User Manual

DSP Machinery Control

Ver.: 2.0

DSP Machinery Control

Copyright and trademark 5
Introduction 7
Development 8
Administration and load sensors 8
Creation of plants 9
Creation of Sub plants 11
Creation of equipment 12
Creation of point 15
Masks of alarms 20
Creation of masks 21
Creating measurements 23
Measurement setup window 23
Time Table 27
Variable 29
Channel 29
Max. Freq. (Hz) 29
Measurement type 30
Lines/samples 30
Averages 30
Window 30
Gain 31
Filter 31
Shooting (%) 35
AC auxiliary channels 37
DC auxiliary channels 38
Scenes configuration 39
Configuration of Visualizations 41
Display modes 43
There are three ways to present the values on the screen 43
Trend 43
Using the mouse 47

Bars and Clocks 48
Format with alarm clocks 49
Routes 49
Creating and Editing Routes 50
Connecting to PC, to upload and download routes 54
Upload Routes to equipment: 55
Download Routes of the equipment 57
Connection to PC, to download Reports 59
Download equipment Reports 60
Analysis of Spectrum, waveforms and / or Orbital Graphic 62
Access to records 63
Results list 63
Export to CSV 69
Graphs of the results 69
Analysis tools 76
Icon: Main dial cursors 76
Harmonics 77
Lateral Bands 77
Maximum Peaks 78
Icon: Main changes in the spectrum scales 78
Hz/CPM - Change in Frequency Units: 79
Metric/Imperial - Change In Spectrum Measurement System: 79
Speed measurements 80
Linear/Logarithmic - Amplitude Scale Change in the Spectrum: 80
G/M/S^2 Change in Spectrum Measurement System: 81
Configuration tools 82
Zoom Vertical Axle 82
Maximize the Spectrum 83
Spectrum Reset 83
Calculation of the Actual Frequency of RPM 83

Save a Spectrum 84
Images, Text, and Data 84
Copy Image to the Clipboard 84
Spectrum Send by E-Mail 85
Spectrum Print 85
Spectrum Export to Microsoft Word 85
Spectral Distance 86
Frequency Bearing Fault 86
Diagnostic tools in velocity and displacement 87
Rocking Analysis 87
Alignment Analysis 87
Mechanical Clearance Analysis 88
Accelerating diagnostic tools 88
Diagnostic tools in acceleration 89
Analysis of Bearing 89
Lubrication Analysis 89
Windows deployment 90
Reports 91
Guide for installation and service 93
To install the application as a service: 93
To remove the service 94

Copyright and trademark

September 2013
Copyright © 2012-2013 SEMAPI CORP.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopy, recording, or otherwise, without the prior written permission of SEMAPI.

The information contained in this publication is provided for informational purposes only and is subject to change without notice. SEMAPI and its affiliates assume no liability for any damages or losses that may result from use of the information contained in this publication. The software described in this book is supplied with pertinent licenses and registered with a number of U.S. Patents Pending and foreign counterparts.

This manual is distributed hardware and software that includes an agreement to an end user license. This manual or the software described in it is provided under license and may only be used or copied in accordance with the terms and conditions of such license.

Except as permitted by such license, the reproduction of any part of this manual or storage in a retrieval system or transmission in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of SEMAPI is prohibited. Please note that the content of this manual is protected by copyright law, even if it is not distributed with software that includes an end user license agreement.

The content of this manual is furnished for informational use only and is subject to change without notice. It should not be construed as a commitment by SEMAPI, which assumes no liability or responsibility for any errors or inaccuracies that may appear in the information content of this manual.

Remember that existing artwork or images that you may want to include in your project may be protected by intellectual property laws. The unauthorized incorporation of such material into your new work could be a violation of intellectual property rights of the copyright holder. Be sure to obtain the appropriate permissions from the copyright holder.

Introduction

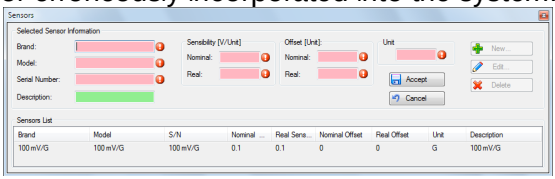
The phrases Machinery Control®, DSP Remote Monitor®, DSP Compact WRM, and DSP Full Condition® are trademarks of SEMAPI.
The SEMAPI logo is a registered trademark. All other trademarks are property of their respective owners.

The Machinery Control DSP software lets you manage measurements of connected hardware systems, regardless of the family that controls the machine. All associated hardware connected to the network will be managed by the software.
The database creation and subsequent analysis of the measurements is performed by the software.

Development

Administration and load sensors

This section of the program is usually set by the installer of the system by entering the "Administration" option on the menu bar, then choosing the "Sensors" option on the submenu, which displays a window that allows you to **incorporate** a new sensor system, **edit** the characteristics of an existing sensor, or **remove** a sensor erroneously incorporated into the system.



To register a new sensor, you must click "New" and then complete all the data that are normally printed and a sensor certification. After completing these fields, click "Accept," and this data will be ready for use as sensor responses chosen by setting the measuring point.

It is very important to note that the **Actual Sensitivity** field must be accurately completed with the data provided by the sensor manufacturer, as this depends on the proper calibration data of the corresponding measuring point. In addition, this field should be expressed in volts; for example, if the sensor indicates technical brief sensitivity of 96.4 mV/g, then in the field you must enter **0.0964** actual sensitivity, and in the "Unit" field Unit, you must enter **g**.

The fields **Brand**, **Model**, and **Serial Number** will be the identifiers of a particular sensor. If such data is not known, it may be supplemented with generic information, such as **Accelerometer**, **Universal**, and **S/N**, for example.

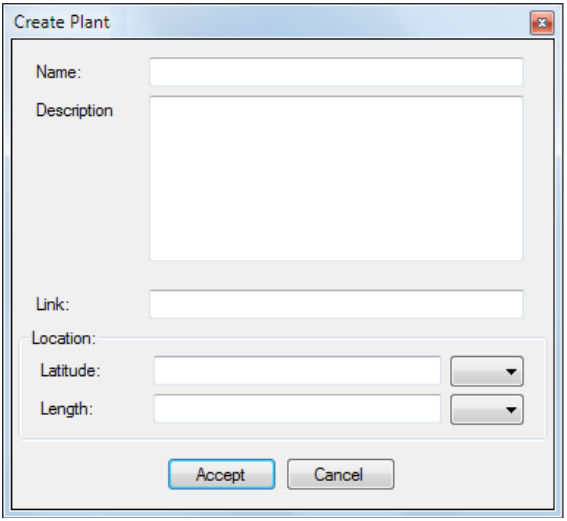
Do not attempt to enter a new sensor if sensitivity is unknown, since wrong data in the field will generate an error in the measurement range.

Creation of plants

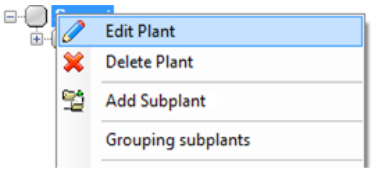
The system will save all the collected information into a single file, and to handle the data it will generate a tree whose top level is generically called “Plant.”

Defining one or several plants will depend on the number of modules that are under control. If there are not too many, it can be convenient to create a single plant, since all modules will be in one location, and thus there will be a simpler and more straightforward reference and comparison of measurements. If there are many control modules (more than 30, for example), then generating more than one plant or sub plant can generate more orderly control of the measurements.

To create a plant, simply enter the “Administration” option on the menu bar and then choose “Create Table” on the submenu. A window will open that will allow you to incorporate a new plant into the system.

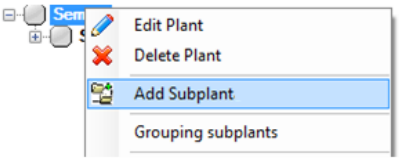


This location can be edited to suit the physical location of the system. To do so, simply click on “Plant” and then right click and select “Edit.” Then then simply change the name as desired.



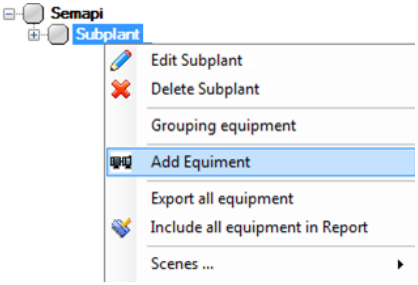
Creation of Sub plants

You can create a lower level in the tree called “Sub plant.” This level can accommodate multiple measurement modules. If these modules are installed in the same area of the plant, it would be advisable to generate these modules in the same sub plant. You can generate as many sub plants as necessary. To generate a sub plant, just click on “Plant” then right click and choose the option “Add Sub plant.” Write the name in the popup window and accept.

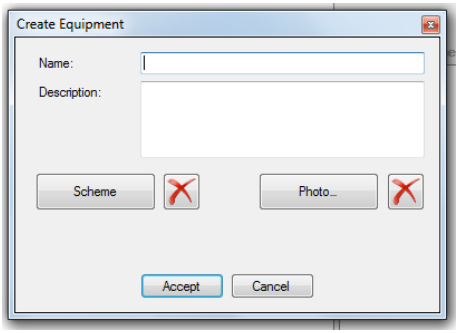


Creation of equipment

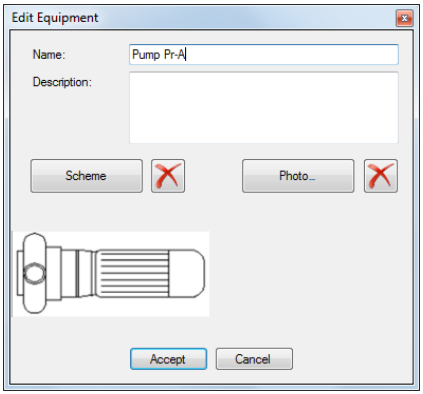
Once created, the Sub plant may be generated with rotating equipment to control. Following the same procedure, select the Sub plant, and right click to choose “Add Equipment.”



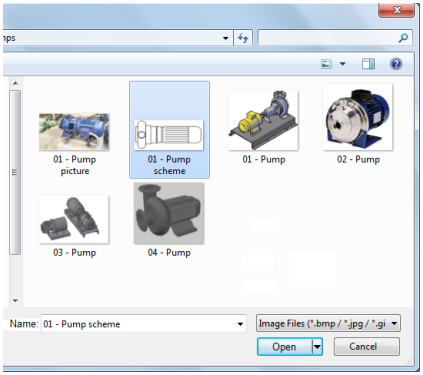
To create equipment, simply enter a name. If you want, you can associate your equipment with a digital photo or a graphic file, generating a link through “Scheme” or “Photo.”



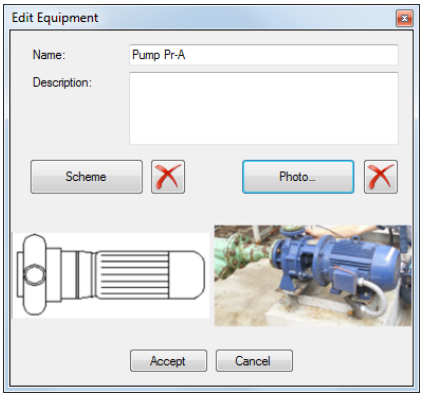
The scheme can be a line drawing of equipment. When joining a schematic of a computer, you can identify the measurement points that are created.



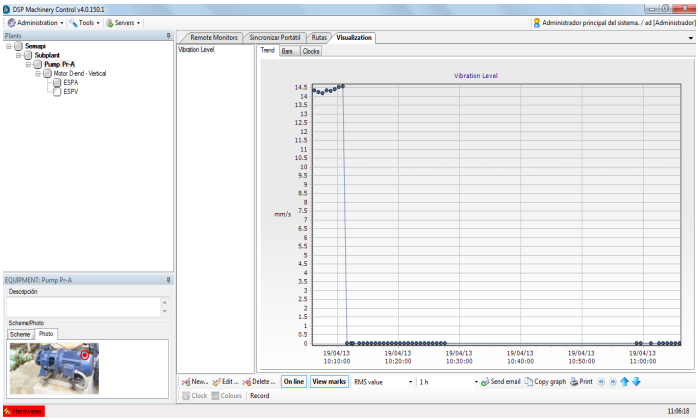
The system has some schemes; you can choose to add them to your computer.



The photo is an image of the equipment that must be specific; this can help identify similar machines.

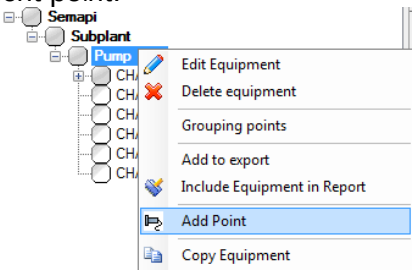


These graphics can be viewed on a computer display, as shown in the window:

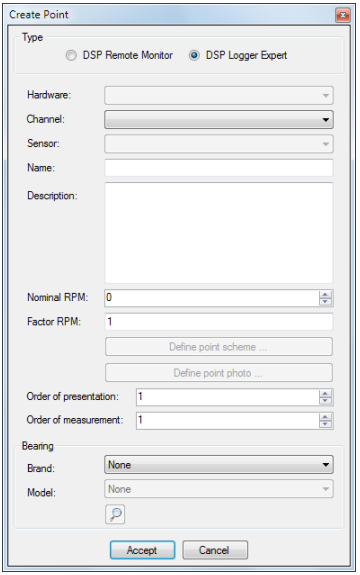


Creation of point

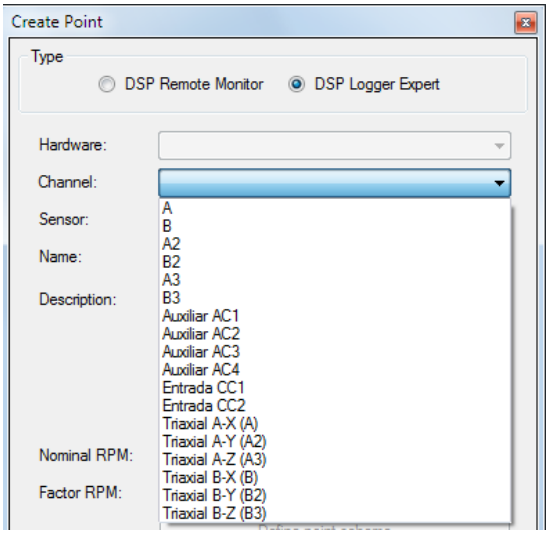
Following the same procedure – selecting the equipment and right clicking – can then create a measurement point.



