

Introduction:

The following are defined in the CONFIGURATION program:

- Plants or Sectors
- Equipment
- Points
- Measurements
- Process variables

It is very important to begin with as much information as possible about all equipment to be measured. Additionally, it is fundamental to know which equipment the measurement route will contain.

In the CONFIGURATION application, all of the data logger functions the data logger will have available in the field will be defined.

The order and priorities of the elements that conform to the configuration as well as the structure will help the collected data to be correctly found. For this reason, the configuration must be planned with thought to the equipment used today and what will be used in the future.

Plants y Sub-plants:

Plant is defined as a collection of equipment that is being monitored. This definition is arbitrary, as the equipment from one company might be found inside one or more physical plants or buildings.

If there is no upper limit for equipment to be included into a plant, it is recommended to set up plants having a maximum 50 pieces of machinery, so access to the data is easy and simple.

For factories with more equipment, it is recommended to create sub-plants or sectors.

Example:

(Plant) SERVICES
(Sub-plant) Boilers
(Sub-plant) Compressor Room

Creating Plants y Sub-plants:

From the initial window of the CONFIGURATION program, you can create new plants or sub-plants with the following commands:



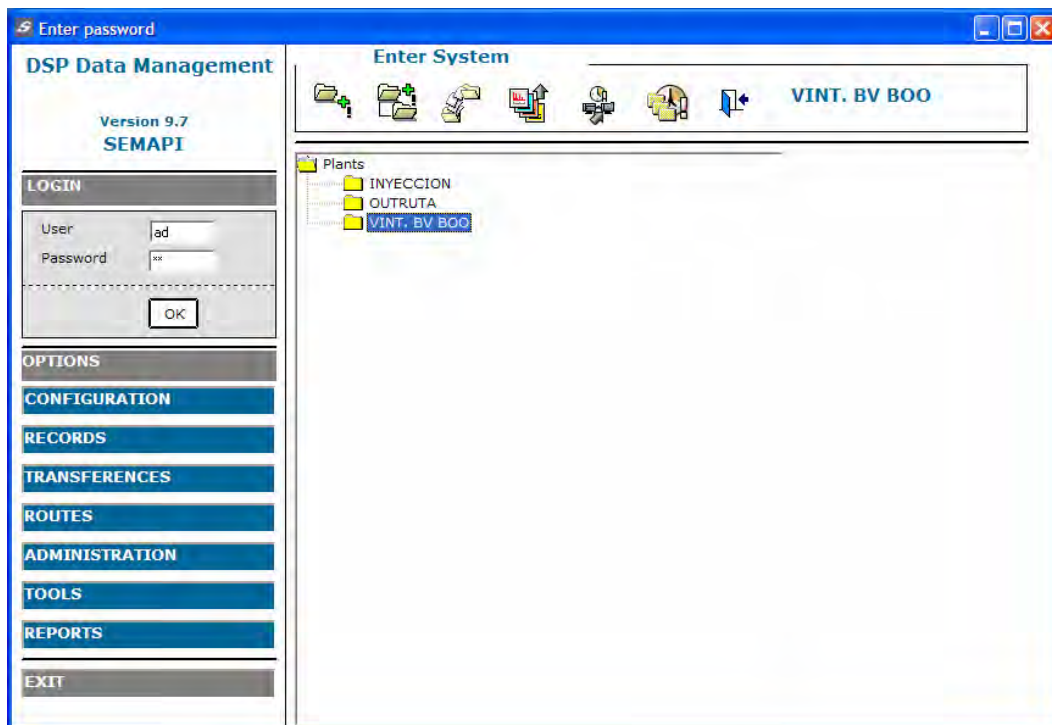
ICON to create plants



ICON to create sub-plants

Once inside the system by way of the corresponding password, the user must choose which plant is to be enabled with new equipment and measurements, or edit a plant that has already been created.

Choose the plant with the left-hand Mouse button and activate the function from the button:

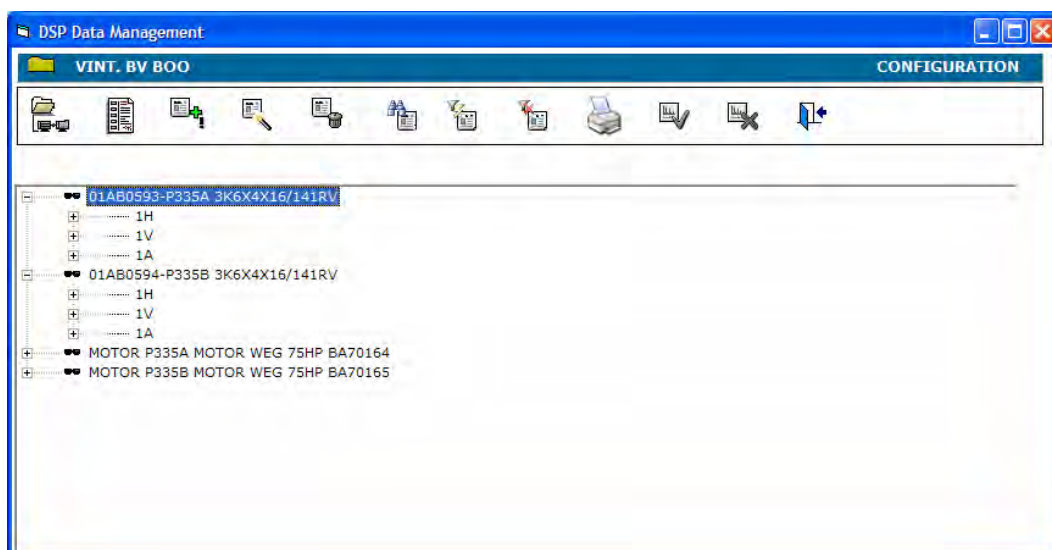


Enter to Configure:

OPTIONS

CONFIGURATION












This option is only enabled if the user is permitted to do so by the security system. The configuration window presents its contents as a tree, which permits easy access to the configured equipment, points, and measurements.



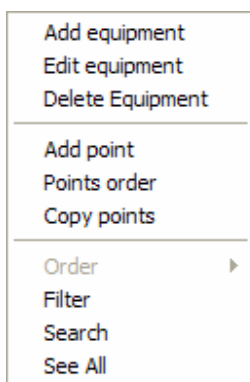
Each measurement that is presented inside a point is identified with an ICON.

Access to EQUIPMENT, POINTS, and MEASUREMENTS is located in the top border of the screen as an ICON menu. The right-hand mouse button also permits access according to the tree.

Menu Functions:

| | |
|---|--|
|  | ICON to see the equipment list in tree form. |
|  | ICON to see the configuration in grill form. |
|  | ICON to add a new record. |
|  | ICON to edit an existing record. |
|  | ICON to delete a record. |
|  | ICON to seek equipment. |
|  | ICON to filter equipment. |
|  | ICON to deactivate the filter or to see other equipment. |
|  | ICON to print. |
|  | ICON to enable a measurement. |
|  | ICON to disable a measurement. |

Right-hand Mouse Button Functions for the Level of Equipment:



From the main level of the tree the primary functions of the Equipment can be accessed.

This function replaces the ICONS of the main menu.

Configuring Equipment:

Add Equipment: refers to any piece of machinery that is monitored.

To organize the information, the DSP-DM software works with these units, which include all of the points and measurements to be made.

Although there is no limit to the number of measurement points any equipment can have, it is recommended that the points be no more than 5 or 6. In the case of very large equipment (for example, a turbogenerator), it is convenient to divide the equipment into simpler units: *turbine - differential - generator*.

Equipment Creation and Configuration Screen:

Access to the command is via the right-hand Mouse button or with this icon:



CODE: Corresponds to the coding of equipment monitored for vibration. It is recommended that this code be the same as that used in the company's maintenance system.

DESCRIPTION: Corresponds to the description of the equipment, in which can be detailed an operative name of the equipment.

Example: WATER PUMP 1 OF BOILER 1

DIAGRAM: Through a corresponding icon, an image file (*.bmp or *.jpg) can be included into the program and associated with the equipment. This image will be available on the levels of configuration for the equipment and upon consulting the record.

DOCUMENT: Through a corresponding icon, any type of document file can be included into the program and associated with the equipment. This file can be opened by another program specified in the association table (see table configuration)

These mechanical data fields are very useful for the equipment analysts when they are not the same persons that are performing the field inspection.

| | |
|-------------------------|----------------------|
| Transmission | <input type="text"/> |
| Bearing Type | <input type="text"/> |
| Driver Lubrication Type | <input type="text"/> |
| Driven Lubrication Type | <input type="text"/> |
| Stiffness Type | <input type="text"/> |
| Equipment Type | <input type="text"/> |

This data provides background on possible faults that may register and helps to locate the causes of high vibration levels, in addition to providing information that may help to bring a solution to the problem.

To enter data in this table see table configuration in this chapter.

Equipment Type:

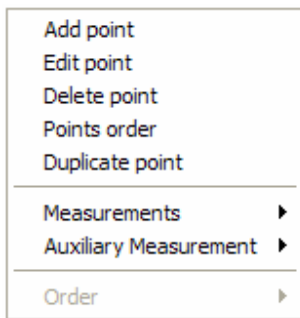
The selection of equipment type is directly related to the different groups of equipment according to ISO vibration standards.

