



COPADATA
do it your way

zenon manual

Historian

v.8.00





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Contents

1. Welcome to COPA-DATA help	6
2. Historian	6
3. General information	7
3.1 Historian licensed version	8
3.2 Historian Starter Edition	9
4. Types of archiving.....	9
4.1 At start and end of Runtime.....	12
4.2 Starting and stopping archives via functions	12
4.3 RDA - Real time Data Acquisition	12
5. Archiving concept	13
5.1 Best Practice.....	16
6. Engineering in the Editor.....	17
6.1 Detail view.....	17
6.2 Toolbar and context menus	18
6.3 Creating a new archive.....	21
6.3.1 Assistant	22
6.4 Edit archive	26
6.4.1 Properties	26
6.4.2 Runtime	29
6.4.3 Recording type	32
6.4.4 Save	35
6.4.5 Options	43
6.4.6 Example	46
6.5 Aggregated archives.....	48
6.5.1 Variable selection and aggregation method	50
6.5.2 Editing aggregation archives	52
6.5.3 Templates for aggregated archives	54
6.6 Add and remove variables	63
6.7 Lot archiving.....	66

6.8	Creating a screen of the type Archive Revision.....	67
7.	Functions	72
7.1	Screen switch - archive revision.....	72
7.1.1	Archive filter.....	75
7.1.2	Time.....	77
7.1.3	Lots.....	92
7.1.4	Shift.....	100
7.2	Archive: Start.....	107
7.3	Archive: Stop.....	108
7.4	Index archive.....	110
7.5	Show active archives.....	111
7.6	Export archives.....	112
7.6.1	General.....	115
7.6.2	Archive.....	121
7.6.3	Time.....	123
7.6.4	Lots.....	126
8.	Operating during Runtime	135
8.1	Procedure.....	138
8.2	Selection.....	139
8.3	Lot filter and time filter.....	141
8.4	Define font and column width.....	145
8.5	Editing values.....	146
8.6	Inserting values.....	148
8.7	Store values in archive.....	149
8.8	Print archive.....	150
8.9	Cycles in Runtime.....	151
9.	Use of archive data in zenon	152
9.1	Report Generator.....	152
9.1.1	Archive and logging functions.....	153
9.2	Report Viewer.....	155
9.3	Extended Trend.....	156
10.	Additional information	156
10.1	Format of archive files.....	156

10.1.1	String variables	158
10.2	Evacuate to an SQL database	159
10.2.1	Configuration	163
10.2.2	SQL script	164
10.2.3	Oracle database	165
10.2.4	MS Azure service bus	165
10.2.5	CRATE.IO	166
10.2.6	Conversion	166
10.2.7	Troubleshooting	167
10.3	RDA	168
10.3.1	PLC data format	168
10.3.2	Description header	169
10.3.3	Time stamp format	169
10.3.4	Types	170
10.3.5	Note:	172
10.4	Archiving in the zenon network	174
10.4.1	Behavior in the network	174
10.4.2	Multi-Project Administration	175

1. Welcome to COPA-DATA help

ZENON VIDEO-TUTORIALS

You can find practical examples for project configuration with zenon in our YouTube channel. 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 Support Team, who 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. Historian

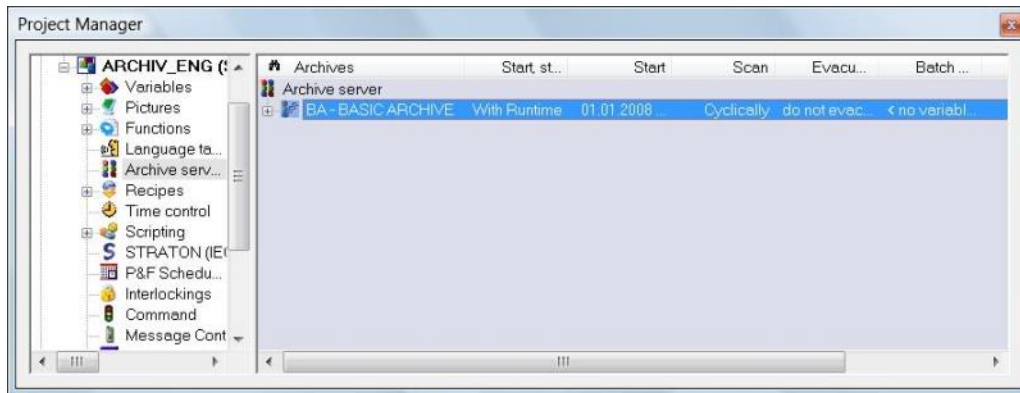
In zenon, the Historian takes on the saving of process data as well as the export of the archived data. The data is thus available for subsequent processing and evaluation - even outside of zenon.

The module Historian is available in zenon in two versions:

- **HistorianStarter Edition** (on page 9):
function-limited base version

- ▶ Historian licensed version (on page 8)

You will find the **Historian** in the **Project Manager**.



In zenon, you can evaluate archive data and further process it with:

- ▶ Archive revision screen
- ▶ Extended Trend
- ▶ Report Generator
- ▶ Report Viewer
- ▶ zenon Analyzer

3. General information

Archiving is carried out with different methods (on page 9) and with different types of recording.

To use archiving:

- ▶ Create archives and aggregated archives in the Editor (on page 17).
- ▶ Call up archives in Runtime (on page 135) by means of an archive revision screen.
- ▶ Save the archive data in different formats.
- ▶ Evaluate archive data with other modules such as Extended Trend, Report Generator, Report Viewer and zenon Analyzer.



Attention

*Archives for the future are not supported.
Manual value entries must never be in the future! If these values concern running archives, this can lead to problems with archive handling in Runtime.*

TIME

The following is applicable for the time stamping of the archive:

- ▶ Archiving:
Archives use UTC time when saved. The local time that is shown on the computer consists of: UTC + time zone + standard time/daylight saving time. The zenon Runtime automatically considers the local time for archive requests.

DETAILED INFORMATION

You can find detailed information on formats (on page 156), time and RDA (on page 168) types in the **Further information** (on page 156) section.

3.1 Historian licensed version

*The **Historian Starter Edition** on the PC can be upgraded to the full Historian version at any time, without compatibility problems (license extension).*

- ▶ If the **Historian** is licensed, all Historian functionality is available.
- ▶ **Historian Starter Edition** is available in combination with **Extended Trend Starter Edition** for Windows CE 6.0 Runtime (data export in CE only available in CSV format).

INCLUDED WITH THE LICENSED VERSION

The licensed version of the Historian has:

- ▶ Data logging: cyclic, event-triggered, on change
- ▶ Cascaded data aggregation (aggregated archives)
- ▶ Lot recording
- ▶ RDA archiving
- ▶ SQL evacuation
- ▶ User-defined start/stop of recording
- ▶ Function execution when starting and closing the archive
- ▶ Automatic data evacuation
- ▶ Automatic creation of substitute archives
- ▶ Data export via a function (to XML for example)
- ▶ Manual revision of archive data

SQL EVACUATION

The licensed version of the Historian can be enhanced by SQL evacuation. To do this, zenon SQL Server must be licensed

3.2 Historian Starter Edition

*The standard license of the TAG-based zenon version on the PC includes the limited version of Historian as a **Starter Edition**.*

LIMITATIONS

*The **Starter Edition** is based on the standard Historian but has the following restrictions:*

- ▶ no RDA
- ▶ no record on change or event triggered scanning - only cyclical recording type
- ▶ No evacuation of data
- ▶ no Aggregated archive
- ▶ no lot archiving
- ▶ No manual revision of archive data
- ▶ Export under CE only possible in ASCII format (this is also possible in XML and DBF format on a PC)
- ▶ Archive data can only be saved in the ARX format



Attention

- ▶ If, in the Editor, only the die **Historian Starter Edition** is licensed, functionalities beyond its restrictions cannot be configured.
- ▶ If, in Runtime, only the **Historian Starter Edition** is licensed, archives that exceed its restrictions are not started. An entry in the Diagnosis Server is created. No save operations can be carried out by the report or archive revision. Example: An archive with event triggered scanning is created. It is not started in Runtime. This means that no data is recorded for the archive.

Note: For I/O licensed version, the Starter Edition is not available.

4. Types of archiving

The archiving is based on the principle of cascading archives. In doing so, the desired variables are recorded in a base archive and transferred to an aggregation archive (on page 48) by means of an

aggregation function. This process can be continued as often as desired. Archives can be created in different ways. There are up to three methods of recording available for each type of creation.

CREATION

An archive can be created in different ways:

- ▶ **At start and end of Runtime:**
The archive is always active if Runtime is running.
- ▶ **User defined:**
The time period in which the archive can be written to is defined using the **Archive: Start** and **Archive: Stop** functions.
- ▶ **RDA (Real Time Data Acquisition):**
Reads archived values in the controller and saves them to a zenon archive.

RECORDING TYPES

Data can be recorded in archives using different methods:

- ▶ **cyclic:**
The values of the assigned variables are written to the archive in a defined interval. The value for milliseconds is automatically set to 0 in the time stamp.
- ▶ **event-triggered:**
The archive is assigned a trigger variable. When the value of the trigger value is set to 1, the values of the variables are always written to the archive that was assigned in the variable selection (on page 26).
- ▶ **On-change:**
The values of the assigned variables are written to the archive each time there is a value change.
Note: In order to keep the amounts of data recorded low, the configuration of a **Hysteresis**, especially a **Negative for archive** and **Positive for archive**, is recommended for this type of recording. For details, read the **Hysteresis** chapter in the **Variables** manual.

The available type of archive recording depends on the method used to create the archive.



Attention

*In an archive of the type **On change** variables are also saved on each status change.*

For example: If a driver is stopped all its variables receive the status OFF. Therefore stopping and starting a driver causes two entries.

1. OFF
2. SPONT or GI (if reconnection is successful)

This also happens when the variable value does not change.

AGGREGATION

The summarizing function is initiated at the ending of the save cycle. The following aggregation functions are available:

- ▶ Sum
- ▶ Average
- ▶ Minimum
- ▶ Maximum

Several aggregation archives can also be used at the same time in a project.



Attention

Strings cannot be compressed.

STORAGE

In order to keep a complete save cycle, the archive data can be saved or exported by means of a function.

Storage	Description
Database	Each archive contains files in which the configured number of archive cycles is buffered. If the configured number of files is exceeded, files can either be discarded or exported.
File export	After closing of an archive cycle it is immediately exported to a file.
Export function	<p>Archive export saves archives with time filters in the following standard file formats:</p> <ul style="list-style-type: none"> ▶ ASCII ▶ dBase ▶ SQL ▶ XML <p>For this, the following applies:</p> <ul style="list-style-type: none"> ▶ Files can be saved locally on the computer or on approved drives in a network. ▶ The file names are issued independently from the system. ▶ The name contains the year, month, day, hour minute and second of the export: YYMMDDhhmmss.XML

4.1 At start and end of Runtime

With this form of archiving, the archive is started when Runtime is started and stopped when Runtime is closed. The recording of data can be as follows:

- ▶ **cyclic**
- ▶ **event-triggered**
- ▶ **on change**

4.2 Starting and stopping archives via functions

Archiving in zenon can also be controlled manually with the help of the Start archive (on page 107) and Close archive (on page 108) functions.

As long as an archive is active, values can be written to the archive. With recording via functions, the recording can be as follows:

- ▶ **cyclic**
- ▶ **event-triggered**
- ▶ **on change**

4.3 RDA - Real time Data Acquisition

The RDA functionality is used in order to read values which were archived in the control and to save them in a zenon archive. The recording can be as follows:

- ▶ **On change**

A typical application for this is controllers that do not permanently communicate with zenon or that are to archive many values in a short period of time.



Example

For a PLC with communication in the event of a value change, values should be archived in a time period <100 ms. In this case, the values are collected from the controller and read as a block using RDA.

(Note: The smallest possible sampling rate in zenon is 100 ms.)

RDA can also be used for the postmortem analysis in the event of PLC errors, if the PLC supports this.

Note: RDA archives can be evacuated. Evacuation is carried out immediately after the archive is closed.

CONFIGURATION

To configure RDA:

1. Define the variables in the PLC.
 - A separate, continuous, linear area has to be created in the PLC for each RDA variable.
 - The data type for the variables must not be less than that in which the PLC is organized.
 - The first variable of the area designated for the RDA in the PLC serves as a trigger for instigating the transfer process.
This means: If this variable is set to the value 1 (or >0) by the PLC, the subsequent values (as defined in the header (on page 169)) are loaded and archived in zenon. Afterwards, the driver automatically resets the variable to the value 0.

2. Define the variable in zenon.

The values are displayed in the archive in the format of the data type of the RDA variable.

Example: If the values are displayed as a floating-point number (REAL) in the archive, the RDA variable must have the data type REAL.

Attention: The variable property **Recording type** for **Harddisk data storage** must be set to **Postsorted values (RDA)**.

3. Create the archive in zenon and select the RDA variables.
The archive must be set as the **on change** recording type.

Note: You can find detailed information on RDA archiving in the **RDA** (on page 168) chapter in the **Further information** (on page 156) section.



Information

You can find out whether your driver supports RDA in the documentation for the respective driver.

*Drivers with symbolic communication do not generally support RDA. However there is a workaround for some of these drivers. You can find information on this for the respective driver and in the **Notes** (on page 172) chapter.*

5. Archiving concept

The following is applicable for archiving in general:

- In principle, up to 1296 different archives can be configured for each project.

- ▶ You can create as many variables as you want for each archive.
- ▶ The number of closed and stored archives is only limited by the disk space available.

Even before the archive has been created, it is necessary to define which data is to be archived and in which granularity.

Recommendations:

- ▶ Keep archives easily manageable and do not store large amounts of data, because:
 - Unnecessary archives create a high requirement for disk space and can place an unnecessary load on your computer in certain circumstances.
 - Archives that are too large need extra resources and time when displayed in Runtime.
- ▶ Attempt to recognize how the data belongs together and have this influence the composition of your archive.

BASIC QUESTIONS

A concept should be created before the archiving is configured. The following decision is important:

- ▶ What data should be stored in an archive
 - at what intervals
 - via which driver/protocol
 - for what purpose
- ▶ What data should be stored in an archive
 - in which zenon modules or external applications

ORIGIN OF THE DATA

The origin of the data is one of the most important points when creating an archive. In doing so, it is mostly a matter of:

- ▶ What type of data is it?
- ▶ How is data transferred to zenon?

Further important information for configuration:

- ▶ Driver:
What drivers establish the connection to the PLC?
Data can only be written to an archive as fast as the driver can provide it.
- ▶ Granularity
In what level of detail does the data need to be recorded?
For example: For a water meter, it is usually sufficient to archive one value daily. In contrast, for

a press in car manufacturing, possible value changes in the range of a few milliseconds need to be recorded.

- ▶ **Storage period:**
How long should data be available in zenon?
The more data is archived within a certain time, the more memory requirements are increased.
- ▶ **Granularity for long-term archiving:**
For large amounts of data, it is important to plan how long this is to be present in a certain resolution. For example, is it necessary to also use the data in that level of detail years after it has been collected? Or are average values or sums over longer periods of time sufficient? In the latter case, aggregation archives (on page 48) are created in zenon.

USE OF DATA

It is not just the origin of the data that plays an important role when archiving; subsequent use in zenon should also be considered.

Archive data is mostly used in trends and reports. In order to keep the storage requirement and loading times as low as possible, it is necessary to keep the data as efficiently as possible.

Note: Always encapsulate data according to its use. This means: The save cycle of the archives must be well selected. The time period of the data in a capsule should correspond to that time period of the data used in zenon.

For example: Data from the last ten minutes is to be examined in a trend. If only one capsule per archive is saved each day, the complete archive of a day must be read in order to display data for 10 minutes. The majority of the data is thus loaded for nothing. Vice versa, if the capsules are saved in intervals of one minute, 10 capsules must be opened for consideration.

In the concept of data usage, the content of the information per capsule and the number of required files must be balanced out. Frequently-used methods:

- ▶ **Conceiving archives for different purposes.**
For example, archives for long-term data storage and archives for use in trends, which is only saved for a short period of time.
- ▶ **Also compiling data that is used jointly into an archive.**
For example data for use in a trend in an archive for display in the trend. This avoids several capsules having to be loaded for different curves in a trend, which may include data that is of no significance to the trend.

RESOLUTION OF PRINT AND MONITOR RESOLUTION

With the use of data in Extended Trend in particular, the resolution of the screen or printing plays a decisive role. This is because the resolution limits the number of values per curve that can be meaningfully displayed. If the trend curve is displayed in an element with a width of 1,000 pixels, no more than 1,000 values per curve can be displayed.

5.1 Best Practice

The configuration of archives must primarily take in to account which data, from which time period, is needed for which purpose. In doing so, it is important to optimize the size and number of the archives. Archives that are too large could lead to computers being put under too high a load and high consumption of memory or prevent the execution of Runtime. The recording types and cycle times that are supported depend on the PLC and driver.

You can find information on effective configurations in this chapter.

CONFIGURATION FOR THE "ON CHANGE" RECORDING TYPE

The **on change** recording type saves each change. This can add up to 36,000 values per second with up to 10 values. If longer time periods need to be displayed, extensive archives need to be read in Runtime. All values of all variables are always read in, even if only one variable is displayed. The maximum number of values to be read in the memory for Extended Trend, archive revision, AML, CEL and tables can be amended. The size is limited to 1 GB as standard. The size can be amended in zenon6.ini and the **SPEICHER=** entry.

Recommendations:

- ▶ Find out which variables cause the most entries.
- ▶ Configure the **hysteresis** for values that change quickly (such as fluctuating ones). The number of entries is thus reduced.
- ▶ Amend the value for **SPEICHER=** to your system.
- ▶ Test how the archive files grow in size on a test system before implementing the system productively.

CONFIGURATION FOR DISPLAY IN A TREND

The data that can be displayed in a trend is also limited by the physical restrictions of the screen or the print-out. If a trend diagram covers more than 1440 pixels, for example, a maximum of 1440 values can also only be displayed in theory. If 5 pixels are available for a value, this corresponds to the value every five minutes within 24 hours.

Recommendations:

- ▶ Evaluate what data and time periods are needed in Runtime.
 - ▶ Pack the variables that are displayed together into an archive instead of dividing the archives according to variables.
 - ▶ Use aggregated archives.
 - ▶ Amend the save cycles of archives and aggregation archives to the time periods to be displayed.
- The less redundant data that needs to be read in and transferred to the network, the less effort there is for Runtime.

- ▶ Use zoom for longer periods of time to display data from aggregation archives instead of showing all data from a base archive.
- ▶ Index the Runtime files (**Index Runtime files** project property).
- ▶ Index the lot variables (configuration of the archives).
- ▶ With large amounts of data, deactivate the automatic updating of the display in the trend.

CONFIGURATION FOR REPORTING

Recommendations:

Only use the **on value change** recording type if absolutely necessary.

The recording of each change can lead to a very large amount of data.

- ▶ Use archives with cyclic recording.
- ▶ Amend the recording time periods and save cycles to the periods to be displayed.

6. Engineering in the Editor

Archives are created and administered in the Historian module in the Editor.

6.1 Detail view

Archives are shown in a table in the detail view. The columns of this table are fixed and cannot be configured individually. The column width can be amended with the mouse. Incremental searching is possible in the columns.

TABLE COLUMNS

The following is displayed for each archive:

- ▶ Archives
- ▶ Start, stop
- ▶ Start
- ▶ Recording type
- ▶ Evacuate
- ▶ Lot variable

- ▶ Number
- ▶ estimated size

SEARCH IN THE TABLE

To search in the table:

1. Click on the desired column heading.
2. A symbol (binoculars) shows that a search is being carried out in this column.
3. Type in the search term.
4. The first appropriate entry is highlighted.

6.2 Toolbar and context menus

PROJECT TREE

CONTEXT MENU HISTORIAN

Menu item	Action
New archive	Opens the wizard for creating a new archive.
Export all as XML	Exports all archives as an XML file.
Import XML	Imports XML files.
Editor profile	Opens the drop-down list with predefined editor profiles.
Help	Opens online help.

DETAIL VIEW

TOOLBAR HISTORIAN AND ARCHIVES



Symbol	Description
New archive	Opens the wizard for creating an archive.
New aggregated archive	Opens the wizard to create an aggregated archive.
Edit archive	Opens the dialog for editing the selected archive.
Add variable	Opens the dialog for selecting variables.
Remove variable	Deletes a variable from the list without confirmation.
Jump back to starting element	Jumps back to the initial position in the zenon Editor. Note: This context menu entry is only available if a jump to the current position has been made from another position with the Linked elements context menu entry.
Delete	Deletes the selected archive.
Export selected as XML...	Exports selected archives as an XML file.
Import XML	Imports XML files.
Rename	Makes it possible to change the name of the archive.
Help	Opens online help.

CONTEXT MENU HISTORIAN

Menu item	Action
New archive	Opens the wizard for creating a new archive.
Save	Saves the configuration for new and amended archives. Note: This entry is only available in the Historian node of the detailed view. This entry is not available in the node of the workspace.
Export all as XML	Exports all archives as an XML file.
Import XML	Imports XML files.
Help	Opens online help.

CONTEXT MENU ARCHIVE

Menu item	Action
Edit archive	Opens the dialog for editing the selected archive.
Add variable	Opens the dialog for selecting variables.
New aggregated archive	Opens the wizard to create an aggregated archive.

Create template	Opens the dialog (on page 59) to create a template for aggregated archives.
Import template	Opens the dialog (on page 55) to import a template for aggregated archives.
Delete	Deletes the selected archive
Export selected as XML...	Exports selected archives as an XML file.
Import XML	Imports XML files.
Rename	Makes it possible to change the name of the archive.
Help	Opens online help.

AGGREGATED ARCHIVE CONTEXT MENU

Menu item	Action
Edit archive	Opens the dialog for editing the selected archive.
Add variable	Opens the dialog for selecting variables.
New aggregated archive	Opens the wizard to create an aggregated archive.
Delete	Deletes the selected archive
Export selected as XML...	Exports selected archives as an XML file.
Import XML	Imports XML files.
Rename	Makes it possible to change the name of the archive.
Help	Opens online help.

CONTEXT MENU VARIABLE LIST

Menu item	Action
Add variable	Opens the dialog for selecting variables.
Help	Opens online help.

CONTEXT MENU VARIABLE

Menu item	Action
Remove variable	Deletes variable from the list. Attention: Deletion is carried out without a request for confirmation.
Help	Opens online help.

6.3 Creating a new archive

You can create archives manually or with the help of an assistant. In order for the assistant to be able to be started, the **Use assistant** option in the **Tools/settings** menu of the Editor must be activated.

To create a new archive with the assistant:

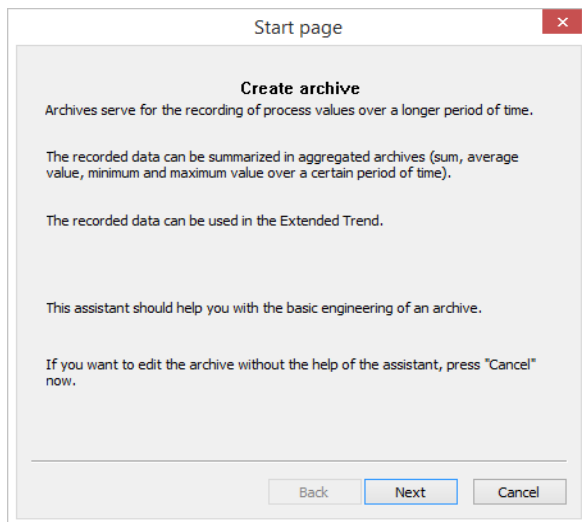
1. Ensure that the **Use assistant** option has been activated.
2. Navigate to the **Historian** node.
3. Select **New archive** in the context menu or in the toolbar.
4. The assistant is started. Follow the steps in the Assistant (on page 22).

To create a new archive individually:

1. Navigate to the **Historian** node.
2. Select **New archive** in the context menu or in the toolbar.
3. The dialog **New archive** is opened.
If the assistant is started, close this using the **Cancel** button.
4. Configure the archive according to the **Edit archive** (on page 26) dialog.

6.3.1 Assistant

The assistant supports you in the basic configuration of an archive. The assistant supports you when creating archives and aggregated archives. It allows the entry of the name and short name of the archive, and also enables you to select variables and templates and amend the settings for the recording type of variable values.



Option	Description
Next	Moves to the next page of the assistant.
Back	Leads you to the previous page of the assistant.
Cancel	All entered settings are lost. No archive is created.
Finish	Only available at the end of the wizard. Ends the assistant. The new archive is entered in the archive tree (detail view of the project manager).

If you want to configure the archive without the help of the wizard, click on **Cancel**.

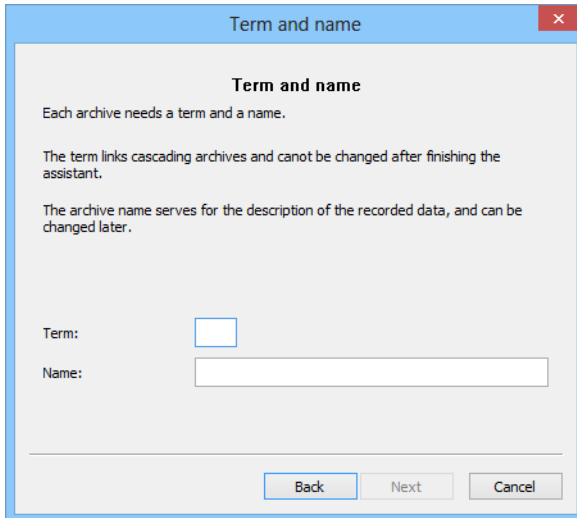
If the assistant is not displayed, then:

1. Open the menu **Tools** in the Editor.
2. Select **Settings**.
3. Activate, in the **Settings** tab, the **Use wizard** option.

CONFIGURATION WITH THE WIZARD

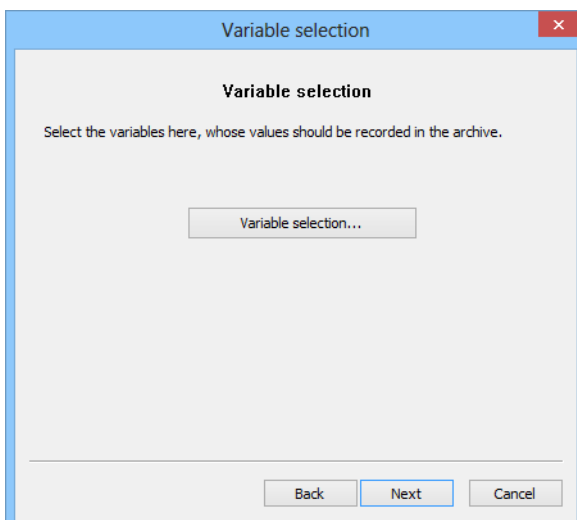
1. Click on the Next button once the wizard has been started. Configuration starts by giving a name and a short description.

2. Enter a short description (2 characters are obligatory) and a name.



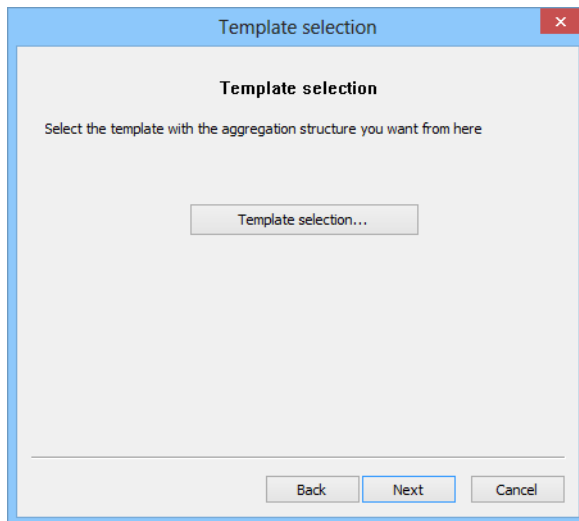
- **Short name:** 2 characters. Can only contain alphanumerical characters: all letters from A to Z and figures from 0 to 9, but no country-specific characters or special characters.
Note: The short name cannot be changed later on.
- **Name:** Entry of a valid name for the archive.
The following characters are not permitted: / \ : * ? < > ! | " ' # % @
The name can be changed later on.

3. Click on **Next**.
4. The variable selection is configured.



- a) Click on the **Variable selection** button.
 - b) The dialog to select variables that are to be archived is opened.
 - c) Select the desired variables.
5. Click on **Next**.

The template to be used for the desired aggregation structure is selected.



Clicking on the **Template Selection** button opens the dialog to select a template (on page 54).

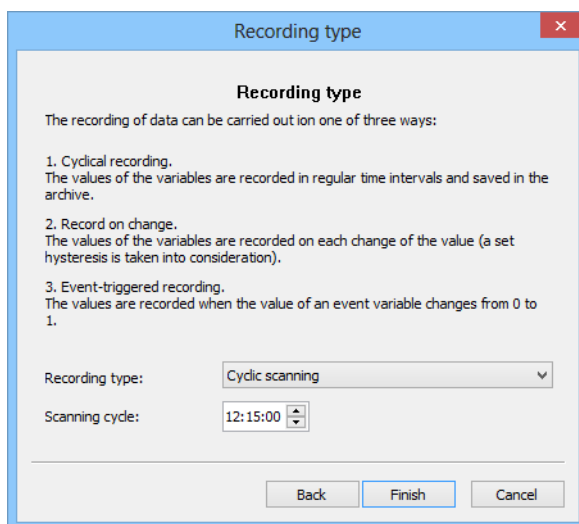
- Templates can only be imported for base archives with cyclic scanning. These archives cannot have any aggregated archives yet.
- The dialog is only opened if at least one template is present.

Attention: No check to see if the template contains a valid aggregation structure is carried out.

Further sequence of the assistant:

- Selecting a template The assistant is thus completed. Click on the **Finish** button.
- No template selected: Click on **Next** to configure the recording type individually.

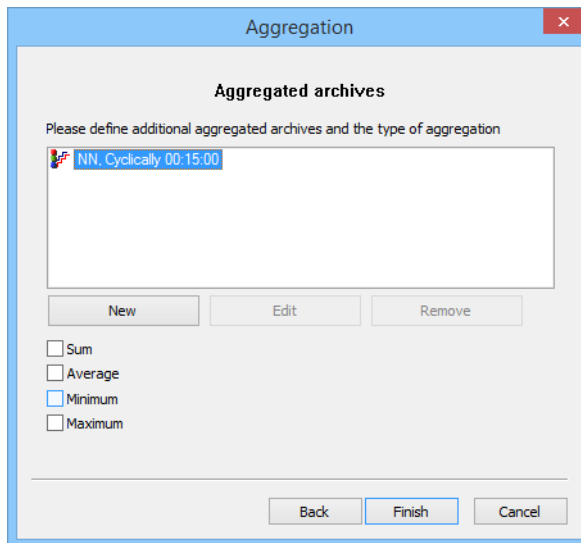
6. Configure the type of recording if you have not selected a template in the previous step.



Selection of recording type from drop-down list.

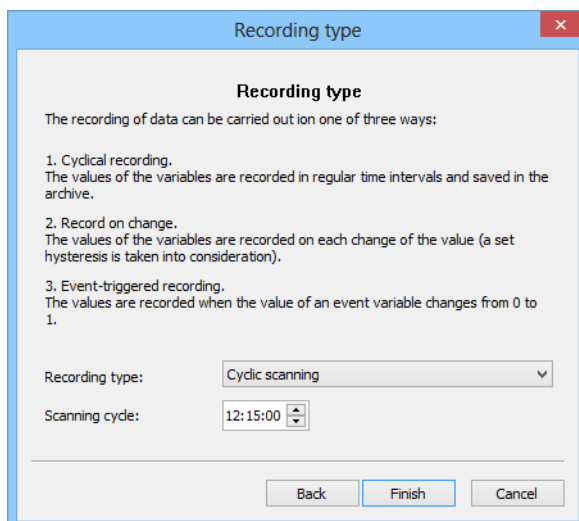
7. Click on **Next**.

Configure new aggregation archives if you want to.



- a) Click on **New** to create a new aggregation archive or on **Edit** to change the name of an existing archive.
 - b) Assign the aggregation archive the desired aggregation types. These always apply for all aggregation archives shown in this dialog.
 - c) To delete an aggregation archive, click on **Remove**.
8. Close the assistant by clicking on **Finish**.

