MBJLab

Version 1.1

User's guide

MBJ electronics s. c. ul. Tulipanowa 21 30-432 Krakow

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User's guide version: MBJLab / 1.101 / 2005

It is recommended to read the manual prior to using the instrument.

Contents

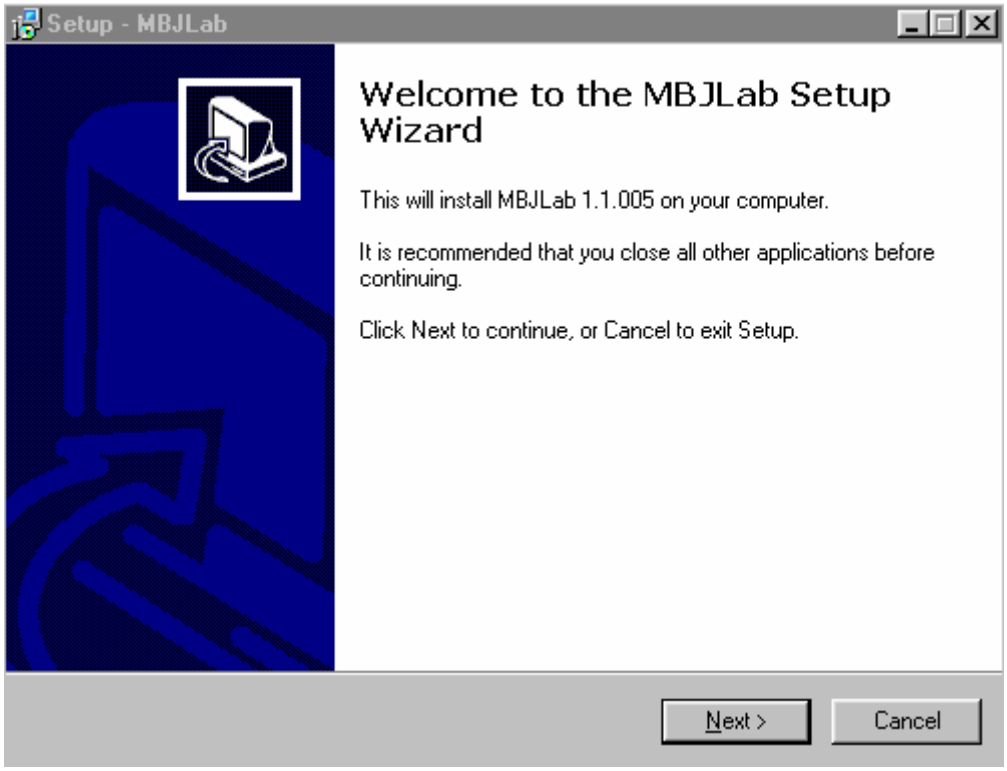
1. Introduction

The MBJLab program is designed to work with the measurement instrument DIAMOND 401. The vibration monitoring and diagnostics is easier and more efficient with the use of MBJLab. The MBJLab allows the user to create the data base of his machinery, to design the route for collecting the measurements, to download the measurement results from the instrument and save them in the data base, to review the results graphically and to prepare the reports. Here are the basic elements of MBJLab:

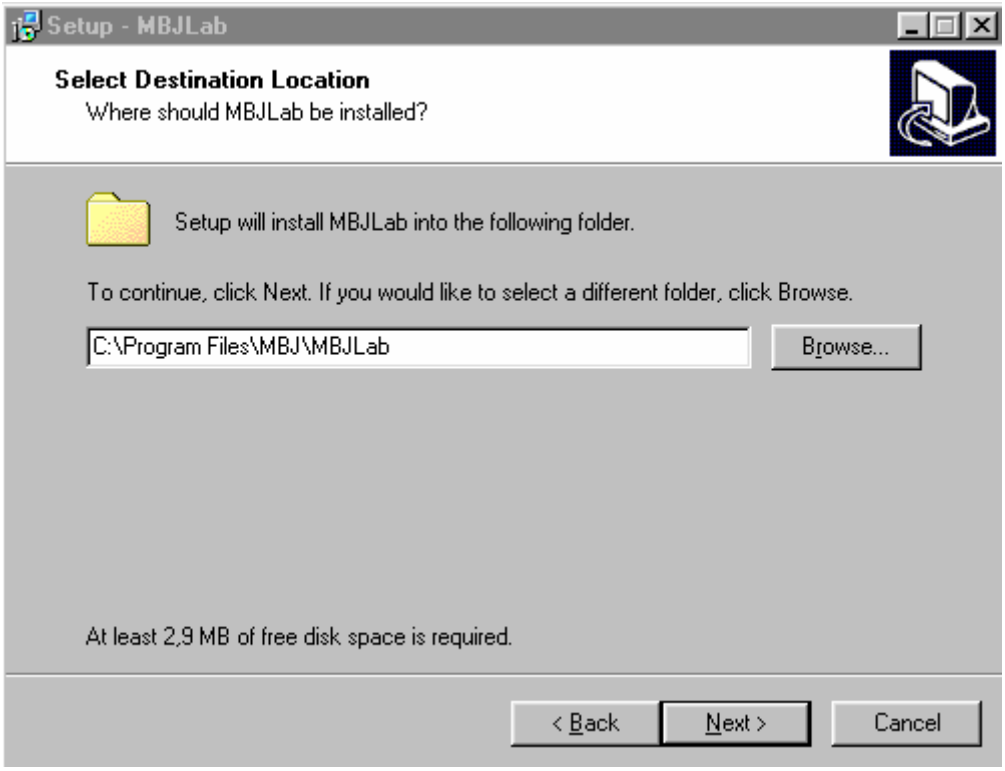
- ***Data base***. It is the collection of the information about the machines and the installations that are concerned by the vibration diagnostics. The user himself creates the data base. Creating the data base means :
  - Giving the name to each machine
  - Identifying and naming each of the measurement points on a given machine
  - Defining the measurements that have to be made in, and collected from, each of the measurement points.
- ***Measurement routes***. These subsets of the data base are created in order to transfer to the instrument information concerning the machines, the measurement points and the measurements to be done.
- ***Communication with the measurement instrument***. The communication is necessary to transfer the measurement routes from the computer to the instrument and the measurement results the other way around.
- ***Visualisation of the measurement results***. Reviewing the collected in the data base measurement results either in tabular or in graphical form.

2. Installing and launching the program

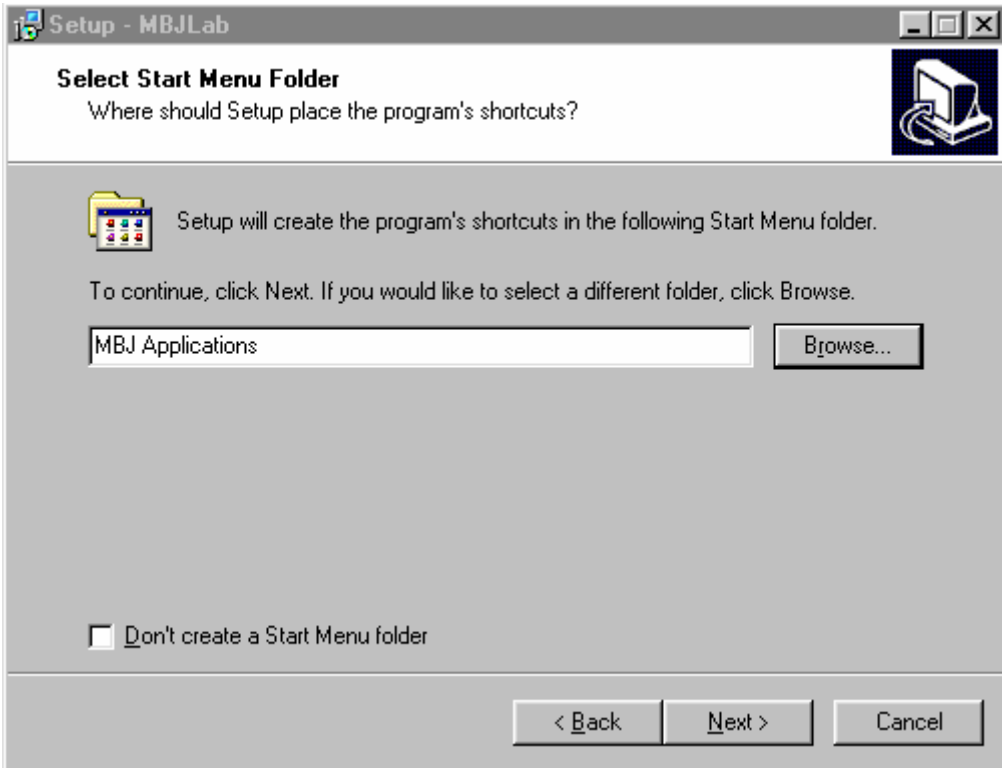
The program is shipped on a CD-ROM. From the CD you should launch the ***Setup.exe*** program. The following window will appear on the screen:



The next window after selecting ***Next*** looks like this:

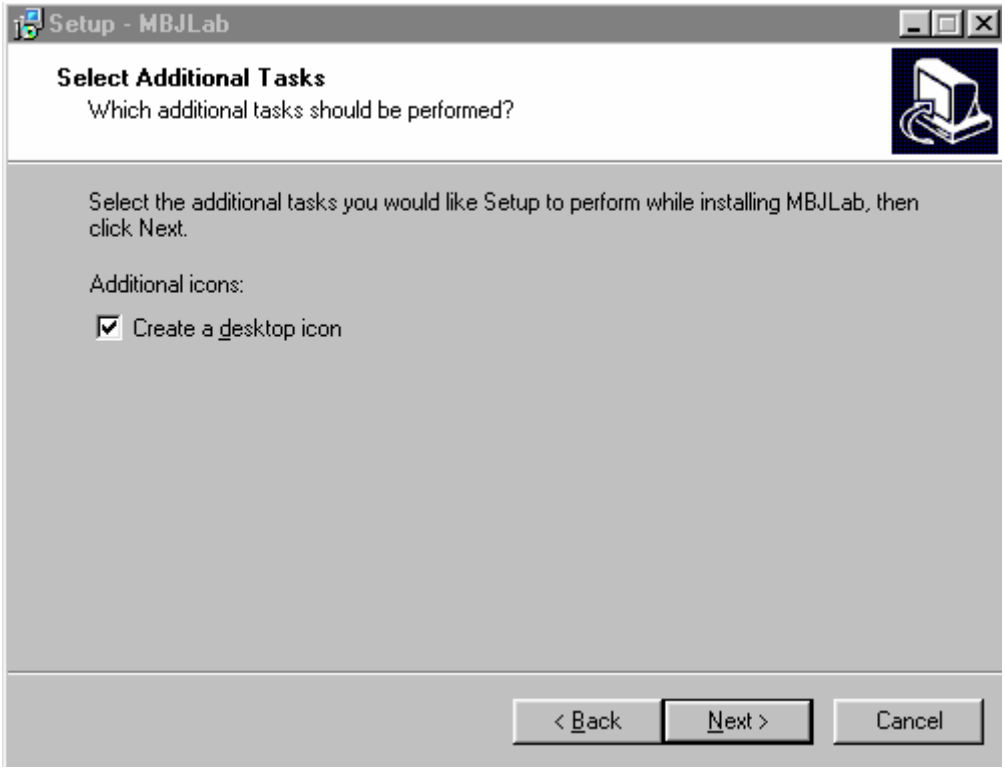


This window helps to choose the directory where will be installed the MBJLab program. The directory **C:\Program Files\MBJ\MBJLab** is proposed by default. Once the directory is chosen press ***Next*** and the following window appears:

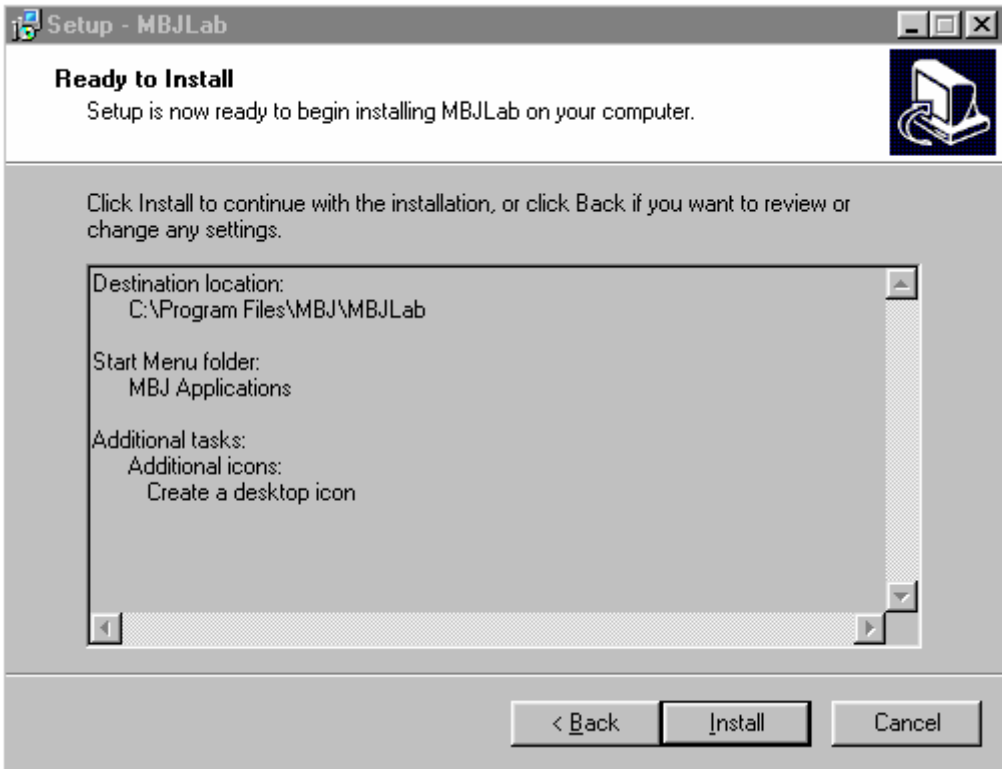


Here you can select the location in the **Start** menu of Windows.