When you click "Add Point" A window is displayed, first it should be noted that the point to create belongs to: DSP Expert Logger checking the tick box.

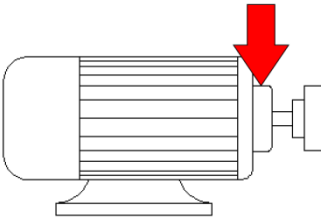


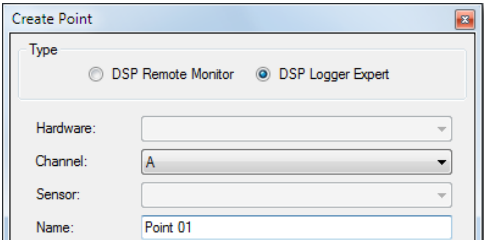
Once this selection is disabled Hardware field, and you must select the channel that will connect the sensor, to measure point to create, whether to use a standard acceleration sensor must select channel A or B (usually channel a), whether to use a triaxial sensor input should be selected corresponding to the direction in which this point is measured (triaxial AX (A) for example).



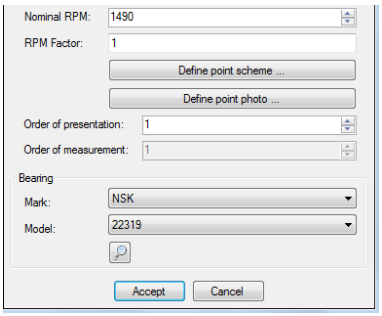
If you want to make a measurement with other sensor with alternating voltage output, such as a clamp meter, you should select the entries AC1 to AC4, and if what is being measured is a sensor with voltage output (eg temperature) or manual entry data entry must be selected CC1 or CC2.

To conclude the creation of a point must give it a name, usually associated with the position of the sensor, it is also possible to add a description to make it clearer point location on the machine to be controlled.

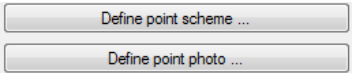




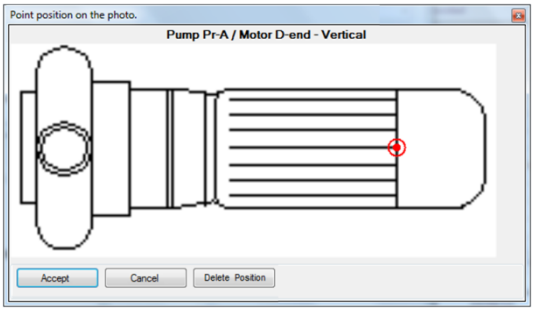
As additional information, more general RPM rotational bearing data can be added, and, if applicable, the latter two items are of great help in the analysis, as they calculate bearing fault frequencies.

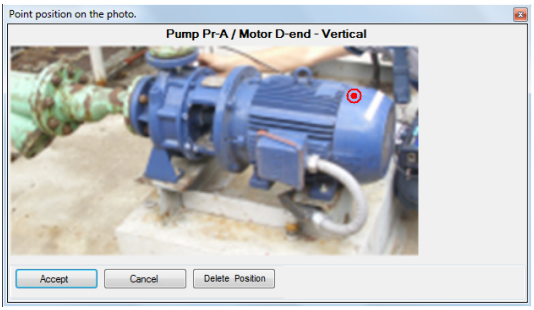


Define measuring point in the schematic and photo:



From the buttons' set points, you can plot the exact position where you have or should place the sensor measuring point.





You should repeat this operation at each point the first time you set up the equipment or from the scheme or the appropriate photo.

The Presentation Order field defines how the point is located in the main tree, if for all points leaving the order of presentation with the value 1 the order of presentation will be alphanumeric, this field can be edited at any time.

Finally we Measurement Order field, this field indicates the order in which they will measure the points generated, if for all points allowed measurement order with value 1 order of measurement is alphanumeric.

This field is of great importance when measuring a triaxial sensor, since for the system to perform the measurements in the three directions of a triaxial sensor points should have the same order of measurement.
This configuration example would be as follows:

Horizontal Point 1: select Channel **Triaxial AX (A), Order of Measurement: 1**
Vertical Point 1: select Channel **Triaxial AZ (A3), Order of Measurement: 1.**
Axial Point 1: select Channel **Triaxial AY (A2), Order of Measurement: 1.**
Horizontal Point 2: select Channel **Triaxial AX (A), Order of Measurement: 2.**
Vertical Point 2: select Channel **Triaxial AZ (A3), Order of Measurement: 2.**
Axial Point 2: select Channel **Triaxial AY (A2), Order of Measurement: 2.**
Horizontal Point 3: select Channel **Triaxial AX (A), Order of Measurement: 3.**
Vertical Point 3: select Channel **Triaxial AZ (A3), Order of Measurement 3.**

Axial Point 3: select Channel **Triaxial AY (A2), Order of Measurement 3.**
Horizontal Point 4: select Channel **Triaxial AX (A), Measurement Order 4.**
Vertical point 4: select Channel **Triaxial AZ (A3), Order of Measurement 4.**
Axial Point 4: select Channel **Triaxial AY (A2), Order of Measurement 4.**

Masks of alarms

The system has the ability to set mask values that trigger alarms in both spectral measurements as well as in the scalar values. The two alarms may be used individually or both be set in one measurement.

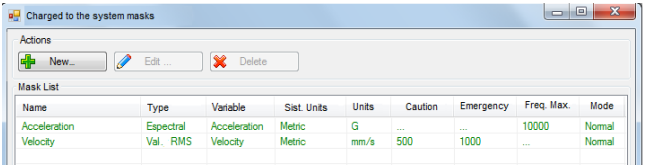
The creation of the mask can be made from experience, trend levels known in the machine, or with available vibration history and international standards vibrations.

If the mask is to adapt most effectively from the first measurement, determination of the shape of the mask may be relatively complicated and dependent on the machine and normal variation in spectral vibration levels at various frequencies. This can only be determined by examining a series of historical spectrums, with the application of good judgment and knowledge of the machine.

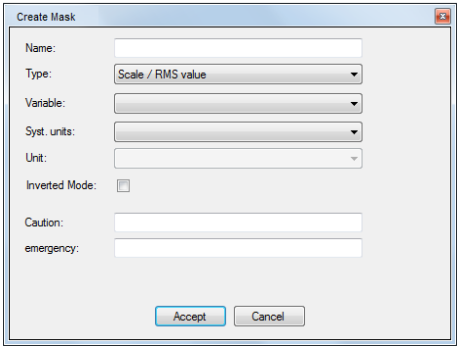
Creation of masks

Before measurement, you should define some set alarm masks for scalar values for spectra. These masks are those that define the states of the measurements and will activate relays to generate the assigned action.

To generate new alarms, choose the "Administration" option on the menu bar and then choose the "Masks" on the submenu. This displays a window that allows you to incorporate a **new** mask, **edit** the values of a mask, or **eliminate** an existing mask.

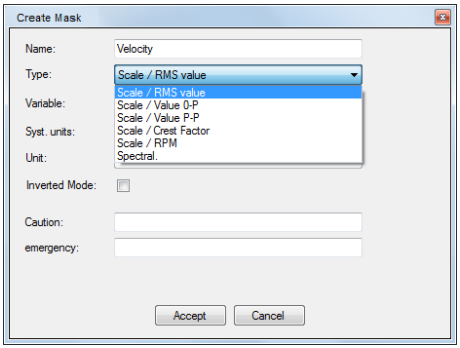


Clicking "New" will open a second window that will allow you to configure the mask.

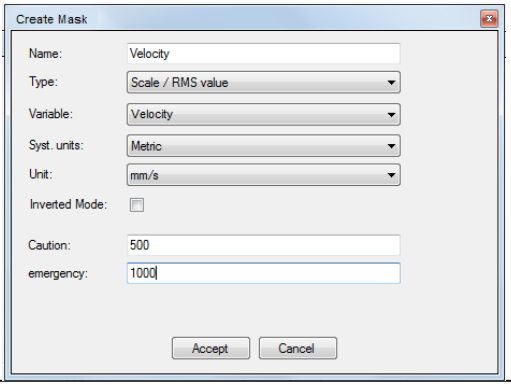


You must enter a name that is representative and then define whether the mask is for a scalar value or a spectrum. After this you must define the variable, the unit system, and finally the values chosen for the level of caution and the level of emergency.

If the mask is scalar values, this can be defined for RMS measurements, 0-Peak, Peak-Peak, Crest Factor, or RPM.



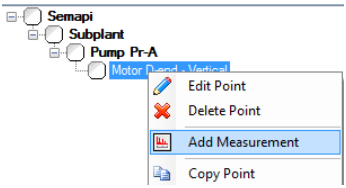
If you create a mask for a spectrum, you must define the values and emergency care for different frequency steps, always defining the cut off frequency of each step.



The mask is saved upon clicking “Accept” and is ready to be assigned to a measurement, visualization, or activation of a relay.

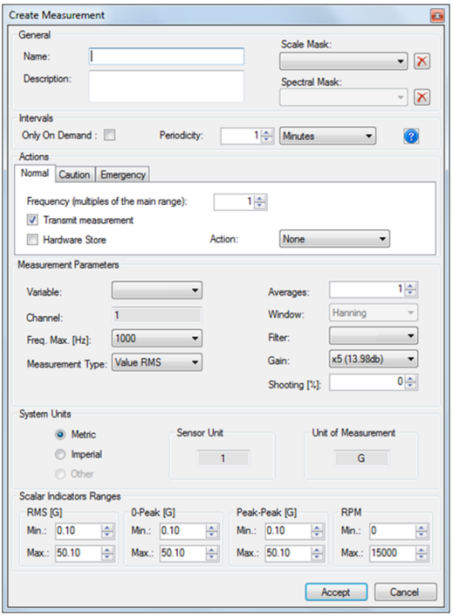
Creating measurements

Now you can add a measurement. Click on the created point, then right click to select “Add Measurement.”

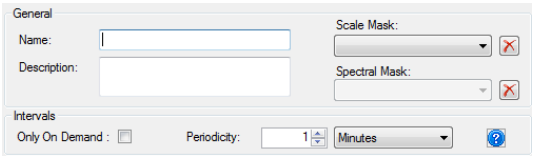


A window will display that will allow you to configure the multiple types of measurements that the system allows. It is very important to focus on the different measurement options, as there will be parameters such as fmax and resolution in lines that cannot be modified after creating the measurement.

Measurement setup window



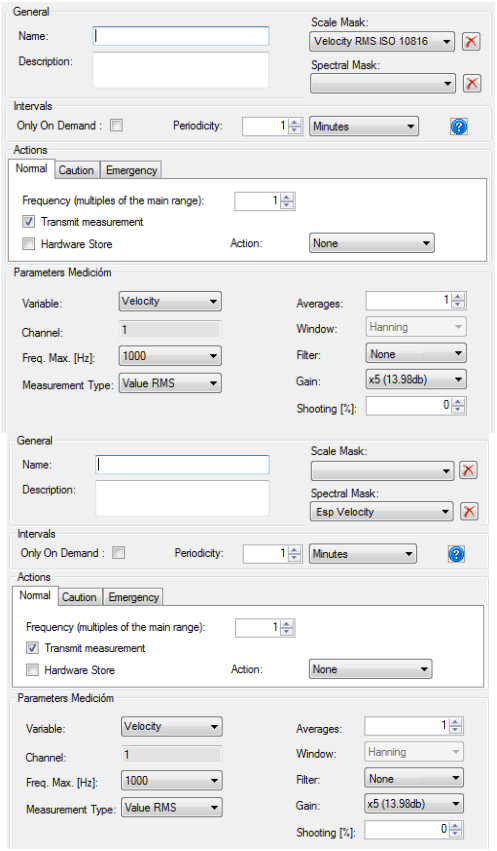
In the “General” at the top of this window, assign a name to this measurement. This field is required, and you can add a description of the measurement if desired.



The box “Only on Demand” should not be selected before the measurement is performed. Check this box if the measurement will be without accent until you register the same, as this option is applicable the first time to perform the measurement once.

The fields “scalar mask” and “spectral mask” set alarm limits that allow the measurement set. This requires a previously generated mask to have an alarm that is compatible with the measurement (see “creating of masks”).

The alarms will be selected in a manner directly related to the measurement setup and configuration of the alarm. The system only displays alarms that can be applied to each measurement.



Finally, the “Periodicity” field allows you to define how often to make the measurement. You can select a periodicity of seconds, minutes, hours, or days.

The minimum periodicity depends on the type of measurement. For example, by choosing a measurement of speed climbing of 500 Hz, it will give a measurement of periodicity between 1 and 2 seconds. For rapid measurements, you must know the sampling time required for the acquisition of each measurement.

