zenon
by COPA-DATA

zenon driver manual

BURPVI

v.8.10

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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). The tutorials are grouped according to topics and give an initial insight into working with different zenon modules. All tutorials are available in English.

GENERAL HELP

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

PROJECT SUPPORT

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

LICENSES AND MODULES

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

2 BURPVI

Driver for B+R controls based on the PVI software from Bernecker+Rainer. The driver communicates with PVI. For example system 2000 family (2003, 2005 etc.), Acopos, X20 system, Automation PC, PowerPanel etc. ...

The driver supports spontaneous operation with hysteresis and online import of multidimensional arrays and arrays with a start index <> 0.

Coupling: Serial, Ethernet

Protocol: PVI

The BUR-PVI driver replaces the BUR20032 driver. The addressing of these two drivers is not compatible with each other as the BUR20032 driver addresses the PVI items via an allocation file and the BUR-PVI saves the addressing directly via properties in the V-DLL. The driver is symbol-oriented.

Attention

Addressing of one-dimensional arrays:

If one-dimensional rays are addressed with a start index <> *0*, a comma must be attached to the index. For details see: Documentation B&R.

For example: *zenon[3,]*

3 BURPVI - data sheet

General:	
Driver file name	BURPVI.exe
Driver name	BuR-PVI Treiber NG
PLC types	All Bernecker and Rainer controllers that can communicate with PVI, for example System 2000 family (2003, 2005 etc.), Acopos, X20 System, Automation PC, PowerPanel etc.
PLC manufacturer	Bernecker + Rainer

Driver supports:	
Protocol	PVI
Addressing: Address-based	Name based
Addressing: Name-based	--
Spontaneous communication	X
Polling communication	X
Online browsing	X
Offline browsing	X

Driver supports:	
Real-time capable	--
Blockwrite	--
Modem capable	--
RDA numerical	X
RDA String	--
Hysteresis	X
extended API	X
Supports status bit **WR-SUC**	X
alternative IP address	--

Requirements:	
Hardware PC	Serial interface RS232 or standard network card
Software PC	PVI software required, including under Windows CE. The PC setup is available on the installation medium.
Hardware PLC	--
Software PLC	--
Requires v-dll	X

Platforms:	
Operating systems	Windows 10; Windows 7; Windows 8; Windows 8.1; Windows Server 2008 R2; Windows Server 2012; Windows Server 2012 R2; Windows Server 2016

4 Driver history

Date	Driver version	Change
1/26/2010	1400	Driver was created newly
1/14/2010	1500	Fixed error at the configuration
3/5/2010	1600	Adjusted to PVI 3.0
3/17/2010	1700	Revised dialogs

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

PVI software from Bernecker+Rainer.

5.2 Control

6 Configuration

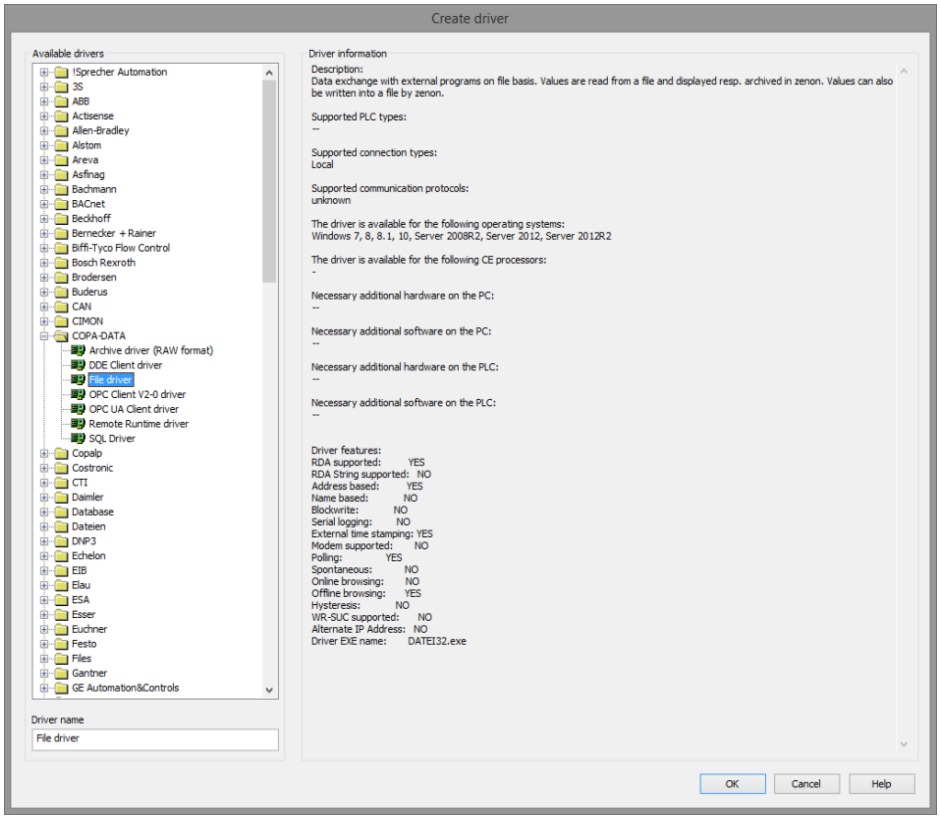
In this chapter you will learn how to use the driver in a project and which settings you can change.

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
Available drivers	List of all available drivers.

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

CLOSE DIALOG

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

Information

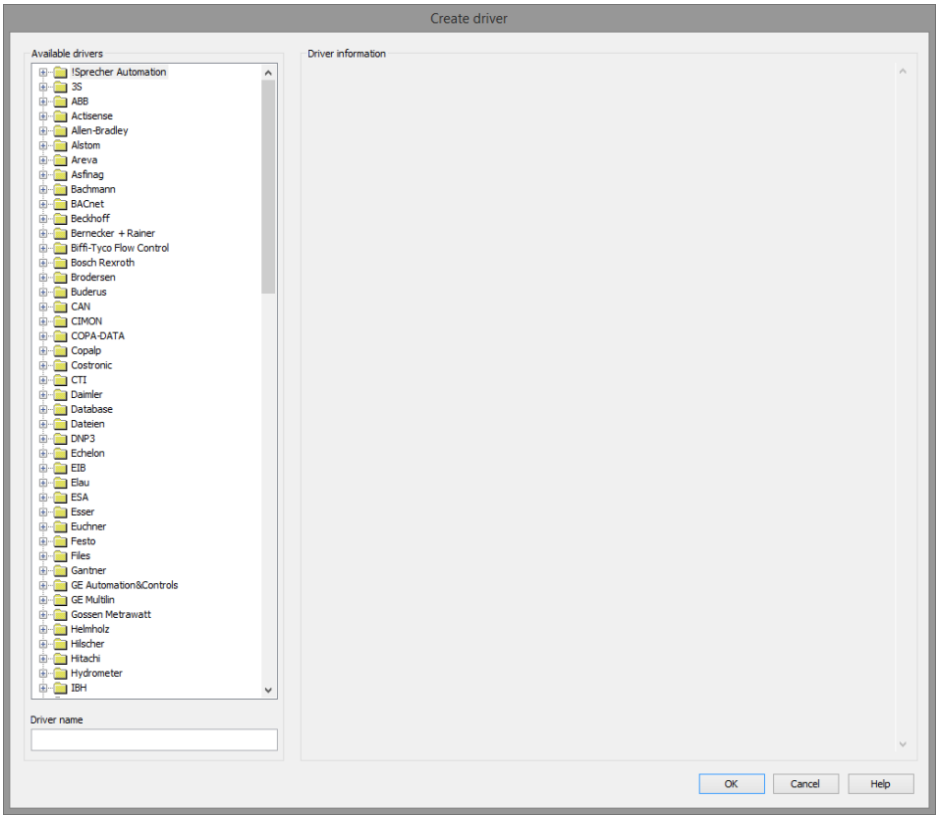
The content of this dialog is saved in the file called Treiber_[Language].xml. You can find this file in the following folder:
C:\ProgramData\COPA-DATA\zenon[version number].

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**:

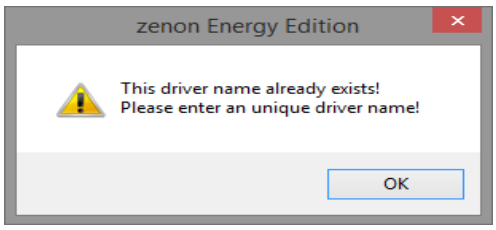
   - The **Driver name** must be unique.
     If a driver is used more than once in a project, a new name has to be given each time. This is evaluated by clicking on the **OK** button. If the driver is already present in the project, this is shown with a warning dialog.
   - The **Driver name** is part 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.



ZENON PROJECT

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

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

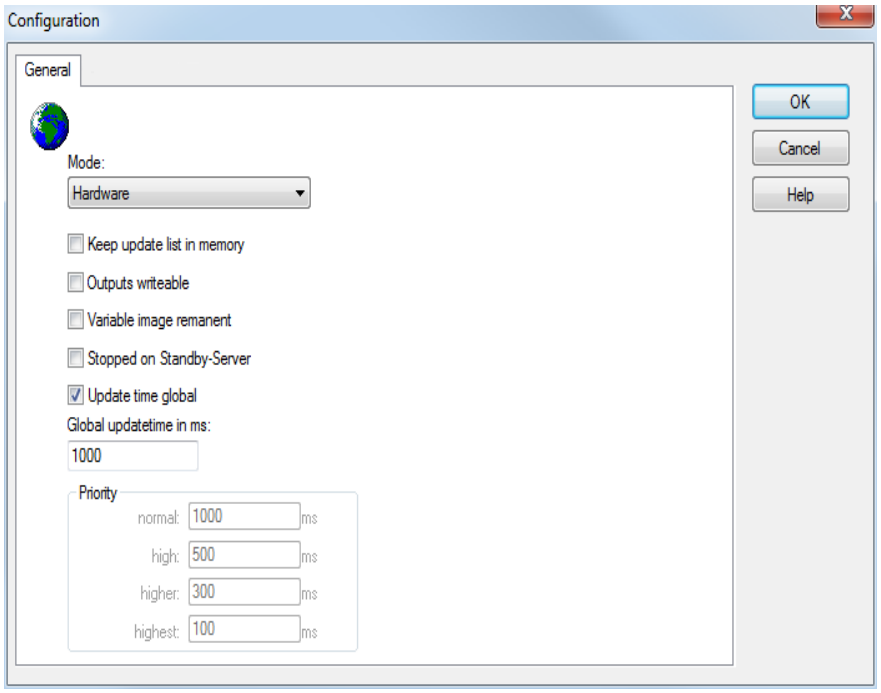
> **Information**
>
> Only the required drivers need to be present in a zenon project. Drivers can be added at a later time if required.

