



**COPADATA**  
do it your way

# zenon driver manual

## MELSECA

v.7.20





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# 1. Welcome to COPA-DATA help

## GENERAL HELP

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

## PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at [support@copadata.com](mailto:support@copadata.com) (<mailto:support@copadata.com>).

## LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email [sales@copadata.com](mailto:sales@copadata.com) (<mailto:sales@copadata.com>).

## 2. MELSECA

### 3. MELSECA - Data sheet

General:	
Driver file name	MELSECA.exe
Driver name	Mitsubishi - Melsec A-Q
PLC types	Supports CPUs of the AnS/AnA and Q series.
PLC manufacturer	Mitsubishi;

Driver supports:	
Protocol	Melsec A; Melsec Q;
Addressing: Address-based	x
Addressing: Name-based	-
Spontaneous communication	-
Polling communication	x
Online browsing	-
Offline browsing	-
Real-time capable	-
Blockwrite	x
Modem capable	-
Serial logging	x
RDA numerical	x
RDA String	-

Requirements:	
Hardware PC	RS 232 serial interface; Standard Ethernet Card;
Software PC	-
Hardware PLC	Communication processor A1SJ71C24-R2; A1SJ71UC24-R2; QJ71E71-100(for Ethernet); Q-Series CPUs with onBoard interface
Software PLC	-
Requires v-dll	-

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

## 4. Driver history

Date	Driver version	Change
07.07.08	1600	Created driver documentation

### DRIVER VERSIONING

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

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



### Example

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

## 5. Requirements

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

### 5.1 PC

#### HARDWARE

- ▶ RS232 serial interface  
or
- ▶ Ethernet interface

#### SOFTWARE

The driver file **Me1secA.exe** must be present in the current zenon directory.

### 5.2 Control

#### HARDWARE

- ▶ A1SJ71C24-R2 (for A1 series PLCs)
- ▶ A1SJ71UC24-R2 (for A2 series PLCs)
- ▶ Q06HCPU
- ▶ QJ71E71-100



- ▶ Communication processor

The driver was tested with A1SJ71C24-R2 and A1SJ71UC24-R2.

**Important:** The CPU type is set in the **option** (on page 17) tab in the driver dialog.

#### SETTINGS IN THE PROCESSOR MODULE:

SW03:OFF  
SW04: ON  
SW05:OFF  
SW06:ON  
SW07:ON  
SW08:ON  
SW09:OFF  
SW10:OFF  
SW11:OFF  
SW12:ON  
MODE : 1:Form1

#### CONNECTION

The connection to the PLC is possible via:

- ▶ Serial cable to the PC's RS232 interface (COM). Handshake cables are not required. The pin assignment (on page 46) is described at the end of the documentation.
- ▶ Ethernet interface with conventional 10BaseT cable

## SETTINGS IN THE PROGRAMMING SOFTWARE FOR Q SERIES

Local Label Setting POU\_01 [PRG] POU\_01 [PRG] Program [Structur... Network Parameter - MELSECNE... Network Parameter Ethernet

IP Address/Port No. Input Format

	Protocol	Open System	Fixed Buffer	Fixed Buffer Communication Procedure	Pairing Open	Existence Confirmation	Host Station Port No.	Destination IP Address	Destination Port No.
1	TCP	Unpassive	Receive	Procedure Exist	Disable	No Confirm	0502	PORT:1282	
2	TCP	Unpassive	Receive	Procedure Exist	Disable	No Confirm	0502		
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15	TCP	MELSOFT Connection						PORT:5002	
16	TCP	MELSOFT Connection							

(\*) IP Address and Port No. will be displayed by the selected format.  
Please enter the value according to the selected number.

Press END before download

For Ethernet connections: tested with SPS MELSEC Q series and QJ71E71-100

## SETTINGS IN THE PROGRAMMING SOFTWARE:

**Ethernet operations**

Communication data code  
☐ Binary code  
☒ ASCII code

Initial timing  
☐ Do not wait for OPEN ( Communications impossible at STOP time )  
☒ Always wait for OPEN ( Communication possible at STOP time )

IP address  
 Input format   
 IP address

Send frame setting  
☒ Ethernet(V2.0)  
☐ IEEE802.3

☒ Enable Write at RUN time

It is important to configure the communication channels. The port address must match the one used in the driver (on page 19). The zenon driver uses TCP communication.

	Protocol	Open system	Fixed buffer	Fixed buffer communication	Pairing open	Existence confirmation	Local station Port No.	Destination IP address	Dest. Port No.
1	TCP	Unpassive	Receive	Procedure exist	Pairs	No confirm	0500		
2	TCP	Unpassive	Send	Procedure exist	No pairs	No confirm	0500		
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