POSSIBLE RECORDING TYPES



Option	Description
Cyclic scanning	Set the Cycle time .
Record on change	Configure: <ul style="list-style-type: none"> ▶ Possible saving of the process image ▶ The initialization value if required
Event-triggered recording	Configure: <ul style="list-style-type: none"> ▶ An event variable by clicking on the ... button ▶ the timestamp ▶ The initialization value if required

For details see recording type (on page 32) chapter.



Information

With a new archive, the dialog for the recording type is displayed. Not with an aggregated archive, because an aggregation archive always carries out recording in the event of a change.

6.4 Edit archive

To edit archives:

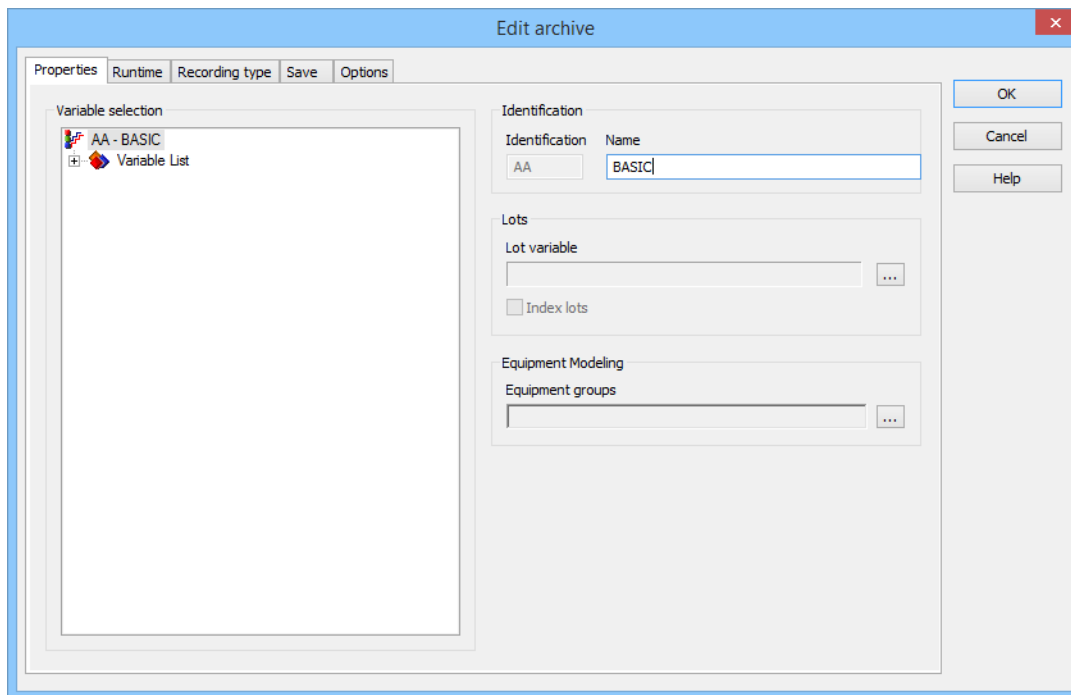
1. Highlight the desired archive.
2. Select **Edit archive** in the context menu or in the toolbar, or press the `Enter` key
The dialog to configure an archive is opened.

Note: This dialog is also opened if a new archive is created and the wizard is deactivated.

6.4.1 Properties

In this tab, you define the identification and select variables, lots and equipment models.

Note: You can find help for configuring the properties of aggregated archives in the **Aggregated archives** (on page 48) chapter.



VARIABLE SELECTION

Option	Description
Variable selection	<p>Display and configuration of the variables that should be taken into account in this archive.</p> <ul style="list-style-type: none"> ▶ Add variables: Select Add variable in the context menu. You can add variables to the archive from all projects which are in the same workspace. Ensure that variables from other projects are also available in Runtime. ▶ Delete variables: Highlight the variable and select Delete variable in the context menu. <p>Note: Seamless redundancy is only supported for variables that come from the same project as the archive.</p>

Attention: Only add variables if the archive has not yet been used.

If, in an archive filter, the start date of the archive is before the date of adding, the variable is not taken into account.

IDENTIFICATION

Option	Description
Identification	Name and identification of the archive.
Identification	<p>Two-digit unique identification of the archive. This identification is integrated into the name of the ARX file when saving the archive data and during automatic name issuing when exporting. The assignment of the files is thus assured</p> <p>Attention: The identification can only be issued when creating a new archive. It cannot be changed afterwards.</p> <p>Note: Only alphanumeric characters (A-Z and 0-9) are permitted for the identification. Possible problems during export or evacuation of the archive are thus avoided.</p>
Name	<p>Freely-definable name of the archive.</p> <p>Note: The following characters are not permitted: / \ : * ? < > ! " ' # % @</p>

LOTS

Option	Description
Lots	Configuration of lots. See also the Lot archiving (on page 66) chapter.
Lot variable	<p>Selection of lot variables. These must be <code>string</code>-type variables. The value of the variable is used as lot name. Click on the ... button to open the dialog for selecting the variable.</p> <p>Note: The value of the variable is used as lot name. While the archive is open, the value of the variable and therefore the lot name can change. Kindly note this at filtering. The value of the variable when ending the archive is used as final lot name.</p>
Index lots	<p>Active: The lot values of this archive are automatically indexed. This allows quicker access to the lot values.</p> <p>Lots can also be indexed in Runtime with the Index archive function.</p>

EQUIPMENT MODELING

Option	Description
Equipment Modeling	Configuration of equipment models.
Equipment Groups	Selection of an equipment group for the archive. Click on the button ... in order to open the dialog for selecting an equipment

	group.
--	--------

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.



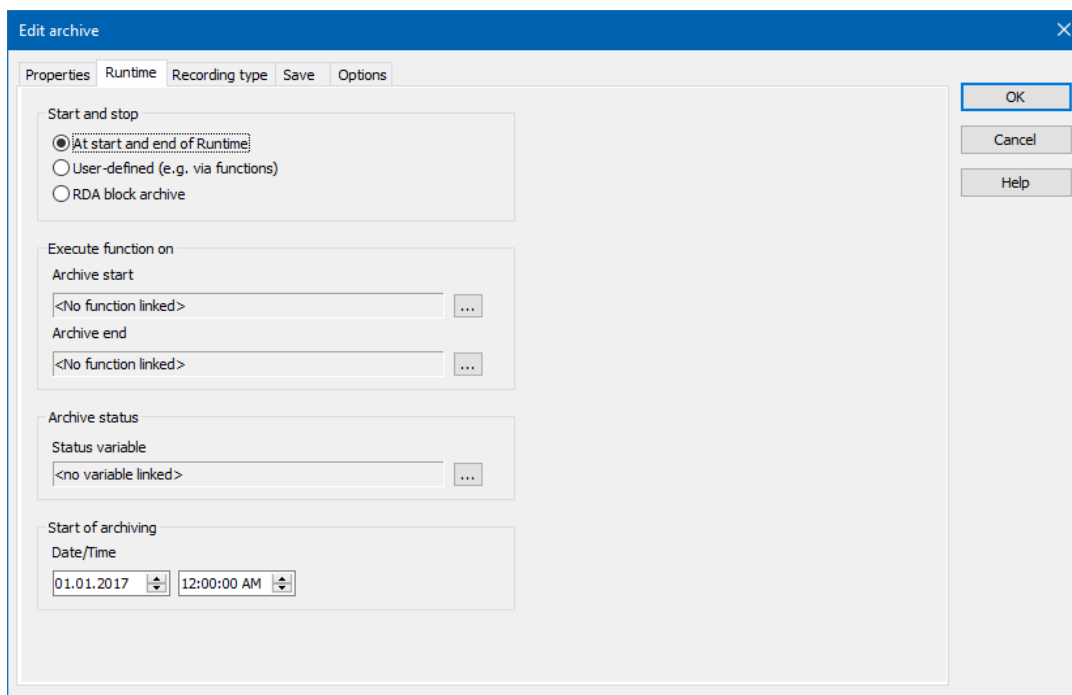
Information

Archives can contain variables from sub projects. Variables from sub projects can be identified by the variable name. This contains the project name.

*With the **lot variable** option (lot archiving (on page 66)) and the content linked to the **event variable**, variables from subordinate projects can also be used.*

6.4.2 Runtime

In this tab, you define when and how archives are started and stopped and which functions are also executed in addition to archive start or archive end.



The screenshot shows the 'Edit archive' dialog box with the 'Runtime' tab selected. The dialog has a title bar with a close button (X) and a tab bar with 'Properties', 'Runtime', 'Recording type', 'Save', and 'Options'. The 'Runtime' tab contains the following sections:

- Start and stop:** Three radio buttons: 'At start and end of Runtime' (selected), 'User-defined (e.g. via functions)', and 'RDA block archive'.
- Execute function on:** Two text boxes with dropdown arrows. The first is 'Archive start' with '<No function linked>'. The second is 'Archive end' with '<No function linked>'. Each has a three-dot menu button to its right.
- Archive status:** A text box with a dropdown arrow labeled 'Status variable' containing '<no variable linked>'.
- Start of archiving:** A section with a 'Date/Time' label and two dropdown menus showing '01.01.2017' and '12:00:00 AM'.

On the right side of the dialog, there are three buttons: 'OK', 'Cancel', and 'Help'.

START AND STOP

Option	Description
Start and stop	Selection of how archives are started and stopped in Runtime.
At start and end of Runtime	<p>The archive is automatically started and stopped with the Runtime.</p> <p>In doing so, the time that has been set under Start of archiving is also taken into account. If this is in the future, there is no archiving until this time is reached.</p> <p>Attention: If you activate this setting, the archive must not be stopped or started using functions (on page 72). This can cause unwanted behavior in Runtime.</p>
User-defined (e.g. via functions)	<p>The archive is started and stopped as defined by the user. For example, by using the Start an archive (on page 107) and Stop an archive (on page 108) functions</p> <p>These functions can be triggered:</p> <ul style="list-style-type: none"> ▶ manually by the user ▶ by events ▶ by time control <p>Attention: These functions do not correspond to those of the settings for Execute function on.</p>
RDA block archive	<p>The archive is administered via RDA (on page 12).</p> <p>In doing so, values which have been stored in the PLC are read and saved in a zenon archive. This is triggered by a trigger variable.</p> <p>Note: Variables configured with "Only request from Standby Server" are not supported in RDA archives.</p>

EXECUTE FUNCTION ON

Option	Description
Execute function on	<p>Selection of functions that are to be executed when the archive is started and ended.</p> <p>Attention: These functions are executed on starting and ending. However they do not trigger starting or ending. Functions to close and start an archive are configured separately in the project and linked to a button or event.</p>
Archive start	Selection of a function that is to be carried out when the archive is started.

ARCHIVE END

Option	Description
Archive end	Selection of a function that is to be carried out when an archive is ended.

ARCHIVE STATUS

Option	Description
Status variable	<p>Variable to represent the status of the archive:</p> <ul style="list-style-type: none"> ▶ <code>true</code> or <code>1</code>: Archive is running ▶ <code>false</code> or <code>0</code>: Archive is not running <p>Click on button ... in order to open the dialog for selecting variables. The linked variable must be of the data type <code>BOOL</code>.</p> <p>The following is applicable for the value of the status variable:</p> <ul style="list-style-type: none"> ▶ For archives that are started with Runtime, the initial value is <code>true</code> (at the start too). ▶ Archives that are started using a function have the initial value <code>false</code> and change this status to <code>true</code> after being started successfully. ▶ With redundancy switching, the status is retained on the Standby Server, i.e. running archives are set to <code>true</code> and stopped ones are set to <code>false</code>. ▶ With cyclical archiving, the variable gets the value <code>false</code> for a brief period during a cycle change. <p>Tip: link an internal variable driver as the status variable.</p>

START OF ARCHIVING

Option	Description
Start of archiving	Stipulation of the start time.
Date/Time	<p>Definition of the start time for the scan and save cycle.</p> <p>The set time defines the first save time of the files that are to be archived. It is used as the basis of calculations for the set save cycles.</p> <p>Example: You define an archive that is to be saved weekly. This save cycle starts at the set start time. If this is set to a Tuesday,</p>

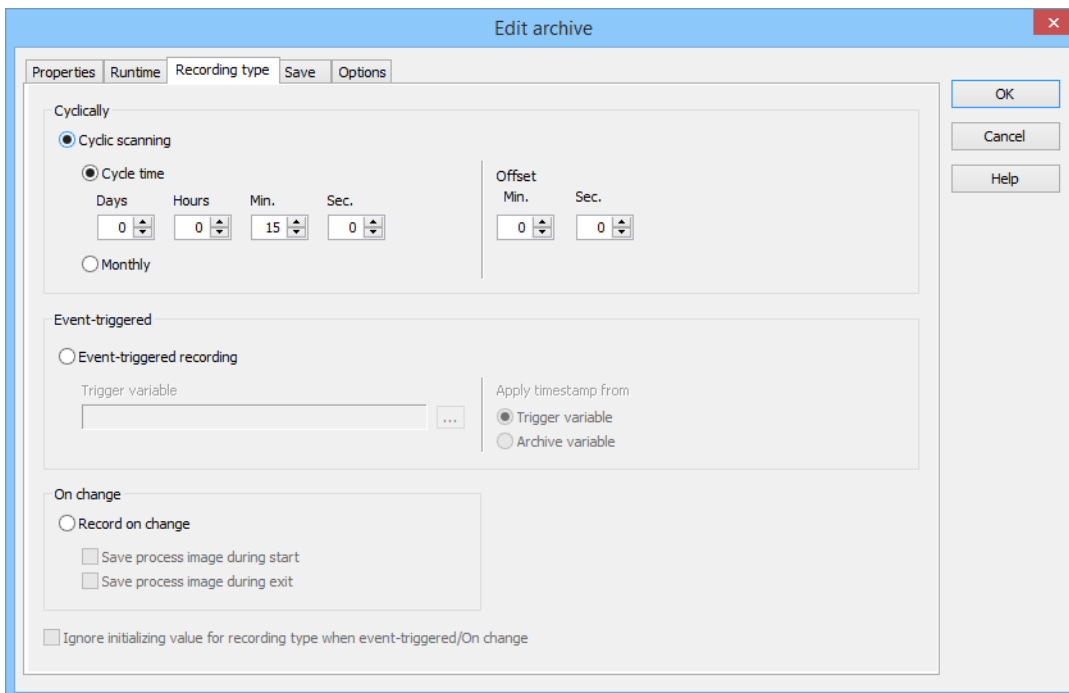
	<p>your weekly archive runs from Tuesday to Tuesday.</p> <p>Recommendations:</p> <ul style="list-style-type: none"> ▶ Leave the start time on the 1 . 1 . at 00:00. This ensures that monthly archives and yearly archives always start on the first day of each month/year. ▶ The start of the scan and save cycle should contain a rounded time and date in the past, so that data recording is started automatically with the next time Runtime is started.
--	---

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.

6.4.3 Recording type

In this tab, you define how data is recorded to the archives.



CYCLICALLY

Option	Description
Cyclically	<p>Settings for cyclic recording.</p> <p>The cycle is freely selectable. However it is closely related to the save cycle (on page 35).</p> <p>Hint: The save cycle should be a multiple of the scan cycle. Otherwise there could be overlaps between scanning and saving the archives. This leads to imprecisions in the aggregated archives.</p> <p>Note: The value for milliseconds is automatically set to 0 in the time stamp.</p>
Cyclic scanning	Active: Archive data is recorded cyclically. After that define the cycle time.
Cycle time	Define the cycle time (days, hours, minutes and seconds) in which values are to be written to the archive.
Monthly	Reading in of the values is done at every month change
Offset	<p>Define how long the archive is to wait after it has requested the values from the driver. The offset is primarily needed for slower drivers. This setting is important if an archive is closed directly after reading the last value.</p> <p>It does not have any influence on the time stamp of the values.</p> <p>Note: The offset must always be smaller than the cycle time.</p>

EVENT-TRIGGERED

Option	Description
Event-triggered	Settings for the event-triggered recording.
Event-triggered recording	Active: Archive data is recorded on an event-triggered basis.
Trigger variable	Selection of the variables that are to trigger the reading of the values. The reading is triggered by the rising edge of this trigger variable from 0 to 1. Select by clicking on the ... button.
Time stamp is taken from	<p>Definition of how the time stamp is set. It can be accepted from:</p> <ul style="list-style-type: none"> ▶ Trigger variable ▶ Archive variable

ON CHANGE

Option	Description
On change	<p>Settings for recording on change.</p> <p>Hint: This method should not be applied for heavily-fluctuating values, because this could lead to an exceptionally high amount of entries.</p>
Record on change	<p>Active: Variables are only written to the archive when their values change spontaneously.</p> <p>Recommendation: Stipulate a measurement range for a Hysteresis in order to avoid values that change rapidly (such as fluctuating ones). These can quickly create large amounts of data. For details, see the Hysteresis chapter in the Variables manual.</p>
Save process image during start	<p>Active: On creating a new archive file the current values of the variables are written into the archive.</p> <p>Note: Must be activated if a Gantt curve is also to display the current status in Extended Trend.</p>
Save process image during exit	<p>Active: On closing an archive file the current values of the variables are written into the archive.</p>

Note on process image: When creating an image for an event-triggered archive, a joint command is sent for all variables.

EVENT-TRIGGERED/ON CHANGE

Option	Description
Event-triggered/On change	
Ignore initializing value	<p>If a variable is read for the first time, an initialization value can be entered.</p> <p>An initialization value is read, for example, when Runtime is started or if a Standby Server upgrades to Primary Server.</p> <ul style="list-style-type: none"> ▶ Active: The initialization value is not taken into account in the archive. ▶ Inactive: The initialization value is taken into account. <p>Note: When starting and switching servers, this triggers a new initialization value. The new initialization value that is created as a result is taken into account and entered into the archive accordingly.</p>

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.

6.4.4 Save

In this tab, you define how archives are saved.



Attention

The current Alpha archive is deleted when changing the save type or the cycle. An Alpha archive is the archive file that is being written by zenon.

Edit archive [X]

Properties Runtime Recording type **Save** Options

Saving format

☒ Internal database (*.arx)

☐ dBase (*.dbf)

☐ CSV (*.txt)

☐ Save as unicode

☐ XML (*.xml)

Saving cycle

☒ Cycle time

Days: 0 Hours: 1 Min: 30 Seconds: 0

☐ Turn of month

☐ Turn of year

Exported columns for CSV/dBase evacuation

Exported columns: DZVWS

Syntax: V-variable name, I-identification, W-value, S-status, D-date, Z-time

Evacuation (archives are deleted after the evacuation)

Storage duration: 1 Month(s)

Evacuation after storage time

☒ Do not evacuate

☐ Internal database (*.arx)

☐ SQL database

...

Create table

☐ Using MS Azure Service Bus for writing

...

☐ XML (*.xml)

☐ CSV (*.txt)

☐ Export as unicode

☐ dBase (*.dbf)

Variable for evacuation status: <no variable linked> ...

OK Cancel Help

SAVE OPTIONS IN THE DIALOG

SAVING FORMAT

Selection of how archives are saved.

Option	Description
internal database (*.arx)	Active: Data is available for subsequent editing and evaluation in a ring buffer (FIFO). The data is stored in the Runtime folder. [Project Path]\[Computer Name]\[Project Name] . They are moved to the export folder hen moved (FIFO).
dBase (*.dbf)	Active: When the archive is closed, the data is immediately evacuated to a dBase file (*.dbf) Attention: For evacuated archives, archive revision, log creation and line graphics are no longer possible.
CSV (*.txt)	Active: When the archive is closed, the data is immediately evacuated to a CSV file (*.txt) Attention: For evacuated archives, archive revision, log creation and line graphics are no longer possible.
Save as unicode	Active: The TXT file is saved as Unicode.
XML (*.xml)	Active: At ending the archive, the data are immediately evacuated as a *.XML file. Attention: For evacuated archives, archive revision, log creation and line graphics are no longer possible.

Note: In the Historian Starter Edition, only saving to the internal database (ARX) is possible.

SAVING CYCLE

Defines the interval in which archives are created. This cycle has a reciprocal effect on the **recording type** (on page 32) in Runtime. For details, see **Cycles in Runtime** (on page 151).

Option	Description
Cycle time	<p>Active: The length of the archives is defined in days, hours, minutes and seconds.</p> <p>This option has an effect on the file size and the number of archive files, and determines the cycle for aggregated archives (on page 48).</p> <p>define the values for:</p> <ul style="list-style-type: none"> ▶ Days ▶ Hours ▶ Minutes ▶ Seconds <p>Note: These values also have an effect on user-defined archives. These are used to calculate the number of archives to be archived.</p> <p>Recommendation: Values greater than 30 seconds.</p>
Turn of month	<p>Active: The archive is saved each time the month changes (monthly archive).</p>
Turn of year	<p>Active: The archive is saved each time the year changes (annual archive).</p>

Note: This setting already defines the cycle for aggregated archives.



Attention

User-defined starting and ending of archives:

Information in the **Cycle** option does not have an effect on the starting and stopping of archives, because this is carried out via functions. However this value does have an influence on how many archive files are stored. The various actual sizes of the archive files are not taken into account here.

The number of archive files to be stored is calculated as follows:

storage duration/Cycle time.

Evacuation is started after this. This ensures that evacuation is carried out with user-defined archiving after a certain number. The number of files to be stored is limited to 65535. The configuration of **save cycle** and **duration of storage** takes this into account automatically.

Example:

- ▶ **storage duration:** 5 hours (= 300 minutes)
- ▶ **Cycle:** 15 minutes

Result: $300/15 = 20$ archive files to be stored.

EVACUATION

Configuration of the evacuation of archives. Archives are deleted locally after evacuation.

Option	Description
Storage duration	<p>Define the duration of storage for the archive before it is evacuated.</p> <p>Granularity</p> <ul style="list-style-type: none"> ▶ Hours ▶ Days ▶ Months ▶ Years <p>A maximum of 65535 archive files can be stored.</p> <p>Attention: The duration of storage is directly dependent on the save cycle. If the save cycle is changed, the values for the duration of storage are amended to the maximum.</p> <p>Examples:</p> <ul style="list-style-type: none"> ▶ Cycle time: 1 second maximum storage time 18 hours. ▶ Cycle time 1 minute maximum storage time 1092 hours or 45 days or 1 month. <p>Attention: No archive is saved if the value 0 is entered. The only existing archive is the current one.</p>
Evacuation after storage time	<p>Setting the evacuation method.</p> <p>Note: The type of evacuation method also has an effect on the display in the Extended Trend.</p> <p>For further information in relation to this, see the Display differences of the evacuation methods chapter in the Extended Trend manual.</p>
Do not evacuate (archives are deleted)	<p>Active: Archives are deleted after the duration of storage has expired.</p>
internal database (*.arx)	<p>Active: Archives are evacuated in the *.arx internal database format.</p> <p>If the number of archives which should be stored is reached, the oldest archives are stored in an ARX format. This file can then be imported in zenon again and it can be read and written there.</p>
SQL database	<ul style="list-style-type: none"> ▶ Active: Archives are evacuated to an SQL database. E.g.: Microsoft SQL Server, Oracle, CRATE.IO and other database systems that have an ODBC interface. <p>Selection of database: Click on the ... button to open the dialog to</p>

	<p>select and configure a database.</p> <p>In contrast to dBase, ASCII or XML archives evacuated into an SQL database are automatically reloaded when necessary (e.g. for Extended Trend).</p> <p>Attention: Archives evacuated to SQL can be read in zenon but it is no longer possible to write to them.</p> <p>Note: Databases can also be evacuated in the MS Azure service bus.</p> <p>You can find details on evacuation to SQL databases in the Evacuating archives to an SQL database (on page 159) in the Further information (on page 156) section.</p>
Create table	Clicking on this button opens the dialog to create or update tables in the SQL database.
Using MS Azure Service Bus for writing	<p>Active: Writing to the SQL table is not carried out directly via the OLEDB connection and SQL INSERT statement, but via the MS Azure service bus.</p> <p>The connection name for the MS Azure service bus must be entered in the field under the option.</p> <p>For details, read the Further information (on page 156) section in the MS Azure service bus (on page 165) chapter.</p>
XML (*.xml)	Active: Archives are evacuated in XML format.
CSV (*.txt)	Active: Archives are evacuated in CSV format into a text file.
Export as unicode	Active: Activate this checkbox in order to save the evacuated TXT files as Unicode.
dBase (*.dbf)	Active: Archives evacuated in DBF format.
Exported columns in CSV/dBase evacuation:	<p>With the two evacuation options dBase and CSV, certain parameters of archived variables can also be evacuated.</p> <p>Enter the desired parameters into the text field in this sequence:</p> <ul style="list-style-type: none"> ▶ V: Variable name ▶ I: Variable identification ▶ W: Value ▶ S: Status ▶ D: Date ▶ Z: Time <p>Default: DZVWS</p>

The path for the save location of the evacuation files is configured using the **General/File storage** project property. SQL evacuation (on page 159) is not included in this. The path is set in the **Evacuated archives** option (see also **Project-related folder** chapter). In addition, the path to read back archives can also be defined using the **Read-back folder for archives** option. These paths can also refer to the same save location. Exported archive data files can thus also be read back again without manual copying. Different paths make sense if, for example, read-back is from a DVD and the exported data is only burnt onto new DVDs at defined times.

Note: RDA archives can be evacuated. Evacuation is carried out immediately after the archive is closed.

VARIABLE FOR EVACUATION STATUS

Option	Description
Variable for evacuation status	<p>Variable for the representation of the status of the evacuation of an archive:</p> <ul style="list-style-type: none"> ▶ <code>true</code> or 1: there is a problem with evacuation. ▶ <code>false</code> or 0: Evacuation works without errors. <p>Click on button ... in order to open the dialog for selecting variables. The linked variable must be of the data type <code>BOOL</code>.</p> <p>If the evacuation of an archive is unsuccessful, for example because the SQL server cannot be reached or the data carrier is not ready to write, the value of the variable for the evacuation status changes to <code>true</code> briefly. This change can be evaluated using a reaction matrix.</p> <p>Tip: link an internal variable driver as the status variable.</p>

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.

EXPORT PARAMETERS

The column separator character for ASCII export and the decimal points for TXT, DBF, XML and SQL can be amended in the `project.ini` file:

Section: **[ARCHIV]**

Entries:

- ▶ **TRENNZEICHEN=**
- ▶ **ARCHDIGITS=**

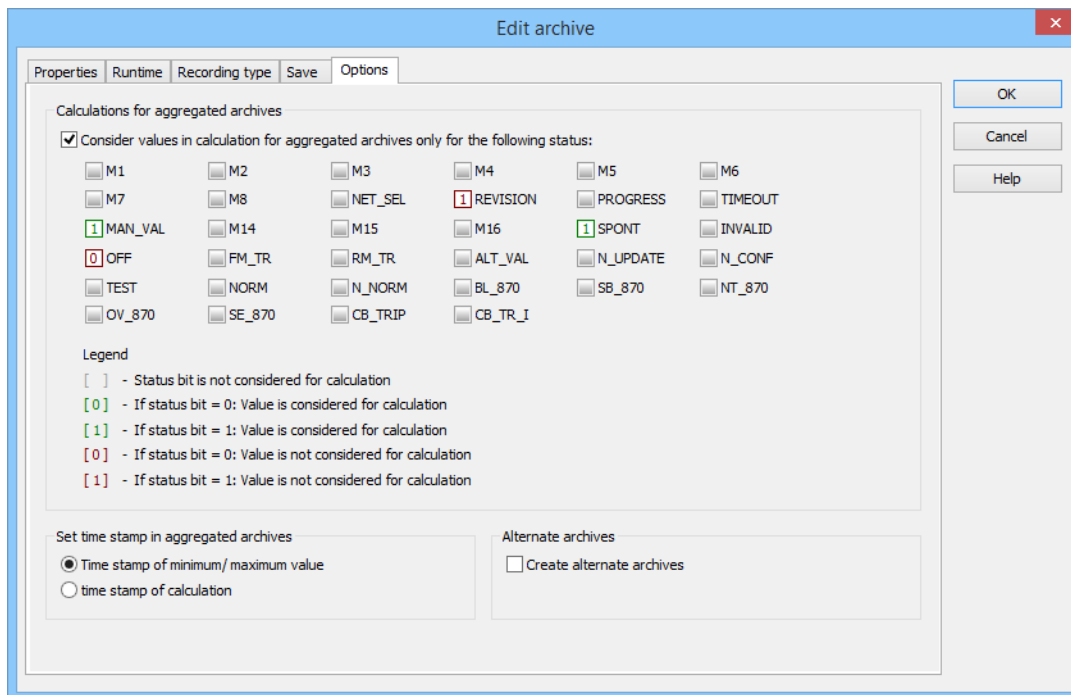
FILE NAMES

The file names of the archives to be exported are issued as follows:

Parameter	Description
XXYYMMTThhmmss.xxx	File name
XX	Archiv Short name
YY	Year (e.g. 14 for 2014)
MM	Year (e.g. 03 for 2005)
DD	Day
hh	Hours in UTC.
mm	Minute
ss	Second
xxx	File format

6.4.5 Options

In this tab, you define criteria for creating aggregation archives. You can set exclusive and inclusive filters to different status bits to do this.



CALCULATIONS FOR AGGREGATED ARCHIVES

Option	Description
Only accept values in the aggregated archive calculation if the following status filter is true	<p>Active: Activated status bits are taken into account for the calculation of values of aggregation archives.</p> <p>The additional statuses are</p> <ul style="list-style-type: none"> ▶ shown in the archive editor ▶ Shown in the report and can also be set there <p>For the definition of the status, see the Status processing chapter:</p> <p>Each status bit can have one of 5 possible states:</p> <ul style="list-style-type: none"> ▶ empty: is not evaluated ▶ green 0: Is taken into account if the value is 0. ▶ green 1: Is taken into account if the value is 1. ▶ red 0: Is not taken into account if the value is 0. ▶ red 1: Is not taken into account if the value is 1. <p>Note: If the checkbox is activated, at least one status bit must be activated.</p>

SET TIME STAMP IN AGGREGATED ARCHIVES

Option	Description
Timestamp of minimum/ maximum value	Active: The time stamp of the minimum/maximum value found is used as a time stamp.
time stamp of calculation	Active: The time stamp of the calculation is used as a time stamp.

ALTERNATE ARCHIVE

Option	Description
Create alternate archives	<p>Behavior if Runtime is not active:</p> <ul style="list-style-type: none"> ▶ Active: Missing archive files are created the next time Runtime starts. Note: To do this, cyclic recording must be selected. ▶ Inactive: Only the current cycle is filled up.

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.

CREATING A STATUS FILTER

By clicking the checkbox next to each displayed status, you can decide for each value of the archive if it is to be used for the aggregated archive.



Example

In the aggregated archive, only values for which bit NORM is set and bit INVALID is not set are taken into account.

For this you set a green 1 for bit NORM and a red 1 for bit INVALID. The check boxes of all other bits remain gray.

You can explicitly include or exclude set or un-set bits.



Information

Not all status bits set during archiving are also visualized. Non-visualized bits are:

- ▶ T_EXTERN (status bit 21)
- ▶ T_INTERN (status bit 22)
- ▶ INFO (status bit 26)
- ▶ RES28 (status bits 28)
- ▶ RES31 (status bits 31)
- ▶ WR_ACK (status bit 40)
- ▶ WR_SUC (status bit 41)
- ▶ COT0 (status bit 32) to COT5 (status bit 37)
- ▶ T_STD (status bit 30)

Non-visualized status bits are:

- ▶ not saved as a TXT file or written as an XML
- ▶ Not printed when printing out
- ▶ Not shown in the Recipegroup Manager

You can find an overview of all status bits in the Status bits chapter

6.4.6 Example

The start and end time of an archive file, as well as the time points for the entry of variable values into the archive file are calculated from the options of the following tabs:

- ▶ **Runtime:**
Start of archiving
- ▶ **Recording type:**
Cyclic recording
- ▶ **Save:**
Saving cycle

The calculation of the time point for the entry of variable values into the archive file is restarted for each archive file.



Attention

Note the difference between:

- ▶ The scanning and save cycle (SSC) and
- ▶ Cycle time (CT)

These must not be confused.