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
Mode	Allows to switch between hardware mode and simulation mode ▸ *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 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. ▸ *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

Option	Description
	within a value range automatically. ▸ *Simulation - programmed*: 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).
Keep update list in the memory	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.
Output can be written	▸ *Active*: Outputs can be written. ▸ *Inactive*: Writing of outputs is prevented. **Note**: Not available for every driver.
Variable image remanent	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 hardware mode if one of these statuses is active: ▸ User status *M1* (*0*) to *M8* (*7*) ▸ *REVISION(9)* ▸ *AUS(20)* ▸ *ERSATZWERT(27)* The variable image is always saved if: ▸ the variable is of the object type **Driver variable** ▸ the driver runs in simulation mode. (not

Option	Description
	programmed simulation) The following states are not restored at the start of the Runtime: ▸ *SELECT(8)* ▸ *WR-ACK(40)* ▸ *WR-SUC(41)* The mode **Simulation - programmed** at the driver start is not a criterion in order to restore the remanent variable image.
Stop on Standby Server	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. **Attention:** If this option is active, the gapless archiving is no longer guaranteed. ▸ *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** (**statusverarbeitung.chm::/24150.htm**) but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian. Default: *inactive* **Note:** Not available if the CE terminal serves as a data server. You can find further information in the zenon Operator manual in the CE terminal as a data server chapter.
Global Update time	Setting for the global update times in milliseconds: ▸ *Active*: The set **Global update time** is used for all variables in the project. The priority set at the variables is not used. ▸ *Inactive*: The set priorities are used for the individual variables.

Option	Description
	Exceptions: Spontaneous drivers ignore this option. They generally use the shortest possible update time. For details, see the **Spontaneous driver update time** section.
Priority	The polling times for the individual priority classes are set here. All variables with the according priority are polled in the set time. The variables are allocated separately in the settings of the variable properties. 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. **Attention:** Priority classes are not supported by each driver, e.g. spontaneously communicating zenon drivers.

CLOSE DIALOG

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

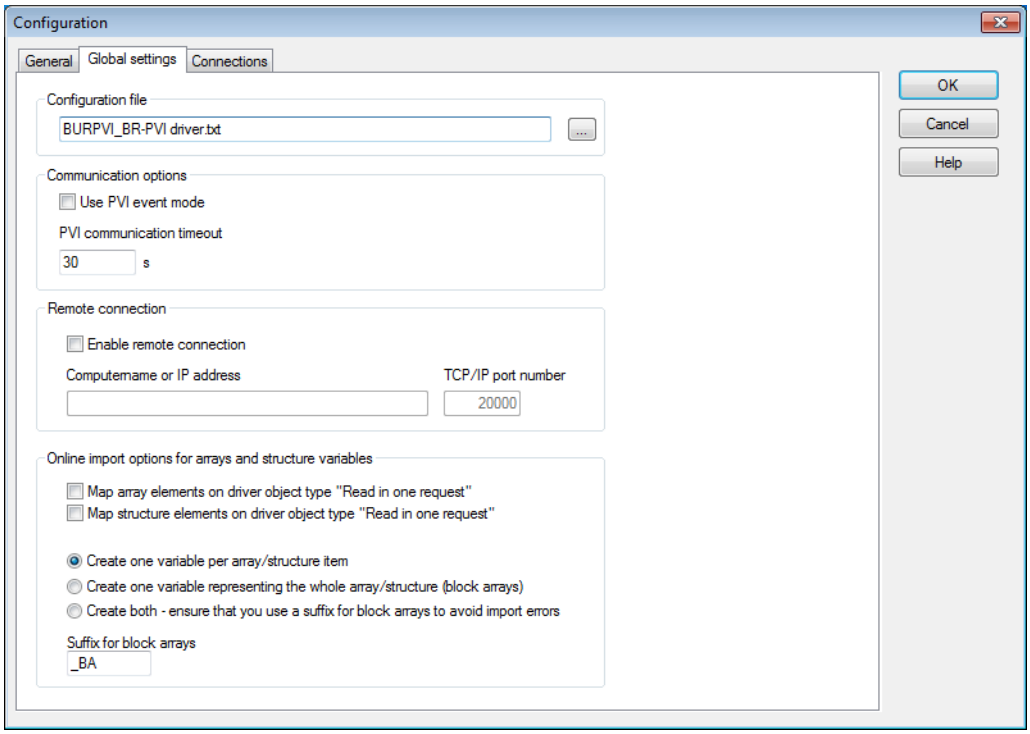
UPDATE TIME FOR SPONTANEOUS DRIVERS

With spontaneous drivers, for **Set value**, **advising** of variables and **Requests**, a read cycle is triggered immediately - regardless of the set update time. This ensures that the value is immediately available for visualization after writing. The update time is generally 100 ms.

Spontaneous drivers are **ArchDrv**, **BiffiDCM**, **BrTcp32**, **DNP3**, **Esser32**, **FipDrv32**, **FpcDrv32**, **IEC850**, **IEC870**, **IEC870_103**, **Otis**, **RTK9000**, **S7DCOS**, **SAIA_Slave**, **STRATON32** and **Trend32**.

6.2.2 Global settings

General settings for the PVI communication are set in the **Global Settings** tab. These settings are true for all connections which are available in the driver.



Parameter	Description
Configuration file	File in which the configuration of connections and the global settings are saved. Click on **...** in order to open the Windows Explorer. Note the hints in chapter: Configuration file in redundant operation (on page 38).

REMOTE CONNECTION

Parameter	Description
Use PVI event mode	*Active*: All PVI variables are requested via event mode (PVI command *AT=rwe HY=0*). *Inactive*: PVI variables are read cyclically with the setting of the global update time (**AT=rw**, **RF=global update time in ms**).
PVI communication timeout [s]	Timeout or PVI communication in seconds. PviInitialize (dwTimeout, ...)

Parameter	Description
Enable Remote Connection	*Active*: Connection to a remote PVI system via TCP/IP is established. The communication takes place exclusively via this gateway. A local PVI installation is always necessary. In addition to the settings for the driver, you must configure the setting for the remote communication via TCP/IP on the PVI itself (PVI client/Manager) - locally and on the remote system.
Computername or IP address	Computer name or IP address on which the remote PVI system is installed and runs.
TCP/IP Port number	TSP/IP port number of the remote PVI system. **Note:** Any firewall that may be present must be configured so that the target port can be reached.

ONLINE IMPORT OPTIONS FOR ARRAYS AND STRUCTURE VARIABLES

Options for the online import of array variables and structure variables.

Parameter	Description
Map array elements on driver object Type "Array as whole"	*Active*: At the import of array elements select **Driver object types***Read in a request* - exception for arrays in structures.
Map structure elements on driver object Type "Array as whole"	*Active*: At the import of array elements select **Driver object types***Read in a request* - also for arrays in structures.
Create one variable per array/structure item	*Active*: Only individual variables are created and no nodes are displayed. Default setting.
Create one variable representing the whole array/structure (block arrays)	*Active*: For arrays and structures, only block variables are created, but no variables that represent individual variables of structures/arrays. This option has no influence on top level variables.
Create both - ensure that you use a suffix for block arrays to avoid import errors	*Active*: For arrays and structures, both individual elements and blocks that represent the whole structure are represented.
Suffix for block arrays	Suffix for the zenon names of variables that were created as block array - variables that represent a whole structure or

Parameter	Description
	complete array.

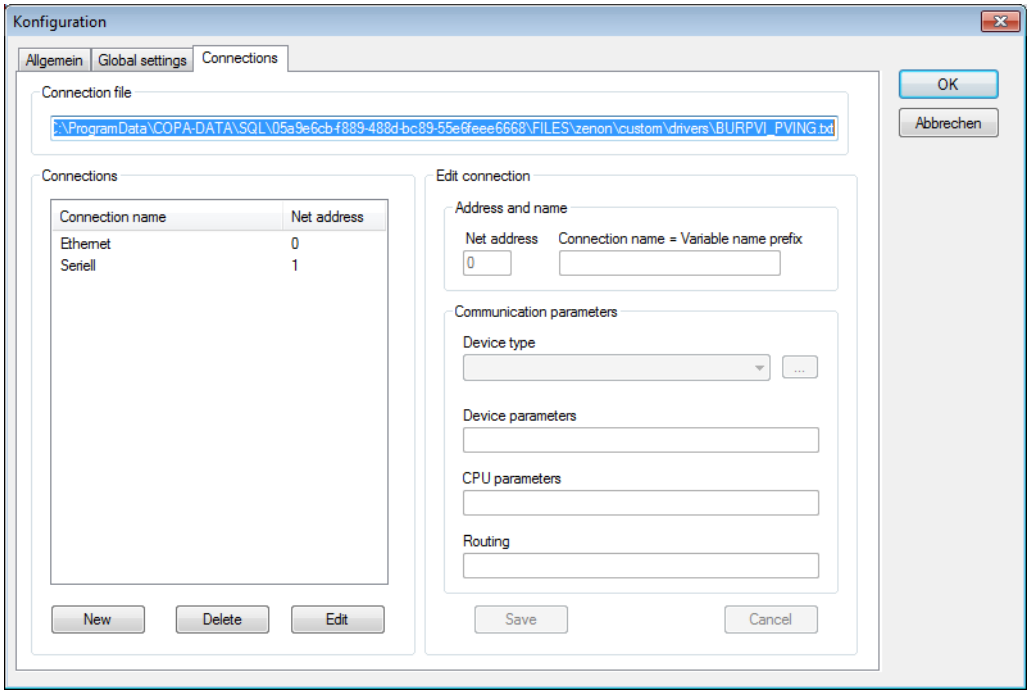
ARRAY AS A WHOLE

With this all elements of the driver object type **Array as whole** are mapped. All elements of this object type are no longer read in the event that a value changes, but polled cyclically. The driver always reads in the whole array as a block.

A block array is a large variable in zenon that reads a complete block from the PLC. Many individual arrays are therefore read as a single array.

6.2.3 Connections

On this tab you carry out the settings for the connection. You can create any number of connections in the driver. All connections use the global settings which are defined on tab **General Settings** (on page 17).



Parameter	Description
Connection file	Storage location for the configuration file in which the connection and the global setting is saved. The file is set in tab **General Settings** (on page 17).
Connections	List of available connections.
New	Adds new entry to the list. Settings are carried out in the

Parameter	Description
	field to the right of the list.
Delete	Deletes selected entry from the list.
Edit	Makes it possible to configure the selected entry. The area to the right of the list for editing the connection is activated. **Attention!** The driver dialog cannot be closed in editing mode. Only once the editing mode has been left using **Save** or **Cancel** can you close the driver dialog.
Edit connection	Edit connection settings.
Address and name	Address and name.
Net address	Net address of the connection for the allocation of variables. **Attention:** If you change the net address here, you must also change the net address of all other variables of the connection. Otherwise the allocation is no longer correct and variables cannot communicate in the Runtime!
Connection name	Symbolic connection name. This name is used as a prefix for the variable name.
Communication parameters	Communication parameter:
Device type	Selection of the PVI device type from the drop-down list: ▸ Serial ▸ Ethernet ▸ Modem ▸ CAN ▸ Shared ▸ User defined For types **Serial** and **Ethernet** you can open a dialog for configuration by clicking on **...**.
Device parameters	Direct input of the PVI device parameter. If you carry out the setting for the connection with the configuration dialog for Ethernet or Serial, the settings are overwritten here. Ethernet default: */IF=TCPIP /SA=1* Serial default: */IF=COM1 /BD=57600 /PA=2 /IT=1* You can find the settings for the single communication

Parameter	Description
	types in chapter Device parameter - INA2000 device object (on page 29)
CPU parameters	Direct input of the PVI CPU parameter. This is the station address of the CPU. For serial connections no station address is needed. Ethernet default: */DA=2* Serial default: -
Routing	Direct input of a routing path for the routing via PLC stations. See description for routing further down.
Save	Saves the configuration of the selected connection.
Cancel	Discards configuration.
OK	Saves all changes and closes dialog.
Cancel	Discards all changes and closes the dialog.

