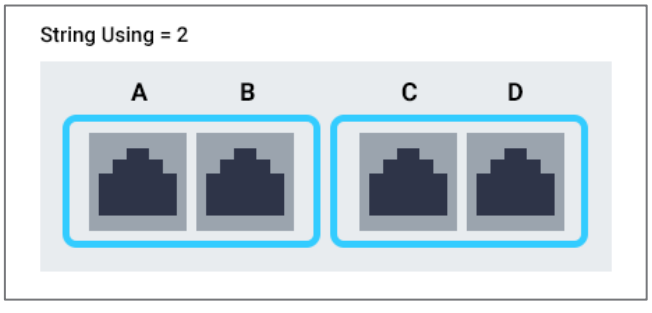


Figure 3.45 Two strings merging in one string

3.10.4 Threshold

Threshold feature is used to set the upper and lower bound values of the parameter for the normal value judgment.

First, select the string and parameter for setting (1, 2 in Figure 3.46). Then type the upper and lower bound values and the result will show in the graphic on the right side simultaneously (3 in Figure 3.46). Click **Save** to save the settings (4 in Figure 3.46).

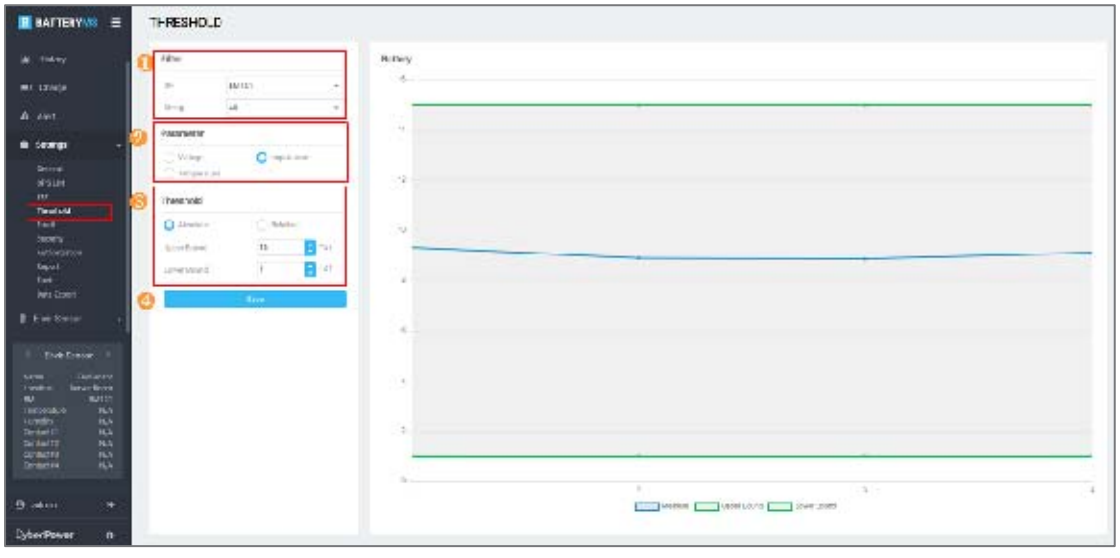


Figure 3.46 Threshold

3.10.5 Email

PowerPanel® Battery Management will send the report and alert events to the users by email.

Email feature allows users to manage the mail server and the recipients to complete the email configuration.

To setup the email server, select Generic to use the SMTP mail server to send out the mail, or select Gmail as the mail server (1 in Figure 3.47). If Gmail is selected, click **Login** to complete the Gmail configuration (Figure 3.48).

The next step is to add the email receivers into PowerPanel® Battery Management (2 in Figure 3.47). Click **Add** to add a receiver and select a notice type. Users can also edit and delete the selected email receivers for management.

