



# VERTICAL SERIES+

**SX-VS-128, SX-VS-1216, SX-VS-1624,  
SX-VS-108i, SX-VS-1016i, SX-VS-1624i**



## Switched IP Controllable Vertical PDU

# User Manual

# AMETEK<sup>®</sup>

ADVANCED SERIES MODE <sup>®</sup>	ELIMINATOR SERIES <sup>™</sup>	ICE <sup>®</sup>	NEXT GEN <sup>®</sup>	SURGE ELIMINATION <sup>®</sup>
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This product may be covered by one or more claims of the following patents or published patent application:

U.S. Patent Nos.: RE39,446; 4,870,528; 4,870,534; 5,136,455; 6,040,969; 6,728,089; 6,744,613; 6,947,266; 7,068,487; 7,184,252; 7,511,934; 7,541,696; 7,551,412; 8,482,885; 8,520,349; 8,547,672; 8,614,866; 9,166,396; 9,225,534; 9,310,870; 9,489,026; 9,577,473; 9,787,081; 9,787,086; 9,831,662; 10,014,680; 10,090,662; 10,114,395; 10,184,963

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China Patent Nos.: 102916388B

**Table of Contents**

- 1. Introduction ..... 5
  - 1.1 Metering is performed at the system level, and includes: ..... 5
  - 1.2 Physical Interfaces ..... 5
  - 1.3 Rated & Maximum Current ..... 6
  - 1.4 Voltage Requirements ..... 6
- 2. Installation and Components ..... 7
  - 2.1 AC Power: Output Power ..... 7
  - 2.2 AC Power: Input Power ..... 7
  - 2.3 Ethernet ..... 7
  - 2.4 USB-Micro AB ..... 7
  - 2.5 LED Indicators ..... 7
  - 2.6 Buttons ..... 8
- 3. Rack Installation ..... 8
  - 3.1 Step One ..... 9
  - 3.2 Step Two ..... 10
- 4. Web Server ..... 11
  - 4.1 Login ..... 11
  - 4.2 Power Management ..... 11
  - 4.3 Reports ..... 11
  - 4.4 Setup ..... 13
    - 4.4.1 Device Setup ..... 14
    - 4.4.2 Network Setup ..... 18
    - 4.4.3 Network Advanced Setup ..... 19
    - 4.4.4 Triggers Setup ..... 22
    - 4.4.5 Users Setup ..... 26
    - 4.4.6 Sequences Setup ..... 26
  - 4.5 Utilities ..... 27
    - 4.5.1 File Upload ..... 27
    - 4.5.2 Backup/Restore ..... 28
    - 4.5.3 Factory Reset ..... 28
    - 4.5.4 Soft Reboot ..... 28
- 5. Security ..... 29
  - 5.1 Authentication ..... 29

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5.1.1	802.1X.....	29
5.1.2	SSO (Single Sign-On).....	29
5.2	Interfaces .....	29
5.2.1	Network Interface.....	29
6.	Application Programming Interfaces (APIs) .....	30
6.1	HTTP/HTTPS REST .....	30
6.2	Interfaces .....	30
7.	Part Numbers.....	31
7.1	Part Number Scheme.....	31
8.	Troubleshooting .....	32
9.	Specifications .....	33

## 1. Introduction

The SurgeX V Series is a smart vertical PDU that is IP-enabled with independently switchable outlets and inlet current monitoring. Designed for mounting in the back of a rack, the three sizes - 8 outlet, 16 outlet and 24 outlet - provide the flexibility to add IP controllable power for most rack sizes. The internal web server provides configuration, output control, monitoring, and retrieval of data logs. Multiple security and communication interface options are supported.

The extensive programming capabilities of the V Series provides advanced sequencing and scheduling operations. Triggers can be programmed to activate on an “if X then do Y, then do Z when no longer X” basis. Trigger sources include various AC power measurements, scheduling, and A u t o p i n g. Actions include: turning receptacles on and off, cycling a receptacle, executing previously defined sequences, and putting a unit into shutdown. For example, an action can be created to power cycle a network appliance if it fails to respond to a ping command.

### 1.1 Metering is performed at the system level, and includes:

- Line Voltage
- Neutral-Ground Voltage
- Current
- Power
- Line Frequency
- Power Factor
- Voltage Crest Factor
- Energy

### 1.2 Physical Interfaces

Model	Output	Input	Communication	Resettable Fuse
SX-VS-128	(8) 5-15R	(1) NEMA 5-15P	(1) RJ45, (1) USB-Micro AB	(1) Push Button
SX-VS-1216	(16) 5-15R	(1) NEMA 5-15P	(1) RJ45, (1) USB-Micro AB	(1) Push Button
SX-VS-1624	(24) 5-20R	(1) NEMA 5-20P	(1) RJ45, (1) USB-Micro AB	(1) Push Button
SX-VS-108i	(8) IEC 13	(1) IEC C14	(1) RJ45, (1) USB-Micro AB	(1) Push Button
SX-VS-1016i	(16) IEC 13	(1) IEC C14	(1) RJ45, (1) USB-Micro AB	(1) Push Button
SX-VS-1624i	(20) IEC 13 (4) IEC 19	(1) IEC 20	(1) RJ45, (1) USB-Micro AB	(1) Push Button

### 1.3 Rated & Maximum Current

Model	Rated full load current	Maximum Current
SX-VS-128	12A	15A
SX-VS-1216	12A	15A
SX-VS-1624	16A	20A
SX-VS-108i	10A	15A
SX-VS-1016i	10A	15A
SX-VS-1624i	16A	20A

### 1.4 Voltage Requirements

Model:	Input Voltage
SX-VS-128	120V AC
SX-VS-1216	120V AC
SX-VS-1624	120V AC
SX-VS-108i	240V AC
SX-VS-1016i	240V AC
SX-VS-1624i	240V AC

## 2. Installation and Components

V Series is designed to be installed vertically in the back of an equipment rack. The supplied nuts, bolts and washers must be used to mount the V Series to the rack through the mounting holes (A) following the appropriate local regulations and requirements.

### 2.1 AC Power: Output Power

Plug the equipment cord (B) into the suitable receptacles as needed. Please review Introduction, Physical Interfaces, column Outputs, for the suitable plugs for each model's receptacles.

### 2.2 AC Power: Input Power

Connect power to the V Series using an appropriately rated 3 wire grounding type power cord provided with the equipment (C). Do not plug the unit into a relocatable power tap. Check the outlet for correct polarity and presence of a ground conductor before plugging the unit in.

### 2.3 Ethernet

The RJ45 connector for Ethernet (D) is situated on the front panel and is to be used for setup, debugging, and network connectivity. The default IP Address is DHCP assigned. To find the IP address of the device, please use the discovery tool at [ametekeesp.com](http://ametekeesp.com). The mDNS protocol is supported for dynamic device discovery.

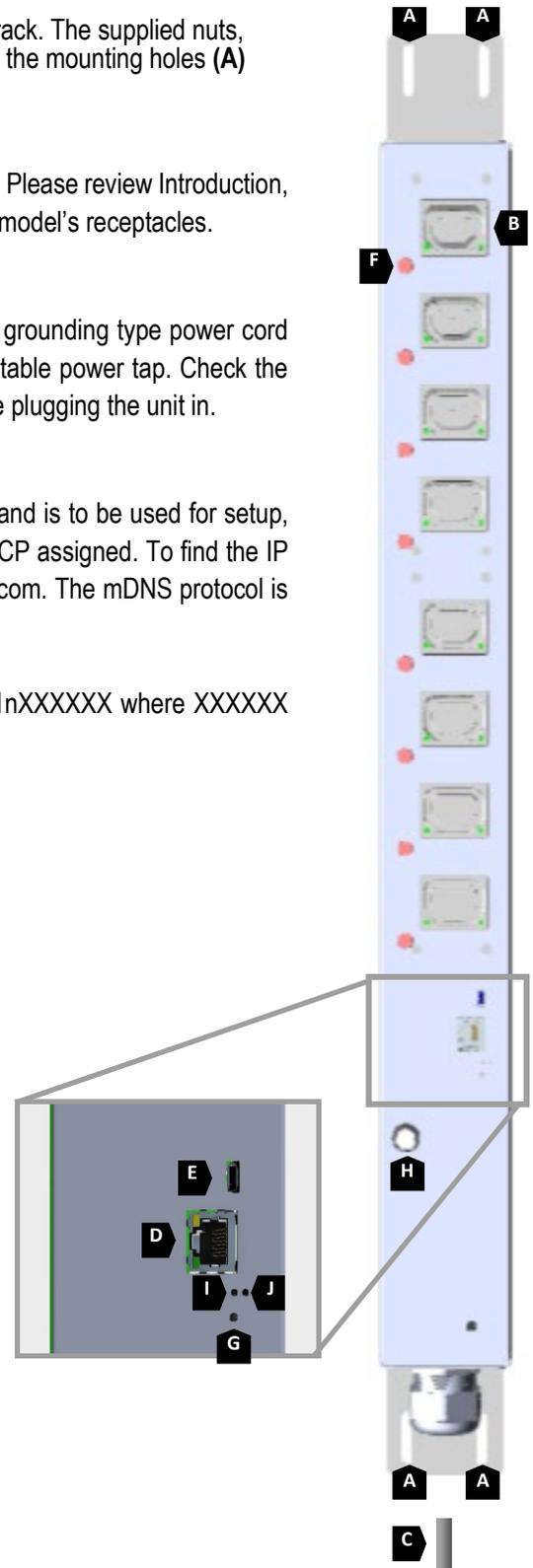
The default username is admin, and the default password is Adm1nXXXXXX where XXXXXX are the last six characters of the MAC address.

