zenon manual

Runtime

v.7.50

COPADATA
do it your way

Table of 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. Runtime

Runtime is software that supports graphic display possibilities for HMI/SCADA projects.

License information

The zenon Runtime must be licensed. The license is calculated according to the used TAGs or IOs. For details about licensing see chapter Licensing.

It offers:

- ▶ Process display,

▶ Archiving of data such as messages and process values,

▶ Integrated alarm message list,

▶ Recipes,

▶ Multi-Touch and much more.

> ⚠ **Attention**
>
> *For the optimal display of zenon in Runtime, the standard setting (corresponds to `100%`) is recommended for the Windows **display**. Higher values can lead to graphic elements, symbols, texts, etc. not being displayed correctly.*

Runtime is available as a 32-bit version and a 64-bit version from zenon 7.10. Projects can run on both versions. You can read details on compatibility with versions of zenon 7.10 in the Project conversion manual, in the 64-bit version (on page 6) chapter. The Runtime is available as zenon Supervisor and as zenon Operator for Embedded operating systems. The versions differ in their functionalities. For details see Restrictions for zenon Operator.

SEVERAL INSTANCES OF RUNTIME

> *Only one instance of zenon Runtime can be started on a computer at any time. This applies regardless of whether Runtime is started as an EXE file, a Web Client or as Runtime Control (OCX).*

Exception: On the terminal server or terminal client, one instance of Runtime per user can be started as an EXE file, as a Web Client or as Runtime Control (OCX). Only 1 instance can run at any time within a user context.

3. 32 and 64-bit version

zenon is now available for Editor and Runtime as a 32-bit and 64-bit version. A 32-bit and a 64-bit zenon Editor or a 32-bit and a 64-bit zenon Runtime are installed on 64-bit operating systems. The file names of the executable files are identical for 32-bit and 64-bit.

On 64-bit systems, all services present in 64-bit are registered and used in the 64-bit version. Editor and Runtime can be started alternately. Projects can be executed in both Editors and in both Runtimes.

Components such as, for example, zenon Logic Runtime, zenon Logic Workbench, drivers, Process Gateway and other tools are always only used in the 32-bit version.

GENERAL LIMITATIONS

The basic limitation of only 64-bit DLLs being able to be loaded in 64-bit processes also means that there are certain limitations when operating zenon. This mostly affects external components that are loaded

in the Editor or Runtime. DLLs that are loaded using VBA/VSTA code and ActiveX controls are directly affected. These DLLs must be present as a 64-bit version for use in the 64-bit Editor or Runtime. ActiveX controls supplied by COPA-DATA are always available in 32-bit and 64-bit versions.

CONVERSION OF ZENON 5.50 PROJECTS

No zenon 5.50 projects can be converted with the 64-bit editor. These must be converted beforehand with the 32-bit Editor.

RGM LIMITATION

The Access database is no longer supported in the RGM. In order to be able to use MS Access data from previous versions under 64-bit, the project must first be converted in the 32-bit Editor.   The **DataSource** property is no longer available from version 7.10. For details, see the Converting Recipegroup manager database chapter.

VBA

VBA was converted to VBA version 7.1. Therefore VBA is also available in zenon 64-bit. If, in the VBA code, Windows API or other imported DLL functions are accessed, these calls must be adapted to 64-bit. In general, the following applies: A VBA file created with a 32-bit version cannot be used without changes in a 64--bit version.

There are some defines/functions available in VBA in order to write 32-bit and 64-bit compatible code. For example:

```
#if Win64 then
   Declare PtrSafe Function MyMathFunc Lib "User32" (ByVal N As LongLong) As LongLong
#else
   Declare Function MyMathFunc Lib "User32" (ByVal N As Long) As Long
#end if
#if VBA7 then
   Declare PtrSafe Sub MessageBeep Lib "User32" (ByVal N AS Long)
#else
   Declare Sub MessageBeep Lib "User32" (ByVal N AS Long)
#end if
```

You can also obtain some useful notes on the porting of VBA 32-bit code to VBA 64-bit from Microsoft:

▸ Microsoft Office 2010, notes on porting:
  http://msdn.microsoft.com/en-us/library/ee691831.aspx
  (http://msdn.microsoft.com/en-us/library/ee691831.aspx)

▸ 32-bit and 64-bit declares for API calls: http://www.jkp-ads.com/articles/apideclarations.as
  (http://www.jkp-ads.com/articles/apideclarations.as)p

COMPONENTS IN 32-BIT ONLY

The following components are also only available as 32-bit versions on 64-bit computers:

- ▶ Some programs, such as SIC.exe and DiagViewer.exe
- ▶ Licensing
- ▶ Process Gateway
- ▶ Startup Tool
- ▶ Windows CE
- ▶ Drivers
- ▶ zenon Logic Runtime and Workbench

4. Putting Runtime into operation

The procedure for putting Runtime into operation for the first time depends on whether the device you are operating is a turn-key device with Runtime installed or a device on which Runtime must be installed. If Runtime is already installed on the device, only the desired project needs to be copied to the Runtime device.

To do this:

- ▶ Save your project files on an external data medium.
- ▶ Use Drag&Drop or Copy&Paste to transfer these to your Runtime device.

or

- ▶ Get the project from the server on the Runtime device.
- ▶ Create a Client using the network topology.

Note: This is also possible by means of remote transport.

If Runtime is not yet installed on the device, it must first be installed. You can read how this works in the zenon standard installation chapter.

A license is required after installation in order to put it into operation. The license information is on a license form, which is enclosed with the device or the installation medium.

Note: The hard drive of the device you are operating may stop working after many years of use in a harsh industrial environment. To avoid loss of data, it may be a good idea to ensure that there is a redundant environment, such as working with both a Server and a Standby Server.

4.1 Installation

For the installation of zenon Runtime, start the installation process from your zenon installation medium.

This process automatically starts when the zenon installation medium is connected and guides you through the whole installation. Alternatively, it is possible to start the installation by executing **START.exe** in the root directory of your zenon installation medium.

> 💡 **Information**
>
> *You can find further information in the installation and updates manual in the zenon standard installation chapter.*

4.2 System requirements and operating systems

You can get a detailed overview of supported operating systems and the required software and hardware in the installation and updates manual.

4.2.1 System requirements when using DirectX

The following minimum requirements must be met when using `DirectX hardware` or `DirectX software`:

Note: For extensive projects or several projects loaded at the same time you will need accordingly faster/stronger hardware. The minimum requirements can increase as a result of this.

Parameter	Minimum requirements	Recommended
CPU:	Single core with SSE2 support.	Quad Core or more cores
Graphics card: (DirectX hardware only)	DirectX 11 mainstream graphics card. Note: When an integrated graphics chip is used in particular, it is possible, depending on the driver used, that there are impairments to the display quality.	Dedicated DirectX 11 AMD or nVidia high-end graphics card
Graphics memory: (DirectX hardware only)	1 GB VRAM Note: The size that is actually needed depends on the number of screens called up and the elements displayed.	2 GB VRAM
Driver graphics card: (DirectX hardware only)	The graphics card manufacturer's most recent driver.	
Operating system:	`DirectX hardware` and `DirectX software` only works on operating systems that support `DirectX11.1`. If the system does not support `DirectX 11.1`, it automatically switches to `Windows Enhanced`. The current `DirectX-` Runtime must be installed. For zenon it is installed together with the setup. For the Web Client it must be installed manually.	

You can check the DirectX hardware compatibility of the graphics card and the driver with the Windows operating system tool **dxdiag.exe**.

Up to Windows 7: Check the **DDI version** value under **Display**. The value `11` for example means DirectX 11.

From Windows 8: All supported versions of DirectX are displayed in the **Display** tab under **Feature Levels**. For example, DirectX 11 is displayed as `11.0`.

4.2.2   File Structure

The special file structure is created or extended during the installation.

The zenon program files are copied to a folder which can be defined during the installation.

Additionally the installation asks for a folder for the SQL databases of the projects. The storage medium for project archiving (SQL, screens etc.) must have enough free space, because all current and future project data is stored there.

Folder	Path

Program folder	`32-bit system:`
	`%Program Files%\COPA-DATA\zenon7xxx`
	
	`64-bit system:`
	
	`%Program Files%\COPA-DATA\zenon7xxx`
	
	`%Program Files (x86)%\COPA-DATA\zenon7xxx`

Program data folder, **e.g. global symbols, print** **templates, log files etc.**	`%ProgramData%\COPA-DATA\zenon7xxx`
Database folder (SQL)	`%ProgramData%\COPA-DATA\SQL`
System folder	`%ProgramData%\COPA-DATA\System`
Settings Editor and profiles	`%Users%\UserName\AppData\Local\COPA-DATA\ze` `non\Editor`
Settings Diagnosis Viewer	`%Users%\UserName\AppData\Local\COPA-DATA\ze` `non\DiagView`

DEFINITION RUNTIME FOLDER AND DATA FOLDER

RUNTIME FOLDER

The Editor creates the Runtime files in the Runtime folder, or these files are transferred to this folder by means of Remote Transport. When creating a project, you must define the Runtime folder. Later it can be changed in the project properties. With Remote Transport, the Runtime folder is defined in Remote Transport settings.

DATA FOLDER

Runtime saves all data files that were created in Runtime, such as alarm files or archive files, in the data folder. The data folder is created as a subfolder of the Runtime folder by default. The folder is automatically assigned the name of the computer the Runtime is running on. You can change this save location in the project properties (**General/Data folder**).

Hint: Never configure the data folder to a removable device such as a USB stick or a network device. It is recommended that the data is recorded locally and backed up externally.

> ⚠ **Attention**
>
> If the defined path does not exist or is not available, no more data is written from the Runtime. This means a complete loss of data. The Runtime can still be operated but must be restarted as soon as the path is available again. The availability of the folder can be checked via the system driver variable **[System summary] Runtime folder not available**.

4.2.3   Free ports

zenon and zenon Logic need certain communication ports for the communication in the network. If these ports are occupied by other programs like e.g. an already installed SQL server, the communication of zenon can be disturbed. Many ports in zenon can be changed using the **Startup Tool** or properties in the Editor.

This is how you check the port assignments:

1. Enter `netstat -a -n -o` in the command line.

    You can reach the command line in Windows:

    - by pressing the Windows-key and R

    - Enter cmd and confirm with **OK**.

    - A DOS-window pops up

    - enter the command netstat

2. A list of all currently used TCP and UDP ports will pop up.

3. Check the listening ports (status: `ABHÖREN` LISTEN) if the process-ID (PID) of the ports needed by zenon and zenon Logic corresponds with the processes of zenon and zenon Logic.

    These PIDs can be found in the window **Processes** of the **Windows Task Manager**; for this purpose activate the column **PID** in the menu **Select view/columns**.

4. If other software uses these ports, reconfigure this software.
    You can see the ports that zenon and zenon Logic use in the **Port assignment by zenon and zenon Logic** table. Here you can also see if these ports can be amended in these programs.

PORT SETTINGS BY ZENON AND ZENON LOGIC

Application	Description	Ports	Transport log
stratonrt[k].exe	zenon Logic Runtime polling communication and zenon Logic Workbench.	▸ 1200–1210	**TCP**
stratonrt[k].exe		▸ 4500–4510	**TCP**
stratonrt[k].exe	zenon Logic redundancy.	▸ 7000–7010	**TCP**
stratonrt[k].exe	zenon Logic Runtime spontaneous communication.	▸ 9000–9010	**TCP**
zennetsrv.exe	zenon network service.	▸ 1100–1100	**TCP**
zensyssrv.exe	zenon transport service.	▸ 1101	**TCP**
zendbsrv.exe	zenon database service.	▸ 1103	**TCP**
zenAdminsrv.exe	zenon administration service.	▸ 50777	**TCP**
zenLogSrv.exe	zenon logging service.	▸ 50780	**TCP**
zenvnc.exe	zenon Remote Desktop service	▸ 5600 (fixed) ▸ 5610 (fixed)	**TCP**
CodeMeter.exe	Code Meter dongle service.	▸ 22350 (changeable but must not be changed)	**TCP**
WkSvW32.exe	WibuKey Network service	▸ 22347 (fixed)	**TCP**
Zenrt32.exe	**Message Control** with Voice over IP.	▸ 5060: SIP ▸ 4000: RTP ▸ 4001: RTCP (fixed) SIP and RTP can be configured using the Editor. RTCP is	**UDP**

		automatically set by the system.	

4.2.4   Exceptions for anti-virus

However zenon needs a range of services and operations that could categorize anti-virus programs as potentially dangerous.

Examples of this:

- ▶   Communication with CodeMeter --> USB dongle
- ▶   Loading VBA or VSTA code
- ▶   Embedding ActiveX elements in screens
- ▶   Frequent file access, for example for archiving, CEL, AML...

Note: There are compatibility problems with `Ahnlabs V3` virus scanner. If zenon refuses to start with an error message, put V3 into `Game-Mode` or uninstall V3.

4.2.5   firewall setup

zenon uses a number of ports. Any firewall that is present must allow communication via these ports. These must be enabled in the firewall if applicable.

PORTS USED

For communication within zenon, only TCP ports are used; no UDP ports are used. zenon requires the following ports in a network:

Service	File	Goal	TCP-port
Network service	**zenNetSrv.exe**	Runtime communication.	1100
Transport service	**zenSysSrv.exe**	Data transfer by means of Remote Transport (Editor).	1101
zenon Web Server	**zenWebSrv.exe**	On-site logging machine between web client and Runtime	1102

Port numbers can be amended individually by means of the **Listening ports** tab in the Startup Tool. Note in this case that all devices affected must be amended.

Furthermore, zenon and zenon Analyzer services use a range of ports:

Application	Standard port
zenon	
Network Service	1100
Transport Service	1101
WEB Service Classic	1102
DB Service	1103
SQL Browser Service, (for distributed engineering in the Editor)	1434
zenAdminSrv.exe	50777
Logging Service	50780
zenVNC.exe	5600 – 5610
SNMP Trap Service	50782
zenLicenseSr	50783
zenLicenseStub	50789
zenLicenseCenter	50689
WEB Service Tunneling	8080
zenon Logic	
Assigned port for zenon Logic or straton depends on the project and service. E.g.: First zenon Logic project occupies 1200 and 9000, second project 1201 and 9001 etc.	1200 – 1210 4500 – 4510 7000 – 7010 9000 – 9010
zenon Analyzer	
Administration Service	50777
Analyzer Connector Service	50778
Analyzer License Service	50779
ZAMS	50781
Drivers	
Driver Simulation	6000 – 6020
Process Gateway OPC Server	135
Process Gateway SNMP	161
Process Gateway Modbus	502
Process Gateway IEC60870-5 104 slave	2402
Process Gateway DEC	5555

Process Gateway DNP3 Slave	20000

Note: zenon drivers that communicate by means of Ethernet use TCP and thus need authorizations in the firewall in this case, regardless of the port used.

