



COPADATA
do it your way

zenon driver manual

VDMALaetus

v.7.11





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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. VDMALaetus

Driver for connecting intelligent components in packaging and process machinery via the VDMAXML_P protocol (integration of intelligent components in packaging machinery and process machinery - VDMAXML_P version 1.0). This protocol was specified by the VDMA - Verband Deutscher Maschinen- und Anlagenbau e.v. (German Engineering Federation).

Particularly suitable for connecting Laetus components via the Laetus XML Interface Server as VDMAXML_P protocol converter.



Information

Employment with other VDMAXML_P devices:

Basically the use is possible but was not tested. The driver sends generic VDMAXML_P telegrams. The symbolic addressing of the variables takes place only via the XML tree which is transferred for the variable.

3. VDMALAETUS - Data sheet

General:	
Driver file name	VDMALAETUS.exe
Driver name	VDMA-XML driver
PLC types	VDMAXML_P compatible PLCs or devices; Laetus devices with VDMA-XML interface server.
PLC manufacturer	Laetus; VDMA;

Driver supports:	
Protocol	VDMAXML_P;
Addressing: Address-based	-
Addressing: Name-based	x
Spontaneous communication	x
Polling communication	x
Online browsing	-

Offline browsing	-
Real-time capable	x
Blockwrite	-
Modem capable	-
Serial logging	-
RDA numerical	-
RDA String	-

Requirements:	
Hardware PC	-
Software PC	Devices without a native VDMAXML_P implementation can use a protocol converter like VDMA-XML interface server from Laetus.
Hardware PLC	-
Software PLC	-
Requires v-dll	-

Platforms:	
Operating systems	Windows CE 6.0, Embedded Compact 7; Windows Vista, 7, 8, 8.1 Server 2008/R2, Server 2012/R2;
CE platforms	x86; ARM;

4. Driver history

Date	Driver version	Change
9/24/2009	100	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

If the communication takes place with VDMAXML_P-enabled components, there are special prerequisites.

In order to communicate with Laetus devices you must operate the Laetus XML interface server as protocol converter either on the local PC or on a remote device.

5.2 Control

The PLCs must be VDMAXML_P-enabled. As an alternative a protocol converter can be used in order to communicate with components without VDMAXML_P.

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 order to create a new driver:

1. Right-click on **Driver** in the Project Manage and select **Driver new** in the context menu.

2. In the following dialog the control system offers a list of all available drivers.



3. Select the desired driver and give it a name:
- The driver name has to be unique, i.e. if one and the same driver is to be used several times in one project, a new name has to be given each time.
 - 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 with **OK**. In the following dialog the single configurations of the drivers are defined.

Only the respective required drivers need to be loaded for a project. Later loading of an additional driver is possible without problems.



Information

For new projects and for existing projects which are converted to version 6.21 or higher, the following drivers are created automatically:

- ▶ Internal
- ▶ MathDr32
- ▶ SysDrv.

▶

6.2 Settings in the driver dialog

You can change the following settings of the driver:

6.2.1 General



Parameters	Description
Mode	<p>Allows to switch between hardware mode and simulation mode</p> <ul style="list-style-type: none"> ▶ Hardware: A connection to the control is established. ▶ Simulation static 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 straton. 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. ▶ Simulation - counting 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. ▶ Simulation - programmed N 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 straton Workbench and runs in a straton Runtime which is integrated in the driver. For details see chapter Driver simulation (main.chm::/25206.htm).
Keep update list in the memory	<p>Variables which were requested once are still requested from the control even if they are currently not needed.</p> <p>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>
Outputs writeable	<p>Active: Outputs can be written.</p> <p>Inactive: Writing of outputs is prevented.</p> <p>Note: Not available for every driver.</p>

