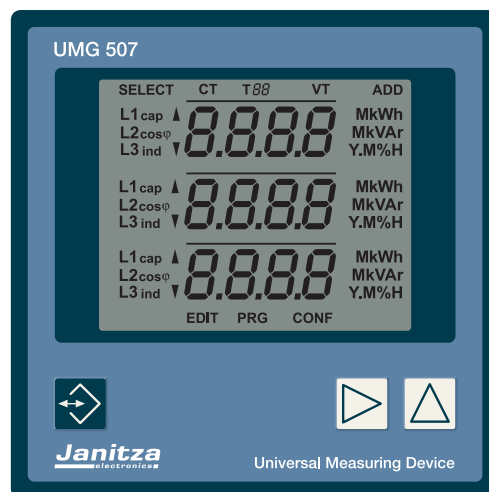


Universal Measuring Device

UMG507

Functional description

OPC Server Port 8000 (Modbus Gateway)



Generals

The UMG507 supports the protocols Modbus RTU, Modbus TCP/IP, Modbus over TCP/IP (Modbus Gateway) or Profibus DP V0, depending in the version. This functional description is an addition to the manual and describes the configuration of the corresponding function step by step.

More functional descriptions can be found on the CD-ROM PSW/basic/professional. At present, the following functional descriptions are available:

- UMG507 used as remote data display for external Modbus slaves
- OPC Server Port 502
- OPC Server Port 8000 (Modbus Gateway Function)
- The webserver of UMG507
- Description of the storage of UMG507
- Description of Profibus with examples

Important note:

While using the Modbus Gateway function, please mind the following:

1. The Modbus slaves must support Modbus RTU protocol (not Modbus ASCII).
2. At maximum 31 devices can be connected to the RS485 interface of the UMG507.
This number can be expanded to 255 by suitable repeaters.
3. The used protocol is „Modbus over TCP/IP“.
4. Only one software application can be used on Port 8000 simultaneously.

Note: Only the protocol Modbus TCP/IP is used.

For this purpose, the measured values of the slaves must be assigned to the internal data arrays (Address 9000 to 9126) of the UMG507E/EP. The biggest possible number of transmissible measured values and process data is 32 or 64 (see functional description „UMG507 as remote data display for external Modbus slaves“).

Issue note:

