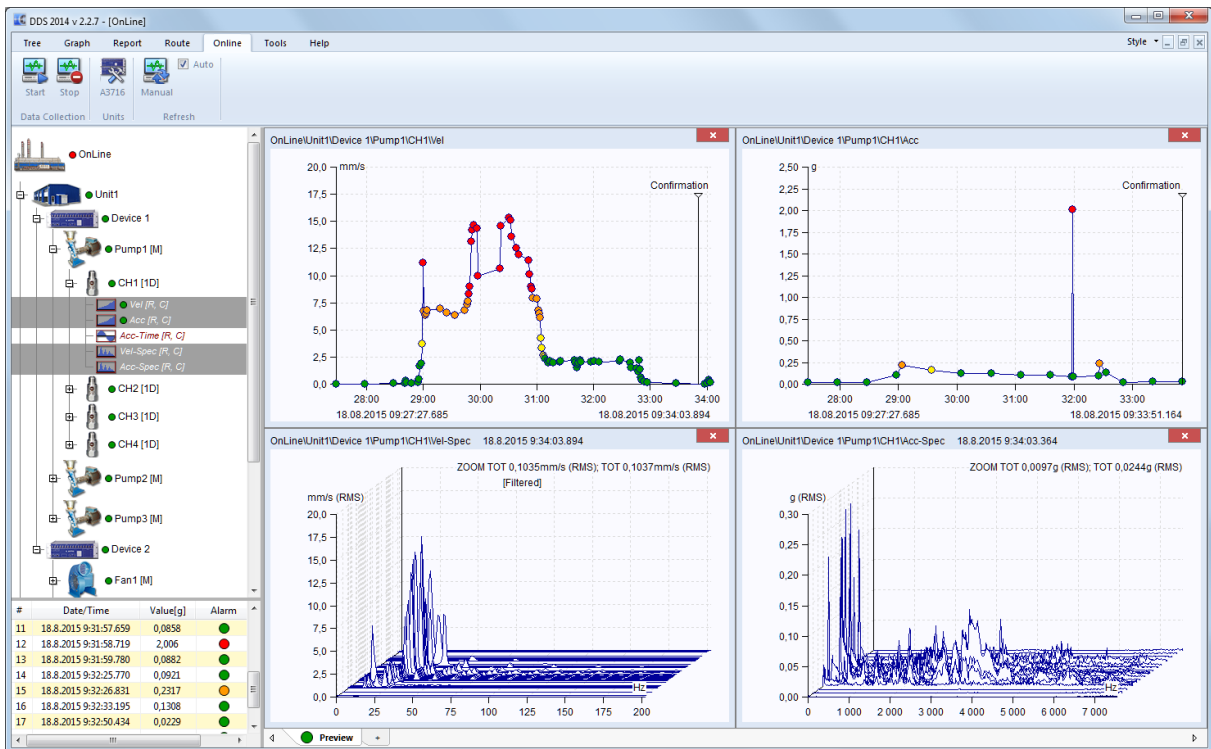




# USER MANUAL

## DDS



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# **Installation**

## **System Requirements**

DDS is designed for MS Windows 7 and higher systems. It could also be run on MS Windows XP, but we do not fully guarantee 100% functionality.

## **What is needed to run the full version of DDS?**

You need the following things to run the full version of DDS for the first time:

1. Run the installation file (which you received on the USB drive or CD).
2. Keep the **USB drive (or CD)** inserted during the first run of DDS as the license file is being imported to DDS.
3. Insert the **USB dongle** to the computer USB port; the license key is there.

*Note: During the first run of DDS, the USB drive (or CD) with installation files and license file needs to be inserted. During another runs of DDS you don't need the USB drive there anymore. The hardware dongle (with license key) has to be inserted every time you run DDS.*

## **License Key**

Please be aware that the license key is saved in USB dongle. Actually you buy the dongle not the software which is free of charge. There is no need for the dongle key for DDS used with the Vibrio M or the Lubri. There is only a small limitation – it can only handle one tree with a maximum size of 200 MB.

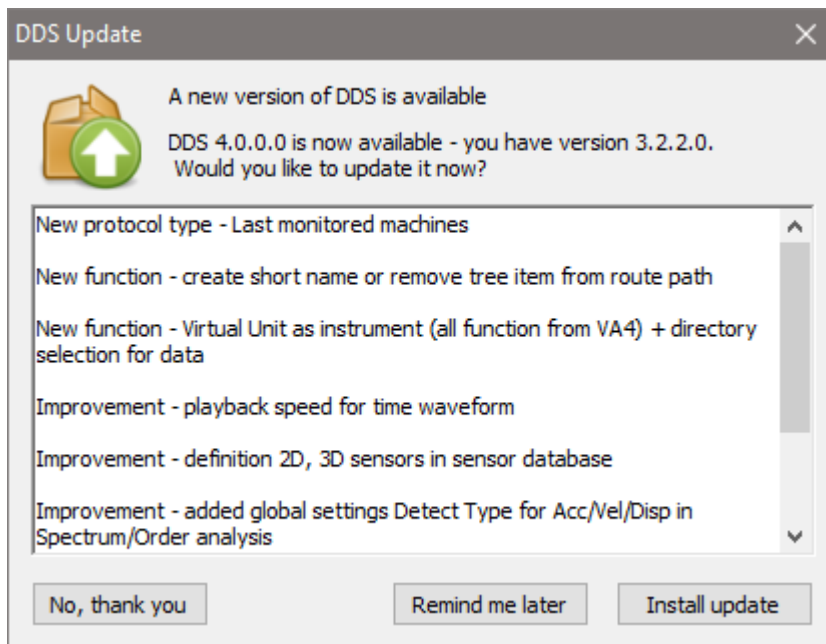
You can install DDS to many computers, but you can only run it when the dongle is found by (connected to) the computer. This is the advantage compared to a PC-based license file. You can simply move the license key between the computers.

A LAN dongle is also available for running multiple applications. Contact us for details.

*Advanced Note: If you have more Adash software products, you only need one dongle. All additional details about the products properties are saved in the file with the .lic (.aky for older products) extension in the main directory (folder). If you contact us regarding licenses, please always provide us with the dongle serial number to us.*

## **Upgrading**

When you run the DDS, then it checks the newer version on Adash website. If the newer version is available, you can install it.



Install update – the new version will be downloaded and installed. The DDS has been closed before updating.

Remind me later – skipping of update and the new version will be offered again in next run.

No, thank you – skipping of update and the checking of newer version will not be made in future runs.

Manually you can check new version by **Help/ Update** button.

The newer version you can also find directly on [www.adash.com](http://www.adash.com).

## DDS Installation

### DDS

You can always find the installation file on the Adash website ([www.adash.com](http://www.adash.com)) in the Download/Adash software section. Installation has one file and you need appropriate rights for running it (if you have problem to run installation, contact your IT administrator). Follow the installer instructions during installation.

DDS will be installed to *C:\Program Files(x86)\Adash\DDS* or *C:\Program Files\Adash\DDS*. It depends on whether you have 32 or 64bit system. You can choose another specific location.

Leave the option “always use the DDS to open .ndb file” checked, if you wish to open the .ndb files in DDS by double-clicking them.

**IMPORTANT:** The license file is usually provided on a flash drive DDS tries to import it after first run. The license can be later changed/imported later using the dialog in Help / Licenses / Import.

### Dongle driver

You will find the dongle (HASP) driver on the flash drive or you can download it from the Adash website ([www.adash.com](http://www.adash.com)), in the *Download/Third parties' software/DriverHASP* section (choose your Windows version).

## Language selection

On first run on PCs where DDS has not been installed before, DDS asks which language to use. Use the *Tools/ Global/ General/ Language* in section Application. If the proper language file is not found (removed by user), then the default English version is used.

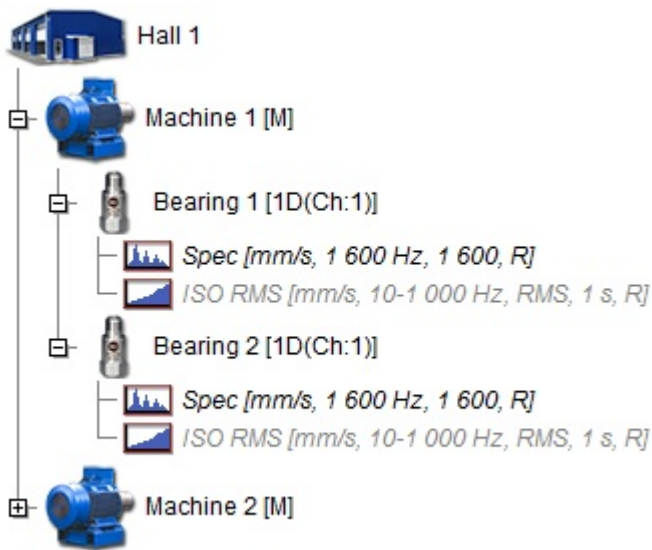
# Data Structure

## Tree

The TREE is the base of the data structure. It has the same meaning as database in the past. We are trying to leave the database in the terminology, because in many situations it can be confusing. This is the reason why you open the tree, create the new tree, delete the tree etc. Each tree is saved in one specific database file. The tree size is limited only by the free space on your hard drive.

The tree structure is hierarchical. The number of levels of the tree is not limited by DDS.

Example of a tree structure:



## Tree Item vs. Data Cell

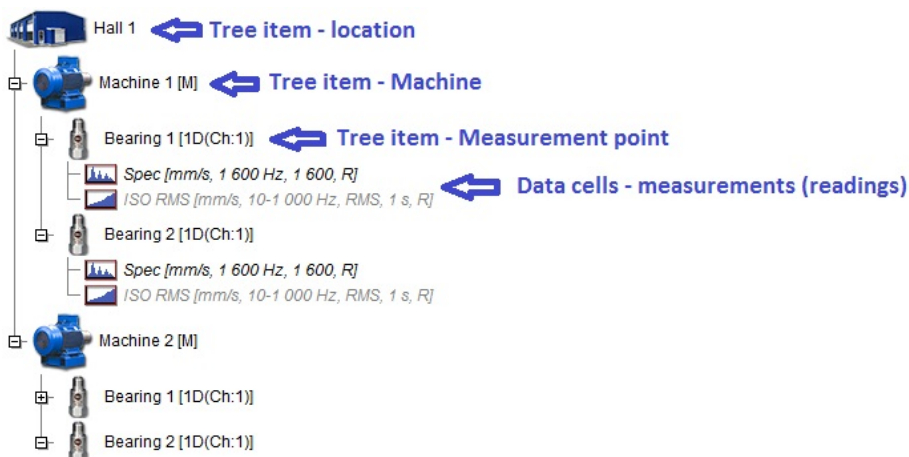
We define two different types of cells in the tree.

### Tree item

This is used for developing the tree structure ( e.g. site, production line, machine, machine parts, points, ...). The tree item doesn't contain readings (measurements)

### Data Cell

This is the item which contains readings (overalls, spectra, time waveforms,...). Typically the data cells are created under the Measurement Points. However data cells can be defined anywhere, e.g. the speed data cell is usually under the machine.



## Static and Dynamic Data Cells

There are two kinds of data cells:

**Static** this kind of cell contains readings where data are represented by one value; for example an overall or process value. The value may be complex (real+imaginary parts) and may also contain some condition information (usually the speed).

**Dynamic** this kind of cell contains readings where data are represented by an array (many) of values; for example spectrum, time waveform or order analysis.

## Route and Online Data Collection

The DDS is designed for both uses. The data formats and database structures enable one piece of software to be used for both collections.

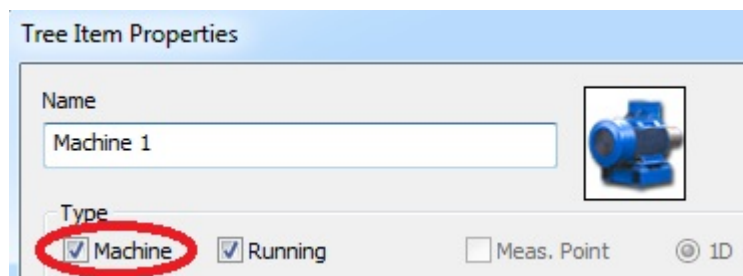
## Database Files Options

There are two options of Database Files available. Most users will use the database which is saved in one file with .ndb extension. This is the SQLite option.

The DDS can also work with MS SQL Server database. You can use the full license or just MS SQL Server Express (free, but with some limitations). DDS offers the MS SQL Server option only if the appropriate driver is installed (SQL Server Native Client 10.0/11.0).

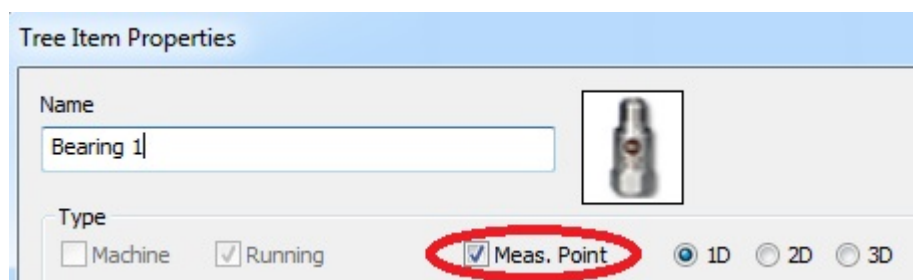
## Machine Label

Somewhere in the tree hierarchy you need to define which tree items are machines– to do so we use the Machine Label (checkbox). The route is generally the list of machines. It is the reason for defining that machine label.



## Measurement Point Label

Under the machine label you need to define the measurement points. These are the locations on the machine where the sensor is mounted. You can define one, two or three axes in one point.



The following properties are available for the point:

- technical - bearings, gears, speed conversion, ...), ...
- reading - default sensor, default RPM, ...
- alerts - bands, overalls, ...



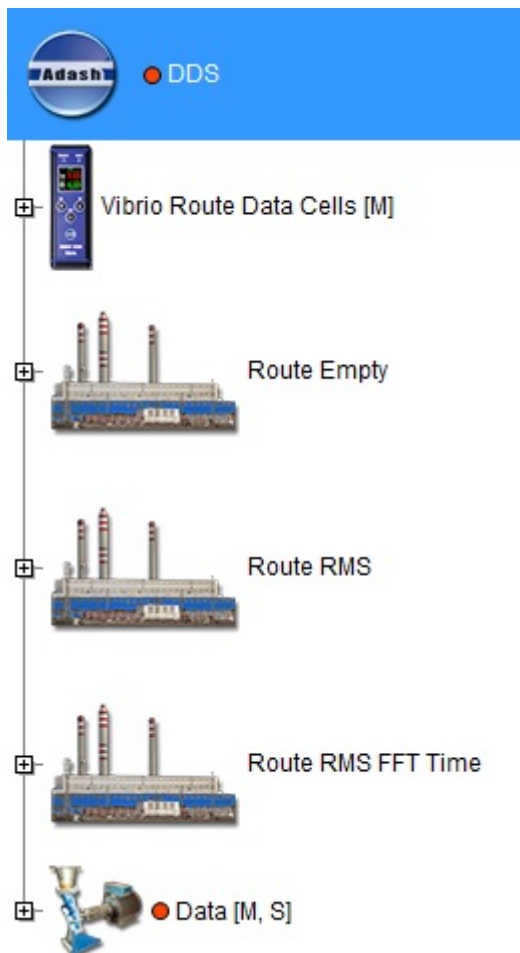
## Where are Data stored on the computer

The default location of the SQLite databases for all users is in *C:\ProgramData\DDS\DB\*. For Windows XP it is *C:\Documents and Settings\All Users\Application Data\DDS\DB\*. You can use any other user location.

If you need to find the location of a tree (\*.ndb file) then select the Open Tree function. The window with the list of trees appears. Right click on any tree and choose Open folder with database.

## The demo Tree

The DDS demo tree appears after installation. It contains an example of the tree with data.



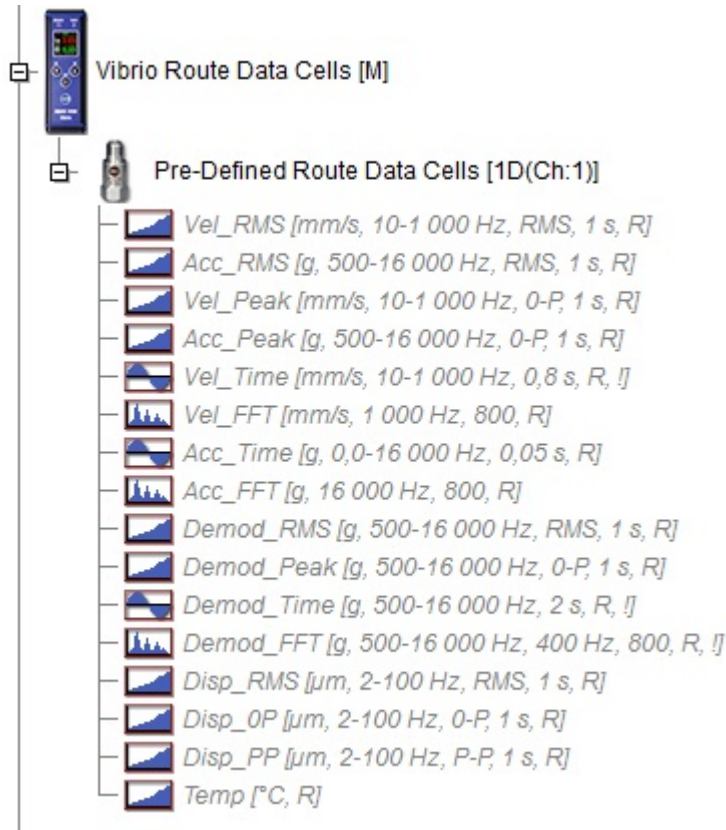
## Vibrio Route Data Cells

Definitions of all data cells, which can be used with A4900 Vibrio M unit.

Vibrio M data cells (readings) are predefined and it is not possible to change its parameters such as frequency range, number of lines etc. Only these predefined measurements can be measured with Vibrio M. See below Vibrio M data cells.

Explanation of the first data cell *Vel-RMS*:

Measurement of Velocity, RMS in mm/s with 10 Hz to 1000 Hz frequency range.



### Route Empty

Example of route structure without data cells.

### Route RMS

Example of route structure with data cells for overall (wideband) readings.

### Route RMS FFT Time

Example of route structure with data cells for overall (wideband) readings, spectra and time waveforms.

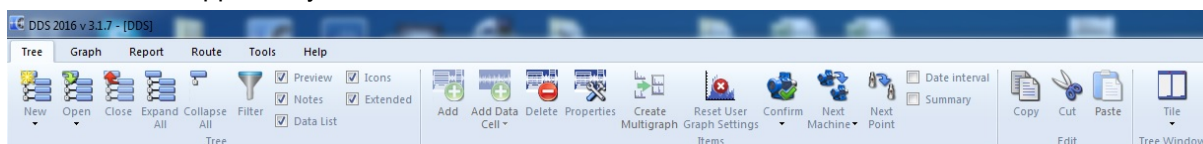
### Data

Example of readings for unbalance, looseness, misalignment, bearing failure (fault frequencies), alarms and waterfall.