EXAMPLE

- ▶ Identification: **XX**
- ▶ Start of archiving: 01.01.2013, 00:00:00
- ▶ Cyclic scanning: 13 seconds (00:00:13)
- ▶ Saving cycle: 1 minute (00:01:00)

Result:

Date	Time	Archive file
12/7/2013	03:08:13	xx80131207020900.arx
12/7/2013	3:08:26 AM	xx80131207020900.arx
12/7/2013	3:08:39 AM	xx80131207020900.arx
12/7/2013	3:08:52 AM	xx80131207020900.arx
12/7/2013	3:09:13 AM	xx80131207021000.arx
12/7/2013	3:09:26 AM	xx80131207021000.arx
12/7/2013	3:09:39 AM	xx80131207021000.arx

12/7/2013	3:09:52 AM	xx80131207021000.arx
-----------	------------	-----------------------------

- ▶ Each archive file contains data for a minute each.
- ▶ Data recording for each archive file starts at hh:mm:13.

DETERMINATION OF THE DTV

The determination of the time of the first value (DTV) is achieved by rounding the scan and save cycle to the cycle time. In doing so, please note:

- ▶ The rounding of the scan and save cycle to the first cycle time is carried out in accordance with the following model:
 - Hours with hours
 - Minutes with minutes
 - Seconds with seconds

This means: If the time (H:M:S) of the recording and save cycle to be rounded is less than that of the cycle time, the latter is always 0.

- ▶ If the cycle time is a day, the recording and save cycle is always taken as 0:0:0 o'clock Recording starts at 00:00.
- ▶ For monthly cycle time, recording always takes place on the first day of the month at 00:00:00.

SOME EXAMPLES:

- ▶ **ASZ**: Scan and save cycle
- ▶ **ASZr**: Scan and save cycle rounded:
- ▶ **AZ**: Cycle time
- ▶ **EZW**: Time first value

ASZ	AZ ->	EZW;	ASZr + AZ =	EZW
XX:XX:XX	1T 00:00:00	00:00:00;	00:00:00 + 00:00:00	00:00:00
12:01:00 AM	0d 23:59:00	11:59:00 PM;	00:00:00 + 11:59:00 PM	11:59:00 PM
12:30:00 AM	0d 12:30:00 AM	1:00:00 AM;	12:30:00 AM + 12:30:00 AM	1:00:00 AM
12:30:00 AM	0d 12:29:00 AM	12:58:00 AM;	12:29:00 AM + 12:29:00 AM	12:58:00 AM
12:30:00 AM	0d 12:05:00 AM	12:35:00 AM;	12:30:00 AM + 12:05:00 AM	12:35:00 AM
12:29:00 AM	0d 12:05:00 AM	12:30:00 AM;	12:25:00 AM + 12:05:00 AM	12:30:00 AM
12:00:00 AM	2T 12:00:00 AM	12:30:00 AM;	00:00:00 + 2d00:00:00	3. 12:00:00 AM

6.5 Aggregated archives

Aggregated archives always relate to a base archive, the data of which it shows in compressed form. Within zenon, aggregated archives act like any other archive. You can do the following with aggregated archives:

- ▶ Edit them in Runtime using an `archive revision` screen
- ▶ Include them in reports and trends
- ▶ evacuate

The following calculation methods are available for the compression of data:

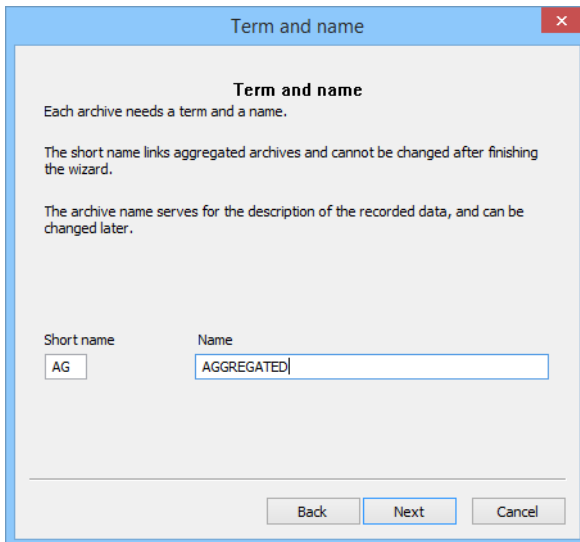
- ▶ Sum
- ▶ Average
- ▶ Minimum
- ▶ Maximum

The use of aggregation archives is recommended for large amounts of data most of all. For a comparison of time periods such as complete weeks, months or years, average values or sums are often sufficient. The raw data can thus be prepared in a clear manner and the amount of data can be reduced.

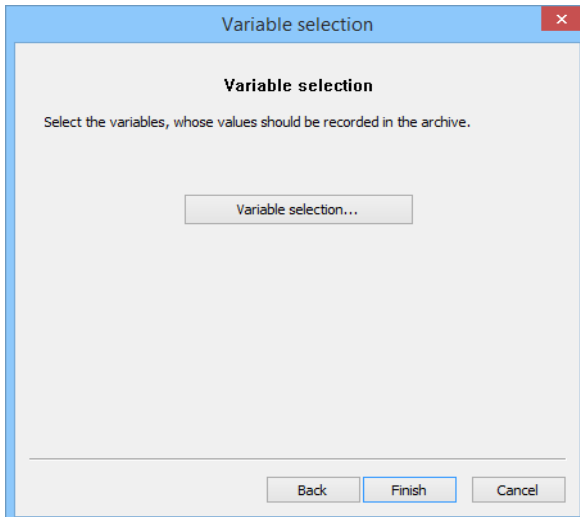
CREATING AN AGGREGATION ARCHIVE

To create an aggregation archive:

1. In the detail view, select the archive that is to be aggregated.
2. Select **New aggregated archive** in the toolbar or in the context menu
3. The assistant is started provided it is activated in the **settings**.
(In order for the assistant to be able to be started, the **Use assistant** option in the **Tools/Settings** menu of the Editor must be activated.)
4. Please define a name!



5. Select the Variable and the method (on page 50) of aggregation.

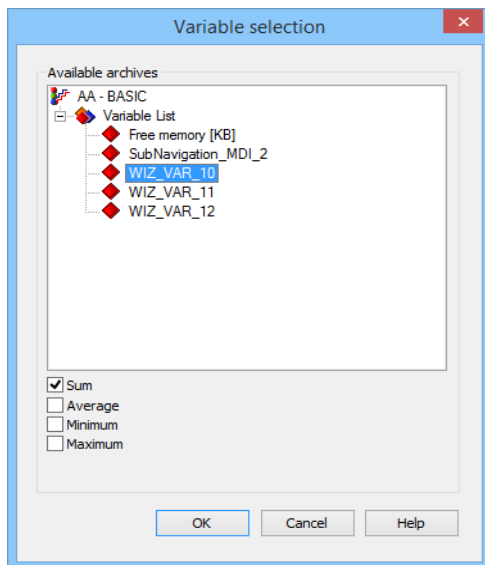


Click on the **Variable selection** button to open the dialog (on page 50) to select a variable and the aggregation method.

Aggregated archives are also recorded **on change**. The scan cycle of the aggregation archive is set via the save cycle of the respective base archive. The values selected for the aggregated archive are always calculated if a base archive is closed and saved. zenon recognizes the closing of the basic archive as a value change and triggers the calculations for the aggregated archive.

6.5.1 Variable selection and aggregation method

In the variables selection dialog, the variables to be aggregated and the aggregation method are selected.



AVAILABLE ARCHIVES

Option	Description
Available archives	Select, from the variable list, the variables that should be taken into account in the aggregated archive. Multiple selection with Control key or Shift key.
Sum	Active: Values of the selected variables are added depending on the save cycle.
Average	Active: Average value of the selected variables is generated.
Minimum	Active: The minimum per selected variable is determined.
Maximum	Active: The maximum per selected variable is determined.

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.

AMEND TIME STAMP FOR AVERAGE VALUE

The time stamp in an aggregated archive corresponds to the time when the ARX file was closed. This leads to the following situation:

- ▶ The values of a day, x , are saved to an archive. The start time is thus 00:00, the save time is 24:00.
- ▶ The aggregation archive for this day, x , has an average value and received the times stamp 00:00:00 on day $x + 1$. (the minimum and maximum can have the same or the original time stamp; in our case we assume the original)
- ▶ If filtering for the day x , 00:00:00, up to day $x + 1$, 00:00:00 is carried out in the aggregated archive, you get the values for minimum and maximum with the original time stamp for the day x .
- ▶ You get the average value for the day $x-1$ (time stamp day x , 00:00:00). The value for the day x , which is in the file with the time stamp day $x + 1$, 00:00:00, is expected.
- ▶ The minimum and maximum thus have a time stamp within the selected time period; the average value has a time stamp outside this time period.

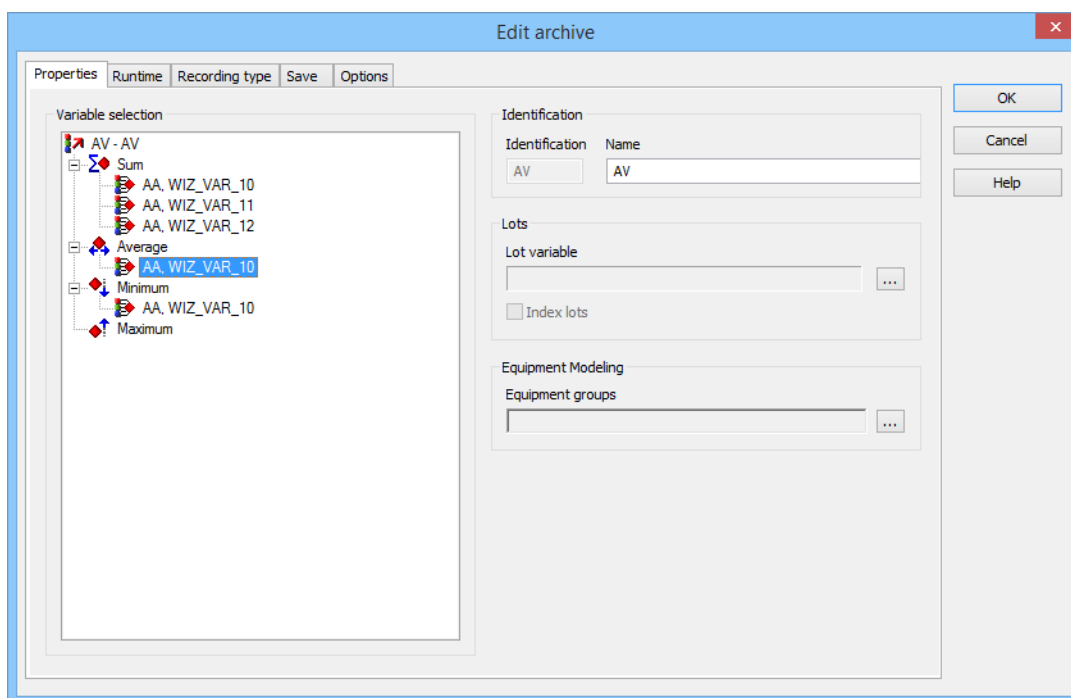
SOLUTION

In order to receive a matching time stamp, set the time stamp for the average value back by one second. To do this, enter, in the file called **project.ini**, in the **[ARCHIV]** section, the value 1 for **ZEIT_AUTOMATISCH=**.

The time for the aggregation archive is thus automatically set to one second before saving. Day X+1, 00:00:00, becomes day X, 23:59:00.

6.5.2 Editing aggregation archives

The editing of aggregation archives differs from the editing of base archives in terms of the properties most of all. For aggregation archives, variables are assigned to the calculation methods.



IDENTIFICATION

Option	Description
Identification	Name and identification of the archive.
Identification	Two-digit unique identification of the archive. Is used for the automatic name issuing with export functions. Attention: The identification can be issued when creating a new base archive. It cannot be subsequently changed.
Archive name	Freely-definable name of the archive. Note: The following characters are not permitted: / \ : * ? < > ! " ' # % @

VARIABLE SELECTION

Option	Description
Variable selection	<p>Select the calculation method in the archive and add variables to it or remove variables that are to be taken into account in the aggregation archive. Multiple selection with Control key or Shift key.</p> <ul style="list-style-type: none"> ▶ Sum: Values of the attendant variables are added depending on the save cycle. ▶ Average: Average value of the values of the attendant variables is generated. ▶ Minimum: The minimum per attendant variable is determined. ▶ Maximum: The maximum per attendant variable is determined. <p>Adding or deleting variables:</p> <ul style="list-style-type: none"> ▶ Add variables: Select Add variable in the context menu. You can add variables from the base archive. ▶ Delete variables: Highlight the variable and select Delete variable in the context menu.

LOTS

Option	Description
Lots	Configuration of lots. (See also chapter Lot selection (on page 66) .)
Lot variable	<p>Selection of lot variables. These must be <code>string</code>-type variables. The value of the variable is used as lot name. Click on the ... button to open the dialog for selecting the variable.</p> <p>Note: The value of the variable is used as lot name. While the archive is open, the value of the variable and therefore the lot name can change.</p>

	Kindly note this at filtering. The value of the variable when ending the archive is used as final lot name.
Index lots	Active: The lot values of this archive are automatically indexed. This allows quicker access to the lot values.

EQUIPMENT MODELING

Option	Description
Equipment modeling	Configuration of equipment models.
Equipment Groups	Selection of an equipment group for the archive. Click on the button ... in order to open the dialog for selecting an equipment group.

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.

Note: Further tabs are configured in same way as **editing the archive** (on page 26).

LIMITATIONS

- ▶ Aggregated archives are automatically set to `record on change` by zenon. The recording type cannot be changed.
- ▶ The save cycle results from the length of the attendant base archive. The values of the variables are always written to the aggregated archive whenever the basis archive is ended.
- ▶ All entries of the base archive are used by default for calculation (i.e. also INVALID entries and manual values).
Exception: In the base archive, the **Only accept values in the aggregated archive calculation if the following status filter is true** property in the options is activated and configured.

6.5.3 Templates for aggregated archives

Templates for aggregated archives make it possible to import existing aggregated archives into base archives. Structures that have already been configured can be easily reused this way.

There are pre-configured templates (on page 56) available that are supplied with zenon. In addition, individual configurations (on page 59) can be saved as templates.

Templates can only be imported for base archives with cyclic scanning. These archives cannot have any aggregated archives yet.

TEMPLATE PATHS

The templates are stored in two paths:

- ▶ **Pre-defined templates:**
In the subfolder of the installation folder:
`\Templates\Archives\<Language>\<Filename>.xml`
- ▶ **User-defined Templates:**
`%programdata%\COPA-DATA\zenon8.00plates\Templates\Archives\<Language>\<Filename>.xml`

Note: Depending on the type of registration, this path can also be in the program folder. zenon automatically takes this into account.

FILE FORMAT

Templates are stored in XML format. The template contains metadata with:

- ▶ Description of the template
- ▶ Name of the template
- ▶ The main settings of the archive for each archive of the hierarchy

Importing templates

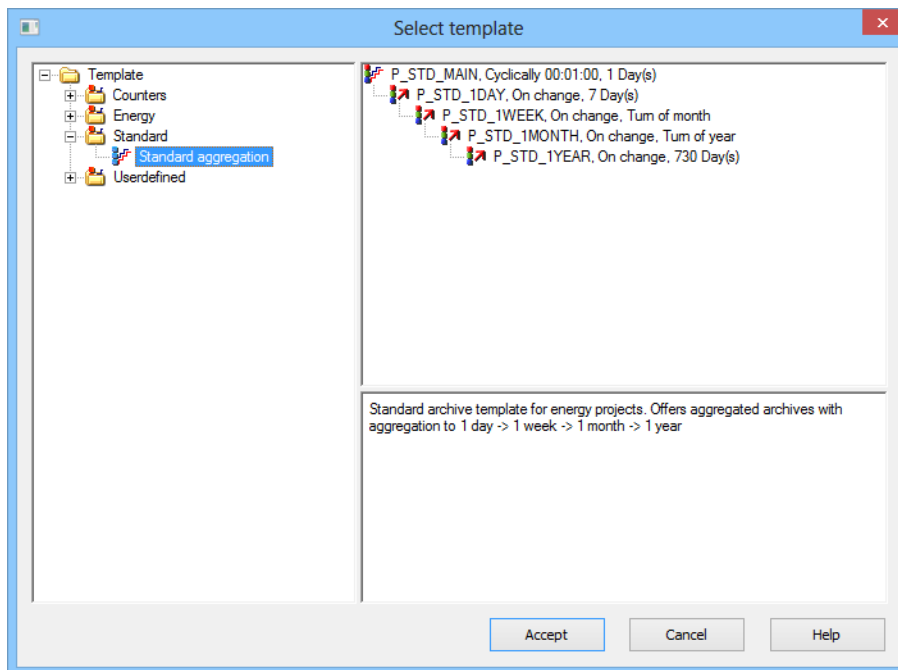
To import templates for aggregated archives:

1. Highlight the desired base archive.
2. Select the **Import template** command in the context menu.
3. The dialog for selecting a template is opened.
4. Select the desired template.
5. Click on the **Accept** button.
6. The aggregated archive is imported.



Information

Templates can only be imported for base archives with cyclic scanning. These archives cannot have any aggregated archives yet.



Option	Description
Templates window	Display of the templates present.
Selected templates window	Display of the selected aggregated archive.
Apply	Imports the aggregated archive into the base archive and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

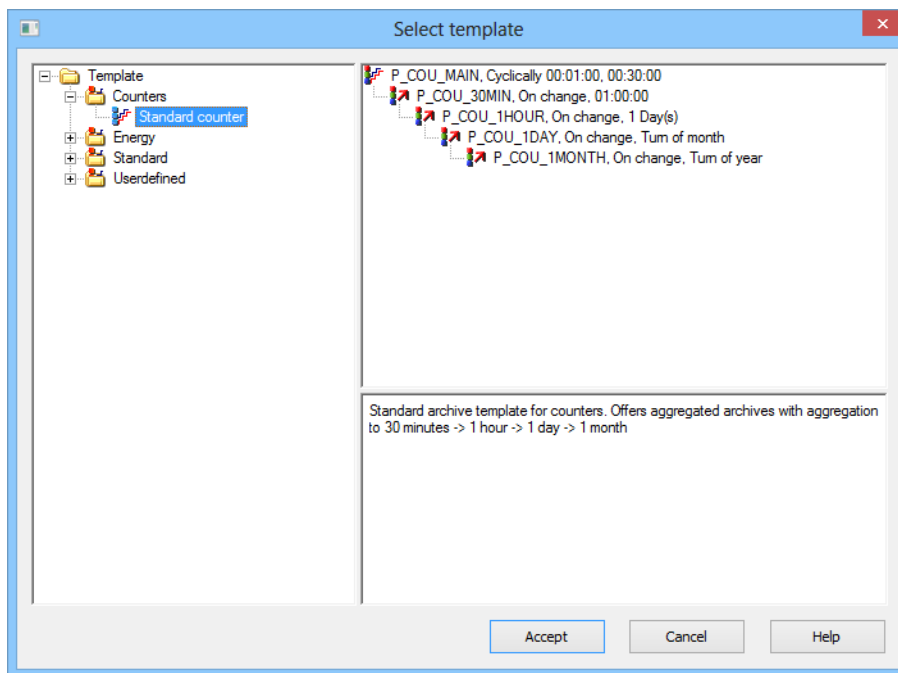
Supplied templates

The following pre-configured templates are supplied with zenon:

- ▶ **Counters:** Counting aggregated archive, which aggregates from one day over a week, a month and a year up to two years and stores the data for up to 10 years.
- ▶ **Standard:** Standard aggregated archive, which aggregates from 30 minutes over an hour, a day and a month to one year and stores the data for up to 16 years.
- ▶ **Energy:** Aggregated archive for energy, which aggregates from 15 minutes over an hour, a day and a month to one year and stores the data for up to one year.

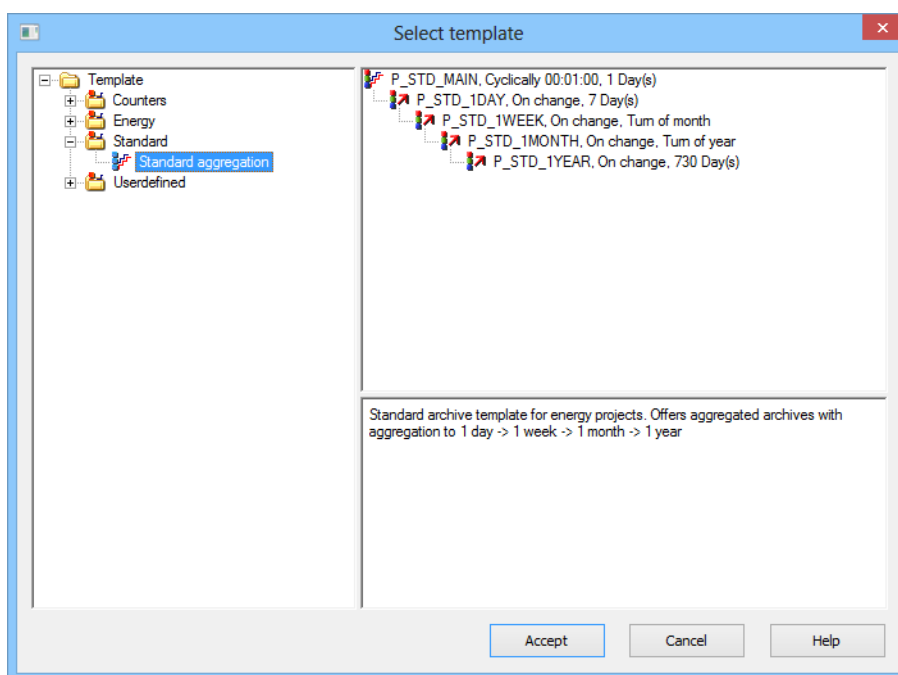
Supplied templates are write-protected and cannot be changed. They are shown in the dialog with blue symbols. Self-created templates have red symbols.

AGGREGATED ARCHIVE COUNTER



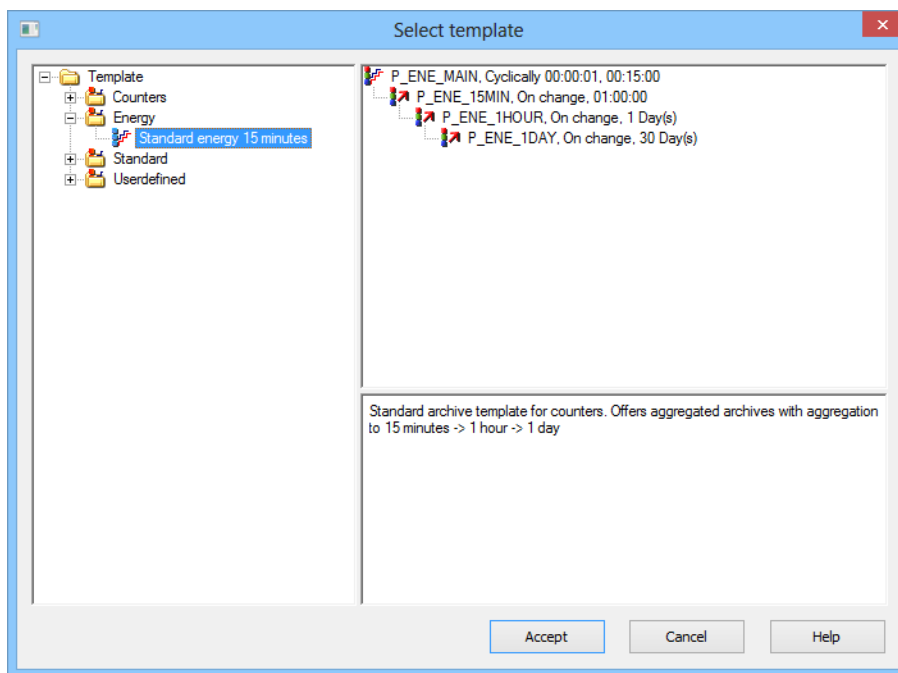
Archive level	Current aggregation level	Aggregated archive aggregation level	Storage
1: CO-P_COU_30MIN	30 minutes	1 hour	14 days
2: C2-P_COU_1HOUR	1 hour	1 day	6 months
3: C3-P_COU_1DAY	1 day	When the month changes	3 years
4: C4-P_COU_1MONTH	1 month	When the year changes	10 years

AGGREGATED ARCHIVE STANDARD



Archive level	Current aggregated archive	Aggregated archive aggregation	Storage
1: DO-P_STD_1DAY	1 day	7 days	1 year
2: D2-P_STD_1WEEK	1 week	When the month changes	3 years
3: D3-P_STD_1MONTH	1 month	When the year changes	10 years
4: D4-P_STD_1YEAR	1 year	2 years	16 years

AGGREGATED ARCHIVE ENERGY



Archive level	Current aggregated archive	Aggregated archive aggregation	Storage
1: EO-P_ENE_15MIN	15 minutes	1 hour	14 days
2: E1-P_ENE_1HOUR	1 hour	1 day	6 months
3: E2-P_ENE_1DAY	1 day	30 days	1 year

Creating and editing templates

Templates can be created individually. Templates can only be created for base archives (first level) and only for archives with cyclic scanning. The menu item is deactivated for all other archives, or not present for aggregated archives.

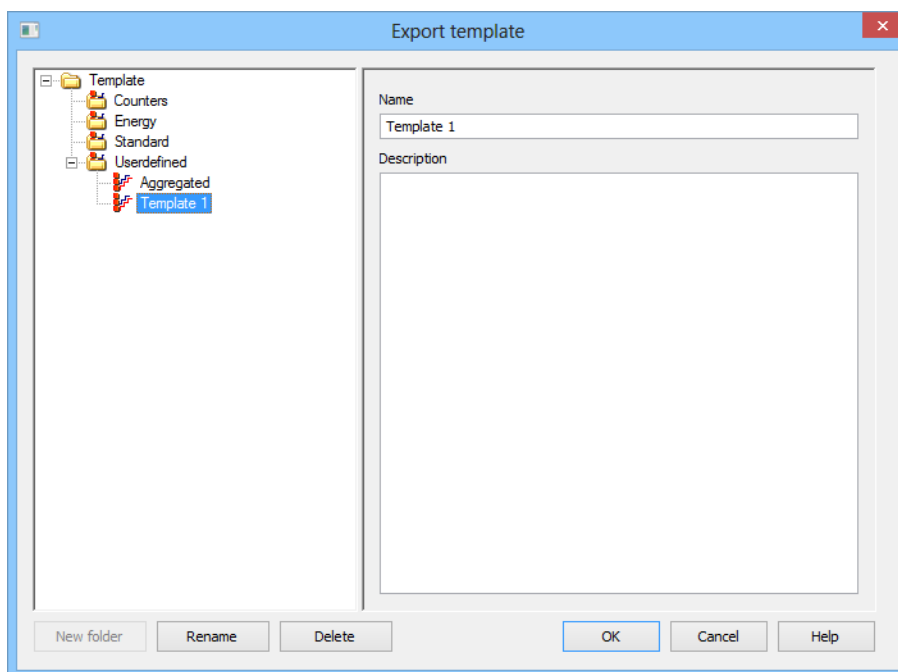
To create a separate template:

1. Highlight the desired aggregated archive in the detail view
2. Select **Create template** in the context menu.
3. The dialog for configuring templates is opened
4. Select the desired folder or create a new one
5. Assign a meaningful name for the template.
6. Confirm the new template by clicking on **OK**.

When creating a template, the complete hierarchy of the selected aggregated archive is used.

Note: Supplied templates and their folder structure cannot be edited or deleted.

CREATING AND EDITING TEMPLATES



Option	Description
List of templates	Contains a folder structure with all pre-defined templates. Templates can be selected and the name and description can be edited. Pre-defined elements cannot be edited.
Name	Name of the template. Hint: Select a meaningful name in order to quickly be able to find the correct template when importing.
Description	Detailed description of the template.
New folder	Creates a new folder in the highlighted folder. Keyboard operation: <code>Ins .</code> key.
Rename	Opens the highlighted element for editing. Keyboard operation: <code>F2</code> Key Pre-defined elements cannot be renamed.
Delete	Deletes the selected element. If templates are only to be deleted and no new ones are to be created, the dialog must be closed by clicking on Cancel . Keyboard operation: <code>Del</code> key. Note: Pre-defined elements cannot be deleted.

CLOSE DIALOG

OK	Applies settings and closes the dialog. The template saves the settings of all aggregated archives to the selected archive.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

CREATE, EDIT AND DELETE ELEMENTS

CREATING A FOLDER

To create a new folder:

1. Highlight the existing folder
2. Click on the **New folder** button
oder

Press the `Insert` key
or

Select `New folder` in the context menu of the superordinate folder

EDIT ELEMENT

To edit an element:

1. highlight the element
2. Change the name or description
or

Select the corresponding command in the context menu of the element.

DELETE ELEMENT

To delete an element:

1. highlight the element
2. Click on the **Delete** button
or

Press the `Del` key
or

Select the `Delete` element in the context menu of the element

3. Close the dialog by clicking on **Cancel**

CHANGING THE STRUCTURE

To change the structure:

1. Highlight the desired element (folder or template)
2. Drag it with the mouse to the folder where it is to be a subfolder

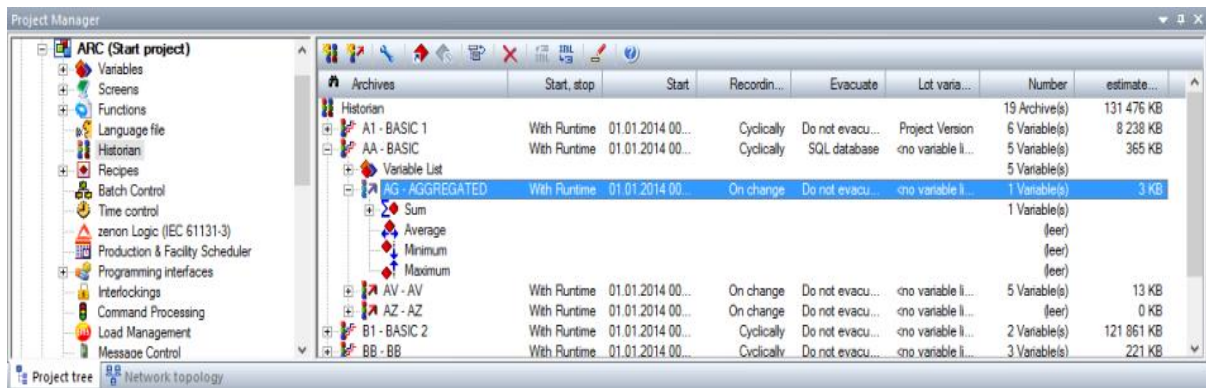
EDIT FOLDER AND TEMPLATES WITHOUT ACCEPTING THE ARCHIVE SETTINGS

You can also edit folders and templates without accepting the archive settings on closing

To do this, edit the elements in the left window with the list of templates.

6.6 Add and remove variables

Variables and their aggregation types are displayed in the detail view of the archive.



Variables can be added or removed here:

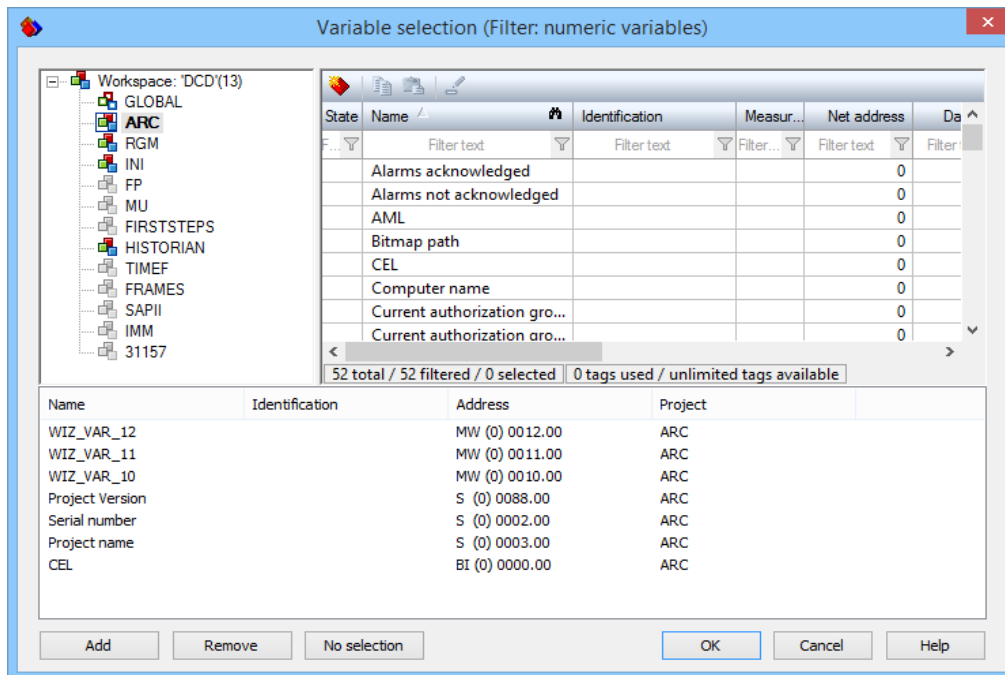
- **Add:**
To add variables, select the **Add variable** command in the context menu or in the toolbar by means of Drag&Drop.
- **Remove:**
Select the desired variables and press the **Del key** or select the **Remove variable** command in the context menu or the toolbar.
Attention: Variables are removed from the variable list without a request for confirmation.

