

Vigilant Web-Interface User Guide

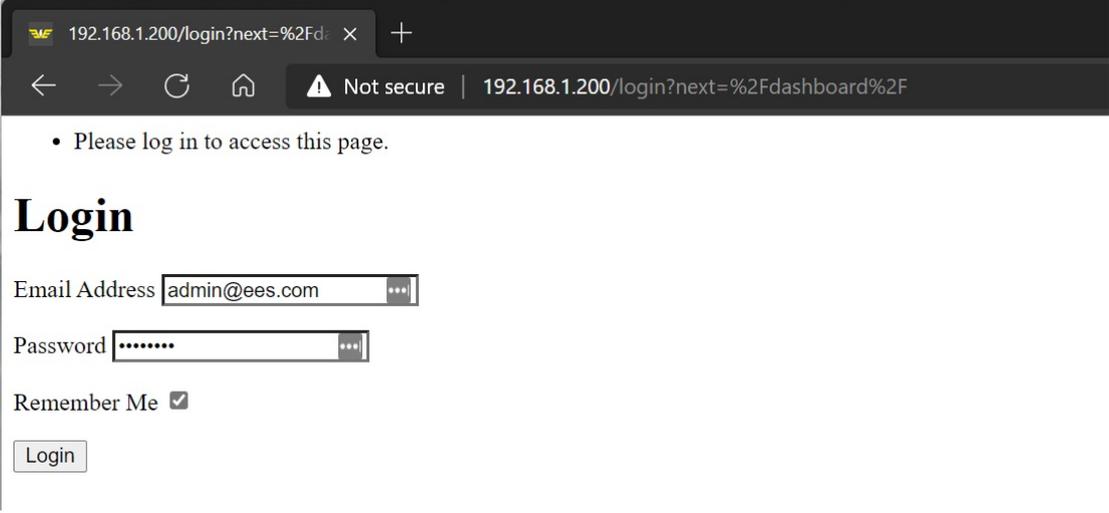
Vigilant Web-Interface User Guide

- 1.0 System Login
- 2.0 Navigating the Web-Interface
 - 2.1 Header
 - 2.2 Navigation Bar
 - 2.3 Page Content
 - 2.3.1 Page Links
 - 2.3.2 Chart Controls
- 3.0 Home Page
- 4.0 Summary Page
- 5.0 Alerts Page
- 6.0 Battery Page
- 7.0 Sensor Dashboard Page
 - 7.1 Data Overview
 - 7.2 Cell Information
 - 7.3 Control Panel
 - 7.3.1 Sensor controls
 - 7.3.2 Requests
 - 7.3.3 ELM controls
 - 7.3.4 Update sensor information
- 8.0 Discharges Page
 - 8.1 Discharge Event Page
 - 8.1.2 Discharge Report (in development)
- 9.0 Snapshots Page
- 10.0 Reports Page
 - 10.1 Creating Reports
 - 10.2 Suggested Report Organization
- 11.0 Settings Page
 - 11.1 Network Settings
 - 11.2 Data Management
 - 11.3 User Settings
 - 11.4 Modbus Settings
 - 11.5 Alarm Settings
 - 11.6 Actions Settings
 - 11.6.1 Reboot
 - 11.6.2 Shutdown
 - 11.6.3 Set Clock
 - 11.6.4 Calibrate
- 12.0 ELM Management
 - 12.1 Calibrate Multiple ELM Sensors
 - 12.2 Other ELM Tasks
- Appendix A - Measurement Intervals
- Appendix B - Example Reports

1.0 System Login

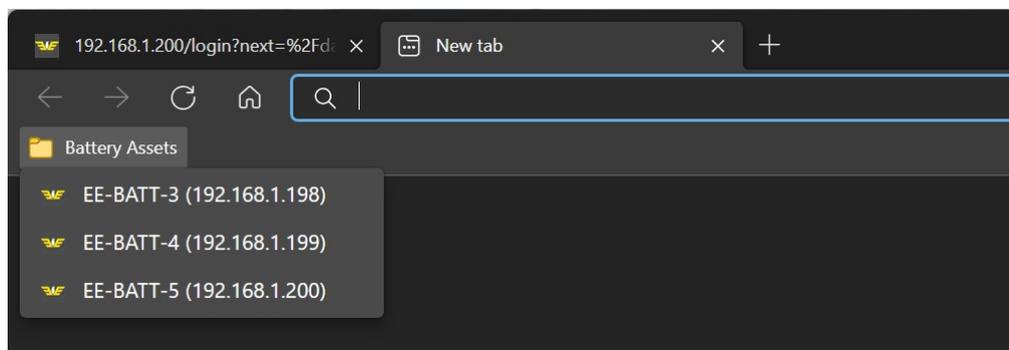
The web-interface is hosted on the Vigilant Monitor and can be accessed via any modern web browser. The device used to access the Vigilant must be on the same network as the Vigilant Monitor. In most applications, the Vigilant is configured with a static IP address. This guide assumes the IP address and login credentials have been provided.

1. Enter the IP address of the Vigilant in the web browser.
2. Enter the login credentials (note the login is the system email address, not username).
3. Click "Remember Me" to prevent having to enter the credentials every time on the same browser.



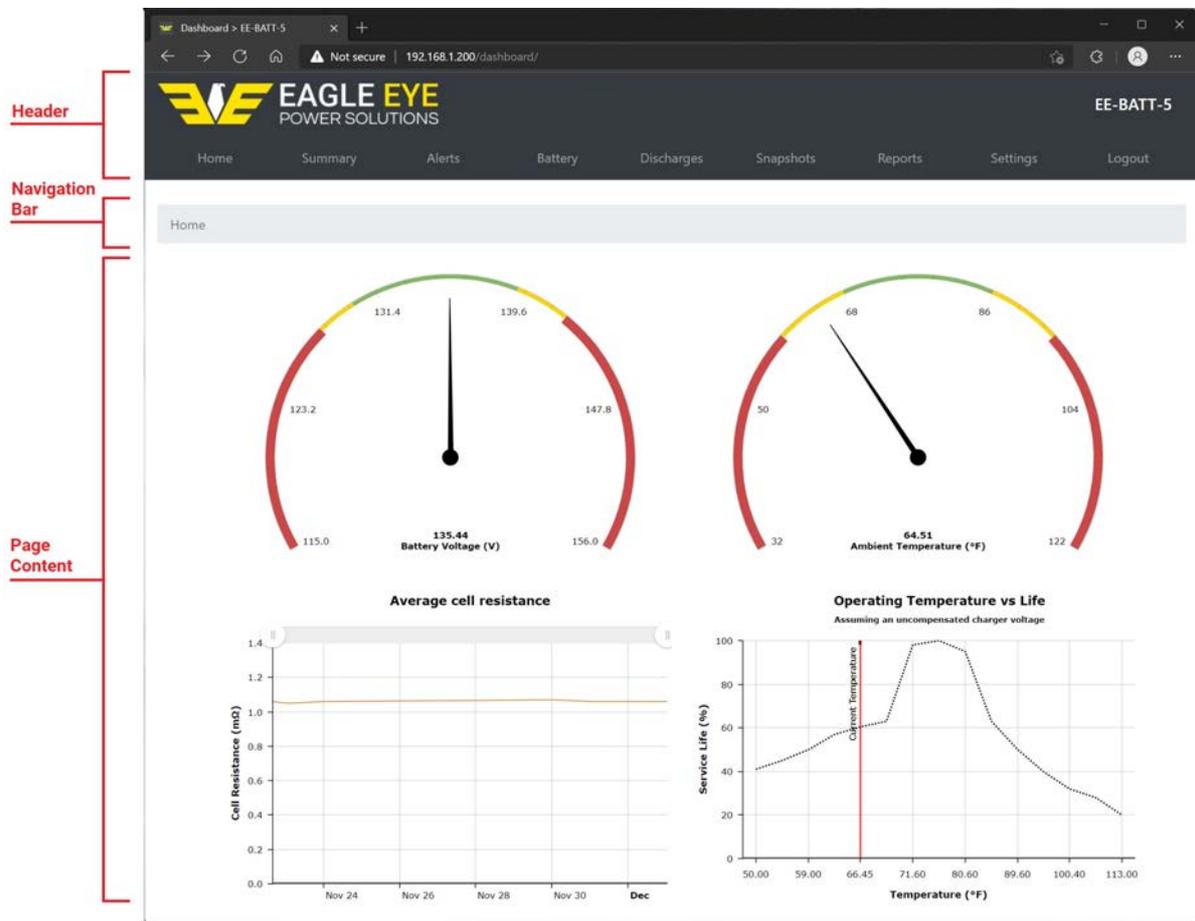
A screenshot of a web browser showing the login page for a Vigilant system. The address bar shows the URL `192.168.1.200/login?next=%2Fdashboard%2F`. The page content includes a message: "Please log in to access this page." Below this is a large heading "Login". There are two input fields: "Email Address" with the value `admin@ees.com` and "Password" with masked characters. A "Remember Me" checkbox is checked. A "Login" button is located at the bottom left of the form.