18.11.2004

22.11.2004

First edition / Wagner

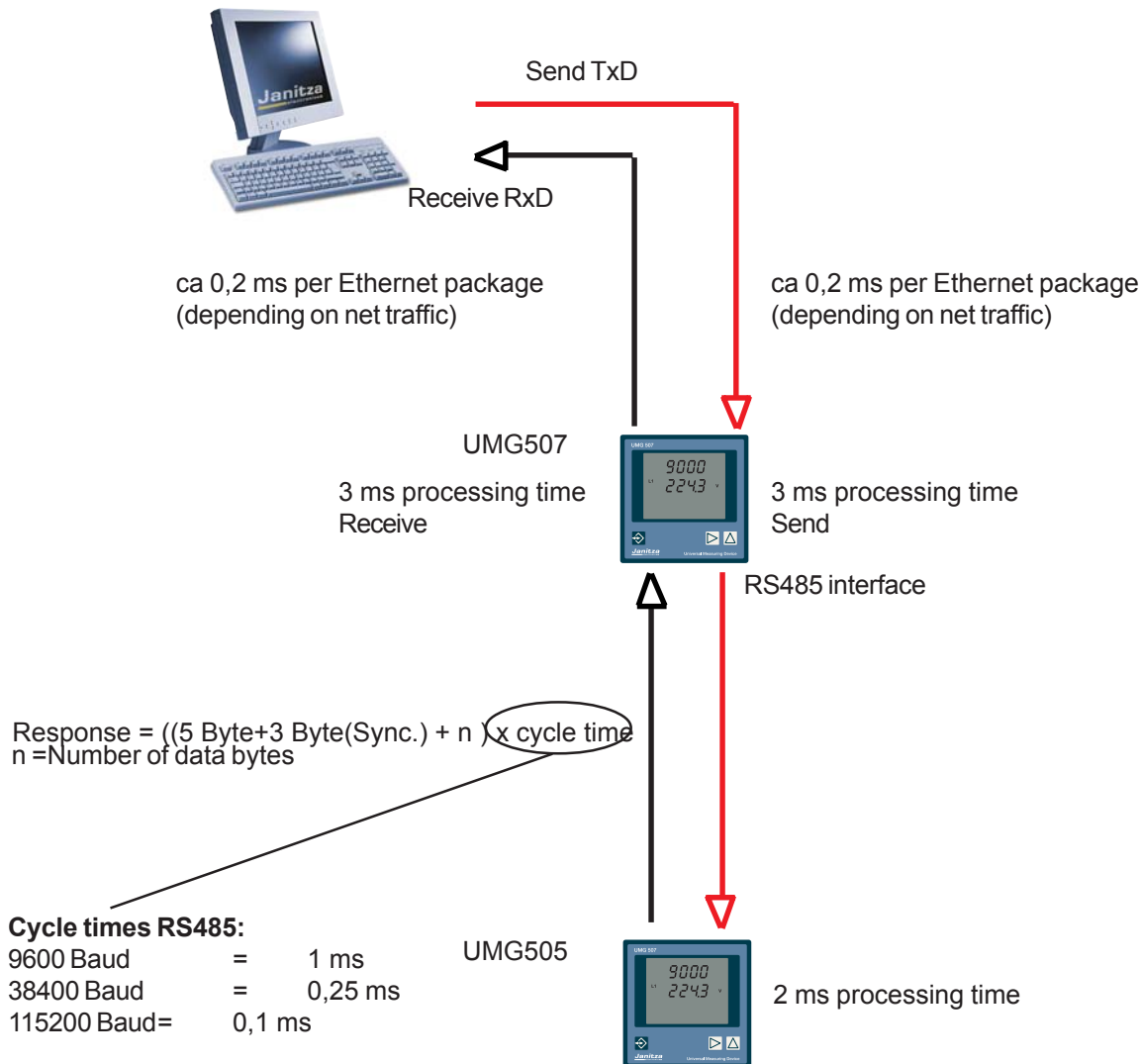
Correction

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Transmission speed UMG507E/EP

The UMG507 has the following transmission speed in Modbus Master / Gateway mode:



Example: All three voltage values of the UMG505 on address 8003 to 8005 (6 Data bytes) shall be read via RS485 interface.

The maximum baud rate of UMG505 is 38400 Baud.

So, the following cycle times will be effected:

Send Ethernet package	=	0,20 ms
Processing time UMG507E/EP send	=	3,00 ms
Request ((8 Byte + 3Byte(Sync.)) x cycle time)	=	2,75 ms
Processing time UMG505	=	2,00 ms
Response ((5 Byte+3 Byte(Sync.) + n) x cycle time	=	3,50 ms
Processing time UMG507E/EP receive	=	3,00 ms
Receive Ethernet package	=	0,20 ms
Total time	=	14,65 ms

Result: In about 15 ms all three voltage values in this telegram are read.

Hint: It is advantageous to read as many measured values as possible in one telegram, rather than with several telegrams. But this is possible only, if the measured values of the slaves are deposited on subsequent register addresses.

Comparison: The reading time of three voltage values in three telegrams is 40,95 ms instead of 15 ms.

Modbus Master and Modbus Gateway function

The UMG507 can read and display measured values or process data of Modbus devices (also those of other manufacturers) in „Modbus Master Mode“ via RS485 interface, and provide the information to other Modbus slave devices. The measurement or process data can be assigned additionally to logical or mathematical functions, and the result of those operations can be processed on the bus as well. Internal flags or arrays save the data and allow the output via the internal webserver.

The Modbus Gateway functionality additionally provides the possibility to visualize devices without Ethernet connection within Ethernet network. The UMG507E uses the Modbus over TCP/IP protocol for that purpose. A protocol changeover from Modbus/RTU to Modbus TCP/IP however is not possible.

OPC Server

Via a configurable and scalable software driver the measured values and process data of a UMG 507 can be submitted via OPC to a visualization system. This software driver contains a MODBUS TCP/IP or MODBUS over TCP/IP Master and an OPC Server. The data (e.g. measured values) are read via the Ethernet interface (PORT 502, protocol Modbus TCP/IP) and provided to the OPC Server. The **OPC Server** delivers the data to the **OPC Client** of the external program. The data exchange can be done within an internal network also. DCOM must be configured only. We recommend the software driver (charged) der Firma Toolbox www.softwaretoolbox.com.

Note:

This description is a summary / addition and was written especially for the software driver of the company Toolbox. This description does not nullify the detailed description. Furthermore, we fully recognize all licence rights of Software Toolbox an.

