SHOCKWATCH®

Damage Prevention and Safety Solutions

OpsWatch Operator User Manual

SHOCKWATCH®
Damage Prevention and Safety Solutions

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1. Introduction

During operation, some level of vibration in motor, pumps, conveyor systems or any mechanical system is a natural occurrence. There are normal vibration patterns when equipment is in a start-up mode, when it is in operation or during shut-down processes, however changes in a vibration pattern can be an early warning signal that should trigger preventive maintenance before equipment failure occurs.

Until now, vibration analysis has been complex and required highly trained individuals to interpret the data. The OpsWatch impact and vibration monitoring system simplifies the process of identifying vibration related issues and provides real-time notifications that vibration has reached unacceptable levels or than an impact has occurred to your equipment.

The OpsWatch system monitors and records low-frequency, seismic vibration and shock and identifies changes in equipment operating conditions. Monitor for over-the-threshold impact events or stream vibration measurements over a Wi-Fi connection for characterising vibration over time. When conditions are outside of normal range, user alerts allow for quick decisions to be made and actions to be taken. Information from the OpsWatch system combined with the right preventive maintenance program reduces the costs associated with unplanned downtime.

An intrinsically safe version of the OpsWatch hardware is available (OpsWatchEx) for applications that require Zone 1 approvals. The functionality and specifications of both versions are the same unless otherwise noted.

1.1. Description and Features

The OpsWatch system combines advanced tri-axial piezoelectric accelerometer technology and software with a world-class vibration and shock monitoring solution. The OpsWatch unit records vibrations and impacts and the data is sent via Wi-Fi to the OpsWatch web-hosted software. Data can be reviewed, post processed and exported into .csv files if desired.

User defined vibration and impact alarm levels, frequency of data collection, and cut-off frequency filters are set for each specific application. When an alarm level is exceeded, a visual alarm in the software will alert the user and store the data for future analysis. Email notifications can be sent to the person or team that needs to know when something unexpected is happening to the equipment being monitored.

The OpsWatch system is available as a cloud-based software solution or a server based solution. If the software is to be installed on your company server, please contact SpotSee Technical Support to schedule an installation planning session.

Features:

- Real-time monitoring for vibration and shock
- Adjustable alarm thresholds for vibration and shock
- Live streaming of accelerometer data
- Wi-Fi enabled hardware and cloud-hosted software
- Tamper-proof hardware design

1.2. Technical Specifications

OpsWatch Unit	
Operating Temperature Range (Standard Unit)	-40°C to 85°C
Operating Temperature Range (Hazardous Area)	-40°C to 60°C
Enclosure Rating	IP67
Case Material	Aluminum
Dimensions (without connectors or mounting)	150 x 110 x 39 mm
ATEX Dimensions	150 x 110 x 39 mm
Standard Dimensions	110 x 110 x 40 mm
Weight	1350 grams
ATEX Weight	544 grams
Standard Weight	1180 grams
Drop Test Survival	1 m
Flash Memory	8192 Kbytes

Communication Interface	
WiFi Interface	IEEE 802.11
Operating Frequency	2.412 - 2.484 GHz
Data Rate	1.25 Mbps

Power	
Batteries (Temporary Power)	2 x 3.6V lithium thionyl chloride; 2.2 Ah
INTRINSICALLY SAFE ENVIRONMENT WARNING!	Only SAFT LS145000 cells are approved for use with this device. They shall only be replaced when the equipment is in a non-hazardous area or when an explosive atmosphere is shown to be absent.

External Power (Non intrinsically safe environment)	
External Power Source Voltage	6 - 30V
External Power Source Average Current (normal @ 28V) (clearing or downloading @ 28V)	 35mA 50mA
External Power (Intrinsically Safe Environment)	Ui = 28V, Ii =100mA Pi = 1.2W; Ci = 0; Li = 0

EMC	
CISPR32: Ed 2.0 (2015-03)	
CISPR24: Ed 2.0 (2015-04)	
ICES-003 Issue 6 (2016-01)	
FCC Rules 47 CFR: Parts 15-B	
INTRINSICALLY SAFE ENVIRONMENT WARNING!	EMC tested with SpotSee approved antenna. This antenna is the ONLY one certified for use in an intrinsically safe environment.

Accelerometers	
Sampling Rate	5000 samples/second (max)
Low Frequency Cut-off (-3dB)	1. 0.5 Hz
High Frequency Cut-off @ Maximum Filter Setting (-3dB 10 g range and above)	900 - 1100 Hz
High Frequency Cut-off @ Maximum Filter Setting (-3dB 3 g range and above)	480 - 530 Hz
High Frequency Cut-off @ Maximum Filter Setting (-3dB 1 g range and above)	180 - 220 Hz
High Frequency Cut-off @ Minimum Filter Setting (-3dB)	20 - 25 Hz
High Frequency Roll-off	-9 dB/Octave
Resolution (% of Full Scale)	0l1 % 1% for Peaks
Scale Factor Accuracy at 5g (event record)	±2%
Additional Error Other Ranges	±2%
Additional Error Peak Capture	±5%
Change of Scale Factor Over Time	±4%
Acceleration Ranges	±1g, ±3g, ±10g, ±30g, ±100g, ±200g
Alarm Threshold (% of Range)	5 - 95%

2. Getting Started

2.1. Hardware Setup

Preparing to use the OpsWatch hardware consists of three steps:

1. Installing the backup batteries
2. Mounting the OpsWatch hardware
3. Powering the unit

Battery Installation

While the OpsWatch hardware is powered by an external power supply, it is critical that the recording unit have batteries installed. These batteries preserve date and time on the OpsWatch unit in the event of an unexpected power loss. Please see Section 1.2 for the battery specifications. The expected battery life when external power loss has occurred is 12 months. The batteries do not supply power to the OpsWatch unit when external power is applied. Batteries should be replaced in the OpsWatch unit as part of the overall maintenance plan.

The battery compartment is located on the underside of the OpsWatch unit. The image below illustrates the standard OpsWatch hardware. Remove the four securing screws and lift the battery cover clear. Ensure the battery orientation is correct when inserting the batteries into the unit. Ensure the rubber seal is correctly positioned, replace the battery cover and insert the four screws. The screws should be tightened evenly to 25 cNm torque.

Mounting

The OpsWatch unit should be mounted directly to the product being monitored in a structurally sound location. The OpsWatch can be secured with magnetic mounts or with mounting screws and isolation bushings. If holes cannot be drilled into the equipment being monitored, the magnetic mount is the recommended method.

When mounting the OpsWatch unit, the x-y-z orientation of the unit is marked on the device itself. A best practice is to note the orientation of the OpsWatch unit in regard to these axes.

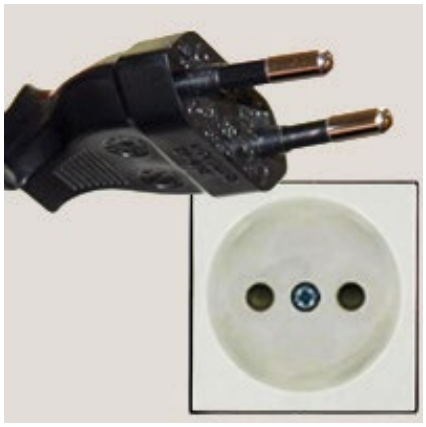
Safety Notice

Note when using magnetic mounts: Magnetic fields are present. Do not locate near pacemakers or other equipment that is sensitive to magnetics.

Magnetic mounts create a pinch hazard. Exercise caution to avoid pinching hands and fingers when mounting the product.

External Power

The power cable specified at the time of ordering is included with the OpsWatch unit. Power cable options are available with regional plug types. Examples include North America & Japan (Type B); Europe, South America and Asia (Type C); United Kingdom, Malaysia & Singapore (Type G). An unterminated power cable for connecting directly into facility power is also available.



2.2. OpsWatch Software

The OpsWatch Cloud software allows you to reach your data from any device that can access the internet and it guarantees that you have access to the most recent version of the software (enhancements, bug fixes). The OpsWatch cloud receives data from each reporting device.

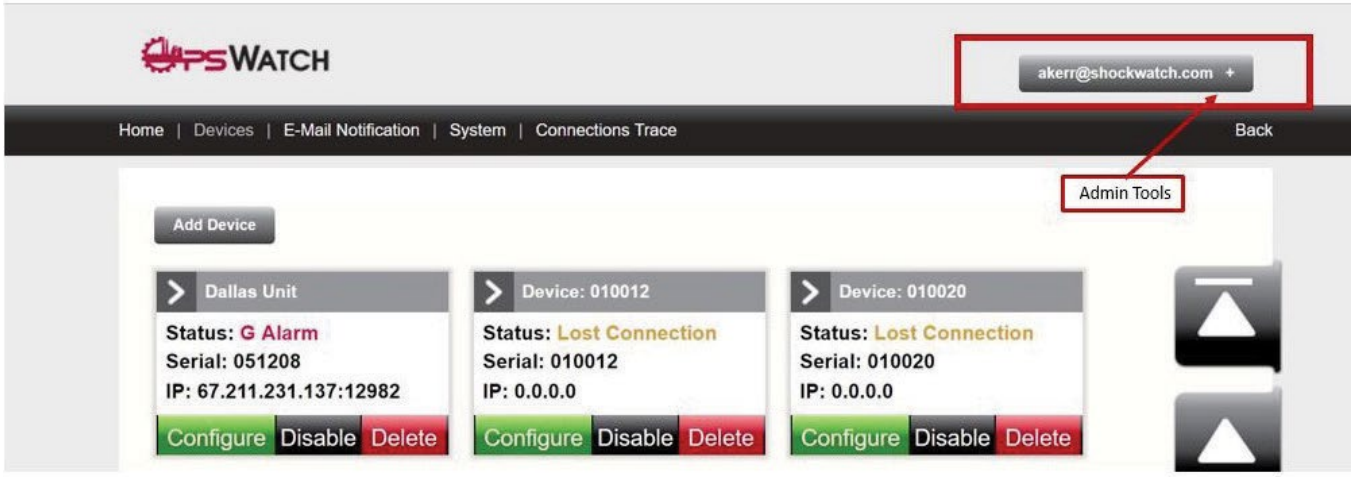
The OpsWatch hardware is configured over the USB port through a ClickOnce application which can be accessed from the OpsWatch cloud. In the event the unit must be accessed when USB is not available it is possible to configure the unit by placing the unit into Software Access Point (SoftAP) mode and configuring the unit though a webpage hosted on the OpsWatch unit. Device configuration is discussed in Section 2.3 Configuring the Hardware.

