zenon
by COPA-DATA

zenon manual

Extended Trend

v.8.20

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1 Welcome to COPA-DATA help

ZENON VIDEO TUTORIALS

You can find practical examples for project configuration with zenon in our YouTube channel (https://www.copadata.com/tutorial_menu). The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com.

PROJECT SUPPORT

You can receive support for any real project you may have from our customer service team, which you can contact via email at support@copadata.com.

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com.

2 Extended Trend

The Extended Trend is used for the representation of online and historical values(Archive values) of process variables and derived process variables in form of curves. It makes it possible to reread historic data. Scrolling in the Extended Trend provides a ruler and zoom function together with a trend analysis. In contrast to the **trend** dynamic element, it is possible to zoom, browse, query and scale online values and values from archives.

EXTENDED TREND STARTER EDITION

In the standard package of zenon, a reduced version of Extended Trend with limited functionality is included with the Starter Edition.

The Starter Edition has the following limitations:

- no XY trend
- no second time axis
- number of curves limited to 8
- no logarithmic representation
- Scanning with a cursor

For additional limitations on use in Windows CE projects, the zenon Operator under Windows CE manual, Limitations for zenon chapter.

Attention

You cannot use any functions that exceed the limitations mentioned above if you have only the Starter Edition license in the Editor.

If you only have the Extended Trend Starter Edition license in the Runtime, you cannot use screen switch functions that do not follow the rules mentioned above. The *Extended Trend* screen will then be loaded with the default filter (=empty filter). An entry in the Diagnosis Server is made.

Example: You try to perform a screen switch to an Extended Trend Module screen with 10 curves in Runtime with the Starter Edition. The Extended Trend screen will be opened, but no curves will be shown.

3 Engineering in the Editor

To use Extended Trend in Runtime, the following must be carried out in the Editor:

- An Extended Trend (on page 6) screen is created
- A screen switch function (on page 16) is created
- Curves (on page 107) are configured

3.1 Creating screens of type Extended Trend

The *Extended Trend* screen is for operating **Extended Trend** in the Runtime.

ENGINEERING

Two procedures are available to create a screen:

- The use of the screen creation dialog
- The creation of a screen using the properties

Steps to create the screen using the properties if the screen creation dialog has been deactivated in the menu bar under **Tools**, **Settings** and **Use assistant**:

1. Create a new screen.

   To do this, select the **New screen** command in the tool bar or in the context menu of the **Screens** node.

2. Change the properties of the screen:

   a) Name the screen in the **Name** property.

   b) Select *Extended Trend* in the **Screen type** property.

   c) Select the desired frame in the **Frame** property.

3. Configure the content of the screen:

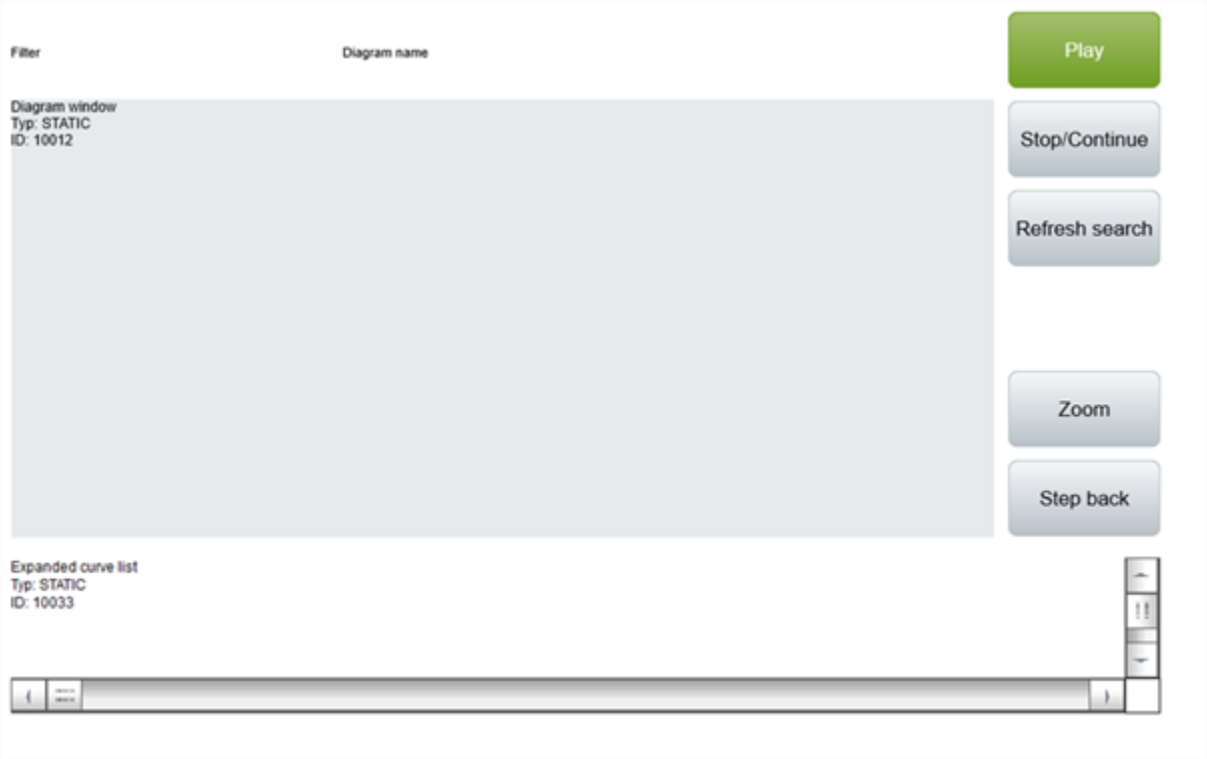
   a) Select the **Elements (screen type)** menu item from the menu bar.

   b) Select *Insert template* in the drop-down list.
   The dialog to select pre-defined layouts is opened. Certain control elements are inserted into the screen at predefined positions.

   c) Remove elements that are not required from the screen.

   d) If necessary, select additional elements in the **Elements** drop-down list. Place these at the desired position in the screen.

4. Create a screen switch function.



CONTROL ELEMENTS

INSERT TEMPLATE

Control element	Description
Insert template	Opens the dialog for selecting a template for the screen type. Templates are shipped together with zenon and can also be created by the user. Templates add pre-defined control elements to pre-defined position in the screen. Elements that are not necessary can also be removed individually once they have been created. Additional elements are selected from the drop-down list and placed in the zenon screen. Elements can be moved on the screen and arranged individually.

WINDOW

Selection of the window to be displayed for diagrams and curves in the Runtime.

Control element	Description
Diagram	Window to display trend curve Not available if the screen has been called up with the **Display lot selection dialog -> Relative lot selection** option activated.
Diagram name	Shows the diagram name. **Note:** Element of the type *Dynamic text*. Functionality is assigned using the **Screen type specific action** property.
Set filter	Shortened display of the currently selected filter conditions in a compact filter line. **Note:** Element of the type *Dynamic text*. Functionality is assigned using the **Screen type specific action** property.
Set filter (detail list)	Detailed display of the currently selected filter conditions in a text window. Details can be found in the **Runtime** manual in the **Filter** section.
Cursor output list	Shows the position of the cursor in the diagram window and the values set in diagram settings and cursor output (on page 102)
Expanded curve list	Curve list that can be edited in the Runtime (on page 143). The following can be edited: ▸ Active ▸ Color ▸ Area display ▸ Fill color ▸ Curve name ▸ Sorting order ▸ Title ▸ Transparency fill color ▸ Variable name ▸ Variable identification ▸ Y-Axis **Note:** Not available under Windows CE. Is replaced by the **curve list (outdated)** there.

Control element	Description
Activate curve	Activates the selected curve in the extended curve list. The curve in the screen is shown/hidden in the screen and the list is updated by activation/deactivation. Multiple selection is possible. The button is inactive if no trend curve was selected in the trend curve list or if a visibility variable is linked in the screen switch.
Activate axis	Activates the selected axis in the extended curve list. The axis in the screen is shown/hidden in the screen and the list updated by activation/deactivation. Multiple selection is possible. The button is deactivated if no trend curve has been selected in the trend curve list.
Curve color	Allows the setting of the desired color for the respective curve. When the color is changed, the curve is redrawn in the screen and the list is updated. The button is only activated if no curve has been selected in the extended curve list.

DIAGRAM FUNCTIONS

Pre-defined controls for diagrams.

Control element	Description
Filter	Display of set filter.
Chart settings	Activates the dialog (on page 102) for diagram settings and cursor output
Curves	Change curve parameters.
x-axis	opens the dialog (on page 51) for x-axis settings. Not available if the screen has been called up with the **Display lot selection dialog -> Relative lot selection** option activated.
Refresh	Refreshes the display.
Stop	Do not refresh screen.
Next	Update screen
Cursor on/off	Query values
Double cursor on/off	Display (on page 131) values that are between two cursors.

Control element	Description
Print	Prints diagram. **Note:** Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Screen switch - Extended Trend** function or the **Print Extended Trend diagram** function. The functions assume a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.
Print with dialog	Choose the printer before printing out the diagram.
Copy to clipboard	Copy representation into the intermediate store.
Export displayed data	exports (on page 140) all visible data of all curves as a CSV file.

DIAGRAM NAVIGATION

Buttons for navigation in the diagram.

Control element	Description
Cursor one pixel to the left	Places cursor one pixel to the left. If the **Shift** key is pressed at the same time, the cursor is moved by 10 pixels.
Move cursor one pixel to the right	Places cursor one pixel to the right. If the **Shift** key is pressed at the same time, the cursor is moved by 10 pixels.
Backwards	Scroll backward on the time axis (history)
Quarter backwards	Moves the time period displayed back by a quarter of the measuring unit selected.
Forwards	Scroll forward on the time axis (current)
Quarter forwards	Moves the displayed time period forwards by a quarter of the unit selected.
Zoom	Zoom display
Step back	Reduce display
Zoom +	reduces display time intervals

Control element	Description
Zoom -	Increases display time intervals
Zoom to 100 %	Sets zoom factor to 100%. This zoom action is saved in the zoom history. For example: **zooming** is used ▸ to zoom 2x into a selected area of the Extended Trend, ▸ then **zoom content to 100%** is selected and ▸ then a selected area is zoomed into again, then there are 4 zoom events in the history. These can be jumped back step by step with the **Step back** button.

COMPATIBLE ELEMENTS

Control elements that are replaced or removed by newer versions and continue to be available for compatibility reasons. These elements are not taken into account with automatic insertion of templates.

Control element	Description
Diagram name	Static Win32 control element. Was replaced by a *dynamic text* field. For the description, see current element.
Set filter	Static Win32 control element. Was replaced by a *dynamic text* field. For the description, see current element.
CE curve list	List of curves. Is used for CE for compatibility reasons. The extended curve list is recommended for all other projects.

FILTER PROFILES

Buttons for filter settings in the Runtime.

Control element	Description
Profile selection	Select profile from list.
Save	Saves current setting as a profile. **Note:** The name can be a maximum of 31 characters long and must only contain valid characters.

Control element	Description
	Prohibited are: **! \ / : * ? < > | ""**
Delete	Deletes selected profile.
Import	Imports filter profiles from export file.
Export	Exports filter profiles in the file.

Information

The cursor one pixel to the left and cursor one pixel to the right control elements move the cursor if it is active, not the trend.

Arrow keys on the keyboard can also be used instead of the control elements.

If you hold down the **Shift key** when moving with the arrow keys, the movement is carried out in 10-pixel increments.

3.1.1 Settings for tooltip to display curve values in the Runtime

In the Runtime, the current curve value can be displayed as a tooltip in the *diagram window* control element under the mouse pointer.

To activate the tooltip:

1. Open a **Extended Trend** screen type.
2. Click in the diagram window of the Extended Trend.

   The properties of the diagram window are shown.
3. In the **Runtime** properties group, activate the checkbox of the **Display tooltip** property. The tooltip is now active and can be used in the Runtime.

The tooltip is displayed if the mouse pointer in the Runtime is at one position for a certain amount of time.

The curve values of the curves are displayed as a tooltip in the area of the mouse pointer.

Invalid curve values are displayed in gray.

Note: For Gantt curves, the tooltip is displayed if the mouse pointer is within the rectangular area of the curve.

The window of the tooltip is closed as soon as there is an input on the keyboard or a change to the position of the mouse pointer.

Note: Otherwise the window is automatically closed after approximately 30 seconds.

3.1.2 Settings for the operation of Extended Trend with the mouse in Runtime

In the Editor, settings can be made in order to define the mouse functions in a screen of the screen type **Extended Trend** in Runtime:

1. Open a **Extended Trend** screen type.
2. Click in the *diagram window* control element in Extended Trend.

   The properties of the diagram window are shown.
3. Select the **Manipulation using mouse** property in the **Runtime** properties group**.**
4. Configure the desired behavior in Runtime with the respective properties.

   Note: If a cursor is used for the display in the trend view, mouse interactions are deactivated in Runtime.

Option	Description
Drag with left mouse button	The choices are: ▸ *No reaction* ▸ *Drag zoom borders* ▸ *Move* ▸ *Move horizontally* **Note:** The **Zoom** button is not available if the *drag zoom borders* setting has been selected for **Drag with left mouse button**.
Drag with right mouse button	The choices are: ▸ *No reaction* ▸ *Drag zoom borders* ▸ *Move* ▸ *Move horizontally*
Mouse wheel	The choices are: ▸ *No reaction* ▸ *Move vertically* ▸ *Move horizontally*

Option	Description
Alt + mouse wheel	The choices are: ▸ *No reaction* ▸ *Move vertically* ▸ *Move horizontally*
Ctrl + mouse wheel	The choices are: ▸ *No reaction* ▸ *Zoom* ▸ *Zoom X/T axis*

3.2 Preparations to call up an ETM screen

The following possibilities are available to call up a **Extended Trend** screen type:

- Using the screen switching function (standard function)
- Using a dynamic element with context menu

PREPARATIONS FOR CALLING UP AN ETM SCREEN USING A DYNAMIC ELEMENT WITH CONTEXT MENU

If several dynamic elements are linked to a context menu to call up an ETM screen, the variable of the dynamic element from which the context menu has been opened is always shown in the ETM screen.

Engineering:

1. Navigate to the **Menus** node in the project tree.

   The detail view is opened.

2. Create a new context menu with the desired name.

   The symbol of the context menu is shown on the right side.

3. Click on the symbol with the left mouse button.

   The properties window of the symbol is opened.

4. Under **Representation/type** and **Text**, enter the text that is to be displayed in Runtime in the context menu.

   This text is also shown in the symbol.

   Note: If you click in the highlighted area below the text, you can enter further text in the properties. A further function can then be connected with this context menu entry.

5. Set *Show extended trend* in **Action type**.
6. In the project properties, go to the **Extended Trend** node.
7. Select a **Extended Trend** screen under **Screen** using the **...** button.

   Note: A tick is shown in front of the text of the context menu by activating the **Check mark** checkbox. Otherwise this checkbox has no effect.
8. Set the desired time under **Time filter relative**.

   Default: *0T 00:00:00*
9. Select the desired style under **Style group chart** using the **...** selection button.
10. Open the screen in which the dynamic element that is to be linked to the context menu is located.
11. Click on the dynamic element with the left mouse button.

    The properties window of the element is opened.
12. Select the desired context menu under **Runtime** and **Context Menu**.
13. Start the Runtime.
14. Right-click on the dynamic element with the context menu.

    The context menu is opened.
15. Left-click on the desired entry.

    The ETM screen is opened. The variable of the dynamic element is already visible in the curve list and created as a curve.

3.3 Screen switch - Extended Trend

The parameters for the trend diagram to be displayed in Runtime are defined with the screen switching. Each trend curve is provided with its own name. We recommend not displaying too many trend curves at the same time, so you can maintain a good overview. Several variables can be configured for the configuration of curves, which can then be freely activated in the Runtime.

ENGINEERING

Steps to create the function:

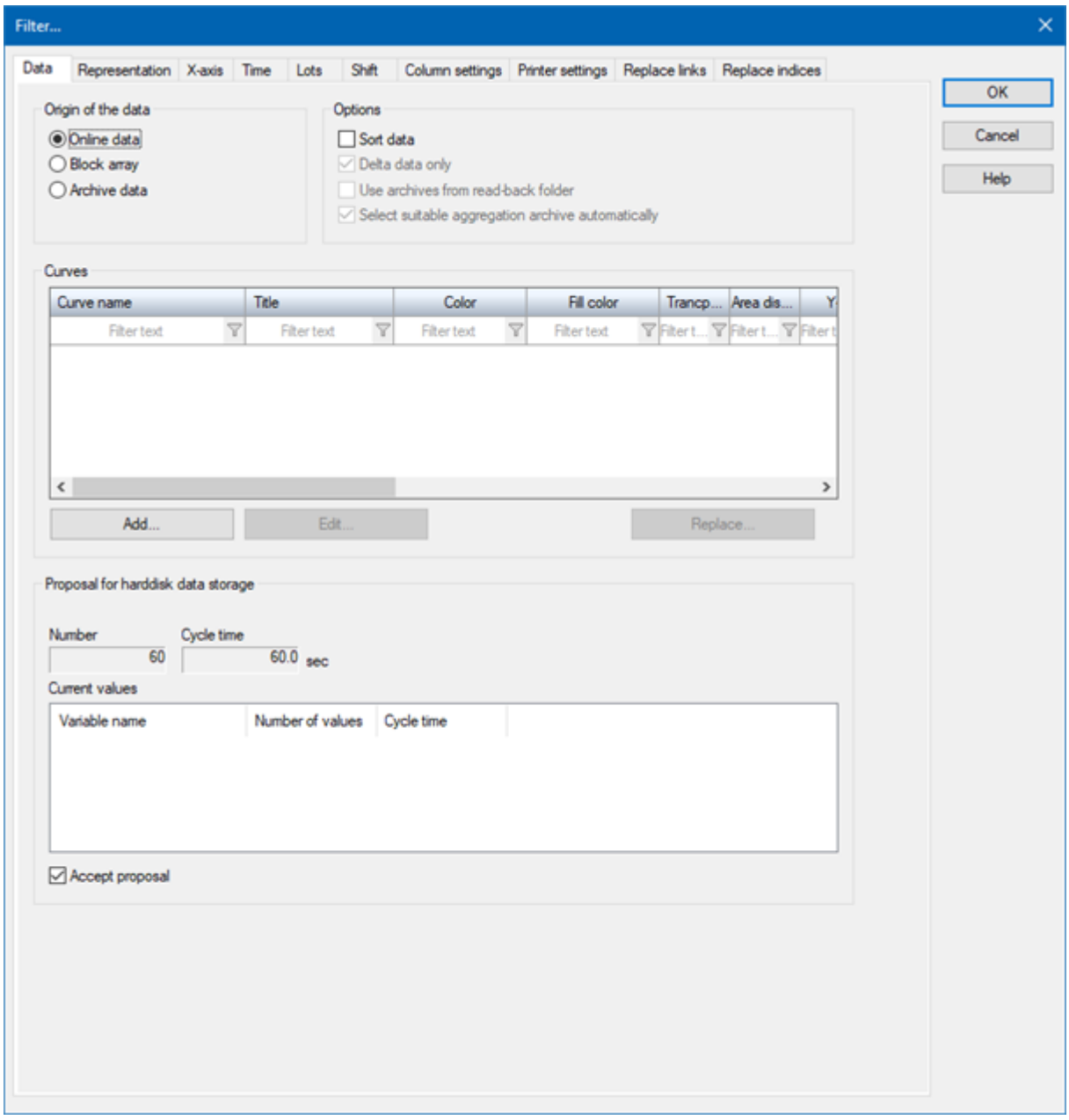
1. Create a new function:

   In the toolbar or in the context menu of the Functions node, select **New function**.
   The dialog to select a function is opened.
2. Go to the **Screens** node.
3. Select the **Screen switch** function.

   The dialog for selecting a screen is opened.

4. Select the desired screen.
   Note: If you select a screen from another project, ensure that the project is running in the Runtime.
5. Configure the filter.
6. Name the function in the **Name** property.

FILTER DIALOG SCREEN SWITCH



Tab	Description
Data (on page 18)	Configuration of the source of data and curve

Tab	Description
	administration.
Display (on page 38)	Configuration of the diagram display.
X-axis (on page 45)	Configuration of the x-axis.
Time (on page 59)	Configuration of the time filter.
Lots (on page 78)	Configuration of the lot filter.
Shift (on page 87)	Configuration of the shift filter. Cannot be active together with the lot filter.
Column settings (on page 96)	Configuration of the columns to be displayed:
Printer settings (on page 104)	Configuration of the settings for printing diagrams or saving them as a screen.
Option	**Description**
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

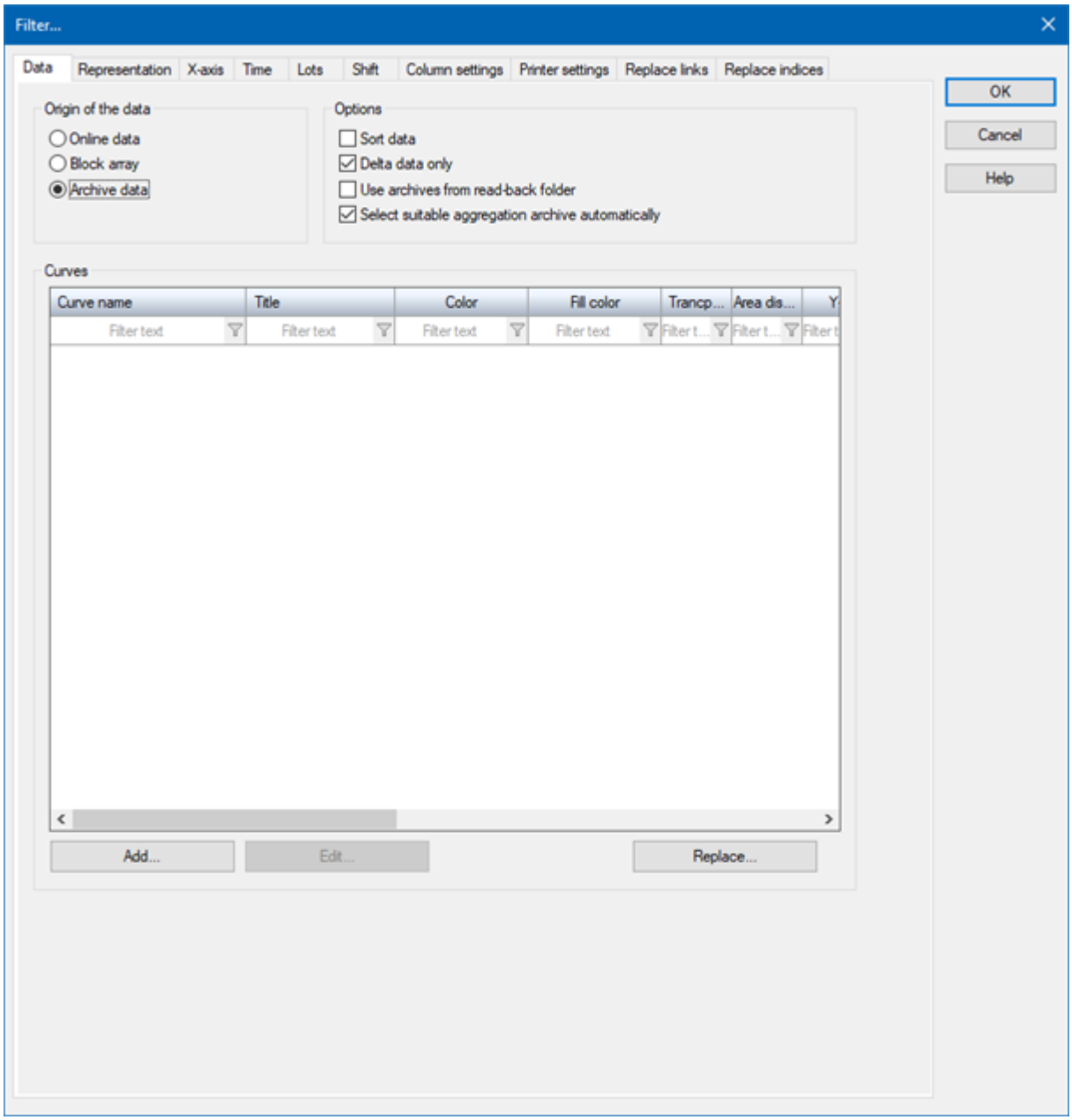
3.3.1 Data

Here the data origin and curves can be configured as well as their display in Runtime. Possible options vary depending on the origin of the data.

- Online data
- Block array
- Archive data

> **Information**
>
> Extended Trend supports the display of cross-project data. In doing so, both the display of data from subprojects in an integration project, as well as the reverse direction, are supported. This is possible for all types of data origin.
>
> You can find further information on cross-project exchange of data in the Multi-Project Administration chapter.

CONFIGURATION OF DATA



Note: The **Replace...** button is only available if **Archived data** has been selected for **Data origin**.

ORIGIN OF THE DATA

Selection of the data origin:

- **Online data**
- **Block array**
- **Archive data**

Can only be selected as long as no curves have been configured.

Option	Description
Online data	*Active*: Current online values are used for the display.
Block array	*Active*: Variables with array values are used for the display. You can limit the display of variables to those that are based on a driver that supports variables with array values using this. The display of variables with array values works just like the XY display. However, you may not select a time filter or X variable. Enter, in the X-axis (on page 51) tab (XY-display) for **Scale From** and **To** the corresponding array indexes of the source data. **Note:** Block array corresponds to the **Block array size** property that can be set for a variable and is not identical to array variables.
Archive data	*Active*: Saved Archive values (in ARX format or SQL data) are used for the display. **Note**: Archives in XML, dBase or TXT formats are no longer displayed after the storage cycle has expired.

OPTIONS

Configuration of options, depending on the origin of the data.

Option	Description
Sort data	Only available for **online data** and **archive data**. *Active*: The data is sorted depending on its time stamp after loading. **Note:** The use of this option can impair the performance, because the data must be re-sorted each time it is loaded. **Recommendation:** Use this option if it cannot be guaranteed that the order is correct when loading.
Delta data only	Only available for **archive data**. ▸ *Active*: When the trend is connected or updated, the displayed data is not deleted and reloaded. Archive files with unaltered content remain unchanged. Archive files that contain new data

Option	Description
	compared to the previous display are reloaded. ▸ Inactive: With every connection and update, all archive files will be reloaded.
Use archives from read-back folder	Only available for **archive data**. The historical data from the readback folder is used for the display. When loading archive data from the readback folder, the archive data from the Runtime path and from all subfolders of the readback folder is also read.
Select suitable aggregation archive automatically	Only available for **archive data**. ▸ *Active*: The appropriate aggregation archive is automatically selected in the Runtime. Default: *active* How it works in the Runtime: See details below the table.

Functioning of the "Automatically select suitable aggregation archive" property in Runtime:

When a curve is connected and when zooming, the archive is selected as the data source whose cycle time fits the diagram width best.
An aggregation archive is only used if it provides at least one value per pixel of the diagram width for the selected time range.
If the diagram is zoomed in on again (with the **Zoom +** button), the diagram switches back to the archive with the higher detail level.

Example: Basic archive with minute values plus aggregated archive with hourly values. With a diagram width of 1500 pixels, the archive with hourly values is used if the displayed time range is greater than 1500 hours. Basic archive is used for shorter time ranges.

- Choice of aggregated archives
  The aggregated variable that appears first in the following sequence is selected from the aggregated archives:
  - Average
  - Maximum
  - Minimum
  - Sum

Attention: If only the aggregation function **Sum** is configured, the value range of the recorded data changes.
Example The daily sum corresponds to 24 hourly values. This requires a different configuration of the

Y axis.
If only a sum variable is found for a variable from the basic archive, there is a warning in the Diagnosis Viewer and in the Editor output window.

Attention: If the variable for the diagram is selected from an aggregated archive, the following is applicable:

- Only the same aggregation function is taken into account in the trend display.
- Only data from the selected aggregation archive and aggregated archives based on it are used. Display of the data that is based on the aggregation variable is no longer possible.

If several aggregated archives are present on one level with the same aggregation function, the one that was created first in Editor is always used.

Example: An archive saving cycle of one day has two aggregation archives: one with a storage cycle of 7 days and one with a storage cycle of one month. The archive saving cycle of one month was created first in Editor. With automatic archive selection, only an archive saving cycle of one month is used.

CURVES

Display and activation of the configured curves. Double clicking on the entry opens the dialog for configuring the curve. The display in the Runtime can be activated and deactivated here and the sequence of the display can be configured.

Option	Description
Curve window	Display of configured trend curves.
Add...	Opens the dialog to select a variable, depending on the origin of the data: - **Online data**: numeric variables - **Block array**: numeric variables - **Archive data**: Variables of existing archives
Edit...	Opens the dialog to configure curves (on page 107). This dialog can also be opened by double clicking on a curve in the **Curves** list.
Delete	Removes the selected entry.
Replace...	Opens the Substitute filter objects (on page 30) dialog. The following objects can be substituted: - Curve data (archive variable)

Option	Description
	▸ Axis title (Y axis / X axis) ▸ Curve title ▸ Visibility variable of the curve ▸ X axis data (archive variable for XY diagram)

The displayed columns in the curve list correspond to the current configuration of the **Extended curve list** in the tab **Column settings (on page 96).T**he order of the columns can also be changed by clicking on the column header and then drag&drop. Sorting within a column is done by clicking on the column header.

Important columns:

- **Curve name**: The curve name is displayed.
- **Title**: The configured curve title is displayed.
- **Color**: The configured curve color is displayed.
- **Y-axis**: Activation/deactivation of the display of the Y-axis in the Runtime by clicking in the checkbox.
  If the checkbox has been deactivated, the Y-axis for the curve can be selected and displayed in the Runtime in the **Extended Trend** screen.
- **Active**: Activation/deactivation of the display of the curve in the Runtime by clicking in the checkbox.
  If the checkbox has been deactivated, the curve can be selected and displayed in the Runtime in the **Extended Trend** screen.
- **Variable name** : The variable name is displayed.
- **Variable identification**: The variable identification is displayed.
- **Sorting order**: Defines the sequence in which the curves are displayed in this tab and in the Runtime.
  The sequence can be changed by clicking in a cell and entering a number.
  - Minimum: *1*
  - Maximum: Number of curves

  The list entries are displayed according to the selected column sorting. If this is not active, the display follows the selected order.
  The sequence can also be configured in the Runtime (on page 143).
- **Source:** Provides information on the original location of the variables shown. The naming of the original archive is carried out according to the following rule: **<Short description> +"-" + <Name> +", "+ <Grouping> + " (" + <Source> + ")". Example: A1-ARCHIVE1,SU(AA-ARCHIVE1)**

Notes:

- The permitted number of curves depends on the license.
- When selecting an *string* archive variable, the **Gantt display** (on page 118) option is automatically displayed in the **Curve settings** (on page 108) dialog.
- Sorting by columns other than order**sequence** does not affect the order of the curve display in the diagram. Curves that come later in the order may overlap curves that come earlier in the order.

PROPOSAL FOR HARD DISK DATA STORAGE

Only available for **online data**.

Offers the values proposed by the properties of the **Harddisk data storage** group in the zenon Editor.
Calculation of the proposal is directly related to the **refresh rate** (**Display** tab). For **YT display** (on page 46), the time configured in the time filter is also included in the calculation.

Option	Description
Number	Number of values that are written. Corresponds to the value that is entered in the **Number of values** property.
Cycle time	Cycle time in seconds. Corresponds to the value that is entered in the **Cycle time [s]** property.
Current values	Displays the current value of variables that are to be replaced by the proposed values.
Accept proposal	*Active*: Writes the proposed values to the respective properties of the variables when the dialog is closed with **OK**. **Note:** It is activated, if the property **Harddisk data storage active** is deactivated at this time.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

HARD DISK DATA STORAGE IN EDITOR

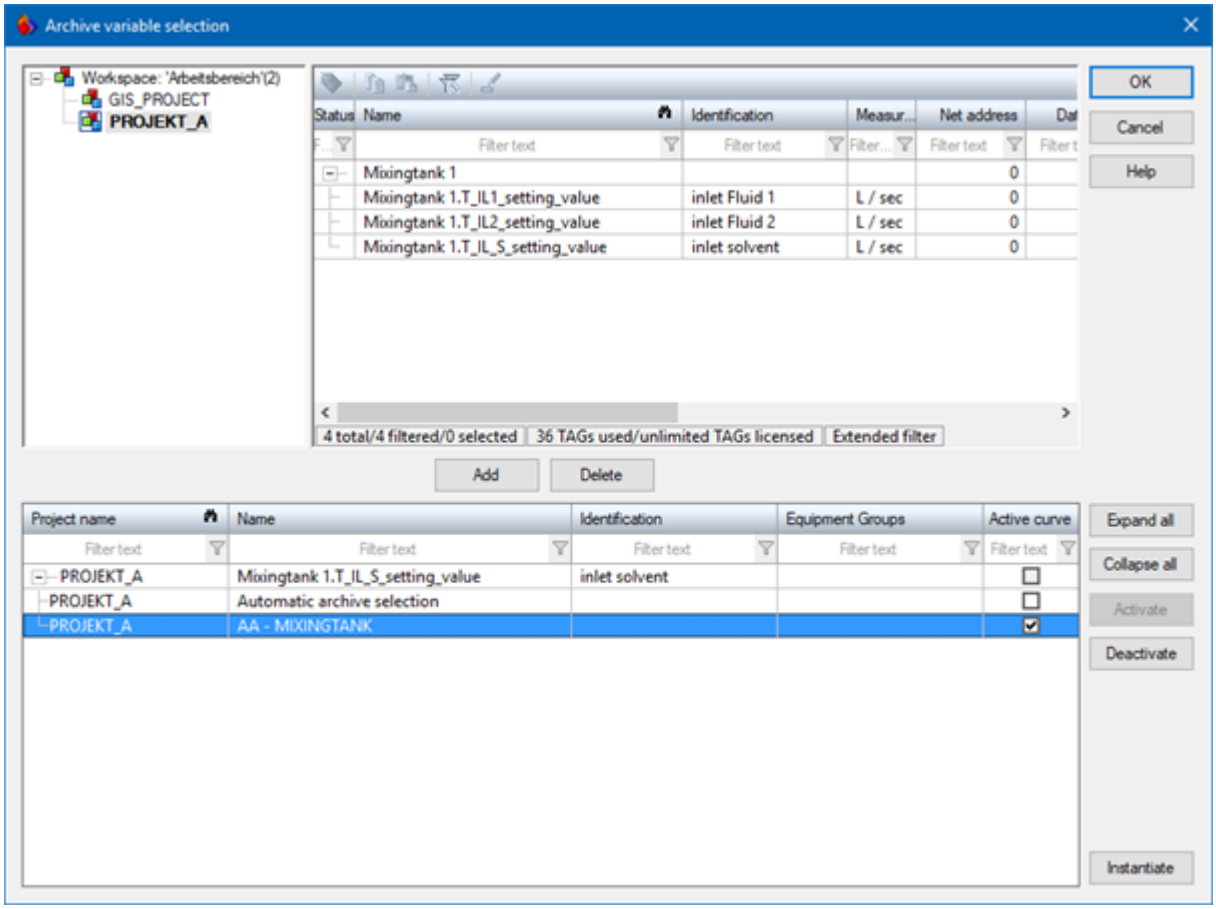
If online variables are to e displayed in Extended Trend, it is recommended that the values for saving the variable values are coordinated on the hard drive. If, when configuring the screen switching to an **Extended Trend** screen, the option **Online data** is selected, the system proposes optimal values for saving the variable values to the hard disk. These values can also be adapted manually.