Data types

The UMG507 uses the following data types in Modbus Master Mode:

Higbyte before Lowbyte

UMG507 description	Type	Size	Range
float	float	4 Byte	$\pm 3.8 \cdot 10^{-38}$ to $3.4 \cdot 10^{38}$ (floating point format)
short	short	2 Byte	-32768 to 32767
u_short	unsigned short	2 Byte	0 to 65535
int	int	4 Byte	-2147483648 to 2157583647
u_int	unsigned int	4 Byte	0 to 4294967296
char	char	1 Byte	-128 to +127
bit	Bit always reads a complete register (16Bit)		

Lowbyte before Highbyte

UMG507 description	Type	Size	Range
float.I	float	4 Byte	$\pm 3.8 \cdot 10^{-38}$ to $3.4 \cdot 10^{38}$ (floating point format)
short.I	short	2 Byte	-32768 to 32767
u_short.I	unsigned short	2 Byte	0 to 65535
int.I	int	4 Byte	-2147483648 to 2157583647
u_int.I	unsigned int	4 Byte	0 to 4294967296
char.I	char	1 Byte	-128 to +127
bit.I	Bit always reads a complete register (16Bit)		

I = inverted

Modbus Master Settings

Modbus Slaves can assign their measured and process data via the Modbus Gateway Function of the UMG507E/EP to the Ethernet range. The UMG507E/EP must work in Modbus Master Mode configuration over PSWbasic/professional). As physical communication port, the RS485 interface of the UMG507E/EP is used. The data are written via the protocol „Modbus over TCP/IP“ (Port 8000) to the Ethernet. In this example two UMG96S shall be visualized via the UMG507E/EP Ethernet range. At first, please connect the devices as shown below to the RS485 interface of the UMG507E/EP.

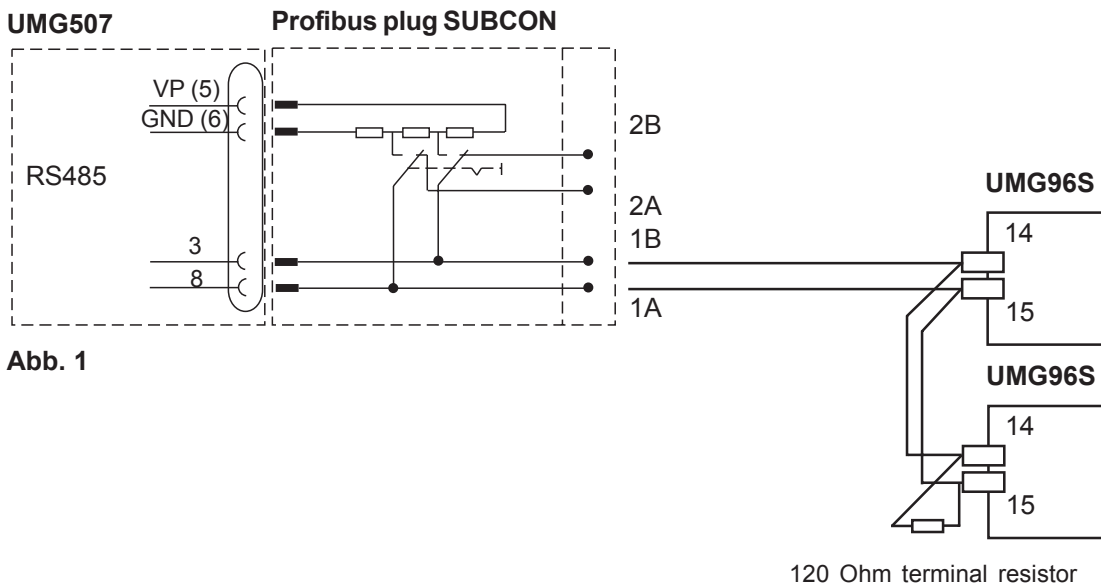
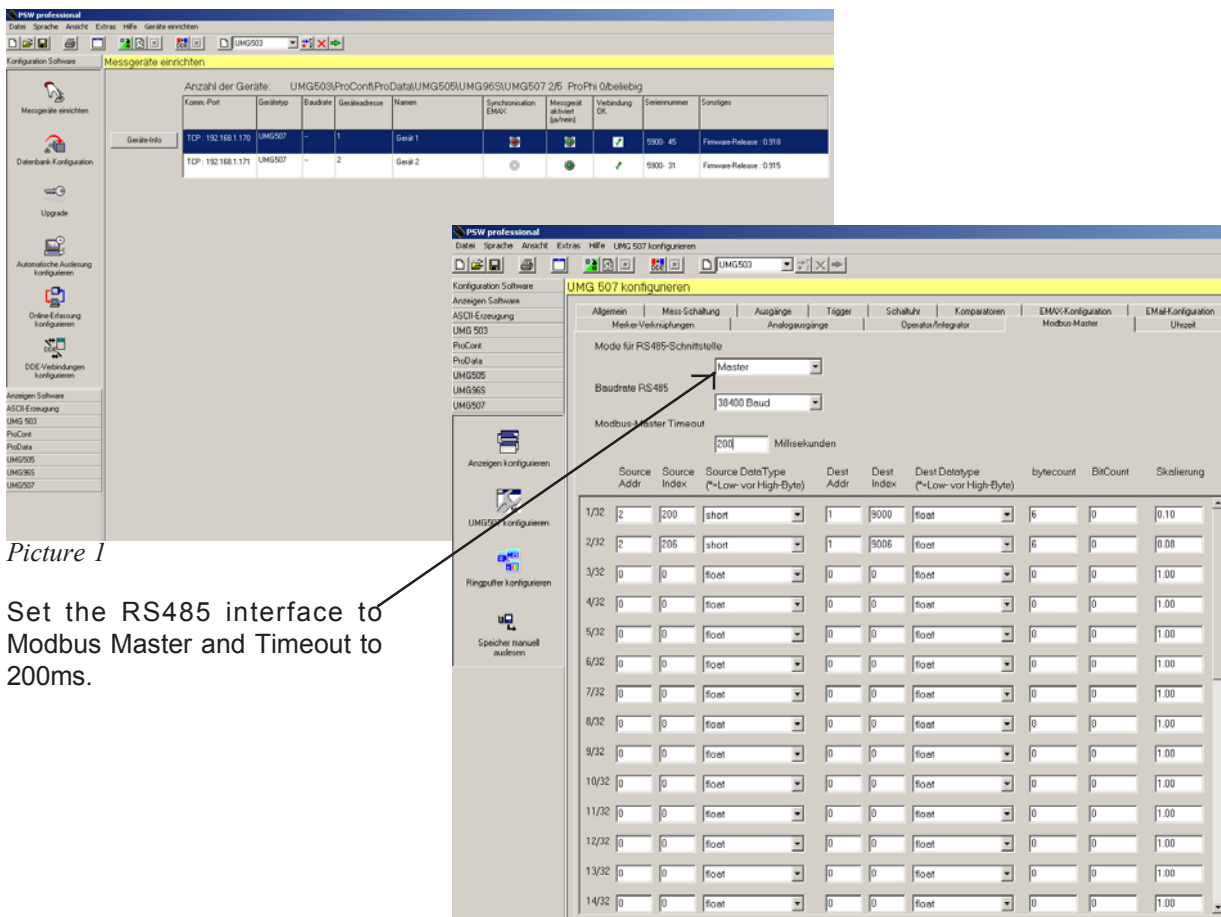