### 2.4 USB-Micro AB

The USB-MICRO AB connector (E) is for OOB diagnostics and troubleshooting IP connectivity issues. To use, please use the discovery tool at [ametekeesp.com](http://ametekeesp.com) or manually enter the static IP address <https://169.254.10.100> into a supported web browser. The web server will always be accessible at <https://169.254.10.100> through this USB port. The web server on this interface cannot be changed and will always be unsecured HTTP at port 80.

### 2.5 LED Indicators

The receptacles have individual power indicator LEDs (F). These are paralleled in the control interface. In addition, the unit has an LED indicating power (G).



## 2.6 Buttons

### 2.6.1

The resettable fuse (**H**) is used to reset the V Series in case the fuse tripped. This is a single push button to the bottom left of the Ethernet RJ-45 jack. Also, there is a reset switch for hardware and another for software.

### 2.6.2

Hardware Reset (**I**): The Hardware Reset button performs a hard reboot of the processor. This hard reboot will immediately switch controlled outlets off, removing power to connected equipment on all outputs.

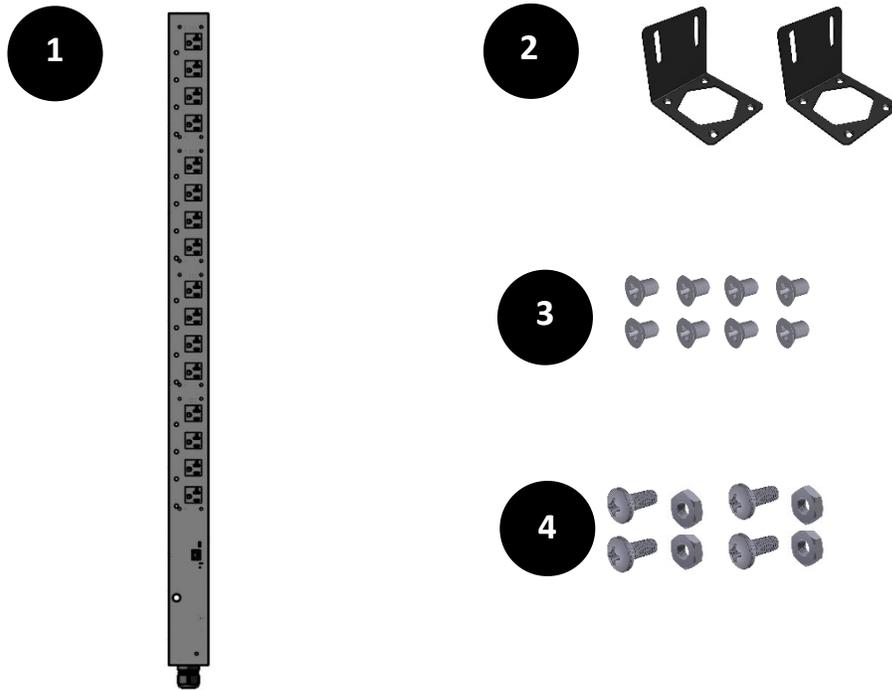
### 2.6.3

Software Reset (**J**): The Software Reset button is a multi-functional control depending on length of press. If the button is held for longer than 10 seconds, the unit resets itself to factory defaults, and all custom configurations are erased. If the button is held for less than 10 seconds, the unit will perform a software reset that will not reset any data, or power cycle the connected equipment.

## 3. Rack Installation

V Series is designed to be installed vertically in the back of an equipment rack. The supplied nuts, bolts and washers must be used to mount the V Series to the rack through the mounting holes (**A**) following the appropriate local regulations and requirements.

1. PDU (Quantity 1)
2. Mounting Brackets (Quantity 2)
3. 8-32 Mounting Bracket Screws (Quantity 8)
4. 10-32 Rackscrew Truss-Head - 4 Pieces (Quantity 4 pairs)



V Series is designed to be installed vertically in the back of an equipment rack.

**3.1 Step One**

Assemble mounting brackets to the top and bottom of the PDU onto the PDU by connecting each mounting bracket using 4 bolts each bracket utilizing the threaded holes (Diagram A).

*Hint: The mounting brackets can be rotated in any direction to attach on the PDU Diagram B and C.*

Diagram A

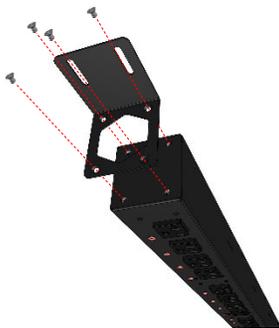


Diagram B



Diagram C



**3.2 Step Two**

The supplied nuts, bolts and washers connect the V Series PDU to the DIN rail of the equipment rack.

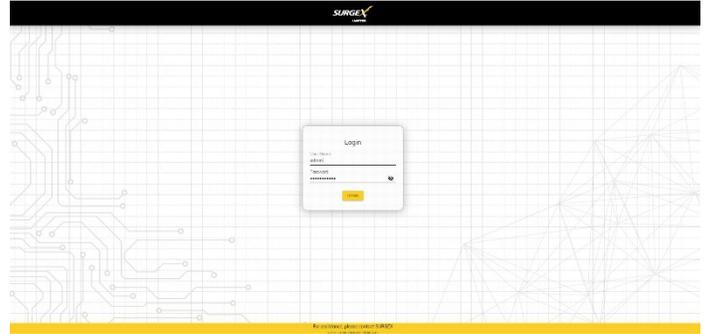


## 4. Web Server

V Series' internal web server provides a comprehensive portal for configuration, monitoring, and control.

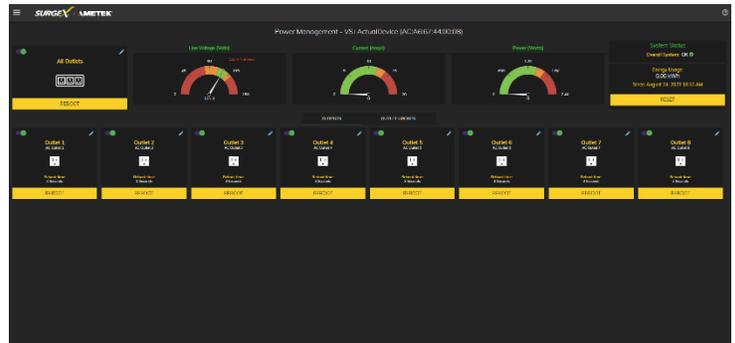
### 4.1 Login

The Login page is the first page displayed when a web browser makes a connection to the V Series. Enter a valid username and password in the "User Name" and "Password" fields, and press "Login" to log in.



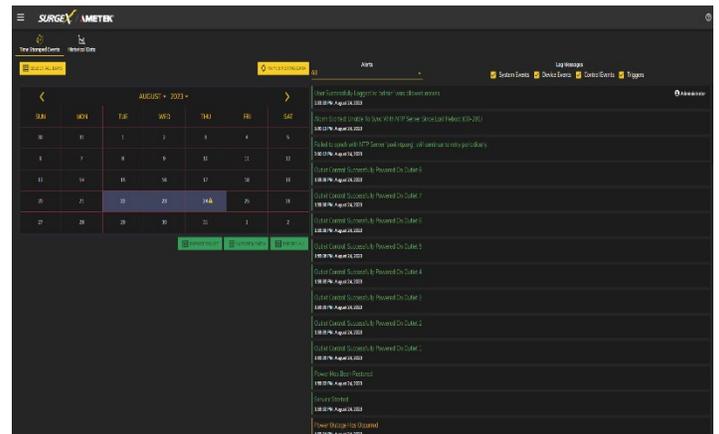
### 4.2 Power Management

The Power Management page provides information and status for the PDU and individual outlets, as well as basic control of each outlet. The top right section of the page provides system status.



### 4.3 Reports

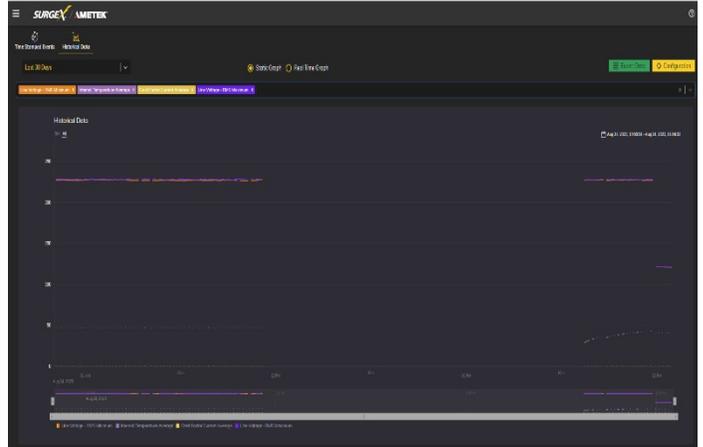
The Reports page displays data collected by the V Series and stored to its internal memory. The data is presented in two groups: Time Stamped Events and Historical Data. Time Stamped Events are recorded, with a date and time of occurrence when a condition meets established criteria. V Series uses a Real Time Clock (RTC) synced to an Internet time server and backed up by an internal battery. For the most accurate time stamps and to eliminate clock drift, we suggest verifying the NTP connection.



