

# SICARO PQ

## Software for Power Quality Analyses

Application description

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## Notes on Safety

This manual does not constitute a complete catalog of all safety measures required for operating the equipment (module, device) in question because special operating conditions might require additional measures. However, it does contain notes that must be adhered for your own personal safety and to avoid damage to property. These notes are highlighted with a warning triangle and different keywords indicating different degrees of danger:



### Danger

means that death, severe injury, or substantial damage to property **will** occur if the appropriate safety measures are not taken.



### Warning

means that death, severe injury, or substantial damage to property **can** occur if the appropriate safety measures are not taken.



### Caution

means that minor injury or damage to property can occur if the appropriate safety measures are not taken.



### Note

is important information about the project, handling the product, or the part of the documentation in question, to which special attention must be paid.



### Qualified Personnel

Commissioning and operation of the equipment (module, device) described in this manual must be performed by qualified personnel only. As used in the safety notes contained in this manual, qualified personnel are those persons who are authorized to commission, release, ground, and tag devices, systems, and electrical circuits in accordance with safety standards.

### Use as Prescribed

The equipment (device, module) must not be used for any other purposes than those described in the Catalog and the Technical Description. If it is used together with third-party devices and components, these must be recommended or approved by Siemens.

Correct and safe operation of the product requires adequate transportation, storage, installation and mounting as well as appropriate use and maintenance.

During operation of electrical equipment, it is unavoidable that certain parts of this equipment will carry dangerous voltages. Severe injury or damage to property can occur if the appropriate measures are not taken:

- Before making any connections at all, ground the equipment at the PE terminal.
- Hazardous voltages can be present on all switching components connected to the power supply.
- Even after the supply voltage has been disconnected, hazardous voltages can still be present in the equipment (capacitor storage).
- Equipment with current transformer circuits must not be operated while open.
- The limit values indicated in the manual or the operating instructions must not be exceeded; that also applies to testing and commissioning.

## Product overview

# 1

### Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions of both hardware and software are as accurate as possible. However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors or omissions contained in the information given.

The data in this manual are checked regularly and the necessary corrections are included in subsequent editions. We welcome any suggestions or proposals for improvement.

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# Foreword

**Purpose of this manual** This manual describes how to operate the software **SICARO PQ** and provides information on the standards and evaluation methods on which **SICARO PQ** is based.

**Target group** The manual is aimed at users of **SICARO PQ**.  
Users must have basic knowledge of the operating systems and the relevant standards (DIN EN 50160, IEC 61000).

**Scope of validity of the manual** This manual is valid for **SICARO PQ**, version 1.40 or higher.

**Standards** The software **SICARO PQ** has been developed in compliance with the guidelines of ISO 9000:2000.

**Hotline** For technical questions on **SICARO Q Manager** and SIMEAS Q, please contact our hotline in Nuremberg:

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Customer Care Center  
Humboldstr. 59  
D-90459 Nürnberg  
Phone +49 (0)180 / 5247000  
Fax +49 (0)180 / 5242471  
e-mail [ptd.support@siemens.com](mailto:ptd.support@siemens.com)

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[www.powerquality.de](http://www.powerquality.de) or  
[www.simeas.com](http://www.simeas.com)



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## Product overview

### General

**SICARO PQ** (Siemens Computer Aided Resource Optimization for Power Quality) is a software product for the statistical evaluation of the measured data of quality recorders.

With **SICARO PQ** you can

- check the power quality based on standards EN 50160, IEC 61000-2-2 and IEC 61000-2-4 as well as self-defined criteria.
- define the relevant characteristics to be included in the statistical evaluation for each feeder point of your station.
- archive the results, and display/print out in self-defined reports.
- automatically evaluate measured data.

In order to automatically evaluate measured data, **SICARO PQ** is equipped with an interface to **OSCO P**.

The following quality characteristics are taken into account when evaluating measured data:

- Power frequency
- Level of supply voltage
- Voltage asymmetry
- Waveform of supply voltage

### Functional scope

**SICARO PQ** lets you configure all the parameters required for the statistical evaluation of measured data.

**SICARO PQ** can directly access the **SICARO Q Manager** archive and create reports using measured data stored in the archive. A report can be created either manually or using the task scheduler.

After having specified the parameters you will be able to carry through the statistical evaluation of measured data.

