

# SIEMENS

## Power Quality Recorder

**SIMEAS Q80 7KG8080**

System manual



E50417-H1076-C420-A1



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# 1 SIMEAS Q80 7KG8080

**Note**

Please observe the instructions and warnings for your safety in chapter foreword "[Information for your safety](#)"

**Disclaimer of liability**

The contents of this documentation have been carefully checked for consistency with the hardware and software systems described. Nevertheless, it is impossible to completely rule out inconsistencies, so that we decline to offer any guarantee of total conformity.

The statements made in this document are regularly checked and any necessary corrections are reflected in subsequent editions. We gratefully accept any suggestions for improvements.

We reserve the right to make technical modifications of the systems.

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## 2 Foreword

### **Purpose of the manual**

This manual generally describes the installation, commissioning, parameterization and operation of the power quality recorder *SIMEAS Q80 7KG8080*.

### **Target audience**

This manual is intended for project engineers, commissioning and operating personnel in electrical systems and power plants.

### **Validity of the manual**

This manual is valid for the power quality recorder *SIMEAS Q80 7KG8080*.

### **Additional support**

For any questions concerning your system, please contact your local Siemens representative.

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## 2.2 Information for your safety

This manual does not represent a complete listing of all the safety measures required to operate the equipment (module, device) since specific operating conditions may make further measures necessary.

However, it contains information which you have to observe in order to ensure your personal safety and in order to avoid material damage. The information is highlighted by a warning triangle and, depending on the degree of danger, is shown as follows:

**Danger**

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

---

**Warning**

indicates that death, severe personal injury or substantial property damage can result if proper precautions are not taken.

---

**Caution**

indicates that minor personal injury or property damage can result if proper precautions are not taken. This particularly applies to damage on or in the device itself and consequential damage thereof.

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**Attention**

indicates that property damage can result if proper precautions are not taken.

---

**Note**

indicates information about the device or respective part of these operating instructions which is essential to highlight.

---

## 2.3 Qualified personnel



### Qualified personnel

Commissioning and operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel, in the context of the safety information contained in this manual, are persons authorized to commission, start-up, ground and label devices, systems and circuits according to all applicable safety standards.

### Use for the intended purpose

The equipment (device, module) may only be used for the applications specified in the catalog and the technical manual, and only in connection with OEM devices and components recommended and approved by *SIEMENS*.

The prerequisites for trouble-free, reliable operation of the product include proper transport, proper storage, proper installation and assembly, as well as proper operation and maintenance.

When operating electrical equipment, certain parts of this equipment are subject to dangerous voltage levels. Therefore, improper handling can result in serious injury or equipment damage:

- The equipment must be grounded at the PG terminal before making any connections whatsoever.
- Dangerous voltages may occur in all circuit components connected to the inputs or power supply.
- Dangerous voltages due to capacitor memory may still exist in the equipment even after it has been disconnected from the power supply or input circuits.
- Equipment with current transformer circuits must never be operated in any state where the current transformer circuits are open-circuited.
- The operating limits specified in the manual and in the operating instructions must not be exceeded at any time (including inspection and commissioning).

The parameter value limits stated in the instructions may not be exceeded; this also applies to inspection and commissioning situations.

## 2.4 Statement of Conformity

	<p>This product complies with the directive of the Council of the European Communities on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Council Directive 2004/108/EC) and concerning electrical equipment for use within specified voltage limits (Low voltage Directive 2006/95/EC).</p> <p>This conformity has been established by means of tests conducted by Siemens AG in accordance of the Council Directive in agreement with the standard IEC 61326-1:2006 for the EMC directives, and with the standard EN 61010-1 for the low-voltage directive.</p> <p>The device has been designed and produced for industrial use.</p>
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## 2.5 Disclaimer of liability

The contents of this documentation have been carefully checked for consistency with the hardware and software systems described. Nevertheless, it is impossible to completely rule out inconsistencies, so that we decline to offer any guarantee of total conformity.

The statements made in this document are regularly checked and any necessary corrections are reflected in subsequent editions. We gratefully accept any suggestions for improvements.

We reserve the right to make technical modifications of the systems.

## 3 Introduction

### 3.1 Application

*SIMEAS Q80 7KG8080* is a **IEC 61000-4-30 Ed. 2 class A** measurement device for integral measurement of power quality. It encompasses all important quantities for the assessment of electrical supply networks at once. The user software serves the purposes of rigging the device, taking measurements with online monitoring and composing a report of the quality analysis.

*SIMEAS Q80 7KG8080* enables you to measure on up to 4 differently configured leads with a resolution extending **up to the 50<sup>th</sup> harmonic**.

You can devise a variety of trigger mechanisms for **long-term monitoring** of events.

Along with the conventional trigger mechanisms which respond to the signal exceeding limit values which can be set, it is also possible to set **triggering** conditions representing the signal deviating significantly from the expected **curve shape**. Thus, as an example, any sudden signal deviations occurring during long-term monitoring which are due to **harmonics** or brief **voltage fluctuations (spikes)** can be captured even if the magnitude of the deviation is much smaller than the nominal value itself.

The **long-term monitoring** technique of measurements returns results with the following attributes: independent of the option of triggered measurement mentioned previously, all relevant measurement data are recorded. *SIMEAS Q80 7KG8080* provides you with the ability to decide after the measurement what limits you wish to set for which quantity, and thus what to consider in the evaluation of results. The incoming data are converted online by the signal processor to useful information for the user. The data volume is reduced to the minimum necessary. This avoids the danger of losing record of relevant events which lie inside the boundaries.

Wherever Complete Recording isn't possible, the European **standard EN50160** forms the basis for proceeding. This standard stipulates minimum requirements for inspection of power quality, in terms of the scope and the precision of measurements taken. By collaborating with German power suppliers on its development, *SIMEAS Q80 7KG8080* benefits from large amounts of practical know-how which enables the scope of its functionality to go far beyond EN50160.

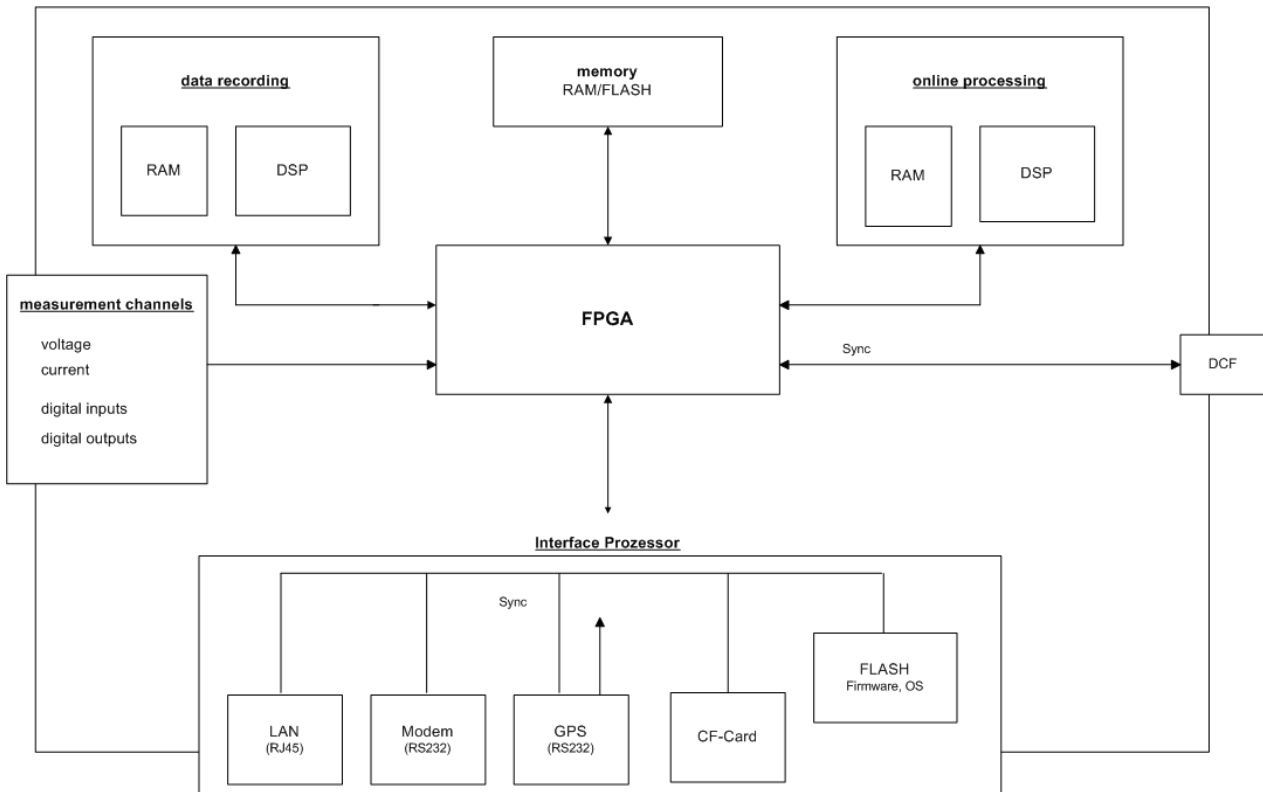
By using multiple *SIMEAS Q80 7KG8080* units with a radio-controlled **GPS/DCF 77** real-time clock, measured data from different sources can be **synchronously** correlated. And with the help of the database module, it is possible to search through the data for any events or limit overstepping, and then display and compare them. It is also possible to synchronize multiple *SIMEAS Q80 7KG8080* units even without a radio-controlled GPS/DCF 77 real-time clock, and to plot their respective data jointly in correct chronological relationship.

*SIMEAS Q80 7KG8080* main field of application is stationary **network monitoring** with subsequent evaluation. But short-term measurements are also fully supported, in which highly fluctuating disturbance phenomena must be observed. For this purpose, the data can be displayed online on the connected PC.

And if the device is intended for stationary operation for longer periods (such as many months), a special data storage mode makes it possible for the **measurement results** to be generated on a **daily or even a monthly** basis for later retrieval at the user's convenience.

In the examples below, the values assume the European low voltage grid frequency of 50Hz, and a phase-to-neutral voltage of 230 Volt; for measurements of a 60 Hz grid or other voltages, the quantities must be converted/adapted accordingly.

## 3.2 Computation procedures



Concept of SIMEAS Q80 7KG8080

The computations are performed in accordance with the standard IEC 61000-4-30 Ed.2 class A compliant for the following:

- Frequency
- Magnitude of Supply Voltage
- Flicker
- Voltage Dips, Swells, Interruptions
- Unbalance
- Harmonics
- Mains Signaling
- Time clock uncertainty
- Flagging



### Note

SIMEAS Q80 7KG8080 is designed to be used in either 50 Hz or 60 Hz grids.

**The sample values presented pertain to a low voltage power network of 50 Hz and 230 V; in case of any deviations, the nominal voltage or network frequency is noted.**

### 3.2.1 Effective (RMS-) values

Calculation of the RMS values is calculated every half period over a complete period (20 ms @ 50 Hz or 16,66 ms @ 60 Hz).

This consists in **summing up** the squared input voltage values and taking the root of the result, as per the equation:

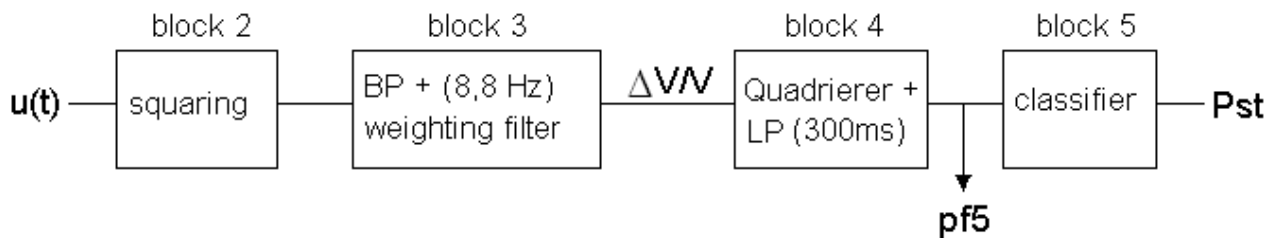
$$U = \sqrt{\frac{1}{P} \sum_{n=1}^P u_n^2}$$

Here, P stands for the number of samples. For a sampling frequency of 10 kHz and a network frequency of 50 Hz, P = 100.

### 3.2.2 Flicker

Calculation of the flicker proceeds according to the description of a flicker meter in the standard EN 61000-4-15 (IEC868). However, the entire structure has been replicated **completely digitally, i.e. as a component of DSP program**. Flicker calculation is performed at a sampling rate of 100 Hz. This means that the values arrive at the classifier at a rate of 100 Hz.

The flicker calculation's input signal is the squared mean value from the RMS-value filter. Block 3's weighting filter (see standard) can be realized completely correctly by digital signal processing. Switching between ranges isn't necessary, since calculation is performed with 32-bit Floating-Point numbers. Scaling of the output signal to the means value of the input voltage (Block 1) comes after the weighting filter.



The classifier at the end of the chain (Block 5) computes  $P_{st}$ . The classifier's **operating range** is  $\leq 20$ . Up to a  $P_{st} \leq 10$ , the error limit of 5 % is adhered to.



#### Note

If there are very strong amplitude fluctuations which would cause a value of  $P_{st}$  greater than 10, the tolerance of  $\pm 5\%$  is no longer assured. In this case, the error cutoff depends on the characteristic curve's interference and can range up to 12%.

### 3.2.3 Rapid fluctuations of the RMS-value

Rapid changes in the RMS-values of voltage and current are recorded in the **curve plots**. For this purpose, a patented procedure called **Transitional Recording** is used.

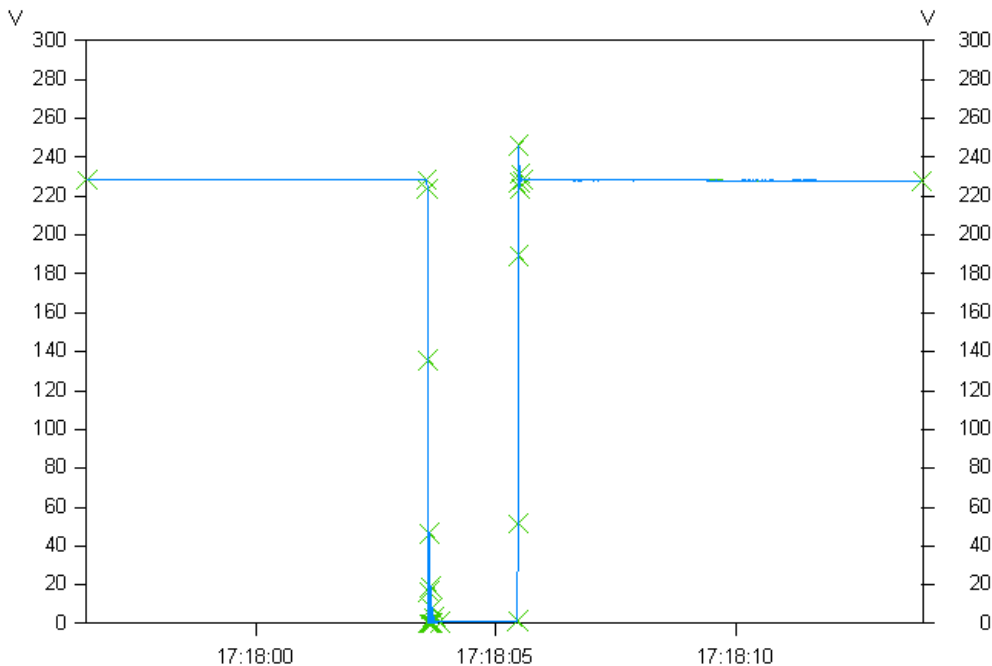


Fig 3-1 Curve plot of a voltage outage

The figure shows a voltage outage with data reduction. The crosses mark the sampled points of which the reduced curve plot consists.

A "**transition**" always refers to a change from a stationary amplitude state to a new state, where *state* can also mean a stretch of constant increase or decrease in amplitude. By comparing the slopes appearing within the curve to be reduced, sudden changes of the curve's course can be detected. The procedure is designed to limit the resulting curve plot's maximum deviation from the original signal.

The classic algorithm has been slightly modified for *SIMEAS Q80 7KG8080*. Thus, within a tolerance band of 5 % around the nominal voltage, the algorithm works at its default accuracy of **1,5 %**, while outside of this band it works at twice that level, namely **0,75 %**. The values can be edited via the user interface. As a result, events such as voltage dips are represented in very high precision while within the uninteresting "passing" region, the data is strongly reduced. By extending the data format to 64 bits the bufferable time range between two points is increased so that for a constant voltage, an obligatory data point must be recorded only after approx. 23 hours.

These steps increase the achievable reduction factor all the way to **1:20,000** without sacrificing relevant information. Ideally, if the network is free from disturbances, there would be **eight data points per week**: one per day plus the initial point. By contrast, any disturbances are recorded with time resolution of one-half period. In any case: **no threshold values** need to be set.

### 3.2.4 Events

Typical courses of the voltage RMS-value which can be characterized by the duration and depth<sup>1</sup> of the amplitude, are recorded by *SIMEAS Q80 7KG8080* as events.

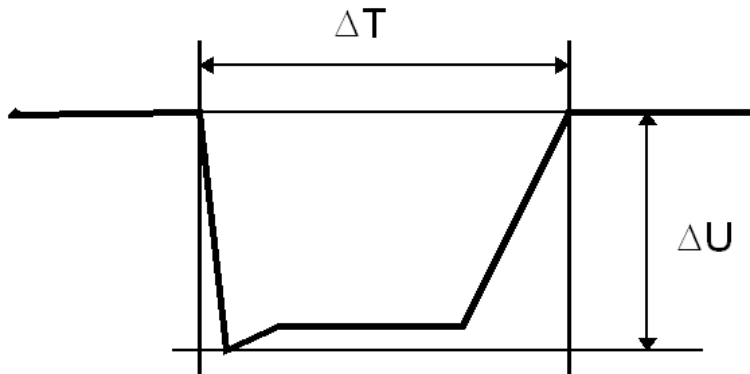


Fig 3-2 Event with duration and magnitude

The curve plots of the RMS-values serve as the source for the capture of events. While the deviation of the RMS-value in **one direction** leads to the recording of a data point in a reduced curve plot, an event is always defined by **two transitions**: one from the normal voltage level to the fault level one another one back to the normal level.

The duration of an event is measured between two departure points, in other words at the amplitude setpoint. The magnitude of the event is determined from the minimum or maximum amplitude in the disturbance region. This is done in the assumption that the amplitude remains relatively constant during the disturbance.

According to currently valid standards, every deviation of >10% from the nominal voltage counts as an event. Depending on the duration and amplitude, distinctions are made between sags and outages.

<sup>1</sup>For overvoltage, depth is the same as height.

### 3.2.5 Signal voltage (ripple control signals)

Signal voltage refers to a signal superimposed onto the supply voltage, which is used to communicate information. The most familiar example is so-called ripple control signals.

*SIMEAS Q80 7KG8080* has three special channels, each with different time resolution, for monitoring signal voltages.

1. In addition to the harmonics and interharmonics, the mean voltage level at signal frequency is also recorded.
2. The RMS-value of the spectral line of the FFT corresponding to the signal frequency is recorded with data reduction.

### 3.2.6 Harmonics, interharmonics

Calculation of the frequency components in voltages, currents and thus also in power is performed by means of a Fast Fourier Transformation (FFT).

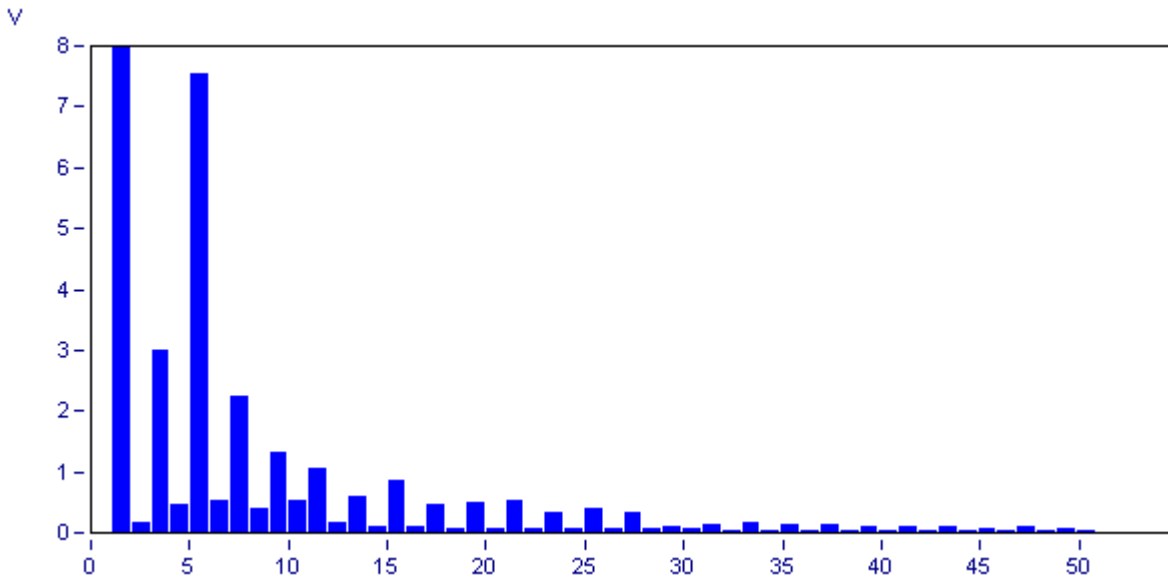


Fig 3-3 Mean values from FFT

The **FFT** is computed with a rectangular window as per the standard EN 61000-4-7 "Specifications for the measurement of harmonics and interharmonics in power supply networks". The harmonics are computed according to the method of harmonics-subgroups, where the RMS value is determined with the two adjacent frequency lines.

The **THD** (total harmonic distortion) is determined according to the method of harmonics-subgroups total distortion. This is the ratio of the RMS of the harmonics subgroups to the RMS of the fundamental oscillation subgroup.

This causes the number of samples to vary since it is chosen on the basis of the fundamental frequency in order to calculate exactly the harmonic and interharmonic components of that particular fundamental. Example: According to the standard, the frequency may deviate within the range  $50 \text{ Hz} \pm 1\%$ . This means that for a 10 kHz sampling frequency, a period can vary between 98..102 sample values.

The resulting frequency vector is used to derive the aggregation of the 50 harmonics and 10 interharmonics. Together with the THD and signal voltage, 64 aggregations are derived for each input signal.

The spectra produced by the FFT can be viewed immediately by means of the online monitoring, for which purpose no aggregation are computed. The special channel for the signal voltage recorded with data reduction (ripple control signals) is fed directly from the FFT.



## 3.3 QuickStart

Brief instructions on starting *SIMEAS Q80 7KG8080* for the first time.



"**Task process**" the tree diagram on the left side of the interface; according to the selection made here; the right side displays corresponding options, data or lists

### 3.3.1 Installation

- Install the software
- Connect measurement unit to the communication network
- Connect measurement with all measurement leads (observe safety guidelines for dealing with high voltages!)
- Switch on measurement unit
- Set IP address with program IF-Config (*Start>program files>SIMEAS Q80 Manager>IF-Config*).
  - Click on the plus-sign by the network adapter in the left column
  - Click on the plus-sign for your device
  - Select the LAN branch
  - Set the IP-address
- Start the *SIMEAS Q80 Manager* program → Prompt for device definition → "OK"
- Device selection dialog opens
  - Select "New..." → "Add device interface"-dialog appears
  - Select "Network settings..." → "Settings for network"-dialog appears
  - "TCP/IP" must be selected → Close with "OK"
  - Select "Network search" → PC searches network for SIMEAS Q80 7KG8080 devices
  - Select <%GERAETEBEZEICHNUNG%> → Close with "OK"



#### Note





#### Note

If your device doesn't appear in the list, you must first call "IF-Config" and assign the device a valid address. (Start Menu/*SIMEAS Q80 7KG8080*/IF-Config; rf. "[Configuring the Interface](#)"<sup>[128]</sup>).

- The device selection dialog must be in the right-hand side list → finish with "OK"


- Click  → the Assistant opens

- (use the toolbar button  or menu item "File / New Ctrl+N")

- Enter a name for a new measurement site → e.g. "Power Station 1" → 

- Device is selected → 

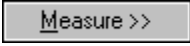

- Enter a name for the measurement task → e.g. "Test 1"


- Complete the summary form by clicking 

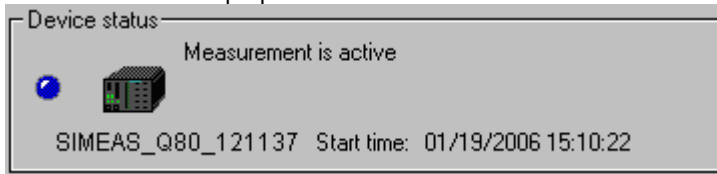
### 3.3.2 Making basic settings



- The description for the measurement task opens → 3-phase voltage measurement is selected,
- or **Task process/Network quality/Setup/Basic settings**
- Enter names for "**Company**", "**Department**",... "**Comment**" → ...optional
- If necessary, select the current probe used and the input range (definition of new current probes in *Task process / Network quality / Setup / Converter database*)

### 3.3.3 Measuring





- Scroll down in the window, click  → the start dialog opens
- or click on the toolbar key , or *Task process/Measure/Start Stop network analysis*

- The device's current state is indicated → click 
- The measurement is prepared and started → "Measurement is active"












- You can now disconnect and exit the software; the device can continue measurement without the PC.
- Or online monitoring of the measurement
  - Click  to **Online monitoring** → complete overview is displayed
  - **Task process / Measure / Standard display** → various data views can be selected
- Return to **Task process / Measure / Start Stop network analysis** → End measurement (to obtain analyzable data, measurement should run at least 20 min) 

### 3.3.4 Data transfer

- Click on  to **Data transfer (F4)** in the start dialog
- or **Task process / Data transfer** or click  in the toolbar
- Select  → *SIMEAS Q80 Manager* searches the hard drive for saved measurements
- Select a measurement and move it to the lower list  
Select  → Measurement data are transferred and pre-processed

### 3.3.5 Evaluation

- Go to analysis mode via toolbar button  or **Task process / Evaluation**
- Select a measurement from the list → double-click or click 
- **Task process / Evaluation / Network quality report** → opens the report dialog, with display measurement settings and measurement duration
- At the start of the evaluation, click  → Evaluation as per EN 50160 NV and MV or select other value limits in **Task process / Evaluation / Standard and limit values**
- Summary form appears filled in → are there values which exceed standards limits?
- Clicking on a bar in the overview chart, you go to the corresponding results table.
- Use the toolbar button  or menu item "**File / Print..**" to print out the report
- Detailed observation of measured data → under **Task process / Evaluation**, special overviews are available for each type of measured data
- E.g. **Task process / Evaluation / Frequency** displays
  - table of all immediately displayable data,
  - table of minimum and maximum values of the displayable data.
- At the right edge of the window, there is a toolbar (the functions affect the data window selected, if more than one window is open. A mouse-click on a window highlights it).
- The available buttons are:
  -  Calculates histograms for the selected data
  -  Opens the dialog for Measuring/displaying data values
  -  Opens a data navigator (for moving through a long measurement data set)
  -  Opens the dialog **Channel selection...**, in order to be able to add any amount of additional channels to the data window
- Use the toolbar button  or the menu item "**File / Print..**" to print out the data window
- Menu item "**File / Print preview**" → see effect of printout settings; make changes before printout, for example, add comments...



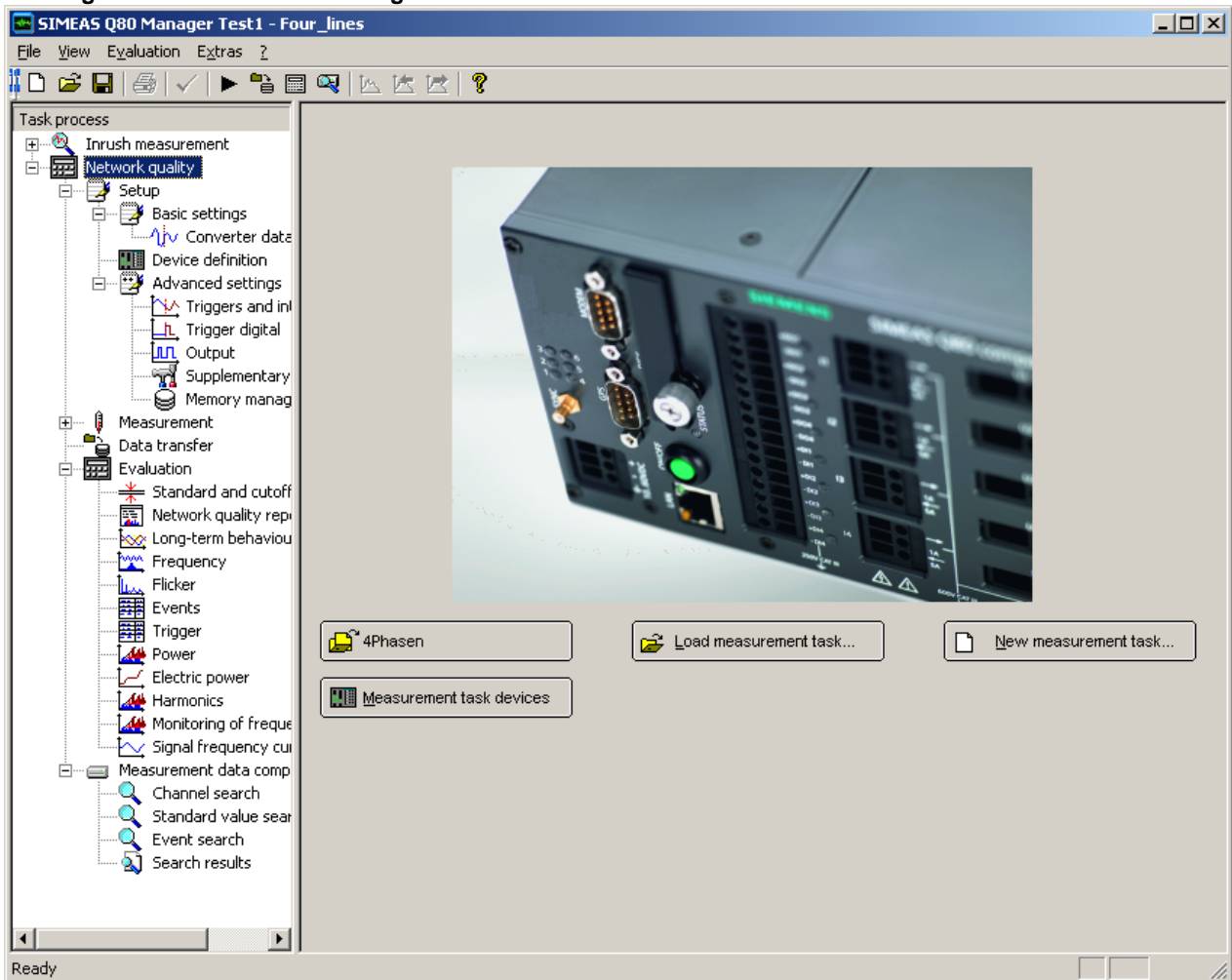
## 4 Operation modes

SIMEAS Q80 7KG8080 is able to perform long-term analysis. Long term analysis is accessed under the tree branch *Network quality* and is the actual application complex which includes e.g. the standard EN50160 plus a few extras.

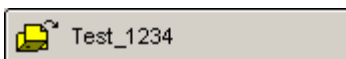
The task steps "Setup" and "Measurement" refer to the measurement task which was either just loaded or to be processed. The other task steps use the current settings as defaults, but do not change the configuration.

### 4.1 Network quality

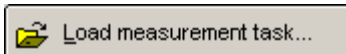
#### Loading a new measurement configuration / New start



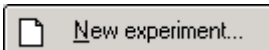
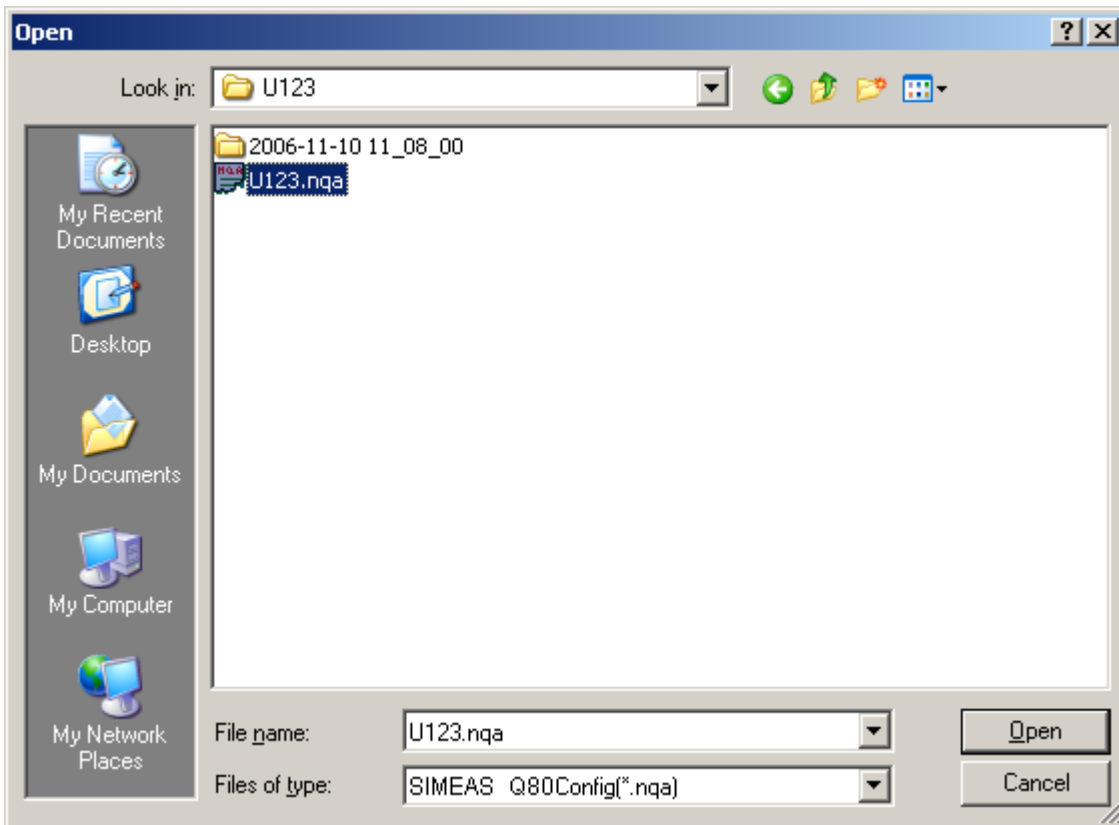
Load a configuration



Loads the configuration most recently worked upon, e.g. "loschen\_02"

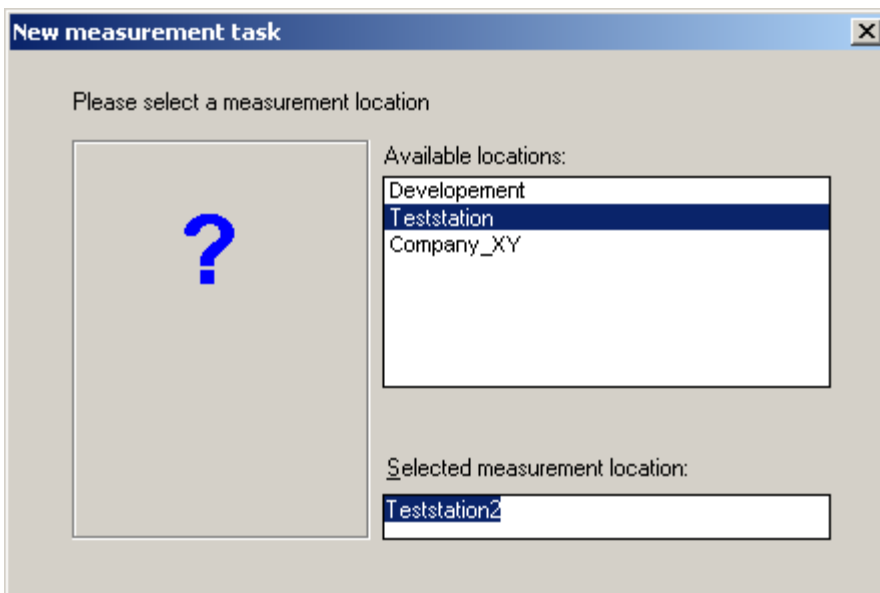


Displays the Windows "Load file" – dialog, for display of a configuration file; corresponds to the command *File/Open...*



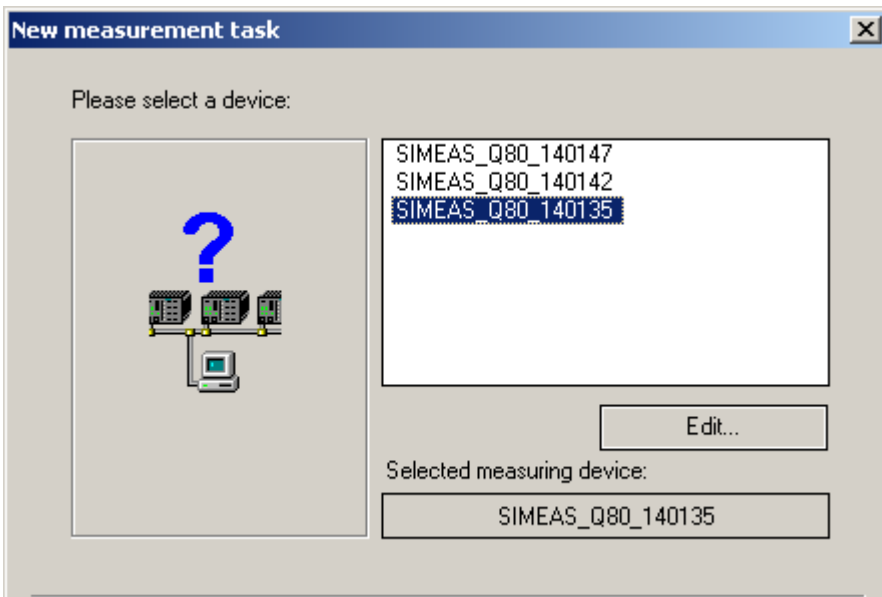
Creates a new measurement configuration, corresponding to the command *File/New* or *File/Save as*.

A wizard leads you through various dialogs for entering the required names, selecting a measurement device and, if appropriate, for changing the data storage location.

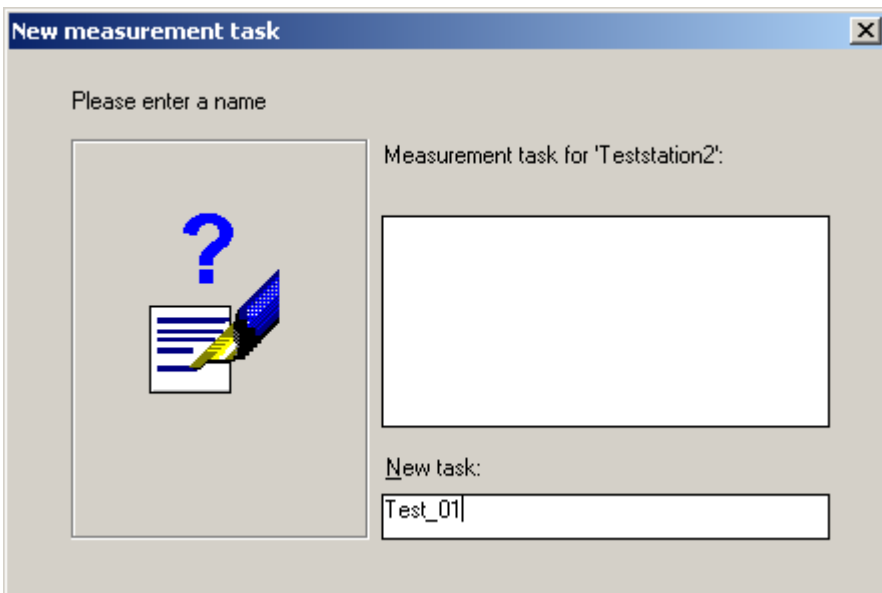


1. Entry of a name for the measurement location

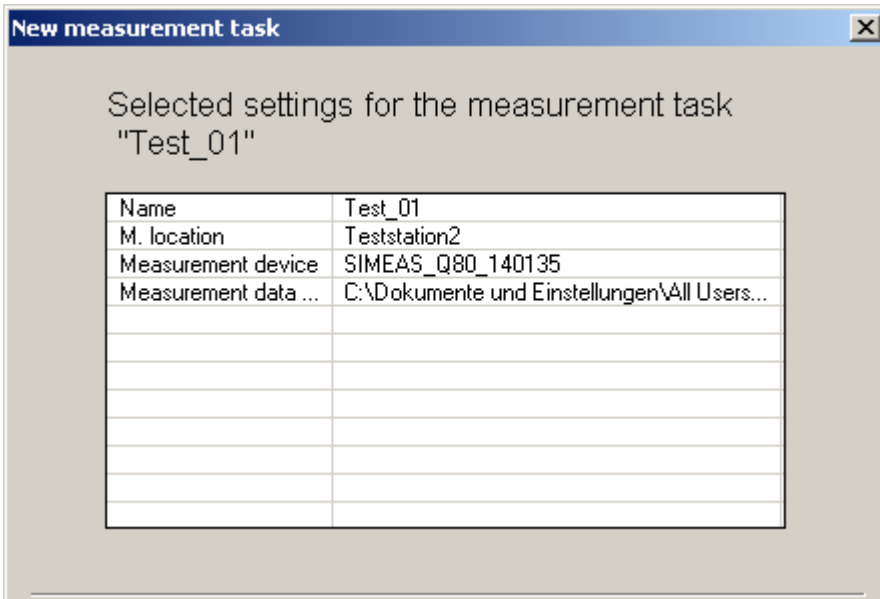
Use *Next >* to proceed to the next dialog



2. Selection of the SIMEAS Q80 measurement device to be used



3. Entry of an name of the measurement task



#### 4. Summary of entries

By clicking on Finish, a new configuration is created with the default settings.

If an existing measurement task is to be applied to a different measurement location and a different device:

- a. Load the existing settings
- b. Select *File/Save as...*
- c. Enter the new measurement location name and select the measurement device

**The storage of data is organized according to the following principle:**

Data path / Meas. Loc. 1/ measurement task1 / measurement task1.nqa (configuration file)

/ 2004-11-25 17\_40\_00 (data of 1st measurement)

/ 2004-12-10 10\_10\_00 (data of 2nd measurement)

/ measurement task2 / measurement task2.nqa

/ 2004-12-16 14\_00\_00

/ Meas. Loc. 2/ measurement task3/ measurement task3.nqa

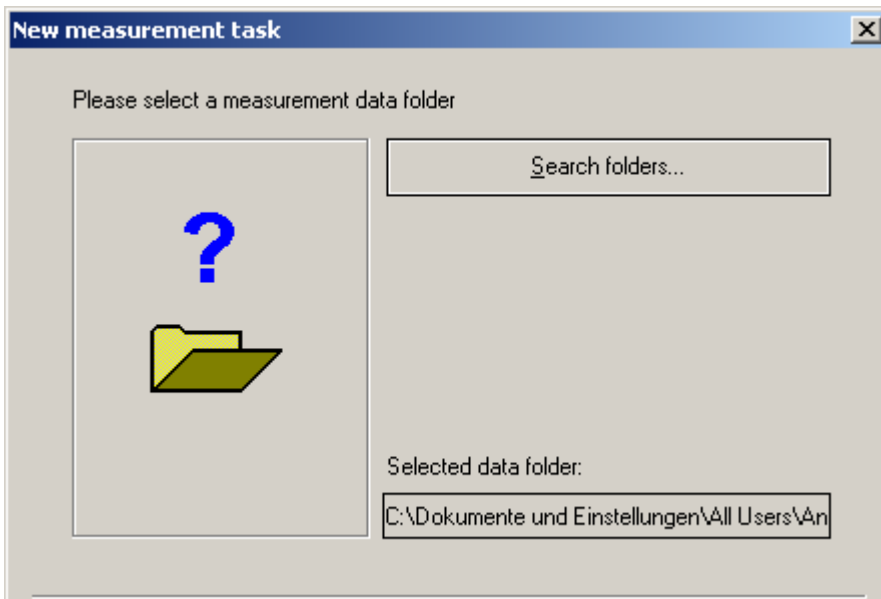
/ 2005-01-12 12\_00\_00

/ ...

/ Meas. Loc. N/ measurement taskN/ measurement taskN.nqa

If the button "Back" in the first dialog is clicked, the data path can be changed.





Using *Search folders...*, an existing path can be selected, or a new path created. The data folder can be set in [Options - Folders](#) <sup>86</sup>.

## 4.1.1 Setup

Use the mouse to fill in the boxes on the forms, which are later printed out. These forms provide the appearance of "virtual paper"; see also Chapter [Forms](#) <sup>[92]</sup>.

### 4.1.1.1 Basic settings

Here you make entries for the most important properties which affect the protocol and how the measurement is interpreted. The boxes whose entries can be edited are shaded in a certain color.

The screenshot shows the 'SIMEAS Q80 Manager Teststation - Standard\_EN50160' window. The 'Basic settings' form is displayed with the following fields and values:

- Company: Testing Company
- Department: System Testing
- Supervisor: Testing Officer
- Inspector: Tester
- Last measurement: (empty)
- Location: Teststation
- Device: SIMEAS\_Q80\_140135
- Name: Standard\_EN50160
- Power frequency: 50 Hz
- Circuit: 4-wire system
- Nominal voltage: 230.00 Volt

The circuit diagram shows a 4-wire system with three phase lines (L1, L2, L3) and a neutral line (N). Each phase line has a red dot indicating a measurement point. Below the lines are four measurement points labeled U1, U2, U3, and N.

Fill-out form for basic settings

#### 4.1.1.1.1 Personal data


This includes the boxes **"Company"**, **"Department"**, **"Supervisor"** and **"Inspector"**.

