zenon manual

Historian

v.7.20

Contents

1. Welcome to COPA-DATA help

GENERAL HELP

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

PROJECT SUPPORT

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

LICENSES AND MODULES

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

2. 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:

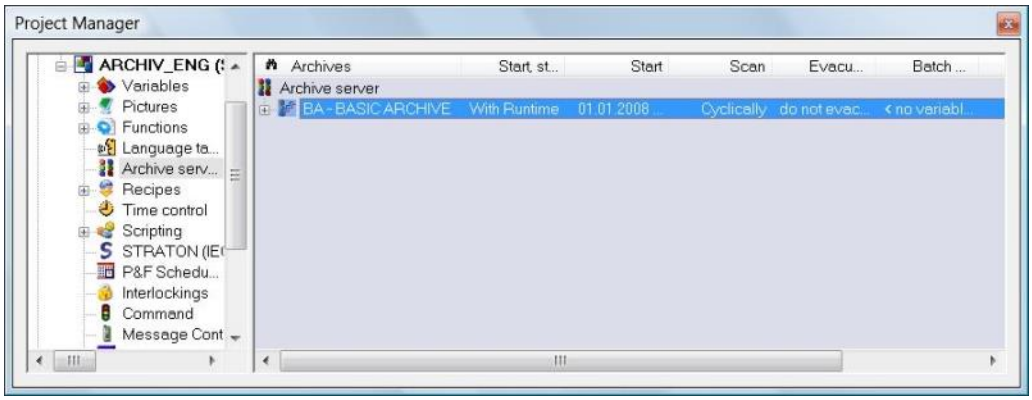
- **`Archivserver Starter Edition`** (on page 9): function-limited base version
- Historian licensed version (on page 8)

License information

Must be licensed for Editor and Runtime (standalone, server, standby).

Note: The function-limited ***`Archivserver Starter Edition`*** *is already included in the standard license.*

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 120) 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.

TIME

Archive use local 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 141), time and RDA (on page 151) types in the **`Further information`** (on page 141) 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 the 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 (on page 71)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:

- **Cyclical**:
  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 27).
- **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 recored 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 type of hysteresis that is available 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 the 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	For each archive, there are files in which the defined number of archive cycles can be kept. 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	Archive export saves archives with time filters in the following standard file formats: ▸ ASCII ▸ dBase ▸ SQL ▸ XML For this, the following applies: ▸ Files can be stored locally and in the computer in the 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 96) and Close archive (on page 98) 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.
For example: For a controller with communication in the event of a value change, values should be archived in a time period <100 ms. zenon allows a minimum of 100 ms. In this case, the values are collected from the controller and read as a block using RDA.

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

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 152)) 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 151) chapter in the **Further information** (on page 141) 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 155) chapter.*

5. Archiving concept

In principle, up to 1296 different archives can be open for each project. This number results from the possibilities for naming the short description: Two alphanumeric characters (A-Z, 0-9) result in 36^2 archives. 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 used
  - at what intervals
  - via which driver/protocol
  - for what purpose
- What data should be used
  - 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: Foe 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 larger time periods need to be displayed, large archives need to be read in Runtime. All values are 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 `hysteresis` for fluctuating values. 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 change` recording type if absolutely necessary.
  Note that the recording of each change can lead to very large amounts 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 XML all`	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

Parameters	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	If you entered the list via function **linked elements**, the symbol leads back to the start element. Only available in the context menu when all linked elements are opened.
Delete	Deletes the selected archive.
Export selected 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 changed archives.
Export XML all	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 60) to create a template for aggregated archives.

Import template	Opens the dialog (on page 56) to import a template for aggregated archives.
Delete	Deletes the selected archive
Export selected 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 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 assistants** option in the `Options/settings` menu of the Editor must be activated.

To create a new archive with the assistant:

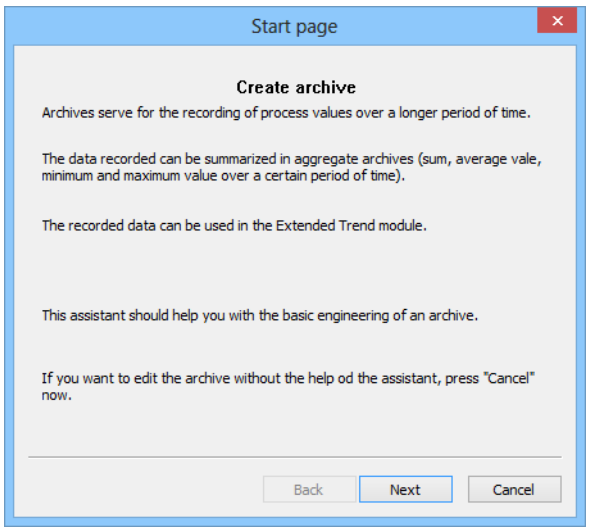
1. Ensure that the **Use assistants** option has been activated.
2. Navigate to the `Historian` node.
3. Select `New archive` in the context menu or in the tool bar.
4. The assistant is started. Follow the steps in the Assistant (on page 22).

To create a new archive individually:

1. Navigate to the `Historian` node.
2. Select `New archive` in the context menu or in the tool bar.
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 27) 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.



Parameters	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).

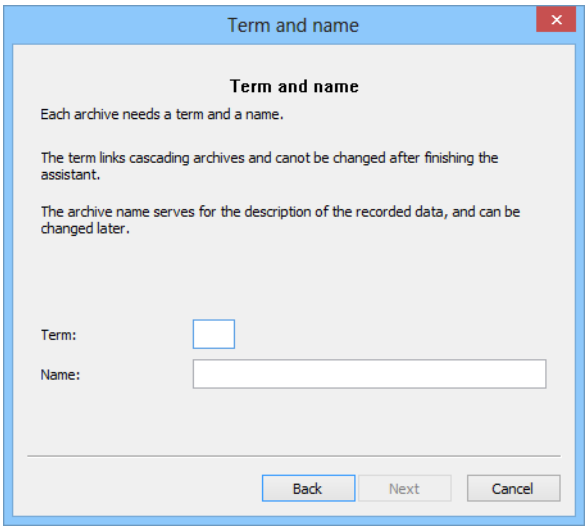
If you want to configure the archive without the help of the wizard, click on **Cancel**.

If the assistant is not displayed, then:

1. Open the **Options** drop-down list in the Editor
2. Select **Settings**
3. Activate, in the **Settings** tab, the **Use wizard** option

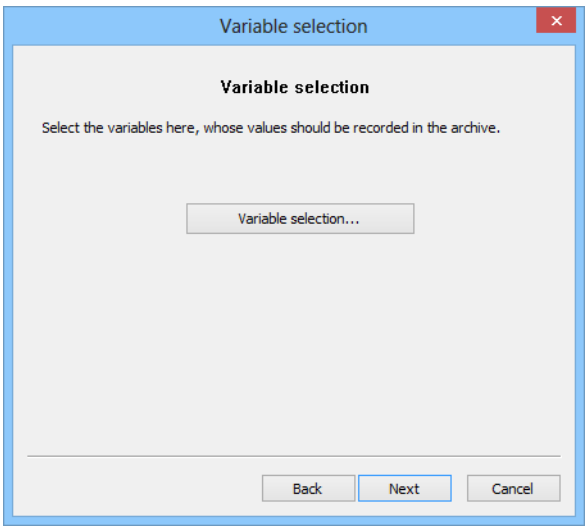
CONFIGURATION WITH THE WIZARD

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.



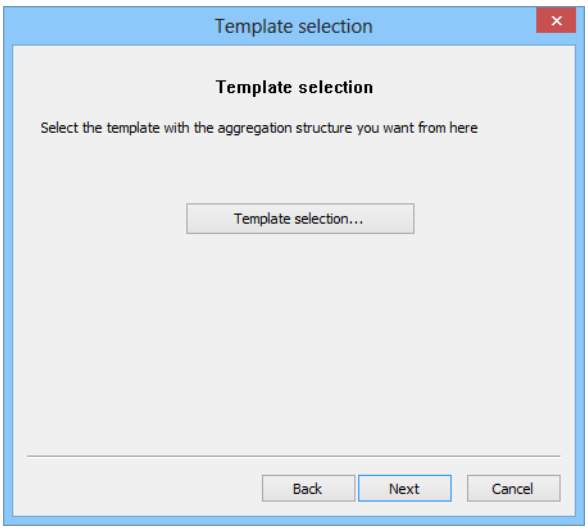
a) Click on the **Variable selection** button.

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 55).

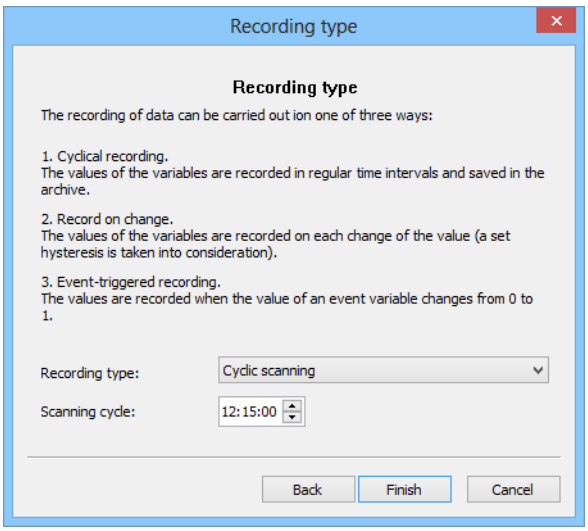
- Templates can only be imported for base archives with cyclic scanning. These archives cannot have any aggregated archives yet.
- The dialog is only opened if at least one template is present.

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.

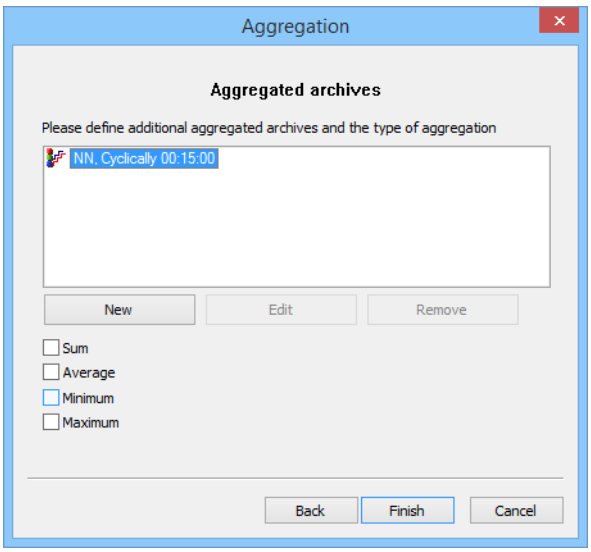
6. Configure the type of recording if you have not selected a template in the previous step.



Selection of recording type from drop-down list.

7. Click on **Next**.

Configure new aggregation archives if you want to.



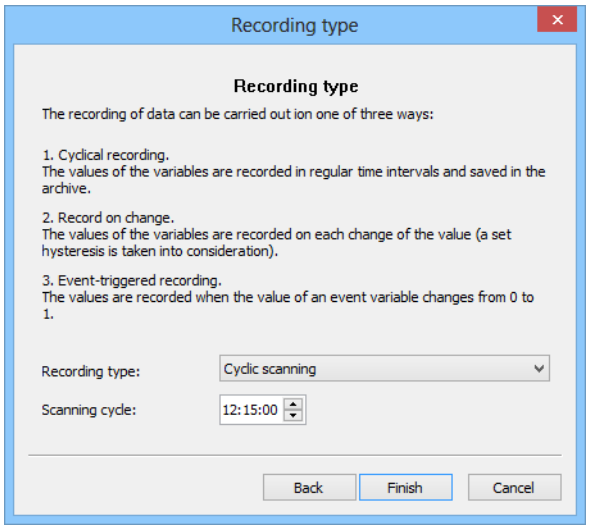
a) Click on **New** to create a new aggregation archive or on Edit to change the name of an existing archive.

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



Parameters	Description
`Cyclic scanning`	Set the **Cycle time**.
`Record on change`	Configure: ▸ Possible saving of the process image ▸ The initialization value if required
`Event-triggered recording`	Configure: ▸ An event variable by clicking on the . . . button ▸ the timestamp ▸ The initialization value if required

For details see recording type (on page 33) 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:

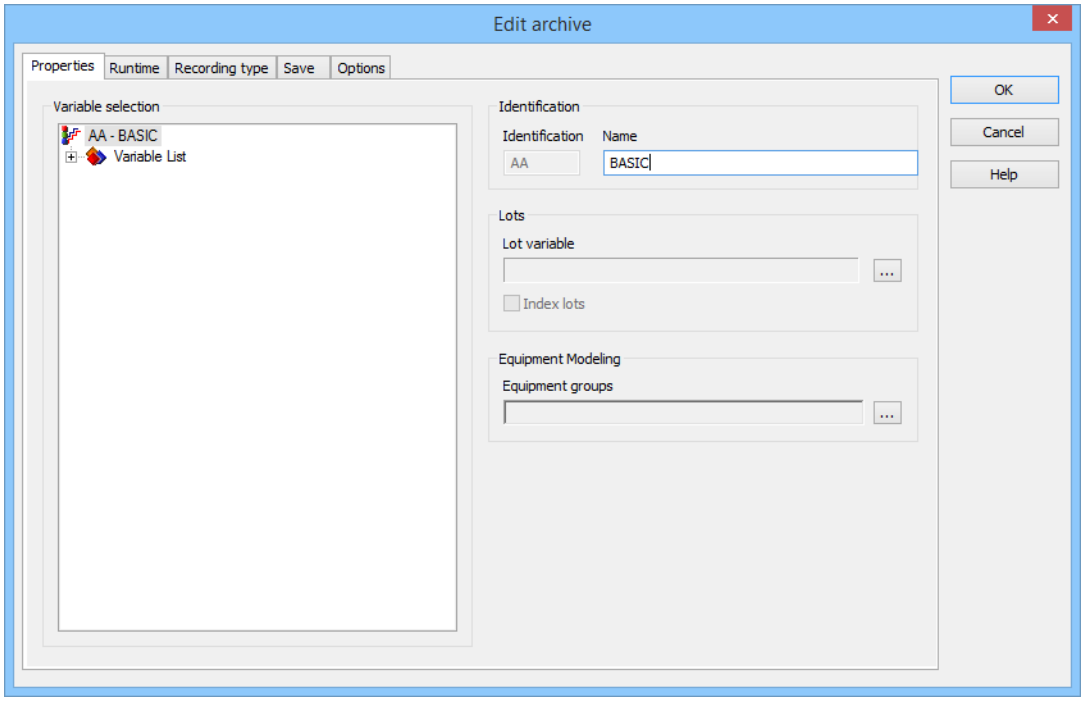
1. Highlight the desired archive
2. Select **`Edit archive`** in the context menu or in the toolbar, or press the `Enter` key
3. The dialog to configure an archive is opened

Note: This dialog is 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.



DESCRIPTION

Parameters	Description
`Description`	Name and identification of the archive.
Identification	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 Attention: The identification can only be issued when creating a new archive. It cannot be changed afterwards. 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.
Archive name	Freely-definable name of the archive. Note: The following characters are not permitted: `/ \ : * ? < > ! | " ' # % @`
`Variable selection`	Display and configuration of the variables that should be taken into account in this archive. ▸ 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. Note: Seamless redundancy is only supported for variables that come from the same project as the archive.

LOTS

Parameters	Description
`Lots`	Configuration of lots. See also the **Lot archiving** (on page 67) chapter.
Lot variable	Selection of lot variables. These must be `string`-type variables. The value of the variable is used as lot name. Click on the `...` button to open the dialog for selecting the variable. 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.

Index lots	`Active`: The lot values of this archive are automatically indexed. This allows quicker access to the lot values. Lots can also be indexed in Runtime with the **Index archive** function.

EQUIPMENT MODELING

Parameters	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

Parameters	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.

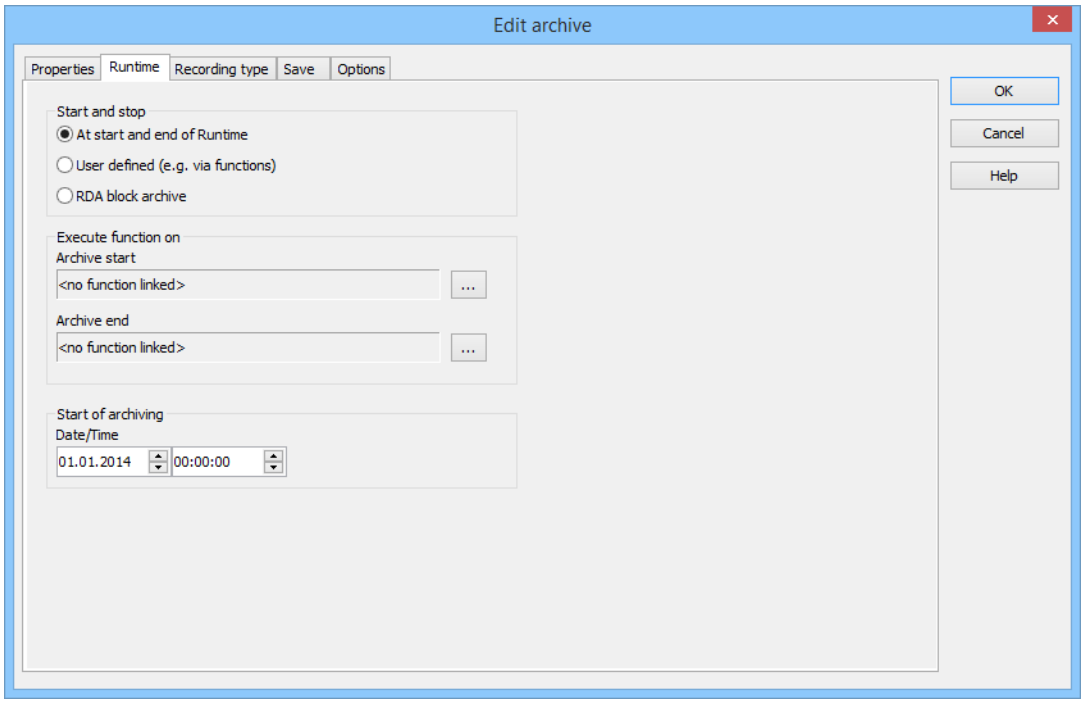
Information

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

Variable from sub-projects can also be used for lot variables (lot archiving (on page 67)) and the event variable.

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.



START AND STOP

Parameters	Description
`Start and stop`	Selection of how archives are started and stopped in Runtime.
At start and end of Runtime	The archive is automatically started and stopped with the Runtime. 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. Attention: If you activate this setting, the archive must not be stopped or started using functions (on page 71). This can cause unwanted behavior in Runtime.
User-defined (e.g. via functions)	The archive is started and stopped as defined by the user. For example, by using the Start an archive (on page 96) and Stop an archive (on page 98) functions These functions can be triggered: ▸ manually by the user ▸ by events ▸ by time control Attention: These functions do not correspond to those of the settings for **`Execute function on`**.
RDA block archive	The archive is administered via RDA (on page 13). In doing so, archived values are read off in the control unit and saved in an archive. This is triggered by a trigger variable.

EXECUTE FUNCTION ON

Parameters	Description
`Execute function on`	Selection of functions that are to be executed when the archive is started and ended. 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.
Archive start	Selection of a function that is to be carried out when the archive is started.

