![COPADATA logo — do it your way]

zenon manual

Functions and scripts

v.8.00

COPADATA
do it your way

Contents

1. Welcome to COPA-DATA help

ZENON VIDEO-TUTORIALS

You can find practical examples for project configuration with zenon in our YouTube channel. The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

GENERAL HELP

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

PROJECT SUPPORT

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

LICENSES AND MODULES

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

2. Functions and scripts

The user can influence zenon via user-defined project functions. Scripts make it possible to compile several user-defined functions and execute these in a sequence in
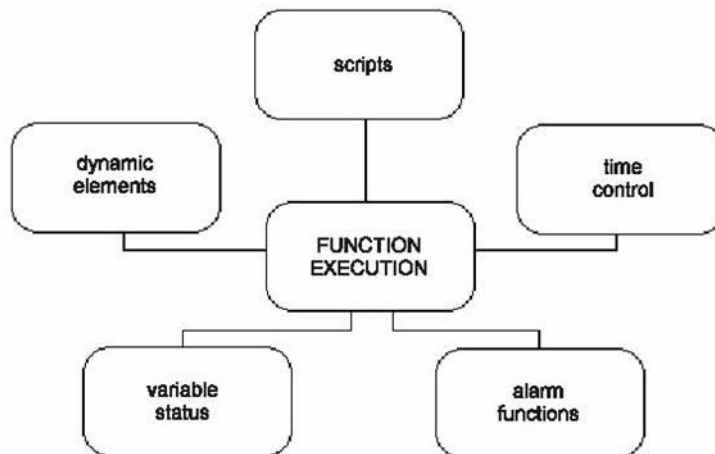
Runtime.

3. Functions

All functions used in a project are based on the existing system functions. These are pre-defined macros that are easy to use and parameterize by the user.

Functions are configured or selected using:

- ▶ The Functions node (on page 40)
- ▶ The Select functions and scripts dialog (on page 77)

3.1   Context menus and toolbar

PROJECT MANAGER

Menu item	Action
Function new	Opens a window with function selection to create a new function.
Display unused functions	Creates a project analysis for unused functions in the current project and displays it as result list in an own window.
Export all as XML	Exports all entries as an XML file.
Import XML...	Imports entries from an XML file.
Open in new window...	Opens a new window in order to view and edit the function. The window is displayed at the lower edge of the Editor as a default setting. This can be moved as desired.
Editor profile	Opens the drop-down list with predefined editor profiles.
Help	Opens online help.

DETAIL VIEW

Toolbar and context menu

Menu item	Action
Function new	Opens the dialog for creating a new function.
Parameter	Opens the dialog for entering the parameter.
Copy	Copies the selected entries to the clipboard.
Paste	Pastes the content from the clipboard. If an entry with the same name already exists, the content is pasted as "**Copy of...**".
Delete	Deletes selected entries after a confirmation from list.
Export selected as XML...	Exports all selected entries as an XML file.
Import XML	Imports entries from an XML file.
Function use...	Creates a project analysis for selected functions in the current project and displays it as result list in an own window.
Remove all filters	Removes all filter settings.
Edit selected cell	Opens the selected cell for editing. The binocular symbol in the header shows which cell has been selected in a highlighted line. Only cells that can be edited can be selected.
Replace text in selected column	Opens the dialog for searching and replacing texts.
Properties	Opens the **Properties** window.
Help	Opens online help.

3.2   Overview functions in zenon

Functions are sorted in the following groups:

- ▶ Add-In (on page 9)
- ▶ AML and CEL (on page 10)
- ▶ Application (on page 12)
- ▶ Historian (on page 14)
- ▶ Batch Control (on page 15)
- ▶ User Administration (on page 16)
- ▶ Screens (on page 17)
- ▶ Fault locating in electric grids (on page 19)
- ▶ Message Control (on page 19)

▶ Network (on page 20)

▶ Report Generator / Report Viewer / Analyzer (on page 20)

▶ Recipes (on page 35)

▶ Command Sequencer (on page 35)

▶ Shift Management (on page 36)

▶ Script (on page 36)

▶ Variable (on page 38)

▶ VBA (on page 39)

▶ VSTA (on page 39)

▶ Windows (on page 40)

> 💡 **Information**
>
> *The functions available in zenon depend on the license.*

3.2.1 Favorites

This group contains functions that you have defined as favorites.

To add functions to this group:

▶ Drag the desired functions into this group with Drag&Drop in order to be able to access them more quickly.

3.2.2 Add-In

This group contains functions for the handling of Add-ins.

Function	Description
Display dialog "Manage Runtime services"	Opens the dialog to manage the services. More in chapter:**Display dialog "Manage Runtime services"**:
Execute Project Wizard Extension	Makes it possible to execute a wizard in Runtime. More in chapter:**Execute Project Wizard Extension**:

3.2.3 AML and CEL

This group contains functions for the handling of the alarm message list (AML) and the Chronological Event List (CEL).

Function	Description
Alarms: acknowledge flashing	This function acknowledges the flashing of all elements of the currently open screen of a selected frame. More in chapter:Alarms: acknowledge flashing
Confirm alarm acknowledgement	This function deletes filtered alarms. More in chapter:Delete alarms
Acknowledge alarms	This function acknowledges filtered alarms. More in chapter:Acknowledge alarms
Alarm/event group log in/log off	This function signs the variables of the alarm/event group in or out with the driver. More in chapter:Alarm/event group log in/log off
Alarm Message List active	This function activates the entire alarm message list. More in chapter:Alarm Message List active
Alarm Message List active/inactive	This function activates/deactivates the entire alarm message list. More in chapter:Alarm Message List active/inactive
Alarm Message List inactive	This function deactivates the entire alarm message list. More in chapter:Alarm Message List inactive

Activate/deactivate Alarm Message List, alarm/event groups/classes	This function activates/deactivates an alarm/event group, an alarm/event class or the entire Alarm Message List. More in chapter:Activate/deactivate alarm message list / alarm/event groups / alarm/event classes
Export AML	This function exports filtered entries of the alarm message list to an external format. More in chapter:Export AML
Save AML and CEL ring buffer	This function saves current alarms and events to file ALARM.BIN and CEL.BIN and values from the mathematics variables (counter) in file `SY_MA32.BIN`. More in chapter:Save AML and CEL ring buffer
Export CEL	This function exports filtered entries of the Chronologic Event List (CEL) to an external format. More in chapter:Export CEL
Print AML or CEL	This function prints selected entries of the alarm list (AML) or the Chronological Event List (CEL). More in chapter:Print AML or CEL
Create/print IPA document	This function creates an IPA report and writes it to an HTML file or prints it out. More in chapter:Create document
Switch online printing on/off	This function switches on/off online printing of the alarm message list or the Chronological Event List (CEL). More in chapter:Switch online-printing on/off
Online printing start new page	In activated online printing this function finishes a page and starts a new one. The page number is reset to 1. More in chapter:Online printing start new page
Switch online printer	This function switches the online printing to a selected printer. Optionally, a dialog for the user can be opened before that. More in chapter:Switch online printer

3.2.4 Application

This group contains functions for the handling of project settings.

Function	Description
Select printer	This function opens a dialog in which the user can select printers for the different print tasks. More in chapter:Select printer (on page 45)
Print Extended Trend diagram	With the help of this function, you can print Extended Trend diagrams or save them in a file (JPG or BMP) without opening the Extended Trend screen. This function is only carried out on the server. More in chapter: Start Load Management save without having to call up an `Extended Trend` screen. More in chapter:Print Extended Trend diagram
Switch palette	Creates a function in order to switch between palettes in the Runtime. More in chapter:Switch palette
Functions active at limit values	This function activates the function administration. Automatically executed functions (e.g. via time control, limit value violation, etc.) are executed. More in chapter:Functions active at limit values (on page 45)
Functions active/inactive at limit values	This function switches the function administration on or off. Automatically executed functions (e.g. via time control, limit value violation, etc.) are not executed. More in chapter:Functions active/inactive at limit values (on page 45)
Functions inactive at limit values	This function switches the function administration off. Automatically executed functions (e.g. via time control, limit value violation, etc.) are not executed. More in chapter:Functions inactive at limit values (on page 45)
Open help	This function opens a selected help page from a CHM file. More in chapter:Open help
Start Load Management	This function starts the optimization for a selected service area in the Load Management module. This function is only carried out on the server. More in chapter:: Start Load Management
Stop Load Management	This function stops the optimization for a selected service area in the EMS module. This function is only carried out on the server. More in chapter:: Stop Load Management

Show license information	A dialog to display the version and license information can be called up with the help of this function.
	More in chapter:: Version and License information
Reload project online	This function reloads only changed or all Runtime files.
	More in chapter:Reload (on page 45)
Determine open maintenances	This function sends currently open maintenances from the IMM to status variables.
	More in chapter:Determine open maintenances
Switch on/off simulation	This function switches between simulation mode and hardware mode. The type of simulation mode or hardware mode can be selected.
	In addition, the simulation for the **Process recorder** module can also be started in playback mode.
	More in chapter:Activate/deactivate project simulation
PFS - execute user-defined event	This function executes a PFS event previously created by a user.
	More in chapter:PFS - execute user-defined event
Activate/deactivate Process Recorder playback	This function activates or deactivates the playback mode of the **Process Recorder** module.
	More in chapter:Process Recorder: Activate/deactivate playback
Simulate right click	This function interprets the next mouse click as a right click.
	More in chapter:Simulate right click (on page 47)
Save remanent data	Allows to the save the data of the configured modules.
	The choices are: AML ring buffer, CEL ring buffer, system driver and mathematics driver, internal driver, remanent images of all drivers, locking of the command processing.
	More in chapter:Save remanent data (on page 47)
Exit Runtime	This function closes the zenon Runtime.
	More in chapter:Exit Runtime (on page 46)
Analyze S7 Graph heuristics	This function makes it possible to carry out the S7 Graph heuristics without the screen S7 Graph being active.
	More in chapter:S7 Graph heuristics
Execute SAP function	Enables call up of a SAP function in the Runtime.
	More in chapter:Execute SAP function
Language switch	This function switches to a selected language in multi-lingual projects.
	More in chapter:Language switch
Topology - Search for ground fault	Call up of the short-circuit detection.

	More in chapter:Topology - Search for short-circuit
Topology - Check connections	Determines the supply state of the topological devices and depicts them on variables.
	More in chapter:Topology - LoadShedding

3.2.5   Historian

This group contains functions for the optional module Historian.

Function	Description
Archive: Stop	This function stops a selected archive of the optional module Historian.
	More in chapter:Archive: Stop
Index archive	This function indexes archives.
	More in chapter:Index archive
Archive: Start	This function starts a selected archive of the optional module Historian.
	More in chapter:Archive: Start
Export archives	This function exports filtered archive entries of the optional module Historian to an external format.
	More in chapter:Export archives
Show open archives	This function displays a list of running archives of the optional module Historian.
	More in chapter:Display open archives

3.2.6   Batch Control

This group contains functions for the Batch Control.

Function	Description
Export Batch recipes	Recipes can be exported to a XML file with the help of this function. More in chapter:Export Batch recipes
Import Batch recipes	Recipes can be imported from a XML file with the help of this function. More in chapter:Import Batch recipes
Execute recipe command/change mode	You can send control commands to the batch execution with this function. More in chapter:Execute recipe command change or mode change
Create control recipe	With the help of this function, a pre-defined control recipe can be created in the Editor by means of a button in Runtime. More in chapter:Create control recipe function

3.2.7   User Administration

This group contains functions for the User administration.