The close-up shows the following fields and values:

- Company: Testing Company
- Department: System Testing
- Supervisor: Testing Officer
- Inspector: Tester

#### 4.1.1.1.2 Selecting the measurement device

Click the mouse on the **Device** box. A list of the software for all known devices appears. Only one device at a time can be selected.


	Location:	Teststation	Comment:	engine 7807
	Device:	SIMEAS_Q80_140135		
	Name:	Standard_EN50160	Comment:	max. load



#### Note

- Only the device stated in the measurement protocol can be connected to the PC. If your *SIMEAS Q80 7KG8080* has a different name than what appears in the box **Device**, it cannot be addressed with this configuration.
- To register new devices, follow the instructions in the manual's chapter Getting Started - Connect the device. Special connection options are presented [here](#) <sup>[123]</sup>.
- Various words have distinctive coloring and change color when the mouse pointer is positioned over them. Clicking on such a word opens a dialog for setting the property which that word denotes. E.g., clicking on *Converter* opens a dialog for making converter settings.
- One measurement assignment can be used as the basis for other assignments. To do this, load the desired assignment and change the measurement device. It is highly recommended to save the assignment under another name, since there may otherwise be conflicts when the data are later saved. One exception is when changing the device at one measurement location, in which case the name does not need to be changed.

#### 4.1.1.1.3 Power (grid) frequency

 Power frequency:

Selection of the power frequency: 50 Hz or 60 Hz.



#### Note

- For determining the frequency, all three phases are taken into account.  
A calculation is performed whenever at least one line exceeds a threshold 10 V RMS.

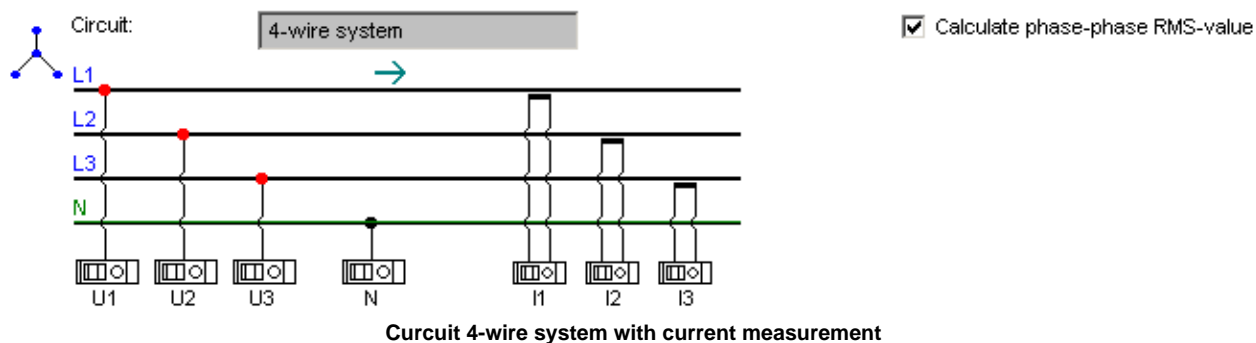
#### 4.1.1.1.4 Voltage connection

Click on the list box **Voltage** to open it. You can choose from three possible configurations of the inputs U1 to U3:

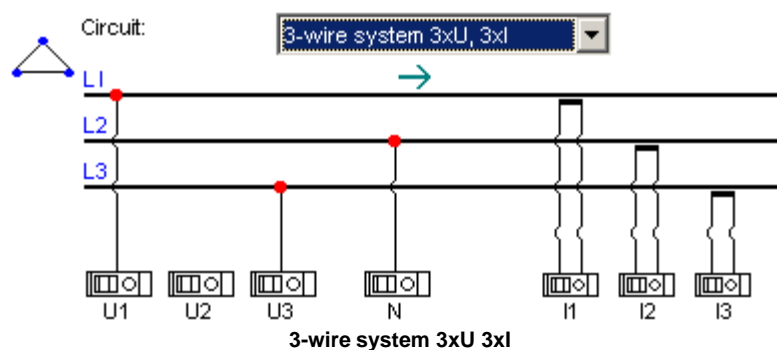
- **Four-wire system (Star)**
- **Three-wire system 3xU (Delta)**
- **Three-wire system 2xU (Open delta)**
- **Single line P-COM**

The selected configuration is illustrated in a graphic.

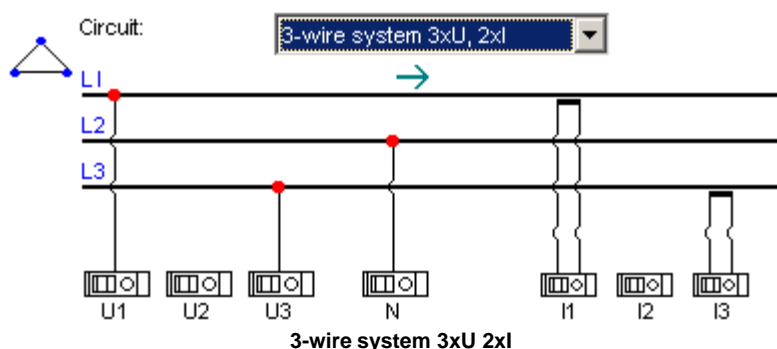
##### Circuit 4-wire system



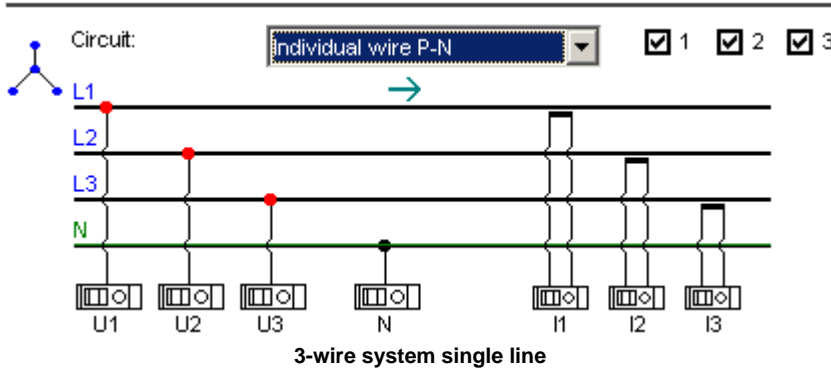
##### Circuit 3-wire system 3xU 3xI



##### Circuit 3-wire system 3xU 2xI



Circuit Individual wire P-N



3-wire system single line

Two positions are provided for entering the nominal voltage and thus also the input range. The first, **Primary value**, represents the actual voltage at the measurement location. The second, **Secondary value**, indicates the voltage at the inputs of SIMEAS Q80 7KG8080. If the measurement is performed without a converter (no check in the box **Converter**), then the primary side presents a list of possible nominal voltages which can be connected directly.

Nominal voltage:  Volt

Operating voltage:  Volt

U4 active

**Voltage values**

- 57.73
- 120.00
- 230.00
- 380.00
- 5773.50
- 11547.00
- 11547.00
- 63508.50
- 127017.00
- 219393.10

**Nominal voltage:**

- Nominal line voltage
- Serves as indicator variable and not used for calculations

**Operating voltage:**

- Expected or declared line voltage
- Normally equal to the nominal voltage, especially at low voltage
- The operating voltage is used for all subsequent calculations and value limits.

	Primary value	Secondary value
Converter: <input checked="" type="checkbox"/>	<input type="text" value="1000.00"/> Volt	100.00 Volt
Converter: <input type="checkbox"/>	<input type="text" value="35000.00"/> Volt	

If the measurement is carried out with a converter, the list shows a selection of primary voltages, which you can define yourself under [Converter database](#). In parallel to this, the corresponding secondary voltage at the device inputs is indicated.

Primary voltage (in V)	Secondary voltage (in V)
380000.00	100.00
220000.00	100.00
110000.00	100.00
35000.00	100.00
20000.00	100.00
10000.00	100.00
1000.00	100.00

Converter data base

Depending on the input configuration, the nominal voltage is interpreted either as the conductor voltage or as the voltage to the neutral point. This saves the trouble of value conversion. When you switch between different input configurations, the values are adapted automatically.

**Note**

- If you need a voltage or a converter ratio which doesn't appear among the selections, you can manually overwrite the values offered.
- Make sure that the selected input configuration is really used. Otherwise, the measurement values are incorrectly scaled and weighted.
- The configuration *Open delta* calculates the third voltage according to the equation:  $u_1 + u_2 + u_3 = 0$ . This only applies to the voltage between the conductors. (Aron-configuration)
- Voltage converters affect the frequency and phase response of the original signal.

**4.1.1.1.5 Current connection**

Current transformers come with input range recognition which *SIMEAS Q80 7KG8080* reads automatically.

There are two connection terminals:

- Terminal 5 A is for input ranges 2,5 A, 5 A and 10 A.
- Terminal 1 A is for input range 0,5 A and 1 A.

Current transformer:

Input range:  Converter:

**Selection of current terminal and input range**

Similarly to the case of the voltage terminals, there are various ways to define an external transformer. When you click on **Current transformer**, the entry box displays a list of all possible input ranges. Clicking on **Converter** opens the list of pre-defined external **transformers**.

Converter name	Input range text	Current range (...)	Output voltage (mV/A)
Direct 5.0 A	10.0 A	10.00	1000.00
Direct 5.0 A	5.0 A	5.00	1000.00
Direct 5.0 A	2.5 A	2.50	1000.00
Direct 1.0 A	1.0 A	1.00	1000.00
Direct 1.0 A	0.5 A	0.50	1000.00

**Current connector and -range (display only)**

I4 can be used to measure current as well. In addition it is possible to do a calculation of I1 + I2 + I3:

I4 active:   automatic line recognition

Current input: I4 = I1 + I2 + I3

Input range: Converter:

**Definition for I4****Note**

- You have the responsibility of making sure that the input range specified in the software matches that of the current probe. If they don't match, this will result in **incorrect scaling of the Y-axis**. However, the hardware is **not** in danger of damage.
- Current converters affect the frequency and phase response of the original signal.

#### 4.1.1.1.6 Digital inputs SIMEAS Q80 7KG8080

Record digital inputs

The digital inputs are captured at a sampling rate of 1 kHz and the data is reduced, which means it is only recorded when it changes.

#### 4.1.1.1.7 Converter database

Here, data for the current and voltage transformation can be entered, which later are available for selection from the pop-down list boxes in the fill-out forms.

### Converter - Voltage transformation

Primary voltage (in V)	Secondary voltage (in V)
380000.00	100.00
220000.00	100.00
110000.00	100.00
35000.00	100.00
20000.00	100.00
10000.00	100.00
1000.00	100.00

**Current input definition**

Converter name	Input range text	Current range (...)	Output voltage (mV/A)
Direct 5.0 A	10.0 A	10.00	1000.00
Direct 5.0 A	5.0 A	5.00	1000.00
Direct 5.0 A	2.5 A	2.50	1000.00
Direct 1.0 A	1.0 A	1.00	1000.00
Direct 1.0 A	0.5 A	0.50	1000.00

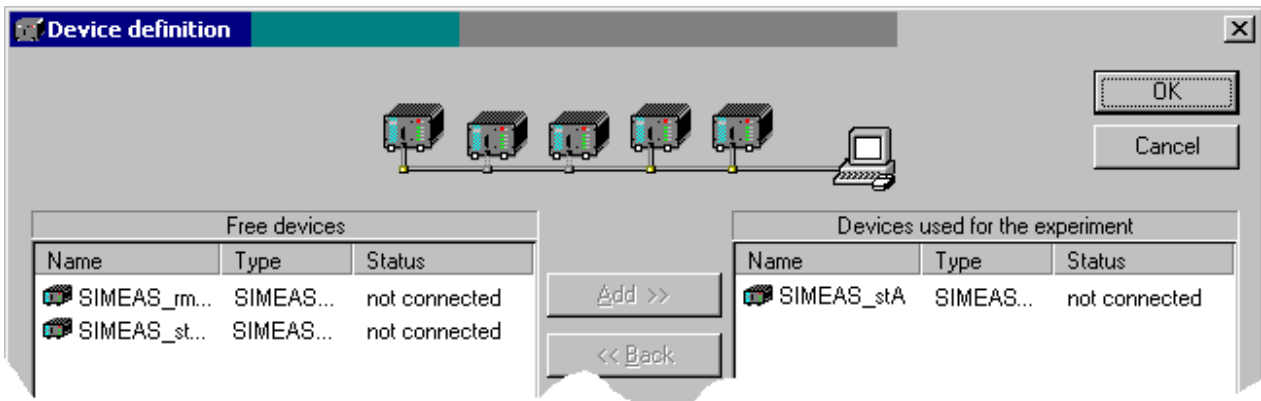
### Converter - Current transformation

Primary current (in A)	Secondary current (in A)
5000.00	1.00
5000.00	5.00
1000.00	1.00
1000.00	5.00
500.00	1.00
500.00	5.00
100.00	1.00

Definition of voltage and current converters

#### 4.1.1.2 Device definition

The dialog *Device definition* enables you to select from among the available measurement devices, see "Getting started \ Connect to the device" of the operation manual.



Device selection



### 4.1.1.3 Advanced settings

#### 4.1.1.3.1 Triggers

This page presents the **Trigger options**. For a more detailed explanation, see instruction manual under "Computations - Trigger."

The **Trigger type** desired can be set by clicking the checkbox appearing next to its entry in the list. Once this is done, the entries in the column **Trigger condition** become enabled. All values are stated in terms of the unit specified in the input box. If you hold the mouse pointer over the input box for a moment, an explanatory text appears.

The settings only apply to any activated measurement inputs. For instance, the electric current triggers are only active if current measurement is switched on on the "Basic settings" dialog page.

#### Triggers and interharmonics

Trigger type	active	Trigger condition
<b>1</b> Voltage	<input type="checkbox"/>	Monitoring of: <span style="border: 1px solid gray; padding: 2px;">Phase-Neutral</span> <b>2</b> <input type="checkbox"/> Limits in % of the operating voltage = 230.00 V <b>3</b> ± 0.000 V Deviation from previous curve form Lower threshold      Upper threshold      Hysteresis <hr/> ↕ - 34.50 V      ↗ + 34.50 V      10.58 V
<b>4</b> Curve comparison (comparison between periods)	<input type="checkbox"/>	
<b>5</b> Threshold value (Deviation from operating voltage)	<input type="checkbox"/>	
<b>6</b> Signal frequency (Ripple control)	<input type="checkbox"/>	<input type="checkbox"/> L1 <input type="checkbox"/> L2 <input type="checkbox"/> L3 10.00 V (Operating voltage = 230 V) 750 Hz Trigger frequency
<b>Current</b>		
<b>7</b> Curve comparison	<input type="checkbox"/>	± 1.00 A deviation from previous curve shape Deviation in absolute values
<b>8</b> Threshold value	<input type="checkbox"/>	↕ 0.00 A      ↗ 0.00 A      4.60 A
<b>Frequency</b>		
<b>9</b> Threshold value	<input type="checkbox"/>	<input type="checkbox"/> Limits in % of power frequency ↕ 49 Hz      ↗ 51 Hz      0.5 Hz
<b>Pretrigger (0.1..30s)</b>		<b>Recording duration (0.1..60s)</b> <input checked="" type="checkbox"/> in seconds
<b>10</b> 0.2 seconds		min 1 seconds <b>11</b> max 1 seconds block 0.2 seconds

The numbered items in the figure above are explained as follows:

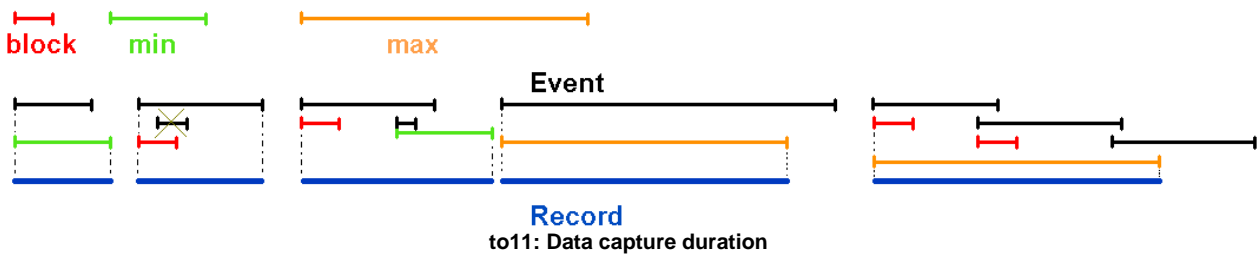
Nr	Trigger	Description
1	Voltage	Trigger settings for the voltage inputs. The grid frequency is defined at the <a href="#">basic settings</a> [27]. Find an explanation for the hysteresis <a href="#">here</a> [35].
2	Monitoring	Selection of the event voltage <ul style="list-style-type: none"> <li>• Phase-to-Neutral</li> <li>• Phase-to-Phase</li> </ul> <p>In 4-wire configuration, the signal to be monitored is selectable. Either the Phase-Neutral or the Phase-to-Phase voltage.</p>
3	Limits in %	Selection of the specified cutoff limit <ul style="list-style-type: none"> <li>• Absolute values (not activated)</li> <li>• % of operating voltage (activated)</li> </ul> <p>With the cutoff limit specified in % of the operating voltage, these settings can be applied to any voltage system, since they are independent of the absolute operating voltage.</p>
4	Curve comparison trigger for the voltage	The discrepancy between instantaneous values at the same position in two periods must not exceed the specified value.
5	Threshold value trigger for the voltage	The signal's RMS-value may not sink below the lower threshold in a negative slope, and may not pass the upper threshold in a positive slope (range trigger).
6	Signal frequency	The amplitude of the modulated signal may not exceed the specified threshold. Each checkbox activates signal capture for one of the three conductors..
7	Curve comparison trigger for the current	The discrepancy between instantaneous values at the same position in two periods must not exceed the specified value.
8	Threshold trigger for the current	The signal's RMS-value may not sink below the lower threshold in a negative slope, and may not pass the upper threshold in a positive slope (range trigger).
9	Frequency trigger	Resolution of a trigger if the network frequency found either exceeds or falls below the respective limits.
10	Pretrigger	Recording duration preceding the event
11	Data capture duration	<a href="#">Recording duration</a> [35] following the trigger event <ul style="list-style-type: none"> <li>• min minimum recording duration</li> <li>• max maximum contiguous recording duration</li> <li>• block Blocking time after event detection. During this time, there is no new trigger release.</li> </ul> <p><i>Example 1: Setting of a fixed recording duration of one second</i>  <math>min = max = block = 1s</math></p> <p><i>Example 2: Variable recording duration</i>  <i>Upon detection of an event, there is to be at least 0.5 seconds of data recording. Multiple releases from one event are to be prevented by means of a blocking time of 0.3 seconds (e.g. chatter of the digital input). The recording is to be extended upon occurrence of new events, but is not to exceed 60 seconds.</i>  <math>min = 0.5; max = 60.0; block = 0.3</math></p>



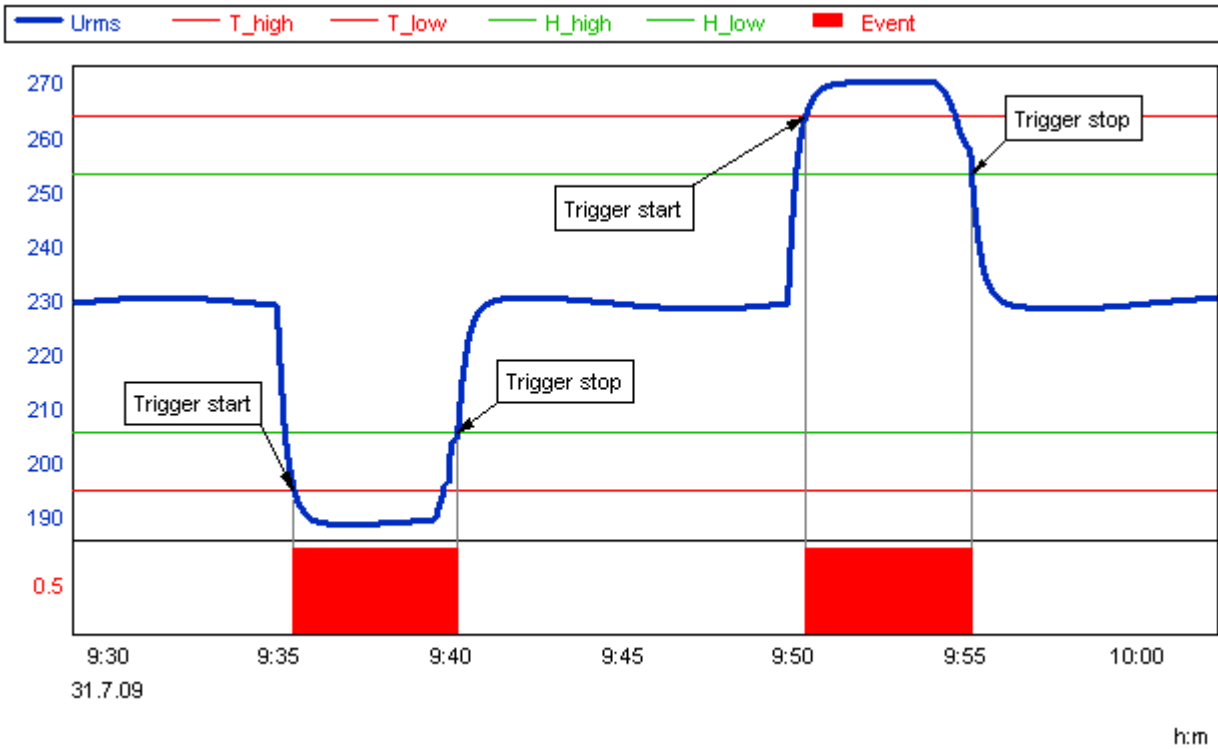
#### Note

- You should only use the signal frequency trigger on one of the conductors, since the capacity of the device hard drive will otherwise be exhausted too quickly.
- Triggered signals can lead to data glut if the trigger is released often. For this reason it's recommended for long measurements to work without a trigger and to instead capture the disturbance source as interharmonics. The reduced signal enables equally good qualitative evaluation.
- The amplitude of the signal frequency is at first saved continuously as a **curve plot** and **aggregation**. Therefore it's absolutely necessary to specify the frequency. The signal with the highest resolution is only recorded when the trigger voltage is exceeded.

4.1.1.3.1.1 Data capture duration



4.1.1.3.1.2 Hysteresis




**Effect of the hysteresis:**  
 The value of the hysteresis is added to the trigger level (neg. slope) or. subtracted (pos. slope)

#### 4.1.1.3.2 Inharmonics

In the table Interharmonic oscillations, you can select up to 10 frequencies which are to be captured in addition to the 50 harmonics included standard.

**Click** the mouse on a number to enter the frequency.

Monitoring of fixed frequencies



No.	Frequency - 5..3000 Hz ( 5Hz resolution, mean value record, power)	
1.:	16.67	Hz
2.:	75.00	Hz
3.:	125.00	Hz
4.:	275.00	Hz
5.:	500.00	Hz
6.:	0.00	Hz
7.:	0.00	Hz
8.:	0.00	Hz
9.:	0.00	Hz
10.:	0.00	Hz

##### Definition of monitored inharmonics

The permitted frequency range is between 10 Hz and 3 kHz. Thus it is possible to both monitor interharmonics below 50 Hz as well as signal frequencies above 2 kHz.

#### 4.1.1.3.3 Digital triggers SIMEAS Q80 7KG8080

Triggers can also be defined by external events. This can be transported as network bits as well as be based on the device's own digital inputs (optionally).

##### Trigger digital

Trigger type	Trigger condition	
Digital IN	Trigger start upon transition 0 --> 1 or 1--> 0	
Bit	Status	Trigger if
DI_1	active	0 -> 1
DI_2	active	0 -> 1
DI_3	passive	0 -> 1
DI_4	passive	0 -> 1

##### Network

- Distribution of a trigger release via the network
- Recognize trigger release via network

Hold time: 2 s

**Triggering via digital IN:**

If the device possesses digital inputs, then triggers can be configured to respond when a signal transition occurs at the digital input. All available digital inputs are displayed, in accordance with how the measurement device is equipped.

Status:	Active/passive	(De)-activation of the monitoring of a digital input
Trigger condition:	0 → 1 / 1 → 0	Definition of the signal transition to be monitored

LED shines:

- Green - the high level is applied at the DI
- Yellow - High level recognized, but + and – were mistakenly switched in the wiring. The DI DOES NOT go to High level! There is no state transition and thus no trigger release.

**Triggering via the network:**

If multiple measurement devices are run, then when a device detects a trigger event, it can send a signal via the network which is recognized by other devices on the network, which causes them to start triggered measurement as well. This means that the effect of events at various measurement sites can be monitored, although the trigger threshold was only overstepped at one location.

Distributed trigger release	The measurement device should send a signal around the network indicating a locally recognized trigger event. A holdoff time must be defined, meaning the minimum distance between the signaling of consecutive trigger releases. This amount of time depends on how the network is structured, and how it is burdened. The minimum time to specify, assume 0,6 s. To ensure that the same event does not release the trigger repeatedly whenever it is detected and signalized at multiple sites, times > 1 s are recommended.
Recognize trigger release	The measurement device should start a triggered measurement if a trigger release is detected on the network.

The trigger distribution is limited to the active subnet!

#### 4.1.1.3.4 Digital outputs SIMEAS Q80 7KG8080

Pre-defined functions can be assigned to the digital outputs. By this means, for example, a variety of measurement states can be signalled by external display elements.

The digital outputs are designed as relay contacts: If a bit's value is 1, the switch is closed. The connected voltage must be supplied from outside. There is **no** internal connectable voltage (TTL etc.)

Clicking in the function column of a binary output opens a list of available functions:

Bit	Function	Cutoff value	
DO1	Live Signal	---	
DO2	Voltage dip	Standard value	90.00 %
DO3	Low free memory	Freely specified...	50.00 MB
DO4	Asymmetry	Standard value	2.00 %

##### Digital outputs

LED – shines green when the relay is closed.

For cutoff values, values can either be defined or parameters of the selected standard can be used.

Function	Description
Live Signal (device active)	The closed relay contact (LED=green) indicates that the device is measuring. When the measurement is closed, the relay opens automatically (LED=red)
Power outage	The relay closes whenever a power outage is detected. The cutoff limit is entered in % of the operating voltage.
Low free storage	The relay closes when the free data storage falls below a cutoff limit. The cutoff limit is specified in MBytes.
Asymmetry	The relay closes when the asymmetry exceeds a cutoff limit.

#### 4.1.1.3.5 LED indicator SIMEAS Q80 7KG8080

The LED functions are permanently allocated:

Name	Function
LED_01	Measurement active
LED_02	Trigger condition recognized
LED_03	No synchronization signal present
LED_04	Frequency not measurable
LED_05	Low free memory
LED_06	System error

##### Interpretation of the LEDs

#### 4.1.1.3.6 Supplementary parameters

Under "Additional parameters", you will find the tolerance ranges for data reduction and the parameterization of the message transmission (see Chapter [Messaging](#)<sup>[11†]</sup>). Optionally, the plot of the RMS-values' min/max points is recorded.

Expert insight into *SIMEAS Q80 7KG8080's* data processing methods is required for the purpose of making changes to this page, since any changes would render with the EN50160 standard void. Furthermore, the resulting data volume will be strongly affected– see e.g. Instruction manual section *ComputationsMemory management \ Aggregation intervals*.

4.1.1.3.6.1 Recording of mean values

Record of averages

	State	Averaging interval	Minima	Maxima
U RMS	active	10 min	Calculate	Calculate
I RMS	passive	10 min	-	-
f	active	10 s		
Pst	active	10 min		
Pf5	passive	0.1 s		-

Recording of mean values



Note

Per default the parameters are set to comply with the norm EN 50160. With different intervals an evaluation according the EN 50160 can not be assured.

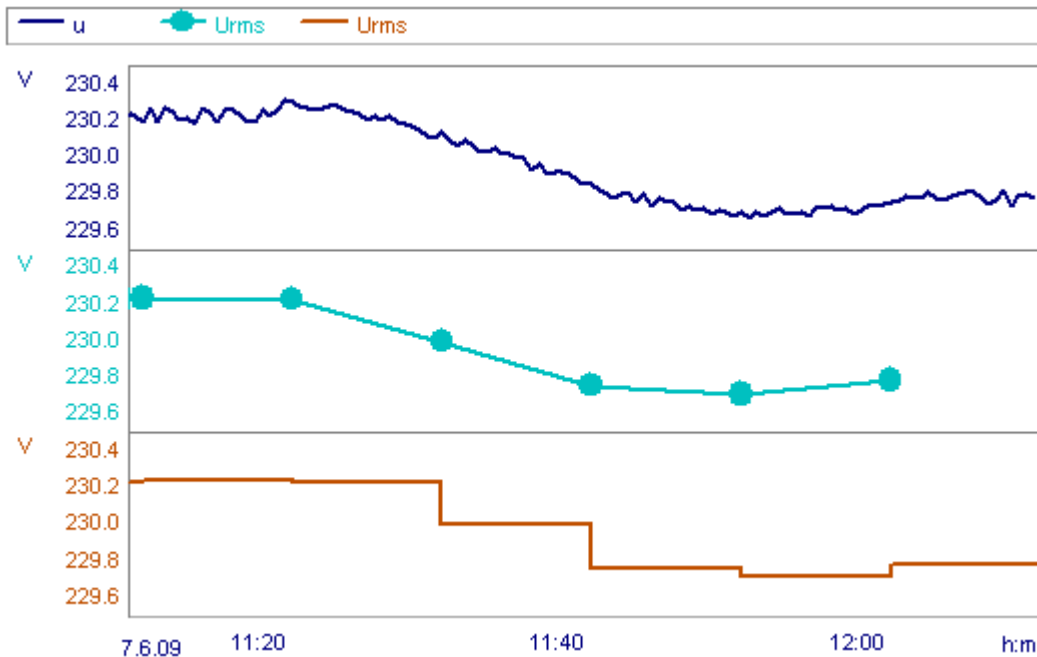
Recording of the mean value enables the following computations and their activation:

- When you click on a cell with the mouse, a selection list with available options appears. The first column and any empty cells cannot be edited.
- Setting of the mean value intervals for various measurement variables.
- Activation of the recording of Min/Max values
- Activation of calculation of a variable (e.g. the flicker Pf5-value is deactivated as the default setting.)
- The aggregation intervals for "U RMS" and "I RMS" cannot be set separately!



Note

The averaged value appears in the curve window at the chronological start of the averaging interval. In the line display mode "Steps", the average value is displayed over the entire averaging interval.



## 4.1.1.3.6.2 Tolerance range and data reduction

Data reduction tolerance range

Voltage L1-L3:	<input type="text" value="1.5"/>	% of the operating voltage
Voltage L4:	<input type="text" value="5"/>	% of the operating voltage
Current L1-L3:	<input checked="" type="checkbox"/> active <input type="text" value="3"/>	% of the input range
Current L4:	<input type="checkbox"/> active <input type="text" value="3"/>	% of the input range

## Data reduction tolerance range

- The data reduction tolerance range influences how voltage events are detected. The wider the tolerance range, the less precise the recognition of events will be.
- With the voltages L1-L3, the tolerance set is the range nominal voltage  $\pm 10\%$ . Outside of that range the tolerance is divided by 2. For minor voltage fluctuations, you obtain highly reduced data (in extreme cases, less than for the averaging). If the voltage leaves the "good range", there is more precise recording, for better plotting of dips/surges.
- The current measurement channels can be deactivated since the accumulation of data can be very high when there is strong fluctuation!

## 4.1.1.3.6.3 Events / Messages

Events / Messages

To generate a messages use:

Voltage event  eMail (small) hotline@imc-berlin.de

free space < 0 MB

Cyclical notification (0 h)

UDP data storage state Port:  Received IP-address:

Time interval:

## Events, messages and UDP

**Sending messages:** The measurement device can send messages in response to particular events. For an exact explanation of the function and [configuration](#)<sup>[116]</sup>, see the section [Messaging](#)<sup>[111]</sup>.

The measurement device can send cyclical messages about the conclusion of the data measurement.

**UDP measurement data status**

The measurement device can send cyclical messages about the conclusion of the data measurement. The message contains the device recognition as well as information about concluded measurements, so that for consecutive measurements it is possible to recognize whether new measured data are available to be retrieved. The User Datagram Protocol (acronym UDP) is a minimalistic network protocol in the transporter branch of Internet protocols.

The message recipient must be stated:

- IP-address: Address of the PC which is receive the messages.
- Port: Target port for receiver
- Time interval: Sending interval in minutes. The entry is made either manually or by means of the pop-down list.

Example: Sending a message every 10 min:

IP-address: 10.0.2.10; Port: 1205; time interval: 10 min

**Note**

Relevant standards are available as templates defined in [Standard and limits](#)<sup>[57]</sup>.





4.1.1.3.6.4 Limited data monitoring

limited data monitoring (recommended in case of slow connection to the device)

Any measured data with sampling rates higher than 1Hz are not transferred to the PC.  
 This means that the raw data and the triggered data are not visible at the PC.

4.1.1.3.7 Memory management

These settings affect the hardware and thus the *SIMEAS Q80 7KG8080* unit must be connected for this purpose. There are options for time-limited measurements and for a trial measurement.

Memory management

Data storage on device hard disk

Storage location:

Measurement intervals:  interval begins:

Overwrite oldest data if memory space exhausted:

Storage space for events and triggers

Storage option:

If free space is less than  stop trigger recording

Possible measurement duration

		Trigger condition met	
		1 per day	5 per day
With free disk space	: Unknown free space	?	?
Entire hard drive ( 2 GB )	: 1 Year + 39 weeks	1 Year + 39 weeks	1 Year + 38 weeks
Memory required for triggered acquisition			
1 Event	: 12.19 KB		

Dialog for data storage settings

**Storage space:** Selection of the storage medium. With *SIMEAS Q80 7KG8080*, only Compact Flash cards are used.

**Save interval:** Parceled capture of data is not yet supported.

**Storage options for events and triggers:** This option lets you set sensible limits to the data volume resulting from capture of trigger events.

- With **Use available space**, triggered data are captured until the hard drive is full. Then, since there is no more

space for more data, data capture ends.

- **If free space is less than...** prevents triggered acquisition from leaving less space than the amount you specify here.
- In the box **Possible measurement duration**, an estimate of the measurement duration based on the current settings is displayed. Additionally, the data volume to be expected based on the triggers set is indicated, which also serves to estimate the maximum measurement duration.



#### Note

- Calculation based on the actually free memory on the Flash-card is only performed if the measurement device is connected. If there is no connection yet, a memory card 2 GB in size is assumed.
- Some foresight must be exercised for correctly saving data to the hard drive. For instance, when the drive is almost full, it must be ensured that all data still to be accumulated on all channels are saved all the way up to the measurement's completion. In a configuration with the maximum channel count, however, up to 4 MByte of memory on the hard drive may remain reserved.

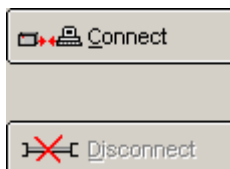
## 4.1.2 Measurement

Once a measurement has been prepared under *Setup*, it can be run under *Measurement*.

### 4.1.2.1 Connect/Disconnect - SIMEAS Q80 7KG8080 in a network



Example of a complex network with PCs and multiple SIMEAS Q80 7KG8080



A device of the type *SIMEAS Q80 7KG8080* can only ever be connected with one PC. To enable a second user to observe a measurement in progress, the device must first be enabled. This is accomplished by hitting the "Disconnect" button.

#### Sample case:

User 1 configures Device 1 using *SIMEAS Q80 Manager* on PC1. Next, user 1 starts the measurement, for which it must necessarily be connected with device 1. User 1 remains connected as well.

User 2 sits in a different location from user 1 and also starts measurement *SIMEAS Q80 Manager* on PC2. User 2 tries to connect with device 1. It contains an error message indicating that the device is already connected. For user 2 there is no way to force a connection to be set up. He must request user 1 to disconnect from the device.

Once 1 has disconnected the device from his PC, user 2 can set up a connection and observe the measurement in progress.



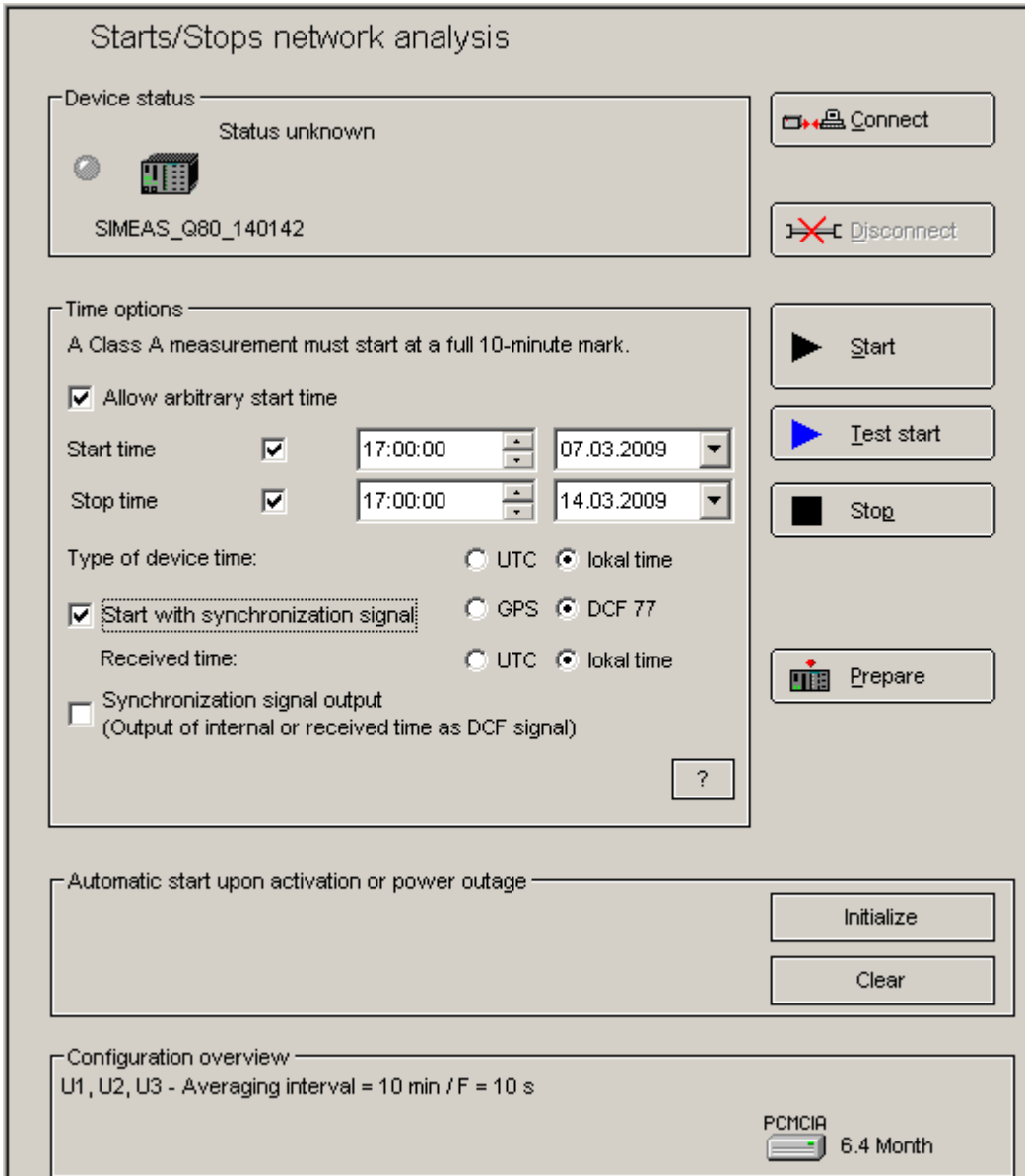
#### Note

At any given time, *SIMEAS Q80 Manager* allows connection with only one device. If multiple *SIMEAS Q80 7KG8080* are to be configured, this can only be done one-by-one.

If *SIMEAS Q80 Manager* is closed while a connection exists to the device, it is automatically disconnected. Afterwards, the device can be connected with other users.

### 4.1.2.2 Start/Stop Network analysis

From here is where to access the hardware. By the time you open this dialog, the *SIMEAS Q80 7KG8080* device needs to be connected. There are options for timed measurement and for a trial measurement.

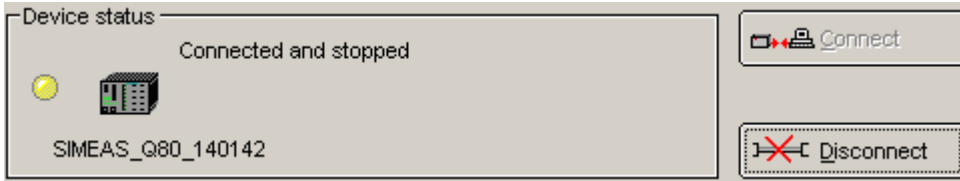


Start measurement dialog

When you go to the Start dialog, you initially see a flashing display of the message Determining status.... The software starts the device driver for *SIMEAS Q80 7KG8080* and queries the device's current. Depending on whether the device is in its resting state or running a measurement, the function (and labeling) of the buttons changes.

If the measurement device is not available, this takes longer to determine, since the system must wait for the maximum possible response time to elapse!

Supposing you have not yet begun a measurement and the device is in its **Online and stopped** state (connected):



**Starting the measurement** involves the following steps:

1. **Connection:** The software sets up a network connection.
2. **Preparation:** The settings for the measurement task are written to the device. Then the device is ready to measure.
3. **Start:** Data capture is started. (Clicking on "Start" right away causes all three steps to be performed immediately).

The device state indicated is now **Measurement active**. As long as the device is connected to the PC, data are continuously transmitted to the PC via the communication network. This is absolutely necessary for the online display but it makes heavy demands on the communication network's resources.

Clicking on **Disconnect** ends the link between the computer and the measurement device. This neither ends nor disturbs data acquisition, since all measured data are saved to the internal removable hard disk.



The device setting indicated now is **Off-line, measurement active**. After disconnecting from the device, you can close the *SIMEAS Q80 Manager* software and deactivate the PC. To resume work, restart the program and re-connect the PC to the device. You can connect and disconnect as often as desired.

To **end the measurement**, the PC must be connected to the device. Use the button **Stop**. All folders on the hard drive are closed. Alternatively, you can end a measurement using the device's Start/Stop-button. But to use the button to start a new measurement isn't possible!



#### Note

- **Connecting to a running measurement** is only possible from the computer which was used to **start** the measurement. But stopping is always possible.
- When you disconnect, a connection file **\*.umt** is created on the host PC. This file is used to identify the running measurement. Without this "key", no connection can be made to a device while it's running a measurement.
  - During active measurement and online monitoring, various pages of the *SIMEAS Q80 Manager* are disabled.
  - Changes to the settings only take effect at the start of the next session.

### 4.1.2.2.1 Connecting

When connecting to a measurement device, it makes a difference which of several situations is in effect:

**1. Device is in rest state:**

Connection is carried out.

**2. Device has been disconnected from the PC during a running measurement**

A dialog prompts the user to decide whether to connect during the running measurement or to stop the measurement.

When connecting to the running measurement, the currently open measurement configuration is closed and the configuration required by the device is read and loaded. The program connects to the device and goes into measurement mode. If the required measurement configuration is not found, the process can be aborted. The device continues to carry out measurements without any connection having been made.

If the user chooses to stop measurement in order to set up the connection, the current measurement configuration remains open and unchanged.

**3. The device was previously disconnected in an uncontrolled manner**

The user is notified that connection is only possible after first stopping measurement. If the process is aborted, the device continues measuring without any connection having been made.

**4. Measurement device takes measurements after an automatic start**

Same procedure as under Point 2 above.

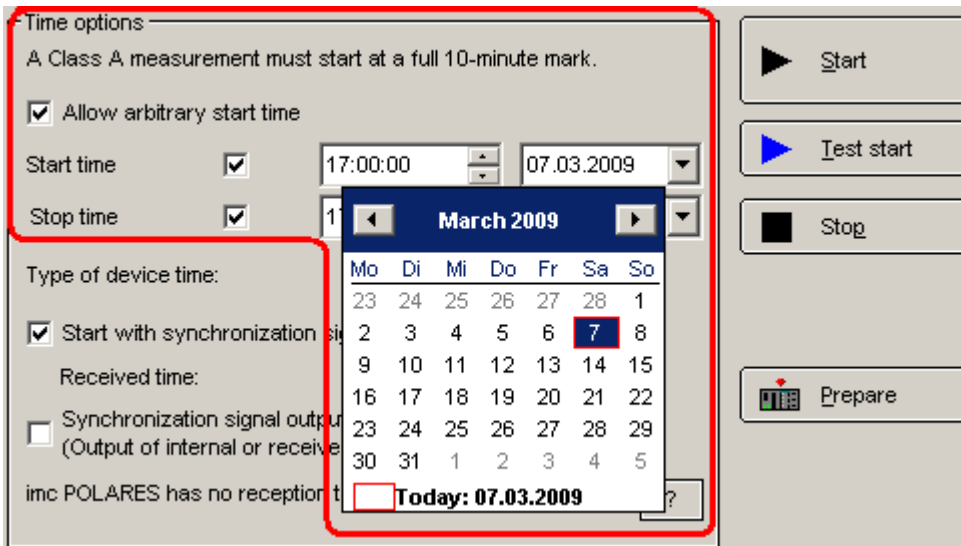


**Note**

**Connecting during a running measurement** is only possible from the computer from which the measurement **was started**. Conversely, it is always possible to stop the measurement.

### 4.1.2.2.2 Setting the start/stop time

Click on the check box **Start or Stop** to make the controls for the time and date appear:



If the option *Allow arbitrary start time* is not selected, it is always necessary to enter a starting time with this time pattern, or other times are rounded up.

*Class A Measurement:* The standard IEC61000-4-30 requires for this class of measurement that the start is at the stroke of a multiple of ten minutes of actual time, in order to enable comparison of data from different, spatially separated measurements. See also the menu item *Extras* ⇒ *Options* ⇒ *Start*.

**Note**

- Even if you have set a starting time, you must click **Start** to prepare measurement by timed start.
- You can specify either the **Start time** or the **Stop time** or both.
- You can also use settings aid such as **arrow buttons** and **calendar**.

