

VIBER X2 Pro™

An instrument for analysing and trending



Manual Ver. 1.0

English



VMI:s handheld vibration instruments





Index

1.0 Important information	4
2.0 Introduction	4
2.1 Scope of supply	5
2.2 Menu and functions	6
2.3 Menu for vibration	7
3.0 Warning messages	9
4.0 Battery status bar	10
4.1 Changing Battery	10
5.0 How to interpret vibration levels	10
6.0 ISO standard 10816-312	11
7.0 Vibration analysis	12
8.0 Recommended bearing condition levels	13
9.0 Trend View	14
9.1 Create a measurement project	15
9.2 Create a “Route Plan” and edit a project	38
9.3 Trend measurements	40
9.4 Transfer of data to Trend View	42
9.5 General description and viewing trends	51
10.0 Technical data	52



1 Important information

Safety precautions

Vibration measurement involves measurement on rotating machines. Keep a safe distance to rotating parts and secure transducers and transducer cables from rotating parts. Always follow internal, local and national security regulations! When working with weights on the rotor always secure the start switch with a locker and also use the emergency switch for double safety. This is especially important when the machine is remote controlled.

VMI takes no responsibility for any accidents on people and machines.

VMI and our authorized dealers will take no responsibility for damages on machines and plants as the result of the use of **VIBER X2 Pro™** measurements.

VMI has the aim to improve and develop our work, why surely an upgraded version of this manual will be distributed in the future. As a result of this, we might change and correct these items in later issues without further notice. Also changes in the **VIBER X2 Pro™** equipment may take place that affects this information.

2 Introduction

VIBER X2 Pro™ is designed for maintenance/repairer personnel. It is an excellent tool, for basic condition monitoring checks, easy to use and reliable for status analyse. The **VIBER X2 Pro™** instrument has the following features:

- Accurate measurements for 4 selectable frequency ranges. Gives high reliability.
- Real-time measurement of the total vibration level and the Bearing Condition (BC) measures and displayed simultaneously, facilitates analysis of bearing faults.
- Fast and easy fault analysis screen displaying the five highest peaks with amplitude and frequency one by one.
- Measurement quantities and their units and presentation can be selected by the user from the following list:
 - g-value = Acceleration (RMS, Peak or Peak-Peak)
 - a = Acceleration (m/s^2) (RMS, Peak or Peak-Peak)
 - V = Velocity (mm/sec) (RMS, Peak or Peak-Peak)
 - V = Velocity (inch/sec) (RMS, Peak or Peak-Peak)
 - D = Displacement (mils) (RMS, Peak or Peak-Peak)
 - D = Displacement (μm) (RMS, Peak or Peak-Peak)
- Bar indicator shows measurement stability.
- Bearing Condition measurements in the frequency range (0,5 – 16 kHz).
- Fast and easy fault analysis displaying the five highest peaks frequency in Hz or RPM in main screen display.
- Large dynamic range of the vibration signal (up to 50g).
- Low power consumption.
- High performance accelerometer.
- Vibration, danger alarms by red and yellow colour LED's.
- Fast battery charging capacity using an external charger, provided in the delivery.
- Display with backlight.

2.1 Scope of supply

A complete delivery is:

- **VIBER X2 Pro™**, machine condition analyzer
- Accelerometer, magnet included
- 1 m transducer cable
- Cable for transfer between “VIBER X2 Pro” and computer
- Battery charger
- VMI “Trend View” software
- Manual for instrument and software
- Shoulder bag
- Calibration certificate



The **VIBER X2 PRO™** keypad

* ON/OFF Orange key *MENU and ACCEPT Green key *SAVE key for Route measurement

*Arrow white keys *LED:s

Green LED lights, when any key is pressed.

Yellow LED lights, when the measurement is above the warning set level.

Red LED lights when the measurement is above the danger set level.



2.2 Menu and functions

To activate menus, press the green key. Navigate using the arrow keys.

Functions
Vibration
Settings
Upload
Delete

fig 1.

Settings
Instrument
Transducer
Vibration
Display
BACK

fig 2.

The first menu you get is "Functions". Here you can choose from 4 different functions, see fig1. When selecting "Settings" you get 4 new options, etc. See fig2. Scroll with the arrow keys up or down to make a selection, confirm by pressing the green key. To return to the function menu, select "BACK" and confirm with the green key.

Functions
Vibration
Settings
Upload
Delete

fig 3.

To delete a measurement from the **VIBER X2 Pro™** memory table, select "Delete" from the function menu, see fig3 and confirm with the green key. A new menu appears, see Fig 4.

Delete
Clear mem.
ALL vib.
Vibration
BACK

fig 4.

Choose what you want to delete, for example, a vibration measurement, scroll with the arrow keys to "Vibration" confirm with the green key and the following menu appears, see fig5.

Vibration	
1	15,71 0,12
2	17,19 0,10
3	2,09 0,08
4	
5	

fig 5.

Select the memory cell that you want to delete, for example memory cell 3, confirm with the green key. The "Delete" function can also be used to see which data is stored. To exit this type of menu, press the "save key".





The frequency appears as follows:

The Frequency range of the highest peak in relation to the frequency range setting is described in the below table, the limit of the maximum frequency* of the peak is 1000 Hz.

Frequency range	Frequency of the highest peak
2-400 Hz	2 - 400 Hz
6 – 1600	6 – 1600* Hz
11-3200 Hz	11 to 2000* Hz
10-1000 Hz	10 to 1000 Hz

Reliability is reduced when measuring Displacement with accelerometer and double integration.

Frequency	Vibration	Theoretically	Measured	Deviation
Hz	Velocity mm/s (RMS)	Displacement µm (RMS)	Displacement µm (RMS)	%
2	10	795,8	203	-74,5
2,5	10	636,6	540	-15,2
3	10	530,5	549	3,5
5	10	318,3	321	0,85
10	10	159,16	160	0,53
80	10	19,89	20	0,55



3 Warning messages

The following message may appear in normal operation:

Calibration lost!

This message may appear if the calibration data is lost from the permanent FRAM memory or if the calibration data are corrupted. In such cases, the instrument must be re-calibrated; otherwise it will measure incorrectly. The message appears only once, and then default calibration data is used.

Battery too low

When this message appears, the battery voltage is too low to ensure a correct running condition. The measurements may be invalid! The instrument battery pack must be charged immediately, using the external charger. In order to temporarily decrease the power consumption, the backlight will be switched **OFF**. The instrument can still work, but only for a short while. If even in this condition the voltage remains low, the instrument will shut off in 20 sec.

Shut-off in 5 sec

This message appears only if the *Auto-shut off* setting is enabled. The user may cancel the shut-off condition, pressing any key **except ON/OFF**. If no key is pressed the instrument will shut off in 5 seconds.

Missing transducer

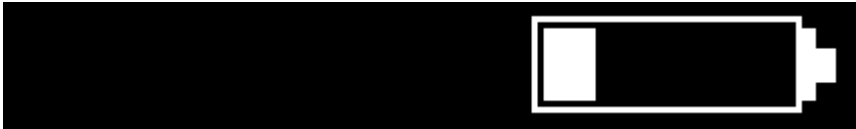
This message appears only if the *Transducer power setting* is enabled and indicates that the transducer is missing or is out of order.

When the *Transducer power* setting is disabled, the user has the possibility to use another external source for the vibration input (a signal generator or a buffered output from another device).

When the instrument starts, the *Transducer power* is always **ENABLED**. When this message appears, it will remain on the screen, even if the transducer is plugged-in. To continue the normal running mode in such a condition, switch the screen temporarily to another menu. When you come back, the message disappears.



4 Battery status bar



When the measurement window is activated, a battery symbol appears on the top of the screen (see page 7) which shows approximately how much battery capacity is left. If the battery voltage drops below approximately: 3.3 V then the instrument turns off. When the battery charger is connected, a moving staple moves back and forth, and a green LED lights up until the battery is fully charged.

4.1 Changing Battery

The unit has an embedded Lithium battery and after a number of years when the battery is exhausted we recommend that a VMI reseller or service centre makes the replacement.

5 How to interpret vibration levels

User with no previous experience, we recommend to use the ISO 10816-3 standard. The standard normally calls for a measure in velocity based on mm/s RMS. To better understand what this measure means, consider the reading as a mean or average value of the back and forward motion of the machine. This measure gives a good understanding of the amount of "break down energy", causing mainly wear and fatigue in the machine, or the structure.

The instrument measuring the total RMS-value of the vibration in the frequency range. This RMS value is the square average sum of all the measured vibrations, in the actual frequency range.

CALCULATION:

If the simultaneous vibration caused by unbalance is (4mm/s), by misalignment (2 mm/s) and by the gear mesh (5 mm/s), then the total vibration measured on the **VIBER X2 Pro** is 6.7 mm/s.

$$\text{Total vibration (RMS)} = \sqrt{4 * 4 + 2 * 2 + 5 * 5} = 6,7 \text{ mm/s}$$



6.0 Excerpt from ISO standard

ISO Standard 10816-3 classifies machines differently depending on whether they are flexible or rigid (fixed) mounted. This reflects the location of the machine's "rigid resonances" related to the machine's operating speed.

Examples of vibration levels ISO standards

Vibration mm/s	Class 1	Class 2	Class 3	Class 4
0.28	A	A	A	A
0.45				
0.71				
1.12	B	B	B	A
1.8				
2.8	C	C	B	B
4.5				
7.1	D	D	C	B
11.2				
18		D	D	D
28				
45				

Class 1: Small machines, Electric motors below 15 kW

Class 2: Medium-sized machines, Electric motors 15 - 75 kW

Class 3: Large machines, rigid foundation

Class 4: Large machines, weak foundations

A = Good

B = Satisfactory

C = Unsatisfactory

D = Unacceptable



7 Vibration analysis

7.1 Recommended vibration levels

The following is an extraction of part of the old standard ISO 2372 class 4, large machines on flexible foundations, with some common findings added. Use this simplified list as a first indication, when approaching a newly commissioned machine or after some time in operation. Investigate the reason for any machine that vibrates above 3 mm/s RMS.

- **0 – 3 mm/s** **0 – 0,12 in/s**
Small vibrations – None or very small bearing wear. Rather low noise level.
- **3 – 7 mm/s** **0,12 – 0,28 in/s**
Noticeable vibration levels are often concentrated to some specific part as well as direction of the machine. Noticeable bearing wear. Seal problems occur in pumps etc. Increased noise level; try to investigate the reason. Plan an action during next regular stop. Keep the machine under observation and measure at shorter time intervals than before to detect a deterioration trend if any. Compare vibrations to other operating variables.
- **7 – 11 mm/s** **0,28 – 0,43 in/s**
Large vibrations and high noise levels. This is detrimental to the safe operation of the machine. Stop operation if technically or economically possible. Few machines can withstand this levels without internal or external damage. Reduce any further running time to an absolute minimum.
- **≥ 11 mm/s -** **≥ 0,43 in/s -**
Very large vibrations and high noise levels. This is detrimental to the safe operation of the machine. Stop operation if technically or economically possible. Few machines can withstand this level without internal or external damage. Reduce any further running time to an absolute minimum.

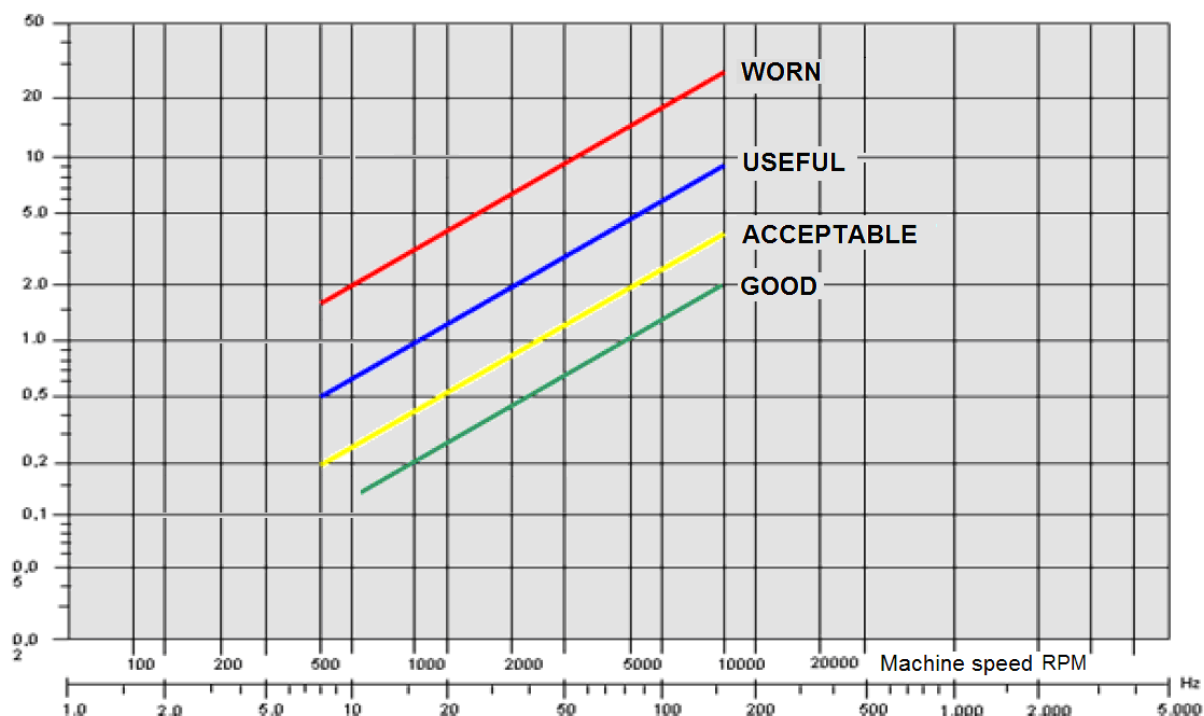


8.0 Recommended bearing condition levels

The bearing condition value is the total RMS value of the acceleration of all high frequency vibrations within the range from 500 Hz up to 16000 Hz, given as a "gBC- value".

Based on the machine's measured "gBC value". Follow the line corresponding to the measured "gBC value" on the left-hand axis, towards the line in the center of the chart that corresponds to the machine's speed. Depending on which of the four lines in the center of the chart, which corresponds to the other two values, (gBC and RPM), you can get the following information about the bearing: GOOD, ACCEPTABLE, USEFUL and WORN.

gBC-värde



The diagram above is a help to translate bearing condition values. About, for example, the measured gBC value is 2.0g. It shows that if a machine has a speed of approximately: 10000 RPM, the bearing may still be good while a machine with a speed of about 550 RPM with the same gBC value can be considered as consumed. If vibrations of other causes occur (eg flow, pressure shock, gears) and within the frequency range, it may also give high "gBC values" without damage to the bearings. A high "gBC value" can also be expected if the bearing is poorly lubricated or overloaded (eg in case of poor alignment or hard tension drive belt). Compare this value with the bearing temperature. If both the "gBC value" and the temperature are high or increase in a trend measurement, then there is probably a bearing problem.



9 Trend View software use for trends and route

This software is designed to trend measurement and this enables the users to monitor the condition in machines.

Trends are one method to perform condition monitoring (CM). **TREND VIEW™** is designed for use only with **VIBER X2 Pro™** and **VIBER X3™**.

For every plant or building, you can create a database and a route with up to 100 measurements. If there are need for several measurement points, you can create several projects with 100 new storage locations. Each measurement store vibration amplitude and bearing condition. This covers normally 5 – 20 machines / project, depending on how many directions are measured on every bearing* and the number of bearings. That amount is equivalent to number of measuring points in a route.