Function	Description
Change user	This function opens a dialog, where a logged-in administrator can create, edit or delete users and user groups. More in chapter:Change user
Login with dialog	This function opens the standard login dialog. More in chapter:Login with dialog
Login without password	This function logs in a selected user without asking for his password. More in chapter:Login without password
Logout	This function logs out the currently logged in user. More in chapter:Logout
Change password	This function opens a dialog in which the currently logged-in user can change their password. More in chapter:Change password

3.2.8   Screens

This group contains functions for the handling of Screens.

Function	Description
ALC source colors	Function for the configuration of the ALC source colors for the error detection in electric grids. More in chapter:ALC source colors
Screen with index	This function opens a screen with a name containing a selected variable. More in chapter:Screen with index.
Close screen	This function closes a selected screen. More in chapter:Close screen.
Screen: Return to last	This function returns to the previously opened screen of the selected frame. More in chapter:Screen: Return to last.
Delete path for "Screen: Return to last"	with this function, the path of the **Screen: Return to last** function can be deleted in Runtime. More in chapter:Delete path for "Screen: Return to last".
Screen: Move center	This function scrolls or zooms in a worldview screen. More in chapter:Screen: Move center.
Screen switch	This function opens a selected screen. Optionally, a dialog for the user can be opened before that. Note: Without dialog the function is carried out with the highest priority (1). If a dialog is called up before the execution, the priority is downgraded to high (2). More in chapter:Screen switch.
Activate input to the element with the focus	This function executed the functionality of the element, which currently has the input focus. More in chapter:Activate input to the element with the focus.
Set focus to frame	This function sets the input focus to the currently open screen of a selected frame. This allows to create projects with pure keyboard operation. More in chapter:Set focus to frame.
Move focus	This function sets the input focus to a certain element on the picture, whose frame currently has the focus. More in chapter:Move focus.
Take focus away from frame	This function takes the input focus aways from the currently open screen of a selected frame. This allows to create projects with pure keyboard operation.

	More in chapter:Take focus away from frame
Show menu	This function opens or closes a selected main menu. Optionally, a dialog for the user can be opened before that. More in chapter:Show menu.
Assign monitor	This function assigns a selected virtual monitor to a selected real monitor. Optionally, a dialog for the user can be opened before that. More in chapter:Assign monitor.
Runtime profiles	Creates a function with which the profile administration can be opened, a profile can be created or loaded in the Runtime More in chapter:Runtime profiles.
Move frame to foreground	With this function, screens that are covered by other screens in Runtime can be moved to the foreground. More in chapter:Move frame to foreground.
Close frame	This function closes the currently open screen of a selected frame. More in chapter:Close frame.
Print screenshot	This function prints out a screenshot of the whole monitor or frames in Runtime. More in chapter:Print screenshot.
Setpoint input for keyboard screen	This function sets a predefined value or writes a predefined value in the keyboard screen type. More in chapter:Setpoint input for keyboard screen.
Display overview window	This function opens an overview window. With this you can simulate a multi-monitor system on a one-monitor system. More in chapter:Display overview window.

3.2.9   Fault locating in electric grids

Contains functions for the fault locating in electric grids.

Function	Description
Acknowledge ground fault message	Function for acknowledging an earth fault message. Opens the dialog for selecting a variable. More in chapter:Acknowledge ground fault message
Stop search for ground fault	Function for closing the search for earth fault. More in chapter:Stop search for ground fault
Start search for ground fault	Function for starting the search for earth fault. More in chapter:Start search for ground fault
Acknowledge ground fault message	Function for acknowledging a short-circuit message. Opens the dialog for selecting a variable. More in chapter:Acknowledge short-circuit message

3.2.10   Message Control

This group contains functions for the optional module Message Control.

Function	Description
Save current queue	In the Runtime saves the current message queue. More in chapter:Save current queue
Group/class/area/equipment suppressed	Makes it possible to suppress the sending of messages for certain alarms. More in chapter:Suppress groups/classes/areas/equipment:
Send a Message	Creates a function for sending messages. More in chapter:Send a Message
Send Message: activate	Activates Message Control in the Runtime for the activated project. More in chapter:Send Message: activate
Send Message: deactivate	Deactivates Message Control in the Runtime for the activated project. More in chapter:Send Message: deactivate

3.2.11   Network

This group contains functions for the handling of a Network.

Function	Description
Operating authorization in the network	This function fetches or releases the authorization in a network. More in chapter:Authorization in network
Redundancy switch	This function swaps the project's Primary Server and the Standby Server, depending on the selected **Redundancy mode**: ▶ Evaluated ▶ Dominant ▶ Not dominant Note: Not available if the CE terminal serves as a data server. You can find further information in the zenon Operator manual in the CE terminal as a data server chapter. More in chapter:Redundancy switch

3.2.12   Report Generator / Report Viewer / Analyzer

This group contains functions for:

▶   Report Generator

▶   Report Viewer

▶   zenon Analyzer (on page 21)

Function	Description
Analyzer: Create report	Event-controlled report creation makes it possible to use an event as a trigger for the creation and dispatch of a report in the COPA-DATA product zenon Analyzer; a value change for example. More in chapter:**zenon Analyzer** (on page 21)
Report Generator: execute	This function executes a selected report of the optional module Report Generator. More in chapter:Report: execute
Print Report Generator	This function prints a selected report of the optional module Report Generator. More in chapter:Print report
Export Report Generator	This function exports a selected report of the optional module Report Generator to an external format. More in chapter:Export Report
Report Viewer: export/print	Makes it possible to issue reports in Runtime as a PDF or online print. More in chapter:Export or print report.

zenon Analyzer

zenon provides functions that make the exchange of data with the COPA-DATA product zenon Analyzer more easy.

EVENT-DRIVEN REPORT CREATION

Event-triggered report creation makes it possible to use an event - such as a change of value, for instance - as a trigger for the creation and sending of a report.These reports can be created by means of a zenon function (on page 22).
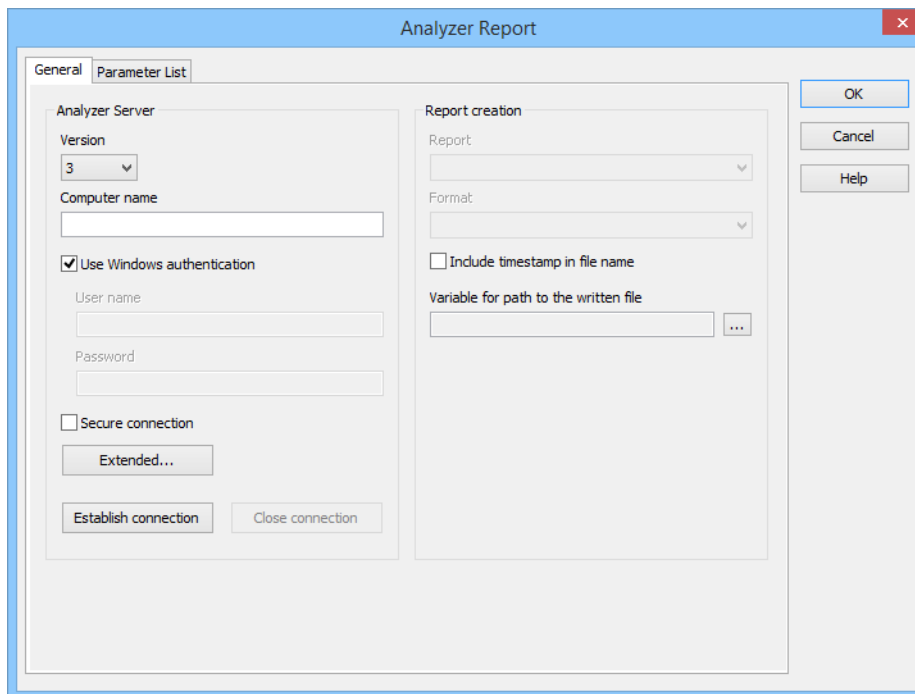
Create an Analyzer report using the zenon function

REQUIREMENTS

In order for you to be able to create an event-triggered report for the zenon Analyzer via the zenon **Analyzer: Create report** function, the following requirements must be met:

- ▶ zenon version 7.20 or higher

- ▶ Connection with corresponding rights to an Analyzer server version 2 or higher

- ▶ **Analyzer Server Wrapper** must be installed. Installation is carried out by means of a selection item in the zenon setup.

- ▶ Runtime and Editor must both be restarted after installation of the **Analyzer Server Wrapper**, so that they can find the installed **Analyzer Server Wrapper** DLLs.

- ▶ Recommendation: In order to be sure that the Windows authentication works, the Analyzer server should be in the same domain as zenon Editor and zenon Runtime.

PROBLEM SOLUTION

▶ Communication problems with the Analyzer server: Check the communication in the network as well as the authentication (user and access rights).

▶ Reports are rendered but do not contain any data: Check the license of the Analyzer server:

CREATING A FUNCTION

To create the function:

1. Create a new function in the zenon Editor.

2. Navigate to the **Report Generator/Report Viewer/Analyzer** group in the selection dialog.
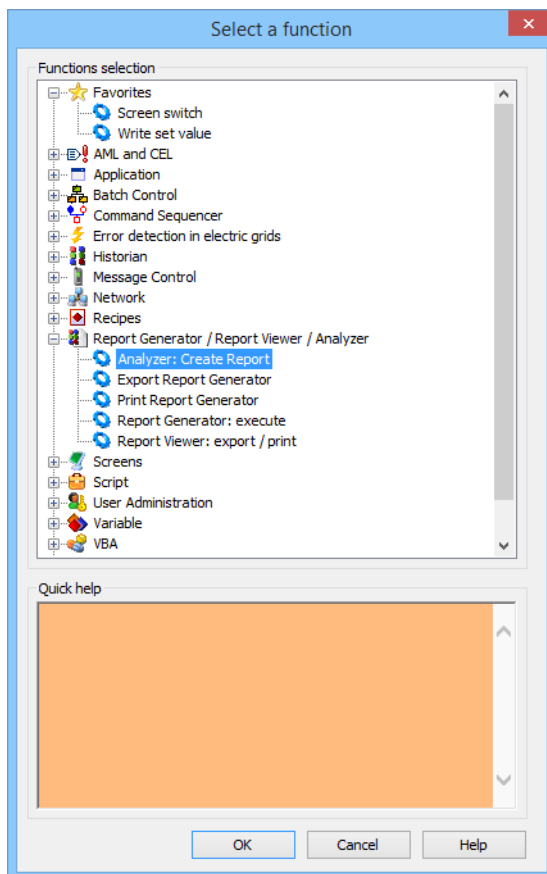
3. Select the **Analyzer: Create Report** function.

4. The dialog for configuration is opened:

5. Configure, in the **General settings** (on page 24) tab, the connection parameters and select the desired report.

   Attention: Before a switch is made to the second tab, a connection must be made and a report must be selected!

6. Configure the report properties in the **Parameter list** (on page 28) tab.
   When switching to the second tab, an attempt is made to set values that already exist for the parameter input. If this is not successful, the list of set parameter values is displayed as empty.