Note - If not using the Fleet Management Software (FMS), it's recommended to bookmark the web-interface for easy access. This is especially helpful if you access multiple systems from the same browser. The FMS allows aggregation of Vigilant systems into a single user interface.



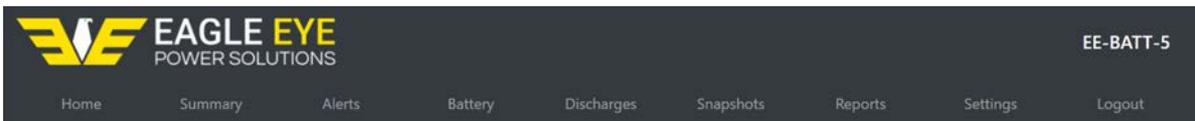
2.0 Navigating the Web-Interface

After logging in, the Home page will be displayed. Every page in the web-interface is organized into 3 main sections. Understanding these sections will make it easy to navigate the web-interface.



2.1 Header

The header is the gray bar across the page. It shows the battery asset name on the top right (e.g. EE-BATT-5) as well as links to each section of the software. Each section will be described briefly below, then in more detail throughout this guide:



- **Home** - This is the default page when logging into the Vigilant.
- **Summary** - Displays a summary of main data points for the Vigilant.
- **Alerts** - Displays active alerts, with a link to historical alerts.
- **Battery** - Displays all battery data, with links to individual cell dashboards.
- **Discharges** - Displays a list of discharge events that have occurred on the system.
- **Snapshots** - Displays links to each of the available bar graphs for measured data.
- **Reports** - Displays links to available reports.
- **Settings** - Displays links to all of the available settings, as well as the current software version.
- **Logout** - Link to logout of the system.

2.2 Navigation Bar

The navigation bar is a trail of links that displays the currently viewed page's location within the hierarchy of the web-interface. Click any page before the current page to go back (shown in blue).

[Home](#) / [Battery](#) / [10](#) / Cell Resistance

2.3 Page Content

Under the navigation bar is the page content. The content displayed will depend on the page being viewed. There are several UI elements throughout the web-interface that provide additional interaction when clicked.

2.3.1 Page Links

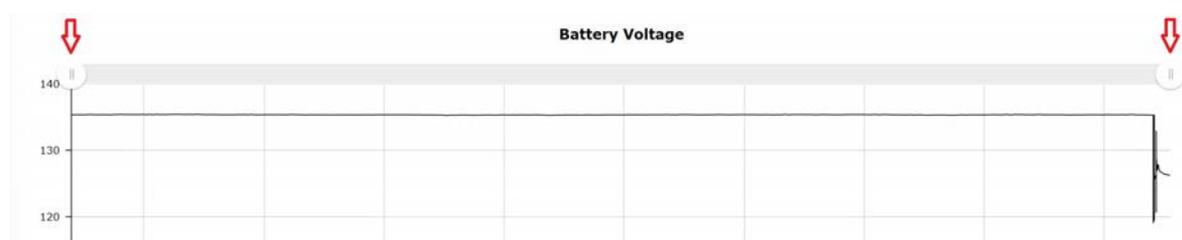
Throughout the web-interface a word, phrase, or number displayed in blue is a clickable link. The example below shows a collection of links from the Summary page.

Home / Summary	
Under discharge	No
Overall battery voltage	135.3V
Battery current	-55.78mA
Ambient temperature	64.18°F
Average post temperature	65.8°F
Ground Fault	No

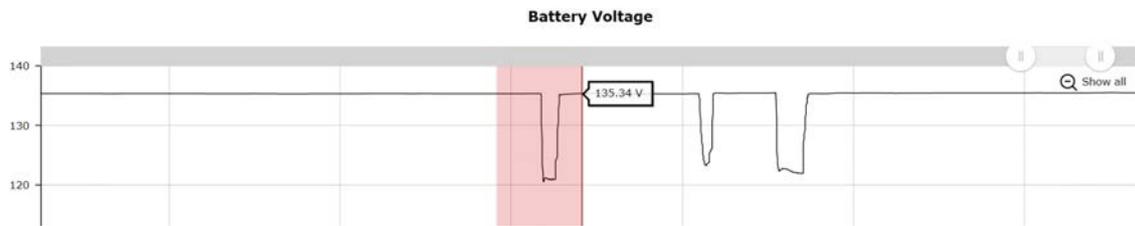
Links open various sections of the software. Typically a link that is related to a measured value will open the historical chart for that value. Other links might open new pages, or tabs within a page. Important links will be explained throughout this guide.

2.3.2 Chart Controls

Line charts for historical data contain controls to zoom in or out of the chart. The slider controls are on the upper left and right of the charts.