If only one direction is measured at each measuring point, choose the direction with the highest vibration. After the measurement, the data can be uploaded to the computer. In the computer you can store almost an unlimited number of machines. You can choose what unit you want to display in **TREND VIEW™**.

Analyzing this information, periodically, you can act proactively and avoid failures.

Regarding installation of the software, see the installation guide.

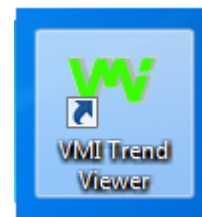
* Bearing condition is stored in horizontal direction on each bearing. If you not measures this direction you must choose one of the direction you measure. Change direction in properties.



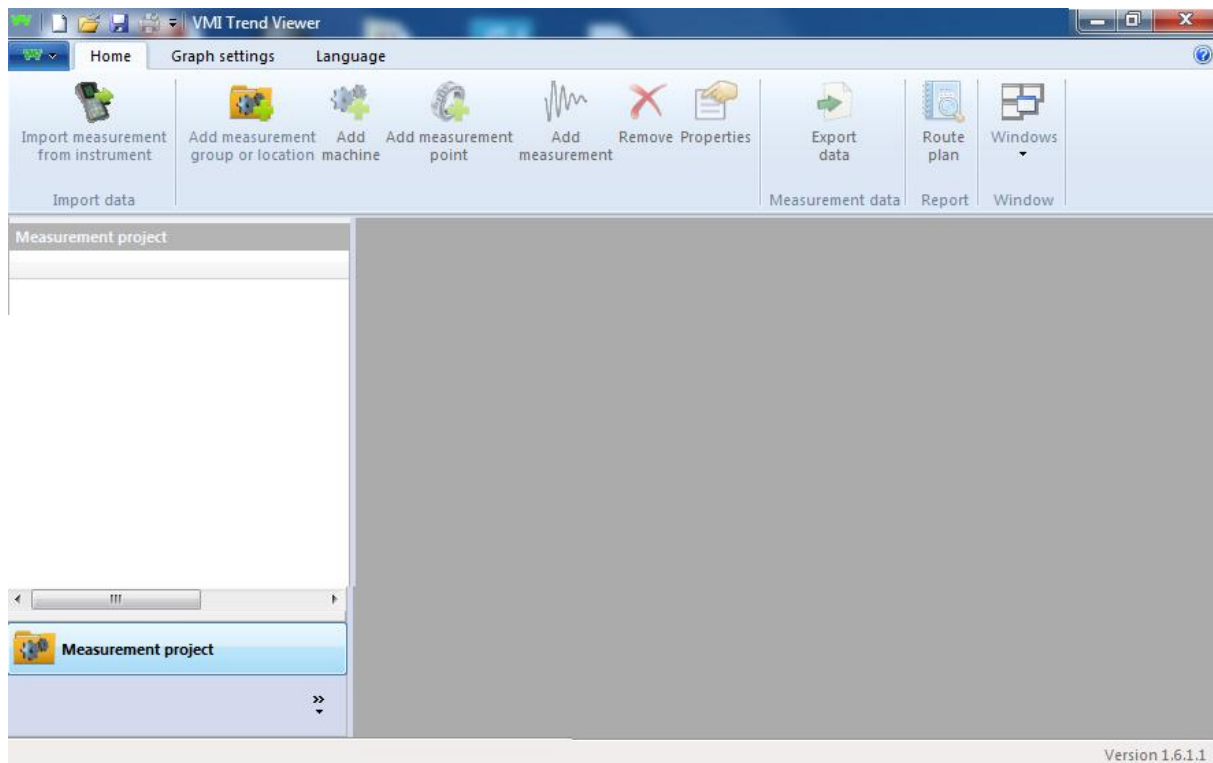
9.1 Create a measurement project

You start by creating a "measurement project" to store measurement values.

In this manual, we show an example of how to build a "measurement project" or "database" with two grinding machines. Grinding machine 1 and Grinding machine 2. For both machines we measure : Vibration, Bearing condition (BC) The machines belong to the "Grinding department".

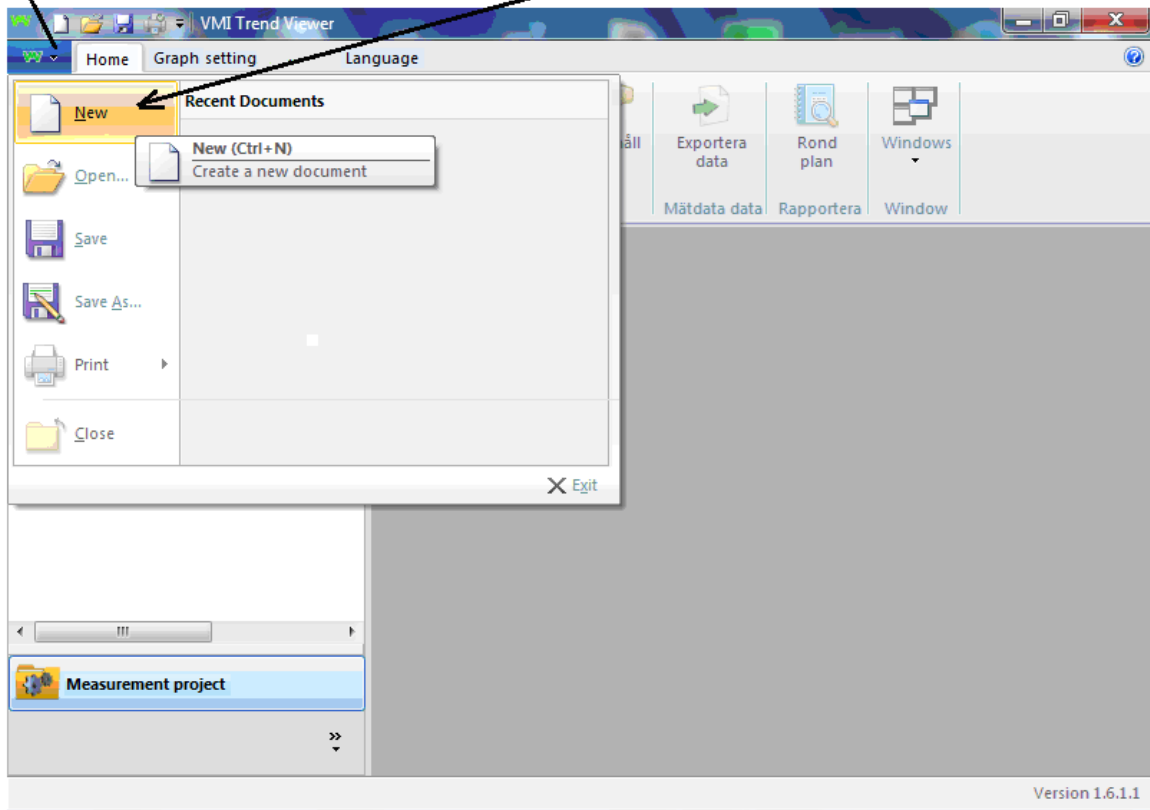


Start the "Trend View" program by clicking on the icon: on the desk.

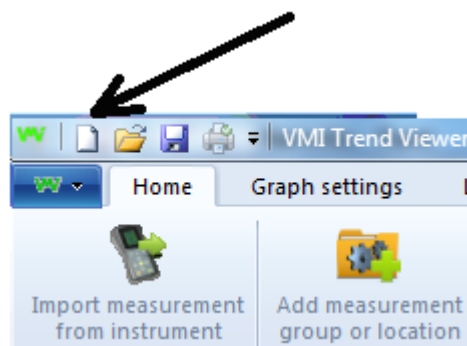




Click the green "W" and choose "New" from the dialogbox

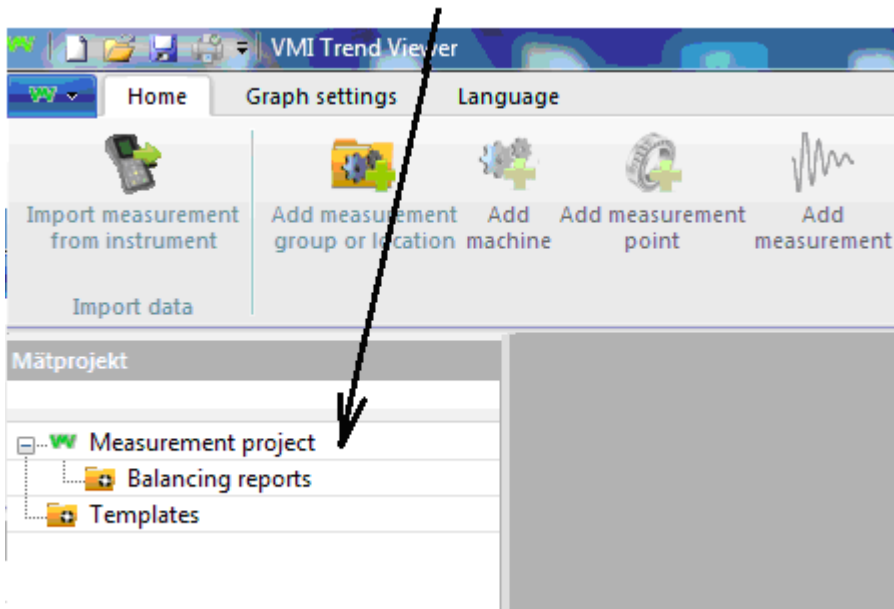


You can also click on the symbol that shows a "white sheet of paper" to create a new project.

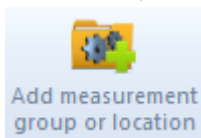




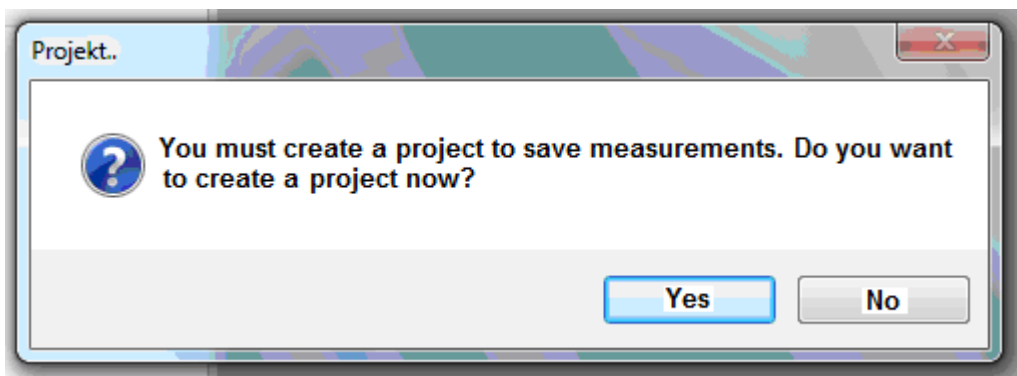
Here is the new project. You can not measure temperature or perform balancing with **VIBER X2 Pro**.



You can build a hierarchical tree, from a plant or department down to a single measuring point, or just set up a single machine. In this example, we select "Department" (Grinding Department). We also add two machines, (Grinding machine 1) and (Grinding machine 2). Next step is to click on the icon:

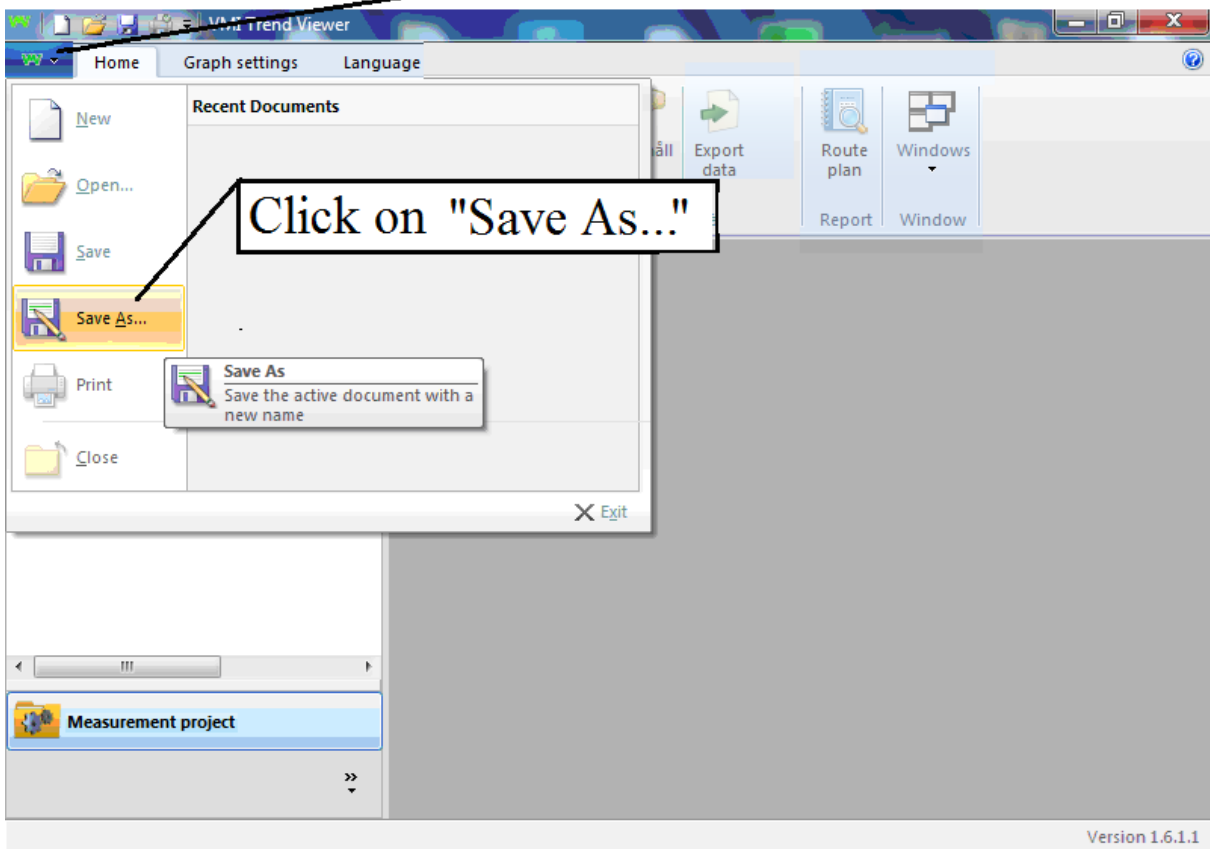


If you click on the icon "Add Group or Location" before you create a project, you will receive the following prompt:



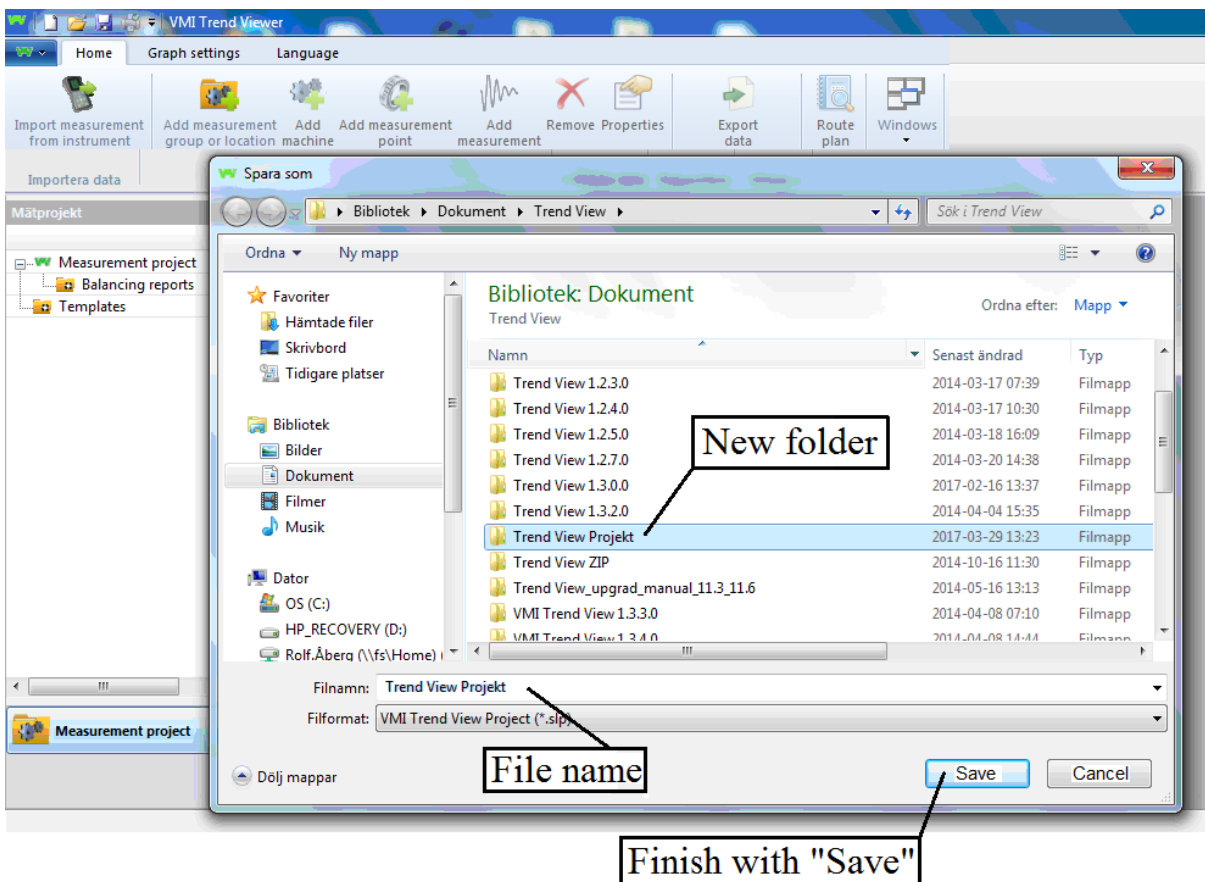


Assign the project a name by clicking on the green "W"



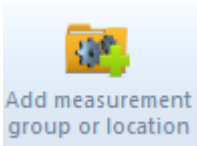


Assign a project name to the project and decide where you want to save your projects. Create a "Folder" and give it a name, for example: "Trend View Project".

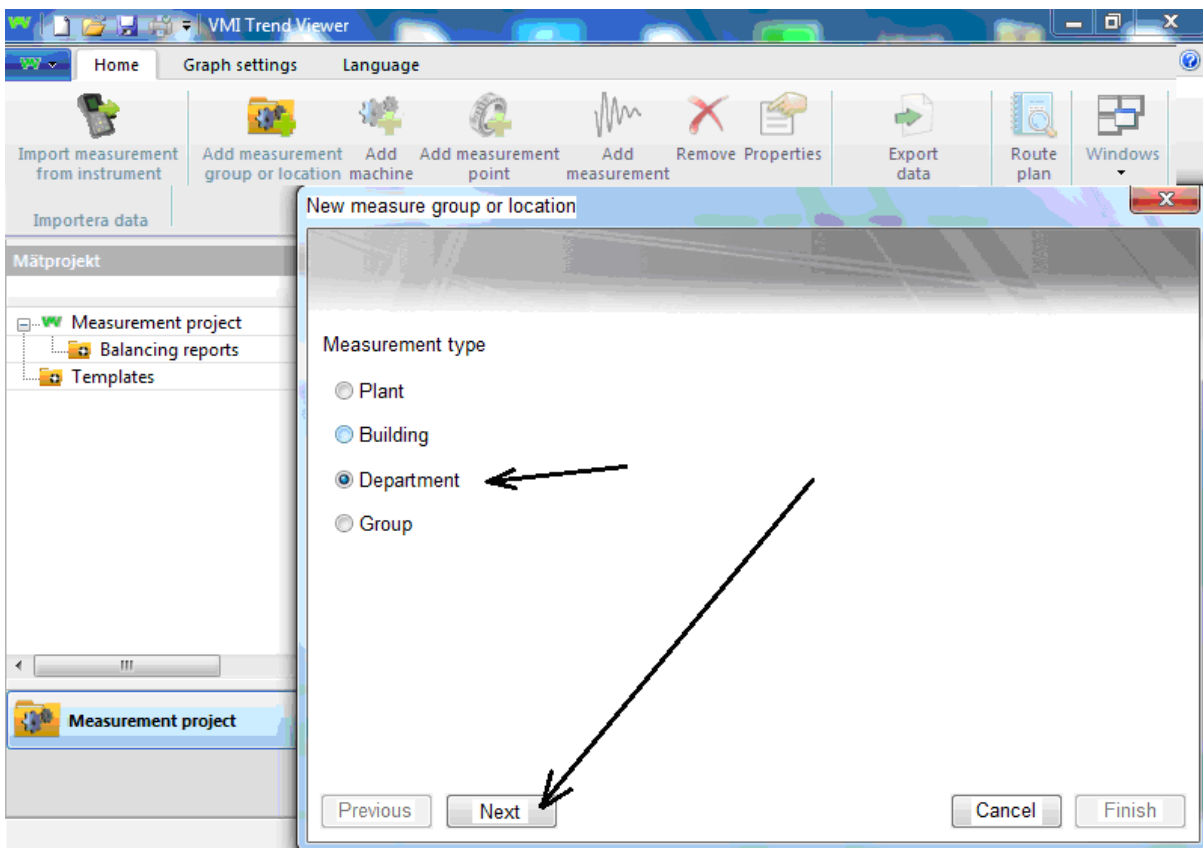




Continue by clicking on the "Add measurement group or location" icon.

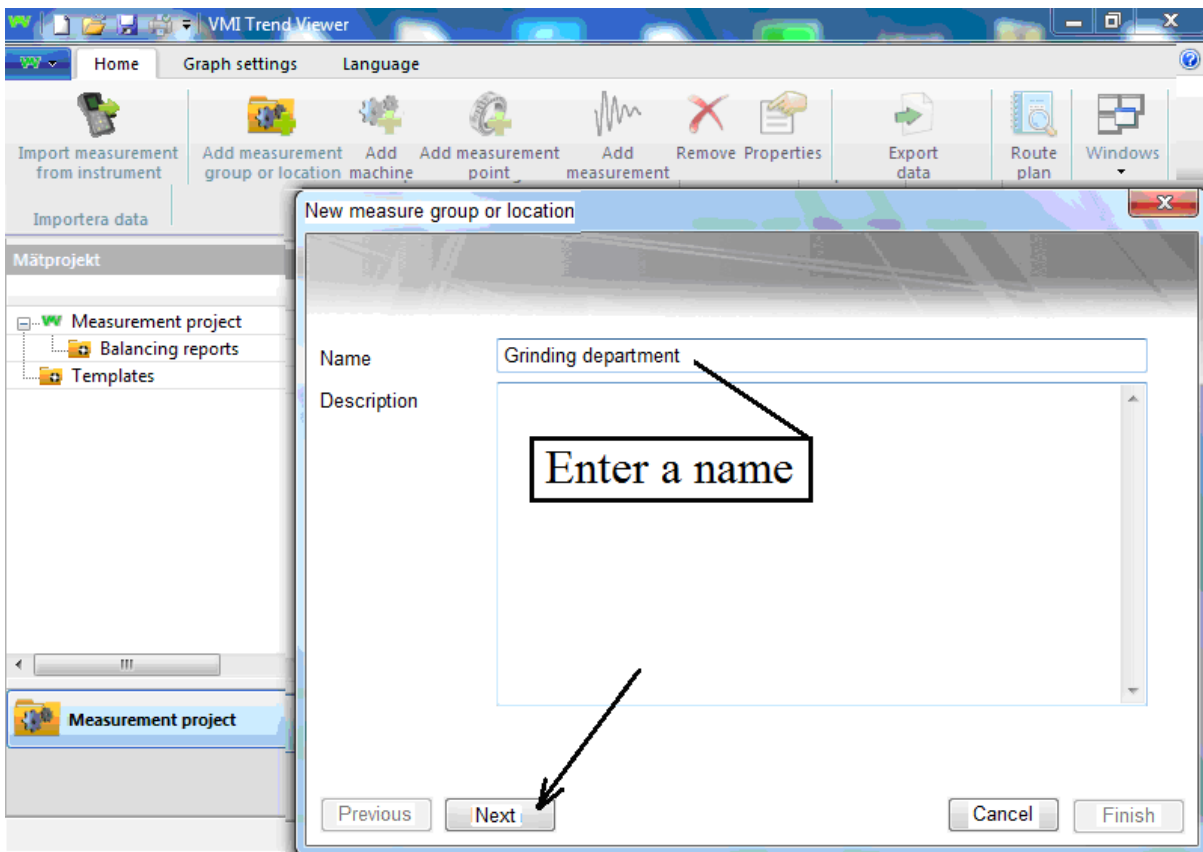


Select "Department" for our example. In other cases, choose the option that suits. The top level of the project (Database) is usually a building or department, which must be added to the project. Then click on the next.



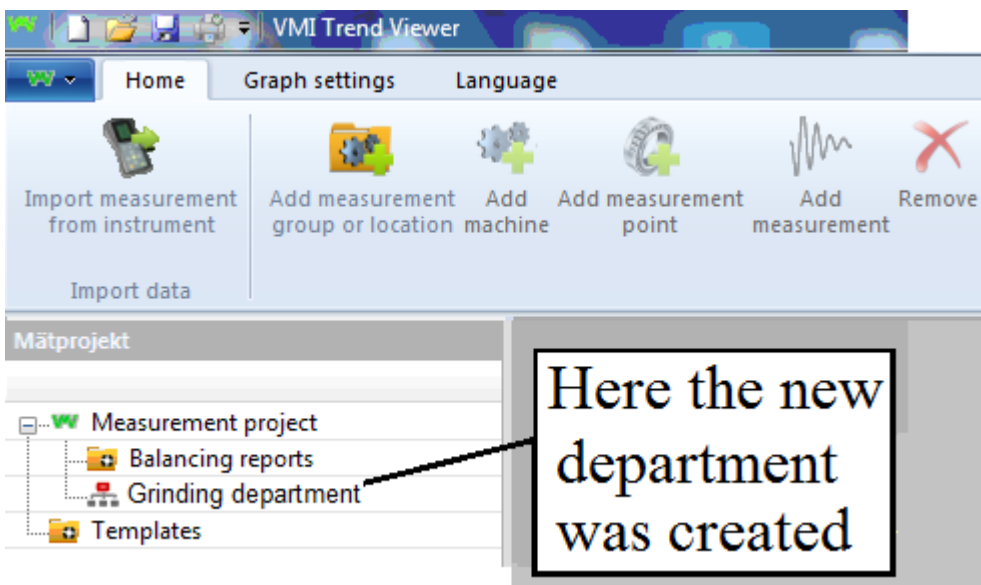
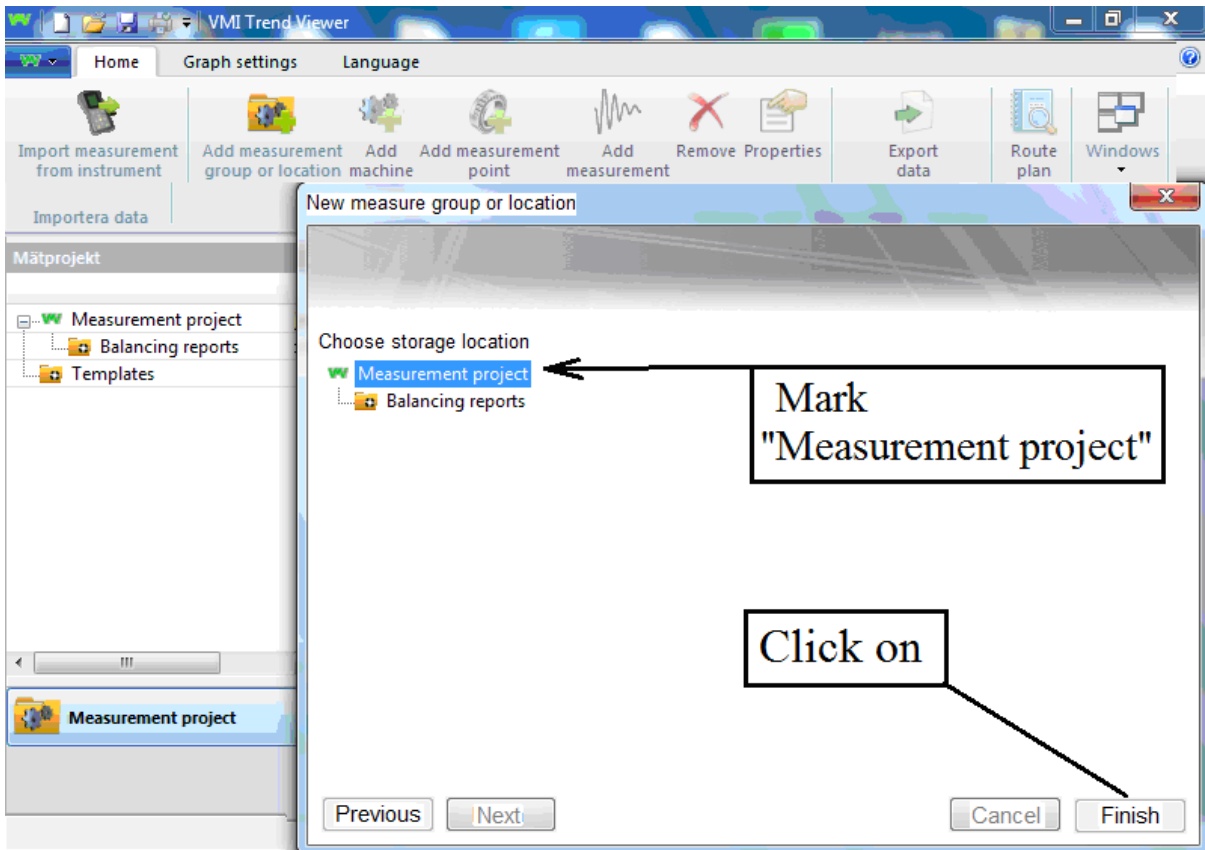


Enter a name for the department, proceed with a click on "Next".