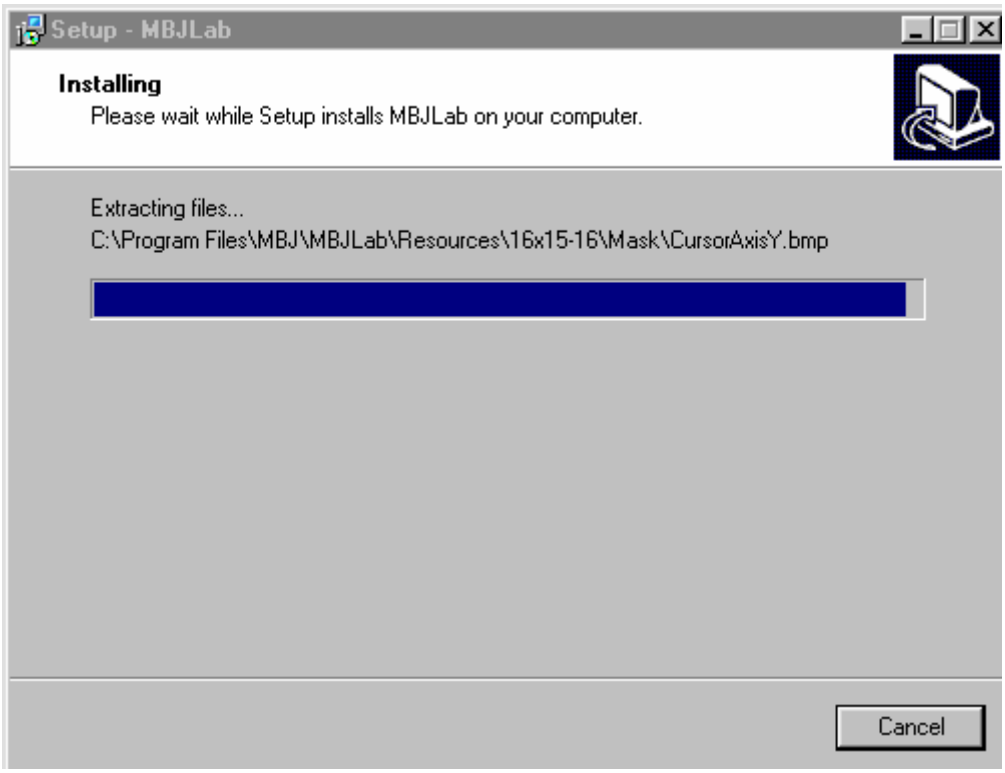
After pressing ***Next*** we get to the window where we should decide concerning the icon that will be useful for launching the program.



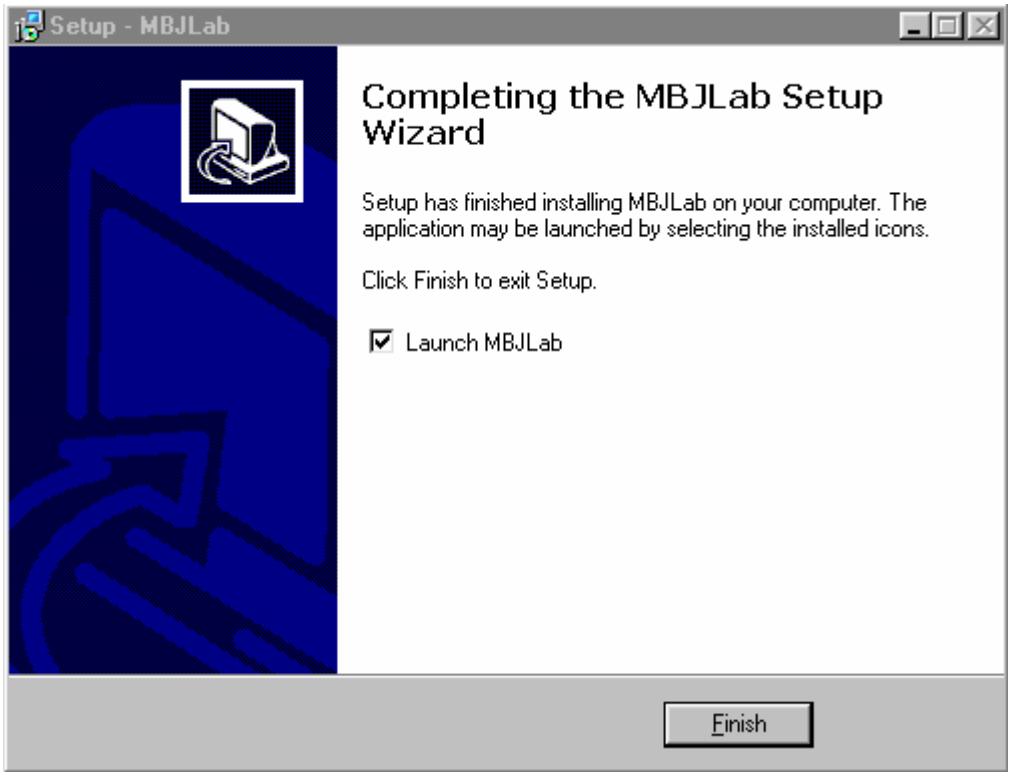
If we do not want to create the icon then we should remove the marker. The next window contains the summary of our selections:



If everything looks OK for us then we press ***Install***, if not, by selecting ***Back*** we return to the previous windows and we can modify some of the selections we have made, or we can quit the installation by pressing ***Cancel***.



Finally the following window tells us that the installation has completed successfully:



If we have selected to have the icon for launching the program then the following symbol should be displayed on the screen:

Clicking on that will launch the program.

3. Main menu

The main menu appears underneath the title bar with the name and the version of the program. The user opens and closes the main windows of the program with the keys from the main menu:

Opens and closes the data base window with the measurements results.

Opens and closes the measurements routes window.

Opens and closes the window that allows the user to review the measurements.

Opens and closes the window that helps to establish the communication with the instrument.

Opens the window in which the user configures the program.

Gives the access to the short-form user guide.

Opens the window with the information concerning the version of the program. Press ***OK*** to close the window.

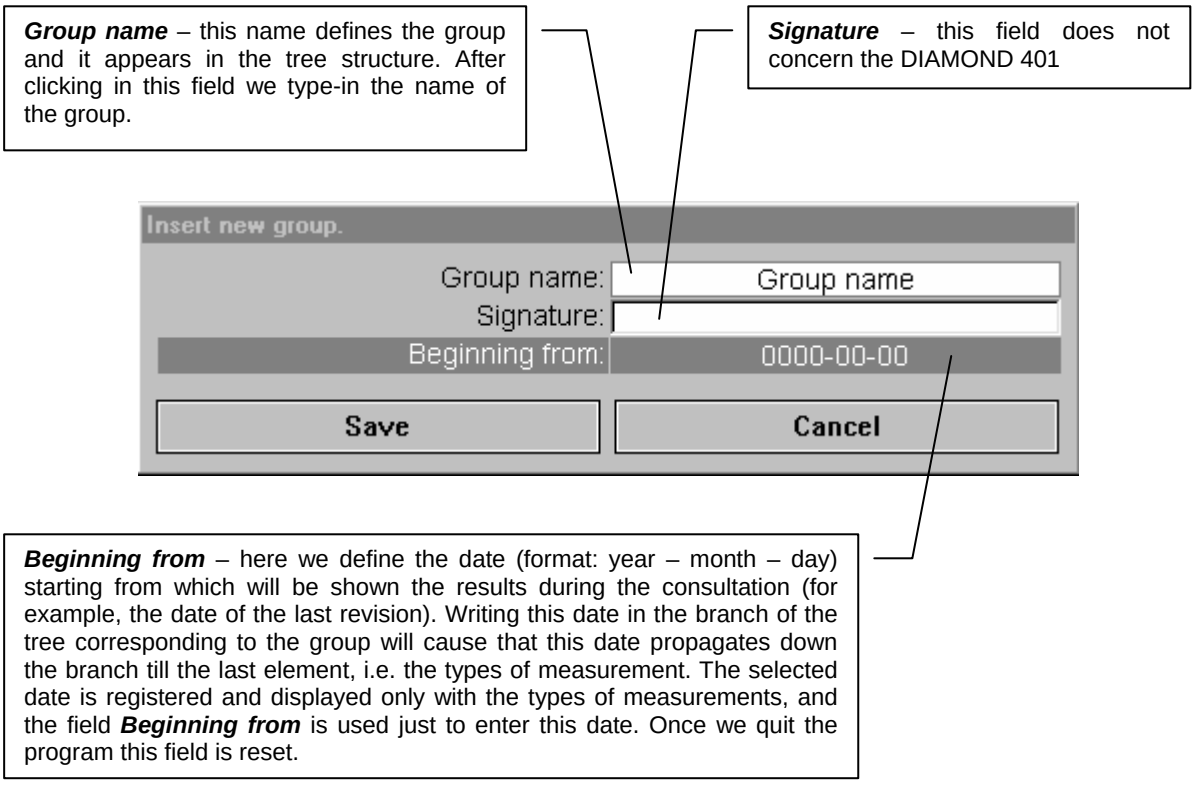
4. Data base

The data base is a collection of information about the machines and the measurement points that are associated with each machine. The measurement results are also stored in this data base. The structure of the data base has the form of a tree and can arbitrarily created, configured and developed. Here is the data base window:

The data base is conceived and modified with the help of icons in the bar on the top of the window. The data base structure consists of two types of elements: the « ***groups*** » (these are the main elements of the structure) and the « ***types of measurements*** » (they are always the last elements of the structure in each branch of the tree). A factory, a department, a machine, a measurement point are the examples of groups. The diagnostic parameter that is measured by the instrument, like for example vibration velocity, temperature or FFT analysis, are the types of a measurement. The meaning of each icon is explained below.

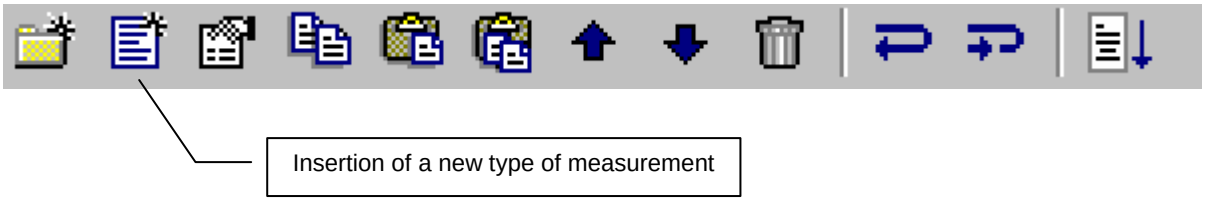
4.1 Inserting a new group

Using this icon we create the structure of the data base. After having clicked on it the following window appears:



To confirm the selection press ***Save***. By pressing ***Cancel*** we abandon the selection.

