CyberPower

USER'S MANUAL

Battery Management System

BM100

BP100-12VT

BP100-2VT

The Battery Remote Management System allows a battery system to be managed, monitored, and configured.

SAVE THESE INSTRUCTIONS

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

K01-E000024-02

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Safety Instructions

Read these instructions carefully and be familiar with the equipment before trying to install, operate, move, maintain or repair it. Owing to the possibility of potential hazards, always use extreme caution when working with batteries. The following safety information should be observed before any works are performed on the system.

Important Symbols

WARNING

The use of WARNING indicates that an electrical hazard exists which will cause serious personal injury if the instructions are not followed.

CAUTION

The symbol of CAUTION alerts users to the potential personal injury hazards. Please follow all safety instructions to avoid possible injury or death.

Note:

The Note is used to provide additional information to help accomplish a specific practice or procedure.

General Precautions

- For safety reasons, it is highly recommended that the system should only be moved, installed, operated, maintained and repaired by two or more proper personnel who are trained and qualified to recognize the hazards involved. Failure to follow may cause serious injury.
- Always work in a ventilated area where there is no high gas concentration, flammable materials and moisture. Never smoke, create a spark or flame in the vicinity of a battery.
- Check the existence and location of fire extinguishers or other fire containment methods near the working site.
- Remove jewelry, watches and any metal objects before starting to work with or around batteries.
- Verify if there is any leak of electrolyte from a battery. Always avoid skin and eye contact with these harmful fluids.
- Always wear suitable safety equipment and protective clothing such as rubber gloves, rubber boots, safety face shield and glasses to prevent skin from direct contact with battery components.
- Battery electrolyte fluid is highly corrosive. If it enters eyes, immediately rinse them thoroughly with clean water for at least 15 minutes and look for medical treatment. If electrolyte fluid gets on skin or clothing, please wash promptly with water and baking soda.
- Use double-insulated tools when performing work related to batteries.
- Make sure all the charging and power supply sources are turned off before connecting or disconnecting battery terminals.

- Inspect whether there is any mistakenly connected polarity between batteries before powering on the system.
- To avoid short circuits or suffering from electrical shock, do not touch or replace any cables connected to the battery before having disconnected the system from the batteries.
- Battery terminals are always live. Always keep batteries' surface clean and never place metal materials or tools on top of the batteries or near the cable lugs.
- Use appropriate tools to avert damage to the battery terminals or other system components, and be cautious to prevent sparks or short circuits when working with metallic tools.

Introduction

Overview

The CyberPower Battery Management System (BMS) 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). The system helps extend the battery lifespan, maximize the battery performance and proactively identify the battery deterioration and failure, thus delivering a reduced cost of maintenance.

After installing the hardware and configuring an IP address, users can simply use a web browser to access, monitor, and control the Battery Manager from anywhere in the world!

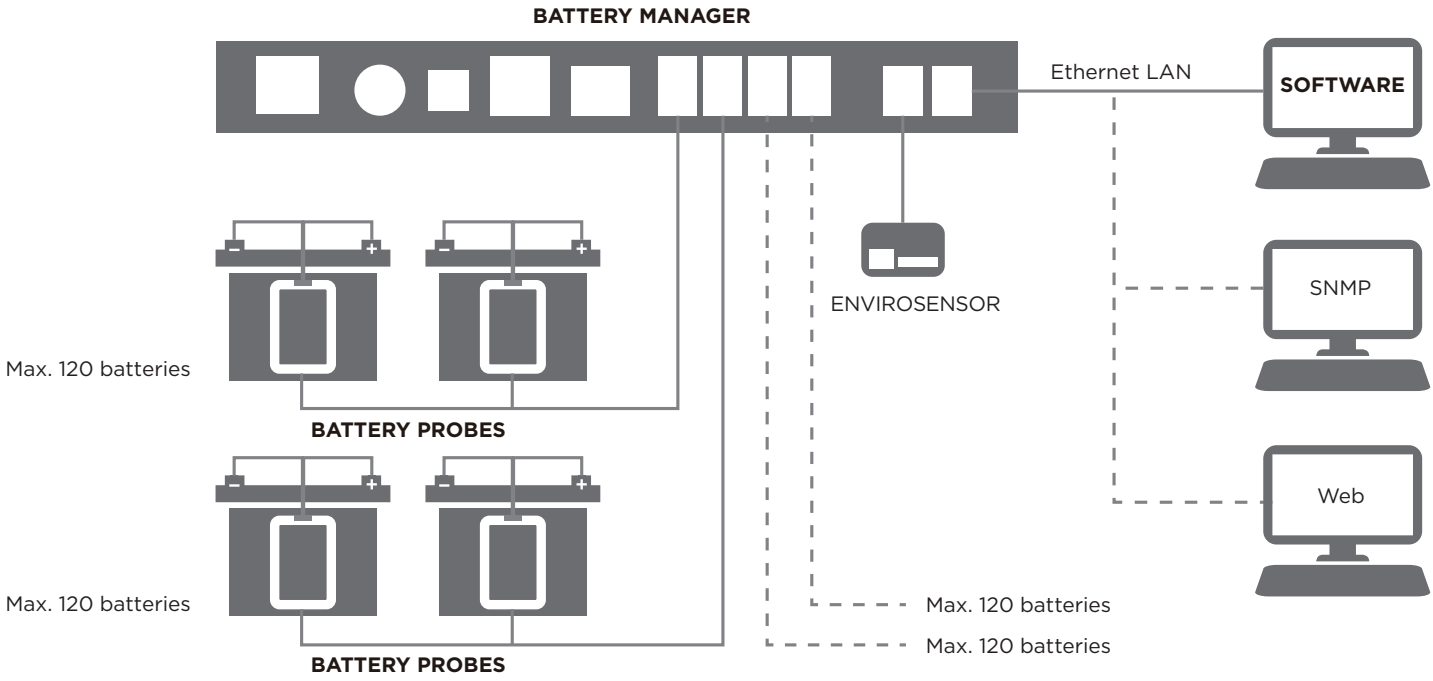
Features

- Monitor the battery voltage, temperature and internal resistance
- Charge equalization function to extend the battery lifespan and maximize the battery performance
- Reduce maintenance cost with easy battery maintenance
- Replace battery based on battery condition to prevent expensive premature replacement
- Detect the weak battery early to reduce the possibility of damage to the entire battery string
- Achieve low power consumption to reduce the impact on the battery
- Real-time battery system monitoring
- Remote management and configuration of the battery system via Web Browser or NMS
- User-friendly web interface
- Event logging to trace the battery and battery string event history
- Graphic data logging to analyze battery and battery string conditions
- Record up to 14 years with 4 probes in one string on a default recording interval (20 minutes).
- Save and restore configuration settings
- Event notifications via Email, SNMP traps, Syslog, and SMS
- Support IPv4/v6, SNMPv1/v3, HTTP/HTTPs, TELNET/SSH, DHCP, NTP, DNS, SMTP, FTP, MODBUS TCP, and Syslog protocol
- Support RS485 MODBUS
- Support Email Secure Authentication Protocols: SSL, TLS
- Support Google OAuth 2.0 to access Gmail
- Support External Authentication Protocols: RADIUS, LDAP, LDAPS, Windows AD
- SNMP MIB available for free download
- User upgradeable firmware
- Upgrade Ethernet module firmware and upload configuration files to multiple units at once
- Server level software “BMS Software” supports multiple managers monitoring/control, powerful data recording, graphing and analyzing features.
- Support Environmental Sensor (ENVIROSENSOR)
- Operate under extremely wide temperature range from -40°C to 60°C*
  *LCD Readout: -20°C to 60°C

System Requirements

- A 10/100Mbps Ethernet connection to an existing network
- Web Browser
- (Optional) NMS (Network Management System) compliant with SNMP

Application



Battery Manager

The battery manager continuously and securely collects the detailed information on every battery, checks each measurement with alarm thresholds, and notifies the users if abnormality occurs. The battery manager is fully Ethernet TCP/IP compatible with built-in web server and supports SNMP/MIB communication, data logging and event notification, monitoring up to 4 strings of 120 batteries each (totally 480 batteries).

Note: An optional Environmental Sensor (ENVIROSENSOR) can be added to monitor the ambient temperature and humidity.

Battery Probe

A probe is installed to the terminal posts of each monitored battery. The probes measure the battery's internal resistance, voltage, and battery temperature.

