COPA-DATA
do it your way

zenon manual

Extended Trend

v.7.10

Contents

1. Welcome to COPA-DATA help

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 (mailto:documentation@copadata.com).

PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com (mailto: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 (mailto:sales@copadata.com).

2. Extended trend

The Extended Trend module 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 ETM 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. The module must have been licensed to use the function.

License information

Must be licensed for Editor and Runtime (single-user, Server, Standby and Client).

Note: An ***Extended Trend Starter Edition*** *with limited functionality is already included in the standard license.*

EXTENDED TREND STARTER EDITION

The standard license of the TAG based version on the PC includes a reduced version of the Extended Trend Module. The Starter Edition is based on the standard Extended Trend Module.

The Extended Trend Module Starter Edition has the following limitations:

- no XY trend
- no second time axis
- number of curves limited to 8
- no logarithmic representation
- no scanning

For additional limitations on use in Windows CE projects, the zenon 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 ETM 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 function to an Extended Trend Module screen with 10 curves. The Trend screen will be opened, but you will not see any curves.

LICENSING

The Extended Trend Module Starter Edition on the PC can be upgraded to the full Extended Trend Module version at any time, without compatibility problems. If you have licensed both the Starter Edition and the full

version, you will get access to all functions of the full version.
The Starter Edition is not available for versions with I/O based licenses.

For the Windows CE 6.0 Runtime, the Extended Trend Module Starter Edition is available in combination with the Historian Starter Edition. None of the two modules are available for any older Windows CE versions.

2.1 Engineering in the Editor

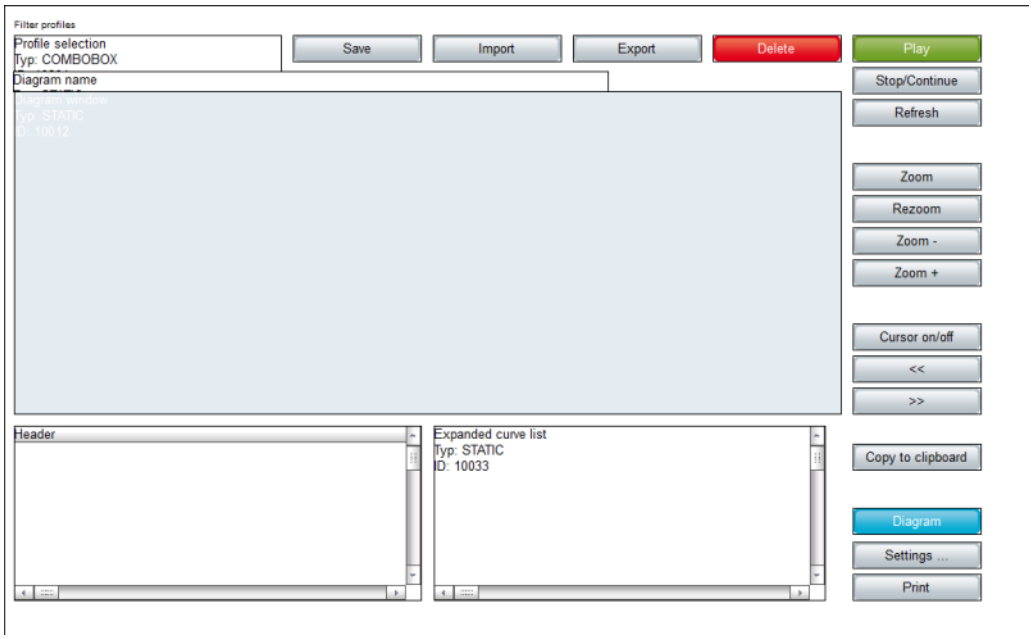
2.1.1 Creating screens of type Extended Trend

Extended Trend is operated in Runtime with the help of an Extended Trend (on page 6) **screen**. This screen must be created in the editor first.

To create an **Extended Trend** screen:

1. Select, in the toolbar or in the context menu of the **Screens** node, the **New Screen** command
2. An standard empty screen is opened
3. Change the screen type in the detail view; to do this:
   a) click on **Standard** in the **Screen type** column
   b) Select **Extended Trend** from the drop-down list
4. Click in the screen.
5. Select the **Control elements** menu item in the menu bar
6. Click on **Add template** in the drop-down list
7. The standard elements are inserted

8. Select additional elements as required and insert them into the desired place on the screen



Element	Description
Add 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 locations 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 dragged onto the screen. Elements can be moved on the screen and arranged individually.
Windows	Representations.
Diagram window	Window to display trend curve
Diagram name	displays diagram name
Cursor output window	Shows the position of the cursor in the diagram window and the values set in diagram settings and cursor output (on page 29)
Curve list	Drop-down list of curves.
Extended curve list	Curve list that can be edited in Runtime (on page 81): ▸ Curve name ▸ Title ▸ Color ▸ Y-axis ▸ Active Note: Not available under Windows CE and is replaced by the normal curve list there.
Display: Set filter	Displays the status of the current time filter in Runtime.
Buttons	pre-defined control elements
Diagram button	Change diagram parameters
Curve button	Change curve parameters
Diagram settings	activates the dialog (on page 29) for diagram settings and cursor output
Zoom button	Zoom display

Rezoom button	Reduce display
Zoom +	reduces display time intervals
Zoom -	Increases display time intervals
Zoom to 100%	Sets zoom factor to 100%. This zoom action is saved in the zoom history. This means: If a selected area of the Extended Trend is zoomed to twice using **Zoom** after this **Zoom into content at 100%** is selected and then a selected area is zoomed to again; there are then 4 zoom events in the history. This function can be gone back to again using the **Rezoom** function.
Refresh button	Update display
Back buttons	Scroll backward on the time axis (history)
Forwards button	Scroll forward on the time axis (current)
Stop button	Do not update screen
Play button	Update screen
Cursor on/off	Query values
Double cursor on/off	Display (on page 72) values that are between two cursors.
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.
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.
Print	Prints diagram. **Note:** Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Print extended trend diagram** function. The function assumes a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.
Print dialog	Choose the printer before printing out the diagram.

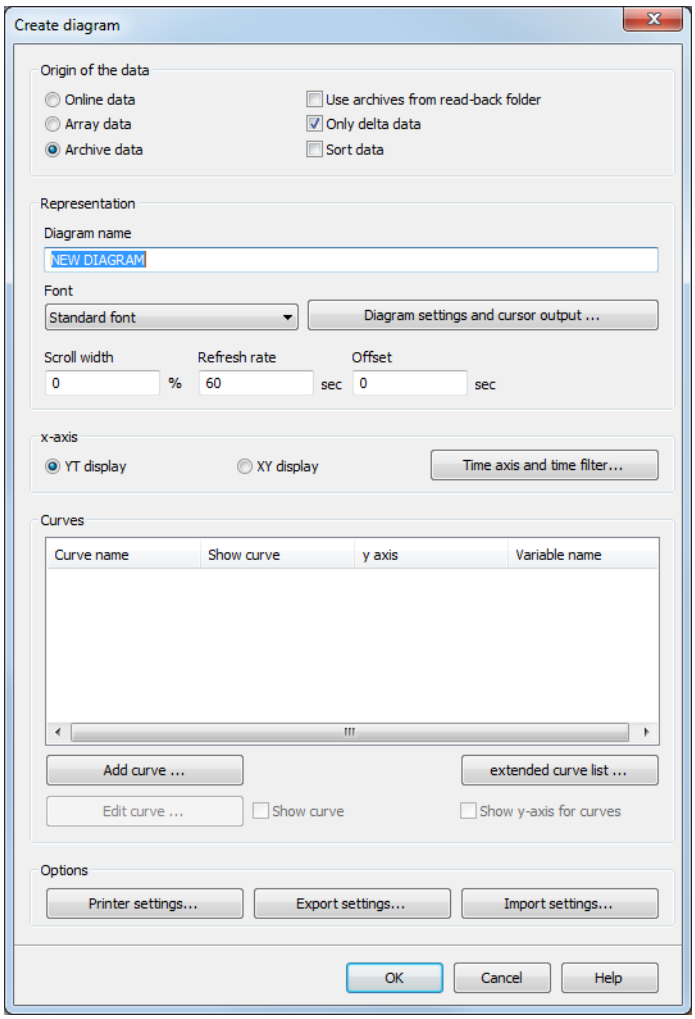
Copy to clipboard	Copy representation into the intermediate store.
Backwards one quarter button	Moves the time period displayed back by a quarter of the unit selected.
Forwards one quarter button	Moves the displayed time period forwards by a quarter of the unit selected.
X axis button	opens the dialog (on page 35) for X axis settings.
Export data displayed	exports (on page 80) all visible data of all curves as a CSV file.
Filter profiles	Profile administration.
Profile selection	Select saved profile.
Save	Save settings as profile.
Delete	Delete profile.

Info

*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 key, the movement is carried out in 10-pixel increments.*

2.1.2 Creating a new diagram

To set up a new diagram, configure screen switching for the `Extended Trend` screen. In doing so, the dialog for configuration of the diagram is opened:



Configurable options are:

Parameter	Description
Origin of the data	Selection of the data origin.
`Online data`	Use the current online values and saved values for display in diagrams.
`Array data`	Use variables with array values for display in diagrams. The display of variables with array values works just like the XY display. However, you may not select a time filter or X variable. In the X axis

	(on page 35) dialog, you enter the corresponding array indices of the source data on a scale `from` and `to`. **Note:** Array data does not mean array variables, but the `Block array size` property, which can be set for a variable.
`Archive data`	Use the archive values (ARX format or SQL data) which are stored in the database to display in diagrams. **Info**: Archives in XML, dBase or TXT formats are no longer displayed after the storage cycle has expired.
`Use archives from read-back folder`	Only available if you have selected the `Archive data` option field. The historical data from the readback folder is used for the display.
Delta data only	`Active`: When switching or updating the trend, only archives with amended data are loaded.
Sort data	`Active`: The data is sorted with a time stamp after loading. **Note:** The use of this option can impair the performance, because the data must be re-sorted each time. **Recommendation:** Use this option if the data comes from an external source and it cannot be ensured that the sequence is correct.
Representation	Settings for the display.

`Diagram name`	Freely configurable diagram name; can be displayed in the control element.
	If the string in the diagram name contains this character combination %c%, it is replaced by the batch names which fulfill the filter criteria in the Runtime. For example:
	`Diagram name = Diagram1_%C%_end`
	this leads in the Runtime to
	`Diagram1_batch1_end`

`Font`	Selection or setting of the user defined font for the axis labels and the value indicators
`Diagram settings and cursor output`	Opens the dialog to make further settings for the display of the diagram (see diagram settings and cursor output (on page 29)).
`Scroll width [%]`	Definition of the screen scrolling if the right edge of the diagram has been reached.

	Attention: Only for diagrams with online values.
Refresh rate [s]	Set the refresh rate in seconds. ▸ The value must be greater than 0 for online data and array data. ▸ The screens cannot be loaded statically for online data or array data. ▸ For archive data, the refresh rate automatically adapts to the loading time of the data. If loading lasts longer than half of the refresh interval, the refresh rate is doubled. Alternatively, the value for Refresh rate can be set to 0. This results in the displayed data not being updated. This setting is helpful if a large amount of data is to be displayed in the ETM. If, in this case, Refresh rate is set to a low value, this can lead to an infinite loop. **Optimize refresh rate:** When reading archive data, a log message is created at the start and the end by the server (also standalone) and the client. The log message can be read with the help of the Diagnosis Viewer. With this it can be determined how long the reading lasts and the Refresh rate and be defined accordingly.
Offset [s]	Moving the zero point of the time axis to the stated value in seconds.
X-axis	Options for the X axis.
XT display	Representation of the curves over time.
XY display	Representation of the curves with another variable.
X axis and time filter/time axis and time filter	Opens the dialog for X axis/time axis settings and the time filter (see X axis and time filter (on page 31)). The engineering of the time period is carried out similar to the engineering of the time filter in AML and CEL (see chapter Time filter in manual Alarm Message List).
Curves	Options for the curves.
Add curve	Opens the dialog to select variables.
Delete curve	Click on this button to delete selected curves.
Extended curve	Opens **Column settings** dialog **(on page 56)** for configuration of

list	the columns for the extended curve list (on page 81).
Edit curve	Opens the dialog for curve settings and the settings for the Y axis (see Edit curve).
Display curve	For each selected curve, you can decide, using the checkbox, if it should be displayed when the diagram screen is loaded. If you deactivate this checkbox, you can then select the curve in the **Extended Trend** screen and have it shown. The first **x** on the right, next to the curve name indicates if you have activated the checkbox for this curve.
Display Y axis for the curve	For each selected curve, you can decide if the Y axis for this curve should be displayed when the diagram screen is loaded using the checkbox. If you deactivate this checkbox, you can then select the Y axis for the curve in the **Extended Trend** screen and have it displayed. The second **x** on the right, next to the curve name indicates if you have activated the checkbox for this curve.
Options	Additional settings.
Print settings	Opens the print settings dialog. You can either print diagrams or save them as a file (see Print diagram (on page 69)).
Export settings	Exports the diagram parameters that have been set (variables,frames, times etc.) as a DRG file.
Import settings	Imports the diagram parameters that have been set (variables,frames, times etc.) from a DRG file.
OK, Cancel, Help	Buttons for the confirmation of the setting, cancel and call help. **Note:** Button **OK** is active when at least one curve has been engineered.

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, which can then be freely activated in Runtime.

