PANDUIT®
infrastructure for a connected world

ES2P Intelligent PDU User Manual
V1.0

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Section 1 – System Overview

PDU Controller

All Panduit Intelligent PDUs feature a Rotatable or Hot Swappable Intelligent Network Controller (iNC). This centralized piece of intelligent hardware receives an IP address, contains a Graphical Web Interface and is addressable over the network.

Connecting the PDU via Ethernet Port

Connecting the PDU to a LAN provides communication through an Internet or Intranet connection enabling monitoring and control over the intelligent power distribution unit.

1. Connect an Ethernet cable to the Ethernet port on the PDU (see Figure 1).
2. Connect the other end of the cable to the Ethernet port on the router (or another LAN device).

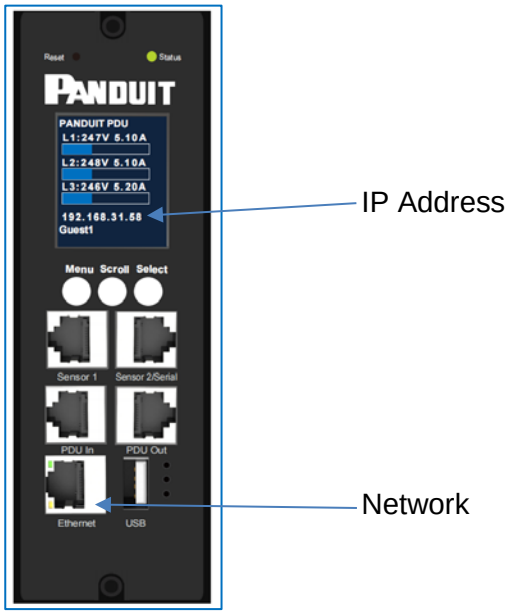


Figure 1: Ethernet Port for Network Connection

From the factory the PDU defaults to DHCP and HTTPS connection. If you are connected to a network with a DHCP server, the PDU automatically receives an IP address and will display it on the LCD screen. If there is no DHCP server after several minutes, the LCD display shows IP address is 0.0.0.0, If the network cable is unplugged and plugged back in, the PDU will restart the DHCP server search process.

Connecting the PDU to a Computer Serial Port

If unable to connect to network, you can change the network setting using the serial interface.

To configure the network setting, perform the following steps:

1. Connect PDU Serial port to a computer's serial port. Set baud rate for a terminal emulation program.
2. Using a CLI command to enable DHCP or set a static IP.
3. Verify access to the Web interface. The Ethernet LED on the PDU front panel provides communication status by color and display activity (see Figure 2).

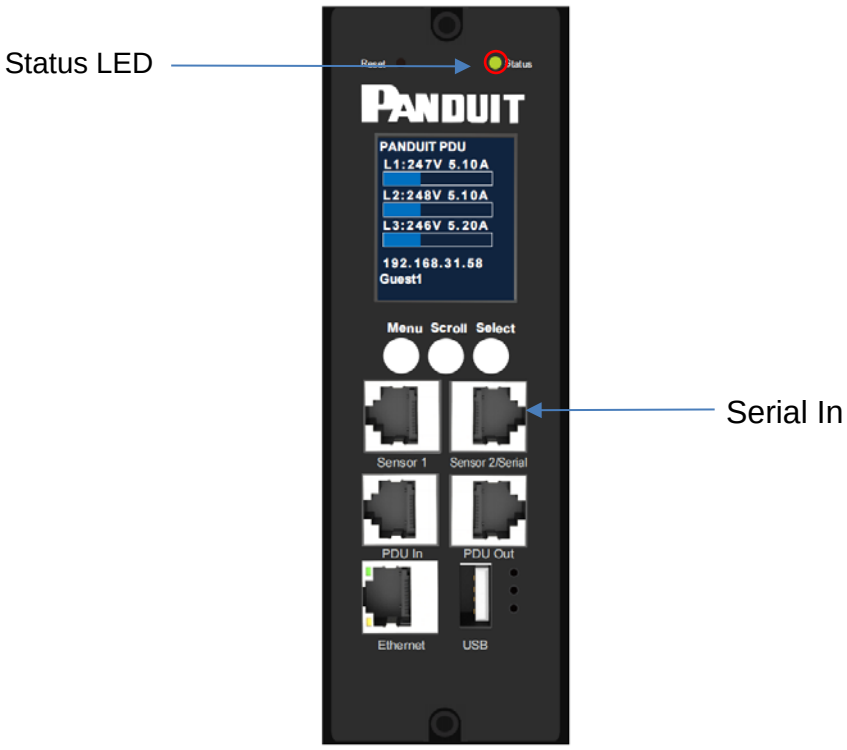


Figure 2: Status LED & Serial In Port Identified

Additional details in Appendix F.

Section 2 – Web Graphical User Interface (GUI) Configuration

Internet Protocol (IP) Addressing

After the PDU receives an IP address, login to the Web interface to configure the PDU and assign a static IP address (if desired).

Connecting to the PDU

1. Ethernet port on the PDU indicates solid green light on the right and a flashing yellow light on the left. This indicates successful connectivity to the network.
2. You can find the IP address on the LCD display; or selecting **Scroll> Network > IPv4 or IPv6** as applicable.
3. In a standard web browser, enter the PDU IP address ("https://IP ADDRESS") and proceed to configure the PDU as shown in the Web Configuration section.

Web Configuration

Supported Web Browsers

The supported Web browsers are Google Chrome (mobile and desktop), Mozilla Firefox, Microsoft Edge and Apple Safari (mobile and desktop).

Changing Your Password

Please use the default username and password for first login.

Initial Default Username: **admin**
Initial Default Password: **admin**

After successful login, you are required to change the default password immediately:

1. Enter the current password and new password twice to confirm. By default, passwords must be between 8 and 32 characters.

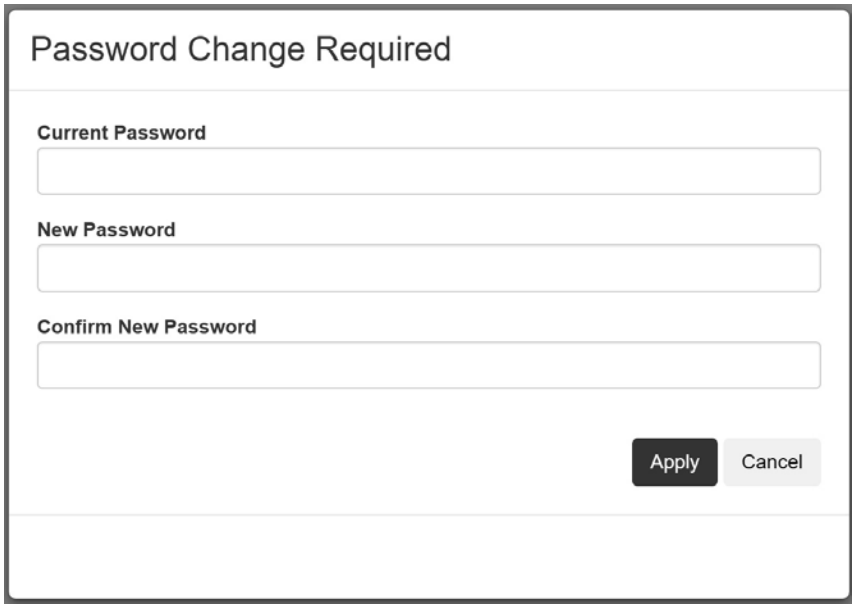


Figure 3: Changing Your Password

2. Click **Apply** to complete the password change. After the initial login, change the password by the following steps:

1. Go to User Name and select Change Password.

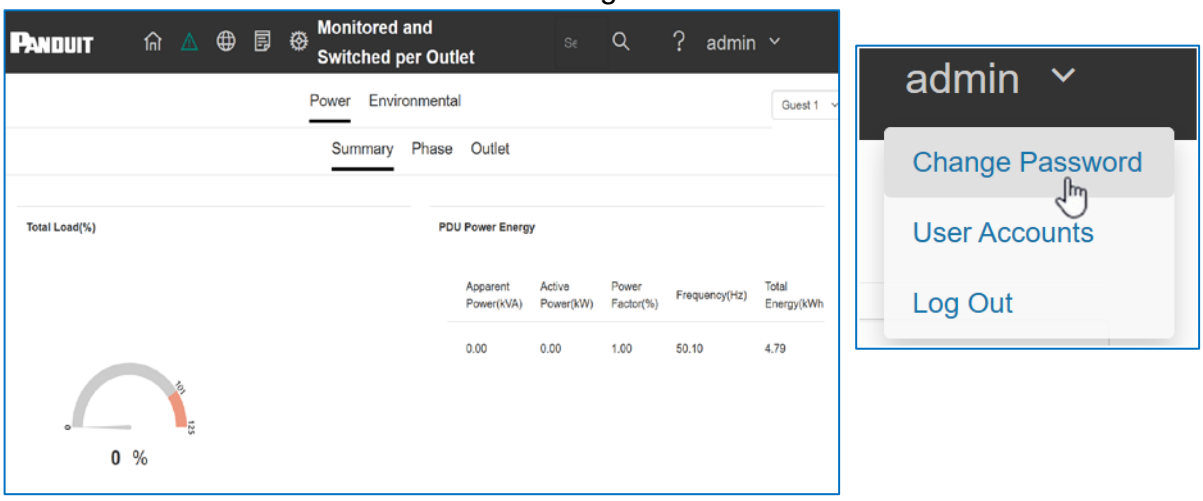


Figure 4: After Login

2. The Change User Password and change guest password window opens.

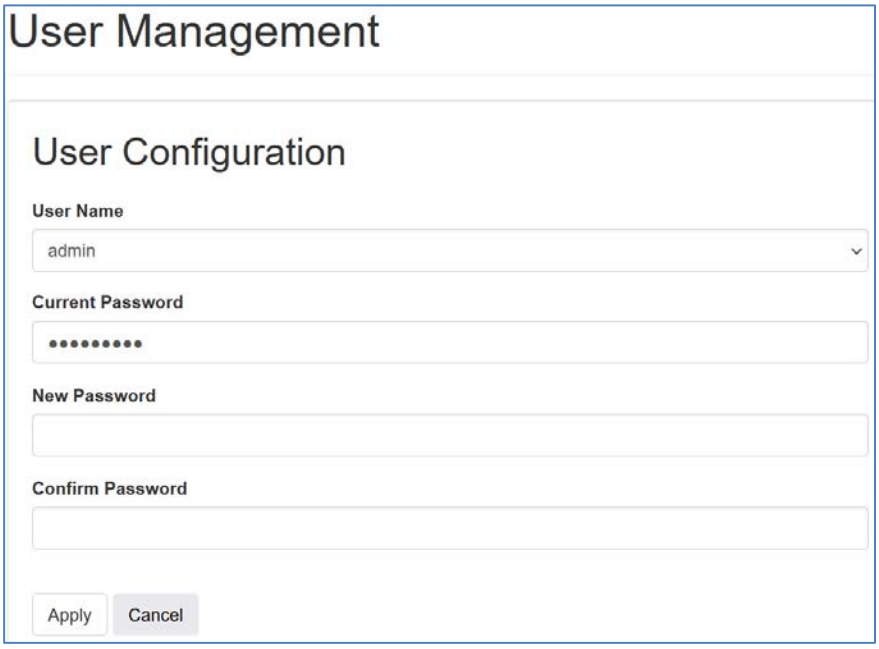


Figure 5: Change User Password

3. Enter the old password and then new password twice to confirm. By default, passwords must be between 8 and 32 characters.

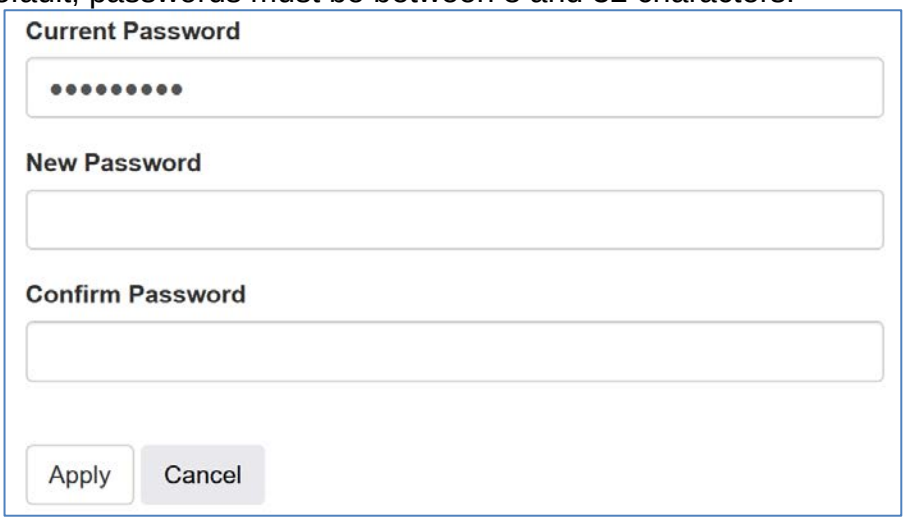
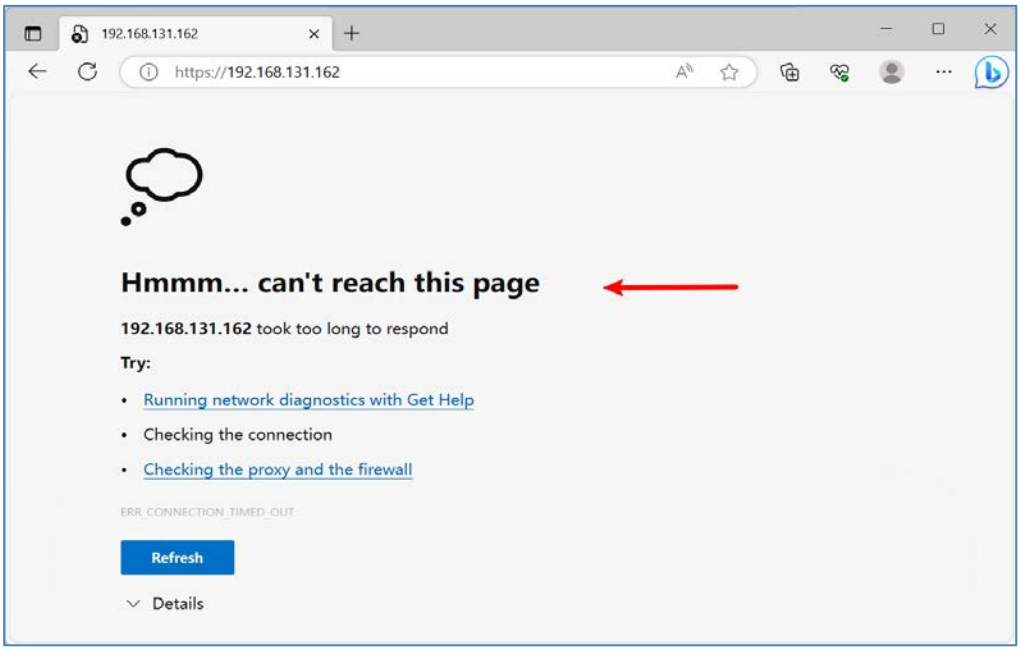


Figure 6: Change Password

4. Click **Apply** to complete the password change.

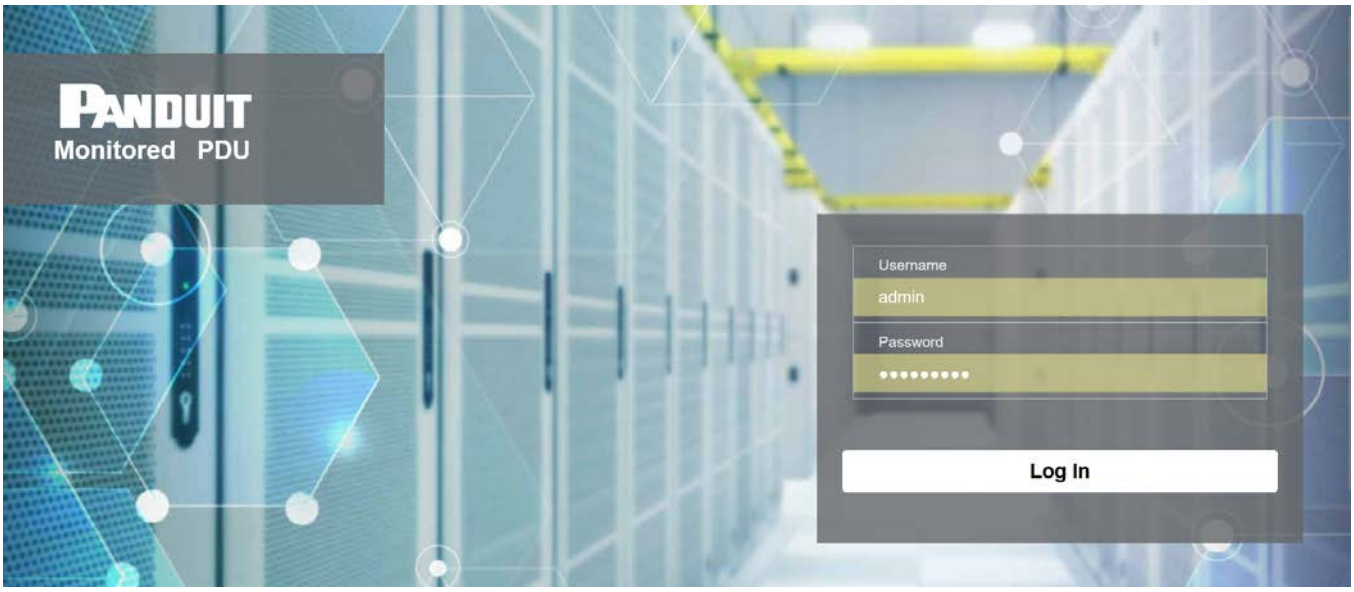
Logging in to the Web Interface

- Open a supported web browser and enter the IP address of the PDU (HTTPS)
- If browser displays “can’t reach this page” please *double check* that you are using the “https://” protocol not “http://”



  - If username and password have NOT been configured, use the default username: ***admin*** and password: ***admin.*** For security purposes, a change of password is required upon first initial login.
  - If admin credentials are lost, use Appendix B to factory reset the PDU.

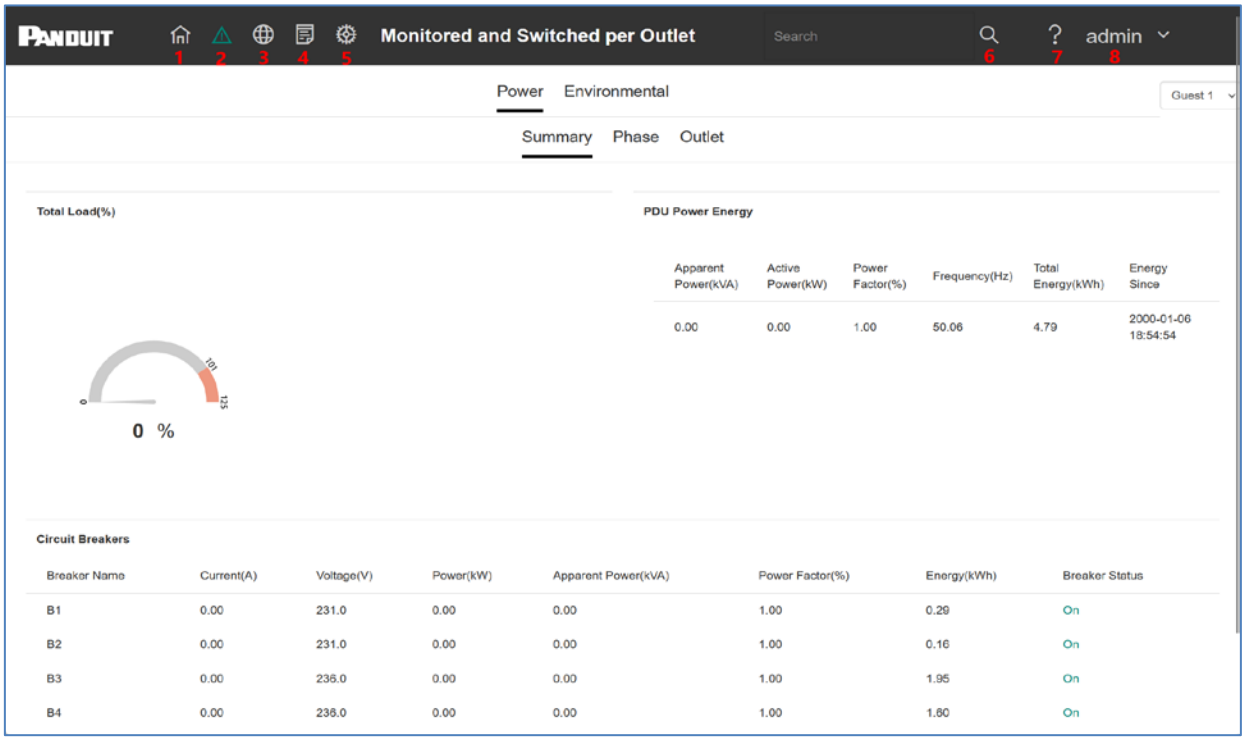
Introduction to the Web GUI



Login Page Note: https:// must be used (for initial login)

Figure 7: Login Page

Landing

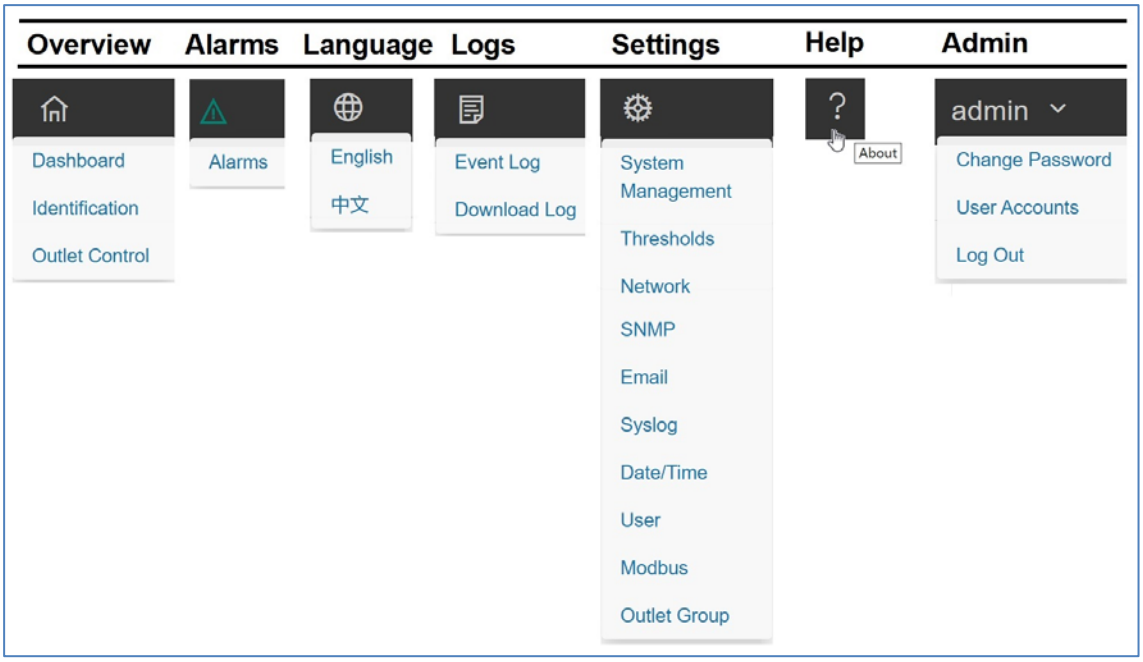


Page/Dashboard

Figure 8: Landing Page/Dashboard

Number	Icon	Description
1		The home icon provides an overview of the PDU with access to the Dashboard, Identification, and Outlet Control.
2		The Alarm icon provides details of the active critical alarms and active warning alarms.
3		This icon lets you select a Language. There are two languages available to choose from: English, Chinese.
4		This icon provides the event logs of the PDU which can be viewed and downloaded. The Event Log is a log of the PDU status.
5		The settings icon allows a user to setup the System Management, Thresholds, Network, SNMP, Email, Syslog, Date/Time, User, Modbus, Outlet group.
6		The search icon allows you to input key words and search for the related results.
7		Information about the PDU can be found using this icon. You also can click user guide and license to ask for help.
8		This icon shows who is logged in (user or admin). Account passwords can be changed, and user accounts managed through this page.