## **TREE Tab menu**

The main window appears at startup. The main menu is at the top ( Tree, Graph, Route, ...). Every menu tab contains a set of functions which are displayed in the panel below the menu.

Tree tab menu appears by default:



You can move along the tree by using the mouse or keyboard. When you use the mouse, there is tree a navigator (slide) to the right side of the tree. You can select the Tree Item by left-clicking on it. You open/close the branches of Tree Item by double-clicking on it.

Use the keyboard for faster movement along the tree.

Use the up/down arrows to move up/down along the displayed tree items.

To open/close the branches of the tree item push Enter. The Enter button opens (closes) just one branch below the tree item.

To expand or close all branches below the tree item press the + or - button.

The right arrow opens the branch. Left arrow closes the branch.

If you wish to move down along the tree items of the same type (machine, meas.point) press TAB. To move up along those tree items press SHIFT+TAB. If the data cell is selected and you push TAB, you will move to the next data cell of the same type and same physical value (even if it is in next machine). By pushing TAB+SHIFT you will move up in the same way.

By pressing Space Bar you can move between Tree and Graph (when data cell is selected).

Only one tree is allowed in free DDS version. That is why the New/Open/Close Tree options are not available.

### **New Tree (new database)**

Select the Tree in the menu and the New icon. In the next window define the name of new tree (the top item) and location. For beginners we recommend the default location (see the chapter Data Structure/ Where are Data stored in the Computer).

### **Open Tree**

We defined the user list of often used trees. The opening of tree is faster, because you only need to select one from the list. You don't need to waste your time to find every tree on your hard drive by Explorer. Once you create a new tree, it is automatically included to the list. If you received some external tree from other user e.g. by email, then you need to add the tree file (with .ndb extension) into the list manually.

When you click on the arrow bellow the Open icon, the user list appears and you can select required tree.

When you click on the Open icon, the next *Open Tree* window appears. It contains the user list, you can select required tree and press Open or use double right click directly in the list.

The *Open Tree* window contains following functions:

- Add to List     it allows to add the next tree to the user list (add the next .ndb file)
- Remove from List     removes the tree from list (not from the computer)
- Set as default     the default tree will be automatically opened when you run the software
- Import MDB     for user of old DDS software to import old databases
- Delete DB File     removes the .ndb file from computer

### **Close Tree**

Closes the opened tree and closes the tree window.

## Expand All, Collapse All

Opens or closes all branches in the tree. The keyboard shortcut "\*" has the same effect. Note. There is also shortcut "+" that expands only selected tree item.

## Tree Filter

It is a useful function which enables you to select only required part of the tree. Push the Filter button or press Ctrl+F and new window appears. The window is divided into two parts. Selection of tree items is in the first part. The selection of data cells is in the second part.

Two main functions are available, filtering and selection. Filtering displays the tree which contain only items which are in compliance with defined conditions. The selection selects (makes active - blue colored) items which are in compliance with defined conditions.

You can use the Filtering first and then use the Selection in filtered tree.

Both functions are always applied under the tree item, which is selected when the Filter window appears.

If the when case sensitive searching is required, use the checkbox.

When you check the **Keep Original Selection**, then the filtration process will hold the originally selected tree item(s) and all procedures will be done on that selection. You can switch off this function also in **Filter** button.

### Tree item searching

Write required text to the Find text box in Tree Item section. You can find in all tree items or only in Machines or Points. If you write e.g. "fan", then all items, which contain the "fan" in the name will be selected.

If you need to use more then one text strings, then use the "+" (plus) symbol between them. E.g. "fan+pump" means finding all fans and pumps.

You can also use the advanced conditions, which enables to define items and also their parent items. You use the "/" symbol. E.g. if you enter LineA/motor, then will be selected all items which contains "motor" and at least one of parents contains "LineA". This system is similar like folders system in computer.

You can also select one Route and to find items only in that route.

### Data Cell searching

Write required text to the Find text box in Data Cell section. If you write e.g. "NDE", then all cells, which contain the "NDE" in the name, will be selected.

If you need to use more then one text strings, then use the "+" (plus) symbol between them. E.g. "NDE+DE" means finding all NDEs and DEs.

You can also use the advanced conditions, which enables to define items and also their parent items. You use the "/" symbol. E.g. if you enter motor/NDE, then will be selected all items which contains

"NDE" and at least one of parents contains "motor". This system is similar like folders system in computer.

Additionally you can define also the data cell type. Next data cell key-words can be used:

all	all data cells
oa	overall(wideband)
dmd_oall	overall demodulated (enveloped)
time	time waveform
dmd_time	time waveform demodulated (enveloped)
spec	spectrum
dmd_spec	spectrum demodulated (enveloped)
speed	speed
dc	discrete current or voltage or manually entered cell for process values
orbit	2D waveform
order	order analysis
acmt	compressed time signal, see VA4 manual for more details
aps	1x amplitude phase
smax	maximum of displacement for shaft vibration
cl	center line
ps	phase shift
img	image
rec	record
bal	balancing
fasit	fasit
frf	frequency response function

If you need to use more then one key-words, then use the "+" (plus) symbol between them.

Finally you can select only data cells which are over then some alert limit. Use the function Find equal or Higher alert then.

The route name can be selected in Route section. Then the filtering or selection will be done only on that route items.

### **Filter, Select and Turn OFF filter**

Push the Filter or Select to apply the rules for selection. Push the Turn OFF filter for cancellation of filter. When no corresponding item is found then the message "Not found" is displayed. The filter rules are always applied to complete tree.

## **Preview, Notes, Data List, Icons, Extended**

This check boxes switches on/off the displaying of properties or information. See the Plotting of Graphs chapter for more details about screen areas and pages.

### **Preview**

The Preview page is switched on or off.

There are the notes displayed in this tab, which are saved under and above the selected tree item. E.g. if there is the data cell selected, you will see the notes from the Point and Machine at the same time. If there is Machine selected, you will see the notes from all Points of the Machine.

### **Notes**

The Notes page is switched on or off.

### **DataList**

It displays the list of readings in selected data cell with their properties:

- Id number
- Date/Time of reading
- Value (only for static reading)
- Speed
- measured by tacho

- inherited from parent tree items, the symbol \* is used  
 Reached Alert  
 Instrument, which was use for reading.

The static data can be changed, added or deleted in Data list.

### Extended

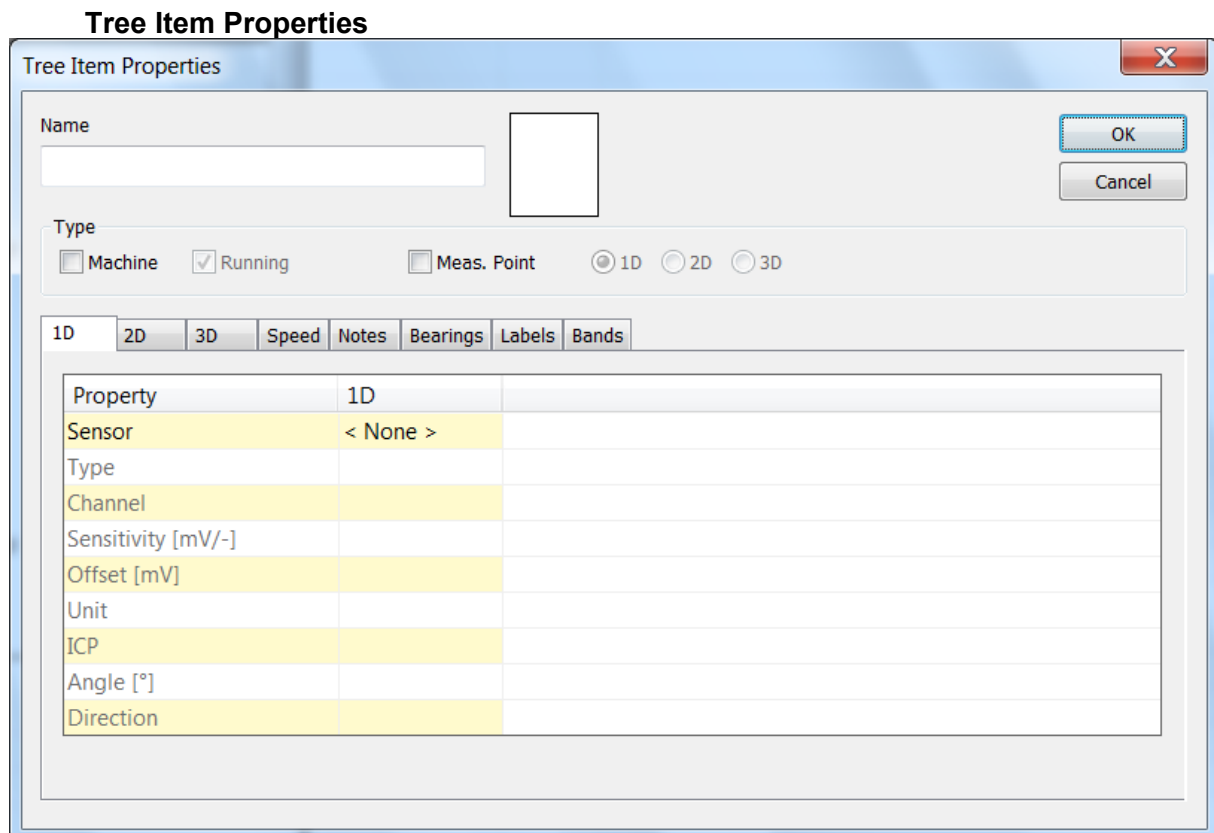
If it is ON then the text information is added to tree items.

M machine  
 1D, 2D, 3D point dimension and channel number (if defined)  
 S the speed is defined  
 B the bearing is defined  
 R will be transferred to the route  
 ! expired data cell, new reading should be taken  
 Ch list of channels  
 T tachometer here  
 On online meas. point

The data cell info also contains unit, range, lines number,...

### Add Tree Item

Select the top tree item first and then you can create a new item under it (the child item). Push Add (Items section) and the following Tree Item Properties window appears. Now let's suppose we want to create e.g. the site, not the machine, not the point. Then you can define the name only and maybe the icon. You see several tabs in window (1D, 2D, ...). They enable to define many properties. The Notes can be used in every item for maintenance control, supervising and reporting.



**Name** the name of item in the tree.

**Item icon (image)** every tree item can have own icon. In the Tree Item Properties window it is displayed next to the name. Click on that and the Icon Setting window appears. You can select one icon from the list or push the No Icon button. Use the Tools/Icons for management of the list of icons.

**Machine** check it, if the item is the machine. That is important for route, because the route is the list of machines.

**Running** if this checkbox is off, then the machine is not running and it will not be load to route. It is useful, when the machine is not running for long time e.g. it is repaired. It enables to not copy it to route.

**Meas.Point** check it, if the item is point. The Point is the basic term for reading. It is the actual place, where the sensor is mounted. The machine is the list of points in the route. Several different point types are available. The 1D, 2D, 3D property is our new approach to the point.

1D It means one sensor used in one direction/orientation/axe. Typically it is the accelerometer.

2D It means use of two sensors in one point. Typical use of 2D is the shaft displacement reading, when two proximity (eddy current) sensors are used. To be precise, it is not point - it is the plane. The directions are marked as A and B.

3D This point is designed for tri-axial sensor. The directions are marked as X, Y and Z.

**1D – 2D – 3D check boxes** if the item is the point, select the type of it.

### 1D, 2D, 3D tabs

For each direction select one sensor from the Sensors list (see the chapter Tools/Sensors) or select the User for manual entry of all parameters. When you use the predefined sensor from the list, then you can edit any parameter too (usually the correct sensitivity). Changes are saved only to this tree item, not to the sensors list. The sensor properties are COPIED from the predefined sensor. If in the future when you change the predefined sensor parameters or remove it, it has NO effect for item where it was used.

If the properties is displayed for more selected Points, then the <Ignore> is written in the sensor line. No change of sensor will be done in any selected point. If you define the other sensor (not the ignore) then such sensor parameters will be written to all selected points.

**Settling prolongation** - it enables to increase the settling time of sensor

### Why sensor definition when the item is not the point?

Now you probably want to ask why it is possible to define the sensor in standard tree item. You expected it in Point only, didn't you?

The DDS enables the inheriting of many properties. E.g. when you define the sensor type in the root (top) tree item, then this sensor will be used for all points. There is no need to define it individually in every point item. But if the individual sensor is defined directly in the Point, then it is preferred and no inheriting is used.

Generally you can define all three options (1D, 2D and 3D) in root item ONLY on the top of tree. Then these parameters will be used for all points in the tree (depending of type 1D or 2D or 3D). To be precise it will be used for all points which do not contain individual definition of sensor parameters.

It enables to define sensors, default speed, bearings, bands, etc. in proper items and then inherit them down in the tree.

### Notes Tab

You can create text notes in this Tab, which are related to the tree item. You can use them for description of the actual condition or to make a note of a task which needs to be done (e.g. "faulty bearing", "grease the bearing").

Apart from the User's notes there are notes displayed informing us that the function Confirm was used for this Tree item (see the chapter Confirm).

If the **Failure** and **Severity** are entered, then this notes will be printed in **Failures Report**.

If the **Confirm** is checked, then the note is settled and is not included in reports.

### Speed Tab

**Tacho here** - check this box when the tacho position is on the output shaft of selected tree item. If the tacho is on input shaft, then you must check **Tacho here** on the parent (previous) item. All Gear factors on other tree items will be related to this initial position (it means initial speed measurement).

**Default Speed** is the value, which is used when the speed is not measured directly by tacho. Directly measured speed value by tacho value has always the highest priority in front of all defaults defined in the tree. The **Default Speed** is always the speed on the **OUTPUT** of selected tree item.

You can select one of the three options:

<value> write the speed value directly (e.g. 3000)

- <Undef.> speed is inherited from parent tree items
- <Detected> if the option is selected on machine item and a measuring instrument supports it (VA3, VA4), then the speed detection is used
- <Manually Entered> the manually entered speed is required before measurement on machine (VA3, VA4)

**Gear Ratio** enables to define the ratio between the input and output speed of tree item. For example when the input speed is 1500 RPM and output speed is 525 RPM, then the ratio is 0.35.

If **Gear Ratio** is used (it is not equal 1.0) then

- 1) measured speed by tacho on defined location/item (**Tacho here**) is **multiplied** it,
- 2) inherited Default Speed is **multiplied** by it.

E.g. Let suppose gearbox with 3 gears. The tacho is mounted on the 2nd gear output shaft. Then the Gear factor enables to get correct speed also on input and output shaft of gearbox.

E.g. the default speed is defined in the motor item and the reading is made on gearbox output. The gear ratio enables to get correct speed value on lower tree items.

**Note** : Up to version 3.1.6 was used the **Tacho factor** for multiplying of measured speed by tacho and the **Gear factor** for multiplying of **Default speed**. Now is the **Gear factor** used for both options. Additionally you have to define the position of tacho sensor. Older databases are automatically converted, when you open them by new version.

**Min. speed** - the lowest speed value, which is expected. It has direct relation to the tacho pulse waiting timeout. We expect one pulse per one rotation. Two pulse is required for speed calculation. If the Min.Speed = 0.5Hz, then the max waiting time could be 2 sec. If two pulses did not come in that 2 sec, then **NoSpeed** warning appears. The 1/100 Hz is the minimum value. When you will use this minimum and the tacho cable would be broken, then waiting time will be 100 sec.

### Route tab

It contains several parameters which are used for route transfer to instrument.

**Route name** – enables to use specific name for tree item. If it is not used, then the name of route item is created from all items in the route path. For example if the Pump of cooling system A52 is used in the tree, then it is too long for using in the instrument. You can use only A52 as **Route** name and only this three characters will be transferred to instrument.

**Use In Route Path** – (Yes, No) if some tree items in the point route path are required to transfer to the instrument, then select **No**.

**User Id** - if you have some ID system of machines and their parts in your factory, then this ID enter here. It will be used in all reports.

### Bearings tab

It is the list of bearings which are assigned to the tree item. The list is empty if you have not assigned any bearings.

Press Add button to open the User bearing database and select the bearings which you wish to assign to the Tree Item and push Add button. Close the window.

The bearings added directly in selected Tree Item are displayed black. If the name is grey, then this bearing is inherited from some predecessor (parent). It means it is not defined in this item.

Select the bearing and push Remove to delete the bearing from the list.

### Labels

You can define labels for special frequencies. They which will be drawn to every spectrum graph in this tree item.

The labels are divided into three groups - General, Gear and Blades. The general group should contain all labels except gears and blades frequencies. But you can e.g. save all your labels only to general group. The dividing to 3 groups has one meaning. When you push the Change Group (it means groups mentioned above) then all the groups are displayed circularly. The user labels are displayed always together with them.

See the Labels in Graph chapter for more details.

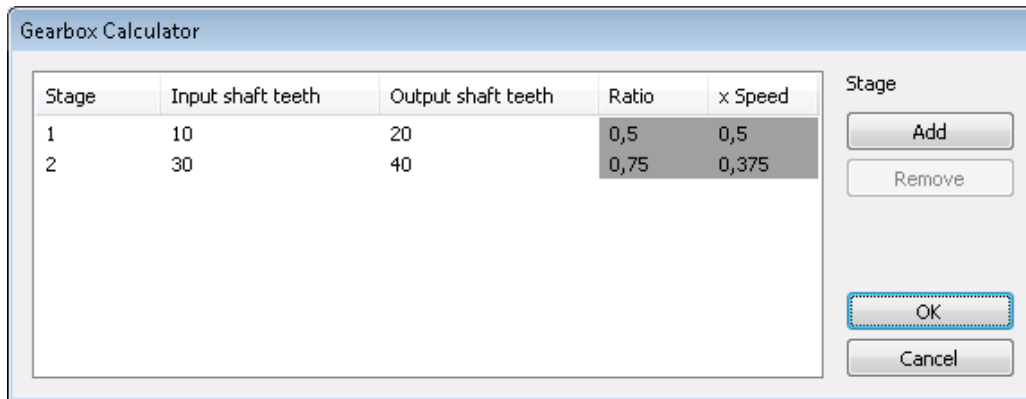
### Gearbox Calculator

System provides a simple way how to calculate gearbox forcing frequencies. The input speed of gearbox is used for all formulas.



Select Labels tab. Select Gear Labels Group. Push Gearbox Calculator button. You can edit each stage of gearbox (use double click on value, which you want to edit). Also to Add or to Remove stage. Press OK and next labels will be created:

- Input Speed
- SPD X – Gear Speed of stage X.
- GMF X – Gear Mesh Frequency of stage X
- FHT X – Hunting Tooth Frequency of stage X



### Bands tab

Bands are the special property of spectra, which are used for spectral alarm band evaluation. Bands should be defined originally in data cells, but the inheriting function enables to defined them also in other tree items.

See the Add the Data Cell chapter for more details.

### Point Groups tab

Point group is a set of points on one machine that are in route measured together (simultaneously). Usually such reading uses more channels on analyzer.

Select all points which you want to measure together (multiselection). Apply the right click on one point of them and the menu appears. Select Create Group of Points.

All selected points

- must be in one machine
- are not used in other point group.