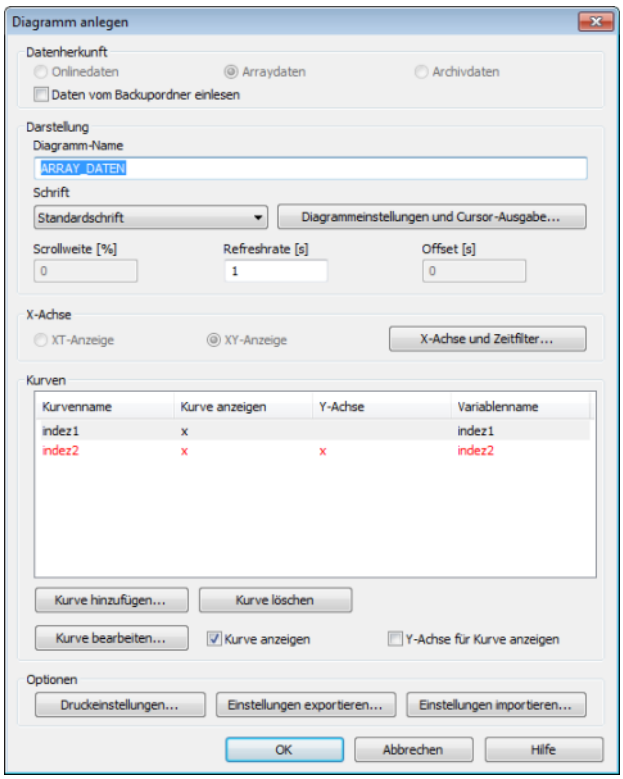
> **Info**
>
> *You can limit the display of variables to those that are based on a driver that supports variables with array values using the `array data` option.*

ARRAY DATA

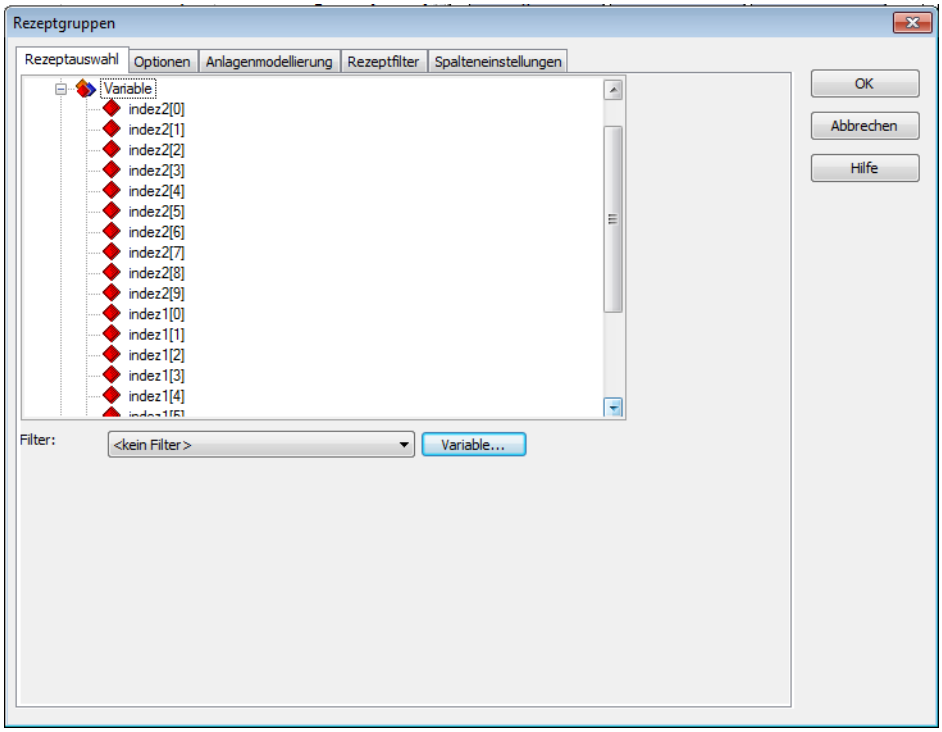
To set up variables with array data:

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

- Select, for the **`screen switching`** function, the `array data` property on the ETM screen:

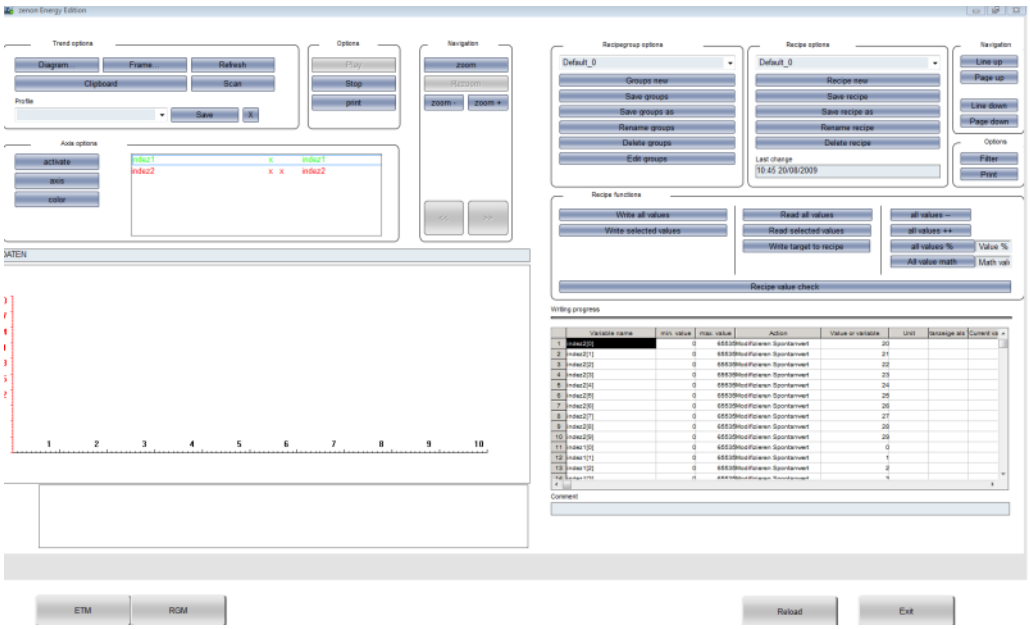


It can be seen in the variable view of the RGM that each variable exists as a block of 10 (0 to 9):

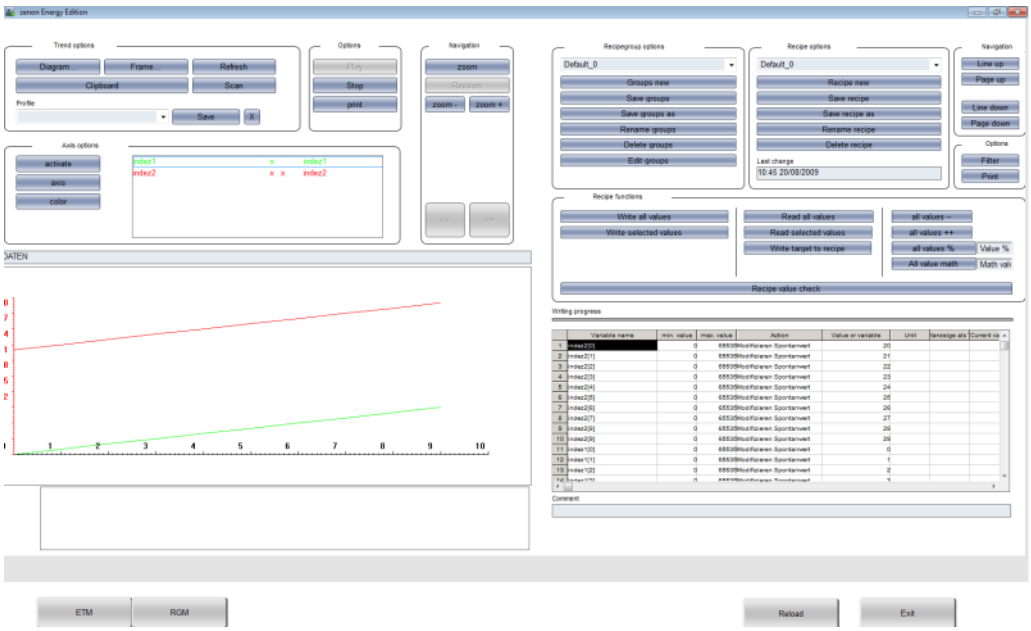


RESULT IN RUNTIME

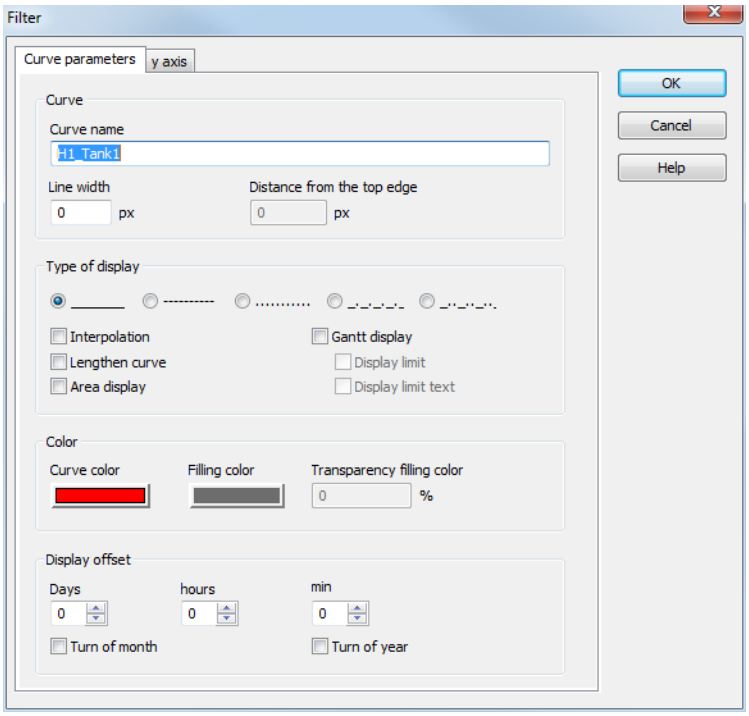
The ETM screen is still empty when Runtime is started:



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



Curve settings



For each trend curve the curve features can be parameterized.

Parameters	Description
Curve	
Curve name	Freely definable curve name. The variable name is entered by default. **Note:** Subsequent amendment of the variable name has no influence on the existing curve names.
Line width [Pixel]	Defines the width of the curve in pixels.
Distance from the top frame [Pixel]	Only available for Gantt display. Define the distance in pixels from Gantt chart to the top diagram frame.
Display type	Definition of line type for trend curve. Possible formats: ▸ Line ▸ Dashes ▸ Dots ▸ Dash-dot ▸ Dash-dot-dot **Note**: If, in the Graphics quality property, Windows basis was selected, only solid lines can be displayed in Extended Trend for a line width of greater than 1.
Interpolation	Values connected by poly-lines (supporting positions). If the option is not set then the value changes are shown as line jumps (stepped representation).
Lengthen curve	The curve is lengthened from the last available datapoint to the current moment.
Area display	The values are displayed as areas instead of lines.
Gantt display	Activates the Gantt display for this curve. The curve name is used as labeling For details on limitations, seethe Gantt display (on page 20) and Y-axis parameters (on page 22) sections.
Display limit	Only available for Gantt display. The numerical limit is displayed.
Display limit text	Only available for Gantt display. The description of the limit value is displayed.

Color	
Curve color	Defines the curve color.
Filling color	Defines the filling color. This is only effective if you selected area display.
Transparency of the filling color [%]	Defines the transparency of the filling color. With this you can avoid that curves are overlaid by curves with area display. 0 equals no transparency. 100 equals complete transparency. Note: Not available for Windows CE.
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.
Month change	Moves the curve by a month.
Turn of year	Moves the curve by a year.

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 limits 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.

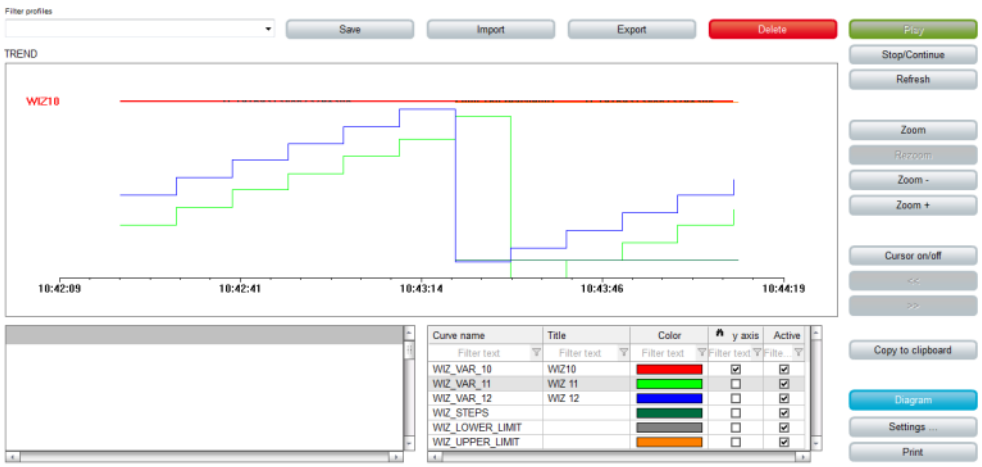
As a basis for the color of the respective Gantt charts the violated limit or reaction matrix is used. In doing so, the currently-configured limits and states of the **Reaction matrix** are always used for this. If you change them, even historic evaluations are displayed with the current values. There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

CURVE PARAMETERS

The following applies for curve parameters:

- The curve name is used as labeling
- Parameters are set in the **curve settings** tab:
  - Distance from the top edge: A negative value must be entered here to display the curve in Extended Trend.
  - Display limit
  - Display limit text

  If the options Display limit and Display limit text are used together, the display is:
  Limit text/limit value
- Settings for the labeling are set in the Y-axis (on page 22) tab:
  - Color
  - Position in % of the width of the X-axis (measured from the left)

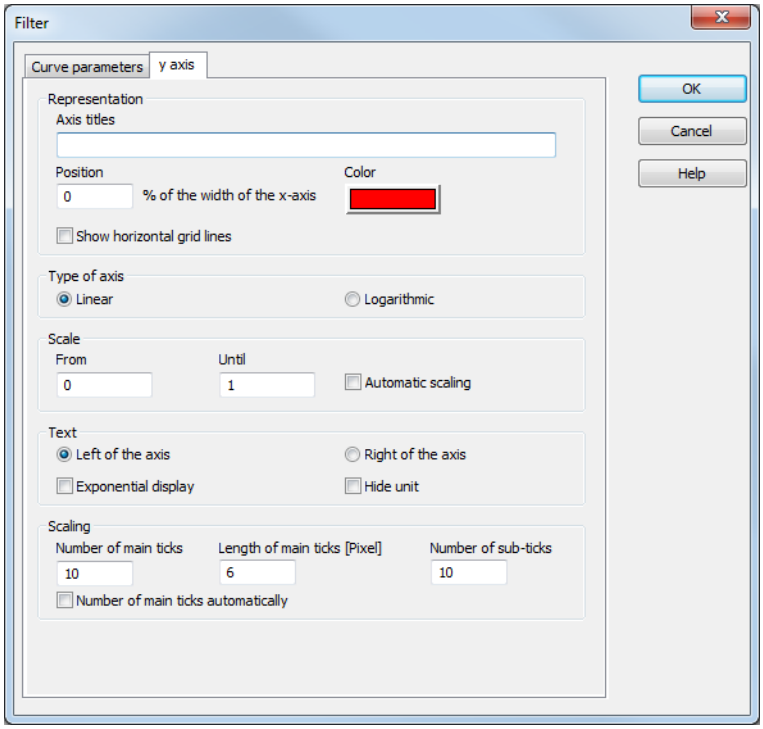


The following Y-axis settings are not available for Gantt displays:

- Display horizontal grid line
- Axis type
- Scale
- Exponential display
- Axis subdivision

Y axis parameter

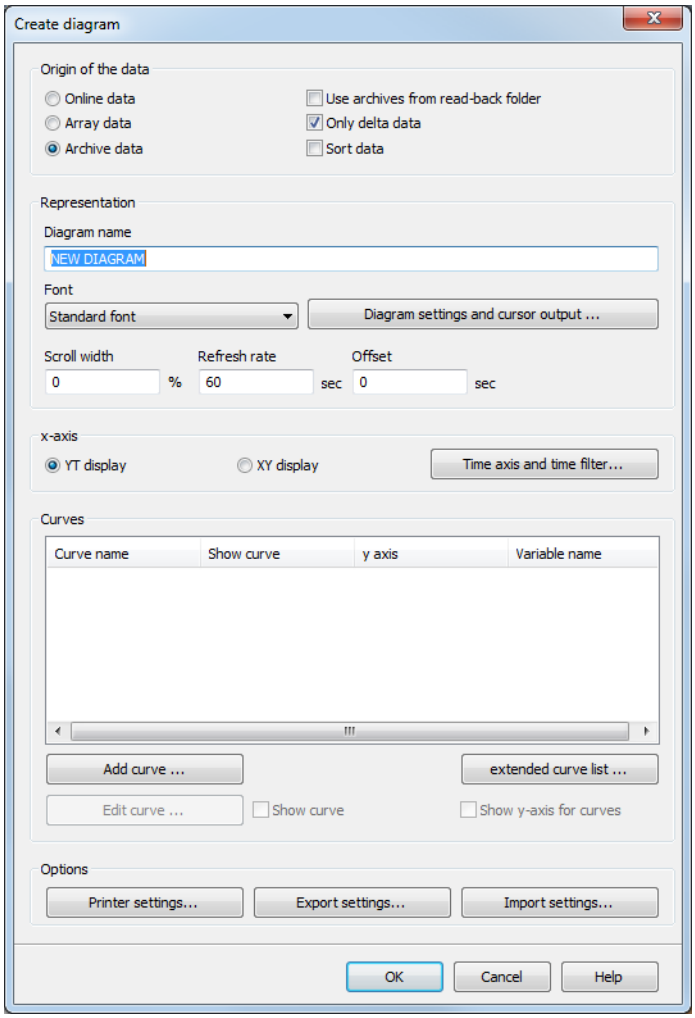
The curve parameters are defined this dialog and the curve parameters (on page 18) dialog.