4.3   Hardware requirements

One of the requirements for putting Runtime into operation is that setup has been completed successfully. It is also important to have a valid license.

The minimum requirements are listed in the following table. These are based on a complete installation of Runtime. For extensive projects or several projects loaded at the same time you will need accordingly faster/stronger hardware. The minimum requirements can increase as a result of this.

Hardware	Minimum requirements	Recommended
CPU	Single core with SSE2 support.	Quad Core
RAM memory	Windows 7/8: from 512 MB. Note: Projects with big amounts of data, Network projects, multiple projects simultaneously and projects in redundance mode need more memory.	Windows 7/8: 4096 MB
Harddisk	2 GB free space for the Runtime-installation plus additional space for the projects. Attention: If you log historical data (e.g. Archive data or Alarm-/CEL-Data), you need sufficient harddrive space or you have to make sure during engineering that the historical data is evacuated or deleted.	
Monitor resolution	VGA with 640 x 480 pixels.	
Graphics adapter	64 MB dedicated memory. Cards with shared memory can lead to performance loss. Note the System requirements when using DirectX (on page 9) chapter in relation to this.	
Input devices	Keyboard and/or mouse. Operation via touchscreen is also possible. Many individual, customizable soft keyboards for the touchscreen are available for you.	
USB interface (optional)	▸ For installation. Installation also possible via network or other storage media. ▸ For dongle. Network dongle also available.	
Network connection (optional)	64 kBits/s for standard Client/Server projects. 100 Mbit/s full duplex for redundant operation.	100 Mbits/s full duplex for standard Client/Server projects.
Remote connection (optional)	Minimum requirements: Dial-up modem with 9600 Bit/s.	1 Mbit/s full duplex.
WAN connection (optional)	Any desired connection via router, e.g. per ISDN or DSL Data transfer is slower in a WAN than in a local network for technical reasons. Be sure to check the possible data transfer rates of your WAN technology already at the time when you create the project.	
Message Control (optional):	Please refer to chapter Message Control for the requirements.	

| Interfaces (optional) | The necessary interfaces depend on the requirements of the PLC and/or the bus connection, for example serial RS232 or RS422/485 interfaces, ISA/PCI slots, etc. | |

4.3.1   Paths for setup and operation

Paths for zenon:

▶   Setup

▶   Runtime

> ### 💡 Info
>
> You can display many default paths with the help of the **set** command:
>
> ▶   start the command line (enter **cmd** in the Windows start area)
>
> ▶   enter command **set**
>
> ▶   with click in button Enter standard folders for Windows and zenon are displayed

Note: As absolute paths differ in different operating system, the paths are displayed as Windows environment variable in this chapter. For example %ProgramData% instead of C:\ProgramData.

SETUP

During setup, paths are set for required software from third-party providers, as well as the zenon Runtime folder.

The setup needs administrator rights. This is also true for changing the installtion paths.

REQUIREMENTS

The installation paths of the required third-party software match the standard paths of the respective manufacturer and cannot be changed during setup.

The additional software packages that need to be installed depend on the type of installation:

▶   zenon Editor

▶   zenon Runtime

▶   zenon Web Client

▶ zenon Logic Runtime

Requirement	Editor	Runtime	Web Client	zenon Logic Runtime
Microsoft .NET Framework 3.5 SP1	+	+	-	-
Microsoft .NET Framework 4.0	+	+	-	-
Microsoft Visual C++ 2005 Redistributables	+	+	-	+
Microsoft Visual C++ 2010 Redistributables	+	+	+	+
Microsoft Visual C++ 2012 Redistributables	+	+	+	+
Microsoft SQL-Server 2012 SP1 Express (from 7.10 on)	+	-	-	-
VSTA	+	+	-	-
OPC-Core Components (up to 6.22 SP1)	+	+	-	-
Wibu key Dongle Software 6.0 x86/x64	+	+	-	-
COPA-DATA Multiple Network Protocol Driver x86/x64	+	+	-	+
CodeMeter dongle software x86/x64	+	+	-	-
Report Viewer 10.0 (from 7.00 on)	+	+	+	-
VBA 7.1	+	+	+	-

ZENON RUNTIME

zenon Runtime uses the path that is set in zenon6.ini for projects. This path can be set using the Startup Tool as well as using Remote Transport from a zenon editor.

Object	Path
Project	`[user-defined path]\[project]\RT`
External files	`[User-defined path]\[project]\RT\FILES\...`
Exported archives, Chronological Event List and Alarm Message List	`[User-defined path]\[project]\Export` Note: Is created at the first export.
System files	Windows system folder.

ZENON LOGIC

Paths for zenon Logic are created analogous to the zenon paths.

4.3.2   Demo mode

If Runtime is not licensed, it can be used in demo mode for 30 days. Licensing (soft licensing or dongle licensing) is possible at anytime by entering a valid serial number and activation number. Licensing is only effective once zenon has been restarted.

Note: From the 41st start or the 31st day in demo mode, Runtime only runs for 10 minutes. Runtime always runs for 30 minutes in demo mode.

4.3.3   Runtime under Windows Embedded Standard

The minimum requirements relate to an installation of Runtime adapted to the Windows Embedded Standard 7 SP1 operating system with platform update. The hardware must be accordingly more powerful for extensive projects.

This table only states the figures that are different to the standard installation. The other parameters correspond to the figures described in the Hardware requirements for Runtime chapter.

Hardware	Minimum requirement	Recommended
RAM memory	▸ 512 MB. Note: Projects with big amounts of data, Network projects, multiple projects simultaneously and projects in redundance mode need more memory.	2048 MB
Storage medium	▸ 2 GB of free memory on C:\ drive before the installation of .NET Framework 3.5 and 4.5 800 MB of free memory after the installation of the .NET Framework ▸ Plus memory space for the projects, archives, etc.	80 GB

Attention: If you log historical data (e.g. Archive data or Alarm-/CEL-Data), you need sufficient harddrive space or you have to make sure during engineering that the historical data is evacuated or deleted.

4.3.4   Runtime for Windows CE

The minimum requirements are based on a complete installation of the Runtime for Windows CE. The hardware must be accordingly more powerful for extensive projects.

Hardware	Minimum requirement	Recommended
CPU	At least 400 MHz	1 GHz
RAM memory	64 MB	1024 MB for Windows CE 6.0.
Storage medium	64 MB free harddrive space. Permanent recordable remanent storage medium for project data	256 MB free harddrive space or more.
Network connection	For standard Client/Server projects: 10 Mbit/s full duplex.	

⚠ **Attention**

Windows CE is no longer supported from version 7.50.   zenon CE version 7.20 is installed. To use this, the Runtime files for version 7.20 must be created.

5. Uninstalling Runtime

To uninstall Runtime:

1. Open the **Control Panel**.

2. Click on **Programs**.

3. Click on **Programs and Features**.

4. Select the zenon 7.50 programs.

5. Click on **Uninstall**.

6. Follow the uninstall wizard.

6. Runtime for Windows CE

The Runtime installation for Windows CE consists of the following files:

File name	Description
zenonrCE.exe	The Runtime application
Cd_tooCE.dll	Necessary for the Runtime
ZennetsrvCE.dll	The control system netservice for Windows CE. Necessary for network projects.
SysSrvCE.exe	Transport service
LogCliLibCE.dll	The logserver client
zenon6.ini	Text file with settings for the Runtime like e.g. start project, language of the Runtime, etc.
UpdateCE.exe	Application, necessary for the CE Update tool.
RgermaCE.dll	German language file
RengliCE.dll	English language file
RfrancCE.dll	French language file
RitaliCE.dll	Italian language file
RrussiCE.dll	Russian language file
RspaniCE.dll	Spanish language file

Install the Runtime to the CE device with the entry CE Runtime Update-Programs (under menu **Option**).

> ⚠ **Attention**
>
> *Windows CE is no longer supported from version 7.50.   zenon CE version 7.20 is installed. To use this, the Runtime files for version 7.20 must be created.*

> 💡 **Info**
>
> *The following is true for a connection to Windows CE 6.0 with **CX1000**, **Profibus** or **SYCONuni**: Make sure that the file **CDMemDrv.dll** has been transferred to the device. **CDMemDrv.dll** is a Windows CE device driver. The DLL is available for x86 and for ARMV4I.*

Additionally there are a number of other drivers for hardware communication. If the processor type of the CE device is recognized by the editor, the Remote Transport automatically transports the drivers used in the project to the CE device. The manner or the number of transferred files is displayed in the Output Window of the Editor.

These files always have to be compatible with the according CE version and with the according processor type. Mixing files from different CE versions or even service packs can lead to failures and unwanted side effects, and is thus is not permitted.

> 💡 **Info**
>
> *When starting **zenonrce.exe**, the file **syssrvce.exe** is also executed. Thus it is guaranteed that a TCP connection can also be established. Long delays are avoided and only one file is necessary for the autostart functionality.*

6.1   System files

The Windows CE Runtime requires the existence of certain system files. In case one of these files is missing, the operating system sends an error message during Runtime start, that one or various components have not been found. The following system files are required:

File	Description
mfc90u.dll	Necessary for the Runtime. On startup, an error message pops up if this file does not exist.
msvcr90.dll	Necessary for the Runtime. On startup, an error message pops up if this file does not exist.
atl90.dll	Not necessary for starting the Runtime but for the use of drivers with network connections or the use of zenon in a network. If this file does not exist, the device will not work as a client or TCP/IP driver connections will not work.
IMGDECMP.dll	Not necessary for starting the Runtime but necessary for displaying Transparency if Alpha Blending is not integrated in the operating system. Animation of GIF files is not possible with Windows CE.
VBSCRIPT.dll + JSCRIPT.dll	Not necessary for starting the Runtime. This file is needed for the PCE (Process Control Engine).

Some of these system files are installed together with the installation of zenon for CE and can be transferred to the CE device using the **UpdateCE** Tool. All these system files should be integrated in the operating system image of the CE device by the manufacturer.

> ⚠ **Attention**
>
> *For manufactures of Windows CE OS-images:*
> *CE versions older than 6.0 need the file **toolhelp.dll**. Activate the following option in*
> ***Platform Manager*** *in order that the file is available on the CE device and Toolhelp is available in SDK.*
> *Core OS -> Display Based Device ->Core OS Services -> Debugging Tools ->*
> `Toolhelp API`*. Thus the* `Toolhelp.dll` *is part of the image.*
> *Hint: Always use the most up-to-date Servicepack of the **Platform Builder**.*
>
> *Note: File **toolhelp.dll** is not used for Windows CE 6 and should not be used with CE 6.*

6.2 Update of the Windows CE Runtime

To perform an update of Windows CE Runtime:

▶ make sure that the zenon Transport Service (**SysSrvCE.exe**) runs in the CE device

▶ make sure that you do not have established a remote connection via the zenon Editor to the device

▶ In the zenon Menu, select **Options** and then **Update Windows CE Runtime**.

▶ The dialog for transfer of Runtime files opens

▶ configure the link

▶ define the data you want to transfer

▶ choose the appropriate version

▶ start the update

Note: If you are transferring/installing Runtime for the first time, note the information in the **Manual installation and Runtime update** (on page 32) chapter.   (on page 32)

CONFIGURE CONNECTION

You can configure the connections to the Windows CE device in the tab **Connection**.
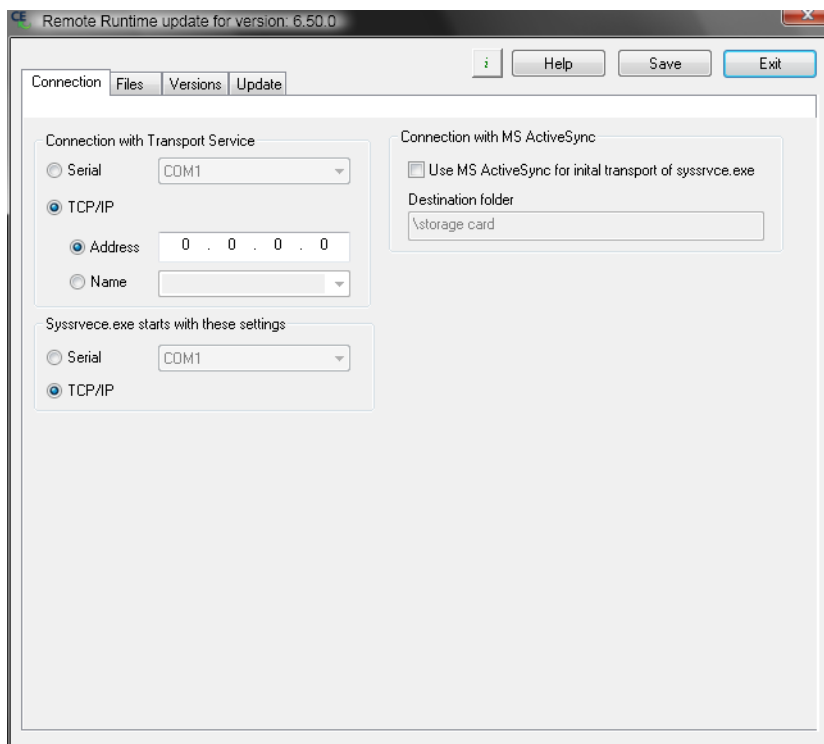
Parameters	Description
Serial	Settings for serial connection with Windows CE device, you have to select a port.
TCP/IP	Settings for TCP/IP-connection to the Windows CE device.
Adress	IP address.
Name	Computer name
Syssrvce.exe starts with these settings	Settings for starting **syssrvce.exe**.
Serial	`Active::` serial connection selected, port must be selected.
TCP/IP	`Active:` TCP/IP-connection selected.
Connection with MS ActiveSync	Settings for connection via MS ActiveSync
Use MS ActiveSync for initial transport of syssrvce.exe	Active: syssrvce.exe is transferred during the first transport via MS ActiveSync.
Destination folder	Target folder.
Help	Opens online-help
Save	Saves all changes.
Exit	Closes the update CE-tool and reminds you before to save unsaved changes.

