SURGEX / AMETEK®

AXESS ELITE+

Switched IP-Controllable Surge Protected PDU

USER MANUAL

SX-AEP-159

SX-AEP-209

SX-AEP-1011i

SX-AEP-1611i

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AMETEK®

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DEFENDER SERIES®	ESP®	MULTIPAK®	REMOTE PORTAL®	
DIGITAL QC®	FLATPAK™	MULTI-STAGE®	SERIES MODE®	

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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European Patent Nos.: EP2469554; EP2482085; EP2512092; EP2555004; EP2680014; EP3021441: EP3062409

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1. Introduction

The SurgeX Axess ELITE+ is an AC power distribution unit with power conditioning, control, and monitoring with independently IP switchable AC receptacles and current monitoring for individual outlet. Designed for mounting on the rack with supplied mounting brackets or sitting on a counter with supplied rubber feet. The internal web server provides configuration, output control, monitoring, Individual output current monitoring and retrieval of data logs. Multiple security and communication interface options are supported.

Axess ELITE+ incorporates SurgeX's patented technology, Advanced Series Mode® surge suppression and EMI/RFI filtering technology. This protection safeguards the AC outlets. It also provides Inrush Current Elimination circuitry (on receptacles 1 and 2).

Two Auxiliary Relay outputs are provided for simple control of other equipment. Connection terminals are provided for each relay's Common, Normally Open, and Normally Closed connections.

The extensive programming capabilities of the Axess ELITE+ 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 AutoPing. 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 series of pings.

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

- Line Voltage
- Neutral-Ground Voltage
- Each Outlet Current
- Each Outlet Power
- Line Frequency
- Each outlet Power Factor
- Crest Factor
- Each Outlet Energy

1.2 Physical Interfaces

MODEL	OUTPUT	INPUT	COMMUNICATION	RESETTABLE FUSE
SX-AEP-159	(9) NEMA 5-15R	(1) NEMA 5-15P	(1) RJ-45 (1) USB-Micro AB (1) Serial Port (1) Contact Closure	(1) Push Button
SX- AEP -209	(7) NEMA 5-15R, (2) NEMA 5-20R	(1) NEMA 5-20P	(1) RJ-45 (1) USB-Micro AB (1) Serial Port (1) Contact Closure	(1) Push Button
SX- AEP -1011i	(11) IEC 13	(1) IEC C14	(1) RJ-45 (1) USB-Micro AB (1) Serial Port (1) Contact Closure	(1) Push Button
SX- AEP -1611i	(11) IEC 13	(1) IEC C20	(1) RJ-45 (1) USB-Micro AB (1) Serial Port (1) Contact Closure	(1) Push Button

1.3 Rating

MODEL	OUTLET DETAILS	RATED INPUT VOLTAGE	RATED INPUT CURRENT	FREQUENCY
SX-AEP-159	9 Outlets / 5-15R	120V AC	12 A	50/60 Hz
SX-AEP-209	2 Outlets / 5-20R 7 Outlets / 5-15R	120V AC	16 A	50/60 Hz
SX-AEP-1011i	11 Outlets / IEC C13	240V AC	10 A	50/60 Hz
SX-AEP-1611i	11 Outlets / IEC C13	240V AC	16 A	50/60 Hz

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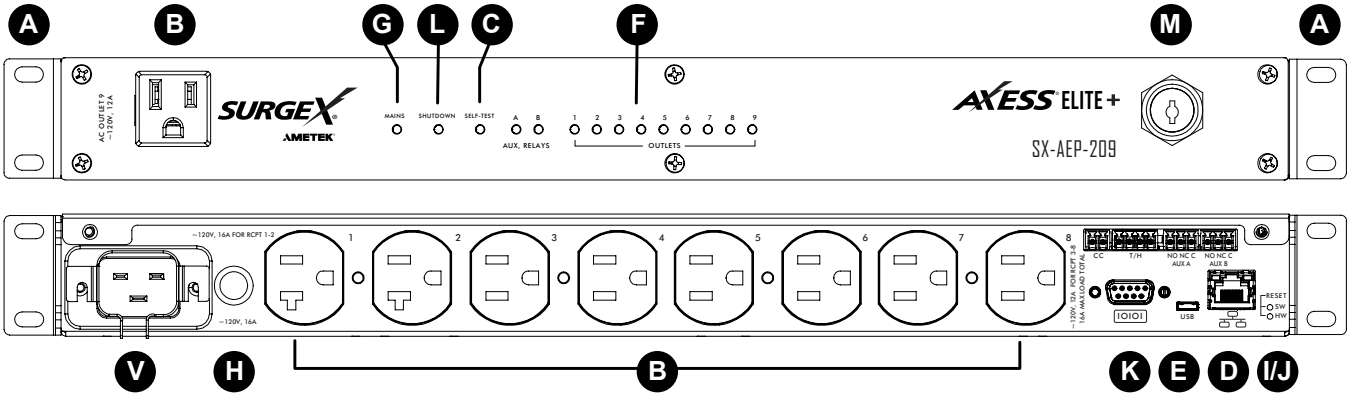
2. Installation and Components



Axess ELITE+ is designed to be installed horizontally on the equipment rack or placed on a flat surface. The supplied nuts, bolts and washers must be used to mount the Axess ELITE+ to the rack through the mounting holes **(A)** following the appropriate local regulations and requirements. If the Axess ELITE+ is used outside of a rack, attach the supplied rubber feet.

2.1 AC Power: Output

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

Connect power to the Axess ELITE+ using an appropriately rated 3 wire grounding type power cord provided with the equipment in inlet **(V)**. 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 and Account Admin Password

The RJ-45 connector for Ethernet **(D)** is situated on the back panel. The default IP Address is DHCP assigned. To find IP address of the device, please use the discovery tool at ametekesp.com. The mDNS protocol is supported for dynamic device discovery.

The default login credentials are:

Username: **admin**

Default password: **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 diagnostics and troubleshooting IP connectivity issues. To use, please use the discovery tool at ametekesp.com or manually enter the static IP address http://169.254.10.100 into a supported browser. The web server will always be accessible at http://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 Connect Serial Port (Optional)

The Axess ELITE+ has a 9 pin D subminiature connector **(K)** for RS- 232 serial control. The connector is configured as DCE for direct connection to a laptop or other terminal device. Default serial parameters are 115200 bps, 8 data, no parity, 1 stop bit (115200,8, n,1).

2.6 Connect Contact Closure Input (Optional)

Connect contact closure control input to the 2 pins of the first terminal block as shown in section 2.9. Relays, switches, and push buttons are all suitable input types. The wire size can range from 18 AWG to 22 AWG.

2.7 Connect Temperature / Humidity Sensor (Optional)

The Axess ELITE+ comes with external Temperature and Humidity sensor (Part No. SEN0385) for monitoring external environmental conditions. This sensor can be connected via the green Phoenix Connectors on the device. Connect red wire to pin 1, SDA (Green/Blue) to pin 2, SCL (Yellow/White) to pin 3 and black wire to pin 4 of the second terminal block as shown in the below wire connection section 2.9. Real-time external temperature and humidity values are displayed in the system info (section 4.9). The temperature data can be utilized to set triggers and actions (section 4.6.6). However, humidity values cannot be used as input for triggers. Additionally, these values are not stored or displayed as historical data; only real-time values are made visible in the system info page.

2.8 Connect Auxiliary Relay Outputs (Optional):

Two auxiliary relay outputs are provided at the third (Aux Relay A) and fourth (Aux Relay B) terminal blocks as shown in section 2.9. Access to the Common, Normally Open, and Normally Closed positions is provided for each relay. The wire size can range from 18 AWG to 22 AWG.

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2.9 Wiring details:

Contact Closure		Temperature/Humidity				Auxiliary Relay A			Auxiliary Relay B		
CC1	CC2	+5V	SDA	SCK	GND	NO	NC	COM	NO	NC	COM

2.10 LED Indicators:

The receptacles have individual power indicator LEDs **(F)**. This are paralleled in the control interface. In addition, the unit has an LED indicating power **(G)**, Shut down is indicated by **(L)** and Self -Test is indicated by **(C)**.

Mains	Shutdown	Self-Test	A	B	1	2	3	4	5	6	7	8	9	10	11

LED INDICATORS		
Indicator	**Colour**	**Description**
Mains	Red	When illuminated, the Axess Elite is connected to a live wall or floor outlet.
Shutdown	Amber	When illuminated, the Axess Elite is in shutdown mode due to out of range line voltage, current, or temperature.
Self-Test	Green	When illuminated, the surge suppression circuitry is functioning correctly.
Aux Relays	Green	When illuminated, the corresponding auxiliary relay is latched.
Outlets	Green	When illuminated, the corresponding AC outlet is on.

2.11 Buttons

2.11.1 Resettable Fuse

The resettable fuse **(H)** is used to reset the Axess ELITE+ 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.

2.11.2 Hardware Reset

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.

