# NetShelter® Rack PDU Advanced

**User Guide** 

**April 2022** 





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# Introduction

### **Product Description**

The NetShelter Rack PDU Advanced features color-coded circuit breakers and power outlet options to customize the equipment according to your requirements and is available in Metered, Switched, Metered-by-Outlet, and Metered-by-Outlet with Switching models.

# **Product Features**

The NetShelter Rack PDU Advanced may be used as a stand-alone, network manageable power distribution device or up to 32 devices can be connected together using one network connection. You can manage a NetShelter Rack PDU Advanced through its Web User Interface (UI), its Command Line Interface (CLI), Redfish (through an app such as POSTMAN), or from the Rack PDU's display interface.

- Network management and alerting capabilities supporting HTTP, HTTPS, SSH, SNMP, and email.
- Strong encryption, passwords, and advanced authorization options including local permissions, LDAP/S, and Active Directory.
- Cascade the Rack PDUs: Guest Rack PDUs can be connected to a single Host Rack PDU. Up to 32 Rack PDUs of the same SKU can be connected in series.
- Each Rack PDU can support a maximum of eight (8) environmental sensors.
- The Power Sharing feature allows for uninterrupted network communication and sensor function in the event of input power loss.
- Depending on the Rack PDU model, the following features are provided: Inlet Power Measurement, Outlet Power Measurement, Outlet Switching Capability.
- Single Phase Rack PDUs are provided with hydraulic magnetic breakers that are color-coded to match their corresponding outlets.
- Three Phase, 208V, Rack PDUs use circuit breakers color coordinated to correspond to the line connections and include a label of the two connected input phases (L1–L2, L2–L3, L3–L1).
- Three Phase, 400V~415V, Rack PDUs use circuit breakers and outlets color coordinated to the appropriate input phase (L1–N, L2–N, L3–N). The Rack PDU is labeled to indicate the input-phase associated with each circuit breaker and its associated outlets.
- All Three Phase Rack PDUs rated above 16A and 20A use a three (3) color coding system (dark gray, light gray, and white).
- The Rack PDUs are equipped with a Live Swappable NMC Module which eliminates the need to power down the Rack PDU and connected loads during replacement.
- Toolless mounting pegs allow for mounting in most racks from the rear or side of the Rack PDU.
- The USB port on the display panel allows for file downloads to a USB flash drive and for local firmware upgrades.
- Switched Rack PDUs feature individual outlet control and configurable power On or Off delays.
- Multiple login feature which allows up to sixteen (16) users to be logged in simultaneously.
- Configurable alarm thresholds that provide network and visual alarms to help avoid overloaded circuits.
- Email notifications for system events.

# **Types of User Accounts**

A total of sixteen (16) user accounts can be created. All sixteen (16) users can be logged in at the same time but for maximum performance three (3) users are recommended.

The default setting has three (3) accounts: one user, one manager, one admin.

Thirteen (13) additional users can be added.

- · admin: has all privileges including Redfish
- manager: has all privileges including Redfish (This user level is intended for management of Redfish API)
- user: read-only access

# **Establish Network Settings**

**NOTE:** If the Rack PDU is placed within a static network environment, users can configure the Rack PDU to a Static IP address by connecting the Rack PDU by serial cable to your computer or by uploading a configuration file using the USB port on the display interface. See those topics in this manual for more information.

# **Establish a Network Connection**

Rack PDUs are set to obtain an IP address using DHCP by default. When the Rack PDU is connected to a network for the first time, the Rack PDU will automatically obtain an IP address.

- 1. Connect a standard Ethernet cable to Port 1 or Port 2 on the Rack PDU.
- 2. Connect the other end of the cable to your Network (LAN).
- 3. A solid green light on the left side and a flashing yellow light on the right side of the Port will indicate successful connectivity to the network.

# **Obtain the IP Address from the Rack PDU**

On the Rack PDU display, navigate through the menus to obtain the IP address (IPv4 or IPv6 as applicable).



To login to the Web UI, in a standard web browser, enter the IP address you obtained from the Rack PDU: https://IP address

The login page for the Web UI will open.

**NOTE:** You can also use the IP address to login to the Rack PDU using the CLI.

# **Local Serial Connection**

You can configure the network settings using the Command Line Interface (CLI) with a serial connection. You can either connect serially using the optional Schneider Electric RJ45–DB9 Cable, 940–9591 (recommended) or by creating a unique pinout.

- 1. Connect the RJ45 end of the serial cable into the Port 1 on the Rack PDU.
- 2. Connect the DB9 end of the cable into the communications (COM) port on your computer.

**NOTE:** You can use a DB9–serial-to-USB adapter connected to the Console Cable for this step to connect to the USB if a DB9 serial port is not available on your computer.

3. Open a communications program such as HyperTerminal or PUTTY.

Select the **COM** port. Set the communications port as follows:

- Speed (baud) Bits per second: 115200
- Data bits: 8
- Stop bits: 1
- · Parity: None
- Flow Control: None

Session	Options controlling	local serial lines	
Logging Terminal Keyboard Rell	Select a serial line Serial line to connect to	COM1	
- Features	Configure the serial line		
- Window	Speed (baud)	115200	
- Appearance Rehaviour	Data bits	8	
Translation	Stop bits	1	
Selection     Colours	Parity	None	~
Connection	Flow control	None	~
Proxy Telnet Riogin B- SSH Serial			

4. Use the default initial login indicated below.

**NOTE:** Username and Password are both case sensitive.

- Username: admin
- Password: 12345678

**NOTE:** For security, following your initial login, you will be prompted to change your password.

- 5. The **apc>** prompt appears after you have logged in.
- 6. To configure network settings, type the appropriate commands in the command prompt and press the Enter key. All commands are case sensitive.

NOTE: You can type "?" to access a list of all available commands.

# **Creating a Unique Pinout Connection**

To create your own pinout connection for the RJ45 to Serial cable, make the wiring connections as shown:



# Assign a Static IP Address

You can assign a static IP address using the CLI.

To assign a static IPv4 address, configure the below parameters: net tcpip eth0static x.x.x.x (*ipaddress*) x.x.x.x (*netmask*) x.x. x.x (*gateway*) Example: net tcpip eth0static 192.168.1.100 255.255.255.0 192.168.1.1

To assign a static IP address to Port 1 of the Rack PDU using the CLI: apc>net tcpip

SUCCESS eth0 IPv4 Addr: 192.168.0.103 eth0 IPv6 Link Local Addr: fe80::ca45:44ff::feab:cbee eth0 IPv6 DHCP Addr: 2406:7400:75:2ff:ca45:44ff:feab:cbee eth1 IPv4 Addr: 192.168.0.104 eth1 IPv6 Link Local Addr: fe00::fcad:dff:fe6f:d61b eth1 IPv6 DHCP Addr: 2406:7400:75:2ff:fcad:dff:fe6f:d61b

apc>net tcpip eth0static 192.168.0.200 255.255.255.0 192.168.0.1

Reboot required for change to take effect Network is reconfired, Please reboot to validate System Reboot now, Are you sure? (Y/N):Y

To assign a static IP address to Port 2 of the Rack PDU using the CLI: apc>net tcpip

SUCCESS eth0 IPv4 Addr: 192.168.0.200 eth0 IPv6 Link Local Addr: fe80::ca45:44ff::feab:cbee eth0 IPv6 DHCP Addr: 2406:7400:75:2ff:ca45:44ff:feab:cbee eth1 IPv4 Addr: 192.168.0.105 eth1 IPv6 Link Local Addr: fe80::6453:31ff:fe36:60e9 eth1 IPv6 DHCP Addr: 2406:7400:75:2ff:6453:31ff:fe36:60e9

apc>net tcpip eth1static 192.168.0.199 255.255.255.0 192.168.0.1

Reboot required for change to take effect Network is reconfired, Please reboot to validate System Reboot now, Are you sure? (Y/N):Y

After static IP addresses have been assigned to both ports, the CLI response will appear similar to the below example when queried: apc>net tcpip

SUCCESS
eth0 IPv4 Addr: 192.168.0.200
eth0 IPv6 Link Local Addr: fe80::ca45:44ff:feab:cbee
eth0 IPv6 DHCP Addr: 2406:7400:75:2ff:ca45:44ff:feab:cbee
eth1 IPv4 Addr: 192.168.0.199
eth1 IPv6 DHCP Addr: 2406:7400:75:2ff:380f:9dff:fe91:f55f
apc>

The Web UI can now be accessed after the static IP addresses are assigned.

s	Schneider Electric	×	+					_		×
$\leftarrow \rightarrow$	C O A	https://1	92.168.0.200/#/netwo	ork?_k=z9yz	7a		50% 🖍	2	$\bigtriangledown$	≡
		lnput l	Metered, Outlet Switch	ed PDU 2.0.0.6	в	•	? License			
	A U 🕸 8	6		∆ & ?	8 6	Welcome admin	→ Logout			
Network Se	ttings			Set Certificat	te Key	Change Lini	( Speed	Syslog Co	onfigura	tion
Ethernet-1 IP	Configuration	Ethernet-2 IP	Configuration	Web/ RESTapi A	Access C	onfiguration	SSH/FTPs Config	guration	9	
Boot Mode	Static	Boot Mode	Static	Web Access	https		SSH Access		$\checkmark$	
IPv4 Address	192.168.0.200	IPv4 Address	192.168.0.199	Web Port	443		SSH Port		22	
Network Mask	255.255.255.0	Network Mask	255.255.255.0	Access	Access X		FTPs Access		√ 21	
Default Gateway	192.168.0.1	Default Gateway	192.168.0.1	Certificate		View Certificate				
IPv6 Access	$\checkmark$	IPv6 Access	$\checkmark$							
IPv6 Link Local Address	fe80::ca45:44ff:feab:cbee	IPv8 Link Local Address	fe80::380f:9dff:fe91:f55f							
IPv6 Auto Configured Address	2408:7400:75:2ff:ce45:44ff.fes	IPv6 Auto Configured Address	2406:7400:75:2ff:380f:9dff:fe9							



Static IP addresses assigned using CLI for Port 1 and Port 2 will appear on the LCD display of the Rack PDU similar to the below example:



# Assign DHCP IP Addresses From Static Mode

You can change from Static mode to DHCP mode using the CLI to assign DHCP IP Addresses for Port 1 and Port 2 of your Rack PDU.

To change to DHCP mode from static mode for Port 1:

Type: net tcpip eth0dhcp

The CLI response:

Reboot required for change to take effect Network is reconfigured, Please reboot to validate System Reboot now, Are you sure?(Y/N):

Type: Y to confirm. The Reboot will start.

To change to DHCP mode from static mode for Port 2:

Type: net tcpip eth1dhcp

The CLI response: Reboot required for change to take effect Network is reconfigured, Please reboot to validate System Reboot now, Are you sure? (Y/N):

Type: Y to confirm. The Reboot will start.

To see the DHCP IP addresses, type: net tcpip

The CLI response:

SUCCESS eth0 IPv4 Addr: 192.168.0.103 eth0 IPv6 Link Local Addr: fe80::ca45:44ff:feab:cbee eth0 IPv6 DHCP AddrP 2406:7400:75:2ff:ca45:44ff:feab:cbee eth1 IPv4 Addr: 192.68.0.107 eth1 IPv6 Link Local Addr: fe80::1ccf:3fff:fe3c:755f eth1 IPv6 DHCP Addr: 2406:7400:75:2ff:1ccf:3fff:fe3c:755f

# **Front Panel Overview**



Item	Description	Function
0	Display Panel	Shows information about the Rack PDU.
0	Scroll button	Press once to display the menu. Press additional times to move the highlight bar down the menu list until you reach the desired item.
8	Select button	With the menu item highlighted, press the Select button to display the Rack PDU information.
9	Reset	Resets the network management interface without affecting outlets of the Rack PDU.
6	10/100 Network port	Redundant Ethernet and Cascading with DC Power Share. Connects the Rack PDU to the network using a Cat5e network cable.
6	Sensor port 2	Port for connecting an optional sensor.
Ø	Sensor port 1	Port for connecting an optional sensor. This port is also used for the serial port.
8	10/100/1000 Network port	Gigabit Ethernet port. Connects the Rack PDU to the network. Connects the Rack PDU to another Rack PDU in a cascading group with DC Power Share, using a Cat5e network cable.
0	USB port	For use with a flash drive for firmware upgrades. Can also be used to download log files to a flash drive.
Ø	Menu button	Press to view MENU information or navigate back to the previous screen. The display screen shows MAIN above the MENU button.