   Defaults can be replaced by individual values. To do this, deactivate the checkbox in front of the value and click on the value. A dialog to enter the new value is opened

7. Connect the function with a button or an event in order to be able to access it in Runtime

PROCEDURE IN RUNTIME

Procedure when triggering the function to create a report in Runtime:

1. The configured connection is established.

2. The selected report is set.

3. The selected parameter values are set for this report.

4. The report is created and output in the desired form.

5. The file name is generated and the file is saved in the export folder of the project.

6. The complete file name is written to the selected variable.

General settings
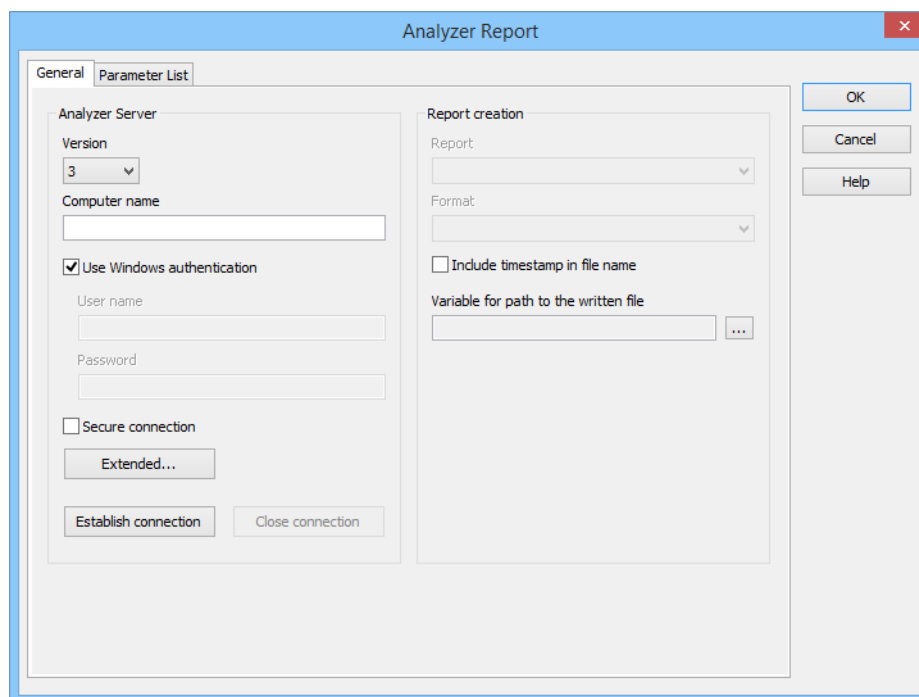
In this tab, the connection to the Analyzer server is configured and selected in the report. Before you switch to the **Parameter list** tab:

▶ The connection to the Analyzer Server must be established

▶ This tab must be configured in full

The options that are available in the **Parameter list** tab depend on your selection for the **Report** option.

GENERAL SETTINGS TAB

ANALYZER SERVER

Option	Description
Analyzer Server	Configuration of the connection to the Analyzer server.
Version	Select the version of the Analyzer server from the drop-down list. Only available if there is no connection.
Computer name	Entry of the name of the computer on which the Analyzer server runs. Only available if there is no connection.
Use Windows authentication	Selection of the type of authentication: ▸ `Active`: Windows authentication is used. ▸ `Inactive`: The user must enter the user name and password.
User name	Entry of the user name. Only available if **Use Windows authentication** is `inactive` and there is no connection.
Password	Entry of the password for authentication. The characters entered are not shown and the length of the password is hidden. The password is saved in encrypted form and is only decrypted to establish a connection. Only available if **Use Windows authentication** is `inactive` and there is no connection.
Secure connection	`Active`: The connection is established as secure. Only available for zenon Analyzer from version 3.00.
Extended	Advanced settings for the connection waiting time. This can be a maximum of 1 day. Clicking on the button opens the dialog for configuration. (on page 30) Only available for zenon Analyzer from version 3.00.
Establish connection	Clicking on the button establishes a connection to the analyzer server. Once the connection has been successfully established, the drop-down lists for **report** and **format** are updated.
Close connection	Clicking on the button disconnects the existing connection.

REPORT CREATION

Option	Description
Report creation	Configuration of the basis data for the report.

Report	Selection of the report from a drop-down list.
Format	Selection of the output format from a drop-down list: ▸ CSV ▸ Excel ▸ MHTML (Web Archive) ▸ PDF ▸ TIFF file ▸ Word ▸ XML file with report data
Include time stamp in file name	▸ Active: The execution time stamp is included in the file name. Sequence of file name creation: ▸ The report name without a path is the starting point. Example: **Alarms** ▸ The time stamp is then added if activated. Example on 15/8/2014 at 15:20:00: **Alarms_2014_08_15_15_20_00** ▸ The file name extension is then added according to the selected output format. Example: **Alarms_2014_08_15_15_20_00.pdf** ▸ If there is already a file with this name in the export folder of the project, a counter is added until the file name is unique. Example: **Alarms_2014_08_15_15_20_00.pdf** **Alarms_2014_08_15_15_20_00 (2).pdf** **Alarms_2014_08_15_15_20_00 (3).pdf**
Variable for path to file created	Shows the currently-selected zenon variable that gets the path to the written report file. Click on button **...** in order to open the dialog for selecting a variable. Hint: Thus when a lot archive is closed or if a limit value is breached, a script can send an event-triggered report by E-mail from zenon. In doing so, this variable is used to define the attachment of the Message Control function **Send a Message**. Procedure: ▸ Firstly, the report function that writes the variable is executed. ▸ Then the **Send a Message** function is executed, which reads the attachment path from the variables.

CLOSE DIALOG

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

Parameter List

You configure the report parameters in this tab. The controls that are offered depend on the selection of the report in the **General settings** tab.

PARAMETER LIST TAB

Option	Description
Parameter List	Display of the report parameters. The sequence corresponds to the sequence in the report. **Recommendation:** Configure the parameters from top to bottom.
Parameter Name	Display of the parameter name. Cannot be configured here.
Standard	Defines whether the parameter is set to its default value. ▸ `Active`: The default value from the report is used. ▸ `Inactive`: The value is selected individually by clicking in the **Value** column. Clicking with the mouse or pressing the space key with the parameter highlighted switches the checkbox. If a parameter doesn't have a default value, the checkbox is grayed out and inactive.
Value	Display of the current value of the parameter. ▸ If the **Standard** checkbox is activated, the text **default value** is displayed here and the cell does not allow any input. ▸ If the **Standard** checkbox is deactivated, the currently-configured value is shown here. Clicking on the cell or pressing the Enter key with the parameter highlighted opens the input dialog (on page 30) for the respective value. If a parameter cannot be entered, the text **not available** is displayed and the cell is deactivated. This can mean, for example, that values for a different parameter must be set first in order to fill the list of values.

CLOSE DIALOG

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

Hint: lot/shift reports

In Runtime, the value of a zenon string variable is read. A search for this string as a label is carried out in the list of predefined values for the parameter. The value of the label to be corresponded to is then the parameter value, i.e. the selected shift or lot.

The lot variables of a lot archive can be used here. For the lot report, carry out the **Analyzer: Create report** function when closing the lot archive. The report then has the last lot of this archive as a time filter.

Advanced settings for secure connection

Configuration of the connection waiting time. The dialog is opened by clicking on the **Advanced** button in the **General Settings** (on page 24) tab.
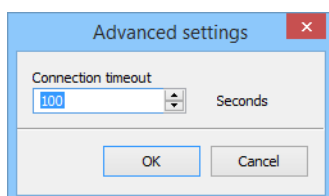
Parameters	Description
Connection timeout	Waiting time for establishing a connection in seconds. The establishment of the connection is canceled if this is exceeded.
	▸ Minimum: `1`
	▸ Maximum: `86400` (1 day)
	Default: `100`
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.

Configuration of the values

For the configuration of the parameter values, there are appropriate dialogs available for each input. The configuration is carried out depending on the input possibility for:

- ▸ A value without a predefined value: Entry of the value.
- ▸ Several values without predefined values: Entry of the values and adding to a list.
- ▸ A value with predefined value: Selection from drop-down list or list.
- ▸ Several values with pre-defined values: Select from list.

Whether a value can be configured can depend on whether the previous value has been selected. For example, projects whose archives and variables can be configured must be selected.
The dialogs that are offered depend on the report selection:

Examples of frequently-used dialogs:

EQUIPMENT GROUPS

Selection of desired equipment groups:
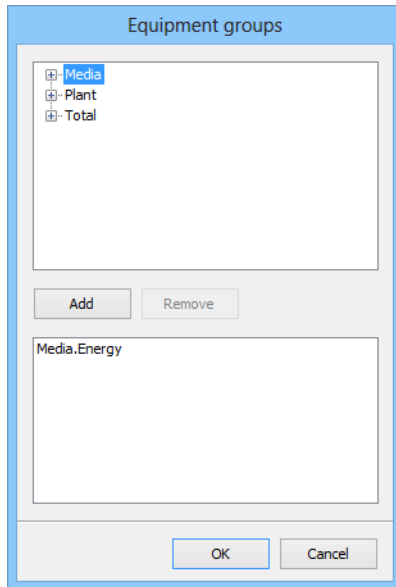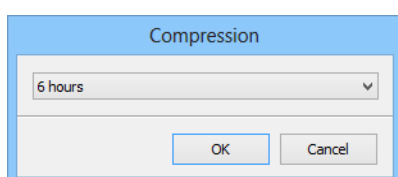
1. Select the desired equipment groups in the top list.

2. Click on **Add**.
    The selected groups are added to the lower list.

3. If you want to remove equipment groups again, highlight these in the lower list and click on
    Remove.

4. To transfer all selected equipment groups to the report, click on **OK**.

ARCHIVES
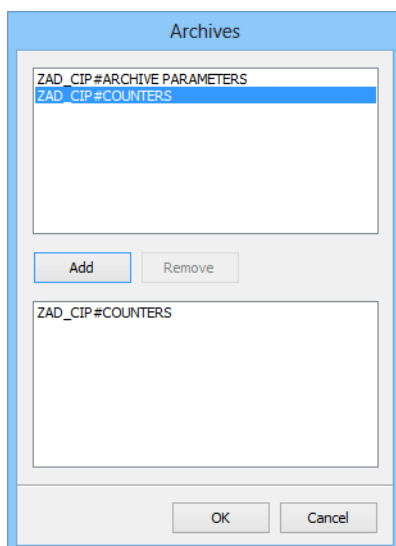
1. Select the desired archive in the upper list.

2. Click on **Add**.
    the selected archives are added to the lower list.

3. If you want to remove archives again, highlight these in the lower list and click on **Remove**.

4. To transfer all selected archives groups to the report, click on **OK**.
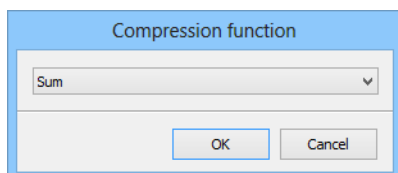
COMPRESSION

1. Select the desired compression from the drop-down list

2. Click on **OK**.

COMPRESSION FUNCTION

1. Select the desired compression function from the drop-down list.

2. Click on **OK**.

PROJECTS
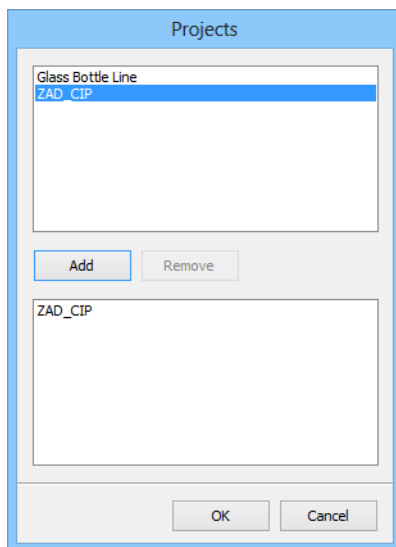
1. Select the desired project in the upper list.