Configuring equipment inside a group will show the equipments' operational status as per the ISO standard (see Chapter 5).

The equipment groups are the following:

| GROUP | DESCRIPTION OF EQUIPMENT |
|-------|--|
| 4-1 | Rotor directly on motor axis |
| | Rigid Foundation |
| | Power less than 15 kW (20 hp) |
| 4-2 | Rotor directly on motor axis |
| | Flexible Foundation |
| | Power less than 15 kW (20 hp) |
| 3-1 | Rotor coupled to motor |
| | Rigid Foundation |
| | Power less than 15 kW (20 hp) |
| 3-2 | Rotor coupled to motor |
| | Flexible Foundation |
| | Power less than 15 kW (20 hp) |
| 2-1 | Height to center of axis between 160 and 315 mm |
| | Rigid Foundation |
| | Power between 15 kW (20 hp) and 300 KW (400 hp) |
| 2-2 | Height to center of axis between 160 and 315 mm |
| | Flexible Foundation |
| | Power between 15 kW (20 hp) y 300 KW (400 hp) |
| 1-1 | Height to center of axis greater than 315 mm |
| | Rigid Foundation |
| | Power between 300 kW (400 hp) and 50 MW (67000 hp) |
| 1-2 | Height to center of axis greater than 315 mm |
| | Flexible Foundation |
| | Power between 300 kW (400 hp) and 50 MW (67000 hp) |

Functions for the right-hand mouse button on the Point level:



From the second level of the tree, the primary functions of the points can be accessed.

These functions can only be accessed from this location.

Configuration of Points:

A Point is defined as the location on the equipment that the measurement information shall be taken. For each Point one must configure the specifics of the desired measurements.

As the DSP-DM software systems are designed for many types of data measurement and collection, the configuration of the points should be adapted to the requirements of the user keeping in mind which type of measurement is to be made.

Furthermore, the most common use of the system is for the inspection of rotating equipment, so the number of the bearing and the machine speed are added to the principal information about the Point. If for whatever reason these values are not applicable, leave them blank and incomplete to avoid introducing errors to other measurements.

For each configured point, one can create the measurements that are necessary to diagnose problems or monitoring values over time.

It should be noted that any type of measurement of which the data logger is capable can be assigned to a Point. What is not permitted is to assign two measurements to a Point, even if they are configured differently.

Ex: SPCAL (acceleration spectrum of 400 lines with max freq of 10,000Hz)
SPCAL (acceleration spectrum of 400 lines with max freq of 2000Hz)

Ex: ARMS (Total acceleration value with max frequency of 10,000Hz)
ARMS (Total acceleration value with max frequency of 2000Hz)

However, it is permitted to configure two measurements for a Point if the measurements have different spectral definitions.

Ex: SPCAL (acceleration spectrum of 400 lines with max frequency of 10,000Hz)
SPCAM (acceleration spectrum of 2000 lines with max frequency of 10,000Hz)

Screen for Configuring and Creating Points:

The command is accessed from the right-hand mouse button when equipment has already been selected from the tree or the list.

POINT (Code): Corresponds to the typical coding of equipment under vibration control.

It is recommended that these codes contain the least number of letters possible as the data logger will be handling these codes.

DESCRIPTION: Corresponds to the description of the code of the Point on the equipment. In this description the complete details of the location of the measurement point.

Example:

- 1H Motor free side horizontal direction
- 1V Motor free side vertical direction
- 2H Motor coupled side horizontal direction
- 2V Motor coupled side vertical direction

RPM: The speed in RPM should be entered for the Point. The system will use this data to calculate the bearing fault frequencies'.

Manufacturer: The brand of bearing corresponding to the Point should be entered. The system contains a database of more than 26,500 bearings from 24 manufacturers.

Choosing the manufacturer permits the viewing of the bearing numbers corresponding to the choice.

Bearing Number: The bearing number should be entered for the Point that is being monitored. The program will search its database for the fault frequencies corresponding to that bearing and input these frequencies automatically. In the case where the bearing is not found in the database, the data can be manually input from the menu tables: bearings.

It is important that such frequencies be registered as the spectral analytical tools will mark these frequencies on the spectrum and thus clearly identify the faults.

The fault values that are shown in the configuration window are only coefficients that the system has calculated from the RPM previously mentioned.

The order in which the tree points are shown will be the same as what is shown on the data collector upon taking the field measurement.

If for any reason a change is required to this order, it can be made from the right-hand mouse button and stopped on the point level, accessing the change order function.

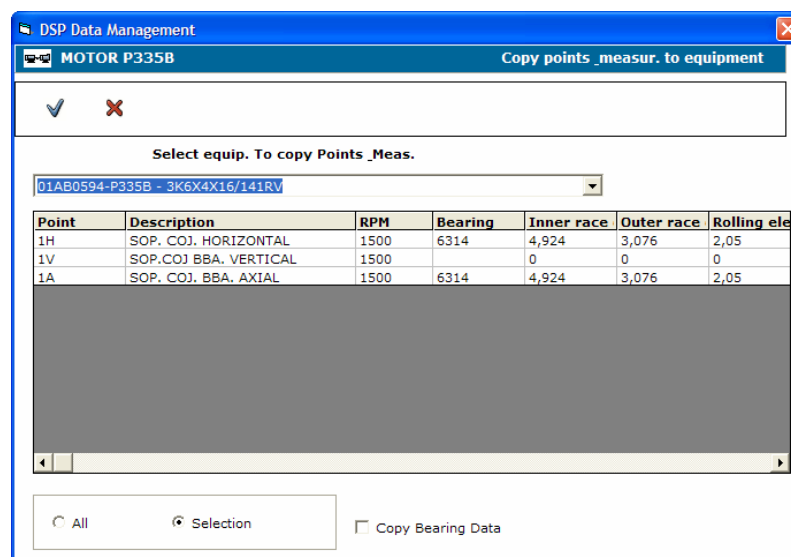
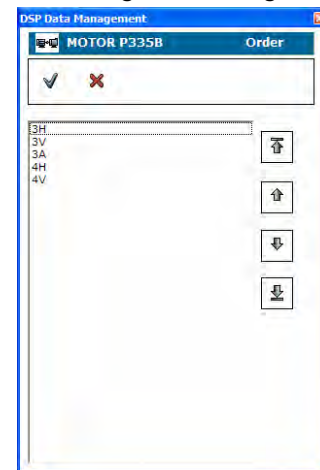
A window will open to enable manual changing of the order of the points.

In the copy equipment screen, it can be selected from what equipment one desires to copy points, and whether all of them or only selected points are to be chosen.

The program will copy the points from one equipment to another only when the points do not repeat, as they cannot be overwritten.

Copying Points:

The copy points function is activated from the right-hand mouse button menu. Its purpose is to use the configuration already set up for points and measurements of other equipment and apply it to new equipment.



Upon activating the function, a window opens to permit choosing equipment from the plant, and the points that can be copied will be shown. One can choose to copy all or select points to be copied.

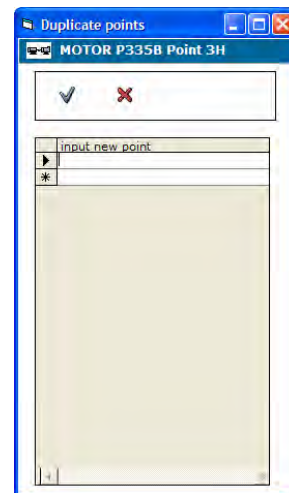
Duplicate Point:

The duplicate point function is designed so that upon creating equipment and a point, it can be duplicated as many times as necessary with the same quantity and measurement types as the selected point.

To duplicate a point one must select a point with measurements and then select the option with a click of the right-hand mouse button on the point.

To input new points, one must only write them into the empty spaces on the list, advancing with the TAB key to input the new points.

When all the points are in, one must confirm with the command:



Configuration of Measurements:

This is the way by which information about the working status of the machinery is obtained.

The system will determine the operating status of equipment from a periodic evaluation of measurements, comparing the obtained results with their corresponding alarm levels. To complete this objective, it is necessary to configure the measurements to obtain the best information about the condition of the machinery.

Measurements:

The DSP-DM system administers the measurements that are taken with the multiple variable data collector, which offers a great variety of measurements that can be configured into a point.

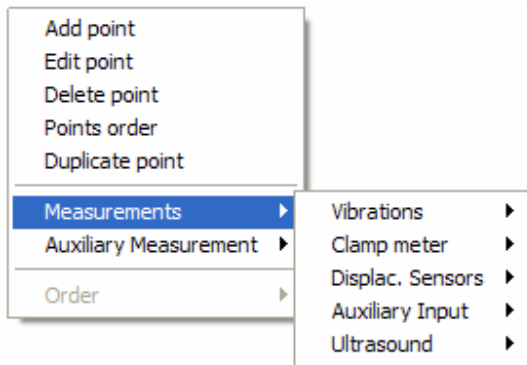
These measurements are divided into three basic groups:

- Alternating Current Input Measurements
- Constant Current Input Measurements
- Process Variable Manual Measurements

In all cases, each of these input groups offers different types of configurable measurements.