## 6. Configuration

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



### Information

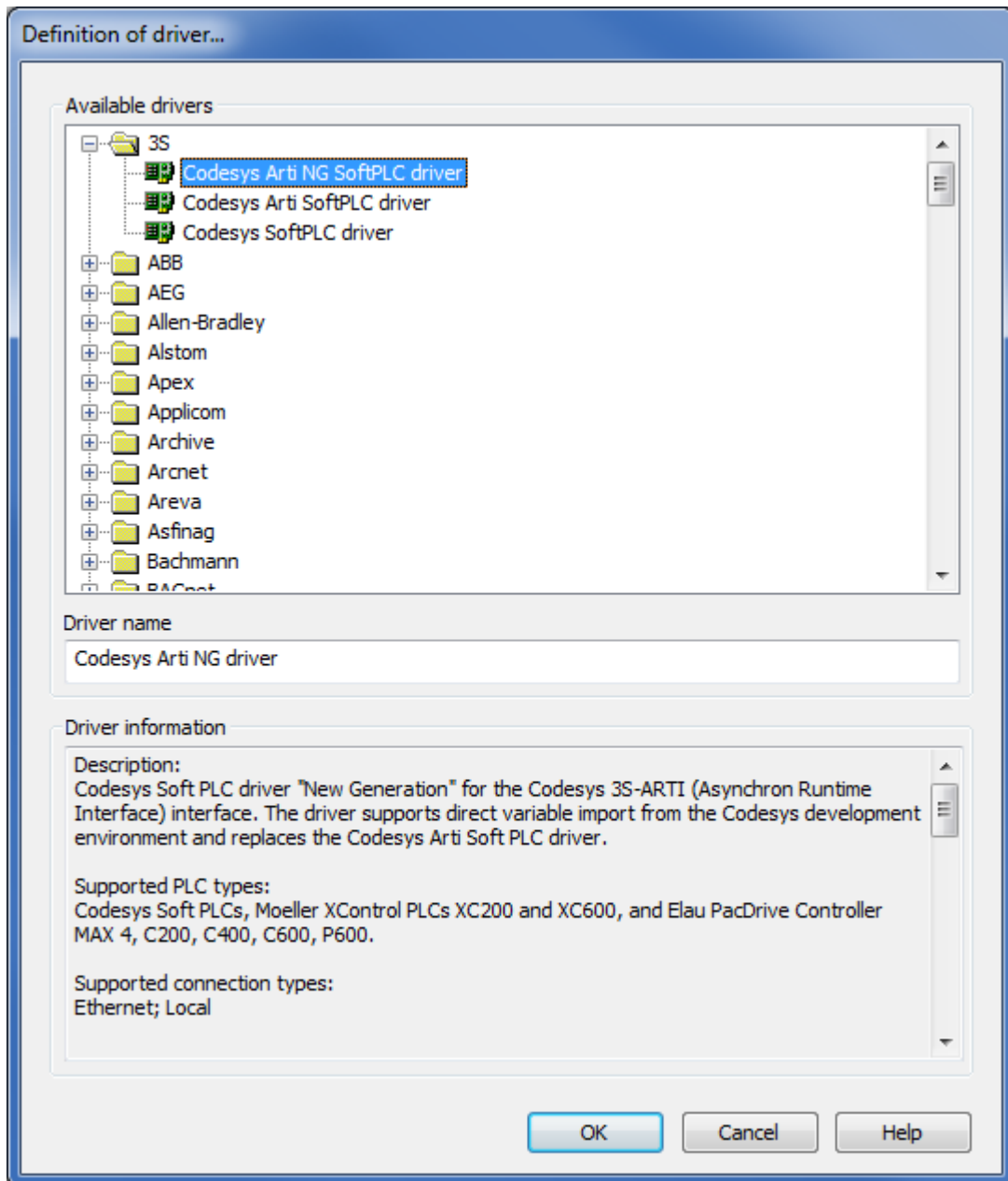
Find out more about further settings for zenon variables in the chapter Variables (main.chm::/15247.htm) of the online manual.

### 6.1 Creating a driver

In order to create a new driver:

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

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



3. Select the desired driver and give it a name:
  - The driver name has to be unique, i.e. if one and the same driver is to be used several times in one project, a new name has to be given each time.
  - The driver name is part of the file name. Therefore it may only contain characters which are supported by the operating system. Invalid characters are replaced by an underscore (\_).
  - **Attention:** This name cannot be changed later on.

4. Confirm the dialog with **OK**. In the following dialog the single configurations of the drivers are defined.

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



### Information

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

- ▶ Internal
- ▶ MathDr32
- ▶ SysDrv.

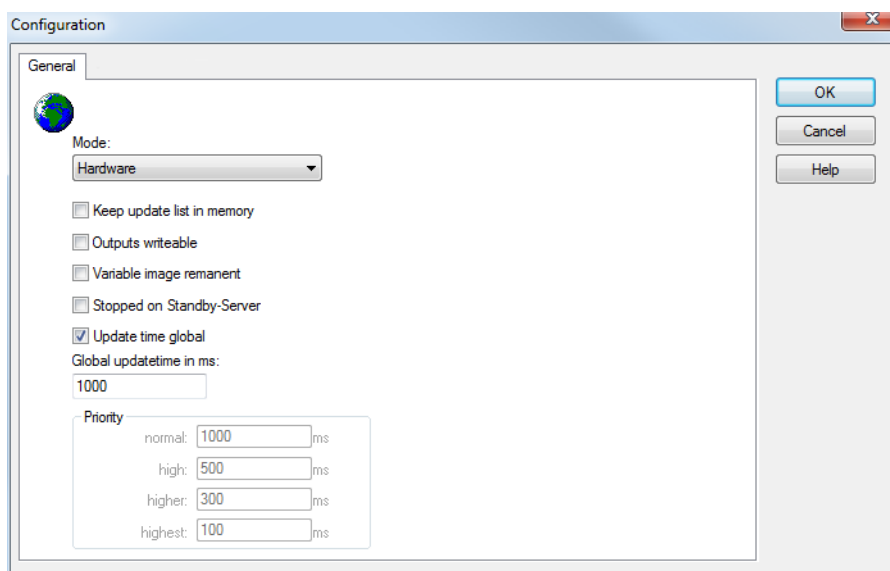
▶

## 6.2 Settings in the driver dialog

You can change the following settings of the driver:

### 6.2.1 General

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.



Parameters	Description
<b>Mode</b>	<p>Allows to switch between hardware mode and simulation mode</p> <ul style="list-style-type: none"> <li>▶ Hardware: <p>A connection to the control is established.</p> </li> <li>▶ Simulation static <p>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.</p> </li> <li>▶ Simulation - counting <p>No communication between to the control is established, the values are simulated by the driver. In this modus the driver increments the values within a value range automatically.</p> </li> <li>▶ Simulation - programmed <p>N communication is established to the PLC. The values are calculated by a freely programmable simulation project. The simulation project is created with the help of the 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).</p> </li> </ul>
<b>Keep update list in the memory</b>	<p>Variables which were requested once are still requested from the control even if they are currently not needed. This has the advantage that e.g. multiple screen switches after the screen was opened for the first time are executed faster because the variables need not be requested again. The disadvantage is a higher load for the communication to the control.</p>
<b>Output can be written</b>	<p>Active: Outputs can be written.</p> <p>Inactive: Writing of outputs is prevented.</p> <p><b>Note:</b> Not available for every driver.</p>
<b>Variable image remanent</b>	<p>This option saves and restores the current value, time stamp and the states of a data point.</p> <p>Fundamental requirement: The variable must have a valid value and time stamp.</p>