A report shows the result of the evaluation on-screen. It can be saved and printed in **SICARO PQ** format or converted into standard HTML format.

### Compatibility

**SICARO PQ 1.40** is fully compatible with the old data so you can continue to work with them.



## Installation

### Hardware requirements

The computer must comply with the hardware requirements of the operating system used.

### Software requirements

**SICARO PQ** is a 32-bit application requiring the following operating system:

- Windows XP Professional incl. Service Pack 2

### Installing SICARO PQ

The **SICARO PQ** software is to be installed via a setup program.

---

**Note:**

You require administrator rights for installing the software.

---

Proceed as follows for installing the software:

- Insert the installation CD into your CD-ROM drive. The installation process is started.
- 

**Note:**

If the installation process is not started automatically, proceed as follows:

- Click **Start** → **Run**.
  - Enter **X:\SETUP.EXE**, with **X** designating the letter of your CD-ROM drive.
  - Click **OK**.
- 
- Follow the installation instructions.
  - Create a shortcut on the desktop of your computer if you want to start **SICARO PQ** from your desktop.



# Operating SICARO PQ

# 3

## Overview

This chapter describes the **SICARO PQ** user interface.

A basic knowledge of Windows user interfaces is required. You will find more information on working with Windows user interfaces in Windows Help.

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---

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## 3.1 Starting and terminating SICARO PQ

### Starting SICARO PQ

Proceed as follows:

- Double-click on the **program icon**  on the Windows desktop.
- Or
- Start the program via the Windows Start menu:  
**Start** → **Power Quality** → **SICARO PQ** → **SICARO PQ**

The program starts.

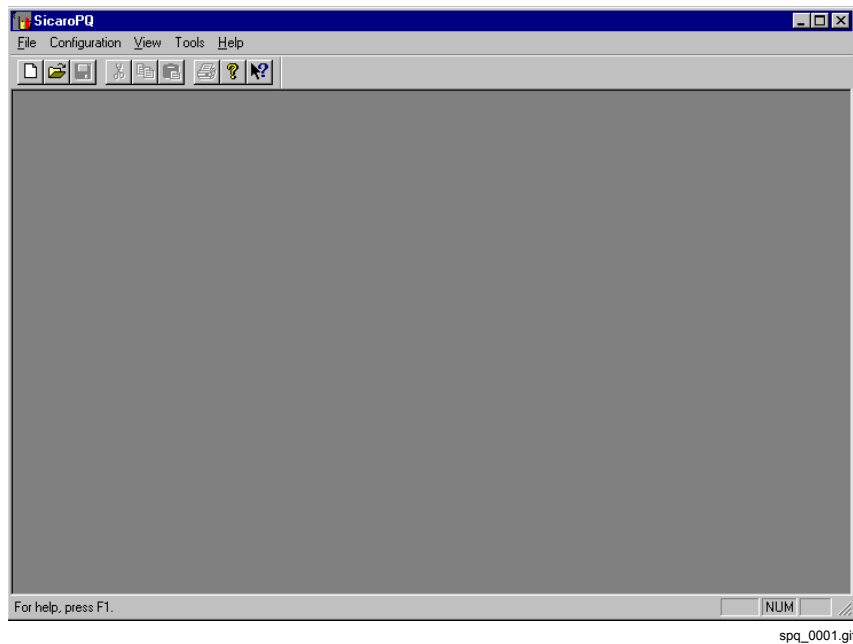


Fig. 3-1 SICARO PQ after starting the program




#### Note:

There are no files loaded when you start the program.

### Terminating SICARO PQ

Proceed as follows:

- Select **File** → **Exit**.
  - Or
  - Click the **icon**  in the upper right corner of the title bar.
- The program closes.