Menu Dropdowns



Introduction to the Dashboard

Daisy Chained PDUs Selection Page

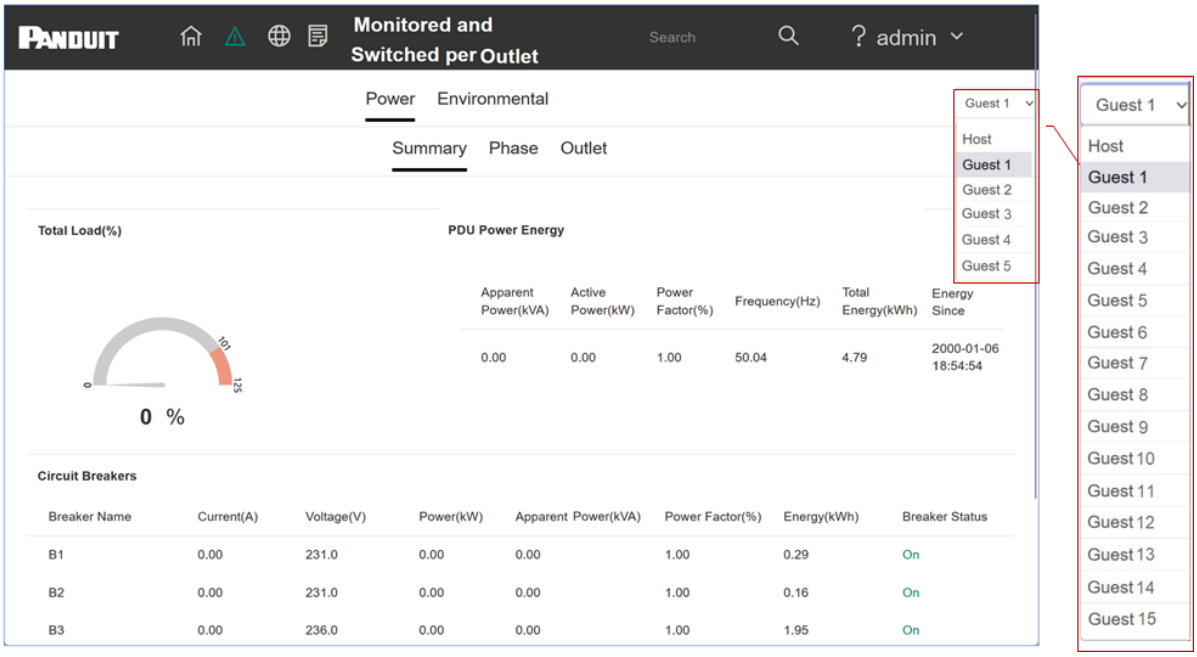


Figure 9 Daisy Chained PDUs Selection Page

Power Summary Page

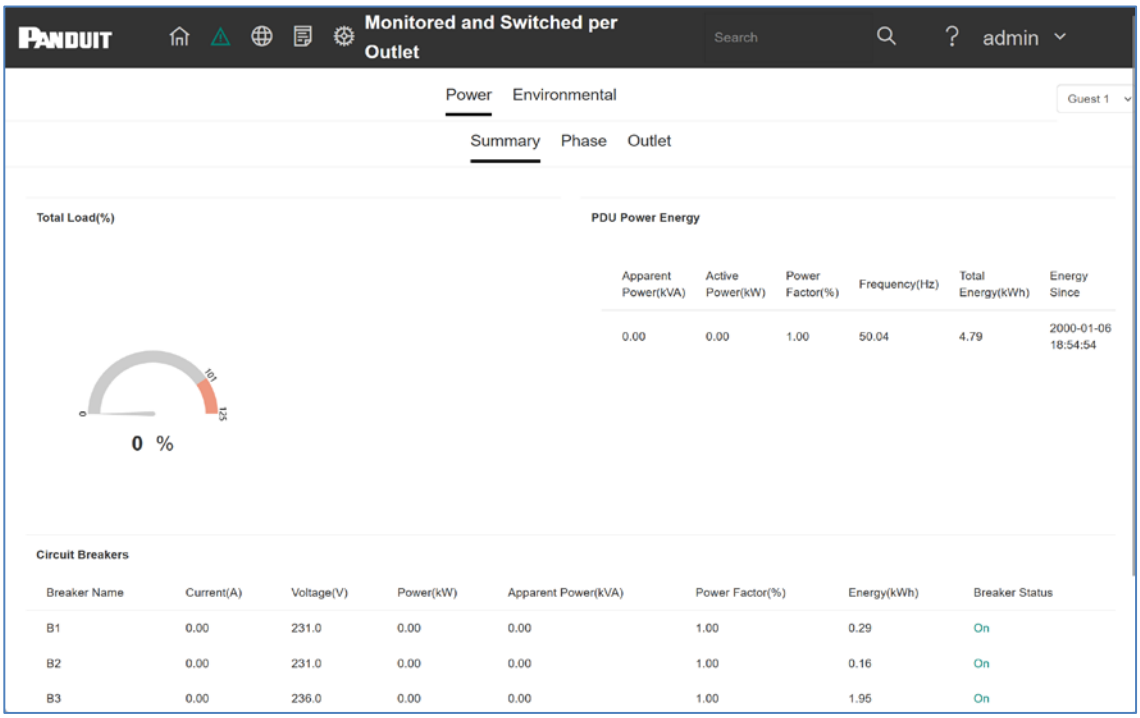
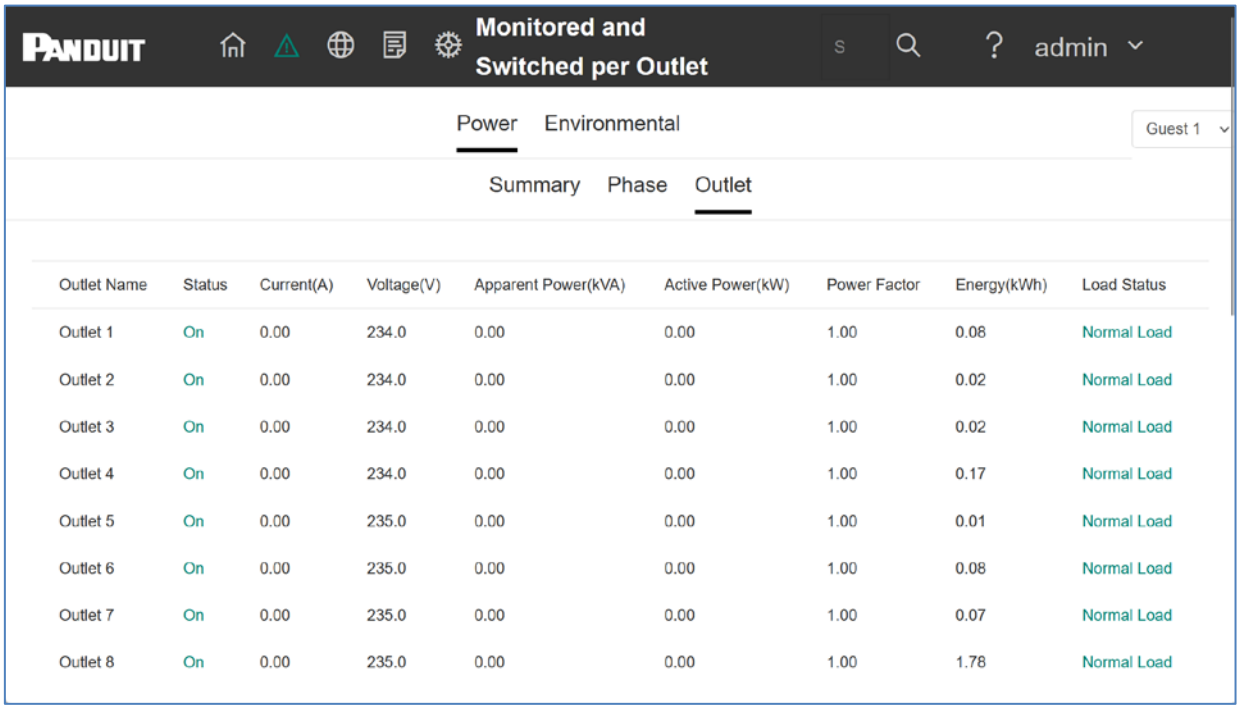


Figure 10: Power Summary Page

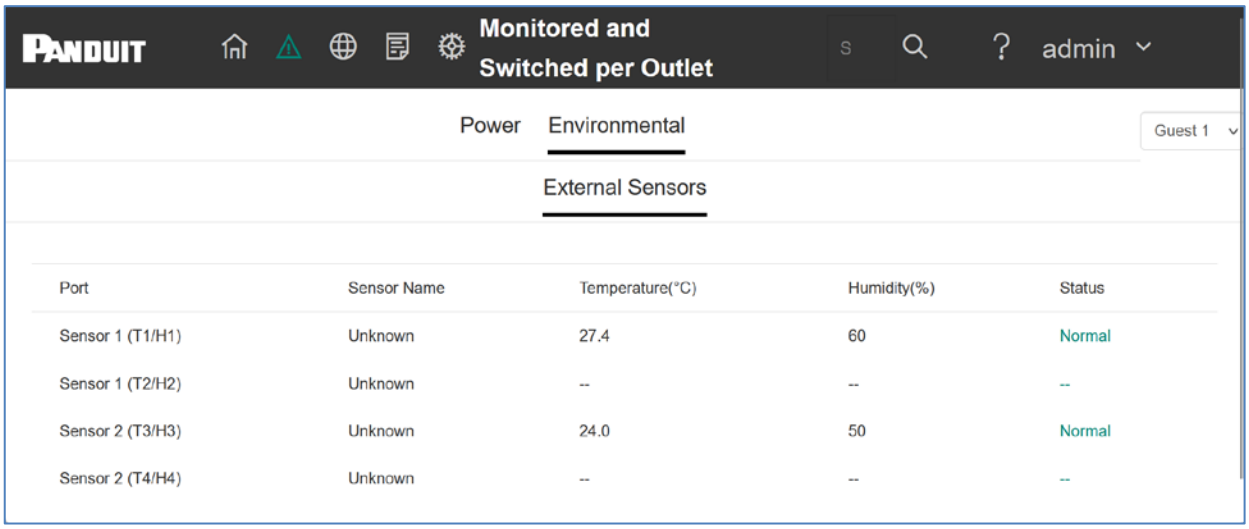
Outlet Monitoring Page



Outlet Name	Status	Current(A)	Voltage(V)	Apparent Power(kVA)	Active Power(kW)	Power Factor	Energy(kWh)	Load Status
Outlet 1	On	0.00	234.0	0.00	0.00	1.00	0.08	Normal Load
Outlet 2	On	0.00	234.0	0.00	0.00	1.00	0.02	Normal Load
Outlet 3	On	0.00	234.0	0.00	0.00	1.00	0.02	Normal Load
Outlet 4	On	0.00	234.0	0.00	0.00	1.00	0.17	Normal Load
Outlet 5	On	0.00	235.0	0.00	0.00	1.00	0.01	Normal Load
Outlet 6	On	0.00	235.0	0.00	0.00	1.00	0.08	Normal Load
Outlet 7	On	0.00	235.0	0.00	0.00	1.00	0.07	Normal Load
Outlet 8	On	0.00	235.0	0.00	0.00	1.00	1.78	Normal Load

Figure 11: Outlet Monitoring Page

Environmental Monitoring Page



Port	Sensor Name	Temperature(°C)	Humidity(%)	Status
Sensor 1 (T1/H1)	Unknown	27.4	60	Normal
Sensor 1 (T2/H2)	Unknown	--	--	--
Sensor 2 (T3/H3)	Unknown	24.0	50	Normal
Sensor 2 (T4/H4)	Unknown	--	--	--

Figure 12: Environmental Monitoring Page

Identification

The PDU can display system information, PDU information of Model name, Serial Number, firmware version, hardware version, PDU power parameters etc. User can check this information from **Home**>**Identification**.

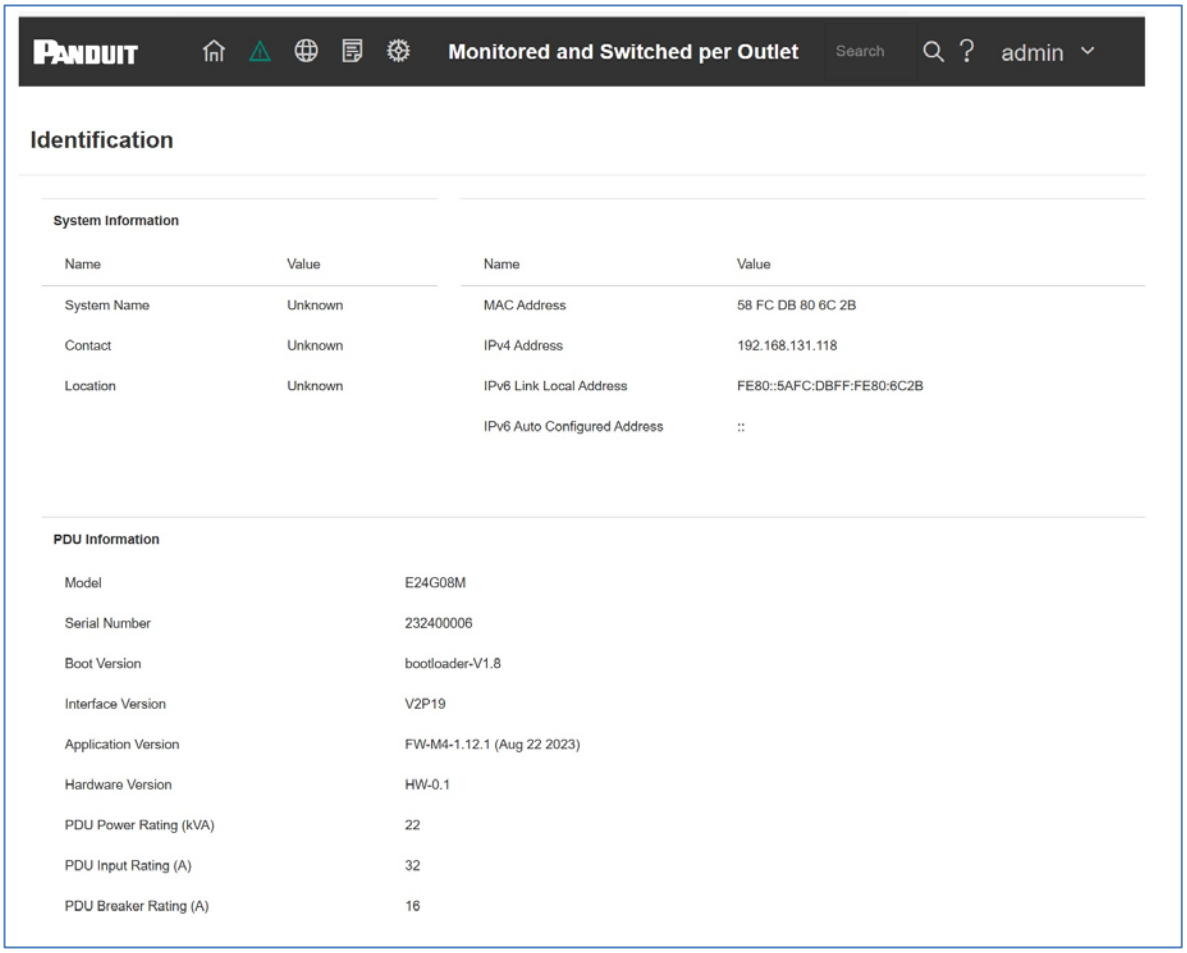


Figure 13: Identification Page

Language Selection

The system lets you select a Language: English, Chinese. User can select language from **Home**>**language**.

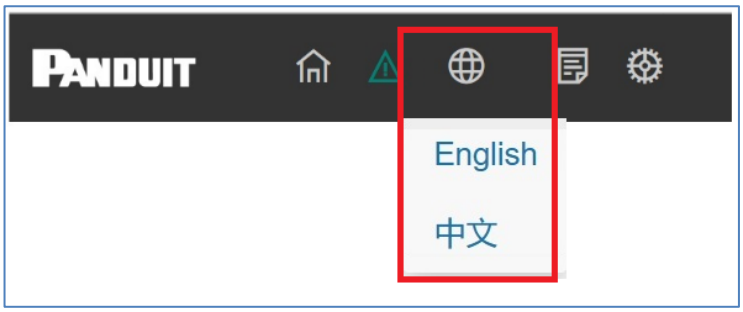


Figure 14: Language Configuration

System Management Information

The system management information is a way to distinguish the PDU system's name and location inside the data center.

To configure the system management information, select **System Management** under the **gear** icon.

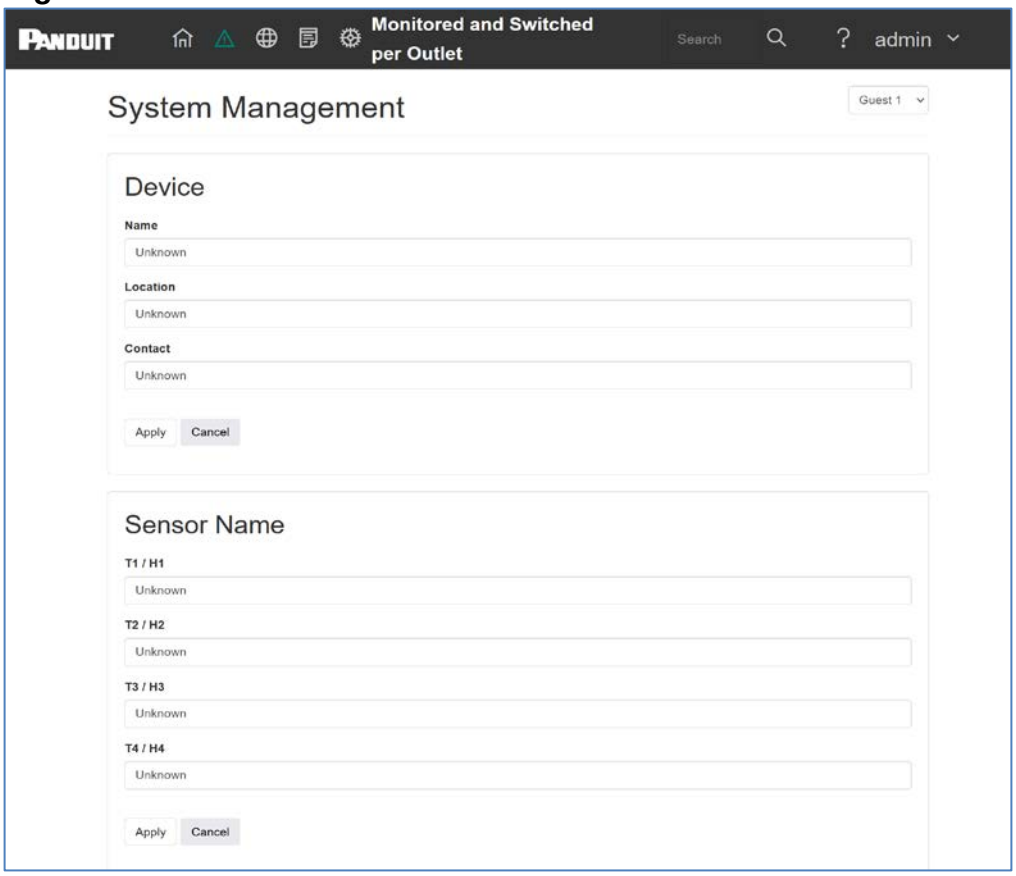


Figure 15: System Management

Device Info

The device information includes the name of the PDU system and information of the person to contact in case an issue arises. Follow the steps below to set up the system information:

1. Select the **System Management** tab to define Device I**nformation.**

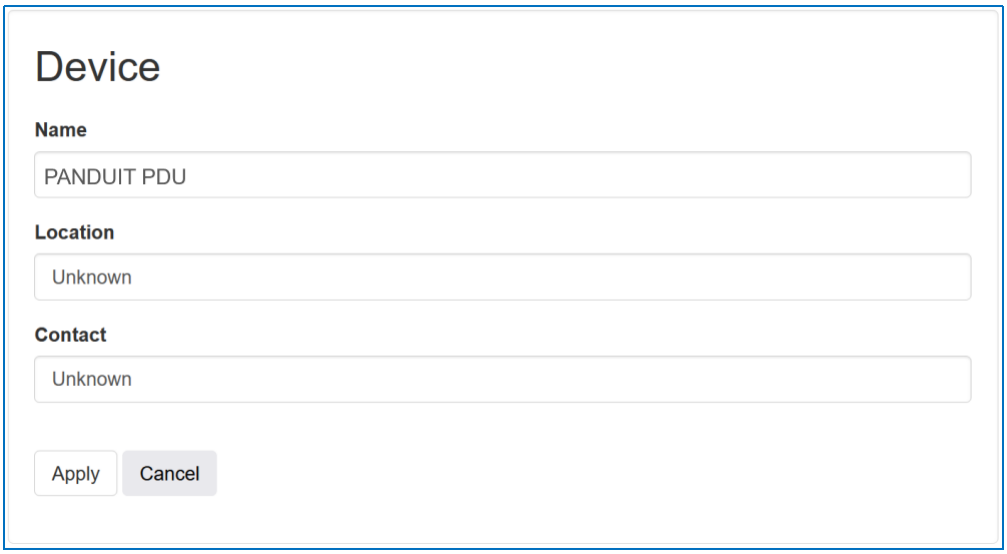


Figure 16: Device Configuration

2. Change the **Device Name**: The “device” is indicating the **Host PDU.** After complete naming the device. The name will appear on PDU LCD display.
   Note: PDU controller display only can shows no more than 15 characters of the device name. Naming Example: PDU08_RACK0020.
3. Enter the location of the main PDU into **Location** section.
4. Enter the information of who should be contacted if there is a problem with the system into the **Contact** section.
5. Press **Apply**.