2. Click on **Add**.
    the selected projects are added to the lower list.

3. If you want to remove projects again, highlight these in the lower list and click on **Remove**.

4. To transfer all selected projects to the report, click on **OK**.
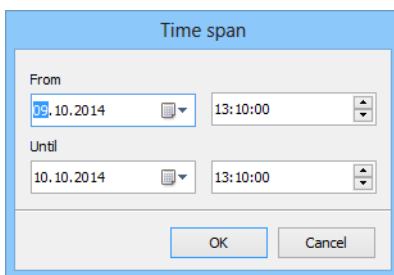
VARIABLES

Selection of the desired variables.
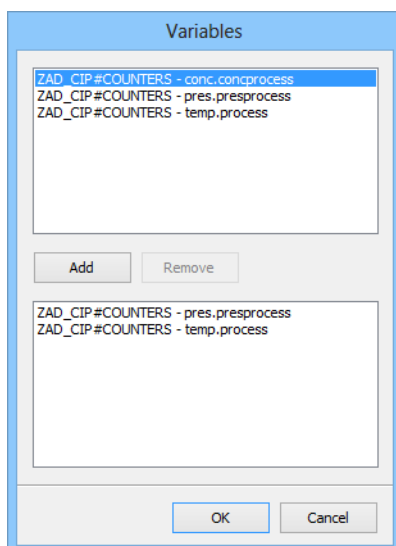
1. Select the desired variables in the upper list.

2. Click on **Add**.
   The selected variables are added to the lower list.

3. If you want to remove variables, highlight these in the lower list and click on **Remove**.

4. To transfer all selected variables to the report, click on **OK**.

TIME PERIOD

1. Select the desired date and the time for

   a) **From**

   b) **To**

2. Click on **OK**.

3.2.13   Recipes

This group contains functions for the handling of Standard Recipes and recipes of the optional module Recipegroup Manager.

Function	Description
Recipe Group Manager	This function writes, reads, copies, imports or exports a selected recipe of the optional module Recipegroup Manager (RGM). Optionally, a dialog for the user can be opened before that. More in chapter:Recipegroup Manager
Standard Recipe	This function writes, reads, copies, imports or exports a selected standard recipe. Optionally, a dialog for the user can be opened before that. More in chapter:Standard recipe
Standard Recipe single directly	This function sends the values of a selected standard recipe to the PLC. More in chapter:Standard Recipe single directly
Standard Recipe single with dialog	This function opens a dialog in which the user can edit or execute a standard recipe. More in chapter:Standard Recipe single with dialog
Standard Recipe single with online dialog	This function opens a dialog in which the user can select and execute or edit a standard recipe. More in chapter:Standard Recipe single with online dialog

3.2.14   Command Sequencer

This group contains functions for the optional Historian module.

Function	Description
Export command sequences	Exports configured command sequences as an XML file. More in chapter:Export command sequences.
Import command sequences	Imports configured command sequences from an XML file. More in chapter:Import command sequences.
Teach command sequences	Start or stop the teaching process in Runtime using this button. This function is particularly suitable for starting teaching in Runtime in a process screen, without having to switch to the command sequence editor. More in chapter:Teach command sequences
Execute command sequences command/mode switching	You can send control commands to the command sequence execution with this function. More in chapter:Execute command sequence or mode change

3.2.15   Shift Management

This group contains functions for the handling of shift management.

Function	Description
SQL export shift calendar	These functions allow the creation and editing of shift occurrences.

3.2.16   Script

This group contains functions for the handling of Scripts (on page 72).

Function	Description
Script: execute	This function executes a selected script. More in chapter:Script: execute (on page 72)
Script: select online	This function opens a dialog in which the user can select and execute a

	script.
	More in chapter:Script: select online (on page 72)

3.2.17 Variable

This group contains functions for the handling of Variables.

Function	Description
Export data	This function exports values of selected variables saved on the hard disk (*.HDD) to an external format. More in chapter:Export data
Read dBase file	This function reads a selected dBase file and executes it as a recipe. More in chapter:Read dBase file
Print current values	This function prints current values of selected variables. More in chapter:Print current values
Measuring unit conversion	Switches from basic unit to conversion unit. More in chapter:Unit conversion
HD administration inactive	This function switches hard disk data storage off. HDD files are not written. More in chapter:HD administration inactive
HD administration active	This function switches hard disk data storage on. HDD files are written. More in chapter:HD administration active
HD administration inactive/active	This function switches hard disk data storage on or off. HDD files are (not) written. More in chapter:HD administration inactive/active
Write set value	This function sends a new value for a selected variable to the PLC. More in chapter:Write set value
Driver commands	This function sends a selected command to a selected driver. Optionally, a dialog for the user can be opened before that. More in chapter:Driver Commands
Transfer driver simulation image to the Standby Server	Is only carried out at the Standby Standby Server. Demands an image for the selected drivers from the server when it is executed. The driver has 5 seconds of time for this. More in chapter:Transfer driver simulation image to the standby
Write time to variable	This function reads the system time of the operating system and writes it to a string variable in the PLC. This way, the system time of the PLC can be synchronized with the operating system. More in chapter:Write time to variable
Read time from variable	This function reads the time from a string variable of the PLC and sets the system time of the operating system accordingly. This way, the system time of the PLC can be synchronized with the operating system. More in chapter:Read time from variable

3.2.18 VBA

This group contains functions for the handling of VBA (on page 6) macros.

Function	Description
Open PCE editor	This function opens the editor of the optional module Process Control Engine (PCE). More in chapter:**Open PCE editor**
Open VBA Editor	This function opens the VBA editor. More in chapter:**Open VBA Editor**
Execute VBA m (on page 6)acro	This function executes a selected VBA macro. **Attention:** The VBA Event `project inactive` is carried out by script `AUTO_END_xxx`. Therefore the zenon function **Execute VBA macro** is no longer executed in scripts as VBA is not running at this time. VBA macros which should be carried out in "AUTOEND" must be called via Project.Inactive. More in chapter:**Execute VBA macro** and **functions in zenon**.
Display VBA macro dialog	This function opens the VBA macro dialog. More in chapter:**Show VBA macro dialog**

3.2.19 VSTA

This group contains functions for the handling of VSTA.

Function	Description
Open VSTA editor	This function opens the VSTA editor. More in chapter:Open VSTA Editor
Execute VSTA macro	This function executes a selected VSTA macro. More in chapter:Execute VSTA macro
Display VSTA macro dialog	This function opens the VSTA macro dialog. More in chapter:Show VSTA macro dialog

3.2.20   Windows

This group contains functions for the handling of operating system functionality.

Function	Description
Play audio file	This function plays a selected audio file (*.wav) once. More in chapter:Play audio file (on page 48)
File operations	This function copies, deletes or moves selected files. Optionally, a dialog for the user can be opened before that. More in chapter:File operations (on page 49)
Start continuous tone	This function plays a selected audio file (*.wav) continuously. More in chapter:Start continuous tone (on page 51)
Stop continuous tone	This function stops the continuous playing of a audio file (*.wav). More in chapter:Stop continuous tone (on page 51)
Window to the background	This function switches the zenon Runtime to the background. More in chapter:Window to the background (on page 51)
Window to foreground	This function switches the zenon Runtime to the foreground. More in chapter:Window to foreground (on page 51)
Print screenshot	This function prints either the current screen or the currently open screen of a selected frame. Optionally the print-out can be routed to a fax. More in chapter:Print screenshot
Start program	This function starts an external program. Transfer parameters can be defined. Optionally, a dialog for the user can be opened before that. More in chapter:Start program (on page 52)

3.3   Engineering in the Editor

You can configure functions in Runtime in the zenon Editor.

3.3.1   Creating and editing functions

In the context menu of the entry **Functions**   in the Project Manager the following commands are available:
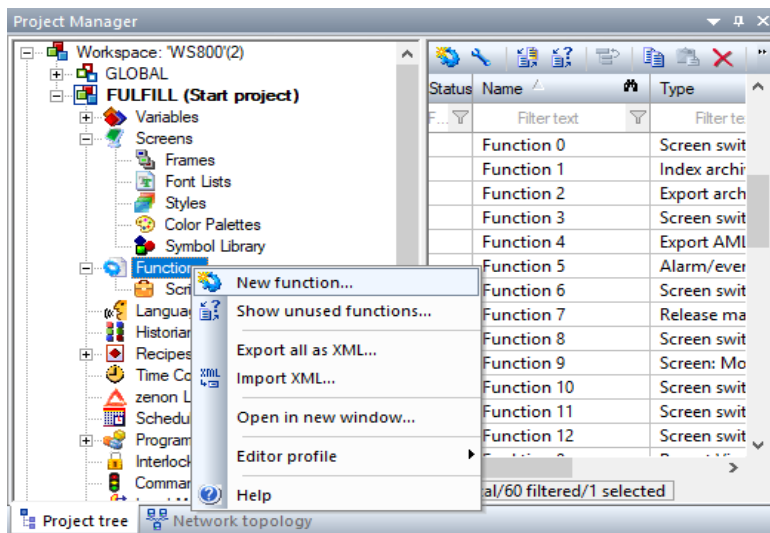
Parameter	Description
Function new ...	A new function is created and can be defined in the properties window.
Show unused functions...	Opens the Project analysis in the main window and shows unused functions.
Export all as XML	Export all functions to an XML file See chapter Import/Export.
Import XML ...	Import functions from an XML file. See chapter Import/Export.
Open in new window...	Opens the detailview of the functions in a new window.
Editor profile	See tool bar editor profiles chapter.

3.3.2   Selecting a function

In order to create a new function, select the entry `New function`. The function selection dialog opens. If a function is selected, you will find a dialog help in the lower part of the dialog. There the selected function is explained. You will find more information in the chapter Overview functions (on page 8).
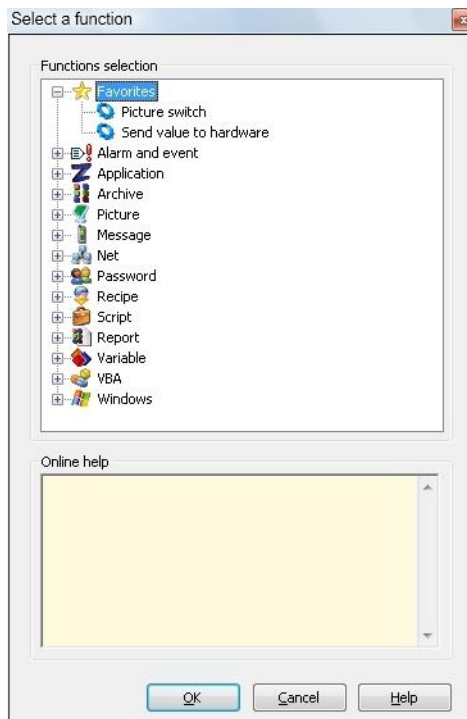
A function is created after you have selected it and confirmed with **OK**. The parameters of this new function can now be defined in the properties window.

If you press the **Help** button in the Dialog after the selection, you will be forwarded directly to the corresponding function in the online help.

Similar to the properties window also here an individually definable favourite view is available. The node **Favorites** is always at the top of the list. As a default it contains the functions **Screen switch** and **Write set value**. Any function can be added to or removed from the favourites with the context menu or by Drag&Drop.

If a function is selected, you will find a dialog help in the lower part of the dialog. You will find more information on the single functions in the chapter Overview functions (on page 8).

3.3.3   Deleting functions

In order to delete a function, the function has to be selected in the detail view and deleted with the `DEL key`.

3.3.4 Inserting functions from other projects

It is possible to insert functions from other projects of the same workspace.

This is possible for screens (Screen Start-end Function, Buttons), limit values, time control, scheduler, scripts, menus, projects (automatic function execution, archive).

3.4 System functions

System functions are not limited to one module. They have an effect on the complete zenon project configuration and control computer settings such as the selection of a printer for example.