## 3.2 User interface

### 3.2.1 Layout

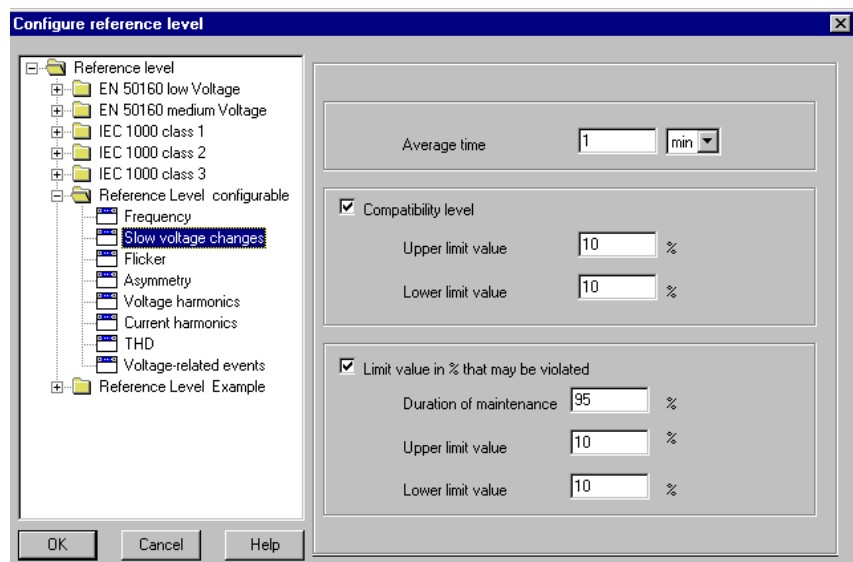
**Screen elements** The user interface of **SICARO PQ** complies with Windows conventions. It is divided into the following screen elements (cf. also Fig. 3-1):

- Title bar
- Menu bar
- Toolbar
- Data area
- Status bar

**Data area** The data area is used to open the **SICARO PQ** dialog boxes or display reports for the statistical evaluation of measured data.

When you configure the parameters for the statistical evaluation of measured data, the data area comprises the following components:

- A navigation window (left), which lets you navigate through the folder of parameters for the statistical evaluation of measured data, as in the Windows Explorer.
- Dialog mask (right), which lets you configure the parameters for the statistical evaluation of measured data.



kbl\_0002.gif

Fig. 3-2 Data area of a configuration parameter

When you display the reports for the statistical evaluation of measured data, the data area comprises the following components:

- A navigation window (left), which lets you navigate through the folder of the diagrams of a report, as in Windows Explorer.
- The main window (right), which displays the diagram of a report.

Master\Gerät 1  
EN 50160 low Voltage, Basic profile  
Test SICARO PQ 5, 12/19/2005 15:38:00 - 12/19/2005 16:00:00

**Average values :**

Characteristic	Compatibility level		Percentage violation		Coverage
	LL	UL	LL	UL	
Slow voltage changes L1-N			OK	OK	91 %
Slow voltage changes L2-N			viol.	OK	91 %
Slow voltage changes L3-N			OK	OK	91 %

**Event statistics :**

Result type	Count		
	1-phase	2-phase	3-phase
Overvoltages	2	0	0
Voltage dips	1	0	0
Short interruptions	1	0	0
Long interruptions	1	0	0
Fast changes	3	0	0

**Event list :**

Date/Time	Duration	Extreme value %	Involved phases	Result type
12/19/05 15:39:57.830	00:00:31.000	0	L2-N	Short interruption
12/19/05 15:40:29.830	00:00:30.000	92.015	L2-N	Fast change
12/19/05 15:41:00.830	00:00:30.000	115.14	L2-N	Overvoltage
12/19/05 15:41:31.830	00:01:19.990	49.952	L2-N	Voltage dip
12/19/05 15:42:52.820	00:01:20.000	107.15	L2-N	Fast change
12/19/05 15:44:13.820	00:03:21.000	0	L2-N	Long interruption
12/19/05 15:47:35.820	00:03:19.990	91.972	L2-N	Fast change
12/19/05 15:50:56.810	00:03:20.000	115.15	L2-N	Overvoltage

ges\_0001.tif

Fig. 3-3 Main window of a report

### 3.2.2 Main menus

This section only describes selected main menus that contain features specific to **SICARO PQ**.

#### Tools menu

Use the **Tools** menu to select the user interface language. This menu is only active if no file is open.

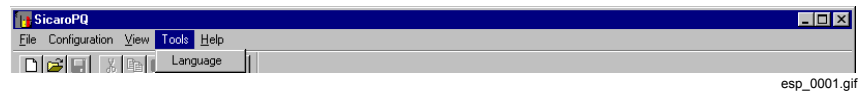


Fig. 3-4 Tools menu

#### Configuration menu

The **Configuration** menu lets you set all the parameters required for the statistical evaluation of measured data.