The types of events which may be recorded are:

- Triggers
- Power Outage
- Network Events
- Outlet Changes
- Shutdown Events
- Firmware Upgrades

Historical Data is a record of measured electrical parameters and may be adjusted to sample certain items at specific intervals. The available parameters are:



Historical Parameters		Description
Voltage Max	Line -Neutral	The maximum measured RMS voltage between the conductors during the measurement period.
	Neutral -Ground	
Voltage Min	Line -Neutral	The minimum measured RMS voltage between the conductors during the measurement period.
	Neutral -Ground	
Voltage Average	Line -Neutral	The average measured RMS voltage between the conductors during the measurement period.
	Neutral -Ground	
Voltage Peak Max	Line -Neutral	The maximum measured peak voltage between the conductors during the measurement period.
	Neutral -Ground	
Current Max	Total Device	The maximum measured RMS current during the measurement period.
Current Average	Total Device	The average measured RMS current during the measurement period.
Current Peak Max	Total Device	The maximum measured peak current during the measurement period.
Power Max	Total Device	The maximum measured average power during the measurement period.
Power Average	Total Device	The average measured average power during the measurement period.
Power Peak Max	Total Device	The maximum measured peak power during the measurement period.
Frequency Max		The maximum measured AC line frequency.
Frequency Min		The minimum measured AC line frequency.
Frequency Average		The average measured AC line frequency.
Power Factor Mode	Total Device	The most recorded power factor during the measurement period.
Crest Factor Max	Line Voltage	The maximum crest factor calculated during the measurement period.
	Neutral -Ground Voltage	
Crest Factor Min	Line Voltage	The maximum crest factor calculated during the measurement period.
	Neutral -Ground Voltage	
Energy Usage	Total Device	The accumulated energy consumed by connected equipment during the measurement period.

#### 4.4 Setup

Complete setup and configuration of V Series is provided via 6 Setup web pages. Each setup page is described in the following sections. Each setup page has a save button at the bottom of the page which must be pressed to keep the configuration changes. A green success message will temporarily appear in the top right of the page when the settings are saved properly.

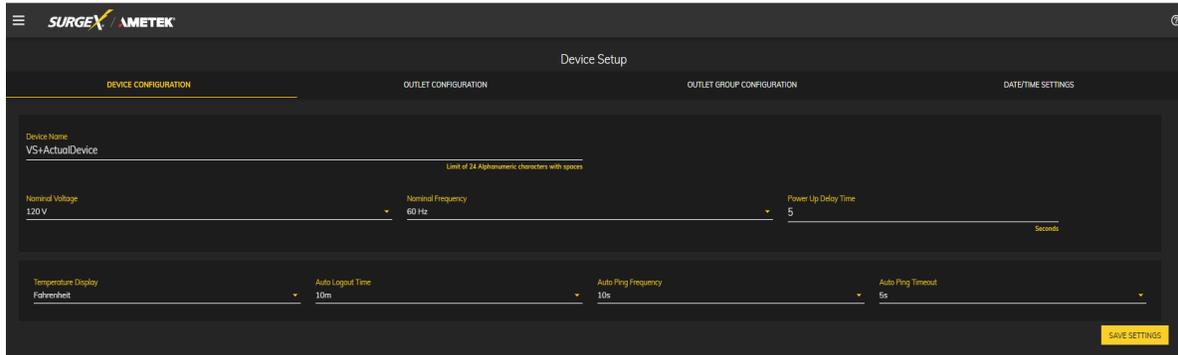
Setup	
Setup Page	Description
Device	Configure basic device parameters
Device Configuration	Configure settings for visual feedback and power up procedure
Outlet Configuration	Configure controllable outlet settings
Outlet Group Configuration	Create, Edit. or delete outlet groups.
Date/ Time Settings	Configure NTP server or set manual time
Network	Configure network settings, including the network adapter and time keeping
Network Advanced	Configure advanced monitoring and security settings
SNMP	Configure SNMP connection and communication settings
802.IX Settings	Configure authentication settings and/or view connection logs.
LDAP Client Settings	Configure LDAP authenticator, options, and test connection
Users	Configure and modify user accounts.
Triggers	Create and modify Triggers
Threshold with Samples	Configure triggers based on measurements
Auto Ping	Configure triggers based on pinging IP addresses
Schedule	Configure triggers based on time
Sequences	Create and modify custom Sequences

## 4.4.1 Device Setup

The Device Setup page allows for the specification of basic device parameters.

### 4.4.1.1 Device Configuration

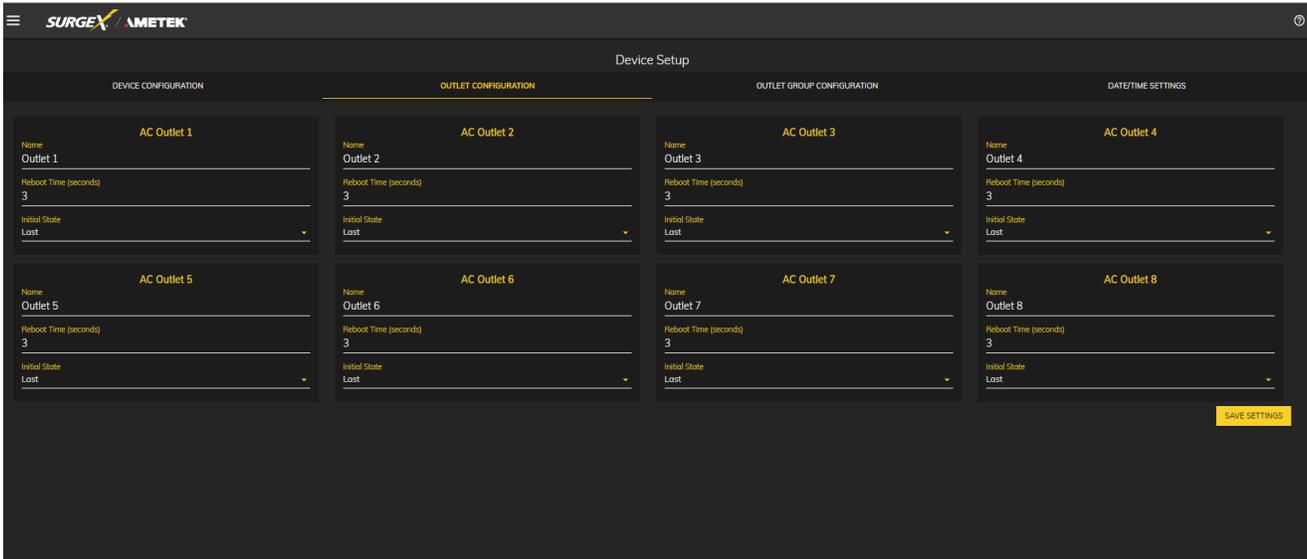
The Device Configuration tab allows for the specification of visual feedback and device initialization.



Device Configuration	
Item	Description
Device Name	Specifies the name label to be associated with this Vertical Series Plus device.
Nominal Voltage	Specifies the expected voltage on the input receptacle. This selection does NOT change any settings for over/under voltage shutoff. This is only for visual coloring on gauges.
Nominal Frequency	Specifies the expected frequency on the input receptacle. This selection does NOT change any settings for triggers. This is only for visual coloring on gauges.
Power-Up Delay Time	Specifies the amount of time in seconds by which to stagger the manual turning on of multiple outlets when applying the initial state.
On Power Up	Specifies whether to set outlets to initial states run a predefined sequence when Vertical Series Plus device powers up, or the hard reset button is pushed.
On Shutdown Clear	Specifies whether to set outlets to initial states run a predefined sequence when Shutdown state clear.
Temperature Display	Specifies whether to display temperature in degree Fahrenheit or Celsius.
Auto Logout	Specifies the web security timeout in minutes.
Auto Ping Frequency	Specifies how frequent the Vertical Series Plus device will send pings to an IP Address or Hostname in an auto ping trigger.
Auto Ping Timeout	Specifies the amount of time the Vertical Series Plus device will wait for a ping response before calling the attempt a failure.

## 4.4.1.2 Outlet Configuration

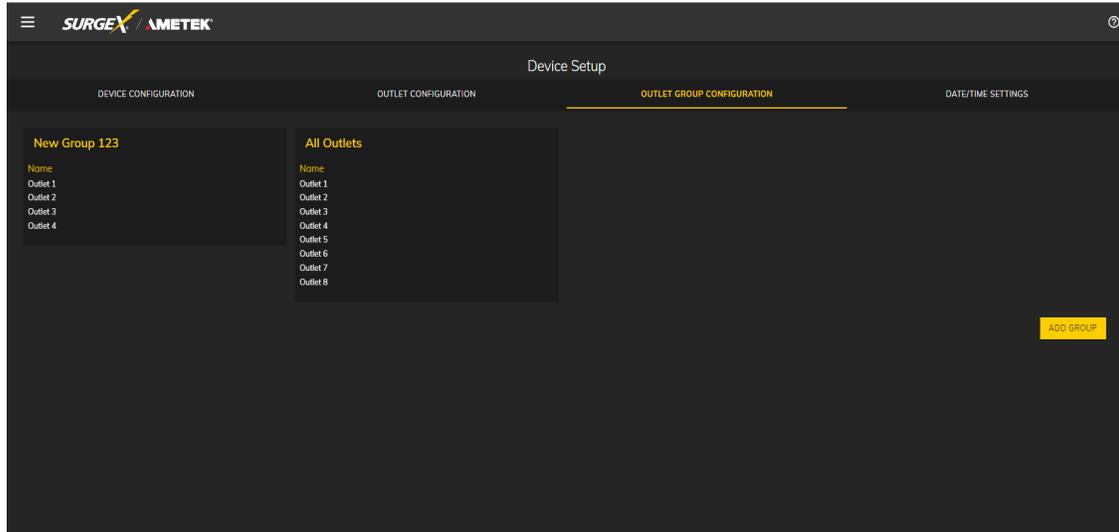
The Outlet Configuration tab allows for the specification of unique names and reboot times per outlet. The configuration for initial state per outlet is also here, if this option is selected in the Device Configuration tab for either On Power Up or On Shutdown Clear.