Note:
1. PDU Name only can be changed before daisy chain connection.
2. In daisy chained Mode, only can change **Host** PDU name. all **Guest** PDU cannot change name. PDU LCD display continue show name as “Panduit PDU”

Sensor Info

Each rack PDU can support up to four Temperature and Humidity sensors, user can define the name of four Temperature & Humidity sensors to make a distinction.

Figure 17: Sensor Name Configuration

1. Enter the information of the T1/H1 sensor into **T1/H1 Name**
2. Enter the information of the T2/H2 sensor into **T2/H2 Name**
3. Enter the information of the T3/H3 sensor into **T3/H3 Name**
4. Enter the information of the T4/H4 sensor into **T4/H4 Name**
5. Press **Apply.**

Firmware Upgrade

Each rack PDU can upgrade the firmware by Web Interface

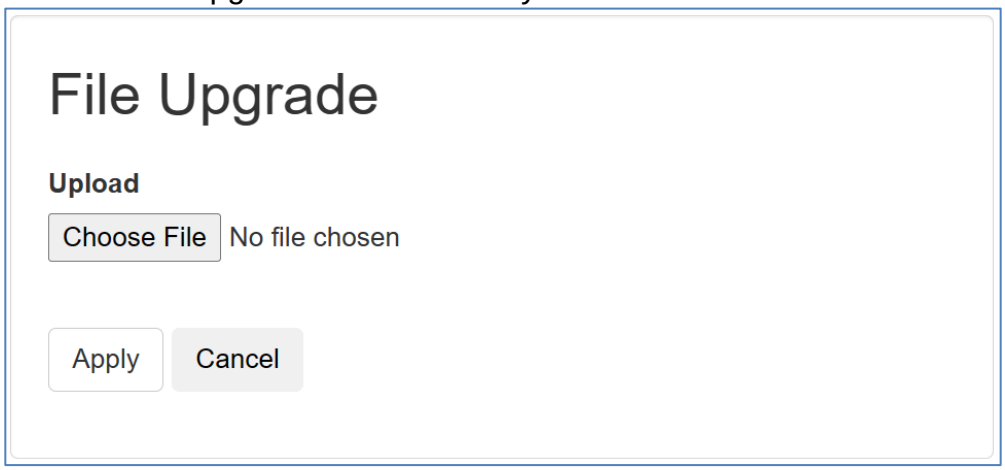


Figure 18: Firmware Upgrade Page

Please refer to Appendix A **Firmware Upgrade Options> Web Interface Method.**

Upgrade Certificate File

Add, replace, or remove a security certificate.

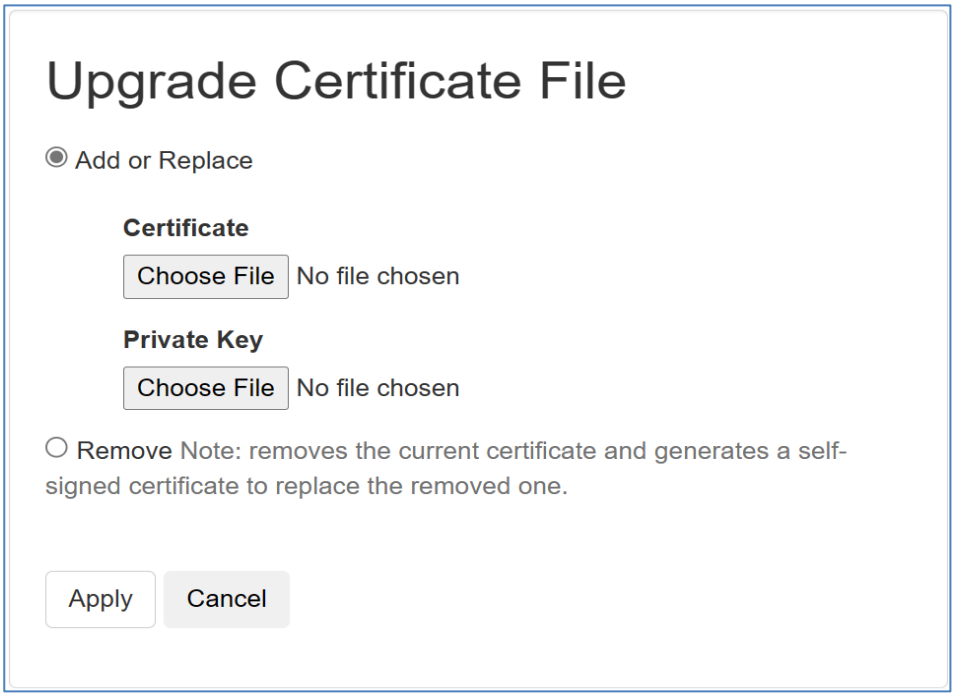


Figure 19: Upgrade Certificate File

If user installs an invalid certificate, or if no certificate is loaded when opening web browser, the Rack PDU will generates a default certificate. User can use the default certificate for basic encryption- based security, but a security alert message will display whenever a user logs in.
Add or Replace Certificate File: add or replace certificate file via web browsers.
Remove: Delete the current certificate.

Reset/Reboot Network Interface

User can reset and reboot various parameters of the network interface.

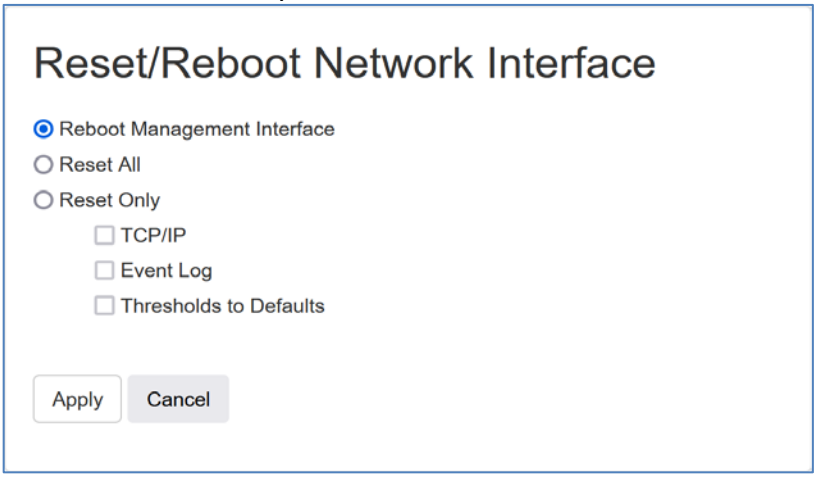


Figure 20: Reset/Reboot Network Interface

Reboot Management Interface: only restart the Rack PDU's Network Management Interface. It does not affect the outlet ON/OFF status.
Reset All: Reset all configuration values except account information and the Event Log.
Reset Only: Options include:

- **TCP/IP:** Set TCP/IP Configuration to default setting: DHCP. The Rack PDU will receive its TCP/IP settings from a DHCP server.
- **Event Log:** Reset all Event logs.
- **Thresholds to Default:** Reset all threshold settings.

Outlet Power Management

Control and management

This is only applicable to outlet-switched PDUs.
Outlets on the switched PDU models in the Panduit PDU are easily switched on, switched off. This action requires the user to have Administrator Privileges.

1. Select the **Outlet Control** folder from the **Home** icon.
2. In the **Outlet Control** interface, select the outlet that must be switched on, switched off.
4. Select **Apply**.

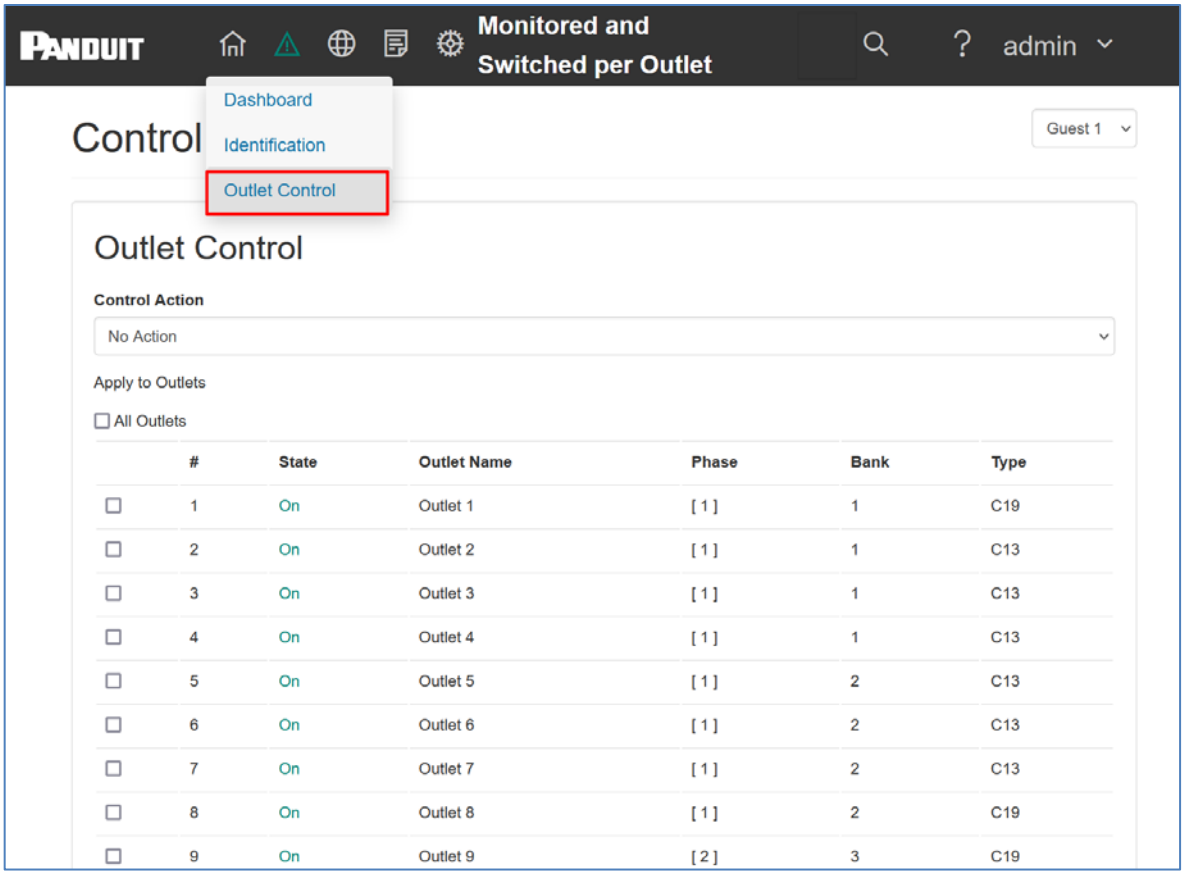


Figure 21: Control & Manage PDU

Outlet Group

The PDU can support outlet group customization function. Outlets that in an outlet group have the synchronized manner of group turn on, group turn off, group reboot action. To configure the **outlet group** function, select Outlet Group under the **gear** icon.

1. Press the **Outlet Group1~10** button and select the related PDU outlet;
2. Press **Apply** to enable the current outlet group; Press Delete to disable the current outlet group.

Note：

1. This is only applicable to outlet-switched PDUs.
2. Each group includes a maximum of 4 units.

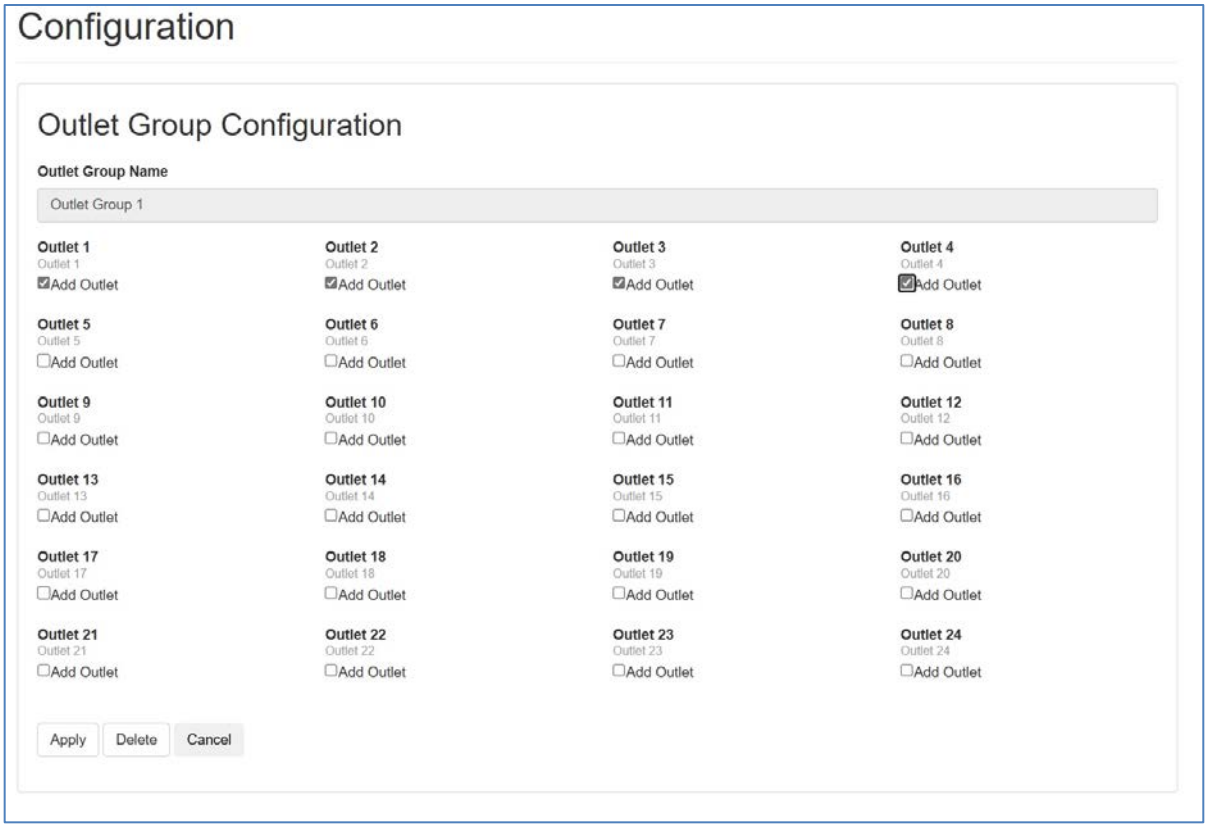


Figure 22: Outlet Group Configuration

Thresholds

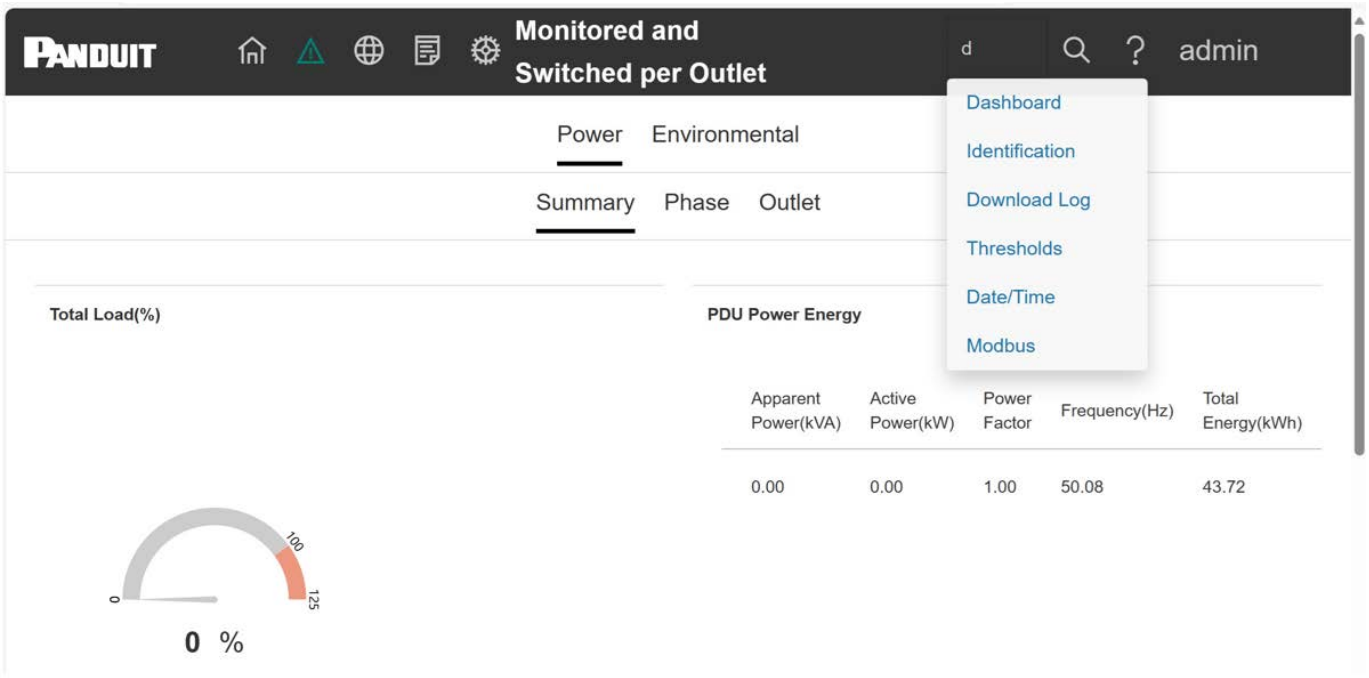


Figure 23: Thresholds Configuration

Device Load Threshold

Panduit PDUs will send alert notifications when a device load threshold wattage crosses above or below the settings you specify in the Device Load Threshold configuration.

1. Go to the **Settings > Thresholds >Device Load**
2. Click the Device Thresholds Configuration to update.

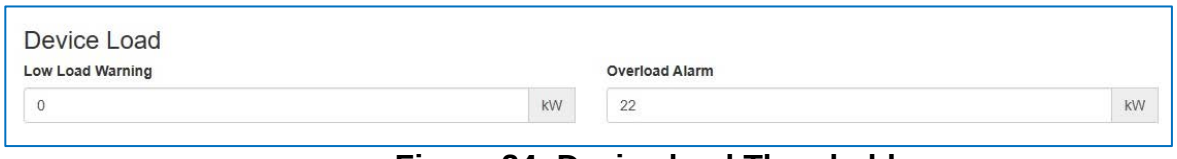


Figure 24: Device load Threshold

3. Select and enter the appropriate thresholds in kW and click **Apply**.
   - Low Load Warning (kW)
   - Overload Alarm (kW)

Phase Threshold

The PANDUIT PDU will send alert notifications when any phase thresholds crosses above or below the settings you specify in the Phase current Threshold configuration.

1. Go to the **Settings > Thresholds >Phase**
2. Click the Phase Thresholds Configuration to update.

Figure 25: Phase Threshold

3. Select Phase and enter the appropriate thresholds in amps and click **Apply.**
   - Select Phase
   - Low Load Warning (A)
   - Overload Alarm (A)

Bank Threshold

The PANDUIT PDU will send alert notifications when any Bank thresholds crosses above or below the settings you specify in the Bank current Threshold configuration.

1. Go to the **Settings > Thresholds >Bank**
2. Click the Bank Thresholds Configuration to update.

Figure 26: Bank Threshold

3. Select **Bank** and enter the appropriate thresholds in amps and click **Apply.**
   - Select Bank
   - Low Load Warning (A)
   - Overload Alarm (A)

Outlet Threshold

The PANDUIT PDU will send alert notifications when any outlet thresholds crosses above or below the settings you specify in the outlet current Threshold configuration.

1. Go to the **Settings > Thresholds >Outlet**
2. Click the Outlet Thresholds Configuration to update.

Figure 27: Outlet Threshold

3. Select Outlet and enter the appropriate thresholds in Watts and click **Apply.**
   - Select Outlet
   - Low Load Warning (W)
   - Overload Alarm (W)

T&H Sensor Threshold

The PANDUIT PDU will send alert notifications when any T&H sensor thresholds crosses above or below the settings you specify in the T&H sensor Threshold configuration.

1. Go to the **Settings > Thresholds >T&H Sensor**
2. Click the Thresholds Configuration to update.

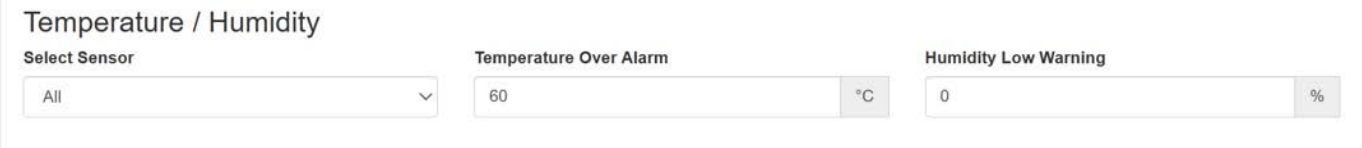


Figure 28: T&H Sensor Threshold

3. Select Sensor and enter the appropriate temperature and humidity thresholds and click **Apply.**
   - Select Sensor
   - Temperature Over Alarm (℃)
   - Humidity Low Warning (%)

Network Settings

The Network Settings allow management of IPv4,IPv6 Configuration, Web Access Configuration.

