Sensoteq®

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HMI User Guide

Sensoteq Condition Monitoring

Contents

Revisions

Ref		Date
01	Original Release	15/02/2019
02	Summer Update	24/06/2019
03	Fall Update	07/10/2019

Introduction

Thank you for choosing Sensoteq as your condition monitoring partner.

This guide aims to assist new and existing users to effectively navigate and understand the Sensoteq HMI. HMI is an acronym for *Human Machine Interface*, and that is exactly its purpose – providing an interface for you to better understand the health of your machinery. The HMI is linked to the sensors that are installed on the machinery within your site, and it is the primary method for accessing and gaining insight into the data coming from those sensors.

Key terminology

Trending

A key feature of our technology is data trending. Our sensors transmit a range of measurements every minute, this means that, not only is the data you see in the HMI as close to real time as possible, but also faults are detected extremely quickly and with high reliability.

Most data within the system is displayed as a time series, meaning you can look at one measurement over a given period of time and make decisions about changing values.

Fault Diagnosis

After a fault is detected there are several tools at your disposal to identify the cause of an issue. This leads into the area of vibration analysis.

Alarms

Alarms feature heavily within the system and are a key part of identifying problems early. In general, the following colour scheme is used across the site:

Green – All sensors are connected and working, no alarms are active

Yellow – One or more sensors are disconnected or *a warning alarm is active*

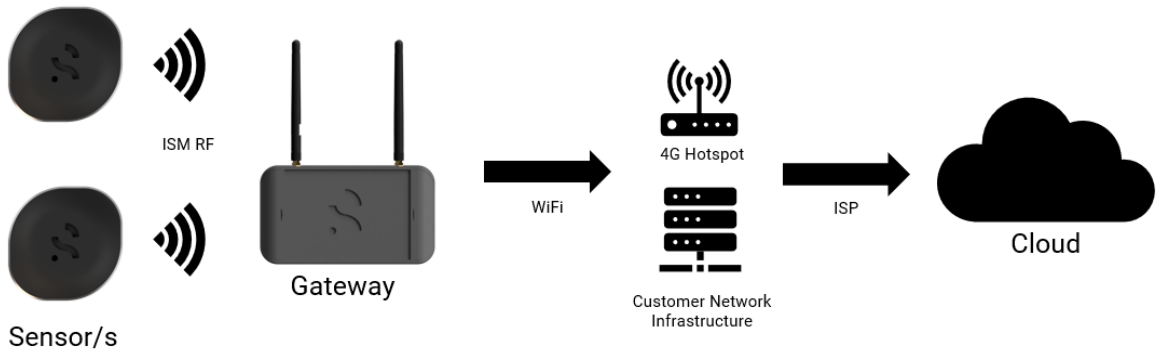
Red – All sensors on a machine are disconnected or *a critical alarm is active*

We work closely with our customers and partners to continuously improve our system. If you have any suggestions, please contact support@sensoteq.co.uk.

System Overview

The system is comprised of two physical pieces of hardware, sensors and gateways. Typically, a system will comprise of multiple sensors and gateways.

Sensors measure data from the machine, primarily temperature and vibration, and transmit this data to the gateway. The gateway will transfer this data to Sensoteq's Servers, aka the Cloud.



All the data is stored in the Cloud, processed, and converted to useful information that is available for display to the user via the HMI.

Once the data is stored in the cloud, it will always be accessible to you, providing you have permission to view it. This is true even if the gateway or sensors are disconnected or stop working.

When data arrives at the cloud, significant processing occurs to ensure the data is reliable and useable. Furthermore, at this stage when alarms are processed, this all happens in the background for the users, you will be automatically alerted to issues when they occur via email and/or text message.

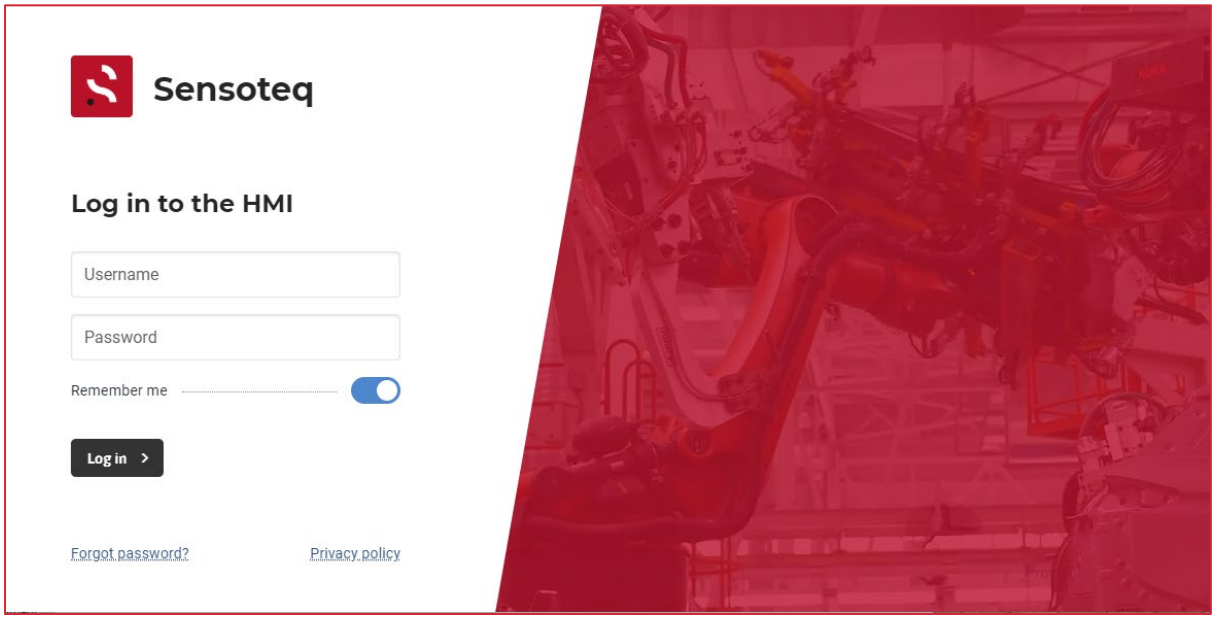
Receiving an alarm is a useful tool for understanding if there are issues with your machinery. However, to understand the problem in greater detail it is recommended to use our HMI. We have developed a range of tools to help our customers diagnose problems without having to be near the machine, in fact, you can access our HMI from anywhere in world.

This guide has been written to help you understand the user interface should you need help, however, there is much more information available to help you diagnose faults related to vibration analysis.

Should you require additional training please contact us: support@sensoteq.co.uk.

Accessing the HMI

To use the Sensoteq System you must have a valid internet connection with access to a browser application.

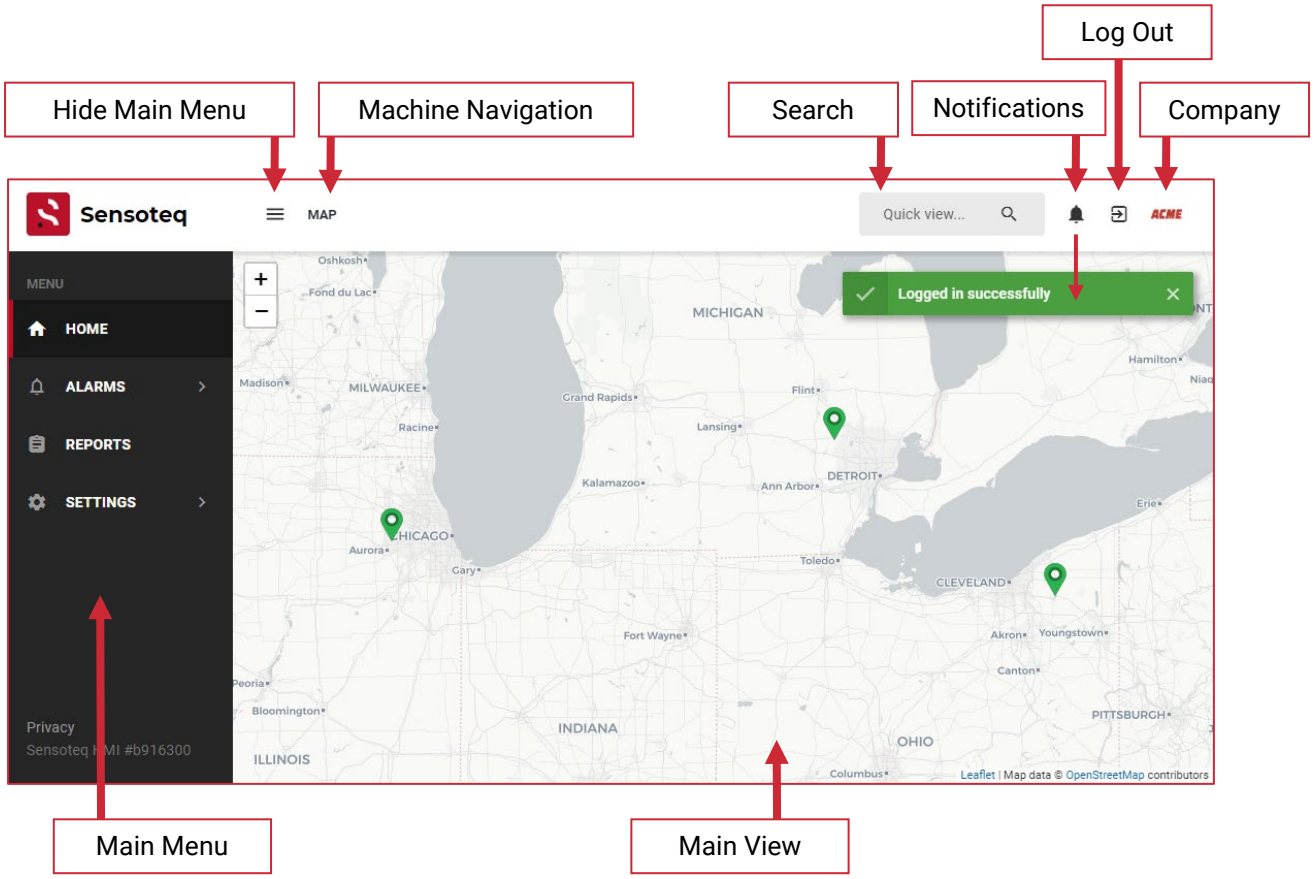


1. Enter *https://hmi.sensoteq.com/login* into your browsers address bar
    a. It is recommended you use the latest version of Chrome or Firefox browser
    b. Bookmark the address *https://hmi.sensoteq.com* for faster access
2. Enter your *Username* and *Password* as supplied by Sensoteq
    a. If you have forgotten your password, click *Forgot password?* And follow the instructions to reset it. You will need access to the email address you enter.
3. De-select *Remember me* when using a public or shared computer
4. Click *Log in >* to log into the system

When logging on for the first time it is recommended that you change the default password to one of your choice.
Jump to the *Passwords, Email and Phone* section.

Navigating the HMI

When you log in successfully you will be presented with a screen similar to the one below.



From this initial *Home* page, you will be able to view the locations where Sensoteq equipment is installed across your companies' sites.

Navigation of the website is conducted in the following ways:

- Click the site *pin-drop* to access that site
- Click the search *Quick view…* to show a list of your sites and assets
- Use the *Main Menu* for specific functions
- Clicking *Home* will always bring you back to this view

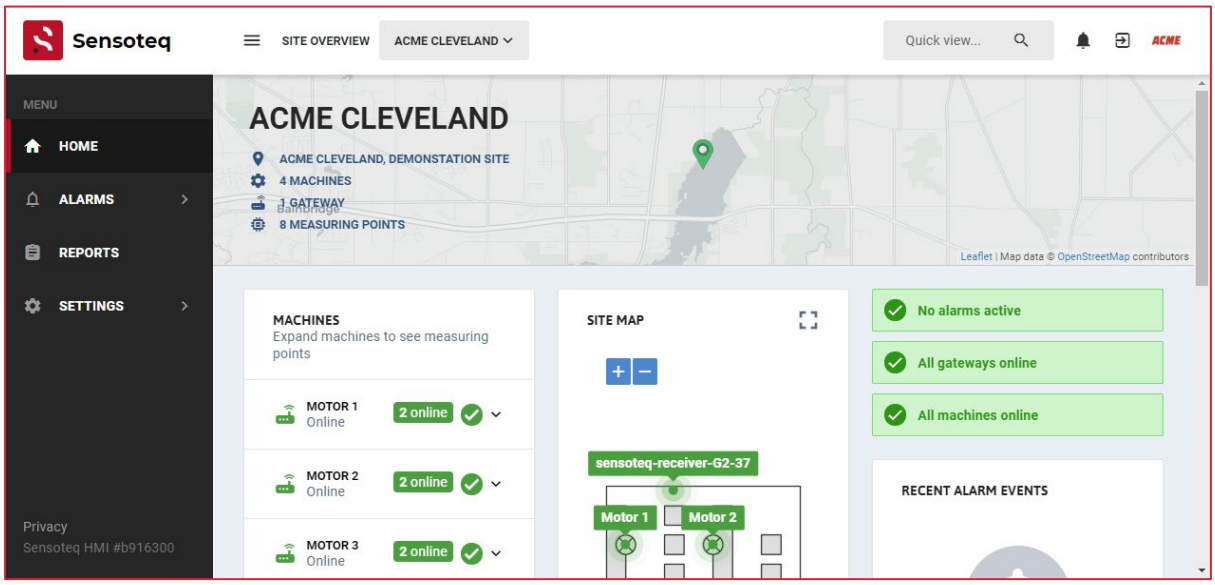
Clicking on the *hamburger symbol* ☰, will collapse the main menu. This is useful when using a smaller screen with a lower resolution.

Sites

The map will display the sites that you have permission to see, they will each show up as a pin-drop . Pin-drops have a specific colour to identify the "health" of the site. The colour can be affected by a machine in an alarm state, or an issue with the Sensoteq hardware.

Pin Drop	Description	Action
	The site is a good state. All machines are healthy. Data is being received successfully.	No action required
	There is an issue with receiving data from the site.	See the troubleshooting guide
	A warning alarm has been triggered at the site.	Investigate the fault at a suitable time
	A critical alarm has been triggered at the site.	Investigate the fault as soon as possible

To open a site, *click on the pin drop* . You will be presented with the site page:



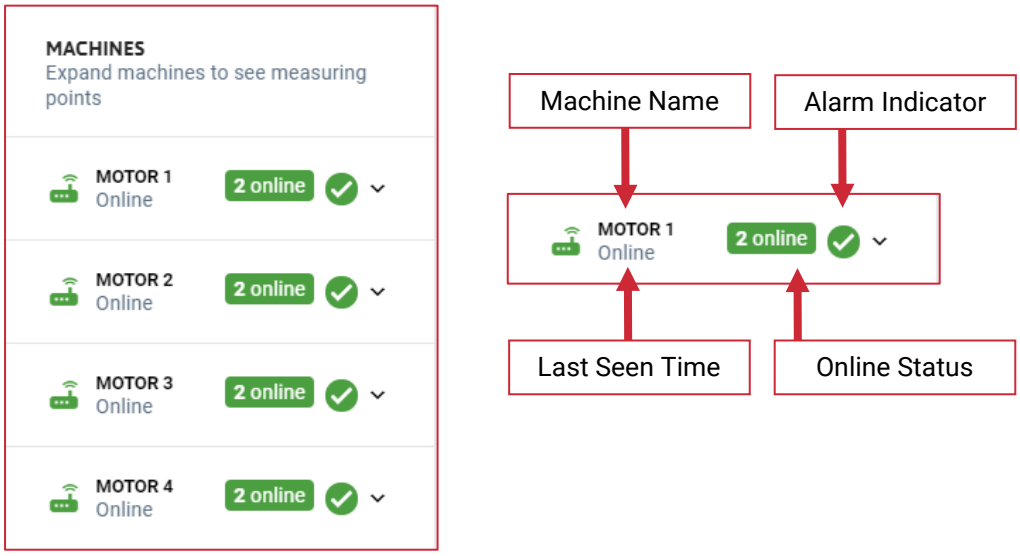
The site page gives you an overview of the site health. The information is broken down into distinct panels to group the information in a clear way.

Machines Panel

All machines within a site are listed in this panel. This is a useful tool to get a high-level understanding of the machine health.

Overall State

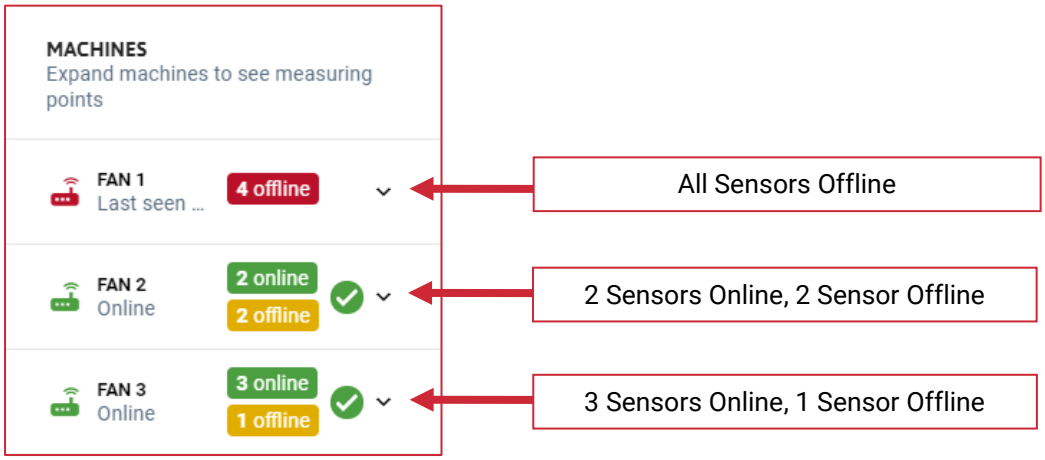
When all machines are online & healthy, the site will be all green, no action is needed.



Clicking on a machine will display all of the measuring points (sensors) on that machine.