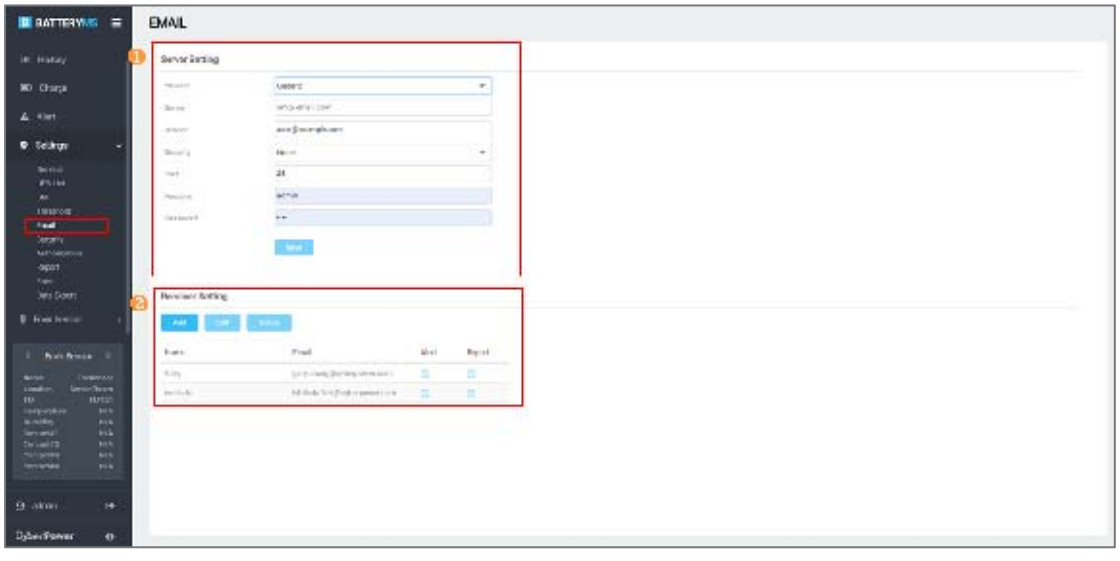


Figure 3.47 Email

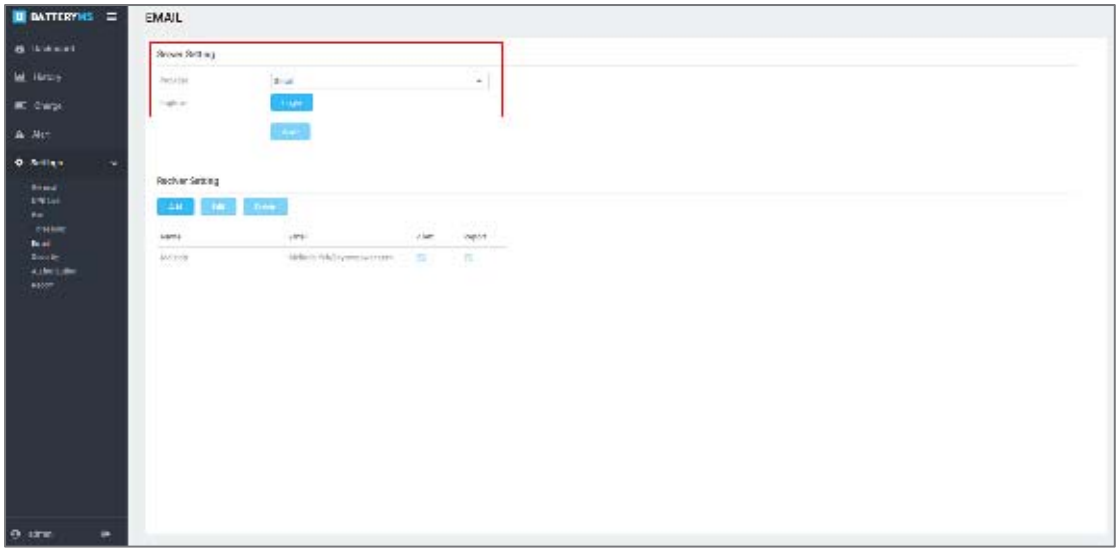


Figure 3.48 Gmail configuration

3.10.6 Security

PowerPanel® Battery Management provides more prudent transfer protocol for users. Security feature allows users to change the transfer protocol in https (Figure 3.49).