ARCHIVE END

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

START OF ARCHIVING

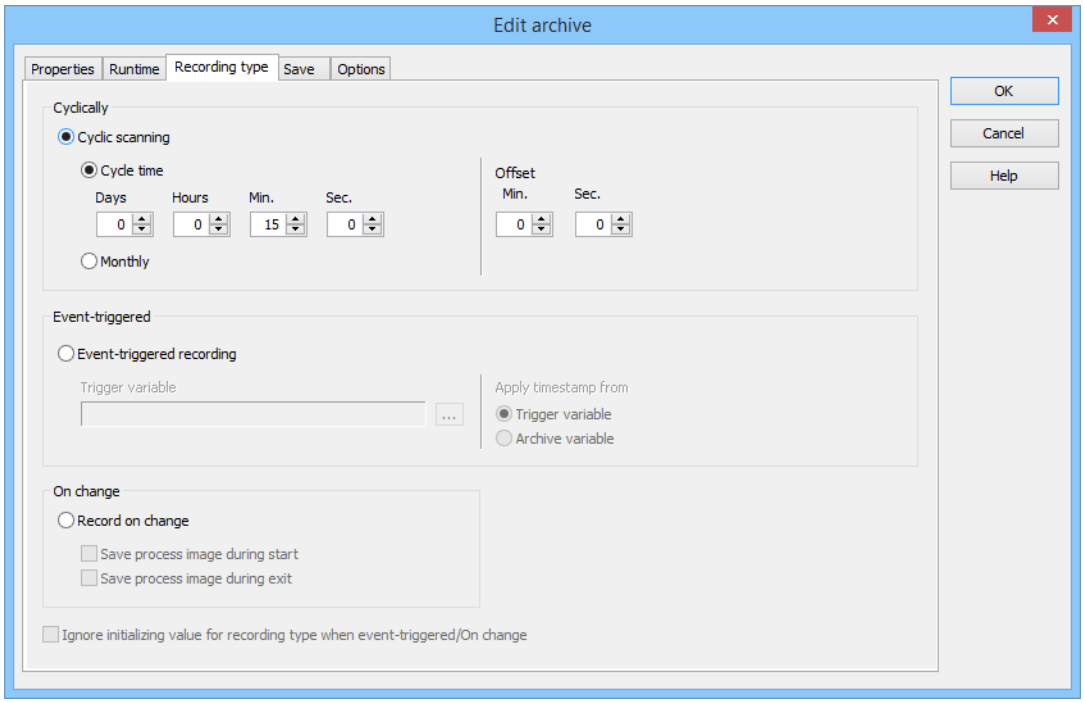
Parameters	Description
`Start of archiving`	Stipulation of the start time.
Date/Time	Definition of the start time for the scan and save cycle. The set time defines the first save time of the files that are to be archived. It is used as the basis of calculations for the set save cycles. Example: You define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

Parameters	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

Parameters	Description
`Cyclically`	Settings for cyclic recording. The cycle is freely selectable. However it is closely related to the save cycle (on page 36). 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. Note: The value for milliseconds is automatically set to `0` in the time stamp.
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	Define how long the archive is active and how long the requested values should be waited for. This setting is important if an archive is closed directly after reading the last value. The offset is primarily needed for slower drivers. It does not have any influence on the time stamp of the values. Note: The offset must always be smaller than the cycle time.

EVENT-TRIGGERED

Parameters	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	Definition of how the time stamp is set. It can be accepted from: ▸ **Trigger variable** ▸ **Archive variable**

ON CHANGE

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

EVENT-TRIGGERED/ON CHANGE

Parameters	Description
Event-triggered/On change	
Ignore initializing value	If a variable is read for the first time, an initialization value can be entered. This happens, for example, when Runtime is started or if a Server 2 upgrades to Server 1. ▸ Active: The initialization value is not taken into account in the archive. ▸ Inactive: The initialization value is taken into account. The starting and switching by the server is entered.

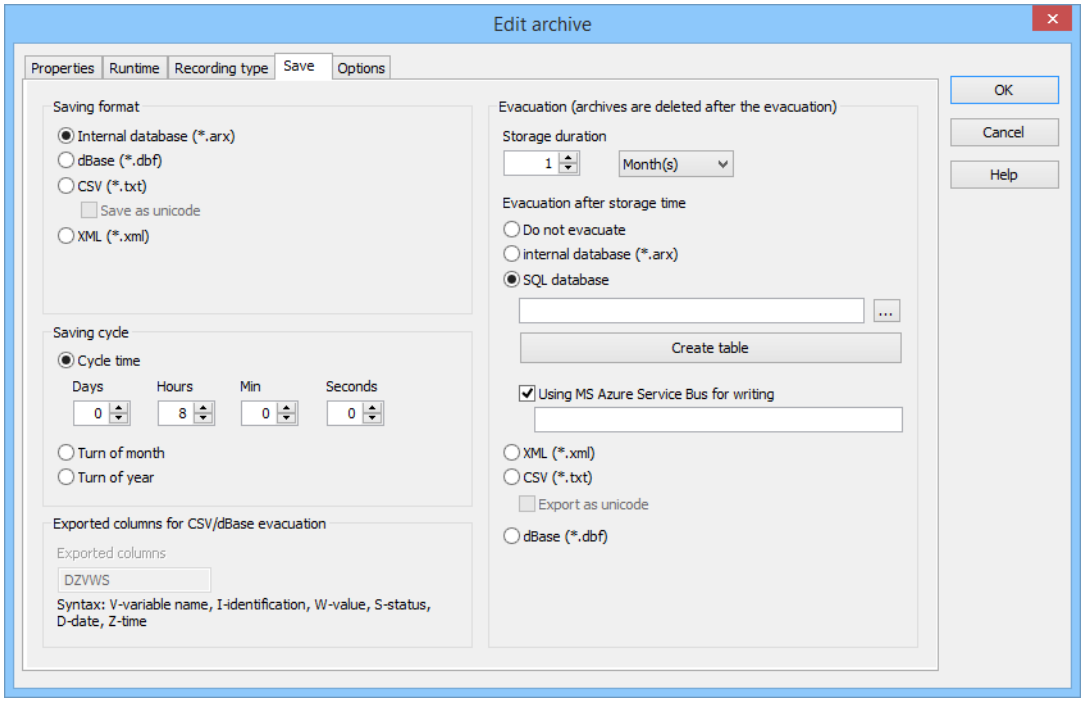
CLOSE DIALOG

Parameters	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.*



SAVE OPTIONS IN THE DIALOG

SAVING FORMAT

Selection of how archives are saved.

Parameters	Description
internal database (*.arx)	`Active`: Data is available for subsequent editing and evaluation in a ring (FIFO). The data is initially stored in the following 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 33) in Runtime. For details, see **`Cycles in Runtime`** (on page 136).

Parameters	Description
Cycle time	`Active`: The length of the archives is defined in days, hours, minutes and seconds. 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). define the values for: ▸ **Days** ▸ **Hours** ▸ **Minutes** ▸ **Seconds** Note: These values also have an effect on user-defined archives. These are used to calculate the number of archives to be archived. Recommendation: Values greater that `30 seconds`.
Turn of month	`Active`: The archive is saved each time the month changes (monthly archive).
Turn of year	`Active`: The archive is saved each time the year changes (annual archive).

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.

Parameters	Description
Storage duration	Define the duration of storage for the archive before it is evacuated. Granularity - Hours - Days - Months - Years A maximum of 65535 archive files can be stored. 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. Examples: - Cycle time: 1 second maximum storage time 18 hours. - Cycle time 1 minute maximum storage time 1092 hours or 45 days or 1 month.

	Attention: No archive is saved if the value 0 is entered. The only existing archive is the current one.
Evacuation after storage time	Setting the evacuation method.
Do not evacuate (archives are deleted)	Active: Archives are deleted after the **duration of storage** has expired.
internal database (*.arx)	Active: Archives are evacuated in the ***.arx** internal database format. If the number of the archives, that want to be evacuated 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.
SQL database	Active: Archives are evacuated to an SQL database. Selection of database. Click on the **...** button to open the dialog to select and configure a database. Databases can also be evacuated in the MS Azure service bus. In contrast to dBase, ASCII or XML archives evacuated into an SQL database are automatically reloaded when necessary (e.g. for Extended Trend). Attention: Archives evacuated to SQL can be read in zenon but it is no longer possible to write to them. You can find details on evacuation to SQL databases in the **Evacuating archives to an SQL database** (on page 144) in the **Further information** (on page 141) section.
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	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. The connection name for the MS Azure service bus must be entered in the field under the option. For details, read the **Further information** (on page 141) section in the **MS Azure service bus** (on page 148) chapter.
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:	With the two evacuation options **dBase** and **CSV**, certain parameters of archived variables can also be evacuated. Enter the desired parameters into the text field in this sequence: ▸ V: Variable name

	▸ `I`: Variable identification ▸ `W`: Value ▸ `S`: Status ▸ `D`: Date ▸ `Z`: Time Default: `DZVWS`

The path for the save location of the evacuation files is configured using the **General/File storage** project property. SQL evacuation (on page 144) 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.

CLOSE DIALOG

Parameters	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=**

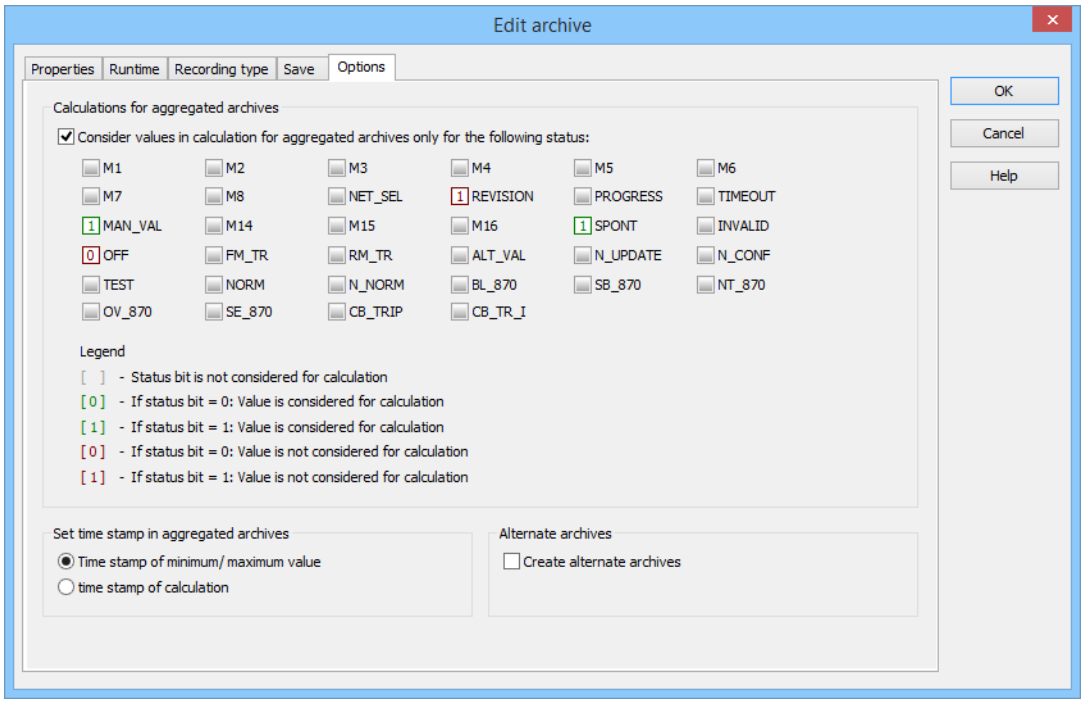
FILE NAMES

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

Parameters	Description
XXYYMMTThhmmss.xxx	File name
XX	Short archive description
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

Parameters	Description
`Calculations for aggregated archives`	
Only accept values in the aggregated archive calculation if the following status filter is true	`Active`: Activated status bits are taken into account for the calculation of values of aggregation archives. The additional statuses are ▸ shown in the archive editor ▸ Shown in the report and can also be set there For the definition of the status, see the Status processing chapter: Each status bit can have one of 5 possible states: ▸ `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`. Note: If the checkbox is activated, at least one status bit must be activated.

SET TIME STAMP IN AGGREGATED ARCHIVES

Parameters	Description
`Set time stamp in aggregated archives`	
Time stamp 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

Parameters	Description
`Alternate archive`	
Create alternate archives	Behavior if Runtime is not active: ▸ `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

Parameters	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 illustration 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 scanning**
- **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
07.12.2013	03:08:13	**xx80131207020900.arx**
07.12.2013	03:08:26	**xx80131207020900.arx**
07.12.2013	3:08:39 AM	**xx80131207020900.arx**
07.12.2013	3:08:52 AM	**xx80131207020900.arx**
07.12.2013	3:09:13 AM	**xx80131207021000.arx**
07.12.2013	3:09:26 AM	**xx80131207021000.arx**
07.12.2013	3:09:39 AM	**xx80131207021000.arx**
07.12.2013	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, 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:

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

SSC	AZ ->	EZW;	ASZr + AZ =	EZW
XX:XX:XX	1T 00:00:00	`00:00:00;`	00:00:00 + 00:00:00	`00:00.00`
00:01:00	0T 23:59:00	`23:59:00;`	00:00:00 + 23:59:00	`11:59:00 PM`
12:30:00 AM	0D 00:30:00	`01:00:00;`	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	2D 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:

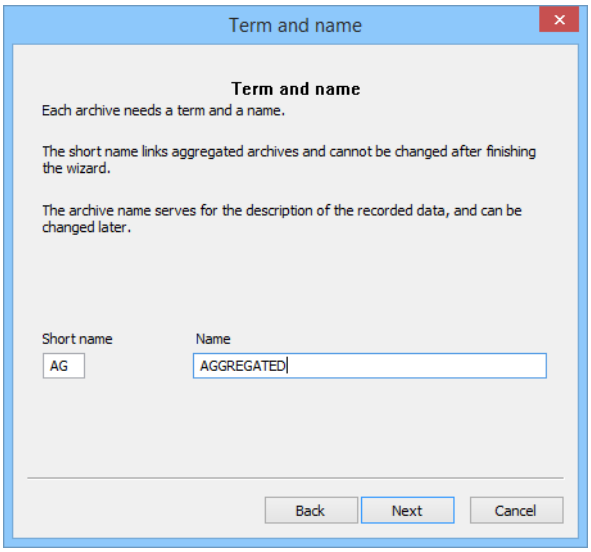
- Sum
- Average
- Minimum
- Maximum

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.

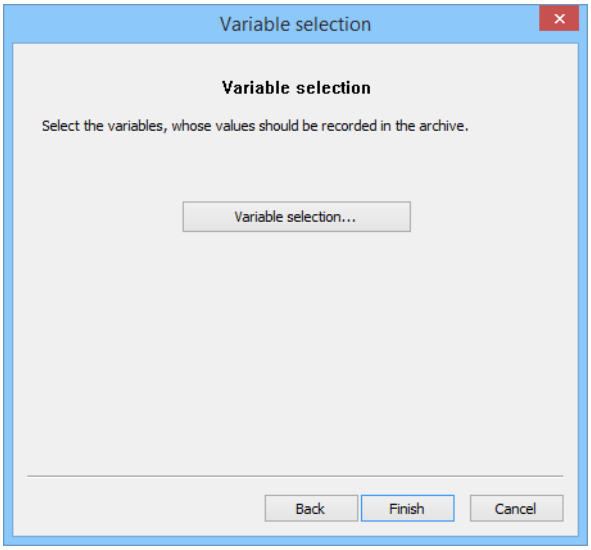
CREATING AN AGGREGATION ARCHIVE

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 tool bar or in the context menu
3. The assistant is started provided it is activated in the options.
   (in order for the assistant to be able to be started, the **Use assistants** option must be activated in the Editor in the **`Options/settings`** menu)
4. Please define a name!



5. Select the Variable and the method (on page 51) of aggregation.



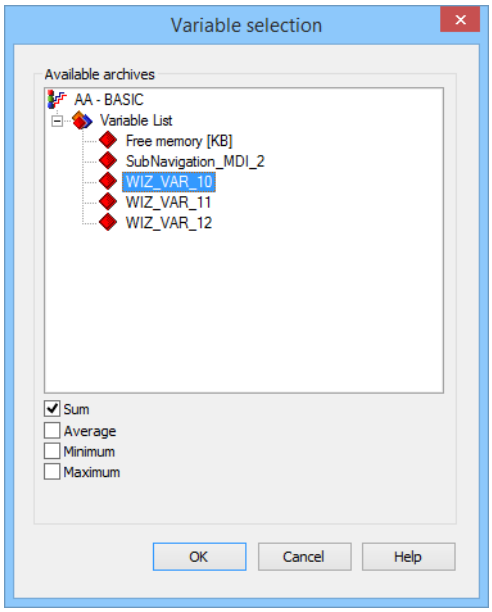
Click on the **`Variable selection`** button to open the dialog (on page 51) to select a variable and the aggregation method.

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

Parameters	Description
Available archives	Select, from the variable list, the variables that should be taken into account in the aggregated archive. Multi-select with `Ctrl` or `Shift`.
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

Parameters	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.

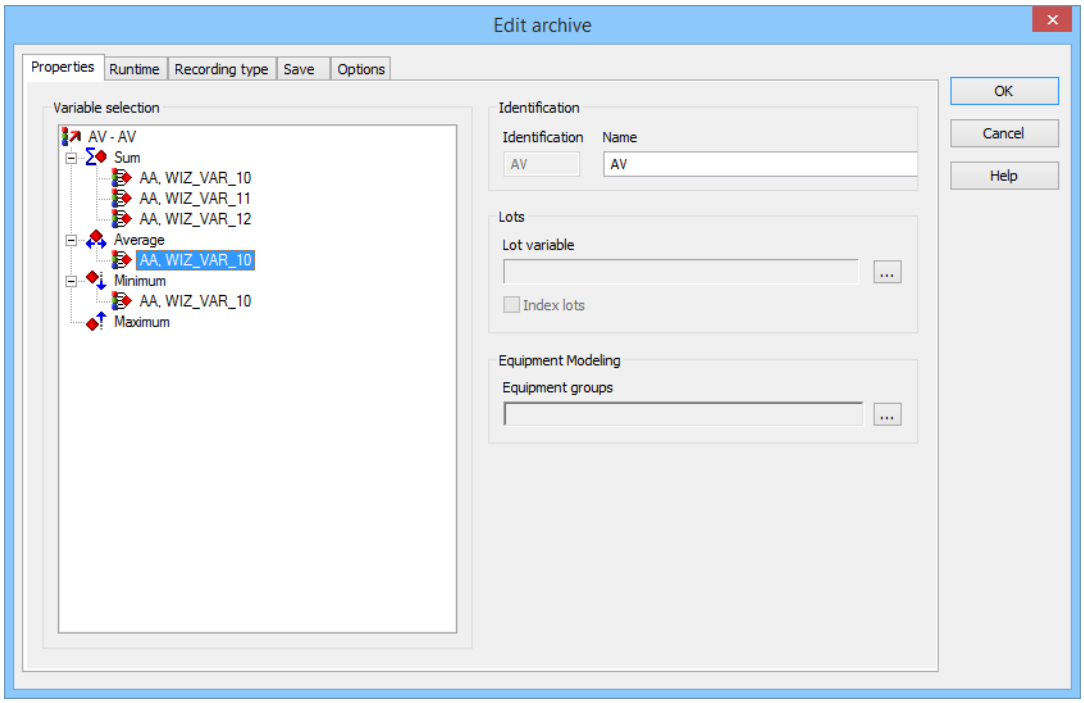
SOLUTION

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 **`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.