Enter the name of point group in next window.

Now open the properties of the Machine, which contains selected points. Display the Point Groups tab. The list of groups is displayed. The list of points is displayed for each group. Here you can also delete Point Group or change their order in a route.

### Selection of tree items

The selection is made by single click of mouse. Use the Ctrl or Shift buttons for selection of more items.

### Items Moving in the Tree

#### By Mouse

You can move one or more items together by drag and drop.

Two symbols are displayed when you move the mouse cursor inside tree:

- Left arrow      The selected item will be moved to the new position with all child items.
- [+]              The selected item will be copied, in the next window you will decide whether to copy with recordings or not. You change also the function to *Move*.
- Two rectangles      The selected item will be moved, in the next window you change the function to *Copy*.

#### By Clipboard

You can copy/move selected items by standard Copy/ Cut/ Paste functions. The items in Clipboard are in red color. Clear it using Esc.

## Multi copying

One tree item you can copy to many other items at once.

Example:

Follow next steps to copy of one data cell to many other points.

- select one data cell and press Ctrl+C or Tree/Copy,
- select all target points ( Ctrl + mouse left click)
- press Ctrl+V or Tree/ Paste.

## Add the Data Cell

Select the Point item and press the Add Data Cell button. The list of available readings appears. Select one of them and next window with several tabs appears. Various tabs are displayed for various data cell types. Enter the name of data cell.

## Templates list

For every data cell you need to define the reading properties. It means numbers of lines or samples, frequency interval, averaging, ... . It can be done in Properties tab directly or you can select one of predefined templates. The parameters of selected template is copied to the properties tab, where you can edit them.

## Properties

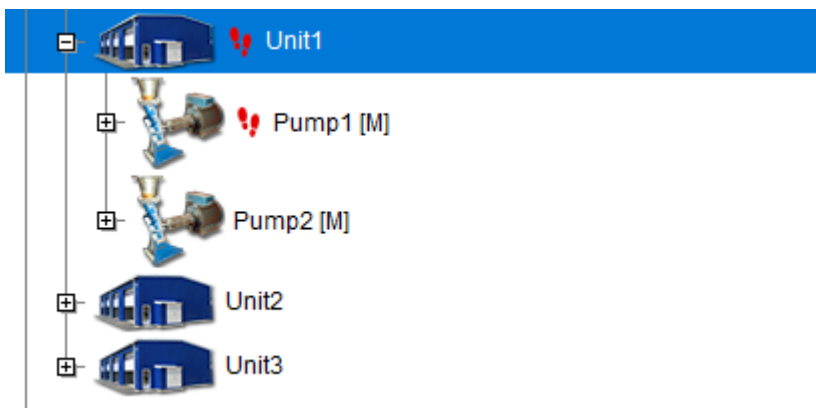
Define the reading properties. See chapter Reading (Measurement) Properties for details.

### Route

Transfer to Route	the Off cells will not be loaded to route
Interval	required time interval for readings
Manual Entry	manually entered value
Last Reading Time	info about last reading

If the **Interval** = < None >, then the reading will be always loaded to instrument.

If the e.g. **Interval** = 1 week, then reading will be loaded to the instrument only if last reading is older than 1 week.



## Bands

Precisely speaking it is set of spectrum alarm bands, the special property applied only to spectra. The Bands tab contains the list of bands (or it is empty). Push the New button and define the new band parameters:

<b>Used</b>	this checkbox enables to switch on/off the band
<b>Name</b>	the name will be used for drawing in spectra
<b>Min, Max</b>	frequency interval
<b>Detect Type</b>	RMS, Max - the type of value which is calculated. The max means the top line in band.
<b>Unit</b>	frequency unit

**Inherited from** the band can be defined directly at tree item/ data cell or can be inherited from parents items. Inherited bands from parent items are displayed in grey.

## Limits for Static

Limits signalizes when measured value is over the limit. When it happens, then colored circle is drawn aside from data cell name. The color matches the alarm type (defined in Tools/Alarms). The colored circle with the highest achieved alarm is inherited up to the root item in tree.

Three ways how to create limit is available for static data cells.

### ISO 10816

The limits are defined according the ISO 10816 standard and are available only for velocity readings in frequency interval 10-1000Hz. The **Machine Group** and **Machine Foundation** (ISO 10816 tab) has to be defined before the using this standard.

### Adash

The limits are derived from Adash rules, which are developed for more then 20 years of Adash history. These limits requires to know the speed value. That is the key point, we do not think, that one limit value can work well for wide speed range defined in ISO 10816. Adash limits are available for two data cells types:

- velocity readings in frequency interval 10-1000Hz, which forks very well for unbalance, misalignment and looseness detection,
- acceleration readings in frequency interval 500 - 16 000 Hz (higher frequency then 16 kHz is accepted too).

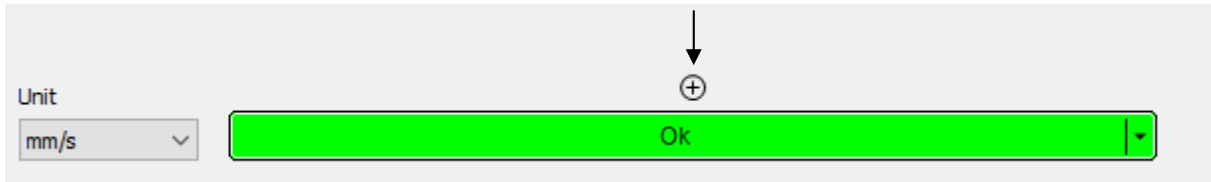
The colored circles is drawn in trend graphs only, not the limit lines. It is because of the relation to speed. Each reading can have different speed.

### User

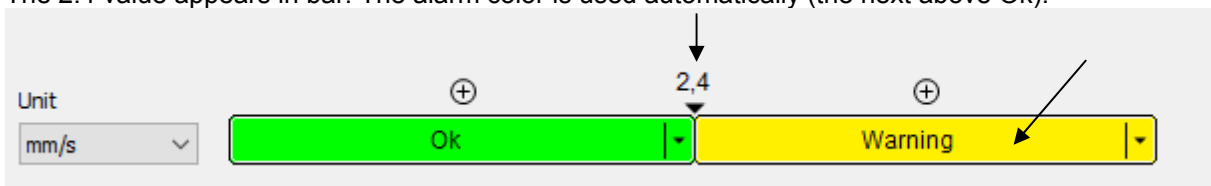
The user can also define own limit values. Look to the example.

Select one or more data cells. Push the **Properties** button in **Tree** tab. Check the **User** in **Limits** tab in next window. Now the limit are in the bottom is available (active) to use.

Click on the **+** symbol. New window appears. Enter the limit value and press **Ok**.

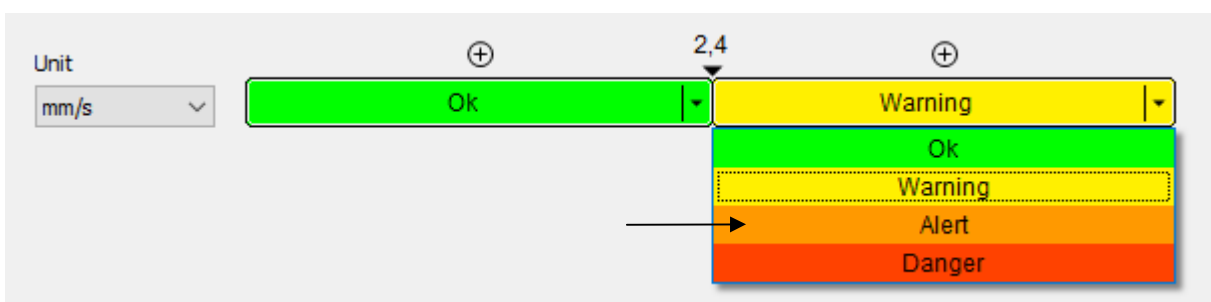


The 2.4 value appears in bar. The alarm color is used automatically (the next above Ok).



You can change value too. Use the right click or left double click on the value and enter new value. The **Delete** option is available too.

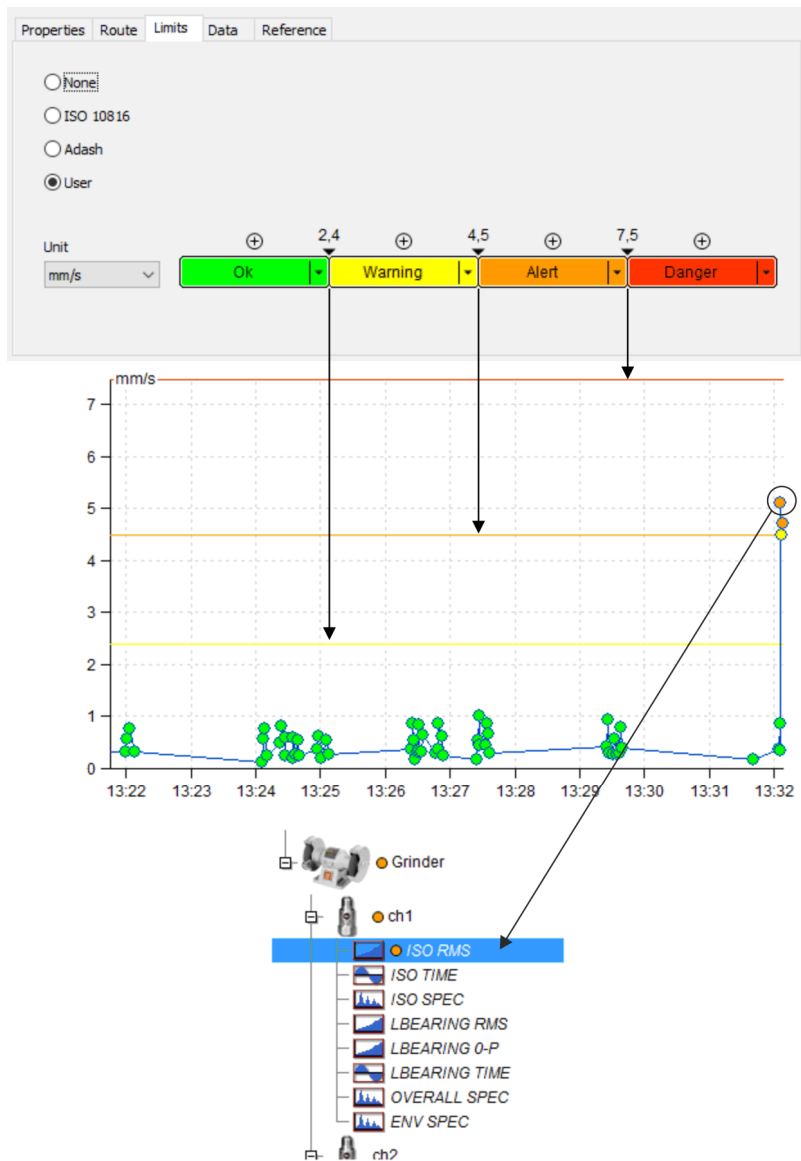
When you want change the alarm color, then click in the colored area. The list of available alarm colors appears ( defined in **Tools/ Alarms** ). Select new alarm color.



This procedure repeat until all limits are defined.

You can also change the unit of limits for example from mm/s to inch/s.

When you close the **Properties** window, then the new limit circle color (aside data cell) is derived.



The **User** limits can user change also directly in the trend graph (**Limit value edit in graph**).

### Multi edit of limits

Select more data cells of the same type, e.g. more static cells ISO RMS. Display the properties and the Limits tab. It looks like the tab of one selected cell. Now you can edit values and the changes will be made in all selected cells.

If limits are not identical in all selected data cells, then you can enter the new identical limits for all selected cells.

### Limit value edit in graph

The limits edit you can do also directly in graph. Open graph, use right mouse button click and set the Limits to ON. Then limits are displayed ( of course some limits must be defined for data cell).

### Addition of new limit value

1. Press and hold Ctrl key (button in keyboard), make left double click on required Y value in graph, standard window appears, edit parameters and press OK.

2. Open right click menu and select Limits/ Add

### Value edit for existed limit

Move the cursor to limit line. The cursor symbol is changed and the value of limit appears.

1. Use left mouse button, drag the line and move it to required value (position).
2. Open right click menu and select Edit

### Delete of limit

Move the cursor to limit line. The cursor symbol is changed and the value of limit appears. Open right click menu and select Delete

## Limits for Spectrum

The limits for spectrum are related to defined spectral alarm bands. The limit values are defined individually for every band.

To define one or more bands is the first step you need to do.

Used	Name	Min	Max	Detect Type	Unit	Inherited From
<input checked="" type="checkbox"/>	1X Speed	23	27	RMS	Hz	
<input checked="" type="checkbox"/>	Harmonics	45	260	RMS	Hz	

Two bands are created. **1X speed** for speed frequency which is 25Hz for this machine. The second band **Harmonics** contains 10 harmonics ( 50, 75, 100, 125, ..., 250).

Now we open the **Limits** tab. It is empty.

Bands

Add Delete

Push **Add** and select band for limits entering.

Bands

Quantity Unit Detect Type

Velocity mm/s RMS

+

Ok

Now you should define required Quantity, Unit and Detect Type. Enter limit values by the same way as in static data cells.

Now we should explain two kinds of Detect Type. The first Detect Type is defined in **Bands** tab. Two possible choices are available. The RMS means the rms value, which is calculated from all frequencies in band (  $rms = \sqrt{f_1^2 + f_2^2 + \dots + f_N^2}$  ). The Max means the top peak in band.

The second Detect Type is in the **Limits**. In this moment is known, what Detect Type is defined in Band. In this tab you only select what will be the limit value type.

Example: the band Detect Type is Max and for specific spectrum the Max can be used as  $2,5g^{RMS}$  or  $3,52g^{0-P}$  ( $0-P=1,41*RMS$ ) or  $7,05g^{P-P}$  ( $P-P=1,41*0-P=2,82*RMS$ ). The same logic is used for RMS detect type in band tab.

### **Band and limit edit in spectrum graph**

Display bands with limits in graph (right click menu - Bands/ With limits).

#### **New band creation**

1. Press and hold Ctrl button. Make left double click. Standard band window appears.
2. Open right click menu and select Bands/ Add.

#### **Band edition**

1. Move cursor to band and make left double click or open right click menu and select Edit Band.
2. Move cursor to left or right frequency border, drag the border by left mouse button and move.

#### **Band deleting**

Move cursor to band, open right click menu and select Delete Band.

#### **Addition of limit value to the band**

1. Move cursor to band, open right click menu and select Add Limit.
2. Move cursor to band. Press and hold Ctrl button. Make left double click.

#### **Limit value edit**

Move cursor to band limit. Cursor symbol is changed and limit value is displayed.

1. Drag the limit and move it.
2. Press and hold Ctrl button. Make left double click. Edit value in window.
3. Open right click menu and select Edit Limit Value.

#### **Deleting of limit**

Move cursor to band limit. Cursor symbol is changed and limit value is displayed. Open right click menu and select Delete Limit Value.

### **Data**

This tab contains all measured values in the cell. You can edit them or delete.

Any static and spectrum reading can be labeled as Reference. This value is downloaded to the route and used in instrument. Select required reading and press Set Reference button.

The DC Offset can be manually entered for time signals and orbits. Select required reading, push Edit and enter value.

### **Reference**

Any static and spectrum reading can be labeled as Reference. This value is downloaded to the route and used in instrument. Select required reading and press Set Reference button. Selected value is also displayed in Reference tab, where you can disable it e.g. for limited time.

#### **Static Reference**

Defined reference value is displayed in graph.

#### **Spectrum Reference**

Select the reference spectrum (Data tab). Use the tolerance values for reference spectrum development.

## **Create Multigraph**

Multigraph is the set of graphs created from several data cells which can be compared to each other. The multigraph behaves the same way as the normal graph, but there are several functions which enable to compare the graphs easily.

Basic features of multigraph are following: certain views are changed for easier comparison of readings from data cells, actual reading of cursor values from all viewed data cells, the zoom of axis is same on the axis with the same unit.

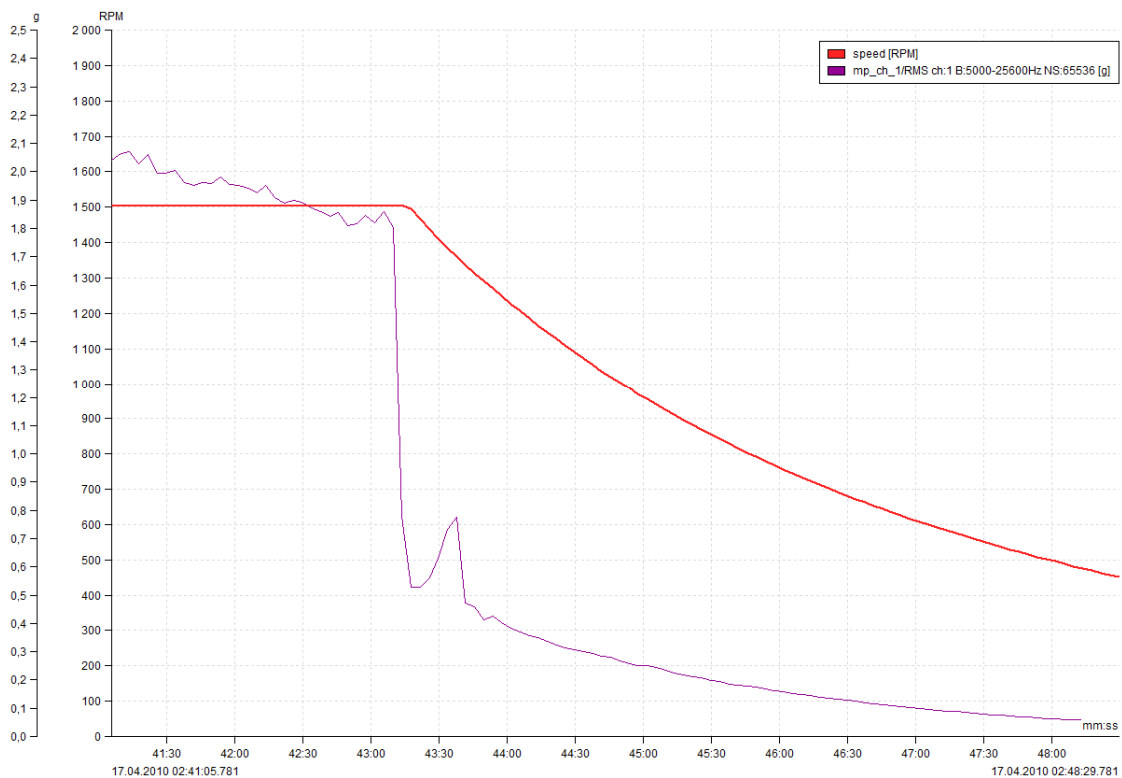
To create multigraph, choose the data cells from the tree (those which can be compared). Click on icon Create multigraph in section Graph or do the right click on tree and choose Create multigraph.