# **Display Tree — Example 1**

The display on your Rack PDU provides information about the Rack PDU and its connected devices. The Main Menu and its immediate submenus are shown below.



# **Display Menus**

The display menus provide user configuration options and information regarding Network, Device, Display, Language, USB, and Temperature Units. On the Main Menu screen, scroll down to highlight Settings. Press the Select button to open the submenu. Scroll down to highlight a submenu option. Press the Select button to open that option's screen. You can press the Main Menu button to return to the previous menu screen.

#### **Network Submenu**

The Network submenu allows you to view the IP address for IPv4 or IPv6. Settings>Network>ETH0 Settings>Network>ETH1

On the Settings menu, scroll down to Network. Press Select to enter the Network Submenu. Scroll down to highlight the selected option from the menu. Press Select to display the screens that display the IP address. Press the Main Menu button to return to the previous menu.

# **Device Information Submenu**

The Device Information submenu provides details regarding the SKU, Serial number, MAC address, and firmware version. Settings>Device Information>SKU Number Settings>Device Information>Serial Number Settings>Device Information>MAC Address Settings>Device Information>Firmware Version

On the Settings menu, scroll down to highlight Device Information. Press Select to open the Device Information submenu. Scroll down to the item you wish to display and press Select. Press the Main Menu button to return to the previous menu.

# **Display Settings Submenu**

The Display Settings submenu allows you to customize settings for the display. The Display Settings options are:

Settings>Display Settings>Contrast

Settings>Display Settings>Flip Screen

On the Settings menu, scroll down to highlight Display Settings. Press Select to select the Display Settings submenu. Press the Main Menu button to return to the previous menu.

### Language Submenu

The Language submenu allows the user to view the display in 8 languages. Settings>Language>English Settings>Language>German Settings>Language>Spanish Settings>Language>French Settings>Language>Chinese Settings>Language>Italian Settings>Language>Italian Settings>Language>Japanese Settings>Language>Korean On the Settings menu, scroll down to highlight Language. Press Select to display the Language submenu. After you select the language, press Select to set the

language as displayed on the screen. Press the Main Menu button to return to the previous menu.

### **USB Submenu**

The USB submenu allows you to upload Firmware and Configuration files. It also enables the user to download an Event or Data Log.

Settings>USB>Firmware Upload Settings>USB>Configuration Upload Settings>USB>Configuration Download Settings>USB>Data Log Download Settings>USB>Event Log Download

On the Settings menu, scroll down to highlight USB. Press Select to enter the USB submenu. Select the desired function from the USB submenu. The user will be asked to verify the USB operation and Configuration Mode. After you select Yes, the system will reboot into the USB operation and Configuration mode. Press the Main Menu button to return to the previous menu.

**NOTE:** If a USB drive is not present in the USB slot the PDU will enter normal operation.

**NOTE:** If you are in USB mode and you want to exit USB mode, you must remove the USB drive before exiting USB mode. Otherwise, the PDU will reboot and re-enter USB mode.

### **Temperature Units Submenu**

The Temperature Units submenu displays the temperature units. Settings>Temperature Units> Celsius (°C) Settings>Temperature Units> Fahrenheit (°F)

On the Settings menu, scroll down to highlight the Temperature Units. Press Select to enter the Temperature Units Submenu. After you select the values, press Select to set the values as displayed on the screen. Press the Main Menu button to return to the previous menu.

**NOTE:** This can only be done locally at the PDU.

### Alarms Menu

The Alarms menu displays active alarms of the PDU. On the Main Menu, scroll down to highlight Alarms. Press Select to display the Alarm Screen. When you finish your review, press the Main Menu button to return to the previous screen.

#### **Power Menu**

Use the Power menu to view Breaker, Phase and Outlet Information. It allows for management of Guest Device Status.

On the Main Menu, scroll down to highlight Power. Press Select to enter the Power menu. Scroll down to select a submenu and press Select to display the submenu options. Press the Main Menu button to return to the previous menu.

### **Device Status Submenu**

The Device Status submenu displays Current, Voltage, Energy and Power of the respective Rack PDU.

#### Power>Device Status

On the Power menu, scroll down to highlight Device Status. Press Select to display the information. Press the Main Menu button to return to the previous menu.

#### **Phase Information Submenu**

The Phase submenu is to display the status and information of 3–Phase lines. **Power>Phase Information** 

On the Power menu, scroll down to highlight Phase Information. Press Select to display the Phase Information submenu. Press the Main Menu button to return to the previous menu.

#### **Guest Status Submenu**

The Guest Status submenu displays Current, Voltage, Energy and Power of the Guest PDU.

#### Power>Guest Status

On the Power menu, scroll down to highlight Guest Status. Press Select to display the information. To navigate through the different Guest Rack PDUs, press the Scroll button. Press the Main Menu button to return to the previous menu.

#### **Breaker Information Submenu**

The Breaker Information submenu is to display the status and information for the circuit breakers.

#### **Power>Breaker Information**

On the Power menu, scroll down to highlight Breaker information. Press Select to display the information. To navigate through the different Circuit Breakers, press the Scroll button. Press the Main Menu button to return to the previous menu.

#### **Outlet Information Submenu**

The Outlet submenu is to display Current, Voltage, and Power from Outlet number 1 to number N.

#### **Power>Outlet Information**

On the Power menu, scroll down to highlight Outlet Information. Press Select to display the values for the first outlet. To navigate through Outlet number 1 to number n, press the Scroll button. Press the Main Menu button to return to the previous menu.

**NOTE:** Custom outlet names noted in the Web UI do not make changes to the local display. This is done to make it easier to map to outlet numbers which can be seen locally on the outlets themselves.

# **Sensors Menu**

The Sensor menu displays the information related to the respective Environmental and Security sensor. The display shows temperature, humidity, leaks, etc.

On the Main Menu screen, scroll down to highlight **Sensor** and press Select. This will display the sensor data for the first sensor. Press the Scroll button to see more sensor data, if you have additional sensors installed. Press the Main Menu button to return to the previous menu.

**NOTE:** A maximum of eight (8) sensors can be configured per Rack PDU.

# Web User Interface (Web UI)

# **Supported Web Browsers**

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

**NOTE:** If the browser displays a "can't reach this page" message, check that you are using the **https://** access protocol and not **http://**.

# Log On to the Web User Interface

Confirm that the network connection has been established with the Rack PDU and that you have obtained the IP address.

Enter the IP address of the Rack PDU into your Web browser. The Login Page of the Web UI will open.

Log on to the Web UI. The default login is admin and the password is 12345678.



# **First Log On**

When you log on to the Web UI for the first time, following the initial login page, you will be prompted to change the default account password. Type the current password, enter the new password and confirm the new password by entering it again in the appropriate space on the page. Click on the **Change Password** button at the bottom of the page to complete the process.



The password change is confirmed when the following window opens:

Schneider	ilectric >	Schneider Electric	× +	-	ð	×
$\leftarrow \rightarrow$	C	O A https://192.168.0.10	V#/logs?_k=im9b6	☆	⊚	≡
Ap	plication Log	Password of user mana	nger of PDU 1 changed by user manager from host 192.168.0.102	2010/01/23, 08:25:26		

# **Changing your Password**

If you need to change your password at any time following the initial password change requirement, follow the steps below:

1. Click on the User Settings icon  $\stackrel{Q}{\leftarrow}$  located at the top of the Web UI pages.



The User Settings page will open.

Users		
Username	Role	Action
admin	admin	
user	user	Ø ×
manager	manager	Ø×

- 2. In the Users section, click the Edit icon *i* next to your Username and Role to open the Edit dialog box where you can change your password.
- 3. Type your new password in the **Password** field then, type it in again in the **Confirm Password** field. Click the **Save** button to save your changes.

Edit
User
Username User
Password
Confirm Password
Role
O Administrator
• User
O Manager
Save

# **SSL Certificate**

To edit the **SSL Certificate Key Length**, click on the **Set Certificate Key** in the top right corner of the Network Settings page. The **Edit** window for SSL Certificate Key Length will open.

- Click on SSL Certificate Key Length
- Select bits (1024/2048) from the dropdown menu.

Edit	
SSL Certificate Key Length	
SSL Certificate Key Length 2048 bits	
Save	

• Click on the **Save** button at the bottom of the Edit window to save your changes.

# **Navigating the Web UI**

The Landing page (following login):



#### The icons across the top of the Landing page are described in the following table.

lcon	Description
	Home icon: Select the Home icon to open the Home menu which includes: Dashboard, Identification, and Control & Manage.
	Logs icon: Select the Logs icon to view and download the logs and data logs of the PDU.
₩ \$	<b>Settings icon:</b> The Settings icon allows the user to set the Network Settings, System Management, SNMP Manager, Email Setup, Event Notifications, Trap Receiver, and Thresholds.
0.00	<b>User Settings icon:</b> Select the User Settings icon to view the logged-in user, administrator, or manager. Users can also change account passwords and manage user accounts. Users and Roles can be added (by admin or manager).
Ţ	Alarm icon: Select the Alarm icon to view details of the active critical alarms and active warning alarms. Alarms are configured based on Thresholds set by the user on parameters like Power, Voltage, Input Phase, Circuit Breaker and External Sensors. Icon colors are based on alarm status — Red for Critical Alarms and Yellow for Warnings. Critical Alarms have precedence over warnings.
- All	Link icon: Select the Link icon to view the cascade connection status alarms.
0	Sensor icon: Select this icon to view sensor related alarms.
	Security icon: Select this icon to view the Door sensor alarm status.
	Outlet status icon: Select this icon to view Circuit Breaker and Outlet alarm status.
	Language icon: Select this icon to choose a language. Choose from: English, French, Italian, Korean, German, Spanish, Japanese, and Chinese.
?	Information icon: Select the Information icon to find information about the Rack PDU. Go to www.apc.com to get more information.

# The Home Menu

Click the Home icon  $\widehat{\mbox{lnl}}$  to see the dropdown menu.



The options are:

- Dashboard: View total load details
- Identification: System information of the Rack PDUs in the network
- Control & Manage: View and edit the Outlets of your Rack PDUs by Circuit Breaker or Bank

# Identification

Select the **Identification** page, to view the **System Information** and individual **PDU Information**.

<ul> <li>Schneider Electric</li> </ul>	× +									0	-	σ	×
← → C ▲	Not secure   https://10.	10.106.16/#/identi	fication?_k=9zj	5qx							0, ☆		:
	Schneider	Outlet Metere	d, Outlet Sw	vitched PDU	2.0.1		Output     Description     Construction     Output     Description     Construction     Construction						-
	m 🖱 🗶 2.						▲ ◈ ♥ & ె	Welcome  admin  Logo	ut				
Identification													
System Information													
Name				Value			Name		Value				. 1
System Name							MAC Address		C8-45-44-66-2B-35				
Contact Name							IPv4 Address		10.10.106.16				
Contact Email							IPv6 Link Local Address		fe80::ca45:44#.fe66.2b35				
Contact Phone							IPv6 Auto Configured Address		2001.c0a8.aa01.0.ca45:44ff:fe66:2b35				
Contact Location													
PDU Information													
						PDUs	1-1						
							_						-1
1													
Name Core Location													
Core U Position	346,415V 164 11 54VA 50(60H)												
Part Number /	APDU10250SM												
Serial Number A	APC1												- 1
Web Version 2	20.0.D												
Firmware Version 2	2.0.1												
POLL Parent Patient (MAN)	1.00												
PDU Input Rating (A) 1	16												
PDU Breaker Rating (A) 0	0												
						_							×
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# **The Dashboard Pages**

Select Dashboard from the Home menu. The Dashboard page allows the user to view details relating to the Total Load, Total Sensors, Total Energy, and Total Rack PDUs.

Schneider Electric Outlet Metered, Outlet Switched PDU 150.1		⊕ ?	License	
命 む  ② &	∆ «° ?	A 🖬 Weld	<sup>come</sup> ⊟ Logout	
Total Load				
	Summary	Apparent Power(VA)	Active Power(W)	% Load
	PDU 1	0	0	0%
	<u>PDU 2</u>	0	0	0%
0 % 0 % 0 %	PDU 3	0	0	0%
PDU#1 PDU#2 PDU#3				
Total Load Total Sensors Total Energy Total PDUs				

Select the Total Energy button on the opening page of the Dashboard to open the Energy Information page.