Sensor Online Status

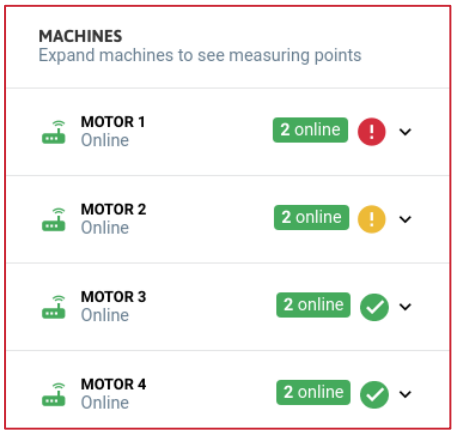
If a machines measurement points have lost connectivity with the gateway, or the gateway is not connected to the WiFi / Internet, then the faults will be displayed by a change in colour:



2 online	Number of sensors online
2 offline	Number of sensors offline
4 offline	All machine sensors offline

Alarm Status

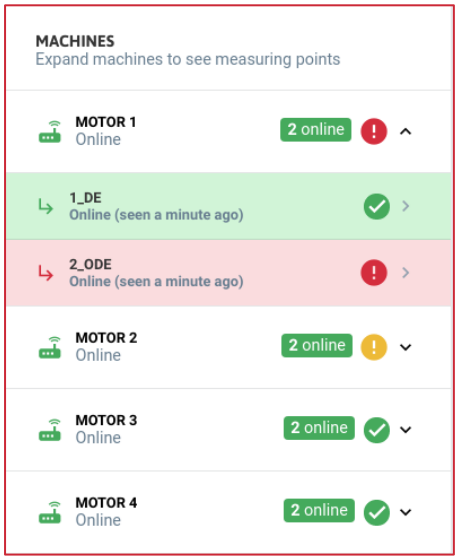
If an alarm is triggered on a machine, it will change the colour of the Alarm Indicator for the affected machine.



Symbol	State
	No alarms active
	Warning alarm active
	Critical alarm active

Clicking on the machine arrow ⌄ or anywhere on the machine status line will show a list of measuring points on that machine. Each measuring point will have its own status, this is useful to see which measurement point triggered the alarm condition.

If multiple measuring points on one machine trigger an alarm, then the most critical alarm of any measuring point is used as the overall machine health.



Motor 1 Example

We see that the ODE (Opposite Drive End) measuring point detected an alarm condition, but the DE (Drive End) did not.

Thus, the overall level is critical.

Clicking on any measurement point in the list will take you to the measurement page for that sensor.

Status Panel

On the right-hand side of the site page you will find the status panel. Here you get a clear overview of the whole site. This becomes particularly useful if you have a large list of machines that is not viewable without scrolling.

If a status error is active, you can click it to find out more detail.

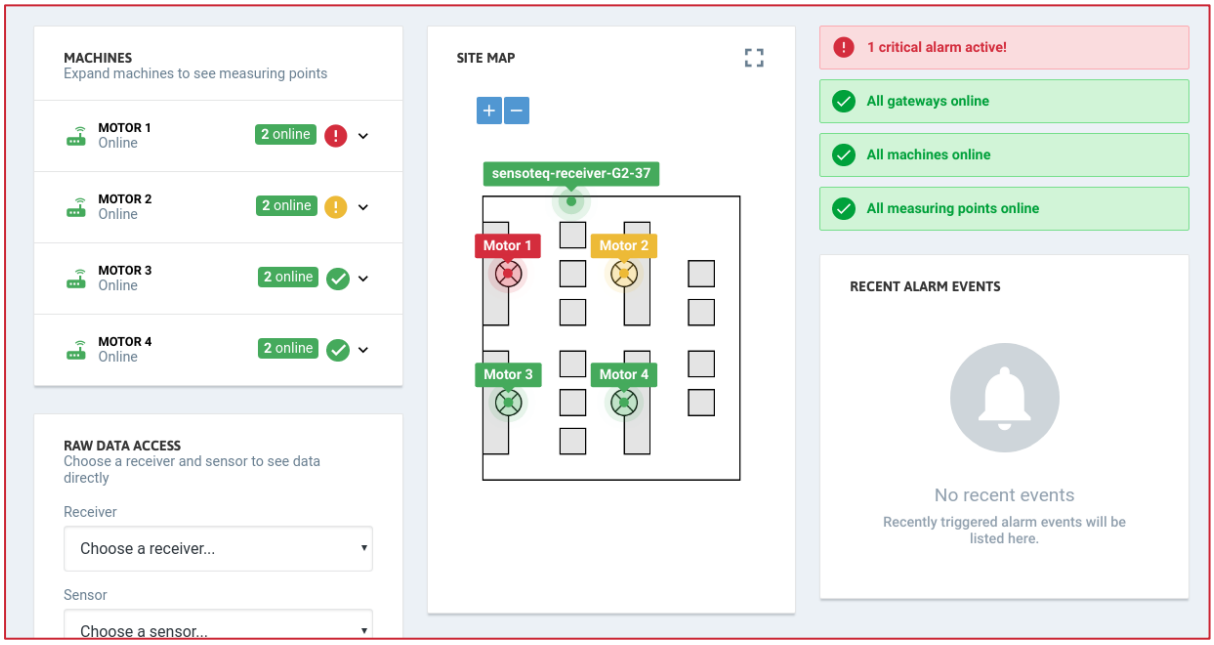
Recent Alarm Events

Individual alarms that caused an event are listed in chronological order. Clicking on an alarm will bring you to the specific measurement that triggered the alarm.

Site Map

The site map is placed in the centre of the page, it gives a plan view of where each piece of machinery and the subsequent Sensoteq Receiver Gateway is located. The colour of the item corresponds to the online or alarm state as above.

If you *click on a machine* it will expand the machine to show the relevant measurement points.



Site maps must be added by an administrator. If no site map is visible, please contact support@sensoteq.co.uk.

Measuring Point

Sensors take measurements that are localised to a specific measuring point, these measurements can be quite distinct between measurement point even when they are attached to the same machine.

Gateways also take measurements, but these are to monitor ambient conditions and provide another layer of information to assist in fault diagnosis.

Direct Measurements

Device	Measurement	Description
Sensor 	Temperature	This is the temperature that has propagated through to the sensor from the contact surface. Temperature is useful for catching problems that are not vibration related. Measured every minute.
Sensor 	Vibration RMS	Vibration is measured in three axes, X, Y and Z. We take a measurement every minute. Acceleration RMS is an average value of vibration. Very useful for identifying that a problem exists with a machine.
Sensor 	Vibration Time Waveform	A full set of time waveforms (for each axes) is sent every 12 hours. The time waveform is the key component in deciphering the root cause of a problem.
Gateway 	Ambient Temperature	This is the temperature at the gateway. Typically positioned high and away from machinery, ambient temperature is useful for understanding environmental conditions. Measured every minute.
Gateway 	Ambient Humidity	This is the humidity at the gateway. Typically positioned high and away from machinery, ambient humidity is useful for understanding environmental conditions. Measured every minute.

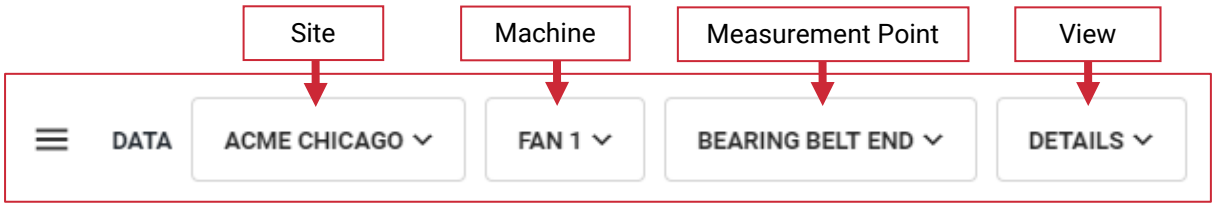
Derived Measurements

Calculated in the cloud.

Measurement	Derived From
Delta Temperature	Gateway Temperature, Sensor Temperature
Vibration Spectrum/s (X/Y/Z)	Vibration Time Waveform
Power Band Trending (X/Y/Z)	Vibration Spectrum Alarm Levels
Velocity RMS (X/Y/Z)	Vibration Spectrum
Crest Factor (X/Y/Z)	Vibration Spectrum

Measurement Point Navigation

Once you have selected a measurement point form the Site page, your navigation options at the top of the screen will change.



Click on the site (**ACME CHICAGO**), to select any other site

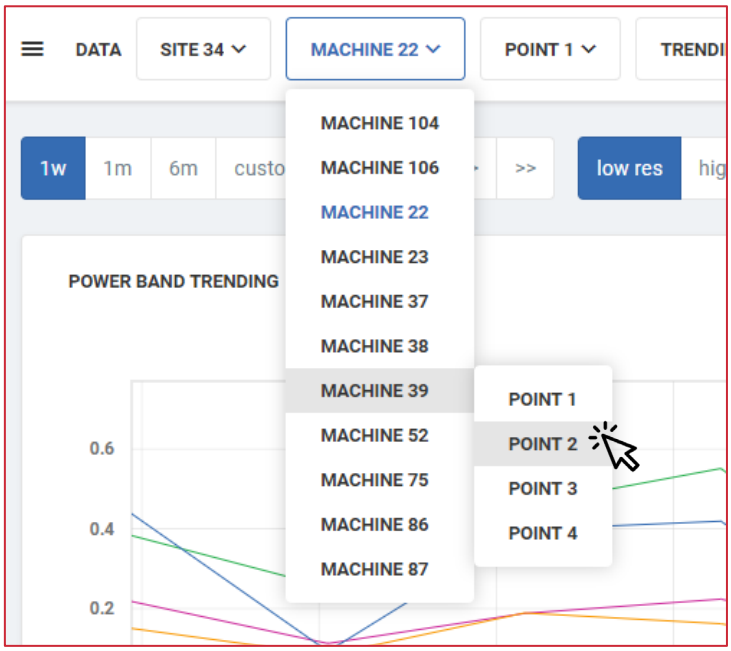
Click on the machine (**FAN 1**), to select any other machine within that site

Click on the measuring point (**BEARING BELT END**) to select any other point on that machine

Click on the view (**DETAILS**), to change what information you see from that measurement point

Faster Measuring Point Navigation

By hovering over a machine name in the navigation bar, you will be presented with a list of measuring points related to that machine – clicking on another measuring point in this way will mean that you are presented with the same graph view, just with different data.



Installation Image

On the measurement point details page, the system will display a photo of the measurement point at the time of installation – this will only display if a photo was taken during the installation and with the Sensoteq Install App, otherwise please contact Sensoteq and we can add any image you desire.

Measurement Point Views

Details
This is the default page.

- View measurement point details, such as sensor type, orientation, set RPM
- View recent alarms associated with that sensor
- View and create events

Config
Make changes to the settings for the sensor

- Adjust the sensor orientation and RPM
- Adjust the Power Band levels for the Velocity Spectrum
    - **Note** *This will impact the alarms for these bands*

Environment
View environmental conditions, both sensor and gateway related.

- Delta Temperature (Sensor – Ambient)
- Sensor Temperature
- Ambient Temperature
- Ambient Humidity

Trending

- Power Band Trending (from velocity spectrum)
- Acceleration RMS
- Velocity RMS
- Crest Factor

Vibration RMS

- Acceleration RMS (All axes)

Vibration Spectrum
Acceleration profile for both:

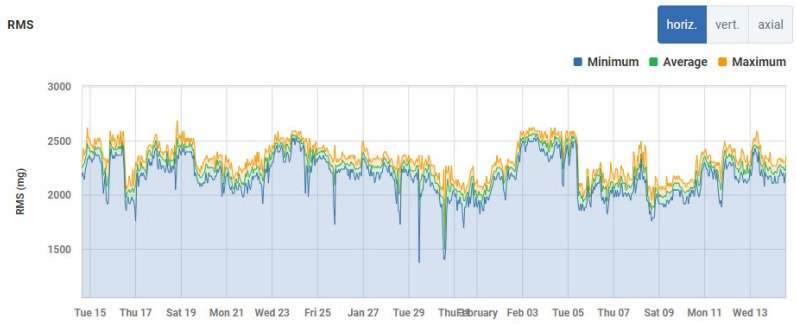
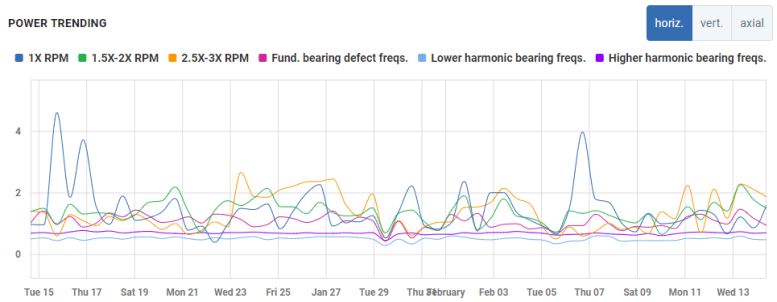
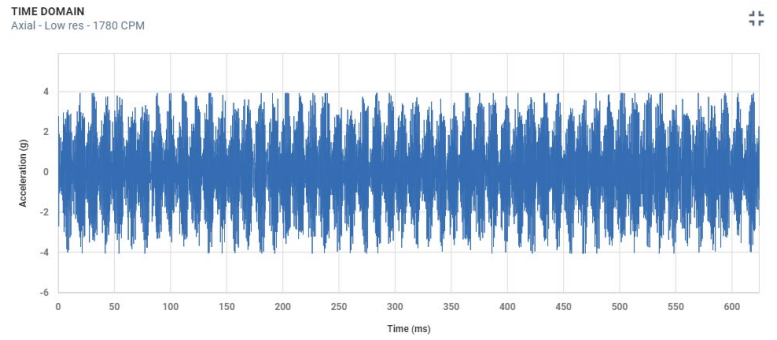
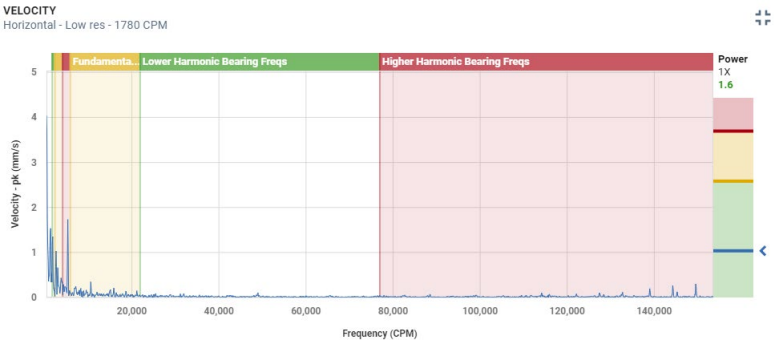
- Low Res – Up to 2500Hz\150,000CPM FMax (Each bin = 1.60 Hz),
- High Res – Up to 550Hz\33,000CPM FMax (Each bin = 0.34 Hz)

- Time Waveform
- Velocity Spectrum (Low Res with Power Bands)
- Acceleration Spectrum
- Displacement Spectrum

Vibration Waterfall
Here you can see a collection of Velocity or Acceleration Spectrums compared against each other, useful for detecting trends in the spectrum over time.

Graphs

There are several types of graphs within the HMI.

Graph Type	Update Period	Example
Time Series	Once per minute	
Time Trending	Every 12 hours	
Time Waveform	Every 4 hours	
Spectrum	Every 4 hours	

Generic Graph Controls

All graphs use the same basic controls. Some controls will change based on the graph type, and the contextual controls will only permit options for the given graph.

Zoom

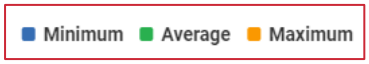
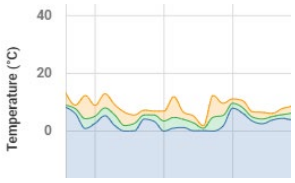
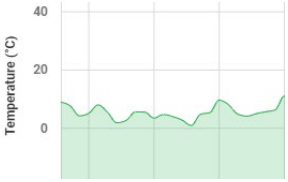
Use your *mouse scroll wheel* to zoom the X axis. As you scroll the Y axis will adjust automatically.

Detailed Point Information

Hover the mouse cursor over a given point to get details, such as magnitude and date/time.

View Controls

Change what information is displayed on the graph by clicking the corresponding measurement name. By default, all information is displayed and clicking a control will deselect it from view. Clicking again will enable it. At least one measurement must be selected.

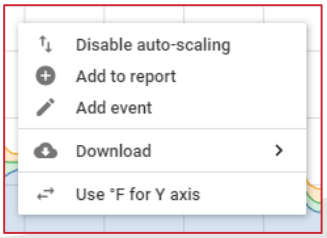
All Views Selected		
Only Average View Selected		

Contextual Control

Right Click within the main graph data window to access additional controls specific to that view or graph.

Within this menu it is possible to change graph parameters, change units, save a graph for later use or add additional information.

Disable/Enable auto scaling – Change Y axis scaling
Add to report – Save graph for later use in a report
Add event – Log an event at a given time (ie Maintenance)
Download – Save graph as image or CSV file
Use … for Y axis – change Y axis unit



Keyboard Shortcuts

Keyboard shortcuts are now available for most graph types, and they are intended to provide a faster method of accessing graph features.

Some commands require the user to hold down a key and perform a secondary action, such as scrolling the mouse wheel or click and drag.