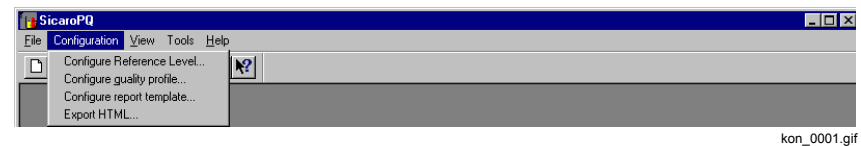


Fig. 3-5 Configuration menu

### 3.3 Changing the user interface language

Use the **Tools** menu to change the user interface language.

The following languages are currently available:

- Deutsch
- English



**Note:**

You can only change the user interface language if no file is open.

---

To change the user interface language, proceed as follows:

- Select **Options** → **Language**.
- The **Select Program Language** dialog box appears.

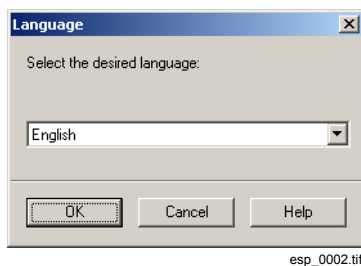


Fig. 3-6 Select Program Language

- Select the required language and confirm with **OK**.



**Note:**

To activate the newly selected language you must terminate and restart the program.

---

# Configuring SICARO PQ

## Overview

This chapter describes,

- how to configure the parameters required for the statistical evaluation of measured data and
- how to configure the HTML export of a report using the statistical evaluation.

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## 4.1 Overview

The statistical evaluation of measured data comprises the following parameters:

- Reference levels
- Quality profiles
- Report templates

### Reference level

The reference level contains all characteristics which need to be taken into account for the statistical evaluation of measured data.

Characteristics of the reference level:

- Frequency
- Slow voltage changes
- Flicker
- Asymmetry
- Voltage harmonics
- Current harmonics
- Total harmonic distortion (THD)
- Voltage-related events

**SICARO PQ** has preconfigured reference levels,

- whose characteristics are defined in a standard and
- whose characteristics can be defined as required.

### Quality profile

The quality profile is used for selecting the characteristics of the reference level you would like to take into consideration for the statistical evaluation of measured data.

### Report templates

A report shows the results of a statistical evaluation of measured data. It comprises an overview and at least one diagram.

### Configuring HTML export

You can convert reports into HTML format. Conversion is carried out using standardized HTML templates that let you create a page-orientated display of your report in an HTML browser. Each page has a header and footer containing details of the statistical evaluation. To customize the display, you need to configure the HTML templates.

**Configuring  
SICARO PQ**

The parameters are configured in corresponding dialog boxes.

These dialog boxes enables the user to:

- Create new parameters
- Rename parameters
- Delete parameters
- Print parameters
- Export and import parameters
- Configure the values for the characteristics of the parameters

## 4.2 Creating new parameters

After installation, predefined reference levels, quality profiles and report templates that can be used for the statistical evaluation of measured data are available.

In addition, you can also create new parameters if you want to evaluate measured data using your own parameters.

### 4.2.1 Creating a new reference level or quality profile

To create a new reference level or quality profile, you simply copy an existing reference level or quality profile. The values of the characteristics of the new parameter can be defined as required and configured in a further step (cf. chapter 4.8 or chapter 4.9).

The following example deals with a reference level, but the method of procedure is the same as for both reference levels and quality profiles.

To create a new reference level, proceed as follows:

- Click **Configuration** → **Configure Reference Level**. The **Configure Reference Level** dialog box appears.