NOTE: Data is archived for 30 days on OpsWatch.net. Customers should export any data that they wish to save for longer periods of time.

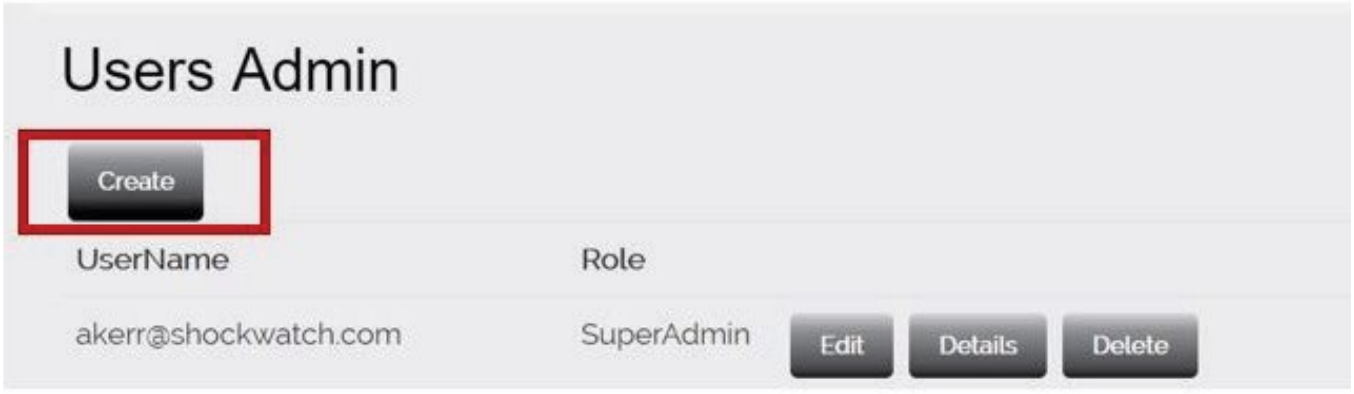
2.3. User Management

When an OpsWatch system is first ordered, the SpotSee team will ask the customer for the name and email address for the person acting as the company administrator. This person will be responsible for adding and editing system users.

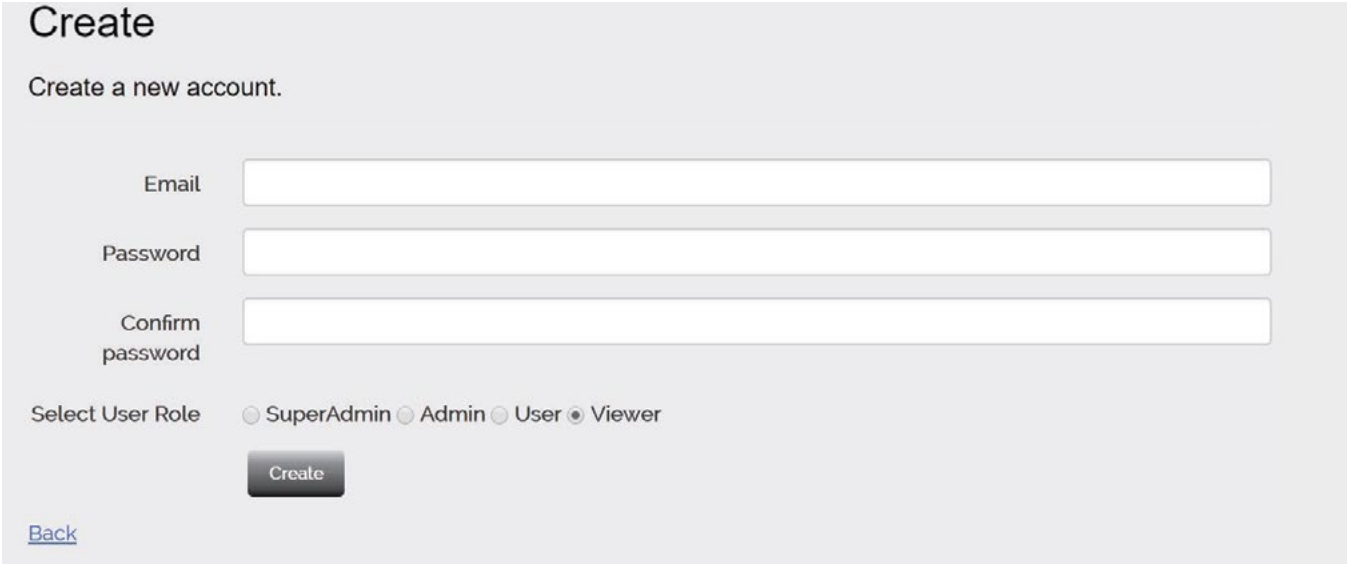
With the admin access, log into the cloud software at opswatch.net. Click on the "+" sign after the admin log-in name to open the admin tools. From the pop-up list, select User Admin.



A screen will open and allow the super user to create new system users.



Click CREATE and complete the form to set up the new user.



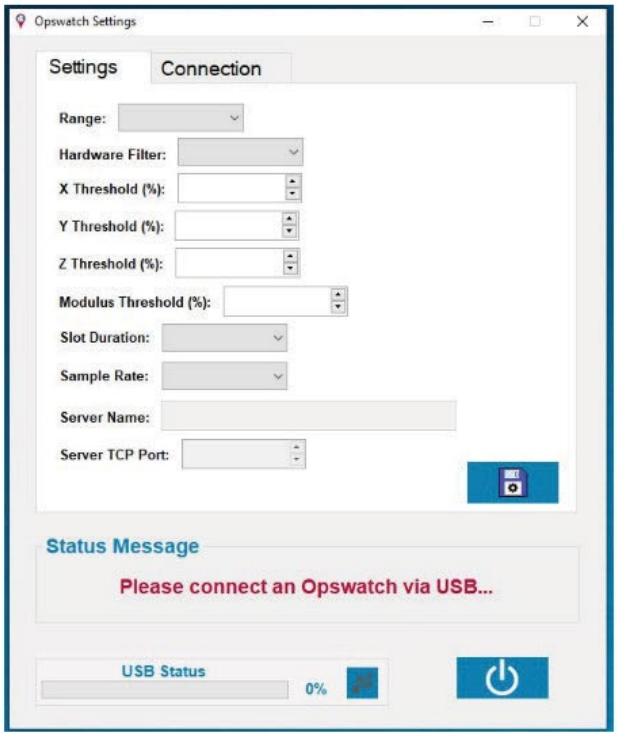
User roles in the system are as follows:

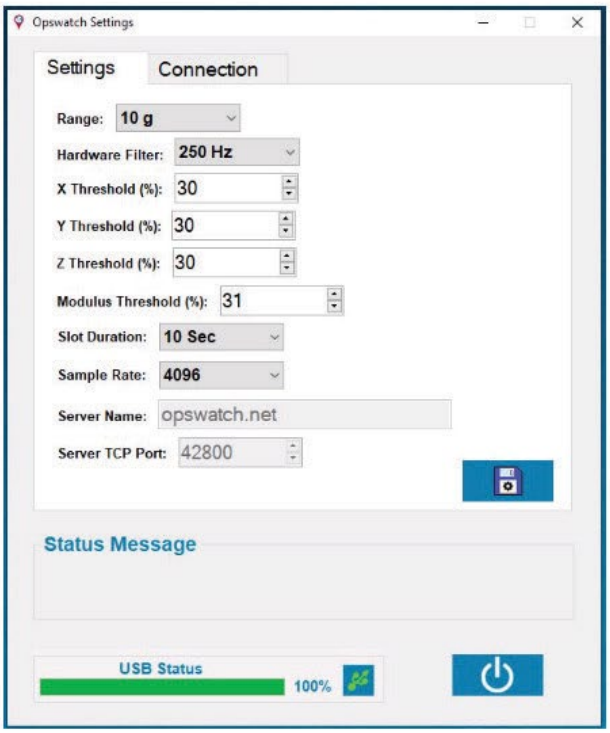
- **SuperAdmin** – SpotSee level access to set up new customer accounts and for aiding customers with troubleshooting.
- **Admin** – Company specific user administrator has the ability to add users, devices, etc. (they only have visibility within their company). Able to edit device thresholds and acknowledge alarms.
- **User** – Customer who has the same rights as an admin with the exception of creating/deleting/editing users for their company.
- **Viewer** - This user can view OpsWatch screens but cannot access the Settings menu. The Viewer cannot acknowledge alarms.

2.4. Configuring the Hardware

In order to configure that OpsWatch unit, remove the metal cap on the right side of the device to expose the USB port. Connect the OpsWatch to a computer and navigate to opswatch.net. The ClickOnce application can be located at the top of the screen.

First, complete the Settings portion of the setup.





The user will set the range, filter, impact alarm level, sample period (slot duration) and sampling rate. The settings are explained below:

Range - The range setting determines the scale that the unit will use when recording impacts. In general, the larger and heavier the equipment being monitored, the lower the impact level that will damage the equipment. In the example above, the range setting is 30g which will allow the unit to record from 0g to 30g.

Hardware Filter – OpsWatch contains a configurable hardware filter that eliminates higher frequency impacts which may simply be noise and not relevant to the application. If vibration is a concern, the filter should not be set lower than 250Hz. Filter options higher than 250Hz are included for specific applications. It is recommended that you discuss your specific application with SpotSee Technical Support before setting above 250Hz.

X Threshold (%) – This setting defines the level of impact on the X-axis that is considered an alarm event. It is set as a percentage of the overall scale range. In the example above, an impact of 3G would be considered an alarm (10% of 30G).

Y Threshold (%) – This setting defines the level of impact on the Y-axis that is considered an alarm event. It is set as a percentage of the overall scale range. In the example above, an impact of 3G would be considered an alarm (10% of 30G).

Z Threshold (%) – This setting defines the level of impact on the Z-axis that is considered an alarm event. It is set as a percentage of the overall scale range. In the example above, an impact of 3G would be considered an alarm (10% of 30G).

Modulus Threshold (%) – The modulus is the vector sum of the x, y, and z axes. It is calculated as $\sqrt{(x^2+y^2+z^2)}$. This setting defines the level of impact for the modulus that is considered an alarm event. It is set as a percentage of the overall scale range. In the example above, an impact of 3G would be considered an alarm (10% of 30G).

Slot Duration – A slot is a time interval. Slot duration is the period of time over which the peak impact will be recorded. In the example above, the slot duration is set for 10 seconds so the OpsWatch will look across every 10 second period for the largest impact (x, y and z axes) and will record the maximum peak for that period.

