ibaQPanel

Technology and user-related live display of measurement and quality data

Manual

Issue 2.2

Measurement Systems for Industry and Energy

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1   About this documentation

This documentation describes the function and application of the software

ibaQPanel.

1.1   Target group and previous knowledge

This documentation is aimed at qualified professionals who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as professional if he/she is capable of assessing safety and recognizing possible consequences and risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

1.2   Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu *Logic diagram*
Calling the menu command	*Step 1 – Step 2 – Step 3 – Step x* Example: Select the menu *Logic diagram – Add – New function block*.
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
Filenames, paths	`Filename`, `Path` Example: `Test.docx`

1.3   Used symbols

If safety instructions or other notes are used in this manual, they mean:

Danger!

The non-observance of this safety information may result in an imminent risk of death or severe injury:

■ Observe the specified measures.

Warning!

The non-observance of this safety information may result in a potential risk of death or severe injury!

■ Observe the specified measures.

Caution!

The non-observance of this safety information may result in a potential risk of injury or material damage!

■ Observe the specified measures

Note

A note specifies special requirements or actions to be observed.

Tip

Tip or example as a helpful note or insider tip to make the work a little bit easier.

Other documentation

Reference to additional documentation or further reading.

2   Introduction

With *ibaQPanel*, process and quality data, conditions, events and video images in live mode can be displayed in a technology-related representation. It combines the functionality of an interactive measurement value display with elements from the area of HMI and can be integrated seamlessly in *ibaPDA*.

2.1   What is ibaQPanel?

ibaQPanel is a software-add-on to *ibaPDA* which requires a license. In order to display measured values, numerous display objects are available which include, besides the usual trend graphs, bar charts, 2D-colored charts, FFT analysis and alpha-numerical state displays.

Therefore, *ibaQPanel* is particularly suitable for the live display of measured data in a clearly structured and easy-to-acquire form.

The display objects may be freely arranged in one or several layers in the plane and can be freely configured in its appearance (size, color, font type etc.).

Thanks to the possibility of using even graphics as background images, HMI-similar monitor images can be created. In comparison to a common HMI system, *ibaQPanel* can be used even for the display of quick signals.

Position, visibility and operability of the elements can be freely configured and dynamically changed.

By using input elements, additional parameters can be entered not only for recording, but also for calculation and can be transferred to secondary controls.

Furthermore, it is possible to supply *ibaQPanel* elements with the signals of an *ibaHD-Server*. This allows "live" displays of data from *ibaHD-Servers*.

In particular, *ibaQPanel* can display the HD stores of multiple *ibaPDA* systems at once.

The size of an ibaQPanel and the size and location of its objects can be automatically scaled when it is loaded on a screen with a different resolution than the resolution it was created on. The *ibaQPanel* window, all contained objects and the font sizes are scaled.

2.2   Function and application

ibaQPanel receives the measured data via the connection between the ibaPDA client and an ibaPDA server or ibaHD-Server. All signals, which should appear in ibaQPanel, have to be defined and configured in the I/O Manager of the ibaPDA system.

Time-based as well as length-based displays of the value graphs are possible. As a result, quality-relevant measured values for long-term products can be displayed in connection to the length segment.

By means of multi-dimensional signals (vector signals) and 2D-colored display, temperature, flatness and thickness profiles can be displayed which clearly show the quality fluctuations and give the user the possibility to immediately intervene with corrective action.

With the help of bar charts, transverse profile displays for force, measured thickness values or similar sizes or simple filling degrees displays can be created.

Corresponding field objects are available for the visualization of alpha-numerical information (e.g. static or dynamic texts, actual values, etc.) or of different states by means of color changes. To display movements or other dynamic changes, almost all element properties are controllable.

ibaQPanel supports the creation of user friendly displays which are also accepted on operating platforms and control rooms. In full screen mode, the panel display can use the entire monitor.

2.3　　License model

The license *ibaQPanel-Add-On* contains the display objects and is an add-on license for *ibaPDA* or *ibaHD-Server*. The license requires an *ibaPDA* client, which has to be licensed in addition if needed.

If no *ibaQPanel* license is available, you can use ibaQPanel in demo mode. If you use more than 2 signals, then a dongle symbol appears on the panel and no measured data is shown.

Nevertheless, you can configure the panel in design mode.

2.4　　System requirements

Software

- *ibaPDA*, version 8.3.0 or higher

- minimum *ibaPDA* client installed locally (pure client PC)

- optional *ibaHD-Server*, when historical data shall be displayed.

Hardware

The same orders as for *ibaPDA* are applied.

2.5　　Installation

ibaQPanel is an integral part of ibaPDA and does not require a separate installation.

3 The ibaQPanel designer

3.1 Creating a panel

Note

Please note that the display can only be changed when the current user is entitled to change the layout.
(*ibaPDA* user management)

In order to use the specific display objects for *ibaQPanel*, you have to create a panel where the display objects (=tools) are placed.

When you create an *ibaQPanel* by clicking on the button in the toolbar, the program will automatically switch to design mode. In this mode, the panel and the objects can be changed in size, shifted and their properties can also be changed. The following picture shows an empty panel in design mode.
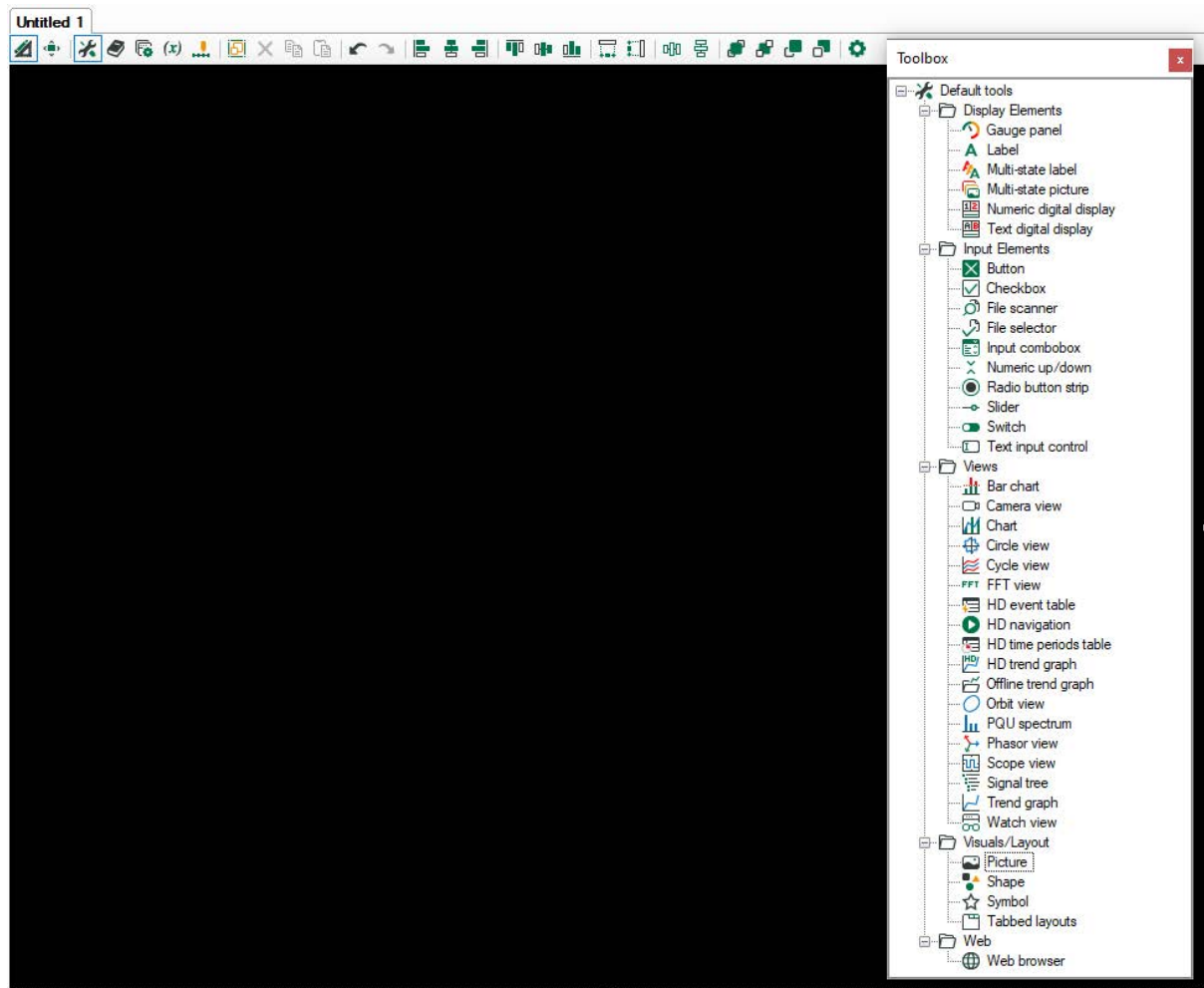
The panel will be shown first as a black plane.

To change the properties of the panel, double click the panel. The properties dialog will open.
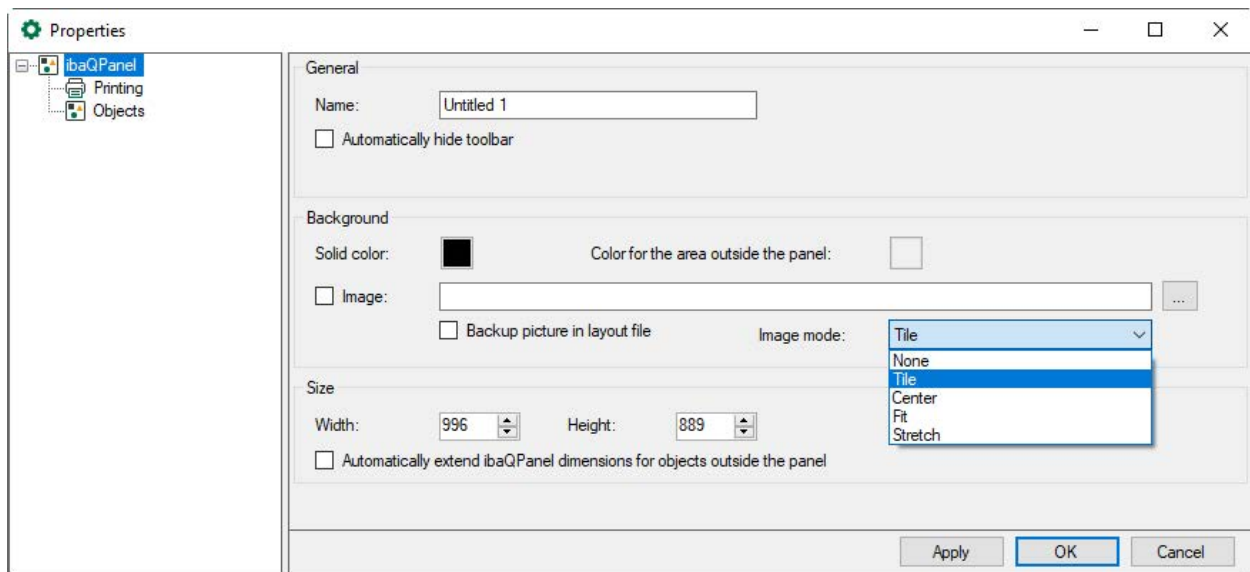
You can enter a name for the panel.

Automatically hide toolbar
If this option is chosen, the toolbar only appears in design mode when the mouse moves over the upper limit of the window. When fading in, the toolbar slides across the panel; the panel itself, however, will not be moved to the bottom.

Background
You can choose a fixed color or image file for the background and a color for the area outside the panel. You can change the color by clicking on the color field.

If you want to use a graphic as background image, please click on the checkbox *Image* and choose the desired graphic via the browser button.

Several options are available for displaying the image under Image mode:

- Tile: Tile arrangement of the image in the object
- Center: the image is displayed in its original size in the center of the object
- Zoom: the image is fitted into the object in its original size ratios
- Stretch: the image is adapted to the object in height and widths
- None: the image is displayed in its original size

If the *Backup picture in layout file* option is activated, the image is saved in the layout.

Note

The current graphic formats (bmp, gif, jpg, png, tif etc.) can be used.

Size
Here, you can enter the size of the panel in pixel and choose the background (solid color or graphic file).

Automatically extend QPanel dimensions for objects outside the panel

If you copy elements from one panel to another, they will be displayed in the target panel at the same position as in the source panel. If the target panel is too small, the element will be shifted to the border or is not visible anymore. If this option is enabled, the target panel will be automatically enlarged so that the copied element fits the panel.

It is possible to create and configure several panels. They can be shifted and positioned as docking windows like common *ibaPDA* signal displays or arranged one behind the other in form of tabs.

Tip

You can also drag the panel with the mouse on the desired size when you shift one of the eight limitation points of the selected panel. However, this method is not recommendable when the panel should be larger than the current window.

The setting with pixel values is recommendable when the panel will be used for the total screen area (full screen mode) for example.

The elements on the panel define its minimum size. If you want to reduce the size of the panel, the elements have to be moved or removed.

General notes on full screen mode

When using the full screen display during operation, the usual *ibaPDA* client window will be covered completely. However, it can be useful to keep the tabs for various panels or signal displays, in order to e.g. easily switch from one view to another. In this case, a range is reserved in the upper screen for the tabs with the panel names (20 pixel). You decide if the tabs are seen or hidden in the menu layout with "Signal display without tab". This margin area has to be considered during dimensioning the panel for full screen display so that the panel is neither too large nor to small. To determine the maximum panel size for the full screen display, this value has to be subtracted from the vertical pixel size of the monitor.

The following table contains panel sizes for some usual screen formats:
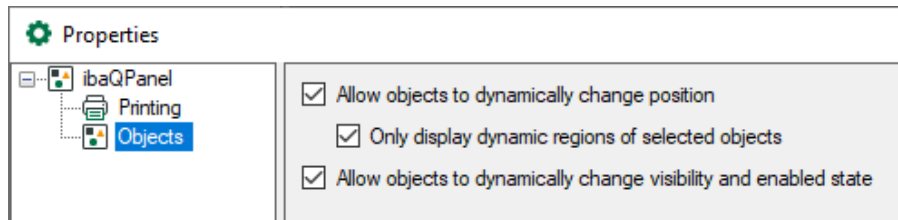
Monitor size	Panel size for full screen mode	
	with tab	**without tab**
1024 x 768	1024 x 748	1024 x 768
1280 x 1024	1280 x 1004	1280 x 1024
1600 x 1200	1600 x 1180	1600 x 1200
1366 x 768	1366 x 748	1366 x 768

Note

A resolution smaller than 1024x748 can cause that the property windows of the elements are not completely displayed when creating the layout.
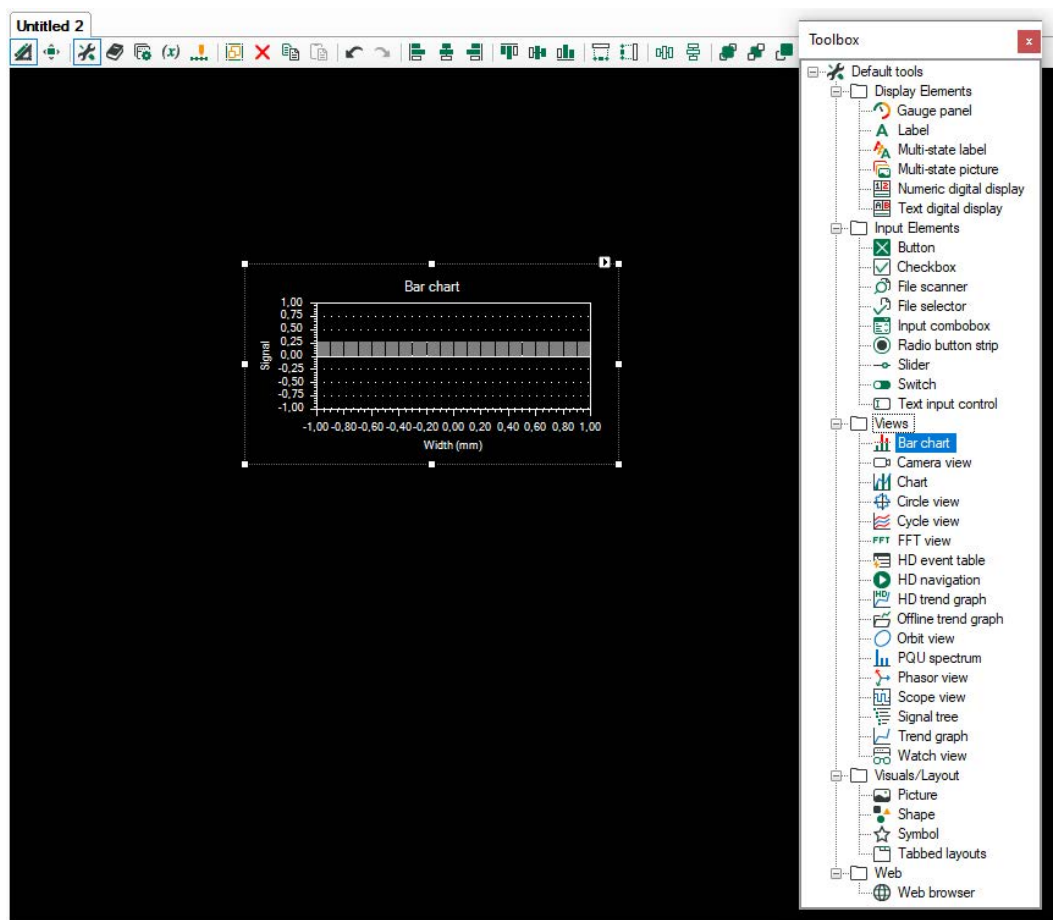

Objects

Here you can enable or disable the dynamic behavior of all objects. You can also also decide whether the dynamic regions should be displayed only for the selected objects or for all the objects on the panel. This can be useful to align multiple regions to each other.

3.2   Adding display objects

To add display objects, drag them from the toolbox onto the panel. Via the button ⚒ the tool list can be displayed or hidden.

If you select an object on the panel, a frame appears around the object with 8 control points. To shift the object, click on the selected object and move it with the mouse button pressed.

To change the size of the object, click on one of the control points and drag it along the desired direction. If you prefer to specify position and size of the object in pixel, click on the small field with the arrow and enter the values in the following dialog.
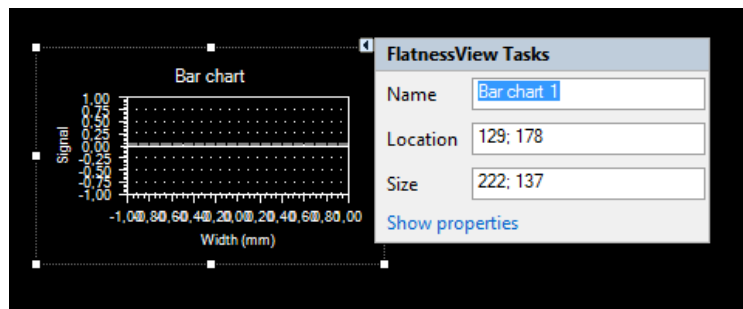
Information regarding position and size can be summarized as follows: X; Y coordinate of the top left corner and width; height. The object can also be named.

The settings can also be changed at a later point of time.

Note

i   This option is not available in full screen mode.

3.3   Changing object properties

The properties dialog of an object opens in various ways:

■ Click on the properties button ⚙ in the toolbar, if the object is selected.

■ Double click on the object.

■ Make a right mouse click on the object and select "Properties" in the context menu.

Note

i   Changes in the settings must always be confirmed in the properties dialog by clicking on the button <Apply> or <OK> to become effective. If you press the button <Confirm> after every change, you can check your settings immediately, and the dialog will remain open for further settings.

The individual available settings are described in detail in chapter ⏏ *ibaQPanel standard objects*, page 45 for each object type.

3.4   Common properties

In addition to the above described properties dialog, there is a properties window in which properties of one or more objects can be displayed and changed.

If several objects are marked, their common properties can be changed simultaneously.

There are 2 methods to open the properties window:

- Click on the button ⬚ in the toolbar. The properties window will then be displayed as a dockable window.

- Mark several objects in the panel and and double click on one of the elements. The properties window will then be displayed as a "floating" window.

- In the context menu you can select and open the respective properties dialog of the single elements.
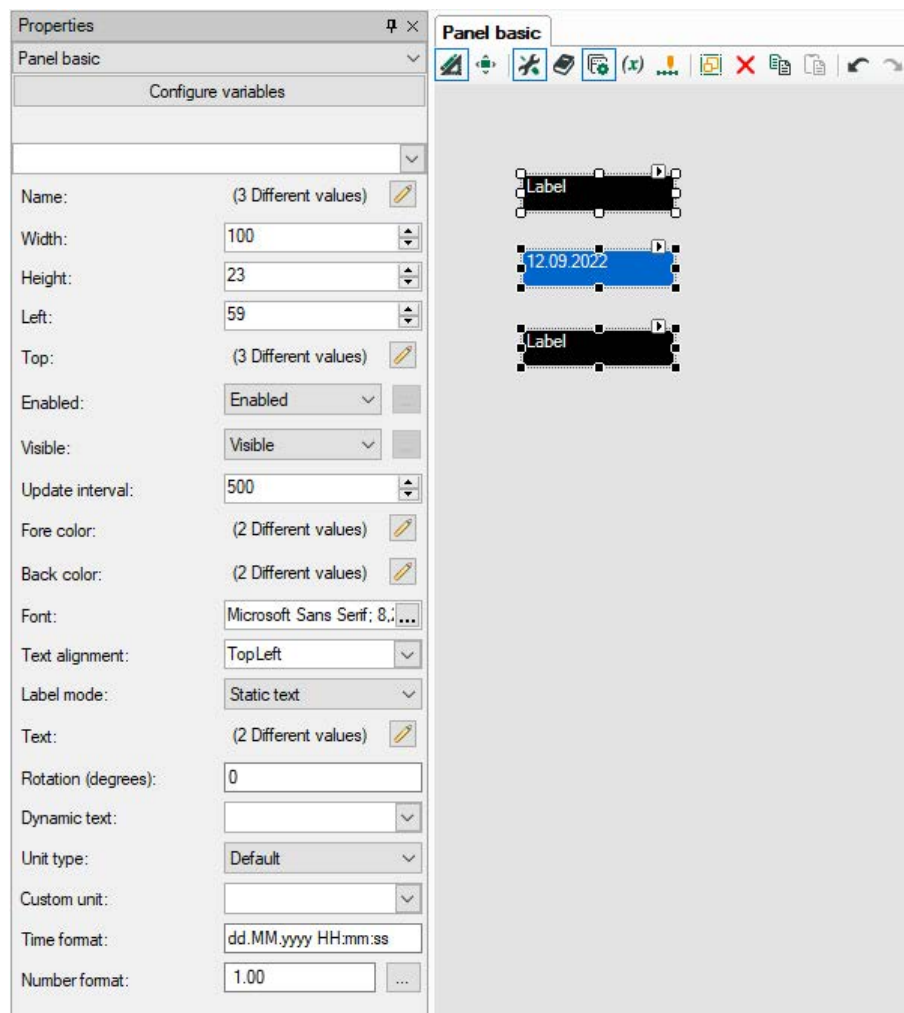
The properties that apply to all marked objects will be displayed in plain text. If the properties differ, no value will be displayed but the amount of the different properties.


By clicking the <Edit> button ✏ the property can be changed. The change then applies for all marked objects.

For example, a background color can be assigned to all objects. The property "Back color" can be changed here for different objects collectively.

If different objects are marked, all properties that show the marked objects will be displayed in the properties window. However, the assignment which property belongs to which object, will not be displayed.

In the following example, the properties "Checked" and "Target channel" belong to the check box object. They do not apply to the text field objects.
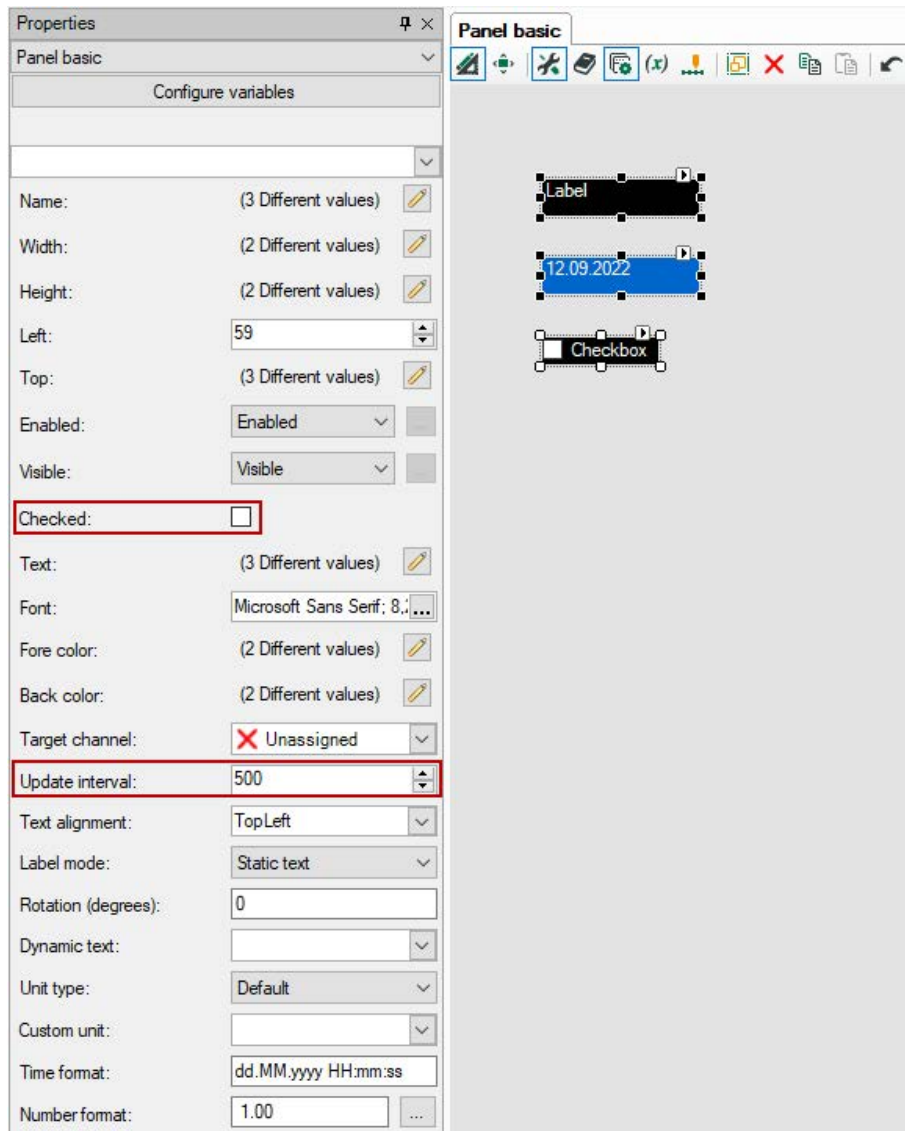

3.5   Removing objects

There are three different methods to remove an object from the panel:

■ Select the object and click on the button ✖ in the toolbar.

■ Select the object and press the <Del> key.

■ Make a right mouse click on the object and select "Delete" in the context menu.

3.6   Selecting and copying objects

To select several objects at the same time, draw a rectangle with the mouse around all objects which you would like to select. As an alternative, select successively the desired objects with the buttons <Shift> or <Ctrl> pressed. To select all objects press <Ctrl> + <A>.
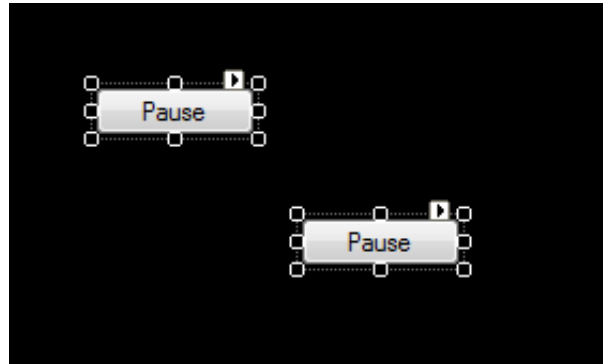
The ibaQPanel designer supports copying and inserting of single and also several objects. To copy objects, 3 methods are selectable. First, select the object which has to be copied and then...

- ... click on the copy button [icon] in the toolbar.

- ... press <Ctrl>+<C>

- ... right-click on the object(s)
  and select "Copy" in the context menu.

There are thus three methods to insert objects:

- Click on the insert button [icon] in the toolbar.

- Press <Ctrl>+<V>

- Make a right mouse click on the panel and select "Paste" in the context menu.

Differences when inserting

Insert with <Ctrl>+<V> in the same panel
The object will be inserted with an offset down right. At the edge of the panel the objects are overlaid.

Insert with <Ctrl>+<V> in another panel
The object will be inserted at the same XY position as in the source panel. If you repeatedly insert the object with <Ctrl>+<V>, the object will be inserted with the offset at the bottom right.

"Paste" from the context menu
If you choose "Paste" from the context menu which opens with a right-click, the object will be added to the cursor position.

3.7   Grouping of objects

You can group several objects together in order to treat them as a unit. A group can be edited, copied, inserted and added to a library as a unit.

There are several methods to group objects. Mark two or more objects and:

- Click on the "Group" button.
- Click with the right mouse button on one of the marked objects and select "Group" from the context menu.
- Press <Ctrl> + <G>.

A marked group can be ungrouped again:

- Click on the "Group" button again.
- Click with the right mouse button on one of the marked objects and select "Ungroup" from the context menu.
- Press <Ctrl> + <G> again.

Properties of groups
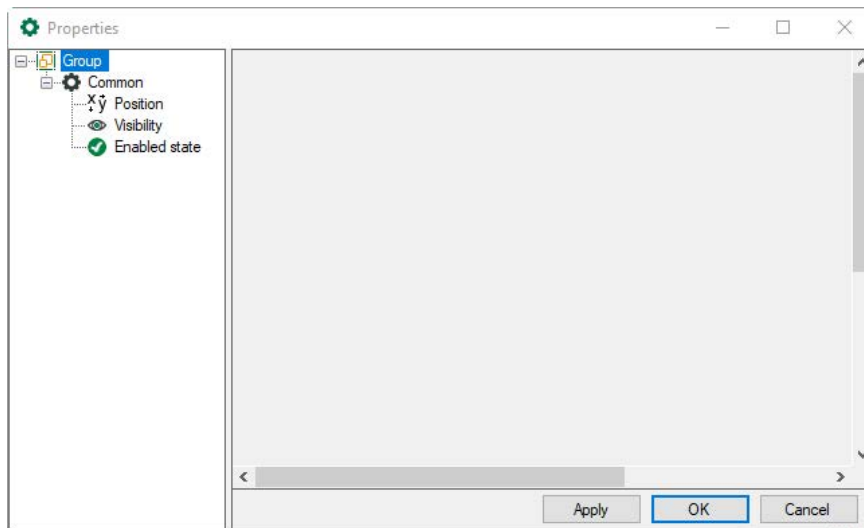
The properties dialog of a group offers only a few setting options, such as the general dynamic properties. If properties of a single object are to be changed, the group either needs to be un- grouped temporarily (provided that you are working in design mode), or you can right-click on an object in the group. In the context menu, you can then choose whether you want to edit the properties of the object or group.
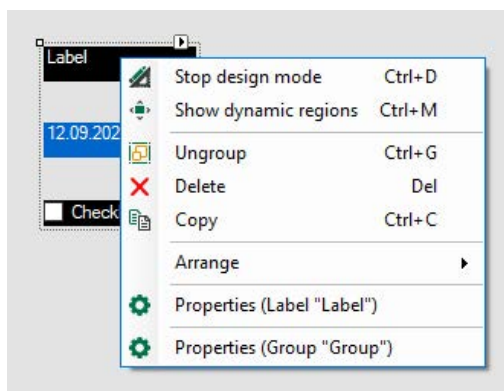
In the display mode, you can, however, display and change the properties of single objects at any time. For this purpose, open the properties dialog from the context menu.

A group is created automatically if several objects are selected and added to the library, see chapter ⌐ *Library*, page 37.

Note

i	When grouping, any dynamizations will be lost.

3.8 Undo / redo

The designer supports the undo/redo function. The function can be applied on adding/removing, shifting and changing the size of the object, however the properties cannot be changed.

You can undo an action by pressing <Ctrl>+<Z> or clicking on the button ↰ in the toolbar. You can repeat an action by pressing <Ctrl>+<Y> or clicking on the button ↳ in the toolbar.

3.9 Switching design mode on and off

Once you have designed the panel, you can exit design mode and switch to display mode by clicking on the button ◿ in the toolbar or selecting "Stop design mode" in the context menu.

Note

i	As long as the program is in design mode, no actual values will be shown in the display objects, even if you have assigned active measured signals. The update of the values is effected in the display mode.
	Furthermore, the measuring signals of a displayed object in the design mode can only be assigned in the signal table in the properties dialog of the object. Adding measuring signals to a display object via drag & drop only works in display mode.

If you want to switch from display mode back to design mode, right-click on the panel and choose "Design mode" in the context menu or press the key combination <Ctrl>+<D>.

Tip

If the panel is totally filled with display objects so that the mouse pointer cannot be positioned on the panel background anymore, then the context menu cannot be shown to switch to the design mode. In this case, press <Ctrl>+<D>.

Every QPanel display can only be changed to design mode individually. Then the toolbox appears for all panels in design mode. Other panels can still be in display mode.

The panel mode can be identified by the upper toolbar which is only displayed in design mode.

3.10   Tools in the designer

You can find further buttons in the toolbar of the designer which can be useful for the layout of the different objects.

Button	Description
	Align selected objects to the left
	Center selected objects horizontally
	Align selected objects to the right
	Align selected objects to the top
	Center selected objects vertically
	Align selected objects to the bottom
	Make selected objects the same width
	Make selected objects the same height
	Equal horizontal distance between the selected objects
	Equal vertical distance between the selected objects
	Object in foreground
	Object in background

The positioning always refers to the object whose control points are filled. This is the first when selecting with <shift> key or the last when working with the frame.

Example: The option "Align to the Top" does not refer to the last object, but to the upper edge of the reference object, this means the one with the filled control points.
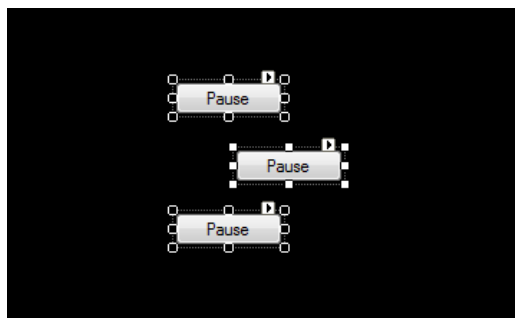
3.11   Printing
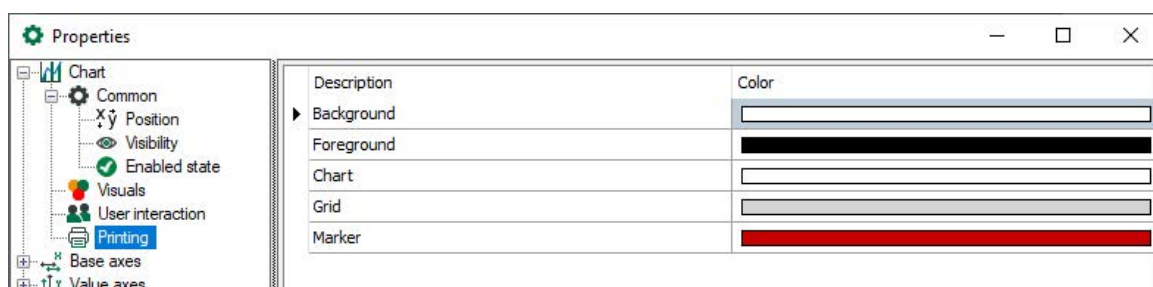
In the properties dialogs of the display objects, it is possible to configure the color for foreground and background, chart, grid and other elements in the "Printing" dialog.

3.12   Automatic scaling of the QPanel window

An *ibaQPanel* window can be configured to fill the entire screen. If you then open it on a monitor with a different screen resolution, the size of the window changes. You can use the *Automatic scaling* option to automatically adapt the size of the *ibaQPanel* window and all the objects it contains if it is used on a monitor with a different resolution. All text sizes are also rescaled.

Automatic scaling can be enabled in the Layout Manager. Open the Layout Manager by selecting *Configuration - Layout Manager* in the menu or using the icon.
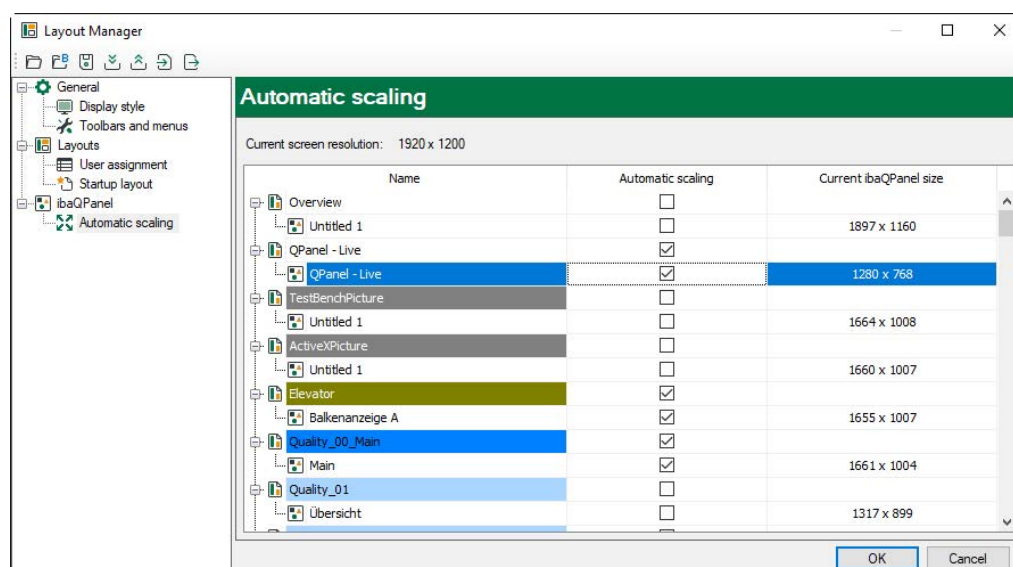

The scaling is carried out when opening *ibaPDA* on a screen with a different resolution. It also works on the fly if you drag the window to another screen with a different resolution.

You can enable automatic scaling separately for each window by clicking on the checkbox for the relevant window.

You can use the context menu to show or hide the columns in the table:

■ Automatic scaling: Enable/disable automatic scaling

■ Current *ibaQPanel* size (in pixels)

■ Native resolution: Resolution of the screen on which the window was created

■ Native *ibaQPanel* size: Size corresponding to the system resolution.
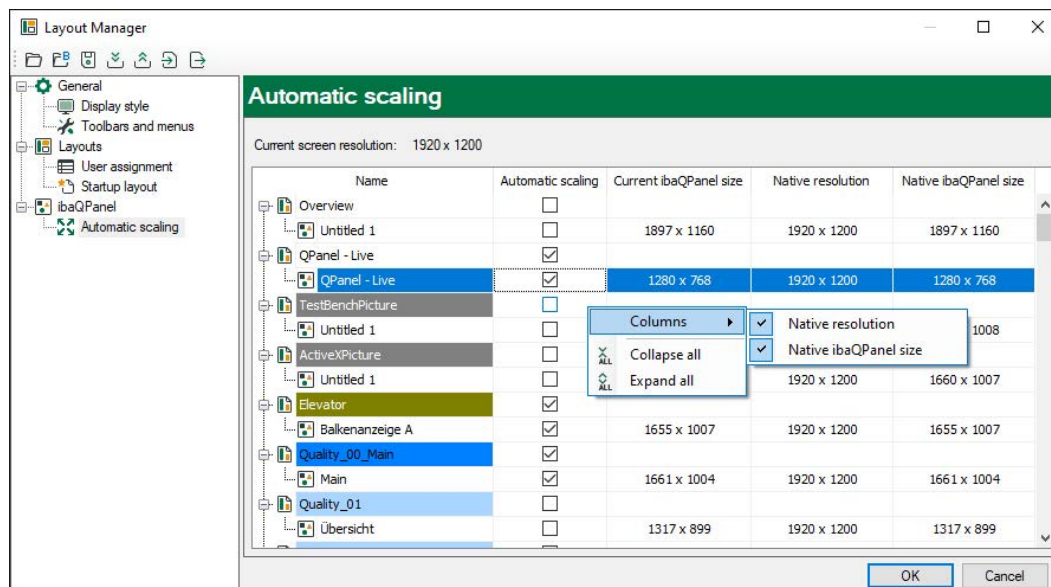
You can adjust the native resolution to the current screen resolution. To do this, right-click to open the context menu in the *Native resolution* column and select *Set native resolution to current screen resolution*.
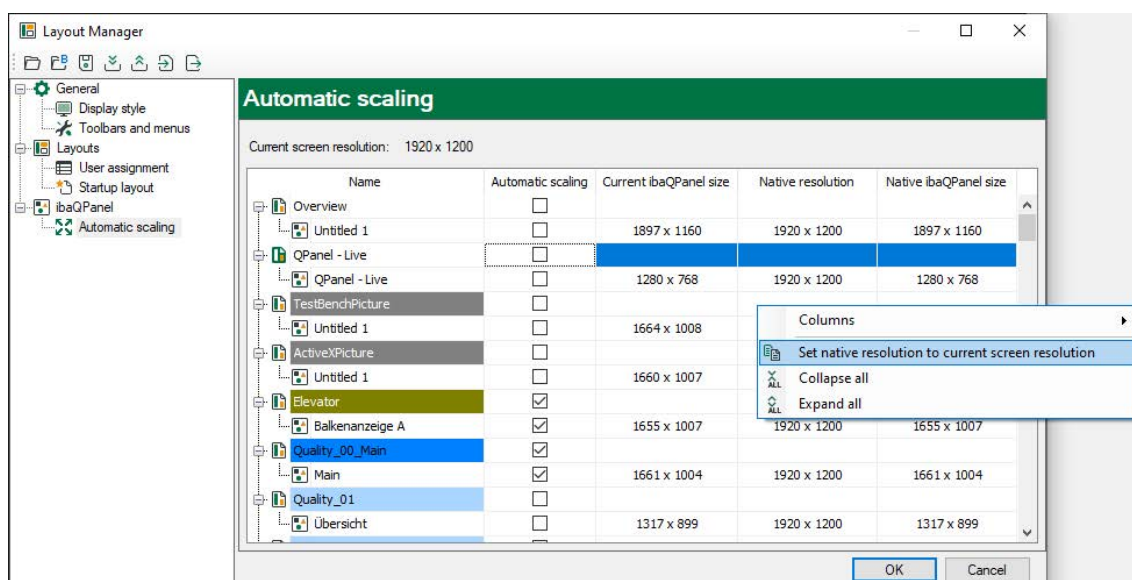
When you open an existing layout with an *ibaQPanel* window for the first time in the new version, the native resolution is initialized to the current screen resolution and the native size to the current size.

4   Basic object display properties

A range of properties are common to the majority of objects. These include the foreground and background color, partly font settings as well as size and position.
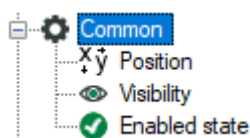
Most of these properties will be defined in the design mode and do not change during operation.

From version 6.31.0 of ibaPDA, certain display properties can be changed dynamically during operation.

4.1   Basic static display properties

These settings can only be changed in design mode.

- Foreground color

- Background color

- Font type, size, style

- Object size

In the branch "Common", you can assign a name. By means of the name, the object can be identified later.

With the input of pixel values, the size of the object is adjustable. In design mode, you can configure the size with the mouse by dragging the object with the control points.
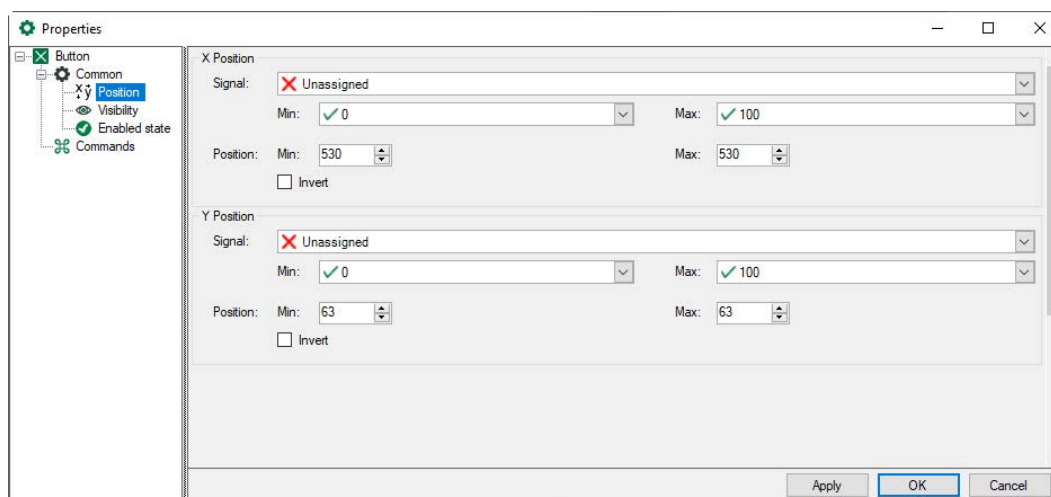
4.2   Basic dynamic display properties

These settings can be either permanently configured in design mode or made dependent on other dynamic conditions.

- Position

- Visibility

- Enabled state
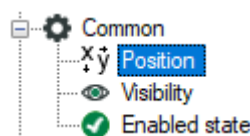
4.2.1   Position

The position can be configured with dynamic values along the X and Y-axes. The values at min. and max. refer to the value range of the signal. This will be scaled with the min./max. position. Reference point is the left upper corner of the object.

In the above example, an object with the dimensions 10*10 is placed as follows:
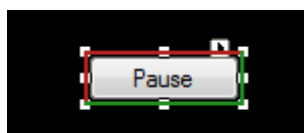With a signal value -100, the object appears at X=0 pixels, i.e. at the far left.
with the signal value 100 appears the upper left edge of the object at X = 500 pixel.

Dynamic ranges can be defined graphically as well. Select "Dynamic regions" in the context menu (Shortcut keys <Ctrl>+<M>).
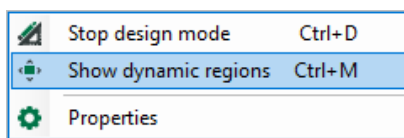
If this function is enabled, a frame in red and green is shown when clicking on an object.


Drag the mouse to draw the green frame and with this define the dynamic range. Do not touch the frame at the control points otherwise the object will be enlarged. You have to touch the green lines outside the control points with the mouse in order to drag them.
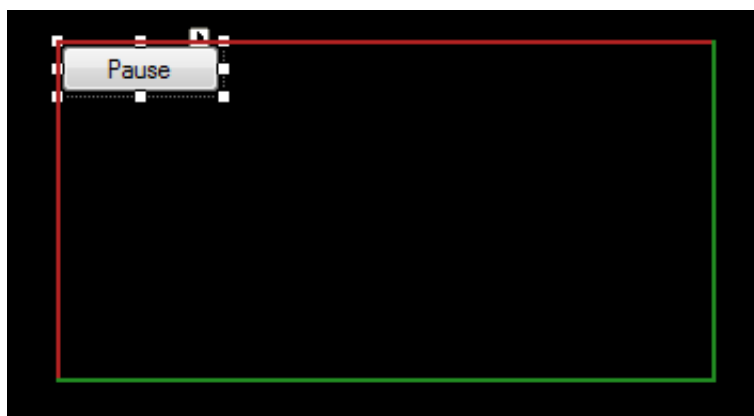
The object moves within the range marked like this.

By enabling the option *Invert* the direction of movement will be reversed.

4.2.2   Visibility
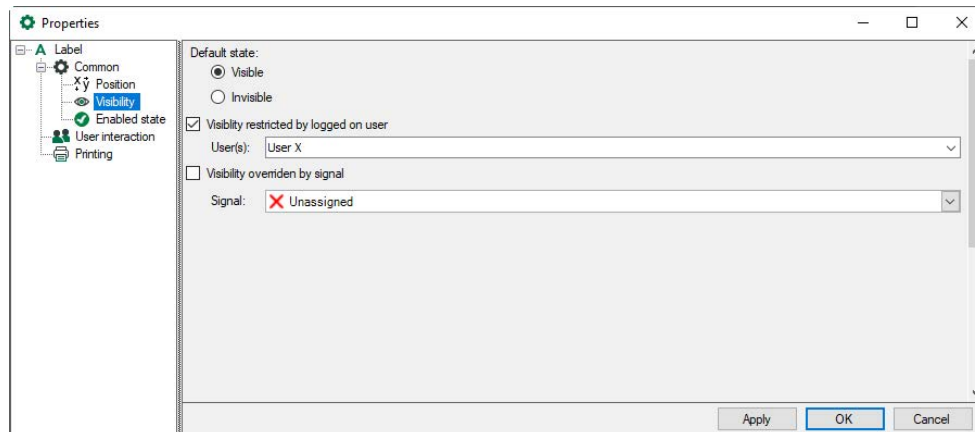
An object can be visible or hidden. The visibility of an object can be controlled via a signal or by a user. It is possible to choose several users which are allowed to see this object. All users created in the user management can be chosen via a drop-down list. The administrator always sees all elements.
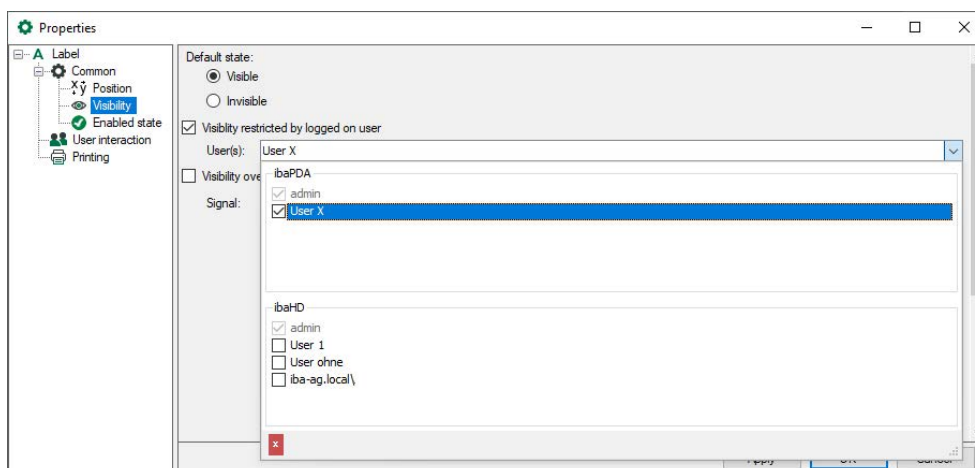
4.2.3   Enabled state

An object can be enabled or disabled, or the enabled state can be controlled by a signal or user. User selection, see previous chapter "Visibility".
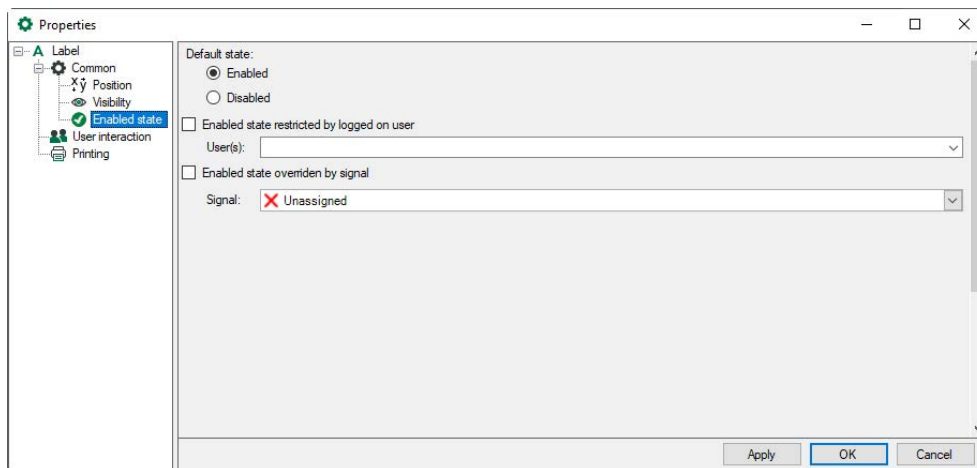
4.3   Dynamization

With the dynamization tool, properties of an object can be dynamically controlled by a signal. With this tool, filling degrees or material movements can be visualized.

The tool can be applied to almost all properties. A dynamization consists of one or more objects and of the related properties and is linked to an ibaPDA signal.

Within a dynamization, several different states can be defined, as long as they are linked to the same ibaPDA signal. A state can contain one ore more objects, whereas each of it will be assigned certain properties.

In addition to this, a signal value will be assigned to every state. This means that when the signal reaches this value, the defined state will be displayed. Transitions can be defined for status changes.

If an object is to be controlled by several signals, a dynamization will be required for every signal.

4.3.1   Configuration in the dynamics editor

A dynamization is configured in the dynamics editor. Click on the button (x) in the toolbar to open the dynamics editor.

Basic procedure

1. Drag the objects for which a dynamization is required into the panel, prior to creating the dynamization.

2. Create a new dynamization.

3. Select a signal that controls the dynamization.

4. Define the states to be executed during the dynamization. To do this, it is necessary to activate configuration mode.

5. Configure the objects used with the desired properties for each state and transitions between the states. When you have finished editing, turn configuration mode off again.

You will find a more detailed description in the following description of the dynamics editor and an example.

Note

i	The object states can only be changed if configuration mode is active.

Operation in the dynamics editor

Dynamizations are configured for a specific panel. If several panels are already configured, you can select a panel in the drop-down menu (1).

Click on the button to create a new ✚ dynamization. Existing dynamizations can be selected from the drop-down menu (2). A selected dynamization can be removed by clicking on the ✕ button.
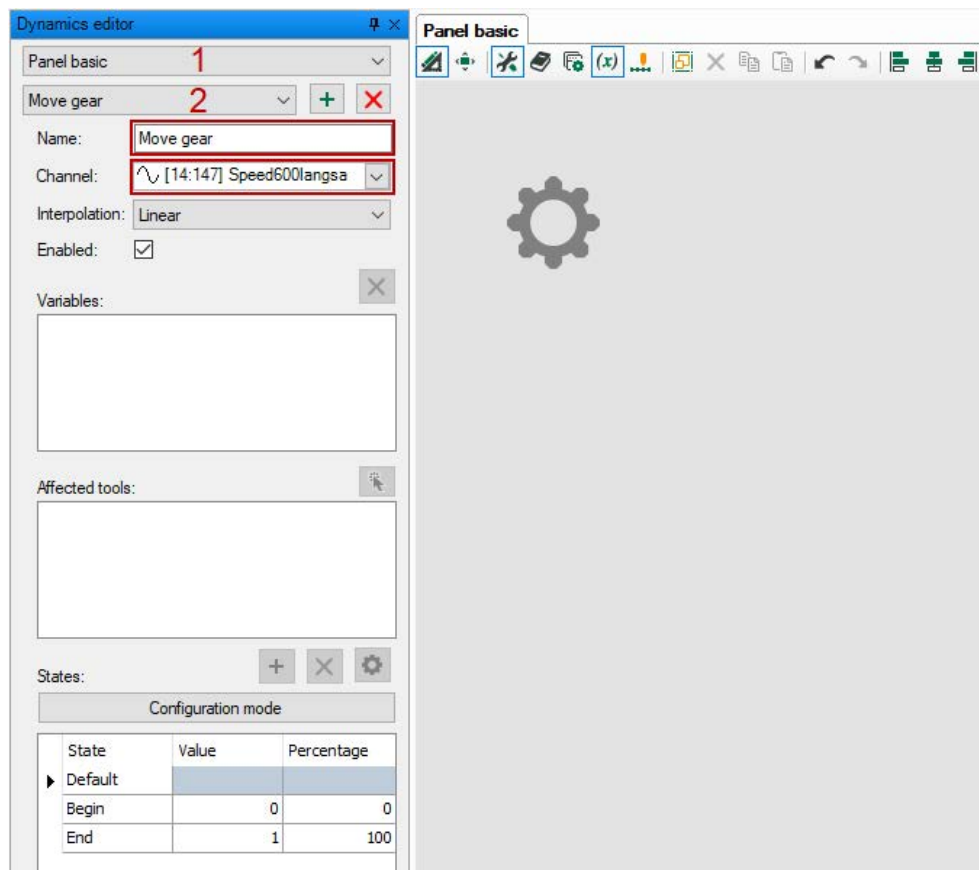
**Name**
Enter a clear name here.

Channel
Select the *ibaPDA* signal that is to control the movement from the "Channel" drop-down menu.

Interpolation
The transition between two states can be defined here. Available for selection are:

- Steps: there will be no interpolation between states here. The associated state is first displayed once the next signal value is reached.

- Linear: the change of the property between two states will be interpolated linearly. Please note that not every property, such as font types, can be changed linearly.

- Ease in: Transition with a slow start accelerated towards the end

- Ease out: Transition with a quick start that gets slower at the end

- Ease in and out: Transition starts and ends slowly and accelerates in between

Interpolation curves of the different transitions:
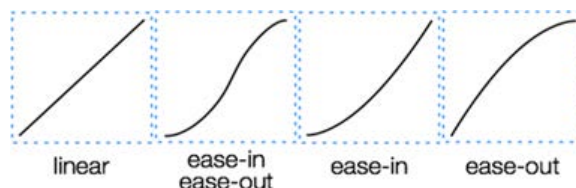
Enabled

Here you can enable and disable the dynamization. Thus it is possible to preconfigure a dynamization and to apply it later.
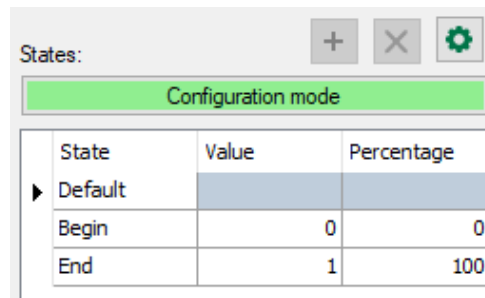
Variables/affected tools

As soon as configuration mode is activated and you make changes to an object in the panel, the name of this object appears in the "affected tools" field. The modified property is also automatically added as a variable in the "Variables" field. Properties and objects can also be deleted directly in these fields.
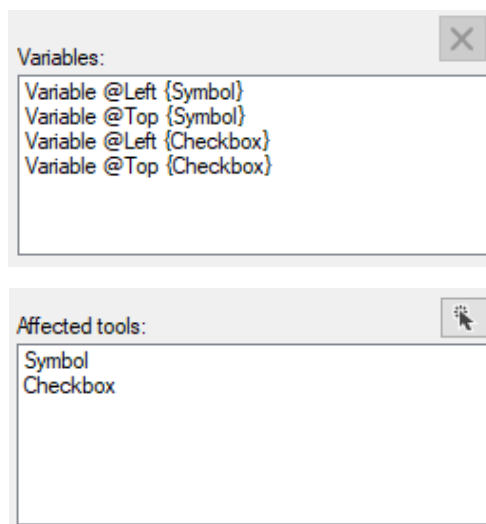
Use the select button to select all objects. By clicking on the name, a single object can be selected, too.
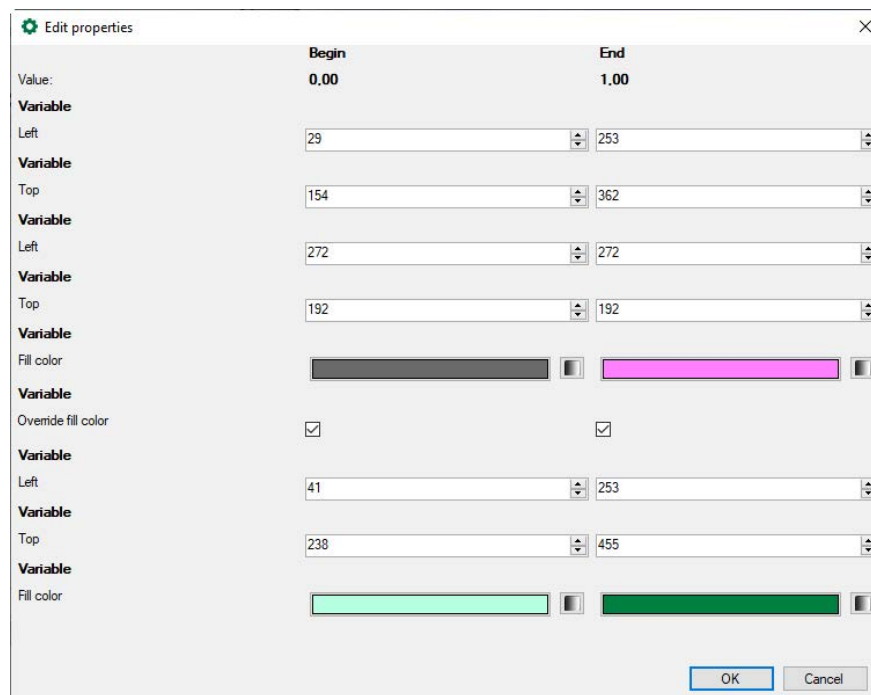
States

The states "Default," Begin" and "End" are available by default. The default state describes the state of the objects when switching from display mode to design mode. The begin and end state describes the state of the objects at the beginning and end of the dynamization.
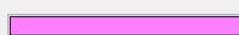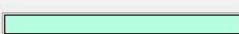
The states can only be edited or new ones added if configuration mode is activated via the <Configuration mode> button. If configuration mode is active, the button turns green. When the editing is finished, configuration mode can be deactivated by clicking the button again and the color of the button changes back to gray.

Additional states can be added (✚) and removed (✖) using the control elements. A signal value can be assigned to every state that will be entered numerically in the "Value" column. In the "Percentage" column, the percentage of the signal value from the end value is automatically entered.

In case a state is marked, the related properties can be defined. For this purpose, there are 2 methods available:

- Mark the object in the panel for this task and change here the properties of the panel, such as the placement and/or the color. The object and the changed properties will be automatically applied in the dynamics editor.

- Open the "Edit Properties" dialog by clicking on the button ⚙. In this dialog, all objects that belong to this dynamization are displayed with the related properties.

Procedure by means of the example „Move gear"

The aim of the example is the linear movement of a graphics element (symbol) from position 1, if the signal value is 0, to position 2 at the maximum signal value 800.

1. Drag the symbol object onto the panel.

2. Create a new dynamization and enter a name (Move gear).

3. Select the signal that is to control the movement.

4. Select the interpolation "Linear".

5. Activate configuration mode via the <Configuration mode> button.

6. Define all desired states and the related signal values. The signal value 0 is assigned to the initial state, the signal value 800 to the end state (this corresponds to the real signal range and should be known).

7. Mark the "Begin" state and drag the symbol to the start position while keeping the mouse key pressed.
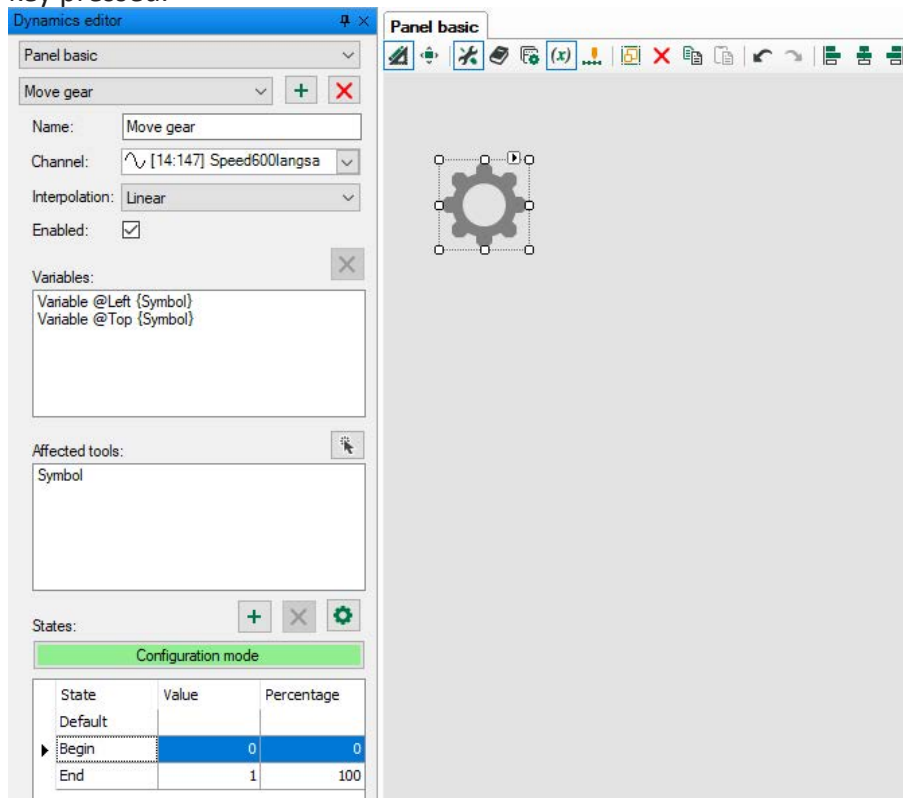
8. The object will be displayed in the "Affected tools" field, and the changed properties in the "Variables" field.

9. Mark the "End" state and drag the symbol to the end position while keeping the mouse key pressed.
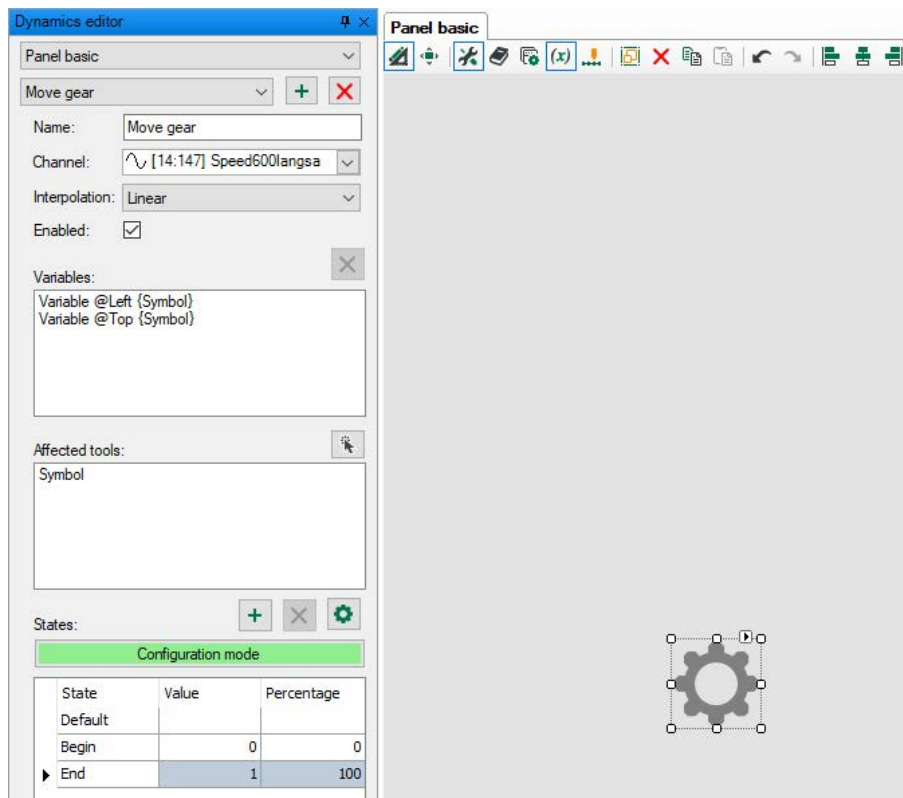
10. Both positions can be controlled or corrected, if the respective state is marked.

11. Exit configuration mode by clicking the <Configuration mode> button.

12. Click <OK> to close the dynamics editor.

13. If you switch to display mode, the symbol will move between both positions according to the signal value.

4.3.2   Dynamizations in the properties dialog

Mark an object in the design mode and open the properties dialog. If the object is part of a dynamization, the latter will be displayed in the tree structure. Similarly, the number of other objects in which this dynamization is still used is shown above.
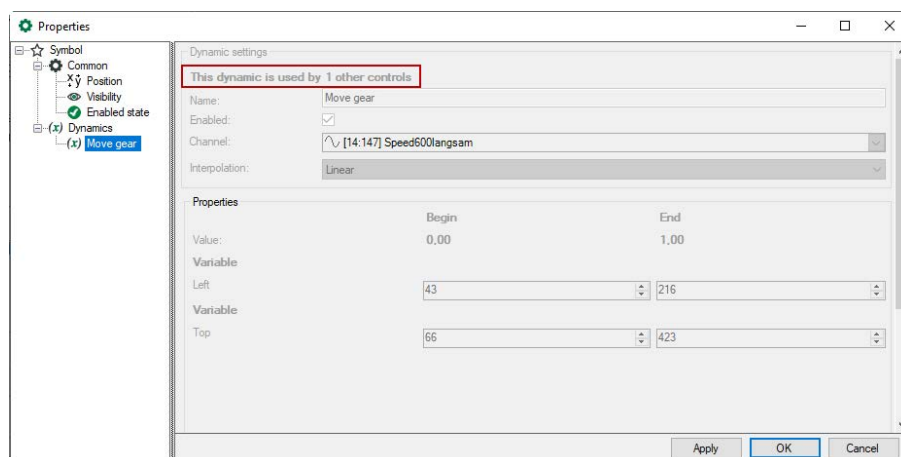
In addition, all dynamizations which use this object are displayed.
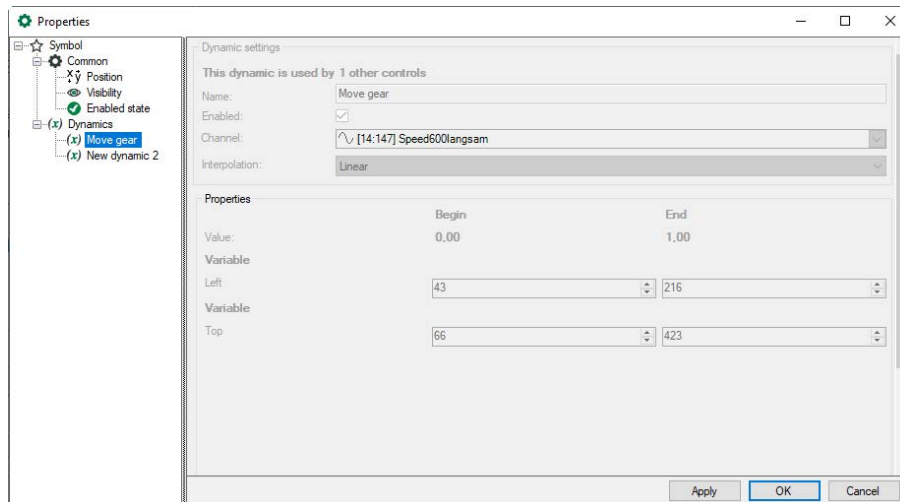
4.3.3   Dynamics value line

By means of the dynamics value line, a dynamization can be clearly checked and edited. On the value line, the defined states will be displayed along a linear bar. The states will be displayed with their names at the respective position within the signal. To check a dynamization, every value along the value line can be marked with one mouse click.

In the panel, the corresponding situation of the objects (position, color etc.) will be displayed. This does not only apply to the defined states but also to any value in between.

In case a state is marked, the properties of the objects can be changed in the panel. This change will simultaneously be applied for the dynamization.

If properties of objects are changed between two states, a new state will be inserted at this position.
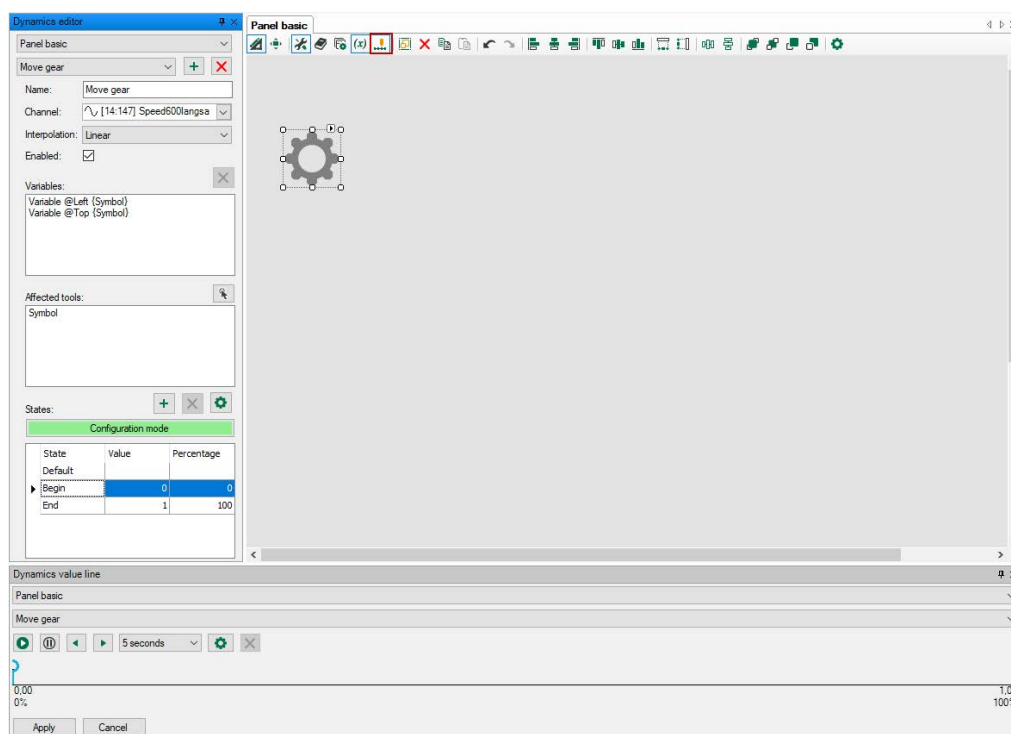
The dynamics value line is displayed by clicking on the button in the toolbar.

In the drop-down menu, you can select dynamizations that have already been created.
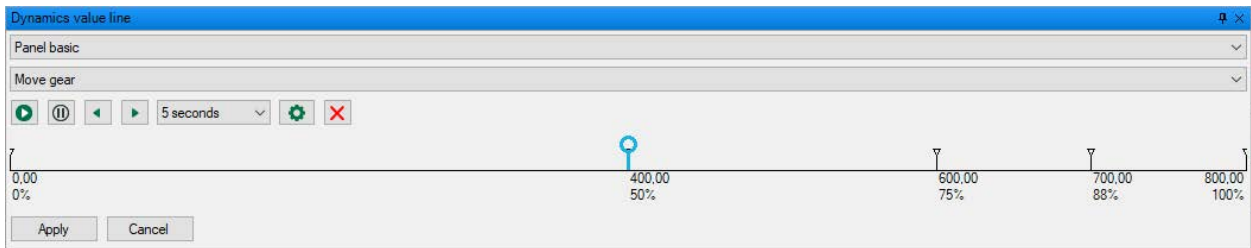
The currently marked position on the value line will be displayed by a marker. The marker is blue, when a defined state is marked, in the areas in between, the marker is green. The value of the marked position will be displayed as a tooltip.
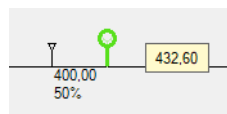
4.3.3.1   Editing states in the value line

In the value line, states can be deleted and moved or new states can be added.

Deleting a state

Mark a state and press the <Remove state> button.

Moving a state

Select a state and move it along the value bar by keeping the mouse button pressed.

Adding a state

1. Mark the position on the value line, where the state is to be inserted.

2. If you now change a property of the object in the panel, a new state will be added. The new state will also be displayed in the dynamics editor.
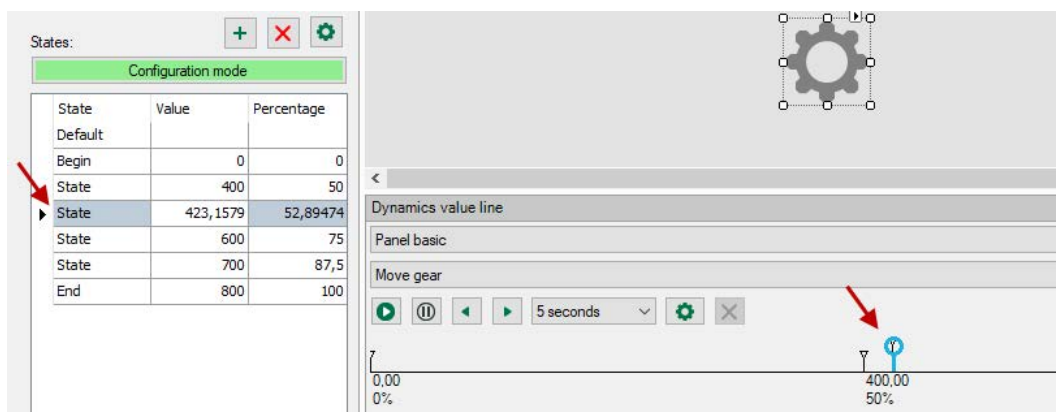
4.3.3.2   Simulating a dynamization

The dynamization can be simulated using control elements.
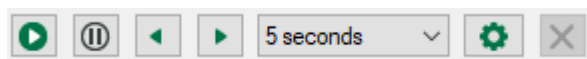
Thus, the dynamization can be played and checked during the total run. It can be stopped at any time and, if necessary, corrected.

Playing and pausing the simulation

Jumping to the next state
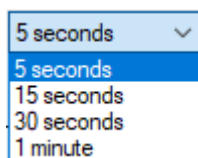
Here, you can set the time, in which the simulated procedure will be carried out.

Example 30 seconds: playing the simulation from the begin state to the end state takes 30 s.

If you click on this button, the "Edit properties" dialog will be opened. All objects that belong to this dynamization will be displayed in this dialog along with the related properties, and can be changed there.

Edit properties						✕
	Begin	**State**	**State**	**State**	**State**	**End**
Value:	0.00	400.00	423.16	600.00	700.00	800.00
Variable						
Left	44	319	323	418	480	543
Variable						
Top	88	555	616	336	377	419

OK   Cancel

4.4   Library

Once created objects can be saved in a library and be reused any time. You can create several libraries and load them into a project. Libraries will be saved as "qpanellib" files to the desired location and are also available for other ibaQPanel projects. Dynamic properties of an object cannot be saved in the library.

In design mode, the library window is opened by clicking on the button 📖 in the toolbar. Libraries that have already been created will be displayed in a tree structure. If the suffix "unsaved" appears before the name of the library, the latest version of the library has not yet been saved.

To load a saved library, click the <Open> button 📁 in the library window and select the "qpanellib" file in the file browser.

Note

Any dynamization properties of elements are lost when the elements are saved in the library.

4.4.1   Creating a new library

There are two methods available to create a new library:

- Click on the button <New> in the library window or

- In the design mode, drag an object from the panel into the empty area of the library window by keeping the mouse button pressed. A new library will be created automatically, which contains the object.
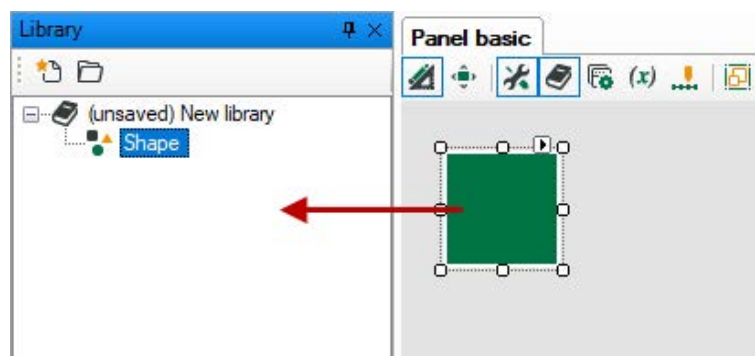
4.4.2   Saving/Closing a library
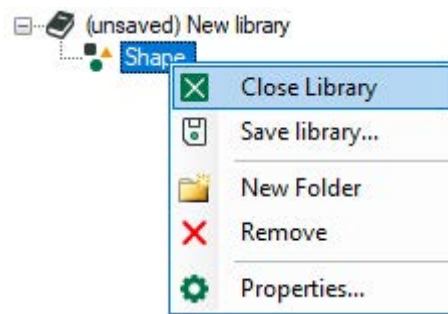
With the "Save library..." command, you can save the changes of your library in the library file to the desired location. The addition "unsaved" will disappear. Unsaved changes will not be saved in the library file, however, they will be kept during a restart of the *ibaPDA*.