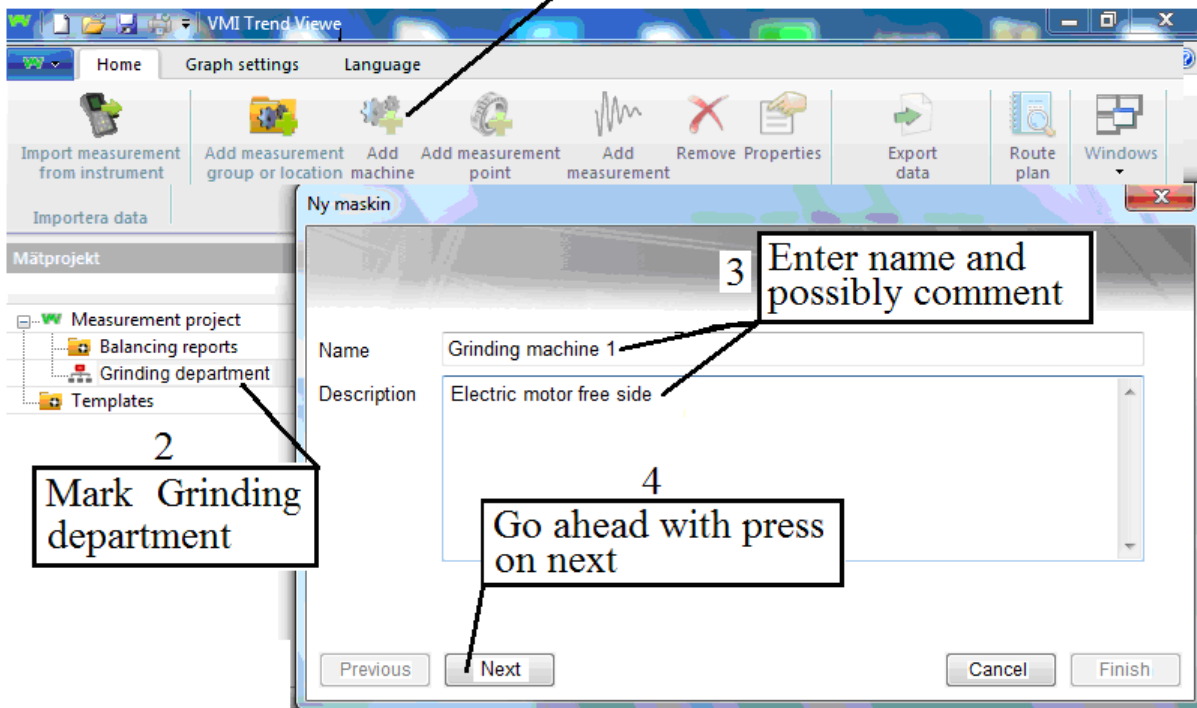


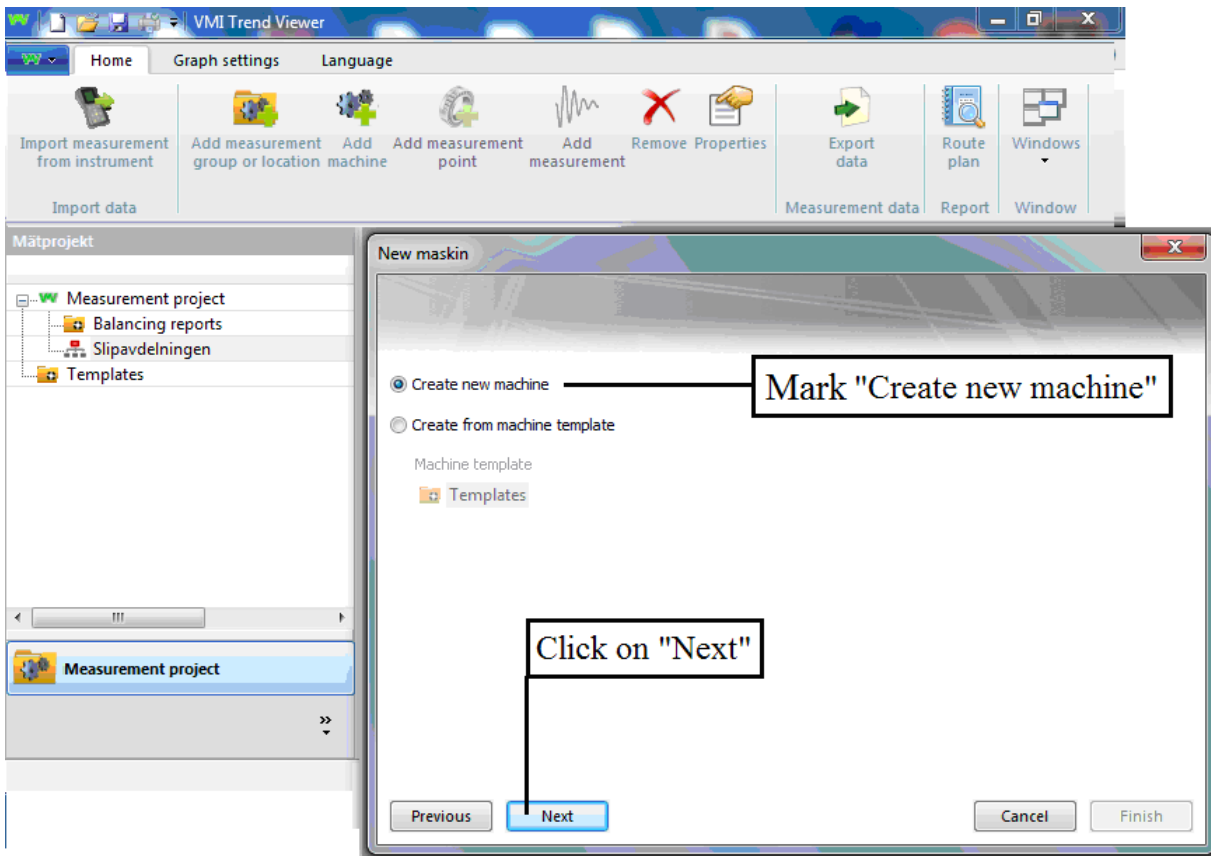
Select the type of measurement you want to do "Measuring Project" or "Balancing reports". In our ex. We choose "Measurement Projects" because we will perform trend measurements. You can not perform balancing with **VIBER X2 Pro**. Click "Finish".

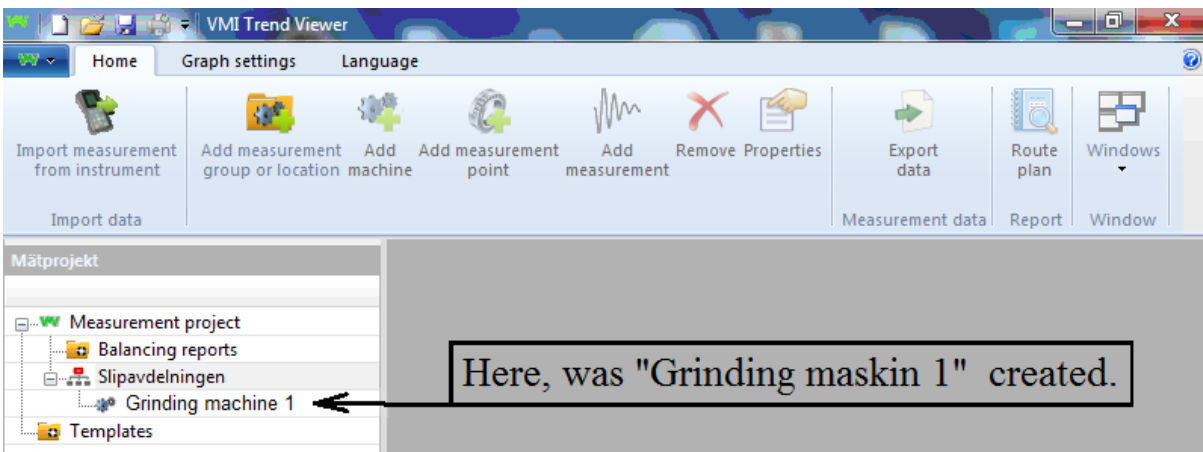
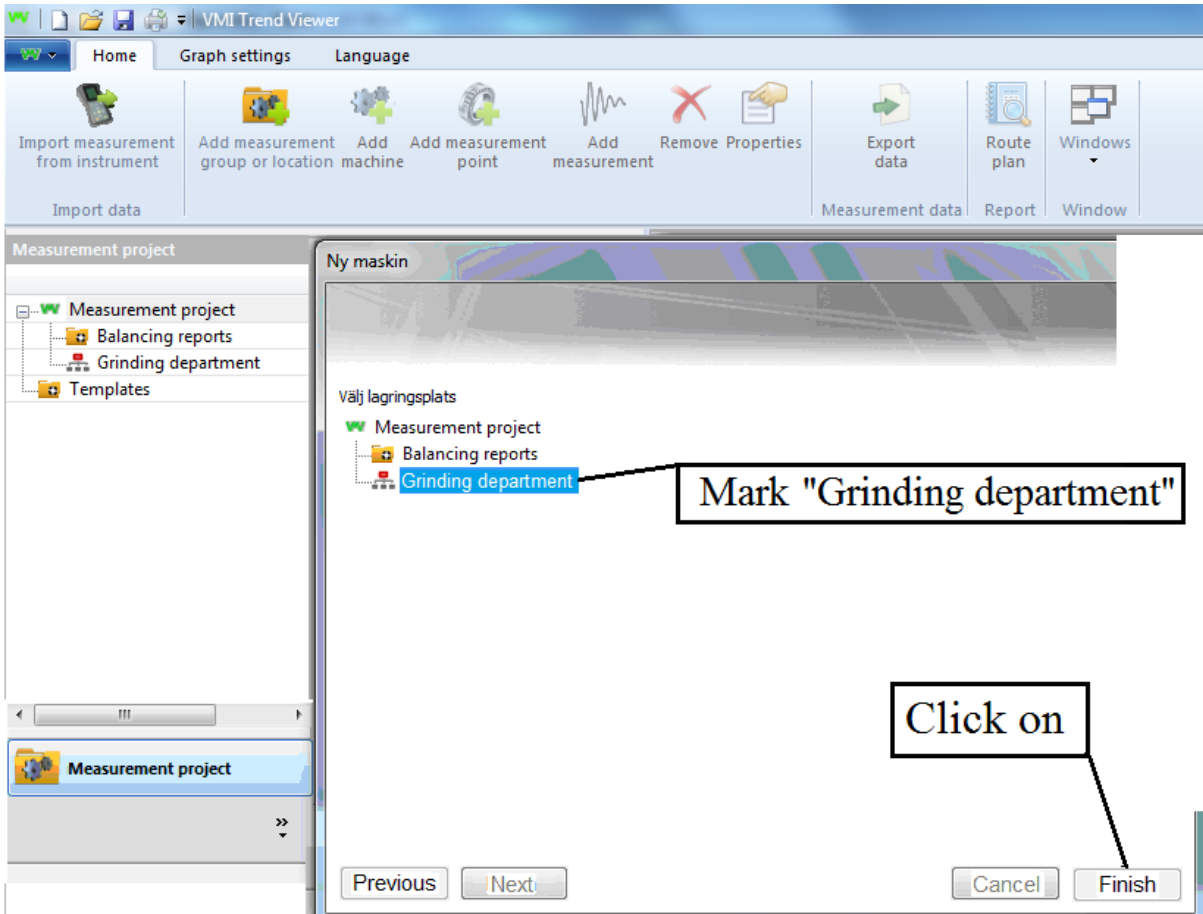