	<p>The variable image is saved in mode hardware if:</p> <ul style="list-style-type: none"> <li>▶ one of the states S_MERKER_1(0) up to S_MERKER8(7), REVISION(9), AUS(20) or ERSATZWERT(27) is active</li> </ul> <p>The variable image is always saved if:</p> <ul style="list-style-type: none"> <li>▶ the variable is of the object type <b>Driver variable</b></li> <li>▶ the driver runs in simulation mode. (not programmed simulation)</li> </ul> <p>The following states are not restored at the start of the Runtime:</p> <ul style="list-style-type: none"> <li>▶ SELECT(8)</li> <li>▶ WR-ACK(40)</li> <li>▶ WR-SUC(41)</li> </ul> <p>The mode <b>Simulation - programmed</b> at the driver start is not a criterion in order to restore the remanent variable image.</p>
<b>Stop on Standby Server</b>	<p>Setting for redundancy at drivers which allow only on communication connection. For this the driver is stopped at the Standby Server and only started at the upgrade.</p> <p><b>Attention:</b> If this option is active, the gapless archiving is no longer guaranteed.</p> <p><b>Active:</b> Sets the driver at the not-process-leading Server automatically in a stop-like state. In contrast to stopping via driver command, the variable does not receive status <b>switched off</b> (<a href="#">statusverarbeitung.chm::/24150.htm</a>) but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian.</p> <p><b>Note:</b> Not available if the CE terminal serves as a data server. You can find further information in the zenon Operator manual in the CE terminal as a data server chapter.</p>
<b>Global Update time</b>	<p><b>Active:</b> The set <b>Global update time</b> in ms is used for all variables in the project. The priority set at the variables is not used.</p> <p><b>Inactive:</b> The set priorities are used for the individual variables.</p>
<b>Priority</b>	<p>The polling times for the individual priority classes are set here. All variables with the according priority are polled in the set time.</p> <p>The allocation to the variables takes place separately in the settings of the variable properties.</p> <p>The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities.</p>

Thus the communication load is distributed better.

**Attention:** Priority classes are not supported by each driver. For example, drivers that communicate spontaneously do not support it.

## CLOSE DIALOG

Parameters	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.

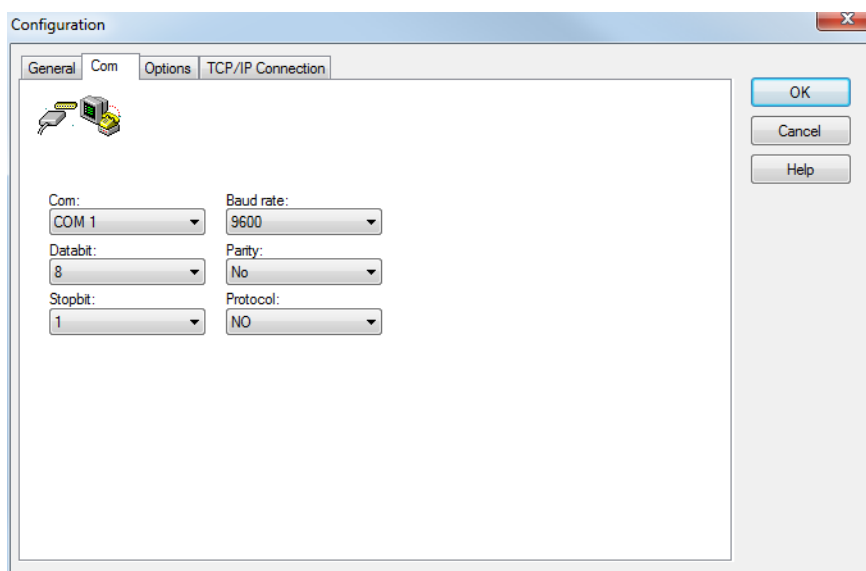
## UPDATE TIME FOR CYCLICAL DRIVERS

The following applies for cyclical drivers:

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

## 6.2.2 COM

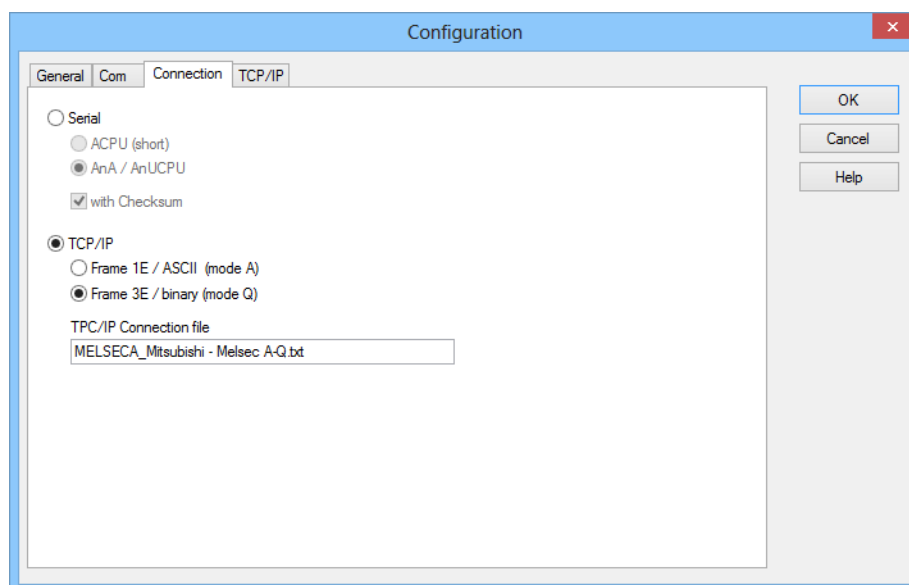
### SETTINGS FOR SERIAL CONNECTION





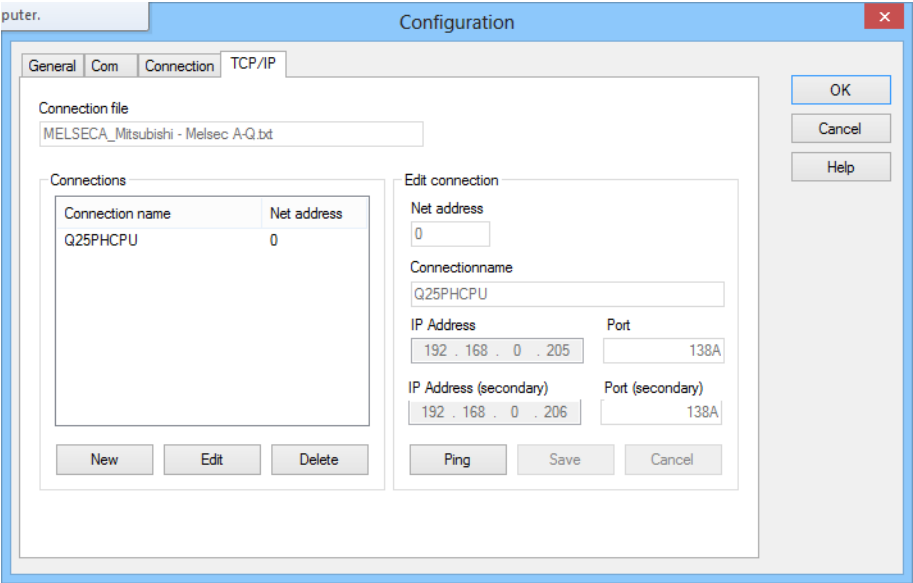
Parameters	Description
<b>Com</b>	Selection of the serial interface, to which the PLC is connected.
<b>Baud rate</b>	Baud rate of the connection (Default: 9600).
<b>Data bit</b>	Data word size in Bit: 5, 6, 7, 8 Default: 8
<b>Parity</b>	Settings for the parity of the connection (Default: No).
<b>Stop bit</b>	Number of stopbits for the connection (Default: 1).
<b>Protocol</b>	Protocol of the connection (Default: NO).

