



**COPADATA**  
do it your way

# zenon driver manual

**TrendNG**

**v.7.60**





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# 1. Welcome to COPA-DATA help

## **ZENON VIDEO-TUTORIALS**

You can find practical examples for project configuration with zenon in our YouTube channel ([https://www.copadata.com/tutorial\\_menu](https://www.copadata.com/tutorial_menu)). The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

## **GENERAL HELP**

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

## 2. TrendNG

### 3. TRENDNG - Data sheet

General:	
Driver file name	TRENDNG.exe
Driver name	Trend NG driver
PLC types	IQ xxx
PLC manufacturer	Trend;

Driver supports:	
Protocol	unknown;
Addressing: Address-based	X
Addressing: Name-based	X
Spontaneous communication	X
Polling communication	X
Online browsing	X
Offline browsing	--
Real-time capable	X
Blockwrite	--
Modem capable	X
Serial logging	X
RDA numerical	X
RDA String	--
Hysteresis	X

extended API	--
Supports status bit <b>WR-SUC</b>	X
alternative IP address	--

Requirements:	
Hardware PC	--
Software PC	Trend TCC-Suite
Hardware PLC	--
Software PLC	--
Requires v-dll	--

Platforms:	
Operating systems	Windows 7, 8, 8.1, 10, Server 2008R2, Server 2012, Server 2012R2, Server 2016;
CE platforms	-;

## 4. Driver history

Date	Driver version	Change
5/17/2010	0100	Created driver documentation

### DRIVER VERSIONING

The versioning of the drivers was changed with zenon 7.10. There is a cross-version build number as of this version. This is the number in the 4th position of the file version,  
For example: **7.10.0.4228** means: The driver is for version **7.10** service pack **0**, and has the build number **4228**.

Expansions or error rectifications will be incorporated into a build in the future and are then available from the next consecutive build number.



### Example

*A driver extension was implemented in build **4228**. The driver that you are using is build number **8322**. Because the build number of your driver is higher than the build number of the extension, the extension is included. The version number of the driver (the first three digits of the file version) do not have any significance in relation to this. The drivers are version-agnostic*

## 5. Requirements

This chapter contains information on the requirements that are necessary for use of this driver.

### 5.1 PC

#### HARDWARE

Serial interface RS232 or Ethernet network card.

#### SOFTWARE

The TCC Suite from Trend is necessary if you want to use the driver.

If drivers are not available in zenon: Copy file **TrendNG.exe** in the zenon folder.

### 5.2 Control

#### HARDWARE

IQxxx



## SOFTWARE

For Alarms: Text communication On

# 6. Configuration

In this chapter you will learn how to use the driver in a project and which settings you can change.

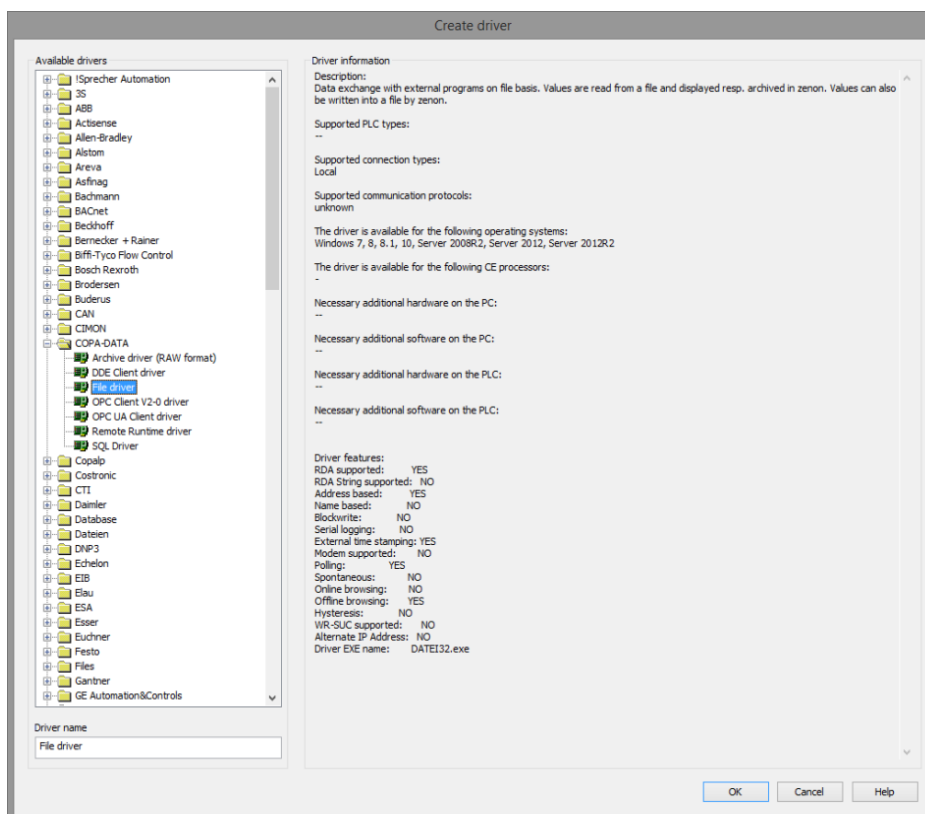


### Information

Find out more about further settings for zenon variables in the chapter Variables (main.chm::/15247.htm) of the online manual.

## 6.1 Creating a driver

In the **Create driver** dialog, you create a list of the new drivers that you want to create.



Parameter	Description
<b>Available drivers</b>	<p>List of all available drivers.</p> <p>The display is in a tree structure:            [+] expands the folder structure and shows the drivers contained therein.            [-] reduces the folder structure</p> <p>Default: no selection</p>
<b>Driver name</b>	<p>Unique <b>Identification</b> of the driver.</p> <p>Default: Empty</p> <p>The input field is pre-filled with the pre-defined <b>Identification</b> after selecting a driver from the list of available drivers.</p>
<b>Driver information</b>	<p>Further information on the selected driver.</p> <p>Default: Empty</p> <p>The information on the selected driver is shown in this area after selecting a driver.</p>

#### CLOSE DIALOG

Option	Description
<b>OK</b>	Accepts all settings and opens the driver configuration dialog of the selected driver.
<b>Cancel</b>	Discards all changes and closes the dialog.
<b>Help</b>	Opens online help.



#### Information

*The content of this dialog is saved in the file called `Treiber_[Language].xml`. You can find this file in the following folder: `C:\ProgramData\COPA-DATA\zenon[version number]`.*

#### CREATE NEW DRIVER

In order to create a new driver:

1. Right-click on **Driver** in the Project Manager and select **New driver** in the context menu.  
 Optional: Select the **New driver** button from the toolbar of the detail view of the **Variables**.  
 The **Create driver** dialog is opened.

2. The dialog offers a list of all available drivers.



3. Select the desired driver and name it in the **Driver name** input field.  
This input field corresponds to the **Identification** property. The name of the selected driver is automatically inserted into this input field by default.

The following is applicable for the **Driver name**:

- The **Driver name** must be unique.  
If a driver is used more than once in a project, a new name has to be given each time.  
This is evaluated by clicking on the **OK** button. If the driver is already present in the project, this is shown with a warning dialog.
- The **Driver name** is part of the file name.  
Therefore it may only contain characters which are supported by the operating system.  
Invalid characters are replaced by an underscore (\_).
- **Attention:** This name cannot be changed later on.