Unpacking

Inspect the package upon receipt. The package should contain the following:

Battery Manager

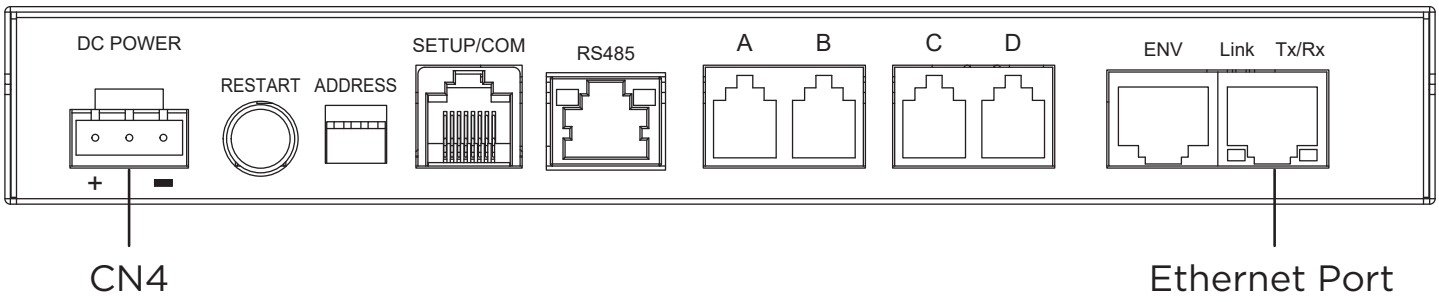
- CyberPower Battery Manager
- Quick Start Guide
- Dry Contact Interface Power Cable (244cm; L4)
- 4 Battery Probe Communication Cables (90cm; L1)
- DB9/RJ45 Communication Cable (for future firmware update)
- 2 Rack Fixed Brackets
- 4 (M3) Bracket Mounting Screws

Battery Probe

- CyberPower Battery Probe
- Quick Start Guide
- Battery Connecting Cable (250 terminal; 30cm; L3)
- Battery Probe Communication Cable (30cm; L2)
- 4 Ring Washers (M8 Ring*2, M10 Ring*2; L5)

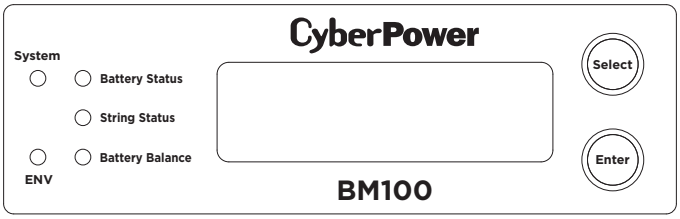
Battery Manager

- Front Panel



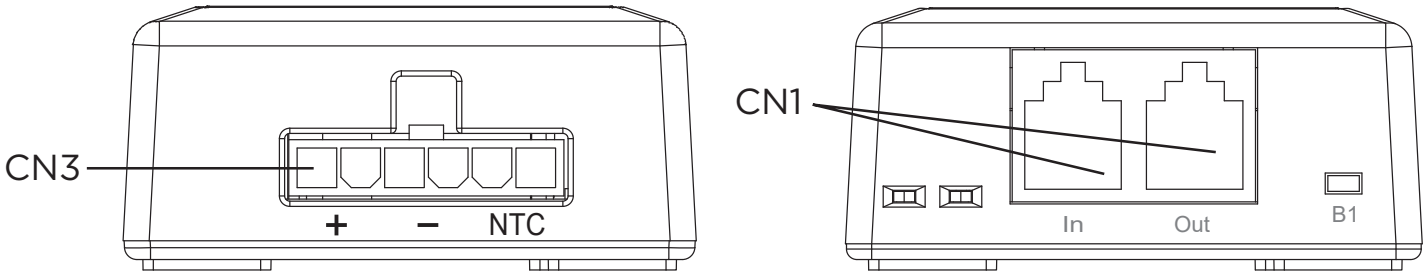
Name	Description
DC POWER (CN4)	Power input of the Battery Manager **Warning:** Required supply voltage: 15V min, 60V max.
ADDRESS	Battery Manager RS485 communication address, LSB is on the left
RESTART	Button to restart the Battery Managed System.
SETUP/COM	Port for firmware upgrade and current sensors
RS485	Port for MODBUS communication
A/B/C/D	Port connected to Battery Probes **Note:** Every string has to connect to the same quantity of Battery Probes.
ENV	Port connected to environmental sensor
Ethernet Port	Port connected the Ethernet cable
Link LED	Off: The Battery Manager is not connected to the Network/ or the Battery Manager power is off On (Orange): The Battery Manager is connected to the Network
Tx/Rx LED	Off: The Battery Manager power is off On (Green): The Battery Manager power is on Flashing (Green): - Receiving/transmitting data packet - Reset finished

- LCD Panel



Name	Description/Condition
System	Green (steady): The Battery Manager is supplied with power and works normally. Red (steady): The communication or conditions of battery probes are abnormal.
ENV	Green (steady): The communication of the environmental sensor is normal. Red (steady): The condition of the environmental sensor is abnormal.
Battery Status	Green (steady): The connected batteries are normal. Red (steady): The voltage, temperature or resistances of the connected batteries are abnormal.
String Status	Green (steady): The battery string is normal. Red (steady): The voltage or current of the battery string is abnormal.
Battery Balance	Green (steady): The battery voltage is balanced. Green (flashing): The battery voltage is equalizing (or balancing).
Select Button	Control the LCD screen and toggle through the available information options.
Enter Button	Choose the selected item, enter submenu or return to the previous menu.

Battery Probe



Name	Description/Condition
Battery Connector (CN3)	Connected to battery (The red cable(+) has to connect to the battery positive pole; the two black cables (-) and NTC have to connect to the battery negative pole) **Warning:** Please connect the battery connecting cable to the confirmed positive and negative electrode. It can result in short circuit if the connection is converse.
In/Out (CN1)	Port connected to Battery Manager through the 'In' port, and to another Battery Probe (Left side is 'In' and right side is 'Out')

Name	Description/Condition
B1	Communication Test Button
LED1 (Red)	Steady: The battery is abnormal.
LED2 (Green)	Steady: Power is provided, the communication is normal, and datagram is receiving or transmitting. Flashing: The power of the battery probe is on and the communication is under testing.

Installation Guide

Please read safety instructions carefully before installation.

Step 1. Install and Clean the Batteries

1. Before beginning installation, identify the desired installation site and setting position of the batteries.
   Note: Ensure that the communication cable is long enough to connect the Battery Manager to the Battery Probe after confirming desired installation site.
2. Ensure that all batteries' polarities are properly connected. To wire batteries in series, the negative terminal of the first battery is connected with the positive terminal of the second battery by using jumper wire. One battery's positive or negative terminal must be connected to the opposite polarity of next battery and so on.
3. Clean and dry the surface of each battery for fixing the Battery Probe with Loop tape.

Step 2. Hardware Installation

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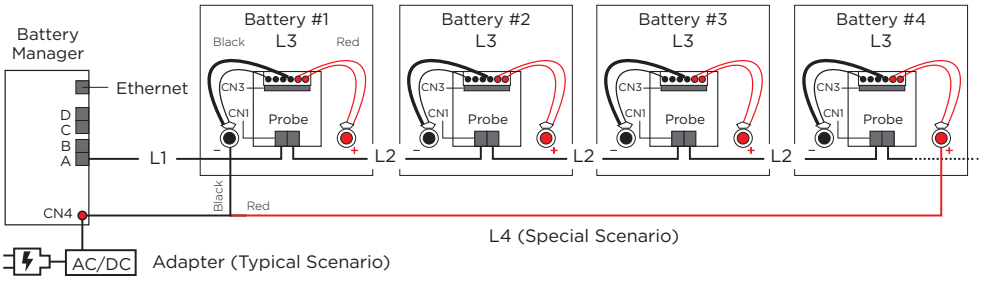

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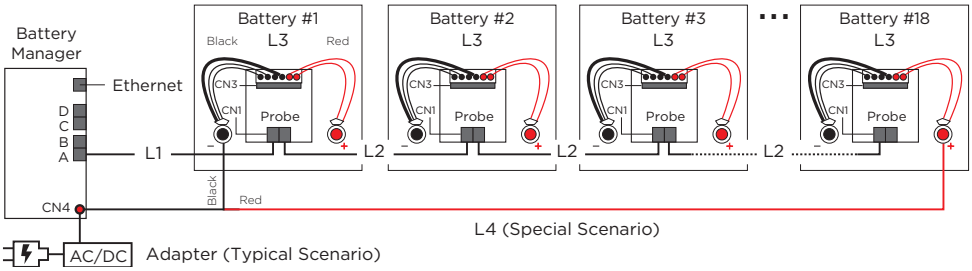

WARNING: Highly recommended to use insulated gloves when installing the battery probes.

1. Connect the battery connecting cable (L3) to M8 or M10 ring washers (L5). Besides, make sure that the M8 or M10 washers (L5) are installed above the battery series connection wire.

