



User's Guide

DDS

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Installation

System Requirements

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

License Key

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

You can install software to many computers, but you can run it only when the dongle is found (connected) on the computer. This is the advantage comparing with PC-based license file. You can simply move the license between the computers.

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

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

Upgrading

The newest released version is always prepared on our website for free downloading and installation.

DDS Installation

DDS

You can always find installation file on Adash website (<http://adash.com>) in Download/Software Adash section. Installation has one file and you need appropriate rights for running (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 of 32/64bit 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.

IMPORTANT: License file is usually provided on CD and DDS tries to import it after first run. License can be later changed/imported using dialog in Help/ Licenses.

HASP Dongle driver

You will find the HASP driver on the CD or you can download it from Adash (<http://adash.com>) website, section Download/Third parties' software/DriverHASP... (choose your Windows version).

Language selection

On first run on PC where DDS was not 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 data structure. It has the same meaning as database in the past. We are trying to leave the database in 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. You are free in the number of levels of the tree.

Tree Item vs. Data Cell

We define two different types of cells in the tree.

Tree item

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

Data Cell

It is the item which contains readings (overalls, spectra, time waveforms,...). Typically the data cells are created under (in) the Points. However cell 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 which data are represented by one value. It is e.g. overall, wideband or process value. The value may be complex (real+imaginary parts) and also may contain some condition information (usually the speed).

Dynamic this kind of cell contains readings which data are represented by array (many) of values. It is e.g. spectrum, time waveform, order analysis.

Route and Online Data Collection

The DDS is designed for both uses. The data formats and database structures enable to use one software for both collections.

Database Files Options

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

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

Machine Label

Somewhere in tree hierarchy you need to define the Machine label. By others words you need to tell the software, where is the machine position. The route is generally the list of the machines. It is the reason why to define that machine label.

Measurement Point Label

Under the machine label you need to define the points. It is the location on the machine, where the sensor is mounted. You can define one, two or three axes in one point. Following properties are available for the point:

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

Where are Data stored in the computer

The default location of the SQLite databases is for all users in C:\ProgramData\DDS\DB\ folder. 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 a location of the tree (*.ndb file) then select the Open Tree function. The window with the list of trees appears. Use the right click on any tree and choose Open folder with database.

The demo Tree

The demo tree DDS appears after installation.
It contains several main tree items with data.

Vibrio Route Data Cells

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

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 Menu Item

Run the DDS on your system. The main window appears. The main menu is on the top (Tree, Graph, Route, ...). Every menu item contains the set of functions, which are displayed in the panel below the menu.

Select the Tree menu item and the Open icon. We will use the short text Tree/Open in manual for such using of more items. The Open Tree window appears. The "DDS" should be in the list (if not use the Open existing Tree chapter below). Select it and press Open.

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

Use keyboard for faster movement along the tree.

Use arrows up/down 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 + or - button.

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

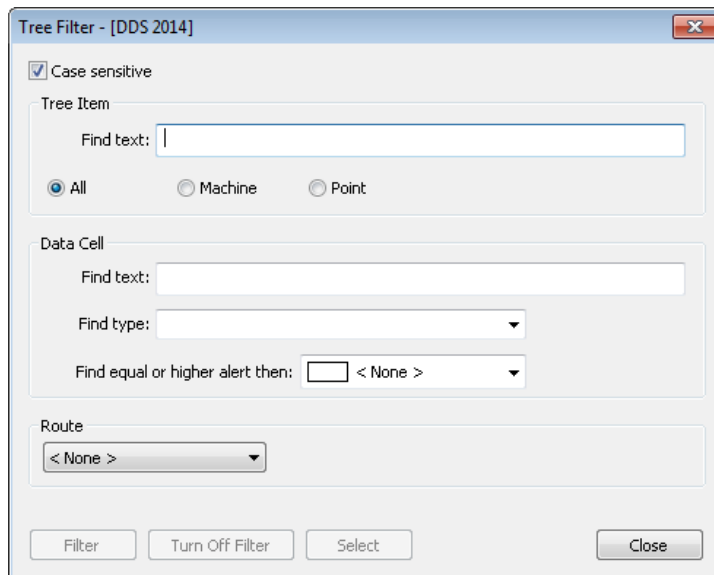
Close Tree

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.

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 |
| wb | wideband |
| dmd_wb | wideband 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 | the amplitude and phase on speed frequency |
| smax | maximum of displacement for shaft vibration |
| cl | center line |
| ps | phase shift |
| img | image |
| rec | record |
| bal | balancing |

If you need to use more than 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 tachometer

- inherited from parent tree items, the symbol * is used

Reached Alert

Instrument, which was used 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 |

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.