The selection of measurements is made from points already created which become available with the right-hand mouse button, as shown in this image:

For each of the measurement types that the system presents, the measurements that are not selected for the point are always shown, as the system does not permit the configuration of two equal measurements for one point.



When editing, the system will present the loaded measurements as editable.
To input measurements to a point, the system presents the entire range of variables and entries available for the data collector.
From the Measurements menu, the user may access inputs such as Alternating Current, Constant Current and manually input process variables.

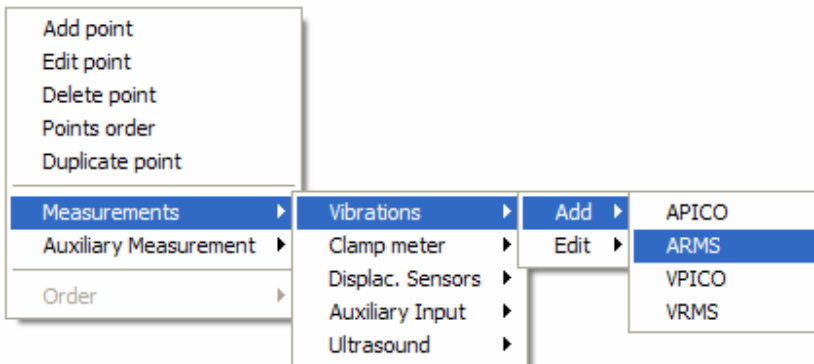
Alternating Current Input Measurements:

Measurements are grouped by global values of vibration and displacement, spectral vibration measurements, displacement, amperometric clamps, ultrasonic guns, and measurements of instruments with alternating voltage outputs.

Measurements of Global Vibration Values:



ICON: That identifies the global values on the record's configuration tree.



Global Measurements Options:

Variables:

Acceleration: RMS / 0-Peak / Peak-Peak

Velocity: RMS / 0-Peak/ Peak-Peak

Displacement: Peak-Peak

Inputs:

Accelerometer 1 and Accelerometer 2

Filters:

Band-pass 1250-2500Hz

Band-pass 2500-5000Hz

Band-pass 5000-10000Hz

Band-pass 10000-15000Hz

High-pass 15000-10000Hz

Gain:

X1 / X10

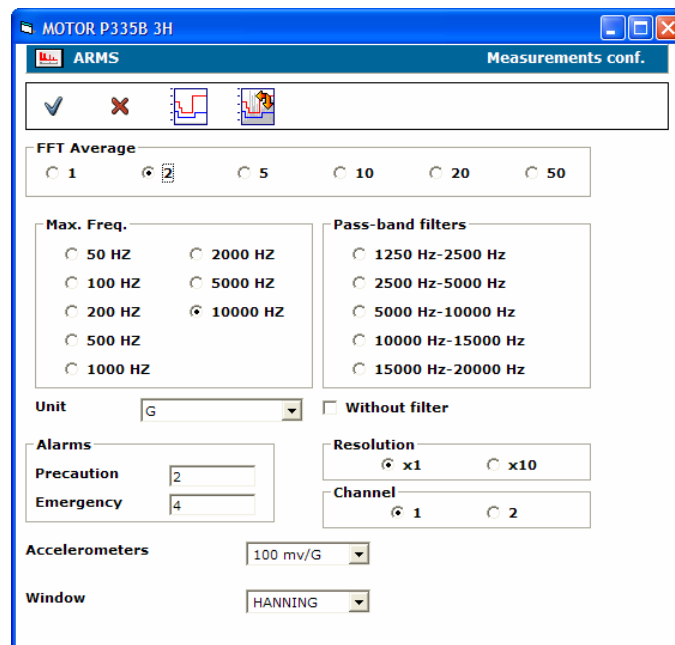
Sensor Sensitivity:

50mv/g, 100mv/g, 500mv/g

Maximum Frequency:

50Hz, 100Hz, 200Hz, 500Hz, 1000Hz, 2000Hz, 5000Hz, 10000Hz

Configuration of Global Vibration Value Measurements:



Name: Identifies the measurement within the list of point measurements.

Example: VRMS

Averaging: Defines the time extension on which the measurement is taken. The time extension depends on the maximum frequency and the averaging selected.

Maximum Frequency: Defines the upper limit of signal frequencies to measure.

The peak value of a signal is very sensitive to the maximum frequency selected.

Band-pass filters: Defines a band of the spectrum where the signal will be taken and the value shown.

Without Filters: de-activates whatever type of filter automatically configured by the system. (see in this chapter, AUTO-CONFIGURATION FUNCTIONS)

Units: the units are defined for each variable, depending on the calibration of the DSP Logger MX 300.

| Velocity | Acceleration | Displacement |
|---------------------------------|---|------------------------------------|
| mm/s [millimeter/second] | g [acceleration of gravity] | µm [micrometer] |
| in/s [inch/second] | m/s² [meter/second squared] | mil [thousandth of an inch] |
| | ft/s² [foot/second squared] | |

Masks: a predefined mask can be set to measurement values from Tables or manually for each state: Precaution and Emergency.
(see Configuration of Tables)


Resolution: Defines the scale of major values and proposes to multiply it (x10) whenever these values are too low in amplitude.

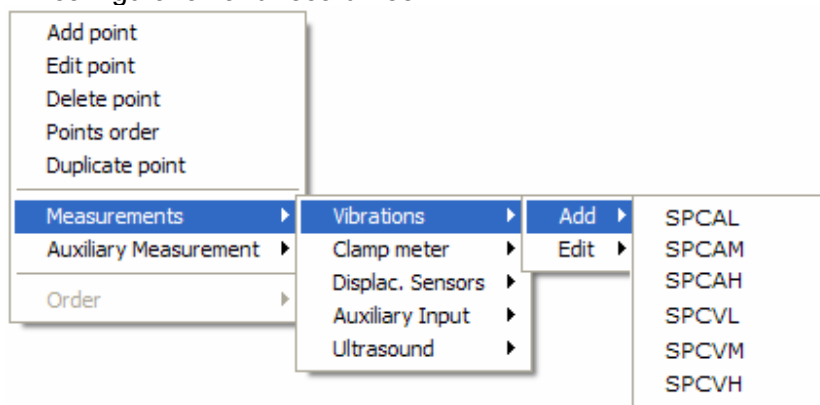
Accelerometers: Defines which type of accelerometers (by output) will be used for the measurement: 50mv/g, 100mv/g or 500mv/g

Channel: Defines which of the two available sensor channels will be used.

Window: The type of window by which the measurement will be taken. The system permits selection of Hanning or flat-top.

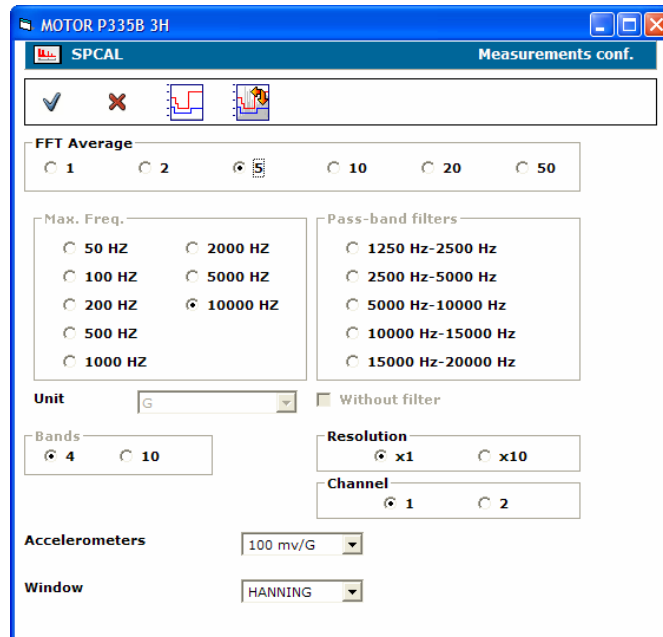
Spectral Vibration Measurements:

 **ICON** (gray background) which identifies the spectra of vibrations on the configuration and record tree.



The DSP-DM systems presents 3 types of spectral vibration measurements that are coded by their definition in lines:

- “L” (low) Spectra in 400 lines of definition.
- “M” (mid) Spectra in 2000 lines of definition.
- “H” (high) Spectra in 4000 lines of definition.



Spectra in 400 lines of definition:

- **SPCVL** (velocity spectrum)
- **SPCAL** (acceleration spectrum)

Name: Identifies the measurement within the list of point measurements.

Example: SPCAL

Averaging: Defines the time extension on which the measurement is taken. The time extension depends on the maximum frequency and the averaging selected.

Maximum Frequency: Defines the upper limit of signal frequencies to measure. For spectra in 400 lines the maximum frequency begins at 50Hz and ends at 10000Hz

Band-pass filters: Defines a band of the spectrum where the signal will be taken and the value shown.

Without Filters: de-activates whatever type of filter automatically configured by the system..