   Note: Please see below illustration for correct installation of the two black cables. Besides, connect the red cable to the battery pole (+).

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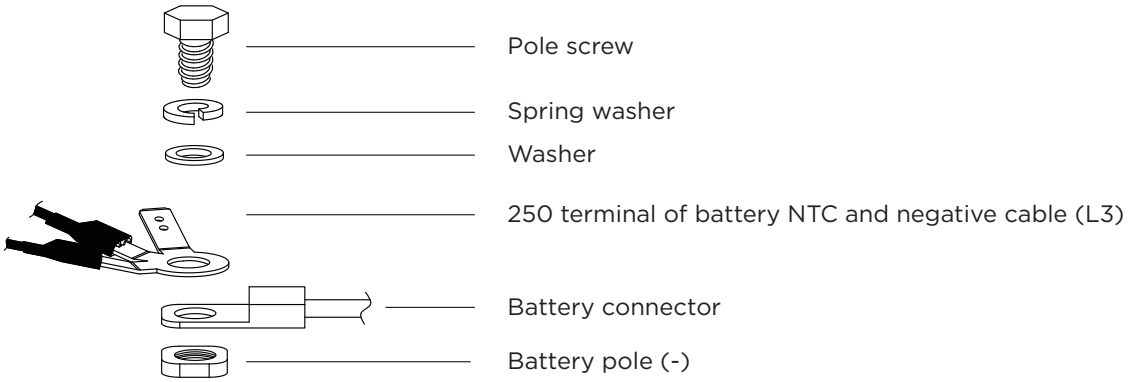

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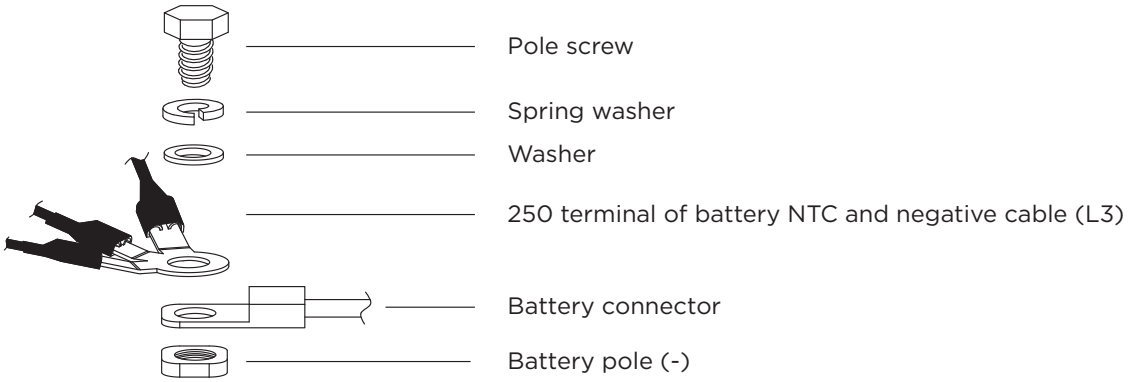


2. Connect the cable to each Battery Probe through battery connector (CN3).
3. Fix each Battery Probe to each battery with Loop tape.

   Note: When fixing the Battery Probes to the batteries, make sure it is easy to observe the LED indicators of the Battery Probe.
4. Connect the Battery Manager's 'A' (RJ25) port to the 'Left' ('In') RJ25 port (CN1) of the first Battery Probe with the communication cable (L1)..
5. Connect Battery Probes with one another through RJ25 ports (CN1) of Battery Probes with probe communication cables (L2), and up to 120 Battery Probes in a string.
6. Connect an Ethernet cable to the Ethernet port of the Manager.
7. Provide power to the Battery Manager through the DC power (CN4). The required Battery Manager input voltage is **15V min, 60V max**.

   Typical Scenario

   Connect the Battery Manager to the utility power with an AC/DC adapter cord whose output power is more than **60W**.

   Special Scenario

   For battery string whose total voltage is **between 15V and 60V**, connect the Battery Manager to the first and last terminal of the battery string with the included power cable (L4).

   ⚠ **WARNING:** A battery can present a high risk of short circuit current and electrical shock. Please pay attention to the input voltage.

8. Press the **RESTART** button for one second to restart the system.
9. IP address will show on the LCD interface once the Manager is powered and the system is initialized, or you can find it through **[About → Network info. → IPv4 address]**. Use the IP address to login to the Web Interface. The factory default Username/Password is **admin/admin**.

Note: Once the number of battery string and connected battery has been changed from last configuration, please configure it via web interface on the **[Battery → Configuration]**, select the number of string(s) and batteries per string, and then click Apply. Or you can reset the system to the factory default setting via LCD interface on the **[Reset/Reboot → Reset → Confirm]**.

Note: For mounting bracket installation, please refer to Appendix 4.

Step 3. Configure the IP address for the CyberPower Battery Manager

Note: You can find the IP address of the Battery Manager via LCD interface on the **[About → Network info. → IPv4 address]**.

Note: These instructions are for Windows OS. For other OS please refer to Appendix 4.

Method 1: Using the Power Device Network Utility 2

1. Install the Power Device Network Utility 2 available for download at www.CyberPower.com.
2. After installation completes, run the “Power Device Network Utility 2”.
3. The main window of the Power Device Network Utility 2 program is shown in Figure 1. The configuration tool will display all CyberPower Remote Management devices present on the local network subnet. The "Scan" button is used to search the local network subnet again.

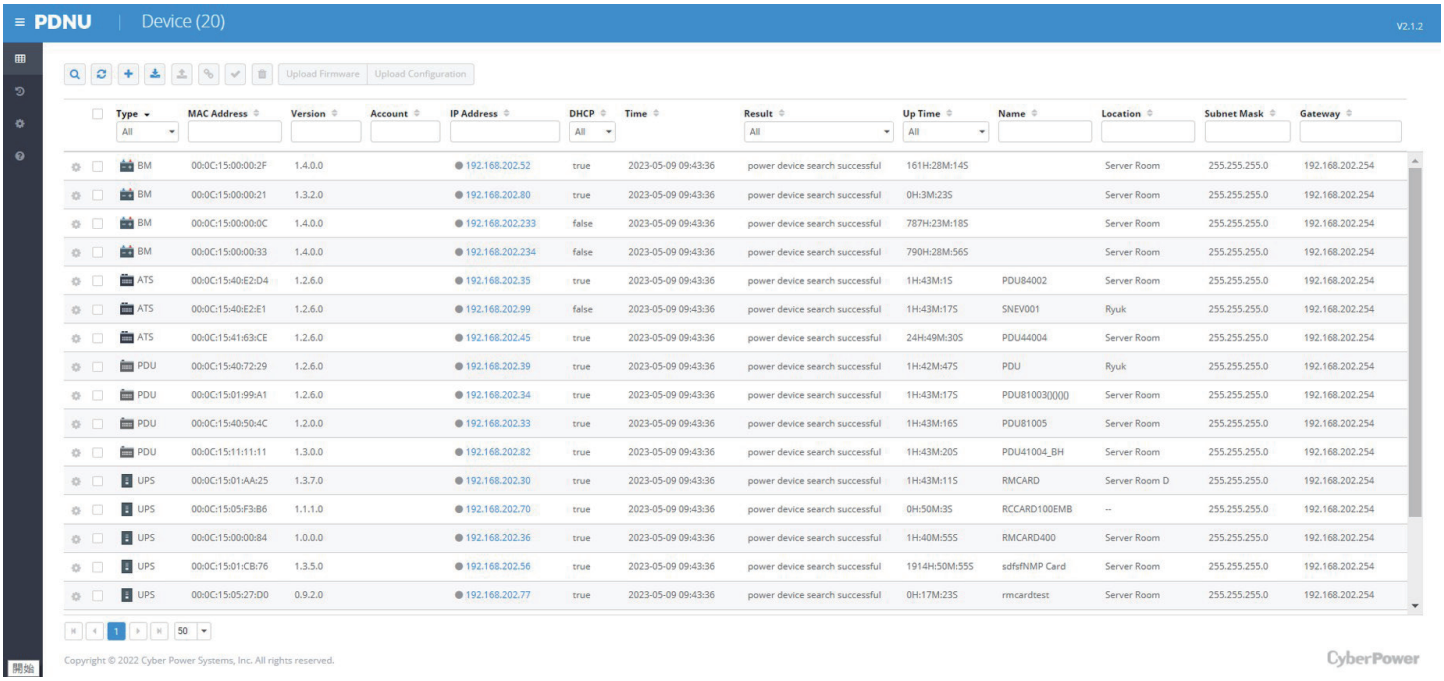


Figure 1. The main window of the “Power Device Network Utility 2” program

4. Select the Battery Manager you are setting up. Click on the Tools menu and select the Battery Manager you want to configure. Then, click the "Connection" button on the top tools list to set up.

