

# PDU SD-1688

Per outlet current monitoring

Per outlet control

User Manual





# Safety Precautions

To avoid potential problems when using PDU:

- If the building has 3-phase AC power, ensure that the server and monitor are on the same phase. For best results, they should be on the same circuit.
- To avoid potentially fatal shock hazard and possible damage to equipment, test AC outlets at the server and monitor for proper polarity and grounding.
- To ensure the safety of network communication, it is recommended that the PDU be installed in a network firewall to prevent malicious attacks by hackers, which will affect the safety of power consumption.

## Safety instructions

Read all the following safety guidelines to protect yourself and your PDU.

**WARNING:** All outlets of the PDU output high voltage. Necessary precautions should be taken.

**WARNING:** Do not push any objects through the openings of the PDU. Doing so may cause fire or electric shock by shorting out interior components.

**WARNING:** There is a possibility of severe electrical shock from either the live or neutral side of any of the power outlets or their wiring, even if one of the circuit



breakers is disabled.

**WARNING:** The PDU is intended for indoor use only.

**WARNING:** To help protect the PDU from electrical power fluctuations, use a surge suppressor, line conditioner or uninterruptible power supply.

**WARNING:** Be sure that nothing rests on the cables of the PDU and that it is not located where it may be stepped on or tripped over.

**WARNING:** Do not spill food or liquids on the PDU. If it gets wet, disconnect the power immediately.

**WARNING:** Keep the PDU away from heat sources.

**WARNING:** One output can only be connected to a single device. Do not use extension cords to power multiple devices, so as not to damage the output relay due to the accumulation of inrush currents from multiple devices.

## **Rack mount safety considerations**

When installing the PDU, make sure the following environmental specifications are met:

**Elevated Operating Ambient Temperature:** If the PDU is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature. See above.



**Reduced Air Flow:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

**Mechanical Loading:** Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading.

**Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

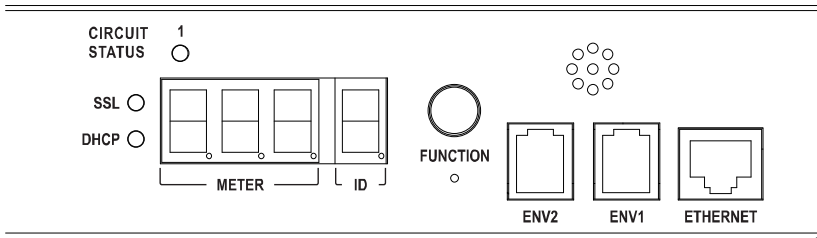
**Reliable Grounding:** Reliable grounding of rack-mounted equipment should be maintained.

Particular attention should be given to supply connections other than direct connections to the branch circuit, such as power strips or extension cords.



# Features and Benefits

The PDU is an Internet-ready power strip equipped with an intelligent current meter to indicate the total power consumption of the Power Distribution Unit (PDU). Each PDU includes PDU Utility software to monitor and manage multiple PDUs.



Functions	Description
Ethernet	Ethernet connection for the built-in web server.
Audible Alarm	Holes for audible alarm.  Warning- 1 beep in 1 second.  Overload- 3 beeps in 1 second.  Note: The audible alarm will keep beeping until the current gets back to normal and the current is lower than the threshold to 0.5 amps.



Function  
Button

A function button that can be used to change the meter display

- Press and hold the key after 1 beeping; it can let the meter to show up the current information and temperature/humidity in sequence.
- Press and hold the key after 2 beeping; it can let the meter to show up the IP address
- Press and hold the key after 4 beeping; it can change the way to get IP by DHCP or Fixed IP.

Press button then release it after 6 beeping; reset PDU back to default setting.



After six beeps to return to factory settings, do not cut off the power when the long beep sounds until the power information is displayed, otherwise the system will be damaged and may not work normally.

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Meter

A built-in true Root Meter Square (RMS) current meter.

3 digits to display current and IP Address.



ID	The identification of power circuit.
LED Indicator	<p>SSL (Blue): Light on means web access is protected by SSL.</p> <p>DHCP (green): Light on means PDU gets IP from DHCP server.</p> <p>Circuit Status (red): Circuit Status LEDs labeled alphabetically to indicate the PDU's circuit status. The number of LED will vary according to different models.</p>
ENV1 / ENV2	RJ11 connection for optional accessory to measure temperature and humidity.
Circuit Breaker	Overload power protection.