2.11.3 Software Reset

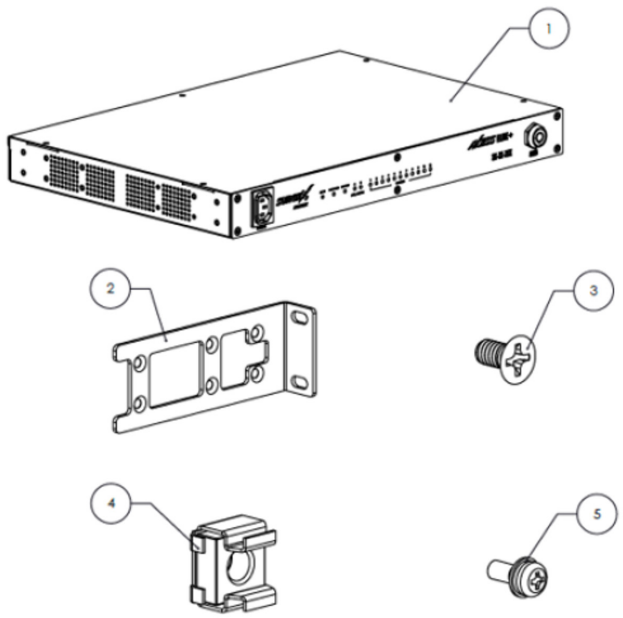
Software Reset **(J)**: The Software Reset button is a multi-functional control depending on length of press. If the button is held for longer than 10 seconds, the unit resets itself to factory defaults, and all custom configurations are erased. If the button is held for less than 10 seconds, the unit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

2.11.4 Front Key Switch

Front key Switch **(M)**: The front key switch is used to turn the unit on and off. Use the provided key, which comes in the box, to turn the switch to the right (clockwise) to switch the unit on, and to the left (anticlockwise) to switch it off. The key can be removed from the unit in both the on and off positions. Make sure to store the key safely in a secure place when not in use to prevent loss or damage. The front key switch shall be only for the SX-AEP-159 and SX-AEP-209 models.

3. Rack Installation

Axess ELITE+ is designed to be installed horizontally in the equipment rack. The supplied nuts, bolts and washers must be used to mount the Axess ELITE+ to the rack through the mounting holes **(A)** following the appropriate local regulations and requirements.



Inventory

Sl. No	Items	Qty
1	Axess ELITE+ Unit	1
2	Ear Mount Bracket	2
3	Flat Head Screws	8
4	Cage Nut	4
5	Pan Head Screws	4

⚠ DANGER ⚠

HAZARD OF ELECTICAL SHOCK, EXPLOSION, OR ARC FLASH

- This Unit is intended to use indoor only.
- Do not install this Unit where excessive moisture or heat is present.
- Never install any wiring, equipment, or Units during a lightning storm.
- Plug this Unit into a three-wire, grounded power outlet only. The power outlet must be connected to appropriate branch circuit/mains protection (fuse or circuit breaker). Connection to other type of power outlet may result in a shock hazard.
- Install the unit in such a way that the Wall socket-outlet should be readily accessible.
- Use only the supplied brackets for mounting and use only the supplied hardware to attach the mounting brackets
- Do not use extension cords or adapters with this Unit
- If a socket-outlet is not accessible to the equipment, a socket-outlet shall be installed.
- Do not work alone under hazardous conditions.
- Check that the power cord, plug, and socket are in good condition.
- Disconnect the Unit from the power outlet before you install or connect equipment to reduce the risk of electric shock when you cannot verify grounding. Reconnect the Surge Unit to the power outlet only after you make all connections
- Unit installation instructions that require verification of the Protective earthing connection of the socket-outlet by a Skilled person.
- This equipment is not suitable for use in locations where children are likely to be present.
- Use a protective earth connector with equipment. This type of connector carries the leakage current from the load devices (computer equipment).
- Do not exceed a total leakage current of 3.5 mA
- Do not handle any kind of metallic connector before the power has been removed
- Use one hand, whenever possible, to connect or disconnect signal cables to avoid a possible shock from touching two surfaces with different grounds.
- This unit does not have any user-serviceable parts. Repairs are to be performed only by factory-trained service personnel.
- The Unit is intended to be installed and operated by a skilled person in as controlled location with restricted access.
- The ambient operating temperature of a closed or multi-unit rack environment may be greater than the ambient temperature of the room. Ensure the ambient operating temperature of your rack environment does not exceed the rated ambient operating temperature for the device.
- Ensure the Unit is mounted securely and evenly.
- To avoid possible electrical shock and equipment damage, Use only the supplied hardware.

Failure to follow these instructions will result in death or serious injury

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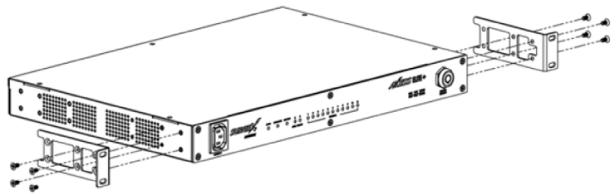
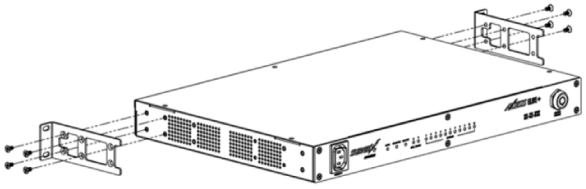
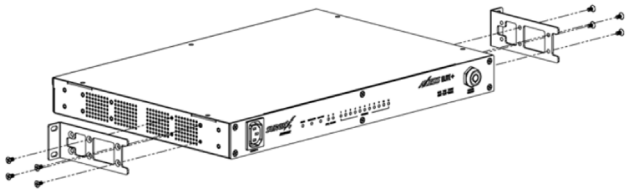
3.1 Rack Mounting Options



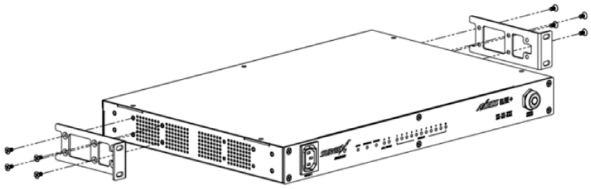
Option 1: Mounting Ear Mount Bracket at Front
Secure Ear Mount Brackets to the Unit using eight Flat head screws



Option 2: Mounting Ear Mount Bracket at Rear
Secure Ear Mount Brackets to the Unit using eight Flat head screws



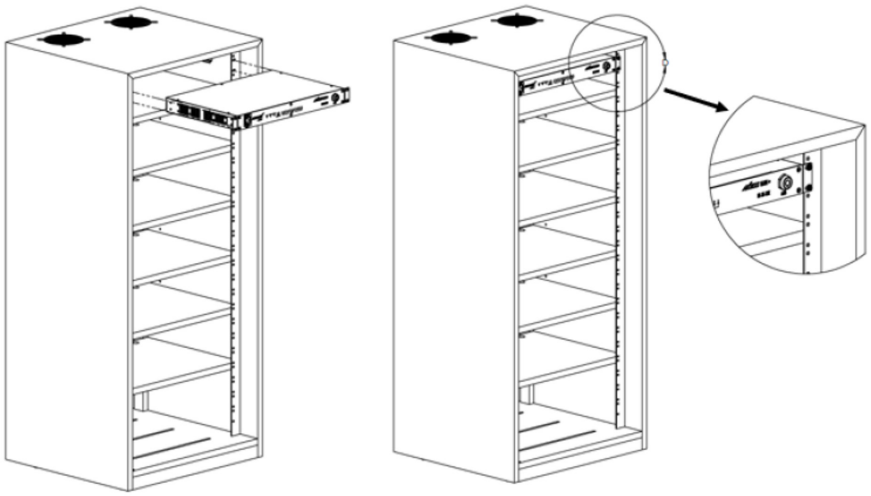
Option 3: Mounting Ear Mount Bracket at the Center
Secure Ear Mount Brackets to the Unit using eight Flat head screws



Option 4: Mounting Ear Mount Bracket at the Center
Secure Ear Mount Brackets to the Unit using eight Flat head screws

3.2 Unit Installation into the Rack

Horizontal Mounting: Mount Unit on 19” rack holes provided in the channel and secure the Unit using four Pan head screws.

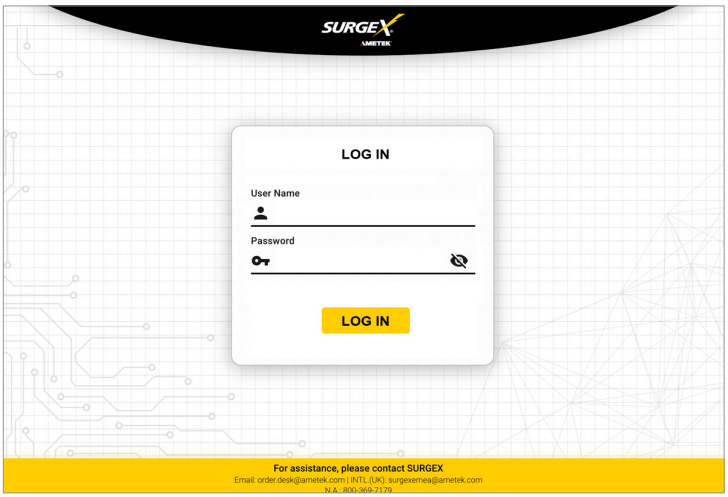


4. Web Server

Axess ELITE+'s 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 Axess ELITE+. Enter a valid username and password in the "Username" and "Password" fields, and press "Login" to log in.