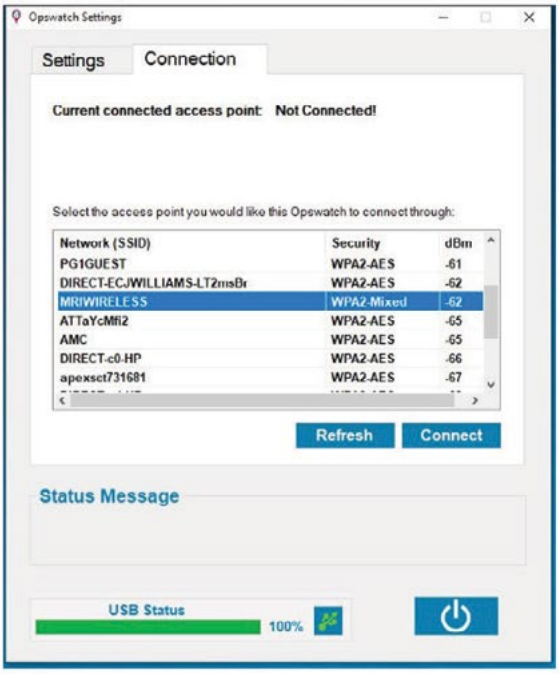
Sample Rate – The sampling rate determines how fast the OpsWatch will collect data. In the example above, the OpsWatch will sample data coming into the unit accelerometers at a rate of 4092 samples per second

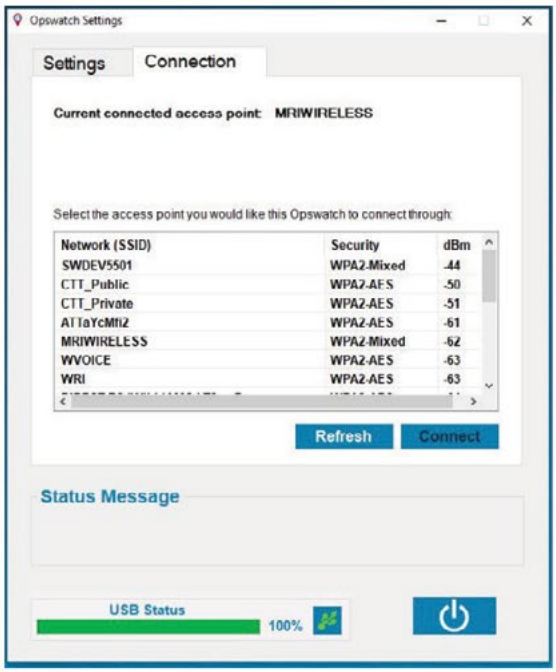
Server Name – Server name or IP Address of the server running the OpsWatch software. When utilising the web-hosted version of the OpsWatch software, the server name is opswatch.net. If the server-based software is being utilised, the server name is the IP address of the server that is running the software. This information should be provided by your IT department.

Server TCP Port – The port that the software uses on the server to “listen” for OpsWatch devices. Once established, this port should not be changed as it is the port used to establish first time connections. The default setting for opswatch.net is 42800. When using the cloud-hosted software, do not change this setting.

Next, set up the wireless connection for the unit by clicking on the Connection tab in the ClickOnce application.

Refresh will update the list of potential wireless networks. Select the network, enter the network password and the unit will be connected.





Disconnect the USB cable, replace the USB port cover and you are ready to start monitoring.

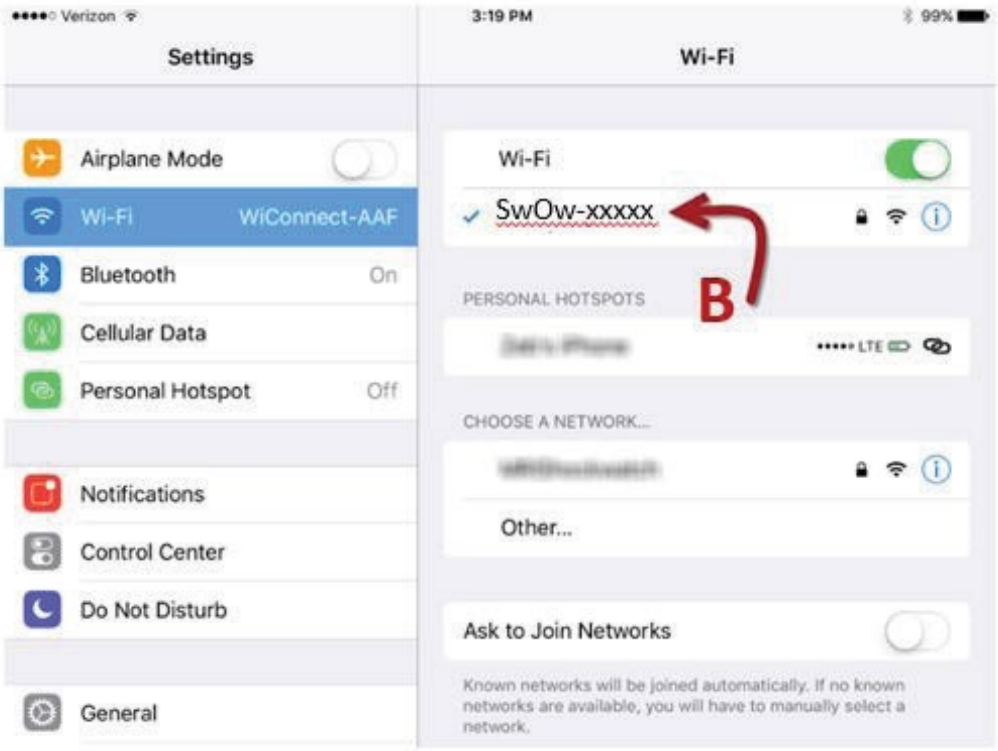
If the unit must be reconfigured and there is no computer available, it is possible to put the OpsWatch unit into SoftAP mode and configure the unit with a smartphone. Instructions for this configuration follow.

Note: Please follow the steps for configuring the hardware in the order presented for best results. Screen shots for the setup process may be slightly different for various wireless devices. The fundamental process will remain the same. It is recommended that a cellular enabled device be put into airplane mode when going through the setup process.

When prompted for the network password, enter the default password “password” and join the network.

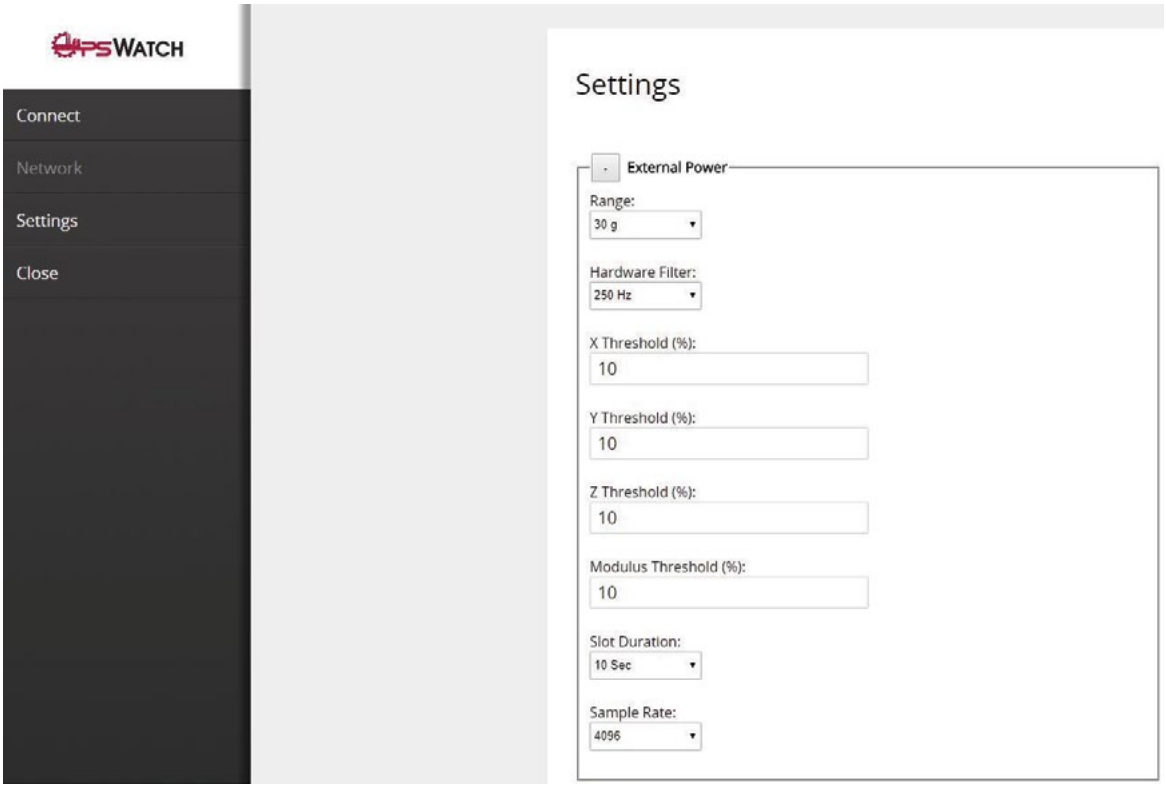
Connect to this network and you have created a network connection to the OpsWatch.

Confirm that you are connected to “SwOw-xxxxxx”. *See B below.*

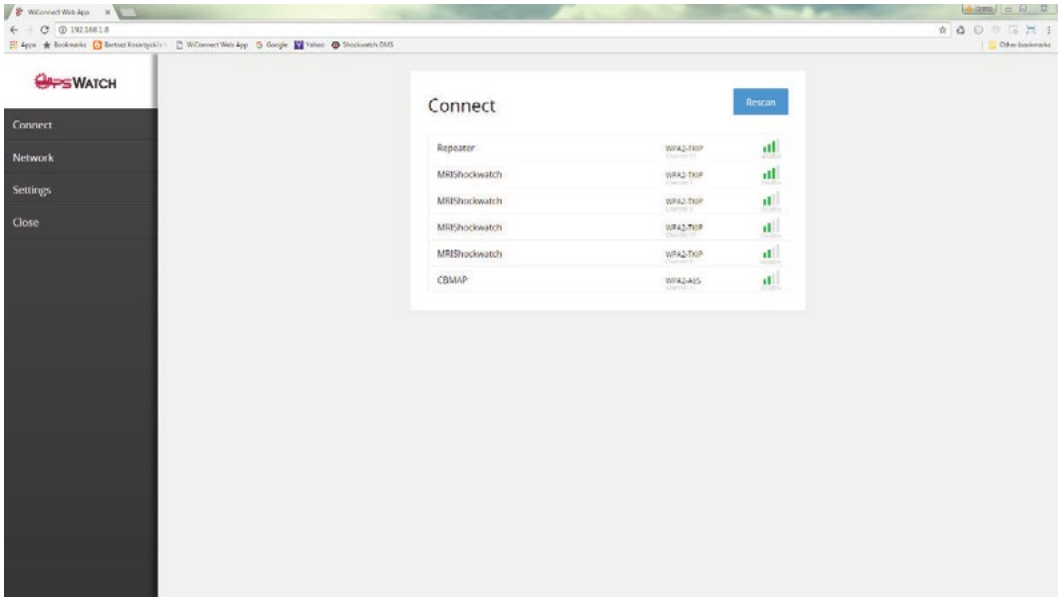


Next open your web browser and go to setup.com (10.10.10.1). This web page will open the unit setup information.