With the "Close library" command, the library will be closed, however, not deleted. The library file can only be deleted in the file system.

4.4.3   Editing a library

You can add a new element to a library, if you drag the object from the panel to the library title by keeping the mouse button pressed. If several objects are marked and added to the library, they will be inserted as a group. A new element will appear in the tree structure with its object name. You can change the name by clicking on it and by entering a new one.

For a clearer structure, you can create folders and subfolders in the library. You will find the "New folder" command in the context menu. With the "Remove" command, you can delete the folder again.
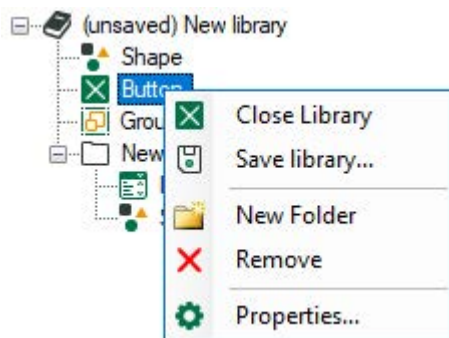
If an element of the library is marked, it can be deleted via the context menu. If you select "Properties", the element will be displayed in a preview window.
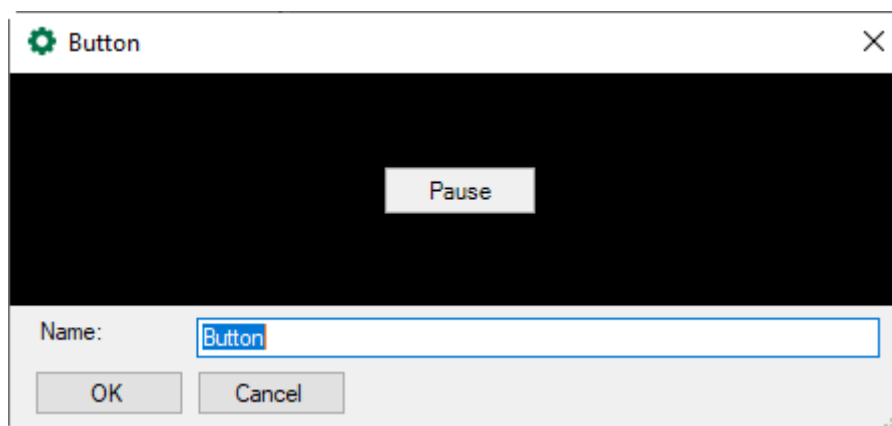
Here you can change the name, if required. The names of the elements and folders can also be changed if you click on their names in the tree structure.

4.5   Language switching

In *ibaPDA*, the GUI language can be switched using the *View - Language* menu command. As default, German, English and French are available. The availability of further languages depends on the language pack installed. In *ibaQPanel*, you can switch the language of text-based objects using the language switch of *ibaPDA*, too. The prerequisite is that the text belonging to the objects, is available in a language dictionary for the different languages.

The language switch can only be realized for static texts. Dynamic texts from text signals will be displayed as they have been saved in the text signal.

The language switch can be controlled by the button object, too. For this purpose, the "Change language" command is available, see chapter ↗ *Button*, page 64.

Creating different languages
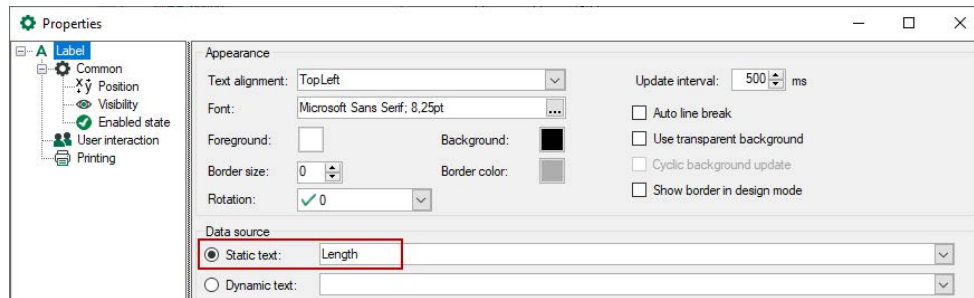
Open the drop-down menu for the text field which should be language-dependent and select "Edit QPanel dictionary...".
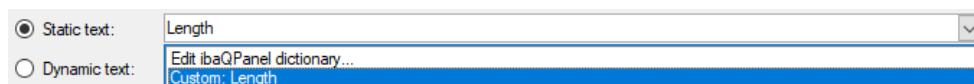
The dictionary dialog opens. Enter an ID (key) for the word and the translation in further languages. With the <Save> command, the word will be added to the dictionary.
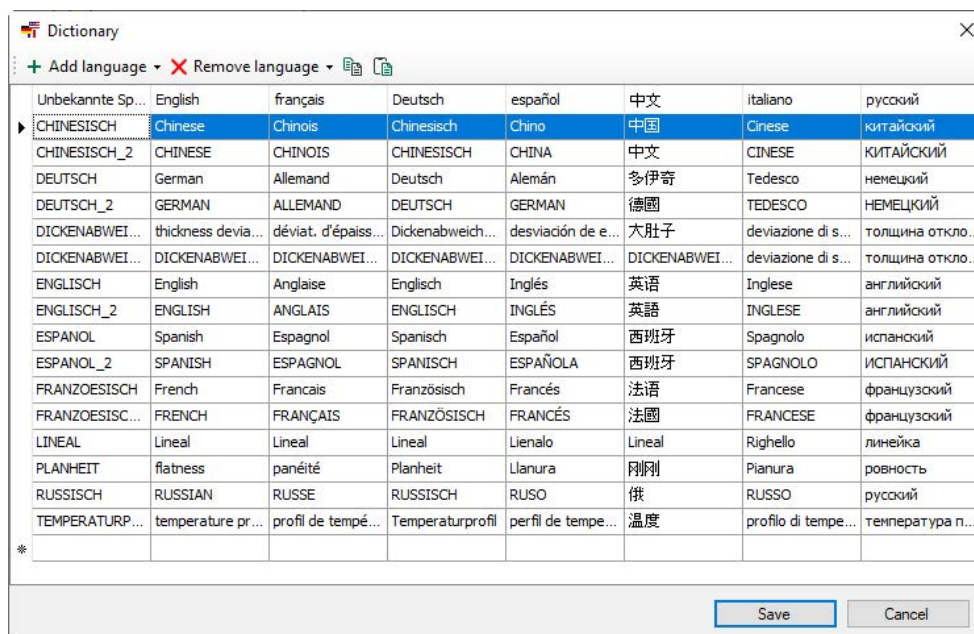
The entry is now marked with a flag symbol.

The text will now be displayed depending on the selected language:

If the translation is missing in the chosen language, the key word is displayed in brackets:
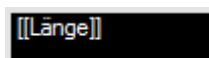
The text will now be displayed depending on the selected language:

Editing the dictionary

In the *View – QPanel language dictionary* menu, the whole dictionary can be opened and edited.
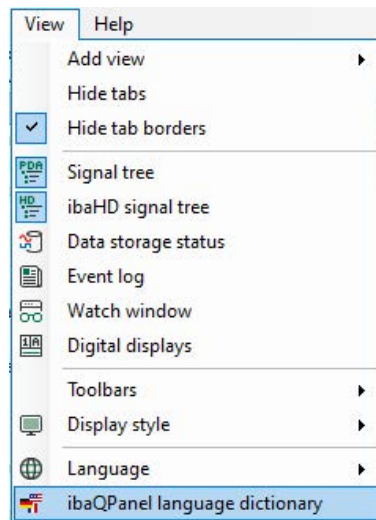
In the dictionary, you can edit, add and delete entries as well as add new and delete existing languages. You can enter a new entry in the empty line. You can edit an existing entry directly in the line.
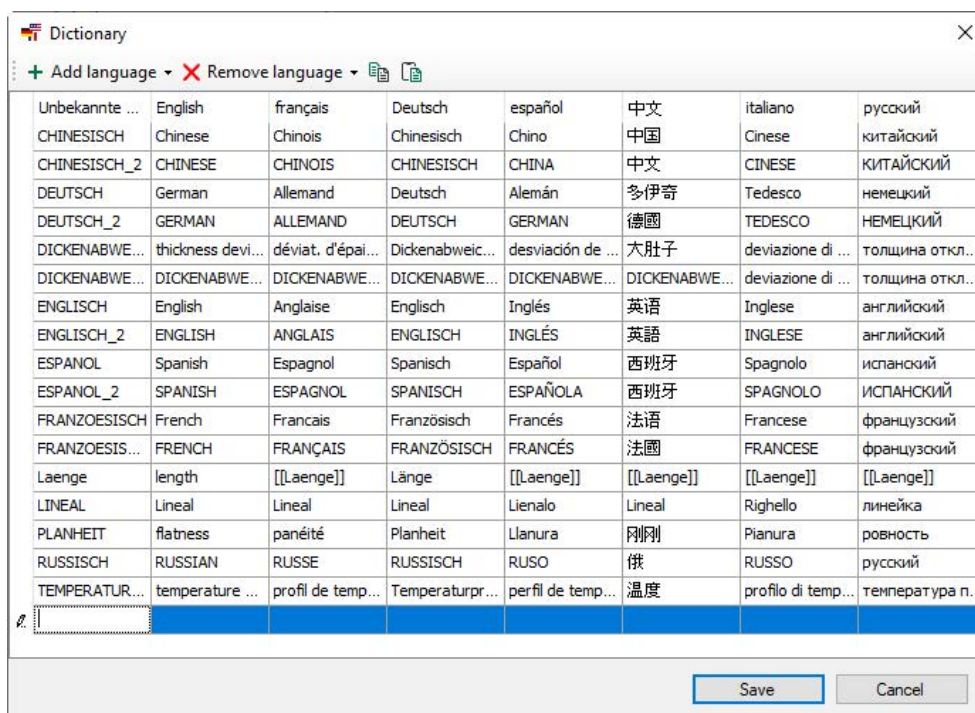
For editing the dictionary, the following commands are available:
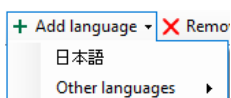
: adds a new language. Select the language that you want to add from the drop-down menu.

✗ Remove language ▾ : removes a language. Select the language you want to remove from the drop-down menu. The languages installed in *ibaPDA* will be displayed. English is set by default and cannot be removed.

: copies the whole dictionary into the clipboard. By doing so, you can insert the dictionary into an Excel table.

: adds the content of the clipboard to the dictionary.

System language

When adding a new language, numerous supported languages are available for selection in the "Other languages" submenu. You can also add these languages to the dictionary.
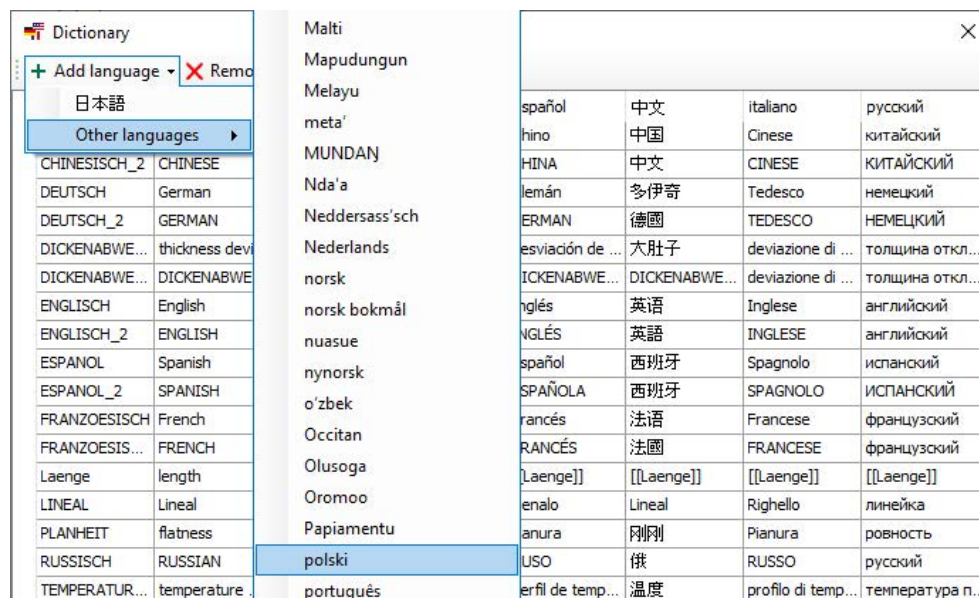
If one of these languages is set for the system, this language can also be used for QPanel, if you select "System" when selecting the language.

Selecting a language in ibaPDA: *View - Language* **menu:**
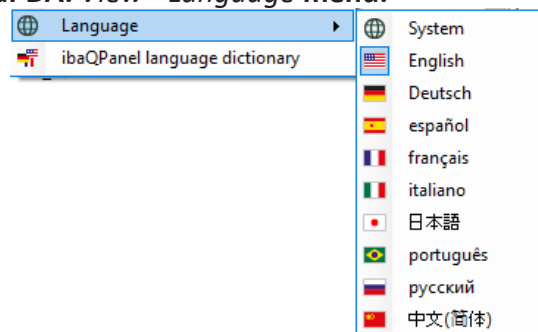
Selecting a language with the button object:
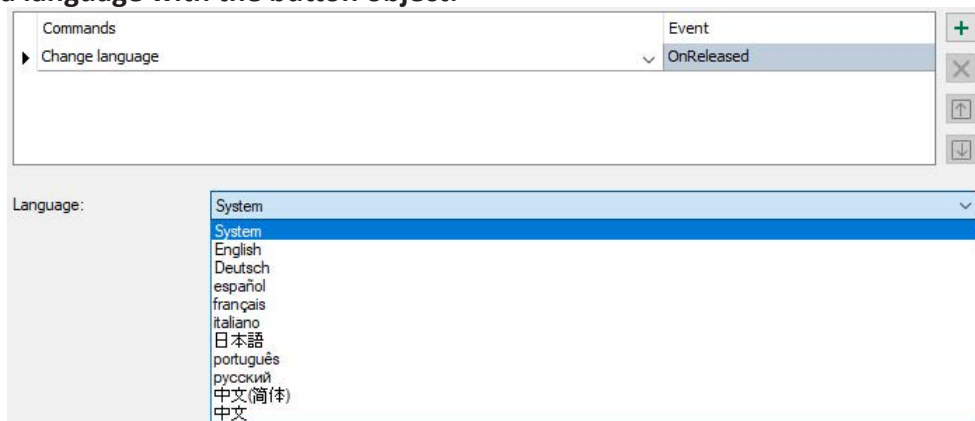
Note

> [i] General information about the language settings in Windows can be found in the FAQ section of the iba website at www.iba-ag.com under the heading "General".

4.6   Display style

In ibaPDA, different display styles can be switched on and off via the menu command *View - Display style*. Available for selection are:

Command	Meaning
Normal	Standard Windows frame with signal display area, toolbars, menus, signal tree window, event log, Technostring status, etc.
Full client	The signal display area (with the layouts) is expanded over the full area of the *ibaPDA* client window including the frame; no toolbars, menus or other windows are visible.
	Other Windows programs can be positioned above the *ibaPDA* client. When you restore the *ibaPDA* client window, you can still see the desktop background.
Full client on top	Equivalent to "Full client" but the *ibaPDA* client is always in the foreground.
Full screen	Equivalent to "Full client on top" but the signal display area covers the whole screen. The Windows task bar is also covered.
Full screen on all monitors	Equivalent to "Full screen" when using several monitors.
Fixed size	Equivalent to "Full client on top" with a fixed client size. The client size is set in the *Layout Manager* see the following description.

Dispaly style "fixed size"

Open the Layout Manager via the *Configuration - Layout Manager* menu or via the icon . In the *Display style* node under *Fixed size settings ...* you can configure the client size and other settings.
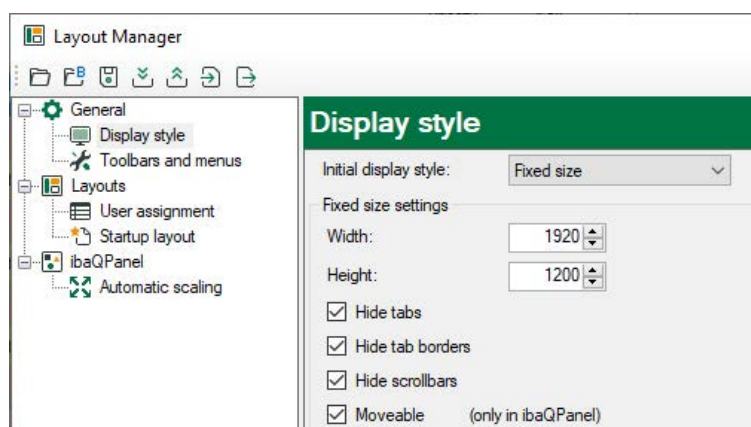
With *Width* and *Height* you define the size of the client. The *Hide tabs* and *Hide tab borders* options can be used to show or hide the tabs and the tab borders. The settings here override the settings of *ibaPDA* in the view tab.

When the configured fixed size is smaller than the layout size then scrollbars will appear. That can be avoided by the option *Hide scrollbars*. In that case only the fixed size is visible and the other parts of the layout can't be reached.

If you enable the *Moveable* option, the *ibaPDA* client can be moved on the screen with a fixed size. This only applies if there is an *ibaQPanel* object inside this *ibaPDA* client. To do this, click an empty area without an element in *ibaQPanel* and thus drag the entire panel.
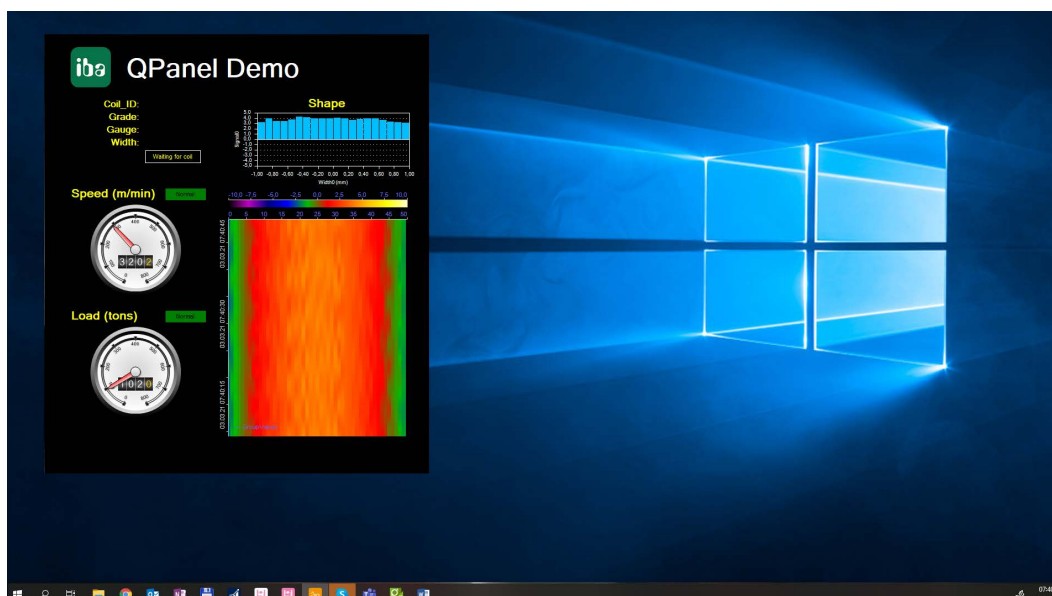
5   ibaQPanel standard objects

The objects are grouped by functions in the toolbox.
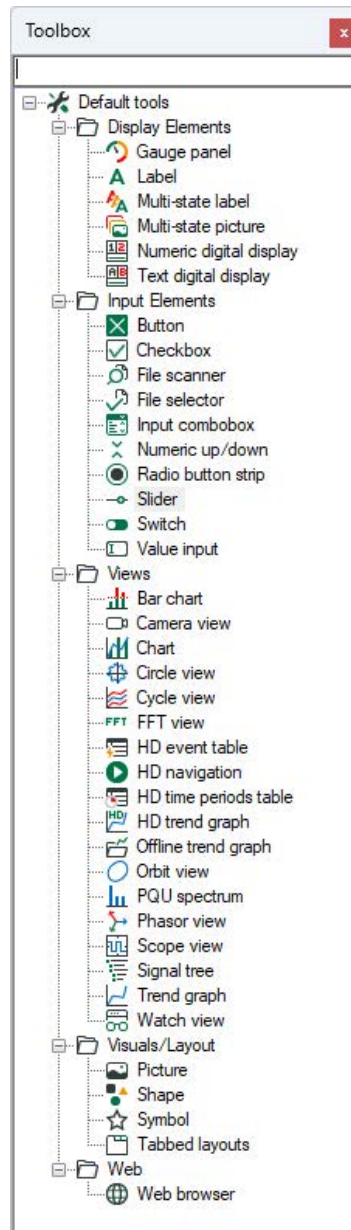
The description is done according to the order in the toolbox.

Object	Function	Application
Display Elements		
Gauge panel	Display of signal values on a classic analog-style gauge Circular, linear and numerical gauges available; numerous design options, free set-up of shape, color, scales and pointers	Highlighted display of values Replaces traditional displays

Object	Function	Application
Label	Display of static or dynamic text or signal values in alphanumeric form Source can be a signal or text signal	Label the displays Display the text signal Numerical representation of signals
Multi-state label	Convert a signal value into different states of a label; color change depending on value range(s), text or text signal in the label	State display
Multi-state picture	Display of various graphics, depending on the signal value	Status display Security warning
Numeric digital display	Display signal values as numbers Hold the positive and negative peak value (resettable)	Large, clear display of signal values
Text digital display	Display of texts	Large and clear display of text signals and other texts
Input elements		
Button	Execute commands using a button: Close ibaPDA client Switch layout Execute command line Activate application (*.exe) Print (QPanel screen) Pulse digital signal Set signal value Trigger value input control Pause one or all views Start or resume one or all views Load layout from server Save signal on server Open user management Connect to ibaPDA- or ibaHD-Server Change language Change window state Change display style Commands can be executed manually or by signal edge; Button text and image configurable Action adjustable: When pressing When releasing While pressed	Control of QPanel display Execution of other applications or scripts Set signal values Take over signal value A after signal B Quick opening of various dialogs (user management, connect to server) Change language
Checkbox	Input a binary signal value	Binary value input

Object	Function	Application
File selector	Search for files using a pattern/filter in the name or the date in a given folder	Find and use files in trend/text/image displays
File scanner	Search for new or changed files in a given folder	Find and use files in trend/text/image displays
Input combobox	Selection of input values via text	General value input Specifying parameters for calculations as plain text Specifying parameters for subordinate devices
Numeric up/down	Selection of input values in steps via up/down buttons	General value input
Radio button	Selection of input values via radio buttons	General value input
Slider	Enter a numeric value using the slider	General value input
Switch	Input of two binary states	Binary value input with graphical display
Value input	String entry or value input for a text signal or analog or digital signals	Additional information on data file, printout, further applications, etc.
Views		
Bar chart	Display of signal values as single-bar or multi-bar charts Color change for value ranges, dynamic limits, polynomial calculation for profiles	General value display Fill levels Profiles
Camera view	Display a camera view of an ibaCapture server on the screen Scenario player for event-based camera switching	Surveillance Process monitoring Troubleshooting
Chart	Universal tool to - display any number of bar graphs - integrate images/color ranges - integrate all kinds of markers - realize x/y recorder	General value display Fill levels Profiles Represent complex machines with graphs and moving parts Display operating point
FFT view	Display the frequency spectrum of a signal	Frequency analysis Chatter monitoring
HD event table	Display a list of events based on an event-based HD data store	Error and alarm monitoring; search for process events
HD navigation	Parent control for multiple HD trend graphs for scrolling, zooming, time selection, jump, start, stop	General control

Object	Function	Application
HD time periods table	Display time periods from time period stores	Comparison of measurement data from different time periods, process monitoring
HD trend graph	Display HD signal values in a trend graph X axis time or length-based; from historical data	General value display
Offline trend graph	Display complete graphs from an existing measurement file (*.DAT, also CSV/TXT possible). Live position can be shown as comparative cursor	Comparison of previous measurements with the current measurement
Scope view	Display signals in a digital oscilloscope	Commissioning Troubleshooting
Signal tree	ibaPDA / ibaHD signal tree	Source to drag and drop signals into an enabled trend view
Trend graph	Display signal values in a trend graph X axis time or length-based; automatic 2D-colored top-down view on vector signals	General value display Colored display of profiles (temperature, flatness, etc.)
Watch view	Display window for the value of single signals	Monitoring of certain signals for value change/status
Visuals/Layout		
Picture	Display of a graphic (static) or several graphics (dynamic, controlled by signal)	Background image Logo Flexible objects
Shape	Tool for creating different basic shapes	Free graphical design of displays
Symbol	Display of vector graphics in SVG format	Background image Logo Flexible objects
Tabbed layouts	Display of several single layouts in a group frame in the current layout	Layout with fixed and variable parts (header/footer etc.)
Web		
Web browser	Display web pages, PDFs and other browser-enabled files	Display data from ibaDaVIS

The tools PQU spectrum and PQU phasor can only be used in connection with the central unit ibaPQU-S and are described there.

The Orbit View tool is used by the ibaInSpectra Orbit module and described there.

The tools Circle view and Cycle view are used by the ibaInCycle module and described there.

5.1   Gauge panel

Function

The element "Gauge Panel" offers a great variety of possibilities to design measured value displays as classic gauges. A number of objects is available to design round or linear pointer instruments, thermometer graphics and rolling counters. The display attributes can be freely defined on a large scale.

Configuration

If a gauge panel object is dragged in design mode onto the panel, the properties dialog opens automatically.
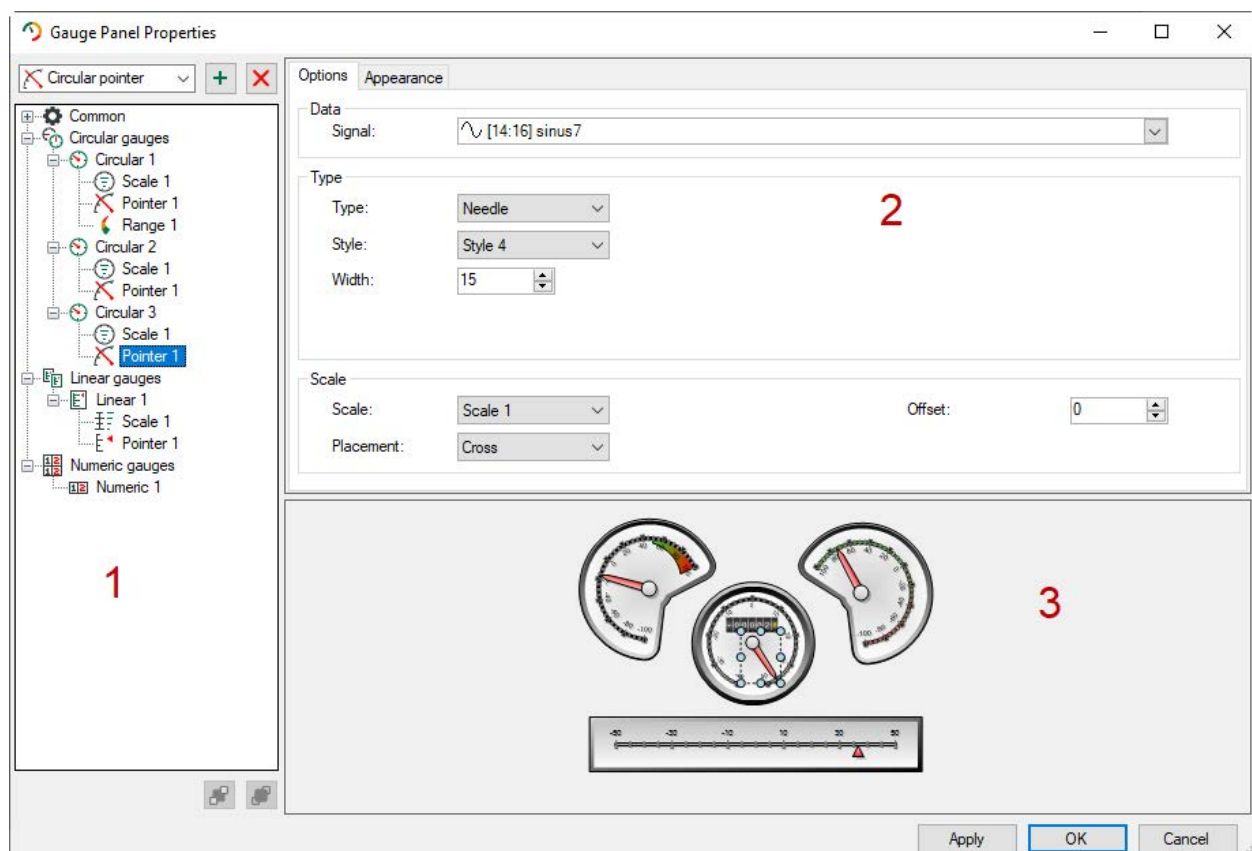
The dialog is divided into 3 parts:

- The properties tree (1) shows the hierarchical structure of the elements in the gauge panel.

- The properties tabs (2) show the settings for the element selected in the properties tree.

- The preview window (3) shows the instruments with the currently chosen properties.

If an element is selected in the properties tree, the corresponding properties tab will be displayed and the element marked in the preview. Elements can be selected in the preview as well; the marking in the properties tree and the display of the tabs change accordingly.

5.1.1   Adding elements

The element selected in the drop-down menu is added by clicking on the **+** button.
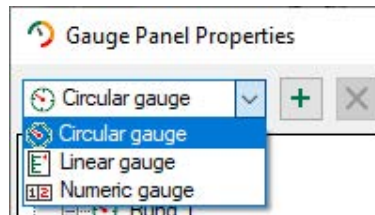
Depending on which element is selected, additional sub-elements and components of the element are available, which can be added with < **+** >.
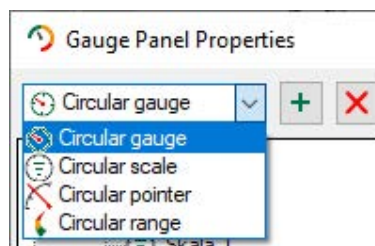
By clicking on < **✕** > the currently selected element is deleted again.

5.1.2   General element properties

If one of the three instrument branches (circular or linear or numeric gauge) is selected, the following dialog opens:
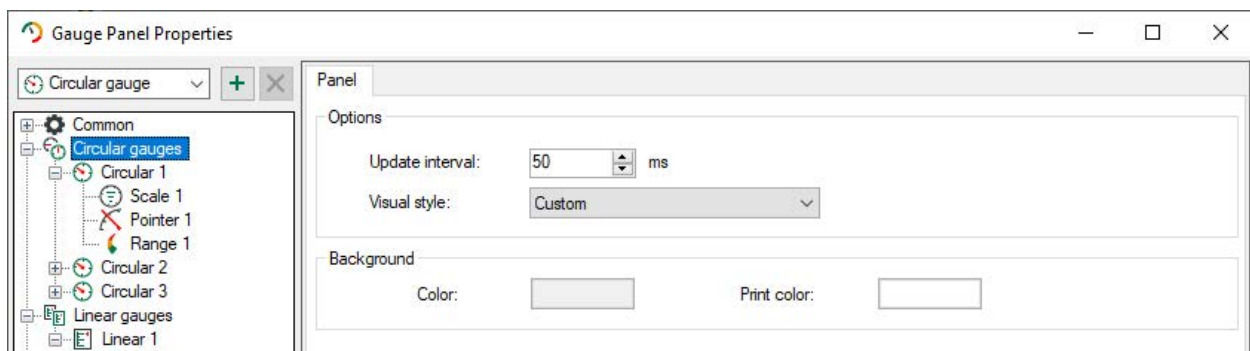
Here the update interval can be set, the background color as well as the background color when printing. The visual style can be defined individually, or chosen from a certain number of already predefined styles.
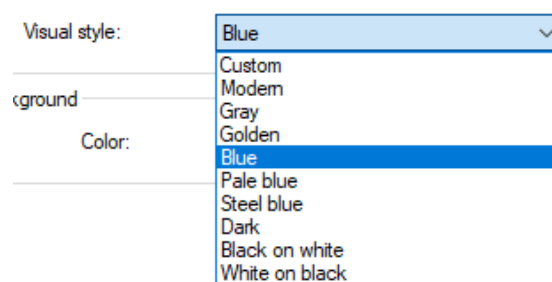
If a predefined style has been chosen, all already created instruments adjust to this style as well as all instruments which are still to be created.

5.1.3   Position and size of an element
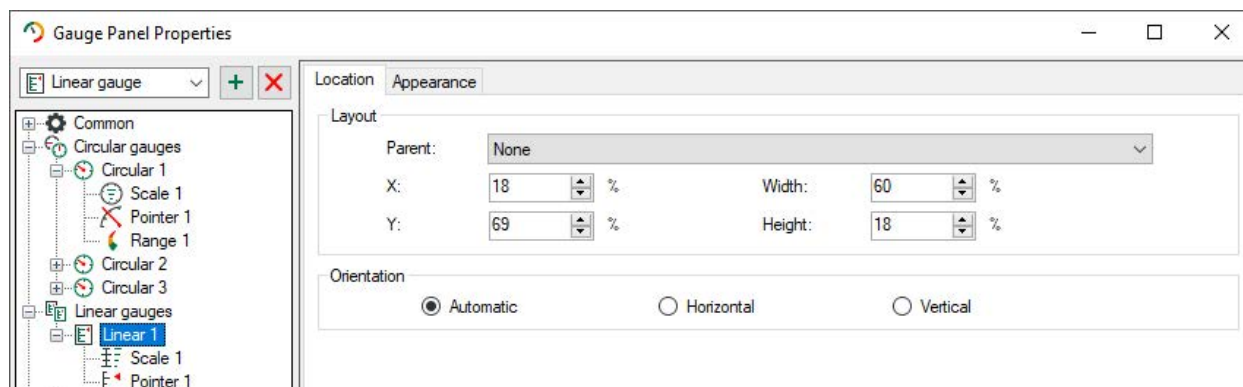
Layout

Position and size of the element will be defined in the tab "Location" which appears when an instrument is selected on the left side of the tree. Position and size will be defined in percentage. The percentage value can also refer to another element which is chosen with "Parent". If "None" is chosen, the element itself is the reference size.

The position of the element can also be changed by shifting in the preview.

Orientation

For linear instruments, an additional orientation can be chosen in the dialog "Position". With the setting "Automatic", the orientation refers to the height and width which has been defined in "Layout".

5.1.4   Appearance
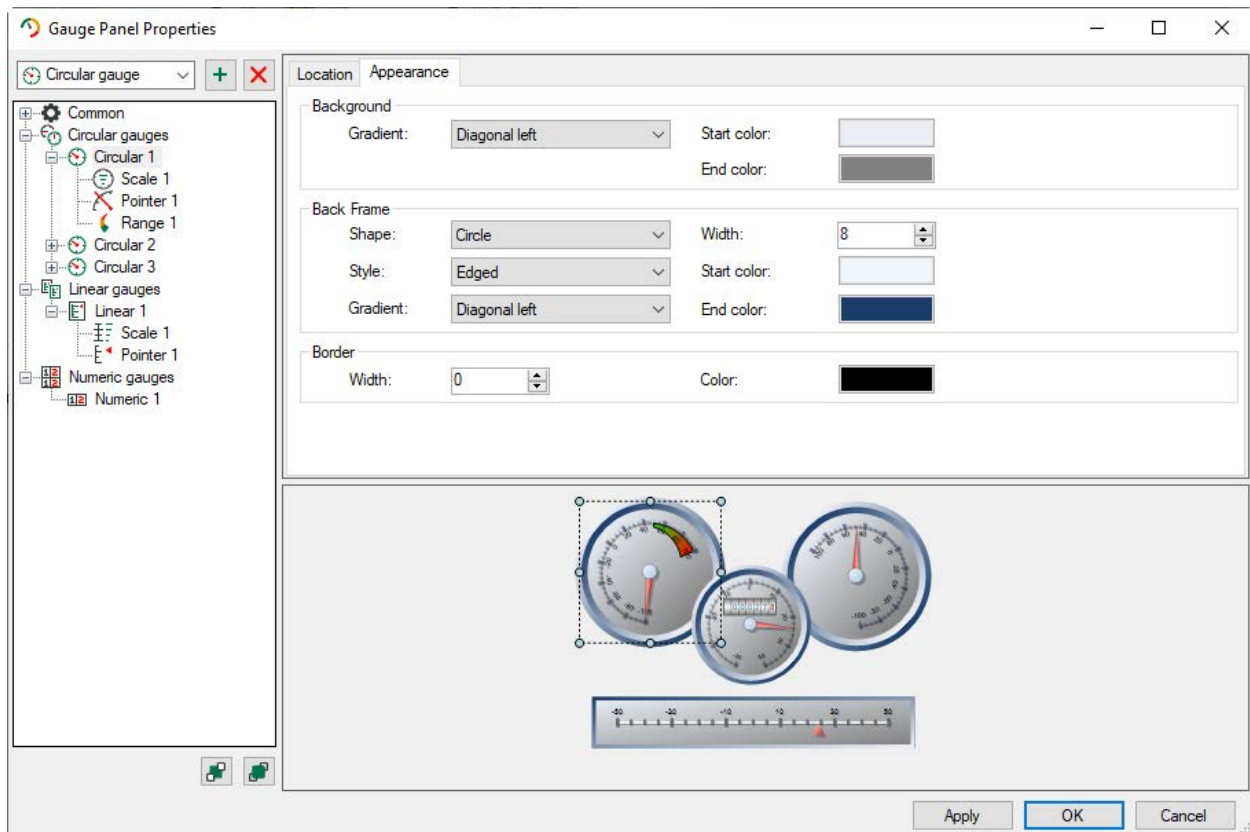
In the tab *Appearance*, the appearance of the background, the frame and the border of the selected gauge can be defined. The frame "Auto shape" lies as close as possible around the configured scale. The example above shows that if the scale runs only over a semicircle with circular gauges, the frame adjusts its form to a semicircle as well. The dialog "Appearance" for linear and numeric gauges corresponds with the dialog of circular gauges.

5.1.5   Scale properties

The scale properties are described here in the example of the circular gauges. The settings for linear gauges are the same.
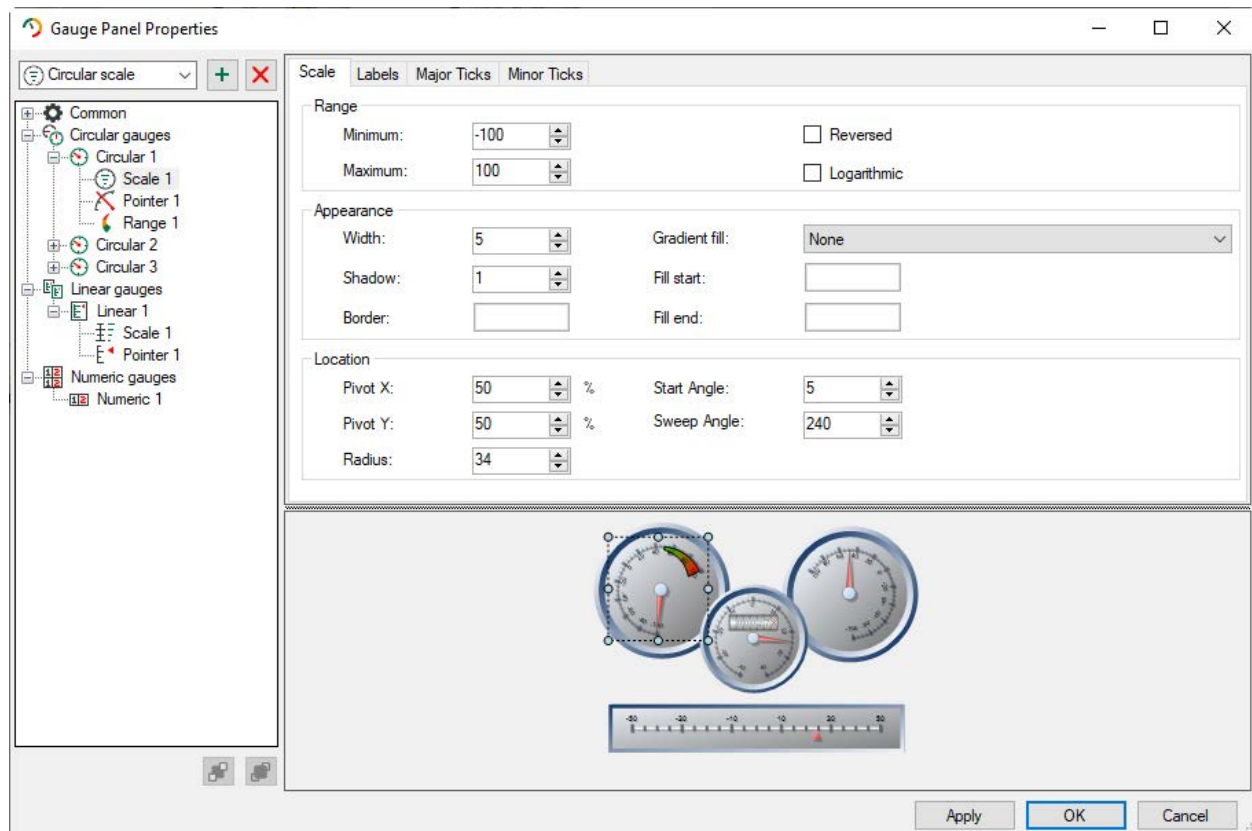
Range

The range displayed on the scale will be given with the minimum and maximum value. Furthermore, the direction can be changed and a logarithmic scale can be chosen.

Appearance

Here, the width of the scale, the shadow and colors are defined.

Location

The center of rotation is located in the middle of the scale. The scale itself can be shifted within the gauge. With X and Y values of 50%, the scale is positioned in the middle of the gauge. The initial angle will be calculated from the lowest point of the scale; the scale angle will be calculated from the initial angle.

5.1.6 Labels
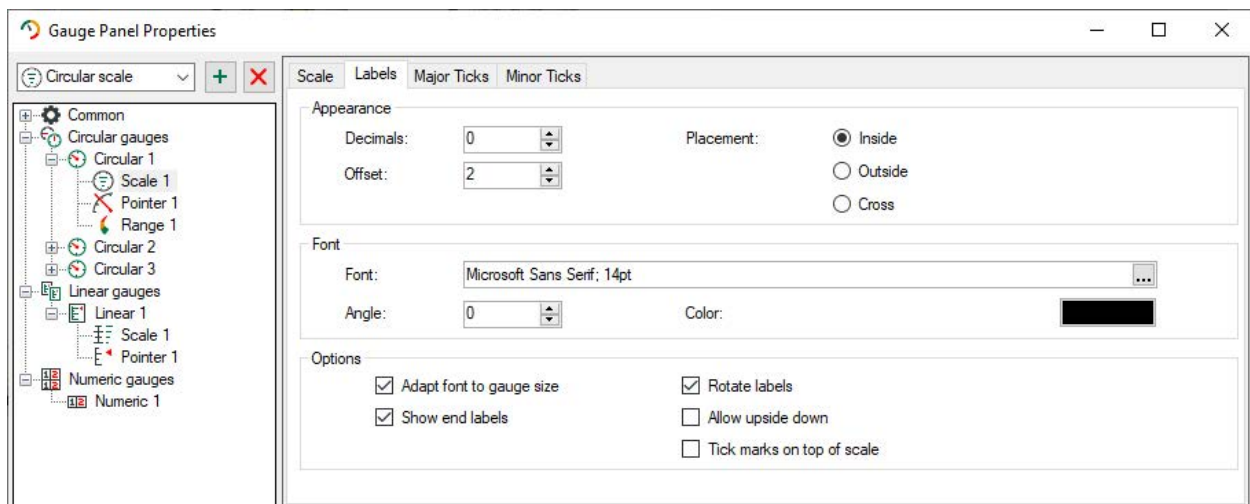
In the dialog *Labels*, the properties for scale labeling are defined like font, color, position of the scale, etc. All chosen properties can be checked in the preview window.

5.1.7 Tick marks
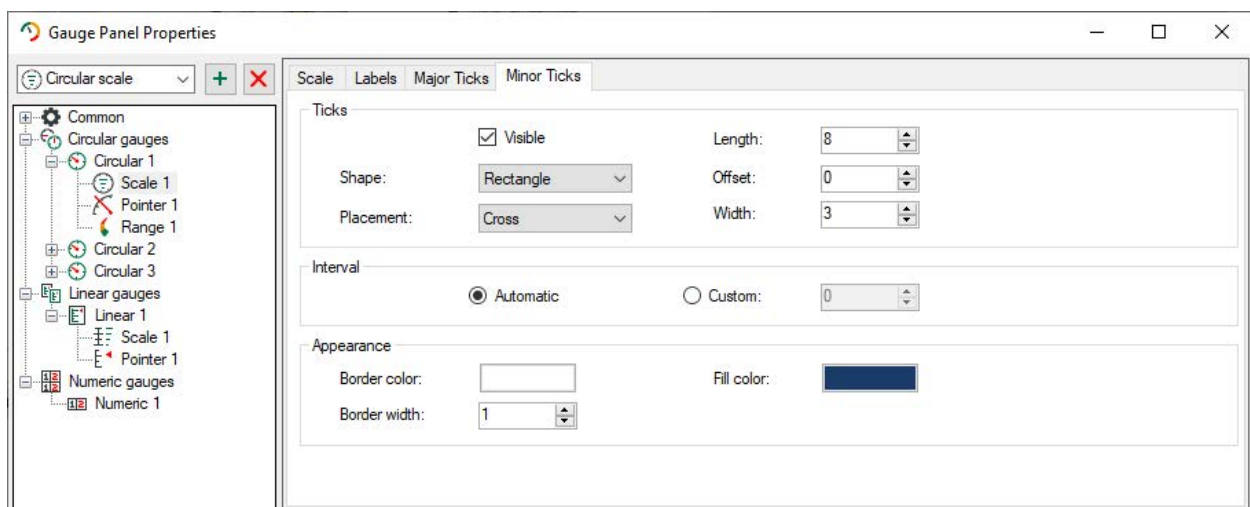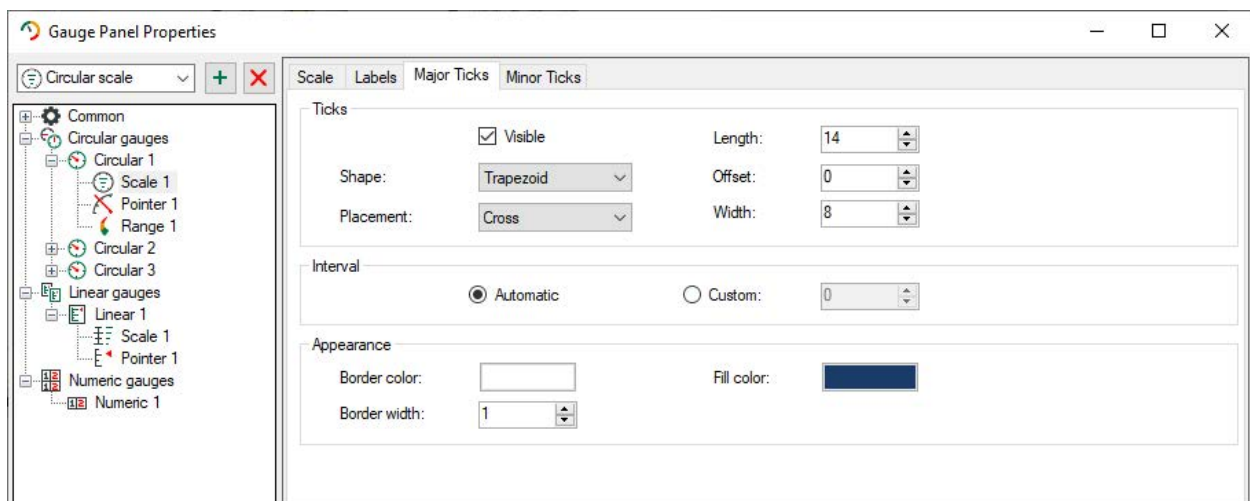
In the tabs *Major Ticks* and *Minor Ticks*, the properties of the tick marks are configured. Tick marks can vary with regards to form, color, position and size. All selected properties can be checked in the preview window.

5.1.8   Pointer

The pointer properties are described here in the example of the circular gauges. The settings for linear gauges are the same.
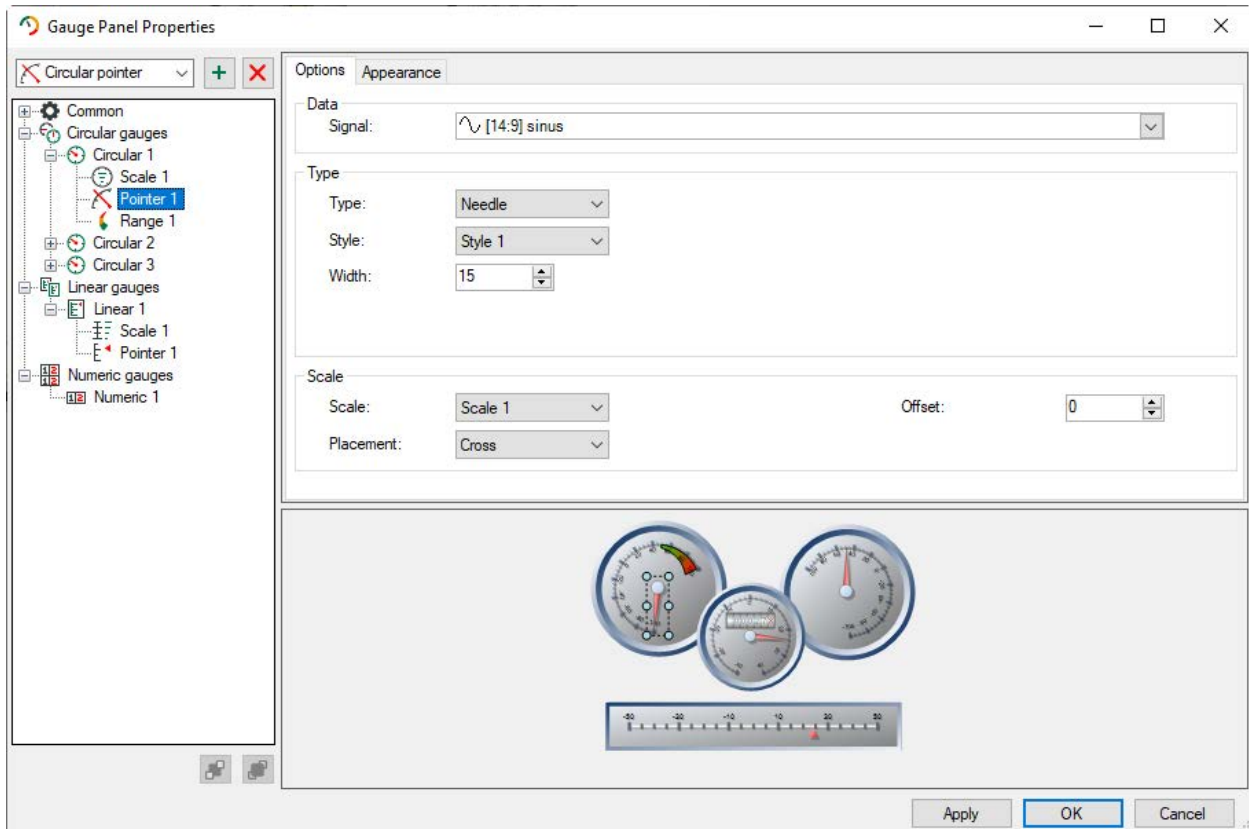
Options

You choose the signal which values shall be displayed in the range "Data". In the range "Type", you can choose from different display types and configure the width. You can assign the pointer to a scale in the range "Scale" and adjust the position in the gauge. If there is no scale set in the gauge, the pointer will not be displayed.
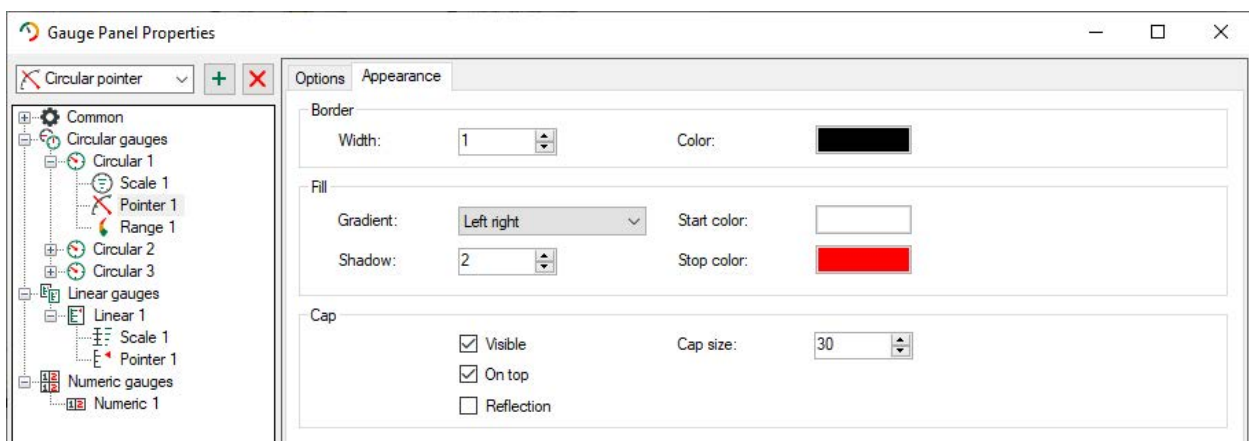
Appearance

Here, the border of the instrument, the filling and the cap of the pointer is defined. The cap of the pointer is the pointer's center of rotation.

5.1.9   Range

The description of the range properties follows here with the example of the circular gauges. The settings for linear gauges are the same.
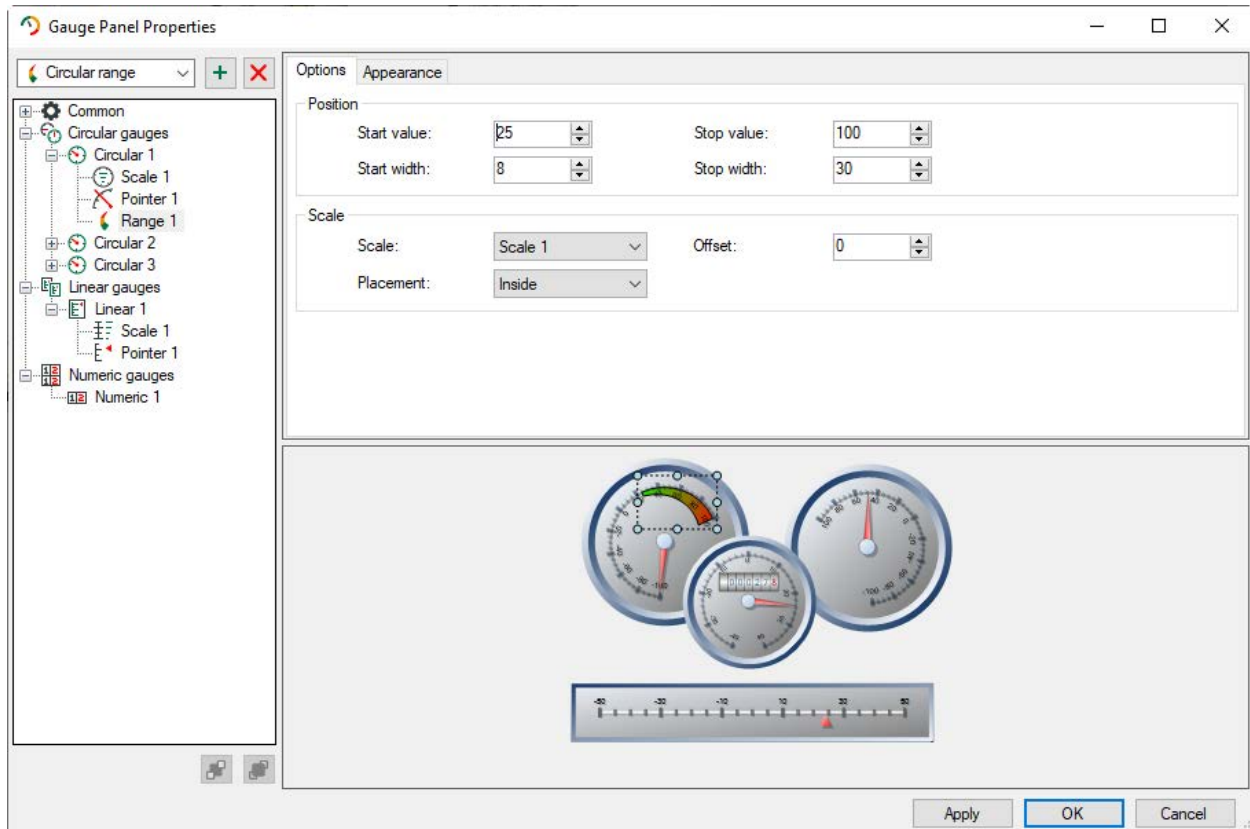
Options

In addition to the scale, a range can be displayed. Start and stop value refer to the values on the scale. You define the position of the range via placement and offset. Without scale, the range is not visible.
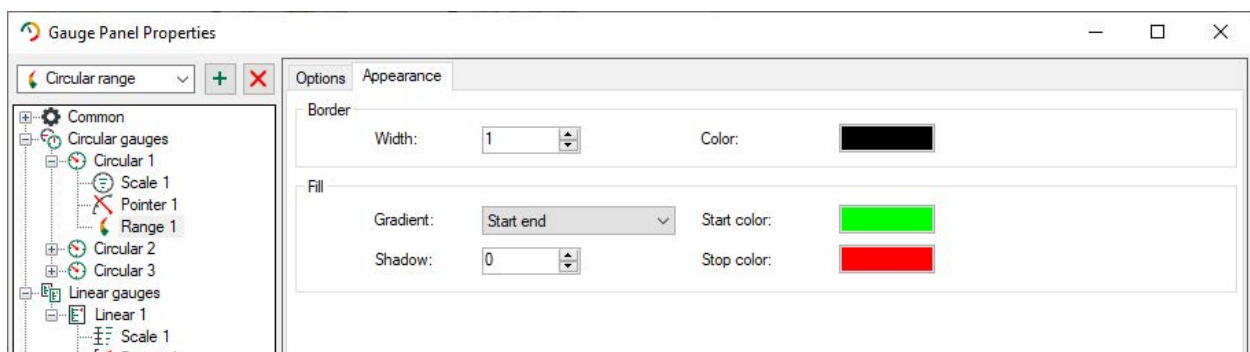
Appearance

In the tab *Appearance*, you can specify the borders and fillings of the range.

5.1.10   Numeric display
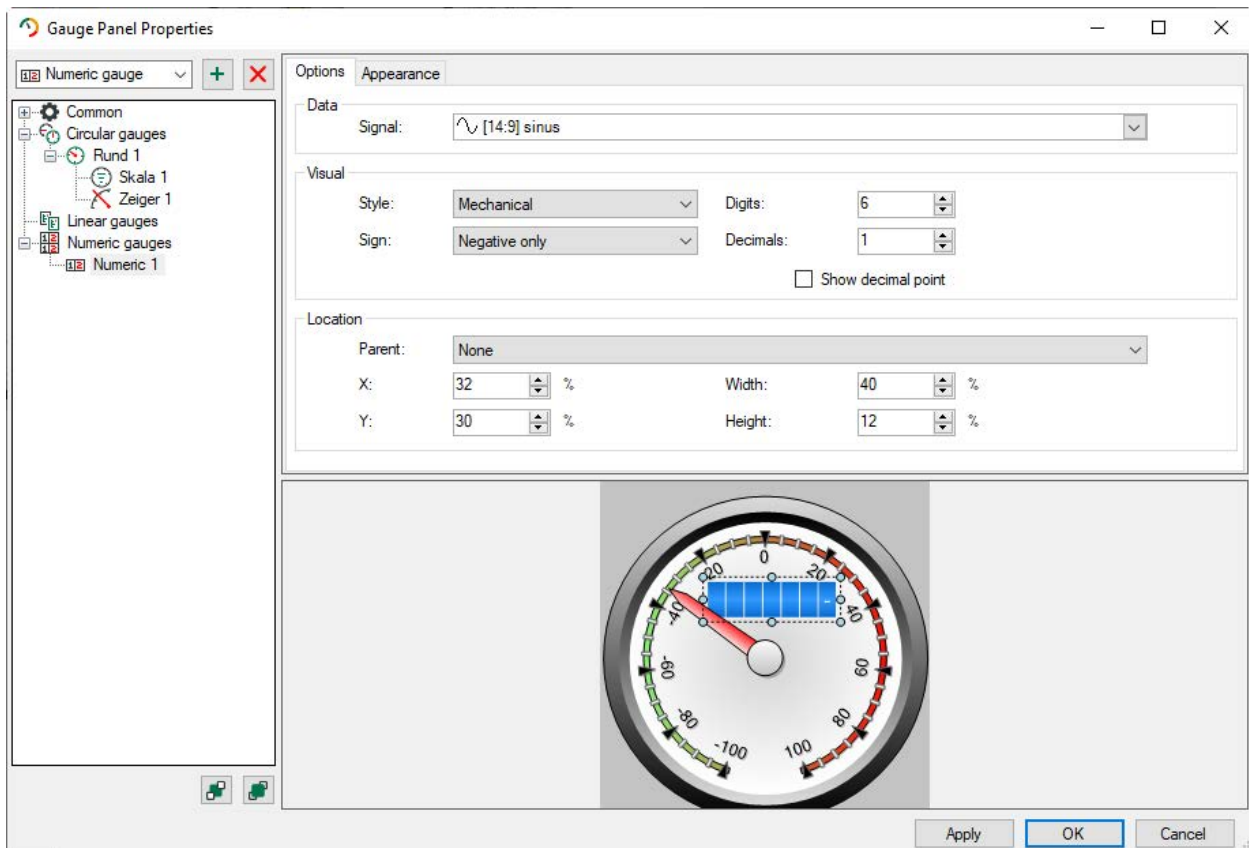
Options

You choose the signal which values shall be displayed in the range "Data". In the range "Visual", you can select different display styles, specify digits and decimals as well as indicate when the signs are displayed. In the range "Location" you define position and size of the numeric display. These information will be indicated in percentage and can refer to an already configured gauge. You can select this gauge with "Parent".
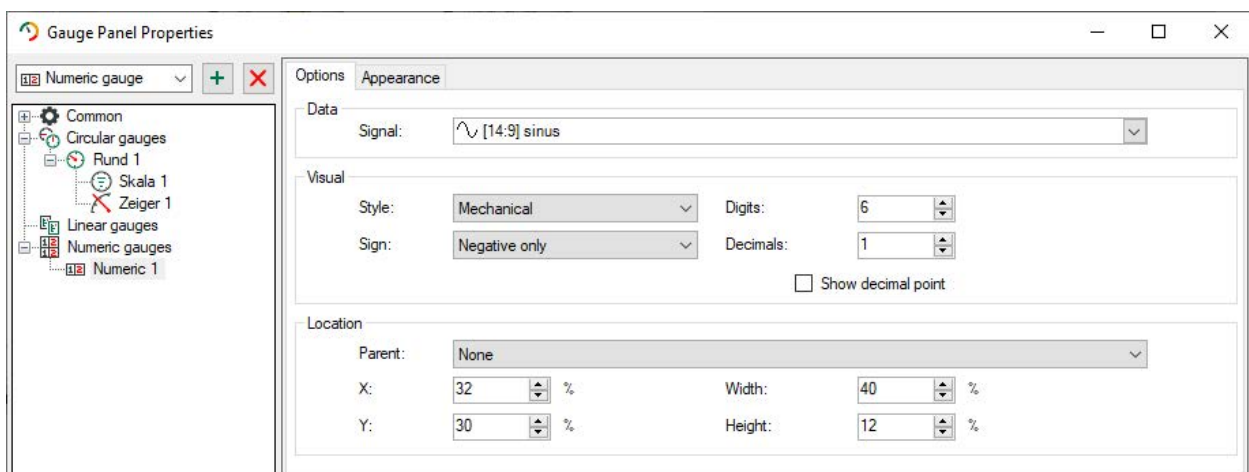
Appearance

In the dialog "Appearance", properties for the display of digits, separators, frame and background are defined.

5.2   Label

Function

The labels in ibaQPanel can display not only static but also dynamic texts. To display dynamic texts, use a measured signal or a text signal section. Date, time or system information can be displayed in the label. The update time determines how many times the label will be updated.

Configuration
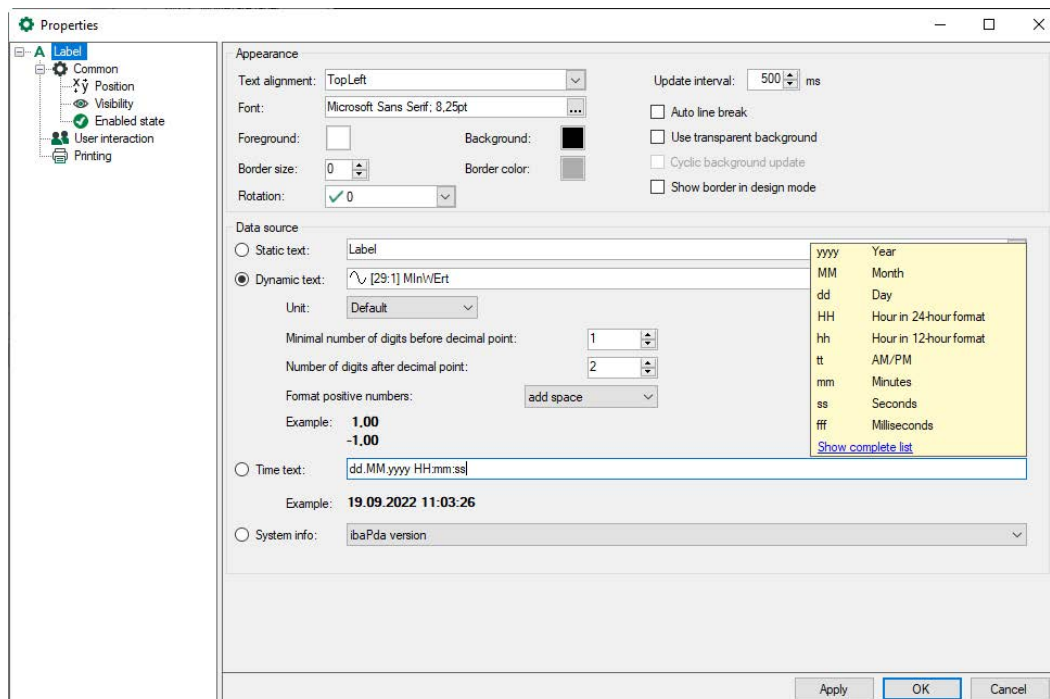
Appearance

Here you define the update interval, the color or transparency of the display as well as the font style and optionally a border.

If you do not define a border and the object is set to transparency, it can still be displayed in design mode to show where the button object is located. To do this, activate the option *Show border in design mode*.

The option *Cyclic background update* should only be activated if it is absolutely necessary that a moving/changing element in the background is updated cyclically. It requires a lot of computing performance. If this option is not activated, the background is frozen at the time of leaving the design mode.

Data source
Static text: Here, you can enter any text.

Dynamic text: The value of a selected signal is displayed. The signal will be chosen from the picklist of the option field. Furthermore, the format of the display, as pre-decimal digits or dec-

imals is determined. The default unit, or a custom one, can be displayed as the unit. You can enter a fixed text or control it dynamically with placeholders.
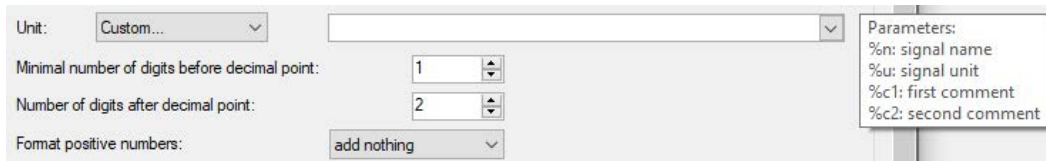
Unit:	Custom...	⌄		⌄	Parameters:
Minimal number of digits before decimal point:		1	⬍		%n: signal name
					%u: signal unit
Number of digits after decimal point:		2	⬍		%c1: first comment
					%c2: second comment
Format positive numbers:		add nothing	⌄		

After leaving the design mode, the signal can be placed from the signal tree to the text field via drag & drop.

Time text: If this option is enabled, date and time of the computer will be shown. The display can be formatted by the use of variables. The list of variables opens with a click on the time text field. If a connection to the internet is set, you reach via the link "Show complete list" a Microsoft page with a description for further user-defined formatting strings for date and time (from .NET Framework). Example: dddd = day as plain text, e.g. Monday. The result will be shown dynamically in the line below at "Example".

System info: Here, you can choose from various displays: *ibaPDA* version, connected *ibaPDA* server, connected *ibaPDA* user, connected ibaHD server, connected ibaHD user or local computer name.

5.3   Multi-state label

Function

The multi-state label in *ibaQPanel* can show different texts and colors dependent on the state of a digital or analog state signal. The state is defined as value range. It is possible to assign a static text or text signal section to each state.

Every multi-state label has at least two states:

- No channel state

- Default state

No-channel state remains when no signal state has been configured.

If a state signal is configured, but the current value of the signals cannot be assigned to any of the defined states in the multi-state text display, the default state will be displayed.

The following example shows (from left to right) the no-channel state, the default state and three configured states of multi-state text displays. The properties of the multi-state text display are outlined in the image below.
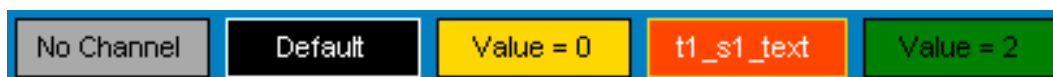
Configuration

You can add further states by clicking on the ✚ button.

Please note that the no-channel state is not available in the properties dialog. The signal can be assigned via the drop-down list of the field "Data Source". After leaving the design mode, the signal can be placed from the signal tree to the text field via drag & drop.
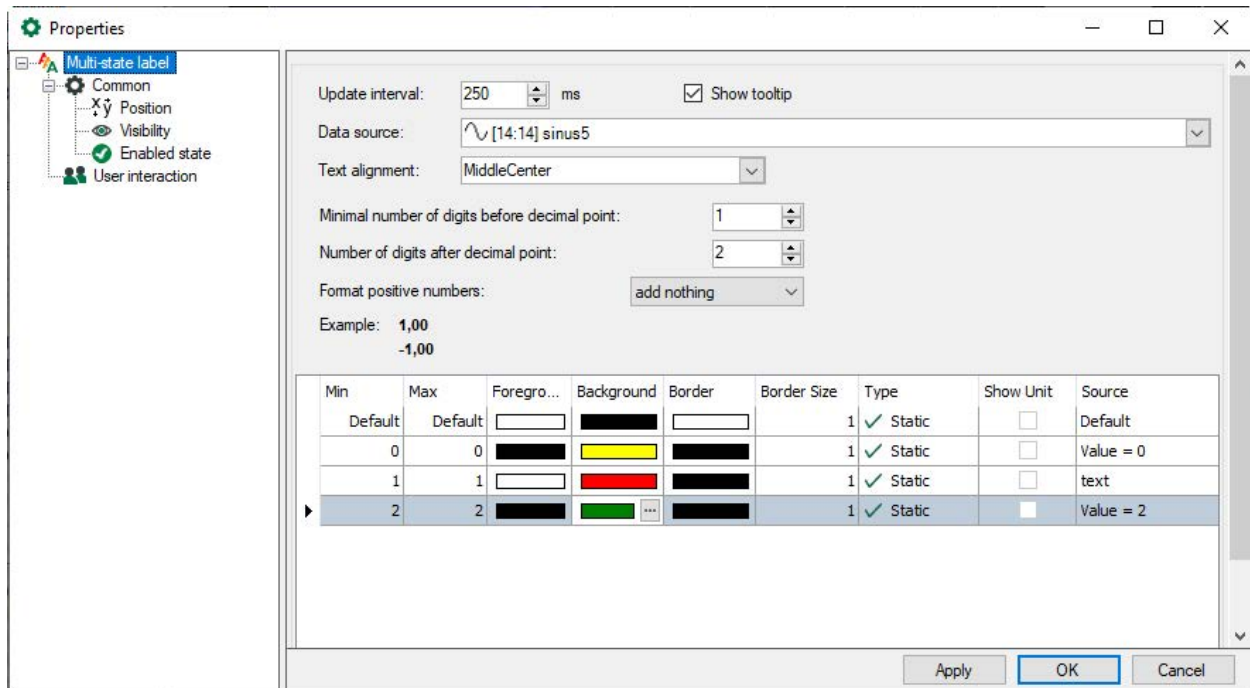
While a digital signal can only have 2 values (0 or 1), analog signals can control plenty of states depending on the value range and the granularity you want to obtain.

Each row in the table refers to a state and hence to a value or value range of the data source signal.

The "No channel" and "Default" states are mandatory and two states are preset for example.

You can add further states in the table by clicking on the ✚ button. You can delete a selected state from the table by clicking on the ✖ button. Use the arrow keys to move selected lines up or down.

By entering values in the "Min" and "Max" columns, you set the value or value range for the state.

For each state, you can configure foreground (text), background, border colors and border size.

For each state, you can select text type and text source. You have the choice between manually entered text or text from a signal.

- Text type = static: enter the text to be displayed on the label in the "Source" column.

- Text type = dynamic: If you select an analog signal in the "Source" column, the signal value is displayed. You can specify the number format with the parameters *Minimal number of digits before decimal point*, *Number of digits after decimal point* and *Format positive numbers*. Additionally the unit can be displayed.

    Alternatively, you can select a text signal that provides the text to be displayed.

The "Font" setting determines the font and text size of the label.

5.4   Multi-state picture

Function

The multi-state picture display enables the display of different pictures in dependence of a signal value. Like for the multi-state label display, you can define different value ranges of a measured signal and assign different pictures to them.

The pictures can be of any bitmap image type, like bmp, jpg, png, etc.

Configuration
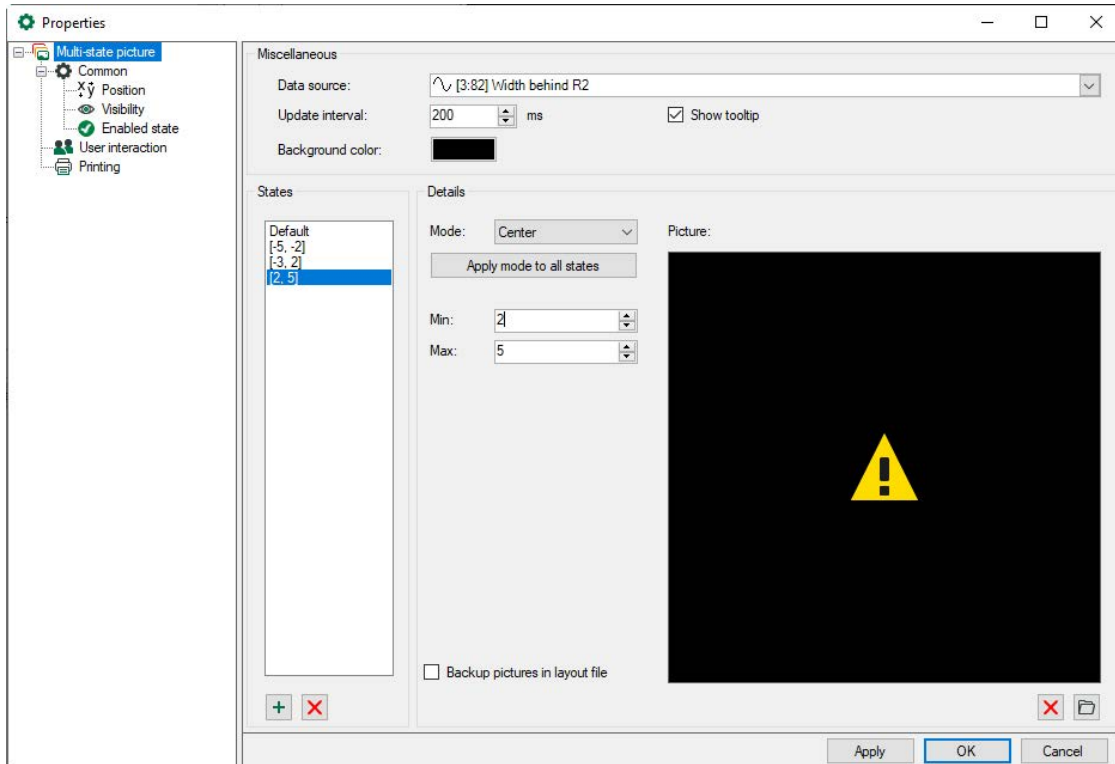
Miscellaneous

Here, you choose the signal as data source, the update interval, tooltip options and the background color.

States

In the "States" range of an object, you can add more states to the list by clicking on the **+** button. You can delete a selected state from the list by clicking on the **✕** button. An arbitrary number of states can be defined.

Details

By entering values in the "Min" and "Max" input fields, you set the value or value range for the state. This also identifies the state of the list. Besides the "Min" and "Max" values, each state can be assigned to a mode (picture display as with the element "Picture") and a picture. The mode can be applied by clicking on the button for all states.

You need to select a state in the list to configure it. Use the browser button in the lower right corner to select the picture file. The images are saved in the layout file if the option is enabled.