Variable image remanent	<p>This option saves and restores the current value, time stamp and the states of a data point.</p> <p>Fundamental requirement: The variable must have a valid value and time stamp.</p> <p>The variable image is saved in mode hardware if:</p> <ul style="list-style-type: none"> ▶ one of the states S_MERKER_1(0) up to S_MERKER8(7), REVISION(9), AUS(20) or ERSATZWERT(27) is active <p>The variable image is always saved if:</p> <ul style="list-style-type: none"> ▶ the variable is of the object type <code>Driver variable</code> ▶ the driver runs in simulation mode. (not programmed simulation) <p>The following states are not restored at the start of the Runtime:</p> <ul style="list-style-type: none"> ▶ SELECT(8) ▶ WR-ACK(40) ▶ WR-SUC(41) <p>The mode Simulation - programmed at the driver start is not a criterion in order to restore the remanent variable image.</p>
Stopped on Standby Server	<p>Setting for redundancy at drivers which allow only on communication connection. For this the driver is stopped at the Standby Server and only started at the upgrade.</p> <p>Attention: If this option is active, the gapless archiving is no longer guaranteed.</p> <p>Active: 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 switched off (<code>statusverarbeitung.chm: :/24150.htm</code>) but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian.</p>
Update time global	<p>Active: The set <code>Update time global</code> in ms is used for all variables in the project. The priority set at the variables is not used.</p> <p>Inactive: The set priorities are used for the individual variables.</p>
Priority	<p>Here you set the polling times for the individual priorities. All variables with the according priority are polled in the set time. The allocation is taken</p>

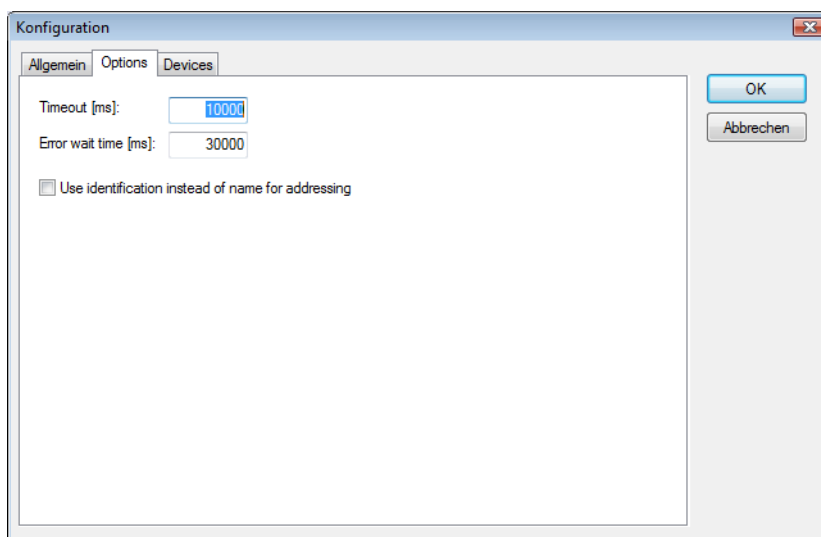
	place for each variable separately in the settings of the variable properties. The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities. Thus the communication load is distributed better.
OK	Accepts settings in all tabs and closes dialog.
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

UPDATE TIME FOR CYCLICAL DRIVER

The following applies for cyclical drivers:

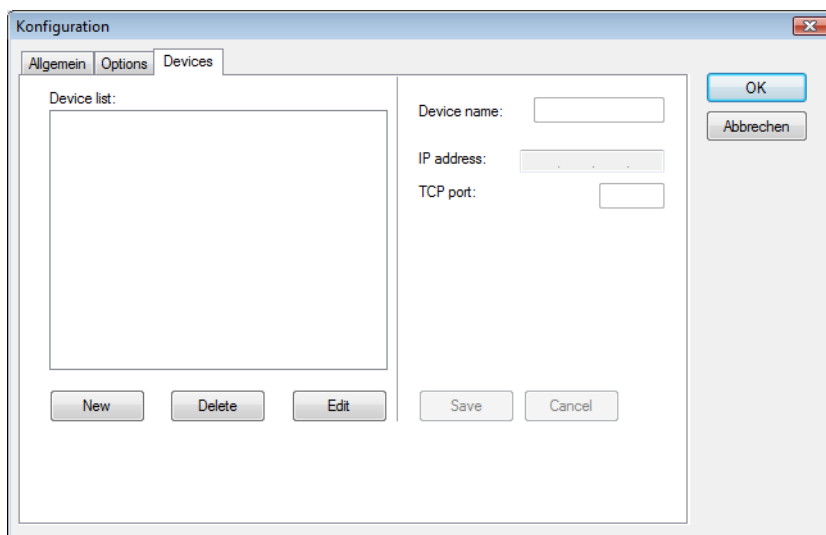
For **Set value**, **Advising** of variables and **Requests**, a read cycle is immediately triggered for all drivers - regardless of the set update time. This ensures that the value is immediately available for visualization after writing. Update times can therefore be shorter than pre-set for cyclical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

6.2.2 Driver dialog 1



Parameters	Description
Timeout [ms]	Timeout of the communication in milliseconds.
Error wait time [ms]	Error wait time in milliseconds.
Use identification instead of name for addressing	If you activate this checkbox, the variable identification is used for addressing instead of the variable name.