In the zenon Editor you will find these properties in the **Harddisk data storage** variables properties group.
This includes the properties:

- **Harddisk data storage active**: Switches data saving on or off.
- **Number of values**: Number of values that are saved.
- **Cycle time [s]**: Cycle time in seconds.
- **Recording type**: type of saving:
  - *Hard disk data (cyclical)*:: Cyclical writing of values to the hard disk.
  - *Resorted values (RDA)*: The values are written blockwise by the driver on to the hard disk. Suitable for post mortem analysis. The control unit must therefore be configured to save data in the event of an error and to write this to the hard drive once back in operation.

If hard disk data backup is not used, data is not saved in the Runtime.

3.3.1.1 Archive variable selection



You can select a variable from an archive in order to use this as the X axis in an XY display.

Option	Description
Workspace	Tree view of the current workspace. All current projects are displayed. Selection of the project by clicking.
Variable list	List of all variables of the selected project that are in archives. This list can be sorted and filtered. Additional columns can be displayed by means of a context menu. You get this context menu if you right in a column heading. Information about available variables and the selected variable is shown in the footer of the

Option	Description
	variable list as text. The variable list has the following columns: ▸ **Project name** ▸ **Name** ▸ **Identification** ▸ **Equipment Groups** ▸ **Active curve** **Note:** If the checkbox of the **Active curve** property is activated with the naming *automatic archive selection*, an archive is automatically selected in the Runtime in order to find the best-possible solution for the time period in question. This setting depends on the **Select suitable aggregation archive automatically** property.
List for usage of the selected variable	Shows the selected variable. This can be stored in several archives.
Add	Adds selected variable from the **variable list** to the **List for usage of the selected variable**. **Note:** A variables from the variable list can also be accepted by double clicking.
Delete	Removes the selected variable from the **List for usage of the selected variable**.
Expand all	Opens subnode of the selected variable.
Collapse all	Closes subnode of the selected variable.
Activate	Selects the variable in the desired archive.
Deactivate	Resets the selection.
Instantiate	Creates a copy of a variable for a curve.

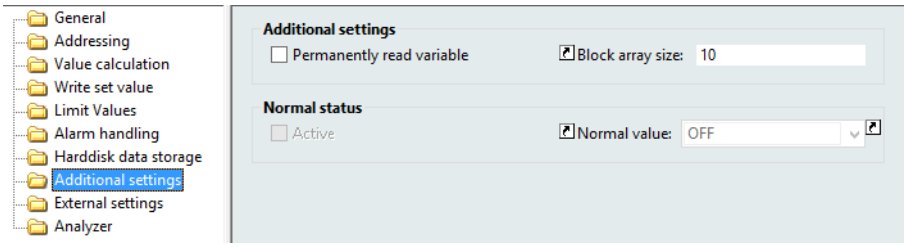
CLOSE DIALOG

Options	Description
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

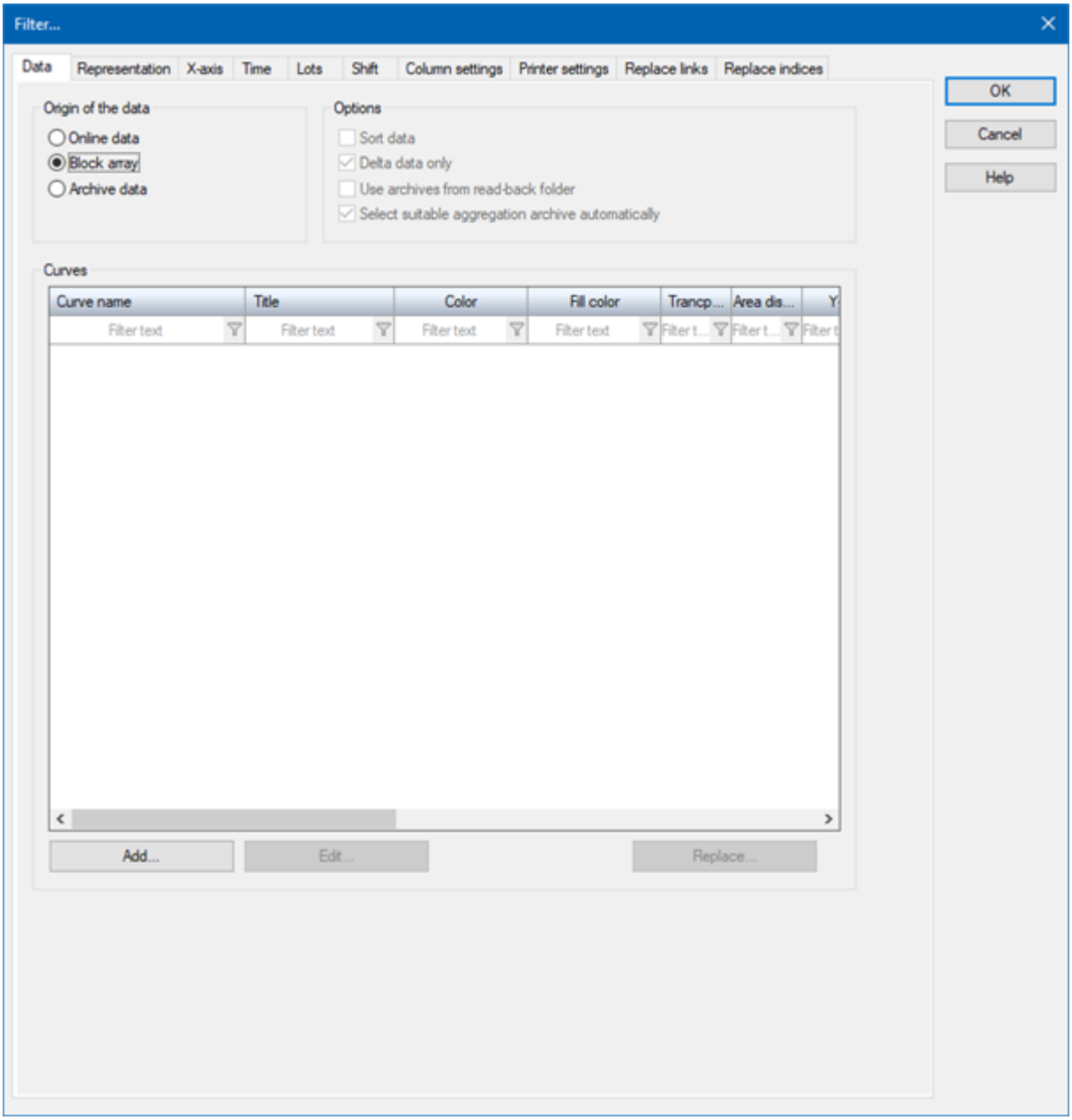
3.3.1.2 Block array

To set up variables with array data:

- Define the corresponding property variable **Block array size** in the group **Additional settings**, for example 10

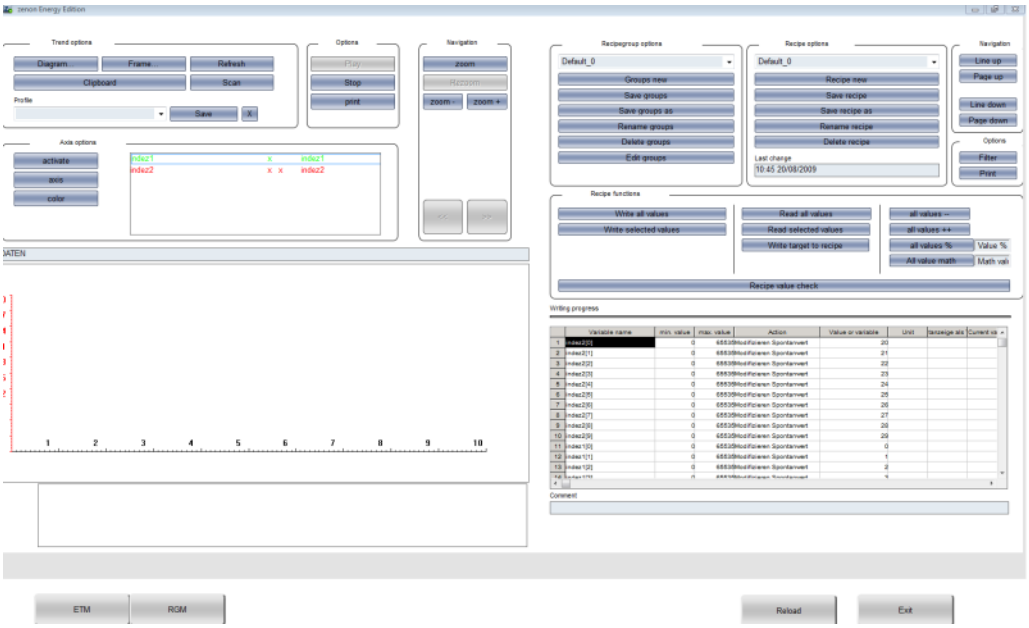


- When configuring the **screen switching** function for the extended Trend Screen, select the property **Block array** :

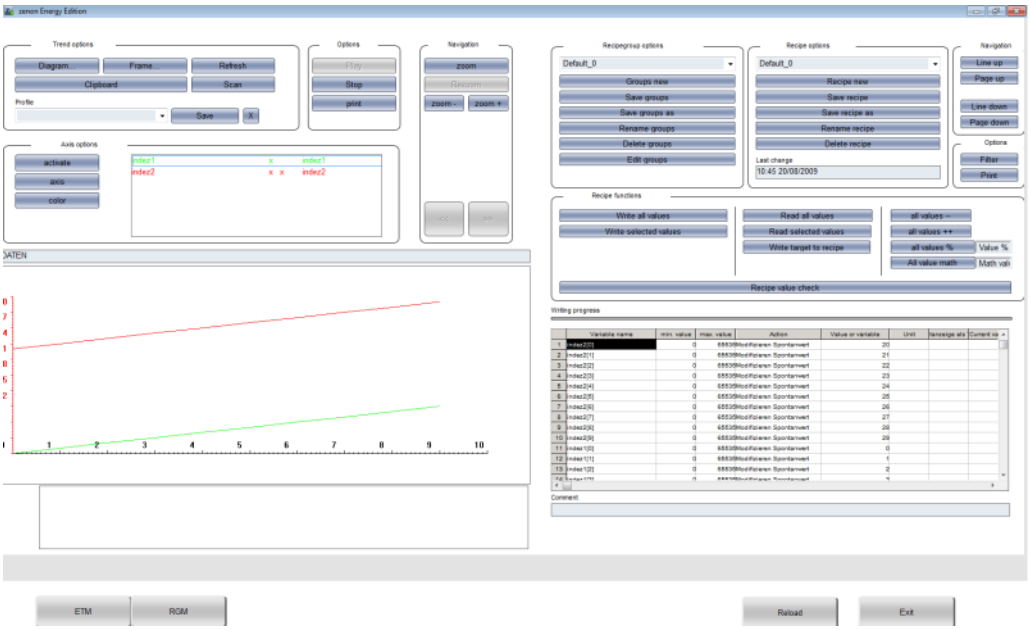


RESULT IN THE RUNTIME

1. The Extended Trend screen is still empty when Runtime is started:



2. The values of the variables with block arrays are displayed as soon as the recipe values are set:



3.3.1.3 Substitude filter objects

The following elements can be substituted in the **Substitute filter objects** dialog:

- Curve data (archive variable)

- Axis title (Y axis / X axis)
- Curve title
- Visibility variable of the curve
- X axis data (archive variable for XY diagram)

In this dialog, you can for instance use a curve setting that has already been defined in the Editor for the display in the ETM for further variables.

The variables of the curve that have already been defined are replaced with the desired variable.

There is then a curve available in Runtime with the same settings.

The procedure is used for two examples for the replacement of variables.

When configuring substitution in the Editor, the entry of the archive channel is identified uniquely with the following string:

ArchiveProject#ArchiveShortName|Aggregation(PossibleSubAggragetion).ProjectOfVariable#Variable Name

You can do the following in the respective tab of the **Substitute filter objects** dialog:

- **Replace links** (on page 31)
- **Replace indices** (on page 35)

PREPARATION TO REPLACE LINKINGS OR INDICES

Preparatory work:

1. Select the variable that is to be replaced in the filter dialog of the screen switching function of the ETM. To do this, click on the **Add...** button in the **Data** tab.

   The **Archive variable selection** dialog is opened.

2. Select the desired variable and click on the **Insert** button

   Example: Variable1

3. Confirm the selection by clicking on **OK**.

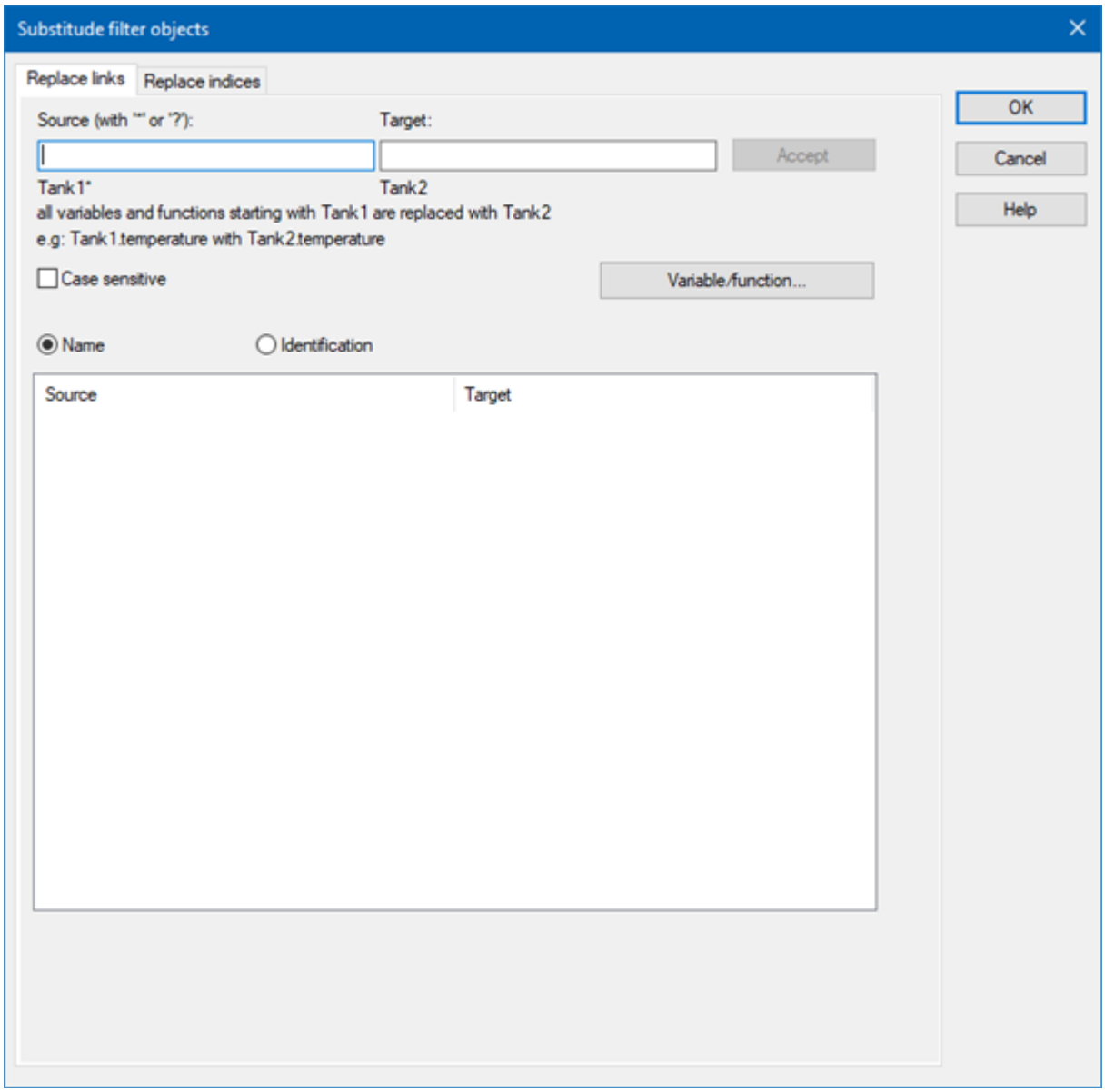
   The dialog is closed. The selected variable is visible under **Curves**.

3.3.1.3.1 Replace links

There are two procedures available:

- Replacement of linkings using the **Apply...** button

- Replacement of linkings using the **Variable/function...** button



Entries displayed under **Target** can also be edited in this view if the desired **Target** is known.

Procedure:

1. Highlight the desired entry under **Target** by clicking on the left mouse button.
   The entry is shown with a blue background.
2. Add the new target name using the keyboard.
3. Confirm the entry by clicking on the Enter key. Alternatively, you can also navigate with the arrow keys of the keyboard.
   The change to the target name is applied.
   Note: If the new target is not found, a corresponding message appears in its own dialog. Close the dialog by clicking on **OK**. The original target name is retained.

CONTEXT MENU

If an entry under **Source** or **Target** is clicked on with the right mouse button, a context menu with the following entries is available:

Option	Description
Select target	Opens the dialog to select the desired target.
Copy	Copies the selected entry to the clipboard.
Add	Pastes the content from the clipboard. **Note:** Only available if content to be copied has been selected and the context menu is opened in an area in which insertion is possible.
Reset	Resets the amended target selection of the highlighted line entry. The **source text** then corresponds to the **target text** again.

NAVIGATION WITH THE CURSOR KEYS ON THE KEYBOARD

It is also possible to move with the cursor keys on the keyboard in edit mode.

Option	Description
Left key	Moves to the left in the line entry to be edited.
Right key	Moves to the right in the line entry to be edited.
Up key	Leaves the line entry being edited and switches to the line entry above. Carries out the substitution of the target exists. Otherwise the mouse pointer remains in the line entry and an error message appears. Close the dialog by clicking on **OK**. The original target name is retained.
Down key	Leaves the line entry being edited and switches to the line entry below. Carries out the substitution of the target exists. Otherwise the mouse pointer remains in the line entry and an error message appears. Close the dialog by clicking on **OK**. The original target name is retained.

REPLACEMENT OF LINKINGS USING THE APPLY BUTTON

Example: **Variable1** is to be replaced by **Variable2**.

Procedure:

1. Carry out the preparations to replace linkings or indices (on page 30).
2. Then click on the **Replace...** button in the **Filter...** dialog in the **Data** tab.

   The **dialog to substitute filter objects** is opened.
3. Enter the origin of the linking to be replaced in the input field under **Source (with `*´ or `?')**.

   Example: **Variable1***

   The variable is visible under **Source** and **Target**.

   Initially, **Source** and **Target** are filled with the same variable.
4. Enter the variable with which Variable1 is to be replaced in the input field under **Target**.

   Example: **Variable2**

   Note: **Variable 2** given in the example must have already been created and must be an archive variable.
5. Click on **Accept**.

   A dialog shows how many connections have been replaced.
6. Confirm the dialog by clicking on **OK**.

   The variable that replaces the source variable is now entered under target.
7. Click on **OK** to close the dialog.
8. Click on **OK** to close the filter dialog.

   The next time Runtime is opened, the curve is available in the ETM with the replaced variable (**Variable 2**).

REPLACEMENT OF LINKINGS USING THE VARIABLE/FUNCTION BUTTON

Example: **Variable1** is to be replaced by **Variable2**.

Procedure:

1. Click on **Variable/Function...** in the **Substitute filter objects** dialog.

   The **Archive variable selection** dialog is opened.
2. If there are entries in the lower list area of the dialog, highlight these by clicking on the left mouse button.
3. Click on the **Delete** button to remove the entries.

4. From the archive variable displayed, select the variable that you want to replace with the source variable.
5. Confirm the selection by clicking on **Insert**.

   The selection is shown in the lower list area.
6. Click on **OK** to close the dialog.

   The selected variable is now visible in the **Substitute filter objects** dialog under **Target**.
7. Click on **OK** to close the dialog.
8. Click on **OK** to close the filter dialog.

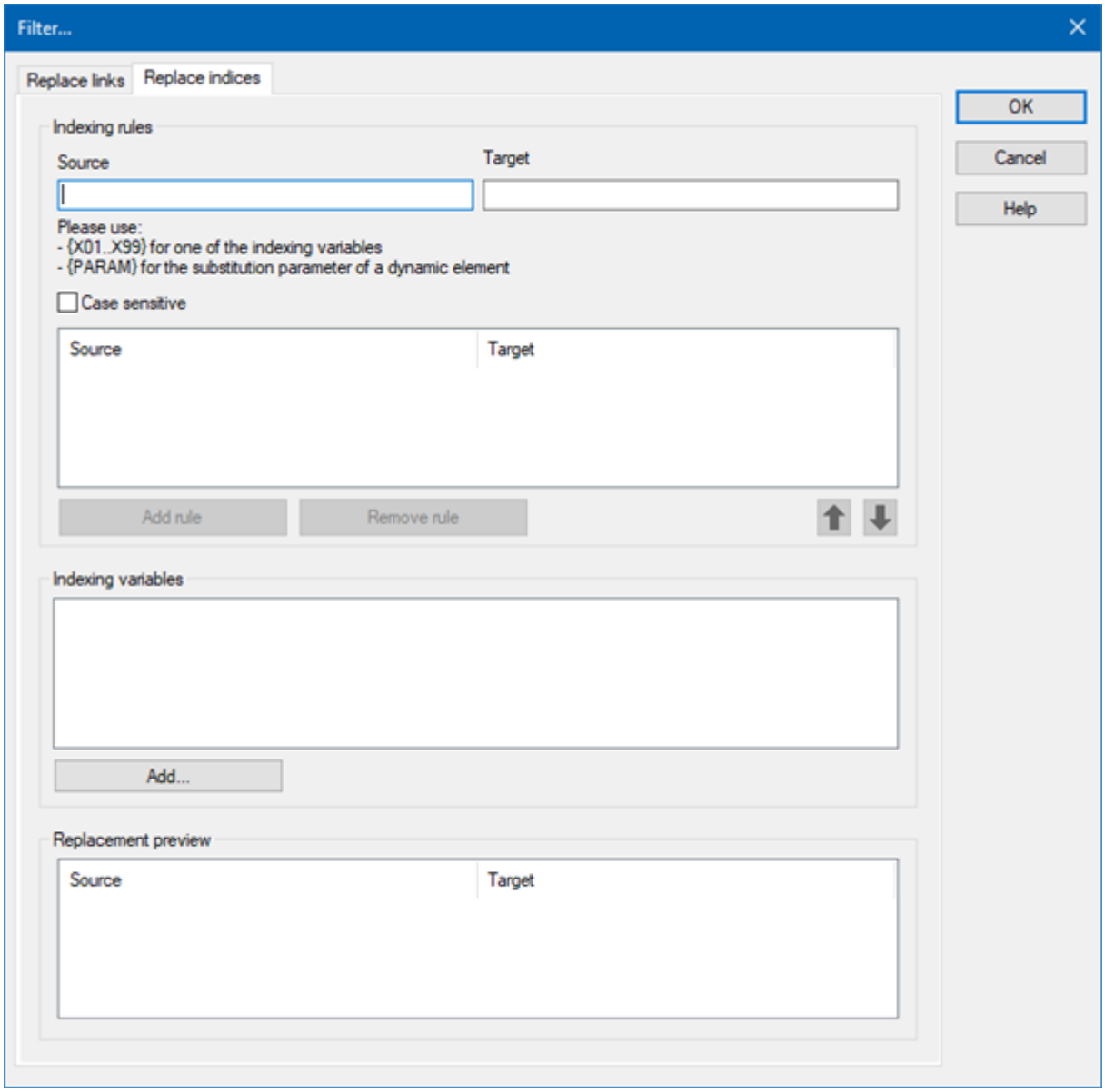
   The next time Runtime is opened, the curve is available in the ETM with the replaced variable (**Variable 2**).

3.3.1.3.2 Replace indices

There are two procedures available:

- Replace indices with indexing variables (*X01-X99*)
- Replace indices with substitution parameters of a dynamic element {*PARAM*}

Example: **Variable1** is to be replaced with an indexing variable or the substitution parameter of a dynamic element.



REPLACEMENT OF INDICES

Procedure:

1. Carry out the preparations to replace linkings or indices (on page 30).
2. Click on the **Replace indices** tab in the **Substitute filter objects** dialog.

   The variable to be replaced is shown in the **replacement preview** under **Source**.

   Example: **Variable1**

3. In the **replacement preview**, click on the variable to apply this to the **indexing rules** in **Source** and **Target**.
4. To work with indexing variables (*X01-X99*), change the naming of the variable under **Target** as desired.

   Example: **Variable(X01)2** The indexing variable *X01* is used.

   Note: Always start with *X01*, because variable assignment under indexing variables automatically starts upwards.
5. Click on the **Add rule** button to apply the information in **Source** and **Target** from the indexing rules.
6. Click on the **Add...** button under **Indexing Variables**.

   The **variable selection** dialog is opened.
7. Select the variable that is to be replaced.
8. Click on **Add** to accept the variable.
9. Click on **OK** to close the dialog.

   The *X01* assigned variable is visible under **Indexing Variables**.
10. You can add further rules if you rename the variable in the **indexing rules** under **Target** and click on **Add Rule**.

    You can also use the substitution parameters of a dynamic element {*PARAM*} for this.

    Example: **Variable{PARAM}2**
11. Click on **OK** to close the filter dialog.

    The next time Runtime is opened, the curve is available in the ETM with the replaced variable.

Note: If there are several indexing rules, these are gone through from top to bottom. The first applicable rule is executed. The order of the rules can be amended with the arrow keys.

3.3.2 Representation

Settings for the representation of the diagram in the Runtime:

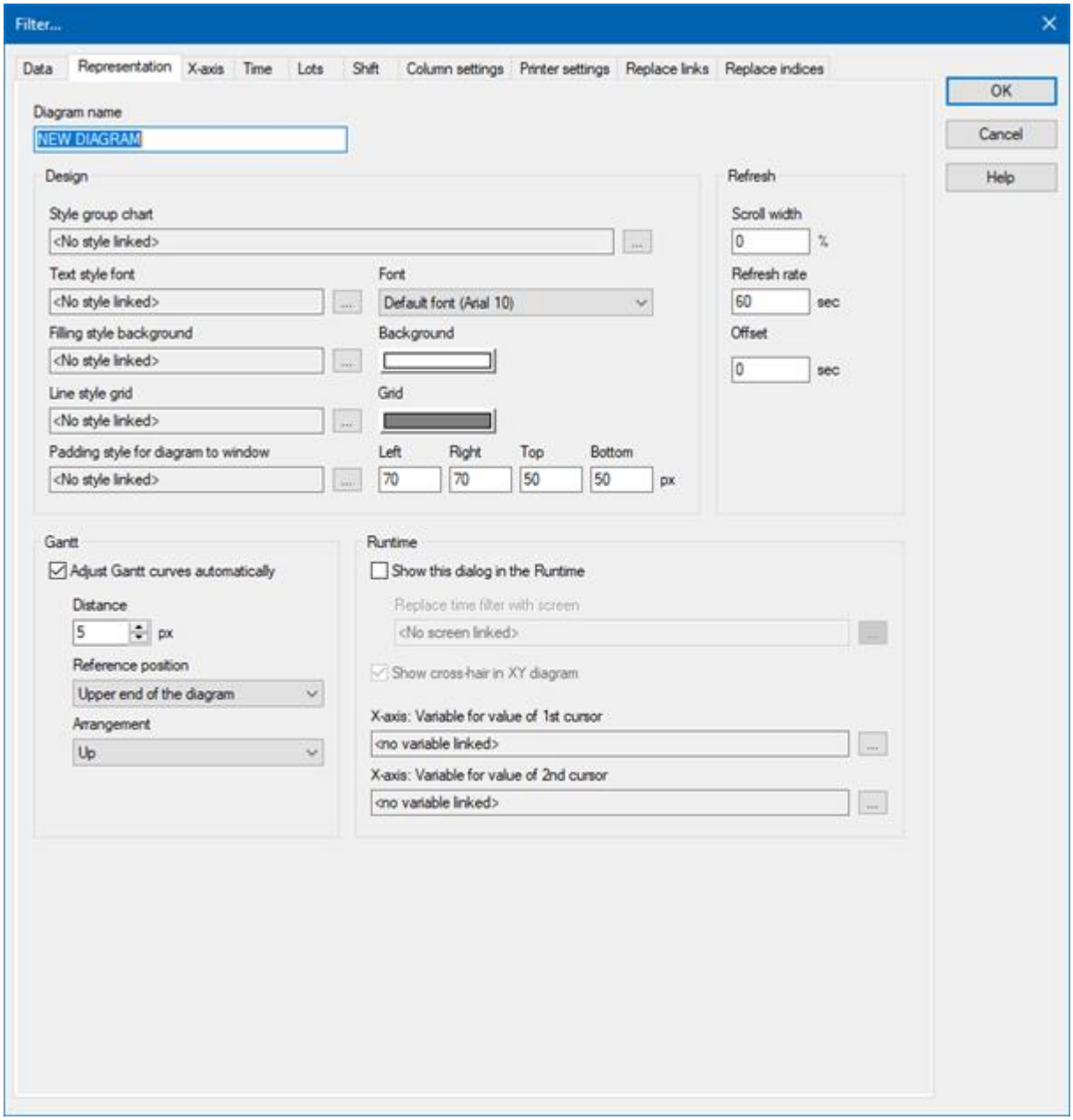


DIAGRAM NAME

Option	Description
Diagram name	Freely-configurable diagram name. Maximum length: *30 characters* **Integrate lot names dynamically**: The diagram name

Option	Description
	can contain lot names. To do this, insert the character sequence **%c%** into the name. in Runtime, **%c%** is replaced by those batch names that meet the filter requirements. For example: The diagram name **Diagram1_%C%_End** results in **Diagram1_Lot1_End** in Runtime

DESIGN

Settings for the design of the diagram.

Option	Description
Style group for diagram	A pre-defined style group for the diagram can be selected using the **...** selection button. If a style group is selected and thus linked, all styles in the style group are applied and grayed out. If a style group is deselected, the styles linked to the style group are also deselected.
TEXT STYLE FOR FONT	A pre-defined text style for the font in the diagram can be selected using the **...** selection button.
Font	Selection of the user-defined font for the axis labels and the value indicators from a drop-down list
Fill style for background	A pre-defined fill style for the background of the diagram can be selected using the **...** selection button.
Background	Selection of the background color for the Diagram. Clicking on the button opens the dialog to select the screen.
Line style for grid	A pre-defined line style for the grid of the diagram can be selected using the **...** selection button.
Grid	Selection of the color for the overlaid grid. Clicking on the button opens the dialog to select the screen.
Padding style from diagram to the the window	A pre-defined padding style for the determination of the distance between diagram and window border can be selected using the **...** selection button.

Option	Description
	Respective minimum: *10 px* Respective maximum: *2000 px*
Left	Distance between the left edge of the screen and the diagram. **Attention**: Take into account the space that a left-hand labeling of the Y axis requires for the configured user-defined font.
Right	Distance between the right edge of the screen and the diagram. **Attention**: Take into account the space that a right-hand labeling of the Y axis requires for the configured user-defined font.
Top	Distance between the top edge of the screen and the graph. **Attention**: Take into account the space for later optional display of the stored information when the cursor is active.
Bottom	Distance between the bottom edge of the screen and the diagram. **Attention**: Take into account the space that the configured user-defined font needs for two-line labeling of the X axis.

UPDATE

Settings for the allocation of the monitors.

Option	Description
Scroll width	Set scrolling percentage: ▸ Minimum: *0* ▸ Maximum: *100* As soon as the diagram reaches the right edge while drawing, the entire display is shifted to the left by the selected percentage. **Attention**: Only available for **YT display** (on page 46).
Refresh rate	Set frequency for the screen update in seconds.

Option	Description
	For details see: **Details update rate**
Offset	Moving the zero point of the time axis to the stated value in seconds. Maximum: *65535 s* Not available for **block array** data source.