Outlet Configuration	
Item	Description
Outlet Description	A fixed short phrase that references a physical feature.
Outlet Name	Specifies the name label to be associated with this Outlet
Reboot Time	Number of seconds that the device will wait in between turning an outlet off and turning the outlet back on during a reboot command.
Initial State	<p>The state that an outlet will assume during start up or after a shutdown clears, if the initial state setting is selected in the Device Configuration tab. Options are as follows:</p> <ul style="list-style-type: none"> <li><b>Always On</b>      Regardless of other settings, this outlet will always be on. Ignores Shutdown state and deselecting Initial State in the Device Configuration tab. Outlet ignores user commands to reboot or power off. The only thing that will kill power with this selected is a hard reboot, or of power outage.</li> <li><b>Always Off</b>      The opposite of Always On, this setting will never allow an outlet to pass power.</li> <li><b>On</b>                  The outlet will start in an On state.</li> <li><b>Off</b>                  The outlet will start in an Off state.</li> <li><b>Last</b>                The outlet will assume the last state it was in. (Factory Default)</li> <li><b>Reboot Only</b>      The outlet will act like the On state but will ignore user commands to power off. This outlet will only respond to reboot commands. Useful for network appliances that may need to be rebooted, but otherwise want to be on all the time. Using this setting, the outlet will still turn off during Shutdown state.</li> </ul>

### 4.4.1.3 Outlet Group Configuration

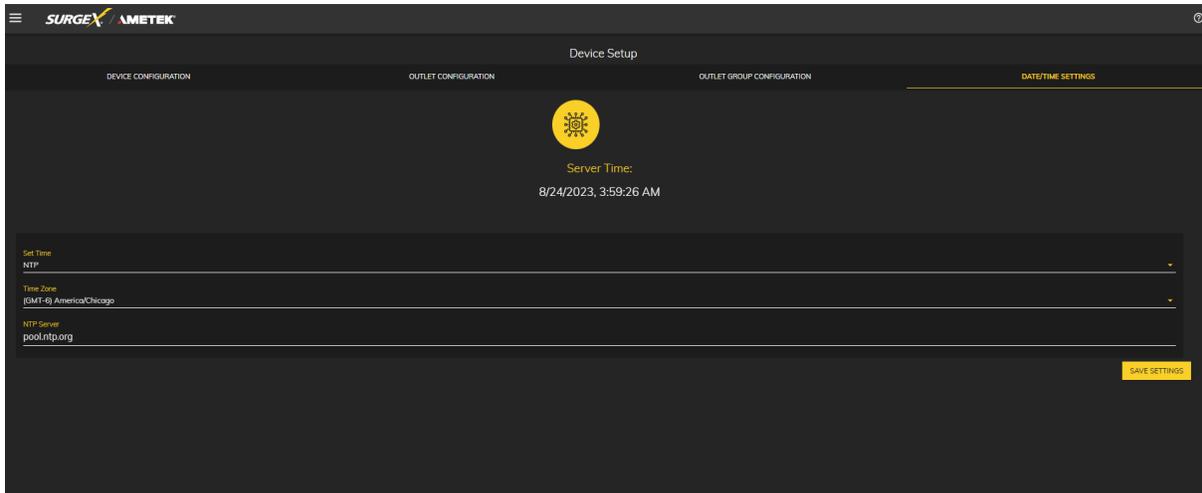
The Outlet Group Configuration tab allows for the specification of visual feedback, and device initialization.



Outlet Group Configuration	
Item	Description
Group Name	Specifies the name label to be associated with the outlet group.
Member Name	Specifies the outlet members of this outlet group.

### 4.4.1.4 Date/Time Settings

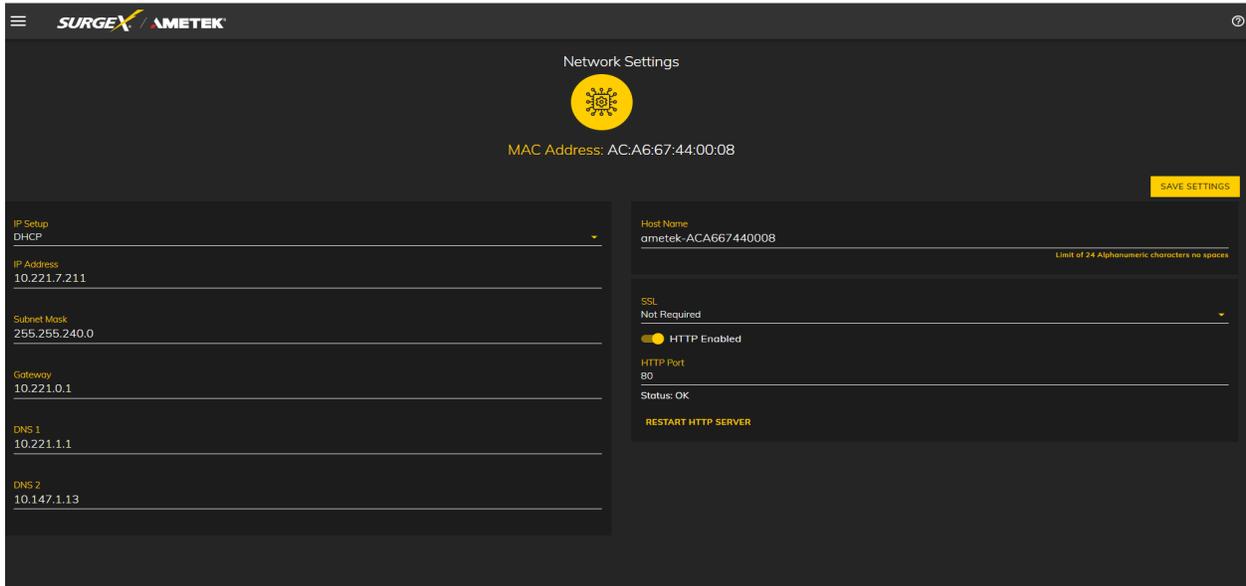
The Date/Time Settings tab allows for the specification of visual feedback, and device initialization.



Date/Time Configuration	
Item	Description
Server Time	Returns the device's internal time based on the local time zone.
Set Time	Specifies the method for setting the time in the Vertical Series Plus device. Options for this setting are NTP or manual. NTP will use the NTP Server option to automatically sync the device time every day.
Time Zone	Specifies the desired time zone adjustment for the Vertical Series Plus device.
NTP Server	Specifies the hostname or IP address of the NTP server to use for time synchronization.

## 4.4.2 Network Setup

The Network Setup page allows for the specification of network settings, including the network interface and NTP time server.



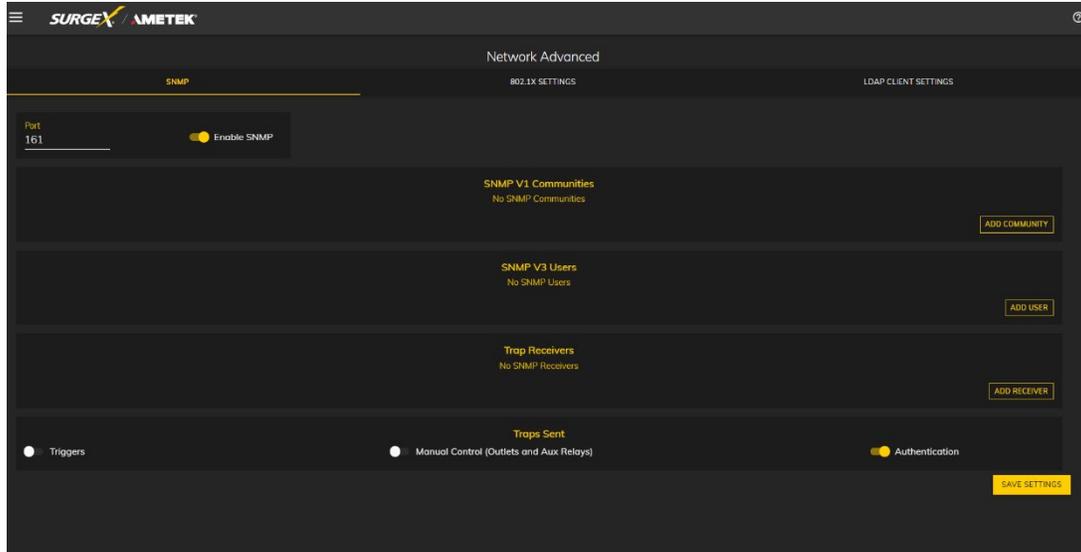
Network Configuration	
Item	Description
Setup	Specifies if the device will have a static IP Address or will dynamically be assigned network settings through DHCP.
Address	Current IP Address of the network interface on the RJ45 Ethernet port
Subnet Mask	Current Subnet Mask of the network interface on the RJ45 Ethernet port.
Gateway	Current Gateway of the network interface on the RJ45 Ethernet port
DNS 1	Current DNS1 of the network interface on the RJ45 Ethernet port.
DNS 2	Current DNS2 of the network interface on the RJ45 Ethernet port.
Hostname	A configurable unique name to be used to access the device instead of an IP Address.
SSL	Specifies whether the web server will be SSL encrypted (HTTPS) or not (HTTP). The default certificate is self-signed and will require the user continue through a safety notification if a custom signed certificate is not uploaded to the device.
HTTP Enabled	Specifies if the web server is enabled or disabled. NOTE: If disabling the web server, the web interface end REST API will be disabled, only limited functionality over SNMP will remain it enabled.
HTTP Port	Port number to use for the web server.