5.5   Numeric digital display

Function

The numeric digital display shows the actual value of an analog signal. Optionally, it can show the minimum and maximum values of a signal (resettable). It can also show a range bar showing the position of the current value between the minimum and maximum signal value. Minimum and maximum value as well as the range bar can be enabled or disabled in the context menu.
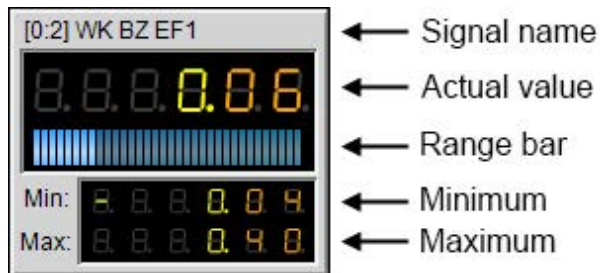
Configuration

In the preferences and properties of the *ibaQPanel* numeric display there are the same settings available like in the preferences for the normal digital numeric display.
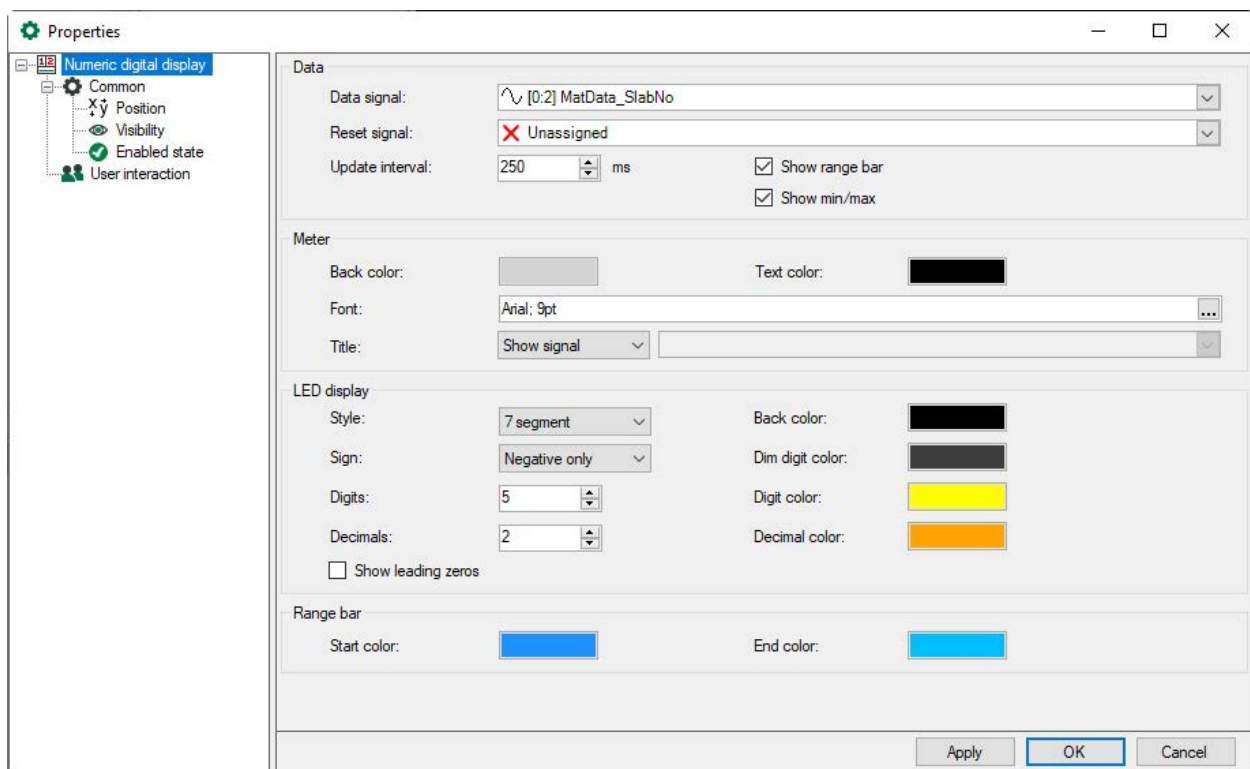
Data

Here you define the analog signal whose value is shown in the digital numeric display. You can select a digital signal as reset signal which resets the minimum and maximum value of the display. The update interval determines the update rate for the display. You can enable the display of the range bar as well as the display of minimum and maximum value of the signal.

Meter

Here you define the color and label of the frame. In addition to texts, custom combinations are also possible in the title, e.g., signal name and unit.

LED display

Here you define style and format of the value display. You can choose between a 7 or a 14 segment display, set the number of digits and decimal positions and select the colors.

With the option "Sign", you decide how to deal with positive/negative signs.

- Never: Neither "+" nor "−" are displayed

- Negative only: "+" is not displayed

- Always: Both "+" and "-" are displayed

Range bar

Set up the start color and end color of the range bar in order to get a color gradient e.g. from green to red.

Note

i	If a signal value exceeds the predefined number of digits, each digit in the display will be shown with an "E". In this case, the number of digits has to be enlarged manually. The number of digits will not be adjusted automatically.

5.6   Text digital display

Function

With the digital text display, texts from text channels and text signals can be displayed.

Configuration
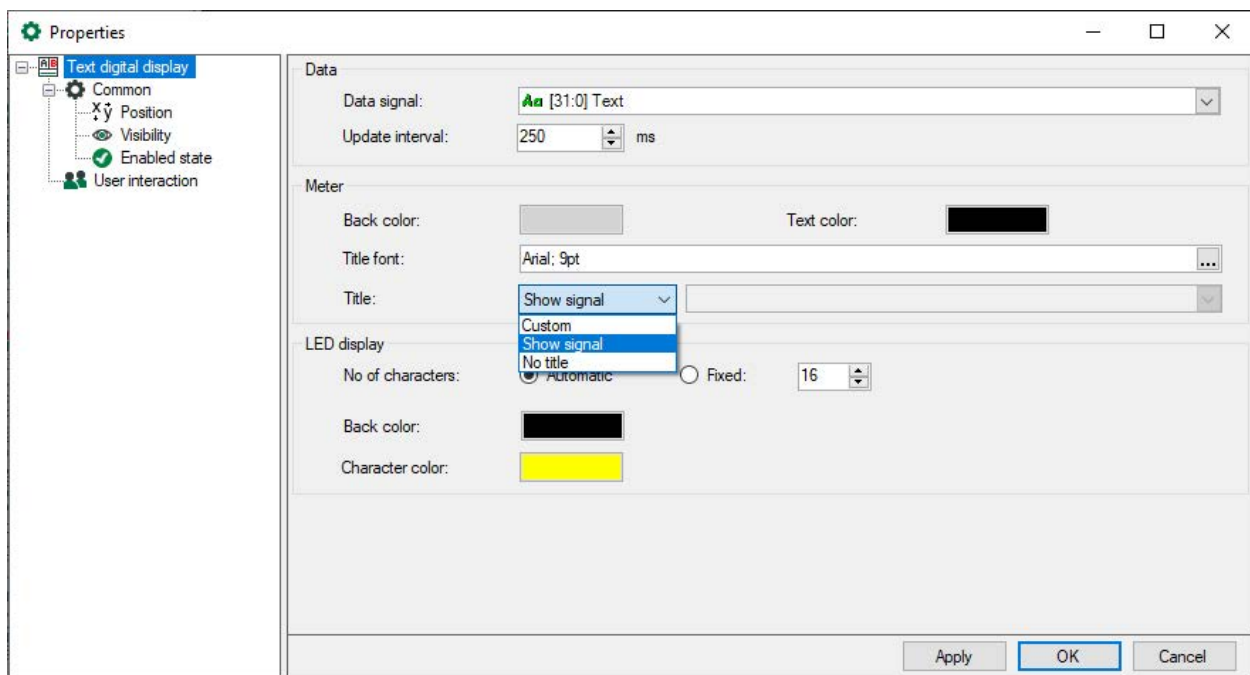
Data

Here you determine the text channel and the text signal whose text shall be displayed. The update interval determines the update rate for the display.

Meter

Here you define the color and label of the frame and the display of a title. This can be the signal name or a user defined text. You can enter a fixed text or control it dynamically using placeholders.

LED display

Here you define the color and length of the text display. You can define the length with a fixed number of characters. The length is adjusted to the displayed text with the setting "Automatic". The type size will also be automatically adjusted to the text displayed.

5.7   Button

Function
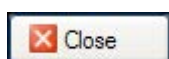
By means of this button, commands and functions can be executed.

Configuration

You can define text, font type, a graphic and the positions of the text and the graphic as well as mouseover behaviour.
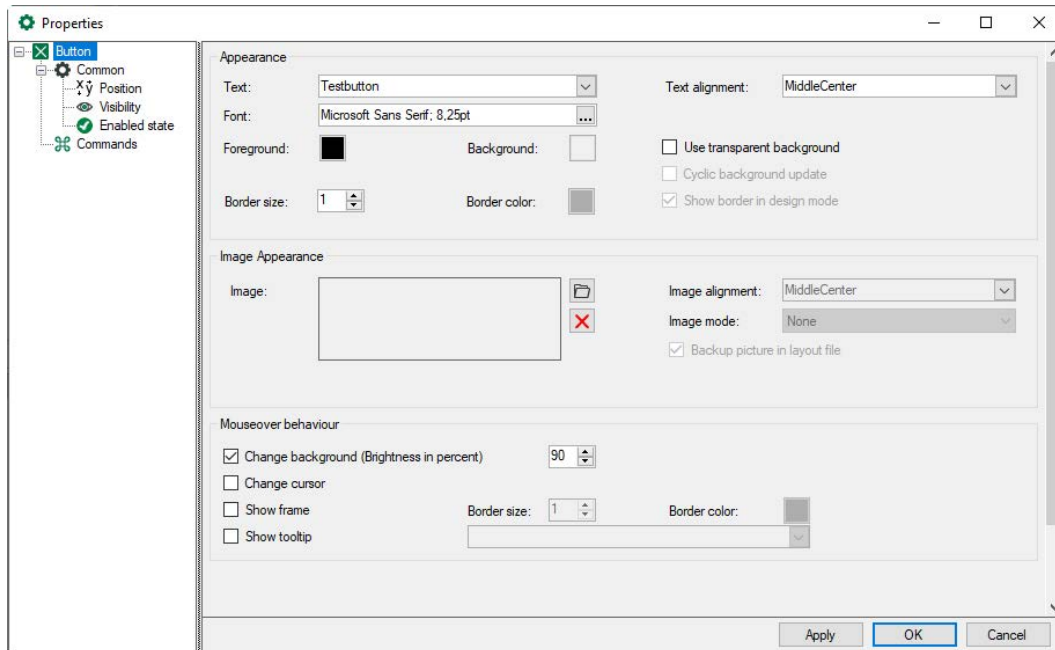
Appearance

In this section of the dialog, you design the button.

Enter the text which has to be displayed on the button, set the alignment and choose the font. You can select colors for the foreground, background and border and define a border size.

If you do not define a border, it can still be displayed in design mode to show where the button object is located. To do this, activate the option *Show border in design mode*.

The option *Cyclic background update* should only be activated if it is absolutely necessary that a moving/changing element in the background is updated cyclically. It requires a lot of computing performance. If this option is not activated, the background is frozen at the time of leaving the design mode.

In addition to or instead of a text, you can use an image (bitmap). Browse for the image file and set the image alignment within the button.

Several options are available for displaying the image under Image mode:

- Tile: Tile arrangement of the image in the object

- Center: the image is displayed in its original size in the center of the object

- Zoom: the image is fitted into the object in its original size ratios

- Stretch: the image is adapted to the object in height and widths

- None: the image is displayed in its original size

If the *Backup picture in layout file* option is activated, the image is saved in the layout.

You can specify a mouseover behaviour and select several of the possible options:

- Change background: set the desired brightness in percent

- Change cursor: Cursor is displayed as a hand symbol

- Show frame: specify border size and border color

- Show tooltip: enter the text to be displayed as tooltip

Commands

In this section, you can configure the command execution:
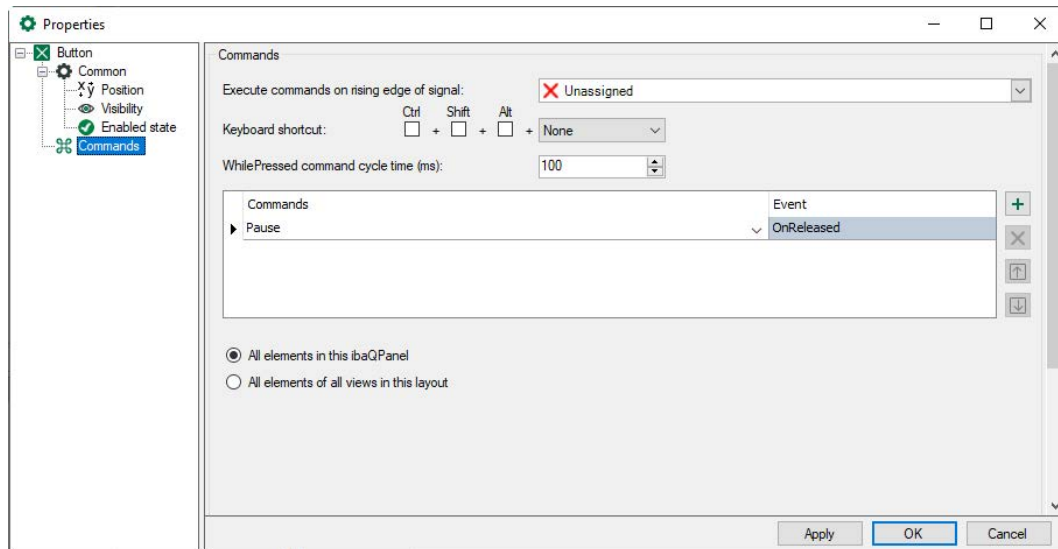
One or more commands can be executed by

- clicking the button or

- using a digital trigger signal (rising edge) or/and

- a keyboard shortcut (even functions when the button is not visible)

You can add additional commands in the table below by clicking on the ➕ button on the commands table. By clicking on the ❌ button the currently highlighted command will be deleted. The commands will be executed in the order in this table.

By clicking on the ➕ button, the "Pause" command is inserted by default. You can change the command by selecting the command line. Click on the arrow symbol on the right and choose from the drop-down menu the desired command. Via the command table, properties associated to the selected line will be shown and can be changed.

Depending on the command you choose, more inputs are required in the field below the table.

Commands of the QPanel button:

Command	Function	Additional configuration
Close	Close ibaPDA client.	None
Switch layout	Activate further layout	Select the layout for activation.

Command	Function	Additional configuration
Execute command line	Execute a command line, e.g. start ibaAnalyzer	Enter the command line. The command line can contain variables as well such as %TEMP%\ProcessClick.bat. Placeholders can be static values or signals.
Activate application	Execute any application on the computer	Enter application's executable like in a command line
Print	Print out the current screen (views)	Enter document title and/or enable "Print setup" dialog. By default the document title is left-aligned. If you want the document title to be centered, enter: ~[document title] If you want the document title to be right-aligned, enter: ~~[document title] (default: printing on standard printer)
Pulse digital signal	Set a digital signal on TRUE for a limited time	Select the digital signal. This digital signal requires a digital signal from a virtual module of the type *ibaQPanel* input.
Set signal value	Set a value	Select an analog signal and define the value or the signal whose value has to be transferred. The target signal requires an analog or digital signal of a virtual module of the type *ibaQPanel input*, or *ibaQPanel text input* for texts.
Trigger value input control	Saves a value on a target signal	The command controls the value input; select one or more of the available value input elements from the drop-down list.
Pause	Pause scrolling in all views	None
Start	Start scrolling in all views	None
Load layout from server	Open a dialog box with available user layouts	None

Command	Function	Additional configuration
Save layouts on server	Saves the current layout (C:\ProgramData\iba\ibaPDA\ layouts)	None
Open user management	Open dialog for user management	None
Connect to ibaPDA server	Connect to an ibaPDA server	Enter address and port of the ibaPDA server, and user credentials if necessary
Connect to ibaHD server	Connect to an ibaHD server	Enter address and port of the ibaHD server, and user credentials if necessary
Change language	Change language in ibaPDA and ibaQPanel	Select language in the drop-down menu
Activate design mode	Switches on the design mode	
Change window state	Changes the window size of the ibaPDA client	Possible options: normal, minimized, maximized
Change display style	Changes the display style	Possible options: normal Full Client: only the views are displayed in the ibaPDA client window Full Screen: the views in the ibaPDA client are displayed in full screen mode Full Client Top.: like Full client, but the window always remains in the foreground Full Screen All: the views in the ibaPDA client are displayed across all monitors
Log out from ibaPDA server	Logs off the client from the ibaPDA server	
Log out from ibaHD server	Logs off the client from the ibaHD server	

For every command, you can choose when it will be executed:

- When pressing the button (rising edge)

- While the button is pressed
  When setting signal values with this function, the result signal reverts to its most recent prior value when the button is released

- When releasing the button (falling edge)

Finally, you can determine if the button effects the display objects in this QPanel or if it effects all views in this layout.
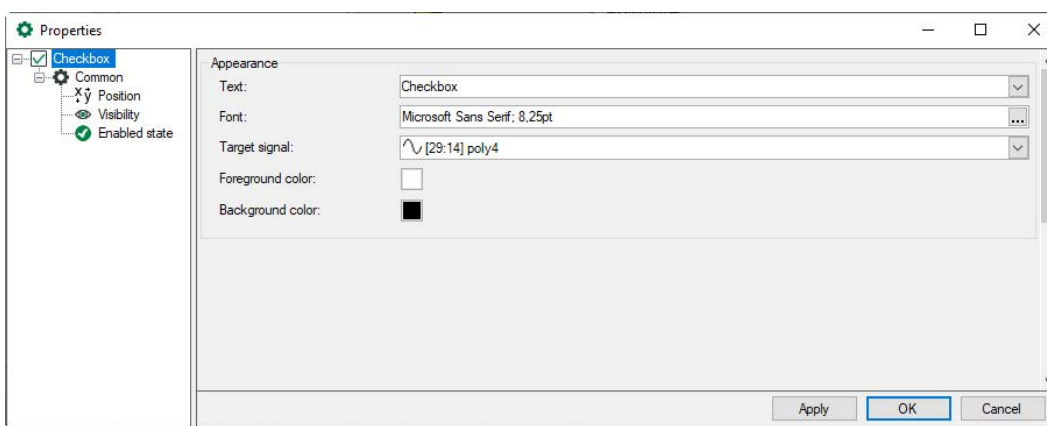
5.8   Checkbox

Function

With the checkbox, you can write two binary states to a writeable signal. If the checkbox is checked, a 1 will be written to the signal. If no state is selected, a 0 will be written to the signal. If a signal is adapted via several checkboxes, the status change of one checkbox will be displayed in the other checkboxes accordingly.

The target signal requires an analog or digital signal from a virtual module of the type *ibaQPanel input.* The *ibaQPanel input* module can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Configuration

Appearance

Enter here the text to be shown in the checkbox, and select the font type. For "Target signal", select the *ibaQPanel* target signal that you want to write to.

In addition, you can define the background and the foreground color (=text color).

Example:
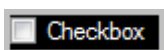
5.9   File scanner

Function

With the help of the file scanner, you can monitor a directory for new or changed files. The file found will be saved together with the whole path in a text signal. The search is not limited to DAT files, it can also be extended to other file formats. Moreover, you can define here, if the newest or second newest etc. file will be saved in the text signal. The text signal can then be used, for example, to display the file found in an offline trend graph or to display the name in a text field. For each file to be found you need to configure a separate file scanner.

The target signal requires a text signal from a virtual module of the type *ibaQPanel text input*. The module *ibaQPanel text input* can be found in the I/O Manager in the *Analytics* tab under the virtual module.

Configuration

The file scanner object will only be visible in the design mode and will be displayed with this symbol:
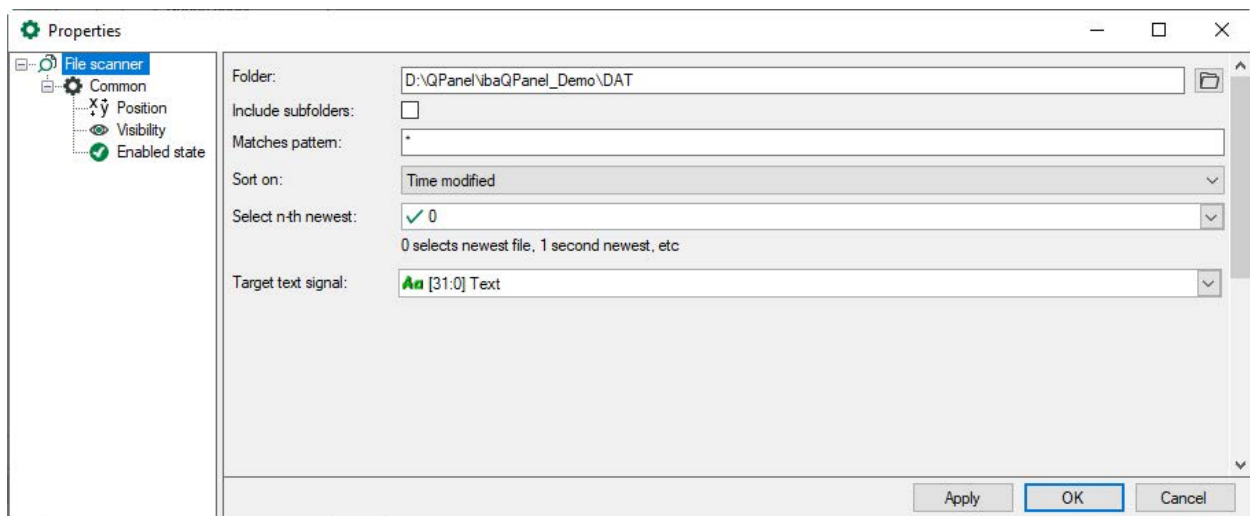
Via the browser button, select the folder you want to monitor. If subfolders are to be monitored, too, activate the "Include subfolders" option.

Specify a pattern the file name has to contain or a file ending. Placeholders, such as * and ? are also allowed.

The files can be sorted according to modification or creation date.

In the "Select n-th newest" field, you can define, whether the newest or second newest etc. file has to be selected.

- "0": selects the newest file
- "1": selects the second newest file, etc.

You can select the target text signal from the drop-down menu below.

Example: Displaying the three newest files in an offline trend graph

For every single file, you can configure file scanners that monitor a defined directory. In the first file scanner, enter "0" at "Select n-th newest" for the first file, in the second file scanner, enter "1" for the second newest file and in the third file scanner, enter "2" for the third newest file. For every file scanner, you need to define a separate text signal.

Create three offline trend graphs. In the offline trend graph properties dialog, select the "Monitor text signals" monitoring mode. In the related drop-down menu, select the text signal that contains the desired file path. Any time, the text signal is changed, the new file will be loaded.

By doing so, you can create several offline trend graphs, in which the newest, second newest etc. file will be loaded, and compare them then.
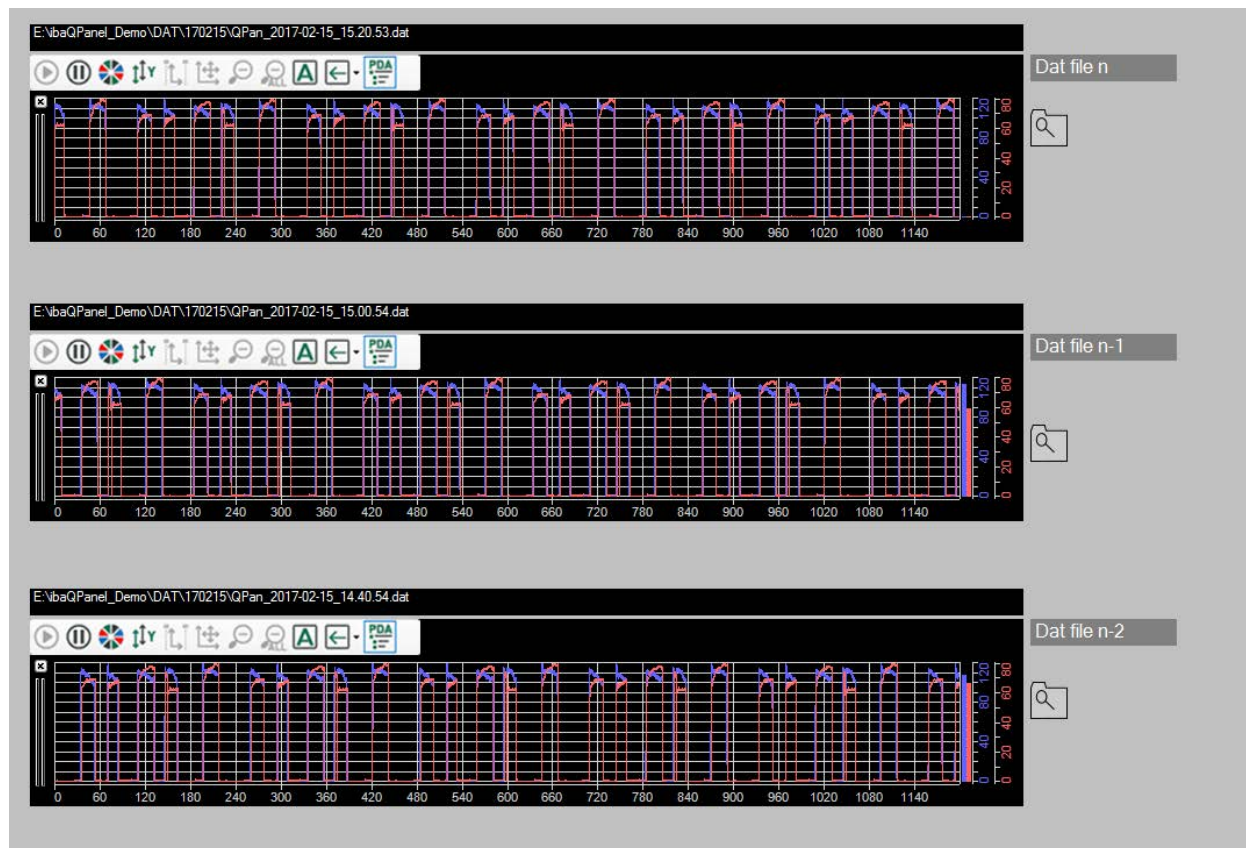
5.10   File selector

Function

The file selector object searches a directory for files using the name or the pattern in a file name. By doing so, you can search for specific file endings or parts of a file name. For example, this can be technological designations or date or time specifications. The files found will be displayed in a selection list, from which you can select a file. The selected file will be saved with its path in a text signal. The text signal can then be used, for example, to display the file in an offline trend graph, to display the name in a text field or to load image files into an image display.

The target signal requires a text signal from a virtual module of the type *ibaQPanel text input*. The module *ibaQPanel text input* can be found in the I/O Manager in the *Analytics* tab under the virtual module.

Configuration
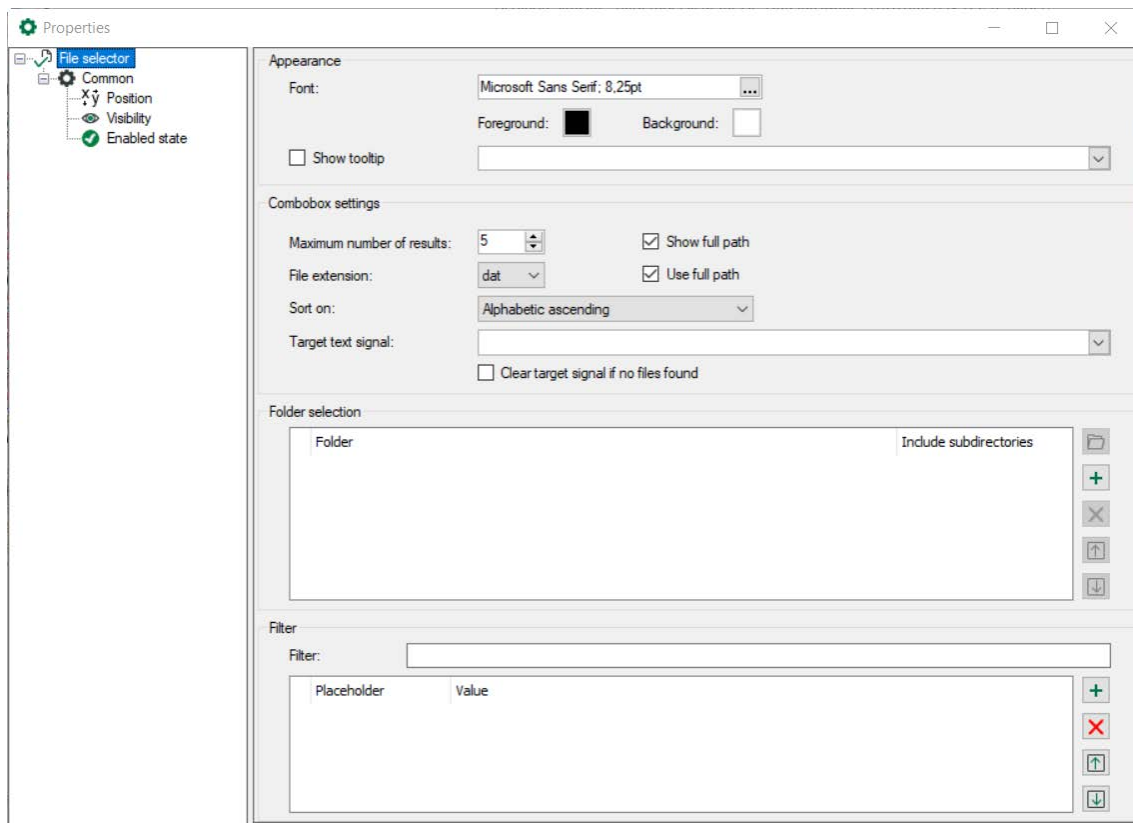
You can determine the number of visible search results. Further results are then accessible via scrollbars.

You can define whether the path should also be displayed in the selection list.

You can define whether the path is also entered in the target text signal.

It is possible to configure the sorting mode of the files in the *Sort on* drop-down menu:

■ alphabetically

■ by time created or

■ by last time modified.

Select the target text signal from the drop-down menu.

You can delete the target signal if no file was found. The target signal is then cleared.

In the *Folder selection* field, you specify the folders to be monitored. The operation can be done with the buttons to the right of the field. Use the browser button to select the folders. If sub-folders are to be monitored as well, activate the option *Include subdirectories*. Use the <+> button to add new folders. You can remove selected folders with <x> and change the order with the arrow keys.

However, instead of using the browser symbol, you can also select a text signal directly as a folder. This enables dynamic folder switching via a signal.

In the *Filter* field, enter a pattern that the file name should contain or a file extension. Wildcards such as * and ? and configured placeholders are also allowed. Placeholders are filled by text signals.

You can enter a combination of static text and placeholders, e.g. d:\{0}.{1}

The example means that the path D:\ is fixed. The file name is determined by placeholder {0} and the file extension by placeholder {1}.

You define placeholders in the field below. With the <+> button you add a placeholder. In the *Value* column you can define a fixed value or select the text signal that fills the placeholder from the drop-down menu. Use the <+> button to add new placeholders. You can remove marked placeholders with <x> and change the order with the arrow keys.

Example selection list
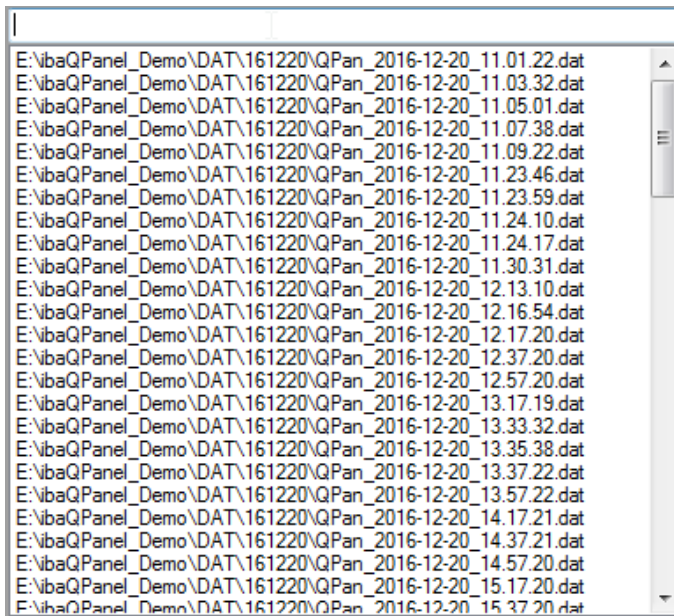
5.11   Input combobox

Function

With the input combobox, values from a drop-down list in text form can be selected and written on a signal.

The target signal requires an analog or digital signal from a virtual module of the type *ibaQPanel input* or of the type *ibaQPanel text input* for entering texts. The modules *ibaQPanel input* and *ibaQPanel text* input can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Note

The value must be unique. If several values are identical, the text of the first value found is displayed (search from top to bottom).
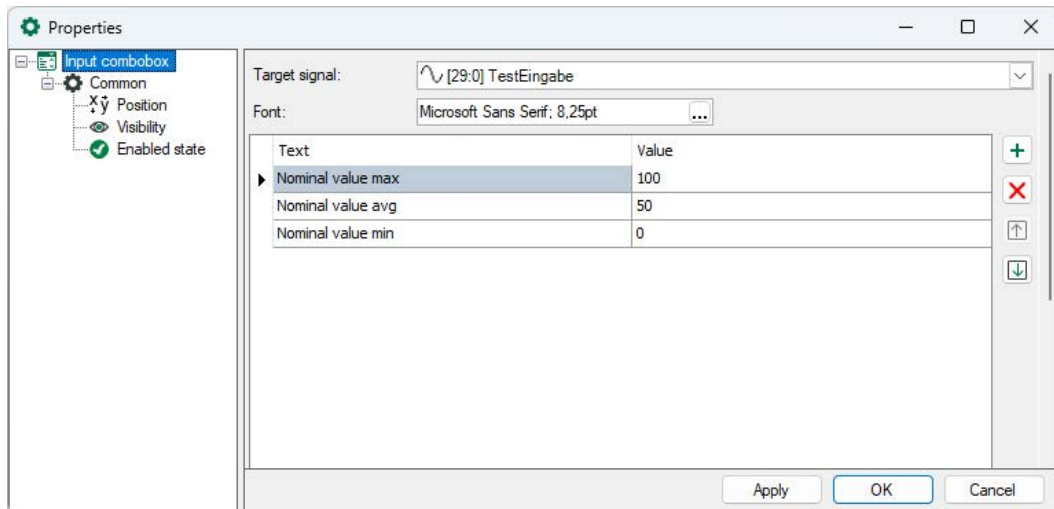
Configuration

Choose a target signal first. This can be:

- A text section of an *ibaQPanel text input* module

- An analog or digital signal of a virtual *ibaQPanel input* module

Both the text sections and the virtual *ibaQPanel* signals must have been configured in the I/O Manager before.

In the list below, you define the text which appears as plain-text in the drop-down list. By clicking on the button **+** you can add a new entry. Insert the text and the corresponding value. By clicking on the button **✕** you can delete the currently highlighted line. The order of the list can be changed via arrow buttons.

In the field "Font", you define font and character size of the display in the drop-down list.

5.12   Numeric up/down

Function

The object is used to enter numerical values on a writable signal. The value can be incremented or decremented by clicking the buttons or by scrolling with the mouse wheel. The value can also be entered manually.

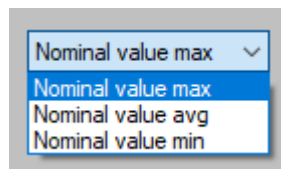The signal is updated immediately when changing the value. The longer a button is pressed, the faster the value increases or decreases.

The target signal requires an analog signal from a virtual module of the type *ibaQPanel input*. The *ibaQPanel input* module can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Configuration
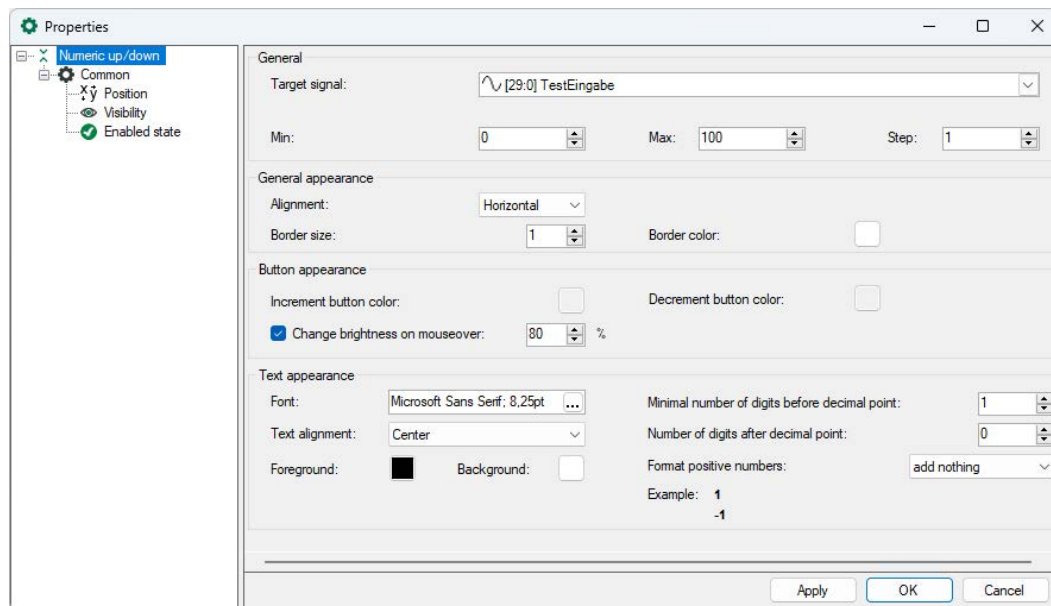
Target signal

Select the *ibaQPanel* input signal to be written to in the target signal field.

Min and *Max* define the limits of the signal value. Step defines the value used to increment or decrement the signal.

Please note that a step cannot be greater than the difference between *Min* and *Max*. *Min*, *Max* and *Step* must have the same number of decimal places. The value cannot exceed the limits (*Min* and *Max*). If a value exceeding the limits is entered, it will be reset to the respective bound.

Alignment

The alignment defines the position of the increment and decrement button.

Horizontal:

Vertical:

Border

Here you specify the size and color of the border. Border size 0 means no border.

Button appearance

Here you specify the color for the increment and decrement button. When you move the mouse over the button, the brightness can change. Enter the desired brightness in percent for the mouseover effect.

Text appearance

Here you define the font, size and alignment of the value display as well as the text and background color. Number of digits before and after decimal point and the format of positive numbers can be specified for the display of the signal value.

Precision

If you enter the values for minimum, maximum and step with decimal places, they should match the setting for text appearance. If the decimal places do not match, a message box appears.
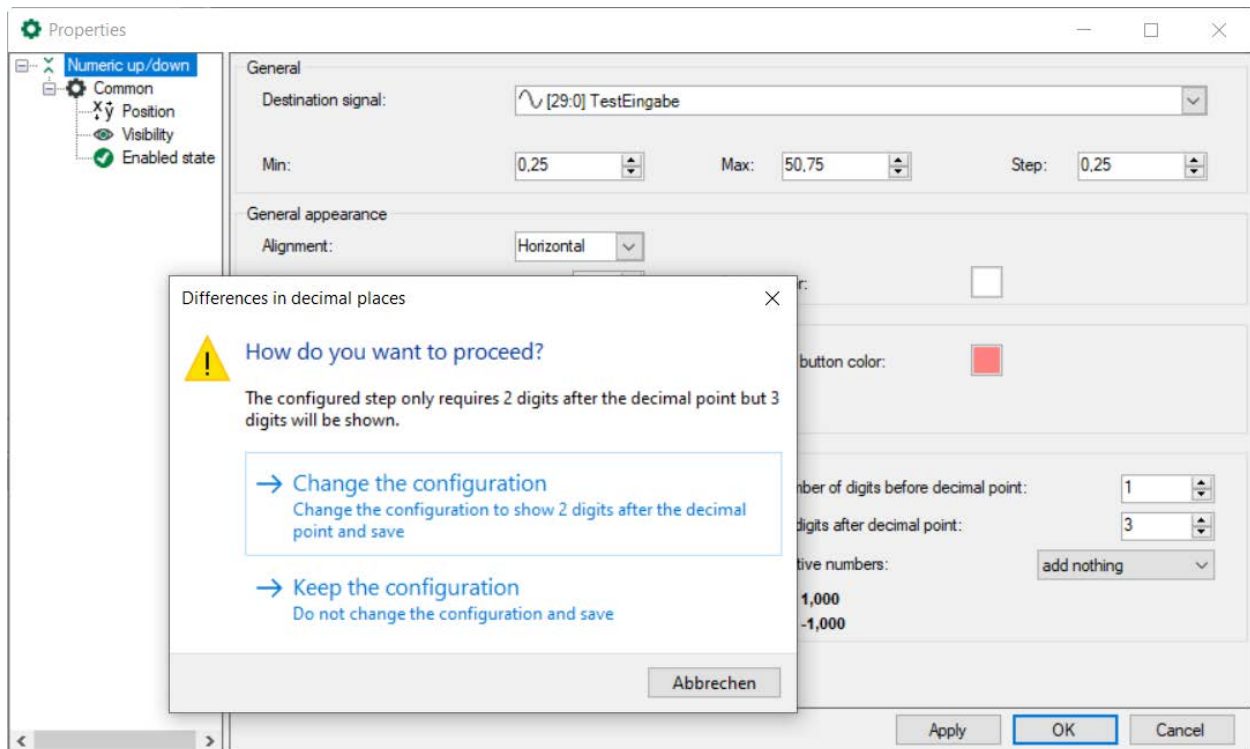
You can proceed as follows:

■ Change the configuration: This option will adjust the number of digits after decimal point to the decimal places used in the step field (in the example: 2) and save it.

■ Keep the configuration: Settings at *Min*, *Max*, *Step* are not changed; the warning message is suppressed until the number of digits after the decimal point has been changed.

5.13   Radio button strip

Function

With the radio button strip, you can write a signal value to a writeable signal. You can define several options with different signal values. By selecting one of the radio buttons, you can activate it and the corresponding value will be written to the target signal.

The target signal requires an analog or digital signal from a virtual module of the type *ibaQPanel input* or of the type *ibaQPanel text input* for entering texts. The modules *ibaQPanel input* and *ibaQPanel text* input can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Note

 The value must be unique. If several values are identical, the text of the first value found is displayed (search from top to bottom).

Configuration
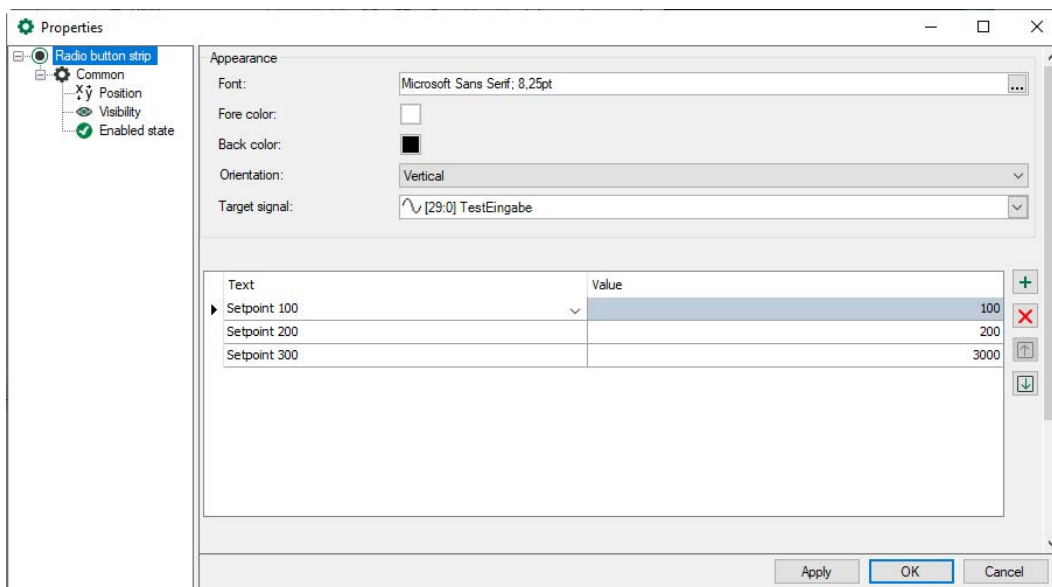
Appearance

You can select here the font type of the displayed text as well as the background and the foreground color (= text color). With "Orientation", you can define, whether the radio buttons should be arranged vertically or horizontally. For "Target signal", select the *ibaQPanel* entry signal that you want to write to. In the table, you can define the displayed text and the related value. The buttons on the right facilitate the editing of the list:

|	
+	Inserts a new line
✕	Deletes the highlighted line
↑ ↓	Shifts the marked line to the top or the bottom

Example

5.14   Slider

Function

The slider is used to write a signal value to a writeable signal. The value can be selected by simply dragging a slider.

The target signal requires an analog or digital signal from a virtual module of the type *ibaQPanel input.* The *ibaQPanel input* module can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Configuration
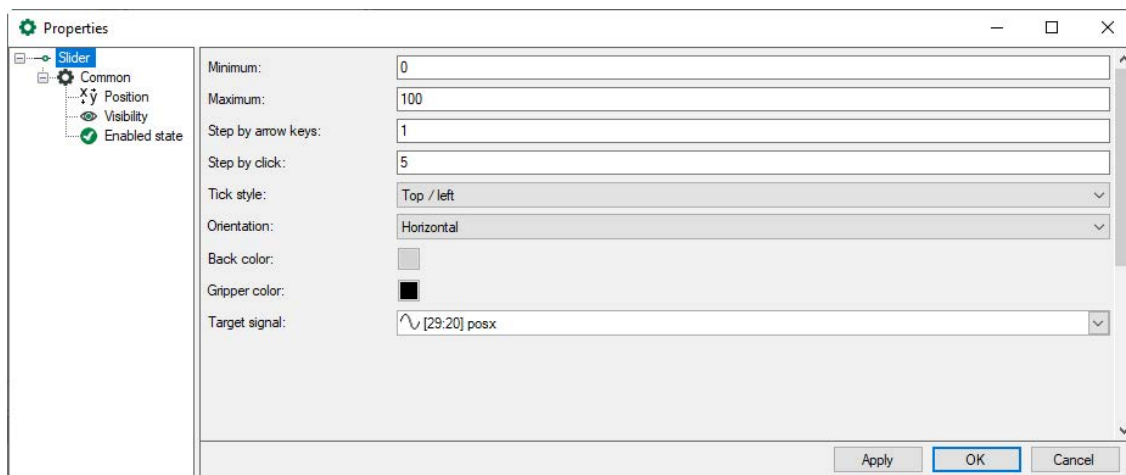
The *Minimum* and *Maximum* values define the value range of the slider.

You can move the gripper with the mouse button pressed, or via the arrow keys or single mouse clicks. You can define the respective increment in the two fields *Step by arrow key*s and *Step by click*.

You can orient the slider horizontally or vertically. Accordingly, the scale can be arranged bottom/right or top/left.

The background color and the color of the gripper can be freely selected with the color editor.

The ibaQPanel input signal to be written is selected under *Target signal*.

5.15   Switch

Function

With the switch, you can write two binary states (ON/OFF) to a writeable signal. The states can be visualized by different images.
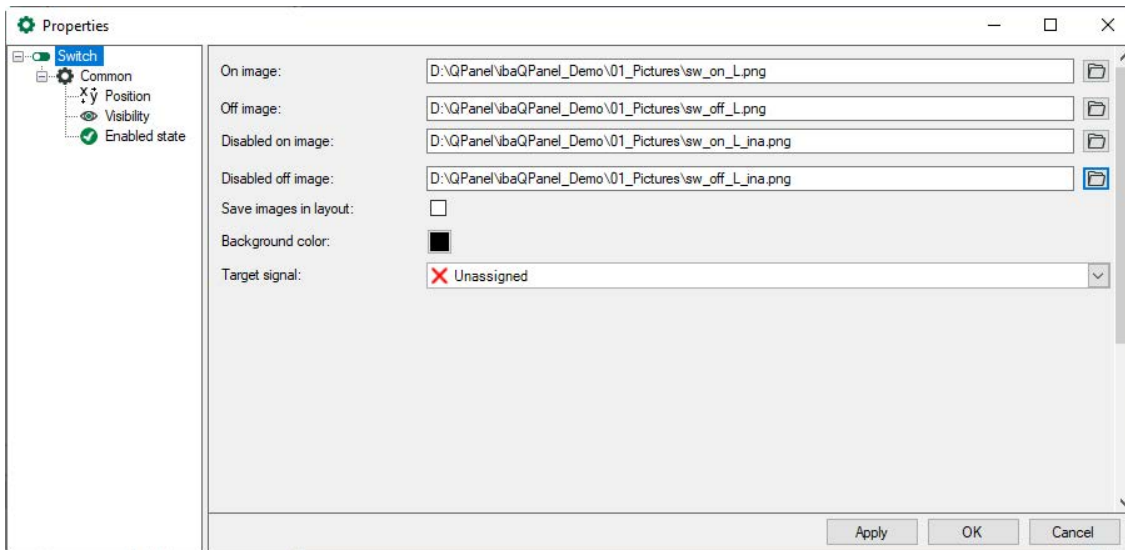
The target signal requires an analog or digital signal from a virtual module of the type *ibaQPanel input.* The *ibaQPanel input* module can be found in the I/O Manager in the *Analytics* tab under the virtual modules.

Configuration

Internal default images are used for the ON and OFF switch states. These are replaced when own images are selected.

If a switch is deactivated, the states disabled ON and disabled OFF can be visualized by separate images, too.

For every state, you can select an image file from the file browser. The images can have any bitmap image format, such as bmp, jpg, png, etc. The background color is valid for all states. Select the *ibaQPanel* input signal you want to write to at target signal.
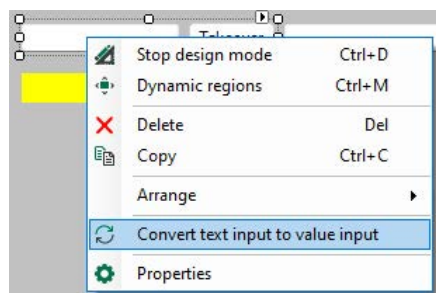
5.16 Value input

Function

The value input control is intended for manual text input or numerical values which are written on a signal. To do this, a virtual signal of the type ibaQPanel input or ibaQPanel text input is required, which can be defined in the I/O manager of *ibaPDA*.

The virtual signals can be found in the I/O Manager in the Analytics tab. The ibaQPanel input module offers analog and digital signals for the input or output of numerical values, the ibaQPanel text input module is used for texts. Changes of the values can be applied with a button.

**Converting text input controls to value input controls**

The value input replaces the text input. If you have previously used text input, you can convert these into value input. In design mode, open the context menu of the text input and select *Convert text input to value input*.

All settings of the text input are taken over into the value input, as well as the position and the size of the text input control.

Configuration

If you drag a value input onto the panel, it is without a button by default. You can add the button by opening the context menu and selecting *Add apply button*.
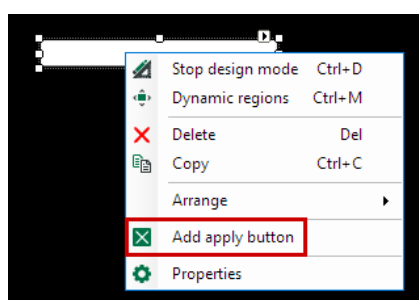
The *Apply* button is placed next to the input field. You can apply pending changes with one click.

It is also possible to select several value inputs at once. In this case, the *Apply* button is added to each selected element.

Button configuration

To control the value input, the *Trigger value input control* command is available for the button. The command is selected by default and a list appears with all available value inputs of the current *ibaQPanel*. One or more entries can be selected in the drop-down list. If you click on the button, each selected value input is triggered and the pending changes are saved.

See also chapter ↗ *Button*, page 64.

Multiline display

If you change the size of the value input, a multi-line display is possible. A vertical scroll bar is automatically added if the text exceeds the height.
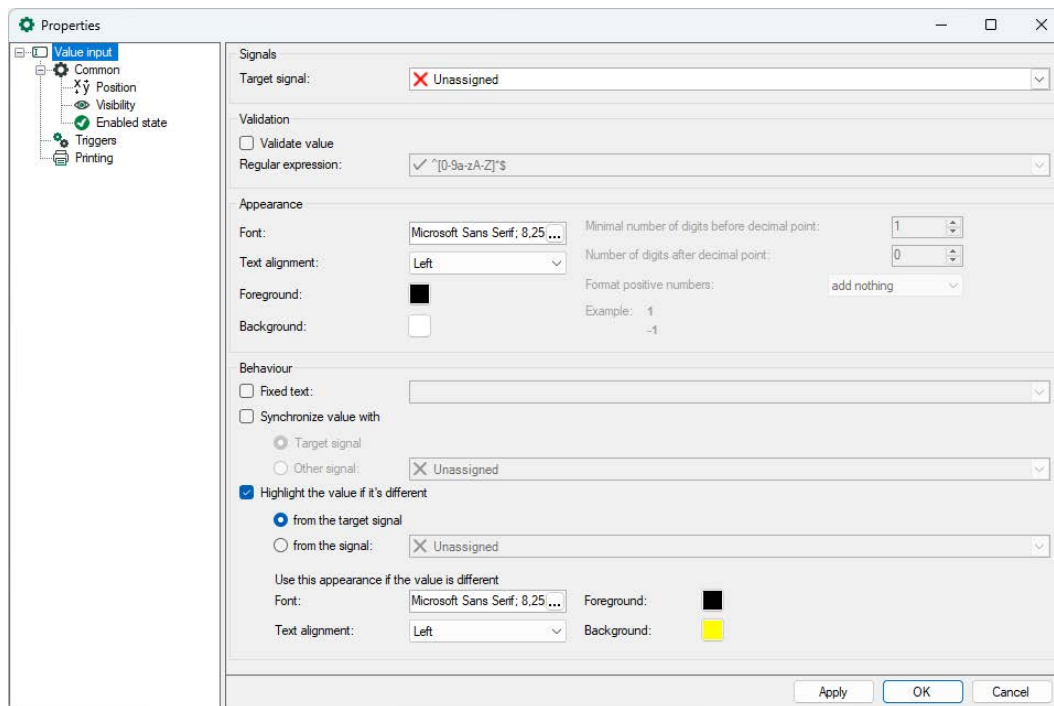

Note

i	Press the <RETURN> key to apply the current value.
	To enter a new line, use <CTRL> + <RETURN> or <SHIFT> + <RETURN>.

5.16.1   Properties

Target signal

First, a target signal should be selected. This can either be an *ibaQPanel input* or an *ibaQPanel text input*. The value is applied with the <Enter> key, the <Apply> button or with a trigger signal and is then saved in the target signal.

Validation

With the *Validate value* option, the value can be validated using a regular expression to ensure that the text only contains defined, valid characters. The text is compared with the regular expression pattern. The regular expression can also be specified in the client preferences. Select the menu *Configuration - Client preferences* in the *ibaPDA* client. The regular expression can be a static text or a a text signal.

■ Static text as pattern

Enter a static text in the *Regular expression* field. By default the pattern ^[0-9a-zA-Z]*$ is predefined. It allows any characters from a-z, A-Z and 0-9, special characters are not allowed. When the pattern is changed, an icon and the tooltip at the end indicate whether the entered pattern is valid. If the pattern is invalid, the icon changes and the tooltip informs about the error.

■ Text signal as pattern

The signal contains the pattern used to validate the text. This is especially useful if the pattern has to be changed dynamically.

Note

You can find examples of regular expressions and patterns as well as test tools on the Internet under the term *RegEx* or *regular expression*.

Appearance

The font, alignment and colors can be set for the display of text in the text box. Number of digits before and after the decimal point and the format of positive numbers can be specified for the display of numerical values.

Behaviour

Fixed text:

If *fixed text* is activated, the value input control is read only and cannot be modified. The text defined here is written to the target signal.

Synchronize value with

This option allows the value input control to synchronize the current value with either the target or a selected signal. This way, the value input control is always updated with the latest value of the selected source.

If there's a pending change, e.g the value input control is focused or the value has been changed without applying it, the value will not be synchronized to prevent overwriting the user's changes.

Highlight the value if it's different

This option allows you to change the display of the value if the value is different from either the target or a selected signal.

In both cases, the current value in the value input is compared with the target signal or the selected signal. The font, alignment and colors can be set for the appearance of the highlighted text.

5.16.2   Trigger

The value in the value input can be written to the target signal or reset using a trigger. Select the node in the properties dialog.
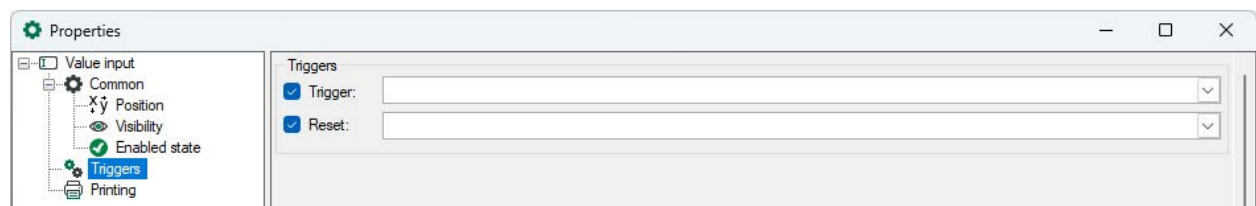
Trigger

Select a trigger signal from the drop-down list. The value is saved when a rising edge of the selected trigger signal is detected.

Reset

Select a reset signal from the drop-down list. If a rising edge of the reset signal is detected, pending changes are reset to the value of the target signal. If the synchronize value option is activated, the value is reset to the selected synchronization source.

## 5.17   Bar chart

Function

The bar chart in *ibaQPanel* is flexible to use. The flatness profile of a strip rolled in a rolling mill can be visualized with this display for example.
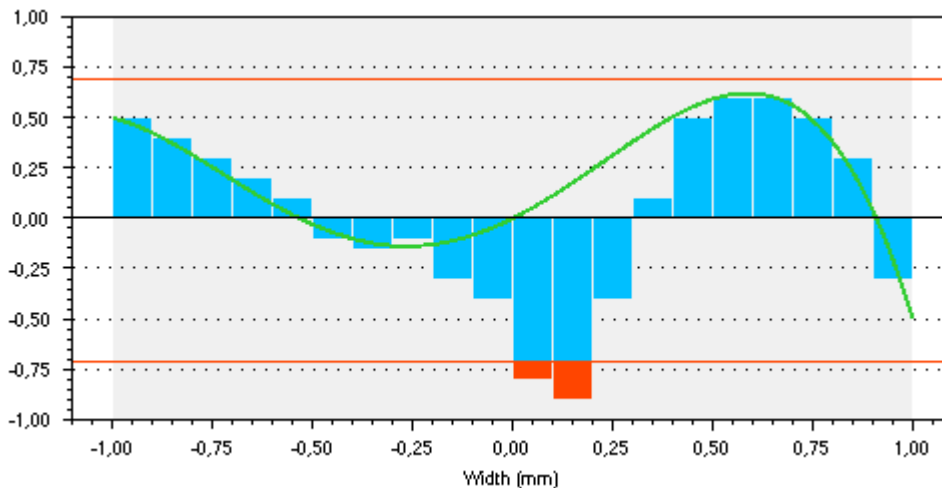
In this example, every bar represents the rotating pressure sensor of a flatness measuring roll when a strip is rolled over. Both of the red horizontal lines represent limit values. If a bar is beyond the limit values, the extending part of the bar will be displayed in the color of the limit. The green curve represents the calculated strip profile. It is a polynomial of the fourth order or single values. The range marked in gray complies with the measured bandwidth.

5.17.1   Appearance

The colors, orientation, style (bars, lines or dots), the number of bars, the title as well as the type size of the display can be configured. The update interval determines how often the display will be updated.
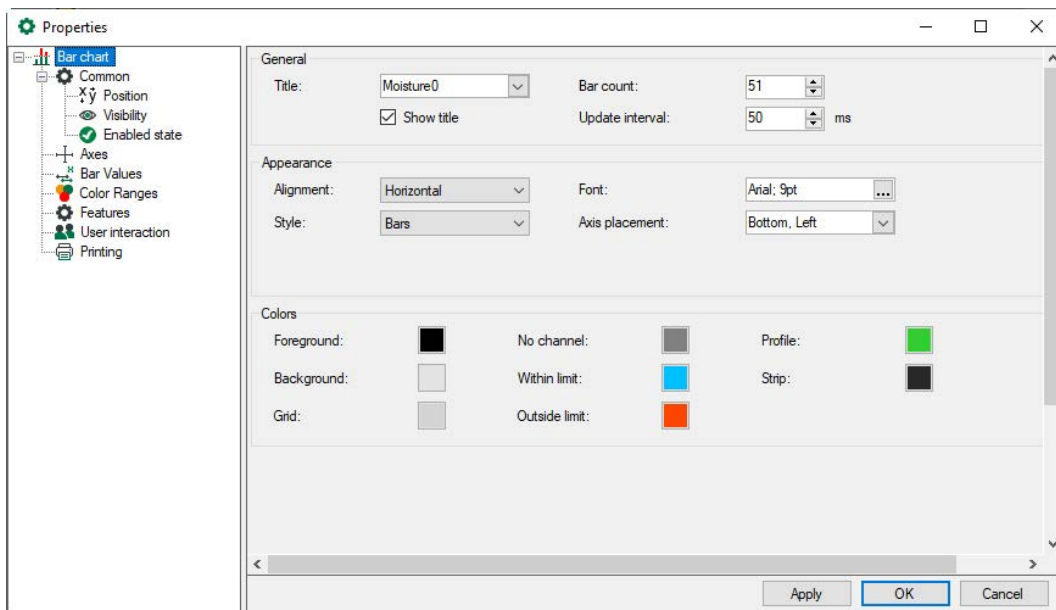
5.17.2   Axes

The x-coordinate and the value axis can be arranged horizontally or vertically depending on the orientation of the display. You can assign a name and a unit to both. For both axes, the major and minor ticks shall be configured.

Flipping a horizontal axis means that the smallest value will be positioned on the right side and the highest value on the left side. Flipping a vertical axis means that the smallest value will be displayed on top and the highest value at the bottom.
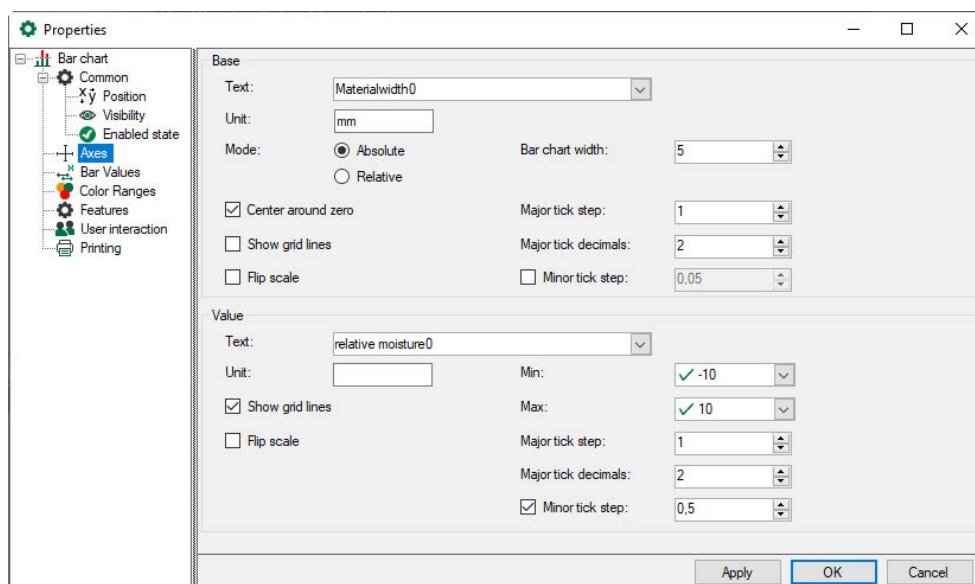
Two modes are available for the base axis:

▪ Absolute
  This mode was especially developed for technological cross profile displays in the steel industry, such as flatness profiles, strip tension profiles or temperature profiles.
 You can set up the rolling mill width (= width of bar graph) and values for major and minor

tick marks on the axis given in the unit specified in the corresponding entry field (mm, cm, etc.). The number of bars as specified in the "Bar chart" dialog is distributed over the base axis. The width of the bars itself can be adjusted in the "Bar Values" dialog in the properties tree.

▪ Relative
This mode should be used if no metrical relation is required on the base axis, e.g. for a filling degree display. The number of bars as specified in the "Bar chart" dialog is always distributed over the entire base axis. In this mode, you can only specify the axis title and the major ticks.

For the base axis (x-coordinate), the bar width has to be specified. With enabling the option "Center around zero," the bars will be placed symmetrically to a zero point in the middle; not only on the negative side, but also on the positive side. If this option is not enabled, the bars will be assigned in positive ranges only, as displayed in the following image.
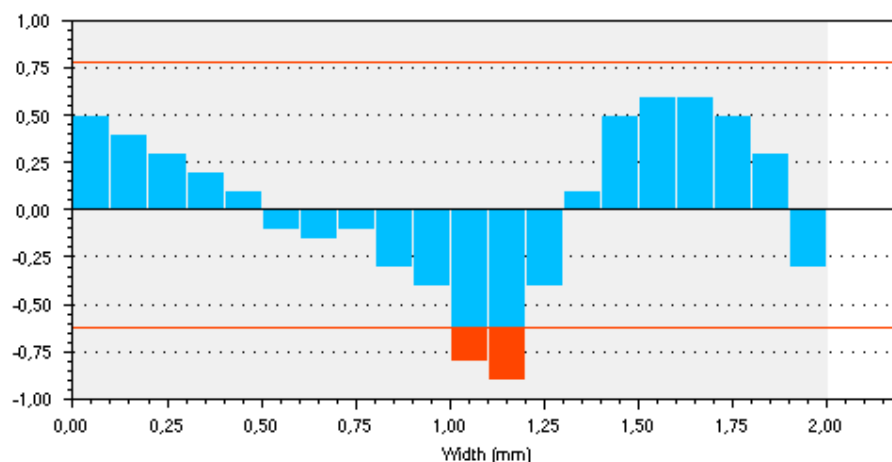
5.17.3   Bar values

The signal assignment to each element in the bar display can be done in the dialog "Bar values" of the display settings.
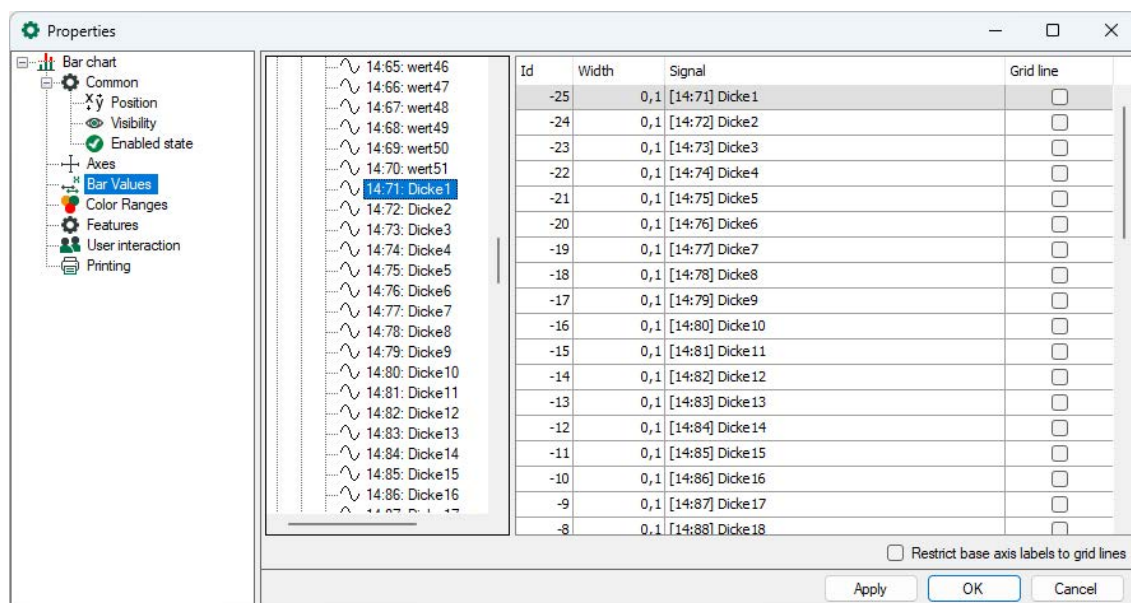
Id
Complies with the position on the base axis

Width
Bar width

Signal
Bar value (signal that controls the bar value). You can drag and drop the signals from the signal tree into the signal column. Multiple selection is also possible.

Grid line
Displays vertical grid lines (This column is only shown in relative mode of the axis.)

Restrict base axis labels to grid line
If this option is enabled, the base axis value on the gridline is shown. If no gridline is chosen, no base axis value is displayed. (This column is only shown in relative mode of the axis.)

5.17.4   Color ranges

By configuring the color ranges, you can assign any color change to each bar depending on its value.

Each range has a minimum and maximum value, a normal color and a limit color displayed outside the limits.

A signal must be assigned to each bar. The signal value is used to determine the bar's colors with reference to the range settings. The Id column refers to the existing bars. Basically, the same signals as used for the bar values can be used again for the color ranges. Drag the signal to the desired line of the signal table or select the line of the desired bar and double-click on the suitable signal in the tree.

The individual assignment of signals enables you to determine for which bar the color range should apply or not.

However, you may assign other signals for controlling the color than the bar values. For instance, you can define a bar's color by a state or a fault signal instead of the bar value itself.

Make sure that the "Min range" and "Max range" values comply with the signal assigned in the color range mapping table.

If you leave a line empty, the corresponding bar will use the default colors.

If the value of a signal defined for color range control is outside the range, the bar will be displayed in default colors.

If you like to use limits and the corresponding limit colors, make sure the color range covers the entire signal value range, including values inside and outside the limits.

Example:
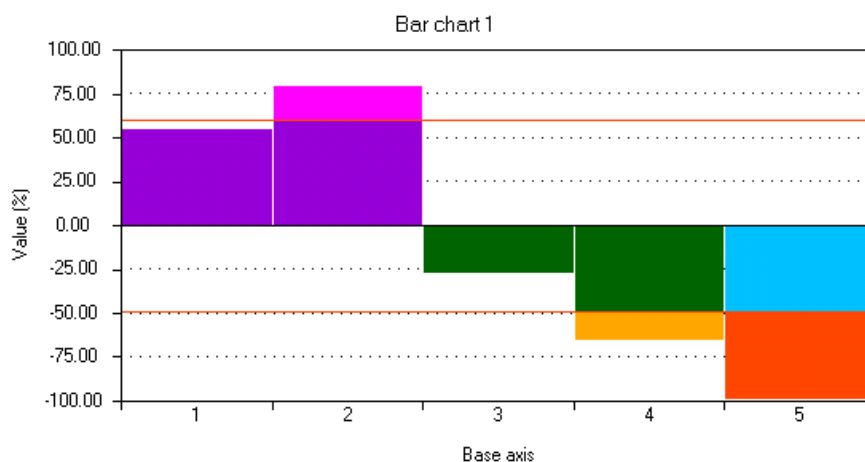
The chart above is the result of the following settings and values.

Color ranges:
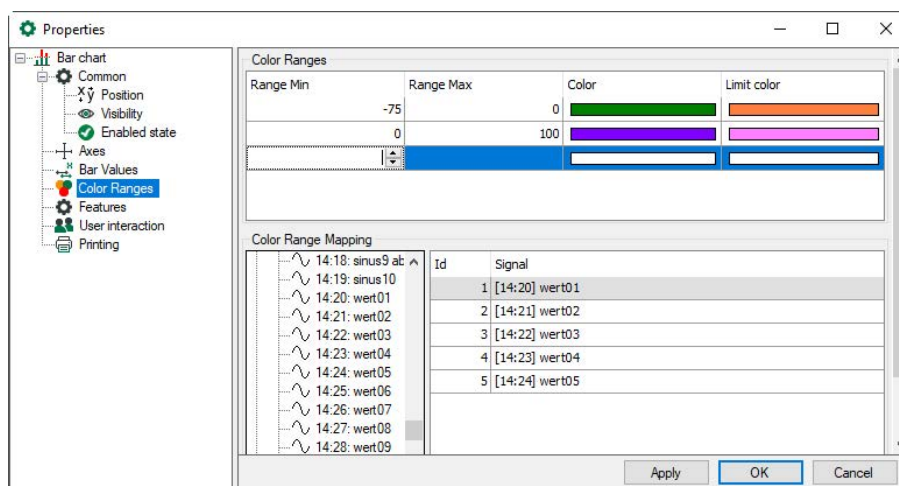
	Value	Mapped to color range	Comment
Lower limit	-50		Lower red horizontal line
Upper limit	60		Upper red horizontal line
Bar no. 1	55	Yes	In color range 0 – 100, inside limits
Bar no. 2	80	Yes	In color range 0 – 100, outside upper limit
Bar no. 3	-27	Yes	In color range 0 – -75, inside limits
Bar no. 4	-65	Yes	In color range 0 – -75, outside lower limit
Bar no. 5	-99	Yes	Out of color range, default colors

5.17.5   Features

For the bar chart, further functions can be enabled here: Limit values, bandwidth and profile coefficients.
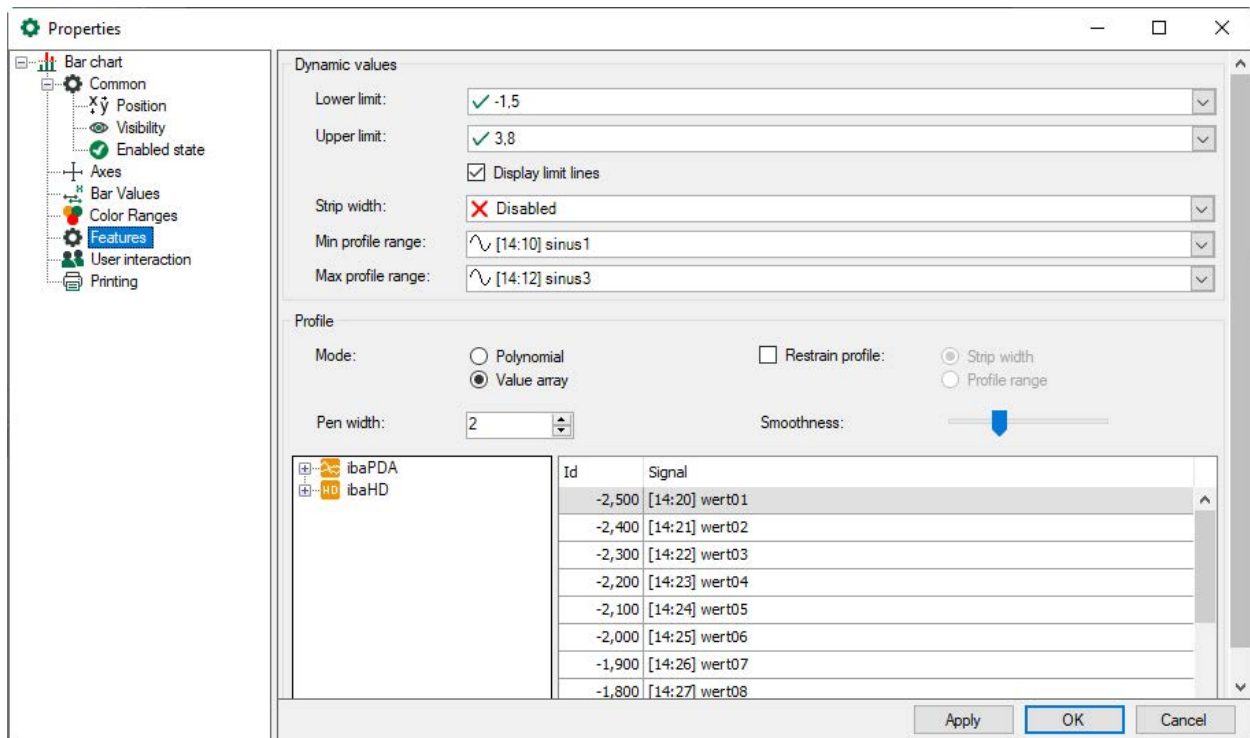
For the profile display, single polynomial coefficients or a value field (2D vector signal) can be used. The signal assignment for this is done easily by dragging the desired signal with the mouse from the adjacent signal tree to the corresponding line in the table. If no signal has been assigned to an object, it will not be displayed. Except for the bars which will always be displayed.

The signal values, which can be assigned to the profile curve, will be used as coefficients in a polynomial of the fourth order. If no signal is assigned, the corresponding coefficient is zero.

If the box "Display limit lines" is not enabled, no horizontal limit lines will be displayed. Nevertheless, the limits are enabled and the bars will be shown in a different color when exceeding the limit value, unless a corresponding signal was assigned to the limit values. If the profile curve is limited to the strip, the profile is only visible within the range of the strip width. With the value "Pen width" (in dots), the thickness of the profile curve is configured.
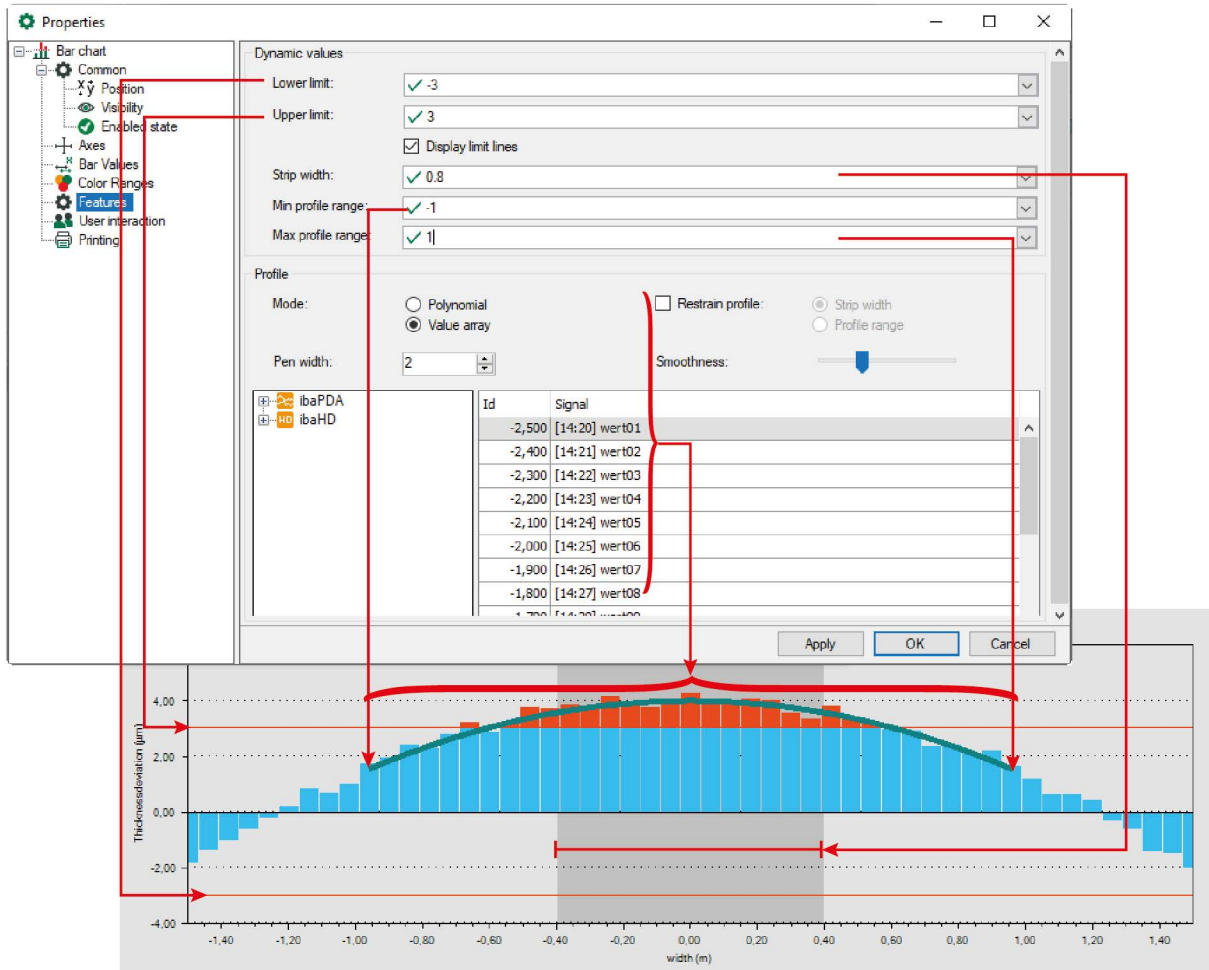
Another possibility to assign signals to a profile is the dragging of a valid signal (analog or vector signal) or a signal group from the signal tree in ibaPDA to the display object, as described in the following example. However, you have to leave the design mode first.