## **Alarms and monitoring**

The PDU delivers accurate, real-time global current monitoring of all connected devices via the onboard web interface or through the PDU Utility software. Users have the ability to set a current alarm threshold that, once exceeded, will cause the PDU to sound an alarm or send a notification message, or both.

## **Sequential power application**

The PDU incorporates a sequential power application feature that prevents all power outlet receptacles from turning on at once, eliminating the potential of current surges that could render the equipment inoperable. Together with the global current monitoring, the sequential power application feature lets users safely install more equipment on existing power circuits without the worry of current overloads.

## **Features : System**

- Built-in Web Server to Support Remote Power Management.
- Local LED Displays Amps, IP Address ,Temperature or Humidity
- Daily, Weekly, Monthly & Yearly Power Consumption Data
- 10/100 Base-T Ethernet Port
- IPv4 and IPv6 Support
- SNMP Control (v1,v2c,v3)
- Telnet, SSHv2 Encryption Support
- Radius Authentication
- User Account for Three Different Permissions Management





## System

Alarm Notification via Email, SNMP, Syslog, LED or audible alarm

SSLv3, TLS1.0, TLS1.1, TLS1.2 Support

IP Address Filtering

Max. of 100000 entries for each Power Consumption Data and Event Log

Remote firmware Upgrade Support

Alive of Heart Beat Trap Available.

Definable Reset Button

Fahrenheit and Celsius Switchable

Export and Import PDU Configuration

Support wireless network connection

## **Power Management**

True RMS Current Measurement.

Remote Per Outlet On/Off Power Switching

Remote Per Outlet Current Monitoring

User Defined Alarm Thresholds for Warning and Overload.

User Defined Power On/OFF Sequence Time.

Timed & Scheduled On/Off/Reboot Switching

Alternative Outlet Restart Mode: Memorized Previous Status,  
Always On or Always Off

Ping-No-Answer Alarm

Outlet Action via Pre-Set Event, Including Power Event,  
Environment Event and Receiving Trap from Other Devices.

Circuit Breaker Protection

Free Bundle Management Utility.



# Getting Started

Before installing your PDU, refer to the following list to ensure you have all items that shipped with the PDU, as well as other items necessary for proper installation. The standard PDU package includes the following:

- Power Distribution Unit
- Rack mounting brackets
- Four retaining screws for each rack mounting bracket .



# Installation Instructions

This section will provide a quick instruction to install the PDU.

A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer.

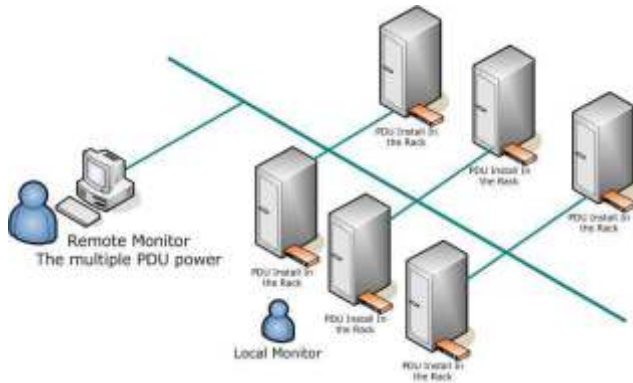
B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

## Diagram



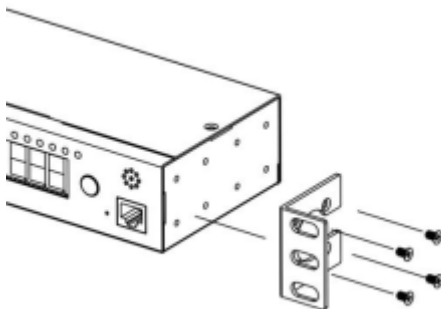
## Hardware

### 1. Install mounting brackets.

The PDU comes with brackets for mounting in a rack. To mount the PDU into a rack performs the following procedure:

- 1.1 Attach the mounting brackets to the unit, using the four retaining screws provided for each of the brackets.