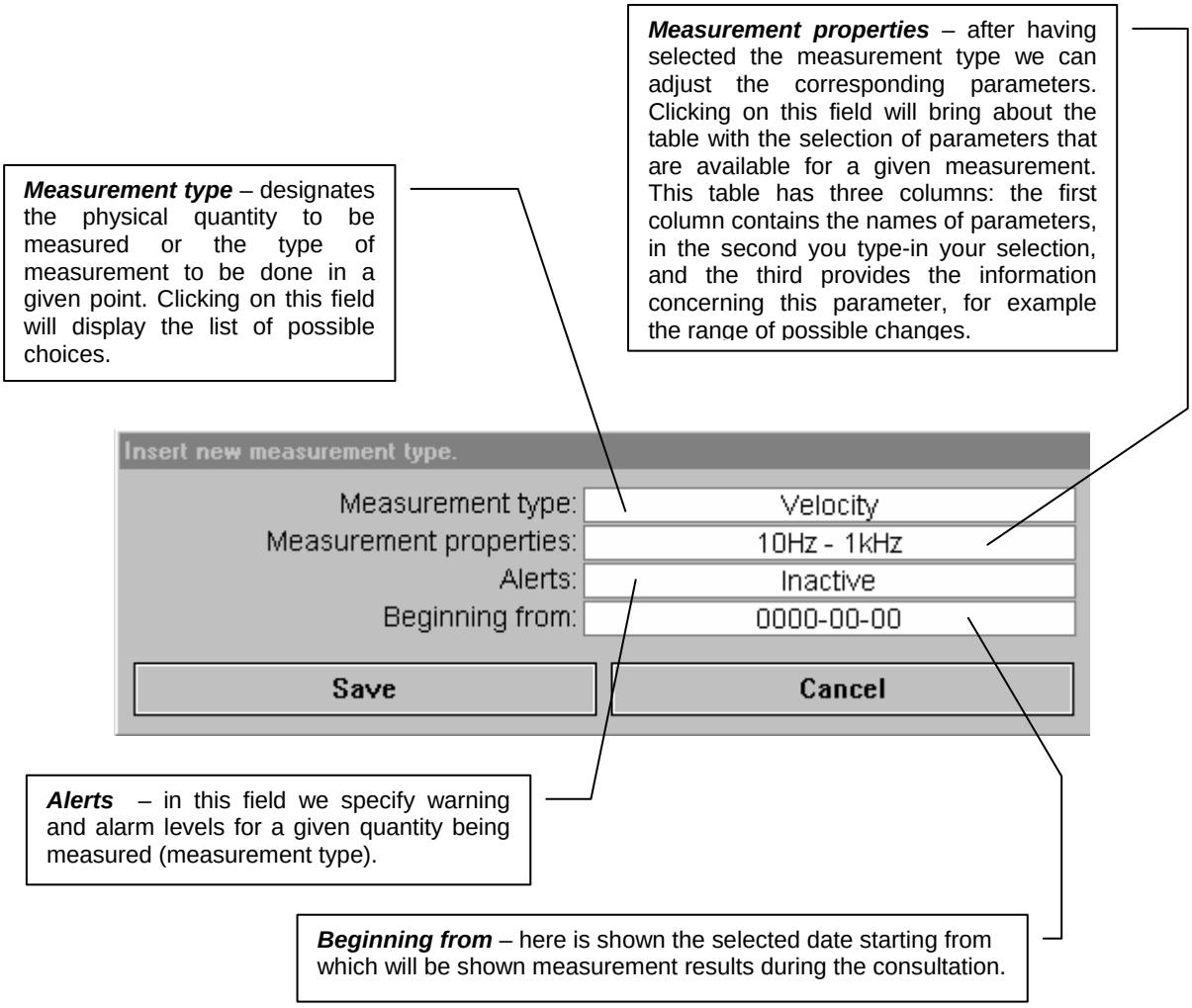
4.2 Inserting a new type of measurement



With this icon we define the very last elements in the branches of the data base structure, i.e. the types of measurements.

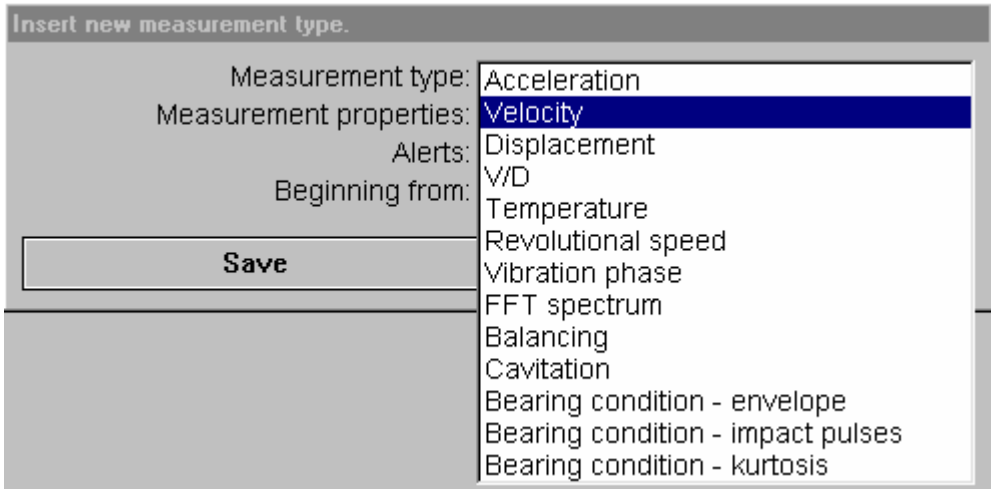
It is recommended to design the data base in such a way that before the last group designates a machine, while the last group in a branch designates the measurement point, to which are attached only the types of measurements. It is not allowed to place the groups and the types of measurements simultaneously on the same level in data base tree.

The following table appears after selecting this icon :



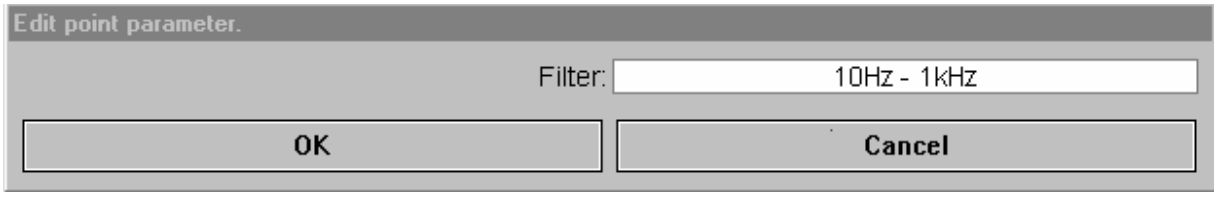
4.2.1 Selecting the type of measurement

After having clicked on the ***Measurement type*** field we get the list shown below and from which we select the physical quantity to be measured:

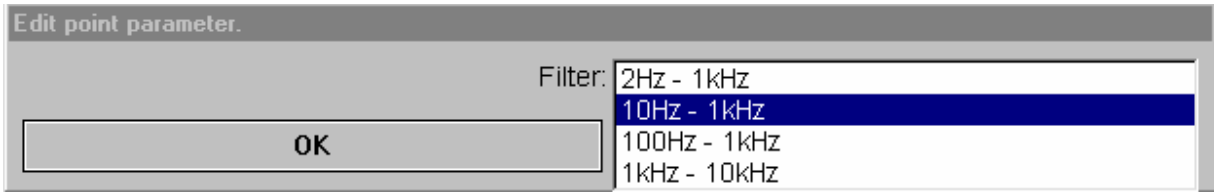


4.2.2 Setting the parameters for a given type of measurement

Once we have selected the type of measurement we must specify one or more parameters that are associated with this type. For example, if we have selected the vibrations velocity as the measurement type then clicking in the field ***Measurement properties*** we get the following window:



Here we can adjust the parameter that is associated with this measurement type. By clicking in this field we unwind the list from which we can select the desired value of the parameter. In our example we get the list of available filtering ranges for the measurement of vibrations velocity:

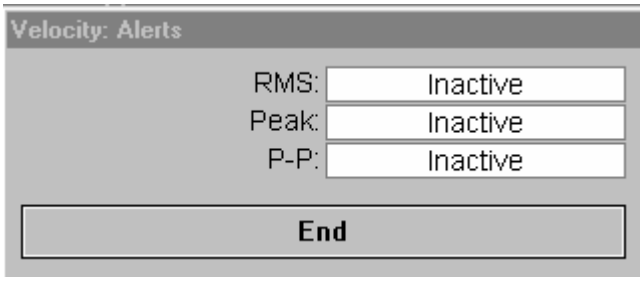


The table below shows the available types of measurement and their corresponding sets of parameters:

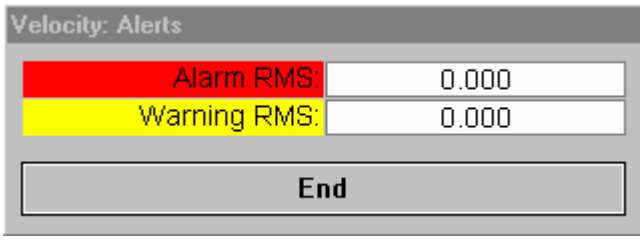
Type of measurement	Characteristics of the type	Values
Acceleration Velocity Displacement	Filter	10 Hz – 1 kHz
		2 Hz – 1 kHz
		100 Hz – 1 kHz
		1 kHz – 10 kHz
Pulses	---	---
Kurtosis	Filter	5 kHz – 10 kHz
		10 kHz – 20 kHz
		15 kHz – 30 kHz
Envelope	Filter	5 Hz – 100 Hz
		50 Hz – 1 kHz
		500 Hz – 10 kHz
		5 kHz – 30 kHz
FFT analysis	Amplitude quantity	acceleration velocity displacement envelope
	Frequency range	DC à 100 Hz – 25,6 kHz
	Resolution	100 – 1600 lignes
	Envelope filter	5 Hz – 100 Hz
		50 Hz – 1 kHz
		500 Hz – 10 kHz
		5 kHz – 30 kHz
	Window	Rectangular, Hanning
	Type of averaging	RMS, P-K, OFF
	Number of averages	1 - 999
Phase	Physical quantity	acceleration velocity displacement
	Tracking filter	0,5 Hz
		0,05 Hz
	Number of averages	1 - 99
Temperature	---	---
Rotations	Number of rotations	1 - 99
Cavitation	---	---

4.2.3 Defining the warning and alarm levels

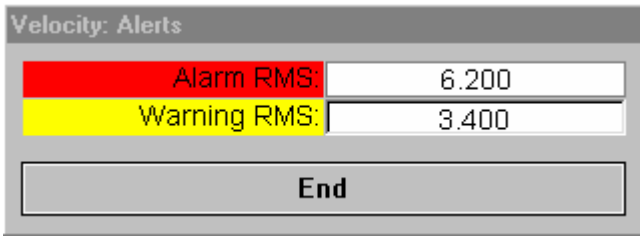
The warning and alarm levels for scalar measurement types are being programmed in the ***Alerts*** field. When the warning or alarm levels are exceeded it will be indicated in the tree with the yellow flag for the warning levels and with the red flag when the alarm levels are crossed. Depending on the type of measurement it is possible to adjust these levels for individual detectors. For example, when measuring the vibrations velocity you can set the warning and alarm levels separately for RMS, P-K and P-P values. When you click in the ***Alerts*** field the following window appears:



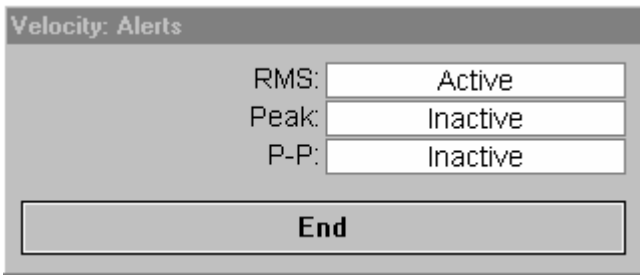
If the levels were not programmed then in the corresponding fields are displayed the words ***Inactive***. In order to program the levels you should click in a given field. For example if you click in the field RMS then another window is displayed:



Here we type-in into these fields the desired levels:

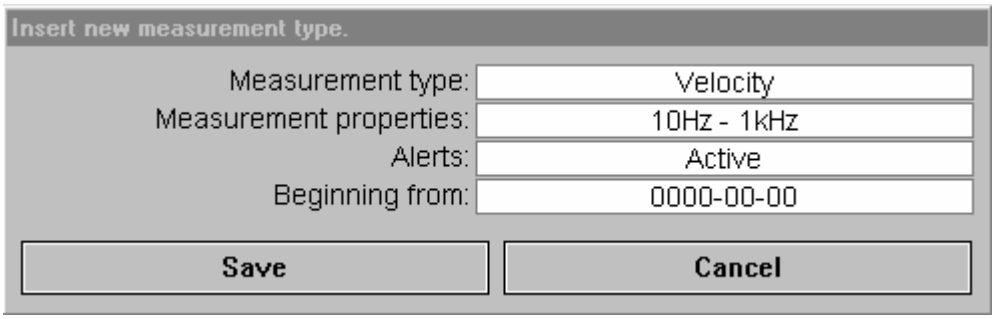


In order to confirm the selection you should press ***End***. You will be then taken back to the previous window but this time in the corresponding field appears the word ***Active***:



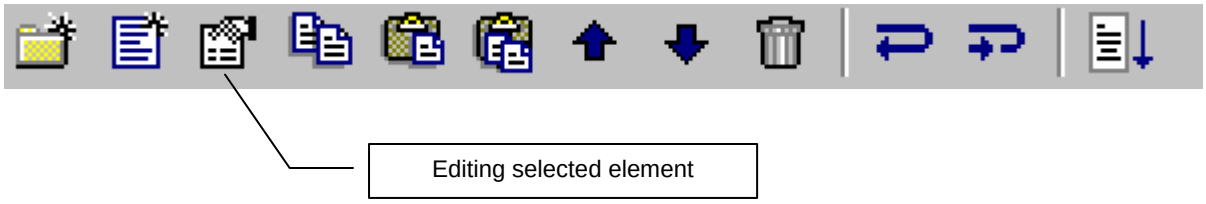
If we want to desactivate the alerts then we should enter zero values for the warning and alarm levels.