DEFINE FILES YOU WANT TO TRANSFER
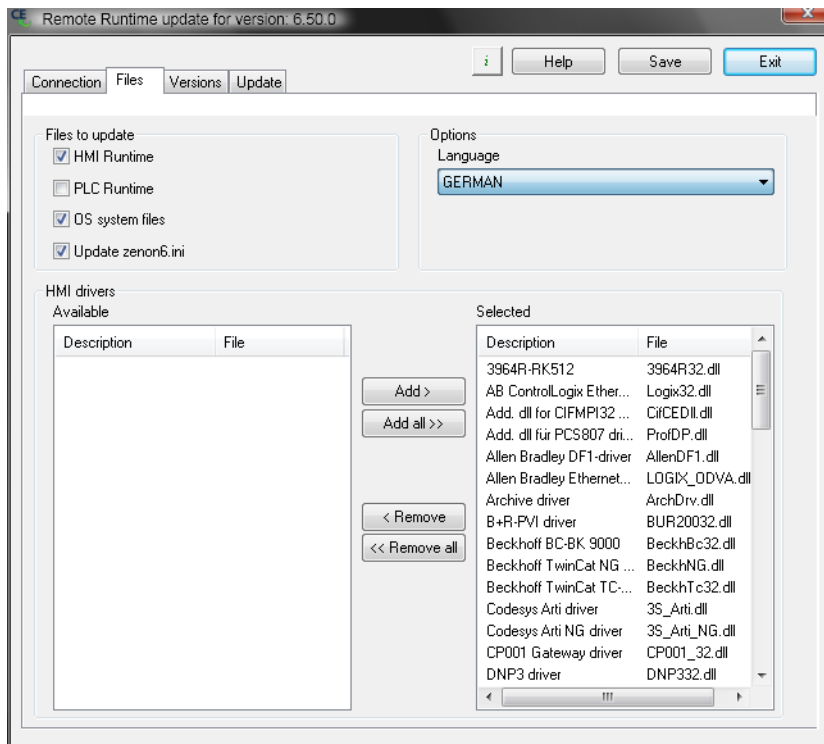
Parameters	Description
Files to update	Files to be transferred.
HMI Runtime	`Active`: Transfers zenon files to the target device. Default: `Active`
PLC Runtime	`Active`: Transfers zenon Logic files to the target device. Default: `Inactive`
OS system files	`Active`: Transfers necessary files for the OS. Default: `Active`
Update zenon6.ini	Transfers zenon6.ini to the target device. This way, the license information of the target device is also changed.
Options	
Language	Desired target system language. Default: `English`
HMI drivers	Selection of HMI drivers for transfer.
Available	List of available drivers.
Selected	List of selected drivers.
Add	Adds chosen drivers to the list of selected drivers.
Add all	Adds all drivers to the list of selected drivers.
Remove	Removes chosen drivers from the list of selected drivers.
Remove all	Removes all drivers from the list of selected drivers.
Help	Opens online-help
Save	Saves all changes.
Exit	Closes the update CE-tool and reminds you before to save unsaved changes.

SELECT VERSION

Select the correct version in the tab **Versions** if it wasn´t automatically recognized.
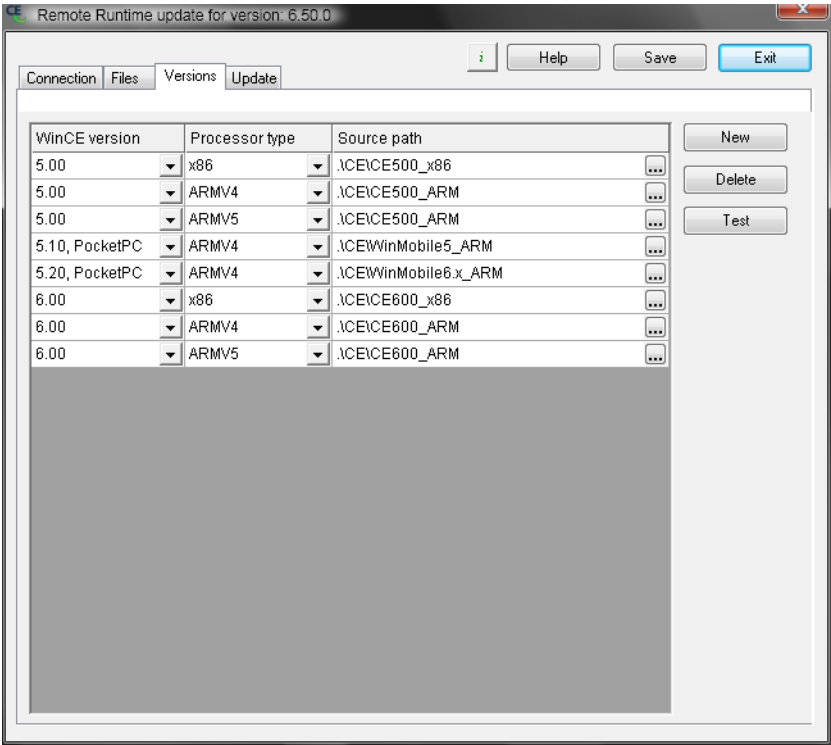
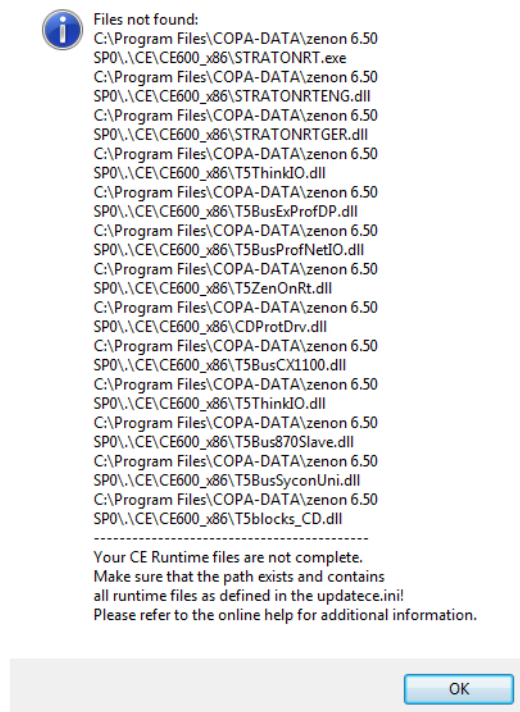| Parameters	Description
WinCE version	Version of the target device Windows CE OS. Click the button to open a drop-down list for selection.
Processor type	Processor of the device.
Source path	Path to the folder that contains the files. Click the button ... and a dialog opens to select a folder.
New	Inserts a new, empty entry in the list.
Delete	Deletes the selected entry from the list
Test	Verifies settings.
Help	Opens online-help
Save	Saves all changes.
Exit	Closes the update CE-tool and reminds you before to save unsaved changes.

START UPDATE

To establish a connection:

▶ click on the button **Start** on the tab **Update**.
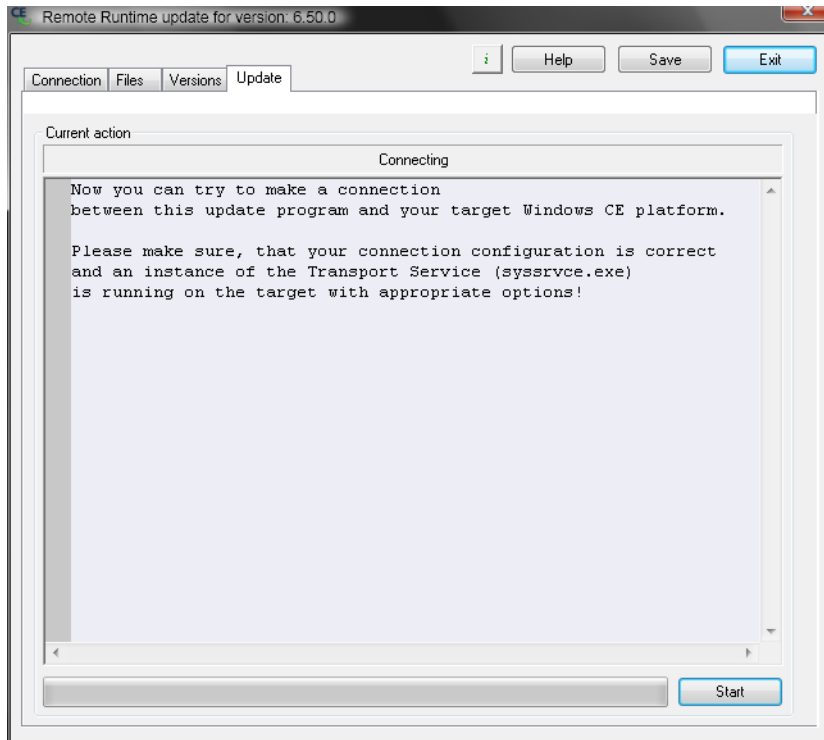
▶ The data that shall be transferred is verified and displayed in a window.

▶ Start the transfer to the target device by clicking on the button **Next** .
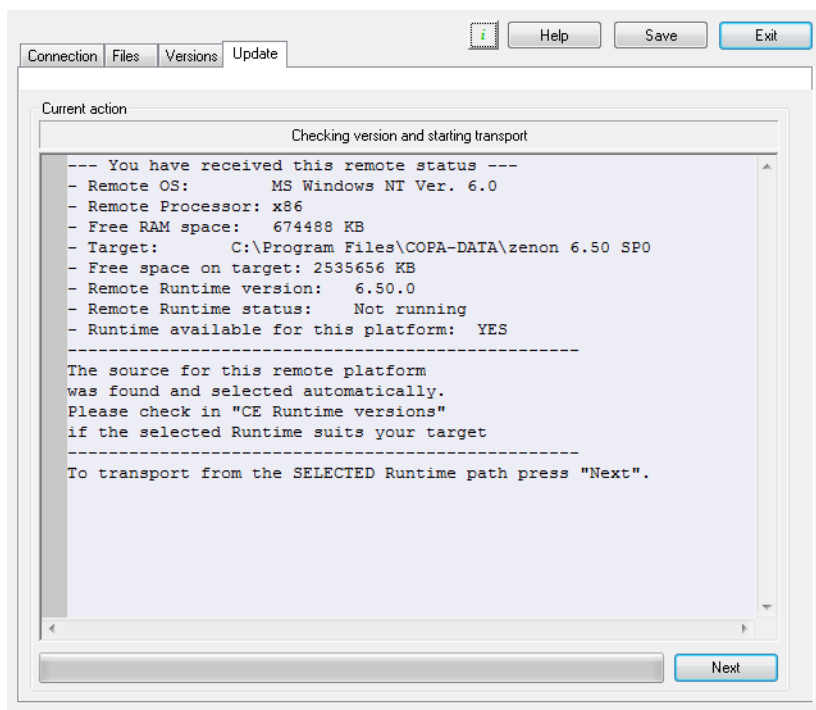
If the transfer cannot be initiated because files are missing, an error message with a list of missing files pops up:

Files not found:
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\STRATONRT.exe
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\STRATONRTENG.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\STRATONRTGER.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5ThinkIO.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5BusExProfDP.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5BusProfNetIO.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5ZenOnRt.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\CDProtDrv.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5BusCX1100.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5ThinkIO.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5Bus870Slave.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5BusSyconUni.dll
C:\Program Files\COPA-DATA\zenon 6.50 SP0\.\CE\CE600_x86\T5blocks_CD.dll
----
Your CE Runtime files are not complete.
Make sure that the path exists and contains
all runtime files as defined in the updatece.ini!
Please refer to the online help for additional information.

OK

▶ If you get the error message **The current update was not completed**, the update was interrupted or not executed properly.

💡 **Information**

If you want to replace zenVNCServer.exe via update, it is terminated and restarted after the update. For this the file **zenVNCSrvCE.exe** *must contain the*

the following entry in the UpdateCE.ini in section [SOURCES_FILES_GENERAL] (exists per default):

▶ zenVNCSrvCE.exe

▶ zenVNCCfgCE.exe

6.3   Manual installation and Runtime-update

Installation and update are also possible without remote transport and ActiveSync. You have to copy the needed files manually on a storage card for the CE device. You have to know CE version and processor type.

It is mandatory to copy the following files from the according folder for the correct platform to a storage card for the CE device:

- **zenonRCE.exe** (Runtime)

- **LogCliLibCE.dll** (Diagnose-DLL)

- **zenon6.ini** (Configuration file)

- **Cd_tooCE.dll** (Help DLL)

- **ZenNetSrvCE.dll** (Network)

- **CDHelper.dll** (Help DLL)

- One of the following language dlls: **RChineCE.dll, RCzechCE.dll, REngliCE.dll, RFrancCE.dll, RGermaCE.dll, RItaliCE.dll, RRussiCE.dll, RSpaniCE.dll** (the selected language is stipulated in the **zenon6.ini** file.)

- **syssrvce.exe** (Transport service and diagnosis server)

- **atl90.dll** (System file, possibly part of the operating system)

- **mfc90u.dll** (System file, possibly part of the operating system)

- **msvcr90.dll** (System file, possibly part of the operating system)

Further files, for example the driver or the remote desktop software (**zenVNCCfgCE.exe** and **zenVNCSrvCE.exe**), are optional.

7. Supported protocols

Runtime communicates with all possible controllers using drivers. The drivers support a number of protocols.