4. Confirm the dialog by clicking on the **OK** button.  
The configuration dialog for the selected driver is opened.

**Note:** The language of driver names cannot be switched. They are always shown in the language in which they have been created, regardless of the language of the Editor. This also applies to driver object types.

## DRIVER NAME **DIALOG ALREADY EXISTS**

If there is already a driver in the project, this is shown in a dialog. The warning dialog is closed by clicking on the **OK** button. The driver can be named correctly.



## <CD\_PRODUCNTAME> PROJECT

*The following drivers are created automatically for newly-created projects:*

- ▶ **Intern**
- ▶ **MathDr32**
- ▶ **SysDrv**



### Information

Only the required drivers need to be present in a zenon project. Drivers can be added at a later time if required.

## 6.2 Settings in the driver dialog

You can change the following settings of the driver:

### 6.2.1 General

The configuration dialog is opened when a driver is created. In order to be able to open the dialog later for editing, double click on the driver in the list or click on the **Configuration** property.



Option	Description
<b>Mode</b>	<p>Allows to switch between hardware mode and simulation mode</p> <ul style="list-style-type: none"> <li>▶ <b>Hardware:</b> A connection to the control is established.</li> <li>▶ <b>Simulation - static:</b> No communication between to the control is established, the values are simulated by the driver. In this modus the values remain constant or the variables keep the values which were set by zenon Logic. Each variable has its own memory area. E.g. two variables of the type marker with offset 79 can have different values in the Runtime and do not influence each other. Exception: The simulator driver.</li> <li>▶ <b>Simulation - counting:</b> No communication between to the control is established, the values are simulated by the driver. In this modus the driver increments the values within a value range automatically.</li> <li>▶ <b>Simulation - programmed:</b> No communication is established to the PLC. The values are calculated by a freely programmable simulation project. The simulation project is created with the help of the zenon Logic Workbench and runs in a zenon Logic Runtime which is integrated in the driver. For details see chapter Driver simulation (main.chm::/25206.htm).</li> </ul>
<b>Keep update list in the memory</b>	<p>Variables which were requested once are still requested from the control even if they are currently not needed. This has the advantage that e.g. multiple screen switches after the screen was opened for the first time are executed faster because the variables need not be requested again. The disadvantage is a higher load for the communication to the control.</p>
<b>Output can be written</b>	<p><b>Active:</b> Outputs can be written. <b>Inactive:</b> Writing of outputs is prevented. <b>Note:</b> Not available for every driver.</p>
<b>Variable image remanent</b>	<p>This option saves and restores the current value, time stamp and the states of a data point. Fundamental requirement: The variable must have a valid value and time stamp. The variable image is saved in mode hardware if:</p> <ul style="list-style-type: none"> <li>▶ one of the states S_MERKER_1(0) up to S_MERKER8(7), REVISION(9), AUS(20) or ERSATZWERT(27) is active</li> </ul> <p>The variable image is always saved if:</p>

	<ul style="list-style-type: none"> <li>▶ the variable is of the driver object type <b>Communication details</b></li> <li>▶ the driver runs in simulation mode. (not programmed simulation)</li> </ul> <p>The following states are not restored at the start of the Runtime:</p> <ul style="list-style-type: none"> <li>▶ SELECT (8)</li> <li>▶ WR-ACK (40)</li> <li>▶ WR-SUC (41)</li> </ul> <p>The mode <b>Simulation - programmed</b> at the driver start is not a criterion in order to restore the remanent variable image.</p>
<b>Stop on Standby Server</b>	<p>Setting for redundancy at drivers which allow only one communication connection. For this the driver is stopped at the Standby Server and only started at the upgrade.</p> <p><b>Attention:</b> If this option is active, the gapless archiving is no longer guaranteed.</p> <p><b>Active:</b> Sets the driver at the not-process-leading Server automatically in a stop-like state. In contrast to stopping via driver command, the variable does not receive status <b>switched off (statusverarbeitung.chm::24150.htm)</b> but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian.</p> <p><b>Note:</b> Not available if the CE terminal serves as a data server. You can find further information in the zenon Operator manual in the CE terminal as a data server chapter.</p>
<b>Global Update time</b>	<p><b>Active:</b> The set <b>Global update time</b> in ms is used for all variables in the project. The priority set at the variables is not used.</p> <p><b>Inactive:</b> The set priorities are used for the individual variables.</p>
<b>Priority</b>	<p>The polling times for the individual priority classes are set here. All variables with the according priority are polled in the set time.</p> <p>The variables are allocated separately in the settings of the variable properties.</p> <p>The communication of the individual variables can be graded according to importance or required topicality using the priority classes. Thus the communication load is distributed better.</p> <p><b>Attention:</b> Priority classes are not supported by each driver For example, drivers that communicate spontaneously do not support it.</p>

## CLOSE DIALOG

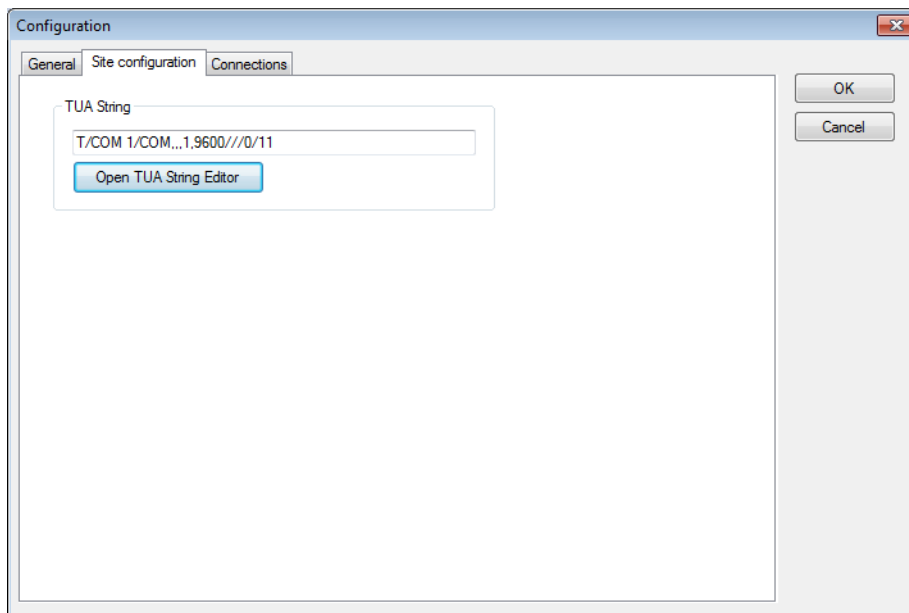
Options	Description
<b>OK</b>	Applies all changes in all tabs and closes the dialog.
<b>Cancel</b>	Discards all changes in all tabs and closes the dialog.
<b>Help</b>	Opens online help.

## UPDATE TIME FOR CYCLICAL DRIVERS

The following applies for cyclical drivers:

For **Set value**, **advising** of variables and **Requests**, a read cycle is immediately triggered for all drivers - regardless of the set update time. This ensures that the value is immediately available for visualization after writing. Update times can therefore be shorter than pre-set for cyclical drivers.