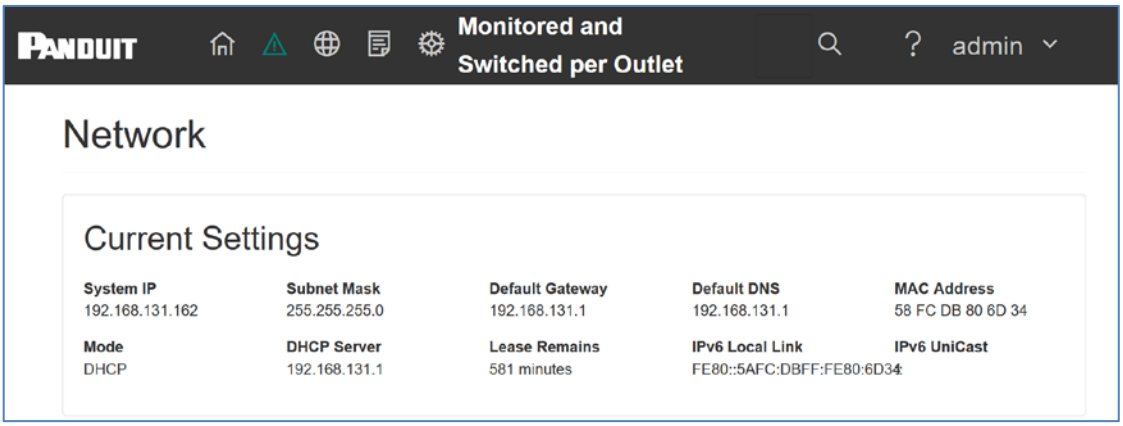


Figure 29: Current Network Setting Page

IP Configuration:

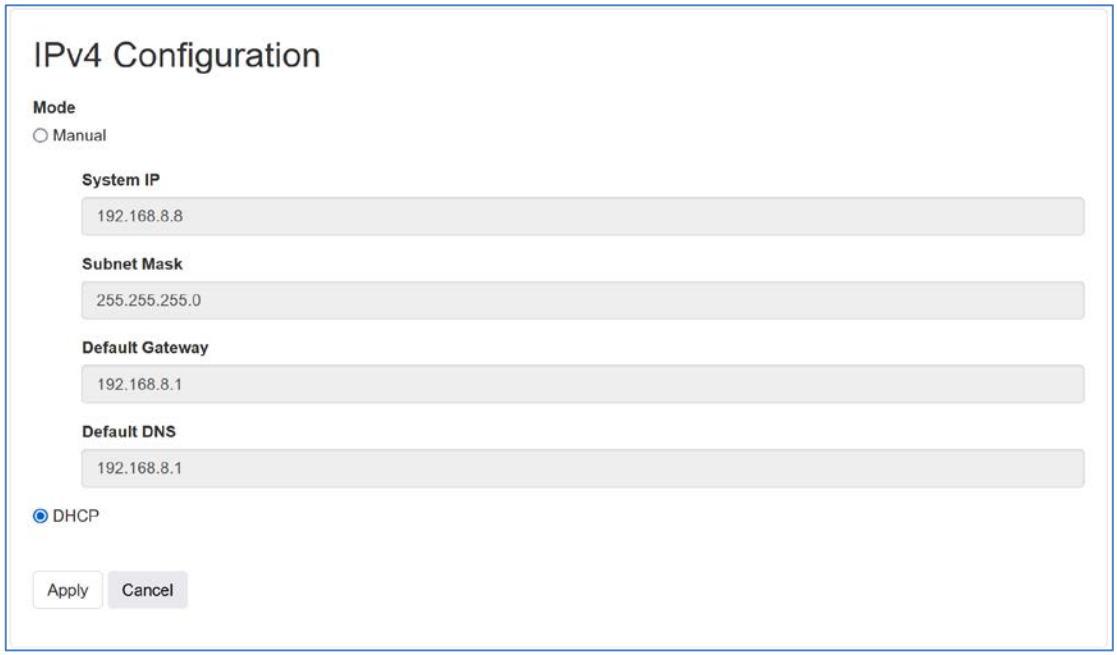


Figure 30: IPv4 Configuration

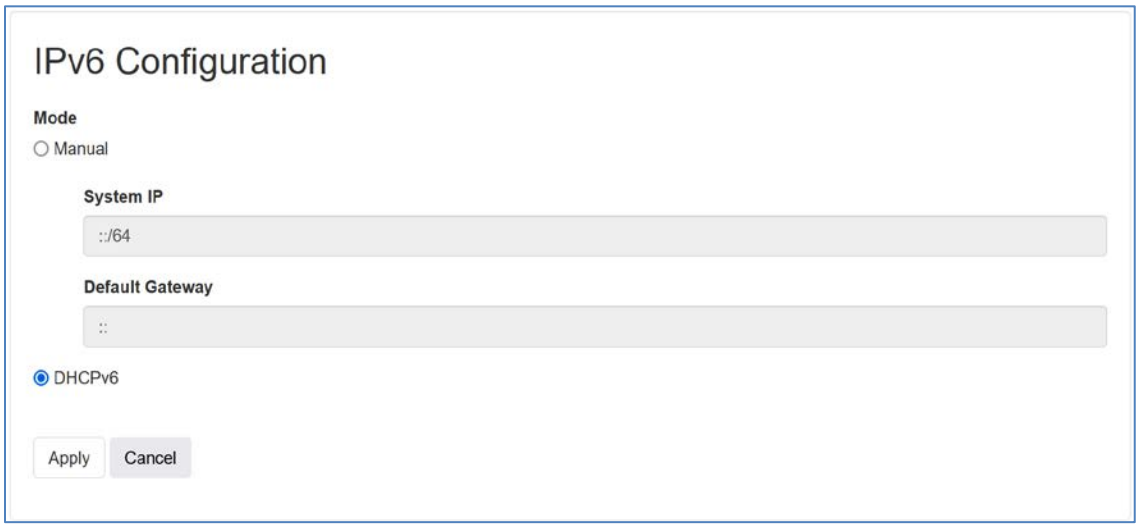


Figure 31: IPv6 Configuration

Web Access Configuration can be used to set HTTP, HTTPS.

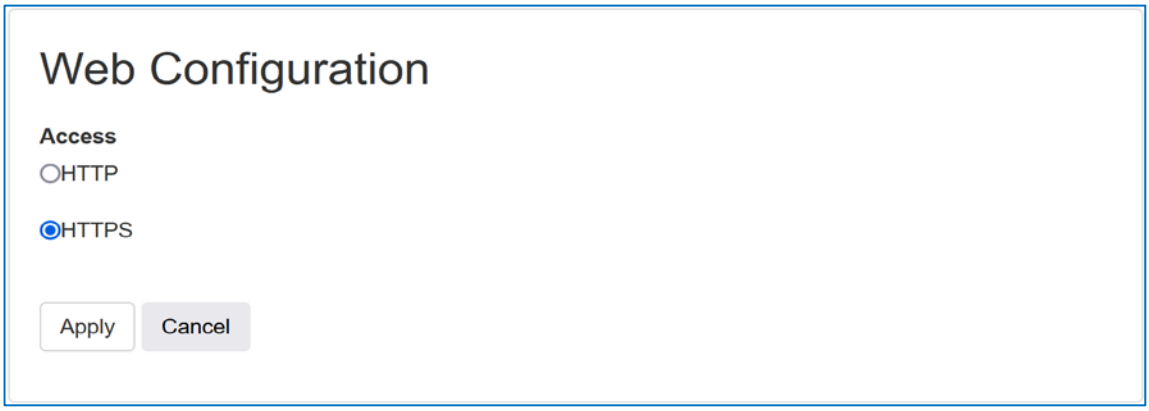


Figure 32: Web Access Configuration

Email

The Panduit PDU can be configured to send Emails to specific users when an event occurs. To do this, the information about the SMTP (Simple Mail Transfer Protocol) server needs to be configured.

1. From the PDU dashboard Menu, go to the gear setting and select **Email**.

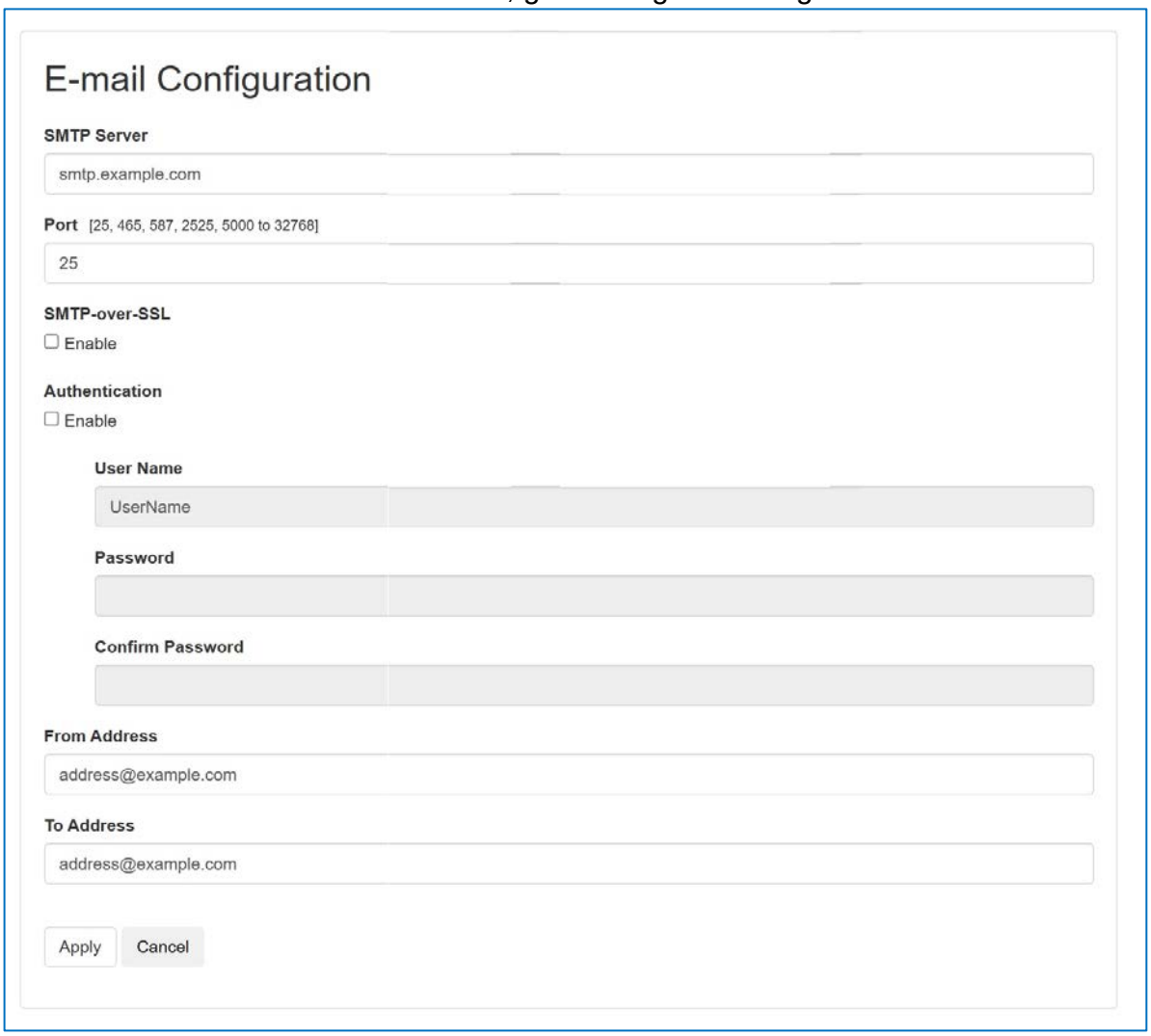


Figure 33: Email Configuration

2. Set the **SMTP Server** Address. This is the IP address of the SMTP that is going to accept the messages.
3. Configure the **Port** number. The port number is the communication endpoint on the server. The default is 25. Other common SMTP ports are 465,587 2525, 5000 to 32768.
4. Select whether SMTP supports SSL by **SMTP-over-SSL.**
5. If the SMTP server requires **Authentication**, enter the **User Name** and **Password**. These will be determined by the configuration on the SMTP server. If the SMTP does not require authentication, a **User name** and **Password** will need to be entered, but they will not be used.
6. Set the **From Address** and **To Address**. This is the email address that the email is sent from and sent to. You could use a unique email address on required PDU or the same email address across all PDUs.
7. Press **Apply** when done.

Event Notifications

The PDU can be configured to provide event notifications.

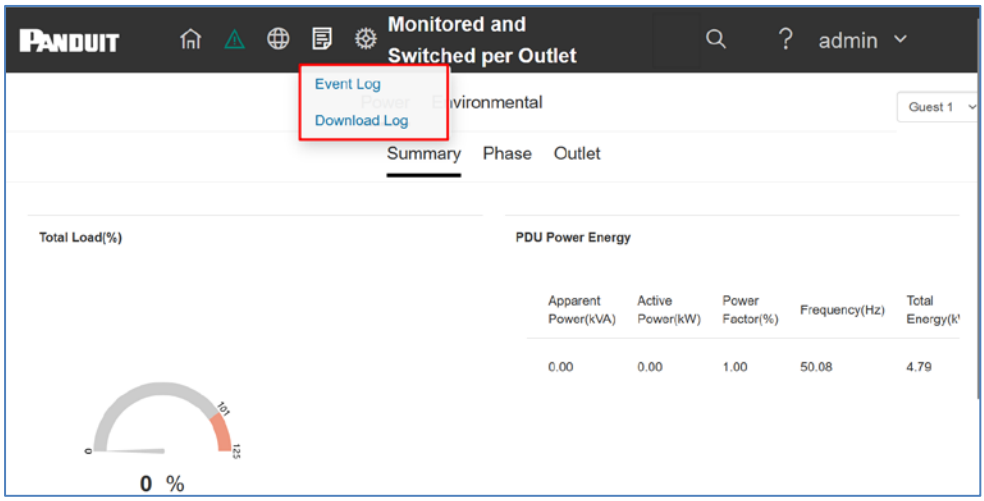


Figure 34: Event Notifications

Note: Not every Event Notification applies or is supported by every PDU type even though the toggle switch in the Web GUI may seem like the feature is supported.

Below is a table of PDU types and the Event Notifications that particular PDU type supports.

Event Notifications	Monitored Input (MI Series)	Monitored Switched (MS Series)	Monitored Per Outlet (MPO Series)	Monitored and Switched Per Outlet (MSPO Series)
Circuit Breaker Status Changed	X	✓	X	✓
Breaker Voltage	X	✓	✓	✓
Breaker/Group Current	✓	✓	✓	✓
User Activity	✓	✓	✓	✓
Outlet Power Control Status Changed	X	✓	X	✓
User Status Changed	✓	✓	✓	✓
Critical Alarm	✓	✓	✓	✓
Warning Alarm	✓	✓	✓	✓
Password/Settings Changed	✓	✓	✓	✓
Network Card Reset/Start	✓	✓	✓	✓
External Sensor Status Changed	✓	✓	✓	✓
User Role Status Changed	✓	✓	✓	✓
Firmware Updated	✓	✓	✓	✓
Communication Status Changed	✓	✓	✓	✓

Syslog Configuration

The PDU can automatic synchronization system logs and has the function of uploading these logs to the designated server. To set up the PDU to send syslog message, follow the following procedure:

Configuring Syslog

1. Go to Gear>Syslog> **Syslog Configuration**.
2. Press **Apply**.

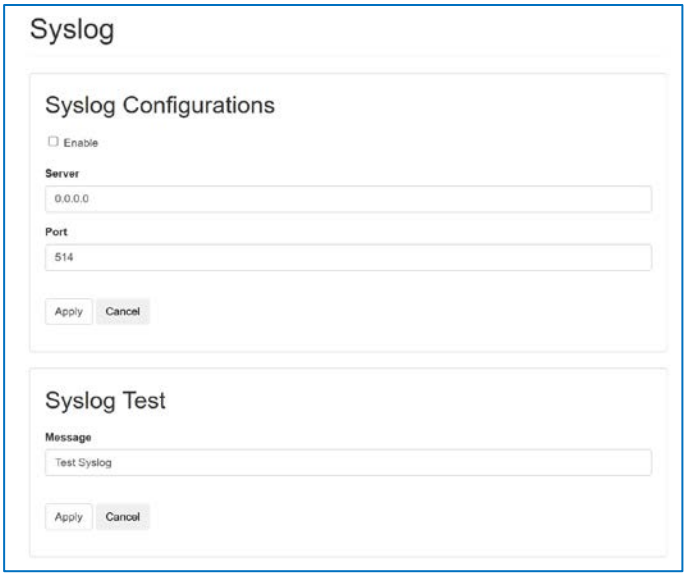


Figure 35: Syslog Notifications

Enable: Enable syslog function.
Server: Set the IP address of server to receive these syslog data.
Port: Set the syslog service port, the default port is 514.
Syslog Test: send a test message and check if server can receive the test message.

Setting Time and Date on the PDU

You can set the internal clock manually or link to a Network Time Protocol (NTP) server and set the date and time:

Manually Setting Time and Date

1. Go to Settings and select Date/Time Settings.

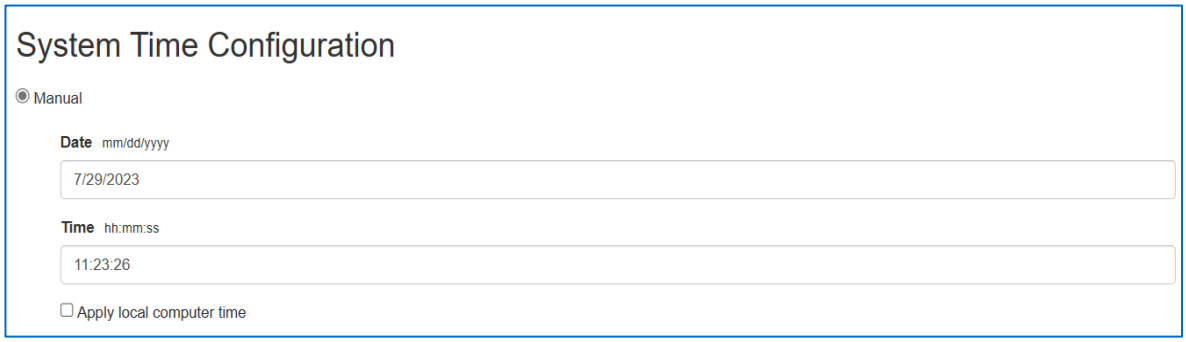


Figure 36: System Time Configuration

2. Enter the **Date** using the YYYY-MM-DD format to set a date.
3. Enter the **Time** using the hh/mm/ss format to set a time in 24 hours system.

4. Press **Apply**.
5. Or select directly **Apply Local Computer Time**.

If you select Override Manual NTP Settings, data from other sources (typically DHCP) take precedence over the NTP configurations you set here.

Link to a Network Time Protocol (NTP)

1. Go to Network Settings and select Network Time Protocol (NTP).

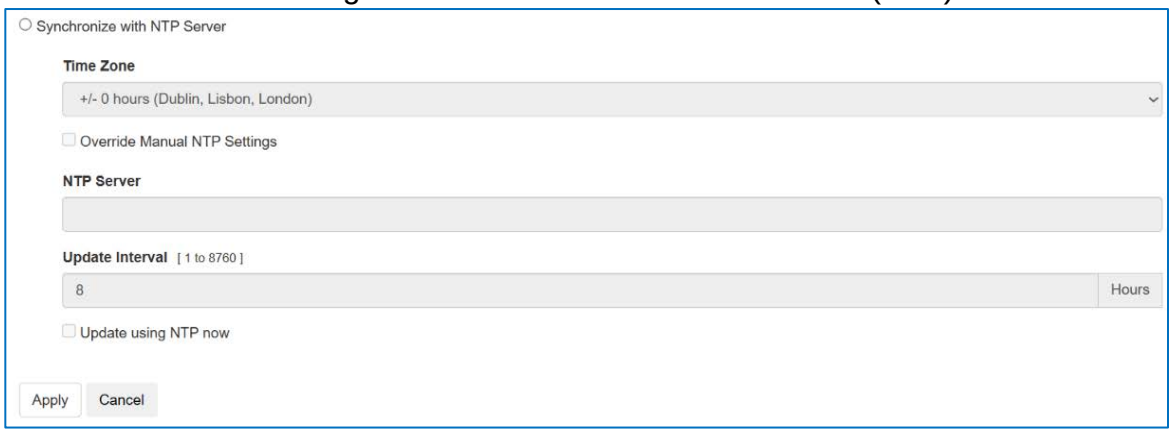


Figure 37: NTP Configuration

2. Select **Synchronize with NTP Server** to enable NTP.
3. Select the appropriate time zone from the **Time Zone** drop-down list.
4. Enter the IP address of the NTP server in the **NTP Server** field.
5. Select the interval time of PDU access the NTP server zone for an update in the **Update Interval**. Minimum:1; Maximum:8760(1year).
6. Press **Apply**.

Note: NTP Server must be online to test and save the settings.

Web Interface Access

Logging Out

Users should logout after each session to prevent unauthorized changes to the system.

1. Click the **User Account icon** in the top right corner of the screen (see Introduction to the Web Menu).
2. Click **Log Out** in the drop-down menu.

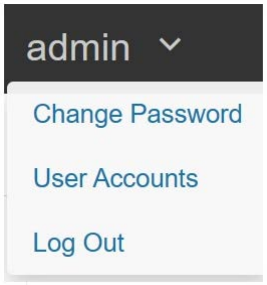


Figure 38: Log out Interface

Access Types

There are two levels of access privileges:

- Administrator Privileges
- Read Only

The PDU comes with a standard **Administrator Privileges** profile and a standard **Read Only** profile. The “Admin Role” is typically the system administrator and has the Administrator Privileges with full operating permissions. By default, the User Role is a Read Only profile. All other users must be added by a user with administrator privileges. Users are defined by their unique login credentials and by their user role. The level of access privilege determines what the user will see and what actions the user can perform. The level of access privilege determines which menu items the user can access, or which fields display on individual setting and configuration dialogs. Before setting up users, determine the Roles that will be required. Each user must be given a Role. These Roles define the permissions granted to the user.

Role	Default Permissions
Super User	Full permissions that cannot be modified or deleted.
Read Only	Read-only permissions. Can monitor the system but cannot change any configuration

User Accounts

Add a user with the following steps:

1. Go to User Management and select User Accounts.

Figure 39: User Configuration

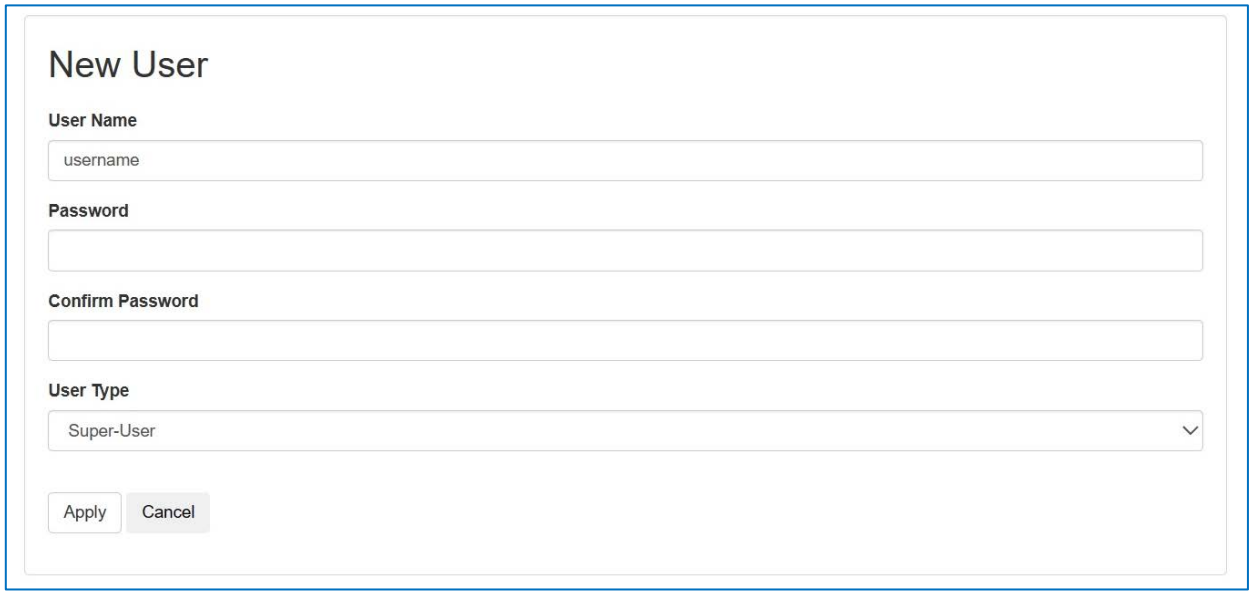


Figure 40: New User

2. Select **New User** to create a new user profile.
3. Use the Settings tab to enter the following information:
    - User Name (required)

- Password (required)
- Confirm Password (required)
- User Type (drop-down list)

NOTE: Set password requirements in the required field. By default, passwords must be 8-32 characters in length, and have at least one numeric character, and at least one special character. Only admin user account can Create the new user.