5. You will need to enter a User Name and Password for the Battery Manager in the authentication window, as shown in Figure 2.
   - Default Account: **admin**
   - Default Password: **admin**

Figure 2. Authentication window

6. You can modify the IP Address, Subnet Mask, and Gateway address for the Device MAC Address listed in the Device Network Settings window, as shown in Figure 3. The factory default IP Address is 192.168.20.177 and the default Subnet Mask is 255.255.0.0.

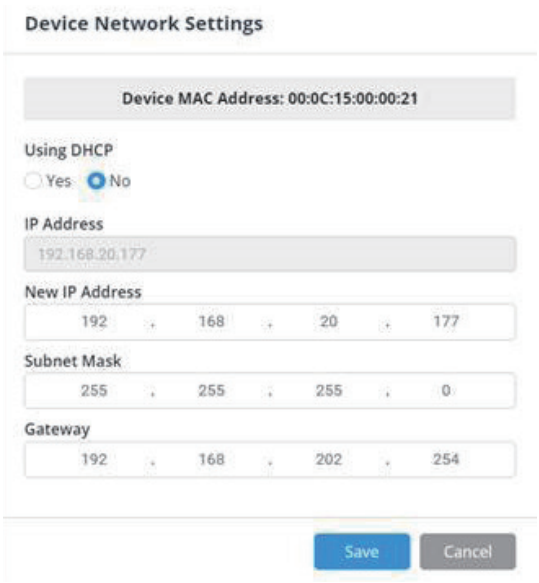


Figure 3. The Device Network setting window

7. Modify the IP, subnet mask or gateway address. Enter the new addresses into the corresponding fields and then click “Save”.
8. In case the change is not successful, for example, if the IP address change is unsuccessful you will see a warning message. Attempt to make the desired changes again. If the problem persists, please see the Troubleshooting section for help.

Method 2: Using a command prompt

1. Obtain the MAC address from the label on the Battery Manager. Each Manager has a unique MAC address.
   Note: The MAC address is labelled on the Manager.
2. Use the ARP command to set the IP address.
   Example:
   To assign the IP Address 192.168.20.177 for the Battery Manager, which has a MAC address of 00-0C-15-00-00-21 you will type in the following in the command prompt from a PC connected to the same network as the Battery Manager.
   (1) Type in "`arp -s 192.168.20.177 00-0C-15-00-00-21`" for Windows OS; type in "`arp –s 192.168.20.177 00:0c:15:00:00:21`" for Mac OS, then press Enter.
3. Use the Ping command to assign a size of 123 bytes to the IP.
   (1) Type in "`ping 192.168.20.177 -l 123`" then press Enter.
   (2) If the replies are received, your computer can communicate with the IP address.

To select an IP address for the Battery Manager, please refer to Appendix 1.

Web Interface

Login User Account

You will need to enter a User Name and Password to login to the interface. There are two user account types.

1. Administrator
   - Default username: **admin**
   - Default password: **admin**
2. View only
   - Default username: **device**
   - Default password: **device**

You will be asked to reset a username and password upon the first login. The administrator can access all functions, including enable/disable the view only account. The viewer can access read only features but cannot change any settings.

Note: The Administrator account is also used for the FTP login, Power Device Network Utility, and Upgrade and Configuration Utility.

Note: Only one user can log in and access the device at a time.

Web Content

[Summary] Provide an overview of the system operation and the items that are auto refreshed; however, different Battery Management System models may have different items displayed.

Item	Definition
Current Condition	Display the current operating condition of the system.
Battery Status	Shows individual battery string and battery status. Battery String is normal in green color if its string voltage and current are good, otherwise shows abnormal in red color. Battery is normal in green color if its voltage, temperature and resistance are good, otherwise shows abnormal in red color.

Item	Definition
System Data	
Name	The name given to the Battery Manager.
Location	Location description given to the Battery Manager.
Contact	The person to contact about this Battery Manager.
Uptime.	Length of time the system has been working continuously
Envir Status	
Temperature	Graph of the current temperature reading of the environmental sensor.
Humidity	Graph of the current humidity reading of the environmental sensor.
Recent Device Events	A list of the five most recent device events. All events are related to configuration changes.

[Battery] The following items can be displayed/configured through the Battery page.
[Battery->String Status] Display the basic information about the battery string status.

Item	Definition
Status	
# (index)	Index of the battery string.
String Voltage	Battery string voltage reading.
Current	Battery string current reading.
Volt.	Batteries voltage range in a particular string.
Temp.	Batteries temperature range in a particular string.
Res.	Batteries resistance range in a particular string.
Status	Battery string voltage, current, resistance, and temperature status. Shows red color if voltage, current, resistance, and temperature is out of configured range.
Voltage Distribution	
Battery Using	Shows the number of batteries is used in a string or system.
Average Voltage	Shows average battery voltage in a string or system.
Normal Range	Shows normal voltage range of batteries in a string or system.
Normal	Shows the number of batteries is normal in a string or system.
Warning	Shows the number of batteries is out of regular voltage range in a string or system.

[Battery->Status] Display the basic information about the current battery status. Items displayed are auto refreshed.

Item	Definition
Data	
# (index)	Index of the battery within its string.
Volt.	Current battery voltage reading.
Temp.	Current battery temperature reading.
Res.	Current battery resistance reading.
EQ.	Current battery equalization power in percentage.
Status	Current battery voltage, temperature and resistance status. Shows red color if voltage, temperature or resistance is out of configured range.
Graphic	
Voltage	Shows batteries voltage in graph.
Temperature	Shows batteries temperature in graph.
Resistance	Shows batteries resistance in graph.

[Battery->Configuration] Configure the parameters of the system.

Item	Definition
Manager Configuration	
Merge	Setup the merge function to enable or not.
Battery Probes Connect	Setup the Manager current battery probe series and parallel configuration.
Equalization	Setup battery voltage equalization function to enable or disable. Enable – Let the system to equalize managed batteries voltage under a proper voltage, temperature condition. Disable – Not equalize batteries voltage.
Resistance Measure Interval	Setup the Manager automatically resistance measurement time period.
Probe Configuration	
String Voltage Range	Setup battery string voltage range. Battery probes give the alarm when the battery string voltage is out of range.
Voltage Range	Setup battery voltage range. Battery probe gives alarm when battery voltage is out of range. **Note:** If Equalization is active and battery voltage is out of low threshold, it may be caused by a faulty or aged battery and should be checked to eliminate the risk of downtime.

Item	Definition
Temperature Range	Setup battery temperature range. Battery probe gives alarm when battery temperature is out of range.
Resistance Range	Setup battery resistance range. Battery probe gives alarm when battery resistance is out of range. **Note:** If the battery is fully charged and battery resistance is out of high threshold, it may be caused by a faulty or aged battery and should be checked to eliminate the risk of downtime. **Note:** For more information, please refer to Troubleshooting.

[Battery->PPBM Software] Configure the parameters of the system.

Item	Definition
Current Settings	
Manager Operation Mode	Shows the manager operation mode is Auto Detect, BM Standalone Mode or PPBM Software Mode.
PPBM Host Address	Shows the PPBM host address.
PPBM Host Status	Shows the PPBM host status.
Configuration	
Manager Operation Mode	Setup manager Operation function is Auto Detect, BM Standalone Mode or PPBM Software Mode. Auto Detect- The default setting, the Manager Operation Mode configured as Auto Detect is like BM Standalone Mode and capable for PPBM Software connection. BM Standalone Mode- Control Manager operates in BM Standalone Mode. (Not allowed for PPBM software connection) PPBM Software Mode-Control Manager operates in PPBM Software Mode.
Secret Phrase	The Authentication Phrase used to communicate with PPBM Software.

[Battery->Modbus TCP] Configure the parameters of the system.

Item	Definition
Status	
Host IP Address	Shows the Modbus TCP host IP address.
Connecting Status	Shows the Modbus TCP communication status.
Configuration	
Allow Access	Setup the allow access function to enable or disable.
Access IP Address	This setting determines what IP address is allowed to access the device via Modbus TCP. If you want to access device from any IP address, you can set as 0.0.0.0.
Modbus TCP Port	Setup Modbus TCP port.(default: 502)

[Current->Status] Configure the parameters of the system.

Item	Definition
Configuration	
# (index)	Index of the current probe.
Current Probe Name	The name of the current probe.
Current Probe Location	The location of the current probe
Channel	Channel index of the current probe.
Measure Name	The name used to identify the measurement.
Measure	Shows the measured current in a string.
Status	Shows the current status is normal or abnormal.

[Current->Configuration] Configure the parameters of the system.