1. Bar chart as profile display - Signals were assigned to only the upper limit and the last bar.
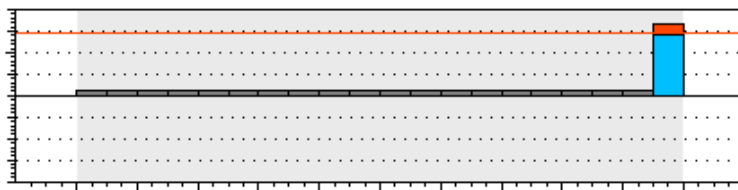

2. When dragging the mouse across the display, the bar size and profile, and the limits are becoming visible. The object underneath the mouse pointer will be highlighted. In this example, 5 analog signals, which were selected in the signal tree before, will be dragged onto the display.
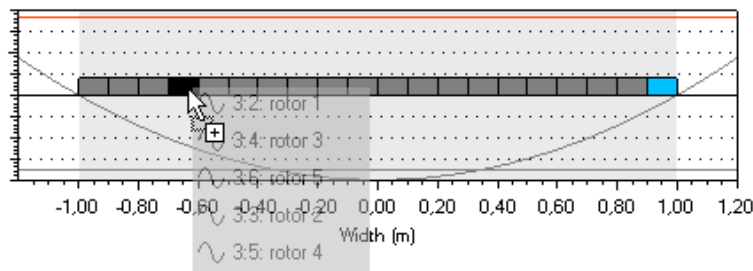
3. After the signals have been dropped, all five analog signals will be added progressively. If one or several vector signals are dragged onto the display, all bars are highlighted and the first vector signal will be assigned to the bar.
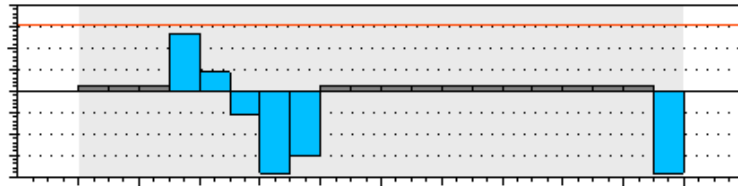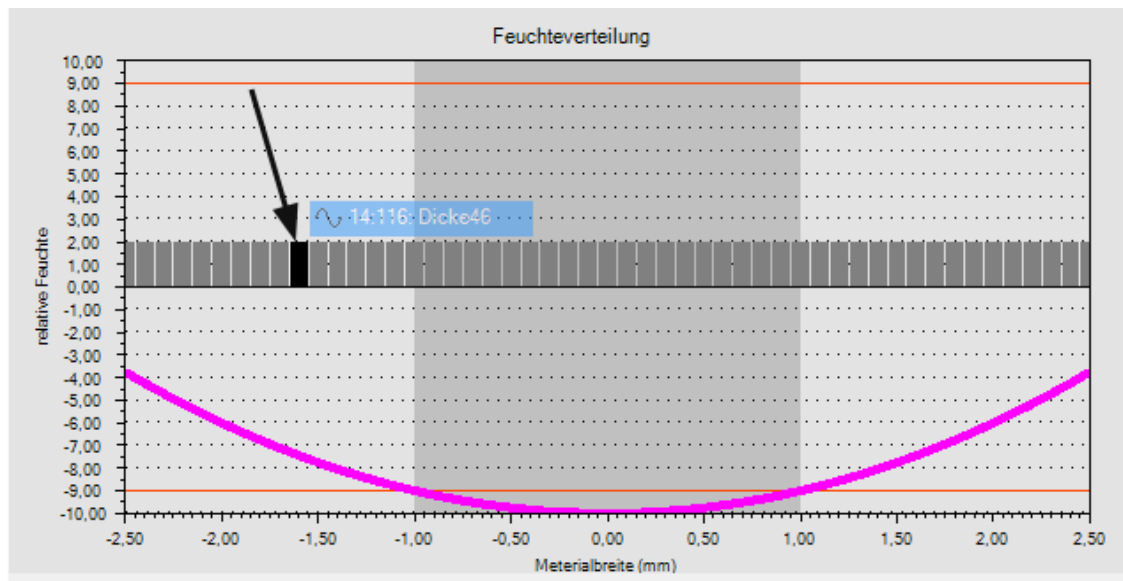

4. A signal can be removed by right clicking on the desired element. This is even possible in the signal table of the properties.
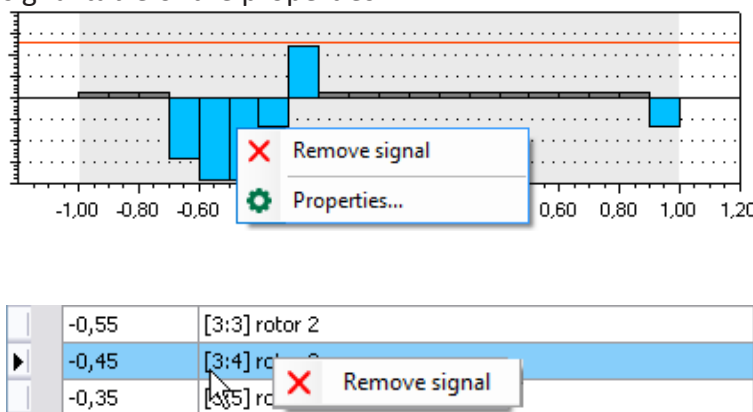
5. Besides the single bars, a signal from the signal tree can also be assigned to limit lines and profiles via drag & drop.
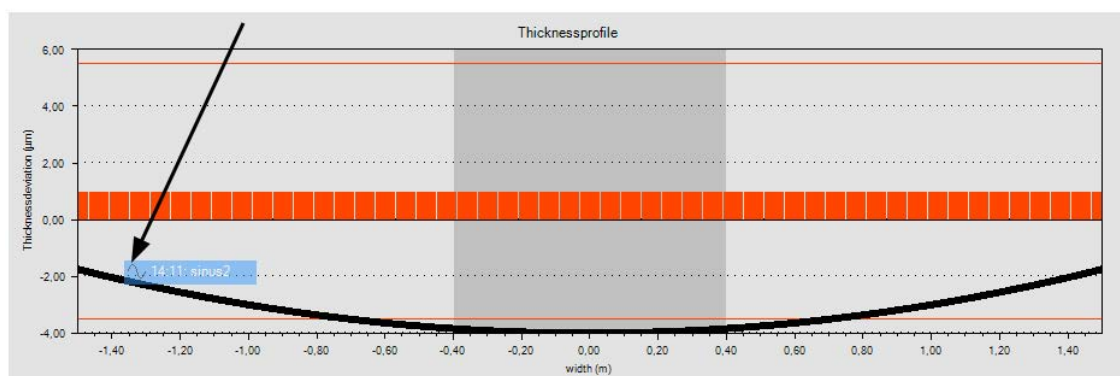
In the following example a signal was assigned to a bar.

5.18   Camera view

Function

If parts of a plant are monitored by *ibaCapture*, the views of several cameras can be displayed in *ibaQPanel*. The user can arrange the camera views according to his needs. Besides the live display, the replay function allows you to rewind along the time axis, to change the replay speed or even to zoom the image. With the scenario player, it is possible to switch to a specific camera view when triggered.


Note

> For the use of the camera view, the *ibaCapture* player has to be installed. For this, please install *ibaCapture* and choose only the *ibaCapture* player during installation.

5.18.1   Scenario player

Functions and properties of the camera view in *ibaQPanel* correspond to those of a normal camera view in *ibaPDA*. You find the description in the *ibaCapture* manual.

Additionally, the scenario player is available in *ibaQPanel*. The scenario player can switch to specific camera views when being triggered.
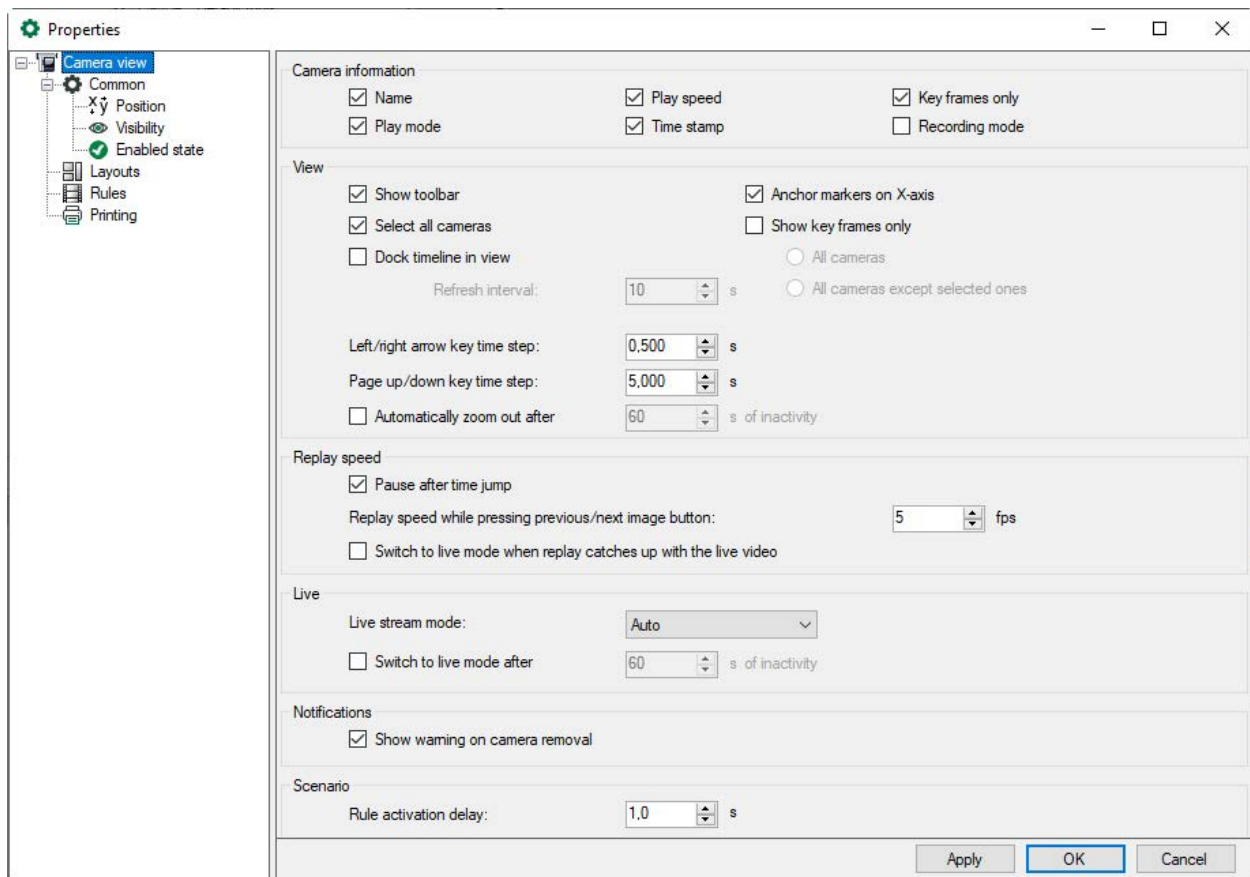
Setting up a scenario is done by defining the desired camera layouts, which then will be deployed in user defined scenario rules. By the means of these rules, signals from *ibaPDA* can be used to activate the associated layout. Upon activation of the layout, each individual selected camera can be set in live mode, in replay mode while jumping back in time with a static offset or in replay mode while jumping back in time caused by a trigger signal.

When at least one layout and one rule have been defined, the camera view's toolbar will display the scenario buttons. These buttons allow the user to activate ( ) or deactivate ( ) a scenario.

When the scenario is activated, user interaction is disabled. This means the user cannot switch between live or replay mode, zoom, etc. If the scenario is deactivated, the scenario triggers still work, however the rules will not become active (see also chapter ↗ *Rules*, page 94).

The trigger rules are cyclically checked every 250 ms. To prevent unnecessary and uncontrollable layout changes, a rule activation delay can be specified in the properties dialog. Once a rule trigger releases, this specific delay starts and all other rule-triggers are ignored. At the end of this period the layout change caused by the first rule trigger is activated.
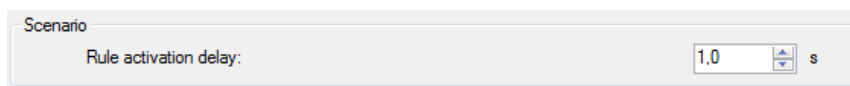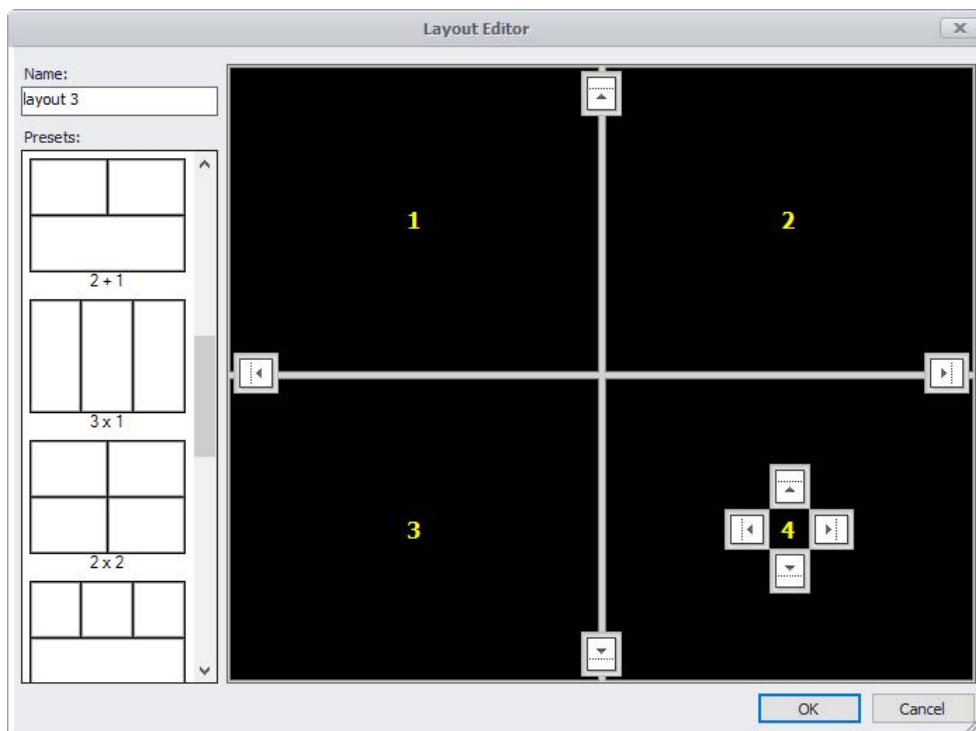
5.18.2   Layouts

In the "Layouts" branch, the user can add (⊕), remove (▨) or edit (°°°) the layouts of the camera windows that will beavailable for the scenario rules.
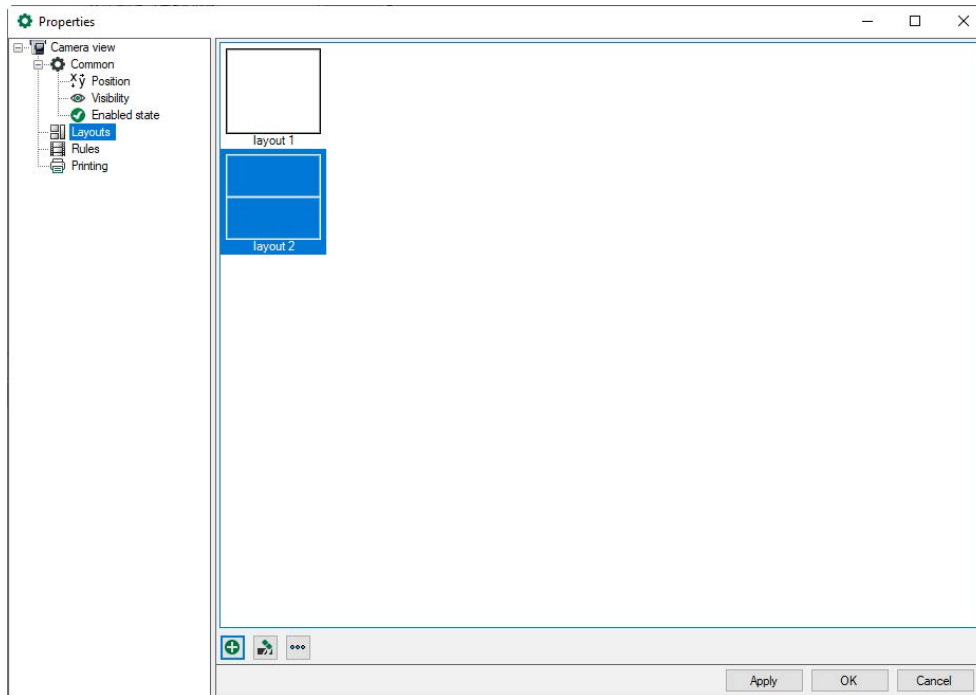
When the button <Add> ⊕ or <Edit> °°° is pressed, the layout editor opens. In this editor, you can create or change a layout in a similar way as in the camera view itself.


In the upper left side of the editor, the name of the layout can be entered. This name has to be unique. On the left, some layout templates are displayed that will be loaded when clicked. On the right, the layout editor is displayed.

You can also create individual layouts. When a drop pad is selected by mouse click, a new camera window opens. The camera windows can also be resized.

5.18.3   Rules

The trigger mechanism for setting up scenarios requires a user-defined ruleset. Each rule has its own trigger, layout, and camera configuration. When a certain rule-trigger releases, its proprietary layout will be loaded and thus its camera configuration will be applied.
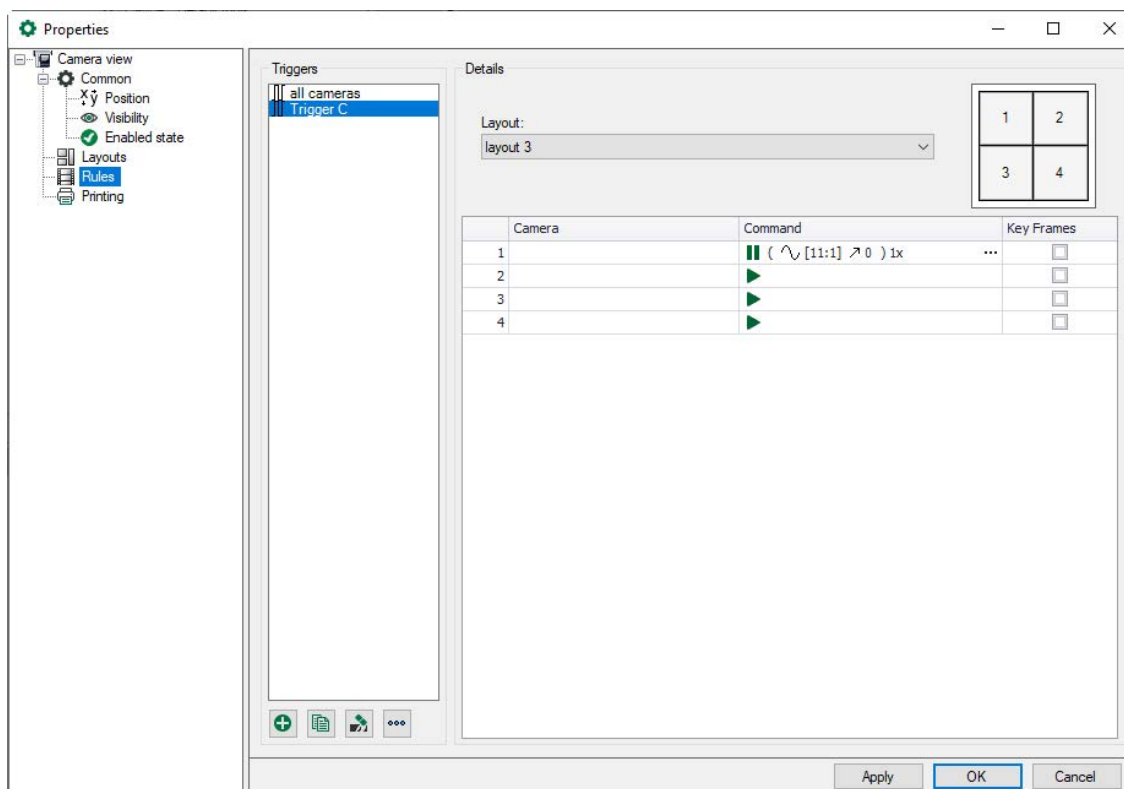
Creating a rule

1. To create a rule, click at first on the branch "Rules" in the properties dialog structure.

2. Click on the < > button on the lower left of the dialog.
   The trigger editor (rule-trigger) dialog opens:
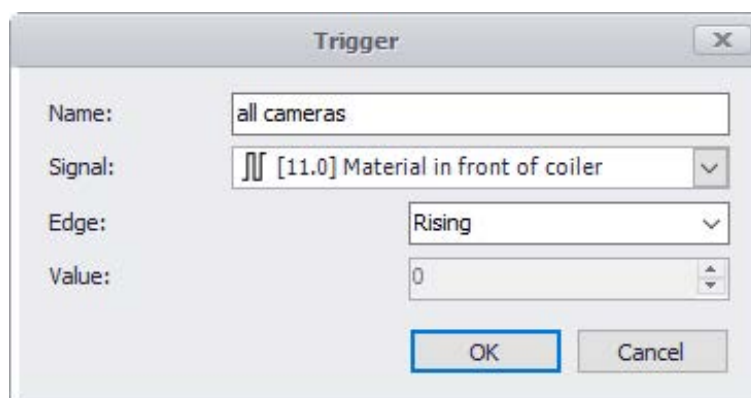
3. Give the trigger a comprehensive, application-specific name. If the name is omitted an automatic name will be generated.

4. Specify the trigger signal in the signal drop-down list. The trigger edge can be rising, falling or both. If the signal is analog, a trigger level value has to be entered.

5. Confirm the dialog with <OK> to add the trigger to the trigger list.

6. Leave the trigger selected and select the layout, which has to be activated, in the "Layout" drop-down list, which contains all defined layouts. On the right, the selected layout icon is displayed and the camera list is adjusted to the number of cameras in the layout.
For every camera window, a camera signal and a camera command has to be configured:

7. In the "Camera" column, select the camera which should be used on this position.

8. In the "Command" column , click on the button <...> to open the command editor. The "Camera command" dialog is described below.

9. Activate the "Key frames" option to limit the video stream to key frames only in order to reduce the network load.

Camera command dialog

There are 3 types of camera commands:

Live
- Sets the camera to live mode

Static offset
- Sets the camera to replay mode at a preset playback speed and jumps back to the preset point in time before the trigger event. You can set the replay speed with the slider and define the time span in the respective field.

- If the option "Return to live mode after" is enabled, the camera switches after the set time sequence from replay mode to live mode.

Replay trigger
- Sets the camera to replay mode at the preset replay speed and jumps back. You can set whether the jump into the past is done by a fixed time period ("Use a static offset") or controlled by an offset signal.

- Define the replay trigger similar to the rule-trigger in the field "Trigger".

- Change to live mode as in the static offset mode.

5.18.4   Logging

When the scenario is enabled, the scenario log can be opened using the camera view's context menu. The log allows users to check the scenario triggers. This can be very helpful when configuring a scenario.
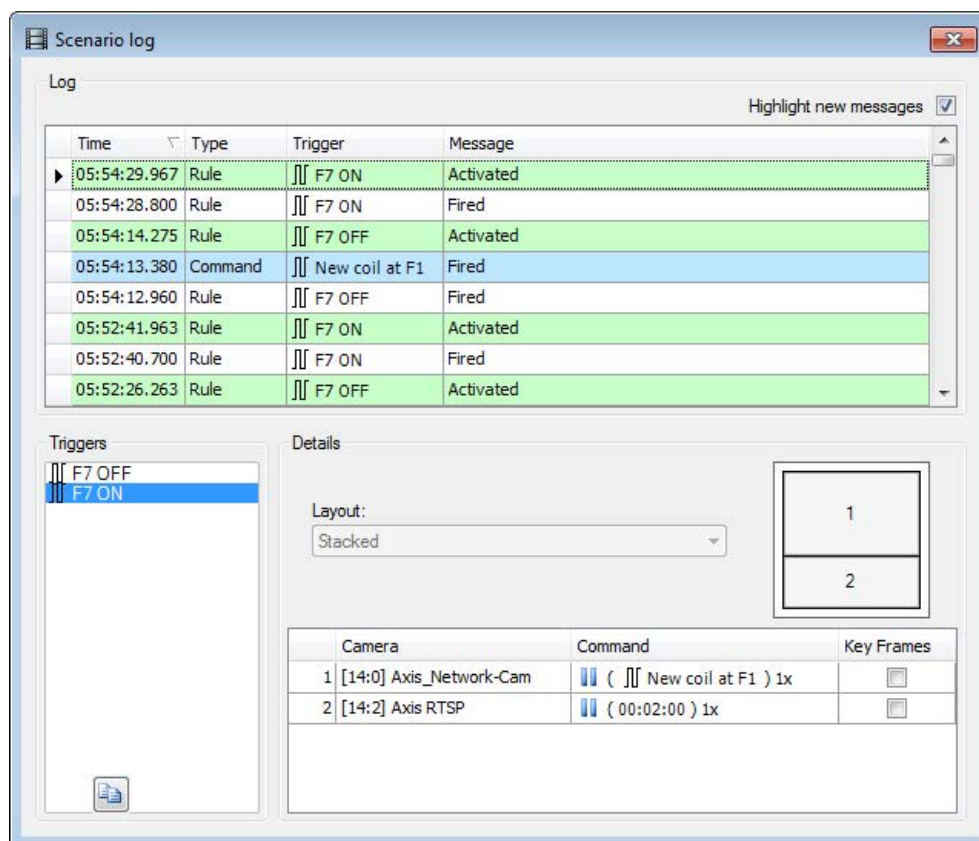
At the top, there is a table displayed which contains the logged trigger information. When a log entry (row) is selected, the scenario rule, that caused the log entry, is displayed at the bottom. This means that this rule trigger is selected from the list of triggers and the specific camera configuration is displayed. When the scenario rule that caused an entry is unknown, the entry is displayed in gray. When such a row is selected, the list of triggers will have no selected item and the camera configuration will be empty. Unknown entries are those made before the most recent opening of the properties dialog. Detailed information is only available for the current configuration.

The log can be cleared using the context menu. The checkbox above the table allows you to highlight new log entries. So the scenario can easily be examined while executing.

Note that there are 2 trigger types. Either they belong to a rule (rule trigger), or they belong to a replay trigger command (replay trigger).

The log entries are highlighted in the logging table in different colors for better clarity:

Color	Meaning	Note
White	Rule trigger is released	
Blue	Replay trigger of a camera command is released	When the rule is activated afterwards, the replay starts at the trigger event.
Orange	Rule trigger of a rule with camera command has fired but replay trigger has not fired yet.	Cameras, whose replay triggers have not released yet, just start replaying at the given replay speed.
Green	Rule was activated successfully	Scenario switching according to the rule; not all released rule triggers may activate their layouts (see chapter "Rules")
Red	Rule has been ignored	This is the case, for instance, when multiple releasing occurs during delay time
Gray	Unknown rule	This log entry was done before the most recent opening of the properties dialog

The log in the image above shows the following events in chronological order (bottom up):

- rule «F7 OFF» was released (not visible anymore) and the scenario was activated

- rule «F7 ON» was released and activated

- rule «F7 OFF» was released again

- replay trigger «New coil at F1» released

- rule «F7 OFF» was activated

- rule «F7 ON» was released again and activated. Video replay refers to replay trigger «New coil at F1» which fired before

5.19   Chart

Function

The display object "chart" offers the most flexible visualization. Principally, it is an extended bar chart. The bars can be displayed as curves, bars, lines or dots. Color and transparency can be freely chosen; the exceeding of limit values can be marked with dynamic color areas. The integration of text elements and images enables additional visualization effects. Markers as well can be freely defined in color, size and symbol. Furthermore, a XY display enables a display similar to the display in an oscilloscope.

Configuration

Besides the general properties, a diagram will be configured in the 3 major branches: base axes, value axes and elements.

In a diagram, several base or value axes can be configured. The properties of the axes can be defined individually, as e.g. the value range, tick marks or designations.

With the help of so-called items, the appearance of the diagram is configured. The following items are available:
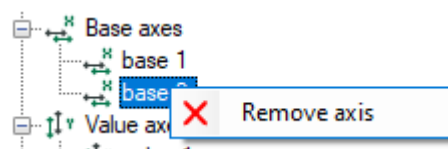
■ Curve

■ X-Y pair

■ Image

■ Region

■ Marker

■ Text

In general, the single items will be added or removed via the context menu.
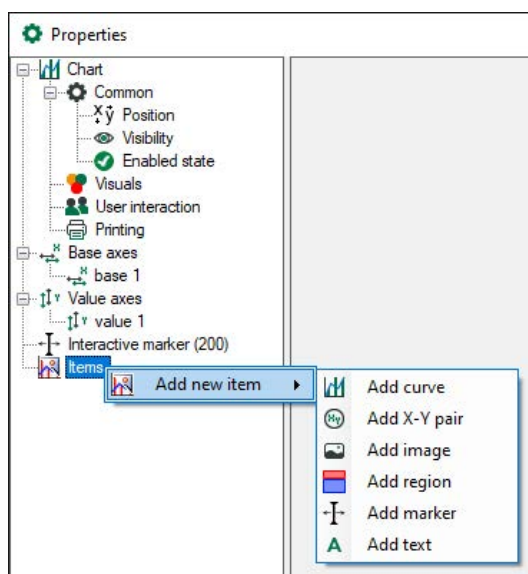

By making a right mouse click on the branch, the corresponding context menu opens where you can add base axes, value axes or new items.

By right-clicking on the axis or item, the axis or items can be removed. However, it is only possible to remove unused axis. Used axes do not offer the "Remove axis" option.
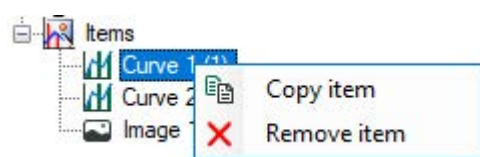
Create axes and items you wish to use with the context menus. You can find the configuration description for each item from chapter ↗ *Items*, page 105 onwards.

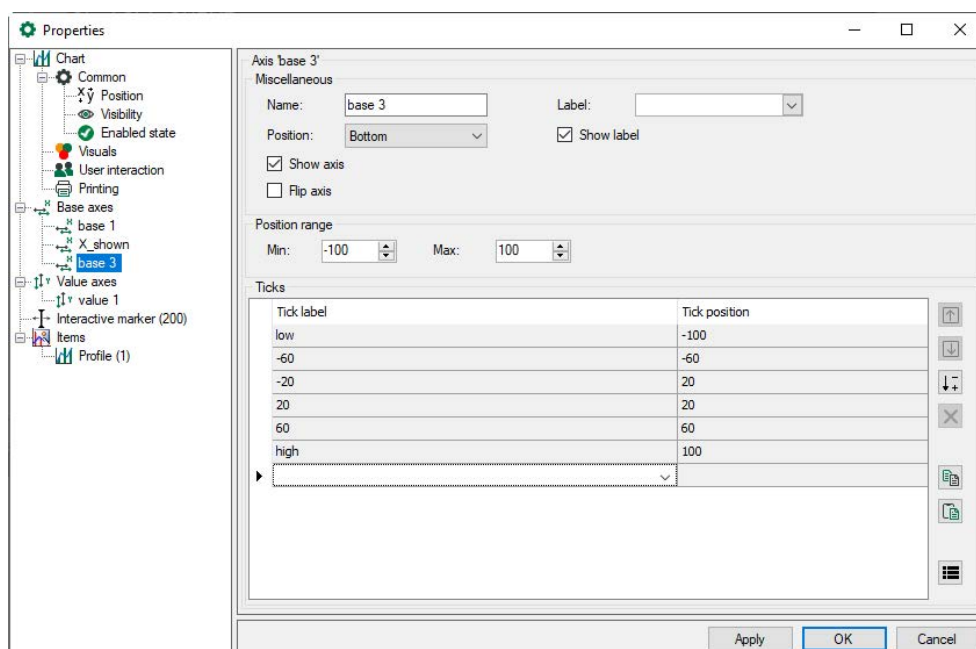### 5.19.1   General properties
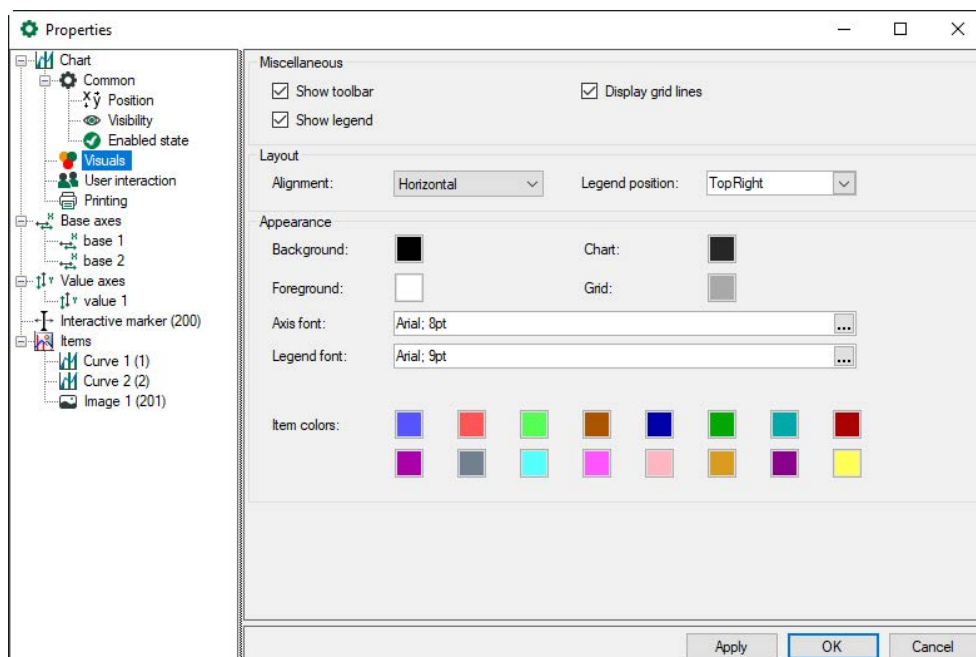
The basic colors of display and curves, orientation and position of the legend are determined in the dialog "Visuals".

Via "Miscellaneous", it is possible to select and deselect various display options. If a legend is shown, as default, only curves and X-Y pairs are displayed.

5.19.2   Base axes

In a chart, several base axes can be configured. This serves to assign an own axis to each of the items in the chart. For example, a marker can have another axis than the bar values.

Miscellaneous

In the range "Miscellaneous", you modify the general settings, as for example the name for unique identification or position and visibility of the axis. Label is a description in square brackets at the end of the axis, e.g. [m/s].

Position range

Here, you define the minimum and maximum value of the axis, the possible range varies from -1000000 to 1000000.

Ticks

A position on the base axis is defined with a tick mark which can be assigned to a signal curve. The value of the signal will be displayed at this position as bar, curve, line or dot. It is possible to assign a signal to each tick mark. The assignment of the signals is made in the corresponding curve item which uses this base axis.

In the list below, the tick marks in the display will be defined. In the column "Position", you indicate the desired position of a tick mark within the given range; and in the column "Label" the designation which has to be displayed. If a line is filled, a new line appears automatically.

The buttons on the right facilitate the editing of the list:

↑ ↓	Shifts the selected lines to upward or downward
↓	Sorts the list in ascending order
✗	Deletes the selected lines
	Copies the content of the list in the clipboard and can be inserted in e.g. MS Excel
	Inserts a list separated by tabs in the selected line of the list
☰	Opens the tick mark generator

With the <Ctrl> key pressed, several single lines can be selected. With the <Shift> key pressed, a group of consecutive lines can be selected.

By means of the tick mark generator, ☰ a list with tick marks at equal distances can be quickly created.

In the range "Amount and range", you enter the number of the desired tick marks. The position range serves as a display of the maximum range of the previous dialog. The limits of the generation range min. and max. comply with the range the user wants to adjust, change or add.

In the range "Labels", you can indicate the description of the tick marks. By default, the position will be used as designation. With the option "Base name" it is possible to define a name which is numbered in ascending order. The initial numbers are defined with "Start value". In the example above, the base name is "pos", beginning with the value "0". It is also possible to enter individual designations. You also can determine how many decimals are displayed (up to 8).

Click on <OK> to create the list in the generator, which you can further edit if necessary. Newly created values are added to the current list via the option "Add to Current List." Otherwise, the existing list will be overwritten. By clicking on <OK> a list is created in the generator which can be edited if required.

5.19.3   Value axes
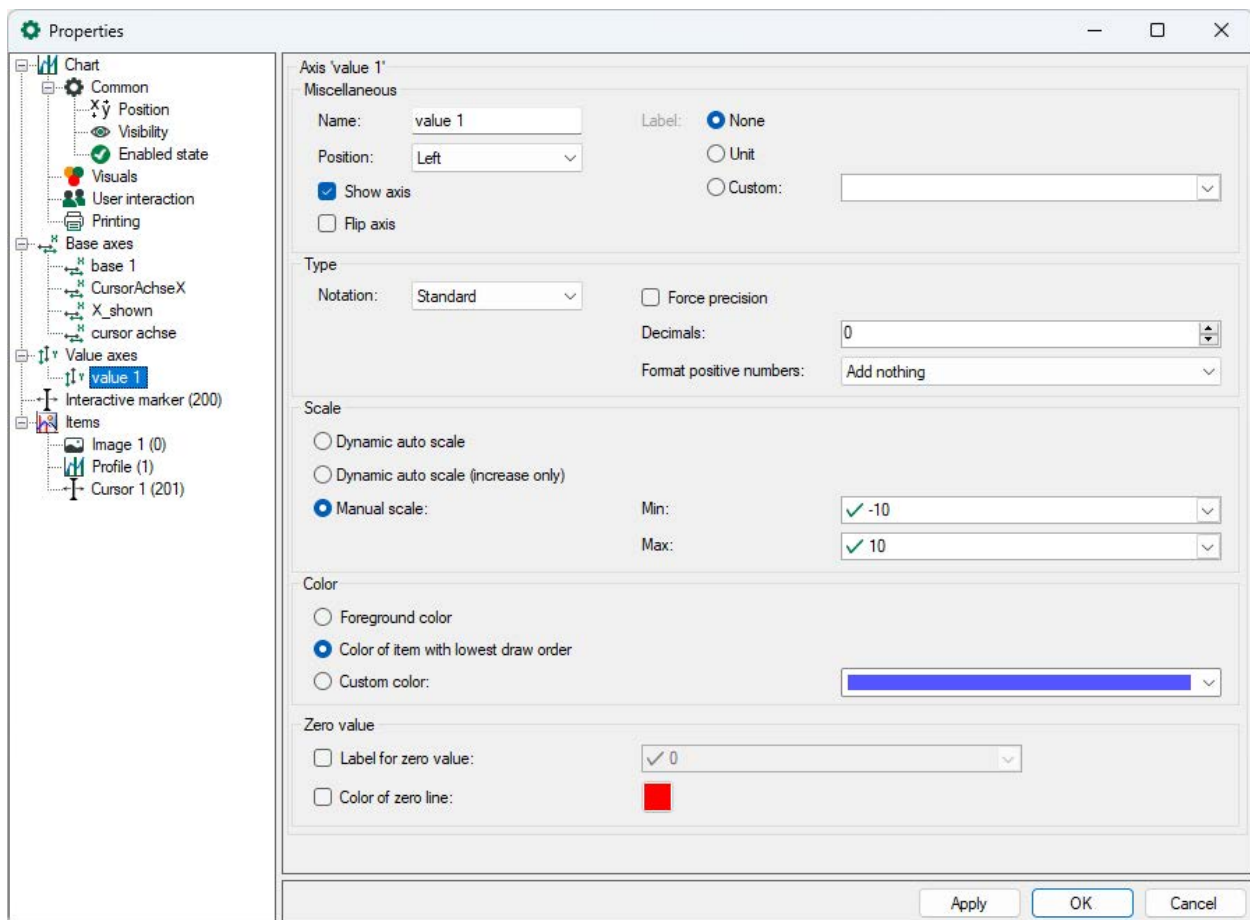
As with base axes, several items can be assigned to a value axis.

Miscellaneous, type
In the ranges "Miscellaneous" and "Type", you enter the name of the axis, define the type of display, visibility and notation (auto, standard or scientific).

If an item has not been assigned to a value axis, the axis will not be displayed.

"Label" indicates the label of the X-axis and will be shown as first value in square brackets. Here you can use the unit indicated in the I/O Manager of each signal or a customized text.

Since negative numbers are always preceded by the minus sign, you can use the "Format positive numbers" to determine whether positive numbers should also display the plus sign or a space for the same number of digits.

With "Force precision" you can specify the number of decimals for the display.

Scaling
The value axis offers several scaling possibilities as e.g. auto scale, auto scale only with enlarged ranges or manual scaling which range has to be defined here.

Unlike the base axis, the value axis can be enlarged and shifted. The value axis can be shifted upward or downward with the mouse button pressed; the scrolling of the mouse causes the zooming in/out of the value axis to the point where the marker is situated.

If you move the mouse over the upper range of the value axis, pop-up buttons will appear which can be used for scaling the value axis as well.


The two outer arrows bisect or duplicate the scale range, the two inner arrows zoom in and out with a smaller factor. The middle point causes auto-scaling of the axis.

If you remove a value axis via the context menu of the axis, all items assigned to this value axis will be assigned to the next available value axis.

Color
There are different possibilities to define the color of the value axis:

- The foreground color refers to the foreground color chosen in the dialog "Visuals" of the chart settings.

- The color of the item with the lowest draw order refers to the configured color of the item assigned to this value axis and placed on the lowest draw order.

- If you prefer other colors, you can choose another color from the list of customized colors.
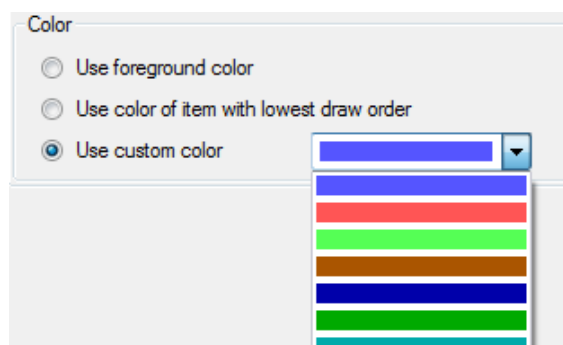
Zero value
With the option "Label of zero line", it is possible that the label of the zero line is defined by a signal. This is recommended when the deviation from a reference value shall be measured for example. Enable the option "Label of zero line" and enter a static value or choose a signal. Then the signal value will be displayed on the zero line. You can also select a color for the zero line.

5.19.4   Interactive markers

Interactive markers can be moved alongside the assigned base axis with a mouse click. By doing so, the interactive marker will always be positioned on the defined tick marks of the base axis: always on the tick mark that is nearest to the mouse position.

The interactive marker's appearance can be set in the same way as for user-defined markers ↗ *Marker*, page 114.
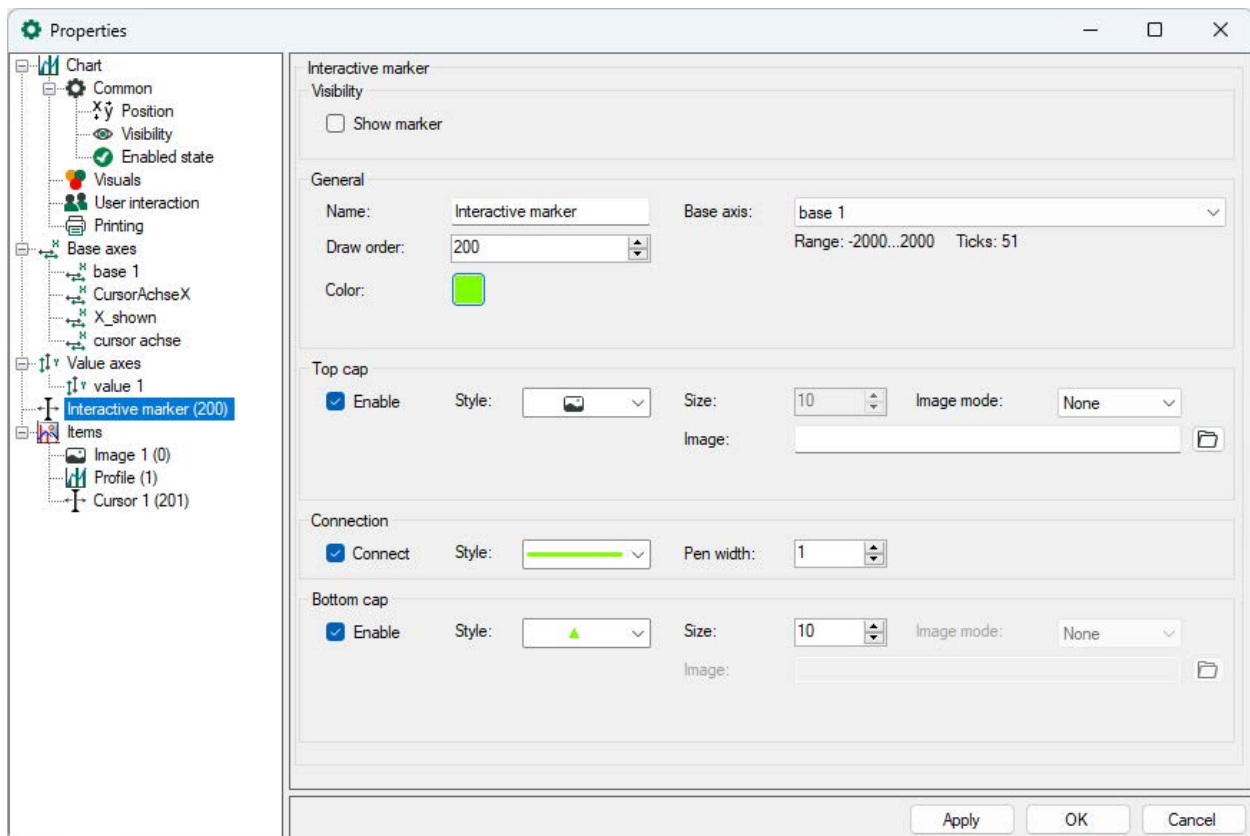
Visibility

If you select this option, the interactive marker will be displayed. The visibility can also be controlled via the button ▯▯ in the toolbar.

General

In the "General" area, you can set the name and the color of the interactive marker, as well as the drawing layer and the related base axis.

Top cap / connection

The interactive marker consists of a top and a bottom cap (symbol) and a connecting line. For each element, you can select a style as well as define its size and visibility. Apart from the display styles triangle and square for the top and bottom cap, you can also select an image. You can select a image mode to display the image:

■ None: the image is displayed in its original size

■ Stretch: the image is adjusted in height and width to the object

■ Zoom: the image is adjusted to the set size in the original size ratio

The positions of both caps can be configured independently with a fixed value or dynamically with a signal.
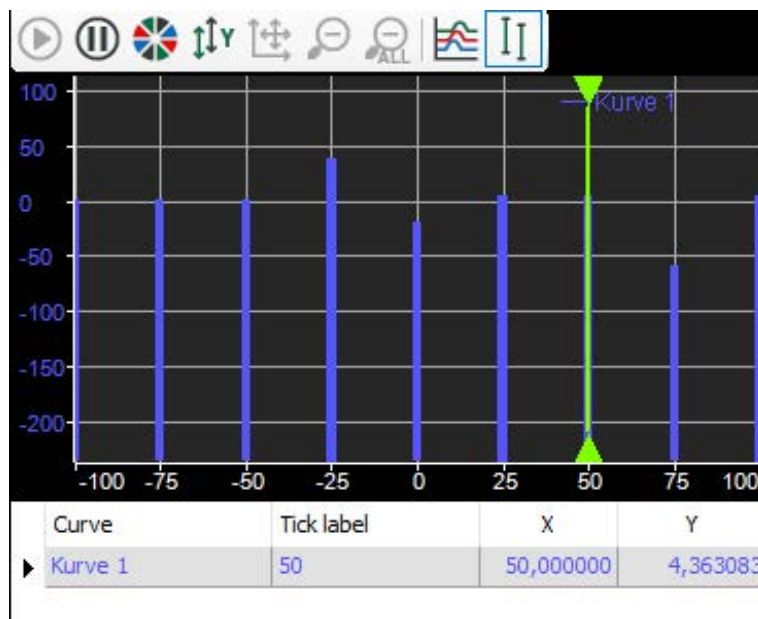
If the interactive marker is visible (green line in the picture above), a table will be displayed below the diagram that shows the x and y values of all curves that are defined at the marked position. The interactive marker can be moved by a mouse click. It will then jump to the tick mark that is nearest to the mouse position.

5.19.5   Items

The diagram offers different items which can be added via the context menu.

- Curve

- Image

- Region

- Marker

- X-Y pair

- Text

For special modules like ibaPQU, ibaInSpectra and ibaInCyle, further elements can exist here. These are described with the respective modules.

Each item offers different possibilities for configuration, however, two properties are assigned to all items:

Name
Designed for identification in the tree structure and the legend.

Draw order
The draw order defines the order in which the various items are superimposed. The draw order <0 signifies that the item lies behind the grid lines; the draw order >0 signifies that the item lies in front of the grid lines. The item with the highest draw order lies on top.

5.19.5.1 Curve
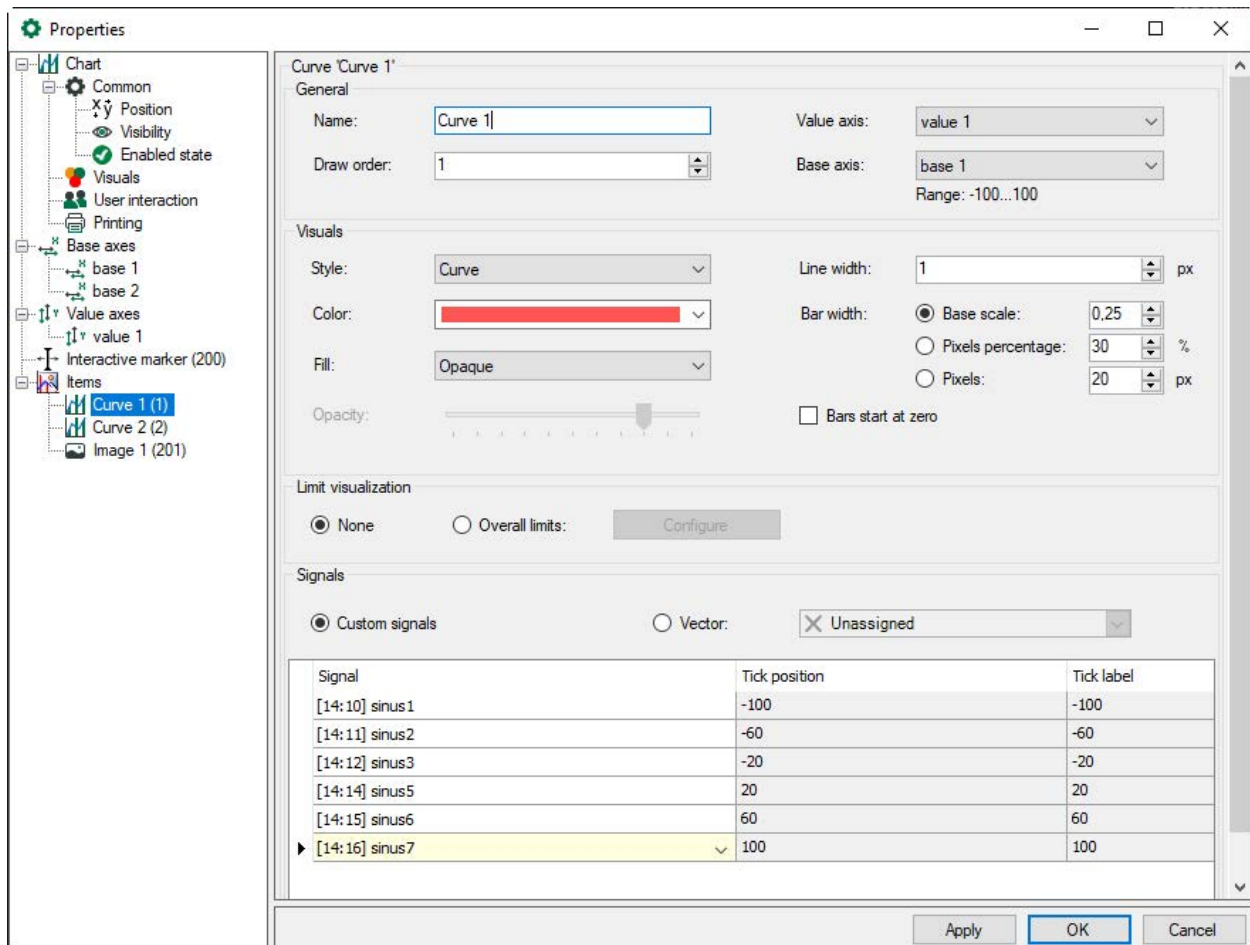
General

Every curve has to be connected with a base axis and a value axis, which can be chosen in the drop-down menu.

Visuals

For the display of the curve, several options can be selected. With the options bars or dots, a signal on a position defined by the base axis will be displayed as "growing" bar or rolling dot. With the option "curve" it is possible to connect several signals with a curve.
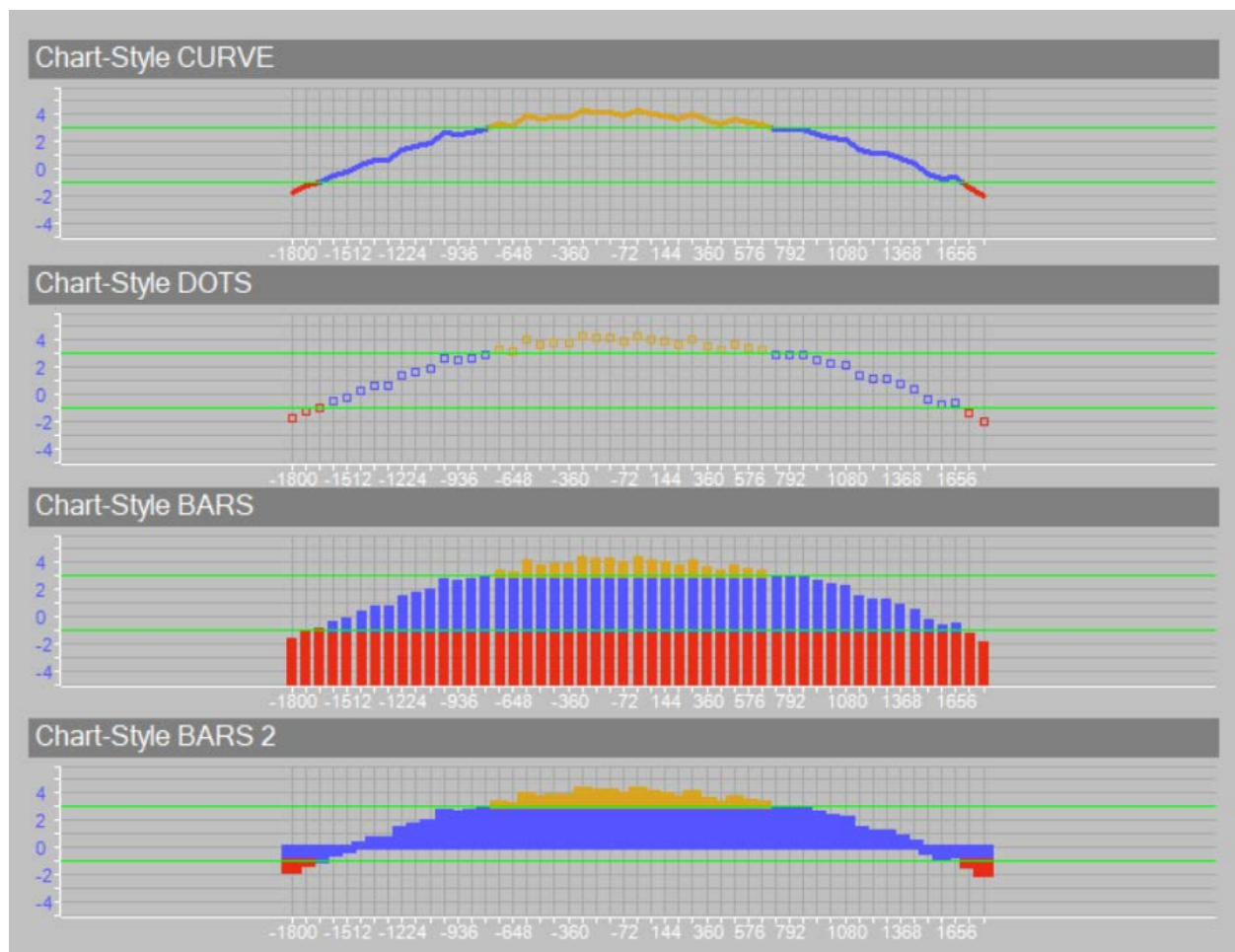
For the display styles dots and curve, a thickness and width as well as a filling can be defined, which can be opaque or transparent. The transparency can be configured steplessly with the slider from 0% (completely transparent) to 100% (opaque).

The bar width can be configured in different ways:

- Base scale: based on the scale of the assigned base axis (default setting)

- Pixels percentage: percentage of the available gap

- Pixels: bar width in pixels

If the option "Bars start at zero" is selected, the bars start on the value axis at zero, otherwise at the bottom of the chart (like BARS 2 in the example above).

A drop-down menu lists the selection of colors for the curve.

Limit visualization
If the option "Overall limits" is selected, it is possible to assign dynamic colors to the graph.
With this, limit values can be especially highlighted. The dialog for configuring the limits can be

opened with the <Configure> button. Here several limit values which are either fixed or dynamically given by a signal, can be specified.

In the upper list, the limits can be specified beginning with the highest limit to the lower limits. A color can be selected for the curve above the specified limit. For better detection, the limit values can be displayed as lines with selectable line style, thickness and color.

In the lower list, the limits can be specified for the lower limits.

Note

The limits must be entered in the right order, i.e. the highest limit must be entered in the first line.

Using the button ↓⁻₊ the list can be correctly sorted.

The buttons on the right facilitate the editing of the list:

↑ ↓   Shifts the selected line upward or downward

↓⁻₊   Sorts the list in descending order

✗   Deletes the highlighted line

▤   Copies the content of the list in the clipboard and can be inserted in e.g. MS Excel

▤   Inserts the clipboard content in the selected line

In the example below, the curve above the highest limit value is marked in orange. Between this limit and the second limit value, the curve is marked in green and below the lower limit value in red. Two limit values are shown as lines in different styles.
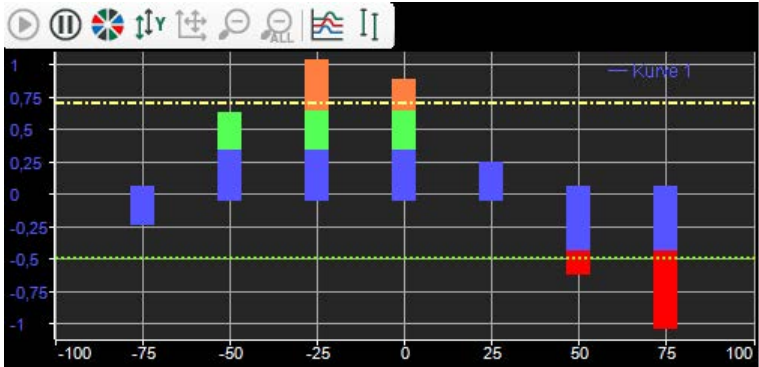
Signals

In the range "Signals", you can assign a signal to each position which is defined in the corresponding base axis. In the column "Signal", the signals can be selected in the drop-down menu. Click in the range below the table, then a new line appears, click in the column "Signal", then a drop-down menu appears.

The signals will be assigned to the positions in increasing order (from left to right); the positions and corresponding labels have already been specified.

In online mode, signals can be dragged onto a chart via drag & drop. For these signals, a new base axis and a new value axis are created. If more than 5 signals are dragged onto a diagram, a dialog appears in which the base and value axis can be chosen. With the buttons and it is also possible to add new base and value axes.

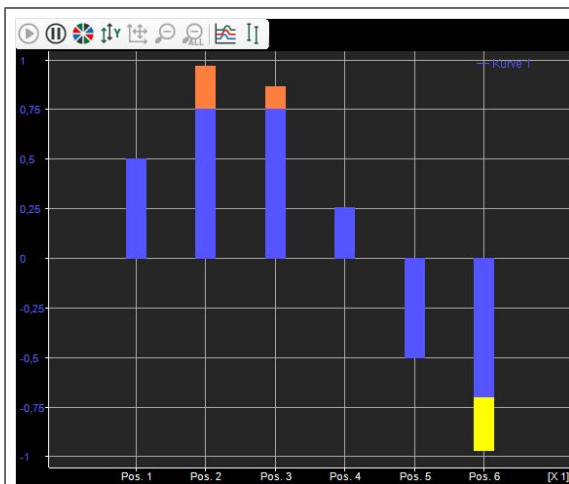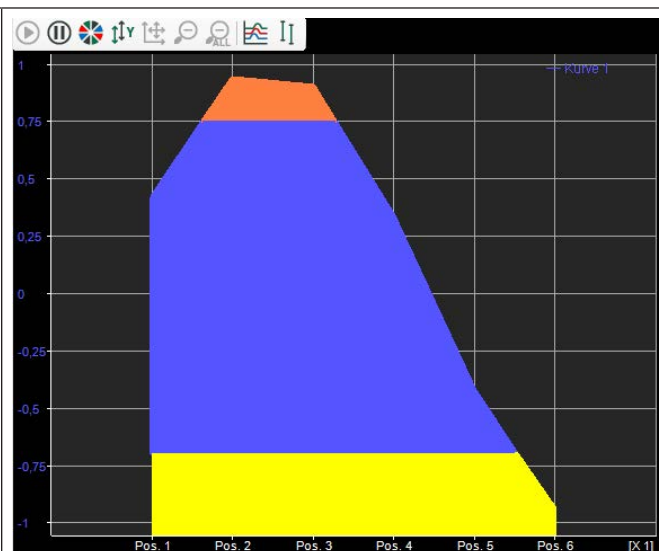It is also possible to display vector signals in the chart. Choose the option "Vector" and choose a vector signal from the drop-down menu. With vectors, the corresponding signals will be displayed in a list.

Examples:

Display of 6 signals as bar with dynamic color assignment from an upper and lower limit value	Display of these 6 signals as a curve, dynamic color assignment as with the column display

5.19.5.2 X-Y pair

The relation between two values can be displayed graphically with a X-Y pair by controlling the X and Y position of a point with 2 signals. Furthermore, a defined number of previous X-Y values can be displayed. It is possible to draw Lissajous figures or to create the so-called trailing actions.
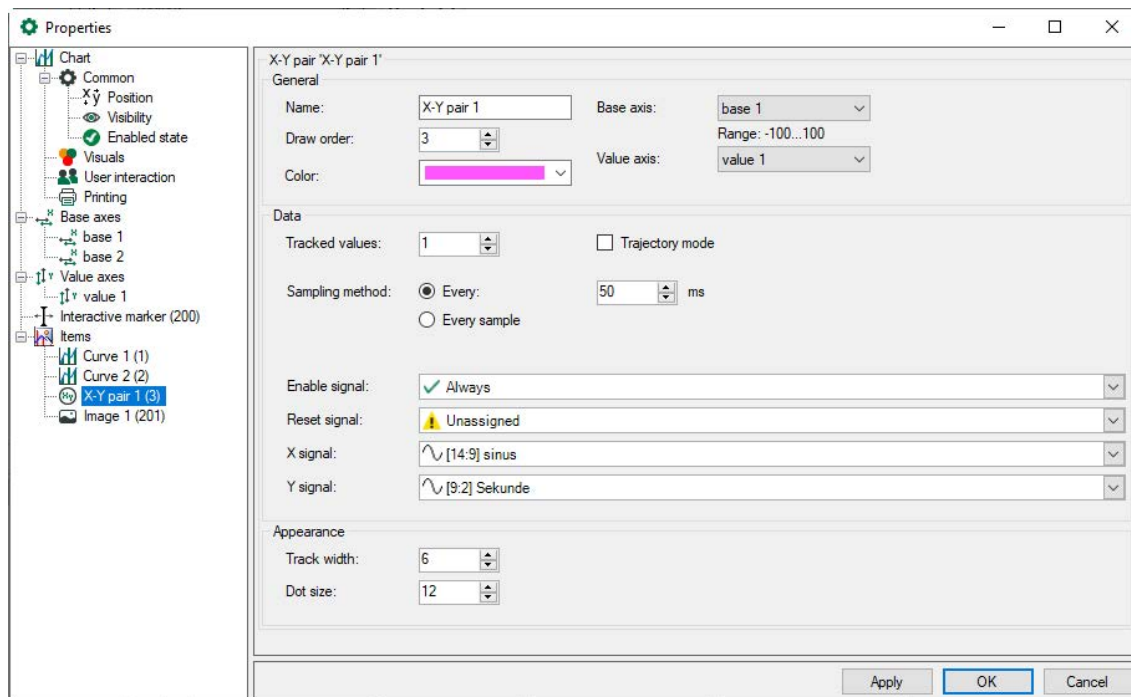
The X and Y coordinate of the point refer to a base and value axis. Besides the color, the dot size defines the presentation of the point. The track width determines the size of the previous points. You determine via "Tracked values" how many previous points are displayed.

The sampling method determines the time interval for the signal sampling. You can either specify a fixed time interval in ms (*every x ms*) or adjust the signal sampling (*every sampling*).

The display of the point can always be enabled or controlled by a digital signal. As long as the digital signal is TRUE, new points will be drawn. If the digital signal is FALSE, the point remains at its last position until the signal has been enabled again.

If the signal is active again, a line is always drawn from the last point before deactivation to the new first point after the signal was reactivated. In trajectory mode, this connection line is not drawn.

The display can be deleted again with a reset signal.

Example:
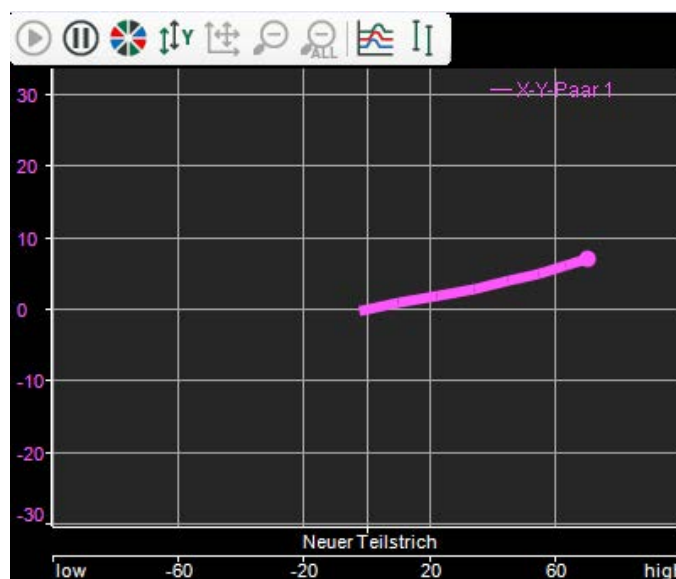
5.19.5.3 Image

Image

With the image item, you can integrate static images by selecting an image file in the file brows-
er. The image can be saved in the layout (*Backup picture in the layout file*). If you move the
project, the image is also available, even if the original is no longer accessible in the path. The
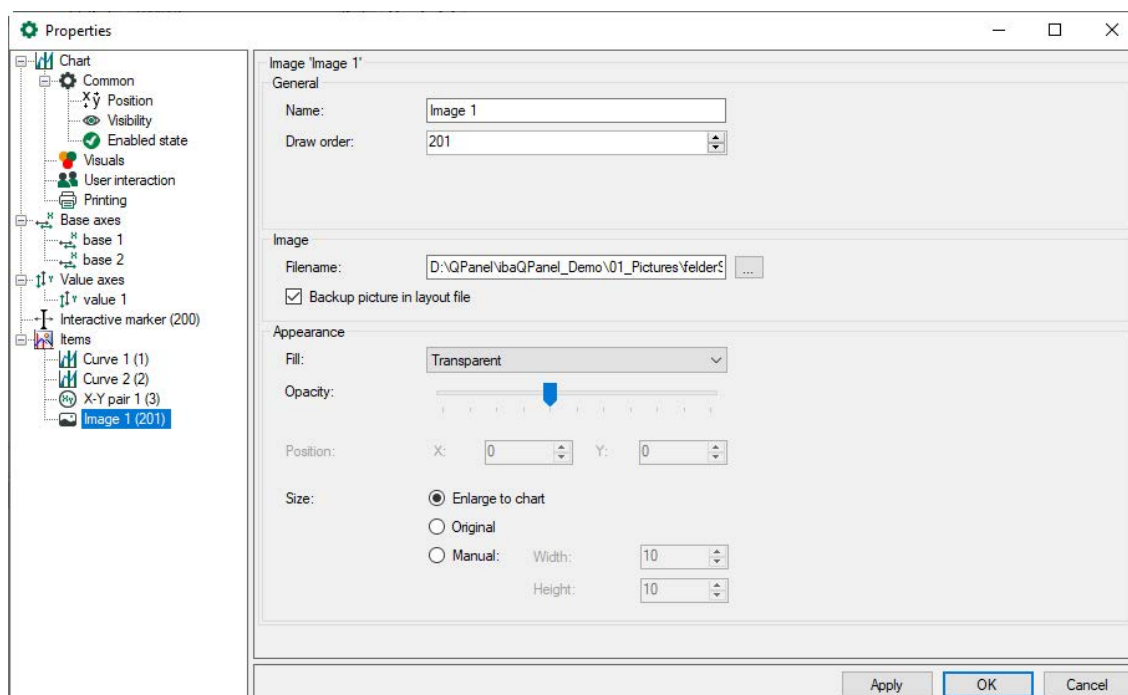original image cannot be restored from the layout.

Appearance

The transparency can be set with the slider analogous to the item "Curve".

The image can be stretched to the size of the chart or it can be displayed in the original size.
If the original image is bigger than the current diagram, the image is only shown partially. The
size can be specified manually with the desired width and height (in pixel) as well as a X/Y offset
(position) which refers to the left edge at the top.
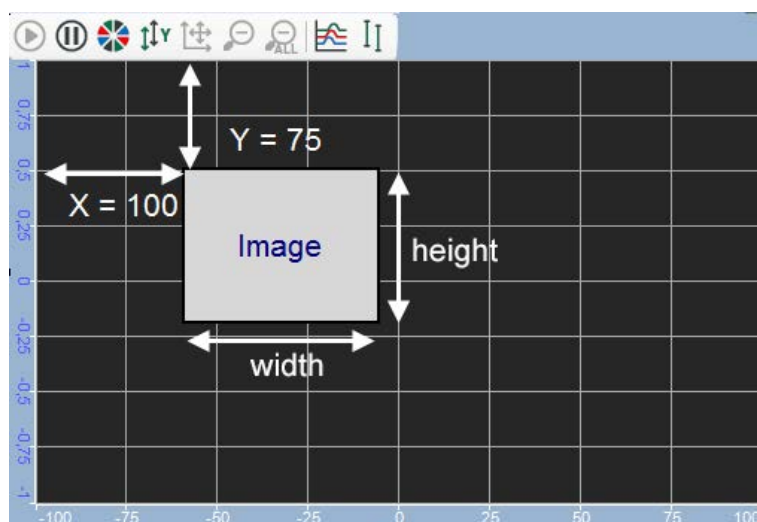
5.19.5.4 Region

With the help of the item "Region", a certain range in the diagram can be marked with colors.
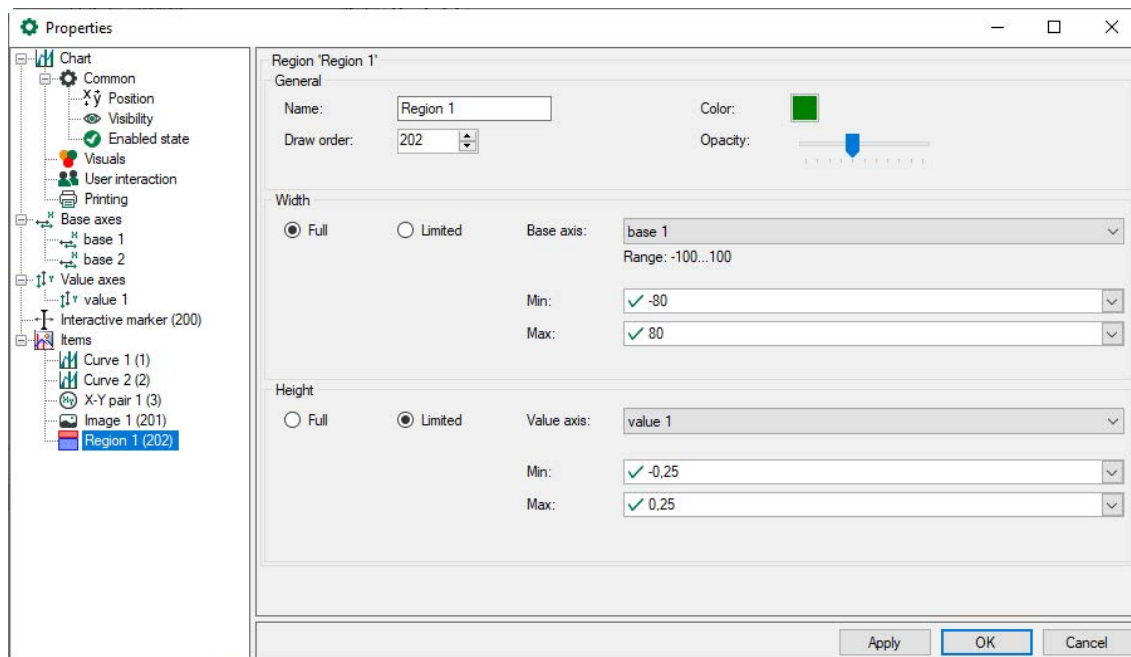
General

The color and opacity of the region are defined in "General" as well as the draw order which displays the region.

Width / height

The position of the region is defined via "Width" and "Height". With this, the width and height of the region can cover the total diagram (option "Full") or only a certain range.

A limited range (option "Limited") refers to a single axis and can be defined either statically with a constant value or dynamically with a signal which can be chosen in the drop-down menu. Values outside the axis range will be cut out.

Example:
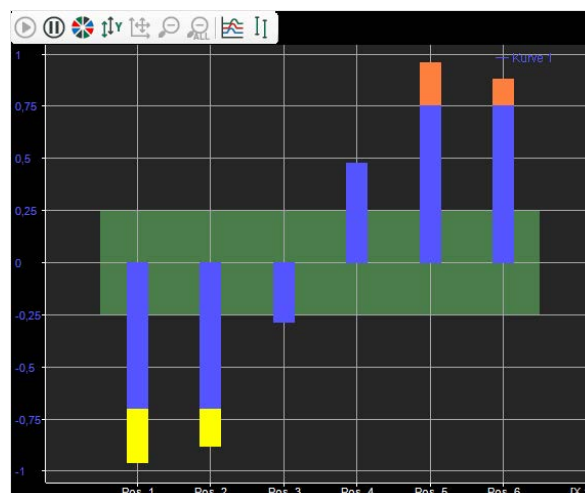
5.19.5.5　Marker

With the marker, it is possible to create a flexible element which can be used to display the position of a certain component for example.
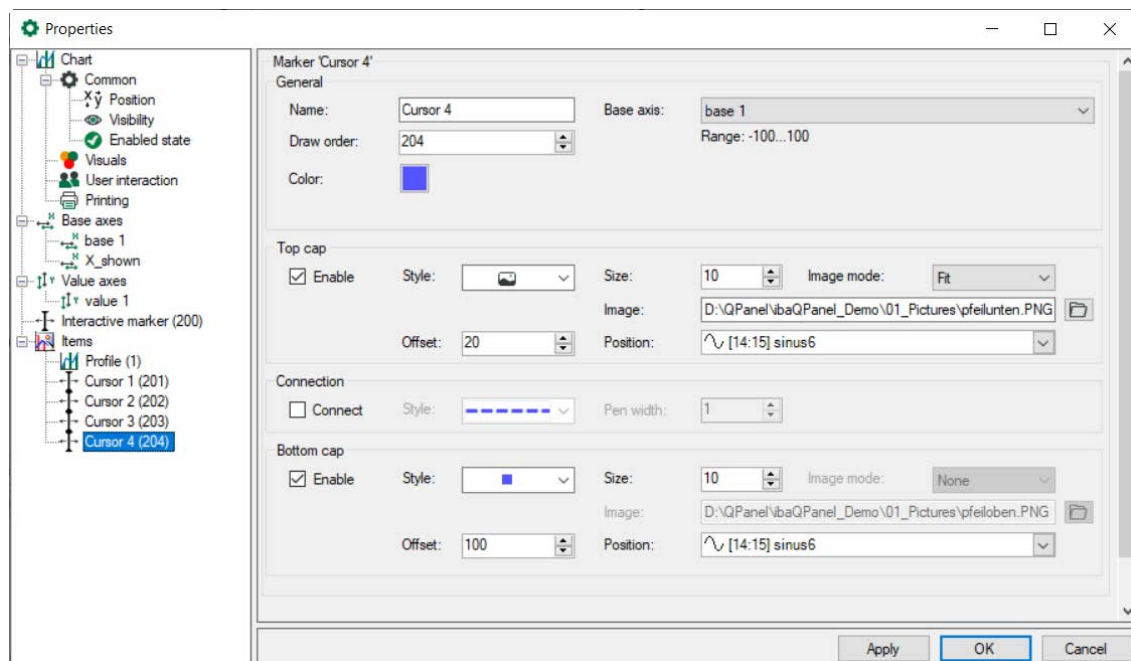
General
The colors of the marker, the draw order and the corresponding base axis are assigned in "General".

Top cap / connection
A marker consists of an upper and lower cap (symbol) and a connection line. For each element, you can select a style as well as define its size and visibility. Apart from the display styles triangle and square for the top and bottom cap, you can also select an image. Several options are available for displaying the image under *Image mode*:

■ None: the image is displayed in its original size

■ Fit: the image is fitted into the object in its original size ratio

■ Stretch: the image is adapted to the object in height and width

The positions of both caps can be configured independently with a fixed value or dynamically with a signal.

Examples:

Properties of the marker:	Properties of the marker:
Top cap: Triangle, size 15, fixed position 0 Connection: dashed, line width 2 Lower cap: Triangle, fixed position -60	Upper cap: Image, position combined with signal Connection: continuous, line width 1 Lower cap: disabled
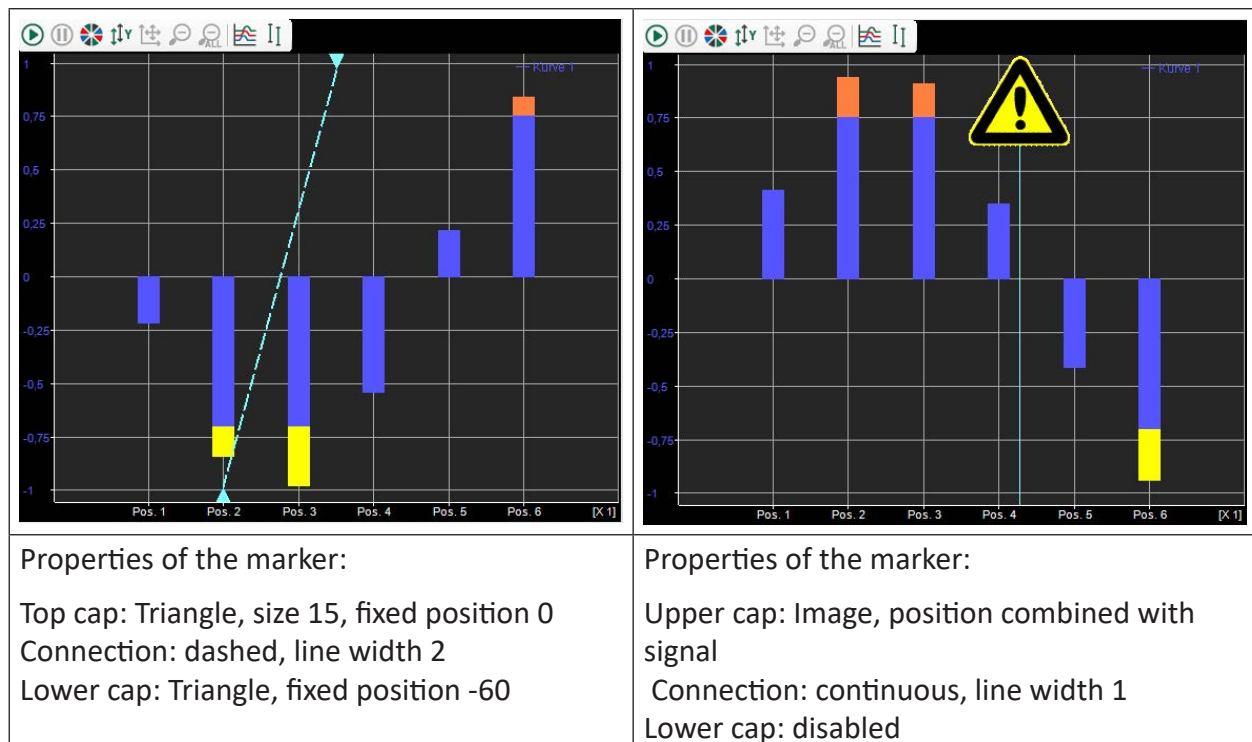
5.19.5.6 Text

In the dialog "Visuals", it was possible to define if the names of all configured items were displayed or only the names of the curves and the X-Y pairs. If the signal of a curve is invalid, this will be indicated with an exclamation mark.