Parameters	Description
Representation	Parameters for display of curves in Runtime.
Axis title	Name of the axis.
Position	Positioning of the Y-axis on the X-axis in percentage of the length of the X-axis. ▸ 0 = left, ▸ 100 = right
Color	Definition of the axis color. **Attention:** Can be configured independently of the trend curve color.
Display horizontal grid lines	Display of help lines on the main ticks. (not available for Gantt display.)
Axis type	Defining of the scaling of the Y-axis. (not available for Gantt display.)
Linear	Linear division of the Y-axis. (not available for Gantt display.)
Logarithmic	Logarithmic division of the Y-axis
Scale	Define representation range of the process variables within their configured technical limits (zoom function). (not available for Gantt display.)
From	Scaling start value. Default: −32768
Until	Scaling end value. Default: 32768
Automatic scaling	Active: The scaling of the axis is automatically determined for this curve in Runtime. The min/max values of the area to be displayed are used as axis limits. If the checkbox is activated, the input fields for the scaling (From/To) are no longer available for individual configuration.

Labeling	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.)
Axis subdivision	Definition of the axis subdivision. (not available for Gantt display.)
Number of main ticks	Number of main ticks with value indication.
Length of main ticks (in pixels)	Length of main ticks in pixels.
Number of sub ticks	Number of subdivisions between two main ticks.
Number of main ticks automatic	Automatic setting of scaling and axis subdivision during online operation.

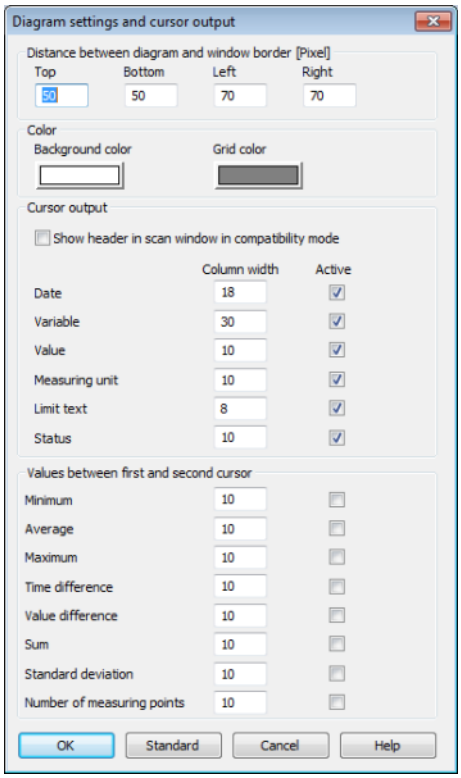
After the configuring of the trend curves and the associated Y-axis parameters, the new trend curve is accepted into the diagram by pressing the "OK" button. It is displayed in the diagram as an available trend curve (trend curve name, process variable name).



For each trend curve the corresponding type of processing (active, with Y-axis) has then to be laid down. The configuring is done by marking the trend curve in the window and setting the appropriate option .

Diagram settings and cursor output

With the help of button **`Diagram settings and cursor output`** you can define additional settings for the display of the diagram.



The following settings are available.

Parameters	Description
Distance diagram to window frame [Pixel]	
Top	Distance between the upper edge of the control element and the trend curves represented inside it. (**Attention**: Room for later optional showing of stored details with active pointer)
Bottom	Distance between the lower edge of the control element and the X-axis (Origin 0%-Y-axis) (**Attention**: Room for two-line labelling of the X-axis for the configured user defined font)
Left	Distance between the lower edge of the control element and the X-axis (Origin 0%-Y-axis) (**Attention:** Room for the left-hand side labelling of the Y-axis for the configured user defined font)
Right	Distance between the lower edge of the control element and the X-axis (Origin 100%-Y-axis) (**Attention:** Room for the right-hand side labelling of the Y-axis for the configured user defined font)
Colors	
Background color	Background color of the graphics displayed
Grid color	Color of the overlying grid
Cursor output	
Display header in the scan window in compatibility mode	Active: For zenon versions before 6.51 SP0, column headings are shown for "scan window in compatibility mode". Is used to display converted projects in Runtime, for example. Not necessary for projects from version 6.51 onwards. All column titles are displayed in the **Scan list**.
Date	Column width for the time stamp in the cursor output list. With the help of the checkbox you can activate this column.
Variable	Column width for the variable name in the cursor output list. With the help of the checkbox you can activate this column.
Value	Column width for the value in the cursor output list. With the help of the checkbox you can activate this column.
Unit	Column width for the unit of measurement in the cursor output list. With

	the help of the checkbox you can activate this column.
Limit	Column width for the limit in the cursor output list. With the help of the checkbox you can activate this column.
Status	Column width for the status in the cursor output list. With the help of the checkbox you can activate this column.
Values between first and second cursor	
Minimum	Colum width of the minimum between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Average	Colum width of the average value between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Maximum	Colum width of the maximum between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Time difference	Colum width of the time difference between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Value difference	Colum width of the value difference between first and second cursor in the cursor output window. With the help of the checkbox you can activate this column.
Sum	Colum width of the sum of the measuring points between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Standard deviation	Colum width of the standard deviation between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.
Number of measuring points	Colum width of the number of the measuring points between first and second cursor in the cursor output list. With the help of the checkbox you can activate this column.

> **Info**
>
> *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 earlier than 6.51 SP0, you can insert the respective cursor output list after you selected the desired Runtime version.*

Customize view of cursor output list

The appearance of 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 the report:

1. In project properties, select the `Extended graphical settings` property in the `Representation` group
2. Define the desired properties in the groups `Scroll bars` and `Header and grid` for the Alarm Message List element on the screen

> **Info**
>
> *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.*

SORTING IN RUNTIME

To mark the relevant column for sorting in 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 properties `Sort ascending` and `Sort descending` each with a graphics file
3. in the Runtime the selected graphic for the corresponding sorting order is displayed in the column which is relevant for the sorting
4. Click on the graphic in order to change the sorting order
5. Click on header in order to activate the column for sorting

OPERATE HEADER IN THE RUNTIME

You can enable users to operate the header in the Runtime. With this an individual adjustment of the display in the Runtime is possible:

- Move columns
- Change size
- Changing sorting.

To do this, navigate to `Alarm Message list` group in the settings and select, in the `Header AML` property, `Operable headers`. Alternatively, you can also switch the header to inoperable or invisible here.

These settings apply for all headers in the project.

> **Info**
>
> *You can prohibit the manipulation and/or the visibility of the header for each screen Alarm Message List by deactivating the property `Show header` or `Make header editable` for the tabular view.*

PREVIEW

By activating the `Extended graphical settings` property in the Editor, the header and scroll bars can be previewed. This way, details such as color fill effects, light effects or grids can 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.

Engineering the time or value axis (x-axis)

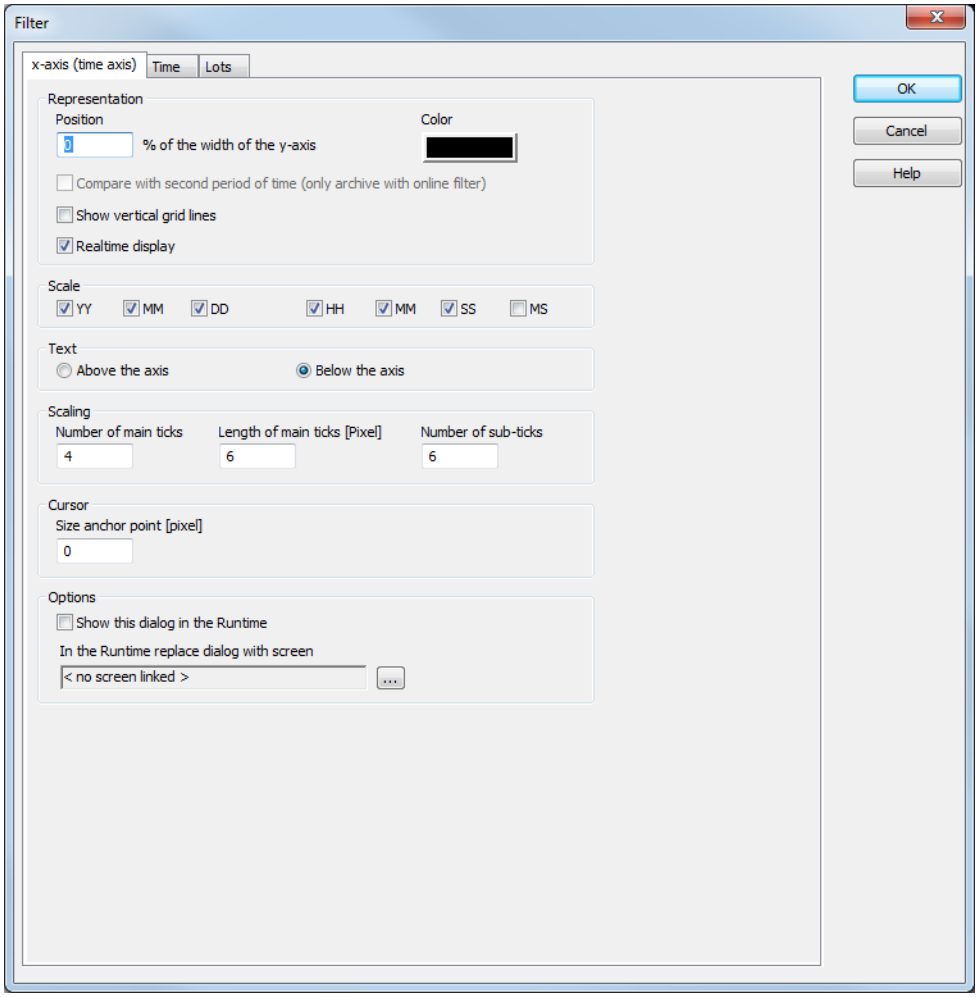
The X-axis can be used in two different configurations.

- `x-axis (time axis) (on page 32)`**:** 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 35)`**:** Display of the values over a process or a derived variable (local curves, operating points etc.).

To configure the X-axis:

1. Select, in the **`X-axis`** area in the screen switching dialog, the display type (`YT display`, `XY display`)
2. Click on the **`Time axis and time filter`** button
3. define the desired properties
4. Confirm with **`OK`**
   (if, with the selection of **`online data`** time parameters are different from the values configured in the `Harddisk data storage` group, suitable settings that you can accept are offered by a dialog (on page 67).)

YT display

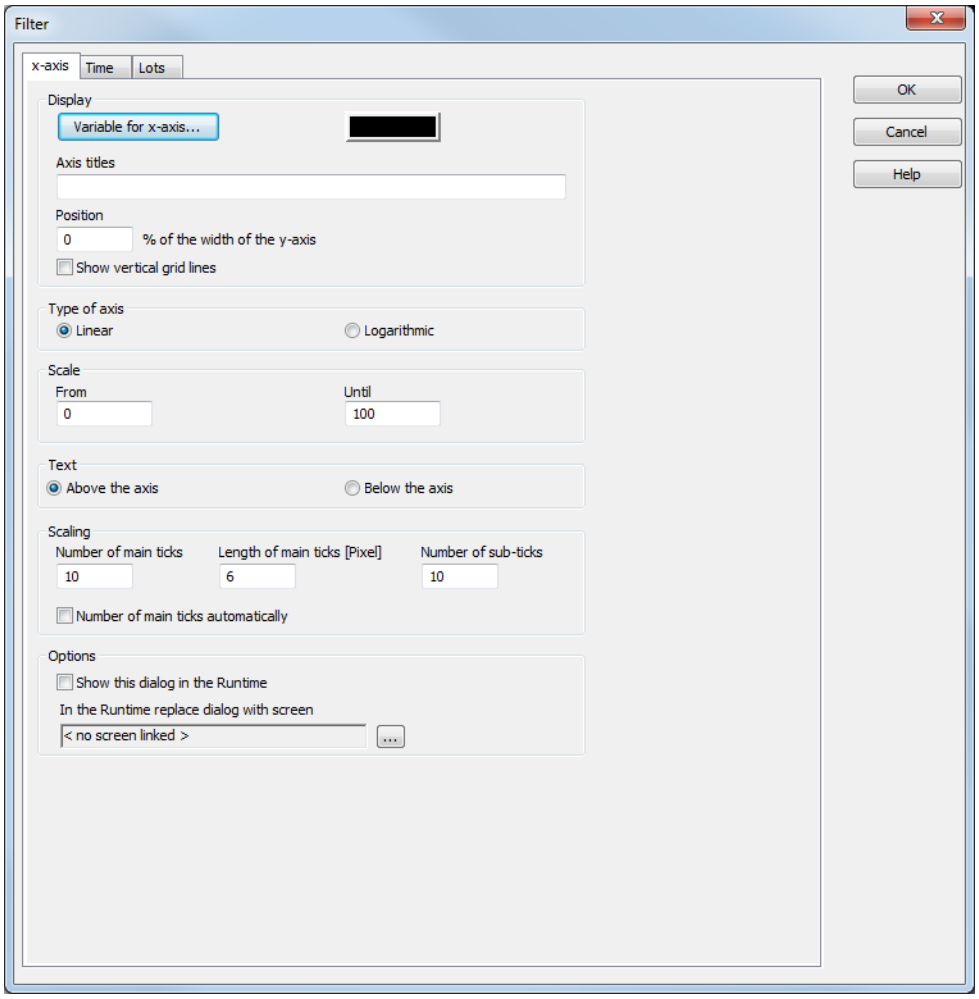

Filter
x-axis (time axis)
Time
Lots
Representation
Position
% of the width of the y-axis
Color
Compare with second period of time (only archive with online filter)
Show vertical grid lines
Realtime display
Scale
YY
MM
DD
HH
MM
SS
MS
Text
Above the axis
Below the axis
Scaling
Number of main ticks
Length of main ticks [Pixel]
Number of sub-ticks
4
6
6
Cursor
Size anchor point [pixel]
0
Options
Show this dialog in the Runtime
In the Runtime replace dialog with screen
< no screen linked >
...
OK
Cancel
Help