We close the window by selecting ***End*** and we return to the initial window for inserting a new type of measurement but this time the field ***Alerts*** indicates that the alarms are activated:



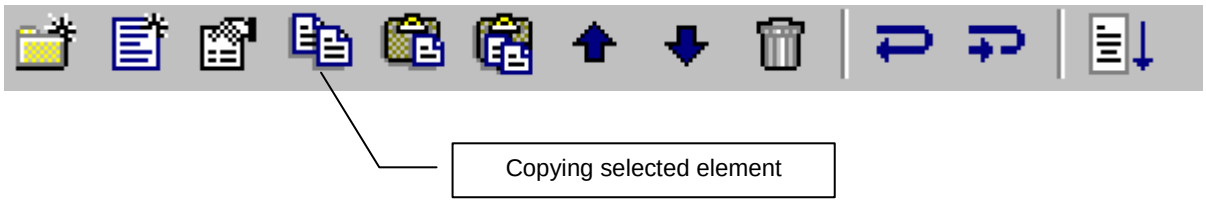
By pressing Save we confirm the setting up of a new type of measurement.

4.3 Editing the element



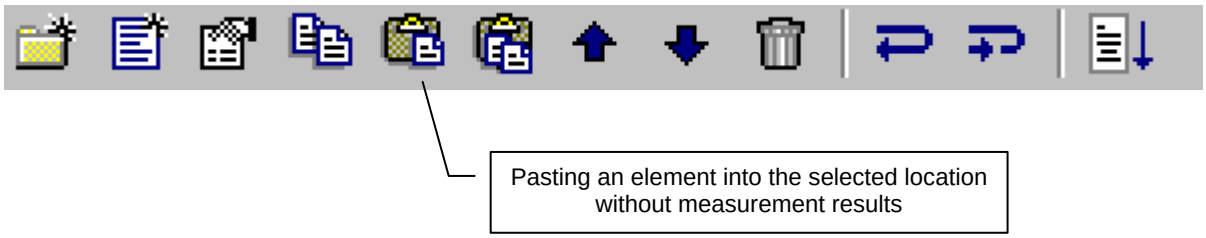
After having pressed on this icon will appear a table adequate with the selection we have made in the tree: a group or a type of measurement. These are the same tables as for the creation of a new element and are used to make the changes or corrections in the existing tree structure.

4.4 Copying the element



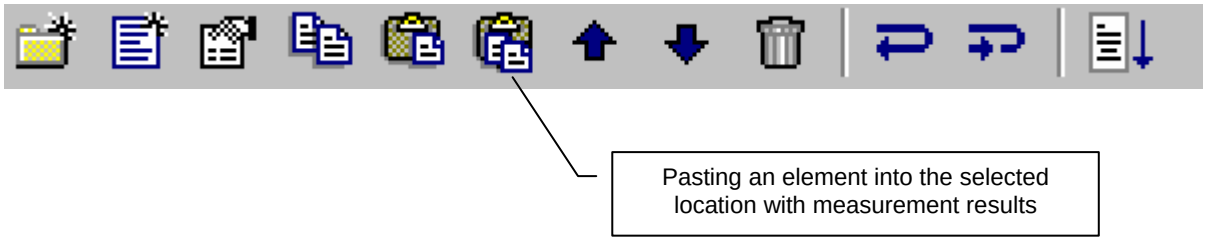
If some elements in the tree reoccur then a good solution consists on creating a model and on copying it in the tree. This icon allows us to copy the element that is marked in the tree.

4.5 Pasting copied element into a chosen location without measurement results



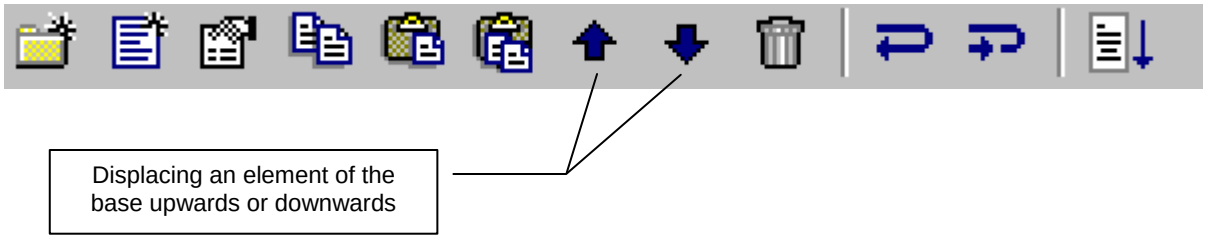
After having copied an element we mark the place in the tree where we want to paste it and then we choose this icon. The element will be copied without the measurement results it contained. Only the structure of the base has got reproduced.

4.6 Pasting copied element into a chosen location with measurement results



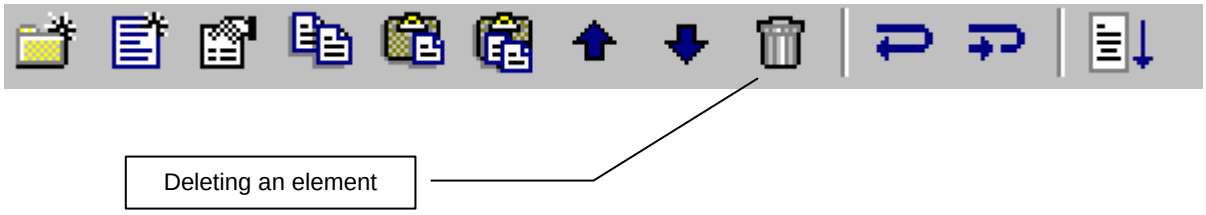
After having copied an element we mark the place in the tree where we want to paste it and then we choose this icon. The element will be copied with all the measurement results it contained. In this case, together with the structure of the data base are copied the measurement results contained in this structure.

4.7 Displacing the elements

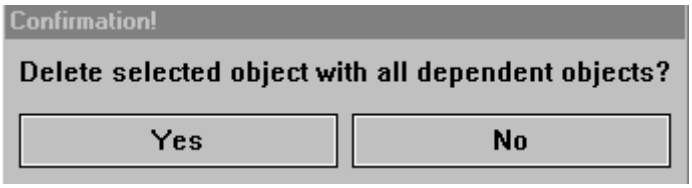


These icons help to change the sequence of the elements that are on the same level in the data base. Therefore we can rearrange the elements to obtain the order which suits us the best. The upward arrow shifts the element one position up, and the downward arrow shifts the element one position down.

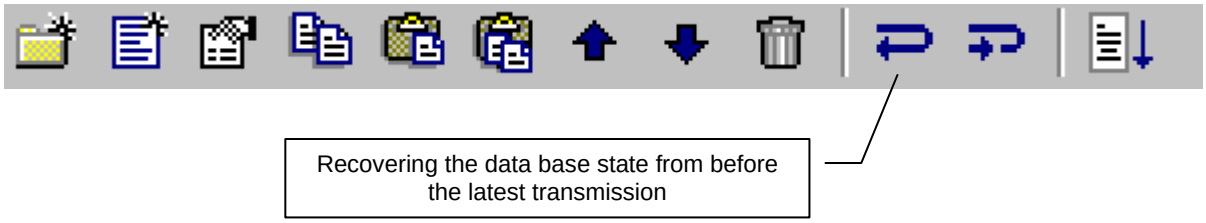
4.8 Deleting an element



The icon representing the waste basket is used for removing a selected element and all elements underneath from the data base tree. After having selected this icon appears a warning window demanding the user to confirm the required action:

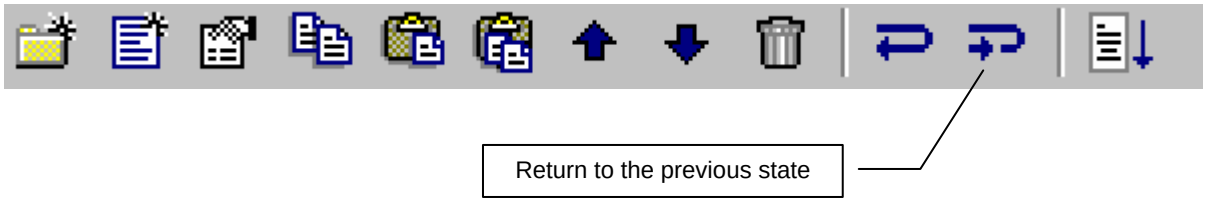


4.9 Recovering the data base as it was before the latest transmission



This function is useful in the situation when an error is made while transmitting the measurement results from the instrument, for example if these results were written into the wrong location in the data base. Using this icon we can recover the initial state of the base as it was before the transmission and repeat the transmission properly.

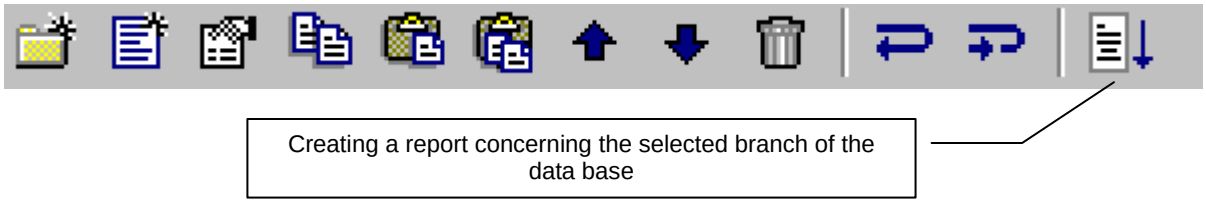
4.10 Recovering the previous state of the data base



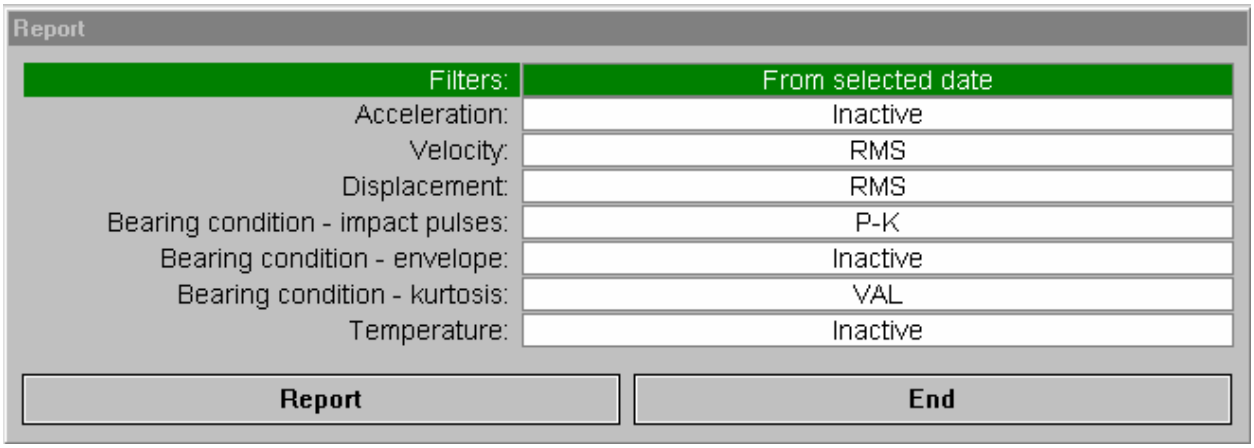
This function works in the opposite way to the previous one. Selecting this icon restores the previous state of the base.

When creating the data base one should remember that the last group element of the tree should be the measurement point on a machine. One should not add to these points other groups but only the measurement types.

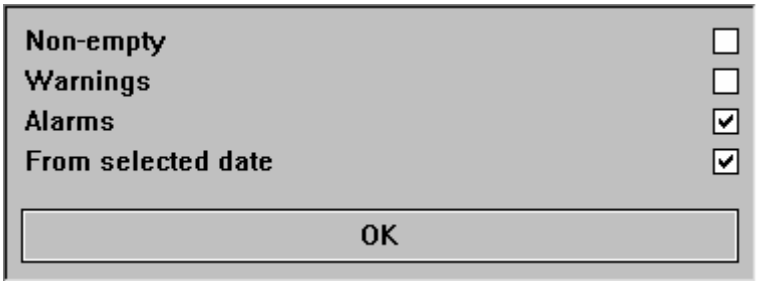
4.11 Creating the report



In the report is collected the information concerning the machines and their measurement points where the selected parameters have exceeded the warning and alarm levels. The report looks like a table and is ready to be printed. When we click on this icon we get the window that helps us to configure the report. In the first field we define the filters, that is the conditions that must be fulfilled by the measurement results in order to be included in the report. In the following lines we select the measured quantities and their detectors that should be taken in the consideration while creating the report.