Single Key Stroke

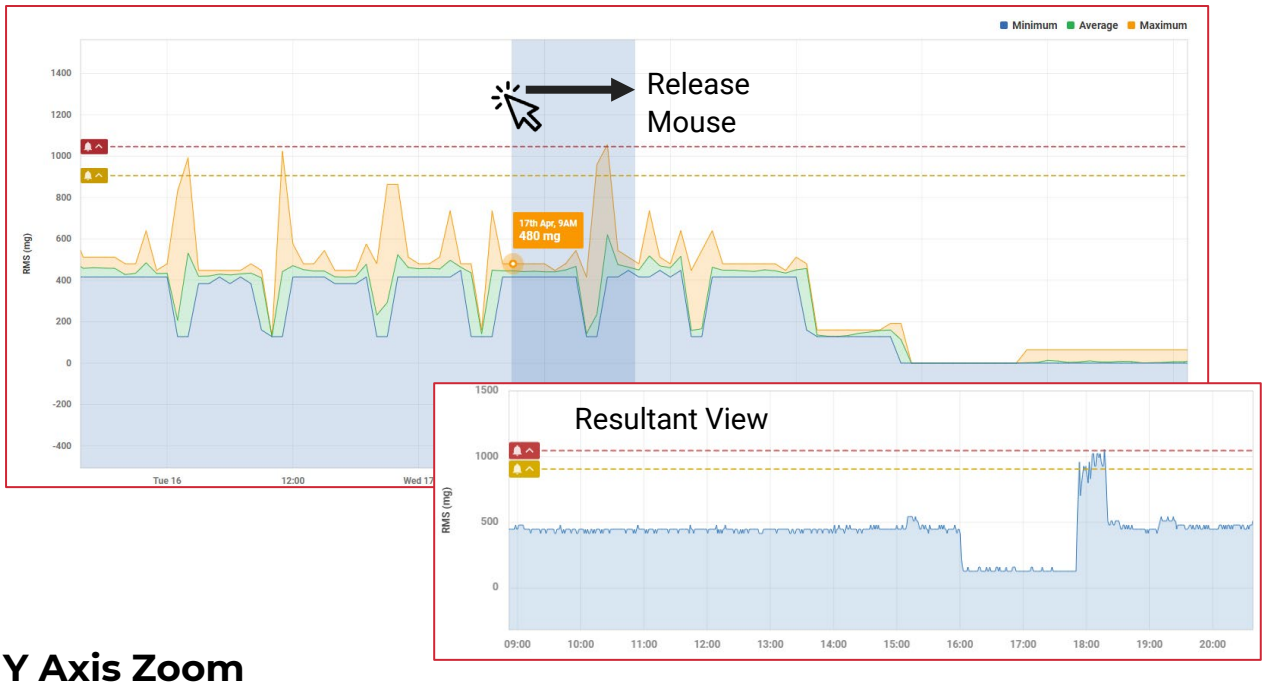
Key	Graph	Outcome
A	Any	Enable/disable autoscaling
H	Any	Enable/disable harmonic line
L	Any	Lock/unlock harmonic lines to current position
P	Spectrum	Show power bands
B	Spectrum	Show/hide bearing frequencies (bearing must be selected first)
N	Spectrum	Cycle bearing frequencies (FTF > BPFO > BPFI > BSF)
S	Spectrum	Show/hide side band cursor
P	Time Domain	Play audio representation (Speakers/headphones required)
S	RMS	Show spectrum event lines (Vibration RMS only)
X	Any	Change X axis units (graph dependent)
Y	Any	Change Y axis units (graph dependent)

Compound Commands

Key	Secondary Action	Outcome
Ctrl	Click, Drag, Release left mouse	Zoom X axis time series graph
Ctrl	Mouse Wheel	Zoom Y axis

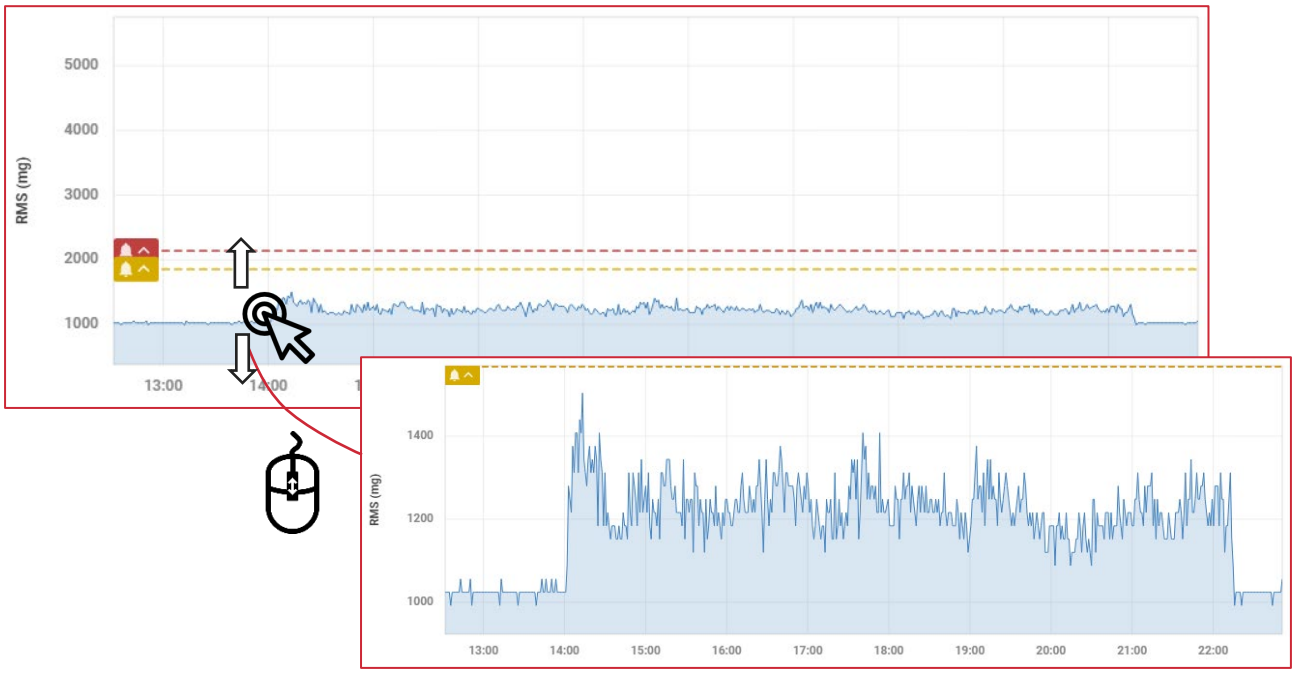
X Axis Zoom

Zooming on the X axis is achieved by holding down the Ctrl key and clicking and dragging across the graph. The resultant zoom level will attempt to give you a view of the raw data, rather than the previous averaged view – but this depends on the amount of time you are attempting to view.



Y Axis Zoom

Hover over a point on the graph, this will be the anchor point for the zoom – hold down the Ctrl key and use the mouse wheel to adjust the zoom level. Press “A” to return to auto scale.



Time Series Graph

Period

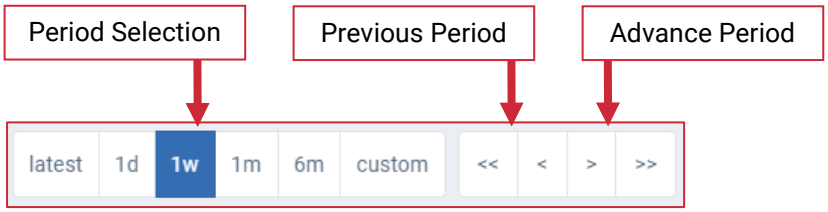
At the top of each page with one or more time series graphs, is the Period Selection Tool.

Selecting a period will change the scale on the X axis for all time series graph on that page.

Latest will show the last 12-hour period that was successfully recorded.

1d, 1w, 1m, 6m will show the selected period up to and including the most recent data.

Custom opens two additional boxes that allow you to specify a particular time period.



Use the Previous/Advance buttons to quickly see previous or next weeks in sequence.

Averaging

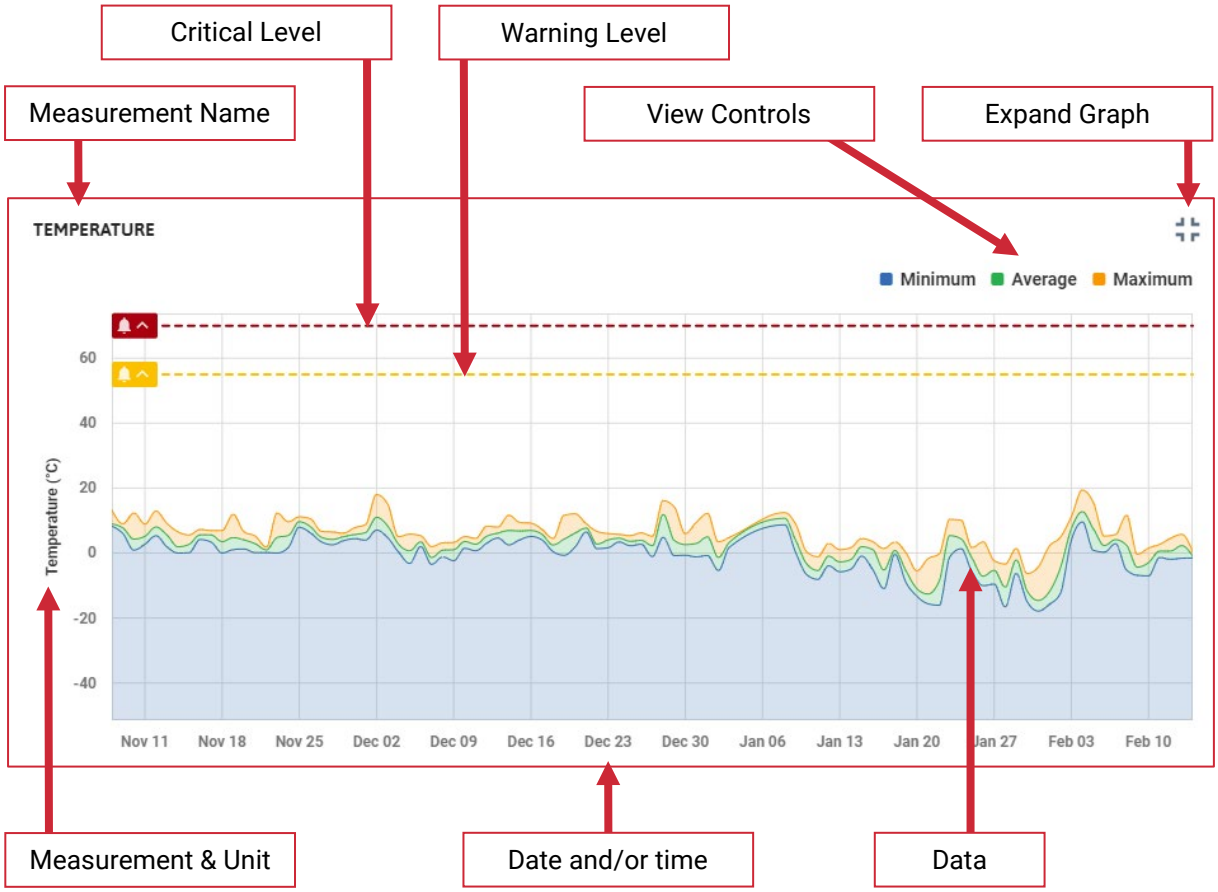
Time Series Graphs are intelligent, they adjust to the amount of data shown on screen to ensure good system performance and readability.

Selecting certain time periods will automatically adjust the averaging that is performed on the data, with 1d not averaging any data (effectively raw) and 6m averaging heavily to ensure the data is readable. The same logic is applied to the custom selection tool.

When averaging is applied you can select to see the minimum, maximum or averaged data – this gives you a good idea of how the data is trending.

Layout

Time series graphs are at the core of our product. They enable *Data Trending*, a key benefit of using this system. With data recorded every minute, it is possible to quickly detect changes in any recorded measurement value. Time series graphs provide good insight into how a machines health has changed over time.



Graph View

Change how the graph looks by expanding it to a larger view, *click*
Adjust what is shown on the graph by *selecting/deselecting the View Controls*

Alarm Levels

If alarms are set up for a particular measurement the levels will be displayed on the graph. This is useful to see how long a machine has been in an alarm state. Alarm levels can be adjusted by dragging the alarm "handle" to an appropriate level.

Note Not all time series graphs are alarmable. Alarm controls are disabled on these graphs.

See *Alarms* for more information.

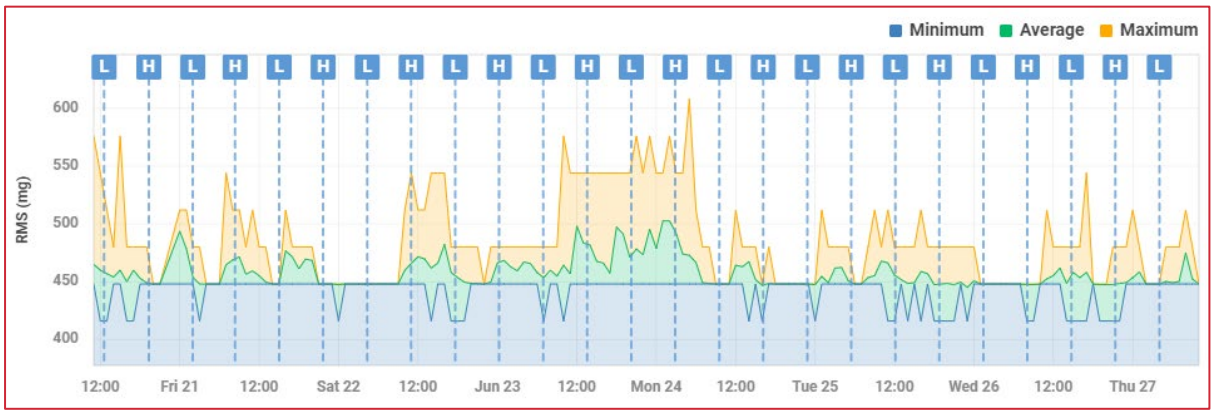
Spectrum Event Lines

Right click on any Vibration RMS graph and select “Show Spectrums” to show a group of events – or press the “S” key on your keyboard.

This feature is limited to latest, 1d, 1w, 1m and custom views. It will not work with the 6-month view.

Event lines shown will highlight when a spectrum was captured for that measurement axis (Horiz. Vert. or Axial).

- L = Low Res Spectrum (Standard full range 0 – 153k CPM)
- H = High Res Spectrum (High resolution limited range 0-32k CPM)



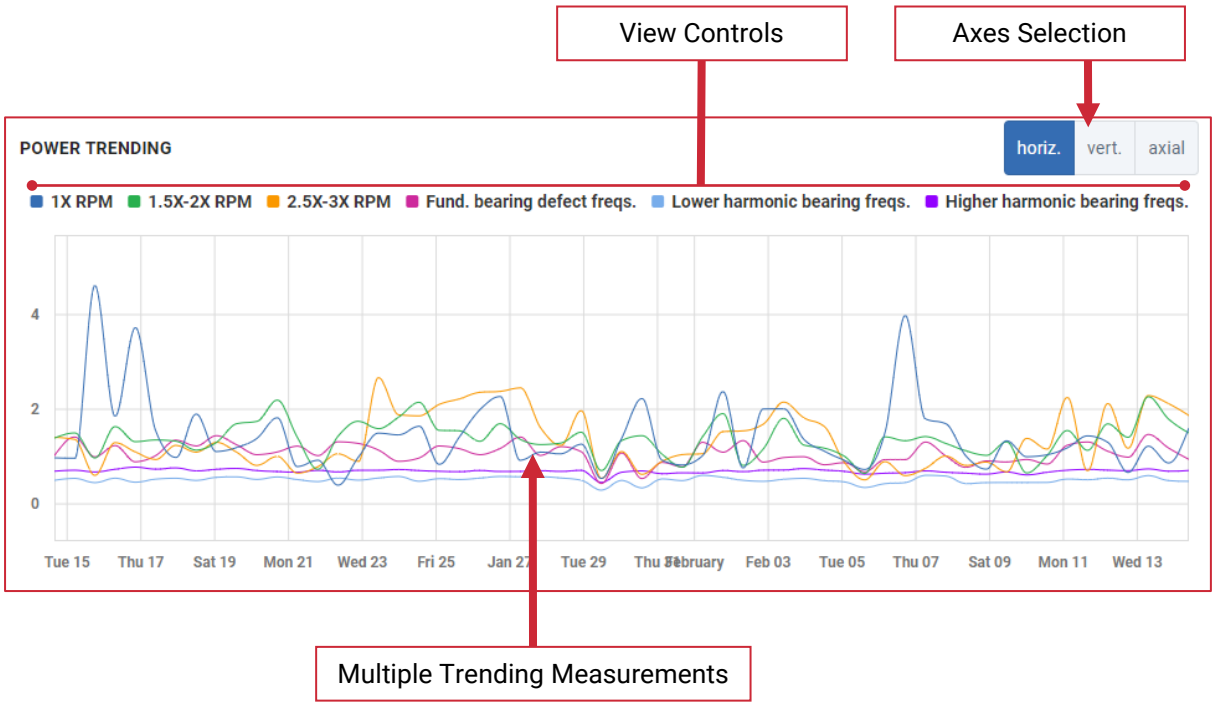
To access the spectrum simply click on either the H or L indicator and you will automatically navigate to that specific spectrum – for the measurement axis you viewed on the RMS graph.

This tool is particularly useful to find a spectrum during a specific mode of operation, such as a period of very high RMS vibration.

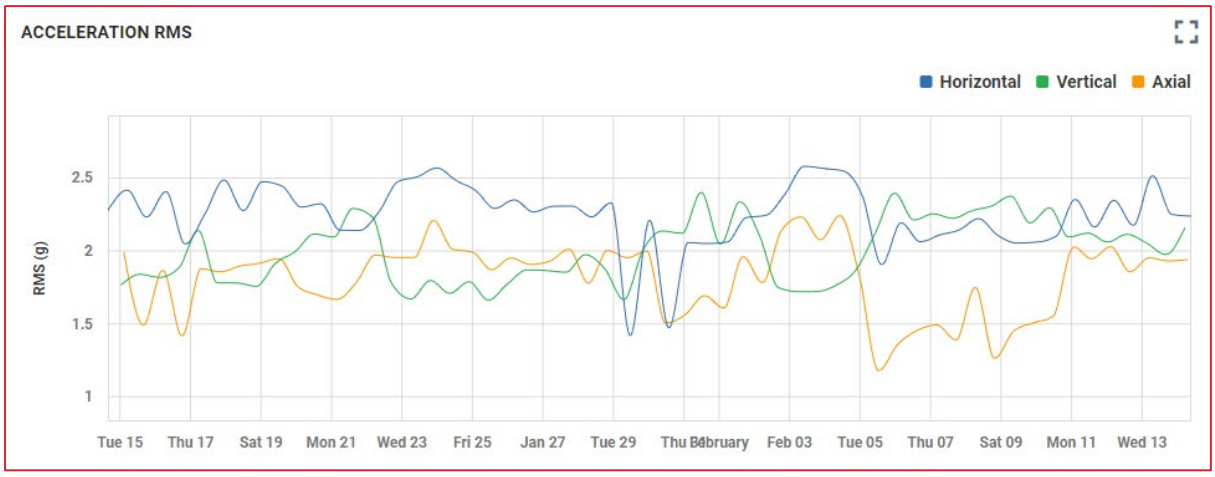
Time Trending

Time trending graphs are measured and updated every 12 hours. They are based on calculations from the raw data received from the sensor.