The next step is to add a machine

1 Click on "Add Machine"

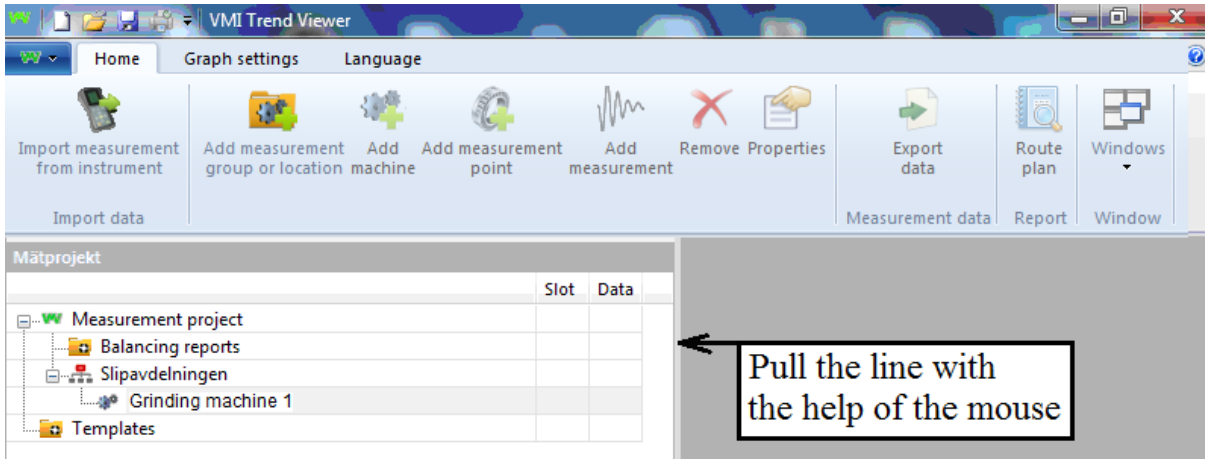




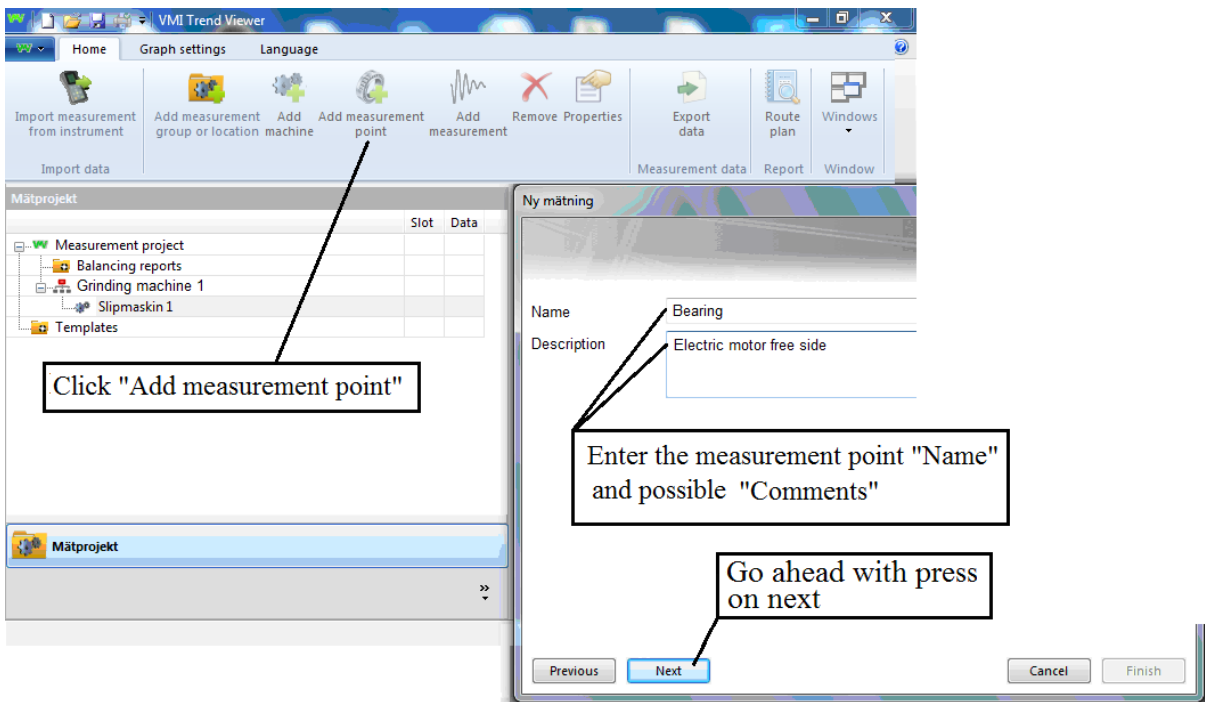


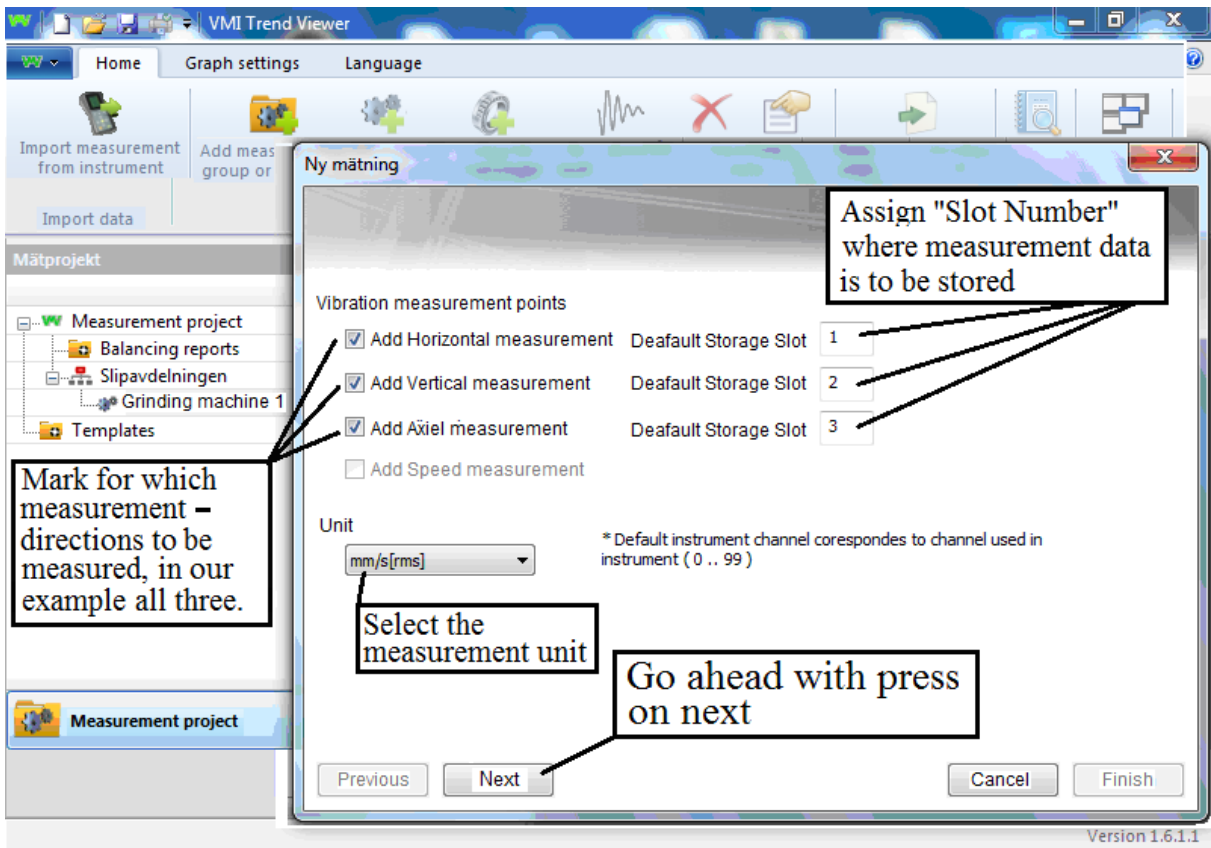


Mark "Grinding machine 1", drag the line to see "Slot" and "Data".



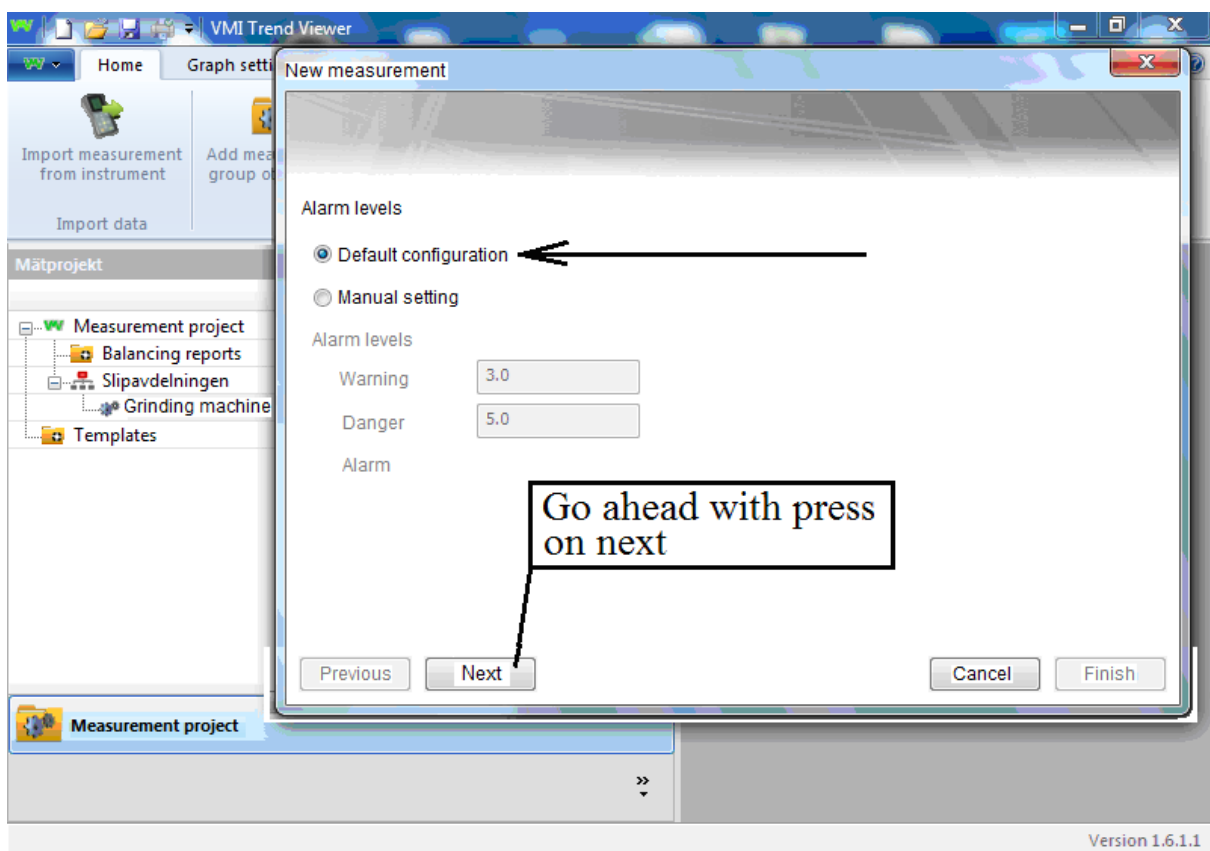
The next moment is to add a measurement point (usually a bearing). In this example we want to measure two bearings in three directions for each machine.





You can skip the allocation of "Slot number" and, at a later time, perform an automatic sorting of storage slots locations (Auto Assign), see pages 35 - 37.

The next dialog box allows you to select alarm levels, manually or from a standard table. In the example, we choose the default.





The screenshot shows the 'New measurement' dialog box in the VMI Trend Viewer software. The dialog is titled 'New measurement' and contains the following elements:

- Bearing condition:** A section for setting the bearing condition.
- Alarm levels:** A table with three rows:

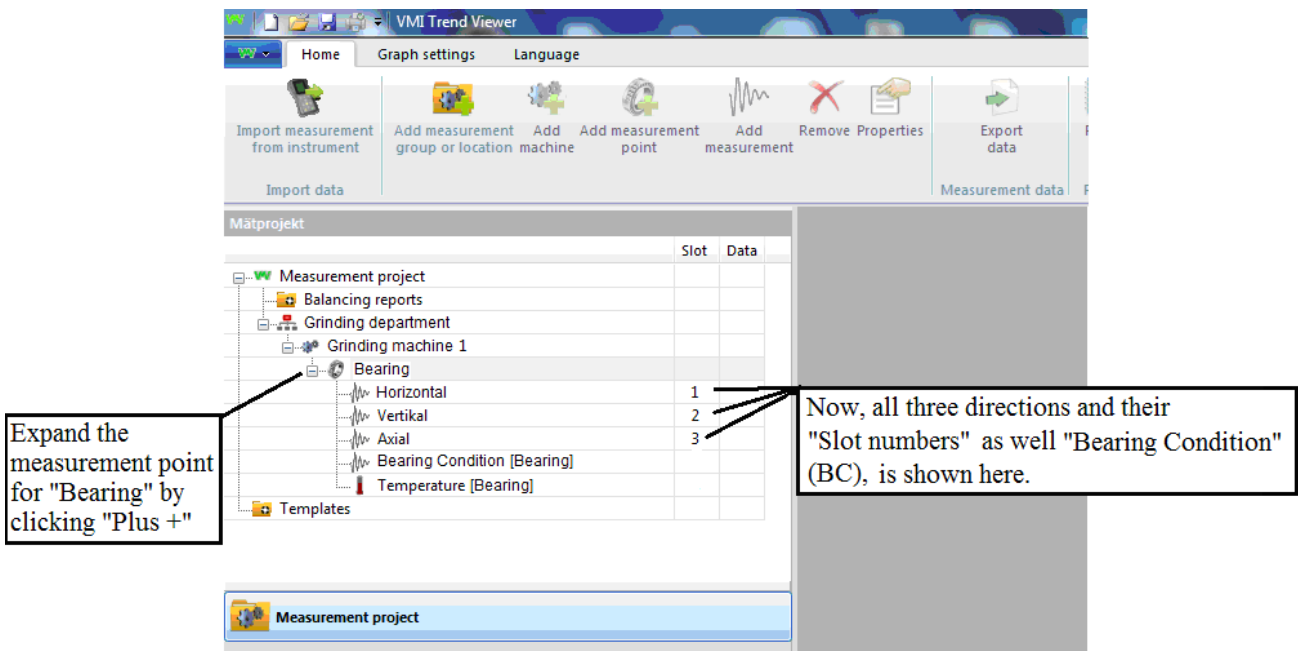
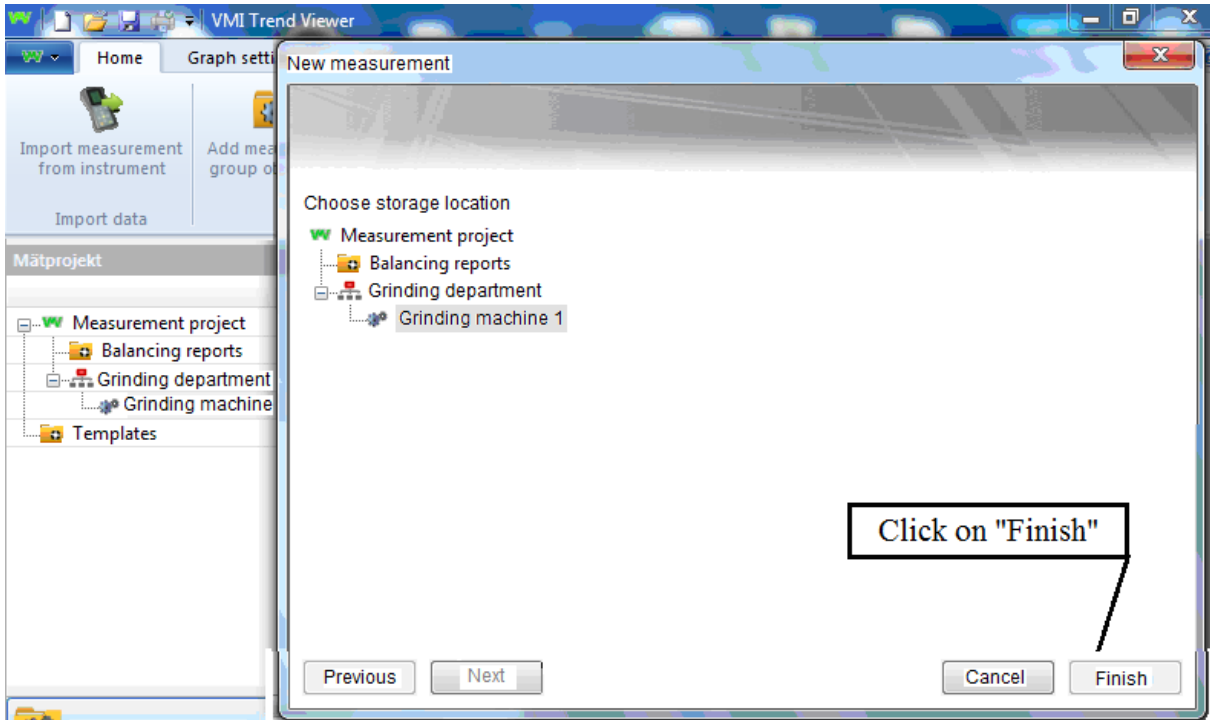
Warning	3.0	g(rms)
Danger	5.0	g(rms)
Alarm	7.0	g(rms)
- Graph:** A log-log plot showing bearing condition curves. The y-axis is labeled 'g(rms)' and ranges from 0.02 to 50. The x-axis is labeled 'Hz' and ranges from 1.0 to 500. The curves are labeled: GOOD (green), ACCEPTABLE (yellow), USED (blue), WORN (red), and CHANGE (black).
- Buttons:** 'Previous', 'Next', 'Cancel', and 'Finish' buttons are located at the bottom of the dialog.

Annotations in the image include:

- A box labeled 'Preset alarm levels' with arrows pointing to the 'Warning', 'Danger', and 'Alarm' input fields.
- A box labeled 'Go ahead with press on next' with an arrow pointing to the 'Next' button.

Version 1.6.1.1

Temperature is not measured with **VIBER X2 Pro™**.





Thus, "Grinding machine 1" is finished. To create "Grinding machine 2" you can now make a copy of grinding machine 1, and then edit it.

The screenshot shows the VMI Trend Viewer interface. The 'Mätprojekt' tree is expanded to show 'Grinding machine 1' selected. The tree structure is as follows:

- Measurement project
 - Balancing reports
 - Grinding department
 - Grinding machine 1 (Selected)
 - Bearing
 - Horizontal (Slot 1)
 - Vertikal (Slot 2)
 - Axial (Slot 3)
 - Bearing Condition [Bearing]
 - Temperature [Bearing]
 - Templates

Annotations:

- An arrow points to 'Grinding machine 1' with the text: **Mark Grinding mashine 1**
- A text box on the right says: **Press the "Ctrl" key, and simultanesly you holding down the left mouse button**

The screenshot shows the VMI Trend Viewer interface after a copy operation. The 'Grinding department' is now highlighted in blue. The tree structure is as follows:

- Measurement project
 - Balancing reports
 - Grinding department (Selected)
 - Grinding machine 1 (Original)
 - Grinding machine 1 (Copied)

Annotations:

- An arrow points from the 'Grinding machine 1' under 'Grinding department' to the text box: **Drag "Grinding machine 1" to "Grinding department" and release the keys simultaneously**
- A text box at the bottom says: **A weak text is displayed at the same time**



VMi Trend Viewer

Hem Graf inställningar Språk

Importera mätdata från instrument Lägga till grupp eller plats Lägga till maskin Lägga till mät punkt Lägga till mätningar Ta bort Innehåll Exportera data Rond plan Windows

Mätprojekt

	Slot	Data
Measurement project		
Balancing reports		
Slipavdelningen		
Slipmaskin 1		
Lager		
Horizontal	1	
Vertikal	2	
Axial	3	
Lager kondition[Lager]		
Temperature [Lager]		
Slipmaskin 1(copy)		
Templates		

Mätprojekt

Version 1.6.1.1

If everything went as it should, there is now a copy of "Grinding machine 1" here.

VMi Trend Viewer

Home Graph settings Language

Import measurement from instrument Add measurement group or location Add machine Add measurement point Add measurement Remove Properties Export data Route plan Windows

Mätprojekt

	Slot	Data
Measurement project		
Balancing reports		
Grinding department		
Grinding machine1		
Bearing		
Horizontal	1	
Vertikal	2	
Axial	3	
Bearing Condition [Bearing]		
Temperature [Bearing]		
Grinding machine 1 (copy)		
Templates		

Mark the copy of "Grinding machine 1" and right-click on it.