### 4.4.3 Network Advanced Setup

The Network Advanced Setup page allows for the specification of more advanced network security and monitoring options.

#### 4.4.3.1 SNMP

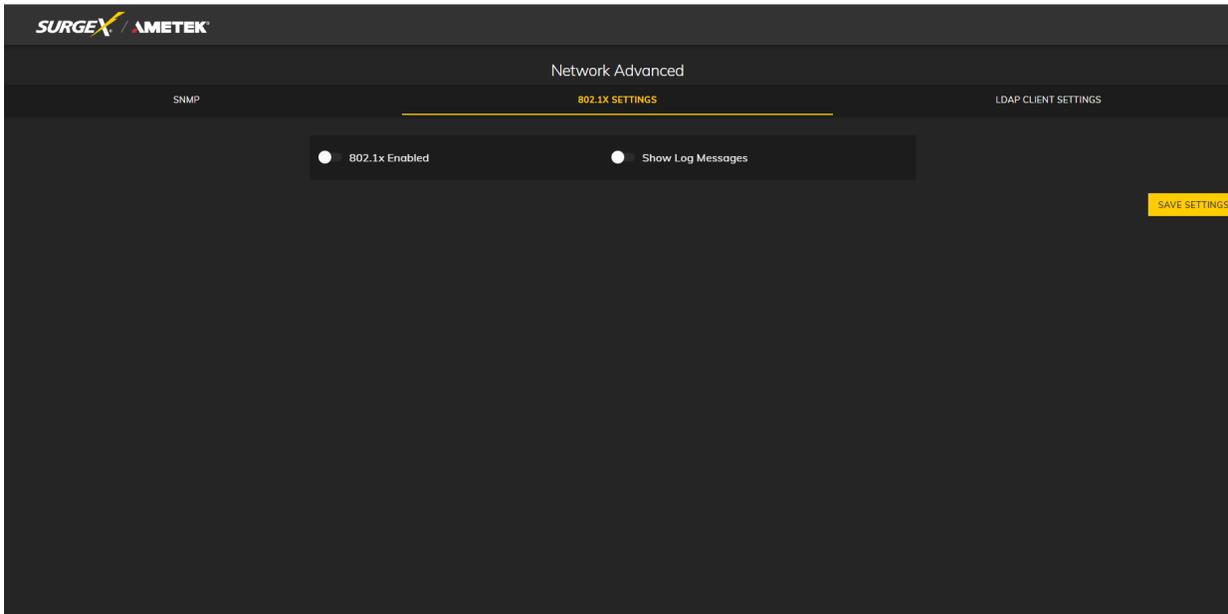
The SNMP tab allows for the specification of parameters for the SNMP agent, supporting V1 through V3.



SNMP Setup	
Item	Description
Enable SNMP	Specifies whether to enable the SNMP agent.
Port	Specifies the port number for the SNMP agent. 161 is the standard SNMP port.
SNMP V1 Communities	Is a table of all SNMP communities, supporting SNMP V1 at a minimum.
Name	Specifies the Community name for read and/or write access.
Source	Specifies an unrequired whitelist. If requests are not to be filtered by hostname or IP Address, this field can be left blank.
Access	Specifies the type of access allowed by the community.
SNMP V3 users	Is a table of Users specifically for SNMP V3 authorization. Users here will not apply to the REST API, and REST API users will not be able to authenticate via SNMP V3 without redefining their credentials here. SNMP credentials cannot be authenticated using the LDAP Client.
Name	The name or username for authorization.
Authorization	Type of encryption used per user. Options are DES or MD5.
Access	Type of access per user. Options are Read Only or Read/Write.
Passphrase	Passphrase or password for the user.
Trap Receivers	Is a table of all the destinations for SNMP traps.
Name	The name of the community for traps.
Host Name	The hostname or IP address of the SNMP Manager that is going to receive traps.
Port	The port number that the SNMP Manager is listening for traps on.
Traps Sent	Specifies which specific traps are to be sent. Triggers send traps for Triggering and Clearing. Manual Control sends traps for outlet state changes, and Authentication sends traps for failed authentication attempts.

### 4.4.3.2 802.1X Settings

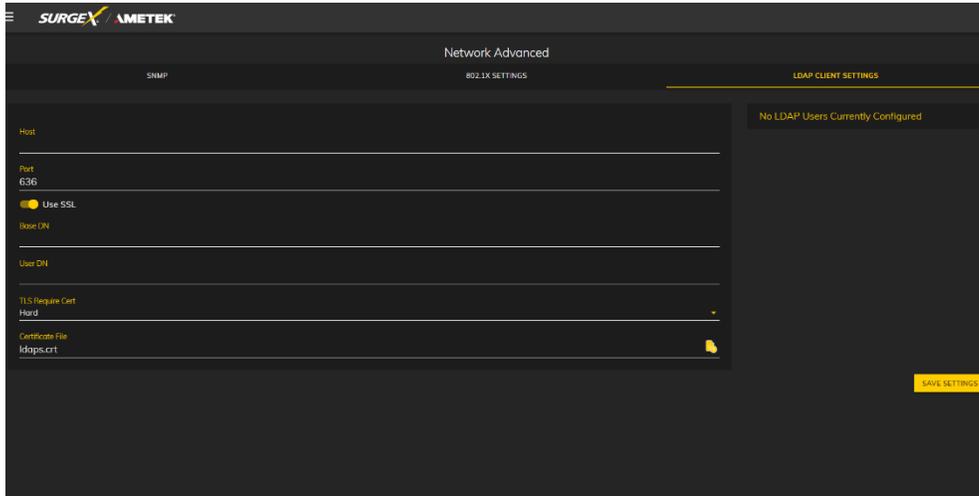
The 802.1X Settings tab allows for the specification of 802.1X authentication and debugging of errors as they may arise.



802.1X Settings Setup	
Item	Description
802.1x Enabled	Enables the 802.1x authentication client. This does not require the user to have a unique password for Vertical Series Plus device. Network login credentials can be used.
Show Log Messages	Opens and hides a table with date/time coded 802.1x related messages for debugging an authentication failure.
Authentication Type	Specify the authentication method used during the 802.1x EAP negotiation. Different authentication options and settings will be displayed based on the selected Authentication Type.

### 4.4.3.3 LDAP Client Settings

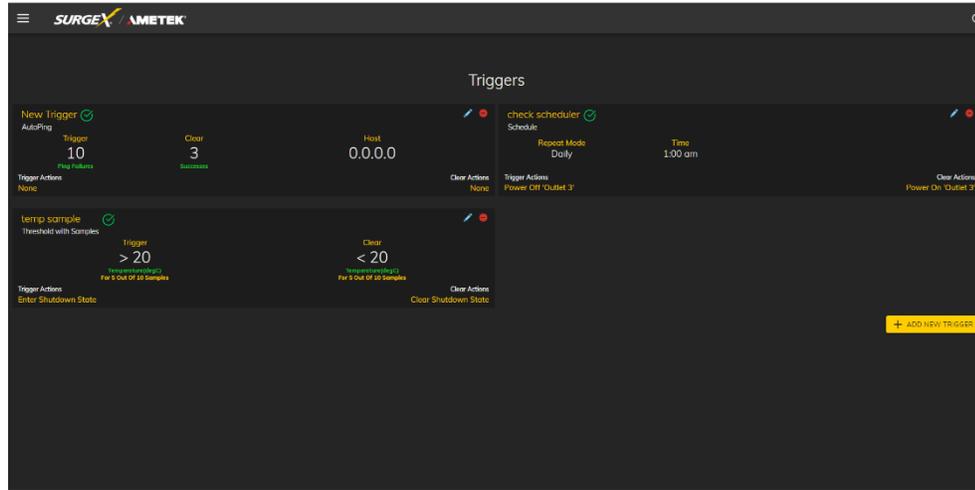
The LDAP Client Settings tab allows for the specification of the LDAP Authentication server and authentication method, and a test interface to test the server setup.



LDAP Client Settings Setup	
Item	Description
Host	The hostname or IP address of the LDAP server
Use SSL	A switch that will enable or disable SSL when attempting to connect to the LDAP server. This is a separate option than the port number, in the case that a site is using a nonstandard port for authentication, but still wants the ability to specify encryption. We always suggest using encryption when using LDAP.
Base DN	The base point in the directory tree where the user distinguished name search will begin.
User DN	The distinguished name of a user that will be used to authenticate. Multiple users are supported by using macros. For example, in the above image, the username test User attempts to log in, and the User DN pulls the name "Test User" from the user's definition for use in the authentication to replace the string %Full Name%.
TLS Require Cert	This specifies how to handle server certificates during TLS negotiations. Never: the client never asks the server for a certificate. Allow: the client will ask for a certificate, if none is provided the session proceeds normally. If a certificate is provided but the client is unable to verify it, the certificate is ignored and the session proceeds normally, as if no certificate had been provided. Try: the certificate is requested, and if none is provided, the session proceeds normally. If a certificate is provided and it cannot be verified, the session is immediately terminated. Demand: the certificate is requested, and a valid certificate must be provided, otherwise the session is immediately terminated.
Certificate File	This is the certificate that will be sent to the LDAP Server when/if requested.
User Name	The information for a user that is defined in the Users page. The first part (name), is accessible by the %Full Name% macro, and the second part (username) is accessible with the %User Name% macro.
Password	The password for the given user to test the LDAP server configuration.
Test User	A button to send an authentication request using the given settings for the user and password above. NOTE: Settings should be saved using the "Save Settings" button at the bottom of the page before testing a configuration change.