Parameter	Description
Position	Position of the X-axis in relation to the height of the Y-axis. Percentage value between 0 and 100. For example: 0 %: at the lower end of the Y-axis. 100 %: at the upper end of the Y-axis. 50 %: in the middle of the Y-axis.
Color	Definition of the axis color. **Note:** Can be configured independently of the trend curve color.
Comparison with 2nd Period	Active: Display comparison with a second time period. Only possible for archives with online filter. Two time ranges are displayed at the same time for each per archive variable (e.g. comparison over a week). Two trends are opened when switching; the second time range is displayed on the opposite labeling side of the time axis in the grid line color.
Display vertical grid line	Active: Display of help lines on the main ticks.
Real-time display	Active: The axis must already have time markers. Inactive: The switching time is defined as 00:00 and is labeled relatively in the past ... -01:00
Scale	Defines values of the scale using checkboxes: JJ: Year MM: Month DD: Day HH: Hour MM: Minutes SS: Second MS: Millisecond
Labeling	Position of the axis labeling
Above the axis	Axis labeling above the axis
Below the axis	Axis labeling below the axis

Axis subdivision	Definition of the axis subdivision
Number of main ticks	Number of main subdivisions with value indication
Length of main ticks	Length of the main subdivision lines (pixel)
Number of sub ticks	Number of subdivisions between two main subdivisions
Cursor	Display of cursor.
Size of sizing handle [in pixels]	*Diameter of the circle-shaped sizing handle displayed in the middle to make it easier to use the rulers, such as in touch operation.* ▸ 0: no sizing handle (compatible with projects from versions before version 7) ▸ >0: Sizing handle is displayed according to the value entered *Default: 0 pixel* *Maximum: 100*
Options	
Show this dialog in the Runtime	This dialog is opened in Runtime. Attention: In contrast to the function for switching to AML or CEL, this option is only evaluated after being switched. A dialog is only offered with **Extended Trend** if: ▸ The time filter is a time range ▸ The time filter type Absolute was configured without specification in the editor ▸ The time filter type Relative was configured without specification in the editor All other time filters are switched directly.
In the Runtime replace dialog with screen	Replaces the dialog with a time filter screen in Runtime. The currently-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 filter screens are offered. When selecting a filter screen, the **BOX SCREEN** information is also shown in the detail view of the function in the **Parameter** column; without a linked

	screen, only **BOX** is displayed.
OK	Applies all changes and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	*Opens online help.*

XY display



Parameters	Description
Variable for X-axis	Selection and marking of one of the process variables allocated to the diagram. It is used for the X axis.
Color	Definition of the axis color. **Note**: Can be configured independently of the trend curve color.
Axis title	Text of axis labeling in Runtime.
Position	Position of the X-axis in the diagram (0=bottom, 100=top).
Display vertical grid line	Active: Display of help lines on the main ticks.
Axis type	Definition of the scaling of the X-axis.
▸ Linear	Linear division of the X-axis.
▸ Logarithmic	Logarithmic division of the X-axis.

Scale	Define representation range of the process variables within their configured technical limits (zoom function).
Labeling	Position of the axis labeling:
Above the axis	Values are displayed above the axis.
Below the axis	Values are displayed below the axis.
Axis subdivision	Definition of the axis subdivision.
Number of main ticks	Number of main subdivisions with value indication.
Length of main ticks	Length of the main subdivision lines (in pixels).
Number of sub ticks	Number of subdivisions between two main subdivisions.
Number of main ticks automatic	Automatic setting of scaling and axis subdivision during online operation.
Options	
Open this dialog in the Runtime	This dialog is opened in Runtime. Attention: In contrast to the function for switching to AML or CEL, this option is only evaluated after being switched. A dialog is only offered with **Extended Trend** if: ▸ The time filter is a time range ▸ The time filter type Absolute was configured without specification in the editor ▸ The time filter type Relative was configured without specification in the editor All other time filters are switched directly.
In the Runtime replace dialog with screen	Replaces the dialog with a time filter screen in Runtime. The currently-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 filter screens are offered. When selecting a filter screen, the **BOX SCREEN** information is also shown in the detail view of the function in the **Parameter** column; without a linked screen, only **BOX** is displayed.

OK	Applies all changes and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	*Opens the online help.*

Attention

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 11) in the diagram
- Deactivate the display for this curve
-

Info

If, with online values, the target parameters are different from those configured in the `Harddisk data storage` group, suitable settings that can be accepted are offered by a dialog (on page 67).

Time

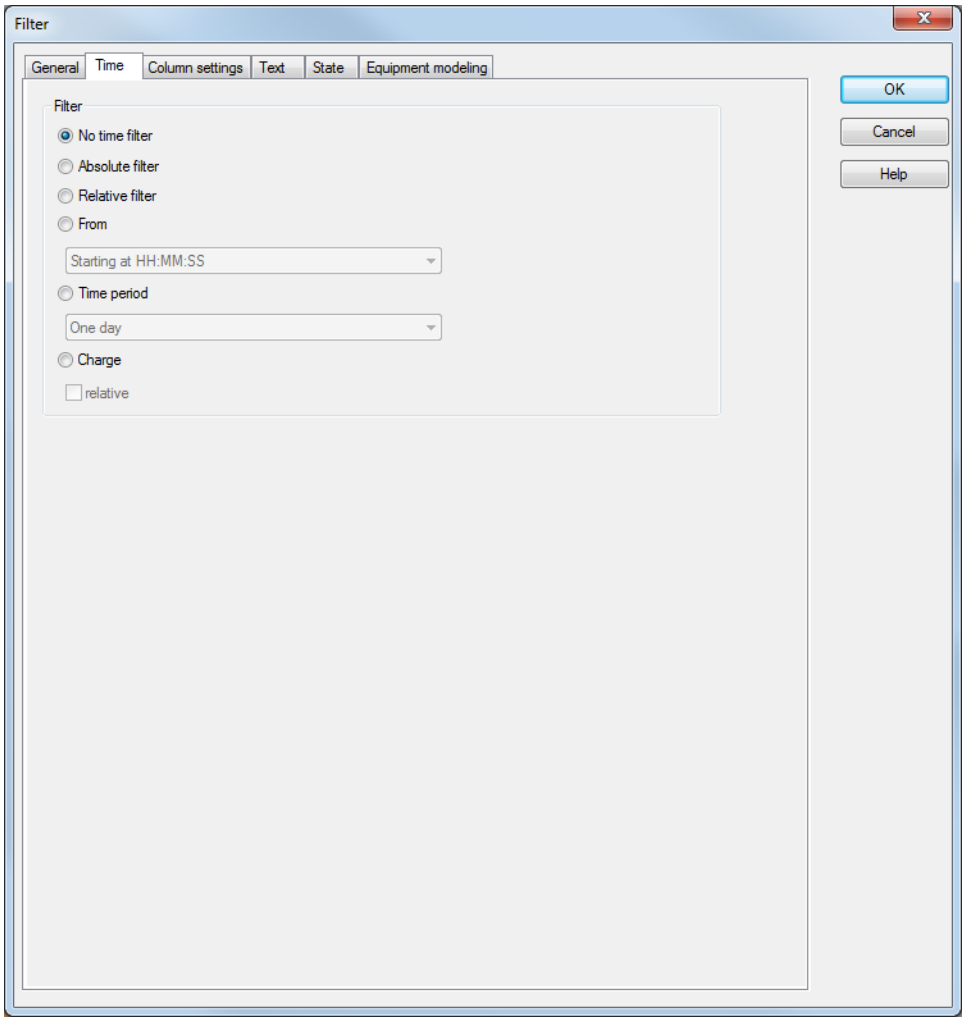
Time filters make it possible to limit the data to be displayed or exported. The time filters are very flexible to implement and can be pre-set in the editor or adjusted in Runtime.

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

The mechanisms described here are applicable for screen switching as well as export for:

- Alarm Message List
- Archive revision

- Chronologic event list
- Extended trend (on page 4)
- Filter screens
- Report Generator
- Report Viewer
- Function Export Archives.



Time filtering can be carried out in two ways:

1. Define time period in the Editor

   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 Runtime.

2. Time filter amendable in Runtime
   Pre-defined times are used. The time filter is defined in the Editor and can be changed in Runtime as desired.

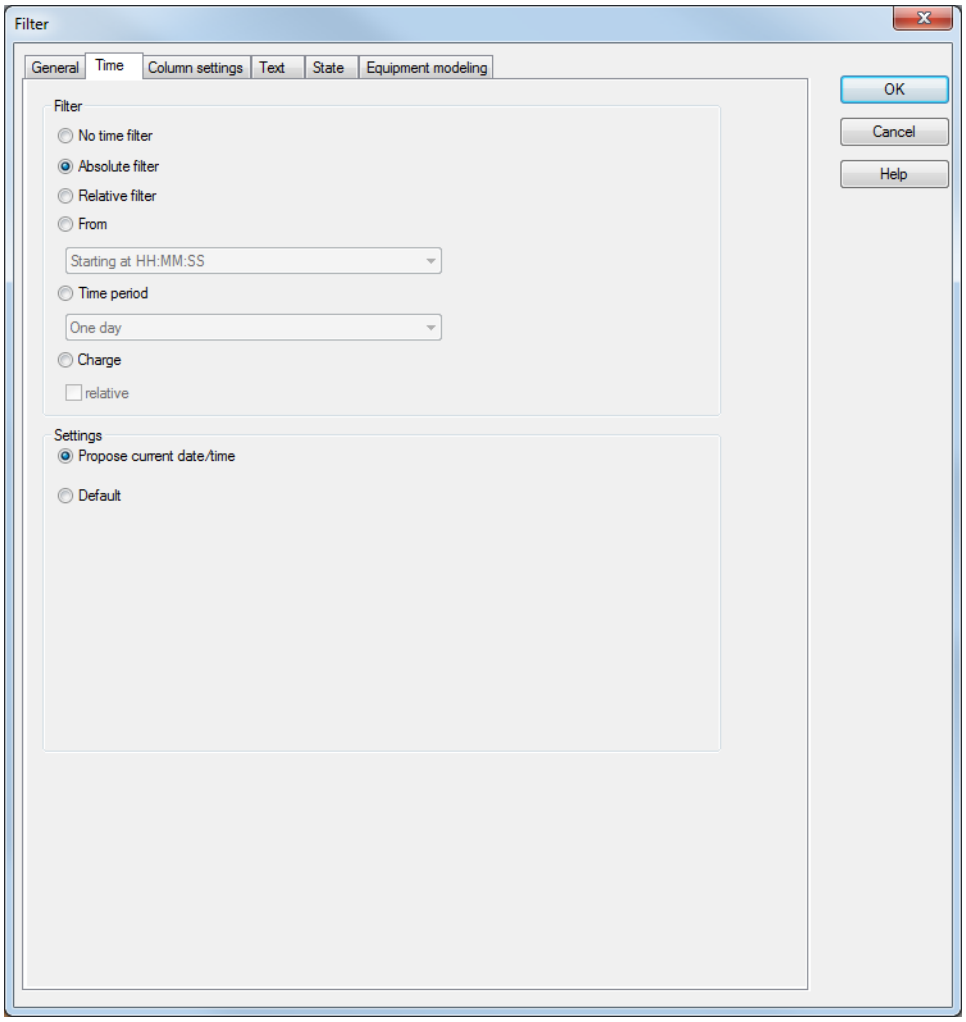
> **Info**
>
> *If a screen that does not have a time filter is referenced, the time filters are deactivated.*
>
> *For the setting* `Set filter for time filter type` *the option* `Display filter dialog in Runtime` *can be selected, but it is not available in runtime.*

Time filter can be modified as you will in the Runtime

With this method, you stipulate a time filter in the Editor. This can be amended in Runtime before execution. To create the filter:

1. create a picture switch function.
2. The screen must have **`Filter`** and **`Display filter`** buttons
3. select the desired filter:
   - Absolute filter
   - Relative filter
4. Select, in the **`Specification`** section, the option **`Propose current date/time`**

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



Parameters	Description
Filter	Selection of the filter.
No time filter	Active: No time filter is used. Not available for Extended Trend
Absolute filter	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 (on page 47) there. **Note:** Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.
Relative period of time	Active: A relative time period is entered. In the settings section, the corresponding options can be shown and configured (on page 50) there. **Attention:** this filter is constantly updated.
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 at HH:MM:SS ▸ Starting on day at HH:MM:SS ▸ Starting on day, month at HH:MM:SS In the settings section, the corresponding options can be shown and configured (on page 52) 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.
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 (on page 54) there.
Lot	Active: The dialog for lot selection is shown in Runtime. only available for Extended Trend, archive revision and reports.
relative	Active: Display always starts from zero point. Enables several lots to be compared directly. Only for **Extended Trend** and only available if the Lot option is activated.
OK	Applies all changes on all tabs and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens the online help.