AVAILABLE DRIVERS:

- 3964R-RK512 driver (Win, CE)

- Allen Bradley DF1-driver (Win, CE)

- Allen-Bradley ODVA driver (Win, CE)

- Applicom driver (Win)

- Applicom IO configuration (Win)

- Archive driver (RAW format) (Win, CE)

- ARCNET - Driver for ABB (Win)

- AS-interface (Win)

- Bachmann M1 driver (Win)

- ▶ Bacnet and DDC4000 driver (Win)

- ▶ BACnet driver Next Generation (Win, CE)

- ▶ Beckhoff BC-BK 9000 (Win, CE)

- ▶ Beckhoff TwinCat ADS driver (Win)

- ▶ Beckhoff TwinCat NG driver (Win, CE)

- ▶ Beckhoff TwinCat TC-ADS driver (Win, CE)

- ▶ Biffi DCM (Win)

- ▶ BR TCP-IP driver (Win)

- ▶ BR Transponder Reader 4102/4150 (Win, CE)

- ▶ BR-PVI based driver (Win, CE)

- ▶ BR-PVI based driver (replaced) (Win, CE)

- ▶ Brodersen IOTOOLS (Win)

- ▶ Buderus32 driver (Win)

- ▶ Codesys Arti NG SoftPLC driver (Win, CE)

- ▶ Codesys Arti SoftPLC driver (Win, CE)

- ▶ Codesys SoftPLC driver (Win)

- ▶ CP001 Gateway driver (Win, CE)

- ▶ CTI driver (Win, CE)

- ▶ Danfoss driver (Win)

- ▶ DataTaker driver (Win, CE)

- ▶ DDE Client driver (Win)

- ▶ DMX 512 driver (Win)

- ▶ DNP3 driver (Win, CE)

- ▶ DNP3 Slave/Outstation (Win)

- ▶ Driver for ABB 07KT94 (Win)

- ▶ Driver for ESA PCI CIB (Win, CE)

- ▶ Driver for Esser BMZ 8000 (Win, CE)

- ▶ Driver for IBH Soft PLC (Win, CE)

- ▶ Driver for internal variables (Win, CE)

- ▶ Driver for Mathematics variable (Win, CE)

- ▶ Driver for Otis controller (Win, CE)

- ▶ Driver for SE-Elektronic (Win)

- ▶ Driver for simulator variables (Win, CE)

- ▶ Driver for Slot PCL SPCx00 (Win)

- ▶ Driver for system variables (Win, CE)

- ▶ Driver for the buttons /Ketop (Win, CE)

- ▶ Driver for VIPA CE touchpanel (Win, CE)

- ▶ Drv for BCI hand-held scanner (Win)

- ▶ Eldatic driver (Win)

- ▶ Elrest CAN Network driver (Win)

- ▶ Energy analysis device UPM 3000 (Win)

- ▶ European Installation Bus (Win)

- ▶ Festo EasyIP Multiprog driver (Win)

- ▶ Festo Serial-CI driver, FST (Win)

- ▶ File driver (Win)

- ▶ FMS with PC card from Siemens (Win)

- ▶ Hekatron driver (Win)

- ▶ Hilscher CIF driver (Win)

- ▶ Hilscher CIF Profibus (Win, CE)

- ▶ Hilscher MPI driver (Win, CE)

- ▶ Hilscher SYCON CifX (Win)

- ▶ Hilscher SYCON configuration (Win, CE)

- ▶ Hilscher SYCON configuration (Win, CE)

- ▶ Hitachi driver (Win, CE)

- ▶ HMI adapter driver (Win, CE)

- ▶ HMS configuration (Win)

- ▶ Hydrometer Driver (Win)

- ▶ i-LON 100 driver (Win)

- ▶ Idec driver (Win)

- ▶ Ident System driver (Win, CE)

- ▶ IEC 60870 - 5 - 103 Driver (Win)

- ▶ IEC 60870-5-101_104 driver (Win, CE)

- ▶ IEC 61400-25-4 Annex C (Win, CE)

- ▶ IEC 61499 driver (Win)

- ▶ IEC 61850 Client (Master) (Win, CE)
- ▶ IEC 61850 driver (Win, CE)
- ▶ IEC 61850 Server (Slave) (Win, CE)
- ▶ IEC-62056-21 Driver (Win)
- ▶ IEC60870-5-101/104 Slave (Win, CE)
- ▶ Interbus S driver (Win)
- ▶ Interbus-S (Win)
- ▶ Internal driver with time stamp (Win, CE)
- ▶ Jetter Treiber (Win)
- ▶ K-Bus driver for CX1000 (Win, CE)
- ▶ Kemro User ID Driver (Win, CE)
- ▶ Kieback + Peter driver (Win)
- ▶ KOYO Sequence driver (Win, CE)
- ▶ LogiCAD driver (Win)
- ▶ LON driver (Win)
- ▶ LS Industrial Systems-XGT (Win)
- ▶ Matsushita TCP-IP driver (Win)
- ▶ Mininet-Master driver (Win, CE)
- ▶ Mitsubishi - Melsec A-Q driver (Win, CE)
- ▶ Mitsubishi - Melsec FX driver (Win, CE)
- ▶ Modbus Energy driver (Win, CE)
- ▶ MODBUS Master protocol (Win, CE)
- ▶ Modbus RTU and Open Modbus TCP (Win, CE)
- ▶ MODBUS Slave protocol (Win, CE)
- ▶ Modicon TSX Micro driver (Win, CE)
- ▶ Moeller Electric PSUNI driver (Win, CE)
- ▶ OMRON driver (Win, CE)
- ▶ Omron FINS driver (Win, CE)
- ▶ OPC Client V2-0 driver (Win, CE)
- ▶ OPC UA Client driver (Win, CE)
- ▶ OSAI TCP/IP driver (Win, CE)
- ▶ Panasonic serial driver (Win)

- ▶ Passive Modbus RTU driver (Win)

- ▶ PC Adapter - Vipa Green Cable (Win, CE)

- ▶ PCS807 Profibus DP driver (Win, CE)

- ▶ PCS812 S7 connection (Win, CE)

- ▶ PDNet PCI - driver (Win)

- ▶ PICnet driver (Win, CE)

- ▶ PILZ-PSS driver (Win, CE)

- ▶ Profibus DP Master driver (Win)

- ▶ ProfiNet IO RT (Win, CE)

- ▶ Reis Robotics driver (Win)

- ▶ RTK9000 driver (Win)

- ▶ S5 H1 driver (Win)

- ▶ S5 TCP-IP driver (Win)

- ▶ S7 driver for S7-200 (Win, CE)

- ▶ S7 driver Softnet based (Win)

- ▶ S7 MPI for Siemens CE terminals (Win, CE)

- ▶ S7 TCP-IP driver (Win, CE)

- ▶ S7_MPIISA driver (Win)

- ▶ Saia Directly driver (Win, CE)

- ▶ SAIA2ND32 driver (Win)

- ▶ SaNORS - Asfinag SOS-telephones (Win)

- ▶ Schiele S400 driver (Win, CE)

- ▶ Schiele S800 driver (Win, CE)

- ▶ Siclimat X Decos (Win)

- ▶ Siemens S5 PD driver (Win, CE)

- ▶ Siemens Sigmasys driver (Win)

- ▶ SIGMATEK driver (Win)

- ▶ Sigmatek Lasal Driver (Win, CE)

- ▶ Simotion driver (Win)

- ▶ SNMP Driver (Win)

- ▶ SoftNet ProfibusDP (Win)

- ▶ SQL Driver (Win)

- ▶ SST Driver (Win)

- ▶ Standard M-Bus driver (Win, CE)

- ▶ straton driver (Win, CE)

- ▶ straton NG driver (Win, CE)

- ▶ straton to zenon RT connection (Win, CE)

- ▶ Swarco Futurit (Win)

- ▶ System 2000 driver (Win)

- ▶ System 2000 driver with logging (Win)

- ▶ Telco200 driver (Win)

- ▶ Teleperm driver (Win)

- ▶ ThinkIO/IOSystem758 (Win, CE)

- ▶ TI 505 - 545 driver (Win)

- ▶ Trend Driver (Win)

- ▶ Trend NG driver (Win)

- ▶ VDMA-XML driver (Win, CE)

- ▶ VMEBUS driver (Win)

- ▶ Win32 Shared memory (Win)

- ▶ WINAC driver (Win)

- ▶ Write variable values in SQL (Win)

8. Starting the Runtime

There are several possibilities for starting zenon Logic Runtime:

- ▶ Using the Editor

  - • by pressing key `F5`

  - • via symbol **Start Runtime** in the toolbarRuntime files

- ▶ Via the Startup-Tool

- ▶ via the Windows start menu

- ▶ using Windows Autostart.

- ▶ Via the **zenStartupMgr** (on page 41) service

DIENST ZENADMINSRV

The `zenAdminSrv` service must be started to start the Runtime. If the service is not available, you will receive an error message accordingly.

When starting via Windows Autostart, zenon attempts to start Runtime until the service is available or you end the error message by clicking on the **Cancel** button.

SIZE OF THE MAIN WINDOW

The size of the Runtime window when Runtime is started is configured for the local computer in the zenon Editor.
Carry out the following steps for this configuration:

1. Select the **Workspace** in the zenon Editor.

2. Click on the **Local Runtime size** property group.

3. Enter the values for **Runtime window width [pixel]**.

4. Enter the values for **Runtime window height [pixel]**.

FUNCTION "WINDOW TO FOREGROUND"

The Runtime can be moved behind other running programs with the help of function **Window to the background**. With function **Window to foreground** it is moved to the foreground.

> 💡 **Information**
>
> *At moving the Runtime to the foreground the Runtime window is defined as the topmost window. At this the alarm status line is covered. In order to get the alarm status line back to the foreground, you can:*
>
> ▸ activate the system keys (deactivate project settting **Lock system keys**) and get back the alarm status line via `Alt+Tab` to the foreground
>
> ▸ activate the Windows task bar and click un window **Status**
>
> ▸ move the Runtime back to the background
>
> ▸ restart the Runtime

SET START PROJECT

If you have created a project, you can start this in different ways.

Note: It is a requirement that the project generated is first transferred to the target system if the configuration computer is not also the target system.

There are several possibilities for starting a project in Runtime:

Using the Editor:

1. Start the zenon Editor.

2. Select the project that you want to set as the start project.

3. Click on `Set project as start project` in the context menu

Via the Startup Tool:

1. Open the Startup Tool.

2. Click on **Item-->Properties...**

3. Select, in the **RT project** field, the project that you want to set as the start project.

Via Remote Transport:

1. Activate the project in in the toolbar.

2. Select the desired project as the start project.

Via the network topology:

1. Add a computer.

2. Select this computer.

3. Select the desired project as the start project.

8.1   Set up Runtime autostart

To set up Runtime autostart, proceed as follows:

1. Select the `zenonrt.32.exe` application from the `C:\Program Files (x86)\COPA-DATA\zenon 7.50 SP0` directory.

2. Create a local link for this.

3. Copy this into the `Autostart folder` from the start menu.

Runtime thus starts automatically the next time you log on.

8.2   Keyblock Runtime Start

Keyblock Runtime Start is a program with which zenon Runtime runs as a **Shell**. In doing so, zenon Runtime is started, but all **Windows** system tasks are blocked. Keyboard shortcuts such as **Windows** key or `Ctrl+Alt+Del` no longer have an effect. User can no longer access the operating system but only work on the zenon user interface.

The precondition for this is that the project properties are set **Runtime title** to `No title (full screen)`. Then zenon runs in full screen mode and the Runtime cannot be minimized.

Note also the information provided in the **Protect Runtime files** chapter**.**

Note: The blocking of the **Windows** key can be circumvented. You should therefore block the **Windows** key using the corresponding entry in the **Startup Tool**

> **License information**
>
> *Part of the standard license of the Editor and Runtime.*

8.3   Configure start delay

When using dongles for licensing, the Codemeter service must be ready before zenon Runtime starts. To amend the start time, you can configure a start delay for zenon Runtime.

ZENON RUNTIME START DELAY

Stipulate a start delay of at least 30 seconds in the **zenon6.ini** file for zenon.

To do this:

1.   Open the **zenon6.ini** file with a text editor.

2.   Navigate to the **[DEFAULT]** area

3.   Enter the desired delay for **STARTDELAY=** .

Example:

[DEFAULT]

STARTDELAY= 30000

> **Information**
>
> *You can find **zenon6.ini** in the following path:*
>
> *Windows 7/8: %ProgramData%\COPA-DATA\System*

9. Starting Runtime as a service

The zenon Runtime can automatically be started as a service by the **zenStartupMgr** service.

Attention: If Runtime is started using the **zenStartupMgr**, it can no longer be stopped or restarted by users.

To start Runtime as a service:

1. Register the file **zenStartupMgr.exe** as a service:

2. Configure the properties for sign-in.

3. Start, if necessary, Remote Transport (on page 45) with **zenStartupMgr**

4. Define the Runtime to be started in the Startup Tool (on page 44)

5. Configure a start delay (on page 41) for zenon Runtime if you are using a dongle license

REGISTER SERVICE

To register **zenStartupMgr.exe** as a service:

1. Open the command line.

2. Go to the save location of the file **zenStartupMgr.exe**.
   (default with 32-bit OS: `%ProgramFiles(x86)%\Common Files\COPA-DATA\zenStartupMgr`
   (default 64-bit OS: `%ProgramFiles\Common Files\COPA-DATA\zenStartupMgr`)

3. Register the file as a service with the **zenStartupMgr.exe –service** command.
   Note: The service, if it is already running, is first stopped and then registered. If **zenStartupMgr** is running, it is closed.

CONFIGURE SERVICE FOR THE USE OF MANY DRIVERS

Windows as an operating system limits the number of windows that can be created due to its fixed, reserved desktop memory, depending on the version and possible integration with the desktop.

| Version/action	Interactive Desktop	Non-Interactive Desktop
Windows 7 32-Bit	12 MB	512 KB
Windows 7/Windows Server 2008 R2 64-bit	20 MB	768 KB

zenon drivers each need several windows.   The number of drivers that can be used can be influenced using the **Allow data exchange between service and desktop** option in the properties of the service.

▶ `Inactive`: A maximum of 20 drivers can be started.

▶ `Active`: As many drivers as there are in a Runtime started as a user process can be started.

To activate the **Allow data exchange between service and desktop** option:

1. Open the Windows Service Manager.

2. Open the properties of the **zenStartupMgr** service.

3. Go to the **Login** tab.
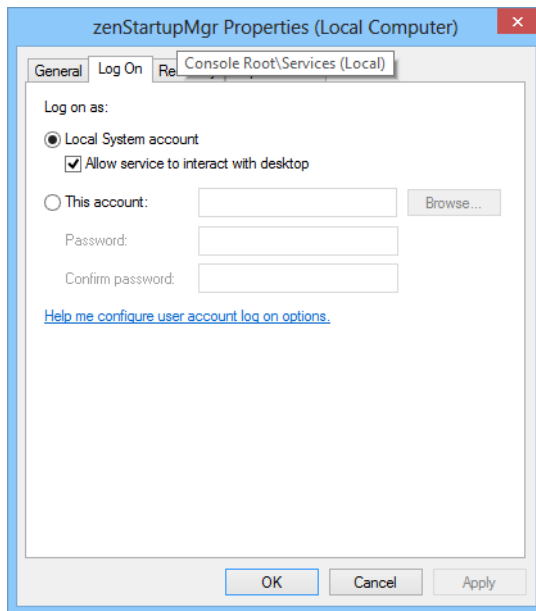
4. Activate the **Allow data exchange between service and desktop**.
This service must be configured to `automatic` start type. With the service active, the user logged on to the computer is notified if the zenon Runtime as a service opens an additional window, for example in the event of a new alarm and active status line.