Time options

A Class A measurement must start at a full 10-minute mark.

Allow arbitrary start time

Start time  17:00:00 07.03.2009

Stop time  17:00:00 14.03.2009

Type of device time:  UTC  lokal time

Start with synchronization signal  GPS  DCF 77

Received time:  UTC  lokal time

Synchronization signal output  
(Output of internal or received time as DCF signal)

imc POLARES has no reception to synchronise. ?

Start

Test start

Stop

Prepare

**Time options**

The device time type is recorded along with the measured data. This makes comparison of different measurement data possible.

*Type of device time*

- Selection of either UTC or local time.
  - Local time: The indicated PC time is written with the measured data.
  - UTC (Universal Time Coordinated): The world-wide accepted reference time is written with the measured data. The prerequisite is that the PC time is correctly set with UTC + deviation.
- The *Type of device time* is ignored if *Start with synchronization signal (GPS/DCF/..)* is activated.

*Start with synchronization signal (GPS/DCF/..)*

- Input of the time type of the synchronization signal. In contrast to *Type of device time*, this entry is not arbitrary. The time type is determined by the external timer, but can not be queried by the *SIMEAS Q80 Manager*. For this reason, the user must manually enter the time type here.
- If you wish to change time types, the timer must be reconfigured. To learn about this, read the instructions for your timer.

**Note**

In general, GPS receivers come with the ability to process the received UTC time internally in order to provide the measurement device with the local time. The manufacturer of the GPS receiver provides configuration software for this purpose.

DCF77 works with the local time as a rule. However, it is possible to synchronize a GPS-equipped device A to UTC time. Device A then transmits its UTC time to device B as a DCF77 signal via the Sync terminal. In this case, device B receives UTC time via DCF77.

*Synchronization signal output*

- The device can output the internal clock as a time signal via the synchronization terminal. An adjacent device which as a time signal recipient is supplied with this signal, can be synchronized in this way. The measurement then runs synchronously on both devices. This means that different measured values from the exact same time can be compared. Even without an external GPS or DCF clock, it is possible to synchronize multiple devices with each other.
- For output of a time signal, no external clock needs to be connected!

**4.1.2.2.3 Test start**



To check your settings, it's possible to perform a test measurement. In this case, measured data are not saved. Click on the online monitoring to view the data measured.



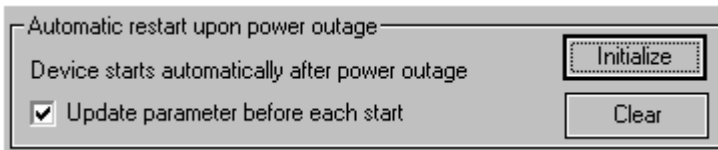
One-time triggering and transmission of messages. Strongly recommended for verifying the connection parameters entered.

This button only appears if a [message](#) has been defined and the device was prepared.

**4.1.2.2.4 Automatic restart upon power outage**

SIMEAS Q80 7KG8080 has a number of features intended to ensure uninterrupted monitoring.

1. The device's built-in UPS secures continued measurement operation despite short-term failure of the power supply.
2. The device's automatic self-starting capability enables continuation of measurement following either a longer-term power outage or continual short outages: if the internal rechargeable battery's capacity is insufficient, the current measurement ends automatically. In this case, proper closure of all measurement files is ensured.



The automatic starting mode can also be used to prepare and test a measurement at the office. When SIMEAS Q80 7KG8080 is subsequently hooked up at the measurement site and activated, measurement can begin without any further configuring.

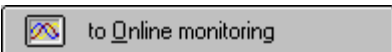
The button *Initialize* writes the current setting to the device a single time.



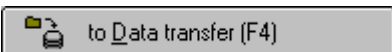
**Note**

- After initialization, these measurement settings are in effect until the removable data carrier is totally cleared or the configuration is deleted.
- Regardless what other measurements are performed in the meantime, upon activating the device, exactly this measurement is started again.
- If the removable data carrier is removed and inserted into a different SIMEAS Q80 7KG8080 unit, the new unit will in turn start with this measurement.

**4.1.2.2.5 Switching to other views**



This option can be activated during a running measurement. The system skips to the branch [Standard display- Overview](#) and displays important data already during the measurement. This also includes the alarm messages.



This takes you directly to the Data Transfer branch.

### 4.1.2.3 Standard display and Free display

For data display during a running measurement, there are two basic curve window types.

The **Standard display** offers pre-defined views covering all basic curve types.

- **Frequency, RMS, V, I:** Display of the RMS-values of voltage and current. Any events which occur and instantaneous frequency.
- **Original U, I:** Display of the original voltage and current signals.
- **Power:** Display of power curves
- **Overview:** Display of all important values as well as vector representation of voltage and current.
- **Harmonic online:** Harmonic voltage and current values
- **Harmonic - effective power:** Harmonics of the active power – the direction of the power can be distinguished
- **Free display:** Up to four curve windows next to each other can be filled with any measurement channels.

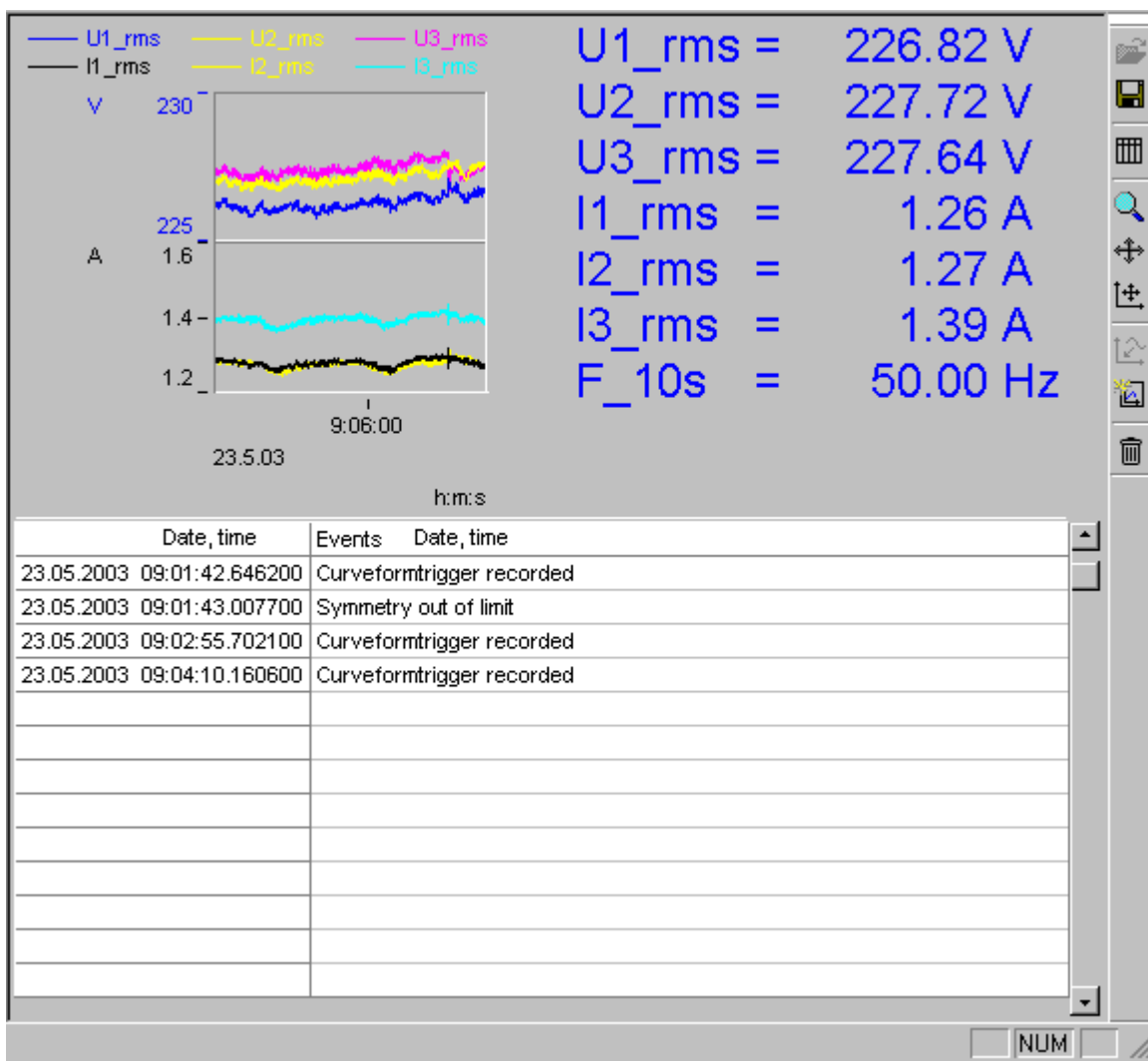
These windows can't be changed or deleted.

If you change a standard window, you can save it among the free displays (except the total overview and the display of harmonics).

#### 4.1.2.3.1 Standard display

There are four standard windows which provide a comprehensive view of the data:

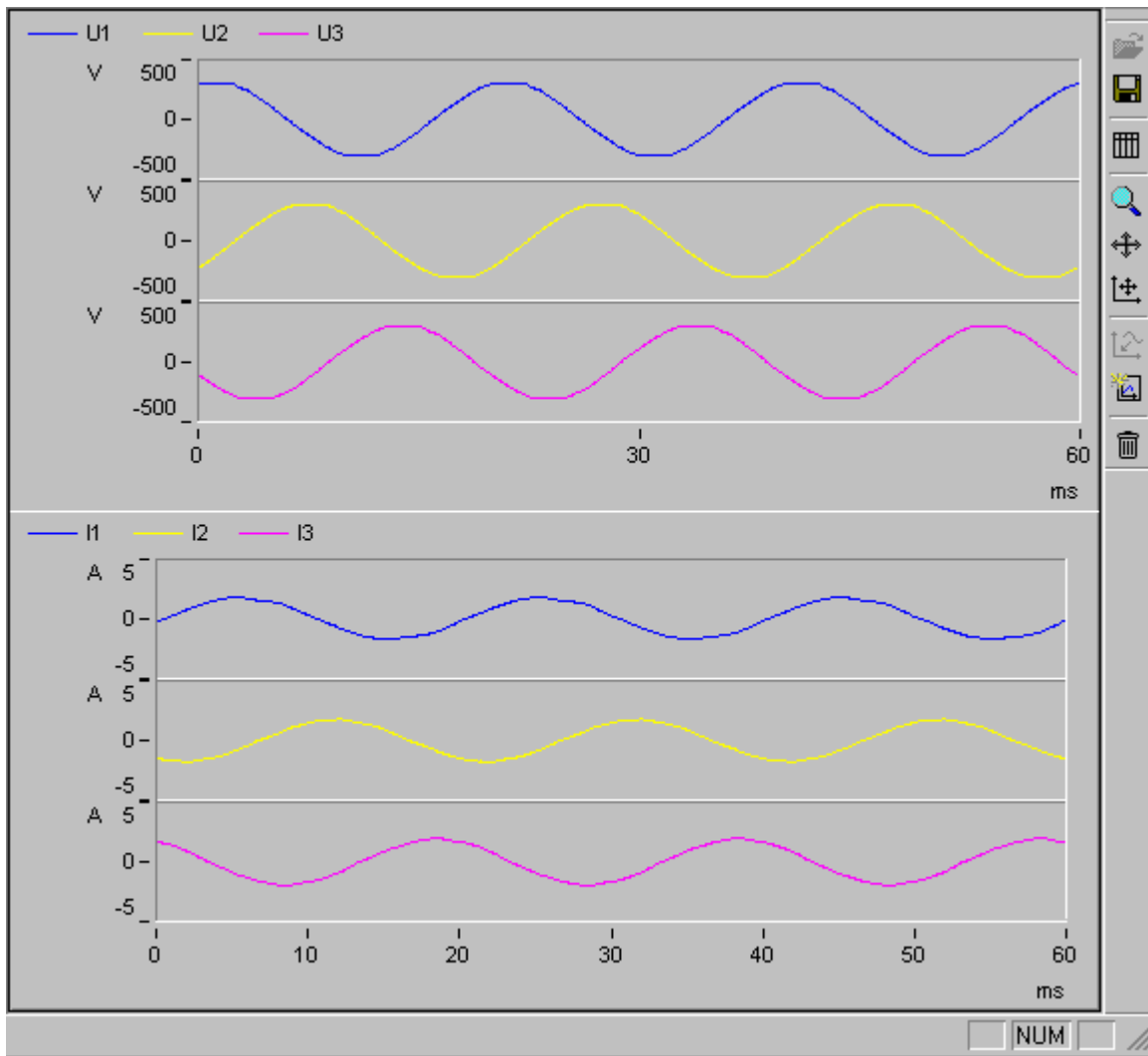
**F, RMS, U,I**



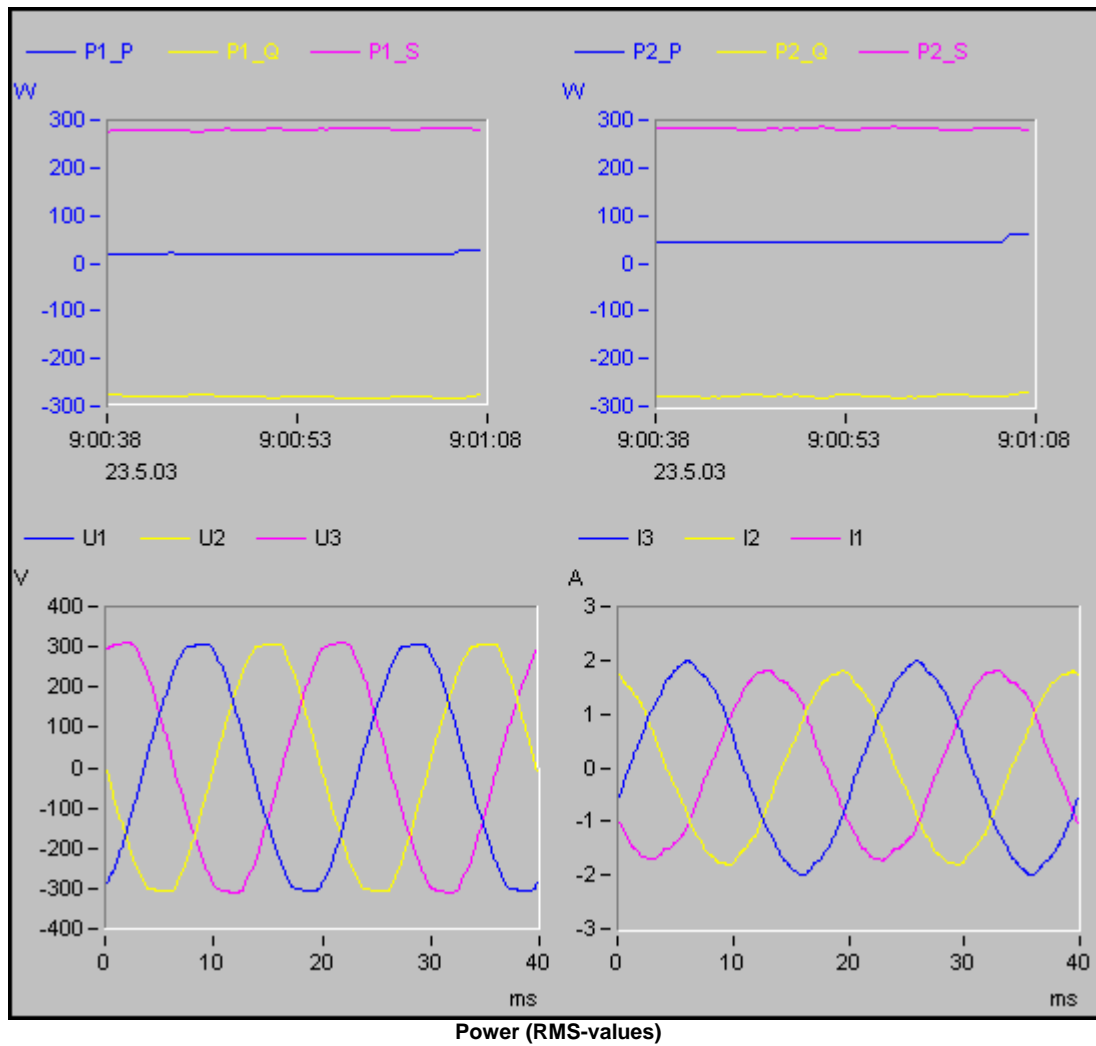
Frequency, RMS, voltage and current (RMS-values)



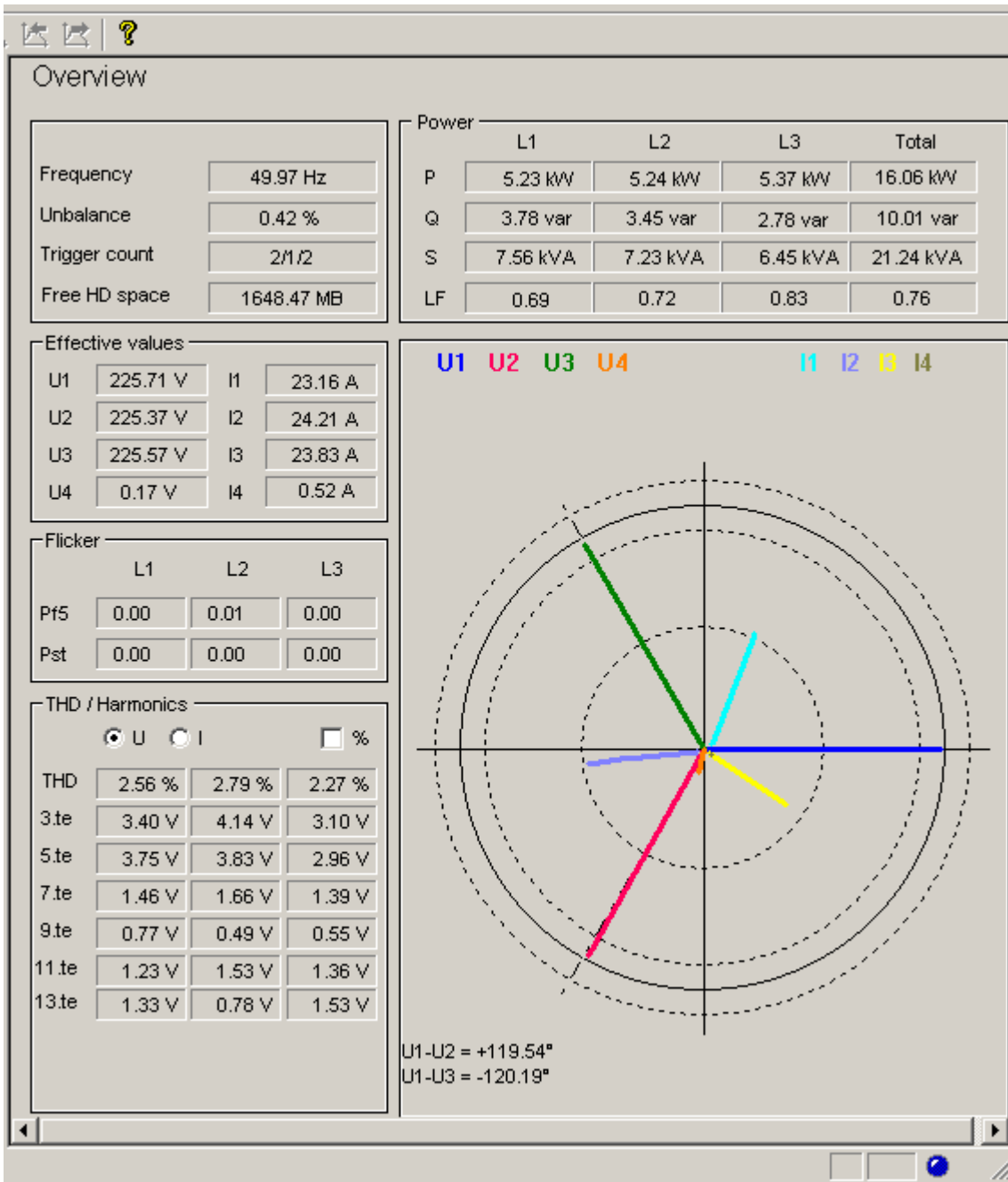
**Original V, I**



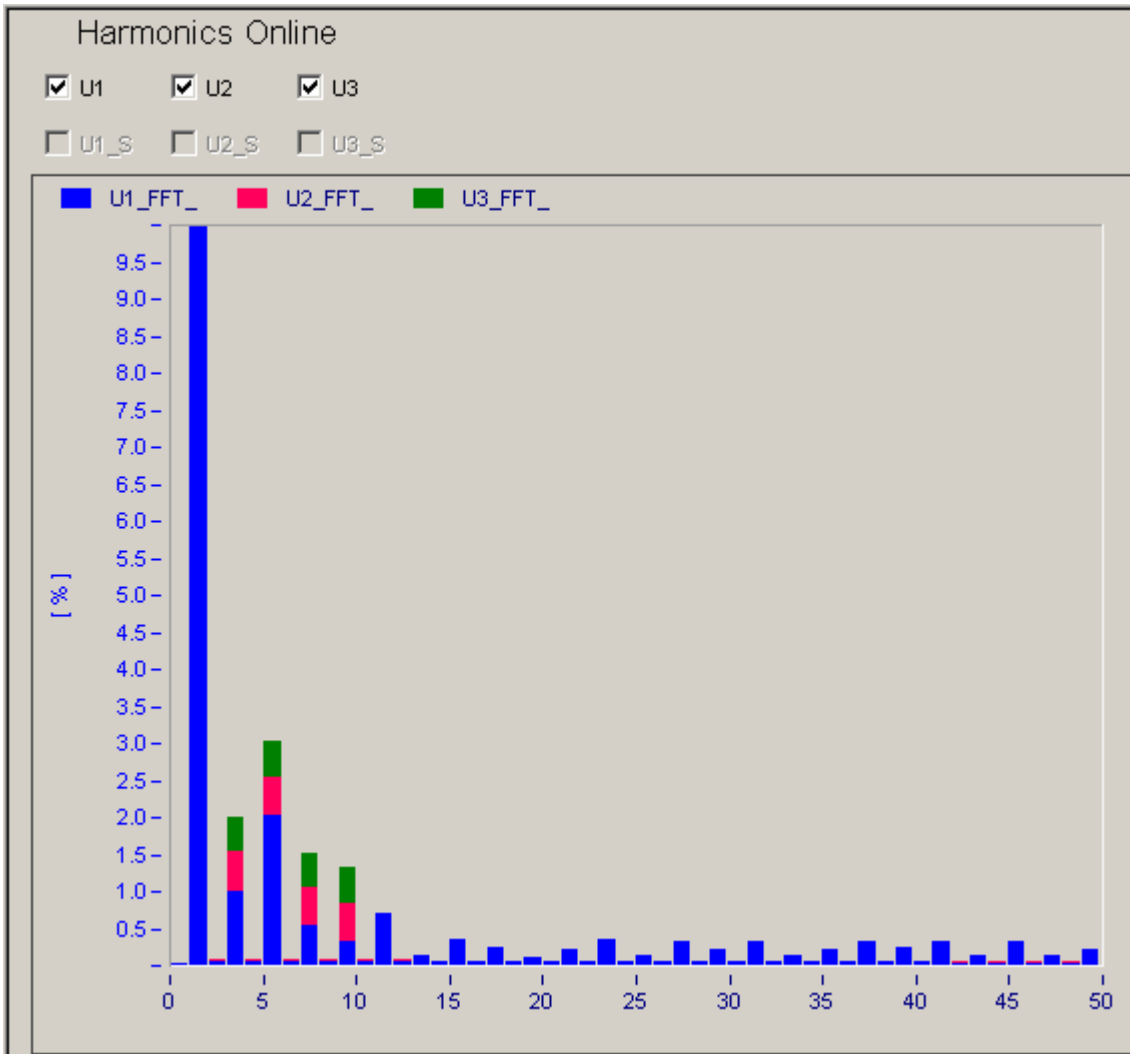
**Instantaneous voltage and current values**

**Power**

Overview



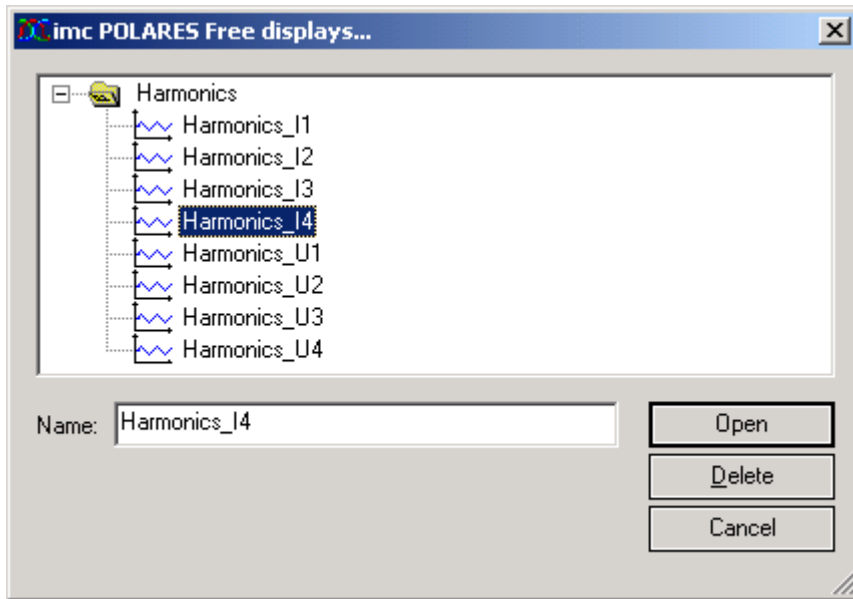
Overview of all important values and a vector diagram for displaying phase angle between conductors

**Harmonics Online**

Overview of the harmonics U, I of Lines 1,2 and 3

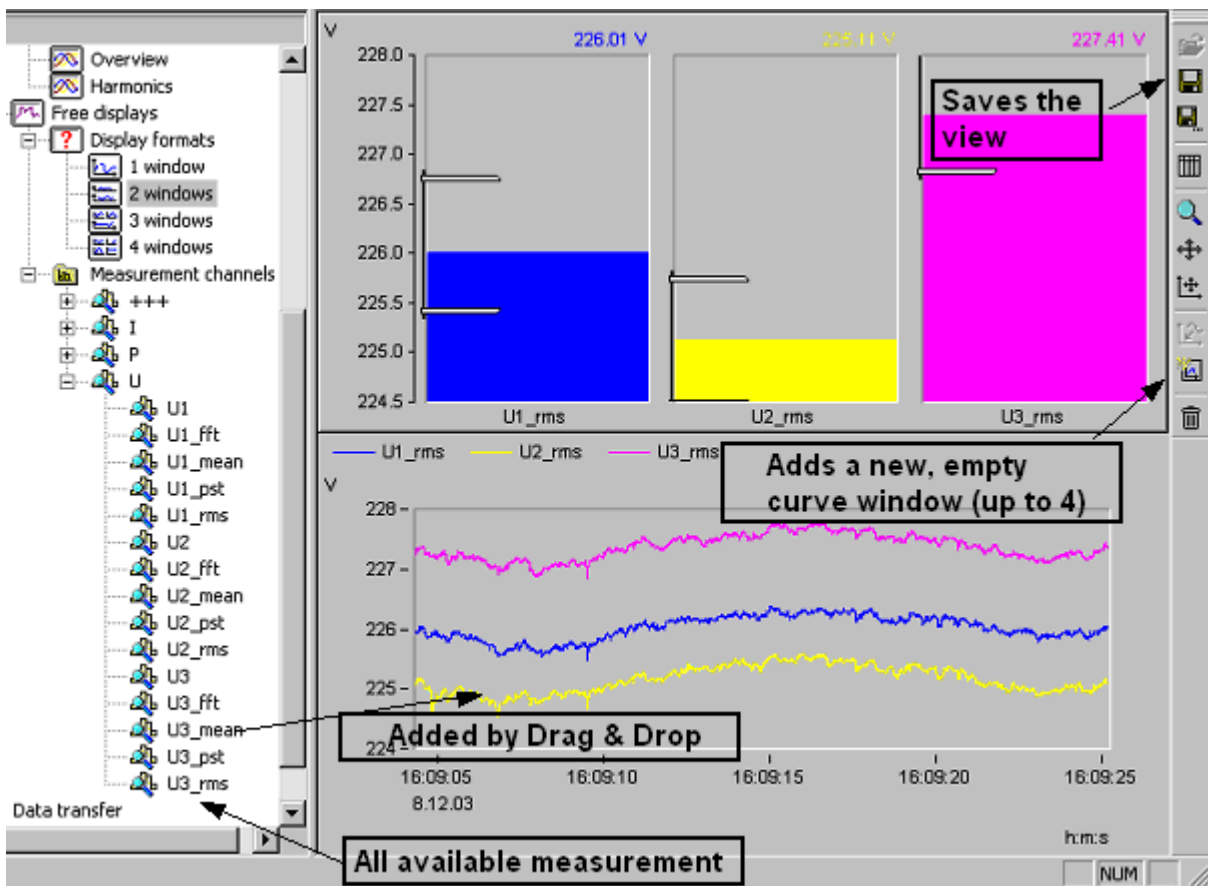
The harmonics to display can be selected individually. Changes of the display, usually adaptation of the scaling to the existing level, can be saved and opened via the toolbar.

Opening a saved view:



#### 4.1.2.3.2 Free display

Here you can design curve windows to suit your wishes, which are added to the tree diagram upon being saved.



Example of a bar chart of voltage RMS-values

### 4.1.3 Data transfer

This dialog enables convenient data transfer:

- Use **Select device...** to specify the desired *SIMEAS Q80 7KG8080* unit if you have multiple devices in your communication network.
- Clicking on **Search hard disk** to read out the contents of the selected measurement device's hard drive. The function initially starts with a search window while the software prepares a list of all data present on the device hard drive. The measurement's **Location**, **measurement task name**, **Start time** and **End** are indicated.
- If you wish to read-in the data stored on the Compact Flashcard inside a laptop slot, for example, select **Search PC**.

Measurements present in the device SIMEAS\_Q80\_140135:

Location	Measurement task	Start time	End
R&D	longterm_135_Synth	03/27/09 16:55:59	03/30/09 14:14:18
Teststation	Power2_PN	03/26/09 16:24:27	03/26/09 16:25:58
top_right	System_top_right	03/24/09 13:43:15	03/25/09 15:26:13
top_right	System_top_right	03/24/09 13:42:05	03/24/09 13:42:29
top_left	System_top_left	03/24/09 13:40:18	03/24/09 13:41:56
top_right	System_top_right	03/24/09 13:39:26	03/24/09 13:39:32
top_right	System_top_right	03/24/09 13:38:55	03/24/09 13:39:17
middle_right	System_middle_right	03/24/09 13:37:33	03/24/09 13:38:46
top_left	System_top_left	03/24/09 13:36:03	03/24/09 13:36:35
Test2	Testfall_Siemens1	03/24/09 13:30:52	03/24/09 13:35:50
Test2	Testfall_Siemens1	03/24/09 13:20:24	03/24/09 13:27:41

Transferred measurement data:  Load transferred data configuration

Location	Measurement task	Start time	End	Size
<input checked="" type="checkbox"/> Teststation	Power2_PN	03/26/09 16:24:27	03/26/09 16:25:58	34.46 KB

PC data storage: (C:\Documents and Settings\All Users\Application Data\SIEMENS\SIMEAS Q80\Data\)


Total capacity	Free	C:\Application Data\
7.99 GB	2.44 GB	

Device hard drive(s) SIMEAS\_Q80\_140135:

Removable drive	1.90 GB	1.33 GB

Data transfer selection window

Next, the following options are available:

- **Selecting data to transfer:** By dragging the entries for data from the upper list to the lower list, data from the source is transferred to the target. Alternatively, select the desired entries to highlight them and click the button .
- **Deleting data:** Highlight the data to be deleted in the upper list and then click **Delete**.

Once the data has been successfully transferred, the data in the lower list appear with a checkmark.

*SIMEAS Q80 7KG8080* data are stored on the device's hard drive in a **special format**. Only upon being transferred, the data are converted to a format which can be read.



**Note**

- **Measured data on the hard drive which originate from *SIMEAS Q80 7KG8080* can only be processed by *SIMEAS Q80 Manager* software!**
- If your PC is equipped with a Compact Flashcard drive, the hard drive can be removed from the *SIMEAS Q80 7KG8080* unit and inserted into the PC, and the data to be transferred are selected using the button **Search PC**.
- Only *SIMEAS Q80 7KG8080* data contain extra information such as the measurement location and the actual measurement time.
- Information on this page have nothing more to do with the measurement configuration and isn't saved; only the device selection remains.
- With brief measurements it is possible that certain measured quantities can not be determined. In this case, a message appears indicating that no data are available.

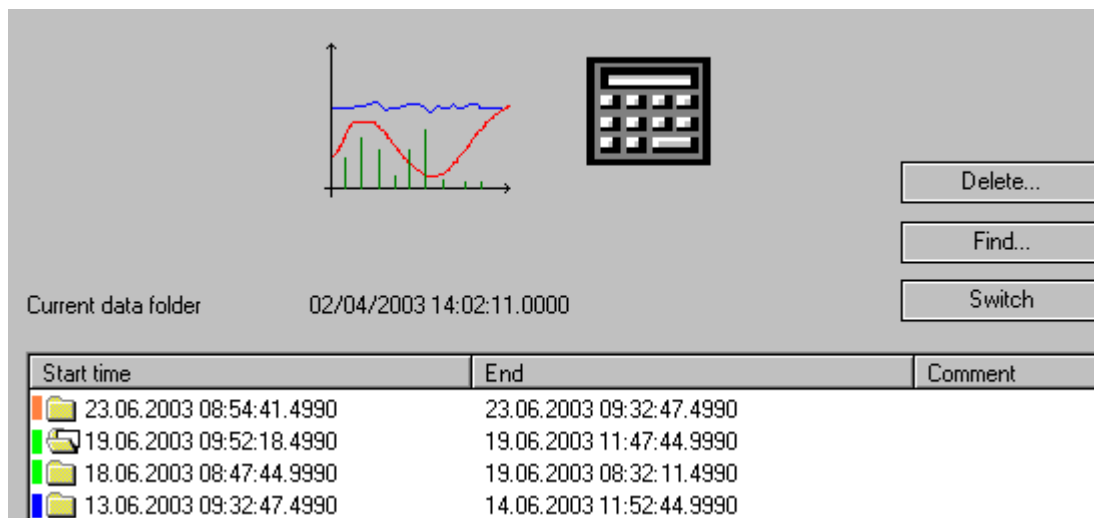
If the extra information could not be found, this is indicated by asterisks around the measurement task name:

*not SIMEAS Q80 7KG8080*	data don't come from <i>SIMEAS Q80 7KG8080</i> !
*auto*	data which were automatically recorded when the device was started, but don't belong to any measurement task
*not ready*	measurement not finished yet -> data transfer not possible
*unkown_place*	couldn't find info about measurement start
*unkown_Exp*	measurement task info not present

## 4.1.4 Evaluation

### 4.1.4.1 Selecting data folders

On the main screen of the task step "Evaluation" all measurements belonging to the current measurement task are listed.



Excerpt of the dialog for selecting data to evaluate

The button **Find...** enables you to select the desired measurement from among those which exist.

Using the button **Change**, you can move to a different source data folder. First highlight the entry in the list for the measurement you wish to evaluate, or alternatively, double-click on it.

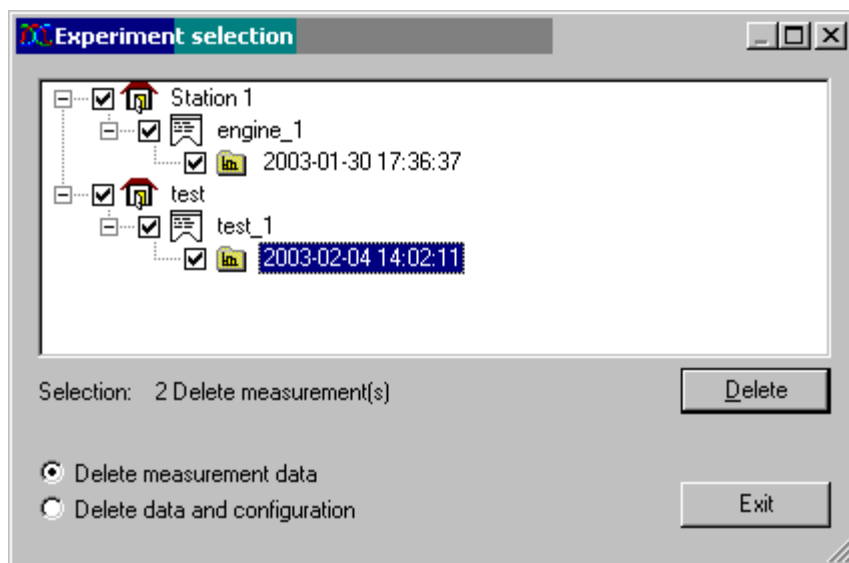
Identical measurement tasks can be recognized by the **color indicator** next to the folder symbol. Consecutive measurement tasks which are alike have the same color."



#### Note

If you have kept curves or calculated results belonging to a previous measurement, these will be deleted when you go to a different measurement. The actual measurement data are preserved, but all views, formats and print layouts are lost.

Use **Delete** to open a dialog for deleting measurement task configurations and measurement data:



Deleting experiments



#### 4.1.4.2 Creating a report

*SIMEAS Q80 Manager* automatically generates a report reflecting all settings.

The *File* menu in the [main dialog](#)<sup>[84]</sup> contains the following items:

- The menu item *Print* sends the report to the printer.
- *Report*:
  - *With Add Page*, you can add the current display of measured data to the report. The new page is appended to the existing report, respectively, a new report is created.
  - *With Export page*, an image is created which is saved by default in C:\Documents and Settings\All Users\Application Data\SIEMENS\SIMEAS Q80 7KG8080\Output.
- *With Page Preview*, the report is displayed in the Report Generator. You can edit the report further in the Report Generator, and from there either print it or export it in PDF format, for instance.



#### Note

Views in portrait and landscape format cannot be combined! A separate report is created in either format.

#### 4.1.4.3 Standard and limits

The most important setting made before the start of an evaluation is of the limit values. By default, the limit values specified in the standard EN50160 are used. You can access already available files or create your own set of limit values. The *SIMEAS Q80 Manager* product package already includes the **limit values** for the European standard **EN50160**. Since this standard doesn't include all signal attributes which the software is able to determine, there are a few extra parameters. These are denoted by asterisks.

The fill-out form states all values currently in effect. The limit values can be changed and saved under any name specified.

## Standard and cutoff values

Standard used: EN 50160

EN 50160

EN 50160 MV

Category

Cutoff values

Long-term flicker

95 % of measured

1

100 % of measured

1

\* (Values denoted by \* do not belong to the standard EN50160)

Voltage unbalance:

95 % of measured

2 %

100 % of measured

3 % \*

Distortion factor (THD)

95 % of measured

8 % of the operating voltage

Voltage interruptions:  $U(t) <$  1 % Hysteresis 2 % of the operating voltage

Short interruptions until: 1 s duration \*

Long interruption starting: 180 s duration

Long interruption starting: 300 s duration \*

Voltage dips:  $U(t) <$  90 % Hysteresis 2 % of the operating voltage

Duration till: 60 s

Duration  $<$  1 s and  $U(t) >$  60 % of the operating voltage \*Overvoltage:  $U(t) >$  110 % Hysteresis 2 % of the operating voltage $U(t) >$  130 % of the operating voltage \*

Fill-out form for the Standard and cutoff values for the evaluation

**Save:**

Enter the name of the new limit values or overwrite an existing set of values.

**Save as...:**

Saves the limit values currently in effect under a new name.

**Open:**

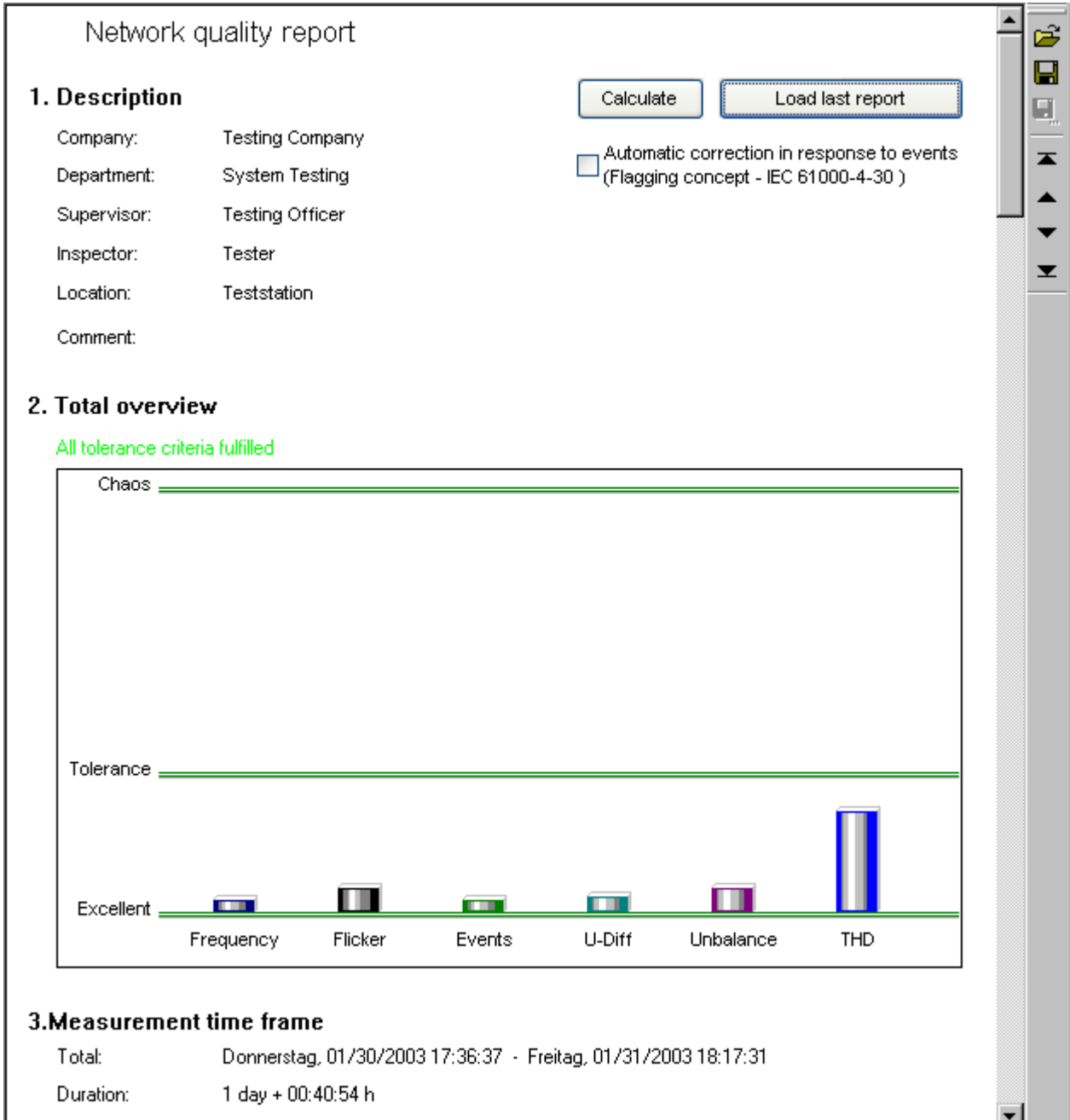
Select a limit value data set and close by clicking OK.

**Note**

- If the limit values specified are incorrect, the results of your evaluation will also be wrong. This is especially true for lists of events, such as dips and interruptions.
- The limit values are saved to the database.

#### 4.1.4.4 Network quality report

This item is for the purpose of composing and printing out a measurement protocol reflecting all parameters required by the standard EN 50160. At the same time, there is an automatic analysis of the measurement results based on the limit values specified. If the option *Automatic correction* is selected, the system takes account of the fact that in cases of voltage dips, overload, or outages, it is possible for invalid network frequency values, voltage fluctuations, flicker, asymmetry, voltage overload and THD to occur, and it prevents the event from being counted repeatedly in various quantities (in accordance with the standard IEC 61000-4-30's flagging technique).



First screen of network quality report

When you move the mouse cursor onto one of the histogram bars, the ranges measured are indicated. Left-clicking the mouse on a bar causes you to jump to the table displaying the explicit measurement results which follows the overview graphic.

The report can be printed out and saved. Since different limit data sets besides EN 50160 can be defined, it's possible to evaluate a measurement according to a variety of requirements and to save the results for subsequent comparisons.

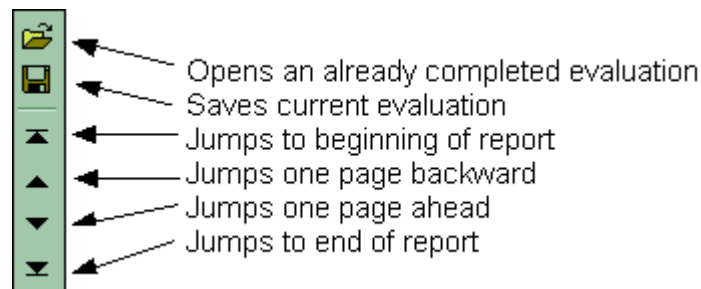
By default, the analysis is carried out for the entire measurement, and other time spans are available as alternative selections.

On the basis of a particular measurement, the analysis can be carried out over different timeframes and with different limits.