ADDING A VARIABLE TO A BASE ARCHIVE

To add a variable to a base archive:

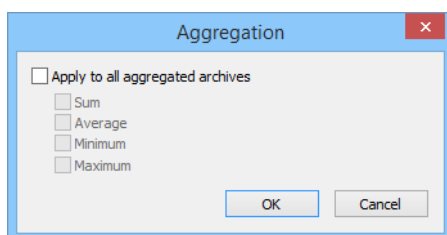
1. Select **Add variable** in the context menu, the toolbar of the base archive or the variable list.

- The selection dialog is opened.



Add the desired variables.

- Close the dialog.
- If there are aggregation archives, then the dialog to add the new variables for aggregation archives is opened.



Select whether the variables are to be added to all existing aggregation archives, and with which aggregation types:

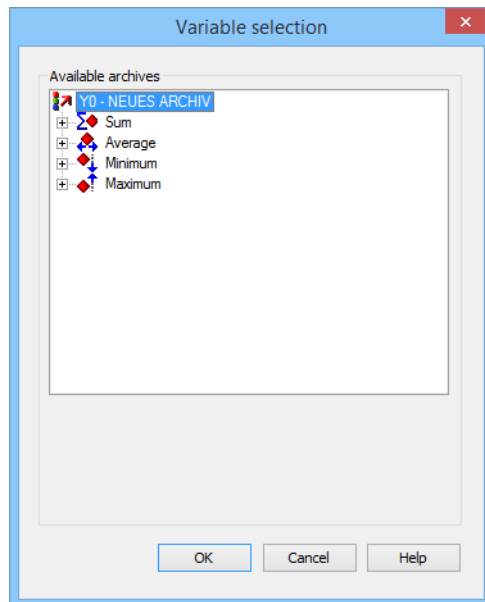
- Apply to all aggregation archives:** The newly-added variables are taken into account in all existing aggregation archives. When activating, the desired aggregation archives (sum, average value, minimum, maximum) must be selected.

ADDING A VARIABLE TO AN AGGREGATION ARCHIVE

To add a variable to an aggregation archive:

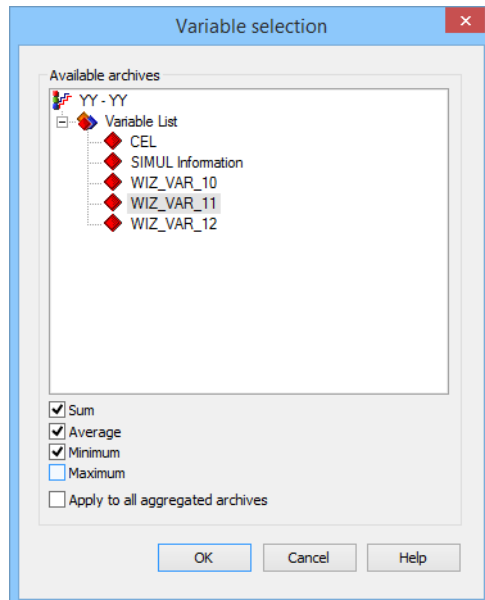
- Select **Add functions** in the context menu or in the tool bar of a configured archive.
- The selection dialog is opened, depending on the type of archive:

a) No subordinate aggregated archive present



Add the desired variables.

b) Subordinate aggregated archive present:



Select the desired variables and aggregation archives.

If these variables are to be applied in all subordinate aggregation archives, then activate the **In Apply to all aggregation archives** option.

3. Close the dialog.

INSERT VARIABLES INTO THE AGGREGATION ARCHIVE BY MEANS OF DRAG&DROP

Additional variables can also be inserted into an aggregation archive directly by means of Drag&Drop. There are two methods available to you for doing this:

- ▶ Individual variable:
Select an individual variable from the variable list of the base archive and drag this with the left mouse button held down to the desired data compression type of an attendant aggregation archive.
- ▶ All variables:
Drag the complete base archive to a data compression type. In doing so, all variables contained therein are allocated.

6.7 Lot archiving

Lot archiving allows for the easy allocation of lot designations to an archive. Lot labeling allows you to filter archive data, such as in Extended Trend or the Report Generator, as you wish when processing it further.

Note: The lot name must not contain any pipe characters (|).

A lot archive is used most of all if no cyclical processes are to be recorded. For example in a drinks-filling plant, where different products are manufactured in different qualities. In doing so, the freely-definable lot names can be used very easily to make a link between the archive and the lot. The lot name can then also be used for filtering in Runtime.

Because lot archives are not based on defined time periods or a number of value entries, it makes sense to index these. It is thus possible to access the data more quickly at a later time.

The main differences between a lot archive and an archive:

- ▶ defined start and stop time of the archive (Generally: not cyclic)
- ▶ defined lot name



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.

INDEX

For quicker access to the lot values in the lot filter, an index can be created for each archive. The index is stored in the file **[short name].ARI**. An entry is made in the index file each time a lot archive is saved. This entry contains: archive name, lot description, start time and end time. With the evacuation of the archive the index also is updated.

Archives can be deleted or moved using file operations. In this case, the index file must be reindexed. To do this, use the **Index archive** function.

AUTOMATIC INDEXING

Activate, when configuring the base archive or the aggregation archive (on page 52), the **Index lots** option in the Properties tab. The index is only created from archive files in the Runtime folder. If archive files are read from the read-back folder, this reading is carried out file by file.

The new creation of a lot index is carried out with the **Index archive** function. Use this function if data is to be saved to a Runtime folder manually, or to be read manually from it. The index file is not evacuated with it and also not read when the data is obtained from the read-back folder. Indexing again only accesses the archive files in the Runtime folder. If archive files are read back from the read-back folder, these are not moved back to the Runtime folder again. The data is loaded to the RAM. New indexing thus accesses data in the Runtime folder, but not data in the read-back folder.

FUNCTION INDEX ARCHIVE

Generating the index file can be a time-consuming procedure depending on the amount of the archive files. In order not to block the Runtime, this is done in the background. If the new indexing is not finished but lot values are needed, this request has to wait until the procedure is finished. With the **Execute synchronously** option, there is a wait until the new indexing is finished before the function is executed.

Note: You can find this option in the configuration dialog of the function.

6.8 Creating a screen of the type Archive Revision

CREATING A SCREEN OF THE TYPE ARCHIVE REVISION

The `archive revision` screen is for displaying, configuring and editing archives in Runtime.

ENGINEERING

There are two procedures for the creation of a screen from zenon version 8.00:

- 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 `archive revision` in the **Screen type** property.
 - c) Select the desired frame in the **Frame** property.
3. Configure the content of the screen:
 - a) select menu item **Control elements** 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.

ARCHIVE REVISION SCREEN

Filter

Selection...

Short name

Filter profile
Profile selection
Typ: COMBOBOX
ID: 10201
Archive data list
Typ: LISTBOX
ID: 10002

SaveImportExportDelete

Number of values

Archive status

Number invalid

Archive

Open...Close

Print

Column configuration

CONTROL ELEMENTS

Control element	Description
Insert template	<p>Opens the dialog for selecting a template for the screen type.</p> <p>Templates are shipped together with zenon and can also be created by the user.</p> <p>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.</p>

WINDOW

Control elements for windows.

Control element	Description
Archive data window	Display of the archive data in Runtime.
Set filter (list)	Definition of the set filter.
Set filter (display)	<p>Display of the set filter.</p> <p>Note: Element of the type <code>Dynamic text</code>. Functionality is assigned using the Screen type specific action property.</p>
Archive status	<p>Display of the archive status.</p> <p>Note: Element of the type <code>Dynamic text</code>. Functionality is assigned using the Screen type specific action property.</p>
Short name	<p>Display of the short description of the displayed archive.</p> <p>Note: Element of the type <code>Dynamic text</code>. Functionality is assigned using the Screen type specific action property.</p>
Total number	<p>Display of the number of the displayed values.</p> <p>Note: Element of the type <code>Dynamic text</code>. Functionality is assigned using the Screen type specific action property.</p>
Number INVALID	<p>Display of the number of variables with the status INVALID.</p> <p>Note: Element of the type <code>Dynamic text</code>. Functionality is assigned using the Screen type specific action property.</p>

LIST FUNCTIONS

Buttons for controlling the list functions in Runtime.

Control element	Description
Open archive	Opens the dialog to select an archive.
Close archive	Closes the archive that is currently open.
Save archive	Saves changes in the archive and updates aggregated archives on request.
Edit entry	Opens the dialog (on page 146) to edit the selected archive entry.
Insert entry	<p>Opens the dialog (on page 148) to insert archive entries into the archive files.</p> <p>If there are no archive files for this time range, no entries can be inserted. A corresponding error message is shown if an attempt to insert an entry is made.</p>
Delete entry	Deletes selected archive entries after confirmation query.
Selection	Clicking on the button opens the dialog to configure the filter.
Column configuration	Opens the dialog (on page 145) to configure column width and font.
Print	Prints list to configured printer.

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
Set filter (Display)	Static Win32 control element. Was replaced by a <code>dynamic text</code> field. For the description, see current element.
Archive status	Static Win32 control element. Was replaced by a <code>dynamic text</code> field. For the description, see current element.
Short name	Static Win32 control element. Was replaced by a <code>dynamic text</code> field. For the description, see current element.
Total number	Static Win32 control element. Was replaced by a <code>dynamic text</code> field. For the description, see current element.
Number INVALID	Static Win32 control element. Was replaced by a <code>dynamic text</code> field. For the description, see current element.

FILTER PROFILES

Buttons for filter settings in 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. Prohibited are: ! \ / : * ? < > ""
Delete	Deletes selected profile.
Import	Imports filter profiles from export file.
Export	Exports filter profiles in the file.

7. Functions

In zenon, there are several functions available to control archiving.

- ▶ Screen switch - archive revision (on page 72): Configuration of screen switching including filtering
- ▶ Archive: Start (on page 107): Start archive manually
- ▶ Archive: Stop (on page 108): Stop archive manually
- ▶ Show active archives (on page 111): Show active archives in Runtime
- ▶ Index Archive (on page 110): Start/renew Indexing for archive
- ▶ Export archives (on page 112): Export archive

7.1 Screen switch - archive revision

To open an `archive revision` screen in Runtime and to set the parameters:

1. Create a screen of type Archive Revision (on page 67).
2. Create a screen switch function to the screen.
3. Define the desired filter properties

Setting the parameters of the content to be displayed in Runtime is carried out using the filter conditions of the screen switching. You can access the same screen repeatedly with different functions and have differently-filtered lists shown.

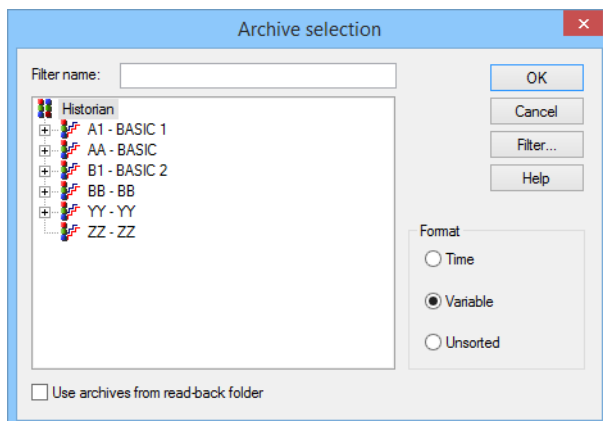
In the Runtime you can modify the filter properties. Exception: In the Editor fixed time filter (on page 89) was defined.

CONFIGURE SCREEN SWITCHING

To create a screen switch to a screen of type `Archive Revision`:

1. In the context menu of node **function** select command **New function**.
2. Click on **screen switch**.
The dialog for the screen selection will be opened.
3. select the screen of type `Archive Revision`
the dialog for archive selection is displayed.
4. Highlight the archive that is to be displayed in Runtime for screen switching.
5. Use the **Format** option to configure how the data is to be sorted for the display.
6. Configure the desired filter for variables, status bits, time, lots and shifts.
To do this, click on the **Filter** button.
7. Close the filter dialog and archive dialog by clicking on **OK** for each.

ARCHIVE SELECTION DIALOG



Option	Description
Filter name	<p>Name of the configured filter.</p> <p>This name is attached to the parameters of the screen switching function and serves to distinguish between different screen switching functions with different filter configurations.</p>
Archives	<p>List of available archives.</p> <p>Attention: An archive must be selected. This is displayed in Runtime. If a lot archive (on page 92) is to be displayed, this must correspond to the configured archive for the selection in Runtime.</p>
Format	<p>display format and sorting of displayed archive entries:</p> <ul style="list-style-type: none"> ▶ Time: Filter for date and time ▶ Variable: according to variable name ▶ Unsorted: no sorting
Use archives from read-back folder	<p>Active: Archives from the read-back folder are also used.</p> <p>Inactive: Only current archives are used.</p> <p>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.</p> <p>Attention: Before you can access evacuated archives using the Use archives from read-back folder option, they must first be copied to the read-back folder. At the evacuation archives are saved in folder Evacuated archives. This folder does not comply with the read-back folder. You define the folders in the Standard settings dialog on the Folder tab. You can find the dialog under <code>File -> General configuration -> Standard</code>.</p> <p>Hint: The folder for evacuated archives and archives from read-back folder can also be set as the same one, in order to avoid manual copying. Different paths make sense if, for example, read-back is from a DVD and the exported data is only burnt onto new DVDs at defined times.</p>

CLOSE DIALOG

OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Filter	<p>Opens the dialog to configure the filter criteria:</p> <ul style="list-style-type: none"> ▶ Archive filter (on page 75): Variables (only available if an archive has been selected) and status bits ▶ Time (on page 77): Time filter ▶ Lots (on page 92): Lot filter ▶ Shift (on page 100): Shift filter
Help	Opens online help.

7.1.1 Archive filter

Filter...

Archive filter

Time

Lots

Shift

M1	M6	PROGRESS	M16	OFF
M2	M7	TIMEOUT	GI	N_SORTAB
M3	M8	MAN_VAL	SPONT	FM_TR
M4	NET_SEL	M14	INVALID	RM_TR
M5	REVISION	M15	T_STD_E	ALT_VAL

Name

Identification

☐ WIZ_VAR_11

☐ Value
(in base unit)

Minimum

0

Maximum

1000

String mask

*

☐ Delete selection

☐ Show this dialog in the Runtime

☒ all entries

OK

Cancel

Help

Option	Description
Status list	<p>Selection of the status bits that are to be filtered for. Selection and deselection by clicking on the respective status bit.</p> <p>Only available if the All entries option has been deactivated.</p>
Variable list	<p>Variables that are to be displayed from the selected archive. Select and deselect them by clicking in the checkbox in front of the variables.</p> <p>Only available if the All entries option has been deactivated.</p>
Value (in base unit)	<p>Active: Filtering is carried out for archive values whose value is between a minimum and a maximum or which contain a certain character sequence as a string.</p> <p>Input of:</p> <ul style="list-style-type: none"> ▶ Minimum: Lower limit of the value ▶ Maximum: Upper limit of the value ▶ String mask: Character sequence that is be filtered for <p>Only available if the All entries option has been deactivated.</p>
Delete selection	<p>Only available if the dialog is called up in Runtime using the Selection (on page 139) button.</p> <p>In Runtime, when the dialog is called up using the Selection button, the entries in the list that correspond to the selected variables and status bits are highlighted.</p> <ul style="list-style-type: none"> ▶ Active: Removes all bold font in the list when the dialog is closed.
Show this dialog in the Runtime	<p>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.</p> <p>Note: If, in the Lots tab, the Show lot selection dialog option is also selected, then the lot selection dialog is called up in Runtime. This is no longer displayed after reloading.</p> <p>Notes for time range filters:</p> <p>Show this dialog in the Runtime active:</p> <ul style="list-style-type: none"> ▶ The filter is opened in Runtime in screen switching. The filter is no longer offered on 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. <p>Show this dialog in Runtime inactive:</p> <ul style="list-style-type: none"> ▶ 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.

All entries	► Active: Settings apply for all statuses and variables. The entries in status list , variable list and value cannot be selected individually.
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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.

7.1.2 Time

Configuration of the time filter.

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

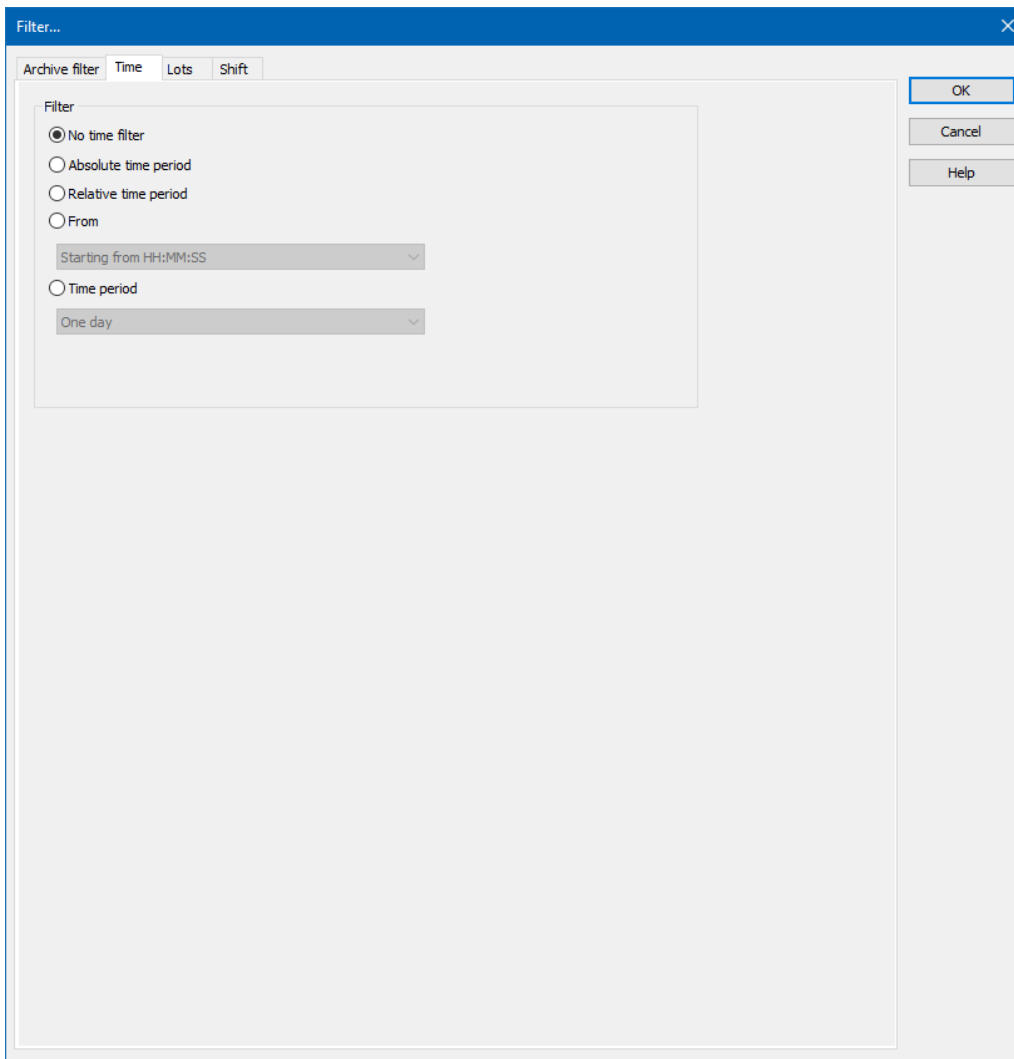
Time filters can be pre-set in both the Editor and in Runtime for:

- Absolute period of time (on page 81)
- Relative period of time (on page 82)
- From (on page 84)
- Time period (on page 86)

Time filtering can be carried out in two ways:

1. Define time period in the Editor (on page 89)
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 configurable in Runtime (on page 90)
The time filter is defined in the Editor and can be changed in Runtime as desired.

CONFIGURING THE TIME FILTER



The screenshot shows the 'Filter...' dialog box with the 'Time' tab selected. The 'Filter' section contains the following options:

- ☒ No time filter
- ☐ Absolute time period
- ☐ Relative time period
- ☐ From

Below the 'From' option is a dropdown menu showing 'Starting from HH:MM:SS'.

- ☐ Time period

Below the 'Time period' option is a dropdown menu showing 'One day'.

On the right side of the dialog, there are three buttons: 'OK', 'Cancel', and 'Help'.

FILTER

Selection of the filter.

Parameter	Description
No time filter	<p>Active: No time filter is used.</p> <p>Note: all Runtime entries since 1. 1. 1990 are displayed. Use of this filter setting is not supported by Extended Trend.</p>
Absolute filter	<p>Active: A fixed period of time is entered in the editor. When the function is executed, the defined absolute time period is exactly used.</p> <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Note: Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.</p>
Relative time period	<p>Active: A relative time period is entered.</p> <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Attention: this filter is constantly updated.</p>
From	<p>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.</p> <p>Selection of the area mode from drop-down list:</p> <ul style="list-style-type: none"> ▶ Starting from HH:MM:SS ▶ Starting from day - HH:MM:SS ▶ Starting from day, month - at HH:MM:SS <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Attention: The start point of this filter is not updated automatically. Only the existing times are used when shown.</p> <p>The end time point is not defined with this filter, it is carried over.</p>

Time period	<p>Active: A fixed time period is entered. Selection of the area mode from drop-down list:</p> <ul style="list-style-type: none"> ▶ One day ▶ One week ▶ Two weeks ▶ One month ▶ One Year ▶ 15 minutes ▶ 30 minutes ▶ 60 minutes <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>The following selection is also enabled on activation:</p> <ul style="list-style-type: none"> ▶ Display selection dialog ▶ Use current date and time <p>The Modify time period property can be activated.</p> <p>The time period can be moved to the future.</p> <p>The time period can be amended.</p> <p>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 Modify the checkbox of the time period property Enter the following setting under Move time period to the future: HH = 0 . Activate, under Change time period by, the checkbox of the Use last-completed time period property.</p> <p>Evaluation: today's date: 2/22/2018</p> <p>Result of the time filter in Runtime: 01.01.2018 - 31.01.2018</p>
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CLOSE DIALOG

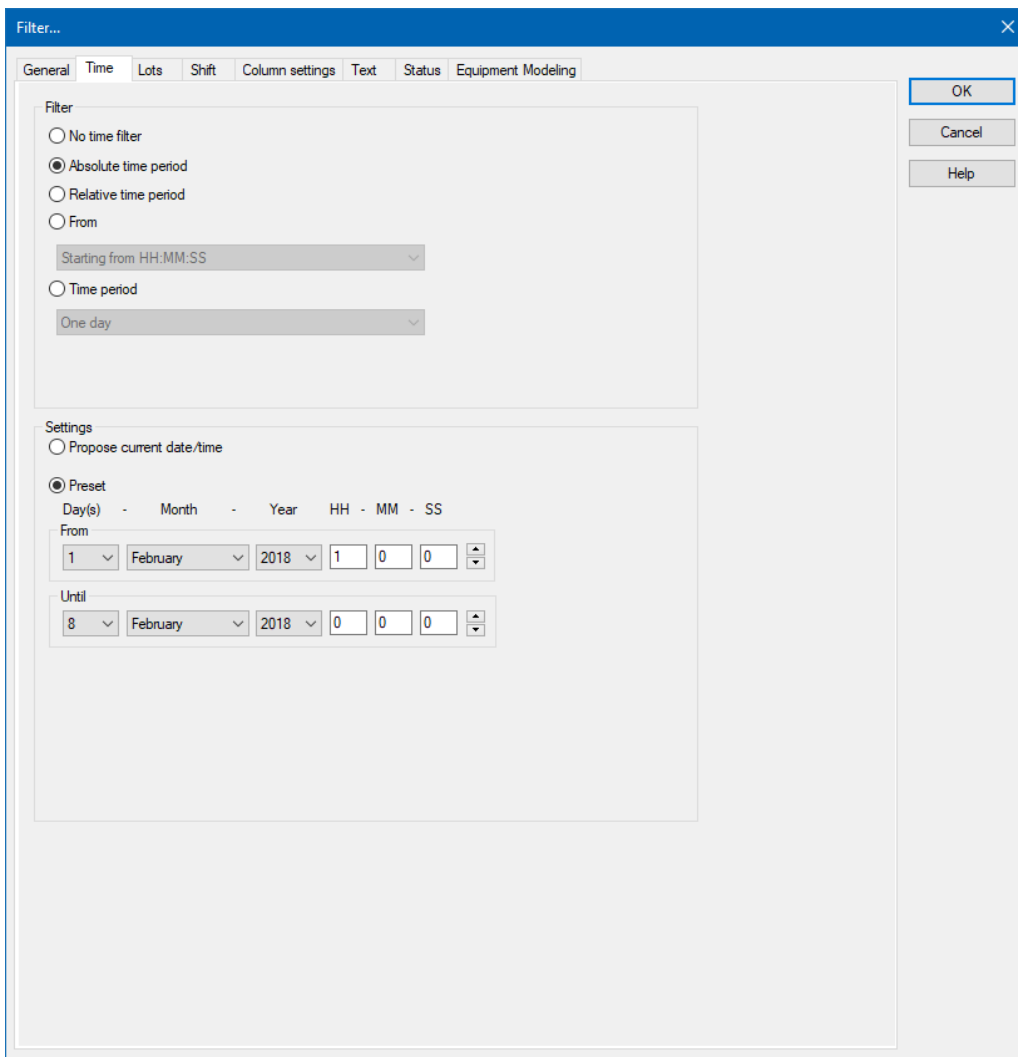
Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.

Help	Opens online help.
-------------	--------------------

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



The screenshot shows the 'Filter...' dialog box with the 'Time' tab selected. The 'Filter' section has three radio buttons: 'No time filter', 'Absolute time period' (which is selected), and 'Relative time period'. Below these is a 'From' label and a dropdown menu showing 'Starting from HH.MM.SS'. The 'Settings' section has two radio buttons: 'Propose current date/time' and 'Preset' (which is selected). Below 'Preset' are fields for 'Day(s)', 'Month', 'Year', 'HH', 'MM', and 'SS'. The 'From' row shows '1', 'February', '2018', '1', '0', '0'. The 'Until' row shows '8', 'February', '2018', '0', '0', '0'. On the right side of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

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, Stunde, Minute und Sekunde.
Bis	Endzeitpunkt 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.

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

Filter...

General Time Lots Shift Column settings Text Status Equipment Modeling

Filter

☐ No time filter

☐ Absolute time period

☒ Relative time period

☐ From

Starting from HH:MM:SS

☐ Time period

One day

Settings

☐ Propose current date/time

☒ Preset

Day(s) - Month - Year HH - MM - SS

0 1 0 0

OK

Cancel

Help

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

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.

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

Filter...

GeneralTimeLotsShiftColumn settingsTextStatusEquipment Modeling

Filter

No time filter

Absolute time period

Relative time period

From

Starting from HH:MM:SS

Time period

One day

Settings

HH - MM - SS

1

0

0

OK

Cancel

Help

Parameter	Description
Settings	Configuration of the time filter.
[Date/Time]	<div>Depending on the settings of the Off option, the time from which the filter is effective is configured here:</div> <div><div>▶ Starting from HH:MM:SS</div><div>▶ Starting from day - HH:MM:SS</div><div>▶ Starting from day, month - at HH:MM:SS</div></div> <div>Warning! 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.</div>
▶ Starting from HH:MM:SS	A time from which the filter is effective is stated. If the time is

85

	<p>not reached on the current day, filtering takes place from the corresponding time the previous day.</p> <p>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.</p>
<p>► Starting from day - HH:MM:SS</p>	<p>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.</p> <p>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.</p>
<p>► Starting from day, month - at HH:MM:SS</p>	<p>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.</p> <p>Example: You enter Day 5, Month October - 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.</p>

CLOSE DIALOG

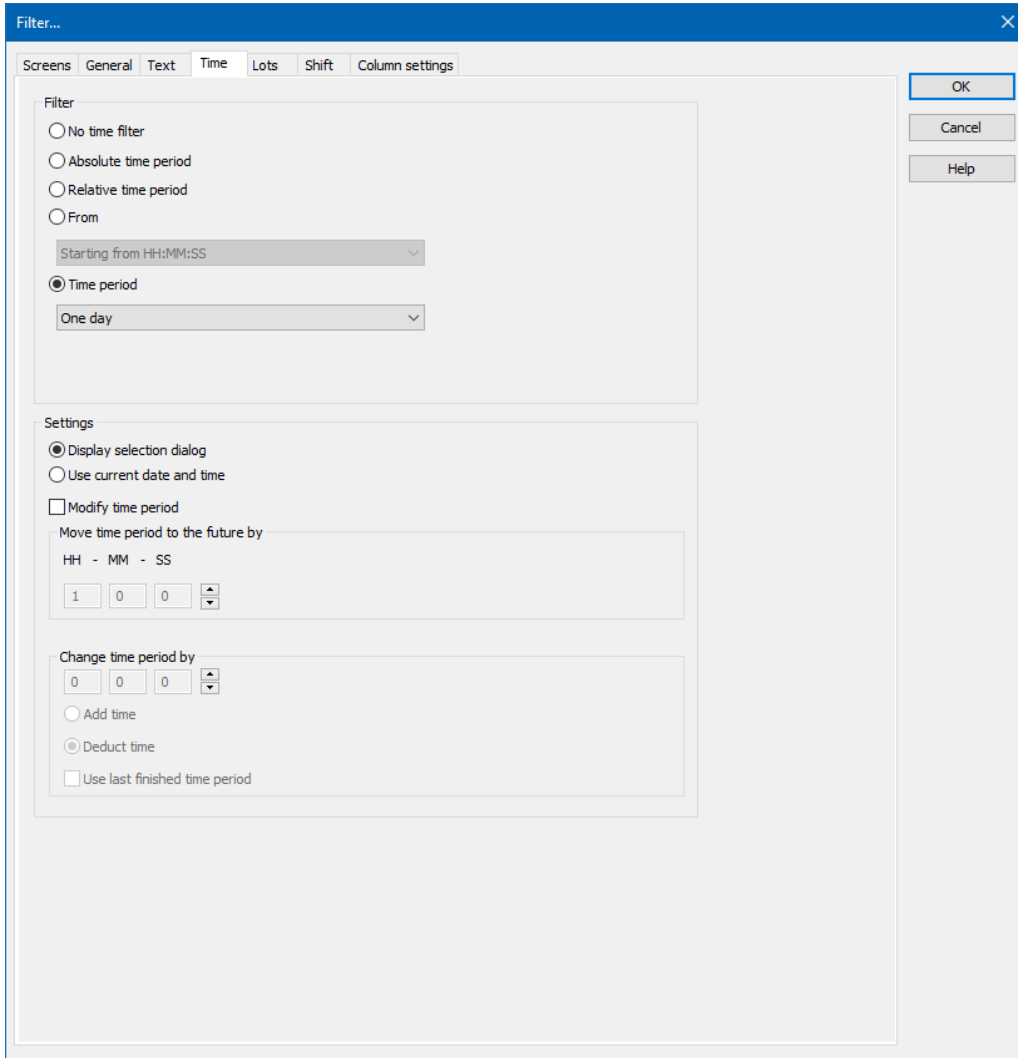
Option	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

Time 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.



Filter...