Abb. 1

The following chapters imply, that the UMG 507 can be called via Ethernet already. Please open PSWbasic/professional and open menu „Modbus Master“.



OPC Server (Modbus over TCP/IP; Modbus Gateway Function; Port 8000)

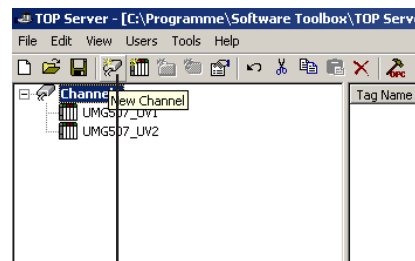
Now configure the OPC Server:

The following settings must be carried out directly at the devices:

- UMG507 must be set to Modbus Master Mode.
- Select Baud rate between Modbus Master (UMG507) and Modbus slave (UMG96S) (e.g. 38400 Baud).
- Device address UMG507 = Set to 1.
- Device address UMG96S = Set to 2.

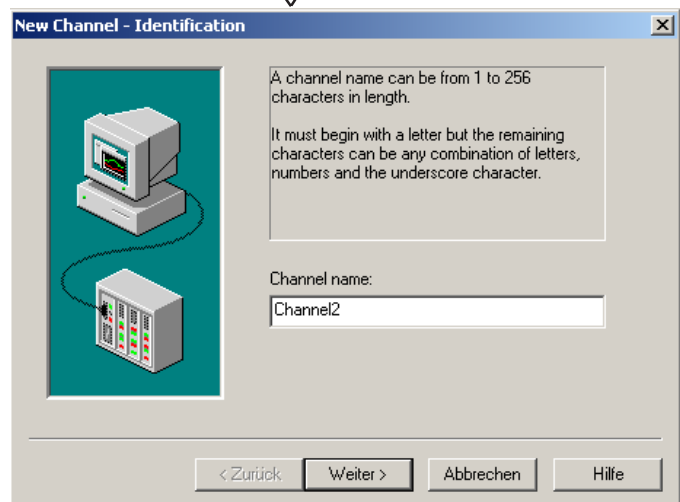
Step 1:

Press function „Channel“



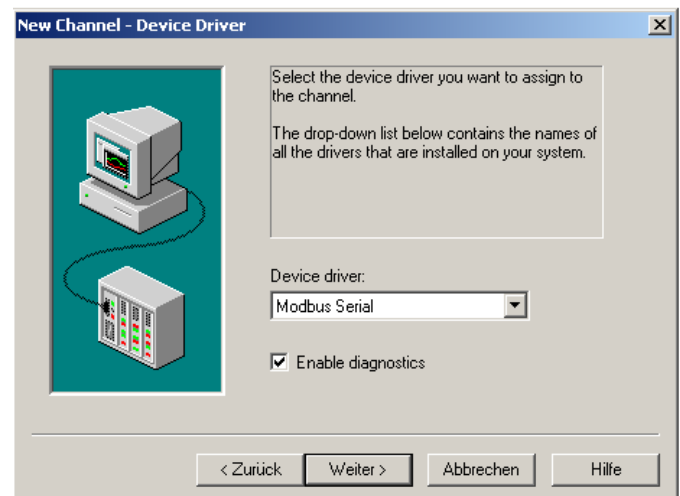
Picture 1

The settings in the right dialogue can be used unchanged



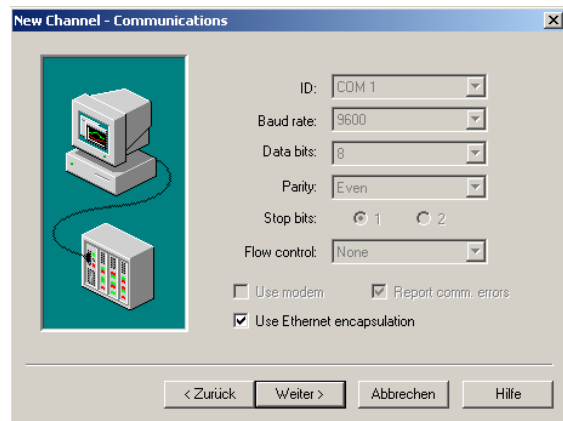
Picture 2

Select „Modbus serial,“ as device driver and activate diagnosis.



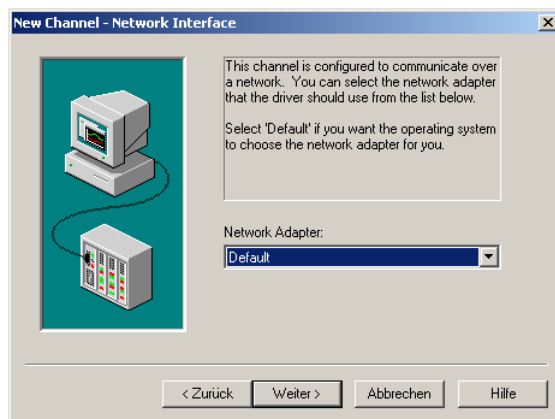
Picture 3

Aktiviere „Use Ethernet encapsulation“.

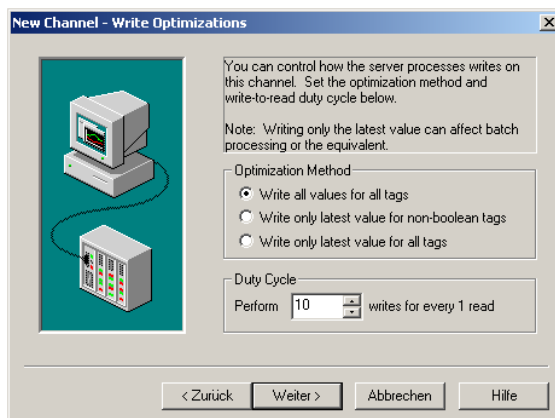


Picture 4

The settings in picture 5 and 6 can be used unchanged.

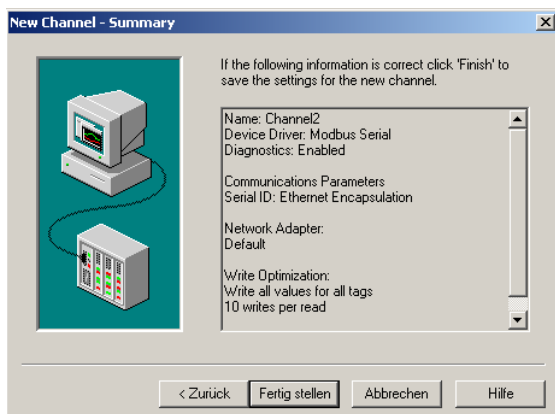


Picture 5



Picture 6

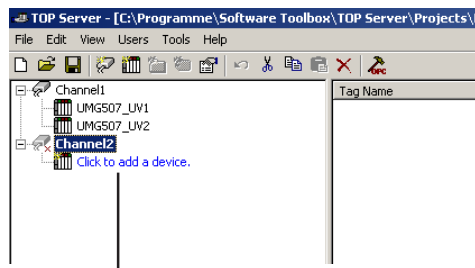
Press function „Finish“.