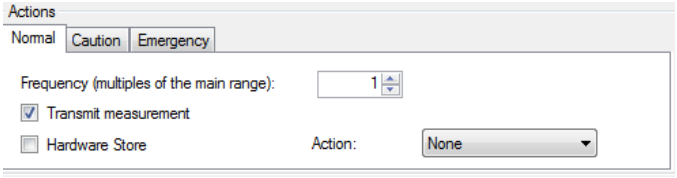
Time Table

Acceleration and AC Auxiliaries				
fmax [Hz]	**10**	**20**	**50**	**100**
fs virtual [Hz]	25.6	51.2	128	256
T of acq of 1024p/400l (sec)	40	20	8	4
fmax [Hz]	**200**	**500**	**1000**	**2000**
fs virtual [Hz]	512	1280	2560	5120
T of acq of 1024p/400l (sec)	2	0.8	0.4	0.2
fmax [Hz]	**5000**	**10000**	**15000**	**20000**
fs virtual [Hz]	12800	25600	38400	51200
T of acq of 1024p/400l (sec)	0.08	0.04	0.0267	0.02

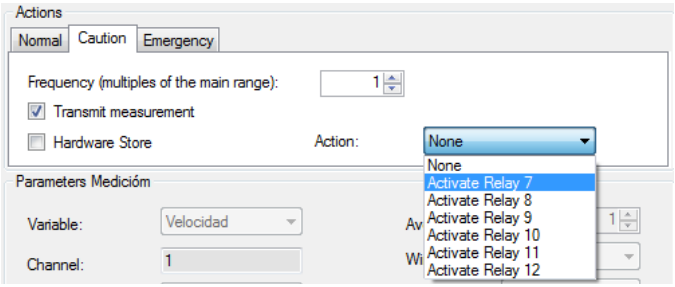
Velocity				
fmax [Hz]	**10**	**20**	**50**	**100**
fs virtual [Hz]	25.6	51.2	128	256
T of acq of 1024p/400l (sec)	40	20	8	4
T Filter Transient 1% (sec)	40	20	8	4
T Filter Transient 2,5% (sec)	20	10	4	2
T Filter Transient 5% (sec)	10	5	2	1
T Filter Transient 10% (sec)	5	2.5	1	0.5

Velocity			
fmax [Hz]	**200**	**500**	**1000**
fs virtual [Hz]	512	1280	2560
T of acq of 1024p/400l (sec)	2	0.8	0.4
T Filter Transient 1% (sec)	2	0.8	0.4
T Filter Transient 2,5% (sec)	1	0.4	0.2
T Filter Transient 5% (sec)	0.5	0.2	0.1
T Filter Transient 10% (sec)	0.25	0.1	0.05

"Actions" defines whether the module operates "on line" transmitting measurement or if measurements are stored in its internal memory. The default is "Transmit Measurement."

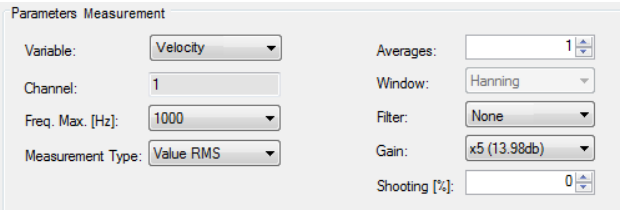


The tabs "Caution" and "Emergency" will allow you to define the activation of one of the relays of each hardware module. For Compact DSP versions, there are 2 (two); other versions can reach up to 6 (six).



For this to be possible, you must first select an alarm mask, so when the value exceeds the caution level of vibration it will activate relay 1, and when it exceeds the emergency level, it will activate relay 2, if they were selected.

The section “Measurement Parameters” allows you to configure the measurement itself by completing the following parameters:



Variable

Define the variable of vibration to be used, choosing between acceleration, velocity, displacement, and envelope.

Channel

This field is filled in automatically according to the selection made when creating the measurement point. It is not editable.

Max. Freq. (Hz)

Defines the maximum frequency of measurement to make. You can select a value between 10 and 20,000 Hz. This field will be limited according to the selected variable. For “Shift,” the maximum frequency of 200 Hz; for “Speed,” 1,000 Hz; and for “Acceleration” and “Envelope,” it will be up to 20,000 Hz.

Measurement type

This defines what type of measurement is to be made. You can select among scalar values in RMS, 0-Peak, Peak-Peak, graphic spectrum, and wave form graph.

Lines/samples

This field appears when you select a type of measurement as a wraith or a wave form. It selects a spectral resolution between 400 and 25,600 lines for a spectrum, and between 512 and 16,384 samples for a wave form.

Averages

This defines whether to perform signal averaging, to select a value between 1 and 50, and defines the temporal extent over which the measurement is made.
The temporal extent depends on the maximum frequency and averaging chosen.

Window

This field is enabled only when selected as a measurement type spectrum. You can select from 3 types of windows: Rectangular, Hanning, and Flat Top. For routine measurements, we recommended the Hanning window.

Gain

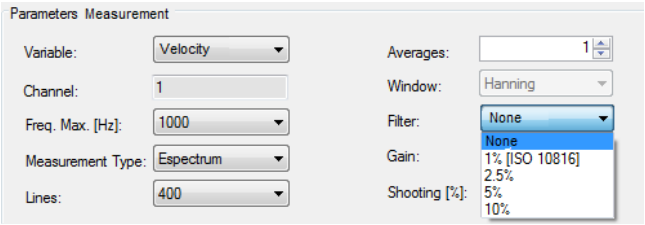
This allows you to activate a signal amplifier (recommended when the signal is of very low amplitude). You can choose to amplify x1, x5, x50, and x100. **No significant amplifications are chosen when the high frequency vibration generates high levels of acceleration; this will result in saturation of the system, resulting in erroneous measurements and high levels of noise**. Limit the use of the amplifier to measurements of very low-end computers, where vibration energy does not generate high levels of acceleration.

Filter

According to the selected variable, different types of filters will be enabled or not to measure very low frequencies. “Velocity” or “Displacement” can select filters to improve the signal to noise ratio. These filters are activated depending on the frequency, and the maximum frequency may be 1 %, 2.5 %, 5 %, or 10 % of that frequency.

The selectable filters are expressed in percent; this percentage is applied according to the selected maximum frequency. Example: fmax, a 500 Hz filter set to 5%, will apply a filter in measuring 0 to 25 Hz.

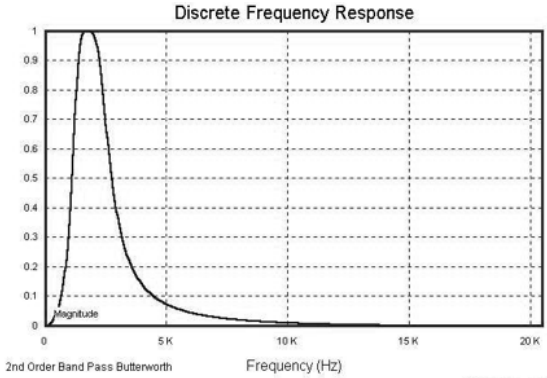
A filter of 1% is applicable to measurements to assess state condition according to ISO 10816. This measurement should be set to fmax 1000 Hz, applied 1% filter; the frequency response is 10 Hz to 1000 Hz.



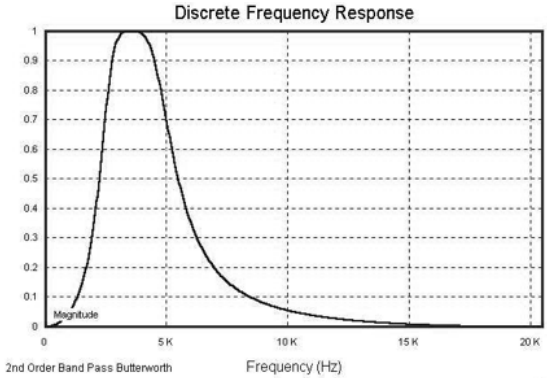
If the selected variable is “Surround,” different band pass filters are enabled. You can select the appropriate one depending on the area where you want to generate the demodulation of the input signal.

All filters can be used in a measurements envelope, if it is applicable to the selected maximum frequency – the filter case 5 – which is implemented as a high pass.

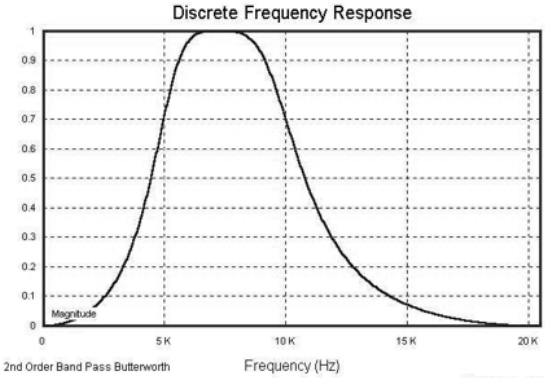
1-Filter 1250 Hz a 2500 Hz -3db



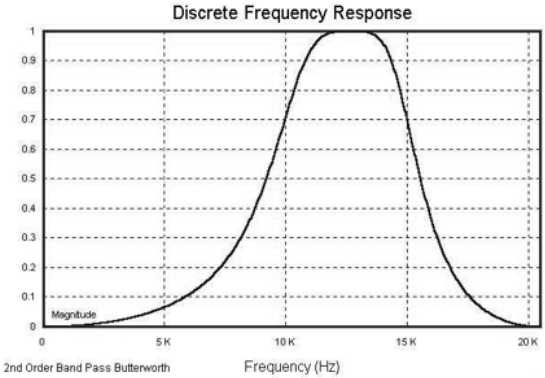
2-Filter 2500 Hz a 5000 Hz -3db



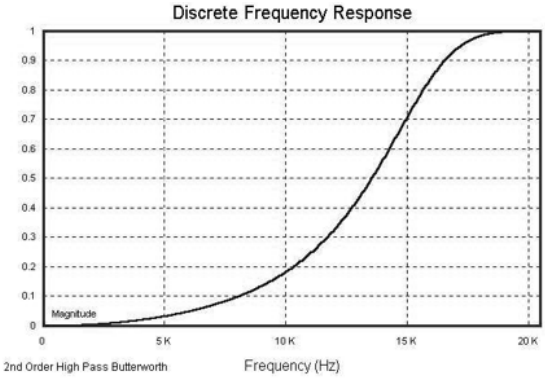
3-Filter 5000 Hz a 10000 Hz -3db



4-Filter 10000 Hz a 15000 Hz -3db



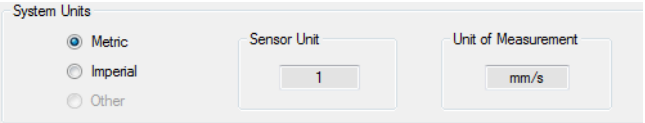
5-Filter 15000 Hz a 20000 Hz -3db



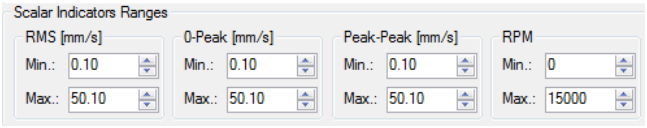
”Selecting the “Acceleration” variable does not activate any filters.

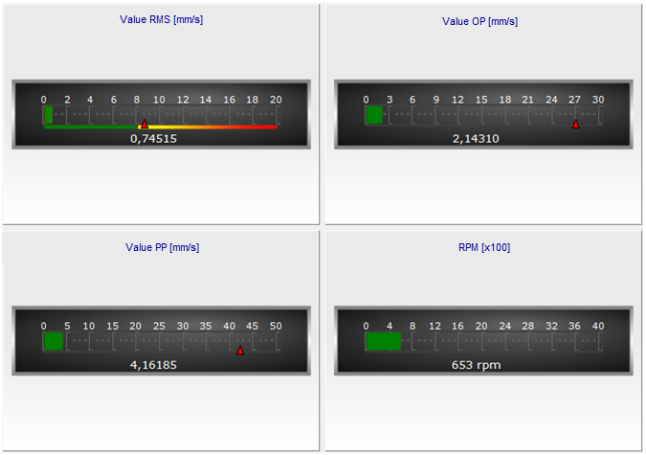
Shooting (%)

This activates a trigger threshold. If the vibration level does not exceed that percentage, then the measurement is not made. You should not enter percentages of 0 (zero) for routine measurements.
The section unit system offers a choice of metric or English measurements.



Finally, the section “Scalar Ranges Indicators” selects the full scale of the clocks and measuring rods. These indicators should be adjusted to a value slightly above the maximum levels expected to obtain clearer readings.

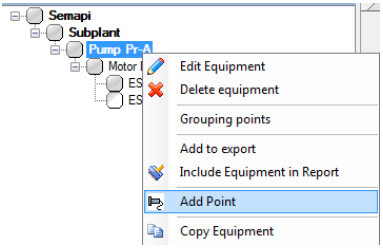


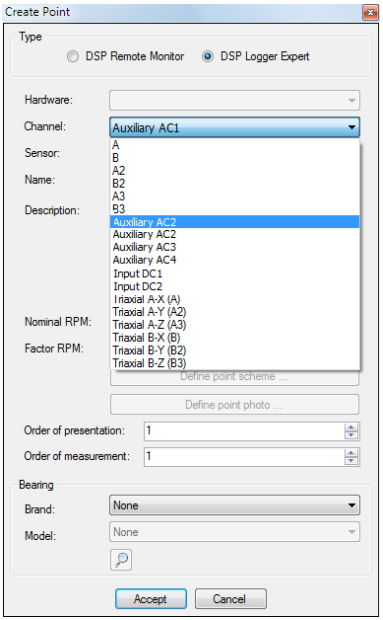


Clicking “Accept” will define the range according to the selected parameters.

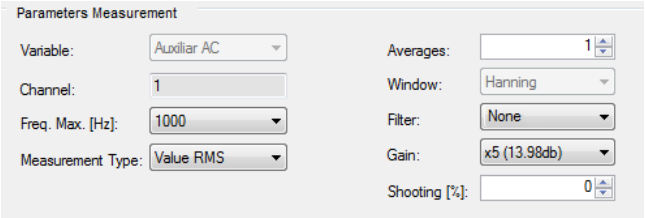
AC auxiliary channels

To add an AC measurement, you must first create a linked point for auxiliary channels 1 to 4.
Follow the same procedure for other points. Right clicking creates a measuring point.