Screens General Text **Time** Lots Shift Column settings

Filter

☐ No time filter

☐ Absolute time period

☐ Relative time period

☐ From

Starting from HH:MM:SS

☒ Time period

One day

Settings

☒ Display selection dialog

☐ Use current date and time

☐ Modify time period

Move time period to the future by

HH - MM - SS

1 0 0

Change time period by

0 0 0

☐ Add time

☒ Deduct time

☐ Use last finished time period

OK Cancel Help

Option	Description
Time period	<p>Selection of a time range from a drop-down list.</p> <p>Filtering for this time range is carried out in Runtime. The filter relates to the time of screen switching.</p> <p>For example: The value <code>60 minutes</code> shows all archives of the last hour.</p> <p>If this dialog is also offered in Runtime, the start time of the time range can be selected.</p> <p>The following possibilities for selection are activated:</p> <ul style="list-style-type: none"> ▶ Display selection dialog ▶ Use current date and time <p>The Modify time period property can be activated.</p> <p>The time period can be moved to the future.</p> <p>The time period can be amended.</p>
Settings	Optional setting for the time range.
Display selection dialog	The selection dialog for the start time of the filter is offered in Runtime.
Use current date and time	The current date/time is set for the filter.
Modify time period	<p>Allows amendments to cycles, postponements and extensions of time periods.</p> <p>Active: Evaluation is carried out in accordance with the following rules:</p> <ul style="list-style-type: none"> ▶ 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. <p>Inactive: No changes to the time period are made.</p> <p>Attention: With version 7.10, filter actions on the basis of this function led to different results than those in the versions before.</p>
Move time period to the future by	<p>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.</p> <p>Given in <code>hours - minutes - seconds</code>.</p> <p>If a postponement that is the same or greater than the selected time period is set, a note to check the configuration is displayed.</p> <p>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.</p>

Change time period by	<p>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.</p> <p>Given in hours - minutes - seconds.</p> <p>The time range can be added or deducted. Selection by means of radio buttons:</p> <ul style="list-style-type: none"> ▶ Add time: The time stated in Change time period by is added to the time defined in the Time range option. ▶ Deduct time: The time stated in Change time period by is deducted from the time defined in the Time range option. <p>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.</p>
Use last finished time period	<p>Active: The last selected and fully-completed time period in the Time period option is used.</p> <p>Example: For the Time period option, <i>One day</i> was selected. Filtering is thus carried out for "Yesterday", because this is the last day that was completed in full.</p>

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.

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 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.

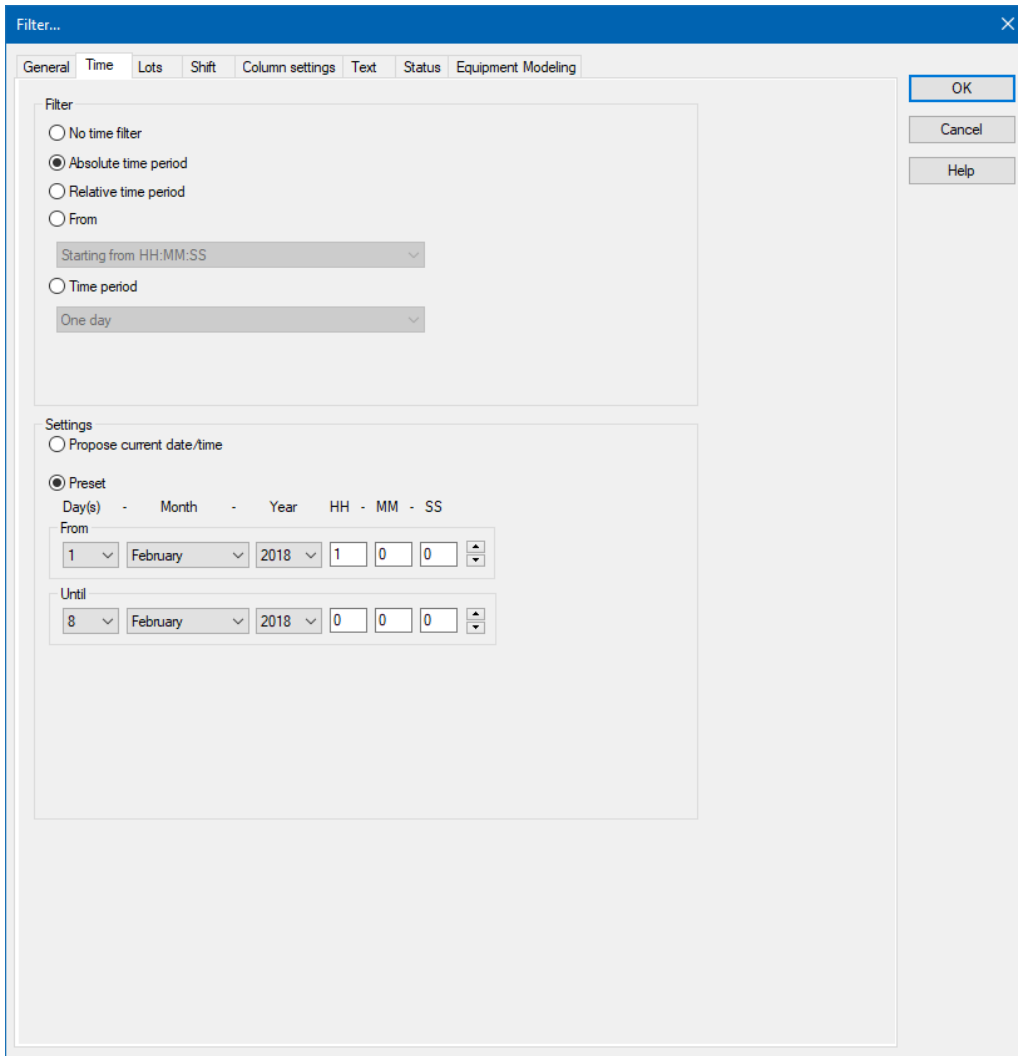


Attention

*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. The screen must have the **Filter** button to start the filter in Runtime
2. select the desired filter
3. Configure the selected time period



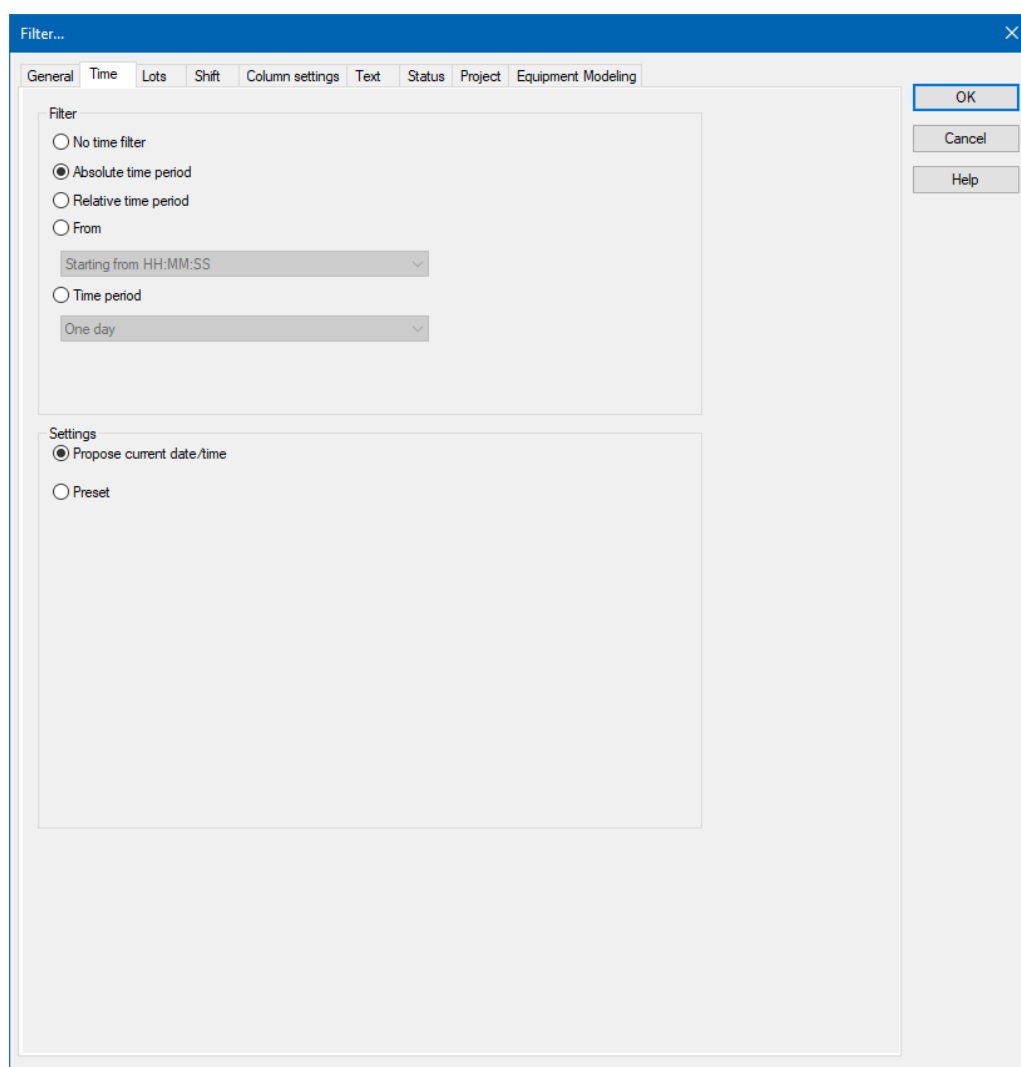
Tip for time period: Activate the `Show this dialog in Runtime` option in the filter dialog. This way you can amend the start time before the function is carried out. Do not have the filter displayed in Runtime when the function is turned on; this way the current time period is always used. If you have 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.

Time filter can be configured in Runtime

With this method, the time filter can be amended in 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 Runtime with the current date and time



7.1.3 Lots

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

If the lot filter is activated, the following happens in Runtime:

- ▶ A list of all configured lots that correspond to the configured time period is obtained in advance from the archive
- ▶ The list of the archives is filtered for this.

Attention: The lot archive selected in Runtime must correspond to the archive selected in the screen switching.



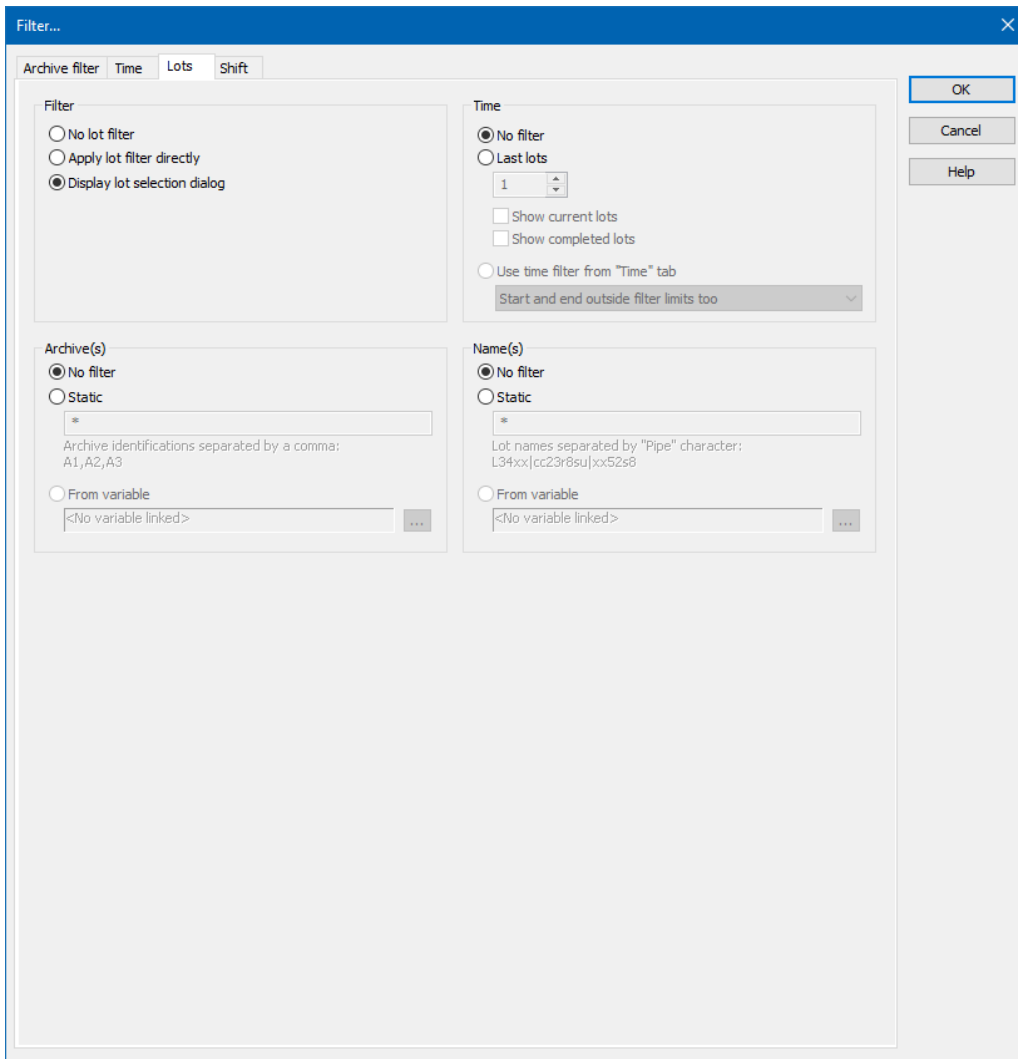
Information

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

The lot filter can offer a list of existing lots in 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 you then select a lot from this list in 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 Runtime and a lot is selected, the time filter displayed does not correspond to the one configured in the Editor.



FILTER

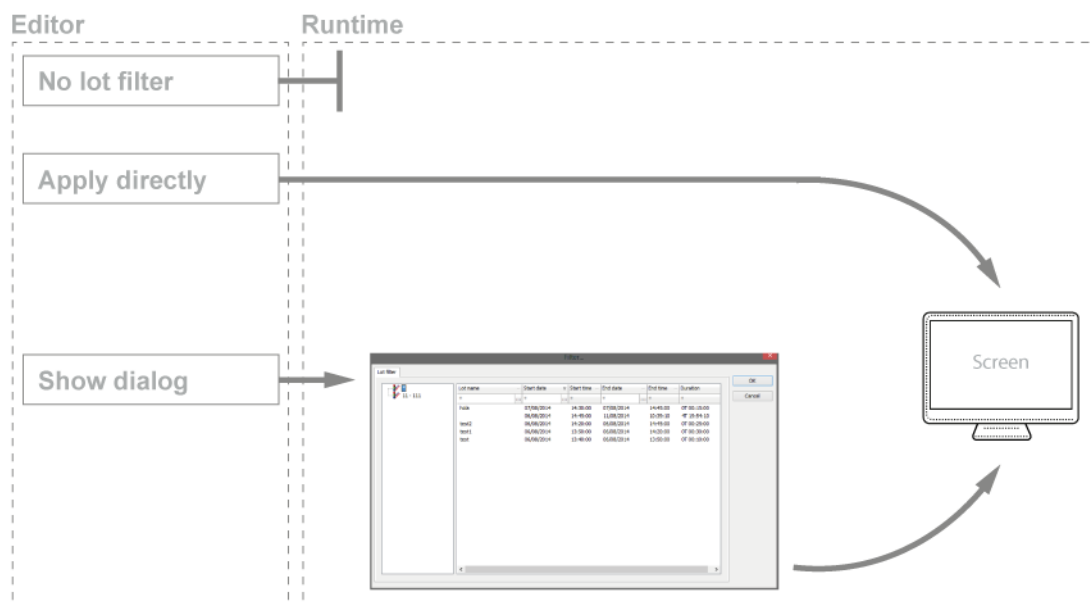
Settings for the application of the lot filter. Selection of one of the following options:

- ▶ **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	<ul style="list-style-type: none"> ▶ Active: The lot filter is deactivated and cannot be configured. Filtering for lots is not carried out in Runtime.
Apply lot filter directly	<ul style="list-style-type: none"> ▶ Active: The filter configured here is applied in Runtime directly. <p>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.</p>
Display lot selection dialog	<p>Active: The dialog for lot selection is shown in Runtime when:</p> <ul style="list-style-type: none"> ▶ Clicking on Filter or ▶ screen switching, if the Show this dialog in Runtime option has been activated (Not available for each function/screen type) <p>Note: The dialog is not shown on reloading.</p> <p>Options can be pre-selected in the Editor.</p>

Overview of the implementation of configuration in 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	<ul style="list-style-type: none"> ▶ Active: The time range set in the Time tab is not taken into account. All completed and current lots are displayed.
Last lots	<p>Attention: Only works in conjunction with the Apply lot filter directly option.</p> <p>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.</p> <ul style="list-style-type: none"> ▶ 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. <p>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.</p> <p>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.</p> <p>Note on compatibility: If the project is compiled for a version before 7.11, the following is applicable: If the current lots are selected or the combination of current and completed lots, then only the completed lots are shown in Runtime.</p>
Display current lots	<ul style="list-style-type: none"> ▶ Active: The current lots are displayed. <p>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 reached.</p> <p>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.</p>
Display completed lots	<ul style="list-style-type: none"> ▶ Active: The completed lots are displayed. <p>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.</p>
Use time filter from "Time" tab	<ul style="list-style-type: none"> ▶ Active: Pre-filtering is carried out with the settings of the Time tab. <p>The effective range of the filter can be amended within this time range. Select from drop-down list:</p> <ul style="list-style-type: none"> ▶ Start and end also outside filter limits: (Default) Lots can start before the start time configured in the Time

	<p>filter and end after the configured end time.</p> <ul style="list-style-type: none"> ▶ 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.
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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	<ul style="list-style-type: none"> ▶ Active: Filtering for archive names is not carried out.
Static	<ul style="list-style-type: none"> ▶ Active: Archives whose identification corresponds to the character string entered in the input field are filtered for. <p>Input of the archive identifications in the input field:</p> <ul style="list-style-type: none"> ▶ Several identifications are separated by a comma (,). ▶ * or empty: All archives, no filter.
From variable	<ul style="list-style-type: none"> ▶ Active: The value of the variables linked here is applied as a filter for archive names in Runtime. <p>Click on button ... in order to open the dialog for selecting a variable.</p> <p>Available for AML and CEL modules if the Apply lot filter directly option has been selected: Other modules use their own configurations.</p> <p>Notes for variables in Runtime:</p> <ul style="list-style-type: none"> ▶ The variable selection is only activated in Runtime if a valid variable has already been linked in Runtime. The ... button is always deactivated in 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. <p>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.</p>

Note for ETM: In the ETM, the archives are established by the curves configured in screen switching. This is only possible in Runtime with the **relative lots** option. With this, the variables must be selected in 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	<ul style="list-style-type: none"> ▶ Active: Filtering for lot names is not carried out.
Static	<ul style="list-style-type: none"> ▶ Active: Lot names that correspond to the character string entered in the input field are filtered for. <p>Input of the lot name in the input field:</p> <ul style="list-style-type: none"> ▶ Several entries are separated by a pipe character (). ▶ * or empty: All lots of all displayed archives, no filter.
From variable	<ul style="list-style-type: none"> ▶ Active: The value of the variable linked here is applied as a filter for lot names in Runtime. <p>Click on the ... button to open the dialog for selecting a variable.</p> <p>Only available if the option Apply lot filter directly has been selected.</p> <p>Notes for variables in Runtime:</p> <ul style="list-style-type: none"> ▶ The variable selection is only activated in Runtime if a valid variable has already been linked in Runtime. The ... button is always deactivated in 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. <p>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.</p>

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.

7.1.4 Shift

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 range:** 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 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 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 Runtime. 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.

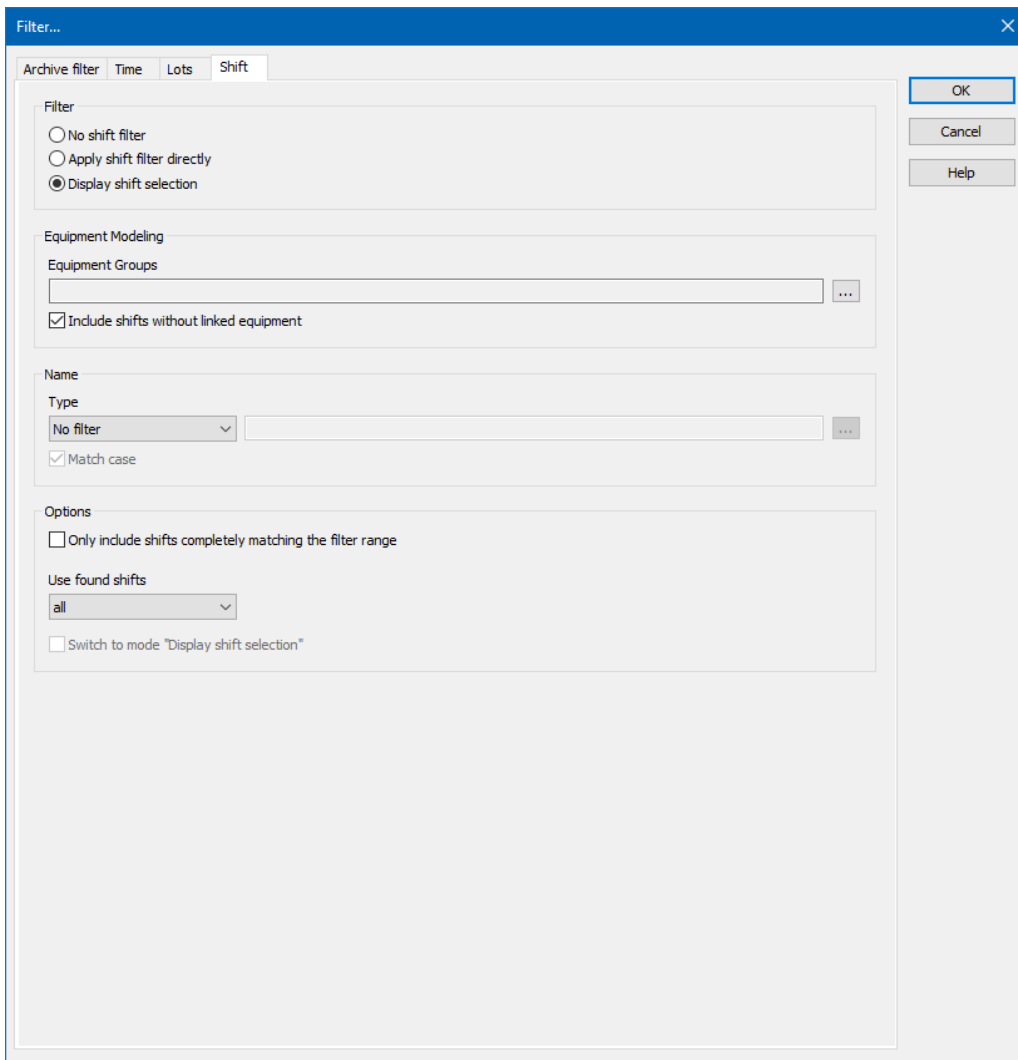
The shifts for filtering the data are redetermined if:

- ▶ 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

SHIFT DIALOG



Filter...

Archive filter Time Lots Shift

Filter

☐ No shift filter

☐ Apply shift filter directly

☒ Display shift selection

Equipment Modeling

Equipment Groups

☒ Include shifts without linked equipment

Name

Type

No filter

☒ Match case

Options

☐ Only include shifts completely matching the filter range

Use found shifts

all

☐ Switch to mode "Display shift selection"

OK Cancel Help

FILTER

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

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

Option	Description
No shift filter	<p>Shift filter selection:</p> <ul style="list-style-type: none"> ▶ Active: The shift filter is deactivated and cannot be configured. Filtering for shifts is not carried out in Runtime.
Apply shift filter directly	<p>Applying the shift filter in Runtime:</p> <ul style="list-style-type: none"> ▶ Active: The filter configured here is applied in Runtime directly. Equipment groups and shift names can be preselected. The shift list and Update button are not shown in Runtime.
Display shift selection	<p>Display of the shift selection in Runtime:</p> <ul style="list-style-type: none"> ▶ Active: The dialog for shift selection is shown in Runtime. <p>The settings chosen in the Editor are applicable for the reading of the shifts in Runtime.</p> <p>The dialog is shown in Runtime when:</p> <ul style="list-style-type: none"> ▶ Clicking on the Filter button. Or: ▶ Executing screen switching. Note: The dialog is not shown on reloading. <p>Attention: At least 1 shift must be selected in Runtime in order to call up the page or to be able to configure the filter.</p> <p>If, in the General tab, the Show this dialog in Runtime option is activated at the same time, the complete configuration dialog is called up.</p>

EQUIPMENT MODELING

Configuration of the equipment groups for filtering for shifts.

Option	Description
Equipment Groups	<p>Selection of equipment groups to which shifts must be linked.</p> <p>Clicking on the ... button opens the dialog to select equipment groups.</p> <p>If several equipment groups are selected, they are displayed in the option separated by a semicolon (;).</p>
Include shifts without equipment linking	<p>Selection of whether linking to an equipment group is necessary.</p> <ul style="list-style-type: none">▶ 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. <p>Default: Active</p>

NAME

Configuration of the shift names for which filtering is to take place.

Selection of one of the options:

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

Option	Description
Type	<p>Selection of the filter type from a drop-down list when filtering according to name:</p> <ul style="list-style-type: none"> ▶ 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 Runtime. Click on button ... Opens the dialog for selecting a variable. <p>Default: No filter</p> <p><u>Wildcards:</u></p> <ul style="list-style-type: none"> ▶ *: 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, .. <p>Notes for variables in Runtime:</p> <ul style="list-style-type: none"> ▶ The variable selection is only activated in Runtime if a valid variable has already been linked in Runtime. The ... button is always deactivated in 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. <p>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.</p>
Note case sensitivity	<p>Setting for filtering for upper/lower case</p> <ul style="list-style-type: none"> ▶ Active: Capitalization is taken into account for names. <p>Default: Aktiv</p>

OPTIONS

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

Option	Description
Only include shifts that are fully in the filter range	<p>Configuration of which shifts are displayed.</p> <ul style="list-style-type: none"> ▶ 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. <p>Default: <code>Inactive</code></p> <p><u>Example:</u></p> <ul style="list-style-type: none"> ▶ Time filter: Today 08:00 – 12:00. ▶ Existing shift: Today 8:30 AM – 5:00 PM. <p>Result for:</p> <ul style="list-style-type: none"> ▶ 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 partly in the time filter.
Use shifts found	<p>Selection of shifts that are taken into account, from drop-down list:</p> <ul style="list-style-type: none"> ▶ 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. <p>Default: <code>all</code></p> <p>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.</p> <p><u>Example:</u></p> <p><u>Configuration and shifts:</u></p> <ul style="list-style-type: none"> ▶ Only include shifts that are fully in the filter range option: active. ▶ Use found shifts option: <code>Latest shift only</code> ▶ 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.

	<u>Result:</u> ▶ 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 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 <u>Behavior in Runtime:</u> If the shift management is set to Show shift selection in 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.

FILTER BUTTON IN THE SCREEN IN RUNTIME

If the **Filter** button is pressed in the CEL screen, depending on the configuration, the complete filter dialog including the shift selection list is shown. The filter settings can thus be amended and the shift list can be updated in order to select another shift.

7.2 Archive: Start

This function starts an already-configured archive in Runtime.



Attention

Attention: If the starting and stopping is defined using the Start/end of Runtime (on page 29), the archive can no longer be started or stopped by means of functions. These functions then have no effect.

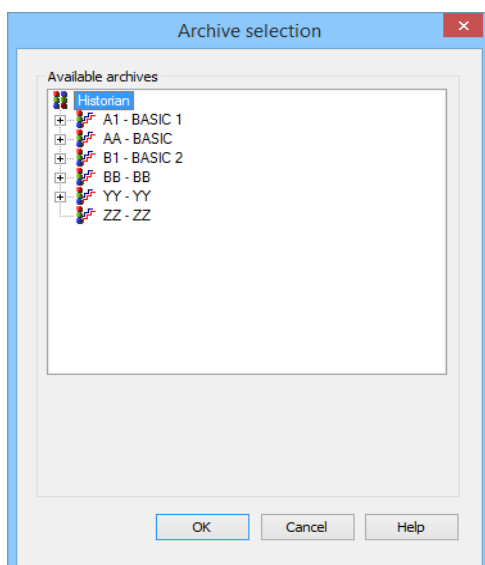
To configure the function:

1. Select, in the **Functions** node, the **New function** button in the toolbar or the context menu.
2. The dialog for selecting a function is displayed.
3. Navigate to the node **Historian**.

4. Select the **Archive: Start** function.
5. The dialog for archive selection is opened:
6. Select the desired archive
7. Close the dialog by clicking on **OK**.
The archive name is shown as a parameter in the list of functions.
8. Link the function to a button.

In Runtime, the function starts the selected archive if it is executed.

ARCHIVE SELECTION DIALOG



Option	Description
Available archives	Display of all configured base archives and aggregation archives. Selection by clicking on the entry.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

7.3 Archive: Stop

This function stops a selected archive in Runtime.



Attention

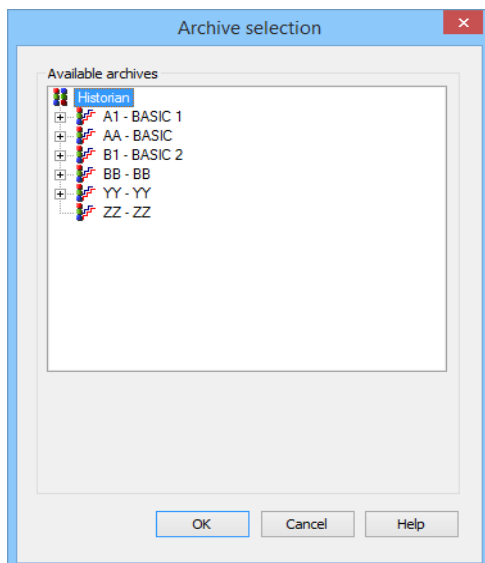
Attention: If the starting and stopping is defined using the Start/end of Runtime (on page 29), the archive can no longer be started or stopped by means of functions. These functions then have no effect.

To configure the function:

1. Select, in the **Functions** node, **New function** in the toolbar or the context menu.
2. The dialog for selecting a function is displayed.
3. Navigate to the node **Historian**.
4. Select the **Archive: Stop** function.
5. The dialog for archive selection is opened:
6. Select the desired archive
7. Close the dialog by clicking on **OK**.
The archive name is shown as a parameter in the list of functions.
8. Link the function to a button.

In Runtime, the function stops the selected archive if it is executed.

ARCHIVE SELECTION DIALOG



Option	Description
Available archives	Display of all configured base archives and aggregation archives. Selection by clicking on the entry.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

7.4 Index archive

For quicker access to the lot values in the lot filter, an index can be created for each archive. The index is stored in the file **[short name].ARI**. An entry is made in the index file each time a lot archive is saved. This entry contains: archive name, lot description, start time and end time. With the evacuation of the archive the index also is updated.

Archives can be deleted or moved using file operations. In this case, the index file must be reindexed. To do this, use the **Index archive** function.

Note: Indexing can also be automatic. To do this, activate the **Index lots** option in the **Properties** (on page 26) tab when configuring the archive.

You can read details on indexing in the lot archives (on page 66) chapter.



Information

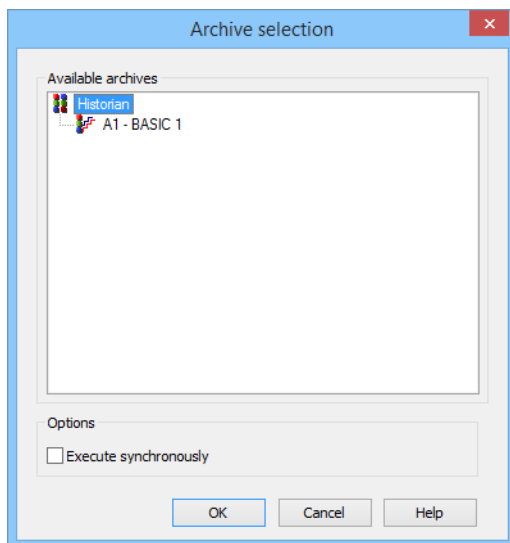
*The **Index archive** function is always executed on the Primary Server.*

To configure the function:

1. Select, in the **Functions** node in the toolbar or in the context menu, **New function**.
2. The dialog for selecting a function is displayed.
3. Navigate to the node **Historian**.
4. Select the **Index archive** function.
5. The dialog for archive selection is opened:
Only lot archives are displayed.
6. Select the desired archive
7. Close the dialog by clicking on **OK**.
The archive name is shown as a parameter in the list of functions.
8. Link the function to a button.

In Runtime, the function indexes the selected archive if it is executed.