Information

Maximum number of Ethernet connections: 256.

ROUTING

With the help of routing, communication connections can be established via a PLC station to PLC stations of other networks. This connections can run via several PLC stations. The single stations are defined in the routing path.

SYNTAX

<Entry 1>/<Entry 2>/.../<Entry n>
The single path entries are separated by character '/'.

Syntax for an entry:

SL<Slot>.SS<Subslot>.IF<Interface>.<Address>

All partial entries are separated by character '.'. Statement SL<Slot> and SS<Subslot> need not to be specified for 0 or 1. The statement <Address> is only needed for connections via the network.

Parameter	Description
SL<Slot>	Slot number: 0 (1) - 15.
SS<Subslot>	Subslot number: 1 - 3.
IF<Interface>	Interface number: 1 - 15.
<Address>	Station address: 1 - ff (hexadecimal).

Routing on or via peripheral processors:

Parameter	Description
CP	Main processor.
PP<Slot>	peripheral processor, slot number: 0 (1) - 15.

EXAMPLES

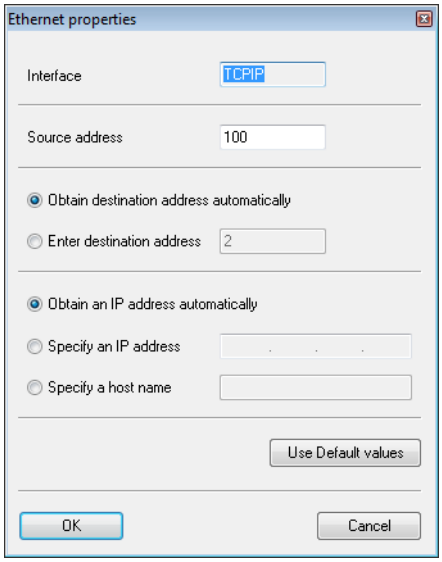
/CN=IF3/IF2.7
From the PC to the first PLC, from there via IF3 to the next station (PLC) and then via IF2 to a CAN station with station number 7.

/CN=SL6.IF1
From the PC to the first PLC then on via slot 6 (e.g. IF 050) and IF1

/CN=PP3
From the PC to the first PLC and on to the peripheral processor 3

ETHERNET CONNECTION

A click on **...** in area **Device type** opens the dialog for the configuration of the Ethernet connection if you have selected **Ethernet**:



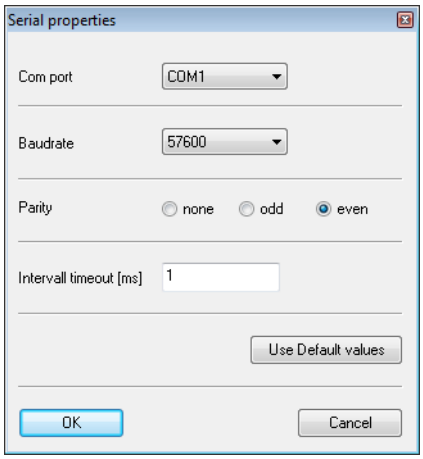
Parameter	Description
Interface	Defines the interface. Mist always be TCP/IP.
Source address	Station number of the source station (own station). **Attention!** The station number must be unique within the INA2000 network. As default B&R Automation Studio uses station number 1. Thus it can easily happen that the communication to the PLC does not work if station number 1 is used. The highest possible station number is 99 for SG3 and 255 for SG4. See also Configuration file in redundancy operation (on page 38).
Obtain destination address automatically	Obtain destination address automatically: PVI connects to the defined device (IP address or computer name must be set) and determines the station address automatically.
Enter destination address	Enter destination address: Enter the station address of the target system. If **Obtain an IP address automatically** is activated, a broadcast is carried out in the network in order to find the station.
Obtain an IP address	Obtain an IP address automatically: Carries out a broadcast in the network and tries to find the station with the station

Parameter	Description
automatically	address defined at **Enter destination address**.
Specify an IP address	Define IP address: Enter the IP address of the station.
Specify a host name	Define host name: Enter the host name of the station.
Use Default values	Resets the properties to the default settings.
OK	Applies settings and closes the dialog.
Cancel	Discards settings and closes the dialog.

As an alternative you can enter the values in areas **Device Parameter**, **CPU Parameter** and **Path target system**.

SERIAL CONNECTION

A click on **...** in area **Device type** opens the dialog for the configuration of the serial connection if you have selected **Serial**:



Parameter	Description
Com port	Defines interface. Default: *COM1*
Baud rate	Defines baud rate. Default: *57600*
Parity	Defines parity: ▸ *no* ▸ *odd*

Parameter	Description
	▸ *even* Default: *even*
Interval timeout (ms)	Defines the interval in milliseconds. Default: *1*
Use Default values	Resets the properties to the default settings.
OK	Applies settings and closes the dialog.
Cancel	Discards settings and closes the dialog.

As an alternative you can enter the values in areas **Device Parameter**, **CPU Parameter** and **Path target system**.

6.2.3.1 INA2000 communication

The driver supports the communication in accordance with the INA2000 protocol.
The INA2000 communication is supported by the following devices:

- Serial communication
- CAN communication
- Ethernet UDP communication
- Modem communication
- Profibus FDL communication
- LS251 communication
- AR000 communication

Each INA2000 communication possesses a life monitoring. As soon as a connection is established, it is checked each second by exchanging small data packages (ping/pong).

GENERAL PLC PREREQUISITES:

The INA2000 communication works limited (services) as of PLC operating system 1.91. To be able to use all services (e.g. upload, download of modules), PLC operating system 2.10 is necessary.

If multimaster abilities or a TCP/IP communication between PC and PLC are necessary, you must use PLC operating systems 2.20 or higher. For a INA2000 event handling via the PLC (PLC monitors data change), a PLC operating system 2.24 or higher is needed.

INA2000 orders are processed in the PLC in the remaining time. To receive suitable response times, a balance time of at least 20% is required. If 20% balance time cannot be guaranteed due to application reasons, longer answer times will occur and therefore the data will be refreshed slower.

SERIAL COMMUNICATION

The serial communication can only be operated as point-to-point connection (RS232 or RS422).

CAN COMMUNICATION

The CAN communication is used as INA2000 network with a maximum of 32 (extendable to 255) stations. The individual stations are distinguished by the CAN node number.

PC REQUIREMENTS

Please refer to the manufacturers description to find out which CAN card can by used with which Windows system.

PLC REQUIREMENTS

To allow an INA2000 communication via CAN, you must activate CAN communication in Automation Studio. See Automation Studio documentation (**Project -> Hardware configuration -> CAN configuration**).

ETHERNET UDP COMMUNICATION

PC REQUIREMENTS

The TCP/IP protocol must be installed.

PLC REQUIREMENTS

To allow an INA2000 communication via Ethernet, you must activate Ethernet communication in Automation Studio. See Automation Studio documentation (Project -> Hardware configuration -> Ethernet configuration).

For SG4 (i386):
The configuration of the IP address and the station number (INA node number) takes place in the Ethernet property dialog of the Automation Studio. No additional modules must be transferred to the PLC.

For SG3 (m68k):
For INA2000 communication modules "FBTCPIP.BR" and "TCPIPMGR.BR" must be burned. In addition a data object "TCPIPCFG.DAT" with the corresponding settings must exist.

USE SEVERAL ETHERNET NETWORK CARDS AT THE PC.

How to make sure that PVI uses the correct network card in order to communicated with the PLC when two or more network cards are available in the PC.

In order for the correct network card to be selected for the PLC communication, the subnet mask must be set correctly. The IP address of the target station (PLC) is linked with the subnet mask with AND; thus the correct network card is found and used for the communication.

Example:

Device parameter: /IF=tcpip /SA=1

CPU parameter /DA=13 /DAIP=172.43.70.13

IPAdr NW1: 172.43.71.12 subnet mask: 255.255.255.0

IPAdr NW2: 172.43.70.12 subnet mask: 255.255.255.0

IPAdr PLC: 172.43.70.13

With this network card two is used for the communication to the PLC. If a DHCP server is configured for a network card, you must know which IP addresses and subnet masks the DHCP server assigns so that you can configure the second network card correctly.

MODEM COMMUNICATION

The Modem communication just as the serial communication is a point-to-point connection.

Modem features:

- Transparency: The modem is accessed only via standard Windows functions. I.e. any modem can be used which can be installed under Windows. The user must only take care about the installation of the modem. He does not need any special knowledge about the modem (AT commands, etc.).
- Automatic connection reestablishment: An actively established connection (see below) will be monitored constantly. When the connection is lost (e.g. interruption of the phone line, unplugging the modem, turning of the modem), a new connection establishment is tried in periodic intervals. The number of tries and the interval can be engineered.
- Active connection establishment: The Windows computer establishes a dial connection to the stated phone number and transfers the protocol defined by PVI line on this connection.
- Passive connection establishment: The Windows computer waits for an incoming call, picks up automatically and establishes a connection. With this operation mode it is for example possible that a PLC itself initiates a connection establishment to a Windows computer via PVI.

PC REQUIREMENTS

The PVI modem device needs Microsoft TAPI version 2.0. This version is already installed at Windows NT 4.0. When using Windows 95 it is necessary that the default TAPI version 1.4 is replaced by a newer version. The most topical Microsoft (www.microsoft.com) version available is version 2.1. To install TAPI version 2.1 under Windows 95, start program "tapi2195.exe" in subfolder "Pvi\SysSetup\Modem". This file is installed via PVI setup option "Modem system components".

The installation of a modem is carried out in Windows via control panel -> modem. If the dialog is opened it is possible to add new modems and to change the settings of the modem ("Properties"). The label of the modem in this dialog matches the modem name which must be stated as PVI device parameter (/MO).
The behavior during dialing can be configured under "Control panel -> Phone" (current location, dialing card, etc.).

PROFIBUS FDL COMMUNICATION

Attention:

The INA2000 communication via Profibus FDL is only possible on System 2000. External systems are not supported by the PVI!

The settings of the PLC Profibus card (NW100/NW150) and the PC card (5A1104.00-090) can be taken from the PROFIBUS user manual (MASYS2PB-0).

PC REQUIREMENTS

The data exchange with the PC takes place via a 32 KB DPR. For this a free address area must be defined on the PC. On the Profibus card this is set with two hex switches SW1 and SW2 (SW1 = 0; SW2=D). If only one Profibus card is used in the system, jumper BR1 and BR2 must be let open. Additional information can be found in the PROFIBUS user manual.

For this memory to be deallocated on the PC, the memory area must be excluded in the BIOS. On the IPC5000 in the BIOS under "PNP/PCI Configuration" you must exclude either 32 KB (1 Profibus card) or 64 KB (for 2 Profibus cards) starting at basic address D000.

PLC REQUIREMENTS

NW100 or NW150 with revision higher/equal to xx.05.