DESCRIPTION

Parameters	Description
`Description`	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

Parameters	Description
`Variable selection`	Select the calculation method in the archive and and add variables to it or remove variables that are to be taken into account in the aggregation archive. Multi-select with `Ctrl` or `Shift`. ▸ **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. Adding or deleting variables: ▸ 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

Parameters	Description
`Lots`	Configuration of lots. (See also chapter **Lot selection** (on page 67) .)
Lot variable	Selection of lot variables. These must be `string`-type variables. The value of the variable is used as lot name. Click on the `...` button to open the dialog for selecting the variable. 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.
Index lots	`Active`: The lot values of this archive are automatically indexed. This allows quicker access to the lot values.

EQUIPMENT MODELING

Parameters	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

Parameters	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 27).

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 57) available that are supplied with zenon. In addition, individual configurations (on page 60) 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\zenon7.20plates\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

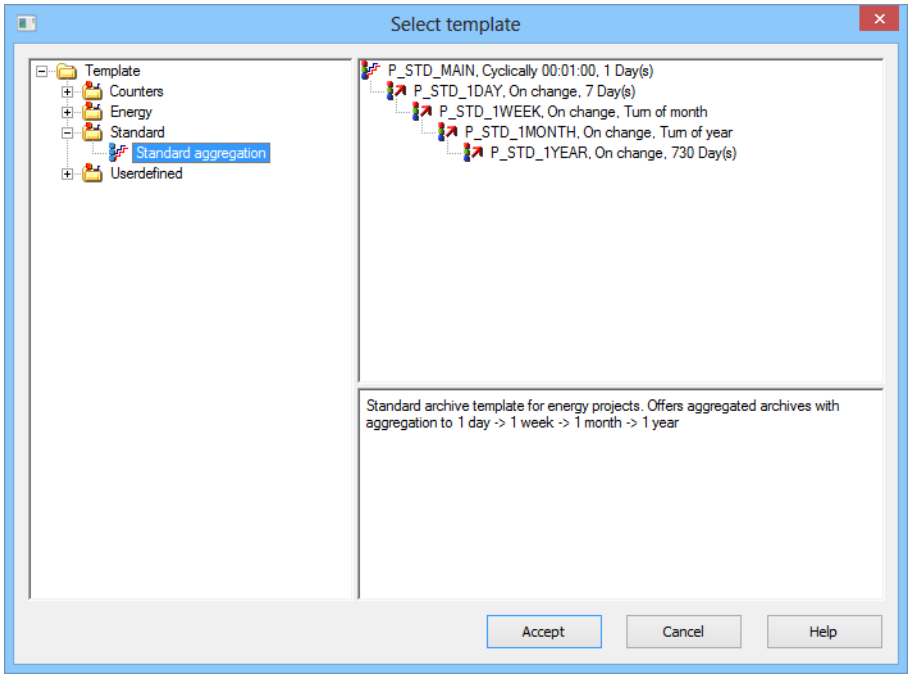
Importing templates

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.



Parameters	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

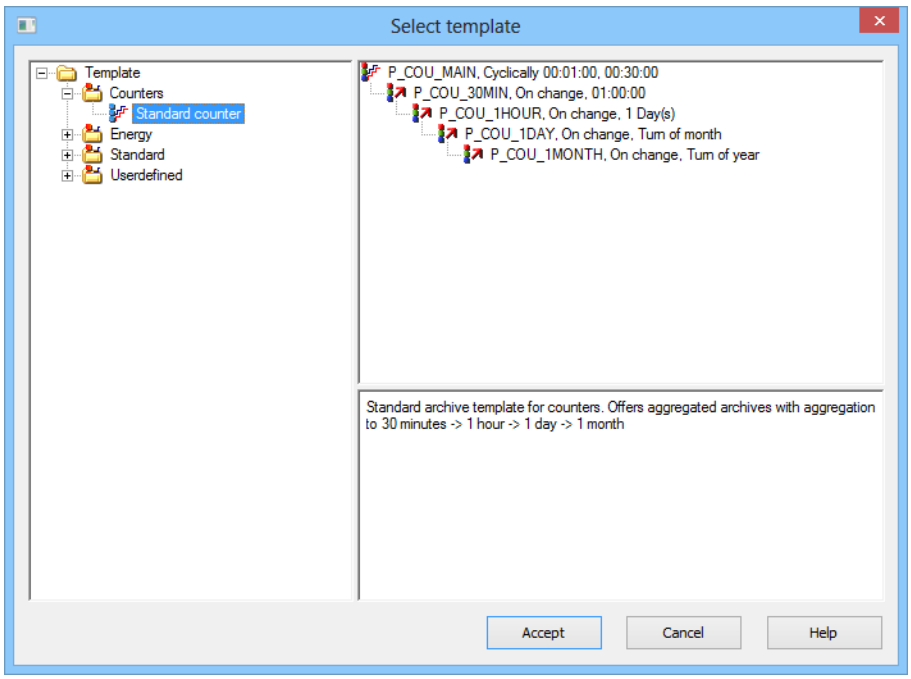
The following pre-configured templates are supplied with zenon:

- 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.

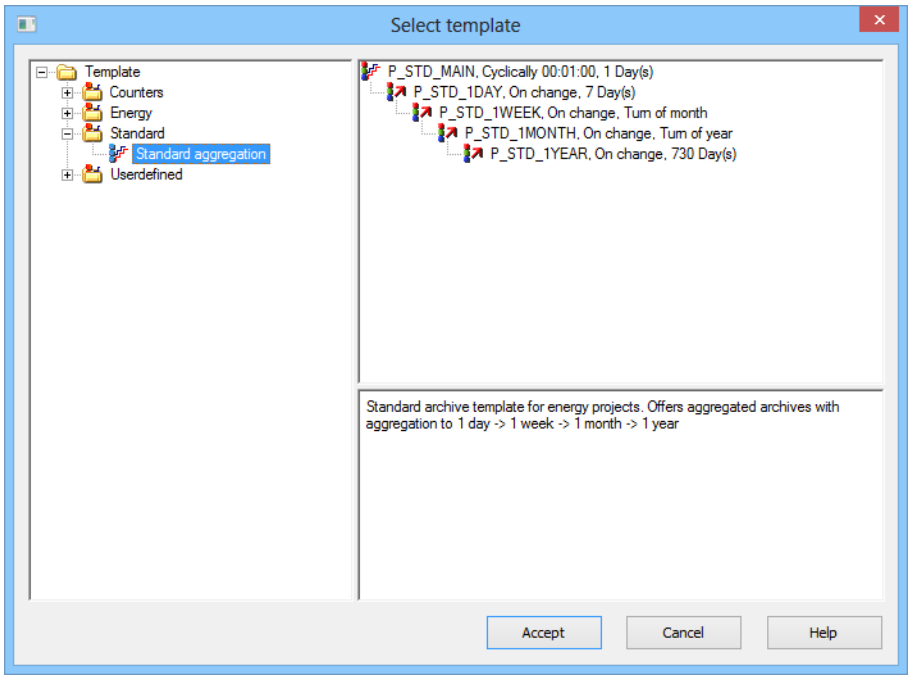
Supplied templates are write-protected and cannot be changed. They are shown in the dialog with blue symbols. Self-created templates have red symbols.

AGGREGATED ARCHIVE COUNTER



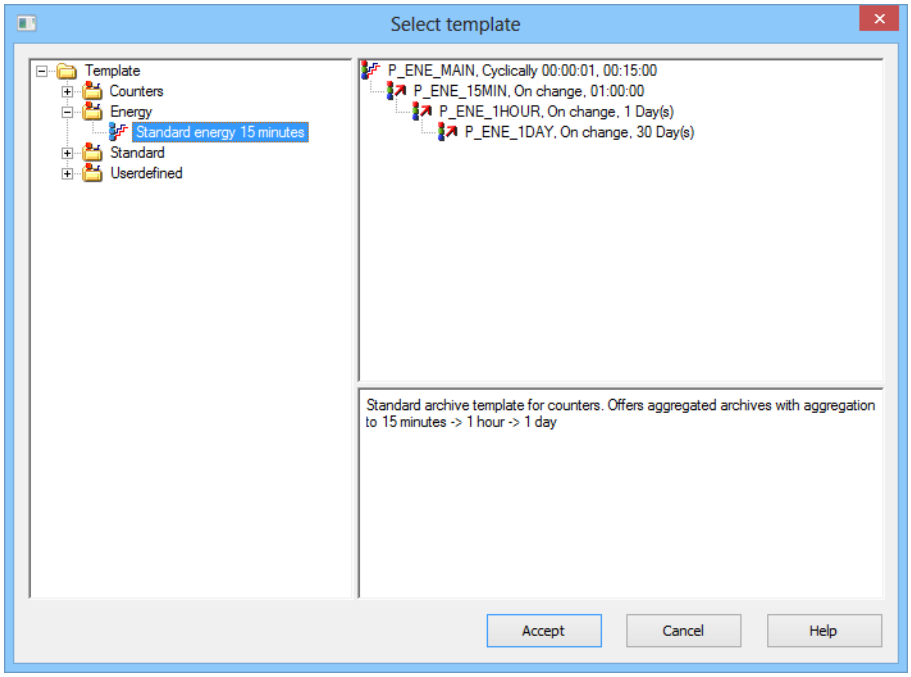
Archive level	Current aggregation level	Aggregated archive aggregation level	Storage
1: CO-P_COU_30MIN	30 minutes	1 hour	14 days
2: C2-P_COU_1HOUR	1 hour	1 day	6 months
3: C3-P_COU_1DAY	1 day	When the month changes	3 years
4: C4-P_COU_1MONTH	1 month	When the year changes	10 years

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, and not present for aggregated archives.

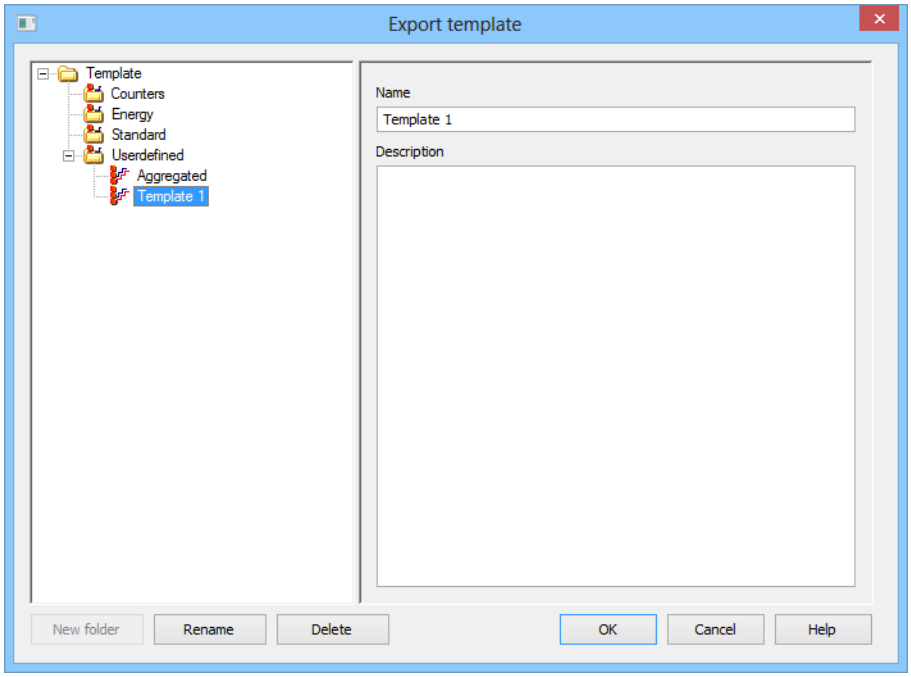
To create a separate template:

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



Parameters	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: `Ins` key.
Rename	Opens the highlighted element for editing. Keyboard operation: `F2` 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: `Del` 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 and/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

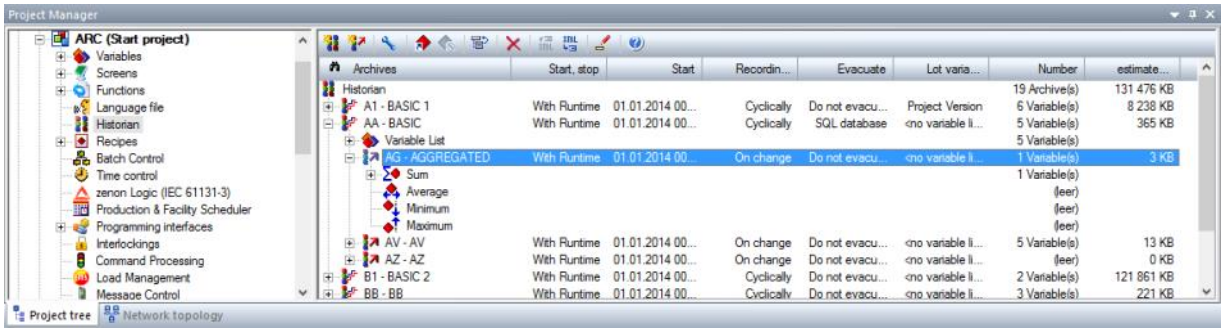
EDIT FOLDER AND TEMPLATES WITHOUT ACCEPTING THE ARCHIVE SETTINGS

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:

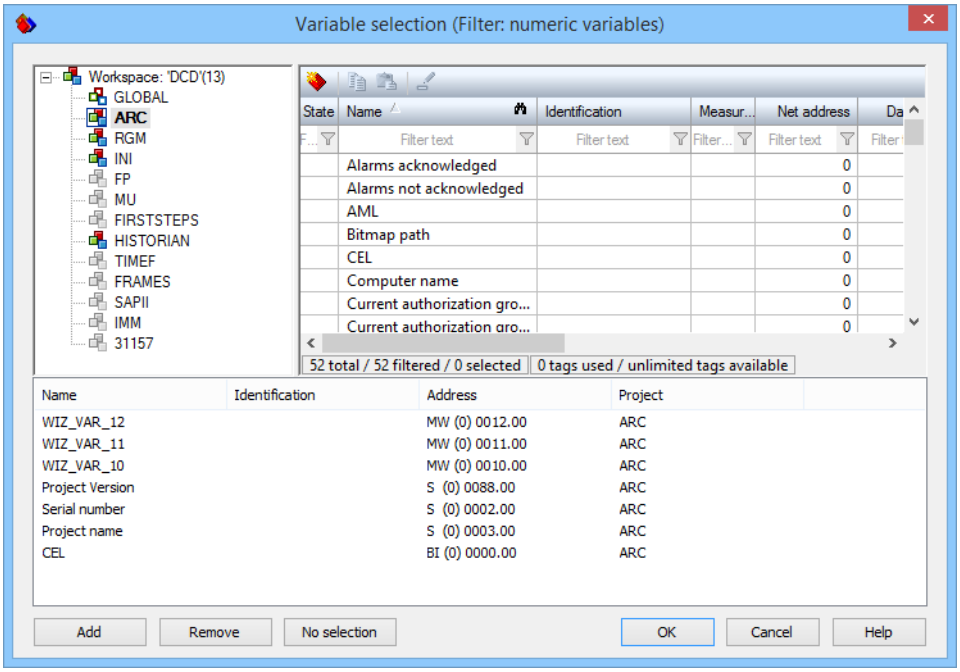
- Add:
  To add variables, select the **`Add variable`** command in the context menu or in the tool bar by means of Drag&Drop.
- Remove:
  Select the desired variables and press the **`Del`** key or select the **`Remove variable`** command in the context menu or the tool bar.
  Attention: Variables are 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 tool bar of the base archive or the variable list.

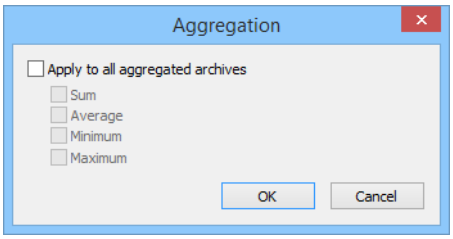
2. The selection dialog is opened



Add the desired variables.

3. Close the dialog.

4. 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:

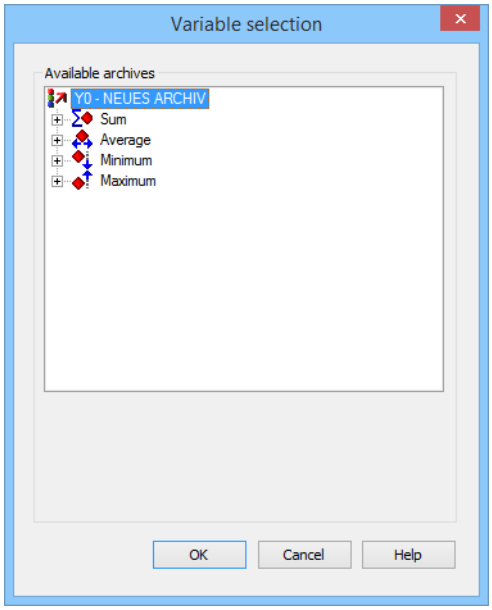
- **`Apply to all aggregation archives`**: The newly-added variables are taken into account in all existing aggregation archives. Wen activating, the desired aggregation archives (sum total, average value, minimum, maximum) must be selected.

ADDING A VARIABLE TO AN AGGREGATION ARCHIVE

To add a variable to an aggregation archive:

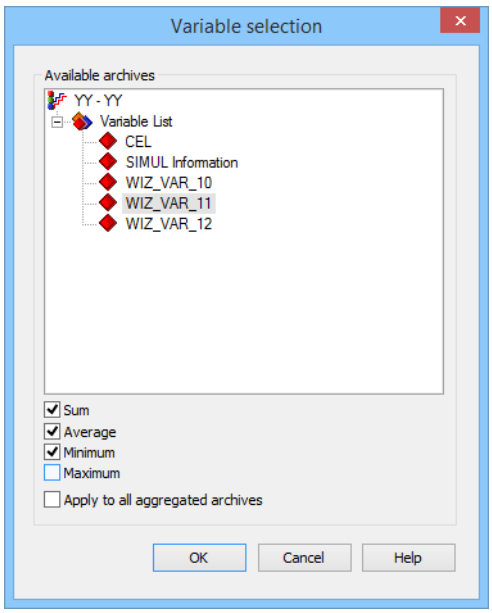
1. Select Add variable in the context menu, the tool bar of the base archive or the variable list.
2. The selection dialog is opened, depending on the type of archive:

a) No subordinate aggregation archive present



Add the desired variables.

b) Subordinate aggregation 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.

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 an archive name, lot description and end time. With the evacuation of the archive the index also is updated.

Archives can be deleted or moved using file 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 (see "Editing aggregation archives"), the **Index lots** option in the Properties tab. The index is only created from archive files in the Runtime folder. If reading is from the from the read-back folder, reading-in 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 files 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 would be 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.