Structure of the results tables:

- **Unit** of the following quantities
- **Portion** of the measurement values taken into account for calculations. Usually 95 % or 100 %.
- **limit values**, on which the evaluation is based
- **Conductor (line)** under investigation if there is no evaluation of the overall system
- **Min/Max value** – the extreme signal values which occur during measurement
- **Values out of bounds** are values which exceed the specified limits

Toolbar:



4. Input range			
Nominal voltage:	230.00 V	Power frequency:	50.00 Hz
Operating voltage:	230.00 V		
	L - N	L - L	
At object:	1000.00 V	---	1
At the input:	1000.00 V	---	

**Case 1** - Measurement L-N (4 wire system), no converter

- The device is able to measure up to 1000 V

4. Input range			
Nominal voltage:	20.00 kV	Power frequency:	50.00 Hz
Operating voltage:	19.50 kV		
	L - N	L - L	
At object:	---	20.00 kV	2
At the input:	---	100.00 V	

**Case 2** - Measurement L-L (3 wire-system) with converter in a 20 KV

- operating voltage
- converter: 20kV primary voltage, 100 V secondary voltage

### 5. Network frequency

All tolerance criteria fulfilled

Unit	Component	Cutoff value (Deviation of 50.00 Hz)	Value min	Value max	Values out of bounds
% Hz	99.50	± 1.00 % 49.50 .. 50.50 Hz	-0.133 % 49.93 Hz	0.133 % 50.07 Hz	-
% Hz	100	-6.00 .. +4.00 % 47.00 .. 52.00 Hz	-0.156 % 49.92 Hz	0.171 % 50.09 Hz	-

### 6. Flicker

All tolerance criteria fulfilled

Unit	Component	Cutoff value (Flicker intensity)	Line	Value min	Value max	Values out of bounds
% plt	95	0 .. 1.000	L1	0.055	0.104	-
% plt			L2	0.054	0.109	-
% plt			L3	0.041	0.105	-
% plt	100	0 .. 1.000	L1	0.055	0.177	-
% plt			L2	0.054	0.183	-
% plt			L3	0.041	0.182	-

### 7. Voltage changes


All tolerance criteria fulfilled

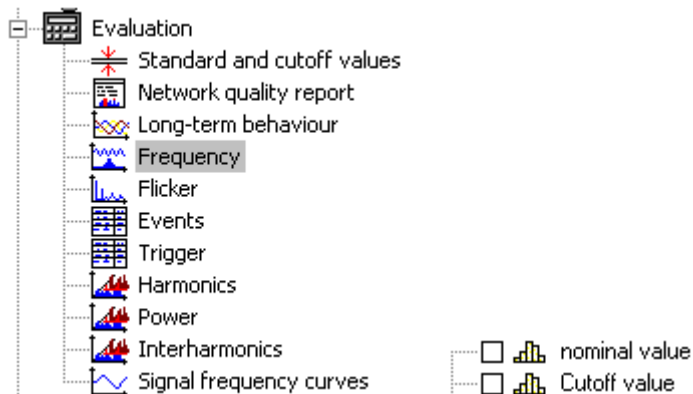
Unit	Component	Cutoff value (% of 230.00 V)	Line	Value min	Value max	Values out of bounds
% V	95	± 10.00 % 207.00 .. 253.00 V	L1	-1.87 % 225.70 V	-0.592 % 228.64 V	-
% V			L2	-1.69 % 226.11 V	-0.327 % 229.25 V	-
%			L3	-1.31 %	0.275 %	-

Second screen of network quality report

#### 4.1.4.5 Evaluation window

Depending on the settings in effect, more than 500 data sets for evaluating a measurement's results can be available, which can be displayed as curves. In order to make this amount of data manageable, the data are grouped according to the results in a **Tree diagram**.

The data of the individual groups can be displayed directly and all other measurement curves can be accessed by means of the button .



#### Calculations

Called via:

- Menu item *Evaluation* → *Histogram*
- Menu item *Evaluation* → *Cumulative frequency*
- Toolbar button
- The calculation selected is carried out on the data set in the curve window selected. If the window contains multiple windows, a selection dialog appears and offers the data sets to which the calculations can be applied.

*Measured data list* and *Extreme value list* → see explanations under “Long-term behavior”, below




*Extreme value list*:

- Double-clicking in an entry displays the maximum value in the corresponding data set
- Right-clicking the mouse opens a context menu:

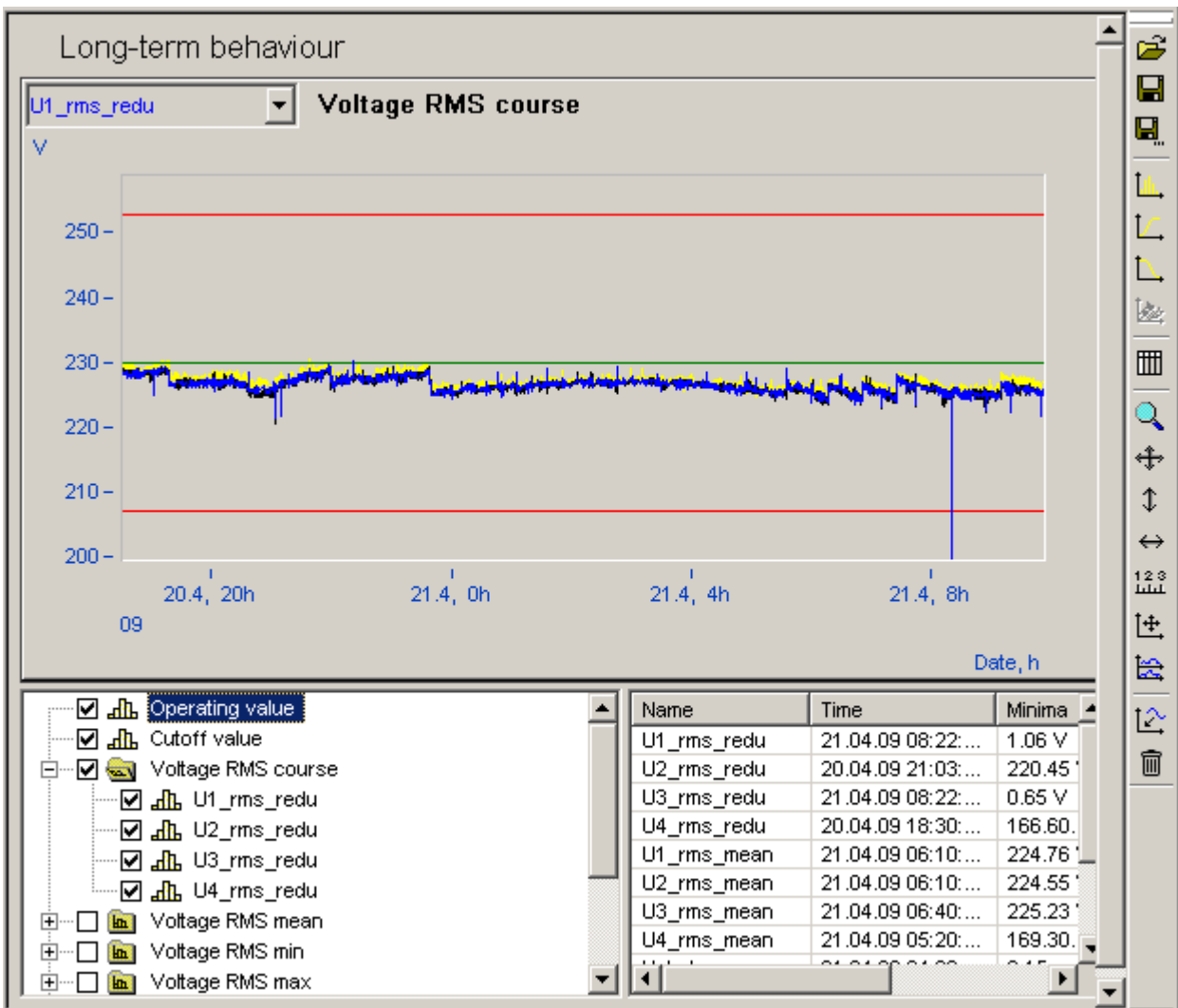
Show	Displays the data curve
Show maximum	Displays the data curve + selects the maximum value
Show minimum	Displays the data curve + selects the minimum value



#### Notes

- Display data in curve window: Highlight the data desired in the measured data list. You can have an entire group of results displayed or can select individual data sets.
- Changes to the curve window can be saved  /  and opened again later 

#### 4.1.4.5.1 Long-term behavior



Long-term behavior of the RMS-values of U1 with maximum and minimum values. The green line at 230V shows the nominal value, the red lines at 208V and 253V the permissible cutoff values

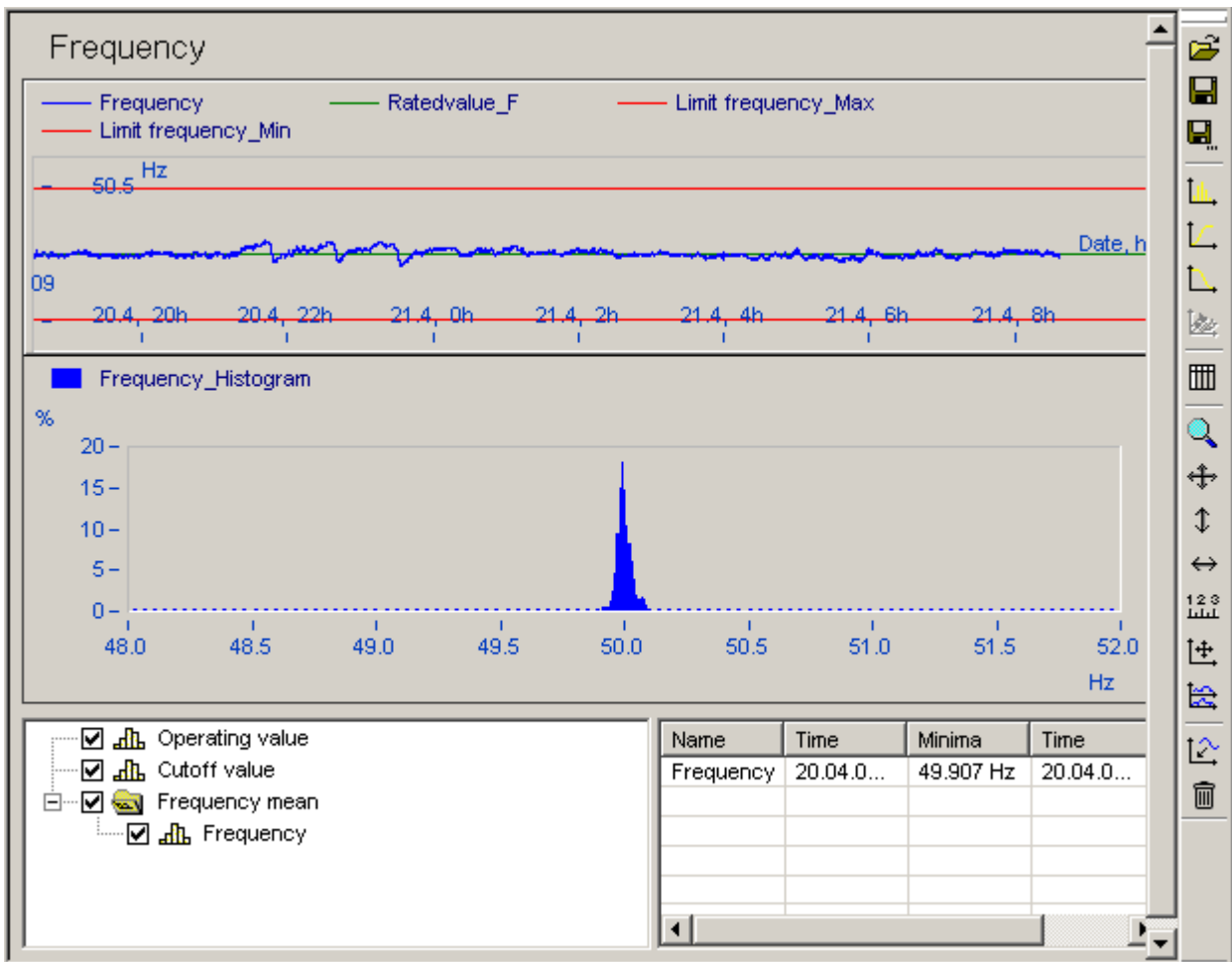
##### Measured data list

- Nominal voltage value
- limit values for slow voltage fluctuations
- Data-reduced voltage plot
- Mean values, minima and maxima in the aggregation interval for the voltages

With simultaneous current measurement:

- Data-reduced current plot
- Mean values, minima and maxima in the aggregation interval for the current
- Balanced components, Unbalance
- Digital inputs

#### 4.1.4.6 Frequency



Frequency over time and distribution in a 50 Hz network

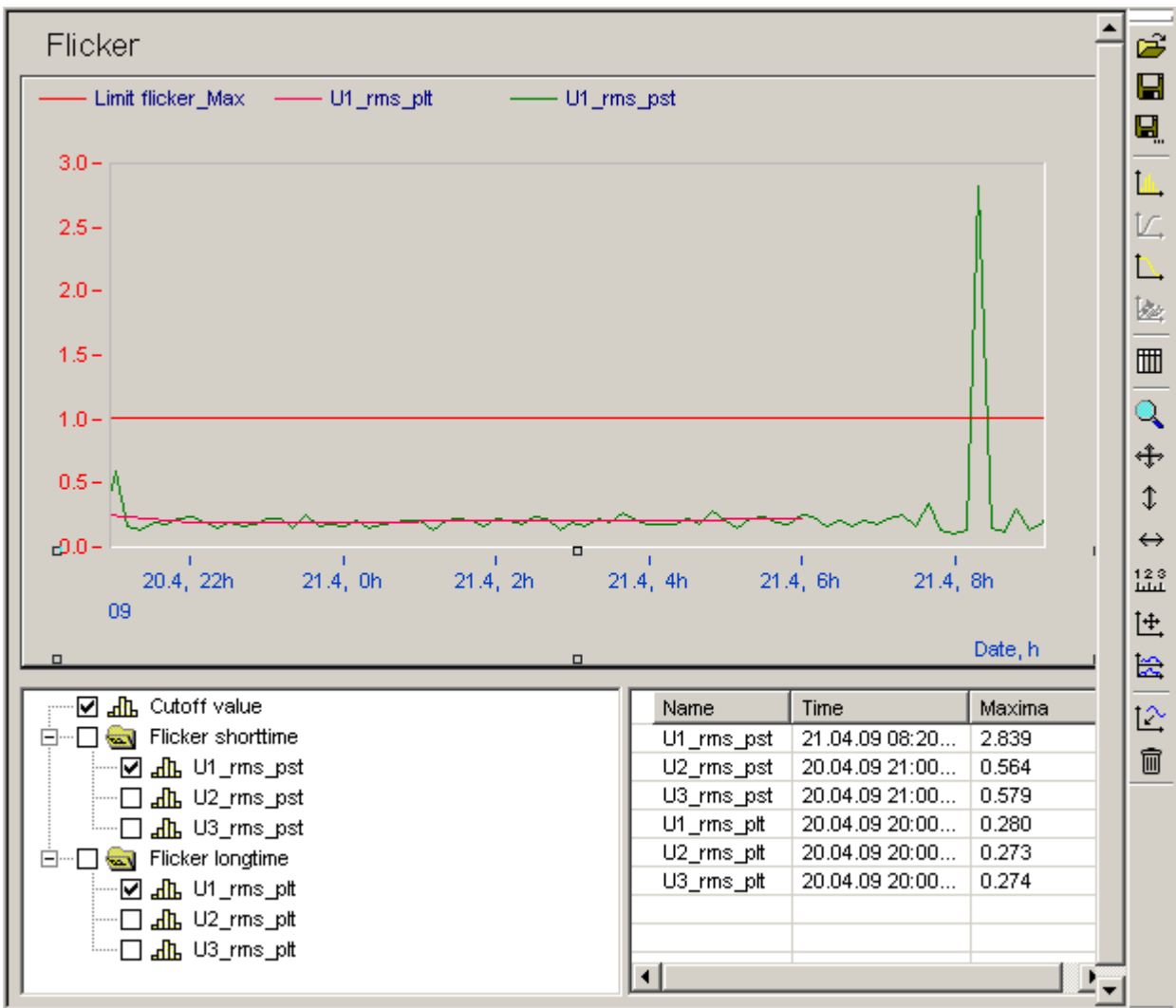
##### Measured data list

- Nominal network frequency value
- Cutoff network frequency value, minima and maxima
- Mean values of the measured frequency
- Histogram of the frequency in the range nominal values  $\pm 10$  Hz

The histogram calculated by default features a fixed range, which simplifies making comparisons of different measurements. When you select the calculation *Histogram*, the statistical observation distribution over the actual input range is found, which usually returns a higher resolution, since the frequency in normal cases fluctuates in the range (nominal values  $\pm 1$  Hz) at most.



### 4.1.4.7 Flicker



Flicker plot with display of a cutoff limit (1.0)

Measured data list:

- Limit for long-term flicker
- Flicker shorttime
- Flicker longtime, if measurement duration has been long enough

#### 4.1.4.8 Events

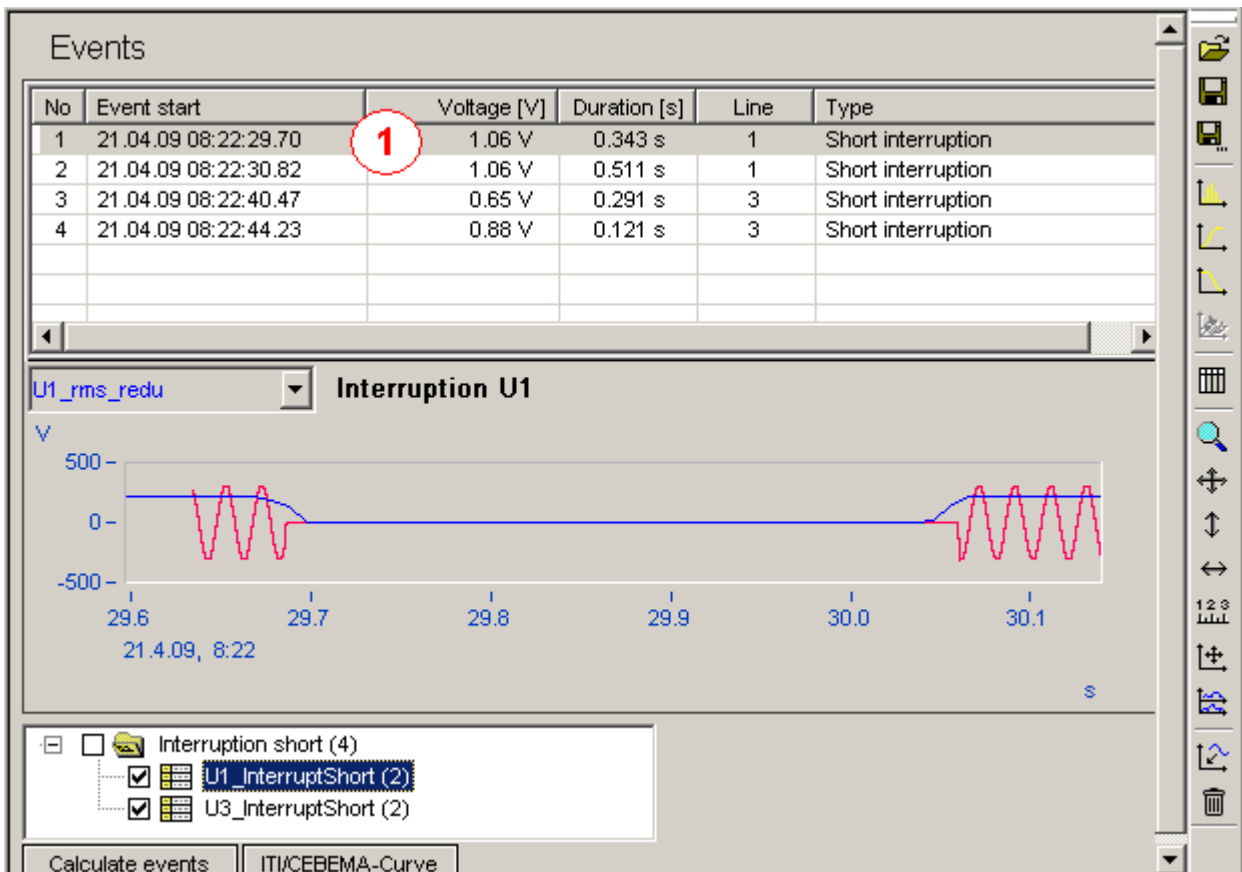


Table of events with curve graph display of the selected event

List of measured data contains the events which occurred, sorted by type and line number:

- short outages
- long outages
- voltage sags
- overvoltage
- rapid voltage fluctuations
- events that affect all lines get one entry with the line number is 0

1

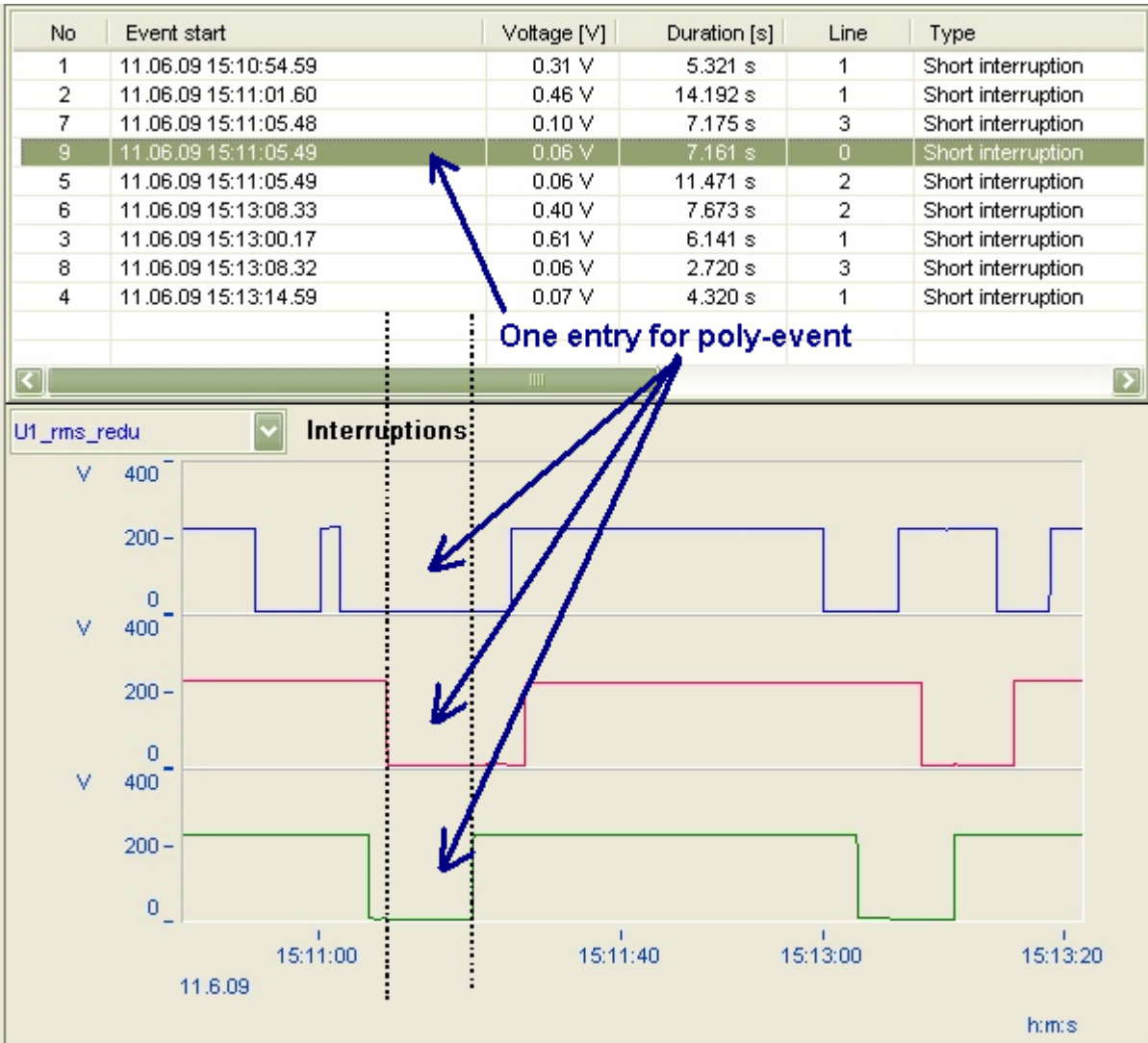
Tabular display of the measurement data list of selected events

#### Displaying measured data on event

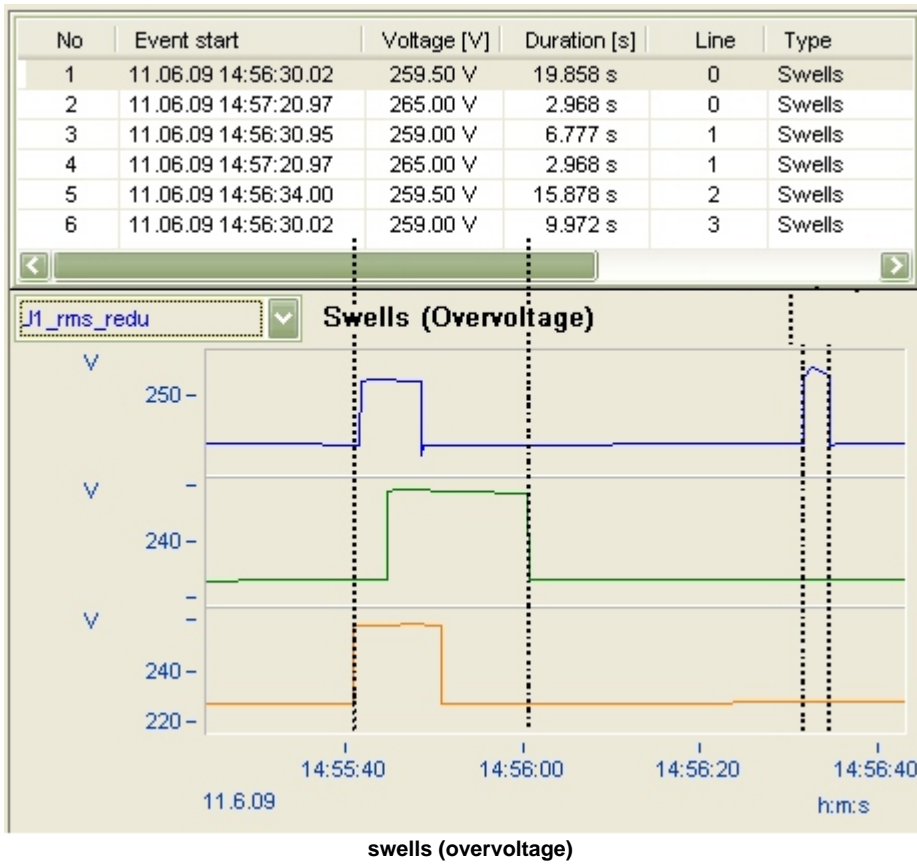
- By double-clicking on an event's entry, you can display the plot of the voltage (see figure above, plot of Event 6)
- After opening the context menu (right click of mouse in the list), you can choose between displaying the plot of either the voltage or current.

#### Calculating events

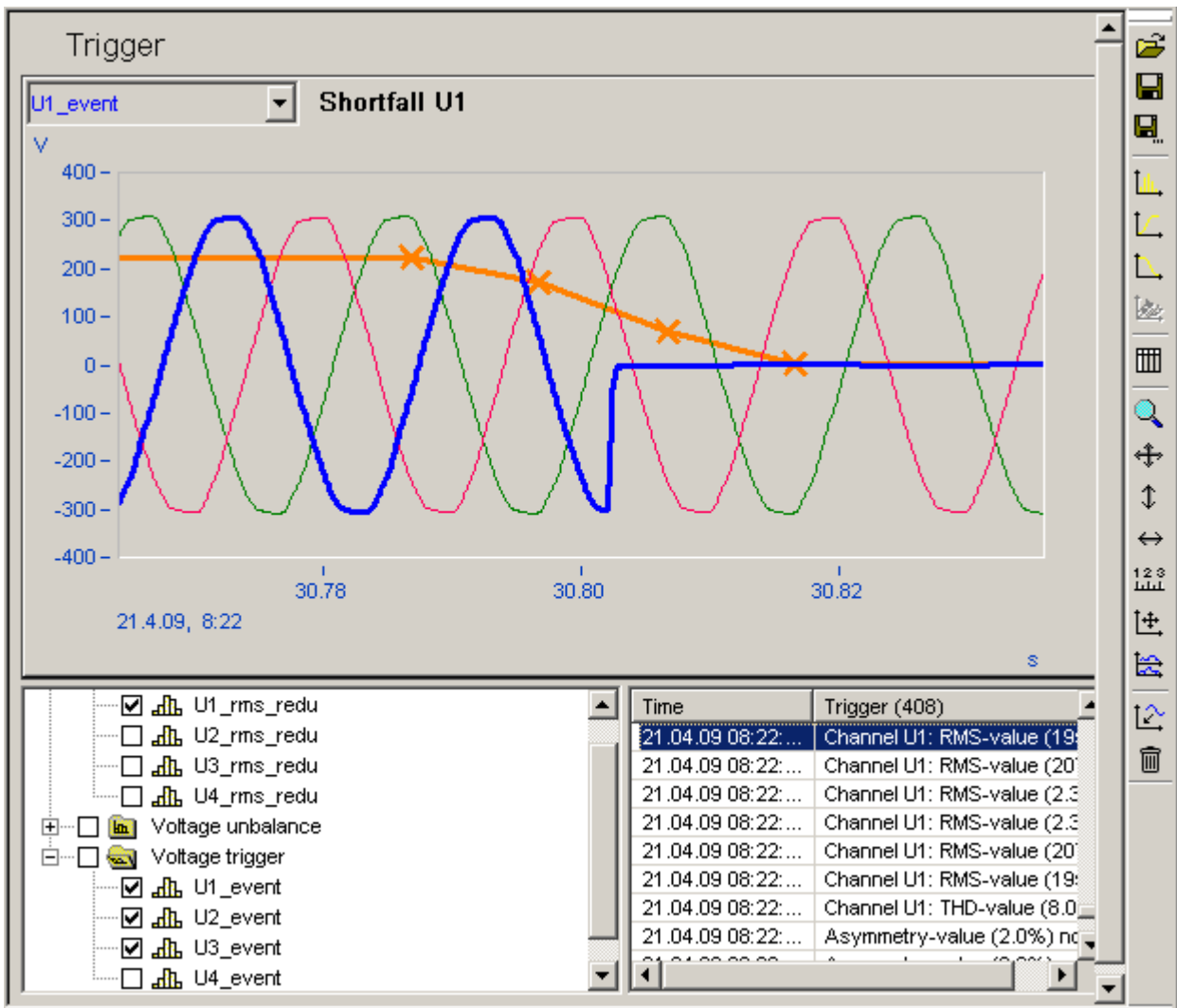
- If no evaluation was yet performed for this measurement, you can use this button to start a search for events.



Events that affect all lines get one entry with the line number is 0



#### 4.1.4.9 Triggers



Triggered voltage range

Measurement data list:

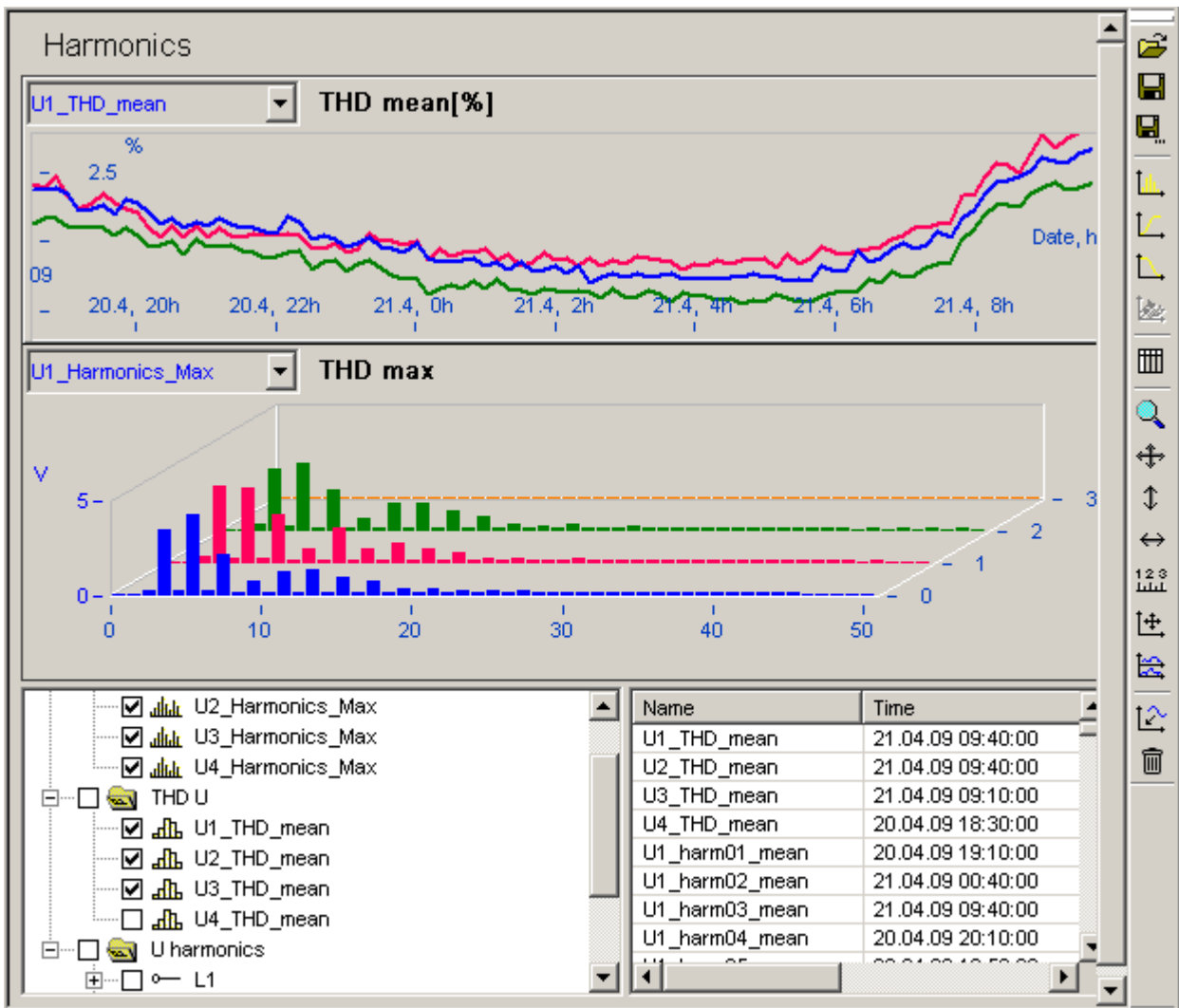
- Plot of voltage signal
- Plot of current signal
- Triggered voltage channels

Triggered current channels If you have set monitoring of trigger events for your measurement, then the list on the right side will display all events whose occurrence released the trigger for data acquisition. During a triggered acquisition, monitoring of the trigger thresholds is deactivated, and remains so until the end of the acquisition. In monitoring of RMS and curve form triggers, it's thus probable that only one trigger release is displayed although the conditions for release of both triggers have been met.

#### Displaying a triggered recording

- double-click on an event's entry in the trigger list to show the measured curve,
- or open the context menu (right mouse button) and click *Show*

#### 4.1.4.10 Harmonics and interharmonics

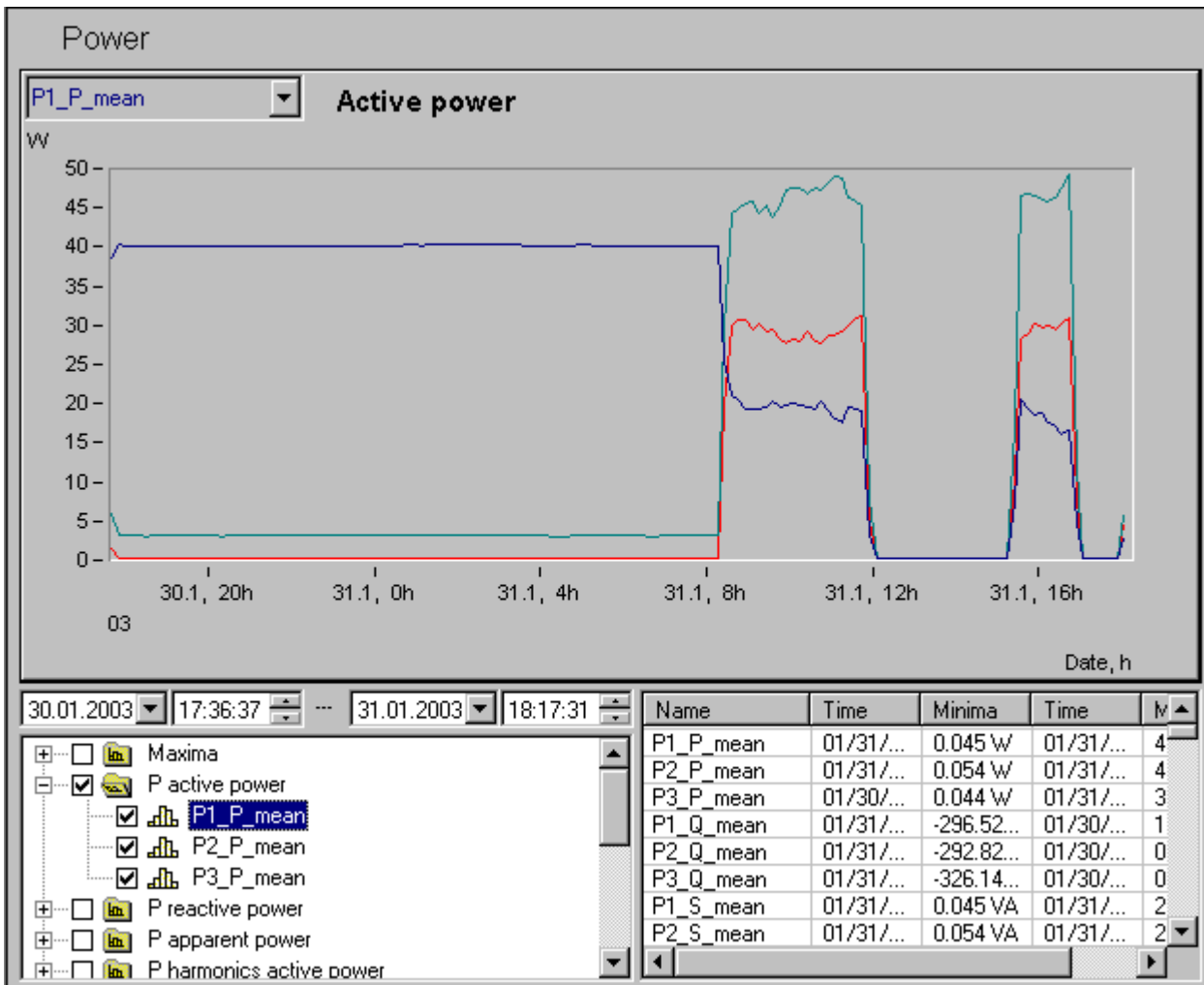


Plot of THD over time and as a histogram

#### Measurement data list

- Contains THD and all harmonics 1 to 50
- Under Maxima, an overview of the maxima of all harmonics can be displayed for each conductor monitored. Note that this doesn't include the fundamental frequency, since it is usually much greater and the harmonic components would barely be visible in comparison.

4.1.4.11 Power

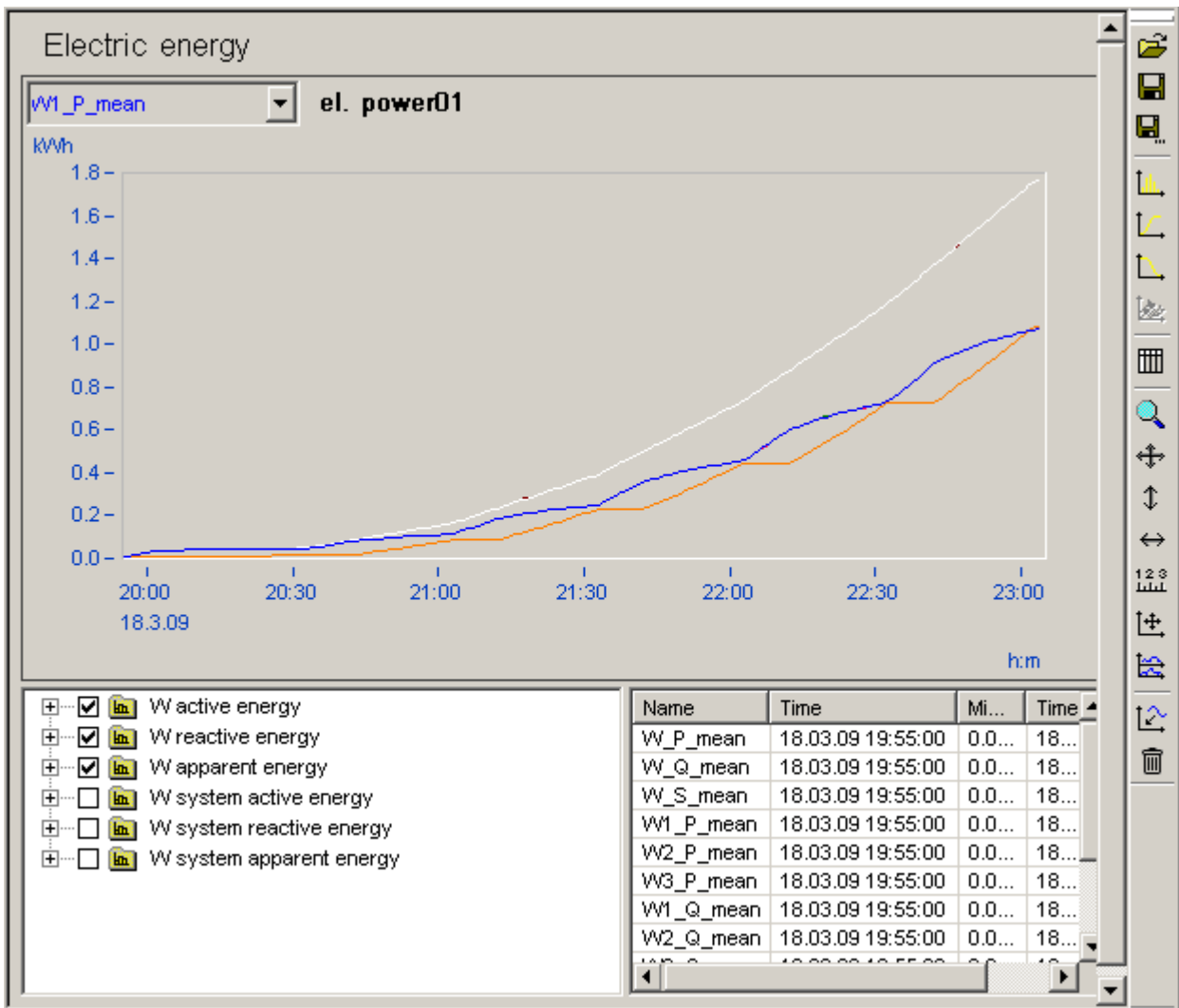


Power and phase from P1-P3

Measurement data list contains:

- the active, reactive and apparent power, phase of harmonics,
- the active, reactive and apparent power, phase and power factor of the individual conductors and of the overall system,
- under Maxima, the range of the harmonics' phase which occurs during measurement

## 4.1.4.12 Electric energy



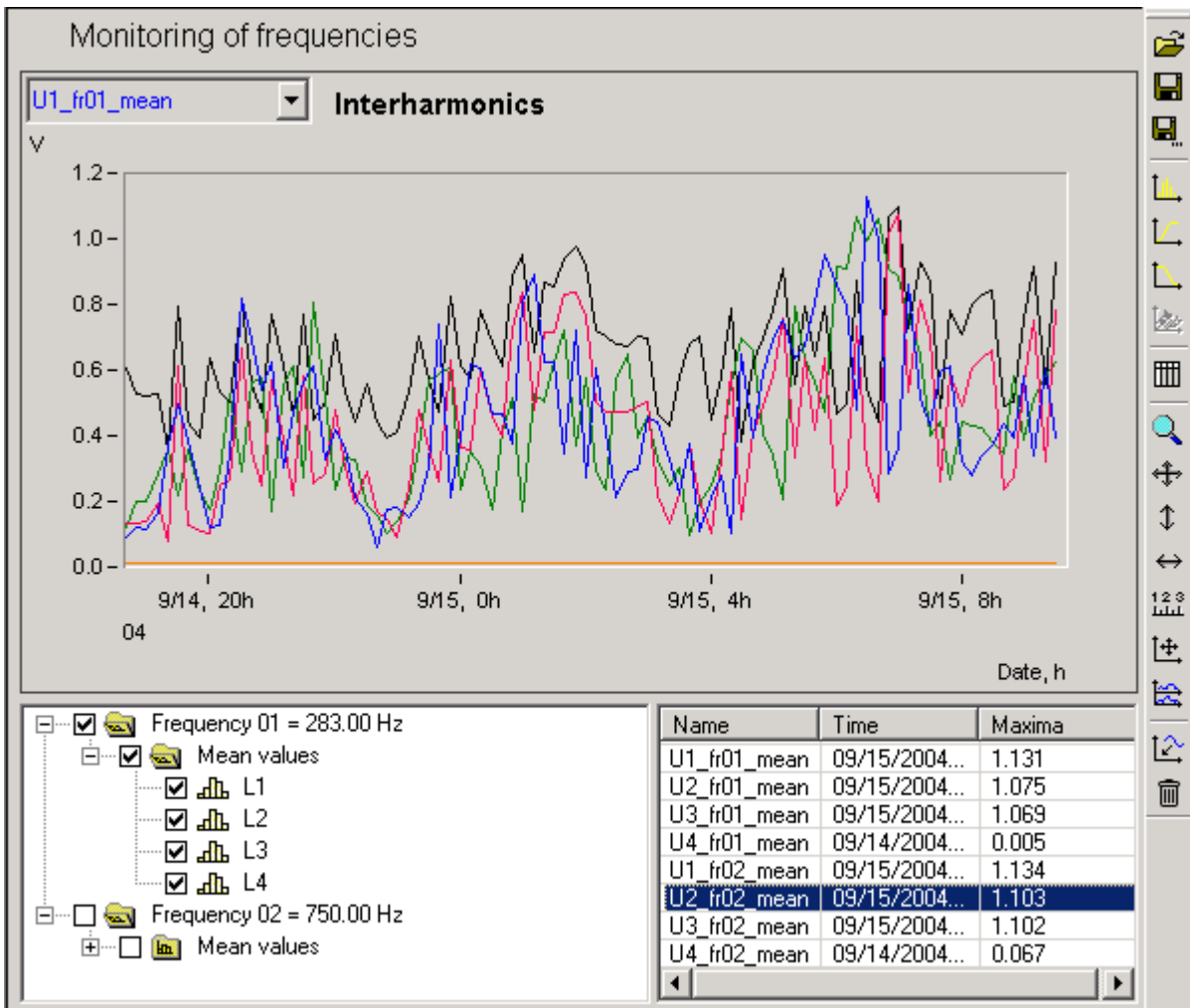
Electric energy of all three lines as active, reactive and apparent energy

Measurement data list contains:

- the active, reactive and apparent energy
- the active, reactive and apparent energy of the overall system,



4.1.4.13 Interharmonics



Mean values of the monitored frequencies

Measured data list:

- Mean values of voltage

Also, in case of simultaneous current measurement:

- Mean values of active, reactive and apparent power
- Means values of the phase between U and I
- Mean current values

## 4.1.4.14 Signal frequency curves

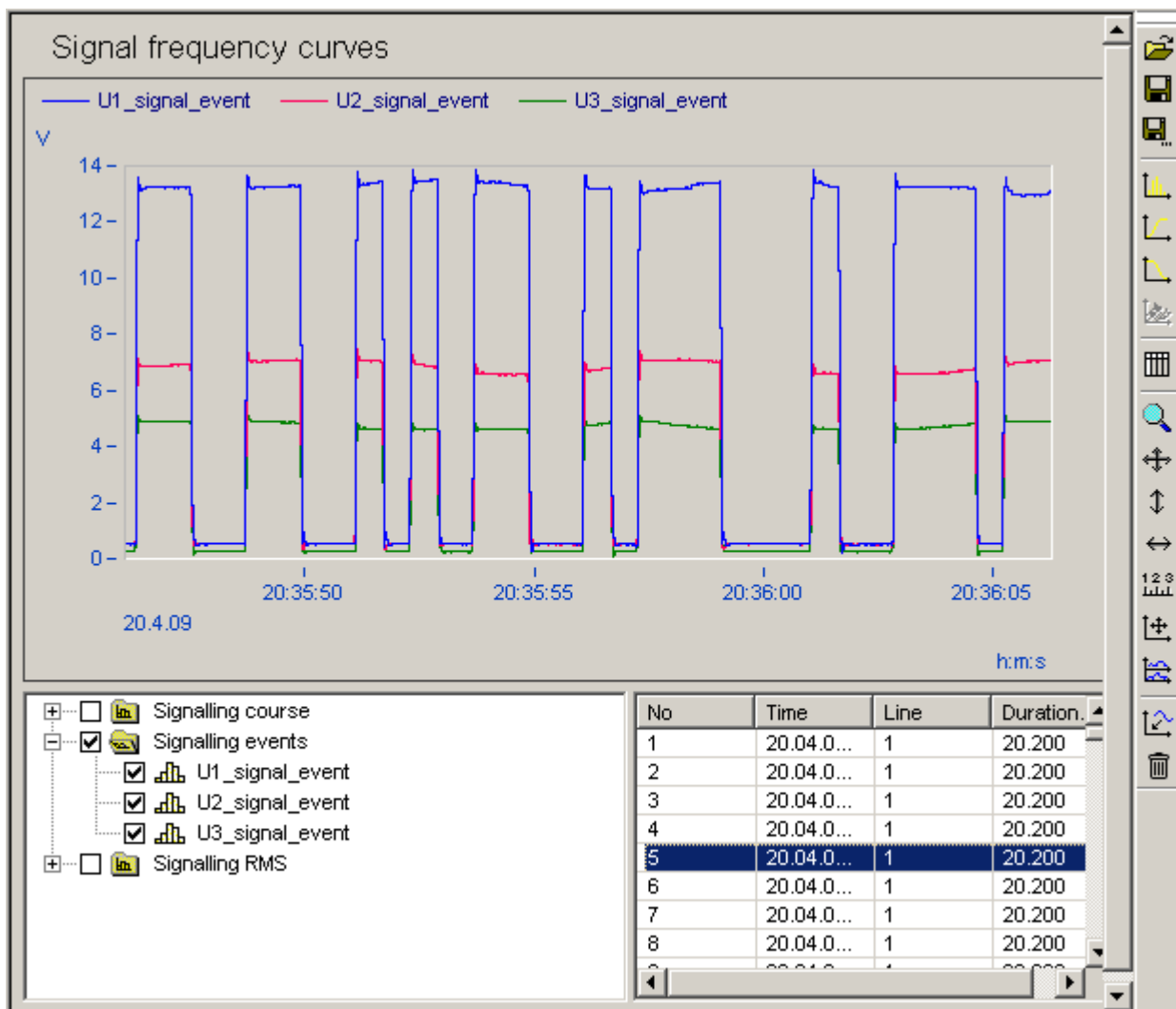


Table of recognized signal curves with curve plot of a selected signal trigger

**Measurement data list contains:**

- plot and mean values of the monitored signal frequency
- calculated power components
- event data, if the voltage set is exceeded.