Note Windows 8/Server 2012: In order for the service to be able to be started, the entry must be set correctly in the Windows registry:

a) Go to the entry
   `HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Windows`.

b) Open or create the DWORD value **NoInteractiveServices**.

c) Set the decimal value of `1` to `0`.

5. To stop Runtime messages being displayed on the desktop:
Deactivate the **Detection of inactive services** service.

INTERACTIVE ACCESS

If it is possible to interactively access the process, then:

1. Activate the **Allow data exchange between service and desktop** option in the service**.**

2. Activate the **Detection of interactive services** service.

Note: This type of access is not suitable for use for the actual operation of Runtime. Services are intended as program instances that run in the background that are not operated by means of a user interface. If operations on the Runtime Server are to be carried out, Runtime must be started as an application. If Runtime is to run on the Server as a service, operation of Runtime can be carried out from a zenon Client.

LIMITATIONS TO INTERACTIVE ACCESS

If zenon Runtime is started as a service and this is nevertheless to have a graphic user interface (GUI), this is implemented by the operating system by means of the `Secure Desktop` (detection of interactive services) system service.

Access to the Runtime user interface via the Windows system service has been subject to several restrictions since the Vista/Server 2008 version for security reasons. Above all:

▶ The interactive desktop is automatically ended after one minute of inactivity and the windows login screen is displayed.

▶ Display of DirectX effects, such as glow or shadowing for elements is not possible.

▶ Multi-monitor operation is not possible.

9.1   Configuration of zenon Logic Runtime

If zenon is running as a service, the user interface of the integrated zenon Logic Runtime is not available. To make changes to the configuration of zenon Logic Runtime, Runtime must be started normally.

There are different possibilities for configuration:

1. You can connect to the panel on which Runtime is to run via remote transport and enter the license for Runtime there.

2. Network configuration: Encryption via Remote Transport can also be configured.

3. See the zenon6.ini, General settings [DEFAULT] chapter.

# 9.2   Configuration in the Startup Tool

You can define how several programs are to be started by the service in the **Startup Tool**. To start an existing zenon Runtime as a service:

1.   Open the zenon **Startup Tool**.

2.   Click **Application**.

3.   Select **Options**.

4.   The dialog with the settings is opened.

5. Navigate to the **Service Startup** tab.
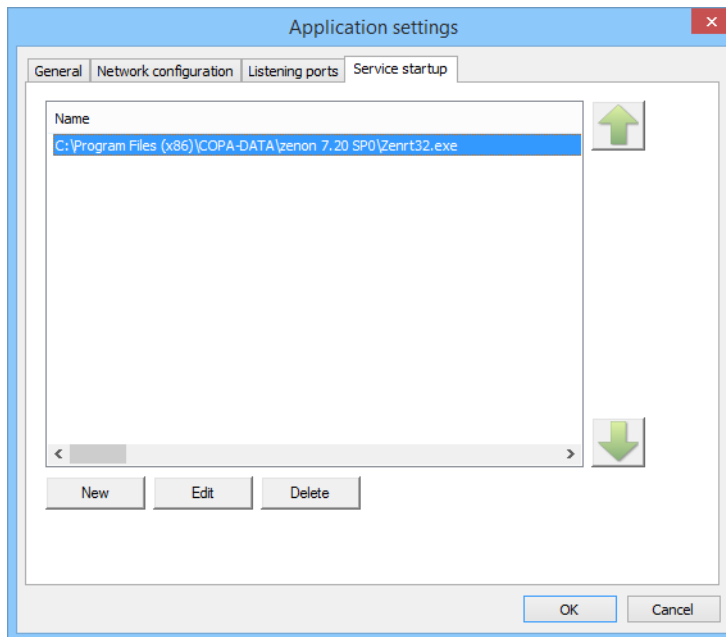
6. To define a Runtime, click on the **New** button

7. The dialog for selecting a program is opened.
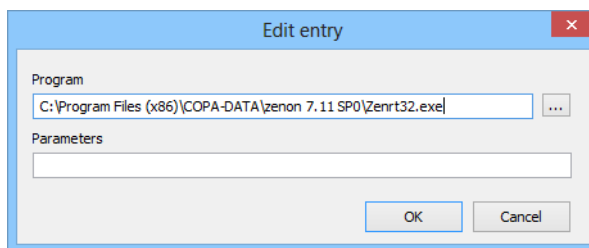
8. Click on the **...** button to open the file selection dialog

9. Go to the corresponding zenon folder

10. Select **Zenrt32.exe**.

11. Close the selection dialog and the **Startup Tool**.

9.3 Remote Transport

In its standard settings, zenon Remote Transport runs in the context of a logged-in user. In this configuration, it can neither start Runtime as a service nor reload or stop it.

Remote Transport must therefore be started with **zenStartupMgr**. To do this:

1. Create an entry for the start of **zenSysSrv** in the **Startup Tool** -> **Service startup**.

2. Place the entry before the entry for **zenrt32.exe**.

3. Deactivate **zenSysSrv** for logged-in users.

The Remote Transport can:

▶ Transfer data to the server

▶ Reload data

If Runtime runs as a service, it cannot be stopped or started by means of Remote Transport.

DEACTIVATE REMOTE TRANSPORT FOR LOGGED-IN USERS

If **zenSysSrv** is started with **zenStartupMgr**, it can no longer be started by logged-in users. To avoid this, remove it from the registry manually.

zenSysSrv up to Windows 8:

1. Open the Windows dialog to execute commands (`Windows key + R`).

2. Enter **msconfig**.

3. The **system configuration** dialog is opened.

4. Go to the **Start** tab.

5. Deactivate the automatic start of zenon by deactivating the checkbox in front of **zenSysSrv.exe**.

6. Click on **Accept**.

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

8. Restart the computer

zenSysSrv from Windows 8:

1. Open the Task Manager (`Crtl + Shift + Esc` keys).

2. Go to the **Autostart** tab.

3. Deactivate the automatic start of zenon by deactivating the checkbox in front of **zenSysSrv - Transport service**.

4. Click on **Deactivate**.

5. Restart the computer

Attention: If a zenon version is re-registered via the **Startup Tool**, the entry is recreated and must be removed manually again.

9.4 Procedure

If the **zenStartupMrg** service is started, then it starts all processes entered in the Startup Tool consecutively as child processes. If the service is ended, it ends all processes it has sent in reverse order.

RIGHTS

All processes started by **zenStartupMrg** run under the user under which the service is started by the system. This is generally the local system account. Only resources that can access the local system account can be used.
The following are thus generally not reachable:

- ▶ Network drives

- ▶ Network printers

- ▶ Databases with the option **Use Windows NT integrated security** activated

If **zenStartupMgr** is started under a dedicated Windows user, no interaction with the desktop is possible.
Warning: The password of a dedicated user can neither be changed nor expire. Otherwise the service will no longer start.

SECURE DESKTOP

Secure Desktop can be used to interactively access a process that has a user interface and is executed in a system context. The following must be the case for this:

- ▶ In the **zenStartupMgr** service, the option **Allow data exchange between service and desktop** must be activated

- ▶ The system service **Detection of interactive services** must be started

Note: This type of access is not suitable for use for the actual operation of Runtime. Services are intended as program instances that run in the background that are not operated by means of a user interface. If operations on the Runtime Server are to be carried out, Runtime must be started as an application. If Runtime is to run on the Server as a service, operation of Runtime can be carried out from a zenon Client.

Message boxes and modal dialogs are automatically suppressed if:

- ▶ zenon Runtime is started via **zenStartupMgr** in the system context
  and

- ▶ **Secure Desktop** is not displayed

⚠ **Attention**

Modal dialogs must never be called up via VBA or VSTA, because there is no possibility to close these again through user interaction.

10. Runtime as ActiveX control

For KUKA HMIs, there is an ActiveX control available that allows the complete Runtime to run in a control. Runtime can thus be inserted into another application as a sub-program. The control acts, with a few exceptions, in the same way as the zenon Web Client and can also run in a browser.

Name Control: **zenRuntimeCtrl.ocx**

Differences to zenon Web Server:

▶ Can only run within a 32-bit zenon Runtime installation

▶ Server and standalone is also possible, not just client
Note: The **Command Sequencer** and **Batch Control** module are not supported in this ActiveX control.

▶ Also starts the driver

▶ Soft licenses only.

▶ The license is read from zenon6.ini, so a zenon Runtime license is therefore required

▶ The start project is read from zenon6.ini; OCX properties server, zenon Web Server and project do not exist

▶ Network communication is carried out using **zenNetSrv.exe**, not via **zenNetSrv.dll**

⚠ **Attention**

*Runtime ActiveX Control only supports soft licenses. Licensing via **Wibukey** or **CodeMeter** is not possible.*

11. Operating during Runtime

TYPES OF OPERATION

Runtime can be operated with a mouse as well as with a keyboard or touch screen. For mouse or touch operation, you can primarily use buttons, status buttons, switches and invisible buttons in your project. The possibility of mouse operation of a screen object is signalized with a change in the cross symbol of the cursor for a button on the computer, for example by the symbol
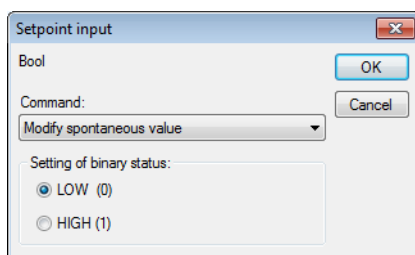
> 💡 **Information**
>
> The switching time of screens in Runtime depends on the number of linked variables. Only once all variables have been successfully signed in can the screen be operated.
>
> If many variables are operated, this can slow the switching time. In this case, a progress bar is shown, which displays the loading progress.
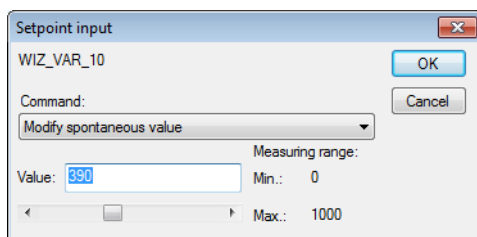
11.1   Mouse

Clicking on a dynamic element opens (depending on the setting of the dynamic element) the standard dialog for setpoint input. Depending on the data type of the variable the following dialogs are opened:
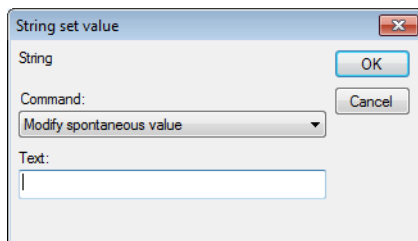
Possible operations are:

Parameter	Description
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC
Switching and modes. Spontaneous value	Combination of the two commands above
Switch to alternate value	Display substitute value (value from variable definition), if spontaneous value was displayed before
Modify alternate value	Set new substitute value for variable
Switching and modes. Alternate value	Combination of the two commands above
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Setting of binary status	- LOW (0) - HIGH (1)

Possible operations are:

Parameter	Description
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC.
Switching and modes. Spontaneous value	Combination of the two commands above.
Switch to alternate value	Display substitute value (value from variable definition),if spontaneous value was displayed before.
Modify alternate value	Set new substitute value for variable
Switching and modes. Alternate value	Combination of the two commands above.
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Value	New numerical value (within defined measuring range).

Possible operations are:

Parameter	Description
Switch to spontaneous value	Display spontaneous value (value from PLC) if substitute value was displayed before or the value was turned off.
Modify on-change value (default)	Write new spontaneous value to the PLC
Switching and modes. Spontaneous value	Combination of the two commands above
Switch to alternate value	Display substitute value (value from variable definition), if spontaneous value was displayed before
Modify alternate value	Set new substitute value for variable
Switching and modes. Alternate value	Combination of the two commands above
Switch off spontaneous value	Turn off connection to the PLC for this value by setting status bit OFF (bit 20).
Switch on spontaneous value	Resume connection to the PLC for this value by resetting bit OFF.
Text	New text

LASSO

Dynamic elements which are linked with a variable or function can be pre-selected with the lasso in the Runtime and therefore by used for VBA events.

SELECTION PER LASSO

To select elements with the lasso in the Runtime, you must:

- ▶ activate property **Runtime settings/Runtime lasso** in the project settings
- ▶ activate property **Runtime/selectable with lasso** in the property of the dynamic element

In the Runtime several methods for selecting elements are available:

- ▶ Select elements: Left-click on a free area and move lasso over the screen elements while holding the mouse button pressed.

- ▶ Extend selecton: Ctrl+mouse click on an element in order to select/deselect it in addition to the other elements already selected

- ▶ Add elements: While spanning the lasso press and hold Ctrl in order to add elements to the existing selection

- ▶ Cancel selection: Spanning a lasso which does not contain elements.

11.2 Touch

With zenon, touch screens can also be operated with Multi-Touch gestures. You can obtain an example project from your zenon consultant.

The following is recommended for Multi-Touch:

- ▶ Use of a DirectX 11-compatible graphics card
- ▶ Use DirectX hardware in the project settings for the graphics quality.

Note: With Windows 8 gestures, interaction can be configured in many areas via Multi-Touch via properties with no additional programing necessary.

11.2.1 Navigation with Multi-Touch in the worldview

Multi-Touch gestures for zooming and scrolling are suitable for navigation on touch panels in the worldview. For this a screen of type Worldview overview is not necessary. The navigation can be implemented with:

- ▶ Windows 7 touch gestures (on page 54)
- ▶ Windows 8 touch gestures (on page 55)

RULES

- ▶ Move: If a screen in a container is not a worldview, it accepts the settings of the faceplate screen.

MOVING THE WORLDVIEW OR WORLDVIEW IN THE CONTAINER OF A FACEPLATE

- ▶ Screen is bigger than the frame: Content of the screen is moved.
- ▶ Screen is the same size or smaller than the frame: No reaction.

WORLDVIEW EMBEDDED IN FACEPLATE.

- ▶ Screen is bigger than the frame: Content of screen is moved.
- ▶ Screen is the same size or smaller than the frame: No reaction.

MOVE THE FRAME OR BORDER WITH THE MOUSE IF THE SCREEN IS A WORLDVIEW AND THE SAME SIZE OR SMALLER THAN THE FRAME:

▶   With the right mouse button: No reaction.

▶   With the left mouse button: Frame is moved.

CHANGE WORLDVIEW SIZE

The size of the worldview cannot be changed.
Exception: If the worldview is a faceplate, the size cannot be changed.