DETAILS REFRESH RATE

The following applies for the refresh rate:

- **Online data** and **Block Array:**
  - Value must be > *0*.
  - No static connection possible.
- **Archive data:**
  The **refresh rate** dynamically adjusts to the loading time of the data for the archive trend. If loading lasts longer than half of the refresh interval, the refresh rate is doubled.
  Attention: If the refresh rate is set too low, this can lead to an endless loop with large amounts of data.
  Alternative: The value for the refresh rate is set to *0*. Then the displayed data will not be updated. This setting is helpful if a large amount of data should be displayed .
  - Maximum: *3600* s

Default:*60* s

Hint: When reading archive data, a LOG message is created at the beginning and at the end. This can be read with the Diagnosis Viewer. With this it can be determined how long the reading lasts and the **Refresh rate** and be defined accordingly.

GANTT

Settings for the design of the Gannt chart.

Option	Description
Adjust Gantt curves automatically	Allows the adjustment of Gantt curves according to self-defined requirements. - Active: The curves are automatically aligned. - Inactive: All alignment settings must be made manually.

Option	Description
	If the checkbox is activated, the following options can be configured for automatic alignment: ▸ **Spacing** ▸ **Reference position** ▸ **Arrangement**
Spacing	Setting of the distance value. Only available if the **adjust Gantt curves automatically** property has been activated. Possible values: *0* to *20* px
Reference position	Selection of the position from which the distance value is to be calculated. Only available if the **adjust Gantt curves automatically** property has been activated. The following options are available for selection: ▸ Upper end of the diagram ▸ Lower end of the diagram
Arrangement	Selection of the position of the Gantt curve. Only available if the **adjust Gantt curves automatically** property has been activated. The following options are available for selection: ▸ Up ▸ Down **Note:** With several Gantt curves and a configuration with "Upper end of the diagram" and "Up", the upper distance from the diagram to the window must be selected as correspondingly large.

RUNTIME

Settings for the behavior in the Runtime.

Option	Description
Show this dialog in the Runtime	If, in the **X axis** (on page 45) tab for the **XT display** (on

Option	Description
	page 46), the option **Comparison with 2nd time period** is activated, two time filters for both X-axes are offered. *Active*: Before every call of the screen the filter dialog is opened. The filter settings can be modified. This option is not available with Windows CE. **Note:** If, in the **Lots** tab, the **Show lot selection dialog** option is also selected, then the lot selection dialog is called up in the Runtime. This is no longer displayed after reloading. **Notes for time range filters:** **Show this dialog in the Runtime** *active*: ▸ The dialog with the filter settings is opened in Runtime when switching screens. The filter is no longer offered when reloading. This behavior can differ for individual screen types if the dialog was displayed in screen switching and canceled. ▸ The last time period that has finished is always used. **Show this dialog in Runtime** *inactive*: The screen is opened with the set time filter. ▸ **Use last finished time range** *active*: The last time period that has finished is always used ▸ **Use last finished time period** *inactive*: The current time period is used.
Replace time filter with screen	Only available if the **Show this dialog in Runtime** option has been activated. Replaces the dialog with a *time/lot/shift filter* screen in the Runtime. The linked screen is displayed. Click the **...** button and the dialog opens to select a screen. Only screens from the project calling them up and *time/lot/shift filter* screens are offered. For details on replacement with a shift filter, see the **shift management** manual, **Extended Trend** chapter. When selecting a filter screen, the **BOX SCREEN**

Option	Description
	information is also shown in the detail view of the function in the **Parameter** column; without a linked screen, only **BOX** is displayed.
Display cross-hair in XY diagram	Display of the cross-hair in the Runtime: ▸ *Active:* switched on ▸ *Inactive*: switched off Only available if **XY display** has been activated in the **X-axis** tab.
X-axis: Variable for value of the 1st cursor	Variable for abscissa of the first cursor (on page 137). Clicking on the **...** button opens the dialog to select a **LREAL** or **DWORD/DINT/UDINT** variable. When calling up and moving the cursor in the Runtime, its abscissa (time or X value) is written to the assigned variable. In doing so, the values are saved in Unix time format (number of seconds passed since 1 January 1970 00:00 UTC).
X-axis: Variable for value of the 2nd cursor	Variable for abscissas of the second cursor (on page 137). Clicking on the **...** button opens the dialog to select a **LREAL** or **DWORD/DINT/UDINT** variable. When calling up and moving the cursor in the Runtime, its abscissa (time or X value) is written to the assigned variable. In doing so, the values are saved in Unix time format (number of seconds passed since 1 January 1970 00:00 UTC).

CLOSE DIALOG

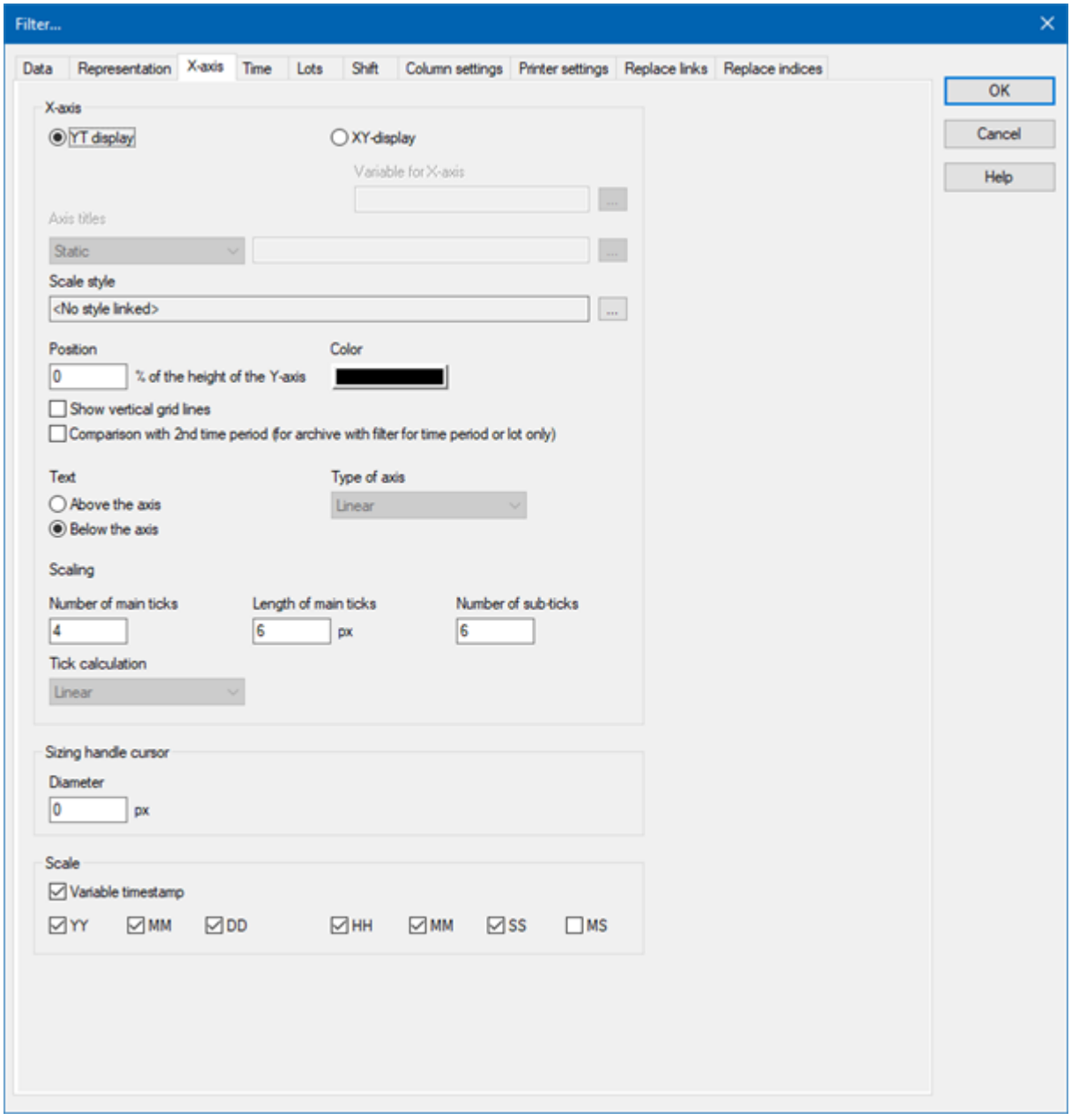
Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.3 X-Axis

Settings for the X-axis. This can be configured in two different forms:

- **YT-display** (on page 46): Display of the trend curves over the configured time range.
  When configuring the time axis, the time range, the lots and the axis display can be defined.
- **XY display** (on page 51): Display of the values by means of a variable or derived variable (location curves, working points etc.)
  Only available if, in the **Lots** (on page 78) tab, the **Relative lot selection** option is not active.

3.3.3.1 YT display



X-AXIS

Option	Description
X-axis	Selection of display type.
YT display	*Active*: The display of the curves over time is configured. Summer time is automatically played back correctly.

Option	Description
XY display	*Active*: Display of the curves using another variable is configured. With the XY display activated, the **variable time stamp** and the further selection possibilities **YY**, **MM**, **DD**, **HH**, **MM**, **SS** and **MS** are not available.
Variable for x-axis	(Not available for YT display).
Axis titles	(Not available for YT display).
Scale style	Possibility to select a style for the scale using the **...** selection button to the right of the display field. **Note:** If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however. **Note:** A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.
Position	Entry of a percentage value for the positioning of the X-axis in relation to the height of the Y-axis. Possible values: *-100* to *100*. For example: ▸ *0 %*: Positioning at the lower end of the Y-axis. ▸ *100 %*: Positioning at the upper end of the Y-axis. ▸ *50 %*: Positioning in the middle of the Y-axis.
Color	Definition of the axis color. Click on the color and a dialog opens to select a color.
Show vertical grid lines	*Active*: Vertical assistance lines are displayed at the main ticks in the Runtime.
Comparison with 2nd Time period	*Active*: Display comparison with a second time period. Two time ranges are displayed at the same time for each per archive variable (e.g. comparison over a week). Two trends are called up when it is called up. The second time range is displayed on the opposite labeling side of

Option	Description
	the time axis in the color of the grid (on page 38). Only for archives and filter for time range or lot. When using a 2nd time period in conjunction with lots, a lot variable must be linked to the archive. A comparison with relative lot filter is not possible. Only available with a full license.
Label	Position of the axis labeling.
Above the axis	Axis labeling above the axis.
Below the axis	Axis labeling below the axis.
Type of axis	(Not available for YT display.))
Linear	(Not available for YT display.))
Logarithmic	(Not available for YT display.))
Scaling	Definition of the axis subdivision.
Number of main ticks	The desired number of main subdivisions with value display. Maximum: *100* How many main ticks will actually be displayed in Runtime depends on: ▸ Displayed time period ▸ Number of intervals that can be visibly displayed in this period **Example:** ▸ Number of main ticks: *6* ▸ Displayed time period: *1* Day ▸ Result with axis subdivision by hours: There are 4 main ticks displayed 6 hours each. Possible intervals: 1, 2 or 6 hours.
Length of main ticks	Length of main tick lines in pixels. Maximum: *100*
Number of sub-ticks	Number of subdivisions between two main subdivisions.

Option	Description
	Maximum: *60*
Tick calculation	(Not available for YT display.))

SIZING HANDLE CURSOR

Option	Description
Sizing handle cursor	Definition of the circle-shaped sizing handle displayed in the middle to make it easier to use the rulers, such as in touch operation.
Diameter	Diameter of the sizing handle in pixels. ▸ *0*: no sizing handle ▸ *>0*: Sizing handle is displayed according to the value entered Default: *0* Maximum: *100*

SCALE

Option	Description
Variables timestamp	Display of the time stamp of the variable in Runtime. ▸ *active*: The axis is labeled with the existing time markers. ▸ *Inactive*: The switch-on time is defined as *00:00*. Values before this are labeled relatively in the past (*-01:00)*. ▸ Default: *active*
JJ	Display of the year figure in the axis labeling.
MM	Month
TT	Day
HH	Hours
MM	Minutes
SS	Seconds

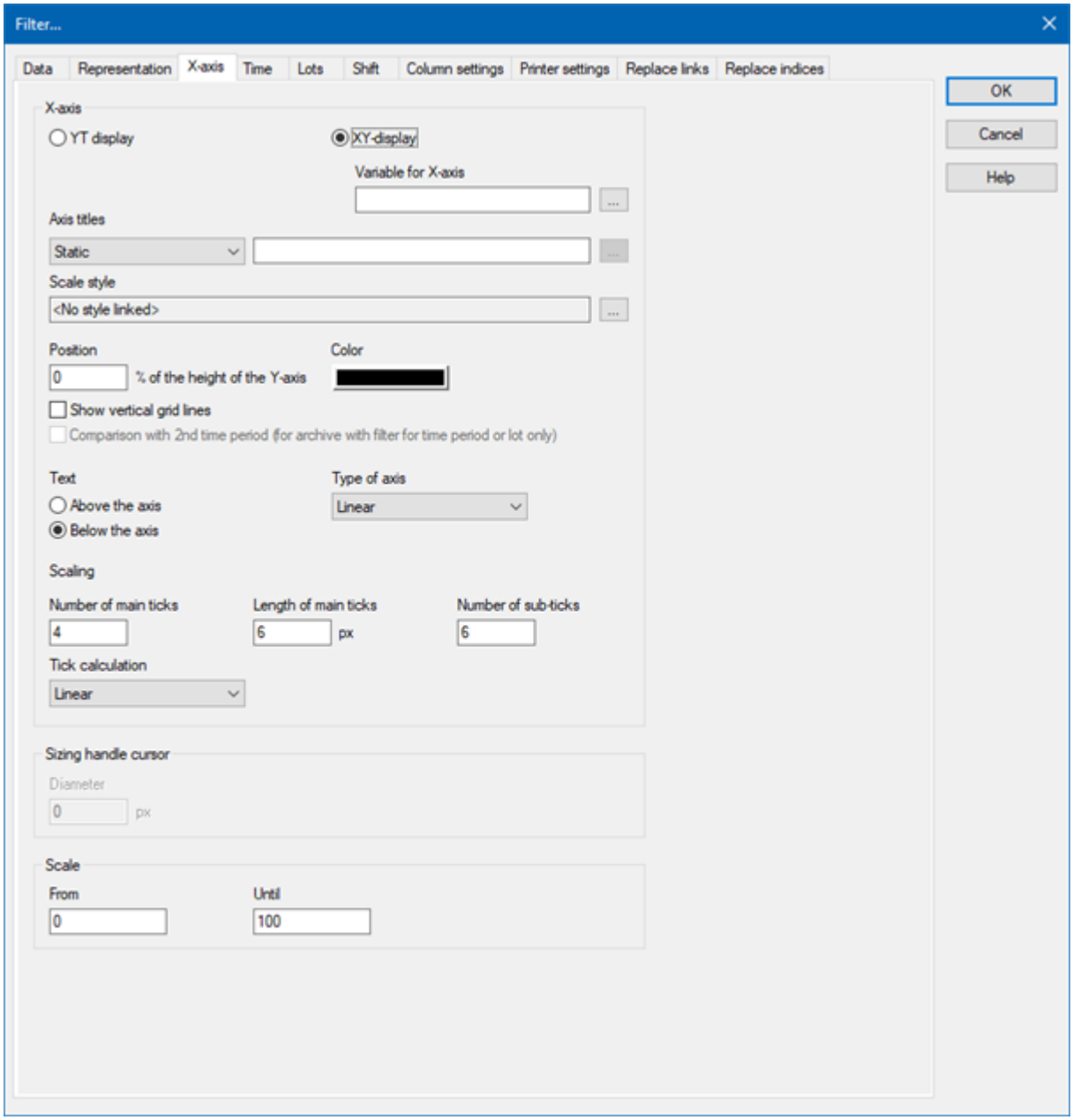
Option	Description
MS	Milliseconds The **MS** checkbox is activated by default.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.3.2 XY display

Only available if, in the **Lots** (on page 78) tab, the **Relative lot selection** option is not active.



Option	Description
X axis	Selection of display type.
YT display	*Active*: The display of the curves over time is configured.
XY display	*Active*: Display of the curves using another variable is configured.

Option	Description
Variable for x axis	Selection and marking of one of the variables allocated to the diagram. It is used for the X axis. Clicking on the **...** button opens the dialog for variable selection, depending on the origin of the data.
Axis titles	Text of axis labeling in the Runtime. Maximum length: *30 characters* The following possibilities are available for selection: ▸ **Static**: The title can be entered freely. The text field is available. The **...** selection button is grayed out. ▸ **From variable**: The title is taken from a linked variable. The text field is not available. The **...** selection field is active. ▸ **Variable name** : The name of the variable is taken as a title. The text field is not available. The **...** selection button is grayed out. **Static** is set by default.
Scale style	Possibility to select a style for the scale using the **...** selection button to the right of the display field. **Note:** If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however. **Note:** A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.
Position	Entry of a percentage value for the positioning of the X-axis in relation to the height of the Y-axis. Possible values: *-100* to *100* For example: ▸ *0 %*: Positioning at the lower end of the Y-axis. ▸ *100 %*: Positioning at the upper end of the Y-axis. ▸ *50 %*: Positioning in the middle of the Y-axis.

Option	Description
Color	Definition of the axis color. Click on the color and a dialog opens to select a color. **Note:** Can be configured independently of the trend curve color.
Show vertical grid lines	*Active*: Vertical assistance lines are displayed at the main ticks in the Runtime.
Comparison with 2nd Time period	(Not available for XY display).
Variables timestamp	(Not available for XY display).
Label	Position of the axis labeling.
Above the axis	Axis labeling above the axis.
Below the axis	Axis labeling below the axis.
Type of axis	Selection of the display of the axis: ▸ Linear ▸ Logarithmic
Linear	*Active*: Linear display of the axis.
Logarithmic	*Active*: Logarithmic display of the axis. Only available with a full license.
Scaling	Definition of the axis subdivision.
Number of main ticks	Number of main subdivisions with value indication. Maximum: *100*
Length of main ticks	Length of main tick lines in pixels. Maximum: *100*
Number of sub-ticks	Number of subdivisions between two main subdivisions. Maximum: *60*
Tick calculation	Amendment possibility to calculate the ticks shown: ▸ **Fitted** - Minimum value and maximum value are the extreme limits of the axis. The labeling of the display is automatically rounded to visually-clear

Option	Description
	figures and the ticks are amended accordingly. A small deviation to the set main ticks can occur if the space available on the axis can be divided evenly. If there would be an overlap of a labeling with a main tick, the text of the axis limit is not displayed. ▸ **Automatic** - the calculation of the maximum values of the axes and the ticks is calculated automatically using an algorithm. The axis limits that have been created in the Editor can be amended in the Runtime. ▸ **Linear** - an even distribution of the ticks on the axis is carried out. Default: *Fitted*

SIZING HANDLE CURSOR

Option	Description
Sizing handle cursor	(Not available for XY display).
Diameter	(Not available for XY display).

SCALE

Option	Description
Scale	**Stipulation of the values for the scale by activating the checkboxes:** **YY: Year** **MM: Month** **DD: Day** **HH: Hour** **MM: Minutes** **SS: Second** **MS: Millisecond**

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

Information

Display of X-axis in the diagram from version 6.51

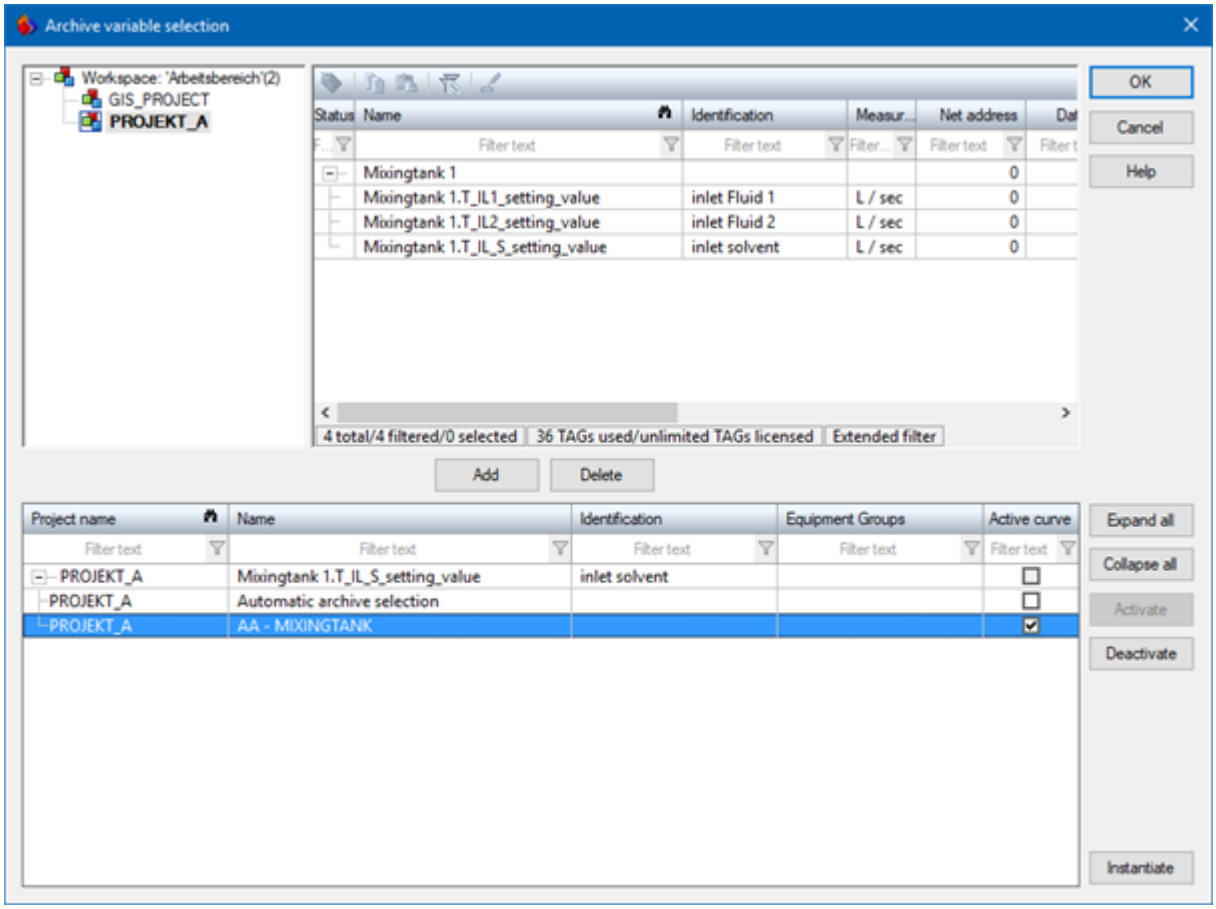
Archive data for the X-axis is no longer loaded for performance reasons. To display the X-axis in the diagram anyway:

- Add the variable selected for the **variable for X-axis** as well as the curve (on page 16) in the diagram
- Deactivate the display for this curve

Information

If an XY display is configured, then only the respective current value is shown when the scanning is started. This cannot be updated. The cursor cannot be moved.

3.3.3.2.1Archive variable selection for X axis



You can select a variable from an archive in order to use this as the X axis in an XY display.

Option	Description
Workspace	Tree view of the current workspace. All current projects are displayed. Selection of the project by clicking.
Variable list	List of all variables of the selected project that are in archives. This list can be sorted and filtered. Additional columns can be displayed by means of a context menu. You get this context menu if you right in a column heading. Information about available variables and the selected variable is shown in the footer of the

Option	Description
	variable list as text. The variable list has the following columns: ▸ **Project name** ▸ **Name** ▸ **Identification** ▸ **Equipment Groups** ▸ **Active curve** **Note:** If the checkbox of the **Active curve** property is activated with the naming *automatic archive selection*, an archive is automatically selected in the Runtime in order to find the best-possible solution for the time period in question. This setting depends on the **Select suitable aggregation archive automatically** property.
List for usage of the selected variable	Shows the selected variable. This can be stored in several archives.
Add	Adds selected variable from the **variable list** to the **List for usage of the selected variable**. **Note:** A variables from the variable list can also be accepted by double clicking.
Delete	Removes the selected variable from the **List for usage of the selected variable**.
Expand all	Opens subnode of the selected variable.
Collapse all	Closes subnode of the selected variable.
Activate	Selects the variable in the desired archive.
Deactivate	Resets the selection.
Instantiate	Creates a copy of a variable for a curve.

CLOSE DIALOG

Options	Description
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

3.3.3.2.2 Instancing of archive variables

In the **Archive variable selection** dialog, you can now create one or more instances of an archive variable for curves using the **Instance** button. The new entries are shown in the lower list and given ascending numbers. The copies made this way can be shown in the Runtime as curves.

Engineering:

1. In the **Filter...** dialog, click on the **Add...** button in the **Data** tab.

   The **Archive variable selection** dialog is opened.
2. Highlight the desired archive variable in the list in the top window.
3. Click on the **Insert** button.

   The copy of the archive variable is inserted into the list in the lower window.
4. In the list in the lower window, highlight the archive variable that is to be instanced (copied).

   The **Instance** button is activated.
5. Click on **Instance** to create a further instance.

   The entry is added below the original file and given an ascending number in order to distinguish it.
6. Carry out this procedure until you have the desired number of instances available.
7. Close the dialog by clicking on **OK**.

Note: If no active curves have been configured for entered archive variables in the list in the lower window, an error message is given. The corresponding variables and already-linked curves are removed.

3.3.3.2.3 Preparatory work for variable selection of the X-axis in Runtime

In order to also be able to use the archive variable selection in the Runtime, the following preparatory work is necessary:

1. Open the **Extended Trend** screen from which you want to access the variable selection.

2. Add a diagram function (**X axis...** for example) to your **Extended Trend** screen.
3. Save the changes by clicking on **Save screen** in the context menu or with **Ctrl+S**.

   The preparatory work is complete.

3.3.4 Time

Configuration of the time filter. Not available for **block array** data source.

Note: Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.

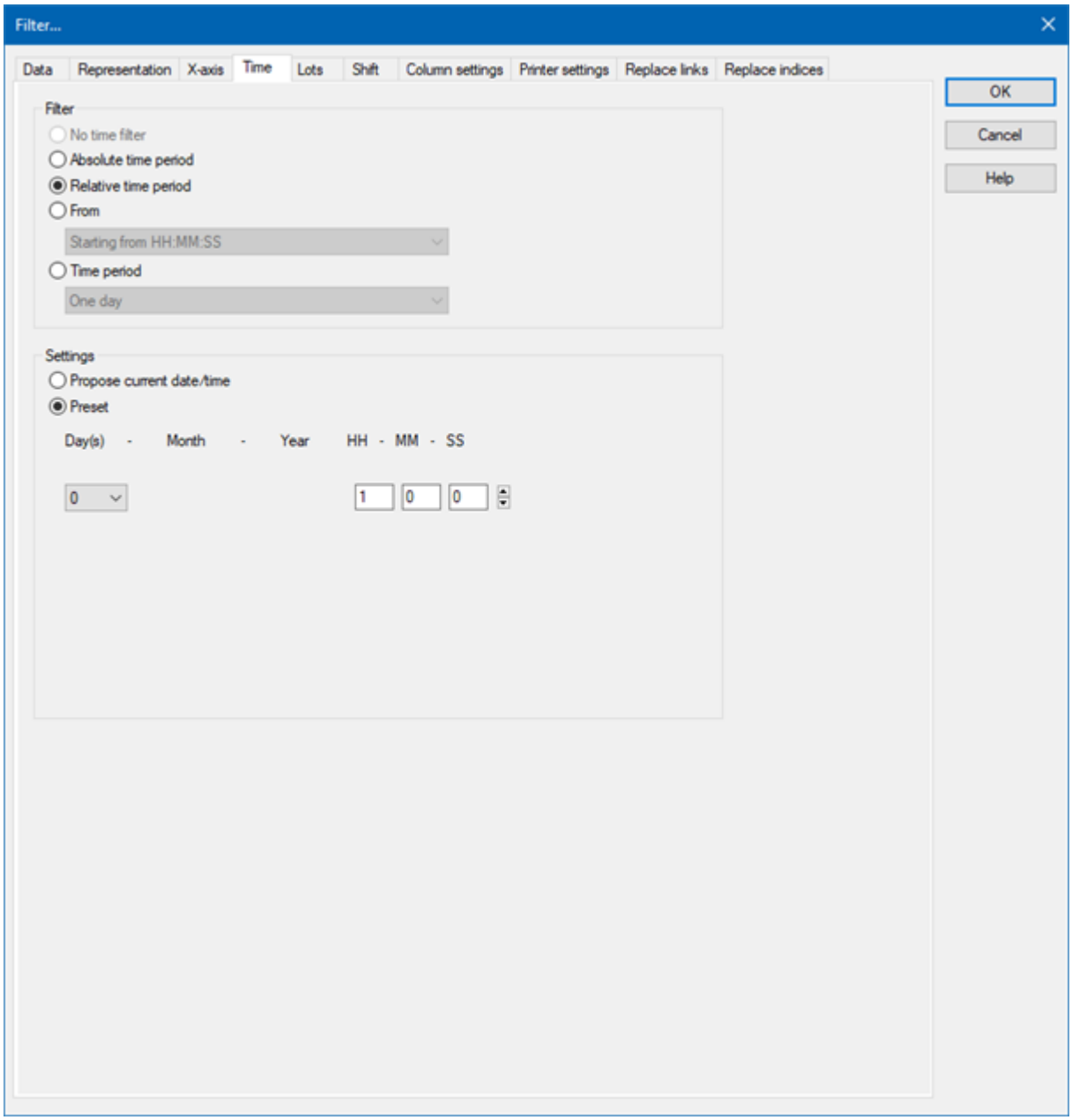
Time filters can be pre-set in both the Editor and in the Runtime for:

- Absolute time period (on page 63)
- Relative time period (on page 65)
- From (on page 67)
- Time period (on page 70)

Time filtering can be carried out in two ways:

1. Define time period in the Editor (on page 75)
   Fixed time areas are used. A time period is given in the editor. It is only possible to filter according to this time period in Runtime. Other filters - such as filtering according to variable name, alarm/event groups and alarm/event classes etc. can no longer be amended in the Runtime.
2. Time filter configurable in the Runtime (on page 77)
   The time filter is defined in the Editor and can be changed in the Runtime as desired.

TIME FILTER



FILTER

Selection of the filter.

Parameter	Description
No time filter	*Active*: No time filter is used. **Note:** In the Runtime, all entries since 1. 1. 1990 are displayed. Use of this filter setting is not supported by Extended Trend.

Parameter	Description
Absolute time period	*Active*: A fixed period of time is entered in the editor. When the function is executed, the defined absolute time period is exactly used. In the settings section, the corresponding options can be shown and configured there. **Note:** Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.
Relative time period	*Active*: A relative time period is entered. In the settings section, the corresponding options can be shown and configured there. **Attention:** this filter is constantly updated. **Process Recorder:** The time that is played back is used as the current time in the Process Recorder module in playback mode. As a result, reference is always made at the time of the recorded and reproduced data, and not at the time when the data is played back on the computer.
From	*Active*: A time from which the filter is effective is stated. If the time is not reached on the current day, filtering takes place from the corresponding time the previous day. Selection of the area mode from drop-down list: ▸ Starting from HH:MM:SS ▸ Starting from day at HH:MM:SS ▸ Starting from day, month - HH:MM:SS In the settings section, the corresponding options can be shown and configured there. **Attention:** The start point of this filter is not updated automatically. Only the existing times are used when shown. The end time point is not defined with this filter, it is carried over. **Process Recorder:** The time that is played back is used as the current time in the Process Recorder module in playback mode. As a result, reference is always made at the time of the recorded and reproduced data, and not at the time when the data is played back on the computer.

Parameter	Description
Time period	*Active*: A fixed time period is entered. Selection of the area mode from drop-down list: ▸ One day ▸ One week ▸ Two weeks ▸ One month ▸ One Year ▸ 15 minutes ▸ 30 minutes ▸ 60 minutes In the settings section, the corresponding options can be shown and configured there. The following selection is also enabled on activation: ▸ **Offer selection dialog** ▸ **Use current date/time** The **Modify time period** property can be activated. The time period can be moved to the future. The time period can be amended. **Example:** Create a screen switch, for example to an *AML* screen. In the screen switching filter dialog in the **Time** tab, set the filter to **time period** and select **One Month** in the drop-down list. Select **Use current date/time** under **Settings**. Activate the checkbox option **Modify time period**. Enter the following setting under **Move time period to the future**: **HH** = *0*. Activate, under **Change time period by**, the checkbox option **Use the last completed time period**. Evaluation: today's date: 22.02.2018 Result of the time filter in the Runtime: 01.01.2018 - 31.01.2018

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.