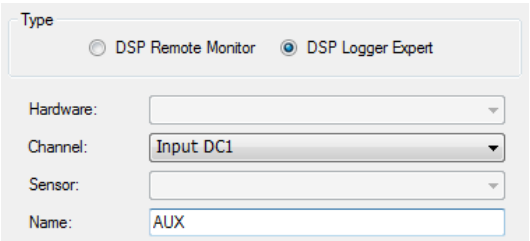


The measurement parameters are partially disabled by the hardware type entry.



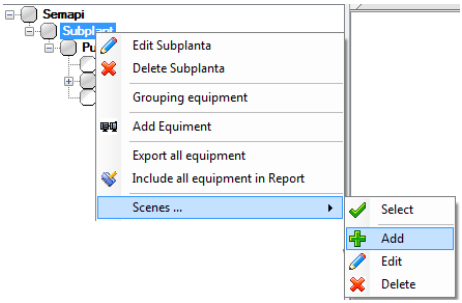
DC auxiliary channels

To add a DC measurement, you must create a point associated with these channels DC1 and DC2.
Follow the same procedure at other points and right click to create a measuring point.

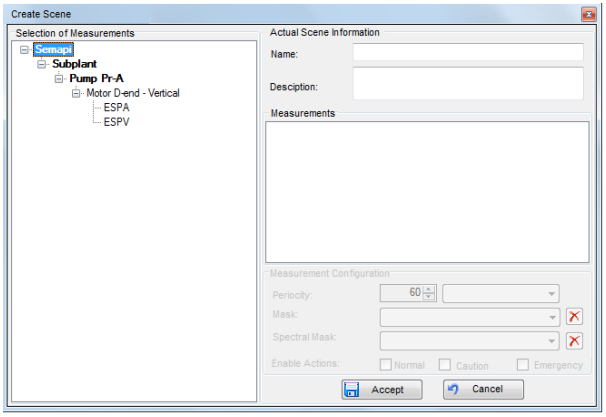


Scenes configuration

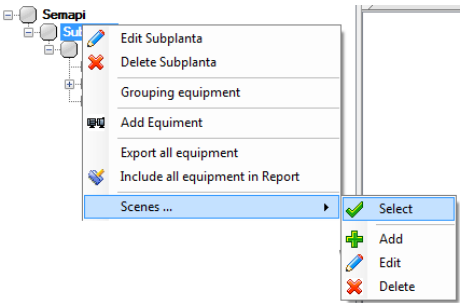
The scenes are actions that change the measurement conditions of the selected equipment. Generating scenes can define which teams will meet at which point and under what conditions.
To create a scene, right click on sub plant, then select “Scenes” and “Add.”



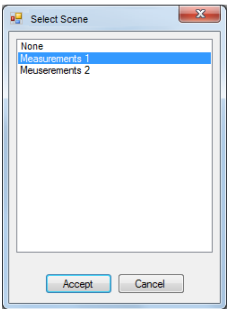
This opens a window that lets you set the scene.



Here, you can define which elements of the tree will be part of the scene. You need only double-click on the selected item in the tree. You can choose the entire computer or any of the measurements. Once selected, elements can be configured for periodicity, masks can be assigned, and actions can be enabled.
To start a scene, right click again on the sub plant, and choose “Scenes” and “Select.”



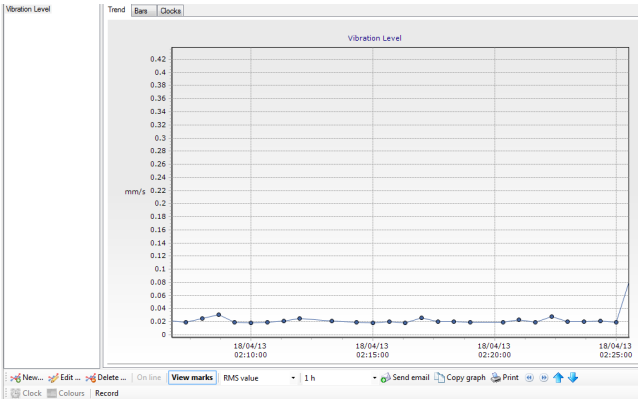
Then choose the scene to enable the list.



You must synchronize the software with the hardware to implement the selected scene.

Configuration of Visualizations

Clicking on a computer belonging to a plant or sub plant brings up the “Views” window.

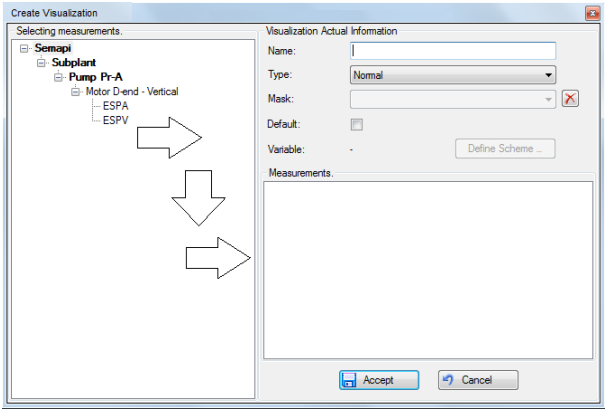


This screen allows you to track vibration levels as “on line” in the form of “Trend,” “Bar,” or “Clock.”
To generate visualization, you must click “New” in the menu bar located at the bottom of the window. The window will display “Create View,” where you can create different views of the set of values according to the following conditions:

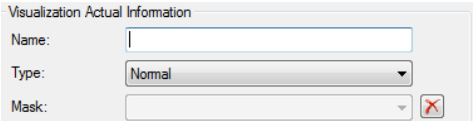
1. The measurements added to the same view must be of the same variable and with similar configurations.

2. You can add up to 10 measurements in a single view; these measurements could belong to different points and different equipment.

To add a measurement, you must double click on the corresponding measurement.



The “Measurement” box shows the measurements in the order they were selected.
Once the desired points have been added for this display, you must assign a name, and you can also assign an alarm mask.



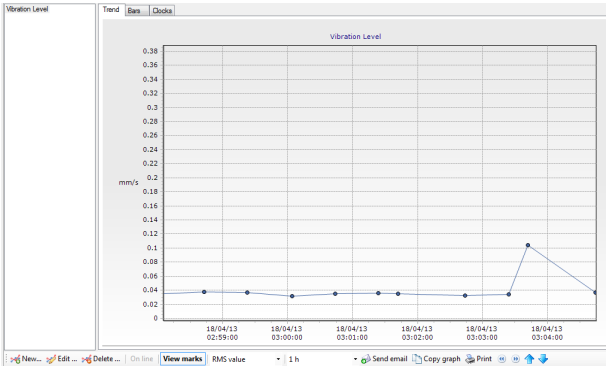
Clicking on the “Mask” field will display masks and generated alarms compatible with the selected measurements.
Click “Accept” to save this view and make it available for use.

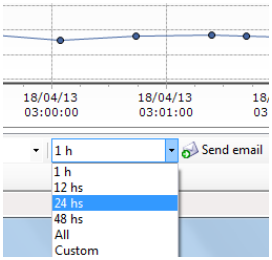
Display modes

There are three ways to present the values on the screen.

Trend

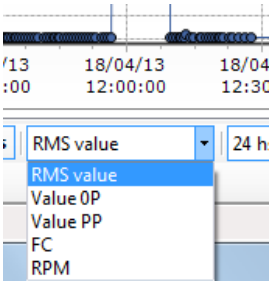
When you select this option, the window displays the change in value of the vibration amplitude versus time. The time interval between two consecutive measurements depends on the frequency selected to configure the measurement, while the total time period shown in the window can be selected from the option shown below the graph.



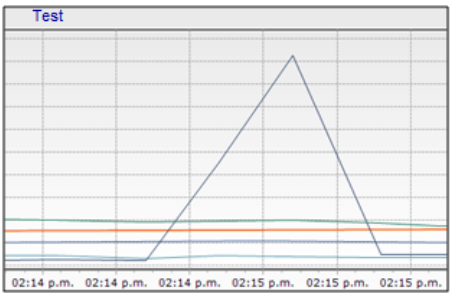


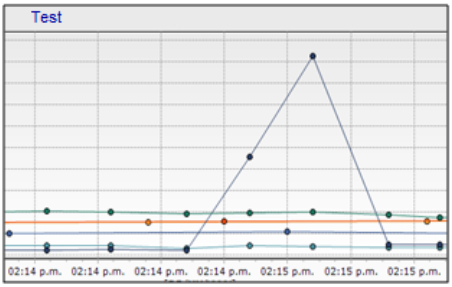
The amplitude of the displayed value can be selected in the same way from options RMS, 0-

Peak, Peak to Peak, Crest Factor, and RPM, if available.



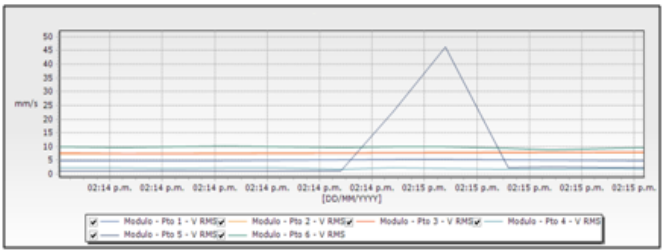
Each amplitude value shown on the graph is identified by a point of a given color, bound together by a solid line of the same color as the point. You can hide or show these alternately by clicking “View brands.” If it is hidden, only the evolution of the amplitude value will appear on the chart as a solid line.





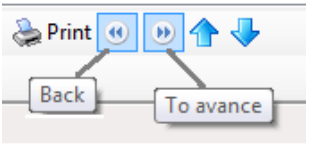
"View Marks" is enabled by default.
The Trend graph will be updated with the amplitude values, as these go by logging. To freeze the screen and stop it from entering values to analyze a given situation, you can click "On line" to disable this option. This option is enabled by default.

To identify the brands and see which measurement is being performed, you can double-click anywhere on the graph, which will display the details of the points and the respective colors.



To see a specific part of the graph in detail, use the zoom tool. Click with the mouse on the top left of the area to be magnified and drag the mouse to the bottom right of that sector. To disable the zoom, you can click anywhere on the graph and drag the mouse to the left of this position.

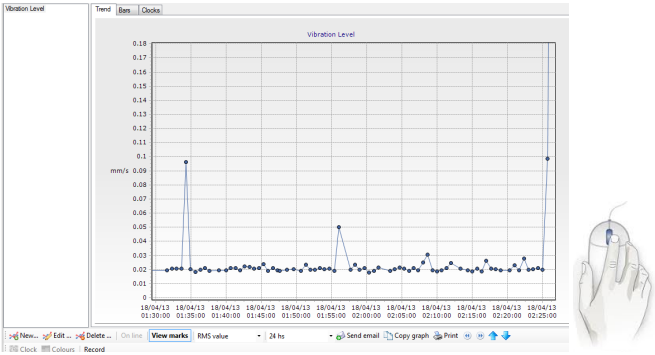
While zoomed in, you can move the chart to the left or right to see the measurements that were left out of the picture by zooming, by clicking on the icons “Back” and “Forward.”



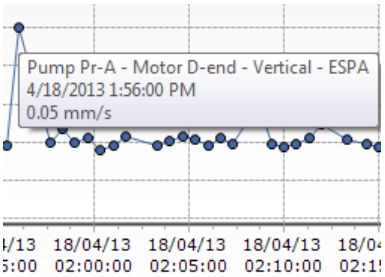
You can also increase or decrease the amplitude scale with the icons “Scroll Up” and “Scroll Down” respectively.

Using the mouse

In the “Trend” graph, it is best to use the mouse. Positioning the cursor in the desired graph, you can use the mouse wheel to zoom, achieving a more dynamic picture.

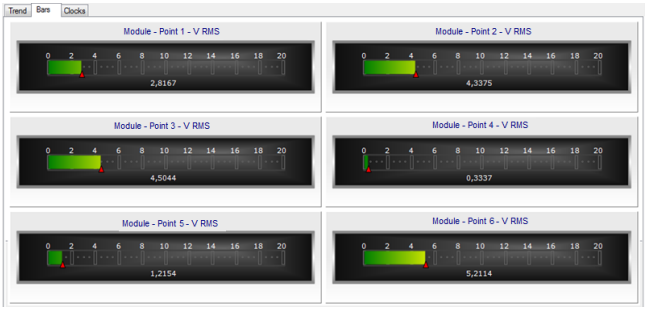


In addition, by clicking on any of the lines representing the values of the measurements, you can obtain value information, date, time, equipment, and related measurement points.



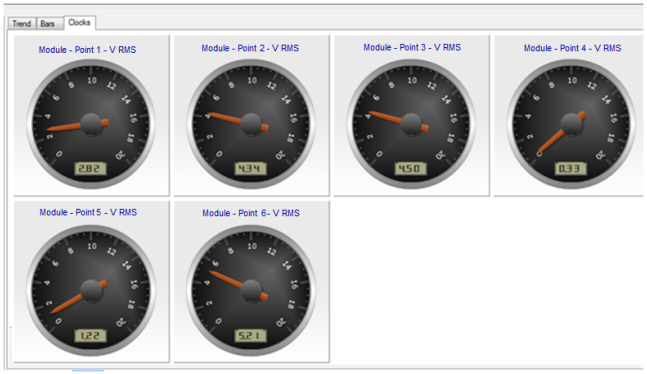
Bars and Clocks

This option displays the values of vibration in a bar format.