Horizontal:





- 1.2 Choose a location for the brackets.
- 1.3 Align the mounting holes of brackets with the notched hole on the vertical rail and attach with the retaining screws.
2. Connect input and output power.
3. Connect Ethernet cable to the PDU.
4. Power on the PDU.



## Web interface:

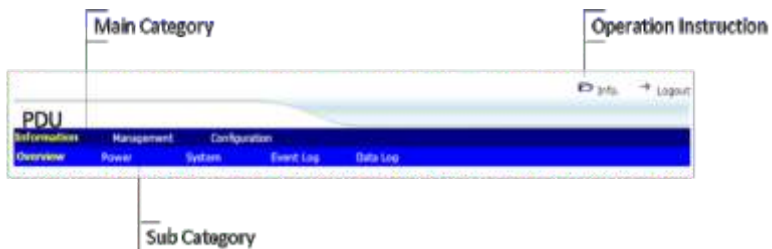
The default setting for the way to get IP address is DHCP. If PDU can not get the IP from DHCP server, the IP address will stay at **192.168.0.216**



Default ID: **snmp**

Default Password: **1234**

After login to web, user can check all operation instruction in web page of “Info.”





# Information Overview

Display current, temperature and humidity information, event log and outlet status.

The screenshot shows a PDU monitoring interface with the following sections:

- Navigation:** Information (selected), Management, Configuration. Sub-navigation: Overview (selected), Power, System, Event Log, Data Log, Chart.
- Status:** Normal (with a green checkmark icon). Date/Time: 2022/11/23 05:28:31.
- PDU Information:**
  - Current Monitor:** Total PDU Current: 0 Amp.
  - ENV Monitor:** Temperature(1): 21 °C (Normal); Humidity(1): 67 % (Normal); Temperature(2): 22 °C (Normal); Humidity(2): 56 % (Normal).
- Event Log:**

Date	Time	Event
2022/11/23	05:26:07	Web user [snmp] logged in from 192.168.0.43
2022/11/23	02:13:46	Web user [snmp] logged out from 192.168.0.1
2022/11/23	02:00:11	Web user [snmp] logged in from 192.168.0.1
2022/11/23	01:45:01	Web user [snmp] logged in from 123.195.124.213
2022/11/22	09:01:56	Web user [snmp] logged in from 192.168.0.1
- Outlet Status:**

No.	Name	Status	Event	Ping	Schedule
1	OutletA	ON			
2	OutletB	ON			
3	OutletC	ON			
4	OutletD	ON			
5	OutletE	ON			
6	OutletF	ON			
7	OutletG	ON			
8	OutletH	ON			

Note:



## Setting column

S: Schedule is set. PDU will execute the pre-set outlet action in specified time automatically.

P: Ping function is active. If the specified device stops ping response, PDU will execute the pre-set outlets action

E: PDU will execute the pre-set outlets' action according to event happen.

## Power

Each outlet current consumption

## System

System information

## Event Log

System memory can log up to 100000 entries.

## Data Log

System memory can log up to 100000 entries.





# PDU

Status: Normal

2022/11/23 05:30:23

## Data Log Filtering

Filter

Data Log Time:  Last  From  
All Logs

Select any PDU and time interval; press the Filter button, its data log will be displayed

## Data Log

Date	Time	Amp	Temp	Humidity
2022/11/23	05:30:07	0.00	21.22	66.56
2022/11/23	05:20:07	0.00	21.22	66.56
2022/11/23	05:10:07	0.00	21.22	66.56
2022/11/23	05:00:07	0.00	21.22	66.56
2022/11/23	04:50:07	0.00	22.22	66.56
2022/11/23	04:40:07	0.00	22.22	67.57
2022/11/23	04:30:07	0.00	22.22	68.58
2022/11/23	04:20:07	0.00	22.23	68.58
2022/11/23	04:10:07	0.00	22.23	69.59
2022/11/23	04:00:07	0.00	23.23	69.60

## Chart

Display history chart for current, temperature and humidity.