6.8 Creating a screen of the type Archive Revision

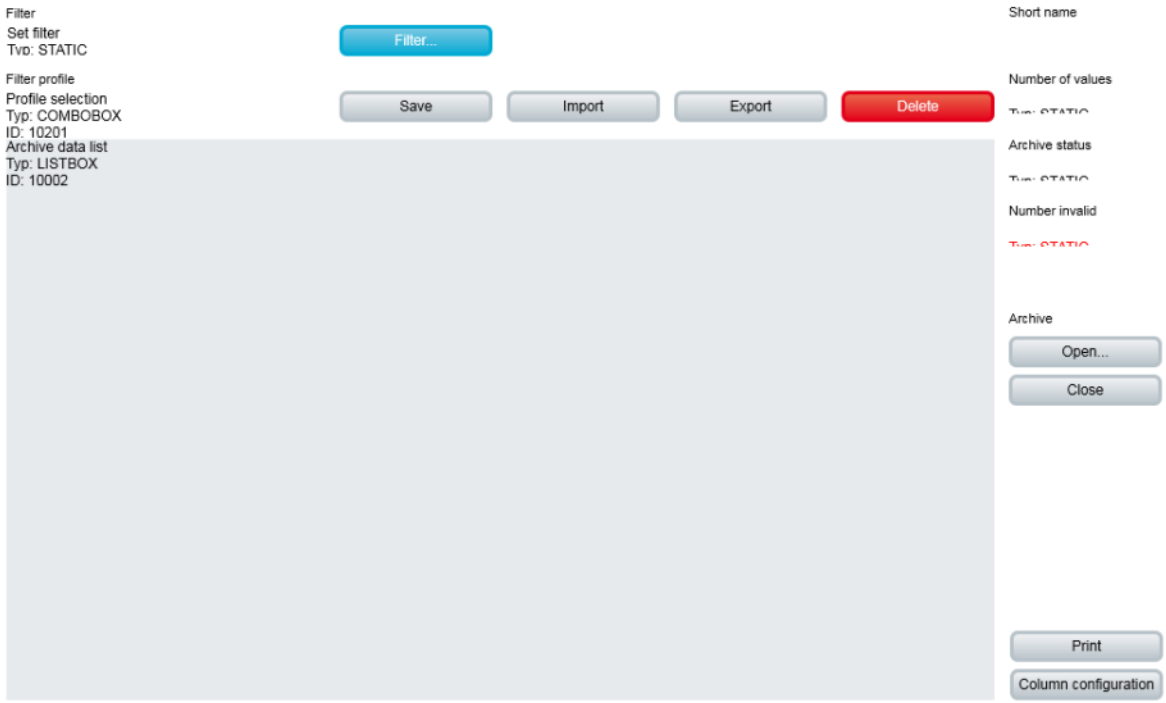
The `archive revision` screen makes it possible to display, configure and edit archives in Runtime.

To create a screen of the type Alarm Message List:

1. In the tool bar or the context menu, select the **`New screen`** command in the context menu of the **`Screens`** node.
   A standard empty screen is called up.
2. Change the screen type in the detail view. To do this:
   a) click on **`Standard`** in the **`Screen type`** column
   b) Select the `Archive revision` entry from the drop down list
3. Click in the screen.
4. Select the **`Control elements`** menu item in the menu bar
5. Click on **`Add template`** in the drop-down list.

6. The standard elements are automatically inserted
7. Select additional elements as required and add them at the desired place on the screen or delete superfluous elements.
8. Create a screen switch function (on page 71) in order to be able to call up the screen in Runtime (on page 120).
9. In screen switching, configure the content that is to be displayed in the screen in Runtime.

ARCHIVE REVISION SCREEN



Parameters	Description
Insert template	Opens the dialog for selecting a template for the screen type. Templates are shipped together with zenon and can also be created by the user. Templates add pre-defined control elements to pre-defined locations in the screen. Elements that are not necessary can also be removed individually once they have been created. Additional elements are selected from the drop-down list and palced in the screen. Elements can be moved in the screen and placed individually.
Window	Control elements for windows.
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.
List functions	Buttons for controlling the list functions in Runtime.
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 the aggregated archives on request.
Edit entry	Opens the dialog (on page 131) to edit the selected archive entry.
Insert entry	Opens the dialog (on page 132) to insert archive entries into the archive files. 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.
Delete entry	Deletes selected archive entries after confirmation query.
Select	Clicking on the button opens the dialog to configure the filter.
Column configuration	Opens the dialog (on page 130) to configure column width and font.
Print	Prints list to configured printer.
Filter profiles	Control elements for filter profiles.
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.

7. Functions

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

- Screen switch - archive revision (on page 71): Configuration of screen switching including filtering
- Archive: Start (on page 96): Start archive manually
- Archive: Stop (on page 98): Stop archive manually
- Show active archives (on page 101): Show active archives in Runtime
- Index Archive (on page 99): Start/renew Indexing for archive
- Export archives (on page 101): 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 68).
2. Create a screen switch function for this 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.

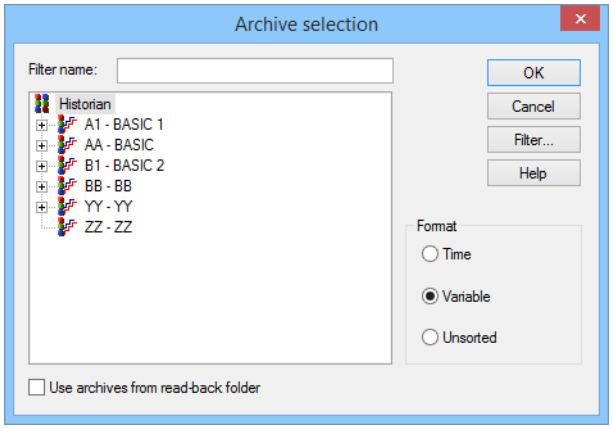
In the Runtime you can modify the filter properties. Exception: In the Editor fixed time filter (on page 88) was defined.

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

ARCHIVE SELECTION DIALOG

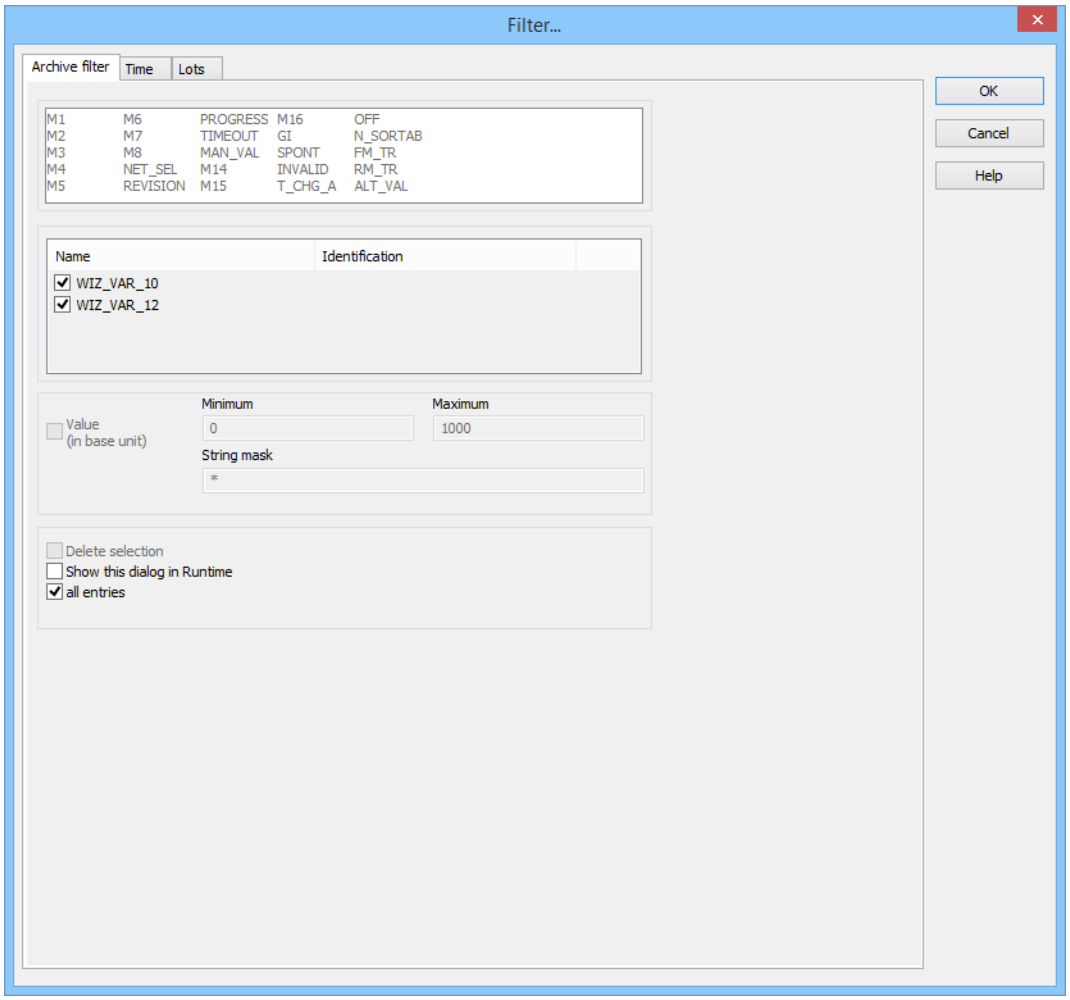


Parameters	Description
Filter name	Name of the configured filter. This name is attached to the parameters of the screen switching function and serves to distinguish between different screen switching functions with different filter configurations.
Archives	List of available archives. Attention: An archive must be selected. This is displayed in Runtime. If a lot archive (on page 90) is to be displayed, this must correspond to the configured archive for the selection in Runtime.
Format	display format and sorting of displayed archive entries: ▸ **Time**: Filter for date and time ▸ **Variable**: according to variable name ▸ **Unsorted**: no sorting
Use archives from read-back folder	Active: Archives from the read-back folder are also used. Inactive: Only current archives are used. 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. 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 File -> General configuration -> Standard. 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.

CLOSE DIALOG

OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Filter	Opens the dialog to configure the filter criteria: ▸ **Archive filter** (on page 74): Variables (only available if an archive has been selected) and status bits ▸ **Time** (on page 76): Time filter ▸ **Lots** (on page 90): Lot filter
Help	Opens online help.

7.1.1 Archive filter



Parameters	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)	`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. Input of: ▸ **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	Only available if the dialog is called up in Runtime using the `Selection` (on page 125) button. 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. ▸ `Active`: Removes all bold font in the list when the dialog is closed.
Show this dialog in the Runtime	`Active`: Before every call of the screen the filter dialog is opened. The filter settings can be modified. This option is not available with Windows CE. Note: If, in the `Lots` tab, the **Show lot selection dialog** option is also selected, then the lot selection dialog is called up in Runtime. This is no longer displayed after reloading. Notes for time range filters: **Show this dialog in the Runtime**`active`: ▸ 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-concluded time period is always used. **Show this dialog in the Runtime**`not active`: ▸ **Use last finished time range**`active`: The last-concluded time period is used ▸ **Use last finished time range**`not active`: 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.

CLOSE DIALOG

Parameters	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.

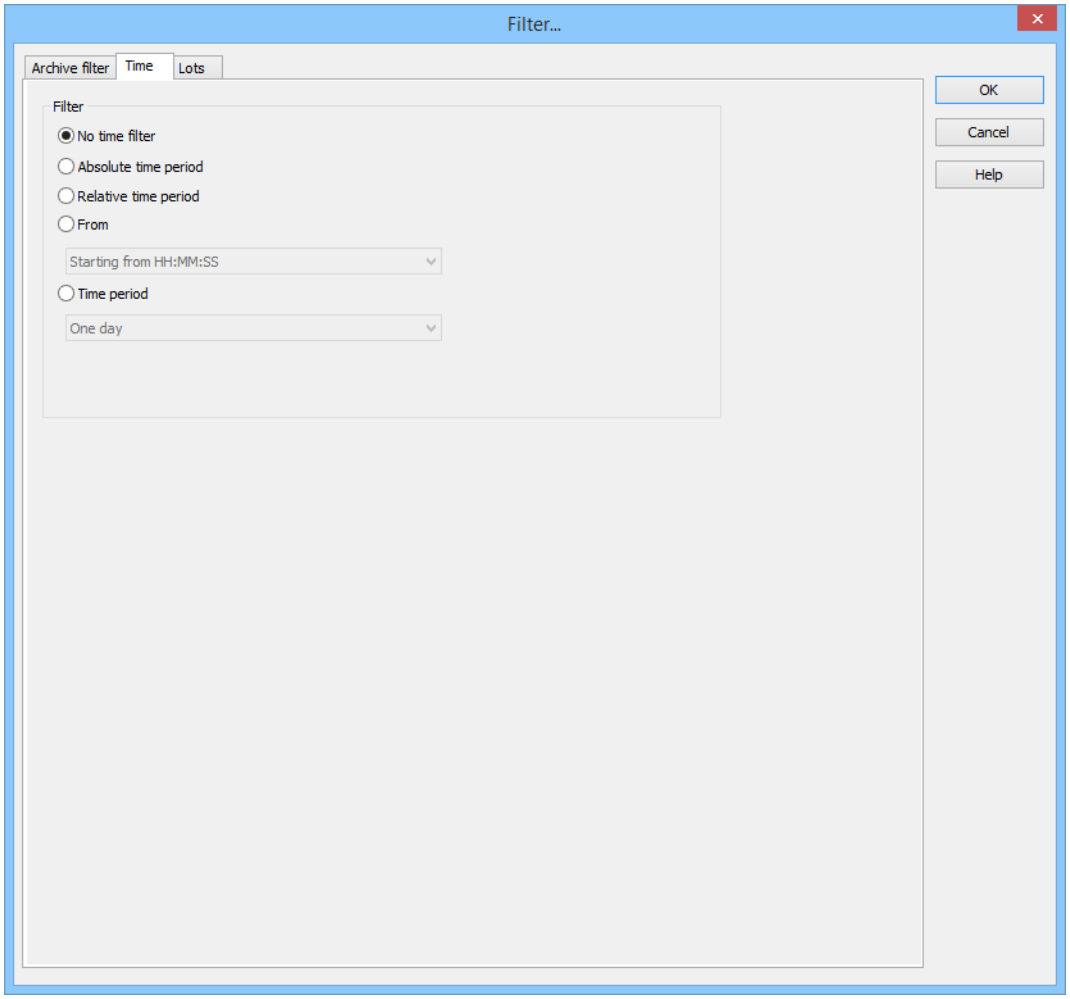
Time filters can be pre-set in both the Editor and in Runtime for:

- Absolute period of time (on page 79)
- Relative period of time (on page 81)
- From (on page 83)
- Time period (on page 86)

Time filtering can be carried out in two ways:

1. Define time period in the Editor (on page 88)
   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 89)
   The time filter is defined in the Editor and can be changed in Runtime as desired.

CONFIGURING THE TIME FILTER



FILTER

Selection of the filter.

Parameters	Description
No time filter	`Active`: No time filter is used. Note: all Runtime entries since 1. 1. 1990 are displayed.
Absolute filter	`Active`: A fixed period of time is entered in the editor. When the function is executed, the defined absolute time period is exactly used. In the settings section, the corresponding options can be shown and configured there. Note: Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.
Relative period of time	`Active`: A relative time period is entered. In the settings section, the corresponding options can be shown and configured there. Attention: this filter is constantly updated.
From	`Active`: A time from which the filter is effective is stated. If the time is not reached on the current day, filtering takes place from the corresponding time the previous day. Selection of the area mode from drop-down list: ▸ From HH:MM:SS o'clock ▸ From day - HH:MM:SS o'clock ▸ Starting on day, month at HH:MM:SS In the settings section, the corresponding options can be shown and configured there. Attention: The start point of this filter is not updated automatically. Only the existing times are used when shown. The end time point is not defined with this filter, it is carried over.
Time period	`Active`: A fixed time period is entered. Selection of the area mode from drop-down list: ▸ One day ▸ One week ▸ Two weeks ▸ One month ▸ One Year ▸ 15 minutes ▸ 30 minutes ▸ 60 minutes

	In the settings section, the corresponding options can be shown and configured there.

CLOSE DIALOG

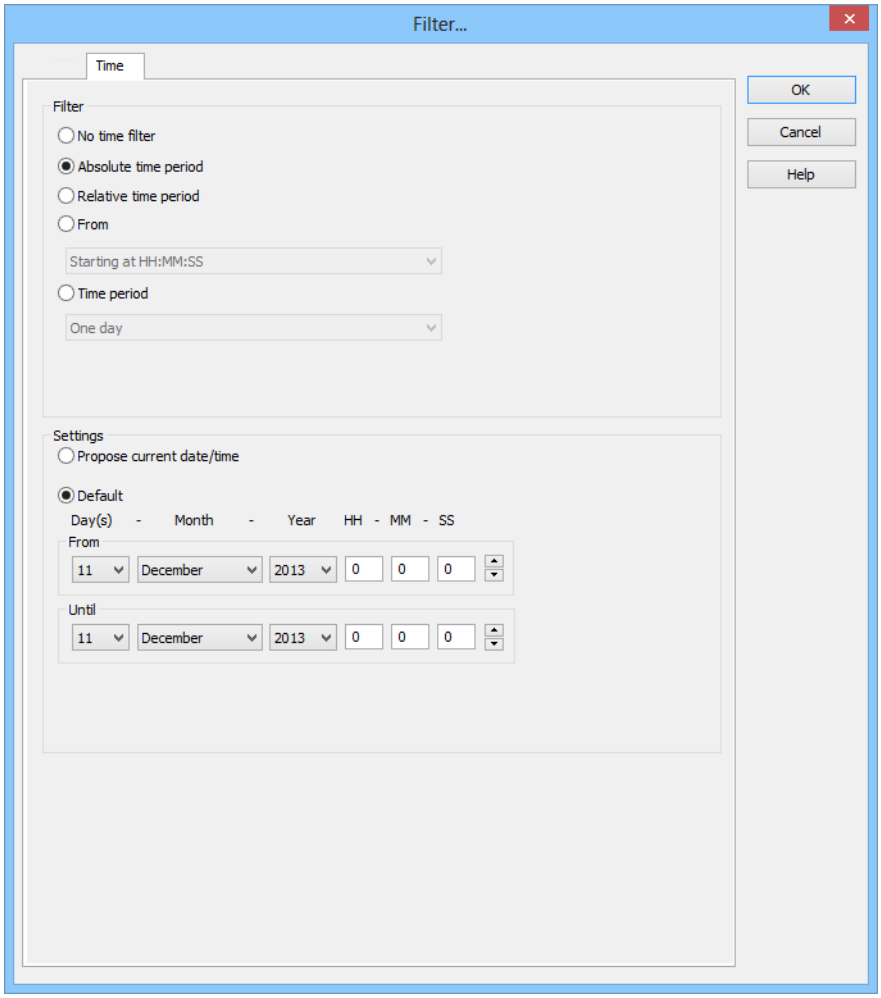
Parameters	Description
`OK`	Applies all changes in all tabs and closes the dialog.
`Cancel`	Discards all changes in all tabs and closes the dialog.
`Help`	Opens online help.