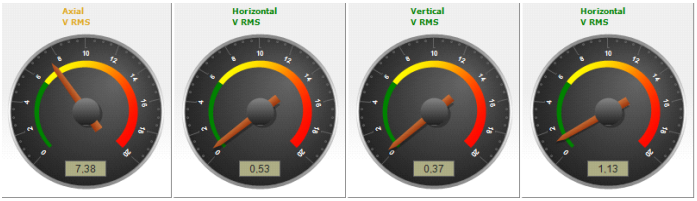


Otherwise, you can use a clock format as the selected indicator.

Format without alarm clocks



Format with alarm clocks



The values shown are always the latest measured. If "On line" is on the screen, it will be refreshed with new measurements, entered according to the periodicity configured.

If the option "On line" is off, the values shown are the last ones measured.

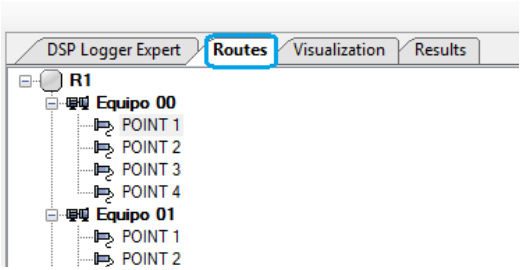
The amplitude of the displayed value can be selected from the options RMS, 0-Peak, Peak to Peak, Crest Factor, and RPM, if available.

The options "Send Mail," "Copy Graph," and "Print" select the image being displayed and send it by mail to a predefined address. You can add it to the Windows clipboard to make it available for pasting into any document or print it to the default printer.

Routes

Once the configuration of all plant equipment in order to perform predictive maintenance inspection is complete, lists shall be made of measurement routes. They are organized by field and order the equipments configured to be received by the collector data of the DSP Logger Expert.

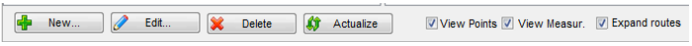
To administer the routes, enter this section through the “Routes” tab on the main program window:



Creating and Editing Routes

You must assign a name to a route to create it.
It is very important when creating a route to know the order in which the data collector operator will be in the field with the equipment. This will optimize the data collection time.

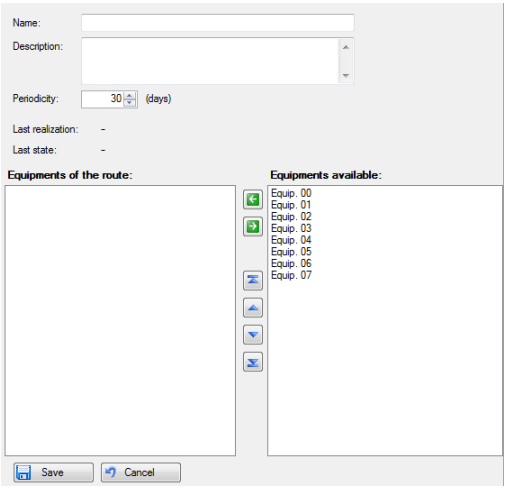
The “Routes” tab displays different options for the administration of routes at the bottom:



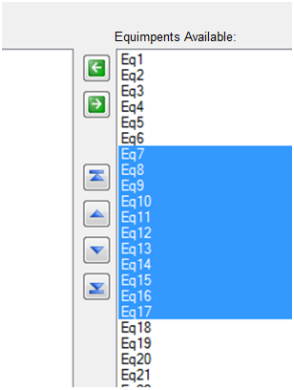
To create a new route, once you have activated the corresponding icon, selection will be enabled in the right section of the screen that will allow you to create a new route.

Here you can assign a route name (required) and a route description (optional). Periodicity can also be assigned, with a default value of 30 days.

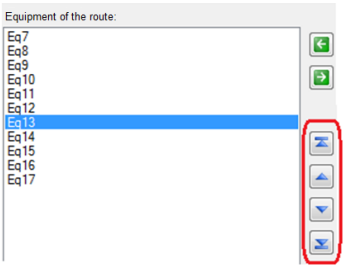
A picture on the right will show all the equipment available in the plant. To generate the new route, only select the equipment that will be part of the route, and move the square to the left.



This can be done easily using “Shift” or “Ctrl” to select the equipment or simply double-clicking on equipment you wish to incorporate into the route.



With the green keys, you can move the selected equipment to the left and incorporate them into the new route.

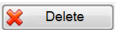


The blue keys allow you to correct the order of the particular equipment within the route, thus being able to set the order in which the equipment will meet in the field automatically.

Once you have finished creating the route, click "Save" to complete the operation.

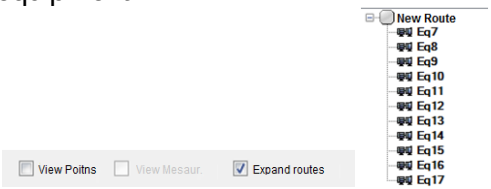
Selecting "Cancel" closes the window without saving the route.
The routes can edited at any time to modify the order or the amount of equipment in a route.

It is also possible to directly delete a route by selecting the name of the route and clicking "Remove."



The "Actualize" key shows all paths of a plant, including those that have been recently created, and the changes in the configuration of the different equipment that makes up each route.

You can modify the routes tree display by selecting the level of detail of the equipment that makes up the route. You can choose to see the equipment with your points and measurements (this will generate a heavily-loaded tree) or only see the codes equipment.



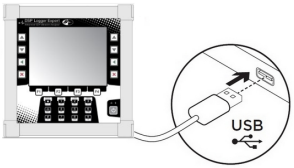
Connecting to PC, to upload and download routes

To make this process, it is necessary to enter the module, Data Collector:

Activate the connection to the icon:

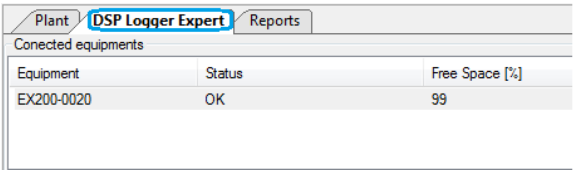
The hardware is expected to connect the USB cable to a port on a PC.

Important: If you connect the USB cable before activating the function, possibly not access the hardware connection with the software.



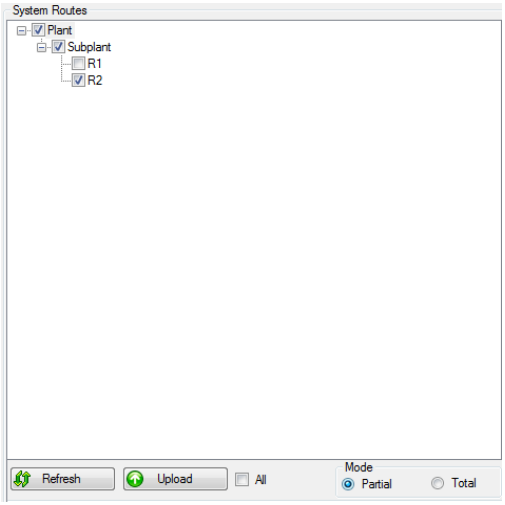
Upload Routes to equipment:

Access the DSP Logger Expert tab for upload the routes on your equipment.



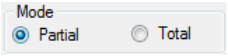
Note: To update the connected equipment (reading your database), you must click Refresh.
If you want to clean the equipment database, click Clear Database.

Once selected the Hardware connected routes must tick you want to transfer from: software to your equipment (box: System routes).



In case you want to check or uncheck all routes should tick or no tick (respectively) the option: All.

There are two modes to upload the routes available to equipment:
Partial: load the selected routes, without erasing that were already on the equipment. Their process is only copying.
Total: upload the selected routes, replacing and erasing pre loaded on the equipment.



Note: The loading time on Partial mode, is 3 times higher than to Total mode.

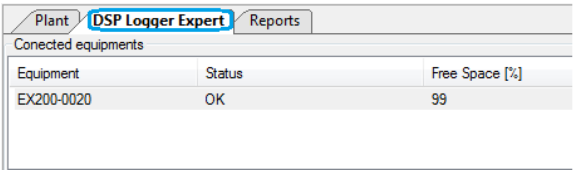
Note: You can update routes (in the case have been made new) by clicking on the icon: Refresh.

After defining which routes you want to pass the software to the equipment, you must click on the icon: Upload.

Then, wait for it to save the routes selected on the equipment.

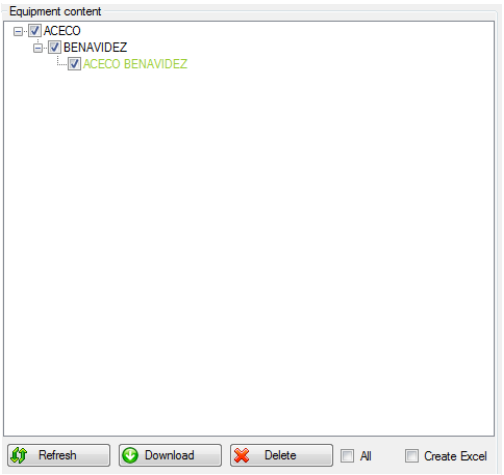
Download Routes of the equipment

Access the DSP Logger Expert tab to download the routes contained in the equipment.



Note: To update the connected equipment (reading your database), you must click Refresh.
If you want to clean the equipment database, click Clear Database.

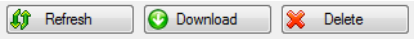
Once selected the Hardware connected routes must tick you want to transfer from: equipment to the software (box: Equipment content).



In case you want to check or uncheck all routes should tick or no tick (respectively) the option: All.

Note: You can update routes (in the case have been made new) by clicking on the icon: Refresh.

After defining which routes you want to pass the equipment to the software, you must click on the icon: Download.



Then, wait for it to save the routes selected on the software.

Note: To remove the routes on the equipment, click the icon: Delete.

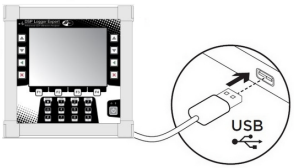
Connection to PC, to download Reports

To complete this process, you need to enter the module: Utilities:

Activate the connection to the icon:

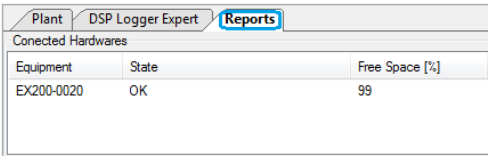
The hardware is expected to connect the USB cable to a port on a PC.

Important: If you connect the USB cable before activating the function, possibly not access the hardware connection with the software.



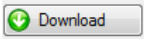
Download equipment Reports

Access the Reports tab, to download the contents of the equipment.



Note: To update the connected equipment (reading your database), you must click Refresh.
If you want to clean the equipment database, click Clear Database.

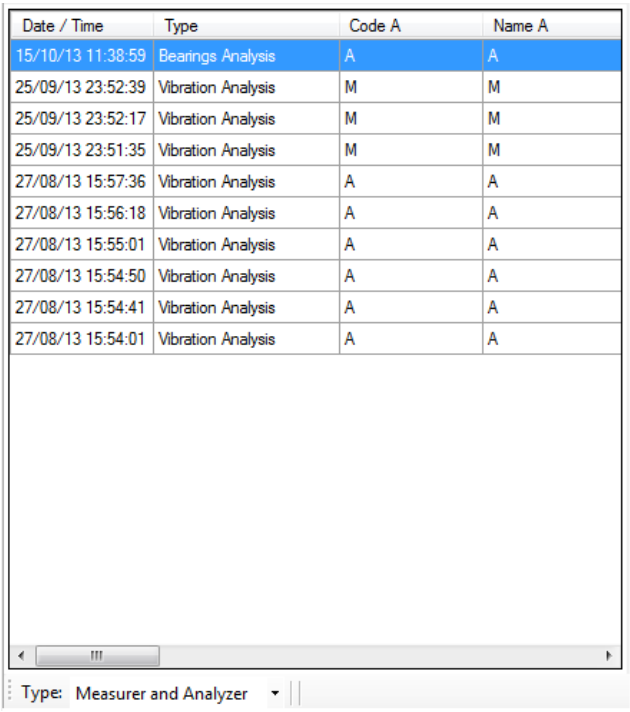
After selecting the Hardware connected, must click on Download: to download all reports containing the equipment.



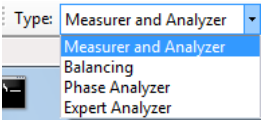
Then you must click on yes, when the software asks if you want to download all the equipment reports. Finally, wait for a while to display the same, according to reports made by each module of the equipment.

Note: In the box below, you can see the reports made with the following data: Date / Time, Type, Class ISO 10816, Code, Name, Point, Review, RPM, Bearing Brand and Model, of each channel. To see all the features, you can see the slider moving laterally.

On the right screen you can see the details of the measurements made, the field name and the value or name of each variable analyzed.



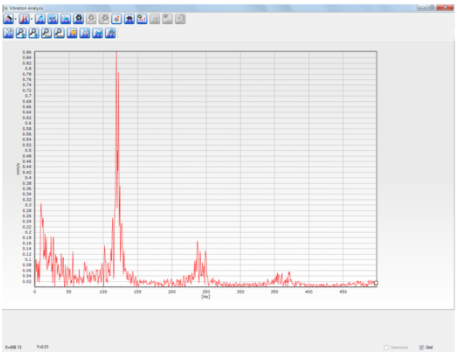
At the bottom of this screen, there is a box that says: Type. This allows you to restrict what type of module you want to observe and analyze.