4. Use the **User Type** tab to set full or read only privileges.
5. Select **Apply** to save the new user profile.

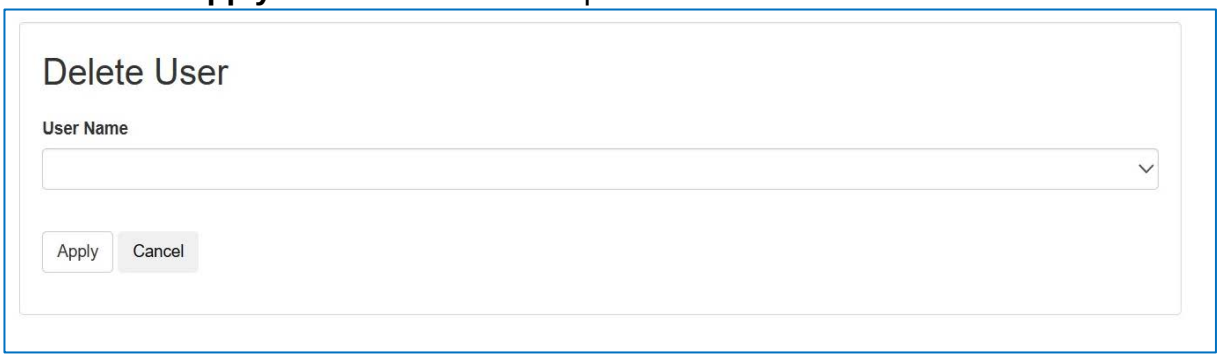


Figure 41: Delete User

Delete user profile with the following steps:

1. Go to User Management and select **Delete User.**
2. Select the **User Name** that need to delete.
3. Click **Apply** to delete the user account.

Section 3 – Simple Network Management Protocol (SNMP)

SNMP Management Configuration

Setup SNMP

1. Access the Web interface and login.
2. Under SNMP Managers, select SNMP Configuration (or type SNMP in the search). The SNMP General page displays.

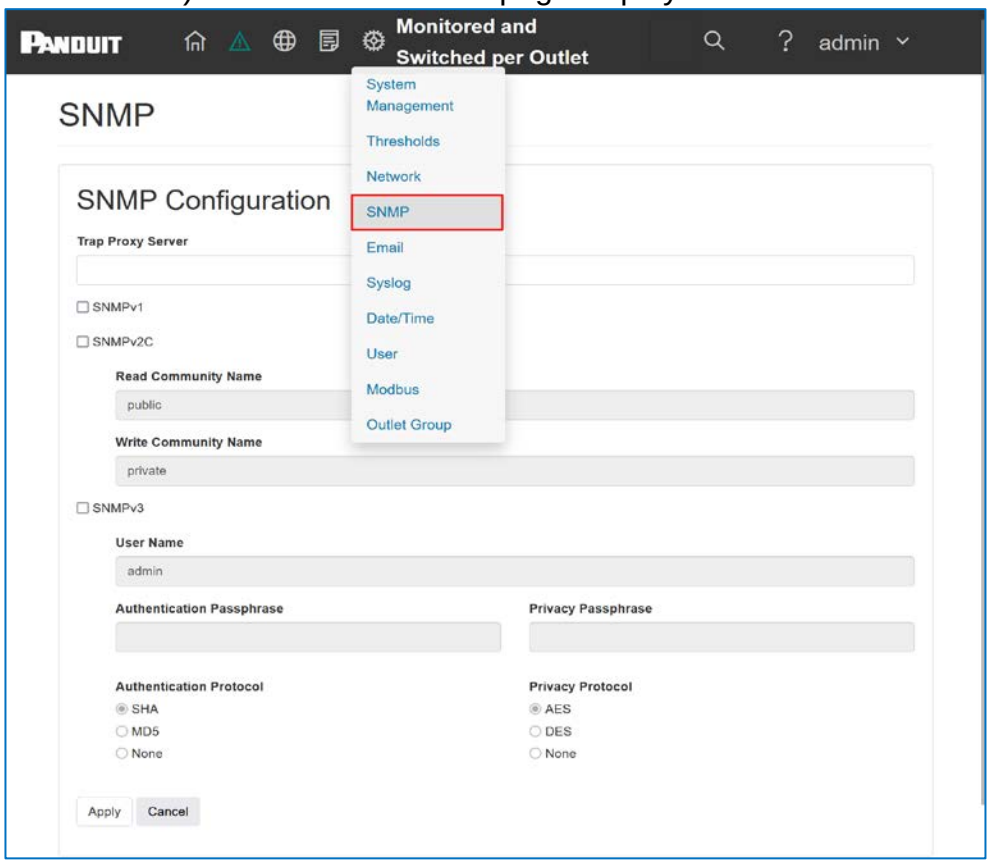


Figure 42: SNMP Configuration

3. The SNMP Configuration includes SNMP Access and Version.

Configuring Users for SNMP V1/V2C

1. Access the Web interface and log in.
2. Under SNMP Configuration, select **SNMP V1 or SNMP V2C**.
3. Set the **Read Community Name** and **Write Community Name**

- **Read Community**: the read-only community string to allow an SNMP V1/V2C manager to read a SNMP object.
- **Write Community**: the write-only community string to allow an SNMP V1/V2C manager to write an SNMMP object.

4. Select **Apply** to enable SNMP v1 or SNMP v2C.

Note: The default SNMP v1 port is 161.

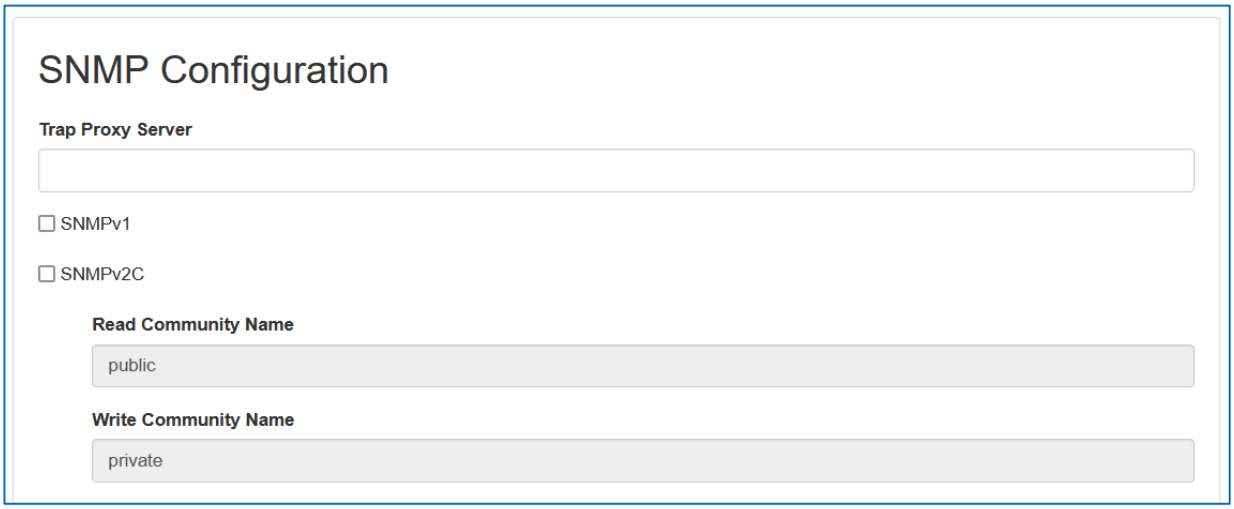


Figure 43: Define SNMP v1/v2C Configuration

Configuring Users for SNMP v3

1. Access the Web interface and log in.
2. Under SNMP Configuration, select **SNMP V3**.
3. Configure the SNMP **User Name**.
4. Set the **Authentication Passphrase** and **Privacy Passphrase password**

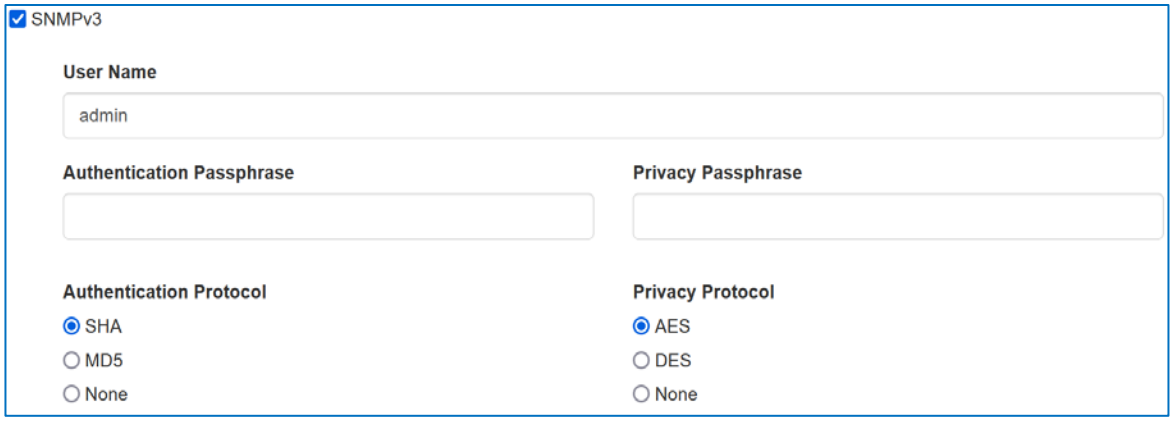


Figure 44: SNMP V3 Configuration

5. Select the desired authentication and privacy protocol algorithm.

   Authentication:

   - SHA
   - MD5
   - None

   Privacy:

   - AES
   - DES
   - None

6. Click **Apply** to enable SNMP v3.

Configuring SNMP Traps

The PDU keeps an internal log of all events. These events can be used to send SNMP traps to a third-party manager. To set up the PDU to send SNMP traps, follow the following procedure:

Configuring SNMP Trap Settings

1. Go to Device Configuration >SNMP> SNMP Configuration.
2. Set the **Trap Proxy Server** address.

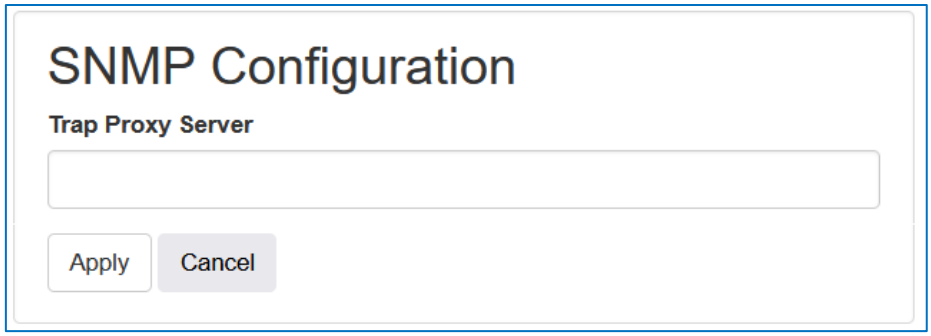


Figure 45: SNMP Trap Configuration

3. Enter the **SNMP V1/V2C/V3** parameters in the fields provided.
4. Select **Apply** to enable SNMP Trap.

Note: The default SNMP traps port is 162.

Modbus

The PDU can support Modbus -TCP/IP protocol. To set up the PDU to support Modbus-TCP/IP protocol, follow the following procedure:

Configuring Modbus-TCP/IP

1. Go to **Gear** >**Modbus**>**Modbus-TCP**.
2. Select **Enable** and press **Apply**

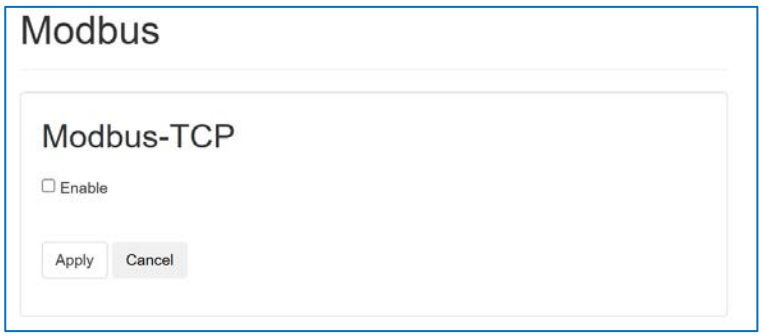


Figure 46: Modbus-TCP/IP Configuration

Note: Please contact Panduit PDU Tech support for the Modbus agreement.

Section 4 – Local Display

Onboard Display and Network Controller

The Onboard Display provides information about the PDU and connected devices. The PDU has a three-button, graphical Network Controller panel (see Figure 2). Use the buttons to change the screen display and retrieve specific data.

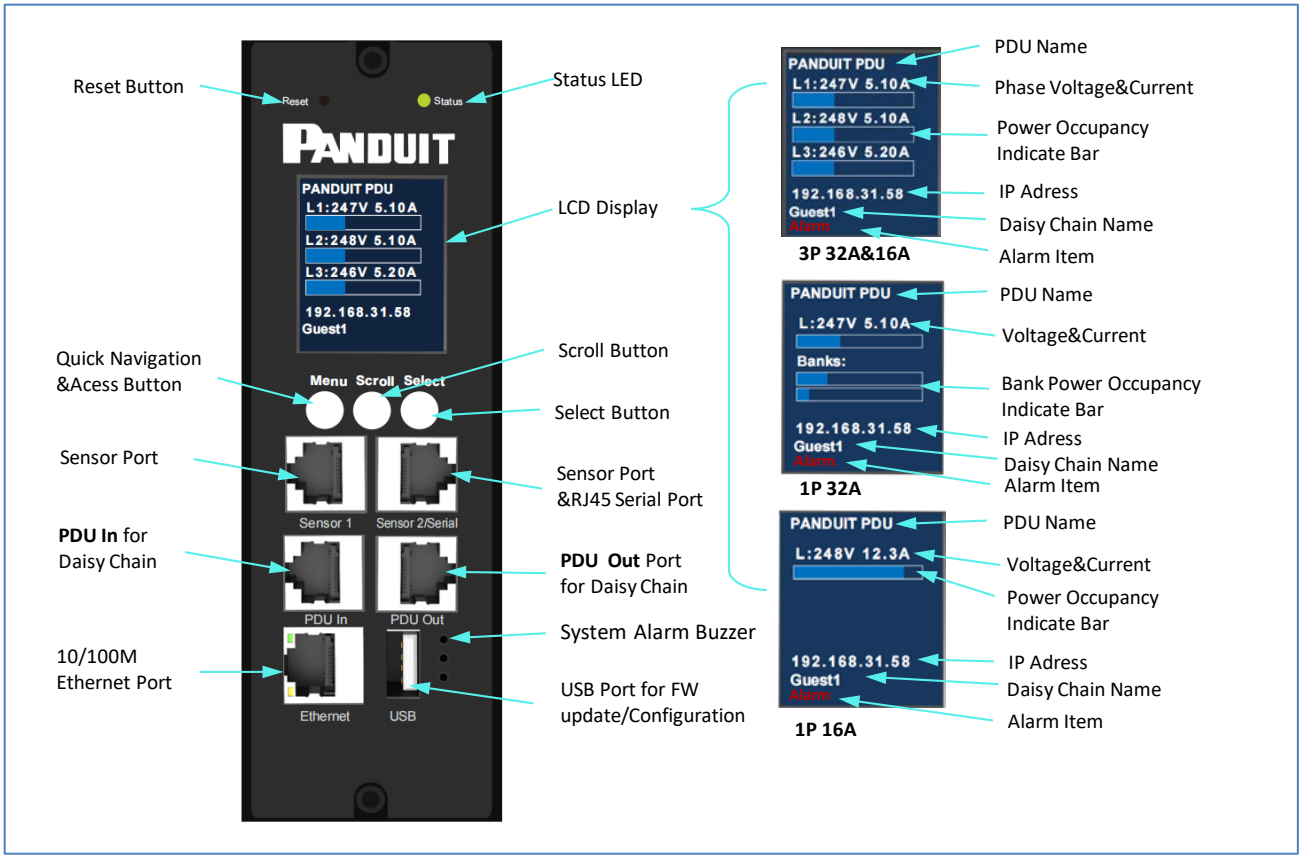


Figure 47: Network Controller

The Network Controller Display has Two modes:

1. **Menu mode** (Network Controller Display main menu): When the PDU is powered up or when a button is pushed while in Power Save mode.
2. **Power Save mode**: The PDU enters Power Save mode when it has been in Menu mode for setting time. To exit Power Save mode, press any button on the display.

Control Buttons

The table below summarizes how to use the control buttons on the Network Controller display.

Button	When in Menu Mode	When in Screensaver Mode
Menu	Return to default display	Returns to the previous display screen before entering the screensaver mode.
Scroll	Scrolls down through the list of menu items. **NOTE:** A highlighted menu item is ready to be selected.	Returns to the previous display screen before entering the screensaver mode.
Select	Opens the selected menu.	Returns to the previous display screen before entering the screensaver mode.

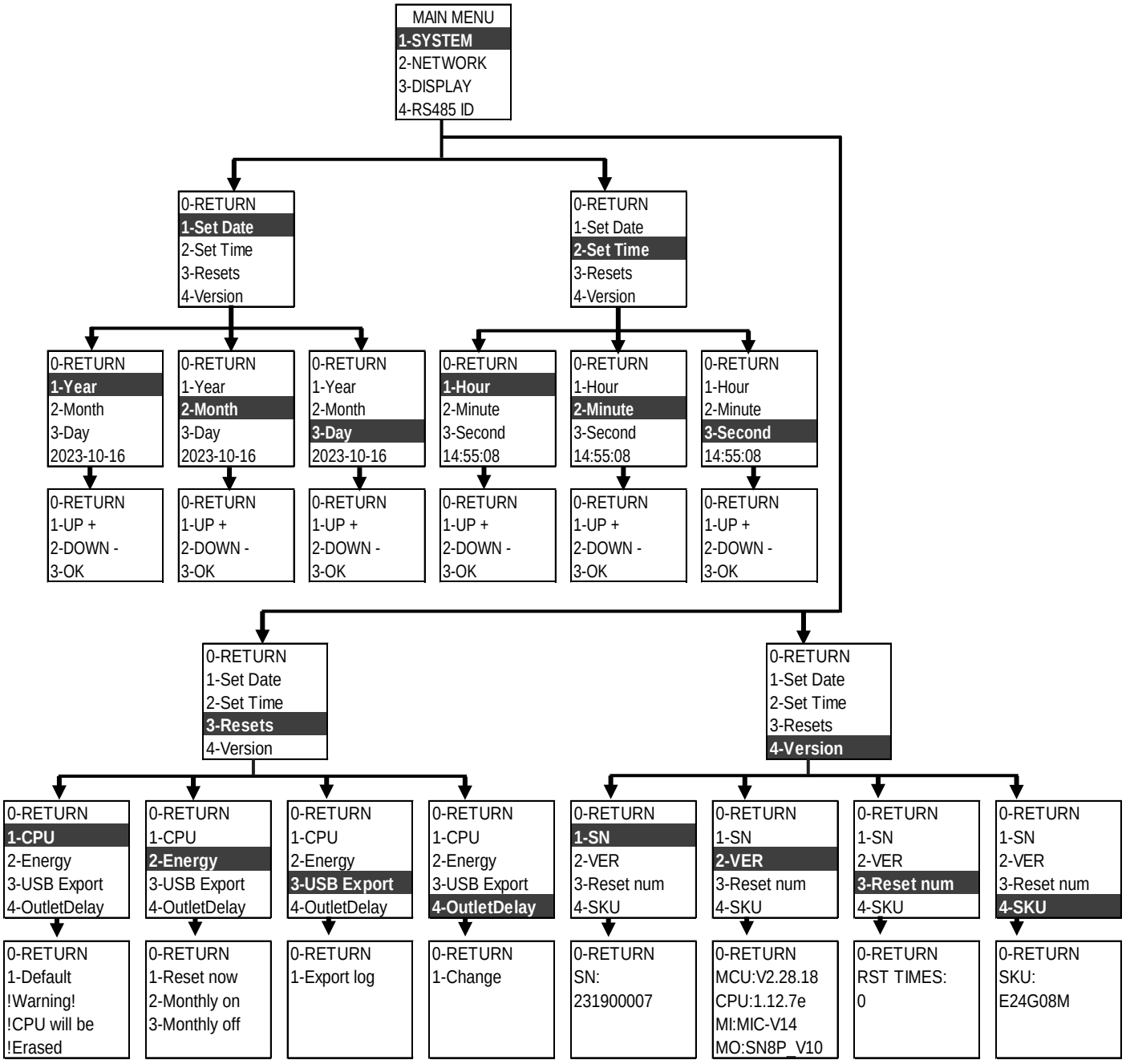
Status LED

The LED will change colors depending on the state of the PDU.

LED State	Description
Solid Green	Normal Operation
Solid Red	Critical or Warning Alarm

Network Controller Menu Structure

Press **Scroll** button on controller into PDU system navigation



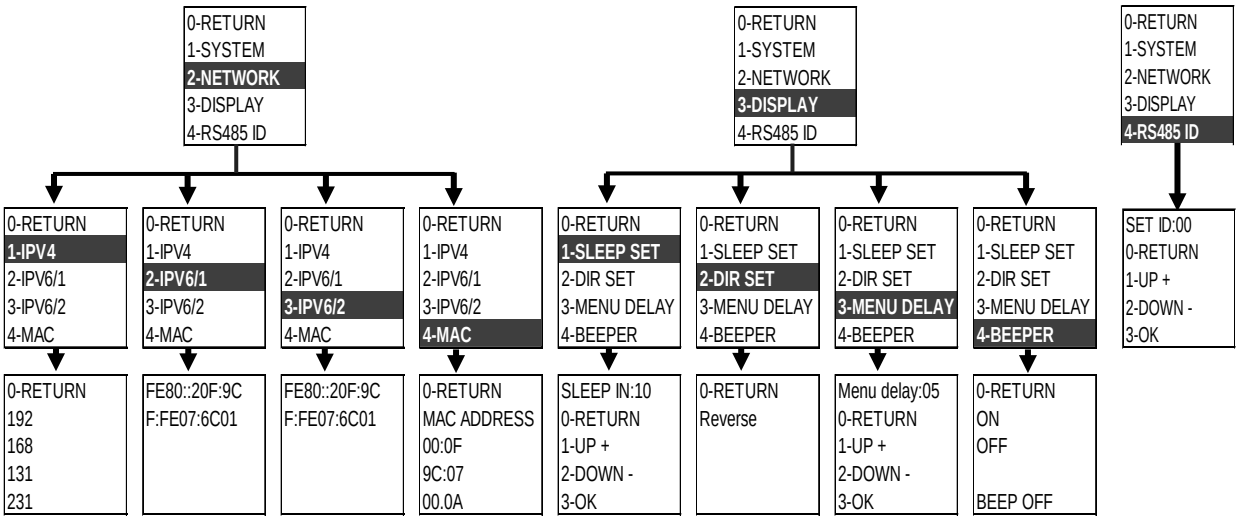


Figure 48: Network Controller Menu Structure

Main Menu Selections

Press **Scroll** button, The PDU menu selection hierarchy consists of **System**, **Network**, **Display** and **RS485 ID**. press **Scroll** button to scroll down for selection, press **Select** button to go into sub-menu. Scroll down to select a sub-menu and press **Select** button to display the sub-menu options. Select **RETURN** to return to the previous menu.