Option	Description
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

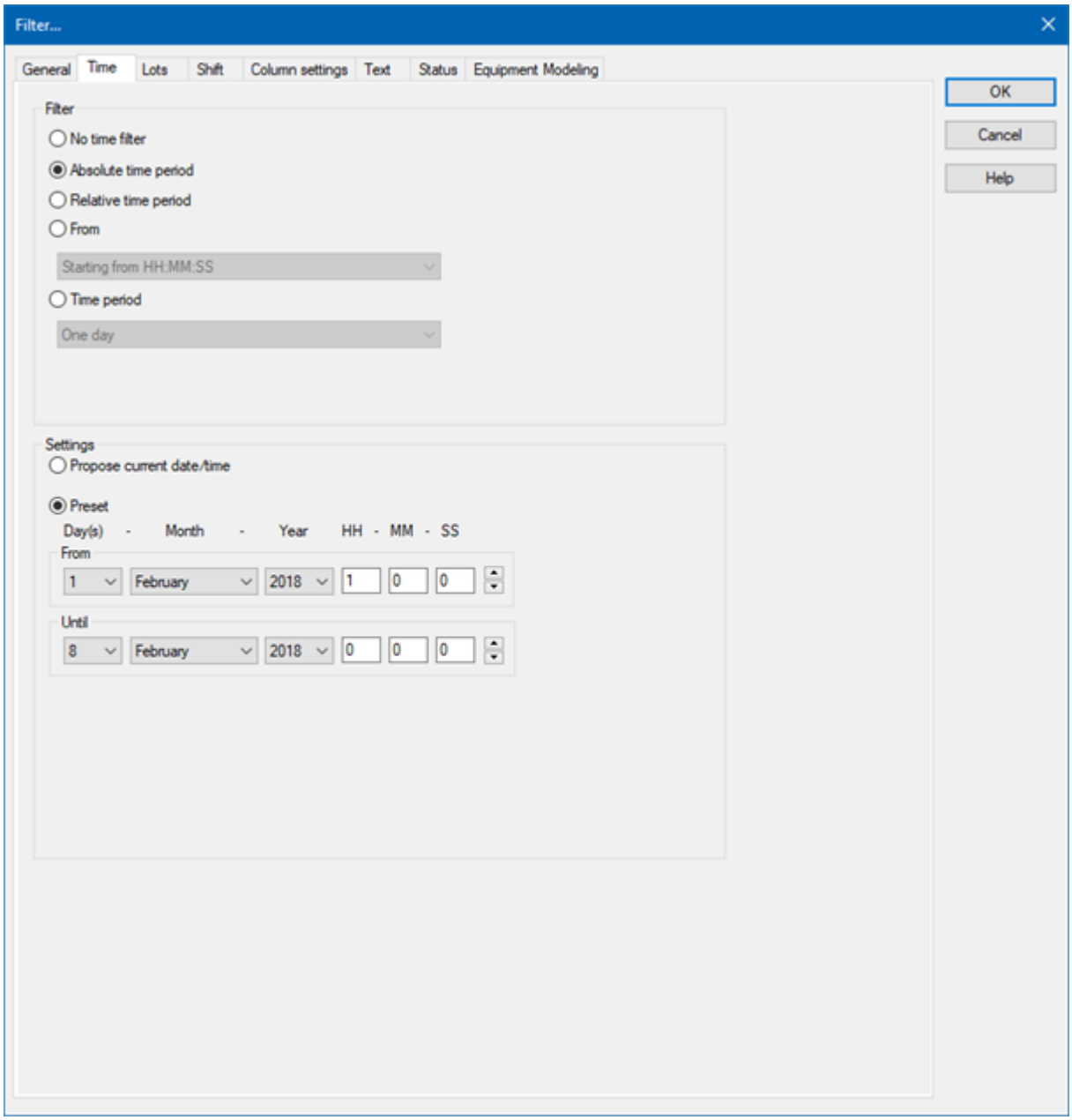
Note: The **No time filter** option is not available for Extended Trend.

3.3.4.1 Absolute time period

You define a fixed time period with the absolute filter. When the function is executed, the defined absolute time period is exactly used. To set the filter:

1. Select, in the **Filter** section, the **Absolute time period** option

2. Configure the desired time in the **Settings** section



Parameter	Beschreibung
Einstellungen	Konfiguration des Zeitfilters.
Aktuelles Datum/Uhrzeit vorschlagen	*Aktiv*: Zeitfilter wird zur Runtime konfiguriert.
Vorgabe	*Aktiv*: Zeitfilter wird im Editor vorgegeben. Zur Runtime kann nur noch der Startzeitpunkt festgelegt werden.
Von	Startzeitpunkt des Filters. Auswahl von Tag, Monat, Jahr,

Parameter	Beschreibung
	Stunde, Minute und Sekunde.
Bis	Endzeitzeitpunkt des Filters. Auswahl von Tag, Monat, Jahr, Stunde, Minute und Sekunde.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.4.2 Relative period of time

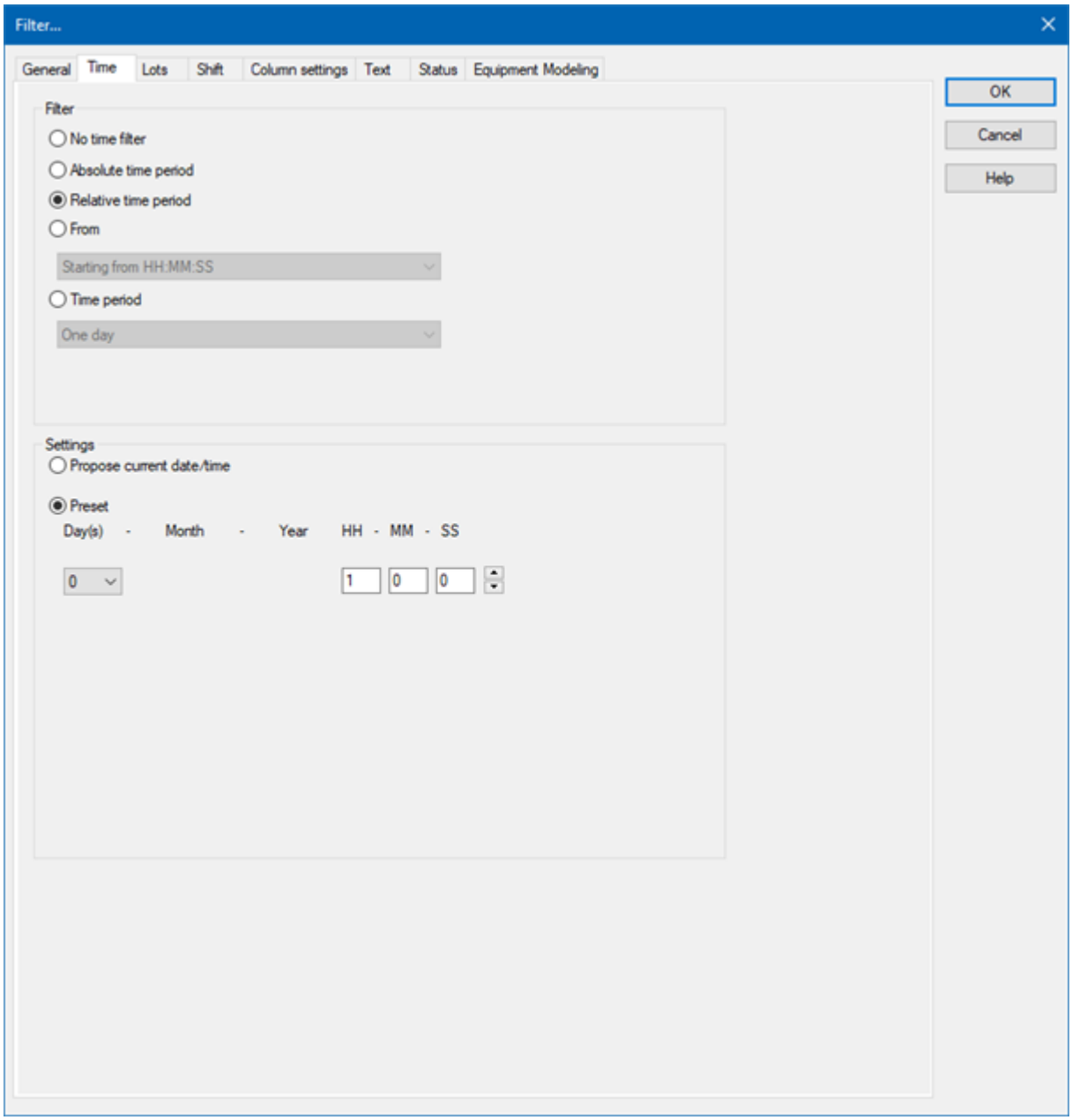
A relative time period is entered.

Attention: This filter is updated constantly and continues to run.
Example: You set a relative time of *10* minutes and switch to a screen with this time filter at *12:00*. You are then shown the data from *11:50* to *12:00* when switching. If the screen stays open, the filter is automatically updated. At *12:01*, you see the data from *11:51 - 12:01* etc.

To set the filter:

1. Select, in the **Filter** section, the **Relative period of time** option

2. Configure the desired time in the **Settings** section



Parameter	Description
Settings	Configuration of the time filter.
Propose current date/time	*Active*: Time filter is configured in the Runtime.
Default	*Active*: The time filter is prescribed in the Editor. Only the start time can still be stipulated in the Runtime. Selection of the relative time period in days, hours, minutes and seconds.

CLOSE DIALOG

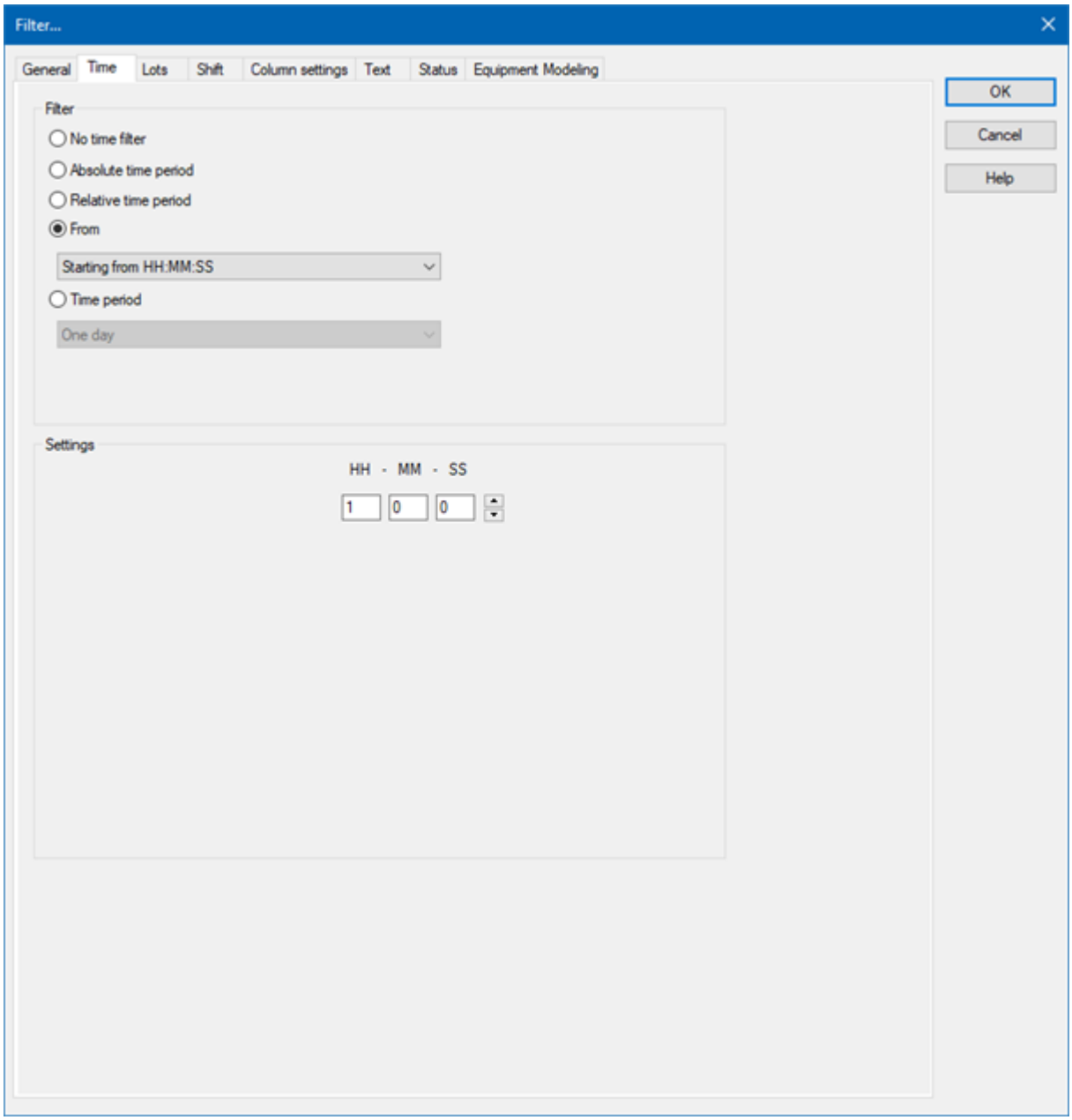
Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.4.3 From

A time from which the filter is effective is defined. To set the filter:

1. Select, in the **Filter** section, the **Off** option
2. Select the desired filter from the drop-down list.
   - *Starting from HH:MM:SS*
   - *Starting from day - HH:MM:SS*
   - *Starting from day, month - at HH:MM:SS*

3. Configure the desired time in the **Settings** section



Parameter	Description
Settings	Configuration of the time filter.
[Date/Time]	Depending on the settings of the **Off** option, the time from which the filter is effective is configured here: ▸ *Starting from HH:MM:SS* ▸ *Starting from day at HH:MM:SS* ▸ *Starting from day, month - HH:MM:SS*

Parameter	Description
	Attention! The start point of this filter is not updated automatically. Only the existing times are used when shown, even if the screen remains open and 23:00:00 is reached. The end time point is not defined with this filter, it is carried over.
▸ *Starting from HH:MM:SS*	A time from which the filter is effective is stated. If the time is not reached on the current day, filtering takes place from the corresponding time the previous day. **Example:** You enter *11:00:00 PM*. If it is then 23:30 when executing the function, then it is filtered from 23:00:00 up to the current point in time. If it is 22:30 however, then filtering takes place from 23:00:00 on the previous day to the current point in time.
▸ *Starting from day at HH:MM:SS*	A day and time for the start of the filter are entered. If the time given has not been reached in the current month, the corresponding time from the previous month is used. **Example:** You enter **day** *5 - 11:00:00 PM*. If it is the 10th of the month at 23:30, then filtering takes place from the 5th of the month from 23:00:00 to the current time point. If, however, it is the 4th of the month, then filtering is carried out from 23:00 on the 5th of the previous month to the current time point.
▸ *Starting from day, month - HH:MM:SS*	A month, day and time for the start of the filter are entered. If the time stated has not been reached in the current year, the corresponding time from the previous year is used. **Example:** You enter **Day** *5*, **Month** *October - 11:00:00 PM*. If it is October 10th at 23:30, then filtering takes place from October 5th from 23:00:00 to the current time point. If, however, it is only October 4th, then filtering takes place from 23:00 on the 5th of the previous year to the current time point.

CLOSE DIALOG

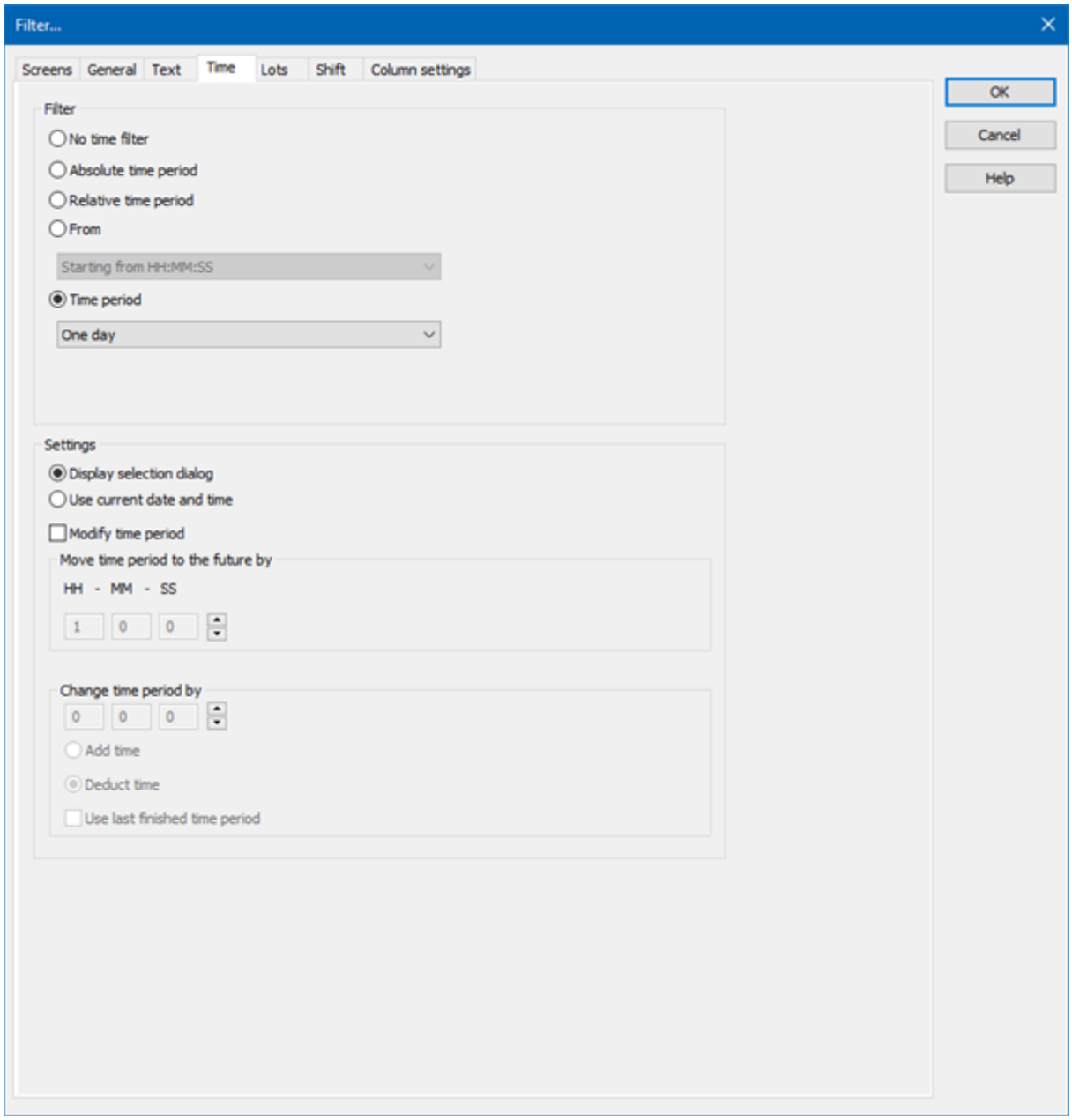
Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.4.4Time period

A time period in which the filter is effective is defined.
To set the filter:

1. Select, in the **Filter** section, the **Time period** option.
2. Configure the desired time in the **Settings** section.

3. **Note:** The **Offer selection dialog** and **Use current date/time** entries are deactivated if, in the **Filter...** dialog in the **Display** tab under **Runtime**, the **Show this dialog in Runtime** property has been activated.



Option	Description
Time period	Selection of a time range from a drop-down list. In Runtime this time range is filtered. The filter starts with the fixed start time of its time period: ▸ 15 minutes: *0, 15, 30, 45* minutes of the hour

Option	Description
	▸ 30 minutes: *0, 30* minutes of the hour ▸ 60 minutes: *0* minutes of the hour **Example 1:** ▸ Time period: 60 minutes ▸ Current time: 8:50 AM ▸ Result: Display for 08:00 - 08:50 **Example 2:** ▸ Time period: 60 minutes ▸ Current time: 9:00 AM ▸ Result: Display for 08:00 - 9:00 AM **Example 3:** ▸ Time period: 15 minutes ▸ Current time: 8:35 AM ▸ Result: Display for 8:30 AM - 8:35 AM **Example 4:** ▸ Time period: 15 minutes ▸ Current time: 8:45 AM ▸ Result: Display for 8:30 AM - 8:45 AM Dialog in the Runtime: If this dialog is also offered in the Runtime, the start time of the time range can be selected. The following possibilities for selection are activated: ▸ **Offer selection dialog** ▸ **Use current date/time** The **Modify time period** property can be activated. ▸ The time period can be moved to the future. ▸ The time period can be amended.
Settings	Optional setting for the time range.
Offer selection dialog	The selection dialog for the start time of the filter is offered

Option	Description
	in the Runtime.
Use current date/time	The current date/time is set for the filter.
Modify time period	Allows amendments to cycles, postponements and extensions of time periods. *Active*: Evaluation is carried out in accordance with the following rules: ▸ First, the **Use last finished time period** option is evaluated. ▸ After this, **Change time period by** is used. ▸ **Move time period to the future by** is then applied. *Inactive*: No changes to the time period are made. **Attention:** As of version 7.10, filter actions on the basis of this function lead to different results than in prior versions.
Move time period to the future by	*Active*: The time period defined in the filter is postponed to the future. The start and end time are moved by the set time span. Given in *hours - minutes - seconds*. If a postponement that is the same or greater than the selected **time period** is set, a note to check the configuration is displayed. **Note:** The default value for **HH** is *1*. If, for example, an evaluation of the last month is to be undertaken, this value must be set to *0*.
Change time period to	*Active*: The time period defined in the filter is modified. The end time is moved by the set time span. The start time remains unchanged. Given in *hours - minutes - seconds*. The time range can be added or deducted. Selection by means of radio buttons: ▸ **Add time:** The time stated in **Change time period by** is added to the time defined in the **Time range** option.

Option	Description
	▸ **Deduct time:** The time stated in **Change time period by** is deducted from the time defined in the **Time range** option. If a change and a postponement that are the same or greater than the selected **time period** is set, a note to check the configuration is displayed next to the control element for time configuration. The following options are available: ▸ *Use current time period* ▸ *Use last finished time period* ▸ *Use next completed time period* Default: *Use current time period*
Use current time period	*Active*: The current time period is used for the filter process.
Use last finished time period	*Active*: The last selected and fully-completed time period in the **Time period** option is used. **Example:** For the **Time period** option, *One day* was selected. Filtering is thus carried out for "Yesterday", because this is the last day that was completed in full.
Use next completed time period	*Active*: The last selected and fully-completed time period in the **time period** option is used. **Example:** For the **Time period** option, *One day* was selected. Filtering is thus carried out for "tomorrow", because this is the next day that will be completed in full.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.4.5 Specify time period in the Editor

With this method, you enter a fixed time period into the Editor, which is applied when the function is carried out in the Runtime. You can then only define the start time in the Runtime, but no further filter settings.

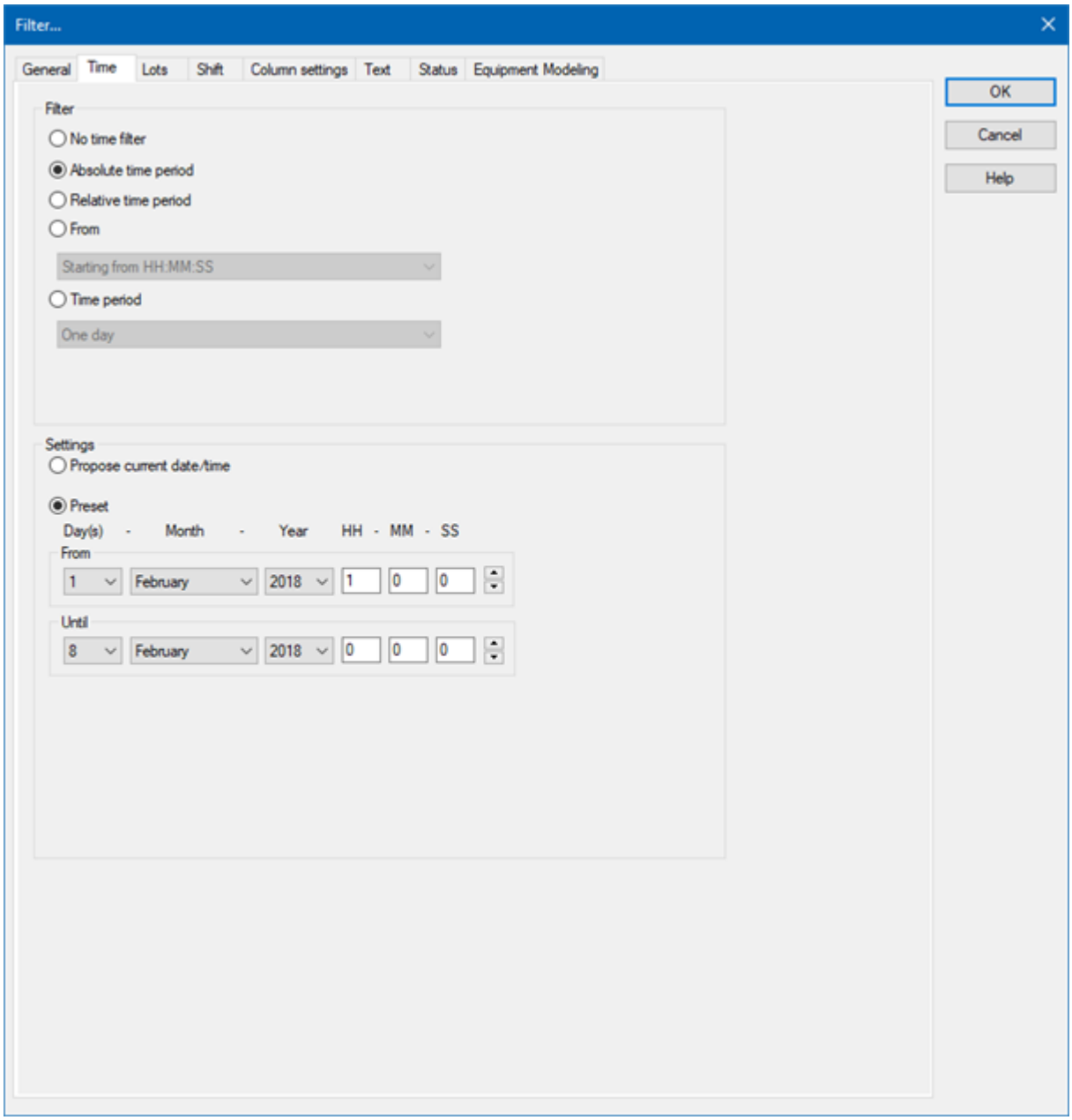
For example: You set a 30 minute time filter. In Runtime, you can now only set when this 30 minute time period is to start. However, you cannot change the filter to a day filter.

> **Attention**
>
> When using this type of filter, you can also no longer amend all other filters in the Runtime that are available in the **General** tab. It is still possible to filter for text, status and equipment.

To create the filter:

1. The screen must have the **Filter** button to start the filter in the Runtime
2. select the desired filter

3. Configure the selected time period



Tip for time period: Activate the *Show this dialog in Runtime* option in the filter dialog. This way you can amend the start time before the function is carried out. Do not have the filter displayed in Runtime when the function is turned on; this way the current time period is always used. If you have activated the **Use last closed time period** option, the previous time period is shown.
For example: You have set a 30 minute filter. It is 10.45 when the function is activated. If the **Use last closed time period** option is deactivated, the filter is set to the current time period 10:30:00 to 10:59:59. If the option is activated, the filter is set to the previous time period of 10:00:00 to 10:29:59.

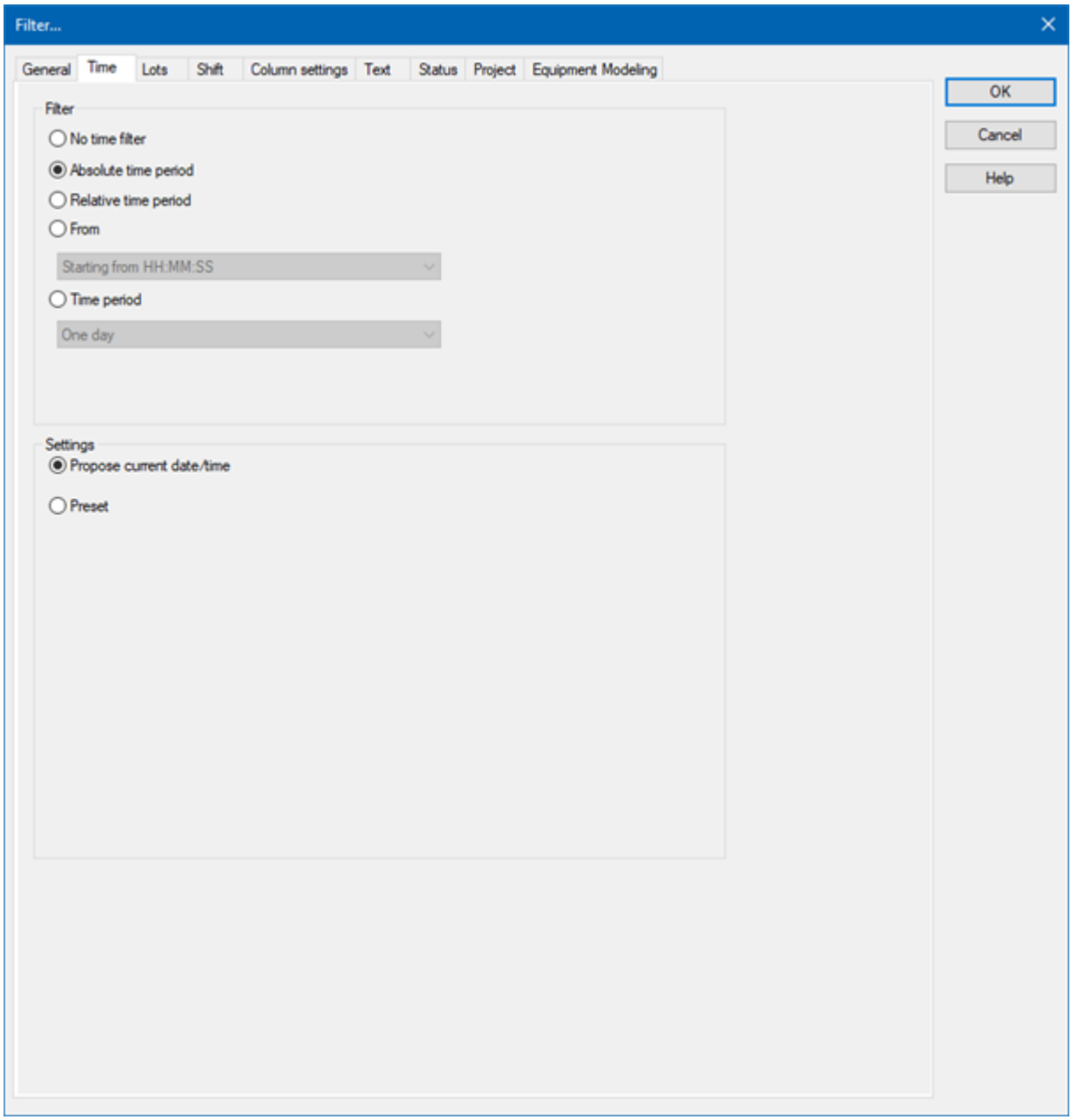
3.3.4.6 Time filter can be configured in Runtime

With this method, the time filter can be amended in the Runtime before execution.

To create the filter:

1. select the desired filter:
   - Absolute time period
   - Relative time period
   - Time period
2. Select, in the Settings section, the option **Propose current date/time**

3. The filter dialog is opened in the Runtime with the current date and time



3.3.5 Lots

You configure the limitation of the display to certain lots in this tab. The lot information is also applied to the existing filter.Only available for **archive data** data source.

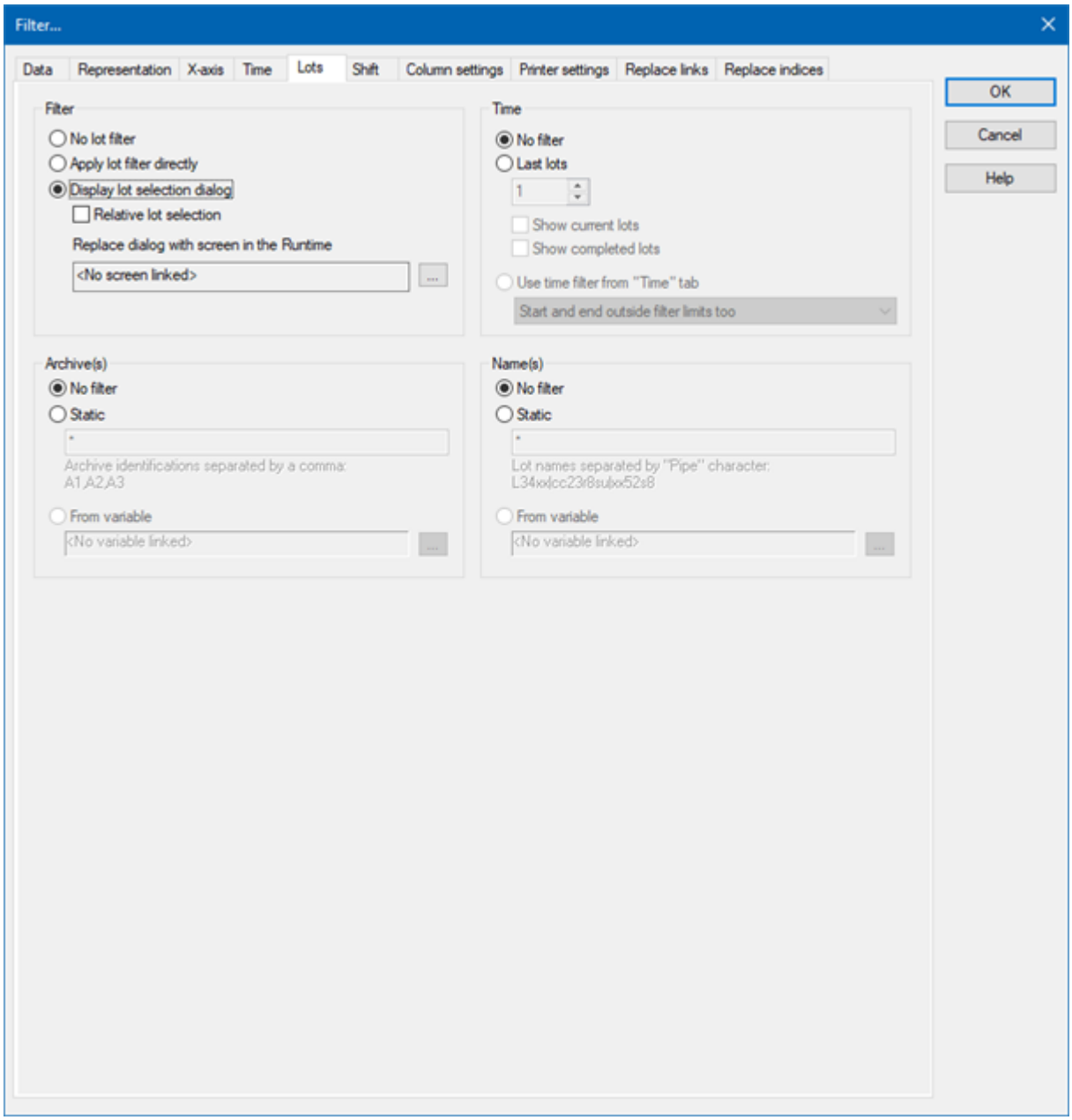
Information

Some filters in zenon can be configured independently of one another and then combined in the Runtime. This is only possible to a limited extent with the lot filter.