Analysis of Spectrum, waveforms and / or Orbital Graphic

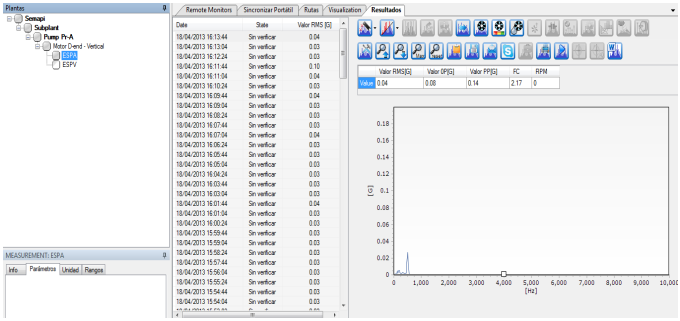
In order to observe and analyze reports measurements obtained with the equipment you must click on one of them, and the software to display the graph (spectrum, waveform or graphic orbital) for measuring the module used.

Example: on the Vibration Analysis module, you can see the spectrum obtained for each of the measurements taken with the equipment.



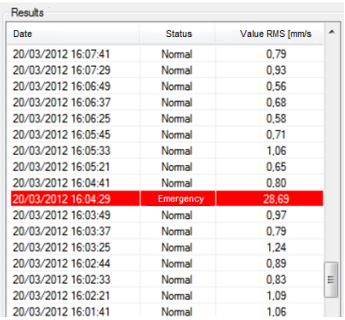
Access to records

To access the history of a particular measurement, you must click on the “Results” button located at the bottom of the menu, then click on the measurement you want to see.



Results list

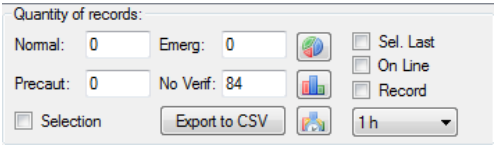
On the left side of the window, “Results” shows the history of the selected measurement.



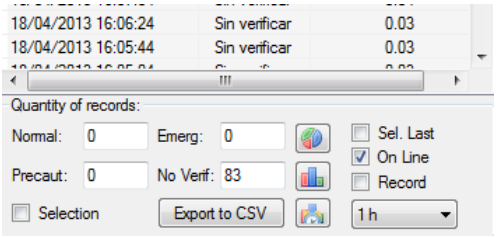
Results

Date	Status	Value RMS [mm/s
20/03/2012 16:07:41	Normal	0,79
20/03/2012 16:07:29	Normal	0,93
20/03/2012 16:06:49	Normal	0,56
20/03/2012 16:06:37	Normal	0,68
20/03/2012 16:06:25	Normal	0,58
20/03/2012 16:05:45	Normal	0,71
20/03/2012 16:05:33	Normal	1,06
20/03/2012 16:05:21	Normal	0,65
20/03/2012 16:04:41	Normal	0,80
20/03/2012 16:04:29	Emergency	28,69
20/03/2012 16:03:49	Normal	0,97
20/03/2012 16:03:37	Normal	0,79
20/03/2012 16:03:25	Normal	1,24
20/03/2012 16:02:44	Normal	0,89
20/03/2012 16:02:33	Normal	0,83
20/03/2012 16:02:21	Normal	1,09
20/03/2012 16:01:41	Normal	1,06

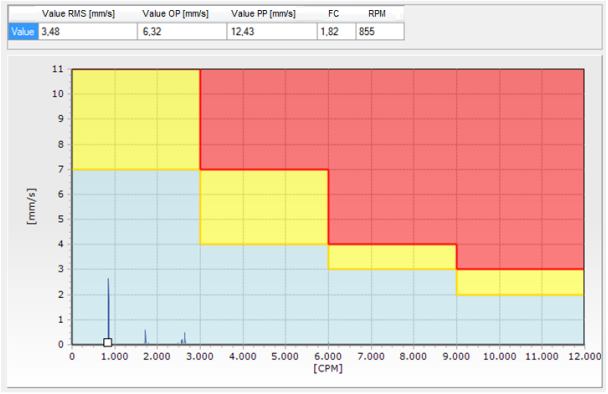
Where there is a list of measurements by date with measured value and status, the status will change from “Normal” to “Caution” or “Emergency” as a function of the alarm mask assigned to this measurement. If the measurement had no alarm mask assigned, then the “Status” column will display as “Unverified.”



Below the list of measurements are two check boxes for the measurement. If the box “On Line” is checked, it will allow measurements to be entered according to the frequency that has been configured. Unchecking this box will suspend the entry of this measurement to the system in the form on line until it is re-checked, at which point it will enter all measurements that were suspended from the database. This option is checked by default.

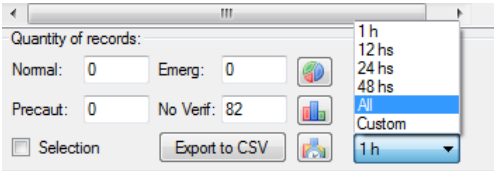


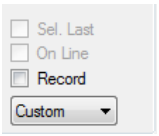
If the square is labeled “Select Last,” this makes the right side of the “Results” window display the last result entered, and it will update automatically every time you enter a new measurement system.



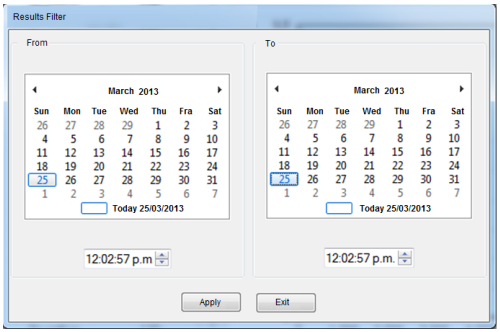
By default, this box is unchecked.

The number of measurements that will be in the “Results” display can be set as displayed in the field as shown below:

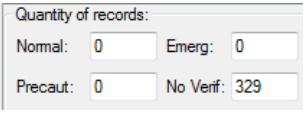




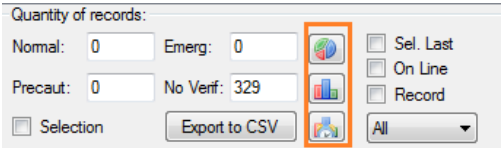
By applying the “Custom” option, two calendars are displayed where you can select the date and time from which you can see the measurements.



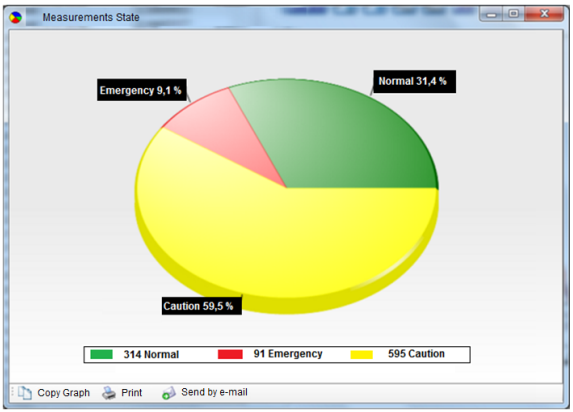
Below the list is a record counter showing the number of measurements per state.



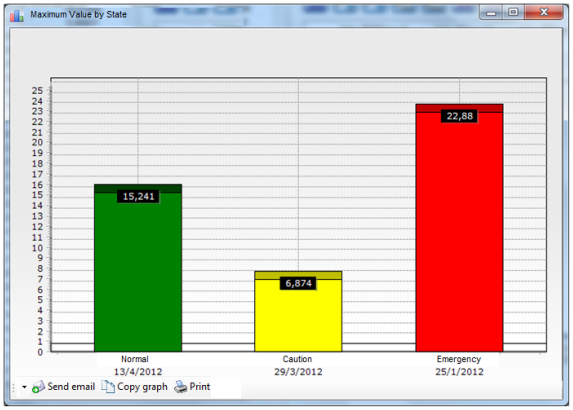
These three types of selector graphs are shown from point measurements, where these have a defined state (normal, precautionary, or emergency).



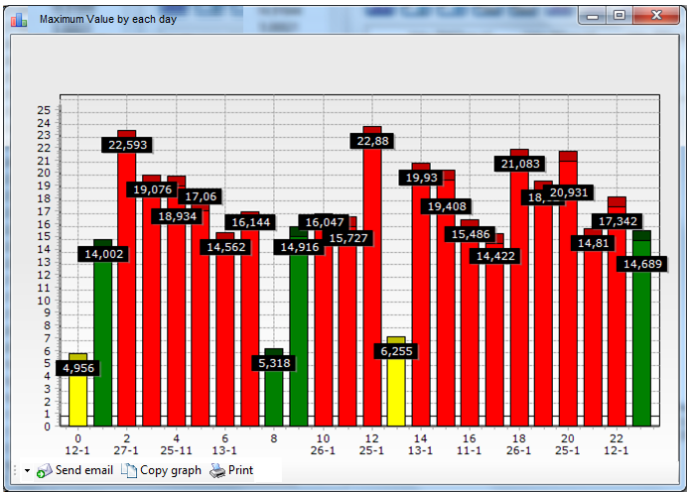
The graphic is grouped by the number of measurements, with statements presented in percentages.



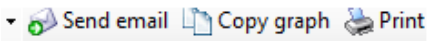
The graph is drawn with maximum values by state and the maximum value recorded during the selected filter (NORMAL, CAUTION, and EMERGENCY conditions).



The graph shows the maximum values at each time within the selected filter, with the color corresponding to the state.

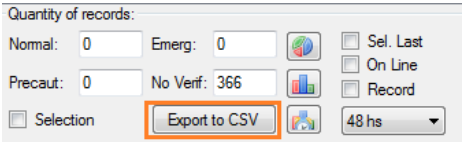


These graphs can be copied to the clipboard, printed, or e-mailed using the appropriate tools.



Export to CSV

You can export the information to CSV from the measurement value, date, and status of this measurement by using the “Export to CSV” button.

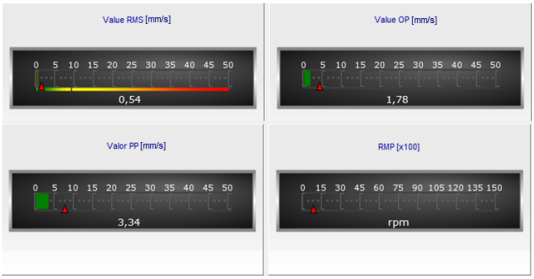


These comma-separated files can be opened in Excel and then made a part of a report. In addition, they can be used with other management programs that can import data from CSV files.

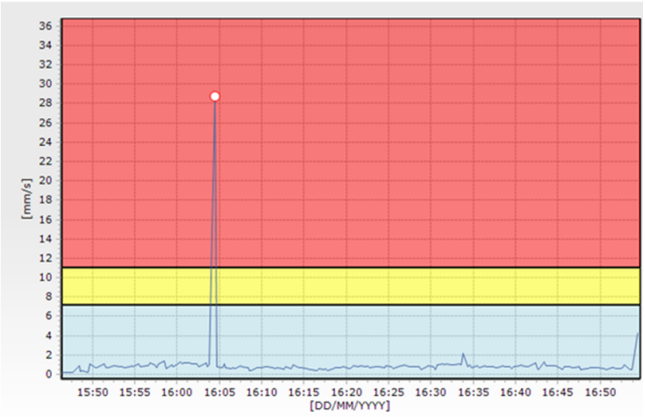
Graphs of the results

“Results” shows the graph of the measurement on the right side of the window if it is a spectrum or wave form, or it will show the results as bars representing the values if the measurement is a scalar value.

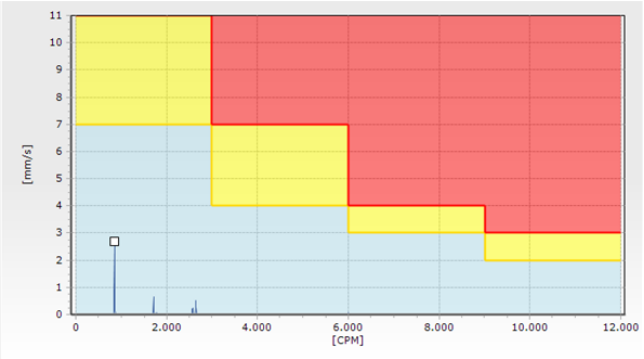
Measured values can be displayed as scaled RMS, 0-Pico, Pico-Pico, and RPM (if available) using the “Graphic” (disabled), “Scale,” or “Trend” boxes.

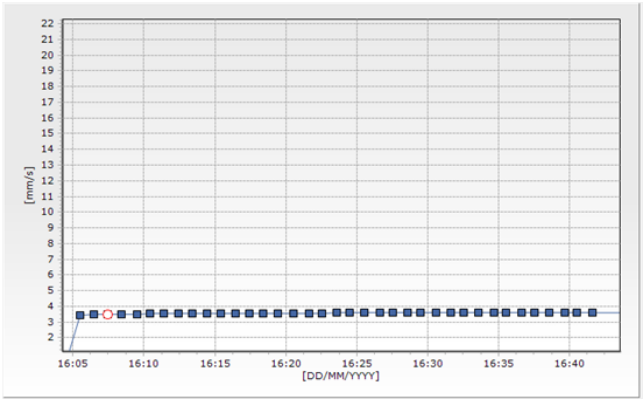


”Trend” can show any form of amplitude measurement.

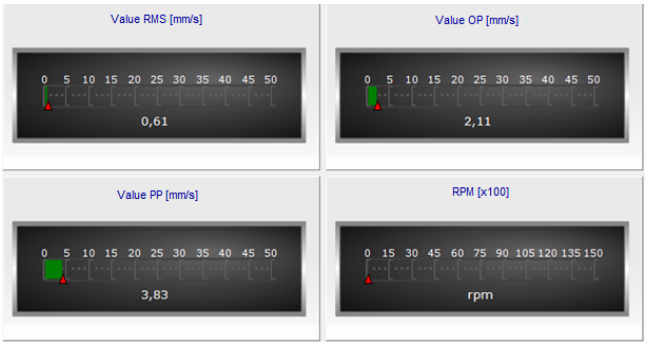


When consulting a spectral measurement, you can also change the view between the spectrum graph and the trend of the total value of the measurement.