View the total number of Rack PDUs connected in your network.

Total PDU(s)		
	Summary	
	Total# PDU in Use Total# PDU not in Use	1
50%	Total# PDUs Connected	2
50 %		
Total Load Total Sensors Energy PDU(s)		

View external sensors, sensor readings, and the Rack PDU (by its number) hosting the sensors.



# **Control and Manage**

Click the Home icon  $\widehat{(n)}$  and select **Control and Manage** from the dropdown menu.



You can view and control the Power Outlets of the Rack PDU.

Click the Outlet Control Enabled button.

The page can be viewed in two separate modes by selecting either **CB** (to view the circuit breaker information) or **Bank #** mode (to view banks of outlets) to enable.

<ul> <li>Schneider Electric</li> </ul>	× +					o – a ×
$\leftrightarrow$ $\rightarrow$ C $\blacktriangle$ Not se	cure   https://10.10.106.16	6/#/control?_k=182ivz				९ 🖈 😩 ।
So	chneider outlet	t Metered, Outlet Switched PE	U 20.1			
ሰ	0 @ 2.		۸	🖋 🖗 🔂 🔟 🛛 Welcome admin	G→ Logout	
Control & Manage						Actions 🗸
Outlet Control Enabled						
CB C8 PDU	-1					
			Bank#1 Bank#2 Bank#3 Ba	ank#4 Bank#5 Bank#6		
Outlet Name	Power Control	On Delay(0-7200s)	Off Delay(0-7200s)	State on Startup	Reboot Duration(5-60s)	
OUTLET 1	04	0	0	Ċ	5	1
OUTLET 2	Co (	0	0	Ċ	5	1
OUTLET 3		0	0	Ċ	6	1
OUTLET 4	Co D	0	0	Ċ	5	1
OUTLET 5	CX 🔵	0	0	Ċ	5	P
OUTLET 6	(CH )	0	0	Ċ	5	1
📕 🔎 Type here to s	earch	o 🖽 😼 📬	; 🗖 🐠 🧿 🛤	🐴 🤱 🚾 🔼	🐢 25°C Rai	in へ 👄 句》 🦟 ENG 03:47 PM 🔒

Click the Edit icon  $\mathscr{D}$  to change the Outlet information.

Outlet name: Identify the outlet

On delay time: 0 — 7200 seconds

Off delay time: 0 — 7200 seconds

State on startup: Choices are **On**, **Off**, and **Last Known** 

Reboot duration: Configure the time for the reboot duration between 5 to 60 seconds

Edit						
Dutlet Information						
Outlet Name						
On Delay(0~7200s) 0						
Off Delay(0~7200s)						
0						
State on Startup						
Reboot Duration(5~60s)						
5						
Save						

# **View Logs**

From this page, the user can view, download, or clear logs generated by the activities of the Rack PDU. Click on the Log icon to see the dropdown menu. The available options are:

View Logs	
Download Logs	<b>(</b> I) (I) (I) (I) (I) (I) (I) (I) (I) (I) (
View Datalogs	View Logs
Download Data Log	view Logs
	Download Logs
	View Datalogs
	Ŭ
	Download Data Log

Select View Logs to view the information. Some of the actions performed by the Rack PDU are:

- Generating Event, Audit, and Application logs •
- **Recording Power Share details** •

View Logs		🛃 Download Clear
page   1/9		1 2 3 4 5 22 9
Туре	Description	Date & Time
Audit Log	User admin of PDU 1 from host 10.10.107.75 logged in	2010/01/17, 01:53:33
Event Log	Frequency on Input Phase 3 of PDU 2 asserted below lower critical	2010/01/16, 14:02:38
Event Log	Frequency on Input Phase 2 of PDU 2 asserted below lower critical	2010/01/16, 14:02:38
Event Log	Frequency on Input Phase 1 of PDU 2 asserted below lower critical	2010/01/16, 14:02:38
Event Log	Frequency on Input Phase 3 of PDU 2 deasserted below lower critical	2010/01/16, 14:01:47
Event Log	Frequency on Input Phase 2 of PDU 2 deasserted below lower critical	2010/01/16, 14:01:47
Event Log	Frequency on Input Phase 1 of PDU 2 deasserted below lower critical	2010/01/16, 14:01:46

Click on the Download or Clear buttons in the top right corner of the View Logs page.



# **View Data Logs**

View, configure, download, and clear the Data recorded by the Rack PDU.

- Energy information
- Power information
- Date and Time information

Click on the **Log** icon 0 to view the dropdown menu.

Select View Data Logs to open the Data Log page.

	Schneider			Outlet M	letered, C	utlet Swi	tched P	DU					<b>⊕</b>	? Lice	150					
	<b>î</b> n (t	•	<i>2</i> •							▲ 🔗	0	۵	Wel	come ⊡ <u>heek</u> ⊡	Logout					
Data Log														Data Lo	g Configur	ation	Dov	vnload		lear
Date(DD/MM/YY)	Time(HH:MM:SS)	PDUID	Pwr.kW	PwrMax.kW	PwrApp.kW	Energy.kWh	PH.VOL.1	2	3	PH.CUR.1	2	3	PH.PEAK.1	2	3	PH.PWR.1	2	3	CB.CUR.1	2
17/01/2010	06:13:28	3	0.000	4294.967	0.000	4294967.3	0	0	0	0.00	0.00	0.00	4294967.30	4294967.30	4294967.30	0.000	0.000	0.000	0.00	0.00
17/01/2010	06:13:28	2	0.000	0.000	0.000	0.0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	0.00
17/01/2010	06:13:28	1	0.000	0.000	0.000	0.0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.00	0.00

At the top right corner of the **Data Log** page, you can select from three buttons, **Data Log Configuration**, **Download**, to download the data logs, and **Clear** to delete the data logs.

To enable log configuration and set the log interval time (in minutes), select the **Data Log Configuration** button to open the **Edit** dialog box.

# Edit

**Data Log Configuration** 

Log Interval(1-	1440 minutes)		

# **Settings**

Manage the IP Configuration, Web RESTapi Access Configuration, SSH/FTPs Configuration, Network Time Protocol (NTP), Date/Time Settings and Daylight Savings Time.

The Rack PDU supports IPv4 and IPv6 Internet Protocol options with full network management and alerting capabilities. After you select your Internet protocol option, you will be able to communicate using HTTP, HTTPS, SNMP, FTPS and Email for network communications.

Click on the Settings icon  $^{\textcircled{}}$  to open the dropdown menu. The menu options are:

- Network Settings
- System Management
- SNMP Manager
- Email Setup
- Event Notifications
- Trap Receiver
- Thresholds

#### **Network Settings**

The Network Settings page allows the management of IP Configuration, Web RESTapi Access Configuration, SSH/FTPS Configuration, Network Time Protocol (NTP), Date/Time Settings and Daylight-Savings Time Settings.

NetShelter Rack PDU Advanced supports IPv4 and IPv6 with full-featured network management and alerting capabilities. After you select your Internet protocol option, you will be able to communicate using HTTP, HTTPS, SNMP, FTPS, and email for network communications.

From the dropdown menu of the Settings icon 5, select Network Settings to open the Network Settings page.

	Schn	eider o	utle	t Metered, (	Outlet Switched PDU	T.F.0.1					• ?	License			
	<b>命</b> 🕄					Δ	æ	0	₿		Welcome pratheek	B Log	out		
Network S	ettings	Network Setting System Manage	s iment					Se	t Ce	rtificat	te Key	Chang	e Link Speed	Syslog	Configuration
Ethernet-1 IP	Configuration	SNMP Manager Email Setup		t-2 IP Configu	ration	w	eb/ RE:	STapi A	ccess	Configu	uration		\$\$H/FTPs Config	guration	
Boot Mode	DHCP	Event Notificatio	Boo	/lode	DHCP		Web Ac	cess		https			SSH Access		$\checkmark$
IPv4 Address	10.10.106.171	Trap Receiver	IPv4	vddress	192.168.2.2		Web Po	rt		443			SSH Port		22
Network Mask	255.255.252.0	Thresholds		rk Mask	255.255.255.248		RESTap	i Acces:	5	X	v Cortificato		FTPs Access		~
Default Gateway	10.10.104.1			IPv6 Access	$\checkmark$		Continue	10		VIEV	ventineate		1115101		
IPv6 Access	$\checkmark$		IPv6 Ado	5 Link Local dress	fe80::cac8:45ff:fe44:7792										
IPv6 Link Local Address	fe80::cac8:45ff;fe44:6692		IPvé Add	3 Auto Configured Iress											
IPv6 Auto Configured	2001:c0a8:aa01:0:cac8:45	ff:fe44:6692													

# Click on the Edit icon $2^{\circ}$ to open the **Edit IP Configuration** dialog box where you can change the information.

Select **DHCP** to auto-configure the IP Address of the Rack PDU. Select **Static** to manually configure the IP Address and then fill in the remaining fields of the dialog box.

If you are manually configuring the IP Address, enter the following:

IPv4 address

Network Mask

Default Gateway

Once you have configured the settings, click the **Save** button to save your changes.

# Edit

**IP** Configuration

Boot Mode
DHCP
◯ Static
IPv4 Address
10.10.106.171
Network Mask
255.255.252.0
Default Gateway
10.10.104.1
IPv6 Access
531/0

#### **RESTapi Access Configuration**

The Rack PDU is accessed using HTTPS by default.

Click the Edit icon *i* to open the **Edit Web/RESTapi Access Configuration** dialog box where you can enter your information. The available settings are:

Web Access (HTTP or HTTPS)

**Web Port** (Default 80 for HTTP, and 443 for HTTPS)

#### Enable RESTapi Access

To access the HTTPS settings, upload the **SSL Certificate** and **SSL Certificate Key** provided by Schneider Electric.

Click the **Save** button to confirm and save your settings.

### Edit

Save

Web/ RESTapi Access Configuration

Web Access Https
Web Port Default 80 for Hitp, 443 for Hitps 443
RESTapi Access Disable

SL Certificate	
SSL Certificate	
Choose File	No file chosen
SSL Certificate	Кеу
Choose File	No file chosen

#### Setting the Time and Date

The date and time can be set either by connecting to a Network Time Protocol (NTP) server or by setting the time manually.

#### **Network Time Protocol (NTP)**

Link the Rack PDU to a **Network Time Protocol (NTP)** server and let it set the date and time.

Click the Edit icon *i* to open the **Edit NTP** dialog box.

Click on the **Enable** button to enable NTP settings.

To synchronize the Rack PDU time with a selected server:

Type the valid **Primary** NTP server address

Type the valid **Secondary** NTP server address

Select the desired **NTP GMT offset** time from the dropdown list.

Click the **Test** button to confirm that the network is valid.

Click the **Save** button to confirm and save your changes.

Edit
Network Time Protocol(NTP)
Enable
Primary NTP Server 0.0.0.0
Secondary NTP Server 0.0.0.0
NTP GMT Offset (UTC) Dublin, Edinburgh, Lisbon, London
Tact Sava
Jave

#### Manually Setting the Date and Time

You can manually set the internal clock on the Rack PDU by clicking on the Edit icon  $\mathscr{D}$  to open the Edit Date/Time Settings dialog box.

Type the Date in YYYY-MM-DD format or use the calendar icon.

Type the Time in HH:MM:SS format and time is measured in 24-hour format.

Click the Save button in the bottom of the Edit window to save your changes.

Date/Time Settings Date 2010/01/17 Time	
Date 2010/01/17 Time	
2010/01/17	
Time	Ħ
THING	
HH:MM:SS	
06:26:45	╚
Date Format	
Supported format is [YYYY/MM/DD]	

#### **Daylight Saving Time**

Click the Edit icon  $\mathscr{D}$  to open the **Edit Daylight Saving Time** dialog box.

Click on the Enable button to enable Daylight Saving Time.

Saving Time.	Edit
Select the specifics of the <b>Start Month</b> . The choices are:	Daylight Saving Time
Month	Easte
Week	
Day	Start Month
Time	Select
Select the specifics of the <b>End Month</b> . The choices are:	Select Select
Month	0:0:0
Week	End Month
Day	End Month::Week::Day::Time
Time	Select
Assign the Time Offset.	Select
Click the <b>Save</b> button to save your settings.	0:0:0
	Time Offset Select

Save

# **Ethernet Link Speed**

Click on the Change Link Speed button in the top right corner of the Network Settings page to open the Ethernet Link Speed Edit dialog box.