On the PLC operating system 2.00 or higher is necessary. For the INA2000 communication module "FBPB.BR" must be burnt. The Profibus configuration module is already part of the operating system and can be changed with the help of suitable tools if necessary.

To allow an INA2000 communication via Profibus, you must extended the configuration for the INA2000 Profibus communication in the SYSCONF module.

LS251 COMMUNICATION

PC REQUIREMENTS

With Windows the LS251 card is recognized by the operating system automatically after it has been plugged in. In the hardware wizard you can select the corresponding driver under "Pvi\Drivers\Ls251\W2k_xx".

Runtime PLC prerequisites:

On LS251 PLC operating system V2.01 or higher must be installed.

AR000 COMMUNICATION

Communication with AR000 takes place via an Ethernet UDP device and an Ethernet UDP station with local IP address 127.0.0.1.

Connection description for device: "/IF=TcpIp", Connection description for station: "/DAIP=127.0.0.1 /REPO=11160".

PC REQUIREMENTS

The AR000 Runtime emulation must be installed.

6.2.3.2 Device parameter - INA2000 device object

With the INA2000 device object the used communication device is defined. You must enter the parameters described here in the connection configuration in field **Device parameter**.
The following communication parameters can be defined:

- Serial device
- CAN device
- Ethernet UDP device
- Modem device
- Profibus FDL device
- LS251 device

The communication device including the necessary device parameters are defined in the connection description of the device object. Within the connection description the single parameters are distinguished by parameter identifications. The parameter identification always starts with character '/'.

SYNTAX OF THE CONNECTION DESCRIPTION

/IF=<device name> [/<identification1>=<parameter value> [/<identification2>=<parameter value> ...]]

Parameter /IF is the same for all communication devices. All other parameters depend on the used communication device. The device name is not case-sensitive. You must insert at least one space character between the parameter declaration.

In the object description the connection description must always be between quotation marks ("...").

EXAMPLE FOR CONNECTION DESCRIPTION

CD="/IF=com1 /BD=57600 /PA=2"

SERIAL DEVICE

The following table shows all definable parameters defined in the connection description of the device object for serial communication.

Parameters	Values	Input	Description
/IF	com1 ...comX	None	by default: com1 to com4. With corresponding serial interface cards or adapters even more than com4 is possible. Example: "/IF=com1".
/BD	9600, 19200, 38400, 57600, 115200	57600	Baud rate in bits per second.
/RS	-1, 0, 232, 422, 485	232	set protocol RS232 or RS422. RS485 is not supported by INA2000. Example: "/RS=422". With this parameter the flow control of the line CTS (clear-to-send)) and RTS (request-to-send) of the serial interface is set. Possible parameter values: = -1: PVI does not change the current setting (see properties interface device) of the CTS/RTS flow control. = 0: always switch off RTS line (RTS flow control is

Parameters	Values	Input	Description
			deactivated). = 232: Use RTS handshake. = 422: Always switch on RTS line. = 485: Switch on RTS line in order to trigger a transfer and during a transfer. The CTS flow control is deactivated for all parameters >= 0. Some USB/serial adapter (USB to serial interface) cannot handle the CTS/RTS flow control correctly. To establish an RS232 connection via these adapters, parameter "/RS=0" must be entered.
/PA	0 - 4	1	Setting for parity. 0=NOPARITY, 1=ODDPARITY, 2=EVENPARITY, 3=MARKPARITY, 4=SPACEPARITY. Default setting for INA2000 communication is "/PA=2".

Example

Example for connection description:

CD="/IF=com2 /BD=115200 /PA=2"

CAN DEVICE

To communicate with a INACAN device, you must first set it up as CAN device via B&R device configuration. The configuration is started via control panel and CAN device. The device list of the configuration shows all already setup CAN devices. The device number must also be entered in the PVI device name. At this device CAN1 matches the PVI device name INACAN1; CAN2 matches INACAN2 and so on. With the B&R CAN device configuration you also set the device resources (IRQ, port address, etc.).

The following table shows all definable parameters defined in the connection description of the device object for CAN communication.

Parameters	Values	Input	Description
/IF	inacan1 ... inacanX	None	CAN device. The used device must be entered in the device list of the B&R CAN device configuration. Example: "/IF=inacan1".
/CNO	0, 1	0	Number (channel) of the CAN controller. On the LS172 card 2 CAN controllers are available. With parameter /CNO the desired controller is selected. For the standard CAN controller you must not enter another values as 0 (zero). Example for LS172 card: CAN-Bus 1: "/IF=inacan2 /CNO=0", CAN-Bus 2: "/IF=inacan2 /CNO=1".
/IT	0 - 60000, 0 = off	0	Interval timeout (ms). Defines the maximum time which may pass between receiving and sending an INA frame between two CAN messages. This parameter is used together with parameter /RT of the INA2000 CPU objects in order to recognize a connection termination. The parameter must not be smaller than the reaction time of the control (5 - 30 ms) plus a cushion of at least 25 ms (if there is a high interrupt strain on the PC, it must be respectively higher) but it should be smaller than /RT. If no quick recognition of the connection termination is necessary, the monitoring of the interval timeout can be switched off ("/IT=0"). Example: "/IT=80".
/BI	0 - 2047 / 536870911	1598	Basic CAN-ID of the INA2000 communication. All stations of the INA2000 network must have the same setting. Example: "/BI=1598".
/MDA	32 - 255	32	Number of maximally possible INA2000 stations (=highest station number). All stations of the INA2000 network must have the same

Parameters	Values	Input	Description
			setting. Example: "/MDA=50".
/SA	1 - /MDA	1	Station number of the source station (own station). The station number must be unique within the INA2000 network. Example: "/SA=3".
/BD	10000, 20000, 50000, 100000, 125000, 150000, 250000, 500000, 800000, 1000000	*)	Baud rate (data rate) at the CAN bus in bits per second. The rate can also be in Kbits per second. All stations of the INA2000 network must have the same setting. Example: "/BD=250000" or "/BD=250".
/CMODE	11, 29	*)	CAN communication with 29 bit identifier (extended frames) or with 11 bit identifier (standard frames). If 29 bit CAN identifiers (extended frames) are used, 11 bit identifiers cannot be received or sent. All stations of the INA2000 network must have the same setting. Example: "/CMODE=29".
/CT	>= 1, 0 = off	*)	Cycle time (in ms); in this time not more than the stated number of CAN messages (parameter /MC) can be sent. Values < 20 ms make no sense. Example: "/CT=20".
/MC	>= 1	*)	Maximum number of CAN messages which are sent in the

Parameters	Values	Input	Description
			states cycle time (parameter /CT). Example: "/MC=15".

*) Parameters /BD, /CMODE, /CT and /MC can also be set with the B&R CAN device configuration. If these parameters are not stated in the connection description (= recommended method), the values set in the configuration are used. If one of the parameters is stated in the connection description, the respective configuration setting is overwritten.

Parameters /CT and /MC serve as message limitation. With this the number of sent CAN messages per cycle time can be limited. The traffic caused by the PC on the CAN bus is reduced by this. The message limitation is important if other bus members can only process a certain number of received CAN messages at a fixed baud rate or reduce the interrupt strain of other bus members in general. The disadvantage of the message limitation is a slower CAN communication.

For the INA2000 communication each station needs 3 CAN-IDs. The CAN-IDs are created from the basic CAN-ID (parameter /BI), the station number (node number) and the maximum number of stations (parameter /MDA):

- ID1 (initiate request) = <Basic CAN-ID> + <station number> - 1
- ID2 (initiate response) = <Basic CAN ID> + <station number> - 1 + <maximum number of stations> * 2
- ID3 (data segment) = <Basic CAN ID> + <station number> - 1 + <maximum number of stations>

> **Example**
>
> Example for connection description:
>
> CD="/IF=inacan3 /CNO=1 /SA=3"

ETHERNET UDP DEVICE

The following table shows all definable parameters defined in the connection description of the device object for Ethernet UDP communication.

Parameters	Values	Input	Description
/IF	tcpip	None	Ethernet UDP device. Statement: "/IF=tcpip".
/LOPO	1024 - 32767	11159	Port number of the source station (own station).

Parameters	Values	Input	Description
			If the value is stated in hexadecimal, "0x" must be placed in front (e.g. "/LOPO=0x2b97"). You must only set another port number as the default if it is not unique within the local computer. Example: "/LOPO=11159".
/SA	0 - 99 / 255	1	Station number of the source station (own station). The station number must be unique within the INA2000 network. The highest possible station number is 99 for SG3 and 255 for SG4. Example: "/SA=3".

Example

Example for connection description:

CD="/IF=tcpip /SA=3"

MODEM DEVICE

The following table shows all definable parameters defined in the connection description of the device object for modem communication.

Parameters	Values	Input	Description
/IF	modem1 ... modemX	None	Modem device. Example: "/IF=modem1".
/MO	Modem description	None	Description of the modem as in the setup dialog (control panel -> modem). The string must be between single quotation marks. If a single quotation mark should be used within a string, you must use two single quotation marks (e.g. m'56k is stated as /MO=''56k'). Example: "/MO='MicroLink 56k'".
/TN	Phone number	None	Phone number. The phone number which should be

Parameters	Values	Input	Description
			called in accordance with "ITU-T Recommendation E.123", z.B. +43(7748)6586. You must always enter the complete phone number (including international access code); the conversion to the actual phone number is carried out automatically. This string must be between single quotation marks. If it should be waited for a call, you must enter an empty string (/TN=''). Example: "/TN='+43(7748)6586'".
/MR	0 - INFINITE	INFINITE	Maximum number of failed re-dialing attempts. Defines the number of tries a failed connection should be tried to be reestablish. If you enter INFINITE the number of retries is unlimited. If you enter 0, there is no retry. Parameter /MR only has a meaning if /TN is not empty. Examples: "/MR=50", "/MR=INFINITE".
/RI	0 - 3600	60	Time interval between retries in seconds. If a retry fails, this time is waited until a new try is started. Parameter /RI only has a meaning if /TN is not empty. Example: "/RI=120".
/IT	0 - 60000	40	Interval timeout (ms). Defines the maximum time which may pass between the reception of two successive characters. Example: "/IT=100".

In addition to parameter /IF, you must also always enter parameter /MO and /TN.

Reading from the serial interface is carried out by an operating system function. A buffer is handed over to this function. In this buffer the received data is stored. The operating system finishes the reading if one of the following situation occurs:

1. The buffer is full.
2. Since receiving the last character a time interval which is larger than the timeout interval has past.

The correct setting of parameter /IT for the timeout interval is therefore especially important. If the timeout interval is to small, INA2000 frames could be lost. This would lead to a connection termination. If the timeout interval is to large, the data throughput suffers as the timeout interval passes before the

PC recognizes a received frame. Default value 40 ms has been chosen because of measurings which show that a modem (by internal buffering) adds 35 ms breaks in the byte stream. Normally it should not be necessary to select another value. We can however not rule out that you must set a higher value if using another modem type or bad line quality (modems have their own transfer security with automatic retransmission).

Example

Example for connection description:

CD="/IF=modem1 /MO='ZyXEL MODEM Omni 288S' /TN='+43(7748)999'"

PROFIBUS FDL DEVICE

The following table shows all definable parameters defined in the connection description of the device object for Profibus FDL communication.