Use them to identify if issues exist in one axis, multiple axes; even isolated or spread across parts of the spectrum using power trending.



Acceleration RMS is useful in determining how values have trended across multiple axes.

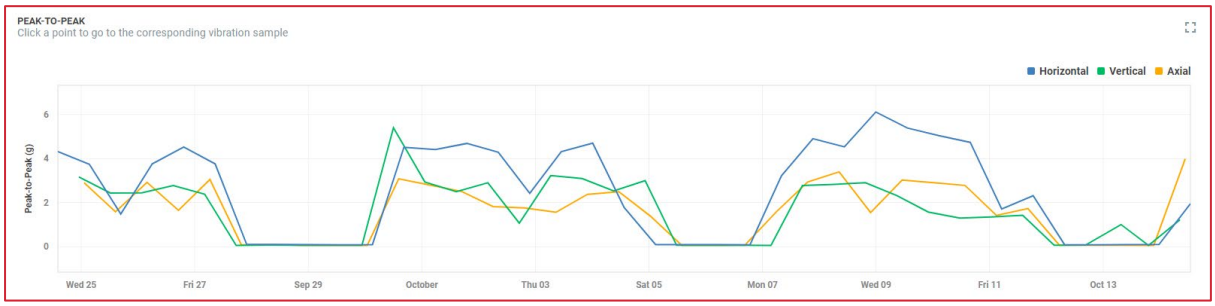


Power Trending

Each line on this graph represents a power band from the *Low-Res* spectrum. Power bands are measured by axis, select the correct axis using the tool in the top rand hand corner. Increases within this graph indicate that the power within the band is increasing over time and this is a good indicator of increased vibration.

Peak to Peak

The Peak-to-peak graph shows the difference between the maximum positive and the minimum negative value of the *Time Waveform* graph. This is a key indicator for trending the peak vibration power, and especially useful for detecting bearing faults.

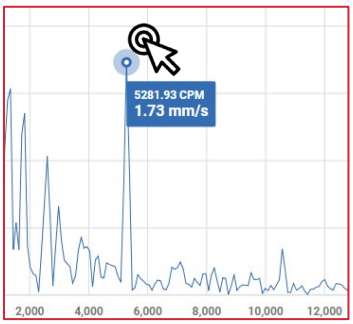


Time Waveform and Spectrum

Whilst trending graphs are very useful for identifying that a problem exists, the Sensoteq system also provides the ability to diagnose what is causing issues within the machine.

It is important to remember that Spectrum graphs are constructed from the information contained within the time waveform. Whilst a spectrum is arguably the most useful tool for vibration analysis, a lot of information can be learned from the time waveform also.

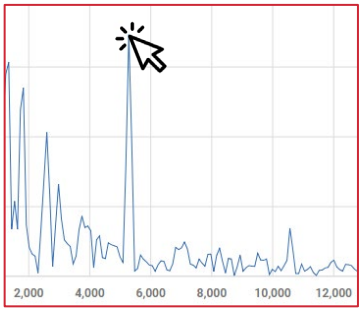
Tool - Difference Cursors



When analysing spectra and time waveform it can be useful to get specific information about a given point on the graph.

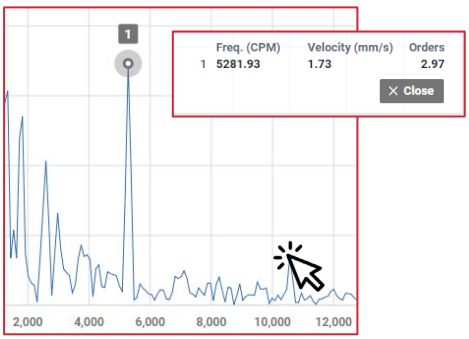
Hovering the mouse cursor over a point will give you information about the X/Y axis values.

Clicking on a point will select it at as **Point 1**



When a point is selected a window appears and lists the details about that point, on a spectrum, you will also be shown the "Orders" which refers to how many harmonics the selected point is away from the running speed of the machine.

Clicking on a second point will select it as **Point 2**



Point 2 can be considered the difference point. You will be shown the detail about that, but also the difference between **Point 1** and **Point 2.**

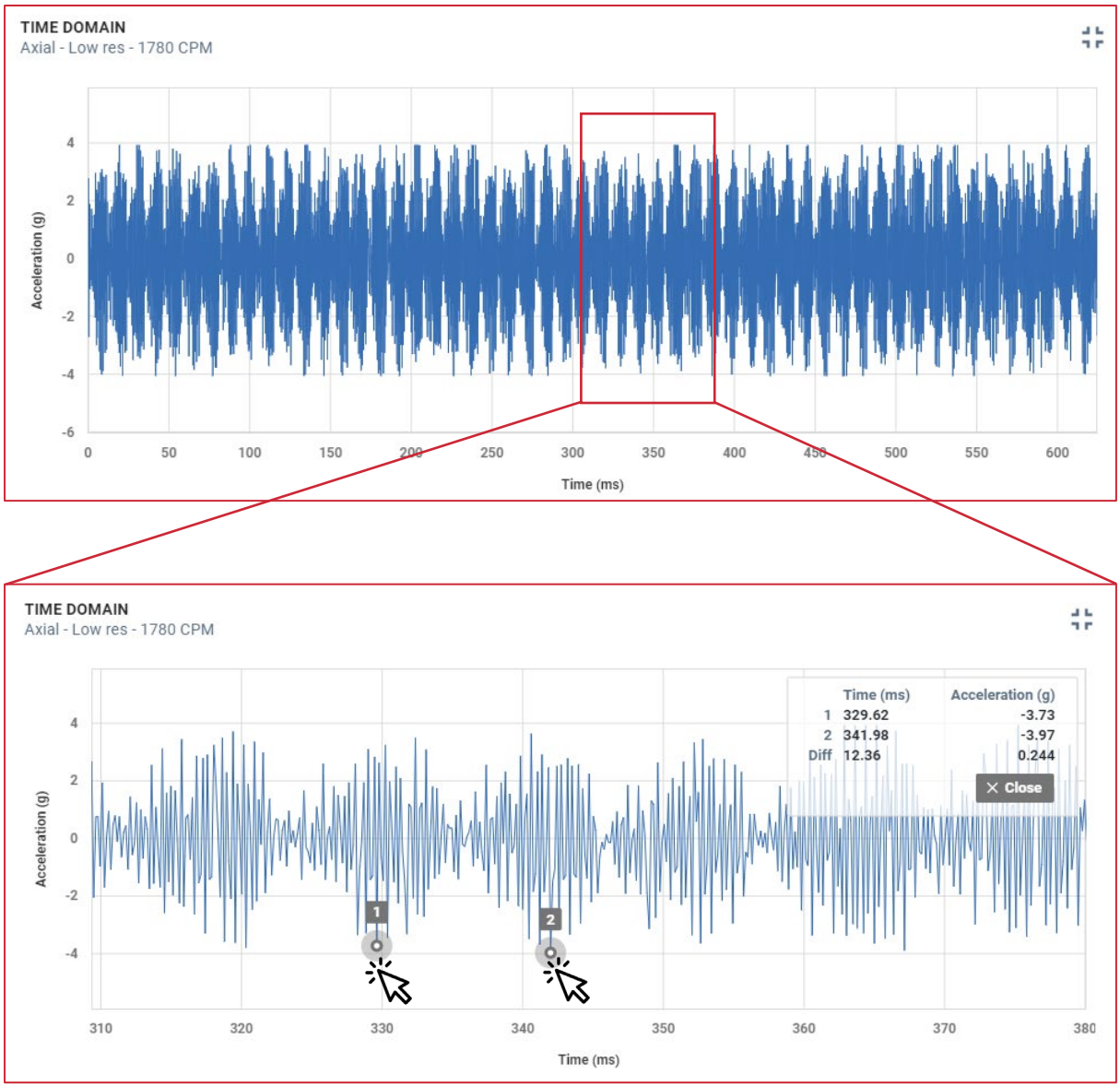
Removing Points

Selecting another point will change only the selection for Point 2. Point 1 will remain fixed.

Click the close button, this will remove all points from the graph window and close the information panel.

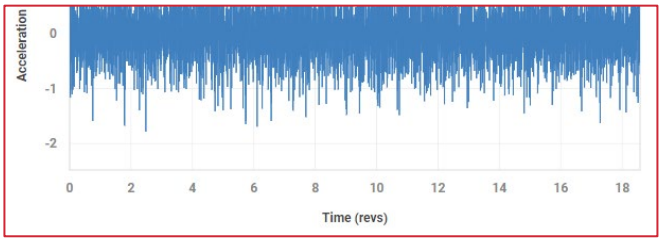
Time Waveform

The time waveform is constructed from a detailed, fast sample of vibration on a given axes. If we wish to examine an area of the graph, we can zoom by scrolling the mouse wheel.



Once zoomed in, a periodic wave is present. By *clicking on each peak,* we open the difference tool, providing values useful in diagnosis.

X Axis Unit

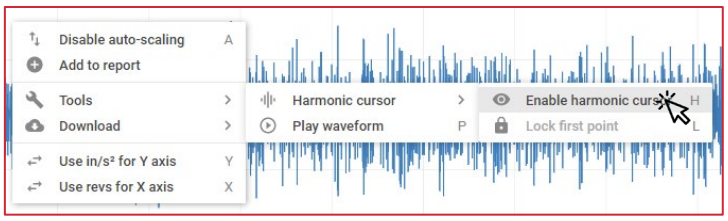


Change the X axis (time) unit to Revs by *pressing X* whilst hovering over the graph, or *right click* and select *Use revs for X axis*

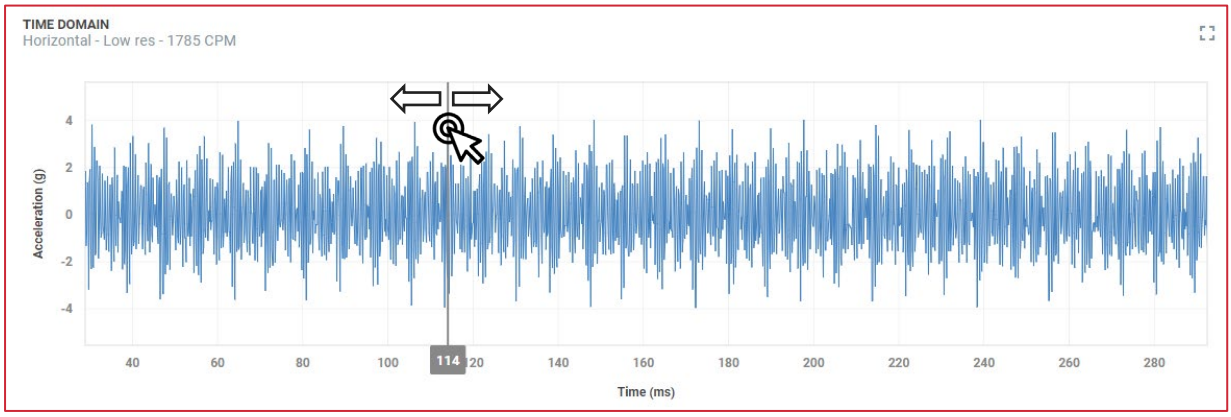
Revs will use the pre-set machine speed (in RPM) as the default, however, entering a new RPM into the Analysis Options will force a new RPM value to be used for this value.

Harmonic (Period) Cursor

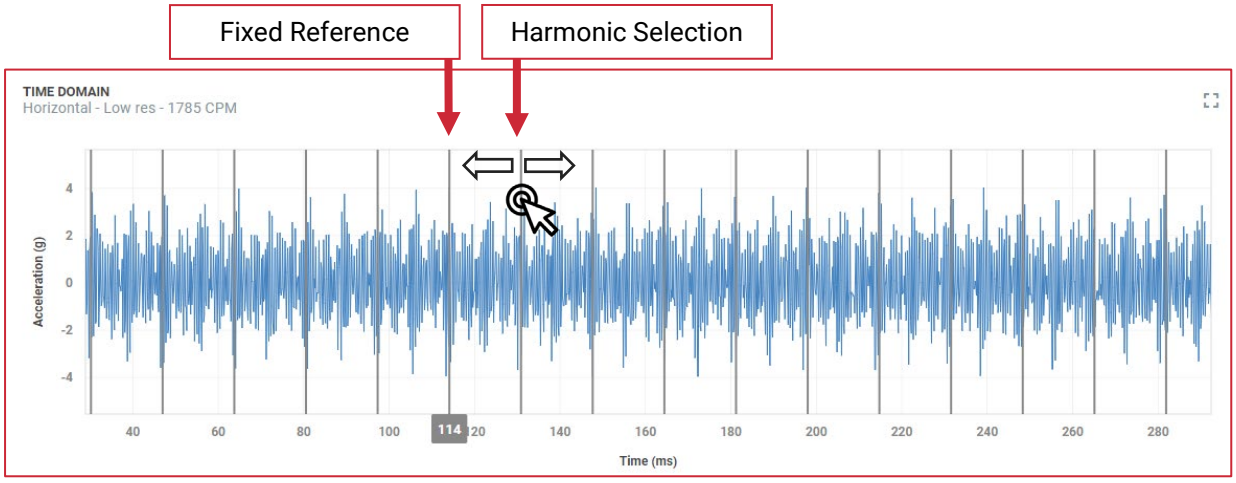
Use the harmonics tool to identify peaks with the waveform and discover their frequency.

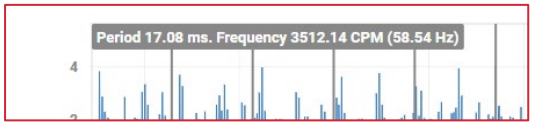


Right click, *Tools* > *Harmonics Cursor*, or *press H*. A single cursor will appear, this is the **reference cursor**. *Move the reference cursor left or right* on the graph using the mouse, it can be placed anywhere, but typically will be located at a defined peak. The reference cursor will serve as centre cursor for which the harmonic indicators are based from. *Left click* once to lock the reference cursor. Alternatively, *press L* on the keyboard to lock.



Once the reference cursor is locked, a group of harmonics appear. To set the harmonics, you adjust the first harmonic to the desired location, all other indicators will move automatically. *Click to lock* or *press L*. The period and frequency of the harmonic will be displayed.



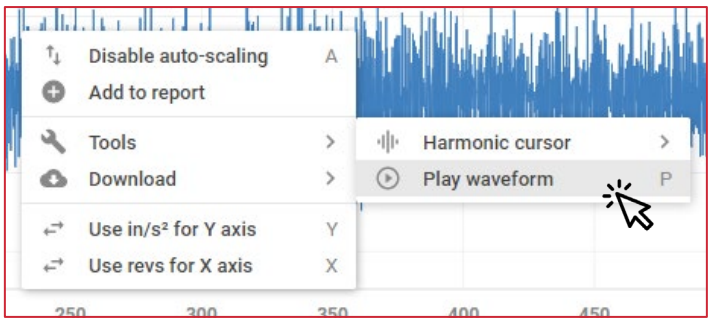


Audio Playback

This feature plays an audible representation from the currently selected time domain. Please note that this will not be an exact recreation of the sound heard at the machine, as the recorded time domain is limited to 6.4kHz (Low-res) or 1.6kHz (High-res).

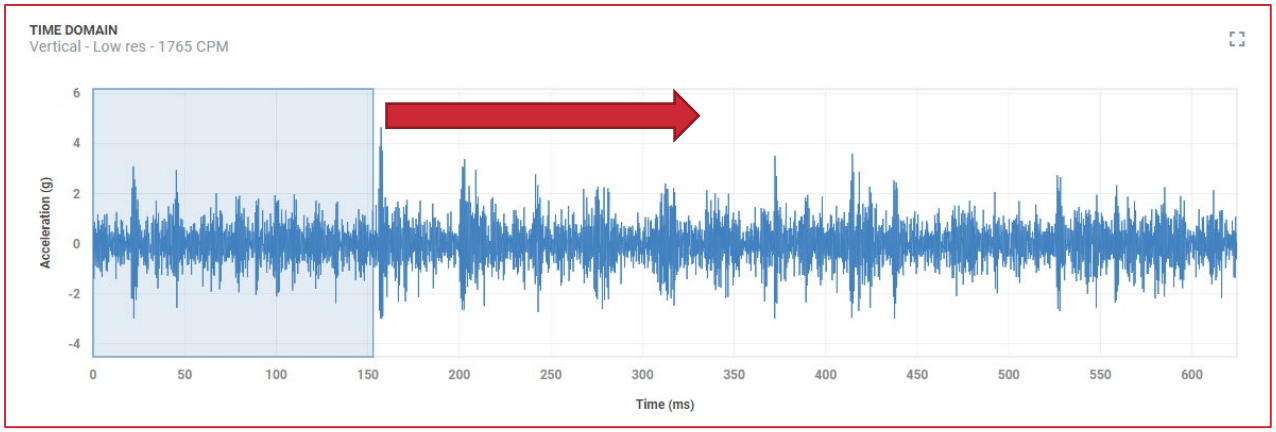
To use the feature, *right click* on a time domain graph, select *Tools*, then *Play waveform*.

Alternatively, *press P* on your keyboard whilst hovering over the graph.