(see in this chapter, AUTO-CONFIGURATION FUNCTIONS)

Units: the units are defined for each variable, depending on the calibration of the DSP Logger MX 300.

| Velocity | Acceleration | Displacement |
|---------------------------------|---|------------------------------------|
| mm/s [millimeter/second] | g [acceleration of gravity] | µm [micrometer] |
| in/s [inch/second] | m/s² [meter/second squared] | mil [thousandth of an inch] |
| | ft/s² [foot/second squared] | |

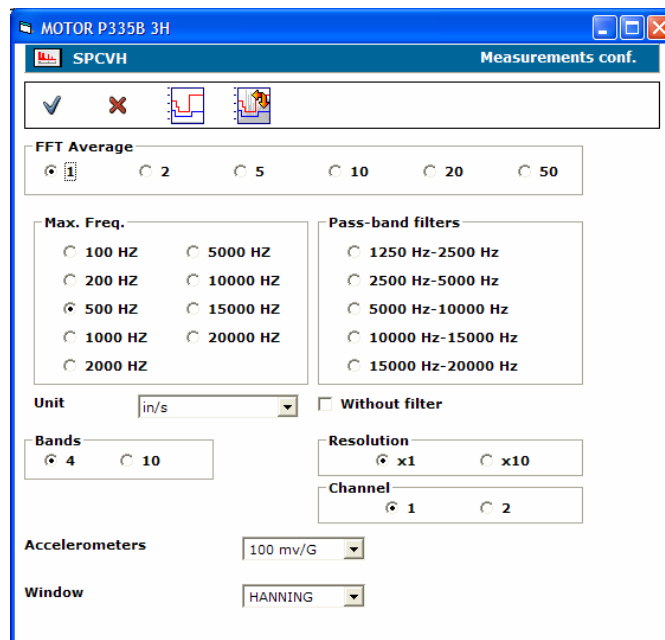
Masks: a predefined mask can be set to measurement values from Tables or manually for each state: Precaution and Emergency.
(see Configuration of Tables)

Resolution: Defines the scale of major values and proposes to multiply it (x10) whenever these values are too low in amplitude.

Accelerometers: Defines which type of accelerometers (by output) will be used for the measurement: 50mv/g, 100mv/g or 500mv/g

Channel: Defines which of the two available sensor channels will be used.

Window: The type of window by which the measurement will be taken. The system permits selection of Hanning or flat-top.



Spectra in 2000 lines of definition:

ESPVM (velocity spectrum)
ESPAM (acceleration spectrum)

Spectra in 4000 lines of definition:

ESPVH (velocity spectrum)
ESPAH (acceleration spectrum)

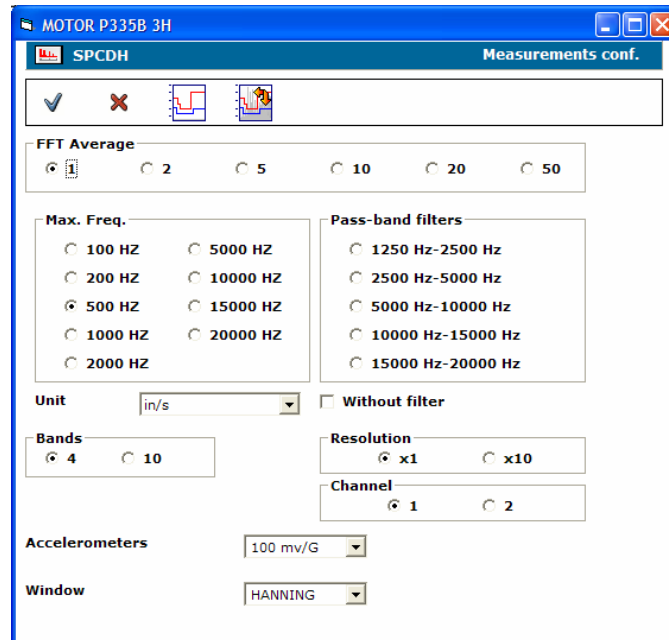
The configuration of the spectra in 2000 and 4000 lines is identical to that of spectra in 400 lines.

The maximum frequency of these spectra begins at 100Hz and ends at 20000Hz.

Spectral Measurement of Displacement with Accelerometers:



ICON (yellow background) that identifies vibration spectra on the configuration and record tree:



For these spectra the user can select 3 different definitions for the number of lines:

- SPCDL (displacement spectrum of 400 lines)
- SPCDM (displacement spectrum of 2000 lines)
- SPCDH (displacement spectrum of 4000 lines)

The configuration is identical to that of the vibration spectral measurements. In the sensor selection window, one can select accelerometers of different sensitivity.

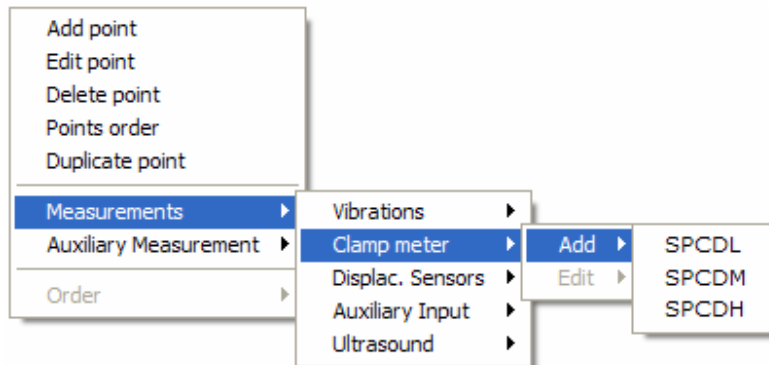
Spectral Measurements of Current with an Amperometric Clamp:



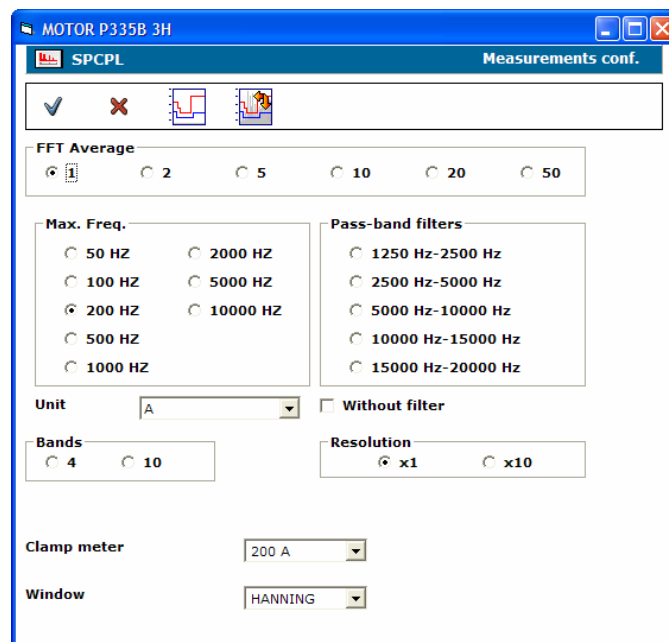
ICON (green background) that identifies vibration spectra on the configuration and record screen.

These spectra also allow the user to select 3 different definitions for the number of lines:

- SPCPL (Current spectrum 400 lines)
- SPCPM (Current spectrum 2000 lines)
- SPCPH (Current spectrum 4000 lines)



The configuration is identical to that of spectral vibration measurements.



In the clamp selection window the user can select 2 types:


- Clamp up to 200A maximum.
- Clamp up to 1000A maximum.

Application of this measurement:

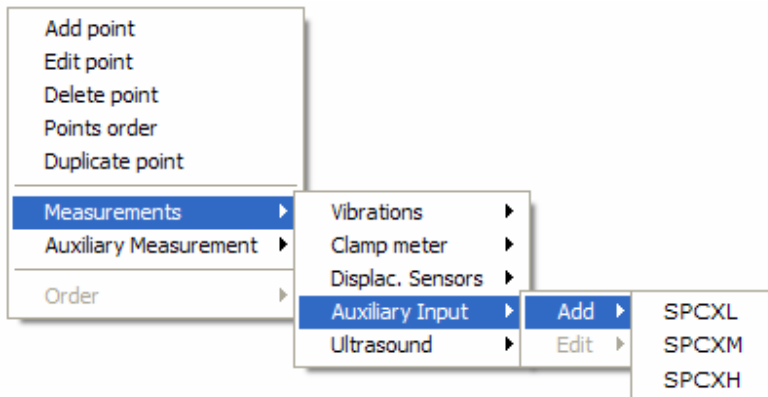
This type of measurement is recommended for the detection of electrical problems in motors of any horsepower.
The standard clamp that the DSP Logger MX300 data collector takes is a precision-type for measuring harmonics, which is why we recommend the user take this into account if using another type of clamp is desired.

The analysis tools used to detect problems with electric motors and their operation, are available in the record option of DSP Data Management.
(see chapter 4)

Auxiliary Spectral Measurements:

 ICON: (orange background) that identifies the spectra of auxiliary measurements on the configuration and record tree.