4.2 Power Management

The Power Management page provides information and status for the Axess ELITE+ and individual outlets, as well as basic control of each outlet and auxiliary relay outputs. The top right section of the page provides system status. Contact Closure input status is displayed.

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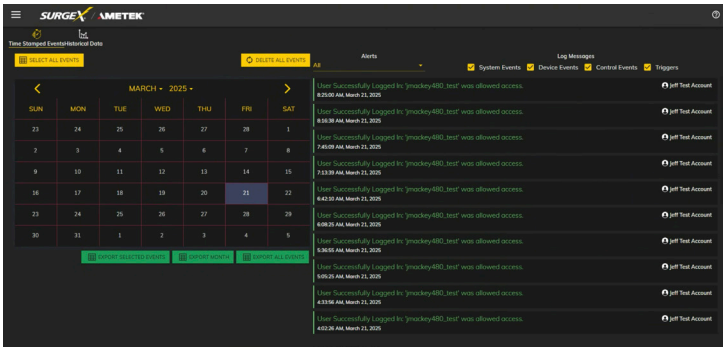
4.3 Reports



The Reports page displays data collected by the Axess ELITE+ 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. Axess ELITE+ 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

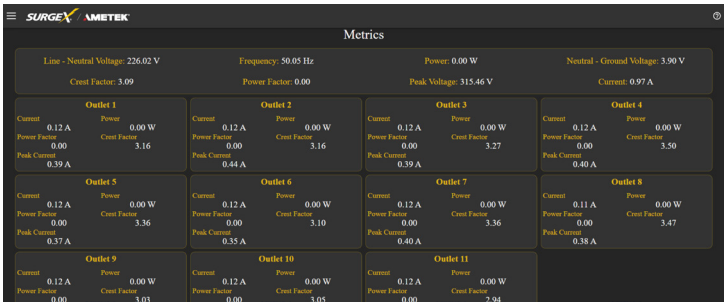
Historical Data is a record of measured electrical parameters and may be adjusted to sample certain items at specific intervals. The available parameters are:

HISTORICAL PARAMETERS		DESCRIPTION
Voltage	Line -Neutral	The measured voltagebetween the conductors during the measurement period.
	Neutral-Ground	
Voltage Neutral ground peak	Neutral-Ground Peak	The measured peak voltage between the conductors during the measurement period.
Total Current of all outlets	Total current	The measured total current of all the outlets during the measurement period.
Frequency	Frequency	The measured input frequency during the measurement period.
Power Factor of all Outlets	Power Factor	The measured power factor during the measurement period.

HISTORICAL PARAMETERS		DESCRIPTION
Total Energy of all Outlets	Total Energy	The measured energy of all outlets during the measurement period.
Internal Temperature		The measured Internal temperature during the measurement period.
Each Outlet Current	Each Outlet	The measured RMS current during the measurement period.
Each Outlet Active Power	Each Outlet	The measured active power during the measurement period.
Each Outlet Peak Current	Each Outlet	The measured peak current during the measurement period.
Each Outlet Power Factor	Each Outlet	The measured power factor during the measurement period.
Each Outlet Crest Factor	Each Outlet	The maximum crest factor calculated during the measurement period.

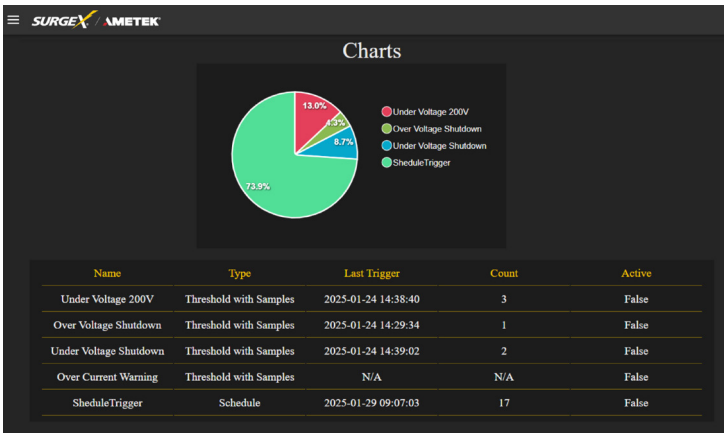
4.4 Power Monitoring

Power Monitoring page provides real-time data collected by the Axess ELITE+. It presents details regarding the total outlet power and the power distributed through each outlet. Key metrics displayed include Line-Neutral Voltage, Neutral-Ground Voltage, Current, Frequency, Power Consumption, Crest Factor, and Power Factor.



4.5 Chart

The Chart page provides a comprehensive log of all user-defined triggers activated by the Axess ELITE+. It includes detailed information such as the trigger name, type, last activation timestamp, activation count, and current status. Additionally, a pie chart offers a visual representation of the relative frequency of trigger activations, providing a clear comparison of trigger activity.



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4.6 Setup

Complete setup and configuration of Axess ELITE+ 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.

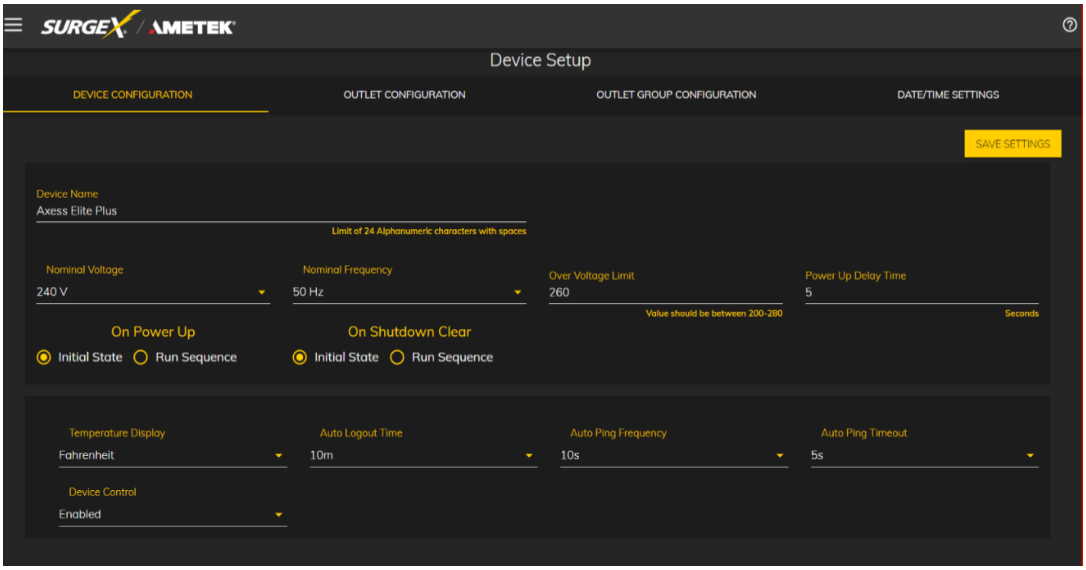
SETUP	
Setup Page	**Description**
DEVICE	Configure basic device parameters
Device Configuration	Configure settings for visual feedback and power up procedure
Outlet Configuration	Configure controllable outlet settings
Outlet Group Configuration	Create, Edit, or delete outlet groups
Date/ Time Settings	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
Syslog Settings	Configure Syslog server settings
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
Contact Closure (CC)	Configure triggers based on contact closure status
SEQUENCES	Create and modify custom Sequences

4.6.1 Device Setup

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

4.6.1.1 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 Axess ELITE+ 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.
Over Voltage Limit	Based on the type of device, the range of the over voltage limit can be adjusted.
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 Axess ELITE+ 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 Axess ELITE+ device will send pings to an IP Address or Hostname in an auto ping trigger.
Auto Ping Timeout	Specifies the amount of time the Axess ELITE+ device will wait for a ping response before calling the attempt a failure.
Device Control	Specifies if the user has permission to control device from cloud if it is enabled and vice versa if disabled.