Picture 7

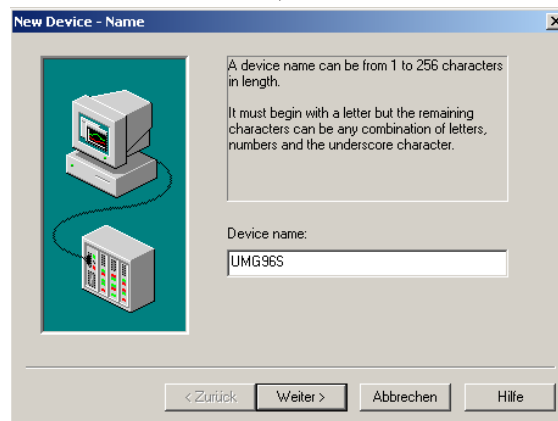
Step 2: Add device.

By pressing the text „Click to add a device“ , a new device is added.

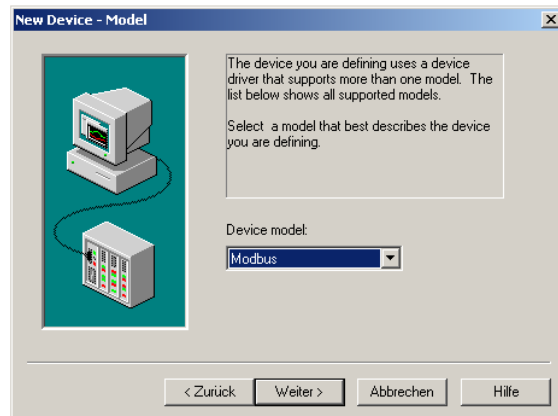


Picture 8

The settings in the pictures 9 and 10 can be used unchanged.

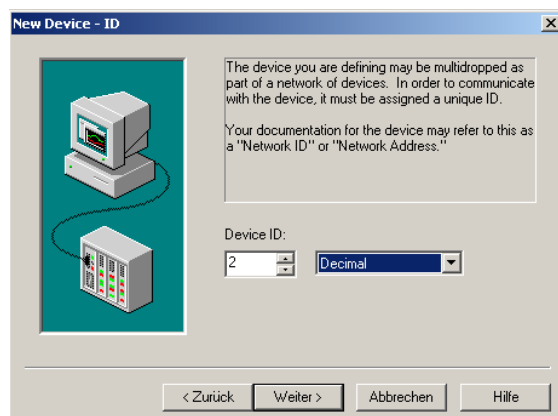


Picture 9



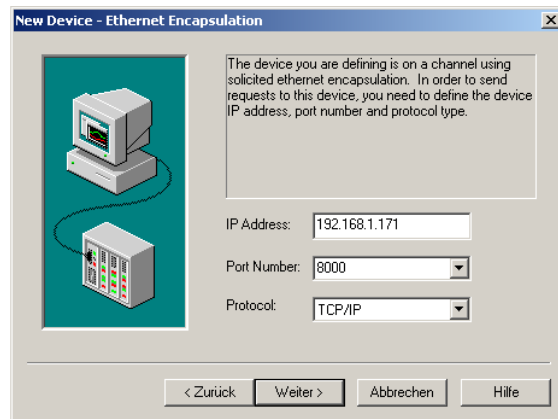
Picture 10

Enter the Modbus address of the UMG 96S in the dialogue on the right side.



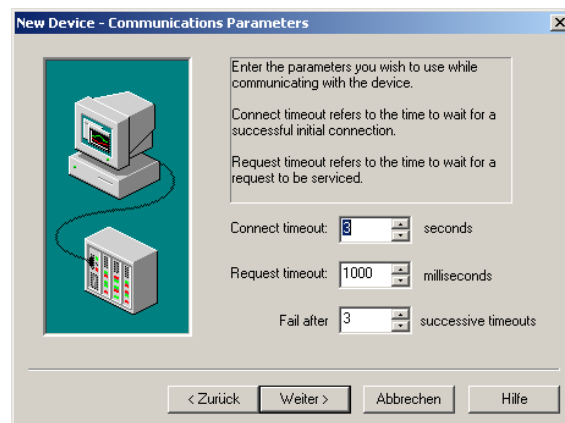
Picture 11

Set the IP address and Port 8000. As protocol TCP/IP is used.