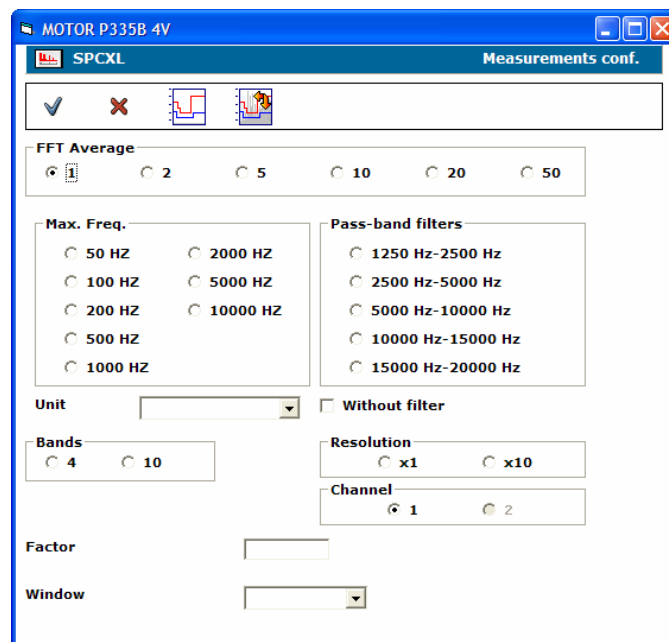
These spectra also allow the user to select 3 different definitions for the number of lines:



SPCXL (current spectrum of 400 lines)

SPCXM (current spectrum of 2000 lines)

SPCXH (current spectrum of 4000 lines)



The configuration is identical to that of the vibration spectral measurements, but the factor is a fundamental point of the configuration.

One must take into account that the factor is the level of analogic output of the instrument to connect, always expressed in Volts.

Application of this measurement:

This measurement is recommended for any type of instrument with alternating current output, as the allowable measurement input is 2VRMS.

Example: Turbine monitoring equipment with sensors to measure the axle's displacement.

The application of this measurement can be considered as a universal input for spectral analysis of alternating current.

Can be connected to any type of device with output up to 2 Volts.

Connection Example:

A vibration monitor on a turbine may have measurement outputs on its panel.

Acceleration Outputs:

Channel 1: 1.02mv/g Channel 2: 1.02mv/g


In order to perform a spectral analysis of these outputs one must configure an Auxiliary Input Spectrum, in this case the factor would be 0.00102. With this factor and selecting (g) units of measurement the measurements will correspond to those monitored by the fixed equipment.

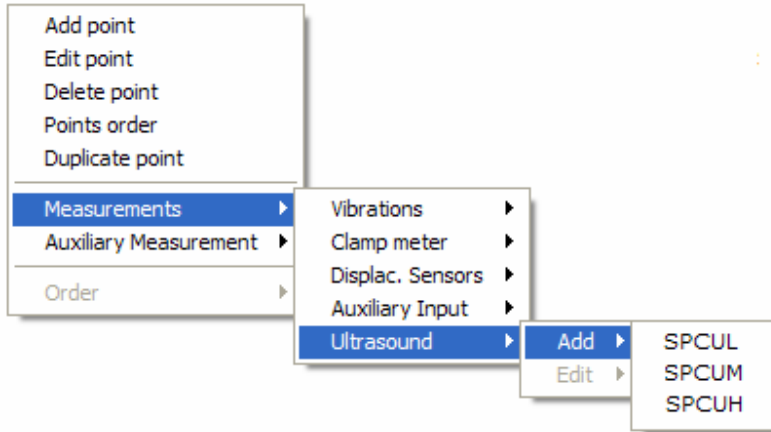
Velocity Outputs:

Channel 1: 3.93mv/mm/s Channel 2: 3.93mv/mm/s

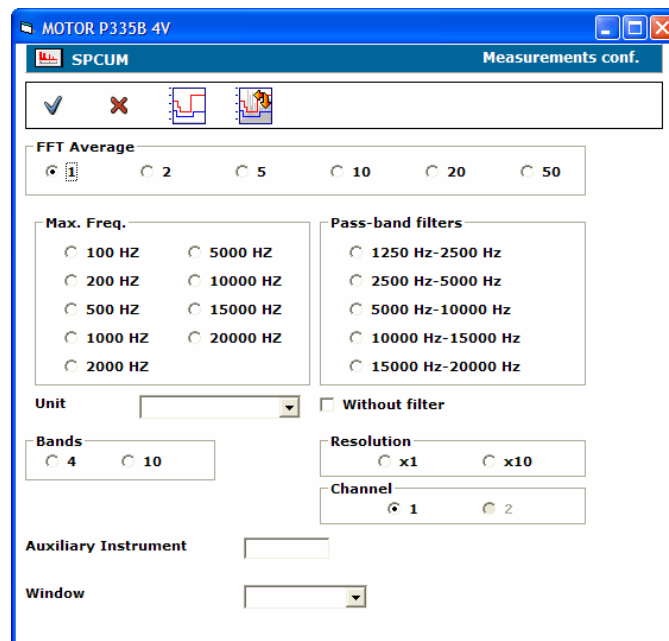
In order to perform a spectral analysis of these output one must configure an Auxiliary Input Spectrum, in this case the factor would be 0.00393. With this factor and selecting (mm/s) units, the measurements will correspond to those monitored by the fixed equipment.

Spectral Measurements with Ultrasonic Instruments:

 ICON: (turquoise background) that identifies measurement spectra for ultrasonic instruments on the configuration and record tree.



For these spectra 3 different definitions also can be made for the number of lines of definition.



ESPUL (current spectrum of 400 lines)

ESPUM (current spectrum of 2000 lines)

ESPUH (current spectrum of 4000 lines)

The configuration is identical to that of vibration spectrum measurements.

In the Auxiliary Instrument selection window a factor is determined by which the input is increased or decreased in the DSP Logger MX300 data collector, if the audiophone output or the audio of the ultrasonic gun is very high.

Application for this measurement:

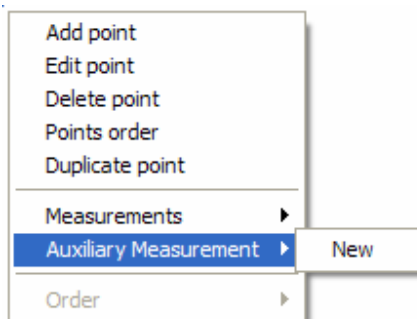
This measurement is recommended for monitoring and performing spectral analysis of data acquired with an ultrasonic instrument.
The applications can range from bearing failures to the behavior of vapor traps.

Variables of a process Measurement

In this group are included the measures defined as auxiliary and process. They can be taken manually from the keyboard or by using a transmitter instrument which deliver them as an output of direct current.

All measures entered manually, may be considered as variables of a process." Any measure that is not a vibration measure is considered as a Process Variable. The system allows configuring any kind of measure of any kind of parameter and unit.

To create these types of measurements, the user needs to enter and activate their configuration window by right-clicking the mouse (Auxiliary Measurements)



Configuration of Auxiliary Measurements:

Measurement Type: when the measurement type is selected, the inputs of the analog-to-digital converter on the data collector are also selected. Whenever a manual measurement is made, the choice of inputs or other options is not critical.

Auxiliary Measurement: corresponds to the name given to identify the measurement and will depend on the instrument used.

Unit: this is the variable measurement unit. Alarms should be entered in the same units.

Choosing between A/D Converter or Manual:

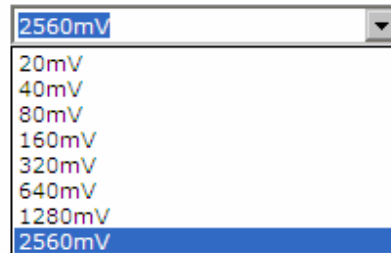
This permits a choice from measuring with manual or fixed instruments, or from an analog output device where the signal registers in the collector.

The Manual option converts the collector into register for Process Variables, whereby the operator can input from the keyboard the values that are read by other field instruments or control rooms.

In the A/D converter, the range is selectable to take best advantage of the unit's performance and the precision of its 24-bit inputs.

When selecting this range it is very important to know the maximum output of the instrument which will be connected to the unit.

Rango A/D



Example:

The temperature indicator (shown below) available as an accessory item for the DSP Logger MX300 has an output of 1mV/°C and the maximum temperature it can read is 250°C.

Whenever the unit is measuring the maximum, the analog output will be 250mV. In this case the range of the AD converter should be set at 320mV.

However, if the maximum measurement will not be reached, the unit can be set to lower values on the converter, permitting more precision for the measurement.

Offset: Defines and permits adjustments to measurements according to which value is selected as the floor.

Factor: In the factor selection window the system allows input of values to adjust the measurement of the instrument used, in relation to its analog output and the maximum value sent to the converter.

Averaging: Defines the time extension over which the measurement is taken.

Low alarm: Verifies that the measurement is maintained above established limits.

If the value is below the lower limit, an alarm condition will be generated.

High Alarm: Verifies that the measurement is maintained under the established limits.