# PDU

Info Logout

Information Management Configuration  
Overview Power System Event Log Data Log **Chart**

Status: Normal

2022/11/23 05:32:10

## Chart Filtering

Data Log Time:  Last  From  
All Logs

Filter

Select any PDU and time interval; press the Filter button, its chart will be displayed

## Data Chart

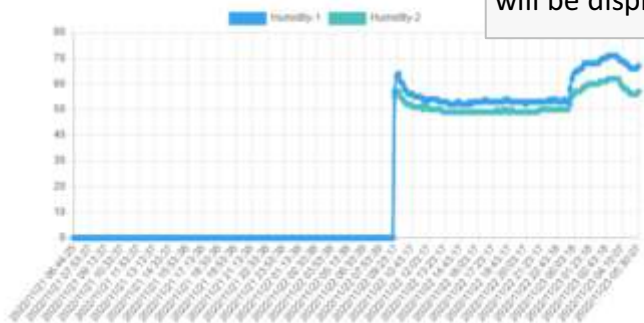


Chart: It can display amp, temperature and humidity history chart



# Management

## Control

1. Directly control outlet.
2. Set a number of outlets as a group to control them by one function button.

### PDU

Information **Management** Configuration

Control Schedule Plug Action Event Action Device Threshold

Status: Normal 2022/03/29 05:40:58

#### Group Outlet Control

No.	<input type="checkbox"/>	Group	Outlet
01	<input type="checkbox"/>	NewGroup	OutletE(5) OutletF(6) OutletG(7) OutletH(8)

#### Outlet Control

No.	<input type="checkbox"/>	Outlet	Status	Task	Delay On (Sec)	Delay Off (Sec)
1	<input type="checkbox"/>	OutletA	ON	Free	1	1
2	<input type="checkbox"/>	OutletB	ON	Free	2	2
3	<input type="checkbox"/>	OutletC	ON	Free	3	3
4	<input type="checkbox"/>	OutletD	ON	Free	4	4
5	<input type="checkbox"/>	OutletE	ON	Free	5	5
6	<input type="checkbox"/>	OutletF	ON	Free	6	6
7	<input type="checkbox"/>	OutletG	ON	Free	7	7
8	<input type="checkbox"/>	OutletH	ON	Free	8	8



# Schedule

Pre-set time to turn on or off the specified outlet

## PDU

Information **Management** Configuration  
Control **Schedule** Ping Action Event Action Device Threshold

Status: Normal

2022/03/29 05:45:09

### Schedule Setting

Outlet:    
Outlet Action:    
Date(yyyy/mm/dd):  Once   
 Every    
Time (hh:mm):

### Schedule List

No.	<input type="checkbox"/> Item	Date	Time	Action	Enable
1	<input type="checkbox"/> OutletA	2022/03/29	10:00	OFF	<input checked="" type="checkbox"/>
2	<input type="checkbox"/> OutletB	Sunday	12:00	OFF/ON	<input checked="" type="checkbox"/>
3	<input type="checkbox"/> OutletC	Day	14:00	ON	<input checked="" type="checkbox"/>

- 1. Outlet A is scheduled to off at 10:00 on 2022/03/29.
- 2. Outlet B executes off/on at 12:00 every Sunday.
- 3. Outlet C executes on at 14:00 every day.



# Ping Action

Ping-No-Answer power action

## PDU

Information **Management** Configuration  
Control Schedule **Ping Action** Event Action Device Threshold

Status: Normal

2022/03/29 06:05:18

### Ping Action Setting

Outlet:    
IP Address:   
Response Time:    
Outlet Action:

### Ping Action List

No.	<input type="checkbox"/> Outlet	IP Address	Response Time	Action	Enable
01	<input type="checkbox"/> OutletA (1)	192.168.0.1	5 min(s)	OFF/ON	<input checked="" type="checkbox"/>
02	<input type="checkbox"/> OutletD (4)	192.168.0.100	15 min(s)	OFF	<input checked="" type="checkbox"/>

1. Ping 192.168.0.1, if there is no response within 5 minutes, Outlet A will OFF/ON
2. Ping 192.168.0.100, if there is no response within 15 minutes, Outlet D will OFF.

Automatically reboot the locked device by ping its IP



# Event Action

Pre-set outlet action once the current, temperature or humidity over threshold

## PDU

The screenshot shows the PDU Management interface. At the top, there are tabs for Information, Management (selected), and Configuration. Below these are sub-tabs for Control, Schedule, Ping Action, Event Action (selected), Device, and Threshold. The status is 'Normal' with a green checkmark, and the timestamp is '2022/03/29 06:11:57'.