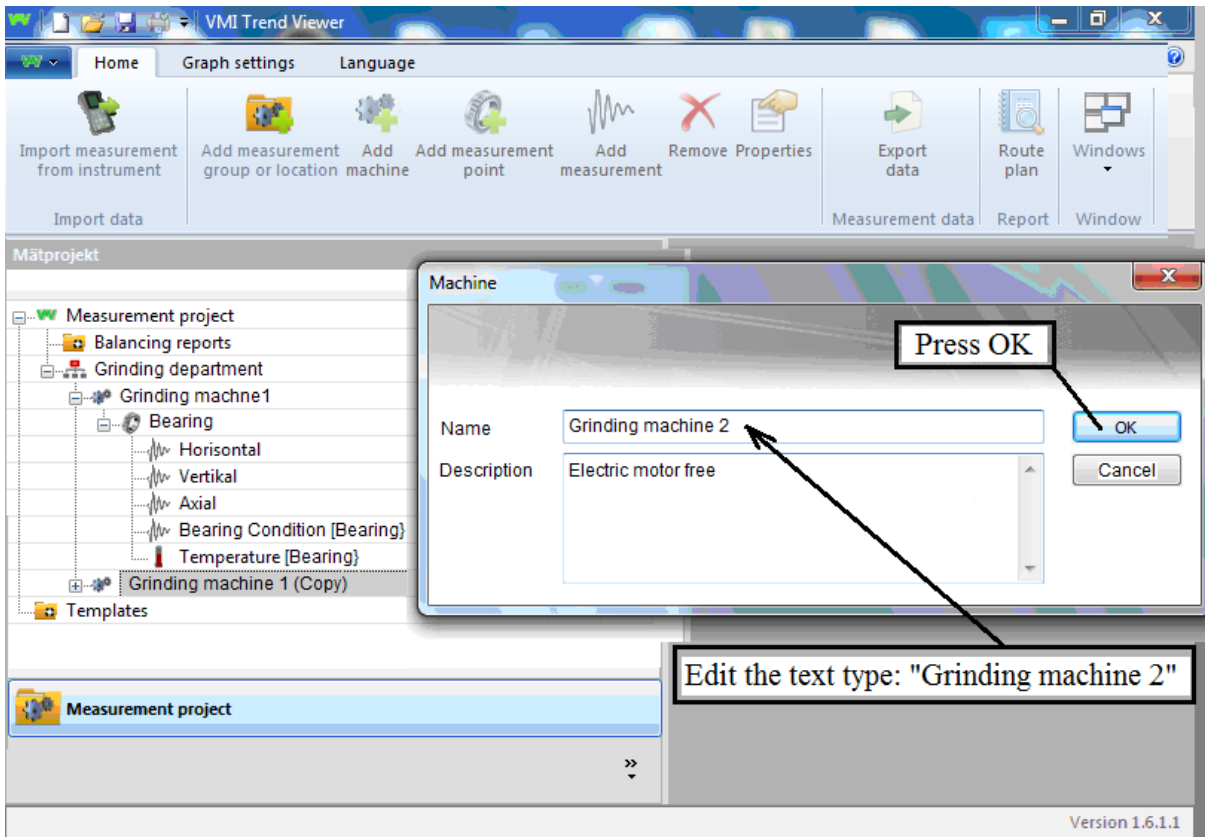


The screenshot shows the VMI Trend Viewer software interface. The top menu bar includes 'Home', 'Graph settings', and 'Language'. Below the menu bar is a toolbar with icons for 'Import measurement from instrument', 'Add measurement group or location', 'Add machine', 'Add measurement point', 'Add measurement', 'Remove Properties', 'Export data', 'Route plan', and 'Windows'. The main area is divided into a left sidebar and a central workspace. The sidebar contains a tree view of the measurement project structure. The central workspace shows a table with columns 'Slot' and 'Data'.

	Slot	Data
Measurement project		
Balancing reports		
Grinding department		
Grinding machine1		
Bearing		
Horizontal	1	
Vertikal	2	
Axial	3	
Bearing Condition [Bearing]		
Temperature [Bearing]		
Grinding machine 1 (copy)		
Templates		

A context menu is open over the 'Grinding machine 1 (copy)' item. The menu items are: Add measurement group, Add machine, Add measurement point, Add measurement, Delete, View trend, Export, Sort storage slots, Route plan (Ctrl+Shift+P), Move up, Move down, Create template from machine, and Properties. A callout box with an arrow points to the 'Properties' option.

Select "Properties" from the dialog





Now we need to assign "Grinding machine 2" slot number (Storage locations).

The screenshot shows the VMI Trend Viewer software interface. The main window displays a tree view of measurement data under the heading "Mätprojekt". The tree view includes several measurement groups, with "Grinding machine 2" highlighted in blue. A context menu is open over "Grinding machine 2", listing various actions such as "Add measurement group", "Add machine", "Add measurement point", "Add measurement", "Delete", "View trend", "Export", "Sort storage slots", "Route plan", "Move up", "Move down", "Create template from machine", and "Properties".

Two callout boxes provide instructions:

- Mark "Grinding machine 2" and right-click with the mouse, a new dialog box appears.
- Select "Sort storage slots"

	Slot	Data
Horizontal	1	
Vertikal	2	
Axial	3	
Bearing Condition [Bearing]		
Temperature [Bearing]		
Grinding machine 2		
Bearing		
Horizontal		
Vertikal		
Axial		
Bearing Condition [Bearing]		
Temperature [Bearing]		



VMI Trend Viewer

Home Graph settings Language

Import measurement from instrument Add measurement group or location Add machine Add measurement point Add measurement Remove Properties Export data Route plan Windows

Import data Measurement data Report Window

Mätprojekt

	Slot	Data
Horizontal	1	
Vertikal	2	
Axial	3	
Bearing Condition [Bearing]		
Temperature [Bearing]		
Grinding machine 2		
Lager		
Horizontal		
Vertikal		
Axial		
Bearing Condition [Bearing]		
Temperature [Bearing]		
Templates		

Sortera slots

1. Mark "Vibration slots"

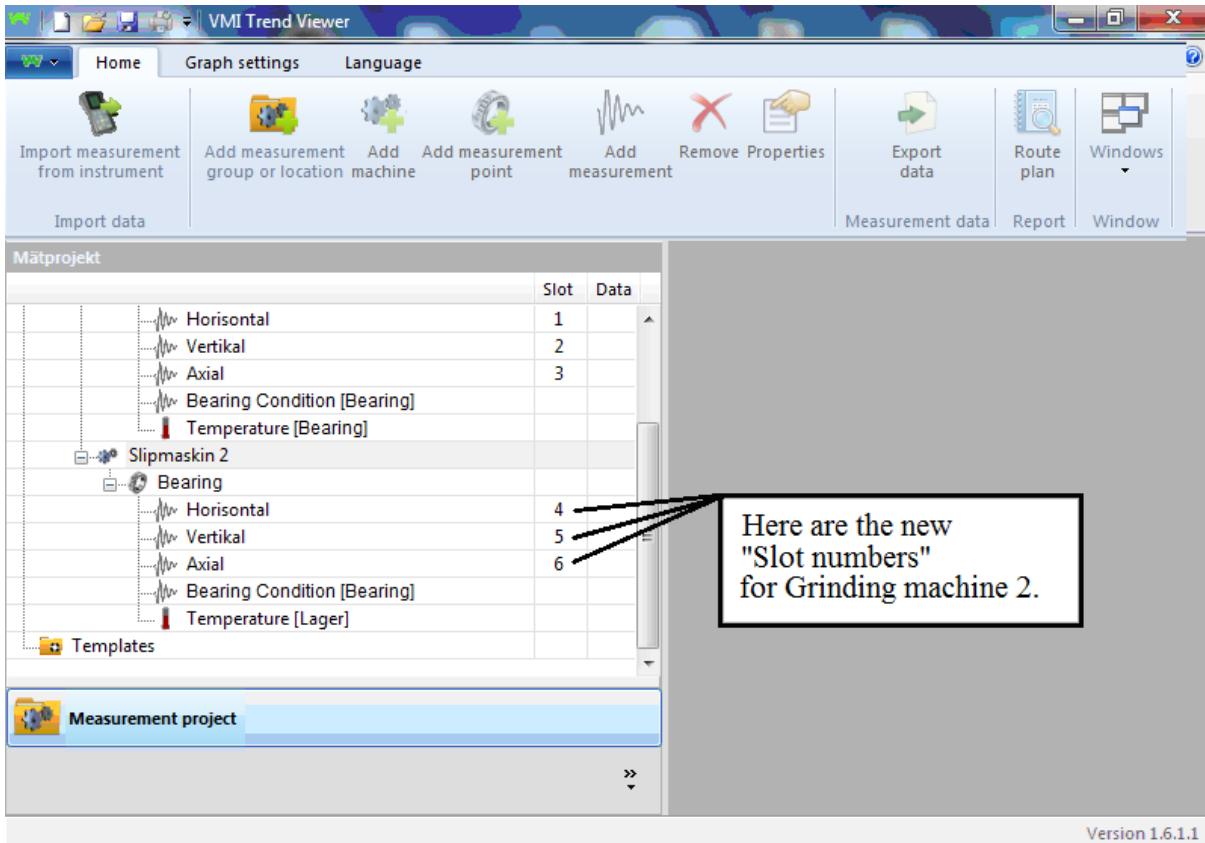
3. Click on OK

Vibration slots Temperatur slots

	Name	Objekt	
Assigned slot			
1	Horizontal	Grinding machine 2 \Bearing	Horizontal
2	Vertical	Grinding machine 2 \Bearing	Vertikal
3	Axial	Grinding machine 2 \Bearing	Axial
Allocate slot			
1	Horizontal	1 Grinding machine 1 \Bearing	Horizontal
2	Vertical	2 Grinding machine 1 \Bearing	Vertikal
3	Axial	3 Grinding machine 1 \Bearing	Axial
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

2. Click on "Auto assign"

OK Cancel Move up Move down Assign Unassign Auto assign



Thus, the first "project" is finish and you can now start measuring on the machines and then transfer measurement data to "Trend View".



9.2 Create a "Route Plan" and edit a project

The screenshot shows the VMI Trend Viewer software interface. The top menu bar includes 'Home', 'Graph settings', and 'Language'. Below this is a toolbar with icons for 'Import measurement from instrument', 'Add measurement group or location', 'Add machine', 'Add measurement point', 'Add measurement', 'Remove Properties', 'Export data', 'Route plan', and 'Windows'. The main workspace displays a project tree under 'Mätprojekt' with a table for 'Slot' and 'Data'. The tree structure includes 'Measurement project', 'Balancing reports', 'Grinding department', 'Grinding machine 1', 'Bearing' (with sub-items: Horizontal, Vertikal, Axial, Bearing Condition [Bearing], Temperature [Bearing]), 'Grinding machine 2', and another 'Bearing' (with sub-items: Horizontal, Vertikal). A context menu is open over the 'Bearing' item under 'Grinding machine 1', listing options: 'Add measurement group', 'Add machine', 'Add measurement point', 'Add measurement', 'Delete', 'View trend', 'Export', 'Sort storage slots', 'Route plan' (with keyboard shortcut 'Ctrl+Shift+P'), 'Move up', 'Move down', and 'Properties'. Three callout boxes provide instructions: one points to the 'Route plan' option, another to the 'Properties' option, and a third points to the 'Export' option.

One can retrieve and print a list (Route Plan) that shows where the measurement points are located, and as a reminder list.

Select the department where the measurement is to be performed and right-click, select "Route plan" from the dialog box.

You can "export" measurement data to excel if you want to do some form of documentation.

Select "Properties" If you want to edit

We recommend that the route plan be printed out and used every time you make measurements. Make a route plan based on how often the measurement is done, such as week, month, half year etc.



When selecting "Route plan", a list appears to the right in the picture, that can be printed out.

The screenshot shows the VMI Trend Viewer software interface. The main window displays a tree view of a 'Measurement Project' with the following structure:

- Measurement project
 - Balancing reports
 - Grinding department
 - Grinding machine 1
 - Bearing
 - Horizontal (Slot 1)
 - Vertikal (Slot 2)
 - Axial (Slot 3)
 - Bearing Condition [Bearing]
 - Temperature [Bearing]
 - Grinding machine 2
 - Bearing
 - Horizontal (Slot 4)
 - Vertikal (Slot 5)
 - Axial (Slot 6)
 - Bearing Condition [Bearing]
 - Temperature [Bearing]
 - Templates

The 'Print out' window is open, displaying the following content:

Grinding department

Grinding department

Grinding machine 1

Bearing

1. Horizontal (Vibration)
2. Vertikal (Vibration)
3. Axial (Vibration)

Grinding machine 2

Bearing

4. Horizontal (Vibration)
5. Vertikal (Vibration)
6. Axial (Vibration)

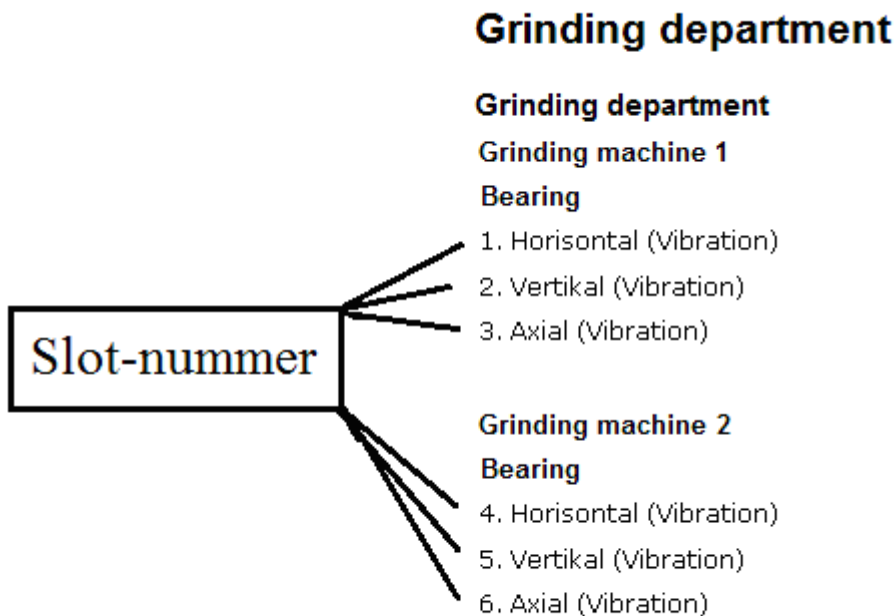
Version 1.6.1.1



9.3 Trend measurements

Perform the project (database) with the machines you want to measure within the same interval, (weekly, monthly, etc.).