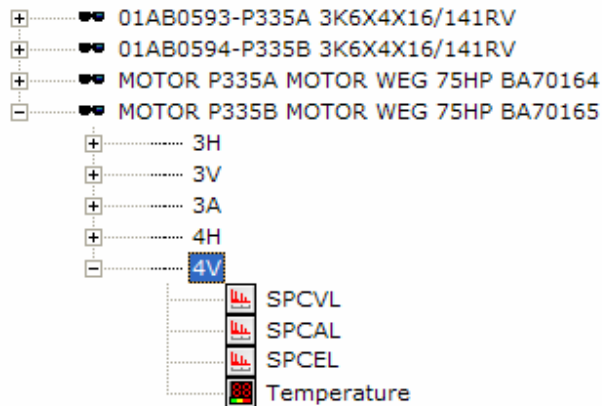
If the value is higher than the established upper limit, an alarm condition will be generated.

Measurement range: Indicates the range in which the process variable measurement can be measured.

This option is valid only for manual process variable measurements.



As they are configured, the auxiliary measurements appear inside of the measurement points together with the spectral measurements:



There is no limit to the quantity of auxiliary measurements that can be assigned to a point.

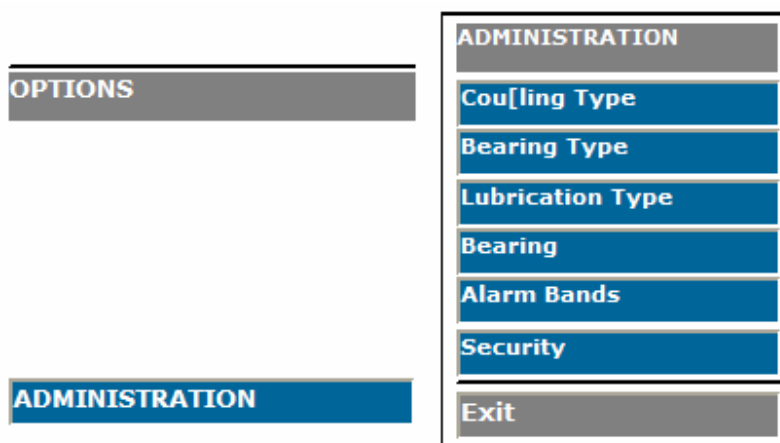
However, the name of any such measurement cannot be repeated.

Another option is to configure a group of measurements on a single point. In this way the measurements can be taken consecutively.

Configuration of Tables:

The software's tables contain information about the different types of entries necessary for the configuration. These tables are accessed from the principal buttons on the initial screen.

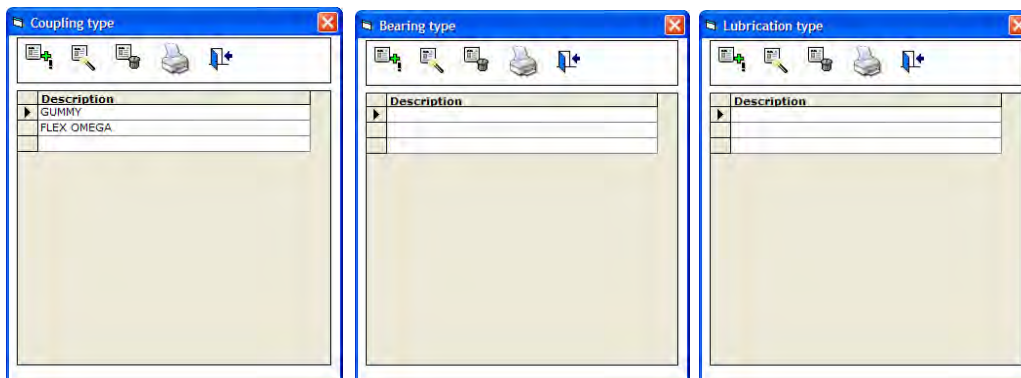
To activate access from the button:



Type of COUPLING, BEARING, LUBRICATION.

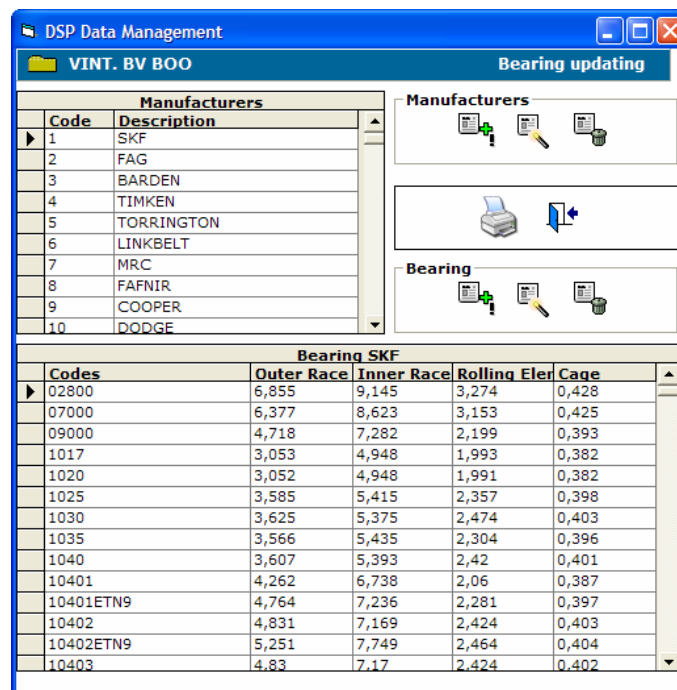
These tables can contain mechanical data that can be selected when the user is configuring the equipment. This data is important for two reasons: it adds important detail on the equipment and will be used to diagnose problems in the equipment.

To create new entries, edit existing entries, or eliminate entries in the tables, the user must activate the functions by clicking the right-hand mouse button from the contents window:

**Bearings:**

The table of bearings contains all the fault frequencies that will be incorporated into the measurement point on the equipment.

Although the newest software holds data for more than 27,000 bearings from 24 manufacturers, it is possible that the specific bearing used is not on the list. In this case, it can be manually added.



This table contains the tools to add, edit, or remove an entry for a manufacturer and/or a bearing:



ICON used to add a new entry.



ICON used to edit an existing entry.



ICON used to erase an entry.

Alarm Masks:

Alarm masks define the status of any measurement on one point of a machine. This can be done via a global value and a spectrum, with the alarm activating if any component exceeds the fixed limit.

To organize the alarms - taking into account that each machine should have different alarm-levels according to its operation and running speed - the software contains a default alarm level for each measurement, maximum frequency, and number of lines. These defaults are configured according to international vibration standards and are activated just by configuring the measurement of any point.

Details of these default alarms can be seen in the Alarm Masks configuration window:

DSP Data Management

VINT. BV 800 Bands configuration for Alarms

| Measurement | Alarm band description | Max. Fre | Unit | Bands | # | Pass-band filters |
|-------------|------------------------|----------|-------|-------|---|-------------------|
| ESPAH | ESPAH 100Hz - 4B | 100 | G | 4 | 0 | |
| ESPAH | ESPAH 100Hz - 4B | 100 | m/s2 | 4 | 0 | |
| ESPAH | ESPAH 100Hz - 4B | 100 | ft/s2 | 4 | 0 | |
| ESPAH | ESPAH 100Hz - 10B | 100 | G | 10 | 0 | |
| ESPAH | ESPAH 100Hz - 10B | 100 | m/s2 | 10 | 0 | |
| ESPAH | ESPAH 100Hz - 10B | 100 | ft/s2 | 10 | 0 | |
| ESPAH | ESPAH 200Hz - 4B | 200 | ft/s2 | 4 | 0 | |
| ESPAH | ESPAH 200Hz - 4B | 200 | G | 4 | 0 | |
| ESPAH | ESPAH 200Hz - 4B | 200 | m/s2 | 4 | 0 | |
| ESPAH | ESPAH 200Hz - 10B | 200 | ft/s2 | 10 | 0 | |
| ESPAH | ESPAH 200Hz - 10B | 200 | G | 10 | 0 | |
| ESPAH | ESPAH 200Hz - 10B | 200 | m/s2 | 10 | 0 | |
| ESPAH | ESPAH 500Hz - 4B | 500 | ft/s2 | 4 | 0 | |
| ESPAH | ESPAH 500Hz - 4B | 500 | m/s2 | 4 | 0 | |
| ESPAH | ESPAH 500Hz - 4B | 500 | G | 4 | 0 | |
| ESPAH | ESPAH 500Hz - 10B | 500 | ft/s2 | 10 | 0 | |
| ESPAH | ESPAH 500Hz - 10B | 500 | m/s2 | 10 | 0 | |
| ESPAH | ESPAH 500Hz - 10B | 500 | G | 10 | 0 | |
| ESPAH | ESPAH 1KHz - 4B | 1000 | m/s2 | 4 | 0 | |
| ESPAH | ESPAH 1KHz - 4B | 1000 | ft/s2 | 4 | 0 | |
| ESPAH | ESPAH 1KH - 4B | 1000 | G | 4 | 0 | |
| ESPAH | ESPAH 1KHz - 10B | 1000 | ft/s2 | 10 | 0 | |
| ESPAH | ESPAH 1KHz - 10B | 1000 | m/s2 | 10 | 0 | |
| ESPAH | ESPAH 1KHz - 10B | 1000 | G | 10 | 0 | |
| ESPAH | ESPAH 2KHz - 4B | 2000 | m/s2 | 4 | 0 | |
| ESPAH | ESPAH 2KHz - 4B | 2000 | G | 4 | 0 | |
| ESPAH | ESPAH 2KHz - 4B | 2000 | ft/s2 | 4 | 0 | |

Masks are easily configured according to each machine's operation and its associated vibration standards. If for any reason a particular machine requires a special alarm mask, it can easily be created and applied to the machine. Although an existing mask can be modified, the modification will affect all measurements that are configured with this type of spectrum, maximum frequency, and number of lines.