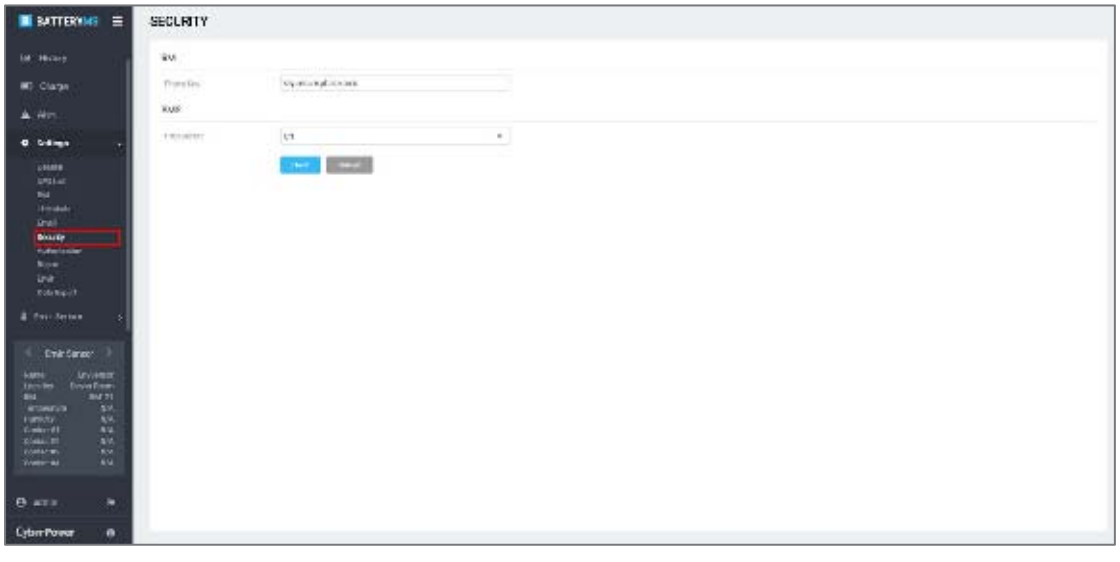


Figure 3.49 Security

3.10.7 Authorization

PowerPanel® Battery Management requires authorization to add the BMs. 25 BMs authorization with 4*50 scope has already been installed in the PowerPanel® Battery Management (Figure 3.50). If more authorization is required, please contact the support team and add the new authorization on this page.

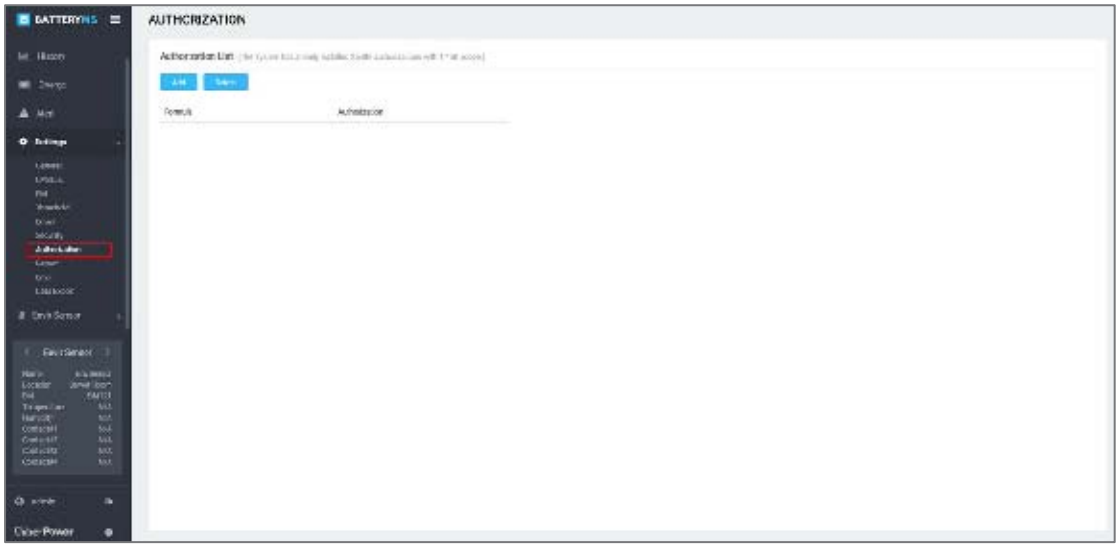


Figure 3.50 Authorization

3.10.8 Report

PowerPanel® Battery Management provides two types of periodic reports: Daily Report and Monthly Report. Users can customize the report sending time in the Report function (Figure 3.51).