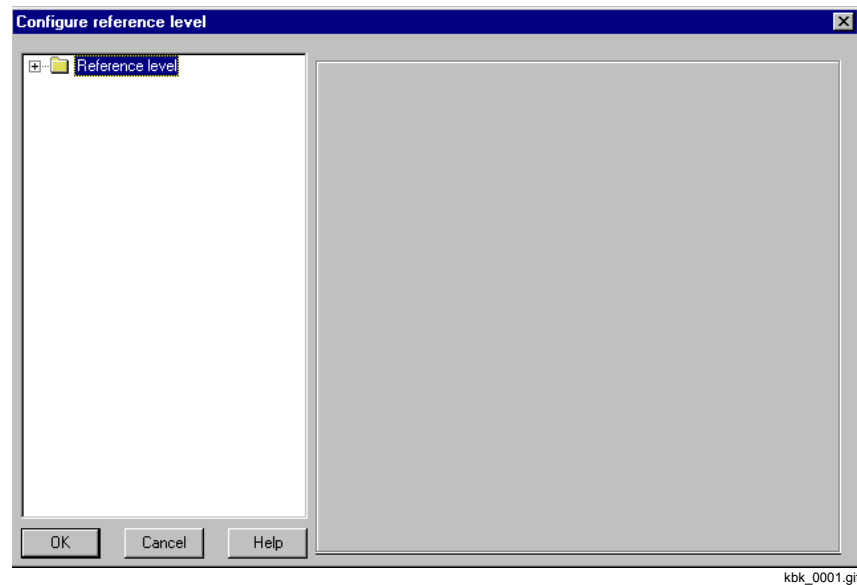


Fig. 4-1 Configure Reference Level dialog box

- Right-click Reference Level. A pop-up menu appears.
- Click **New**. The Create New Reference Level dialog box appears.



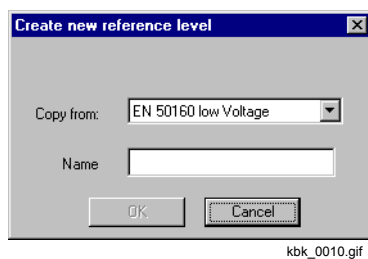


Fig. 4-2 Create New Reference Level dialog box

- From the drop-down list box, select the reference level you want to make a copy of.
- Enter the name of a new reference level and click **OK**. The new reference level is created.

## 4.2.2 Creating a new report template



**Note:**

If you want to save the new created diagram under a different name you have to rename the diagram. (cf. chapter 4.3).

A new report template is created as an empty template without diagrams. Next you need to add one or more diagrams to the new report template (cf. chapter 4.2.3).

To create a new report template, proceed as follows:

- Click **Configuration** → **Configure Report Template**. The **Configure Report Template** dialog box appears.

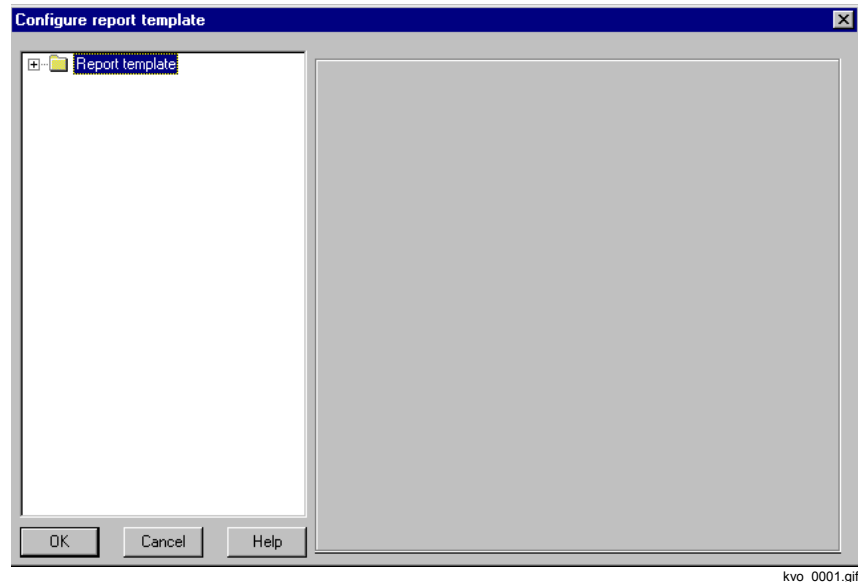


Fig. 4-3 Configure Report Template dialog box

- Right-click **Report Templates**. A pop-up menu appears.
- Click **New** and choose **Report Template**. The **Create New Report Template** dialog box appears.

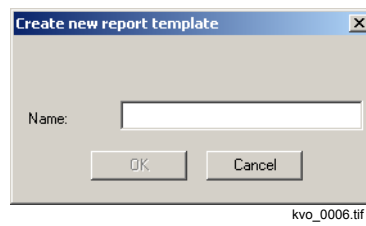


Fig. 4-4 Create New Report Template dialog box

- Enter the name of the new report template and click **OK**. The new report template is created.

### 4.2.3 Creating a new diagram

Furthermore a new created diagram has to be configured for the statistical evaluation (cf. chapter 4.10).