Clicking in the editing field of filters (right column) will bring the window with the list of possible conditions:



Non-empty – this condition will limit the content of the report only to these machines and measurement points for which the measurement results exist in the data base,

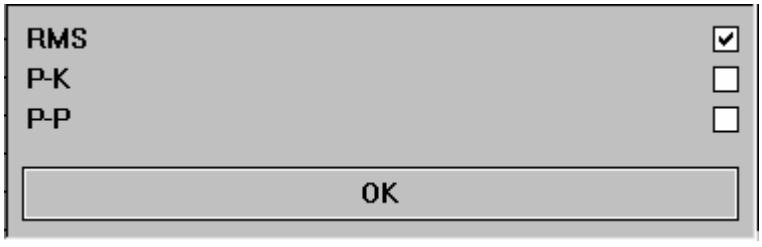
Warnings – this condition will limit the content of the report only to these machines and measurement points for which the results of selected measurement types have exceeded the warning level,

Alarms – this condition will limit the content of the report only to these machines and measurement points for which the results of selected measurement types have exceeded the alarm level,

From selected dates – this condition implies that only the measurement results that were obtained after the date that was selected in the data base tree are taken into consideration.

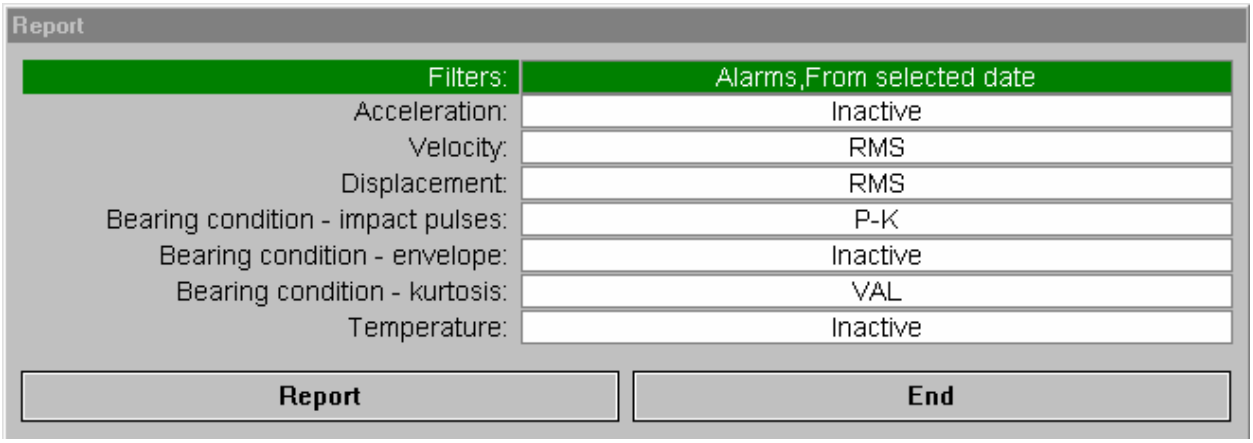
The user can choose any combination of these conditions. Only the measurement points that satisfy all selected conditions will be included in the report.

Clicking on the consecutive lines in the table we select the measured quantities which are of interest for us. The selection is made by marking the detectors corresponding to a given quantity, for example RMS for the vibrations velocity or P-K for pulses. Here is how we make the choice for vibrations velocity:



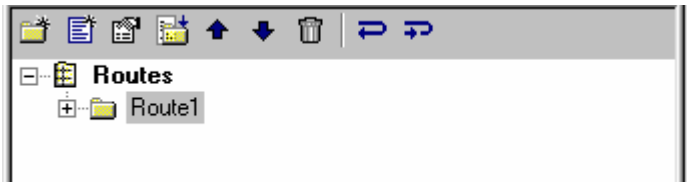
We close the window by clicking ***OK***. If for a given quantity we decide not to select any detector then in the corresponding field will appear the word ***Inactive*** and this type of measurement will not be taken into account while producing the report.

Below is shown an example of the report window which was configured in such a way that in the report will be included the machines and the measurement points for which the RMS values of vibration velocity, or RMS values of displacement, or P-K values of bearing pulses, or the value of kurtosis have exceeded the alarm levels after the selected date. We produce the report by clicking the key ***Report***. We close the window without generating the report by pressing ***End***.



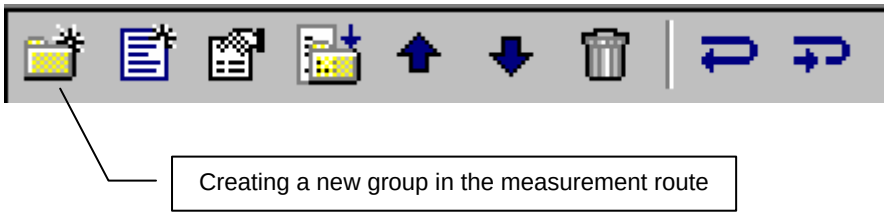
5 The measurement routes

The measurement routes are closely related to the data base, and each of them is the subset of the base. We create the measurement routes in order to transfer to the instrument the information concerning the names of machines and measurement points.



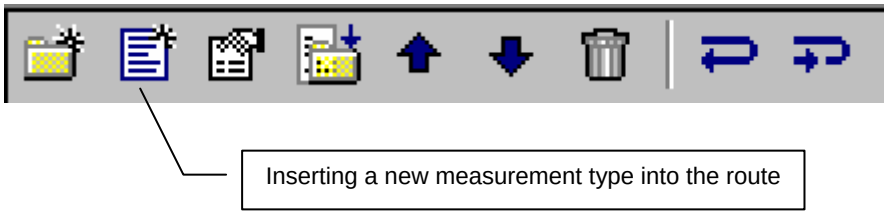
This window is used to create and design the measurement routes. The measurement route is a succession of machines and measurement points on the machines, as well as types of measurements to be performed in these measurement points. The measurement routes should facilitate the task of collecting the measurement results during the surveillance rounds and therefore all this information must be installed in the instrument memory. Below are shown the icons representing various functions which are helpful in creating the measurement route.

5.1 Creating a new route or a group in the measurement route



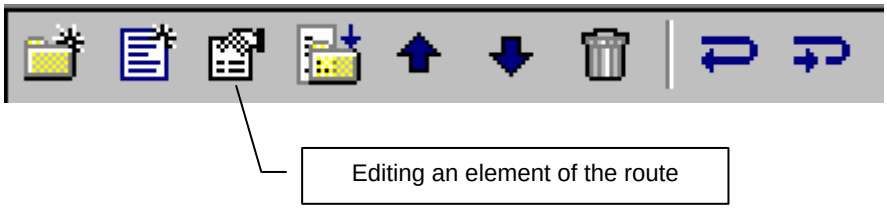
Similarly as for the creation of the data base this icon is used to create the structures of the measurement routes.

5.2 Inserting a new measurement type into the route



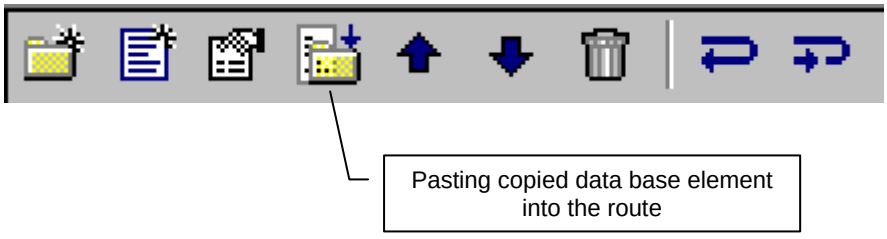
Similarly as for the data base it is used to associate a given measurement type with a measurement point.

5.3 Editing an element of the route



It helps to make the changes and the corrections in the existing structures of routes.

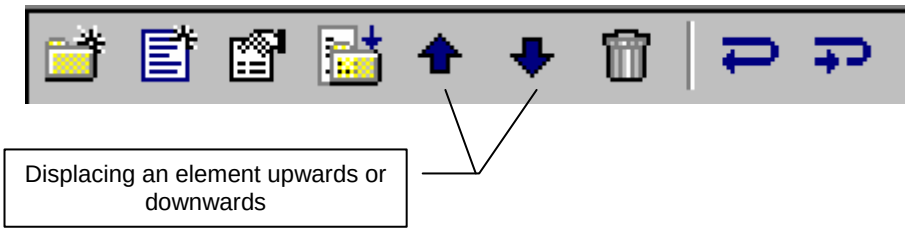
5.4 Copying-pasting a data base element into the route



This icon facilitates the creation of routes from the existing data base. It is used to insert into the structure of the route the data base elements. First we copy the selected element using the corresponding icon in the data base. Next we open the routes window, and we mark the

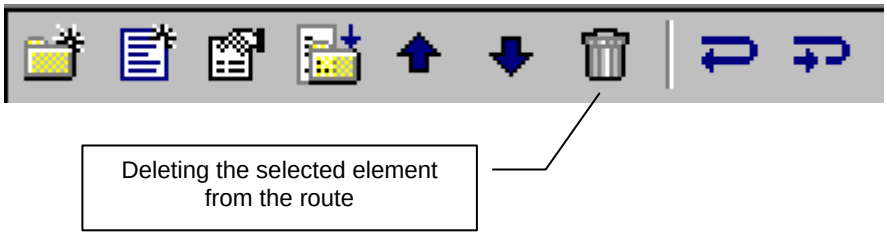
location where we want to insert this element, and finally we paste the element using this icon.

5.5 Displacing the element upwards (earlier) or downwards (later)



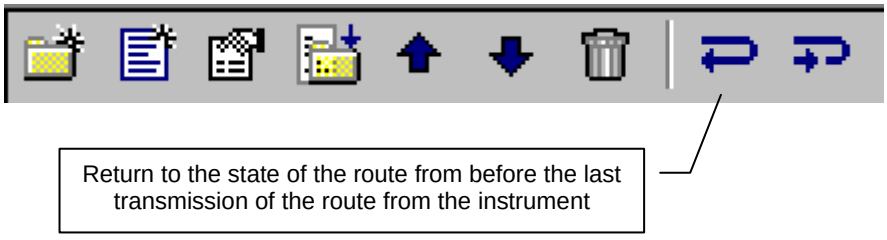
These two icons are used to change the sequence of elements in the measurement route. It is important to be able to design the sequence of measurements that is the most efficient and convenient. The upward arrow shifts the selected element of the route one position up (earlier), and the downward arrow shifts the element one position down (later).

5.6 Deleting an element from the route



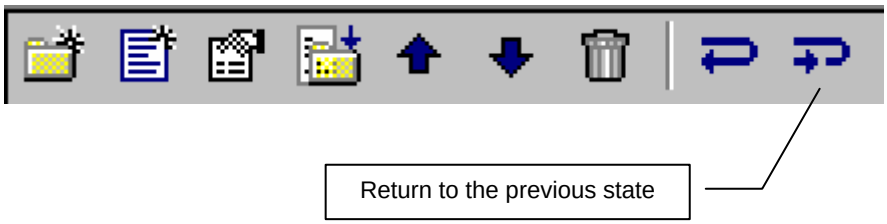
Similarly like in the case of data base this icon helps tp eliminate the elements from the structure.

5.7 Returning to the state of routes as it was before transmission



This icon will be used on very rare occasions when the route is transferred from the instrument to the computer. It allows us to recover the state of the measurement routes from before the transmission.

5.8 Returning to the latest state of the route



This function is the opposite to the previous one. Choosing this icon will restore the latest measurement route.

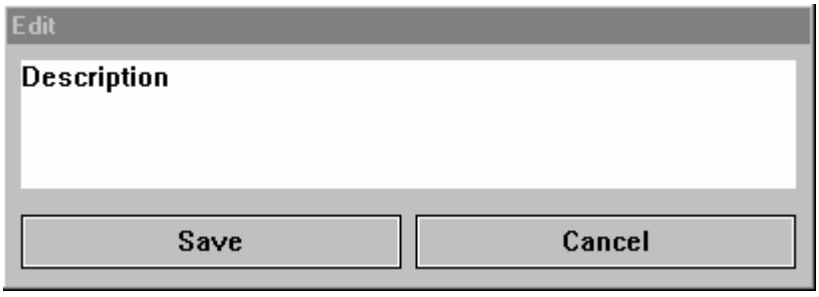
6 Measurements

The ***Measurements*** window is used to review the measurement results that are stored in the data base. We open this window by selecting in the main menu the icon 

. The appearance of the ***Measurements*** window depends on what is being selected in the tree.