### Trend multigraph

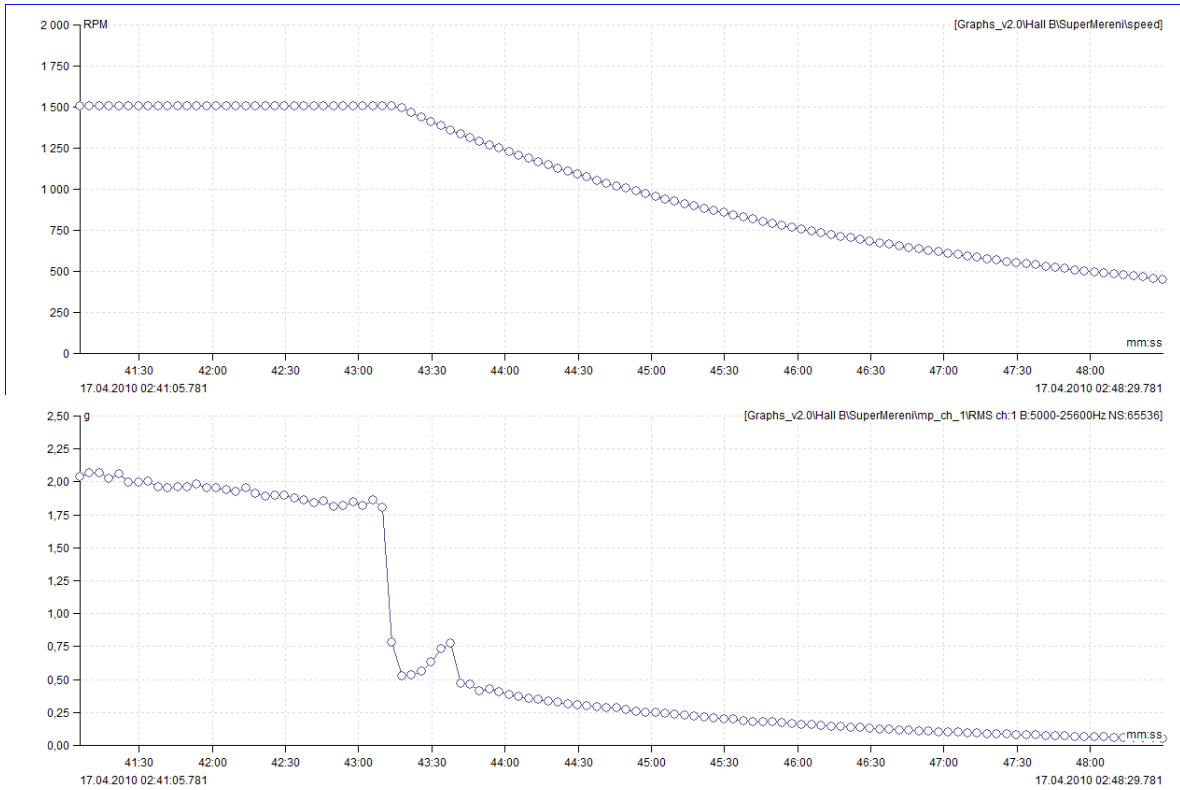
All basics functions of trend graph are same as for the usual graph. There is just a difference in the type of view *amplitude* and there is one new type of view *amplitude stacked*.

For example, if we create multigraph from data cells speed and overall, there are following types of view:

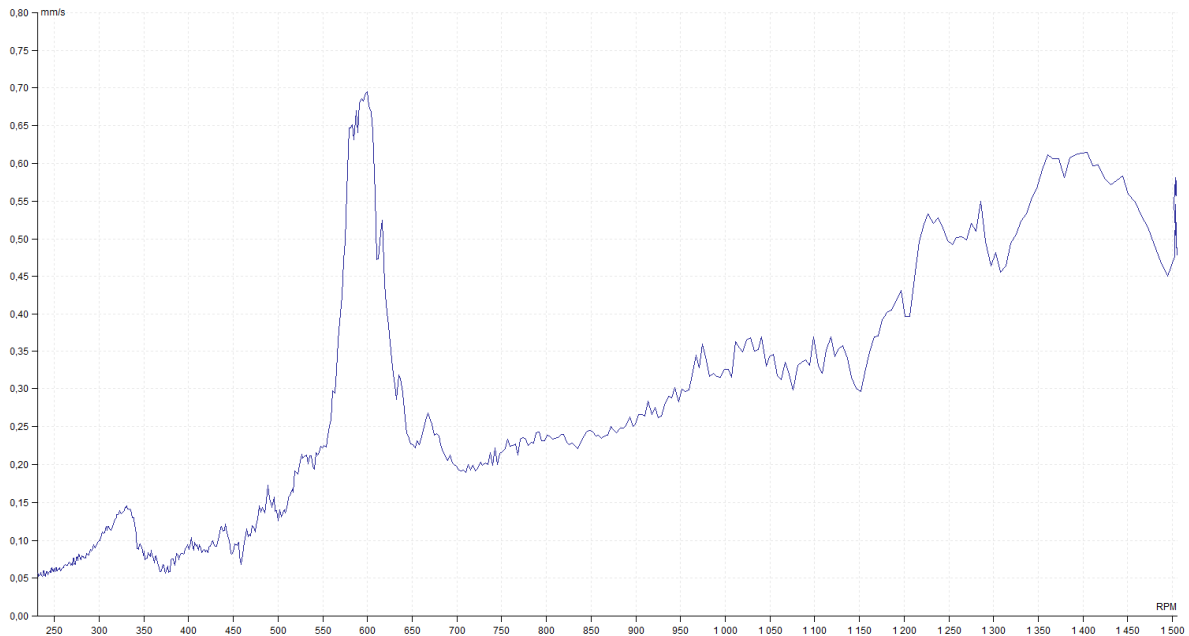
**Amplitude** – curves of amplitudes are overlaid. There are axes with units on the left side of the multigraph. The active data is bold and you can change it by pushing Shift + Arrow Up/Down. The order of the y-axes is changed by active data (the y-axis on the right belongs to the active curve of the graph). The maximum number of y-axes is set in Global settings/All Graphs/section Other/Graph Count in Stacked. If the limit is exceeded, the y-axis of active data is shown.



**Amplitude Stacked** - you can see the set of graphs in one window. Each graph represents one data cell. To activate the data cell do the left click on graph or use Shift + Arrow Up/Down.



**Y Unit Relation** – this graph enables to evaluate relations between units on Y axes. E.g. if we have speed trend and vibration trend, we can show the graph showing relation between speed and vibration. The unit on X axis must be selected by user. Data has to be collected on the same measurement times (the 500ms toleration is used). The Y Unit Relation should be typically used for data from RunUp module.



### Multigraph of dynamic data cells

Multigraph of dynamic data cells expands the function of standard graph. There is actual reading of cursor values from all viewed data cells. It adjusts the stacked and waterfall view. To create the Multigraphs from dynamic data cell, select Create Multigraph from main menu in tree. You can create the multigraphs just from the data cells which can be compared (same data type and same physical value).

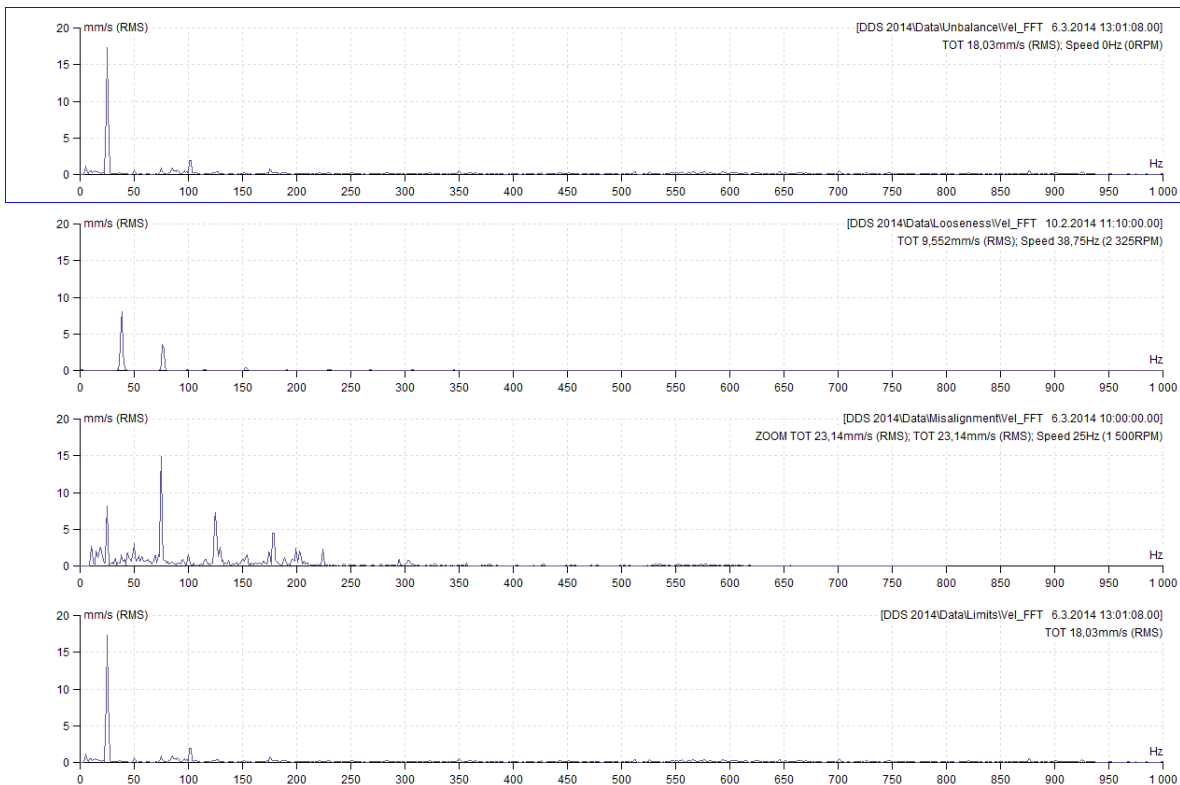


For example, if you choose 4 spectrums and create the multigraph, you can choose from following options:

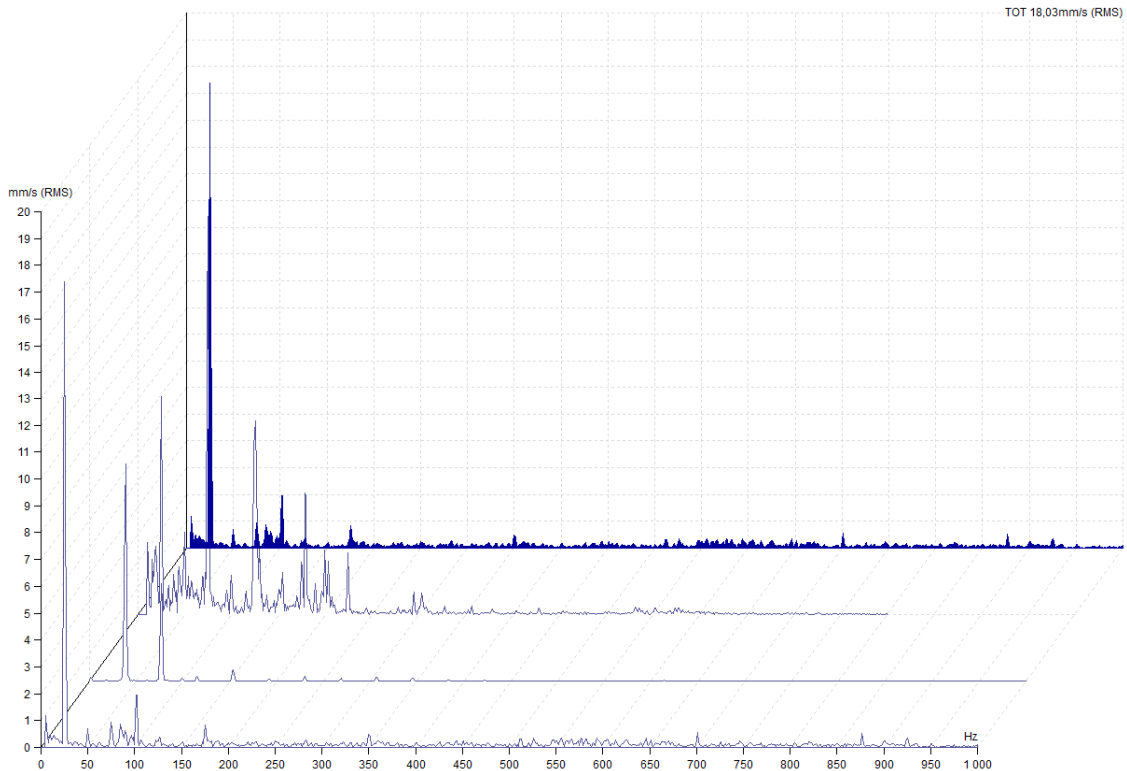
**Amplitude** – it shows the amplitude of active data cell. You can see the information about the active data cell in the header of the graph. To change the active data cell push Shift + Arrow Up/Down. To switch between the readings use Arrow Up/Down.

**Amplitude Stacked** –the group of the graphs is displayed in one window. Each graph contains reading of one data cell. The number of displayed graphs is limited by choice in global settings (General/All Graphs/section Other/Graph Count in Stacked). E.g. if you create multigraph from 10 data cells and the limit in global settings is 6, there will be 6 graphs displayed on the screen. You can view the rest of the graphs by changing the active data cell (Shift + Arrow Up/Down). Push Page Up/Down for faster switching between the data cells. It activates each n-data cell (n is the limit value from global setting).

Active data cell is the leading data cell (is it highlighted by border). You can switch between readings in leading data cell by pushing Arrow Up/Down button. The nearest time reading is chosen in other data cells.



**Waterfall** – there is one reading of each data cell in waterfall multigraph displayed. To change active data cell push Shift + Arrow Up/Down. To switch between the readings push Arrow Up/Down. The information about active data cell is shown in header of the graph window or by moving the mouse over end of x-axis of relevant reading.



## Confirm, Remove Confirmation, Undo

If the limit values are used, the tree contains the warning colors. When the high values are gone, we want the warning color (e.g. red) to be gone from graph as well. To do that we use the function Confirm.

That means setting of time stamp and ignoring all readings before that time. Only readings after that time will be used for warning color evaluation.

Confirm function can be used on any tree item or data cell. To use the Confirm function, select the tree item (e.g. machine) and push the button Tree/Items/Confirm. The calendar appears and you need to choose the date.

In case the data cell is selected and the graph is displayed, the time of the active reading is used as the time of Confirmation (the reading must be chosen by cursor in the trend graph). If the Confirm function is applied on the data cell, all the other data cells in the same Tree Item (Point) will be confirmed.

The information about the time of Confirmation is saved in the tree item as a note. The note can be displayed in tab Tree Item properties/Notes or in tab Notes in graph section (tab Notes must be switched on).

In case you need to remove the Confirm function, use the function Remove confirmation (you need to open the menu of Confirm button).

If you made the wrong confirmation, you can use the Undo function and to return back. It is very useful when you work with many tree items together (multiselection).

## Next Machine, Next Point

Use these buttons to move to the next machine or point in the tree.

You can move only to machines which contain readings from defined time interval. All other machines will be skipped. Use the **Time interval** button (bottom part of **Next Machine** button) and specify time interval. You can specify both times or one time only (**From** or **To**). Then check the box **Time Interval** in ribbon panel.

## Summary

If the Summary checkbox is on (checked), the function Item Summary is applied after selection of tree item.

## **Reset User Graph Settings**

When you use right click on the tree item, the Reset User Graph Settings function is in the list.

You define properties for every data cell. E.g. the mm/s ie in the Global list, but you define ips for one data cell. Then this definition has the priority and graph will use ips.

When you want to remove such special defined properties, then use the Reset User Graph Settings function. Then will be used the Global options again.

# Reading (Measurement) Properties

The readings are saved in data cell, which is special tree item. It differs from other tree items like Machine, Point, etc. which don't contain measured data.

## Vibration Readings

The most often used readings in route are in the following list. Usually for all of them the accelerometer is used. The main properties will be mentioned for each of them.

### Overall, Demod Overall

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Length	reading length in seconds
Fmin	highpass filtering frequency, Fmin and Fmax define the frequency band
Fmax	lowpass filtering frequency
Detect Type	RMS, True 0-P, True P-P, Scaled 0-P, Scaled P-P
Avg	Off or number of averages
Averaging	Linear, Peak Hold

### Time (time waveform)

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Length	reading length in seconds
Fmin	highpass filtering frequency, Fmin and Fmax define the frequency band
Fmax	lowpass filtering frequency
Avg	Off or number of averages

### Demod Time

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Length	reading length in seconds
Fmin	highpass filtering frequency, Fmin and Fmax define the frequency band
Fmax	lowpass filtering frequency

### Spectrum

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Fmin	highpass filtering frequency
Range	spectrum range, lowpass filtering frequency (Fmax)
Lines	number of lines
Window Type	Hanning, Rectangular
Avg	Off or number of averages
Overlap	percentage overlapping
Averaging	Linear, Peak Hold

### Demod Spectrum

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Range	spectrum range, lowpass filtering frequency (Fmax)
Lines	number of lines
Demod Fmin	highpass filtering frequency, Demod Fmin and Demod Fmax define the frequency band
Demod Fmax	lowpass filtering frequency
Avg	Off or number of averages
Averaging	Linear, Peak Hold

### Orbit

Quantity	physical quantity (acceleration, velocity, displacement, ...)
Input A	valid only for 3D point - signal selection (A, B, X, Y, Z)
Input B	valid only for 3D point - signal selection (A, B, X, Y, Z)
Length	reading length in seconds
Fmax	lowpass filtering frequency
Avg	Off or number of averages

### Smax

Quantity	physical quantity (acceleration, velocity, displacement, ...)
----------	---

Input A	valid only for 3D point - signal selection (A, B, X, Y, Z)
Input B	valid only for 3D point - signal selection (A, B, X, Y, Z)
Length	reading length in seconds
Fmax	lowpass filtering frequency
Averaging Type	Linear, Peak Hold
Avg	Off or number of averages

### 1x Amplitude Phase

Quantity	quantity (acceleration, velocity, displacement, ...)
Averaging	Linear, Peak Hold
Avg	Off or number of averages

### Centerline

Quantity	quantity (displacement, ...)
Averaging	Linear, Peak Hold
Avg	Off or number of averages

### Phase Shift

Avg	Off or number of averages
Frequency	Tacho or manual entering of speed
Resolution	number of lines in FFT

### FRF (Frequency Response Function)

Range	response range (lowpass filtering frequency (Fmax))
Lines	number of lines
Window Type 1	transient, exponential
Window Type 2	transient, exponential
Result type	H1, H2, H3
Avg	Off or number of averages
Overlap	overlapping percentage

## Other Readings

### Speed

Avg	Off or number of averages
Averaging	Linear, Peak Hold

### Process

Quantity	physical quantity (voltage, current, power, ...)
Avg	Off or number of averages
Averaging	Linear, Peak Hold

### FASIT

Description in Drawing graphs, FASIT below.

### Temperature

Measurement from instrument's non-contact IR temperature sensor (VA3/Vibrio M)

## Record and it's Analysis

It enables route measurement of record (in VA4 Pro) and it's later analysis in the office. You need to install VA4Pro Virtual Unit before using this function. Download VA4Pro Virtual Unit from Adash website: [www.adash.com](http://www.adash.com). Define the link to VA4Pro Virtual Unit in DDS software (Global Settings/General/Application).