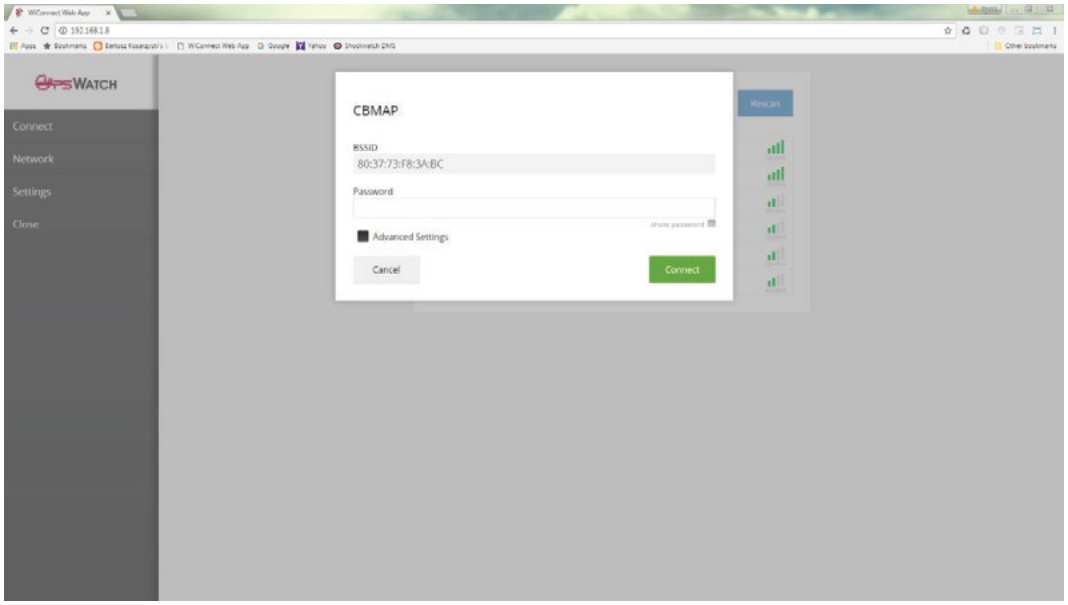
Select Settings from the menu on the left to configure the unit for use.


OPSWATCH
Connect
Network
Settings
Close
Settings
External Power
Range:
30 g
Hardware Filter:
250 Hz
X Threshold (%):
10
Y Threshold (%):
10
Z Threshold (%):
10
Modulus Threshold (%):
10
Slot Duration:
10 Sec
Sample Rate:
4096

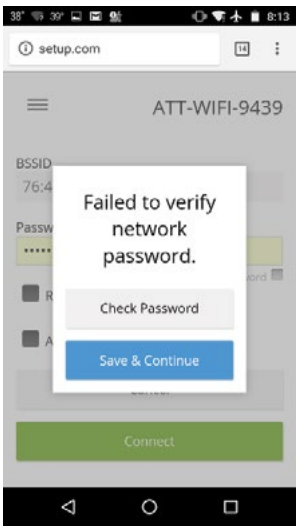
Next, connect the unit to your company's network. Select Connect from the menu on the left, and the page will display the Wi-Fi networks within range. Click on the appropriate network to connect.



When prompted, enter your network password and click Connect. You will get a message confirming that a connection was successfully made.



If you receive a message stating that the network password failed verification, the first step is to verify your password. If your password is correct, click Save & Continue and the connection should be established.

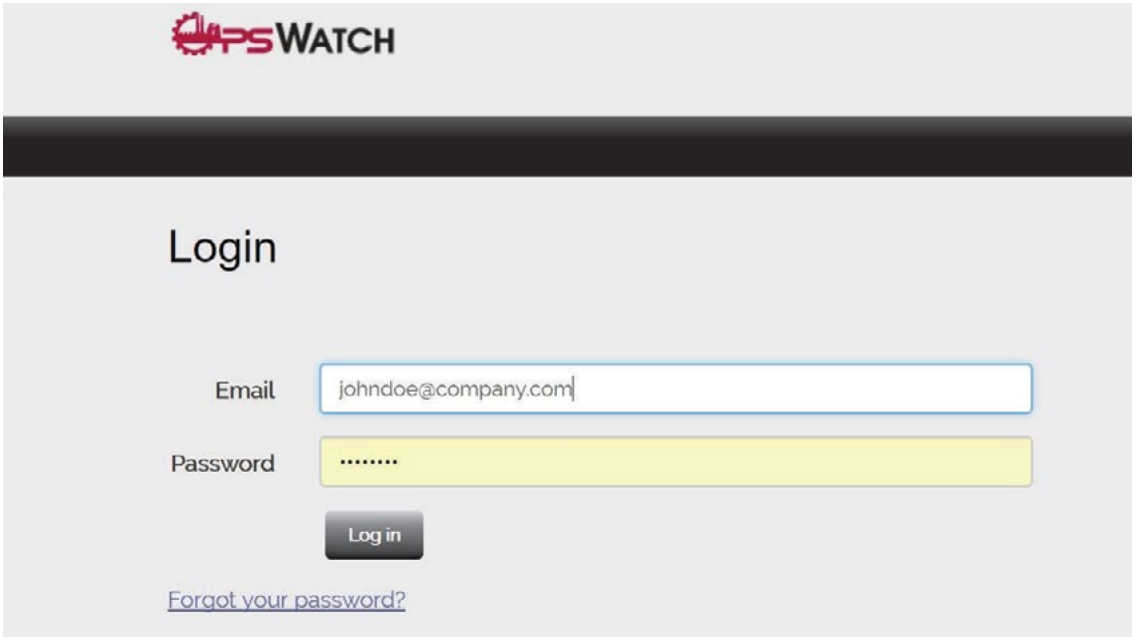


3. Navigating the OpsWatch Software - OpsWatch.net

3.1. Logging In

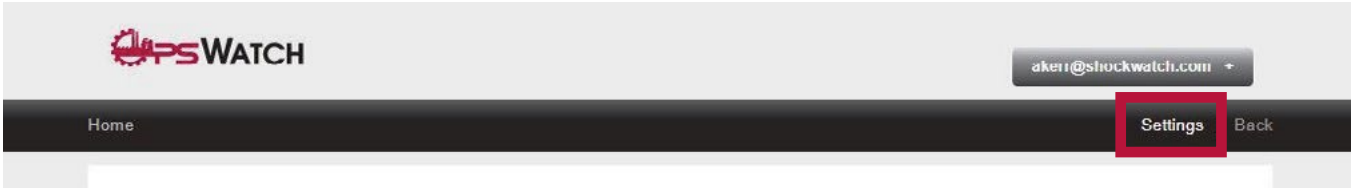
Once you have your unit(s) configured go to http://opswatch.net and enter your username and password. If you forget your password, click on "Forgot your password?" to reset it.

Note: An account administrator will be set up by SpotSee when your first OpsWatch unit is ordered. The account administrator will set up new users in the system. If you do not have an account, please contact your company's administrator.

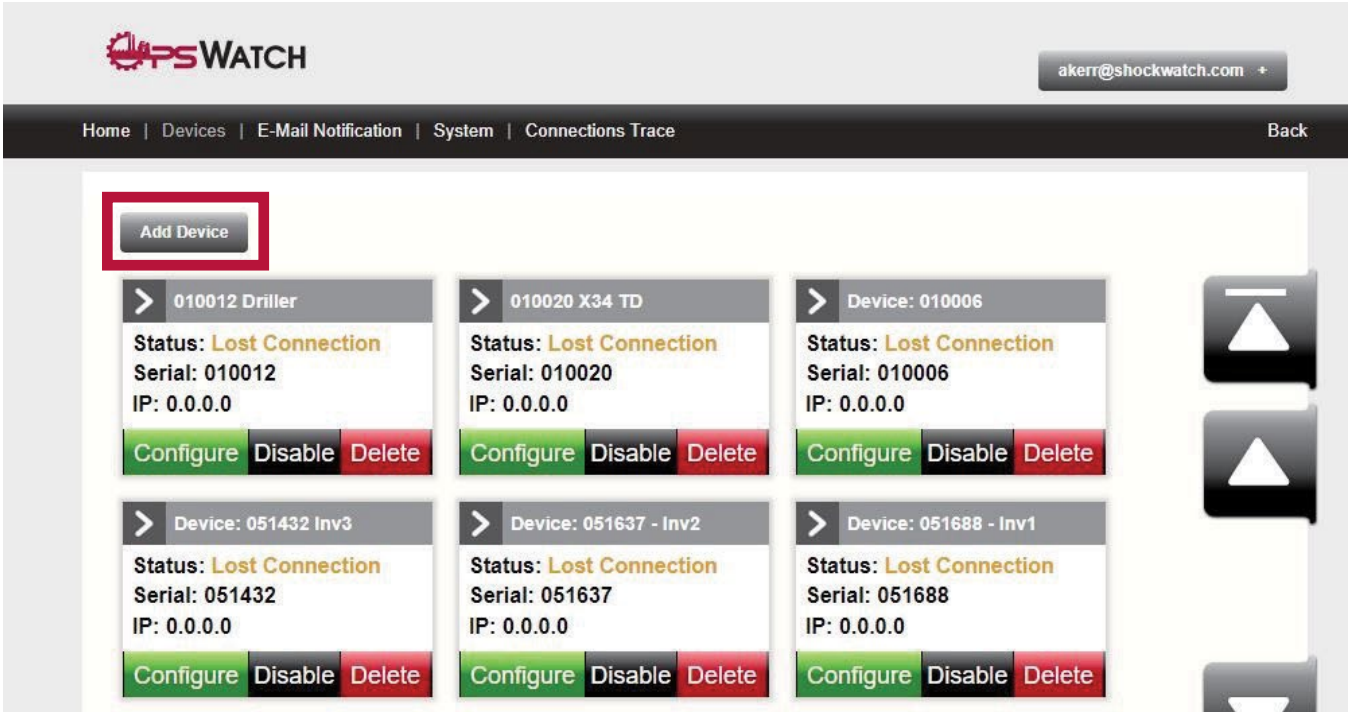


3.2. Adding OpsWatch Units

After logging in, hardware units should be added to the account. Click on the Settings tab.