6.1 Group description in the data base tree

If a group is selected in the tree then at the top of the ***Measurements*** window is displayed a table containing the information about the number of collected measurements, and about the number of results that in a given branch have exceeded the warning and alarm levels. The remaining part of this window is filled in with the the gray background containing the description of the selected group, for example the description of a machine or a measurement point. At the bottom of the window there is the key ***Edit***. By pressing this key we open the window (shown below) that is used to create or to modify the description:



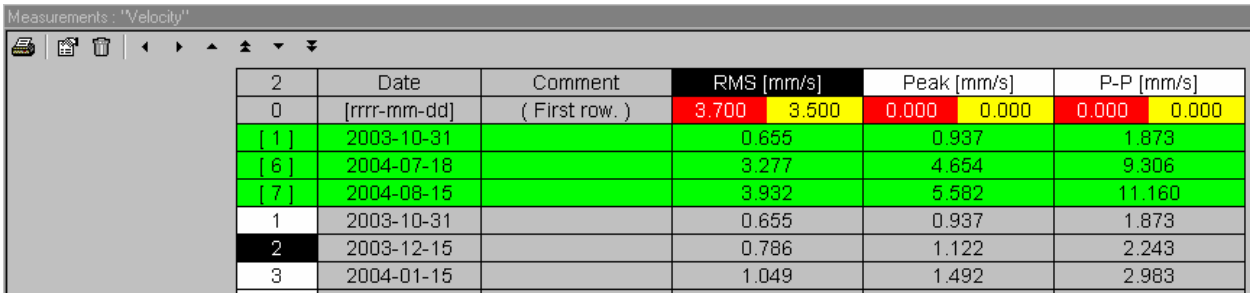
The key ***Save*** is used to store just created or modified description, while the key ***Cancel*** closes the window without saving the description.

6.2 Consulting the measurements results

If in the data base tree we have selected the measurement type and if underneath are saved the measurement results, then the window ***Measurements*** will allow us to review these results. The window is divided into two parts and in the upper part the results are shown in the tabular form, while in the lower part they are displayed graphically..

6.2.1 Window with the table of measurement results

This window is composed of a table and the icon bar located above the table. In the first column is indicated consecutive numbers of measurements, in the second column there are the dates when these measurements were done and in the third are the remarks. In the following columns are shown the measurement results. This part of the table will be different for different types of measurements and this rule does not concern neither the FFT analysis, nor the balancing. In the case of FFT analysis these columns contain the parameters of the analysis, while in the case of balancing the table consists only of three columns, while the measurement results are shown in a separate table. Below is an example of the window with the measurement results table:

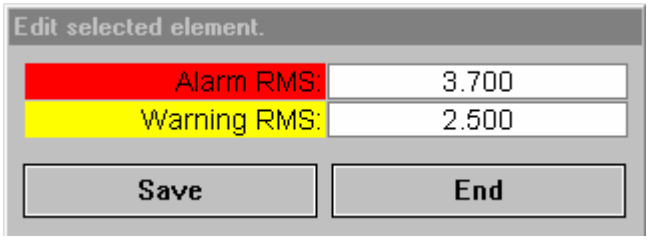


2	Date	Comment	RMS [mm/s]		Peak [mm/s]		P-P [mm/s]	
0	[rrrr-mm-dd]	(First row.)	3.700	3.500	0.000	0.000	0.000	0.000
[1]	2003-10-31		0.655		0.937		1.873	
[6]	2004-07-18		3.277		4.654		9.306	
[7]	2004-08-15		3.932		5.582		11.160	
1	2003-10-31		0.655		0.937		1.873	
2	2003-12-15		0.786		1.122		2.243	
3	2004-01-15		1.049		1.492		2.983	

Several important fields of the table are marked out. In green colour are marked the three lines that contain the first, the before the last and the last measurement. Thanks to that it is possible to quickly recognize the change in the value of a given parameter from the beginning till the last period of time. Underneath, in the following lines, are shown the consecutive measurements. The number of each measurement is indicated in the first column and by clicking on it we can select a given measurement to add a comment or to delete it from the table.

6.2.1.1 Window with the scalar measurements table

In each column with the measurement results we can notice the red and yellow fields. In these fields are shown the alarm and warning levels for a given parameter. By clicking in these fields we open a new window in which we can select these levels:



In the white fields we can type in warning and alarm levels. By pressing ***Save*** we confirm our edition, while by pressing ***End*** we close the window without registering the changes. If one of the parameters exceeds a warning or alarm level then in the data base tree appears the appropriate flag. If we do not want to signal the warning or alarm condition then we should type in 0. If none of the parameters exceeds one of these levels then the flag has green colour. If in the selected branch some parameters exceed only warning level, and some other exceed the alarm level then in the tree will be displayed both flags.

Below are explained the meanings of icons from the icon bar:

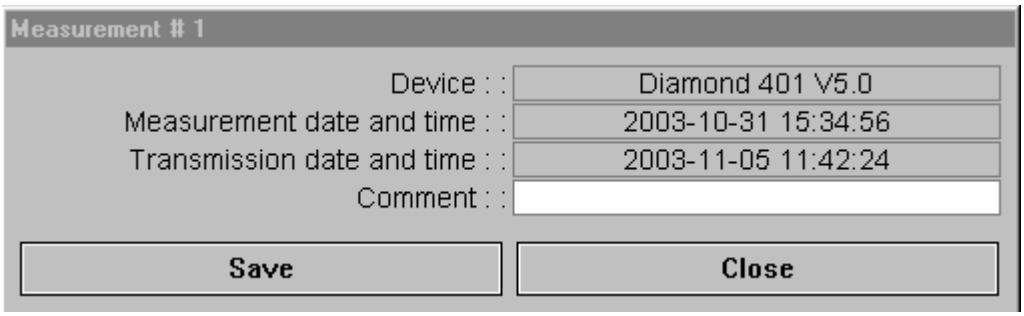
Copy – after clicking on this icon the results from the selected line of the table are copied to the clipboard and can be then pasted to another program or application

This icon is used to launch printing. In addition to the graph the following information is printed:

1. Location in the data base
2. Name of the machine and measurement point
3. Measurement type
4. Measurement and printing dates
5. User comment (in the comment is included the text taken from the description of a machine, measurement point and type of measurement)

Edit - this icon helps to add comments to a given measurement

In order to add the comment to a measurement we should first mark this measurement in the first column and then press this icon. As a result appears the window containing the information from which instrument originates the measurement, the date of measurement and the date of transmission.



When we click on the empty field in the last line appears a new window in which we can type in the comment.

By clicking ***OK*** we accept the comment and we return to the previous window wher we should click ***Save***.

Basket is used to delete the selected measurement. The selection is made in the first column and then we press this icon. Appears then the window where we confirm or cancel this action.

6.2.1.2 Balancing table window

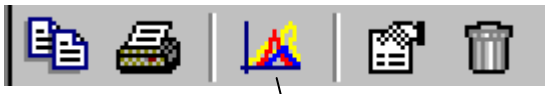
This window is different since balancing is not an ordinary measurement but a collection of measurements. In the table is only indicated the number of balancing, its date and comments. Underneath there is another table containing the descriptions and the results of all measurements done during the balancing. In the case of one-plane balancing a part of this table is empty. The icon bar in the balancing table window contains one more icon for transferring the balancing to the measurement instrument and two other icons for scanning the table with the balancing measurements results.

Icon for transmitting the selected in the table balancing to the measurement instrument. We click on this icon once we have activated the transmission in the instrument. The selected from the table balancing will be transferred to the instrument and memorized with the number: ***Machine :001*** and ***Point :01***.

Two icons helping to scan through the table with the balancing results. Therefore we can review all consecutive verification measurements and their corresponding corrective masses.

6.2.1.3 FFT analysis table window

In this case, in place of results the table contains the information concerning the measurement parameters: the frequency range, the number of lines, the degree of Zoom (if it was used). One of the icons in the bar is reserved for FFT analysis:



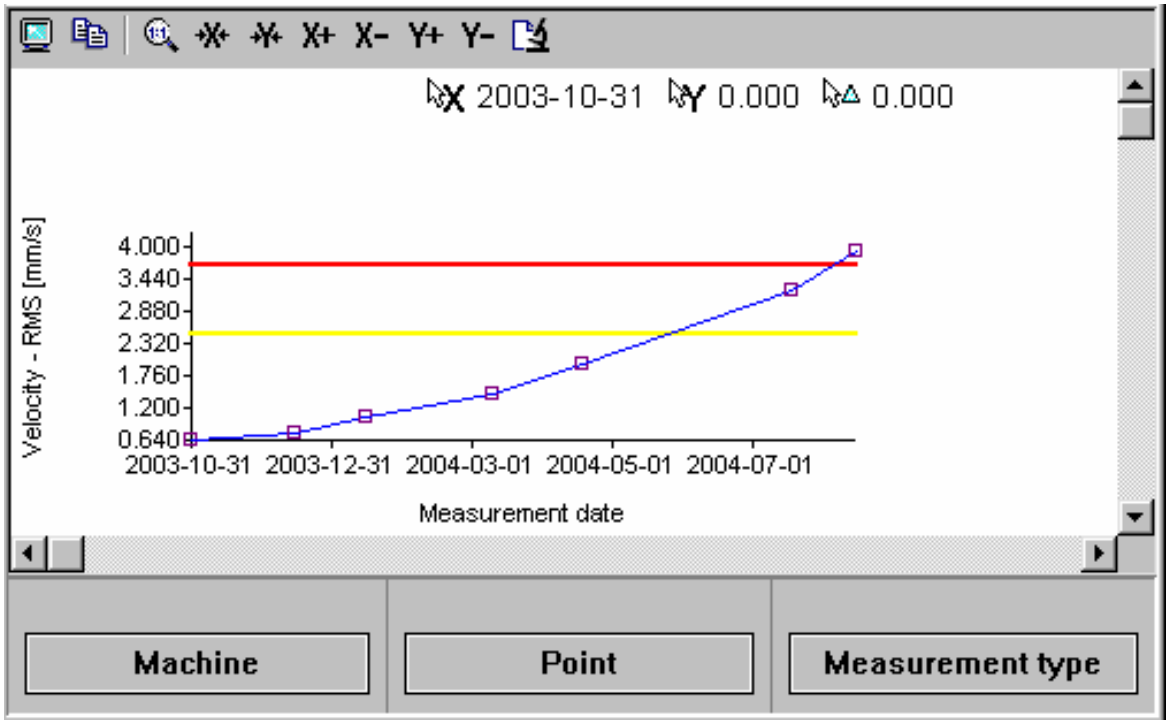
Multiple graphs - this icon turns on and off the possibility to simultaneously display greater number of FFT analysis results on the same graph. Once we click on it then by default all lines in the table are selected. By maintaining the key ***Crtl*** depressed we can now reject or maintain in the first column the consecutive lines with FFT analysis. The lines with the FFT results that are selected in the table can now be shown n the lower window as a waterfall display or we can turn on an additional scalar graph showing how given spectral components ("orders") were changing with time.

6.2.2 Graphs window

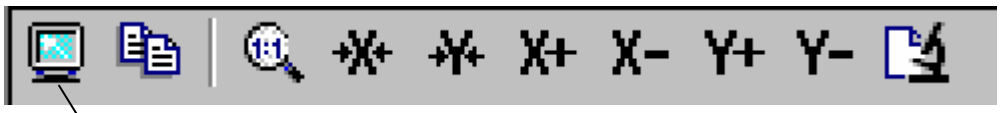
The window showing the graphics is located underneath the window with tables. Depending on the type of measurement it will have different appearance. The scalar graphs are reserved for displaying the quantities which give the results in form of numbers. A particular case of scalar graph is the chart showing the phase measurement since it represents simultaneously two values. The FFT analysis is a different case since its result is by itself a graph. Finally, the balancing constitutes still another set of requirements. In the following paragraphs we shall discuss various types of graphics.

6.2.2.1 Scalar graph window

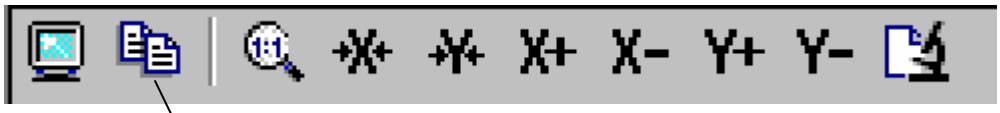
Below is shown an example of a window with the scalar graph. On the top of the window there is the icon bar which helps to manipulate the graph. Underneath the bar there are displayed the coordinates of the cursor. At the bottom of the window are three keys that are used to edit the descriptions. From the left: the key to edit the description of the machine (***Machine***), next one for the edition of the measurement point (***Point***), and the last one for the description of the measured quantity (***Measurement type***). The first two descriptions are accessible also from the data base if we click on the corresponding branch.