Parameters	Values	Input	Description
/IF	pbusfdl1 ... pbusfdlX	None	Profibus device. Example: "/IF=pbusfdl1".
/BA	0x00000 - 0xFFFFF	0xD0000	Basic address of the DPR of the Profibus card. If the value is stated in hexadecimal, "0x" must be placed in front. Example: "/BA=0xD0000".
/FF	Path name*)	nw_load.bin	Path name of the firmware file for the Profibus card. Example: "/FF=nw.bin".
/FC	Path name*)	nw_pb_32.br	Path name of the network configuration file for the Profibus card. Example: "/FC=nw_pb.br".
/CB	1 - 255	2	Number of communication buffers of the Profibus card. Example: "/CB=4".
/SA	0-127	1	Station number of the source station (own station). The station number must be unique within the INA2000 network. Example: "/SA=2".

*) A standard firmware file and configuration file is part of the PVI. If no path is entered, the files must be in the folder of the PVI manager.

Settings such as baud rate and timeout cannot be defined via the device parameters. For this the configuration file must be changed with the right tools.

Example

Example for connection description:

CD="/IF=pbusfdl1 /FF=c:\pbconfig\nw_load.bin /FC=c:\pbconfig\nw_pb_32.br /SA=1"

LS251 DEVICE

The following table shows all definable parameters defined in the connection description of the device object for LS251 communication.

Parameters	Values	Input	Description
/IF	ls251_1 ... ls251_9	None	LS251 device. Example: "/IF=ls251_1".

Example

Example for connection description:

CD="/IF=ls251_1"

6.2.4 Configuration file in redundant operation

The PVI communication needs a unique station address for each station (PLC or computer) in the INA2000 network. For the zenon redundancy operation this means that the server and the standby need different configuration files. In the configuration file the station address is saved for each connection. This is how you can created different configuration files for the server and the standby:

- Set up the driver in the Editor so that the connection is correct.
- Test the communication at the server in the Runtime.
- Activate the standby once. At this the standby fetches the whole project including the configuration file from the server. Deactivate the standby.

- Open the **Remote Transport** configuration in the project properties.
- Select the line that is responsible for the driver files (line 8) and set this line to inactive. This setting makes sure that the changes you made at the standby are not overwritten by the file from the server. If you do not make this changes, the standby will fetch the topical configuration file from the server and overwrite its own local file.
- Transfer this change to the server and reload it or start it again.
- Start the Windows Explorer at the standby.
- Go to the Runtime folder of the project and then to folder: \RT\FILES\zenon\custom\drivers. There you can find the driver configuration file. Open the file with the Windows Editor (Notepad).
- For each connection you can find entry DEVICE_PARAM= in the file. In this entry the station address is saved (/SA=x). Change the station address to an unique station address. Save the changes and close the file.
- Create a variable in the Editor which has property **Read from Standby Server only** set. With the help of this variable you can check in the Runtime whether the server and the standby communicate simultaneously with the control.

> **Attention**
>
> Changes in the driver configuration (e.g. changed IP address) in the Editor are now no longer transferred via the Remote Transport to the server and from there to the standby. You must manually take care that the changes are added to the configuration files at the server and the standby.

7 Creating variables

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

7.1 Creating variables in the Editor

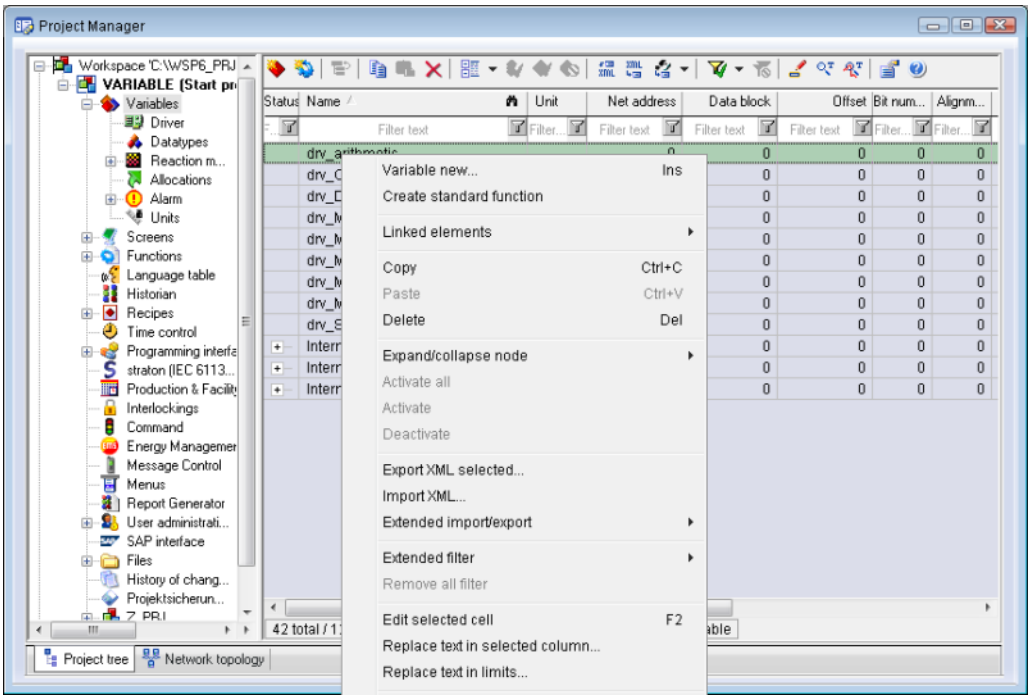
Variables can be created:

- 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:

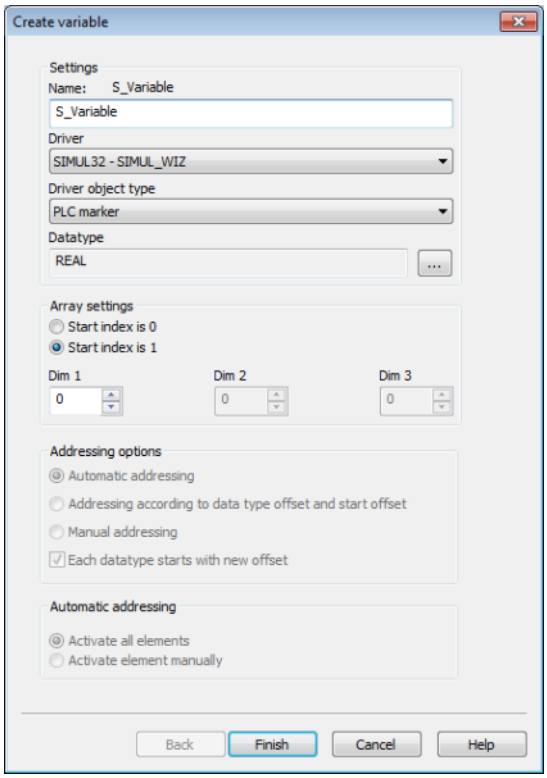
1. Select the **New variable** command in the **Variables** node in the context menu



   The dialog for configuring variables is opened

2. Configure the variable
3. The settings that are possible depends on the type of variables

CREATE VARIABLE DIALOG



Property	Description
Name	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. Maximum length: 128 characters **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. **Note:** For some drivers, the addressing is possible over the property **Symbolic address**, as well.
Drivers	Select the desired driver from the drop-down list. **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.
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

Property	Description
	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 addressing	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.

The following drivers support the **Symbolic address**:

- **3S_V3**
- **AzureDrv**
- **BACnetNG**
- **IEC850**
- **KabaDPServer**
- **OPCUA32**
- **Phoenix32**
- **POZYTON**
- **RemoteRT**
- **S7TIA**
- **SEL**
- **SnmpNg32**
- **PA_Drv**

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
Addressing	Property group for addressing
Net address	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.
Data block	not used for this driver
Offset	Offset of variables. Equal to the memory address of the variable in the PLC. Adjustable from *0* to *4294967295*.
Bit number	Number of the bit within the configured offset. Possible entries: *0* to *65535*.
Alignment	not used for this driver
String length	Only available for String variables. Maximum number of characters that the variable can take.
PVI Address	Address information for the B&R PVI driver.
PVI Type (VT)	Variable type. (List of types see table: **PVI variable types**.)
PVI Number of Elements (VN)	Number of elements at field variables. Pre-allocation: VN=1. For multi-dimensional field variables the number of the elements of all field dimensions is quoted (Example: var[10][5] => VN =50).
PVI Length (VL)	Variable length in bytes. For single variables the variable length equals the process data length. For field variables the variable length defines the element length.
Driver connection	Position of the variable within the defined offset.
Drivers	Selection of the driver

Group/Property	Description
Driver Object Type	Object type of the variables. Depending on the driver used, is selected when the variable is created and can be changed here.
Data Type	Data type of the variable. Is selected during the creation of the variable; the type can be changed here. **Attention:** If you change the data type later, all other properties of the variable must be checked and adjusted, if necessary.
PVI name	Is automatically set during online import.

Attention

Addressing of one-dimensional arrays:

If one-dimensional rays are addressed with a start index <> *0*, a comma must be attached to the index. For details see: Documentation B&R.

For example: *zenon[3,]*

PVI VARIABLE TYPE (VT)

Type	Description
i8	8 bit integer with sign. Variable length: VL=1. Range of values: -128 ... 127.
i16	16 bit integer with sign. Variable length: VL=2. Range of values: -32768 ... 32767.
i32	32 bit integer with sign. Variable length: VL=4. Range of values: -2147483648 ... 2147483647.
u8	8 bit integer unsigned. Variable length: VL=1. Range of values: 0 ... 255.
u16	16 bit integer unsigned. Variable length: VL=2. Range of values: 0 ... 65535.
u32	32 bit integer unsigned. Variable length: VL=4. Range of values: 0 ... 4294967295.
f32	32 bit floating point (IEEE floating). Variable length: VL=4. Range of values: -3.402823466e+38 ... -1.175494351e-38 / +1.175494351e-38 ... +3.402823466e+38.
f64	64 bit floating point (IEEE floating). Variable length: VL=8. Range of values: -1.7976931348623158e+308 ... -2.2250738585072014e-308 /

Type	Description
	+2.2250738585072014e-308 ... +1.7976931348623158e+308.
boolean	Bit variable (flag) mapped on 1 byte. Variable length: VL=1. TRUE = value not equal to 0, FALSE = value equal to 0.
string	String with 1 byte character size and binary 0 (zero) ending. The length of the string buffer can be defined via the variable length (parameter VL). The length of the string buffer is also the maximum string length. The actual string length defined by the binary zero character. At reading and writing process data with variable type string, take care that the data is only transferred up to and including the zero character. All characters after the zero character are undefined.

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
Reading in an interrogation	36	X	X	*BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING*	Read array polling as a whole. For details, see "Block reading of arrays" section.
CPU status	9	X	--	*BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING*	Status of CPU.
PLC marker	8	X	X	*UINT,INT*	Read data points polling/spontaneously.
Communication details	35	X	X	*BOOL, SINT, USINT, INT, UINT, DINT,*	Variables for the static analysis of the communication; is

Driver Object Type	Channel type	Read	Write	Supported data types	Description
				UDINT, *REAL*, *STRING*	transferred between driver and Runtime (not to the PLC). **Note**: The addressing and the behavior is the same for most zenon drivers. You can find detailed information on this in the Communication details (Driver variables) (on page 62) chapter.