6.2.3 Devices



Konfiguration

Allgemein Options Devices

Device list:

Device name:

IP address:

TCP port:

New Delete Edit Save Cancel

OK Abbrechen

Parameters	Description
Device list	Displays the connection names with the corresponding hardware addresses. To display the connection parameters of a name, click on the according connection name.
Device name	Name of the connection or the component. Attention: The connection name must not contain any of the following characters: { } & ~ ! [] () " ' ; =
IP address	IP address of the component or the protocol converters.
TCP port	Port number of the component or the port of the protocol converters through which the component is reached.
New	Creates a new connection with default settings.
Clear	Deletes the connection selected in the connection list.
Edit	Opens the selected connection for editing.
Save	Saves a new or edited connection.
Cancel	Cancels the editing of connection settings without saving changes.

CREATE NEW CONNECTION

1. click on the button **New**
2. enter the connection parameters **Net address**, **Connection name** and **IP address**
3. Click on **Save**

DISPLAY CONNECTION PARAMETERS OF A CONNECTION

1. select the desired connection in the connection list with the mouse pointer.
2. the parameters will be displayed

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

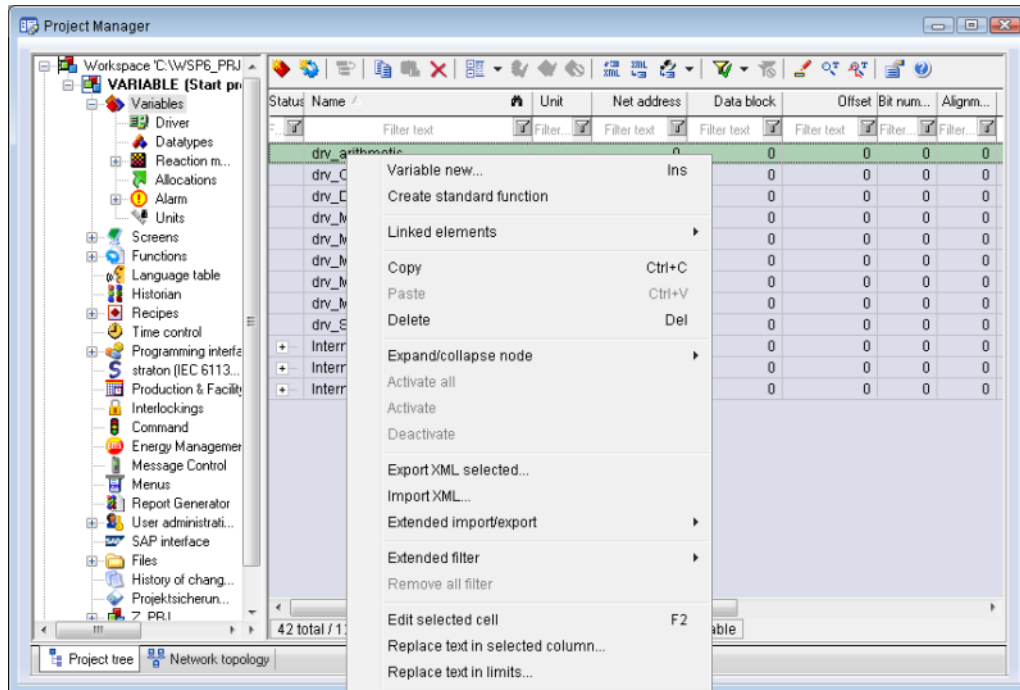
Variables can be created:

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

VARIABLE DIALOG

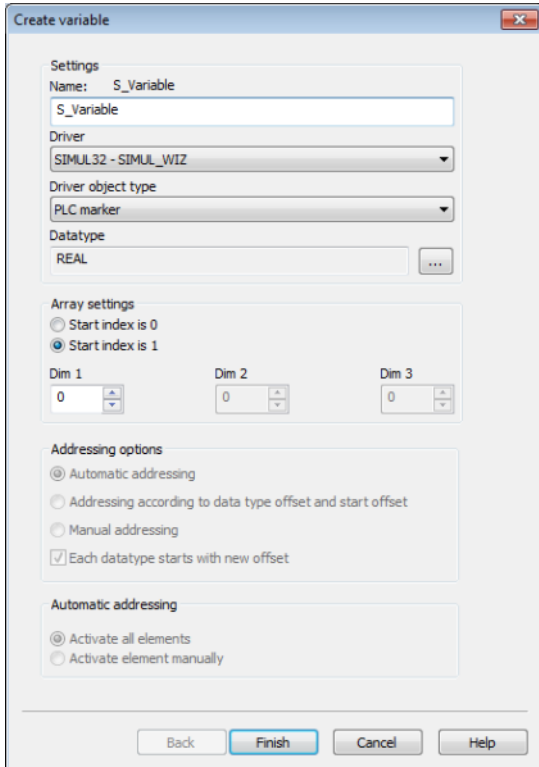
To create a new variable, regardless of which type:

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



2. The dialog for configuring variables is opened
3. configure the variable

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



Parameters	Description
Name	<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>Attention: The characters # and @ are not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the Finish button remains inactive.</p>
Drivers	<p>Select the desired driver from the drop-down list.</p> <p>Note: If no driver has been opened in the project, the driver for internal variables (Intern.exe (Main.chm::/Intern.chm::/Intern.htm)) is automatically loaded.</p>
Driver object type (cti.chm::/28685.htm)	Select the appropriate driver object type from the drop-down list.

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

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

Group/Property	Description
General	
Name	<p>Name of the variable. Is used for addressing the data point.</p> <p>You must use the connection name from the driver configuration as prefix. Then follows an exclamation mark and the name of the base variable. In order to address structure elements of a variable their names are attached to the base name separated by dots.</p> <p>Array elements are addressed with the help of their index in brackets.</p> <p>e.g. Scanner12!Identification.wtDevice.Name, Scanner12!ServerStatus.XML-Interface.State._elements.Value[0]</p> <p>Attention: For every zenon project the name must be unambiguous.</p>

Identification	<p>Freely assignable identification, e.g. for resources label, comment ...</p> <p>If the option "Use identification instead of name for addressing" is used, the name can be freely assigned because the identification is used for addressing.</p>
Addressing	
Net address	Not used.
Data block	Not used.
Offset	Not used.
Alignment	Not used.
Bit number	Not used.
String length	Only available for String variables: Maximum number of characters that the variable can take.
Driver connection/Driver object type	Depending on the employed driver, an object type is selected during the creation of the variable; the type can be changed here later.
Driver connection/Data type	<p>Data type of the variable. Is selected during the creation of the variable; the type can be changed here later.</p> <p>Attention: If you change the data type later, all other properties of the variable must be checked and adjusted, if necessary.</p>
Priority	<p>Based on the priority of the variable is decided whether it is read in a polled or spontaneous way.</p> <p>If the priority is set to "Normal", the variable communicated spontaneously.</p>

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 object types are available in this driver:

Driver object type	Channel type	Read / Write	Supported data types	Description
Value	8	R / W	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, LREAL, STRING	Data point of a component.
XML raw value	10	R / W	STRING	Data point or several data points of a component as XML raw value (not decoded).
Compound write trigger	11	R / W	BOOL	Trigger in order to write several elements of a structure variable at once.
Driver variable	35	R / W	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	Variables for the statistical analysis of communication. Find out more in the chapter about the Driver variables (on page 36)
Audit trail message	9		STRING	String variable with the following syntax (on page 41): <code>Text.Entry, Variable.Name, Variable.Value.Old and Variable.Value.New</code>

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.