### 4.4.4 Triggers Setup

The Triggers Setup page allows for the modification of Triggers. Triggers define event logging parameters and allow configuration to automatically control and protect connected equipment. Triggers are categorized into three types, autoping, Threshold with Samples, and Schedule, but all have the same possible actions. Actions can either be on the onset (Trigger/Alarm Actions) or offset (Clear Actions) of a trigger. All Triggers are logged, along with the associated actions.

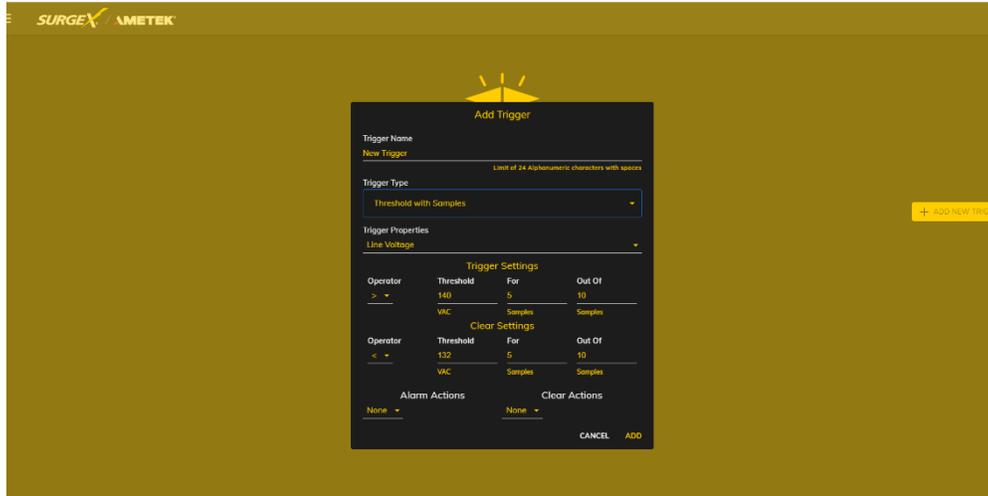


Trigger Types	
Item	Description
Threshold with Samples	Uses measurements over an allotted time to take an action. This trigger type is configurable to act very quickly or very slowly depending on environmental/system needs.
Auto Ping	Issues a ping function on a periodic basis to determine if an IP asset is accessible.
Schedule	Uses the device time to issue a one time or periodic command. We suggest ensuring the NTP server is updating correctly to use the schedule trigger.

Action Types	
Item	Description
None	Do not take any action, only log the event. This is useful as a Clear Action when an action should persist, or for both Alarm and Clear actions when just logging the event is desired.
Power On	Power on a specific outlet if the outlet configuration allows it.
Power Off	Power off a specific outlet if the outlet configuration allows it.
Reboot	Reboot a specific outlet if the outlet configuration allows it. If an outlet is already off when this command is issued, the outlet will simply turn on after the outlet specific reboot delay time.
Run Sequence	Run a specific sequence.
Enter Shutdown State	Put the device into a shutdown state. This state turns off all outlets (unless they are configured for always on). The only way to clear a shutdown state, is another trigger, a button on the web interface, or a REST API command.
Clear Shutdown State	Clear the device's shutdown state. Clearing the device's shutdown state will cause the outlets to follow the logic defined by the On Shutdown Clear setting.

### 4.4.4.1 Threshold with Samples

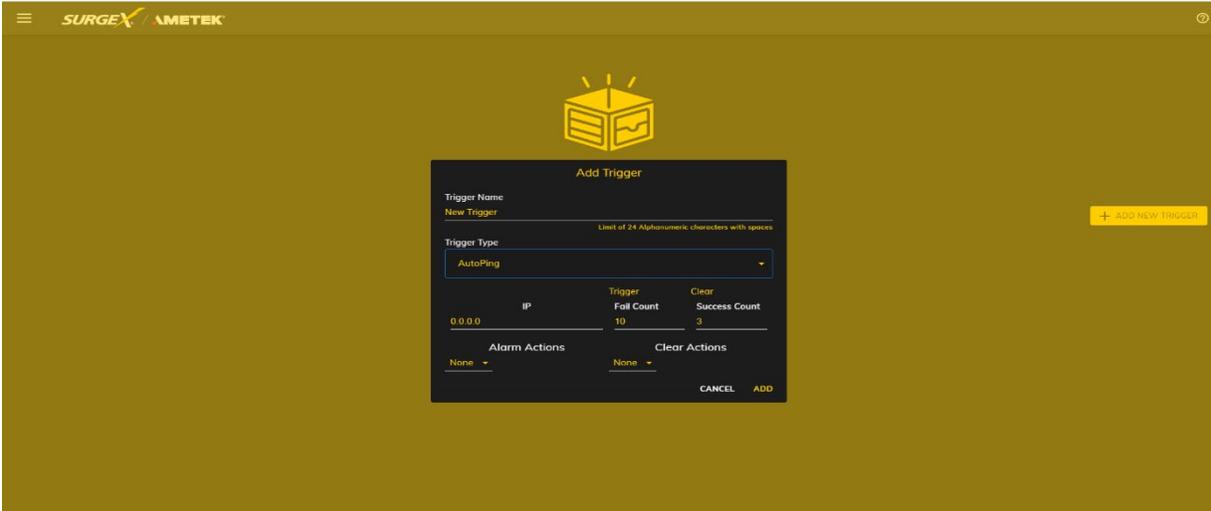
The Threshold with Samples trigger uses several measurements to decide when to act. The trigger can be configured to act quickly, or slowly, depending on the number of measurement samples used. A new sample is available every 50ms, with the minimum samples being used for a trigger being 1 sample, and the maximum being 20 samples. Threshold with Samples triggers are evaluated every time a new sample is available. Based on the below “New Trigger” example below, the trigger will alarm or turn on after 5 of any consecutive 10 samples are above 140V.



Item	Options	Description
Trigger Properties	Line Voltage	Uses the Line to Neutral voltage measurement. Measurement accuracy is between 90 VAC and 300 VAC.
	N-G Voltage	Uses the Neutral to Ground voltage measurement. Measurement accuracy is between 0.6 VAC to 300 VAC.
	Current	Uses the current measurement, which includes total product current. Measurement accuracy is between 0.1 A and 20 A.
	Temperature	Uses the internal temperature measurement. This should not be treated as an ambient temperature and will vary drastically based on loading.
	Frequency	Uses the frequency measurement. Measurement accuracy is between 45 Hz and 65 Hz.
	Average Power	Uses the average power measurement. Measurement accuracy is between 12 W and 6000W.
	Crest Factor	Uses the Line to Neutral Voltage Crest Factor.
	Power Factor	Uses the Power Factor.
Operator	>	Requires "For" number of measurements to be greater than the threshold.
	<	Requires "For" number of measurements to be less than the threshold.
	=	Requires "For" number of measurements to be exactly equal to the threshold.
Threshold	Numerical Range	Is the number to be evaluated against all measurements to either trigger or clear the Trigger.
For	1- 20	The number of measurements out of the given number of samples being evaluated that must meet the criteria to trigger or clear the Trigger.
Out Of	1-20	The number of consecutive measurements to be evaluated to trigger or clear the Trigger.

### 4.4.4.2 Autoping

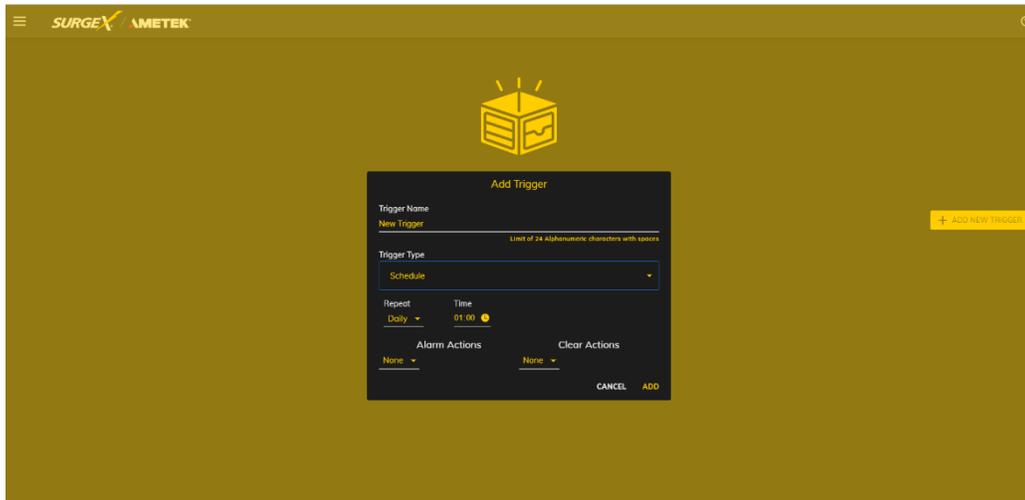
The Autoping trigger uses a ping command on a periodic basis defined in the device settings to test if a specific IP address will respond. This trigger type is useful if there is a problematic piece of equipment that becomes unresponsive, or if internet connectivity is inconsistent.