Mark the machines according to the printed list:



Each new measurement performed on the same machine must be stored in the same "slot number" (memory cell) as the previous measurement. **Before a new measurement is performed, first the previous measurement must be transferred to the "Project" in Trend View.**



Press the SAVE key to save a measurement, and the vibration storage table appears on the instrument display:

Vibration	
1	15,71 0,12
2	
3	
4	
5	

— Vibration (mm/s)
 — Bearing Condition (BC)

If you want to place the measurement value in "slot number 1" confirm with the green

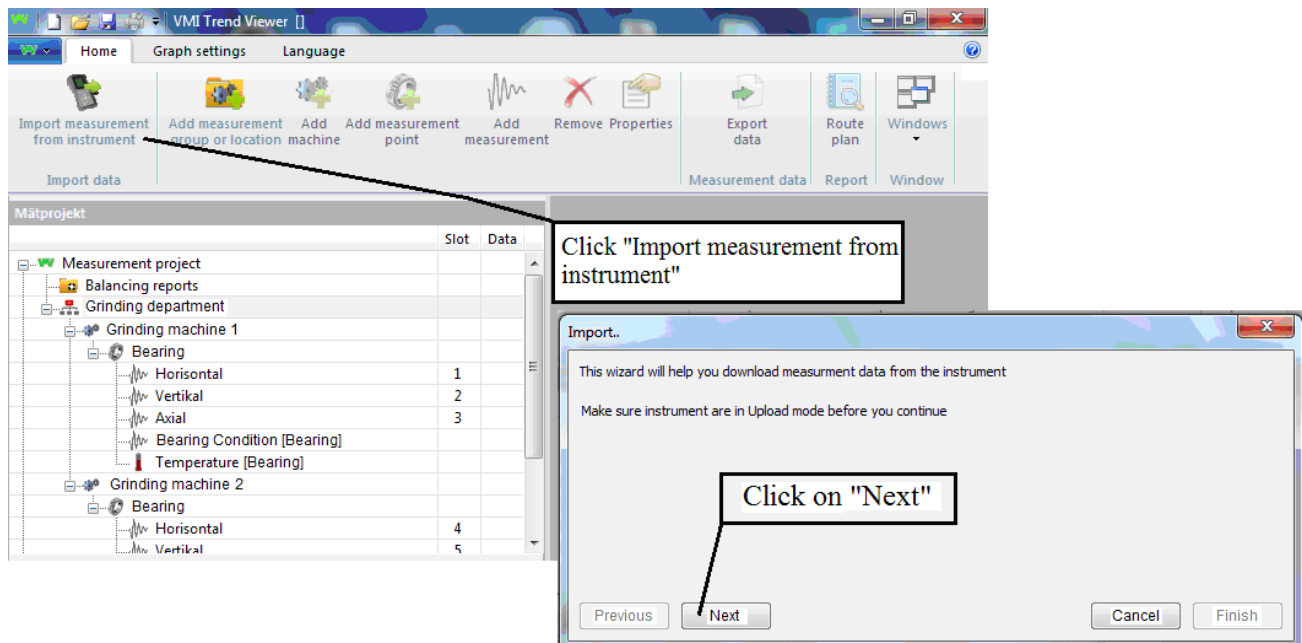


key. If you want to move the measurement value to another slot number, use the arrow keys.

9.4 Transfer of data to Trend View

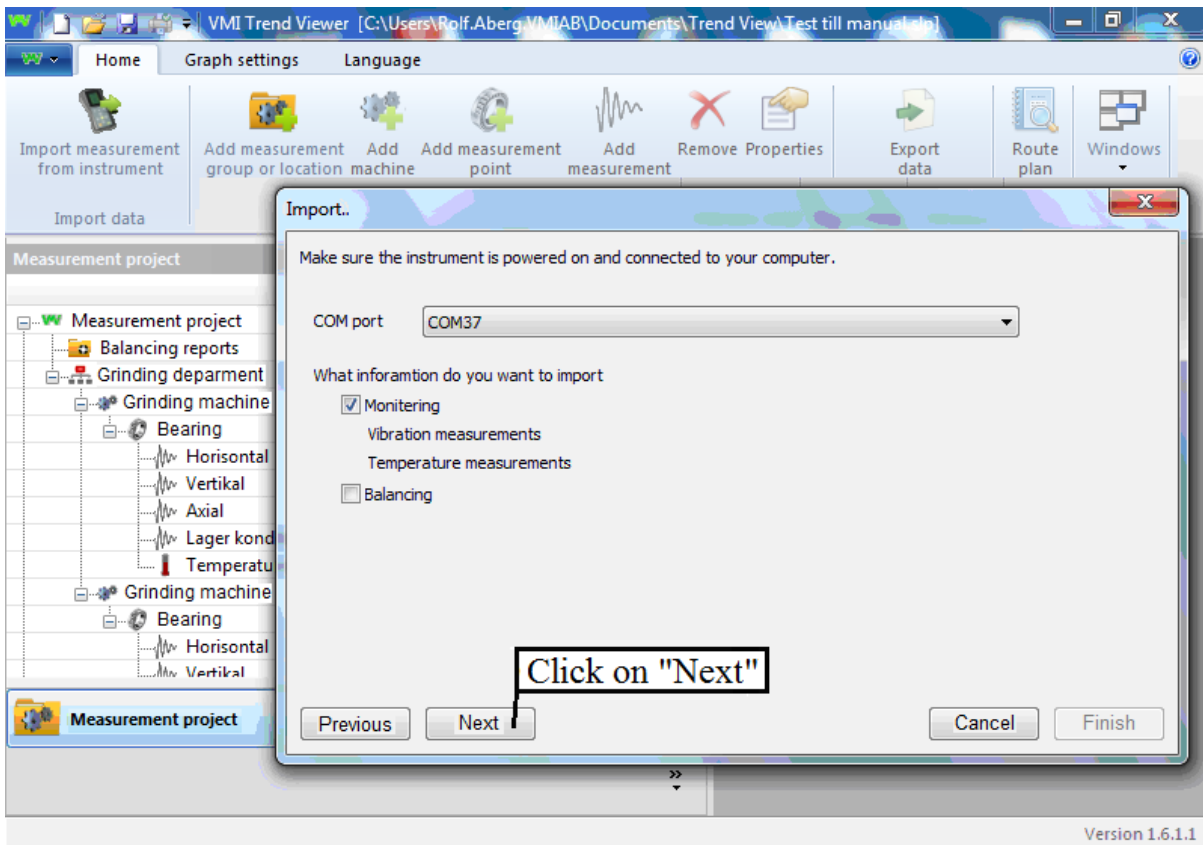
When each measurement in a route is complete, measurement data must be transferred to the “**Trend View**” computer software. Note. It is important that you make the "transfer" in the correct order, see below.

- 1) Connect "(USB - 3.5mm plug)- cable" to the instrument "Serial data connector" , and the USB side to the computer's USB input. You must verify that the correct serial port is selected by the computer (If a problem occurs, see the special installation instructions for the PC software.
- 2) Start the **VIBER X2 Pro™** instrument, and select "Upload" from the function menu.
- 3) Open "Trend View" and select "Import measurement data from instrument"



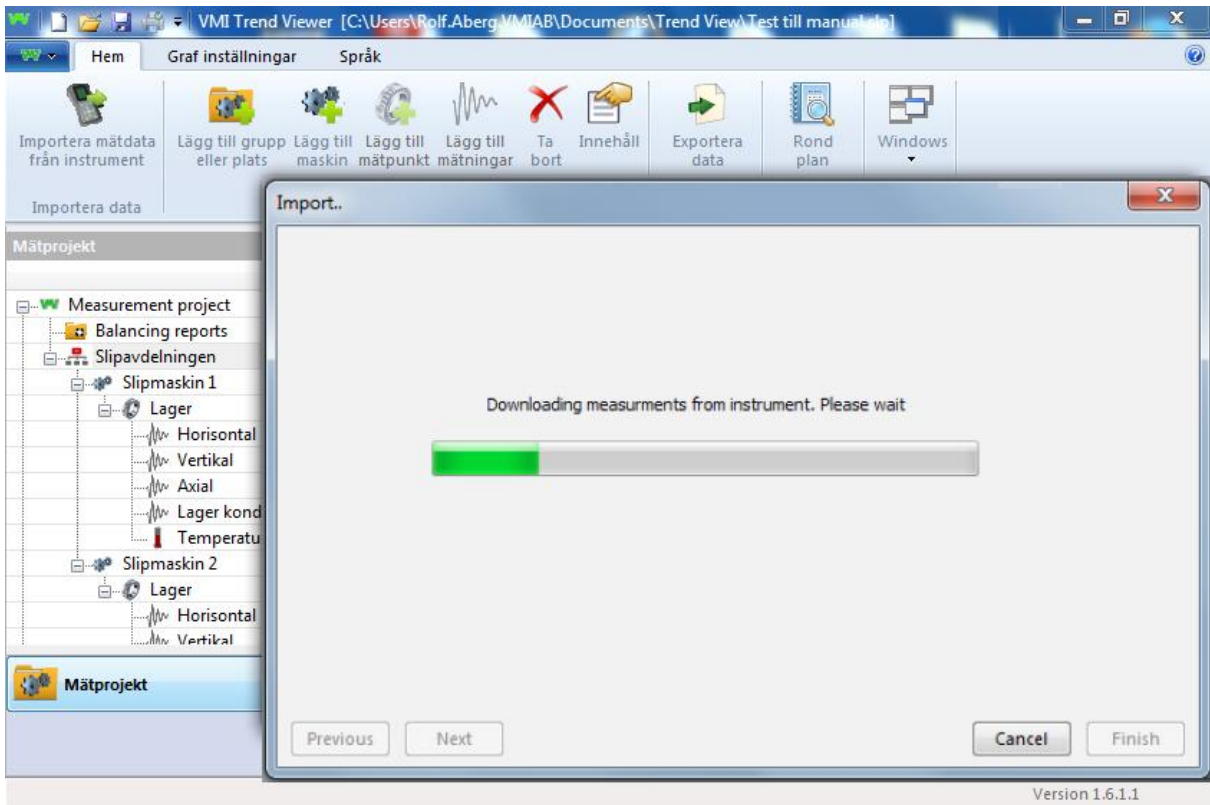


Note. The **VIBER X2 Pro™** instrument must be "on" and upload must be selected from the function menu, confirm with the green key. A rotating symbol appears on the screen. In this mode, you continue in "Trend View" by clicking "Next" in the dialog box.



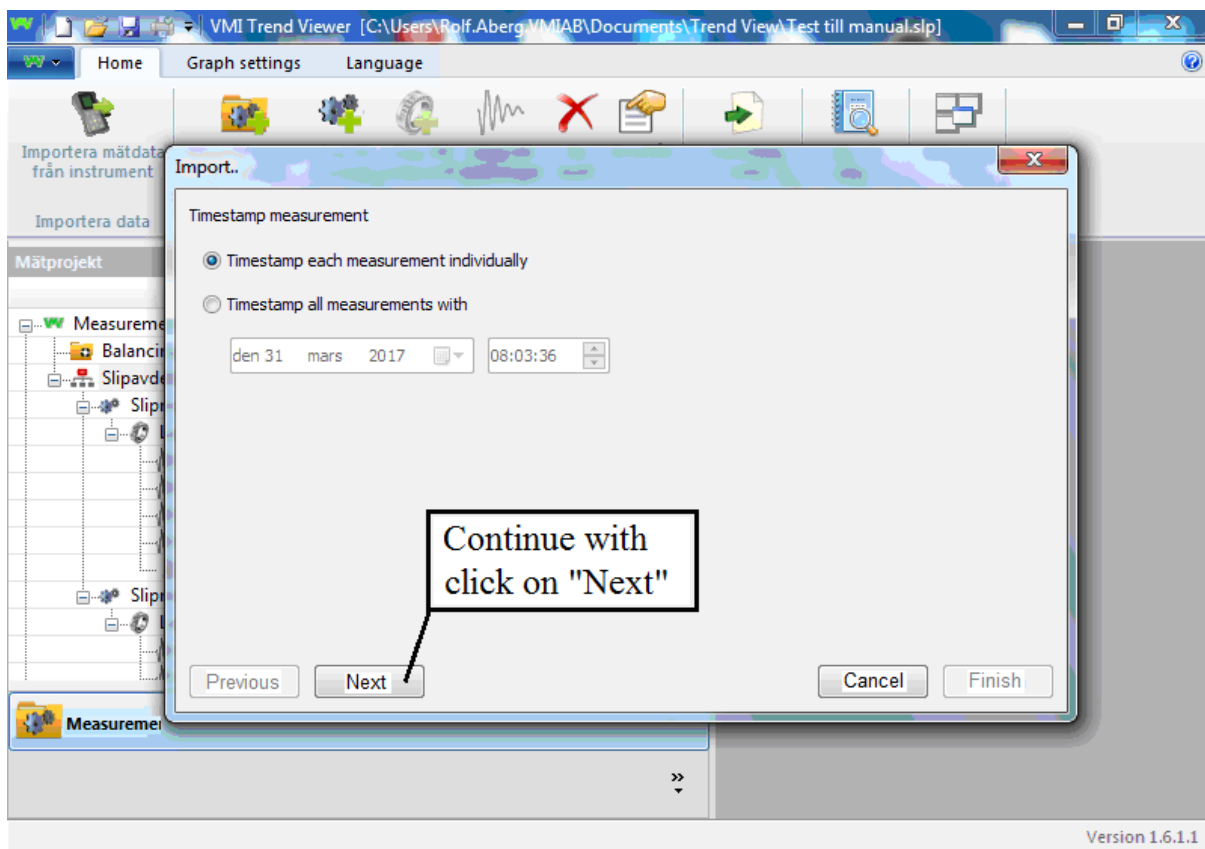


Wait a while, and the transfer procedure will start.





Since the instrument does not store times when the **measurement was performed**, but only time **for the transfer**, you have to change the date manually. If you want to save the times when the measurement was performed select: **"Timestamp each measurement individually"**.





Here shows all **vibration data** from the first measurement.

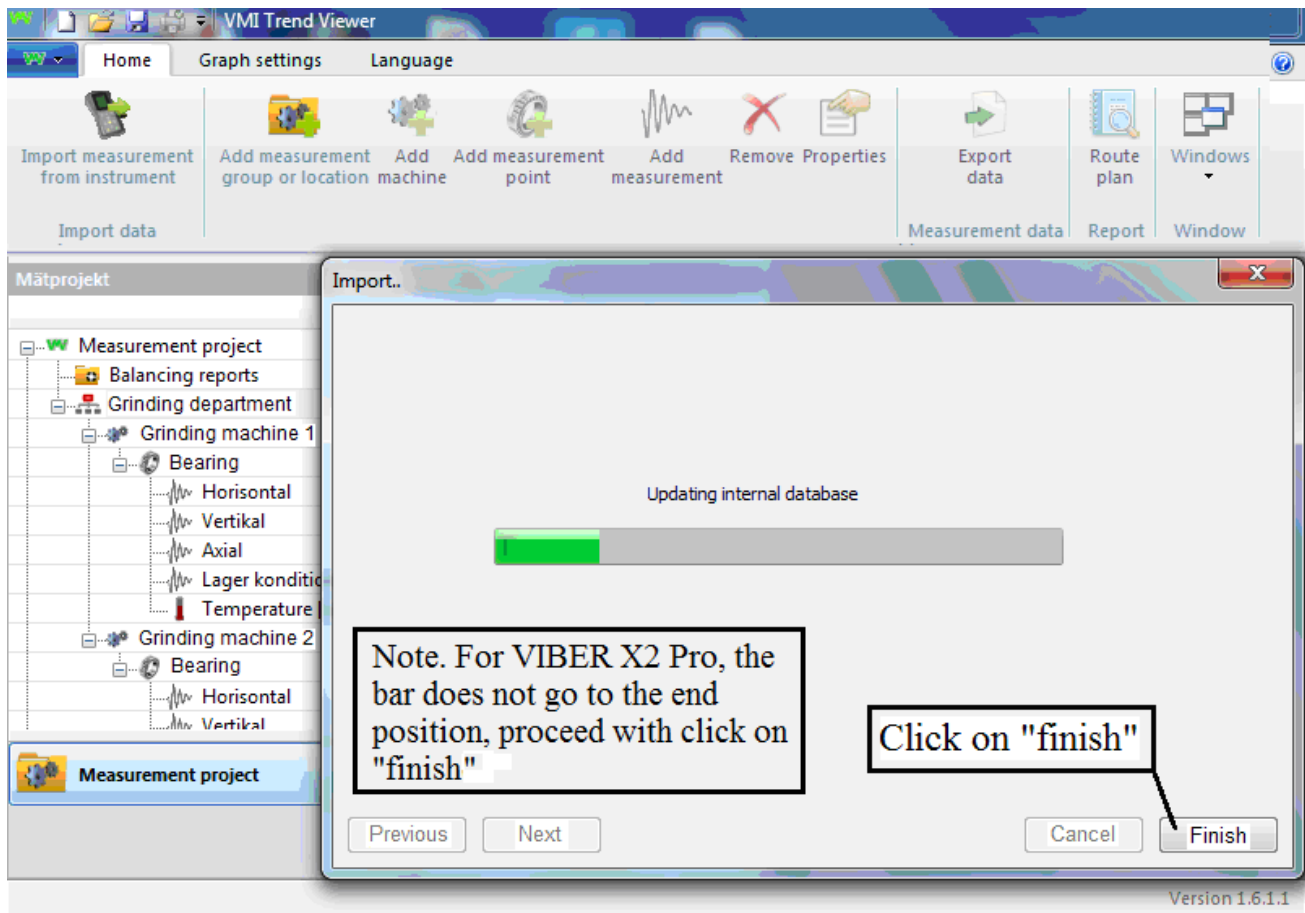
The screenshot shows the VMI Trend Viewer interface. The 'Import..' dialog box is open, displaying a table of measurement data. The table has four columns: 'Timestamp', 'Measurement (mm/s[rms])', and 'Target'. The 'Timestamp' column contains three entries, all with the same date and time: '2017-03-31 08:31:03'. The 'Measurement' column contains three values: '23.729223', '23.590397', and '4.730167'. The 'Target' column contains three entries: 'Horisontal', 'Vertikal', and 'Axial'. A callout box with an arrow pointing to the 'Timestamp' column contains the text: 'You can manually change the date of the measurements.' The dialog box also has a 'Unit' dropdown set to 'mm/s[rms]' and buttons for 'Previous', 'Next', 'Cancel', and 'Finish'.