The lot filter can offer a list of existing lots in the Runtime. It is Runtime data that is not available in the Editor.

When configuring the screen switching in the Editor, the **time filter** tab can only be used in conjunction with the lot filter as a prefilter for the lot selection dialog. If a lot from this list is then selected in the Runtime, the time filter is overwritten with the data from the selected lot, in order to achieve precise filtering for the selected lot.

That means: If the lot selection dialog is used in the Runtime and a lot is selected, the time filter displayed does not correspond to the one configured in the Editor.



Note: The **Relative lot selection** option is only available for the **YT axis** and only if no curves have been configured.

FILTER

Settings for the application of the lot filter. Selection of one of the following options:

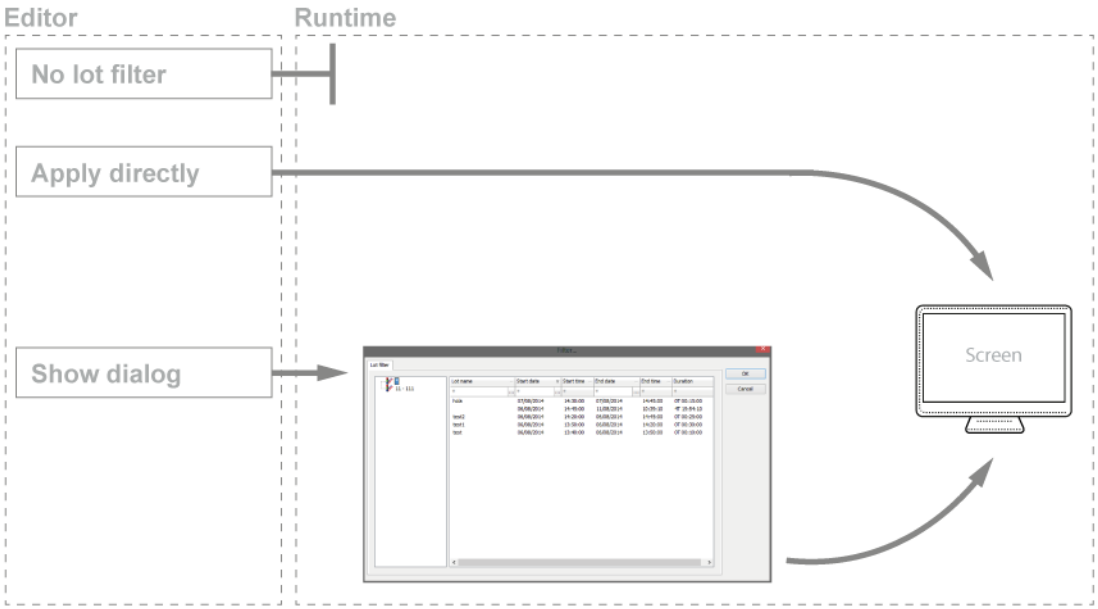
- **No lot filter**
- **Apply lot filter directly**

- **Display lot selection dialog**
  Note: If the lot filter is shown as a dialog, it can be prefiltered for archive identifications. It is expressly recommended that you use this prefiltering for performance improvements.

Option	Description
No lot filter	▸ *Active*: The lot filter is deactivated and cannot be configured. Filtering for lots is not carried out in the Runtime.
Apply lot filter directly	▸ *Active*: The filter configured here is applied in the Runtime directly. **Note:** There is no possibility to have all lots in a list displayed and to select one manually. If a certain lot is to be shown, the filter for the archives, name and time must be configured accordingly. This requires the existing data to be known very well. Alternatively, it is recommended that the **Show lot selection dialog** option is selected.
Display lot selection dialog	*Active*: The dialog for lot selection is shown in the Runtime when: ▸ Clicking on **Filter** or ▸ screen switching, if the **Show this dialog in Runtime** option has been activated (Not available for each function/screen type) **Note:** The dialog is not shown on reloading. Options can be pre-selected in the Editor.
Replace in Runtime with screen	Only available if the **Show lot selection dialog** option has been selected. **Note:** Only available in screen switching functions. Definition of a screen that is to be called up in the Runtime instead of the **lot selection dialog**. Only *time/lot/shift filter* screens are offered. Click the **...** button and the dialog opens to select a screen. If the linked screen is not found in the Runtime, a search is made for corresponding screens with specific names. **Note:** A lot filter screen can also be selected using the

Option	Description
	Show this dialog in Runtime option. However this is not used as a lot filter here, but as a time filter screen. The lot filter options are not correctly applied at this position.
Display lot selection dialog	**Attention:** This option is only available for **Extended Trend**. With faceplates, it is displayed for all screen types, but here it is also only available for ETM. **Configuration for ETM:** In order for the option to be available, the **Show lot selection dialog** option must be activated and the **Windows CE project** property must be deactivated in the project properties. ▸ *Active*: Enables several lots to be compared directly. Display always starts from the zero point. **Note**: If the option is activated, the **Diagram** and **X-axis** buttons are not available in the Runtime. This also applies for the right-click functionality.

Overview of the implementation of the configuration in the Runtime:



TIME

Configuration of the time filter for lot selection. Selection of one of the following options:

- **No filter**
- **Last lots**
- **Use time filter from "Time" tab**

Option	Description
No filter	▸ *Active*: The time range set in the **Time** tab is not taken into account. All completed and current lots are displayed.
Last lots	**Attention:** Only works in conjunction with the **Apply lot filter directly** option. The option allows the combination of both options **Display current lots** and **Display completed lots**. At least one of the two options must be activated. If both options have been deactivated, this corresponds to the **No filter** setting. ▸ *Active*: Input of the number of lots last concluded, according to what they should be filtered for. Input of the number in the number field or configuration via arrow keys. Example: *3* was entered as a value for the option. 2 lots run and 10 have been ended. The following is shown: the two that are current and one that has been completed. **Note:** The setting of the time filter is not used as a time period for the current lots, but the last year. This filter will not be executed as a prefilter and can therefore not be used to improve performance. **Note on compatibility:** If the project is compiled for a version before 7.11, then: If the current lots are selected, or the combination of current and completed lots, then only the completed lots are shown in the Runtime.
Display current lots	▸ *Active*: The current lots are displayed. **Note:** If the number of lots to be displayed is greater than the number of current lots, lots that have been completed are also shown until the set limit has been

Option	Description
	reached. Example: 3 lots are to be displayed. 1 lot is running, 5 have been completed. The one current lot and two completed lots are displayed.
Display completed lots	▸ *Active*: The completed lots are displayed. **Note:** If the number of lots to be displayed is greater than the number of completed lots, lots that have been completed are also shown until the set limit has been reached.
Use time filter from "Time" tab	▸ *Active*: Pre-filtering is carried out with the settings of the **Time** tab. The effective range of the filter can be amended within this time range. Select from drop-down list: ▸ *Start and end also outside filter limits*: (Default) Lots can start before the start time configured in the **Time** filter and end after the configured end time. ▸ *Start and end only outside filter limits*: Lots must start and end within the time points configured in the **Time** filter for the start and end. ▸ *Start also before filter limit*: Lots can start before the start time configured in the **Time** filter and end after the configured end time. ▸ *End also after the filter limit*: Lots can also end after the end time set in the **time** filter, but must start at or after the configured start time. ▸ *Adjust start and end to filter limits*: Lots are cut to the time points configured in the **Time** filter for the start and end.

ARCHIVES

Configuration of filtering for archives. This filter is applied as a prefilter for the lot selection dialog.

Selection of one of the following options:

- **No filter**

- **Static**
- **From variable**

Option	Description
No filter	▸ *Active*: Filtering for archive names is not carried out.
Static	▸ *Active*: Archives whose identification corresponds to the character string entered in the input field are filtered for. Input of the archive identifications in the input field: ▸ Several identifications are separated by a comma (,). ▸ ***** or empty: All archives, no filter.
From variable	▸ *Active*: The value of the variables linked here is applied as a filter for archive names in the Runtime. Click on button **...** in order to open the dialog for selecting a variable. Available for AML and CEL modules if the **Apply lot filter directly** option has been selected: Other modules use their own configurations. **Notes for variables in the Runtime:** ▸ The variable selection is only activated in the Runtime if a valid variable has already been linked in the Runtime. The **...** button is always deactivated in the Runtime. The option can be selected, but no new variable can be linked. ▸ If the variable is not signed into the driver at the time at which the lot filter is applied, the variable is signed in and read. This can lead to delays with slow driver connections/protocols. **Attention:** If the selected variable is not found in Runtime, there is no filtering for archive names. This also applies if the value of the variable cannot be determined. The filter then corresponds to the **No filter** setting.

Note for ETM: In the ETM, the archives are established by the curves configured in screen switching. This is only possible in the Runtime with the **relative lots** option. With this, the variables

must be selected in the Runtime, which is in turn stipulated by the possible selection of archives. The archive, once filtered, must be one of the archives that relate to the configured curves. No data is displayed if this is not the case. This setting can also be used to limit the displayed curves. However these remain shown in the curve list.

ETM example:

Configured curves	Data source	Archive prefiltering in the lot filter	Result in the screen
A	AR	AR	Is shown in the curve list and drawn in the trend.
B	EA		Is only shown in the curve list.
C	EP		Is only shown in the curve list.

Note archive revision: The archive for which the screen is opened is already selected in the screen switching function. Because only 1 archive can be selected, further limitation makes no sense.

Example of archive revision:

Configured archive	Archive prefiltering in the lot filter	Result in the screen
AR	EA	No data is displayed.

NAMES

Configuration of the filtering to names. Selection of one of the following options:

- **No filter**
- **Static**
- **From variable**

Option	Description
No filter	▸ *Active*: Filtering for lot names is not carried out.
Static	▸ *Active*: Lot names that correspond to the character string entered in the input field are filtered for. Input of the lot name in the input field: ▸ Several entries are separated by a pipe character (**|**). **Note:** Lot name must not contain a **|** character! ▸ ***** or empty: All lots of all displayed archives, no filter.

Option	Description
From variable	▸ *Active*: The value of the variable linked here is applied as a filter for lot names in the Runtime. Click on the **...** button to open the dialog for selecting a variable. Only available if the option **Apply lot filter directly** has been selected. **Notes for variables in the Runtime:** ▸ The variable selection is only activated in the Runtime if a valid variable has already been linked in the Runtime. The **...** button is always deactivated in the Runtime. The option can be selected, but no new variable can be linked. ▸ If the variable is not signed into the driver at the time at which the lot filter is applied, the variable is signed in and read. This can lead to delays with slow driver connections/protocols. **Attention:** If the selected variable is not found in Runtime, there is no filtering for lot names. This also applies if the value of the variable cannot be determined. The filter then corresponds to the **No filter** setting.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.6 Shift

The tab can only be configured with:

- **Data origin** *Archive data*
- Configured time filter

You configure the limitation of the display to certain shifts in this tab. The shift information is also applied to the existing filter.

Note:

- The shift filter requires a configured time filter. If the time filter is set to the **No time filter** option, the shift filter is deactivated. A notice of the cause of the deactivation is shown.
- If the lot filter is activated, the shift filter is automatically deactivated. Both filters mutually exclude one another. A notice of the cause of the deactivation is shown.

CONFIGURATION

To filter for shifts:

1. Configure the time filter.
   - **Absolute time filter**: Shifts from the absolute defined time period are shown.
   - **Relative time filter**: Shifts from the relative defined time range are shown.
     The upper limit is set at 1440 minutes by default.
   - **From**: Shifts from a certain time point are shown.
   - **Time period**: Shifts within a certain time range are shown.
2. Configure the shift filter.
   To do this, select one of the options:
   - **Apply shift filter directly**:
     The configured time filter is used to filter the shifts in the Runtime. In doing so, all shifts that are at least partly in the time filter range are taken into account. Even if the time filter is defined in the Runtime, the shift filter is applied after selecting the time period. If there is no suitable shift, no data is shown in the CEL screen.
     The set filter continues to have an effect on the CEL data. If a shift is only partially within the set time range, only the CEL entries that are both in the time filter and the shift are shown.
   - **Show shift selection**:
     The shift filter is configured and applied when called up in the Runtime when the screen is called up. All shifts that are at least partly in the time filter range are offered in a list for selection. After selecting one or more shifts, the time filter is overwritten and set to the times of the selected shifts. It is thus ensured that the complete shift is always included in the filter.
     Note: If, in the **General** tab, the **Show this dialog in Runtime** option is activated at the same time, the complete configuration dialog with all tabs is called up instead of the shift selection. The user can then redefine all options.
3. Configure **Name** and **Options** if required.

With the Apply shift filter directly option, the shifts are permanently monitored by the filter and the filter is amended if necessary.
The shifts for filtering the data are redetermined if:

- Shifts are reconfigured
- Shifts are newly-created in the filter time period
- The time period is reconfigured

The following are not taken into account in the filter:

- Deleted shifts

Shifts that are removed from the time filter due to a change of the time period

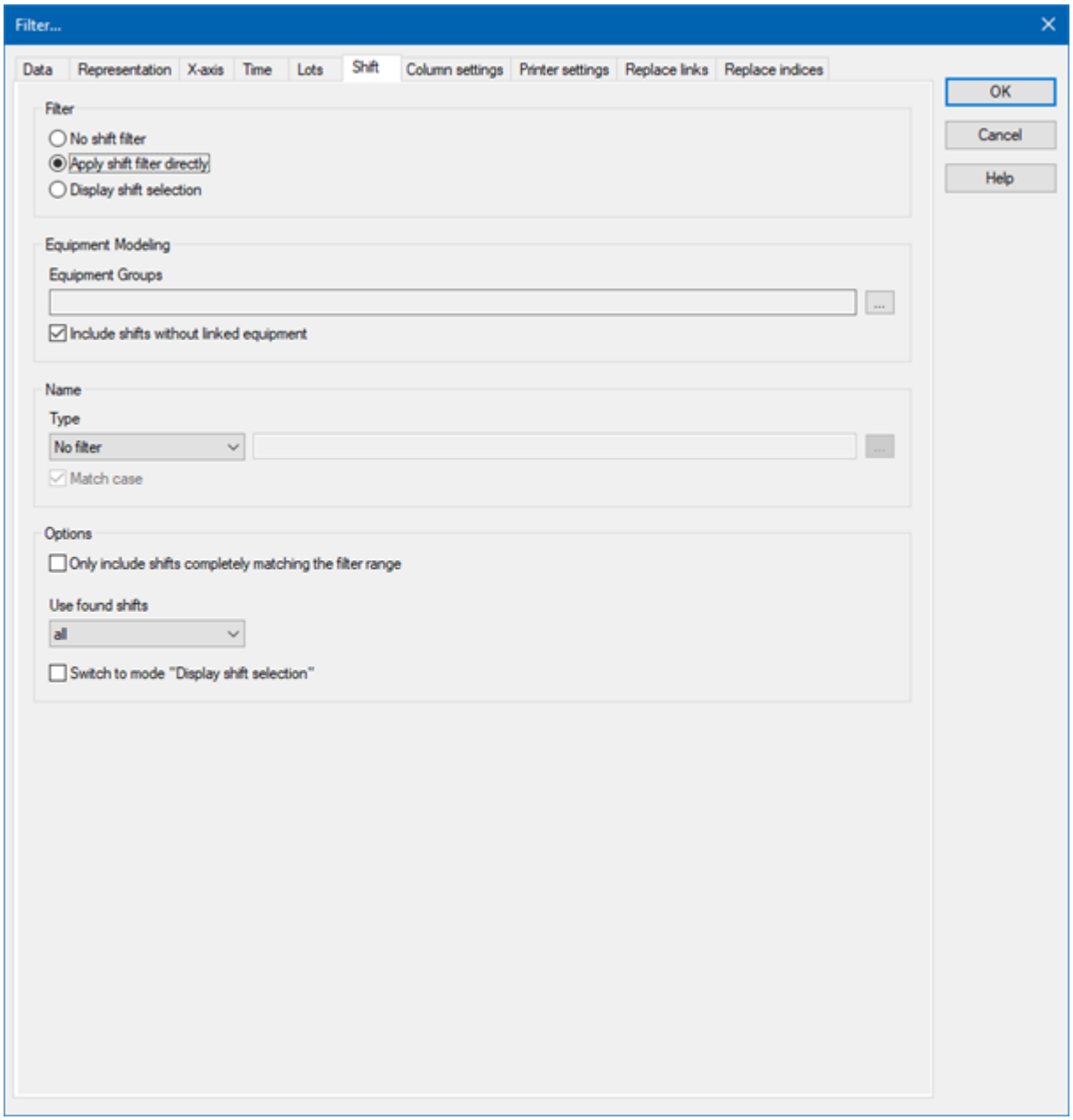
SCREEN SWITCHING TO A LINKED SCREEN

Screen switching to a linked filter screen can also be carried out. Shift filters can be used in the process.
To do this:

1. For screen switching, define the desired filter screen in the **General** tab (for Extended Trend **Display**) in the option **Replace dialog with screen in Runtime**.
2. Ensure that the filter screen contains the necessary control elements for the shift list.
3. Define the desired time filter.
4. Activate, in the **Shift** tab, the **Show shift selection** option.
5. Define the shift filter.

The linked filter screen is called up in Runtime during screen switching. The shifts are shown in the shift list as defined in the screen switching. Control elements for lots are not shown.

SHIFT DIALOG



FILTER

Settings for the application of the shift filter. Selection of one of the following options:

- **No shift filter**
- **Apply shift filter directly**
- **Display shift selection**

Option	Description
No shift filter	Shift filter selection: ▸ *Active*: The shift filter is deactivated and cannot be configured. Filtering for shifts is not carried out in the Runtime.
Apply shift filter directly	Applying the shift filter in the Runtime: ▸ *Active*: The filter configured here is applied in the Runtime directly. Equipment groups and shift names can be preselected. The shift list and **Update** button are not shown in the Runtime.
Display shift selection	Display of the shift selection in the Runtime: ▸ *Active*: The dialog for shift selection is shown in the Runtime. The settings chosen in the Editor are applicable for the reading of the shifts in the Runtime. The dialog is shown in the Runtime when: ▸ Clicking on the **Filter** button. Or: ▸ Executing screen switching. **Note:** The dialog is not shown on reloading. **Attention:** At least 1 shift must be selected in the Runtime in order to call up the page or to be able to configure the filter. If, in the **General** tab, the **Show this dialog in the Runtime** option is activated at the same time, the complete configuration dialog is called up.

EQUIPMENT MODELING

Configuration of the equipment groups for filtering for shifts.

Option	Description
Equipment groups	Selection of equipment groups to which shifts must be linked. Clicking on the **...** button opens the dialog to select equipment groups. If several equipment groups are selected, they are displayed in

Option	Description
	the option separated by a semicolon (;).
Include shifts without linked equipment	Selection of whether linking to an equipment group is necessary. ▸ *Active*: Shifts that are not linked to an equipment group are also taken into account. ▸ *Inactive*: Only shifts that are linked to at least one equipment group are taken into account. Default: *active*

NAME

Configuration of the shift names for which filtering is to take place.
Selection of one of the following options:

- **No filter**
- **Name with wildcards**
- **Name from variable**

Option	Description
Type	Selection of the filter type from a drop-down list when filtering according to name: ▸ *No filter*: Filtering for names is not carried out. ▸ *Name with wildcards*: A name with placeholder can be entered into the input field. All shifts whose name is applicable for the filter are included. ▸ *Name from variable*: The name of the shift is defined by a variable in the Runtime. Click on the **...** Button to open the dialog to select a variable. Default: *No filter* **Wildcards:** ▸ *****: Replaces desired characters in the desired quantity. Can be used as a search term at any desired place. **red*** finds all texts that start with **red**. ▸ **?**: Replaces precisely one character. **r?d** finds **red**, **rad**, ...

Option	Description
	Notes for variables in the Runtime: ▸ The variable selection is only activated in the Runtime if a valid variable has already been linked in the Runtime. The **...** button is always deactivated in the Runtime. The option can be selected, but no new variable can be linked. ▸ If the variable is not signed into the driver at the time at which the lot filter is applied, the variable is signed in and read. This can lead to delays with slow driver connections/protocols. **Attention:** If the selected variable cannot be found in Runtime or the value of the variables cannot be determined, the filter is treated like the **No filter** setting.
Match case	Setting for filtering for upper/lower case ▸ *Active*: Capitalization is taken into account for names. Default: *active*

OPTIONS

Configuration of the options for filtering for shifts in the CEL.

Option	Description
Only include shifts that are fully in the filter range	Configuration of which shifts are displayed. ▸ Active: Only shifts that are fully in the time filter set are shown. ▸ Inactive: Shifts that start earlier and/or finish later are also shown. Default: *inactive* **Example:** ▸ Time filter: Today 08:00 – 12:00. ▸ Existing shift: Today 8:30 AM – 5:00 PM. Result for: ▸ Option *active*: The shift is not taken into account because it is not fully in the time filter. ▸ *Inactive* option: The shift is taken into account because it is

Option	Description
	partly in the time filter.
Use shifts found	Selection of shifts that are taken into account, from drop-down list: ▸ *All*: All shifts found are taken into account. ▸ *Earliest shift only*: Of the shifts found, only the earliest are taken into account. The earliest shift is the shift with the earliest start time. If several shifts have the same start time, one of these shifts is selected randomly. ▸ *Only last shift*: Of the shifts found, only the latest shift is taken into account. The latest shift is the shift with the latest end time. If several shifts have the same end time, one of these shifts is selected randomly. Default: *All* **Attention**: The **Only include shifts that are fully in the filter range** influences the evaluation of this option. If it is active, only shifts that are fully in the time range can be found. If it is inactive, shifts that start earlier or end later can be found. Example: **Configuration and shifts:** ▸ **Only include shifts that are fully in the filter range** option: active. ▸ **Use found shifts** option: *Latest shift only* ▸ Time filter: Today 08:00 – 10:00 AM. ▸ Shift 1: Today 08:00 – 8:30 AM. ▸ Shift 2: Today 8:30 AM – 9:00 AM. ▸ Shift 3: Today 10:00 AM – 11:00 AM. **Result:** ▸ Shift 2 is used
Switch to "Show shift selection" mode	▸ *Active*: The filter acts as with the **Show shift selection** option. The time filter is set to absolute; start and end

Option	Description
	correspond to the start time and end time of the shifts. If no shift is found, the times are set to 0 for the time filter. Default: *inactive* **Behavior in the Runtime:** If the shift management is set to **Show shift selection** in the Runtime, the filter options also have an effect on the shifts shown in the shift list. The shift list is filtered accordingly by clicking on the Update button.

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

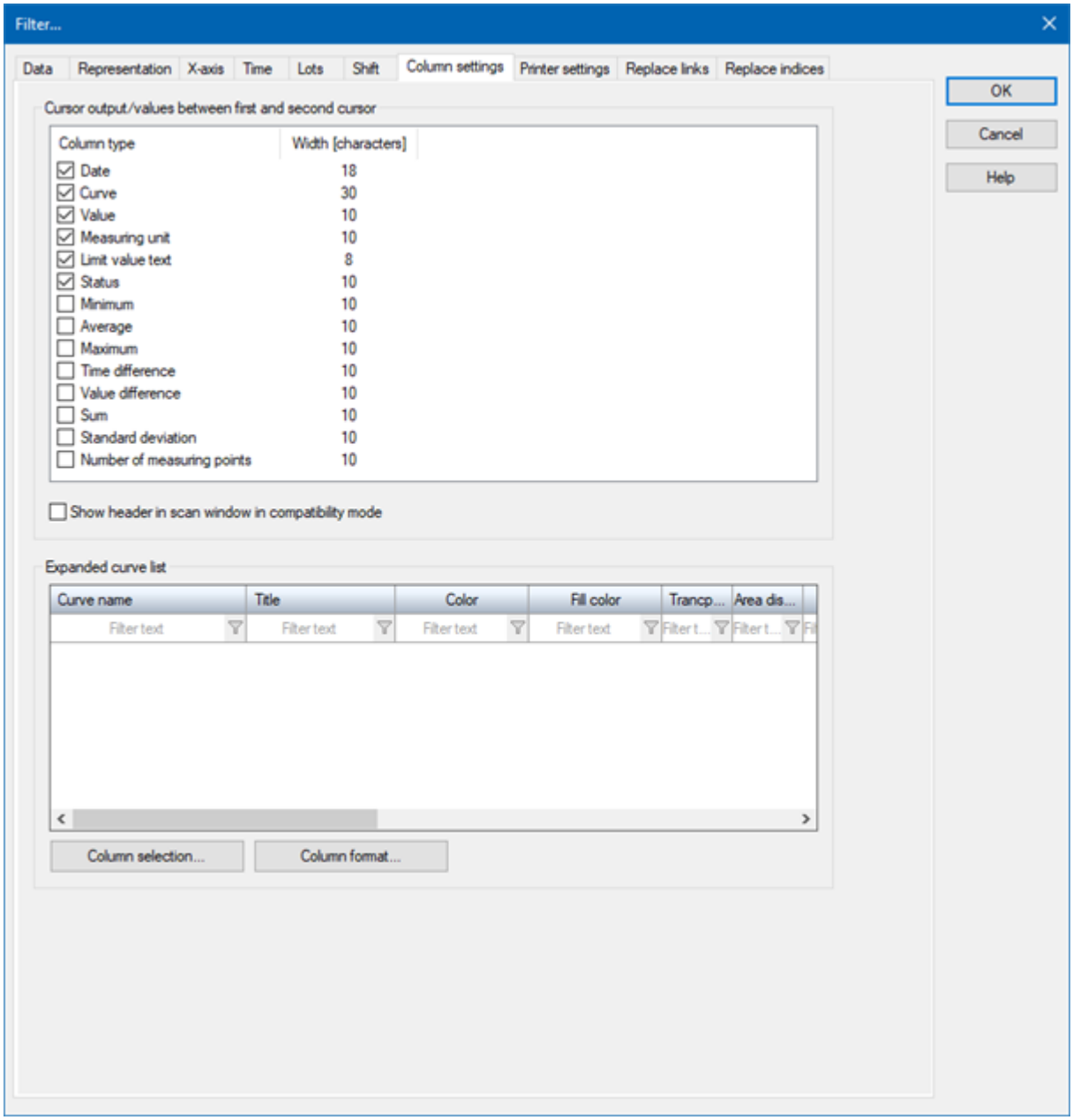
BEHAVIOR IN RUNTIME

The following is applicable for the shift filter in Runtime:

- When comparing to a second time range, one shift filter is used for both time ranges. If a new filter is assigned to the screen, both filters are overwritten with the same value.
- A *No time filter* time filter is not permitted.
- If the time filter is configured as relative, the shifts to be displayed are only determined at the time they are called up.
  That means:
  - At a later point in time, shifts that have been newly added or that have already expired are not taken into account.
  - Only the shift that was the earliest or latest at the time of being called up is taken into account. This then moves from the display of the scale as time passes.
- If the shift filter is configured as **apply shift filter directly** plus **switch to the "show shift selection" mode**, but no shifts can be found, then:
  - The time filter becomes invalid
  - The time filter is automatically set to the default value: **Relative time period** *1 h*
  - The automatic correction is shown in the filter dialog when the **Diagram** button is pressed

3.3.7 Column settings

Configuration of the column settings for the extended curve list.



Option	Description
Cursor output/values between first and second cursor	Configuration of the column types and column widths to be displayed.
Column type	Column types available: **Cursor output**

Option	Description
	▸ **Date** ▸ **Curve** ▸ **Value** ▸ **Measuring unit** ▸ **Limit value text** ▸ **State** **Values between first and second cursor** ▸ **Minimum** ▸ **Average** ▸ **Maximum** ▸ **Time difference** ▸ **Value difference** ▸ **Sum** ▸ **Standard deviation** ▸ **Number of measuring points** Clicking in the checkbox activates/deactivates the display of the type in the Runtime.
Width	Column width of the column output or column width of the measuring points between first and second cursor in the cursor output list. The value corresponds to the number of the characters. Clicking in the value allows it to be edited.
Show header in scan window in compatibility mode	*Active*: For zenon versions prior to 6.51 SP0, column headings are shown for "scan window in compatibility mode". Is used to display converted projects in the Runtime, for example. Not necessary for projects as of version 6.51. All column titles are displayed in the **Scan list**.
Expanded curve list	Configuration of the column settings for the extended curve list.
List field	Display of the configured columns.
Column selection	Opens dialog to select the columns (on page 98).

Option	Description
Column format	Opens dialog to format the columns (on page 99).
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

Information

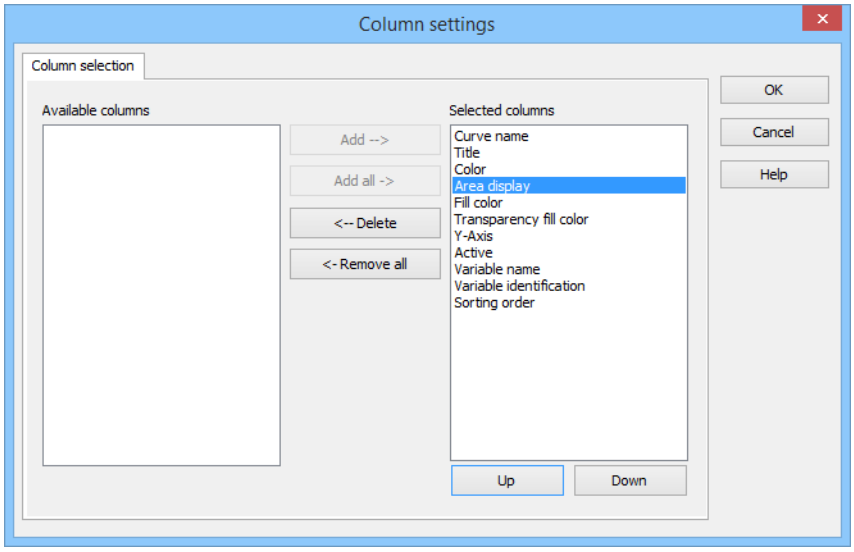
The title of the header of the cursor output list can be changed with the help of the language switch.

To provide the header also when converting projects of older versions, you can either delete the existing cursor output list and replace it with the new element or you activate checkbox **Display header**.

If you create projects for zenon version older than 6.51 SP0, you can insert the respective cursor output list after you have selected the desired Runtime version.

3.3.7.1 Column selection

You configure the columns to be displayed in the Runtime here.



Option	Function
Available columns	List of columns that can be displayed in the table.
Selected columns	Columns that are displayed in the table.
Add ->	Moves the selected column from the available ones to the selected items. After you confirm the dialog with OK, they are shown in the detail view.
Add all ->	Moves all available columns to the selected columns.
<- Remove	Removes the marked columns from the selected items and shows them in the list of available columns. After you confirm the dialog with OK, they are removed from the detail view.
<- Remove all	All columns are removed from the list of the selected columns.
Up	Moves the selected entry upward. This function is only available for unique entries, multiple selection is not possible.
Down	Moves the selected entry downward. This function is only available for unique entries, multiple selection is not possible.

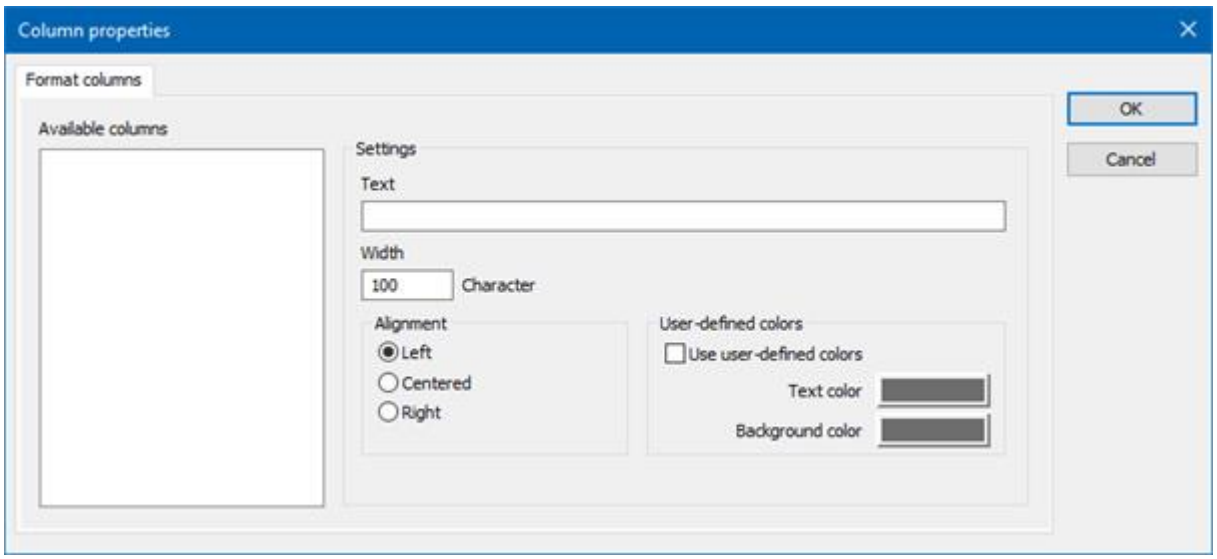
CLOSE DIALOG

Options	Description
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

3.3.7.2 Column Format

The columns are formatted here.