**Event list**

- contains all trigger events recorded
- double-clicking displays the selected event
- in the context menu, you have a choice between:
  - *Show* – displays the event
  - *Show entire signal sequence* – displays the entire event sequence if it is longer than a triggered acquisition lasted (10 s)

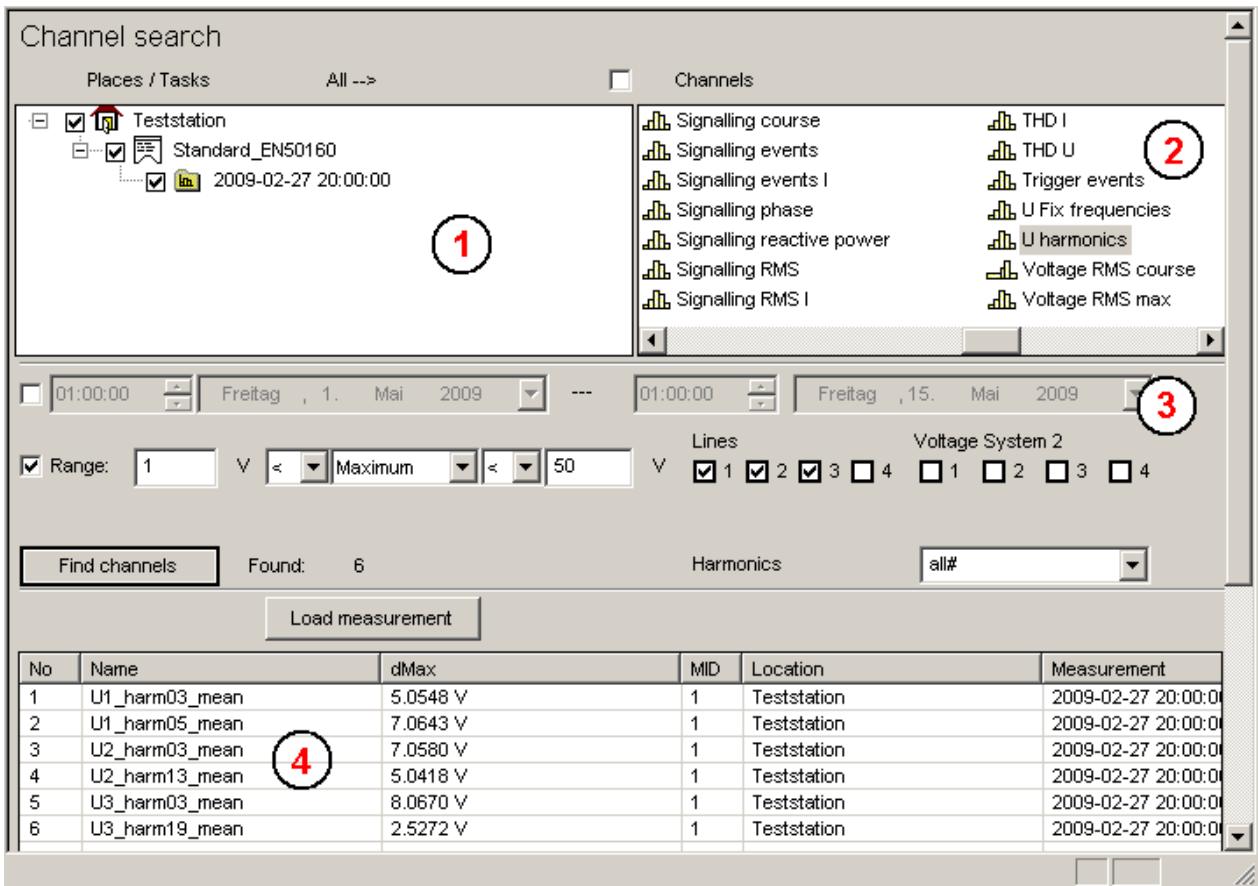
### 4.1.5 Measurement data comparison

Measurement data comparison enables comprehensive analysis of different measurements. This comparison can be applied either to different measurements from a single measurement location or from different locations.

The comparisons are made in the context of specific signal groups. These are:

Channel search	Standard value search	Event search
<ul style="list-style-type: none"> <li>• Voltage</li> <li>• Current</li> <li>• Frequency</li> </ul>	<ul style="list-style-type: none"> <li>• Flicker</li> <li>• Asymmetry</li> <li>• Voltage change</li> <li>• Frequency</li> <li>• THD</li> <li>• Harmonics</li> </ul>	<ul style="list-style-type: none"> <li>• Outages</li> <li>• Voltage dips</li> <li>• Overvoltage</li> <li>• High-speed voltage fluctuations</li> <li>• Transients</li> </ul>
all directly recorded channels	all quantities calculated for the network quality	all voltage events

#### 4.1.5.1 Channel search



Key to dialog elements:

(1) List of all measurements available, sorted by measurement location, measurement task name, time of measurement

Use All/> to select all available measurements

(2) List of the measurement data groups

(3) Search criteria– the following criteria can be set:

a time frame,

a measurement data value range,

I. e.g. all data, where the voltage maxima > 240 V

Range:  V < Maximum ...  V

II. all data, where the voltage minima < 200 V  
 Range:  V ... Maximum <  V

III. all data, where the maxima and minima lie within the range 210...250 V  
 Range:  V < Max+Min <  V

the conductor L1..L4 to find,

the harmonics ranges for upper harmonics

- I. e.g. selecting all odd-numbered harmonics up to the 25<sup>th</sup>

Harmonics

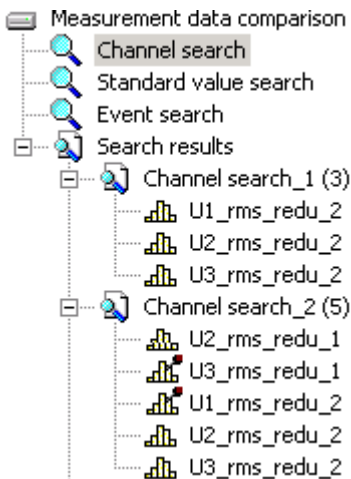
**(4) Search results** – The channels displayed here are also displayed in the task tree under "Search results". However, the limitations on the display of search results stated in the Options dialog (*Extras/Options/Evaluation*) are applicable.

No	Name	MID	Location	dMax
1	U1_harm01_mean	1	Station 1	228.5197 V
2	U2_harm01_mean	1	Station 1	229.1634 V

- Name – Name of data channel
- MID – ID of measurement, appended to channel name for better distinctions
- Location – location of measurement
- dMax – maximum value of data channel

Search results in the task tree (see Section [Search results](#) <sup>80</sup>)

Channel Search 2 comprises 5 search results.



Channels U3\_rms\_redu\_1 and U1\_rms\_redu\_2 contain the desired results and were frozen. Now for better clarity, the entry *Channel Search 2 (5)* can be selected and the context menu deleted → only the two fixed channels are left.

Search example:

Channel search

Places / Tasks All --> Channels

- Teststation
  - Standard\_EN50160
    - 2009-02-27 20:00:00

01:00:00 Freitag, 1. Mai 2009 ...  01:00:00 Freitag, 15. Mai 2009

Range: 1 V < Maximum < 50 V
 
 Lines:  1  2  3  4
 Voltage System 2:  1  2  3  4

Found: 6 Harmonics: all#

No	Name	dMax	MID	Location	Measurement
1	U1_harm03_mean	5.0548 V	1	Teststation	2009-02-27 20:00:00
2	U1_harm05_mean	7.0643 V	1	Teststation	2009-02-27 20:00:00
3	U2_harm03_mean	7.0580 V	1	Teststation	2009-02-27 20:00:00
4	U2_harm13_mean	5.0418 V	1	Teststation	2009-02-27 20:00:00
5	U3_harm03_mean	8.0670 V	1	Teststation	2009-02-27 20:00:00
6	U3_harm19_mean	2.5272 V	1	Teststation	2009-02-27 20:00:00

### 4.1.5.2 Standard value search

Standard value search

Location / Experiment all --> Cutoff values all -->  Cutoff values

- Station 1
  - engine\_1
  - test

1
2
3

01:00:00 Freitag, 21. November 2003 ...  01:00:00 Freitag, 5. Dezember 2003

Range: 0 Hz ... Maximum ... 0 Hz
 Line:  1  2  3 4

Standard:  fulfilled  not fulfilled >= 0 % of readings outside of

Found: 2 Harmonics: all

No	Cutoff ...	Out of ...	MID	Location	Experi...	Measu...	Minima	Maxima	Line	Amount
1	Freque...	-	1	Station 1	engine...	2003-0...	49.922...	50.086...		100.00 %
2	Freque...	-	1	Station 1	engine...	2003-0...	49.933...	50.066...		99.50 %

5

Example of a standard value search as per EN 50160

Key to dialog elements:

1. List of **all available measurements**, sorted by measurement location, measurement task name, time of measurement; use *All* → to select all measurements
2. List of **limit value sets**, all defined limits; use *All* → to select all sets
3. List of **limit values**, all quantities to be calculated as per the standard 50160
4. **Search criteria** – the following criteria can be set:

- a. a time frame,
- b. value range for the measurement data (see [Selecting data folders](#)<sup>[56]</sup>),
- c. the conductor L1..L4 to find,
- d. selection of the harmonics ranges for upper harmonics (see [Selecting data folders](#)<sup>[56]</sup>),
- e. compliance or non-compliance with standards and percentage of values beyond standards limits.

E.g. search of all frequency measurements, where at least 0.5 % of the measured values exceed the standard

Standard:  fulfilled  not fulfilled >=  % of readings outside of

5. **Search results** – List of all measurement channels found:

No	Cutoff ...	Out of ...	MID	Location	Experi...	Measu...	Minima	Maxima	Line	Amount
1	Freque...	-	1	Station 1	engine...	2003-0...	49.922...	50.086...		100.00 %

- a. limit value                      Name of limit value
- b. Out of bounds                Percentage of measured data lying outside of the limits
- c. MID                                ID of the measurement, appended to limit name for better distinctions
- d. Location                        Measurement location
- e. measurement task          Name of measurement task
- f. Measurement                 Measurement designated by its starting time
- g. Min/Maxima                 Extreme values in waveform
- h. Conductor                    Number (1..3) of conductor
- i. Amount                         percentage of measurement values accounted for in evaluation

### 4.1.5.3 Event search

Events	< 10...	< 50...	< 1 s	< 3 s	< 20 s	< 1 ...	< 3 ...	>= 3 ...	Total
Short interruption	0	2	2	0	1	0	0	0	5
Long interrupti	0	0	0	0	0	0	0	0	0
Voltage dip	0	2	2	0	1	0	0	0	5

Example of an event search as per EN50160

Key to dialog elements:

1. List of **all available measurements**, sorted by measurement location, measurement task name, time of measurement; use *All* → to select all measurements
2. List of **limit value sets**, all defined limits; use *All* → to select all standards
3. List of **event types** as per the standard 50160
4. **Search criteria** – the following criteria can be set:
  - a time frame,
  - a voltage value range
  - the conductor (L1..L3) to find or overall system,
    - e.g. search for an outage in the overall system, which means on all conductors at the same time. If L1, L2,L3 is selected, all outages are included,
  - an amount of events; all measurements having either more or fewer than a defined amount of events are found,
  - Sorting criteria.
    - If you search for individual events, they can be classified by, for instance, event duration or depth of voltage dip.
5. **Search results** – the list's structure depends on the search criteria

- Classification of events by time

Events	< 10...	< 50...	< 1 s	< 3 s	< 20 s	< 1 ...	< 3 ...	>= 3 ...	Total
Short interruption	0	2	2	0	1	0	0	0	5
Long interruption	0	0	0	0	0	0	0	0	0
Voltage dip	0	2	2	0	1	0	0	0	5

- Events – name of event type
- Total – total number of events
- Other columns – Number of events whose duration fell within the particular class.

- Classification of events according to voltage range
- Search with event count as criteria – displays a list of voltage channels with the channel count searched for.

#### 4.1.5.4 Extended network quality report

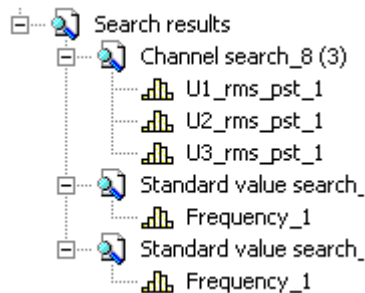
(In preparation)

Like *Network quality report* from the tree branch *Evaluation*, but for different measurements.

Serves the purpose of comparing analyses. Changes in the power network quality over a longer time span can be detected, or comparisons can be made of simultaneous measurements at different locations.

#### 4.1.5.5 Search results

In the task tree, the search results are listed:

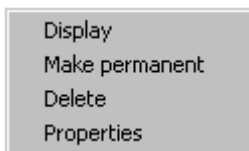


\* *Channel search\_8 (3)*

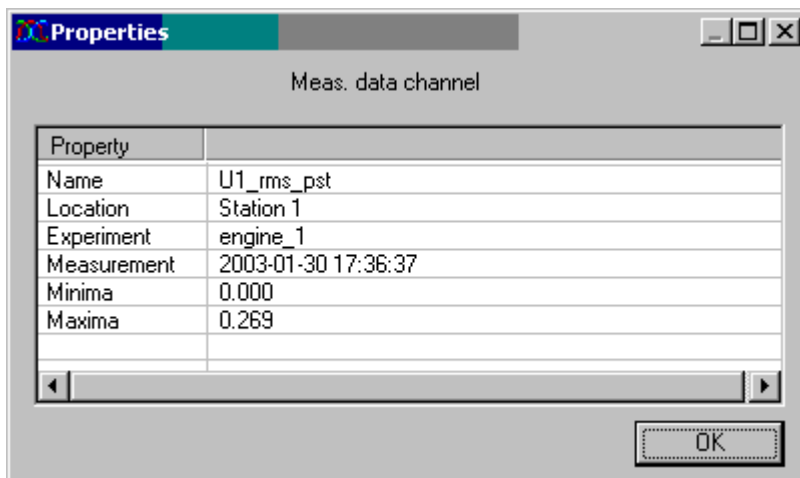
- Eighth search in dialog "Channel search" with 3 results
- context menu (right mouse button) allows deleting of result list
- By making a channel permanent (in the example shown: U1\_rms\_pst\_1), it's possible to protect it from being deleted when making blanket deletions of whole channel groups.

\* *U1\_rms\_pst\_1*

- Result channel named "U1\_rms\_pst" from the measurement with the ID 1
- By clicking on the channel's entry, the data are displayed in the curve window
- Context menu (right mouse button):



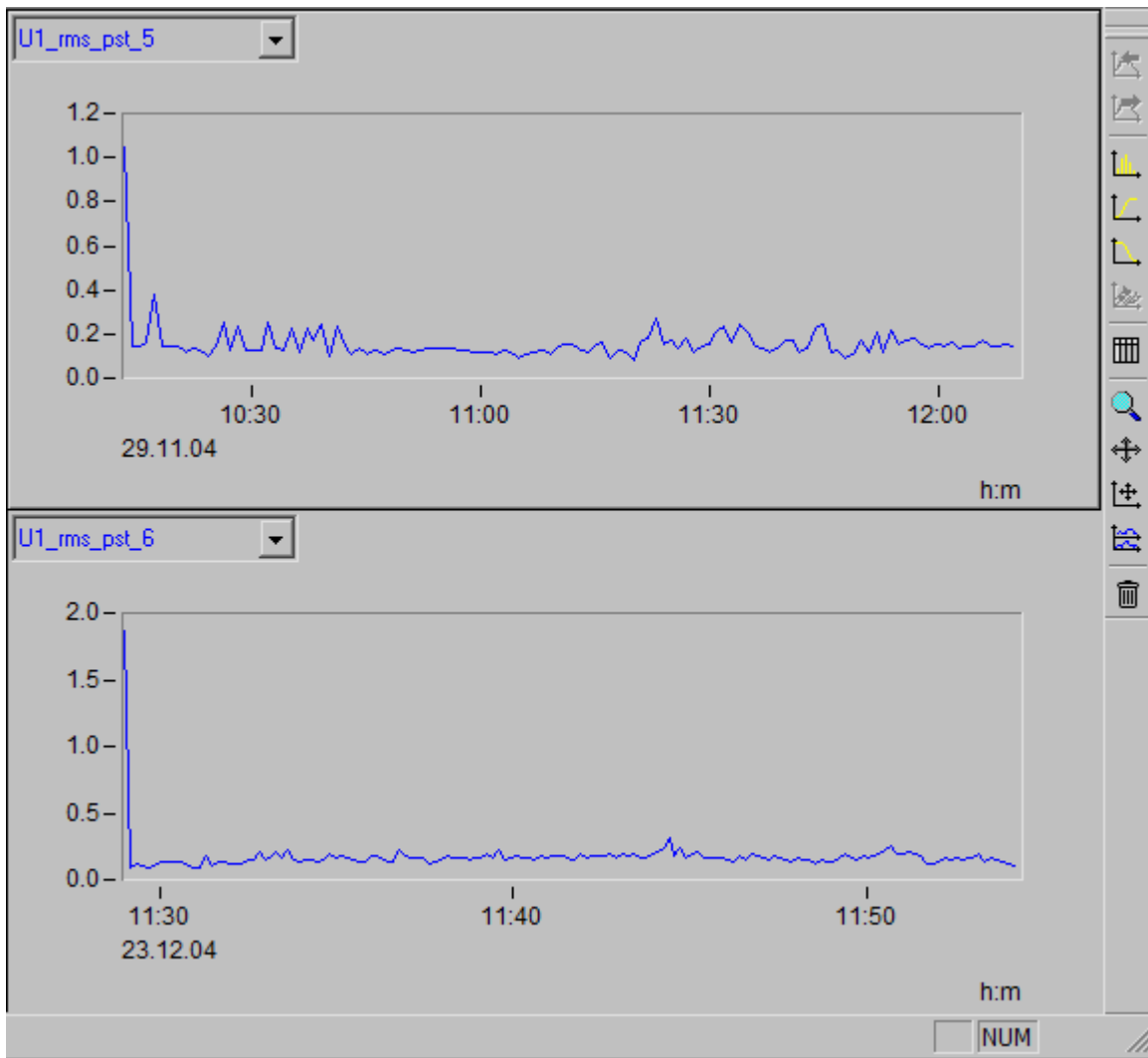
- Display - Display of channel data in the curve window
- Make permanent - Blocks/enables deletion of channel
- Delete - Deletes a channel (from list of results only)
- Properties - Display of result channel properties



Channel properties



Double-clicking on a channel or the context menu command **Display** switches to the curve window mode and the data are displayed. The search screen is exited.

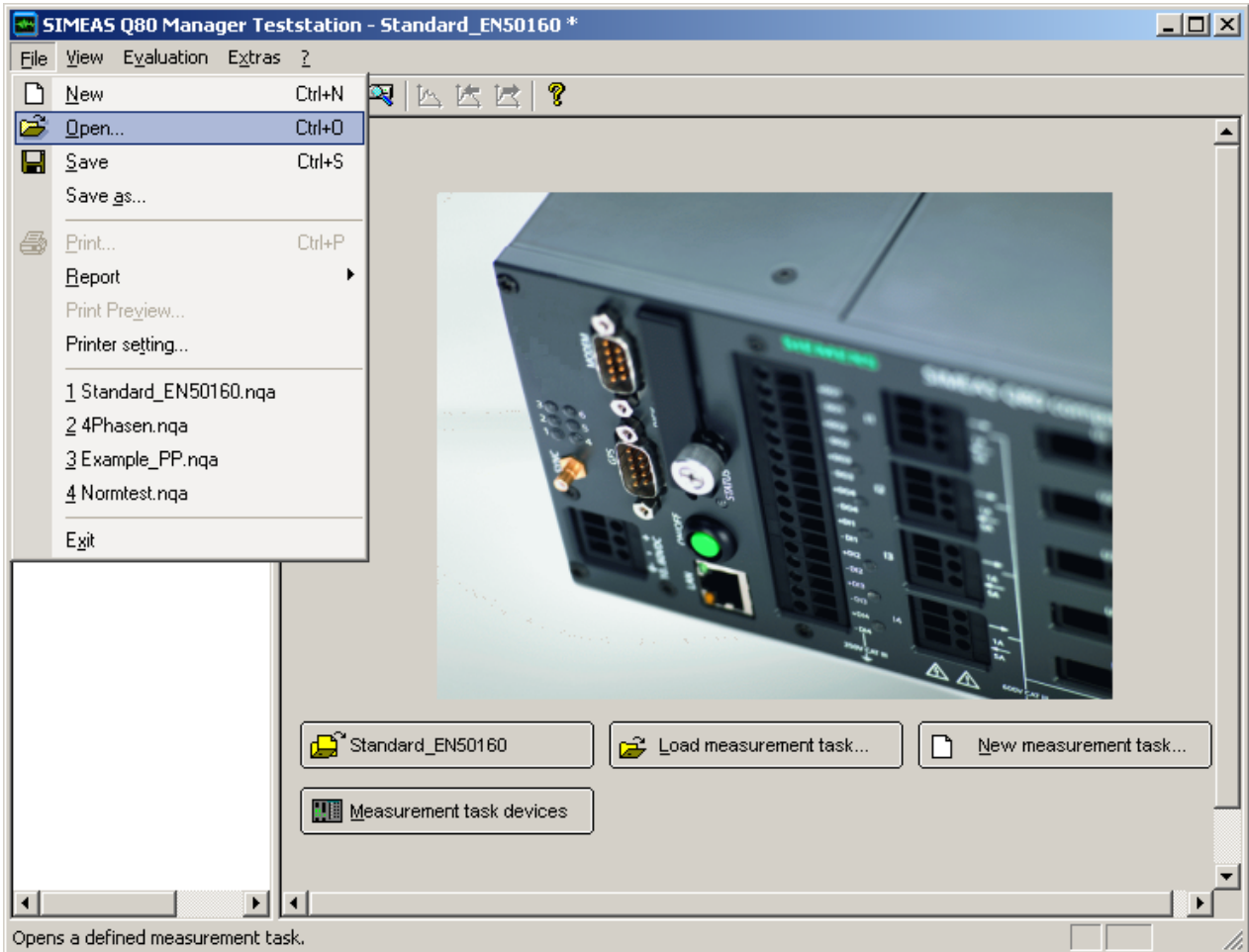


Display of 2 channels found in a search



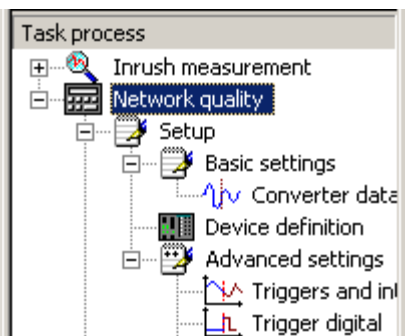
## 5 Operation of the Software

A user interface was designed for *SIMEAS Q80 7KG8080* which resembles the familiar Windows® - Explorer in terms of both appearance and functionality.



SIMEAS Q80 Manager Manager Start dialog

### 5.1 Tree diagram



On the **left side** of the screen is the so-called **tree diagram**. Here, you can always see on which level of the program you are currently located. Clicking on an entry in the tree enables you to proceed to the next task stage.

Depending on what software components you have purchased, some entries may be missing from the tree.

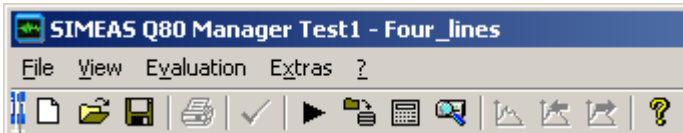
At the top of the hierarchy are the steps *Setup*, *Measurement*, *Data transfer*, *Measurement data comparison* and *Evaluation*. All other functions are subordinate to these.

## 5.2 Editor

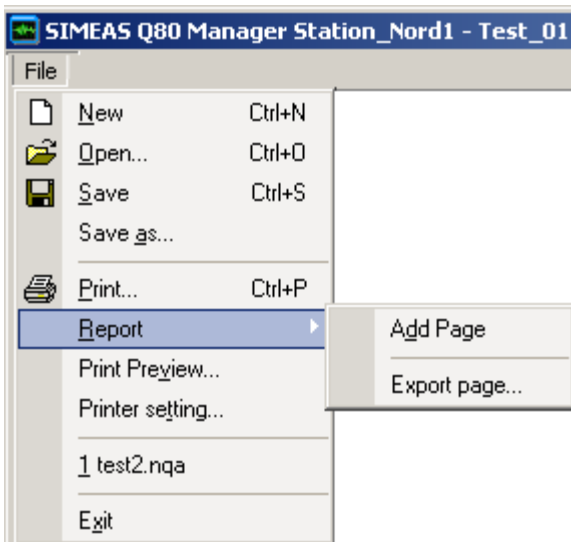
On the **right side** of the screen is the **editor**. Its particular structure depends on the task step currently active.

## 5.3 Menu

In addition to the tree diagram, the menu also enables you to access important functions. This goes especially for saving and loading the configuration files. The main working areas are also accessed via the toolbar.



### 5.3.1 File menu

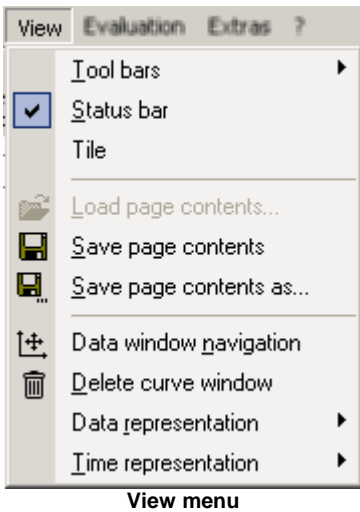


File menu

Here, measurement tasks (measurement configurations) are set up, loaded and saved. See in details at [Loading a new measurement configuration or New start](#) <sup>[21]</sup>.

All settings for printout of the displayed page are available [here](#) <sup>[57]</sup>.

### 5.3.2 View menu



*Toolbar, Status bar:* Shows/hides these two interface elements.

*Tile:* Shifts the dividing border between the tree diagram and the editor. It's also possible to move the line directly by clicking it with the mouse and moving the mouse with its button held down.

*Load/Save page contents (as):* In some formulas, the content displayed (e.g. value limits) can be saved independently of the measurement task

*Curve window navigation:* Opens the toolbox, see Section [Toolbox](#) <sup>[108]</sup>.

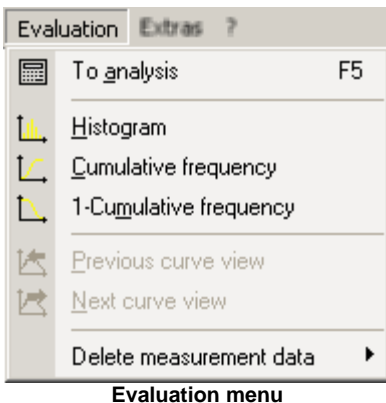
*Delete curve window:* See Section [Working with the curve window](#) <sup>[94]</sup>.

*Data representation:* Affects the active window, e.g. by clicking in the curve window.

- Line: Default representation, samples are connected by straight lines
- Bar graph: Each sample is represented by a bar, suitable for histograms
- Table: Tabular representation of samples, suitable for events
- Bar (Histograms): Each sample is a bar and the x-unit is adapted for histograms.

*Time representation:* Time axis with relative or absolute time. Affects active curve window.

### 5.3.3 Evaluation menu



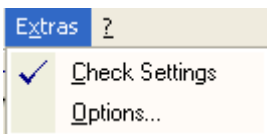
*To analysis:* Goes to the start page for data analysis

*Histogram, (1-) Cumulative frequency,* see Section [Working with the curve window](#) <sup>[94]</sup>.

*Previous/Next curve view:* Moves to a different screen; see [Working with the curve window](#) <sup>[94]</sup>

*Delete measurement data:* Deletes result data sets produced by the analysis. The data to be recorded are not affected. Either the currently displayed measurement or all evaluation results generated thus far can be deleted.

### 5.3.4 Extras menu

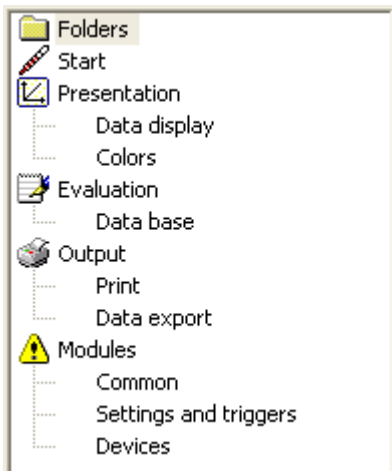


*Check Settings:* Plausibility check of the current fill-out form's settings. All parameters are checked. Faulty entries are indicated in a message. Mainly used in configuring a measurement.

### 5.3.4.1 Options

Dialog for setting a variety of basic options which need not be set for each measurement separately. Total overview of the parameter ranges which are explained in detail further below.

All settings changed are applied in the configuration when the dialog is closed or after pressing the button *Apply*.



#### Folders:

All folders required for the program.

#### Measured data path:

Storage area for measured data.

#### Analysis database:

Database to which the analysis results are saved.

#### Inrush data path:

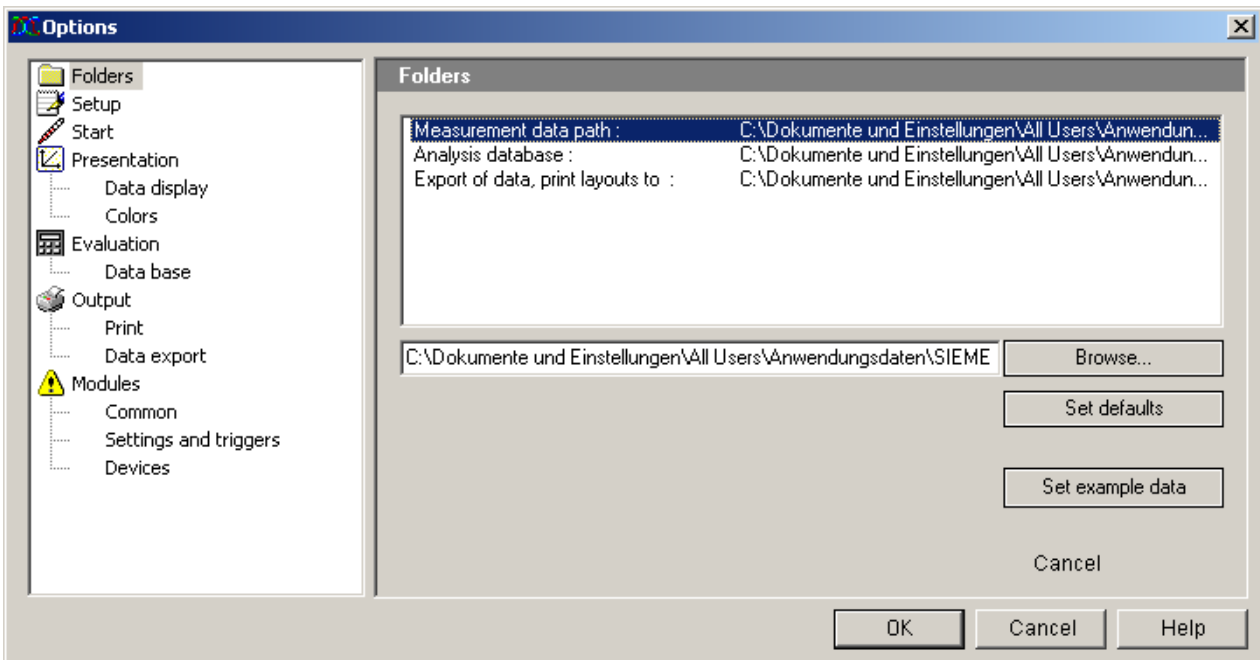
Storage area for the test measurement data.

#### Export of data, reports to:

Storage area for reports and exported data.

For the purpose of gaining familiarity with the program, a sample measurement was included with the installation, which can be accessed by means of the button *Set example data*.

#### 5.3.4.1.1 Options - Folders



- *Measurement data path*: Folder for storing the measured data. This path can also be changed when setting up a new measurement task. If many measurement devices are connected, ensure that there is adequate free memory on this drive, for instance by selecting a data server.
- *Analysis database*: Folder for storing the database for administering the measurements and analyses performed. The maximum file size for a database is currently 2GByte. For instance, if test measurements with many triggers are carried out, it may be necessary to change databases (more than 1 000 000 events).
- *Export of data, print layouts to*: Folder for the storage of various temporary files. (Storage of reports, export of curve windows)

### Changing to a different folder

- Select the folder to change
- Enter a new path. The change once applied will be displayed in the list. When the dialog is closed with *OK*, the existence of the folders is verified.
- By clicking on the button *Browse....* In the folder dialog which then appears, it's possible to set up a new path.

Other commands:

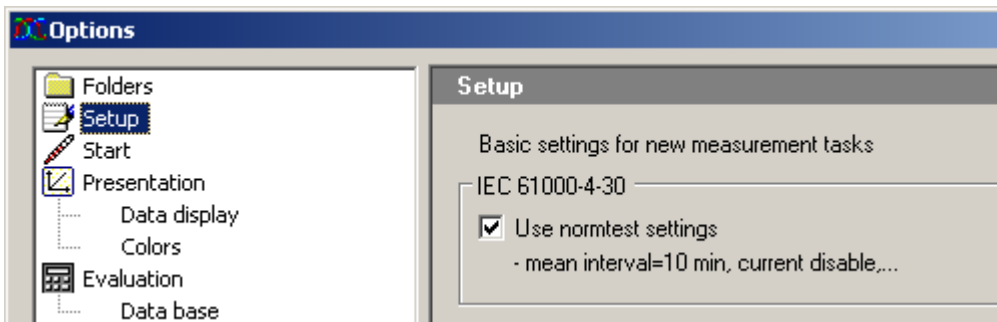
- *Set defaults*: Sets the default paths.
- *Set example data*: Sets the default paths for installation of the sample data.



#### Note

- The path for measured data can be changed independently of the database folder.
- Comparisons of measured data saved in different databases are not possible. Start: Global option upon starting the program.

### 5.3.4.1.2 Options - Setup



Options - Setup

If the option *Use normtest settings* is active, the measurement is only used in compliance with the standard IEC 61000-4-30. Other measurement quantities are not investigated.

For instance, in this case, no current measurement is performed. The aggregation interval is set permanently to 10 min. Additionally, the aggregation over 3s, 10min and 2h are displayed.

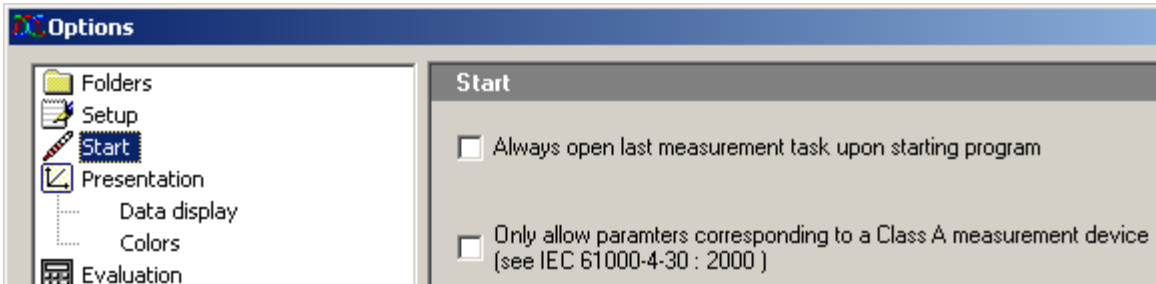


#### Note

If this option was selected during installation of the software, additional [Standard display](#)<sup>48)</sup> are available.

### 5.3.4.1.3 Options - Start

Global option upon starting the program.

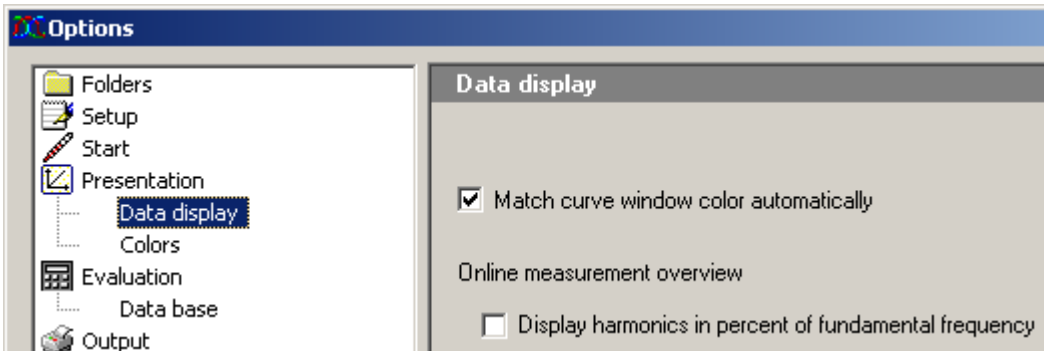


Program start settings

- Upon starting *SIMEAS Q80 Manager*, the configuration last used is loaded automatically.
- Class A measurement device as per the standard 61000-4-30 (Among other things: measurement start only at multiples of 10 minutes. If a radio clock is used, data originating from different measurement devices can be compared sample-by sample.)

### 5.3.4.1.4 Options - Presentation

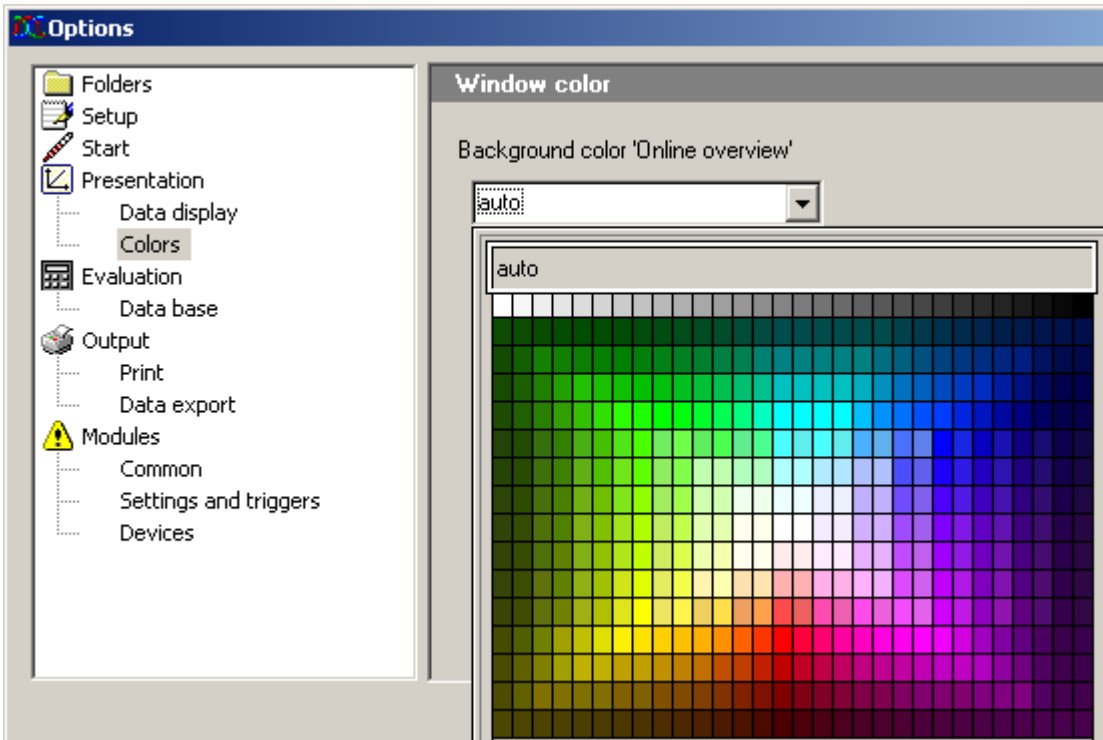
*Presentation / Data display*: Settings for the data display



Online Measurement overview: the upper harmonics can be displayed with their measurement unit (V or A) or in relation (as percent) to the fundamental harmonic.

*Presentation / Data colors*: Settings for the window color



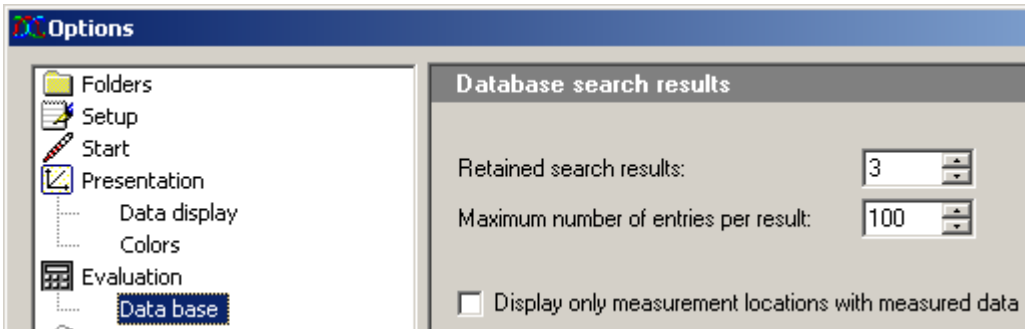


Background of Online view: Colors from the palette are available for selection as the Online view background.