Tree Item Properties

Name 

OK Cancel

Type

☐ Machine ☒ Running ☐ Meas. Point ☒ 1D ☐ 2D ☐ 3D

1D 2D 3D Speed Notes Bearings Labels Bands

| Property | 1D |
|--------------------|----------|
| Sensor | < None > |
| Type | |
| Channel | |
| Sensitivity [mV/-] | |
| Offset [mV] | |
| Unit | |
| ICP | |
| Angle [°] | |
| Direction | |

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.

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).

Speed Tab

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.

Here you can select one of the three options:

- <Undef.> speed is inherited from parent tree items
- <Variable> if the option is selected on machine item and a measuring instrument supports it (VA4Pro), it tries to find actual speed before measurement starts
- Input the actual speed value

Gear Ratio enables to use inherited Default Speed and to multiply it. E.g. the default speed is defined in the motor item and the recording is made on gearbox output. The gear ratio enables to get correct speed value.

Tacho Factor is similar to gear ratio, but it works with directly measured speed by tacho. It is used in the situation, when the tacho sensor is placed in other shaft. When the actual shaft rotation, which is related to measured point, is multiplied by gear ratio, then this ratio should be entered to tacho factor. The correct speed is saved to database then. It means that the speed value (measured by tacho) is multiplied by tacho factor and that value is saved to database.

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. 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

| Stage | Input shaft teeth | Output shaft teeth | Ratio | x Speed |
|-------|-------------------|--------------------|-------|---------|
| 1 | 10 | 20 | 0,5 | 0,5 |
| 2 | 30 | 40 | 0,75 | 0,375 |

Buttons: Add, Remove, OK, Cancel

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,
- must be measured on different channels (1D tab),
- 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.

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 <i>Move</i> . |
| Two rectangles | The selected item will be moved, in the next window you change the function to <i>Copy</i> . |

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.

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 |

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:

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

Abs Alert Limits

Vibration diagnostics knows two kinds of alert limits. The absolute (Abs) limit is defined value with unit, e.g. 1.7g. When the reading is over that limit, then it is reported. The relative (Rel) limit is dimensionless. Usually it is defined in %, e.g. 200% means twice higher value then the reference value. The reference is defined by user, e.g. the value of new machine or after repair. Every limit is in relation to one alarm type. See the Tools/ Alarms for details. Simply talking it is the color of alarm. Usually three colors are used – green, yellow and red.

Abs Alert Limits for Static Readings

For new data cell you see next image in static data cell.

Properties Route **Abs Alert Limits** Data

☐ Use limits

Unit ⊕

mm/s Ok ⌵ ⊕ ⊖

If you want to define limits, check the **Use limits** box.

Properties Route **Abs Alert Limits** Data

☒ Use limits

Unit ⊕

mm/s Ok ⌵

Click on the (+) symbol and next window appears.

Add limit value

Value

OK Cancel

Enter the limit value and push OK. Now you see this:

Properties Route **Abs Alert Limits** Data

☒ Use limits

Unit ⊕ 0,62 ⊕

mm/s Ok Warning ⌵

Click on the down arrow in the right side of Warning area.

Properties Route **Abs Alert Limits** Data

☒ Use limits

Unit ⊕ 0,62 ⊕

mm/s Ok Warning ⌵

Ok
Warning
Alert
Danger

You can select the type of alert (it means color). See **Tools/Alarms** for more information about alerts. By repeating of that procedure you can define all alert limits, which you need.

Properties Route **Abs Alert Limits** Data

☒ Use limits

Unit ⊕ 0,62 ⊕ 0,9 ⊕ 2 ⊕

mm/s Ok Warning Alert Danger ⌵

If you need to edit or delete the limit value, use the right click.

Multi edit of limits

Select more data cells of the same type, e.g. more static cells ISO RMS. Display the properties and the Abs Alert 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 editation 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

Abs Alert 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.

Properties

Route

Bands

Abs Alert Limits

Data

| 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 **Abs Alert Limits** tab. It is empty.

| Properties | Route | Bands | Abs Alert Limits | Data |
|----------------------|-------|-------|------------------|------|
| Bands | | | | |
| <div></div> | | | | |
| <div>AddDelete</div> | | | | |

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

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 ($\text{rms} = \text{square root of } (f_1^2 + f_2^2 + \dots + f_N^2)$). The Max means the top peak in band. The second Detect Type is in the **Abs Alert 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 $2,5g^{\text{RMS}}$ or $3,52g^{0-P}$ ($0-P=1,41 \cdot \text{RMS}$) or $7,05g^{P-P}$ ($P-P=1,41 \cdot 0-P=2,82 \cdot \text{RMS}$). The same logic is used for RMS detect type in band tab.