Configuration of the properties of the columns for configurable lists. The settings have an effect on the respective list in the Editor or - when configuring screen switching - in Runtime.



AVAILABLE COLUMNS

Option	Description
Available columns	List of the available columns via **Column selection**. The highlighted column is configured via the options in the **Settings** area.

SETTINGS

Option	Description
Settings	Settings for selected column.
Labeling	Name for column title. The column title is online language switchable. To do this, the **@** character must be entered in front of the name.
Width	Width of the column in characters. Calculation: Number time average character width of the selected font.
Alignment	Alignment. Selection by means of radio buttons. Possible settings: ▸ **Left**: Text is justified on the left edge of the column. ▸ **Centered**: Text is displayed centered in the

Option	Description
	column. ▸ **Right**: Text is justified on the right edge of the column.
User-defined colors	Properties in order to define user-defined colors for text and background. The settings have an effect on the Editor and Runtime. **Note:** ▸ These settings are only available for configurable lists. ▸ In addition, the respective focus in the list can be signalized in the Runtime by means of different text and background colors. These are configured using the project properties.
User defined colors	*Active*: User-defined colors are used.
Text color	Color for text display. Clicking on the color opens the color palette to select a color.
Background color	Color for the display of the cell background. Clicking on the color opens the color palette to select a color.
Lock column filter in the Runtime	▸ *Active*: The filter for this column cannot be changed in the Runtime. **Note:** Only available for: ▸ Batch Control ▸ Extended Trend ▸ Filter screens ▸ Message Control ▸ Recipegroup Manager ▸ Shift Management ▸ Context List

CLOSE DIALOG

Option	Description
OK	Applies all changes in all tabs and closes the dialog.

Option	Description
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.3.7.3 Amend appearance of lists

The appearance of the extended curve list and the cursor output list can be adapted to individual requirements:

SCROLL BARS, HEADERS AND GRIDS

To define the size and appearance of scroll bars, the header or grids for the table:

1. Activate, in the **Representation** group, the **Extended graphical settings** property.
2. Define the desired properties in the groups **Scroll bars** and **Header and grid**.

> **Information**
>
> If the *Graphics file* property is selected for the **Display style** property, then all elements for which no graphics file has been selected are shown with a color gradient. Transparent graphics cannot be used for control elements for lists.

SORT IN THE RUNTIME

To mark the relevant column for sorting in the Runtime and to determine the sorting sequence, configure the graphic element for the title line:

1. Select the *Graphics files* for the **Display style** property.
2. Link the **Sort ascending** and **Sort descending** properties with a graphics file.

   The selected graphics for the respective sorting direction are displayed in the Runtime for the sorting of relevant columns

   - Clicking on the graphic changes the sorting sequence.
   - Clicking in the column title activates the column for sorting.

OPERATING THE HEADER IN RUNTIME

For the extended curve list, you also have properties for arrangement and sorting of the columns with a mouse click available.

You can make it possible for users to operate the header in the Runtime. With this an individual customization of the look is possible in the Runtime:

- Move columns with Drag&Drop
- Change column width with the mouse
- Change sorting

To do this, use the following properties:

- **Freeze column location**: Controls the possibility to amend or move the width of table columns in the Runtime with mouse actions.
  - *active*: The columns cannot be moved with Drag&Drop and the width cannot be amended.
  - *Inactive*: The columns can be arranged by means of Drag&Drop and the width of the columns can be amended by dragging with the mouse
- **Disable sorting**: Controls the possibility to sort table columns in the Runtime.
  - *active*: The table cannot be sorted.
  - *Inactive*: The table can be sorted by clicking on the header.

The **Freeze column location** property is available for the cursor output list.

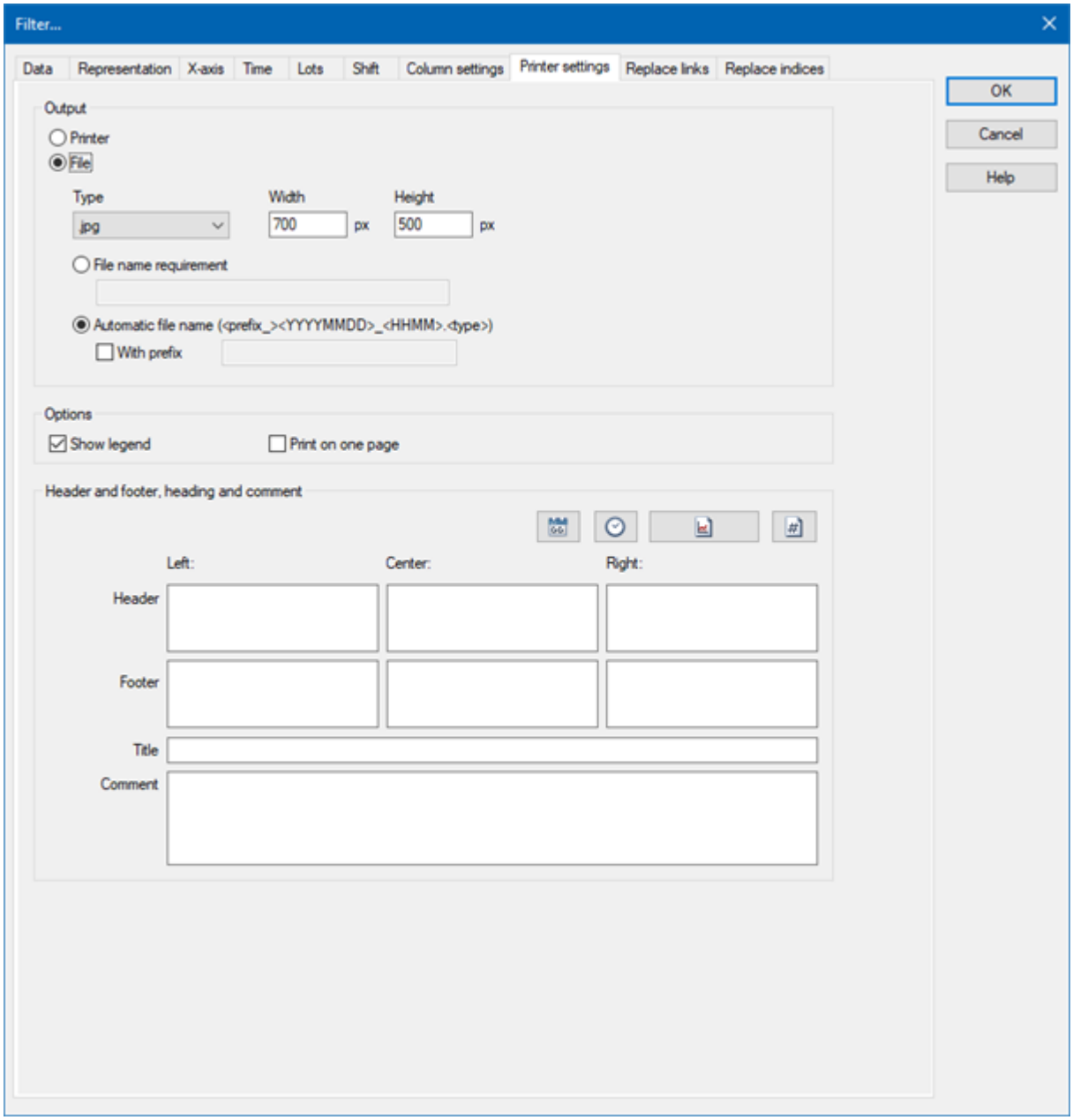
PREVIEW

The header and the scroll bars are shown as a preview in the Editor by activating the **Extended graphical settings** property. Details such as colors, fill effects, lighting effects or grids can thus be configured more easily.

Attention: As the size of the scroll bars equals their size in the Runtime, the total size of the list in the Editor can vary from the size in the Runtime. This is also true for the size of the header and the font of the header.

3.3.8 Printer settings

Configuration of the settings for the print-out or output to a file.



OUTPUT

Option	Description
Output	Configuration of the output type and the corresponding options.
Printer	*Active*: The diagram is output to the printer that is defined in the

Option	Description
	General configuration of zenon by default **for screenshots**. See also the chapter on printers.
File	*Active*: The diagram is saved as a file. Configure the output with the options: ▸ **Type** ▸ **Width** ▸ **Height** ▸ **File name requirement** ▸ **Automatic file name** ▸ **With prefix** These options are only available for output to a file.
Type	Selection of the file type from the drop-down list. The following are available: ▸ JPG ▸ BMP
Width	Entry of the width of the graphics file in pixels.
Height	Entry of the height of the graphics file in pixels.
File name requirement	*Active*: Entry of any desired file name.
File name automatic	*Active*: The filename is issued automatically. Format: **<Prefix_><YYYYMMDD>_<HHMM>.<Type>**
With prefix	Only available if **automatic file name** has been activated. Enter a desired prefix for the automatically-created filename. This is prefixed by the name separated by an underscore (_).

OPTIONS

Option	Description
Options	Configuration of the options.
Show key	*Active*: A key is printed out with the diagram. This informs you of the curves and their colors, for example.
Print on one page	*Active*: The key is output on the same page as the diagram.

HEADER AND FOOTER, HEADING AND COMMENT

Option	Description
Header and footer, heading and comment	For printing an Extended Trend diagram, additional information can be configured for the header and footer, as well as a heading and comments. Four buttons are available for easier input: ▸ Date: Output takes place according to the **Regional format** setting in the operating system. ▸ Time: Output takes place according to the **Regional format** setting in the operating system. ▸ Diagram name ▸ Page number
Header	Entry of information for the header in the following areas: ▸ Left ▸ Center ▸ Right
Footer	Entry of information for the footer in the following areas: ▸ Left ▸ Center ▸ Right
Title	Entry of a title.
Comment	Entry of a comment.
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

Note: Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Screen switch - Extended Trend** function or the **Print Extended Trend diagram** function. The functions assume a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.

3.4 Configure and edit curves

Trend curves are created in the function **Screen switch** by clicking on the **Add** button in the tab **Date** (on page 18).

CONFIGURATION OF CURVES

To configure curves:

1. Highlight the curve in the list
2. Double-click on the highlighted curve or click on the **Edit** button.

   The **Edit curve** dialog to configure the curve is opened.
3. Configure:
   a) Curve parameters (on page 108)
   b) Y-axis parameter (on page 113)
4. Confirm the changes by clicking on **OK**.

EDITING CURVES

The editing of curves is not possible:

- In the Editor in the screen switching section for the ETM screen in the **Data** tab
- in the Runtime in the Extended Curve List (on page 143) of the ETM screen
- In the Runtime in the Curves (on page 147) dialog

Note: The button to open the dialog must be configured.

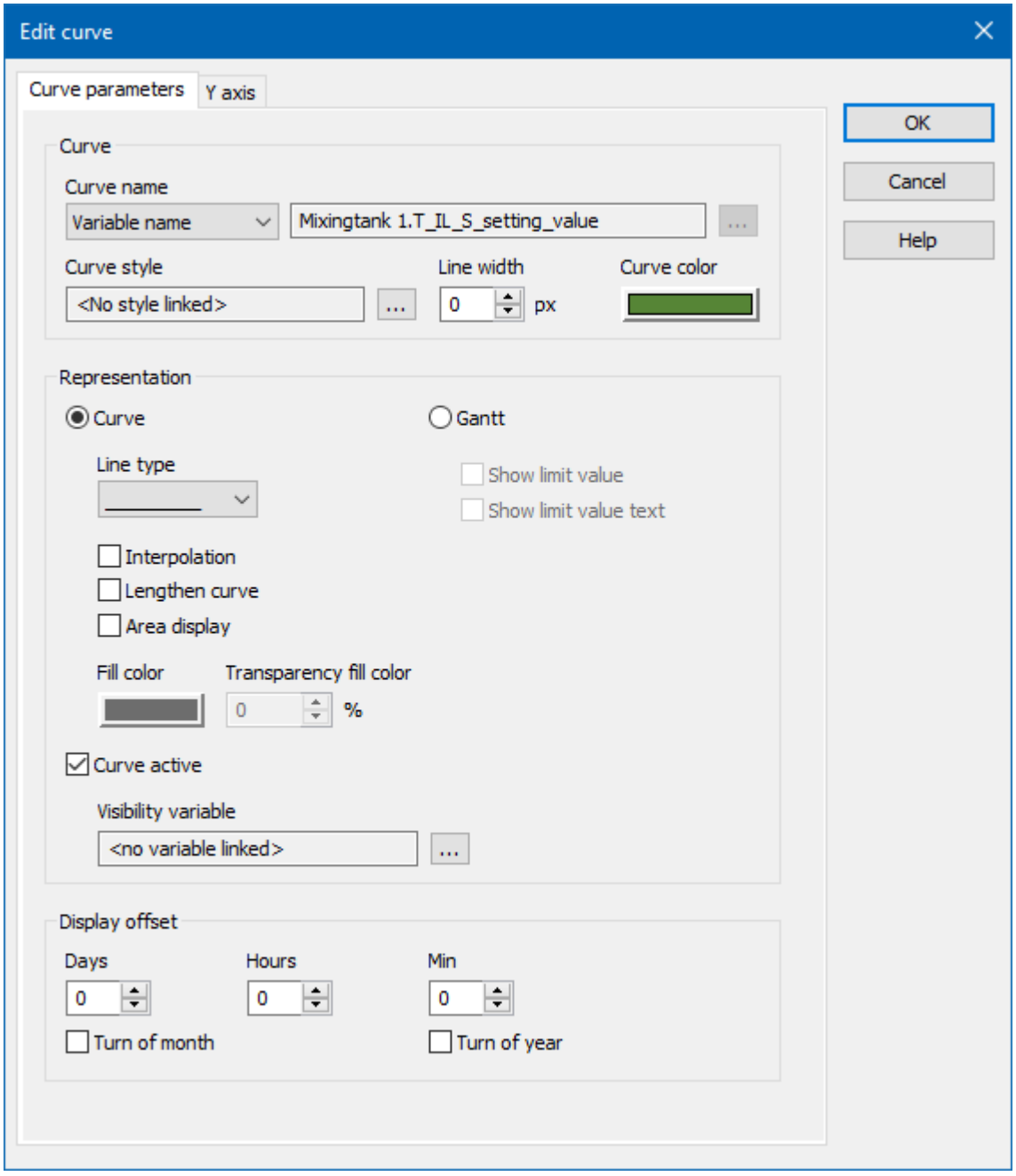
CONFIGURING THE BUTTON TO OPEN THE CURVES DIALOG

To configure the button:

1. Open a screen type **Extended Trend** in the Editor.
2. Select in the menu list **Element (Extended Trend)** in the sub menu **Diagram functions** the entry **trend curves...**.
3. Place the button in the ETM screen with a left-click and drag the button to the desired size.

   The button is available in Runtime

3.4.1 Curve parameters



For each trend curve the curve features can be parameterized.

CURVE

Option	Description
Curve	Configuration of the curve.
Curve name	Freely definable curve name. The following possibilities are available for selection: ▸ **Static**: The title can be entered freely. The text field is available. The **...** selection button is grayed out. ▸ **From variable**: The title is taken from a linked variable. The text field is not available. The **...** selection field is active. ▸ **Variable name** : The name of the variable is taken as a title. The text field is not available. The **...** selection button is grayed out. The variable name is used by default.
Curve style	Configuration of the style applied in the curve. Click on the **...** selection button to open the **style selection** dialog. **Note:** If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however. **Note:** A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.
Line width [Pixel]	Defines the width of the curve in pixels.
Curve color	Configuration of the curve color. Clicking on Color opens the color selection dialog.

TYPE OF DISPLAY

Option	Description
Display	Selection of the display type (**curve** or **Gantt**)
Curve	Configuration of the curve display.
Line type	Definition of line type for trend curve. Possible formats: ▸ Line ▸ Dashes ▸ Dots

Option	Description
	▸ Dash-dot ▸ Dash-dot-dot **Note**: In the Extended Trend, only solid lines can be displayed with a line width *greater than 1*.
Interpolation	*Active*: Values are connected using polylines (supporting positions). *Inactive*: Value changes are displayed as line jumps (stepped display).
Lengthen curve	*Active*: The curve is extended from the last available datapoint to the current time.
Area display	*Active*: The values are displayed as surfaces instead of lines.
Fill color	Configuration of the fill color. Clicking on the color display under fill color opens the color selection dialog. Only effective if the **Area display** option has been activated. If the **Automatic** option has been selected in the color selection display, the **fill color** automatically amends itself to the color selection of the **curve color** in the event that it changes. The **Automatic** option is also available in the Runtime in the curve list (on page 143).
Transparency of the fill color	Stipulation of the transparency of the fill color in percent. This can prevent curves being overlaid by curves with area display. ▸ 0 %: no transparency ▸ 100 %: fully transparent **Note:** Not available for Windows CE.
Curve active	*Active*: The curve and the attendant vertical axis are active in the Extended Trend in the Runtime. The curves and the axis are deactivated by deactivating the checkbox. The entry in the curve list is retained. The status of the curve is visible in the Runtime in the curve list in the **Active** column. **Note:** As soon as a visibility variable is linked to the curve, it is used for the visibility of the curve and the axis in the Runtime.

Option	Description
	Changing the status via the curve list is not possible in this case.
Visibility variable	Controls the visibility of the curve in the Runtime and the attendant vertical axis in the Extended Trend. Click on button **...** in order to open the dialog for selecting variables. **Note:** A linked visibility variable deactivates the following buttons in the screen type **Extended Trend**: ▸ **Activate curve** ▸ **Activate**, if visibility variable is linked with trend curve. ▸ **Y axis**, if visibility variable is linked to axis.
Gantt	*Active*: Gantt display for this curve is activated. For details on limitations, see the Gantt display (on page 118) and Y-axis parameters (on page 113) sections.
Display limit value	Only available for **Gantt display**. *Active*: The numerical limit value is displayed.
Display limit value text	Only available for **Gantt display**. *Active*: The description of the limit value is displayed.
Distance from the upper edge [Pixel]	Only available for **Gantt display**. Definition of the distance in pixels from the Gantt curve to the top diagram border. Positive values move the curve upwards, negative values move it downwards.

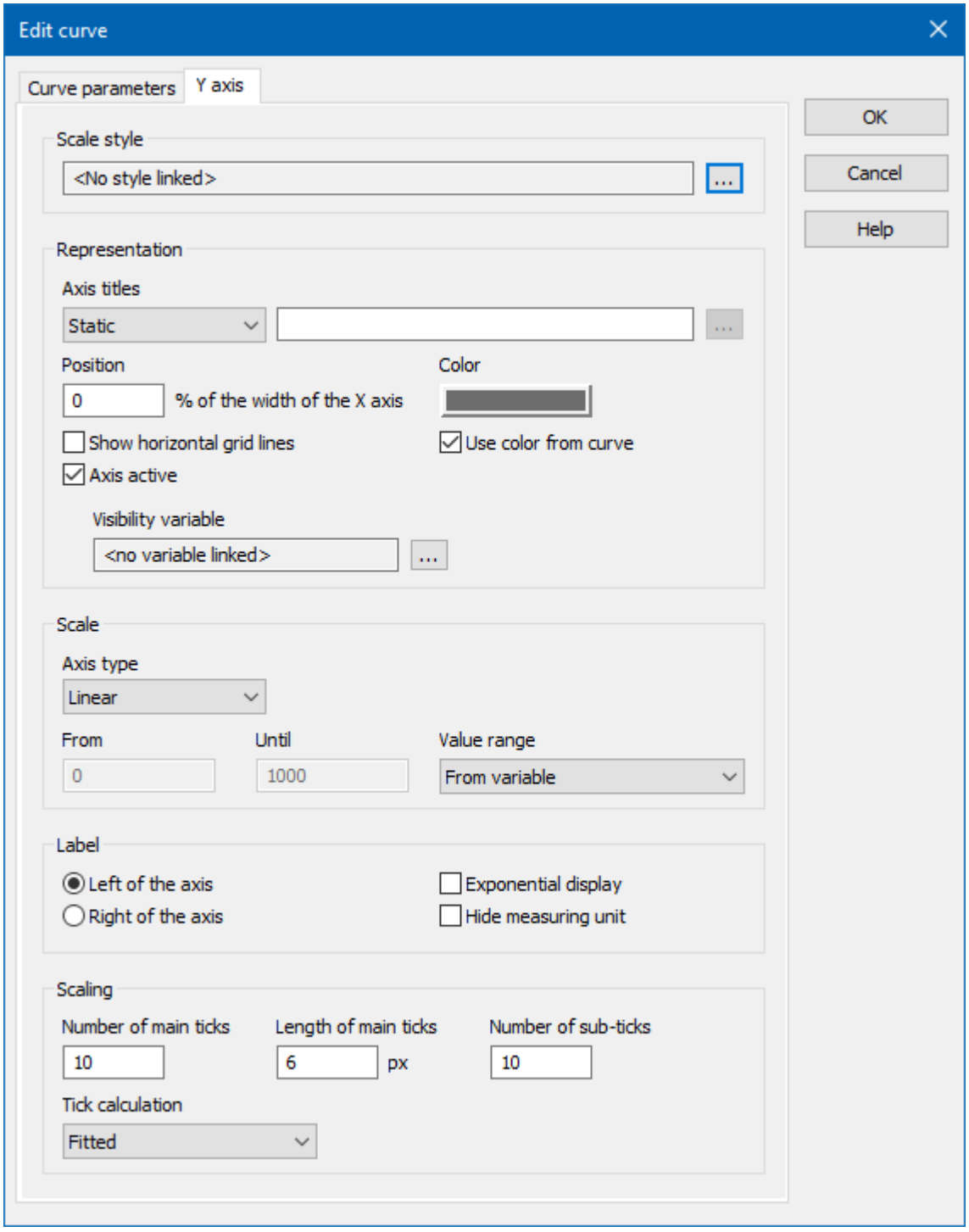
DISPLAY OFFSET

Option	Description
Display offset	Configuration of the display offset
Days	Moves the curve by the set number of days.
Hours	Moves the curve by the set number of hours.
Minutes	Moves the curve by the set number of seconds.
Turn of month	Moves the curve by a month.
Turn of year	Moves the curve by a year.

Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

3.4.2 Y axis parameter

The curve parameters are defined in this dialog and the curve parameters (on page 108) dialog.



SCALE STYLE

Option	Description
Scale style	Configuration of the style applied in the scale. Click on the **...** selection button to open the **style selection** dialog. **Note:** If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however. **Note:** A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.

REPRESENTATION

Option	Description
Display	Options for displaying curves in Runtime.
Axis titles	Name of the axis. The following possibilities are available for selection: ▸ **Static**: The title can be entered freely. The text field is available. The **...** selection button is grayed out. ▸ **From variable**: The title is taken from a linked variable. The text field is not available. The **...** selection field is active. ▸ **Variable name** : The name of the variable is taken as a title. The text field is not available. The **...** selection button is grayed out.
Position	Positioning of the Y-axis on the X-axis in percentage of the length of the X-axis. ▸ *0*: left, ▸ *100*: right
Color	Configuration of the axis color. Clicking on Color opens the color selection dialog. **Attention:** Can be configured independently of the trend curve color.
Display horizontal grid	Display of help lines on the main ticks.

Option	Description
lines	not available for Gantt display.
Apply color from curve	Applies the color of the y-axis for the display of the curve in the Runtime. The **Color** property is inactive if the checkbox is activated. **Note:** If **Use color from curve** is deactivated, the **Color** property is active. Default: *active*
Axis active	Enables the display and hiding of the Y-axis in the Runtime. The Y-axis is displayed if the checkbox is activated. Default: *active*
Visibility variable	Controls the visibility of the Y-axis in the Runtime by means of a visibility variable. If a variable is linked, the **axis active** property is inactive in the Runtime. Only *BOOL* variables are visible in the variable selection dialog. Click on the **...** button to open the selection dialog. Value of the visibility variable: ▸ *0*: Y-axis is not displayed ▸ *1*: Y-axis is displayed

SCALE

Option	Description
Scale	Define representation range of the process variables within their configured technical limits (zoom function). not available for Gantt display.
Type of axis	Defining of the scaling of the Y-axis. The following are available: ▸ **Linear**: Linear division of the Y-axis. ▸ **Logarithmic**: Logarithmic division of the Y-axis not available for Gantt display.

Option	Description
From	Scaling start value.
To	Scaling end value.
Range of values	Enables the selection of the origin of the value range of the scale that is used: ▸ *From variable:* The scale limits are applied from the variable settings in the measurement range. The input fields for the scaling (**From**/**To**) are not available. ▸ *Static:* The input fields for the scaling (**From**/**To**) are available for individual configuration. ▸ *Automatic scaling:* The scaling of the axis is automatically determined for this curve in Runtime. The rounded **min**/**max** values of the area to be displayed are used as axis limits. The input fields for the scaling (**From**/**To**) are not available.

LABEL

Option	Description
Label	Position of the axis labeling
Left of the axis	Values are displayed to the left of the axis.
Right of the axis	Values are displayed to the right of the axis.
Exponential display	Values are displayed exponentially. not available for Gantt display.
Hide unit	*Active*: Unit for axis labeling is not displayed. Allows the display of several variables with different units. Default: *inactive* not available for Gantt display.

SCALING

Option	Description
Scaling	Definition of the axis subdivision.

Option	Description
	not available for Gantt display.
Number of main ticks	Number of main ticks with value indication. Maximum: *100*
Length of main ticks (in pixels)	Length of main ticks in pixels. Maximum: *100*
Number of sub-ticks	Number of main subsidiary ticks with value indication. Maximum: *60*
Tick calculation	Amendment possibility to calculate the ticks shown: ▸ **Fitted** - Minimum value and maximum value are the extreme limits of the axis. The labeling of the display is automatically rounded to visually-clear figures and the ticks are amended accordingly. A small deviation to the set main ticks can occur if the space available on the axis can be divided evenly. If there would be an overlap of a labeling with a main tick, the text of the axis limit is not displayed. ▸ **Automatic** - the calculation of the maximum values of the axes and the ticks is calculated automatically using an algorithm. The axis limits that have been created in the Editor can be amended in the Runtime. ▸ **Linear** - an even distribution of the ticks on the axis is carried out. Default: *Fitted*
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

The display of curve and Y-axis are configured using the checkboxes for **Y-axis** and **Active** in the Data tab.

3.4.3 Assignment of a scale style

You can assign a style to axes and displays in the Editor, which is then applied in the Runtime.

Note: Curve settings that have been taken from a style cannot be changed in the Runtime. This is applicable for the properties **curve color**, **fill color** and **fill color transparency**. The **curve color** in the ETM and the **curve color** selection button in the extended curve list are also not available. The **curve color** is also inactive with multiple selection of curves.

This possibility exists for the following axes and displays:

- X-Axis (on page 45)
  - YT display (on page 46)
  - XY display (on page 51)
- Y-Axis (on page 113)

ENGINEERING

1. To do this, click in the dialog on the **...** selection button next to the **scale style** text field.

   The **style selection** dialog is opened.
2. Select the desired style. If no style has been created yet, you can create a new style group and a new style yourself.

   Note: A new style can only be created once a style group has been created.
3. Confirm the selection by clicking on **OK**.
4. The scale style is applied in the Runtime.

Note: If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however.

Note: A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.

3.4.4 Gantt display

With the help of the Gantt display you can visualize the state of a piece of equipment in the **Extended Trend**. For example it can be displayed when a piece of equipment has been in operation, in maintenance, idle and so one. With the display in the **Extended Trend** it is possible to compare the states of a piece of equipment with the characteristic curve of the process. Thus you can make conclusion about the behavior of a piece of equipment. For example you detect an abnormal behavior of the characteristic curve of the process but you see according to the Gantt chart that the equipment was in maintenance at that time.

ENGINEERING

With the Gantt display, the limit valuess and reaction matrices are taken into consideration for the evaluation, not the actual values of the respective variables. The display reflects the status of a piece of equipment; the exact value does not play a role.

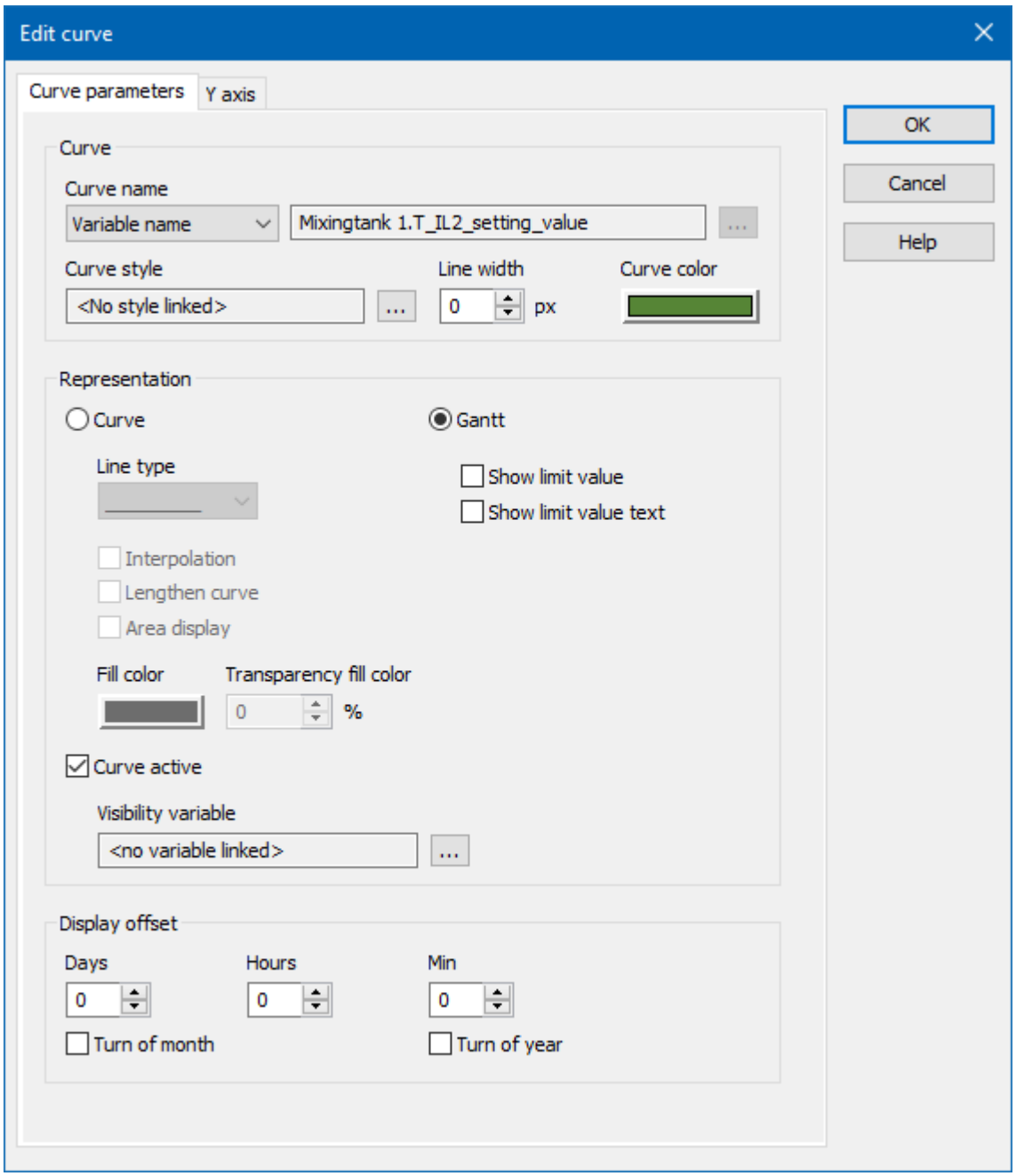
The individual Gantt charts are displayed in the top frame of the control element. Take care that you engineer the frame large enough so that no display problems arise.

As a basis for the color of the respective Gantt charts the violated limit value or reaction matrix is used. In doing so, the currently-configured limit values and states of the **Reaction matrix** are always used for this. If you change them, even historic evaluations are displayed with the current values. There is no history for the limit values or the states of a **Reaction matrix**.

Note: If a **Gantt curve** is also intended to show the current status then, in the configuration of the archiving in the **Recording type** tab, the **Save process image on startup** option must be activated.

CURVE PARAMETERS

The curve settings for the Gantt display are changed using the same dialog as the general curve configuration. Some of the options to be set differ:



Option	Description
Curve name	The curve name is used as the labeling and is freely definable. The following possibilities are available for

Option	Description
	selection: - **Static**: The title can be entered freely. The text field is available. The **...** selection button is grayed out. - **From variable**: The title is taken from a linked variable. The text field is not available. The **...** selection field is active. - **Variable name** : The name of the variable is taken as a title. The text field is not available. The **...** selection button is grayed out. The variable name is used by default.
Curve style	Configuration of the style applied in the curve. Click on the **...** selection button to open the **style selection** dialog. **Note:** If a value defined in the linked style exceeds the maximum value possible in the ETM, it is used in the Runtime. The settings chosen in the Editor are retained however. **Note:** A selected style can be replaced or removed in the Runtime. The creation of new styles or style groups is not possible in the selection dialog.
Display limit value	Only available for **Gantt display**. *Active*: The numerical limit value is displayed.
Display limit value text	Only available for **Gantt display**. *Active*: The description of the limit value is displayed.
Distance from the top edge	Only available for **Gantt display**. Definition of the distance in pixels from the Gantt curve to the top diagram border. Positive values move the curve upwards, negative values move it downwards. **Note:** The option is only shown if, in the screen switching **Display** tab, the checkbox for the **Automatically align Gantt curves** property has

Option	Description
	been deactivated.
Curve active	*Active*: The curve and the attendant vertical axis are active in the Extended Trend in the Runtime. The curves and the axis are deactivated by deactivating the checkbox. The entry in the curve list is retained. The status of the curve is visible in the Runtime in the curve list in the **Active** column. **Note:** As soon as a visibility variable is linked to the curve, it is used for the visibility of the curve and the axis in the Runtime. A change to the status via the curve list is not possible in this case.
Visibility variable	Controls the visibility of the curve in the Runtime and the attendant vertical axis in the Extended Trend.