The playback will repeat 4 times automatically when sampling a low-res time domain but will play only once when listening to a high-res time domain.

A window will appear showing the playback position.



If using headphones, please lower your volume initially to avoid hearing damage and increase as necessary.

Spectrum

The time waveform is the acceleration profile shown in the **Time Domain**. Thus, time is displayed across the X axis.

The Acceleration spectrum is the same acceleration profile (as the waveform) but shown in the **Frequency Domain**. Thus, frequency is displayed across the X Axis.

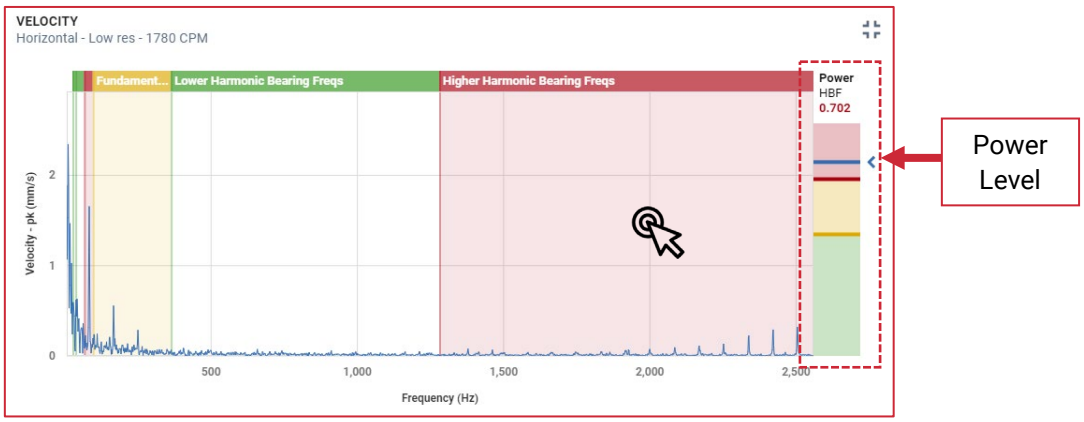
The acceleration spectrum is derived by performing an FFT (Fast Fourier Transform). From the *Acceleration* spectrum we derive *Velocity* and *Displacement* Spectrums.

The *Velocity* spectrum is the traditional way to analyse issues with the machine.

Power Bands

Power bands highlight key areas of the spectrum that can identify specific defects within the machine. Powerbands are defined by the text above the band and are separated clearly. Zoom in to the graph around 1X RPM to see more bands.

When a band is in an alarm state, the whole band will change colour to indicate where the issue is. If you hover over the band, the *power level* on the right-hand side will show the magnitude of the vibration for that band, and how far into the warning level the value is.



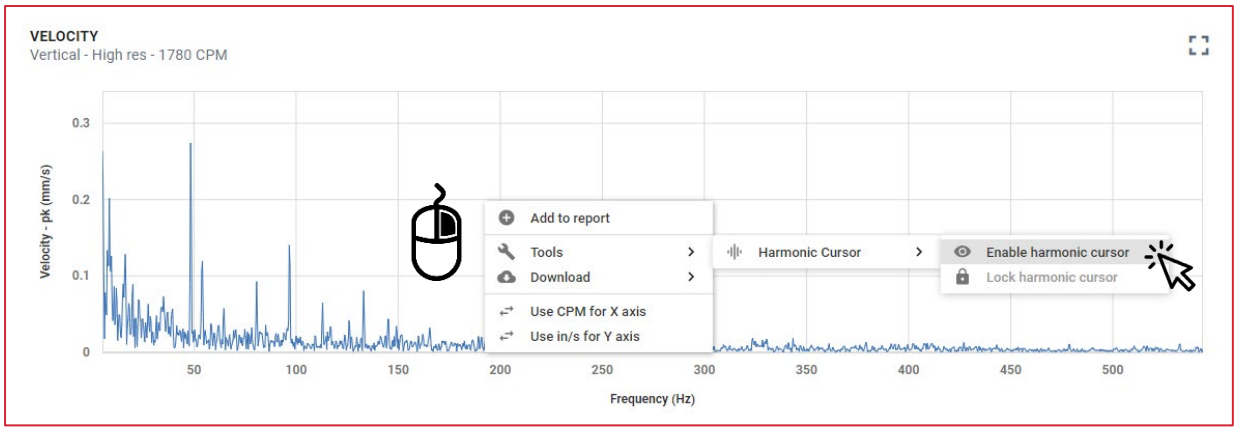
Alarms notifications can be triggered based on band levels.

Harmonic Cursor

The system provides a free form harmonic cursor for deeper analysis of spectra. The cursor can be placed at any frequency in the graph and will show all harmonics that are a factor of the primary cursor.

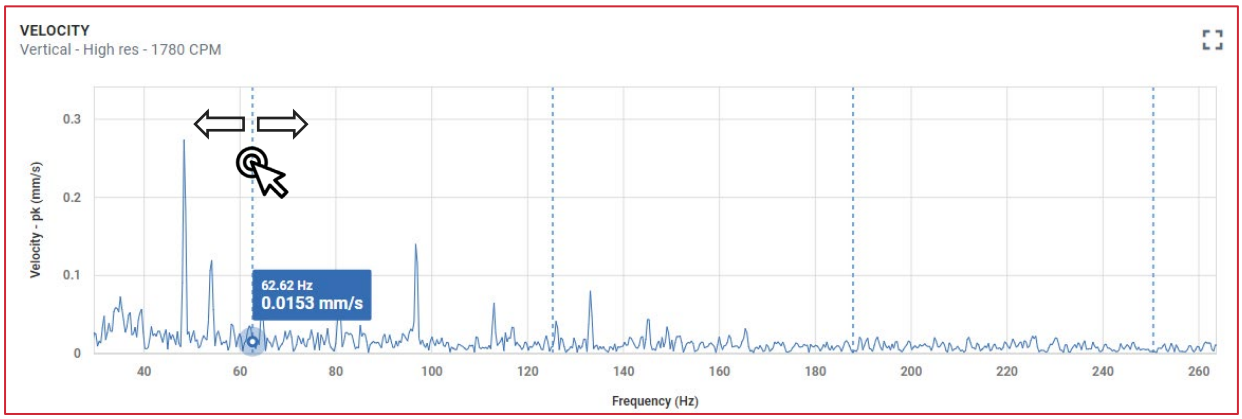
Enabling the Cursor

Right click on any spectrum to access the context menu and enable the cursor.



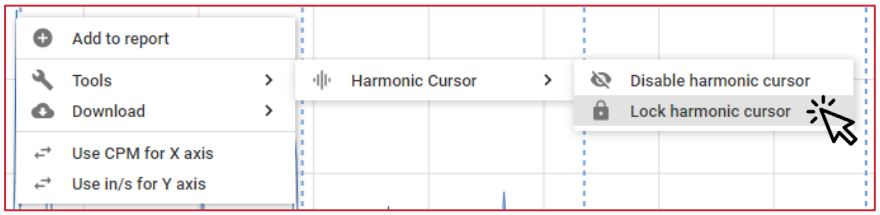
Moving the Cursor

Once the harmonic cursor is enabled, *dragging the mouse left or right* will adjust the position of the primary harmonic cursor, all other cursors will follow as per their order. You can still use the mouse wheel to zoom in and out of the graph to improve the accuracy of cursor placement.



Lock the Cursor in Place

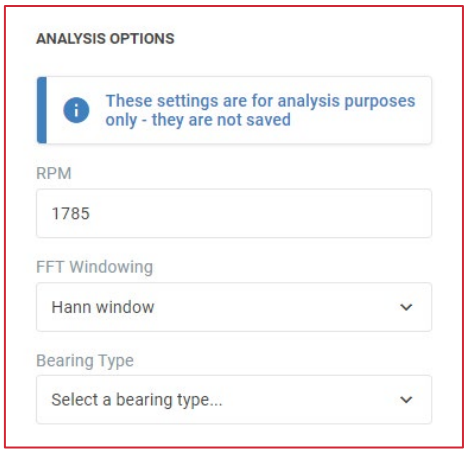
When you have identified the peak and appropriate harmonics, use the *context menu* to lock the cursor to the peak.



The cursor will remain in place until you either *disable the harmonic cursor* or view another graph.

Spectrum Analysis Options

Previously only the windowing option was available to adjust. This latest update adds two new features, custom RPM and Bearing Selection. All these options will only persist whilst the user remains on the page and you can cycle through axes and resolution options. To revert to defaults, please refresh the page.



Adjustable RPM

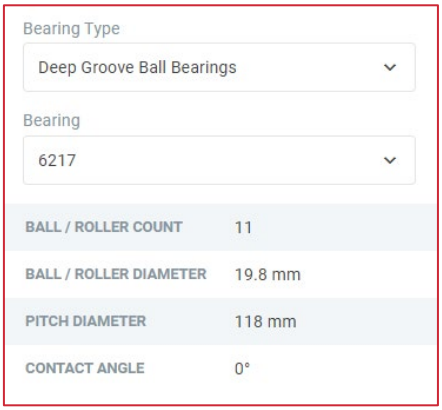
Entering in an RPM into the box will change the RPM reference for all related tools on that specific web page (power bands, harmonic cursors, orders of RPM etc).

To revert to the saved default RPM, refresh the page.

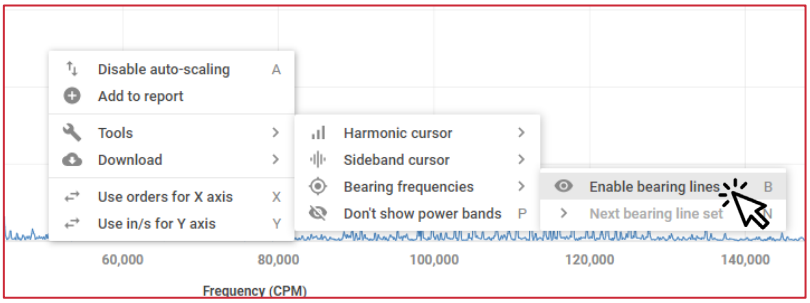
Bearing Type Selection and Frequency Highlight

Selecting a bearing type and number will show the bearing details under the *Analysis Options*. These values are used to generate bearing frequencies that can be displayed at points on the *Velocity Spectrum*.

Select a bearing type, and then the bearing part number from the drop-down menus:



On the spectrum, select Tools > Bearing frequencies > Enable bearing lines, to highlight the bearing frequencies, or press B when hovering over the graph.

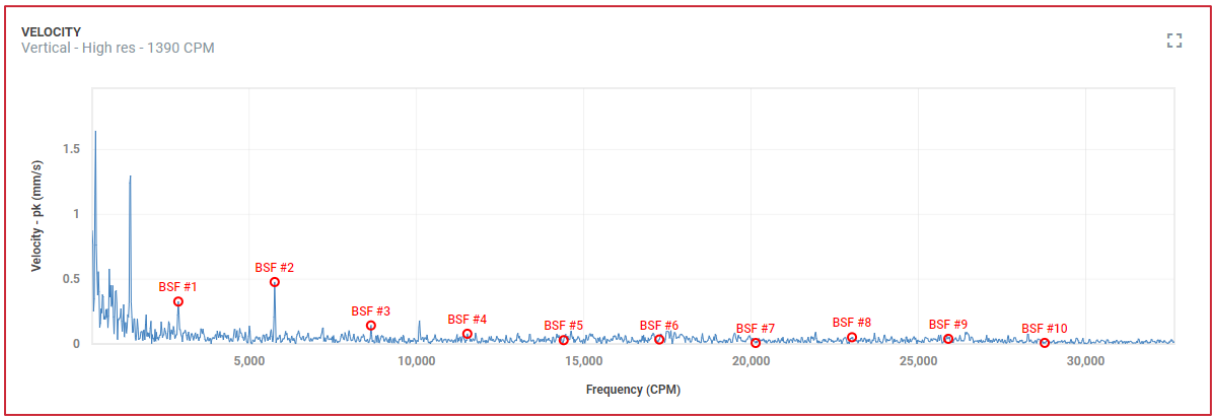


Bearing frequency indicators will be displayed on the graph for the selected bearing.

Press N on your keyboard to cycle through the available frequencies, available in this order:

- FTF – Fundamental Train Frequency
  - Rotation rate of the cage
- BPFO – Ball Pass Frequency Outer
  - Rate at which the ball/roller passes a defect in the outer race
- BPFI – Ball Pass Frequency Outer
  - Rate at which the ball/roller passes a defect in the inner race
- BSF – Ball Spin Frequency
  - Circular frequency of each rolling element as it spins

Each set of indicators will show the primary frequency and associated harmonics. When the indicators line up with peaks in the spectrum it indicates that an issue could be present with the bearings, depending on the peak magnitude and state of the machine.

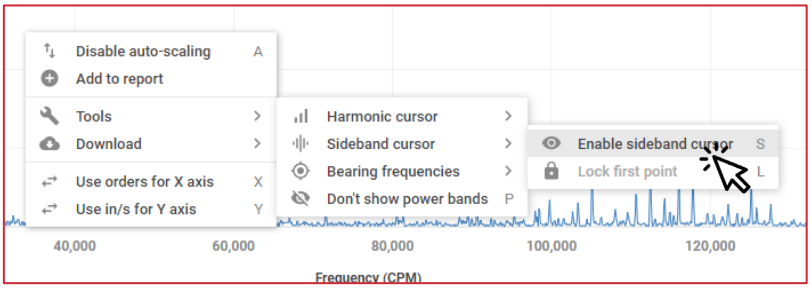


Note

For this tool to work it is critical that you have entered in the actual running speed of the machine at the time the time waveform was captured.

Sideband Cursors

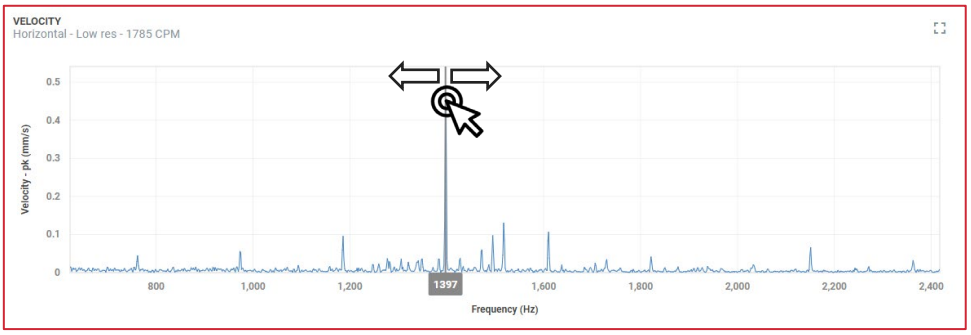
Use the sideband cursor to identify and measure sideband frequency.



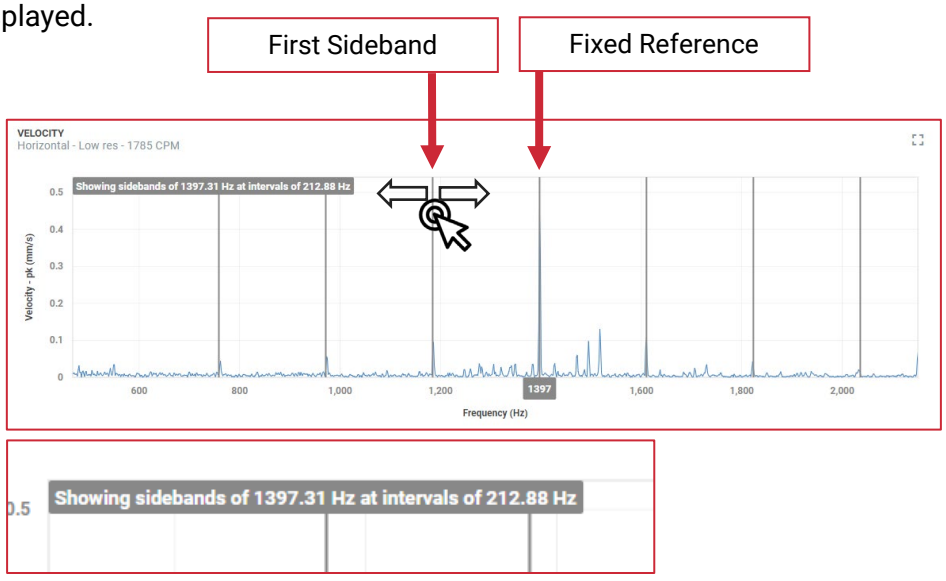
Right click, *Tools* > *Sideband cursor* > *Enable sideband cursor*, or *press S*.

A single cursor will appear, this is the **reference cursor**. *Move the reference cursor left or right* on the graph using the mouse, it can be placed anywhere within the waveform, but typically will be located at a defined peak.

The reference cursor will serve as centre cursor for which the side band indicators are based from. *Left click* once to lock the reference cursor (Or *press L*).