Absolute period of time

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



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

CLOSE DIALOG

Parameters	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

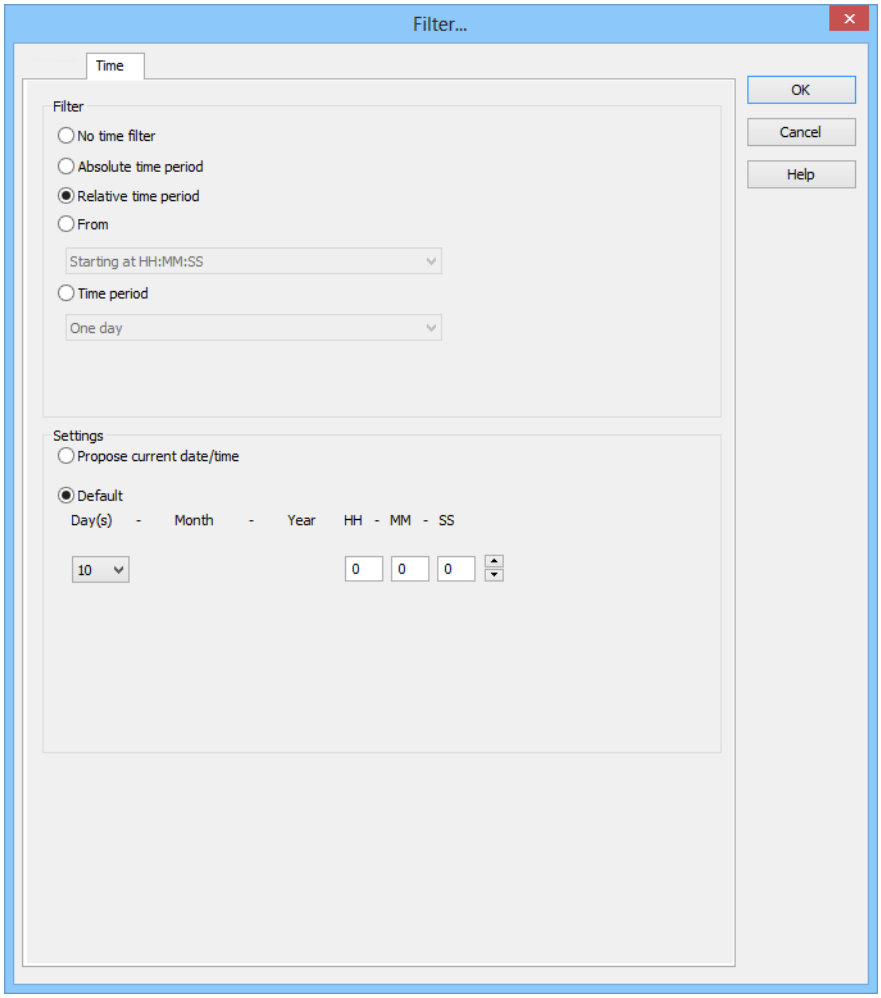
A relative time period is entered.

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



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

CLOSE DIALOG

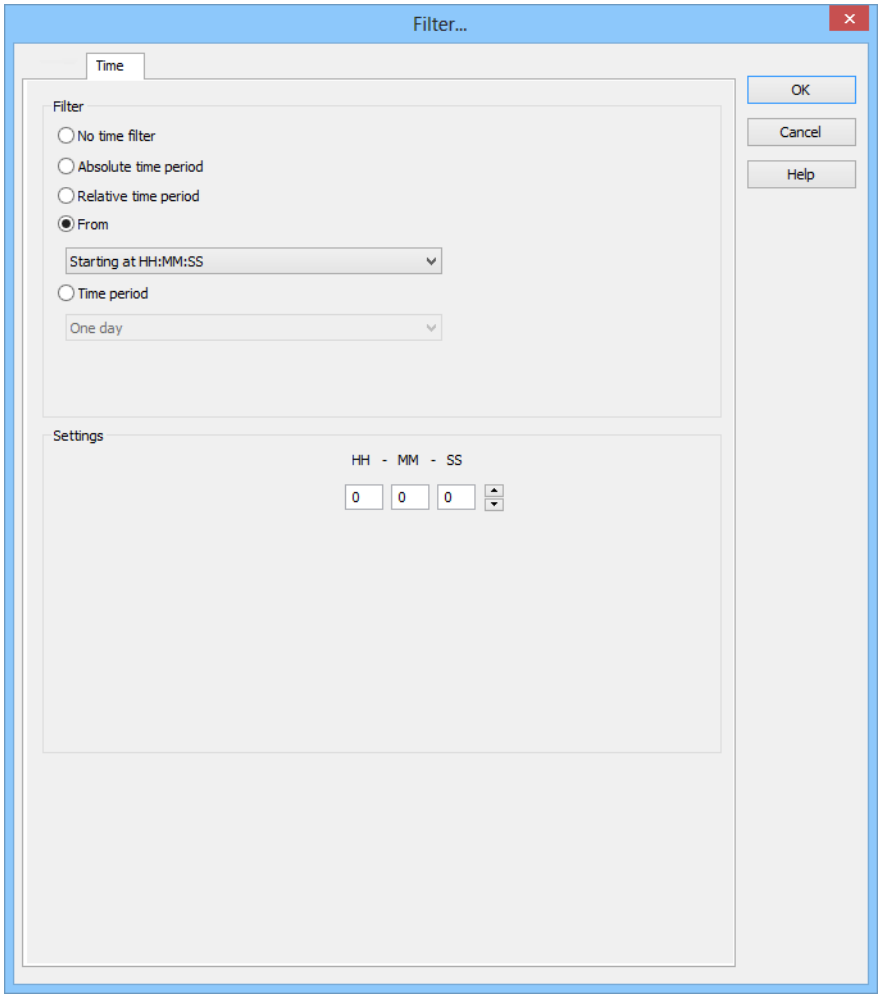
Parameters	Description
`OK`	Applies all changes in all tabs and closes the dialog.
`Cancel`	Discards all changes in all tabs and closes the dialog.
`Help`	Opens online help.

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.
   - `From HH:MM:SS o'clock`
   - `From day - HH:MM:SS o'clock`
   - `Starting on day, month at HH:MM:SS`

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



Parameters	Description
Settings	Configuration of the time filter.
[Date/Time]	Depending on the settings of the **Off** option, the time from which the filter is effective is configured here: ▸ Starting from HH:MM:SS ▸ Starting from day - HH:MM:SS ▸ Starting from day, month - HH:MM:SS 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.
▸ Starting from HH:MM:SS	A time from which the filter is effective is stated. If the time is not reached on the current day, filtering takes place from the corresponding time the previous day. Example: You enter 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.
▸ Starting from day - HH:MM:SS	A day and time for the start of the filter are entered. If the time given has not been reached in the current month, the corresponding time from the previous month is used. Example: You enter **day** 5 - 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.
▸ Starting from day, month - HH:MM:SS	A month, day and time for the start of the filter are entered. If the time stated has not been reached in the current year, the corresponding time from the previous year is used. Example: You enter **Day** 5, **Month** October - 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.

CLOSE DIALOG

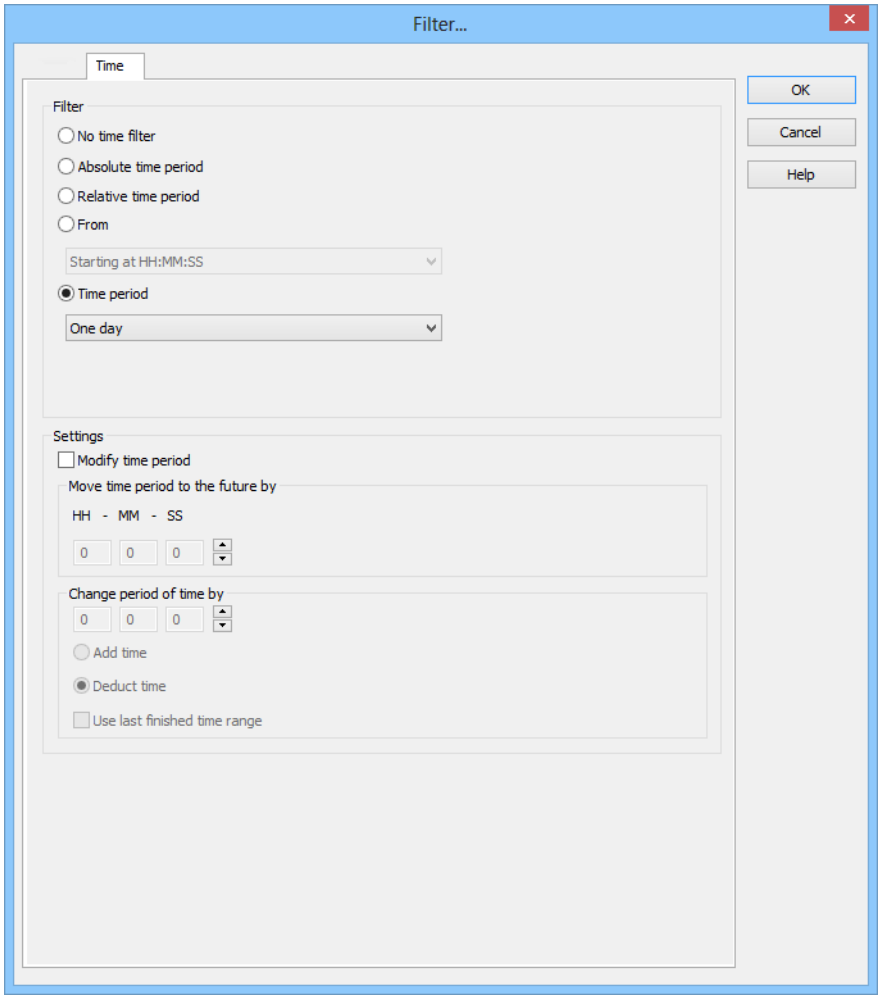
Parameters	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.

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



Parameters	Description
`Settings`	Configuration of the time filter.
Time period	Selection of a time range from a drop-down list. Filtering for this time range is carried out in Runtime. The filter relates to the time of screen switching. For example: The value `60 minutes` shows all archives of the last hour. If this dialog is offered in Runtime, the start time of the time range can be selected.
Modify time period	Allows amendments to cycles, postponements and extensions of time periods. `Active`: Evaluation is carried out in accordance with the following rules: ▶ First, the **Use last finished time period** option is evaluated. ▶ After this, **Change time period by** is used. ▶ **Move time period to the future by** is then applied. `Inactive`: No changes to the time period are made. Attention: With version 7.10, filter actions on the basis of this function led to different results than those in the versions before.
Move time period to the future by	`Active`: The time period defined in the filter is postponed to the future. Given in `hours - minutes - seconds`. If a postponement that is the same or greater than the selected **time period** is set, a note to check the configuration is displayed.
Change period of time by	`Active`: The time period defined in the filter is modified. Given in `hours - minutes - seconds`. If a change and a postponement that are the same or greater than the selected **time period** is set, a note to check the configuration is displayed.
Add time	`Active`: The time stated in **Change time period by** is added to the time defined in the **Time range** option.
Deduct time	`Active`: The time stated in **Change time period by** is deducted from the time defined in the **Time range** option.
Use last finished time period	`Active`: The last finished time period is used.

CLOSE DIALOG

Parameters	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.

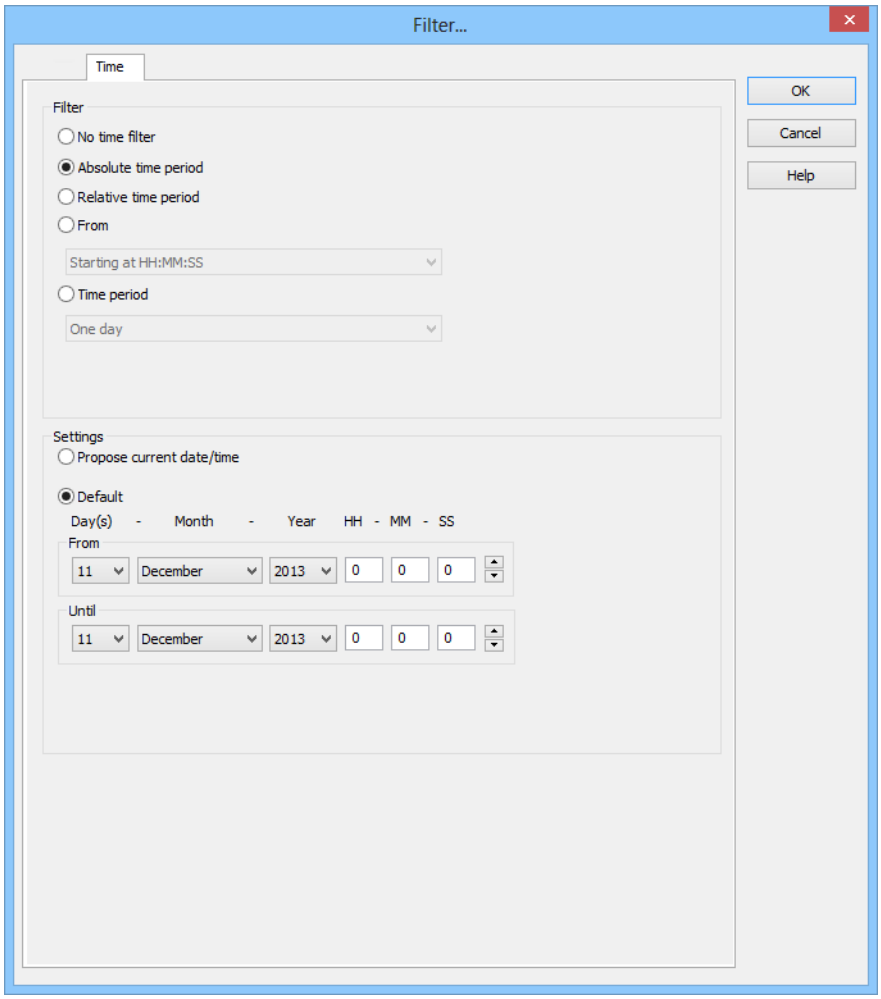
For example: You set a 30 minute time filter. In Runtime, you can now only set when this 30 minute time period is to start. However, you cannot change the filter to a day filter.

> **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 `Offer 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.

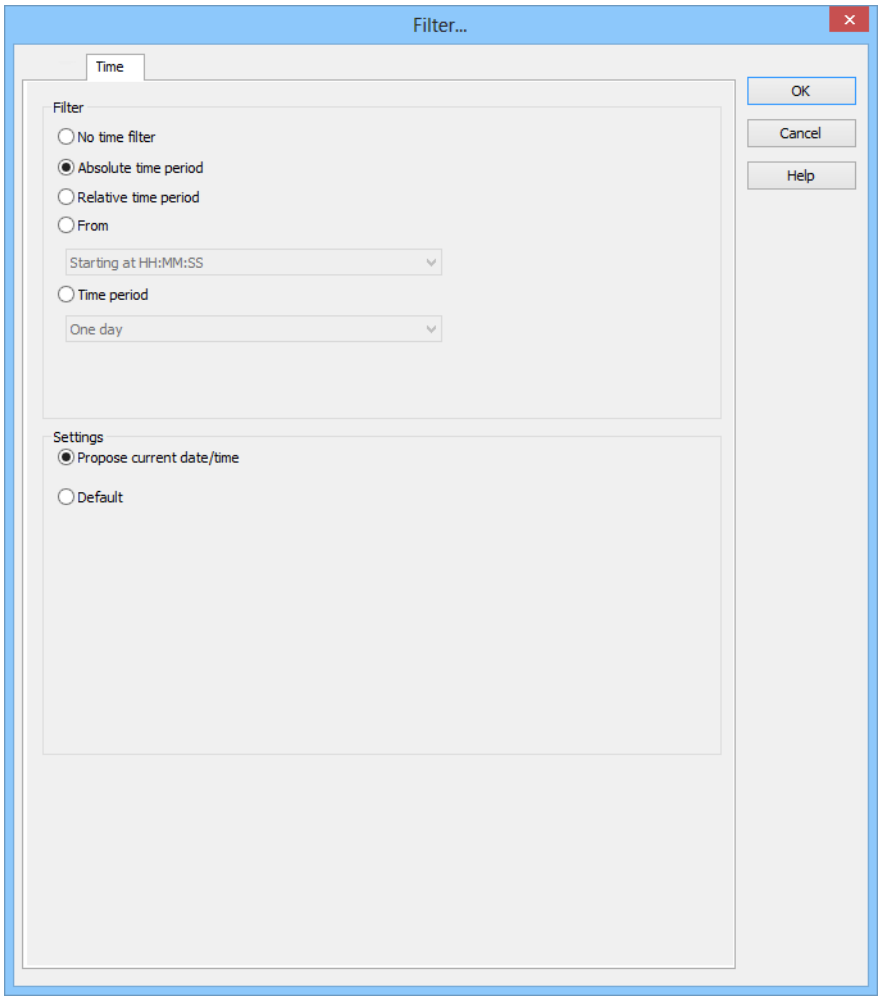
Time filter can be configured in Runtime

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

1. The screen must have **`Filter`** and **`Display filter`** buttons
2. select the desired filter:

- Absolute period of time
- Relative period of time

3. Select, in the Settings section, the option **`Propose current date/time`**
4. The filter dialog is opened in Runtime with the current date and time



7.1.3 Lots

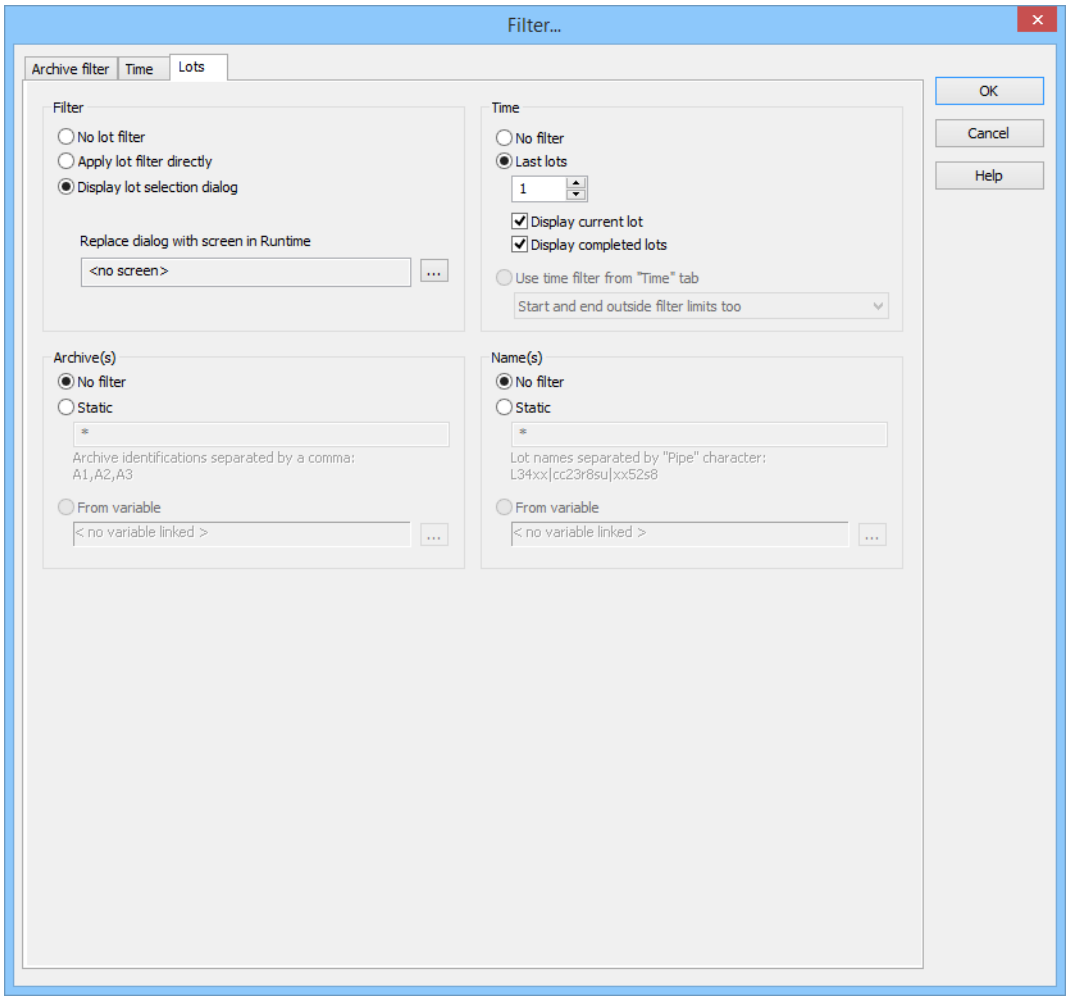
Configuration of the lot filter.