To create a new diagram, proceed as follows:

- Click **Configuration** → **Configure Report Template**.  
The **Configure Report Template** dialog box appears.

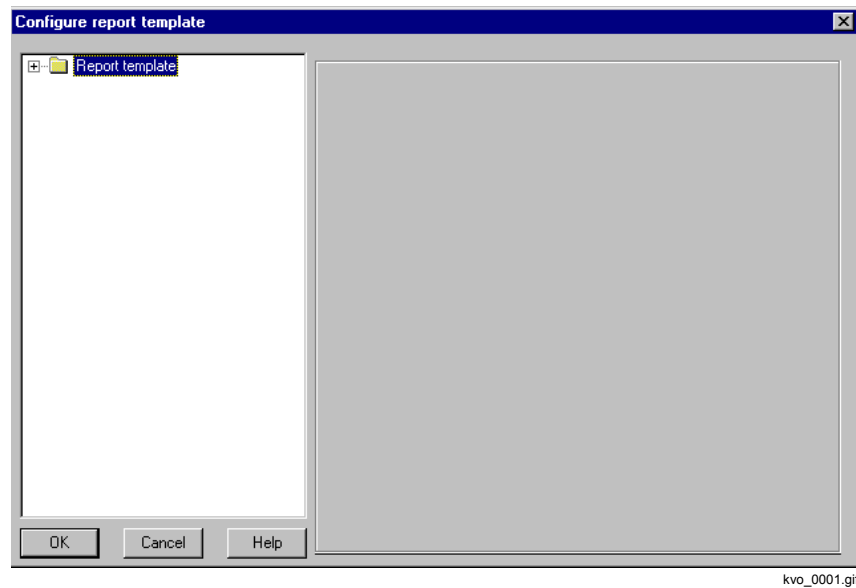


Fig. 4-5 Configure Report Template dialog box

- Double-click "Report Templates".  
This opens a folder that contains all the **report templates**.
- Right-click the report template to which you want to add a new diagram.  
A pop-up menu appears.
- Click **New** and choose **Diagram**.  
The new diagram is created and added to the selected report template under the standard name **<Diagram>** and a consecutive number, such as **<Diagram 1>**.



---

**Note:**

If you want to save the new created diagram under a different name you need to rename the diagram (cf. chapter 4.3).

When changing the diagram type, the name is assigned automatically.

---

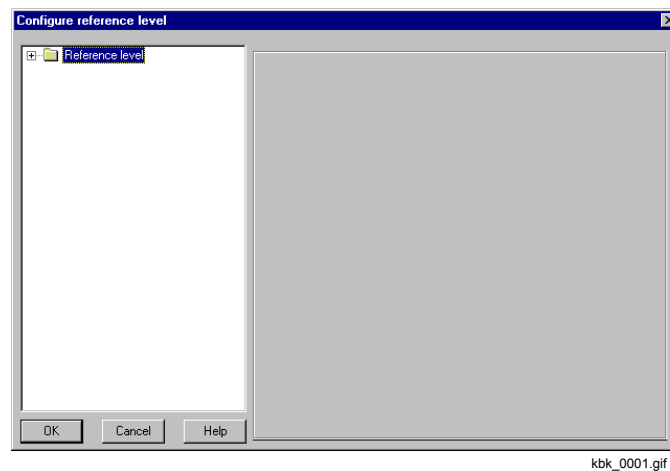
## 4.3 Renaming parameters

Reference levels, quality profiles, report templates and diagrams can be renamed.

The following example deals with a reference level, but the method of procedure is the same as for reference levels, quality profiles, report templates and diagrams.

To change the name of a reference level, proceed as follows:

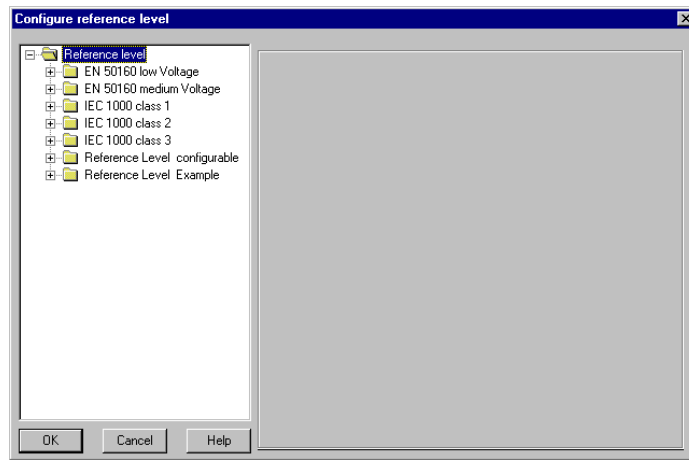
- Click **Configuration** → **Configure Reference Level**. The **Configure Reference Level** dialog box appears.