The legend provides a drag and drop function as in the normal trend graph. This way, an item can be laid upon different value axes. While dragging the item, an arrow appears in the value axis tree pointing to the tree that will contain the item when it is dropped. If an item is not dropped inside a legend row, the item will be laid upon a new axis. An item can be removed by right clicking inside a legend row.
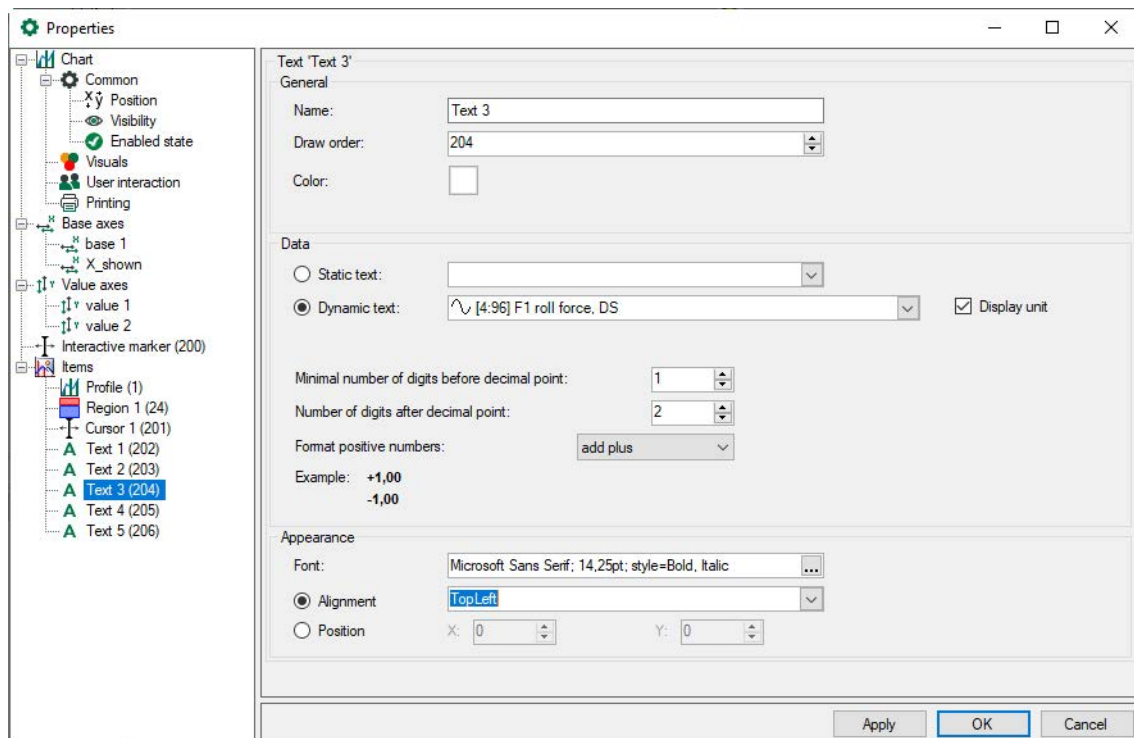
With the item "Text", an additional text can be displayed.

Data
This text can be a static text, which is entered directly in the dialog field, or the value of a signal to be displayed. For the display of the signal value, the integer digit positions, decimals and the sign display can be defined.

Appearance
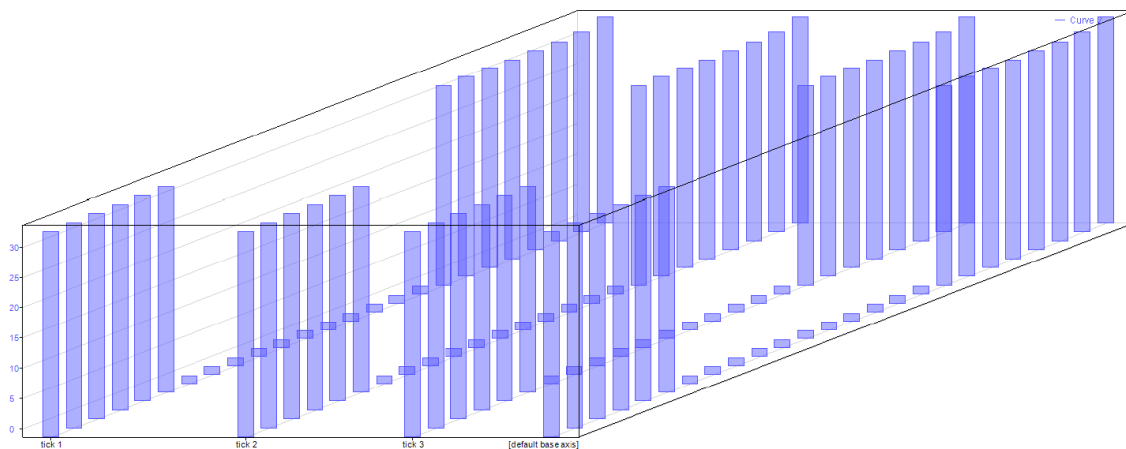Color, font, font size as well as the position are assigned to the text.

Example:
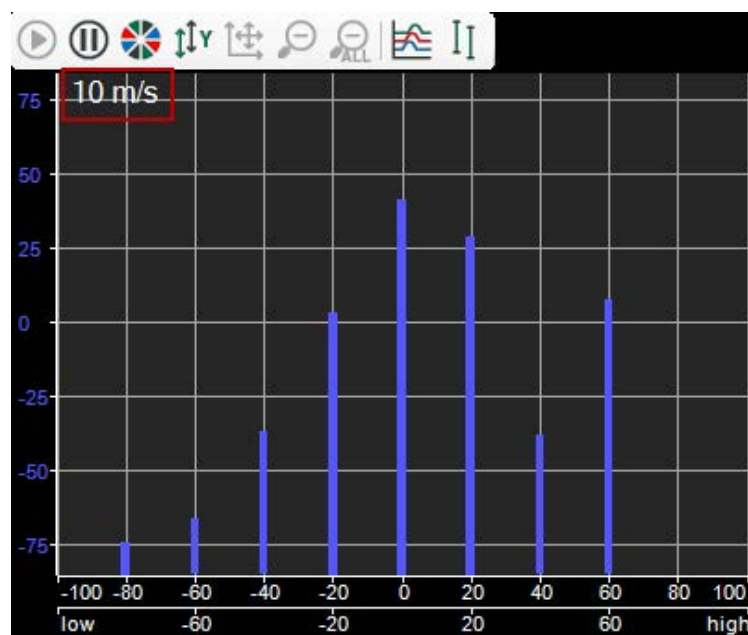
In the example given above, the selected signal value will be displayed in the upper left corner.

5.19.6   Isometric 3D perspective

In the major branch of the properties dialog, an isometric 3D view similar to the FFT view can be configured for the chart.

In this mode, the successive views of a chart are displayed on a Z-axis, with the newest results closest to the axes origin, in order to create a waterfall effect. Images and regions are always shown in the rearmost plane, texts appear in the foreground. The number of Z levels is optionally configurable. However, note that using an isometric perspective demands more resources than using the 2D representation. Especially when a larger number of previous points are displayed in the X-Y pair.

Zoom functions are limited to the foreground layer.

The axis layout settings are overridden in the 3D mode. Axes are always displayed at the side of the chart not overlapping with the perspective flow direction.

The perspective itself is configurable by dragging the back plane center point. The back plane center point is marked with a small gray cross, and the cursor will change when you move over it. When dragging the presentation, the spectra disappear and the perspective will be adjusted.

By right clicking in the view, the context menu opens. Choose "Perspective" and then "Front" to force the 3D view into front perspective for example. This precise view would not be possible with simply dragging the center point.
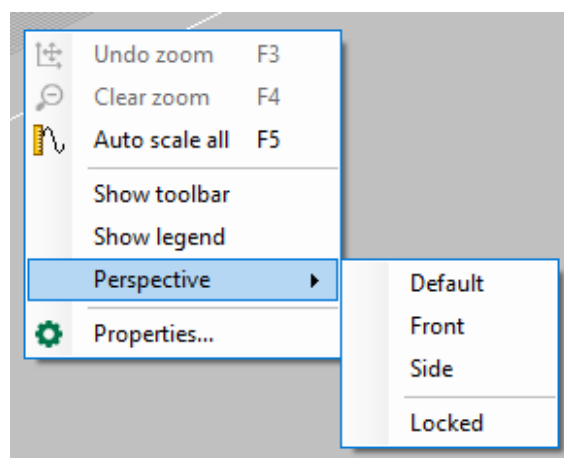
The other settings have the following effect:

  ▪ Default: Positioning of the 3D view in default perspective

  ▪ Side: Side view

  ▪ Locked: It is not possible to change the perspective by dragging the center point.
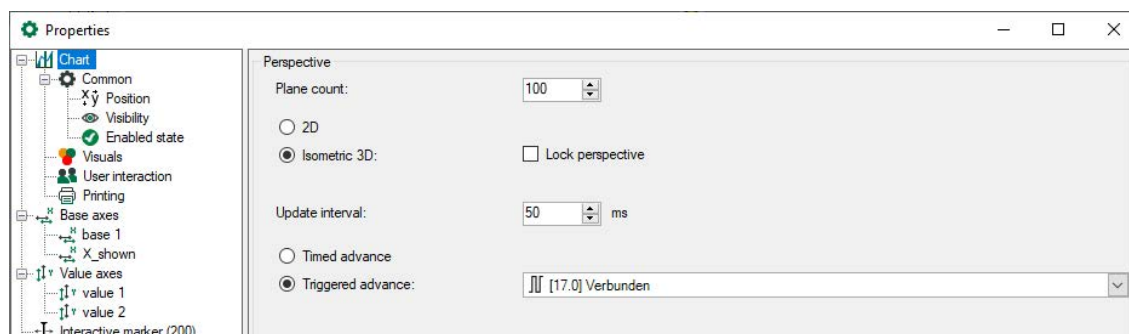
The advance is either time-controlled in the given update interval or triggered by a digital signal.

5.20   FFT view

Function

The basic function of the FFT view of the *ibaQPanel* is the display of the frequency domain of analog signals (=data source).

A detailed description and explanation of the FFT view can be found in the *ibaPDA* manual.
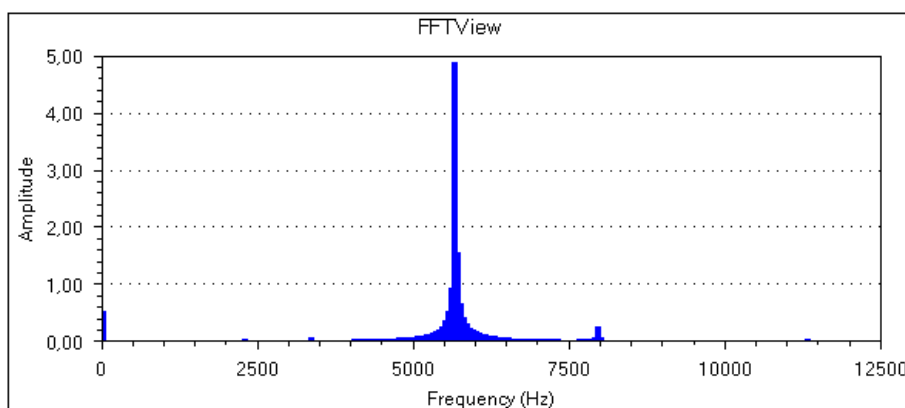
Configuration

Configure the settings in the properties dialog of the *ibaQPanel* FFT view. After exiting design mode, the signal can be transferred from the signal tree to the FFT view via drag & drop.

5.20.1   Properties and preferences FFT view

In the FFT view of *ibaInSpectra (ibaPDA)*, *ibaAnalyzer-InSpectra* and *ibaQPanel*, all settings can be adopted node by node in the preferences and are thus applied to the newly opened FFT views. Changes can be saved by pressing the button <Apply node to preferences>. The preferences cannot be viewed separately in *ibaAnalyzer*. A new FFT view must be opened in order to view preferences. In *ibaPDA*, you open the preferences via the menu *Configuration - Preferences*.
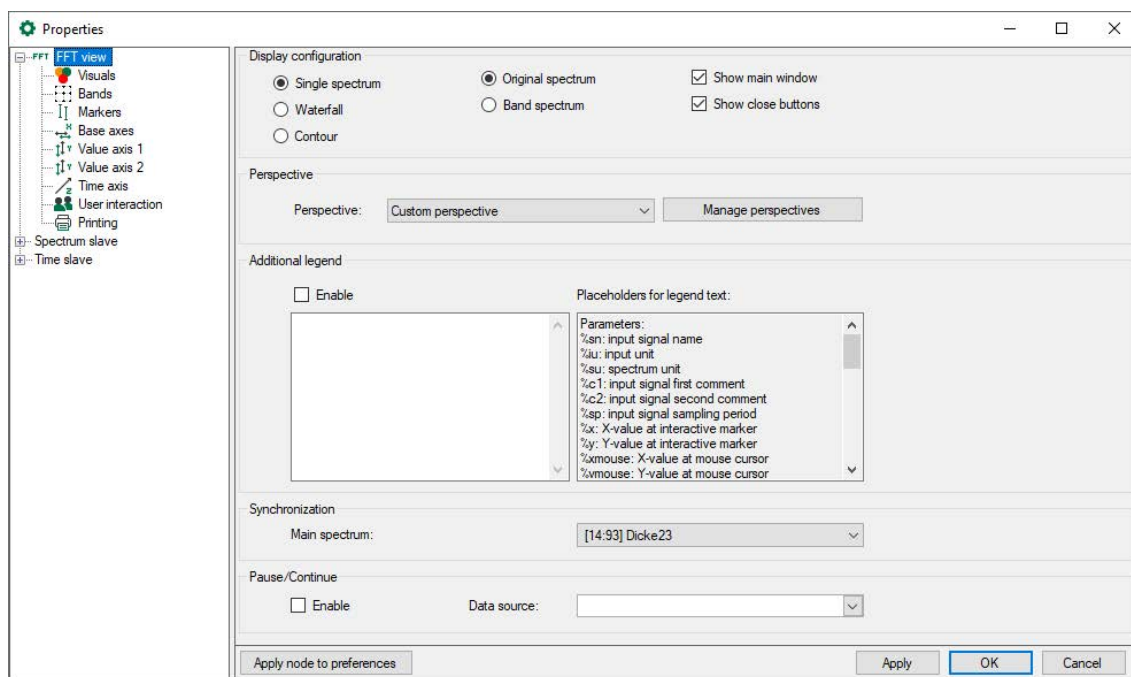
The node *FFT view* offers general settings for the display of the calculated FFTs. The following figure shows the settings in the properties of the FFT view. The preferences dialog looks similar.

Display configuration
Choose between single spectrum, the waterfall view and the contour view of the spectra. The visibility of the main window can also be set here.

You can select *Band spectrum* instead of the *Original spectrum*, then the results of the individual bands will be displayed. Settings for this are made in the *Bands* node, see chapter ↗ *Bands*, page 123.

With the *Show close buttons* option you can control the visibility of the close buttons and the lines to the left of the display.
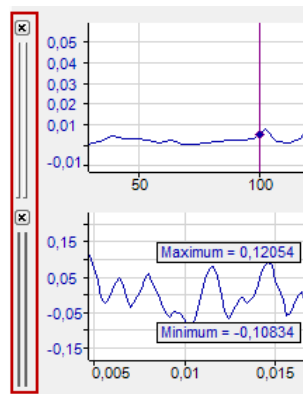
Perspective: Drop-down list *Custom perspective*

If you have saved different perspectives for the waterfall (3D) view, then you can select one of them.

Click the button <Manage perspectives> to open the dialog for managing perspectives. This lets you delete existing perspectives, copy them to the clipboard or paste them from the clipboard. Since perspectives are always specific to one FFT view, you must copy and paste a perspective that you want to use in exactly the same way in another FFT view into the other FFT view.

The perspective is saved in the display. Once you have configured the desired perspective, select *Save perspectives* in the context menu of the main window. Give the perspective a name and close the dialog with <OK>.

Additional legend

When this option is enabled, another legend is displayed in the main window in addition to the normal signal legend. You can define the content of this legend yourself. For example, you can enter a detailed multi-line text, in which placeholders for dynamic information can also be used. The following placeholders are available:

- %sn: Input signal name

- %iu: Input unit

- %su: Spectrum unit

- %c1: Input signal first comment

- %c2: Input signal second comment

- %sp: Input signal sampling time

- %x: X-value at interactive marker

- %y: Y-value at interactive marker

- %xmouse: X-value at mouse cursor

- %ymouse: Y-value at mouse cursor

- %tmouse: Z-value at mouse cursor

- %xmv: X-value of the nearby marker position

- %ymv: Y-value of the nearby marker position

- %tmv: Time value of nearby next marker position

- %nmv: Name of the nearby marker position

- %imn: InSpectra Expert module name

- %rms: RMS value of the selected plane (based on incoming values)

By default, all signal-related placeholders are determined based on the first spectrum. To identify another spectrum, use a colon followed by the word "spectrum" and the index of the spectrum, e.g. "%sn:spectrum1", in order to refer to the first spectrum.

Use the optional formatting string "w.p" to specify the format of the numeric parameters, where "w" is the width and "p" is the precision. The width is the minimum number of the characters shown. Precision is the number of decimal places. Example: "%5.3y1" indicates the Y-value for marker X1 with a width of 5 characters and a precision of 3.

The display always shows the information for the uppermost signal in the main window. The following figure shows the definition of an additional legend (right) and its display (left).
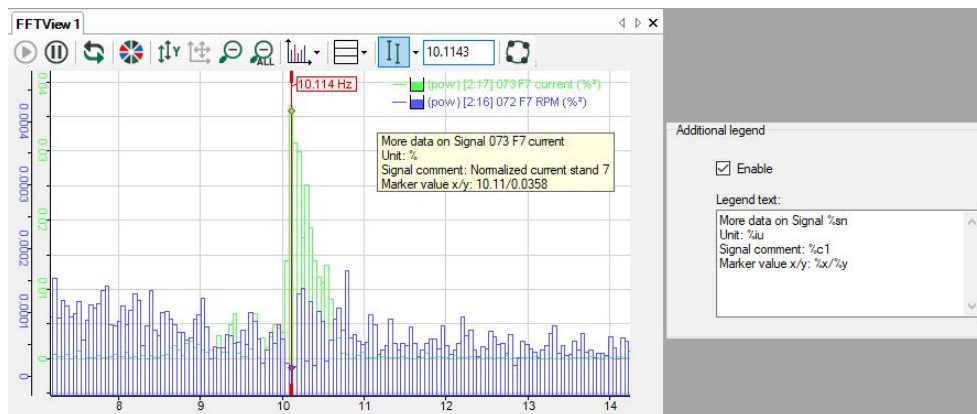
Synchronization

By default, if only one spectrum is displayed in the FFT view, identifiers, markers and zones are synchronized with this spectrum and this setting is not available. If multiple spectra are displayed in the FFT view, you can define the main spectrum here which will be used for synchronization.

Pause/Continue

This function is only available in *ibaPDA*. If this option is enabled, the visualization of the FFT is controlled by a digital signal. The FFT calculation is continued.

If the digital signal is TRUE (1), the visualization is paused and the display shows the frozen image of the last result.

If the digital signal is FALSE (0), the visualization continues and the display is updated regularly.

You can also enter a time in s after which live mode is automatically continued.

5.20.2   Visuals

In the dialog of the *Visuals* node, you can set the appearance and colors of the FFT view.
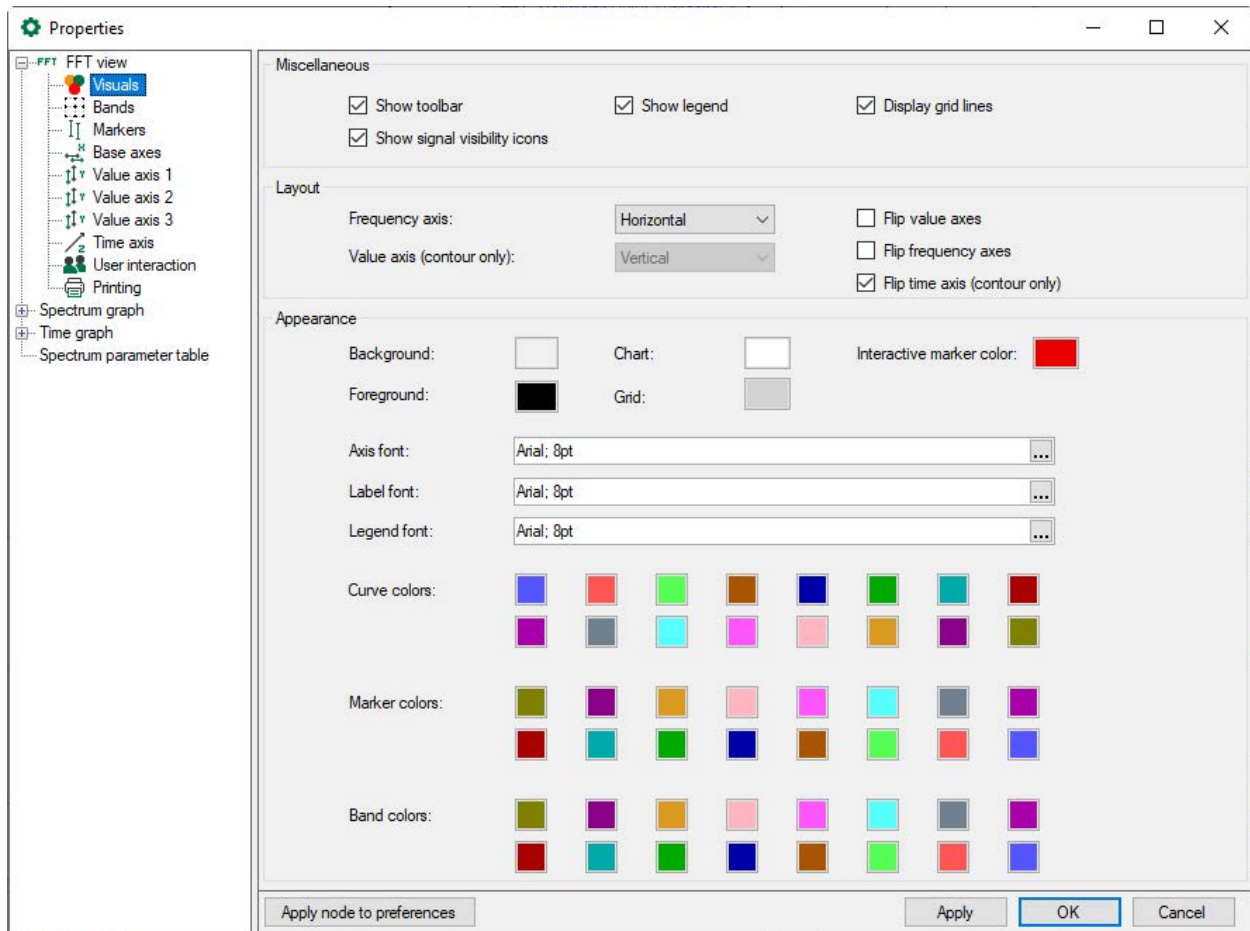
Miscellaneous
You can set whether the toolbar, legend and grid lines are displayed or not.

If you have checked the "Show signal visibility icons" option, you can hide and show the signal by clicking the eye icon in the signal legend.

Layout
You can change the alignment of the FFT axes from horizontal to vertical or vice versa by selecting the relevant option from the picklist *Frequency axis*. You can also flip the individual axes.

For a contour view, the color axis (value axsis) can be displayed horizontally or vertically next to it.

Appearance
Here you make the settings for colors and fonts. For the coloring of curves, markers and bands, 16 colors are available, which are automatically assigned to the corresponding items one after the other when they are added in the view.

5.20.3   Bands

The display supports frequency and value bands. These bands highlight certain parts of the spectra in a different color. Frequency bands (horizontal) have a static or dynamic average (center frequency) and a delta width. Value bands (vertical) start at a dynamic or static value and either reach upward to the next value band or positive infinity.

The frequency bands can optionally be assigned to individual spectra or to all spectra. Value bands apply to all spectra.

Bands are configured in the properties dialog in the node *Bands*. There are two types of bands:

■ You can allocate *custom bands* to any spectrum or all spectra

■ *InSpectra bands* are bands that were configured in the calculation profile of an InSpectra module

If you have selected *Band spectrum* (instead of *Original spectrum*) in the main node *FFT view*, the *Band spectrum* tab appears. For settings see chapter ↗ *Band spectrum*, page 127.
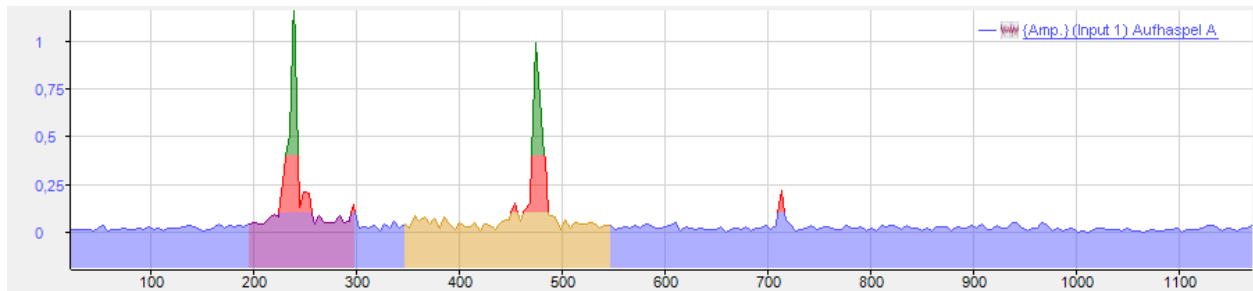
Custom bands

In the *custom bands* tab, you define the frequency bands with a static or dynamic center frequency and a delta frequency. You can allocate a color to the band and a certain spectrum or all spectra.

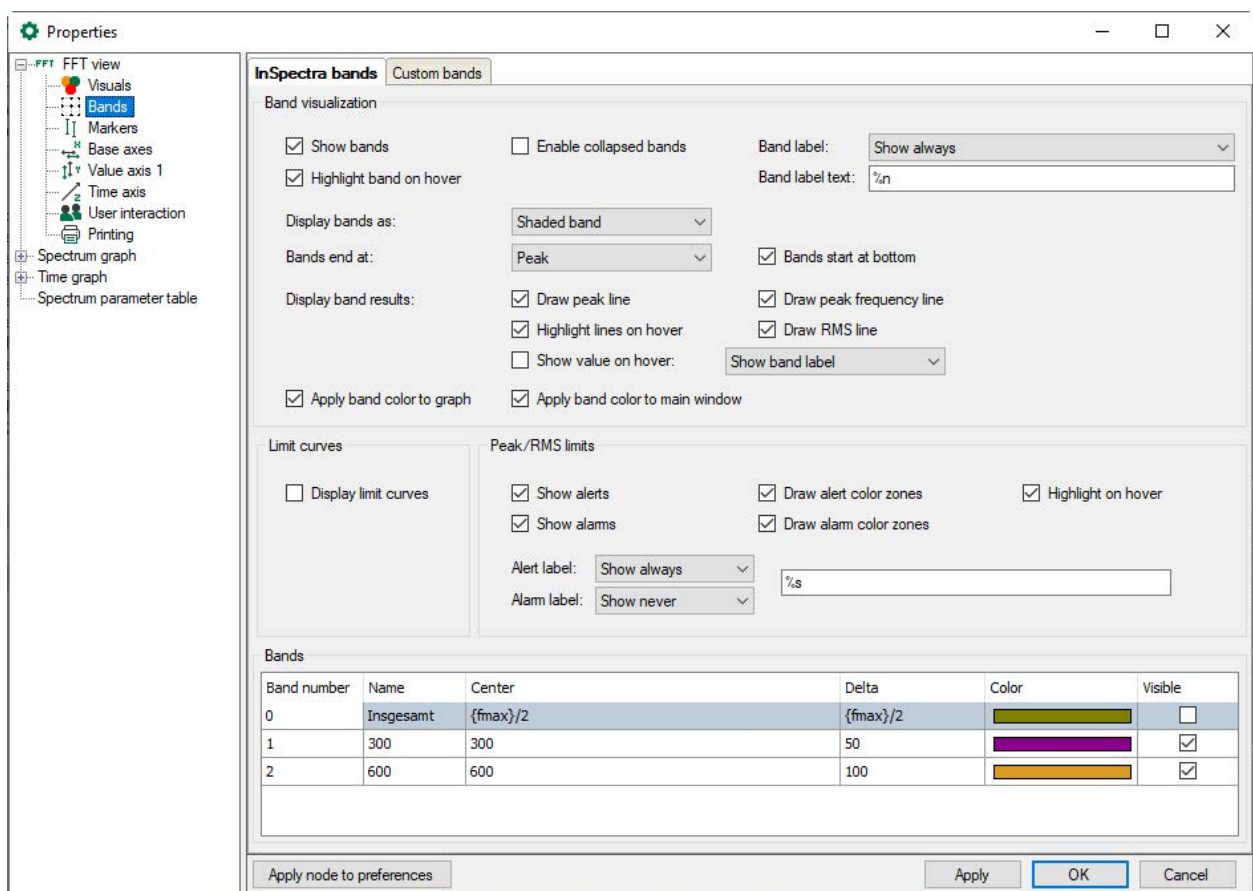In the diagram below, you can see the effects of the following settings.

Example:
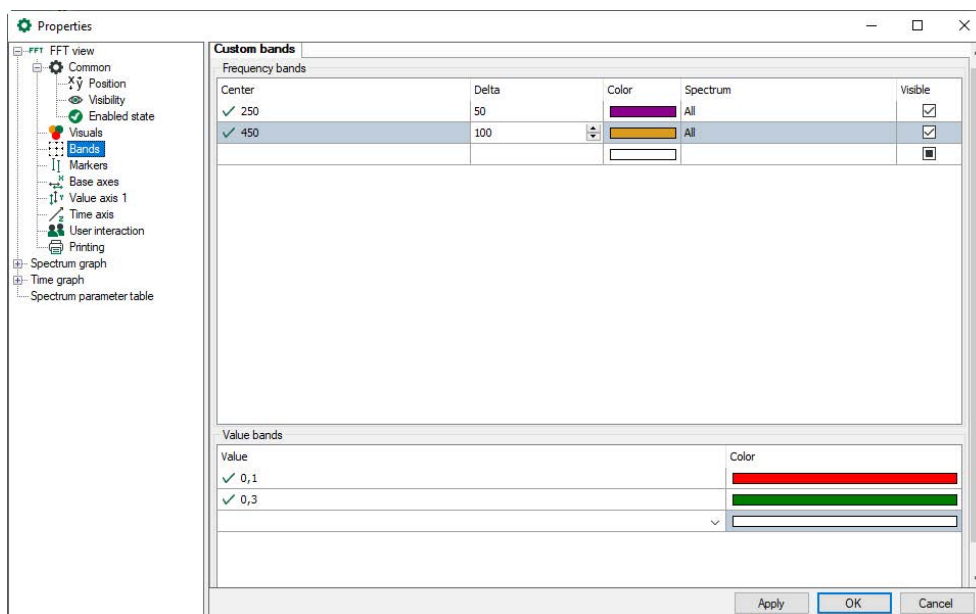
InSpectra bands

If you use the FFT view with InSpectra, an additional *InSpectra Bands* tab will appear in this dialog.


Band settings

Display properties of the InSpectra bands can be determined in the *Band settings* area.

You can enable the collapsed appearance of the bands and whether the band is highlighted on hover. If this option is enabled, the band is highlighted in the display of the frequency spectrum and in the data table.
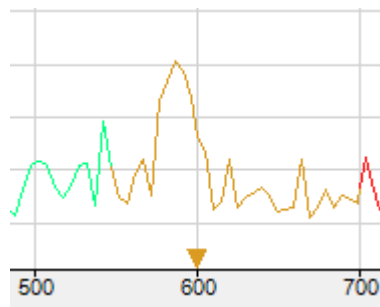
You can determine when the band labels are displayed (never, always or on hover) and what is displayed in the label. If you click the band label text field, a list of parameters appears that you can use for dynamic information in the label text.
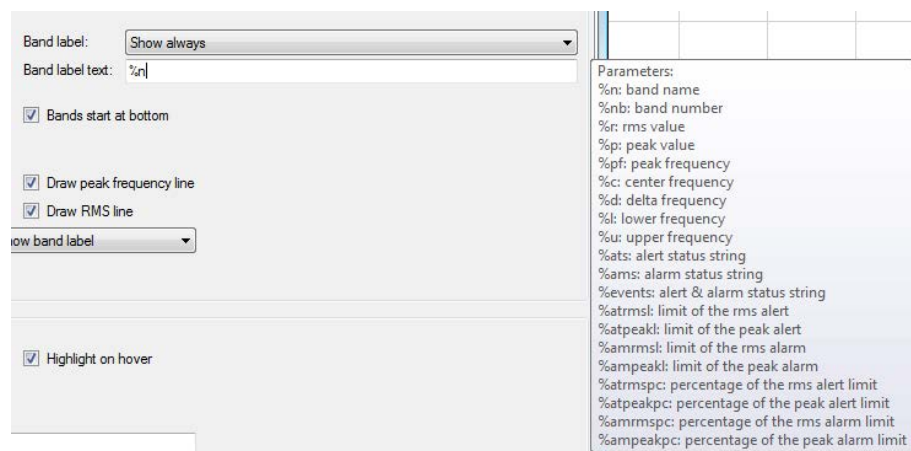
The following parameters can be used:

- %n: Band name

- %nb: Band number

- %r: RMS value

- %p: Peak value

- %pf: Peak frequency

- %c: Center frequency

- %d: Delta frequency

- %l: Lower frequency

- %u: Upper frequency

- %ats: Alert status string

- %ams: Alarm status string

- %events: Alert and alarm status string

- %atrmsl: Limit of the RMS alert

- %atpeakl: Limit of the peak alert

- %amrmsl: Limit of the RMS alarm

- %ampeakl: Limit of the peak alarm

- %atrmspc: Percentage of the RMS alert limit

- %atpeakpc: Percentage of the peak alert limit

- %amrmspc: Percentage of the RMS alarm limit

- %ampeakpc: Percentage of the peak alarm limit

You can determine whether the bands should begin at the lower margin and where they should end (at the end of graph, at the peak or at the RMS value). The frequency bands can be shown as a shaded band or non-shaded band or only as a line at the center frequency.

The characteristic values of the bands can be displayed as lines, which can be highlighted on hover. Example:

1 line for peak value

2 line for RMS value

3 line for frequency peak value, highlight on hover

In addition, the band color can be adopted as a curve color both in the spectrum as well as in the main window.

Event settings
Display properties for events (alerts, alarms) can be set in the *Event settings* area. Dynamic label texts can also be defined for events. See band settings below.

Bands
The bands configured in an InSpectra profile are shown in the table below in the dialog. The name, center frequency and delta frequency are already defined in the InSpectra profile and can no longer be changed here. The color and visibility can still be changed here.

BandNumber	Name	Center	Delta	Color	Visible
0	Insgesamt	{fmax}/2	{fmax}/2		☐
1	300	300	50		☑
2	600	600	100		☑

5.20.3.1 Band spectrum

The spectra of the individual bands can be displayed in the *Band spectrum* mode.
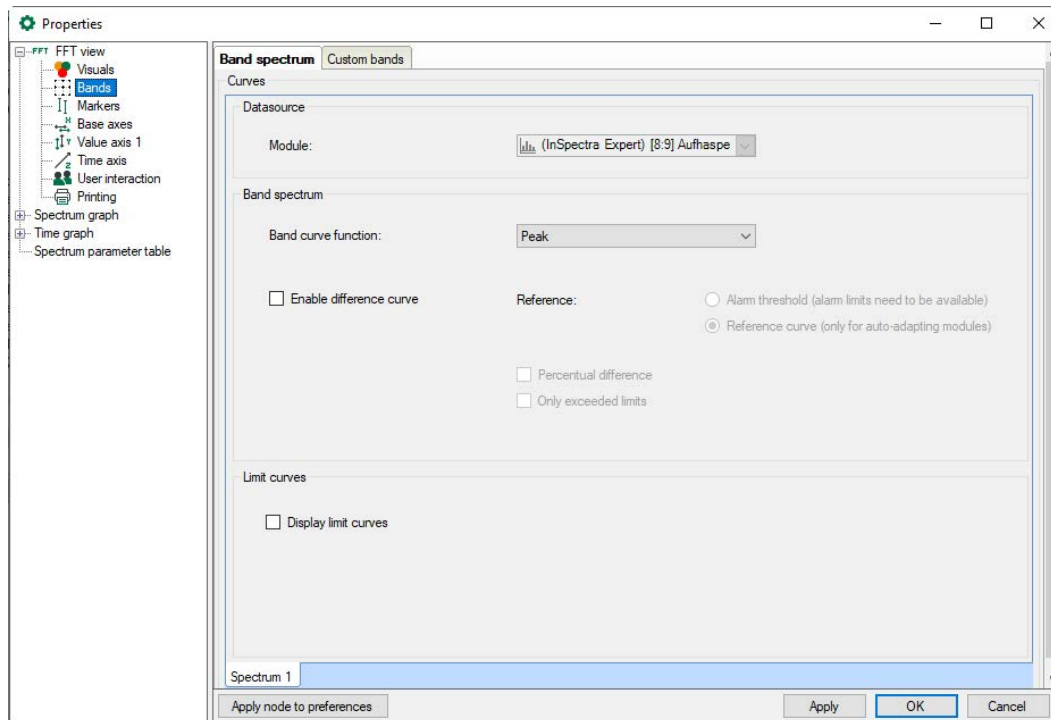
Data source
Display of the module

Settings
You can select the displayed curve function in the *Band curve function* drop-down menu:

■ Peak, Peak fequency, RMS

Enable difference curve
If the FFT view shows an auto-adapting module, a difference spectrum can be displayed representing the difference between the reference curve or the alarm thresholds for each band.

The *Percentual difference* shows all values in percent to the reference values. If *Only exceeded limits* is enabled, the Y-value is set to 0 for all bands in which the limit is not exceeded.

Display limit curves
Enable this option to show the limit curves in the FFT display.

5.20.4 Markers

For a better evaluation of the frequency analysis, markers can be displayed in the main window and in the spectrum graph. The markers mark frequency values along the x-coordinate. Frequencies of interest can be, for example, a constant or variable fundamental frequency, known resonance frequencies or the harmonic components.

There are several types of markers having different functions:

■ Interactive marker
  There is one interactive marker. This marker can be switched on or off and manually moved. In the time graph, only this type of marker is available.

■ Configured marker
  Several markers of this type can be used in a display. This marker cannot be moved manually but its position is not necessarily fixed. The marker position can be set to a constant value or controlled by a signal.

■ InSpectra marker
  This marker is configured in the InSpectra Expert module and cannot be moved manually.

■ Tracking marker
  The tracking marker can be used to track the peak value of a spectrum in the contour plot.

For all markers, harmonic markers and sideband markers can be additionally configured.

You can enable or disable the display of the interactive marker by clicking the button in the tool bar of the FFT view. Depending on the focus, the button refers to the main window and the spectrum graph or to the time graph.

You enable or disable the display of the configured markers and the InSpectra marker solely in the properties dialog of the main window.

The markers are configured in the properties of the FFT view (main window).

For all markers, you can set that the factors are shown in the label of the harmonic markers. And it is possible to display sideband labels that show the offset.

In the waterfall display, you can connect the marker dots between the planes.

The intersections of the markers with the spectrum are displayed by small diamonds. You can hide these with the option *Hide marker dots*. If *Connect marker dots between planes* is also selected, the markers are shown as a line in the waterfall and in the contour view.

The marker lines can also be hidden in the waterfall display.

For better differentiation, you can assign your own line patterns or bold type to the different markers (first harmonic, harmonic markers and sideband markers).

5.20.4.1 Interactive marker

The interactive marker is used for spontaneous reading of X and Y values in a spectrum display. It can be shown or hidden at any time.
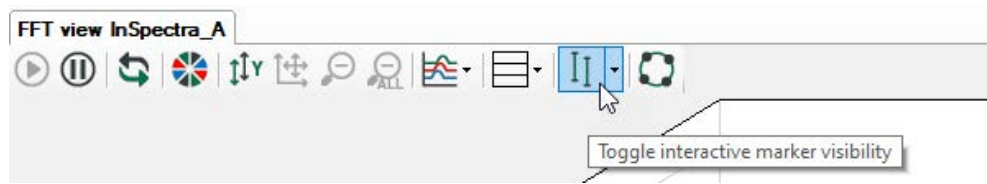

When activating for the first time, the marker is displayed at the position 1 Hz. Every time the marker is switched off and on again, it memorizes the last position.

You can change the marker position either by clicking on the thick ends at the top or at the bottom of the marker or by using the cursor keys:

| Keys	Function
<Cursor to the left>/<cursor to the right>	Normal step width
<Shift>+<cursor to the left>/<cursor to the right>	Large steps
<Ctrl>+<cursor to the left>/<cursor to the right>	Small steps

When you move the mouse over the thickened end of the marker, the cursor changes to a double-arrow symbol. You can then move the marker. In the label with the marker color (default: red), the X value is displayed on the base axis. If there are several base axes, you must specify in the settings of the base axes which axis the marker should refer to (Marker Axis). In addition, X and Y values are displayed at the intersection of the marker with the spectrum.
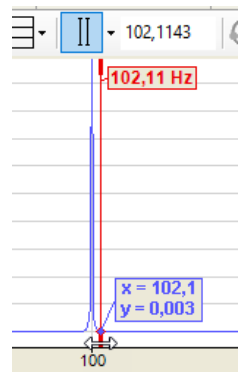
Center markers

Since the marker has a certain position on the frequency axis, it is possible that it is not visible in the image anymore after zooming. Switching the marker off and on to bring it back into the image is useless, as it does not change its position because of that.

This is what the *Center Marker* function is for. With this function, you place the marker in the center of the section currently visible.
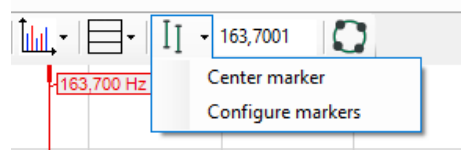
Click on the arrow symbol at the marker button in the tool bar and then on "Center marker."

Configure marker

In addition to general properties such as color and label, you can also configure harmonic markers and sideband markers in the settings.
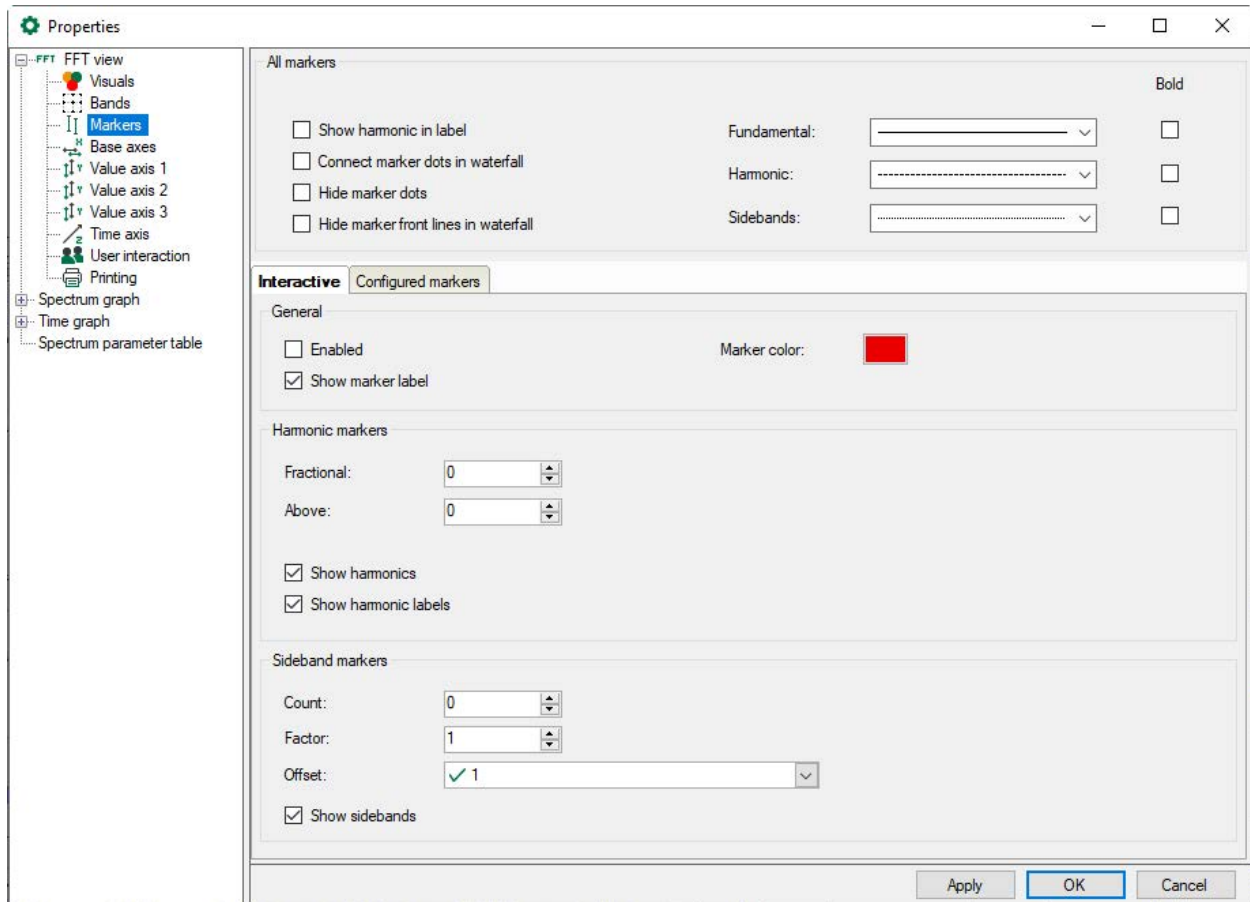
Harmonic markers always have a frequency that corresponds to an integer multiple of the main marker. For the harmonic markers, determine the requested number of the harmonic components below and above the current marker frequency. For the harmonic frequencies, further lines are displayed. Additionally, in the "Markers" branch, enable the option "Show harmonic labels" to display the frequency values on the markers.
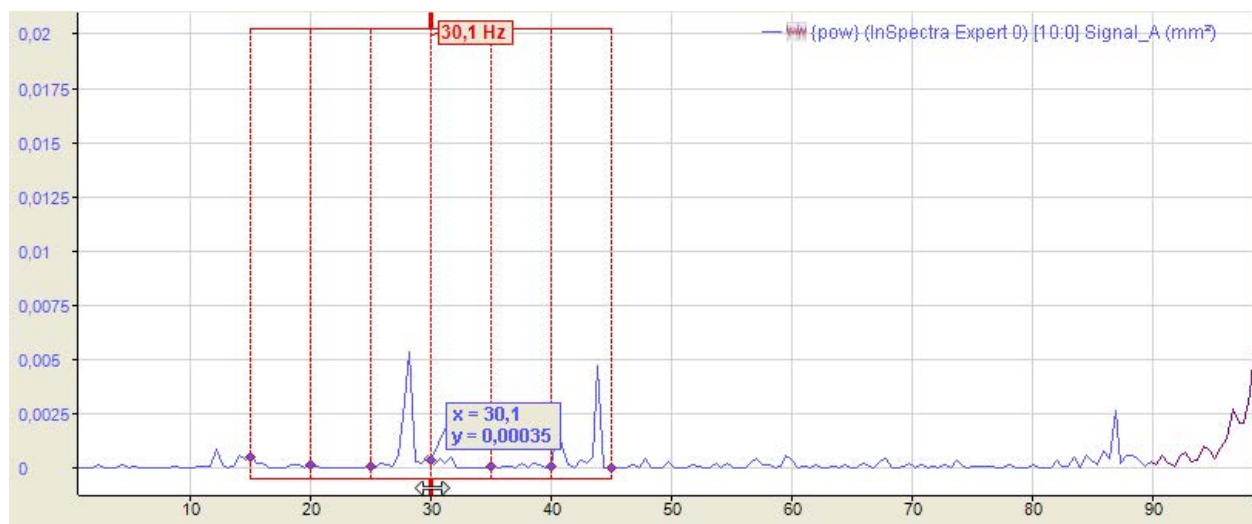
The above figure shows an interactive marker with 1 harmonic component below and 2 harmonic components above the marker frequency of 26.5 Hz.

The values of the harmonic markers are displayed at the maximum height of the value axis. The unit of these values corresponds to the unit of the base axis (see the chapter ➚ *Base axes*, page 135). The view can be configured to show only the frequency of the main marker.

An adjustable number of sideband markers is added symmetrically right and left of the main marker. The distance to the main marker and the neighboring sidebands is the sideband offset, represented in units of the base axis. The sideband offset can be a constant value or an analog signal. The offset can also be changed with the mouse by touching one of the outer markers with the cursor and moving it to the left or right with the mouse button pressed down.

You can enter a factor if the sideband marker is to be at a multiple or fraction of the marker frequency. When the position of the marker in the display is changed by dragging, the factor is updated.

The above figure shows an interactive marker with 3 sidebands and offset of 3 Hz each.

Small diamonds indicate where markers and spectra intersect. If the mouse pointer is moved near a diamond, its coordinates (X and Y values) become visible.

Harmonic component and sideband markers can be displayed in combination, too. The figure below shows a view with a harmonic marker below and two above the main marker. The sideband offset is set to 10 Hz.
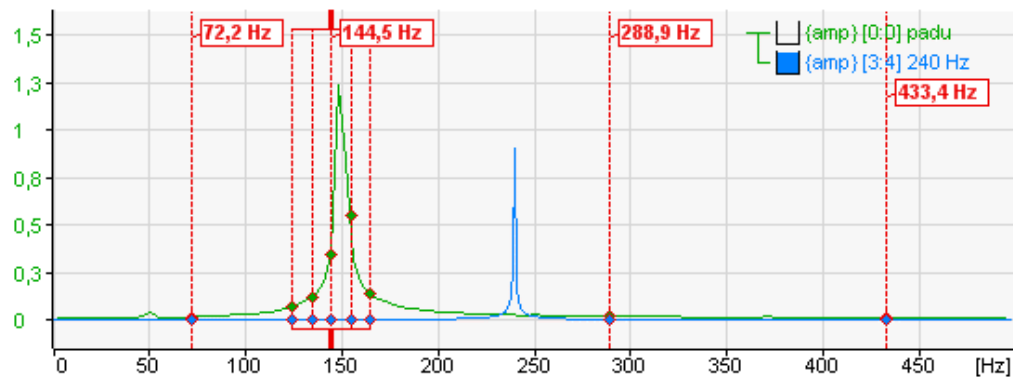
Note

If the sideband offset is specified by a signal, the value of this signal always has to be >=0. If the value is negative, the offset = 0 and no sideband markers are displayed.

Note

You can make the general settings of the markers in the preferences. You will find individual settings for the FFT views in the properties of a view.

For further information, see chapter ⬈ *Properties and preferences FFT view*, page 119

5.20.4.2   Configured marker

The so-called configured markers can either be anchored at certain positions on the base axis with fixed values or moved dynamically along the base axis by means of analog signals.

The markers must first be defined and configured. You can configure the markers in the *Properties* dialog of the FFT view, in the "Marker" branch.

Settings
Here you define whether a marker label is displayed and which information is to be displayed additionally: Value on the X-axis and/or factor.

To create a marker, you simply have to enter the required information in the table line. As soon as you click in the empty space below, a new, empty line is added.

Name
Enter a clear name to be able to easily identify the marker. The name is shown in the display later on, too.

The entries for fundamental frequency, factor and unit determine the position of the marker on the base axis. The marker position is calculated by multiplying these three parameters.

Fundamental
You can enter a fixed value or select a signal for the fundamental oscillation or fundamental frequency. To select a signal, click in the table line and then on the arrow symbol. Select the signal from the signal tree.

If you want to use a signal for controlling the marker position, select a signal complying with the frequency you want to monitor.

In the example of the above image, we have selected a velocity, more precisely the speed of a drive in rpm, to control the marker. In doing so, frequencies of interest can be easily tracked, e. g. during the acceleration and braking phase of a machine. This is especially easy to see in the main window's waterfall and contour view.

Note

| i | If the signal for the fundamental frequency is negative, the marker is not displayed. |

Factor

The default value of the factor is 1. You can enter another factor if, for example, the marker is to be positioned at a multiple or a fractional part of the fundamental frequency.

If the position of the configured marker in the display is changed by dragging, the factor is updated.

Unit

As to the unit, you can choose between Hertz (Hz) and revolutions per minute (rpm). Depending on the settings, another, internal factor is taken into consideration:

- Hz: Factor = 1

- rpm: Factor = 1/60

Order can also be selected for order spectra.

Harmonics

As with the interactive marker, you can individually determine the number of harmonic markers above or below the marker frequency for every static marker. Additionally, this mode allows you to select whether only the even or odd harmonic components are taken into consideration or both types.

Sidebands

As with the interactive marker, you can individually determine the number of sideband markers and the sideband offset for every marker, static and depending an a signal value. If you drag the sideband markers, the factor is updated during dragging.

Sidebands can have a different unit than the marker itself. You can select the unit here.

Note

| i | If the sideband offset is specified by a signal, the value of this signal always has to be >=0. If the value is negative, the offset = 0 and no sideband markers are displayed. |

Color

Here, you can allocate an individual color to every static marker

Visible

This option decides whether a fixed marker is displayed or not. This is the only possibility of enabling or disabling static markers for the display. The marker button in the toolbar of the FFT view does not control the static markers!

"Enable collapsed markers" option

When you enable this option, an additional column appears in the marker table, in which you can decide for each marker whether it is normal, i.e. it should be displayed as a line and possibly with a label, or only as a triangle based on a spectrum.
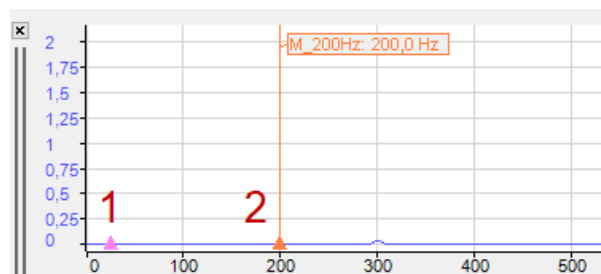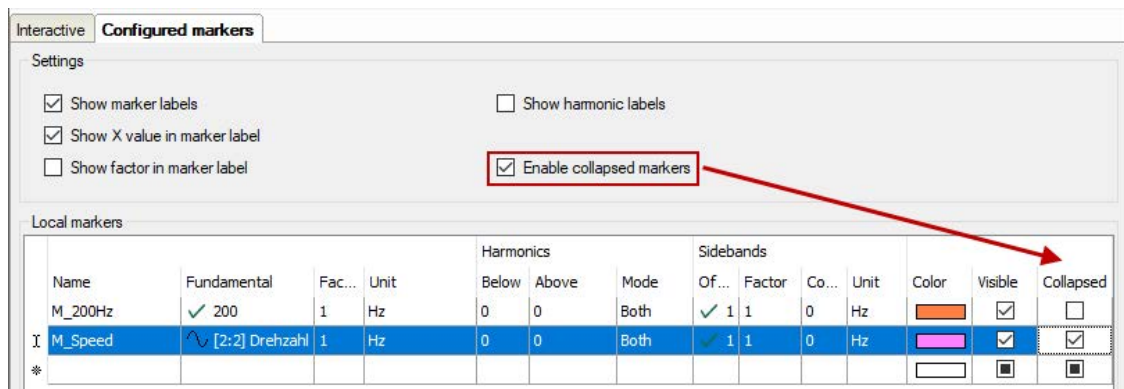
The example above shows a collapsed marker (1) and a normal marker (2).

InSpectra marker

The InSpectra markers are shown in the table below.

Number	Name	Fundamental	Color	Visible
Type: Linked				
0	Mark peak	{fmax}		
0	Max	{fmax}		
Type: Normal				
0	Max	{fmax}		✓
1	300	100		✓

The settings of the InSpectra markers can only be changed in the InSpectra profile. Only the visibility can be set here.

5.20.5   Base axes

You can choose between linear and logarithmic display here and whether the axis unit is displayed or not. Typically, the base axis has the unit Hz in the frequency domain and seconds in the time domain.

The base axis can be inverted so that, for example, the vibration duration (T) is shown instead of frequency (f). The following applies here: $T = 1/f$.

Properties

The figure above shows the properties of the base axes in the FFT view By default, the scaling values are automatically determined. However, you can also make a manual specification.

In case of using a manual scale, beside static values you have the possibility to use a signal for determination of beginning and end values of the scale (min, max). Therefore, just click on the arrow in the Min or Max field and select the appropriate signal in the signal tree.

By default, the table of axes only shows the default Hz axis or order axis with optional setting options for the position (top/bottom), notation (auto/standard/scientific), and axis unit. To change these settings, click on the corresponding cell and select them from the drop-down list.

If you have defined several base axes, select which base axis the markers in the display should refer to in the *Marker Axis* column.

Use the *Show* option to control whether the base axis is displayed or not.

You can add and configure other base axes as needed. These additional base axes can have a different scale, reference value or unit.

An offset can be configured for a custom X-axis. Example: a cycle is sampled with an InCycle Expert module, with a start trigger at 50° and stop trigger at 150°. With an offset of 50, the displayed scale starts at 50°. It is also possible to configure a dynamic offset i.e., an offset depending on a signal value.

By default, the basic display settings for the base axes are adopted from the main window and from the spectrum graph. You can then either change some display settings for the base axes for the frequency spectrum display or synchronize them again with those from the main window.

Note

> ℹ️ The manual "Minimum" and "Maximum" scale settings always apply only to the main axis (Hz). All other base axes enabled in the FFT view are scaled automatically.

Each axis to be shown in the graph is represented by a line in the table below.
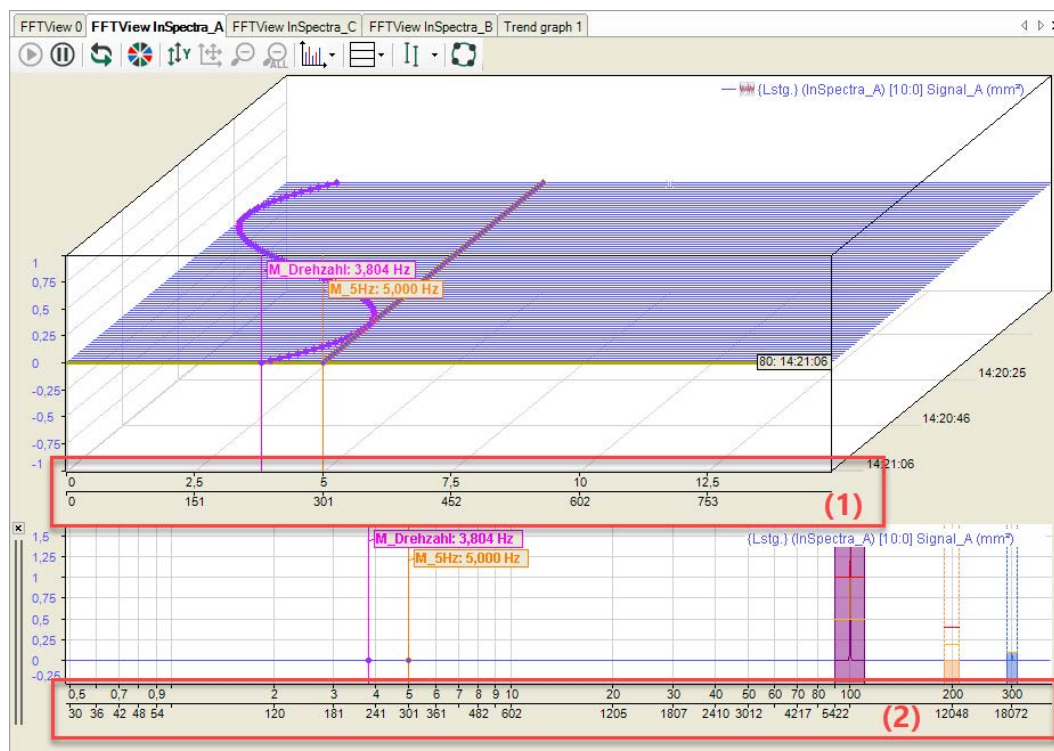
In the following example, two base axes were defined. The first shows the frequency in Hz and the second in rpm. The base axes in the main window (1) are linear. The base axes in the display frequency spectrum (2) are logarithmic.

In addition, the main window was zoomed in.

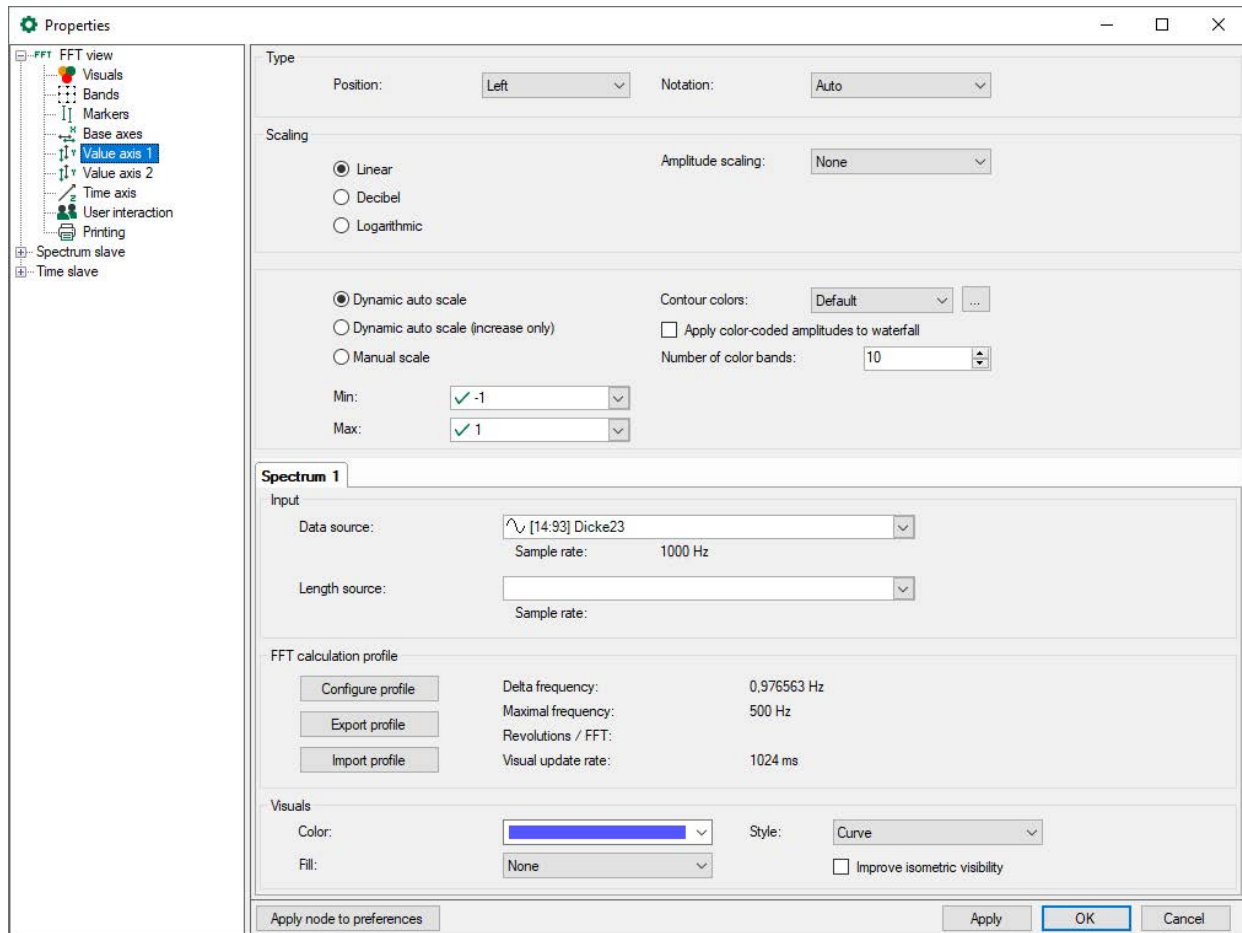
Note

i	Axis = 1/scaling factor

5.20.6   Value axes

A value axis can contain several spectra. Using the legend, you can change the value axis used by a spectrum by changing the sequence of the signals. A value axis can be deleted via its context menu. This also deletes all spectra on this axis. You can also display the settings for the value axis via the context menu.

Settings for type, scaling and view correspond to the usual settings in *ibaPDA* and are self-explanatory.

Scaling
Linear, decibel or *logarithmic* can be set as scale type. This scale type is applied to the appearance of single spectrum, waterfall and contour.

Amplitude scaling
Depending on the requirements for the visualization, it may be useful to either emphasize or suppress the amplitudes for the display. The following methods are available:

- Peak-to-peak
  Amplitude values are practically multiplied by a factor of two

- RMS
  Amplitude values are practically divided by the root 2, thus moving closer to the RMS value.

- Percentage of signal
  The scaling of the amplitude values is defined as a percentage of a signal. Select the signal in the *Reference signal for percentage* field.

■ Percentage of band peak
The scaling of the amplitude values are based on the peak in a specific band. Enter the band number in the *Band number for percentage* field.

Scaling mode

■ Dynamic auto scale: if you enable this option, the scaling is always adjusted to the highest and lowest signal amplitudes in the graph (in both directions). ⬚

■ Dynamic auto scale (only for enlarging): When you enable this option, the scaling is continuously adjusted with the highest signal amplitudes. If the amplitudes go beyond the trend view again, the scaling still remains unchanged. ⬚

■ Manual scale: if this option is selected, the Min and Max scale values can be manually entered or selected from the field next to it. Beside a static value, you can also use any known measured or virtual analog signal configured in the I/O manager.
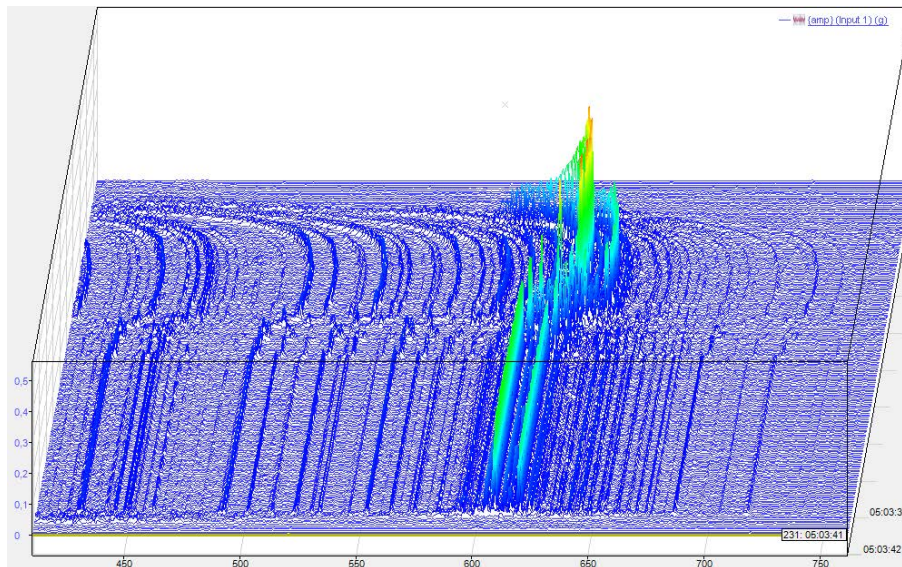

Note

If *Decibel* is selected, the values of the manual scale nevertheless relate to the linear axis. The resulting decibel values are shown next to them.

Color settings

You can choose one of the prepared color schemes for the contour colors (default, grey, jet-white, jet or heat). If you do not like any of the offered color schemes, you can design your own color schemes. To do this, click on the <...> button and the *Manage perspectives* dialog opens. Here you can define new color schemes or change existing ones.

In addition, the colors of the contour view can also be applied to the waterfall view. To do this, enable the *Apply color-coded amplitudes to waterfall* option. The number of color bands defines the color resolution. A maximum of 50 color bands is possible.

Note

> **i**   If *Apply color-coded amplitudes to waterfall* is enabled, custom value bands are displayed only in the spectrum graph.

Spectrum x

By default, a *Spectrum 1* tab is available. These settings are used to process a new signal that is dragged into the FFT view. You can drag multiple signals into an FFT view. If the signals share the same value axis, you will find a separate tab for each signal or spectrum. In the properties, the settings for each spectrum can be changed individually. If each signal or spectrum has its own value axis in the display, each spectrum in the tree structure on the left gets its own node for the value axis.

No calculation profile can be configured in the FFT view of *ibaAnalyzer-InSpectra*. A profile can only be configured for the data acquisition in *ibaPDA* without *ibaInSpectra*. This option is only used for the visualization. The results cannot be acquired. The FFT calculation profile, however, is compatible with InSpectra profiles.

Input

■ Select *Data Source* to specify the signal or InSpectra module to be displayed. If you have already dragged the signal into the display via drag & drop, the field is already filled in.

■ You only need to enter a *Speed Source* if you want to perform speed-dependent analyses or work with the order spectrum.

FFT calculation profile

The way in which *ibaPDA* calculates an FFT is defined in so-called profiles. A profile is a collection of various parameters that are relevant to an FFT.

Each spectrum can be calculated with a different profile. You can define as many profiles as you wish and save them in the system via the export function. You can also import saved profiles into a spectrum.

In the profiles, parameters are defined, including

■ Sensor data (important for vibration measurements)

■ Spectrum type (e.g. integrate, differentiate)

■ Speed data (important for order analysis)

■ Number of samples and lines, overlap

■ Basic calculation rules for the FFT (e.g. calculation mode, averaging, window type)

The button <Configure profile> opens the configuration dialog for profiles. The buttons <Export profile> and <Import profile> below can be used to export and import profiles.

The calculation parameters and their meaning are explained in the ibaInSpectra manual in chapter *Setting calculation parameter*.

The information next to the "Profile..." buttons describes the influence of the acquisition parameters:

- Delta frequency:
  Shows the frequency steps between the results of the division of maximum frequency by bin count.

- Max. update rate:
 Time required for update of the FFT view depending on bin count and overlap factor.

To avoid having to look at the properties to see the profile parameters, the display shows the *Spectrum Parameter Table*. This table is part of the FFT view and can be activated via the drop-down menu in the FFT view. The parameters from the calculation profile shown in the table can be defined in the *Spectrum Parameter Table* node in the FFT view properties. See chapter ↗ *Spectrum parameter table*, page 157

View

A spectrum can be visualized in four different ways:

- Lines,

- Bars,

- Curve or

- Dots

The inner area of a spectrum can be filled with a transparent or opaque color. The figure below shows the four types of spectra visualization, all filled transparently.
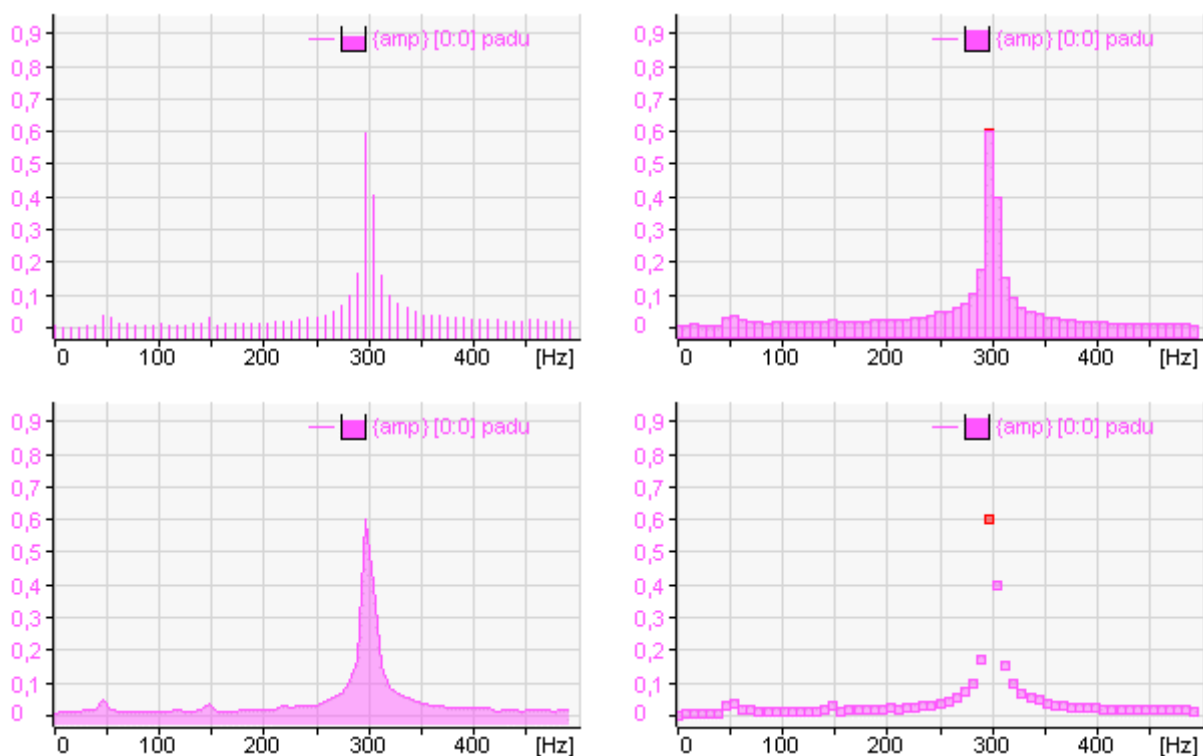
The option *Improve isometric visibility* is used to make spectra opaque. This makes some effects in the waterfall view more visible.

5.20.7   Time axis

In the *Time axis* node you can define the display options for the waterfall view.
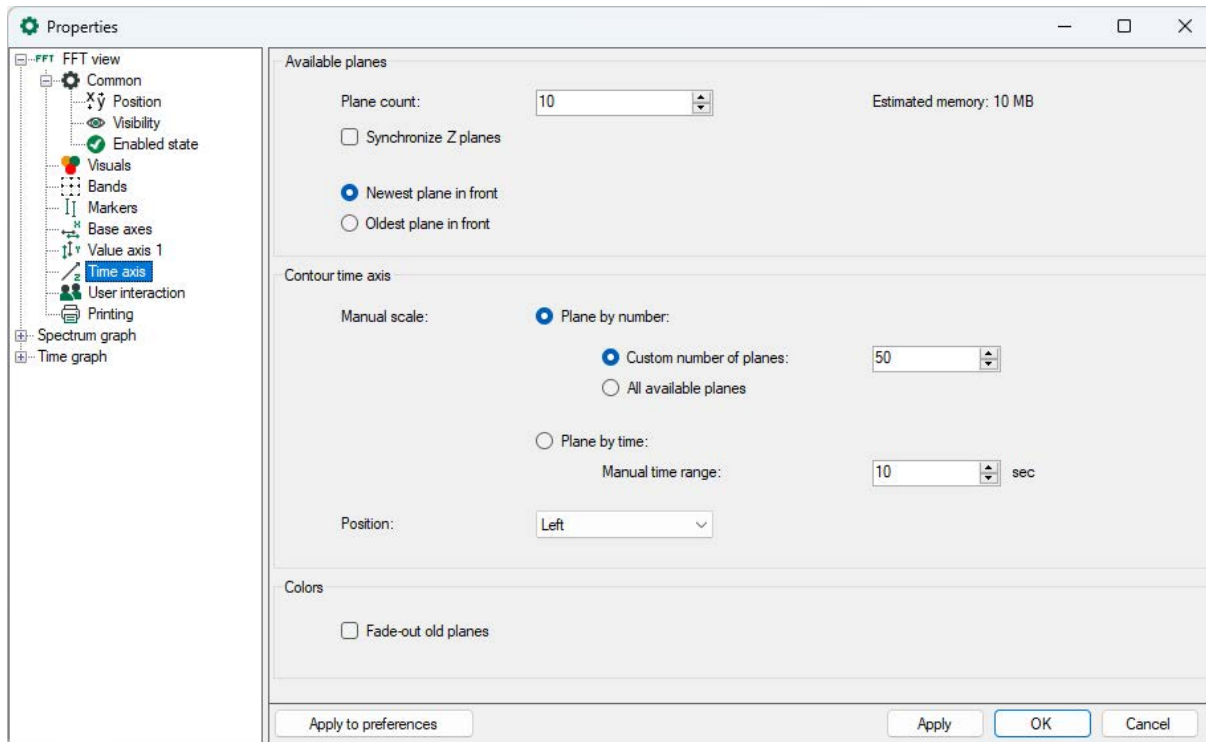

Available planes

- Plane count
  Set the number of planes you wish to be displayed in the Z direction.

- Synchronize Z planes (option in *ibaPDA* only)
  If you use multiple spectra in an FFT view, the spectra move forward at their own pace by default, depending on their sample rate or bin count.
  With this option you can synchronize the advance rates of the Z planes across multiple spectra. With this option enabled, the FFT view will not allow a spectrum to advance over the Z planes until all spectra have generated a new FFT result. While the view is waiting for certain spectra to generate results, the other spectra keep showing their newest results on the front plane.

- You can choose whether the oldest or newest plane is in the foreground.

- Determine plane count automatically (option in *ibaAnalyzer* only)
  Number of spectra is detected automatically (max = 500).

Contour time axis

- Manual scale
  You can choose between a manually defined number of planes or whether a new plane will be displayed after a defined time.

- Position
 Specify the position (left or right) of the time axis.

5.20.8   Spectrum graph and spectrum table

In addition to the main window, you can open a graphical and/or tabular display of the data of the frequency spectrum. Click on the button for the window menu in the toolbar of the FFT view for this purpose.
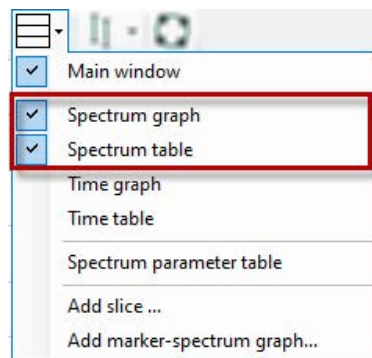
Graphical display and data table form one group, as the table always provides the data matching the spectrum in the graph. However, the graph and table can be individually displayed or hidden.