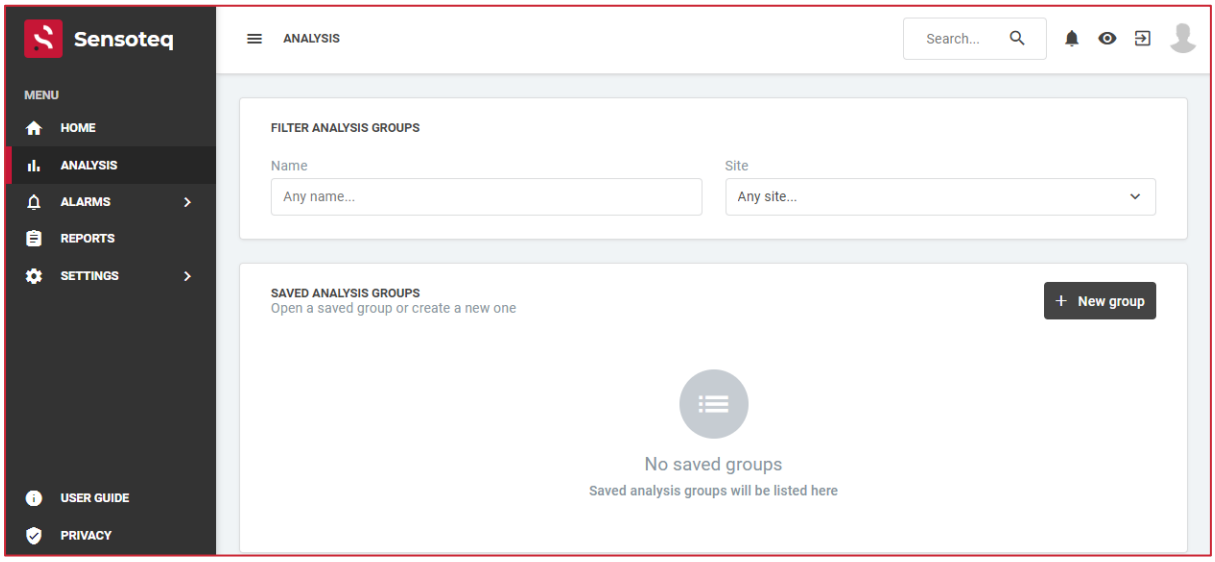
Once the reference cursor is locked, a group of sideband indicators appear. To set the sideband frequency, you adjust the first sideband to the desired location, all other indicators will move automatically. *Click to lock* or *press L*. The period and frequency of the sidebands will be displayed.



Analysis Tool

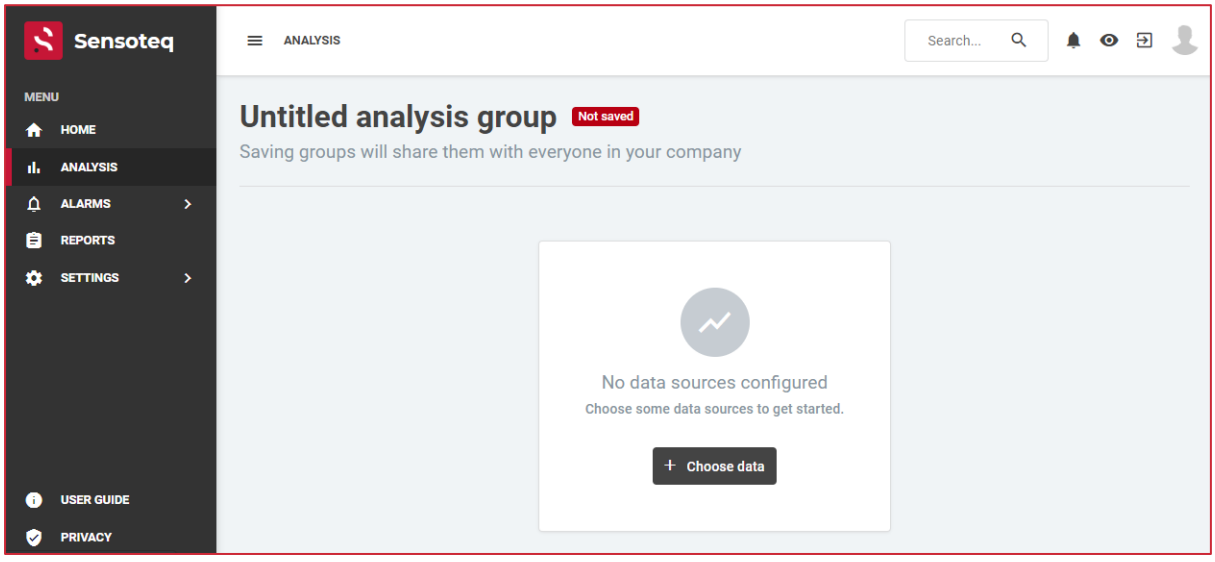
The Sensoteq Analysis Tool is a method of viewing and comparing data from multiple sources to assist with in-depth analysis. Data is selected by the user and placed into a group.

Groups of data sources can be saved and are viewable among staff from the company.



Selection of Data

Start by clicking New group from the main page. This will create a temporary group.



Click Choose data to select data to add to the group. You will then need to select a site from which to select data from.

Click Confirm when your selection is made.

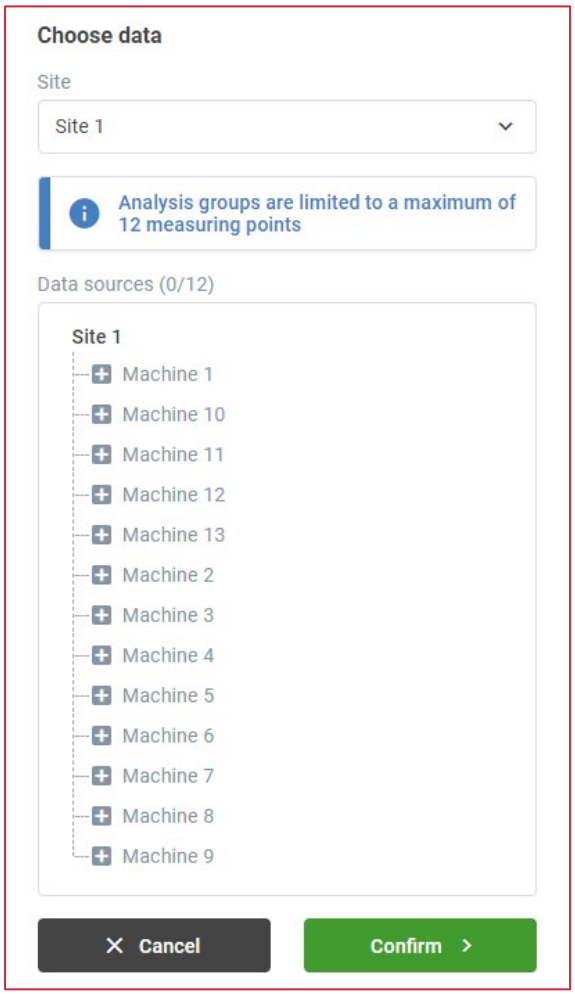
The window that appears will allow you to select data from any machine or measuring point on the selected site.

Data selection is limited to a maximum of 12 measuring points.

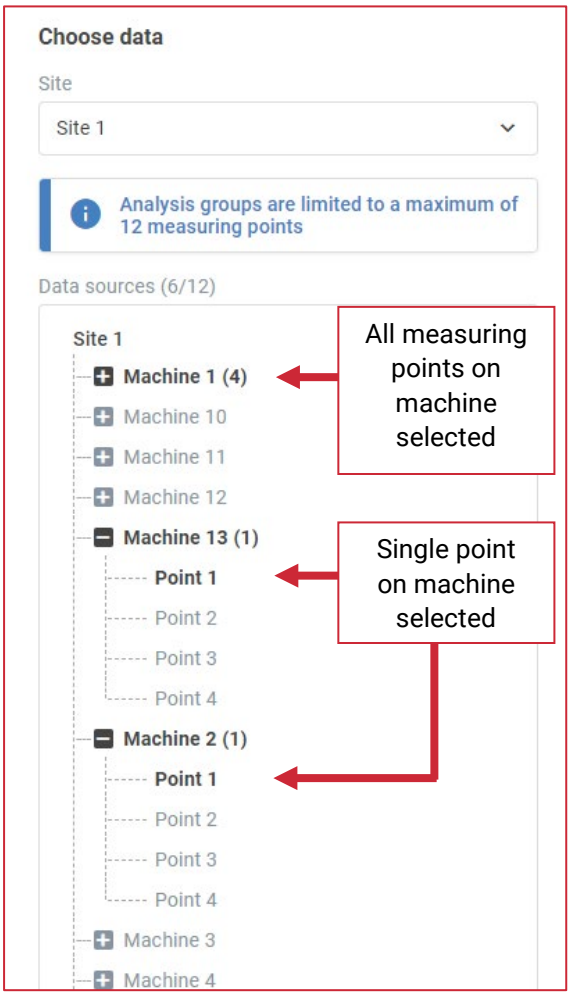
To select all measurement point on a machine, simply click the machine name.

To select an induvial measuring point, expand the machine using the plus symbol and select the desired measuring point. Multiple points can be selected.

No Data Selected



6 Points Selected

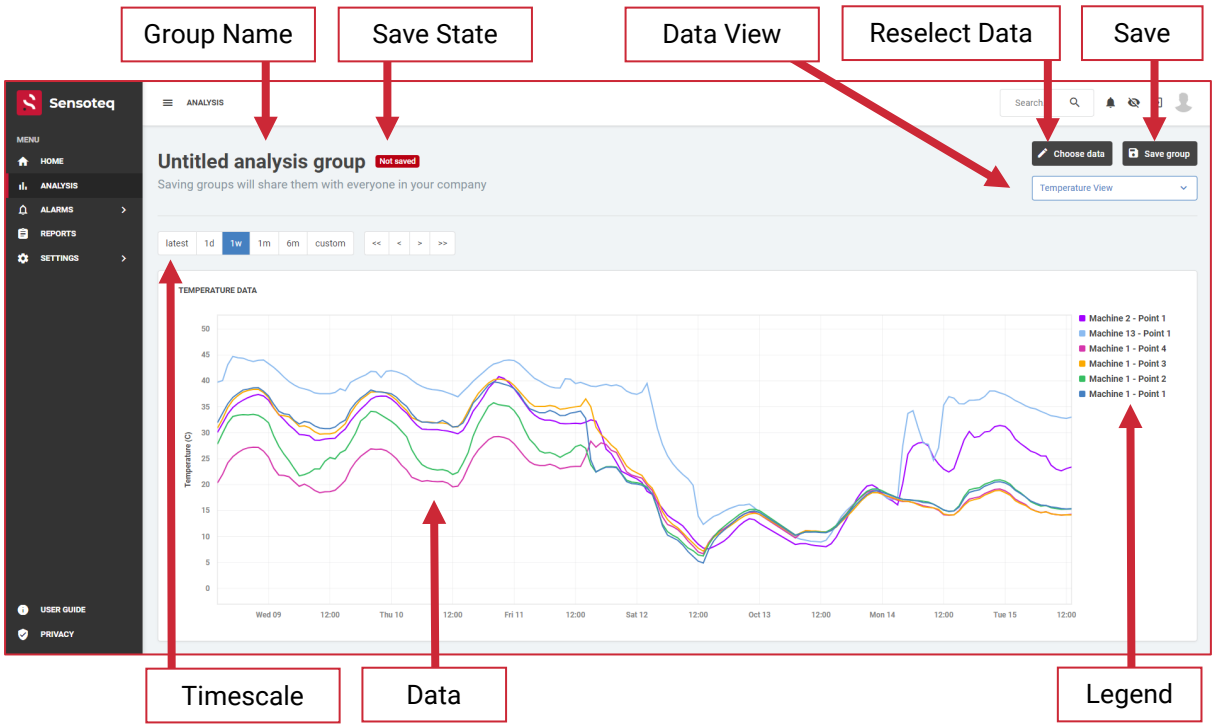


This method of selecting data points allows a user to view data from the same measuring point (such as motor inboard/drive end) across several machines.

Press Confirm to view the data.

Data View, Saving and Recalling

Once data is selected you will be presented with the *Group Analysis Page*.



Data Views

The data is presented in a similar method to the individual analysis tools, with different data streams being presented by a colour. Each data stream is from one measuring point.

Individual streams can be temporarily hidden by clicking the measuring point name on the legend. Clicking a second time will make it visible again.

The following data is available to view and will show data for all the available measuring points:

- Temperature (Of Measuring Point)
- RMS (By Axis)
- Total RMS (All Axis Summed)
- Spectrum View
- Time Waveform
- Peak to Peak

Note

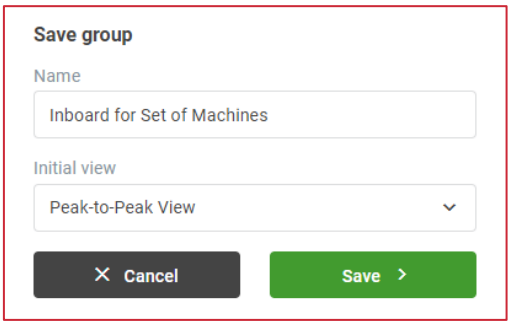
Spectrum and time waveform views will pick the closest measurement available, as data between the measuring points is not synchronised.

Saving Groups

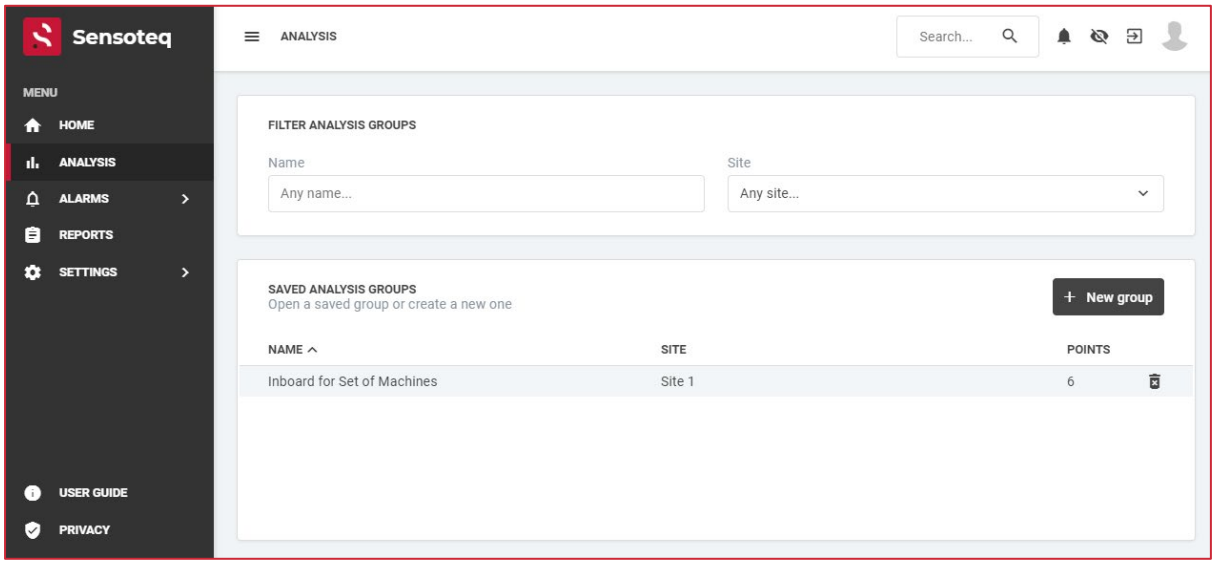
Opting to save the group will allow for fast recall later, meaning you will not need to reselect the measuring points.

If you wish to save the data, click the Save group button.

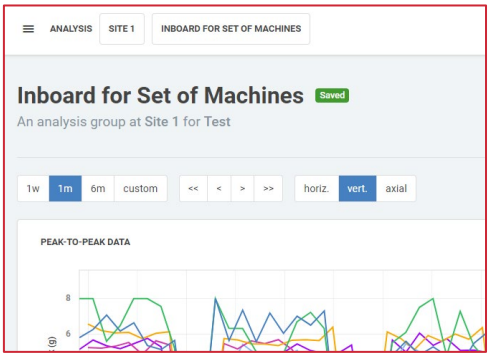
The dialog box allows to assign a name to the group and a default view that you wish to see, all other views can still be selected via the *Data View Drop-down Box*.



Now when you go the Analysis Tool, the saved views will be available:



The *Group Name* and *Save State* will also update:



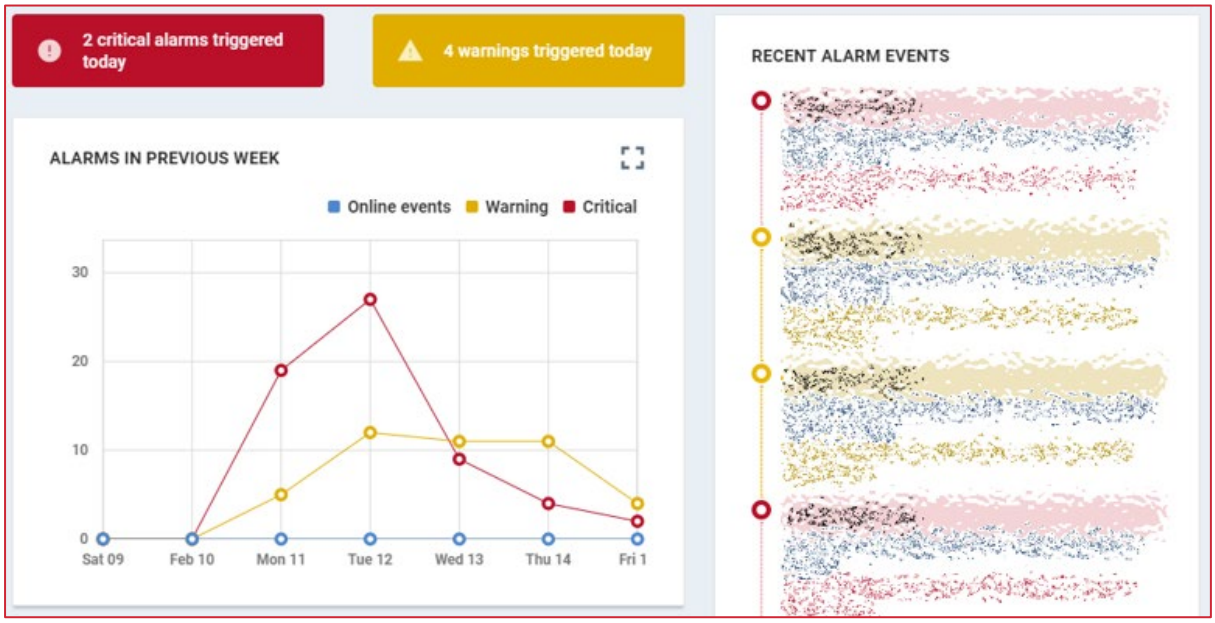
Alarms

The alarms menu has been designed to give the user a high-level summary of alarms during the previous week.

Status

The 4 warning and 3 critical alarms indicate a potential problem with machinery and should be investigated further.