Click with right mouse button:

▶   Screen is bigger than the frame: Contents are moved.

▶   Screen is the same size or smaller than the frame: No reaction.

PROJECT CONVERSION

Values for **Move horizontally** and **Move vertically** when converting from an earlier version to zenon 7.20:

▶   Screen is bigger than the frame: `Move`.

▶   Screen is the same size or smaller than the frame: `No reaction`.

Navigation under Windows 7

To be able to use Multi-Touch gestures under Windows 7 to navigate in the worldview, you must:

▶   activate them via property **Multi-Touch for zoom and scroll**

▶   or implement them via VBA/VSTA

ZOOM AND SCROLL VIA PROPERTY MULTI-TOUCH FOR ZOOM AND SCROLL

To use Multi-Touch without VBA/VSTA:

1. In the project properties in the **Interaction** node for the **Recognition** property, activate `Windows 7`.

2. Deactivate property **Screen size from frame** in node **Frame** at the properties of the screen

3. Activate property **Multi-Touch for zoom and scroll** in node **Interaction** at the properties of the screen

With this you can scroll and zoom in the screen with touch operation using Multi-Touch gestures. With this VBA/VSTA for zooming and scrolling is deactivated.

ZOOM AND SCROLL VIA VBA/VSTA

To implement zooming and scrolling via VBA/VSTA Events, property **Multi-Touch for zoom and scroll** must not be active.

The following is available in the `DynPicture`:

▶ Property

`int ZoomLevel`: Displays the current zoom level in the worldview (valid value only in the Runtime and for a worldview).

▶ Method

`SetZoomAndPos(float ZoomX, float ZoomY, int ZoomLevel, int CursorX, int CursorY, int PosX, int PosY, int PosMode)`:

`ZoomX` -> New zoom factor X direction; if not used, set to 0

`ZoomY` -> New zoom factor Y direction; if not used, set to 0

`ZoomLevel` -> Zoom level, if not used, set to -1

`CursorX ->` Cursorposition X

`CursorY ->` Cursorposition Y

`PosX` -> New position X (see PosMode)

`PosY` -> New position Y (see PosMode)

`PosMode` -> Coordinates in Pos

-1 = PosX, PosY are ignored

0 = center point , original coordinates

1 = center point, zoomed coordinates

2 = left top, original coordinates

3 = left top, zoomed coordinates

4 = zoomed coordinates of the cursor from the top left
The position of the window is changed in such a way that after the zooming the mouse cursor is still over the same position of the screen

Attention: `ZoomX`, `ZoomY` and `ZoomLevel` can never be used simultaneously. Either you enter a `ZoomLevel` or a zoom factor for x and y axis.

Navigation under Windows 8

To navigate in a worldview with Multi-Touch under Windows 8:

1. In the project properties in the **Interaction** node for the **Recognition** property, activate `Windows 8`.

2. Deactivate, for the screen in the **Frame** group, the **Screen size from frame** property and define the screen size as larger than the frame.

3. navigate to group **Interaction** in the screen properties.

4. Configure the properties for **Zoomen** and **Verschieben**.

For the move gesture, you can define the direction - horizontal, vertical or both. To do this, use the **Horizontal verschieben** and **Vertikal verschieben** properties.

11.3　Keyboard operation

You can use the keyboard also for the complete navigation and operation in the Runtime. In doing so, the focus is first set to a frame; within the frame, you can navigate with the cursor keys and instigate an action with the **Enter** key. The following functions (on page 56) are used for control:

▶ Set focus to frame

▶ Take focus away from frame

▶ Move focus

▶ Activate input to the element with the focus

The order in which the elements are selected is defined via the allocation of index numbers (on page 61) to the elements of a screen. This definition of the navigation order also works with symbols.

The keyboard operation can also be carried out with freely allocated shortcuts such as `Ctrl+M`. The shortcuts can be assigned to each operation element at the property **Key combination**.

11.3.1　Functions

For engineering the keyboard operation use the following functions:

SET FOCUS TO FRAME

This function sets the focus to a defined frame when operating the keys in Runtime.

To configure the function:

1. Select, in the list of functions, in the **Screens** node, the **Set focus to frame** function

2. The dialog for selecting a screen is opened

3. select the frame you wish to assign

4. For multi-monitor projects, select the virtual monitor for opening the frame

The frame with a focus is displayed with a frame in runtime. The line width and color of the frame are defined in the **Graphical design/Screens** node in project properties.

FRAME SELECTION DIALOG

In the **frame selection** dialog, frames can be selected for the execution of functions, from:

▶ Current project

▶ Subprojects

▶ All projects in the workspace with the **Keep project in memory** option active
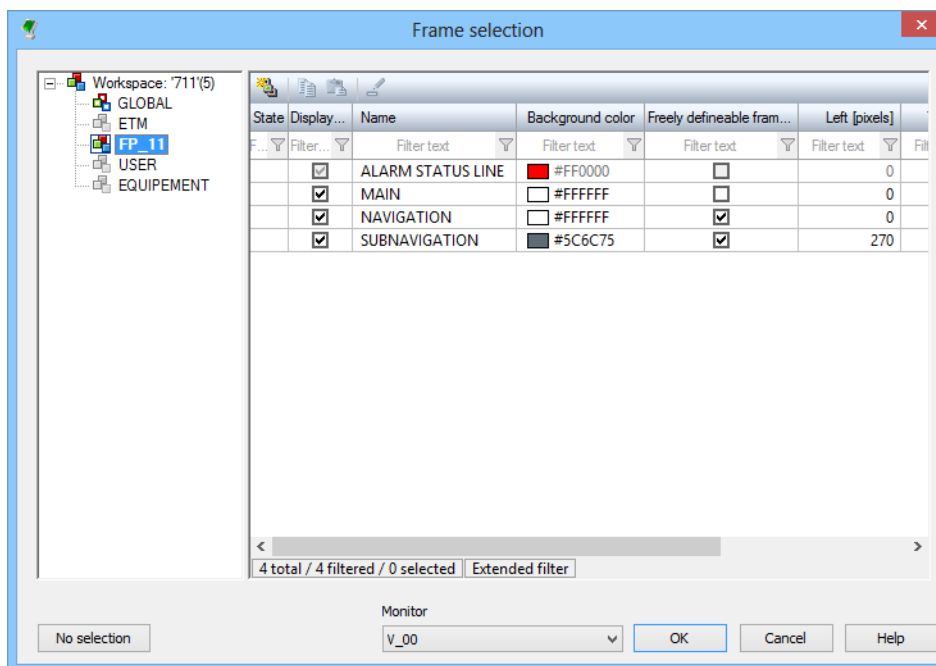
Parameters	Description
Project tree window	Displays all projects in the workspace. Frames can be selected from the current project and from all projects with the **Keep project in memory** option active
Frames window	Selection of a frame. If several frames are selected, the frame at the top of the list is used to execute the function.
No selection	Removes selection and closes dialog.
OK	Applies settings and closes the dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

Set focus on frame with multiple frames called up

If a frame is displayed on a monitor several times, then the focus is switched in the reverse of the switching sequence each time the functions of the focus are executed. If, for example, with a frame that is called up several times, the screens **Screen1**, **Screen2** and **Screen3** are open and then the focus is set to this frame, the focus goes to the last screen opened, **Screen3**. When the **Set focus to frame** function is called up again, the focus is set to **Screen2** etc.

MOVE FOCUS

This function set the focus on a particular element in runtime with keyboard operation and can therefore be used to navigate within a frame.
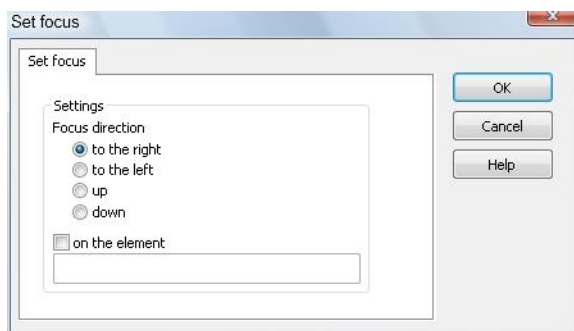
Property	Action
Direction	Define the direction in which the focus should be moved. The following defined sequence applies in the editor in the context menu or under Edit/change focus sequence**...**
on the element	Definition of the element for the focus. Enter the object name of the element.

ACTIVATE INPUT TO THE ELEMENT WITH THE FOCUS

This function activates the element that is being focused on in the frame selected.

TAKE FOCUS AWAY FROM FRAME

This function takes the focus from the current frame in runtime. To continue operating the keyboard, the focus must be set to a frame again.

11.4   Block keyboard shortcuts

Windows keyboard shortcuts can be blocked for online operation. The block is configured in the Editor. It is also possible to block all system keys for Runtime.

LOCK WINDOWS SHORTCUTS

To block Windows keyboard shortcuts, activate the **Lock system keys** property in the **Interaction** area of the project properties.

Locked are:

Key combination	effect
Alt + Esc	Switches to the next application.
Alt + Tab	Switches between open applications. Direction: forwards.
Alt + Shift + Tab	Switches between open applications. Direction: backwards.
Ctrl + Tab	Switches to the next window within the application. Can be assigned application-specifically.
Ctrl + Esc	Calls up Start menu.
Alt + F4	Closes application.
Ctrl + F4	Closes window within an application.
Ctrl + Shift + Esc	Starts up the Windows Task Manager.
Windows key	Calls up Start menu.
Windows key + D	Minimizes or maximizes all windows.
Windows key + E	Opens Windows Explorer.
Windows key + F	Opens the search
Windows key + M	Minimizes all windows present on the task bar.
Windows key + P	Switches to presentation mode.
Windows key + R	Starts the **Execute** dialog.

All corresponding combinations with mouse actions are also blocked.

Not locked are:

Key combination	effect
Ctrl+Alt+Del	Restarts the computer.
Windows key + L	Locks the computer.

LOCK ALL SYSTEM KEYS

To lock all systen keys in the Runtime:

▶   Activate the   property

▶   start the Runtime via Keyblock Runtime Start (on page 40)

▶ consider the hints in chapter **protect Runtime files**

> ⚠ **Attention**
>
> *The **Lock system keys** property is not available for CE projects.*

11.5 Define sort order inside a frame

You define the sequence for the actuation of the elements in a screen with the project configuration in the zenon Editor:

1. Open the screen.

2. Right-click an empty area.

3. Select **Shift order for focus** from the context menu.

4. Select from the drop-down list **Order for left/right** or **Order for up/down**.

5. Each element in the screen is displayed with a number in the top left corner.

6. Click on the element which should be selected first.

7. the number of the element changes to **1**.

8. click on all other elements in the order you want them to be selected:

   - Elements which have already been defined change the background color of the number.

   - Elements which cannot be selected with the help of the keyboard in the Runtime (property **Focus is set to the element** `inactive`) are displayed with a red number.

   - If you click on an element while holding `Ctrl`, the numbering starts with the index number of this element.

> 💡 **Information**
>
> *In the properties of the elements the position is displayed via the properties **Focus position left/right** and **Focus position top/bottom**. These properties are for information only. The index values of the position cannot be changed there.*

SYMBOLS

An index can also be assigned to **symbols**. During compiling the Runtime files, the symbol is disjointed and its elements are inserted. Thereby the order for selecting the elements which was defined in the symbol is taken into consideration.

> ▣▶ **Example**
>
> There are three elements in this screen: the numerical value **Z**, the button **B** and the symbol **VS**. The symbol from the project library receives the three numerical values: **N1**, **N2** and **N3**.
>
> If you define the order in the screen as: **B** - **LS** - **Z**,
> the order in the Runtime is: **B** - **N1** - **N2** - **N3** - **N**.

11.6   Positioning and operation of frames

Frames can be switched to fixed or relatively defined positions in Runtime. In this way, keyboard screens or pop-up screens can be positioned exactly where the mouse pointer or the element to be switched is located. Frames can be switched in runtime:

- ▶ at an absolute position
- ▶ relative to the mouse position
- ▶ relative to element

Absolute and relative positions are defined in the properties of the frame in the zenon Editor.

KEEP POSITION WHEN DISPLAYING AGAIN

Windows always take their screen position from the template. If pop up screens are planned and moved whilst the program is running, the pop up screen is moved back to the planned position the next time the screen switching function is activated. Using the **Keep position and size on reopening** property, the template can be set to keep its position as long as it is open, regardless of screen switches. If the property is active:

- ▶ If a screen is opened in Runtime in a manually-moved frame, its position and size are also retained if the screen is switched.
- ▶ If another screen is opened in the in the same template, its position and size are retained. This also applies for a substituted call.

  With this, a different position position for a template can be used on each client, because the local position is always saved.

ABSOLUTE POSITIONING

The frame is always switched at fixed, pre-defined coordinates. A fixed screen position is always used for all screens that are loaded automatically by the system, e.g. by the time control or a limit value violation.

RELATIVE POSITIONING

Relative positioning is especially suited to loading pop-ups, keyboard screens or command processing screens. This is possible for all screen switches, set value inputs with freely defined keyboard screens, and command processing screens that are started manually by the user. It does not matter whether the action was triggered by a screen switch function, a set value function or directly via an element. Relative positioning is available for:

▶ dynamic elements to which you can allocate a function

▶ dynamic elements that can be used to send a set value (buttons, combined elements)

▶ Main and Context Menus

▶ execute the screen-specific function in the Alarm Message List screen

Relative positioning also works for nested function calls, i.e. when screen switching or the setting of values are triggered by a script. If the screen would stand over the screen border, it is automatically positioned at the screen border. This also applies to multi-monitor management, where screen would rise into the neighboring monitor.

⚠ **Attention**

Relative positioning only works when called up directly by the user, not with automated functions or via VBA.

RELATIVE TO THE ELEMENT

Positions the reference point of the frame relative to the element from which the screen switch was initiated (e.g. a button or a combined element). The frame's reference point is then always placed on the element's calculated reference point. If the frame cannot be switched off in this position because the screen would then be outside the visible screen area, the alternative reference points are used.

First define a reference point for your frame and then the preferred position in the element. The following settings are available:

Property	Value
Reference point element vertical	▸ bottom
	▸ top
Reference point element horizontal	▸ Left
	▸ Right
Vertical movement in pixels	Enter the desired movement
Horizontal movement in pixels	Enter the desired movement

ALTERNATIVE POSITION

Define an alternative position for the reference point of the frame and the reference point at the element. Proceed with the definition of the alternative positions in the same way as with the definition of the favored positions. The alternative position is used when the frame cannot be placed at the favored position.