The software will open a page that allows you to add a new device. *Note: On this page you will see any devices that are currently associated with your account.* To add a new device, click on Add Device.

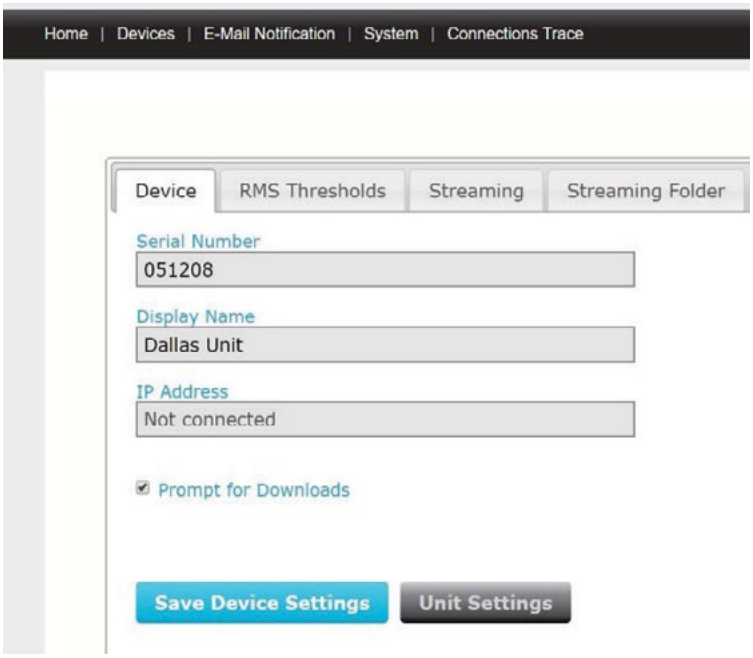


A window will open that allows you to enter the unit serial number (found on the aluminium case of the OpsWatch) and display name.

If the serial number is less than six digits long, please enter a leading 0 in front of the case number. For example, serial number 51208 would be entered as 051208.

The display name should be something meaningful to the user. It can describe the equipment being monitored. For example, Conveyor #1.

After adding the device, select the Configure tab. In the Device tab, there is a checkbox Prompt for Downloads. A best practice is to check the box during the initial system setup and once the monitoring system is fully implemented, the box may be unchecked. There are instances when you may wish to keep the box checked. For example, if you are concerned that the wireless connection will be compromised, you should leave the button checked.



When the connection is restored, the system will give the user two options: Download the Data or Clear.

Download the Data will bring all the recorded information into the OpsWatch Cloud.

Clear will erase all the unit's data.

3.3. Disabling or Deleting OpsWatch Units

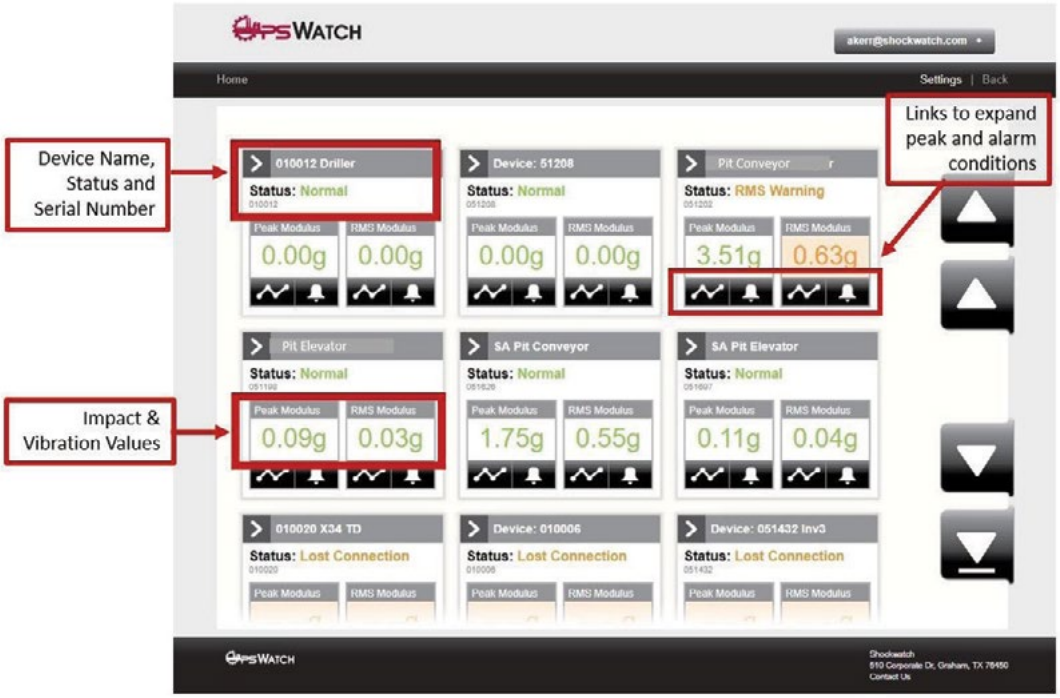
From the settings screen, it is possible to disable or delete OpsWatch units from the OpsWatch cloud.

Click Disable if you wish to suspend a unit in the system. When the units are disabled, they remain in cloud database but do not record any information. An example of a possible reason to disable a unit would be if the unit has been sent back to SpotSee for calibration or repair.

Click Delete if you no longer wish to have the unit associated with your cloud account. An example of a possible reason is that the unit is not being used to monitor a system and you wish to return it to your general inventory for redeployment. ***Note: If you delete a unit, you will also delete all information associated with it in the OpsWatch Cloud.***

3.4. OpsWatch Homepage

On the homepage, you can view the details for each of your OpsWatch units. The screen provides an overview of the devices connected (name, status and serial number); vibration (RMS) and impact (peak) data; and has links that allow you to expand your view of the vibration and impact data. Each of these aspects are detailed below.



3.5. Vibration and Shock

The OpsWatch recording device measures both vibration and impact and reports those conditions to the OpsWatch software. These values are reported as RMS Modulus for vibration and Peak Modulus for impact.

Impact Values - Peak

The impact values are recorded for all three axes (x, y, and z) and the modulus is calculated from those values.

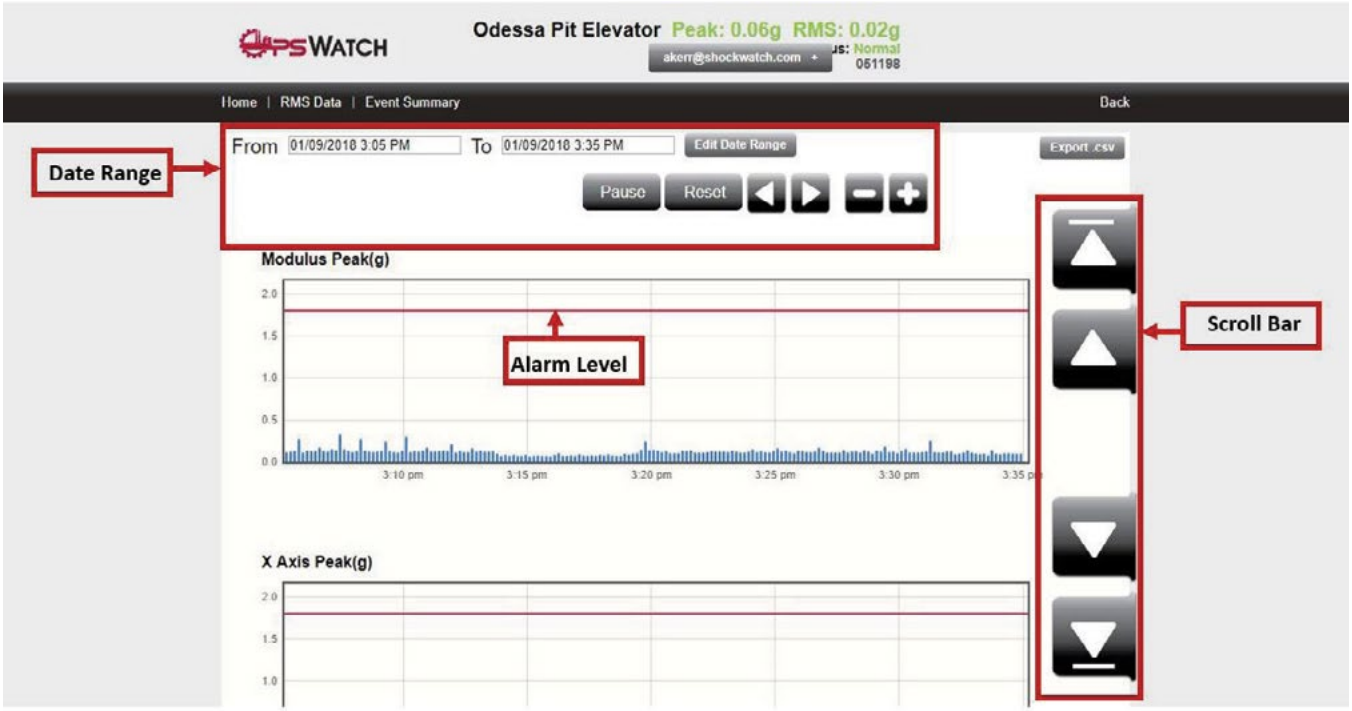
Note: The modulus is the vector sum of the x, y, and z axes. It is calculated as $\sqrt{(x^2 + y^2 + z^2)}$*.*

In the example below, the impact peak modulus being reported over the specified time period (slot) is 0.05g. To view the time slot history, click on the 3-bar graph.

The Peak Data page will open and display the impact values over time. With a live refresh rate, the page will update at the end of every slot as defined by the user. See Page 14 for details.

The page shows the values for modulus, x-axis, y-axis and z-axis peaks. The four graphs can be viewed using the scroll bar on the right side of the page to navigate the screen. The red line across each graph illustrates the alarm threshold level set by the user. See Pages 14 and 15 for details.