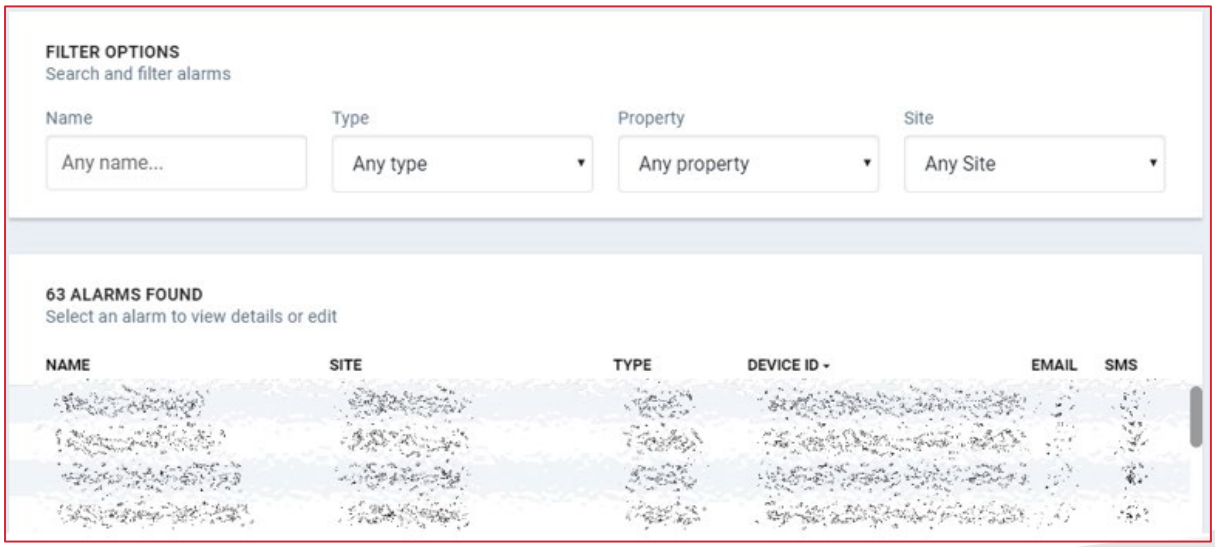
The Recent Alarm Events list on the right gives you quick access to the most recent events and can take you directly to the sensor/graph that is alarming.



List

View the list of all configured alarms for your sites.

Here you can edit or delete existing alarm configurations, including being able to set which users receive alarm warnings.



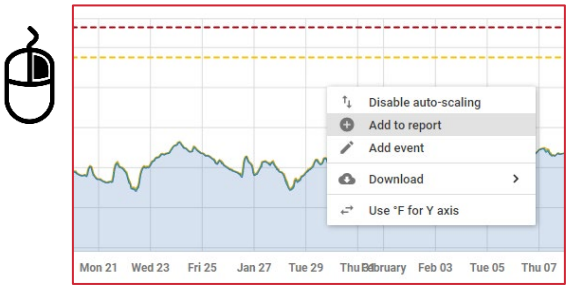
Reporting

Note The report editor only works on a desktop browser.

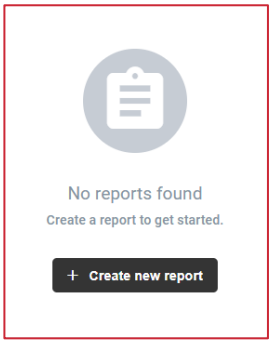
The **Reporting Tool** is useful for generating PDF documents with details about your site(s) machine health. Documents are stored in the cloud for access at any time and are always editable.

Before creating a report, it is recommended that you pre-select items to add into the document.

When viewing a graph that you would like to add to a report, *right click* anywhere within the data window of the graph and select *Add to Report.*



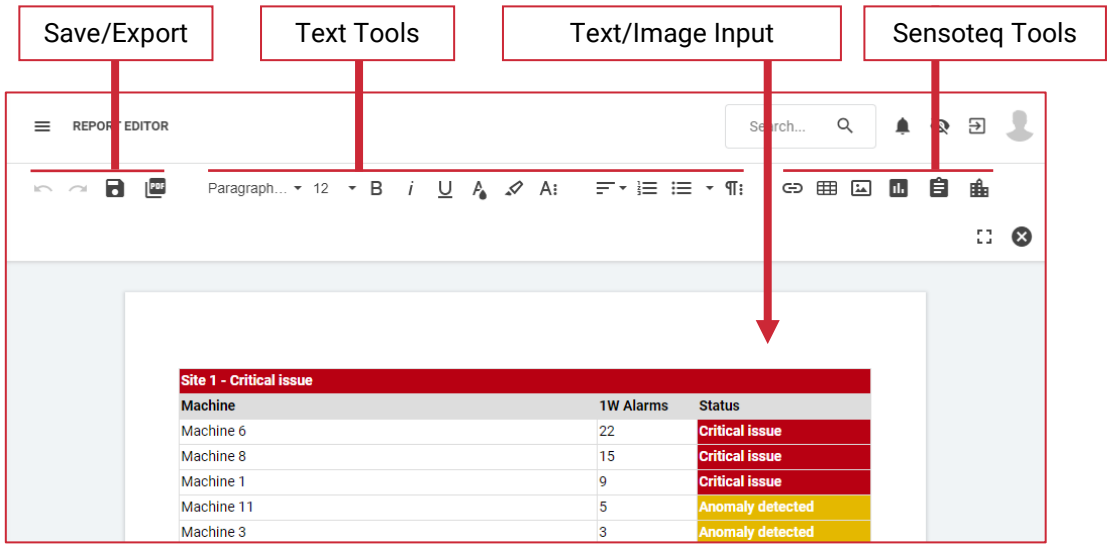
Do this with any number of graphs you wish to add to the report.



Click the Reports tab in the main menu to start creating reports:

If this is your first time using the reporting tool, you will have no report available to view or edit; you will need to create a new report.

Click + Create new report to create a new



File Options

Icon	Action	Description / Example
	Undo	Undo the last change made
	Redo	Redo any changes that were undone
	Save	Save the file within the Sensoteq System
	PDF Download	Export the file as a PDF document for offline viewing

Note
Files saved within the Sensoteq System are viewable by all users within that company.

Copy/Paste to or from Microsoft Word

It is possible to copy and paste data from Microsoft Word (or other popular word processors) from or to the Sensoteq Report Editor.

Copying from Word to Report Editor

Simply copy the detail from Word (Select the data and press Ctrl + C) and select the point within the Report Editor you wish to paste to. Press Ctrl + V to paste the information into the editor. You will be presented with two options (Word Paste Detected):

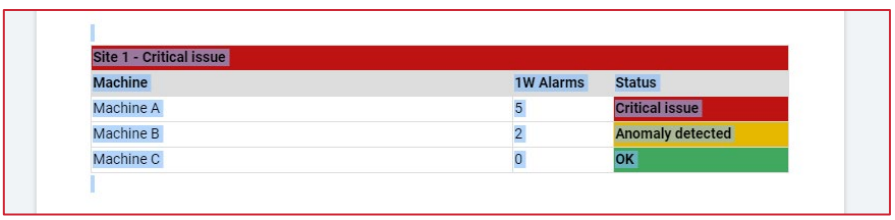
- Clean – Strip all the previous formatting from word and paste a plain text
- Keep – Attempt to keep all the previous formatting

How successful the pasting is will depend on the complexity of the original formatting. The following items will not work/have unpredictable results:

- Cropped images (will paste as the full image)
- Word objects and shapes (will not be pasted)
- Other Word-specific formatting

Copying from Report Editor to Word

When copying from the report editor it is best to copy the selection using the cursor, and copy more than is desired, and then remove the extra content after pasting into Word – this is particularly important with tables – ensure to select above and below the table.

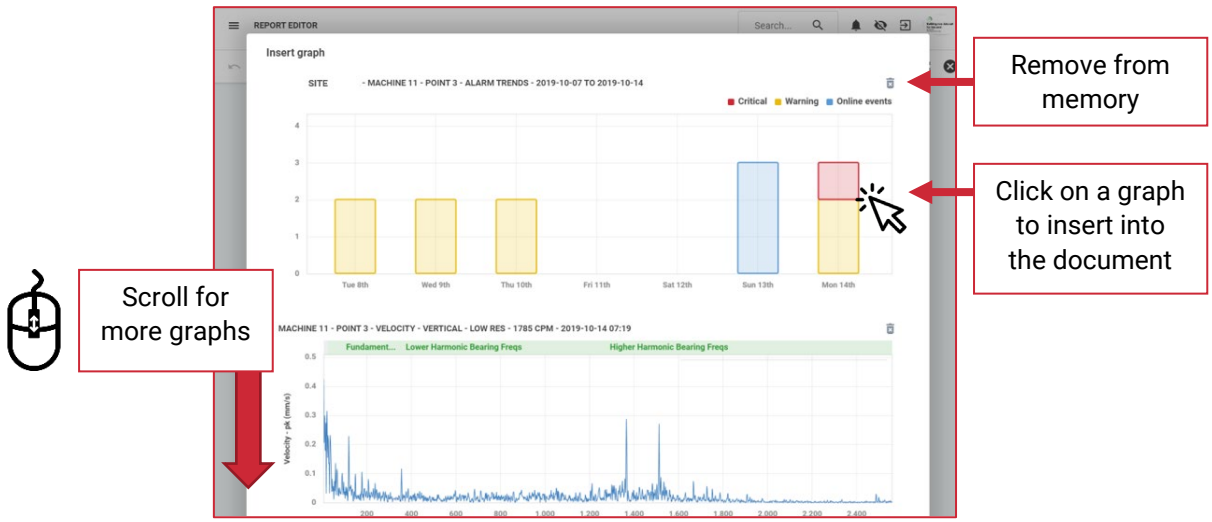


Site 1 - Critical issue		
Machine	1W Alarms	Status
Machine A	5	Critical issue
Machine B	2	Anomaly detected
Machine C	0	OK

Insert Graph

Graphs selected by using the “Add to Report” tool (from the right-click context menu, available on every graph) will appear when clicking the Insert Graph icon.

Click on the graph you wish to add to the report. The machine and point name, along with the date and time will be displayed below the image as an editable caption.

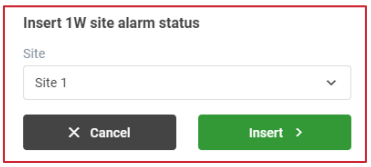


Graphs selected for reporting will remain within this page during your active session and even after they have been inserted into the report. To remove a graph from the tool, please click the trash icon . This will only remove the graph availability in the reporting tool – if it was inserted into the graph it will remain there, and no data is impacted from the analysis section of the HMI.

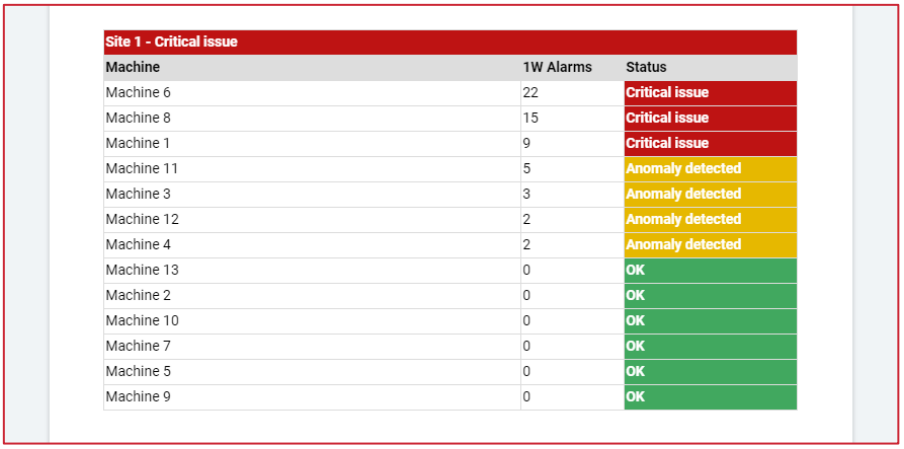
Site Status

Site status will provide a high-level overview of the state for each machine within the selected site for the past week. The worst-case condition of a measuring point associated with the machine is used for the overall status. Also shown is the number of times the machine has been in an alarm state over the past week

Press the *Site Status* button and you will be presented with a list of sites from which to report (this will correspond to the sites that you can view in the HMI).



Press Insert to create an editable table with the data and have it inserted into the report.

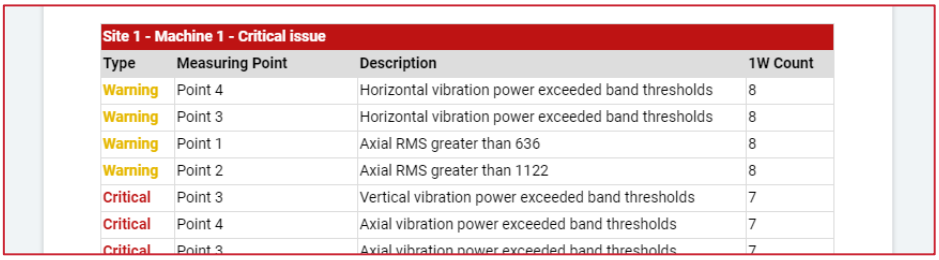


Site 1 - Critical issue		
Machine	**1W Alarms**	**Status**
Machine 6	22	Critical issue
Machine 8	15	Critical issue
Machine 1	9	Critical issue
Machine 11	5	Anomaly detected
Machine 3	3	Anomaly detected
Machine 12	2	Anomaly detected
Machine 4	2	Anomaly detected
Machine 13	0	OK
Machine 2	0	OK
Machine 10	0	OK
Machine 7	0	OK
Machine 5	0	OK
Machine 9	0	OK

The data is shown in descending order of criticality, thus machines with the most critical issues are at the top of the table.

Alarm Log

To gain more detail about the status of each machine, use the *Alarm Log* feature, which will list each type of warning for each measuring point related to that machine. This will show data for the past week. Data can be selected for an individual machine, or all machines within the site. Press the *Alarm Log* button to insert the data.

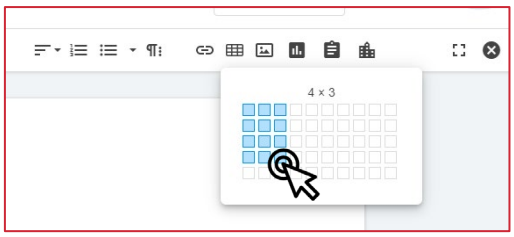


Site 1 - Machine 1 - Critical issue			
Type	**Measuring Point**	**Description**	**1W Count**
Warning	Point 4	Horizontal vibration power exceeded band thresholds	8
Warning	Point 3	Horizontal vibration power exceeded band thresholds	8
Warning	Point 1	Axial RMS greater than 636	8
Warning	Point 2	Axial RMS greater than 1122	8
Critical	Point 3	Vertical vibration power exceeded band thresholds	7
Critical	Point 4	Axial vibration power exceeded band thresholds	7
Critical	Point 3	Axial vibration power exceeded band thresholds	7

This is an editable table so you can modify the data.

Tables

Insert a table into the report by clicking the table icon . This will open the table dialog window. Hover over the desired number of rows and columns and left click to add the empty table to your report.



When inserted, you can edit the formatting and content by either clicking anywhere within an individual cell or click and drag to form a selection of multiple cells. The cell option box will appear below the selection.

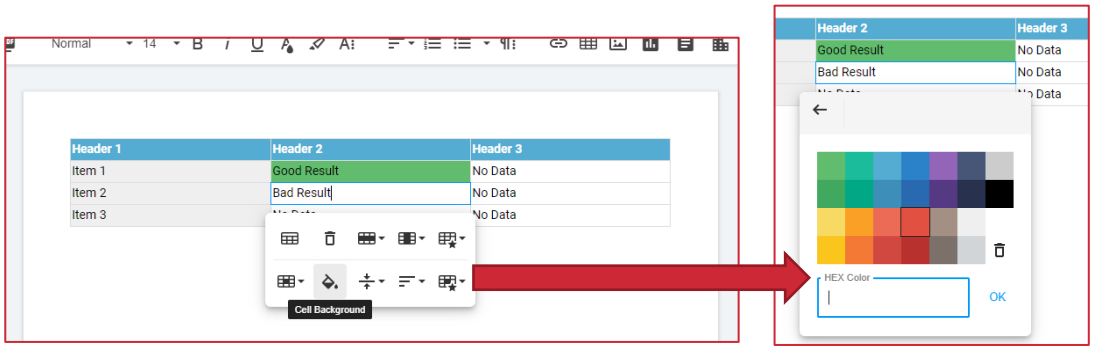
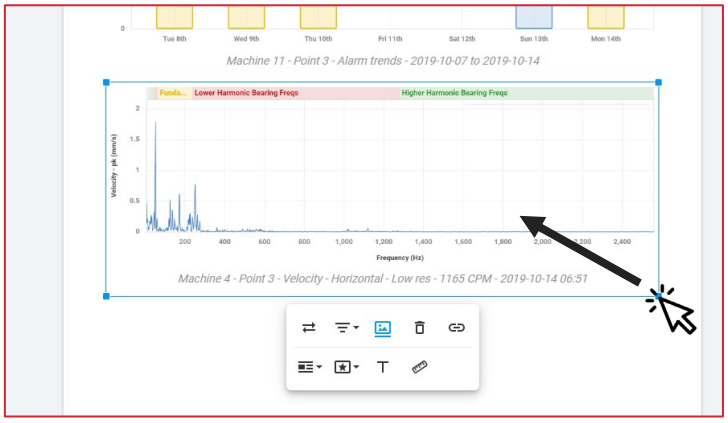


Table Options

Icon	Action	Description / Example
	Table Header	Insert/remove table header
	Remove Table	Remove entire table
	Row options	Insert or remove row
	Column options	Insert or remove column
	Table Style	Machine Machine 6 Machine 8 Dashed borders with alternate row colour
	Merge options	Merge or split cell
	Colour	Change cell or selection colour
	Vertical Align	Top, Middle, Bottom
	Horizontal Align	Left, Right, Centred, Justified
	Cell Style	Machine 12 Machine 4 Machine 13 Highlighted cell with thick border

Image Formatting

Click on any image (graph or otherwise) and a blue bounding box will appear. Hover over the corner of this box until the resize icon appears ⤢. Click and drag *on any corner* to increase or decrease the size of the image as necessary.