### 5.3.4.1.5 Options - Evaluation

Settings for evaluation and measurement data comparison.

To avoid an overflow in the tree diagram, you can specify a maximum amount of *retained search results*. The option *Maximum number of entries per result* refers to table entries per search result. The default setting is the display of the results of the last three searches having up to 100 data sets each.



#### Database search results

- Number of results lists to remember/ display.
- In the left window, the measurement channels of the last n searches are displayed. The respective oldest result is deleted when the maximum amount has been reached.

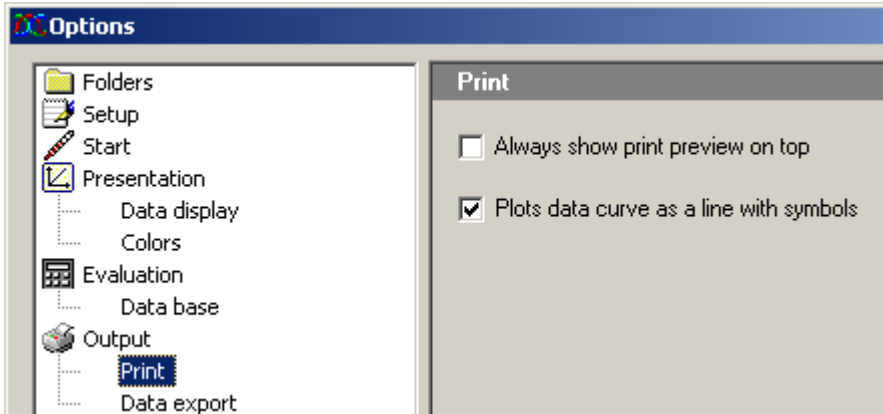
#### Maximum number of entries per result

- Maximum number of search results to list. If more than m channels are found, the search for m results is aborted.
- Often, a high amount of results is caused by a search question which is too general, and not a desirable outcome. Additionally, the processing time is increased along with the demands on system resources.

### 5.3.4.1.6 Options - Output

#### 5.3.4.1.6.1 Print

This dialog is for setting parameters for the printout process. *SIMEAS Q80 Manager* uses the device defined as the standard printer in the Windows system. Thus, the printer's settings can be made directly as part of the Windows settings.



Special settings for printout of the measured data by *SIMEAS Q80 Manager*:

#### *Always show print preview on top*

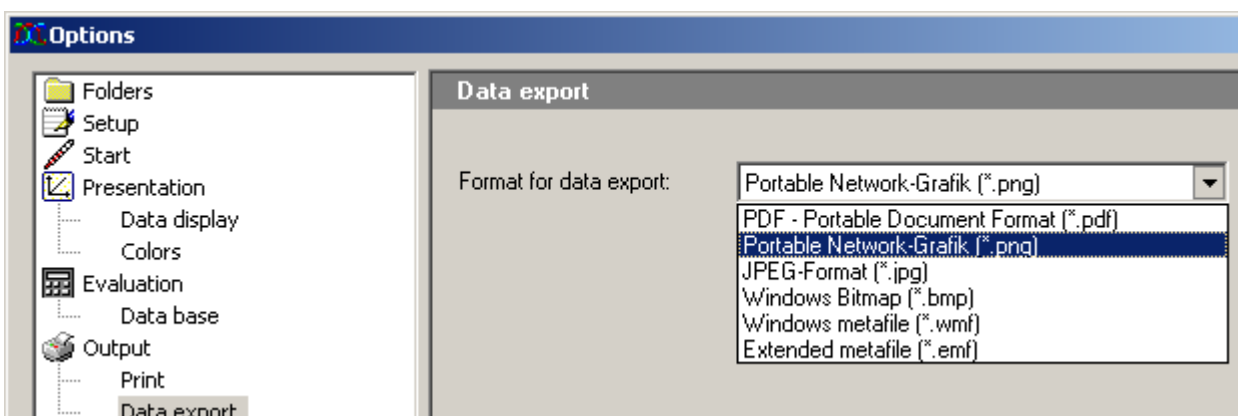
- With the help of the SIMEAS Q80 7KG8080 Report Generator, you can compose printed reports incorporating data curves, texts and other external data and images.
- For ease of using Drag & Drop to deposit the measured data on the printout, the Report Generator can be kept in the foreground without being covered over and over again by the *SIMEAS Q80 Manager* application (e.g. in the maximized mode).

#### *Plots data curve as a line with symbols*

- If multiple measurement curves are to be printed on one page, different symbols can be used to differentiate the curves' data.
- Alternatively to using symbols, it's possible to use a color printer.

#### 5.3.4.1.6.2 Data export

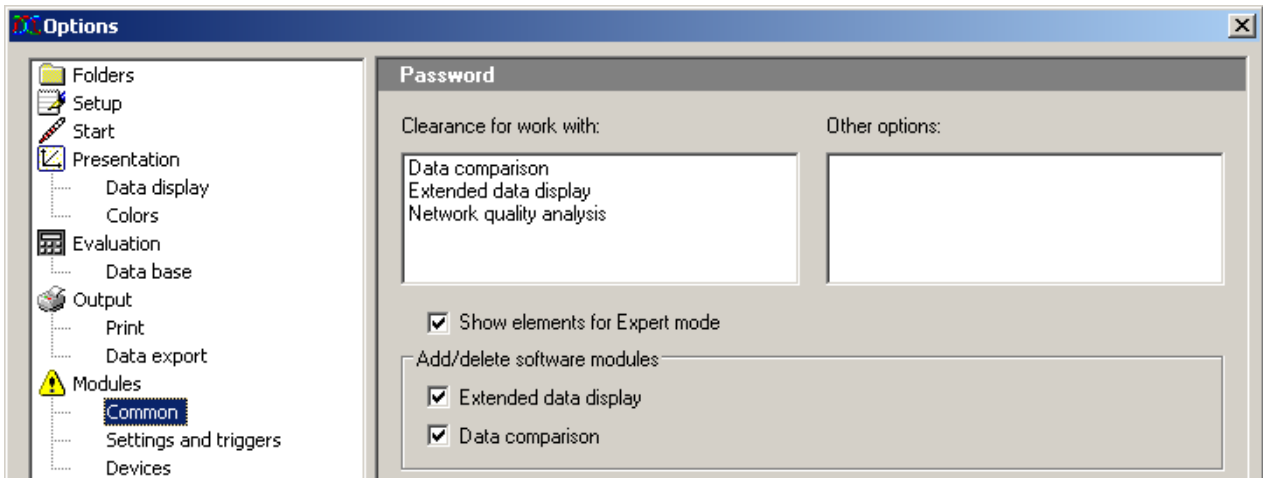
The print layouts generated using *SIMEAS Q80 Manager* can be exported and subsequently imported to another document. On this dialog page, the export format to use is set.



### 5.3.4.1.7 Options - Modules

#### 5.3.4.1.7.1 Common

SIMEAS Q80 Manager's user interface can be adapted to a variety of user profiles. This dialog is used to show/ hide the parameter setting pages.



By changing this page's settings, entries in the task tree diagram (left side of the SIMEAS Q80 Manager program interface) are deleted/ added.

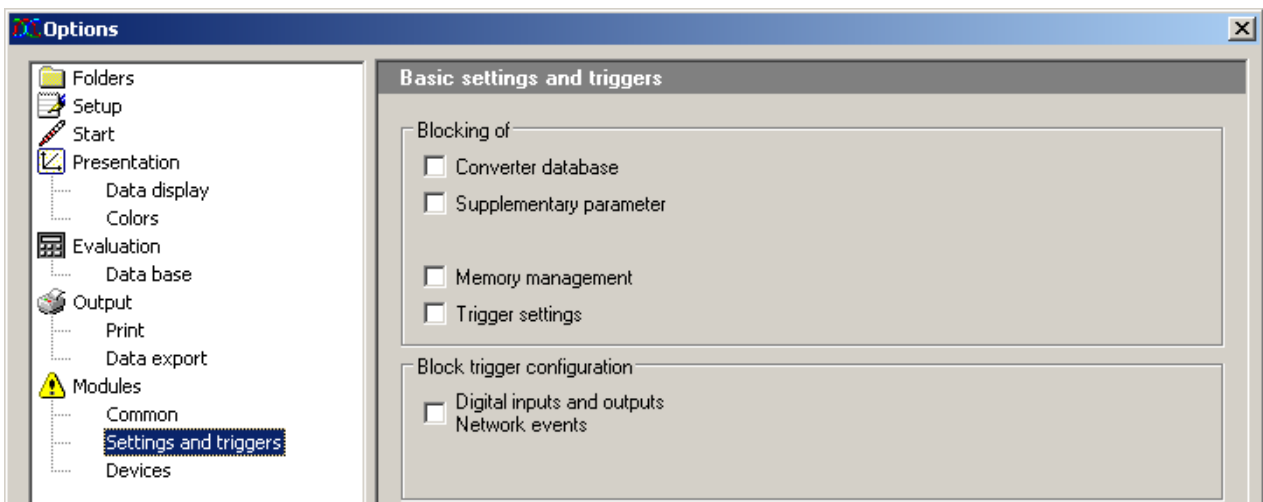
*Extended data display:* If the box is not checkmarked, only the most important controls required for operation are displayed.

The following optional elements are not part of the standard configuration of SIMEAS Q80 Manager and may therefore either be missing or not enabled.

- Data comparison

#### 5.3.4.1.7.2 Settings and triggers

In SIMEAS Q80 Manager, various settings dialogs can be disabled.



By making changes made on this page, basic settings and triggers in the task tree diagram (left side of the SIMEAS Q80 Manager program interface) can be enabled/ disabled. If any pages are disabled in the Options dialog, they are omitted from the work procedure. If the disabling of certain pages is later cancelled, the pages only appear again once SIMEAS Q80 Manager is restarted.

### 5.3.5 ?-menu

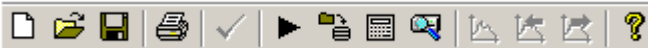
Information dialog for displaying the current software versions.

Using the links (assuming an existing Internet connection), it's possible to jump to the *SIMEAS Q80 7KG8080* homepage, or send an email to the *SIMEAS Q80 7KG8080* Customer Support.

The link "*SIEMENS-Hotline problem report*" automatically appends a file generated by *SIMEAS Q80 Manager* to the email which aids Customer Support in processing issues. The file notes the *SIMEAS Q80 Manager* software version, the version of the operating system used as well as the errors which occurred.

## 5.4 Toolbar

The main dialog's toolbar can be shown or hidden via the *View* menu.



In addition to this toolbar, many display dialogs for individual process steps, such as *Measure* or *Analysis*, come with an extra toolbar offering functions pertaining to the respective process step.

The toolbars contain both functions for direct access (e.g. Load, Save, Print), as well as functions which only work in conjunction with an object (e.g. a curve).

Moving the mouse cursor over a toolbar icon causes a tool tip to be displayed, in which the tool's function is briefly described.

A new feature is the ability to **drag an object to a tool icon with the mouse** in order to apply the corresponding function.

### 5.4.1 Mouse operation

In an *SIMEAS Q80 7KG8080* network analysis, the mouse is practically a virtual hand. All operations can be performed using the mouse. This is as easy as can be; the workings of most functions can be logically guessed based on the particular situation faced. What you are most likely to expect is what your actions actually accomplish:

For instance, move the mouse to a box in the input form in order to fill it in. Grab a curve with the mouse and place it in the curve window. Take a curve out of the curve window and drop it in the waste bin.

### 5.4.2 Forms

Setting parameters is accomplished by filling out forms which are later printed out.

#### Numbers or texts

Clicking on the text causes the box to either expand into a list of several options or to an input box with a cursor, into which you can write directly



Click inside the input field opens a combo box

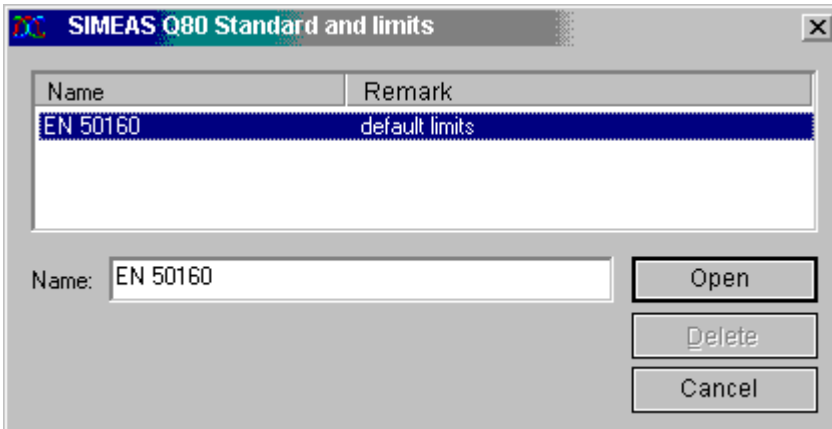
#### Checkboxes

Wandler:  2886.75

De/activate a checkbox by clicking the mouse on it.

#### Saving/Loading entries

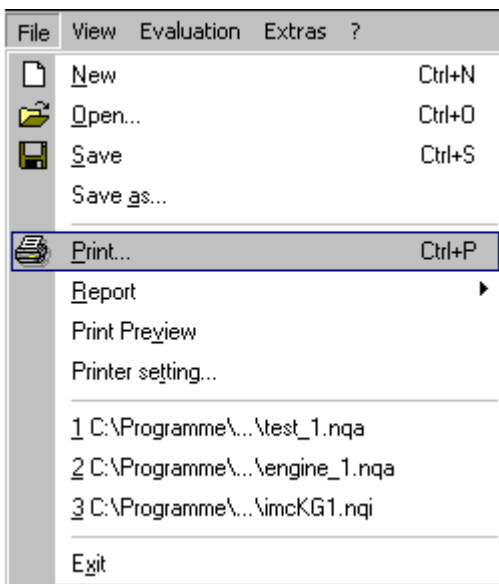
Forms can be saved or loaded via the menu item *View ⇒ Page contents*. A corresponding selection dialog appears. Alternatively for some form pages, there is a Load/Save button in the toolbar on the right side.



Example of a selection dialog for loading nominal and cutoff values in the evaluation

### 5.4.3 Printouts

All functions of the user interface which involve document printout are handled by the **SIMEAS Q80 7KG8080 Report Generator**.

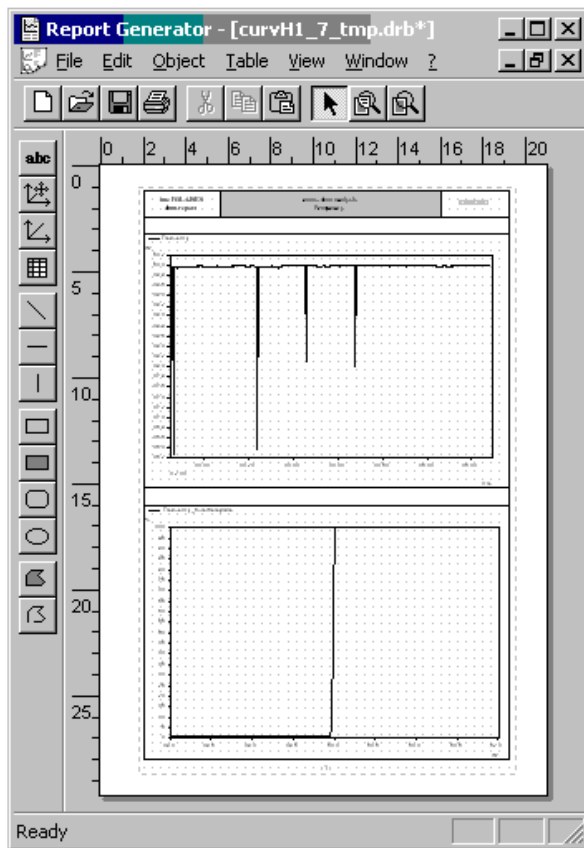


#### Print

Click on the printer icon in the toolbar or on the menu item **File/Print**. All curve windows are printed in the same arrangement and layout as shown in the editor.

Printable views of the forms (e.g. measurement task description, network quality report, setpoint and limit values) are printed out as displayed on screen.

#### Print preview



Click in the menu **File** on **Print preview**. The **Report Generator**, an additional, powerful tool, opens.

Here you can not only **view** the page, but also move curves, edit texts or add new elements.

To **print**, use the Report Generator's menu. There you will find a "real" page preview.

#### 5.4.4 Working with curve windows

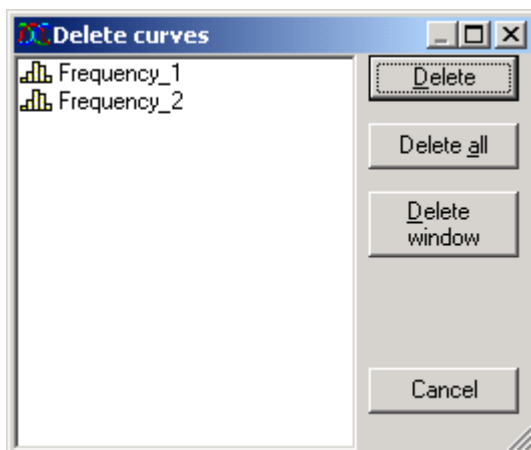
The desired channels can be taken from the list of measurement channels into the curve window by means of Drag&Drop.

Releasing the data over:

- a Y-axis → displays the data with this Y-axis
- the curve window → generates a new Y-axis (recommended if voltage and current are to be displayed simultaneously)
- the X-axis → generates a new X-axis (recommended if very many data are already displayed in a window)

##### Active curve window

Click the mouse on the desired curve window. That curve window then seems to "float" above the others. Any actions taken then affect this window.



##### Delete curve window

Click on the trash bin icon in the toolbar. The following actions then happen to the **active** curve window:

- *No signals in curve window* → Curve window is deleted
- *Exactly one signal in the curve window* → Data set is removed from curve window
- *Multiple signals in curve window* → A selection dialog showing all signals contained in the curve window is shown.

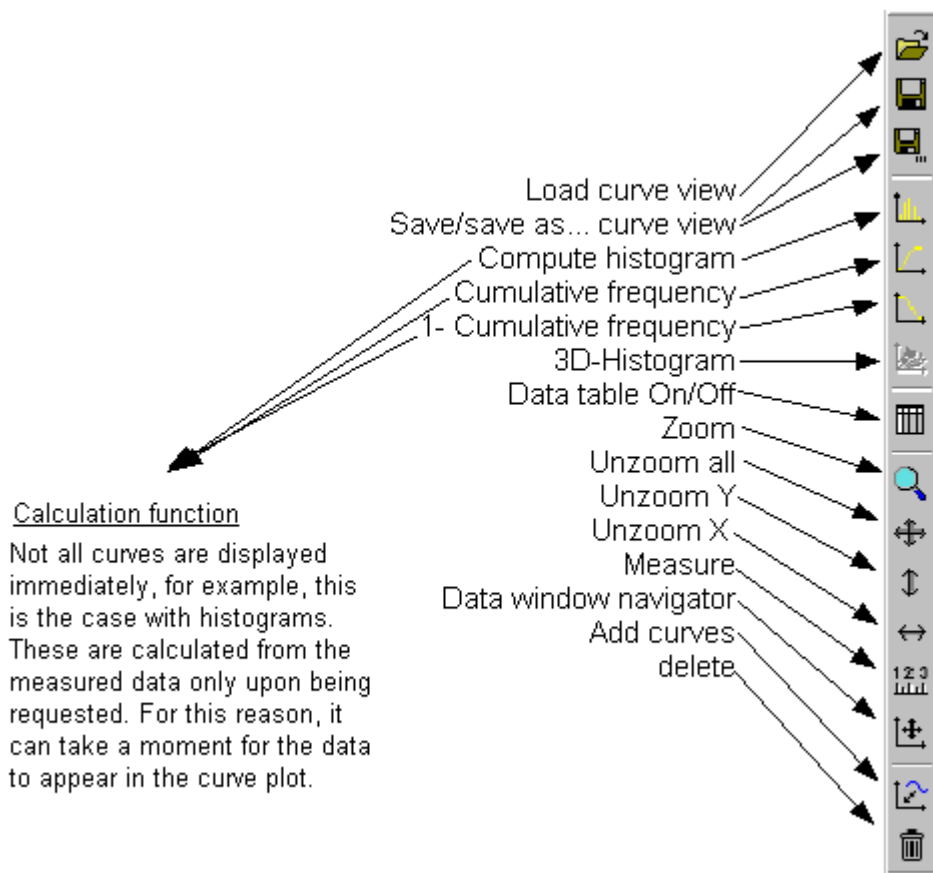
**Multiple pages**

The evaluation is organized into multiple **pages**. Each page has a maximum of four curve windows. If you open a fifth curve window, the software will create a new page. All prior curves are positioned in the background.

To turn a page, click on the **toolbar** or the menu item **Evaluation/ Previous/Next curve view**.

**Toolbar along the curve window**

Depending on the type of data, the function range may vary.

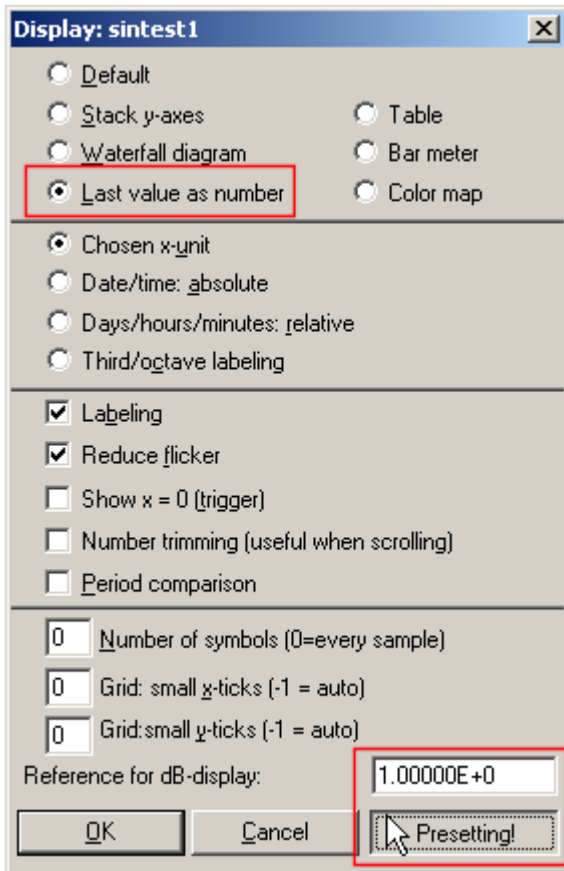


	Function	Significance	Output curve
	Histogram	What percentage of all measured values are within a certain class?	equidistant time-domain curve
	Cumulative frequency	What percentage of all measured values are within the value limit? (Sum over histogram)	equidistant time-domain curve
	Inverse cumulative frequency	What percentage of all measured values are outside of the value limits? (100% - cum. freq.)	equidistant time-domain curve



### 5.4.4.1 Basic options

#### 5.4.4.1.1 Display



Select the menu item *Configuration* ⇒ *Display...* in the curve window.

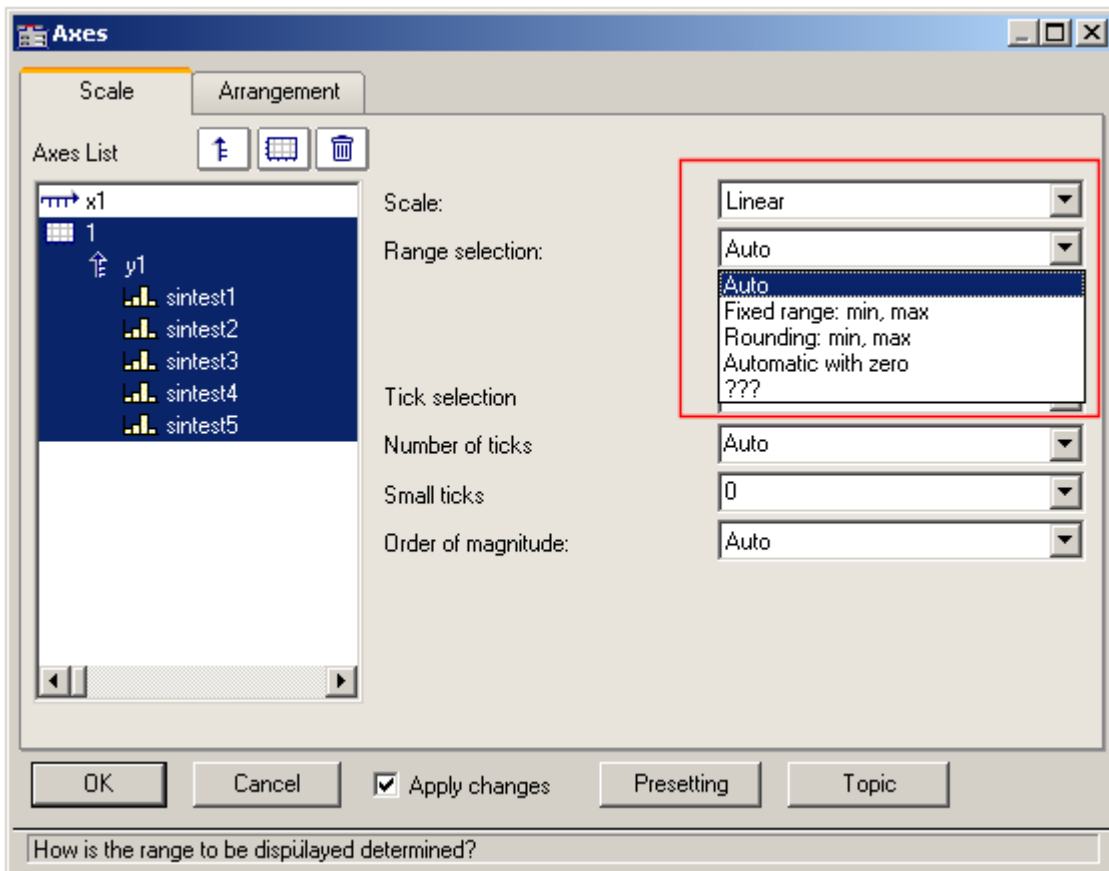
This is where you determine the appearance of your curve window.

For windows which have a time-axis, you can specify whether the time is represented in relative or absolute terms. Especially with triggered channels, absolute representation is necessary for obtaining "real" time-relationships. Otherwise, the curve window will stack all the triggering times.

If you need to change basic settings, it is possible to do this under *Presetting!*. A button of that name is located in a number of dialogs (see picture below). You can use it, for example, to specify the desired numerical format for *Last value as number*, without needing to make the same setting each time.

### 5.4.4.1.2 Axis settings

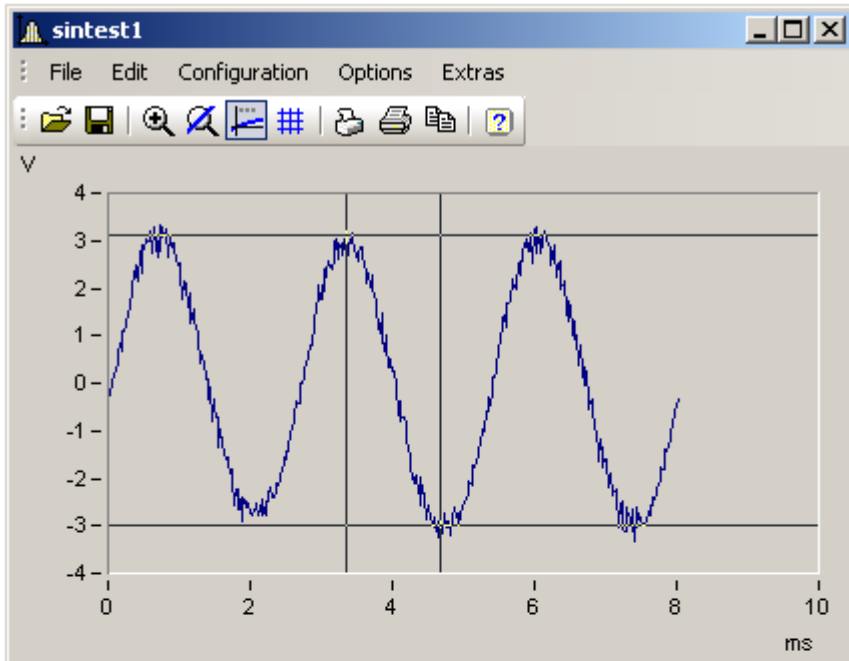
Double-clicking on either the X- or Y-axis opens the respective settings dialog.



The default setting is *Auto*. The curve window tries to fit the signal curve into the whole curve window. If the signal doesn't change much, for instance, in the case of a shorted input, the signal has a very noisy appearance. But if you look at the Y-axis scaling you notice that the noise is very minimal. To avoid this effect, scale the Y-axis to a fixed range.

### 5.4.4.1.3 Measure

With *Edit* ⇒ *Measure* the *Measure* window is opened. The cursor positions are determined by using the left and right mouse keys. Note the context menu, which is opened by right clicking in the *Measure* window. It offers the possibility to display a list of all signals in the curve window.



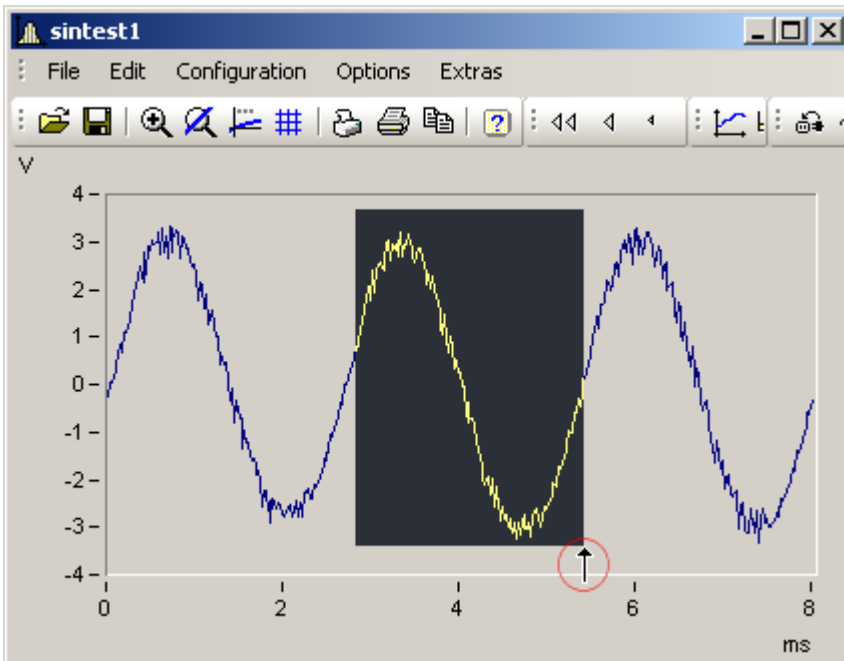
**Measure: sintest1**

xl = 3.34 ms  
 xr = 4.67 ms  
 dx = 1.33 ms  
 yl sintest1 = 3.155 V  
 yr sintest1 = -3.025 V  
 yr - yl = -6.180 V

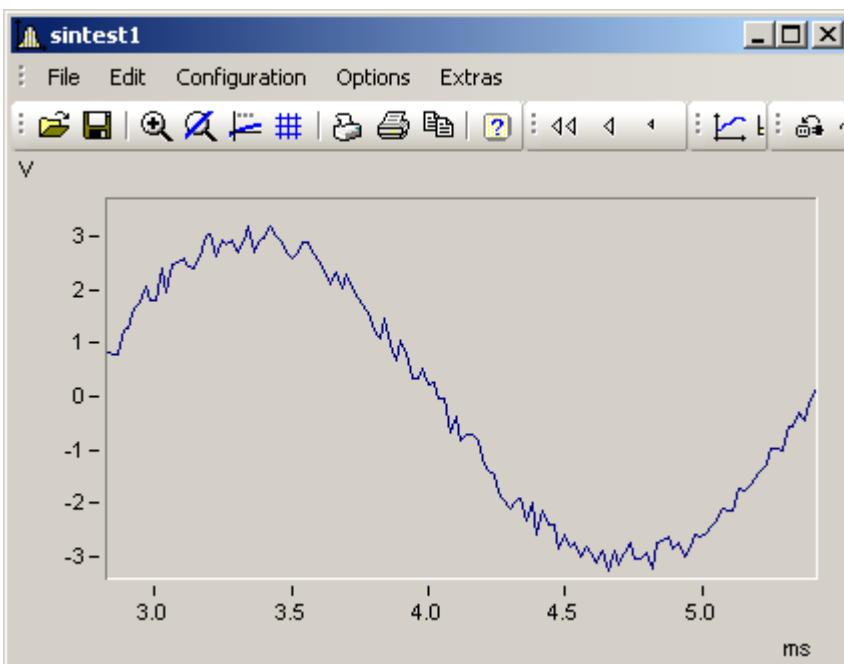
Waveform	Left	Right	Unit
sintest1	3.155	-3.025	V

#### 5.4.4.1.4 Zoom / Unzoom

When you select the menu item *Edit* ⇒ *Zoom*, the mouse pointer changes to an arrow which can be used to choose a region within the curve window to zoom in on. This action can be repeated as often as desired.



Zoom (encircled in red: the zoomcursor)



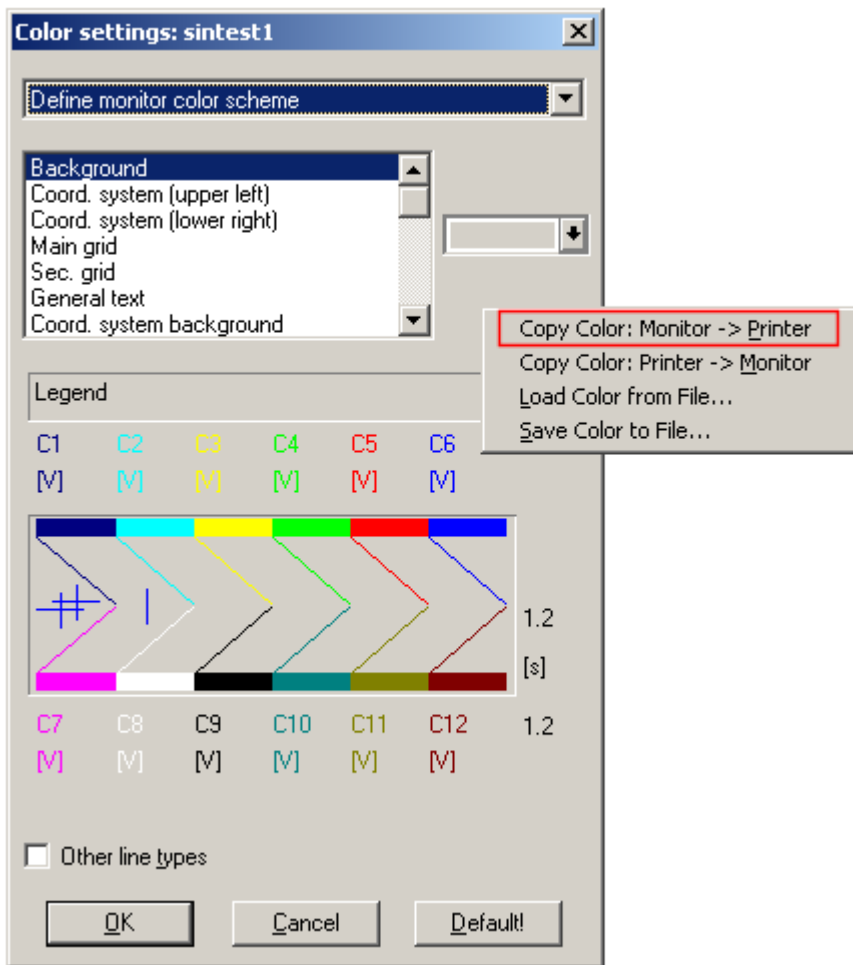
After zooming

*Unzoom* restores the curve to its complete representation. This cancels fixed axis settings. To prevent this consequence, use the command *Undo Zoom!* instead.

#### 5.4.4.1.5 Colors

The menu item *Options* ⇒ *Colors* offers the ability to set all the colors used in the curve window. There is one set of colors each for the two display formats, screen display and printout .

The context menu lets you save a color set individually. There, you also have the option to copy the *Monitor (color scheme)* to *Printer (color scheme)* and vice-versa.



### 5.4.4.1.6 Drag and Drop



#### Function

The drag & drop function can be used to move and/or copy waveforms between curve windows. The following cases illustrate situations where drag & drop can be helpful:

- Moving measurement data from the channel list to a curve window. The data is then displayed in that window.
- Moving measurement data to a new axis or coordinate system within a single curve window.
- Moving measurement data to a different curve window.



#### Mouse Operation

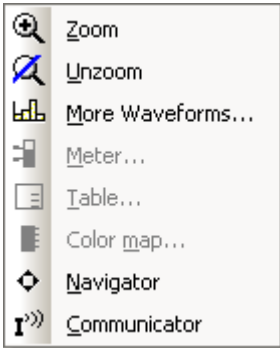
- Press and hold the left mouse button on the desired Y-axis, coordinate system or open area in a curve window.
- Moving the mouse a short way causes the pointer to change. This commences the "drag".
- Drag the mouse to the desired target and release the left mouse button. This constitutes the "drop".
- Pressing the right button while dragging aborts the process.

### 5.4.4.2 Context menu



#### Function

Clicking the right mouse button in a curve window calls up the following context menu, offering immediate access to further curve window functions:

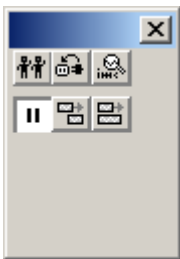


#### 5.4.4.2.1 Navigator



This contains various navigation buttons for scrolling and zooming in a curve window.

#### 5.4.4.2.2 Communicator



This tool box is used to specify settings controlling data exchange with other curve windows/tables as well as the window behavior during running measurements.

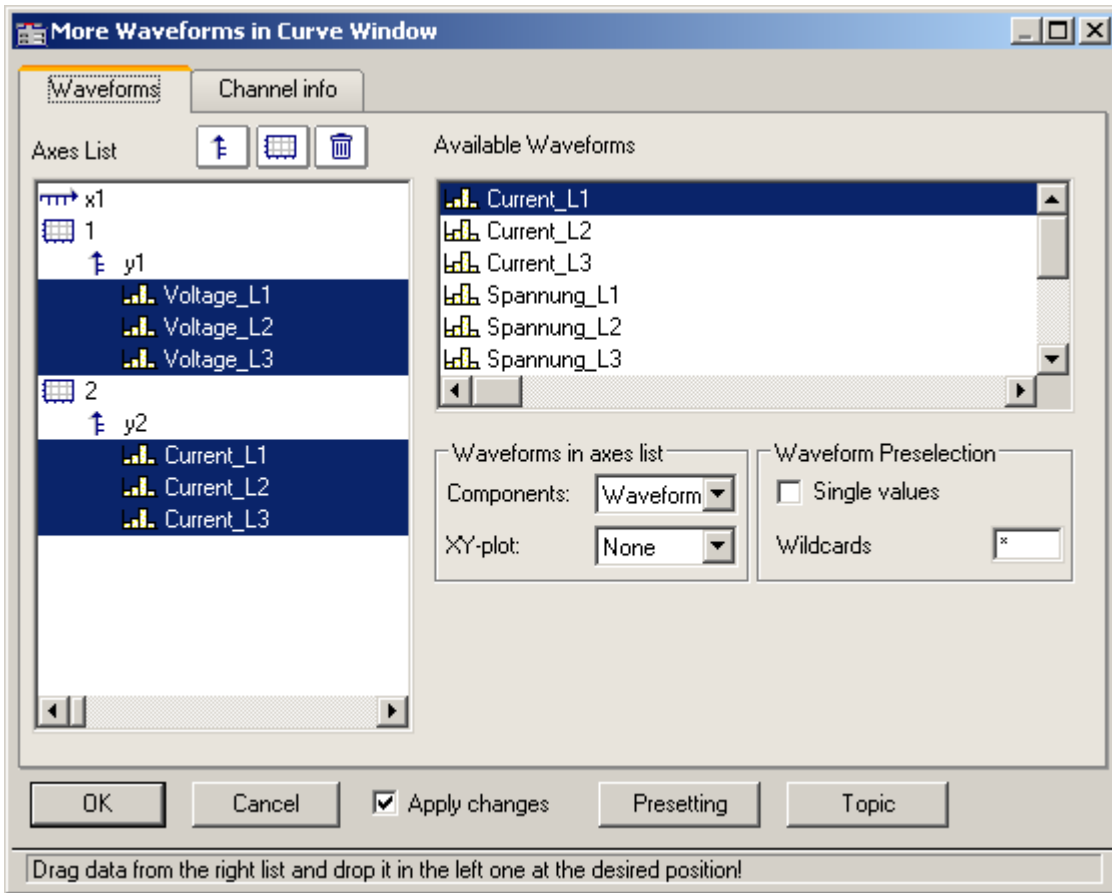
#### 5.4.4.2.3 Scroll / Stretch

Here, you can toggle between curve window display which either scrolls through the curve plot (like a strip chart recorder) or where the window stretches as the curve grows.

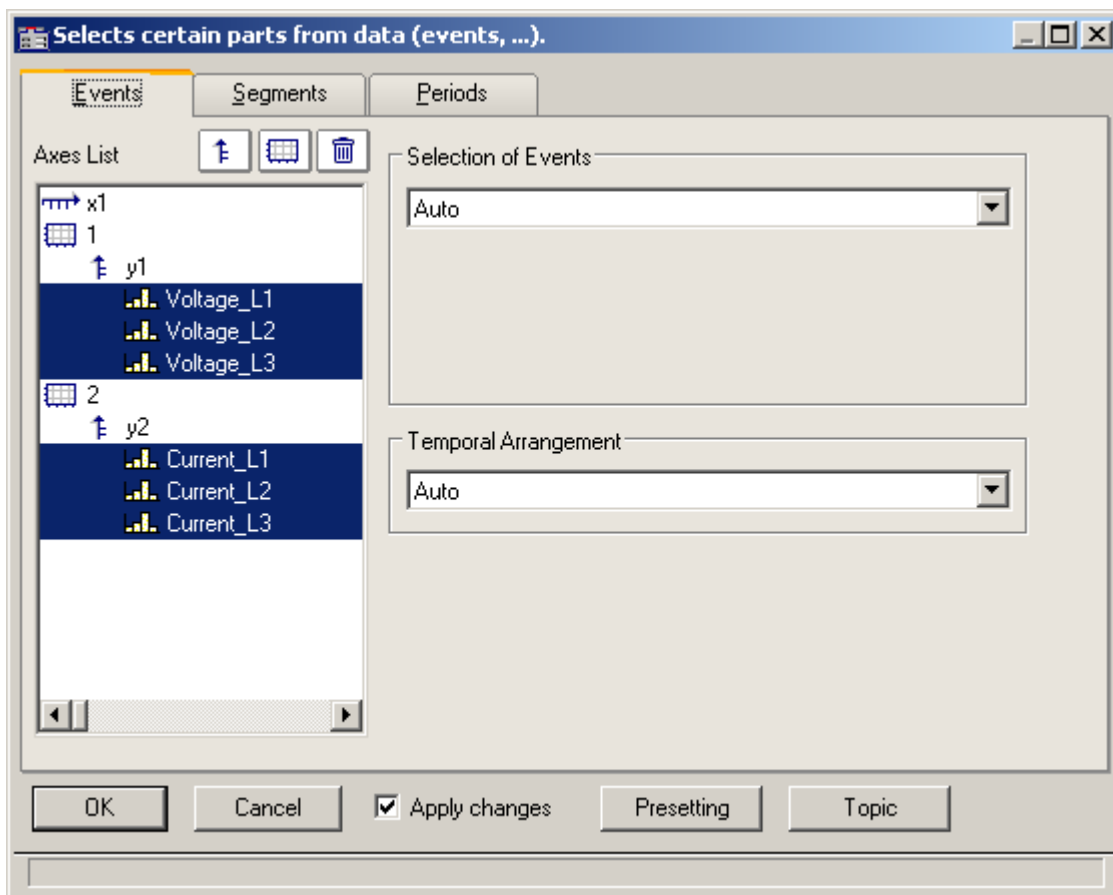


### 5.4.4.2.4 More Waveforms in Curve Window ...

This is a dialog where you can select additional waveforms for display in the curve window.



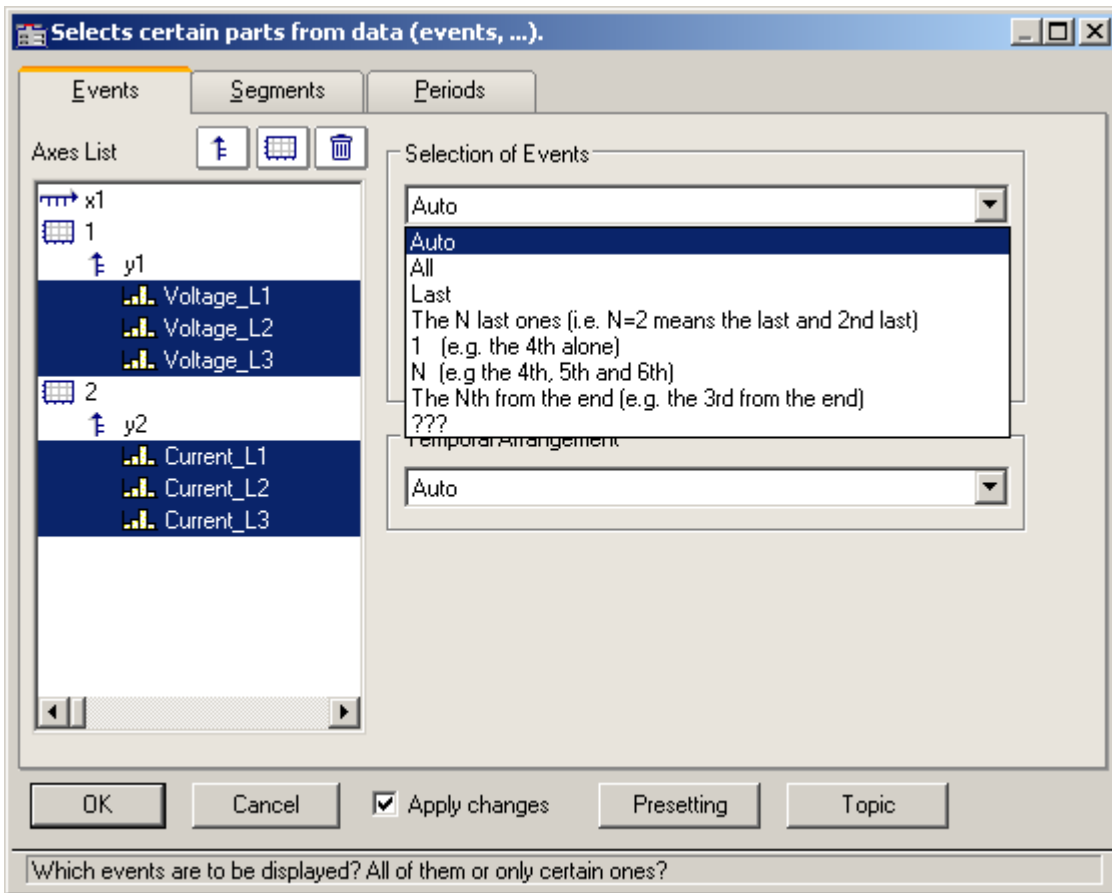
#### 5.4.4.2.5 Window Configuration ...