3.4.1 Application - functions

General zenon functions

Parameter	Description
Select printer	This function opens a dialog in which the user can select printers for the different print tasks. Note: This function is not available for CE devices.
Start Load Management	
Stop Load Management	
Print Extended Trend diagram	With the help of this function you can print diagrams of the extended trend or save them in a file (JPG or BMP) without opening the screen Extended Trend.
Switch palette	Creates a function in order to switch between palettes in the Runtime.
Functions active at limit values	This function activates the function administration. Automatically executed functions (e.g. via time control, limit value violation, etc.) are executed.
Functions active/inactive at limit values	This function switches the function administration on or off. Automatically executed functions (e.g. via time control, limit value violation, etc.) are (not) executed.
Functions inactive at limit values	This function switches the function administration off. Automatically executed functions (e.g. via time control, limit value violation, etc.) are not executed.
Open help	This function opens a selected help page from a CHM file.
Reload project online	This function reloads amended Runtime files in the Editor.
Simulate right click	This function interprets the next mouse click as a right click.
Save remanent data	Allows to the save the data of the configured modules. The choices are: AML ring buffer, CEL ring buffer, system driver and mathematics driver, internal driver, remanent images of all drivers and locking of the Command Processing.
Exit Runtime	This function ends the Runtime of the control system.
Execute SAP function	Carries out an SAP function defined in the SAP interface in the Runtime. The SAP function in turn triggers a remote function call (RFC) in the SAP system.
Language switch	This function switches to a selected language in multi-lingual projects.

Select printer

The printers for the different lists are generally defined in the Standard Configuration.

This function is used to change the printer selection during online operation. This function needs no parameters.

The settings of the printers are done as described in the chapter Configuration/Standard/Printer.

Functions active at limit value

With this function you activate the administration of the limit value functions in the Runtime.

Functions inactive at limit value

With this function you deactivate the administration of the limit value functions in the Runtime.

Function active/inactive at limit value

With this function you can switch limit value functions between states 0 and 1 in the Runtime. The status stored in the `zenon6.ini` file will be loaded when the Runtime is started:

`[FUNKTIONEN]`

ON=0 -> inactive

ON=1 -> active

Reload

This function loads changed Runtime files, without having to restart the Runtime.

💡 Information

If the names of the server or Standby Server are changed in the Editor, these cannot be loaded subsequently. They are only updated by restarting Runtime.

> ⚠ **Attention**
>
> *PNG graphics files cannot be overwritten if they are currently being displayed in Runtime.*
>
> *Background: The Runtime protects opened .png files. This prevents these being overwritten.*
>
> *Solution: Before Remote Transport is instigated, it must be ensured that screens with **.png* files:*
>
> ▸ Are not called up in Runtime
>
> ▸ Are not being used by another program
>
> *This also applies for the reloading of amended Runtime files. The Runtime sync in the network does not work for a **.png* screen if this is switched on a zenon computer that is involved in the process (standby server, client).*

RELOADING DELAYED BY THE SYSTEM

The reloading of Runtime is moved back to a later time by the system if:

▸ The user opens a context menu or a dialog

▸ A message box is shown

The reloading is only carried out in this case if these elements are closed again.

Exit program

This function is used to exit th Runtime in a defined way (logging in CEL, close the archives, execute the AUTOEND script etc.).

No transfer parameters are needed.

> ⚠ **Attention**
>
> ▸ The VBA Event **project inactive** is carried out by script **AUTO_END_xxx**. Therefore the zenon function **Execute VBA macro** is no longer executed in scripts as VBA is not running at this time. VBA macros that should be carried out in "AUTO_END" must be called up via Project.Inactive.
>
> ▸ Cyclical archives must not be given in the `AUTOEND` script.

Simulate right click

After executing this function in the Runtime the next mouse click or the next touch on the touchscreen is interpreted as a click with the right mouse button.

With this function it is possible to use context menus also on touchscreens.

No transfer parameters are needed.

Save remanent data

Function **Save remanent data** makes it possible to save remanent data at any time in the Runtime. The function can be imported and exported. In order to configure the function:

1. select New Function

2. navigate to node Applications

3. select **Save remanent data**

4. the dialog for the selection of the modules opens.
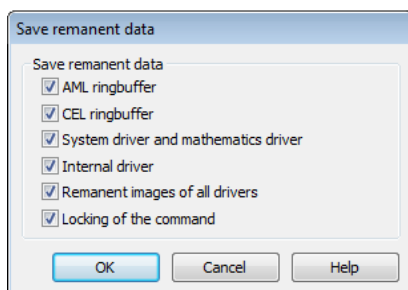
Module	Description
AML ringbuffer	`Active:` AML ring buffer is saved.
CEL ringbuffer	`Active:` CEL ring buffer is saved.
System driver and mathematics driver	`Active:` Data of the system driver and of the mathematics driver are saved.
Internal driver	`Active:` Data of the internal driver are saved.
Remanent images of all drivers	`Active:` Data of all drivers are saved.
Locking of the Command Processing	`Active:` Data of the locking of the command processing are saved.

If errors occur during the saving process, they are written to the error protocol.

> ### 💡 Information
>
> *If the Runtime runs in simulation mode (project simulation active), function **Save remanent data** does not save values from the following drivers:*

▸ Internal driver

▸ mathematics driver

▸ system driver

3.4.2   Windows - Functions

Functions that trigger something in the operating system.

Parameters	Description
Play audio file	This function plays a selected audio file (*.wav) once.
File operations	This function copies, deletes or moves selected files. Optionally, a dialog for the user can be opened before that.
Start continuous tone	This function plays a selected audio file (*.wav) continuously.
Stop continuous tone	This function stops the continuous playing of a audio file (*.wav).
Window to the background	This function switches the Runtime of the control system to the background.
Window to foreground	This function switches the zenon Runtime to the foreground. Attention: At switch to foreground the alarm status bar is overlaid.
Start program	This function starts an external program. Transfer parameters can be defined. Optionally, a dialog for the user can be opened before that.

Play audio file

This function is used to play the indicated audio file (*.wav) once whenever the function is called in the Runtime. Provide the audio file as transfer parameter.
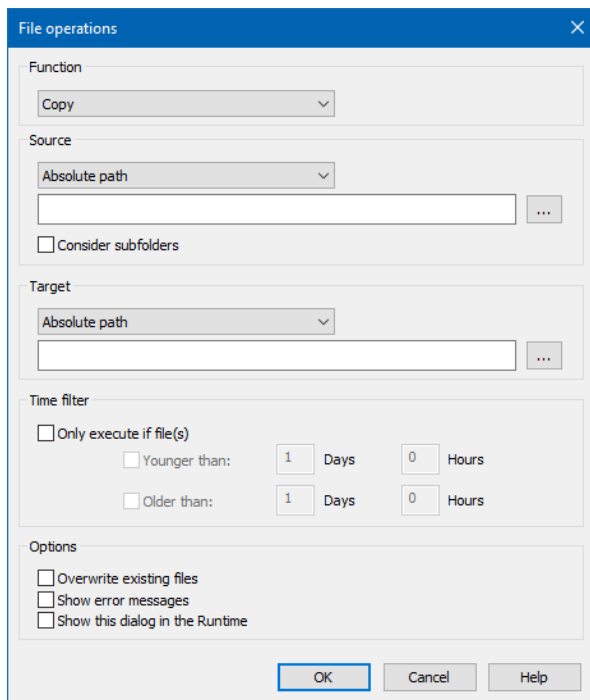
File Operations

A file operation (copy, move or delete) can be carried out by using this function.
The file operation and file parameters are to be given as transfer parameters. This function is configured via an input dialog.

Note: Copying and moving of several files with the same renaming of the file extension is not possible.

POSSIBLE FILE OPERATIONS:

Parameter	Description
Copy	copies files from one name and path to a new name and path. Transfer parameters are considered.
Move	Moves files from one name and path to a new name and path and deletes them in source path. Transfer parameters are considered.
Delete	Delete files. Transfer parameters are considered. Attention: Files are not saved in the Windows Recycle Bin, but are deleted directly and permanently.

If the given source cannot be found (file or path is not present or incorrect), the function will not be executed. By default, no error message is generated. You can also force an error message via the options; we do not recommend this, as this might block the runtime or the processing of other functions.

Additional options can be configured after the file operation is defined.

Parameter	Description
Source/Target	Enter the path to source and target. You can also use wild cards (*) for source and target. (Wildcards are only allowed as prefix or suffix; e.g. *xxx or xxx*.) There are three ways of defining a path: ▸ absolute (You can also use the button '...' next to the text field). ▸ relative according to runtime folder (Link: more about the runtime folder) ▸ relative according to the data folder. (Link: more about the data folder). For example: **absolute:** Source `C:\temp\datenbank.mdb` to target `D:\backup\` -> The file 'database.mdb'is copied to the directory `D:\backup\`. In order for the copying to work, the target directory must already exist and it must be followed by a backslash. **relative:** relative according to the data directory: '*.aml' to target `D:\backup\` copies all files of the alarm list to the folder `D:\backup\`. **Rename files**: It is possible to rename single files. For example: `C:\temp\datenbank.mdb` to target `D:\backup\backupdb.mdb` copies the file `datenbank.mdb` to the directory `D:\backup\` and renames it to `backupdb.mdb`. Renaming several files simultaneously with wild cards is not possible.
Consider subfolders	Looks for files also in the sub folder of the source path and creates that tree structure in the target directory. **Attention:** In conjunction with the `Delete` option, files and folders are not stored in the Recycle Bin but are deleted directly and permanently.
Overwrite existing files	If the source file already exists in the destination directory, it will be overwritten by the new file.
Display error messages	If copying or moving file is not possible, an error message is displayed as system message We do not recommend to activate this option, as it may block the runtime or the processing of other functions.
Show this dialog in the Runtime	Before the function is executed in online operation, a dialog box is loaded, which allows to adjust parameters (file operation, source, target etc.). The modified settings remain during the runtime of the online operation. In this dialog box, the option dialog box before execution is missing.
Only execute if file(s)	File operation is executed only when time criterion was defined (days, hours).

older than	The file must be older than the entered time. '1 day' always means 24 hours after execution time.
newer than	The file must be more up to date than the entered time. '1 day' always means 24 hours after execution time. Note: 'older than' must be greater than 'younger than'.

Start continuous tone

By using this function the defined audio file (*.wav) is played repeatedly in the Runtime via a function call until function **Stop continuous tone** is executed. Provide the audio file as transfer parameter.

Stop continuous tone

This function stops the repeated playing of an audio file (*.wav) which has been started via function **Start continuous tone**.

Window to the background

With this function the zenon window is switched to the background in the Runtime. The entry SYSKEY in the file `project.ini` is not regarded. The selection of other applications (program manager) is possible.

[DEFAULT]	
...	
SYSKEY=	0 - system keys active
	1 - system keys blocked (default)

No transfer parameters are needed.

Window to foreground

With this function the zenon window is switched to the foreground in the Runtime. All other applications are switched to the background (Exception: applications with the **Always in the foreground** setting). The entry **SYSKEY** in the file **project.ini** is regarded.

Entry	Meaning
[DEFAULT]	
SYSKEY=	Block or activation of the system keys:
	▸ `0:` System keys active
	▸ `1:` System keys blocked (default)

No transfer parameters are needed.

> 💡 **Information**
>
> *When switching Runtime to the foreground with the **Window to foreground** function, the Runtime window is defined as the upper window.*
>
> *Note the following special cases:*
>
> ▸ The **DIALOGKBD** keyboard cannot be called up in this situation.
>   Other keyboards can be used.
>
> ▸ The alarm status line is covered by the Runtime window.
>
> *You have the following options to get the alarm status line back to the foreground:*
>
> ▸ Activate the symbol keys (deactivate **Lock system keys** project property) and get the alarm status line back to the foreground with `Alt+Tab`.
>
> ▸ Activate the Windows task bar and click on the **Status** window.
>
> ▸ Move Runtime to the background again.
>
> ▸ Restart the Runtime.
>
> Note: The **Window to foreground** function is not identical to the **Move frame to foreground** function!

Start program

This function is used to execute an external program (*.exe) from the Runtime. On executing the function transfer parameters for the application to start can be defined.