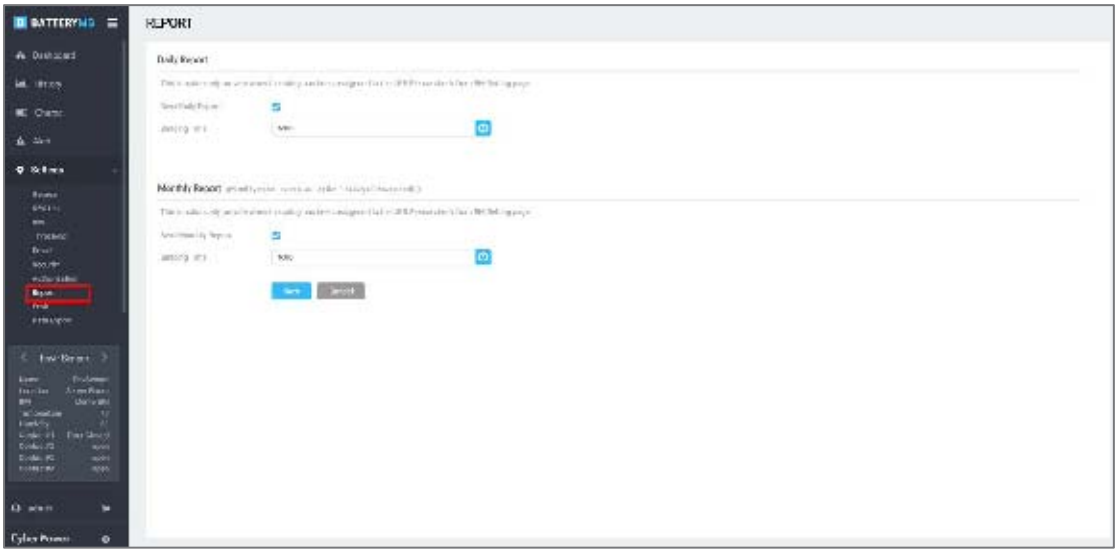


Figure 3.51 Report

3.10.9 Envir

Envir feature allows users to manage multiple environmental sensors. The Envir page shows all environmental sensors in the table and users can click to edit the details Figure 3.52.

The function details are shown in Table 3.11 and the environmental sensor contents are described in Table 3.12.

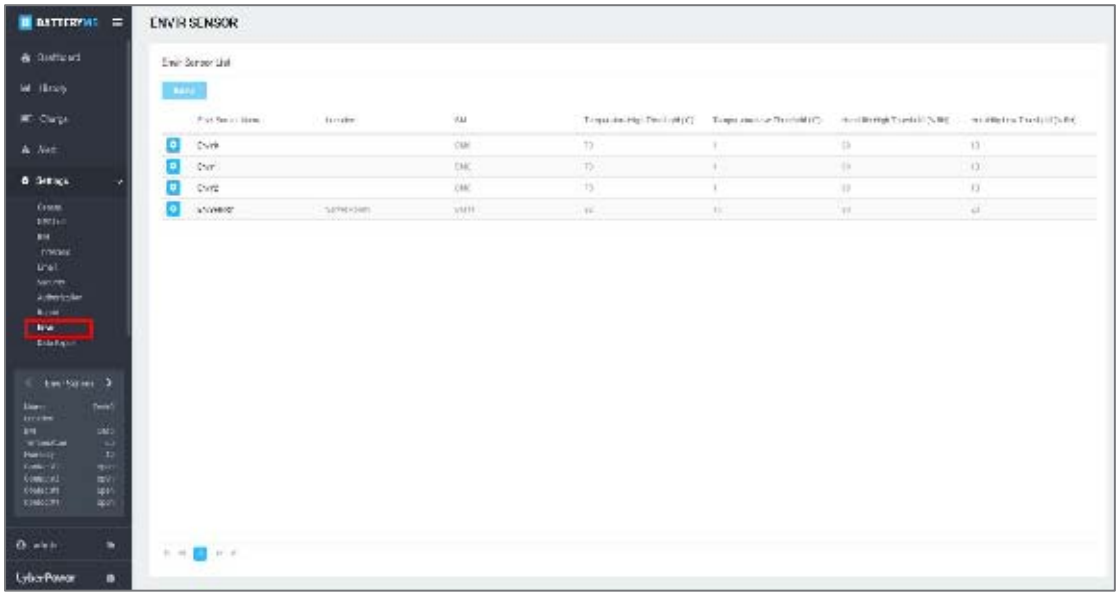


Figure 3.52 Environmental sensor setting

Table 3.11 Envir function description

Item	Description
Delete	Click to delete the selected environmental sensor in the table.
	Click to edit the selected environmental sensor in the table.