In addition, the graph and data table can be minimized (see following figure right side) or displayed together (see following figure left side). To do this, simply click on the small triangle on the right margin of the display:
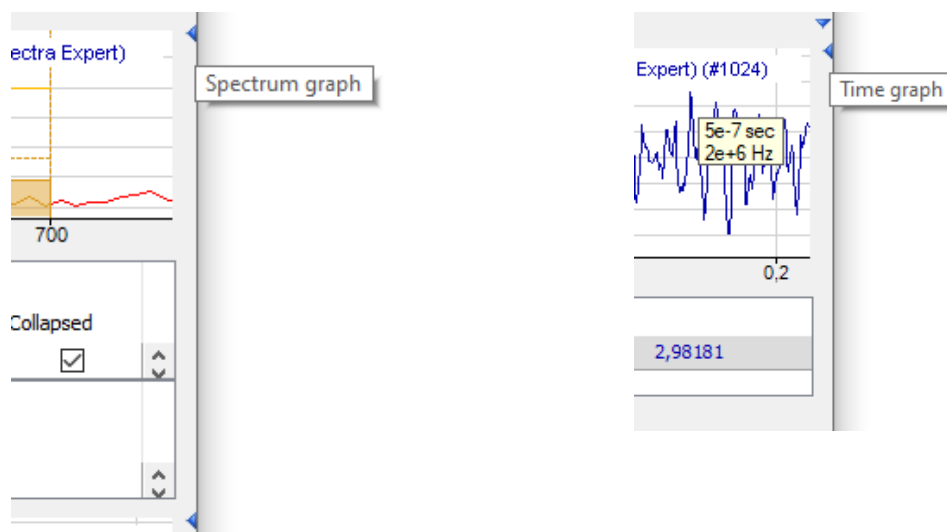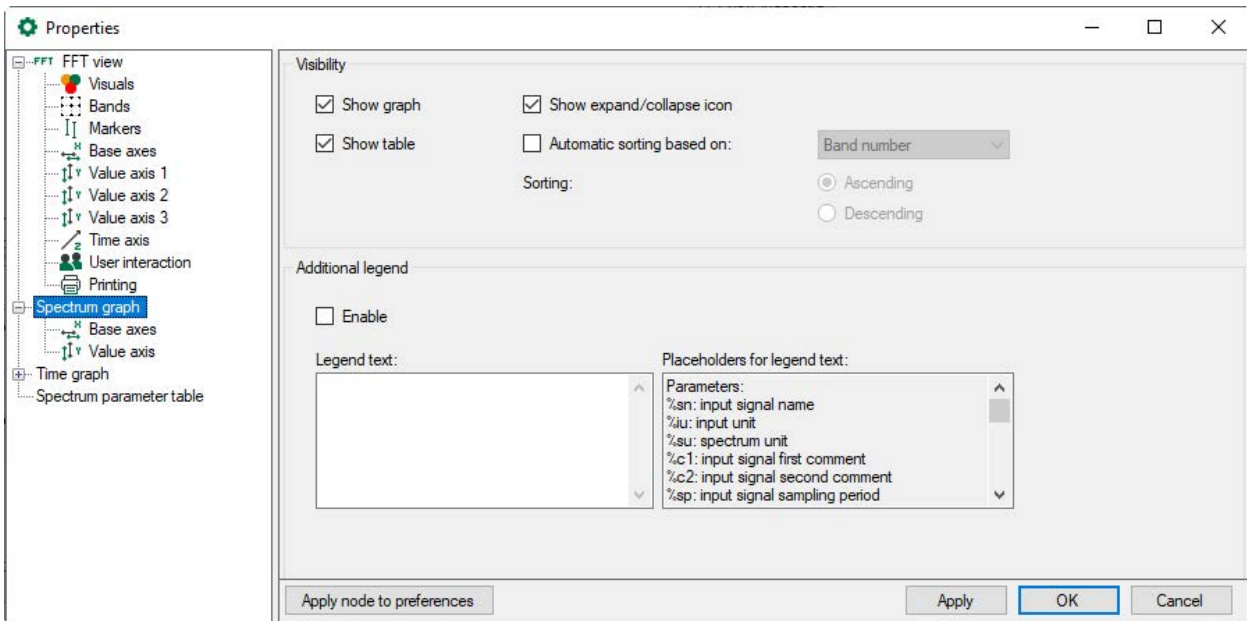

Note

i	Without *InSpectra* modules, the spectrum graph shows the same information as the individual spectrum in the main window and the table does not contain any data.

You define general display properties in the properties dialog of the FFT view in node *Spectrum graph*.

Visibility

You can define here whether the graph and the data table for the spectrum graph are shown by default. Even if a view is disabled here, it can be re-enabled later in the FFT view toolbar.

You can also specify whether the small triangles for expanding and collapsing the graph and data table should be displayed.

The data table can be sorted automatically. Define the parameter (column) here according to which and in which sequence the table is sorted.

Additional legend

When this option is enabled, another legend is displayed in the spectrum graph window in addition to the normal signal legend. You can define the content of this legend yourself. For example, you can enter a detailed multi-line text, in which placeholders for dynamic information can also be used. The following placeholders are available:

- %sn: Input signal name

- %iu: Input unit

- %su: Spectrum unit

- %c1: Input signal first comment

- %c2: Input signal second comment

- %sp: Input signal sampling time

- %x: X-value at interactive marker

- %y: Y-value at interactive marker

- %xmouse: X-value at mouse cursor

- %ymouse: Y-value at mouse cursor

- %tmouse: Z-value at mouse cursor

- %xmv: X-value of the nearby marker position

- %ymv: Y-value of the nearby marker position

- %tmv: Time value of the nearby marker position

- %nmv: Name of the nearby marker position

- %imn: InSpectra Expert module name

- %n: Band name

- %nb: Band number

- %r: RMS value

- %p: Peak value

- %pf: Peak frequency

- %c: Center frequency

- %d: Delta frequency

- %l: Lower frequency

- %ats: Alert status text

- %ams: Alarm status text

- %events: Alert & alarm status text

- %atrmsl: Limit value for RMS alert

- %atpeakl: Limit value for peak alert

- %amrmsl: Limit value for RMS alarm

- %ampeakl: Limit value for peak alarm

- %atrmspc: Quota of limit value for RMS alert

- %atpeakpc: Quota of limit value for peak alert

- %amrmspc: Quota of limit value for RMS alarm

- %ampeakpc: Quota of limit value for peak alarm

- %v: the monitored value

- %mtype: monitored type: either "rms" or "peak"

- %etype: Event type: either "alert" or "alarm"

- %s: Event status text

- %lim: Limit value of the event

- %pc: Quota of event

By default, all signal-related placeholders are determined based on the first spectrum. To identify another spectrum, use a colon followed by the word "spectrum" and the index of the spectrum, e.g. "%sn:spectrum1", in order to refer to the first spectrum.

Band-related placeholders can be referred to by the band name (e.g. "%p:bandname") or by the band number (e.g. "%p:band0").

Event-related placeholders can be referred to as follows:

■ %lim:band0:atpeak (Peak alert)

■ %lim:band0:ampeak (Peak alarm)

■ %lim:band0:atrms (RMS alert)

■ %lim:band0:amrms (RMS alarm)

You may use as well the event name instead of "atpeak", "ampeak" etc.

Use the optional formatting string "w.p" to specify the format of the numeric parameters, where "w" is the width and "p" is the precision. The width is the minimum number of the characters shown. Precision is the number of decimal places.

Example: "%5.3y1" indicates the Y-value for marker X1 with a width of 5 characters and a precision of 3.

You can combine most of these techniques:

E.g. "%10.5p:spectrum1:someband" E.g. "%.6pc:spectrum2:otherband:eventname"

5.20.8.1 Spectrum graph

The graphical display of the frequency spectrum always shows the last result of the FFT in two-dimensional appearance or the spectrum selected in the waterfall or contour plot. (The selected spectrum in the waterfall view is shown with a different color, marked in the contour plot with a triangle):

■ Spectrum

■ Frequency bands

■ Value bands

■ InSpectra bands

■ Characteristic values of the InSpectra bands
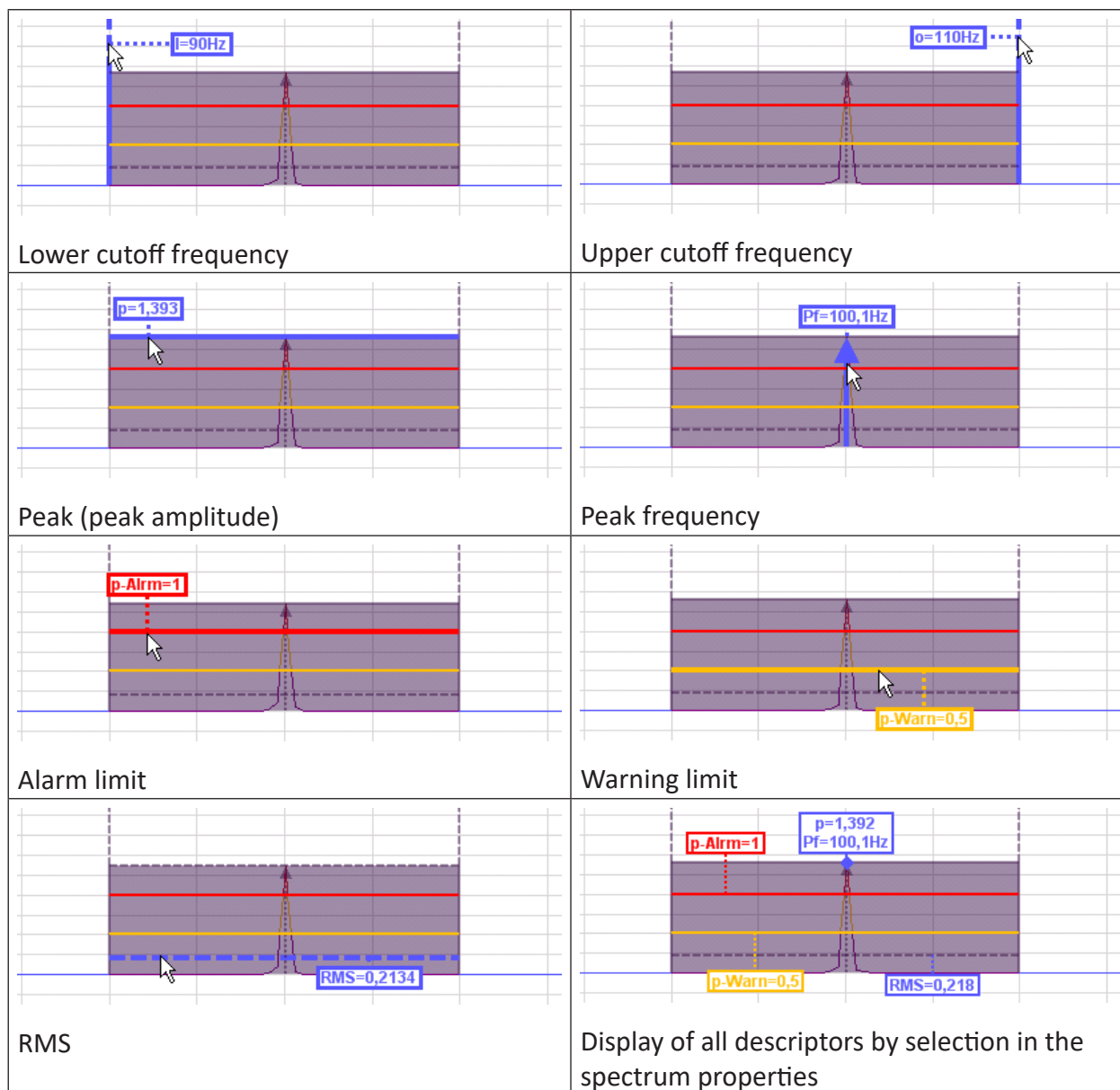
■ Limits of the InSpectra bands
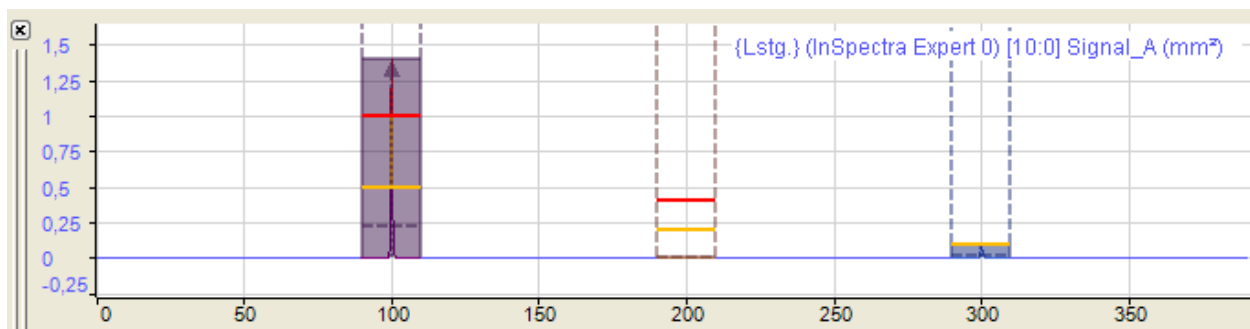
In the figure above the display shows three different frequency bands and at least a part of the spectral graphs from the main window. You can add additional graphs by dragging and dropping them from the main window or from the signal tree via drag & drop. The displays are linked so that all graphs in the small spectral display can also be seen in the main window.

When zooming in, more details can be seen.
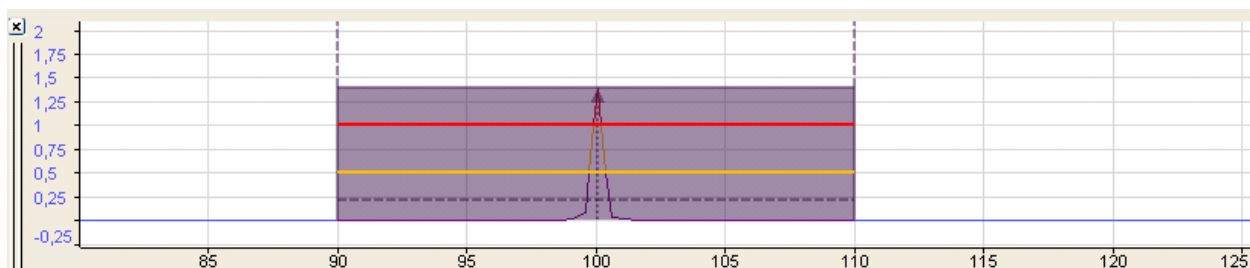
The most important parameters of the frequency bands and of the spectrum are shown with dotted and colored lines. You are shown the respective values when you position the cursor on the lines (hovering).

Lower cutoff frequency	Upper cutoff frequency
Peak (peak amplitude)	Peak frequency
Alarm limit	Warning limit
RMS	Display of all descriptors by selection in the spectrum properties

The configuration of the bands is described in chapter ↗ *Bands*, page 123.

You can decide in the spectrum properties (by using the context menu of the display) which markings and parameters are to be displayed (permanently) and whether the graph should change the color when exceeding the alarm limits.
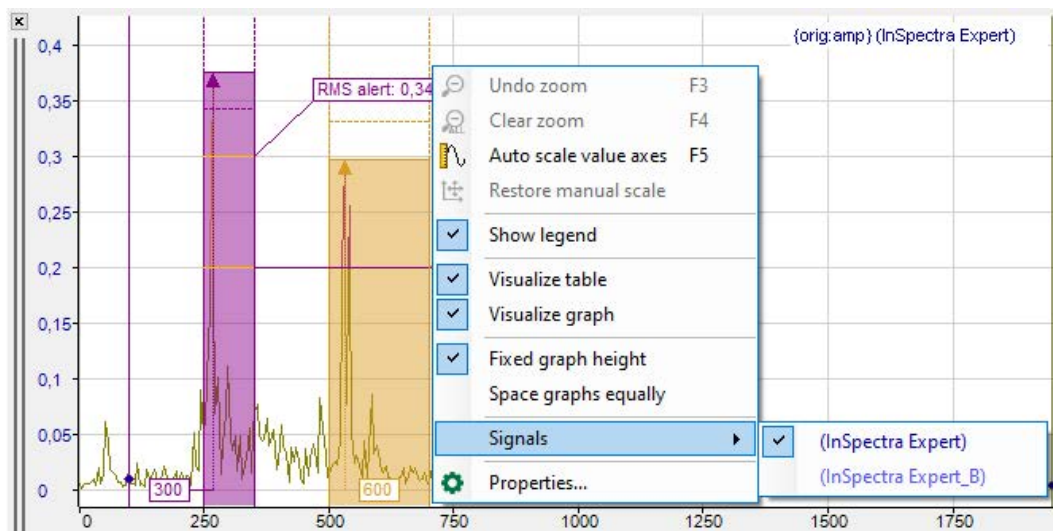
If there are several spectra in the display, individual display properties can be assigned to every spectrum.

If the spectrum graph has the focus (after a mouse click on the header bar), the tool buttons for zooming out and restoring the manual scale relate to this graph and not to the main window. The same applies to the assigned function keys <F3>, <F4> and <F5>.

Base axis

The display has a base axis corresponding to that of the main window. You can still modify the settings of the base axis in the display properties, for example, to select a logarithmic division instead of a linear division or to provide manual scaling. In addition, you can display the period instead of the frequency.

You can choose to scale manually or display the full range.

If you zoom in the spectrum graph or in the main window, this is usually independent from each other. By using the "Follow main window" option, you can determine that a zoom action in the main window also affects the spectrum graph, but only in horizontal direction.
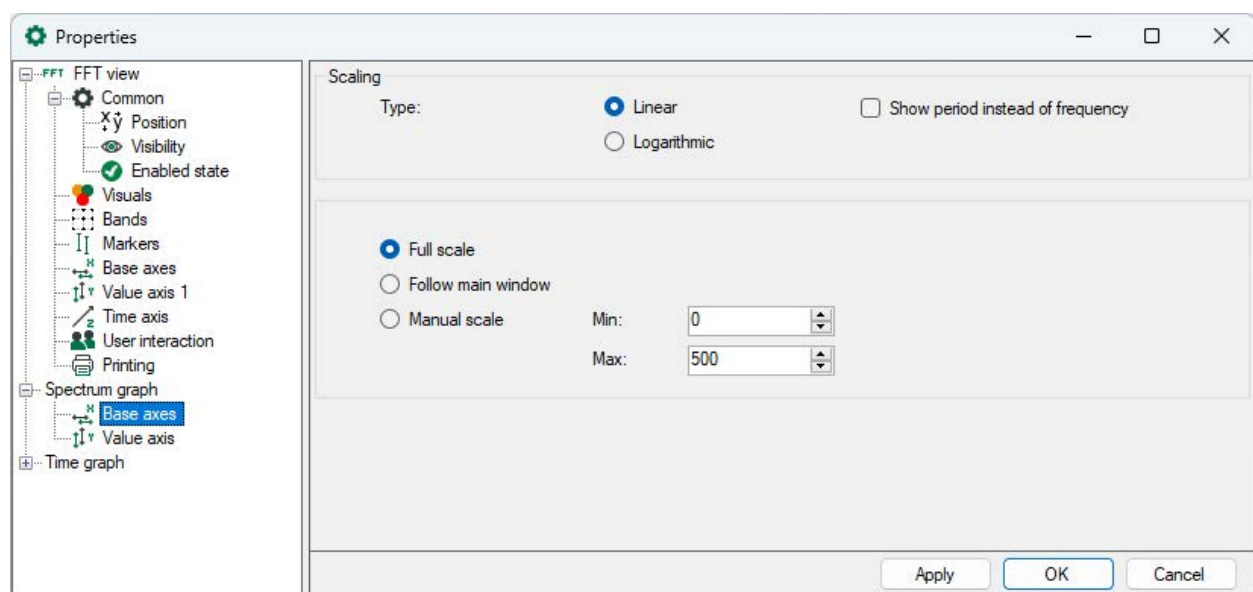
Value axis

The spectrum graph has only one value axis. All charts in the display are displayed on the same scale of values. You can change the settings of the value axis in the properties of the display.
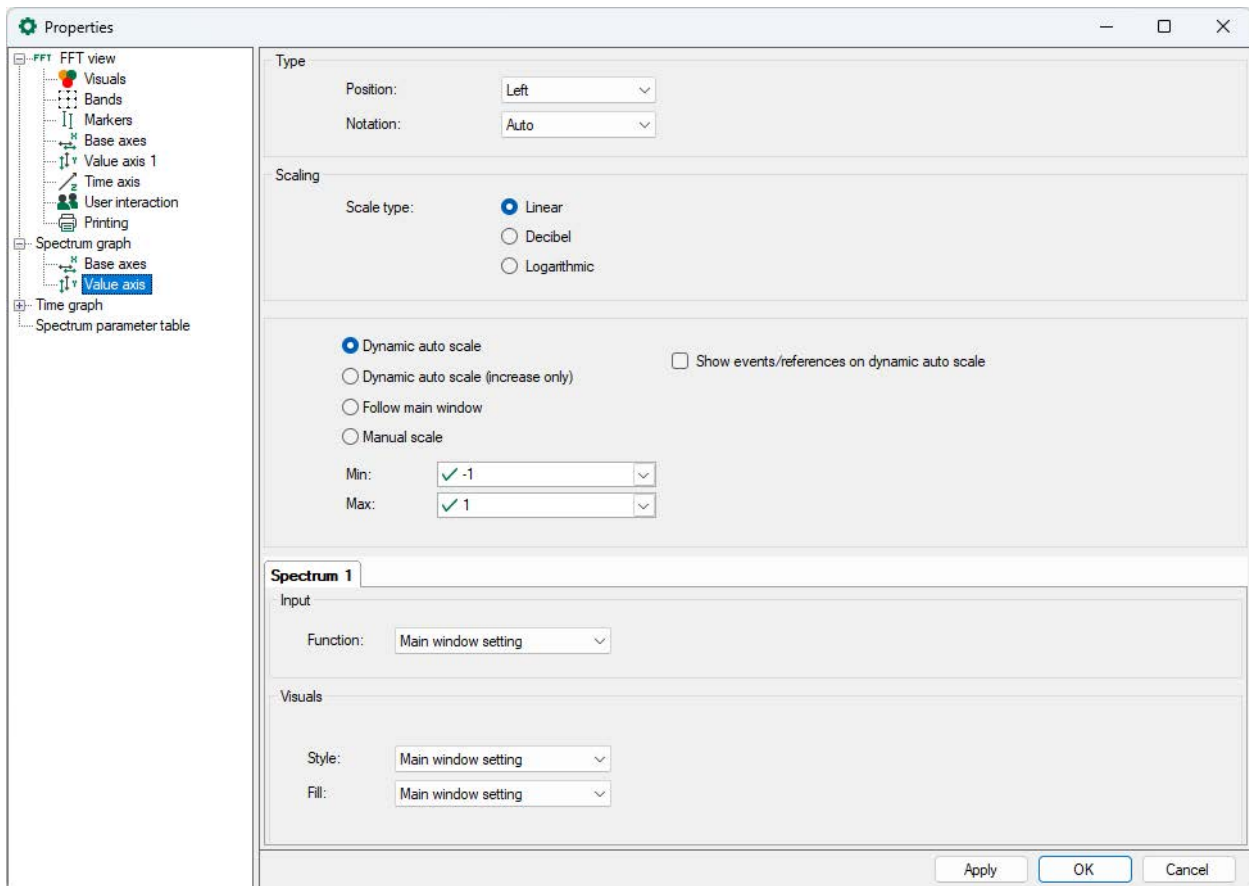
For scaling the value axis, you can choose between linear, decibel and logarithmic.

Scaling mode
The options of the value axis of the main view are available for selection, see chapter ↗ *Value axes*, page 138, and in addition:

■ Follow main window: With this option, a zoom action in the vertical direction in the main window also affects the spectrum graph.

Spectrum x
In the *Spectrum x tab*, you can determine the display properties for style and filling for each spectrum separately. You can adopt the main window setting or select individual settings from the respective drop-down menu.

You can also set the display properties for style and fill for each spectrum separately. You can apply the main setting of the window or select individual settings from the respective drop-down menu.

5.20.8.2 Spectrum table

The data table for the frequency spectrum only contains data if it is an InSpectra module. In case of a simple analog signal, the table remains empty.

In the table, a line is automatically created for every defined band of the displayed InSpectra module.

| No.	/	Band ...	Center	Delta	Peak	Peak Freq	RMS	Peak Alert	Peak Alarm	RMS Alert	RMS Alarm	Visible	Collapsed
⊟ ☑ Show bands ☐ Enable collapsed bands : (InSpectra Expert)													
0		Insge...	974,121	974,121	1,03141	283,203	1,31708					☐	☑
1		300	300	50	1,03141	283,203	1,10277	> 0,2	> 0,7	> 0,3	> 0,6	☑	☑
2		600	600	100	0,629698	561,523	0,612792	> 0,5		> 0,2		☑	☑

No.	/	Name	Value	Events Alert	Events Alarm
⊟ InSpectra Module: (InSpectra Expert)					
0		P1+P2	1,66111		

The parameters and – if configured – the results are shown for each band. Results and alarms for characteristic values are displayed in the area below. A line is created for each parameter.

If there are several InSpectra modules in the spectrum graph, the table also shows the data for the bands of the other spectra, see in the figure below in the case of two InSpectra modules.

No.	/	Band...	Center	Delta	Lower F...	Upper F...	Peak	Peak Freq	RMS	Peak Alert	Peak Alarm	RMS Alert	RMS Alarm	Visible	Collapsed
⊟ ☑ Show bands ☐ Enable collapsed bands : (InSpectra Expert)															
0		Insge...	974,121	974,121	0	1,94824...	1,48727	458,984	1,68337					☐	☑
1		300	300	50	250	350	0,074371	297,852	0,130026					☑	☑
2		600	600	100	500	700	0,100702	517,578	0,217807			> 0,2		☑	☑
⊟ ☑ Show bands ☐ Enable collapsed bands : (InSpectra Expert_C)															
0		Insge...	974,121	974,121	0	1,94824...	0,653055	449,219	0,918155					☑	☐
1		400	400	100	300	500	0,653055	449,219	0,748773	> 0,5		> 0,2	> 0,4	☑	☐

You can display or hide the parameter columns via the context menu (right mouse click in the heading).
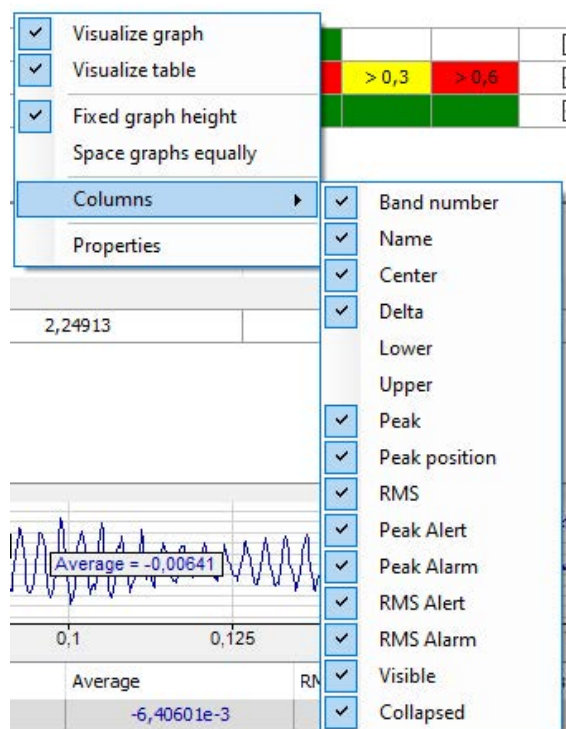
In every parameter column, the displayed values can be sorted by clicking on the table header. A triangle in the header indicates whether the sorting direction is ascending or descending. The order is automatically re-sorted if the order changes during acquisition.

You define the preference for sorting in the properties dialog of the FFT view in the node *Spectrum table*, see chapter ↗ *Spectrum graph and spectrum table*, page 144. The figure below shows a data table sorted by peak values.

| No.	Band ...	Center	Delta	Lower Freq	Upper Freq	Peak ⼁	Peak Freq	RMS
⊟ ☑ Show bands ☐ Enable collapsed bands : (InSpectra Expert)								
2	600	600	100	500	700	0,060893	590,82	0,105716
▶ 1	300	300	50	250	350	0,070283	297,852	0,08079
0	Insges...	974,121	974,121	0	1,94824e+3	0,389348	390,625	0,407757

Show bands / enable collapsed bands
Use this option to globally decide for all bands whether these are displayed in the spectrum graph and whether they can be shown as collapsed bands.

If the option *Show bands* is enabled, the display of individual bands in the *Visible* column can be determined separately.

If the option *Enable collapsed bands* is marked, the display of the individual bands in the *Collapsed* column can be determined separately. Collapsed bands are indicated by a triangle at the center frequency.

5.20.9   Time graph and time table

In addition to the main window, you can open a graphical and/or tabular display of the data of the input signal in the time domain. Click on the button for the window menu in the tool bar of the FFT view.
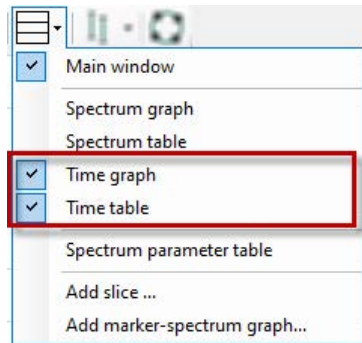

Graphical display and data table form a group, as the table always provides the data matching the graph in the display. However, the graph and table can be individually displayed or hidden.

In addition, the graph and data table can be minimized or displayed together. To do this, simply click on the small triangle on the right margin of the display.

5.20.9.1 Time graph

In the time graph, the time curve of the input signal is graphically displayed. The displayed section contains exactly the samples of the input signal which were included in the FFT calculation.
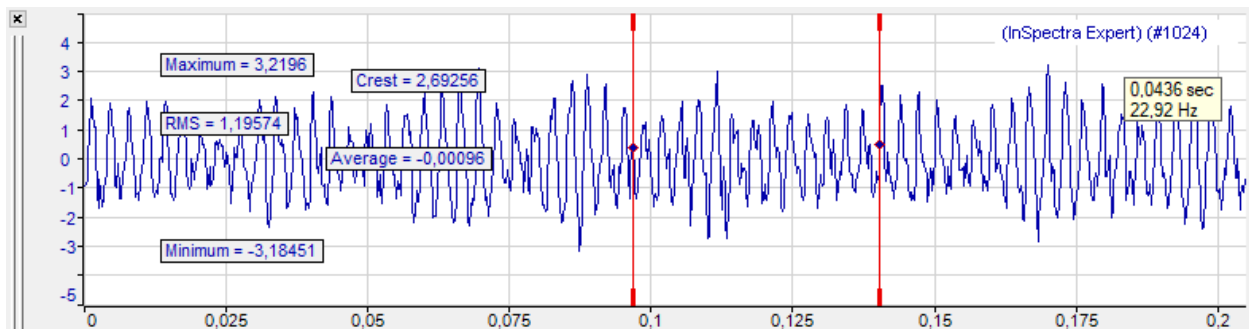
If the averaging function was enabled in the calculation settings of the profile, then the display shows the time signal of the last internal FFT calculation. The displays of the FFT results in the main window and frequency range, however, are also based on prior values of the input signal.

Basically the input signal of the InSpectra module is displayed. However, you can also drag further signals from the signal tree into the time graph. If there are several signals in the main window already, you can select those in the context menu of the graph.

If the time graph has the focus (after a mouse click on the header bar), the tool buttons for zooming out and restoring the manual scale relate to this graph and not to the main window. The same applies to the assigned function keys <F3>, <F4> and <F5>.

Markers

You can also enable markers via the context menu of the display (*Show markers*). The two markers can be moved independently of each other in the display. The legend on the right shows the time difference between the markers and the corresponding frequency.

Legend

The legend of the display contains various information:

- ■ Name of the InSpectra module (if present)

- ■ channel number of the input signal

- ■ Name of the input signal

- ■ Number of samples for the FFT, unit of the input signal

Base axis

The time graph has a base axis. When autoscaling, the length of the base axis results from the number of samples and the sampling time. You can modify the settings of the base axis in the properties of the graph.
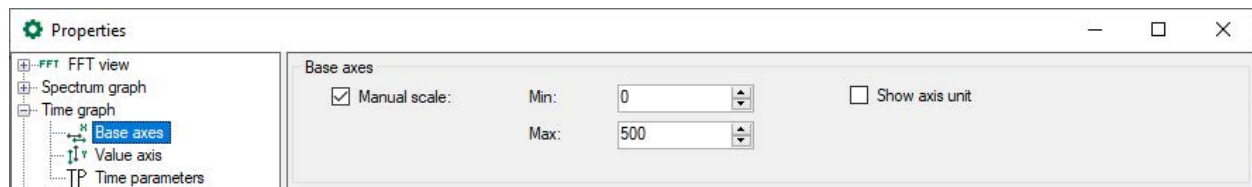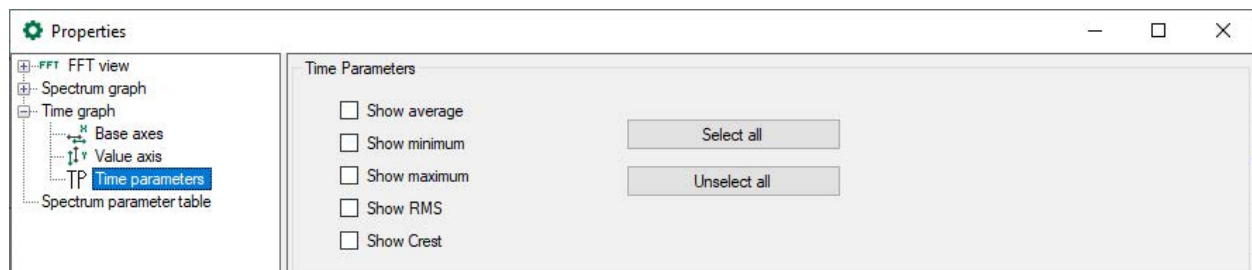
Value axis

The time graph has only one value axis. All curves in the graph are displayed on the same scale of values. You can modify the settings of the value axis in the properties of the graph.
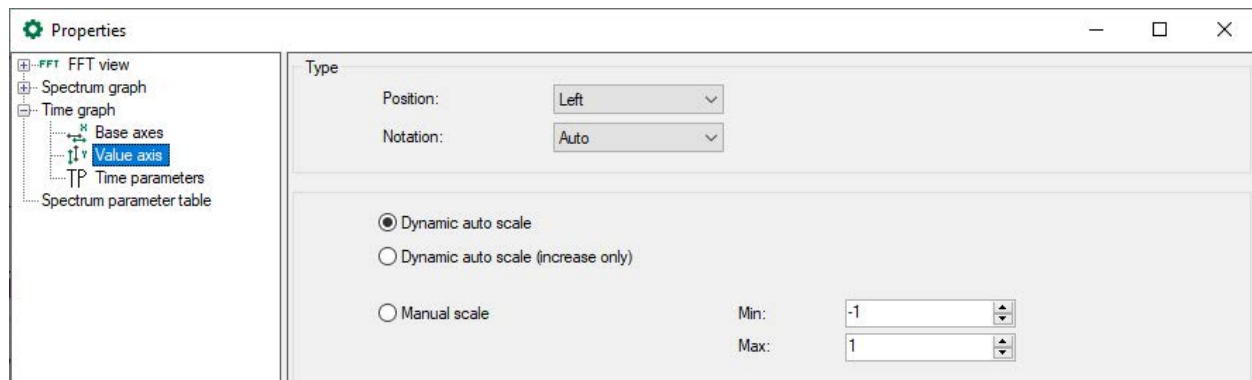
Time parameters

The statistical values (average, minimum, maximum, RMS, crest) determined for the input signal in the shown time range can be displayed in the graph. For this purpose, select the desired parameters in the properties dialog of the graph.

Note

 Sometimes, the crest factor and RMS value is not immediately visible in the graph, as it can be significantly higher or lower than the values of the signal curve. Change the scale of the value axis to see the crest factor.

5.20.9.2 Time table

The data table of the time domain shows the same statistical values of the input signal which were described as time parameters above.

Signal / Module	Minimum	Maximum	Average	RMS	Crest
(InSpectra Expert)	-2,40479	1,85547	4,17233e-4	0,899231	2,0634

5.20.10   Spectrum parameter table

The spectrum parameter table is used to display the FFT calculation parameters. This allows you to display the calculation parameters you wish to observe without having to open the properties dialog of the FFT view.

You can add the spectrum parameter table to the display using the drop-down menu.
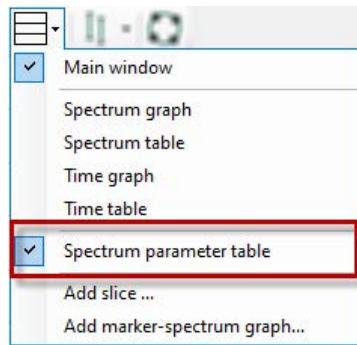
Before doing so, you should specify what information will be displayed in the table, as not all parameters are of interest and you can save some space by reducing the number of parameters.

For example, if you do not want to use an order spectrum, the order parameters can remain hidden.

You can configure the settings in the spectrum parameter table node in the properties of the FFT view. All parameters from the calculation profile are available for selection.
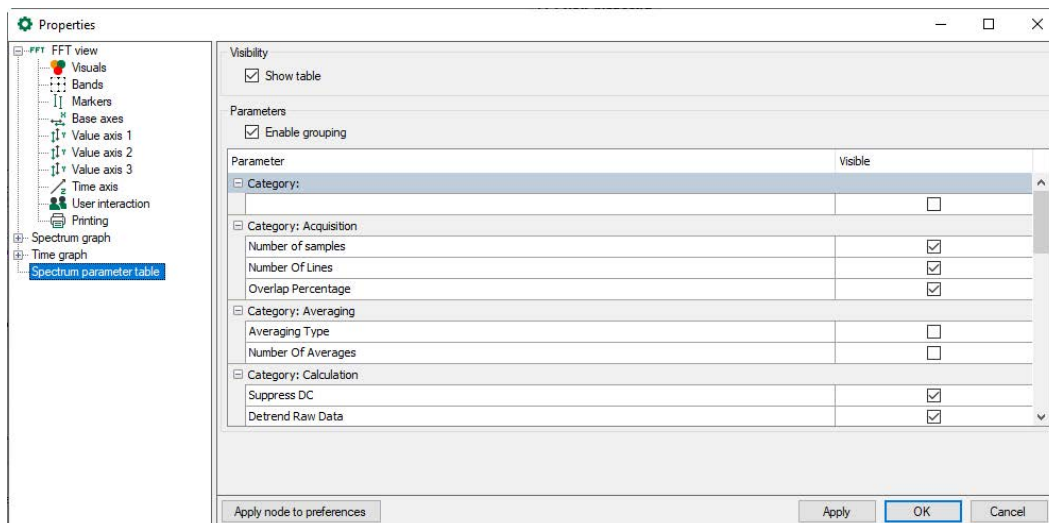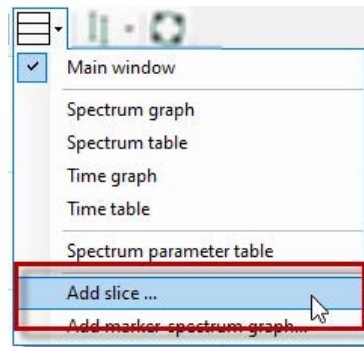

The result might look like this:
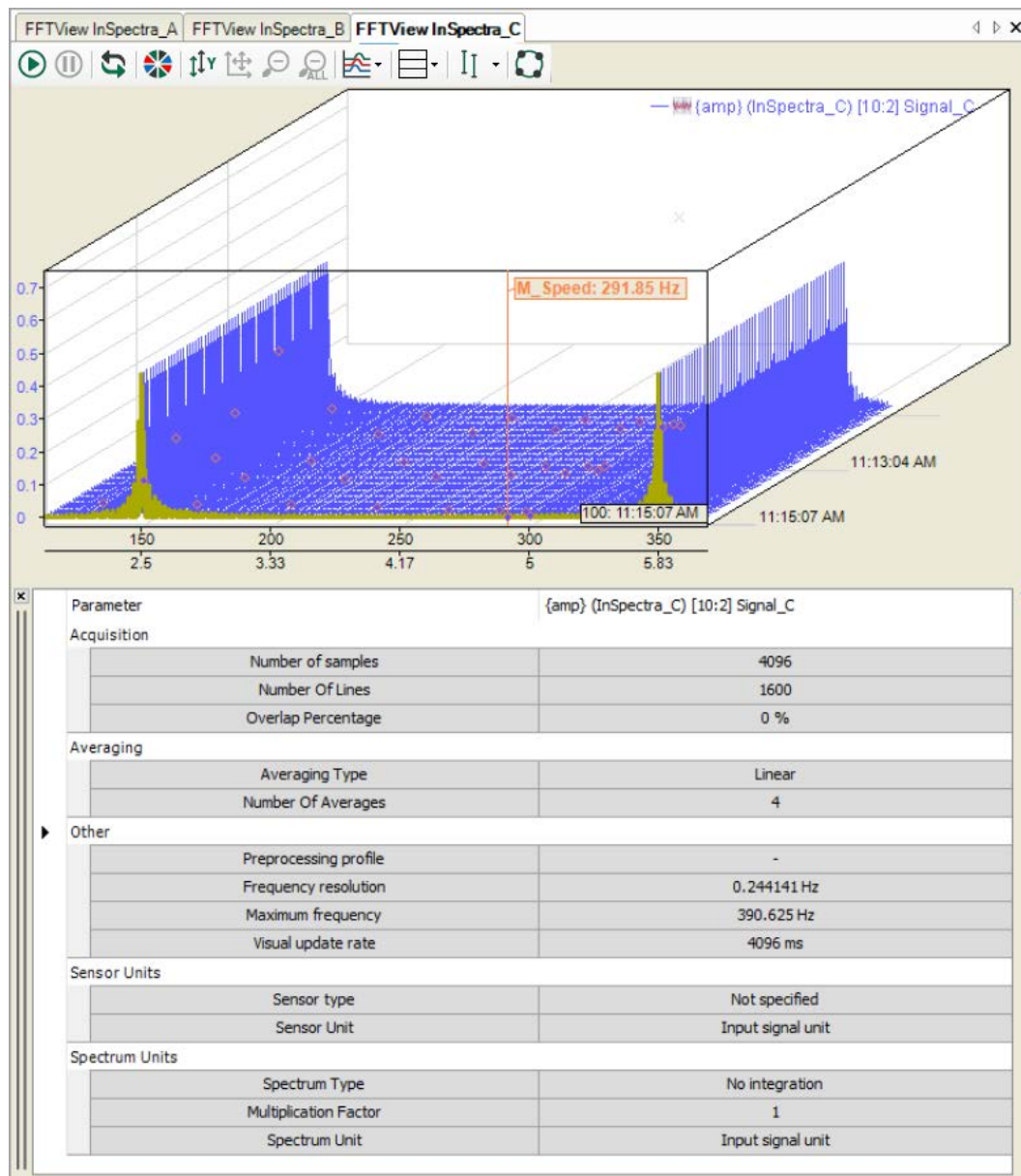
5.20.11   Slice view

With a slice view, you can essentially represent the chronological sequence of an FFT for a se-lected marker position. The amplitude profile of a frequency therefore becomes clear, especial-ly in conjunction with the isometric waterfall view. You add a slice view using the drop-down menu for the FFT display.

The slice view can operate in two modes:

- In **Spectrum Mode** you can monitor a spectrum value that changes over time:

  - The temporal dimension corresponds to the number of planes in the waterfall view. The highest-numbered plane contains the most recent data (front plane). The scale of the X-axis shows the plane number.

  - The frequency dimension is specified by an interactive marker or a configured marker, which is connected to a signal, e.g., a speed signal.
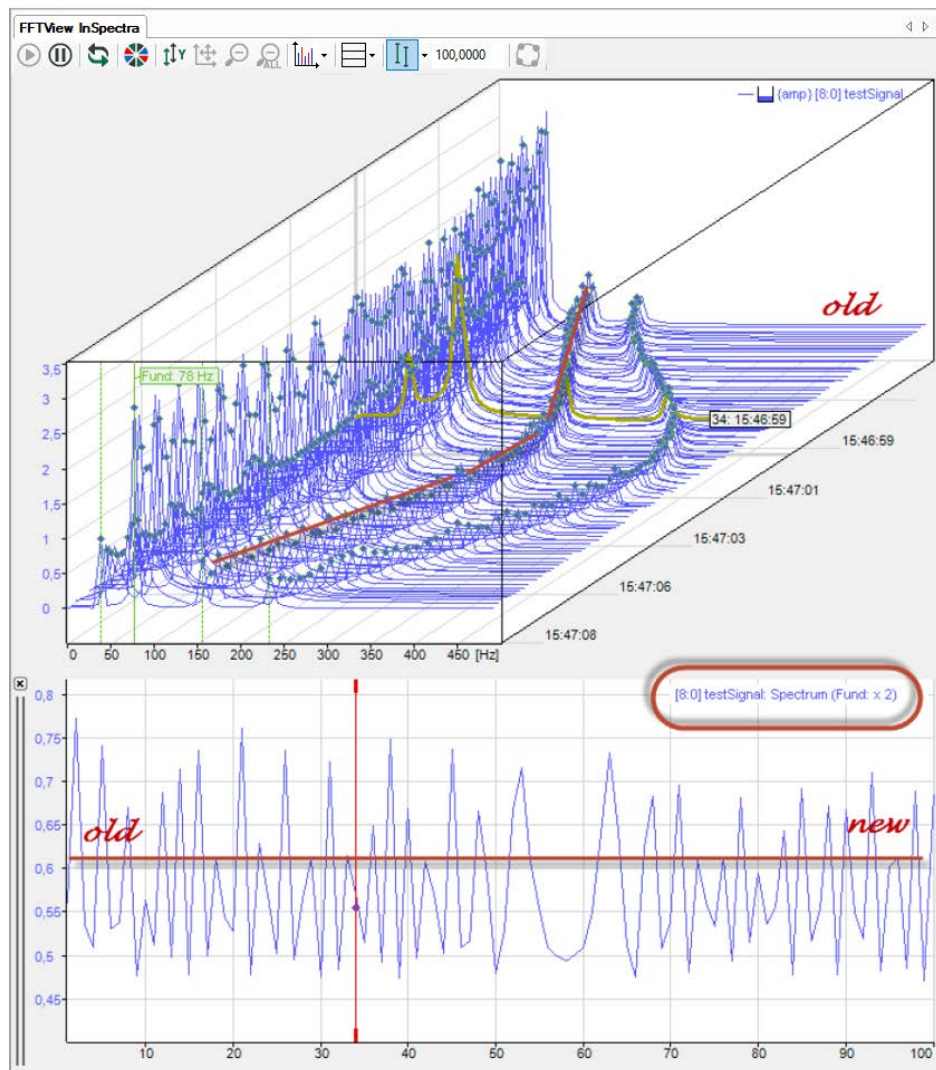
■ In **Marker Mode** you can monitor a frequency value that changes over time:

    ▪ Here again, the temporal dimension corresponds to the number of planes.

    ▪ Application example: Tracking a speed marker to show the speed history.
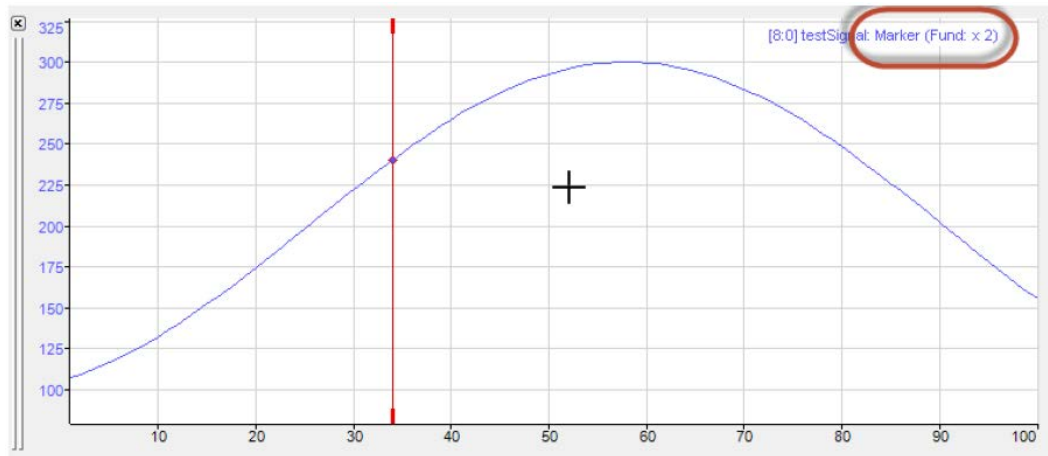
The mode of the slice view is also displayed in the signal legend.

You can add multiple slice views for different applications.

Once defined, the slice views are listed in the drop-down menu and can also be displayed, hidden and deleted there.

The slice view is specified by a marker. In the properties of the slice view, you can select any defined marker, including any available harmonic markers. You can also quickly switch between the different markers in the context menu on the slice view.

In addition, each slice view has its own interactive marker. You can link the interactive marker with the currently selected plane in the waterfall view with the "Link markers with waterfall" option. Note that the position of the interactive markers in the slice view always corresponds to one plane in the waterfall view.
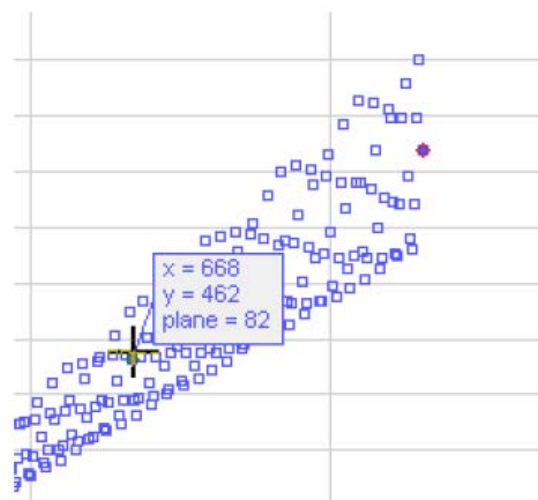
5.20.12 Marker spectrum display

The marker spectrum display is used to represent the relationship between a dynamic marker (horizontal axis in Hz) and the associated spectrum value (vertical axis).

For each plane of the waterfall view, a point for the value pair is entered in the graph.
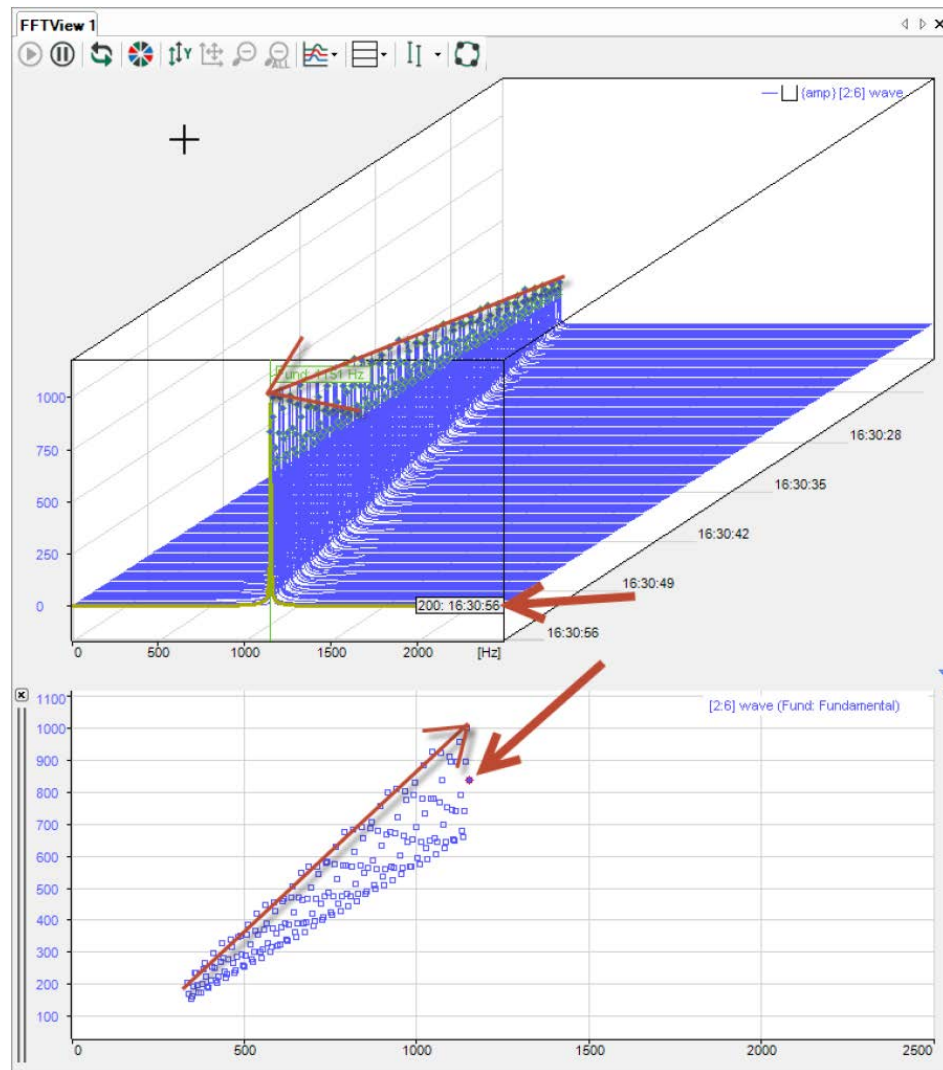
This display does not have its own interactive marker. When you hold down the <M> key, the mouse moves over the points and the corresponding values (X, Y, and plane) are displayed in a pop-up.

The point within the currently selected plane is highlighted with a red circle.

You can add multiple marker spectrum displays and configure them differently.

5.20.13   Zoom

The scale of an axis can be manipulated in three ways.

- Autoscale
  You can perform an autoscale via the context menu of the axis or by using the middle mouse button to click on the axis.

- Shift
 You can shift an axis by dragging it with the mouse.

- Zoom
  Using the mouse wheel, you can zoom in and out in the area of the cursor.

You can change the scale via the pop-up buttons on the axis too. These buttons appear when you move the mouse over the right side of a horizontal axis or over the top of a vertical axis.

The outermost symbols halve/double the scale range based on the average. The arrows have a similar function, but with a smaller zoom factor. The button in the middle autoscales the axis.

In addition, you can zoom into a certain area of the diagram using the zoom rectangle (click with mouse and drag, see fig. below). The zoom rectangle enables the zoom buttons in the view tool-bar, which allow you to return to previous zoom levels.
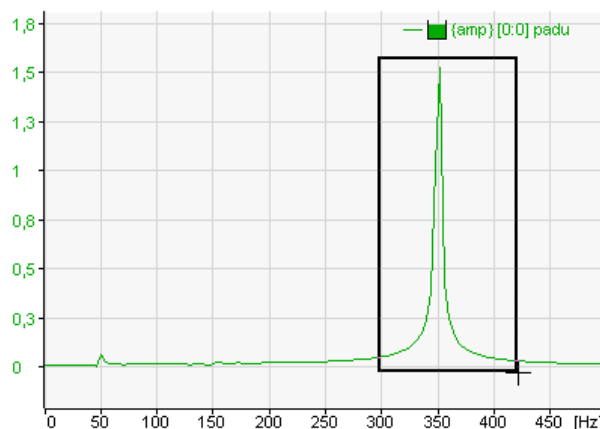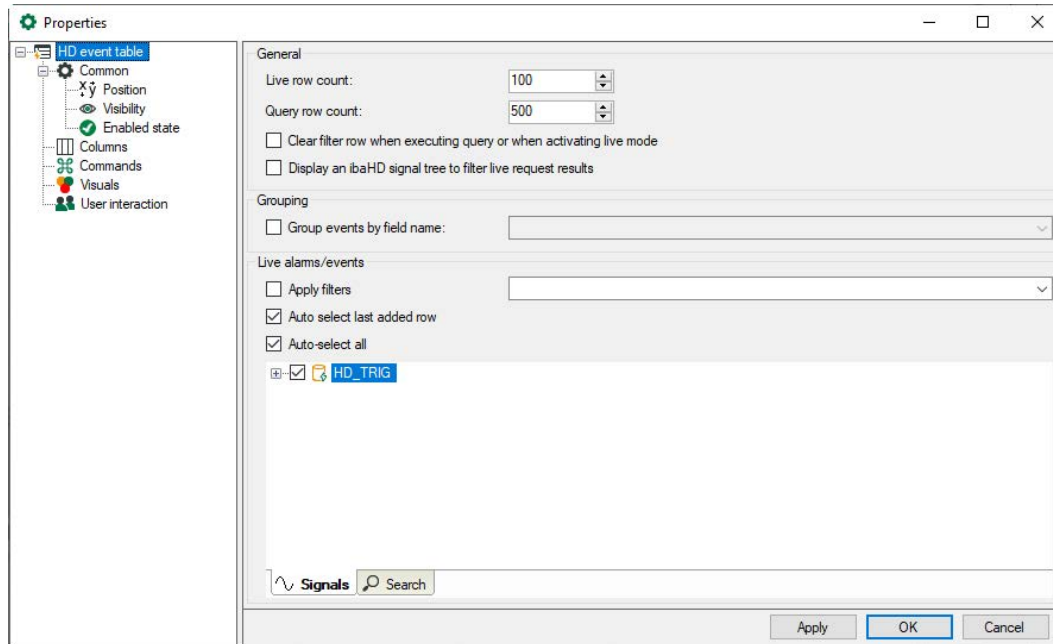
5.21   HD event table

Function

The functions and properties of an event table in the QPanel correspond to those of a normal event table. A description of how to configure and create queries can be found in the *ibaHD-Server* manual.

The following settings are available in the properties of a QPanel HD event table.

5.21.1   General properties


Live/query row count

Here, you set how many lines will be displayed in the event table in live mode. Maximum 1000 lines can be displayed. You can also specify the number of rows of query results.

If this option is selected, the filter row of the query is automatically cleared when a query is executed and if live mode is selected.

Grouping

For better overview, event tables can be displayed in groups according to their field names. Field names will be assigned to the events when configuring the recording.

By clicking on the drop-down button, a list opens with all configured events of the connected HD server with the corresponding fields.
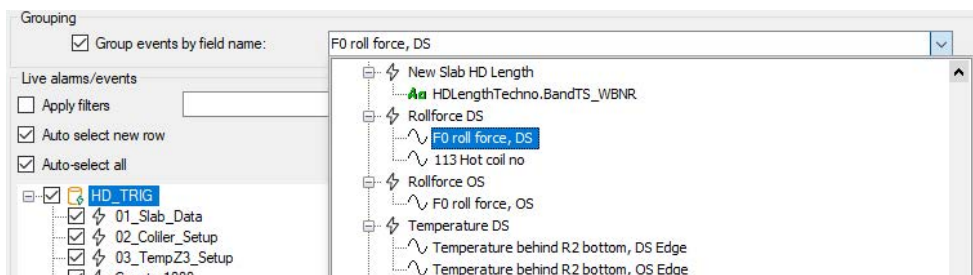
Choose a field name. The corresponding events will be displayed groupwise under a common name chosen for this group.

If several groups are defined, the groups will be arranged according to the value of the column chosen as sorting criterion.

The lines displayed in the group can be manually expanded or hidden with the buttons <-> or <+>. If the option "Auto-expand groups" is enabled, the event table is automatically expanded.

Event table with grouped events:

By double-clicking on the group cell the corresponding trend graph will be searched for all events in this group. In the properties dialog, rules for the application of commands can be defined, so that the commands will only be sent to certain HD trend graphs.

Application example:

In a length-based HD store, to which several measuring stations write the data, the signals of a certain product ID shall be displayed.
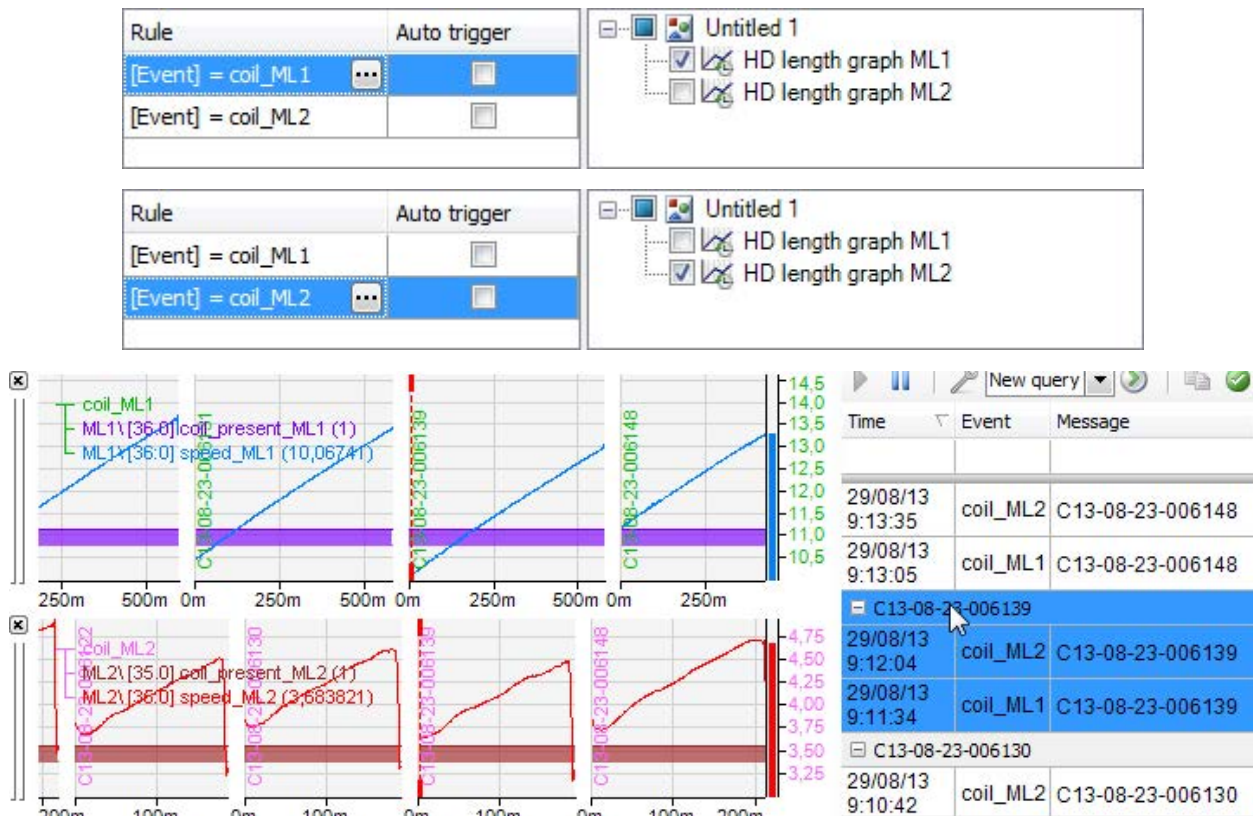
Live alarms/events

Here you can see a tree structure of all event-based HD stores of the associated *ibaHD-Server* with the stored events. Select here the events which have to be displayed in live mode in the event table.

Selecting the setting "Auto-select all" all events of all HD stores of the associated *ibaHD-Server* are always displayed in the event table.

With the setting "Auto select new row" the last added row is automatically selected.

5.21.2   Columns

Here, you select which columns should be displayed in the event table.
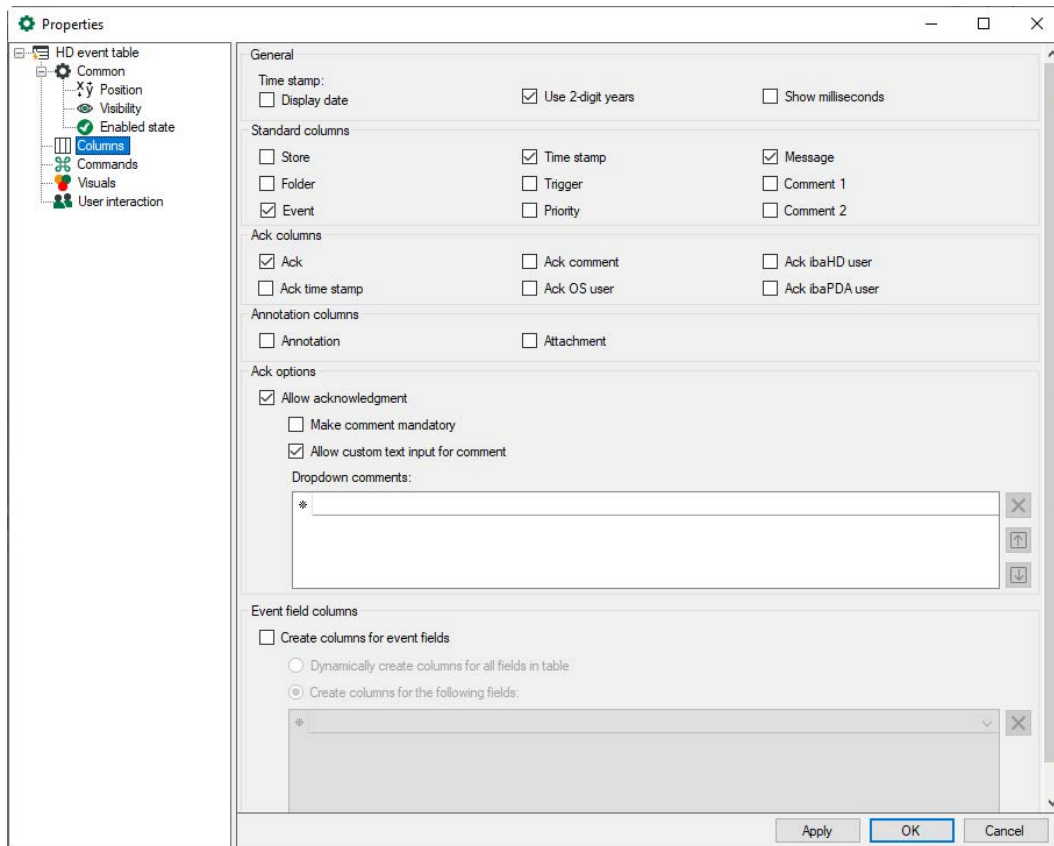
Time stamp

■ Show date

If you do not check this box, only the time will be displayed.

■ Use 2-digit years

To display the time stamp in the "Time" row you can select a 2-digit display of the year. Otherwise a 4-digit display is shown.

■ Show milliseconds

To display the time stamp in the "Time" row you can set the display to show milliseconds. Otherwise only seconds are displayed.

Standard columns

The standard columns selected here are displayed in the event table:

■ Name of the HD store

■ Folder where the events are stored

■ Name of the event

■ System time stamp

■ whether the trigger was released by an incoming or outgoing event

■ Priority of the event

■ Message defined for the event

■ and the optional comments 1 and 2.

Acknowledgment columns
Each event can be acknowledged in the "Ack" column. When an event is acknowledged, additional information can be recorded. The following information can be selected:

■ Ack time stamp (system time)

■ Ack comment (comment entered by the user)

■ Ack OS user (computer and user name)

■ Ack ibaHD user (connected ibaHD server and ibaHD user)

■ Ack ibaPDA user (connected ibaPDA server and ibaPDA user)

Annotation column
Annotations can be entered in the HD trend graph and optional attachments can be saved. Annotations and attachments are treated like events. The HD event table can be used to query annotations and attachments.

Acknowledgment options
Event acknowledgments can be allowed here. In addition, the user may be required to enter a comment to acknowledge the event. When acknowledging, a comment dialog opens.

You can allow user input in the comments dialog, or define comments in the "Drop-down comments" list, which can then be selected in the comment dialog's drop-down menu. Click on a line and enter a comment. You can use the buttons to the right of the list to delete selected comments (x) or change their order via the arrows.

Example comment dialog:
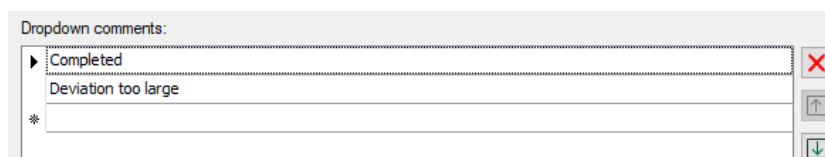
If multiple rows are selected when clicking an Acknowledgment checkbox, or the button on the toolbar is used to confirm all visible rows, you can enter a comment for all selected rows. Previously acknowledged lines are not overwritten.

Event field columns
For all event fields, columns can be created in the event table. The cells in this column display the unformatted values for the fields. If the columns for all fields are dynamically generated in the table, the columns are dynamically added or removed when adding or removing rows in the table. Event fields with the same name use the same column.

It is also possible to manually select the fields for which columns are to be created. The fields can be selected in the list via a drop-down menu.

5.21.3   Commands

Event tables can be coupled with HD trend graphs so that when double-clicking on an event line the desired trend graph stops and is placed on the right position of the time or length axis.

In the branch "Commands" in the properties of the event table you can set such line commands.
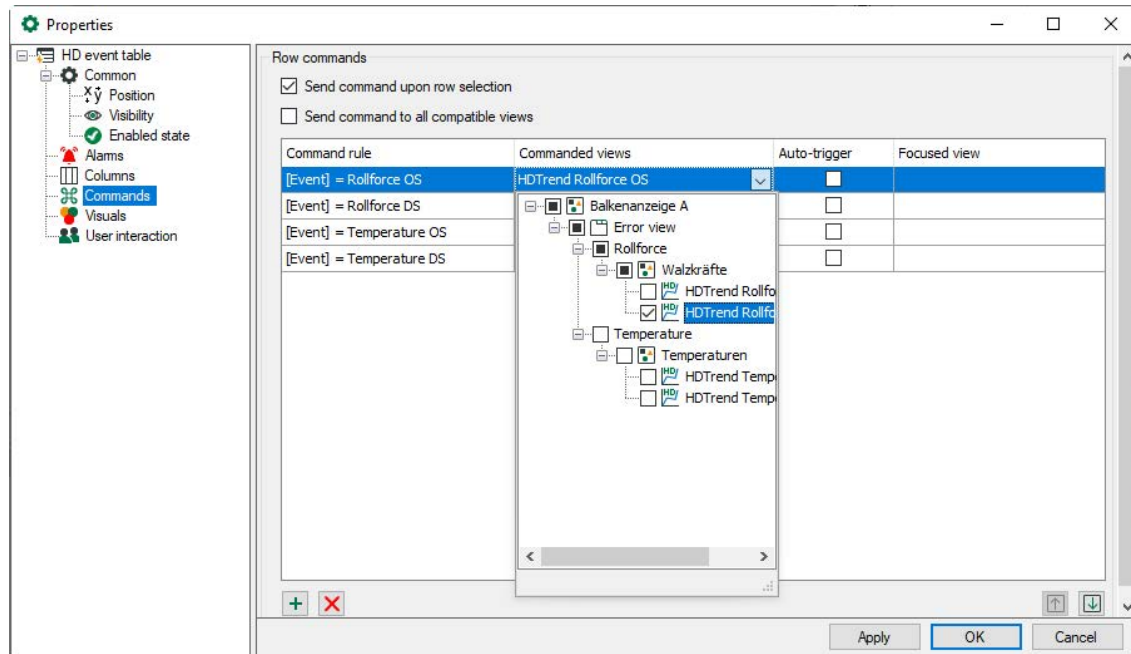
If you do not enable both options for row commands, then double clicking on an event in the event table does nothing.

If you want all HD trend graphs to jump to the time of the event that you have double clicked, then enable the option *Send command to all compatible views*. The command rules will be disabled in this case.

If you want only certain trend graphs to jump to the time of an event and others to continue to run as normal, then only enable the option *Send command during row selection* and configure the appropriate command rules.

Using the command rules, you can specify exactly for which event and under which conditions which trend views jump to the time of the event.

In the column *Relevant views,* you select the trend graphs which have to be stopped and positioned when the conditions are fulfilled.

If you make a check mark for a command rule in the 'auto-trigger' column, then the view is automatically switched when the configured condition occurs.

You can define as many command rules as you want.

Note

> The list of command rules will be checked from the top down when double click-ing on a row in the event table. At the first applied rule, the check will be fin-ished and the command is forwarded to the assigned views.
>
> You can modify the sequence of the rules: Use the button ⬆ to move the marked rule up and the button ⬇ to move it down.

Note

> When using the command rules, double clicking in the event table is only suc-cessful for the events that are included in the command rules.

Configure command rule

➕ Adds a new rule.

❌ Deletes the marked rule.

⋯ Opens the editor for editing the rule

Add a new command rule.

The dialog *Edit rule* opens.
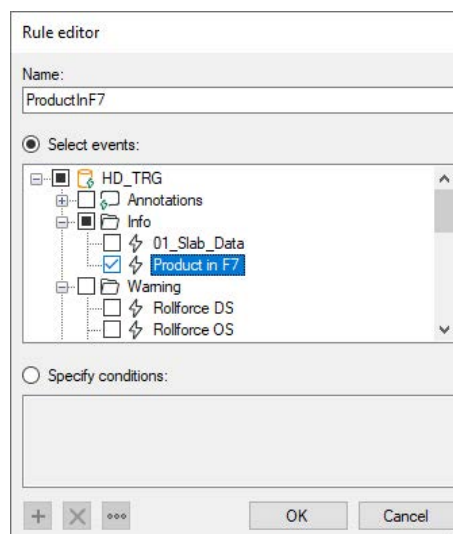
First give the rule a meaningful name.

A rule offers two mutually exclusive methods.

If you enable the "Select events" option, then you can mark one or more events in the tree be-low that trigger a switching of the trend view, either by the status change "incoming" and/or "outgoing" (auto-trigger) or by double clicking on an event row. For events that are not marked here, the trend view will continue to run.

Tip

This method is suitable if you only want to switch certain trend views when dou-
ble clicking on any event. To do this, mark all events in the tree.

If you enable the"Specify conditions" option, then you can formulate check conditions in the
field below that are executed when double clicking on an event row. In the auto-trigger mode,
the conditions are checked constantly.

If a condition is met, the trend view is switched.

Configure conditions

A condition can consist of one or more expressions that are linked with each other.

+ Adds a new expression.

✗ Deletes the marked expression.

Opens the editor for editing the expression.

If a condition contains several expressions, then these will be linked with a logical AND or OR.

Click the button **+** in order to add an expression or the button to edit an existing expres-
sion. In the *Edit expression* dialog, first select a field (e.g. event, comment, trigger, etc.) and then
the value (e.g. event name, plaint text incoming/outgoing, etc.)

In the following example, double-clicking on events stops the HD trend graph named "Rolling
forces" and sets it to the time stamp of the clicked event. The events meet the following re-
quirements:

■ Priority = "High"

■ Trigger = "Incoming"

Command rule with two conditions that must be simultaneously met:
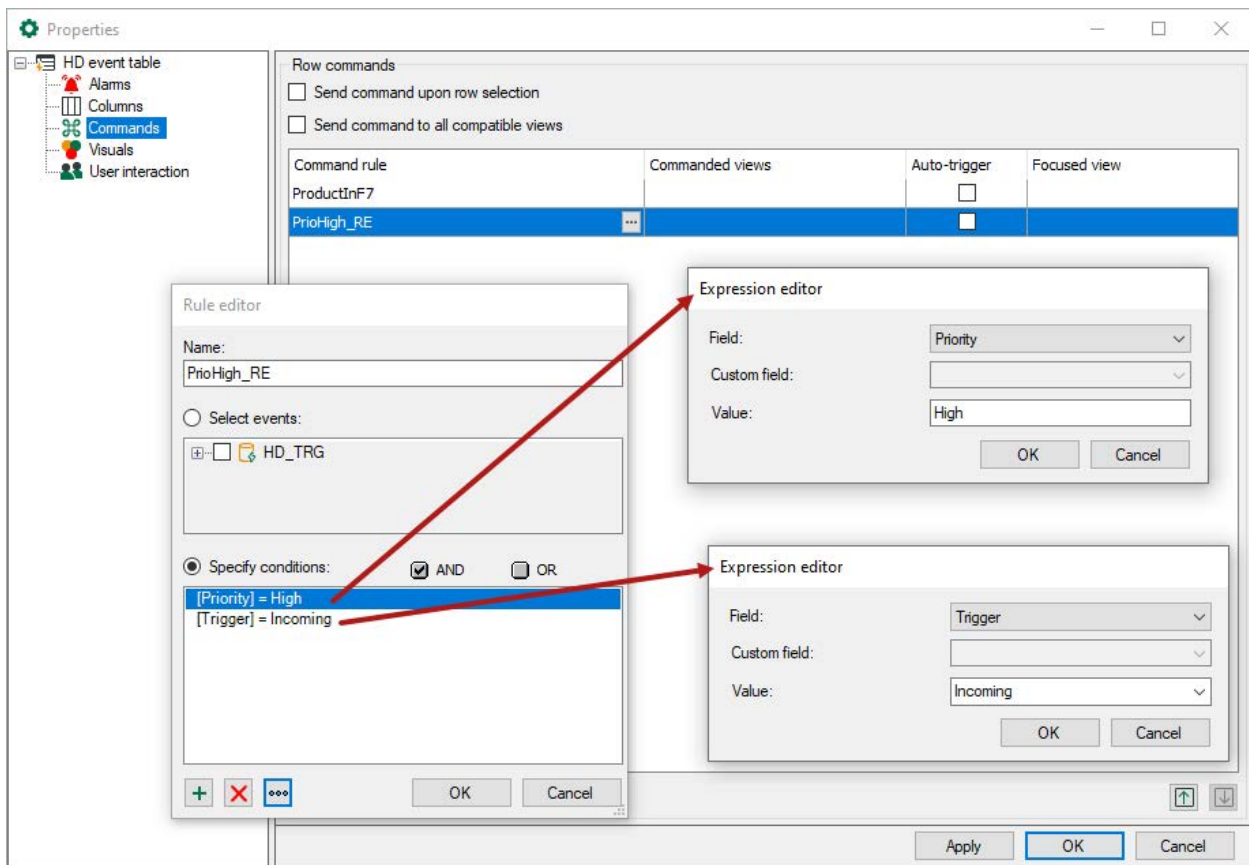
Note

In an expression you can select the field type "Custom". Therefore commands can be written in order to request number and text fields from the event definition.

With this expression, for example, you could check by double clicking on the event whether it has a number field or label called "coil number" and if it is equal to the value "4200".

This argument would be met, for example, for the following event:

Note

You can also send commands to HD trend graphs which are placed in *ibaQPanel*. To name an HD trend graph in *ibaQPanel*, in the design mode click on the triangle icon in the upper right corner of the HD trend graph. Enter the desired designation in the text field "Name".
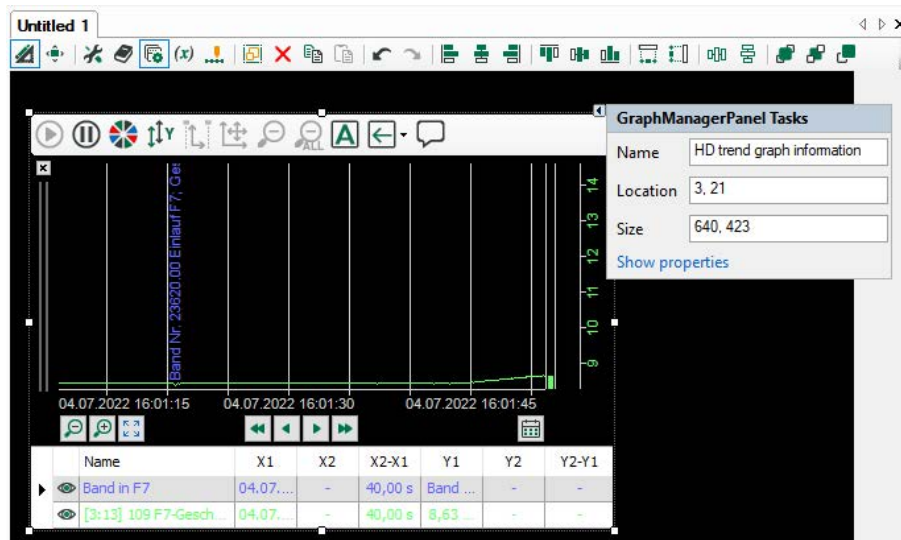
5.21.4   Event queries and filter function

First select the relevant query from the list in the toolbar and then click on the button to the right of it to execute the query.
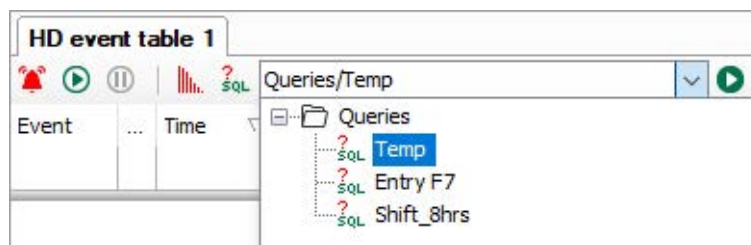
Depending on the complexity of the query and the number of events found, execution may take some time. You can see the progress of the current query in the event list status bar.