Give the program file (*.EXE) as the transfer parameter. This function is configured via an input dialog.
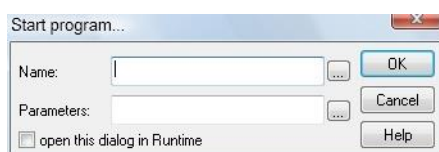
Configurable options are:

Parameter	Description
Name	name of file which will be executed; search and select via button is possible
Parameter	transfer parameter for program
Show this dialog in the Runtime	changes program and parameter during online operation when function is called

The program is selected via a dialog mask.

For the start of a program it has to be in a search path (system environment under Windows NT). User-defined programs (Visual Basic) should be stored in the installation path of zenon.

When the Alarm Message List is active and an alarm in the list has been selected, the call of the variables' name can be transferred as a parameter (for external database information systems). The parameter is transferred as a key word.

Parameter	Description
@alarm.name	Name of the variable
@alarm.unit	unit of the variable
@alarm.value	value, which violated a limit
@alarm.stext	limit value text
@alarm.ctime	time comes (value in seconds since 1.1.1970)
@alarm.ctimemilli	with milliseconds
@alarm.gtime	Time cleared
@alarm.gtimemilli	with milliseconds
@alarm.qtime	Time acknowledged
@alarm.user	user, who quitted
@alarm.identification	Identification of the variable

If no Alarm Message List is open, or several or no alarms are selected, no transfer parameters are generated. If several Alarm Message Lists are displayed (global or selective list), the selected entry of the first found list is used.

If the Chronological Event list is active and an entry in the list has been selected, the program call of the variable's name can be transferred as a parameter (for external database information systems). The parameter is transferred as a key word.

Parameter	Description
@cel.name	Name of the variable
@cel.unit	unit of the variable (only if a variable is linked)
@cel.value	value, which violated a limit value (only if limit entry)
@cel.stext	limit value text
@cel.ctime	time comes (value in seconds since 1.1.1970)
@cel.ctimemilli	with milliseconds
@cel.user	user, who quitted
@cel.identification	Identification of the variable

If no Chronologic Event List is open, or several or no entries are selected, no transfer parameters are generated. If several Chronologic Event Lists are open (global or selective list), the selected entry of the first found list is used.

Additional parameters are:

@screen	screen from within which the function was executed

This function is used to to consider the effects of the started program on the system as a whole (required resources, multitasking, program stability, etc.).

3.5 Functions in the network

If network functions are used, the place of execution must be noted:

For functions that are used in the network:

  ▶ The place of execution can be freely configured in some cases
  ▶ The place of execution is stipulated in some cases

> 💡 **Information**
>
> *Scripts combine several functions. The place of execution then depends on the settings of the **Execute script** function. This setting overwrites the settings of the individual functions.*

CONFIGURE PLACE OF EXECUTION

For functions where the place of execution can be freely configured, the corresponding parameters are available in the properties of the function.

To define the place of execution:

1. Navigate to the **Execution** group in the Properties.

2. Select the desired place of execution by checking the checkbox. Multiple selection is possible:

   - **Current computer**: Function will be executed on the current computer.

   - **Primary Server**: Function will be executed on the Primary Server.

   - **Standby Server**: Function will be executed on the Standby Server.

   - **Client**: Function will be executed on all clients.

OVERVIEW OF FUNCTIONS IN THE NETWORK

The following table shows which functions are executed and where they are executed.

Key:

▶ **Adjustable:** Behavior can be configured

   +: Yes

   -: No

   O: Default

▶ If not adjustable, O identifies the place of execution:

   - Active computer

   - Primary Server

   - Standby Server

   - Client

Function	Adjustable	Current computer	Primary Server	Standby Server	Client
AML and CEL					
Alarms: acknowledge flashing	-	O			
Delete alarms	-		O	O	
Acknowledge alarms	-		O	O	
Alarm/event group log in/log off	-	O			
Activate/deactivate alarm message list / alarm/event groups / alarm/event classes	-		O	O	
Alarm Message List active	-		O		
Alarm Message List active/inactive	-		O		
Alarm Message List inactive	-		O		
Export AML	+	O			
Save AML and CEL ring buffer	-		O	O	
Export CEL	+	O			
Print AML or CEL	+	O			
Create/print IPA document	-		O		
Switch online printing on/off	-		O	O	
Online printing start new page	+	O			
Switch online printer	-		O		

Application					
Select printer	+	O			
Start Load Management	-		O		
Stop Load Management	-		O		
Print Extended Trend diagram	+	O			
Switch palette	+	O			
Functions active at limit values	-		O	O	
Functions active/inactive at limit values	-		O	O	
Functions inactive at limit values	-		O	O	
Open help	+	O			
Reload	+	O			
Determine open maintenances	-		O		
PFS - execute user-defined event	+	O			
Activate/deactivate project simulation	-	O			
Simulate right click	+	O			
Save remanent data	+	O			
Exit Runtime	+	O			
Analyze S7 Graph heuristics	+	O			
Execute SAP function	+	O			

Language switch	+	O			
Topology - Search for ground fault	-		O		
Topology - LoadShedding	-		O		
Historian					
Archive: Stop	-		O	O	
Index archive	-		O		
Archive: Start	-		O	O	
Export archives	-	O			
Show open archives	-		O	O	
User Administration					
Change user	+	O			
Login with dialog	+	O			
Login without password	+	O			
Logout	+	O			
Change password	-	O			
Screens					
Change ALC source color	+	O			
Screen with index	-	O			
Close screen	+	O			
Screen: Return to last	-	O			
Screen: Move center	+	O			
Screen switch	+	O			
Activate input to the element with the focus	+	O			
Set focus to frame	+	O			
Move focus	-	O			
Take focus away from frame	+	O			
Show menu	+	O			
Assign monitor	+	O			
Runtime profiles	+	O			
Close frame	+	O			

Setpoint input for keyboard screen	-	O			
Display overview window	+	O			
Fault locating in electric grids					
Acknowledge ground fault message	+	O			
Stop search for ground fault	+	O			
Start search for ground fault	+	O			
Acknowledge short-circuit message	+	O			
Message Control					
Save current queue	-		O		
Suppress groups/classes/areas/equipment	-		O		
Send a Message	-		O		
Send Message: activate	-		O		
Send Message: deactivate	-		O		
Network					
Authorization in network	+	O			
Redundancy switch	-			O	
Report Generator					
Print report	+				
Report: execute	+				
Export Report	+				
Recipes					
Recipegroup Manager	-	O			
Standard recipe	-	O			
Standard Recipe single directly	+	O			
Standard Recipe single with dialog	-	O			
Standard Recipe single with online dialog	-	O			
Script					
Script: execute	+	O			
Script: select online	+	O			

Variable					
Export data	-		O		
Read dBase file	+	O			
Print current values	+	O			
Measuring unit conversion	+	O			
HD administration active	-		O	O	
HD administration inactive	-		O	O	
HD administration inactive/active	-		O	O	
Write set value	-		O		
Driver commands	-	O			
Transfer driver simulation image to the standby	-			O	
Write time to variable	+	O			
Read time from variable	+	O			
VBA					
Open PCE editor	-		O		
Open VBA Editor	+	O			
Execute VBA macro	+	O			
Show VBA macro dialog	+	O			
VSTA					
Open VSTA editor	+	O			
Execute VSTA macro	+	O			
Display VSTA macro dialog	+	O			
Windows					
Play audio file	+	O			
File operations	+	O			
Start continuous tone	+	O			
Stop continuous tone	+	O			
Window to the background	-	O			
Window to foreground	-	O			
Print screenshot	+	O			

Start program	+	O			

3.6 Execution sequence during Runtime

The execution of functions in the Runtime is done according to a 3 priority levels:

- ▶ Priority 1: `Immediate` (is executed immediately)
- ▶ Priority 2: `High` (a dialog is displayed before it is executed)
- ▶ Priority 3: `Low`

If, for a function with priority `1`, a dialog is displayed before the function is carried out, the priority is downgraded to `2`.

Within one project all functions of one script (on page 66) are in the same queue. All functions in a priority level are executed in the script. This guarantees that the functions are executed after one another.

> 📭 **Example**
>
> *A script is used to activate a screen arrangement with screens of different projects using the **Screen Switch** function, which depends on the sequence of execution (screens are above other screens).*

PRIORITY OF THE EXECUTION IN THE RUNTIME

Function groups	Functions	Priority
AML and CEL	Controlling the AML and CEL administration	
	Alarms: acknowledge flashing	1
	Confirm alarm acknowledgement	1
	Acknowledge alarms	1
	Alarm/event group log in/log off	1
	Alarm Message List active	1
	Alarm Message List active/inactive	1
	Alarm Message List inactive	1

	▸ Activate/deactivate Alarm Message List, alarm/event groups, alarm/event classes	1
	▸ Save AML and CEL ring buffer	1
	▸ Print AML or CEL	3
	▸ Export alarms	2
	▸ Export CEL	2
	▸ Create/print IPA document	1
	▸ Switch online printing on/off	1
	▸ Online printing start new page	?
	▸ Switch online printer	3
Application	Call applications	
	▸ Select printer	3
	▸ Print Extended Trend diagram	1
	▸ Switch palette	2
	▸ Functions with inactive/active limit values	1
	▸ Functions active at limit values	1
	▸ Functions inactive at limit values	1
	▸ Open help	3
	▸ Reload	1
	▸ Determine open maintenances	3
	▸ Execute PFS event	1
	▸ Exit program	3
	▸ Simulate right click	3
	▸ Save remanent data	1
	▸ Analyze S7 Graph heuristics	1
	▸ Switch simulation on/off	1
	▸ Language switch	2
Historian	control of archives	1
	▸ Archive: Stop	1
	▸ Index archive	1
	▸ Archive: Start	1

	▸ Archive: List of active archives	2
	▸ Export archives	1
User Administration	User Administration	
	Change user	3
	Login with dialog	2
	Login without password	2
	Logout	2
	Change password	2
Screens	Select and control screens	
	Change ALC source color	1
	Screen with index	1
	Close screen	2
	Screen: Return to last	1
	Screen: Move center	1
	Screen switch	1
	Activate input to the element with the focus	1
	Set focus to frame	1
	Move focus	1
	Take focus away from frame	1
	Show menu	1
	Assign monitor	1
	Runtime profiles	1
	Close frame	1
	Display overview window	1
Fault locating in electric grids		
	Acknowledge ground fault message	1
	Stop search for ground fault	1
	Start search for ground fault	1
	Acknowledge short-circuit message	1

Message Control	sending of messages (Message Control)	
	Save current queue	1
	Group/class/area/equipment suppressed	1
	Send a Message	1
	Send Message: activate	1
	Send Message: deactivate	1
Network	Network - Functions	
	Operating authorization in the network	1
	Redundancy switch	1

Report Generator	Functions for reports	
	▸ **Print Report Generator**Print report	2
	▸ Export report	2
	▸ Report: execute	2
Recipes	operating recipes	
	▸ Recipegroup Manager	2
	▸ Standard recipe	2
	▸ Standard Recipe single directly	2
	▸ Standard Recipe single with dialog	2
	▸ Standard Recipe single with online dialog	2
Script (on page 72)	Execute functional blocks (scripts)	
	▸ Script: execute	1
	▸ Script: select online	2
Variable	Functions for variables	
	▸ Export data	3
	▸ Read dBase file	2
	▸ Print current values	2
	▸ Measuring unit conversion	2
	▸ HD administration active	1
	▸ HD administration inactive	1
	▸ HD administration inactive/active	1
	▸ Write set value	1
	▸ Driver Commands	2
	▸ Transfer driver simulation image to the standby	1
	▸ Write time to variable	1
	▸ Read time from variable	1
VBA	VBA - Functions	
	▸ Open PCE editor	3
	▸ Open VBA Editor	3
	▸ Execute VBA macro	3
	▸ Show VBA macro dialog	3

VSTA	VSTA functions	
	▶ Open VSTA editor	3
	▶ Execute VSTA macro	3
	▶ Display VSTA macro dialog	3
Windows (on page 48)		
	▶ Play audio file	2
	▶ File operations	3
	▶ Start continuous tone	1
	▶ Stop continuous tone	1
	▶ Window to the background	2
	▶ Window to foreground	2
	▶ Print screenshot	2
	▶ Start program	2

4. Scripts

Scripts compile several functions together in order to execute these in a sequence in Runtime. zenon also provides some pre-defined scripts (on page 70).