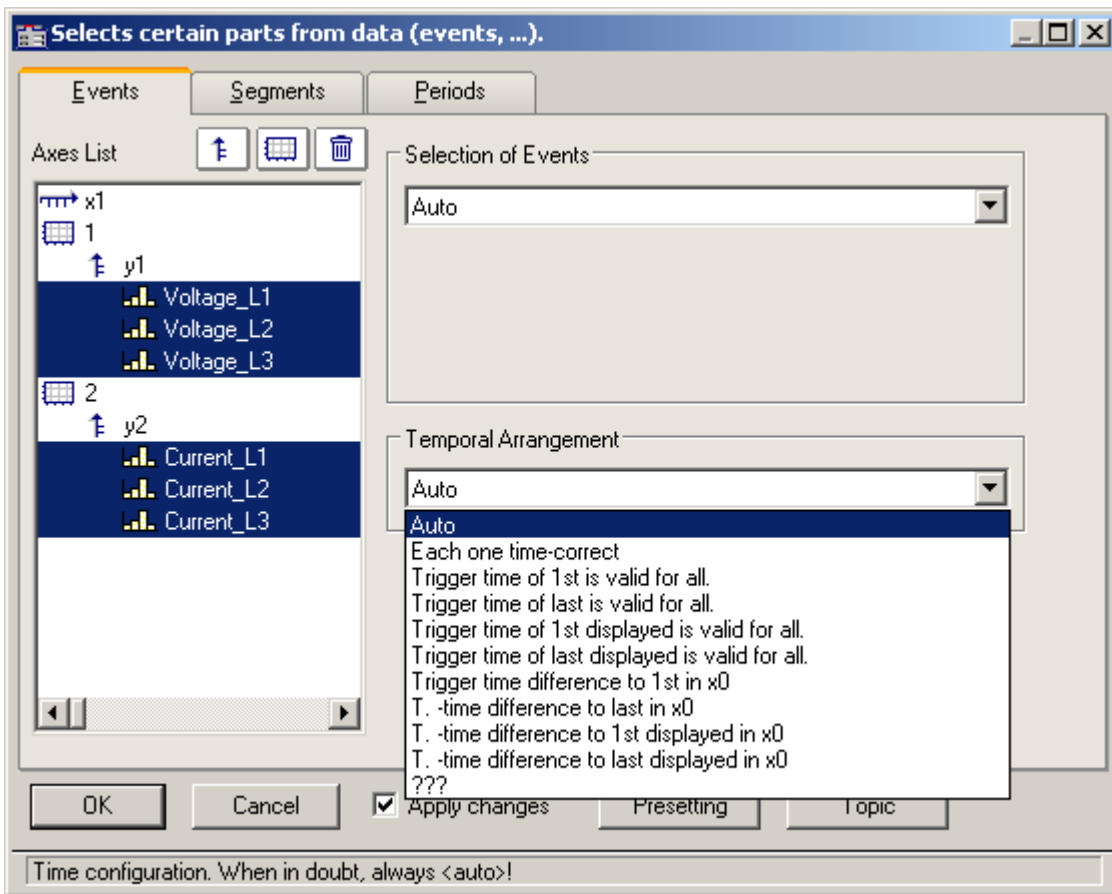
**Selection of events:** The window supports display of events belonging to triggered waveforms.



Right-click in the curve window and select "Window Configuration" from the context menu:

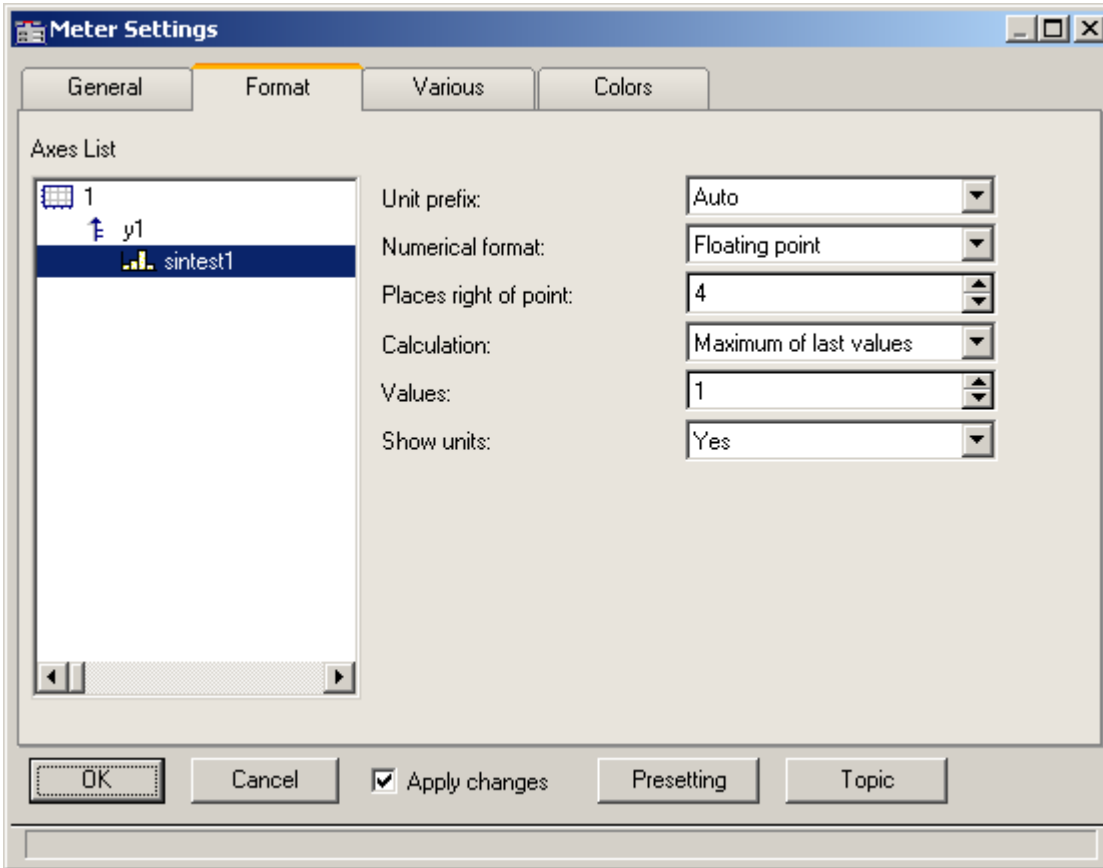


**Temporal arrangement:** Here you can set how different events are arranged to provide a comparison of their positions in time.



### 5.4.4.2.6 Meter...

This dialog is available if the curve window is configured as a bar meter.



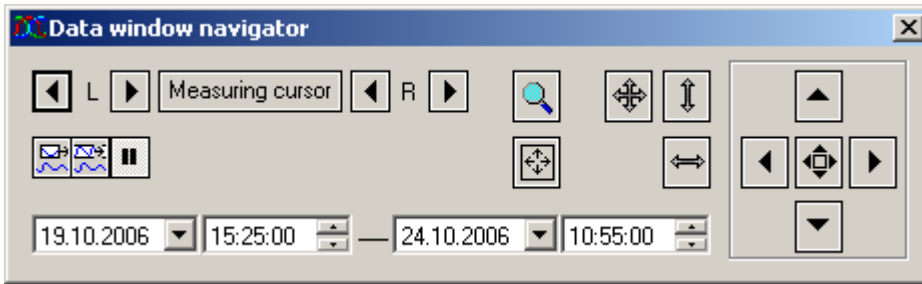
### 5.4.4.3 Tables

Some data sets, for instance, events, are displayed as tables. Tables don't have their own menu.

Name	Time	Maxima
U1_THD_mean	20.10.06 15:55:00.0	3.03 %
U2_THD_mean	20.10.06 15:55:00.0	3.03 %
U3_THD_mean	20.10.06 15:55:00.0	3.03 %
U4_THD_mean	20.10.06 11:05:00.0	23.36 %
I1_THD_mean	23.10.06 06:25:00.0	172.33 %
I2_THD_mean	23.10.06 22:25:00.0	2236.72 %
I3_THD_mean	20.10.06 21:05:00.0	2765.49 %
I4_THD_mean	21.10.06 23:15:00.0	1230.33 %


#### 5.4.4.4 Toolbox

To **magnify or shrink** the curve segment, to scroll through the view and to move the measurement cursor, there is a toolbox which is opened as a separate dialog and which always refers to the active curve window.

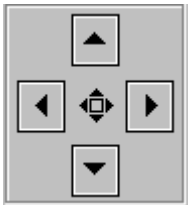


Data window navigator

#### Activation

To activate the toolbox, use the main window menu item **View/Data window navigation** or the button  in the toolbar.

#### 5.4.4.5 Navigating



To change which region of a curve the curve window segment shows, you can use either the **toolbox** or the curve window functions. The following description refers to the toolbox.

In the set of controls on the right side of the toolbox, push the button in the center to switch the functionality between **scroll** and **zoom**. As a result, the function of the arrow buttons changes.



Scroll



Arrow buttons

- **Short clicks** on the arrow button scroll the displayed section slowly (step).
- **Holding down** or double-clicking the buttons cause rapid movement.



Magnify /Shrink **Zoom range**






Arrow buttons

- **Short clicks** on the arrow button scroll the displayed section slowly (step).
- **Holding down** or double-clicking the buttons cause rapid movement.



**Magnifying glass:** The magnifying glass magnifies a specified segment. Click on the magnifying glass and drag the cursor while holding down the mouse button to outline the rectangular segment of the curve window which you wish to zoom into.




#### Unzoom

-  The **Unzoom** button restores the complete curve.
-  Unzoom X-axis
-  Unzoom Y-axis



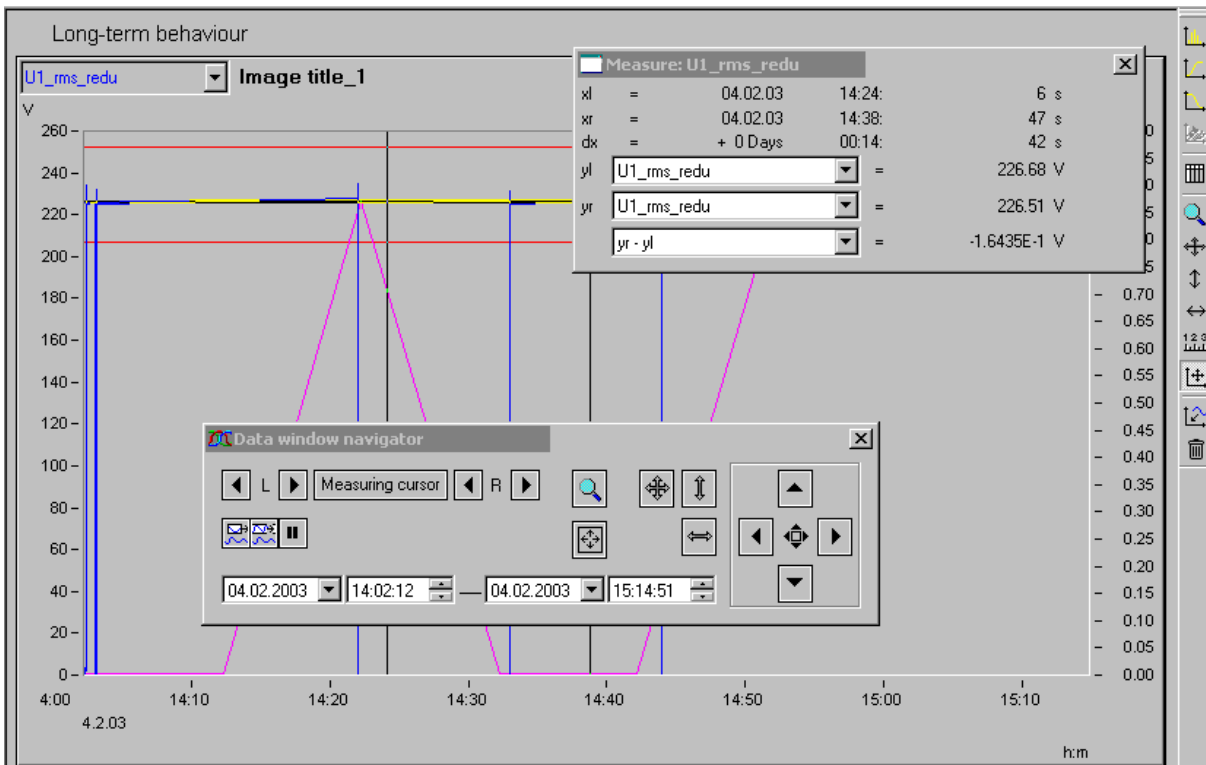
**Maximize curve window:** Displays the active curve window in maximize format

 *Curve window display mode during measurement*

-  Scroll mode – The currently visible rang is automatically moved to the end of the waveform.
-  Stretch mode – The left side of the curve window remains fixed while the right side moves with the extending edge of the waveform. The domain thus grows as the measurement progresses.
-  Pause – The displayed region is frozen. The measurement continues in the background, meanwhile. This is helpful for inspecting the signal while the measurement is still running.

### 5.4.4.6 Measuring

The pinpointing of individual values from the curve can be controlled either via the toolbox or the curve window. the following description refers to the toolbox.



If you click on **Measuring cursor**, a **measurement value window** opens. It displays the amplitude and time values for both measurement cursors and the difference between the left and right values.

With the **toolbox's arrow buttons**, it's possible to move the two measuring cursors. You can also move the pointer in the window directly by means of the **mouse**. The left and right mouse buttons move the left and right cursors, respectively. To do this, hold down the respective mouse button while moving the mouse.



**Note**

The functions for navigating and measuring are available in a more extensive form via the **curve window menus**.



## 6 Messaging

### 6.1 Fundamentals

#### 6.1.1 What is Messaging?

SIMEAS Q80 7KG8080 supports the transmission of text messages in response to specific events. The available events are any signal changes of the virtual bits and network bits. In any bit, the transitions both from 0 to 1 and from 1 to 0 can be linked with one or more message texts.

Each such message can have its own target defined for it. The available message types include email, SMS and FAX in any combinations.

Along with obligatory text components, the message texts can also contain the current values of the network bits, virtual bits and Display variables from the device. Other available text components include the date, time, device name and certain Messaging variables, which can be filled with the currently valid values at the moment the message is generated. The information for Messaging is comprised of these specifications:

On this event:

- this message's frequency
- loss of this message

On all messages generated:

- The count of all messages generated
- The count of messages rejected as undeliverable or due to lack of resources
- The count of all events which could not be processed because they occurred in too rapid succession

#### 6.1.2 What can Messaging be used for?

Practically any event occurring during a measurement can release messages.

In the simplest case, this can be used to alert a service technician by means of an SMS when a threshold is exceeded or a similar event occurs.

The ability to place the current values of the network bits, virtual bits and Display variables from the device in the message makes it possible to generate simple reports as well as malfunction messages. With appropriate programming, time-controlled messages, for example, can be sent, which could contain the most important data on processes current state.

Note, however, that Messaging is conceived exclusively for occasional sending of messages. It should generate only a few messages per hour or even per day! For more information, refer to the section on [reliability](#)<sup>[114]</sup>, and the [technical specs](#)<sup>[124]</sup>.

#### 6.1.3 How does Messaging work?

The devices cyclically examine the virtual bits and network bits for changes. If a change is detected, a check is made of whether there are any message configurations defined for that event.

If there are, then in addition to the virtual bits and network bits already read in, the Display variables, the date and the time are saved. This ensures that the values are as up-to-date as possible for any later generating of messages.

The detected events and all their data are entered into an event queue. All of this queue's entries are later evaluated and all necessary message texts are generated. In the process, the variables in the message texts are replaced with the stored values.

The messages thus generated are saved in a sending queue, from where they can be sent via the respective suitable interface. WARNING! Under certain circumstances, the messages may not be sent in the order in which they were generated (see [Delivery of the messages](#)<sup>[114]</sup>)!

Messaging begins its activities already after preparation for measurement. Be aware, therefore, that messages could be sent even before a measurement starts if a bit for which a message is configured changes. Messaging remains active even after stopping the measurement. In particular, it continues to try sending messages generated during the

measurement! Also, Messaging's counter variables are not affected by the measurement's start or stopping. Only upon preparing the next measurement are the counter variables reset and any unsent messages discarded!

In order to deactivate Messaging, a measurement must be prepared which contains no message configurations.

### 6.1.4 How to configure Messaging

The messages are configured on the page *Supplementary parameter*. *SIMEAS Q80 Manager* uses these to produce an ASCII file which is saved in the measurement task folder. This file lists a description for each message, which states not only the actual text but also the triggering event and the message's destination.

Welche Angaben im Einzelnen notwendig sind, ist vom jeweiligen Nachrichtentyp abhängig. Im Kapitel [Konfiguration](#) [116] wird darauf näher eingegangen.

### 6.1.5 Preconditions

Only devices having an appropriate interface are able to send messages. For the *SIMEAS Q80 7KG8080* a modem is optionally .

In order to send a FAX, a modem which supports G3-Fax Version 2 or 2.0 is needed. The fax machine must also be compatible with one of the two standards. This shouldn't present any problem for most current machines.

Sending an SMS also requires a modem; even a land-line modem is able to send an SMS!

Email can be sent either via modem, or via a network interface, if an appropriate server can be reached via the network.

If either a GSM-modem or a GSM mobile phone is used, then it's not necessary to enable data transfer.

There are no further requirements.



## 6.2 Message types

The message types Email, SMS and FAX come with different strengths and weaknesses which can be considered when making a selection.

### 6.2.1 SMS

An SMS can contain only a small amount of text while offering the advantage of being able to alert a service-technician or responsible engineer directly via mobile. Transmission via the network operator usually takes place within a few seconds, although this is not guaranteed!

For electronic re-processing and archiving, an SMS is rather inappropriate. To send an SMS, a modem is absolutely necessary.

### 6.2.2 FAX

A fax can transmit significantly more text than an SMS and is the most direct message form since it doesn't have an intermediary provider. The device dials the fax machine's number directly.

There is also no time delay between the device's sending of the message and the arrival of the message at its destination. However, the fax machine would have to be permanently watched in order to use this advantage.

Since a fax is transmitted as a bitmap graphic, the data volume transferred is much greater than that of an email or SMS. Therefore, transmitting a fax can take several minutes when using a GSM modem.

A fax is only very conditionally suited to archiving, and re-processing is practically not possible at all. With Messaging, the size of a fax message is limited to one page. A modem is absolutely necessary for sending a FAX.

### 6.2.3 Email

An email can contain almost any amount of text; only the size of the configuration file set certain constraints. Transmission of email by the provider usually occurs after a few seconds, though there is no guarantee for this. By contrast, the email-client may be set to retrieve messages only at longer intervals.

In terms of archiving and re-processing, emails are best suited. In addition, sending an email doesn't require a modem if a mail server is accessible via the LAN interface. In this way, the slow process of dialing via modem is also omitted, so that the emails are sent much more quickly.

If, for instance, the modem is occupied by a PC dialing in, it is still possible to send emails via the LAN. On the other hand, all messages which rely on the modem are detained until the modem is available again.

However, to send an email, an account with a mail server is necessary so that the device can be identified by the server by means of a login name and password.

## 6.3 Reliability

### 6.3.1 Recognizing events (time response)

There is a limit to how many events for which messages are configured can appear in rapid succession. While one message is being sent, any other events occurring can only be stored. However, the event queue responsible for this purpose is of limited size. Once this is used up, all subsequent events are discarded. These lost events are counted in the Messaging variable "EventOverruns".

It isn't possible, however, to reconstruct afterwards which messages were lost due to discarded events!

As soon as Messaging is no longer occupied with sending a message, the accumulated events are translated to message texts and entered into the sending queue. This queue's volume is also limited, so that messages can be lost if they are generated more rapidly than they can be sent.

How long a message can be kept in the queue depends on the one hand on the actual sending duration (from a few seconds to approx. 5 min), and on the other hand on the receiver's capacity to be reached, since, in the case of an error the message will be repeated over and over.

If the modem is busy because a PC has dialed in, then all messages which require that modem will be delayed until it's free. Thus in this case, the messages could stay in the queue indefinitely!

In this way, the transmitting is delayed and the queue's available space can be exhausted, for which reason no new messages may be able to be accommodated.

All lost messages are counted in the Messaging variable "AllMessageLosses". In addition, the variable "ThisMessageLosses" records for each individual message configuration how often a message stemming from this configuration was lost.

Every message has the following addendum to provide a total overview (the numerical values are examples):

```
(This event :2 Unable to send: 0 )
(All messages: 23 Unable to send: 3 Overflow: 0 )
```

This conforms to the template:

```
(This event : "ThisMessageCounter" Unable to send: "ThisMessageLosses")
(All messages: "AllMessageCounter" Unable to send: "AllMessageLosses" Overflow: "EventOverruns")
```

### 6.3.2 Delivery of the messages

As soon as there is a message in the queue ready to be sent, an attempt is made to send it. If an attempt fails, the message is returned to the queue for a repeat attempt later following a pause. There is a specifiable delay before the next attempt to send the message.

This process is repeated several times, each time increasing the pause between delivery attempts. Only after a certain amount of repetitions has failed, the message is considered unable to be sent, and is deleted. The Messaging variable "AllMessageLosses" and the corresponding instance of "ThisMessageLosses" are updated accordingly.

If the modem is busy, for instance due to a PC dialing in, all messages to be sent via modem must be held back until it's once again available. Therefore, an occupied modem won't lead to failed delivery!

Emails which can be sent via the LAN are delivered even if the modem is busy. If appropriate, they can be bumped up in the sending queue. Thus, the messages aren't necessarily sent in the order they were created!

If a message can't be delivered due to configuration errors such as a wrong telephone number or password, then multiple attempts to deliver it may come at (substantial) monetary cost. **Therefore it is strongly recommended to test every message configuration under authentic conditions. The producer of SIMEAS Q80 7KG8080 is not liable for any costs resulting from the use of Messaging!**

### 6.3.3 Storing unsent messages

If a message must be discarded because there's no more room in the sending queue or because it can't be delivered, it is stored on a data carrier in the device, if possible. Even if the device is deactivated or if messages must be discarded due to preparation of a new measurement, storage in the device should still take place if at all feasible. Towards that end, the messages are saved even upon generating the message text and only deleted from the backup folder after being successfully sent.

If the device has an internal hard drive, it will be used for storage. Otherwise the system will check the device for the presence of a removable storage drive to which to save the messages.

For storage of the messages, a folder with the name "UnsentMessages" is created in the data carrier's main directory. All unsent messages are saved in this folder under filenames which provide indication of when and how the message was generated.

The filenames take the following form:

Date	Time	Number	Event	Event count	Type
2004-07-05	09-31-46	#4	Virt_Bit03=1	#2	EMAIL

Examples

2004-07-05 09-31-46 #4 Virt\_Bit03=1 #2.EMAIL

The first number corresponds to "AllMessageCounter". It represents the incremental counter of messages since a measurement was last prepared. The second number is the message's "ThisMessageCounter". It states how often the event occurred.

The filename extension indicates whether the message is an email, an SMS or a FAX.

## 6.4 Configuration

### 6.4.1 General

Configuration of messages is performed with the help of the *Supplementary parameter* page.

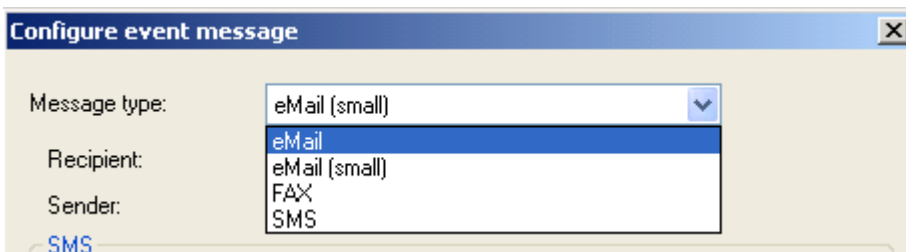
<input checked="" type="checkbox"/> Voltage event	<input type="button" value="Init..."/>	eMail (small)	Paul Smith
<input checked="" type="checkbox"/> free space < 5 MB	<input type="button" value="Init..."/>	eMail (small)	Paul Smith
<input checked="" type="checkbox"/> Cyclical notification (2 h)	<input type="button" value="Init..."/>	SMS	0049304670234

The available message types are:

FAX                  SMS                  Email

Events which can trigger a message:

1. voltage event,
2. free memory on a hard drive falls below a certain amount,
3. sending of a message within an interval set to between 1..24 hours.

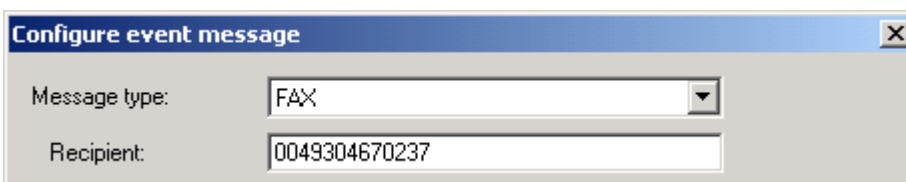


First a definition must be made of when *SIMEAS Q80 7KG8080* is to transmit a message. Transmission may be desired at regular intervals, or in response to specific conditions. To determine this, the corresponding checkmarks must be set under the heading *Events / Messages* on the page *Supplementary parameter*. There is a button  for the respective message transmission triggering option which becomes active when the option is selected. Clicking on this button calls the dialog *Configure event message* for the respective transmission option used to configure the messages.

### 6.4.2 FAX

With a fax, just the fax machine's telephone number provides all data necessary for actually sending the message. You must only be sure to include any digits necessary to obtain a dialing tone, or any area codes.

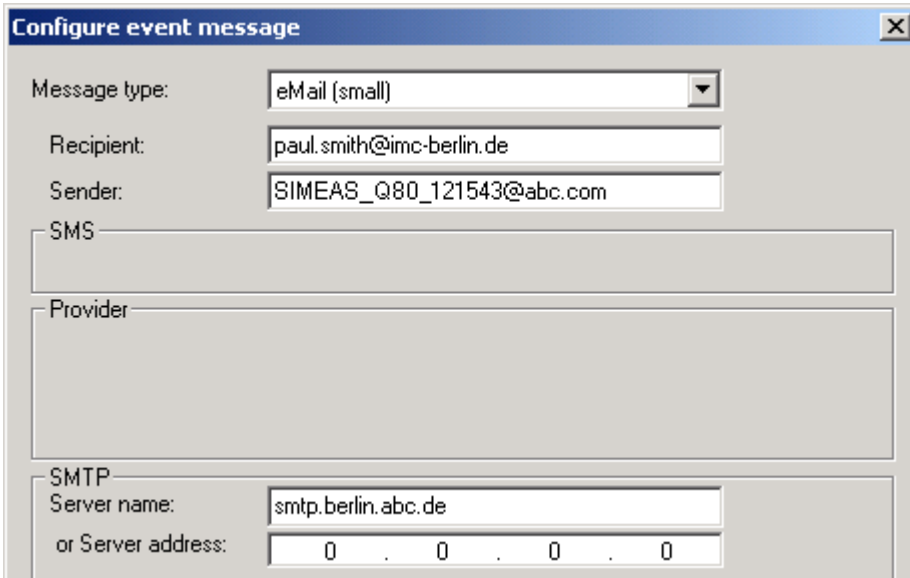
Example :



Note that both your modem and your fax machine must support the standard G3-Fax Version 2 or 2.0. However, this is usually the case anyway.

### 6.4.3 Email

Emails are the only form of messages for which no modem may be necessary. If a mail server is available in the LAN, then only a few data are sufficient for sending an email.



When an email is sent, a sender address must always be specified, otherwise delivery of the mail will be refused. Some servers additionally check whether the email address is even valid. In extreme cases, the server only allows senders which are in the same domain as the server itself, or which belong to a registered account. These steps are intended to combat abuse of mail servers.

The sender address is specified in the box *Sender*.

In order to display a preferred (or more specific) designation for the sender, it is possible to prefix the actual sender address with a string denoting the alternative designation. In this case, the sender address must be bracketed in "<>" characters.

Be sure to check which characters are accepted by the servers involved! For instance, German umlauts are not accepted and thus may not be used.

Certain PC programs resort to replacing the umlauts with a string which causes the email client to display the respective umlauts. However, Messaging does not support this technique!

In the *Recipient* box, the address of the email receiver is stated. In contrast to all other messages, emails can be sent to multiple receivers simultaneously. For this purpose, all target addresses are simply separated by commas.

As with the sender address, a string can be prefixed to the receiver address which then appears in the email client as the receiver. The actual receiver address must then be address must be bracketed in "<>" characters.

For umlauts and special characters, the same limitations apply as for *Sender*.

However, if the email is to be sent by modem, a number of different parameters must be entered.



**Note**

Ask your network administrator whether the measurement devices are permitted to send messages. If they don't have this right, you will not receive any messages even if the configuration is correct.

The device must log itself in with an Internet provider. The provider's dial-up number is entered in the box *Provider / Number*.

Internet access also requires a login name and password. These values are entered in the boxes *Provider / Login Name* and *Provider / Password*.

If an email is sent via the LAN interface, then the entries pertaining to the Internet provider are omitted, of course.

However, the mail server by which the email is to be sent must always be specified. The mail server can be specified either by its IP-address or by its host name. These are entered in the boxes *SMTP / Server name* or *SMTP / Server Address*.

To prevent abuse (spam), almost every mail server requires logging in user name and password. The servers carry out an ID check according to a variety of protocols, of which one supported by the server used must be selected in the box *SMTP / Authentication* (login).

If the mail server demands a login, the login name and password are entered in the boxes *SMTP / Login Name* and *SMT / Password* respectively. Otherwise, these entries are omitted.

#### 6.4.3.1 Example for eMail in response to a power outage:

```
04.04.2005 11:21:42
Device: SIMEAS Q80 7KG8080_121166

A voltage event has occurred!

Type: 3 (1=overvoltage, 2=sag, 3=outage)
Channels: 2
F      = 50.072 Hz

U1_rms = 227.63 V
U2_rms = 0.00 V
U3_rms = 227.62 V

THD U1 = 1.664 %

Free memory: 487156.00 kB

(This event :2 Unable to send:0 )
(All messages:23 Unable to send:0 Overflow:0)
```

### 6.4.3.2 Example for received cyclical eMail

```
08.03.2005 17:30:12
Device: SIMEAS Q80 7KG8080_120760

Cyclical message (life sign signal)

Interval = 4 h
F          = 50.020 Hz

U1_rms = 228.42 V
U2_rms = 228.91 V
U3_rms = 227.81 V

Free memory: 15515.00 kB

(This event :56 Unable to send:11 )
(All messages:65 Unable to send:11 Overflow:0)
```

As subject, Messaging creates automatically a text according this template:

Message from SIMEAS Q80 7KG8080 <device name>

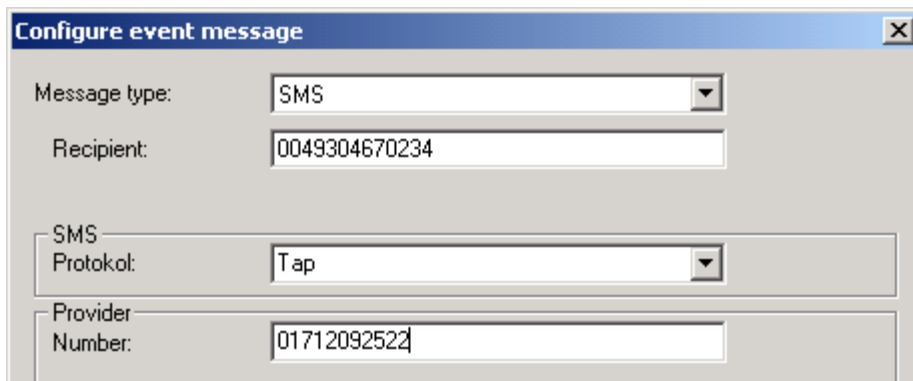
Example:

Message from SIMEAS Q80 7KG8080 <Devices\_121137>

### 6.4.4 SMS

Messaging supports sending of SMS via both GSM modems as well as via land line modems. This ability is made possible by the fact that practically every network possesses servers into which one can dial in either from a land line or via a GSM-modem.

To send an SMS, information enabling communication with the SMS-server is required.



To send an SMS, information is required which enables communication with the SMS server, namely the server's dial-up number and the protocols for transmission of the SMS.

Since there are a variety of protocols for transmitting an SMS, the appropriate protocol for the respective server must be selected. This is done in the box *SMS / Protocol*. The available choices are Tap, Tap-Old, Ucp, Ucp-Extend.

The server's dial-up number must be entered in the box *Provider / Number*.

## 6.5 Potential error source

In order to avoid experiencing problems during actual use, you should test your message configuration in advance! Once you have verified your access data for an Internet provider, mail server or SMS provider, you should next copy and paste them to the configuration file, which avoids typing errors. The same applies to the receivers' telephone numbers and email addresses.

Below is a list of some problems with their possible causes and the corresponding remedies:

**Problem:** The device does not send a message for every event. Messages are generated only sporadically or not at all.

**Cause:** The sending queue is full.

**Solution:** Try not to generate too many messages in quick succession and ensure that the messages can be sent without any problems.

---

**Problem:** The device sends each fax multiple times over a long period of time.

**Cause:** Your fax machine is not entirely compatible with the modem used, which causes the machine to think that the fax was lost. The device repeats the message until it finally gives up.

**Solution:** Replace the fax machine with a different model or contact Customer Service about replacing the device's internal modem!

---

**Problem:** I use Messaging and also automatic callback. The device sometimes takes much longer than normal to call me back.

**Cause:** The device may be sending a message between your call and the callback. This can delay your callback by up to approx. 5min.

**Solution:** Not available.



## 6.6 Messaging Technical specs

Parameter	min. / max.
Delay between occurrence of an event and saving the variable's value	min. 20ms, max. approx. 200ms
Line length in configuration file	max. 512 characters
Size of a configuration file	max. 300000 characters
Number of message configurations	max. 3 per device
Depth of event queue	128 entries
Depth of sending queue	128 messages
Number of sending attempts before loss of message	30
Time between two sending attempts	1,4,9,16,25,36,49,60,60, ... 60min
Duration of attempt to dial into Internet	Maximum permitted: 60s
Email transmission duration	Maximum permitted: 80s
Number of characters in an Email Typical character count in text box:	Limited only by the size of the configuration file approx. 250
SMS transmission duration	Maximum permitted: 80s
Number of characters in an SMS Typical character count in text box	Maximum: 160 characters 0
Fax transmission duration	Maximum permitted: 280s
Fax string length	Maximum: 75 characters
Fax line count:	Maximum: 75 characters
Input ranges Binary states Counter variables Display variables	0 or 1 32 bits unsigned (0 to 4294967295) 32Bit floating point (-3.4e+38 to +3.4e+38)

## 6.7 Templates



### Hinweis

For the purpose of making the configuration of Messaging as easy as possible, the examples below present the access data for certain service providers. For the currently valid access data, contact the respective service provider. **No guarantee for the correctness of the access data is offered or implied!**

## 6.7.1 Internet providers

Here are some examples of Internet providers.

### 6.7.1.1 Call by Call Internet access from land lines (ISDN and analog)

#### Example MSN (Easysurfer power)

ProviderPhoneNumber=0193670  
ProviderLoginName=msn@easysurfer-power.de  
ProviderPassword=msn

### 6.7.1.2 Call by Call Internet access via GSM

#### Example D1 T-Com Inland (Registration required!)

ProviderPhoneNumber=4122  
ProviderLoginName= (assigned upon registration)  
ProviderPassword= (assigned upon registration)

#### Example D1 and D2 Domestic (Germany): Freenet Call by Call

Per-minute price: 20 Cent + any fees for special numbers (debitel)  
ProviderPhoneNumber=22243  
ProviderLoginName=freenet  
ProviderPassword=mobil

## 6.7.2 Free mail servers

You must apply for an email address with a provider, in order to obtain a login name. This can be done via the provider's website.

#### Example GMX

SMTPServer=pop.gmx.net  
SMTPAuthentication=cram-md5  
SMTPLoginName=your login name with this provider)  
SMTPPassword=(your password with this provider)  
SenderAddress=(your email address with this provider)

## 6.7.3 Freely accessed SMS servers

The cost of sending an SMS depends on which network you call the provider from and into which network the SMS is sent. The numbers stated here are applicable to analog, ISDN and GSM modems, unless otherwise indicated!

#### Example D1

ProviderPhoneNumber=01712521001  
or 01712092522 (not applicable to ISDN AL5064S)  
SMSProtocol=Tap  
Convert=Ä [ Ö \ Ü ] ä { ö | ü } ß B \n \s \t \s

## 7 Appendix

### 7.1 Special options for connecting to the device

Additional ways to connect with the device are presented below. For other special cases, please see the section on LAN connection.

#### 7.1.1 Devices and TCP/IP

It is absolutely necessary to carry out the instructions below in the sequence given. But first read through the whole section in order to get a preview of the needed measures.

##### 7.1.1.1 General preparations

An *SIMEAS Q80 7KG8080* device with TCP/IP supports a classic network interface (LAN).

For a device having a LAN-interface, the following parameters must be set appropriately:

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• IP-address</li> <li>• Subnet-mask</li> <li>• DNS-server-address (optional)</li> <li>• Domain (optional)</li> <li>• Router-address (optional)</li> </ul> | <p>If your network is equipped with a DHCP-Server, these data can be accessed automatically by the device upon switch-on. Have your network administrator make the necessary configuration of the DHCP-server and the DNS-server. You can skip the rest of this section, in that case, and proceed with "<a href="#">Preparing the PC</a><sup>[124]</sup>".</p> |
|--|---|



#### Note

##### *Notes for the Administrator:*

We recommend using a fixed assignment of IP-addresses to the devices and to set an unlimited lease-time. A device's host name cannot be changed. It is comprised of a prefix and the device serial number, e.g. "SIMEAS\_Q80\_99030143".

For a device with a PPP-interface, it makes sense to set the following parameters:

- local and remote IP-address
- Baudrate and protocol of the serial interface to modem or cable
- DNS-server address (optional)
- user name and password (optional)
- Scripts for connecting and disconnecting (optional)

If there is no DHCP-server, the necessary device settings must be made as described further below. Have your administrator issue IP-addresses for your device units and make note of the address assignments. Have the administrator enter the device units in the DNS-server if there is one. In this case, also make note of the DNS-server's IP-address and the name of your network domain.

Find out which subnets the device units are to be operated in and make note of the corresponding subnet-masks. You will also need the IP-addresses of any routers present which your device units are to use.

Once you have gathered all the above information, you can proceed with the next section.

### 7.1.1.2 Preparing the PC

To operate TCP/IP devices you need a PC on which the TCP/IP-protocol is installed and ready. We assume here that your PC is already set up correspondingly. If this isn't the case, follow the instructions in your network card's documentation and in the WINDOWS help texts in order to install TCP/IP on your PC.

"[Devices and TCP/IP with PPP](#)"<sup>[133]</sup>, contains hints on preparing your PC for operation of PPP-devices.

Once your network administrator has entered your *SIMEAS Q80 7KG8080* in a DNS-server, your PC's configuration is already complete and you can proceed with the next section. Otherwise, you must enable your PC to translate your device units' hostnames into the corresponding IP-addresses.

To do this, you must create a new file with the name *Hosts* (without file extension). Create the file in the folder "C:\Windows\System32\drivers\etc\". If this file exists already, you can simply add the necessary entries. Use an ASCII-Editor such as Notepad.

You must enter one line for each of your device units; it must contain the device IP-address, followed by its hostname (divided by any number of spaces). Use the addresses assigned to the devices by your administrator. Note that only the last 8 digits of the serial number are used for the hostname. The entries should look about like this:

```
192.168.10.23   SIMEAS_Q80_99030143
192.168.10.24   SIMEAS_Q80_03021747
192.168.10.25   SIMEAS_Q80_03021748
```



#### Note

- If the above mentioned entries are not present in the Hosts file, the SIMEAS Q80 Manager-software is trying to simulate the data (by "poll"). This procedure cannot be used for every network constellation!

### 7.1.1.3 Use of TCP/IP devices in a variety of network situations

In some cases it's necessary to operate the PC and the device in one network (e.g. the company network), and also be able to connect them point-to-point for mobile operation. In order to ensure as convenient and reliable operation as possible in both situations, the following procedure is advised.

In larger networks, the IP-address for PCs in the network are mostly assigned automatically (*My Network places* ⇒ *LAN* ⇒ *Properties* ⇒ *Internet protocol (TCP/IP)* ⇒ *Properties* ⇒ *Obtain an IP-address automatically*). For this purpose, there is a DHCP-server (DHCP: **D**ynamic **H**ost **C**onfiguration **P**rotocol) in the network.

If, within such a network, the Windows operating system is started on the PC (the physical connection between PC and the network (EtherNet cable) must be present!), then the PC is automatically assigned an appropriate IP-address, and the value is set for the subnet mask. The measurement devices can obtain an appropriate IP-address and subnet mask in the same way if use of DHCP is activated for the device. Thus, in a network with a DHCP-server, there are no address conflicts and no problems finding the devices in the network.

If the same PC is later started outside of the network environment (there is no DHCP-server; e.g. inside a vehicle), then the IP-address is assigned according to the APIPA-protocol (**A**utomatic **P**rivate **I**P **A**ddressing). Here, the Windows operating system assigns an IP-address from a reserved IP-address range (169.254.0.1 ... 169.254.255.254). The subnet mask is set to the value 255.255.0.0. See also [AutoIP](#)<sup>[127]</sup>.

In this case, the measurement devices use the IP-address set in the device. Then, if an address from the range reserved for the APIPA is selected as the IP-address in the device, and the subnet mask is set to the value 255.255.0.0 (use of DHCP for the device remains activated!), then there are no problems establishing a connection between the PC and the device outside of the company network.



#### Note

- The IP-address currently used for the PC and the value for the subnet mask can be found with the help of a program:

Windows 2000/XP/Vista: `ipconfig /all`

- If an IP-address from the range reserved for the APIPA is to be set for a device, it is necessary to check first which IP-address is assigned for the PC, if no automatic IP-address assignment is performed. To do this, deactivate the PC. Instead of to the network (with the DHCP Server), the PC is connected with a destination device, e.g. a measurement device. Then, after activating the PC, determine the IP-address currently used as described above. Make note of this IP-address!

- Be sure that a separate IP-address is assigned for every device. This also goes for assignment of IP-addresses from the range reserved for the APIPA! This ensures that there aren't any address conflicts even in a network without a DHCP-server.
- In principle, the physical connection (Ethernet cable) between the device and the network should be established prior to activating the device, so that the automatic IP-address assignment can take place. If automatic obtainment of the IP-address fails, the IP-address set for the device is used up until it is switched off. However, this address usually doesn't match the IP-addresses used in the network and address conflicts can arise, or the device won't be found in the network!

### 7.1.1.3.1 Computers with multiple TCP/IP connections

If you have set up multiple TCP/IP interfaces in your computer, be sure to enter different subnets! Otherwise, random conflicts will occur. Reasons for having multiple TCP/IP interfaces include:

- you separate your company network and the connection to the measurement device with two network cards
- you sometimes connect your measurement device via modem (PPP)
- you have added a Bluetooth connection.

The settings for the addresses may look like this, for example:

	<i>Measurement device</i>	<i>Router-company</i>	<i>Network Card 1</i>	<i>Network Card 2</i>
<b>IP-address</b>	192.168.1.3	192.168.0.1	192.168.1.26	192.168.0.13
<b>Subnet-mask</b>	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0

In this example, your PC communicates with your measurement device via Network Card 1, and with the company network via Card 2.

## 7.1.2 LAN-Configuring of the SIMEAS Q80 7KG8080 units

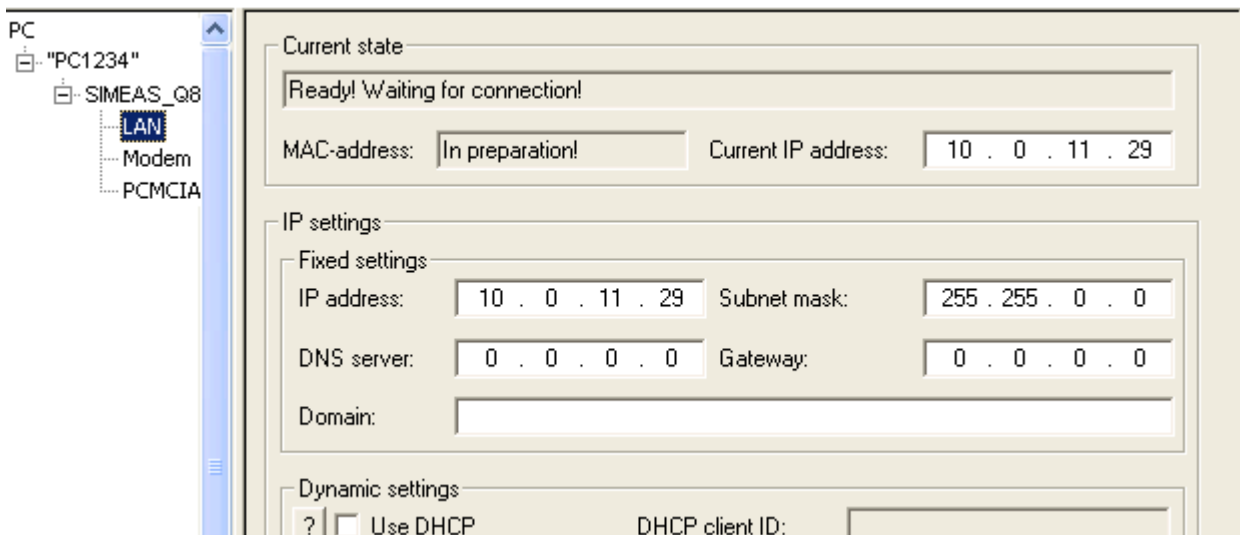
Connect the units to your PC and switch them on. To make the network settings for your devices, start the program *IF-Config* from the *SIMEAS Q80 Manager* program group.