### 6.2.3 Connection



Parameters	Description
<b>Serial</b>	<p>Active: The communication is serial.</p> <p><b>Note:</b> The <b>Net address</b> property for the variables must be set to 0 for serial communication.</p>
<b>ACPU (short)</b>	CPU with short address field.
<b>AnA/AnUCPU</b>	<p>Option must be selected according to the connected CPU type.</p> <p>The correct position is tested for the following PLCs:</p> <ul style="list-style-type: none"> <li>▶ A1SJ71UC24-R2: <i>active</i></li> <li>▶ A1SJ71C24-R2: <i>inactive</i></li> </ul>
<b>With checksum</b>	<p>Active: Checksum is used in the protocol. This setting must match the settings on the communication processor. Only has an effect when using serial communication.</p>
<b>TCP/IP</b>	<p>Active: Communication is via Ethernet. The appropriate settings must be set up in the TCP/IP settings (on page 19).</p>
<b>Frame 1E / ASCII (Mode A)</b>	<p>Compatible with A-CPU.</p> <p>Only limited functionality with Q-CPU.</p>
<b>Frame 3E / binary (Mode Q)</b>	<p>Suitable for Q-CPU.</p> <p>Requirement for redundant operation.</p>
<b>TCP/IP connection file</b>	Name of the file in which the settings for each of the TCP/IP participants are saved.
<b>OK</b>	Applies all changes in all tabs and closes the dialog.
<b>Cancel</b>	Discards all changes in all tabs and closes the dialog.
<b>Help</b>	Opens online help.

6.2.4 TCP/IP settings



Parameters	Description
<b>Connection file</b>	<p>Name of the file in which the settings for each of the TCP/IP participants are saved.</p> <p>Display only. Changes to the file name are made in the <b>Options</b> (on page 17) tab.</p>

## CONNECTIONS

Parameters	Description
<b>Connections</b>	Settings of the connections.
<b>Connection list</b>	List of defined connections to PLCs.
<b>Net address</b>	Each connection is assigned a network address. This must correspond to the settings in the <b>Net address</b> property of the variable definition.
<b>Connection name</b>	Name of the connection as it is displayed in the connection list.
<b>IP address</b>	Address of the PLC.
<b>Port</b>	Port address of PLC. This is entered in the programming software for the MELSEC Q PLC in hexadecimal form. This must correspond to the address in the PLC.
<b>IP address (secondary)</b>	<p>IP address for redundancy.</p> <p>If this field is filled out and the the Q Protocol (on page 17) is used, the driver attempts to connect itself to this address after each unsuccessful establishment of a connection. It remains on this alternative address once the connection has successfully been established until this is no longer reachable or Runtime is restarted.</p>
<b>Port (secondary)</b>	<p>Port for secondary IP address.</p> <p>This is entered in the programming software for the MELSEC Q PLC in hexadecimal form. This must correspond to the address in the PLC.</p>
<b>New</b>	Establishes a new connection.
<b>Delete</b>	Deletes highlighted connection from the list.
<b>Edit</b>	Opens highlighted connection for editing.
<b>Save</b>	Accepts all changes for edited connection and closes editing option.
<b>Reject</b>	Discards all changes for edited connection and closes editing option.
<b>Ping</b>	Sends a ping to the IP address that is configured for this connection. Allows the connection to the device to be tested. If the ping is concluded with a negative response, check the IP address and check to see if the device is online.
<b>OK</b>	Applies all changes in all tabs and closes the dialog.

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



### Information

*Maximum number of connections: 256 (0-255).*

## CREATE NEW CONNECTION

1. click on the button **New**
2. Enter the connection details.
3. Click on **Save**

## EDIT CONNECTION

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

## DELETE CONNECTION

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

# 7. Creating variables

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

## 7.1 Creating variables in the Editor

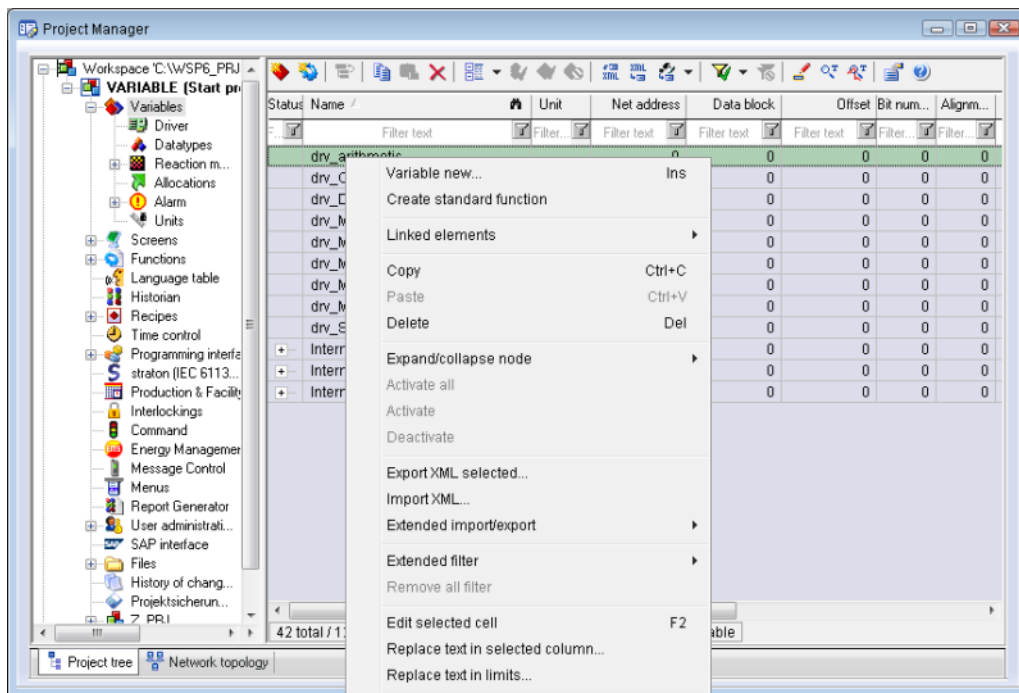
Variables can be created:

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

## VARIABLE DIALOG

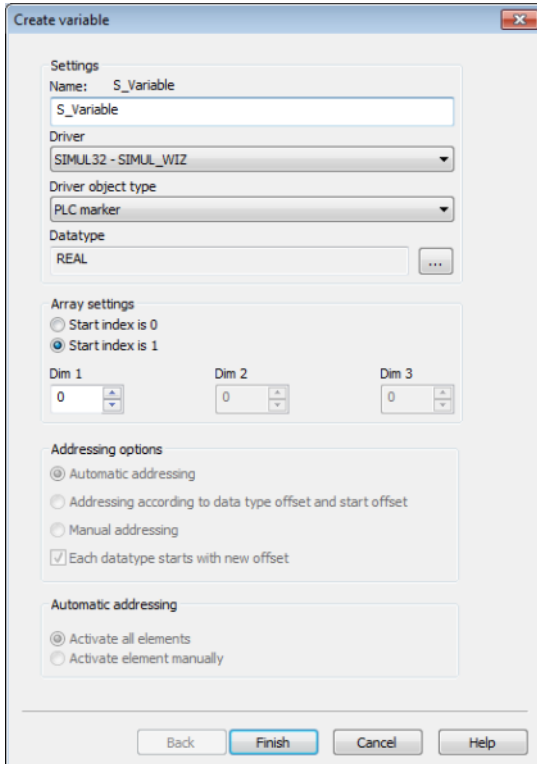
To create a new variable, regardless of which type:

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



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

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



The screenshot shows the 'Create variable' dialog box with the following settings:

- Settings**
  - Name: S\_Variable
  - Driver: SIMUL32 - SIMUL\_WIZ
  - Driver object type: PLC marker
  - Datatype: REAL
- Array settings**
  - ☐ Start index is 0
  - ☒ Start index is 1
  - Dim 1: 0
  - Dim 2: 0
  - Dim 3: 0
- Addressing options**
  - ☒ Automatic addressing
  - ☐ Addressing according to data type offset and start offset
  - ☐ Manual addressing
  - ☒ Each datatype starts with new offset
- Automatic addressing**
  - ☒ Activate all elements
  - ☐ Activate element manually

Buttons at the bottom: Back, Finish, Cancel, Help.

Property	Description
<b>Name</b>	<p>Distinct name of the variable. If a variable with the same name already exists in the project, no additional variable can be created with this name.</p> <p>Maximum length: 128 Zeichen</p> <p><b>Attention:</b> The characters # and @ are not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the <b>Finish</b> button remains inactive.</p> <p>Note: For some drivers, the addressing is possible over the property <b>Symbolic address</b>, as well.</p>
<b>Driver</b>	<p>Select the desired driver from the drop-down list.</p> <p><b>Note:</b> If no driver has been opened in the project, the driver for internal variables (Intern.exe (Main.chm::/Intern.chm::/Intern.htm)) is automatically loaded.</p>
<b>Driver object type</b> (cti.chm::/28685.htm)	Select the appropriate driver object type from the drop-down list.
<b>Data type</b>	Select the desired data type. Click on the ... button to open the selection dialog.
<b>Array settings</b>	Expanded settings for array variables. You can find details in the Arrays chapter.
<b>Addressing options</b>	Expanded settings for arrays and structure variables. You can find details in the respective section.
<b>Automatic element activation</b>	Expanded settings for arrays and structure variables. You can find details in the respective section.

## 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

Addressing is carried out in:

- ▶ the PLC: hexadecimal



- ▶ zenon: as decimal number

 **Example**

*PLC:*

- ▶ E7

*zenon:*

- ▶ **Offset:** 231
- ▶ **Bit number:** 0

**Note:** The **Net address** property for the variables must be set to 0 for serial communication.

## 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:

## OBJECTS FOR PROCESS VARIABLES IN ZENON

Driver object type	Channel type	1E	R / W	HE X	Addr .	Bo ol	UIN T/IN T	UDIN T/DI NT	LREAL /REAL	WSTRIN G/STRI NG
Output	11	Q	R / W	X	B	X				
File register	70	A	R / W	D	W	X	X	X	X	X
Data special register	69	Q	L/S <sup>1</sup>	D	W	X	X	X	X	X
Input	10	Q	R	X	B	X	X			
Index register	96	-	R / W	D	W	X	X	X		
Internal Relay M	64	Q	L/S <sup>1</sup>	D	B	X				
Latch relay	79	A	R / W	D	B	X				
Link register	67	Q	R / W	X	W	X	X	X		
Link relay	77	Q	R / W	X	B	X				
Link special register	68	-	R / W	X	W	X	X			
Link special relay	78	Q	R / W	X	B	X				
Retentive timer (coil)	98	-	R / W	D	B	X				
Retentive timer (contact)	97	-	R / W	D	B	X				
Retentive timer (present value)	99	-	R / W	D	W		X			
Special relay SM	65	Q	R / W	D	B	X				
Timer (coil)	72	Q	R / W	D	B	X				
Timer (Contact)	71	Q	R / W	D	B	X				
Timer (present value)	73	Q	R / W	D	W		X	X		
Counter (coil)	75	Q	R / W	D	B	X				

Counter (contact)	74	Q	R / W	D	B	X				
Counter (present value)	76	Q	R / W	D	W		X			

## NOTES

### 1E:

Usable driver object types:

- ▶ Q: usable with all CPUs (A and Q)
- ▶ A: only usable with AnA/AnU series CPU
- ▶ -: not available for frame type 1E (only since 3E)

### HEX

These driver object types are addressed under GX Works 2 (and other Mitsubishi tools) in hexadecimal form.

This means: Offset 10, ..15, 16 becomes address A, ..F, 10.