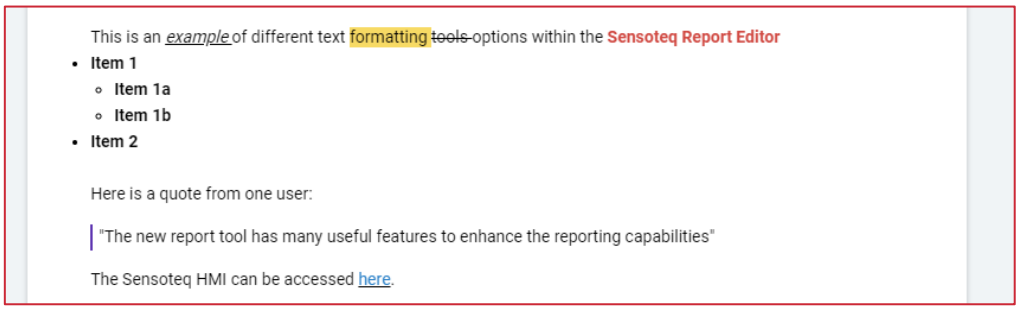


With the image selected, click and drag *within the blue bounding box*, the image to any other point in the document and it will move to that new location.

Text Formatting

Aⵗ

The Report Editor comes with a full featured set of tools for editing, as per this example:

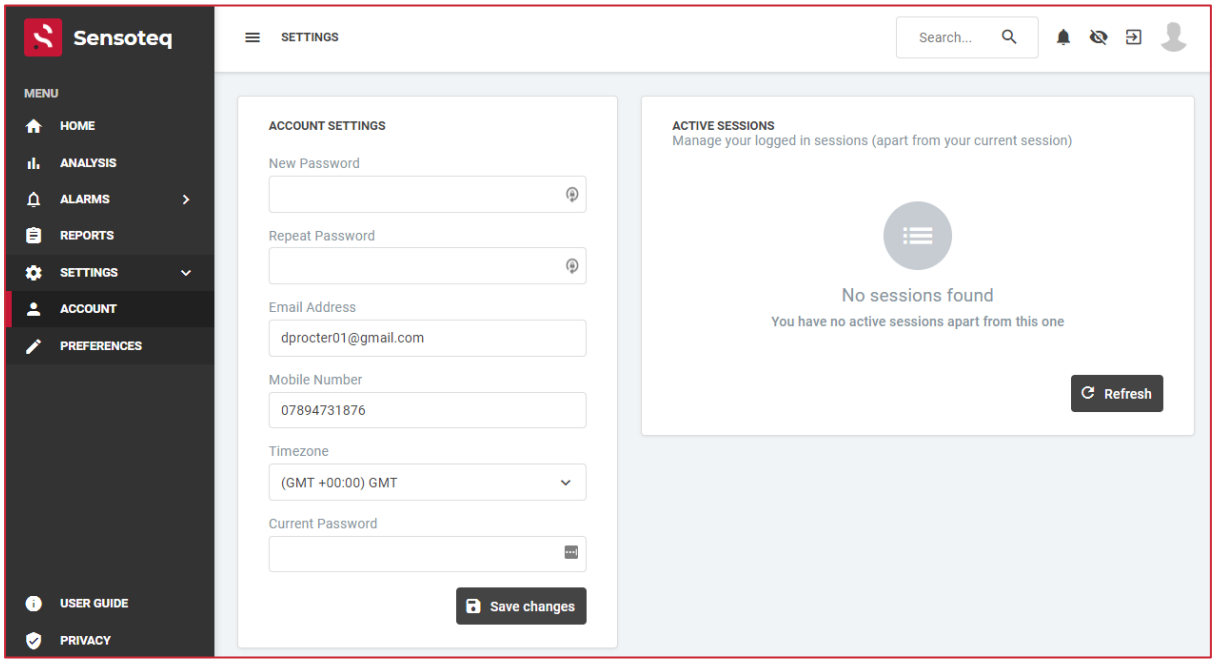


Icon	Action	Description / Example
Normal 14	Font options	Headers and font size
B *i* U	Format	Bold, italic, underline
	Font colour	Change the font colour
	Highlight Colour	Change the background colour behind selected text
Aⵗ	Text options	Strikethrough, subscript, superscript, clear formatting
	Text alignment	Left, right, centred, justified
	Bullet points	Add bullets or numbering
¶ⵗ	Parargraph	Adjust line height, indent level, or add quote
	Insert link	Add a hyperlink/URL to a website etc

Settings

Passwords, Email and Phone

When you wish to change any details stored on the system you will do so through the settings tab.



Changing password

1. Click *Settings > Account*
2. Enter in a *new password* and *repeat password* (both must be the same)
3. Enter your *current password*
4. Click *Save changes*

Changing email or phone

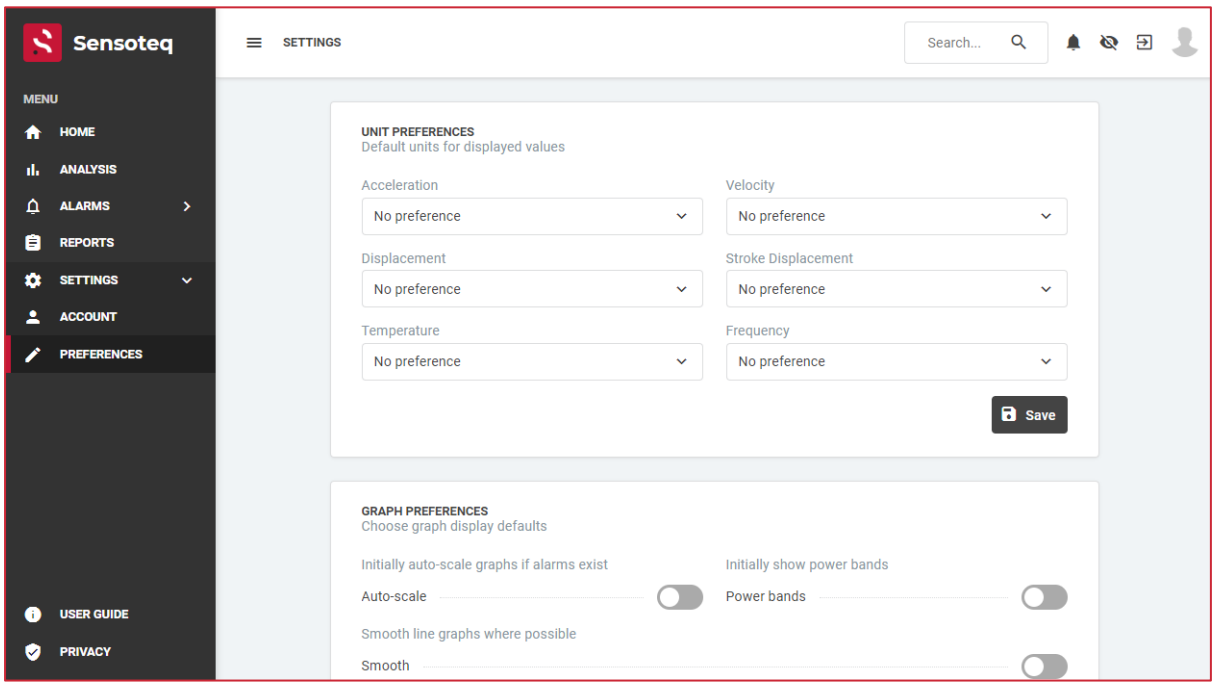
1. Click *Settings > Account*
2. Enter in a new *email address* or *mobile number*
3. Enter your *current password*
4. Click *Save changes*

Active Session

If you are using the HMI on another device (computer or phone) the details will appear in this section. This is for security, if you notice any unauthorised or unexpected sessions please change your password and contact Sensoteq Support.

User Preferences

Many users have a specific preference relating to how information is displayed to them. In this screen you can adjust many of these settings, changes made here are applied by default across the entire HMI. Most settings are also adjustable when viewing a graph itself, in this case changes are only temporary.

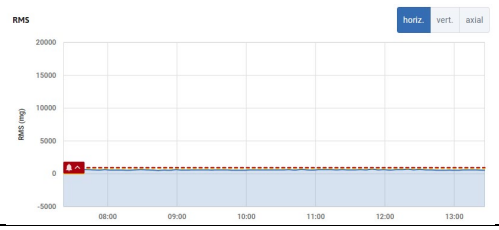
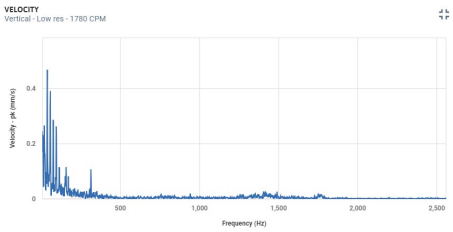
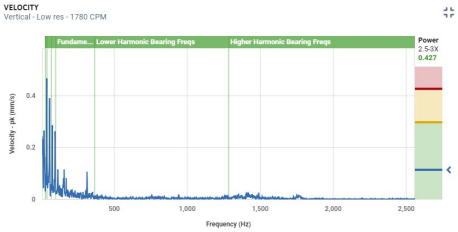


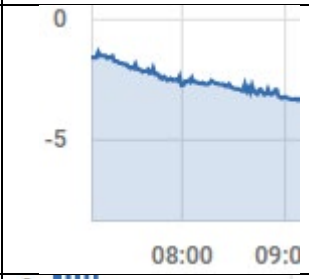
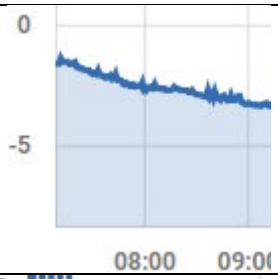
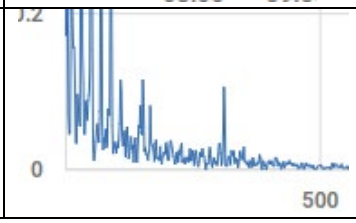
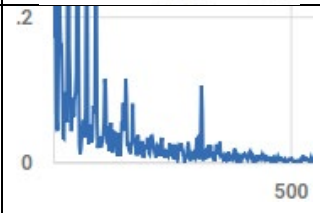
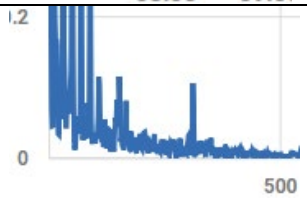
1. Select your unit preference or no preference
2. Click *Save* within that widget

Unit Preferences

Measurement	Unit	Unit Description
Acceleration	g	Gravitational Force (1g = Gravity)
	in/s^2	Inches per Second - Squared
Velocity	mm/s	Millimetres per second
	in/s	Inches per Second
Displacement	microns	Micron ($1x10^{-6}$ Metre)
	mils	Mil or Thou ($^1/_{1000}$ Inch)
Stroke Displacement	mm	Millimetres
	in	Inches
Temperature	°C	Degrees Centigrade (Water Freezes at 0 °C, Boils at 100 °C)
	°F	Degrees Fahrenheit (Water Freezes at 32 °F, Boils at 212 °F)
Frequency	Hz	Hertz
	CPM	Cycles per Minute (equivalent to RPM)

Graph Preferences

Feature	Description / Example
Auto Scale	Autoscales graph when alarm levels are set **Auto-scale OFF**  **Auto-scale ON** 
Power Bands	Enables power bands on spectrum to highlight specific zones **Power Bands OFF**  **Power Bands ON** 

Feature	Line Thickness		
	Thin	**Medium**	**Thick**
Graph Line Thickness			
Vibration Graph Line Thickness			

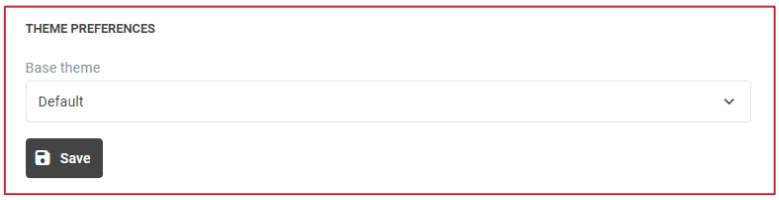
Themes

Themes allow the user to change the look and feel of the HMI based on their preference.

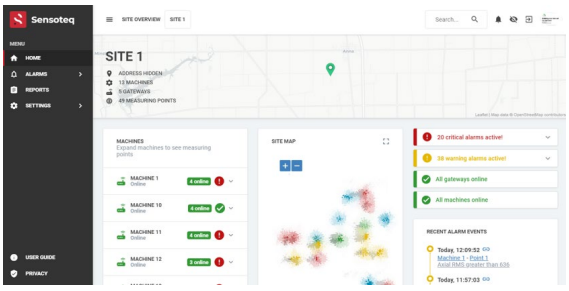
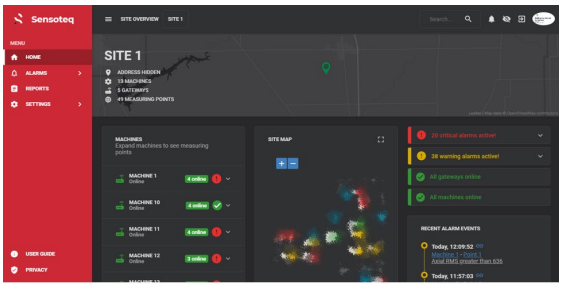
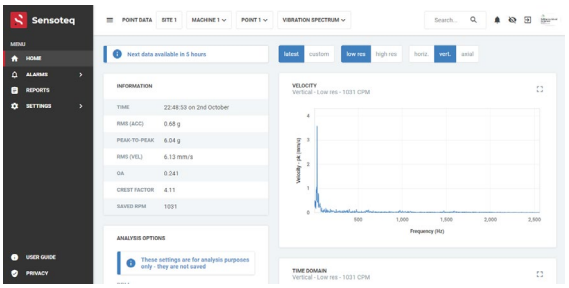
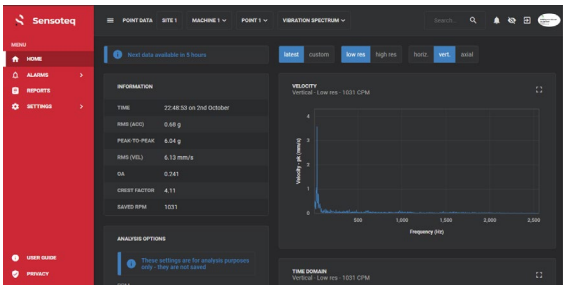
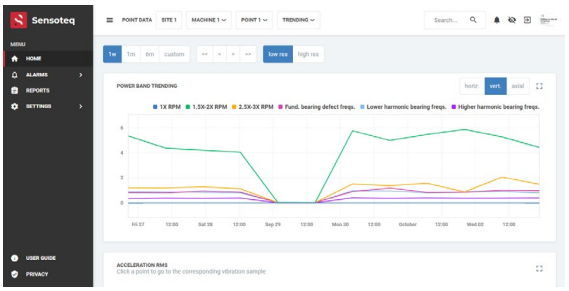
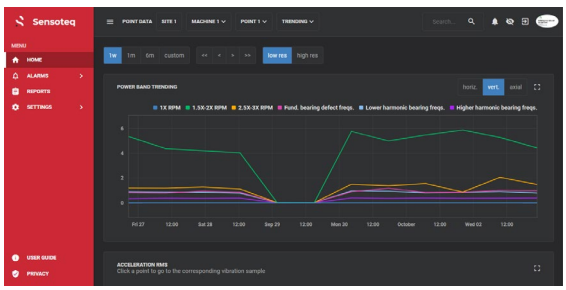
Two themes are currently available:

- **Default** – Light colours and brighter overall feel
- **Dark** – Darker colours designed to reduce eye strain

To select a new theme, navigate to: *Settings* > *Preferences* > *Theme Preferences*



Change the “Base theme” to your desired colour scheme, as per below:

Default	Dark
	
	
	

Troubleshooting

If this guide cannot answer your question, please contact support@sensoteq.co.uk.

Software Issues

Our HMI works best when using the latest version of Chrome, Firefox, Safari or Edge.

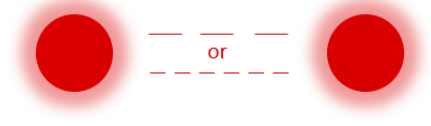
If you experience an error whilst browsing the HMI, please take note of the issue in the following format, doing so will significantly increase the speed at which we can rectify faults:

1. Take a screenshot of the issue
2. Note the steps you followed that led to the issue
    a. Attempt to replicate the problem if possible
3. Note the browser software and version
4. Note the hardware device and operating system used to view the HMI
    a. For example: mobile phone, laptop, Windows or Macintosh etc

Hardware Issues

We have a separate in-depth hardware guide that should be used for diagnosing issues with Sensoteq equipment. Below is a quick guide to the LED colours on the gateway.

Gateway - LED Colour Chart

Colour	Description	Meaning
	*Dark blue* Slow flash	**Listening Mode** No WiFi configured, please connect to the device and set WiFi credentials.
	*Bright Green* Fast blink	**Connecting to WiFi** The device is attempting to connect to WiFi. If it remains in this state for more than 3 minutes please see your IT administrator.
	*Cyan* Fast blink	**Connecting to Cloud** The device is connected to WiFi and internet is available. Attempting to connect with Sensoteq cloud services
	*Cyan* Slow "Breathing"	**Connected to Cloud** Working as expected.
	*Magenta* Fast blink	**Firmware Updating** The gateway is performing an update of its firmware. This is an automatic process.
	*Red* Fast blink or Slow Flash	**Fault Detected** The gateway will attempt to restart automatically. If this pattern persists, please contact Sensoteq.

If you are experiencing issues with the gateway, please attempt to physically restart the device by switching the power off and on.

Measuring Point Sensor

All sensor issues should be reported to Sensoteq Support, these parts are not user serviceable.

support@sensoteq.co.uk