Table 3.12 Environmental sensor content description

Item		Description
Information	BM	The BM name that the environmental sensor is attached to.
	Name	The displayed name of the

Item		Description
		environmental sensor.
	Location	The location of the environmental sensor.
Temperature	High Threshold	The reasonable upper boundary of the temperature.
	Low Threshold	The reasonable lower boundary of the temperature.
	Rate of Change	The tolerance of temperature variation in 5 minutes.
Humidity	High Threshold	The reasonable upper boundary of the humidity.
	Low Threshold	The reasonable lower boundary of the humidity.
	Rate of Change	The tolerance of humidity variation in 5 minutes.
Contact	#X Name	The displayed name of the dry contact.
	#X State	The dry contact normal and abnormal configuration and description.
		The communication of the dry contact is in “1”.
		Normally : For the normally “1” dry contact.
		Abnormally : For the abnormally “1” dry contact.
		The communication of the dry contact is in “0”.
		Normally : For the normally “0” dry contact.
		Abnormally : For the abnormally “0” dry contact.
	Example Set a door sensor on the No.1 dry contacted device. The door sensor is usually set up on the rack door, so it is usually in the close state. We define when the door is closed, it is in the normal state. (Figure 3.53).	

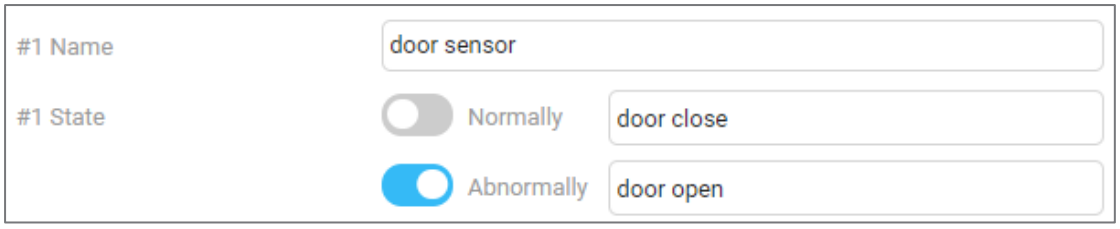


Figure 3.53 The door sensor configuration

3.10.10 Data Management

Data Management allows user to export all battery data for further analysis (Figure 3.54). First, select a particular battery (1 in Figure 3.54) and decide the data period (2 in Figure 3.54). Then click **Export** to output the battery data (3 in Figure 3.54).

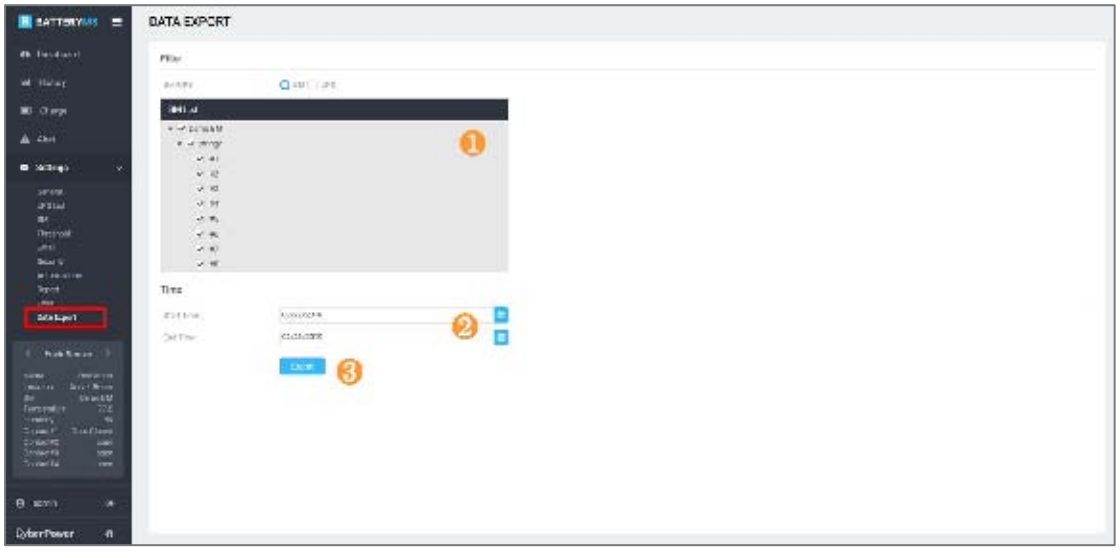


Figure 3.54 Data Management

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