- ▶ D = decimal,
- ▶ X = hexadecimal

### ADDR

Addressing:

- ▶ B: bit-wise
- ▶ W: Wort

### FILE TYPES

- ▶ X: supported
- ▶ Empty: not supported



#### Attention

<sup>1</sup>The driver object types **Internal Relay SM** and **data special register** address internal functions of the CPU. The addressing depends on the type of the CPU. Some can only be read; incorrect values can disrupt the CPU!

### 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
ULINT	ULINT	27
LINT	LINT	26
REAL	REAL	5
LREAL	LREAL	6
STRING	STRING	12
WSTRING	WSTRING	21
DATE	DATE	18
TIME	TIME	17
DATE_AND_TIME	DATE_AND_TIME	20
TOD (Time of Day)	TOD (Time of Day)	19

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

## 7.4 Creating variables by importing

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



### Information

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

## 7.4.1 XML import

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

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



### Attention

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

#### Example:

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

## 7.4.2 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

Description	Type	Field size	Comment
KANALNAME	Char	128	Variable name. The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
KANAL_R	C	128	The original name of a variable that is to be replaced by the new name entered under "VARIABLENNAME" (field/column must be entered manually). The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
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 <b>project.ini</b> .
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	Bus address
BAUSTEIN	N	3	Datablock address (only for variables from the data area of the PLC)
ADDRESS	N	5	Offset
BITADR	N	2	For bit variables: bit address For byte variables: 0=lower, 8=higher byte For string variables: Length of string (max. 63 characters)
ARRAYSIZE	N	16	Number of variables in the array for index variables ATTENTION: Only the first variable is fully available. All others are only available for VBA or the Recipe Group Manager
LES_SCHR	R	1	Write-Read-Authorization



			0: Not allowed to set value. 1: Allowed to set value.
MIT_ZEIT	R	1	time stamp in zenon zenon (only if supported by the driver)
OBJEKT	N	2	Driver-specific ID number of the primitive object comprises TREIBER-OBJEKTYP and DATENTYP
SIGMIN	Float	16	Non-linearized signal - minimum (signal resolution)
SIGMAX	F	16	Non-linearized signal - maximum (signal resolution)
ANZMIN	F	16	Technical value - minimum (measuring range)
ANZMAX	F	16	Technical value - maximum (measuring range)
ANZKOMMA	N	1	Number of decimal places for the display of the values (measuring range)
UPDATERATE	F	19	Update rate for mathematics variables (in sec, one decimal possible) not used for all other variables
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
RESOURCE	C	128	Resources label. Free string for export and display in lists.  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
ADJWVBA	R	1	Non-linear value adaption: 0: Non-linear value adaption is used 1: Non-linear value adaption is not used

ADJZENON	C	128	Linked VBA macro for reading the variable value for non-linear value adjustment.
ADJWVBA	C	128	ed VBA macro for writing the variable value for non-linear value adjustment.
ZWREMA	N	16	Linked counter REMA.
MAXGRAD	N	16	Gradient overflow for counter REMA.



### Attention

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

## LIMIT DEFINITION

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

Description	Type	Field size	Comment
AKTIV1	R	1	Limit value active (per limit value available)
GRENZWERT1	F	20	technical value or ID number of a linked variable for a dynamic limit (see VARIABLEx) (if VARIABLEx is 1 and here it is -1, the existing variable linkage is not overwritten)
SCHWWERT1	F	16	Threshold value for limit
HYSTERESE1	F	14	Is not used
BLINKEN1	R	1	Set blink attribute
BTB1	R	1	Logging in CEL
ALARM1	R	1	Alarm
DRUCKEN1	R	1	Printer output (for CEL or Alarm)
QUITTTIER1	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 text
A_DELAY1	N	10	Time delay
INVISIBLE1	R	1	Invisible

**EXPRESSIONS IN THE COLUMN "COMMENT" REFER TO THE EXPRESSIONS USED IN THE DIALOG BOXES FOR THE DEFINITION OF VARIABLES. FOR MORE INFORMATION, SEE CHAPTER VARIABLE DEFINITION.**

## 7.5 Driver variables

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

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

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

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



### Information

*Not every driver supports all driver variants.*

*For example:*

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

## INFORMATION

Name from import	Type	Offset	Description
MainVersion	UINT	0	Main version number of the driver.
SubVersion	UINT	1	Sub version number of the driver.
BuildVersion	UINT	29	Build version number of the driver.
RTMajor	UINT	49	zenon main version number
RTMinor	UINT	50	zenon sub version number
RTSp	UINT	51	zenon Service Pack number
RTBuild	UINT	52	zenon build number
LineStateIdle	BOOL	24.0	TRUE, if the modem connection is idle
LineStateOffering	BOOL	24.1	TRUE, if a call is received
LineStateAccepted	BOOL	24.2	The call is accepted
LineStateDialtone	BOOL	24.3	Dialtone recognized
LineStateDialing	BOOL	24.4	Dialing active
LineStateRingBack	BOOL	24.5	While establishing the connection
LineStateBusy	BOOL	24.6	Target station is busy

LineStateSpecialInfo	BOOL	24.7	Special status information received
LineStateConnected	BOOL	24.8	Connection established
LineStateProceeding	BOOL	24.9	Dialing completed
LineStateOnHold	BOOL	24.10	Connection in hold
LineStateConferenced	BOOL	24.11	Connection in conference mode.
LineStateOnHoldPendConf	BOOL	24.12	Connection in hold for conference
LineStateOnHoldPendTransfer	BOOL	24.13	Connection in hold for transfer
LineStateDisconnected	BOOL	24.14	Connection terminated.
LineStateUnknow	BOOL	24.15	Connection status unknown
ModemStatus	UDINT	24	Current modem status
TreiberStop	BOOL	28	Driver stopped  For <code>driver stop</code> , the variable has the value <code>TRUE</code> and an <b>OFF</b> bit. After the driver has started, the variable has the value <code>FALSE</code> and no <b>OFF</b> bit.
SimulRTState	UDINT	60	Informs the status of Runtime for driver simulation.