To analyze transferred record in DDS software, choose Record (in section Data/Data Cell Properties) and press button Analyze (accessible also via right click menu in record graph, or double click on a data cell if there is only one record in it). The software VA4Pro Virtual Unit will be run and you can analyze the record and make the measurement by the same way you do it with analyzer VA4 Pro. Note. maximum record size stored in a tree is 500 MB.

### Record

Length	reading length in seconds
--------	---------------------------

FS  
AC,DC

sampling frequency  
AC,DC inputs settings

## **Other types**

### **Image**

The PNG, JPEG, and BMP formats are supported.

### **Balancing**

The balancing report imported from VA4 or VA3 instrument.

# Drawing of graphs

## Screen Areas

The screen is divided into 3 main areas. The tree area is on the upper left side. The data area (DataList of readings) is below the tree on the left side. The Plot/Report areas on the right side are prepared for drawing of graphs and reports.

## Plot/Report Area and Pages

The Plot/Report area contains pages (like in MS Excel). Various graphs can be plotted in each page. The texts and images can be added in report pages.

The Preview page is the basic plot page. It enables fast preview of readings.

## Notes Page

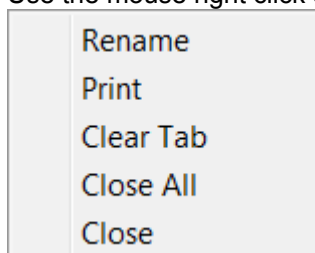
The notes can be written in each tree item (Item Properties/ Notes). All notes from selected item and from all its children items are displayed in the Notes page.

## Add New Plot Page

See the bottom of plot area. There is the plus symbol (+). Push the + and you can define new plot page.

## Next functions for Page

Use the mouse right click on the page name and the items menu appear.



### **Rename**

Renames the page.

### **Print**

Prints page.

### **Close**

Closes one page.

### **Close All**

Closes all pages except PreView and Notes.

### **Clear**

Removes all graphs and cleans the page area.

## PreView Page

This page is a default plot page for graphs plotting. If we open the branch in the tree, then the several basic plotting are available:

### **One reading or trend**

Select one data cell in point. The static cell (e.g. overalls) creates the trend graph. The dynamic cell (e.g. spectra) creates the graph with last reading or waterfall.

### **All data cells from one point**

Select the Point with several data cells. All cells graphs will be created together in the PreView.

### User multiselection

Use the standard Windows buttons (Shift, Ctrl) for multiselection in tree. All selected cells graphs will be created together in the PreView.

### Summary item

This function enables to create quickly the pages (according to data cell selection), which contain same type of data cell and physical quantity. DC data cells are exception, they are grouped in one page.

### Export of data

You can export data from static data cells to the formats which you can use for further processing in other software (e.g. spreadsheet).

There are two ways how to do it. Use the right click on static data cell in tree or in graph and select Export. In next window select the readings which you wish to export and select unit. After pushing Export button, enter the name of file and select the path. Select the type of exported format.

You can export the data from static data cells which were generated from dynamic data cells (e.g. trend data from spectral data cell).

### Copying of the graph to clipboard

To copy the graph as a bitmap to the clipboard do the right mouse click on the graph and select the option *Export/Print->Copy to clipboard*. The other option is to use Ctrl+C (graph needs to be active).

### Drag and Drop the Data Cell to Drawing Area

When you created new page then use the mouse for selection of data cells and drag and drop them to the drawing area.

If only one data cell is dropped to page, then one window is created for that cell.

If more data cells, which are the same type, are selected in the tree, then two options are available:

if they are dropped by mouse to the page, then the new window will be created for every cell,

if "Ctrl" is pressed it will create one Multigraph(if available) instead of separate windows

if the Create Multigraph command is used (mouse right click menu on any selected item), then

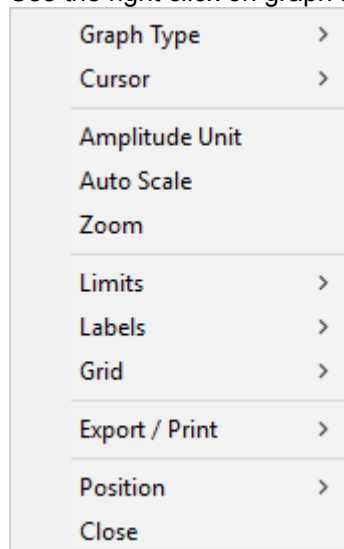
all graphs are drawn in one window. It enables to work with cursor, zoom and other properties together in all graphs.

If more data cells, which are not the same type, are selected in the tree, and dropped by mouse to the page, then the new window will be created for every cell.

### Static Data Cell Graph

If the static data cell is selected then the trend graph appears.

Use the right click on graph and next menu appears.

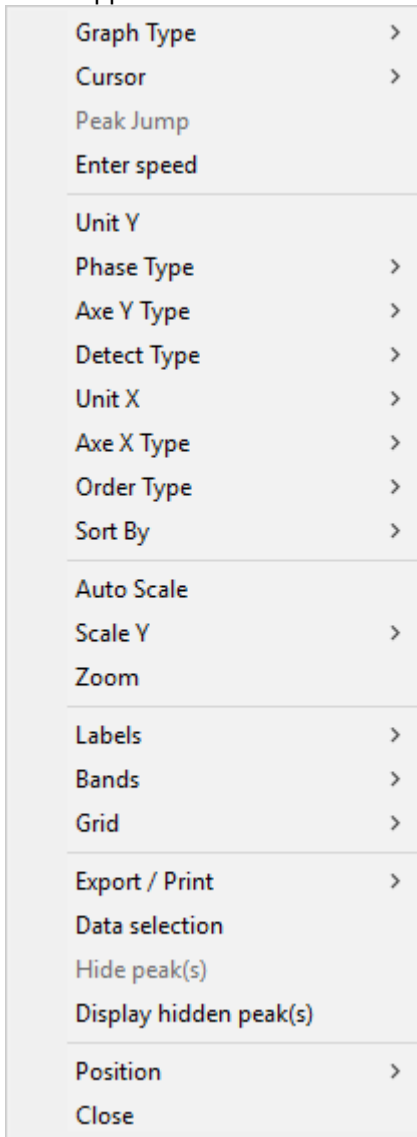




See Labels in Graph chapter for details about Labels item.

## Spectrum Data Cell Graph

Use the Preview page or drag and drop the spectrum data cell to new page. Use right click and the menu appears.



The special items only are described:

**Peak Jump** move the single cursor to some position and select the Peak Jump function. The cursor will be moved to the nearest exact peak position. The algorithm is based on FFT features and finds the position also between lines. It is useful for precise detection of speed.

**Enter Speed** enables to enter the speed value to the header of spectrum data. This place has the most priority level for data acquisition. If the cursor is used, then its position is offered.

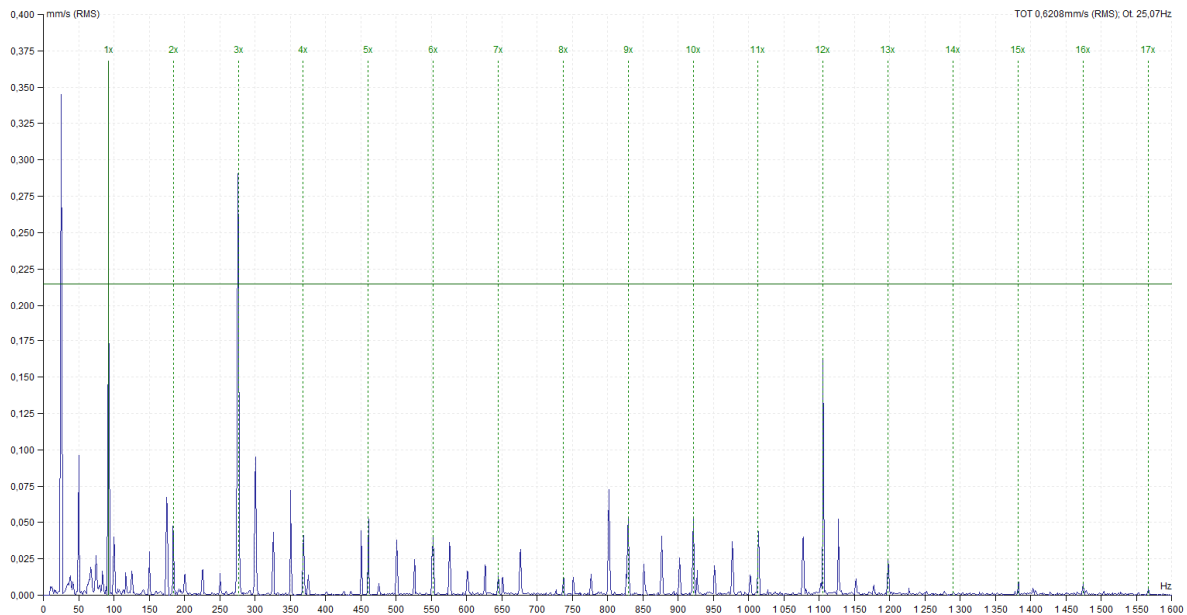
**Axe X/Y Type** to switch between the types of axis (linear, logarithmic, decibels – just for Y-axis)

**Phase Type** ranges (-180, 180), (0, 360) and AUTO are available. The AUTO creates special range without graph oscillation between top and bottom of scale.

**Labels** See Labels in Graph chapter for details.

**Data Selection** the list off all readings appears and you can do the selection.

**Hide Peak(s)** If any cursor type is on, then this function hides all lines under cursor frequencies. It means, that all harmonic frequencies are hidden when harmonics cursor is selected. Using of sideband or delta cursor works similarly. Hidden frequencies are drawn in grid color.



**Display hidden peak(s)** switches off the hidden peaks and all lines are visible again.

### Fine cursor movement

In case of harmonic cursor or sideband cursor use, main cursor movement according to existing spectrum lines can be a restricting factor. If the real rotation frequency lays between two frequency lines we cannot achieve correct position of harmonic components. The higher multiple harmonic component is, the higher difference from the real value we get. The DDS program solves this situation by the main cursor movement between existing frequency lines.

The first method is positioning the cursor by arrows. If you use the right/left arrows only, the cursor moves with corresponding measurement step. When you use these arrows with the **Ctrl** key pressed the cursor movement is 10 times finer. This allows precise placement of the harmonic component on the corresponding spectrum peak.

The second method solves the problem from the opposite side but with the same result. If there is necessary to place e.g. 10th harmonic components to specified spectrum position, drag it by the mouse and place it. The main cursor position is then changed proportionally. You can work the same way with the sideband cursor.

## Waterfall

This plot works with spectra.

### Maximum number of readings

The maximum number of readings in waterfall is defined in Tools/ Globals. If e.g. this number is 32 and you select more recordings (e.g. 320) then only 32 readings will be displayed (each 10<sup>th</sup>). The "filtered" is written aside from Y unit.

### Properties

You can control the properties of the plot by the mouse. We need to define several positions for next explanations. Every axis has the beginning (min value) and the end (max value). We will use following positions: Xmin, Xmax, Ymin, Ymax, Zmin, Zmax.

Xmin, Ymax, Zmin      Move the cursor to this point. You can (drag and drop) change the size of Y axis. When you move the end point, the % of max size is displayed.

Xmin, Ymin, Zmax      you can change the size of Z axis and its angle.

Xmax, Ymin, Z anywhere      You can look the times of readings. In compressed view case you look the time intervals which are averaged to one spectrum.

### Cursors

All cursors work also in waterfall. Additionally you see the cuts through all spectra. If you use the delta cursor, then the delta cut is drawn in cursor position.

### Draw Style Outline or Gradient

Two draw styles are available for waterfall. Set required style in Global Settings/ Waterfall/ Draw Style.

## Amplitude + Trend

This plot works with spectra.

The amplitude spectrum is drawn in the top half and the trend overall value in the bottom half. Trend is displayed over the time scale on x axis. Initially the overall values are displayed in the trend.

Use the delta cursor to define different frequency range.

If the single cursor is displayed, then the trend on cursor frequency is drawn.

If bands are defined, then their trends are drawn. Use the band cursor for selection.

## Amplitude + Trend (Amplitude / Speed)

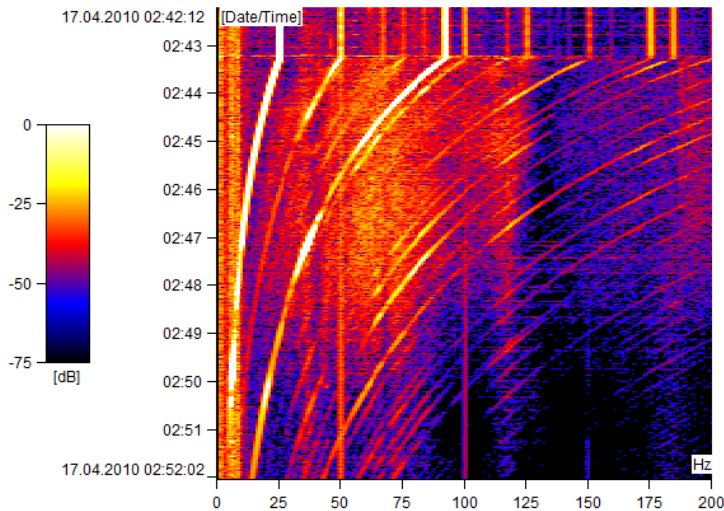
This is option of previous paragraph. When the speed is measured together with vibration, the trend can be displayed over the speed scale on x axis.

## Amplitude Stacked

Several spectra are displayed in one window. Use the mouse or arrows to change the selection. All functions like cursor operation, zoom, ... will be done at all spectra at once.

## Spectrograph

Two dimensional (2D) graph of spectra. You can imagine it as the view to waterfall from the top. The color is related to amplitude value. To change the dB range, go to Global settings (Tools/Global Settings/Dynamic Graphs/Range[dB]) or do the right mouse at local menu graph (item Range).

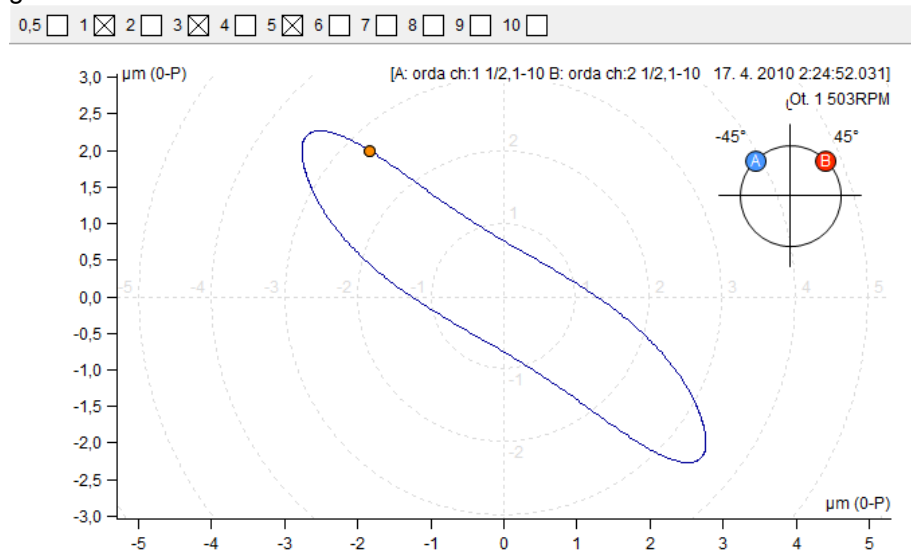


### Order analysis graph

The graph is similar to spectrum graph. Most of functions are the same (Amplitude, Amplitude and Phase, Amplitude Stacked).

#### Filtered orbit graph

It is available when at least two order analysis are in meas. point(2D or 3D). Select them and generate multigraph. You can check various orders and the see the shape of orbit. This orbit are mathematically generated.



### Orbit Data Cell Graph

The right click menu contains similar items like time signal. The Graph Type contains special items.








#### Graph Type

- Time A / Time B** time signal on selected channel is displayed
- Orbit** the orbit from two time signals is displayed (be careful of correct settings of sensor angles in 2D point)
- Orbit A B** orbit and both time signals are displayed together

### FASIT Graph

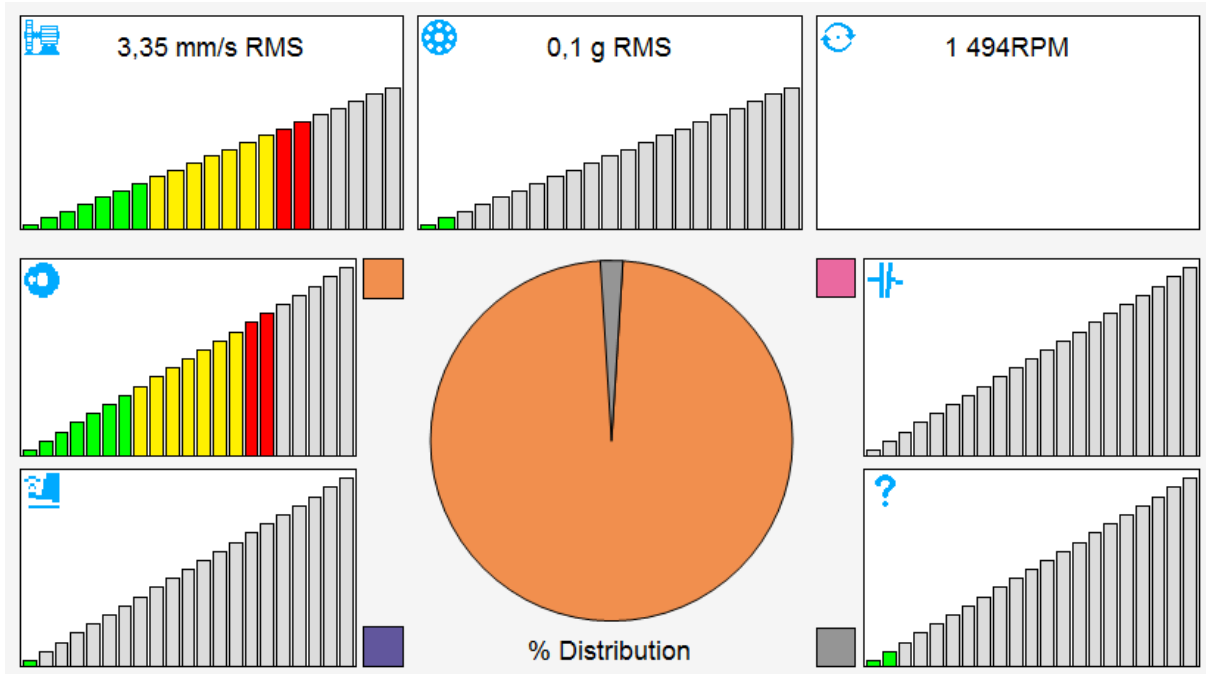
**FASIT** means **FA**ult **S**ource **I**dentification **T**ool. It helps to find the source of problem. The graph contains several parts. Each partial bar graph contains the alarms colors ( see Tools/ Setting/ Alarms )