### 6.2.2 Site configuration

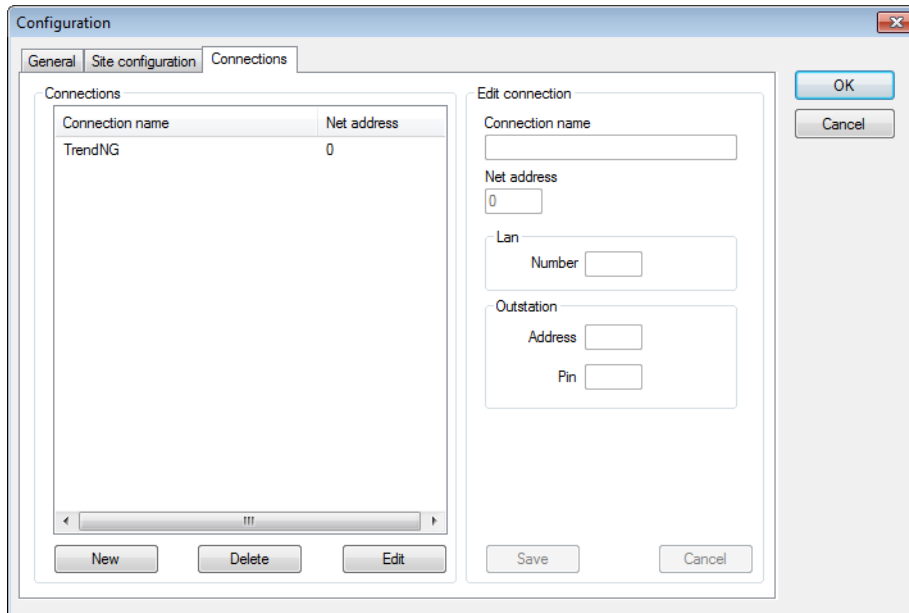


Parameters	Description
<b>Site configuration</b>	Configuration of the site connection.
<b>Open TUA String Editor</b>	Opens the Trend TCC Suite dialog for configuring.



### 6.2.3 Driver dialog addressing

Configuration of the connections to the PLCs.



Parameters	Description
Connections	Contains the configured connections. Select a connection to display the connection settings on the right side.
Connection name	Freely definable name for the distinction of connections.
Net address	The net address identifies the connection. Therefore, every connection must have a unique net address. Variables are assigned to a connection via the net address.
Lan number	Trend LAN address.
Outstation address	Trend Outstation address.
Outstation Pin	Trend Outstation Pin.



#### Information

*Maximum number of connections: 256.*

#### CREATE NEW CONNECTION

1. click on the button **New**

2. Enter the connection details.
3. click on **Save**

#### EDIT CONNECTION

1. select the connection in the connection list
2. click on the button **Edit**
3. change the connection parameters
4. finish with **Save**

#### DELETE CONNECTION

1. select the connection in the connection list
2. click on the button **Delete**
3. the connection will be removed from the list

## 7. Creating variables

This is how you can create variables in the zenon Editor:

### 7.1 Creating variables in the Editor

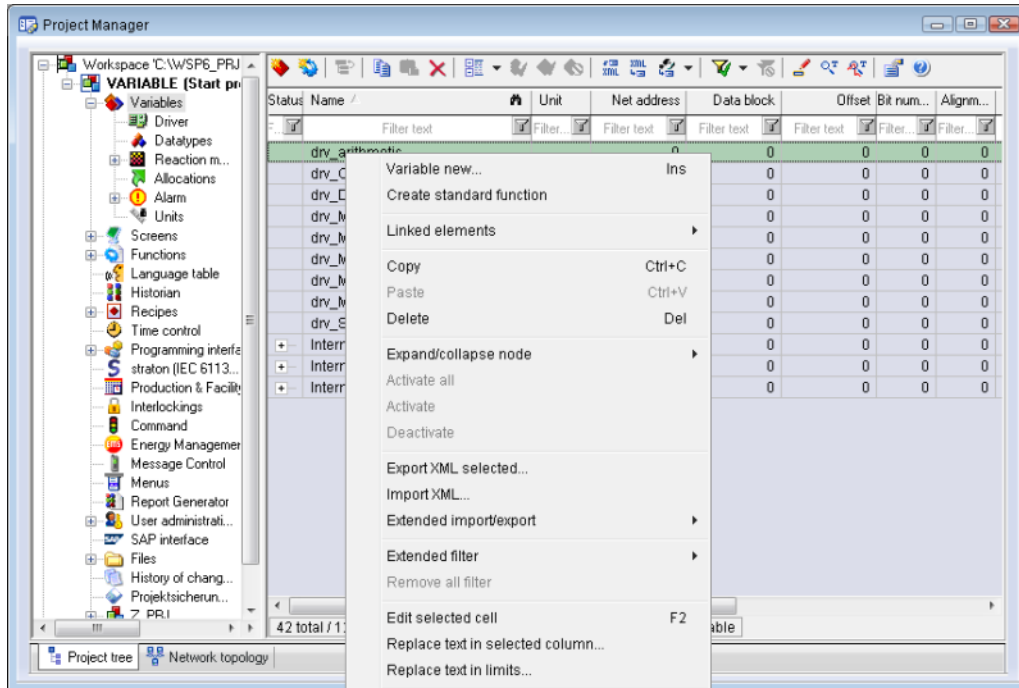
Variables can be created:

- ▶ as simple variables
- ▶ in arrays (main.chm::/15262.htm)
- ▶ as structure variables (main.chm::/15278.htm)

#### VARIABLE DIALOG

To create a new variable, regardless of which type:

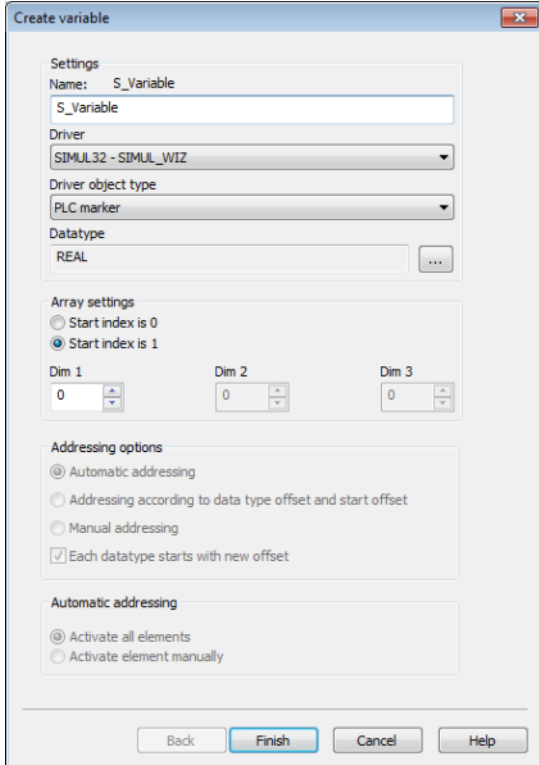
1. Select the **New variable** command in the **Variables** node in the context menu



The dialog for configuring variables is opened

2. Configure the variable

### 3. The settings that are possible depends on the type of variables



Property	Description
<b>Name</b>	<p>Distinct name of the variable. If a variable with the same name already exists in the project, no additional variable can be created with this name.</p> <p>Maximum length: 128 characters</p> <p><b>Attention:</b> The characters # and @ are not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the <b>Finish</b> button remains inactive.</p> <p><b>Note:</b> For some drivers, the addressing is possible over the property <b>Symbolic address</b>, as well.</p>
<b>Drivers</b>	<p>Select the desired driver from the drop-down list.</p> <p><b>Note:</b> If no driver has been opened in the project, the driver for internal variables (<b>Intern.exe (Main.chm::/Intern.chm::/Intern.htm)</b>) is automatically loaded.</p>
<b>Driver Object Type</b> (cti.chm::/28685.htm)	Select the appropriate driver object type from the drop-down list.