RELATIVE TO THE MOUSE POINTER

The screen is displayed depending on the position of the mouse pointer. If the reference point is at the top left side, the frame will be loaded to the bottom right side of the reference point. If the screen cannot be displayed completely at the configured position, the position will be moved until the complete screen is inside the displayed area of the screen.

Define the frame's reference point above the two properties, vertical reference point and horizontal reference point. The reference point is marked on the frame with a red dot. The following settings are available:

Property	Value
Reference point frame vertical	▸ top
	▸ bottom
	▸ centered
Horizontal frame reference point	▸ Left
	▸ Right
	▸ centered

Example

you have a button at the right border of the screen and try to position a popup window on its right side:

▶ Reference point element: right/centered

▶ Reference point element: left/centered

In Runtime, the popup screen will appear on the right side of the button, centered to the middle of the button. The popup window will not cover the button.

You use the same frame also for a button on the left screen border. There may not be enough room on the right side to completely display the popup screen. The alternative configured position will therefore be used. For this, you place the

▶ alternative reference point for the element on: left/centered

▶ the frame's alternative reference point on right/centered

CHANGE THE SIZE IN RUNTIME

The size with which a screen is called up in Runtime and the permitted changes in size are configured with the properties of the **Position** group.

Property	Description
Width (maximum) [pixels]:	Defines the maximum width.
Height (maximum) [pixels]:	Defines the maximum height.
Limitation Minimum:	Defines limits for minimum. Possible values: ▸ `Without`. No limitation If a different value is selected, the selected limit in Runtime is displayed with a dotted line in the frame window. ▸ `Width`: Width limitation. ▸ `Height`. Height limitation. ▸ `Relative`: Limitation to a percentage value of the set screen size. Only has an effect on Multi-Touch gestures. The corresponding values are defined with the **Value (minimum)** property. Default: `Without`
Opening size:	Defines the size with which a screen based on this frame is called up in Runtime: ▸ `Frame size`. Size as defined in **Width (maximum) [pixels]** and **Height (maximum) [pixels]**. If a different value is selected, the size in Runtime is displayed with a dotted line in the frame window. ▸ `Width [px]`. Width as defined in **Value (Opening size)**, height is amended accordingly. ▸ `Height [px]`. Size as defined in **Value (Opening size)**, width is amended accordingly. ▸ `Relative [%]`. The size defined in **Width (maximum) [pixels]** and **Height (maximum) [pixels]** is amended to the percentage value defined in **Value (Opening size)**. The corresponding values are defined with the **Value (Opening size)** property. Default: `Frame size`

MOVING AND ZOOMING

Frames can be moved and zoomed in Runtime.

MOVE

Moving always relates to the monitors defined in the monitor administration. These settings are not supported under Windows CE.

The moving of frames in Runtime can be limited to:

▶ `Frame border`: The frame cannot be moved beyond the monitor limit.

▶ Frame border area: The frame can be moved beyond the monitor limit. However there must be an area on the monitor (**Minimum frame margin**) that can be accessed for further actions.

The limit is only effective if the frame is already within the defined limit when it is opened. If the moving of a frame is not limited, it can - with Multi-Touch gestures for example - be moved beyond the visible area.

> 💡 **Information**
>
> *The moving of frames is most of all envisaged for full-screen operation. The Runtime application itself should not be moved to a different screen. If Runtime is moved, this can lead to limitations when moving.*

ZOOM

The limits also apply for zooming. If a limit is reached when zooming, an attempt is made to continue zooming in the free space. In doing so, the side ratio is retained.

MOVE AND ZOOM OVERVIEW

When moving and zooming, the frames act as follows, depending on the settings made:
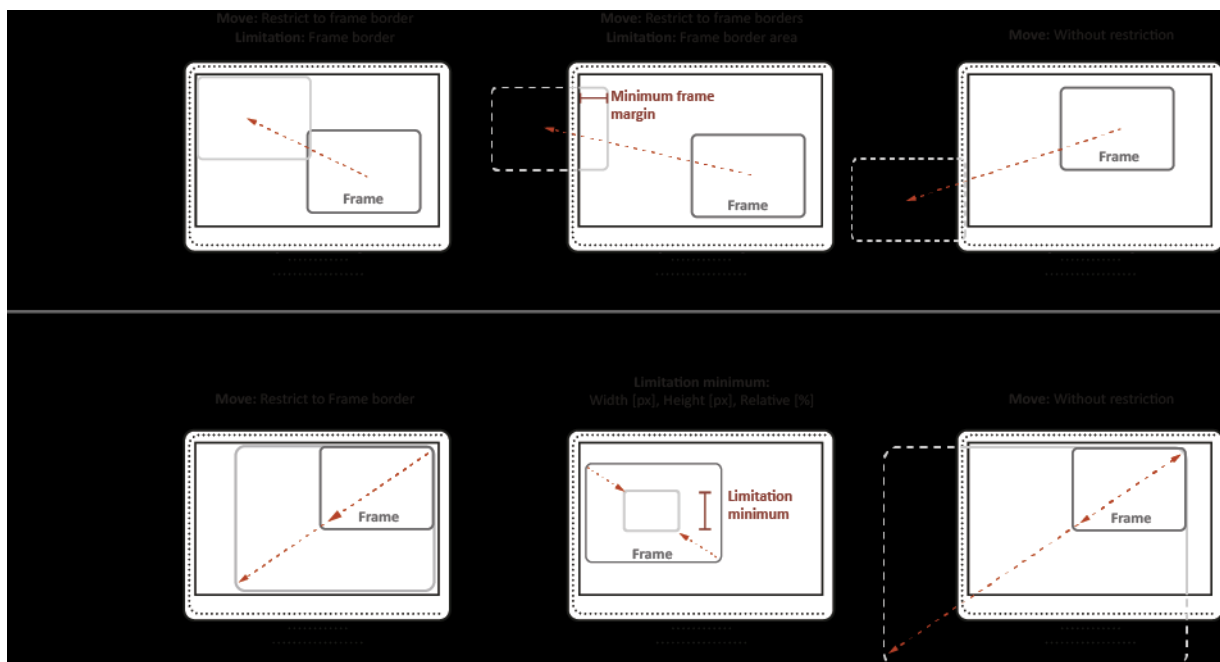
11.7   Configurable lists

A range of lists can be individually configured in Runtime:

- ▶ Active Directory:
  - • List in the Active Directory window (but not: tree)
- ▶ AML
- ▶ AML filter/CEL filter/time filter:
  - • Lots: Archive selection
  - • Lots: Lot selection
- ▶ Batch:
  - • List of master recipes
  - • Control Recipes List
- ▶ CEL
- ▶ User list:
  - • User List
- ▶ Extended Trend:
  - • Expanded curve list
- ▶ Message Control:
  - • Message queue
- ▶ RGM:
  - • Recipe list and recipe value table (but not: CE recipe value table)

The following are possible actions for these lists:

- ▶ Coloring of columns
- ▶ Highlighting of the position with the focus
- ▶ Use of response variables

EDIT CELLS

You have the following possibilities for editing cells in the `configurable list` type lists:

- ▶ Double click on the entry
- ▶ Click in the cell, immediately followed by a second click (slow double click)

Depending on the screen type, there may also be a button available to activate editing.

COLOR COLUMNS

In configurable lists, the text color and background color of each column can be defined individually. To do this, configure the **User-defined colors** area in the `screen switching` function of the respective screen, in the **Format columns** tab.

SHOW FOCUS

In configurable lists, the respective focus can be signalized by means of different text and background colors. The cell, column or line that is in focus is emphasized in bold. These colors are configured in the **Selection colors for the object lists** project properties in the **Graphical design** node.

PRIORITIES WHEN COLORING

If several colors are applied on a list, the following priorities apply:

1. General: **Selection colors for the object lists**

2. RGM: **Recipe value validation**

3. RGM: Online validation

4. RGM: **Interlocking**

5. List: Column color

RESPONSE VARIABLES

Configurable lists can be linked to a `BOOL` response variable. These signalize if something has been selected in the list in Runtime.

To link a response variable:

1. Click on **Configurable lists**.

2. Open the **Response variables** group in the properties.

3. In the **Selection active** property, click on the **...** button.

   The dialog to select a `BOOL` variable is opened.

4. Please select a variable.

5. Link the variable to an element that displays the status of the variable in Runtime.
   Meaning of the values:

   - `0`: No selection in the list.
     Note: If a screen is closed, the list is automatically set to `0`.

   - `1`: Something has been selected in the list.

12. Runtime files

DEFINITION OF RUNTIME FILES, RUNTIME DATA, RUNTIME FOLDER AND DATA FOLDER

RUNTIME FILES

Runtime files are files that are created by the editor that are read and interpreted by Runtime. Some Runtime files are modified by Runtime, for example:

- ▶ Standard Recipes,

- ▶ Recipegroup Manager etc.

The Runtime files are stored in the Runtime folder. This is defined in the Editor under `General`, in the properties window.

RUNTIME DATA

All data that is created and administered by Runtime, such as data from:

- ▶ The alarm message list,

- ▶ The chronological event list

- ▶ The Historian etc.

This also includes data that is created by the Editor (Runtime files) and that can be amended by Runtime, such as data from:

- ▶ Standard Recipes,

- ▶ Recipegroup Manager,

- ▶ User administration, etc.

The Runtime data is stored in the Runtime folder. This is defined in the Editor under `General`, in the properties window.

RUNTIME FOLDER

The Runtime files of the project are saved in this folder. The path is entered into `zenon6.ini` when the start project is set. The Runtime folder can be amended in the project properties. In the Runtime folder, there is the subfolder `RT` and a subfolder with the name of the computer. In the `RT` folder, there are all Runtime files that are created by the Editor. In the `Computer name` folder, there are all data files that are created in Runtime.

Note: Ensure that there is sufficient memory where the Runtime data is, because there can be much data, due to archiving, AML, CEL etc.

DATA FOLDER

The Runtime saves all data files that were created at runtime like alarm files, archive files etc. in the data folder. The data folder is created as a subfolder of the Runtime folder by default. The folder is automatically assigned the name of the computer the Runtime is running on. This save location can be amended in the project properties (**General/Data folder**).

Hint: Never set the data folder to a removable device such as an USB stick or a network device. It is recommended that the data is recorded locally and backed up externally.

12.1   Compatibility Runtime files

The zenon Runtime is backward compatible. The Runtime can always load projects from older version and interpret and display these projects in accordance with their version.

Projects from version 6.20 SP4 on can be started directly without being converted first. Projects with a lower version number must be converted beforehand.

A mixed operation is also possible. This means: With the multi-project administration projects from different versions can be loaded and run at the same time.

ONLINE COMPATIBILITY

The Runtime online compatibility makes interoperability of Runtime systems (also via Web Clients) in the zenon network possible even if the version of the client Runtime is higher than the version of the server Runtime.

The current Runtime cam load projects of the following versions:
- ▶   6.20 SP4
- ▶   6.21 SP0
- ▶   6.21 SP1
- ▶   6.22 SP0
- ▶   6.22 SP1
- ▶   6.50 SP0
- ▶   6.51 SP0
- ▶   7.00 SP0
- ▶   7.10 SP0
- ▶   7.11 SP0

Due to the multi-project administration projects from different versions can be loaded. For example the Integration project can have version 7.11, a sub-project version 7.00 and another sub-project version 6.51. Mixed operation also works in the network. With this different versions can also be started with the zenon Web Client.

Note: If, from version `7.00` a different graphics quality to `Windows Basic` is set for a project (including the corresponding setting for the **Create RT files for**), Runtime up to zenon version `6.51` loads the `Windows extended` graphics quality. If the `Windows basic` graphics quality is set, this is retained.

Attention: Server and Standby Server must have the same version.

Note for Batch Control module: Runtime files for Batch Control up to and including version 7.00 SP0 are not compatible with subsequent versions. Versions from version 7.10 and later are compatible.

COMPATIBILITY BETWEEN THE EDITOR AND RUNTIME:

With the zenon Editor, Runtime files can be created for different versions of Runtime. The Runtime version therefore does not need to correspond to the Editor version. This backward compatibility is particularly suited for use of mixed systems. For example: A project that was planned with Editor 6.50 can also be started with Runtime 6.22.

> ⚠ **Attention**
>
> *If, in a project with a later version of the Editor, properties are shown that are not available in the earlier version, these are not available. This can lead to unwanted results in Runtime.*

CREATING RUNTIME FILES

To create Runtime files in the editor for earlier versions:

1. Select the project in the project tree

2. Navigate to the **General** section in project properties

3. Open the **Create RT files for** property drop-down list

4. Select the desired version:

   - `Default`: The Runtime files are created for the current version of the editor

   - `6.20 SP4`: The Runtime files are created for version 6.20 Service Pack 4.

   - `6.21 SP0`: The Runtime files are created for version 6.21 Service Pack 0.

   - `6.21 SP1`: The Runtime files are created for version 6.21 Service Pack 1.

   - `6.22 SP0`: The Runtime files are created for version 6.22 Service Pack 0.

   - `6.22 SP1`: The Runtime files are created for version 6.22 Service Pack 1.

   - `6.50 SP0`: The Runtime files are created for version 6.50 Service Pack 0.

- `6.51 SP0`: The Runtime files are created for version 6.51 Service Pack 0.

- `7.00 SP0`: The Runtime files are created for version 7.00 Service Pack 0.

Attention: In order to ensure consistency of Runtime files, all Runtime files must be newly created each time this property is changed. The configurations for all drivers are converted. Settings that do not exist in the respective version are set to the default setting.

13. Runtime profiles

A Runtime profile is a reproducible optical snapshot of the screen in the Runtime including information about:

▶ Screen pattern (succession and position)

▶ Monitor allocation

▶ Filter

Runtime profiles are project- and user-related.

The following screen types support Runtime profiles:

▶ Alarm Message List

▶ Archive revision

▶ Chronological Event List

▶ Extended Trend

▶ Industrial Maintenance Manager

▶ Industrial Performance Analyzer

▶ Report Generator

▶ Message Control

▶ Variable Diagnosis

Every zenon user has an own folder in which he can administrate his profiles. Administrators can see and edit all profiles of all users and copy them to user `System`. From user account `System` all users can load Runtime profiles. It serves as an exchange account for Runtime profiles.

Note: Only administrators an copy to and manage profiles in user account `System`. All other users can only manage their own profiles and load the profiles of user `System`.