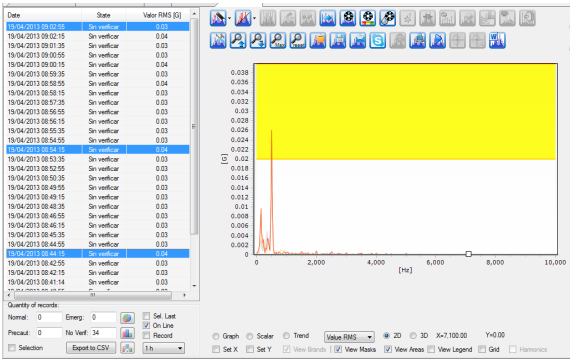


Even in a spectrum, you can choose to view scalar values.

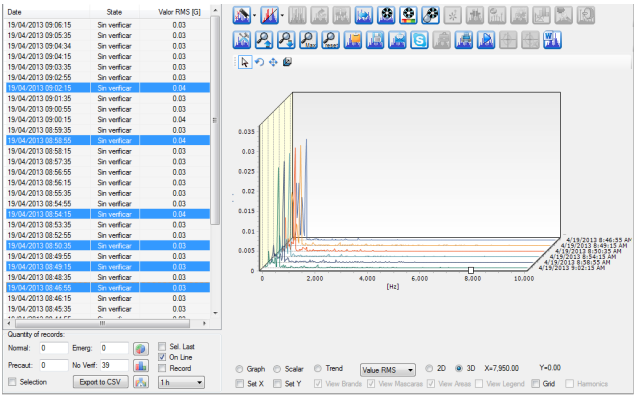


Other tools that can be accessed below the graph are spectral comparisons in 3D and 2D spectrums:

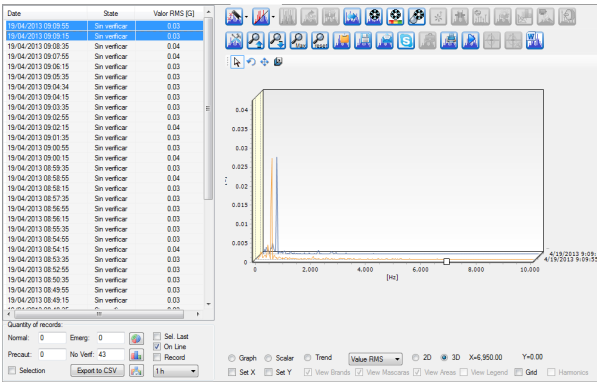
Checking the box “2D” compares two or more spectrums in overlay view.



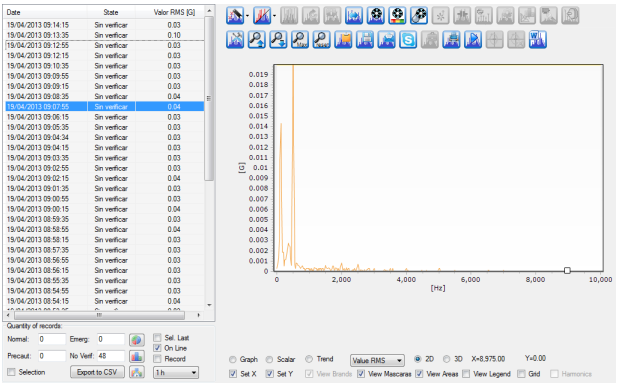
Simply hold down “Ctrl” and click the measurements you want to compare in the list on the left.
Similarly, you can make comparisons cascade by checking the “3D” box.

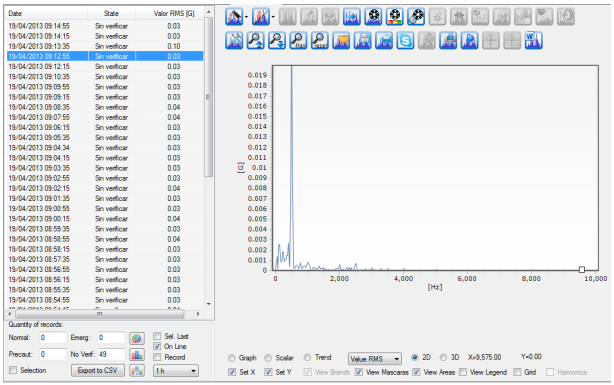


Options for 2D and 3D graphics may auto-complete with measurements when the system is on line; mark the last entered value on the list with the “Ctrl” key.

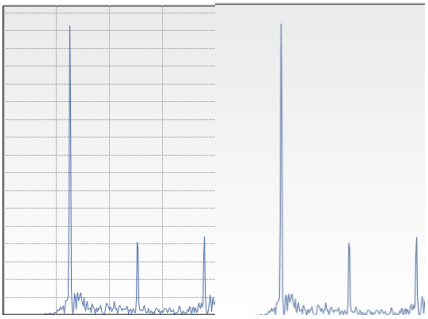


The squares “Set X” and “Set Y” are useful when moving between different measurements on the list. They keep the values of amplitude and frequency of a particular view.





Below the spectrum, the boxes “View Masks” and “View Area” let you show or hide the alarm masks and paint or paint-peel them respectively.



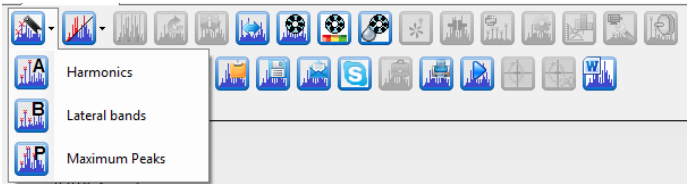
The grid box activates and deactivates reference marks on the spectral graph.

Analysis tools

In graphs of spectrums and wave forms, the above system has a series of graphic icons. These are the analysis tools, and their usage is detailed below.

Icon: Main dial cursors

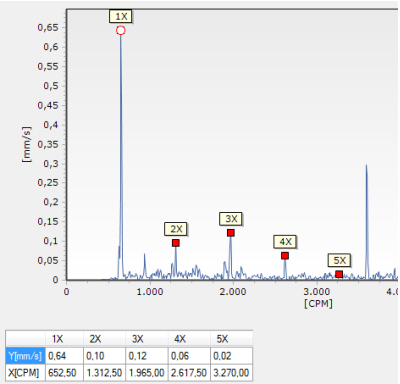
The cursor tool, grouped in an icon, contains three types of tools: harmonics, lateral bands, and maximum peaks.



Selecting some of these tools makes them remain active from one measurement to another within the list of measurements, without having to activate them again.

Harmonics

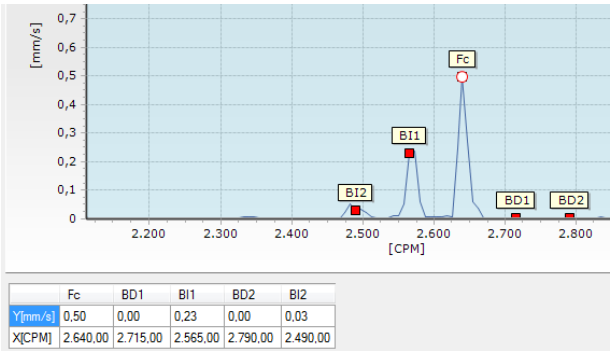
After selecting this tool, you must click on a component of the spectrum and mark its harmonics.



	1X	2X	3X	4X	5X
Y[mm/s]	3,25544	0,81981	0,88172	0,63966	0,08571
X[CPM]	630,00000	1.260,00000	1.897,50000	2.527,50000	3.157,50000

Lateral Bands

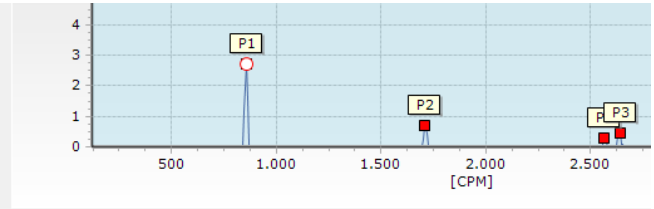
After selecting this tool and clicking on a component, side bands are marked on both sides of the selected component, with the separation taking into account the set.



	Fc	BD1	BI1	BD2	BI2
Y[mm/s]	0,50	0,00	0,23	0,00	0,03
X[CPM]	2.640,00	2.715,00	2.565,00	2.790,00	2.490,00

Maximum Peaks

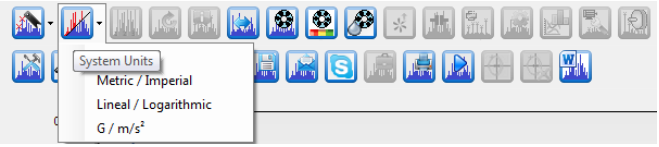
Once activated, this tool will locate the maximum peaks in the spectrum.



	P1	P2	P3	P4
Y[mm/s]	2,72	0,70	0,46	0,27
X[CPM]	855,00	1.710,00	2.640,00	2.565,00

Icon: Main changes in the spectrum scales

The tool contains three types of tools changes (Hz/CPM): metric/imperial, linear and logarithmic, and G/m/s².

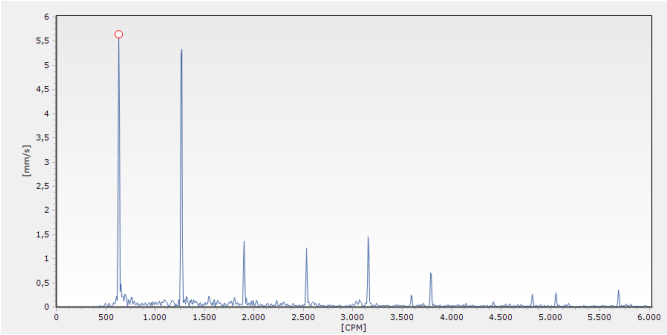


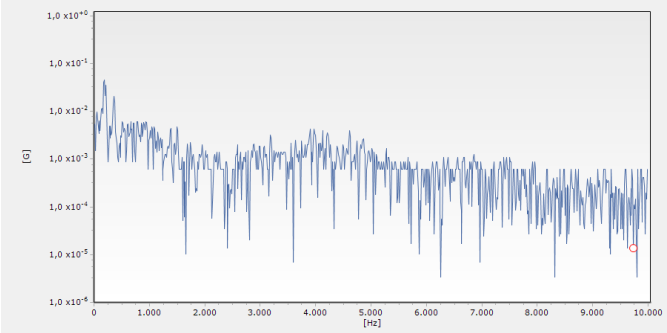
Hz/CPM - Change in Frequency Units:
This function allows you to switch to the CPM scale Hz frequency spectrum of any system. However, the default setting to view a certain way depends on the configuration tool. This option is only temporary.

Metric/Imperial - Change In Spectrum Measurement System:
This icon can change the axis units of amplitude/spectrums of speed of any definition, Metric to Imperial**.**

Speed measurements
Metric: mm/s Imperial: in/s

Linear/Logarithmic - Amplitude Scale Change in the Spectrum:
This feature allows you to scale the amplitude of any spectrum. You can select the same system in “Lineal” or “Logarithmic,” since there are functions and analyses that require the use of this tool.





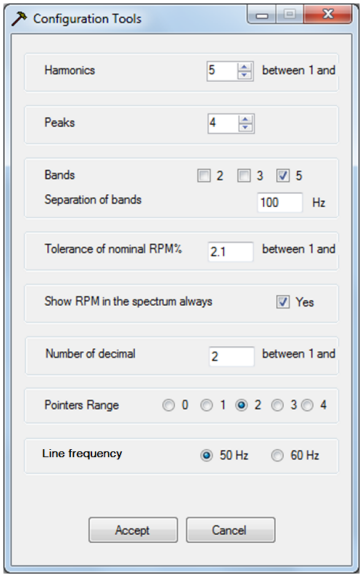
The linear scale may be appropriate in cases where all components have almost the same size, but in the case of machinery vibration, incipient faults in parts (such as bearings) produce very small amplitude signals.

If you want to establish a trend in the levels of these components of the spectrum, it is best to plot the logarithm of the amplitude instead of the same amplitude. This way, you can easily display and interpret a visually dynamic range of at least 5000 to 1, or more than 100 times better than allowed by a linear scale.
In a logarithmic scale, the multiplication of the signal level results in an addition. This means that if you change the amount of amplification of a vibration signal, it will not affect the shape of the spectrum.

G/M/S^2 Change in Spectrum Measurement System:
Through this icon, you can change the axis units of the amplitude spectrums of acceleration of any definition, G to m/s^2 systems.

Configuration tools

The tool defines configuration parameters to enhance the analysis.
The settings of these tools are saved, and each user can store their own settings.

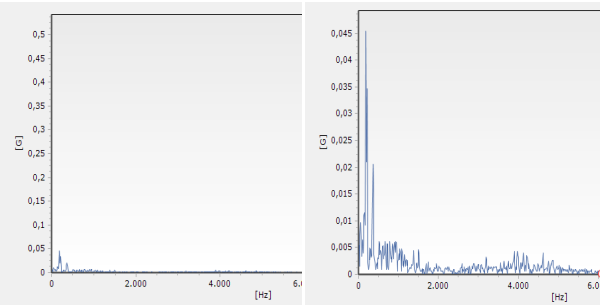


Zoom Vertical Axle

This is a function that changes up or down along the amplitude axis of the spectral graph.

Maximize the Spectrum

When the spectrum opens, the system tries to show all series, spectral graphs, and alarms. If the amplitude has great differences between the spectral components and alarms, these components remain almost invisible. You can modify this to analyze the extent using the maximum scale tool.