Control	zenon	Data type
Boolean	BOOL	8
ui1	USINT	9
i1	SINT	10
ui2	UINT	2
i2	INT	1
ui4	UDINT	4
i	DINT	3
ui8	ULINT	27
i8	LINT	26
Float 32 bit, Number, r4	REAL	5
Float 64 bit, Number, r8, float	LREAL	6
string.ansi	STRING	12
-	WSTRING	21
-	DATE	18
-	TIME	17
-	DATE_AND_TIME	20
-	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 Offline import

The following must be the case for online import

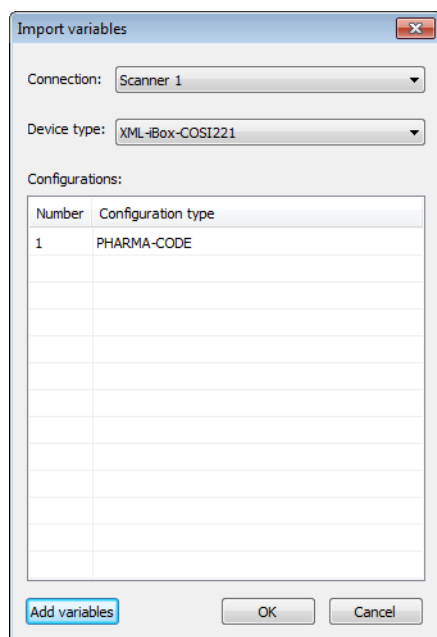
- ▶ The Laetus XML interface (2.6.0 E2) must be present
- ▶ The file VDMALaetus_Laetus.xml must be present in the zenon program directory

OFFLINE IMPORT

To import variables offline:

1. Select the 'Import variables from driver' command from the context menu of the driver
2. The import wizard is opened
3. Follow the configuration of the wizard

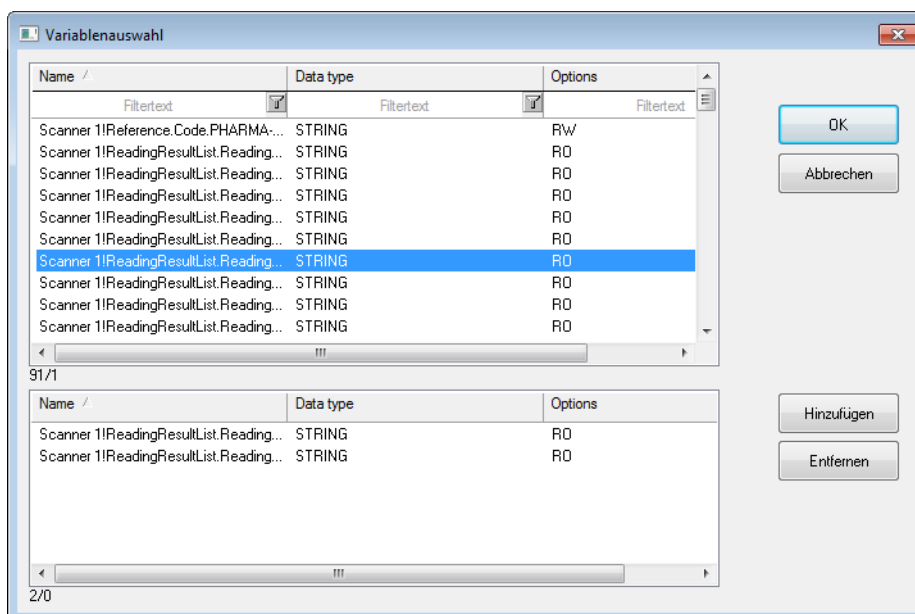
SELECTION OF THE CONNECTION

A screenshot of the 'Import variables' dialog box. It has a title bar with a close button. Inside, there are two dropdown menus: 'Connection:' set to 'Scanner 1' and 'Device type:' set to 'XML-iBox-COSI221'. Below these is a section labeled 'Configurations:' containing a table with two columns: 'Number' and 'Configuration type'. The table has one row with '1' and 'PHARMA-CODE'. At the bottom are three buttons: 'Add variables', 'OK', and 'Cancel'.

Number	Configuration type
1	PHARMA-CODE

Parameters	Description
Connection:	Selection of connection for which variables are to be created from drop-down list.
Device type:	Selection of the Laetus scanner type from the drop-down list.
Configurations:	Setting of the configuration of the scanner, depending on the selected scanner type. This must correspond to the configuration of the scanner in the Laetus Navigator.
Number	Consecutive number of the configurations. Is issued automatically.
Configuration type	Selection of the configuration type from the drop-down list. A click in the cell activates the drop-down list.
Add variables	<p>Button only available if several connections to the driver (on page 16) are created.</p> <p>Variables are first created for the currently-selected connection. After this, the connection is removed from the <code>Connection</code> drop-down list and the next connection is created automatically.</p>
OK	Closes this dialog, creates variables for the currently-selected connection and opens dialog with all the created variables.
Cancel	Discards settings and closes the dialog.