Specify time area 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 Runtime. You can then only define the start time in 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 Runtime that are available in the **General** tab. It is still possible to filter for text, status and equipment.*

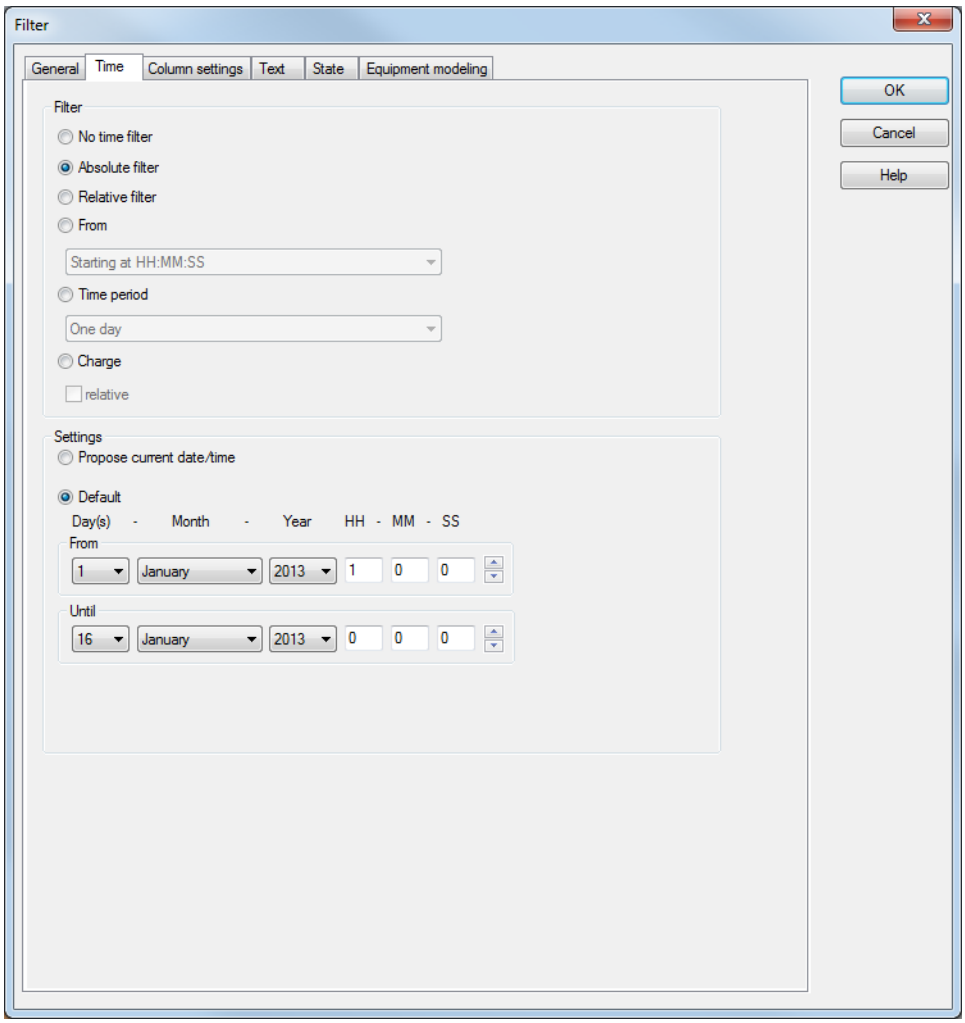
To create the filter:

1. create a picture switch function.
2. The screen must have the **Filter** button to start the filter in Runtime

Hint: Activate the `Offer this dialog in the Runtime` option in the **`General`** tab 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. select the desired filter:
    - Absolute filter
    - Relative filter

4. Configure the selected time period in the **Specification** section of the desired time range (see Absolute filter (on page 47), Relative Filter (on page 50) and Ab (on page 52) sections)



Parameters	Description
Filter	Selection of the filter.
No time filter	Active: No time filter is used. Not available for Extended Trend
Absolute filter	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 (on page 47) there. **Note:** Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.
Relative period of time	Active: A relative time period is entered. In the settings section, the corresponding options can be shown and configured (on page 50) there. **Attention:** this filter is constantly updated.
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 at HH:MM:SS ▸ Starting on day at HH:MM:SS ▸ Starting on day, month at HH:MM:SS In the settings section, the corresponding options can be shown and configured (on page 52) 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.
Time period	Active: A fixed time period is entered. Selection of the area mode from drop-down list: ▸ One day ▸ One week ▸ Two weeks

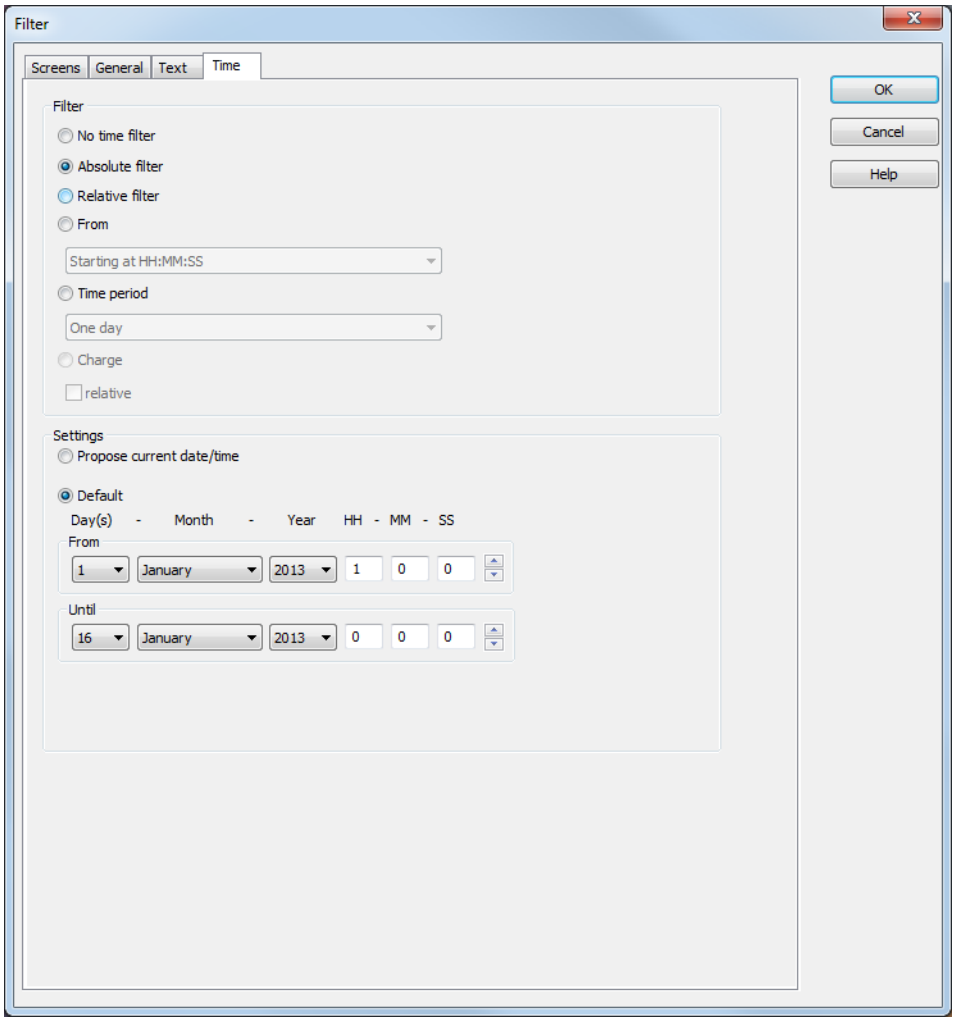
	▸ One month ▸ One Year ▸ 15 minutes ▸ 30 minutes ▸ 60 minutes In the settings section, the corresponding options can be shown and configured (on page 54) there.
Lot	Active: The dialog for lot selection is shown in Runtime. only available for Extended Trend, archive revision and reports.
relative	Active: Display always starts from zero point. Enables several lots to be compared directly. Only for **Extended Trend** and only available if the Lot option is activated.
OK	Applies all changes on all tabs and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens the online help.

Absolute filter

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

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



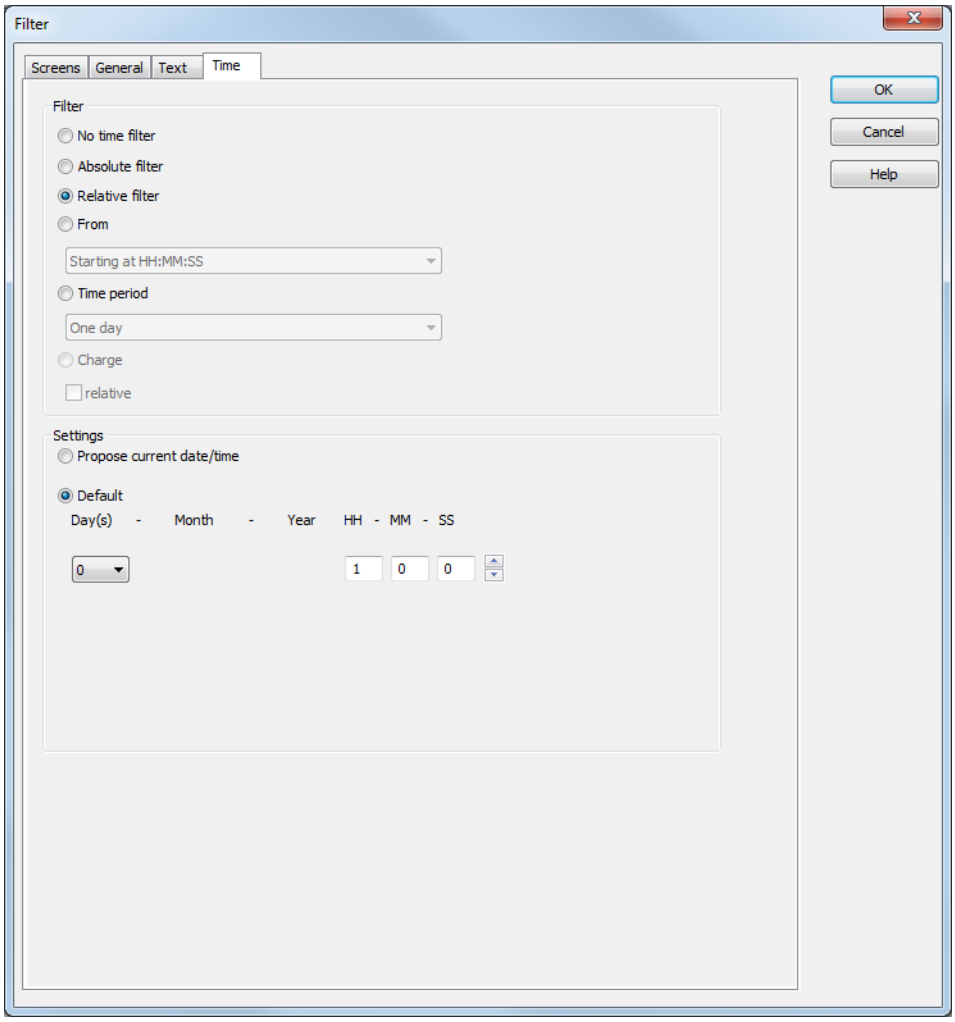
Parameter	Description
Settings	Configuration of the time filter.
Propose current date/time	Active: Time filter is displayed in Runtime.
Default	Active: The time filter is prescribed in the Editor. Only the start time can still be configured in Runtime.
From	Start time of the filter. Selection of day, month, year, hour, minute and second
Until	End time of the filter. Selection of day, month, year, hour, minute and second

Example: If you want to see all alarms from January 1, 2011 to December 31, 2011, then you must enter the corresponding data at From and To.

Relative filter

A relative time period is entered.

Attention: This filter is updated constantly and continues to run.

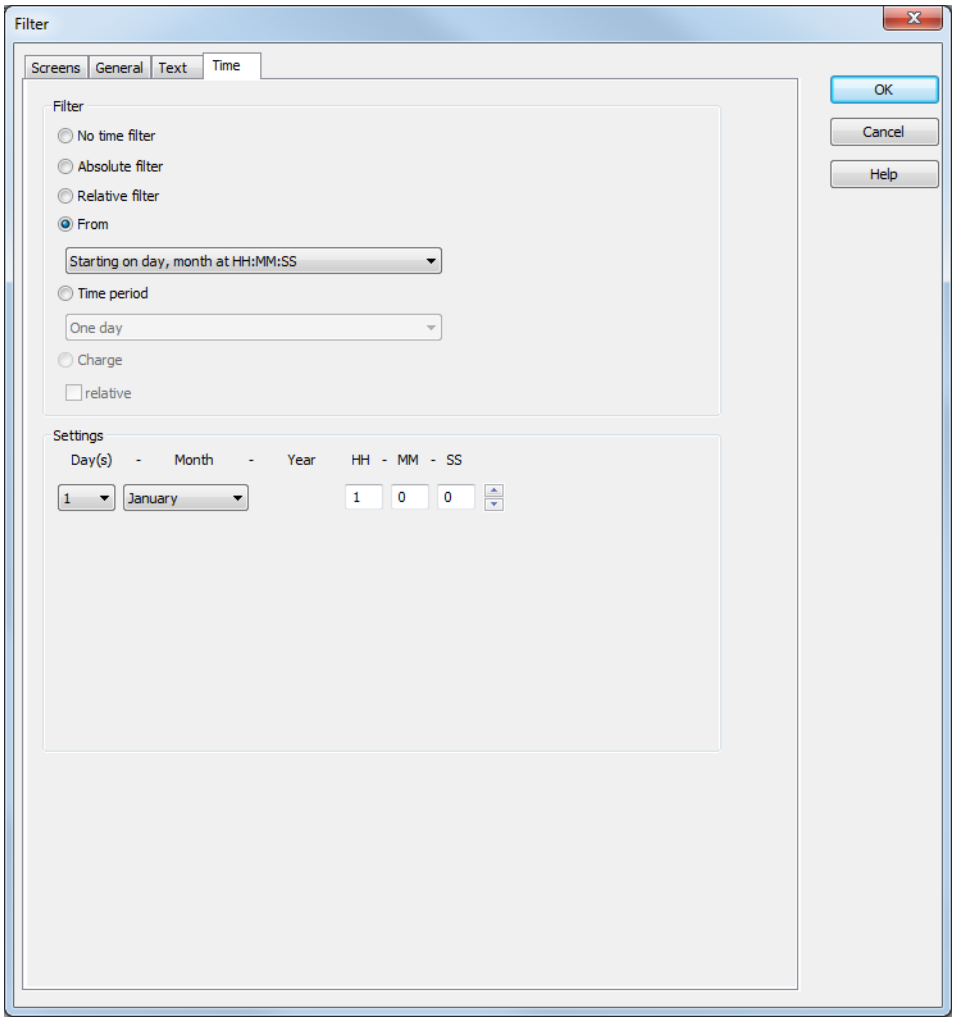


Parameter	Description
Settings	Configuration of the time filter.
Propose current date/time	Active: Time filter is displayed in Runtime.
Default	Active: The time filter is prescribed in the Editor. Only the start time can still be configured in Runtime. Selection of the relative time period in days, hours,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

Example: You set up a relative time of 10 minutes and switch to an Alarm Message List Screen with this time filter at 12:00. Then you are shown the alarms from 11:50 to 12:00 when switching. If the Alarm Message List screen stays open, the filter is automatically updated. At 12:01, you see the alarms from 11:51–12:01 etc.