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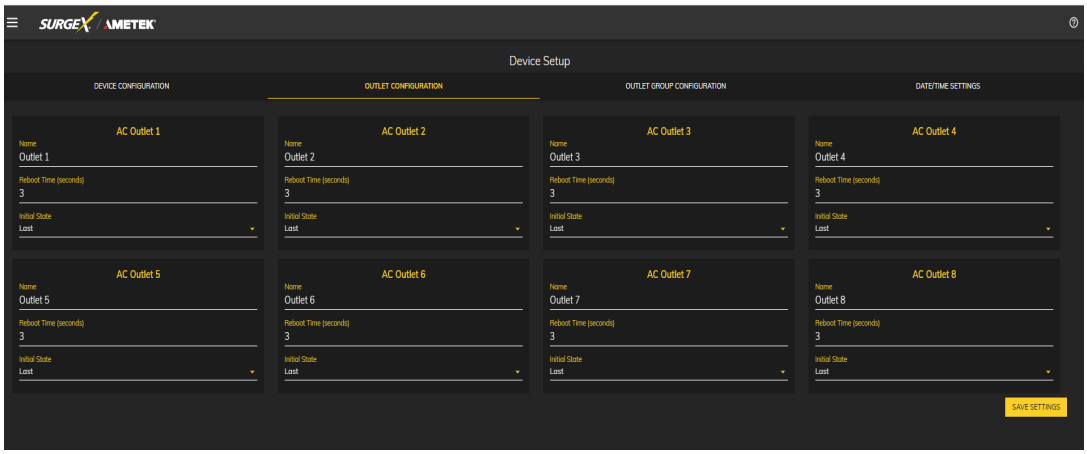
4.6.1.2 Outlet Configuration

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.

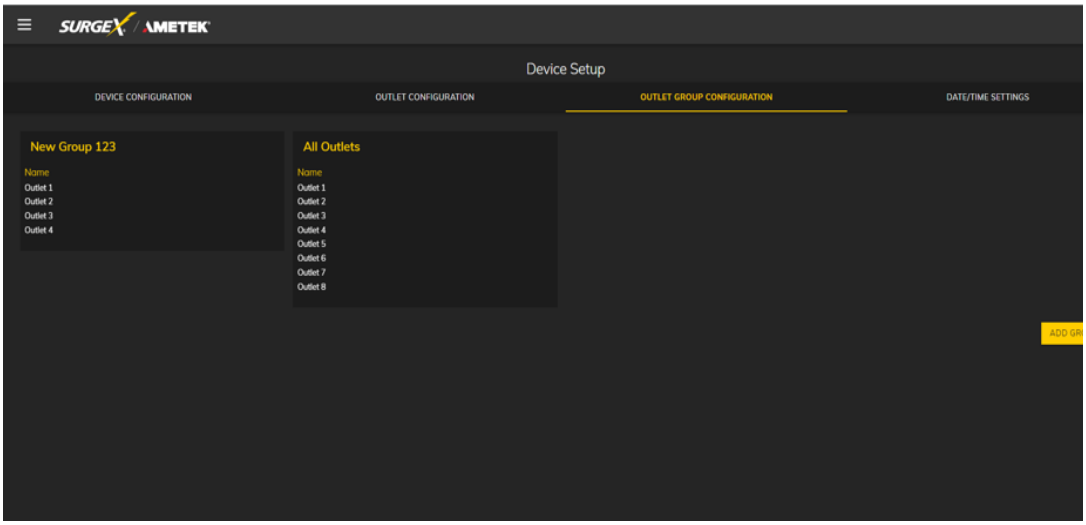


OUTLET CONFIGURATION		
Item	**Description**	
Outlet Description	A fixed short phrase that references a physical feature.	
Outlet Name	Specifies the name label to be associated with this Outlet	
Reboot Time	Number of seconds that the device will wait in between turning an outlet off and turning the outlet back on during a reboot command.	
Initial State	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:	
	Always On	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.
	Always Off	The opposite of Always On, this setting will never allow an outlet to pass power
	On	The outlet will start in an On state.
	Off	The outlet will start in an Off state.
	Last	The outlet will assume the last state it was in. (Factory Default
	Reboot Only	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.

4.6.1.3 Outlet Group Configuration

The outlets can be grouped under unique names as per the user requirements. User can modify/add/delete groups.

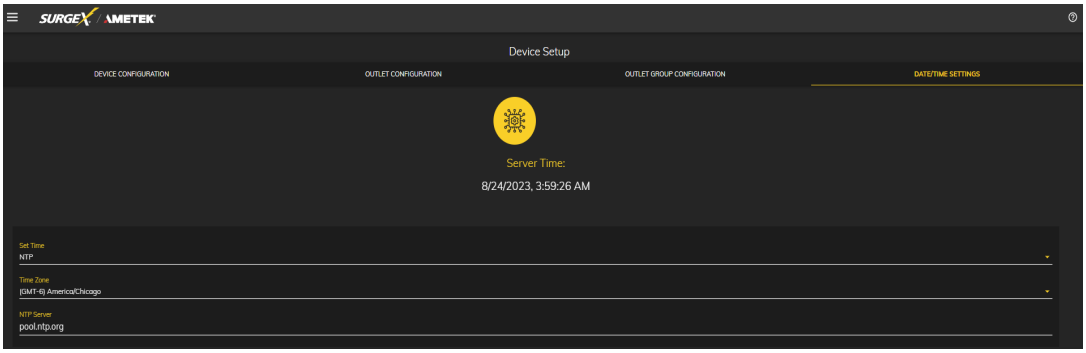
OUTLET GROUP CONFIGURATION	
Item	**Description**
Group Name	Specifies the name label to be associated with the outlet group.
Member Name	Specifies the outlet members of this outlet group.



4.6.1.4 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 Axess ELITE+ 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 Axess ELITE+ device.
NTP Server	Specifies the hostname or IP address of the NTP server to use for time synchronization.



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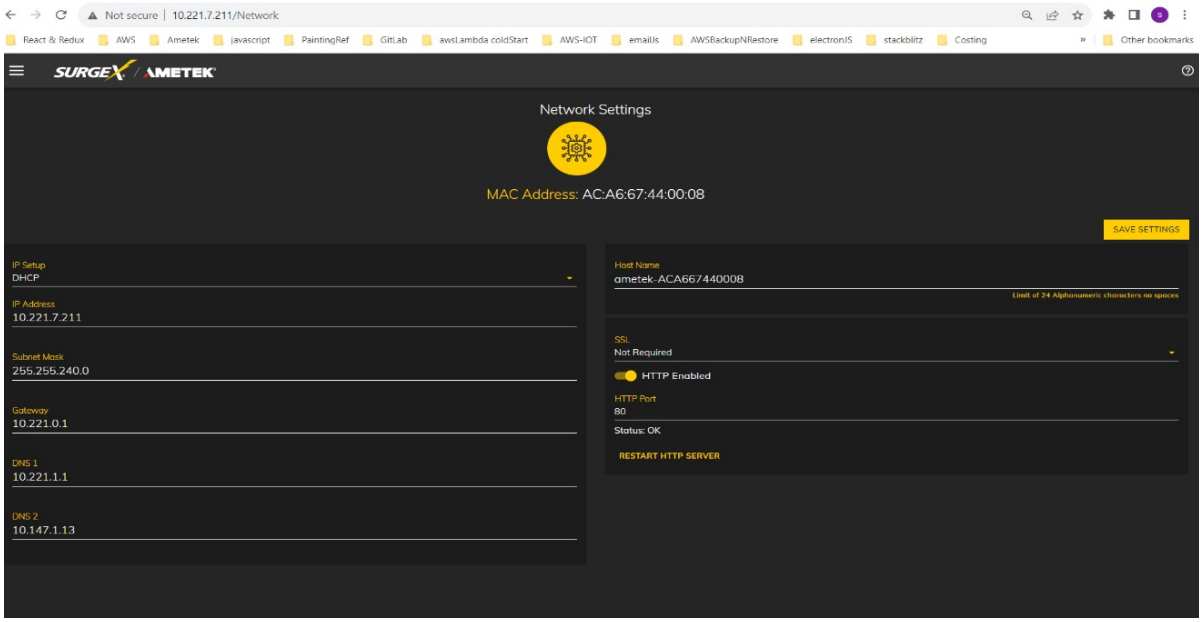
4.6.2 Network Setup

The Network Setup page allows for the specification of network settings, including the network interface.



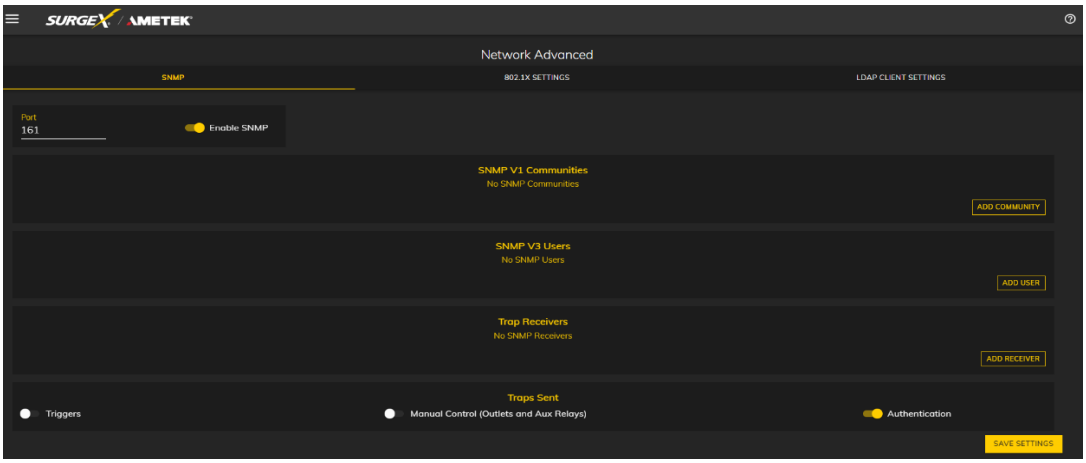
NETWORK CONFIGURATION	
Item	**Description**
IP Setup	Specifies if the device will have a static IP Address or will dynamically be assigned network settings through DHCP.
IP Address	Current IP Address of the network interface on the RJ-45 Ethernet port
Subnet Mask	Current Subnet Mask of the network interface on the RJ-45 Ethernet port.
Gateway	Current Gateway of the network interface on the RJ-45 Ethernet port
DNS 1	Current DNS1 of the network interface on the RJ-45 Ethernet port.
DNS 2	Current DNS2 of the network interface on the RJ-45 Ethernet port.
Host Name	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.