**Event Action Setting**

Buttons: Add, Modify

Event:

- Device (dropdown) Over Warning threshold (dropdown) Occurs (dropdown)
- ENV (1) (dropdown) Temperature Overrun (dropdown) Occurs (dropdown)
- Receive Trap .1.3.6.1.4.1. (input) Value Ignore (dropdown) (input)

From: (input)

Outlet: (dropdown)

Delay: (input) second(s)

Action: (dropdown)

Action Type: (dropdown)

**Event List**

Buttons: Delete

No.	<input type="checkbox"/>	Event	Action	Enable
01	<input type="checkbox"/>	Receive Trap Trap .1.3.6.1.4.1.17420.1.6 From 192.168.0.1	OutletC (3) Delay 10 second(s) and turn OFF/ON	<input checked="" type="checkbox"/>
02	<input type="checkbox"/>	ENV (1) over the Temperature Overrun Occurs	OutletA (1) Delay 5 second(s) and turn OFF	<input checked="" type="checkbox"/>
03	<input type="checkbox"/>	Device over the warning threshold Occurs	OutletA (1) Delay 1 second(s) and turn OFF	<input checked="" type="checkbox"/>

- 1. Receive Trap message 1.3.6.1.4.1.17420.1.6, IP is 192.168.0.1; after 10 seconds, Outlet C will OFF/ON.
- 2. When ENV(1) the temperature exceeds the upper limit, after 5 seconds, Outlet A will "OFF"
- 3. When current over warning threshold, after 1 second, Outlet A will "OFF"..

Note:



Receive Trap OID equal to: User can input the private OID to trigger the specified outlet action.

## Device

Outlets and circuits name, sequence on/off and outlet owner configuration

## PDU

Information **Management** Configuration

Control Schedule Ping Action Event Action **Devices** Threshold

Status: Normal 2022/03/29 06:18:25

### Outlet Configuration

No.	Outlet Name	Delay On second(s)	Delay Off second(s)	After Restart	Owner
0	All Outlet	<input type="text"/>	<input type="text"/>	Last Status ▼	snmp ▼
1	<input type="text" value="OutletA"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	Last Status ▼	snmp ▼
2	<input type="text" value="OutletB"/>	<input type="text" value="2"/>	<input type="text" value="2"/>	Last Status ▼	snmp ▼
3	<input type="text" value="OutletC"/>	<input type="text" value="3"/>	<input type="text" value="3"/>	Last Status ▼	snmp ▼
4	<input type="text" value="OutletD"/>	<input type="text" value="4"/>	<input type="text" value="4"/>	Last Status ▼	snmp ▼
5	<input type="text" value="OutletE"/>	<input type="text" value="5"/>	<input type="text" value="5"/>	Last Status ▼	snmp ▼
6	<input type="text" value="OutletF"/>	<input type="text" value="6"/>	<input type="text" value="6"/>	Last Status ▼	snmp ▼
7	<input type="text" value="OutletG"/>	<input type="text" value="7"/>	<input type="text" value="7"/>	Last Status ▼	snmp ▼
8	<input type="text" value="OutletH"/>	<input type="text" value="8"/>	<input type="text" value="8"/>	Last Status ▼	snmp ▼

### Energy Configuration

Device Carbon Emission Rate

The max. length of outlet name is 36 characters

The max. time for delay on/off is 9999 seconds

After Restart:

Define the outlet action after power restart

**Last Status:** After power restart, outlets remain the same power status.

**ON:** Turn on outlets after power restart.



**OFF:** Turn off outlets after power restart.

**Note:**

After PDU is plugged into main power, PDU system will start to sequentially turn on the output socket according to the pre-set delay time in PDU web interface. The factory default setting for delay time is one second for each outlet; therefore the 8 ports PDU will take 8 seconds, 24 ports PDU will take 24 seconds to complete start-up procedure.

Before the sequence procedure is completed, if a PDU is unplugged from the power source, the outlets which are not turned on will be regarded as remaining at the power-off status. Next time the PDU is plugged into main power, these outlets will not be automatically turned on. These outlets can only be turned on by web interface.

**Carbon Emission Rate:** Users can check this parameter through power plant.






# Threshold

Set threshold of current, temperature and humidity.