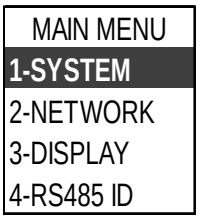


Figure 49: Main Menu Selections

System Menu

The system menu provides user configuration options including Set Date, Set time, Resets and Version.

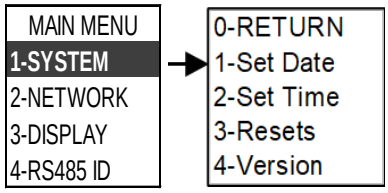


Figure 50: System Menu

Set Date Submenu

The Set Date menu allows you to view recent date. On the System menu, scroll down to Set Date. Press **Select** to enter the Set Date Submenu. Scroll down to highlight the selected option from the menu. Press **Select** to display the screens that display the option. Press **RETURN** to return to the previous menu.

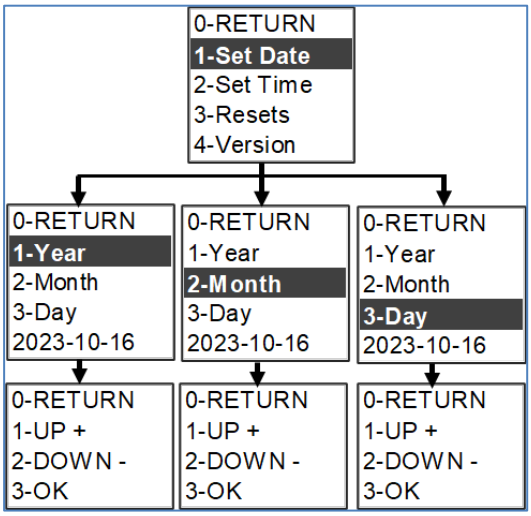


Figure 51: Set Date Submenu

Set Time Submenu

The Set Time menu allows you to view recent time. On the System menu, scroll down to Set Time. Press **Select** to enter the Set Time Submenu. Scroll down to highlight the selected option from the menu. Press **Select** to display the screens that display the Time. Press **RETURN** to return to the previous menu.

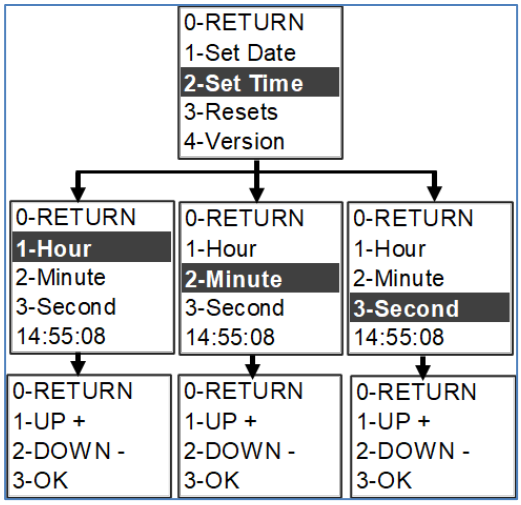


Figure 52: Set Time Submenu

Resets Submenu

The Resets menu allows you to reset configured information. On the System menu, scroll down to Resets. Press **Select** to enter the Resets Submenu. **Scroll** down to highlight the selected option from the menu. Press **Select** to display the screens that display the option. Press **RETURN** to return to the previous menu.

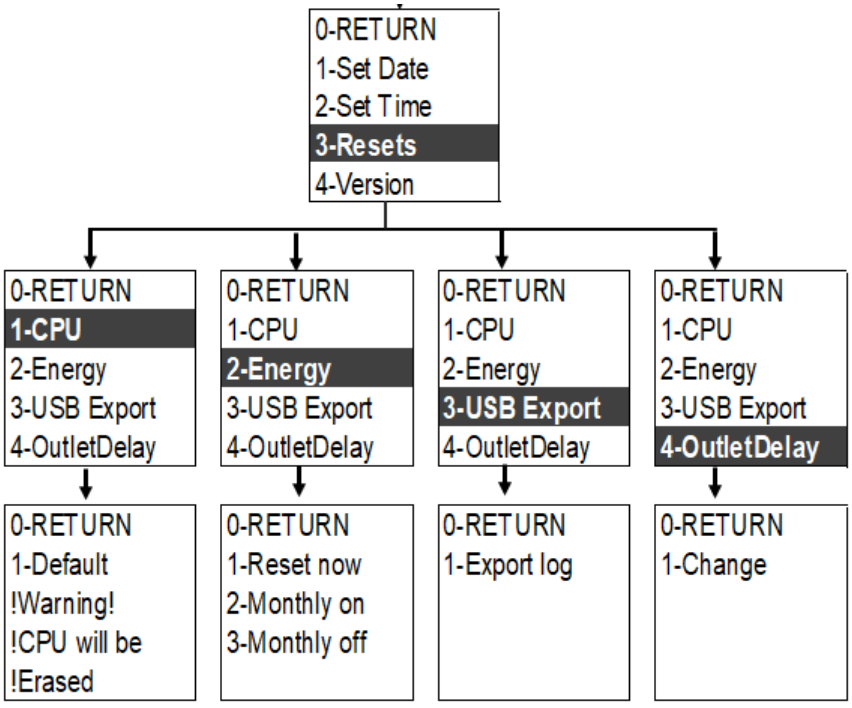


Figure 53: Resets Submenu

Version Submenu

The Version menu allows you to view the PDU's Serial Number and firmware version. On the System menu, **scroll** down to Version. Press **Select** to enter the Version Submenu. **Scroll** down to highlight the selected option from the menu. Press **Select** to display the screens. Press **RETURN** to return to the previous menu.

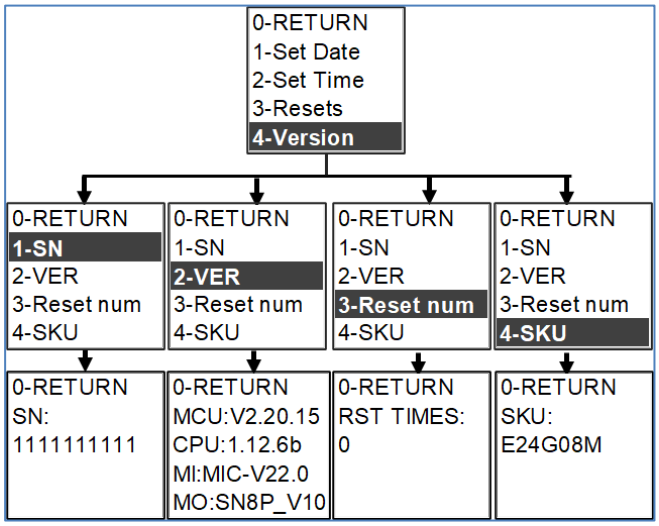


Figure 54: Version Submenu

Network Menu

The Network menu allows you to view IP address IPv4, IPv6 & MAC. On the Main menu, scroll down to Network. Press **Select** to enter the Network Submenu. Scroll down to highlight the selected option. Press **Select** to display the screens. Press **RETURN** to return to the previous menu.

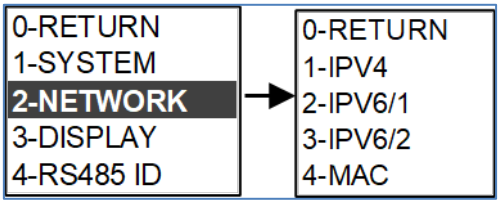


Figure 55: Network Set Menu

IPv4 Submenu

The IPv4 menu allows you to view recent IPv4 setting. On the Network menu, **Scroll** down to IPv4 Submenu. Press **Select** to enter the IPv4 setting. Press **RETURN** to return to the previous menu.

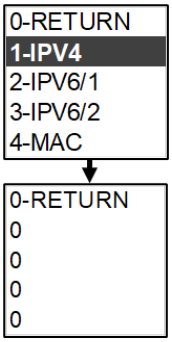


Figure 56: IPv4 Submenu

IPv6/1 Menu

The IPv6/1 menu allows you to view IPv6/1 setting. On the Network menu, scroll down to IPv6/1 Submenu. Press Select to enter the IPv6/1 setting. Press **Scroll** to return to the previous menu.

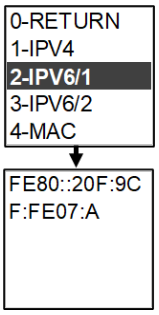


Figure 57: IPv6/1 Submenu

IPv6/2 Menu

The IPv6/2 menu allows you to view current IPv6/2 setting. On the Network menu, **Scroll** down to IPv6/2 Submenu. Press **Select** to enter the IPv6/2 setting. Press **RETURN** to return to the previous menu.

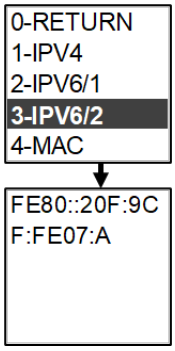


Figure 58: IPv6/2 Submenu

MAC Submenu

The Mac menu allows you to view current Mac setting. On the Network menu, scroll down to Mac. Press Select to enter the Mac setting. Press RETURN to return to the previous menu.

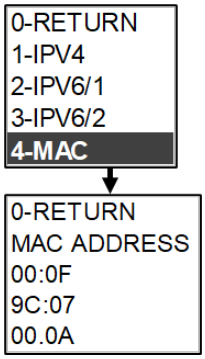


Figure 59: MAC Address Submenu

Display Menu

The Display menu allows you to view Sleep Set, Dir Set, Menu Delay & Beeper. On the Main Menu, **Scroll** down to Display. Press **Select** to enter the Display Submenu. **Scroll** down to highlight the selected option from the menu. Press **RETURN** to return to the previous menu.

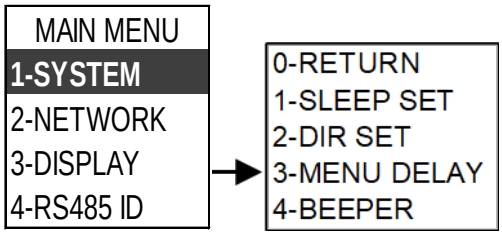


Figure 60: Display Menu

Sleep Set Submenu

The Sleep Set submenu provides the Sleep Setting. On the Display menu, press **Select** to enter the option Submenu. **Scroll** down to the item you wish to display, and press **Select**. Press **RETURN** to return to the previous menu.

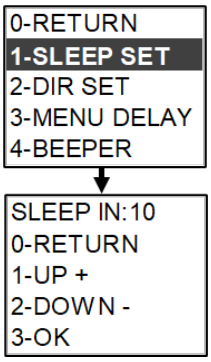


Figure 61: Sleep Set Submenu

DIR Set Submenu

The DIR Set submenu provides the **DIR** Setting. On the DIR Set submenu, press **Select** to display the Reverse Submenu and the screen rotates 180 degrees, then **Select RETURN** to return to the previous menu.

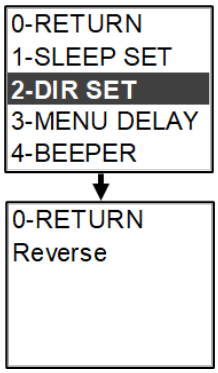


Figure 62: DIR Set Submenu

Menu Delay Set Submenu

The Menu Delay submenu provides the Menu Delay Setting. On the Display menu, scroll down to highlight Sleep Menu Delay submenu. Press **Select** to enter the option Submenu. Scroll down to the item you wish to display, and press **Select**. Press **Scroll** to return to the previous menu.

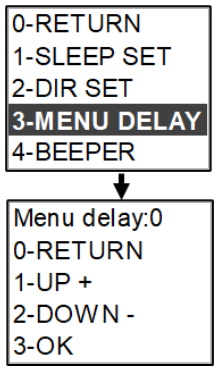


Figure 63: Menu Delay Set Submenu

Beeper Set Submenu

The Beeper Set submenu provides the Beeper status Setting. When system have alarm, Beeper will play sound. On the Display menu, scroll down to highlight Beeper Set submenu. Press **Select** to enter the option Submenu. **Scroll** down to the item you wish to display, and press **Select**. Press **RETURN** to return to the previous menu.

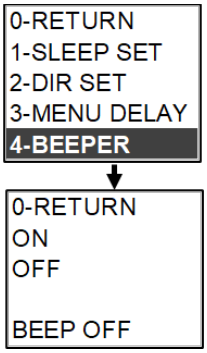


Figure 64: Beeper Submenu

Note: Beeper default setting is off.

RS485 ID Menu

The RS485 Menu which use for managing ID of Daisy Chained PDUs (Review Section 5 – Daisy Chain Configuration) and allows you to view RS485 Set. On the Main Menu, scroll down to RS485 ID. Press Select to enter the RS485 ID Submenu. Scroll down to highlight the selected option from the menu. Press Select to display the option. For guest user, 01 is default No., UP+ can be select from 02 to 15. Down- can reduce by one number. Fox example:00 express Host. After finishing, you choose OK and select RETURN to return to the previous menu.

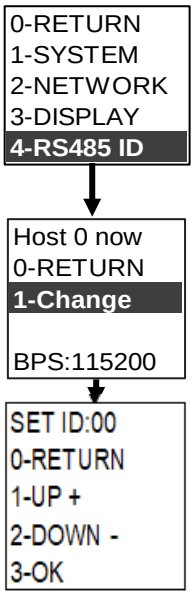


Figure 65: RS485 ID Menu

Power Menu

The Power menu allows you to view system, device, phase, bank and outlets pages. On the Main Menu, press **Select** to display each submenu from system to the Main menu.

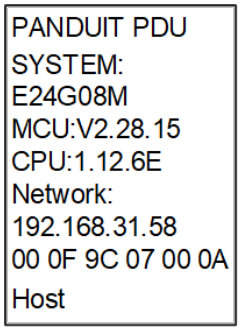


Figure 66: System Information

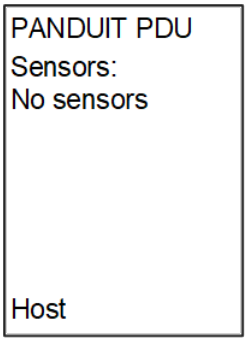


Figure 67: Device Information

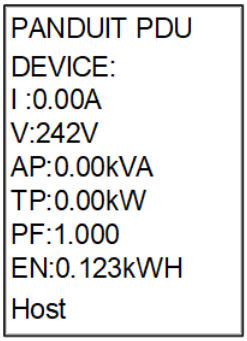


Figure 68: Device Information

Terminology

P#/-B#: Phase#-Breaker#
I: Current
V: Voltage
AP: Apparent Power
RP: Real Power
PF: Power Factor
EN: Energy
Host: Main PDU / **Guest1—Guest****: Daisy chained PDU.

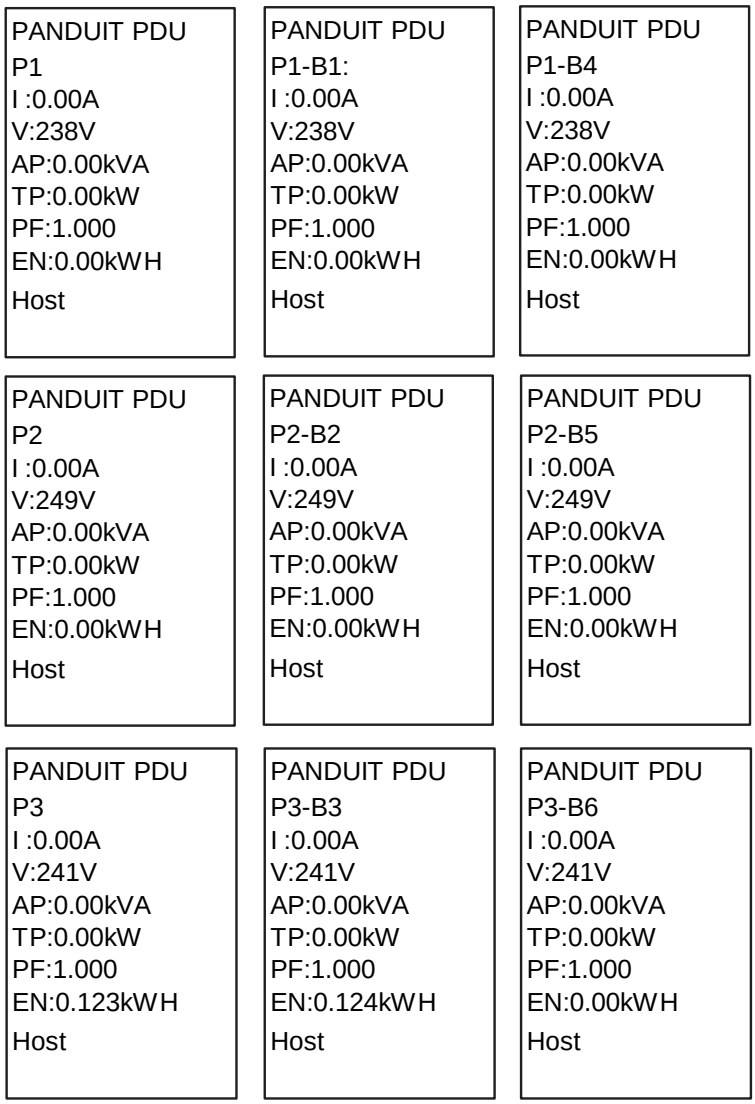


Figure 69: Phase, Bank Information

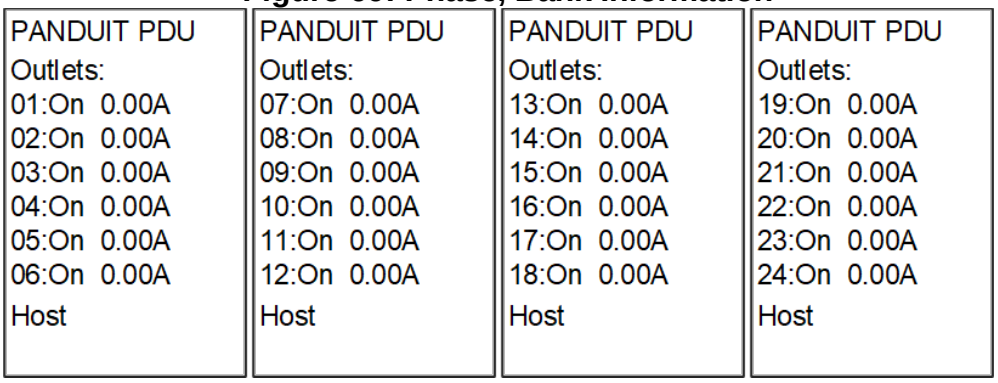


Figure 70: Outlets Information

Section 5 – Daisy Chain Configuration

Daisy-Chain Overview

In daisy chain mode, up to (16) PDUs can be connected via one IP address. This allows users to gather information and data on all daisy-chained PDUs from the main PDU. The daisy chain functionality reduces network cost for PDUs. For example, a standard network switch used in a data center may contain 24 ports. Without using the daisy chain function, each port would supply a network connection to one PDU. However, if using the daisy chain features, a typical network switch with 24 ports can supply network connections for up to 384 PDUs.

Note: When replacing a Daisy Chained PDU or Accessory, please 'RESTART' the Primary (main) PDU1 controller to re-synchronize the daisy chained PDUs sequence. This action will not disrupt operations (or outlet states) and can be completed remotely via Web GUI, SNMP or CLI or physically by pressing and holding the reset button on the primary controller for 10 seconds (but not more than 15 seconds).

Daisy-Chain Setup

1. Select one PDU of daisy chain group as host, set its ID to 0(refer to **RS485 Menu** section), after the initial PDU is configured (host), connect an Ethernet cord from the **PDU Out** port on the configured PDU to the **PDU In** port on the second PDU in the daisy chain line.
2. Repeat step 2, connecting PDUs from the **PDU Out** port to the **PDU In/Serial** port for up to 16 PDUs. Recommend setting the ID from 01-16, but discontinuous ID numbers are not impacting system to recognize daisy chained PDU.
3. Go to the Web interface (or management software) to manage and control the PDUs in the daisy chain.