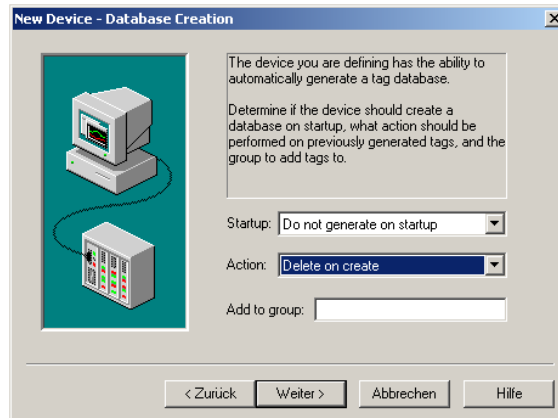


Picture 12

The settings in the pictures 13 and 14 can be used unchanged. The device name selectable.

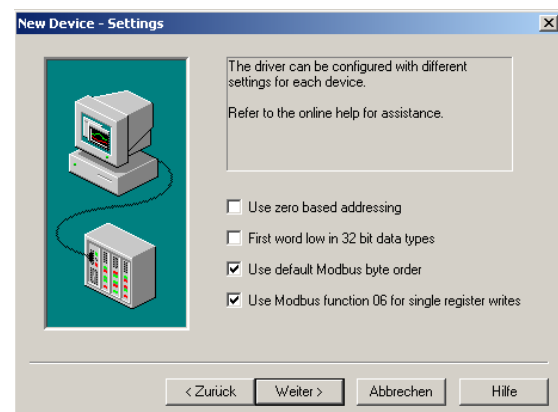


Picture 13



Picture 14

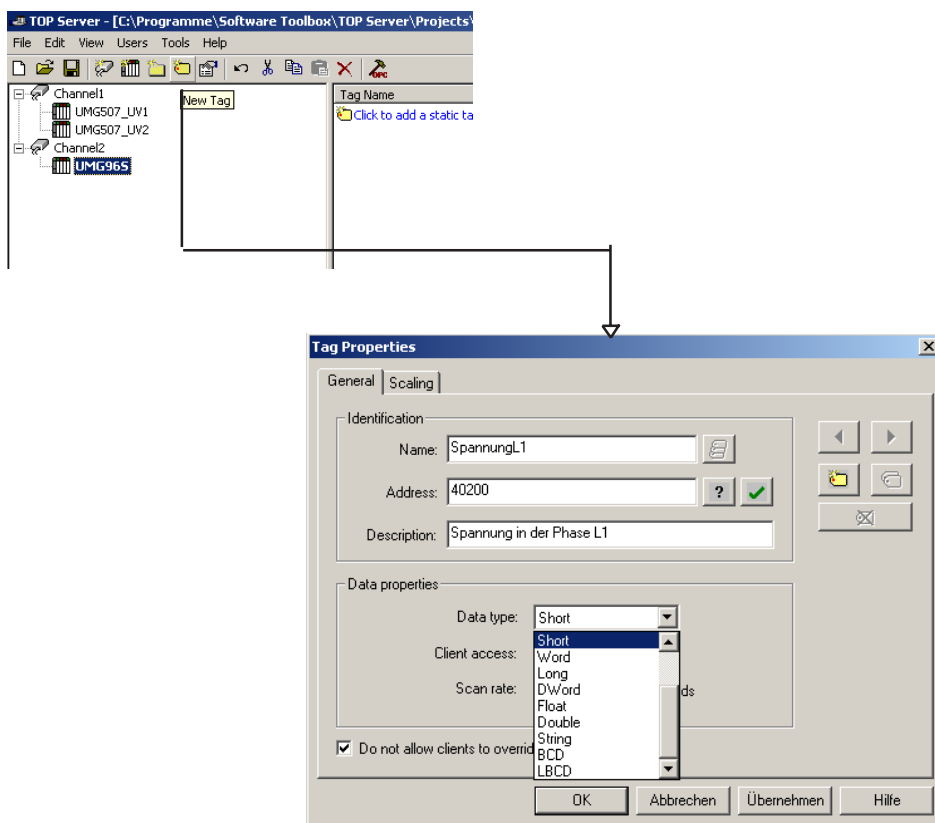
Deactivate „Use zero based addressing“ and „First word low in 32 Bit Data Types. The other windows can be used unchanged.



Picture 15

Step 3: Open a day.

Press onto function „New Tag“.



Name: Here the name of the measured value can be entered.

Address: The register address must be entered in format 40XXXX. The last four digits will be replaced by the real register address of the slave. The register addresses of the UMG507E/EP can be found as pdf file on the CD-ROM PSWbasic/professional.