Spectrum Reset

This is a function to reset the zoom settings and return to the default setting.
It also unchecks spectrum pointers to start again without a trace analysis of markings already made.

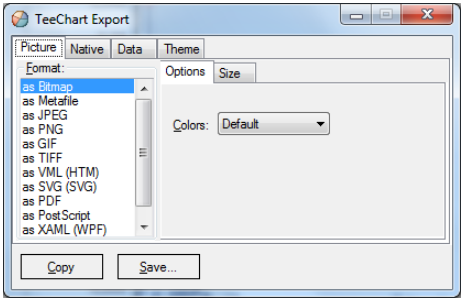
Calculation of the Actual Frequency of RPM

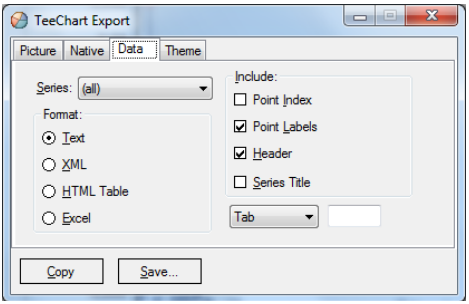
This tool allows accurate calculation of the RPM of a rotor from estimated data.

Save a Spectrum

This adds a file to the directory with a user-specified name and extension, configurable to various types of files.

Images, Text, and Data





Copy Image to the Clipboard

In the position, the spectral graph will be available from the clipboard for pasting into another program if necessary.

Spectrum Send by E-Mail

This tool opens the e-mail program and attaches the image of the spectrum so that it can be sent to a recipient.

Spectrum Print

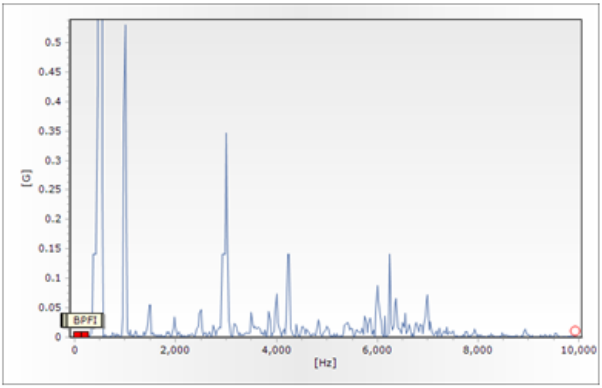
This prints the spectrum as seen on the default printer on the PC.

Spectrum Export to Microsoft Word

This generates a Word file with the image of the spectrum and its corresponding information.

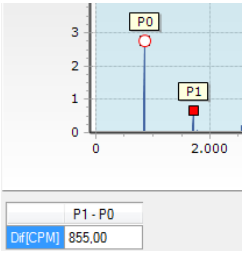
Report

Equipment: Pump Pr-A | Point: Motor D-end - Vertical | Measurement: ESPA
RMS: 14.32 | V0P: 22.19 | VPP: 43.27 | FC: 1.549 | RPM: 0



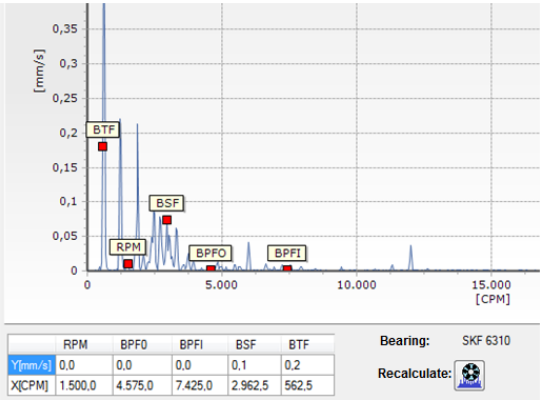
Spectral Distance

To calculate the frequency difference between two components, activate this tool. You must click on the two components whose distance you want to calculate.



Frequency Bearing Fault

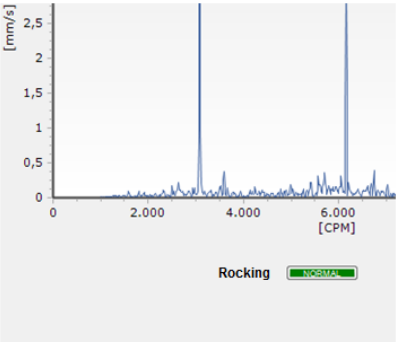
This tool lets you mark bearing fault on the spectrum's characteristic frequencies. To utilize it, you must enter RPM rotational and the bearing manufacturer code as data.



Diagnostic tools in velocity and displacement

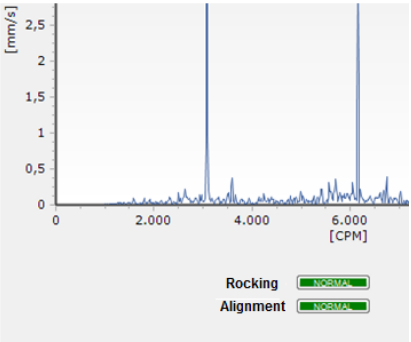
Rocking Analysis

This tool analyses the vibration level that coincides with the rotation of the rotor analyzed and shows a status of “Normal,” “Warning,” or “Emergency” according to recommended standards.



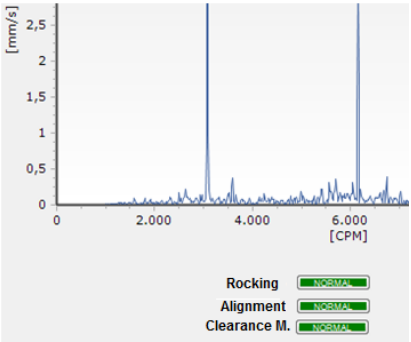
Alignment Analysis

This tool analyses the vibration level coincident with the 2nd and 3rd harmonics of a rotor rotation sample analyzed, and shows a status of “Normal,” “Warning,” or “Emergency” according to recommended standards.



Mechanical Clearance Analysis

This tool analyses the vibration level coincident with the 3rd, 4th, and 5th harmonics of a rotor rotation sample analyzed and shows a status of “Normal,” “Caution,” or “Emergency” according to recommended standards.



These three tools are only available when results are analyzed in a spectrum of velocity or displacement.
Accelerating diagnostic tools

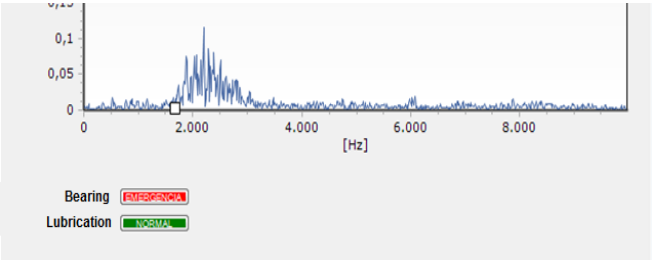
Diagnostic tools in acceleration

Analysis of Bearing

This tool analyses the state of the bearing for the selected point and shows a status of “Good,” “Caution,” or “Emergency” according to recommended standards and rotor RPM.

Lubrication Analysis

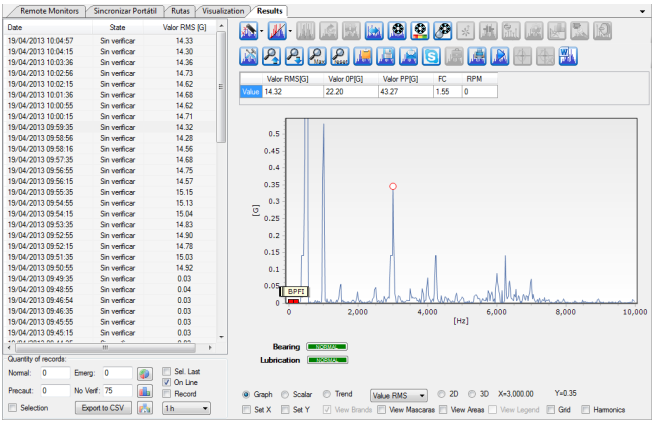
This tool analyses the state of the bearing lubricant film for the selected point and shows a status of “Good,” “Caution,” or “Emergency” according to recommended standards.

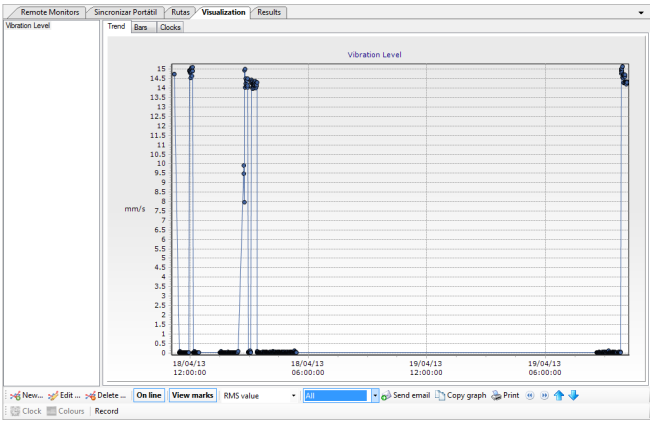


These two tools will only be available to display a spectrum of acceleration.

Windows deployment

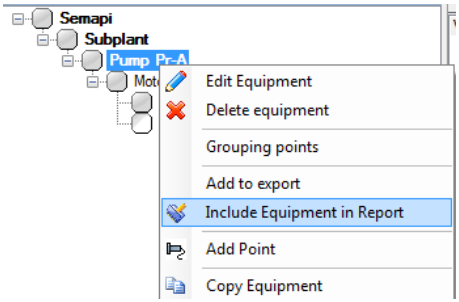
To see more detailed measurements, you can make a full screen display of the results by logging into the “Display Window” from the menu bar. This will display the window that is not active; that is, when you see a display window on screen, this window will display the results.



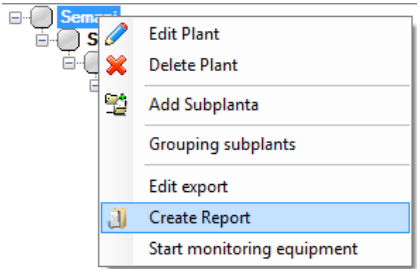


Reports

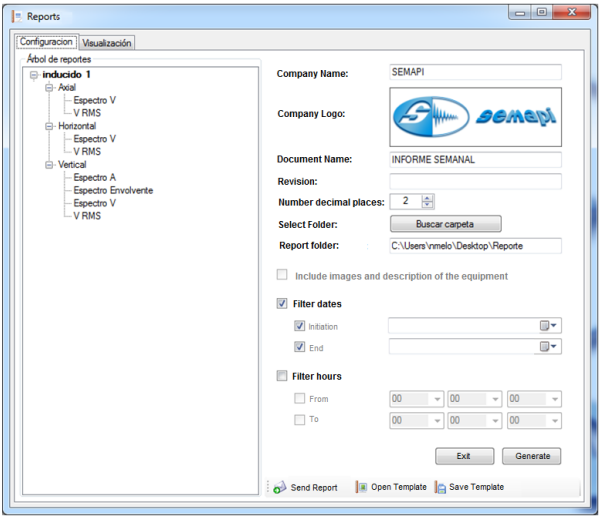
The system allows the generation of configurable reports.
Before moving on to create a report, you must first define what equipment will be a part of that report. This step is done by right clicking on the teams that you want to include in the report, one at a time, and selecting “Include Equipment in Report.”



Right click and select “Create Report” from the menu.



This will configure a PDF form where you can enter a company name and logo. Define a directory in which to save these templates and select the measurement range of the selected computers to be included in the report.



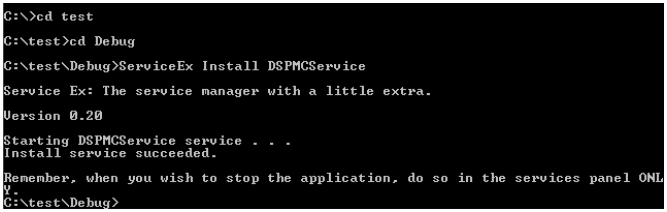
If these reports are routine, you may wish to consider saving the template to avoid having to reconstruct it again.

Guide for installation and service

This guide aims to make the application run as a service on a server. The tool used is ServiceEx.
Reference: http://serviceex.com/
Estimated time for installation of the software and migration: 20 minutes.

To install the application as a service:

- Copy the folder containing the executable file to a known directory.
- Copy the files "ServiceEx.exe" and "DSPMCService.ini" to the directory where the file "DSPMC.exe" is.
- Edit the file "DSPMCService.ini" to include the correct path:
  o Before: ServiceExeFullPath = "C:\Program Files\DSPMC.exe".
  o Now: ServiceExeFullPath = "C:\TestSemapi\DSPMC.exe".
- Save the file without changing the name or extension.
- Select Start-> Run. Type cmd and go to the directory where "ServiceEx.exe" is.
- Typing by command line: Install ServiceEx DSPMCService.



The service is installed and the application starts.

If the program is closed for any reason, it is restarted automatically to run as a service.

To remove the service

- Select Start-> Run. Type cmd.
- Type: net stop DSPMC Service.

```
C:\test\Debug>net stop DSPMCService

El servicio de DSPMCService fue detenido con éxito.
```

- Go to the directory where “ServiceEx.exe” is.
- Type: ServiceEx remove DSPMC Service.

```
C:\test\Debug>ServiceEx remove DSPMCService

Service Ex: The service manager with a little extra.

Version 0.20

Successfully removed service DSPMCService
```

The service has been removed successfully.

SEMAPI proporciona información técnica en Internet para ayudarle a utilizar sus productos en: www.dsplogger.com , puede encontrar manuales técnicos, una base con preguntas frecuentes y notas de aplicación.
También puede encontrar videos instructivos del firmware del DSP Logger Expert en https://www.youtube.com/user/semapicorp