Here are the meanings of the icons:



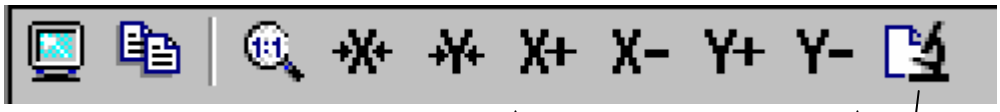
Whole screen – this icon helps to expand the graph on the whole screen



Copy – after selecting this icon the graph will be copied to the clipboard and then can be pasted to another program or application

XY normalization - Icons used to normalize separately X and Y axis in order to be able to see its whole range on the respective axis

Scale 1:1 - Icon used to normalize the scale of the X and Y axis simultaneously



XY scale - Icons used to change the scale of X and Y axis. Icons **X+** and **Y+** cause that the scales will increase, while **X-** and **Y-** provoke the diminishing of the respective scale

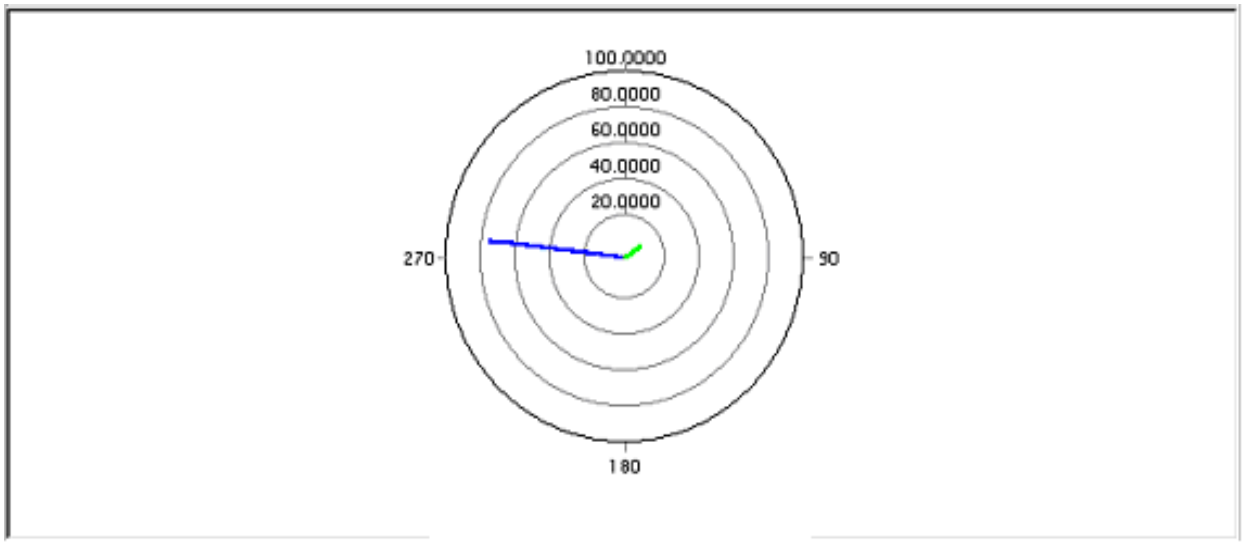
Analysis - icon that turns on and off the trend analysis. The program uses an algorithm for vibrations analysis and prediction. This algorithm fits to the diagram the curve representing the trend and underneath the graph is displayed the time left till the warning and alarm levels are exceeded.

6.2.2.2 Phase graph window

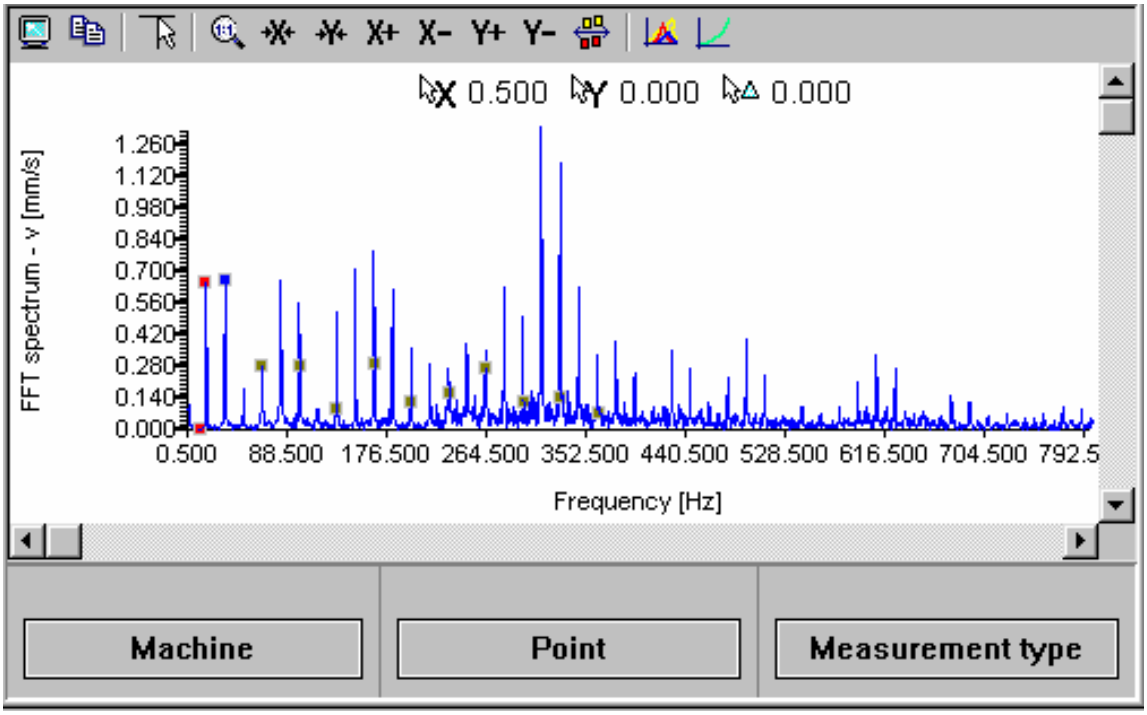
The window with the phase diagram consists of two scalar graphs one above the other. The upper graph represents the changes in the phase angle, while the lower shows the RMS value of vibrations. When we move the cursor on the upper graph, then the cursor on the lower graph is synchronized and follows the movements. It is also possible to move the lower cursor independently.

6.2.2.3 Balancing graph window

In this window are shown graphically, as vectors, the initial unbalance and the residual corrector. From this diagram we can immediately see what is the result of balancing. In case of one-plan balancing we get one circular diagram, while for two-plane balancing we get two graphs, one for each plane. Below is an example of the one-plan balancing:



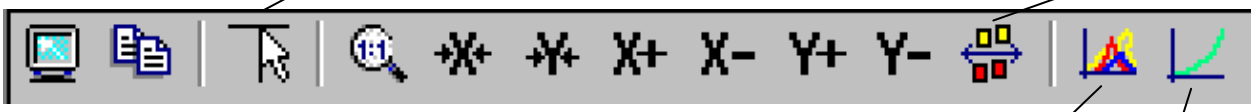
6.2.2.4 FFT analysis graph window



Above is shown the window with a graph showing the results of FFT analysis. On the top of the window there is the icon bar, with icons that help to view and to analyse the graph. Here are the explanations concerning the icons that were not described previously. The remaining ones have the same meaning.

Cursor - Icon to open and close the window for cursor configuration

Fundamental frequency - icon used to determine the fundamental frequency in order to be able to identify the harmonics. You place the cursor on the fundamental and then press this icon.

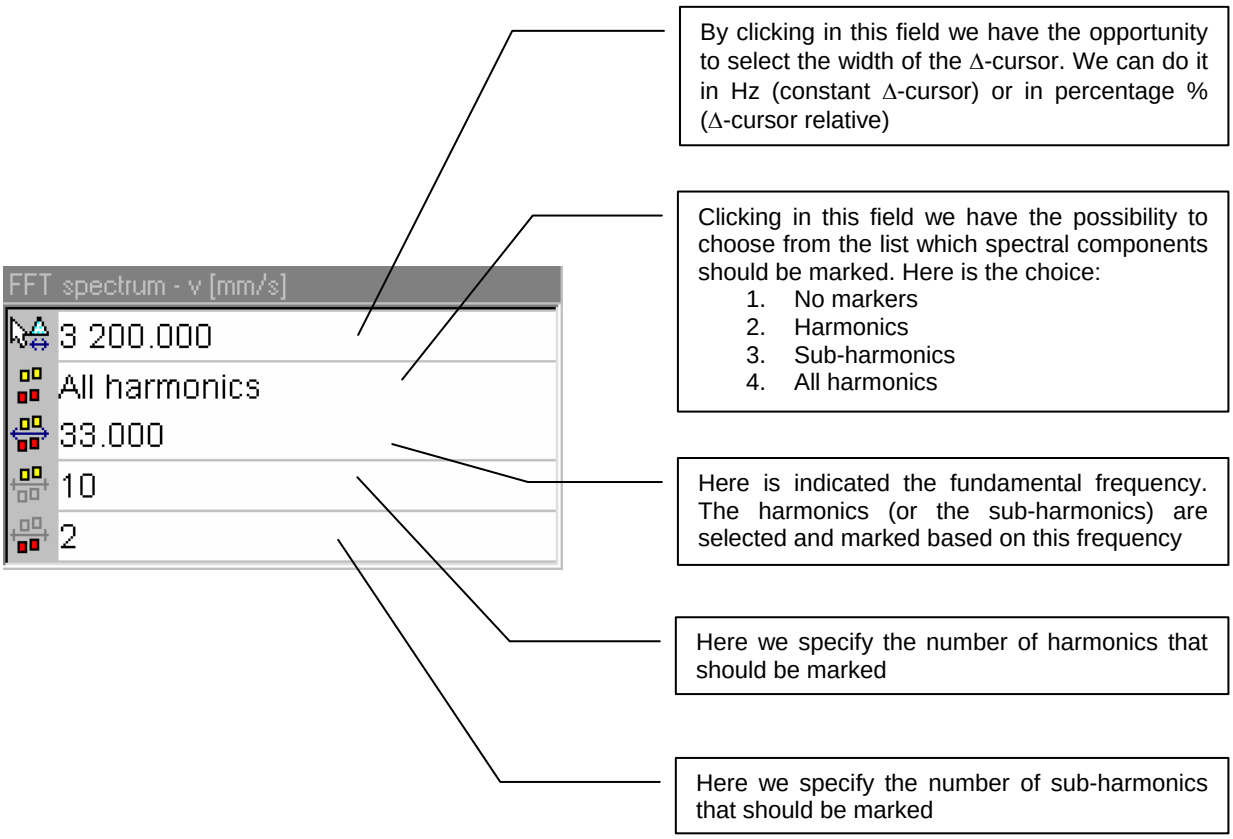


Waterfall display - icon used to switch between the ways of presenting several FFT graphs simultaneously. It switches between presenting several spectra in one coordinates system, or as a « waterfall » display along the third axis.

Trend display - this icon will turn on the additional scalar graph showing the change with time of a selected vibrations component (order). It is possible that in consecutive spectra the same harmonic components can be located on slightly different frequencies. That's why it is recommended to use in all spectra the Δ-cursor in order to encompass the whole vibration component. Then these small differences will not have any significance.
Remark: in order to move the cursor along the additional scalar graph we should maintain the **Ctrl** key depressed.

6.2.2.5 Cursor configuration window for FFT analysis graph

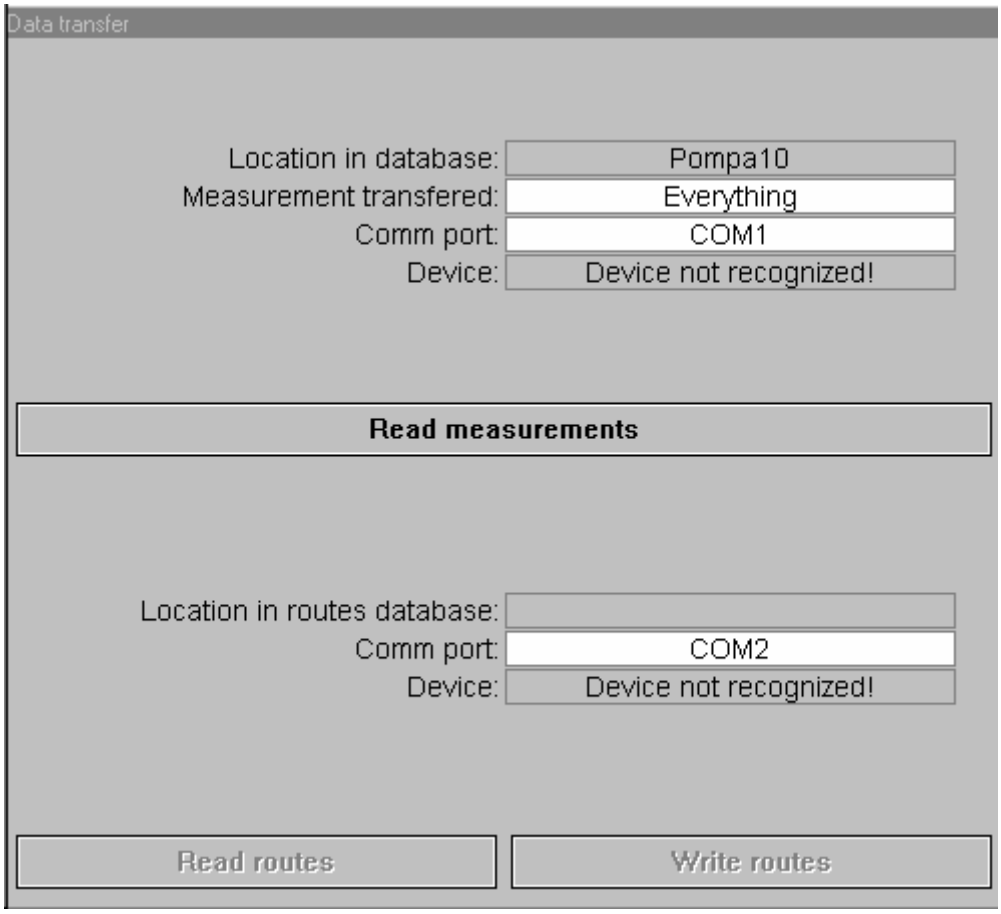
With the FFT analysis graphs the user has the possibility to configure the cursor parameters. The window to do that is shown below. The Δ-cursor function allows the user to measure the whole value of a given vibration component when it is spread over several spectral lines. The value of the Δ-cursor that is displayed next to the coordinates of the cursor is equal to the sum of spectral lines from within its range. The range of the Δ-cursor is selected in the first line. The following four lines concern the selection of harmonic components to be marked on the FFT display.