**PDU** Info Logout

Information **Management** Configuration

Control Schedule Ping Action Event Action Device **Threshold**

Status: Normal  2022/11/23 05:33:56

### Device Threshold Configuration

No.	Device	Below	Warning	Overload
01	Current	<input type="text" value="0"/>	<input type="text" value="12"/>	<input type="text" value="16"/>

Set total current and voltage threshold

### Circuit Threshold Configuration

No.	Circuit Name	Below (Amp)	Warning (Amp)	Overload (Amp)	Apply
01	PDU1	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	<input type="button" value="Apply"/>
02	PDU2	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
03	PDU3	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
04	PDU4	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
05	PDU5	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
06	PDU6	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
07	PDU7	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	
08	PDU8	<input type="text" value="0"/>	<input type="text" value="8"/>	<input type="text" value="10"/>	

Set outlets threshold

### ENV Threshold Configuration

No.	ENV	Temperature(°C)		Humidity(%)		Apply
		Lower	Upper	Lower	Upper	
01	ENV 1	<input type="text" value="0"/>	<input type="text" value="99"/>	<input type="text" value="0"/>	<input type="text" value="99"/>	<input type="button" value="Apply"/>
02	ENV 2	<input type="text" value="0"/>	<input type="text" value="99"/>	<input type="text" value="0"/>	<input type="text" value="99"/>	

Set temperature and humidity threshold

All right reserved



# Configuration

## Network

### IP address related configuration

The default setting for the way to get IP address is DHCP. If PDU can not get the IP from DHCP server, the IP address will stay at **192.168.0.216**

The max. length of host name is 36 characters

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## Security

### Access setup for web, SSL, SSH and Telnet

Default login ID is **snmp** and password is **1234** for SSH and Telnet.

Note: SSH/Telnet command

```
-----
(1) Device / Phases
(2) Circuit
(3) Outlet
(4) Environment
(5) ATS
(6) Network
(7) About PDU
(8) Logout
>
```

- (1) Device / Phase : Display PDU Power information
- (2) Circuit: Display each circuit current.
- (3) Outlet: Display each outlet current and control it



- (4) Environment: Display temperature and humidity information.
  - (5) ATS: Display ATS information.
  - (6) Network: Display network information.
  - (7) About PDU: PDU system information.
- 

## User

### Multiple users configuration

**Note:** Please set the email address to receive alert events.

Users can add up to 8 accounts.

- |             |   |
|-------------|---|
| Admin:      | Full authority to monitor, control and configure PDU<br>Default ID is <b>snmp</b> , password is <b>1234</b><br>(Access <a href="#">Information</a> / <a href="#">Management</a> / <a href="#">Configuration</a> ) |
| Power user: | Monitor PDU, control the specified outlets.<br>No permission to configure PDU.<br>Default Password: <b>password</b><br>(Access <a href="#">Information</a> / <a href="#">Management</a> )                         |
| View Only:  | Monitor PDU only. No permission to control and configure PDU.<br>Default Password: <b>password</b><br>(Access <a href="#">Information</a> )   |
- 

## Mail

### Mail server configuration

Send out alert message to pre-defined account when event occurs.

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## SNMP

### Set the SNMP parameter

Support SNMPv1,v2 and v3

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## Time

### Time by NTP or manually for schedule and log record

Time must be set properly; otherwise the schedule setting will not be performed correctly.

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## Radius

### Advanced authentication

System supports the Remote Authentication Dial-in User Service protocol. (RADIUS). It provides a centralized network protocol to enable remote authentication and authorization.

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## Log

### Log setup

Export	Export events and data log in text format. Set the date to mail information.
Syslog	Sent event log to the specified syslog server.
Data log	Set the interval of log time.
Heartbeat Trap	Send trap continuously to the specified IP to indicate PDU is alive.
Event Log	Check the box to enable to log the specified event

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## System

Configure file export and import, firmware upgrade, reset



## **functions.**

System	Export system configuration. Import system configuration from export file.
Firmware Upgrade	Update: Keep all configurations after complete firmware upgrade. Update and Reset: Reset all configurations back to default after complete firmware upgrade.
Reset System	Restart network system through web.
Temperature Scale	Switch temperature unit between Celsius and Fahrenheit
Hardware Reset Button Definition	Define reset action. The reset procedure is to press and hold the key in the front panel of PDU, release it after hearing 6 beeping.