<b>Data Type</b>	Select the desired data type. Click on the ... button to open the selection dialog.
<b>Array settings</b>	Expanded settings for array variables. You can find details in the Arrays chapter.
<b>Addressing options</b>	Expanded settings for arrays and structure variables. You can find details in the respective section.
<b>Automatic element activation</b>	Expanded settings for arrays and structure variables. You can find details in the respective section.

## SYMBOLIC ADDRESS

The **Symbolic address** property can be used for addressing as an alternative to the **Name** or **Identification** of the variables. Selection is made in the driver dialog; configuration is carried out in the variable property. When importing variables of supported drivers, the property is entered automatically.

Maximum length: 1024 characters.

## INHERITANCE FROM DATA TYPE

**Measuring range**, **Signal range** and **Set value** are always:

- ▶ derived from the datatype
- ▶ Automatically adapted if the data type is changed

**Note for signal range:** If a change is made to a data type that does not support the set **signal range**, the **signal range** is amended automatically. For example, for a change from **INT** to **SINT**, the **signal range** is changed to 127. The amendment is also carried out if the **signal range** was not inherited from the data type. In this case, the **measuring range** must be adapted manually.

## 7.2 Addressing

Property	Description
<b>Name</b>	Depended on the driver object type freely definable name or part of the name; it is used for addressing (see driver specific functions) <b>Attention::</b> the name must be unique within each control system project.
<b>Identification</b>	Freely definable identification. E.g. for Resources label, comments, ...
<b>Net address</b>	Network address of variables.  This address refers to the bus address in the connection configuration of the driver. This defines the PLC, on which the variable resides.
<b>Data block</b>	For variables of object type <code>Extended data block</code> , enter the datablock number here.  Adjustable from 0 to 4294967295.  You can take the exact maximum area for data blocks from the manual of the PLC.
<b>Offset</b>	Offset of variables. Equal to the memory address of the variable in the PLC. Adjustable from 0 to 4294967295.
<b>Alignment</b>	not used for this driver
<b>Bit number</b>	Number of the bit within the configured offset.  Possible entries: 0 to 65535. Working range [0..7]
<b>String length</b>	Only available for String variables. Maximum number of characters that the variable can take.
<b>Driver connection/Driver Object Type</b>	Object type of the variables. Depending on the driver used, is selected when the variable is created and can be changed here.
<b>Driver connection/Data Type</b>	Data type of the variable. Is selected during the creation of the variable; the type can be changed here. <b>Attention:</b> If you change the data type later, all other properties of the variable must be checked and adjusted, if necessary.

## 7.3 Driver objects and datatypes

Driver objects are areas available in the PLC, such as markers, data blocks etc. Here you can find out which driver objects are provided by the driver and which IEC data types can be assigned to the respective driver objects.

### 7.3.1 Driver objects

The following driver object types are available in this driver:

Driver Object Type	Channel type	Read	Write	Supported data types	Comment
Alarm variable	9	X	X	UINT	
Analog output	67	X	X	REAL, LREAL	
analog joint	66	X	X	REAL, LREAL	
Bit	71	X	X	BOOL	
Digital output	69	X	X	BOOL	
Digital input	68	X	X	BOOL	
Knob	65	X	X	REAL, LREAL	
Multivariable Bit	8	X	X	REAL, LREAL, BOOL	
Multivariable Float	8	X	X	REAL, LREAL, BOOL	
Multivariable String	72	X	X	STRING	
Switch	70	X	X	BOOL	
Sensor	64	X	X	REAL, LREAL	
Trigger variable	21	X	X	BOOL, UINT	
Communication details	35	X	X	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	Variables for the statistical analysis of communication.  You can find detailed information on this in the Communication details (Driver variables) (on page 35) chapter.

## OBJECTS FOR VARIABLES IN ZENON

Object	Read	Write	Comment
Configuration	X	X	
Sensor	X	X	V-Parameter is read/written.
Knob	X	X	V-Parameter is read/written.
analog joint	X	X	V-Parameter is read/written.
Analog output	X	X	V-Parameter is read/written.



<b>Digital input</b>	X	X	S-Parameter is read/written.
<b>Digital output</b>	X	X	V-Parameter is read/written.
<b>Switch</b>	X	X	S-Parameter is read/written.
<b>Bit</b>	X	X	Sx-parameter is read/written.(x=Bitnr.)
<b>Multivariable Type Float</b>	X	X	Parameter defined in name is read/written.
<b>Multivariable Type Bit</b>	X	X	Parameter defined in name is read/written.
<b>Alarm variable</b>	X	--	
<b>Trigger variable</b>	X	X	

**Key:**

X =&gt; supported

-- =&gt; not supported

### 7.3.2 Mapping of the data types

All variables in zenon are derived from IEC data types. The following table compares the IEC datatypes with the datatypes of the PLC.

PLC	zenon	Data type
BOOL	BOOL	8
USINT	USINT	9
SINT	SINT	10
UINT	UINT	2
INT	INT	1
UDINT	UDINT	4
DINT	DINT	3
ULINT	ULINT	27
LINT	LINT	26
REAL	REAL	5
LREAL	LREAL	6
STRING	STRING	12
WSTRING	WSTRING	21
DATE	DATE	18
TIME	TIME	17
DATE_AND_TIME	DATE_AND_TIME	20
TOD (Time of Day)	TOD (Time of Day)	19

**Data type:** The property **Data type** is the internal numerical name of the data type. It is also used for the extended DBF import/export of the variables.

## 7.4 Creating variables by importing

Variables can also be imported by importing them. The XML and DBF import is available for every driver.



### Information

*You can find details on the import and export of variables in the Import-Export (main.chm::/13028.htm) manual in the Variables (main.chm::/13045.htm) section.*

### 7.4.1 XML import

During XML import of variables or data types, these are first assigned to a driver and then analyzed. Before import, the user decides whether and how the respective element (variable or data type) is to be imported:

- ▶ **Import:** The element is imported as a new element.
- ▶ **Overwrite:** The element is imported and overwrites a pre-existing element.
- ▶ **Do not import:** The element is not imported.

**Note:** The actions and their durations are shown in a progress bar during import.

#### REQUIREMENTS

The following conditions are applicable during import:

- ▶ Backward compatibility

At the XML import/export there is no backward compatibility. Data from older zenon versions cannot be taken over. The handover of data from newer to older versions is not supported.

- ▶ Consistency

The XML file to be imported has to be consistent. There is no plausibility check on importing the file. If there are errors in the import file, this can lead to undesirable effects in the project.

Particular attention must be paid to this, primarily if not all properties exist in the XML file and these are then filled with default values. E.g.: A binary variable has a limit value of 300.

- ▶ Structure data types

Structure data types must have the same number of structure elements.

Example: A structure data type in the project has 3 structure elements. A data type with the same name in the XML file has 4 structure elements. Then none of the variables based on this data type in the export file are imported into the project.



#### Hint

You can find further information on XML import in the **Import - Export** manual, in the **XML import (main.chm::/13046.htm)** chapter.