Click on Link Speed to open the dropdown menu.
Select from the following options:
Auto Negotiation
10/100 Mbps
1 Gbps
Click on the Save button to save your settings.

Edit		
Ethernet Link Spo	ed	
Link Speed Auto Negotiation		

# **Syslog Configuration**

Click on the **Syslog Configuration** button in the top right corner of the Network Settings window to open the **Edit System Log Configuration** window to **Enable Syslog Server Access**.

Click on the **Enable Syslog Server Access** button

Enter the Syslog Server Address

Select the Syslog Server Port number

Click the Save button to save your settings.

Edit	
System Log Configuration	
Enable Syslog Server Access	
Syslog Server Address	
Syslog Server Port 514	
Save	1

# System Management

Click on the Settings icon <sup>(1)</sup>/<sub>(2)</sub> to open the dropdown menu. Select **System Management** from the menu to open the System Management page.

Schneider	Outlet Metered, Outlet Switched PDU 200A		•	? License		
A O O A		∆ o° የ 6	3 0	Welcome	ogout	
System Management		Upload Firmware	Upl	oad Configuration	Download Configuration	Default Settings
System Information	Rack Location			Select a PDU t	o Restart	
System Name	Room Name			All		$\nabla$
Contact Name	Row Name				Restart	
Contact Email	Row Position					
Contact Phone	Rack Name					
Contact Location	Rack ID 0					
	Rack Height 0					
		PDUs 1-1				
Ø						
1						
Power Panel Name						
Core Location Front						
Core U Position						

You can perform functions like **Uploading Firmware**, **Uploading Configuration**, **Downloading Configuration** and returning the settings of the Rack PDU to the **Default Settings** from the System Management page. You can also **Restart** the Rack PDU from the System Management page.

# **Edit System Information**

Click on the Edit icon  $\swarrow$  to open the **Edit System Management** dialog box and make changes to the System Information. You can enter the following information:

The **System Name** of the Rack PDU for identification.

The Contact Name of the contact person.

The **Contact Email** address of the contact person.

The Contact Location of the contact person.

Click the **Save** button in the bottom of the window to save your settings.

Edit
System Management
System Name
Contact Name
Contact Email
Contact Phone
Contact Location
Save

### **Edit Rack Location**

Click on the Edit icon  $\swarrow$  to open the **Edit Rack Location** dialog box. You can enter the following information:

Room Name: the room where the Rack PDU is located.

**Row Name**: the row where the Rack PDU is located.

**Rack Name**: the rack where the Rack PDU is located.

Rack ID: the identification of the rack.

**Rack Height**: the height of the Rack where the Rack PDU is located.

Click on the Save button to save your changes.

Edit	
Rack Location	
Room Name	
Row Name	
Row Position	
Rack Name	
Rack ID	
Rack Height	
Save	

# **Edit Power Panel and Core Location**

Click on the Edit icon *b* to open the Edit Power Panel & Core Location dialog box. You can enter the following information:

Power Panel Name: Name with which you will identify the Rack PDU.

Core Location: location (Front or Back) of the rack in which the Rack PDU is located.

Core U Position: the U-space location of the Rack PDU within the rack.

Click the **Save** button to save your settings.

Edit	
Power Panel & Core Location	
Power Panel Name	
Core Location Front	
Core U Position	×
Save	

### **SNMP Management**

Simple Network Management Protocol (SNMP) is used to manage the Rack PDU (s) remotely. SNMP allows you to monitor and detect network faults and to configure variable data in the Rack PDU.

Click on the Settings icon <sup>(2)</sup>/<sub>(2)</sub> to open the dropdown menu. Select **SNMP Management** from the menu to open the SNMP Management page. From the **SNMP Management** page, you can manage the transfer of data from the Rack PDU to the MIB Browser.

Schnei	der Outlet Metered, Outlet Switched	PDU			• ?	License		
în 🕲 🏟	8		▲ & ?	8 0	Welcome pratheek	- B→ Logout		
SNMP Management								Download MIB
SNMP General Ø Enable ✓ SNMP Version V1/2c&V3			SNMP Port SNMP Port	161 162				
SNMP V1/2c Manager								
IP Address	Read Community	Write Co	mmunity			Enable		
0.0.0.0	public	private				~	Ø	
0.0.0.0	public	private				×	Ø	
0.0.0.0	public	private				×	Ø	
0.0.0.0	public	private				$\times$	Ø	

#### **SNMP** General

To access the Rack PDU data inside an MIB Browser:

Click on the Edit icon  $\overset{\textcircled{}}{D}$  next to SNMP General on the SNMP Management page.

SNMP General	Ø
Enable	$\checkmark$
SNMP Version	V1/2c&V3

In the **SNMP General** dialog box, click on the **Enable** button.

Click on the Save button to save the changes.

NMP General	
Enable	
SNMP Version	
V1/2c&V3	

#### **SNMP** Port

To secure the link between the Rack PDU and the MIB Browser:

Click the Edit icon next to SNMP Port on the SNMP Management page.



In the dialog box:

- Enter the SNMP Port number.
- Enter the SNMP Trap Port number.
- Click the **Save** button to save your settings.
### Configure Users for SNMP V1/V2c

On the SNMP Management page, click the Edit icon  $\swarrow$  next to the chosen address in the SNMP V1/2c Manager section of the page.

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n 🔊 (	@) &	▲ 🖋 🖗 🗗 🖬	Welcome	
SNMP Management				Download MIB
SNMP General Ø Enable 🗸 SNMP Version V1/2c&V3		SNMP Port SNMP Fort 161		
SNMP V1/2c Manager				
IP Address	Read Community	Write Community	Enable	
0.0.0.0	public	private	$\checkmark$	Ø
0.0.0.0	public	private	×	Ø
0.0.0.0	public	private	×	Ø
0.0.0.0	public	private	×	Ø

When the **Edit SNMP V1/V2c Manager** dialog box opens, you can enter the following information:

#### The IP Address

Define the security to **public** or **private** in: **Read Community** 

#### Write Community

Click on the  $\mbox{Enable}$  button to enable SNMP V1/ V2c.

Click the **Save** button to save your changes.

Edit	
SNMP V1/2c Manager	
IP Address	
0.0.0.0	
Read Community	
public	
Write Community	
private	
Enable	
Save	

Enable

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Privacy Algorithm

AES128

AES128

AES128

AES128

AES128

#### **Configure Users for SNMP V3**

Configure users for SNMP V3 to ensure higher security of data transfer to the MIB browser. Click the Edit icon  $\hat{\mathscr{D}}$  to change the settings of the **SNMP V3 Manager**.

SNMP V3 Manager Username

-				
	Security Level	Authentication Password	Authentication Algorithm	Privacy Key
	NoAuthNoPriv	*******	MD5	*******
	NoAuthNoPriv	******	MD5	*******
	NoAuthNoPriv	*******	MD5	*******
	NoAuthNoPriv	*******	MD5	*******
	NoAuthNoPriv	******	MD5	******

#### Enter the Username.

Click the **Security Level** and assign the level from the dropdown menu:

**NoAuthNoPriv**: No authentication and no privacy. (The default.)

AuthNoPriv: Authentication and no privacy.

AuthPriv: Authentication and privacy.

Type a new, unique password as the **Authentication Password**.

Select the **Authentication Algorithm**. The options are:

MD5

#### SHA

Enter a new, unique password as the **Privacy Key**.

Select the **Privacy Algorithm**. The choices are: **DES** 

AES-128

AES-192

AES-256

Click the Enable button to enable SNMP V3.

Click the **Save** button to save your settings.

### Edit

#### SNMP V3 Manager

Username		
Security Level		
No Auth No P	riv	
Authentication F	assword	
Authentication A	lgorithm	
MD5		
Privacy Key		
Privacy Algorith	m	
AES128		
Enable		
$\bigcirc$		

## Setup Email

To enable your Rack PDU to send alerts or event messages using Email, you must configure the information about the Simple Mail Transfer Protocol (SMTP).

- 1. Click the **Settings** icon <sup>1</sup>/<sub>2</sub> to open the dropdown menu.
- 2. Select Email Setup from the menu to open the Email Setup page.

Email Setup		Send Test Email
SMTP Account Settings Definition		
Sender Address		
Username		
Password	*******	
Port		
Number of Sending Retries		
Time Interval Between Sending Retries(in Minutes)		
Server Dequires Authentication	×	

3. To set SMTP server settings to receive emails and notifications, click the Edit icon *i* to open the **SMTP Account Settings** dialog box where you can configure the settings.

Enter the **Email Server Address**, the IP address of the SMTP for accepting messages.

Enter the Email address from which the recipient will receive mail in the **Sender Address** field.

Configure the **Port** number, which is the communication endpoint on the server. The default is **25**.

Enter the Username for SMTP security.

Enter the Password for SMTP security.

Assign the **Number of Sending Retries**, which is the number of times the Rack PDU will attempt to resend a message if the message fails. The default is **3**.

Enter the **Time Interval Between Sending Retries** (in minutes). The default is **6** minutes.

Click to Enable **Server Requires Authentication** to password protect the SMTP.

Click the Save button to save your settings.

Edit
SMTP Account Settings
Email Server Address
Sender Address
Port
Username
Password
Number of Sending Retries
Time Interval Between Sending Retries(in Minutes)
Server Requires Authentication
Save

#### Send a Test Email

Click the **Send Test Email** button \_\_\_\_\_\_ in the top right corner of the Email Setup page to open the Test Email Recipients window.

Enter the Recipient Email Address.

Click the Send button to send the Email.

Test Email Recipients
Recipient Email Address
Send

## **Event Notifications**

Assign **Event Notifications** from the Rack PDU to the Syslog, SNMP Trap and email. An event notification has two parts:

- **Event**: the situation where the Rack PDU experiences a monitored condition (temperature sensor exceeds a warning limit or circuit breaker status change).
- Action: the assigned response to the event (send an SMTP message and SNMP trap).

Click on the **Settings** icon <sup>3</sup>/<sub>2</sub> to open the dropdown menu.

Select Event Notifications from the menu to open the Event Notification page.

Click on the **Email**, **SNMP Trap** and **Syslog** buttons to enable the respective Events to receive notifications.

Event Notifications			
Events	O Ernail	SNMP Trap	O Sysiog
Circuit Breeker Status Changed	0	0	0
User Activity		0	0
Smart Rack Access		0	
Outlet Power Control Status Changed	0	0	0
User Status Changed	0	0	0
Critical Alarm	0		0
Warning Alarm	0		0
Password Settings Changed	0	0	0
Network Card Reset/Start	0		0
External Sensor Status Changed	0	0	0
PDU Configuration File Imported/Exported	0	0	
User Role Status Changed	0	0	0
Firmware Update	0	0	0
Communication Status Changed	0	0	0
Daisy Chain Status Changed	0	0	0
Enter Bootloader Mode	0	0	0
LDAP/Radius Error	0	0	0
Power Sharing Status Changed	0	0	0

**NOTE:** Critical and Warning alarms are enabled at the SNMP Trap by default. These notifications for the default events can only be received after the **Trap Receiver** (in the following section) is configured.

## **Configure the Trap Receiver**

Click on the **Settings** icon <sup>3</sup>/<sub>2</sub> to open the dropdown menu.

Select Trap Receiver from the menu to open the Trap Receiver page.

#### **SNMP V1 Trap Receiver**

Configuring users for SNMP V1 Trap Settings allows communication to the MIB browser.

Trap Receiver					Send Test Trap
SNMPV1 Trap Receiver					
Name	Host	Community	Enable		
		public	×	Ø	
		public	×	Ø	
		public	×	Ø	
		public	×	Ø	
		public	×	Ø	

Click on the Edit icon  ${\mathscr O}$  to open the Edit SNMPV1 Trap Receiver dialog box. Enter the following information:

Enter the **Name** to identify the different receivers.

Enter the **Host** IP address to which the traps are sent.

Select from **public** or **private** security status options to assign to the **Community**.

Click on the **Enable** button.

Click the Save button to save your settings.

Edit	
SNMPV1 Trap Receiver	
Name	
Host	
Community	
Fnable	
Save	

#### **SNMP V3 Trap Receiver**

Configuring users for SNMP V3 Trap Settings allows encrypted communication to the MIB browser.