VARIABLE SELECTION



Parameters	Description
Name	Variable name; can be filtered and sorted
Data type	Data type; can be filtered and sorted
Options	Options; can be filtered and sorted
Number/number	Display of existing/selected variables
OK	Confirms selection, closes dialog and imports selected variables.
Cancel	Discards settings and closes the dialog without importing variables.
Add	Adds selected variables from the display list into the selection list below. Multiple selection is possible. Variables can also be added by double clicking.
Delete	Removes selected variables from the selection list. Multiple selection is possible.

UNSTRUCTURED VARIABLE TYPES

Completely unstructured variable types can also be read.

For this, the following applies:

- ▶ If a structured variable with all subnodes is to be displayed in a string variable, the driver object type `XML raw value` must be selected.
- ▶ If a variable of driver object type `Value` with the address `EvaluationMode` (unstructured) is created, it is expected that the variable value does not contain any XML nodes.
`<STATE v="EvaluationMode" s="cur">active</STATE>`

- ▶ If a structured variable is created (e.g. `ServerStatus.wtDevice.OperationalMode`), it is expected that the variable value contains the structure under an XML root node with the name of the variable.

```
<STATE v="ServerStatus" s="cur">
  <ServerStatus>
    <XML interface>
      <State>
        <Value>connection to wt device -established</Value>
      </State>
    </XML interface>
  </ServerStatus>
</STATE>
```

```
</XML interface>
```

```
<wtDevice>
```

```
<OperationalMode>Production</OperationalMode>
```

```
<EvaluationMode>active</EvaluationMode>
```

```
<State>
```

```
<Value>successfully running</Value>
```

```
</State>
```

```
</wtDevice>
```

```
</ServerStatus>
```

```
</STATE>
```

- ▶ If a variable with the attribute `c=i` is received, the status bit `not topical (NT_870)` is set.

For example:

```
<STATE v="LoadFormatProgress" s="cur" c="i"></STATE>
```

- ▶ If a structure element is not present in a structure, the `INVALID-BIT` is set

7.4.2 XML import

For the import/export of variables the following is true:

- ▶ The import/export must not be started from the global project.
- ▶ The start takes place via:
 - Context menu of variables or data typ in the project tree
 - or context menu of a variable or a data type
 - or symbol in the symbol bar variables

**Attention**

When importing/overwriting an existing data type, all variables based on the existing data type are changed.

Example:

There is a data type XYZ derived from the type `INT` with variables based on this data type. The XML file to be imported also contains a data type with the name XYZ but derived from type `STRING`. If this data type is imported, the existing data type is overwritten and the type of all variables based on it is adjusted. I.e. the variables are now no longer `INT` variables, but `STRING` variables.

7.4.3 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 there 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

Description	Type	Field size	Comment
KANALNAME	Char	128	Variable name. The length can be limited using the MAX_LAENGE entry in project.ini .
KANAL_R	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 project.ini .
KANAL_D	Log	1	The variable is deleted with the 1 entry (field/column has to be created by hand).
TAGNR	C	128	Identification. The length can be limited using the MAX_LAENGE entry in project.ini .
Unit	C	11	Technical unit
DATENART	C	3	Data type (e.g. bit, byte, word, ...) corresponds to the data type.
KANALTYP	C	3	Memory area in the PLC (e.g. marker area, data area, ...) corresponds to the driver object type.
HWKANAL	Num	3	Bus address
BAUSTEIN	N	3	Datablock address (only for variables from the data area of the PLC)
ADDRESS	N	5	Offset