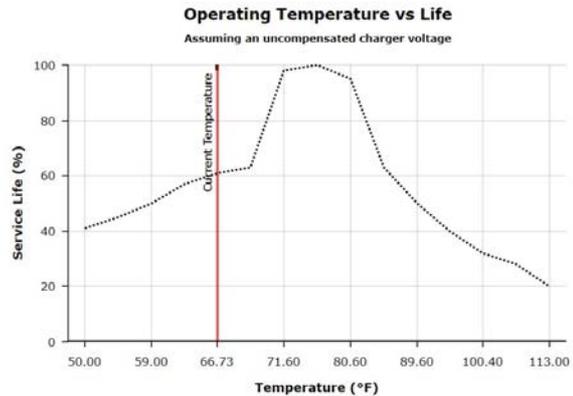
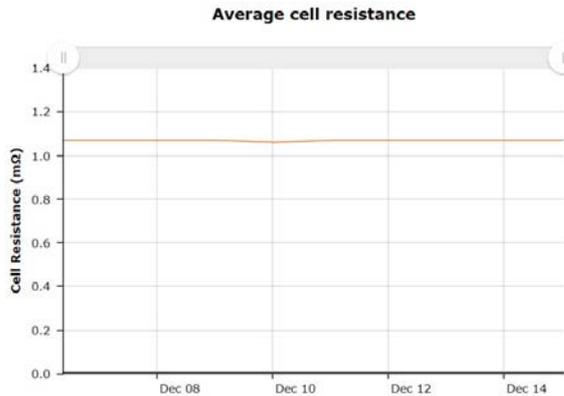
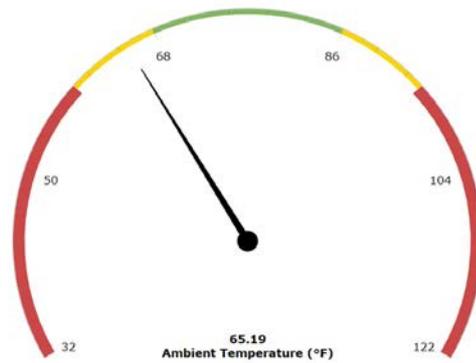
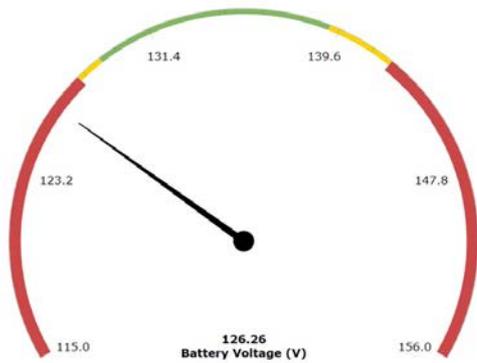
Move the sliders in or out to control the chart zoom level. Click the Show all button to reset the chart. Alternatively, click and hold to select a section of the chart to view in more detail. This is the best method to zoom in to specific areas.



3.0 Home Page

The home page is the default page that is shown after logging in. This page displays the system dashboard which contains the following information:

- **Battery Voltage** - The float voltage of the battery system measured from the positive and negative charger cables. The voltage dial displays the measured value as well as the warning (yellow) and critical (red) alarm ranges. Adjusting the **Alarm Limits** in the **Settings** section will change the display of these alarm ranges.
- **Ambient Temperature** - Displays the ambient temperature as measured from the ambient sensor connected to the monitor.
- **Average Cell Resistance** - Displays the average resistance value of all cells over time. After initial startup of the system this chart will only have 1 data point. Hover over the graph to show the exact value and measured time.
- **Operating Temperature vs Life** - Displays the measured ambient temperature against estimated life of the battery for that operating temperature. This chart is simply used for a reference against recommended operating temperatures for batteries and does not accurately predict battery life.



4.0 Summary Page

The summary page shows top level information from the Vigilant. See below for full explanation of each value.

Note - Clicking any of the hyperlink values on this page will open the historical data graph for that value.

- **Under discharge** - Confirms if the system is recording a discharge or not (Yes or No). If Yes, the value will change to a link which if clicked will open the discharge recording. See the **Discharges Page** section for more information.
- **Overall battery voltage** - Measured battery float voltage.
- **Battery current** - Measured battery float current.
- **Ambient temperature** - Measured ambient temperature value.
- **Average post temperature** - The average value of all negative post temperatures.
- **Ground fault** - Ground fault status (Yes or No).
- **Monitor storage memory used** - Percentage of total monitor memory used.
- **Unexpected restarts** - Number of times the system has unexpectedly restarted. Includes manual reboots of the monitor.

Under discharge	No
Overall battery voltage	126.26V
Battery current	-417.74mA
Ambient temperature	65.19°F
Average post temperature	66.73°F
Ground Fault	No
Monitor storage memory used	1.21 %
Unexpected restarts	No data

5.0 Alerts Page

The alerts page shows all active alerts on the system. There is also a button to view all historical alerts that have occurred.

Note - Many alerts are based on user-defined alarm limits. See the Alerts Page for more information on how to adjust alarm limits.

- Clicking a value under the **Type**, **Metric**, **Threshold**, and **Current Value** column will bring up the historical chart for that entity's value. (e.g., clicking any of those values shown below will bring up the chart for cell 56's resistance history)
- Clicking the number under the **Entity** column will bring up the dashboard for that sensor. See the **Sensor Dashboard** page for more information.

Current alerts

[Click here to see all historical alerts.](#)

Type	Entity	Metric	Threshold	Current Value
Warning cell resistance (high)	56	Cell Resistance (mΩ)	1.60	5.65
Critical cell resistance (high)	56	Cell Resistance (mΩ)	1.87	5.65

- Clicking the historical alerts button will bring up the **Historical** page. This page organizes information as follows:
 - **Type** - This is the type of alert that occurred.
 - **Start / Stop Time** - Time the alert was first detected to when it stop being detected.
 - **Entity** - Sensor number that recorded the alert, the sensor number typically correlates to the cell/unit/jar/bloc on the battery.
 - **Metric** - The type of value that is in alert.
 - **Threshold** - The limit value that must be measured to set off the alert.

- **Trigger Value** - The measured value that set off the alert.
- **Stop Reason** - Why the alarm cleared.

Home / Alerts / Historical

Alert Log

Type	Start Time	Stop Time	Entity	Metric	Threshold	Trigger Value	Stop Reason
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	40	Cell Voltage (V)	2.13	2.11	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	44	Cell Voltage (V)	2.13	2.11	Returned to normal
Warning cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	48	Cell Voltage (V)	2.15	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	53	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	1	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	5	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	58	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	9	Cell Voltage (V)	2.13	2.11	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	13	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	17	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	21	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	24	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	28	Cell Voltage (V)	2.13	2.11	Returned to normal
Warning cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	32	Cell Voltage (V)	2.15	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	36	Cell Voltage (V)	2.13	2.11	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	41	Cell Voltage (V)	2.13	2.11	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	45	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	49	Cell Voltage (V)	2.13	2.12	Returned to normal
Critical cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	54	Cell Voltage (V)	2.13	2.11	Returned to normal
Warning cell voltage (low)	2021-12-15 10:30:00	2021-12-15 14:00:00	1	Cell Voltage (V)	2.15	2.12	Returned to normal

PREVIOUS 1 to 21 of 256 NEXT

6.0 Battery Page

The battery page displays all of the available measurement data from each sensor. A single sensor measures multiple parameters for the individual cell/bloc/unit/jar that it is connected to. The list below outlines the information displayed each in column on this page:

Note - As mentioned earlier in this guide, clicking any hyperlink number will open the historical chart for that measured data.