Key:

X: supported

--: not supported

BLOCK READING OF ARRAYS

If many elements of an array change very often, block reading of arrays can offer better performance than communication in the event of a value change. For this simple array variables and structures via driver object type **Read in an interrogation** can be read as block. A block array is a large variable in zenon that reads a complete block from the PLC. Many individual arrays are therefore read as a single array.

Note: If only a few elements change in an array, communication in Event Mode usually provides better performance.

The following applies for block reading:

- The complete array is always polled. Event-controlled communication is not possible.
- The priority selected must be the same for all elements.
- The PVI settings **VN**, **VL** and **VT** are only required for writing and ignored during reading. They must be set identically to **PLC marker**.
- Settings for import are defined in the Global Settings (on page 17) of the driver configuration.

> **Attention**
>
> For block reading, zenon data type and PVI type must be the same.
>
> This means: BOOL -> Boolean works. BOOL -> Boolean does not work.

EVENT OPERATION

Attention: The defined update times also have an effect on the communication with the control in Event mode.
This means: Events via value change never come more often than defined by the update time for the variable.

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
BOOL	BOOL	8
USINT	USINT	9
SINT	SINT	10
UINT	UINT	2
INT	INT	1
UDINT	UDINT	4
DINT	DINT	3
LREAL	LREAL	6
STRING	STRING	12

DATA TYPE

The term **data type** is the internal numerical identification 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. The import of variables is described in the following documentation. Data types are imported along the same lines.

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 can 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 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
KANALNAME	Char	128	Variable name. The length can be limited using the **MAX_LAENGE** entry in the **project.ini** file.

Identification	Type	Field size	Comment
KANAL_R	C	128	The original name of a variable that is to be replaced by the new name entered under "VARIABLENNAME" (variable name) (field/column must be entered manually). The length can be limited using the **MAX_LAENGE** entry in the **project.ini** file.
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 the **project.ini** file.
EINHEIT	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	Net address
BAUSTEIN	N	3	Datablock address (only for variables from the data area of the PLC)
ADRESSE	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 Recipegroup Manager
LES_SCHR	L	1	Write-Read-Authorization 0: Not allowed to set value. 1: Allowed to set value.
MIT_ZEIT	R	1	time stamp in zenon (only if supported by the driver)

Identification	Type	Field size	Comment
OBJEKT	N	2	Driver-specific ID number of the primitive object comprises TREIBER-OBJEKTTYP 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
MEMTIEFE	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

Identification	Type	Field size	Comment
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 VALUE DEFINITION

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

Identification	Type	Field size	Comment
AKTIV1	R	1	Limit value active (per limit value available)
GRENZWERT1	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)
SCHWWERT1	F	16	Threshold value for limit value
HYSTERESE1	F	14	Is not used
BLINKEN1	R	1	Set blink attribute

Identification	Type	Field size	Comment
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.

7.4.3 Import PVI variables from the driver

PVI variables can be imported offline via an OPCS XML file or via the online import of the driver.

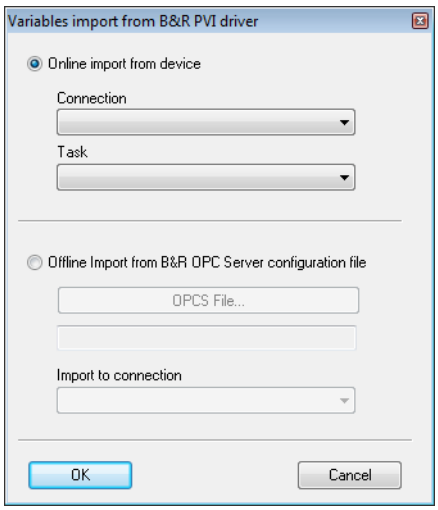
At the import the variables are merged with existing ones. The key for this is the variable name.

- Variable designation
  - The variable name consists of: *Connection name.task name/variable name*
- Address information:

- Address: *Task name/variable name*
- Data type: *u16*
- Connection allocation: Net address *0*

To start the import:

- select **Import variables from driver...** from the context menu of the driver



Parameter	Description
Offline Import from B & R OPC server configuration file	Import via XML file which the BuR OPC server generated.
OPCS file...	Selection of the OPCS XML file. Click on button in order to open the explorer for selecting the OPCS file.
Import to connection	Selection of the connection. A click opens the drop-down list with all available connections. All selected XML variables are connected during import to the selected connection via the net address
Online import from device	Variables are read online from the control.
Connection	Selection of the connection for the online browse.
Task	Selection of the task which is read out at the online browse.

VARIABLE ADDRESSING

The addressing takes place via the properties of the applied PVI variable:

Parameter	Description
Net address	Determines the connection in the driver. Refers to the net address of the connection in the driver configuration dialog.
PVI Name	The name of the PLC variable. The name is created from *Task name/variable name*.
PVI Type (VT)	Variable type. A compilation of all variable types - see list below.
PVI Number of Elements (VN)	Number of elements at field variables. Pre-allocation: VN=1. For multi-dimensional field variables the number of the elements of all field dimensions is quoted (Example: var[10][5] => VN =50).
PVI Length (VL)	Variable length in bytes. For single variables the variable length equals the process data length. For field variables the variable length defines the element length. s

GLOBAL VARIABLES

Global variables can only be used if they are integrated in a task. Global variables are therefore always displayed with the task variables during online import and also addressed as task variables: *Task name/variable name*.

PVI VARIABLE TYPE (VT)

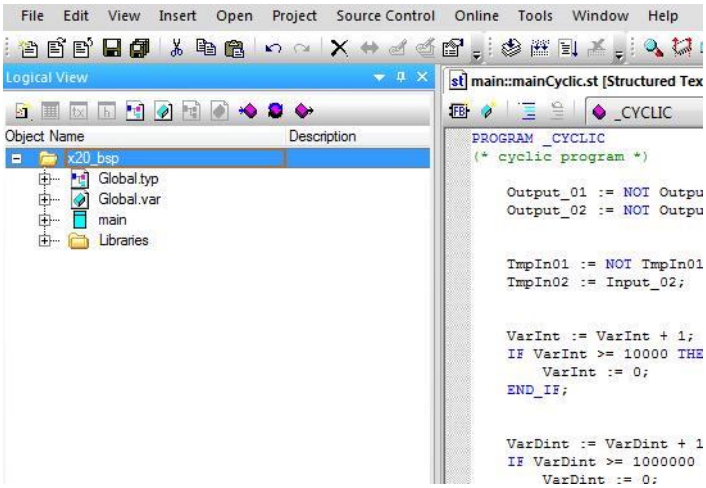
Type	Description
i8	8 bit integer with sign. Variable length: VL=1. Range of values: -128 ... 127.
i16	16 bit integer with sign. Variable length: VL=2. Range of values: -32768 ... 32767.
i32	32 bit integer with sign. Variable length: VL=4. Range of values: -2147483648 ... 2147483647.
u8	8 bit integer unsigned. Variable length: VL=1. Range of values: 0 ... 255.
u16	16 bit integer unsigned. Variable length: VL=2. Range of values: 0 ... 65535.

Type	Description
u32	32 bit integer unsigned. Variable length: VL=4. Range of values: 0 ... 4294967295.
f32	32 bit floating point (IEEE floating). Variable length: VL=4. Range of values: -3.402823466e+38 ... -1.175494351e-38 / +1.175494351e-38 ... +3.402823466e+38.
f64	64 bit floating point (IEEE floating). Variable length: VL=8. Range of values: -1.7976931348623158e+308 ... -2.2250738585072014e-308 / +2.2250738585072014e-308 ... +1.7976931348623158e+308.
boolean	Bit variable (flag) mapped on 1 byte. Variable length: VL=1. TRUE = value not equal to 0, FALSE = value equal to 0.
string	String with 1 byte character size and binary 0 (zero) ending. The length of the string buffer can be defined via the variable length (parameter VL). The length of the string buffer is also the maximum string length. The actual string length defined by the binary zero character. At reading and writing process data with variable type string, take care that the data is only transferred up to and including the zero character. All characters after the zero character are undefined.

7.4.3.1 Offline import

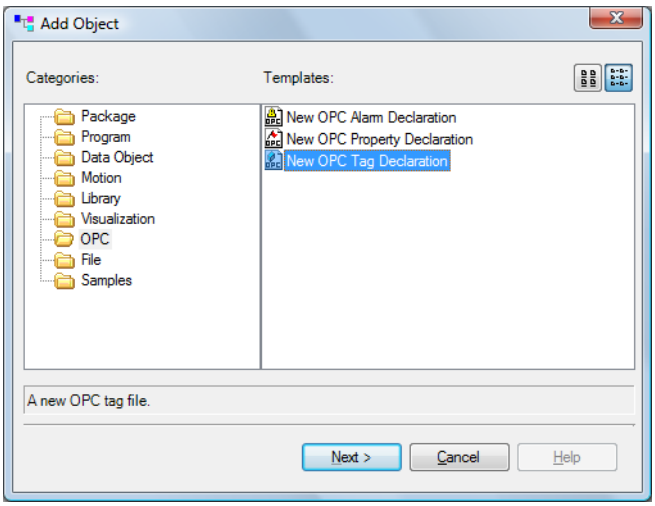
PREPARATIONS IN THE AUTOMATION STUDIO

1. got to the desired file

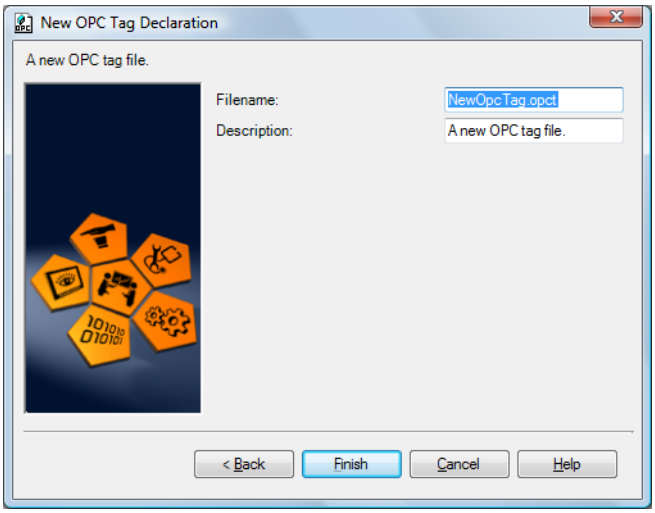


2. select Add Object... in the context menu.