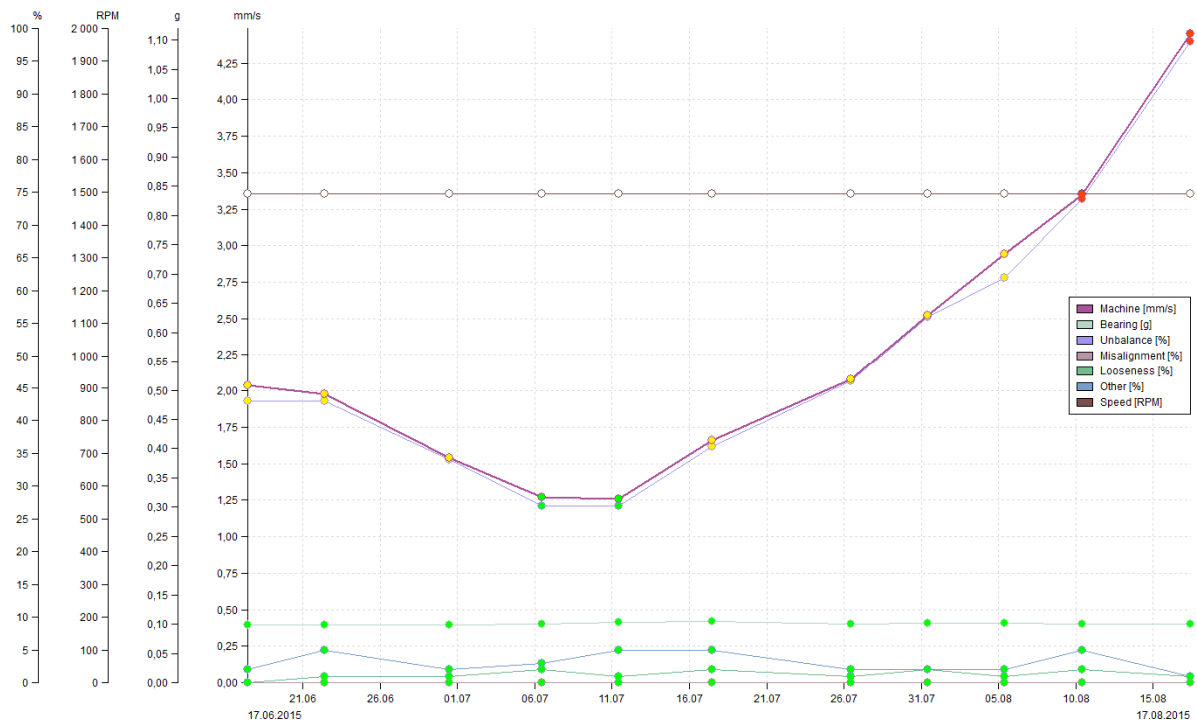
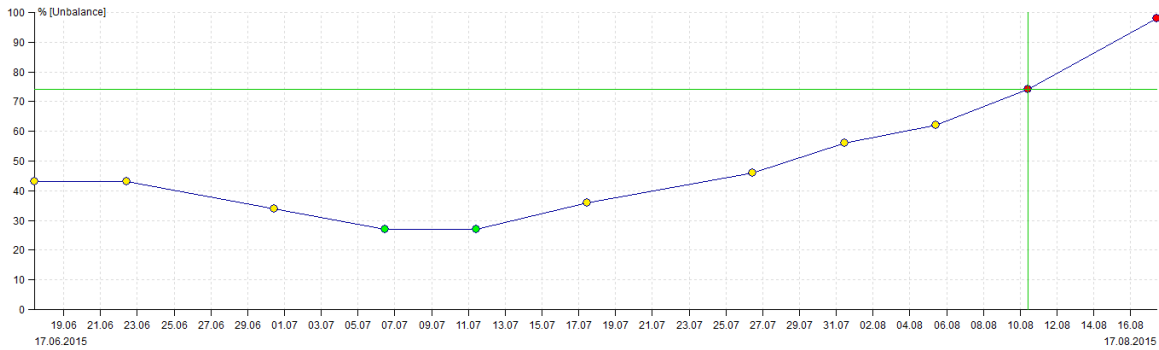
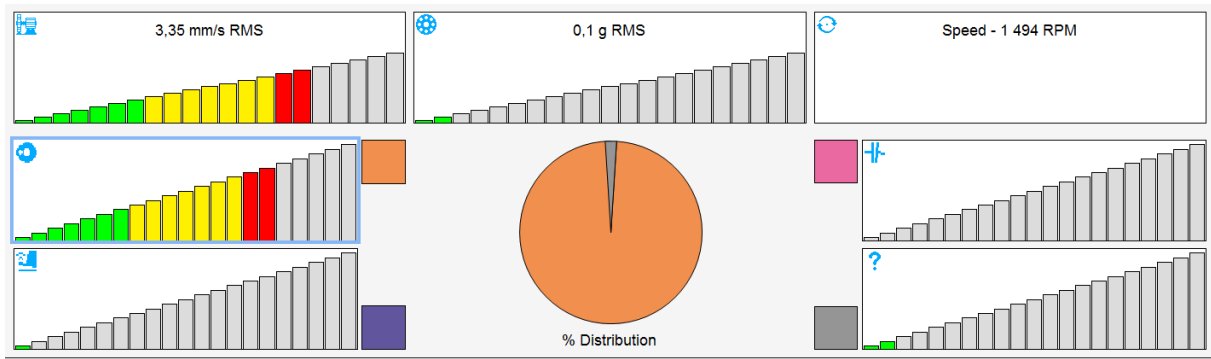
The color tells you the severity of problem (failure). The circle contains sections, which are related to probability of every fault source.

-  The total vibration severity of machine
-  Bearing condition
-  Speed (value only, no severity indication)
-  Severity of unbalance
-  Severity of looseness
-  Severity of misalignment
-  Severity of other sources

### Graph Type

- FASIT** only FASIT displayed (the same view as on instrument screen)
- Fasit+Trend** FASIT + the trend of selected parameter, use the mouse click for selection
- Trend** trends of all FASIT parameters in one multigraph





## **GRAPH Menu Item**

The main target of vibration diagnostics is to recognize the condition of machines. The graphs drawing and evaluating is the main tool how to do that. Especially checking of the trends is usually useful way for that.

### **Cursor**

#### **Cursor Type**

None	no cursor displayed
Single	one cursor line only
Harmonic	1X, 2X, ..., NX frequencies
Sideband	central frequency and sidebands in spectrum
Periodic	for frequency evaluation in time waveform
Delta RMS	RMS, 0-P, P-P value of delta frequency interval in spectrum (related to detect type)
Delta Max	max peak value (highest line) of delta interval in spectrum
Delta 0-P, Delta P-P	amplitude ranges for time signal
Band	band value in spectrum

#### **Peak Jump**

It finds the accurate peak position (frequency) in spectrum. It is often used for speed frequency determining. Also the true amplitude on that frequency is displayed.

#### **Lock**

Check the Lock checkbox. When more graphs of one type are plotted in the page (e.g.6 spectra cells) then you can move with cursor position in one graph and the cursor moves also in other graphs. The movement is not continuous, but all new positions are plotted after you release the mouse button.

If you change cursor type then selected type is applied to all graphs.

If you uncheck the Lock, then each cursor is separated from the others.

#### **Align**

The same (similar) time of reading is kept on displayed graphs. E.g. when there are displayed 2 graphs: trend of overall values and spectrum and we move with cursor in trend of overall values, the reading with same (or nearest similar) time will be displayed in spectrum. It works the other way around as well, when we change the spectrum graph, the cursor in trend of overall values is changed accordingly. It works for both static and dynamic graphs.

### **Setting**

#### **Graph Type**

For spectra only.

Amplitude	single spectrum standard graph
Amplitude + Phase	spectrum graph contains amplitude and phase
Amplitude + Trend	spectrum graph contains amplitude and trend of cursor or overall value
Amplitude Stacked	several graphs in one window (the max number is defined in Globals)
Waterfall	more spectra plotting in 3D

#### **Y-Unit**

Next window appears. The selection of Y axe unit. Integrated units of original reading are available for spectrum.

#### **X-Unit**

Selection of X axe unit. When you push the down arrow, then you can select unit from the list. When you push the icon, then the used unit is changed to the next one (circular shift).

#### **Quantity**

It enables shifting between acceleration, velocity and displacement.

#### **Enter Speed**

The manual enter of speed to the reading data head. The cursor position is offered and can be manually changed.

### **Grid**

It enables to draw several types of grids.

### **Bands View**

If band is defined, then three display modes are available - Off, Basic, With Limits

### **Zoom**

Standard zoom definition.

Mouse zooming is also available. When you operate with mouse in the plot, then both axes are zoomed. When you operate below the X axis, then only the X zoom is applied. When you operate on the left of Y axis, then only the Y zoom is applied.

The mouse zoom works normally when the cursor is off. If the cursor is on, then the mouse has the cursor priority. The mouse zoom is available with CTRL button on keyboard.

When you place the mouse symbol inside the plot area, then also the mouse wheel (roller) can be used for zooming.

### **Autoscale**

Cancellation of zoom.

### **Data Selection**

The list of readings appears. You can make the selection.

### **Trend Limits**

This checkbox switch the limits displaying on/off. It is available only for static data cells, where the trend graph is possible.

### **Min/Max graph**

It maximizes the size of the graph window or return it to the previous size.

## **Graphs**

Several standard windows arrangements.

## **Labels**

Please see the special chapter Labels in Graph for details.

### **Add To Cursor**

Add user label linked to the cursor position. Cursor must be displayed.

### **Change Group**

Displays labels defined in Labels and Bearing tabs in Tree Item Properties and change the groups (bearing, general, gear, blade, off).

### **Scroll Lines**

If more bearings are defined, then it scrolls them.

### **Display User**

Display On/Off of user labels.

### **Induction Motor**

Displays FL with FL+/-FP sidebands on spectrum graph. Option is available only on spectrum measured in current or voltage.

## **Sound**

### **Play, Stop, Loop**

When the waveform graph is selected, then we can listen the waveform on headphones output. If the Loop is checked, then the waveform is replayed again and again until the Stop button is used. You can control the speed of playback ( 0.1x, ..., 10x)

Note: If there is delta cursor selected, DDS plays the sound only from the selected part.



## Tab

### Previous, Next

If more Tabs are opened, you can move along them by pressing Previous or Next button.

### Edit of user label

The position of label rectangle can be changed by mouse.

The position on the X axe change by mouse. Drag the small cross which is on the bottom end of line and move anywhere.

Use the right click on user label and select Edit (double click on label has the same effect). The new window appears. You can change the text.

Use Ctrl+Enter for new line in text.

If the checkbox **Link to value** is off, then the line from label rectangle to graph will not be drawn.

## Labels in graph

You can add short text labels into the graphs, which can be connected to the certain value in the graph. There are two types of labels which can be added to the graph: user labels and generated labels.

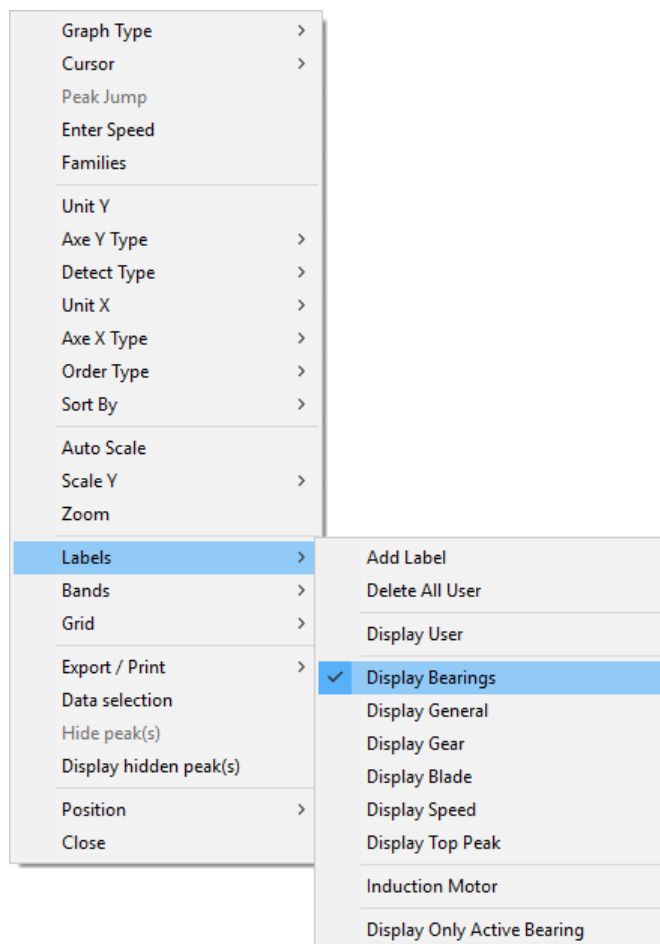
### User Labels

You can enter the text and choose the position of the label. To enter the user label, do the double click on the graph (the window with label settings appear) or do the right click on the graph and you will receive the menu where select Labels/Add Label. You can add the label to the position of the cursor. The cursor needs to be switched on and you can add the label by doing the right click and selecting Add label or you can add the label through the main menu Graph/Labels/Add to Cursor. To edit existing label do double-click on the label or do the right click on the label and select Edit from menu displayed. To change the position of the label, drag it with mouse.

The user labels are saved together with certain reading (e.g. spectrum) and they are displayed together. In view type Waterfall the labels are not displayed.

### Generated Labels (Bearings, Blades, Gear, General)

The other labels are generated labels. The text and position is generated from parameters defined by user (which can be changed in window Tree item properties). Those labels are displayed in groups between which you can switch (in main menu tab Graph/section Labels/Change group or use right mouse click and select Labels).



### **Bearings**

The fault frequencies of bearings are displayed. They are defined in any tree item above the data cell (window Tree item properties/Labels). The labels are displayed in case that the speed is known in spectrum or it is inherited from the tree item above the data cell.

The failure frequencies are displayed for each bearing. If you want to display the selected bearing labels then push right mouse button and select **Labels/Display Only Active Bearing**. The speed value is required for failure frequencies detection. This value can be measured, manually entered (Default speed in Properties) or inherited from higher tree item.

### **Top Peaks**

The list of N top peaks is displayed. The number N is defined in Global settings/Dynamic Graphs/Other.

### **General, Gear, Blades**

The position is defined by frequency entered by user. When the unit is **x Speed**, then it is related to the **OUTPUT** speed of item. It is important for gearboxes. Groups Gears and Blades could be defined in group General, but there would be overlapping of the labels and it could be confusing. For this reason it is better to divide the labels into the groups and switch between them. Those labels can be defined in window Tree item properties/tab Labels.

### **Induction (asynchronous) Motor**

Displays FL with FL+/-FP sidebands on spectrum graph. The proper spectrum resolution is also required (at least two lines between line frequency and sideband). Option is available only on spectrum measured in current or voltage.

Defect frequencies of the asynchronous electric motor:

fL: line frequency

fP - pole pass frequency (= slip frequency \* poles number)

fS: slip frequency (real speed must be measured together with spectrum)

fL+/-fP: side-band frequency (indicates interrupted rotor rod)

The side bands should be at least 40dB less than line frequency line. If not, then interrupted rotor bars are probable.

# Plotting and Reporting

In DDS you can work with various pages. It is similar to the MS Excel. Each page has the flag with name. Flags are in the bottom of plotting area.

## Kinds of Pages

We generally talk about two kinds of pages.

### Plot Page

This page doesn't have the scrollbar on the right side. It means that all objects (graphs) are visible in the same time. The feature is good for data acquisition, when we want to see all data together. The Preview page is the default plot page.

Use the + symbol below the graph area to create the new plot page.

### Report Page

This page has initially the printing format (e.g. A4, Letter, ...). This page has the scrollbar on the right side. It means that all objects (graphs) are not visible in the same time. The size of page is defined in Tools/Globals/General/Report/Page Format.

The Report item is in the main menu. Use the New submenu item to create the new report page.

## Template

Every page can be saved as template for future using. The template contains only empty graphs windows, no direct links to data cells. The template concept is designed for using on points. The data cells contained in point then can be easily displayed.

## Report menu

Report menu item contains two sections of functions. The Report and the Add.

## Report section

This section contains following functions:

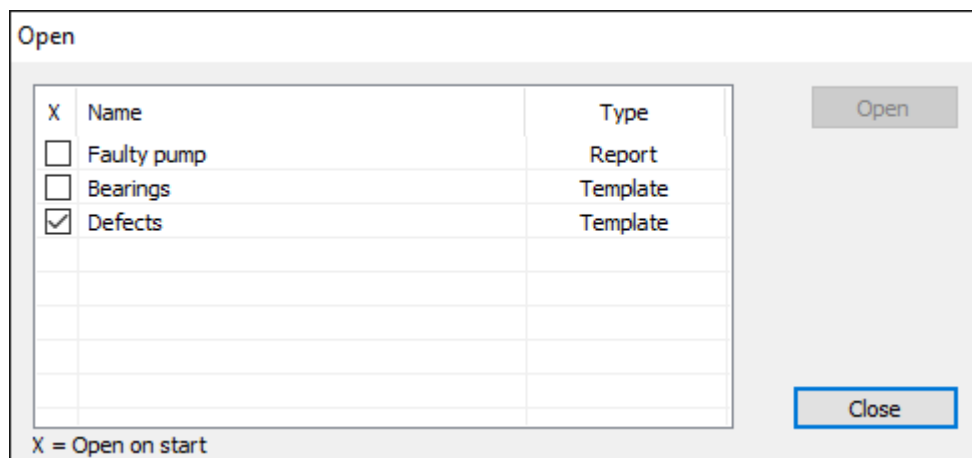
### New

Click on the button New and enter the report name.

### Open

The list of saved report/template pages appears. Select one of them and open it.

Checked Reports (on the beginning of each line in the list) will be opened automatically after tree opening.



### Expand

When you create a new reporting report, then only the first printing page is created. In the process of report development you will probably need a longer document. The Expand function makes the document longer and creates new empty space for writing. The page separators are also displayed.

### **Save**

It saves the selected page. It uses the page name.

### **Save as Page**

Enter the new name and save the selected page.

### **Save as Template**

Enter new name and save selected page as template.

### **Print**

It prints selected page.

### **Rename**

It renames selected page.

### **Close**

It closes the selected page in plotting area.

### **Delete**

The list of saved pages appears. Select one of them and delete it.

## **Add section**

### **Text**

It adds the empty text box into the report. Use the right click and select the Edit or do the double click in the box. Next edit window appears. Write your comments, use formatting of text.

Use the drag and drop to move the box.

Use the right click and select the Delete to remove the box.

### **Time**

It adds the date+time box with actual date and time. Use the drag and drop for moving of box. Use the double click to update the value.

Use the right click and select the Delete to remove the box.

### **Image**

It adds the image into the report. Initially the empty box is created and the window Image Select appears. Initially it contains the empty list. Use the Add button and select image file or images from the computer. Selected images are added to the list and saved to the tree. If the list contains required image select it and press OK. The image appears in the image box.

Use the right click and select the Select Image or do the double click in the box for change of image.