kbk\_0001.gif

Fig. 4-6 Configure Reference Level dialog box

- Double-click **Reference Level**.  
This opens a folder that contains all the reference levels.



kbk\_0002.gif

Fig. 4-7 Configure Reference Level dialog box,  
folder containing all reference levels

- Click the reference level that you want to rename.
- Click again.
- Enter the new name and confirm with **Enter**.  
The name of the reference level is changed.

## 4.4 Deleting parameters

You can delete reference levels, quality profiles, report templates and diagrams.

**Note:**

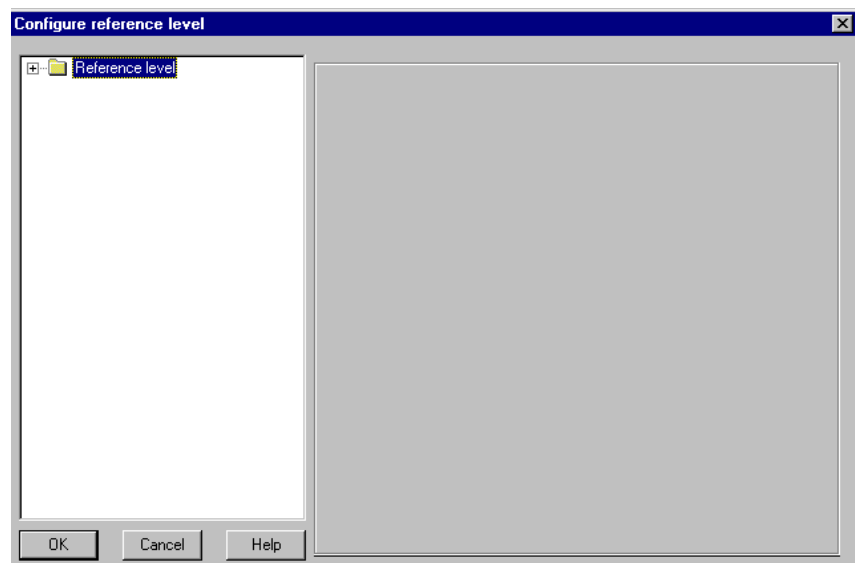
The following parameters cannot be deleted:

- Reference levels that are based on one of the underlying standards.
- The "basic profile" quality profile.

The following example deals with a reference level, but the procedure is the same as for reference levels, quality profiles, report templates and diagrams.

To delete a reference level, proceed as follows:

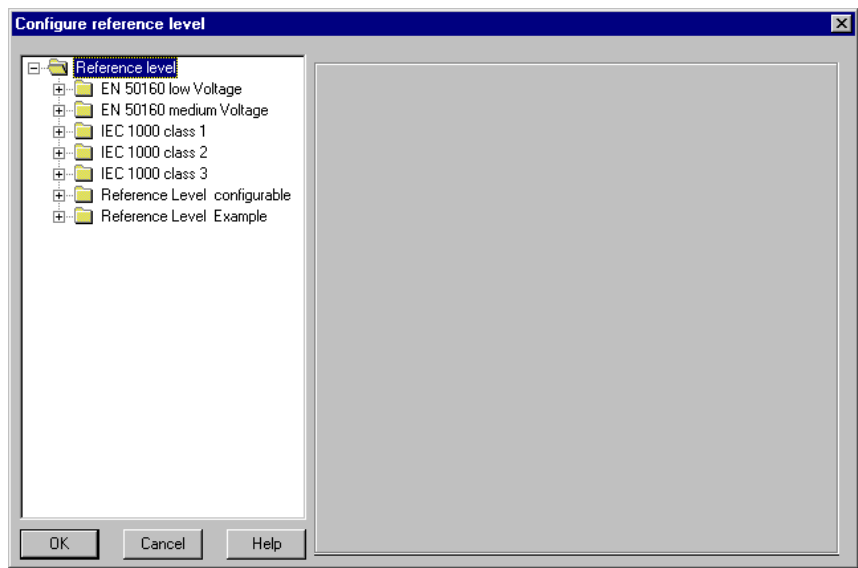
- Click **Configuration** → **Configure Reference Level**. The **Configure Reference Level** dialog box appears.