The lot information is also applied to the existing time 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.



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**

Parameters	Description
No lot filter	`Active`: The lot filter is deactivated and cannot be configured. Filtering for lots is not carried out in Runtime.
Apply lot filter directly	`Active`: The filter configured here is applied in Runtime directly.
Display lot selection dialog	`Active`: The dialog for lot selection is shown in Runtime when: ▸ Clicking on **`Filter`** or ▸ screen switching, if the **Offer this dialog in Runtime** option has been activated (not available for each function/screen type) Note: The dialog is not shown on reloading. Options can be pre-selected in the Editor.
Replace dialog in Runtime with screen	Not available if the **Show lot selection dialog** option has been selected. Definition of a screen that is to be called up in Runtime instead of the **lot selection dialog**. Only `time/lot filter` screens are offered. Click the `...` button and the dialog opens to select a screen. If the linked screen is not found in Runtime, a search is made for corresponding screens with specific names.
Relative lot selection	Only available for **`Extended Trend`** and **`faceplates`** and only if the option **Display lot selection dialog** has been activated. The **Windows CE project** property must be deactivated in the project properties. ▸ `Active`: Enables several lots to be compared directly. Display always starts from the zero point.

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**

Parameters	Description
No filter	`Active`: The time range set in the **`Time`** tab is not taken into account. All completed and current lots are displayed.
Last lots	`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 cursor keys. The option allows the combination of both options **Display current lots** and **Display completed lots**. Example: 3 lots are to be displayed, 2 are running and 10 have been completed. The following is shown: the two that are current and one that has been completed. Attention: At least one of the two options **Display current lots** or **Display completed lots** must be activated. If both options have been deactivated, this corresponds to the **No filter** setting. Note on compatibility: If the current lots or the combination of current and completed lots are selected and the project is compiled for a version before 7.11, the completed lots are shown in Runtime.
Display current lots	`Active`: The current lots are displayed. Note: If the number of lots to be displayed is greater than the number of current lots, lots that have been completed are also shown until the set limit has been reached. Example: 3 lots are to be displayed. 1 lot is running, 5 have been completed. The one current lot and two completed lots are displayed.
Display completed lots	`Active`: The completed lots are displayed. Note: If the number of lots to be displayed is greater than the number of completed lots, lots that have been completed are also shown until the set limit has been reached.
Use time filter from "Time" tab	`Active`: Pre-filtering is carried out with the settings of the **`Time`** tab. The effective range of the filter can be amended within this time range. Select from drop-down list: ▸ `Start and end also outside filter limits`: (Default) Lots can start before the start time configured in the **`Time`** filter and end after the configured end time. ▸ `Start and end only outside filter limits`: Lots must start and end within the time points configured in the **`Time`** filter for the start and end. ▸ `Start also before filter limit`: Lots can start before the start time configured in the **`Time`** filter and end after the configured end time. ▸ `End also after the filter limit`: Lots can also end after the end time set in the **`time`** filter, but must start at or after the configured start time.

	▸ `Adjust start and end to filter limits:` Lots are cut to the time points configured in the **`Time`** filter for the start and end.

ARCHIVES

Configuration of filtering for archives. Selection of one of the options:

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

Note: Only available for the following modules if the **Apply lot filter directly** option has been selected:

- Archive revision
- ETM
- Report Generator
- Report Viewer

Parameters	Description
No filter	`Active`: Filtering for archive names is not carried out.
Static	`Active`: Archives whose identification corresponds to the character string entered in the input field are filtered for. Input of the archive identifications in the input field: ▸ Several identifications are separated by a comma (,). ▸ * or empty: All archives, no filter.
From variable	`Active`: The value of the variables linked here is applied as a filter for archive names in Runtime. Click on button . . . in order to open the dialog for selecting a variable. Only available for all modules if the **Apply lot filter directly** option has been selected: Notes for variables in Runtime: ▸ 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. 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.

NAMES

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

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

Parameters	Description
No filter	`Active`: Filtering for lot names is not carried out.
Static	`Active`: Lot names that correspond to the character string entered in the input field are filtered for. Input of the lot name in the input field: ▸ Several entries are separated by a pipe character (`|`). ▸ `*` or empty: All lots of all displayed archives, no filter.
From variable	`Active`: The value of the variable linked here is applied as a filter for lot names in Runtime. Click on the `...` button to open the dialog for selecting a variable. Not available if the option **Apply lot filter directly** has been selected. Notes for variables in Runtime: ▸ 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. Attention: If the selected variable is not found in Runtime, there is no filtering for lot names. This also applies if the value of the variable cannot be determined. The filter then corresponds to the **No filter** setting.

CLOSE DIALOG

Parameters	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.

7.2 Archive: Start

This function starts an already-configured archive in Runtime.

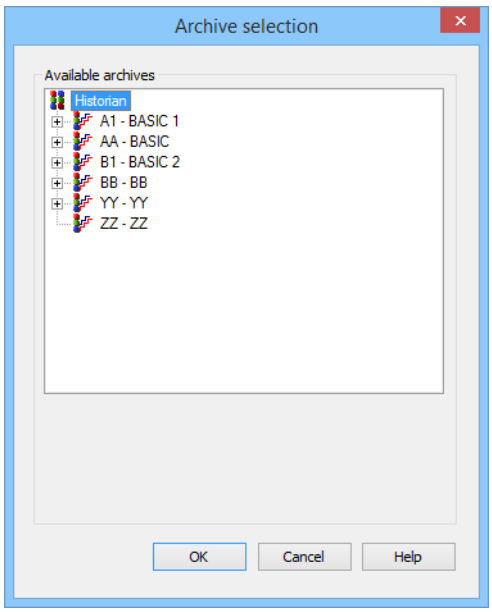
> **Attention**
>
> *Attention: If starting and stopping of the archive is defined via Start/End of the Runtime (on page 30), the manual starting or stopping of archives via functions can lead to undesired behavior of the Runtime.*

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 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



Parameters	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.

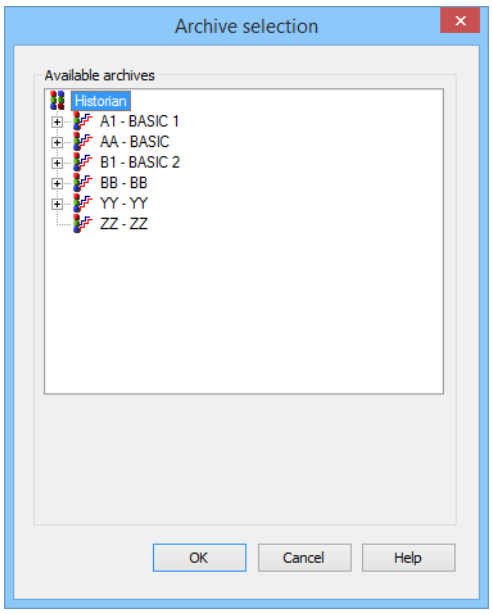
> **Attention**
>
> *Attention: If starting and stopping of the archive is defined via Start/End of the Runtime (on page 30), the manual starting or stopping of archives via functions can lead to undesired behavior of the Runtime.*

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 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



Parameters	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 an archive name, lot description and end time. With the evacuation of the archive the index also is updated.

Archives can be deleted or moved using file 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 27) tab when configuring the archive.

You can read details on indexing in the lot archives (on page 67) chapter.

Information

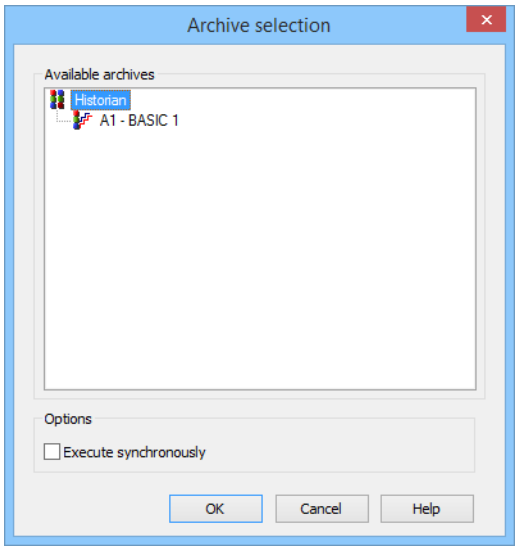
*The **Index archive** function is always executed on the Primary Server.*

To configure the function:

1. Select, in the `Functions` node in the tool bar or in the context menu, `New function`.
2. The dialog for selecting a function is displayed.
3. Navigate to 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.

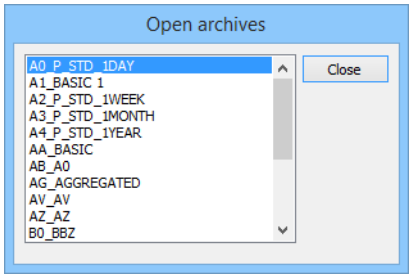
ARCHIVE SELECTION DIALOG



Parameters	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. Active: 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 tool bar or in the context menu, **New function**.
2. The dialog for selecting a function is displayed.
3. Navigate to node **Historian**
4. Select the **Display open archives** function.
5. Link the function to a button.

7.6 Export archives

This function exports the recored 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 must be configured for export:

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

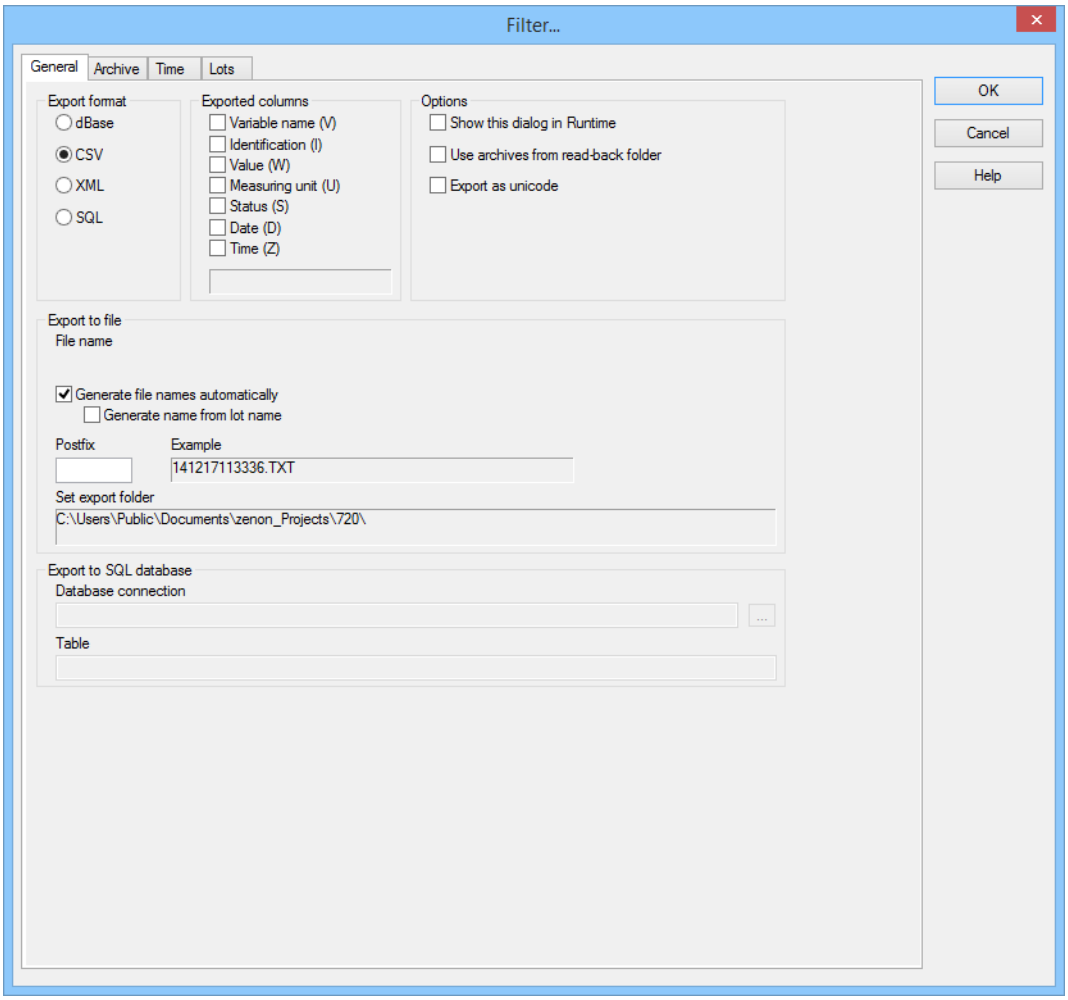
> **Attention**
>
> The file name of the export file must not contain any special characters.
> Prohibited are: `\ / : * ? " < > |`

To engineer the archive export:

1. Select, in the **Functions** node in the tool bar 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



Tabs	Description
General (on page 106)	Definition of: ▸ Export format ▸ Columns to be exported ▸ Options ▸ Export file
Archive (on page 111)	Selection of the archive to be exported
Time (on page 113)	Stipulation of the corresponding time range.
Lots (on page 115)	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	The space available is checked before archive data (***.arx**) is read in. The read in is canceled if: ▶ less than 10% of the available memory is free ▶ the size of the reserved memory (**SPEICHER**=) defined in **project.ini** is exceeded The cancelation is documented in the Diagnosis Viewer via an error message.

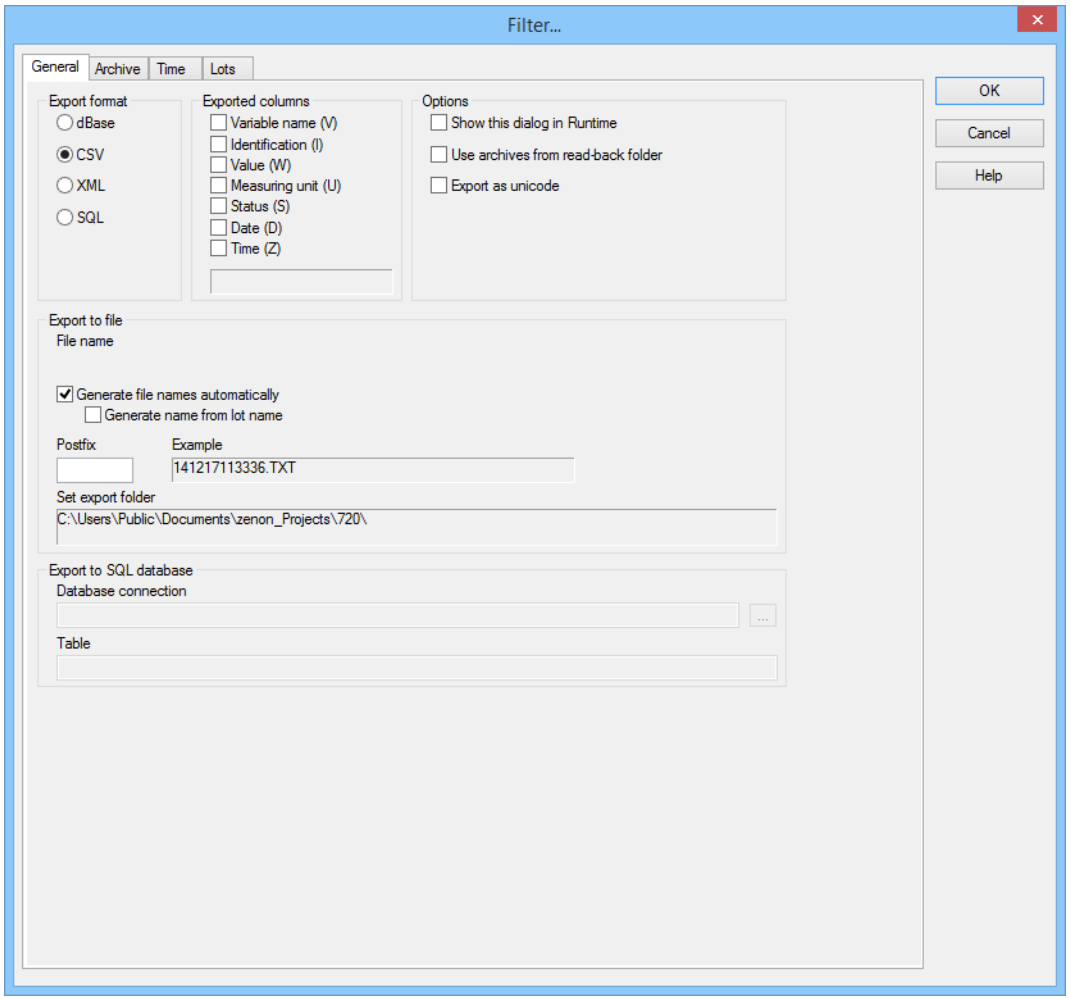
Attention

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



EXPORT FORMAT

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

Format	Description
dBase	`Active`: Export in a Base IV - file (*.dbf). Caution: DBF files must: ▸ conform with there name to the 8.3 DOS format (8 alphanumeric characters for name, 3 characters for extension, no space) ▸ be stored near the root folder
CSV	`Active`: Export to a CSV text file (*.txt). Structure (**->** stands for tabulator): **`Name -> identification -> value -> unit -> (state_HI_DWORD)(state_LO_DWORD) -> second`**
XML	`Active`: Export to an XML file (*.xml).
SQL	`Active`: Export to an SQL database Note: For export to an SQL database, the corresponding license must be present for the Editor and Runtime.

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 grayed out.

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	Description
Variable name (V)	Active: **Variable name** column is exported. Contains the names of the variables.
Identification (I)	Active: **Identification** column is exported. Contains the variable identification.
Value (W)	Active: **Value** column is exported. Contains the technical value of the variables.
Unit (U)	Active: **Unit** column is exported. Contains the attendant unit of a value.
Status (S)	Active: **Status** column is exported. Displays the status of the variables.
Date (D)	Active: **Date** column is exported. Contains the date stamp of the variables.
Time (Z)	Active: **Time** column is exported. Contains the time stamp of the variables.

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.

Parameters	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.

Parameters	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	`Active`: File names are automatically created from a short identifier and a day key. Format of day key: **`YYMMDDHHMMSS.yyy`** ▸ `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	`Active`: the lot name is taken for the creation of the export file name. Only available if the **Generate file name automatically** option has been activated. Attention: The lot name must not contain any special characters.
Postfix	Free identification that is automatically appended to the file names. Maximum 29 ASCII characters. Note: Only available if the **Generate filename automatically** is active.
Set export folder	Display of the defined export path. You can change the folder in the Editor in the following menu: File-> General configuration-> Standard tab -> Exported archives folder.