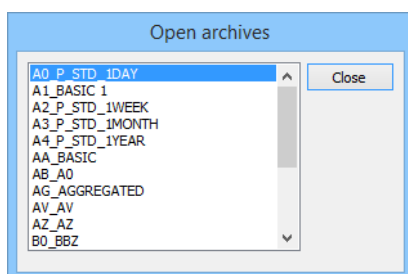
ARCHIVE SELECTION DIALOG



Option	Description
Available archives	Display of all configured lot archives. Selection by clicking on the entry.
Execute synchronously	Is only valid when executed in a script. <i>Active:</i> The next function only starts if this function has been completed.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

7.5 Show active archives

This function opens a window in Runtime that displays all currently-opened archives. The window is permanently displayed in the foreground.



To configure the function:

1. Select, in the **Functions** node in the toolbar or in the context menu, **New function**.
2. The dialog for selecting a function is displayed.
3. Navigate to node **Historian**
4. Select the **Show open archives** function.
5. Link the function to a button.

7.6 Export archives

This function exports the recorded entries of an archive to a file. The language of the identification and measuring unit can be switched on export. These are exported in the language in which Runtime is running.

The following is applicable for the conversion of measuring units: Archive data is always exported in the **Measuring unit** in which it was created. A conversion of measuring units is not taken into account here.

The following must be configured for export:

- ▶ General information on formats, content and export destination
- ▶ the archive
- ▶ the time filter
- ▶ the lot filter



Attention

The file name of the export file must not contain any special characters.
Prohibited are: \ / : * ? " < > |

To engineer the archive export:

1. Select, in the **Functions** node in the toolbar or in the context menu, **New function**.
2. The dialog for selecting a function is displayed.
3. Navigate to node **Historian**
4. Select the **Export archives** function.
5. The filter dialog for the configuration of the export is opened.

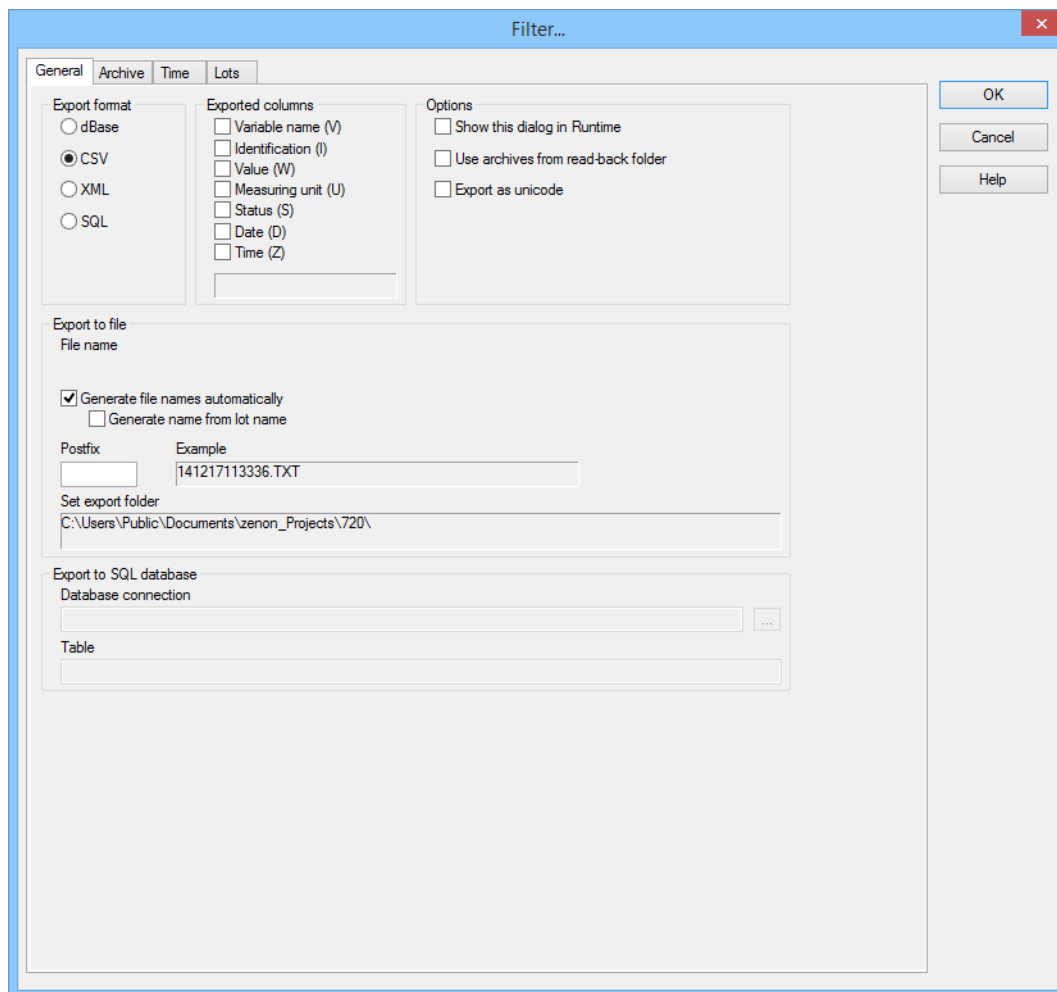


Information

*The number of decimal points when exporting archives in **TXT**, **XML** or **DBF** form, as well evacuation to an SQL Server, can be amended in the **project.ini** file with the **ARCHDIGITS=** setting in the **[ARCHIV]** section.*

*Default: **ARCHDIGITS=1***

FILTER DIALOG



Filter...

General | Archive | Time | Lots

Export format

☐ dBase

☒ CSV

☐ XML

☐ SQL

Exported columns

☐ Variable name (V)

☐ Identification (I)

☐ Value (W)

☐ Measuring unit (U)

☐ Status (S)

☐ Date (D)

☐ Time (Z)

Options

☐ Show this dialog in Runtime

☐ Use archives from read-back folder

☐ Export as unicode

Export to file

File name

☒ Generate file names automatically

☐ Generate name from lot name

Postfix: Example: 141217113336.TXT

Set export folder: C:\Users\Public\Documents\zenon_Projects\720\

Export to SQL database

Database connection: ...

Table:

OK Cancel Help

Tabs	Description
General (on page 115)	Definition of: <ul style="list-style-type: none"> Export format Columns to be exported Options Export file
Archive (on page 121)	Selection of the archive to be exported
Time (on page 123)	Stipulation of the corresponding time range.
Lots (on page 126)	Select desired lots



Information

When exporting an active lot archive, the following entries are set automatically:

- ▶ End time: the time of the export
- ▶ Lot name: the current value of the lot variables

Attention: These values do not need to correspond to the values of the lot archive that has been ended.

TABLE STRUCTURE AND BEHAVIOR ON EXPORT

TABLE STRUCTURE

Statements:

- ▶ Table **_DATA**:

```
"CREATE TABLE [" + szDBTable + "_DATA"] ([PRJ] varchar(128),[ARV] varchar(2),[VAR]
varchar(128),[CALCULATION] int,[TIMESTAMP_S] int,[TIMESTAMP_MS] int,[VALUE]
varchar(128),[STATUS] int)"
```
- ▶ Table **_BATCH** for lots:

```
"CREATE TABLE [" + szDBTable + "_BATCH] ([PRJ] varchar(128),[ARV] varchar(2),[BATCH]
varchar(128),[START_S] int,[END_S] int)"
```

BEHAVIOR ON EXPORT

1. No table name stated:

The table called **_DATA** is created and the values are entered.
 (the table called **_BATCH** is also created, although no filters are active and no values are entered.)

2. State table name **xxx**:

The tables **xxx_DATA** and **xxx_BATCH** are created and the values are entered depending on configuration (lot activated/deactivated).

When exporting, either no name or the table name without **_DATA** is entered in zenon. If values are to be inserted into a certain table (such as **MYPROJECT_DATA**, only **MYPROJECT** can be given as a table name in zenon. If the name **MYPROJECT_DATA** is given, the table **MYPROJECT_DATA_DATA** is created and filled.

If a pre-existing table is exported (no name or named ohne **_DATA**), the values are also entered into the table. This happens regardless of whether the same values are already present in the table.

MEMORY CHECK AT READING BACK

When saved archives are read back the available memory is checked.

Save type	Save checking
SQL	If less than 10% of the memory available in the system are free, the read back of the data from the SQL server is canceled.
ARX files	<p>The space available is checked before archive data (*.arx) is read in. The read in is canceled if:</p> <ul style="list-style-type: none"> ▶ less than 10% of the available memory is free ▶ the size of the reserved memory (SPEICHER=) defined in project.ini is exceeded <p>The cancelation is documented in the Diagnosis Viewer via an error message.</p>



Attention

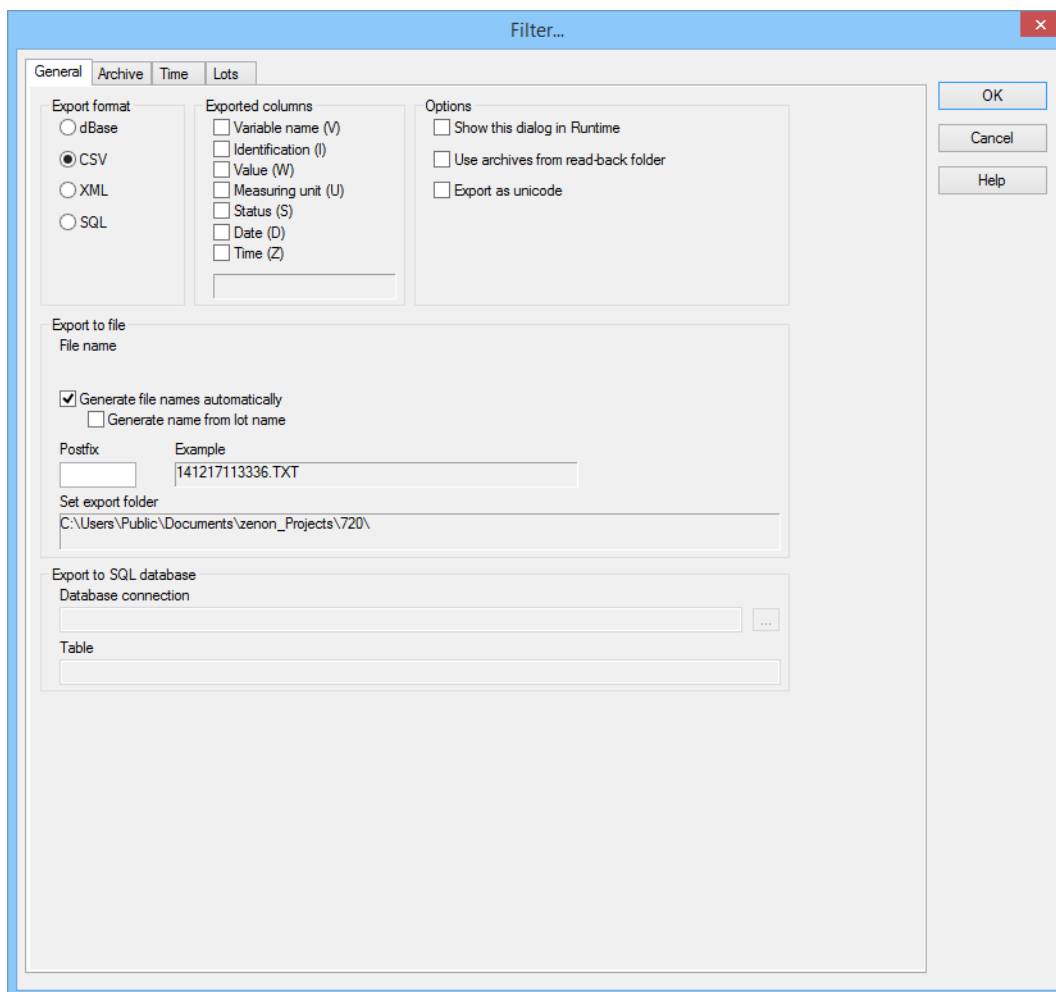
*If files are created in the Historian which exceed either the reserved memory in the **project.ini** or the 10% rule, these files cannot be read in.*

7.6.1 General

The following are defined in this tab:

- ▶ Export format
- ▶ Contents

► File options



The image shows a 'Filter...' dialog box with a blue title bar and a close button (X) in the top right corner. The dialog has four tabs: 'General', 'Archive', 'Time', and 'Lots'. The 'General' tab is selected. It contains three main sections: 'Export format', 'Exported columns', and 'Options'. The 'Export format' section has four radio buttons: 'dBase', 'CSV' (selected), 'XML', and 'SQL'. The 'Exported columns' section has a list of checkboxes: 'Variable name (V)', 'Identification (I)', 'Value (W)', 'Measuring unit (U)', 'Status (S)', 'Date (D)', and 'Time (Z)'. The 'Options' section has three checkboxes: 'Show this dialog in Runtime', 'Use archives from read-back folder', and 'Export as unicode'. Below these sections is the 'Export to file' section, which includes a 'File name' field, a checked checkbox for 'Generate file names automatically' (with an unchecked option for 'Generate name from lot name'), a 'Postfix' field, and an 'Example' field showing '141217113336.TXT'. The 'Set export folder' section shows a text field with the path 'C:\Users\Public\Documents\zenon_Projects\720\'. At the bottom is the 'Export to SQL database' section, which includes a 'Database connection' field with a browse button (...) and a 'Table' field. On the right side of the dialog are three buttons: 'OK', 'Cancel', and 'Help'.

EXPORT FORMAT

Selection of the format in which the export is to be made.

Format	Description
dBase	<p>Active: Export in a Base IV - file (*.dbf).</p> <p>Caution: DBF files must:</p> <ul style="list-style-type: none"> ▶ conform with their name to the 8.3 DOS format (8 alphanumeric characters for name, 3 characters for extension, no space) ▶ be stored near the root folder <p>Note: The column description for export does not depend on the language in which Runtime was started.</p>
CSV	<p>Active: Export to a CSV text file (*.txt).</p> <p>Structure (-> stands for tabulator):</p> <p>Name -> identification -> value -> unit -> (state_HI_DWORD)(state_LO_DWORD) -> second</p>
XML	Active: Export to an XML file (*.xml).
SQL	<p>Active: Export to an SQL database</p> <p>Note: For export to an SQL database, the corresponding license must be present for the Editor and Runtime.</p>

EXPORTED COLUMNS

Selection of the columns of the database that are to be exported. This selection only applies for export to dBase and CSV. Fixed columns are defined for XML and SQL. If XML or SQL is selected as an export format, the column selection is deactivated.

Note: The short form(s) of the selected columns are listed beneath the selection boxes for the columns to be exported. In doing so, the order is the order of selection. Each short form is in the brackets next to the column name.

DBASE AND CSV

The following columns can be selected:

Column	Column in dBase export file	Description
Variable name (V)	VAR	Active: Variable name column is exported. Contains the variable name.
Identification (I)	TAG	Active: Identification column is exported. Contains the identification number.
Value (W)	WER	Active: Value column is exported. Contains the value.
Unit (U)	UNT	Active: Unit column is exported. Contains the unit.
Status (S)	STA	Active: Status column is exported. Displays the status.
Date (D)	DAT	Active: Date column is exported. Contains the date.
Time (Z)	ZEI	Active: Time column is exported. Contains the time.

SQL

Columns for export are defined and fixed, and can no longer be selected. The following are exported:

Column	Description
PRJ	Project name
ARV	Archive identification
VAR	Variable name
CALCULATION	Not zero for entries from aggregation archives.
TIMESTAMP_S	Time stamp of the variables in Unix format.
TIMESTAMP_MS	Milliseconds for the time stamp.
VALUE	Value of the variables.
STATUS	Status of the variables (decimal value).

OPTIONS

Additional options for export.

Option	Description
Show this dialog in the Runtime	Active: This dialog is displayed in Runtime when the screen is called up.
Use archives from read-back folder	Active: Archives to be exported are read from the readback folder. 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.
Export as unicode	Active: The exported file is saved in Unicode (UTF-16). Only available for export format CSV .

EXPORT TO FILE

Definition of the file to which archives are exported.

Option	Description
File name	User-defined freely-available file name. The file is saved under the same name for each export. Note: The name may not contain any special characters. Prohibited are: \\ : * ? " < > Only available if the Generate file name automatically option has been deactivated.

Generate file name automatically	<p>Active: File names are automatically created from a short identifier and a day key.</p> <p>Format of day key: YYMMDDHHMMSS.yyy</p> <ul style="list-style-type: none"> ▶ YY: Year (two-digits) ▶ MM: Month (two-digits) ▶ DD: Day (two-digits) ▶ HH: Hour (two-digits) ▶ MM: Minutes (two digits) ▶ SS: Seconds (two digits) ▶ yyy: file type (DBF, TXT, XML)
Generate name from lot name	<p>Active: the lot name is taken for the creation of the export file name.</p> <p>Only available if the Generate file name automatically option has been activated.</p> <p>Attention: The lot name must not contain any special characters.</p>
Postfix	<p>Free identification that is automatically appended to the file names.</p> <p>Maximum 29 ASCII characters.</p> <p>Note: Only available if the Generate filename automatically is active.</p>
Set export folder	<p>Display of the defined export path.</p> <p>You can change the folder in the Editor in the following menu: <i>File-> General configuration-> Standard tab -> Exported archives folder.</i></p>

EXPORT TO SQL DATABASE

Option	Description
Database connection	<p>When evacuating to an SQL database: Stipulation of the database to be used.</p> <p>Note: Export to an SQL database must be licensed for the Editor and Runtime.</p>
Table	<p>When evacuating to an SQL database: Stipulation of the table to be used.</p> <p>Note: Export to an SQL database must be licensed for the Editor and Runtime.</p>

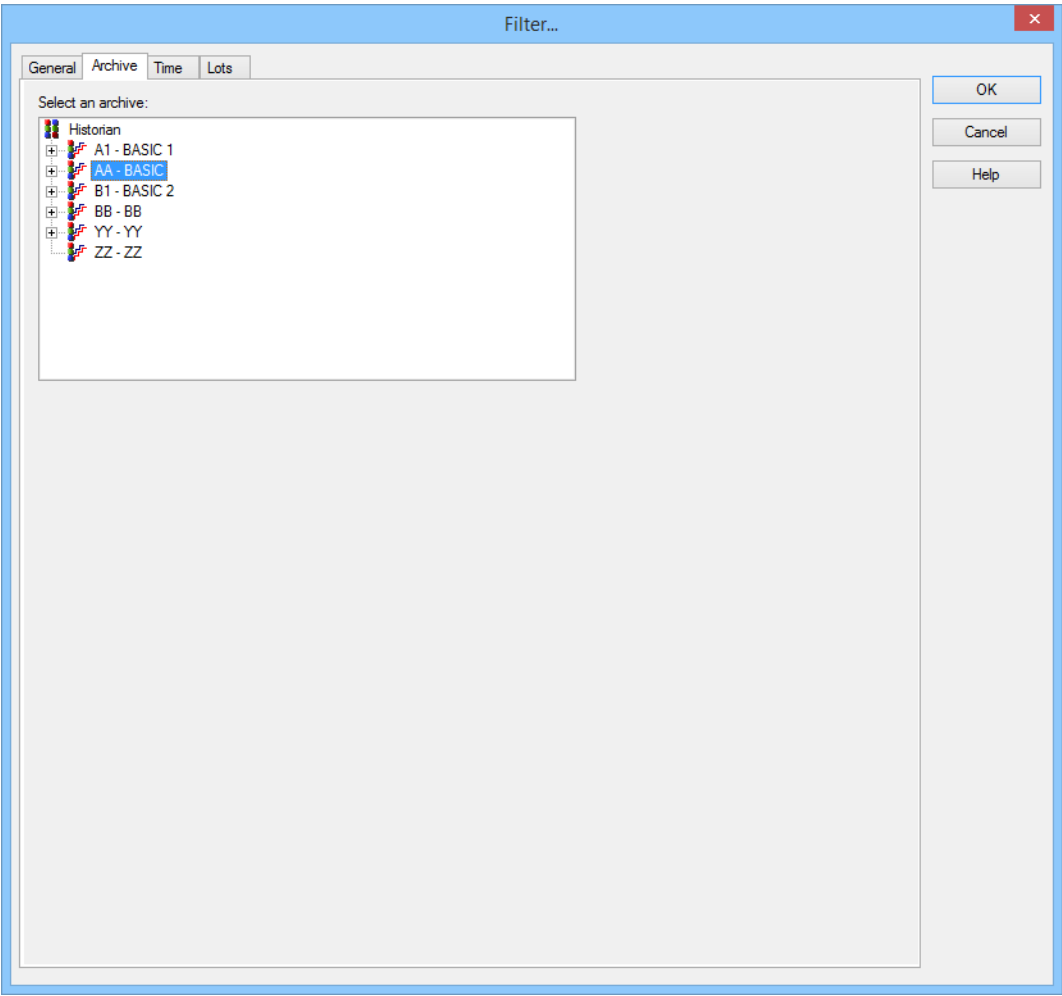
CLOSE DIALOG

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.

7.6.2 Archive

The archive to be exported is selected in this tab.

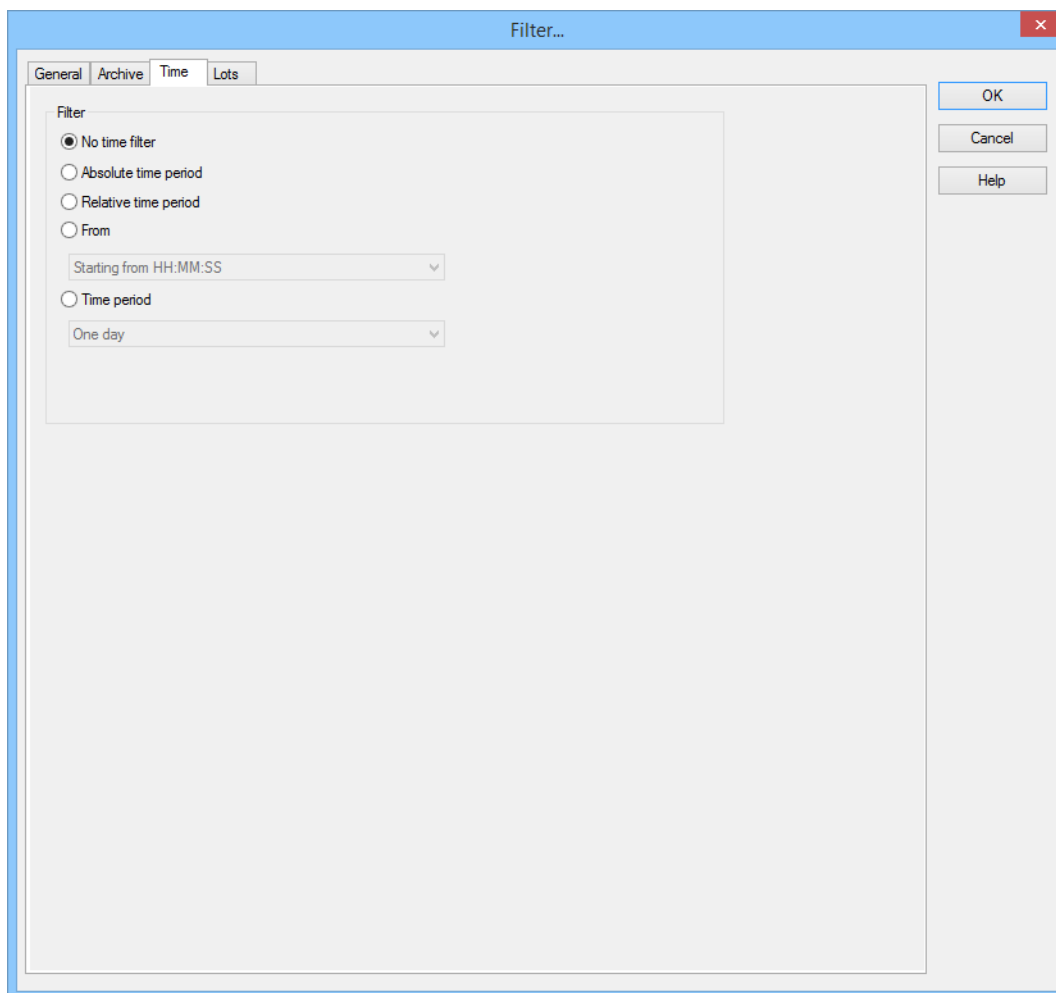


SELECTION OF AN ARCHIVE

Option	Description
Selection of an archive	Selection of an already-created archive from the archive tree. The selected archive name is displayed as a parameter in the list of functions.
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.

7.6.3 Time

The time filter is configured in this tab.



FILTER

Selection of the filter.

Parameter	Description
No time filter	<p>Active: No time filter is used.</p> <p>Note: all Runtime entries since 1. 1. 1990 are displayed. Use of this filter setting is not supported by Extended Trend.</p>
Absolute filter	<p>Active: A fixed period of time is entered in the editor. When the function is executed, the defined absolute time period is exactly used.</p> <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Note: Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.</p>
Relative time period	<p>Active: A relative time period is entered.</p> <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Attention: this filter is constantly updated.</p>
From	<p>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.</p> <p>Selection of the area mode from drop-down list:</p> <ul style="list-style-type: none"> ▶ Starting from HH:MM:SS ▶ Starting from day - HH:MM:SS ▶ Starting from day, month - at HH:MM:SS <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>Attention: The start point of this filter is not updated automatically. Only the existing times are used when shown.</p> <p>The end time point is not defined with this filter, it is carried over.</p>

Time period	<p>Active: A fixed time period is entered. Selection of the area mode from drop-down list:</p> <ul style="list-style-type: none"> ▶ One day ▶ One week ▶ Two weeks ▶ One month ▶ One Year ▶ 15 minutes ▶ 30 minutes ▶ 60 minutes <p>In the settings section, the corresponding options can be shown and configured there.</p> <p>The following selection is also enabled on activation:</p> <ul style="list-style-type: none"> ▶ Display selection dialog ▶ Use current date and time <p>The Modify time period property can be activated.</p> <p>The time period can be moved to the future.</p> <p>The time period can be amended.</p> <p>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 Modify the checkbox of the time period property Enter the following setting under Move time period to the future: HH = 0 . Activate, under Change time period by, the checkbox of the Use last-completed time period property.</p> <p>Evaluation: today's date: 2/22/2018</p> <p>Result of the time filter in Runtime: 01.01.2018 - 31.01.2018</p>
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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.
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Configuration is along the lines of **time filtering for screen switching** (on page 77).

7.6.4 Lots

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



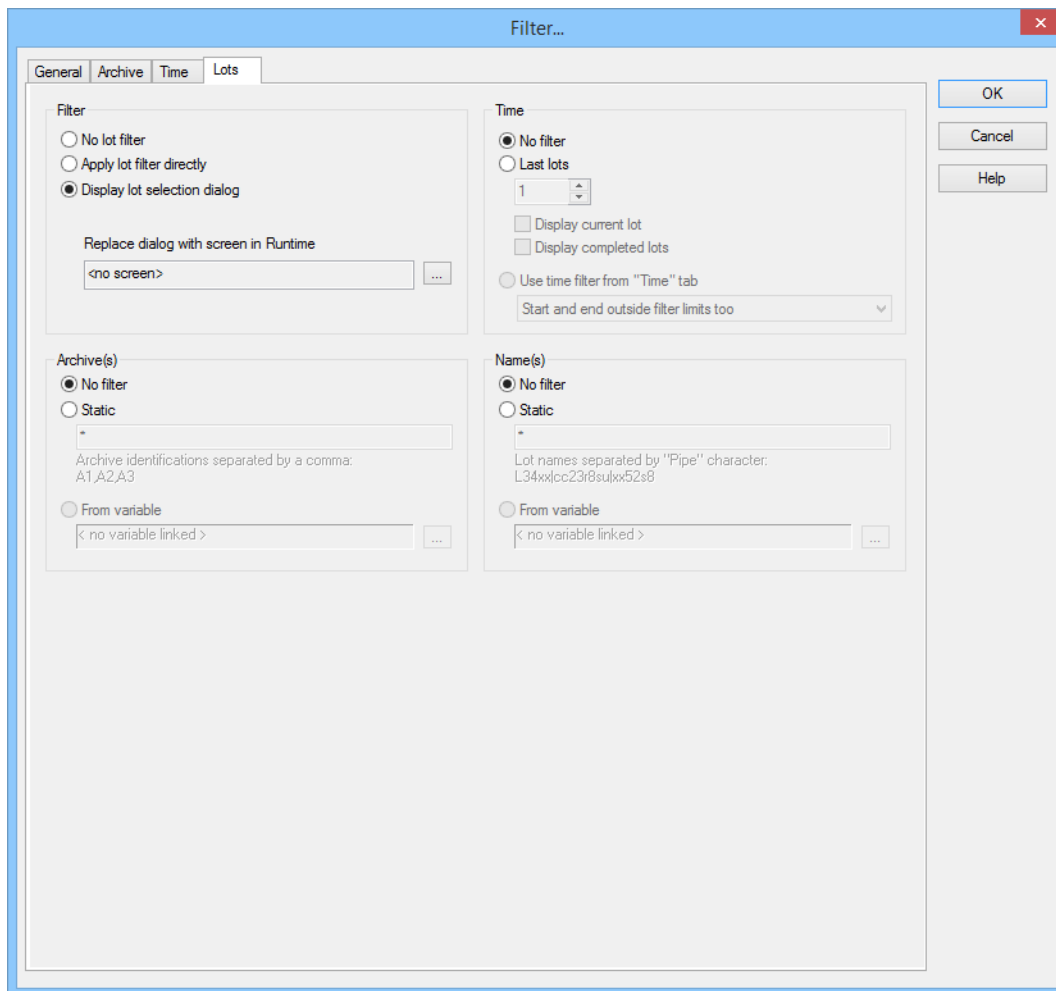
Information

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

The lot filter can offer a list of existing lots in 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 you then select a lot from this list in 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 Runtime and a lot is selected, the time filter displayed does not correspond to the one configured in the Editor.



FILTER

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

- ▶ **No lot filter**
- ▶ **Apply lot filter directly**
- ▶ **Display lot selection dialog**

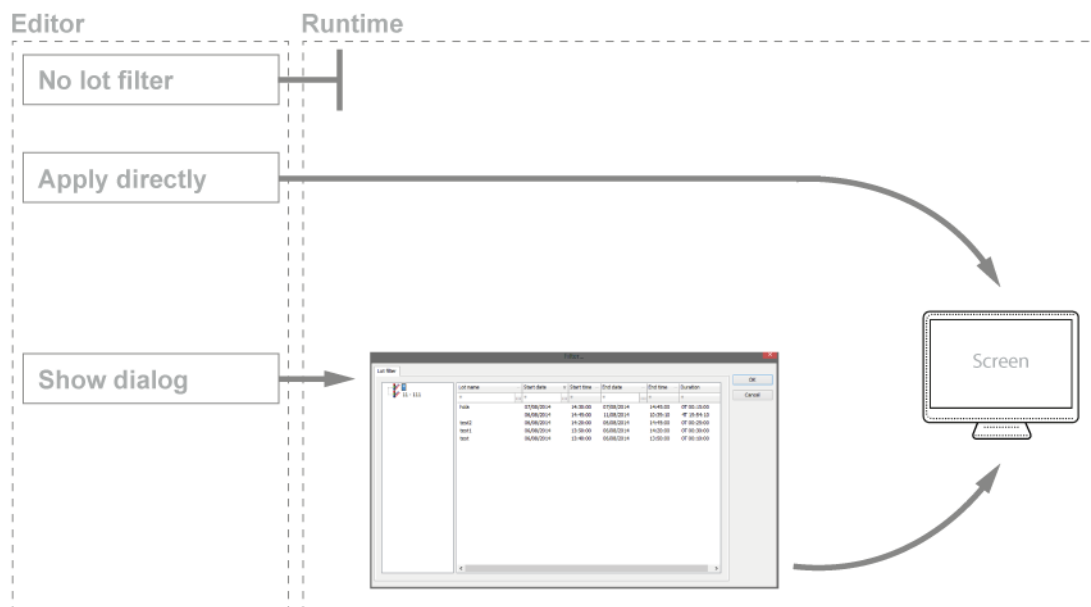
Note: If the lot filter is shown as a dialog, it can be prefiltered for archive identifications. It is expressly recommended that you use this prefiltering for performance improvements.