Scripts are configured or selected using:

- ▶ The Scripts node (on page 69)
- ▶ The Select functions and scripts dialog (on page 77)

4.1 Context menu and toolbar for scripts

PROJECT MANAGER CONTEXT MENU

Menu item	Action
Script new	Creates a new script.
Export all as XML	Exports all entries as an XML file.
Import XML...	Imports entries from an XML file.
Editor profile	Opens the drop-down list with predefined editor profiles.
Help	Opens online help.

SCRIPTS TOOLBAR DETAIL VIEW

Symbol	Description
Script new	Adds a new script to the list.
Add functions	Opens the dialog for adding functions (on page 69).
Use of scripts	Opens the Project analysis in the main window and displays the elements with which the selected script is used.
Show unused scripts	Opens the Project analysis in the main window and shows unused scripts.
Copy	Copies the selected script or the selected functions to the Windows clipboard.
Paste	Pastes an element that was copied to the Windows clipboard.
Delete	Deletes the selected script or removes the selected function from the script.
Expand/collapse	Allows all or selected nodes to be expanded or collapsed. Selection: ▸ **Expand all** ▸ **Collapse all** ▸ **Expand selected** ▸ **Reduce selected**
Export selected as XML...	Exports selected entries as an XML file.
Import XML	Imports elements from an XML file.
Edit selected cell	Renames the script. Also possible by clicking in the field with the mouse or by pressing the **F2** key.
Properties	Opens the **Properties** window.
Help	Opens online help.

CONTEXT MENU SELECTED SCRIPT

Parameter	Description
Add functions	Opens the dialog for adding functions (on page 69).
Script new	Adds a new script to the list.
Create standard function	Automatically creates a standard function for the selected script.
Use of scripts	Opens the Project analysis in the main window and displays the elements with which the selected script is used.
Show unused scripts	Opens the Project analysis in the main window and shows unused scripts.

Copy	Copies the selected script or the selected functions to the Windows clipboard.
Paste	Pastes an element that was copied to the Windows clipboard.
Delete	Deletes the selected script or removes the selected function from the script.
Expand/collapse node	Allows all or selected nodes to be expanded or collapsed. Selection: ▸ **Expand all** ▸ **Collapse all** ▸ **Expand selected** ▸ **Reduce selected**
Export selected as XML...	Exports selected entries as an XML file.
Import XML	Imports elements from an XML file.
Edit selected cell	Renames the script. Also possible by clicking in the field with the mouse or by pressing the **F2** key.
Properties	Opens the **Properties** window.
Help	Opens online help.

4.2 Engineering in the Editor

To configure or edit scripts, click on the **Scripts** node in the **Functions** node and select the desired action in the toolbar or in the context menu.

> 💡 **Information**
>
> *When you change the script name, the parameters of the linked functions are changed accordingly. With multi-user projects, functions are changed automatically after requesting confirmation (`Allow changes`). After the name has been changed successfully, the script is changed.*

CONFIGURING A SCRIPT

To configure a new script:

1. Select **New symbol** in the context menu or in the toolbar.

2. A new script is added to the list.

3. Issue a name or select a pre-defined script (on page 70) from the drop-down list.
   Note: The name must not be empty.

4. Add functions and sort them.
   Functions are executed in the sequence of the project configuration.

5. Create a function to start (on page 72) the script in Runtime.

ADD FUNCTIONS AND PLACE THEM IN SEQUENCE

You can add new functions to a script using a command or add or change the sequence of previously-linked functions by dragging & dropping.

FUNCTION NEW

To add a function to a script using a command:

1. Select **Add functions** in the context menu or in the toolbar.

2. The dialog to select one or several functions is opened.

3. Select the desired functions and close the dialog by clicking OK

4. The functions are added to the end of the list of pre-existing functions.

DRAG & DROP ACTIONS

To add a function to a script by dragging & dropping:

1. Select the desired function from the a script.

2. Move the function to the desired position:

   - Within the source script: The sequence of the function is changed.
     Hint: If the Shift key is held when dragging&dropping, the function is copied.

   - In a different script: The function is copied to the target script.
     If the node of the script is closed, the function is added at the end.
     If the node is opened, the function is inserted at the displayed location.
     Hint: If the Shift key is held when dragging&dropping, the function is deleted in the source script.

4.3   Pre-defined scripts

zenon provides a range of pre-defined scripts. The action of this script in Runtime is pre-defined. The functions to be executed must be configured individually.

Script	Description
AUTOSTART	The start information (e.g. open headings and status lines, reset alarm outputs etc.) is configured in the script. The script will be executed automatically at the start of Runtime when the start screen is called up if the project is the Runtime start project. The script is not executed, if the project is not defined as the start project or if it is a sub project in a multi-hierarchical network. **Attention:** The start screen must not be executed in the AUTOSTART script because it is defined via the project property **Start screen**. For switching to a partial screens that belongs to a main screen, such as screen-specific menus etc., a separate script is defined. This ensures that on selection of the screen via the Screen switch function, selection from the screen catalog or the Return to last screen function, all detail screens are always opened with it.
AUTOEND	The defined end functions are configured in the script. The script is executed automatically when Runtime is ended if the project is the Runtime start project. The script is not executed, if the project is not defined as the start project or if it is a sub project in a multi-hierarchical network. **Attention:** ▸ The **Execute VBA macro** and **Execute VSTA macro** functions are not executed in **AUTOEND** scripts, because the API interface was already terminated at this point in time. Use the **Project.Inactive** event in the API to execute the corresponding functionality before ending Runtime. ▸ Cyclical archives must not be included in the **AUTOEND** script.
AUTOSTART_CLIENT	The start information (e.g. open headings and status lines, reset alarm outputs etc.) is configured in the script. The script will be executed automatically at start of the Runtime on a client and before activation of start display on a client if the project is the Runtime start project.
AUTOEND_CLIENT	The defined end functions are configured in the script. The script will be executed automatically at the end of Runtime on a client if the project is the Runtime start project. **Attention:** ▸ The **Execute VBA macro** and **Execute VSTA macro** functions are not executed in **AUTOEND** scripts, because the API interface was already terminated at this point in time. Use the **Project.Inactive** event in the API to execute the corresponding functionality before ending Runtime.

AUTOSTART_SRVPRJ	Script will be executed automatically at the start of Runtime operation on the computer that is the server for the project, before opening the start screen, regardless of whether the project has been defined as the start project or whether it is a sub project in a multi-hierarchical network.
AUTOEND_SRVPRJ	Script will be executed automatically at the end of Runtime operation on the computer that is the server for the project, regardless of whether the project has been defined as the start project or whether it is a sub project in a multi-hierarchical network. **Attention:** ▸ The **Execute VBA macro** and **Execute VSTA macro** functions are not executed in **AUTOEND** scripts, because the API interface was already terminated at this point in time. Use the `Project.Inactive` event in the API to execute the corresponding functionality before ending Runtime. ▸ Cyclical archives must not be included in the **AUTOEND** script.
Autostart_native_ Webclient	Is executed if the zenon web client is started. Can only be executed for zenon web clients.

The following scripts are available for the HTML Web Engine; they are executed automatically:

Script	Description
AUTOSTART_HTML_WE BCLIENT	This script is executed whenever a session of an HTML web client starts.

The following scripts are available for simulation mode; they are executed automatically:

Script	Description
AUTOSTART_SIMUL	If Runtime is started in simulation mode, the script with the name **AUTOSTART_SIMUL** is executed automatically if it is available. Note: Also applies for playback mode of the **Process Recorder** module.
AUTOEND_SIMUL	If Runtime is ended in simulation mode, the script with the name **AUTOEND_SIMUL** is executed automatically if it is available. Note: Also applies for playback mode of the **Process Recorder** module.

4.4　　Executing scripts in Runtime

A corresponding function must be configured in order to execute a script. Scripts can be started in Runtime by means of the **Script: execute** or **Script: select online** functions:

▸ **Script: execute**:
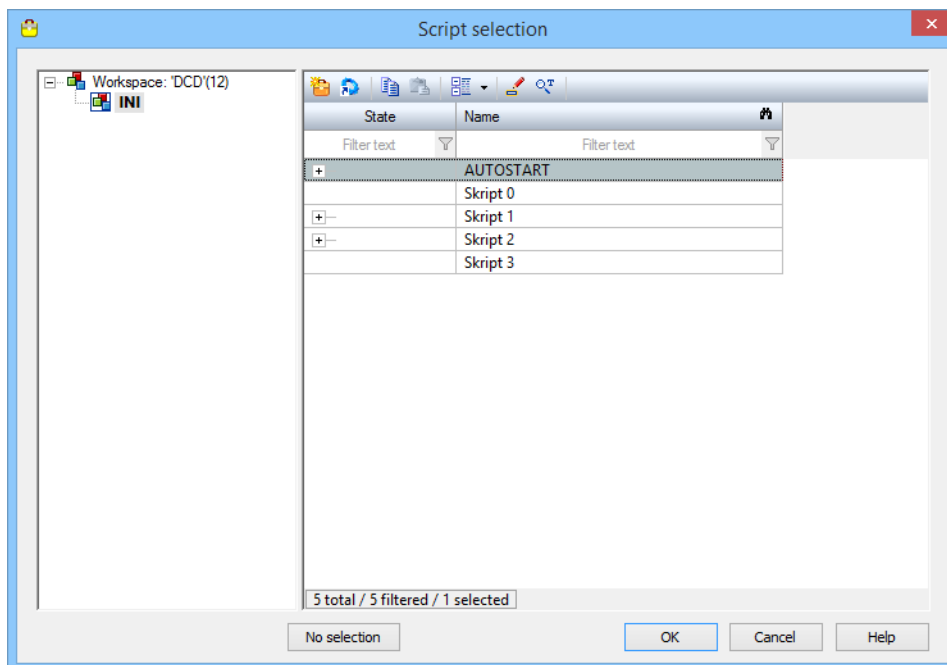Executes a script that was pre-defined in the Editor in Runtime.

▶ **Script: select online**:
Allows selection of the script to be executed in Runtime.

To configure a function to execute a script:

1. Select the **New function** command in the **Functions** node

2. The dialog to select the function is opened.

3. Navigate to the **Script** node.

4. Select the desired function:

   a) **Script: execute**, in order to execute the script selected in this dialog directly

   b) **Script: select online** in order to make it possible to select the script that is to be executed in Runtime.