- **Cell** - Displays the sensor number (which corresponds to the connected cell/unit/bloc/jar). Clicking the number will open the **Sensor Dashboard** page for that sensor.
- **String** - Displays the string number. Multiple string numbers apply to parallel systems.
- **Cell Voltage (V)** - Displays the cell voltage value.
- **Temperature (C/F)** - Displays the sensor temperature value.
- **Temperature Type** - Displays where the temperature is measured. In most cases it will be the negative post.
- **Cell Resistance (mO)** - Displays the internal resistance value.
- **Interconnect Resistance (uO)** - Displays the interconnection value (the value measured on the positive side of the battery the sensor is connected to. E.g., the strap value for cell 4 is the interconnection resistance for the connection between cell 3-4).
- **Interconnect Type** - Displays the type of interconnection reading for that sensor.
- **Summary (buttons)** - Click the Summary button to view the **Sensor Dashboard** page.

- **Plus 1 sensor** - The extra sensor on the battery will be displayed in a separate table at the bottom of the page.

Sensor ID	String	Temperature (°F)	Temperature Type	Interconnect Resistance (μΩ)	Interconnect Type	Summary
61	1	69.13	Cable	189.31	Cable	Summary

7.0 Sensor Dashboard Page

The sensor dashboard page displays more specific information for the data measured from that sensor. It also provides various functionality for that sensor that will be explained in this section. The sensor dashboard page has 3 sections which can be accessed on the top of the page.

[Home](#) / [Battery](#) / 5

5

[Data Overview](#) [Cell Information](#) [Control Panel](#)

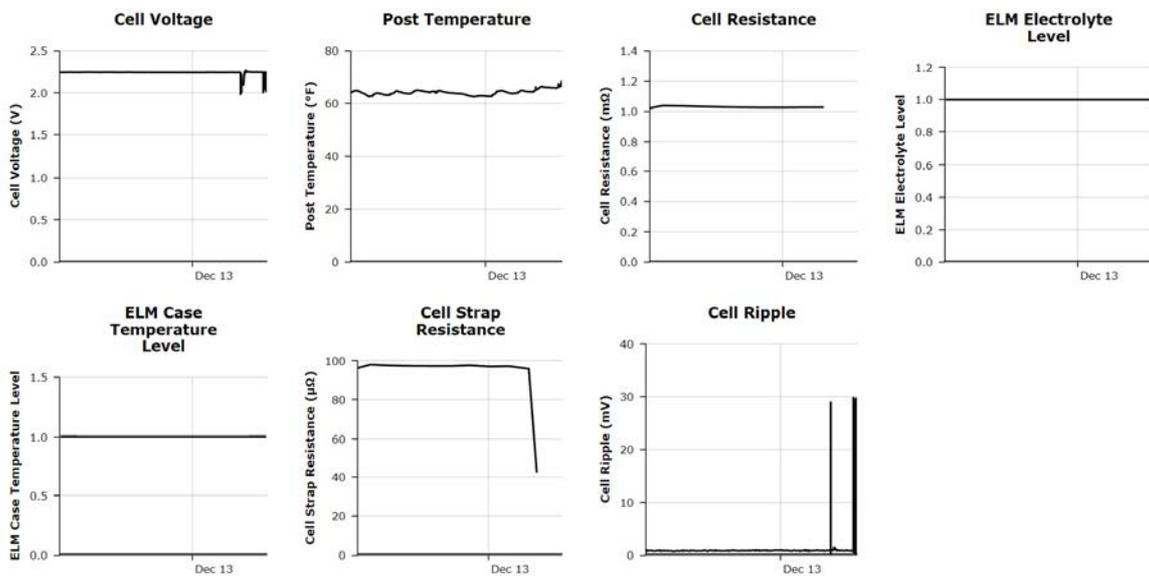
7.1 Data Overview

This section displays a snapshot of each parameter measured from the sensor. Click each chart to view the history.

- Cell voltage
- Post temperature
- Cell resistance
- ELM electrolyte level (**Note** - this chart will either display a 1.0 for no alarm, or a 0.0 for alarm.)
- ELM case temperature (**Note** - this chart will either display a 1.0 for no alarm, or a 0.0 for alarm.)
- Cell strap resistance
- Cell ripple

23

[Data Overview](#) [Cell Information](#) [Control Panel](#)



7.2 Cell Information

This section displays information about the cell/unit/bloc/jar. As of software version 1.3.8, this information is configured during commissioning and cannot be altered after.

7.3 Control Panel

This section contains a number of functions that can be performed on the sensor. Each section will be explained in detail below.

[Home](#) / [Battery](#) / 23

23

[Data Overview](#) [Cell Information](#) [Control Panel](#)

Sensor controls

[Blacklist sensor](#)
[Locate sensor](#)
[Stop locating sensor](#)

Requests

Store results in next request? [Request resistances](#)

ELM controls

[Reset ELM](#)
[Calibrate ELM](#)

Update sensor information

String [1](#) [Change string](#)

7.3.1 Sensor controls

- **Blacklist sensor (button)** - Removes the sensor strap connection from the float current calculation. See the **Calibration Page** section for more information.
- **Locate sensor (button)** - This will force the sensor to start blinking with a red LED. Useful for making sure the sensor is installed in the correct location.
- **Stop locating sensor (button)** - This will stop the sensor locating function.

Note - a successful blacklisting of a sensor will show a confirmation box. Remove a blacklist by clicking the same button which will be renamed.

Sensor blacklisted.

7.3.2 Requests

- **Store results in next request? (checkbox)** - Clicking this checkbox will store a manual resistance test in the history. Do not check this box if troubleshooting erroneous or suspect resistances.
- **Request resistances (button)** - Clicking this button will perform a manual resistance test. This is an important function for troubleshooting. During normal operation, the system will measure resistance once daily. Clicking this button and the checkbox above will save a new resistance value in the history.

Steps to perform a manual resistance test:

Note - As of version 1.3.8, there is no global command to test all resistance. Each sensor must be tested manually using the steps below. This will change in a future update.

1. Determine if you want to save the data or not by checking the box.
2. Click the request resistances button. The page will refresh back to the sensor dashboard page.
3. Click the Control Panel section and a new table will be shown that explains the status of the test. It may take up to 30 seconds for the results to be shown.

Requests

Last request:

Submitted	2021-12-17 08:52:00
Completed	Pending
Type	Resistance (and save)
Request status	Awaiting result

4. A successful test will be shown as below, with the new resistance measurement result.

Requests

Last request:

Submitted	2021-12-17 08:52:00
Completed	Pending
Type	Resistance (and save)
Request status	Awaiting result

5. There are certain conditions that will prevent a resistance test from being done. First is if a test was performed within the last 15 minutes. The second reason is if a discharge has occurred within the last 24 hours. In both cases the message will confirm why the test could not be completed.

Last request:

Submitted	2021-12-17 08:52:00
Completed	2021-12-17 08:54:12
Type	Resistance (and save)
Request status	Cannot do resistance measurement - A discharge ended in the last 24 hours

7.3.3 ELM controls

- **Reset ELM (button)** - Resets the ELM sensor. This must be done after topping off the electrolyte level to clear an alarm. It has the same functionality as pressing the R/S button on the sensor.
- **Calibrate ELM (button)** - Calibrates the ELM sensor to the battery. Must be done only after the water level is well above the minimum line.

For steps on how to send global ELM commands, refer to the **ELM Management** section.