Option	Description
No lot filter	<ul style="list-style-type: none"> ▶ Active: The lot filter is deactivated and cannot be configured. Filtering for lots is not carried out in Runtime.
Apply lot filter directly	<ul style="list-style-type: none"> ▶ Active: The filter configured here is applied in Runtime directly. <p>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.</p>
Display lot selection dialog	<p>Active: The dialog for lot selection is shown in Runtime when:</p> <ul style="list-style-type: none"> ▶ Clicking on Filter or ▶ screen switching, if the Show this dialog in Runtime option has been activated (Not available for each function/screen type) <p>Note: The dialog is not shown on reloading.</p> <p>Options can be pre-selected in the Editor.</p>
Replace dialog with screen in Runtime	<p>Only available if the Show lot selection dialog option has been selected.</p> <p>Definition of a screen that is to be called up in Runtime instead of the lot selection dialog. Only <code>time/lot/shift filter</code> screens are offered.</p> <p>Click the ... button and the dialog opens to select a screen.</p> <p>If the linked screen is not found in Runtime, a search is made for corresponding screens with specific names.</p> <p>Note: A lot filter screen can also be selected using the 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.</p>
Relative lot selection	<p>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.</p> <p><u>Configuration for ETM:</u></p> <p>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.</p> <ul style="list-style-type: none"> ▶ 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 Runtime. This also applies for the right-click functionality.

Overview of the implementation of configuration in Runtime:



TIME

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

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

Option	Description
No filter	<ul style="list-style-type: none"> ▶ Active: The time range set in the Time tab is not taken into account. All completed and current lots are displayed.
Last lots	<p>Attention: Only works in conjunction with the Apply lot filter directly option.</p> <p>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.</p> <ul style="list-style-type: none"> ▶ 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. <p>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.</p> <p>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.</p> <p>Note on compatibility: If the project is compiled for a version before 7.11, the following is applicable: If the current lots are selected or the combination of current and completed lots, then only the completed lots are shown in Runtime.</p>
Display current lots	<ul style="list-style-type: none"> ▶ Active: The current lots are displayed. <p>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 reached.</p> <p>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.</p>
Display completed lots	<ul style="list-style-type: none"> ▶ Active: The completed lots are displayed. <p>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.</p>
Use time filter from "Time" tab	<ul style="list-style-type: none"> ▶ Active: Pre-filtering is carried out with the settings of the Time tab. <p>The effective range of the filter can be amended within this time range. Select from drop-down list:</p> <ul style="list-style-type: none"> ▶ Start and end also outside filter limits: (Default) Lots can start before the start time configured in the Time

	<p>filter and end after the configured end time.</p> <ul style="list-style-type: none"> ▶ 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	<ul style="list-style-type: none"> ▶ Active: Filtering for archive names is not carried out.
Static	<ul style="list-style-type: none"> ▶ Active: Archives whose identification corresponds to the character string entered in the input field are filtered for. <p>Input of the archive identifications in the input field:</p> <ul style="list-style-type: none"> ▶ Several identifications are separated by a comma (,). ▶ * or empty: All archives, no filter.
From variable	<ul style="list-style-type: none"> ▶ Active: The value of the variables linked here is applied as a filter for archive names in Runtime. <p>Click on button ... in order to open the dialog for selecting a variable.</p> <p>Available for AML and CEL modules if the Apply lot filter directly option has been selected: Other modules use their own configurations.</p> <p>Notes for variables in Runtime:</p> <ul style="list-style-type: none"> ▶ The variable selection is only activated in Runtime if a valid variable has already been linked in Runtime. The ... button is always deactivated in 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. <p>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.</p>

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

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

Option	Description
No filter	<ul style="list-style-type: none"> ▶ Active: Filtering for lot names is not carried out.
Static	<ul style="list-style-type: none"> ▶ Active: Lot names that correspond to the character string entered in the input field are filtered for. <p>Input of the lot name in the input field:</p> <ul style="list-style-type: none"> ▶ 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.
From variable	<ul style="list-style-type: none"> ▶ Active: The value of the variable linked here is applied as a filter for lot names in Runtime. <p>Click on the ... button to open the dialog for selecting a variable.</p> <p>Only available if the option Apply lot filter directly has been selected.</p> <p>Notes for variables in Runtime:</p> <ul style="list-style-type: none"> ▶ The variable selection is only activated in Runtime if a valid variable has already been linked in Runtime. The ... button is always deactivated in 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. <p>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.</p>

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.

The lot filter is configured along the lines of filtering when screen switching (on page 92).

8. Operating during Runtime

Archives can be displayed and edited in Runtime with an archive revision (on page 72) screen.

Archives that are created in Runtime are saved as ***.arx** files in the Runtime folder of the computer:
`%Public%\Documents\zenon_Projects\[workspace]\[project]\[computer_name]\[project]`

The current archive file has the name of the identifier. If the archive is closed, this file is saved and renamed, and another file with the name as the identifier as the name is created. For renaming, the UTC time is used for the area. The files are accessed in Runtime by means of filters. Operations with the files in the file browser are not necessary.

Values from archives can be edited, deleted and supplemented in Runtime, depending on the setting.

Attention: If files are created in the Historian which exceed either the reserved memory in the **project.ini** or the 10% rule, these files cannot be read in. For details, see the **Export archives** chapter (on page 112).



Information

*For a decimal value, a comma (,) or a period (.) can be used as a decimal separator. In doing so, the decimal separator is automatically changed to a **period** internally.*

CREATING AN ARCHIVE REVISION SCREEN

Filter

Filter profile

Filter

Short name
AA

Number of values
90

Archive status
Active

Number invalid
85

Archive

Date / time	Variable	Identification	Value	Measuring unit	Status
17.12.2014 08:15:00	Free memory	0		KB	INVALID
17.12.2014 08:30:00	Free memory	0		KB	INVALID
17.12.2014 08:45:00	Free memory	0		KB	INVALID
17.12.2014 09:00:00	Free memory	0		KB	INVALID
17.12.2014 09:15:00	Free memory	0		KB	INVALID
17.12.2014 09:30:00	Free memory	0		KB	INVALID
17.12.2014 09:45:00	Free memory	0		KB	INVALID
17.12.2014 10:00:00	Free memory	0		KB	INVALID
17.12.2014 10:15:00	Free memory	0		KB	INVALID
17.12.2014 10:30:00	Free memory	0		KB	INVALID
17.12.2014 10:45:00	Free memory	0		KB	INVALID
17.12.2014 11:00:00	Free memory	0		KB	INVALID
17.12.2014 11:15:00	Free memory	0		KB	INVALID
17.12.2014 11:30:00	Free memory	0		KB	INVALID
17.12.2014 11:45:00	Free memory	0		KB	INVALID
17.12.2014 12:00:00	Free memory	0		KB	INVALID
17.12.2014 12:15:00	Free memory	0		KB	INVALID
17.12.2014 12:30:00	Free memory	3535636		KB	SPONT
17.12.2014 08:15:00	SubNavigation	0			INVALID
17.12.2014 08:30:00	SubNavigation	0			INVALID
17.12.2014 08:45:00	SubNavigation	0			INVALID
17.12.2014 09:00:00	SubNavigation	0			INVALID
17.12.2014 09:15:00	SubNavigation	0			INVALID
17.12.2014 09:30:00	SubNavigation	0			INVALID
17.12.2014 09:45:00	SubNavigation	0			INVALID
17.12.2014 10:00:00	SubNavigation	0			INVALID
17.12.2014 10:15:00	SubNavigation	0			INVALID
17.12.2014 10:30:00	SubNavigation	0			INVALID
17.12.2014 10:45:00	SubNavigation	0			INVALID
17.12.2014 11:00:00	SubNavigation	0			INVALID
17.12.2014 11:15:00	SubNavigation	0			INVALID
17.12.2014 11:30:00	SubNavigation	0			INVALID
17.12.2014 11:45:00	SubNavigation	0			INVALID
17.12.2014 12:00:00	SubNavigation	0			INVALID
17.12.2014 12:15:00	SubNavigation	0			INVALID

Control element	Description
Archive data window	Display of the archive data in Runtime.
Set filter (list)	Definition of the set filter.
Set filter (Display)	Display of the set filter.
Archive status	Display of the archive status.
Short name	Display of the short description of the displayed archive.
Total number	Display of the number of the displayed values.
Number of INVALID	Display of the number of variables with the status INVALID.
Open archive	Opens the dialog to select an archive.
Close archive	Closes the archive that is currently open.
Save archive	Saves changes in the archive and updates aggregated archives on request.
Edit entry	Opens the dialog (on page 146) to edit the selected archive entry.
Insert entry	<p>Opens the dialog (on page 148) to insert archive entries into the archive files.</p> <p>If there are no archive files for this time range, no entries can be inserted. A corresponding error message is shown if an attempt to insert an entry is made.</p>
Delete entry	Deletes selected archive entries after confirmation query.
Selection	Clicking on the button opens the dialog to configure the filter.
Column configuration	Opens the dialog (on page 145) to configure column width and font.
Print	Prints list to configured printer.
Profile selection	Entry of a name for a new filter profile or selection of a filter profile from a drop-down list.
Save	Saves current filter as a profile with the name given in the filter profile text field.
Delete	Deletes the currently-selected filter profile.
Import	Opens dialog to import a filter profile.
Export	Opens dialog to export a filter profile.

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 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.

With this you can in the Runtime:

- ▶ save filters
- ▶ use saved filters
- ▶ delete filter profiles

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

FUNCTIONS

In online operation the following functions for archive control and monitoring are available.

- ▶ Archive: Start (on page 107): Manual starting of an archive selected in the Editor.
- ▶ Archive: Stop (on page 108): Manual ending of the archive selected in the Editor.
- ▶ Index Archive (on page 110): Subsequent indexing of lot archives (on page 66).
- ▶ Show active archives (on page 111): Display of the archives that are currently running.
- ▶ Export archives (on page 112): Export of archives in various formats.

EDITING OF ARCHIVES SAVED IN SQL

Values can be changed with archives saved in SQL.

However it is not possible to:

- ▶ Change the time stamp
- ▶ Delete values
- ▶ Insert values

8.1 Procedure

When starting an archive in Runtime, a file **xx.arx** (**xx** = short identifier of the archive) is created. As soon as the archive is stopped, it is closed and named according to the rules.

String variables (on page 158) can also be archived.



Attention

Never close Runtime whilst archives are running. This also applies to ongoing processes that use archives (Batch Control, for example).

Reason: Ending with an archive running prevents correct closing.

RUNTIME WAS ENDED WITH A RUNNING ARCHIVE

Problem: Runtime was ended whilst the archive was still running.

Consequences:

- ▶ The archive will not be closed.
- ▶ The file can thus not be renamed.
- ▶ The ARX file is still present.

This leads to the following behavior:

- ▶ The archive no longer continues to run when Runtime is restarted.
If the archive is configured as a cyclic archive, then it is filled in with default values for the missing area in the current interval when Runtime is restarted. If no value was transferred, the defined alternate value is used otherwise the last valid value is used. Existing entries are not overwritten.
- ▶ Execution of the **Archive: Stop** function no longer stops the archive. The ARX file can thus not be copied correctly.
- ▶ No archive export can be carried out as long as there is an ARX file.

Solution: Start the archive again and then stop it. The archive is then correctly closed and renamed. There may be invalid values in the archive.

Hint for engineering: In the scripts **AUTOEND** or **AUTOEND_SERVPROJ**, close all manually-started archives. These are thus automatically stopped and closed when Runtime is ended.

VALUES WITH A STOPPED ARCHIVE

If values are generated whilst an archive is stopped, then:

- ▶ With cyclic archives, substitute values are used to fill them

- ▶ With archives without defined sampling time points, the last respective value with the status I-Bit is written to the archive

RELOADING AND SERVER SWITCH

If reloading is triggered in the Runtime that is running or there is a reclassification between **Server 1** and **Server 2**, duplicate or moved values may occur.

8.2 Selection

Clicking on the **selection** button opens the dialog to select values that are to be displayed in bold.

All entries that correspond to the selected criteria are highlighted in the list. The bold print is removed again by activating the **Delete selection** option.

FILTER DIALOG

Filter...

Archive filterTime

M1	M6	PROGRESS	M16	OFF
M2	M7	TIMEOUT	GI	N_SORTAB
M3	M8	MAN_VAL	SPONT	FM_TR
M4	M9	NET_SEL	M14	INVALID
M5	REVISION	M15	T_CHG_A	ALT_VAL

NameIdentification

☐ Free memory [kB]

☐ SubNavigation_MDI_2

☒ WIZ_VAR_10

☐ WIZ_VAR_11

☒ WIZ_VAR_12

☐ Value
(in base unit)

MinimumMaximum

01

String mask

*

☐ Delete selection

☐ all entries

OK

Cancel

Option	Description
Status list	Selection of the status bits that are to be filtered for. Selection and deselection by clicking on the respective status bit. Only available if the All entries option has been deactivated.
Variable list	Variables that are to be displayed from the selected archive. Select and deselect them by clicking in the checkbox in front of the variables. Only available if the All entries option has been deactivated.
Value (in base unit)	<i>Active:</i> Filtering is carried out for archive values whose value is between a minimum and a maximum or which contain a certain character sequence as a string. Input of: <ul style="list-style-type: none"> ▶ Minimum: Lower limit of the value ▶ Maximum: Upper limit of the value ▶ String mask: Character sequence that is be filtered for Only available if the All entries option has been deactivated.
Delete selection	<ul style="list-style-type: none"> ▶ <i>Active:</i> All bold print in the list is removed when the dialog is closed. Deactivates input possibility for status bits and variables.
All entries	<i>Active:</i> Settings apply for all statuses and variables. The entries in status list , variable list and value cannot be selected individually.

8.3 Lot filter and time filter

The filter settings configured in screen switching (on page 72) can be modified in Runtime. For that

1. Open the screen switching function in the Editor.
2. Click on **Filter**.
3. Activate the **Offer this dialog in the Runtime** option in the **Archive filter** tab.
4. If individual variables are also to be configured in Runtime, then deactivate the **All entries** option in the Editor.

In Runtime, the time filter or lot filter is displayed when the screen is called up, depending on the configuration:

- ▶ Lot filter activated: Lot filter is offered
- ▶ Lot filter deactivated: Time filter is offered

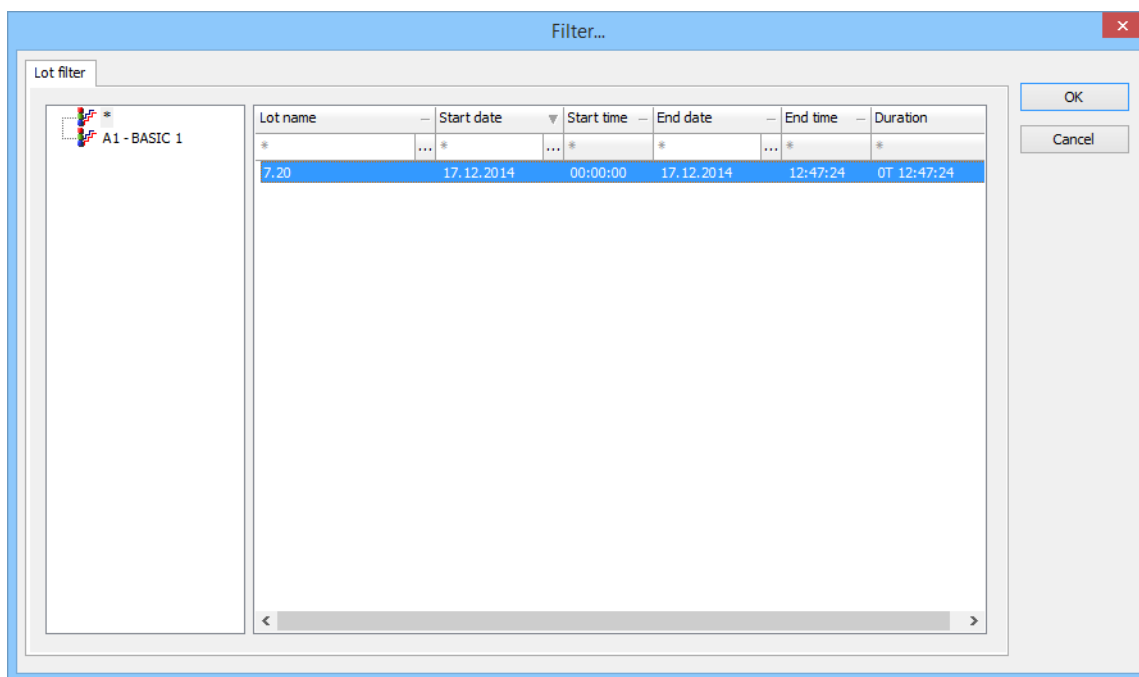
CONFIGURATION OF LOT FILTER

If you set option `no time filter` as time filter type, all Runtime entries since 1. 1. 2000 will be 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: <ul style="list-style-type: none"> ▶ 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 *: <ul style="list-style-type: none"> ▶ 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 time 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

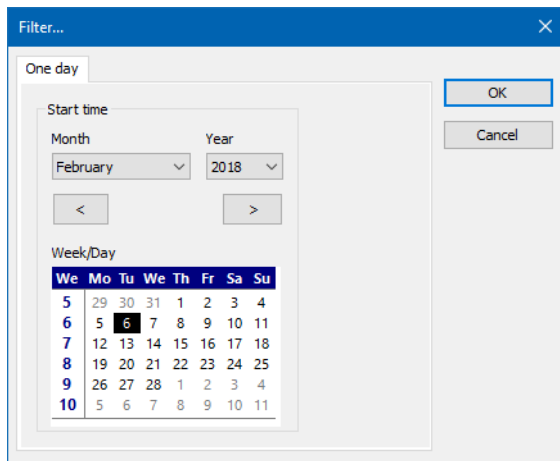
Lot filtering to archive values evacuated into SQL is carried out by means of a time filter. This time filter contains all values of the archive between the start time and end time of the lot. The lot start time and lot end time are also included. Milliseconds are not taken into account with this time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

CONFIGURATION OF TIME RANGE

The filter dialog for the time setting can be offered in 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 Runtime, instead of the complete dialog, only one dialog to configure the time range is offered. For example, for the `One day` setting:



Filter...

One day

Start time

Month: February Year: 2018

< >

Week/Day

We	Mo	Tu	We	Th	Fr	Sa	Su
5	29	30	31	1	2	3	4
6	5	6	7	8	9	10	11
7	12	13	14	15	16	17	18
8	19	20	21	22	23	24	25
9	26	27	28	1	2	3	4
10	5	6	7	8	9	10	11

OK Cancel

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**.

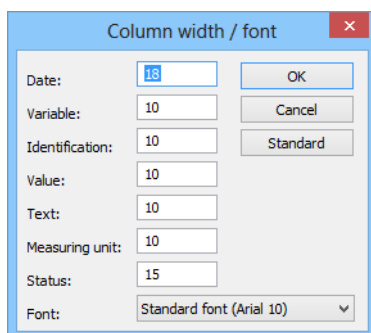
This means that there will be back-calculation from 06:00 on the next day by 16 hours. Now the day lasts from 6:00 a.m. till 2:00 p.m., which corresponds exactly to a morning shift.

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.

8.4 Define font and column width

For the list with the archive data, the font type and column width can also be changed in Runtime. To do this, the **Diagram window** control element must be configured. In Runtime, a click on the button opens the dialog for the configuration of the column width and font:



Option	Description
Column width	Column width in characters. To amend the column width, enter the desired value in the text field in the text field next to the column.
Font	Selection of font type from drop-down list. All the fonts configured in the Editor are offered. The same font is also used for the expression. The selected font is saved in the project.ini file until Runtime is restarted by the Editor.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Standard	Sets all entries for column width to default. The selected font is not changed.

SAVE FONT PERMANENTLY

If Runtime is started from the Editor, the **project.ini** file is overwritten and the set font is changed again.

You make changes to the font in the **project.ini** by means of the **ARCHEDITFONT=** entry.

To apply entries in **project.ini** permanently, the following procedure is recommended:

1. Identify the project.
To do this, note the **GUID** of the project in the Editor. The first 4-6 digits are sufficient.
Hint: Highlight the project in the project manager and press **Ctrl+Alt+E**.
Explorer opens the folder `...\<GUID>\Project_SQL_directory\FILES\`
You need this path in the next step.

Then close the workspace or end the Editor.
2. Go to **project.ini**: This is in the following folder:
`...\<GUID>\Project_SQL_directory\FILES\zenon\system.`
3. Edit the **project.ini**: Make the desired changes in **project.ini**. Save and close the file.
4. Transfer Runtime files: Open the Editor again or load the project. Create the amended Runtime files and transfer the Runtime files.

8.5 Editing values

Variable values in archives can be edited in Runtime. To edit values:

1. Highlight the entry in the list of archive data.
Note: Several entries can also be selected at the same time.

2. Click on the **Open** button or double click on the entry.
3. The dialog to edit the value is opened.
4. Enter the desired value and time stamp.

If several archive entries are changed at the same time, all entries will receive the value and time stamp entered in the dialog.

5. Confirm the dialog by clicking on **OK**.

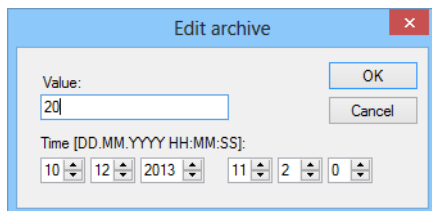
If one or more values have been changed, then following happens after clicking on **OK**:

- The status of the entry is set to manual value (**MAN_VAL**)
- The amended line is colored in blue
- The column title is colored red
- The **Save** button is activated

6. Save the updated list by clicking on the **Save** button.

Once the amended list has been saved, the color of the column title is reset again.

EDIT ARCHIVE DIALOG



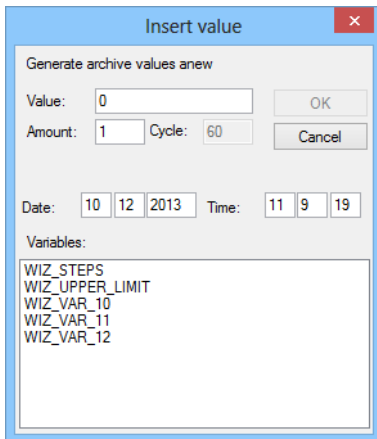
Option	Description
Value	Entry of the new value If several values have been selected, then: <ul style="list-style-type: none"> ▶ The default value is always set to 0 ▶ The new value is applied to all highlighted entries
Time	Entry of the new time stamp If several values have been selected, then: <ul style="list-style-type: none"> ▶ The default value is always set to 0 ▶ The new value is applied to all highlighted entries
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.

8.6 Inserting values

New values can also be inserted into an existing archive.

To insert new values:

1. Click on the Insert button.
2. The dialog to create new values is opened



3. Select a variable.
4. Enter value, number and time stamp.
5. Confirm the selection by clicking on OK.

The following happens by clicking on **OK** and the entry in the list:

- The status of the entry is set to manual value (MAN_VAL)
- The new line is colored blue
- The column title is colored red
- The **Save** button is activated

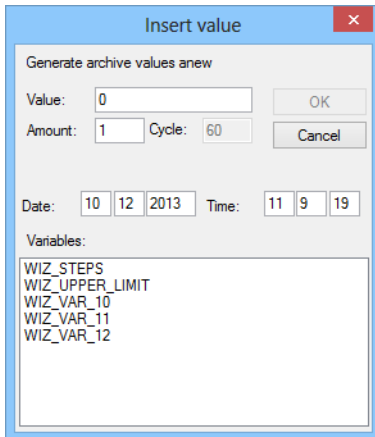
6. Save the updated list by clicking on the **Save** button.
Once the amended list has been saved, the color of the column title is reset again.

Note:

- If an entry is highlighted before the dialog has been opened, then:
 - The time stamp and cycle cannot be changed
 - If the new value is entered below the highlighted variable
- No new values can be inserted into archives saved in SQL.

- Once the amended list has been saved, the color of the column title is reset again.

INSERT NEW DIALOG VALUE



Option	Description
Value	Entry of the new value
Number	Entry of the number of the desired values.
Cycle time	Entry of cycle time in seconds.
Date	Entry of the date.
Time	Entry of the time point.
Variables	Selection of the variables from a list.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.

8.7 Store values in archive

New and amended values must be saved so that they can be transferred to the archive. To do this, click on the **Save** button. The new and amended values are thus saved in the archive. If there are also aggregated archives (on page 48) for the archive, these are automatically updated.

If there are unsaved values in the archive, these are displayed by the headers being colored red.

8.8 Print archive

Archives are printed as a list by default by clicking on the **Print** button. This list can also be given a title line. To do this, there must be a format file with the name `ARV_G.FRM` in zenon.

To format the print-out:

1. Create a formatting file:
 - Name: `ARV_G.FRM`
2. Import the file in the Editor in the subnodes: **Files\Texts and formats**.
 This corresponds to the save location: `%PUBLIC%\Documents\zenon_Projects\[Arbeitsbereich]\[Projekt]\RT\FILES\zenon\custom\lists`.
3. Check the printer set for lists and formats in the *File -> General configuration -> Default -> Printer -> For notepad* menu.

CONFIGURATION OF THE FILE CALLED `ARV_G.FRM`

Create a text file with the name `ARV_G.FRM`.

This file contains the key words for the formatting of the printout in Runtime.

Attention: The key words are entered in German for all languages.

Keyword	Meaning
@AMELDUNG	Limit value text of the archive entry.
@ARCHIVNAME	Name of the archive.
@DATZEIT	Date/time stamp of the archive entry.
@EINHEIT	Unit of the archive entry.
@HEADZEIT	Date/time stamp of the archive.
@KANALNAME	Variable name of the archive entry.
@SEITE	Page number for the print-out.
@STATUS	Status text of the archive entry
@TAGNR	Variable identification of the entry.
@WERT	Value of the archive entry.

The key words for the part of the cyclically-repeated archive entries in the list are included with the %% character.

EXAMPLE

@HEADZEIT @ARCHIVNAME

Page: @SEITE -----

Date/Timet Variable name Value Measuring unit Condition text Status

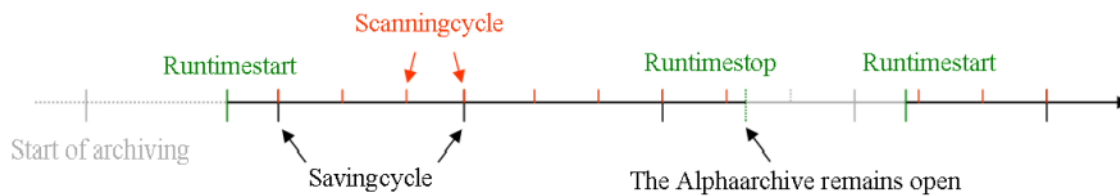
%%

@DATZEIT @KANALNAME @WERT @EINHEIT @AMELDUNG @STATUS

%%

8.9 Cycles in Runtime

The configuration of the recording type (on page 32) and saving (on page 35) in the Editor, as well as the start time of the archives has an effect on the execution in Runtime accordingly:



The start time set in the archive serves as the basis for the calculation of the save times. The save cycles are added from this time point on. zenon thus knows, each time Runtime is started, when the currently-running Alpha archive will be closed and a new file needs to be started.



Information

Archives that are currently open are labeled Alpha archives and therefore do not have any date or time stamp.

If Runtime is stopped whilst data is being written to an archive, this file remains open. The next time it is started, Runtime checks to see if the file should now be closed.

- Yes: The file is closed and a new file is started immediately.
- No: The new data is added to the existing file and the file is used again. Values that are generated during the time that Runtime is down are entered by zenon with the corresponding Archive filler value and receive the status INVALID.



Information

Always configure the scan cycle and save cycle in such a way that they are in whole-number multiples of one another, in order to avoid overlapping and thus imprecision in aggregated archives.

9. Use of archive data in zenon

Data from archiving can be reused in zenon:

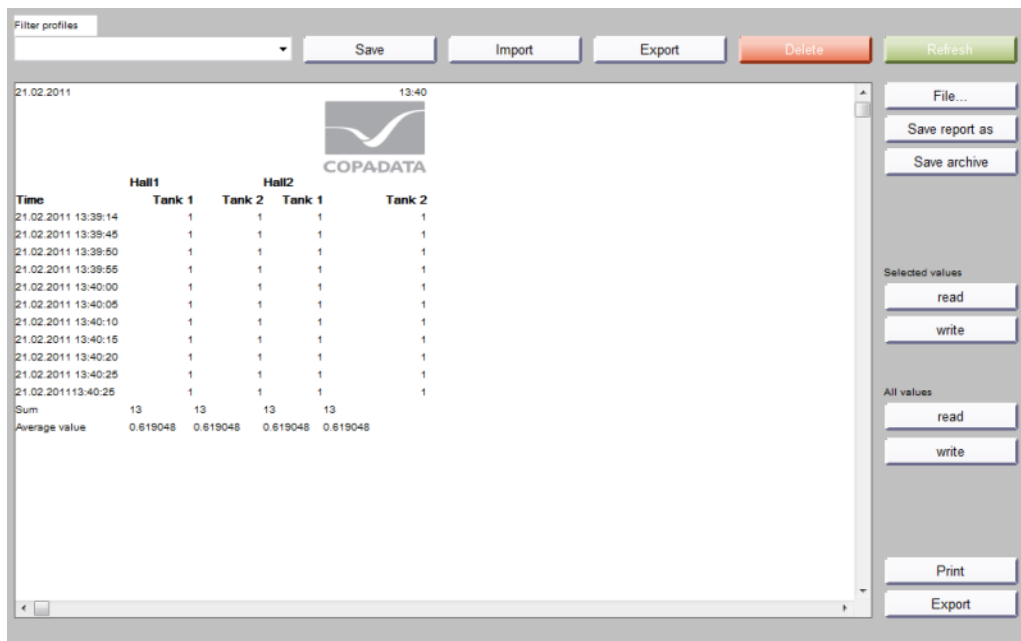
- ▶ Report Generator (on page 152)
- ▶ Report Viewer (on page 155)
- ▶ Extended Trend (on page 156)

Furthermore, data can also be evaluated with the COPA-DATA product zenon Analyzer.

9.1 Report Generator

The Report Generator works on a cell-orientated basis.

Example for a report:



Each of these cells can be assigned certain formats and functions. A report is configured as its own screen as a Report Generator screen. The data is calculated, output and displayed using pre-defined report functions. These can be entered into the respective cells using a dialog or manually. To be able to display reports in Runtime, they must be configured in the Editor.



Attention

The desired printer must be selected before creating the report, because the page formatting of a report depends on the printer that has been set. Subsequent changing of the printer can necessitate reformatting of the existing table.

9.1.1 Archive and logging functions

BASICS

All archive functions build on the basic `archive (FILTERINDEX, PARAMETER, RICHTUNG)` function.

The expansions are distinguishable by additional letters in function names.

Code	Meaning	Comment
r	read only	There is only read access to the archive. Changed values cannot be saved.
sp	Columns	Provides special formatting to define cells to be used.
min	Mathematics	Only has an effect on <code>value</code> and <code>time</code> .
ex	extended	provides special treatments.
w	write	Writing is possible.

FILTER INDEX

The filter index creates a distinction between archive filter numbers used in the report functions and variables from the archives.



Example

```
=archive (5, "value", "downwards")
```

`FILTERINDEX = 5`

The entry present in the filter under no. 5 is used for the report function.

PARAMETERS

Options	Possible value
value	[1-n]
status	[1-n]
time	[1-n]
number	[1]

Direction

Options	Meaning
Right	<p>Value is entered to the right (row).</p> <p>There must be sufficient cells left free for expected entries from further report creation.</p> <p>Attention: If an <code>archivesp</code> function is created with only one column, the value is entered downwards (in the column).</p>
bottom	<p>Value is entered downwards (column).</p> <p>There must be sufficient cells left free for expected entries from further report creation.</p> <p>Attention: If an <code>archivesp</code> function is created with only one row, the value is entered to the right (in the row).</p>

All archive functions can be created with the function assistant.

On outputting the status information, the settings from the `project.ini` file in the **[STATUS]** section or the settings from the internally defined allocation are used. If the status labeling was changed in `project.ini`, the amended name is given. (Tip: makes it possible to keep the project compatible with old status labels.)

In online operation, the query time is either defined in the function query or given in Runtime when a report file is opened.

CHANGE ARCHIVE ENTRIES

If permitted by user authorizations, archive values can also be changed in Runtime. Changes are either saved manually via the `Save` control element or automatically saved when saving a report file. The status of an amended entry is automatically set to `manual` value.



Information

Changing string fields in the report: If a text consists only of numbers, spaces are removed by default when it is saved. Spaces that are desired must be displayed by ASCII character 255 (Alt+255).

9.2 Report Viewer

The **Report Viewer** also allows archive data to be prepared for the user. However, in contrast to the **Report Generator**, these cannot longer be modified. For this, the Report Viewer offers extensive graphic possibilities for display, such as diagrams. In addition, two time ranges for incoming analyses can be compared with one another.