From

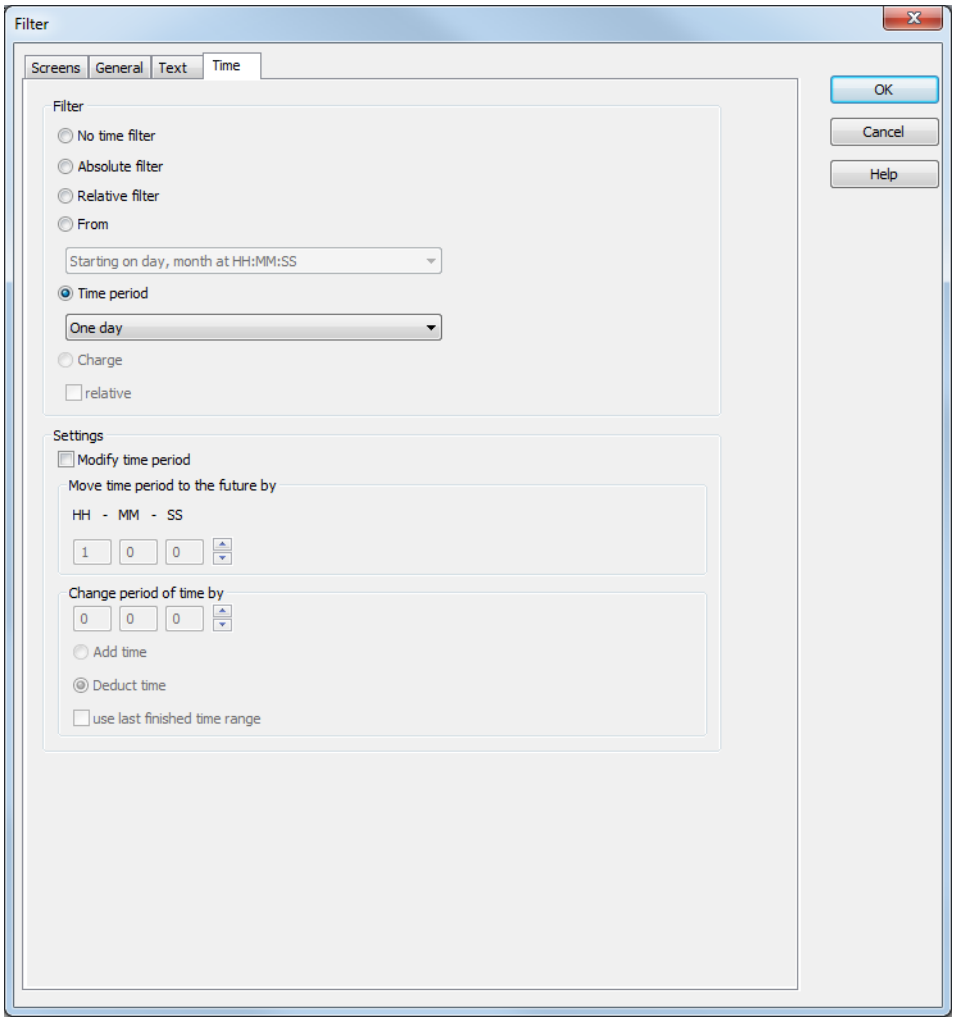
A time from which the filter is effective is defined.



Parameter	Description
Settings	Configuration of the time filter.
[Date/Time]	Depending on the settings of the option, the time from which the filter is effective is configured here: ▸ hour - minute - second ▸ day - hour - minute - second ▸ days - hour - minute - second **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.
▸ hour - minute - second	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 23:00:00. 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.
▸ day - hour - minute - second	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 - 23:00:00. 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 takes place from the 5th of the previous month to the current time point.
▸ days - hour - minute - second	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 Month October,Day5- 23:00:00. 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 the 5th of the previous year to the current time point.

Time period

A time period in which the filter is effective is defined.

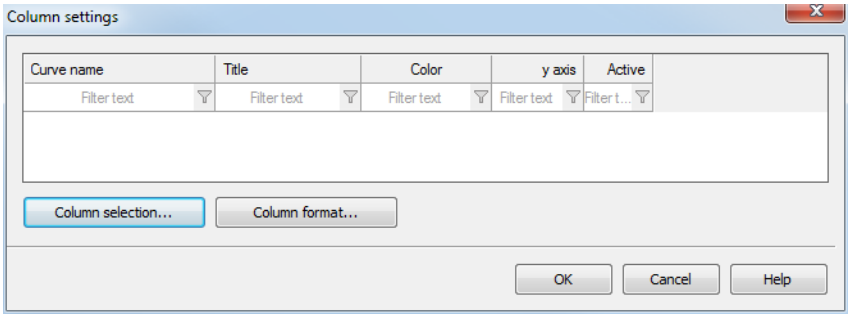


Parameter	Description
Settings	Configuration of the time filter.
Modify time period	Allows amendments to cycles, postponements and extensions of time periods. Active: Evaluation is carried out in accordance with the following rules: ▶ First, the Use last finished time period option is evaluated. ▶ After 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:** With version 7.10, filter actions on the basis of this function led to different results than those in the versions before.
Move time period to the future by	Active: The time period defined in the filter is postponed to the future. 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.
Change period of time by	Active: The time period defined in the filter is modified. Given in hours - minutes - seconds. 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.
Add time	Active: The time stated in Change time period by is added to the time defined in the Time range option.
Deduct time	Active: The time stated in Change time period by is deducted from the time defined in the Time range option.
Use last finished time period	Active: The last finished time period is used.

Column settings for extended curve lists

To configure the column settings for the display of the extended curve list (on page 81) in Runtime:

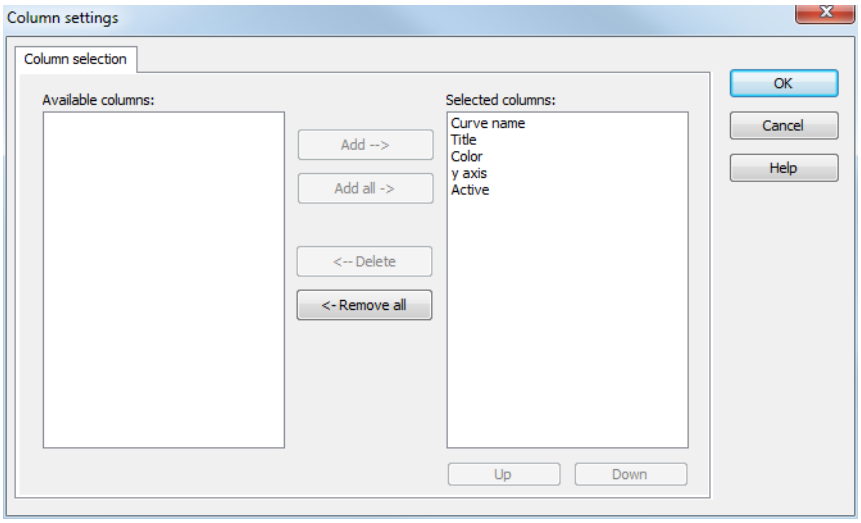
1. Click on the extended curve list button in the screen switching dialog (on page 11)
2. The dialog for configuration of the columns is opened



Parameters	Description
List field	Display of the configured columns.
Column selection	Opens dialog to select the character columns.
Column format	Opens a dialog to format the columns.
OK	Applies all changes and closes dialog.
Cancel	Discards all changes and closes dialog.
Help	Opens online help.

Column selection

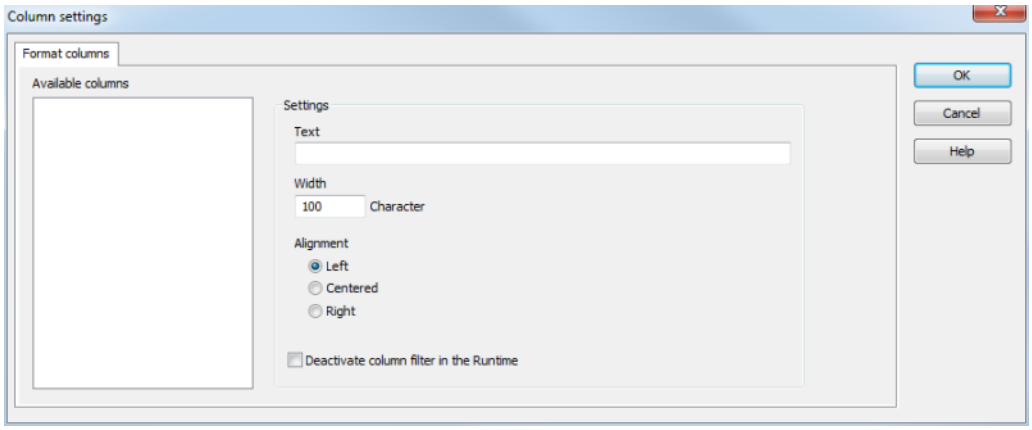
You configure the columns to be displayed in Runtime here.



Button	Function
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.
OK	Applies settings and closes dialog.
Cancel	Discards settings and closes the dialog.
Help	Opens online help.

Column format

The columns are formatted here.



Parameter	Description
Available columns	List of columns available using **column selection**. The column selected here is configured using the settings in the **Parameters** section.
Parameter	Settings for selected column.
Labeling	Name for column title. The column title is online language switchable. For this you must enter character @ in front of the name.
Width	Width of the column in characters. Calculation: Number time average character width of the selected font.
Alignment	Alignment. Possible settings: ▸ Left-justified: Text is justified on the left edge of the column. ▸ Centered: Text is displayed centered in the column. ▸ Right-justified: Text is justified on the right edge of the column.
Block column filter in Runtime	Active: The filter for this column cannot be changed in Runtime. **Note:** Only available for: ▸ Batch Control ▸ Extended Trend ▸ Message Control ▸ Recipegroup Manager
OK	Applies settings and closes dialog.
Cancel	Discards settings and closes the dialog.
Help	Opens online help.

2.1.3 Configuring procedure

The sequence of the extended trend configuring is as follows:

Parameters	Description
`Create new screen of the window class Extended trend.`	Assign separate frame or one already existing from another extended trend. Place control elements in the new screen.
`Function for diagram change via Screen switch`	Create a function '**`Screen switch`**' for screen '**`Extended Trend`**' and set the parameters.
`Entry in file project.ini`	

2.1.4 Entries for the extended trend in the project.ini file

The following entries are possible in the `project.ini` file for the extended trend.

Parameters	Description
[DEFAULT]	
MILLISEK=	1 - Display in millisecond grid, 0 - minimal in the update grid
[EW_TREND]	
ANZEIGE_GWTEXT=	1 - display limit text (default), 0 - do not display
[ARCHIV]	Archive projecting
ARCHDIGITS=	Number decimal places at the export of archives in the format TXT, XML and DBF and for the export to a SQL server. default=1
TRENNZEICHEN=	Seperator for ASCII export default = ;
SPEICHER=	maximal number of of values in the memory for extended trand, archive revision and reports default = 1000
KANALAUSWAHL=	for ETM archive channels checkbox for "all channels" for selection 1 = display (default) 2 = do not display
SQL_MAXROWS=	Maximum number values which can be read from the SQL. Entry is ensued in 1000 steps. 100 = 100.000 values. As of version 6.50 there is an automatic check that there is always at least 10% free memory left.

2.1.5 Filter profiles

Filter profiles are filter settings which can be saved by the user in the Runtime. In order to use the filter profiles there is a submenu **Filter profiles** in the menu **Control elements** with the following elements:

Parameters	Description
Filter profiles	Profile administration
Profile selection	Select saved profile (drop-down list)
Save	Save settings as profile (button)
Delete	Delete profile (button)

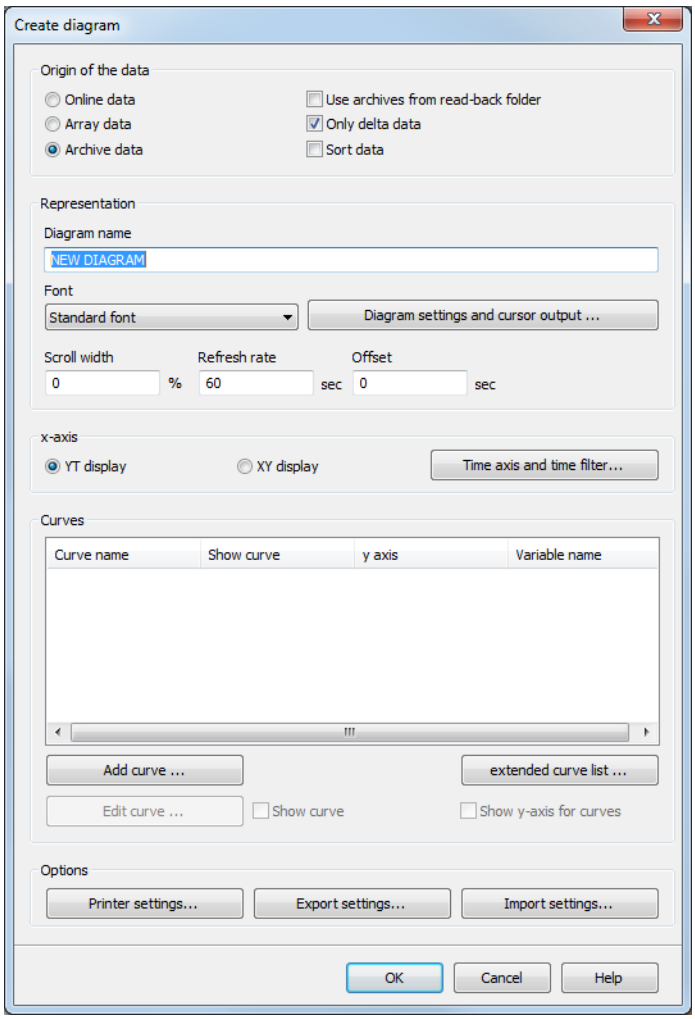
Now the filter settings can be changed in the Runtime. Then any unique name for the defined settings can be entered in the element **Profile selection**. With the button **Save** the profile is saved permanently and is available in future sessions.

After having selected a profile that is no longer needed in the **Profile selection** it can be deleted with the button **Delete**.

2.1.6 Functions

Function Screen switch - Extended trend

After creating a screen of the extended trend (on page 6) screen type, a trend diagram is defined with the screen switch function.



Configurable options are:

Parameter	Description
Origin of the data	Selection of the data origin.
`Online data`	Use the current online values and saved values for display in diagrams.
`Array data`	Use variables with array values for display in diagrams.

	The display of variables with array values works just like the XY display. However, you may not select a time filter or X variable. In the X axis (on page 35) dialog, you enter the corresponding array indices of the source data on a scale `from` and `to`. **Note:** Array data does not mean array variables, but the `Block array size` property, which can be set for a variable.
`Archive data`	Use the archive values (ARX format or SQL data) which are stored in the database to display in diagrams. **Info**: Archives in XML, dBase or TXT formats are no longer displayed after the storage cycle has expired.
`Use archives from read-back folder`	Only available if you have selected the `Archive data` option field. The historical data from the readback folder is used for the display.
Delta data only	`Active`: When switching or updating the trend, only archives with amended data are loaded.
Sort data	`Active`: The data is sorted with a time stamp after loading. **Note:** The use of this option can impair the performance, because the data must be re-sorted each time. **Recommendation:** Use this option if the data comes from an external source and it cannot be ensured that the sequence is correct.
Representation	Settings for the display.

`Diagram name`	Freely configurable diagram name; can be displayed in the control element.
	If the string in the diagram name contains this character combination %c%, it is replaced by the batch names which fulfill the filter criteria in the Runtime. For example:
	`Diagram name = Diagram1_%C%_end`
	this leads in the Runtime to
	`Diagram1_batch1_end`

`Font`	Selection or setting of the user defined font for the axis labels and the value indicators
`Diagram settings and cursor output`	Opens the dialog to make further settings for the display of the diagram (see diagram settings and cursor output (on page 29)).