7 Data transmission

In order to open the data transfer window we should press the icon 

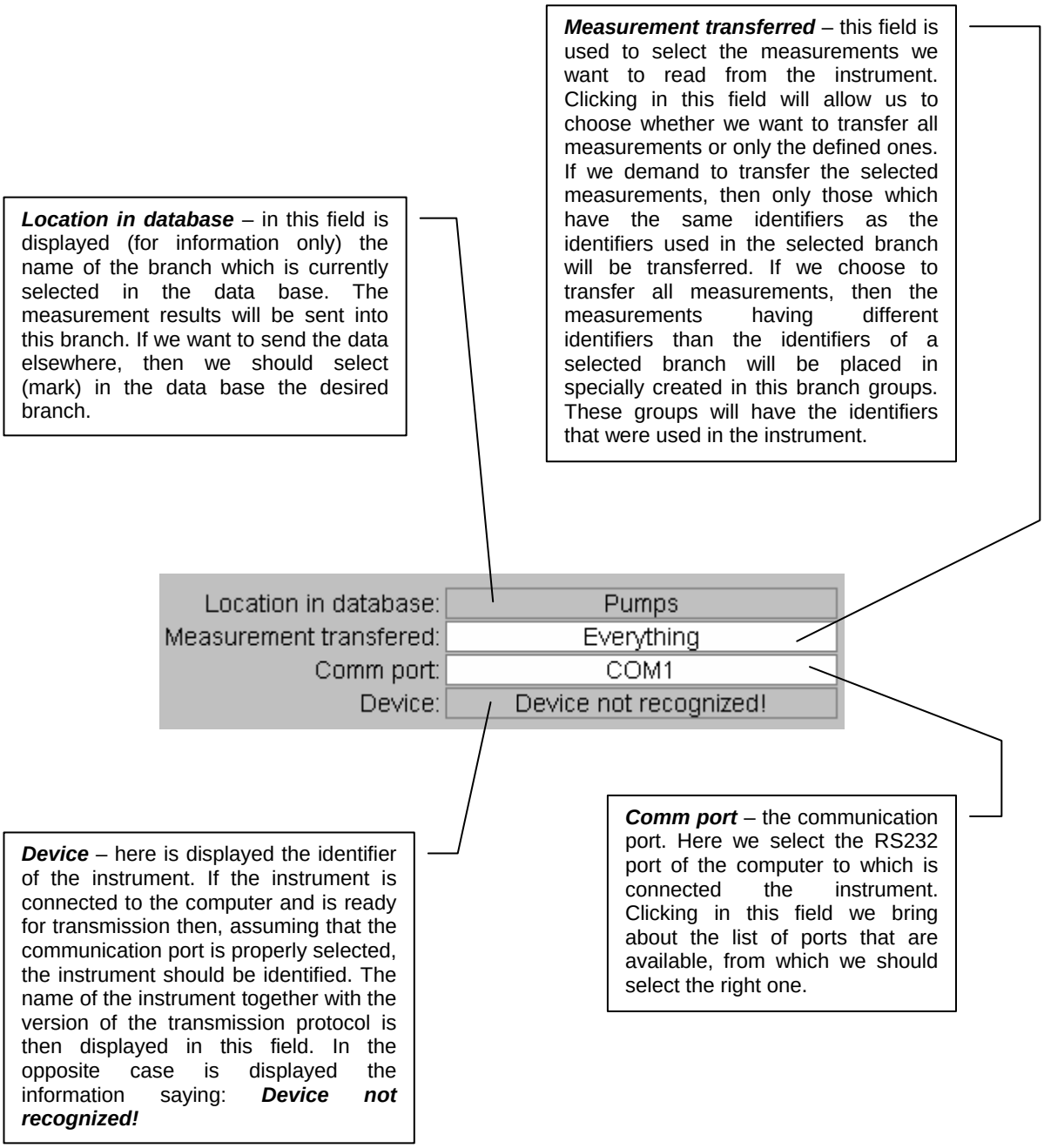
. The following window will appear:



This window is composed of two parts. The upper part is conceived to read into the data base the measurement results from the instrument. The lower part is used to send to the instrument (and, occasionally, to receive from the instrument) the measurement routes. In both parts there are the fields where the user can adjust some parameters and the keys to launch the transmission.

7.1 Reading the measurement results from the instrument

The upper part of the window, which is used to read the results from the instrument, consists of two columns and four lines. The left side column contains the name of parameters that are shown or can be selected in the right column. Only two of these parameters can be programmed. Here is an example:



Measurement transferred – this field is used to select the measurements we want to read from the instrument. Clicking in this field will allow us to choose whether we want to transfer all measurements or only the defined ones. If we demand to transfer the selected measurements, then only those which have the same identifiers as the identifiers used in the selected branch will be transferred. If we choose to transfer all measurements, then the measurements having different identifiers than the identifiers of a selected branch will be placed in specially created in this branch groups. These groups will have the identifiers that were used in the instrument.

Location in database – in this field is displayed (for information only) the name of the branch which is currently selected in the data base. The measurement results will be sent into this branch. If we want to send the data elsewhere, then we should select (mark) in the data base the desired branch.

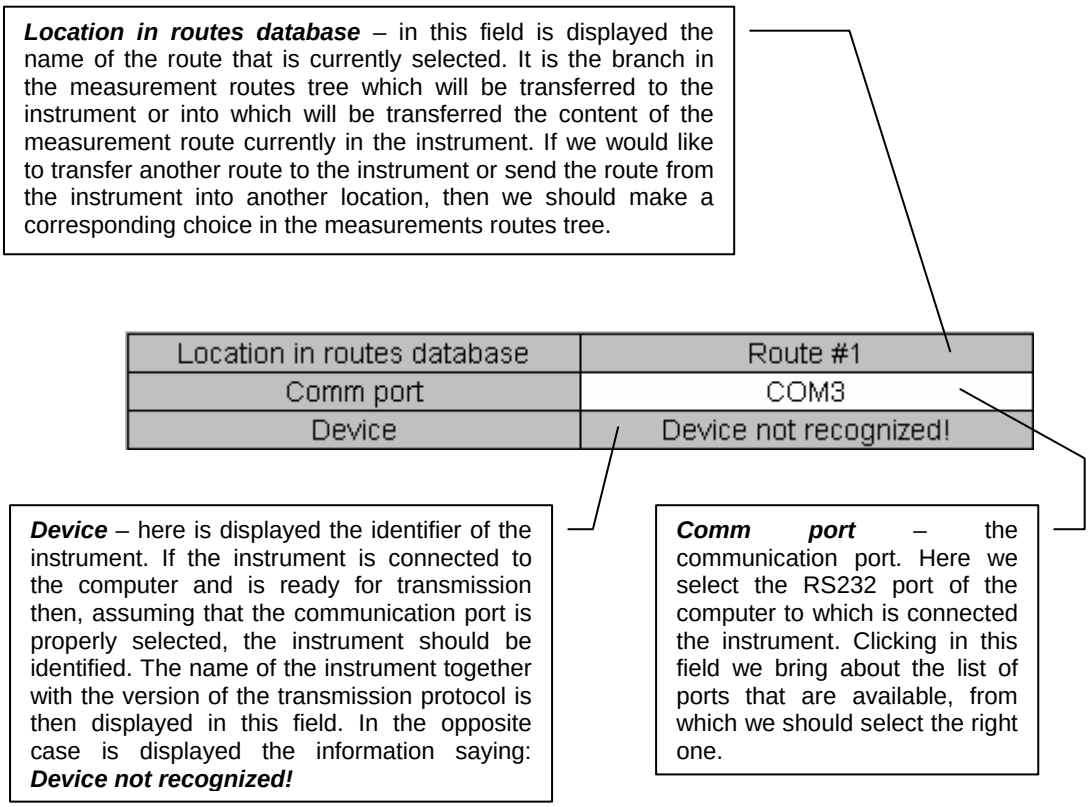
Comm port – the communication port. Here we select the RS232 port of the computer to which is connected the instrument. Clicking in this field we bring about the list of ports that are available, from which we should select the right one.

Device – here is displayed the identifier of the instrument. If the instrument is connected to the computer and is ready for transmission then, assuming that the communication port is properly selected, the instrument should be identified. The name of the instrument together with the version of the transmission protocol is then displayed in this field. In the opposite case is displayed the information saying: ***Device not recognized!***

When we are ready to transfer the data we start the transmission by pressing ***Read measurements***. During the transmission appears a window informing about the progress of the transmission. Once the transfer is completed this window disappears.

7.2 Writing and reading the measurement routes

The lower part of the data transfer window concerning the measurement routes consists of three lines and two columns. The left side column contains the names of parameters that are displayed in the right side column. Here is an example:



Location in routes database – in this field is displayed the name of the route that is currently selected. It is the branch in the measurement routes tree which will be transferred to the instrument or into which will be transferred the content of the measurement route currently in the instrument. If we would like to transfer another route to the instrument or send the route from the instrument into another location, then we should make a corresponding choice in the measurements routes tree.

Device – here is displayed the identifier of the instrument. If the instrument is connected to the computer and is ready for transmission then, assuming that the communication port is properly selected, the instrument should be identified. The name of the instrument together with the version of the transmission protocol is then displayed in this field. In the opposite case is displayed the information saying: ***Device not recognized!***

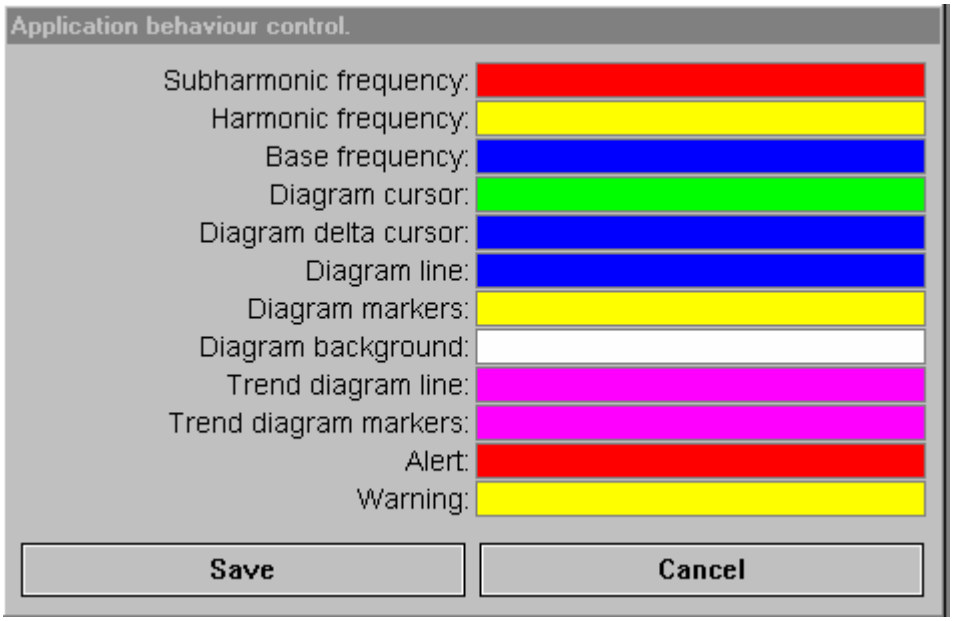
Comm port – the communication port. Here we select the RS232 port of the computer to which is connected the instrument. Clicking in this field we bring about the list of ports that are available, from which we should select the right one.

At the bottom of the window are two keys. The key ***Read routes*** will launch reading the route from the instrument and the key ***Write routes*** is used to transfer and register the route in the instrument.

8 Program configuration

The following icon from the main menu 

is used to configure various parameters of the program. After clicking on it you can adjust the colors of different elements of the graph:



The window contains the denomination of respective elements of display and the field filled in with the currently selected colors. By clicking in a given field we open the window where we can select the desired color.

9 General recommendations on how to use MBJLab with the instrument

DIAMOND 401 combines broad range of measurement capabilities with very convenient and efficient method of collecting the measurements. These measurements are collected along the measurement route. When creating the data base and designing the route we should remember ***the name of the machine and of the measurement point cannot exceed 16 characters***. If the names are longer they will be automatically truncated and this can generate the confusion if the 16 characters that are left are identical in several machines! We should also make sure that in the data base or in its branch, where the measurement data are transferred, the names of machines are different.