Click on the Edit icon *i* to open the Edit SNMPV3 Trap Receiver dialog box.

Enter the **Name** to identify the different receivers.

Enter the **Host** IP address to which the traps are sent.

Click on **Security Level** to open the dropdown menu. Select from the following choices:

**NoAuthNoPriv**: No authentication and no privacy (the default)

AuthNoPri: Authentication and no privacy AuthPriv: Authentication and privacy

Enter a new, unique password as the **Authentication Password**.

Select the **Authentication Algorithm** from the following choices:

MD5

SHA

Type a new, unique password as the  $\ensuremath{\text{Privacy}}$   $\ensuremath{\text{Key}}$  .

Select the **Privacy Algorithm** from the following choices:

DES AES-128

AES-192

AES-256

Click on the Enable button to enable SNMP V3.

Click the Save button to save your settings.

#### Send Test Trap

Click on the **Send Test Trap** button located in the top right corner of the **Trap Receiver** page to send a test Trap to check that the feature is active.

Edit
SNMPv3 Trap Server
Name
Host
Security Level
Authentication Password
Authentication Algorithm MD5
Privacy Key
Privacy Algorithm AES128
Enable
Save

# **Defining Rack PDU Thresholds**

Thresholds are the limits you define over Rack PDU parameters (power, phase, circuit breaker and sensors) to send alert notifications when the value crosses above or below the set limit.

Click on the **Settings** icon to open the dropdown menu.

Select Thresholds from the menu to open the PDU Thresholds page.

PDU Thresholds						
Device Detection Threshold						
Threshold(mA) 150						
		Power Threshold	Input Phases	Circuit Breaker	Control Management	External Sensors
		PDUs 1-3				
Ø	Ø		Ø			
1 (Watts)	2 (Watts)		3 (Watts)			
High Critical 0	High Critical	0	High Critical	0		
High Warning 0	High Warning	0	High Warning	g 0		
Low Warning 0	Low Warning	0	Low Warning	0		
Low Critical 0	Low Critical	0	Low Critical	0		

#### **Power Thresholds**

The Rack PDU will send alert notifications when a power threshold wattage crosses above or below the settings you specify in **Power Threshold**.

Follow the steps below to change the Power Thresholds settings and alarm notifications:

- Select the **Power Threshold** tab on the PDU Threshold page.
- Click the Edit icon  $\hat{\mathscr{P}}$  to change the Power Threshold Setting.
- In the PDU Power Threshold Setting dialog box, change the fields as • needed:

Low Critical (W)	
Low Warning (W)	Edit
High Warning (W)	PDU Power Threshold (W)
High Critical (W)	0
Reset Threshold (W)	
Alarm State Change Delay (samples)	High Warning 0
Click the <b>Save</b> button to save your changes.	Enable High Warning
	Low Warning 0
	Enable Low Warning
	Low Critical 0
	Enable Low Critical
	Reset Threshold 0
	Alarm State Change Delay (Samples)

### **Input Phase Thresholds**

The Rack PDU will send alert notifications when a phase current and voltage alarm crosses above or below the settings you specify in the Input Phase Threshold page.

Follow the steps below to change the Input Phase Settings and alarm notifications:

- Select the Input Phases tab on the PDU Threshold page.
- Click the Edit icon  $\overset{?}{\mathscr{D}}$  to change the Phase Current Settings. •
- You can change the fields listed below as needed in the Input Phase Current • Alarm Setting dialog boxes:

Low Critical (A)	
Low Warning (A)	Edit
High Warning (A)	Input phases current alarm setting
High Critical (A)	Low Critical (A)
Reset Threshold (A)	Enable Low Critical
Alarm State Change Delay (samples)	0
Click the <b>Save</b> button to save your changes.	Low Warning (A) 0
	Enable Low Warning          High Warning (A)         22         Enable High Warning         Image: State of the s
	1 1
	Alarm State Change Delay (Samples) 0
	Save

#### **Phase Voltage Settings**

From this page, you can select the Phase settings you want to configure.

	Power Threshold	Input Phases	Circuit Breaker	Control Management	External Sensors	
			1			
Phase Current	Reading(A)	Low Critical	Low Warning	High Warning	High Critical	
Phase1	0.0	0.0	0.0	41.0	48.0	Ø
Phase2	0.0	0.0	0.0	41.0	48.0	Ø
Phase3	0.0	0.0	0.0	41.0	48.0	Ø
Phase Voltage	Reading(V)	Low Critical	Low Warning	High Warning	High Critical	
Phase1	198.7	180.0	190.0	215.0	225.0	Ø
Phase2	198.6	180.0	190.0	215.0	225.0	Ø
Phase3	198.6	180.0	190.0	215.0	225.0	Ø

To edit or change the Phase Voltage Settings, click the Edit icon  $\hat{\mathscr{P}}$  to open the **Input Phase Voltage Alarm Setting** dialog boxes. The following settings can be accessed here:

Low Critical (V)

Low Warning (V)

High Warning (V)

High Critical (V)

Reset Threshold (V)

Alarm State Change Delay (samples)

Click the Save button to save your settings.

put pha	ises ci	irren	t alar	m set	ting	
Low Critical	(A)					
0						
Enable Low	Critical					
0						
Low Warning	a (A)					
0						
Enable Low	Warning					
0						
High Warnin	g (A)					
22						
Enable High	Warning					
$\oslash$						
High Critical	(A)					
28						
Enable High	Critical					
$\oslash$						
Reset Thres	hold (A)					
1						
Alarm State	Change De	lay (Sam	ples)			
0						

## **Circuit Breaker Thresholds**

Set **Circuit Breaker Thresholds** so the Rack PDU will send alert notifications when a circuit breaker amperage crosses above or below the settings you specify.

Below are the steps to change the Circuit Breaker Settings and alarm notifications:

• Choose the Circuit Breaker tab in the PDU Threshold page.

		Power Threehold I louid Dha	er an Circuit Breaker Control Managemer	nt External Seneore	
		Power Threshold Input Pro	Control Managemen	External Sensors	
			1 2 3		
Bank	Low Critical	Low Warning	High Warning	High Critical	
1	0.0	0.0	11.0	14.0	Ø
2	0.0	0.0	11.0	14.0	Ø
3	0.0	0.0	11.0	14.0	Ø
4	0.0	0.0	11.0	14.0	Ø
5	0.0	0.0	11.0	14.0	Ø
0	0.0	0.0	11.0	14.0	Ø

Low Critical	(A)
--------------	-----

Low Warning (A)

High Warning (A)

High Critical (A)

Reset Threshold (A)

Alarm State Change Delay (samples)

Click the Save button to save your settings.

Edit	
Bank	
Low Critical (A)	
0	
Enable Low Critical	
0	
Low Warning (A)	
0	
Enable Low Warning	
0	
High Warning (A)	
11	
Enable High Warning	
$\bigotimes$	
High Critical (A)	
14	
Enable High Critical	
$\bigcirc$	
Reset Threshold (A)	
1	
Alarm State Change Delay (Samples)	
0	

### **Control Management**

Select the **Control Management** tab to configure thresholds so the Rack PDU will send alert notifications when an outlet wattage crosses above or below the settings you specify in the Control Management Thresholds.

Schneider Electric	× +				o - a
→ C ▲ Not secure	https://10.10.106.16/#/threshold	?_k=zd3d4i			् 🖈 🛓
Schr	Electric Outlet Metered,	Outlet Switched PDU 20.1	? License		
<b>命</b> 53	) @ 2.		∆ ở 🖗 🗄 🖻	admin 🕞 Logout	
U Thresholds					
Nevice Detection Threshold					
Threshold(mA) 150					
		Power Threshold Input	Phases Control Management External Se	insors	
		Fower mesiloid input		113013	
PDU-1					
		Bank#1 Bank#	2 Bank#3 Bank#4 Bank#5 Bank#6		
Name	Low Critical	Low Warning	High Warning	High Critical	
OUTLET 1	0	0	0	0	/
OUTLET 2	0	0	0	0	1
OUTLET 3	0	0	0	0	
omer (		0			-
OUTLET 4		0	U U	Ū	U"
OUTLET 5	0	0	0	0	Ø
OUTLET 6	0	0	0	0	Ø
OUTLET 7	0	0	0	0	1
P Type here to searc	h O	H 🔍 📽 🗖 🙆	o x = 0 w =		25°C Rain 🔿 📥 🕼 🌾 ENG 🛛 33:52 PM

- Select the Rack PDU by name.
- Click the Edit icon *i* to open the **Edit Outlet Information** dialog box. The following settings can then be accessed:

Low Critical (W)	
Low Warning (W)	Edit
High Warning (W)	Outlet Ir
High Critical (W)	0 Sat Lower C
Reset Threshold (W)	0
Alarm State Change Delay (samples)	0
Click the <b>Save</b> button to save your settings.	
	0
	Set High Wa
	High Critica 0
	Set High Cr

Edit
Outlet Information
Low Critical (W) O
Set Lower Critical
Low Warning (W) O
Set Lower Warning
High Warning (W) O
Set High Warning
High Critical (W) 0
Set High Critical
Reset Threshold (W) 0
Alarm State Change Delay (Samples) 0
Save

#### **External Sensors**

The **External Sensors** section displays the connected sensors on the Rack PDU. Choose the External Sensors tab on the **PDU Threshold** page to configure the sensor settings so the Rack PDU can communicate the sensor location, alarms, notifications, and details.

• Click the Edit icon *i* to open the **Edit External Sensors(3:1)** dialog box where you can edit the External Sensors Settings. The following settings can then be accessed:

Low Critical Low Warning

High Warning

High Critical

Click the Save button to save your settings.

Edit	
External Sensors(3:1)	
High Critical	
45	
Enable High Critical	
0	
High Warning	
44	
Enable High Warning	
0	
Low Warning	
38	
Enable Low Warning	
0	
Low Critical	
30	
Enable Low Critical	
0	
Save	

## **User Settings**

The Rack PDU has a standard Admin profile and a standard User profile.

- The **Admin** profile is typically the system administrator and has the "Admin Role" with full operating permissions.
- The default User profile includes the default "User Role" permissions. All other user privileges must be added by the Admin user. Users are defined by their unique login credentials and by their user role.

Before setting up the user profile, determine the roles required. Each user must be given a **Role**. These Roles define the permissions which are granted to the user.

- Admin: Complete system permissions
- **User**: By default, the user can change their own password. Other permissions must be granted by Admin.
- **Manager**: Complete system permissions. Primarily the Manager is intended to be the Redfish (RESTapi) user.

User Settings				Add Role	Add User
Users	LDAP Configuration		Radius Configuration		
Usemane Role Action	Enable	×	Erable X		
admin admin	LDAP Server		Server		
user user 🥒 🗙	Port	309	Port 1812		
A	Type	OpenLDAP	Secret		
manager manager 🥒 🗙	Base DN				
prathoek manager 🧳	Bind Password	****			
	Search User DN				
	Login Name Athibute				
	User Entry Object Class				
Roles	Section Management 🥔		Password Policy		
Role Description Action	Sign-In retries allowed	$\checkmark$	Password Aging Interval	60.5	
admin admin operation 🖉 🗙	Number of Retries Allowed	1 3	Minimum Password Length	8	
	Session Timeout Value	1440 [Minutes of Inactivity]	Maximum Password Length	32	
user useroperation 🖋 🗙	Lockout Time	3 (Meuten)	Enforce at least one lower case character	×	
manager redfish user 🖉 🗙			Enforce at least one upper case character	×	
			Enforce at least one numeric character	$\checkmark$	
			Enforce at least one special character	×	

On the top right corner of the Rack Access control page, you can choose to Add User or Add Role.

To add Users or change a user's password:

- · Click on the Add Users button to open an Add User dialog box.
- Add the user information and role.
- Click on the Save button to save the information.

To modify an existing user profile:

- The Edit User dialog box will open.
- Make the changes to the user profile.
- Click on the Save button to save the changes.

To delete an existing user profile:

On the User Settings page, find the username you want to delete.
 Select the X next to the username you want to delete.

#### **LDAP Server Settings**

To setup LDAP to access the Active Directory (AD) and provide authentication when logging into the Rack PDU from the Web UI:

1. On the User Settings page, go to the LDAP

Configuration tab. Click the Edit icon  ${\ensuremath{\overleftrightarrow{}}}$  to open the Edit dialog box.