	Timestamp	Measurement (mm/s[rms])	Target
1	2017-03-31 08:31:03	23.729223	Horisontal
2	2017-03-31 08:31:03	23.590397	Vertikal
3	2017-03-31 08:31:03	4.730167	Axial

Note. Temperature is not measured with **VIBER X2 Pro™**.



Data is transferred to the project,





Transmission of measurement data for "Grinding machine 1" is now complete. In order to see a graph showing the trend, at least two "2" measurements, at different times, must be performed and transferred to the project.

The screenshot shows the VMI Trend Viewer software interface. The main window displays a project tree on the left and a data table on the right. The project tree is expanded to show 'Grinding machine 1' with sub-items for 'Bearing', 'Horizontal', 'Vertikal', 'Axial', 'Lager konditionLager', and 'Temperature [Lager]'. The data table has columns for 'Slot' and 'Data'. The 'Data' column shows '1' for all listed items, indicating that data has been transferred once.

	Slot	Data
Measurement project		
Balancing reports		
Grinding department		
Grinding machine 1		
Bearing		
Horizontal	1	1
Vertikal	2	1
Axial	3	1
Lager konditionLager		1
Temperature [Lager]		
Grinding machine 2		
Bearing		
Horizontal		
Vertikal		

Here it is shown that "measurement data" has been stored for grinding machine 1 and transmission of data has been transferred once

Slot nr: för vib. BC

Measurement No 1

	Vibration	
Horizontal	1	23,73
Vertical	2	23,59
Axial	3	4,73
	4	0,24
	5	0,09

V = mm/s
B.C = g-value

Where to find these menus in the instrument, see page 6.



After the second measurement for the same machine, the new measurement values are stored in the same "Slot-places" as before, in our case: 1, 2, 3 for vibration.

Measurement project

	Slot	Data
Measurement project		
Balancing reports		
Grinding department		
Grinding machine 1		
Bearing		
Horizontal	1	2
Vertikal	2	2
Axial	3	2
Bearing Condition [Lager]		2
Temperature [Lager]		
Grinding machine 2		
Bearing		
Horizontal		
Vertikal		

After an additional measurement and transmission, "Data" counts up to two "2".

Version 1.6.1.1

Slot nr: för vib. BC

Measurement No. 2

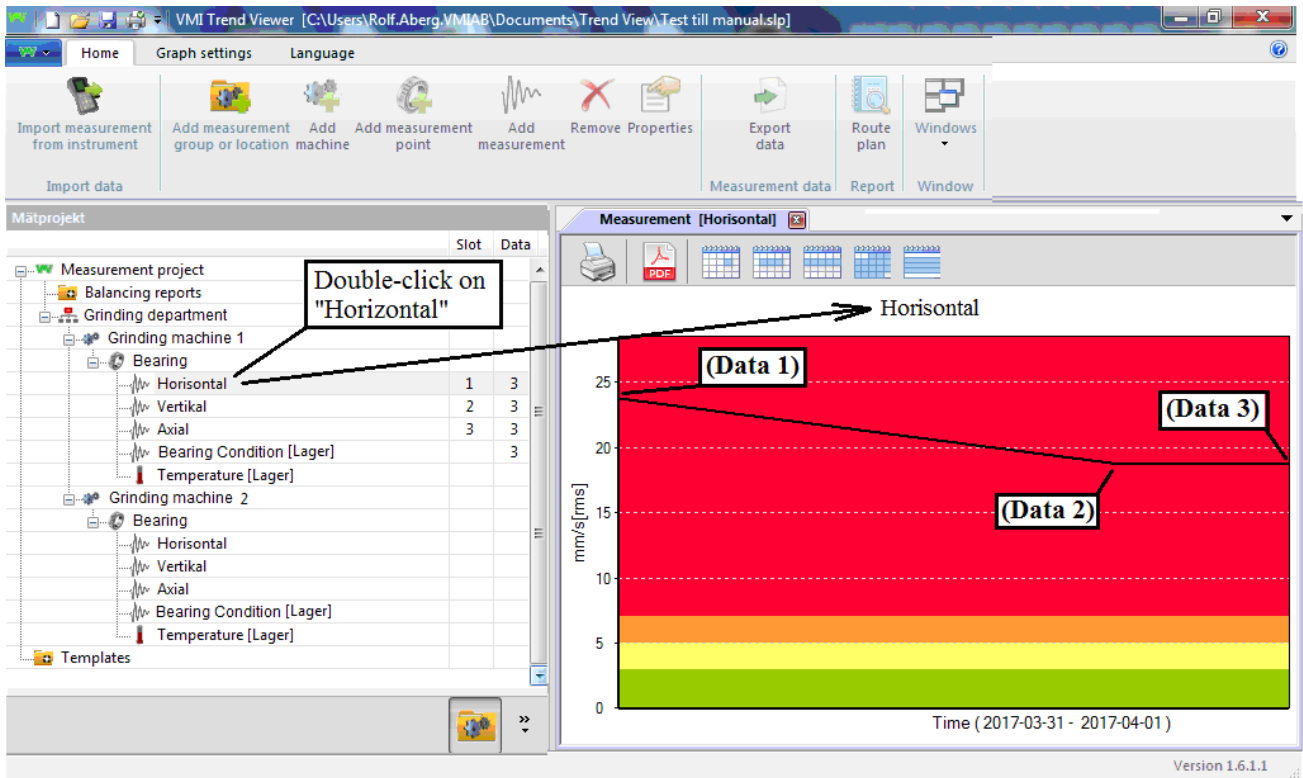
	Vibration	
Horizontal	1	18,75 0,12
Vertical	2	20,46 0,09
Axial	3	2,28 0,06
	4	
	5	

V = mm/s
B.C = g-value

Data for measurement number 2 is stored on the same slot number as before for the same machine.



To see a "Graph", double-click the vibration direction you want to see. The graph below shows "measurement data" after three measurements (those blue-marked in horizontal direction) and after three data transfers.



Slot nr: för vib. BC

Measurement No. 3

	Vibration	
Horizontal	1	18,75
		0,12
Vertical	2	20,46
		0,09
Axial	3	2,28
		0,06
	4	
	5	

V = mm/s
B.C = g-value

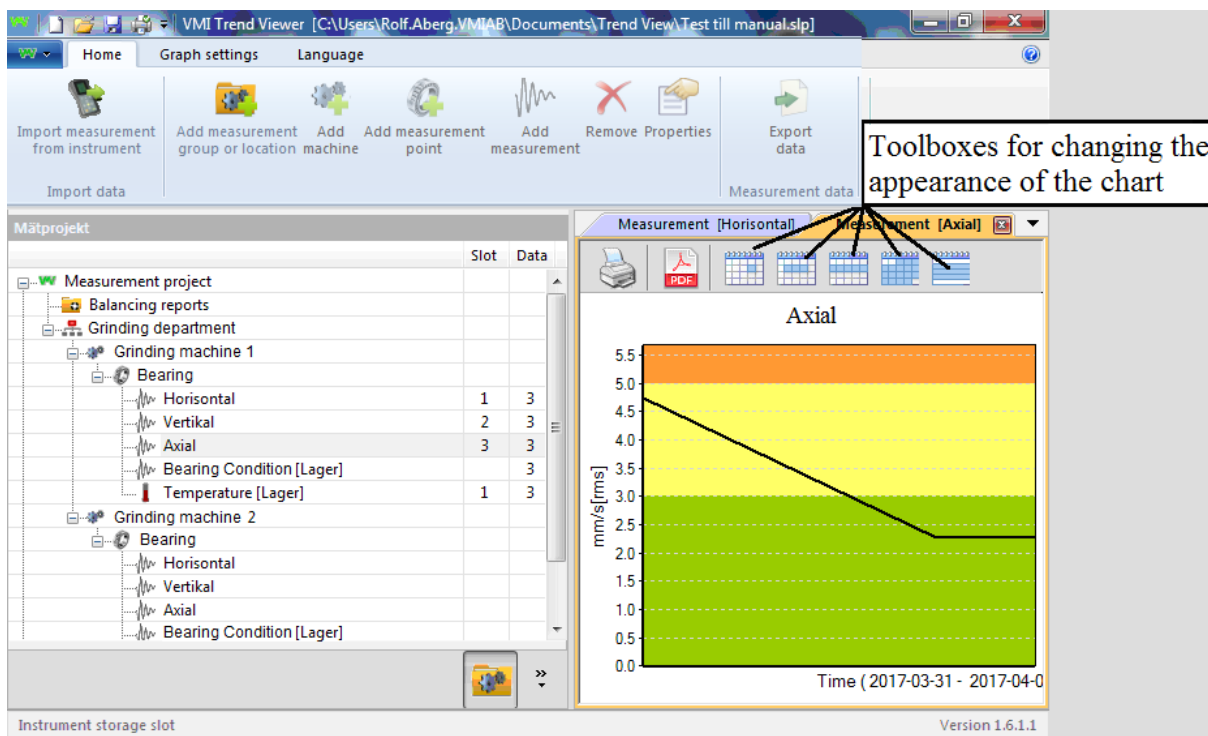
Data for measurement number 3 is stored on the same slot number as before for the same machine.

9.5 General description and viewing trends

After all measurements are saved, you can choose to study a graph to see any deviations of the vibration of the machine.

To see the "Trend chart", select and double-click the project tree and in the direction you want to study.

The window that shows the graph is automatically adjusted according to the number of measurements performed. To change the window view, use the "toolboxes" in the chart header.



Properties can be used to change units in the chart, all measurement points can be expressed in the following units: Vibration (mm/s), Acceleration (m/s^2) or expressed as a g-value, and displacement (μm).

If the Trend measurement shows a large change in vibration or Bearing Condition, then you should measure the machine for shorter intervals.



10.0 Technical data VIBER X2 Pro

Vibration transducer	Accelerometer	Standard 100 mV/g ± 15 %	(selectable sensitivity in the instrument) 0,1 – 9999 mV/g
Input amplitude range	Vibration	Max 50 g RMS	With other sensor up to 500 g and 50 g BC.
	Bearing condition	Max 5 gBC	
Dynamic range	80 dB (159,16 Hz and with auto ranging)		
Frequency range	Vibration	2 - 400 Hz 10 - 1000 Hz 6 – 1600 Hz 11 – 3200 Hz	Note 1
	Bearing condition	0.5 to 16 KHz	
Vibration units	g-value, m/s ² , mm/s, in/s, μm, mils		Note 2
Amplitude presentation	RMS, Peak, Peak-Peak		Note 2
Analysis	Five highest peaks can be displayed		VMI Trend Viewer Software included for PC
Frequency range of peak detection	Frequency range 2 – 400 Hz 6 – 1600Hz 11 – 2000 Hz 10 – 1000 Hz		Note 3
Storage Capacity	100 measurements can be stored		
Communication interface	USB 2.0		
Accuracy	Vibration	± 3 %	Note 4
	Bearing condition	± 5 %	Note 4a
	Frequency/RPM	± 0.2%	
Battery	Rechargeable Lithium	2300 mA/h, max 60 °C	Note 5
Operating time	1 Week normal use		
External charger	5,0 V regulated @ 2000 mA		
LCD display	B&W 64 X 120 pixels with background light		Note 6
Enclosure protection	IP 65		
Operating temp. Range	0 to 50 °C		Note 7
Weight	340 gram		Note 8
Size (LxWxH)	145mm x 77mm x 47mm		



- Note 1. User selectable between Hz and RPM. When measuring displacement with an accelerometer is the minimum measurable frequency 3 Hz.
- Note 2. User selectable
- Note 3. Only 11 to 2000 Hz differs
- Note 4. Full scale is 50g for acceleration other units are frequency dependent.
- Note 4a. Over 0,15 gBC
- Note 5. Capacity of the batteries can vary depending on hardware revision. Max 2300 mAh. (storage temp. -20 to max 60 °C).
- Note 6. Operating temp. min 0°C to max 50 °C, storage temp. max 72 °C.
- Note 7. The restriction concerns display.
- Note 8. Instrument, including battery and transducer.
- OBS. If you change to another accelerometer, then you have to change the sensitivity (mV/g). This is done in the menu under “Transducer”.



Warranty

1 February 2017

Vibration Measurement Instrument International AB (VMI)

Warranty disclaimer

VMI warrants the products to be free from defects in material and workmanship under normal use and service within two years from the date of purchase and which from our examination shall disclose to our reasonable satisfaction to be defective. Warranty claimed products shall be returned prepaid to VMI for service. We reserve the right to repair or to replace defective products. Always try to explain the nature of any service problem; by e-mail or telephone. Check first all-natural problems, like empty batteries, broken cables, etc. When returning the product, be sure to indicate that the purpose is to make repairs and indicate the original invoice number and date of shipment to you, if possible.

Warranty exclusions

Damage that not results from defect in material or workmanship or by incautious use is excluded. Damage resulting from repairs performed other than by an authorized service Centre. The limited two year warranty and remedies contained herein are in lieu of all other warranties, expressed or implied including any warranty of merchantability and any warranty of fitness for a particular purpose, and all other remedies, obligations or liabilities on our part. In addition, we hereby disclaim liability for consequential damages for breach of any expressed or implied warranty, including any implied warranty of merchantability and any implied warranty of fitness for a particular purpose. The duration of any implied warranty which might exist by operation of law shall be limited to one year from the date of original retail purchase. Batteries are excluded from Warranty.

NOTE: Some countries do not allow the exclusion or limitation of consequential damages, and some countries do not allow limitation on how long an implied warranty lasts, so the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from country to country. If you have problems with your instrument during or after the warranty period, first contact the distributor you purchased the unit from.



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