## CONFIGURATION

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

PhoneNumberSet	STRING	38	Telephone number, that should be used
ModemHwAdrSet	DINT	39	Hardware address for the telephone number
GlobalUpdate	UDINT	3	Update time in milliseconds (ms).
BGlobalUpdaten	BOOL	4	TRUE, if update time is global
TreiberSimul	BOOL	5	TRUE, if driver in sin simulation mode
TreiberProzab	BOOL	6	TRUE, if the variables update list should be kept in the memory
ModemActive	BOOL	7	TRUE, if the modem is active for the driver
Device	STRING	8	Name of the serial interface or name of the modem
ComPort	UINT	9	Number of the serial interface.
Baud rate	UDINT	10	Baud rate of the serial interface.
Parity	SINT	11	Parity of the serial interface
ByteSize	USINT	14	Number of bits per character of the serial interface  Value = 0 if the driver cannot establish any serial connection.
StopBit	USINT	13	Number of stop bits of the serial interface.
Autoconnect	BOOL	16	TRUE, if the modem connection should be established automatically for reading/writing
PhoneNumber	STRING	17	Current telephone number
ModemHwAdr	DINT	21	Hardware address of current telephone number
RxIdleTime	UINT	18	Modem is disconnected, if no data transfer occurs for this time in seconds (s)

WriteTimeout	UDINT	19	Maximum write duration for a modem connection in milliseconds (ms).
RingCountSet	UDINT	20	Number of ringing tones before a call is accepted
ReCallIdleTime	UINT	53	Waiting time between calls in seconds (s).
ConnectTimeout	UINT	54	Time in seconds (s) to establish a connection.

## STATISTICS

Name from import	Type	Offset	Description
MaxWriteTime	UDINT	31	The longest time in milliseconds (ms) that is required for writing.
MinWriteTime	UDINT	32	The shortest time in milliseconds (ms) that is required for writing.
MaxBlkReadTime	UDINT	40	Longest time in milliseconds (ms) that is required to read a data block.
MinBlkReadTime	UDINT	41	Shortest time in milliseconds (ms) that is required to read a data block.
WriteErrorCount	UDINT	33	Number of writing errors
ReadSucceedCount	UDINT	35	Number of successful reading attempts



MaxCycleTime	UDINT	22	Longest time in milliseconds (ms) required to read all requested data.
MinCycleTime	UDINT	23	Shortest time in milliseconds (ms) required to read all requested data.
WriteCount	UDINT	26	Number of writing attempts
ReadErrorCount	UDINT	34	Number of reading errors
MaxUpdateTimeNormal	UDINT	56	Time since the last update of the priority group <b>Normal</b> in milliseconds (ms).
MaxUpdateTimeHigher	UDINT	57	Time since the last update of the priority group <b>Higher</b> in milliseconds (ms).
MaxUpdateTimeHigh	UDINT	58	Time since the last update of the priority group <b>High</b> in milliseconds (ms).
MaxUpdateTimeHighest	UDINT	59	Time since the last update of the priority group <b>Highest</b> in milliseconds (ms).
PokeFinish	BOOL	55	Goes to 1 for a query, if all current pokes were executed

## ERROR MESSAGE

Name from import	Type	Offset	Description
ErrorTimeDW	UDINT	2	Time (in seconds since 1.1.1970), when the last error occurred.
ErrorTimeS	STRING	2	Time (in seconds since 1.1.1970), when the last error occurred.
RdErrPrimObj	UDINT	42	Number of the PrimObject, when the last reading error occurred.
RdErrStationsName	STRING	43	Name of the station, when the last reading error occurred.
RdErrBlockCount	UINT	44	Number of blocks to read when the last reading error occurred.

RdErrHwAdresse	DINT	45	Hardware address when the last reading error occurred.
RdErrDatablockNo	UDINT	46	Block number when the last reading error occurred.
RdErrMarkerNo	UDINT	47	Marker number when the last reading error occurred.
RdErrSize	UDINT	48	Block size when the last reading error occurred.
DrvError	USINT	25	Error message as number
DrvErrorMsg	STRING	30	Error message as text
ErrorFile	STRING	15	Name of error log file

## 8. Driver-specific functions

The driver supports the following functions:

### INTERFACE LOGGING

The MELSECA driver can write data is sent and received using a serial interface to a log file.



#### Attention

*It is recommended that logging is only activated for a short time when problems occur. If logging is active:*

- ▶ Significant computer power is required
- ▶ The log file needs a lot of memory very quickly

To activate this option:

1. Open the zenon `project.ini` with a text editor.
2. Insert a new section: `[RS232LOG]`
3. Create the following entry under this: `LOGCOMx=y`
  - x: Number of the selected interface.
  - y: action to be executed

0: Logging is switched off

1: Logging is switched on

4. If logging is switched on, a file called LOG\_COMxxx.txt is generated in the driver folder.
  - X is replaced by the number of the defined interface.



#### Example

```
[RS232LOG]
```

```
LOGCOM1=1
```

Logging is activated for COM1.

## BLOCKWRITE

The driver supports blockwrite.

To activate blockwrite:

1. Open the zenon `project.ini` with a text editor.
2. Insert a new section: `[MELSECA]`
3. Create the following entry under this: `BLOCKWRITE=1`

## REDUNDANCY

The driver supports redundant operation.

To configure redundancy:

1. Select, in the Connection (on page 17) tab in the driver configuration, the option **Frame 3E /binary (mode Q)**
2. Configure, in the TCP/IP settings (on page 19) tab, **IP address (secondary)** and **Port (secondary)**

Procedure in operation:

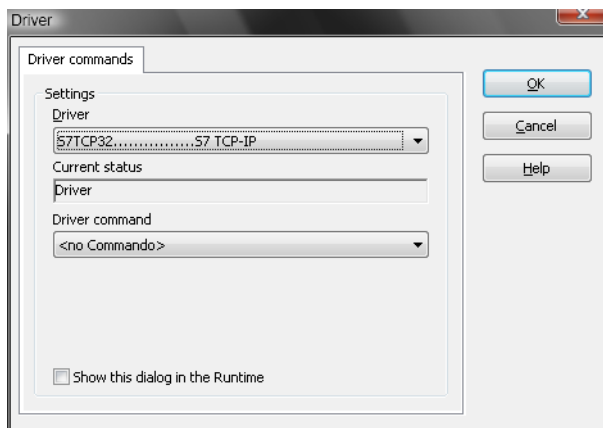
1. If the first IP address cannot be reached, an attempt is made to establish a connection with the second IP address.
2. If the connection is successfully established, all messages are sent to the second IP address.
3. This connection remains intact until the connection is interrupted or Runtime is restarted. In these cases, a connection to the first IP address is made again.