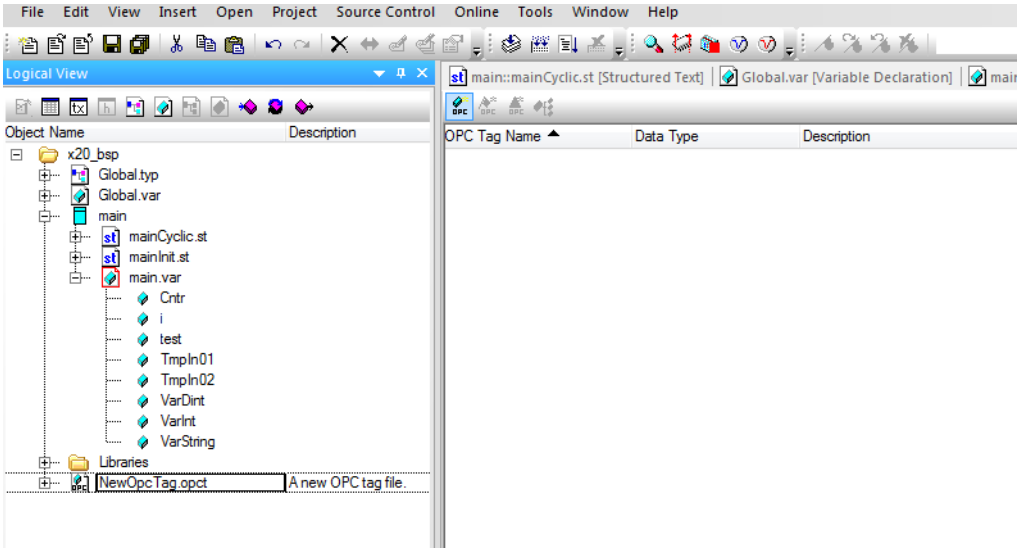
3. in folder **OPC** select template **New OPC Tag Declaration**



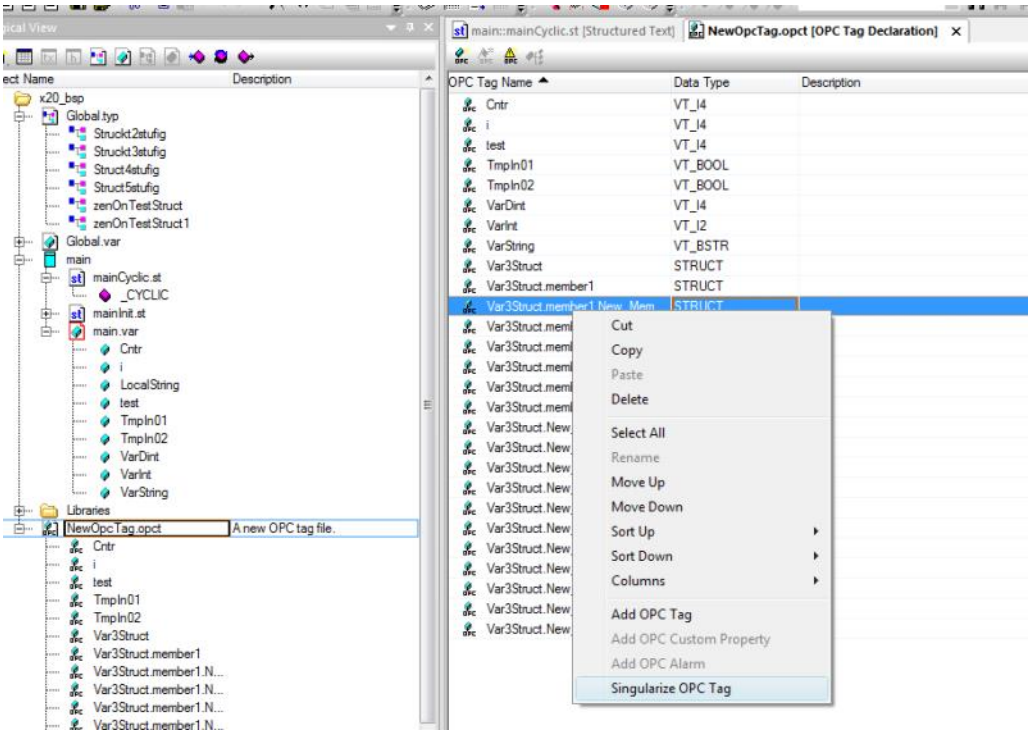
4. assign a file name with extension .opct



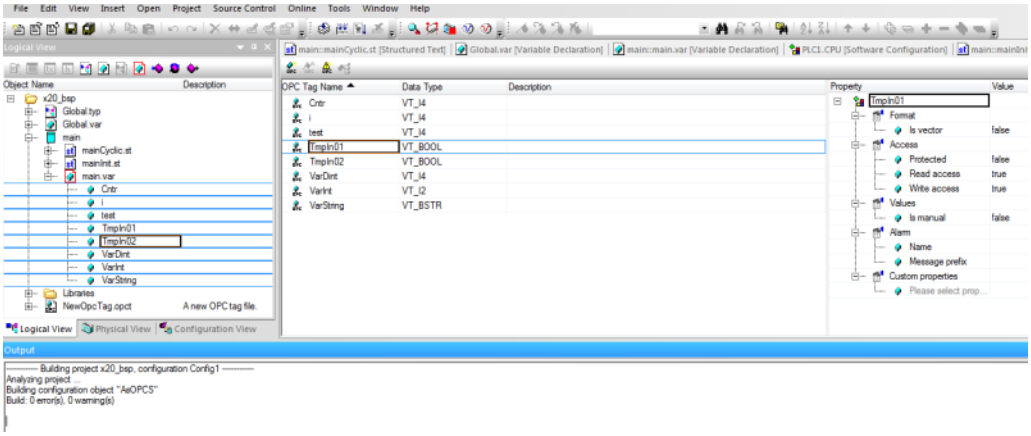
5. open the OPC tag list in Automation Studio



6. Add the variable you want to read out by means of drag & drop
7. To be able to import structures and arrays offline too, the items of the structures must be removed.



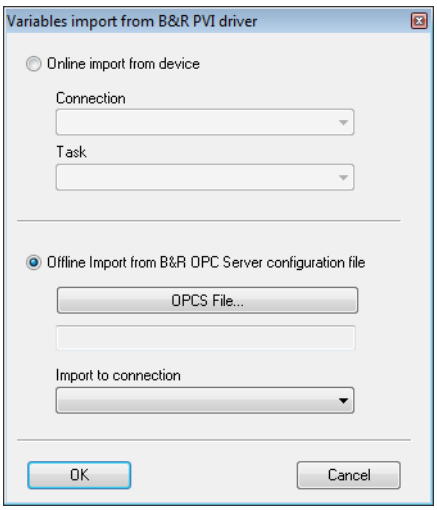
8. at compiling the Automation Studio Project creates the OPCS file
9. the OPCS file is stored in the project folder of the Automation Studio in a subfolder; e.g. *\Temp\Objects\Config1\PLC1\AsOPCS.opcs*



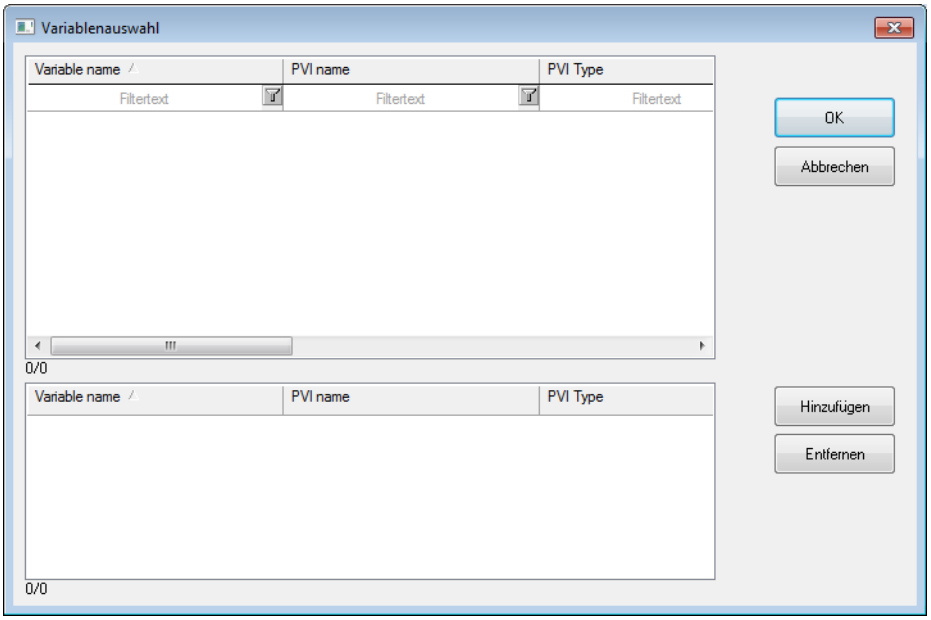
IMPORT INTO ZENON

1. Select the **Import variables from driver** command from the context menu of the driver
2. in the import dialog select **Offline import from B&R OPC server configuration file**

3. click on **PPCS file...** and select the OPVS file.

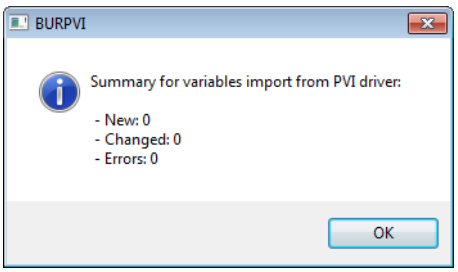


4. select the connection for which the import should be carried out
5. Confirm the dialog by clicking on OK
6. select the desired variable with the help of a double click or click on button **Add** (multi-selection is possible)



7. click on button OK in order to import the variable into zenon

8. an info box informs you about imported variables, changed variables and errors



7.4.3.2 Online import

The driver also supports, for online import, multidimensional arrays and arrays with a start index <> *0* and creates variables with names that correspond to the original array index.

Attention

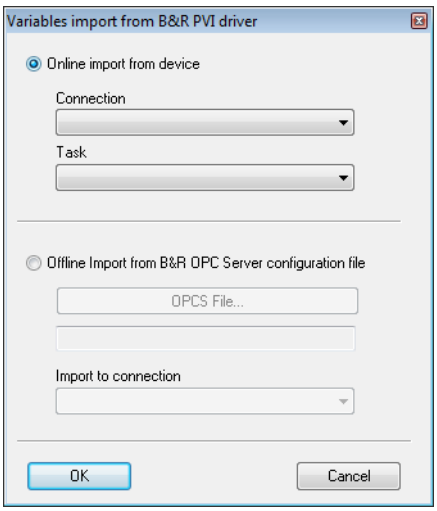
Addressing of one-dimensional arrays:

If one-dimensional rays are addressed with a start index <> 0, a comma must be attached to the index. For details see: Documentation B&R.