The main table functions which are presented in the Alarm Mask configuration window:



ICON used to add a new entry.



ICON used to erase an entry.



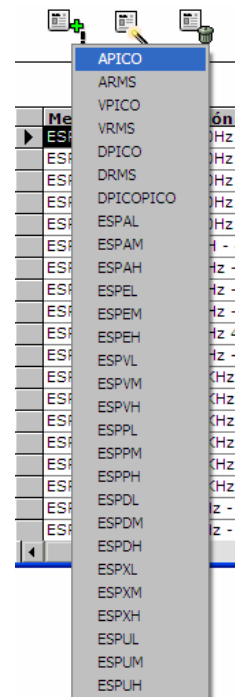
ICON used to edit an existing entry.

Creating a Mask:

Using masks will simplify start-up and maintenance tasks on the system, as the alarms configured on the equipment will vary, in order to optimize the predictive maintenance.

To do so the user can apply a mask for each type of machine, selecting the masks from the tables and pasting them to the configuration when creating a measurement. When creating a new mask, the user should select a measurement type from the list that the software presents.

There is no limit to the quantity of masks that can be created; however, when applying a mask to a spectrum, only those masks which correspond to the measurement, maximum frequency, and number of lines will be shown.



Mask Description: Name by which the mask will be identified.

Maximum Frequency: Defines the background frequency scale. Selecting a high frequency can cover all frequency ranges where different types of problems appear, but this will cause a loss of resolution for the lower-frequency components.

It is recommended to define this value for convenience, with the correct measurement parameter (acceleration or velocity) according to the type of machine being measured, taking into account whether it has journal bearings, ball bearings, gears, and so forth.

Sources of high frequency vibrations, such as gearboxes, running problems, cavitation, or lubrication, are detected through monitoring acceleration spectra having a maximum frequency of 10 kHz.

Sources of low frequency vibrations, such as shaft movements, imbalance, misalignment or mounting problems, are detected through monitoring velocity values with a background frequency scale that covers 4 or 5 times the running speed of the machine (in rpm).

Units:: units for each variable are defined, and these depend on the setup of the DSP Logger MX300.

| | | |
|---------------------------|---|------------------------------------|
| Velocity: | Acceleration | Displacement |
| mm/s [mm/second] | g [acceleration unit of gravity] | µm [micrometer] |
| in/s [inch/second] | m/s² [meter/second squared] | mil [thousandth of an inch] |
| | ft/s² [foot/second squared] | |

Bands: The spectral masks should be configured with frequency bands - the selectable options are either 4 or 10 bands.

For each band, it is necessary to define the Precaution and Emergency alarm values with the spectra that will be compared during measurement. These alarm masks are drawn into the spectra and appear on the screen of the data collector as well as in the Records of the software.

This is the button used to access the alarm configuration window:



The mask bands are very useful to perform precision monitoring on one or more components, differentiating them from others having lower levels of vibration and importance.

| Band | Max. Freq. | RMS range | |
|------|------------|------------|-----------|
| | | Precaution | Emergency |
| 1 | 25 | 0,5 | 1 |
| 2 | 50 | 0,5 | 1 |
| 3 | 75 | 0,5 | 1 |
| 4 | 100 | 0,5 | 1 |
| 5 | 0 | 0 | 0 |
| 6 | 0 | 0 | 0 |
| 7 | 0 | 0 | 0 |
| 8 | 0 | 0 | 0 |
| 9 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 |

Freq in Hz Range in G

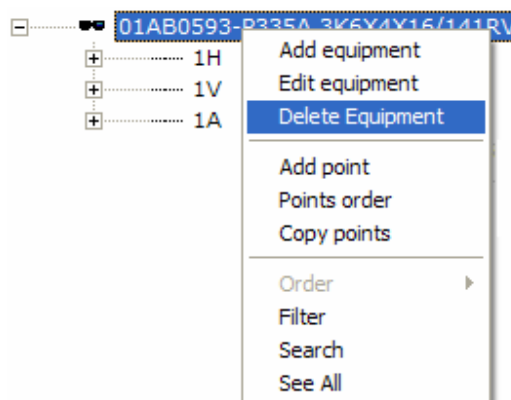
To correctly set the alarms and for system maintenance, this window presents the option to edit them and view them simultaneously in the record screen. (see Chapter 4)

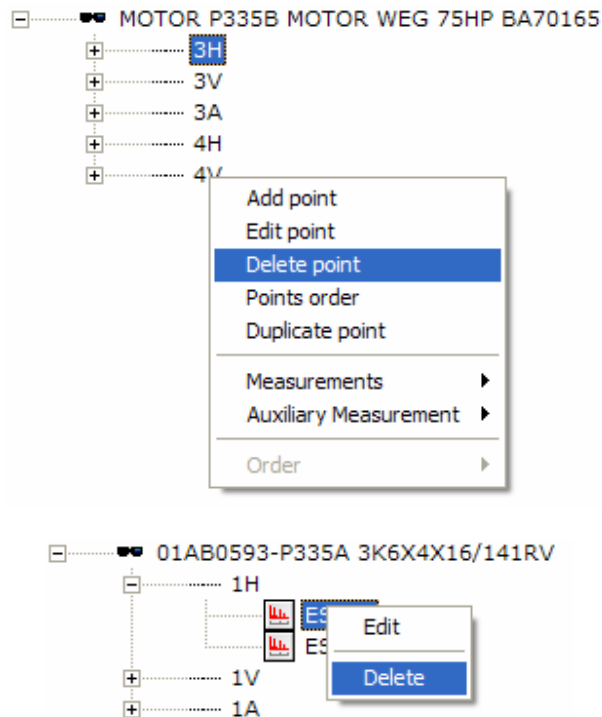
Deleting Equipment and Measurement Records:

There are two ways to delete configured entries.

These entries, once deleted, will affect the associated records, as they will not allow a new lookup.

The way to delete a single machine or a measurement point is via the right-hand mouse button, and the entries will be deleted according to the selection that is made.



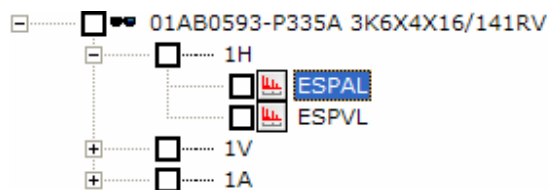


To delete a selection of equipment, points, and measurements, the user activates the menu ICON from the main configuration window:



Activating the delete function, the data tree will add a selection box to choose the equipment, points, and measurements to delete.

After the selection has been deleted, the user must again bring up the delete ICON to finish the process.



Enabling or Disabling Measurements:

The function for enabling and disabling measurements was created to select which measurement contained in a point will be transferred to the collector for the route. Replacing a measurement record with a new one can disable the transfer to the collector of the replaced record.

The disabled measurement will remain outside the route, and thus will not be transferred to the collector.

To disable a measurement use this ICON:



To enable a measurement use this ICON:

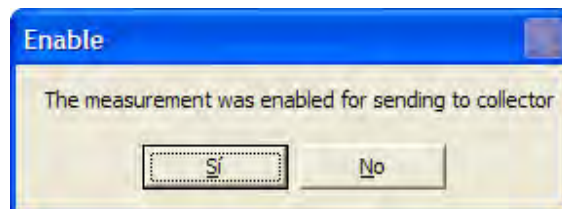


The user must take into account that each newly created measurement will be automatically enabled.

To know which measurements are enabled or disabled, the ICONS will change color according to their status.

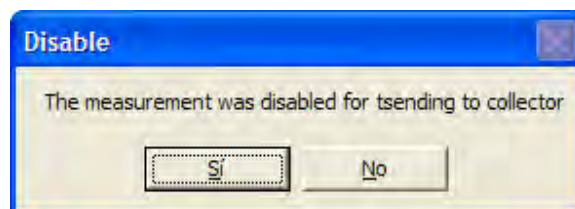
Whenever a measurement is disabled, the enable ICON will be activated and the disable ICON will be deactivated.

The software will ask to confirm any changes:



Whenever a measurement is enabled, the disable ICON will be activated and the enable ICON will be deactivated.

The software will ask to confirm any changes:



Function to Automatically Configure Spectral Envelopes:

The software contains automatic configurations spectral envelopes for the chosen number of lines.

The data required for this automatic configuration are the RPM of the machine and the bearing details for the point.

This will configure the maximum frequency of the spectrum and the filters, optimizing the measurement and providing the best definition to capture the bearing fault frequencies that are being analyzed.

The criteria for automatic configuring of measurements are related to the envelope spectra, where generally one must take into account an appropriate filter and a well-chosen background scale to best evaluate the bearing fault.