4.6.3 Network Advanced Setup

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

4.6.3.1 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.

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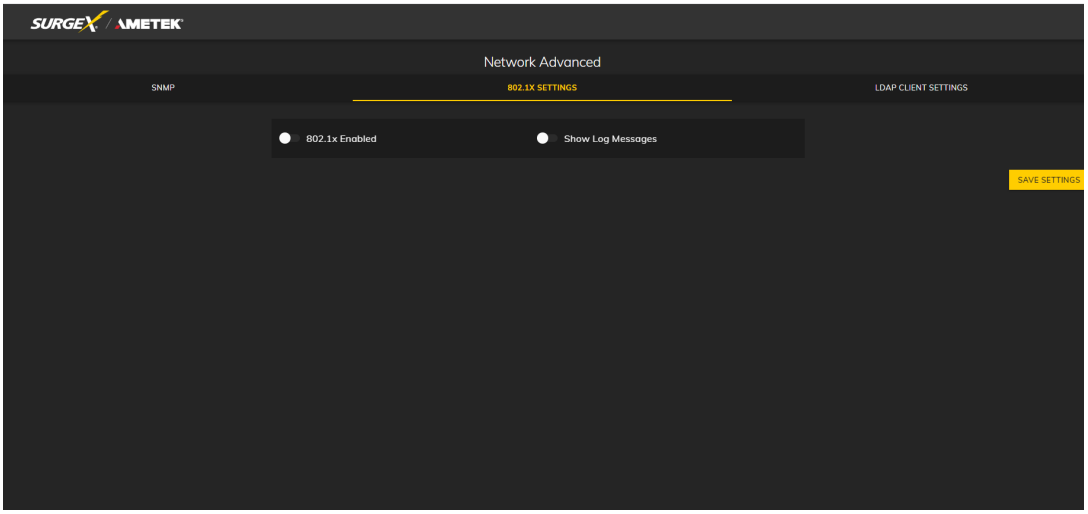
4.6.3.2 802.1X Settings

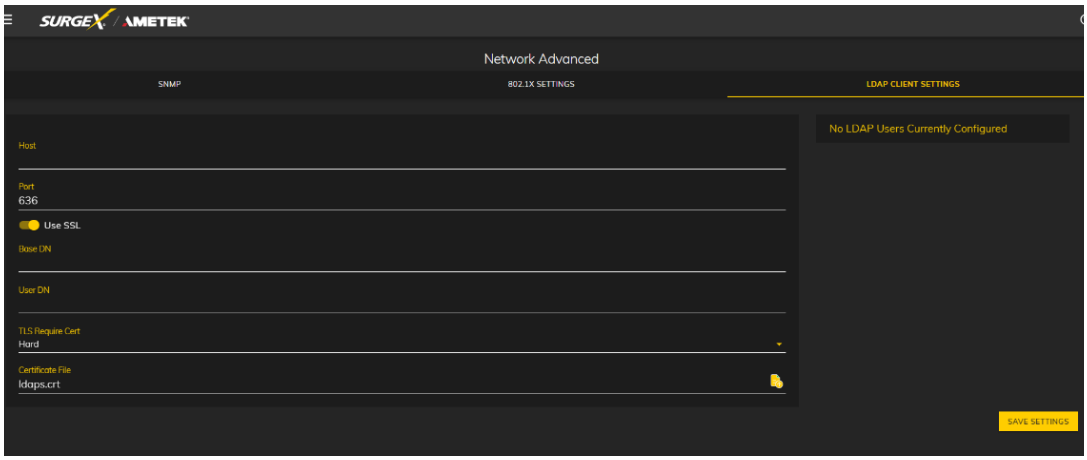
The 802.1X Settings tab allows for the specification of 802.1X authentication and debugging of errors as they may arise.



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 Axess Elite+ 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 negotiation. Different authentication options and settings will be displayed based on the selected Authentication Type.

4.6.3.3 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.

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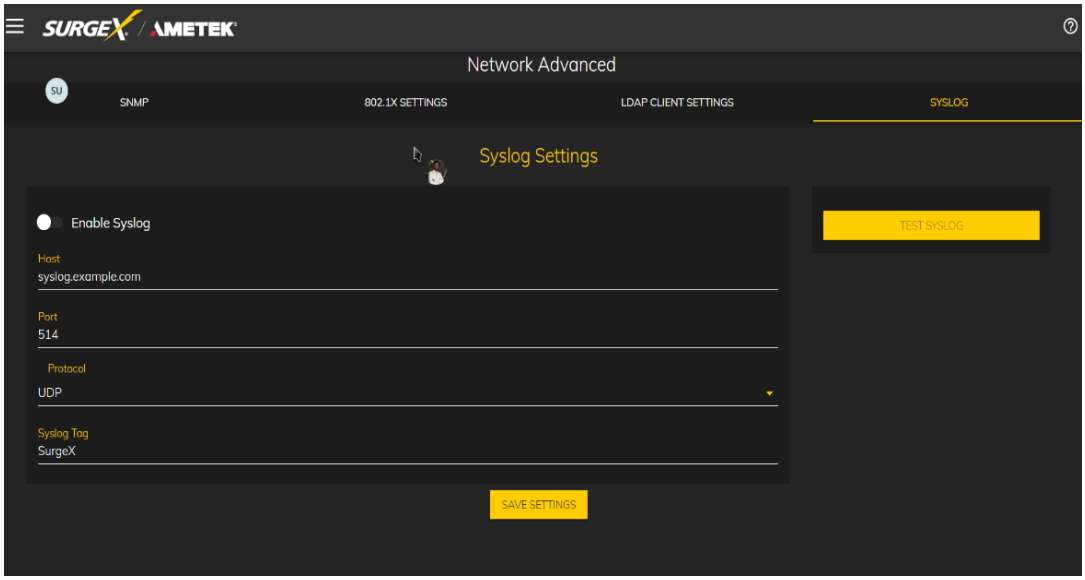
4.6.3.4 Syslog Settings

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



SYSLOG SETTINGS SETUP	
Item	**Description**
Host	The IP address or name of the Syslog server
Port	Listening port used by syslog server
Protocol	Supported protocol by syslog server
Syslog Tag	Required syslog tag can be given

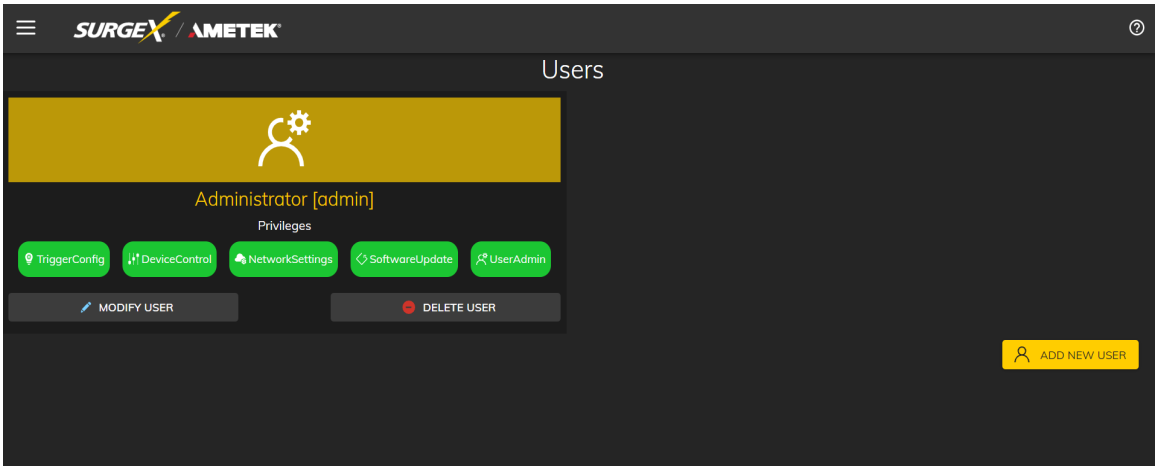
4.6.4 Cloud Setting

To start the device registration process, click on the Cloud Settings menu. Follow these steps carefully: First, ensure the device has the latest firmware. Next, confirm you have created an account on www.surgexconnect.com. Finally, log in using your registered credentials. Next, click on the “Register Device” button to initiate the device registration. Note that the Device Registration Page will not be visible if the device is already registered. Upon successful registration, you will be redirected to a page where you can view basic device information on the cloud. If you ever need to de-register your device, click on the “De-Register” button. Only use this option if you want to remove your device from the cloud.