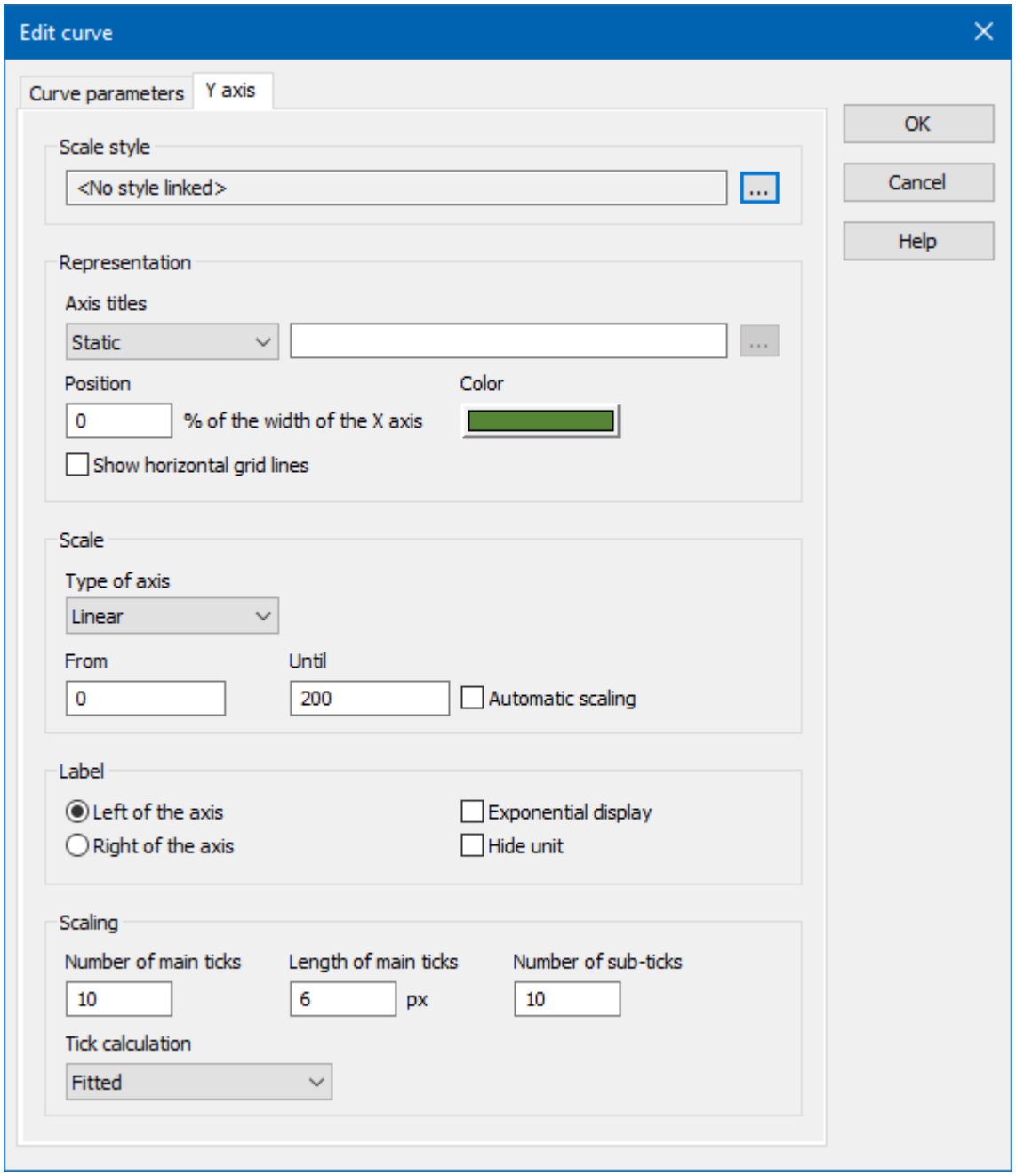
Note: If the options **Display limit** and **Display limit text** are used together, the display is:
Limit text/limit value

Y-AXIS

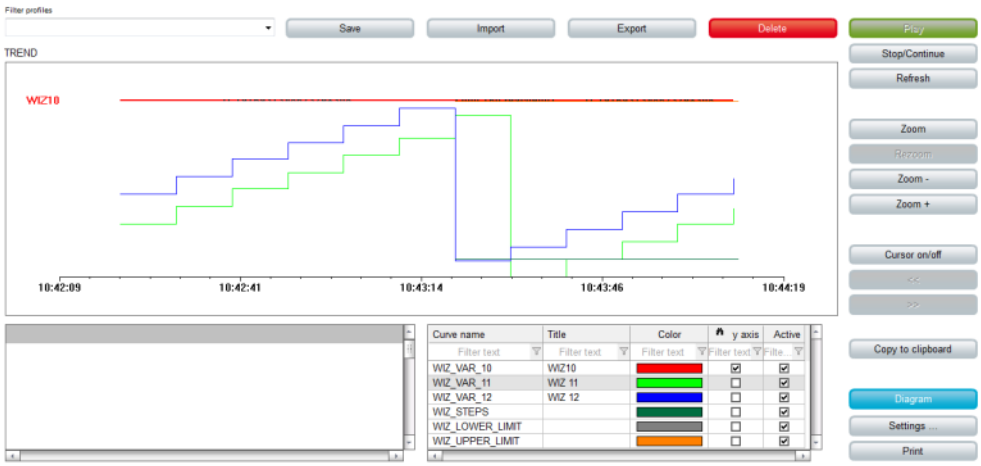
The Y-axis is configured using the same dialog as the general curve configuration. The label is configured here.

- **Color**

- **Position in % of the width of the X-axis (measured from the left)**



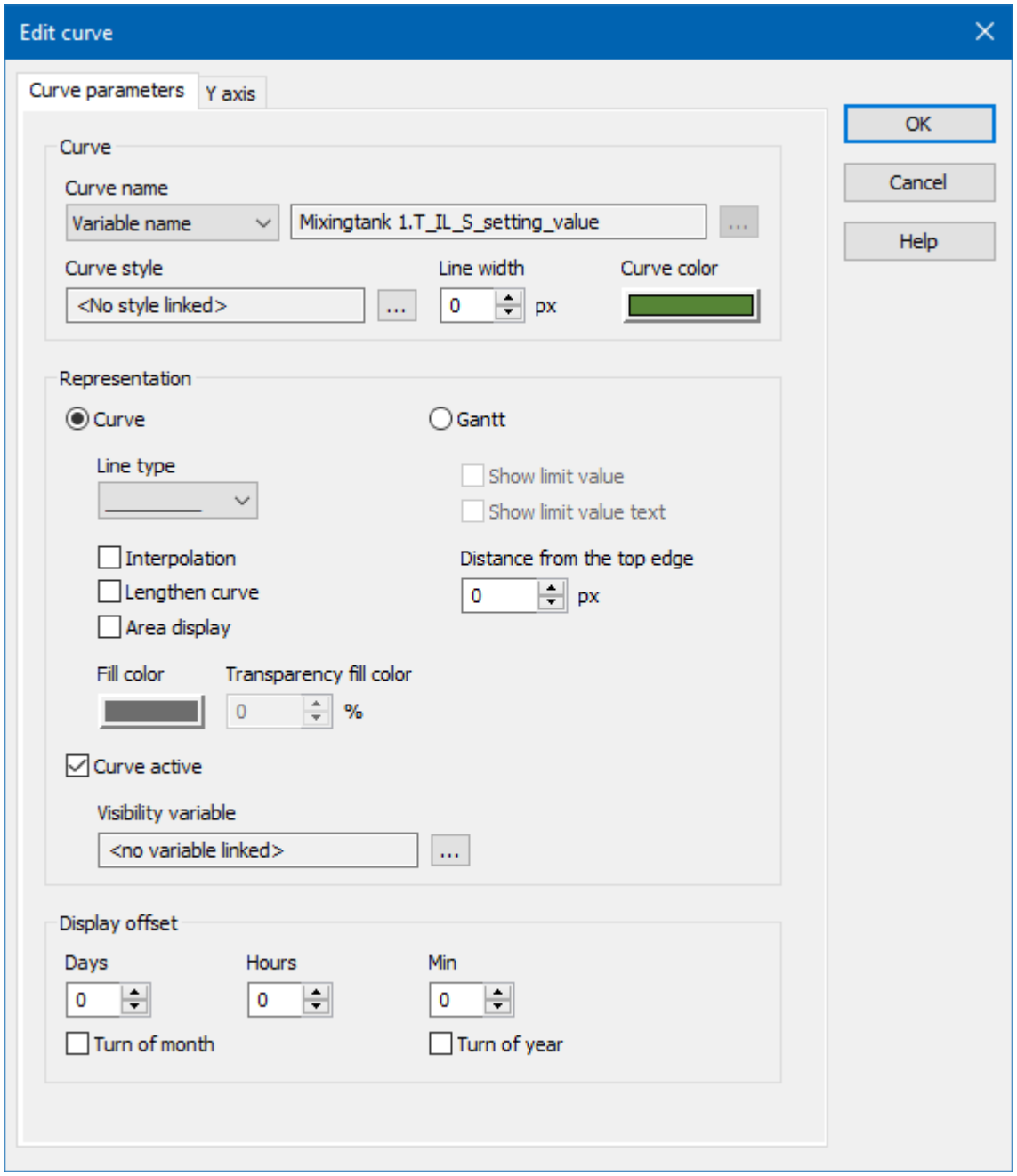
View in the Runtime:



GANTT DISPLAY FOR STRING VARIABLES

The configuration of the curve settings for Gantt display for *string* archive variables is different from the configuration of other Gantt displays in these aspects:

Option	Description
Display limit value	Inactive
Display limit value text	Inactive
Alternative color	replaces the **fill color** property and is initialized with a color that differs from the **curve color**



In the Runtime:

Display with this Gantt display is as with a conventional Gantt display, however with the following differences:

- For each new value of the variable, the bar changes color between **curve color** and **alternative color**
- The string value of the variables is displayed as a text

NOTES ON CONFIGURATION OF THE GANTT DISPLAY FOR STRING VARIABLES

For Gantt curves with text, the **line width** is not amended automatically. The default value *0* here corresponds to a width of *1 pixel*. The font is taken from the settings in the **Display** (on page 38) tab; the font color is *black*.

If, for the recording of string variables in the archive, **record on change** has been selected and he current status is to be displayed, then the **Save process screen on startup** option must be activated.

If Runtime files are created for a version before zenon 7.11, then:

- The Gantt display curve for string variables is not removed
- A bar without text is displayed for as long as the variable has a value

3.4.4.1 Activation of linked functions via Gantt curves

Gantt curves can be linked to functions via variables and reaction matrices.

If the function is executed in Runtime, the Editor can define the variables as well as the reaction matrices:

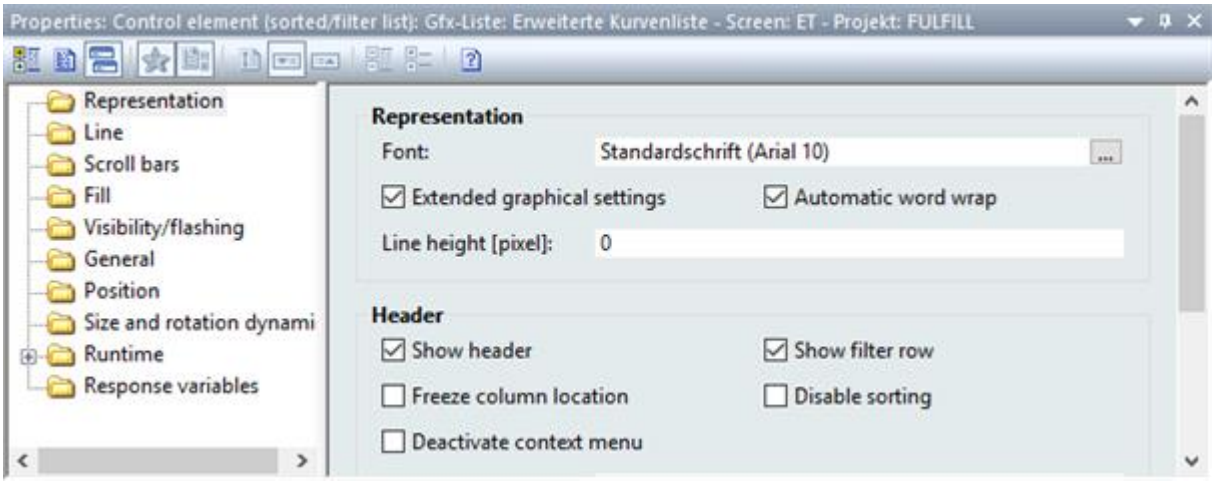
- Variables: In variable properties under **Limit value**. Go to the current **Limit value** and select the desired execution type under **Function**:
  - **Execute function immediately**: Function is executed at limit value violation
  - **Function for button in the AML screen**: Function is executed at limit value violation when the relevant entry in the AML is selected in Runtime and the **Execute function** button is pressed
  - F**unction for Gantt in the ETM screen:** Function is executed at limit value violation when in Runtime, the Gantt curve is clicked with the mouse pointer in the area with the limit value violation.
- Reaction Matrices: In the corresponding reaction matrix under **Functions**. Select between execution types:
  - **Immediately**: Function is executed at limit value violation
  - **With button**: Function is executed at limit value violation when the relevant entry in the AML is selected in Runtime and the **Execute function** button is pressed
  - **With Gantt**: Function is executed at limit value violation when in Runtime, the Gantt curve is clicked with the mouse pointer in the area with the limit value violation.

3.4.5 Setting the line height with automatic carriage return

In order to be able to display particularly long text in lists, there is the possibility to set an automatic carriage return. However, the output of the desired text must be undertaken manually by setting the number of cells. This happens using the line height.

Procedure to set the line height:

1. Activate the checkbox of the **Automatic word wrap** property in the properties of the corresponding list under the **Representation** node.
2. Enter the desired line height in the properties of the list under the **Representation** and **Line height [pixel]** nodes.



If:

- The line height entered is suitable for a multi-line display and the text has spaces, the text is divided into several lines.
- The text is nevertheless too long, it is cut off and **...** is shown at the end.

Example: The Arial 10 font has a height of 10 points. Because 1 point corresponds to 1.333 pixels, 10 results in a height of 13 pixels.

Enter a line height of 34 pixels to get a two-line output.

The following assignment is applicable:

Pixel	Text lines
34	2
50	3
66	4
82	5

Pixel	Text lines
98	6

From the second line on, 16 pixels must be added for each subsequent line.

3.5 Filter profiles

Filter profiles are filter settings that the user can save and call up in Runtime in relation to a certain screen.

To be able to use filter profiles, the following control elements must be configured:

Control element	Description
Filter profiles	Profile administration in the Runtime
Profile selection	Selection of a saved profile from a drop-down list.
Save	Clicking on the button in the Runtime saves the filter settings as a profile. **Note:** The name can be a maximum of 31 characters long and must only contain valid characters. Prohibited are: **! \ / : * ? < > | ""**
Delete	Clicking on button in Runtime deletes the selected profile.

You can thus do the following in the Runtime:

- save filters
- use saved filters
- delete filter profiles

Filter profiles can also be exported and imported with further control elements.

3.6 "Print Extended Trend diagram" function

With the help of the **Print Extended Trend diagram** function, you can print Extended Trend diagrams or save them in a file (JPG or BMP) without opening the *Extended Trend* screen.

To configure the function:

1. Create a new function
2. navigate to the Applications node
3. Select Print Extended Trend diagram

The function will be created along the lines of screen switching (on page 16).

Note: Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Screen switch - Extended Trend** function or the **Print Extended Trend diagram** function. The functions assume a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.

3.7 Entries in the project.ini

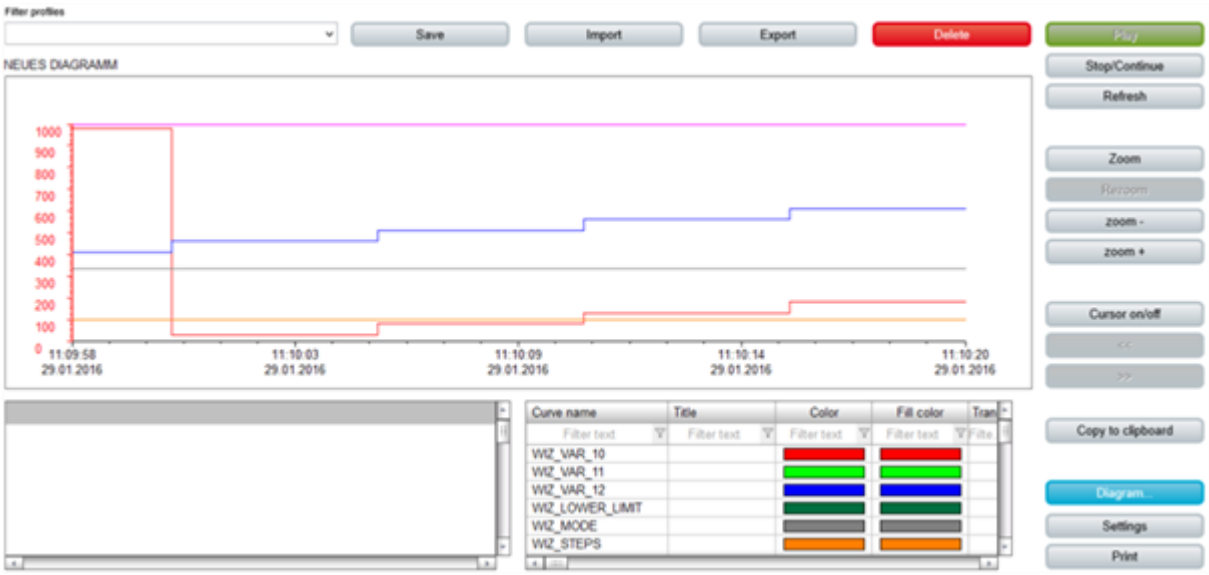
Relevant entries in the configuration file **project.ini**:

Group/entry	Description
[DEFAULT]	General settings.
MILLISEK=	Rendering and internal processing of the hard disk values as well as updating active screens takes place in: ▸ *1*: Milliseconds ▸ *0*: Seconds Default:*1* It corresponds to the property **Trend and HD values in milliseconds** in group **Runtime settings** in the Editor.
[EW_TREND]	Settings for the **Extended Trend**.
ANZEIGE_GWTEXT=	Display of the limit value text when scanning the curves. ▸ *1*: on ▸ *0*: off Default:*1*
[ARCHIV]	Settings for the archive project.
ARCHDIGITS=	Number of decimal places during export of archives in the TXT, XML and DBF. Default: **ARCHDIGITS=***1*
SPEICHER=	Maximum number of values to be read in the memory for: ▸ Extended Trend ▸ Archive revision ▸ AML ▸ CEL ▸ Tables

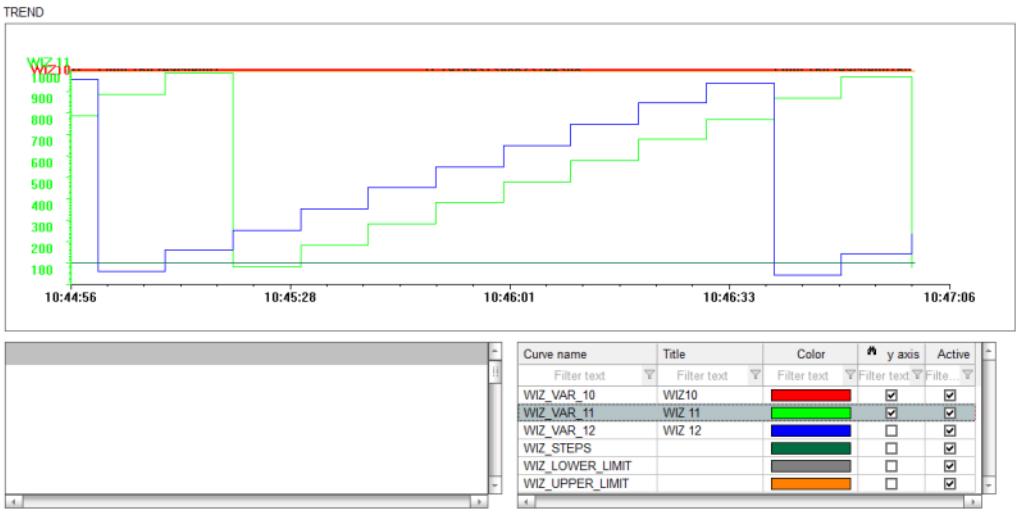
Group/entry	Description
	Display in kilobytes (e.g. 2000000 for 2 GB). Default:*1000000* (*1* GB) **Attention:** With archive data, all values of all variables are always read in, even if only one variable is displayed. **Note:** The space available is checked before archive data (***.arx**) is read in. If more than the size defined here is required, the reading is canceled and an error message is written to the Diagnosis Viewer log.
SQL_MAXROWS=	With archive evacuation in SQL: Number of values that can only be read from the SQL database. Maximum: *4294967295* **Note:** There is an automatic check that there is always at least 10% free memory left.
TRENNZEICHEN=	Separator for export in ASCII files between the fields. Default: **TRENNZEICHEN=***;*

4 Operation in the Runtime

In online operation the window for the Extended Trend is opened via a function call . The screen pre-defined in the Editor (on page 6) is called up.



With extended curve list:



There are different control elements available to operate the extended trend and the displays, depending on the engineering (on page 6).

WINDOW

Selection of the window to be displayed for diagrams and curves in the Runtime.

Control element	Description
Diagram	Window to display trend curve Not available if the screen has been called up with the **Display lot selection dialog -> Relative lot selection** option activated.
Diagram name	Shows the diagram name. **Note:** Element of the type *Dynamic text*. Functionality is assigned using the **Screen type specific action** property.
Set filter	Shortened display of the currently selected filter conditions in a compact filter line. **Note:** Element of the type *Dynamic text*. Functionality is assigned using the **Screen type specific action** property.
Set filter (detail list)	Detailed display of the currently selected filter conditions in a text window. Details can be found in the **Runtime** manual in the **Filter** section.
Cursor output list	Shows the position of the cursor in the diagram window and the values set in diagram settings and cursor output (on page 102)
Expanded curve list	Curve list that can be edited in the Runtime (on page 143). The following can be edited: ▸ Active ▸ Color ▸ Area display ▸ Fill color ▸ Curve name ▸ Sorting order ▸ Title ▸ Transparency fill color ▸ Variable name ▸ Variable identification ▸ Y-Axis **Note:** Not available under Windows CE. Is replaced by the **curve list (outdated)** there.

Control element	Description
Activate curve	Activates the selected curve in the extended curve list. The curve in the screen is shown/hidden in the screen and the list is updated by activation/deactivation. Multiple selection is possible. The button is inactive if no trend curve was selected in the trend curve list or if a visibility variable is linked in the screen switch.
Activate axis	Activates the selected axis in the extended curve list. The axis in the screen is shown/hidden in the screen and the list updated by activation/deactivation. Multiple selection is possible. The button is deactivated if no trend curve has been selected in the trend curve list.
Curve color	Allows the setting of the desired color for the respective curve. When the color is changed, the curve is redrawn in the screen and the list is updated. The button is only activated if no curve has been selected in the extended curve list.

DIAGRAM FUNCTIONS

Pre-defined controls for diagrams.

Control element	Description
Filter	Display of set filter.
Chart settings	Activates the dialog (on page 102) for diagram settings and cursor output
Curves	Change curve parameters.
x-axis	opens the dialog (on page 51) for x-axis settings. Not available if the screen has been called up with the **Display lot selection dialog -> Relative lot selection** option activated.
Refresh	Refreshes the display.
Stop	Do not refresh screen.
Next	Update screen
Cursor on/off	Query values
Double cursor on/off	Display (on page 131) values that are between two cursors.

Control element	Description
Print	Prints diagram. **Note:** Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Screen switch - Extended Trend** function or the **Print Extended Trend diagram** function. The functions assume a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.
Print with dialog	Choose the printer before printing out the diagram.
Copy to clipboard	Copy representation into the intermediate store.
Export displayed data	exports (on page 140) all visible data of all curves as a CSV file.

DIAGRAM NAVIGATION

Buttons for navigation in the diagram.

Control element	Description
Cursor one pixel to the left	Places cursor one pixel to the left. If the **Shift** key is pressed at the same time, the cursor is moved by 10 pixels.
Move cursor one pixel to the right	Places cursor one pixel to the right. If the **Shift** key is pressed at the same time, the cursor is moved by 10 pixels.
Backwards	Scroll backward on the time axis (history)
Quarter backwards	Moves the time period displayed back by a quarter of the measuring unit selected.
Forwards	Scroll forward on the time axis (current)
Quarter forwards	Moves the displayed time period forwards by a quarter of the unit selected.
Zoom	Zoom display
Step back	Reduce display
Zoom +	reduces display time intervals

Control element	Description
Zoom -	Increases display time intervals
Zoom to 100 %	Sets zoom factor to 100%. This zoom action is saved in the zoom history. For example: **zooming** is used ▸ to zoom 2x into a selected area of the Extended Trend, ▸ then **zoom content to 100%** is selected and ▸ then a selected area is zoomed into again, then there are 4 zoom events in the history. These can be jumped back step by step with the **Step back** button.

COMPATIBLE ELEMENTS

Control elements that are replaced or removed by newer versions and continue to be available for compatibility reasons. These elements are not taken into account with automatic insertion of templates.

Control element	Description
Diagram name	Static Win32 control element. Was replaced by a *dynamic text* field. For the description, see current element.
Set filter	Static Win32 control element. Was replaced by a *dynamic text* field. For the description, see current element.
CE curve list	List of curves. Is used for CE for compatibility reasons. The extended curve list is recommended for all other projects.

FILTER PROFILES

Buttons for filter settings in the Runtime.

Control element	Description
Profile selection	Select profile from list.
Save	Saves current setting as a profile. **Note:** The name can be a maximum of 31 characters long and must only contain valid characters.

Control element	Description
	Prohibited are: **! \ / : * ? < > | ""**
Delete	Deletes selected profile.
Import	Imports filter profiles from export file.
Export	Exports filter profiles in the file.

Information

The cursor one pixel to the left and cursor one pixel to the right control elements move the cursor if it is active, not the trend.

Arrow keys on the keyboard can also be used instead of the control elements.

If you hold down the **Shift key** when moving with the arrow keys, the movement is carried out in 10-pixel increments.

If in Extended Trend archive values are displayed or if the continuous updating of the online data is switched off then the current values of the curves up to the current time are re-read in by pressing the **Refresh** button. Or it is updated according to the refresh times defined in **Diagram**.

Paging in extended trend beyond the represented X-axis is possible with the use of the **<<** button (display older values) or **>>**(display more recent values). If online data is displayed, a maximum entry depth as defined for the process variables can be shown. For archive values, the configuration of the archives stored in the database is decisive.

Information

The refresh rate dynamically adjusts to the loading time of the data for archive trend. If loading lasts longer than half of the refresh interval, the refresh rate is doubled.

ZOOM

Clicking on the **Zoom +** button plus dragging an area on the diagram displays the values in a more detailed resolution and at a smaller interval (X and Y axis). Zooming is only possible if the selected area covers at least one subdivision per axis. Multiple zooming is possible. Clicking on the **Rezoom** button switches the zoom factor back to the levels at which they were previously defined.

ONLINE DATA

With Online data and refreshing the visualization changes with each refresh corresponding to the most current entry. To be able to scroll through, ongoing refreshing must be switched of by means of

the **Stop** button. If the continuous updating should be reactivated then the **Next** button is to be pressed. With the diagram's next refresh cycle the new data and the new X-axis range are updated.

Information

Online variables in Extended Trend:

The online variables for Extended Trend are configured in the Editor and can no longer be changed in the Runtime. The HDD ring buffer is also configured for the variable during configuration in the editor. It is not possible to create or change the ring buffer for variables in the Runtime. Online variables therefore cannot be amended in the Runtime.

Variables from archives can also continue to be added in the Runtime.

4.1 Mouse

In Runtime, you can use th mouse to work in the diagram window of the Extended Trend.

You can set the behavior of the mouse when a button is pressed or when the wheel is moved (on page 14) in the editor.

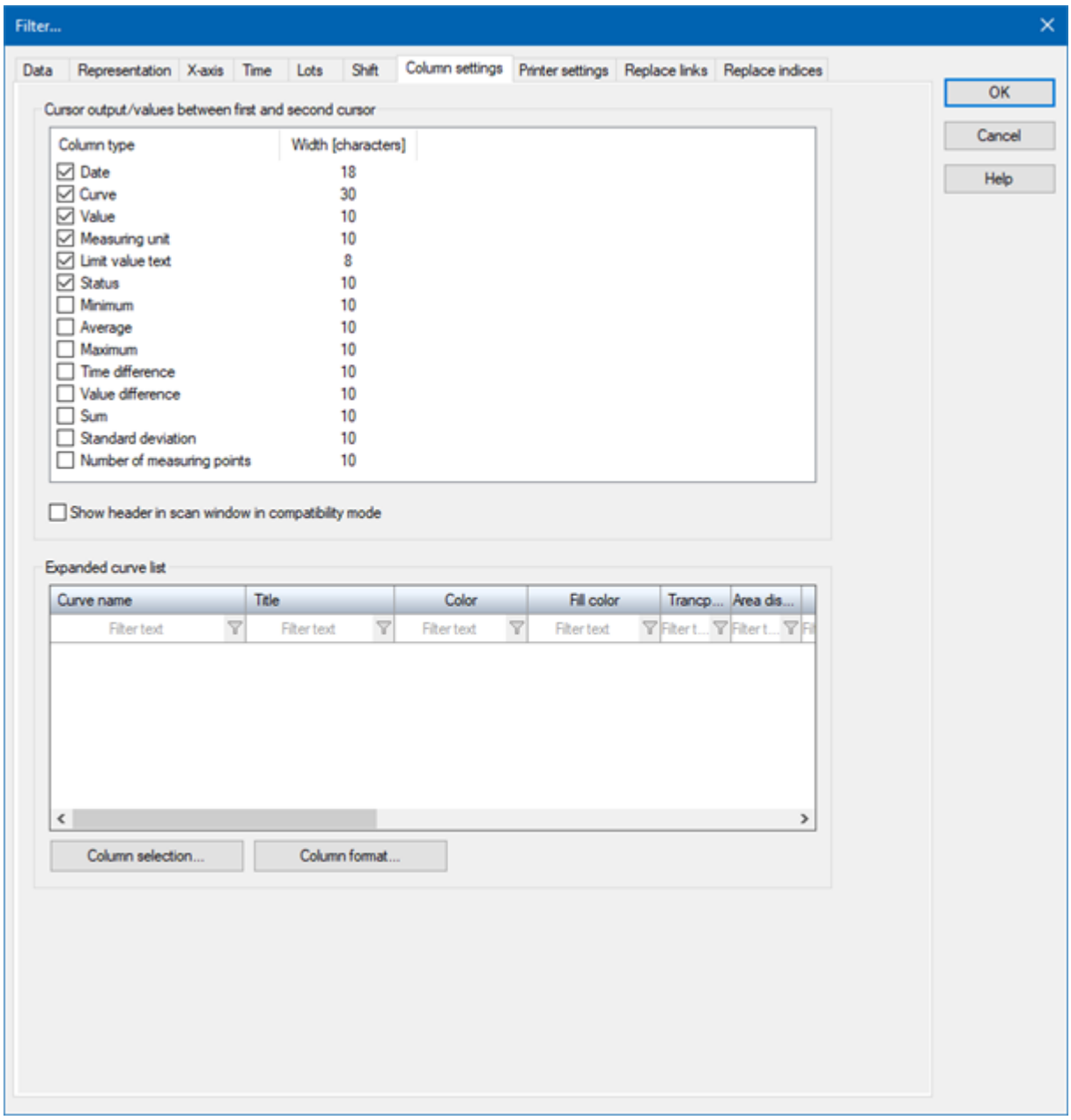
4.2 Cursor

Click on button **Cursor on/off** in order to start the scanning mode. A cursor appears in the middle of the diagram. You can move the cursor by left-clicking on it and moving the mouse while still pressing the mouse button. You can also use the keyboard. Press **Left** or **Right** to move the cursor in small steps. To carry out larger steps, press the **Shift key** at the same time. You can see the respective value in the cursor output window. Click on button **Cursor on/off** again in order to exit the scanning mode. The following information can be displayed in the cursor output window:

Display	Description
Date	Date/Time of the saved value Minimal scaling: Milliseconds
Variable	Name of the variable from which the value comes.
Value	value.
Measuring unit	Unit of the saved value
Condition	Condition text (limit value text) of the saved value.
State	Status of the saved value .

Display	Description
Minimum	Minimum of the period of representation (optional).
Average	Average of the period of representation (optional).
Maximum	Maximum of the period of representation (optional)
Time difference	Time difference. Minimal scaling: Milliseconds
Value difference	Difference between the values.
Sum	Sum
Standard deviation	Standard deviation.
Number of measuring points	Number of measuring points

In order to change the displayed information and the according column widths, click on the button **Diagram...** The dialog to configure the Extended Trend (on page 16) is opened.



In the **Column settings** tab, you can set the column widths for the different entries in the cursor output window. With the help of the checkbox you decide which columns you want to display.