Band and limit edition 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 edition

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.

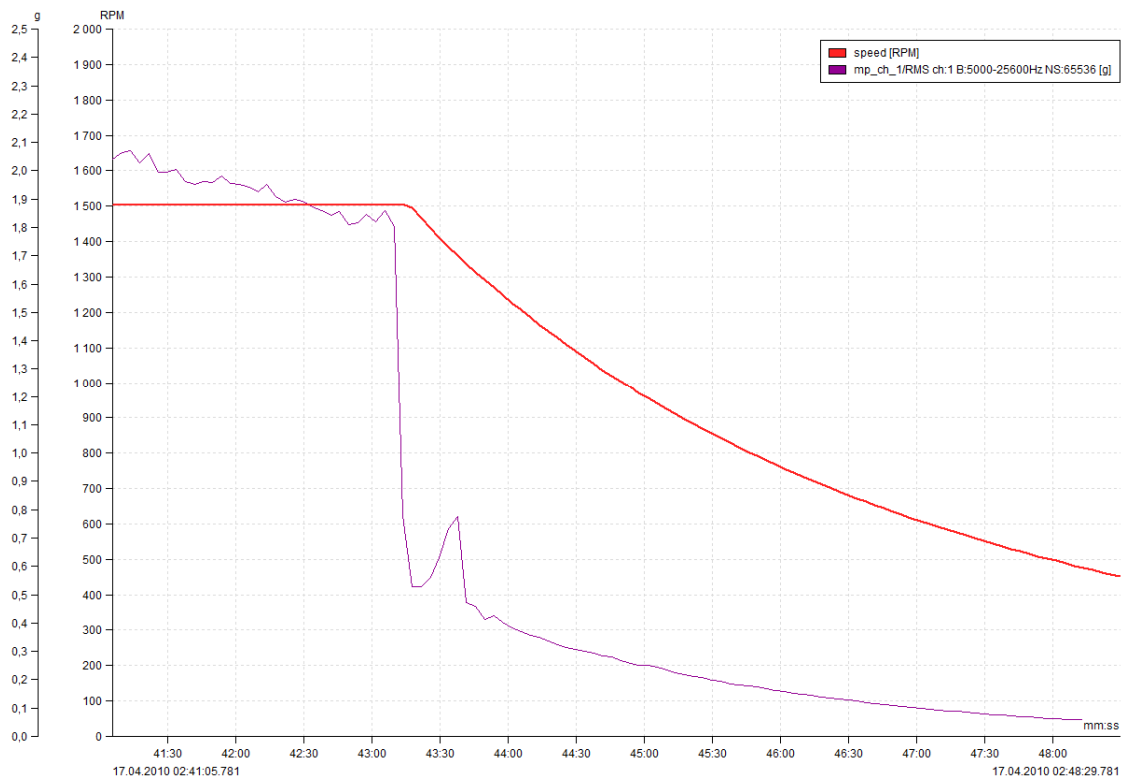
To create multigraph, choose the data cells from the tree (those which can be compared). Click on icon Create multigraph in section Graph or do the right click on tree and choose Create multigraph.