When the query has been completed, the number of events found is displayed in the status bar on the right. A query can return more events than the number of rows in the event list. To display any additional events, click on the blue "More..." link in the status bar.

Filter function

As well as options for formulating queries, the table also provides a filter function.

If you hover the mouse pointer over the table header, a filter symbol appears in the corresponding column.

Clicking on the filter symbol opens a dialog, in which you can filter the column by values and text.

Value filter

Current values are displayed in a list and can be enabled or disabled using the relevant check box.
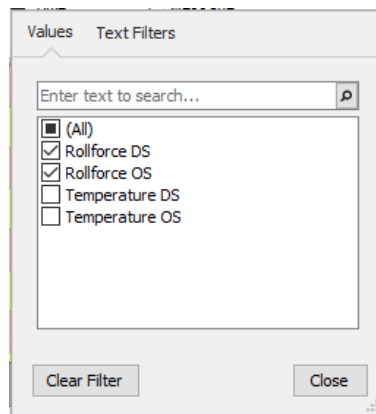
Text filter

The drop-down menu provides a series of operators that can be used to filter the text in the relevant column. Select the required operator and enter the text by which you want to filter in the field below. You can enter whole words of sequences of letters.
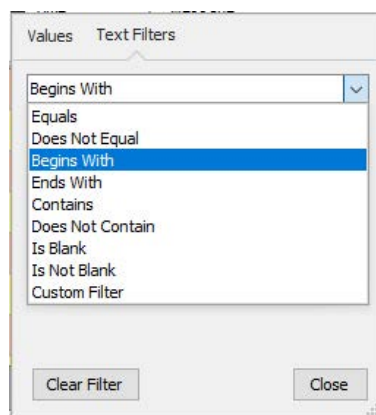
The selected filter options immediately affect the table display. Filter options can be set in multiple columns. A set filter is indicated by a filter symbol.

Selecting <Delete filter> resets the filter. If you have set filters in multiple columns, you have to reset the filters in all affected columns individually.

Search function

You can use the keyboard shortcut <Ctrl> + <F> to open a search function for the event list. Enter the relevant search expression and click on <Find>. The search applies to the *Event* column.

Clicking on the cross in the search text field deletes the search expression. Previously used search expressions can be selected in the drop-down menu. Clicking on the red button with the cross exits the search.

5.22   HD navigation

Function

With the HD navigation, several HD trend graphs can be controlled simultaneously. As in the default HD trend graph, the zooming and navigation elements are available, buttons for play and pause as well as the zoom reset-button which resets all connected HD trend graphs to the state before the zooming.

🔍 🔍	Zoom function
⛶	Auto zoom
↕	Zoom reset
⊞	Display/hide the marker table
▶ ⏸	Play, pause
⏪ ◀ ▶ ⏩	Scroll (big and small steps)
📅	Jump to a date

Configuration
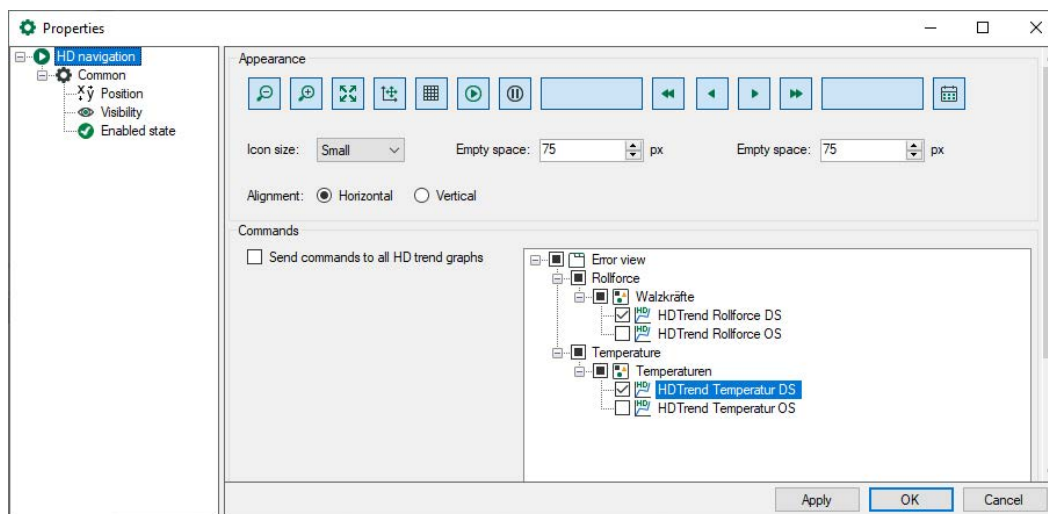
Appearance

By clicking on the button, the display can be switched on and off in the HD navigation. Buttons with gray color are not displayed.

You can choose the icon size in the drop-down menu: small, medium, large. And you can define the space between the icon groups in the *Empty space* field.

You can choose whether the HD navigation is aligned horizontally or vertically.

It is possible to use several HD navigation objects. However, each object can be configured individually with regards to appearance, position and even commands.

Commands

Here, you can choose the HD trend graph to be controlled via HD navigation. When the option *Send commands to all HD trend graphs* is enabled, all HD trend graphs will be operated with one HD navigation.

When this option is disabled, check boxes will appear in the tree before each HD trend graph which you can mark separately.

5.23   HD time periods table

The function and properties of a time periods table in *ibaQPanel* are the same as those for a standard time periods table. You can find a description of the configuration and creation of queries in the *ibaHD Server* manual.

The following settings are available in the properties of an *ibaQPanel* HD time periods table.

5.23.1   General Settings
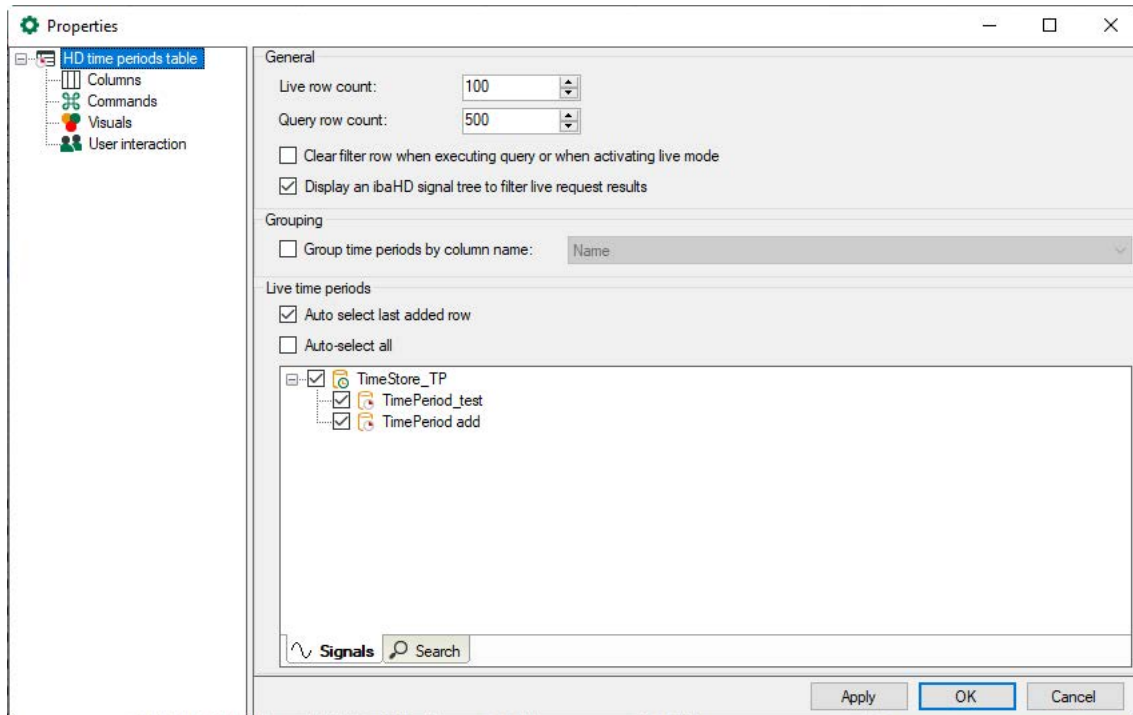
General

Live row count / Query row count
Here, you can set how many rows are to be displayed in the HD time periods table with current time periods and/or how many rows are to be displayed after a query. A maximum of 1000 rows can be displayed.

Clear filter row when executing a query or when activating live mode
Enabling this option automatically deletes any search patterns you have entered in the filter row as soon as you execute a query or switch to live mode in the table. This means that you do not have to remember to manually remove the filter terms.

Display an HD signal tree to filter live request results
Enabling this option displays the tree structure for the ibaHD time periods.

Grouping
Enabling this option allows you to group time periods in the table using columns. Select a column in the adjacent field.

Live time periods
Here, you can specify whether the last row added is to be selected automatically. In the tree structure, you can select the time period store from which the time periods are to be displayed. Select the corresponding stores and the time periods.

5.23.2   Columns
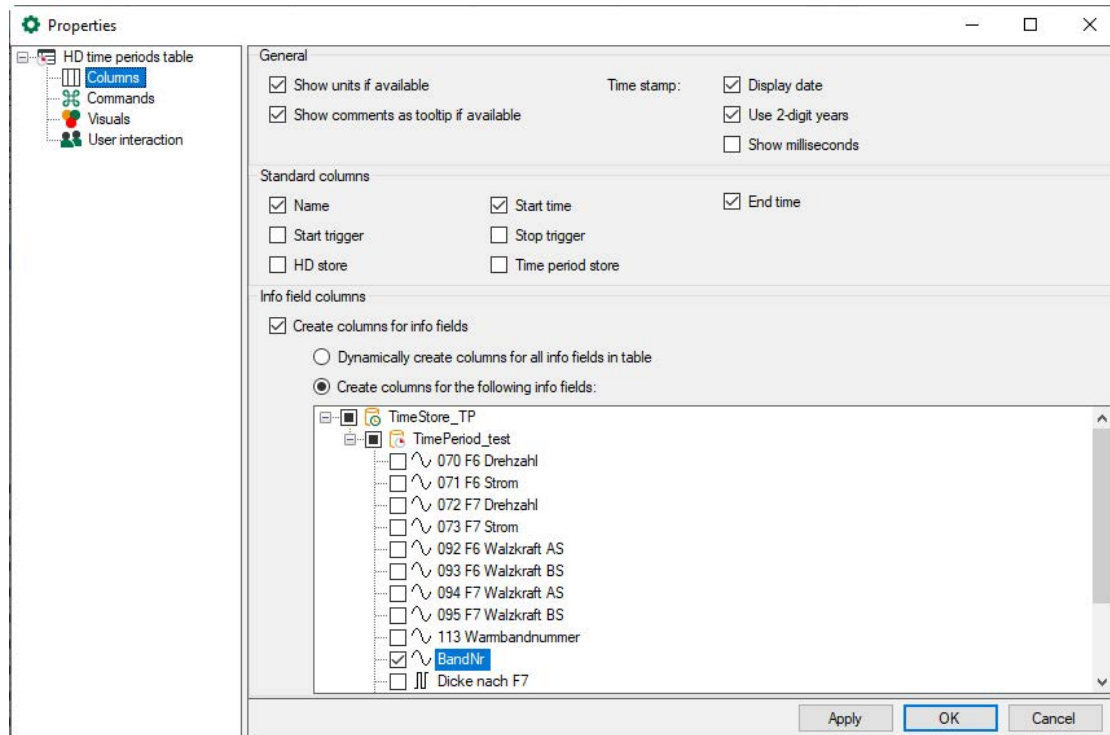
General
Use the options to choose how the data will be formated in the columns.

Standard columns
The selected columns are displayed in the HD time periods table.

Info field columns
You can select the info fields in the tree structure for which a column is added. It is also possible to automatically add columns for all info fields. The selected columns can then be shown or hidden using the context menu in the table. If info fields from different HD time period stores have the same database column name, they are merged a single column in the table.

5.23.3   Commands

Time period tables can be linked to HD trend graphs, which means that when you double-click on a row in the table the HD trend graphs show the time period selected in the row from start to end.
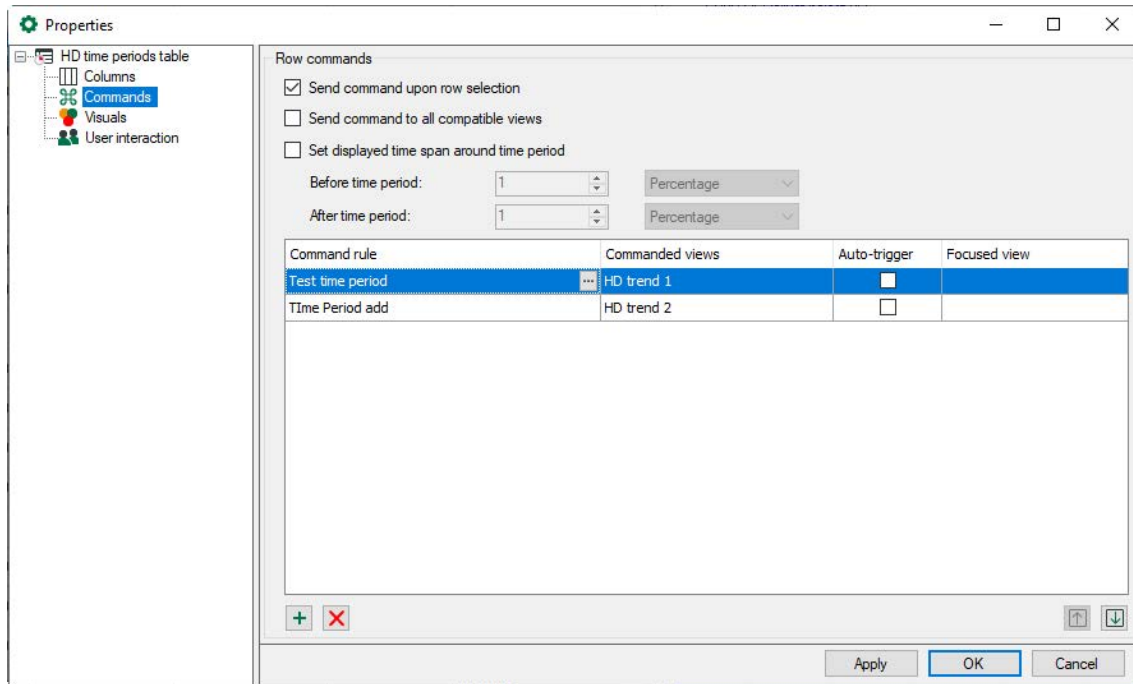
The *Send command to all compatible views* option is enabled by default. This means that when you double-click on a row in the table, all HD trend graphs show the selected time period. In this case, the command rules are disabled.

If you enable *Send command upon row selection*, you only have to select a row to execute the command, instead of double-clicking on the row.

The *Set displayed time span around time period* option enables you to add an additional time span before and/or after the period in which the signals are shown in an HD trend graph.

If you only want certain HD trend graphs to show the selected time period, disable the *Send command to all compatible views* option and configure appropriate command rules.

A command has the following properties

- Command rule: The rule defines the time period to which the command applies. You can select time period stores or define conditions for columns.

- Commanded views: Here, you can select the views that you want to switch to the selected time period.

- Auto-trigger: If Auto-trigger is enabled, the command is triggered when a row that meets the rule is added to the table. If Auto-trigger is not enabled, you have to select or double-click on the row, depending on the *Send command upon row selection* option, to trigger the command.

- Focused view: Here, you can select whether you want to enable a different view after the command has been triggered.

Note

> The list of command rules is checked from the top down when you double-click on a row in the table. When the first applicable rule is found, the check is finished and the command is forwarded to the assigned views.

You can change the order using the arrow buttons to move the selected row up or down.

Configure command rule

You can change the order using the arrow buttons to move the selected row up or down.

+ Adds a new rule.

✕ Deletes the selected rule.

✎ Opens the editor for editing the rule

Add a new command rule. The *Rule editor* dialog opens.
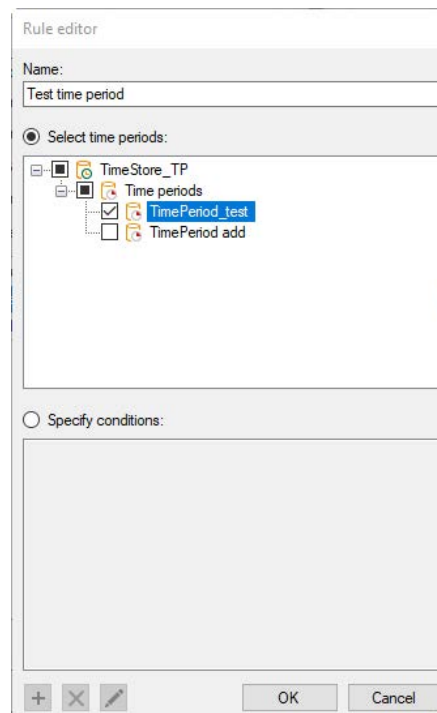
First give the rule a meaningful name. A rule provides two mutually exclusive methods.

If you enable the *Select time periods* option, you can select one or more time periods in the tree below that trigger a switching of the HD trend view when a row is either selected or double-clicked.

If you enable the *Specify conditions* option, then you can enter check conditions in the field below that are executed when double clicking on a row. In auto-trigger mode, the conditions are checked continuously.

If a condition is met, the trend view is switched.

Configuring conditions

The procedure for configuring a condition is the same as that for event tables. See chapter
↗ *Commands*, page 168.

5.24   HD trend graph

Function

The functions and properties of an HD trend graph correspond to those of the normal trend graph. The description of the function and configuration can be found in the ibaHD-Server manual. This document only describes the additional functions.

Depending on whether the first signal is time-based or length-based, the HD trend graph adjusts to this format. A mixed display of length-based and time-based signals is not possible.

Unlike the normal HD trend graph, the 2D view for colored 2D trend graphs is available in the QPanel HD trend graph. This allows vector signals to be displayed in a 2D top-down view in order to visualize, for example, the temperature or flatness of profiles. Its use and configuration is analogous to the trend graph in ibaQPanel, see chapter ↗ *Trend graph*, page 201

The time-based HD trend graph also supports the display of traversing vectors. This function is not available in the length-based HD trend graph. Description see chapter ↗ *Traversing vector*, page 212.

The HD trend graph offers additional control elements for a quicker navigation.

🔍➖ 🔍➕	Zoom function
⛶	Auto zoom
◀◀ ◀ ▶ ▶▶	Scroll (big and small steps)
📅	Jump to a date

The properties of the navigation elements will be determined in the dialog "X-Axis".

5.24.1   Legend

The settings for the HD trend graph legend are identical to those for the legend of a standard trend graph. See chapter ↗ *Legend*, page 205.

5.24.2   Marker grid
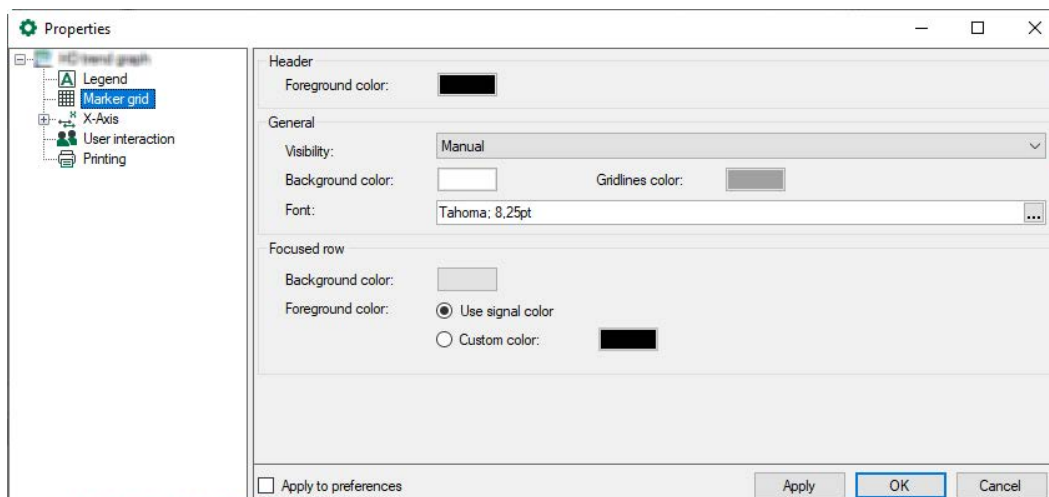
In the *Marker grid* node you can specify the properties of the marker grid.

You can select colors for the text in the header, for the grid background, and the foreground and background colors for the selected row. For the foreground color of the selected row, you can define a fixed color or use the signal colors.

You can change the color by clicking on the color field.

Visibility

The marker grid is disabled in live mode by default. It opens automatically as soon as the signal view switches into pause mode. However, you can change this behavior:

- Always visible

- Never visible

- Manual

  A button for switching the marker grid on or off appears in the toolbar

A further option is to right-click in the trend graph to open a context menu and select *Show marker grid*.
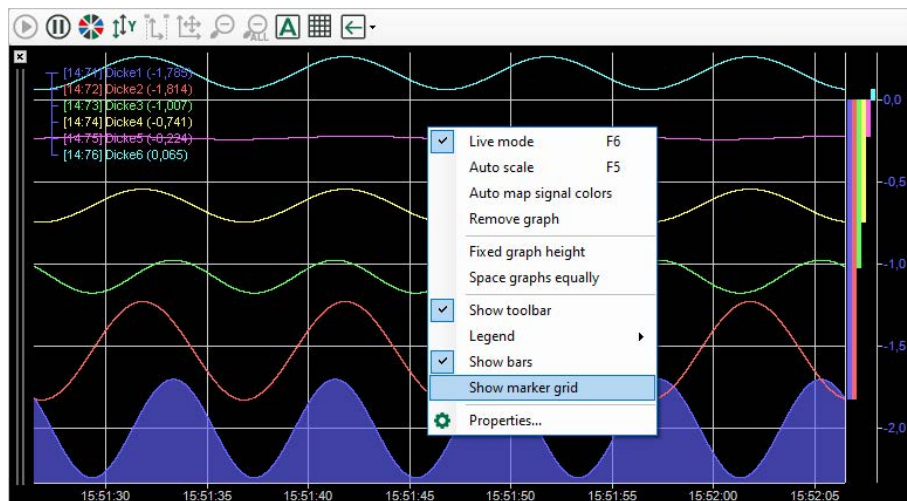
5.24.3 X-Axis
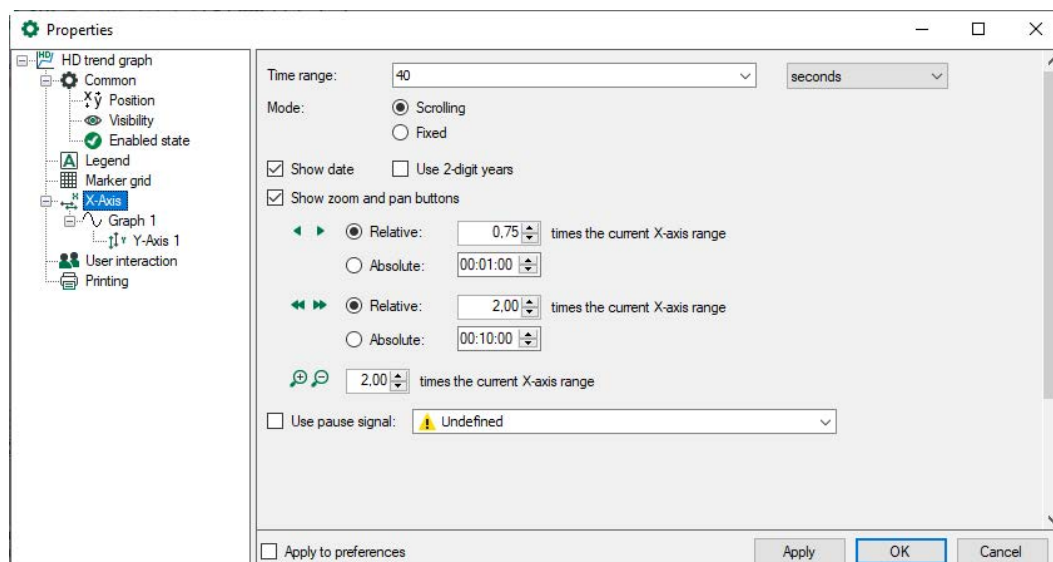
Time range

You can configure the time range represented by the X-axis. If you reduce the value, the signal will move faster on the display and changes to an expanded form. If you increase the value, you will see more measuring points in the graph and the signal will move slower.

Fixed axis

Usually, the time axis moves along with the incoming samples (default). If you enable this option, the signal will be written into the static graph. Once the signal curve has reached the end of the visible time range, the display shifts to the next (empty) time unit and continues to write samples.

Show date

If you enable this option, the date (mm/dd/yyyy) will be displayed along the ticks of the X-axis. Optionally you can shorten the year by 2 digits (mm/dd/yy).

Show zoom and pan buttons

If you enable this option, the zoom and pan buttons will be displayed along the X-axis. Default settings are:

- for small panning steps: 0.75, relative

- for large panning steps: 2.00, relative

- for zooming 2.00

Alternatively, the panning steps can be set as absolute value in the hh:mm:ss time unit.

Pause signal

The HD trend graph feed can be controlled by a digital pause signal. If the digital signal is TRUE (1), the scrolling stops; if the digital signal is FALSE (0), the scrolling continues. The pause signal stops the scrolling only for the duration of the signal.

Note

With the pause signal, the signal curve can also be frozen. If the signal is permanently TRUE (1), the curve will be "freezed". If the signal is on FALSE (0) for a short time (impulse with corresponding length), the display jumps to the current time and will be "freezed" again after the FALSE impulse sequence.

The length-based presentation has gaps between the single lengths.
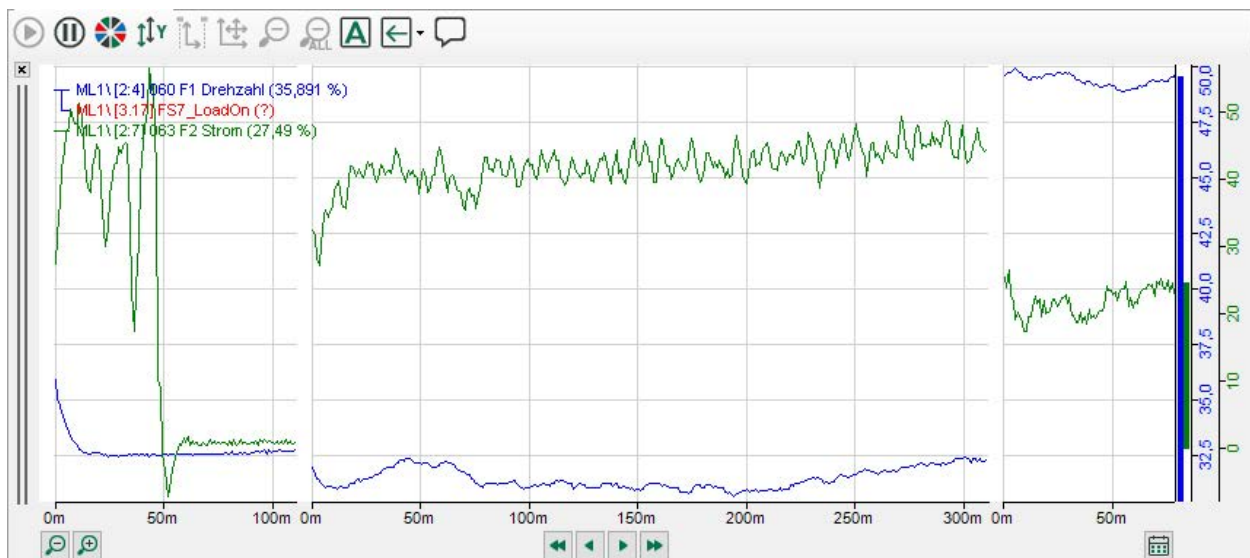
The length gap and the total range can be parametrized:
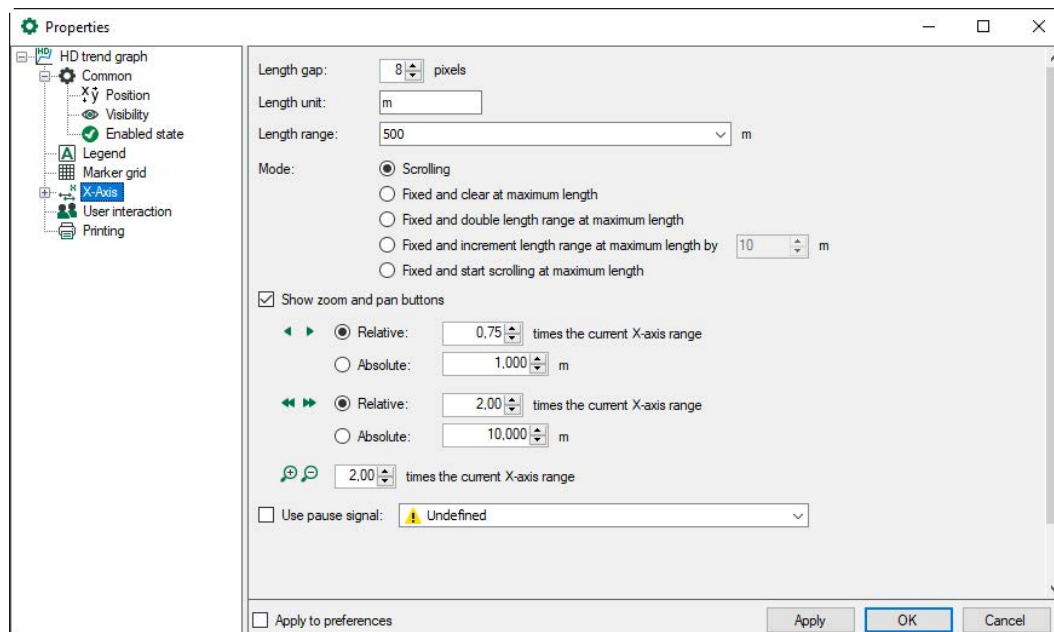
Various properties of a curve can be dynamic.

In the "Height" field you can set the height of the graph in pixels.

"Dynamic visibility" allows the complete signal to be controlled visibly or invisibly via a digital signal. This corresponds to the manual function, which can be activated with the eye icon.

The color of a signal can be dynamic. It can be controlled by another signal. In the signal table of the graph properties, you can determine the signal for the dynamic colors (see figure above). This signal must be an analog signal between 0 and 15. There are 16 different colors available and the color signal selects one of them depending on its value. You can specify the 16 colors in the trend graph properties (see chapter ↗ *Graph*, page 209).

The thickness of the signal can be firmly adjusted or can be controlled dynamically by another signal. For example, the thickness of the signal can be displayed broader with a certain state. In the drop-down menu of the respective column, select the signal that controls the property.

In the column "Style", the graph display with or without filling can be selected.

5.25   Offline trend graph

Function

With the offline trend graph, signals from a closed data file (*.dat) can be displayed, as well as csv and txt files. All information fields included in the data file as well as the signal tree will be loaded. Besides, it is possible to load the files automatically or triggered in the offline display, e.g. each time a data file is completed. Now the user has the possibility to compare completed measurements with the current display. Not only time-based but also length-based signals can be displayed as data or text files parallel to the current recording.

The offline trend graph can also be used to display vector signals and traversing vectors. See also chapter ↗ *Traversing vector*, page 212.

Configuration

The offline trend graph behaves as a default trend graph, whereas data will be loaded from a file.

With a loadable sample file, the desired representation of signals can be configured via drag & drop from the signal tree.

The display consists of two parts. On the left, the signal tree of the currently loaded data file is displayed; on the right, the trend graph.
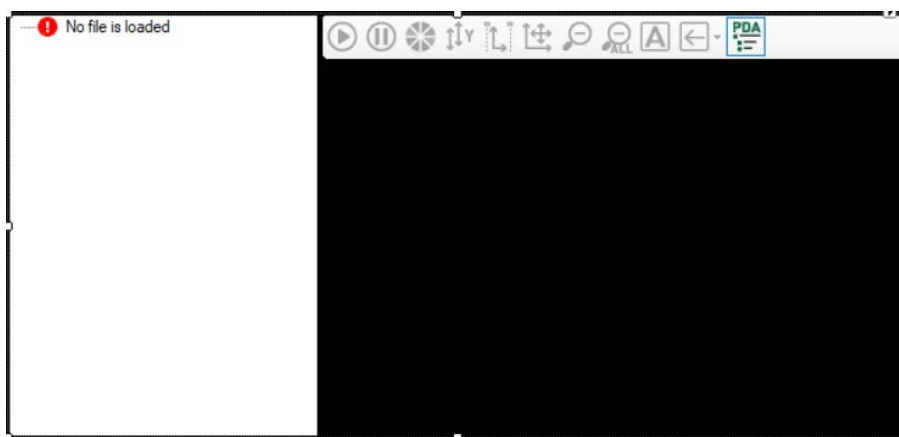
The signal tree can be shown or hidden via the context menu of the signal tree and the trend graph or via a button in the toolbar of the trend graph.
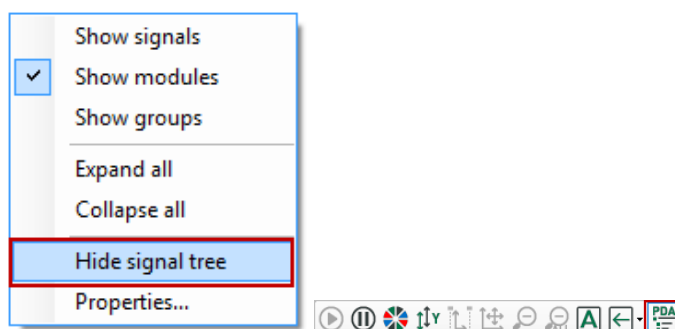
To load a file, open the properties dialog of the offline trend graph over the context menu.
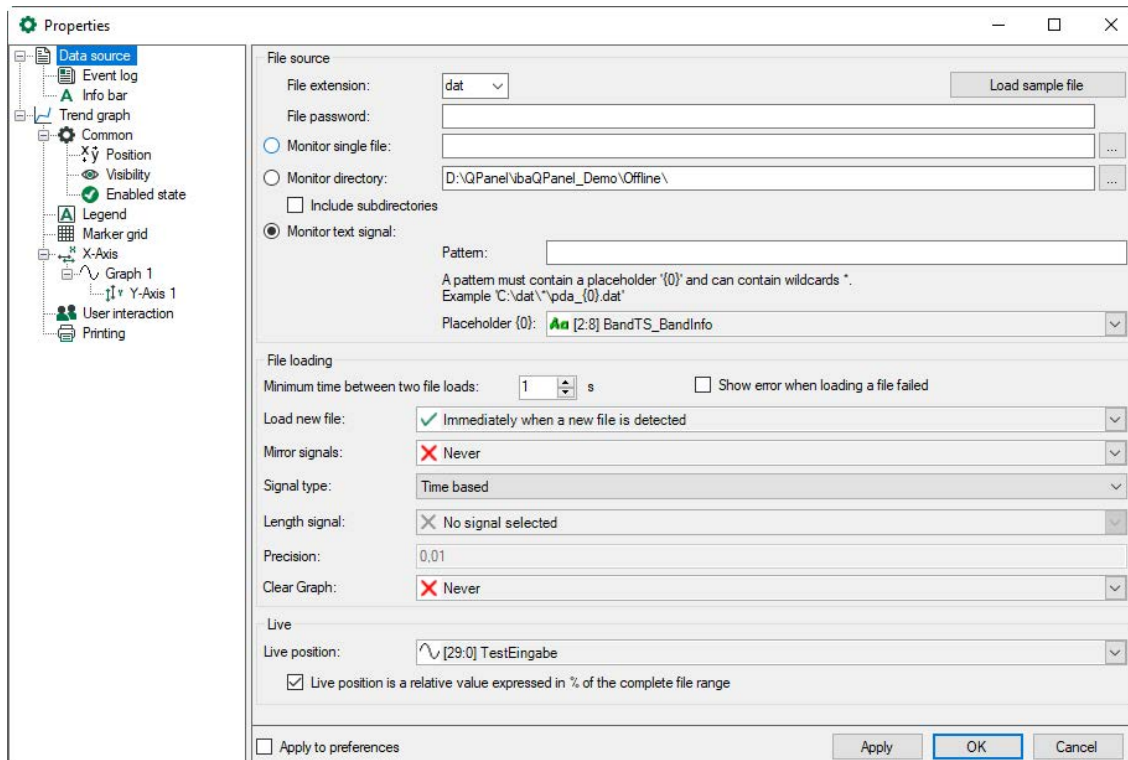
5.25.1   Data source

The dialog "Data source" divides into three parts: File source, File loading and Live.

File source
With "File extension", you can choose the file type that shall be loaded.

Furthermore, you can configure a mode stating which file shall be loaded next. Available for selection are:

- Monitor single file
  Select a file via the browser button. The selected file will be loaded every time the content changes.

- Monitor directory
  Select a directory via the browser button. The most recently closed file from this folder will be loaded. If subfolders should also be monitored, enable the option "Include subdirectories".

- Monitor text signal
  Please enter a defined text signal or choose a text signal from the drop-down menu which includes the file path information. Every time the text signal changes, a new file is loaded.

  If the file name contains a text signal and follows a specific pattern, you can define this pattern in the "Pattern" field. A pattern must contain a placeholder "{0}" and may contain wildcards*. Example: "C:\dat\pda_{0}.dat". In the "Placeholder {0}" field, select the text signal that fills the placeholder.

With the button <Load sample file>, it is possible to directly select a file. With this, the desired signal display can be configured via drag & drop from the signal tree.

If a text file (*.txt) is chosen, a dialog opens to define how the text file is read in.

In file viewer, the first 1000 lines with line numbers (red) will be displayed in the preview.

Delimiter

Choose a delimiter or enter a delimiter in the field "Other". If you select "Treat consecutive delimiters as one", consecutive delimiters will be treated as one.

Data Description

In the range "Data Description" you define in which row are the signal names, signal units and information fields and in which row the data begins.

With the option "Mode", you can select whether the file contains time-based or length-based data. When using time-based files, you can set a time column. For the time column, two types are available: relative time (in seconds) and absolute time (in the same format as ibaAnalyzer-Export: day/month/year hour:minute:second:millisecond). Without time column, the timebase has to be set manually.

When using length-based files, you can choose if a column will be configured for the length. Without length column, the lengthbase has to be set manually, furthermore a unit can be specified. The text file will be loaded with the buttons <OK> or <Apply>.

Note

i	The offline trend graph can only map equidistant values. When reading in a time or length column, the distance of the values is derived from the difference between the first two values. The remaining values are ignored.

File loading

After the data source has been defined, it has to be set in the range "File Loading" when and how the new found file has to be displayed. The time between 2 files has to be at least 1 s in

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order to avoid an overload of the computer. With "Load New File", you can choose if a new file will be loaded immediately, or only with rising edge of a selected digital trigger signal.

"Signal Type" allows you to choose between a time-based or length-based signal. It is also possible to convert a time signal into a length-based signal if you enter an appropriate length or speed signal in the field below. To display the length signal, you can specify an accuracy (number of digits after the decimal point).

The signal files can be mirrored. With the option "Mirror signals", you can choose if the signal shall never or always mirrored or triggered by a chosen digital signal.

Any digital signals in ibaPDA can serve as trigger signals for loading or mirroring of the file, however signals from the loaded file cannot be used as trigger signals.

Live

You choose a signal from the ibaPDA signals which should display the live position in the range "Live". Normally, the signal shows the absolute value on the X-axis in seconds for time-based signals and for length-based signals in meters or in the length unit indicated in the file. If the checkbox below is enabled, the live position will be indicated as relative value expressed in [%] of the complete file range.
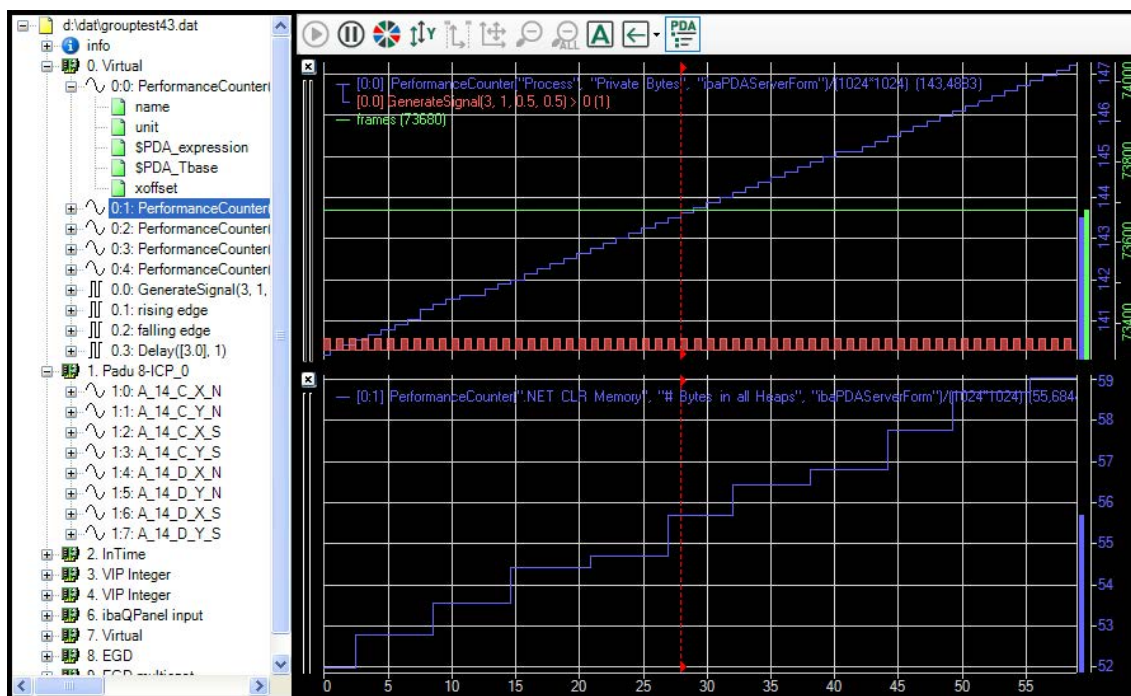
An offline trend graph acts as a normal trend graph. In the signal tree, all information fields, signals, groups and vectors contained are displayed. The signals can be displayed in the trend graph by double click or drag & drop. The red marker indicates the live position. The signal selection is valid for all displayed files which follow.

5.25.2   Event log / Info bar

Event log
Events are displayed as a list.

Info bar
It is possible to display an info bar with the current file name, optionally also with the full path. You can define the font, alignment and color for the text display.

5.25.3   Legend

The settings for the offline trend graph legend are identical to those for the legend of a standard trend graph. See chapter ↗ *Legend*, page 205.

5.25.4   Marker grid

The settings for the marker grid of the offline trendgraph are identical to those for the marker grid of the HD trendgraph. See chapter ↗ *Marker grid*, page 182.

5.25.5   X-Axis

The only difference to the normal trend graph are the properties of the X-axis.
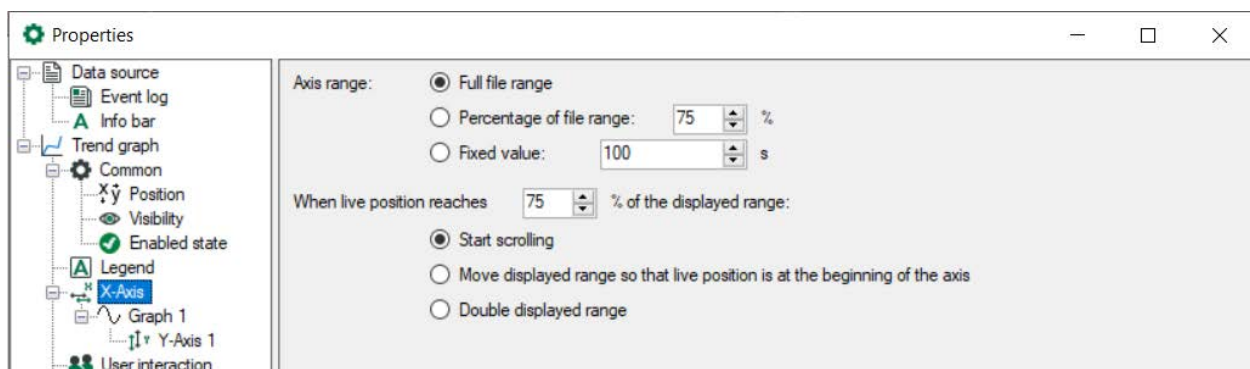
In the offline trend graph, the range of the X-axis is configurable. You can select the entire range or just a subsection: either a certain percentage of the total range or a fixed range. This enables the "pushing through" of the displayed data.

If the X-axis is only shown in a range, you can determine how to proceed with the hidden ranges. First, you can set which proportion of the visible range (in percentage) the live position should have reached until the display switches. For the new display 3 settings can be chosen.

- "Start Scrolling": The range remains as big as it was, however it can be scrolled.

- "Move displayed range so that live position is at the beginning of the axis": The range remains as big as it was, however the beginning point shifts with live-position.

- "Double display range": The X-axis range will be doubled.
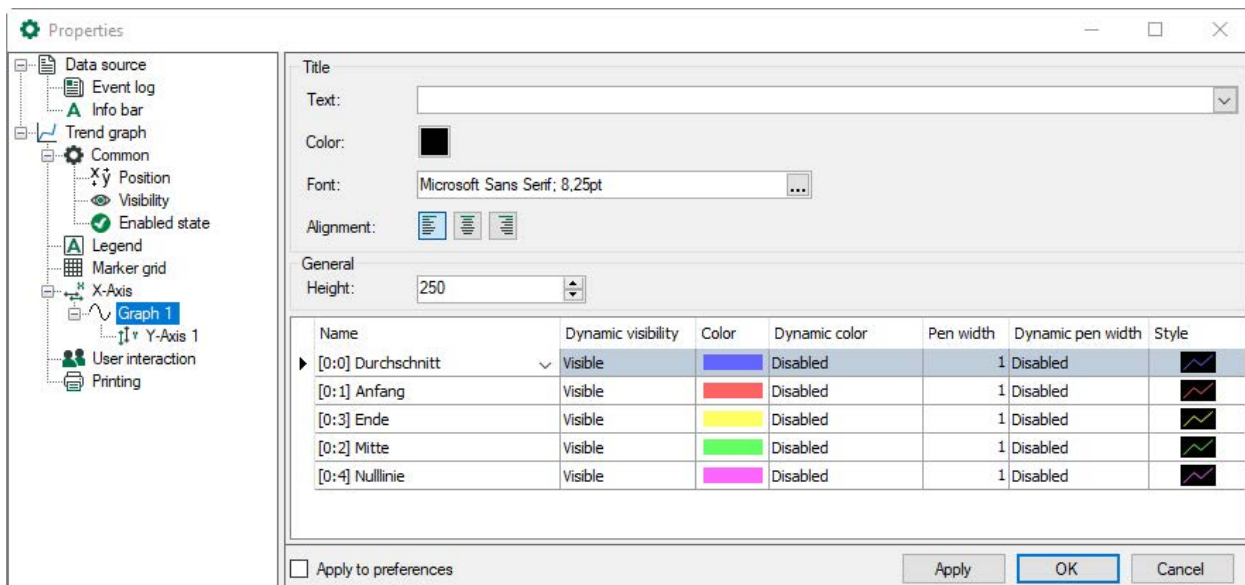
You can set the height of the graph in pixels in the "Height" field.

"Dynamic visibility" allows the complete signal to be controlled visibly or invisibly via a digital signal, which must be available in the measurement file. This corresponds to the manual function, which can be activated with the eye icon.

The color of a signal can be dynamic. It can be controlled by another signal. In the signal table of the graph properties, you can determine the signal for the dynamic colors (see figure above). This signal must be an analog signal between 0 and 15. There are 16 different colors available and the color signal selects one of them depending on its value. You can specify the 16 colors in the trend graph properties (see chapter ⏶ *Graph*, page 209).

The thickness of the signal can be firmly adjusted or can be controlled dynamically by another signal. For example, the thickness of the signal can be displayed broader with a certain state. In the drop-down menu of the respective column, select the signal that controls the property.

In the column "Style", the graph display with or without filling can be selected.

5.26   Scope view

Function

Functions and properties of the scope view in *ibaQPanel* correspond to those of a normal scope view in *ibaPDA*. Each view supports one base axis and multiple signals on multiple value axes.

Signals can be dragged from the *ibaPDA* signal tree onto the view to add them. If the signal is dropped on the chart, a new value axis will be created. To add a signal to an already existing axis, drop the signal on that axis. Every value axis will have the same color as the first signal it contains.

The scope view offers specific display and control elements. You can find the description in chapter ⏶ *Indicating elements*, page 197.
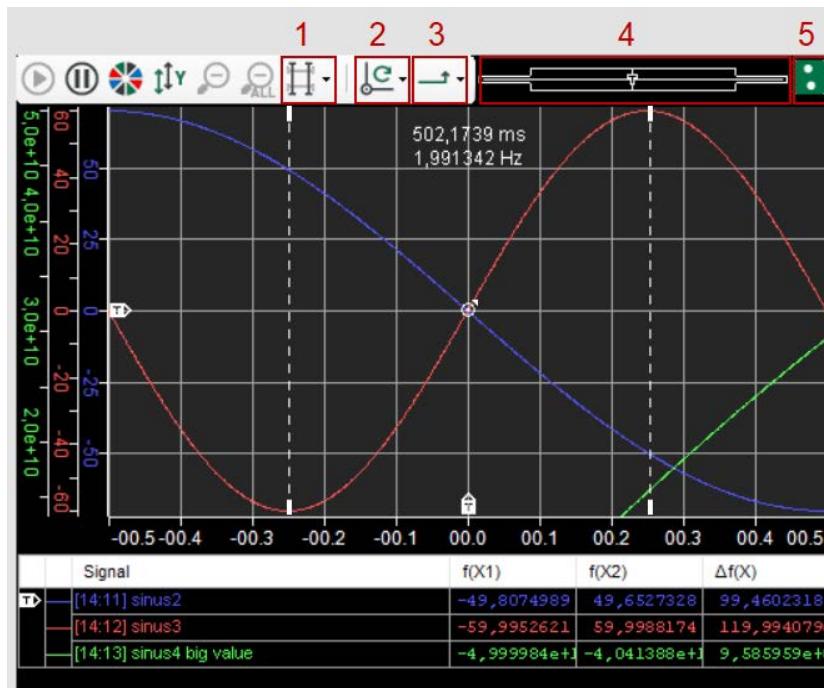
1 marker display

2 trigger mode

3 trigger edge

4 memory length

5 trigger state

5.26.1 General properties

The appearance of the scope view is configured in the *Properties* dialog.
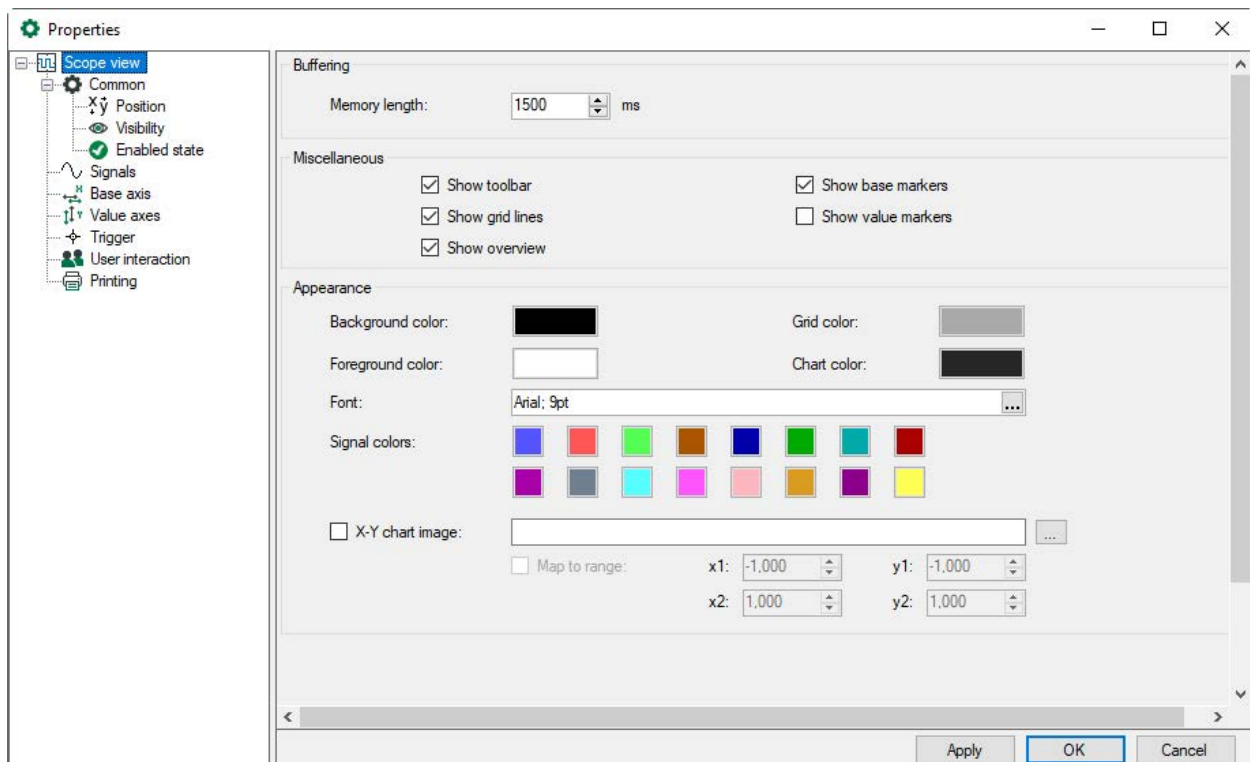
Buffering

The scope view offers a user-defined memory size which is indicated in the field "Memory length" in milliseconds. This determines how many samples are buffered for all of the signals in

the view. The length is limited, depending on the time bases of the signals currently used in the view. So, by adding a new signal, the memory length might change.

Miscellaneous

By setting check marks, the listed objects (toolbars, grid lines, overview, base and value markers) will be displayed or hidden in the scope view.

Markers can be switched on/off in the toolbar as well.
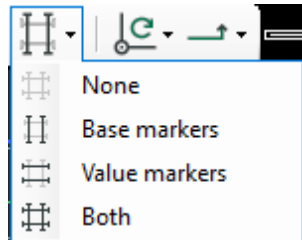
Appearance

Here, the colors of the display and font style is defined.

In the X-Y display mode, the scope view allows to use a graphic file as background image. In order to enable/disable the image display, check/uncheck the "X-Y chart image" checkbox.

Enter the path and file name of the graphic file in the corresponding field or use the browser button to select the file.

The "Map to range" option permits to define size and position of the image in the background. By specifying the coordinates x1/y1 and x2/y2, you can map the 4 corners of the image with regard to the X/Y scales in the view.

If the "Map to range" option is disabled, the background image will always be scaled to the size of the scope view.

Example:

A field of characteristic curves (image) as a background for the measured data.
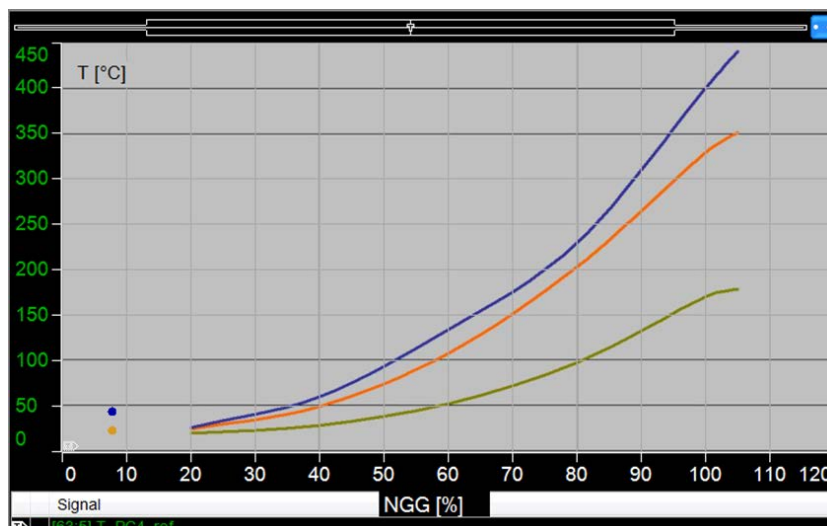
5.26.2   Signals

Signals can be dragged from the signal tree onto the scope view via drag & drop (after exiting design mode). The signals assigned to the scope view will be listed in the window "Signals".
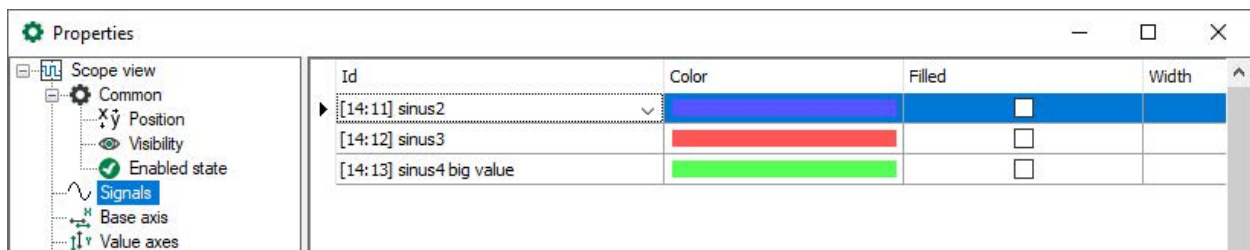
In the column "Id", you can choose another signal via drop-down menu and replace the one you chose first. In the columns "Color", Filled" and "Width", the display properties of the signals are defined.

5.26.3   Base axis
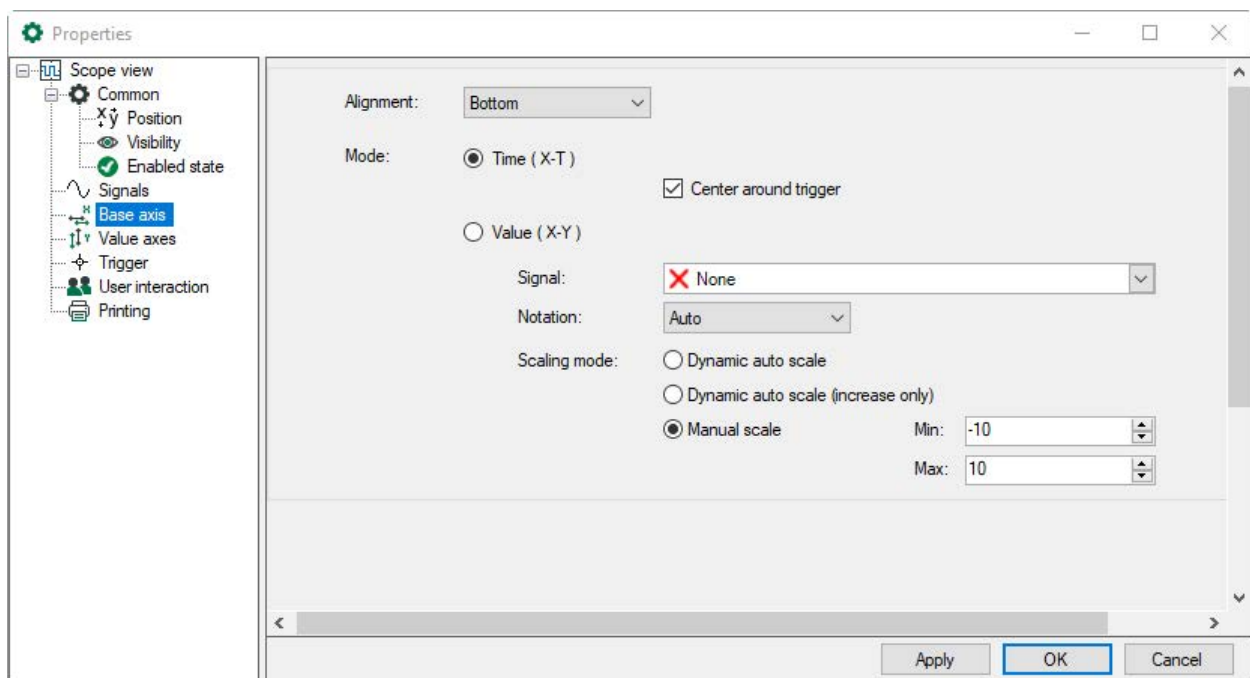
The base axis can operate in two modes:

■ time mode (X-T)

■ value mode (X-Y)

In time mode, you can choose to center the axis values around the trigger or to use absolute time values.

Value mode requires a signal to be configured in the properties dialog. The base axis then uses the signal values and thus becomes a value axis instead of a time axis. The signal will not be added to the signal grid.
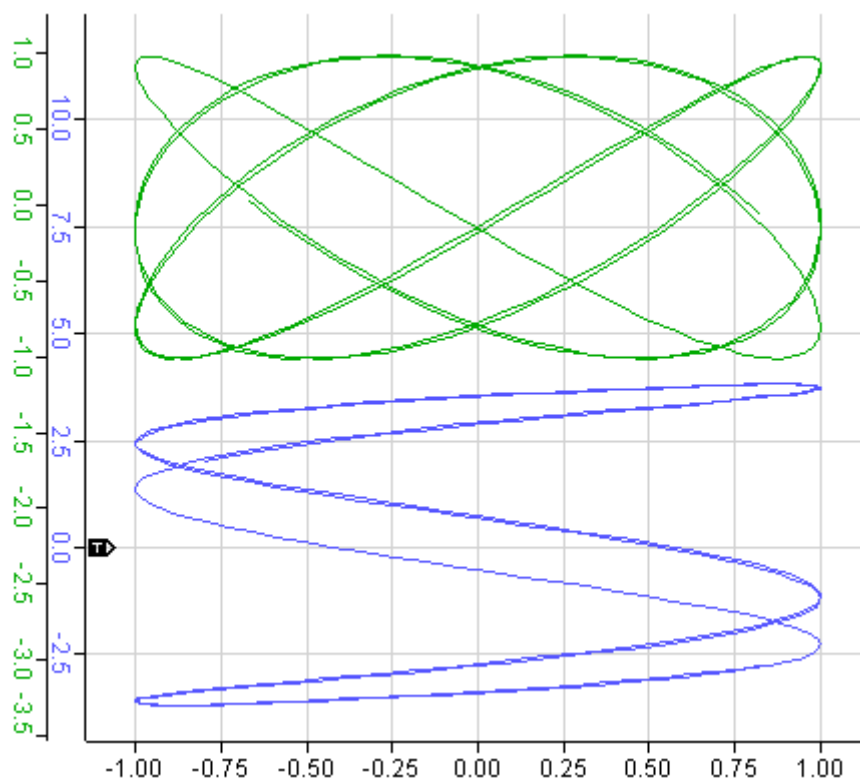
Interacting with the base axis in time mode changes the visible memory length (overview also changes). In value mode, the visible part of the memory length can only be changed by using the overview or by opening the properties dialog.

Note that the axis containing the trigger signal is always placed next to the chart.

All of the axes on the view can be panned by dragging them with the mouse. You can also perform an axis center zoom (in and out) by scrolling the mouse as soon as the cursor is placed over the axis. If the scaling mode is set to manual, you can auto scale the axis by clicking the center mouse button.

5.26.4   Value axis
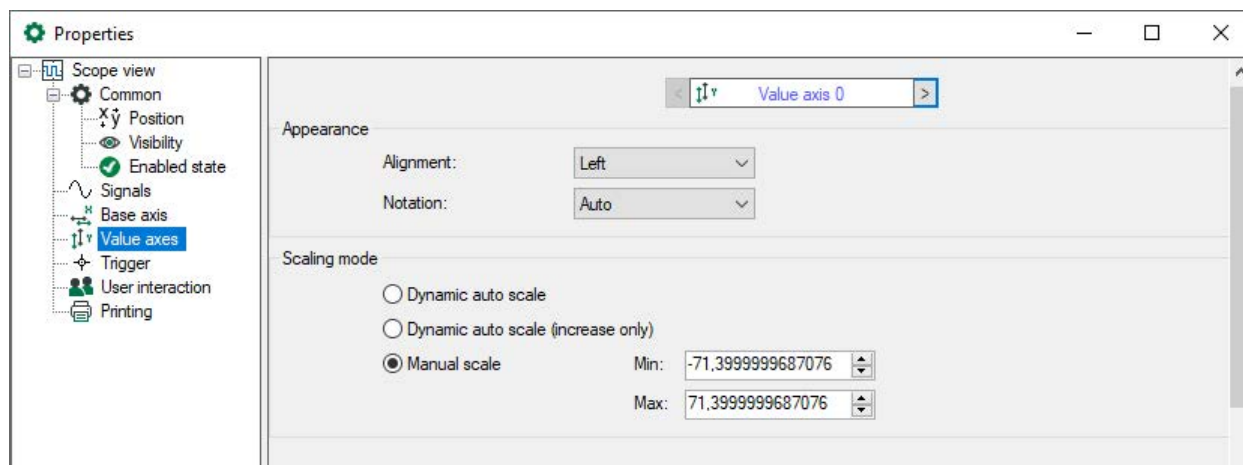
In the "Value axis" properties dialog you can define the alignment (left or right) and notation (auto, standard or scientific) as well as the scaling mode.

The properties refer to the value axis selected in the upper field. If several value axis are available, it is possible to switch between the value axis by clicking in the arrow buttons.

5.26.5   Trigger
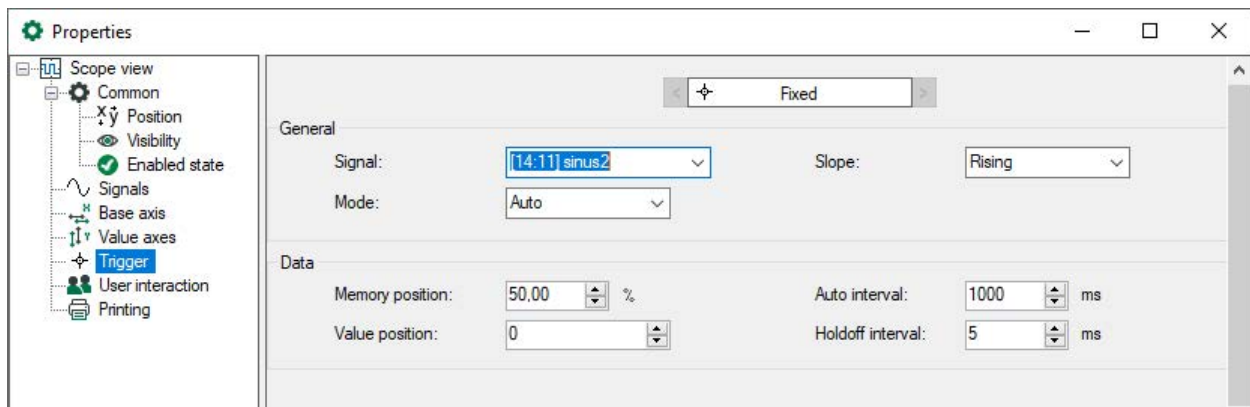
General

Here, the trigger signal is selected. Normally, this is the first signal from the signal tree to be dragged onto the scope view. Via the drop-down menu, another signal can be chosen.

There are four triggering slopes:

- Rising: Trigger can only fire on the rising edges of the trigger signal

- Falling: Trigger can only fire on the falling edges of the trigger signal

- Either: Trigger can fire on both falling and rising edges of the trigger signal.

- Alternating: If a trigger previously fired on a *rising/falling* edge, it will now fire on a *falling/rising* edge.

There are four trigger modes:

- Normal: Trigger fires every time the trigger signal passes the trigger value

- Single: Trigger fires when the trigger signal passes the trigger value *for the first time*.

- Auto: Like normal mode, but also fires when a *time-out* expires

- Auto level: Like auto mode, but the trigger value is set to the trigger signal's center value

The trigger mode and slope can be set in the toolbar or in the "properties" dialog of the view.
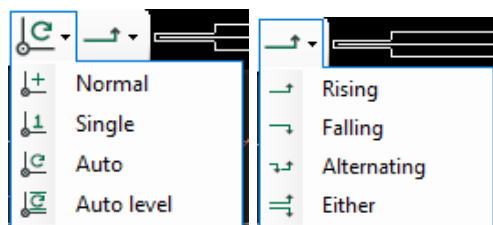
(See also chapter ↗ *Overview*, page 198)

Data

- Memory position: Displayed position within the memory segment.

- Auto interval: Is used in auto/auto level mode. Maximum time until the trigger is set again. It is possible to automatically trigger before since the input data is always scanned.

- ▪ Value position: With this, the Y trigger will be preassigned to a fix value.

- ▪ Holdoff interval: During this time, the input data will not be scanned when the trigger was fired. With this, the activation of a trigger can be prevented for a certain time.

To activate the trigger, click the "Play" button ▶ in the toolbar. To disable the trigger, click the "Stop" button ⏸. If the trigger is disabled, it will not scan incoming samples.

The view's trigger is visualized on the chart by a little circle with a dot inside. If the trigger can be moved, trigger markers appear at the side of the chart, near the base and value axes. The trigger can be moved by dragging these markers.

5.26.6   Indicating elements

5.26.6.1 State indicator

The state indicator shows the state of the trigger. If the trigger is enabled and samples are received, the state graphic will show 2 dots moving in a circle. If the trigger is disabled, the dots *don't move* around in a circle. If a trigger fires, a circle runs through the middle of the dots connecting them. If the auto trigger fires, this circle is smaller, only touching the dots.

	Scanning
	Triggered
	Auto triggered

5.26.6.2 Signal table

The signal table can be found at the bottom of the view. It displays the ID and name of each signal that has been added to the view.

	Signal	f(X1)	f(X2)	Δf(X)	Y1	Y2	ΔY
	[0:0]	2.79194	1.25627	1.53566	7.97447	-1.50742	9.4819
	[8:0] sin 5	-0.39137	-0.87570	0.48432	-0.07347	-3.37960	3.30612
T▶	[6:1] sin 5 fase 45	0.89100	-0.75011	1.64111	-0.07347	-3.37960	3.30612
	[3:0] 50 Hz	-2.79903	0.58778	0.58778	2.48046	-2.55859	5.03906
	[3:8] 10 Hz	0.58778	0.12533	0.46245	2.48046	-2.55859	5.03906

Beside the signal name column, there are two more permanent columns: The trigger column and the axis column. The trigger column shows which signal is currently being used as trigger signal. You can change the trigger signal by dragging the trigger icon onto another row. The second column visualizes a small list for every value axis in the view distinguished by different colors. Each list item connects the signals contained with the axis it represents. If the base marker is shown and the base axis is in *time mode* (XT), the table shows the columns *f(X1), f(X2)* and *Δf(X)*. If the base axis is in "Value" mode (XY), the grid shows *X1, X2* and *ΔX* columns.

If the value markers are visible, the grid shows *Y1, Y2* and *ΔY* columns. You can click inside the "Name" column to shift a signal to another axis. If the dragged signal is the only one on its axis, this axis will be removed. In order to remove a signal from an axis, drag it to any position, but not into another column. The signal is put on a new axis and added to the bottom of the signal table.

Example
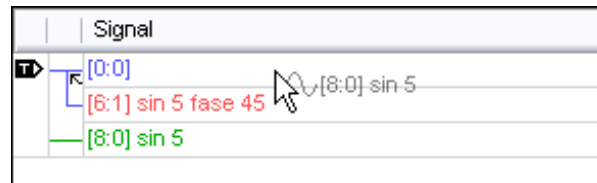
[8:0] is added between [0:0] and [6:1] of the blue axis

The signal table's height can be adjusted. When moving the mouse to the top of the table, a resize icon appears. To auto-size the table, double-click when the resize icon is visible.

5.26.6.3 Overview

This component is a visual representation of the memory length. It shows which part of the memory length is currently visible on the diagram. It also shows the position of the trigger.

The entire width of the overview visually represents the memory length. The large rectangle represents the currently visible part of the memory length. It can be dragged to the left or right to show other parts of the buffered signals on the diagram. If the cursor is above the rectangle, its size can be increased or decreased by scrolling the mouse wheel. The trigger can also be dragged onto a new base position.

5.26.6.4 Chart

The chart is the part of the scope view displaying the signals and grid lines. Furthermore, the chart provides a zoom function. You can draw a zoom rectangle within the diagram, when releasing it, it is zoomed in to the drawn range. When zooming in, the trigger will be disabled. The toolbar buttons can be used to zoom out to the previous level or to zoom out entirely. You can also press the <Play> button to zoom out and enable the trigger.

If a trigger fires, the chart will be updated with new signal data. The maximum update frequency of the chart is 20 Hz. As the visible part of the memory length gets larger, the update frequency gets smaller. The reduction degree depends on the number of signals, the width of those signals, the base axis mode and its value signal, and the memory length itself.

5.27 Signal tree

Function

With the Signal tree object, signals can be dragged and dropped into a trend graph or another *ibaQPanel* object just like from a normal *ibaPDA* or ibaHD signal tree, if *ibaQPanel* is displayed in full screen mode and the normal *ibaPDA* and ibaHD signal tree is not visible and can also not be accessed from full screen mode due to the limited access rights.
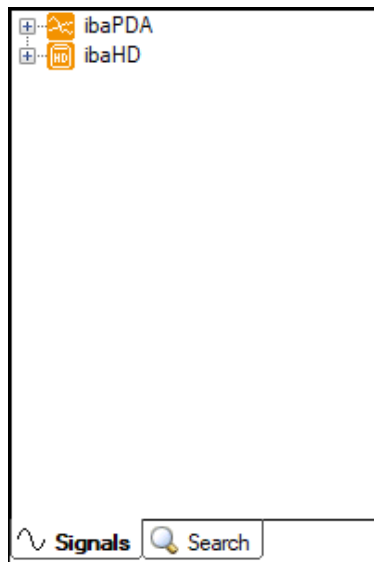
Configuration
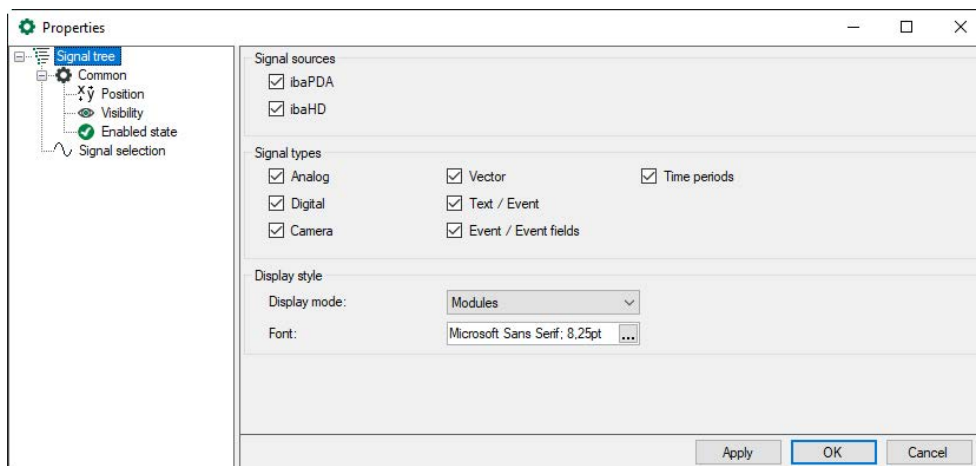
You can select which source the signals come from and which signal types are displayed. Several signal sources and signal types can be selected respectively.

Signal sources

■ *ibaPDA*: the *ibaPDA* signal tree from the currently connected *ibaPDA* server will be shown

■ ibaHD: the ibaHD signal tree from the currently connected *ibaHD-Server* will be shown

Signal types

■ Analog

■ Digital

■ Camera

■ Vector

■ Text / Event (events are also text signals)

■ Event / Event fields: The events and also the variable analog, digital or text signals inside an event message will be shown.

■ Time periods: Configured time periods will be shown

Display style
The display style determines how the signals are grouped in the signal tree.

■ Groups: Signals are grouped by group.

■ Modules: Signals are grouped by module.

■ Signals: Signals are not grouped.

You can set the font and size in the signal tree.

Note

With the *Groups* option a plant specific view can be achieved. The groups must be defined in the I/O Manager of *ibaPDA*.
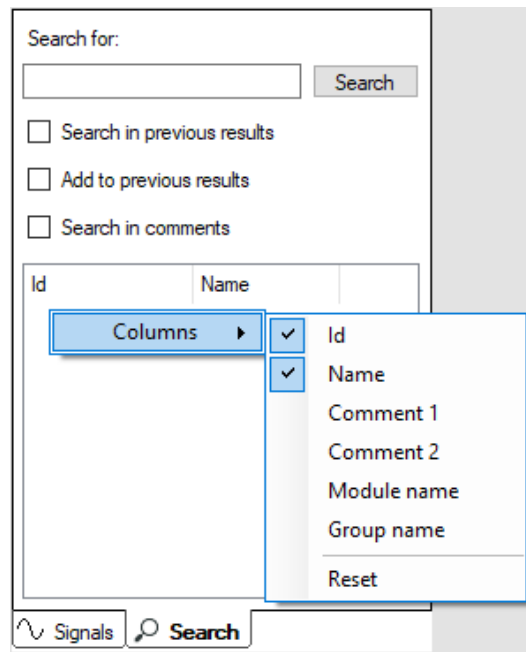

Signal selection
The signal selection allows you to determine which signals should be available in the signal tree. By default, all signals are available. If you want to limit the available signals then select "Show only selected signals" and make your selection by using the checkboxes in the signal tree.
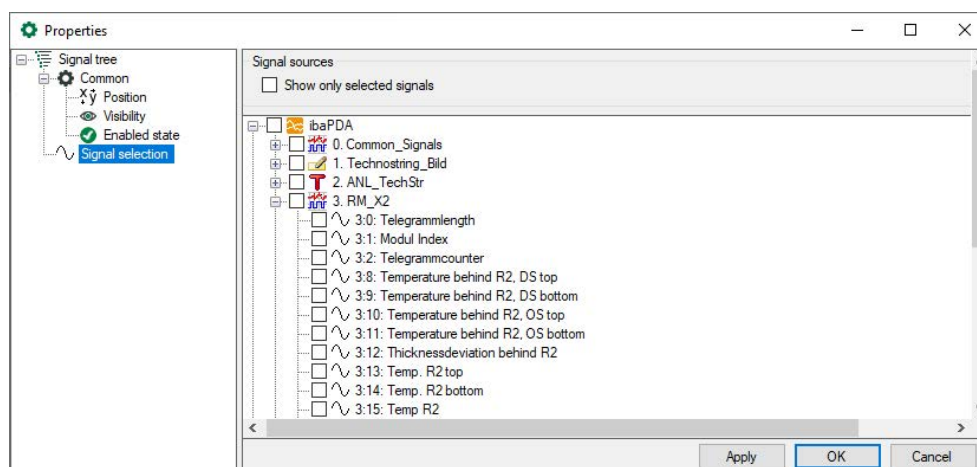
Search

The search function allows the user to find certain signals. This function is similar to the normal *ibaPDA* signal tree. There are some differences in the details. It is possible to search also in groups if the *group* display style is selected. Another difference is that the module name can be made visible in a column.

The display of the signal tree can be modified via the context menu.

With a right mouse click in a free area of the signal tree, the commands for expanding and collapsing the tree can be selected. *Expand all/Collapse all*
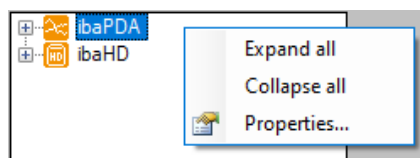
5.28 Trend graph

Function

The signal display in *ibaQPanel* has some extra functions compared to the usual trend graph display in *ibaPDA*. This document only describes the additional functions. The default functions of the display are mentioned in the *ibaPDA* manual.

The signal display also supports vector signals. Vector signals are specifically indicated groups. They are flagged with a 2D symbol in the signal tree.

Note

> The desired signal group must be defined in the *I/O-Manager* of *ibaPDA*, in the category "Groups". In order to display the group as vector signal in the signal tree, the option "Vector" has to be enabled during definition.