### 7.4.2 DBF Import/Export

Data can be exported to and imported from dBase.



### Information

*Import and Export via CSV or dBase supported; no driver specific variable settings, such as formulas. Use export/import via XML for this.*

## IMPORT DBF FILE

To start the import:

1. right-click on the variable list
2. in the drop-down list of **Extended export/import...** select the **Import dBase** command
3. follow the import assistant

The format of the file is described in the chapter File structure.



### Information

*Note:*

- ▶ Driver object type and data type must be amended to the target driver in the DBF file in order for variables to be imported.
- ▶ dBase does not support structures or arrays (complex variables) at import.

## EXPORT DBF FILE

To start the export:

1. right-click on the variable list
2. in the drop-down list of **Extended export/import...** select the **Export dBase...** command
3. follow the export assistant

**Attention**

DBF files:

- ▶ must correspond to the 8.3 DOS format for filenames (8 alphanumeric characters for name, 3 character suffix, no spaces)
- ▶ must not have dots (.) in the path name.  
e.g. the path `C:\users\John.Smith\test.dbf` is invalid.  
Valid: `C:\users\JohnSmith\test.dbf`
- ▶ must be stored close to the root directory in order to fulfill the limit for file name length including path: maximum 255 characters

The format of the file is described in the chapter File structure.

**Information**

*dBase does not support structures or arrays (complex variables) at export.*

**FILE STRUCTURE OF THE DBASE EXPORT FILE**

The dBaseIV file must have the following structure and contents for variable import and export:



### Attention

dBase does not support structures or arrays (complex variables) at export.

DBF files must:

- ▶ conform with their name to the 8.3 DOS format (8 alphanumeric characters for name, 3 characters for extension, no space)
- ▶ Be stored close to the root directory (Root)

## STRUCTURE

Identification	Type	Field size	Comment
<b>KANALNAME</b>	Char	128	Variable name.  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
<b>KANAL_R</b>	C	128	The original name of a variable that is to be replaced by the new name entered under "VARIABLENNAME" (field/column must be entered manually).  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
<b>KANAL_D</b>	Log	1	The variable is deleted with the 1 entry (field/column has to be created by hand).
<b>TAGNR</b>	C	128	Identification.  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
<b>EINHEIT</b>	C	11	Technical unit
<b>DATENART</b>	C	3	Data type (e.g. bit, byte, word, ...) corresponds to the data type.
<b>KANALTYP</b>	C	3	Memory area in the PLC (e.g. marker area, data area, ...) corresponds to the driver object type.
<b>HWKANAL</b>	Num	3	Net address
<b>BAUSTEIN</b>	N	3	Datablock address (only for variables from the data area of the PLC)
<b>ADRESSE</b>	N	5	Offset
<b>BITADR</b>	N	2	For bit variables: bit address For byte variables: 0=lower, 8=higher byte For string variables: Length of string (max. 63 characters)
<b>ARRAYSIZE</b>	N	16	Number of variables in the array for index variables ATTENTION: Only the first variable is fully available. All others are only available for VBA or the Recipegroup Manager

<b>LES_SCHR</b>	L	1	Write-Read-Authorization 0: Not allowed to set value. 1: Allowed to set value.
<b>MIT_ZEIT</b>	R	1	time stamp in zenon (only if supported by the driver)
<b>OBJEKT</b>	N	2	Driver-specific ID number of the primitive object comprises TREIBER-OBJEKTYP and DATENTYP
<b>SIGMIN</b>	Float	16	Non-linearized signal - minimum (signal resolution)
<b>SIGMAX</b>	F	16	Non-linearized signal - maximum (signal resolution)
<b>ANZMIN</b>	F	16	Technical value - minimum (measuring range)
<b>ANZMAX</b>	F	16	Technical value - maximum (measuring range)
<b>ANZKOMMA</b>	N	1	Number of decimal places for the display of the values (measuring range)
<b>UPDATERATE</b>	F	19	Update rate for mathematics variables (in sec, one decimal possible) not used for all other variables
<b>MEMTIEFE</b>	N	7	Only for compatibility reasons
<b>HDRATE</b>	F	19	HD update rate for historical values (in sec, one decimal possible)
<b>HDTIEFE</b>	N	7	HD entry depth for historical values (number)
<b>NACHSORT</b>	R	1	HD data as postsorted values
<b>DRRATE</b>	F	19	Updating to the output (for zenon DDE server, in [s], one decimal possible)
<b>HYST_PLUS</b>	F	16	Positive hysteresis, from measuring range
<b>HYST_MINUS</b>	F	16	Negative hysteresis, from measuring range
<b>PRIOR</b>	N	16	Priority of the variable
<b>REAMATRIZE</b>	C	32	Allocated reaction matrix
<b>ERSATZWERT</b>	F	16	Substitute value, from measuring range
<b>SOLLMIN</b>	F	16	Minimum for set value actions, from measuring range
<b>SOLLMAX</b>	F	16	Maximum for set value actions, from measuring range
<b>VOMSTANDBY</b>	R	1	Get value from standby server; the value of the variable is not requested from the server but from the Standby Server in redundant networks
<b>RESOURCE</b>	C	128	Resources label. Free string for export and display in lists.  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
<b>ADJWVBA</b>	R	1	Non-linear value adaption: 0: Non-linear value adaption is used

			1: Non-linear value adaption is not used
<b>ADJZENON</b>	C	128	Linked VBA macro for reading the variable value for non-linear value adjustment.
<b>ADJWVBA</b>	C	128	ed VBA macro for writing the variable value for non-linear value adjustment.
<b>ZWREMA</b>	N	16	Linked counter REMA.
<b>MAXGRAD</b>	N	16	Gradient overflow for counter REMA.



### Attention

*When importing, the driver object type and data type must be amended to the target driver in the DBF file in order for variables to be imported.*

## LIMIT VALUE DEFINITION

Limit definition for limit values 1 to 4, or status 1 to 4:



Identification	Type	Field size	Comment
<b>AKTIV1</b>	R	1	Limit value active (per limit value available)
<b>GRENZWERT1</b>	F	20	technical value or ID number of a linked variable for a dynamic limit value (see VARIABLEx) (if VARIABLEx is 1 and here it is -1, the existing variable linkage is not overwritten)
<b>SCHWWERT1</b>	F	16	Threshold value for limit value
<b>HYSTERESE1</b>	F	14	Is not used
<b>BLINKEN1</b>	R	1	Set blink attribute
<b>BTB1</b>	R	1	Logging in CEL
<b>ALARM1</b>	R	1	Alarm
<b>DRUCKEN1</b>	R	1	Printer output (for CEL or Alarm)
<b>QUITTIER1</b>	R	1	Must be acknowledged
<b>LOESCHE1</b>	R	1	Must be deleted
<b>VARIABLE1</b>	R	1	Dyn. limit value linking the limit is defined by an absolute value (see field GRENZWERTx).
<b>FUNC1</b>	R	1	Functions linking
<b>ASK_FUNC1</b>	R	1	Execution via Alarm Message List
<b>FUNC_NR1</b>	N	10	ID number of the linked function (if "-1" is entered here, the existing function is not overwritten during import)
<b>A_GRUPPE1</b>	N	10	Alarm/event group
<b>A_KLASSE1</b>	N	10	Alarm/event class
<b>MIN_MAX1</b>	C	3	Minimum, Maximum
<b>FARBE1</b>	N	10	Color as Windows coding
<b>GRENZTXT1</b>	C	66	Limit value text
<b>A_DELAY1</b>	N	10	Time delay
<b>INVISIBLE1</b>	R	1	Invisible