Item	Description
IP	IP address to be pinged at the period set on the device configuration page.
Fail Count	Number of consecutive failed ping responses needed to trigger the Auto Ping trigger.
Success Count	Number of consecutive successful ping responses needed to clear the Auto Ping trigger.

### 5.4.4.3 Schedule

The Schedule trigger uses the internal time of the Squid to easily configure single and recurring events based on time. Only Alarm Actions are used for this trigger.



Item	Options	Description
Repeat	Never	The trigger will only fire when the time reaches the time shown in the configuration the next time.
	One Time	The trigger will only fire once, on the specific date and time shown in the configuration.
	Daily	The trigger will fire every day at the given time.
	Weekly	The trigger will fire every week on the selected day (s) at the given time.
	Monthly	The trigger will fire every month on the given day of the month at the given time.
	Annually	The trigger will fire every year on the given day of the given month at the given time.
Date	Date Picker	A specific date to be used in the One-Time trigger.
Days	Sunday-Saturday	A set of day (s) that can be selected for use in the Weekly trigger.
Day	1-31	A day of the month to be used in the Monthly or Annually trigger.
Month	January - December	A month of the year to be used in the Annually trigger.
Time	12:00 AM-11:59 PM	A given time to be used in all scheduling triggers.

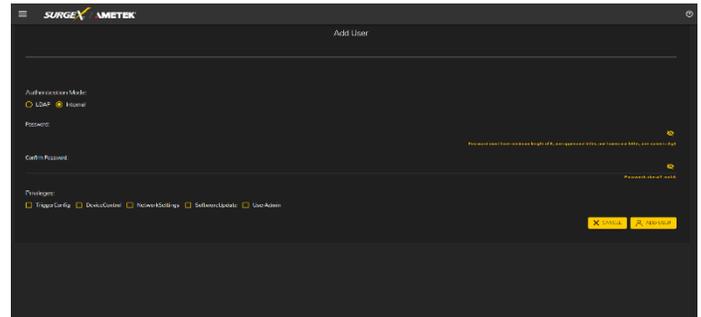
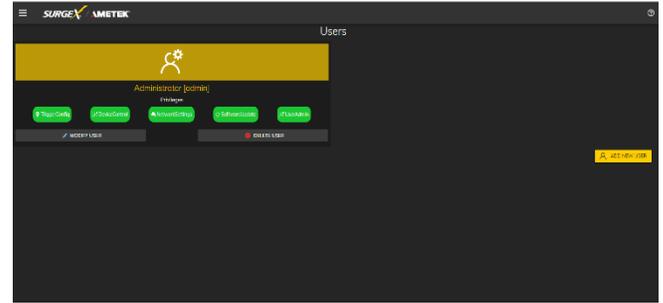
### 4.4.5 Users Setup

The Users Setup page allows for the creation, deletion, and editing of user accounts. Each user will have a unique name, username, authentication mode, and may be assigned access to specific features.

LDAP and Internal authentication modes are supported.

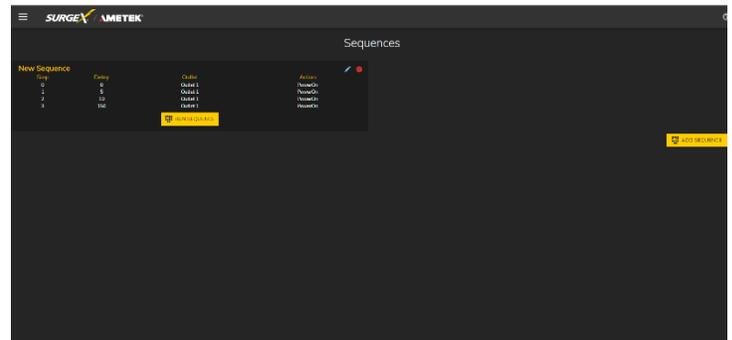
The following privileges may be assigned or revoked as necessary:

- Trigger Config
- Device Control
- Network Settings
- Software Update
- User Administration



### 4.4.6 Sequences Setup

The Sequences Setup page allows for the creation and modification of sequences. A sequence is a set of actions to be taken in a specific order, and with a specified delay time between each step. Using sequences avoids manually performing each action, or turning each outlet on or off, individually.



A sequence, as defined for this product, is purely a one-way sequence. That is, you do not use the same sequence to turn outlets on as you use to turn the same outlets off in reverse order. One sequence must be created for the turn-on function, and then a second sequence must be created for the turn-off function.

To create a new sequence, press the “Add Sequence” button. The new sequence must be given a unique name. This name should clearly indicate what the sequence will do, such as “All On”, “All Off” or “Stage Equipment On”.

To run a sequence to test it, press “Run Sequence”. To edit an existing sequence, press the pencil icon. To delete a sequence, press the minus “-” icon.

After a sequence has been saved, it will be available at the Sequences page, and when creating or editing a trigger when run sequence is selected as an action.

*\*Time delay is specified from the previous sequence item, not from the initial starting point. For example, creating a sequence with “Step 1, 1 second, Outlet 1, On” and “Step 2, 1 second, Outlet 2, On” will turn on Outlet 1 after 1 second, and Outlet 2 on 1 second after Outlet 1 has turned on. This sequence will not turn on both Outlets 1 and 2 at the same time.*

Sequence Actions:

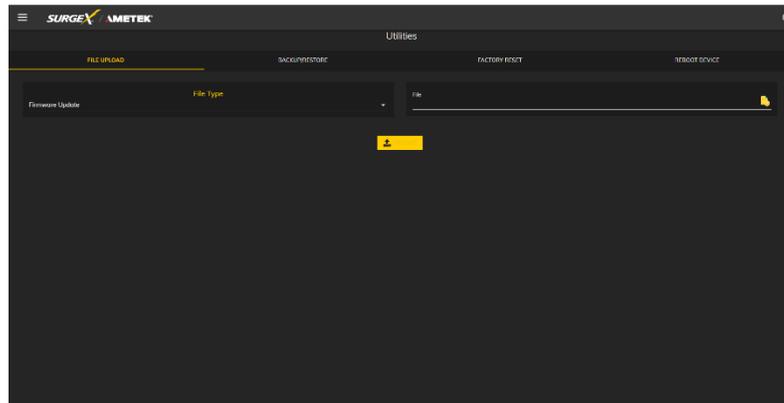
- None (useful for additional time delays)
- State Change
  - On, Off, or Reboot.

## 4.5 Utilities

V Series contains several utilities to ease the configuration and deployment that may be performed on a per unit basis through several web pages.

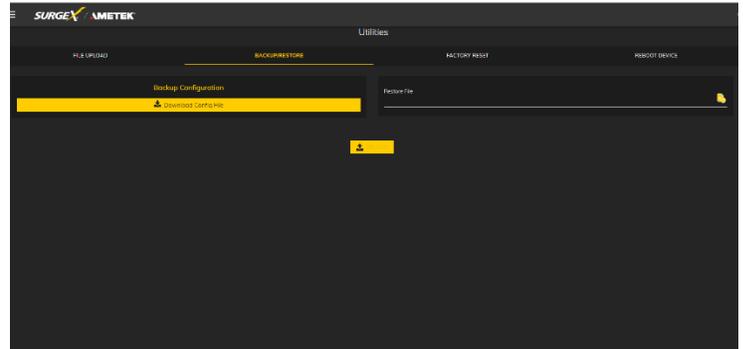
### 4.5.1 File Upload

V Series allows for a variety of files to be uploaded. This is also the method for upgrading the firmware. Current firmware versions can be obtained from the SurgeX website. V Series will not automatically contact SurgeX servers for new firmware. Other files that can be uploaded include a variety of certificates and configurations. By default, V Series ships with a self-signed HTTPS certificate if HTTPS is enabled. A different certificate can be uploaded for use by the HTTPS server by selecting “HTTPS SSL Certificate” under the File type drop down.



### 4.5.2 Backup/Restore

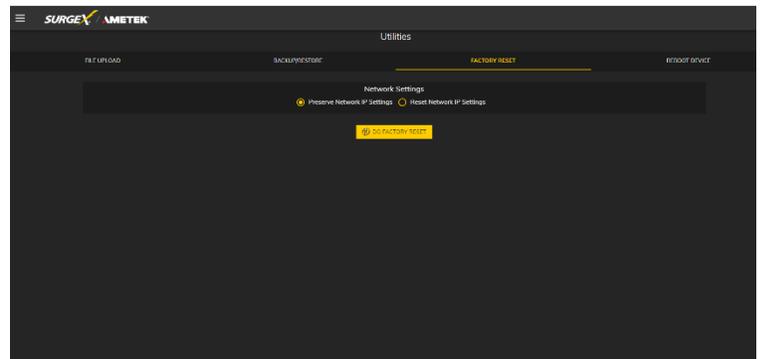
The current configuration may be saved to a file and downloaded for archival. Previously stored configurations may be applied to other units to easily mass configure a larger deployment. IP Settings will not be saved in the Backup Configuration.