BITADR	N	2	For bit variables: bit address For byte variables: 0=lower, 8=higher byte For string variables: Length of string (max. 63 characters)
ARRAYSIZE	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 Recipe Group Manager
LES_SCHR	R	1	Write-Read-Authorization 0: Not allowed to set value. 1: Allowed to set value.
MIT_ZEIT	R	1	time stamp in zenon zenon (only if supported by the driver)
OBJEKT	N	2	Driver-specific ID number of the primitive object comprises TREIBER-OBJEKTYP and DATENTYP
SIGMIN	Float	16	Non-linearized signal - minimum (signal resolution)
SIGMAX	F	16	Non-linearized signal - maximum (signal resolution)
ANZMIN	F	16	Technical value - minimum (measuring range)
ANZMAX	F	16	Technical value - maximum (measuring range)
ANZKOMMA	N	1	Number of decimal places for the display of the values (measuring range)
UPDATERATE	F	19	Update rate for mathematics variables (in sec, one decimal possible) not used for all other variables
MENTIEFE	N	7	Only for compatibility reasons
HDRATE	F	19	HD update rate for historical values (in sec, one decimal possible)
HDTIEFE	N	7	HD entry depth for historical values (number)
NACHSORT	R	1	HD data as postsorted values
DRRATE	F	19	Updating to the output (for zenon DDE server, in [s], one decimal possible)
HYST_PLUS	F	16	Positive hysteresis, from measuring range
HYST_MINUS	F	16	Negative hysteresis, from measuring range
PRIOR	N	16	Priority of the variable
REAMATRIZE	C	32	Allocated reaction matrix

ERSATZWERT	F	16	Substitute value, from measuring range
SOLLMIN	F	16	Minimum for set value actions, from measuring range
SOLLMAX	F	16	Maximum for set value actions, from measuring range
VOMSTANDBY	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
RESOURCE	C	128	Resources label. Free string for export and display in lists. The length can be limited using the MAX_LAENGE entry in project.ini .
ADJWVBA	R	1	Non-linear value adaption: 0: Non-linear value adaption is used 1: Non-linear value adaption is not used
ADJZENON	C	128	Linked VBA macro for reading the variable value for non-linear value adjustment.
ADJWVBA	C	128	ed VBA macro for writing the variable value for non-linear value adjustment.
ZWREMA	N	16	Linked counter REMA.
MAXGRAD	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 DEFINITION

Limit definition for limit values 1 to 4, and status 1 bis 4:

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

7.5 Driver variables

The driver kit implements a number of driver variables. These are divided into:

- ▶ Information
- ▶ Configuration
- ▶ Statistics and
- ▶ Error messages

The definitions of the variables defined in the driver kit are available in the import file `drvvar.dbf` (on the CD in the directory: `CD_Drive:/Predefined/Variables`) and can be imported from there.

Note: Variable names must be unique in zenon. If driver variables are to be imported from `drvvar.dbf` again, the variables that were imported beforehand must be renamed.



Information

Not every driver supports all driver variants.

For example:

- ▶ Variables for modem information are only supported by modem-compatible drivers
- ▶ Driver 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	12:00 AM	Connection in hold
LineStateConferenced	BOOL	12:00 AM	Connection in conference mode.
LineStateOnHoldPendConf	BOOL	12:00 AM	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 <code>OFF</code> bit. After the driver has started, the variable has the value <code>FALSE</code> and no <code>OFF</code> bit.
SimulRTState	UDINT	60	Informs the status of Runtime for driver simulation.

CONFIGURATION

Name from import	Type	Offset	Description
ReconnectInRead	BOOL	27	If <code>TRUE</code> , 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 <code>SrvDrvVarApplyCom</code> 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 <code>SrvDrvVarApplyModem</code> . This closes the current connection and opens a new one according to the settings <code>PhoneNumberSet</code> and <code>ModemHwAdrSet</code> .
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	<code>TRUE</code> , if update time is global
TreiberSimul	BOOL	5	<code>TRUE</code> , if driver in sin simulation mode
TreiberProzab	BOOL	6	<code>TRUE</code> , 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.
Baud rate	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 Normal in milliseconds (ms).
MaxUpdateTimeHigher	UDINT	57	Time since the last update of the priority group Higher in milliseconds (ms).
MaxUpdateTimeHigh	UDINT	58	Time since the last update of the priority group High in milliseconds (ms).
MaxUpdateTimeHighest	UDINT	59	Time since the last update of the priority group Highest in milliseconds (ms).
PokeFinish	BOOL	55	Goes to 1 for a query, if all current pokes were executed

ERROR MESSAGES

Name from import	Type	Offset	Description
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:

WRITE SEVERAL ELEMENTS OF A STRUCTURE VARIABLE OR A ARRAY VARIABLE AT ONCE

Via "compound write trigger" variables it is possible to write several or all elements of a structure or an array at once.