EXPORT TO SQL DATABASE

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

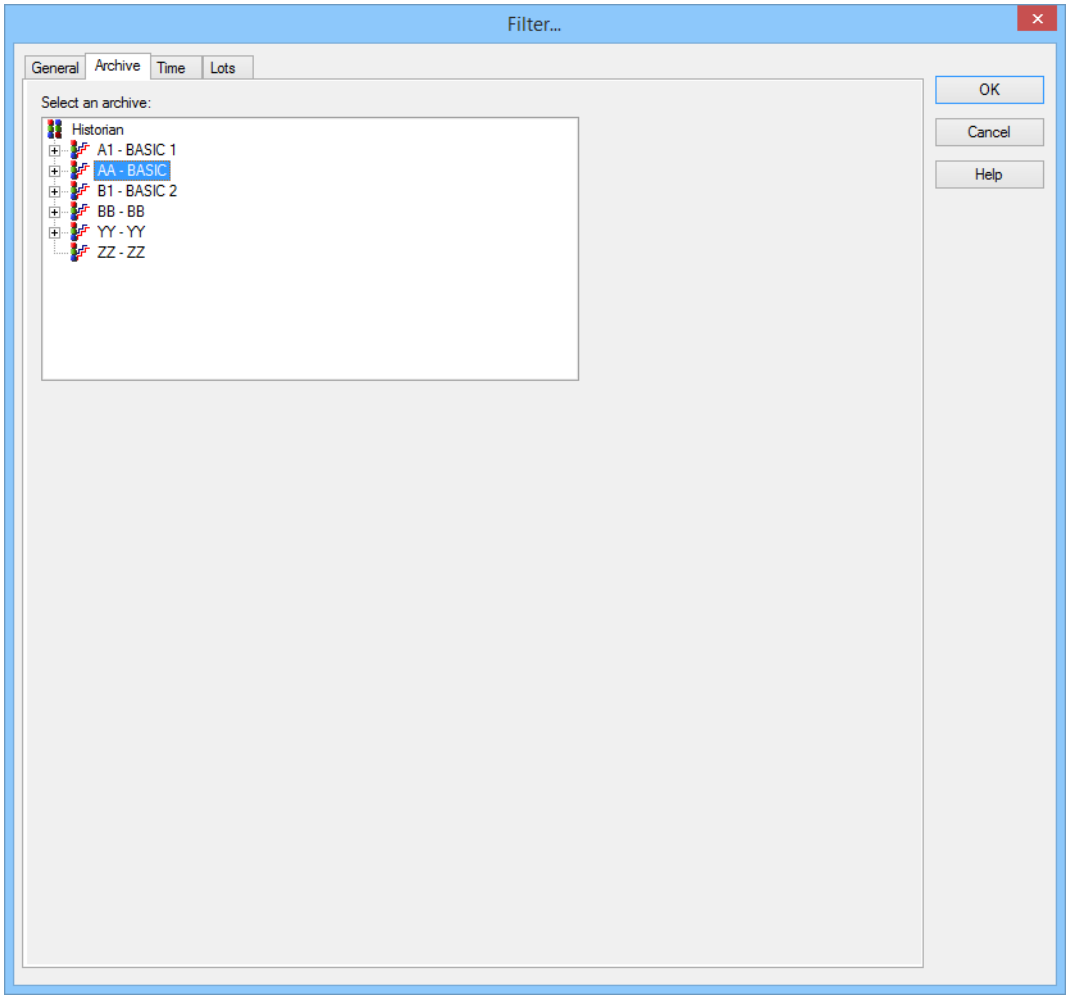
CLOSE DIALOG

Parameters	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.

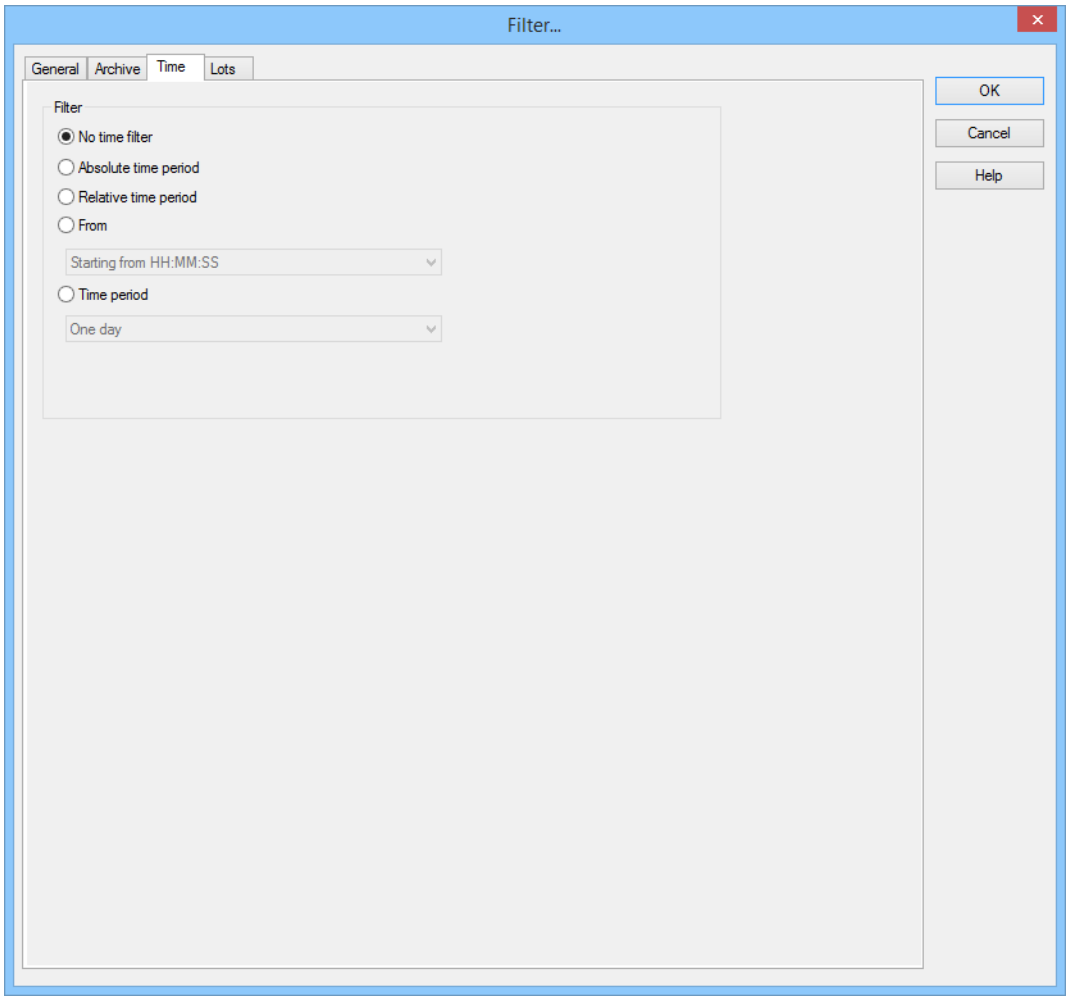


SELECTION OF AN ARCHIVE

Parameters	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.

Parameters	Description
No time filter	`Active`: No time filter is used. Note: all Runtime entries since 1. 1. 1990 are displayed.
Absolute filter	`Active`: A fixed period of time is entered in the editor. When the function is executed, the defined absolute time period is exactly used. In the settings section, the corresponding options can be shown and configured there. Note: Time is saved in UTC. For details see chapter Handling of date and time in chapter Runtime.
Relative period of time	`Active`: A relative time period is entered. In the settings section, the corresponding options can be shown and configured there. Attention: this filter is constantly updated.
From	`Active`: A time from which the filter is effective is stated. If the time is not reached on the current day, filtering takes place from the corresponding time the previous day. Selection of the area mode from drop-down list: ▸ From HH:MM:SS o'clock ▸ From day - HH:MM:SS o'clock ▸ Starting on day, month at HH:MM:SS In the settings section, the corresponding options can be shown and configured there. Attention: The start point of this filter is not updated automatically. Only the existing times are used when shown. The end time point is not defined with this filter, it is carried over.
Time period	`Active`: A fixed time period is entered. Selection of the area mode from drop-down list: ▸ One day ▸ One week ▸ Two weeks ▸ One month ▸ One Year ▸ 15 minutes ▸ 30 minutes ▸ 60 minutes

	In the settings section, the corresponding options can be shown and configured there.

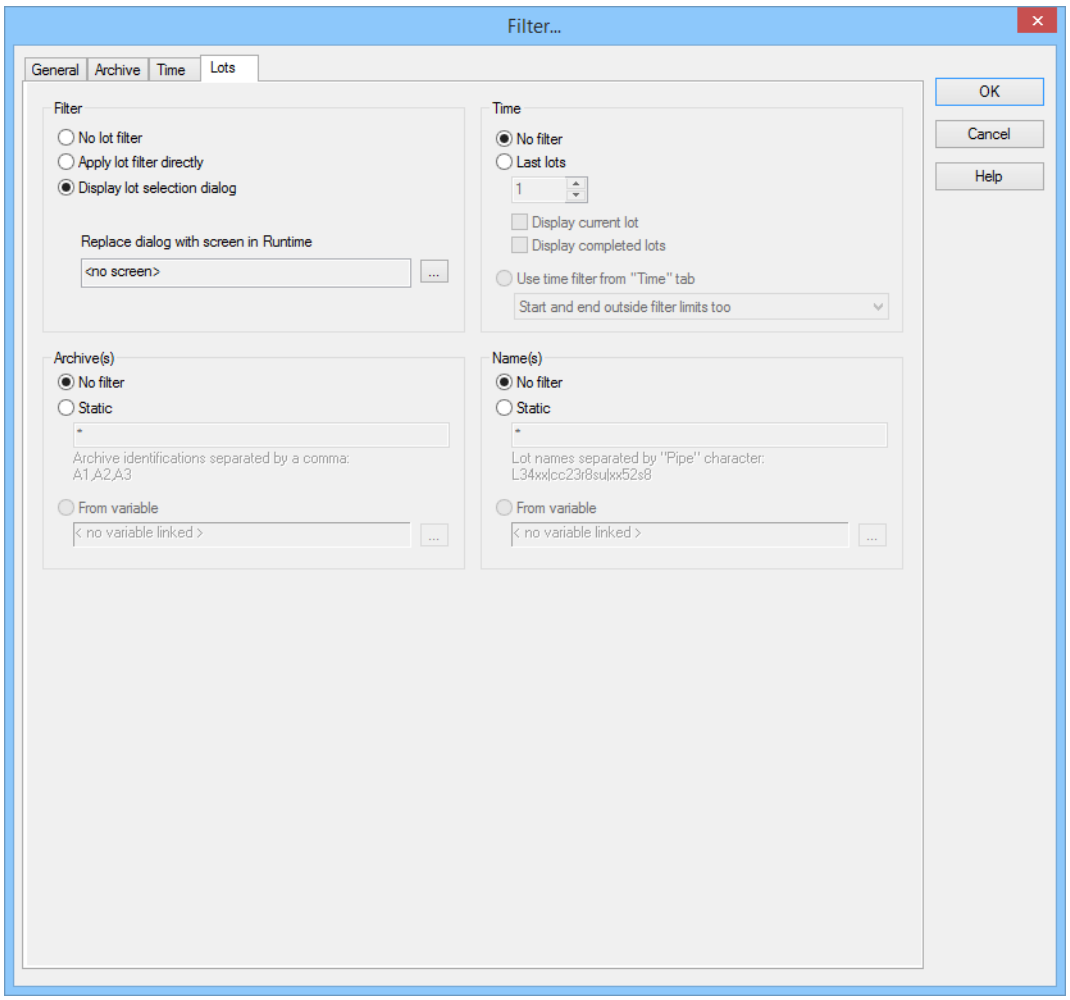
CLOSE DIALOG

Parameters	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.

Configuration is along the lines of **time filtering for screen switching** (on page 76).

7.6.4 Lots

The lot filter is configured in these tabs.



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**

Parameters	Description
No lot filter	`Active`: The lot filter is deactivated and cannot be configured. Filtering for lots is not carried out in Runtime.
Apply lot filter directly	`Active`: The filter configured here is applied in Runtime directly.
Display lot selection dialog	`Active`: The dialog for lot selection is shown in Runtime when: - Clicking on **`Filter`** or - screen switching, if the **Offer this dialog in Runtime** option has been activated (not available for each function/screen type) Note: The dialog is not shown on reloading. Options can be pre-selected in the Editor.
Replace dialog in Runtime with screen	Not available if the **Show lot selection dialog** option has been selected. Definition of a screen that is to be called up in Runtime instead of the **lot selection dialog**. Only `time/lot filter` screens are offered. Click the `...` button and the dialog opens to select a screen. If the linked screen is not found in Runtime, a search is made for corresponding screens with specific names.
Relative lot selection	Only available for **`Extended Trend`** and **`faceplates`** and only if the option **Display lot selection dialog** has been activated. The **Windows CE project** property must be deactivated in the project properties. - `Active`: Enables several lots to be compared directly. Display always starts from the zero point.

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**

Parameters	Description
No filter	`Active`: The time range set in the **`Time`** tab is not taken into account. All completed and current lots are displayed.
Last lots	`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 cursor keys. The option allows the combination of both options **Display current lots** and **Display completed lots**. Example: 3 lots are to be displayed, 2 are running and 10 have been completed. The following is shown: the two that are current and one that has been completed. Attention: At least one of the two options **Display current lots** or **Display completed lots** must be activated. If both options have been deactivated, this corresponds to the **No filter** setting. Note on compatibility: If the current lots or the combination of current and completed lots are selected and the project is compiled for a version before 7.11, the completed lots are shown in Runtime.
Display current lots	`Active`: The current lots are displayed. Note: If the number of lots to be displayed is greater than the number of current lots, lots that have been completed are also shown until the set limit has been reached. Example: 3 lots are to be displayed. 1 lot is running, 5 have been completed. The one current lot and two completed lots are displayed.
Display completed lots	`Active`: The completed lots are displayed. Note: If the number of lots to be displayed is greater than the number of completed lots, lots that have been completed are also shown until the set limit has been reached.
Use time filter from "Time" tab	`Active`: Pre-filtering is carried out with the settings of the **`Time`** tab. The effective range of the filter can be amended within this time range. Select from drop-down list: ▸ `Start and end also outside filter limits`: (Default) Lots can start before the start time configured in the **`Time`** filter and end after the configured end time. ▸ `Start and end only outside filter limits`: Lots must start and end within the time points configured in the **`Time`** filter for the start and end. ▸ `Start also before filter limit`: Lots can start before the start time configured in the **`Time`** filter and end after the configured end time. ▸ `End also after the filter limit`: Lots can also end after the end time set in the **`time`** filter, but must start at or after the configured start time.

	▸ `Adjust start and end to filter limits:` Lots are cut to the time points configured in the **`Time`** filter for the start and end.

ARCHIVES

Configuration of filtering for archives. Selection of one of the options:

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

Note: Only available for the following modules if the **Apply lot filter directly** option has been selected:

- Archive revision
- ETM
- Report Generator
- Report Viewer

Parameters	Description
No filter	`Active`: Filtering for archive names is not carried out.
Static	`Active`: Archives whose identification corresponds to the character string entered in the input field are filtered for. Input of the archive identifications in the input field: ▸ Several identifications are separated by a comma (,). ▸ * or empty: All archives, no filter.
From variable	`Active`: The value of the variables linked here is applied as a filter for archive names in Runtime. Click on button . . . in order to open the dialog for selecting a variable. Only available for all modules if the **Apply lot filter directly** option has been selected: Notes for variables in Runtime: ▸ 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. 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.

NAMES

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

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

Parameters	Description
No filter	`Active`: Filtering for lot names is not carried out.
Static	`Active`: Lot names that correspond to the character string entered in the input field are filtered for. Input of the lot name in the input field: ▸ Several entries are separated by a pipe character (`|`). ▸ `*` or empty: All lots of all displayed archives, no filter.
From variable	`Active`: The value of the variable linked here is applied as a filter for lot names in Runtime. Click on the `...` button to open the dialog for selecting a variable. Not available if the option **Apply lot filter directly** has been selected. Notes for variables in Runtime: ▸ 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. Attention: If the selected variable is not found in Runtime, there is no filtering for lot names. This also applies if the value of the variable cannot be determined. The filter then corresponds to the **No filter** setting.

CLOSE DIALOG

Parameters	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 90).

8. Operating during Runtime

Archives can be displayed and edited in Runtime with an archive revision (on page 71) screen.

Archives that are created in Runtime are stored as `*.arx` files in the Runtime folder of the computer:

```
%Public%\Documents\zenon_Projects\[workspace]\[project]\[computer
name]\[project]
```

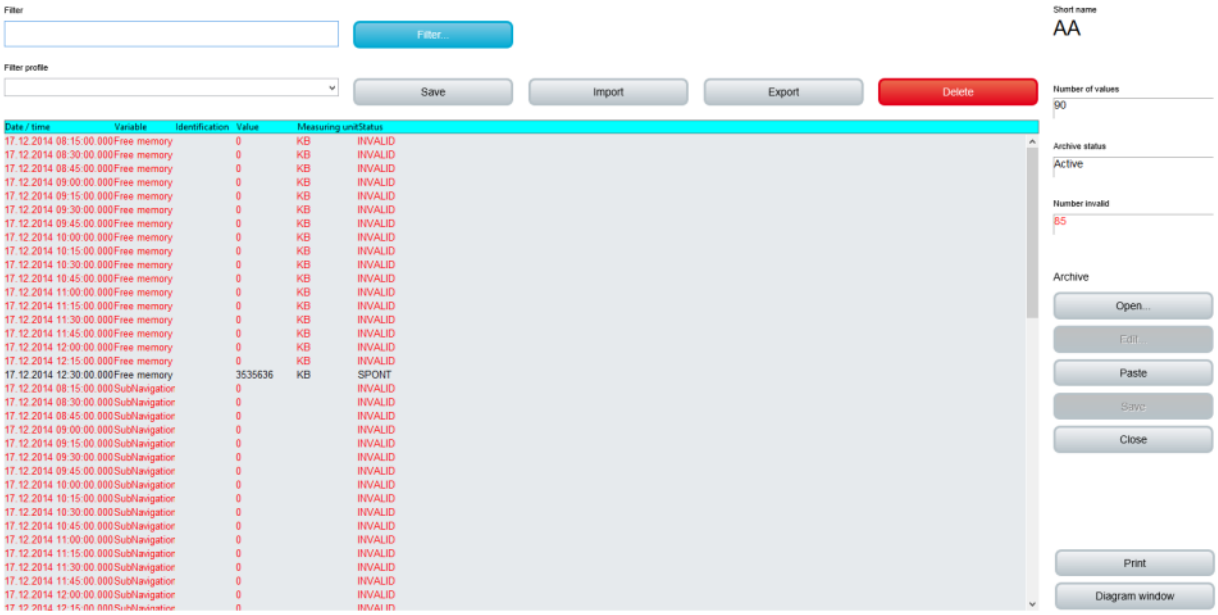
The current archive file has the name of the identifier. If the archive is closed, this file is saved and renamed, and another file with the name as the identifier as the name is created. For renaming, the UTC time is used for the area. The files are accessed in Runtime by means of filters. Operations 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 101).