Trend multigraph

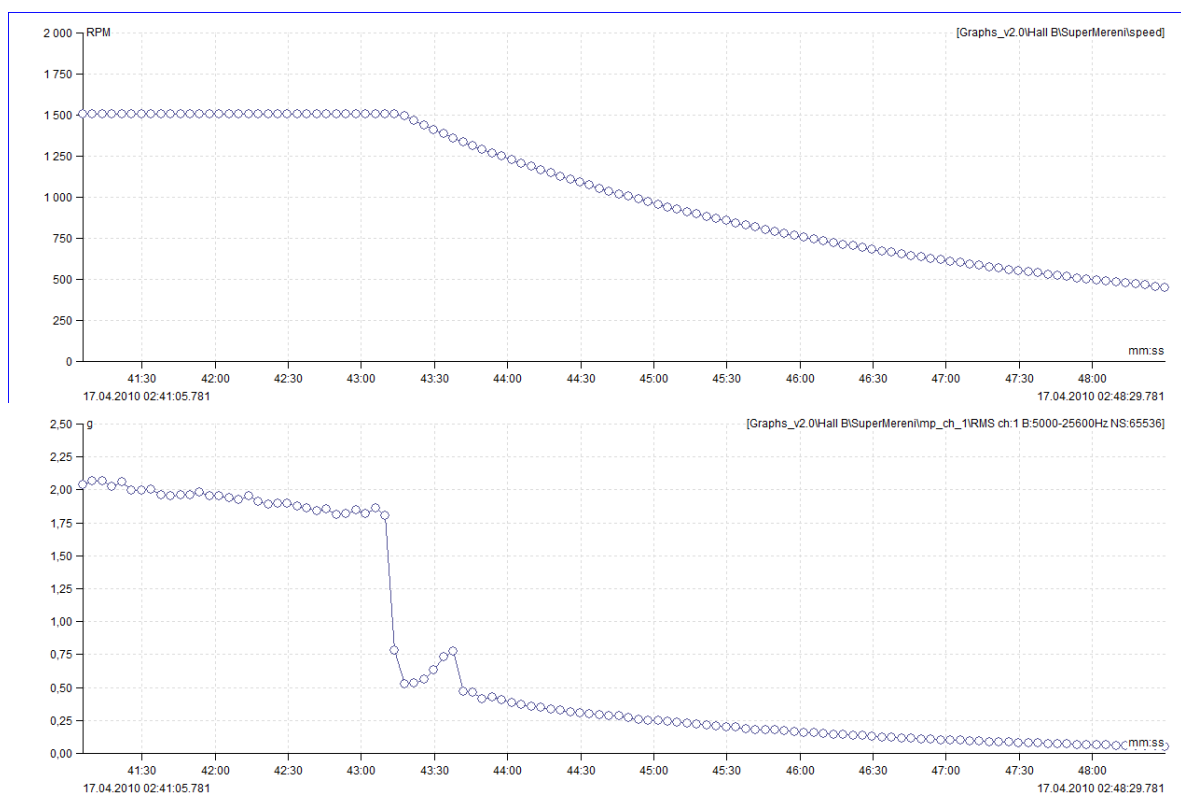
All basics functions of trend graph are same as for the usual graph. There is just a difference in the type of view *amplitude* and there is one new type of view *amplitude stacked*.

For example, if we create multigraph from data cells speed and wideband, 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.



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.

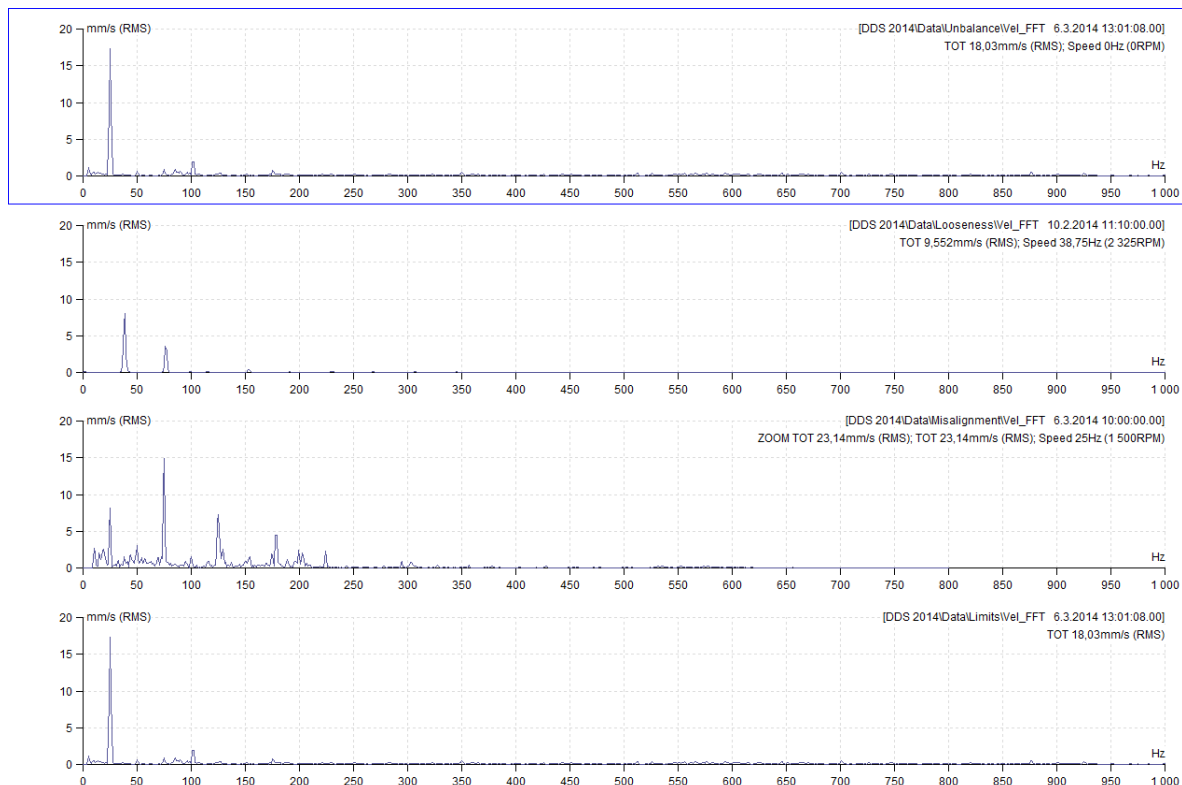
To create the Multigraphs from dynamic data cell, select Create Multigraph from main menu in tree. You can create the multigraphs just from the data cells which can be compared (same data type and same physical value).