Scroll width [%]	Definition of the screen scrolling if the right edge of the diagram has been reached. **Attention**: Only for diagrams with online values.
Refresh rate [s]	Set the refresh rate in seconds. ▸ The value must be greater than 0 for online data and array data. ▸ The screens cannot be loaded statically for online data or array data. ▸ For archive data, the refresh rate automatically adapts to the loading time of the data. If loading lasts longer than half of the refresh interval, the refresh rate is doubled. Alternatively, the value for Refresh rate can be set to 0. This results in the displayed data not being updated. This setting is helpful if a large amount of data is to be displayed in the ETM. If, in this case, Refresh rate is set to a low value, this can lead to an infinite loop. **Optimize refresh rate:** When reading archive data, a log message is created at the start and the end by the server (also standalone) and the client. The log message can be read with the help of the Diagnosis Viewer. With this it can be determined how long the reading lasts and the Refresh rate and be defined accordingly.
Offset [s]	Moving the zero point of the time axis to the stated value in seconds.
X-axis	Options for the X axis.
XT display	Representation of the curves over time.
XY display	Representation of the curves with another variable.
X axis and time filter/time axis and time filter	Opens the dialog for X axis/time axis settings and the time filter (see X axis and time filter (on page 31)). The engineering of the time period is carried out similar to the engineering of the time filter in AML and CEL (see chapter Time filter in manual Alarm Message List).
Curves	Options for the curves.
Add curve	Opens the dialog to select variables.

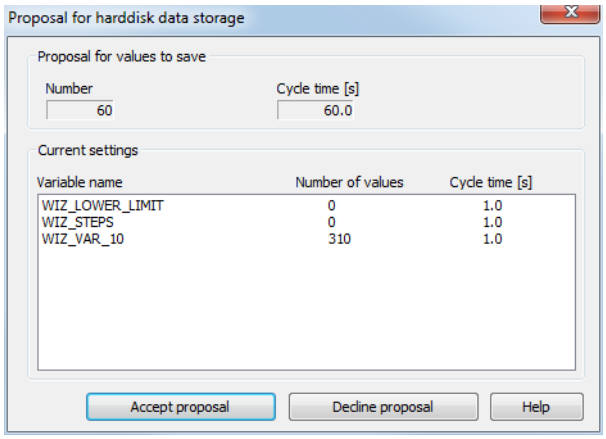
Delete curve	Click on this button to delete selected curves.
Extended curve list	Opens **Column settings** dialog **(on page 56)** for configuration of the columns for the extended curve list (on page 81).
Edit curve	Opens the dialog for curve settings and the settings for the Y axis (see Edit curve).
Display curve	For each selected curve, you can decide, using the checkbox, if it should be displayed when the diagram screen is loaded. If you deactivate this checkbox, you can then select the curve in the **Extended Trend** screen and have it shown. The first **x** on the right, next to the curve name indicates if you have activated the checkbox for this curve.
Display Y axis for the curve	For each selected curve, you can decide if the Y axis for this curve should be displayed when the diagram screen is loaded using the checkbox. If you deactivate this checkbox, you can then select the Y axis for the curve in the **Extended Trend** screen and have it displayed. The second **x** on the right, next to the curve name indicates if you have activated the checkbox for this curve.
Options	Additional settings.
Print settings	Opens the print settings dialog. You can either print diagrams or save them as a file (see Print diagram (on page 69)).
Export settings	Exports the diagram parameters that have been set (variables,frames, times etc.) as a DRG file.
Import settings	Imports the diagram parameters that have been set (variables,frames, times etc.) from a DRG file.
OK, Cancel, Help	Buttons for the confirmation of the setting, cancel and call help. **Note:** Button **OK** is active when at least one curve has been engineered.

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, which can then be freely activated in Runtime.

Harddisk data storage

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 an **`Extended Trend`** screen, the `online data` option is selected, another dialog to determine the cycle time and number of values is opened when the dialog is closed.

This dialog proposes optional values for saving the variable values to the hard drive. The values are transferred and entered into the corresponding properties for the variables by clicking on **`OK`**. **`Cancel`** creates the screen switching without changing the values for the variables. These can also be adapted manually.



Parameter	Description
Suggestion for values to be saved	Values proposed by the system for the properties of the Harddisk data storage group.
Number	Number of values that are written. Corresponds to the value that is entered in the Number of values property.
Cycle time [s]	Cycle time in seconds. Corresponds to the value that is entered in the Cycle time [s] property.
List field	Displays current value of variables that are to be replaced by the proposed values.
Accept suggestion	Writes proposed values to the respective properties of the suggested variables and closes dialog. It is activated if the Harddisk data storage active property is deactivated.
Decline suggestion	Closes dialog without replacing the values of the variables. These can also be changed manually at any time.
Help	Opens online-help

For variables, you find the settings in the Harddisk data storage 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 configure to save data in the event of an error and to write this to the hard drive once back in operation.

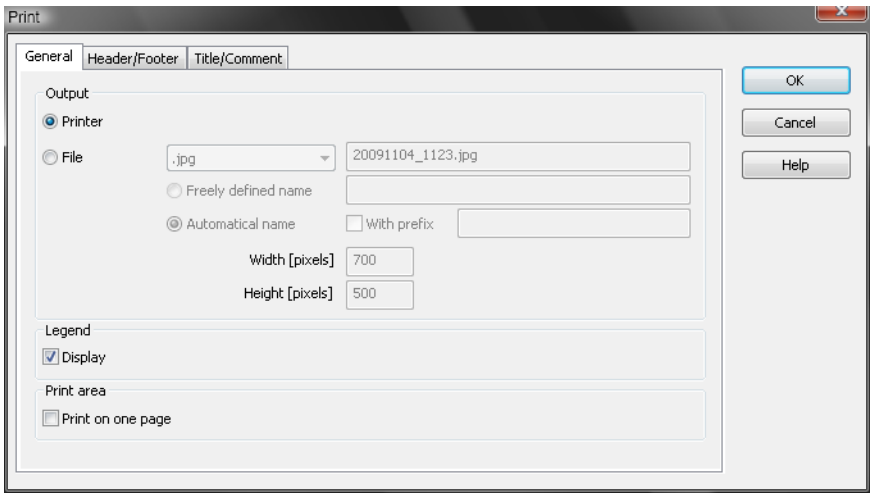
Print Extended Trend diagram

With the help of this function you can print diagrams of the extended trend or save them in a file (JPG or BMP) without opening the screen Extended Trend.

You can find the function in the function list in the applications node.

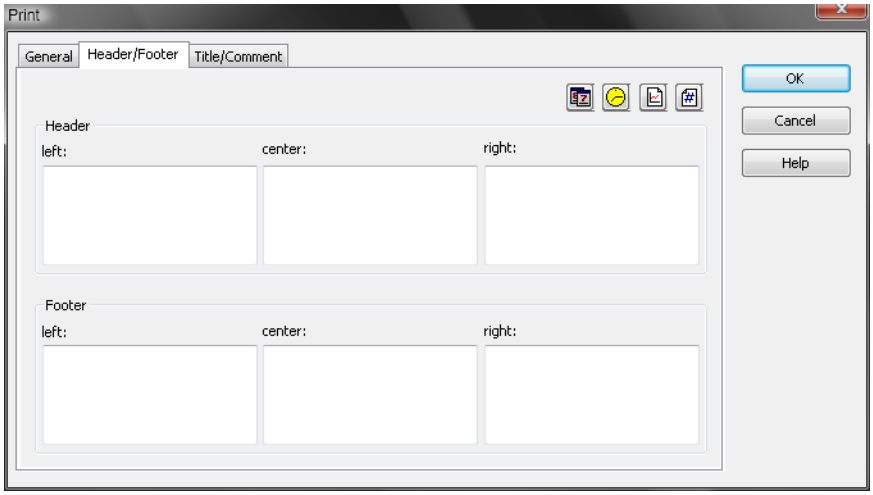
Note: Printouts made using the **`Print`** button of the **`Extended Trend`** screen may be different to those made using the **`Print extended trend diagram`** function. The function assumes a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.

General



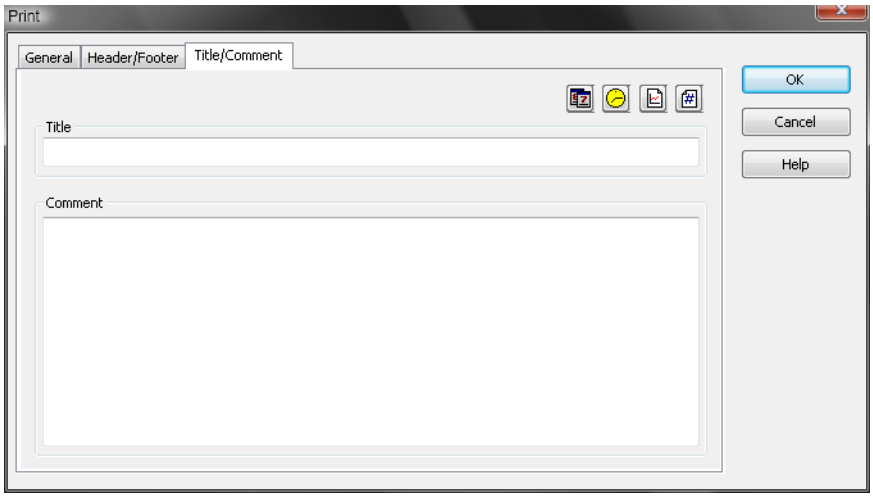
Parameter	Description
Output	
Printers	If you select this option field, the diagram is sent to the printer that you have defined as the printer for screenshots. See also the chapter on printers.
File	If you select this option field, the diagram is saved as a file. You can determine if the diagram is saved as a JPEG file or a BMP file using the drop-down menu. The name of the file is displayed in the field next to the drop-down list. You can define the names using the following two option fields and the With prefix checkbox.
Freely defined name	If you select this option field, you are free to enter a desired name for the file in the input field.
Automatical name	If you select this option field, the filename is automatically created in the following format. YYYYMMDD_HHMM
With prefix	Only available if you have selected Automatic name. Enter a desired prefix for the automatically-created filename.
Width [pixels]	Enter the width for the graphics file in pixels.
Height [pixels]	Enter the height for the graphics file in pixels.
Legend	
Display	Activate the checkbox if you would like to print the legend together with the diagram. The legend lists things such as which curve has which color.
Print area	
Print on one page	Activate the checkbox if the key should be on the same side as the legend.

Header / Footer



For printing an extended trend additional information can be defined for the header and footer of the print-out. You can insert date, time, diagram name and page number using the four symbols.

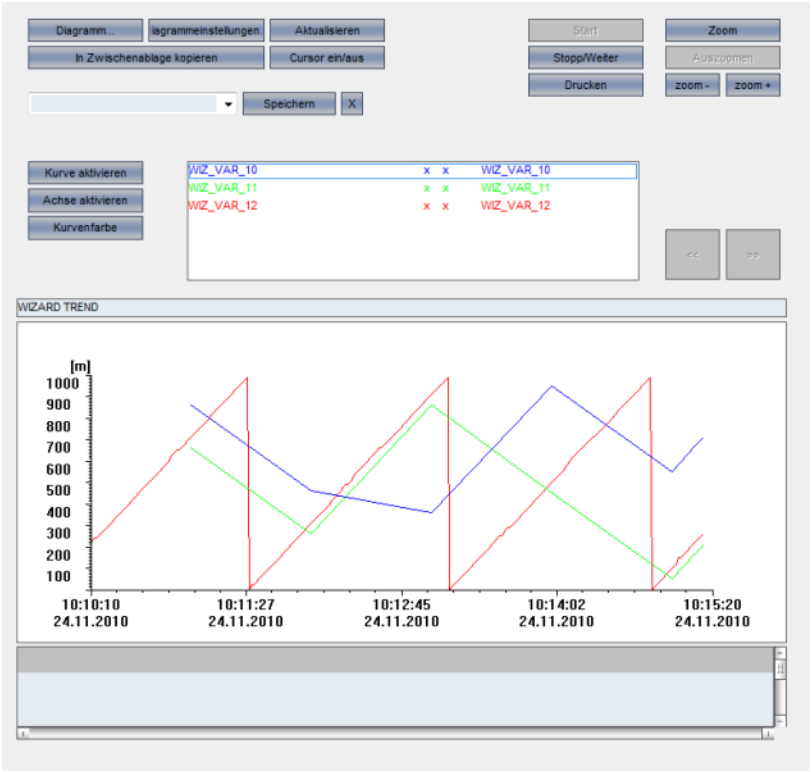
Title / Comment



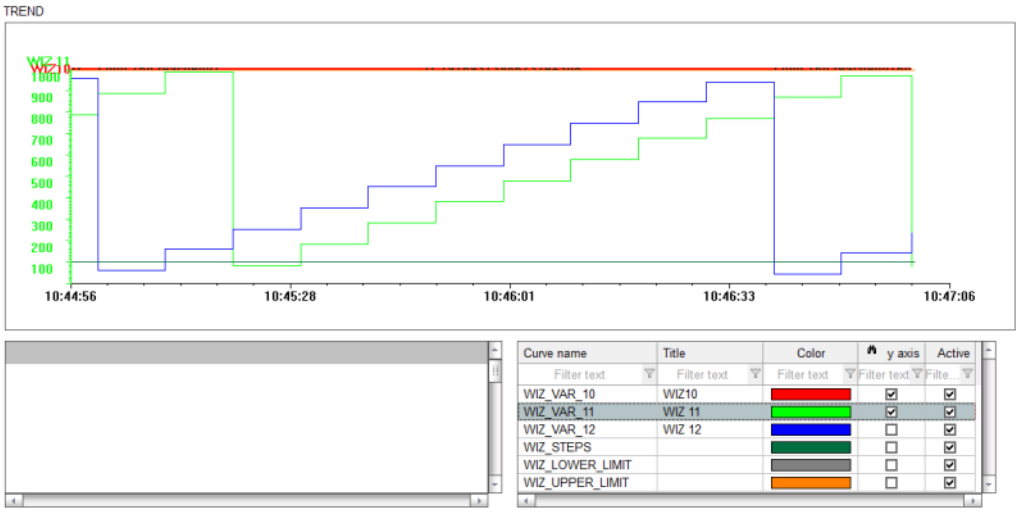
You can also configure a title with a comment when printing the extended trend. You can insert date, time, diagram name and page number using the four symbols.

2.2 Operating during Runtime

In online operation the window for the extended trend is opened via a function call (e.g. button). The online field of the screen predefined in the Editor (on page 6) is opened.