PREDEFINED PROFILES

Besides the individual profiles there are two pre-defined Runtime profiles:

▶ DEFAULT: created by the user and selected as standard profile

▶ LAST: is automatically saved to the folder of the user when he logs out
Exception: Profile LAST is not saved:

- for user **System**

- a temporary login without writing permission

To each zenon user a start profile (on page 76) can be allocated during log in.

> ⚠ **Attention**
>
> *Profiles can only be saved correctly at the Server if all projects are available at the Server:*
>
> ▶ from which screens are called up at the Client
>
> ▶ which call up screens with a screen switch function
>
> Saving Runtime profiles which do not match these conditions can lead to errors in the Runtime.

13.1 Load and create profile in the Runtime

In order to create a profile in the Runtime you must engineer a respective function (on page 75):

▶ Save profile: saves the current profile as it was defined in the function

▶ Profile administration (on page 76): opens the administration of the profiles for saving, loading, allocating and administrating profiles

In addition already existing profiles can be activated in the Runtime:

▶ Load profile

When loading a profile, the same state as when the profile was saved is restored. The screen structure including all filters as it was when the profile was saved is restored.

Attention: If there are screen switch functions defined at the properties of a screen for functions **Start function** or **End function** - such as (**Screen switch**, **Index screen** or **Screen back**), they are not carried out! All other function types are carried out again.

If a script is called up in the two functions, the complete script and all screen switching functions therein are executed. Therefore it can happen that the screen structure after loading the profile does not match the screen structure when saving the profile.

A similar behavior displays variable **Screen active variable**: If a limit value which contains a screen switch function is carried out in the variable, the function is carried out and may affect the display in an undesired way.
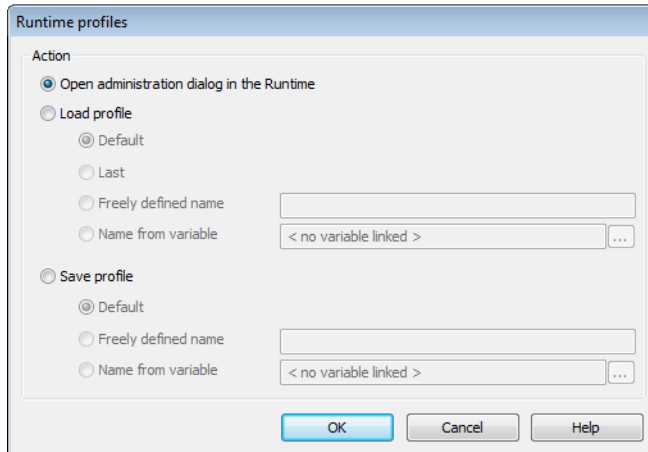
13.2 Configuring functions

In order to load, save and administrate profiles in the Runtime, you engineer a function in the Editor and assigned it to a button:

▶   select New Function

▶   navigate to node **Screens**

▶   select **Runtime profiles**
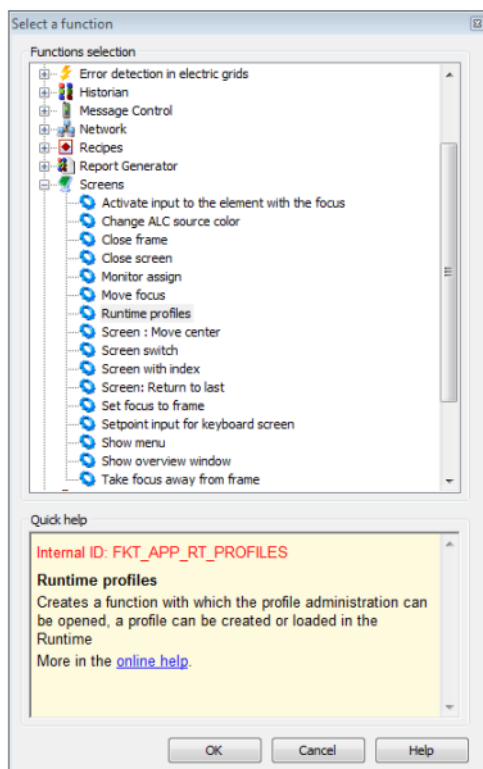
▶ the dialog for configuring functions is opened

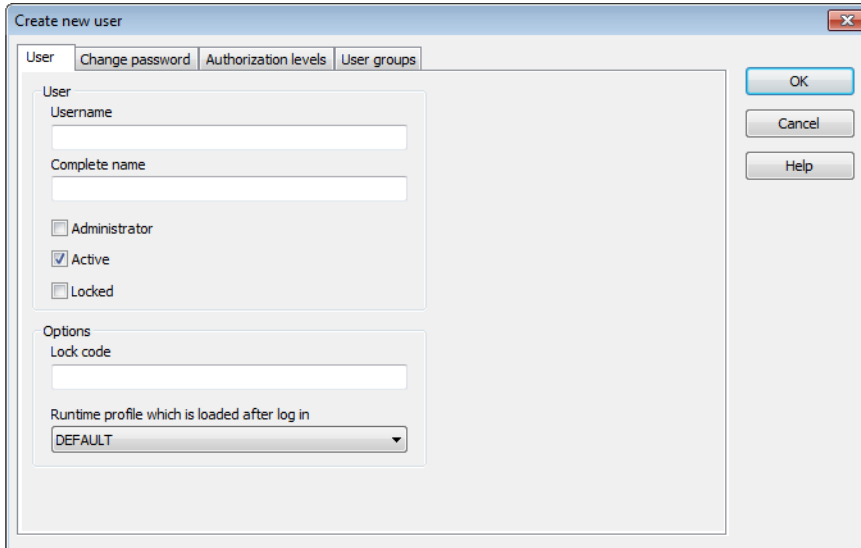| Property	Action
Open administration dialog in the Runtime	Opens the dialog for administrating (on page 76), creating, saving and loading profiles in the Runtime.
Load profile	Loads the profile defined in the dialog in the Runtime:
Default	Loads the profile DEFAULT. It was selected as the standard profile by the user from all existing profiles.
Last	Loads the profile LAST. It was automatically written to the folder of the user at log out.
Freely defined name	Loads the profile with the name which was defined in the dialog. If the profile does not exist, the current profile is kept.
Name from variable	Loads the profile whose name was generated from the defined variable.
Save profile	Saves the profile which was defined in the dialog.
Default	Saves the current profile as DEFAULT.
Freely defined name	Saves the profile with the name which was defined in the dialog.
Name from variable	Saves the profile under the name which was created from the variable defined in the dialog.

13.3 Allocate and administrate profile

Profiles can be allocated in the Editor and in the Runtime. In the Runtime you can create and save them.

IN THE EDITOR

Users are assigned Runtime profiles in the Editor:

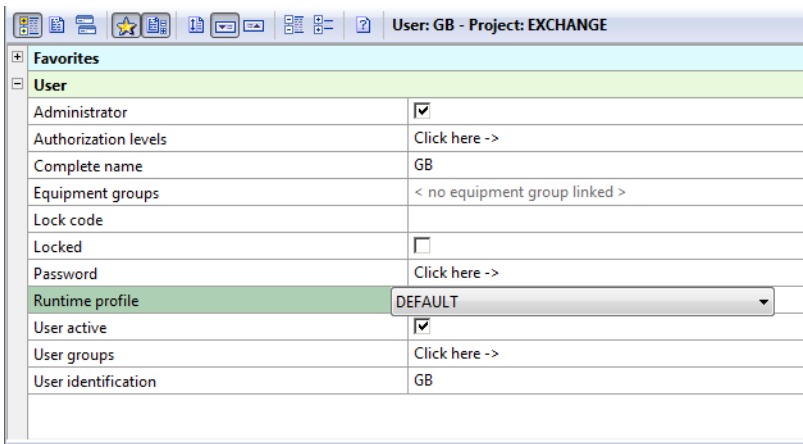▶ in the dialog for creating a new user with the property **Runtime profile which is loaded after log in**:

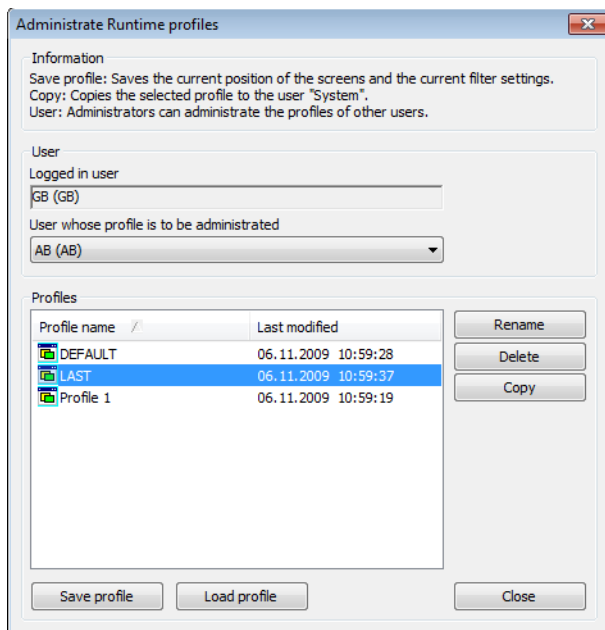▶ Via the property **Runtime profile** of a user:

▶ In the drop-down list the following settings are available:

- `None`: No profile is allocated (default setting)

- `DEFAULT`: Profile `DEFAULT` is allocated

- `LAST`: Profile `LAST` is allocated

IN THE RUNTIME

In the Runtime you can save, load, allocate and administrate profiles with the help of the profile administration. For this you must engineer function (on page 75) **Runtime profiles** with property **Open administration dialog in the Runtime**.

Note: Administrators can administrate the profiles of other users.

Property	Action
Logged in user	User who is currently logged in to the system.
User whose profiles are administrated	User whose profiles are displayed and can be administrated.
Profiles	List of the available profile.
Profile name	Name of the profile.
Last modified	Date and time of the last modification.
Rename	Opens the selected profile name in order to rename it.
Delete	Deletes the selected profile after a confirmation message.
Copy	Copies the selected profile to the user `System`. At this the name can be changed. Hint: Profiles at user `System` are available for all users which are not logged in.
Save profile	Opens the dialog for assigning a profile name and saving the profile under this name. The following characters are forbidden: `Space` and the special characters `/ | \ : * ? ! " < > $`
Load profile	Loads the selected profile.
Close	Closes the dialog.

KEYBOARD SHORTCUTS

Key	Action
`F5`	Updates the profiles' list. At unexpected events in the zenon network such as the loss of server or standby the contents of the list are automatically updated.
`Esc`	Closes the dialog.
`Enter`	Loads the selected profile.
`Ins`	Saves the current state of the new profile.
`F2`	Makes it possible to change the name of the selected profile.
`Del`	Deletes the selected profile after a confirmation message.

13.4 Storage directories of the profiles

The profile data are stored differently depending on their use in the Runtime:

Type of Runtime	Storage directory
`Server or standalone:`	Data are stored locally.
`Client`	Data are stored on the server and are requested and changed interactively.
`Standby`	Data are stored on the server and are requested and changed interactively and are synchronized locally.

14. 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 (on page 81) with further control elements.

SAVE FILTER PROFILE

To create a filter profile:

1. define filter conditions in the Runtime
2. assign a name using property **filter profiles**
3. Click on **Save**

USE FILTER PROFILE

To use a filter profile:

1. select a filter from the drop-down list property **filter profiles**

2. the filter is immediately applied

DELETE FILTER PROFILE

To delete a filter profile:

1. select a filter from the drop-down list property **filter profiles**

2. click on button **x**

3. the profile is deleted

4. the deleted filter is still applied as long as a new filter is defined or selected

14.1   Export and import filter profiles

You can transfer filter profiles to other projects and other computers with the control elements for import and export.

To export profiles:

1. create the control elements for import and export in the screen:
   Control elements -> Filter profiles -> Import or Export

2. start the Runtime

3. open the screen

4. create the desired profiles

5. save the profiles

6. export the profiles:
   these are saved in an XML file and can be imported at the same screen type in another project

To import profiles:

1. save (on page 79) the XML file with the desired profiles at the Runtime computer if it is another computer as the export computer

2. start the Runtime

3. open the screen

4. import the profiles

> **💡 Information**
>
> *At the import all existing profiles are deleted. The profile active at the time is not changed.*
>
> *XML files can only be imported in the screen type in which they were created. If you try to import profiles of other screen types, the import is canceled and an error message is displayed.*

15. Handling of date and time

Date and time in zenon are either local time, UTC time or time periods. The basic principle is that:

- ▶ all times "**from - to**" in filter such as screen switch to AML or CEL are saved in UTC
- ▶ Times in modules such as PFS and Load Management are made in local time
- ▶ Time periods are in seconds

Exceptions:

- ▶ the IPA writes historic data in local time as "**datetime**" in the database
- ▶ **Read time from variable** or **write to variable** does not save times but takes over the local time formatted as string from the control or writes it to the control

UTC

UTC means Coordinated Universal Time. The time unit is second. UTC is the uniform basis for the international time determination and is made available to the public via time senders and other time services. Dependent on the time zone certain time periods must be added or subtracted to or from UTC. This time period can vary one hour because of the day light saving time.
Example:

Country	Local time
Alaska	UTC -9
Australia, Queensland	UTC +10
Bulgaria	UTC +2
United Kingdom	UTC
Korea	UTC +9
Central Europe (CET)	UTC +1
Central Europe (CET) Daylight Saving Time	UTC +2
Saudi Arabia	UTC +3
USA East coast	UTC -5
United Arabic Emirates	UTC +4

CONSEQUENCES TO THE CONFIGURATION

Engineered date and time mean different date and time depending on the execution location of the Runtime.

For example: In the Editor you engineer in the PFS for the execution of a function in time zone **UTC +1** the local time `14:00 o' clock`. After transferring the files to a Runtime in tiem zone **UTC +10**, the function is carried out at `23:00 o' clock`.

SWITCHING OF TIME ZONE

If the time zone is switched in the operating system, this change is automatically applied in zenon Runtime.

15.1   Switch to daylight saving time

The following is applicable for the switch to daylight saving time or standard time:

▶   You must use the automatic Windows time amendment of the computer.

▶   Do not switch the time manually!

    Manual changes can cause problems with relevant times indicated for zenon, for example for save times of archives, time control, etc.

You configure the action of the **Scheduler** and **Production & Facility Scheduler** for time switching in the settings of this module:

▶ Scheduler time switching

▶ Production & Facility Scheduler time switching