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

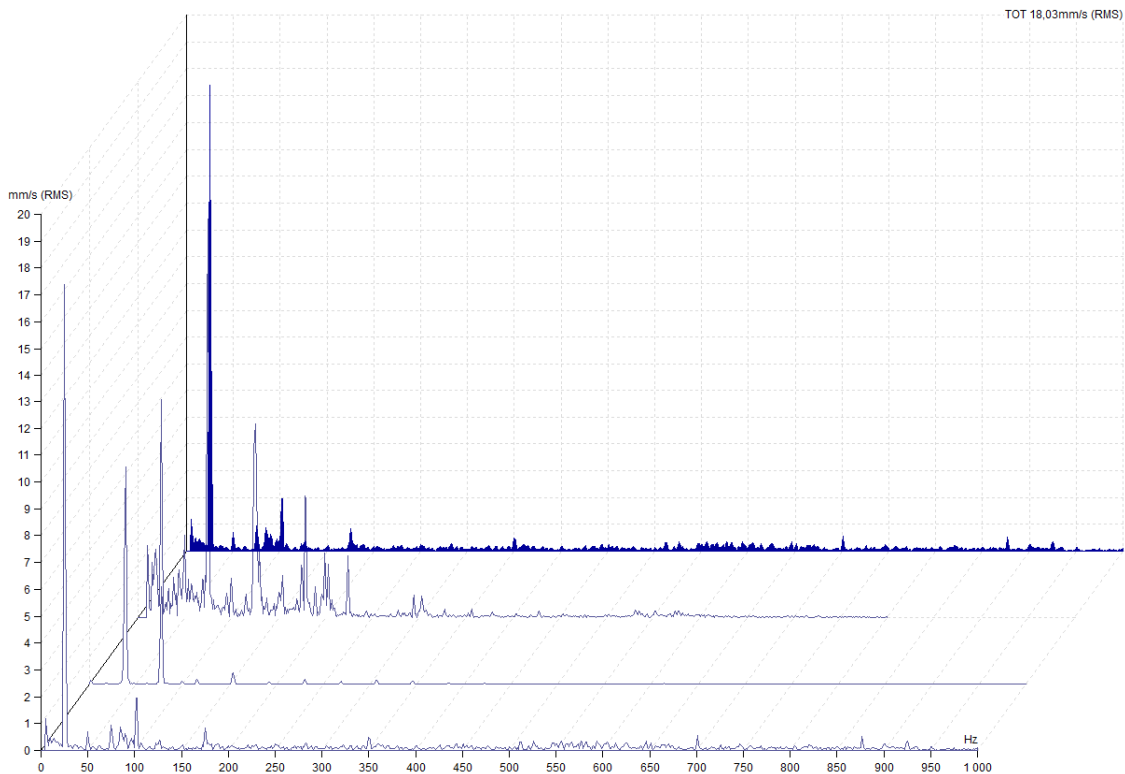
Amplitude – it shows the amplitude of active data cell. You can see the information about the active data cell in the header of the graph. To change the active data cell push Shift + Arrow Up/Down. To switch between the readings use Arrow Up/Down.

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.

Wideband, Demod Wideband

| | |
|-------------|---|
| 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 |

APS

| | |
|-----------|--|
| 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 |

Frequency Response

| | |
|---------------|---|
| 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 |

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. 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 | sampling frequency |
| AC,DC | AC,DC inputs settings |

Other types

Image

the PNG, JPEG, and BMP formats are supported.

Balancing

The balancing report 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

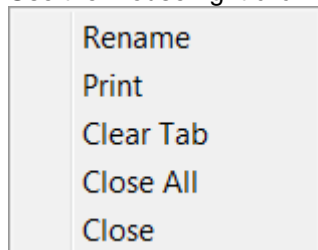
The notes can be written in each tree item (Item Properties/ Notes). All notes from selected item and from all its children items are displayed in the Notes page.