If a vector signal is dragged onto a signal display, it will be shown in the 2D top view. The color scale can be based on percentage in auto scale mode or based on values in manual scale mode. The measured values do not have to be equidistant.
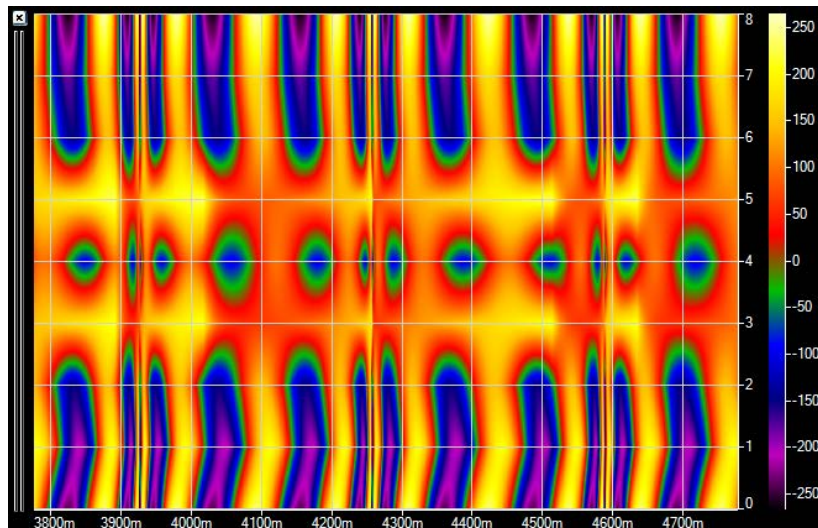
Moreover, the signal display supports text channels. If you drag a text channel on the signal display, the text above the curve is shown at the moment the new text signal was received. The font type of the text channels can be set in the properties of the signal display. The colors of the text channels can be displayed in the same way as the colors of the normal trend graphs.
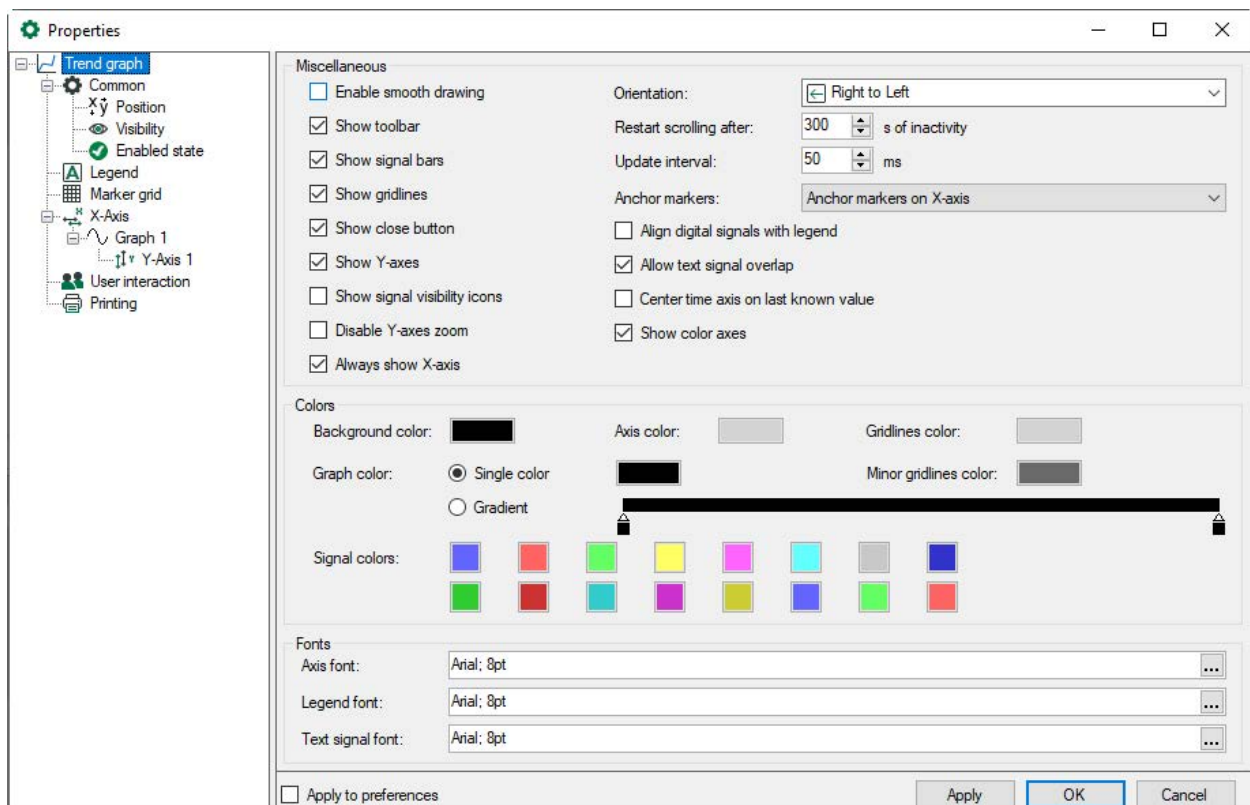
Note

The minimum height of a graph within the trend is 5* font size of "Axis font".

■ Show signal visibility icons

Signal curves can be hidden or shown by clicking on the screen symbol before the signal legend. The display symbol changes from filled to empty. In the hidden state the curve is only masked, the signal label remains.
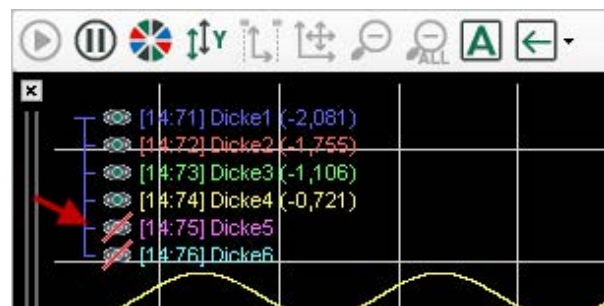
Disable Y-axes zoom
All operations and automatic zoom functions etc. for the Y-axis are deactivated. The user can only change the X-axis, the Y scaling remains.
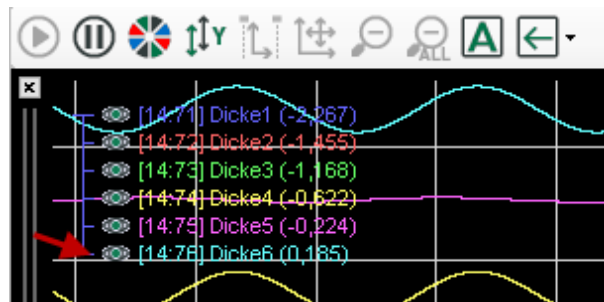
Anchor markers
You can anchor the markers to the X-axis. Then the markers remain at their relative position in the trend graph and do not move while shifting or zooming.

Alternatively, the markers can also be anchored at the right/left position. Then, in pause mode, they remain at the right and left edges of the visible trend curve. This ensures that the marker table values are always displayed in relation to the selected section.

Align digital signals with legend
Digital signals will normally be shown in the lower part of the trend curve. With this selection digital signals will be shown at the height of the corresponding legend.
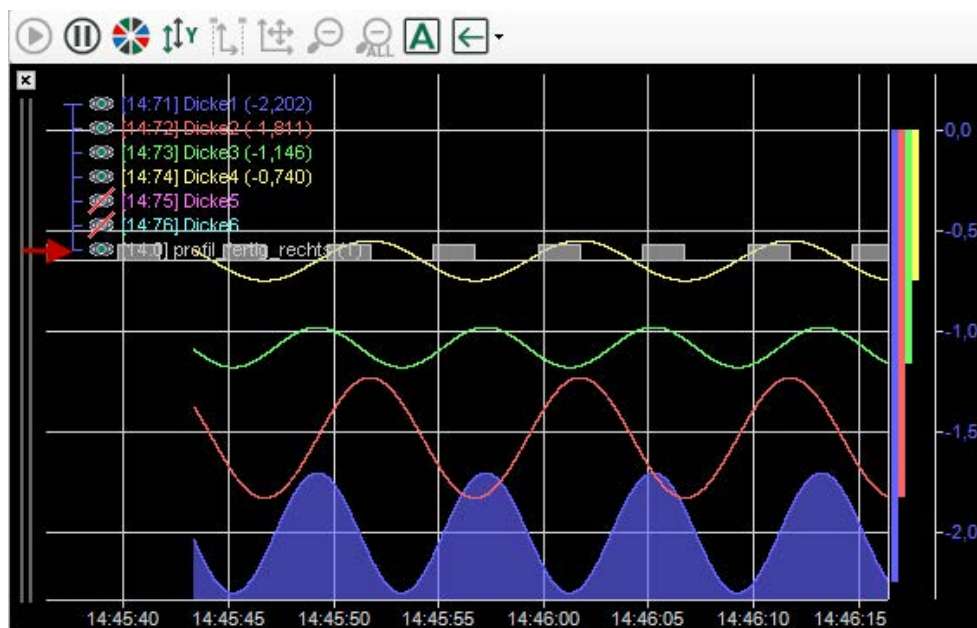
■ Allow text channel overlap
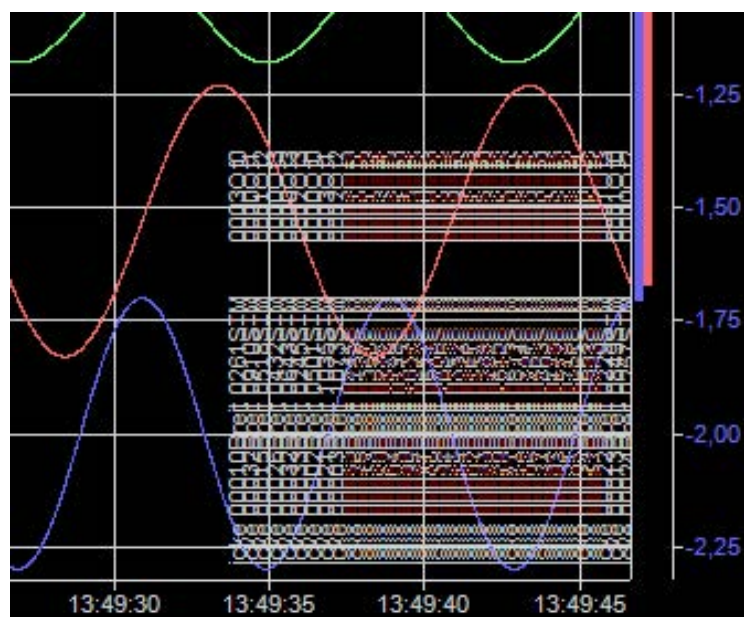
If this option is disabled, the overlapping of text messaged is prevented.
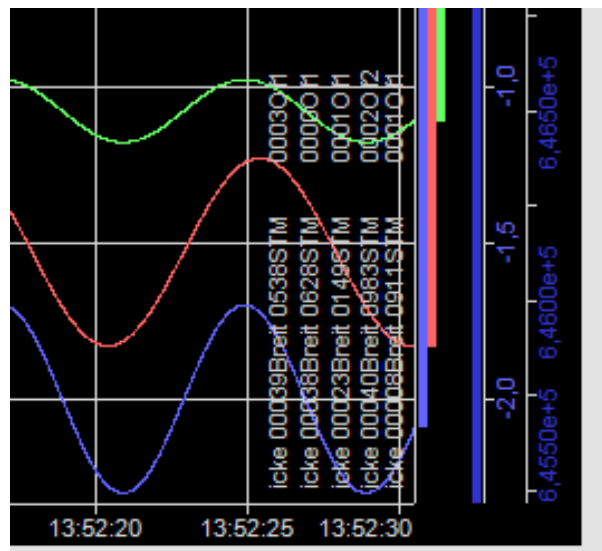
If messages of the text channel come in very fast succession (ms range), the text messages will be displayed in overlap nevertheless. Please note the relation between the cycle of the text channel and the update rate.

Configuration

The preferences/properties of the *ibaQPanel* trend graph differ from the standard trend graph in several aspects.

The "trend graph", "signals" and "Y-axis" settings are the same as in the standard trend graph described in the *ibaPDA* manual.

5.28.1   Legend
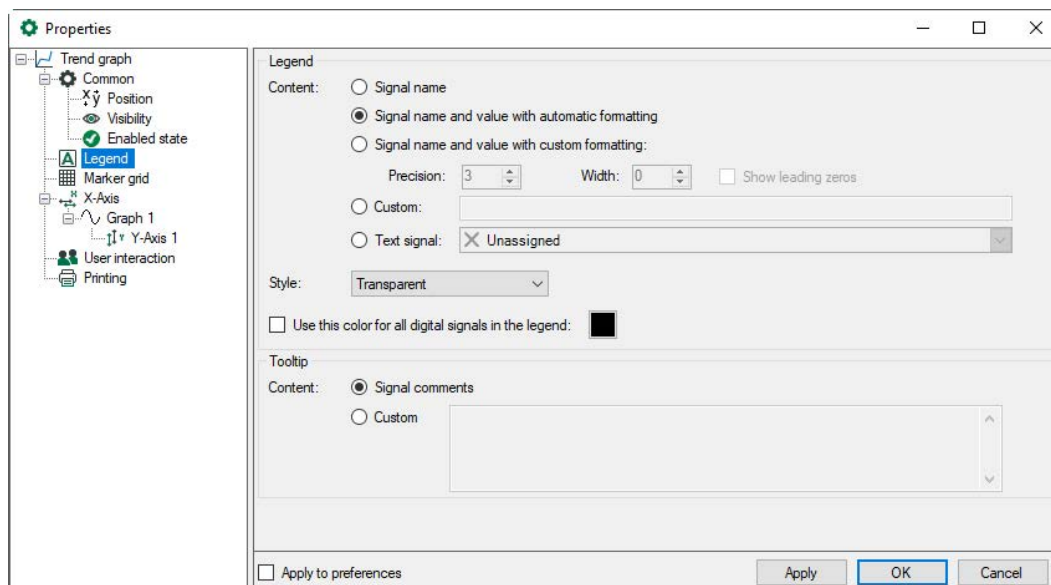
Select one of the following options for the legend content:

■ Signal name

■ Signal name and value with automatic formatting

■ Signal name and value with custom formatting

Enter the number of digits after the decimal point in the *precision* field. The w*idth* is the minimum number of characters displayed. Instead of spaces, leading zeros can be can be displayed.

■ Custom

You can enter text and dynamic content using parameters. When clicking in the input field, a tooltip appears with the possible parameters.

```
Parameters:
%n: signal name
%u: signal unit
%c1: first comment
%c2: second comment
%m: module name
%x1: X-value at X1 marker
%x2: X-value at X2 marker
%dx: difference between marker X-values
%y1: Y-value at X1 marker (= actual Y-value in live mode)
%y2: Y-value at X2 marker
%dy: difference between marker Y-values
%s: sampling period

Use optional format strings "w.p" to specify the
formatting of a numeric parameter where
"w" is width and "p" is precision.
Width is the minimum number of displayed
characters. Precision is the number of digits
after the decimal point.

By default, the width is reached by adding spaces in front.
Use the letter "z" before the dot to add zeros instead of spaces.

E.g "%5.3y1" shows the y-value at the X1 marker
with a minimum width of 5 characters and a precision of 3.
E.g "%12z.6x1" shows the X-value at the X1 marker
with a precision of 6 and with zero characters in front
so the total width is 12 characters at minimum.
```

■ Text signal

Select a text signal. The text signal can contain regular text and legend parameters such as %c1, %x1 etc. You can use the same parameters as described in the *Custom* option.

Note

The HD trend graph supports ibaHD text signals. The offline trend graph supports ibaPDA and ibaHD text signals.

You can select different display styles from the *Style* drop-down menu:

■ Transparent (transparent background)

■ Opaque (opacity adjustable)

■ Invisibile (legend is not visible)

The option "Use this color for all digital signals in the legend" enables a consistently readable legend for digital signals that are originally of different colors.

Tooltip

You can choose between displaying signal comments in the tooltip and user-defined content. The custom content is configured similarly to the custom legend.

5.28.2   Marker grid

The settings for the marker grid of the trendgraph are identical to those for the marker grid of the HD trendgraph. See chapter ↗ *Marker grid*, page 182.

5.28.3   X-Axis
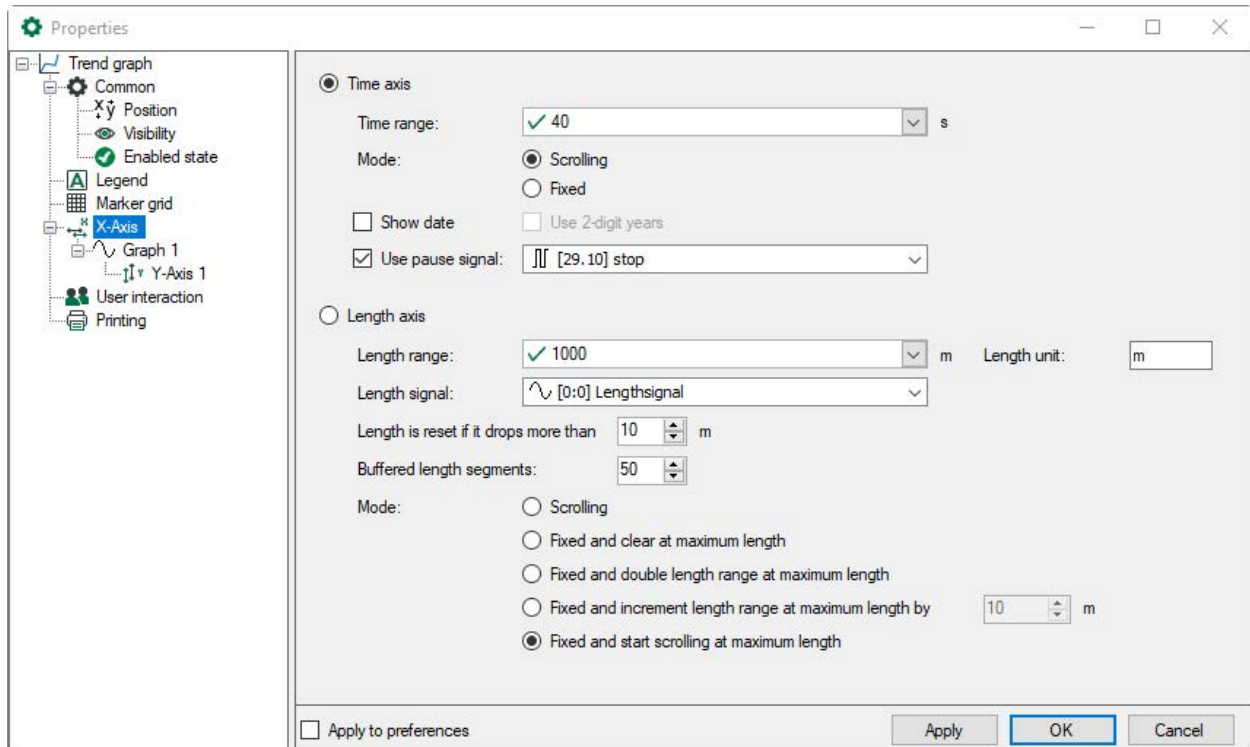
In contrast to the standard trend graph, the X-axis in an *ibaQPanel* trend graph can be time-based or length-based.

Serving as time axis, the time range can be set or controlled by a signal. The X-axis can be fixed or scrolling.

The date can be displayed in addition to the time. You can select a two-digit display of the year. Otherwise, a four-digit display is shown.

The pause signal can be enabled optionally. The pause signal is always a digital signal. As long as the pause signal is TRUE, the scrolling in the QPanel display is paused. A gap is inserted where the pause occurred. The gap is always 20 pixels wide independent of the duration of the pause.
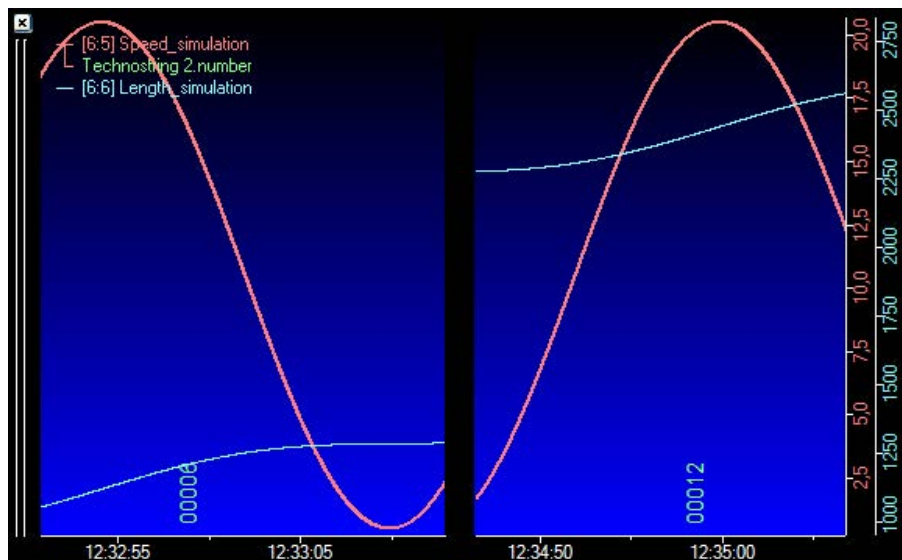
When serving as length axis, more settings are required.

The length range determines the maximum length value on the scale. You may enter a fixed value or – if length range can change from time to time – select a signal providing the length range.

For a proper labeling, set the correct length unit (m, mm, ...)

The actual length should be provided by an analog length signal, which can be selected from the pick-list.

You can set a length resolution value to make the length-controlled feed of the graph a bit smoother.

The "Length is reset if it drops more than ... m" parameter determines the threshold for the length signal. If the actual length shows a sudden decrease of more than the specified value, the length is reset and the feed starts again.

Depending on the feeding mode, different behaviors apply:

Mode	Behavior
Scrolling	The length value determines the visible range of the base axis. The base axis starts at 0 and scrolls in the specified direction until length value is reset. Then a gap follows which indicates the length reset and the scrolling starts again as soon as the length value increases.
Fixed and clear at maximum length	The fixed base axis shows a scale from 0 to length range value. The graph shifts in the specified direction. The graph is cleared when the length signal is reset. If the graph reaches the end of scale before length reset (length range is smaller than the actual length), the base axis shifts for another length range.

Mode	Behavior
Fixed and double length range at maximum length	The fixed base axis shows a scale from 0 to length range value. The graph shifts in the specified direction. The graph is cleared when the length signal is reset. When the graph reaches the end of scale before length reset (length range is smaller than the actual length) the base axis is rescaled to double the length range. The graph continues shifting to the middle of the base axis. When the end of scale is reached again before length reset, the scale is doubled again (4 times the original length range).
Fixed and increment length range at maximum length by x m	The fixed base axis shows a scale from 0 to length range value. The graph shifts in the specified direction. The graph is cleared when the length signal is reset. When the graph reaches the end of scale before length reset (length range is smaller than the actual length) the base axis is extended by the specified length.
Fixed and start scrolling at maximum length	The fixed base axis shows a scale from 0 to length range value. The graph shifts in the specified direction. The graph is cleared when the length signal is reset. When the graph reaches the end of scale before its length reset (length range is smaller than the actual length), the base axis moves with scrolling speed.

5.28.4   Graph
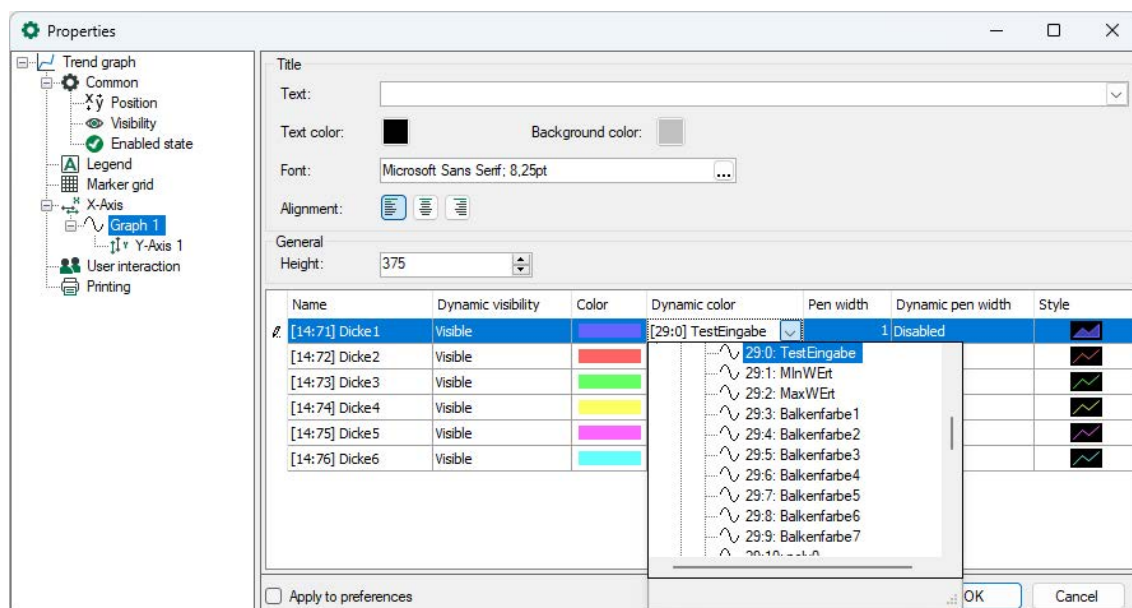
You can define a title for each signal graph (trend) within a trend graph signal display. You can enter a title and determine the font, text and background color and alignment of the title line.

In the "Height" field you can set the height of the graph in pixels.

"Dynamic visibility" allows the complete signal to be controlled visibly or invisibly via a digital signal. This corresponds to the manual function, which can be activated with the monitor icon.

The color of a signal can be dynamic. It can be controlled by another signal. In the signal table of the graph properties, you can determine the signal for the dynamic colors (see figure above).

This signal must be an analog signal between 0 and 15. There are 16 different colors available and the color signal selects one of them depending on its value. You can specify the 16 colors in the trend graph properties (see figure below).


The thickness of the signal can be firmly adjusted or can be controlled dynamically by another signal. For example, the curve can be visible or not visible for a certain state or the line width can be displayed wider.

In the column "Style", the graph display with or without filling can be selected.

Graph properties of vector signals
If vector signals have been placed on the trend graph, the start and end zone options can also be set. A vector signal consists of a group of several individual signals which describe a so-called "zone". If only part of the zone should be displayed, a begin zone and an end zone can be defined.
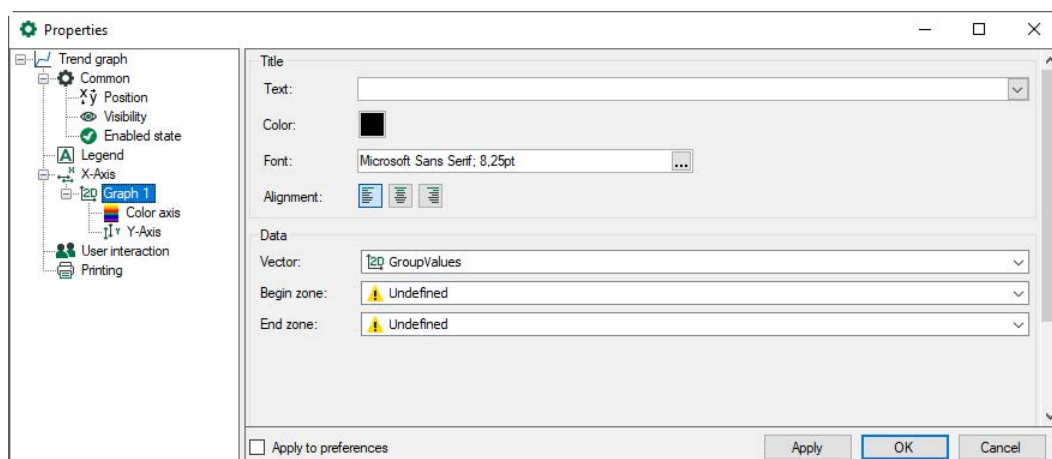
Example: Several signals measure the thickness of a strip in different zones across its width, and are summarized in a vector. For example, if you want to hide the edges of the strip, you can define the desired middle range via the begin and end zones.

5.28.5   Color axis
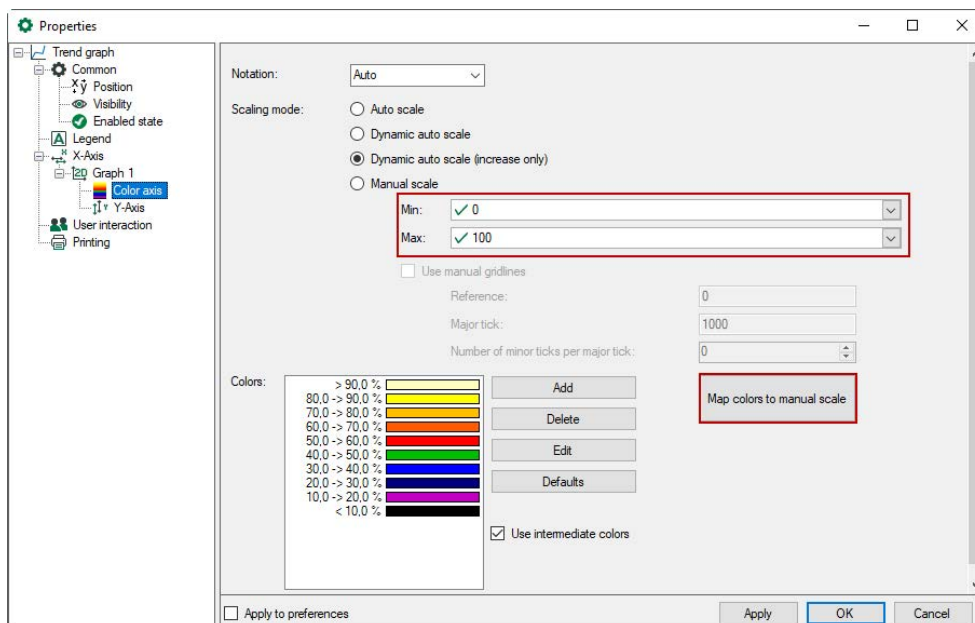
In the "Properties" dialog of a trend graph, this branch is only available if vector signals are put on the trend graph.

Unlike the standard trend graph, the *ibaQPanel* trend graph can display 2D color diagrams as you might know from *ibaAnalyzer*.

The red-framed parameters in the figure above are only available in the trend graph's properties.

The color axis scheme is automatically applied as soon as a vector signal has been assigned to a trend graph. The values of the vector's signals are displayed by colors.

If you manually scale the color axis, you can set the lower and upper value of the scale. When you press the button <Map colors to manual scale> you can see the correspondence between scale values and colors in the color scheme. You can add, change or delete colors according to your needs.

Enable the <Use intermediate colors> option for a smoother color transition.

5.28.6   Y-Axis
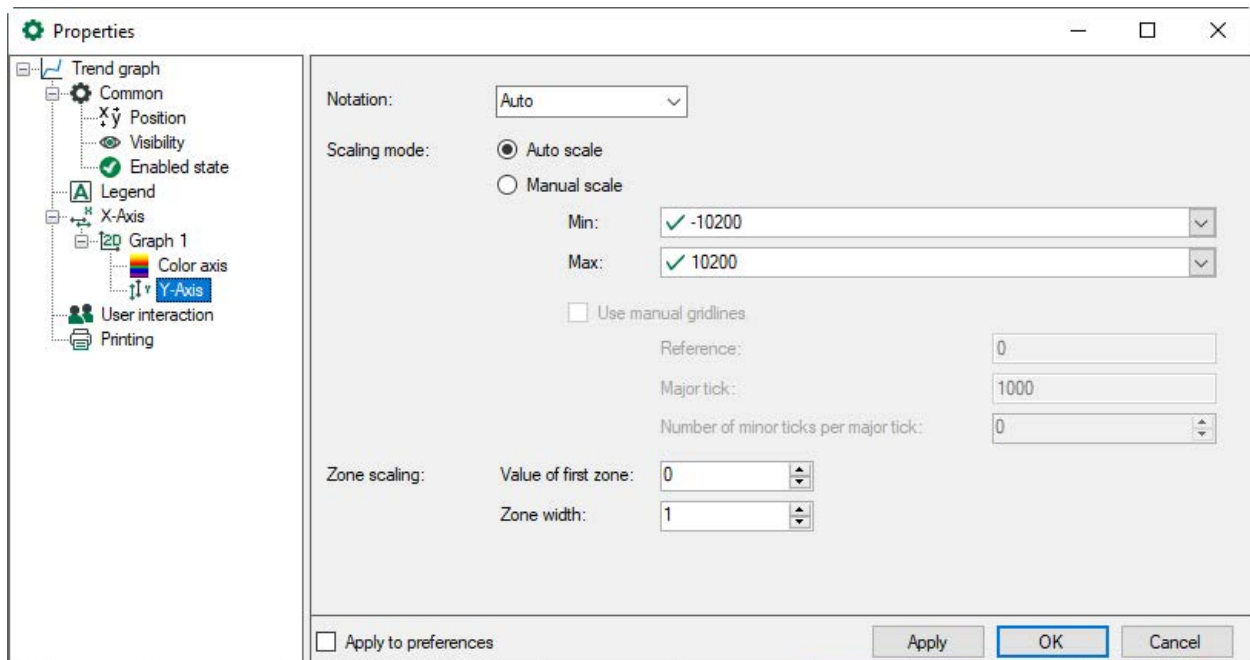
In the preferences, this branch is named "2D Y-Axis". In the properties, it is named "Y-axis" and is displayed below the "color axis" branch.

The 2D Y-axis in the 2D view of a trend graph represents the elements, zones or "tracks" of a vector signal. For a transverse profile measurement of flatness or strip tension in the steel industry, for instance, the 2D Y-axis measures the strip width.

The zone scaling can be set in a manner of counting (zones 1 to n) by "Zone width" =1.

It can also represent a physical dimension by entering the real width of a zone, e.g. of a flatness measurement roll.

Example

A flatness measurement roll has 64 measurement zones represented by a vector with 64 signals. Each zone has a width of 20 mm. Thinking in meters, enter 0.02 as the zone width value and the 2D Y-axis will automatically shift from 0 to 1.28, corresponding to the real width of the measurement roll.

5.28.7   Traversing vector

A traversing vector is a vector that is generated by 2 signals: a position signal and a value signal, for example from a traversing measuring device.

This display is supported in *ibaQPanel* in the time and lengthbased trend graph, in the time-based HD trend graph, in the time and lengthbased offline trend graph and in the offline trend graph with length conversion. The function is not available in the lengthbased HD trend graph.

If there are 2 signals in a trend graph (or any other of the above displays), the *Convert signals into a traversing vector* command appears in the context menu.
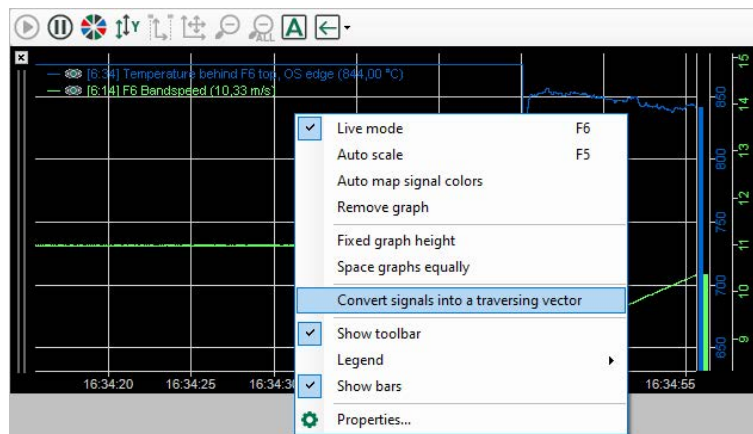
When you select this command, the dialog appears where you can set the properties of the traversing vector.
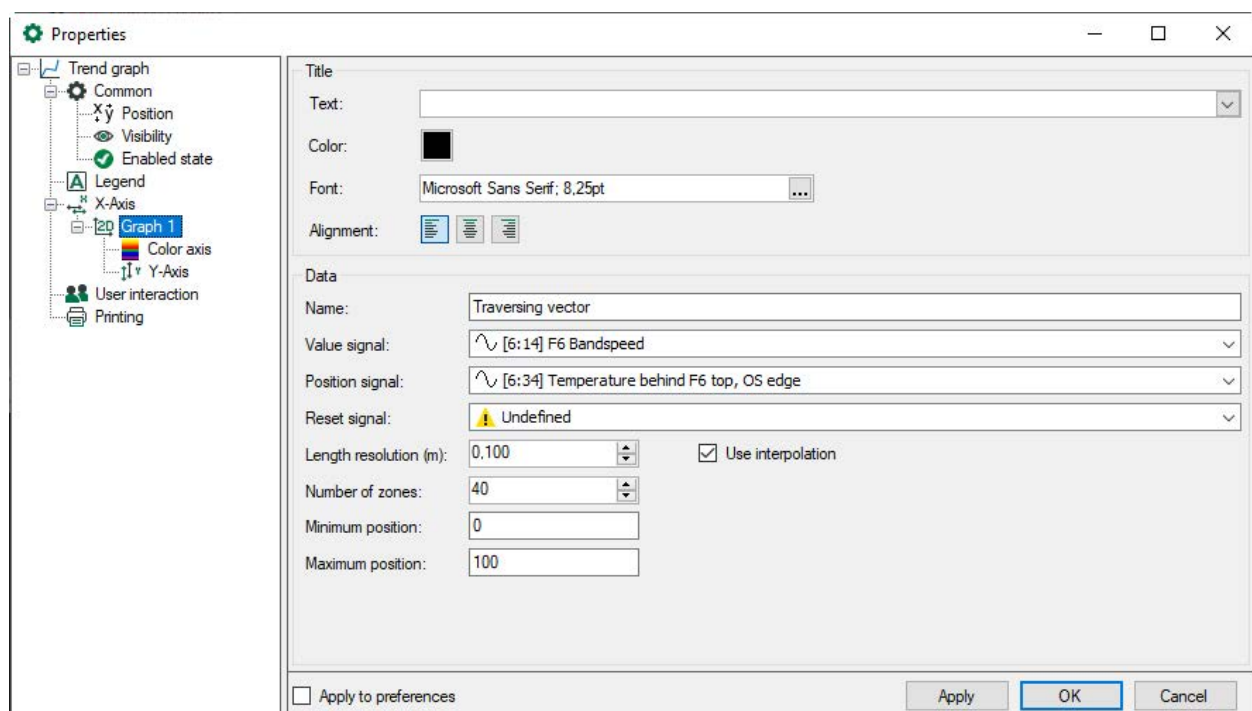

You can give the vector a name. Assign the corresponding signals to the value and position signal.

Define the number of zones you want to generate. You can also define the range of the position signal that will be divided into zones.

Example:

In the example 5 zones will be generated between *Min* and *Max*. The first and the last zones have half the width of the other zones. The zone width is calculated as (Max - Min) / (Number of zones - 1). The zones are positioned like this:

```
|----|--------|--------|--------|----|
 Min      M1       M2       M3     Max
```
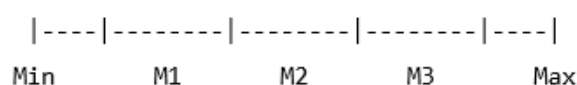
Z0 = from Min to Min + ZoneWidth/2

Z1 = from M1 - ZoneWidth/2 to M1 + ZoneWidth/2 with M1 = Min + ZoneWidth

Z2 = from M2 - ZoneWidth/2 to M2 + ZoneWidth/2 with M2 = Min + ZoneWidth*2

Z3 = from M3 - ZoneWidth/2 to M3 + ZoneWidth/2 with M3 = Min + ZoneWidth*3

Z4 = from Max - ZoneWidth/2 to Max

As long as the position signal is within a zone the values of the value signal are averaged. When the position signal leaves a zone the averaged value is saved at the middle of the zone. When the position signal is less than Min or greater than Max the values are ignored and no new zone data is created.
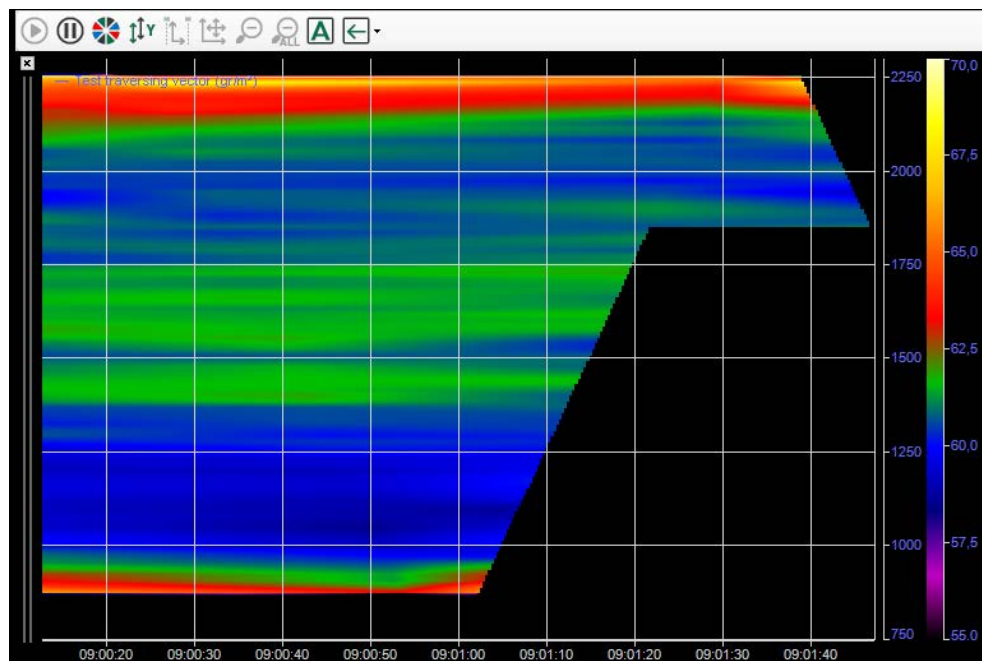
If you enable the "Use interpolation" option, the data will be interpolated in both X and Y directions. In order to do the interpolation we need 2 values so a zone can only be painted when a new point arrives. That is why in interpolated mode a jagged edge is displayed according to the traverse path of the traversing probe.

Without interpolation the value only changes when a new value arrives and otherwise the value is the last one. So the display must not wait for the next value and a straight line can be painted.
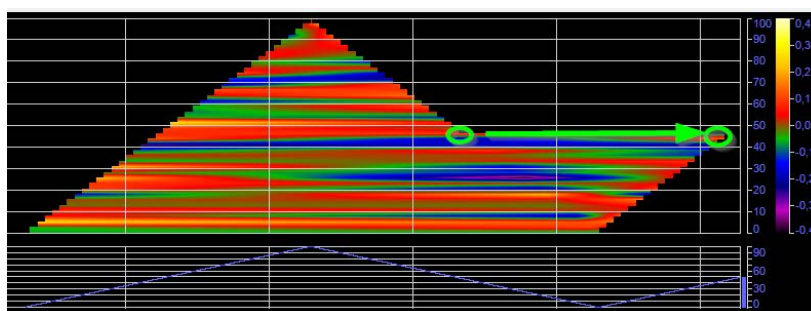
Display with interpolation   Display without interpolation
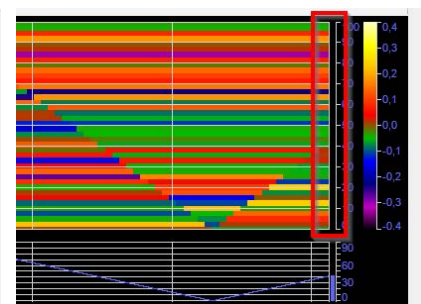
The reset signal is optional. When the reset signal is TRUE the position signal is ignored. When the reset signal is FALSE again new zone data is generated but it will not be connected to the previous zone data.

The length resolution refers to the resolution of the position signal.

5.28.8   User interaction

In the *User interaction* node, you can determine what the user is allowed to do when he doesn't have the "Change layout" right but he does have the "Interact with views" right.
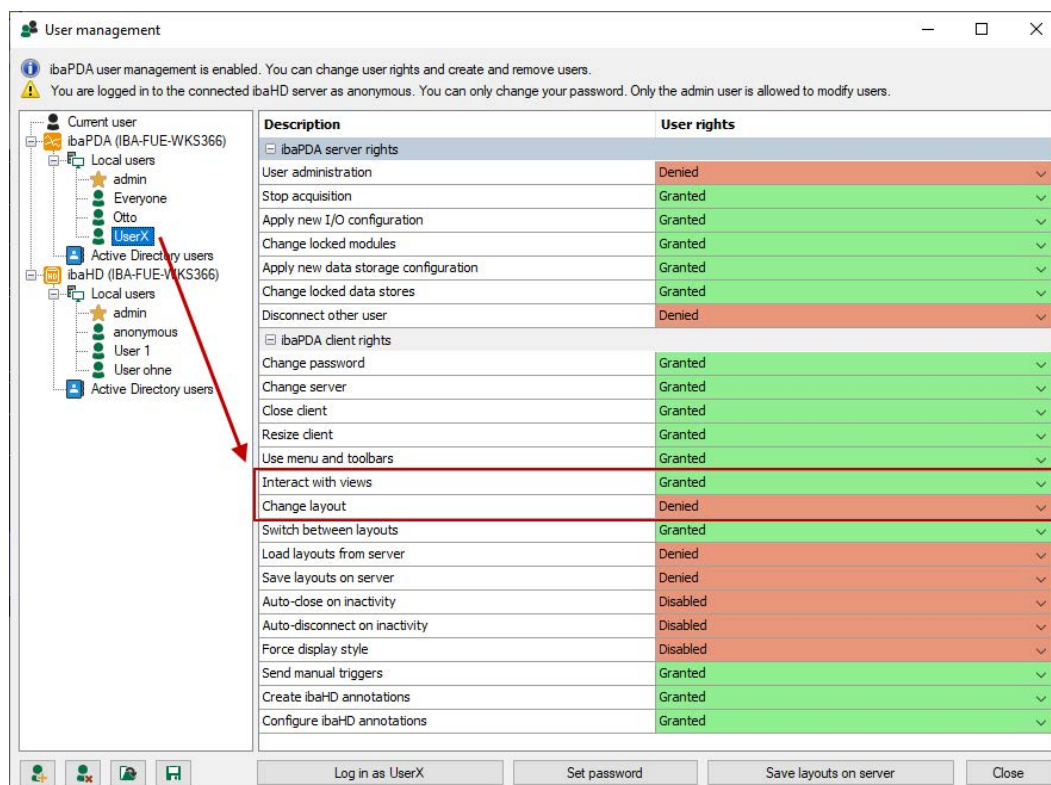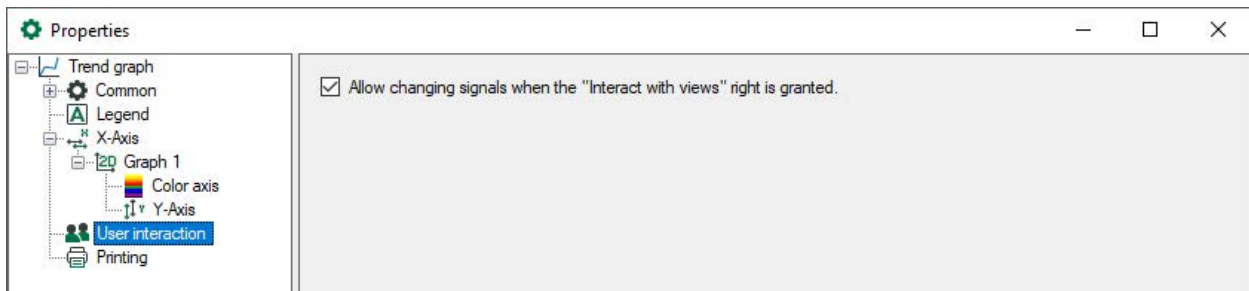
With the right "Interact with views" the user may zoom and move the X-axis. If the "Allow changing signals ..." option is enabled, the user additionally has the right to change the signals in the trend graph. The user can then drag & drop signals from the signal tree to the trend graph. He can also remove signals and rearrange the signals.

When the option is not enabled then the signals are fixed.

This allows you to configure fixed trend graphs and "free" trend graphs that the user can change.
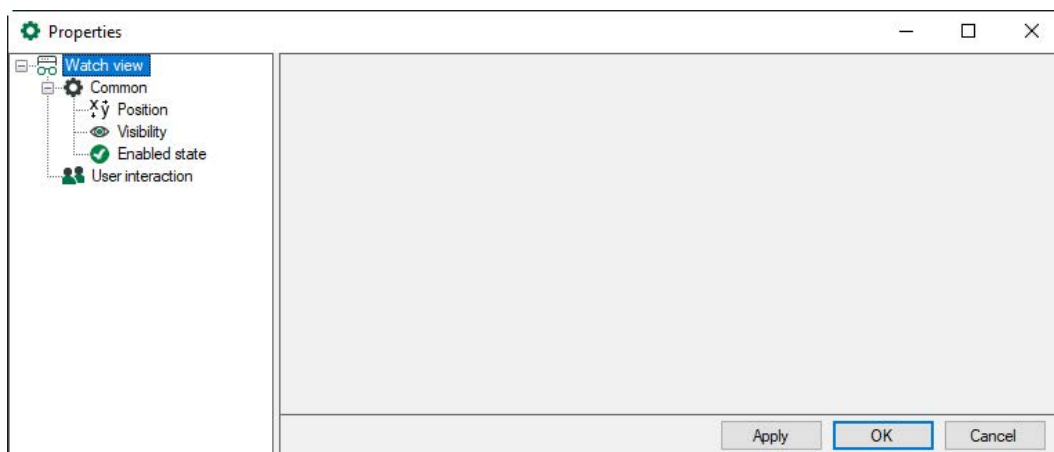
5.29   Watch view

Function

In the *watch view*, the actual values of signals are displayed in a table and can thus be monitored easily. Both numerical and text signals can be displayed. Signals from *ibaPDA* and the *ibaHD-Server* are supported.

Configuration

In the properties dialog of the watch view you can set the general properties. Close the design mode to drag signals into the display.

You can drag and drop one or more signals from the *ibaPDA* or ibaHD signal tree into the watch view. You can also select the signals from the drop-down list in the signal column..

The buttons on the right can be used to change the order of marked signals and to remove signals. You can select multiple lines by holding down the <Shift> and/or <Ctrl> key.

With the button <Assign rows to a section> you can organize the table into sections. Select one or more lines that you want to assign to a section, press the button and enter a name for the section. You can define any number of sections.

5.30   Picture

Function

The picture display object enables the positioning of a picture (graphic, image, etc) in the QPanel surface. A picture file can be loaded statically, or the picture file name can be specified via a text signal or a text channel, so that the picture can change dynamically.

Configuration
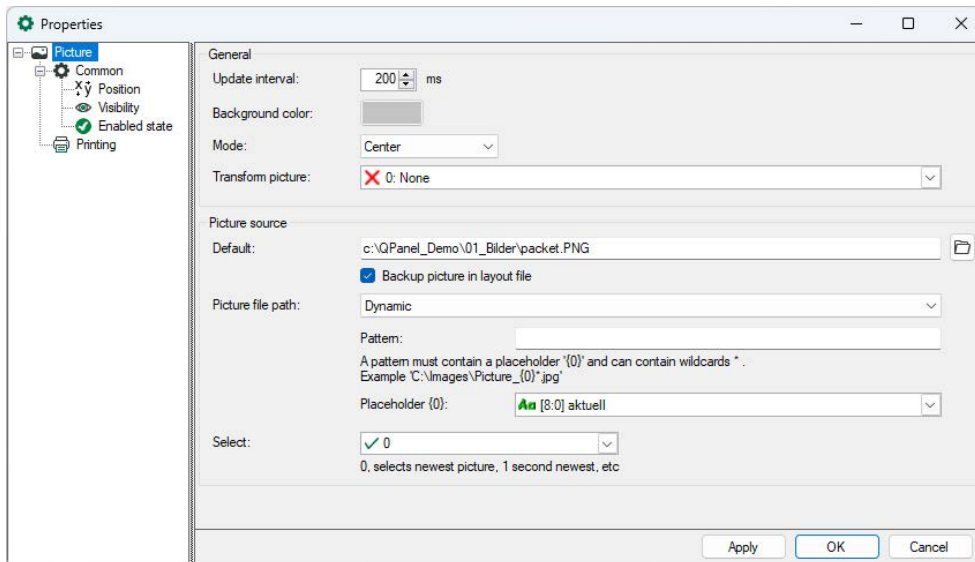

In the properties dialog, the update interval and background color can be defined.

For the display mode, there are 3 options available:

- Centered: the picture will always be placed in the middle of the object in its original size.

- Fit: the picture will be fitted into the object, though in original proportions

- Stretch: the picture will be adjusted in terms of height and width of the object

In the *Transform picture* drop-down menu, there are several options to choose from for transforming the picture:

- Rotate 90 degrees

- Rotate 180 degrees

- Rotate 270 degrees

- Flip horizonzally

- Flip vertically
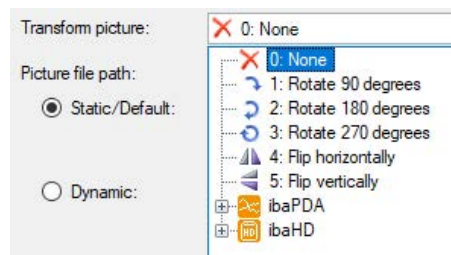
The picture can be permanently converted by selecting the desired transformation type. Or you can set the value 0..5 via an analog signal to convert dynamically.

Picture file path

The picture file path can be entered statically or dynamically. Select one of the following options from the drop-down list. The following input fields change depending on the selection.

■ Static

■ Dynamic

■ Monitor folder

Static

Choose a picture file in the data file browser. The pictures can have every bitmap-image-format, like e. g. bmp, jpg, png etc.

If this option is not selected, but an image with path is entered anyway, then this image is displayed as default image and replaces the iba default image.

Dynamic

You can provide the name of the picture files via a previously created text signal or text channel. To do so, the entire image file path must be specified. The image file path may also follow a particular pattern, it must contain a placeholder and may contain wildcards (*). Enter the pattern for the text signal with a placeholder. Example: C:\images\picture{0}. You can select the text signal from the drop-down menu.

Monitor folder

Folders can be monitored for new image files. To do this, specify the folder and the image file format. When selected, you can define whether the newest, second-newest image, etc. should be displayed. "0" selects the newest picture, "1" the second newest, etc.

It is also possible to save the picture in the layout file. As with all QPanel elements, the position and visibility of the picture can be controlled by a signal in the sub branches "Position" and "Visibility". Using the display of moving images, plants can be visualized, movement simulated or optical warning messages issued when reaching a certain state.

5.31   Shape

Function

With the "Shape" object, you can freely create basic shapes similar to those in standard graphics programs and provide them with different presentational attributes. The following basic shapes are available:

- Rectangle

- Line

- Ellipse
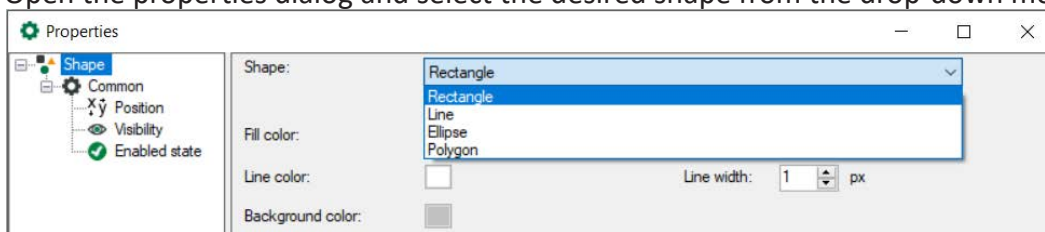
- Polygon

Configuration

Drag the "Shape" object to the Panel. By default, a rectangle will be displayed at first.

There are several methods to change the shape:

- Open the properties dialog and select the desired shape from the drop-down menu.

- Click the small triangle in the upper right corner to open the task menu and select the desired shape from the "Shape type" drop-down menu.
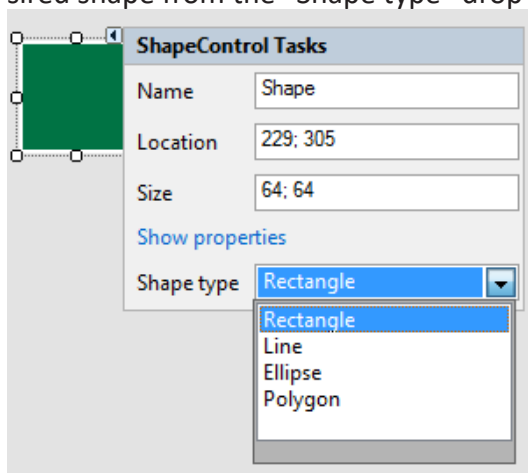
5.31.1   Properties

For dynamic behavior of the properties, please read chapter ↗ *Dynamization*, page 29.

Depending on the selected form, only the relevant setting options are displayed.
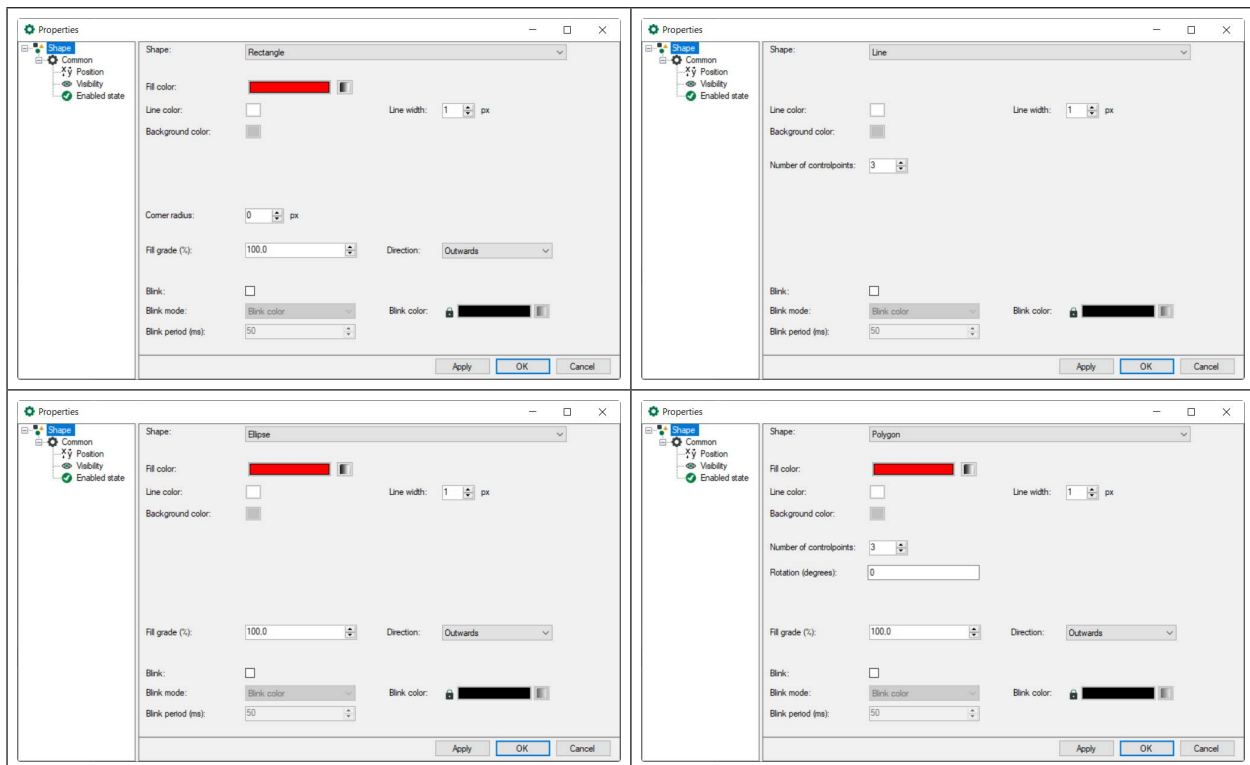
Shape
The shape type can be selected from the drop-down menu: Rectangle, line, ellipse or polygon.

Fill color
Select a color from the color editor, or define a gradient (not available for lines).

Line color/Line width
Select the desired line width of the line.

Background color
The background color is visible for lines and if the fill grade of a shape is less than 100%.

Number of control points
The number of movable control points that can be set for polygon and line.

Corner radius
You can define rounded edges for a rectangle. The value defines the corner radius in pixel.

Rotation
A polygon can be rotated around its center. A positive value specifies the rotation in degrees in a clockwise direction, a negative value in counterclockwise direction.

Degree of filling/direction

The degree of filling specifies to what amount a shape is filled. A degree of filling of 100 means that the whole shape is filled. With the direction you specify, from which side the shape is filled. Available for selection are:

- From the right

- From the left

- From the top

- From the bottom

- Outwards

Examples for fill grade/direction

Rectangle, filling green, 70 from the top, background black	Rectangle, filling green, 40 to the outwards, background black	Ellipse, filling green, 50 from the right, background black

Blink

If "Blink" is activated, the object blinks, if the design mode is terminated. The following options can be set:

- Blink mode
  blink transparent: Switch between visible and invisible
  Blink color: Switch between the filling color defined above and the blink color selected here

- Blink period (ms)
  Time in milliseconds of the combined on and off-state

5.31.2   Setting the gradient

Rectangles, ellipses and polygons can be filled with a gradient. Click on the filling button to open the gradient editor, and select "Gradient".
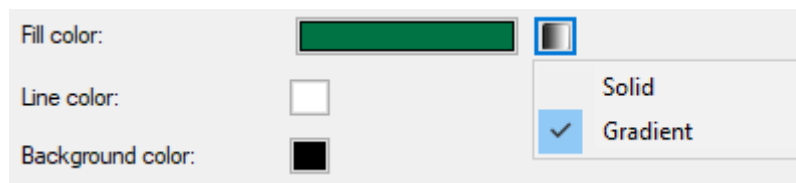
You can define the gradient using the slide controller. By double-clicking on an anchor point, you can open the color editor to select the color.
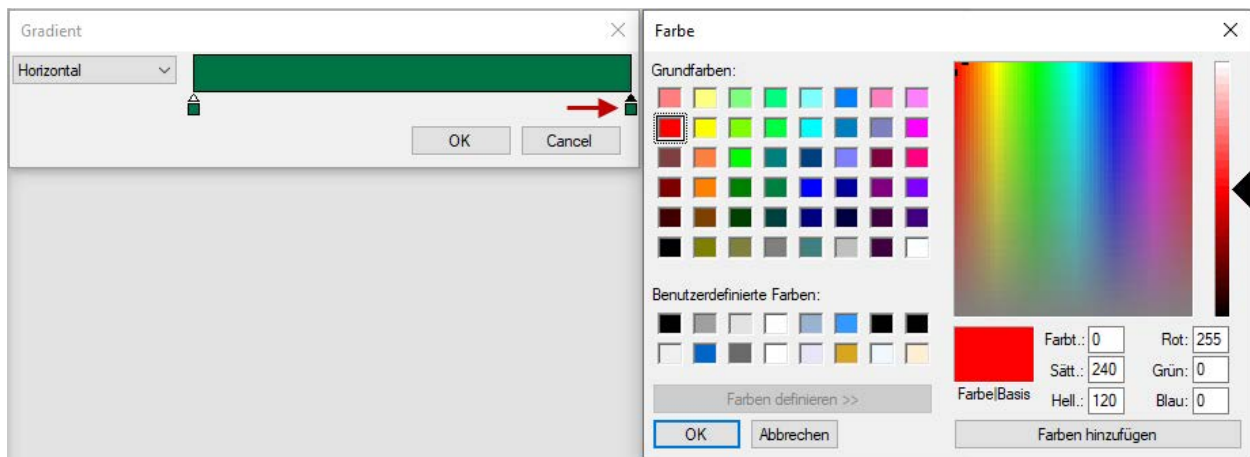
The gradient will be displayed in the color field. You can select the gradient direction (horizontal or vertical) from the dropdown menu.

By double-clicking in the color field, you can add new anchor points. The anchor points can be moved by keeping the mouse button pressed. The end points cannot be moved. To remove a previously added anchor point again, mark the anchor point and press the <Delete> key.
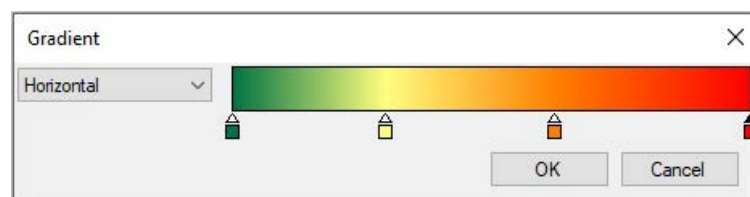
5.31.3   Line

With the "Line" shape, you can create horizontal or vertical lines by default. The orientation depends on if the bounding box is larger in horizontal or vertical orientation.
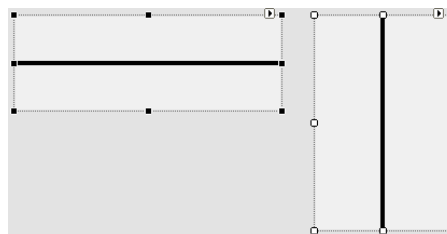
Moreover, you can create user-specific lines by setting the amount of control points to 2 or higher in the properties.

The control points can be moved by keeping the mouse button pressed. You can add additional control points by double-clicking on a control point. By double-clicking and keeping the <Shift> key pressed, you can delete control points.
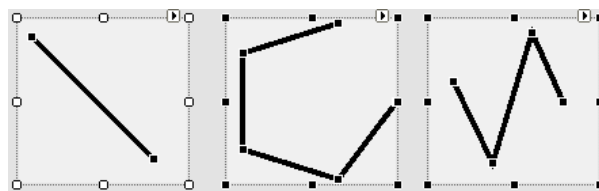
5.31.4   Rectangle

You can define rounded edges for a rectangle. Enter a corner radius in pixel for this. In the rounded edges, the background color becomes visible.

Example: Corner radius 20 and 60 pixel.

5.31.5   Polygon

By default, a polygon will be displayed as a hexagon. The shape can be changed by adding and shifting new control points.

The control points can be moved by keeping the mouse button pressed. You can add additional control points by double-clicking on a control point. By double-clicking and keeping the <Shift> key pressed, you can delete control points.

Example: Hexagon and a polygon with 12 control points
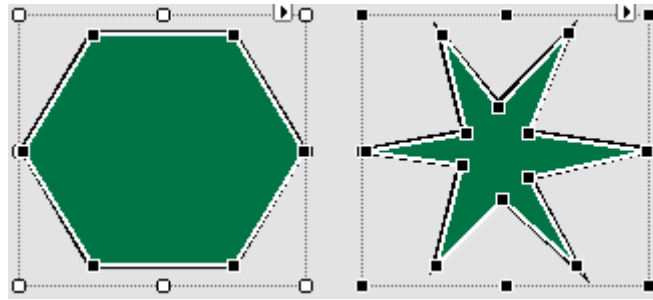
A polygon is the only shape that can be rotated. A positive value in the "Rotation" filed specifies the rotation in degrees in a clockwise direction, a negative value in counterclockwise direction.

The polygon might be distorted when being rotated, if it cannot be rotated completely within its frame.

5.32 Symbol

Function

The "Symbol" object allows you to place a graphics in SVG format on the QPanel surface. SVG graphics are scalable vector graphics that can be zoomed in continuously without any loss in quality. In general, properties, such as fill color and outline, can be changed for the symbol. In addition, the symbol can be rotated and scaled. Please note, however, that symbols that consist of many elements take long to be loaded. If a dynamization is applied, too, this can lead to a computer overload.

Configuration

For dynamic behavior of the properties, see chapter ↗ *Dynamization*, page 29.
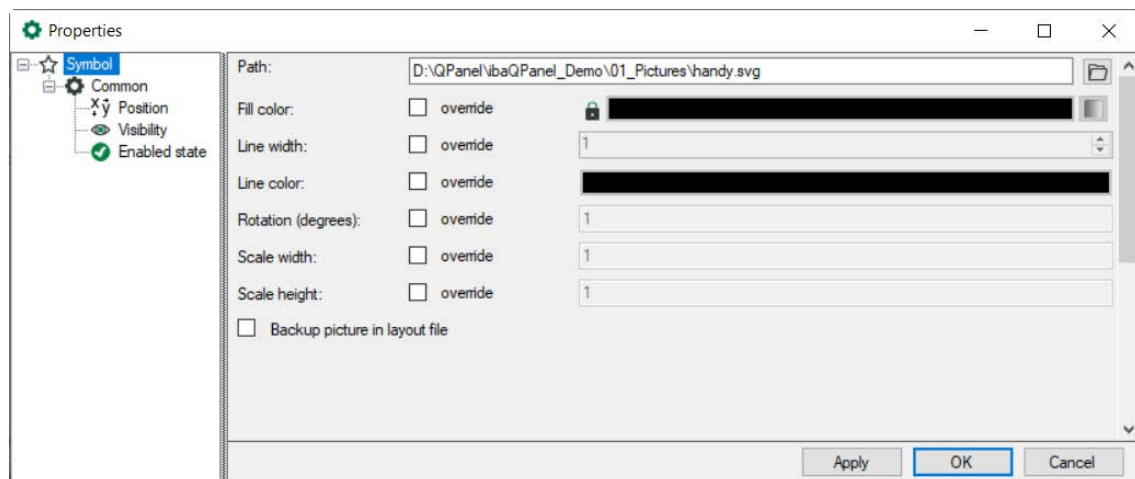
Select the symbol file path using the browser button. A property of a symbol can only be changed, if the "override" check box is checked.

In general, fill color, line width and line color can only be changed for the entire symbol. E.g., the fill color will be applied to all areas of the symbol. By clicking on the fill button, you can define a solid color or a gradient.

Example:

Symbol in the original	Symbol with overridden gradient	Symbol with overridden line color

The original state can be restored, if the "override" checkbox is deactivated for the respective property.

The symbol can be rotated or scaled. For this purpose, enter a rotation angle or a scaling factor for the height and the width.

In addition, you can save the symbol in the layout file.

5.33 Tabbed layouts

Function

The tabbed layouts consists of various tabs, each tab visualizes an existing layout and its contents. The layouts themselves can be directly changed in a layout tab, or in the original layout. By simply clicking on the tab, the user switches between the layouts. Furthermore, it is possible to switch layouts with a button, see chapter ➚ *Button*, page 64. Visibility and display of the layout can be controlled via digital signals.

Note

In one layout, different elements can be used. Among others a tabbed layout. This contains its own elements. Therefore, please verify if the tabbed layout is selected as element of the entire layout or as an element of the embedded tabbed layout. In a layout with many different objects, it might be difficult to select the tabbed layout. Therefore, switch to design mode first with a right-click outside the tabbed layout (or <Ctrl>+<D>), then the tabbed layout can be selected with a click and the properties can be changed. If the cursors stands within the tabbed layout and you switch to design mode with a right click, the elements of the currently displayed layout will be shown.

Configuration
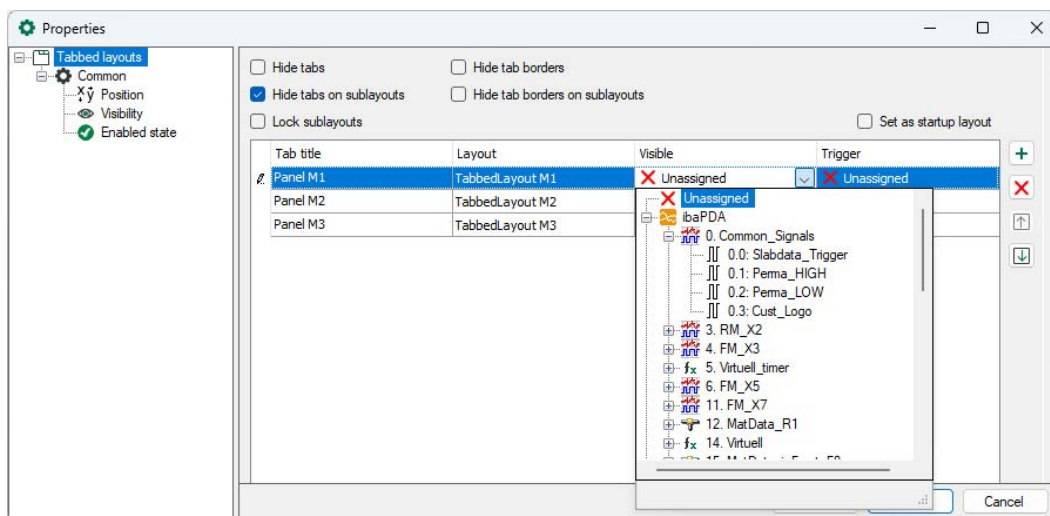
The properties dialog, in general, consists of 4 columns:

- Tab title: The name indicated here will be shown in the tab. The name should be unique.

- Layout: Choose the layout to be displayed from the drop-down menu. The layout, in which the tabbed layout is created, cannot be chosen.

- Visible: Here, a digital signal from the signal tree can be selected which controls the visibility of the tab. When the signal has a falling edge, the tab will be hidden; during rising edge it will be visible again.

- Trigger: When the chosen signal has a rising edge, the tab will be selected, this means placed in the foreground.

You can use the checkboxes to specify whether the tabs or tabs in subordinate layouts are hidden or displayed, whether the tab border is hidden or displayed in the layout or in subordinate layouts, and to specify a start layout.


Note

Switching between layouts within the tabbed layout can be effected via the register tabs. If these registers should be hidden, it is possible to control them via signals or create appropriate buttons. With the button command "Switch Layout", a layout of a tabbed layout can be selected.

5.34   Web browser

Function

The web browser is used to display web pages or browser-enabled files, such as PDF and image files. The web browser can also display data from ibaDaVIS. It can therefore be used to display data from databases. The web browser consists of a toolbar with navigation elements, an address bar, and the browser window.

Configuration
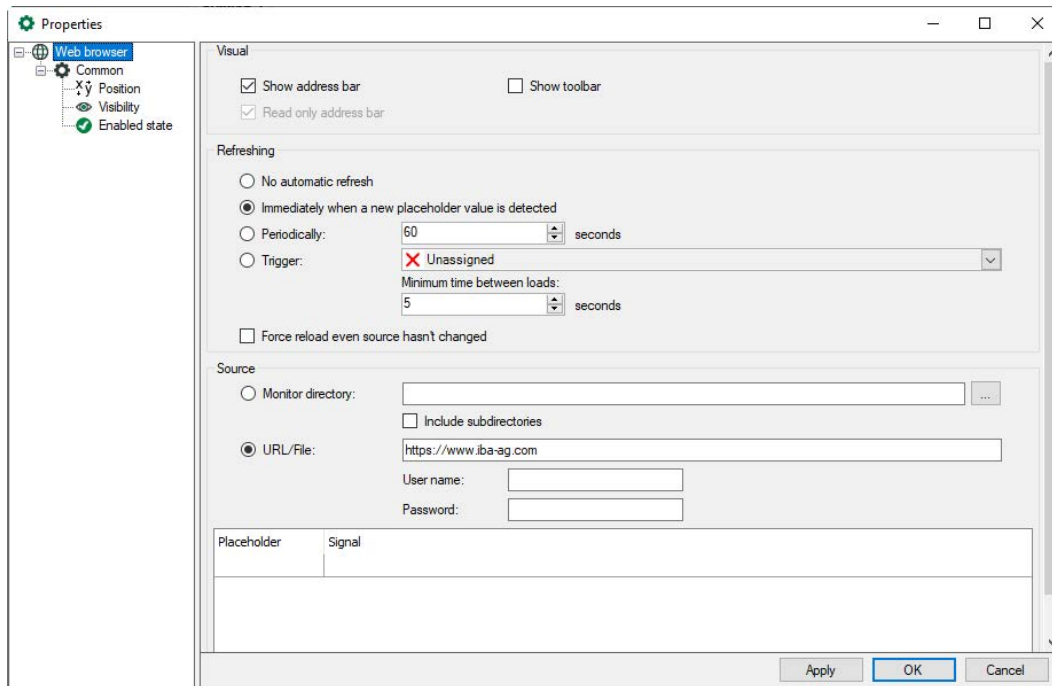
Visual

Select the display options:

- ■ "Show address bar" also allows entries in the browser window
- ■ the read-only address line does not allow entries
- ■ the toolbar contains navigation elements (page back, page forward, reload page)

Refreshing

Refreshing of the web page can be disabled. Alternatively, the web page can be set to refresh if a new file is detected, or after a fixed time interval, or via a trigger signal.

A trigger can be disabled by setting the minimum reload time. The next trigger can only reload the website after this minimum reload time has elapsed.

The reload of the web page can also be forced, even if the source has not changed.

Source
You define the source for the web pages here:

- A defined directory, optionally with subdirectories, can be monitored for new files, such as PDF or image files.

- You can specify a fixed or dynamic URL or a file with a complete path.

If access to a file or URL is password protected, enter the user name and password here.

Note

When accessing the ibaDaVIS, this entry can be used to ensure that the values entered for user and password are adopted and that no separate login is required:

https://ibadavis.iba-ag.com/**api/basicauth?returnUrl=/dashboard**

The bold part is important. The first part corresponds to the normal call of the corresponding ibaDaVIS, e.g.: https://localhost:80/api...

Dynamic URLs, file names, and folder names can use placeholders that are defined in the table below. Placeholders are filled by text signals.

Example: The name of a file is formed from a technostring. You select the technostring in the Signal column and the corresponding placeholder symbol is displayed in the *Placeholder* column.

You can use the placeholder when specifying the file name. Example: *C:\dat\report_{0}.pdf*. As soon as a file whose name follows this pattern is detected, this file is displayed in the web browser.

6   Key combinations

Key combination	Explanation
<Ctrl>+<A>	Select all elements of the ibaQPanel (only in the design mode)
<Ctrl>+<D>	Switches into the design mode (and back)
<Ctrl>+<M>	Displays dynamic areas of marked objects (only in the design mode)
<Ctrl>+<C>	Copies the marked objects (only in the design mode)
<Ctrl>+<V>	Inserts the copied objects (only in the design mode)
<Ctrl> + drag with the mouse	The selected object is duplicated
<Ctrl>+<Z>	Reverses the action (only in the design mode)
<Ctrl>+<Y>	Repeats an action reversed with <Ctrl>+<Z>
<Ctrl>+<cursor to the left>/ <Ctrl>+<cursor to the right>	Moves the interactive marker in the FFT view in small steps to the left/right
<Shift>+<cursor to the left>/ <cursor to the right>	Moves the interactive marker in the FFT view in big steps to the left/right
<Ctrl>+<U>	Access the user administration
<Ctrl>+<Shift>+<U>	Adjusts the toolbars and menus
<Ctrl>+<Shift>+<C>	The signal view area stretches over the whole ibaPDA client window (and back)
<Ctrl>+<Shift>+<T>	The signal view area is expanded over the whole ibaPDA client window, whereas the client window is always in the foreground (and back)
<Ctrl>+<Shift>+<F>	The ibaPDA signal view area is expanded over the whole screen (and back)
<Esc>	Back to the normal view (not in design mode)
Function key <F11>	Switches between layouts
Function key <F6>	Starts/ends the scrolling of the selected trend curve
Function key <F5>	Autoscales the selected trend curve
Function key <F4>	Returns to the original presentation when zoomed in or out
Function key <F3>	Returns to the last zoom factor of the selected trend curve when zoomed in or out
Marking of signals in the ibaPDA signal tree and moving them to a trend curve by keeping the <Ctrl> key pressed	The signals will be displayed in the trend curve with a separate Y axis
Marking of signals in the ibaPDA signal tree and moving them to a trend curve by keeping the <Shift> key pressed	The signals will be displayed in the trend curve with a common Y axis

Marking of signals in the ibaPDA signal tree and moving these signals to a trend curve by keeping the <Alt> key pressed	Every signal will be displayed in a separate signal strip within the trend curve

7   Support and contact

Support

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Email: support@iba-ag.com

Note

If you need support for software products, please state the number of the license container. For hardware products, please have the serial number of the device ready.

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