To be able to create reports using the **Report Viewer**, software from third-party providers will also be required. **Microsoft Report Designer** is therefore also installed when zenon is installed. This opens as soon as you create a new report. There is a separate screen type for display in Runtime.

You can find details on the configuration in the **Report Viewer** manual.

9.3 Extended Trend

Extended Trend, which requires a license, provides online values and archive values from variables as curves. In contrast to the **trend** dynamic element, it is possible to zoom, browse, query and scale online values and values from archives. As with the **Report Generator** and the **Report Viewer**, there is also a separate screen type for **Extended Trend**. You can read details on the configuration switch in the Extended Trend manual.

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

10. Additional information

This section contains background information on archives and archiving.

10.1 Format of archive files

Archives have the following data structure:

- ▶ The archive file with the identification **ARX** contains the variable definitions and numerical data.
- ▶ The **ARS** file contains the String data (on page 158).
- ▶ The archive header contains the archive definition and may or may not contain values of lot variables.
- ▶ The memory that is reserved for the value of the lot variable is - in case the lot variable is a string - dependent on the string length. For numeric variables, a fixed amount of 32 characters is reserved. Lot strings are stored in Unicode. If no lot variable (on page 66) is defined, no memory is reserved.

- ▶ The data record in the **ARX** file has a length of 24 bytes and also offers the possibility to store double values. The status information is 64 bit.
- ▶ Archives can be stored at an interval of 1 second. For cyclical archives, it is recommended that save cycles greater than 30 seconds are adhered to.

CONVERSION OF PROJECTS BEFORE VERSION 6.20 SP0

From version 6.20 SP0, archive files are stored in ARX format; before that, the ARV format was used. If a project is converted, a check is made when Runtime is started to see whether there are archive files in ARV format in the Runtime folder. After confirmation of the conversion, the files are converted into ARX format. This conversion is done for all projects, before the projects start. The ARV files are deleted during the conversion. For evacuation to SQL (on page 166), further columns must be added to the table.

Recommendation: Back up the ARV files before conversion.

NAMING AN ARCHIVE

The name of an archive is formed of:

- ▶ Short name
- ▶ Save time in UTC in the format **YYMMTThhmmss**
- ▶ File extension **.arx**

For example: **XX140403071200.arx**

XX	Name of the archive
14	Year
04	Month
03	Day
07	Hour (UTC)
12	Minutes
00	Second

UTC TIME AND LOCAL TIME

Archive use local time when saved. The local time that is set on the computer consists of: **UTC + time zone + standard time/daylight saving time**. The zenon Runtime automatically considers the local time for archive requests.

EXAMPLE: BERLIN IN THE SUMMER

- ▶ Local time: 2:00 p.m.

- UTC: 2:00 p.m. local time less 1 hour summer time less 1 hour time zone = 12:00 o'clock UTC
The value that occurs locally at 2:00 p.m. is saved with the time 12:00.

You request values between 13:00 and 15:00 local time in Berlin. The Runtime then requests from the archive the values with a time stamp between 11:00 and 13:00 and displays them with the local time (13:00 to 15:00).

10.1.1 String variables

String variables can be archived. They are stored in a file called **[short description][time].ARS**. This file contains only the data of the strings and forms a logical unit with the **ARX file**. Information on whether a string archive has to exist or not is stored in the **ARX file**. If no strings are stored in the archive, no ARS archive is created. If there are strings, the ARS file must be present.



Attention

*File operations must include both files. If a required **ARS file** is missing, the data from the **ARX file** is also not loaded.*

The string data is stored in Unicode with dynamic data length. This happens in order to save memory and is independent of the defined string length. In the data record of the ARX file, the position of the String record in the ARS file is stored.



Attention

If strings are edited in the ARS file, their position can change. This is updated for the edited string in the ARX file. This only happens for the edited string, but not for all others. If the ARS file is accessed via the API or tools, it cannot therefore be guaranteed that the addressed strings are at the assumed position.

An alternate value for strings is available in the variable properties, so that the archive is always supplied with values. The **String archive filler value** is used if zenon (e.g. for filling cyclic archives) needs a value for a string variable and no value is available. If no value was transferred, the defined alternate value is used otherwise the last valid value is used.

For the calculation of archive sizes, the editor calculates with maximal string length.

SIZE OF DATA FIELD

In general, the size of the data field is as large as the longest string variable in the archive. In doing so, the following applies for:

- Archive evacuation
When creating the tables for archive evacuation with the zenon Editor, the column width is adjusted to the longest string.

► Archive export

The column width is fixed at 128 characters. Characters that go beyond this are ignored.

***Note on system driver variables:** The string length is limited to 5 characters and cannot be changed. The string contents of the system driver variables can however be longer than 5 characters. Insert an additional string variable with a length of, for example, 256 characters into the archive in order to avoid data loss.*



Attention

If the length of a string variable to be archived changes, this data field must be adapted when moving it to SQL or exporting it to SQL.

***Note:** These changes must be made before the changes are accepted in Runtime. Otherwise the longer Strings could be archived shortened.*

AMEND DATA FIELD FOR SQL

The amendment can either be carried out manually with a tool for database administration (e.g. Management Studio for MS-SQL Server) or in the archive configuration.

To amend the data field in the zenon editor, carry out the following steps for each archive:

1. Select **Edit archive** in the context menu of the archive
2. Switch to the **Save** (on page 35) tab
3. Go to the **Evacuation after storage time** section:
4. Click on **Create tables (on page 159)**.

10.2 Evacuate to an SQL database

The evacuation of archives to an SQL database allows the standardized storage of data for use in other applications. The following are, for example, supported: Microsoft SQL Server, Oracle, CRATE.IO and other database systems that have an ODBC interface. At the same time, the data can also continue to be used in zenon trends and reports. SQL databases also allow targeted optimization of data storage.

A distinction is made between two different stages of data storage when storing archive data in an SQL database.

- Short-term data: Corresponds to the **Keep archives** setting in the **Save** dialog. These are saved in ARX format on the local data carrier.
- Long-term data: After the period stated here the contents of this file is written to the SQL database as a combined transaction and deleted on the local disc.

If data from this archive is required for trends or reports, the locally-saved short-term data is automatically combined with the long-term data stored in the SQL database into a seamless dataflow again.

This property can also be used to use external data in zenon. After the necessary database tables have been created, these can be filled with data using external tools. The archive does not need to be started for this. The data inserted into the table is thus available for display in a zenon trend or a report.

Note: SQL archives can also be evacuated to a **MS Azure** service bus. To do this, the **Use MS Azure service bus for writing** option must be activated for the archive configuration in the **Save** (on page 35) tab. You can read details in:

- ▶ **MS Azure-Dienstbus** (on page 165) chapter in this manual
- ▶ Manual **MS Azure**

FORMATS OF THE TABLES

A table is generated for each archive in the database that contains the evacuated archive data. Additionally a cross reference table for the whole project is generated containing the allocation between the variable names and the unique numerical variable IDs.



Information

When creating the SQL tables for archive data, lots and variables, a primary key is automatically created via the Editor.

Attention: For performance reasons, the primary key for archives is not optimized for non-cross-project variable references. The project GUID of the variables is thus not included. If archives with cross-project variable references are to be evacuated in SQL, the primary key must be deleted manually or supplemented with the project GUID.

FORMAT OF THE DATA TABLE

The data table consists of the following columns:

Column	Type	Meaning
VARIABLE	int[4]	numerical variable ID
CALCULATION	int[4]	<p>Type of data reduction in aggregated archives.</p> <p>Up to 4 values are possible: Sum, average value, minimum, maximum.</p> <p>When exporting the aggregated archive to a file (e.g. .csv), the values 1 to 4 are written as strings:</p> <ul style="list-style-type: none"> ▶ 1=Sum ▶ 2=Average value ▶ 3=Minimum ▶ 4=Maximum <p>At evacuation or export to SQL the values are written as Integer in ASCII code:</p> <ul style="list-style-type: none"> ▶ 49=Sum ▶ 50=Average value ▶ 51=Minimum ▶ 52=Maximum
TIMESTAMP_S	int[4]	Time stamp in Unix time format
TIMESTAMP_MS	int[4]	Milliseconds for the time stamp
VALUE	float[8]	Value
STATUS	int[4]	Status flag of the value (zenon state)
GUID	varchar[36]	Records the project GUID of the variables. Must not be ZERO.
STRVALUE	varchar	the length depends on the longest string variable to be archived. For numerical variables this field has the value ZERO.

Primary key clustered: **TIMESTAMP_S** and **TIMESTAMP_MS** and **VARIABLE** and **CALCULATION** and **GUID**.

The name of the database table comprises the project name and the short name of the archive together. Both tables are connected with an underscore:

ProjectName_ShortName

If the project name is **ARV_IN_DB** and the short name of the archive is **A1**, the table name is: **ARV_IN_DB_A1**.



Attention

Because the **GUID** is included in the index, the value must be `NOT NULL`. From zenon version 7.20, an empty string is entered instead of `NULL` for the evacuation of variables of your own project for the **GUID**.

If Runtime files for version 7.11 or earlier are compiled, there is a compatibility problem as a result: Because `NULL` is written in the **GUID** column here, the evacuation does not work.

Solution: The table in the SQL Server must be created manually without **GUID** in the primary key or completely without a primary key.

For example, with the following syntax:

```
CREATE TABLE [$projectname$_$archivename$]
(
  [VARIABLE] int,
  [CALCULATION] int,
  [TIMESTAMP_S] int,
  [TIMESTAMP_MS] int,
  [VALUE] float,
  [STATUS] int,
  [GUID] varchar(36),
  [STRVALUE] varchar(?),
  CONSTRAINT [PK_$projectname$_$archivename$] PRIMARY KEY CLUSTERED
  (
    [TIMESTAMP_S] ASC,
    [TIMESTAMP_MS] ASC,
    [VARIABLE] ASC,
    [CALCULATION] ASC
  )
)
```

FORMAT OF THE TABLE FOR THE LOT NAME

The table with the lot names for SQL evacuated archives:

- ▶ has the name **[Project name]_[archive abbreviation]_BATCH**
- ▶ consists of 3 columns

Column	Type	Meaning
BATCH	VARCHAR (128)	Lot name
START_S	INT	Unix time stamp of the lot beginning
END_S	INT	Unix time stamp of the lot end

Primary key clustered: **START_S** and **END_S**.

FORMAT OF THE CROSS REFERENCE TABLE

Column	Type	Meaning
VARIABLE	INT [4]	numerical variable ID
NAME	VARCHAR [128]	Name of the variable
GUID	VARCHAR [36]	Records the project GUID of the variables. Must not be ZERO.

Primary key clustered: **VARIABLE** and **GUID**.

The name of the cross reference table is combined from the project name and the suffix **VARIABLES**. The two parts are connected with an underscore character. So if the project name is **ARV_IN_DB**, the table name will be **ARV_IN_DB_VARIABLES**.

10.2.1 Configuration

To store the data of an archive in a SQL database:

1. Select in tab **Save** property **SQL database**.
2. Click on the **...** button.
3. The dialog to select a database is opened.
 - a) Configure the **provider**.
For example **SQL Server Native Client**.
 - b) Test the connection.
 - c) Close the dialog by clicking on **OK**.

Once you have confirmed the dialog, zenon creates the cross-reference table and data table in the database. As soon as there is data to be evacuated, this is inserted into the data table. If zenon loses the connection to the database during operation, the data remains saved locally. The evacuation is continued as soon as the connection has been successfully reestablished.

4. Click on the **Create tables** button if necessary.

Via button **Create table** the tables can be created newly or adapted automatically at any time. If for example variables are added to or removed from an archive or the provider string is adapted

manually. Every time you add or remove variables to or from archives which are configured for SQL evacuation, the tables must be updated in SQL.



Attention

When using **Native Client 10** and **11**, the password is not automatically carried over to the provider string. It must be entered manually

e.g.: ...,**User ID=sqlExampleUser1;Password=secretPassword;**...

Note: If you configure an archive for SQL evacuation and reconfigure the archive at a later time, you must adapt the tables in SQL respectively.

For example: You have configured an archive for the evacuation to SQL; the tables in SQL have already been configured. According to this, you link a variable for lot archiving. In this case, the tables in SQL must be created again. Otherwise the evacuation to SQL cannot be carried out, because the table for the lot information is not present.



Attention

Ensure that the provider configured in the connection is also available on the Runtime computer in Runtime.

Note: An SQL client is also installed with the zenon Editor. Because the zenon Runtime does not need an SQL Server, no SQL client is automatically installed. This can be downloaded from the Microsoft website and must be installed individually.

Ensure you install the correct version when installing the provider. This must suit the zenon version being used. This means: If a 32-bit zenon Runtime is used, the provider must be a 32-bit version. This also applies if it is installed on a 64-bit operating system and also if the database itself is a 64-bit application.

10.2.2 SQL script

Syntax for SQL script:

- ▶ Variable table:

```
CREATE TABLE "PROJECTNAME_VARIABLES" ("VARIABLE" int,"NAME" varchar(128),"GUID"
varchar(36),CONSTRAINT "PK_PROJECTNAME" PRIMARY KEY CLUSTERED ("VARIABLE"
ASC,"GUID" ASC))
```
- ▶ Data table:

```
CREATE TABLE "PROJECTNAME_ARCHIVENAMESHORT" ("VARIABLE" int,"CALCULATION"
int,"TIMESTAMP_S" int,"TIMESTAMP_MS" int,"VALUE" float,"STATUS" int,"GUID"
varchar(36),"STRVALUE" varchar(1),CONSTRAINT "PROJECTNAME_ARCHIVENAMESHORT"
```

PRIMARY KEY CLUSTERED ("TIMESTAMP_S" ASC,"TIMESTAMP_MS" ASC,"VARIABLE" ASC,"CALCULATION" ASC,"GUID" ASC))

Note:

- ▶ **PROJECTNAME:** Project name of the project
- ▶ **ARCHIVENAMESHORT:** unique short description of the archive two characters, for example A1
- ▶ The variable table table is only present once.
- ▶ The data table must be created for each archive that is to be evacuated to SQL.

10.2.3 Oracle database

No **Primary Key** is created with Oracle databases. This can hinder the performance.

- ▶ **Background:** Oracle treats empty strings as `NULL` values.
With Oracle, columns that contain empty strings can never be part of a **Primary Key**.
- ▶ **Solution:** To speed up the performance during queries, a **Primary Key** that does not contain any empty strings can be created manually.

10.2.4 MS Azure service bus

If the **Use MS Azure Service Bus for writing** option has been activated for the SQL evacuation of an archive, all archive values in the Azure Service Bus Queue are added to the Azure service bus queue with the name **archivequeue**. This must exist in the MS Azure-Namespace of the configured connection. The MS Azure connection name is entered in the input field under the option.

CONFIGURATION

In MS Azure, there must be at least one instance of an **AzureZenonArchiveWorker** cloud service running, which receives the archive values from the queue with the name **archivequeue** and inserts these into the MS Azure SQL storage. The table format corresponds to the classical SQL evacuation of an archive.

The cloud service must be displayed manually with the **AzureArchiveCloudService.cspkg** deployment package via the MS Azure configuration user interface. You can find the package in the following folder: **%ProgramData%\COPA-DATA\zenon8.00\CloudServices**.

Settings:

- ▶ **Zenon.ArchiveServiceBus.ConnectionString:** Corresponds to the MS Azure connection name in archive configuration (on page 35).

- ▶ **Zenon.ArchiveSQLServer.ConnectionString**: Denotes the name for the **MS Azure SQL storage** destination.

PROCEDURE

The archive files are read via an OLEDB connection and SQL SELECT statement. The OLEDB connection name therefore generally shows the same MS Azure SQL-Storage as in the output connection name (**Zenon.ArchiveSQLServer.ConnectionString**) in **AzureZenonArchiveWorker**.

10.2.5 CRATE.IO

A Crate database can be selected when evacuating archive data or during an SQL export of archive data.

INSERT

With an **INSERT** of the values, the **UNNEST** for Crate-specific SQL command is used. The values of the archive file are transferred block by block as strings in the process.

Requirements:

- ▶ The Crate version supports **UNNEST**.
- ▶ The data of a block is less than the maximum Query length of the database.

BLOCK SIZE SETTING

The block size (**Rows**) can be set in **project.ini**:

- ▶ Section: **[ARCHIV]**
- ▶ Entry: **CRATE_BLOCKSIZE=**
- ▶ Default: 10000

10.2.6 Conversion

If archives from zenon versions before 6.20 SP0 are used in a new version, the following columns must be added manually:

- ▶ **STRVALUE** in data table
- ▶ **GUID** in cross-reference list

The columns are either added to the database directly or via the dialog in zenon Editor.

To add the columns in the Editor:

1. Open the **Edit archive** dialog for each archive concerned.
2. Open the **Save** tab.
3. Open the dialog with the **SQL database** option.
4. Close the dialog by clicking on **OK**.

After closing the dialog the according changes in the database are performed.



Attention

If these changes are not performed, no archive data will be evacuated to the SQL database.

10.2.7 Troubleshooting

DUPLICATES

Duplicates cannot be evacuated to the SQL database due to the primary key!

Duplicates can occur with variables whose time stamp comes from a different device or by canceling when Runtime is ended.

EXTERNAL TIME STAMP

Duplicates can occur with variables whose time stamp comes from an external device.

For example: The controller sends special events shortly before a connection failure and repeats sending once the connection has been established again. Two entries with the same value and time stamp are then present.

Problem: The SQL export cancels during an attempt to evacuate data with duplicates.

Solution: Remove the duplicates before evacuation in the `Archive revision` screen.

CANCELING WHEN CLOSING THE RUNTIME

If an export to the SQL database is carried out when Runtime is ended, Runtime is only ended if the export has been completed. If Runtime is ended prematurely in this time period by means of the process desk or the task manager, the following status occurs:

- ▶ Part of the values are already in the SQL database
- ▶ However the archive file was not deleted

When Runtime is restarted, an attempt is made to evacuate the archive file that is still present to the SQL database.

Procedure:

- ▶ Originals are evacuated.
- ▶ If there are duplicates, these are not evacuated due to the primary key. The export is repeated on the next cycle. Duplicates are deleted in the process.

ODBC ERROR MESSAGE 80004005

The following error message is displayed for SQL evacuation:

Execute INSERT statement failed 1, hr=80004005

This indicates an ODBC-related error.

Solution:

Switch to an SQL server provider (on page 163).

10.3 RDA

More detailed information on the configuration and administration of the RDA archiving (on page 12).

10.3.1 PLC data format

Possible RDA data types are:

- ▶ BYTE
- ▶ WORD
- ▶ DWORD
- ▶ FLOAT

They depend on the drivers used in zenon.

Note: You can find out whether your driver supports RDA in the driver documentation.



Attention

No values from the future can be read in. Values can be in the future if the system times in the PLC and the computer are different. Ensure that the system times are always synchronized.

10.3.2 Description header

Parameters	Description
Index [0]	<p>RDA variable that has been added to the archive. Decides on the data type (for example BYTE, WORD, DWORD, FLOAT).</p> <ul style="list-style-type: none"> ▶ The size depends on the data type in zenon. ▶ The trigger flag is set to 1 by the PLC if values are to be obtained. Once zenon has obtained the data, the flag is automatically reset to 0 by the driver.
Index [1]	<p>Number of values that to be saved.</p> <p>32-bit Intel format. Set by the PLC.</p>
Index [2]	<p>Cycle time in milliseconds; is used for TYPE 1 and 4 .</p> <p>32-bit Intel format. Set by the PLC.</p>
Index [3]	<p>RDA type:</p> <ul style="list-style-type: none"> ▶ Type 1: Without time (is no longer used) ▶ Type 2: With time format 1 (is no longer used) ▶ Type 3: With time format 2 ▶ Type 4: Without time <p>32-bit Intel format. Set by the PLC.</p>
Index [4]	<p>Number of the most recent value. Should correspond to the value in Index [1].</p> <p>32-bit Intel format. Set by the PLC.</p>
Index [5]	<p>Contains data. The content depends on the type.</p> <ul style="list-style-type: none"> ▶ Type 3: Values ▶ Type 4: Time stamp.
Index [6]	<p>Contains data. The content depends on the type.</p> <ul style="list-style-type: none"> ▶ Type 3: Timestamp ▶ Type 4: Values
Index [etc.]	

10.3.3 Time stamp format

The time format is shown by an 8-byte long expression:

Byte	Corresponds to	Possible values
1	Year	e.g. 99, 100, 114, etc.

	Note: The time format starts with the year 1900 in a two-digit written form. 1900 = 00. Three digits are used from the year 2000 2000 = 100.	
2	Month	1 - 12
3	Day	1 - 31
4	Hour	0 - 23
5	Minute	0 - 59
6	Second	0 - 59
7	Hundredths of a second	0 - 100
8	reserved	-

10.3.4 Types

There are different types available for RDA archiving. The following are currently used:

- ▶ **TYP 3** (on page 171)
- ▶ **TYP 4** (on page 172)

Attention: Type 1 and type 2 can still be configured for compatibility reasons. However they are no longer used or documented.

Type 1 was replaced by type 4; type 2 was replaced by type 3.

TYP 3

Index	Description
Index [0]	RDA variable.
Index [1]	Number of values to be saved.
Index [2]	Is ignored. (cycle time in milliseconds.)
Index [3]	RDA type.
Index [4]	Number of the most recent value.
Index [5]	First saved value. Size: Depends on the zenon data type.
Index [6]	Time stamp for the first value. (for details, see time stamp format (on page 169)).
Index [7]	Second saved value. Size: Depends on the zenon data type.
Index [8]	Time stamp for the second value. (for details, see time stamp format (on page 169)).
Index [...]	[n-th value]

TYP 4

Index	Description
Index [0]	RDA variable.
Index [1]	Number of values to be saved.
Index [2]	Cycle time in milliseconds
Index [3]	RDA type.
Index [4]	Number of the most recent value.
Index [5]	Time stamp. For details, see time stamp format (on page 169). First saved value. Size: Depends on the zenon data type.
Index [6]	Saved values. <ul style="list-style-type: none"> ▶ Value 1 ▶ Value 2 ▶ Value 3 ▶ Value 4 ▶ etc.

10.3.5 Note:

Note the following for RDA archiving:

- ▶ The transfer of data takes time. With a trigger event, it is possible, depending on the number of values, that there is a transfer time of several seconds.
- ▶ In redundancy operation, the longer transfer time may result in a server that is currently reading an RDA file not being able to synchronize completely due to a fault. The Server that is to take over would read the RDA archive once again, because the trigger in this case has not yet been set to 0.
- ▶ With TYPE 4, in contrast to TYPE 3, only the starting time is transferred.
- ▶ The zenon RDA mechanism needs a coherent block in the controller that can be addressed with an offset. RDA is therefore generally not possible for drivers with symbolic addressing. There is a workaround available for some symbolically-addressable drivers. You can find an example afterwards under **Example of a data type declaration in accordance with IEC 61131-3**. You can find details in the respective driver documentation.

Note: Variables configured with "**Only request from Standby Server**" are not supported in RDA archives.

EXAMPLE OF A DATA TYPE DECLARATION IN ACCORDANCE WITH IEC 61131-3

RDA-TYP 3:

```

TYPE RDA_DATA_3 : (* Structure for RDA type 3 payload *)
STRUCT
Value : DINT; (* value
TimeStamp : ARRAY[0..7] OF BYTE; (* Time stamp (year, month, day, hour, minute, second,
1/100th second, reserve) *)
END_STRUCT
END_TYPE

```

```

TYPE RDA_3 : (* Structure for RDA type 3 *)
STRUCT
Trigger : DINT; (* trigger variable *)
Count : UDINT; (* Number of data sets *)
Cycle : UDINT; (* Cycle time in [ms] (only relevant for type 1 and 4 *)
RDA_Type : UDINT; (* RDA type, 1 - 4 *)
Oldest : UDINT; (* Index of the oldest value (placeholder for compatibility reasons, only
relevant for type 1) *)
Data : ARRAY[0..19] OF RDA_DATA_3; (* payload *)
END_STRUCT
END_TYPE

```

RDA-TYP 4:

```

TYPE RDA_4 : (* Structure for RDA type 4 *)
STRUCT
Trigger : DINT; (* trigger variable *)
Count : UDINT; (* Number of data sets *)
Cycle : UDINT; (* Cycle time in [ms] (only relevant for type 1 and 4 *)
RDA_Type : UDINT; (* RDA type, 1 - 4 *)
Oldest : UDINT; (* Index of the oldest value (placeholder for compatibility reasons, only
relevant for type 1) *)
TimeStamp : ARRAY[0..7] OF BYTE; (* Time stamp of the first value (year, month, day, hour,
minute, second, 1/100th second, reserve)) *)
Data : ARRAY[0..19] OF DINT; (* Payload *)
END_STRUCT
END_TYPE

```

10.4 Archiving in the zenon network

Archiving is integrated into the zenon network.

The network functionality of zenon makes it possible to implement projects as distributed on different computers and to create complex network constellations very efficiently. In doing so, project constellations can also be thought out in such a way that certain project content is only visible at a certain location (a certain computer) for an activity. The zenon Editor supports users in creating and configuring such constellations.

This network functionality can also be executed redundantly. This guarantees additional security for data and against failure.



Information

You can find out further information in the Network manual.

10.4.1 Behavior in the network

Archiving is carried out on the Primary Server.

The Primary Server synchronizes the archive data with the Standby Server and responds to requests from the Clients (such as calling up an `Extended Trend`. screen).



Information

If the Standby Server takes on the role of the Primary Server after the failure of the previous Primary Server, the missing data in the AML, CEL and archives is filled. The missing data comes from the internal buffer of the Standby Server. This buffer is supplied with values by drivers.

REDUNDANCY SWITCHING

With redundancy switching, there may be a delay in switching by the zenon Historian module.

If variables from a different project are archived in an archive, the starting behavior of Runtime in the zenon network changes. In this case, the archives are only started once all projects have been loaded.

As a result, it is ensured that all variables to be archived are detected before the archiving starts and that the computer takes on the role of the Primary Server.



Example

zenon Runtime is started on a computer that has been configured as **Server 1** or **Server 2** during project setup.

- ▶ Runtime starts in the role of the Standby Server.
- ▶ All projects are loaded.
- ▶ The archiving is compared.

These steps are carried out regardless of the current role or evaluation of the computer.

Only once these steps have been completed is redundancy switching carried out - if necessary.

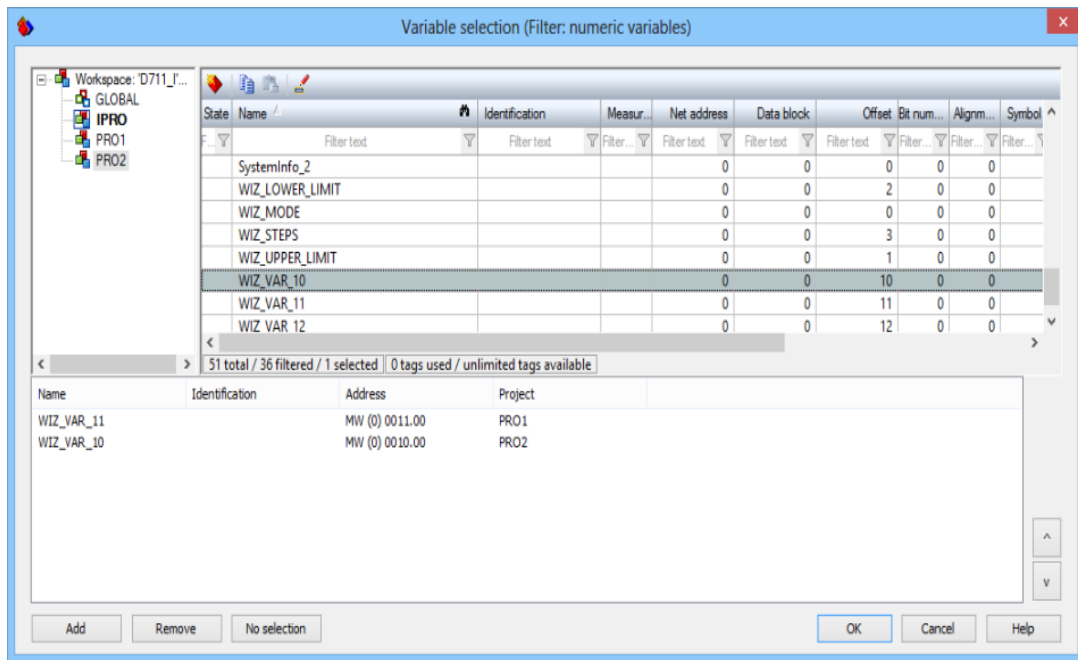
10.4.2 Multi-Project Administration

Values of variables of different projects of the workspace can be recorded in an archive. The values recorded in this way can be filtered, displayed in list form or trend form, and they can be printed or exported just like data from normal archives.

EXAMPLE OF ARCHIVE

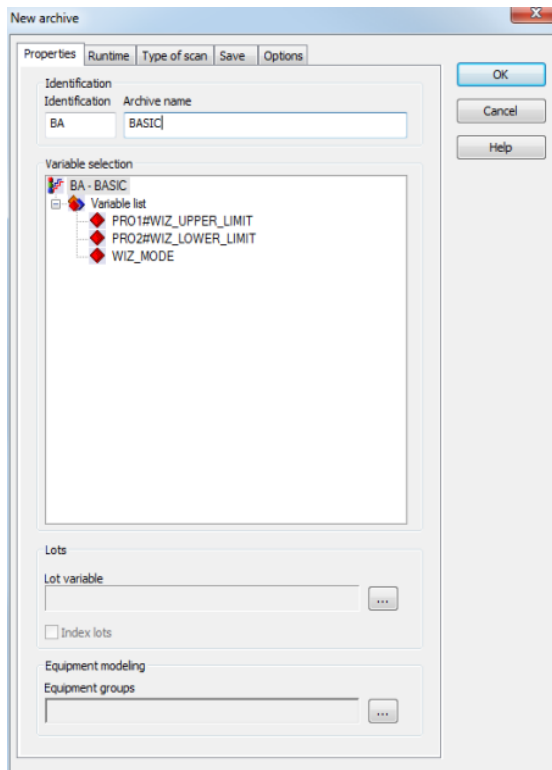
1. In the project **I_{PRO}** open the node **Historian**.
2. Create a new archive named **BA - BASIS**.
3. Open the context menu of **RECIPE1** and select **Add variable**.

4. The dialog for selecting variables is opened



5. Here, you can select not just variables from the `IPRO`. To select variables from other projects:
- In the left list area of the project, select a project from the tree view of the workspace.
The variables of the selected project are shown in the main area.
 - Select the desired variable with a mouse click.
6. Select variables from `PRO1` and `PRO2`.

7. The project name is written in front of the variable name in the archive variable list.

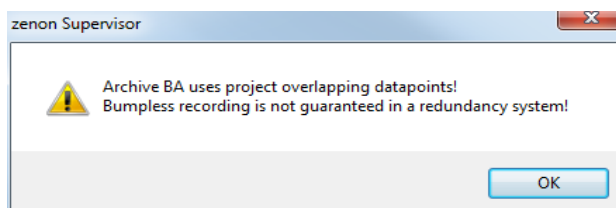


Attention

zenon does not check in the Editor to see if the network structure in Runtime actually allows access to the selected project and its variables.

*For example, in the Editor, in project **PRO1**, a variable from the integration project can be selected. This connection only works in Runtime if the integration project has also been started. This connection will not work on a computer on which only project **PRO1** has been started (start project).*

After the selection of variables has been concluded, a warning dialog indicates that seamless recording is guaranteed under all circumstances.



EXAMPLE

- ▶ The project **PRO1** is executed redundantly; one computer is the Primary Server, a second computer is the Standby Server.
- ▶ The same applies for the **PRO2** project.

- The integration project with the subordinate projects PRO1 and PRO2 is started on a third computer. This is the client for all sub projects.

If variables of the projects PRO1 and PRO2 are now archived in the integration project, then the computer receives the data in relation to the network from the respective Primary Server of PRO1 and PRO2.

If, for example, the Primary Server of PRO1 fails, for the time period until the Standby Server of PRO1 has taken over the Server role, there would be alternative values in the archive for variables from PRO1.

Note: The Standby buffer of seamless redundancy only saves variables of the project for which the computer has been configured as one of the two servers.

Solution: In order to ensure recording without interruptions, the archiving must be local in a redundantly-executed subproject.



Information

You can find further information on archives in the client-server model of the zenon network in the Network manual, in the Client-Server Model, Multi-Project Administration and Archives chapters.