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

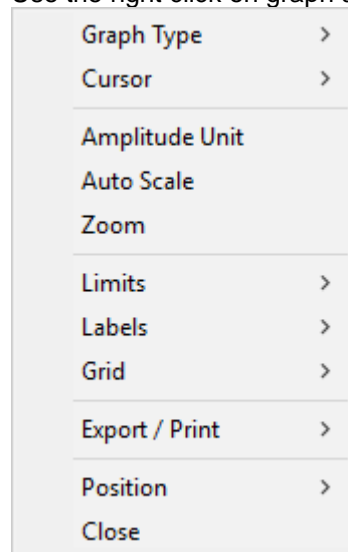
all graphs are drawn in one window. It enables to work with cursor, zoom and other properties together in all graphs.

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.

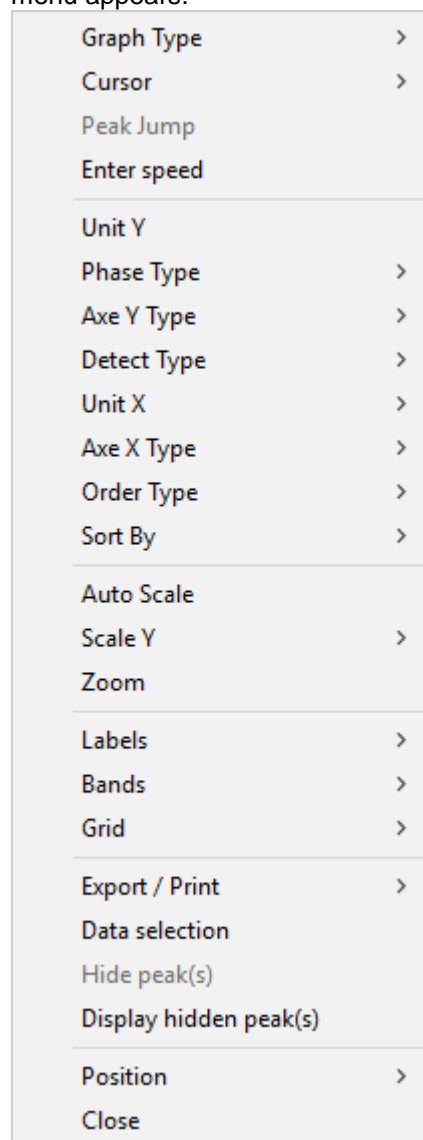
Use the right click on graph and next menu appears.



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.