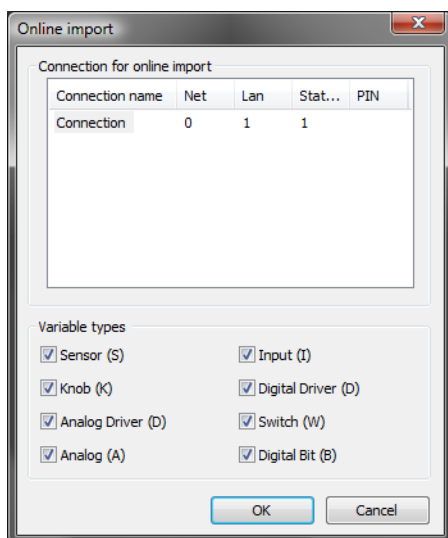
Expressions in the column "Comment" refer to the expressions used in the dialog boxes for the definition of variables. For more information, see chapter Variable definition.

### 7.4.3 Online import

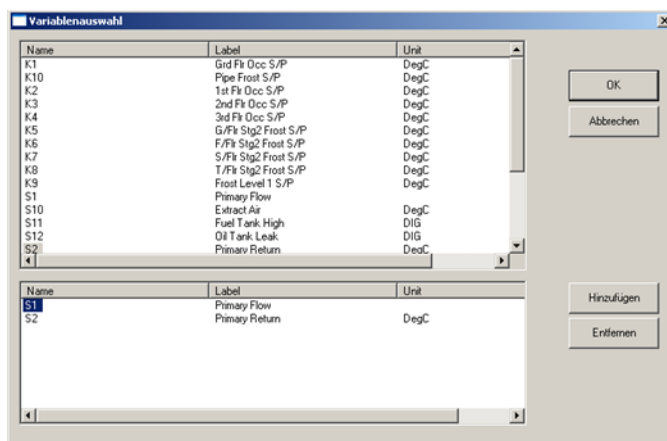
#### ONLINE IMPORT OF VARIABLES

To import variables automatically from the control:

1. select **Import variables from driver** from the context menu of the driver
2. the dialog for the configuration is opened
3. select which kind of variables from which control should be imported



After confirming the configuration with **OK** all variables which correspond to the selected type and are available on the control are read in and presented in a list for selection.



Select the desired variables. After you confirm it with **OK**, the variables are created in the zenon project.

## 7.5 Communication details (Driver variables)

The driver kit implements a number of driver variables. These variables are part of the driver object type **Communication details**. These are divided into:

- ▶ Information
- ▶ Configuration
- ▶ Statistics and
- ▶ Error message

The definitions of the variables implemented in the driver kit are available in the import file **drvvar.dbf** (on the installation medium in the \Predefined\Variables folder) and can be imported from there.

**Note:** Variable names must be unique in zenon. If driver variables of the driver object type **Communication details** are to be imported from **drvvar.dbf** again, the variables that were imported beforehand must be renamed.



### Information

*Not every driver supports all driver variables of the driver object type **Communication details**.*

*For example:*

- ▶ Variables for modem information are only supported by modem-compatible drivers
- ▶ Variables for the polling cycle only for pure polling drivers
- ▶ Connection-related information such as ErrorMessage only for drivers that only edit one connection at a time

## INFORMATION

Name from import	Type	Offset	Description
MainVersion	UINT	0	Main version number of the driver.
SubVersion	UINT	1	Sub version number of the driver.
BuildVersion	UINT	29	Build version number of the driver.
RTMajor	UINT	49	zenon main version number
RTMinor	UINT	50	zenon sub version number
RTSp	UINT	51	zenon Service Pack number
RTBuild	UINT	52	zenon build number
LineStateIdle	BOOL	24.0	TRUE, if the modem connection is idle
LineStateOffering	BOOL	24.1	TRUE, if a call is received
LineStateAccepted	BOOL	24.2	The call is accepted
LineStateDialtone	BOOL	24.3	Dialtone recognized
LineStateDialing	BOOL	24.4	Dialing active
LineStateRingBack	BOOL	24.5	While establishing the connection
LineStateBusy	BOOL	24.6	Target station is busy
LineStateSpecialInfo	BOOL	24.7	Special status information received
LineStateConnected	BOOL	24.8	Connection established
LineStateProceeding	BOOL	24.9	Dialing completed
LineStateOnHold	BOOL	24.10	Connection in hold
LineStateConferenced	BOOL	24.11	Connection in conference mode.
LineStateOnHoldPendConf	BOOL	24.12	Connection in hold for conference
LineStateOnHoldPendTransfer	BOOL	24.13	Connection in hold for transfer
LineStateDisconnected	BOOL	24.14	Connection terminated.
LineStateUnknow	BOOL	24.15	Connection status unknown
ModemStatus	UDINT	24	Current modem status
TreiberStop	BOOL	28	Driver stopped  For <code>driver stop</code> , the variable has the value <code>TRUE</code> and an <b>OFF</b> bit. After the driver has started, the variable has the value <code>FALSE</code> and no <b>OFF</b> bit.
SimulRTState	UDINT	60	Informs the status of Runtime for driver simulation.

ConnectionStates	STRING	61	<p>Internal connection status of the driver to the PLC.</p> <p>Connection statuses:</p> <p>0 : Connection OK</p> <p>1 : Connection failure</p> <p>2 : Connection simulated</p> <p>Formating:</p> <p>&lt;Netzadresse&gt;:&lt;Verbindungszustand&gt;;...;;</p> <p>A connection is only known after a variable has first signed in. In order for a connection to be contained in a string, a variable of this connection must be signed in once.</p> <p>The status of a connection is only updated if a variable of the connection is signed in. Otherwise there is no communication with the corresponding controller.</p>
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## CONFIGURATION

Name from import	Type	Offset	Description
ReconnectInRead	BOOL	27	If TRUE, the modem is automatically reconnected for reading
ApplyCom	BOOL	36	Apply changes in the settings of the serial interface. Writing to this variable immediately results in the method SrvDrvVarApplyCom being called (which currently has no further function).
ApplyModem	BOOL	37	Apply changes in the settings of the modem. Writing this variable immediately calls the method SrvDrvVarApplyModem. This closes the current connection and opens a new one according to the settings <b>PhoneNumberSet</b> and <b>ModemHwAdrSet</b> .
PhoneNumberSet	STRING	38	Telephone number, that should be used
ModemHwAdrSet	DINT	39	Hardware address for the telephone number

GlobalUpdate	UDINT	3	Update time in milliseconds (ms).
BGlobalUpdaten	BOOL	4	TRUE, if update time is global
TreiberSimul	BOOL	5	TRUE, if driver in sin simulation mode
TreiberProzab	BOOL	6	TRUE, if the variables update list should be kept in the memory
ModemActive	BOOL	7	TRUE, if the modem is active for the driver
Device	STRING	8	Name of the serial interface or name of the modem
ComPort	UINT	9	Number of the serial interface.
Baudrate	UDINT	10	Baud rate of the serial interface.
Parity	SINT	11	Parity of the serial interface
ByteSize	USINT	14	Number of bits per character of the serial interface  Value = 0 if the driver cannot establish any serial connection.
StopBit	USINT	13	Number of stop bits of the serial interface.
Autoconnect	BOOL	16	TRUE, if the modem connection should be established automatically for reading/writing
PhoneNumber	STRING	17	Current telephone number
ModemHwAdr	DINT	21	Hardware address of current telephone number
RxIdleTime	UINT	18	Modem is disconnected, if no data transfer occurs for this time in seconds (s)
WriteTimeout	UDINT	19	Maximum write duration for a modem connection in milliseconds (ms).
RingCountSet	UDINT	20	Number of ringing tones before a call is accepted
ReCallIdleTime	UINT	53	Waiting time between calls in seconds (s).
ConnectTimeout	UINT	54	Time in seconds (s) to establish a connection.