LDAP Configuration	
Enable	$\times$
LDAP Server	
Port	389
Туре	OpenLDAP
Base DN	
Bind Password	****
Search User DN	
Login Name Attribute	
User Entry Object Class	

2. In the Edit dialog box, click the **Enable** button to enable LDAP. You can see that LDAP is enabled when the button is colored green. The button will be gray when not enabled.

3. Click in the **Type** (for Type of LDAP Server) field, select **Open LDAP** from the dropdown menu.

4. Type the Port number in the **Port** field. **NOTE:** For Microsoft, this number is

typically 389.

5. In the **Base DN** field, type in the account. Example: CN+=myuser, CN=Users, DC=EMEA, DC=mydomain, DC=com

6. In the **Bind Password** field, type in the password. Type the password again in the **Confirm Password** box when it opens, to complete the step.

7. Search User DN. Type in your DN.

8. Type **SAMAccountName** (typically) in the **Login Name Attribute** field.

9. Type Person Name in the User Entry Object Class field.

10. Click the Save button.

## Edit LDAP Configuration $\bigcirc$ LDAP Server Port 389 Type OpenLDAP Base DN Bind Password Search User DN Login Name Attribute User Entry Object Class Test LDAP Configuration Test Name Test Password

Test LDAP Configuration

With these LDAP settings configured, the Bind is complete.

Once the LDAP is configured, the Rack PDU must understand for which group authentication occurs. A role must be created on the Rack PDU to reference a group within the Active Directory (AD).

• Within the Web UI, go to **User Settings** and click on the **Add Role** button in the top right corner to open the **Add Role** dialog box.

User Settings				Add Role Add User
Users	LDAP Configuration		Nativa Contiguration	
Usemane Role Action	Enable	×	Erable X	
admin admin	LDAP Server		Server	
user user 🥒 🗙	Port	389	Port 1812	
A 14	Type	OpenLDAP	Secret	
manager manager 🖉 🗙	Base DN			
protheek manager 🥖	Bind Paseword	100 A		
	Search User DN			
	Login Name Attribute			
	User Entry Object Class			
Roles	Seasion Management	•	Password Policy	
Rale Description Action	Sign In retries allowed	$\checkmark$	Pessword Aging Interval	80d
admin admin operation 🥒 🗙	Number of Retries Allowe	d 3	Minimum Password Length	8
	Session Timeout Value	1440 [Minutes of Inactivity]	Maximum Password Length	32
user user operation 💉 🗙	Lookout Time	3 [Minutes]	Enforce at least one lower case character	×
manager redich user 🖉 🗙			Enforce at least one upper case character	×
			Enforce at least one numeric character	~
			Enforce at least one special character	×

- Enter the Role Name, which was created in the AD (PDUAdmin), in the **Role** Name field.
- In the **Privileges** field, click on the button to enable **Administrator Privileges**.

Add	
Role	
Role Name	
Description	
Privileges Administrator Privileges	
Save	

• Click the Save button.

#### **Test LDAP Configuration**

Test the setup to determine if LDAP authentication is ready to use.

On the User Settings page, click on the LDAP

**Configuration**Edit icon to open the Edit dialog box again.

Type the Active Directory username/ password into the test box.

Click the **Test LDAP Configuration** button at the bottom of the dialog box. If a dialog box opens with all green "SUCCEEDED" (and no X's), the LDAP is successfully configured.

Edit
LDAP Configuration
Enable
LDAP Server
Port 389
Type OpenLDAP
Base DN
Bind Password
Search User DN
Login Name Attribute
User Entry Object Class
Test LDAP Configuration
Test Name
Test Password
Test LDAP Configuration Save

### **Radius Configuration**

On the **User Settings** page, go to the Radius Configuration tab and click on the Edit icon  $\mathscr{D}$  to open the **Edit Radius Configuration** dialog box.

- Type the Server IP address, Port number, and Secret in the corresponding field.
- Click the Save button to complete the Radius authentication.

Edit
Radius Configuration
Enable
Server
Port
1812
Secret
Save

### Roles

In User Settings, go to Roles to change the User Roles, privileges, and settings.

To create a new Role:

- Click the Add Role button in the top right corner of the page.
- Type the Role Name and Description.
- Assign the Privileges.
- Click the Save button to save your entry.

ole			
Role Name			
Description			
Privileges			
Administrator	Privileges		

To modify a custom user role:

- Select the Role.
- Click on the Edit icon to open the Edit role dialog box.
- Edit the Role name and privileges as needed.
- Click the Save button to save your changes.

lole		
Role	e Name	
adr	ìin	
Des	cription	
adr	in operation	
Priv	leges	
$\checkmark$	Administrator Privileges	

To delete a User Role:

- Select the Role.
- Click the X icon.
- Click Yes to confirm the change



## **Session Management**

Session Management supports users to manage the Sign-In retries, number of retries allowed, session timeout value, and lockout time.

Click the Edit icon to setup the parameters.

Session Management	
Sign-In retries allowed	$\checkmark$
Number of Retries Allowed	3
Session Timeout Value	1440 [Minutes of Inactivity]
Lockout Time	3 [Minutes]

Make your changes in the Edit Session Management dialog box.

Click the Save button to save your changes.

Edit		
Session Management		
Sign-In retries allowed		
Number of Retries Allowed 3		
Session Timeout Value 24 hr		
Lockout Time 3 min		
Save		

### **Password Policy**

You can set a requirement for users to change their password at set intervals using the Password Aging Interval policy. You can also specify criteria for passwords to ensure that your users enter strong passwords.

• Click on the Edit icon next to **Password Policy** on the User Settings page.

Password Policy	
Password Aging Interval	60d
Minimum Password Length	8
Maximum Password Length	32
Enforce at least one lower case character	$\times$
Enforce at least one upper case character	$\times$
Enforce at least one numeric character	$\checkmark$
Enforce at least one special character	$\times$

- Choose a password aging interval from the **Password Interval** dropdown menu, if desired.
- If you wish to specify password criteria, click on the Strong Password radio button to enable.
- Set the Minimum password Length and Maximum Password Length from the dropdown menus.

**NOTE:** Minimum password length cannot be less than eight (8) characters and the maximum allowed is 32.

- Click the checkboxes to force users to use specific types of characters within the password.
- Click the Save button to save your changes.

Edit
Password Policy
Password Aging Interval 60d
Minimum Password Length 8
Maximum Password Length 32
Enforce at least one lower case character
Enforce at least one upper case character
Enforce at least one numeric character
Enforce at least one special character
Save

## **SNMP**

Simple Network Management Protocol (SNMP) is used to manage the Rack PDU(s) remotely. SNMP allows the user to monitor and detect network faults and to configure variable data in the Rack PDU.

Enable SNMP from the Web UI. See SNMP Management in the Web UI section of this manual.

NMP General	
Enable	
SNMP Version	
V1/2c&V3	

## **Using an MIB Browser**

Download the MIB browser and install it on your computer.

1. Open the MIB browser. Type in the IP address of the Rack PDU.



Click the Advanced button to open the Advance Properties of the SNMP Agent window.

	Advanced Properties of SNMP Agent	8
Address	10.10.105.17	
Port		
Read Community	*****	
Write Community	******	
SNMP Version	1	-
		, ro
	Ok Cancel	

- 3. In the Advance Properties of the SNMP Agent window, enter the respective Port, Read Community, and Write Community.
- 4. Select the SNMP manager version: 1, 2, or 3.

#### Loading the MIB File

Click on File. Select Load MIBs to open the window.

- 1. Select the latest version of the mib file.
- 2. Click the Open button to start loading the mib file.

	Freedow 10			
Look in	: thrax		V 10 10 10 10 10 10 10 10 10 10 10 10 10	•
ecent Items	powerne	tetopp1		
Desktop				
Jocuments				
This PC				
-	Els annos	nouvernatetoro 1 mih		Onen
1	rile name:	powernetetopp1.mb		open

3. A window displaying the MIB Tree will open. Expand the MIB Tree and select the **iso.org.dod.internet.private.enterprises.apc** file.

SNMP MIBs	
MIB Tree iso.org.dod.internet.private.enterprises.apc products apcmgmt MIB Tree SNMPv1 TRAPs	ndi 1580a

- 4. Right click on the **iso.org.dod.internet.private.enterprises.apc** and select **walk** from the dropdown menu to monitor the Rack PDU data.
- 5. Click on the **+** icon of the **products** folder to open the dropdown menu and select the **dPDU** folder to perform the SNMP functions of the Rack PDU.



# Redfish

Redfish API can be used to manage your Rack PDUs through an extension app, such as POSTMAN, for GET, POST and DELETE requests. You will need to download the POSTMAN app before performing the task below.

If you use POSTMAN, follow the instructions below to setup Redfish access:

- 1. To setup Redfish access, type the IP Address of the Rack PDU in a Google Chrome browser to open the login page for the Rack PDU. Login to the Rack PDU using your credentials.
- 2. Navigate to Network Settings. Enable RESTapi Access Configuration on that page.

	Schneider	Outlet Metered, Outle	et Switched P	DU 2.0.0.A			
	🗗 🕲 🕲 کې			∆ & ♥ (	9. 10	Edit	
Network S	ettings			Set Cert	ificate Ke	Web/ RESTapi Access Config	uration
Ethernet-1 IF	P Configuration	Ethernet-2 IP Configuration	8	Web/ RESTapi Ace	cess Config	Web Access Https	
Boot Mode	DHCP	Boot Mode	Static	Web Access	https	Web Port Default 80 for Http, 443 for Https 443	
IPv4 Address	10.10.105.50	IPv4 Address Network Mask	0.0.0.0	Web Port RESTapi Access	443	RESTapi Access Enable	
Network Mask	255.255.252.0	Default Gateway	0.0.0.0	Certificate	View	SSL Certificate	
Default Gateway	10.10.104.1	IPv6 Link Local Address	~			SSL Certificate Browse No file selected.	
IPv6 Access	$\checkmark$	IPv6 Auto Configured Address				SSL Certificate Key Browse No file selected.	
IPv6 Link Local Address	fe80::ca45:44ff.feaa:bb99					Save	
IPv6 Auto Configured Address	2001:c0a8:aa01:0:ca45:44ff.feaa:bb99						

- 3. Click the Save button to confirm and apply your changes.
- 4. Open the POSTMAN app. Add the basic authentication header, which is required for all the query requests.
  - For a GET request, type the URL request, enter the basic authentication header with your username and password to query the request.



• To make a POST request, you must include the json object type along with the basic authentication header.

**NOTE:** See the POSTMAN app Web page if you need more information regarding the json object.

 To create a session using POSTMAN: POST query the URL: http://{pdu\_ip}/redfish/v1/SessionsService/ Sessions along with the two headers (basic auth and json object type) and the body:

{ "username":``admin", "password":"123456789" }			
post ∨	https://192.168.10.128/redfish/v1/SessionService/Sessions		
Authorization ●	Headers (2) Body  Pre-request Script Tests		
form-data	x-www-form-urlencoded 🔹 raw 🔍 binary JSON (ap	plication/json) \vee	
1 v (j 2 "userna 3 "passwo 4 }	ame":"admin", ord":"123456789"		
Body Cookies	Headers (6) Test Results		
connection $\rightarrow$ keep content-length $\rightarrow$ 0	o-alive		
content-type → app location → /redfish/	plication/json /v1/SessionService/Sessions/330574760	15774a	

• Use the X-Auth Token from the response body along with the other two headers and basic authentication for any POST requests.

	post 🗸	https://192.1	https://192.168.10.128/redfish/v1/PowerDistribution/1/PowerControl/Loadsegment/1/OutletControl					
Auth	norization	Headers (2)	Body 鱼	Pre-request Script	Tests			
	Key						Value	
~	X-Auth-To	ken					330574760	
~	Content-T	уре					application/json	1575.0
								5

 To complete a DELETE request, type the URL for the session or users you want to delete and enter your basic authentication (username and password).