> **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



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 the aggregated archives on request.
Edit entry	Opens the dialog (on page 131) to edit the selected archive entry.
Insert entry	Opens the dialog (on page 132) to insert archive entries into the archive files. 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.
Delete entry	Deletes selected archive entries after confirmation query.
Select	Clicking on the button opens the dialog to configure the filter.
Column configuration	Opens the dialog (on page 130) 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 in Runtime from a drop-down list.
Save	Clicking on the button in Runtime saves the filter settings as a profile.
Delete	Clicking on the (**x**) 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 96): Manual starting of an archive selected in the Editor.
- Archive: Stop (on page 98): Manual ending of the archive selected in the Editor.
- Index Archive (on page 99): Subsequent indexing of lot archives (on page 67).
- Show active archives (on page 101): Display of the archives that are currently running.
- Export archives (on page 101): 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 143) 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. That means:

- 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` and/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

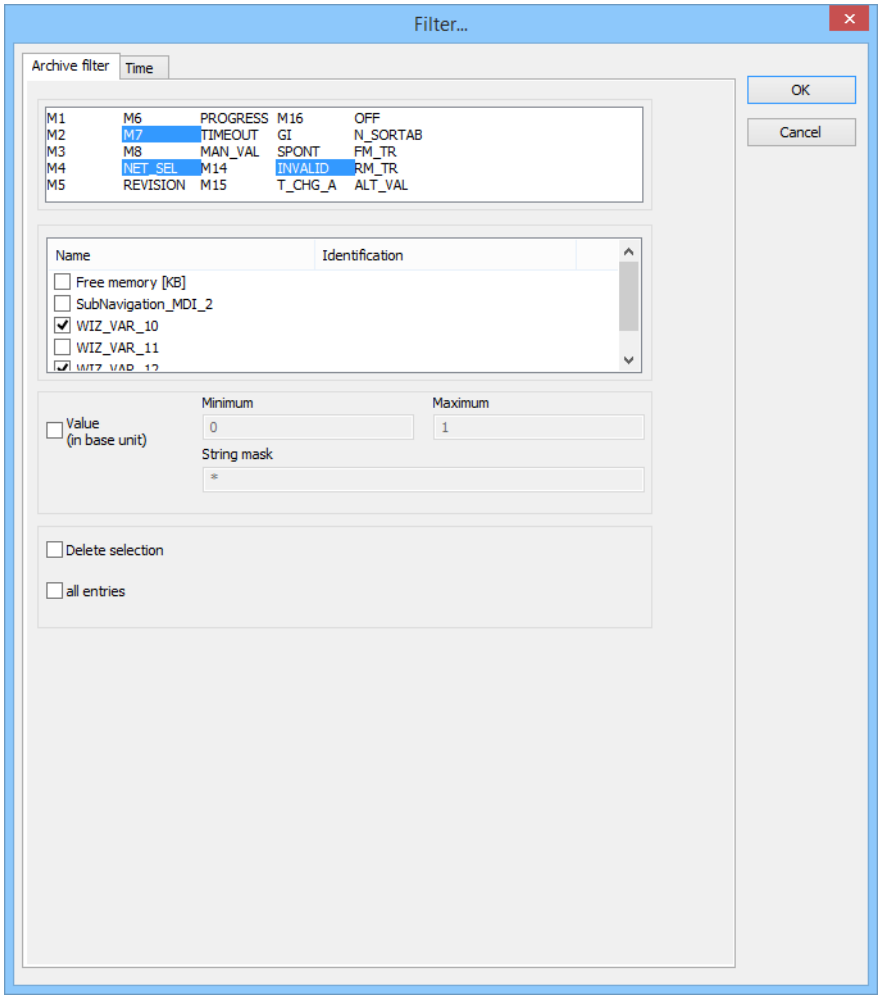
If reloading is triggered in the Runtime that is running or there is a reclassification between Server 1 and Server 2, duplicate or moved values may occur.

8.2 Select

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



Parameters	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)	`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. Input of: ▸ **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	▸ `Active`: All bold print in the list is removed when the dialog is closed. Deactivates input possibility for status bits and variables.
All entries	`Active`: 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 71) 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 th Editor.

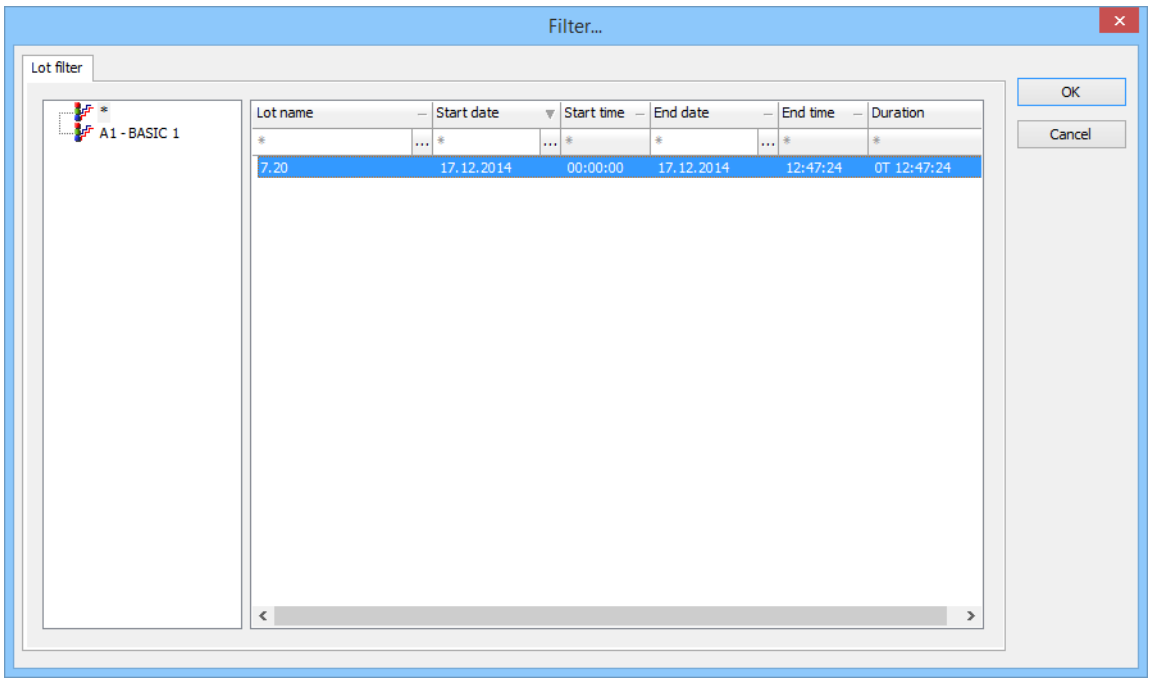
In Runtime, the time filter or lot filter is displayed when the screen is called up, depending on the configuration:

- 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 are displayed.

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



Parameters	Description
`Lot filter`	Selection of the recipe group that is to be imported. The filter consists of the two lists: ▸ `List of archives:` a list of the archives ▸ `List of lots:` List of lots allocated to the selected archive.
`List of archives`	Selection of the desired archive node `*`: ▸ Collects all lots of the displayed archive. ▸ The key is the lot name. ▸ The start time is the start time of the earliest lot. ▸ The end time is the latest end time of all lots.
`List of lots`	Display of the lots allocated to the selected archive. Filtering through entry of text, date, time or rime range - depending on type. Sort by clicking on the header.
`Lot name`	Displays the name of all available lots. Filter: Entry of a character sequence. Only lots matching the respective character string will be displayed.
`Start date`	Shows the start date of all available lots. Filter: Entry of a start date or selection from a calendar.
`Start time`	Only available if you entered a start date. Display of the start time of all available lots. Filter: Entry of a start time. `*` means `12:00:00 AM` o' clock.
`End date`	Shows the start 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 start time of all available lots. Filter: Entry of a start 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

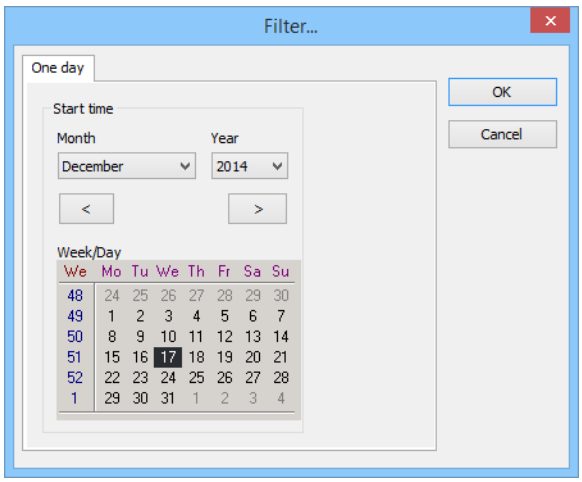
Lot filtering to archive values evacuated into SQL is carried out by means of a time filter. This time filter contains all values of the archive between the start time and end time of the lot. The lot start time and lot end time are also included. Milliseconds are not taken into account with this time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

CONFIGURATION OF TIME RANGE

The filter dialog for the time setting can be 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:



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.

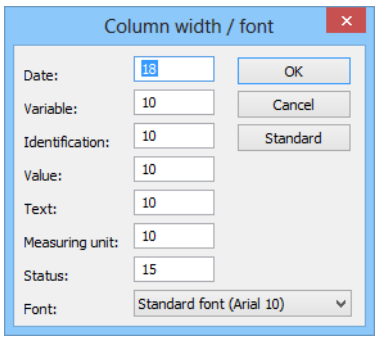
6. Restart the Runtime.

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 the font:



Parameters	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.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Standard	Sets all entries for column width to default values. The selected font is not changed.

8.5 Editing values

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

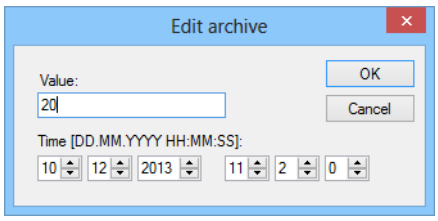
1. Highlight the entry in the list of archive data.

   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 archives are changed at the saved at the same time, all 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



Parameters	Description
Value	Entry of the new value If several values have been selected, then: ▸ 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: ▸ 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.

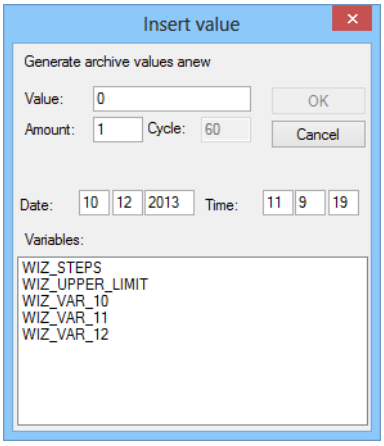
8.6 Inserting values

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.

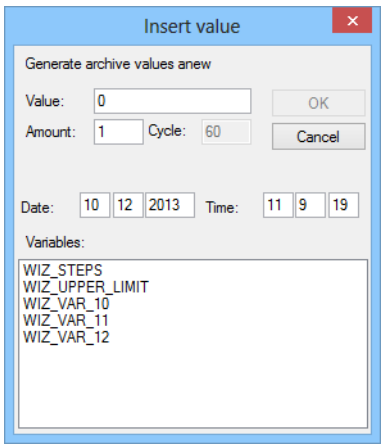
   The following happens by clicking on **OK** and the entry in the list:

   - 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



Parameters	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 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\[Workspace]\[Project]\RT\FILES\zenon\custom\lists**
3. Check the printer set for lists and formats in the File -> General configuration -> Default -> Printer -> Values and protocols for output 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 formating 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

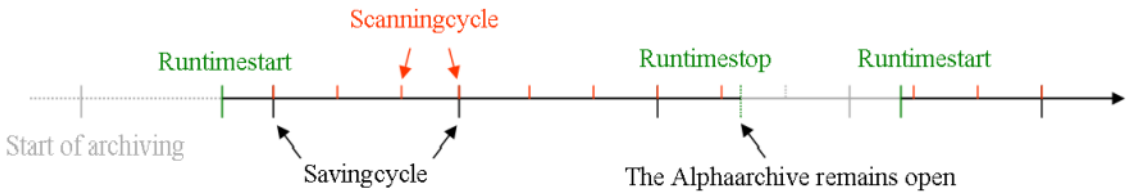
@HEADZEIT @ARCHIVNAME
Page: @SEITE ----------

Date/Timet Variable name Value Measuring unit
Status text Status

```
-----------------------------------------------------------------------------------------------------------
%%
@DATZEIT    @KANALNAME     @WERT    @EINHEIT   @AMELDUNG          @STATUS
%%
```

8.9 Cycles in Runtime

The configuration of the recording type (on page 33) and saving (on page 36) 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.

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 137)

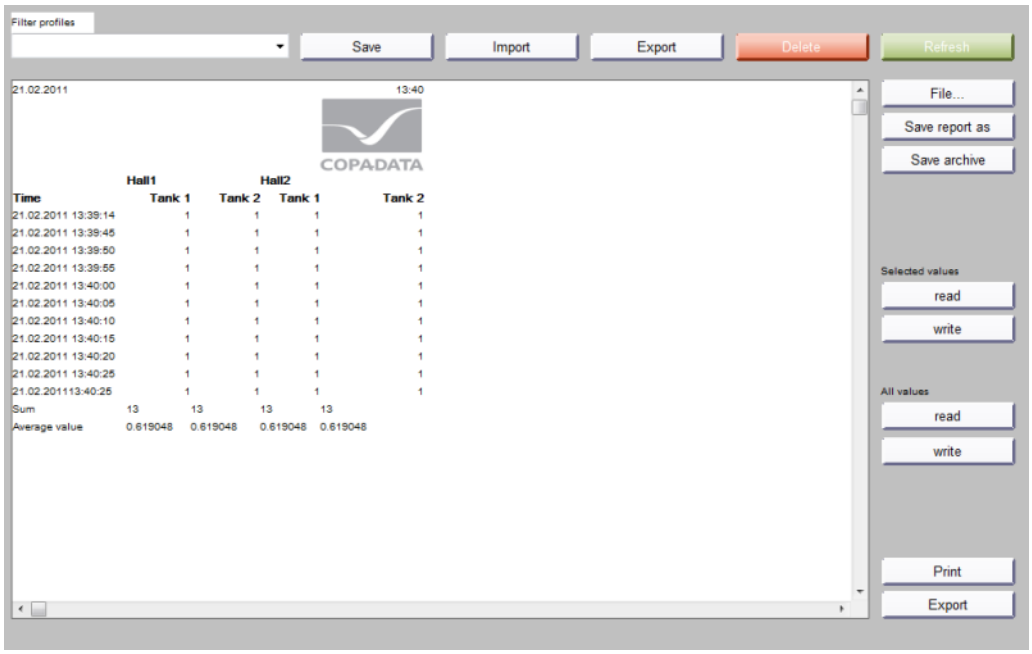
- Report Viewer (on page 140)
- Extended Trend (on page 140)

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 `value` and `time`.
`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`	Value is entered to the right (row). There must be sufficient cells left free for expected entries from further report creation. Attention: If an `archivesp` function is created with only one column, the value is entered downwards (in the column).
`bottom`	Value is entered downwards (column). There must be sufficient cells left free for expected entries from further report creation. Attention: If an `archivesp` function is created with only one row, the value is entered to the right (in the row).

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 changed 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

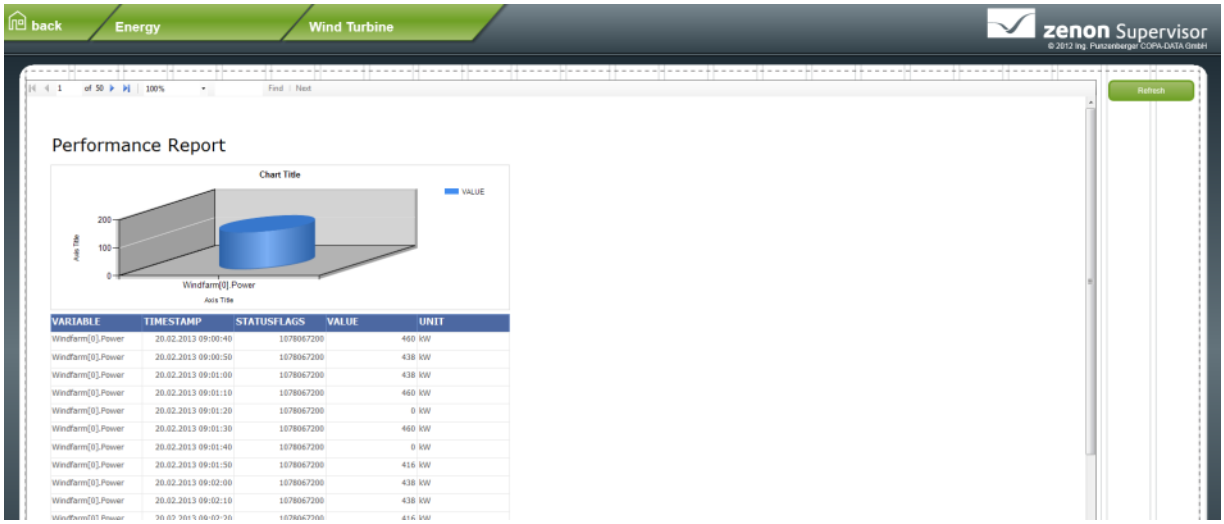
If permitted by user authorizations, archive values can also be changed in Runtime. Changes are either saved manually via the `Save` control element or automatically saved when saving a report file. The status of an amended entry is automatically set to `manual value`.

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 can not 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

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

The Extended Trend Starter Edition has the following limitations:

- no XY trend

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

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 143).
- 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 67) 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 149), 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 sting 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. Assumptions about where strings are located in the ARS archive are misleading, as strings change their position when being edited.

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 36) tab
3. Go to the **Evacuation after storage time** section:
4. Click on **Create tables (on page 144)**.

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. 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.

SQL archives can also be evacuated to an MS Azure service bus (on page 148). To do this, the **Use MS Azure service bus for writing** option must be activated for the archive configuration in the `Save` (on page 36) tab.

Attention

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

- Problem: 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.
  The SQL export cancels during an attempt to evacuate data with duplicates.
- Solution: Remove the duplicates before evacuation in the `Archive revision` screen.

Duplicates from canceling when closing 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. Duplicates are not evacuated due to the primary key and are deleted from the Runtime folder. Originals are evacuated.

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]	Type of data reduction in aggregated archives. Up to 4 values are possible: Sum, average value, minimum, maximum. When exporting the aggregated archive to a file (e.g. .csv), the values 1 to 4 are written as strings: ▸ 1=Sum ▸ 2=Average value ▸ 3=Minimum ▸ 4=Maximum At evacuation or export to SQL the values are written as Integer in ASCII code: ▸ 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 of NOT must be zero. From zenon version 7.20, an empty string is entered instead of ZERO 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 ZERO 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 MS Azure service bus

If the **Using MS Azure Service Bus for writing** option has been activated for the SQL evacuation of an archive, all archive values 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 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\zenon7.20\CloudServices`.

Settings:

- **Zenon.ArchiveServiceBus.ConnectionString**: Corresponds to the MS Azure connection name in archive configuration (on page 36).

- **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`.

10.2.2 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 table

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.*

10.2.3 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) Configure the connection **Verbindung**.

For example with zenon 2012 Server, with the standard zenon database user `zenOnSrv`, with the password `srv_700`.

c) Test the connection.

d) 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.

10.3 RDA

More detailed information on the configuration and administration of the RDA archiving (on page 13).

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]	RDA variable that has been added to the archive. Decides on the data type (for example BYTE, WORD, DWORD, FLOAT). ▸ 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]	Number of values that to be saved. 32-bit Intel format. Set by the PLC.
Index [2]	Cycle time in milliseconds; is used for TYPE 1 and 4 . 32-bit Intel format. Set by the PLC.
Index [3]	RDA type: ▸ 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 32-bit Intel format. Set by the PLC.
Index [4]	Number of the most recent value. Should correspond to the value in **Index [1]**. 32-bit Intel format. Set by the PLC.
Index [5]	Contains data. The content depends on the type. ▸ Type 3: Values ▸ Type 4: Time stamp.
Index [6]	Contains data. The content depends on the type. ▸ Type 3: Time stamp ▸ 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** 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.	e.g. 99, 100, 114, etc.
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 154)
- TYP 4 (on page 155)

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 152)).
`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 152)).
`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 152). First saved value. Size: Depends on the zenon data type.
`Index [6]`	Saved values. ▸ 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 Sever 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.

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