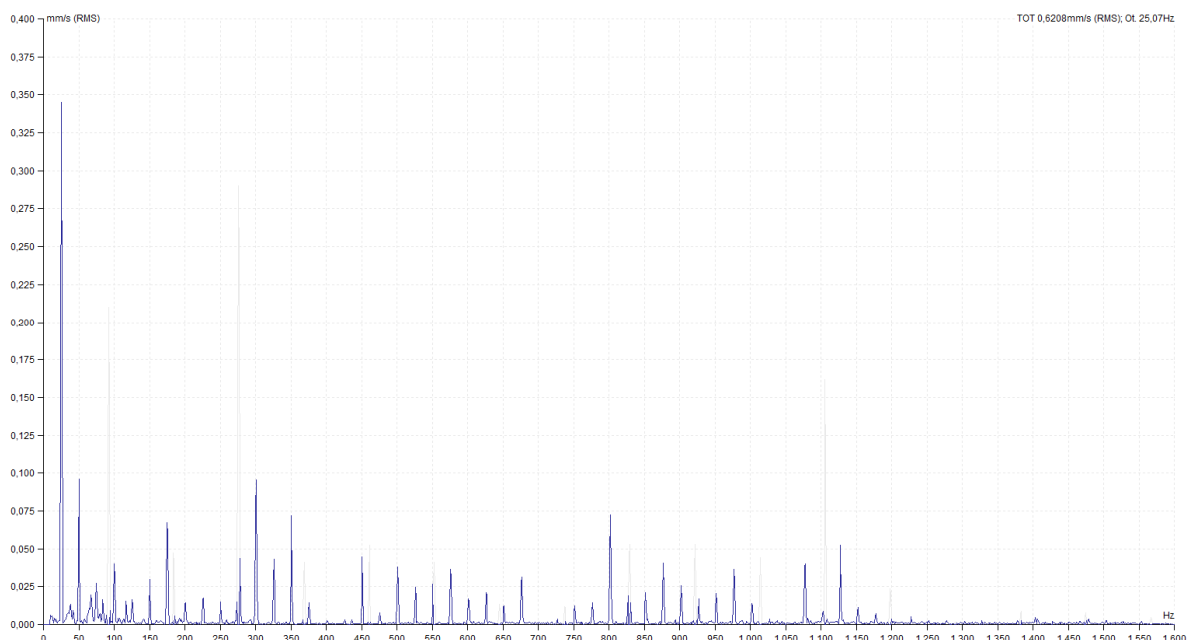
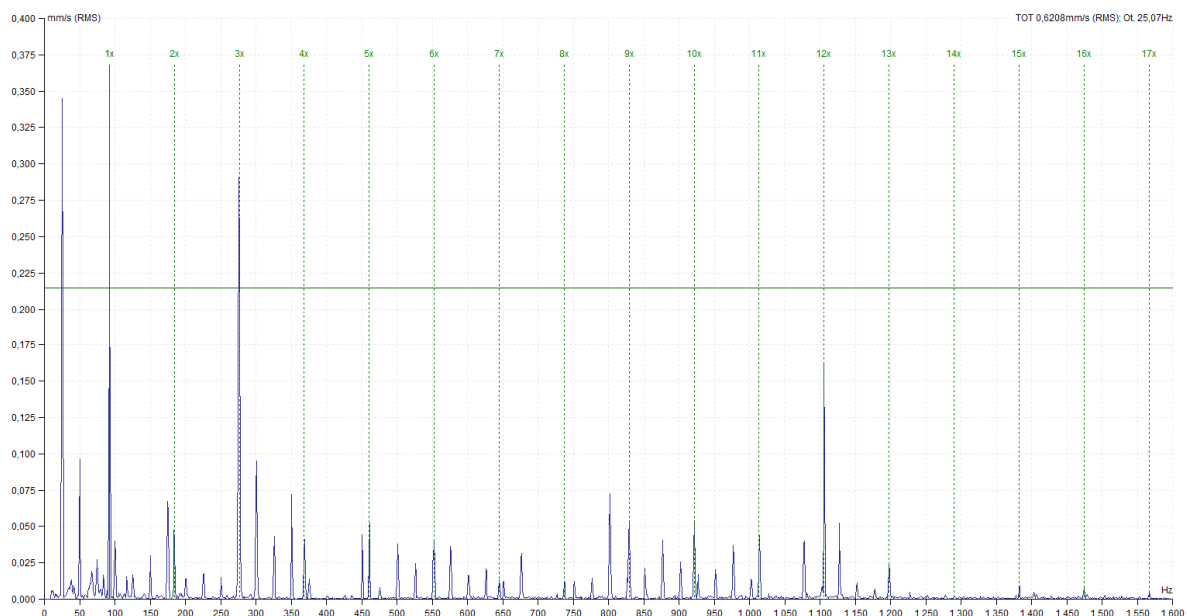
Axe X/Y Type to switch between the types of axis (linear, logarithmic, decibels – just for Y-axis)

Phase Type ranges (-180, 180), (0, 360) and AUTO are available. The AUTO creates special range without graph oscilation 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 10th). 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 axe 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 axe. When you move the end point, the % of max size is displayed.

Xmin, Ymin, Zmax you can change the size of Z axe 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 wideband value in the bottom half. 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.

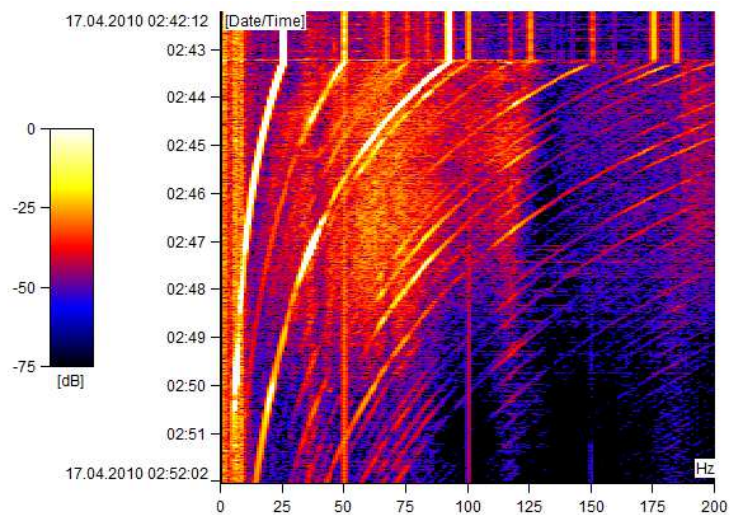
If bands are defined, then their trends are drawn. Use the band cursor for selection.