7.3.4 Update sensor information

- **String (dropdown menu)** - Selects the string number to change to.
- **Change string (button)** - Changes the string to the new number.

8.0 Discharges Page

The discharges page shows a list of historical discharge events captured by the Vigilant. Discharges are captured based on the activation threshold set on the system, visit the **Discharge Setting** page under the **Settings** section of this guide for more information on how to configure the discharge thresholds.

- **Reference** - Name of the discharge, automatically assigned by the system. (as of 1.3.8, there is no way to change this name).
- **Started** - The date and time the discharge started.
- **Finished** - The date and time the discharge ended. This column will say Ongoing for any discharges that are still in progress.

[Home](#) / Discharges

Historical Discharges

Reference	Started	Finished
Discharge: 16 December 2021 12:39:29	2021-12-16 12:39:29	2021-12-16 12:45:28
Discharge: 16 December 2021 12:32:13	2021-12-16 12:32:13	2021-12-16 12:39:20
Discharge: 15 December 2021 10:21:42	2021-12-15 10:21:42	2021-12-15 10:23:49

8.1 Discharge Event Page

This page shows the discharge event in its entirety, including moments before this discharge as well as the recharge afterwards.

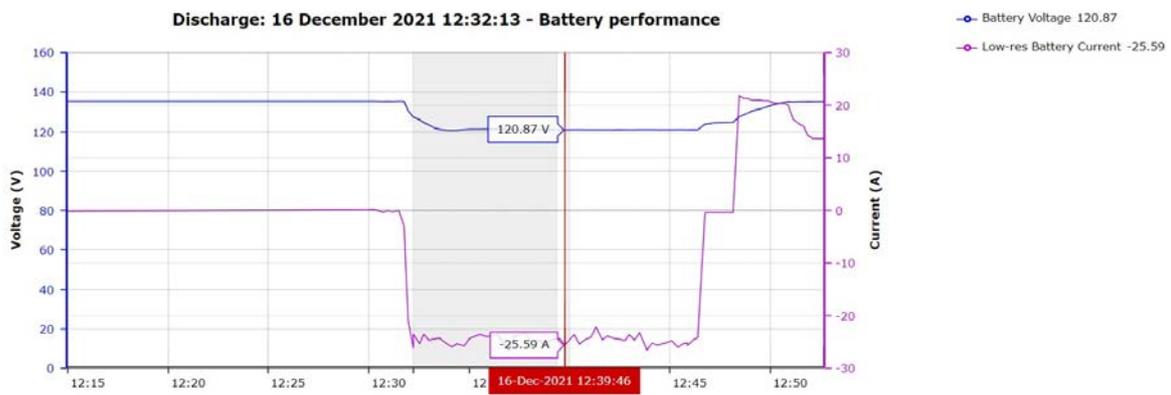
- **Event details** - The top of the page shows the start time, end time, and duration of the discharge.

[Home](#) / [Discharges](#) / Discharge: 16 December 2021 12:32:13

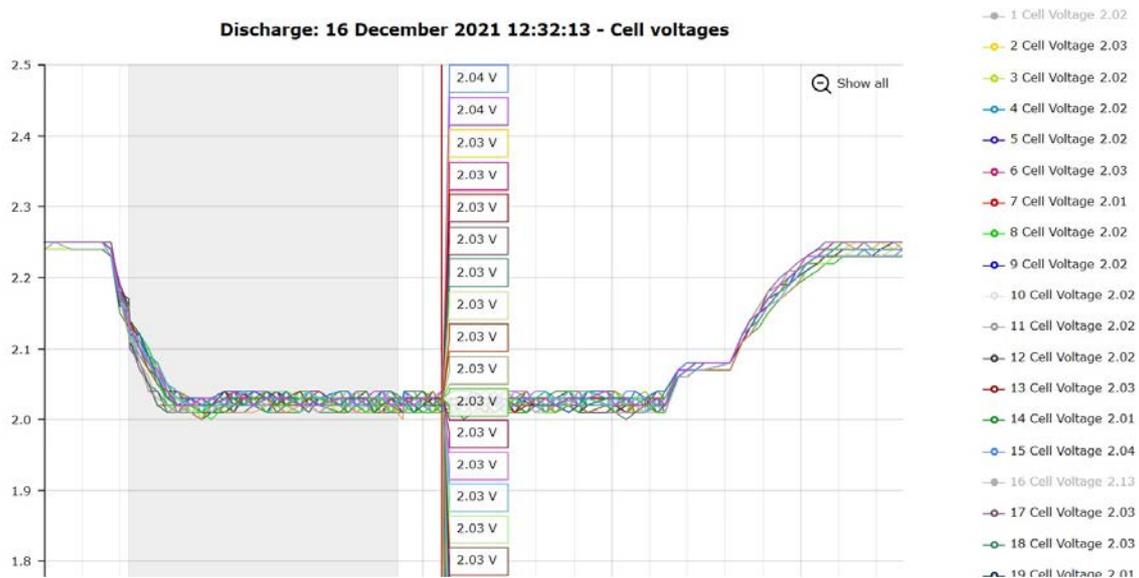
Discharge: 16 December 2021 12:32:13

Start	2021-12-16 12:32:13
End	2021-12-16 12:39:20
Duration	7 minutes and 7 seconds

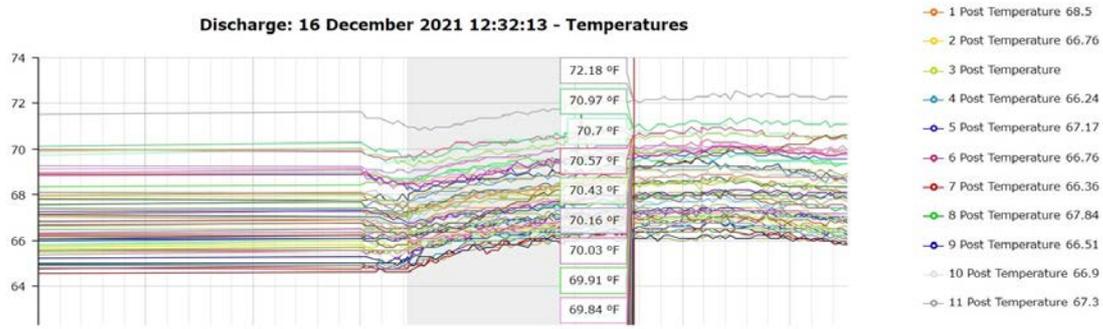
- **Voltage & Current Chart** - The first chart displays the voltage and the current of the battery through the duration of the event. As with all charts in the web-interface, click and highlight sections of the chart to view them in finer detail.



- **Cell Voltage Chart** - The second chart displays all of the cell voltages through the duration of the event. Click any cell on the right to hide it from the chart.



- **Temperature Chart** - The last chart shows the temperature of each negative post during the test. This chart has the same functionality as the cell voltage chart.



8.1.2 Discharge Report (in development)

As of software version 1.3.8, there is no functionality to export the discharge data. This functionality is currently in development and will be available as an update to the end user at no cost.

9.0 Snapshots Page

The snapshots page lists links to all of the available bar graphs on the system.