Use the drag and drop for moving of box.

### **Moving with objects**

All objects in report can be moved forward and backward to place them with correct order. Use right click and the **Position** command.

### **Report**

Several predefined reports are available. See the following chapter.

## **Predefined Reports**

Select the tree item. Push the arrow under the Report button (section Add in Report tab). Select report type. Define time interval in next window. Select columns, which you want in report in next window.

If you wish to show the reduce paths to the tree items in report (machine – meas.point – data cell), set up the option Reduce path to Yes. You can find it in Tools/Globals/tab General.

### **Alarms**

It develops the list of all alarms of the selected tree item and its all children. If the selected item is below the machine, then all alarms of that machine will be displayed.

### **Structure**

It develops the text print with the tree structure of the selected tree item and its all children.

### **Basic**

This report enables to print:

- all static readings from defined time interval

- last static readings
- static readings from last N days ( N is manually entered)

### Statistics

Creates the list of statistic parameters of all static data cells. List contains following stats:

Average– average of values

Median - average alternative, elimination of extremes is advantage here

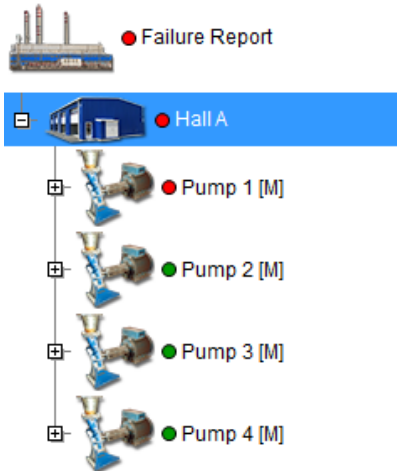
Weighted average - similar to average, it takes into account measurement intervals

Relative variation average - responds to dispersion of values in data cell, always lies between 0-100. 0 – all values equal, 100 indefinitely high differences

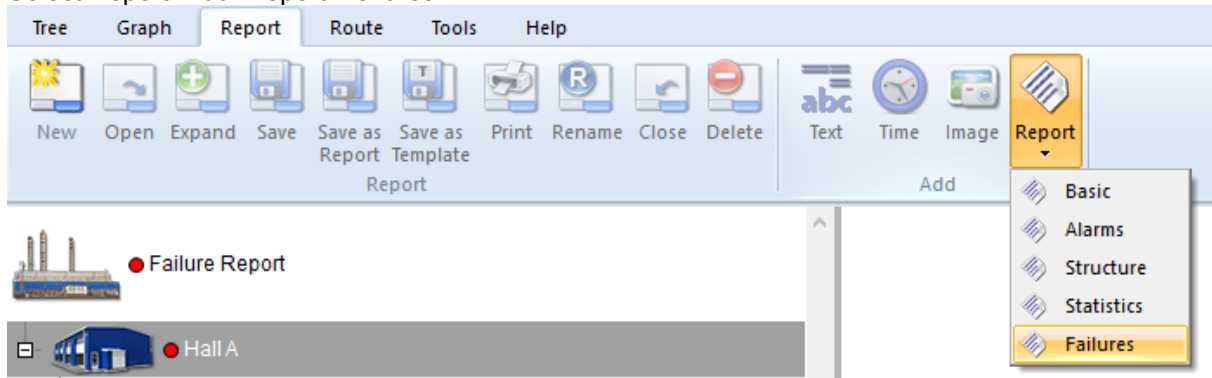
### Failures

The Failures report is created. Follow next steps:

Select tree item (Hall A).



Select Report/ Add/ Report/ Failures.



Enter severity limit. Only higher severities will be included to report. Check whether you want report which contain FASIT or User Notes or both. Press OK:

Severity limit ✕

More than:

▾

FASIT Severities

User Notes

# Failures Report

09.09.2016

## FASIT Severities

Machine	Last Meas. Date	Failure	Severity	Alarm
Failure Report\Hall A\Pump 1	01.06.2015	Unbalance	98%	
Failure Report\Hall A\Pump 4	03.11.2015	Looseness	91%	
Failure Report\Hall A\Pump 3	03.12.2015	Misalignment	89%	
Failure Report\Hall A\Pump 5	23.01.2016	Other	77%	

## User Notes

Tree Item	Date	Failure	Text	Severity	Alarm
Failure Report\Hall A\Pump 4	12.09.2016	Looseness	Repair!	100%	
Failure Report\Hall A\Pump 1	09.09.2016	Unbalance	Repair!	100%	

Alarm colors are used in % intervals <0,33), <34,66), <67,100).

### Last Monitored Machines

It is list of machines, which have at least one reading in defined time interval. The last reading is printed in table. The ID of machine is defined in Properties of machine.

### Printing of colors in printer

When you print reports, you can switch on or off the colors. It depends of your MS Internet Explorer browser. Such parameter is in Page Setup section.

# Families

Families are a powerful tool for frequency spectrum analysis. This feature enables quicker identification of the significant peaks in the spectrum.

## Peak definition:

The peak contains 5 lines with the middle line being the highest and those next to it decreasing in size (the 1<sup>st</sup> and 5<sup>th</sup> line are the lowest lines).

## Pure math Peak definition:

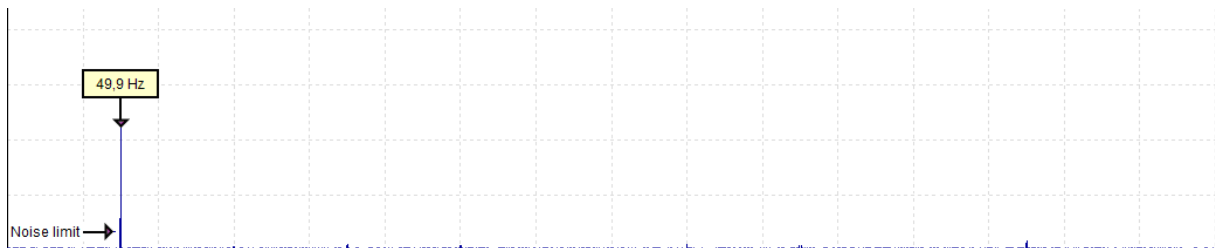
The spectrum contains lines  $f_i$  ( $i=1, \dots, N$ ), which have the amplitudes  $a_i$ . If  $k$  exists, for which the following is true:  $a_{k-2} < a_{k-1} < a_k > a_{k+1} > a_{k+2}$ , then the  $f_k$  is the Peak.

## Noise limit (threshold):

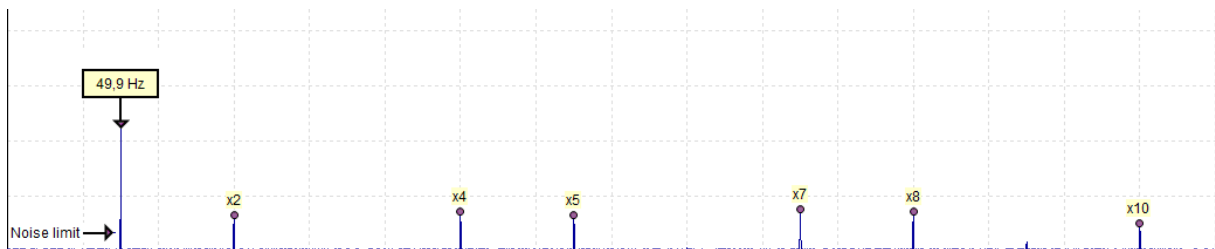
The noise limit is 0.1g, 0.1mm/s, 10um or 1% of TOT of spectrum (depends of which value is higher). For example when the TOT = 3mm/s, then 1% of that is 0.03mm/s, Because it is lower then 0.1mm/s, then the 0.1mm/s will be used. When TOT=20mm/s, then 1% is 0.2mm/s. It is higher then 0.1mm/s and the 0.2mm/s will be used as noise limit.

## Definition of Frequency family:

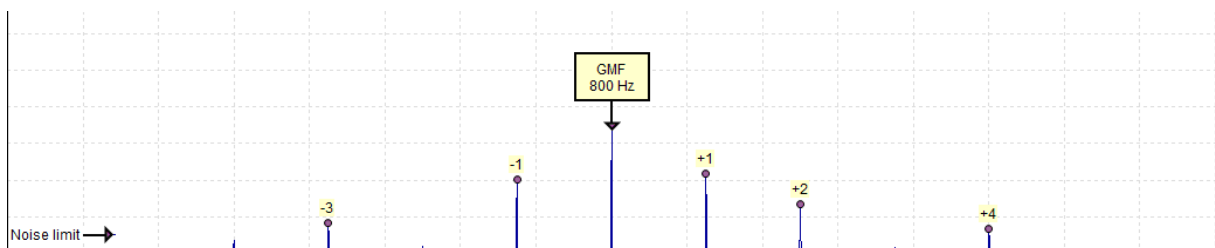
It the set of frequencies in spectrum, which are related to the carrier frequency. The relation can be harmonic or sideband. The sidebands also can be around each harmonic frequency. The individual line is included to set only when the peak also exists on that line and the amplitude is higher then noise limit.



Family with only carrier frequency.



Family with harmonics. The 3rd, 6th and 9th harmonics are missing, because there is not peak or the peak is lower then noise limit.

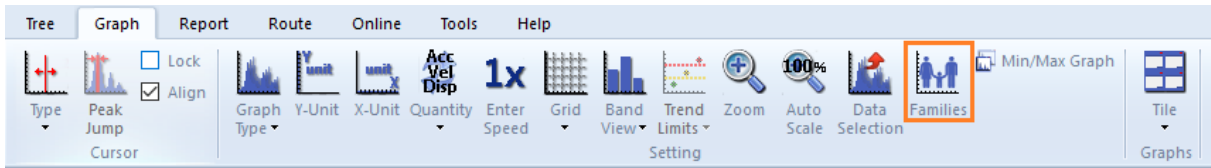


Family with sidebands, some of them are missing.

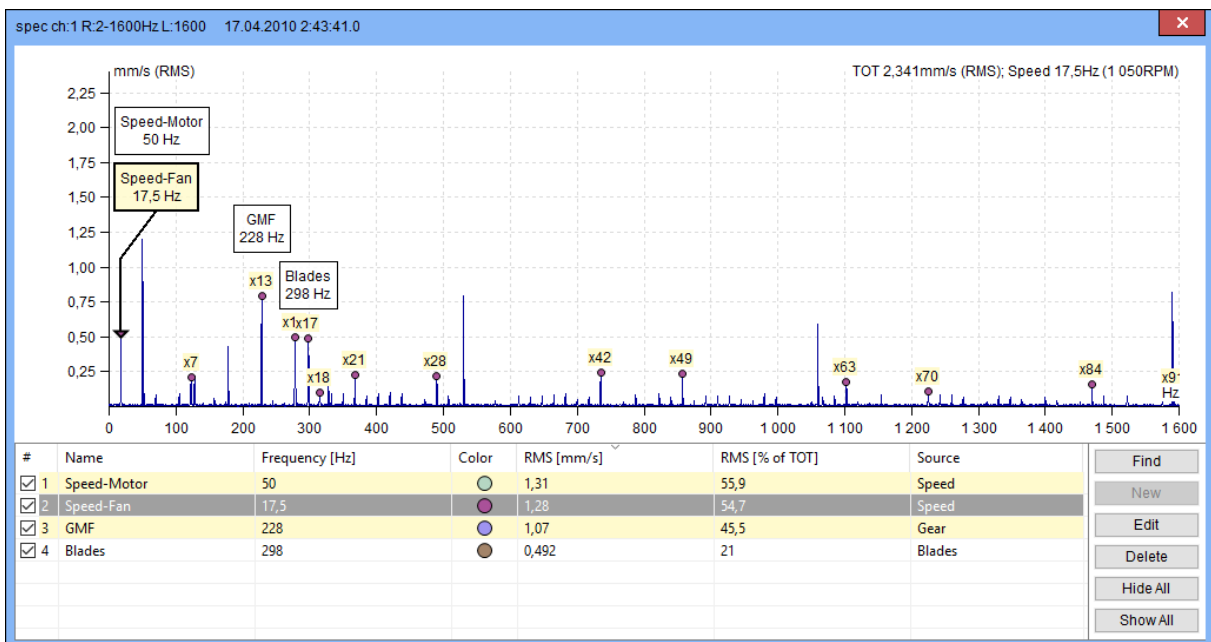
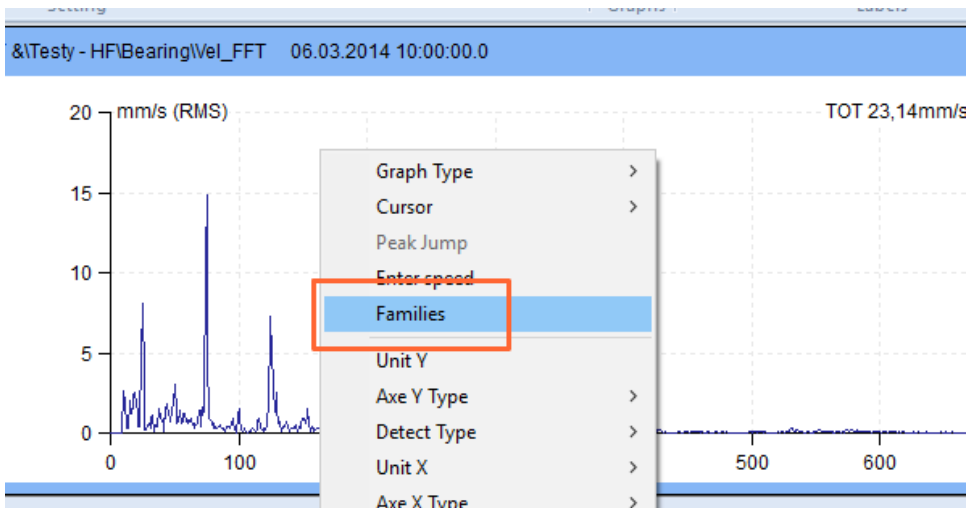


## Using of families

To display the frequency families, select the Graph tab and then the Families button



or select Families in the local spectrum menu (right mouse click).



When the Families function is switched on, the window is split into two parts. The spectrum with the labels on the selected frequencies of families is in the upper window. A detailed list of families with their parameters is in the bottom part. Initially this list contains all frequencies, which are defined in Properties of all items in machine path.

### Family parameters are the following:

*Name* – name of the family

*Frequency* – peak frequency

*Color* – color of the family label (generated randomly)

*RMS* – total RMS of family (RMS of one frequency is counted from 5 lines)

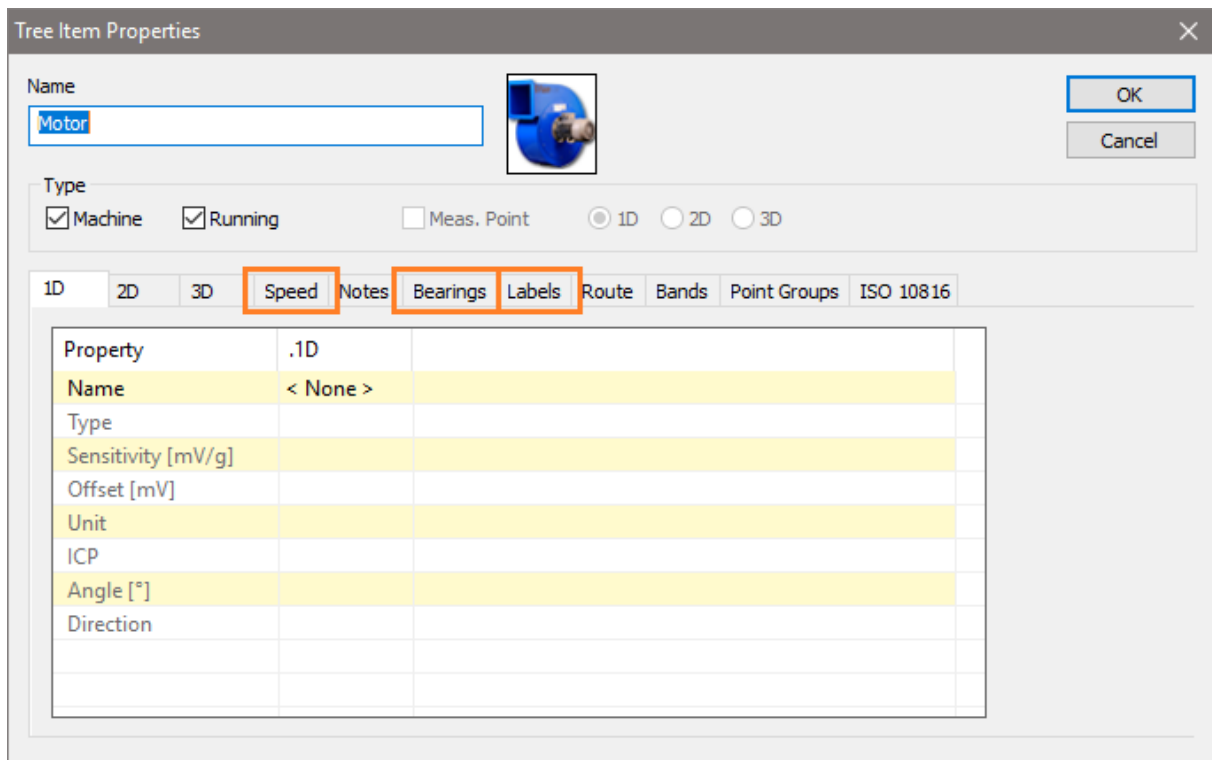
*RMS [% of TOT]* – percentage of the family RMS, when 100% is RMS of complete spectrum. You can see, the sum is not equal 100%. It is correct because many peaks are contained in more than one family.

*Source* – family source (Speed, Bearings, General, Gear, Labels, Found, User)

**Which families are displayed in the spectrum?** All checked families (first column in the list) are displayed. The selected frequency the list or frequency selected by cursor is highlighted.

If the family is not displayed (the first column is unchecked), then the family frequencies peaks are hidden.

You can change the order of the families in relation to each column. Click on the name of the column.



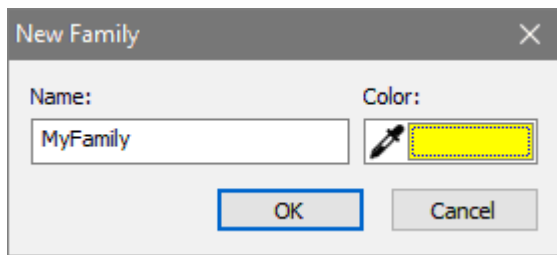
## Family Searching

Other families that exist in the spectrum can be found with the Find button (the button is on the right, next to the list of families).

Press the **Find** button. The procedure will find next families in the spectrum. The new frequencies with their labels appear in the spectrum. These frequencies have next needed properties:

- The **Peak** exists on the frequency,
- The amplitude value is higher the **Noise Limit**.

You can also create new family manually. Display the cursor and move it to required frequency. It does not matter what type of cursor you use. Press the New button to open the window with Family parameters and enter required values. Press OK button to confirm the parameters. When you select the frequency, which is used by other existed family, then the warning window appears and new family will not be created. When on selected frequency is not peak or the amplitude is lower than noise limit, then warning appears and new family will not be created.