For example: *zenon[3,]*

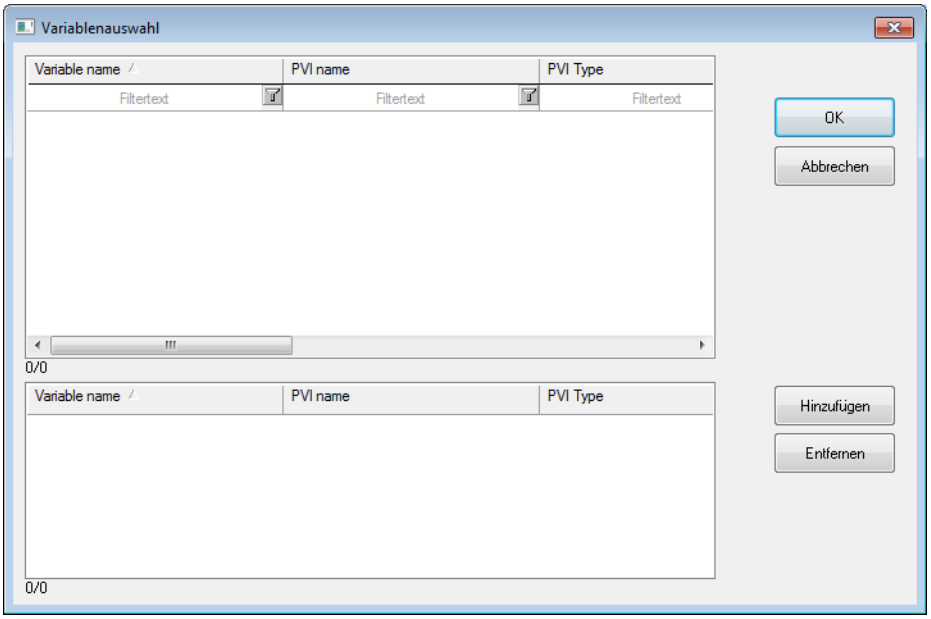
For the online import:

1. select command **Import variables from driver** from the context menu of the driver
2. select **Online Browse** in the import dialog
3. select the connection type and the desired task

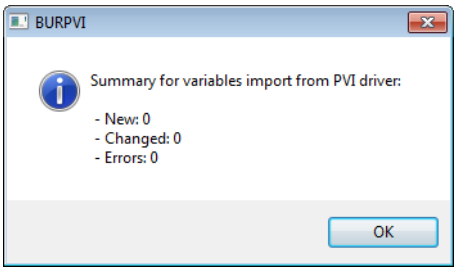


4. confirm the dialog by clicking OK

5. select the desired variable with the help of a double click or click on button **Add** (multi-selection is possible)



6. click on button OK in order to import the variable into zenon
7. an info box informs you about imported variables, changed variables and errors



7.5 Communication details (Driver variables)

The driver kit implements a number of driver variables. This 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** and can be imported from there.
Path to file: *%ProgramData%\COPA-DATA\zenon<Versionsnummer>\PredefinedVariables*

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.
- Driver variables for the polling cycle are only available for pure polling drivers.
- Connection-related information such as **ErrorMSG** is only supported for drivers that only edit one connection at a 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

Name from import	Type	Offset	Description
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 *driver stop*, the variable has the value *TRUE* and an **OFF** bit. After the driver has started, the variable has the value *FALSE* and no **OFF** bit.
SimulRTState	*UDINT*	60	Informs the status of Runtime for driver simulation.
ConnectionStates	*STRING*	61	Internal connection status of the driver to the PLC. Connection statuses: *0:* Connection OK *1:* Connection failure *2:* Connection simulated Formating: *<Netzadresse>:<Verbindungszustand>;...;...;* 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

Name from import	Type	Offset	Description
			connection must be signed in once. 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.

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 **PhoneNumberSet** and **ModemHwAdrSet**.
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.

Name from import	Type	Offset	Description
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

Name from import	Type	Offset	Description
			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 MESSAGE

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.

Name from import	Type	Offset	Description
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:

- Block arrays for structures and arrays
- For Online Import: Multi-dimensional arrays and arrays with a start index <> *0*
- Blockwrite
- RDA

RDA

A linear memory area in the control unit is needed for RDA archiving. This is implemented by means of an array. This array must contain the appropriate RDA header plus archive data. Only the Index [*0*] of this array may be activated and marked as an RDA variable. If the array Index [*0*] is set to *1*, the corresponding values are read out from the PLC.

Note: Variables configured with "**Only request from Standby Server**" are not supported in RDA archives.

You can find more information on RDA archiving in the zenon manual Archiving (Archivserver.chm::/28257.htm).

9 Driver command function

The zenon **Driver commands** function is to influence drivers using zenon.
You can do the following with a driver command:

- Start
- Stop
- Shift a certain driver mode
- Instigate certain actions

Note: 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.

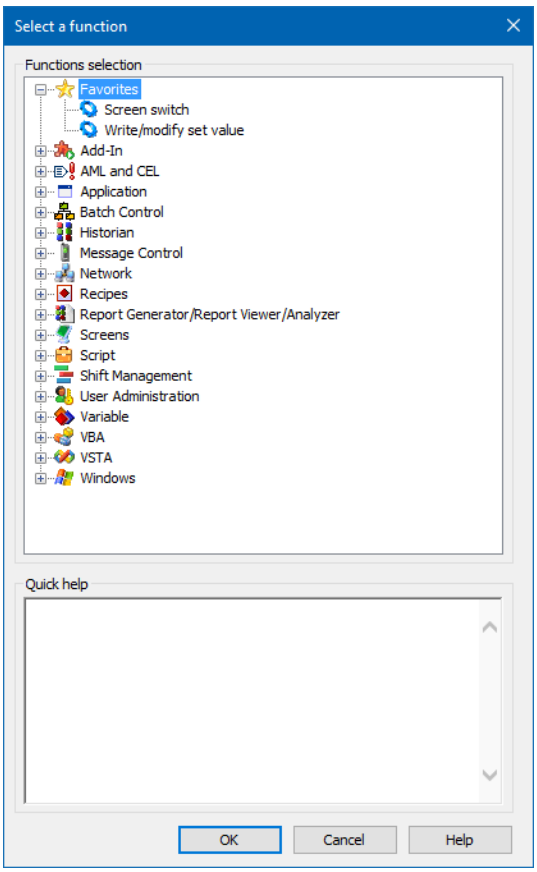
> **Attention**
>
> The zenon **Driver commands** function is not identical to driver commands that can be executed in the Runtime with Energy drivers!

CONFIGURATION OF THE FUNCTION

Configuration is carried out using the **Driver commands** function.
To configure the function:

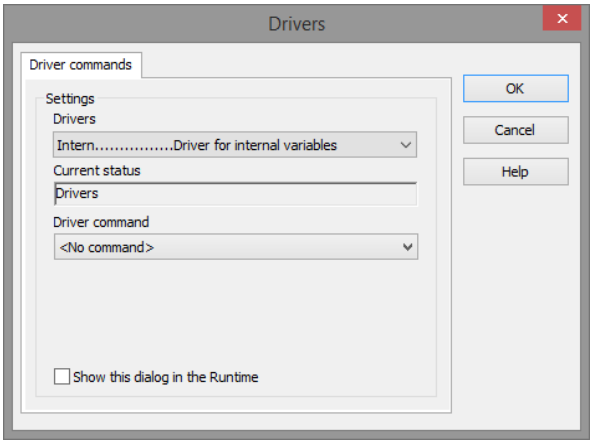
1. Create a new function in the zenon Editor.

The dialog for selecting a function is opened



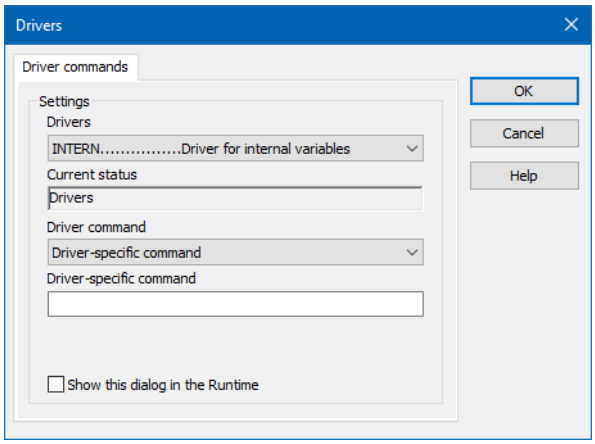
2. Navigate to the node **Variable.**
3. Select the **Driver commands** entry.

   The dialog for configuration is opened



4. Select the desired driver and the required command.
5. Close the dialog by clicking on **OK** and ensure that the function is executed in the Runtime. Heed the notices in the **Driver command function in the network** section.

DRIVER COMMAND DIALOG



Option	Description
Driver	Selection of the driver from the drop-down list. It contains all drivers loaded in the project.
Current condition	Fixed entry that is set by the system. Has no function in the current version.
Driver command	Selection of the desired driver command from a drop-down list. For details on the configurable driver commands, see the **available driver commands** section.
Driver-specific command	Entry of a command specific to the selected driver. **Note:** Only available if, for the **driver command** option, the *driver-specific command* has been selected.
Show this dialog in the Runtime	Configuration of whether the configuration can be changed in the Runtime: ▸ *Active*: This dialog is opened in the Runtime before executing the function. The configuration can thus still be changed in the Runtime before execution. ▸ *Inactive*: The Editor configuration is applied in the Runtime when executing the function. Default: *inactive*

CLOSE DIALOG

Options	Description
OK	**Applies settings and closes the dialog.**
Cancel	Discards all changes and closes the dialog.
Help	Opens online help.

AVAILABLE DRIVER COMMANDS

These driver commands are available - depending on the selected driver:

Driver command	Description
<No command>	No command is sent. A command that already exists can thus be removed from a configured function.
Start driver (online mode)	Driver is reinitialized and started. **Note:** If the driver has already been started, it must be stopped. Only then can the driver be re-initialized 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	Entry of a driver-specific command. Opens input field in order to enter a command.
Activate driver write set value	Write set value to a driver is possible.
Deactivate driver write set value	Write set value to a driver is prohibited.
Establish connection with modem	Establish connection (for modem drivers)

Driver command	Description
	Opens the input fields for the hardware address and for the telephone number.
Disconnect from modem	Terminate connection (for modem drivers)
Driver in counting simulation mode	Driver is set into counting simulation mode. All values are initialized with *0* and incremented in the set update time by *1* each time up to the maximum value and then start at *0* again.
Driver in static simulation mode	No communication to the controller is established. All values are initialized with *0*.
Driver in programmed simulation mode	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 the zenon Logic Runtime.

DRIVER COMMAND FUNCTION IN THE NETWORK

If the computer on which the **Driver commands** function is executed is part of the zenon network, further actions are also carried out:

- A special network command is sent from the computer to the project server.
  It 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 8.10 -> 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

Checks after communication errors:

- 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 at the respective port via **TELNET**?
- Are the PLC and the PC connected with the right cable?
- Was the right **COM** port selected?
- 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 variables?
- Did you use the right object type for the variable?
- Does the offset addressing of the variable match the one in the PLC?
- Analysis with the Diagnosis Viewer: Which messages are displayed?

10.3 Error messages

Errors are documented in the output window or in the log file of the Diagnosis Viewer (main.chm::/12464.htm):

Entry	Debug Level	Meaning
Block array item XY: Array index [Index] exceeds actual dimenstions [Limit].	ERROR	Given index (Address) overwrites the actual array limits.
Block array item XY: Incompatible data types. (Data type size [Zahl] differs from actual data type size [Zahl])	ERROR	zenon data types do not correspond to PVI type.
Block item XY: Offset '%u' exceeds actual size of the object '%u'.	ERROR	Given index (Address) overwrites the actual array/structure limits.
Block item XY: Incompatible data types. (Data type size [Typel] differs from actual data type size [Type])	ERROR	zenon data types do not correspond to PVI type.
Block item XY: Struct element [Index] does not exist.	ERROR	Indicated structure element (address) does not exist.