Note:

1. The total length of the Ethernet cords connecting the PDUs must be less than 50m(164.04 ft.).
2. After Daisy Chain, only Host PDU LCD display have IP address. All Guest PDU will show IP address as 0.0.0.0

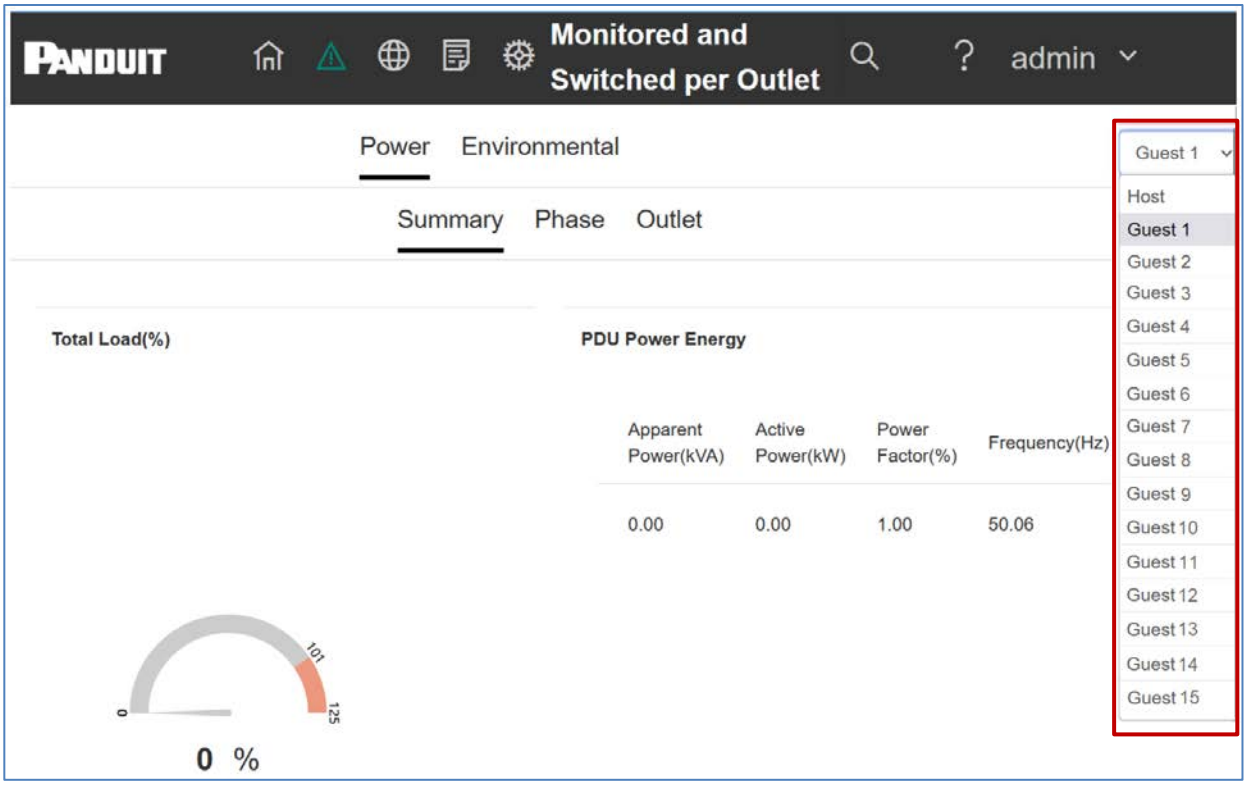


Figure 71: Daisy Chain Interface

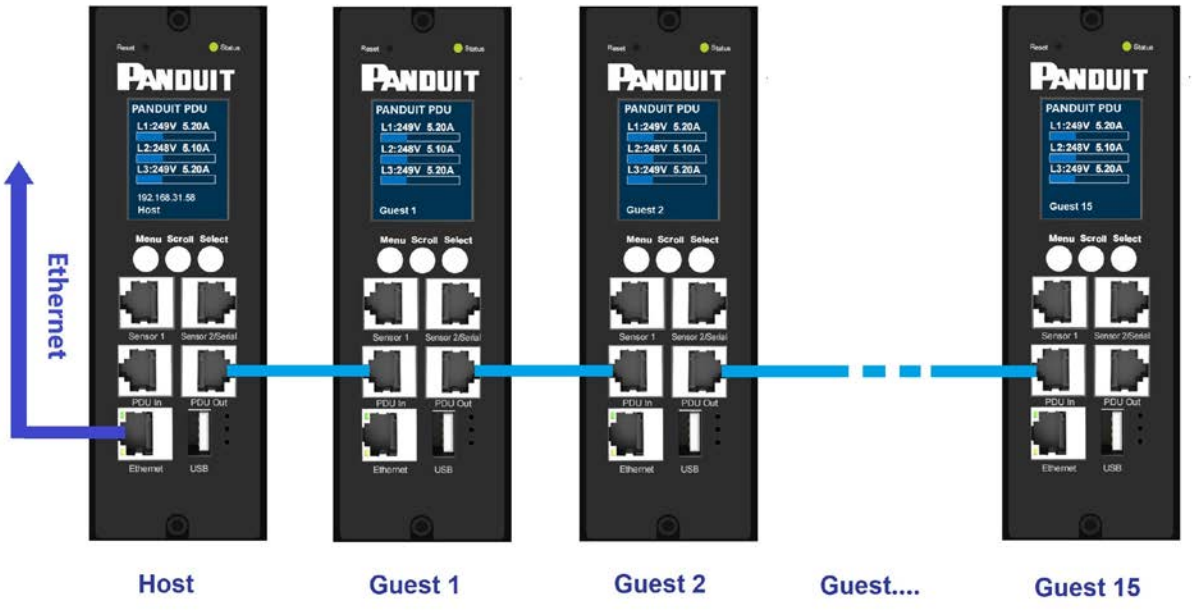


Figure 72: Daisy Chain Physical Connection Diagram

Section 6 –Accessories

Hardware Overview

The dedicated accessories are specially designed to interoperate Essential PDU controller. Connecting unapproved sensors to the Essential PDU controller or connecting Sensors to 3rd party controllers may result in damage.

Monitoring critical attributes (such as temperature, humidity) are all vital aspects of maintaining an efficient-working data center or IT room atmosphere.

Note: A maximum of 4 sensors can be managed by the Panduit Essential PDU controller. Sensors may be installed with PDUs powered on.

The following table lists available sensors as well as sensor count:

Sensor	Description	Sensor Count
Temperature + Humidity Sensor (STH-01)	Monitors the temperature and relative humidity in the rack.	2

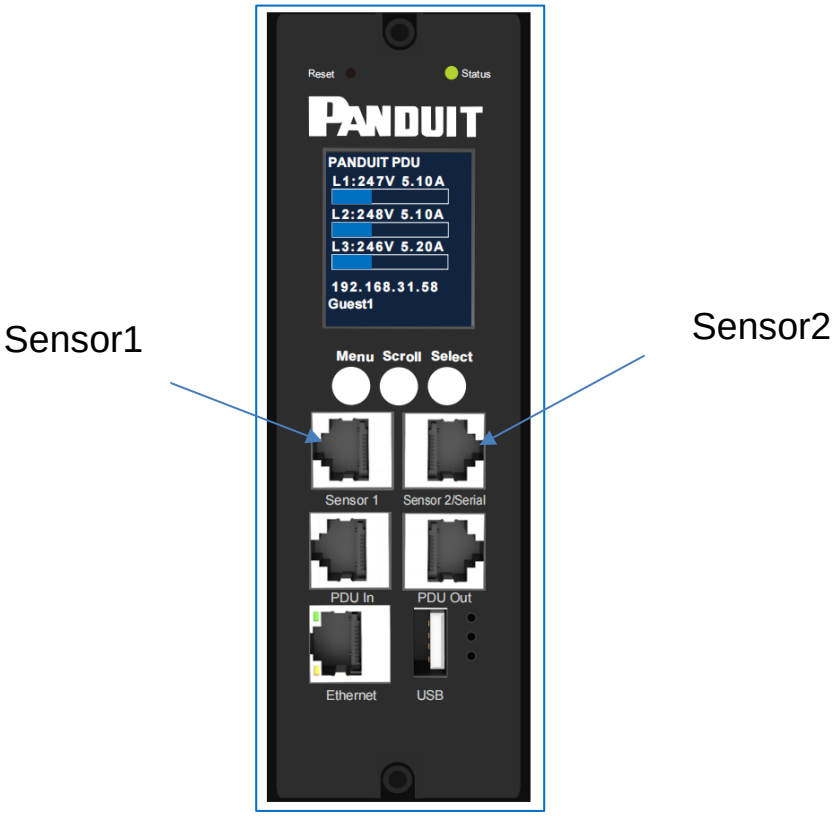


Figure 73: Sensor Ports for Vertical PDU

Note: Sensor configuration refer to **System Management Information and T&H Sensor Threshold section.**

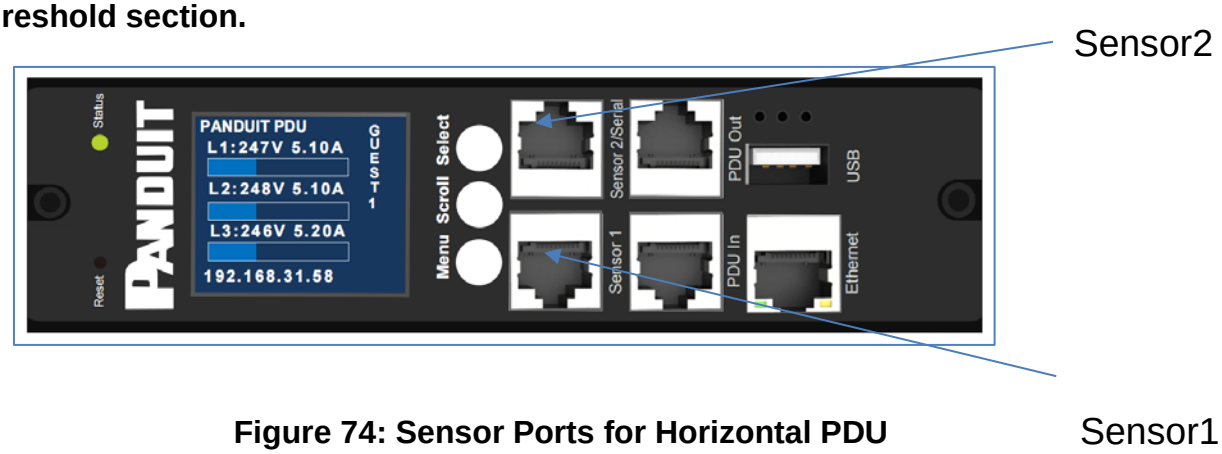


Figure 74: Sensor Ports for Horizontal PDU

Security

This product contains software that stores user entered data. All data entered by the user is stored in non-volatile storage on the system running the software.

Non-volatile Storage

- The Essential iNC Controller uses non-volatile storage on the Essential PDU to store all configuration information.

Authentication Data

- Usernames are stored in non-volatile memory and are available to ‘administrator’ role users, for the purpose of managing access to the system.
- Passwords used for managing the software are stored in non-volatile storage.
- SNMP v1/v2c community strings are stored in non-volatile storage.
- SNMP v3 usernames and passwords are stored in non-volatile storage.

Network Transport Security

- The product comes with a default SSH RSA 1024-bit private host key.
- The product comes with a default RSA 2048-bit private key and certificate.
- The user may upload a custom HTTPS certificate and private key.
    - The HTTPS certificate should use a SHA-256 signature.
    - The private key should be RSA 2048-bit.
    - Other private key types may work, but performance may be negatively impacted if greater private key sizes are used: RSA 3072-bit, RSA 4096- bit.
- The product uses TLS 1.2 to communicate with HTTPS web browser clients.

Network Configuration Data

- Network Configuration, including Static IP addresses and addresses obtained by DHCP are exposed on an “Identification” page and on a Network Configuration page, to aid in network management of the product.
- The product implements an internal authentication mechanism, authorization events generate “Event Logs” containing the IP address and username of successful logins, and the IP address of failed logins for valid usernames.

Warranty and Regulatory Information

Warranty Information

(http://www.Panduit.com)

Regulatory Information

Safety and regulatory compliance

For important safety, environmental, and regulatory information, see *Safety and Compliance Information* at the Panduit website (http://www.Panduit.com)

Panduit Support and Other Resources

Majority of your support needs can be met by visiting Panduit.com and navigating to the respective product page. If you require additional assistance; we are here to help.

Accessing Panduit Support

Asia Pasific

Customer Service

- Price & Availability
- Expedites

+65 6305 7575 or cs@panduit.com

PDU Technical Support:

- PDU Selection
- Competitor Cross references
- Product Documentation

Email: techsupport@panduit.com

Europe / Middle East

Customer Service

- Price & Availability
- Expedites

+44-(0)208-6017200 or cs@panduit.com

PDU Technical Support:

- PDU Selection
- Competitor Cross references
- Product Documentation

Email: techsupport@panduit.com

https://www.panduit.com/en/support/contact-us.html

Global PDU System Support:

- Firmware Updates
- Bulk Configuration

DCIM Software Support
Email: systemsupport@panduit.com
Phone: N A 1-866-721-5302
APAC +65 6305 7044

Acronyms and Abbreviations

A

Amps/Amperes

AC

Alternating Current

AES

Advanced Encryption Standard

CLI

Command Line Interface

DHCP

Dynamic Host Configuration Protocol

Gb

Gigabyte

GUI

Graphical User Interface

IP

Internet Protocol

kVA

Kilo-Volt-Ampere

kW

Kilowatts

kWH Kilowatt Hour

LAN Local Area Network

LCD

Liquid-Crystal Display

PDU

Power Distribution Unit

SHA

Secure Hash Algorithms

SNMP

Simple Network Management Protocol

TCP/IP

Transmission Control Protocol/Internet Protocol

USB Universal Serial Bus

V Volts

W

Watts

Appendix A: Firmware Upgrade Options

It's important to remain up to date on your PDU firmware as bugs are resolved and performance improves with every release.

The firmware upgrade procedure verifies the image by validating the signature of the images. If the signature does not match, the firmware upgrade procedure will ignore the image and remain on the current version. Updating the firmware does not affect the configuration or outlet state of the intelligent PDU.

Note: If you load incompatible firmware, no damage will occur and PDU will maintain the original firmware.

Web Interface Method

1. Open the User interface in a web browser by entering the PDU IP address.
2. Login to with Administration credentials.
3. Go to **Gear>System management> File Upgrade.**
4. In the Firmware Update dialog box, browse to (***.bin)** firmware file.

Figure 75: Upload Firmware

5. Select Apply. The system will update the newest firmware to the Intelligent Network Controller.
6. When the upload is finished, the system will reboot automatically.

USB Method

Note: Verified to work with Toshiba™ or Sandisk™ up to 16GB USB Drives. Others USB drives *may* work as well. Before starting the transfer, make sure the USB drive is formatted in FAT32.

1. Save the Firmware file ('pdu_img.bin') to a USB drive.
2. Insert the USB drive into the USB port of the Network Controller.
3. PDU will update the firmware automatically, waiting for about 30 seconds and check the firmware version from LCD
4. When the update is complete, remove the USB.
5. Press the Reset button and wait for device reboot fully.

YMODEM Method

To use YMODEM to upgrade one Rack PDU that is not on the network, you must extract the firmware files from the official website. Login to a FTPs program with a role with administration privileges.

1. Select a serial port at the local computer and disable any service that uses the port.
2. Connect the RJ-45 to DB-9 console cable to the serial port at the Rack PDU.
3. Run a terminal program such as Tera Term® or HyperTerminal®, and configure the selected port for 115200 bps, 8 data bits, no parity, 1 stop bit, and no flow control.
4. Press the Reset button on the Rack PDU, then immediately press the Esc key several times until the Boot Monitor prompt displays: #>.
5. Type Ymodem, then press ENTER.
6. From the terminal program's menu, select YMODEM, then select the binary firmware file to transfer using YMODEM. After the YMODEM transfer is complete, the Boot Monitor prompt returns.
7. Type reset or press the Reset button to restart the PDU's management interface

Appendix B: System Reset or Password Recovery

Use Reset Button on Controller

Press and hold the Reset Button for 8 seconds to recover from an Intelligent Network Controller communication failure. This will cause a reset of the iNC controller, all configuration(s) will be retained.

To Default the controller to factory settings, press and hold the Reset Button for at least 20 seconds. This will cause a reset of the iNC controller erasing all existing configurations, including username(s) and password(s). It does not change the Energy (kWh) value and does not affect the outlet state.

Resets Command from Submenu

CPU reset

CPU reset command will cause a reset of iNC controller erasing all existing network configurations, including username(s) and password(s), network configurations, It does not change the Energy(kWh) value and does not affect the outlet state.

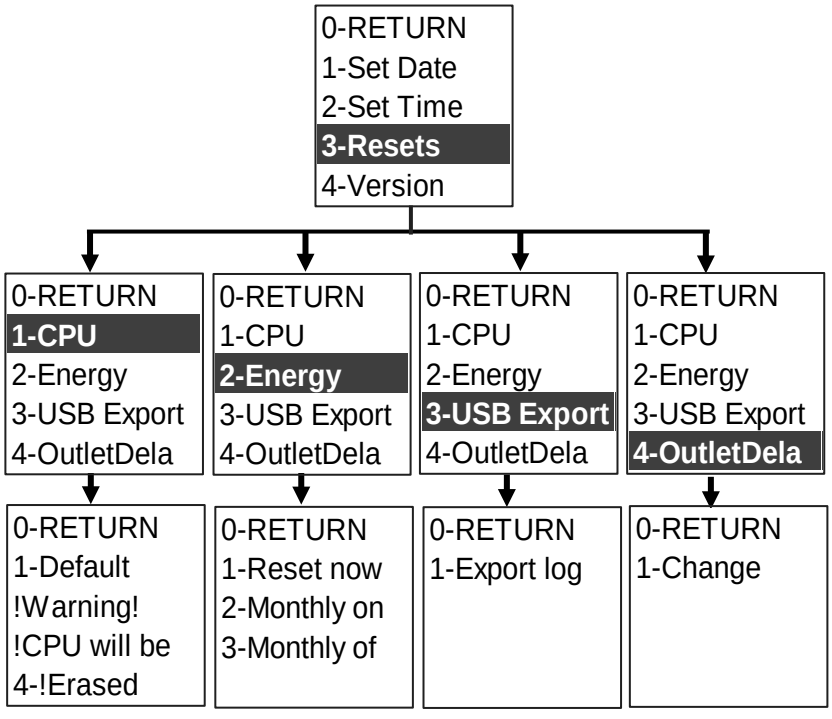


Figure 76: CPU Reset Submenu

Reset/Reboot from Web UI

This menu gives you the option to reset and reboot various components of the network interface.

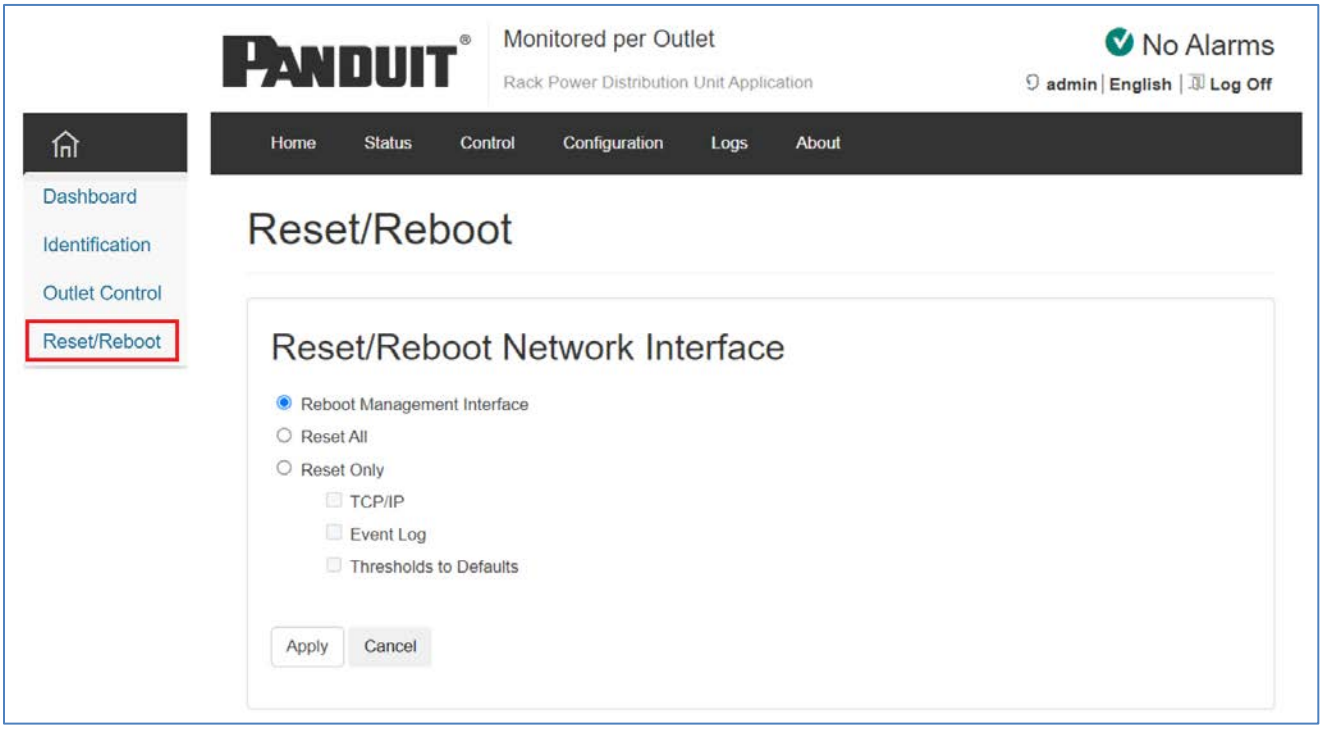


Figure 77: Reset/Reboot Submenu

Reboot Management Interface: Only restarts the Rack PDU's Network Management Interface. It does not affect the outlet ON/OFF status.

Reset All: Reset all configuration values except account information and the Event Log.

Reset Only: Options include:

- **TCP/IP:** Set TCP/IP Configuration to DHCP, its default setting. This requires that the Rack PDU receive its TCP/IP settings from a DHCP server.
- **Event Log:** Reset all Event logs.
- **Thresholds to Default:** Reset all threshold settings.

Appendix C: PDU Alarms

PDU Unit	PDU Unit Active Power Above upper warning PDU Unit Active Power Below lower warning
Input Phase	Input Phase X Current Above upper warning Input Phase X Current Below lower warning
Circuit Breaker	Circuit Breaker X Current Above upper warning Circuit Breaker X Current Below lower warning Circuit Breaker status OFF
Outlet	Outlet X Active Power Above upper warning Outlet X Active Power Below lower warning
External Sensor	External Sensor X (numerical) Above upper warning External Sensor X (numerical) Below lower warning External Sensor X (state) Alarmed External Sensor X (state) Communication Lost

Trap Codes assigned to Alarms List

Trap codes assigned for critical alarms:

Trap Class	Trap Description
Critical	The PDU unit active power is ABOVE critical threshold value.
	The PDU unit active power is BELOW critical threshold value.
	The phase (1-3) current is ABOVE critical threshold value.
	The phase (1-3) current is BELOW critical threshold value
	The outlet (1-48) active power is ABOVE critical threshold value
	The outlet (1-48) active power is BELOW critical threshold value
	The sensor (1-8) temperature/humidity is ABOVE critical threshold value
	The sensor (1-8) temperature/humidity is BELOW critical threshold value
	Input Phase (1-3) Frequency Asserted below lower critical.
	Input Phase (1-3) Frequency Asserted above upper critical

Trap codes assigned for warning alarms:

Trap Class	Trap Description
Warning	The PDU unit active power is ABOVE warning threshold value.
	The PDU unit active power is BELOW warning threshold value.
	The phase (1-3) current is ABOVE warning threshold value.
	The phase 1 current is BELOW warning threshold value.
	The outlet (1-48) active power is ABOVE warning threshold value.
	The outlet (1-48) active power is BELOW warning threshold value.
	The sensor (1-8) temperature/humidity is ABOVE warning threshold value.
	The sensor (1-8) temperature/humidity is BELOW warning threshold value.

Trap codes assigned for information alarms:

Trap Class	Trap Description
Clear	The PDU unit active power is alarm clear.
	The phase (1-3) voltage alarm cleared
	The phase (1-3) current alarm cleared
	The outlet (1-48) active power current alarm cleared.
	The sensor (1-4) temperature/humidity alarm cleared.
	The sensor (1-4) lost communication alarm cleared.

Appendix D: Panduit Network Controller Replace or Rotate 180°

1. Use a T10 Torx screwdriver on the screws as shown in Figure 73. The screws are held in with retaining washers.

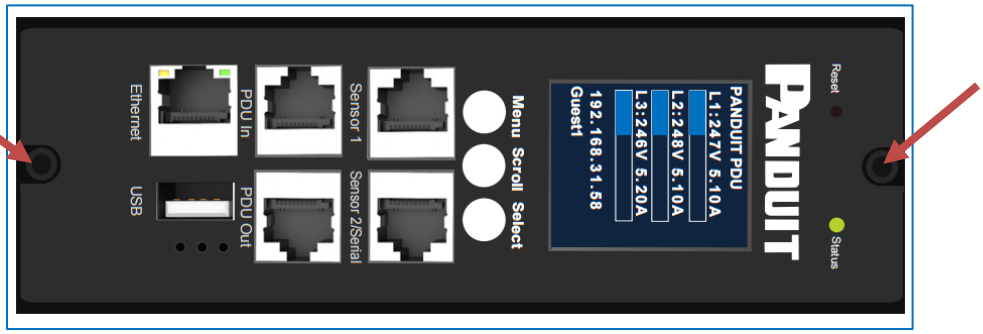


Figure 78: Screws on Network Controller

a. Controller may be rotated to accommodate overhead or underfloor power. If rotating controller, **YOU MUST DISCONNECT** the ribbon cable to prevent damage to the ribbon cable. After rotating the controller, carefully reconnect the ribbon cable making sure to not pinch any of the ribbon cable.