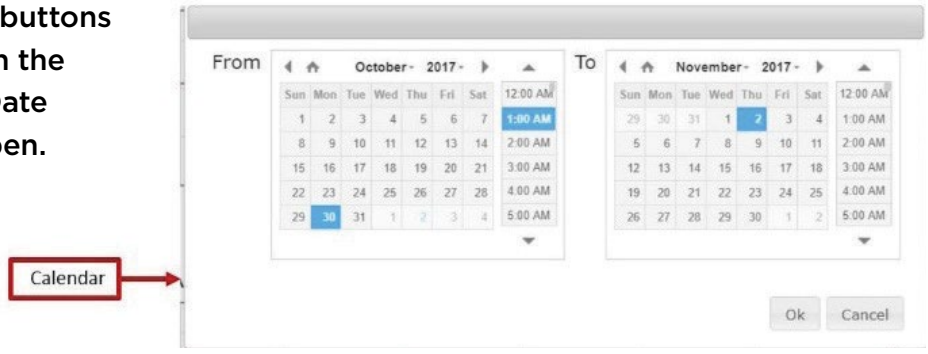
The graph displays the last 30 minutes of data. To look for a specific date and time or to look over a longer time period, use the Date Range feature.



To search for a specific time, click Pause to stop the live refresh.
Note: Pausing the live refresh rate does not result in data loss.

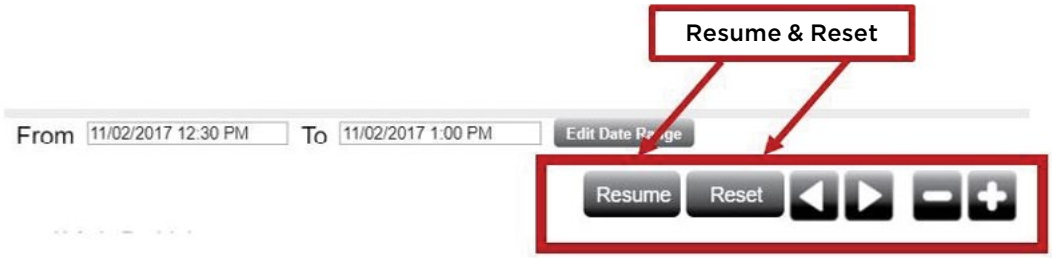
The scroll and zoom in / out buttons can be used to move through the data or you can select Edit Date Range and a calendar will open.

Enter the date and time of interest then click OK.



The OpsWatch software will display the data stored for that date and time. *Note: It will take a few minutes to build the graph. The further back in time you go, the longer it will take to render the data.* This feature allows you to compare conditions over a period of time and spot potential trends. The example below shows that there were impacts to the equipment being monitored on October 30, October 31 and November 1 but there were no impacts on November 2.

Reset allows you to reset the graph to the current time period but does not turn the live refresh on. Resume turns the data refresh back on. *Note: It will take a couple minutes for the graphs to rebuild themselves depending on how long the data feed was paused.*



Impact Values - Alarm

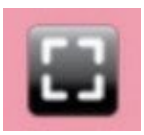
When an impact occurs that is above the user defined threshold, the OpsWatch software will generate an alarm. When an alarm is generated, the Status will display that the unit has experienced an out of tolerance condition and the Peak Modulus will display in RED. A unit with an Alarm Event will show Alarm status and Peak Modulus in RED. To view the alarm events for the unit, click on the Alarm icon. See example below:

The Events screen will open and display impacts that exceeded the user defined threshold. From this screen, you may examine each specific impact event. The top graph represents each impact event peak. Click on an Event (Peak g) and the acceleration vs time curve for the selected event will be displayed below.

Note: The event selected in the Event Peak g graph will become slightly less transparent in colour (red or green). The time of occurrence is the same in both graphs. These methods ensure that you are examining the impact of interest.

Alarms will appear in RED until the user selects the Acknowledge Event(s) button. This feature ensures that an unacceptable impact does not go unnoticed. Once the alarm has been acknowledged, it will appear GREEN. Even after it has been acknowledged, the data is available for review and analysis.

Navigation cursors in the Selected Event screen allow you to move the event curve.

Left or Right	Up or Down	Zoom In or Out	Recenter
			

It is also possible to export the event data to a .csv file for additional post processing.
Note: Data is stored in the OpsWatch Cloud for 30 days, therefore, critical data should be exported to .csv files for archiving.

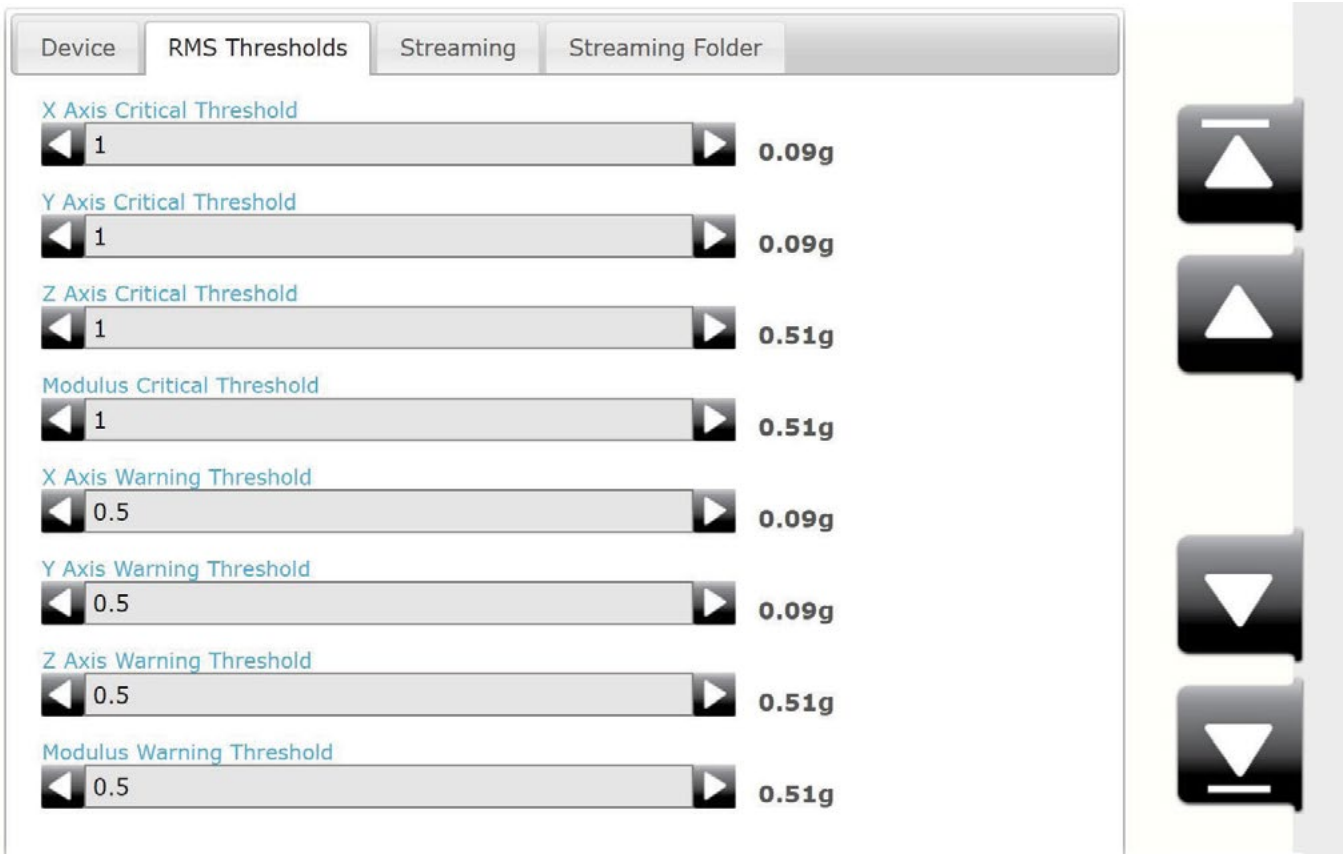
Vibration Values - RMS

Everything has a natural frequency which creates a vibration pattern that is considered "normal" for an object, however, when the vibration pattern changes this change can signal the need for preventative maintenance.

The OpsWatch unit measures underlying min peaks and calculates the Root Mean Square (RMS) value of the vibration. RMS is calculated as the square root of the average of the squared values of the vibration waveform. *Note: Calculating RMS vs storing the entire waveform is done to better manage the data.*

The RMS thresholds are set in the OpsWatch software. From the homepage, click on Settings, locate the unit of interest and the click Configure.

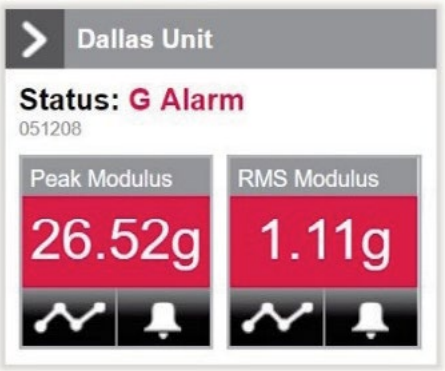
In the RMS Thresholds tab, enter the critical and warning levels (x, y and z axes and modulus) for your application. The Critical threshold must be set higher than the Warning threshold in all instances.



If the vibration levels exceed the warning level, the RMS Modulus field will turn AMBER and will display the RMS value. If the critical threshold is exceeded, the RMS Modulus field will turn RED. In the first example below, the unit has a warning alarm of 0.69g. In the second example, a critical RMS alarm was recorded at 1.11g.