This will optimize the measurements and will avoid re-configuration of the points of the machine.

Nonetheless, the possibility for configuration according to the criteria of the analyst or system administrator remains available before the measurement is accepted.

Configuration Reports:

The configuration application contains different report options that are selected on activating the printing function:

The printing options vary according to the choice of equipment, and printing can be done for one machine to another, according to alphabetical order.


The screenshot shows a window titled "DSP Data Management". It contains a "Print" icon and a "Report" icon. Below these, there are two sections. The first section is labeled "Equipment" and contains two input fields: "From equipment:" and "To equipment:". The second section is labeled "Include in report" and contains three radio button options: "Points", "Measurements", and "Auxiliary Measurement".

Any choice can be included in the report:
 The points, the measurements, or the auxiliary measurements.
 All the reports offer a print preview window, so they can be seen prior to printout.
 This preview will help familiarize the user with the information before printing it.

The screenshot shows a "Configuration" report preview window. It has a title bar "Configuration" and a "Printing Date: 01/08/2006" label. Below the title bar, there is a box labeled "Plant" with the value "VINT. BV BOO". Below this box, there is a table with two columns: "Equipment Code" and "Description".

| Equipment Code | Description |
|----------------|------------------------|
| 01AB0593-P335A | 3K6X4X16/141RV |
| 01AB0594-P335B | 3K6X4X16/141RV |
| MOTOR P335A | MOTOR WEG 75HP BA70164 |
| MOTOR P335B | MOTOR WEG 75HP BA70165 |

Exporting Reports:

 Using this command, all of the reports generated with the DSP Data Management software can be exported to other formats prior to print-out. This utility permits generating files in the correct format to make reports, to save information, or simply to e-mail the data onwards.

Exporting can be done without printing the report.

After clicking on the export command, a window will open to allow the user to choose the format of the file and the destination.

Installation on a Server:

For those cases in which measurement information and monitoring activities are shared among various locations, it is a good idea to install the software on a company server that allows sharing and using the program software via terminals connected to the system.

The software will permit access to the database and running the program installed on the server.

The folder that is created on the server after installation should allow complete access.

To run the system from the terminals, each terminal should have Windows installed and the DSP DM software program should be installed as well.

Once installed, it can be deleted from the local disk and started from the network creating a disk unit accessible from each terminal.

To achieve it, the file DSPDM.INI that is found in Windows must be modified and connected to the network server disk, on each terminal.

Connection and modification of the *DSPDM.INI* file:

```
[Options]
SystemDB=E:\DSPDM\DSPDM.MDW
AllowCustomControls=1
AllowOLELinkFormat=0
[DSPDM]
DirInstall=E:\DSPDM
FileTrACollector=SND.TRF
FileTrDCollector=RCV.TRF
DirFueraRuta=OUTRUTA
Idioma=Esp
Reportes=E:\dspdm
DirTranfe=E:\DSPDM\TRANFE.EXE
GuardaTransferencia=0
DirWeb="C:\ARCHIVOS DE PROGRAMA\MICROSOFT
INTERNET\IEXPLORE.EXE HTTP://WWW.SEMAPI.COM.AR"
rem InterfaseMPX="C:\dspdm\DSPDM32_MPX.MDB"
Unidad1=mm
```

For installation on a non-server network, it will be necessary to select one PC as the master and on it create a virtual disk, which will be queried by the terminals using the program and also by the master PC.

The steps to do so are the following:

On the master PC master, where the data and measurements will be saved:

Create a directory or folder with the name **DSP**.

Write into the file *AUTOEXEC.BAT*, the following line:

subst E: C:\dsp and re-start the PC.

Install the DSP-DM software on the disk named DSP

Verify that the file *DSPDM.INI* is completely aimed on the unit E

Example:

```
[Options]
SystemDB=E:\DSP\DSPDM\DSPDM.MDW
AllowCustomControls=1
AllowOLE1LinkFormat=0
[DSPDM]
DirInstall= E:\DSP\DSPDM
FileTrAColector=SND.TRF
FileTrDColector=RCV.TRF
DirFueraRuta=OUTRUTA
Idioma=Esp
Reportes= E:\DSP\DSPDM
DirTranfe= E:\DSP\DSPDM\TRANFE.EXE
GuardaTransferencia=0
DirWeb="C:\ARCHIVOS DE PROGRAMA\MICROSOFT
INTERNET\IEXPLORE.EXE HTTP://WWW.SEMAPI.COM.AR "
rem InterfaseMPX="C:\dspdm\DSPDM32_MPX.MDB "
Unidad1=mm
```

On PC's that are used for look up or for inspectors:

Connect as a network drive E: the disk with the name **DSP** from the master PC.

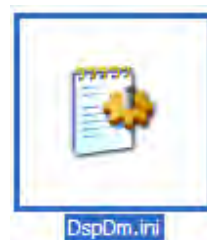
Install the DSP-DM software on the on the C drive of the machine.

After the program is installed it can be deleted, as the PC will operate with the program on the master PC.

Modify the DSPDM.INI file, aiming it at the E drive.

Functions from the DSPDM.INI File

```
[Options]
SystemDB=E:\DSP\DSPDM\DSPDM.MDW
AllowCustomControls=1
AllowOLE1LinkFormat=0
[DSPDM]
DirInstall= E:\DSP\DSPDM
FileTrAColector=SND.TRF
FileTrDColector=RCV.TRF
DirFueraRuta=OUTRUTA
```



```
Idioma=Esp
Reportes= E:\DSP\DSPDM
DirTranfe= E:\DSP\DSPDM\TRANFE.EXE
GuardaTransferencia=0
DirWeb="C:\ARCHIVOS DE PROGRAMA\MICROSOFT
INTERNET\IEXPLORE.EXE HTTP://WWW.SEMAPI.COM.AR"
rem InterfaseMPX="C:\dspdm\DSPDM32_MPX.MDB"
Unidad1=mm
```

Certain functions from the DSP Data Management files can only be configured from the **dspdm.ini** file, given that functions related to it have options that are only defined in installations with particular conditions.

Various units of collectors in a network installation:

The case can exist whereby various terminals operate on a server, with one DSP-DM program running.

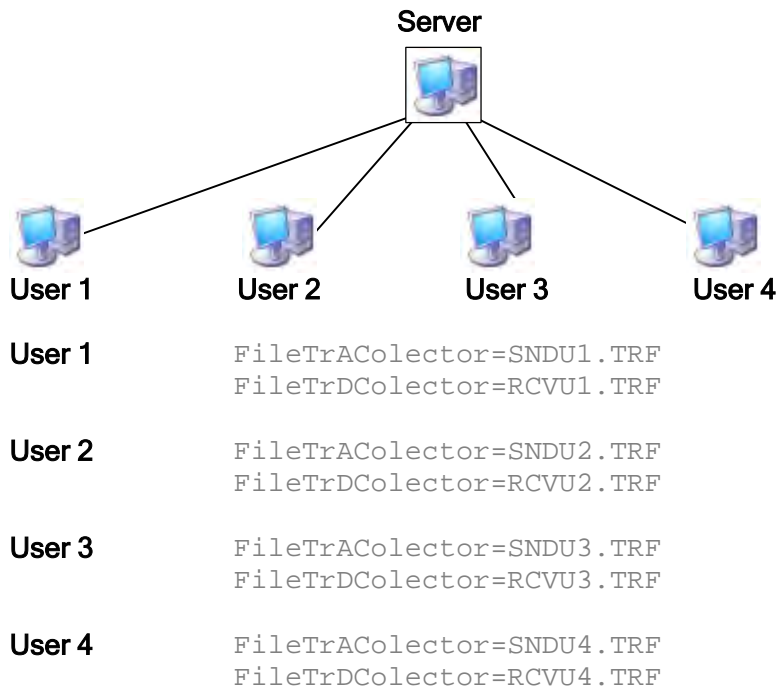
In this case, so each terminal can realize transfers to the data collector, or from the data collector to the terminal, each transfer file must contain a username and something that identifies it as unique.

This filename can be defined uniquely from the dspdm.ini file for each online terminal:

```
FileTrACollector=SND.TRF
FileTrDCollector=RCV.TRF
```

Example:

System installed on a server with databases on the server and 4 terminals, each operating with 1 data collector:



VERY IMPORTANT

The user must take into account that the names assigned to the files must be followed in the configuration of the transfer program in each terminal.
(see Chapter on Routes and Transfers)

Access Route and Placement of the Transfer Program:

To be able to realize transfers from each terminal, after configuring the names of the files to transfer, the user must take into account that each terminal must have the file TRANFE.EXE on its hard drive.



This executable file contains the program which allows communication between the PCB and the DSP Logger MX300.

The placement of the file on each terminal should be described on the line: `DirTranfe=`

It is important that each terminal in operation with the server installation contains a file of this program and that it is executed.

Change in Units for Velocity Measurements:

It is common in some countries to use the velocity measurement units of inch/second (in/s) and not millimeters/second (mm/s). To change to in/s the `dspdm.ini` file permits selection of the default units for these measurements.

This change can be made in the line: `Unidad1=`