### 4.5.3 Factory Reset

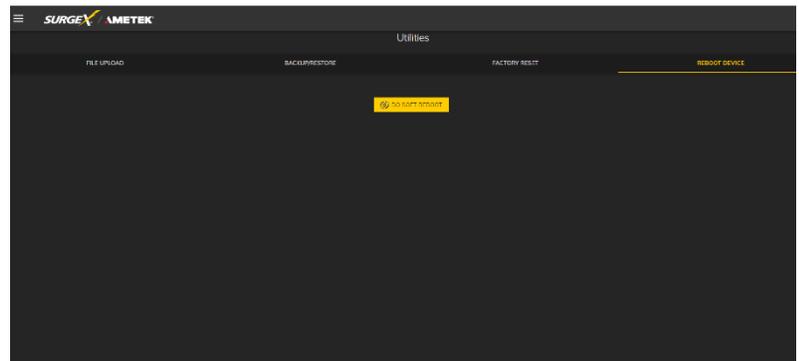
Factory default settings may be applied through the web interface.

- Option to keep or reset network IP settings. - Web Server settings will be reset. A custom port number will be reset to 80, and SSL will be disabled by default.



### 4.5.4 Soft Reboot

Adds the ability to reboot the V Series processor. A soft reboot will not change the outlet state or disconnect power from connected equipment. This request will add a message in the event log "Rebooting Adapter Due to User Request".



## 5. Security

V Series has been designed with security as a priority. All ports and features may be changed or disabled.

### 5.1 Authentication

V Series supports basic and secure authentication for users and network connections.

#### 5.1.1 802.1X

802.1X network authentication may be enabled for networks requiring supplicant authentication.

#### 5.1.2 SSO (Single Sign-On)

V Series users may be configured to use either Internal or SSO (Single Sign-On) authentication. Internal authentication uses basic usernames and passwords assigned by the administrator on a per-unit basis. SSO authentication uses LDAP (Lightweight Directory Access Protocol) to authorize users, and determine their level of privileges, using Microsoft® Active Directory. While it is possible to use LDAP to authorize users without SSL encryption, we suggest only configuring the connection to the authentication server using SSL encryption to plain text network traffic.

## 5.2 Interfaces

### 5.2.1 Network Interface

- **Web Server:** It is possible to enable and disable the internal web server, change the security from none (HTTP) to TLS 1.2 (HTTPS), as well as change its port. These settings also apply to the REST API.
- **SNMP:** Squid supports SNMP V3 for secure communications, with the ability to enable and disable.

## 6. Application Programming Interfaces (APIs)

V Series is designed for flexible communication and integration with diverse control and monitoring platforms.

### 6.1 HTTP/HTTPS REST

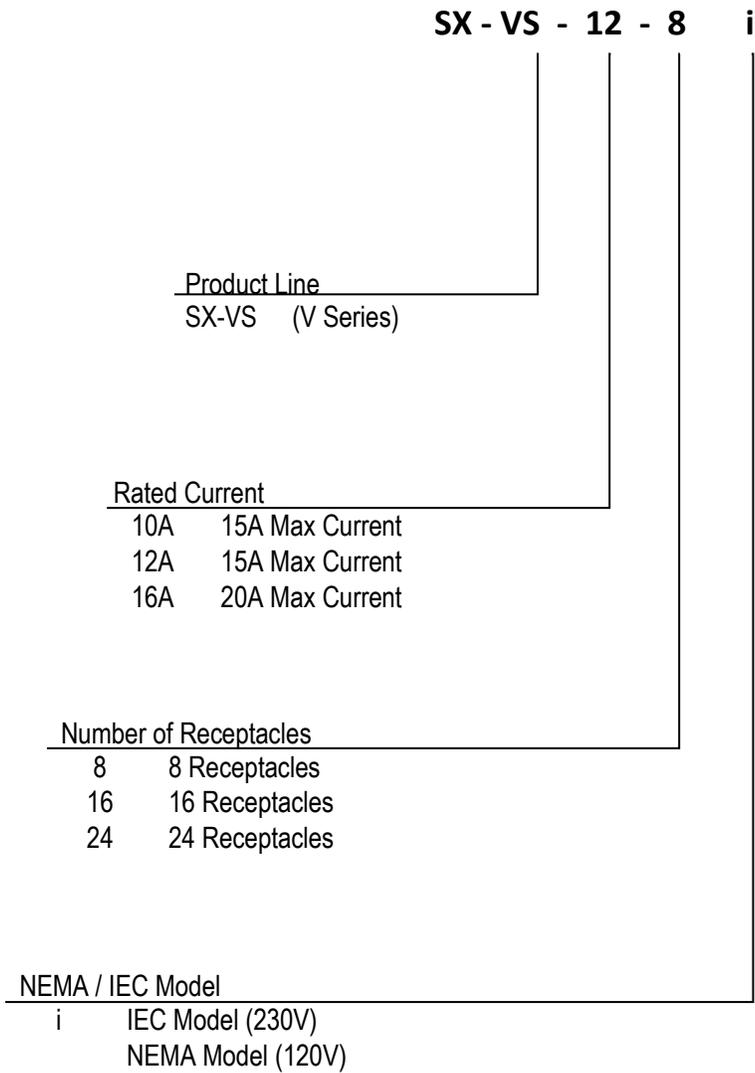
V Series includes an extensive HTTP API (HTTPS when security is enabled) in JSON format. Full protocol details are available at <https://www.ametekesp.com>.

### 6.2 Interfaces

SNMP V3 communications are intended to provide essential items for management. Read, Write, Table, and Trap objects will be included. Full protocol details, and the SNMP MIB, are available at <https://www.ametekesp.com>.

## 7. Part Numbers

### 7.1 Part Number Scheme



## 8. Troubleshooting

- 1) Checking for power input issues -
  - a) Verify if the power source is functioning correctly and ensure that all connections are secure.
  - b) Verify the circuit breaker.
  - c) Verify the incoming line cord to the device is accidentally disconnected or if the mains plug is pulled out from the wall receptacle.
- 2) Diagnosing overloading issues - Check if the device is being overloaded by too many connected devices or if there is a problem with the power distribution unit. Please refer to the Overload current specification table.

Rated Current	Maximum Current
10A	15A
12A	15A
16A	20A

- 3) Inspecting for physical damage - Check for any signs of physical damage, such as bent pins, frayed cords, or broken components.
- 4) Testing voltage levels - Verify that the voltage levels are within the appropriate range for the specific device and check for any voltage fluctuations or spikes. Improper mains voltage a to the device may result in fire.
- 5) Checking for firmware or software issues - Ensure that the firmware or software of the device is up-to-date and functioning correctly.
- 6) Investigating environmental factors - Check for any environmental factors that may be affecting the device, such as extreme temperature or humidity.
- 7) Replacing a component or subsystem in the device without a trained technician may lead to device malfunctionn.
- 8) Contacting customer support - If the above troubleshooting methods do not resolve the issue, the user may be advised to contact customer support for further assistance.

## 9. Specifications

Parameter		Item Number					
		SX-VS-128	SX-VS-1216	SX-VS-1624	SX-VS-108i	SX-VS-1016i	SX-VS-1624i
<b>AC Load Rating</b>		12A @ 120V	12A @ 120V	16A @ 120V	10A @ 240V	10A @ 240V	16A @ 240V
<b>No of Outlets</b>		8	16	24	8	16	24
<b>Measurement Accuracy</b>	Voltage	± 2%					
	Current	± 5%					
	Power	± 5%					
	Energy	± 5%					
<b>Timestamp Accuracy</b>		± 1%					
<b>Network Port</b>		10/100 Ethernet connection on Female RJ-45, Auto Negotiating with 10/100 network connections with Link and Activity LEDs					
		USB RNDIS Device on micro-AB					
<b>Weight</b>		9.0Lbs/4.1Kg	14.1Lbs/6.4Kg	17.8Lbs/8.1Kg	9.0Lbs/4.1Kg	13.9Lbs/6.4Kg	17.6Lbs/8.0Kg
<b>Dimensions (Enclosure)</b>	Length:	23.62"/600mm	42.52"/1080mm	59.06"/1500mm	23.62"/600mm	42.52"/1080mm	59.06"/1500mm
	Width:	2.76"/70.1mm	2.76"/70.1mm	2.76"/70.1mm	2.76"/70.1mm	2.76"/70.1mm	2.76"/70.1mm
	Depth	2.6"/66mm	2.6"/66mm	2.6"/66mm	2.6"/66mm	2.6"/66mm	2.6"/66mm
<b>Temperature Range: 100% Load</b>		0 to 45 °C (32 - 113 °F)					
<b>Humidity Range</b>		5% to 95% R.H. Non-condensing					
<b>Altitude</b>		0 - 10000ft (0 - 3048meters)					
<b>Agency Listings</b>	Safety	<ul style="list-style-type: none"> <li>• UL 62368-1, 2nd Ed, 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements)</li> <li>• CAN/CSA C22.2 No</li> <li>• RoHS: Compliant</li> <li>• Prop 65</li> </ul>			<ul style="list-style-type: none"> <li>• UL 62368-1-14, 2nd Ed, Issued: 2014-12-01 (Audio/video, information and communication technology equipment Part 1: Safety requirements) National Differences specified in the CB Test Report.</li> <li>• CE Mark</li> <li>• UKCA Mark</li> <li>• WEEE</li> <li>• RoHS: Compliant</li> <li>• REACH: Compliant</li> </ul>		
	EMC	<ul style="list-style-type: none"> <li>• EN 55024:2010</li> <li>• EN 55032:2015 + AC:2016</li> <li>• EN 61000-3-2:2014</li> <li>• EN 61000-3-3:2013</li> <li>• FCC 47 CFR PART 15 SUBPART B:2020</li> <li>• ICES-003 ISSUE 6:2016-01 Updated 2019-04</li> </ul>					
<b>IP protection class</b>		IPX0					
<b>AC Power System Type</b>		TN					
<b>Pollution Rating</b>		Pollution degree (PD) PD 2					