4.6.5 Users

To add a new user, click the Add New User button. You can edit/add or delete user accounts on this screen. Each user will have a unique name, username, authentication mode, and may be assigned access to specific features. For each user, you can select the Authentication Mode as either LDAP or internal. You can also set up Privileges for each user, which include:

- Trigger Config: Allows the user to configure triggers.
- Device Control: Grants the user control over device outlets.
- Network Settings: Permits the user to modify network settings.
- Software Update: Enables the user to update software.
- UserAdmin: Provides administrative privileges over user accounts.



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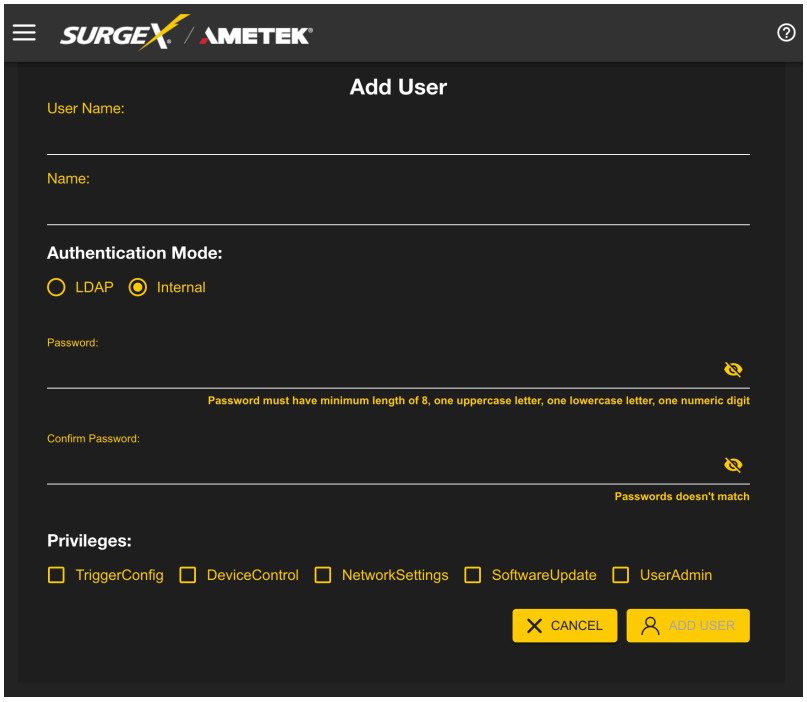
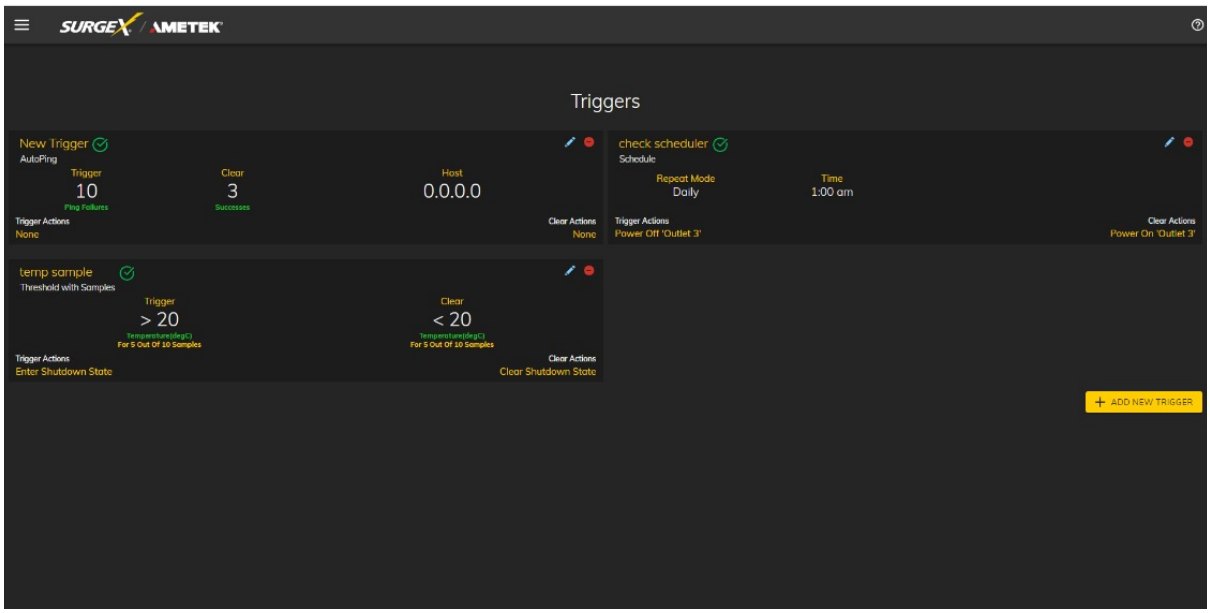


4.6.6 Triggers Setup

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 four types, autoping, Threshold with Samples, Schedule, and Contact Closure 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. Thresholds include: • Line Voltage • N-G Voltage • Current • Temperature (Axess Elite+ Internal temperature) • External Temperature (I2C sensor temperature) • Frequency • Average Power • Crest Factor • Power Factor
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.
Contact Closure	The actions to be executed upon closing or opening of the contact closure input may be defined as various User Triggers on the Triggers Setup web page.

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.



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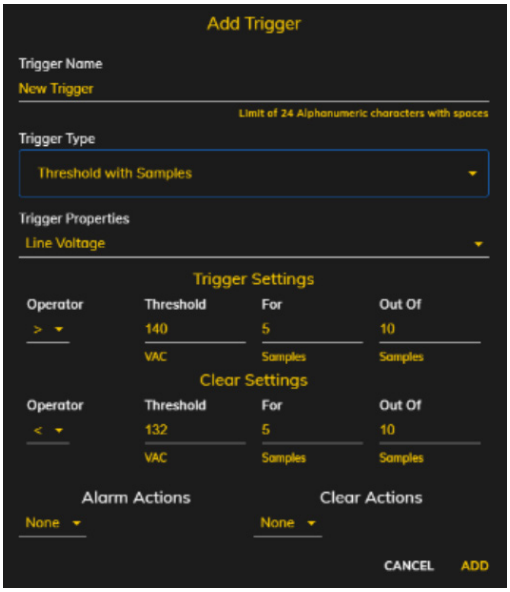
4.6.6.1 Threshold with Samples

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.

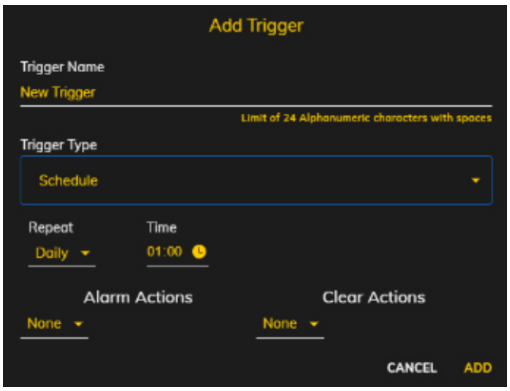


4.6.6.2 Autoping

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.

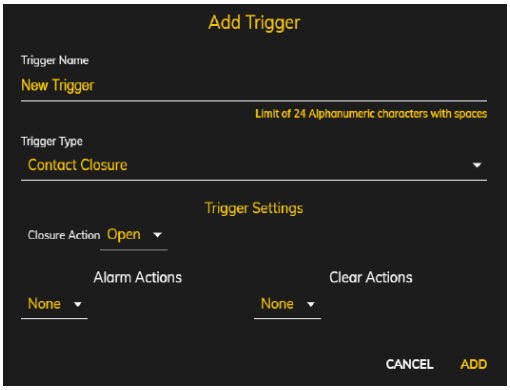
4.6.6.3 Schedule

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



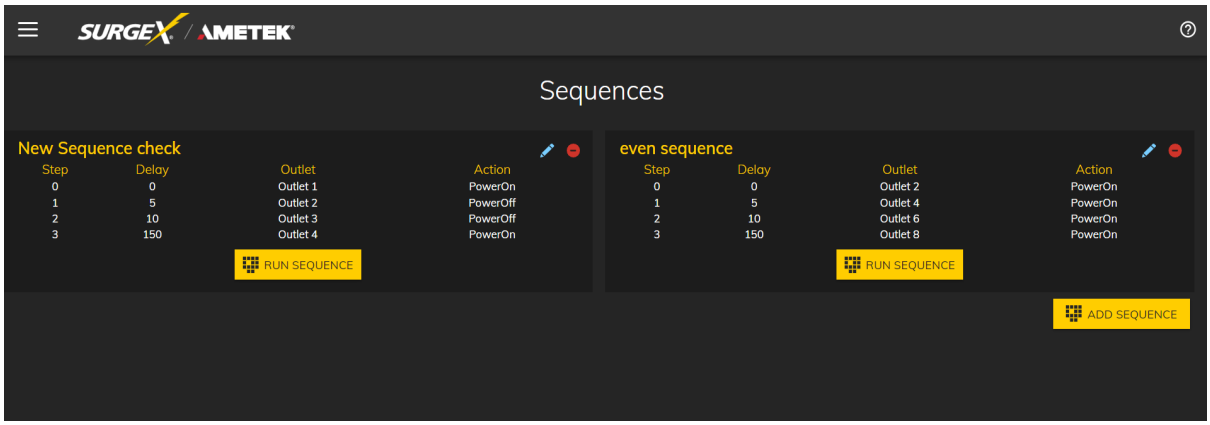
4.6.6.4 Contact Closure

Connect a contact closure control input (if any) to the 2 pins of the second terminal block. Relays, switches, and push buttons are all suitable input types. The actions to be executed upon closing or opening of the contact closure input may be defined as various User Triggers on the Triggers Setup web page.