WARNING

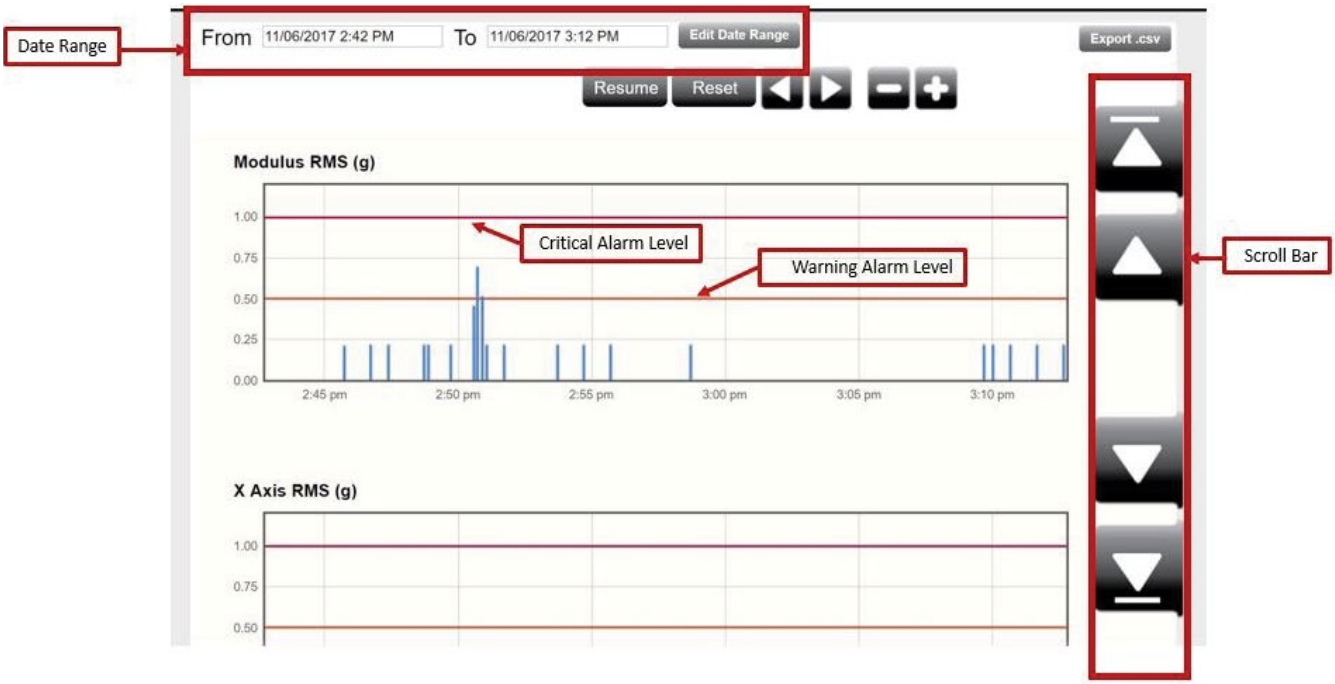
CRITICAL



To view the vibration data for a connected unit, click on the RMS graph icon.

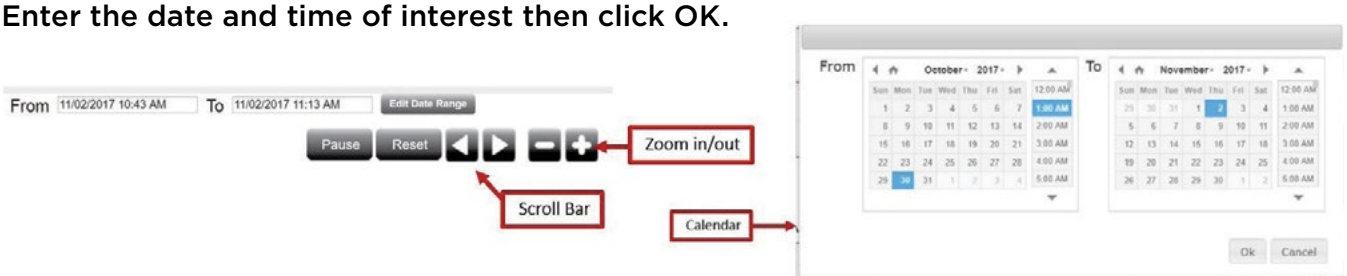
This page shows the RMS over time. The page will refresh its data at the end of each time slot. (See Page 15 for details).

The page shows the values for modulus, x-axis, y-axis, and z-axis RMS values. Use the scroll bars on the right side of the page to navigate the data. The amber line across each graph illustrates the warning level set by the user and the red line illustrates the alarm level set by the user. (See Page 24 for details).



The graph will display the previous 30 minutes of data. To navigate to a specific time period, use the Date Range feature.

To search for a specific time, click Pause to stop the live refresh. *Note: Pausing the live refresh rate does not result in data loss.* The scroll and zoom in / out buttons can be used to move through the data or you can select Edit Date Range and a calendar will open. Enter the date and time of interest then click OK.



The OpsWatch software will display the data stored for that date and time. *Note: It will take a few minutes to build the graph. The further back in time you go, the longer it will take to render the data.* This feature allows you to compare conditions over a period of time and spot potential trends.

The Export .csv button in the upper right of the page allows you to export the data into an excel file. An example of why you might export this data would be to import the data into a vibration system for additional lab testing.

Note: Data is stored in the OpsWatch Cloud for 30 days, therefore, critical data should be exported to .csv files for archiving.

Acknowledging RMS Alarms

If the RMS levels have triggered a Warning (Amber) or Alarm (Red), the alarm must be acknowledged by the user in order to clear the alarm condition. There are two ways to acknowledge the alarm conditions.

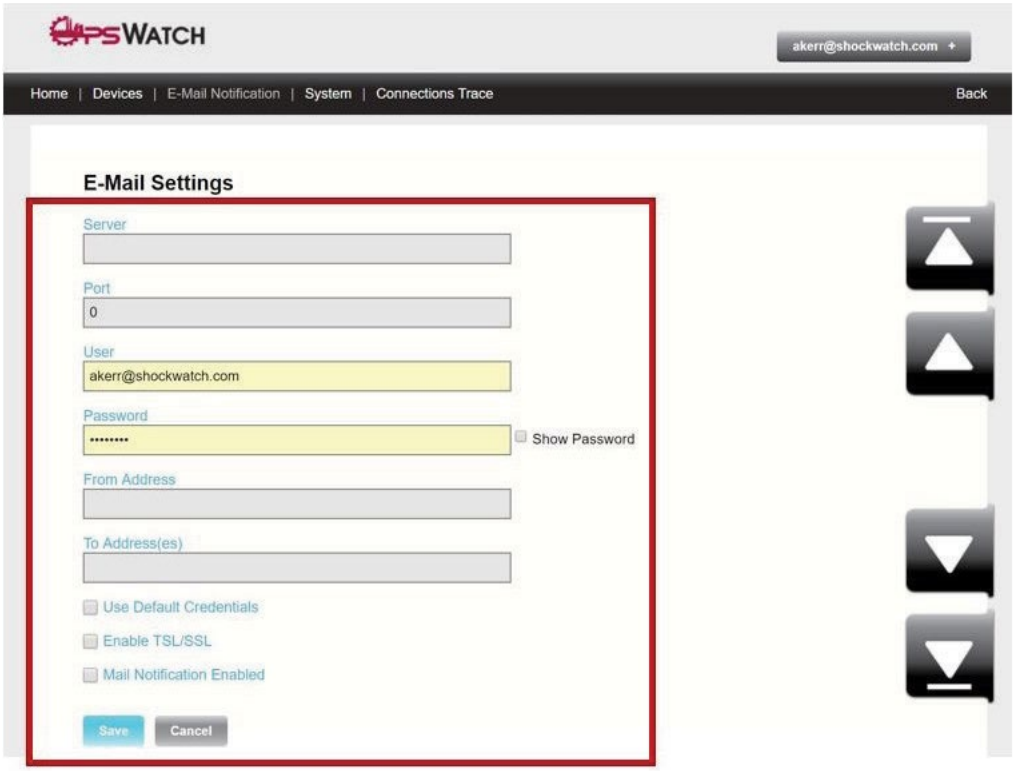
To clear an RMS Warning, click the Acknowledge Alarm icon on the home screen.

To clear an RMS Critical Alarm, click on the Graph icon to open the RMS graph page and then click Reset to clear the critical alarms.

Email Notifications

In the event the OpsWatch unit records a critical vibration (RMS) value or impact alarm (Peak), it is possible to set up an email notification such that the relevant team members are alerted.

Click on Settings and then click the E-Mail Notification tab. Complete the form to set up the email notification process. There may be multiple recipients in the "To Address(s)" field.



The following list provides an explanation of each field:

Server – E-mail server's name or IP address.

Port – Port the e-mail server uses for outbound emails.

User – Account on the e-mail server that the emails will send from.

Password – Password for the User account.

From Address – Address the alerts will show they are coming from.

To Address(es) – Address or addresses that will receive the alerts. Multiple addresses must be separated by a semicolon.

Enable TSL/SSL – Enables TLS/SSL if the server uses these security protocols.

Mail Notification Enabled – When this box is checked, the e-mail notifications will be active.

Email to Text Message Conversion

If it is desirable to receive a text message instead of, or in addition to, an email message, the chart below outlines what email address would be entered based on your phone number and carrier.

Carrier	SMS gateway domain	MMS gateway domain
Alltel	[insert 10-digit number]@message.alltel.com	[insert 10-digit number]@mms.alltelwireless.com
AT&T	[insert 10-digit number]@txt.att.net	[insert 10-digit number]@mms.att.net
Boost Mobile	[insert 10-digit number]@myboostmobile.com	[insert 10-digit number]@myboostmobile.com
Cricket Wireless		[insert 10-digit number]@mms.cricketwireless.net
Project Fi		[insert 10-digit number]@msg.fi.google.com
Sprint	[insert 10-digit number]@messaging.sprintpcs.com	[insert 10-digit number]@pm.sprint.com
T-Mobile	[insert 10-digit number]@tmomail.net	[insert 10-digit number]@tmomail.net
U.S. Cellular	[insert 10-digit number]@email.uscc.net	[insert 10-digit number]@mms.uscc.net
Verizon	[insert 10-digit number]@vtext.com	[insert 10-digit number]@vzwpix.com
Virgin Mobile	[insert 10-digit number]@vmobl.com	[insert 10-digit number]@vmpix.com
Republic Wireless	[insert 10-digital number]@text.republicwireless.com	

Streaming Data

In some applications, it is desirable to capture raw data from the OpsWatch accelerometers for additional analysis. The OpsWatch system allows you to gather this information in two ways: Stream Now or Scheduled Stream

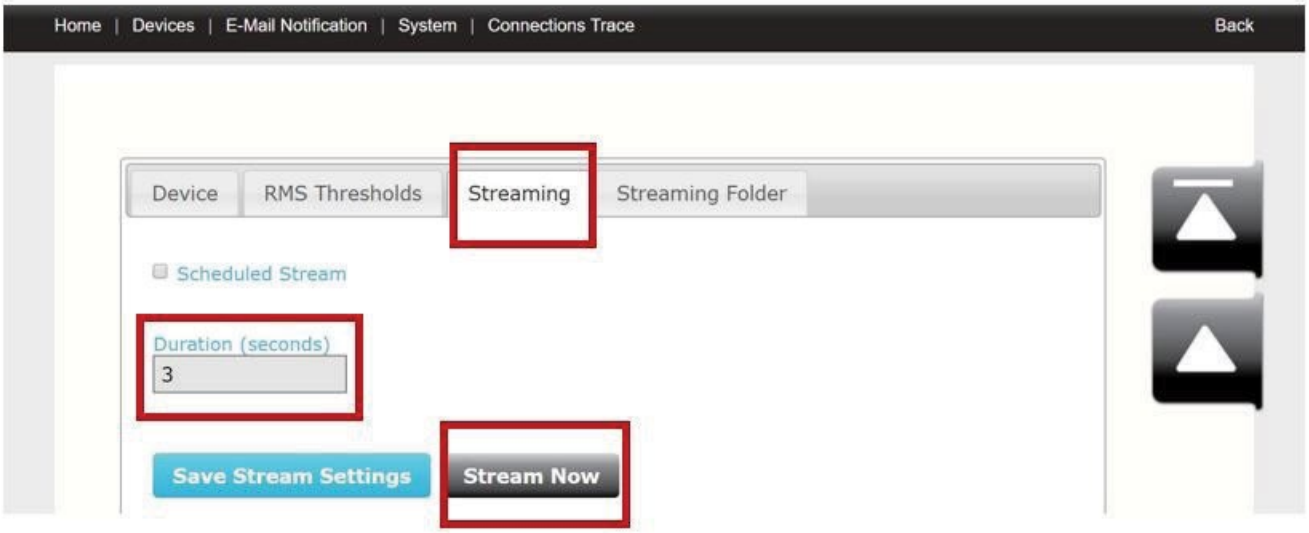
Stream Now

To take a quick snapshot of the accelerometer date, click on the Settings tab from the OpsWatch homepage.