Item	Definition
Configuration	
# (index)	Index of the current probe.
Current Probe Name	Setup the name used to identify the current probe. (Hint: Click enter to edit page)
Current Probe Location	Setup the location used to locate the current probe. (Hint: Click enter to edit page)
Channel	Channel index of the current probe.
Function	Setup channel function of the specific battery string.
Measure Name	Setup the name used to identify the measurement.
Sensor Rating	Setup the rating of the measurement.
Discharge Current Threshold	Setup discharge current limit, current probe alarm when discharge current is out of range.

[**Envir]** Following items can be displayed/configured through the Envir page. Note that Envir Tab only appears when an ENVIROSENSOR is connected to the Battery Manager.
[Envir->Status] Display the basic information of the environmental sensor and contact closure inputs.

Item	Definition
Information	
Name	The name of the environmental sensor.
Location	The location of the environmental sensor.

Item	Definition
Temperature	
Current Value	The current environmental temperature.
Maximum	The highest temperature and time detected by the environmental sensor.
Minimum	The lowest temperature and time detected by the environmental sensor.
Humidity	
Current Value	The current environmental humidity.
Maximum	The highest humidity and time detected by the environmental sensor.
Minimum	The lowest humidity and time detected by the environmental sensor.
Contact	Display the name and status (Normal/Abnormal) of each input dry relay contact.

[Envir->Configuration] Configure the parameters of the environmental sensor.

Item	Definition
Information	
Name	The name used to identify the environmental sensor.
Location	The place where the environmental sensor is located.
Temperature	
High Threshold	Upper limit for normal temperature.
Low Threshold	Lower limit for normal temperature.
Hysteresis	The point at which the difference between the High and Low temperature threshold changes from abnormal to normal.
Rate of Change	The rate used to define an abnormal change in temperature.
Unit	The unit of temperature measurement.
Humidity	
High Threshold	Upper limit for normal humidity.
Low Threshold	Lower limit for normal humidity.
Hysteresis	The point at which the difference between the High and Low humidity threshold changes from abnormal to normal.
Rate of Change	The rate used to define an abnormal change in humidity.
Contact	Enter the name of each input dry contact relay and use the dropdown menu to define the normal status of each one.

[Logs->Event Logs] Display the list of events and a brief description of each event along with the date and time stamp.

Note: 1. The recordable events are listed under “System->Notifications->Event Action.”
2. The recorded time is using the 24-hour clock format.

[Logs->Status Records] This page is used to view the logs of the system status and environment status.

- Date: The time of the specific status records.
- String Voltage (V): The voltage of the particular battery string.
- String Current (A): The current of the particular battery string.
- Temperature (°C): The current temperature of the environmental sensor.
- Humidity (%RH): The current humidity of the environmental sensor.
- A#1 Volt.(V): The string A, 1st battery voltage data.
- A#2 Volt.(V): The string A, 2nd battery voltage data.
  ...(continue until the last valid data)
- A#1 Temp.(°C): The string A, 1st battery temperature data.
- A#2 Temp.(°C): The string A, 2nd battery temperature data.
  ...(continue until the last valid data)
- A#1 Res.(mΩ): The string A, 1st battery resistance data.
- A#2 Res.(mΩ): The string A, 2nd battery resistance data.
  ...(continue until the last valid data)

[Logs->Discharge Events] This page is used to view the logs of the discharge events.

- # (index): Index of the discharge events.
- Start Time: The start time of discharge events.
- Discharging Time: The discharge duration time.
- Discharge Current (Max. A): The maximum discharge current of the event.
- Voltage Drop (String Avg. V): The average string voltage drop of the event.
- Voltage Drop (Battery Avg. V): The average voltage data of the battery in voltage drop of the event.
- Voltage Drop (Battery Max. V): The specific battery of the particular string with the maximum voltage in voltage drop of the event.
  Ex: A#1 Volt. : The string A, 1st battery has maximum voltage drop and its voltage drop in the event.
- Detail: Click to download the detail data of discharge events.

[Logs->Graphing] This page is used to display the data of the Status Record. The graphing function makes the status records easier to view.

Item	Definition
Graph Period	The period used to draw the graph. Longer periods will require more time to be displayed.
Graph Data	The data used to draw the graph. The more data selected, the more graphing time is needed.
Graph Node	Selecting “Display All Nodes in Detail” will display all the points along the line; moving the cursor on the data point will show the information of that point.
Launch Graph in New Window	Checking this box will open the graph in detail in a new page.

[Logs->Syslog] Allow users to set syslog server and send test message.

Item	Definition
Syslog	Enable or disable Syslog function.
Facility Code	Select Syslog facility.
Server IP	The IP address of Syslog server.
Server Port	The UDP port used by the Syslog server.
Send Test	Send test message to Syslog server.

[Logs->Maintenance] This page is used to select "Event Logs" and "Status Records" settings. The application provides information on how many events are recorded before it is full.

Item	Definition
Event Logs	
Clear All Logs	Clear the existing event logs.
The Number of Events	The number of the existing event logs and the maximum number of the event logs that can be recorded. Once the maximum number is reached, new events overwrite oldest events in memory.
Save Event Logs	Save the existing event logs as a text file.
Status Records	
Recording Interval	Set the frequency status data is recorded. A smaller interval will provide more frequent recordings but exhaust available memory quicker. A larger interval will provide less frequent recordings, but save data for a longer period of time.
Clear All Records	Clear the existing status records.

Item	Definition
Remaining Time	The time that records have been kept. A smaller recording interval leads to less remaining time while a larger recording interval leads to more remaining time. Once the maximum number is reached, new status records overwrite oldest status records in memory.
Save Status Records	Save the status records as a text file.

Note: Event Logs and Status Records use a First In First Out memory. Oldest data will be rewritten once memory is full.

[System->General->Time] Display the system date and time and allow users to set it manually or by using the NTP (Network Time Protocol) server.

Item	Definition
Current Settings	Displays the current date and time on the manager status and time until the next Network Time Protocol (NTP) update.
System Time Configuration	
Time Zone	Choose the Battery Manager time zone in GMT (Greenwich Mean Time).
Using NTP server	Enter the IP address/domain name of NTP servers, and set the frequency to update the date and time from NTP server. Click "Update right now" to update immediately.
Manual Setup	Enter the date and time in the designated format.

[System->General->Identification] Assign the system's name, contact, and location.

Item	Definition
Name	The name of the equipment.
Location	Where the power equipment is located.
Contact	The person to contact about this equipment.

[System->General->Daylight Saving Time] Adjust the clock daylight saving time.

Item	Definition
DST Configuration	
Disable	Disable DST.
Tradition US DST	Set traditional US DST settings Start: 2:00, second Sunday in March. End: 2:00, first Sunday in November.
Manual DST	Manual DST date time rules.

[System->Security->Authentication] Set for login authentication and software authentication.

Item	Definition
Login Authentication	
Local Account	Use local account Administrator or Viewer settings to log in.
RADIUS, Local Account	Use RADIUS configuration settings to log in. If RADIUS authentication fails then Local Account settings will be used to log in.
RADIUS Only	Use RADIUS configuration settings to log in.
LDAP, Local Account	Use LDAP configuration settings to log in. If LDAP authentication fails then Local Account settings will be used to log in.
LDAP Only	Use LDAP configuration settings to log in.
Software Authentication	
Secret Phrase	The Authentication Phrase used to communicate with PowerPanel Business Edition Client. **Note:** For more information, please refer to Appendix 4.

[System->Security->Local Account] This page is used to configure the login account.

Item	Definition
Administrator	Administrator has full access to read/write configuration settings.
Viewer	Viewer has restricted access to read only.
Admin/Viewer Manager IP	This setting determines what IP address is allowed to access the device using either Admin or Viewer accounts. If you want to access Battery Manager from any IP address, you can set one of them as 0.0.0.0 or 255.255.255.255. **Note:** A range of IP addresses can be allowed by entering the subnet mask. For example 192.168.20.0/16 means the IP which has subnet of 192.168.0.0 can be allowed to access.

Change Administrator account:

1. Enter User Name
2. Enter Current Password
3. Set the Manager IP (optional)
4. Enter New Password
5. Enter Confirm Password
6. Click “Apply”

Change Viewer account:

1. Select “Allow Access” to enable the Viewer account
2. Enter the User Name
3. Set the Manager IP (optional)
4. Enter New Password
5. Enter Confirm Password
6. Click “Apply”

Note: The maximum length of both User Name and Password is 15 characters.

[System->Security->RADIUS Configuration] After setting the proper RADIUS server, the Battery Manager can use user name and password set on the RADIUS server to login.