4.6.7 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.



4.7 Utilities

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

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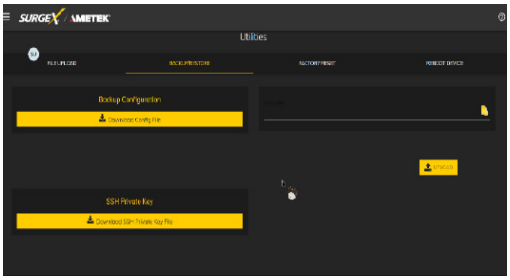
FILE UPLOAD	
Item	**Description**
Firmware Update	Select this option to upload Firmware File.
Configuration File	Select this option to upload a new Configuration File.
SNMP Configuration	Select this option to upload a new SNMP configuration File.
Power Board Firmware Update	Select this option to upload the Power Board Firmware File.
LDAP Certificate	Select this option to upload the certificate required to connect to LDAP server.
HTTPS Certificates	Select this option to upload new HTTPS certificates.
SSH Public Key	Select this option to upload new SSH Public Key, this file must be in pub format.

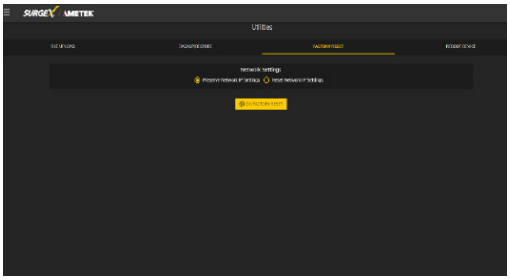
4.7.2 Backup/Restore



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.

Axess ELITE+ also has a provision for downloading the SSH private key file for remote logging on the device

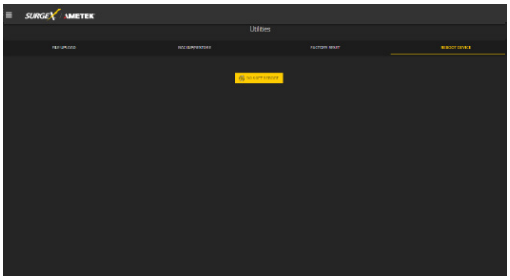
4.7.3 Factory Reset



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.

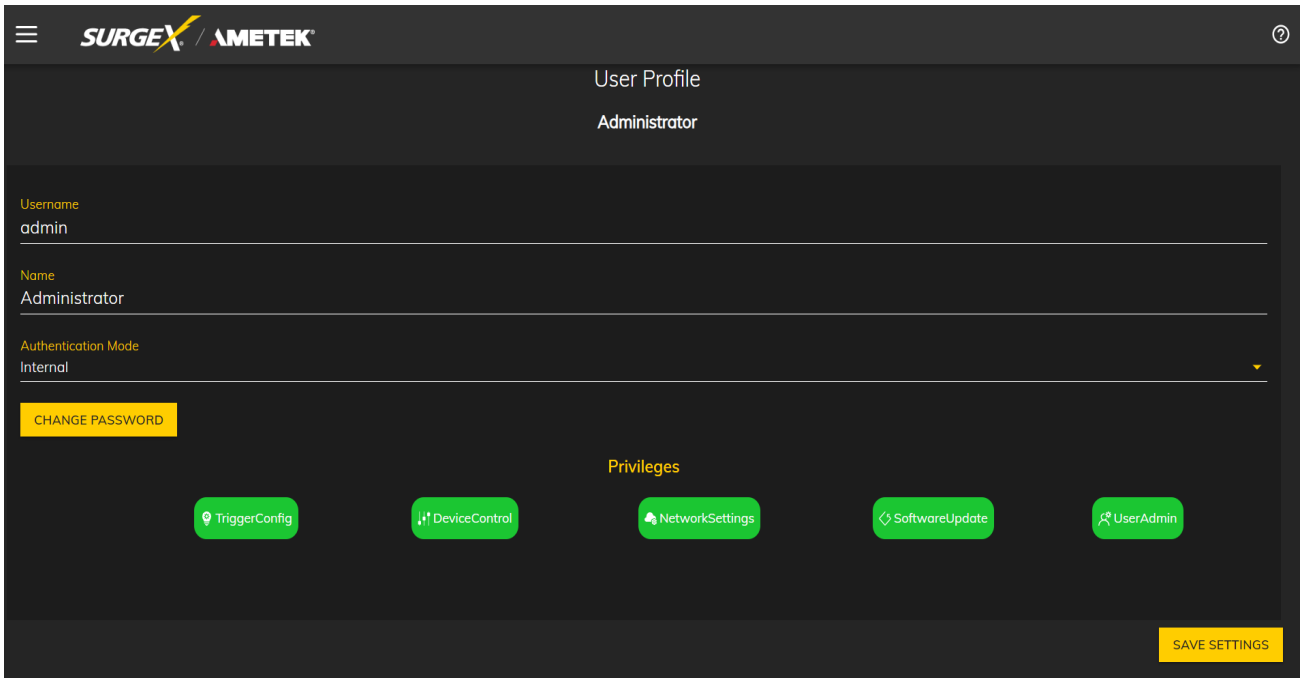
4.7.4 Soft Reboot



Adds the ability to reboot the Axess ELITE+ 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”.

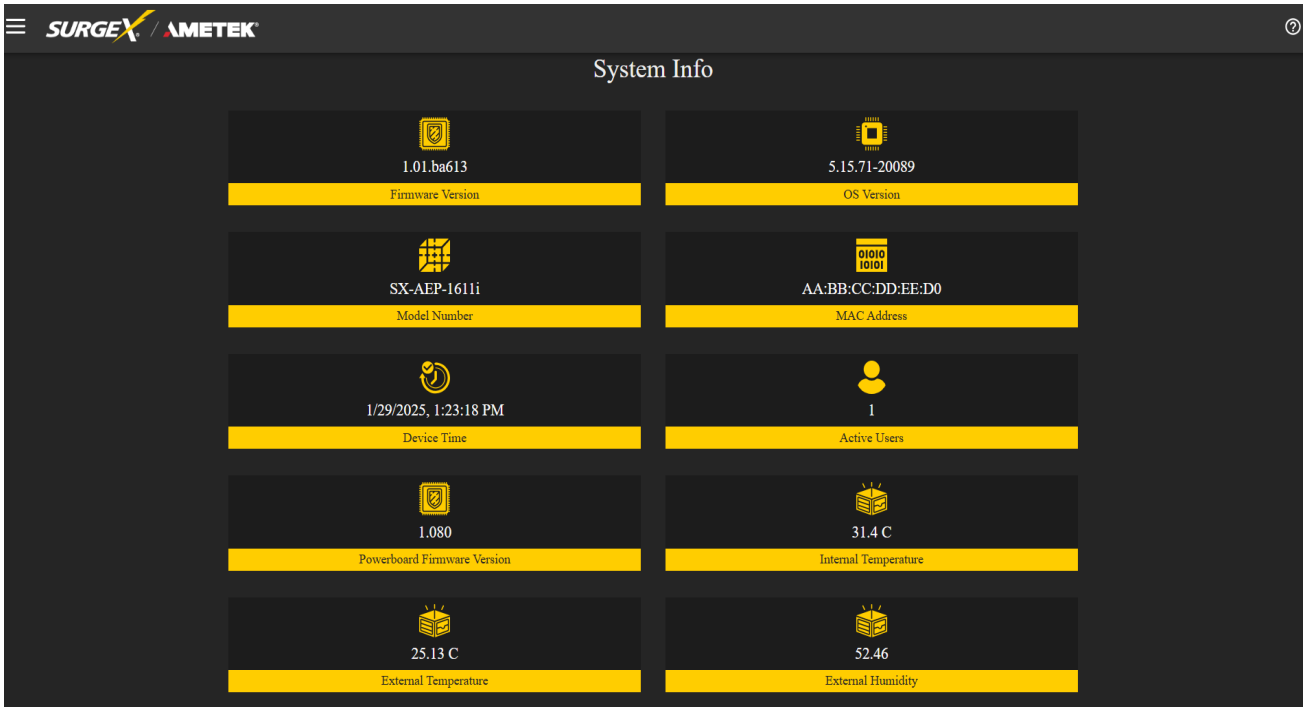
4.8 User Profile

The User Profile screen provides the current user's information and allows them to change their password. On this page, users can also edit their username, password, and view their privileges and authentication mode. This screen helps users to manage their own profiles and maintain their account security.