For this create a variable of object type "compound write trigger". The allocation to the data variables of type "value" or "XML raw value" is made via the name or the identification. If a trigger variable exists, the writing of all data variables whose names start with the name of the trigger variable is controlled.



Example

The trigger variable with name "Scanner11!Identification.wtDevice" controls the writing of all subelements of "Identification.wtDevice" such as "Scanner11!Identification.wtDevice.Name" and "Scanner11!Identification.wtDevice.Client.Port.Number".

SUPPORT OF AUDIT TRAIL MESSAGES

Messages are displayed in variables as XML.

Driver object type (on page 22): `AuditTrailMessage`.

The audit trail message is a string variable. A string with the following syntax is created if a message is received:

`Text.Entry, Variable.Name, Variable.Value.Old and Variable.Value.New`

EXAMPLE 1

Variable `LS1_Code1_Reference_Code` changes value:

- ▶ `old = 4555`
- ▶ `new = 1112`

<AuditTrail>

<ComponentID>LS1</ComponentID>

<MsgID>LS1_2.1</MsgID>

<MsgType>FormatModification</MsgType>

<ClientTime>1291209671</ClientTime>

<Text>

<ID>ID_PRODUCT_CHANGE</ID>

<Lang>en</Lang>

<Entry>Format data changed</Entry>

```
</Text>

<Variable>

    <Name>LS1_Code1_Reference_Code</Name>

    <Storage>cur</Storage>

    <Value>

        <Old>4555</Old>

        <New>1112</New>

    </Value>

</Variable>

</AuditTrail>
```

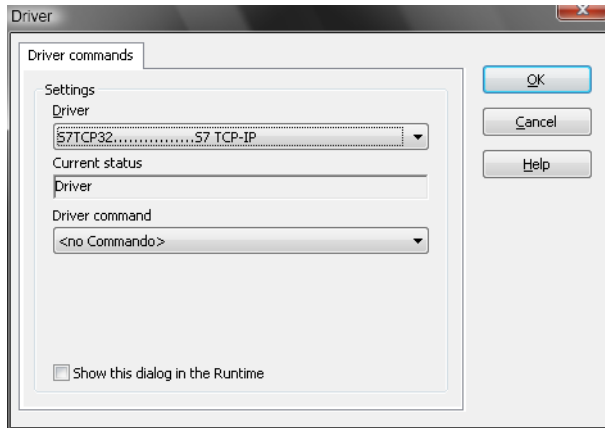
9. Driver commands

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



Parameters	Description
Drivers	Drop-down list with all drivers which are loaded in the project.
Current state	Fixed entry which has no function in the current version.
Driver commands	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. Note: If the driver is in offline mode, all variables that were created for this driver receive the status switched off (OFF; Bit 20).
► 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.
► Activate driver write set value	Write set value to a driver is allowed.
► Deactivate driver	Write set value to a driver is prohibited.

write set value	
► Establish connection 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)
Show this dialog in the Runtime	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 7.11 -> Diagviewer*.

zenon driver log all errors in the log files. The default folder for the log files is subfolder **log** in directory **ProgramData**, example:
 C:\ProgramData\zenon\zenon7.11\LOG for zenon Version 7.11. Log files are text files with a special structure.

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 currently created entries live
- ▶ customize the logging settings
- ▶ change the folder in which the log files are saved

Hints:

1. In Windows CE even errors are not logged per default due to performance reasons.
2. The Diagnosis Viewer displays all entries in UTC (coordinated world time) and not in local time.
3. 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.
4. If you only use **Error logging**, the problem description is in column **Error text**. For other diagnosis level the description is in column **General text**.
5. For communication problems many drivers also log error numbers which the PLC assigns to them. They are displayed in **Error text** and/or **Error code** and/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.
6. 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**.



Information

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

10.2 Check list

Checks after communication errors:

- ▶ Is the PLC or the components connected to the power supply?
- ▶ Are the participants available in the **TCP/IP** network?
- ▶ Can the PLC or the components be reached via the **ping** command?
- ▶ Can the PLC or the components be reached at the respective port via **TELNET**?
- ▶ Is the possible available protocol converter active?
- ▶ Was the connection name or device name set correctly in both the driver dialog and at name of the variable?
- ▶ Did you use the right object type for the variable?
- ▶ Does the variable name match the name in the PLC?
- ▶ Analysis with the Diagnosis Viewer: Which messages are displayed?