Information

If an XY display is configured, then only the respective current value is shown when the scanning is started. This cannot be updated. The cursor cannot be moved.

DOUBLE CURSOR ON/OFF

If you engineered the control element **Double cursor on/off**, you have the possibility to use a second cursor in the diagram. With this a scanning with two separate cursors is possible. Click on button **Double cursor on/off** in order to display two cursors on at the left end and one at the right end of the diagram. You can move the second cursors either with the help of the mouse or the keyboard. In order to do this, press and hold the **Ctrl key** and press **Left** or **Right** to move the cursor in small steps. To carry out larger steps, press the **Shift key** at the same time.

The values between the first and the second cursor are displayed in the cursor output window. You can customize the available columns as desired in the **Diagram settings and cursor output** dialog. Open the dialog by clicking on the **Settings...** button in the ETM screen.

Information

The double cursor is not available for the **block array** data type.

WRITING ABSCISSAS IN VARIABLES

Two variables can be defined for the cursors, in which the abscissas are written for calling up and moving the cursors (time or X values). The variables can be **LREAL** or **DWORD/DINT/UDINT** variable and are configured in the screen switching in the **Display** (on page 38) tab. In doing so, the values are saved in Unix time format (number of seconds passed since 1 January 1970 00:00 UTC).

4.3 Export data

For the extended trend, an **Export displayed data...** button can be inserted as a control element and can be used in the Runtime. In doing so, all visible data of all curves displayed is saved in a text file in CSV format.

FORMAT OF CSV FILE

- The output is in the form of a Unicode text file.
- Separator: Semi-colon (;)
- You are free to choose storage location and file name in the save dialog.
- The file has no header.
- The data is displayed in this order in the text file:

  Variable name;Identification;Value;Unit;Status;Time

Property	Format
Variable name :	Character string
Identification:	Character string

Property	Format
Value:	▸ Up to 8 digits before the decimal separator, ▸ 8 digits behind the decimal separator
Unit:	Character string
State:	Character string
Time:	*dd.mm.yyyy hh:mm:ss.ms*

There is no output if an exported variable property is empty.

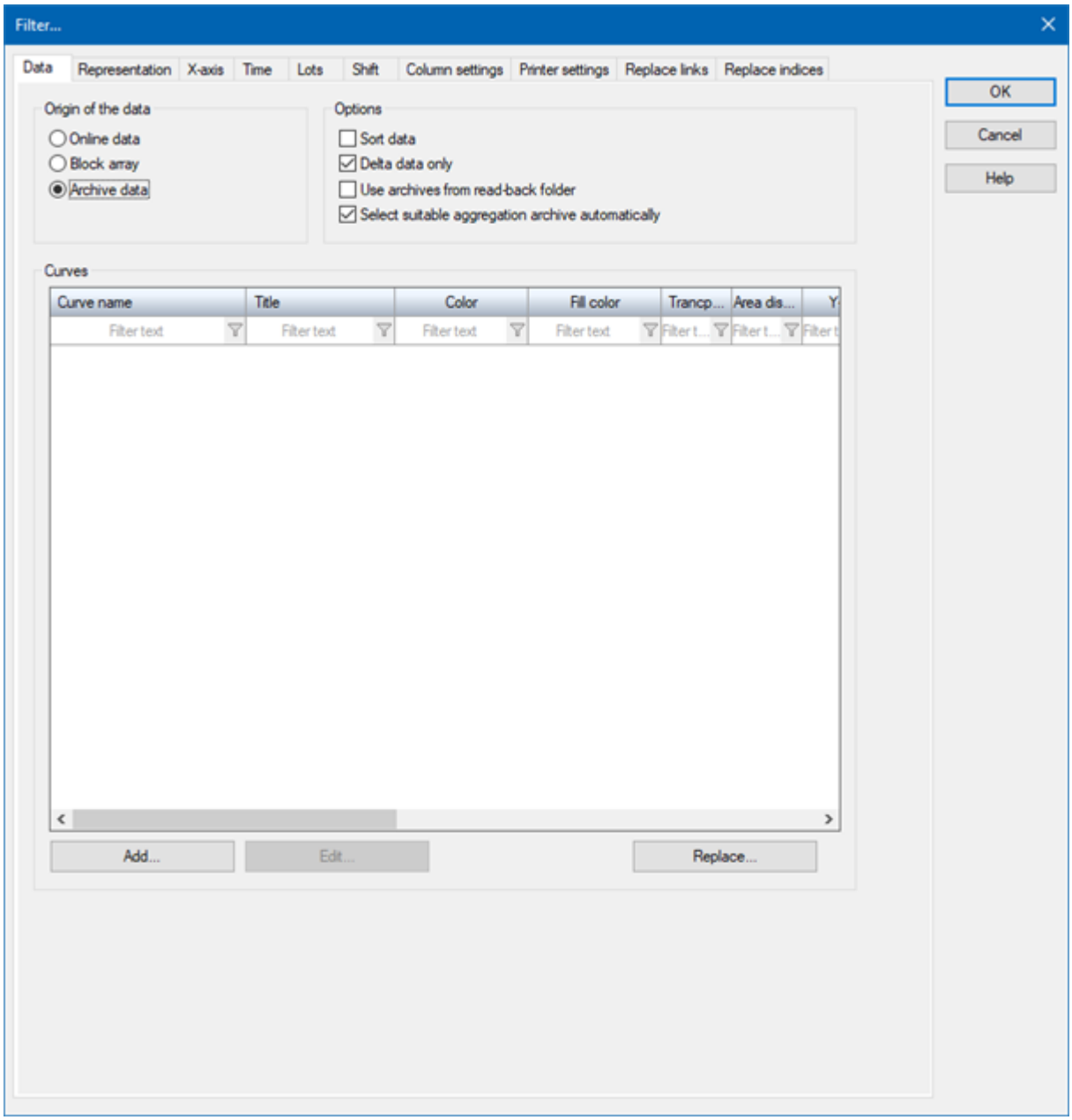
Example: MyVarREAL_4;;978.45000000;;SPONT;09.09.2011 09:37:44.443

Attention

If many curves are selected for export, the data collection can require a considerable amount of time.

4.4 Chart settings

Temporary changes can be made in Runtime from the existing configuration made in Editor. These are not saved.
To open the dialog for configuration, click on the **Diagram** button.



The configuration options are in general the same as when screen switching in Editor (on page 16).

Important amendment options:

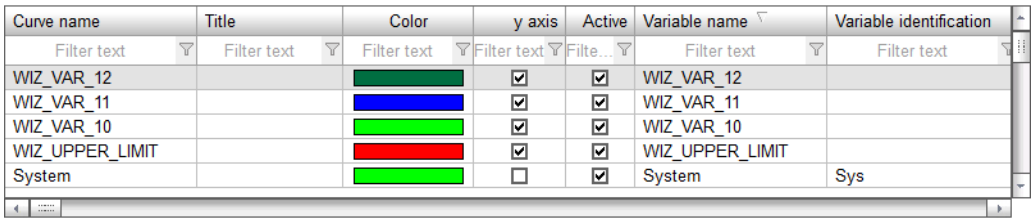
Option	Description
Data: Curves -> Active	Activates and deactivates the display of the curve.

Option	Description
Data: Curves -> Y axis	Representation of the curve's y-axis
Data: Curves -> Editing	Editing the settings of the selected trend curve.
Column settings	Settings of the diagram parameters.
Representation: Design	User defined font for x- and y-axis labeling and value indication
Representation: Update	Updating of the diagram for online data
Printer settings: **Header and footer, heading and comment**	For printing an Extended Trend diagram, additional information can be configured for the header and footer, as well as a heading and comments. Four buttons are available for easier input: ▸ Date: Output takes place according to the **Regional format** setting in the operating system. ▸ Time: Output takes place according to the **Regional format** setting in the operating system. ▸ Diagram name ▸ Page number

Note: Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Screen switch - Extended Trend** function or the **Print Extended Trend diagram** function. The functions assume a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.

4.5 Editing of curves in the extended curve list

If the extended curve list is configured in the Editor, the expanded curve list can be edited in the Runtime.



If you want to edit the list directly using the monitor, activate the Multi-Touch functionality. You can find detailed information in relation to this in the Configure interactions chapter.

It is possible:

- To filter for:
  - Activation
  - Color
  - Curve name
  - Sorting order
  - Title
  - Variable name
  - Variable identification
  - Y-Axis
  - Source
- To edit curve names
- To edit titles
- To edit colors
- To activate or deactivate the Y-axis
  Note: Inactive if in the screen switch function in the dialog Trend curve settings (on page 108), the **Visibility variable** option is activated and a variable is linked. This dialog can be opened in the screen switch function in the **Data** tab under the option **trend curves** by clicking on the **Add** or **Process** button.
- To activate or deactivate curves
  Note: Inactive if in the screen switch function in the dialog Trend curve settings (on page 108), the **Visibility variable** option is activated and a variable is linked. This dialog can be opened in the screen switch function in the **Data** tab under the option **trend curves** by clicking on the **Add** or **Process** button.
- To change the display sequence

If you want to display longer texts in a list in the Runtime, activate the checkbox of the **Automatic word wrap** property beforehand in the properties of the corresponding list under the **Representation** node. The line height must be amended manually (on page 127).

Information

The extended curve list cannot be displayed with Windows CE and is replaced by the normal curve list.

You can find information on the start/end of an axis and on the line type in the table columns:

- **Axis from**: Start of the axis
- **Axis to**: End of the axis
- Line type: Display of the curve in the Runtime

The table columns are available:

- In the Editor in the **Filter...** dialog in the **Column Settings** tab under **Column selection... (on page 98).**
- In the Runtime in the **extended curve list**
- In the Runtime in the **Curves** dialog (on page 107)

ACTIVATION/DEACTIVATION OF TABLE COLUMN HEADINGS

1. In the Runtime, click on the **Settings...** button:
   The **Filter...** Dialog is opened.
2. Click on the Column Settings tab.
   The tab is opened.
3. Click on the **Column selection...** button.
   The **column properties** dialog is opened.
4. Under **available Columns**, highlight all list entries that are to be available in the Runtime as table column headings.
5. Click on the **Add->** button.
   The selected list entries are applied in **Selected Columns**.
   Alternatively, you can also click on **Add all->** to apply all list entries.
6. Click on **OK** to accept the selection.
7. Close the dialog by clicking on **OK**.
   The selected table column headings are displayed in the Extended Trend.

SORT CURVES

The sequence in which the curves are logged in the ETM can be defined:

- In the Editor: when configuring the screen switch function, in the Data (on page 18) tab, in the configuration of the curve list
- In the Runtime: in the extended curve list window

In order to be able to change the sequence, the **Sequence** column must be displayed in the curve list and it must be sorted according to this.

IN THE RUNTIME

To change the sequence in which the curves are drawn:

1. Click in the extended curve list window.
2. Select the curve to be changed.
3. Click in the cell of the **Sequence** column.

4. Enter the desired number. The other curves are rearranged automatically. A low position means that the curve is drawn earlier (displayed further back); a higher position means that the curve is drawn later (displayed further forwards):
   - Minimum: *1*
   - Maximum: Number of curves

Sorting is carried out by clicking on the column header. Sorting according to other columns as a **sequence** does not have an effect on the sequence of the curve display.

USE OF THE ACTIVATE CURVE, ACTIVATE AXIS AND CURVE COLOR BUTTONS

With multiple selection of curves in the **curve list**, the following rules are applicable for the use of the **Activate Curve** and **Activate Axis** buttons:

1. If the respective checkboxes (**Y-axis** or **Active** column) have been activated for all selected curves, they are deactivated by clicking on one of the two buttons.
2. If the respective checkboxes (**Y-axis** or **Active** column) have been deactivated for all selected curves, they are activated by clicking on one of the two buttons.
3. If some checkboxes (**Y-axis** or **Active** column of the selected curves have been activated and some deactivated, the respective checkboxes of the curves are activated the first time a button is clicked on. The behavior described in points 1 and 2 is applicable for all subsequent clicks.
4. If there is a visibility variable linked, the availability of the **activate curve** is controlled with the linked variable.
   If several curves are selected, the status of the buttons (active/inactive) depends on the settings of the corresponding visibility variables.
   Example: If a curve with visibility variables for the curve and the axis has been selected and a curve without visibility variables has been selected, both buttons are activated.

Note: All three buttons are inactive if no curve has been selected in the **curve list**. The **Curve Color** button is also inactive if more than one curve has been selected.

Information

If the old and the new list are present together in the screen, the pre-set rules are only applicable for the extended curve list.

DRAG&DROP

Under certain circumstances, the curve list can be sorted in the Editor and in the Runtime by means of Drag&Drop:

1. Sort the list according to the **Sequence** column.

Attention: The list is also sorted according to a sequence when it is first shown. However for Drag&Drop, the column header must be explicitly clicked for sorting! It has no effect whether sorting is ascending or descending.

2. Ensure that there are no groupings.
3. Click in the line with the desired curve.
4. Drag the curve to the desired place. The place where it is inserted is shown with a red border.

DESIGNING CHECKBOXES WITH GRAPHICS

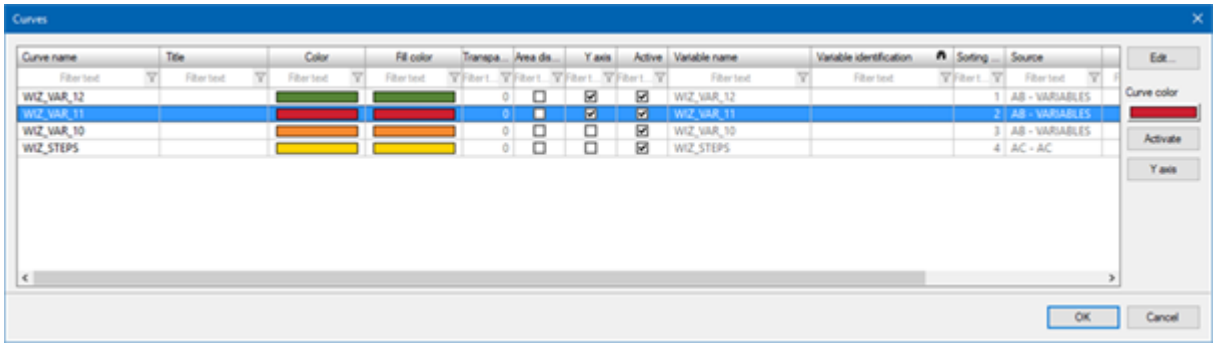
Checkboxes with graphics can be designed individually. To do this, assign the desired graphics to the corresponding properties of the curve list in the editor. The graphics must already be created in the **Files\graphics** node. Properties to be configured in the **Representation** group:

- **On**
- **On (inactive)**
- **Off**
- **Off (inactive)**

The defined graphics are drawn in the Runtime with the aspect ratio being taken into account.

4.5.1 Editing of curves in the Curves dialog

You can edit curves in the **Curves** dialog.



You can edit the curves in the Runtime in the list or in their full extent using the **Edit...** button.

To edit curves in the Runtime:

1. Open the **Curves** dialog by clicking on the **Curves...** button.

   Note: The button must be configured (on page 107).
2. Click in the line of the desired list entry to highlight it.
3. Click on the **Edit...** button.

The dialog to edit the curve (on page 108) is opened. Make the desired changes.

4. Confirm the changes by clicking on **OK**.
5. Close the dialog by clicking on **OK** or **Cancel**.

Note: The view of the columns in the curve list in the Runtime can be defined in the Editor in the screen switch function in the column selection and column format dialogs.

Option	Description
Edit...	Opens the **Filter...** Dialog to edit the entry in the curve list.
Curve color	Shows the set color of the curve. This can also be changed.
Activate	Allows the activation / deactivation of the checkbox of the **Active** property of the highlighted curve in the list entry of the curve list. ▸ *active:* Dialog is displayed in the Runtime ▸ *inactive:* Curve is not displayed in the Runtime **Note:** Multiple selection is possible.
Y-Axis	Allows the activation / deactivation of the checkbox of the **Y-axis** property of the highlighted curve in the list entry of the curve list. ▸ *active:* Y-axis is displayed in the Runtime ▸ *inactive:* Y-axis is not displayed in the Runtime **Note:** Multiple selection is possible.

CLOSE DIALOG

Option	Description
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.

4.6 Filter for screen switch

The filter settings configured in screen switching can be modified in the Runtime. For that

1. Open the screen switching function in the Editor.
2. Activate the **Offer this dialog in the Runtime** option in the **Display** tab.

in the Runtime, the following is displayed when the screen is called up, depending on the configuration:

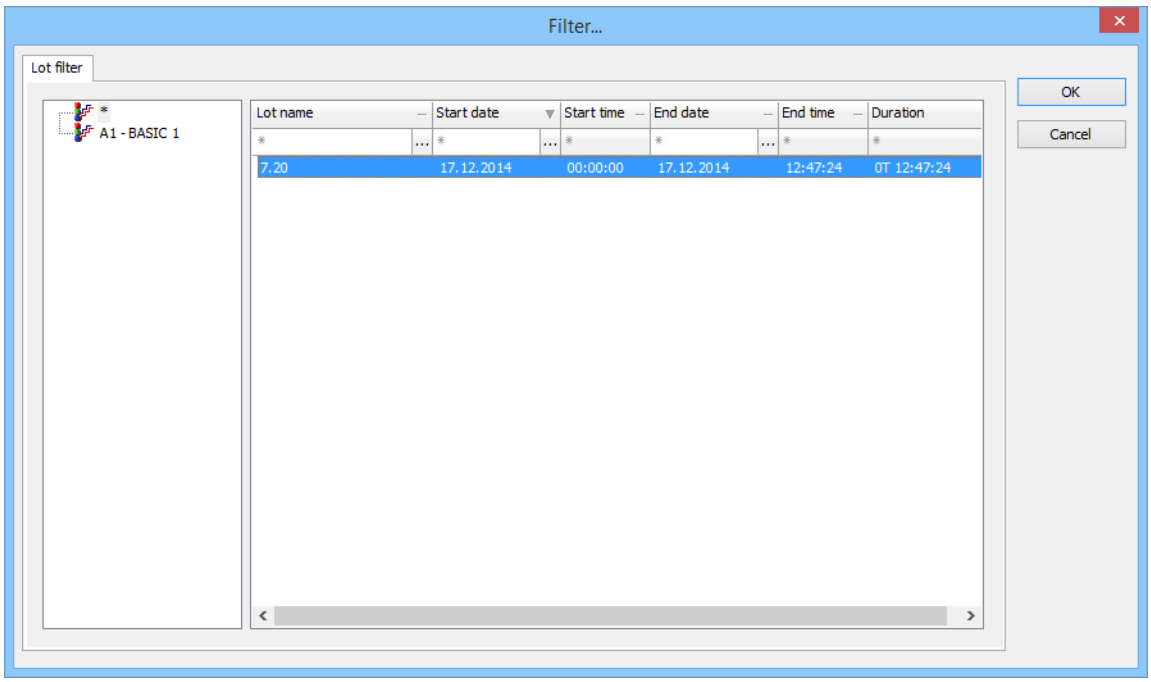
- Complete configuration dialog
- Lot filter activated: Lot filter is offered
- Lot filter deactivated, **time range** time filter: Time filter is offered

CONFIGURATION OF LOT FILTER

If you set option *no time filter* as time filter type, all Runtime entries since 1. 1. 2000 are displayed.

Attention

All configured lot archives are offered in the list of archives. The same archive as in the screen switching must be selected here. Only then is data also displayed.



Parameter	Description
Lot filter	Selection of the recipe group that is to be imported. The filter consists of the two lists: ▸ **List of archives:** List of archives ▸ **List of lots:** List of lots allocated to the selected archive.
List of archives	Selection of the desired archive node *:

Parameter	Description
	▸ Collects all lots of the displayed archive. ▸ The key is the lot name. ▸ The start time is the start time of the earliest lot. ▸ The end time is the latest end time of all lots.
List of lots	Display of the lots allocated to the selected archive. Filtering through entry of text, date, time or rime range - depending on type. Sort by clicking on the header.
Lot name	Displays the name of all available lots. Filter: Entry of a character sequence. Only lots matching the respective character string will be displayed.
Start date	Shows the start date of all available lots. Filter: Entry of a start date or selection from a calendar.
Start time	Only available if you entered a start date. Display of the start time of all available lots. Filter: Entry of a start time. ***** means *12:00:00 AM* o' clock.
End date	Shows the end date of all available lots. Filter: Entry of an end date or selection from a calendar.
End time	Only available if you entered an end date. Display of the end time of all available lots. Filter: Entry of an end time. ***** means *11:59:59 PM* o' clock.
Duration	This column displays the duration for each available lot. Display only.

Information

Still open lots are also displayed if they match the set filter criteria.

Information

The value of the lot variable is written in the index file and in the header of the ARX file at the start of the lot. These entries are adjusted with every change of the variable. When the lot is closed, the value of the lot variable at this moment is finally written in the index file and in the header.

Thus the lot name is final when the lot is closed.

SQL

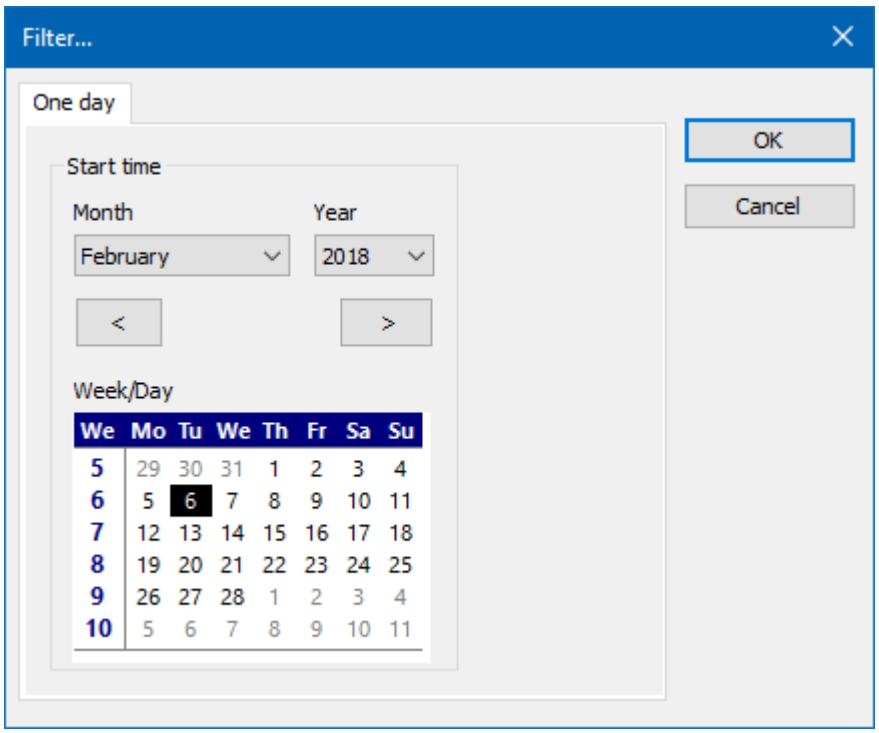
Lot filtering to archive values evacuated into SQL is carried out by means of a time filter. This time filter contains all values of the archive between the start time and end time of the lot. The lot start time and lot end time are also included. Milliseconds are not taken into account with this time filtering.

CONFIGURATION OF TIME RANGE

The filter dialog for the time setting can be offered in the Runtime as specialized for a time range. To do this:

1. Open the screen switching function in the Editor.
2. Click on **Filter**.
3. Open the Time tab
4. Select the **Time period** option.

In the Runtime, instead of the complete dialog, only one dialog to configure the time range is offered. For example, for the *One day* setting:



EXAMPLE

With this setting, individual time ranges, such as shifts, can quickly be called up and configured.

For example: Shift from 6:00 AM until 2:00 PM.

1. Select, as a time period: *One day*.

   As a default a day lasts from 00:00 till 00:00.

2. Set the postponement of the time range to *six hours*.

   Now the day lasts from 6:00 a.m. till 6:00 a.m. the next day.

3. Now set the time period to *16 hours*.

4. Keep the option **Deduct time**.

   This means that there will be back-calculation from 06:00 on the next day by 16 hours. Now the day lasts from 6:00 a.m. until 2:00 p.m., which corresponds exactly to a morning shift.

5. Transfer the new Runtime files.

6. Restart the Runtime.

7. Select the desired day in the screen switching.

You get the data of the selected day from 06:00 am to 2:00 pm.

DIFFERENT ARX AND SQL TIME FILTERS

Time filters for ARX and SQL act differently by default:

- SQL: Excludes and only shows the values up to the last value.
- ARX: Includes and shows all values including the last one.

EXAMPLE

These values are contained in the archive:

- *10:00:00.000*
- *10:00:01:000*

The filter covers *10:00:00.000* to *10:00:01:000*.

Result in SQL:

- *10:00:00.000*

Result in ARX:

- *10:00:00.000*
- *10:00:01:000*

4.7 Fast change of axis parameters in the online operation

To determine the value of displayed curves precisely, the X-axis and Y-axis can be moved. Moving is possible by means of:

- Dragging & dropping with the left mouse button
  - Moving the x-axis vertically
  - Moving the y-axis horizontally
    The y-axis is duplicated when moved: The original axis remains in place when the copy is moved.
- Click on the axis with the right mouse button to open the configuration dialog:
  - X-axis tab ‚YT display (on page 46)
  - Y-axis dialog (on page 113)

The movement is reset when the screen is reopened.

4.8 Display differences of data in Runtime

DISPLAY DIFFERENCES DEPENDING ON THE OUTSOURCING METHOD

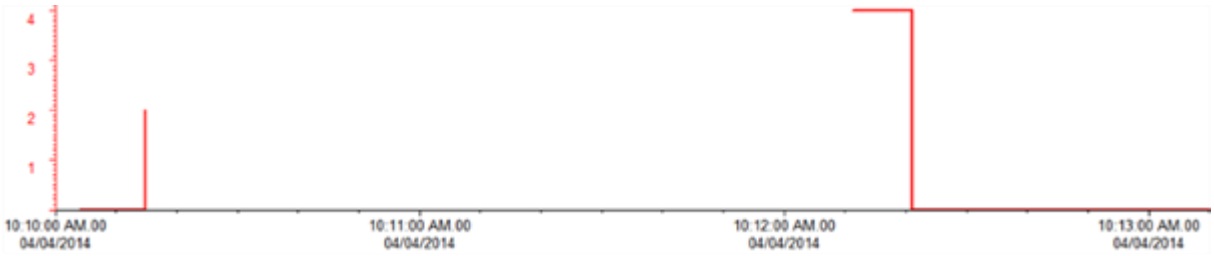
The display of data from outsourced archives in Runtime depends on the configured outsourcing method:

- ARX evacuation method
  The trend draws a constant line between a change to a value
  Evacuated archives without value changes are not connected. There is an empty space during display in the Runtime.
- SQL database evacuation method
  The trend draws a constant line between a change to a value.
  Evacuated archives are connected to one another.

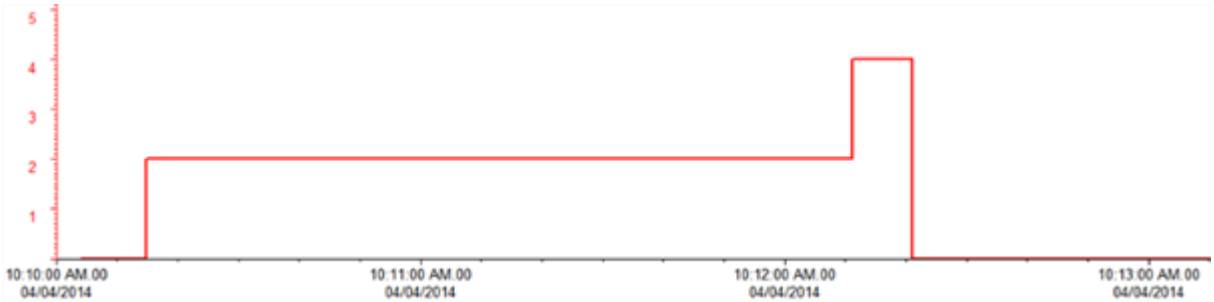
Following example:

- Recording type:
  On value change
- Saving cycle:
  Cyclical, each minute

EXAMPLE FOR ARX EVACUATION METHOD



EXAMPLE FOR SQL DATABASE EVACUATION METHOD



DIFFERENCES IN DISPLAY OF NON-CONTINUOUS ARCHIVE FILES

Points within the same archive file are always linked.

Points from different archive files are only connected in certain cases:

- the archive files follow immediately upon each other.
  The end time of the first archive file is the start time of the second file.
- The interval between the last two items in the first archive file is greater than the interval between the end time of the first file and the start time of the second file.

4.9 Archive variable selection for X axis

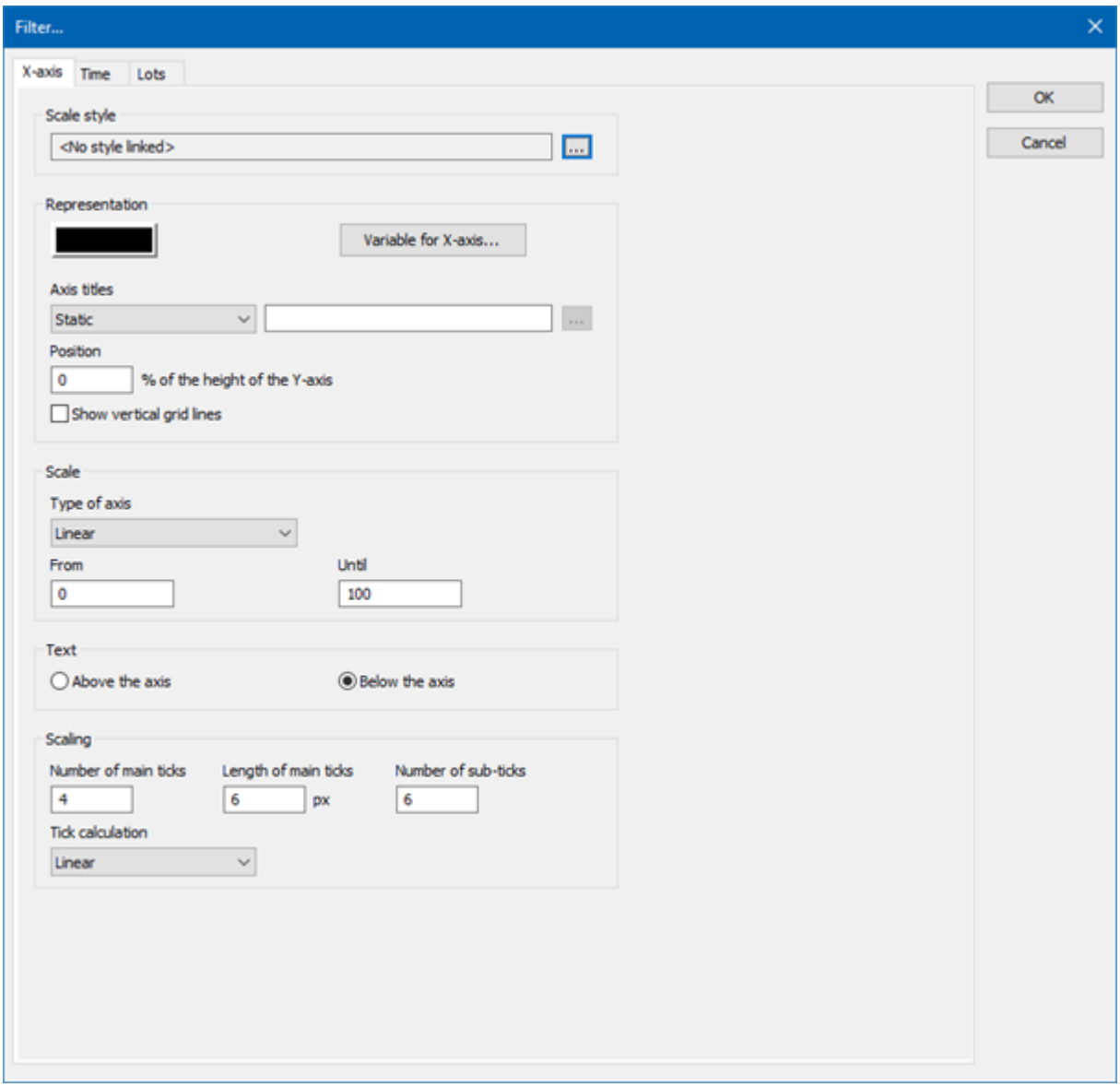
You can select a variable from an archive in the Runtime in order to use this as the X-axis in an XY display.

Note: A requirement for this is that the preparatory work has already been carried out in the Editor. You can find details on this in the Preparatory work for variable selection of the X-axis in the Runtime (on page 58) chapter.

Engineering:

1. Click on a diagram function in the Runtime (for example **X-axis...**).

The **Filter** dialog is opened.



2. Click, in the **X-axis** tab under **Display**, on **Variable for X-axis...**.

   The **Archive variable selection** (on page 56) dialog is opened.

3. Select the desired variable by highlighting it with the left mouse button.
4. Confirm the selection by clicking on the **Insert** button.
5. Close the selection dialog by clicking on **OK**.
6. Select the name of the axis title. The following possibilities are available for selection:
   - **Static**
   - **From variable**
   - **Variable name**

7. Close the **Filter...** dialog by clicking on **OK**.

4.10 Calling up an ETM screen by means of a context menu

ETM screens can be called up using a context menu in Runtime for dynamic elements.

The corresponding variable is shown as a curve in the **Extended Trend** screen.

The corresponding configuration (on page 15) must be carried out in the Editor beforehand.

Engineering:

1. Right-click on the dynamic element with the context menu to call up an ETM screen.

   The context menu is opened.

2. Click on the context menu with the left mouse button.

   The ETM screen is opened. The variable of the dynamic element is already visible in the curve list and crated as a curve.