5. Confirm the configuration by clicking **OK**

SELECT SCRIPT DIALOG

Parameter	Description
List of projects (left)	Selection of the project from which the script is to be selected. Note: Ensure, when selecting scripts from a different project than the current one, that this project is also available in Runtime.
List of scripts (right)	Selection of the script. Only one script can be linked. Scripts can be created and edited using the toolbar and context menu. New scripts and changes are saved immediately. The functions of a script can be rearranged by means of Drag&Drop.
No selection	Removes a pre-existing linking and closes the dialog.
OK	Applies settings and closes the dialog. With **Execute script**, the selected script is started in Runtime when this function is executed. With **Script with online selection**, this dialog is opened in Runtime when this function is executed.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

TOOLBAR AND CONTEXT MENU

Symbol/Command	Description
Script new	Adds a new script to the list.
Add functions	Opens the dialog for adding functions (on page 69).
Copy	Copies the selected script to the clipboard.
Paste	Pastes script from the clipboard.
Expand/collapse	Allows all or selected nodes to be expanded or collapsed. Selection: ▸ **Expand all** ▸ **Collapse all** ▸ **Expand selected** ▸ **Reduce selected**
Edit selected cell (only toolbar)	Renames the script. Also possible by clicking in the field with the mouse or by pressing the F2 key.
Replace text in selected column (only toolbar)	Opens the dialog to search and replace texts in the currently-selected column.

SCRIPTS IN THE NETWORK

With an active network, it is possible to use the properties in the **Execution** group to define the computer on which the script is executed.

💡 **Information**

Take care of the priorities of the script execution in the network (on page 75)

4.5 Priorities in the network

If the network is activated in the zenon project, the executing computer can be configured for a function. To do this, highlight the function in the zenon Editor in the detail view of the Project Manager. In the **Execution** function properties group, activate the computer on which the function is to be executed.

▸ `Current computer`

- ▶ `Client`
- ▶ `Server`
- ▶ `Standby`

The following is applicable for scripts:

Scripts can be called up using the **Script: execute** or **Script: select online** functions.
The configuration of the **Execution** script property overwrites the configuration of the **Execution** function property contained in the script.

Function which had a different execution location assigned, take over the execution location defined here.

EXAMPLE 1: CURRENT COMPUTER

- ▶ Function 1 was defined with execution location `Server`.
- ▶ Function 2 was defined with execution location `Client`.
- ▶ `Current computer` was established for the **Script: execute** function.
- ▶ Consequence: Both functions are carried out on the same computer; the computer on which the **Script: execute** function is executed. This can be a client, a server or a standby, depending on the network role of the calling computer.

EXAMPLE 2: CLIENT VERSUS SERVER

- ▶ The script contains two functions. Each of these two functions is configured with the place of execution as `client`.
- ▶ This script is executed using the **Script: execute** function.
- ▶ `Server` was stipulated for this **Script: execute** function.
- ▶ Consequence: Both functions are executed on the Server no matter on which computer **Execute script** was started.

EXAMPLE 3: DRIVER COMMANDS:

Driver commands are executed on the Server and the Standby per default. If a script with driver commands is started on the Client, then:

- ▶ the function driver command is started on the Client
- ▶ the driver is stopped after the execution of the script on the Server

5. Select Functions and scripts dialog

Individual functions and scripts can be configured for many functions in dialogs, properties and dynamic elements by means of a specific dialog.   Several functions are configured in their own dialogs.
The dialog to select functions and scripts is called up for:

▶ Archive configuration / tab for Runtime: Execute function for archive start or archive end

▶ Combo box/list box: each element that has its own functions

▶ Dialogs: all properties with functions

▶ Dynamic elements: all properties with functions and double click on a dynamic element

▶ Reaction matrices: Function

▶ Replace links: Replace function dialog

▶ WPF: Event properties

The dialog offers the possibility to select functions and to configure scripts:

▶ **Functions selection** (on page 77): Selection of a function or creation of a new function

▶ **Script selection** (on page 80): Selection of a script or creation of a new script as well as assignment of a function **Script: execute**
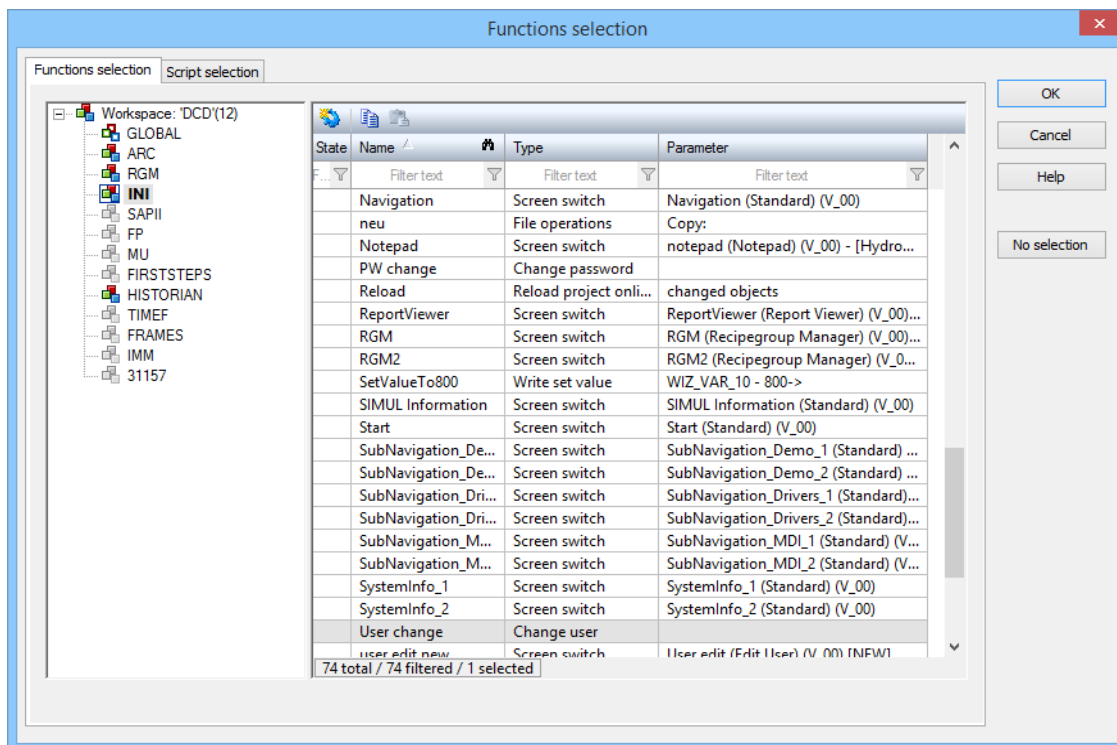
5.1   Functions selection

Selection ands configuration of functions that are to be linked.

To select a function:

1. Select the project that contains the function.

   Note: If a different project than the current one is selected, ensure that the project is available in Runtime.

2. Select the desired function.
   If necessary, it is possible to use the toolbar or context menu to create new functions or copy existing functions.

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

FUNCTION SELECTION DIALOG

Parameter	Description
List of projects (left)	Selection of the project from which the function is to be selected. Note: Ensure, when selecting functions from a different project than the current one, that this project is also available in Runtime.
List of functions (right)	Selection of the function. Only one function can be linked. If more than one function is selected, then the function that was selected last was linked. Functions can be created and edited using the toolbar and context menu. New functions and changes are saved immediately.
OK	Applies the selected function and closes the dialog.
Cancel	Closes the dialog without linking a function.
Help	Opens help
No selection	Removes a pre-existing linking and closes the dialog.

TOOLBAR AND CONTEXT MENU

Symbol/Command	Description
Function new	Adds a new function to the list.
Copy	Copies the selected function to the clipboard.
Paste	Pastes a function from the clipboard.

5.2   Script selection

Selection and configuration of scripts that are to be linked, as well as assignment of the **Script: execute** function.
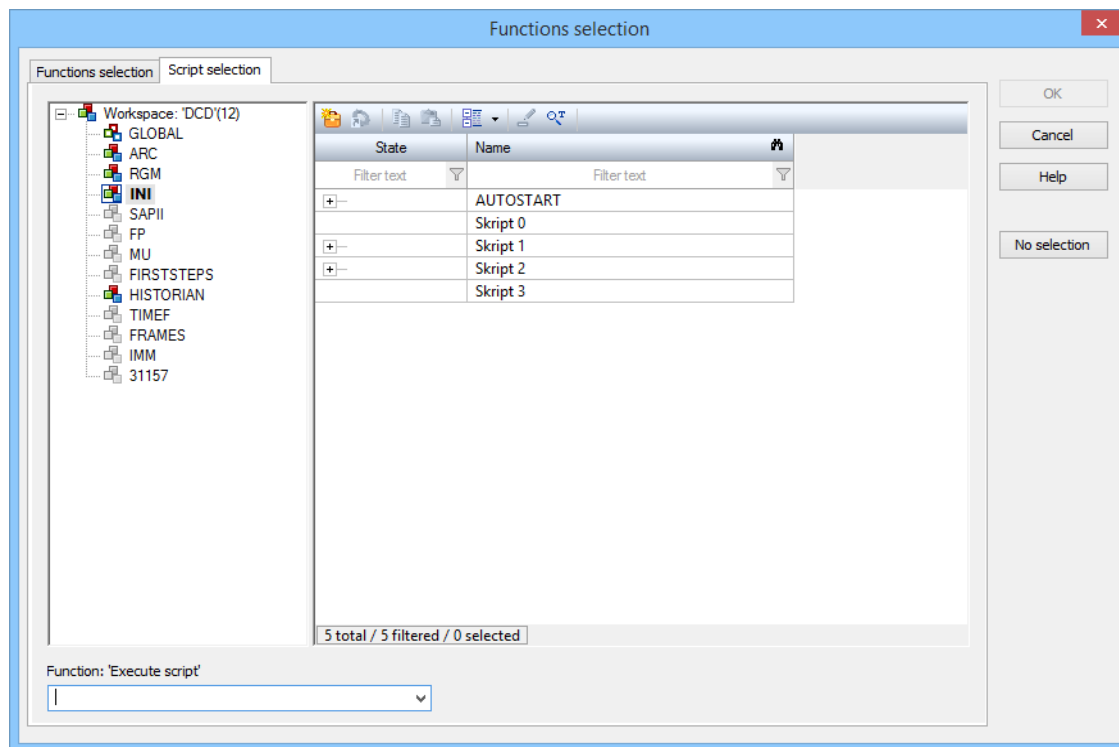
To select a script:

1. Select the project that contains the script.

   Note: If a different project than the current one is selected, ensure that the project is available in Runtime.

2. Select the desired script.

3. Edit the script if required.
   You can use the commands of the context menu or toolbar to create new scripts, add functions and copy or rename scripts.

4. Confirm the selection by clicking **OK**.

SCRIPT SELECTION DIALOG

Parameter	Description
List of projects (left)	Selection of the project from which the script is to be selected. Note: Ensure, when selecting scripts from a different project than the current one, that this project is also available in Runtime.
List of scripts (right)	Selection of the script. Only one script can be linked. Scripts can be created and edited using the toolbar and context menu. New scripts and changes are saved immediately. The functions of a script can be rearranged by means of Drag&Drop.
Function: Script: execute	Selection of the function that is to execute the selected script from a combo box. The combo box contains, in a drop-down list, all functions that have already been defined that can execute the selected script. The name for a new function to execute the script can be entered in the input field.
OK	Accepts the selected or newly-issued name for the **Script: execute** function, links the selected script and closes the dialog.
Cancel	Closes the dialog without linking a script.
Help	Opens help
No selection	Removes a pre-existing linking and closes the dialog.

TOOLBAR AND CONTEXT MENU

Symbol/Command	Description
Script new	Adds a new script to the list.
Add functions	Opens the dialog for adding functions (on page 69).
Copy	Copies the selected script to the clipboard.
Paste	Pastes script from the clipboard.
Expand/collapse	Allows all or selected nodes to be expanded or collapsed. Selection: ▸ **Expand all** ▸ **Collapse all** ▸ **Expand selected** ▸ **Reduce selected**
Edit selected cell (only toolbar)	Renames the script. Also possible by clicking in the field with the mouse or by pressing the F2 key.
Replace text in selected column (only toolbar)	Opens the dialog to search and replace texts in the currently-selected column.