Item	Definition
Server IP	The IP address of RADIUS server.
Shared Secret	The shared secret of RADIUS server.
Server Port	The UDP port used by the RADIUS server.
Test Setting	Test RADIUS server using user name and password settings. If authentication is successful the settings will be saved.
Skip Test	Save RADIUS server settings without testing.

Note: Please refer to Appendix 2 for the account configuration in RADIUS servers.

[System->Security->LDAP Configuration] After setting the proper LDAP server, the Battery Manager can use user name and password that set on the LDAP server to login.

Item	Definition
LDAP Server	The IP address of LDAP server.
LDAP SSL	Enable to communicate with LDAP server by LDAPS.
Port	The TCP port used by the LDAP(S) server.
Base DN	The Base DN of LDAP server.
Login Attribute	The Login Attribute of LDAP user entry (for example: cn or uid).
Generic LDAP Server	Select LDAP server type as OPENLDAP.
Active Directory	Select LDAP server type as Windows AD.
AD Domain	The AD Domain of the Active Directory server.
Test Setting	Test LDAP(S) server using user name and password settings. If authentication is successful the settings will be saved.
Skip Test	Save LDAP(S) server settings without testing.

Note: Please refer to Appendix 2 for the account configuration in LDAP & Windows AD servers.

[System->Security->Session Control] Set for timeout setting for open sessions to automatically log off.

Item	Definition
Timeout	The period (in minutes) that the system waits before automatically logging off.

[System->Network Service->TCP/IPv4] Display the current TCP/IPv4 settings. Set DHCP and DNS server settings.

Item	Definition
Current Configuration	Displays the current TCP/IP settings: IP address, subnet mask, gateway, and DNS server.
DHCP	Select the “Enable DHCP” option and click “Apply” to get IP address, Subnet Mask, and Gateway from DHCP server. Select the “Obtain DNS Address from DHCP” and click “Apply” to get the IP of DNS from the DHCP server.
Manual	Enter the TCP/IP settings directly and click “Apply”.

[System->Network Service->TCP/IPv6] Display and configure the current IPv6 settings.

Item	Definition
IPv6 Interface	Displays the current IPv6 address.
IPv6 Gateway	Displays the current IPv6 gateway.
IPv6 Configuration	
Access	Set the IPv6 service to either Enable or Disable.
Address Mode	
Router Control	The IPv6 address is assigned through one of the following methods as configured in the router settings: Stateless Address Auto-configuration, Stateless DHCPv6 or Stateful DHCPv6.
Manual	The IPv6 address is assigned manually.
Manual IPv6 Address	Enter the IPv6 address directly when the Manual setting is selected.

[System->Network Service->SNMPv1 Service] Allow users to use a NMS and configure the appropriate SNMPv1 settings.

Item	Definition
SNMPv1 Service	
Allow Access	Set the SNMP service to either Enable or Disable.
SNMPv1 Access Control	
Community	The name used to access this community from a Network Management System (NMS). The field must be 1 to 15 characters in length.
IP Address	NMS access can be restricted by entering a specific IP address or an IP network subnet mask. The following subnet mask rules apply: • 192.168.20.255: Access only by an NMS on the 192.168.20 segment. • 192.255.255.255: Access only by an NMS on the 192 segment. • 0.0.0.0 (the default setting) or 255.255.255.255: Access by any NMS on any segment.
Access Type	The allowable action for the NMS through the community and IP address. • Read Only: GET command allowed any time; SET command restricted. • Write/Read: GET command allowed any time; SET command allowed anytime unless a user session is active. • Forbidden: GET and SET commands are restricted.

[System->Network Service->SNMPv3 Service] Allow users to use a NMS and configure the appropriate SNMPv3 settings.

Item	Definition
SNMPv3 Service	
Allow Access	Set the SNMPv3 service to either Enable or Disable.
SNMPv3 Access Control	
User Name	The name to identify SNMPv3 user. The field must be 1 to 31 characters in length.
Privacy Password	The password used to generate the key used for encryption. The field must be 16 to 31 characters in length.
IP Address	NMS access can be restricted by entering a specific IP address or an IP network subnet mask. The following subnet mask rules apply: • 192.168.20.255: Access only by an NMS on the 192.168.20 segment. • 192.255.255.255: Access only by an NMS on the 192 segment. • 0.0.0.0 (the default setting) or 255.255.255.255: Access by any NMS on any segment.
Authentication Type	The hash type for authentication.
Privacy Type	The type of data encryption/decryption.

Note: The privacy protocol cannot be selected if no authentication protocol is selected

[System->Network Service->Web Service] Select Enable to allow access to the HTTP or HTTPS Service and configures the TCP/IP port for them.

Item	Definition
Access	
Allow Access	Enable the access to HTTP or HTTPS service. The HTTPS supports encryption algorithm list as follow: • AES (256/128 bits) • Camellia (256/128 bits) • 3DES (168 bits) • DES (168 bits) • RC4 SHA (128 bits) • RC4 MD5 (128 bits)
Http Settings	
Http Port	The TCP/IP port of the Hypertext Transfer Protocol (HTTP) (80 by default)
Https Settings	
Https Port	The TCP/IP port of the Hypertext Transfer Protocol Secure (HTTPS) (443 by default)

Item	Definition
Certificate Status	Click the following links: • Valid Certificate (or Invalid Certificate): Certificate detail information. • Upload Certificate: Upload a certificate and replace the current one. **Note:** The format of uploading certificate must in a standard PEM (Privacy Enhanced Mail).

[System->Network Service->FTP Service] Allow users to Enable/Disable the FTP server service and configure the TCP/IP port of the FTP server (21 by default).

Item	Definition
Allow Access	Enable the access to FTP server.
Service Port	The TCP/IP port of the FTP server (21 by default). Users can change port setting to any unused port from 5000 to 65535 to enhance security.

Note: The FTP server is used for upgrading Firmware. For more details about the upgrade process, please refer to “Firmware Upgrade” section.

[System->Notifications->Event Action] Configure notification settings for every Device Event. Events are categorized for ease of management.

- Log: Record the event in the “Event Logs”.
- E-mail: Send an email to a specific user (An available SMTP server is necessary).
- Trap: A SNMP trap sent to a specific IP address.
- SMS: Send a short message to a specific mobile phone number (An available SMS service provider is needed).

[System->Notifications->SMTP Server] After setting the proper SMTP server, event notification email can be sent to recipients when specific events occur.

Item	Definition
Service Provider	The service provider of e-mail account. There are two options: General and Gmail.
General	Select General as service provider. Complete all field settings and click Apply to save.
Gmail	Select Gmail as the service provider. Click Authorize for an authorization to send a mail notification. Then complete the sender name and click Apply to save the settings.
SMTP server address	The IP address or Host Name of the SMTP server used to send email notifications.
Sender's E-mail Address	Email address used to send the email notification.
Authentication	Select this option if the SMTP server requires to authenticate the user.

Item	Definition
Username	Username used for Authentication.
Password	Password used for Authentication.
Secure connection	Enable TLS or SSL security.
Service port	The port number used to communicate with the SMTP server.

[System->Notifications->E-mail Recipients] Set up to five email recipients to receive notifications when configured Events occur.
To add a new recipient, click “New Recipient”. To modify or delete an existing Recipient, click the e-mail address of that recipient. To check if SMTP setting and the email recipients are set correctly, click “TEST” button to send a test message.

[System->Notifications->Trap Receivers] Setup up to 10 SNMP TRAP receivers by IP address (IPv6 supported). SNMPv1 and v3 is supported. The listed TRAP receivers will be notified when device Events occur.
To add a new receiver, click “New Receiver”. To modify or delete an existing receiver, click the IP address or name of that receiver. To check if the traps can be received correctly, click “TEST” button.

[System->Notifications->SMS Service] Short Message Service (SMS) is a communication service used by mobile communication systems. Using standardized communication protocols will allow the interchange of short text messages between mobile devices. The system provides 4 methods for users to choose how they want to send the messages.