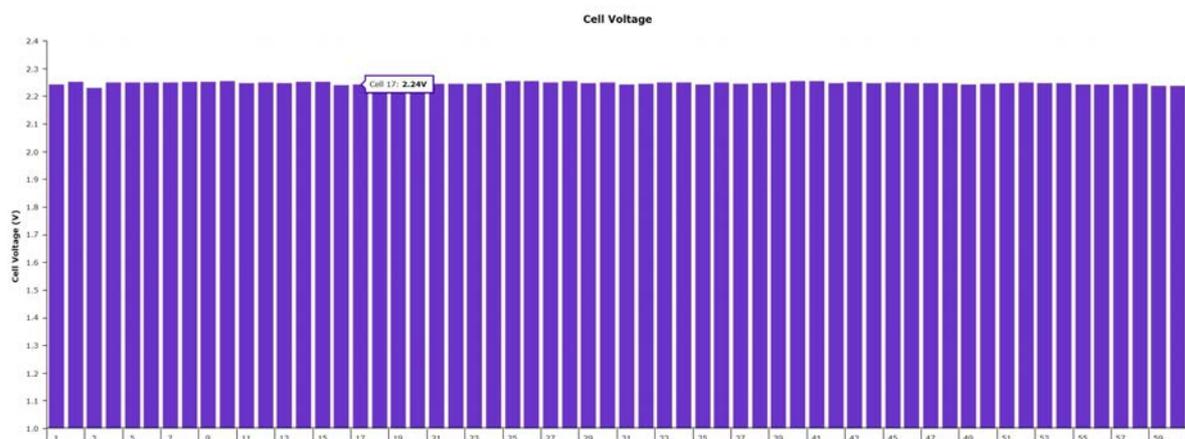
[Home](#) / [Snapshots](#)

Snapshots

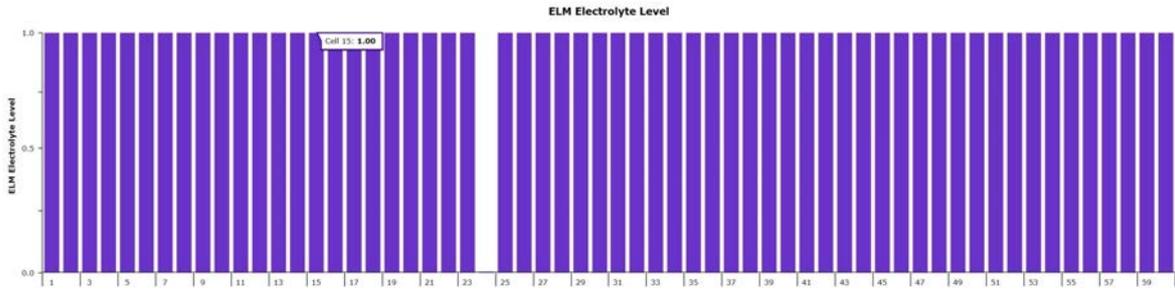
- [Cell Voltage](#)
- [Post Temperature](#)
- [Cell Resistance](#)
- [Cell Ripple](#)
- [ELM Electrolyte Level](#)
- [ELM Case Temperature Level](#)
- **Interconnect Resistances:**
 - [Cells](#)
 - [Intertier](#)
 - [Cable](#)

- Cell voltage, post temperature, cell resistance, cell ripple, and interconnect resistances display measured values for each cell. Hover over a bar to view the cell number and most recently measured data. Click the bar to view history for that cell.

[Home](#) / [Snapshots](#) / [Cell Voltage](#)



- Electrolyte level and ELM case temperature are displayed differently. These values are on/off alarms, so the chart displays a 1.0 when not in alarm, and a 0.0 when in alarm.



10.0 Reports Page

The reports page contains links to the reports that can be viewed and exported from the system. As of software version 1.3.10, there are two reports available:

- **NERC Report** - Report tailored around NERC PRC-005-6: Table 1-4(f) and TPL-001-5 compliance.
- **Monitor Report** - General report that does not specify compliance for any specific entity.

Reports

[NERC Report](#)

[Monitor Report](#)

Note: See Appendix B for example reports.

10.1 Creating Reports

To create either report, follow the steps below:

1. Click the link for the report type.
2. When the report loads, view the web-page version of the report to make sure the data looks acceptable.
3. Click one of the 3 export options:
 - **Download docx** - Creates a docx report that can be opened in Microsoft Word
 - **Download csv** - Creates a csv report that can be opened in Microsoft Excel
 - **Download pdf** - Creates a PDF report
4. Save the report to the desired location. All report filenames include the battery name, date report was made, and the type of report.

NERC Report



[Download docx](#)

[Download csv](#)

[Download pdf](#)

10.2 Suggested Report Organization

As of software version 1.3.10, the Vigilant system does not automatically generate or store reports on the system. When a report is manually generated, it uses them most recent data measured.

Note: A future update will add a drop down to select a date for the report, allowing reports to be created from historical data.

Below is a suggested work flow for creating and organizing reports:

1. Create internal processes for reports:
 - Determine frequency to create reports (e.g., once a month)
 - Determine where to save the reports (e.g., shared network drive)
 - Determine how to organize reports (e.g., folder for the battery system, organized by years)
2. Export the reports to the determined directory.
3. Reference reports as needed for audits or reference.

Name	
 Sandbox_Battery_2022_4_1__nerc.docx	
 Sandbox_Battery_2022_5_1__nerc.docx	
 Sandbox_Battery_2022_6_1__nerc.docx	
 Sandbox_Battery_2022_7_1__nerc.docx	
 Sandbox_Battery_2022_8_1__nerc.docx	
 Sandbox_Battery_2022_9_1__nerc.docx	

11.0 Settings Page

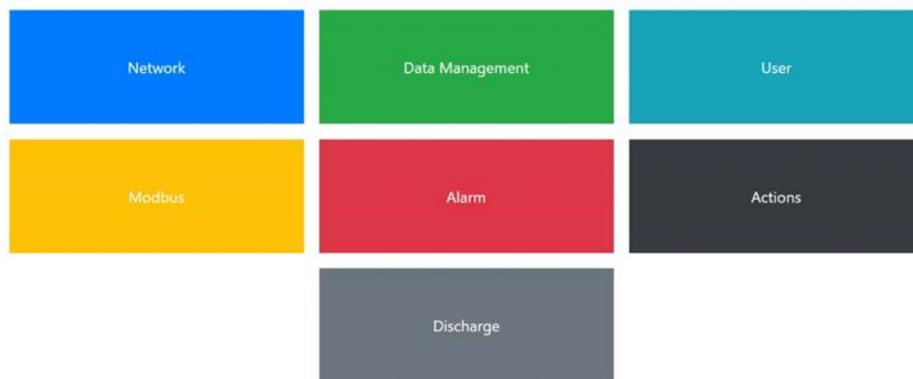
The settings page contains links most of the user-adjustable settings on the system. It also has options for rebooting the system and exporting data. A brief explanation of each section is outlined below, followed by a more detailed walkthrough.

Warning - These settings are typically configured during the commissioning of the system by Eagle Eye trained technicians. Changing some of these settings can break some expected functionalities of the Vigilant.