Amplitude 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).



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 |

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 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 wideband 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.

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.

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).

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.

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. 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).

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.

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)

Last Measurements

Creates the list of data cells, which contain some measurement in defined time interval. The list works only on the selected tree items.

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

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.

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 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.




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.

A4900 - Vibrio M 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.

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.

Bearings

After the installation of the DDS, there is file bearings.lbr in installation folder of DDS. 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 needs 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. Find the file bearings.lbr and open it. 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. To confirm bearing parameters and add new bearing press Save as.. and enter name of the bearing.

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:

| | |
|-----------------------|--|
| wideband velocity | 5 mm/s (0.2 ips) for Warning, 9 mm/s (0.35 ips) for Danger |
| wideband 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).

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

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

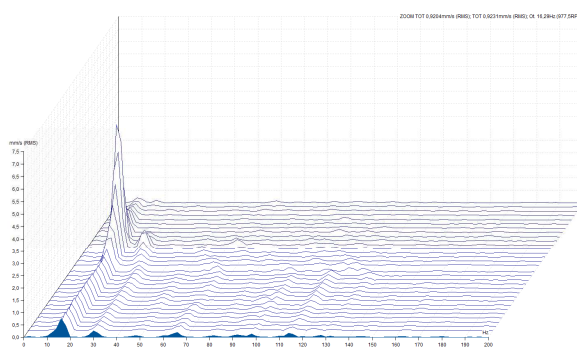
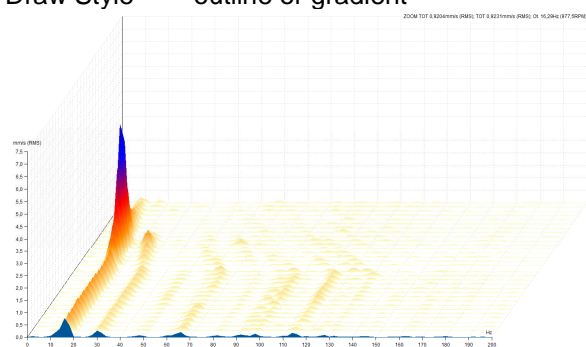
Waterfall

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 – 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

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.

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 |

Import and Export Tree (database)

SQLite Tree

If you use the SQLite tree, then all data are saved in one file with .ndb extension. You can send this file to somebody else and he needs only to add this tree to his list. Then he can work with this tree. All information like bearings, images, limits, ... are included in that file. There is no need to have any other file.

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.

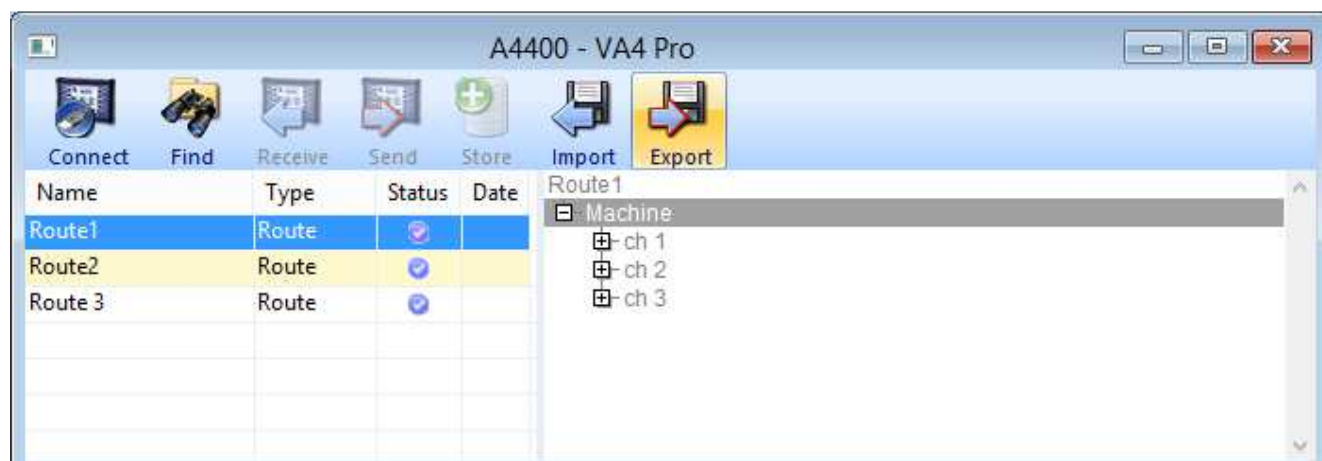
Installation

Download and install the Route Downloader from www.adash.com / 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.