🧐 Postman					-	o x
New      Import R	unner 📭 *	🚦 My Workspace 🗸	ي ي	STING OFF 🛛 🗿	5 A ¥	Sign In
Q Filter	http://192.168.1.126/ ● http://192.168.1.126/ ●	+		No Environment	~	•
History Collections	DELETE V http://192.168.1.126/redfish/v1	1/SessionService/Sessions/1105210873		Params	end 🗸 S	ave ~
You hoven't created any collections yet. Postann Collections is tyou group related requests, making them easier to access and run.	THE BackAth V The authorization header will be automatically generated when you send the report. Learn more about authorization Provider Reparts	Username Password	edmin Show Password			
	Body         Cookes         Headers [4]         Text Result           Pretty         Rare         Prodest         \$50N \nmodels         \$50N \nmodels           3         1         "Section Deletes": 1185218973         \$50N \nmodels         \$50N \nmodels	5		Status: 200 OK	Time: 316 ms 5	Site: 145 B

# **Redfish URLs Supported with GET Method**

## **Session Service**

S. No	URL
1	https:// <ip_addr>/redfish/v1/</ip_addr>
2	/redfish/v1/SessionService
3	/redfish/v1/SessionService/Sessions
4	/redfish/v1/SessionService/Sessions/{session_ids}

## **Account Service**

S. No	URL
1	/redfish/v1/AccountService
2	/redfish/v1/AccountService/Accounts
3	/redfish/v1/AccountService/Accounts/{username}
4	/redfish/v1/AccountService/Roles
5	/redfish/v1/AccountService/Roles/{rolename}

## Managers

S. No	URL
1	/redfish/v1/Managers
2	/redfish/v1/Managers/manager
3	/redfish/v1//Managers/managers/NetworkProtocol
4	/redfish/v1//Managers/1/LogServices
5	/redfish/v1//Managers/1/LogServices/Log
6	/redfish/v1//Managers/1/LogServices/Log/Entries

### **Metrics**

S. No	URL
1	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Metrics

## **Power Equipment**

S. No	URL
1	/redfish/v1/PowerEquipment
2	/redfish/v1/PowerEquipment/RackPDUs
3	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}

### **Branches**

S. No URL		
1	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Branches	
2	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Branches/#cbnumber	

## **Outlets**

S. No	URL	
1	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Outlets	
2	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Outlets/#outletnumber	

### Sensor

S. No	URL		
1	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/Power{cbnum#}		
2	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/Current{cbnum}		
3	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/VoltageAL1N		
4	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/CurrentOUTLET#		
5	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/VoltageOUTLET#		
6	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Sensors/PowerOUTLET#		
7	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/EnergyOUTLET44		
8	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/PowerMains1-6		
9	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/CurrentMains1-3		
10	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/VoltageMains1–6		
11	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/FreqMains		
12	/redfish/v1/PowerEquipment/RackPDUs/2/Sensors/PDUPower		

## Mains

S. No URL		
1	/redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Mains /redfish/v1/PowerEquipment/RackPDUs/{pdu_id}/Mains/AC1	
2		

## **Redfish URLs Supported with POST Method**

S. No	URL	
1	/redfish/v1/AccountService/Accounts	
2	/redfish/v1/PowerDistribution/{pdu_id}/PowerControl/Loadsegment/{loadseg_id}/ OutletControl	

## **Redfish URLs Supported with DELETE Method**

S. No	URL	
1	/redfish/v1/AccountService/Accounts/test_user	
2	/redfish/v1/SessionService/Sessions/ <sessionid></sessionid>	

### **Event Service**

Subscribe to Event Service:

- 1. Using the POST method, create a session and apply the generated X-auth-token to the headers.
- Query the URL http://<pdu\_ip\_addr>/redfish/v1/EventService/ Subscriptions using POST method with the following body:

<pre>{     "destination":"http://<ip_addr>/redfish/v1/ev     "event":"Alert",     "context":"web",     "protocol":"redfish" }</ip_addr></pre>	vents	3″,	
POST V https://10.20.90.238/redits/v1//SvenService/Subscriptions/	Params	Send 🗡	Save
Authorization   Headers (3) Body  Pre-request Script Tests			Cookies (
form-data			
1 * ( sastlasticm**retu/10.30.30.20/reffish/clevests* 2 * "costss**rws", 5 * "protost**rwsfish			

3. To verify the subscriptions, query the URL using the GET method to observe the result of the subscription added: http://<pdu\_ip\_addr>/redfish/v1/EventService/Subscriptions/1

GET V https://10.20.90.230/realfshV//EvenSensice/Subscriptions		Params Send Y Save Y		
Authorization   Headers (1) Body Pre-request Script Tests			Cookies Co	
Key	Value	Description	Bulk Edit Presets	
Authorization	Basic YWRtaW46MTizNDU2Nzg*			
Bedy Cosise Headers (4) Test Results Status 200 GK Time 2006 ms Sccr. 413 B				
Prenty Raw Preview BON V T			Ē C	
<pre>3 c Testeristate.com** 1: Testeristate.com** 1: Testeristate.com**: Testeristate.com*</pre>				

4. To Delete the Subscription, query the URL using the DELETE method to observe the result of the subscription deleted: http://<pdu\_ip\_addr>/ redfish/v1/EventService/Subscriptions/1

# The Command Line Interface (CLI)

The CLI can be accessed over a serial connection using a program such as HyperTerminal or Putty. See Serial Connection in this manual for more information. You can use the CLI to manage and control the status, parameters, and basic functions of the Rack PDU.

Depending on your access status, you can:

- Reset the Rack PDU
- Display Rack PDU and network properties
- Configure the Rack PDU and network settings
- · Switch outlets on or off
- View user information

## **CLI Commands and Prompts**

To display a list of available options in the CLI, type "?" in the command prompt.

The commands are divided into five (5) main categories:

- System setting (sys)
- Network configuration (net)
- User setting (usr)
- · Device setting (dev)
- Power (pwr)

### **CLI Options**

To display a list of available menu items in the CLI, type "?" in the command prompt. This will display the main categories of the command options available:

apc>?	
Sys	PDU system configure and setting
Net	PDU net application configure and setting
Usr	PDU user operation
Dev	PDU device setting
Pwr	PDU power setting

To display the options available for a menu item, type the menu command and press the Enter key.

**NOTE:** you can also type the menu command with "?" to show a list of available commands.

parameter Error
sys: system setting
usage:
sys [date/time/ntp] [2012-09-11/14:16:20/133.100.11.8 133.100.11.9 (serv
erl server2)]
sys [ver/def/rst]
sys upd [pduid] [conf/all]
sys log [del edit] [event data] [on off] [interval]
<pre>sys ledcolor [pduid]/all] [dark/red/green/yellow/blue/pink/cyan/white]</pre>
sys dualinput get
sys dualinput set [NA/EMEA]

# **CLI System Commands**

Sys Commands	Description	Example	
sys date [yyyy- mm-dd]	Sets the user input date	apc:sys date 2021-08-12 SUCCESS	
sys date	Query on the Rack PDU date	apc>sys date SUCCESS Date:2021-08-12 Time:04:58:16	
sys time [hh:mm: ss]	Sets the user input time	apc>sys time 09:20:50 SUCCESS	
sys time	Query on Rack PDU time	apc>sys time SUCCESS Date:2021:08:12 Time:09:20:53	
sys ntp [primary_ip] [secondary_ip]	Sets the NTP	apc>sys ntp 129.6.15.28.129.6.15.29 SUCCESS	
Sys ver Query on the system versions — firmware, web, boot loader, and language version		apc>sys ver SUCCESS Firmware Version: 1.0.6.0 Boot loader Version: 1.1 LANGUAGE Version: 1.01 Web Version: 1.0.5.8	
sys def	Set the Rack PDU system to default settings	apc>sys def Reboot required for change to take effect System Reboot now, Are you sure? (Y/N):	
sys rst	Resets the Rack PDU system	apc>sys rst Reboot required for change to take effect System Reboot now, Are you sure? (Y/N):	
sys upd [pduid] [conf/all]	Updates the configuration file	apc>sys upd	
sys log [del  edit] [event  data] [on off] [interval]		apc>sys log edit data on 5 SUCCESS apc>sys log edit data off SUCCESS	

The commands are divided into five (5) main categories:

## **CLI Network Commands**

Net Commands	Description	Example	
net ssh [on/off]	Sets SSH On or Off	apc>net ssh SUCCESS SSH Port: 22 SSH server is running	
net ftps [on/ off]	Sets FTPS On or Off	apc>net ftps SUCCESS FTPS Port: 21 Service is running Is Ftp	
net http [on/ off]	Sets HTTP On or Off	apc>net http SUCCESS HTTPS Port: 80 Status: ON	
		apc>net https on Reboot required for change to take effect WEB protocol is changed, reboot to validate System Reboot now, Are you sure? (Y/N):	
net https [on/ off]	Sets HTTPS On or Off	apc>net https SUCCESS HTTPS Port: 443 Status: OFF	
		apc>net https on Reboot required for change to take effect WEB protocol is changed, reboot to validate System Reboot now, Are you sure? (Y/N):	
net redfish [on/ off]	Sets Redfish On or Off	apc>net redfish SUCCESS Status: ON	
		apc>net redfish off SUCCESS Status: OFF	
net [snmp] [v1v2c/v3/trap] [on/off]	Sets SNMP On or Off	apc>net snmp SUCCESS v1v2c: ON v3: ON trap: ON	
		apc>net snmp v1v2c off SUCCESS	
net [mac/tcpip]	Displays the MAC address, IPv4	apc>net mac SUCCESS MAC Addr: C8-45-44-66-2B-65 MAC Addr: C8-45-44-66-2B-67	
		<pre>apc&gt;net tcpip SUCCESS eth0 IPv4 Addr: 10.10.105.37 eth0 IPv6 Link Local Addr: fe80:ca45:44ff:fe66:2b65 eth0 IPv6 DHCP Addr: 2001:c0a8: aa01:0:ca45:44ff:fe66:2b65 eth1 IPv4 Addr: 192.168.2.2</pre>	
<pre>net tcpip [eth0dhcp/ eth1dhcp/ eth0static/ eth1static ip nm gw]</pre>	Changes the network to DHCP or Static mode	apc>net tcpip dhcp eth0dhcp Reboot required for change to take effect. Network is reconfigured, reboot to validate System Reboot now, Are you sure? (Y/N):Y	
net ip [v4] [v4v6]	Sets IPv4	apc>net ip SUCCESS IPV4	
		apc>net ipv4	

		Reboot required for change to take effect. IP protocol is changed, rboot to validate System Reboot now, Are you sure?(Y/N):
net phy [auto/ 10100mnbps]	Set the link speed to auto negotiation/10100mbps	apc>net phy SUCCESS link speed: auto negotiation apc>net phy 10100mbps Reboot required for change to take effect Phy speed is changed, reboot to validate System Reboot now, Are you sure?(Y/N):
net cert [def]	Updates the certificate file	<pre>apc&gt;net cert SUCCESS Custom certificate key file active, in /cert/cert.key Custom certificate cert file active, in /cert/cert.crt apc&gt;net cert def Removing custom certificate key file, in/cert/cert.key Removing custom certificate key file, in /cert/cert.crt Reboot required for change to take effect Certificate Setting changed, reboot to validate System Reboot now, Are you sure&gt;(Y/N):</pre>

## **CLI User Commands**

Usr Commands	Description	Example	
usr list	Lists the Rack PDU users	apc>usr list SUCCESS Usr Role Privilege Role id	
		admin admin Administrator 1 user user User 2 manager manager Administrator 3	
usr login	Displays the logged in user details	apc>usr login SUCCESS username: admin ip address: 10.10.94.211 client type: SSH	
us unlock [username]	Unlocks the blocked user	apc>usr unlock en_user SUCCESS	

# **CLI Device Commands**

Dev Commands	Description	Example	
dev cascade [rna] [init] [create]	Setting the Rack PDU Cascade to RNA mode.	apc>dev cascade SUCCESS Cascade unit number: 1 Cascade address list: 0 0 0 Cascade Mode: RNA	
		apc>dev cascade qna create Reboot required for change to take effect System Reboot now, Are you sure?(Y/N):	
dev outlet pdu ID [status/ outlet index] [on/off]	Displays outlet status. Turn On or Off the outlet power.	apc>dev outlet 1 status SUCCESS Relay Outlet Status Outlet# 1: Open Outlet# 2: Open Outlet# 3: Open Outlet#4: Open Outlet# 5: Open Outlet#6: Open Outlet# 7: Open Outlet# 8: Open	
		apc>dev outlet 11 on SUCCESS	
dev [sensor/usb] [on/off]	Lists out the connected sensors on the Rack PDU. Turn the USB On or Off	apc>dev sensor SUCCESS	
		apc>dev usb on SUCCESS	
dev ledstrip [on/off]	Turn the ledstrip On or Off	apc>ledstrip on SUCCESS	
dev powershare	Displays the status of the Rack PDU power share.	apc>dev power share SUCCESS	
		PDU 1: Downstream: 0 Upstream: 1 Mains: 1	
		PDU 2: Downstream: 1 Upstream: 1 Mains: 1	
		PDU 3: Downstream: 1 Upstream: 1 Mains: 1	

## **CLI Power Commands**

Dev Commands	Description	Example
pwr [unit/phase/ cb/outlet] [idx]	Displays the power readings	<pre>apc&gt;pwr unit 1 SUCCESS UNIT power Feature voltage: 0V current: 0.0A active power: 0W power factor: 1.00 energy: 0.000kWh apc&gt;pwr outlet 3 SUCCESS OUTLET 3 power Feature voltage:0V current: 0.0A active power: 0W apparent power: 0W</pre>

# Cascading Rack PDUs and Redundant Network Access (RNA)

In cascade mode, up to 32 Rack PDUs can be connected using one (1) IP address. Information and data from all Guest Rack PDUs is gathered from the Host Rack PDU.