Information	Description
Service provider is Clickatell	Select the **Clickatell** option in the SMS Method field. Complete all the account details including Username, Password and HTTP API ID fields. For example: User Name Name Password Passwd HTTP API ID 3234599
Service provider accepts HTTP GET	This specification from the SMS provider is required before using the **HTTP GET** method. Select the Using **HTTP GET** option in the SMS Method field. Insert the E_PHONE_NUMBER as recipient's mobile phone number and the E_PHONE_MESSAGE as event message, described by the SMS provider specification, and fill in the URL field. The expressions will be replaced by relevant content before the message is sent by the SMS provider. For example: URL http://ServiceProviderURL?user=Name&password=Passwd&api_id=3234599&to=E_PHONE_NUMBER&text=E_MESSAGE

Information	Description
Service provider accepts HTTP POST	This specification from the SMS provider is required before using the HTTP POST method to deliver messages via SMS providers. Select the Using HTTP POST option in the SMS Method field. Insert E_PHONE_NUMBER as recipient's mobile phone number and E_PHONE_MESSAGE as the event message, described by the SMS provider specification, and fill in the POST URL and POST BODY fields. The expressions will be replaced by the relevant content before the message is sent by the SMS provider. For example: URL http://ServiceProviderURL Content user=Name&password=Passwd&api_id=3234599& to=E_PHONE_NUMBER&text=E_MESSAGE
Service provider accepts E-mail (SMTP)	This specification from a SMS provider is required before using the E-mail to deliver the messages via SMS providers. Select the Using E-mail option in the Service Provider field. Insert E_PHONE_NUMBER as recipient's mobile phone number and the E_PHONE_MESSAGE as event message, described by the SMS provider specification. Fill in the Recipient's Address, Subject and Content. The expressions will be replaced by the relevant content before the message is sent by the SMS provider. For example: Address sample@cyberpower.com Subject TestSubject Content E_PHONE_NUMBER&text=E_MESSAGE

[System->Notifications->SMS Recipients] Users can set up to 10 mobile phone numbers as SMS recipients. The Recipients will receive a short message notification when configured events occur.
To add a new recipient, click "New Recipient". To modify or delete an existing Recipient, click the mobile number or Name of that recipient. To test SMS settings, click "TEST" button and see if the test message is correctly received.

[System->Reset/Reboot] Reset or reboot the Battery Management System.

Item	Definition
Item	Definition
Reboot System	Restart the system without turning off and restarting the system.
Reset System	Reset the system to factory default setting. The system will restart. This action will not turn off or restart the system.
Reset System (TCP/IP Settings Reserved)	Reset the system to factory default setting but reserving TCP/IP. The system will restart This action will not turn off or restart the system.

[System->About] Display system information for the Battery Manager.

Item	Definition
Model Name	Model name of the Battery Manager.
Serial Number	The serial number of the Battery Manager.
Manufacture Date	The manufacture date of the Battery Manager
Hardware Version	The hardware version of the Battery Manager.
Firmware Version	The current firmware version installed on the Battery Manager.
LCD Hardware Version	The hardware version of the Battery Manager LCD module.
LCD Firmware Version	The firmware version of the Battery Manager LCD module.
Ethernet Hardware Version	The hardware version of the Battery Manager Ethernet module.
Ethernet Firmware Version	The firmware version of the Battery Manager Ethernet module.
Ethernet MAC Address	MAC address of the Battery Manager.
Save Configuration	Click “Save” to save the Battery Manager configuration file. The text file name will have a default format of YYYY_MM_DD_HHMM.txt.
Restore Configuration	Use this function to restore a configuration that had been previously saved. Click “Choose File” to select the location of the saved configuration file and click “Submit”.

Ethernet Module Firmware Upgrade

By upgrading the Ethernet firmware, you can obtain both the new features and updates/ improvements to existing functionality. FTP service needs to be Enabled before attempting to execute a Firmware Upgrade. You can check the “Firmware version” on the **[System->About]** page on the web user interface of the Battery Manager. There are two files to update in order to upgrade the firmware version.

- A. cpsbmethafw_XXX.bin
- B. cpsbmethadata_XXX.bin

Note: To ensure keeping the Ethernet firmware up to date, please visit CyberPower website every 3 months to see if there is any updated firmware version available.

Note: Please do not turn the Battery Manager off when processing the Firmware upgrade.

Using FTP command

Use the following steps to upgrade the firmware:

1. Download the latest firmware
2. Extract the downloaded files to “C:\”
3. Open a command prompt window
4. Login to the CyberPower Battery Manager with FTP command, in the command prompt type:
   (1) `ftp`
   (2) `ftp> open`
   (3) To [current IP address of Battery Manager] [port]; EX: `To 192.168.22.126 21`
   (4) Input USER NAME and PASSWORD (same as the administrator account in web user interface, see page 7 for default factory settings)
5. Upload file A, type:
   `ftp > bin`
   `ftp > put cpsbmethafw_XXX.bin`
6. Upload is now complete, type:
   `ftp > quit`
7. The system will reboot after you type “`quit`”
8. Login to the FTP again as step 4
9. Upload file B, type:
   `ftp > bin`
   `ftp > put cpsbmethacdata_XXX.bin`
10. Upload is now complete, type:
    `ftp > quit`
11. The system will reboot after you type “`quit`”

Save and Restore Configuration Settings

Figure 9. Save/Restore Configuration in the main window.

You can easily save and restore the device configuration to your local PC on the **[System->About]**, as shown in Figure 9.
To save the configuration file, click “Save” to save the configuration to your local PC. The text file will have a default format of YYYY_MM_DD_HHMM.txt. To restore a configuration, click “Browse” to the location of the saved configuration file and click “Submit” to restore a configuration that has been saved earlier.

Troubleshooting

Problem	Solution
Unable to configure the Battery Manager using method 1 or method 2	1. Check the LED status, it is normal when the yellow and green LEDs are both on. If yellow LED is off : ► Ensure the network connection is good. 2. Ensure the PC being used is on the same local network subnet as the CyberPower device you are trying to communicate with. 3. Ensure the Jumper on the Reset Pin is correctly installed.
Unable to ping the Battery Manager	1. Use method 1 and/or method 2 to get/set a correct IP address for the Battery Manager. 2. If the PC being used is on a different network subnet from the Battery Manager, verify the setting of subnet mask and the IP address of gateway.
Lost the user name and password	Reset the system to the factory default setting via LCD interface on the **[Reset/Reboot → Reset → Confirm**] or via web user interface on the **[System → Reset/Reboot]** **Note:** You may save configuration settings first before resetting the system. Please refer to ‘Save and Restore Configuration Settings’ section.
Default Network Setting	IP: 192.168.20.177 Subnet mask: 255.255.255.0 DHCP: On
Unable to access the Web Interface	1. Ensure you can ping the Battery Manager. 2. Ensure you are specifying the correct URL.
Unable to operate a SNMP get/set	SNMPv1: Verify the community name. SNMPv3: Verify the user profile configuration.
Unable to receive traps	1. Ensure the trap types (SNMPv1/SNMPv3) and trap receiver are configured correctly. 2. Ensure the IP address of gateway is configured correctly if the Battery Manager and NMS are on a different network.

Problem	Solution
Get the alarm of battery resistance and the battery is not fully charged	Check the battery charging system first, retest battery resistance after the battery is fully charged to confirm whether it's a battery aging or charger problem.
Get the alarm of battery resistance and the battery is fully charged	1. Check if the battery connecting wire and pole screw are loose and if there is any corrosion in the battery polarity. 2. Ensure the battery Connecting Cable is correctly and firmly installed to the Battery Probe. 3. Compare the measured resistance value with the internal resistance tester to clarify whether the Battery Probe is abnormal. **Note:** When confirming whether the battery is fully charged, please note it will vary depending on use of battery and design of battery charging system.

Conformance Approvals

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any special accessories needed for compliance must be specified in the instruction.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numerique de la class A respecte toutes les exigencies du Reglement sur le materiel brouilleur du Canada

European Union

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

⚠**WARNING:** This product can expose you to chemicals including Styrene, which is known to the State of California to cause cancer, and Bisphenol-A, which is known to the State of California to cause birth defects or other reproductive harm.

For more information please go to: www.P65Warnings.ca.gov.

Appendix 1: IP Address Settings for CyberPower Battery ManagerFCC Warning

Overview

All devices on a computer network need to have an IP address. Each device's IP address is unique. The same address cannot be used twice. In order to assign an IP address to the CyberPower Battery Manager, you must determine the range of the available IP addresses, and then choose an unused IP address to assign to the Battery Manager.

Note: You may need to contact your network administrator to obtain an available IP address.