The program checks all entries for plausibility and thus prevents a multitude of incorrect entries. Nevertheless, use of the program requires some knowledge of the system.

There are two sides to the program. One side is the *Device search* which serves to locate TCP/IP-devices via user-specified network interfaces. The list *Usable hosts* should contain an entry for each network adapter in your PC for which you have installed TCP/IP. This includes adapters for the Dial-Up-network.

By double-clicking on the desired adapter, a network search is initiated to find all devices to which it is connected. If you don't find any devices, check whether your PC and the devices are correctly connected to the network and activated.

If the search was successful, double-click to expand the branches to locate your device's name. If you're not sure what your device's name is, then also pay attention to the status bar. Clicking in this once causes the active device's network name, which contains the device's serial number, to be displayed. The serial number provides unique identification for the device and is indicated on its plaque.



Click on the entry LAN in the tree diagram in order to make network settings there. On the right side of the screen, make the desired configuration entries in the control panel *IP-settings* or activate *Use DHCP*.

In the control panel right above that, Current state, the current IP- addresses of the *SIMEAS Q80 7KG8080* units are indicated.

In this way, you can make settings for all devices you wish to configure. However, the configuration is only then written to the device once you click the button *Accept*, which is only available when the device is selected, not its branches. To do this, click on the entry for the desired device on the left side of the screen. In the box above the button, *Settings to be applied*, on the right side, you can choose whether or not to apply all the changes you have made for device adapters. By double-clicking on the desired device, you reach a message offering you the chance to reject all changes for this device.



#### Note

- If you respond to the message *Reject all changes?* with *No*, only your entries on the right side remain intact. They are not yet written to the device, this only happens when you click on the button *Accept*.
- Once the configuration has been written to the device, a warm start is carried out so that the new settings take effect. This process lasts about 1-2min. If the text *Settings have been applied* is displayed in the box *Messages*, your device has been successfully configured and you can proceed with the next device.
- To change the *Device name*, click upon starting the *SIMEAS Q80 Manager* software and open under *Setup* the window *Device definition*. Select the desired device and click the button *Edit...* In the upper right portion of the window which then opens, you can change the device name. This name is purely for the user's convenience and has no effect on the actual network functionality.
- After confirmation, *IF-Config* allows the Subnet mask to have a format which is not customary for this network class.  
**Example:** Networks who's addresses start with 192 are so-called Class C networks. They always use a Subnet mask of the format 255.255.255.X. In special situations it is necessary to change this format to 255.255.X.X.

### 7.1.2.1 Alternative IP-addresses

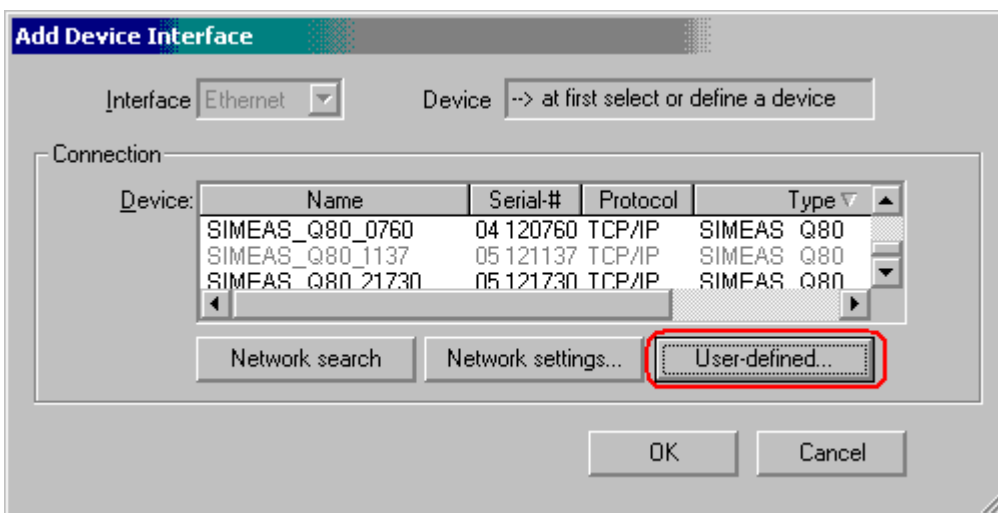
- **Use DHCP:** (Dynamic Host Configuration Protocol) The device tries to get its settings from a DHCP server. If the server is not available, the fixed settings are used! This corresponds to the alternative configuration in Windows XP or Vista PC.
- **DHCP ClientID:** The *DHCP ClientID* can be entered if the DHCP server requires a special DHCP ClientID for IP assignment. If there is no entry, the [MAC-address](#) <sup>[140]</sup> is used. Supposing measurement devices are to be assigned IP by the DHCP server from a particular range. In that case, 'MeasDev 1' etc. could be entered, for example.
- **Auto-IP (DHCP + APIPA):** (*Automatic Private IP Addressing*) *Use DHCP* is automatically activated along with this option. If the DHCP server cannot be reached, the fixed configuration for the address is not used. Instead, the device uses a random number generator to get an address in the range from 169.254.1.0 to 169.254.254.255. Afterwards it tests whether the address generated is available. If it is already used for another device, the search is repeated until a free address is found.

### 7.1.2.2 TCP/IP, PPP via a router

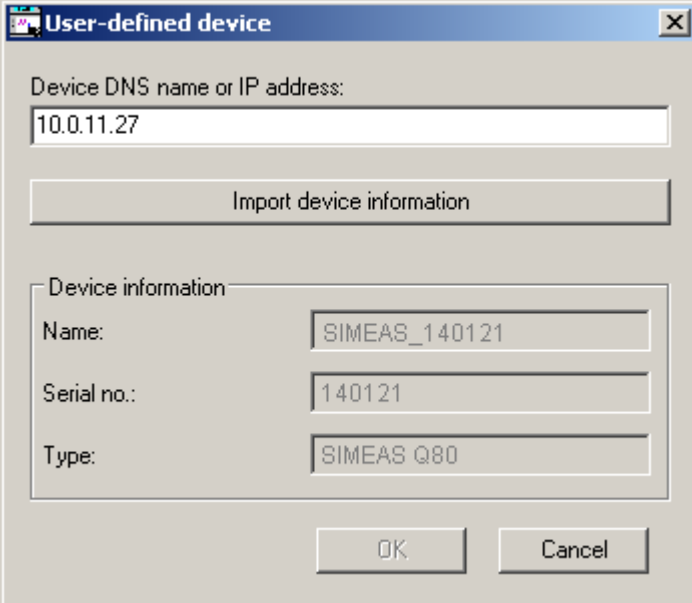
If there is a router between your PC and a device operating with TCP/IP or PPP, this device can't be found by means of a network search. In that case you must enter the device as a *User-defined device*.

In order to integrate a device, which is accessed via a router, into the user interface system software, proceed as follows:

1. Open the dialog *Add device interface* and select *Network settings....*
2. **Activate the option *Enable advanced settings for user-defined interfaces*** and exit the dialog with *OK*.
3. The dialog *Add device interface* then features a new button labeled *User-defined....*



4. Clicking on the button *User-defined* calls the following dialog, after first posting a confirmation prompt. Enter the IP or the DNS name.



The screenshot shows a Windows-style dialog box titled "User-defined device". It features a close button in the top right corner. The main content area includes a text input field for "Device DNS name or IP address" containing "10.0.11.27". Below this is a button labeled "Import device information". A section titled "Device information" contains three text input fields: "Name" with "SIMEAS\_140121", "Serial no." with "140121", and "Type" with "SIMEAS Q80". At the bottom of the dialog are "OK" and "Cancel" buttons.

5. Clicking on the button *Import device information* causes the system to try to set up a connection. If this succeeds, the device's (user-defined) name, its serial number and the product type are displayed and the device can be integrated into the system.

**Note**

If you wish to define a device which is connected to the PC via the Dial-Up network, you must first set up the Dial-Up connection

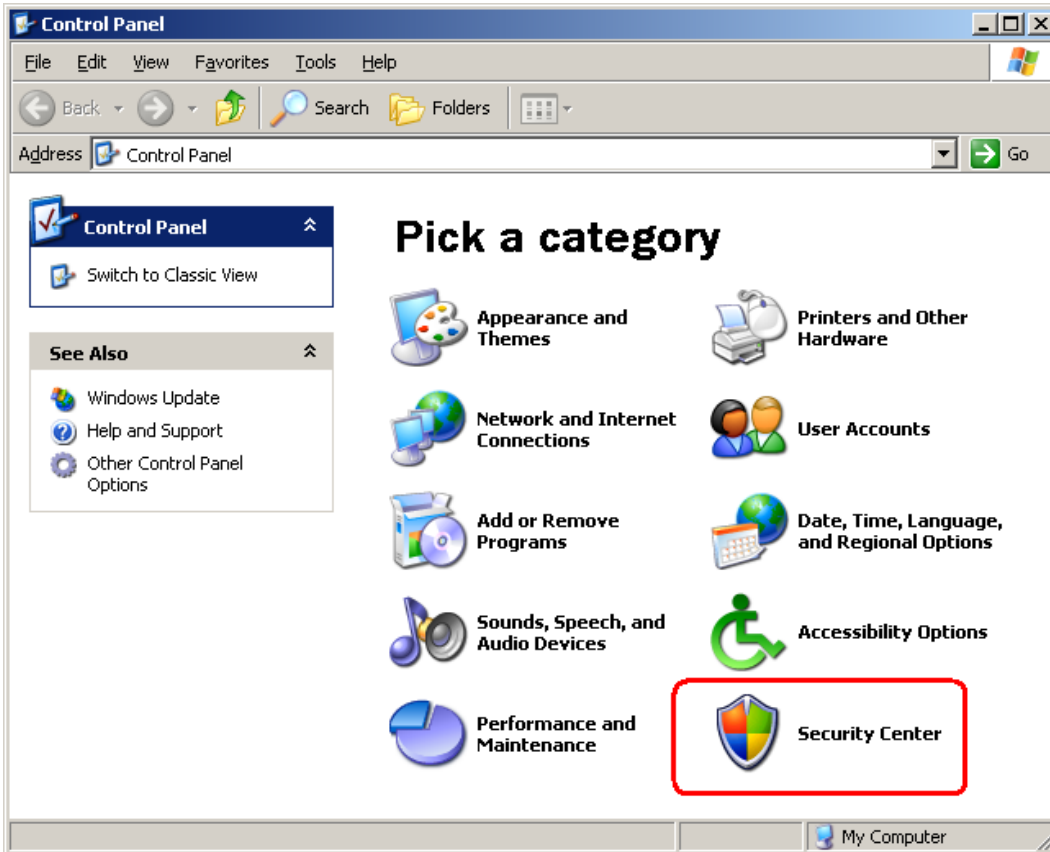


### 7.1.2.3 Firewall and Ports

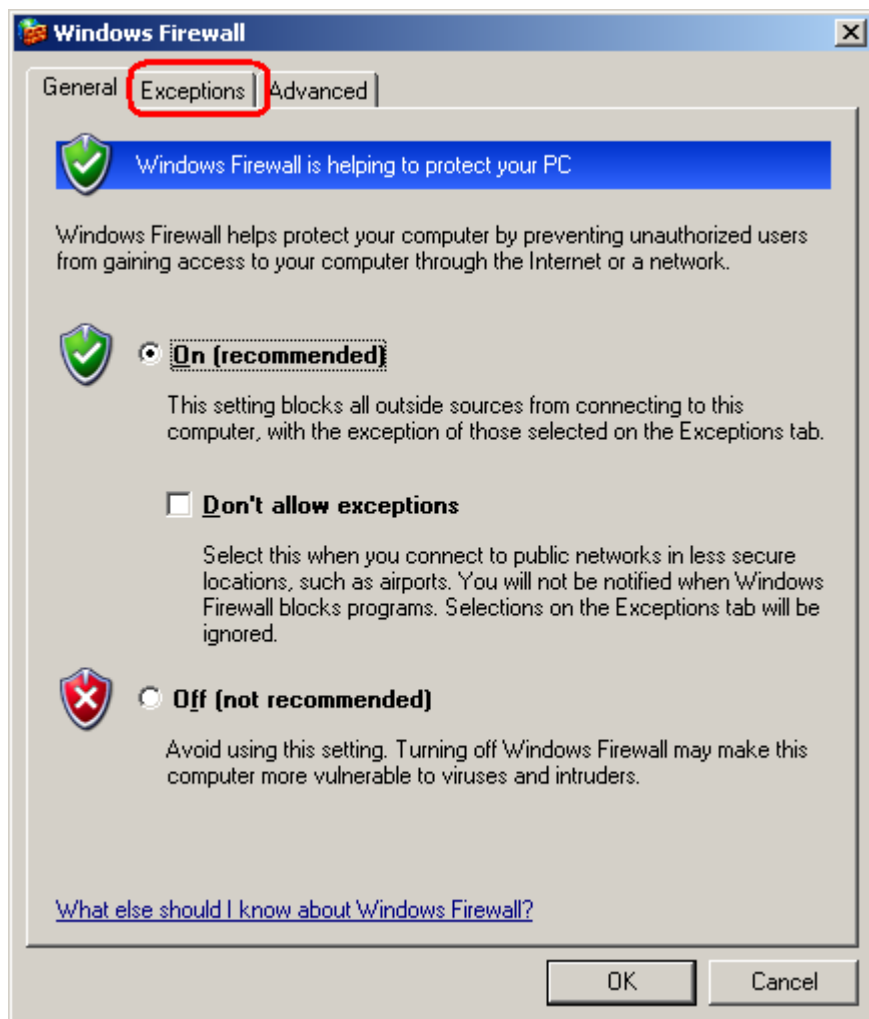
The following ports are used: UDP 1200, TCP 1200 through 1202

If you use the Windows Firewall, it may be necessary to enable the ports. The easiest way to do this is by enabling the program from within *SIMEAS Q80 Manager*.

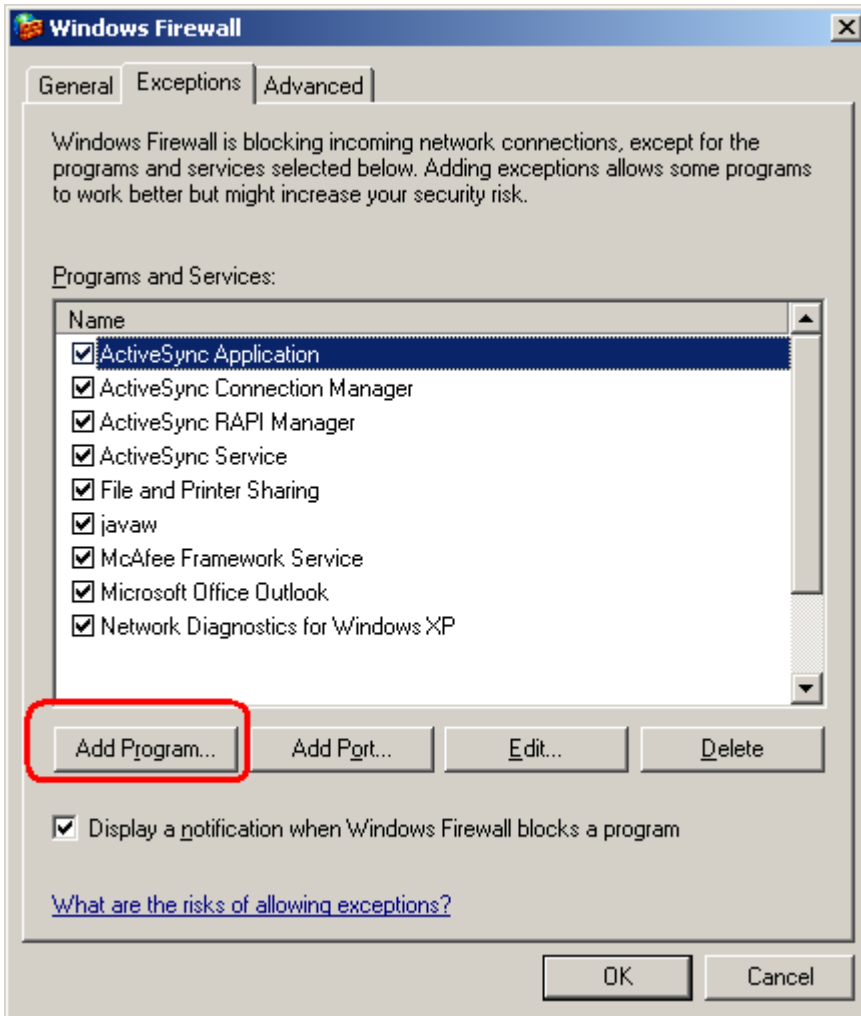
1. Click on the Windows Start button and open the Control Panel. Select *Security Center*.



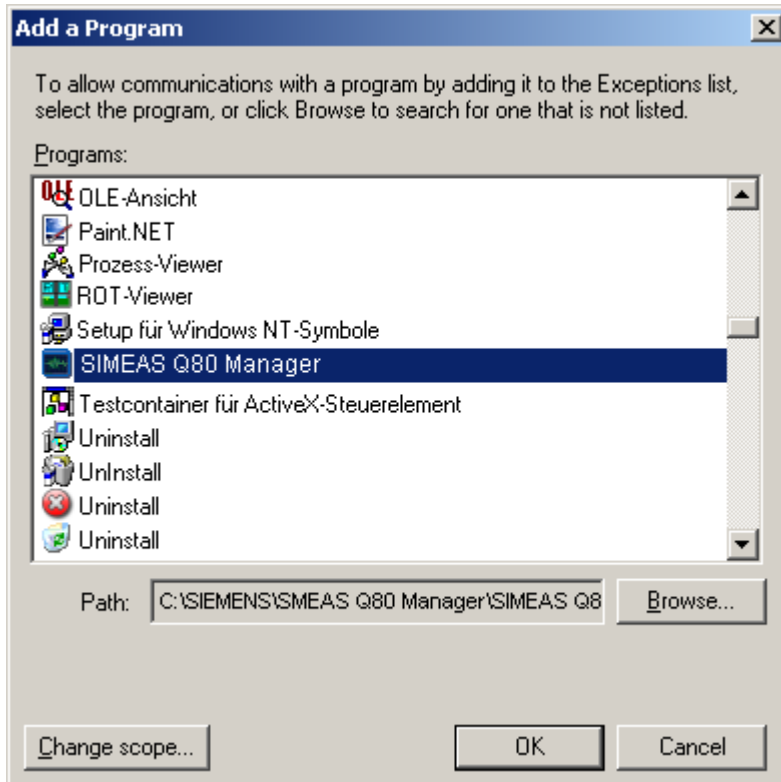
2. Select *Windows Firewall* and go to the dialog page *Exceptions*.



3. Click on the button *Add Program...*



4. Find the program *SIMEAS Q80 Manager* and click *OK*.



Close the dialog with *OK*.

Alternatively, you can enable the ports. To do this, each port must be entered for UDP and TCP.

### 7.1.3 Modem connection (TCP/IP with PPP)

#### What is a PPP connection?

The abbreviation PPP means Point-to-Point Protocol. As the name indicates, this protocol concerns single point to single point connection (i.e., one client and one server) as opposed to Ethernet, where any amount of subscribers are connected together via the Ethernet-bus. The client is always the one to set up the connection and to register with the server. The server checks the client's authorization and transfers to the client all information necessary for participating in network communication. After this, both parties configure their network interface; a connection then exists between the two. The PPP-protocol manages this preliminary procedure; it does not handle the actual communication! Instead, the PPP-protocol can be viewed as building a sort of "tunnel" between the parties and packaging the actual network communication protocol, for instance TCP/IP.

In a TCP/IP-based network, the individual subscribers are distinguished by their personal IP address. Strictly speaking, the address is not assigned to the PC or device, but to the network interface. After all, if a PC has two Ethernet connections, it can have two IP-addresses.

IP addresses, then, can be assigned not only to Ethernet interfaces but to any network interface which is able to transfer data according to the IP protocol. In this sense, even the WINDOWS *Dial-up Network* (with PPP-option activated) represents an IP interface. Consequently, *the Dial-up Network* is also indicated in the *Control Panel* under the icon *Network* as a *Dial-up adapter*. And that is where it must be configured as an IP-interface. The fact that a PPP-connection is what is meant by the *Dial-up Network* is not relevant at this point. The *Dial-up Network* and thus the actual PPP connection is administered under the icon *My computer* on the WINDOWS Desktop.

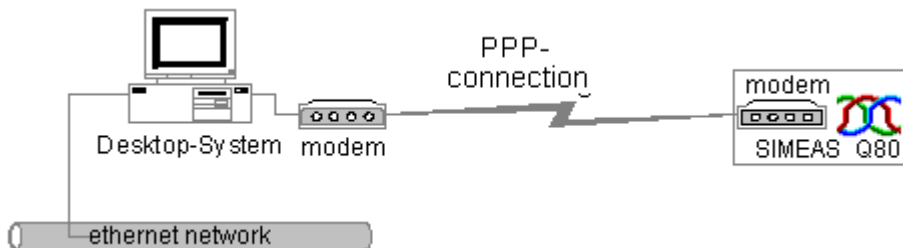
Physically, such point-to-point connections are serial connections. In the simplest case, the two PPP-subscribers are connected via a zero modem cable. However, SIMEAS Q80 7KG8080 is not designed for this; instead, PPP is used exclusively to set up a connection via the built-in modem<sup>2</sup> (and the telephone network).

In summary, PPP in conjunction with TCP/IP serves to connect two PC/devices or networks via a serial modem line. The PPP-connection remains transparent for the network subscribers. The PPP connection is a property of the *Dial-up Network*.

<sup>2</sup>The internal modem is optional (not standard included).

#### 7.1.3.1 SIMEAS Q80 7KG8080 via PPP

For connection via PPP, the device needs a serial interface in addition to the Ethernet connection. This serial interface can be connected to a modem. The measurement device is in this case the PPP server, the control-PC the PPP client. That means that the PC calls the device to establish a connection. TCP/IP is used as the network data transfer protocol.

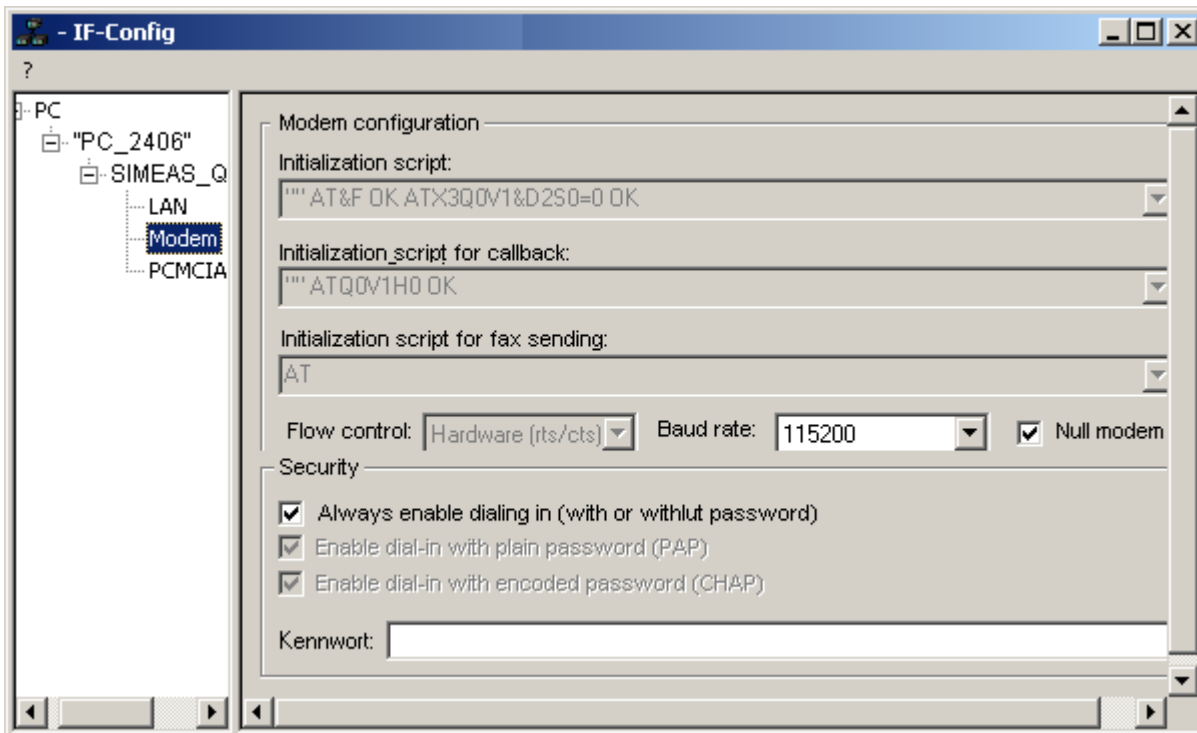


### 7.1.3.2 SIMEAS Q80 7KG8080 configuration as PPP-Server

Your device can be configured as a PPP server. The program *IF-Config*, which is installed along with the *SIMEAS Q80 Manager* software and is located in the *SIMEAS Q80 7KG8080* program group, is provided for the purpose of making this configuration.

For the PPP-configuration, the device must be connected with the PC via Ethernet. Start the program *IF-Config*. Select your device in the tree diagram on the left side in the manner customary for working with the MS-Explorer. When the diagram expands, a network search is automatically carried out via the respective adapter. Among the entries under the expanded branch for your device, click on *Modem*.

On the dialog's right side, you can then make all the PPP-setting necessary for running the device as a PPP-server. You can read more on this in the next segment: [Modem settings for TCP/IP devices \(PPP\)](#)<sup>[134]</sup>



To write the settings to the measurement device unit, simply click on the device's entry on the left side of the dialog and then on the button *Apply* on the right side. But first check the settings in the controls above and activate/deactivate them as appropriate.

Once the configuration has been written to the device, it performs a warm start and applies the new settings. This procedure lasts approx. 1-2 min. When the text "Settings applied" appears in the box *Messages*, configuration of your device is complete and you can proceed with the next device.

### 7.1.3.3 Modem settings for TCP/IP devices (PPP)

To set the PPP-parameters, click on the button *PPP-settings* in the main dialog.

**IP-address:** since Windows isn't able to assign an IP-address to *SIMEAS Q80 7KG8080*, an IP-address must be entered in the box *Local IP-address (device)*. The second box, *Remote IP-address (caller)* can be left on 0.0.0.0. In this case, an IP-address must be assigned to the caller (PC) by means of the Dial-up network settings. This IP-address must be located in the same subnet as the address assigned to *SIMEAS Q80 7KG8080*. Observe the notes under [Computers with multiple TCP/IP](#)<sup>[125]</sup>.

Maximum packet size	
Send (MTU):	1500
Receive (MRU):	1500

**Maximum packet size:** This option enables reduction of the maximum package size in order to improve data throughput if the connection is poor. The default value of "1500" should only be reduced if the telephone connection is very poor, having many CRC-errors. Depending on the version of Windows, CRC-errors are indicated either in the status of the Dial-up connection or in the system monitor.

**Security:** These options govern the protection against unauthorized access to the *SIMEAS Q80 7KG8080* unit.

- *Always enable dialing in (...)* means that password protection is deactivated! Anyone knowing the telephone number can dial, with or without any password.
- *Enable dial-in with plain password (PAP)* means that PAP is allowed. With this procedure, the password is transferred in plain text. Thus, it could be intercepted. Using the intercepted password, it would be possible for an invader to access the device.
- *Enable dial-in with encoded password (CHAP)* means that CHAP is allowed. With this procedure, no information is passed from which the password could be deduced. Even if an invader were able to read an authorized user's code prompt, he would still not be able to dial into the device, because the next code prompt would require a completely different response deducible only with knowledge of the password.
- It is possible to allow PAP and CHAP simultaneously.
- The code may have a maximum of 32 characters.

**Modem configuration:** This is where the PPP-interface's *Baud rate* as well as the *Scripts* are set which govern the process of setting up and terminating a connection.

The PPP-interface constitutes a serial connection whose maximum Baud rate setting is 115200 Bd. The flow control for the serial interface is accomplished exclusively by hardware protocol. These settings are the same for both subscribers.

The two initialization scripts consist of a sequence of “answer-command pairs”, where the first step is always to wait for the modem’s response. Since a command would normally need to be sent first, the empty quotation marks at the beginning indicate that there is nothing to wait for. Then the next command follows, e.g. “ATZ”, upon which the system waits for the response, e.g. “OK” etc.

- The *Initialization script* can have a maximum of 128 characters. Its serves to perform the basic initialization of the modem. If the modem requires special initialization, the pertinent commands should be entered at this point. The combo box already contains examples of the most common cases, which should normally be sufficient. However, with a GSM-modem, the PIN must be entered.
- The *initialization script for callback* normally shouldn't be changed. A maximum of 64 characters can be entered. The callback function makes it possible to call the device and to be called back by it.
- The *initialization string for fax-sending* is a single AT-string with a maximum length of 64 characters. Thus it isn't a script like those in the other controls! This is where to enter special AT-commands necessary for putting the modem in the FAX mode. Normally, this setting shouldn't need to be changed!

In order for your device to be able to accept an incoming call, the modem must be activated. for example this would be, if the measurement device is sending a message using the modems interface.(see chapter [Messaging](#)<sup>[117]</sup>).

Furthermore, there may not be any active connection between the *SIMEAS Q80 Manager* software and the device via the Ethernet. (see section [Switching between Ethernet and PPP](#)<sup>[137]</sup>).

### 7.1.3.4 Configuring a PC as a PPP-client

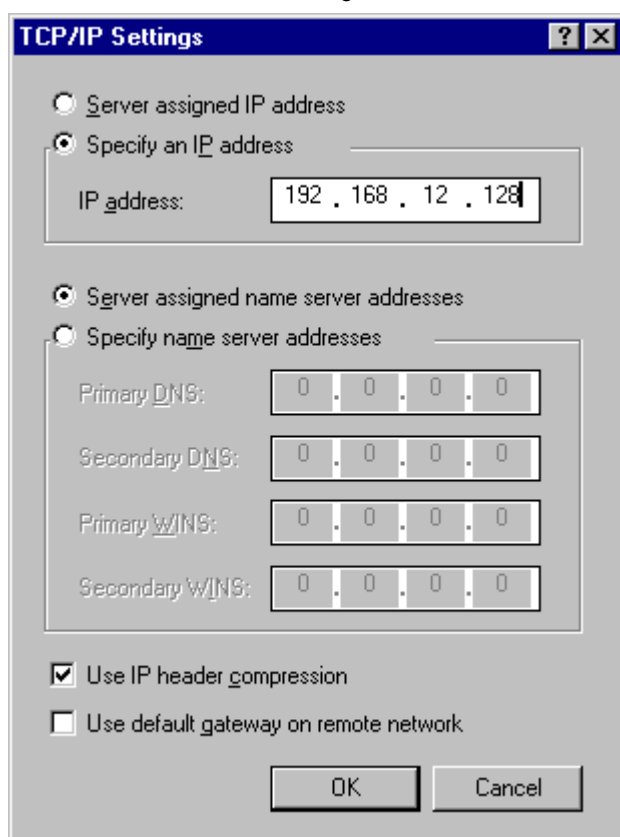
In order to use the Windows PC as a PPP-client, the following conditions must be met:

- a modem is connected to the PC,
- it is installed under Windows,
- the Dial-Up network under Windows was installed.
- *Messaging* is not activated in *SIMEAS Q80 7KG8080*

Refer to the modem manufacturer's documentation and that of Microsoft Windows for information about installing the modem and the Dial-Up network. The following will restrict itself to a few explanations and points on the general procedure which is recommended.

On the Windows Desktop under the icon *My computer* there is the icon *Dial-up Network*. Create a new connection. Enter the telephone number of the *SIMEAS Q80 7KG8080*' modem. Then the Dial-up Network's properties can be edited. The following illustrations show the recommended default configuration, which should always work. Only the IP-address must be entered according to the user's own needs. The dialogs shown come from Windows98. Under other Windows versions, these dialogs appear differently, but are operated in the same way.

Some additional notes on configuration:



- **Protocol:** Select only TCP/IP! Deselect all other protocols.
- **IP-address:** The instructions above configure *SIMEAS Q80 7KG8080* as a PPP server in such a way that the PPP interface on the PC has a fixed address. For this reason, an unambiguous address which identifies the Dial-up Network as a TCP/IP network interface on the local PC must be specified. If the computer has an Ethernet adapter, this IP-address may not belong to the same Subnet.
- **Name-Server:** not needed if there is a direct modem connection between the PC and *SIMEAS Q80 7KG8080* unit.
- **Standard-Gateway:** must be deactivated, since *SIMEAS Q80 7KG8080* is neither an Internet provider nor router. Otherwise there is a danger that the network will not work on the PC involved!
- **Compression:** can be activated. But it is recommended to deactivate it when starting out.
- **LCP Expansion:** Not supported by *SIMEAS Q80 7KG8080*.



### 7.1.3.5 Establishing a PPP connection

As already explained in the introductory passages, a PPP connection actually remains transparent for its subscribers. That means that the *operating* software makes no reference to the PPP connection; as far as it is concerned, the connection is of the usual TCP/IP type. In consequence, the PPP connection must first be set up by Windows, before starting the *SIMEAS Q80 Manager* software.

To establish the PPP connection, select the icon with the link *SIMEAS Q80 7KG8080* in the Dial-Up Network which was set up as per the instructions in the last section.

After the connection has been successfully established, a TCP/IP connection is ready for the *SIMEAS Q80 Manager* software. Now a network search can be carried out in the manner usual under TCP/IP. For the network search, the TCP/IP protocol is selected and the corresponding network interface (network adapter). The PPP connection appears in the list of the network adapters with the TCP/IP address of the PC's Dial-Up Network. After the network search the *SIMEAS Q80 7KG8080* unit should appear in the list of hardware and can be selected.



#### Note

- In order to use *SIMEAS Q80 7KG8080* via the PPP connection, first set up the connection via the Dial-Up Network, then start the software.

### 7.1.3.6 Disconnecting a PPP-connection

First disconnect from the device on the software level. Only after this is done, close the modem connection by selecting *Disconnect* in the Dial-Up network. The device then returns to a standby state.



#### Note

- Never break up a PPP-connection before having disconnected from the device. Otherwise it takes a few minutes before the device can be addressed again.

### 7.1.3.7 Switching between Ethernet and PPP

Although the device has both a serial PPP and an Ethernet interface, only one interface can be used at a time. Switching between the interfaces is accomplished by means of the modem control lines *Data Set Ready* (DSR) and *Data Carrier Detect* (DCD). As a rule, it is sufficient to connect a modem to a serial interface. If the modem is switched on, the device goes into standby. If the modem is switched off, or if no modem is connected, the Ethernet interface is activated.

While communication is taking place, it isn't possible to switch. If you activated the modem while the device is exchanging data with a PC via the Ethernet interface, this connection is not interrupted. Only after the PC has completed its communication with the device is the modem's activation status checked.



#### Notes

- When the device is switched from Ethernet to PPP, it takes about 40 seconds for a call to be able to be received!
- Never break up a PPP-connection before having disconnected from the device. Otherwise it takes a few minutes before the device can be addressed again.

### 7.1.3.8 Commissioning a radio modem with TCP/IP (PPP)

#### 7.1.3.8.1 Falcom A1, A2D-1, A2D-2

**Prerequisites:**

1. Modem set to 9600Baud (factory setting).
2. HyperTerminal connection settings: 9600, 8bits, no parity, 1 stop bit, no protocol.
3. HyperTerminal connection settings: 115200, 8bits, no parity, 1 stop bit, no protocol.

**Preparing the modem:**

1. Connect modem to PC via serial cable.
2. Start HyperTerminal connection at 9600Baud.
3. Input: "at" then *ENTER*. Modem must respond with "OK".
4. Change transfer speed to 115200Baud by entering "at+ipr=115200", then *ENTER*. Modem must respond with "OK".
5. Start HyperTerminal connection at 115200Baud.
6. Input: "at&f", then *ENTER*, "at&s0", *ENTER*, "at+ipr=115200", *ENTER*, "at&w", *ENTER*. Modem must respond each time with "OK".

**Preparing the device:**

The program "TCPIP-Config" is used to make the following changes in the device:

1. The IP-address is set to match the PC's Dial-up entry.
2. For the initialization script, the combobox entry for the GSM-modem is selected.
3. In the command "AT+CPIN=XXXX", XXXX is replaced by the SIM-card's PIN. If the SIM-card doesn't require a PIN, "AT+CPIN=XXXX O AT OK" is deleted.
4. The Baud rate is set to 115200.

#### 7.1.3.8.2 WaveCom Fastrack

**Prerequisites:**

1. Modem set to 115200Baud (factory setting).
2. HyperTerminal connection settings: 115200, 8bits, no parity, 1 stop bit, no protocol.

**Preparing the modem:**

1. Connect modem to PC via serial cable.
2. Start HyperTerminal connection at 115200Baud.
3. Input: "at" then *ENTER*. Modem must respond with "OK".
4. Input: "at&f", then *ENTER*, "at&s0", *ENTER*, "at+ipr=115200", *ENTER*, "at&w", *ENTER*. Modem must respond each time with "OK".

**Preparing the device:**

The program "TCPIP-Config" is used to make the following changes in the device:

1. The IP-address is set to match the PC's Dial-up entry.
2. For the initialization script, the combobox entry for the GSM-modem is selected.
3. In the command "AT+CPIN=XXXX", XXXX is replaced by the SIM-card's PIN. If the SIM-card doesn't require a PIN, "AT+CPIN=XXXX O AT OK" is deleted.
4. The Baud rate is set to 115200.

### 7.1.3.9 Instructions for setting up a PPP-device

1. PC Control panel -> call network
  - a. install TCP/IP Dial-Up adapter
  - b. set IP-address properties if no DNS-server is available
    - i. IP 192.168.12.1
    - ii. Sub 255.255.255.0
  - c. otherwise, configure DNS (normally, this has already been done)
    - i. Host name: name; domain: siemens.siemens-berlin.de
    - ii. search order: add 192.168.11.1 to list
    - iii. Domain siemens.siemens-berlin.de
2. Creating a Dial-Up network (My Computer ⇒ Dial-Up network)
  - a. General
    - i. phone number
    - ii. select modem
      1. General
        - a. configuration of COM connection
        - b. maximum speed 115200
      2. Settings: Standard
      3. Options: Standard
  - b. Server types (win9x)
    - i. Type: PPP
    - ii. Options TCP/IP
      1. TCP/IP settings
        - a. permanently set 192.168.12.12
    - iii. Script: Standard
    - iv. Multilink: Standard
3. Call TCPIP-Config ( from the *SIMEAS Q80 7KG8080* program group)
  - a. Search
  - b. Choose device and call PPP settings
  - c. IP-Address
    - i. Set local address e.g. 192.168.12.13
    - ii. Remote IP doesn't matter
    - iii. Username & password if necessary
    - iv. Script
      1. Default ⇒ don't change anything
      2. GSM
 

```
Send ATZ\r
Pause 1
Send AT+CPIN=XXXX\r
Pause 20
Send ATSO=1 \r
Pause 1
Signal lcp open
```
    - v. Hardware: Default: 38400; Hardware
  - d. Write to device
4. Physically construct modem line
5. Set up Dial-Up connection
6. If the connection is established, start *SIMEAS Q80 Manager*-software
  - a. Choose device ⇒ edit
  - b. Choose network settings
  - c. Click TCP/IP
  - d. Activate host address (in this example: 192.168.12.12)
  - e. Let's go...

### 7.1.4 Determining the MAC-address of the measurement device

In order to find your *SIMEAS Q80 7KG8080* device's MAC-address, start the "input prompt" under Programs \Accessories.

- There, begin by accessing the device with a ping and the IP-address.  
The IP-address can be found with the help of the program IF-Config under Programs\ *SIMEAS Q80 7KG8080*.

Example for the ping command: ping 10.0.9.159

```

C:\> Command Prompt
C:\>ping 10.0.10.30

Pinging 10.0.10.30 with 32 bytes of data:

Reply from 10.0.10.30: bytes=32 time=2ms TTL=64
Reply from 10.0.10.30: bytes=32 time<1ms TTL=64
Reply from 10.0.10.30: bytes=32 time<1ms TTL=64
Reply from 10.0.10.30: bytes=32 time<1ms TTL=64

Ping statistics for 10.0.10.30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>

```

- Next, enter the following command: arp -a

```

C:\> Command Prompt
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>arp -a

Interface: 10.0.1.17 --- 0x4
    Internet Address      Physical Address      Type
    10.0.0.10             00-1d-09-68-5d-03    dynamic
    10.0.0.16             00-0b-db-96-34-64    dynamic
    10.0.0.19             00-0f-1f-64-90-e6    dynamic
    10.0.0.28             00-15-17-50-6a-7c    dynamic
    10.0.10.30            00-a0-33-02-50-74    dynamic

C:\>

```

- In the second column ("Physical Address" in english) you will find the MAC-address.

## 7.2 SIEMENS FAQ, Hotline

### 7.2.1 Hotline

Support, see [foreword](#) <sup>7</sup>.

### 7.2.2 Network

**Question:** Why does it take so long to start the *SIMEAS Q80 Manager* software on my laptop?

**Answer:** A laptop normally operated within a company network is usually set to DNS. In standalone operation with *SIMEAS Q80 7KG8080*, this leads to considerable delays until Windows gives up looking for the DNS in the network which is no longer present.

Solution: switch off DNS

**Question:** My laptop sometimes can't find *SIMEAS Q80 7KG8080* after having been rebooted.

**Answer:** Windows assigns a new adapter address to laptops with PCMCIA network cards at each booting. This adapter number can't be seen from outside.

**Remedy:** New network search and enter the device as new.

## 7.3 File Extensions

Extension	Definition
BAK	backup file
BMP	bitmap
CCV	curve configuration for one window
CCP	curve configuration for several windows
NQA	SIMEAS Q80 7KG8080 configuration
CLB	Settings clipboard
DAT	SIMEAS Q80 7KG8080 waveform (computed data)
DEF	DLL header
DLL	Program library (dynamically linked library)
DOC	Microsoft Word document
DRB	Report Generator (German version)
DRX	Backup of last report
DSP	Digital Signal processor
EDB	temporary database
EXE	Executable program
HLP	WINHELP help file
INI	Initial settings file
MDB	database
PRT	Report Generator (English)
RAW	SIMEAS Q80 7KG8080 waveform ("raw data")
RTF	Protocol file readable by WINWORD or Wordpad
SET	Curve Manager: settings
TMP	Temporary file
TXT	Text file
UMC	Device-configuration file for SIMEAS Q80 7KG8080, containing all measurement task settings
UME UMF, UMS	Device file for SIMEAS Q80 7KG8080, created upon preparation for Autostart or Disk start.
UMI	Device-configuration file for SIMEAS Q80 7KG8080, updated upon each time software connected to the PC
UMT	Device file for SIMEAS Q80 7KG8080, created upon disconnection of the PC.
XLS	Excel waveform

## 7.4 Glossary

<b>application</b>	A program which runs under MS-Windows.
<b>data set</b>	A group of related numerical values, e.g. a series of temperature measurements in sequence.
<b>DSP</b>	Abbreviation for digital signal processor. The designation DSP C32, for instance, refers to a signal processing board.
<b>events</b>	An event is a particular state of the measured signal or of the device. An event can be true or false, either 0 or 1, in other words. Thus, an event is a digital unit of information. An event can be computed from analog and digital quantities.
<b>Hot-Plug</b>	The hot plug feature enables you to remove a Compact Flashcard from the device while a measurement is in progress. Data are buffered in the unit's internal RAM until the new card is inserted.
<b>SIMEAS Q80 Manager</b>	Designation of the user software, as well as of the mobile device version.
<b>SIMEAS Q80 7KG8080</b>	Designation of the device version for stationary operation in a switching cabinet.
<b>measurement</b>	A complete measurement run which may consist of several multi-shot measurements on several channels. A measurement is not complete until all of its parts are finished. All captured data which are saved to the hard drive as belonging to a measurement are placed in a common folder.
<b>measurement duration</b>	The duration of a measurement can be determined by multiplying the number of samples with the of sampling interval.
<b>Parameters</b>	Known in mathematics as "arguments", parameters are inputs needed by a function to produce its results.
<b>pretrigger</b>	When a pretrigger $> 0$ is defined, the data from the time preceding the release of a trigger is recorded along with the triggered data. The instant of triggering is the Time 0; pretrigger times take values $< 0$ .
<b>Report Generator</b>	The Report-Generator provides a fast and easy way to personally layout a document, which may include graphics and text arranged in any pattern.
<b>Unzoom</b>	Reverses the zoom function, displaying the entire picture.
<b>sample</b>	Digital data point belonging to a measurement signal. A sample fills 2 Byte (16 bits).
<b>ScanDisk</b>	ScanDisk is a routine for checking your device's $\mu$ Disk for flaws and correcting the problem, if applicable.
<b>sum sampling rate</b>	The product of the sampling rate times the number of active channels.
<b>time base</b>	Internal clock of device. The time difference between devices can add up to several seconds per day. A remedy to this problem are radio clocks such as the DCF77 or GPS (both options). See also synchronous start.
<b>Zoom</b>	Command to enlarge a portion of a window; the opposite is Unzoom.





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