**Input
In OPC Server**

Example from manual (adresse):

400000
400002
400004
400006
400008
400010
u.s.w

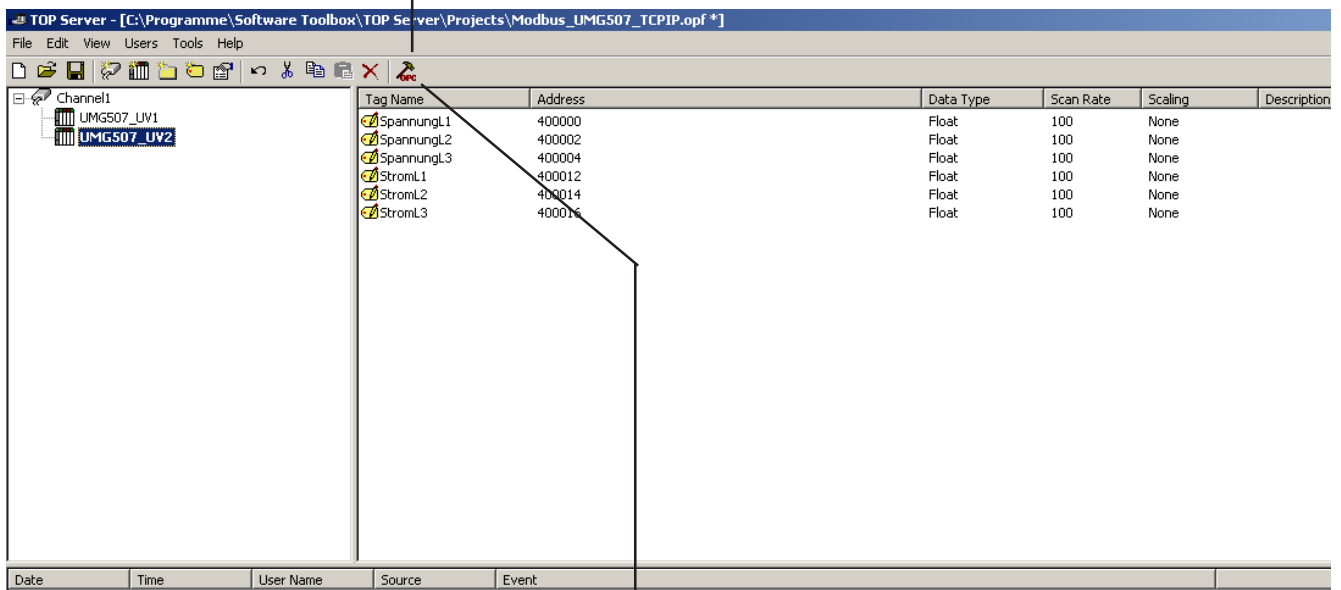


Register Address	Description	Type
0	VoltagePhase: L1	32 bit float
2	Voltage Phase: L2	32 bit float
4	Voltage Phase: L3	32 bit float
6	Voltage Phase LL: L12	32 bit float
8	Voltage Phase LL: L23	32 bit float
10	Voltage Phase LL: L31	32 bit float

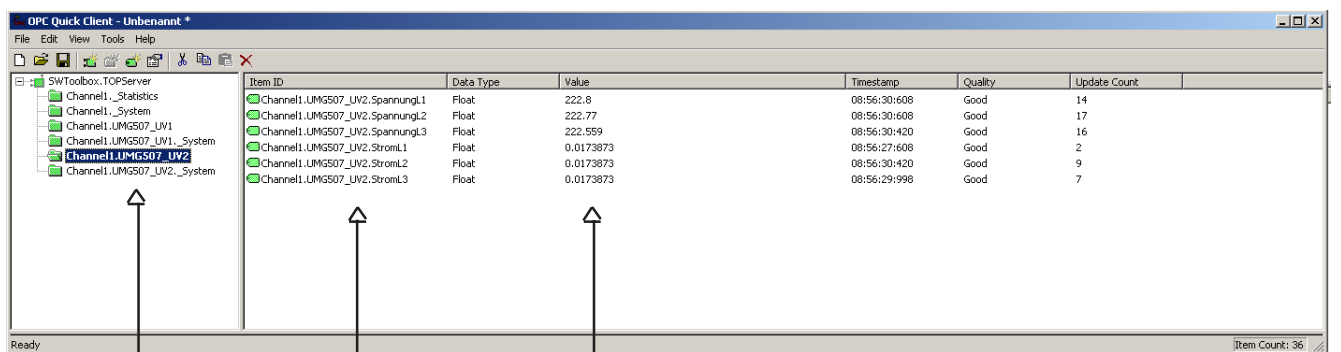
Description: Any description.

Data Type: The data are as „Float“.

Open OPC Quick Client



Picture 17



Picture 18

**OPC Server
Name**

Item ID

**Measured
value**

The configuration of the OPC Quick Client is done automatically. Just select your measuring device on the left. The Item ID and the measured values are indicated on the right side.

Note: The visualization system requires the following information for configuration:

Server Name (SWToolbox.TopServer)
Item ID
Data Type