## STATISTICS

Name from import	Type	Offset	Description
MaxWriteTime	UDINT	31	The longest time in milliseconds (ms) that is required for writing.
MinWriteTime	UDINT	32	The shortest time in milliseconds (ms) that is required for writing.
MaxBlkReadTime	UDINT	40	Longest time in milliseconds (ms) that is required to read a data block.
MinBlkReadTime	UDINT	41	Shortest time in milliseconds (ms) that is required to read a data block.
WriteErrorCount	UDINT	33	Number of writing errors
ReadSucceedCount	UDINT	35	Number of successful reading attempts
MaxCycleTime	UDINT	22	Longest time in milliseconds (ms) required to read all requested data.
MinCycleTime	UDINT	23	Shortest time in milliseconds (ms) required to read all requested data.
WriteCount	UDINT	26	Number of writing attempts
ReadErrorCount	UDINT	34	Number of reading errors
MaxUpdateTimeNormal	UDINT	56	Time since the last update of the priority group <b>Normal</b> in milliseconds (ms).
MaxUpdateTimeHigher	UDINT	57	Time since the last update of the priority group <b>Higher</b> in milliseconds (ms).
MaxUpdateTimeHigh	UDINT	58	Time since the last update of the priority group <b>High</b> in milliseconds (ms).
MaxUpdateTimeHighest	UDINT	59	Time since the last update of the priority group <b>Highest</b> in milliseconds (ms).
PokeFinish	BOOL	55	Goes to 1 for a query, if all current pokes were executed

## ERROR MESSAGE

Name from import	Type	Offset	Description
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ErrorTimeDW	UDINT	2	Time (in seconds since 1.1.1970), when the last error occurred.
ErrorTimeS	STRING	2	Time (in seconds since 1.1.1970), when the last error occurred.
RdErrPrimObj	UDINT	42	Number of the PrimObject, when the last reading error occurred.
RdErrStationsName	STRING	43	Name of the station, when the last reading error occurred.
RdErrBlockCount	UINT	44	Number of blocks to read when the last reading error occurred.
RdErrHwAdresse	DINT	45	Hardware address when the last reading error occurred.
RdErrDatablockNo	UDINT	46	Block number when the last reading error occurred.
RdErrMarkerNo	UDINT	47	Marker number when the last reading error occurred.
RdErrSize	UDINT	48	Block size when the last reading error occurred.
DrvError	USINT	25	Error message as number
DrvErrorMsg	STRING	30	Error message as text
ErrorFile	STRING	15	Name of error log file

## 8. Driver-specific functions

The driver supports the following functions:

### RECONNECT

If the driver loses the connection, it attempts to reconnect three times by default:

- ▶ For a non-ADL connection (autodialed link): after 5 seconds
- ▶ For a ADL connection (autodialed link): after 15 seconds

these settings can be modified in the TUA dialog.



## "DEFAULT" VARIABLES

Driver object type

- ▶ Sensor
- ▶ Knob
- ▶ analog joint
- ▶ Analog output
- ▶ Digital output
- ▶ Switch
- ▶ Bit

The value entered at property **Offset** is used as index.

## EXAMPLE FOR CREATING A SENSOR VARIABLE

For sensor 2 (S2) a new variable of type "Sensor" with the following entries is created:

**Offset:** 2

**Net address :** the connection number set in the driver configuration

**Identification:** freely selectable description

**Name:** freely selectable description

## MULTI VARIABLES

In order to read other parameters, it is possible to create a variable of the type „multi variable“. The following is available:

- ▶ Multivariable Bit
- ▶ Multivariable Float
- ▶ Multivariable String

## EXAMPLE FOR CREATING A MULTI VARIABLE

To read parameter "**H**" from sensor 1:

- ▶ create a variable of type `Multi variable float`
- ▶ **Name:** desired name followed by a colon and the description of the parameter which should be read out;  
for example: `MyName : S1 (H) .`

## ALARMS

The PLC will send alarm telegrams if an alarm occurs. zenon will only react to alarms for which there is an alarm variable. All received alarms are acknowledged automatically.

Logging is carried out on the Logging Server. To do this, the following settings must have been set up:

- ▶ **Modules:** General
- ▶ **Messagelevel:** Errors, Warnings, Message  
Message: All acknowledged alarms are logged

**Note:** Alarms that have not been configured are logged as soon as they have been acknowledged. This only applies to alarms on the controller trend.

## CREATING AN ALARM VARIABLE

Just like creating other variable, station number, identification and name (description) must be entered.

The name must be complemented by a string in accordance with the following:

Parameters	Description
Character 1-2	:O
Character 2-4	Station number: 024
Character 5	Item Type according to Trend Documentation ("S") <ul style="list-style-type: none"> <li>▶ S - Sensor</li> <li>▶ L - Loop</li> <li>▶ H - Schedule</li> <li>▶ D - Driver</li> <li>▶ I – Digital Input</li> <li>▶ G – General Alarms</li> </ul>
Character 6-8	Item number: 001

So that alarms can also be received in zenon, for each station from which alarms should be received alarm routing must be configured in the control. The **Alarm destination** must be configured in a way that the alarms are sent to the station to which the zenon driver is connected.

**Attention:** For the reception of the alarms you must activate property **Number** for **LAN 0** in the driver configuration in tab Connections (on page 17).

Depending on the alarm code, the alarm variable gets a value, that for example is analyzed with a reaction matrix.

Parameters	Value
HIGH	1
LOW	2
OUTL	3
READ	4
SDEV	5
PVFL	6
SDGT	7
MINT	8
DI=0	9
DI=1	10
CONL	11
HELP	12
FPIA	13
FRTC	14
FRAM	15
FDRT	16
FPRM	17
FSWR	18
FTKP	19
FTKA	20
NKCH	21
NKBK	22
DVDD	23
AONL	24
MONR	25
BTNR	26
LINR	27
PGNR	28
AANR	29
CHIH	30
CLOW	31

COUT	32
O/K	33
CSDV	34
CPVF	35
CDGT	36
CMNT	37
CDI0	38
CDI1	39
NKOK	40
DVOK	41

## READING LOGS

To be able to evaluate logs from the trend control, you must create a trigger variable and an RDA variable.

## CREATING A TRIGGER VARIABLE

Under “offset”, enter the sensor that shall request the values. The entered “name” requires a string as described below:

Parameters	Description
Character 1-3	:I=
Character 4-	interval

Example: :I=3; means interval 3.

The intervals are defined as followed:

Parameters	Length of time
0	1 hour
1	15 minutes
2	24 hours
3	1 minute
4	5 minutes
5	10 minutes
6	20 minutes
7	30 minutes
8	6 hours
9	1 second

Recording is not carried out if an invalid parameter is entered (<> 0-9).