With extended curve list:



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

Element	Description
Add 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 locations 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 dragged onto the screen. Elements can be moved on the screen and arranged individually.
Windows	Representations.
Diagram window	Window to display trend curve
Diagram name	displays diagram name
Cursor output window	Shows the position of the cursor in the diagram window and the values set in diagram settings and cursor output (on page 29)
Curve list	Drop-down list of curves.
Extended curve list	Curve list that can be edited in Runtime (on page 81): ▸ Curve name ▸ Title ▸ Color ▸ Y-axis ▸ Active Note: Not available under Windows CE and is replaced by the normal curve list there.
Display: Set filter	Displays the status of the current time filter in Runtime.
Buttons	pre-defined control elements
Diagram button	Change diagram parameters
Curve button	Change curve parameters
Diagram settings	activates the dialog (on page 29) for diagram settings and cursor output
Zoom button	Zoom display

Rezoom button	Reduce display
Zoom +	reduces display time intervals
Zoom -	Increases display time intervals
Zoom to 100%	Sets zoom factor to 100%. This zoom action is saved in the zoom history. This means: If a selected area of the Extended Trend is zoomed to twice using **Zoom** after this **Zoom into content at 100%** is selected and then a selected area is zoomed to again; there are then 4 zoom events in the history. This function can be gone back to again using the **Rezoom** function.
Refresh button	Update display
Back buttons	Scroll backward on the time axis (history)
Forwards button	Scroll forward on the time axis (current)
Stop button	Do not update screen
Play button	Update screen
Cursor on/off	Query values
Double cursor on/off	Display (on page 72) values that are between two cursors.
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.
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.
Print	Prints diagram. **Note:** Printouts made using the **Print** button of the **Extended Trend** screen may be different to those made using the **Print extended trend diagram** function. The function assumes a window size of 1000 x 700. Printing via the button is in the proportion defined in the Editor.
Print dialog	Choose the printer before printing out the diagram.

Copy to clipboard	Copy representation into the intermediate store.
Backwards one quarter button	Moves the time period displayed back by a quarter of the unit selected.
Forwards one quarter button	Moves the displayed time period forwards by a quarter of the unit selected.
X axis button	opens the dialog (on page 35) for X axis settings.
Export data displayed	exports (on page 80) all visible data of all curves as a CSV file.
Filter profiles	Profile administration.
Profile selection	Select saved profile.
Save	Save settings as profile.
Delete	Delete profile.

Info

*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 key, the movement is carried out in 10-pixel increments.*

Info

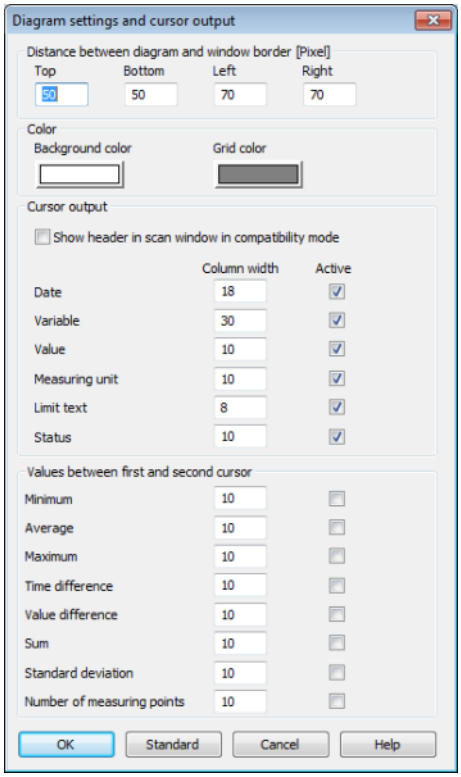
The refresh rate dynamically adjusts to the loading time of the data at archive trend. If loading lasts longer than half of the refresh interval, the refresh rate is doubled.

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** in order to move the cursor in small steps. To carry out larger steps, press Shift 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:

Parameters	Description
Date	Date/Time of the saved value
Variable	Variable name of the saved value
Value	Technical value of the saved value
Unit	Unit of the saved value
Limit	Condition text (limit value text) of the saved value
Status	Status of the saved value
Minimum	Minimum of the display range (optional)
Average	Average of the display range (optional)
Maximum	Maximum of the display range (optional)

In order to change the displayed information and the according column widths, click on the button **Diagram settings...** ; the Diagram settings and cursor output (on page 29) window opens.



In the are **Cursor output** 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.

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 Ctrl und press **Left** or **Right** to move the cursor in small steps. To carry out larger steps, press Shift at the same time.

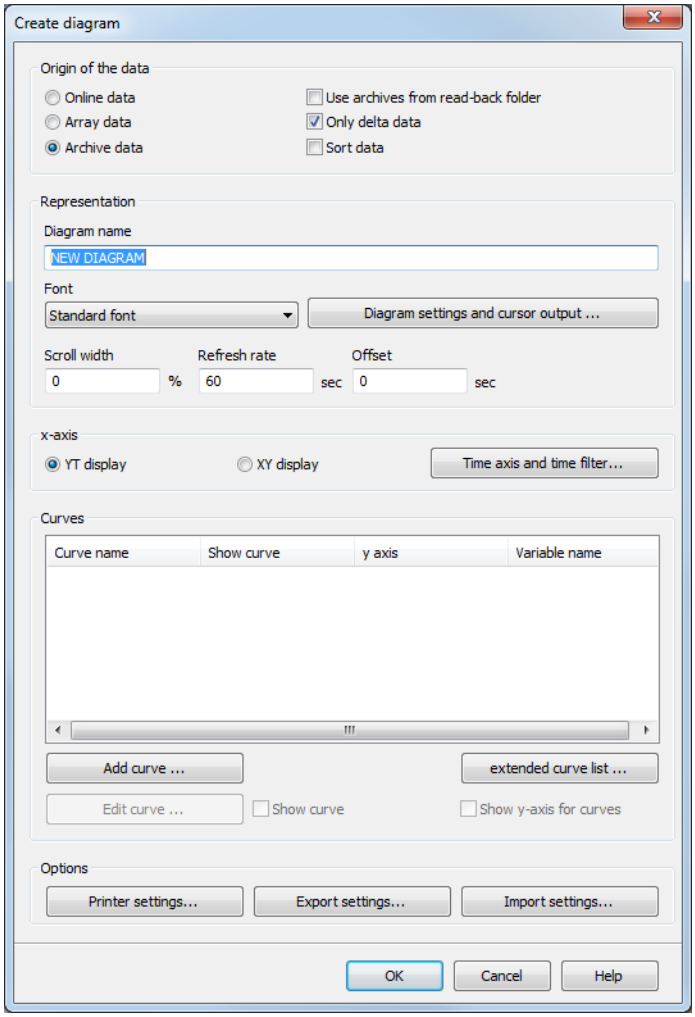
The values between the first and the second cursor are displayed in the cursor output window. You can customize the available columns as desired in the Diagram settings and cursor output dialog.

Info

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

DIAGRAM SETTINGS

From the existing configuration, which was done in the editor, temporary changes (without saving) can be carried out in runtime. Click on the button **Diagram...** to open the window Create diagram (see Screenshot).



Possible changes are:

Parameters	Description
Active	Activates and deactivates the display of the curve
Y-axis	Representation of the curve's Y-axis
Edit curve	Editing the settings of the selected trend curve
Diagram settings and cursor output	Settings of the diagram parameters (Diagram background, frame limits, column widths etc.)
Font	User defined font for X- and Y-axis labeling and value indication
Refresh rate	Updating of the diagram for online data

2.2.1 Export data

As a control element, an Export all data button for Extended Trend can be inserted and used in 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
Value:	▸ Up to 8 digits before the decimal separator, ▸ 8 digits behind the decimal separator
Unit:	Character string
Status:	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

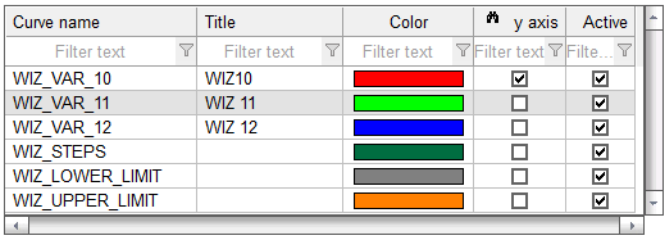
> **Attention**
>
> *If too many curves are selected for export, the data collection can require a considerable amount of time.*

2.2.2 Operate extended curve list

If the extended curve list is configured in the Editor, curves can be edited in Runtime. It is possible:

- to filter according to name, title, color, Y-axis and activation
- To edit curve names
- To edit titles
- To edit colors
- To activate or deactivate the Y-axis
- To activate or deactivate curves

To edit an element, click in the corresponding cell of the list.



Info

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

DESIGNING CHECKBOXES WITH GRAPHICS

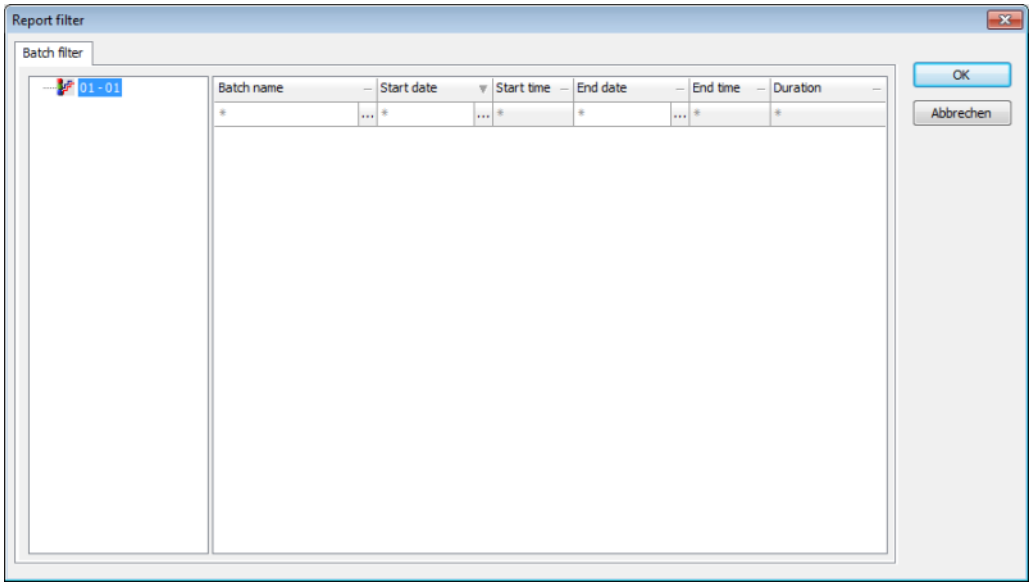
Checkboxes with graphics can be designed individually. For this, the desired graphics assign the corresponding properties of the curve list in the editor. The graphics must already be created in the **`Files\graphics`** node. Properties to be configured in the `Representation` group:

- `On`
- `On (inactive)`
- `Off`
- `Off (inactive)`

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

2.2.3 Filter for screen switch

If you switch to a screen of type Extended Trend the following filter is displayed.



Parameter	Description
Lot filter	On the left side you can choose the desired archive from the available archives. On the right side the available lots are displayed. You can filter the lots there.
Lot name	In this column the names of the available lots are displayed. By left clicking the top part of the header, the lots are sorted alphabetically in an ascending or descending order. In the bottom part of the header you can enter a character string. Only lots matching the respective character string will be displayed.
Start date	In this column the start date of the available lots is displayed. By left clicking the top part of the header, the lots are sorted in an ascending or descending order. Lots with the same start date are sorted according to their start time. In the bottom part of the header you can enter a start date manually or use the displayed calendar.
Start time	Only available if you entered a start date. In this column the start time of the available lots is displayed. By left clicking the top part of the header, the lots are sorted in an ascending or descending order. In the bottom part of the header you can enter the start time manually. Note: '*' means 12:00:00 AM o' clock.
End date	In this column the end date of the available lots is displayed. By left clicking the top part of the header, the lots are sorted in an ascending or descending order. Lots with the same end date are sorted according to their end time. In the bottom part of the header you can enter an end date manually or use the displayed calendar.
End time	Only available if you entered an end date. In this column the end time of the available lots is displayed. By left clicking the top part of the header, the lots are sorted in an ascending or descending order. In the bottom part of the header you can enter the end time manually. Note: '*' means 11:59:59 PM o' clock.
Duration	This column displays the duration for each available lot. It is only for display.

Info

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

Info

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.

2.2.4 Hints for online operation

The current diagram name can be shown on a control element on opening the diagram in online operation.

Pressing the **Zoom** button gives the possibility of representing the available values in a finer resolution and in a smaller interval (X- and Y-axis). The zoom procedure is activated after pressing and pulling out of an area on the diagram. Multiple zooming is possible. Zooming is only possible if the selected area covers at least one subdivision per axis.

Pressing the **Rezoom** button switches the zoom factor back in the steps in which it was previously defined.

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 corresponding to the refresh times defined in the **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 are displayed a maximum HD entry depth as defined for the process variables can be represented. If archive values are represented then the configuration of the archive stored in the database is decisive.

With Online data and refreshing the visualization changes with each refresh corresponding to the most current entry. If scrolling is unwanted the refresh has to be stopped in the online data. Switching off is

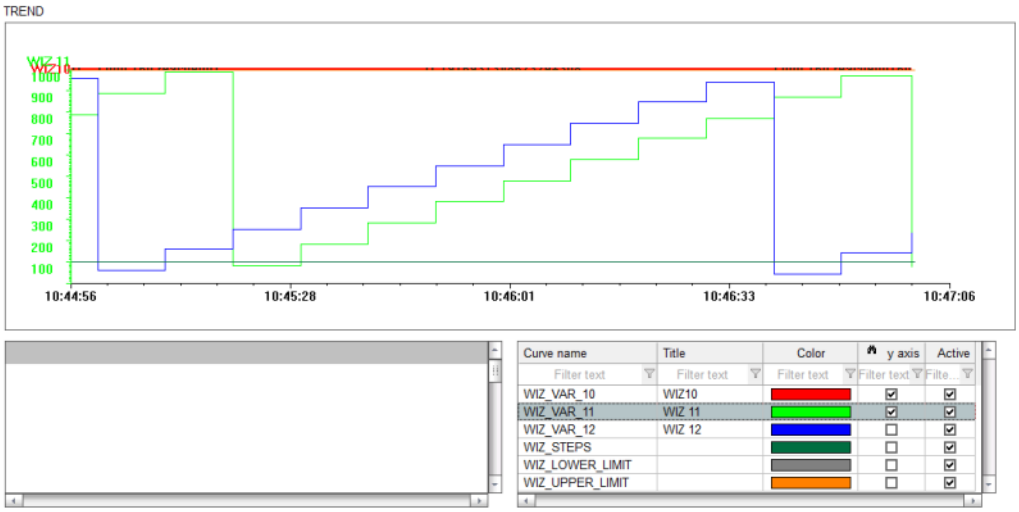
done by pressing the **Stop** button. Paging and zooming are possible. If the continuous updating should be reactivated then the **Play** button is to be pressed. With the diagram's next refresh cycle the new data and the new X-axis range are updated.

Info

Online variables in Extended Trend:

The online variables for Extended Trend are configured in the Editor and can no longer be changed in 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 Runtime. Online variables therefore cannot be adapted in Runtime.

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



The displayed details are:

Element	Description
Curve color	Text in color in which the curve is configured
Date	Date stamp of the interrogated value
Time	Time stamp of the interrogated value
Name	Curve name
Value	Technical value
Limit value display	Display of a set limit value if the setting is in the `project.ini` file. [EW_TREND] ANZEIGE_GWTEXT=1 Limit value text 0 Do not display 11 = Display (default)

2.2.5 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 dialog (on page 32)
  Y-axis dialog (on page 22)

The movement is reset when the screen is reopened.