Cascade functionality reduces the network services cost for Rack PDUs. For example, a standard network switch is used in a data center can contain 24 ports. Without using the cascade function each port supplies network services to one (1) Rack PDU. Using the cascade features, a typical network switch with 24 ports can supply network services for up to 768 Rack PDUs.

#### **Setup the Rack PDUs**

Connect up to 32 Rack PDUs of the same SKU from a single IP address:

1. Configure the Rack PDU which will be the first in line (the Host).

**NOTE:** Refer to Establish Network Settings in this manual for more information.

- 2. After the Host Rack PDU is configured, connect the Ethernet cable from the 10/100 port on the Host Rack PDU to the 10/100/1000 port on the Rack PDU which will be the next in line.
- 3. Continue connect your Rack PDUs from the 10/100 port to the 10/100/1000 port for up to 32 Rack PDUs.

**NOTE:** The length of the Ethernet cables connecting the Rack PDUs must be less than 6m (20 ft).

4. By default, the Cascade command is enabled in the Rack PDU configuration file and default mode of the Rack PDU is RNA. Go to the Web UI (or your management software) to manage and control the Rack PDUs in the Cascade.

#### **Redundant Network Access (RNA) Functionality**

Power Source A		а Р	ower Source B
Host	APC	Guest	APC
		Cascade Shares Information from PDU	
	Schneider		Schneider

The Redundant Network Access allows secure access of Rack PDU data and statistics on two (2) separate private networks. RNA is used with a redundant power delivery design including two (2) Rack PDUs for each IT rack. The Rack PDUs must be the same SKUs when used in RNA applications.

#### **How RNA Works**

- RNA maintains two separate private networks (Landlord and Tenant) that do not overlap.
- RNA works using a redundant power delivery design (that is, two Rack PDUs for each IT rack).
- Each Rack PDU is separately connected to the Landlord or Tenant's private communications network.
- The two Rack PDUs are connected with a data communications bus to allow the Rack PDUs to share user-defined information.
- Each Rack PDU acts like a Host Rack PDU to report Rack PDU data to both networks.

#### Setup RNA on the Rack PDUs

To setup RNA on cascaded Rack PDUs, the user must:

- 1. Configure the Rack PDU for RNA using the CLI.
  - Login to the CLI and type:  ${\tt dev}\ {\tt cascade}\ {\tt rna}$  on the last Rack PDU in the cascade.
  - The response will be: SUCCESS
     System Reboot now, Are you Sure?(Y/N):
  - Type Y to confirm the reboot.
  - After the reboot is complete, the Rack PDU will be set to RNA mode.
     NOTE: Do not place RNA enabled Rack PDUs in among Rack PDUs in a cascaded system.
- 2. Connect the LAN Network cables and Ethernet cables between the Rack PDUs.

#### After the Rack PDUs are configured for RNA:

- 1. Connect the LAN network cable from the network switch to the 10/100/1000 port (GB port) on Rack PDU #1.
- 2. Connect an Ethernet cable from the 10/100 port (MB port) of Rack PDU #1 to the 10/100/1000 port (GB port) to the next Rack PDU to cascade.
- 3. Connect another LAN network cable from the network switch to the 10/100 port (MB port) to the **n**th (last) Rack PDU in the cascade.

# **Firmware Update Procedures**

# Update Using USB

## NOTICE

The USB method for updating firmware is for standalone Rack PDUs ONLY.

Failure to follow these instructions can result in equipment damage.

- 1. Go to www.apc.com and download the most recent firmware version, apc.fw.
- 2. Extract the **apc.fw** and copy its contents to the USB.

0.55	Name	Date modified	Туре	Size
255	📌 📄 apc.fw	08-04-2021 11:33	FW File	36,458 KB
ds	*			
pace	*			
nts	*			
	*			

- 3. Insert the USB drive into the USB port on the Rack PDU.
- 4. Go to Settings>USB on the LCD display of the Rack PDU.
- 5. Select Firmware Upload from the menu and select Yes to confirm.

**NOTE:** The LCD display will show the Firmware update progress. When the update is complete, the Rack PDU will automatically reboot.

- 6. Remove the USB drive from the Rack PDU.
- 7. Go to Settings>Device>Firmware to confirm that the firmware uploaded successfully.

# **Update Using the Web UI**

- 1. Go to **www.apc.com** and download the most recent firmware version, **apc. fw**. Save the file to a folder located on your computer.
- 2. Go to the System management page in the Web UI and select the Upload Firmware option.
- 3. Select the Rack PDU to which you want to upload the firmware and upload the **apc.fw** file.

System Management	Upload Firmware Upload Configu	uration
System Information	Rack Location	Upload Firmware
Contact Name shiv Contact Email shiva@ypmail.com	Row Name Row Position	You must keep your browser window open for the duration of the upload. PDU will reboot once the firmware is Upgraded.
Contact Phone 9876543210	Rack Name	Choose Firmware
Contact Location bengaluru	Rack Height 0	Upload

#### NOTE:

- If you have standalone Rack PDUs: The Rack PDU will reboot and the firmware upgrade will complete automatically.
- If you have a system of cascaded Rack PDUs: A window will open to prompt you to restart your system when the firmware has been updated on all the Rack PDUs.

## **Update Using FTPS**

To access the Rack PDU using an FTPS program, FTPS must be enabled through the Web UI, the CLI or through SSH.

- 1. In the Web UI, go to Network Settings > FTPS.
- 2. Select the check box Enable FTPS Access.
- 3. Login to an FTP program. You must have a role with administration privileges.
- 4. Download the **apc.fw** firmware file from **www.apc.com**. Transfer the firmware file to an **fw** folder accessible by the FTP program.
- 5. Connect to the Rack PDU using an SSH program such as HyperTerm or PUTTY.
- 6. Login using a role with administration privileges.
- 7. Type the command sys upd <pduid> all to start the upload. After you receive the reboot message, type sys upd <pduid> rst in the console window. (In Cascade for the guest device.)

**NOTE:** For a Host Rack PDU or standalone configuration, type the command sys upd <pduid> all

The (Y/N) prompt will appear for the Rack PDU to reboot. Type Y. When the upload is finished, the system will reboot automatically.
## **Security Considerations**

### Overview

As network security continues to change, user requirements for security solutions are a requirement. When you are configuring the settings for the NetShelter Rack PDU Advanced, you should select the settings that provide the necessary security for your installation.

Review the information in this chapter to determine an appropriate secure deployment based on your specific security requirements.

### **Physical Security**

Physical security must be in place to control physical access to the device.

- · Secure your equipment from unauthorized physical access
- · Clearly mark restricted areas for authorized personnel only
- Lock doors of restricted areas
- Ensure that a physical or electronic trail exists to document access to restricted areas.

A password protected NetShelter Rack PDU Advanced installed in a rack that is locked with a secured key, will prevent physical access to the device.

### **Device Security**

- Make sure your devices are updated with the latest firmware versions.
- Do not use admin accounts for non-administrator activities.
- Configure your device to use certificates either from a reputable Certificate of Authority (CA) or appropriate certificates from your enterprise CA.
- Limit the number of users to the minimum required.
- Edit the Password Policy, under User Settings, in the Web User Interface to ensure strong passwords by requiring the use of at least one special characters, capital letters, numerals, and a minimum length (between 8 and 32 characters).

Force users to change their passwords at set intervals. See Password Policy, page 54, in this manual for instructions.

• Keep assigned privileges of user Roles to the minimum. See Roles, page 52, for more information.

### **Network Security**

- Deploy the device behind an appropriate firewall. Do not expose the device to the public Internet.
- · Create a custom certificate to help strengthen authentication.
- Disable File Transfer Protocol (FTP) when it is not in use to help harden security on your device.
- Configure your device to use SNMPv3 protocol to ensure higher security of data transfer.
- Disable unused network addressing protocols such as IPv4 and IPv6 to help secure your device.

#### Web Interface Access and Security

HTTP or HTTPS protocols can be used to access the Web User Interface. For better security, enable HTTPS when configuring your device. In the Web User Interface, Web access can be configured on the Network Settings page.

- · A digital certificate is required when using HTTPS.
- You can choose your Internet protocol option on the Network Settings page of the Web UI. See page 29 for more information.
- From the CLI, use the command:net https [on/off] to set the Internet protocol to HTTPS. See page 64 in this manual for more information

#### **Command Line Interface and Security**

Users can access the Command Line Interface through Secure Shell (SSH). To use SSH, you must first configure SSH and have an SSH client program installed on your computer.

- You can configure the SSH options on the Network Settings page of the Web User Interface. See page 29 in this manual for Network Settings information.
- You can set SSH on or off in the CLI. The command is: net ssh [on/off]

#### RADIUS

The NetShelter Rack PDU Advanced supports the authentication and authorization functions of Remote Authentication Dial-In User Service (RADIUS). Use RADIUS to administer remote access for each network-enabled device centrally. When a user accesses the device, an authentication request is sent to the RADIUS server to determine the permission level of the user.

Edit the RADIUS Configuration from the User Settings page of the Web User Interface. See page 51.

#### Logging

APC recommends enabling the generation of Syslog messages for events that have Syslog configured as a notification method. See Syslog Configuration on page 32.

#### **Vulnerability Reporting**

Cybersecurity incidents and potential vulnerabilities can be reported on either the APC website or the Schneider Electric website. In the search bar enter: Reporting a vulnerability.

#### **Secure Disposal Guidelines**

Set the device to its default properties prior to disposal.

• In the CLI, enter the command sys def to return the device to default settings. A reboot is required. Enter Y to reboot the device.

# Troubleshooting

## **Rack PDU Access Problems**

For problems that persist or are not described here, contact APC Customer Support at **www.apc.com**.

Problem	Solution
Cannot allocate the communications port through a terminal program	Before you can use a terminal program to configure the Rack PDU, you must shut down any application, service, or program using the communications port.
Cannot access the Command Line Interface remotely	Make sure you are using the correct access method.
Cannot access the Web UI	Verify that HTTP or HTTPS access is enabled.
	<ul> <li>Verify that you are using a Web browser supported for the Rack PDU.</li> </ul>
	<b>NOTE:</b> Check the specific error message reported by the browser. It may indicate the specific problem.

## **SNMP** Issues

Problem	Solution
Unable to perform a GET	Verify the read (GET) community name (SNMPv1) or the user profile configuration (SNMPv3).
Unable to perform a SET	Verify that SNMP is enabled.
	<ul> <li>Verify the read/write (SET) community name (SNMPv1) or the user profile configuration (SNMPv3).</li> </ul>
	<ul> <li>Use the CLI or Web UI to ensure that write (SET) access (SNMPv1) has been enabled or access is granted to the target IP address through the access control list (SNMPv3).</li> </ul>
Unable to receive traps	<ul> <li>Make sure the trap type (SNMPv1 or SNMPv3) is correctly configured as a trap receiver.</li> </ul>
	<ul> <li>For SNMPv1, query the MIB OID to verify that the IP address is listed correctly and that the community name defined matches the community name in the table. If either is not correct, use SETs to the OIDS, or use the CLI or Web UI to correct the trap receiver definition.</li> </ul>
	<ul> <li>For SNMPv3, check the user profile configuration and run a trap test.</li> </ul>
Traps received are not identified	Verify that the traps are properly integrated in the alarm/trap database.

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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