Procedures to find an IP address:

1. **Locate the subnet of the CyberPower Battery Manager.**
   One way to determine the range of possible IP addresses is to view the network configuration on a workstation. Click on [Start] and select [Run]. Type "command" into the open box and click [OK]. At the command prompt type "ipconfig /all" and press [Enter]. The computer will display network information as listed below:

```
Ethernet adapter
Connection-specific DNS Suffix ... : xxxx.com
Description ..................... : D-Link DE220 ISA PnP LAN adapter
Physical Address ............... : 00-80-C8-DA-7A-C0
DHCP Enabled .................... : Yes
Autoconfiguration Enabled…: Yes
IP Address ..................... : 192.168.20.102
Subnet Mask .................... : 255.255.255.0
Default Gateway ................ : 192.168.20.1
DHCP Server .................... : 192.168.20.1
DNS Servers .................... : 211.20.71.202
                                  168.95.1.1
```

2. **Select an IP Address for the CyberPower Battery Manager**
   Verify the IP Addresses for the computer and the Battery Manager belong to the same subnet. Refer to the above network information, the possible IP Address for the Battery Manager could be 192.168.20.* (* hereafter represents any number between 1 and 255). Similarly, if the Subnet Mask is 255.255.0.0, the IP Address for Battery Manager could be set up as 192.168.*.* to reach the same subnet with the computer.
   To verify there is no other equipment connected to the network using the same IP Address, run "Ping 192.168.20.240" at the DOS Mode prompt when the IP Address you would like to set is 192.168.20.240. If the response is presented as below, the IP address is most likely not used and may be available for the CyberPower Battery Manager.

```
Pinging 192.168.20.240 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
```

If the response is shown as below, the IP address is in use. Try another IP address until an available address is found.

```
Pinging 192.168.20.240 with 32 bytes of data:
Reply from 192.168.20.240: bytes=32 time<10ms TTL=64
Reply from 192.168.20.240: bytes=32 time<10ms TTL=64
Reply from 192.168.20.240: bytes=32 time<10ms TTL=64
Reply from 192.168.20.240: bytes=32 time<10ms TTL=64
```

Appendix 2: How to Configure a Battery Manager User Account in Authentication Servers

RADIUS

1. Add a new attribute to RADIUS Dictionary as the Cyber vendor:
   3808 – Vendor
2. Add two new specific attributes to RADIUS server interface under the vendor:
   Cyber-Service-Type (integer variable)
   Cyber-Service-Type can accept three integer parameter values:
   1 – Administrator
   2 – Viewer

The example of the Dictionary File:

```
VENDOR          Cyber          3808
BEGIN-VENDOR    Cyber
ATTRIBUTE       Cyber-Service-Type      1               integer
VALUE           Cyber-Service-Type      Admin           1
VALUE           Cyber-Service-Type      Viewer          2
END-VENDOR      Cyber
```

LDAP & Windows AD

Add one of the attributes below to **description** on the OpenLDAP or Windows AD interface for indicating the user account type and authentication:

1. **cyber_admin** (Administrator)
2. **cyber_viewer** (Viewer)

Appendix 3: Software Support

Battery Management System (BMS) Software is used to collect and configure multiple Battery Managers' data. Battery Management System (BMS) Software is available on CyberPower Systems official website. Please visit www.CyberPower.com and go to the software section for free download.

Communicate with BMS software

The Battery Manager requires authentication with BMS software via a shared secret phrase, as shown in Figure 10.

Note: The default secret phrase is 'key.secure.phase.bms'.

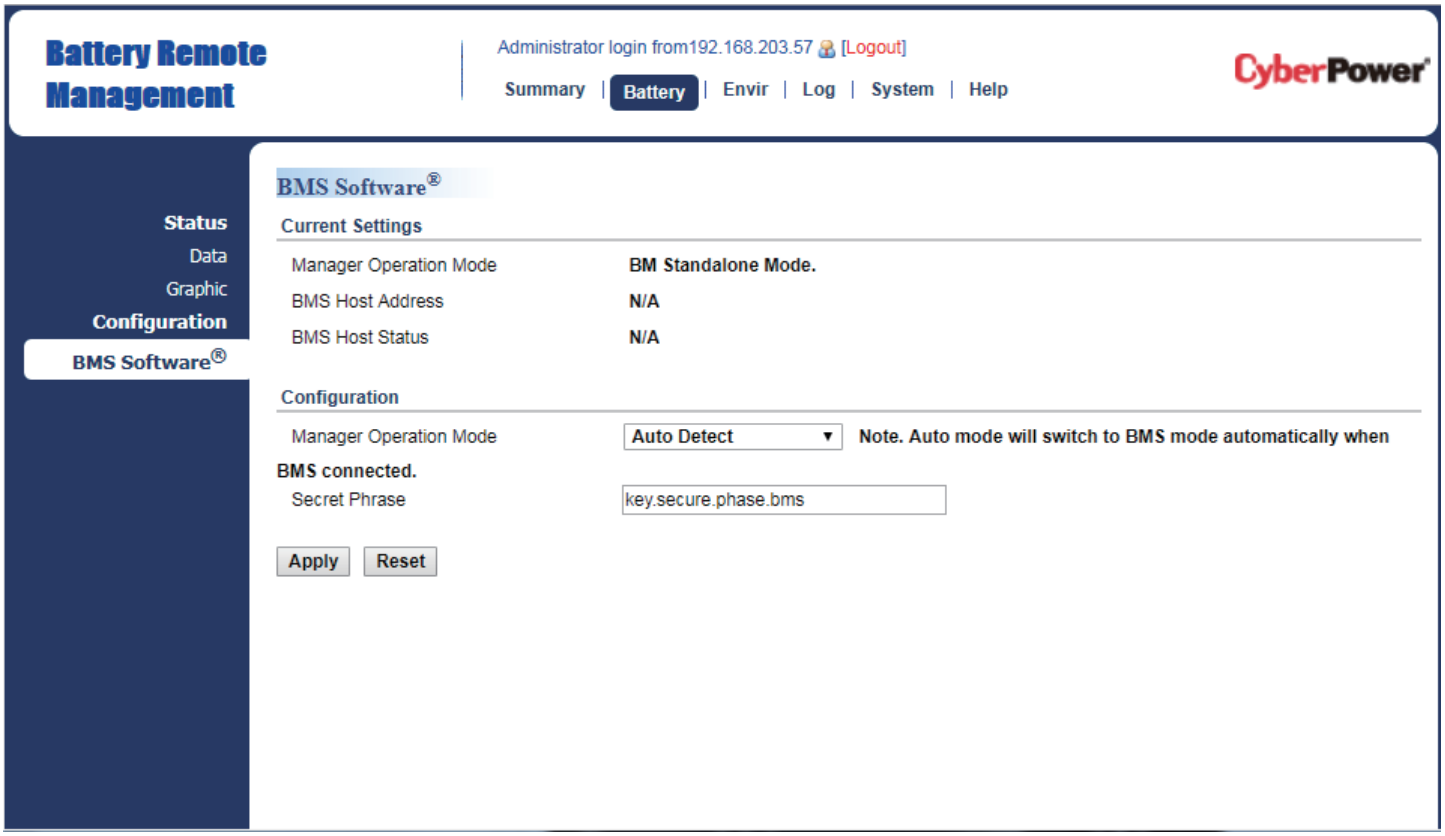
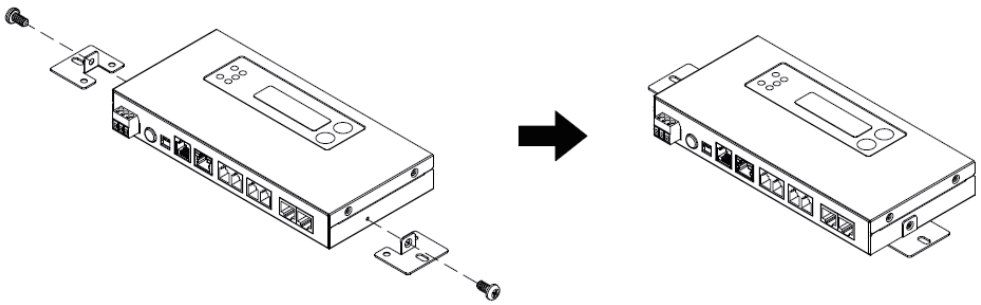


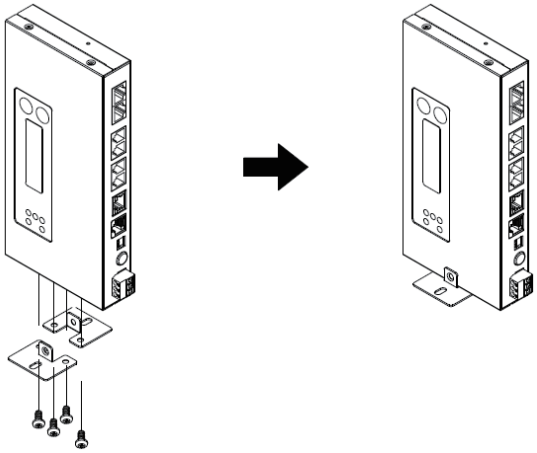
Figure 10. Battery Management System > Authentication web UI.

Appendix 4: Mounting Bracket Installation Guide

Method 1: Horizontal Installation



Method 2: Upright Installation



Note: Please set up the Battery Manager on a level surface.

CyberPower

Cyber Power Systems, Inc.
www.cyberpower.com
For USA and Canada:
4241 12th Ave East, Suite 400
Shakopee, MN 55379
Toll-free: (877) 297-6937
For all other regions:
Please visit our website for local contact information.

CE

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