### Attention

*The interval of the variables must be the same in zenon and in the PLC, otherwise the values are not inserted into the archive.*

As the driver supports two types of loggings, you must define whether Compact Logging or Full-Precision Logging should be used. This is defined with an additional parameter in the variable name.

- ▶ Full Precision: **:C=0;**
- ▶ Compact: **:C=1;**



### Attention

*Differences Compact Logging and Full-Precision:*

- ▶ Compact: Much faster.
- ▶ Full Precision: Precision of the values much higher.

*With compact logging, data for e.g. 1000 values are packed into 12 telegrams; with full precision the same data amount is sent in 200 telegrams.*

As data type you can set either BOOL or UINT. If UNIT is used as data type, you can define via the set value how many values can be maximally read. In doing so, you can only choose between 96 (non-extended log retrieval) and 1000 (extended log retrieval). If you use BOOL as data type, a maximum of 1000 values is read.

## CREATING AN RDA VARIABLE

In addition to a trigger variable, an RDA-variable also has to be defined. Creating an RDA variable works in exactly the same way as the creation of a normal sensor variable (sensor number is set via the offset). In addition RDA must be activated:

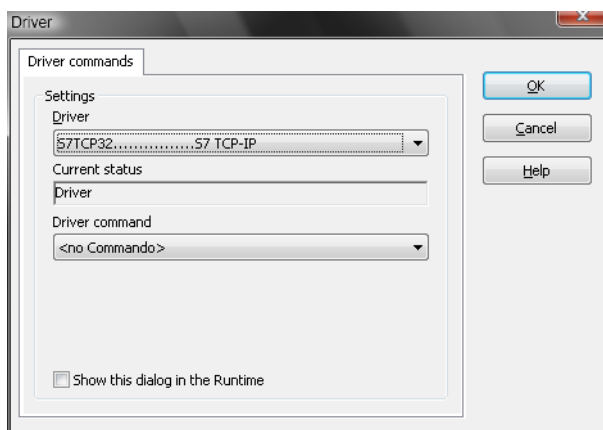
- ▶ navigate to node **Harddisk data storage**
- ▶ Activate the property **Harddisk data storage active**
- ▶ at property **Recording type** select value `Re-sorted values (RDA)`

## 9. Driver commands

This chapter describes standard functions that are valid for most zenon drivers. Not all functions described here are available for every driver. For example, a driver that does not, according to the data sheet, support a modem connection also does not have any modem functions.

Driver commands are used to influence drivers using zenon; start and stop for example. The engineering is implemented with the help of function **Driver commands**. To do this:

- ▶ create a new function
- ▶ select *Variables -> Driver commands*
- ▶ The dialog for configuration is opened



Parameter	Description
<b>Drivers</b>	Drop-down list with all drivers which are loaded in the project.
<b>Current status</b>	Fixed entry which has no function in the current version.
Driver command	Drop-down list for the selection of the command.
▶ Start driver (online mode)	Driver is reinitialized and started.
▶ Stop driver (offline mode)	Driver is stopped. No new data is accepted. <b>Note:</b> If the driver is in offline mode, all variables that were created for this driver receive the status <code>switched off (OFF; Bit 20)</code> .
▶ Driver in simulation mode	Driver is set into simulation mode. The values of all variables of the driver are simulated by the driver. No values from the connected hardware (e.g. PLC, bus system, ...) are displayed.
▶ Driver in hardware mode	Driver is set into hardware mode. For the variables of the driver the values from the connected hardware (e.g. PLC, bus system, ...) are displayed.
▶ Driver-specific command	Enter driver-specific commands. Opens input field in order to enter a command.
▶ Driver - activate set setpoint value	Write set value to a driver is allowed.
▶ Driver - deactivate set setpoint value	Write set value to a driver is prohibited.
▶ Establish connecton with modem	Establish connection (for modem drivers) Opens the input fields for the hardware address and for the telephone number.
▶ Disconnect from modem	Terminate connection (for modem drivers)
<b>Show this dialog in the Runtime</b>	The dialog is shown in Runtime so that changes can be made.

## DRIVER COMMANDS IN THE NETWORK

If the computer, on which the **driver command** function is executed, is part of the zenon network, additional actions are carried out. A special network command is sent from the computer to the project server, which then executes the desired action on its driver. In addition, the Server sends the same driver command to the project standby. The standby also carries out the action on its driver.

This makes sure that Server and Standby are synchronized. This only works if the Server and the Standby both have a working and independent connection to the hardware.

## 10. Error analysis

Should there be communication problems, this chapter will assist you in finding out the error.

### 10.1 Analysis tool

All zenon modules such as Editor, Runtime, drivers, etc. write messages to a joint log file. To display them correctly and clearly, use the Diagnosis Viewer (main.chm::/12464.htm) program that was also installed with zenon. You can find it under *Start/All programs/zenon/Tools 7.60 -> Diagviewer*.

zenon driver log all errors in the LOG files. LOG files are text files with a special structure. The default folder for the LOG files is subfolder **LOG** in the folder **ProgramData**. For example:

**%ProgramData%\COPA-DATA\LOG.**

**Attention:** With the default settings, a driver only logs error information. With the Diagnosis Viewer you can enhance the diagnosis level for most of the drivers to "Debug" and "Deep Debug". With this the driver also logs all other important tasks and events.

In the Diagnosis Viewer you can also:

- ▶ Follow newly-created entries in real time
- ▶ customize the logging settings
- ▶ change the folder in which the LOG files are saved

**Note:**

1. The Diagnosis Viewer displays all entries in UTC (coordinated world time) and not in local time.
2. The Diagnosis Viewer does not display all columns of a LOG file per default. To display more columns activate property **Add all columns with entry** in the context menu of the column header.
3. If you only use **Error-Logging**, the problem description is in the column **Error text**. For other diagnosis level the description is in the column **General text**.
4. For communication problems many drivers also log error numbers which the PLC assigns to them. They are displayed in **Error text** or **Error code** or **Driver error parameter (1 and 2)**. Hints on the meaning of error codes can be found in the driver documentation and the protocol/PLC description.
5. At the end of your test set back the diagnosis level from **Debug** or **Deep Debug**. At **Debug** and **Deep Debug** there are a great deal of data for logging which are saved to the hard drive and which can influence your system performance. They are still logged even after you close the Diagnosis Viewer.



**Attention**

In Windows CE errors are not logged per default due to performance reasons.

You can find further information on the Diagnosis Viewer in the Diagnose Viewer (main.chm::/12464.htm) manual.

## 10.2 Check list

- ▶ Is the PLC connected to the power supply?
- ▶ Are the participants available in the TCP/IP network?
- ▶ Can the PLC be reached via the PING command?
- ▶ Can the PLC be reached via TELNET?
- ▶ Are the PLC and the PC connected with the right cable?
- ▶ Did you select the right COM port?
- ▶ Do the communication parameters match (Baud rate, parity, start/stop bits,...)?
- ▶ Is the COM port blocked by another application?
- ▶ Did you configure the net address correctly, both in the driver dialog and in the address properties of the variable?
- ▶ Did you use the right object type for the variable?
- ▶ Does the offset addressing of the variable match the one in the PLC?
- ▶ Use the DiagViewer for further analysis -> Which messages does it show?