- **Network** - Adjust IP settings.
- **Data Management** - Export data to a csv file.
- **User** - Change user account information.
- **Modbus** - Enable or disable Modbus.
- **Alarm** - Adjust alarm limits.
- **Actions** - Reset system, adjust time, and calibrate.
- **Discharge** - Adjust discharge limits.

Note - The Vigilant version number is shown on the lower left part of the page.

Settings



Vigilant version: 1.3.8

11.1 Network Settings

This section displays currently set network settings including the **IP address**, **MAC address**, **Interface type**, and **Mode** (static or DHCP). Under the current network information are 5 settings that can be adjusted:

- **Static IP** - Enter the desired static IP address here. If a static IP has not yet been set, this value will be 192.168.1.250 which is the default fallback IP address for the Vigilant.
- **CIDR** - Enter the desired CIDR (classless inter-domain routing) number here. The default value is 24 (255.255.255.0).
- **Gateway (optional)** - Enter a gateway here if needed.
- **DNS server IP (optional)** - Enter a DNS server IP here if needed. In most applications, leave this field to the default value or leave it blank.
- **Use DHCP** - If not using a static IP, click this checkbox to enable DHCP.

Click the **Save** button to update any changed network settings.

Network

IP address:	192.168.1.200
MAC address:	cc:15:eb:88:fa:a9
Interface:	LAN
Mode:	Static
Static IP / CIDR:	<input type="text" value="192.168.1.200"/> / <input type="text" value="24"/>
Gateway IP (optional) :	<input type="text" value="192.168.1.1"/>
DNS server IP (optional) :	<input type="text" value="192.168.1.1"/>
Use DHCP:	<input type="checkbox"/>

When you click save - the Vigilant will reboot.

Save

11.2 Data Management

As of version 1.3.8, this section has the functionality outlined below. This section is expected to gain additional functionality in future updates, such as the ability to export additional data and settings for backup purposes.

- **Sensor Data** - Export all sensor data history to a CSV file.
- **Ambient Data** - Export the string data to a CSV file.

Data Management



11.3 User Settings

This section allows adjustment of the following user settings:

- **Change Password** - Type in the current password, followed by the new password and click the button to save the change.
- **Battery unit terminology** - Usually set during commissioning, this allows the user to change the terminology of the individual batteries monitoring on the system. Options include cell,

unit, bloc, and jar. Click the button to save the change.

- **Change timezone** - Usually set during commissioning, this option allows changing of the timezone. Click the button to save.

[Home](#) / [Settings](#) / [User](#)

User

Change Password

Current Password:

New Password:

Battery unit terminology:

Change timezone:

11.4 Modbus Settings

This section is used to enable or disable Modbus. For more information about Modbus, contact Eagle Eye for the Modbus Data Mapping which lists all the available data points.

- **Enable?** - Click this checkbox to enable Modbus.
- **Unit Identifier** - Default value is set to 1. As of 1.3.8, this option does not have any functionality and will likely be removed in a future update.

[Home](#) / [Settings](#) / [Modbus](#)

Modbus Settings

Enable?

Unit Identifier

11.5 Alarm Settings

This section is used to adjust alarm limits on the system. As of software version 1.3.8, the alarm limits listed below can be adjusted. See **Appendix C** for more information on how alarming works with the Vigilant.

Click the dropdown box to select the parameter to adjust alarm limits for:

- **Sensor Voltage** - Alarm limits for voltage measured by each sensor.
- **Post Temperature** - Alarm limits for negative post temperature measured on each sensor.
- **Battery Voltage** - Alarm limits for the total battery voltage measured by the monitor.
- **Sensor Resistance** - Alarm limits for the internal battery resistance measured by each sensor.

[Home](#) / [Settings](#) / Alarms

Alarms

Warning: any individually configured alarms will be overridden by these changes.

Cell Voltage ▾

Upper	critical	<input type="text" value="2.37"/>	V
Upper	warning	<input type="text" value="2.32"/>	V
Lower	warning	<input type="text" value="2.15"/>	V
Lower	critical	<input type="text" value="2.13"/>	V

[Save all](#)

[Home](#) / [Settings](#) / Alarms

Alarms

Warning: any individually configured alarms will be overridden by these changes.

Cell Resistance ▾

Upper	critical	<input type="text" value="1.87"/>	mΩ
Upper	warning	<input type="text" value="1.60"/>	mΩ

[Save all](#)

11.6 Actions Settings

This section outlines various actions that can be taken on the system.

- **Reboot** - Power cycle the Vigilant.
- **Shutdown** - Shutdown the Vigilant operating system and software.
- **Set Clock** - Adjust time and time settings.
- **Calibrate** - Calibrate the current measurement on the system.

System Actions



11.6.1 Reboot

Click the **Yes - reboot** button to reboot the Vigilant. Everything will come back up automatically after up to a few minutes. Rebooting is recommended if the system is being unresponsive or an update has recently been performed.

Reboot

Are you sure that you want to: reboot?

Yes - reboot

11.6.2 Shutdown

Click the **Yes - shutdown** button to shutdown the Vigilant. This will only shutdown the operating system, not the hardware. This is recommended before removing power from the Vigilant.

Shutdown

Are you sure that you want to: shutdown?

Yes - shutdown

11.6.3 Set Clock

This section allows manual adjustment of the date and time. If connected to a network, clicking the **Use NTP sync?** checkbox should set the date and time automatically. Uncheck this box to set the date and time manually.

Take note of the **Next schedule sweep date and time** shown at the bottom. It's recommended to click the **Reset schedules** button after updating the date and time. This will align the automated measurement cycles with the new time.

Set system date & time

Current system time	2021-12-20 15:37:52
Use NTP sync?	<input checked="" type="checkbox"/>
(If not), then set (local) time:	<input type="text"/>
<input type="button" value="Save"/>	
Next scheduled sweep (at page load)	2021-12-20 15:37:51
<input type="button" value="Reset schedules"/>	

11.6.4 Calibrate

This section is used to calibrate the current measured by the Vigilant.

Note - This step is typically completed during commissioning. Only try calibrating the system if trained by Eagle Eye.

Battery current calibration

This page will calibrate your Vigilant sensor interconnect resistances to a known battery current. Each string needs to be calibrated in turn:

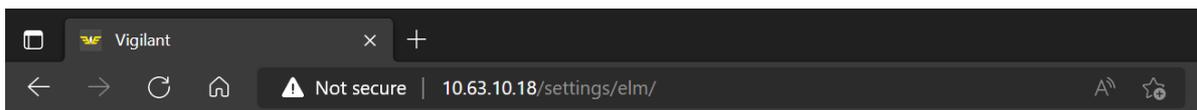
- Measure the DC string current between adjacent cells on the string
- Check that the DC string current is consistent
- Enter the DC string current into the relevant form below & press "Apply"
- The system will then calibrate
- Move onto the next string and repeat

(Calibration can be removed and/or adjusted afterwards)

String 1	<input type="text" value="0"/>	A	<input type="button" value="Apply"/>
----------	--------------------------------	---	--------------------------------------

12.0 ELM Management

The ELM settings page allows the user to send global commands to the ELM sensors. To access this page, enter `settings/elm/` after the IP address in the web browser.



CAUTION: Some of the steps on this page should only be done by Eagle Eye certified installers. Some steps, if followed improperly, can affect the ELM functionality on the system. This section will only cover the steps which can be done by untrained users.