Select the Streaming tab.

Enter the duration in seconds. The duration determines how long the data from the accelerometer will be sent to the cloud.

Click Save Stream Settings and then Stream Now.



Scheduled Stream

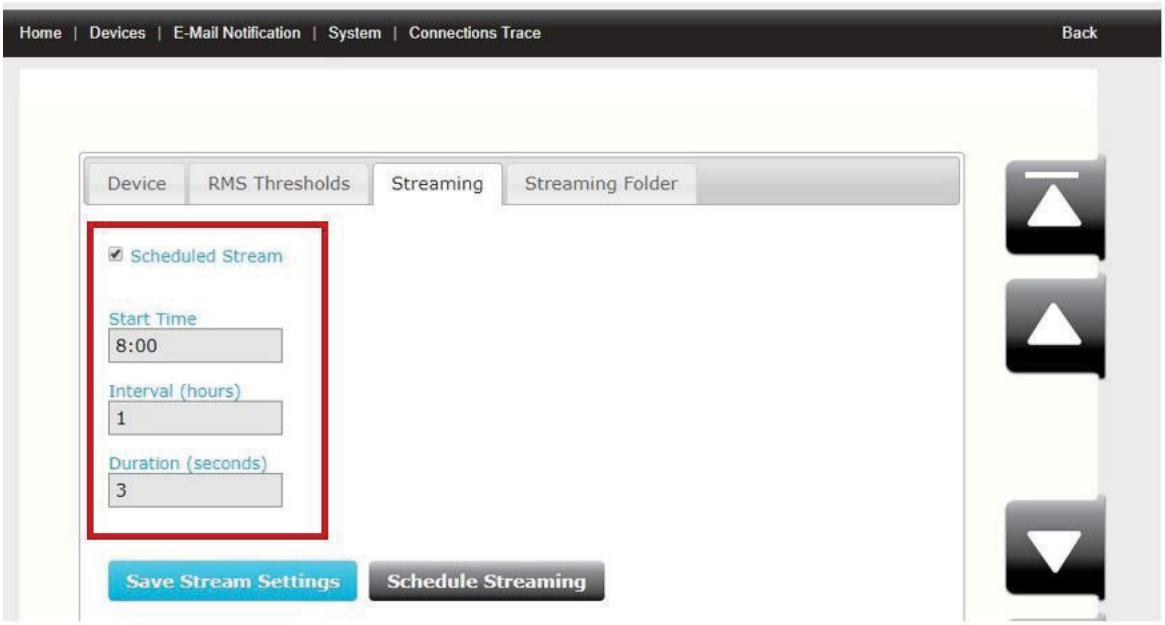
The second option for capturing accelerometer data is to use the Schedule Stream feature. This feature allows you to schedule routine accelerometer data capture sessions automatically.

Select the Settings tab on the OpsWatch homepage.

Select the Streaming tab and check the Scheduled Stream box.

Set the Start Time, the Interval (how often the data will be collected) and the Duration (how much data will be included in each stream).

Click Schedule Streaming and Save Stream Settings

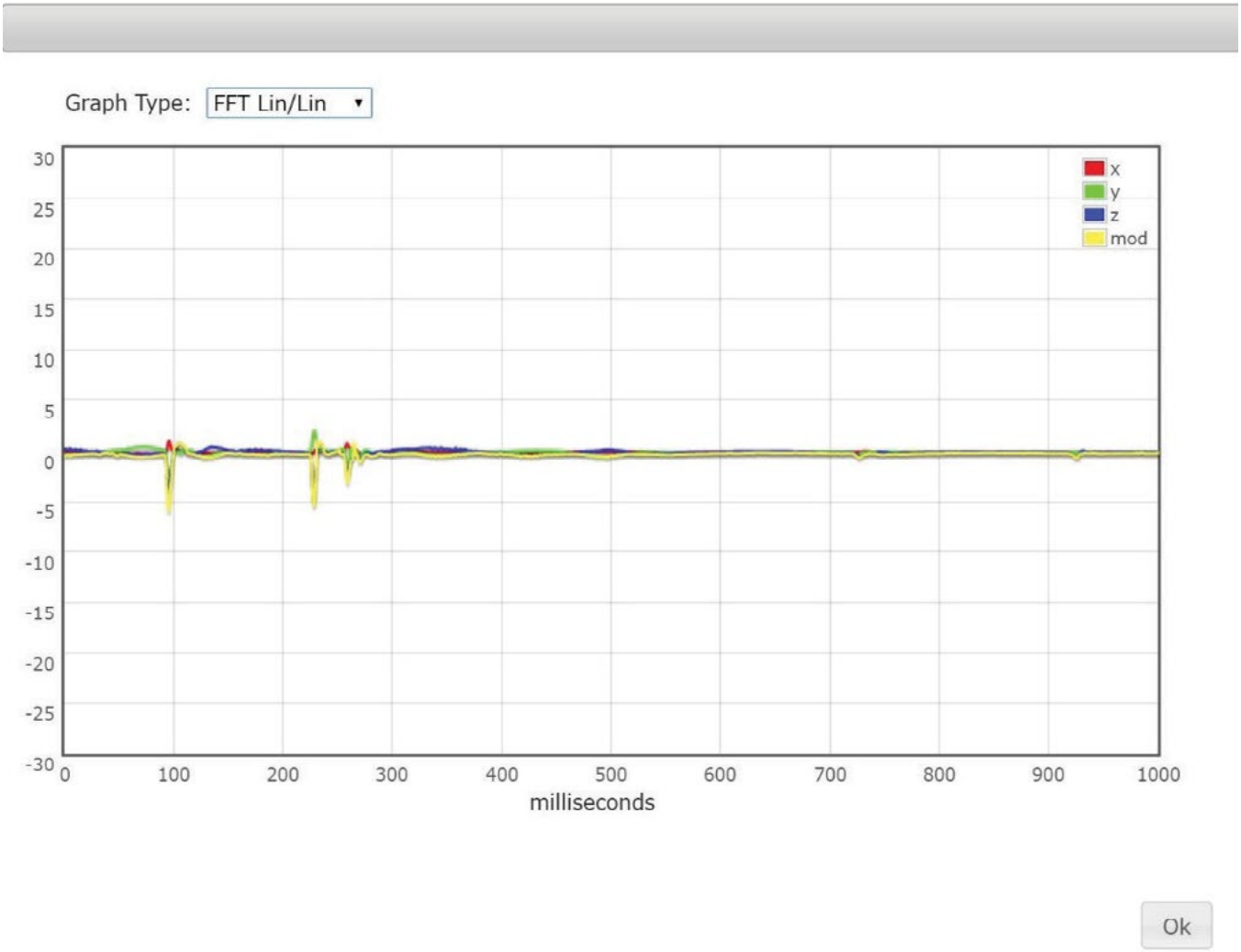


Streaming Folder

In both streaming options (Stream Now and Scheduled Streaming) the data from the accelerometers is sent to the Streaming Folder. In this folder, you may view the data file or graph the data file.

Time	X	Y	Z	Mod
0	-0.09	-0.42	0.15	-0.454972526643093
0.000244140625	-0.09	-0.42	0.18	-0.465725240887801
0.00048828125	-0.09	-0.42	0.18	-0.465725240887801
0.000732421875	-0.09	-0.42	0.18	-0.465725240887801
0.0009765625	-0.09	-0.42	0.21	-0.478121323515277
0.001220703125	-0.09	-0.42	0.18	-0.465725240887801
0.00146484375	-0.09	-0.42	0.15	-0.454972526643093
0.001708984375	-0.09	-0.42	0.15	-0.454972526643093
0.001953125	-0.09	-0.42	0.12	-0.445982062419555
0.002197265625	-0.09	-0.39	0.12	-0.417851648315524
0.00244140625	-0.09	-0.39	0.12	-0.417851648315524

Sample View File



Sample Graph File (Above)

Exporting Data Files

OpsWatch Cloud stores data for only 30 days. It is recommended that you export any critical data. Exporting can be done for both vibration and impact data.

See *Impact Values – Alarm and Vibration Values – RMS* sections for details on how to export data.

4. LED Flash Patterns

The OpsWatch unit utilises three (3) LEDs to communicate its current state. The guide for interpreting the LED flash patterns is below:

OpsWatch State	LED		
	Status A	i-Button B	Alarm C
Unit Start Up (Powered)	Off	Off	Solid Green
No Wi-Fi Address (Not connected)	Off	Flashing Red	Flashing Red
Entering Soft AP mode	Flashing Red	Flashing Red	Off
In Soft AP mode	Flashing Green	Off	Flashing Green
Attempting to connect to WiFi	Flashing Amber	Off	Flashing Amber
Connected to WiFi/ Attempting to connect to server	Flashing Green	Off	Flashing Red
Connected to Server/ Running	Flashing Green	Off	Off

5. Regulatory Compliance

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications, however there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

U.S./Canada Regulatory Compliance Information

To satisfy FCC RF exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada Statements

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

6. Contact Information

Please visit us at https://www.shockwatch.com.au/contact-us
to contact customer service or technical support.

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