2. If replacing controller, disconnect the existing ribbon cable from the existing controller. To reinstall, carefully connect the ribbon cable to the new controller making sure to not pinch any of the ribbon cable.

Figure 79: RJ45 Cable for the Network Controller

3. Replace and tighten the two (T10) screws on the Intelligent Network Controller to 2.2 – 3.1 lbf-in (0.25 – 0.35 N-M). Overtightening the screws may result in metal deformation.

Appendix E: Direct connect to the PDU

Note: Instructions refer specifically to Windows 10. Please refer to your operating system documentation if you are not using Windows 10.

1. Type **control** into Windows Search and select **Control Panel**.

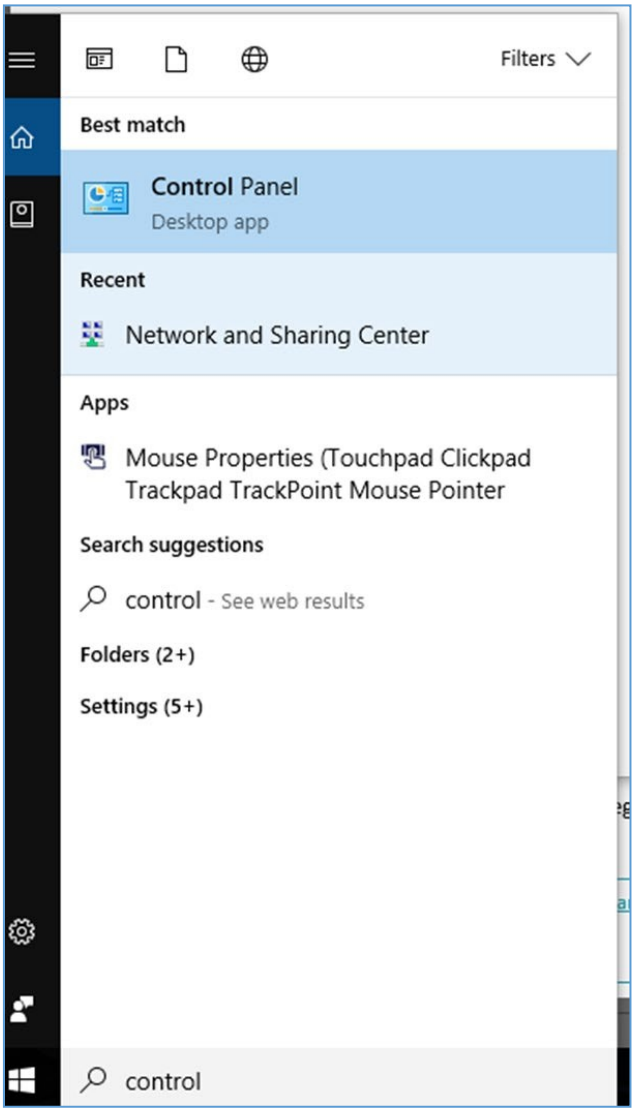


Figure 80: Control Panel

2. In the Control Panel window, select **View network status and tasks** under the Network and Internet heading.

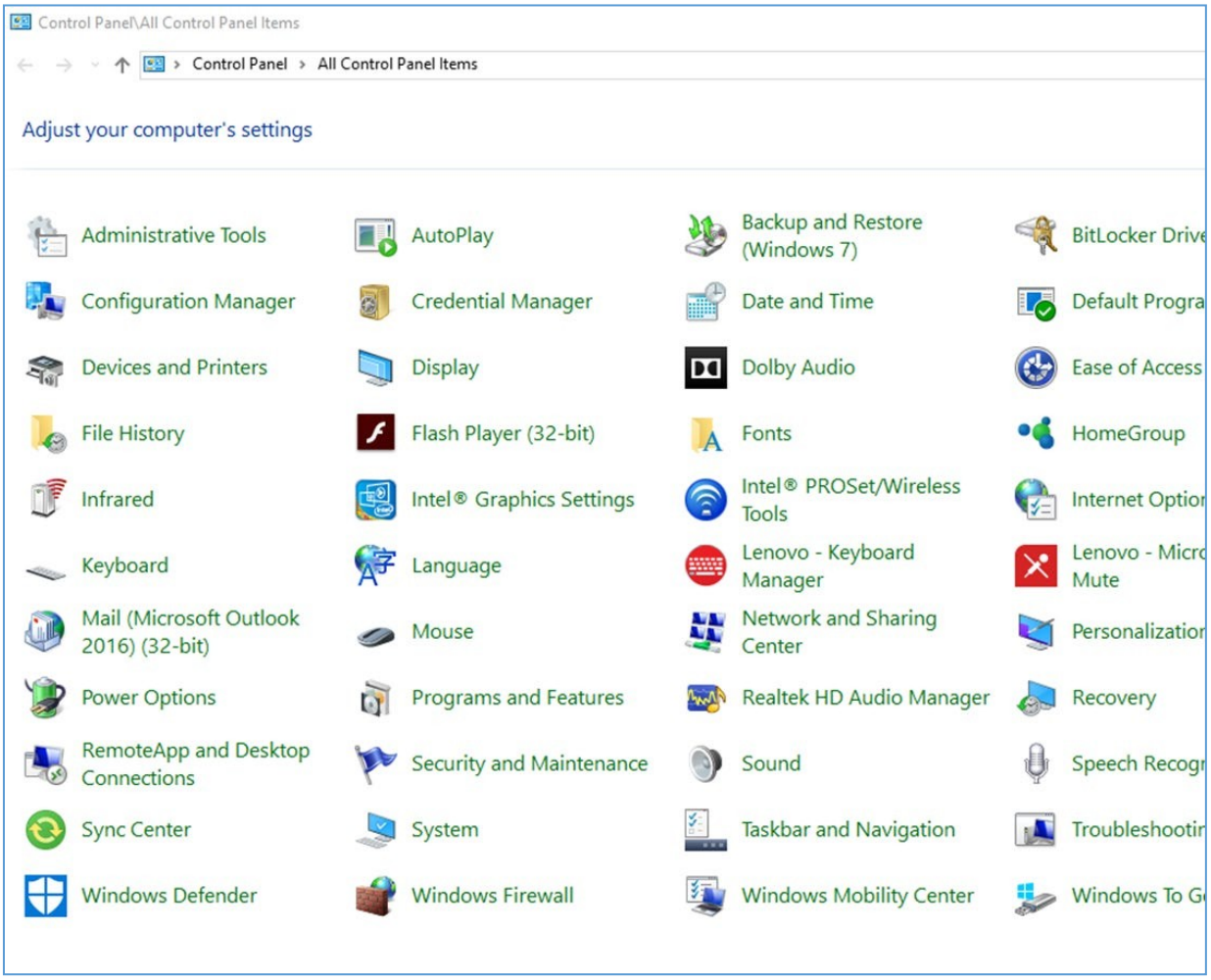


Figure 81: Network Status and Tasks

3. Select **Change adapter settings** from the menu on the left.

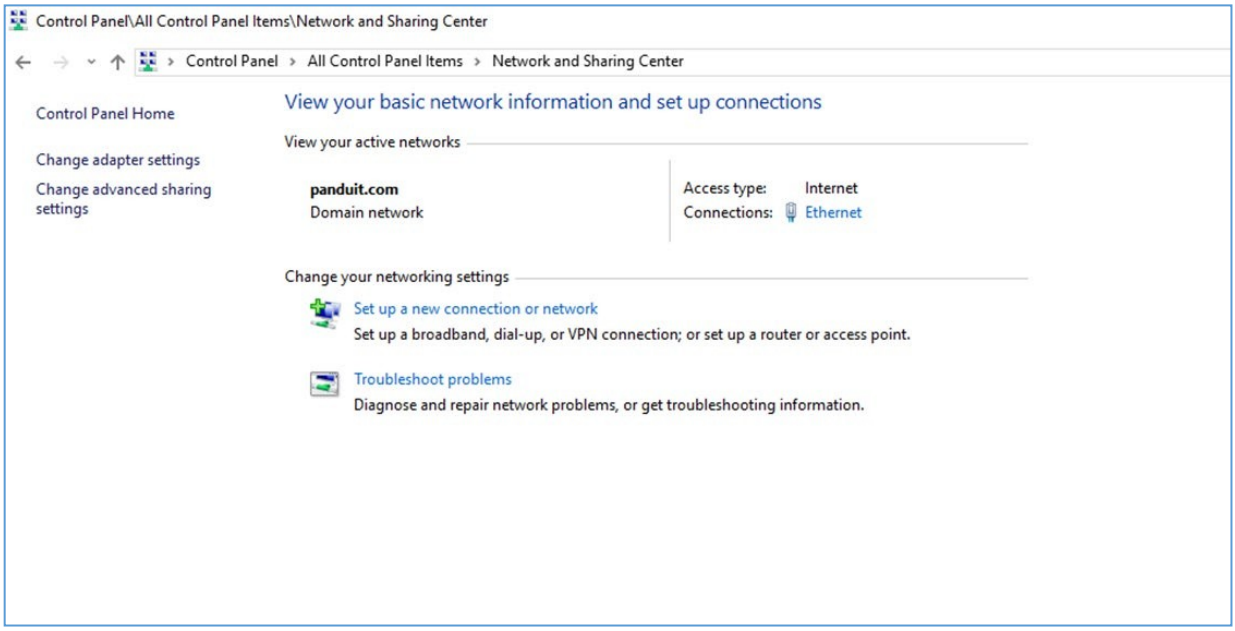


Figure 82: Change Adapter Settings

4. Right-click **Ethernet** and select **Properties**.

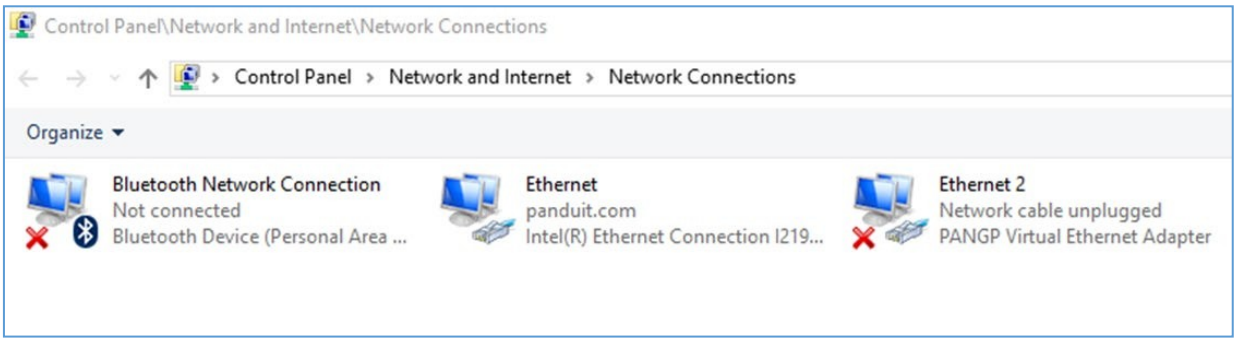


Figure 83: Properties

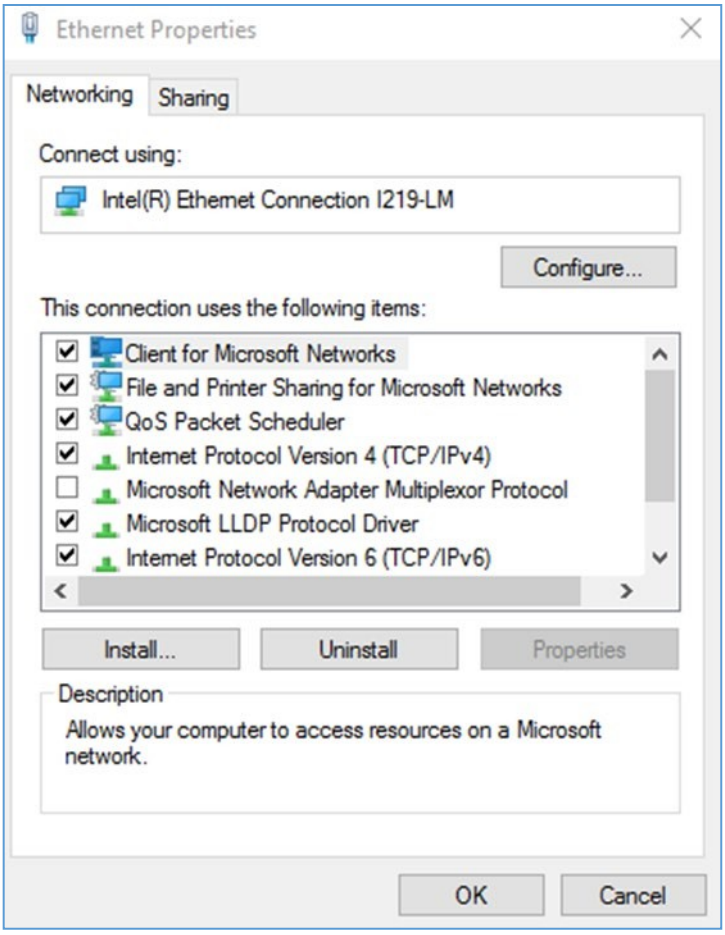


Figure 84: Ethernet Properties

5. Select **Internet Protocol (TCP/IP) Version 4** (you may need to scroll down). Then click the **Properties** button.

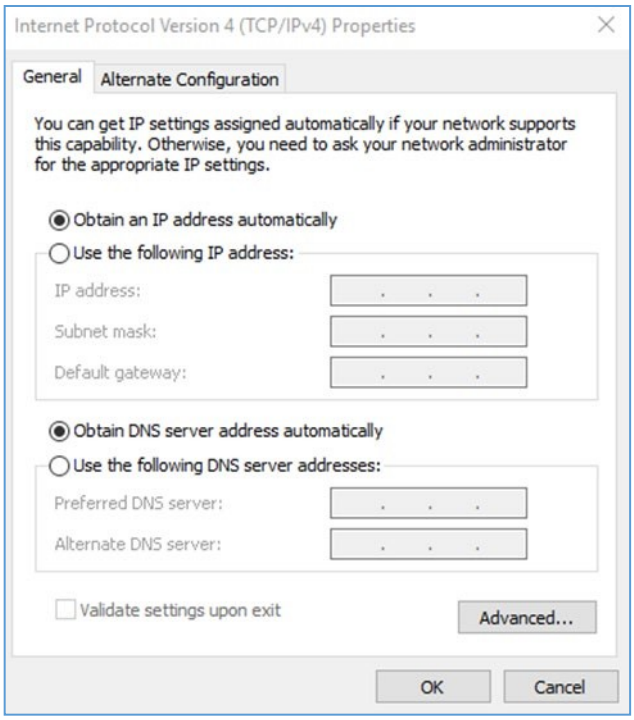


Figure 85: Internet Protocol Version 4

6. Select the **Obtain an IP address automatically** and **Obtain DNS server address automatically radio button,** enable DHCP function.
7. Connect the PDU network connection directly to the PC's Ethernet card using a patch cable.
8. Power the PDU unit.
9. Open a web browser on the PC.
10. Enter the IP address from NMC LCD display into your browser.

Appendix F: Command Line Interface (CLI)

The Command Line Interface (CLI) is an alternate method used to manage and control the PDU status and parameters, as well as basic admin functions. Through the CLI a user can:

- Reset the PDU
- Display PDU and network properties
- Configure the PDU and network settings
- View user information

The CLI uses YMODEM to perform the file transfer. However, you cannot read the current file through YMODEM.

The PDU CLI command set for managing and monitoring the PDU includes the following commands:

- help command: PDU help query
- tcpip command: Configuration and display tcpip parameters
- web command: Configuration and display web parameters
- version command: System version
- reset command: System parameters reset to default
- reboot command: System reboot
- mac command: Configuration device mac address

Connecting to the CLI through the serial interface

An option to communicating through the serial interface is to use the specialized YOST Serial Data Cable. This cable Remaps Panduit Essential Serial Interface to a YOST interface.

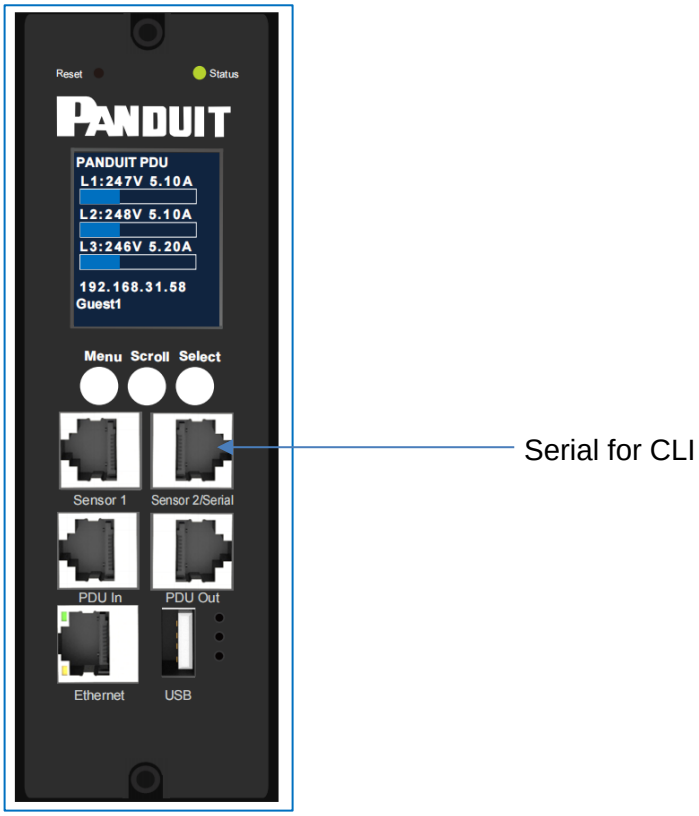


Figure 86: Connect to the Serial port

To connect the PDU to a computer (via Serial Interface):

Using a YOST Remap cable (USB to RJ45) insert the USB End to an available port of the computer.

Logging in with HyperTerminal

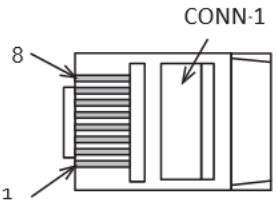
To login through HyperTerminal, set the COM settings to the following parameters:

- Bits per second: 115200

- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

Serial Cable Pinout to Create Your Own Cable

Optionally if you prefer to make your own RJ45-to-DB9 Serial cable, the connections are wired as shown:



CONN·1		CONN·2
Pin	Description	Pin
3		1
2	RS232·RX	2
1	RS232·TX	3
4		4
6	Ground	5
5		6
7		7
8		8

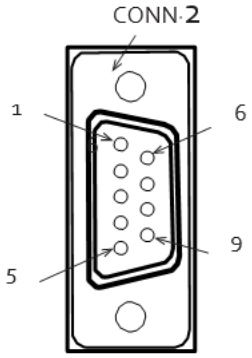


Figure 87: Serial Cable Pinout

Logging in via PuTTY

1. Select a serial port at the computer and disable any service that uses that port.

2. Connect the serial cable from the selected serial port on the computer to the Serial port on the Rack PDU.

3. Run PuTTY (Tera Term® or HyperTerminal®) and configure the selected port (115200 bps, 8 data bits, no parity, 1 stop bit, and no flow control).

4. Press Enter. It may take multiple (up to three) attempts to get a prompt to appear. At the prompt, enter your user name and password.

CLI Commands

Help Commands

Command	Description	Example
>help	List all available PDU CLI commands.	>help **tcpip** Configuration and display tcpip parameters. **web** Configuration and display web parameters. **Version** System version. **reset** System parameters reset to default. **Reboot** System reboot. **mac** Configuration device mac address

System Commands

Command	Description	Example
Version	System version	>version bootloader version: bootloader-V1.8 firmware version: FW-M4-1.9.11
Reset -c	Remove Certificate	> reset -c Remove Certificate
Reset -n	Reset Network parameters	> reset -n Reset Network parameters
Reset -d	Reset Device parameters	> reset -d Reset Device parameters
Reset -a	Reset All parameters	> reset -a Reset All parameters
Reboot	System reboot	> reboot Bootloader start

Network Commands

Command	Description	Example
Web -a http	Web UI Access mode. Access Web UI with Http protocol.	> web -a http
Web -a http	Web UI Access mode. Access Web UI with https protocol.	> web -a http
Web	To view the TCP/IP port used by HTTP.	> web Http: enabled Https: disabled Http Port: 80 Https Port: 443 Minimum Protocol: TLS1.2
tcpip	To view the network settings of the PDU	> tcpip Active IPv4 Settings ---------- Active IPv4 Address: 192.168.131.104 Active IPv4 Subnet Mask: 255.255.255.0 Active IPv4 Gateway: 192.168.131.1 Manually Configured IPv4 Settings ---------- IPv4: enabled IPv4 Address: 192.168.8.8 Subnet Mask: 255.255.255.0 Gateway: 192.168.8.1 MAC Address: 58-fc-db-80-6c-1d Active IPv6 Settings ---------- IPv6 link local address: FE80::5AFC:DBFF:FE80:6C1D IPv6 unicast address:

Command	Description	Example
tcpip -i	To view the IP address of the PDU	> tcpip -i IPv4 address: 192.168.08.08 > tcpip -i 192.168.8.9 IPv4 address: 192.168.08.09 Reboot required for change to take effect
tcpip -m	Get IP address manually or with DHCP.	> tcpip -m Mode: DHCP > tcpip -m manual Mode: Manual Reboot required for change to take effect. > tcpip -m dhcp Mode: dhcp Reboot required for change to take effect.
tcpip -s	Type the subnet mask for the Rack PDU.	> tcpip -s Sub mask: 255.255.255.0
tcpip -g	Type the IP address of the default gateway. Do not use the loopback address (127.0.0.1) as the default gateway	> tcpip -g Gateway: 192.168.131.1
MAC	Configuration device mac address	> mac Mac address: 58-fc-db-80-6c-1d > mac 58fcdb806c1c 58-fc-db-80-6c-1c

Appendix G: Panduit Essential Accessories

Accessory P/N	Accessory Description
TBD	PDU YOST Serial Data Cable Assembly
ENV01	TEMPERATURE & HUMIDITY SENSOR (1T+1H)
PWRCRD1	IEC C19 to IEC 60309 2P+E 6h 16A (IP44)
PWRCRD2	IEC C19 to SCHUKO CEE 7
CNT01	ES2P Controller

Appendix H: Compliance Model Number Details

#1&%%$*, where:

#: Different management feature.

A: Basic PDU

B: Metered iPDU

C: Metered, Outlet

switched iPDU D:

Outlet Metered iPDU

E: Outlet Metered, Outlet switched iPDU

1: Mid Tier

&: Power Input: X: 100-240Vac,

Y: 200/346 -

240/415VAC

%%: Input Current. 16 means 16A

$: Phase: A: Single Phase

B: Three Phase Delta

C: Three Phase WYE

*: Form factor: 0: vertical 1: horizontal

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