4.9 System info

The System Info screen provides hardware and software information about the device and the number of users connected to the device.



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5. Command Line Interface (CLI)

Many configuration parameters may be set using the Command Line Interface (CLI). The CLI is accessed through the network using a SSH telnet client, or through the serial port (RS 232).

5.1 SSH

1. To log in to the SSH console, follow these steps:
2. **Run the application.**
3. **Open the UI** and navigate to **Utilities**.
4. Go to **BACKUP/RESTORE** and download the SSH Private Key.
5. Open the terminal and navigate to the folder containing the SSH Private Key.
6. Use the following command to log in to the SSH console:

ssh -T -i sshrsaPrivate <IP_ADDRESS>

5.2 RS 232 PORT

To access the RS-232 console, follow these steps:

1. Open Tera Term.
2. Connect to the RS-232 port.
3. Go to Setup and select Serial Port.
4. Set the speed to 115200.
5. Click on New Settings to connect.
6. Provide the login credentials:
   - **Login:** admin
   - **Password:** admin

5.3 Commands

Once connected to either the SSH or RS232 consoles, users can execute the following commands to retrieve and set device parameters:

- get all: Retrieves all available data from the device.

```
Axess ELITE2.0> get all
TotalCurrent: 1.03
Frequency: 49.989
PowerFactor: 0.071
TotalPower: 16
TotalCrestFactor: 2.475
VoltageLN: 226.82
VoltageLG: 3.45
rmsvoltsPeakLG: 318.39
InternalTemperature: 35
```

- get outlet 1: Retrieves the data of outlet 1.

```
Axess ELITE2.0> get outlet 1
Outlet1_IoutRms: 0.11
Outlet1_ActivePower: 1
Outlet1_PowerFactor: 0.039
Outlet1_CrestFactor: 3.594
Outlet1_IoutPeak: 0
```

- get nominalvoltage: Retrieves the nominal voltage setting of the device.

```
Axess ELITE2.0> get nominalvoltage
Nominal Voltage: 120 V
```

- get nominalfrequency: Retrieves the nominal frequency setting of the device.

```
Axess ELITE2.0> get nominalfrequency
Nominal Frequency: 50 Hz
```

- get temperatureunit: Retrieves the temperature unit setting of the device.

```
Axess ELITE2.0> get temperatureunit
Temperature Unit: F
```


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- get devicename: Retrieves the name of the device.

```
Axess ELITE2.0> get devicename
Axess Elite+
```

- get fwversion: Retrieves the firmware version of the device.

```
Axess ELITE2.0> get fwversion
1.01.b6ccd
```

- set outlet 1 off: Turns off outlet 1.

```
Axess ELITE2.0> set outlet 1 off
True
```

- set outlet 1 on: Turns on outlet 1.

```
Axess ELITE2.0> set outlet 1 on
True
```

- set outlet 1 reboot: Reboots outlet 1.

```
Axess ELITE2.0> set outlet 1 reboot
True
```

- set auxelay 1 off: Turns off Aux relay 1.

```
Axess ELITE2.0> set auxrelay 1 off
True
```

- set auxelay 1 on: Turns on Aux relay 1.

```
Axess ELITE2.0> set auxrelay 1 on
True
```

- set auxelay 1 reboot: Reboots Aux relay 1.

```
Axess ELITE2.0> set auxrelay 1 reboot
True
```

- set nominalvoltage: Sets the nominal voltage for the device.

```
Axess ELITE2.0> set nominalvoltage 230
True
```

- set nominalfrequency: Sets the nominal frequency for the device.

```
Axess ELITE2.0> set nominalfrequency 60
True
```

- set voltagelimit: Sets the voltage limit for the device.

```
Axess ELITE2.0> set voltagelimit 230
True
```

- set temperatureunit: Sets the temperature unit for the device.

```
Axess ELITE2.0> set temperatureunit C
True
```

- set devicename: Sets the name of the device.

```
Axess ELITE2.0> set devicename Axess Elite +
True
```

- get outletname: Retrieves the name of all the outlets.

```
Axess ELITE2.0> get outletname
outletName 1:Outlet 1
outletName 2:Outlet 2
outletName 3:Outlet 3
outletName 4:Outlet 4
outletName 5:Outlet 5
outletName 6:Outlet 6
outletName 7:Outlet 7
outletName 8:Outlet 8
outletName 9:Outlet 9
outletName 10:Outlet 10
outletName 11:Outlet 11
```


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- get outletstatus: Retrieves the status of all the outlets.

```
Axess ELITE2.0> get outletstatus
outletStatus 1:on
outletStatus 2:on
outletStatus 3:on
outletStatus 4:on
outletStatus 5:on
outletStatus 6:on
outletStatus 7:on
outletStatus 8:on
outletStatus 9:on
outletStatus 10:on
outletStatus 11:on
outletStatus 12:on
outletStatus 13:on
```

- get voltagelimit: Retrieves the voltage limit of the device.

```
Axess ELITE2.0> get voltagelimit
Voltage Limit: 240 V
```

6. Security

Axess ELITE+ has been designed with security as a priority. All ports and features may be changed or disabled.

6.1 Authentication

Axess ELITE+ supports basic and secure authentication for users and network connections.

6.1.1 802.1X

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

6.1.2 SSO (Single Sign-On)

Axess ELITE+ 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.

6.2 Interfaces

6.2.1 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: Axess ELITE+ supports SNMP V3 for secure communications, with the ability to enable and disable.

7. Application Programming Interfaces (APIs)

Axess ELITE+ is designed for flexible communication and integration with diverse control and monitoring platforms.

7.1 HTTP/HTTPS REST

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

7.2 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.

8. Part Numbers

8.1 Part Number Scheme

SX-AEP-1011i

Product Line

SX-AEP	SurgeX Axess ELITE+

Rated Current

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

Number of Receptacles

9	9 Receptacles *(NEMA ONLY)*
11	11 Receptacles *(IEC ONLY)*

NEMA / IEC Model

i	IEC Model *(240V)*
blank	NEMA Model *(120V)*

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9. 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 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.

10. Specifications

PARAMETER		SX-AEP-159	SX-AEP-209	SX-AEP-1011i	SX-AEP-1611i
AC Load Rating		12A @ 120V	16A @ 120V	10A @ 240V	16A @ 240V
No of Outlets - back		8	8	10	10
No of Outlets - front		1	1	1	1
Measurement Accuracy	**Voltage**	± 2%			
	Current	± 5%			
	Power	± 7%			
	Energy	± 7%			
Timestamp Accuracy		± 1%			
Auxiliary Relay Control		(2) 3 x screw terminal			
Contact Closure		(1) 2 x screw terminal			
Temperature Sensor Input		(1) 4 x screw terminal			
Serial Port		RS232 port			
Network Port		10/100 Ethernet connection on Female RJ-45, Auto Negotiating with 10/100 network connections with Link and Activity LEDs			
		Micro USB			
Weight		12.4 Lbs/5.6Kg	12.4 Lbs/5.6Kg	11.9 Lbs/5.4Kg	11.9 Lbs/5.4Kg
Dimensions (Enclosure)	**Height:**	1.73”/44mm	1.73”/44mm	1.73”/44mm	1.73”/44mm
	Width:	17.4”/442mm	17.4”/442mm	17.4”/442mm	17.4”/442mm
	Depth:	11.8”/300mm	11.8”/300mm	11.8”/300mm	11.8”/300mm
Temperature Range: 100% Load		0 to 45 °C (32 - 113 °F)			
Humidity Range		5% to 95% R.H. Non-condensing			
Altitude		0 - 10000ft (0 - 3048meters)			
Agency Listings	**Safety**	Certified to UL 62368-1		Certified to UL 62368-1	
		CAN/CSA C22.2 No 62368-1:19, 3rd Ed		CE Mark	
		RoHS: Compliant		WEEE	
		Prop 65		RoHS: Compliant	
				REACH: Compliant	
	Surge / EMI	FCC 47 CFR PART 15 SUBPART B (Using ANSI C63.4-2014)		EN 55035:2017+A11:2020	
	EMC	ICES-003 ISSUE 7		EN 55032:2015 + A1:2020	
				EN IEC 61000-3-2:2019 + A1:2021	
				EN 61000-3-3:2013 + A2:2021	
Surge Protection		Advanced Series Mode			
IP protection class		IPX0			
AC Power System Type		TN			
Pollution Rating		Pollution degree (PD) PD 2			

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