The Delete button deletes the selected Families in the list.

The Hide All button unchecks the first column of all Families. The Display All button checks the first column of all families.

## **ROUTE Menu Item**

Select the Route menu item. The plotting area is closed and the list of saved routes appears. Each route is the list of machines. You can expand every branch in the list by mouse.

### **Basic Operations**

#### **Create New Route**

Drag the required part of the tree on the left and drop it to Route list.

If you drop it to empty area (the cursor symbol is arrow), then you manually enter the name and new route appears in the list.

#### **Add next machines or point to the route**

Drag the required part of the tree on the left and drop it to selected route in the list. The cursor symbol is [+].

#### **Buttons**

The New creates empty route. The machines must be added (drag and drop) separately.

The Delete deletes and Rename renames route selected in the list.

The Delete Items removes selected tree items in route.

### **A4400 VA4Pro & A4300 VA3Pro Data Collector**

Push the **A4400 VA4 Pro** button in the Instrument section.

The new window appears in the bottom of screen. This window represents the instrument.

#### **Connect**

Once the instrument is connected to the PC (via USB), the connect button connects the instrument with the software and data transfer can be done.

#### **Safely Remove**

The safe disconnection of USB device from computer. The cable disconnection without using this function can harm the flash memory in instrument.




#### **Find**

When readings were made by Virtual Analyzer in the computer, then you need to find the folder with saved data.

#### **Receive**

Connect the instrument and press Receive button. All measured data will be downloaded to the computer. There are two types of data - the route and analyzer (off route) data.

The list contains the name, the type ( route, off-route), the status and the date of last reading.

Status	Date
	
	
	9. 12. 2014 10:56:26

The description of status:

blue the route was not loaded to instrument yet,

grey the route was sent to instrument and not exported yet to VA4\_Disc.

green route downloaded from instrument with readings, the date of exporting to VA4\_Disc is attached.

You can select each route and look at the structure and some (not all) readings.

#### **Send**

Drag the route in the Routes window list (top) and drop it to the list in A4400 - VA4Pro window.

The new dialog with route parameters will appear. It is possible to set sending of data cells with expired interval only and sending of reference data. Default settings can be changed in menu Global settings/Route. Select the route (blue colored). Press Send button.

### **Store**

Select one received route in the list in A4400 - VA4Pro window. Press Store. The complete route with all readings will be loaded from instrument and saved to the database.

### **Export and Import**

Described in chapter Route Downloader.

## **VA4 Pro Virtual Unit**

If the VA4 Virtual Unit is installed in computer, you should write the path to this application to Tools/Global Settings/General/ Application/ VA4 Pro Virtual Unit Path and you can read the data from VA4 Virtual Unit.

You can read the measurement from \VA4 Virtual Unit\data or \VA4 Virtual Unit\ VA4\_DISC. The default folder (one of them) you can select in Tools/ Global Settings/ General/ Application/ VA4 Virtual Unit Data Folder.

When you push the VA4 Pro Virtual Unit button, the instrument window appears. Usage of instrument window is basically same as previous A4400 VA4Pro & A4300 VA3Pro.

## **A4300-VA3 Lite**

The VA3 Lite instrument (interface) is available in free DDS version. It enables to load the Route to the VA3 Pro instrument. But the number of readings is limited, because only readings compatible with A4900 - Vibrio M are available.

## **A4900 - Vibrio M & A4910 Lubri data collector**

Push the **A4900 Vibrio M** button in the Instrument section.

The new window appears in the bottom of the screen. This window represents the instrument.

There is name of the route or „Analyzer“, type (Route, Analyzer) and status (blue – the route was not transferred to the instrument, gray – downloaded from instrument but blank, green – downloaded from instrument with measured data).

### **Send**

Drag selected route in the list and drop it to the table in instrument window.

The new window with route parameters appears. It is possible to select if all data cells will be transferred or just those with expired interval. To change default settings go to Global settings/Route Select route in the list and push Send button. The route will be loaded to the instrument.

### **Receive**

Connect the instrument and press Receive button. All measured data will be downloaded to the computer. There are two types of data - the route and analyzer (off route) data.

The list contains the names, the type ( route, off-route), the status (blue - the route was not loaded to instrument yet, grey - downloaded from instrument but empty, green - downloaded from instrument with data) and the date of last measurement.

You can select each route and look at the structure and some (not all) readings.

### **Store**

If the route data are downloaded, push the Store. All data will be saved to the tree database. You can save analyzer data to the tree by mouse – drag and drop.

### **Delete**

It deletes selected route from the list in instrument window. It does not delete the route in the instrument.

### **Export and Import**

Described in chapter Route Downloader.

## **TOOLS Menu Item**

The Tools menu item contains functions for settings of DDS.

### **Sensors**

This list contains all predefined sensors, which can be used in Point properties definition.

Push the Sensors icon. The new window with sensors list or empty box appears. Push Add and define the new sensor. You can edit the existing sensors by Edit button or by double click. If the predefined sensor is used in Route, then its name is also used. It should simplify the handling with sensor in route.

### **Bearings**

In the installation of the DDS, there is file bearings.lbr in installation folder of DDS\data. It contains approx. 30 000 bearings. To make the work with DDS easier, the user creates User's own database of bearings. This database will contain all bearings which will be used in the Tree. The User's list of bearings is empty in the new Tree. The required bearings need to be imported from bearing database first (file bearing.lbr).

Press the button Bearings to display the window User bearing database. The list of the bearings which were added to the database is displayed. When no bearings were added previously, the list is empty.

To import one or more bearings press Import. DDS will open the file bearings.lbr. Select required bearings and press Add. The bearings were imported to the User's database. When you finished importing then close the window.

You can also add the bearing to the database by manual entering of its parameters. Either you can enter the geometry of the bearing (numbers of balls, ball diameter, pitch diameter and contact angle) or you can enter the relative bearing fault frequencies.

### **Alarms**

#### **Introduction**

The DDS uses a new approach of regarding of the alarms. We use this term for limits of reading values. This new concept enables to define user number of alerts. The only two alerts (e.g. warning and danger) are usually enough in many applications. But if somebody needs more, he can define it. You should understand that in this moment we define only alert types (generally they are the **words**, which will be used). The limits for each type will be defined individually for data cells.

Example:

In Alerts types we defined the Warning and Danger alerts types. The OK alert is default type.

For two data cells we can define exact limits:

overall velocity 5 mm/s (0.2 ips) for Warning, 9 mm/s (0.35 ips) for Danger  
overall acceleration 0.5 g for Warning, 1 g for Danger

#### **Create the alert type**

Use the Alarms button. The Alert Types window appears with the list of types. The default first type is OK, which cannot be deleted. You can only change the name and color.

Push the Add button for new type. Define the new name and select the color. You can change the severity (order) in the list.

### **Icons**

Every tree item can have own icon. Push the Icons. The window contains the list of available icons.

Add it allows to add the new icon to the list  
Delete removes icon from list

You can also define the default icons for items with labels. It means the machine, 1D point, 2D point and 3D point. Such default icon is automatically used for that items type.

### **Globals**

In the Global window you can define many parameters, which enable to customize DDS or define defaults parameters.

## General

### Application

Language – default language for DDS (the change will be shown after restarting the software)  
VA4Pro Virtual Unit Path – shows the path to the folder with the VA4Pro Virtual Unit software. It is used for analysis of records measured in route (see the chapter Record and it's Analysis).  
VA4Pro Virtual Unit Data Folder – default folder for data reading

### Report

Page format

Reduce paths – yes, no;

The “yes“ option means, that the tree items paths is reduced to format Machine -> Meas. Point -> Data Cell

Basic (Select Columns) – yes, no for each report.

The "yes" choice means, that the offer of columns is displayed

Alarm (Select Columns) - yes, no; for each report.

The "yes" choice means, that the offer of columns is displayed

### Other

Alarm Evaluation from – Last Confirmation Time, Last Reading Only

Auto Switch Gibbon Panel – if yes, tabs are active according to the selected items (graph, tree)

Allow MS SQL – no, yes

Defragmentation – yes, no, ask

Open Help in – DDS, Web browser

## All Graphs

### Cursor

Align– it keeps same (similar) time of reading in all displayed graph (see the chapter Graph menu item/Align)

Lock – opened graphs synchronize the position of the cursor with active graph

Harmonic Lines

Sideband Lines

Periodic Lines

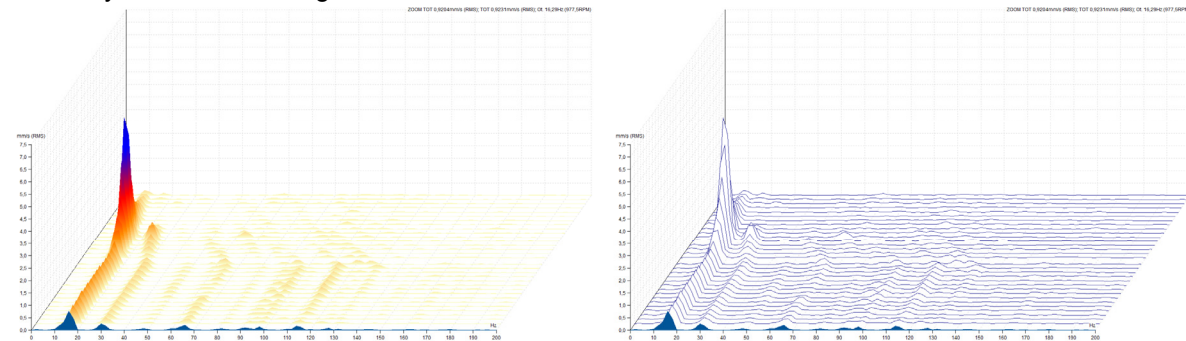
### Waterfall

Angle[°]

Graph Height[%]

Maximum Number of Readings – maximum possible number of graphs in waterfall

Draw Style outline or gradient



### Other

Phase Type

Display Readings from Last – data cell is showing the week/month/year before the last measured data (including the last measured data)

Graph Count in Stacked – maximum number of graphs displayed in tiles

Number of columns in Stacked

Legend Position

Display User Labels

Grid – the type of grid in graphs

### **Fixed Scale**

Enable Fixed Scale – yes/no

In next lines you specify range for every unit.

### **Static Graphs**

#### **View Type**

APS – the default display of the graph of APS data cell

Centerline – the default display of the graph of APS data cell

#### **Other**

Display Unit X – switches off/on the x-axis legend by static graphs

Display Limits

Hide Meas. Circles – yes, no (only for static trends)

### **Dynamic Graphs**

#### **View Type**

Time

Spectrum

ACMT

Order

Orbit

#### **Other**

Spec. Axe Y Type – it switches between linear/logarithmic/decibel axis in spectrum graph

Spec. Axe X Type – it switches between linear/logarithmic axis in spectrum

Sort By – readings are ordered according to time/speed/order

Order Type – ascending/descending

Detect Type Acc – RMS/0-P/P-P

Detect Type Vel - RMS/0-P/P-P

Detect Type Disp - RMS/0-P/P-P

Band View Type – switched off/simple/with limit values

Display Generate Labels – group of generated labels is displayed (the group which is active, see chapter Labels in Graph for more information)

Top Peaks Count – number of peaks in table

Range [dB] – initial range for logarithmic y-axis

Display Tacho Marks – yes, no; Switches on/off tacho marks in time waveforms and orbits.

### **Unit**

You can set up the system of units and default units for selected physical values.

### **Skin**

Setting of display of the graph

### **Route**

#### **Data Cells**

Transfer to route

Interval Type

Interval

#### **Route Parameters**

Don't show dialog again –the dialog with question about what should be transferred to the analyzer is not shown after transferring the route to the analyzer

Send Data Cells – transfers the data cells with expired interval/all to the route

Send Reference – transfers the last measurement to the analyzer as a reference

Display Route Report – show detailed information about sending/receiving route (not measured data cells etc.)

### **Shortcuts**

You can define the shortcut for any command. Push the Shortcuts button. Select the Menu Item and required command. Enter new key and press Assign. During this procedure you are informed whether your new key is already used or not. If it is used, then there is also command for which it is used displayed.



You can define more keys for one command.

You can remove any already assigned key using the delete button.

### Default shortcuts

S	Single cursor
D	Delta RMS cursor
H	Harmonic cursor
B	Sideband cursor
N	cursor OFF
Ctrl+P	Peak Jump
Ctrl+E	tree item properties
Space	switches the focus between tree and graphs
Tab	select next item
Shift+Tab	select previous item
Ctrl+F	Filter (tree menu item)

## SQLite Tree Defragmentation

Use this function to compress the size of the tree file (database file).

## Tree Synchronization

The example will be good. The tree database is saved in the office server. When you go to the field trip, you copy that tree to your notebook. After several days you return back to the office and in notebook tree you have many new readings. And you are not alone, you are part of group where several people return back with new readings. All new readings have to be saved to the office server. It is clear, that standard copy function does not enable that.

The synchronization function can do it. Your notebook tree is the SOURCE tree. The office server tree is the DESTINATION tree. When you run it, then all new readings will be copied to the office tree. In the window select both trees, push Compare, look at results and push Synchronization.

## Tree Backup and Restore

These functions are available only in full DDS version (not the free of charge version).

**Backup** saves complete tree state to a single file with .bkp extension.

**Restore** is the inverse function.

**Note:** Tree in SQLite database format is saved in single file and you can save that file as backup directly. The Backup and Restore function are designed primarily for SQL database formats.

## User Permissions

If many people work with DDS, then it is recommended to assign user permissions to them. Not everybody should have full access to all available functions. The four levels are available. All default passwords are 1234.

Admin	full access to all functions
Power	cannot create new database and cannot edit user permissions
Route	cannot modify tree structure, cannot switch on/off online readings
View	can only view data

## **HELP Menu Item**

### **Help**

Open the help file.

### **About**

The version details of installed DDS.

### **Licence**

Contains license information. It enables import of license if you have bought full version.

### **Update**

Opens the website Adash for update.

# **Route Downloader**

Sometimes you need to take readings in the location, where you don't have access to DDS software. The DDS enables to create the route as one file. This file you can send by email to that location. The technician, who is taking the readings will use the Route Downloader software for uploading the route to/from the instruments (compatible with Vibrio M , VA4Pro and VA3). The technician can later send the route file with readings by email back to the office, where the route data are imported into the DDS tree. The RouteDownloader enables to collect data remotely.

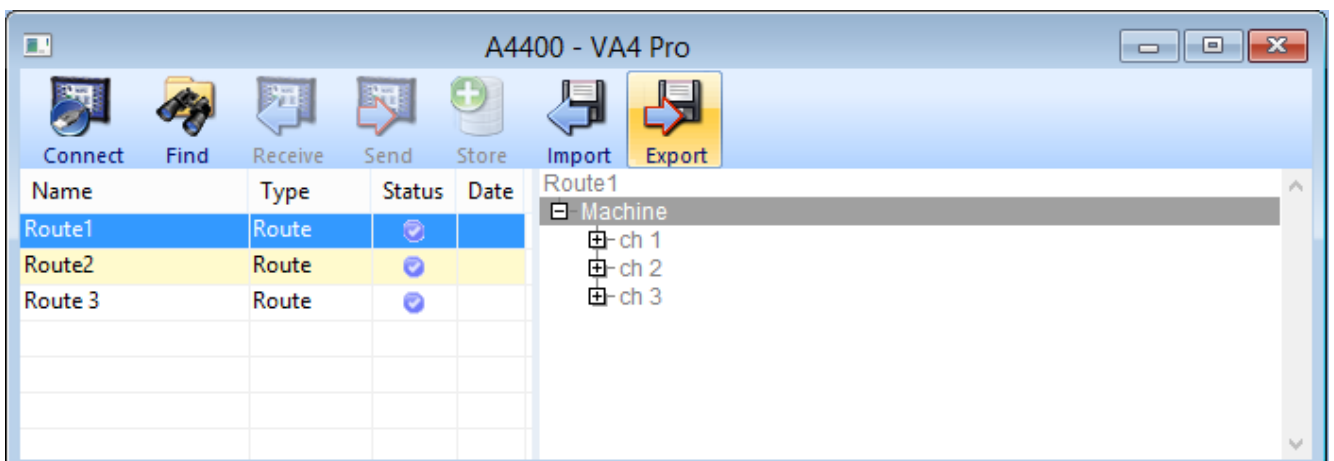
## **Installation**

Download and install the Route Downloader from [www.adash.com](http://www.adash.com) / Downloads / Adash software / DDS / DDS Year / RouteDownloader.exe

Make sure that you have the latest DDS software version which can be found in the same section mentioned above.

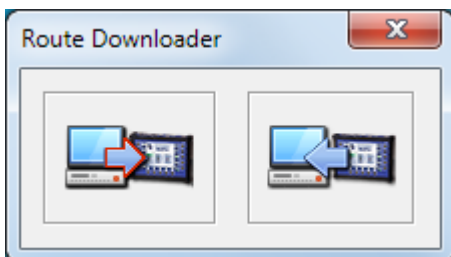
## **Exporting the route**


Open DDS and prepare your route which you would like to send to the instrument. The DDS creates rdi or rvi file which is readable for Route Downloader software. Select one or more routes and press Export. Choose the rdi/rvi file location, name it and save. The rvi extension is used for VibrioM and the rdi extension is used for other instruments.



## **Uploading the route into the instrument**

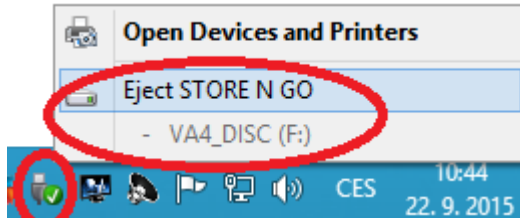
Open the Route Downloader software and connect the instrument with the computer. Software icons are colored once the instrument is found. The buttons are grey if the instrument was not found. Always connect only one instrument to the computer. The Route Downloader cannot work with more than one instrument.



Press  button (used for uploading to the instrument) select your rdi or rvi file and press Open. The route will be uploaded into the instrument.

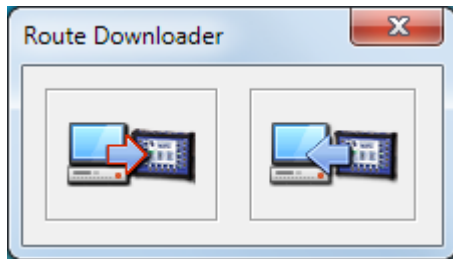
## Disconnecting the instrument


You must not disconnect the instrument during the communication with the software. It may damage the data ! Always use "Safely remove hardware" function before disconnecting the USB cable. There is USB connector symbol in the Windows OS toolbar for that. Click on it and remove appropriate device.



## Downloading the route with readings

Connect the instrument with the computer and open Route Downloader once you collected readings.



Press  button (used for downloading from the instrument). The Route Downloader creates rdx or rvx file which is readable for DDS software. Choose the rdx/rvx file location, name it and save.

## Storing of route readings into the DDS

Open DDS. Press Import, choose your rdx/rvx file and press Open. The route with readings will be displayed in the instruments' window. Select the route and press Store. Your readings will be stored into appropriate route tree.