## 9. Driver commands

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

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

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



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

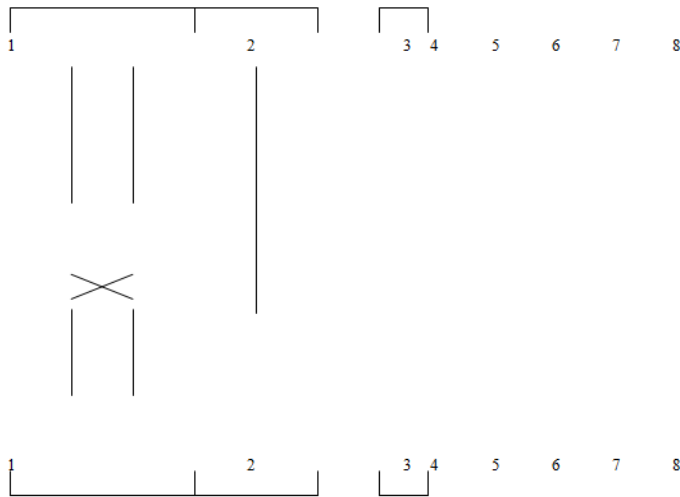
## DRIVER COMMANDS IN THE NETWORK

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

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

## 10. Pin assignment

SUB D9 connection plug assignment:



## 11. Error analysis

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

### 11.1 Check list

- ▶ Are the cables correctly soldered? All control lines have to be connected.
- ▶ Are the settings of the communication processor correct? (Default: 19200 BAUD, data bit: 8, parity: n, stop bit: 1)
- ▶ Was, for serial communication, in the variable for the **Net address** property, the value 0 set?
- ▶ Are the used datablocks defined correctly in the PLC?
- ▶ Was the data analyzed with error logging (on page 47)? (Which errors occurred?)

## 11.2 Error numbers

In the event of communication problems, an entry in the error log file of the driver is generated, in which the error cause is stated with a number. To create an error log, follow the instructions in the **interface logging** section in the **Driver-specific functions** (on page 42) chapter.

Error number	Description
<b>HW error:0</b>	Timeout, general communication error
<b>HW error:0</b>	Offset not allowed or value outside of allowed range.
<b>HW error:0</b>	Read: Type is not supported.
<b>HW error:0</b>	Read: Network address higher than 999.
<b>HW error:0</b>	Read location: Cannot write data request for location.
<b>HW error:0</b>	Read location: No answer to data request received.
<b>HW error:0</b>	Read location: Start sign of answer not received.
<b>HW error:0</b>	Read location: Incorrect size of response telegram.
<b>HW error:0</b>	Read location: Address in response telegram incorrect.
<b>HW error:0</b>	Read location: Type of response telegram incorrect.
<b>E0000020</b>	Write recording: Checksum in response telegram incorrect
<b>E0000021</b>	Write recording: Type of response telegram incorrect.
<b>E0000022</b>	Write recording: Address in response telegram incorrect.
<b>E0000023</b>	Write recording: Incorrect size of response telegram.
<b>E0000024</b>	Write recording: Start sign of answer not received.
<b>E0000025</b>	Write recording: No confirmation for data write from recording received.
<b>E0000026</b>	Write recording: Cannot write data request for recording.

## 11.3 QJ71E71-100: Reconnect after connection termination

### ERROR:

If the PLC does not allow reconnection after a loss of connection, this may be because the PLC is receiving queries more quickly than it can answer them.

In this case, the queries are saved in a buffer in order to be answered later. If the time difference between query and response is too great, the driver runs into a timeout and closes the connection.

The next time the driver attempts to connect to the PLC, the PLC does not allow this.

### SOLUTION:

Include 2 to 3 "COM" instructions in the PLC program. This allows quicker reconnection, because the port is freed earlier and the PLC can communicate with the QJ71E71-100 again.

### TIMER SETTINGS FOR 5 SECONDS:

Timer setting  
Module will operate with default values if setting is left blank

	Setting value	Default value	In units
TCP ULP timer	5	60	×500ms
TCP zero window timer	2	20	×500ms
TCP resend timer	2	20	×500ms
TCP end timer	3	40	×500ms
IP assembly timer	1	10	×500ms
Response monitoring timer	5	60	×500ms
Destination existence conformation starting interval	8	1200	×500ms
Destination existence conformation interval timer	2	20	×500ms
Destination existence conformation resend	1	3	Times

DNS setting  
Input format: DEC.

IP address of DNS server 1				
IP address of DNS server 2				
IP address of DNS server 3				
IP address of DNS server 4				

End Cancel



### TIMER SETTINGS FOR 15 SECONDS:

Timer setting

Module will operate with default values if setting is left blank

	Setting value	Default value	In units
TCP ULP timer	8	60	×500ms
TCP zero window timer	4	20	×500ms
TCP resend timer	4	20	×500ms
TCP end timer	6	40	×500ms
IP assembly timer	2	10	×500ms
Response monitoring timer	8	60	×500ms
Destination existence conformation starting interval	20	1200	×500ms
Destination existence conformation interval timer	4	20	×500ms
Destination existence conformation resend	3	3	Times

DNS setting

Input format: DEC

IP address of DNS server 1				
IP address of DNS server 2				
IP address of DNS server 3				
IP address of DNS server 4				

End Cancel

### ACTIVATING THE EXISTENCE CHECK

The **Existence check** property must be activated for this parameter: *Existence Confirmation* -> *Confirm*

Network parameters: Setting the number of Ethernet/CC IE/MELSECNET cards.

	Module 1	Module 2	Module 3
Network type	Ethernet	None	None
Starting I/O No.	0000		
Network No.	1		
Total stations			
Group No.	0		
Station No.	1		
Mode	On line		
	Operational settings		
	Initial settings		
	Open settings		

Network parameter Ethernet open setting, Module No.1

	Protocol	Open system	Fixed buffer	Fixed buffer communication procedure	Pairing open	Existence confirmation	Host station Port No.	Transmission target device IP address
1	TCP	Unpassive	Receive	Procedure exist	Disable	Confirm	0500	
2								

## 11.4 Analysis tool

All zenon modules such as Editor, Runtime, drivers, etc. write messages to a joint log file. To display them correctly and clearly, use the Diagnosis Viewer (main.chm::/12464.htm) program that was also installed with zenon. You can find it under *Start/All programs/zenon/Tools 7.20 -> Diagviewer*.

zenon driver log all errors in the log files. The default folder for the log files is subfolder **LOG** in directory **ProgramData**, example:

C:\ProgramData\COPA-DATA\LOG. Log files are text files with a special structure.

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

In the Diagnosis Viewer you can also:

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

**Note:**

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

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