12.1 Calibrate Multiple ELM Sensors

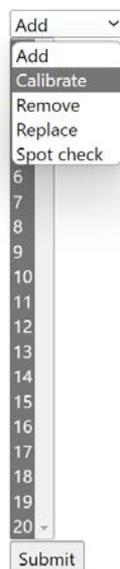
This feature can be used to select multiple or all ELM sensors and calibrate them with a few clicks.

1. On the page, select the sensors to calibrate.
 1. If selecting only some sensors, hold the control button down and click each sensor to calibrate.
 2. If calibrating all sensors, click 1, then hold the shift button and click the last sensor, all should be selected.
2. From the dropdown menu, click Calibrate.

ELM management

You can select multiple sensors from the below selection box. Holding down shift will select a range of sensors, holding down control allows you to select multiple sensors.

[Click here to see what other tasks are currently scheduled.](#)



The image shows a user interface for selecting and calibrating ELM sensors. At the top, there is a dropdown menu with the text 'Add' and a downward arrow. The menu is open, showing five options: 'Add', 'Calibrate', 'Remove', 'Replace', and 'Spot check'. Below the menu is a vertical list of sensor IDs, numbered from 6 to 20. At the bottom of the list is a 'Submit' button.

3. Click the Submit button, a green confirmation box should appear.

ELM tasks scheduled

4. To check the status of the calibration, click the "[Click here to see what other tasks are currently scheduled.](#)" link.
5. The Sensor tasks page will load which shows the status of the calibration. When the calibration is complete, each sensor will have a green box.

Sensor tasks

Clear/cancel all

Reference	elm_off	elm_on	connection_test	elm_calibrate	elm_spot_check	elm_read	Actions	Information
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Clear/cancel	
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Clear/cancel	
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Clear/cancel	

6. When all boxes are green, click the **Clear/cancel** all button to finish the task. This will not undue the ELM and is required for the system.

12.2 Other ELM Tasks

The following other tasks should only be performed by Eagle Eye trained users.

- Add - Allows adding of ELM sensors to the system after commissioning.
- Remove - Allows complete removal of ELM sensors after commissioning.
- Replace - Allows replacement of an ELM sensor.
- Spotcheck - Tests that the ELM is capable of receiving commands.

Appendix A - Measurement Intervals

Under normal float operation:

- **Parameter check** - This handles the measurement of the following metrics. These checks are performed as regularly as possible when the system is not doing other tasks (such as determining the electrolyte level). How regularly this occurs depends on how many sensors are being polled as well as what else is scheduled to happen. These are updated once every 15 minutes on the web UI.
 - Battery float voltage
 - Low resolution float current
 - Cell voltage
 - Cell negative post temperature
 - Ground fault
- **String voltage** - Not independently measured. Measured as the sum of all cell voltages. (Only when strings are in parallel)
- **Float current** - The float current in two ways:
 - Low-resolution float current: occurs in the regular parameter check.
 - High-resolution float current: is used and displayed as float current on the web UI. This is typically measured once a minute. 15-minute average displayed on the web UI.

- **Ambient temperature** - This is measured and updated in the web UI once every 15 minutes.
- **Cell/Connection resistances** - Both the cell resistance and connection resistance is measured once a day @ 1am admin time. This is displayed on the web UI as part of the 15 minute average update, even though there's no average. The reading will not change until 1am the next day.
- **Electrolyte alarm** - Electrolyte alarms operate independently from everything in the system
 - The ELM sensors are polled every 90 minutes. It is displayed at the next 15 minute web UI interval. This means that if an ELM alarm clears, it may take up to 105 minutes to clear in the webserver.
 - If there is a reported low electrolyte level, the sensor is reset.
 - If there are 4 consecutive ELM resets, we then raise an alarm.

Under discharge conditions:

- **Parameter check** - During discharge conditions - parameter checks take priority over other kinds of readings. The system enters SAM (slope acquisition mode), where it measures reasonably quickly and average every 5 consecutive readings for a particular sensor for a particular metric and stores it. It is updated on the web UI every 30s or so. This mode lasts for 5 minutes - although this period can be extended under a number of circumstances. After this, the parameters begin to operate as per normal float operation.
- **String voltage** - Not independently measured. Measured as the sum of all cell voltages. (Only when strings are in parallel)
- **Float current** - as per float - except high-resolution float current this controls the exit criteria for the discharge
- **Ambient temperature** - As per float
- **Resistances** - Not measured
- **Electrolyte alarm** - Not measured

Appendix B - Example Reports

Vigilant NERC Report

Metadata

Battery Name	Sandbox Battery	Manufactured Date	2022-10-26
Model	FNC 142X	Install Date	2022-10-26
Manufacturer	Hoppecke	Report Date	2022-10-26 14:42:18
Nominal Voltage	1.2	Reporting System	Vigilant BMS
Nominal Capacity	28.0	System Version	1.3.10-dev-578c6af29383866b1da7350c7b57b2805c603b4b
Ambient Temperature (°F)	69.1	Report Version	1.3
Average Post Temperature (°F)	66.9		

Station DC Supply PRC-005-6 Compliance Summary

Battery Float Voltage	Warning	Cell Voltage	Fail
Battery Continuity	Pass	Cell Resistance	Pass
Post Temperature	Pass	Electrolyte Level	Pass
Ground Fault	Pass	Station DC Supply	Warning

Station DC Supply TPL-001-5 Compliance Summary

Battery Continuity	Pass	Station DC Supply	Warning
--------------------	------	-------------------	---------

Summary Data

Battery Voltage (V)	Battery Current (A)	Ambient Temp (°F)	Ground Fault
28.24	-0.21	69.1	Pass

Cable & Intertier Data

ID	Interconnection Type	Resistance (μΩ)
1	Cable	45.51
11	Intertier	232.37
21	Cable	63.74

Battery & Strap Data

Min	1.37 (Cell 16)	0.15 (Cell 2)	66.36 (Cell 15)	11.94 (Cell 3)
Average	1.42	0.27	68.42	56.17
Max	1.45 (Cell 11)	0.33 (Cell 11)	71.32 (Cell 20)	204.32 (Cell 6)
Cell ID	Cell Voltage (V)	Cell Resistance (mΩ)	Post Temperature (°F)	Strap Resistance (μΩ)
1	1.43	0.24	70.18	cable connection
2	1.38	0.15	68.70	50.25
3	1.40	0.24	67.88	11.94
4	1.42	0.27	66.78	51.63
5	1.41	0.24	68.21	35.75
6	1.45	0.32	67.36	204.32
7	1.43	0.26	69.89	54.56
8	1.41	0.28	70.37	30.93
9	1.40	0.28	70.13	31.91
10	1.43	0.32	68.18	36.03
11	1.45	0.33	67.79	intertier connection
12	1.43	0.25	67.40	42.33
13	1.41	0.23	67.38	37.55
14	1.41	0.24	68.81	27.58
15	1.43	0.33	66.36	28.95
16	1.37	0.23	69.72	193.45
17	1.44	0.29	67.76	33.78
18	1.44	0.30	67.02	59.22
19	1.41	0.26	67.21	45.48
20	1.41	0.30	71.32	35.42