kbk\_0001.gif

Fig. 4-8 Configure Reference Level dialog box

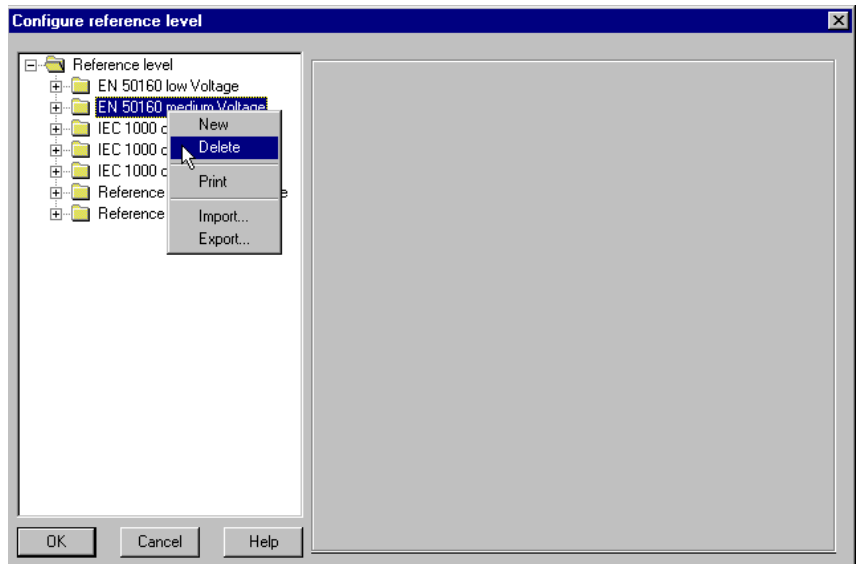
- Double-click **Reference Level**.  
This opens a folder that contains all the reference levels.



kbk\_0002.gif

Fig. 4-9 Configure Reference Level dialog box,  
folder containing all reference levels

- Right-click the reference level that you want to delete.  
A pop-up menu appears.



kbk\_0013.gif

Fig. 4-10 Delete reference level

- Click Delete and confirm the subsequent message with **Yes**.  
The reference level is deleted.



## 4.5 Printing parameters

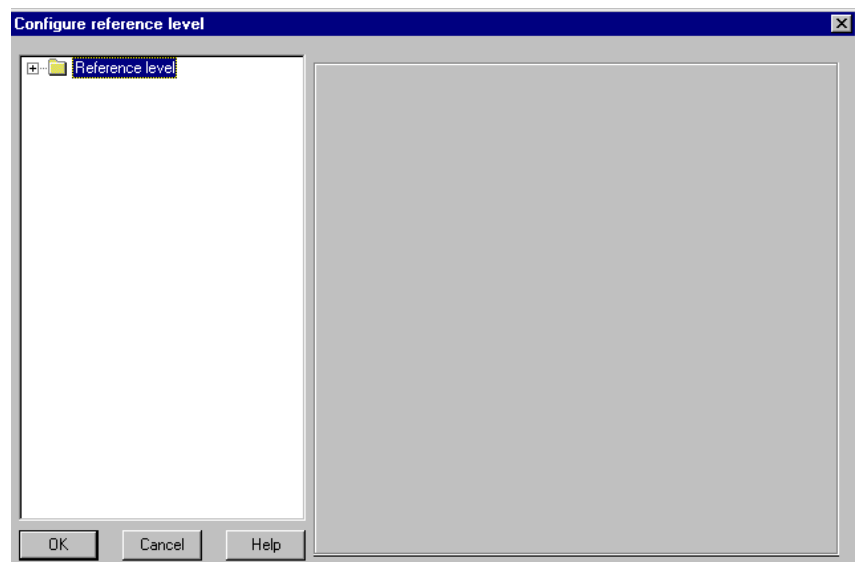
You can print an overview of the following settings:

- Characteristics of all reference levels, quality profiles or report templates
- Characteristics of a specific reference level, quality profile or report template

The following example deals with a reference level, but the procedure is the same as for reference levels, quality profiles and report templates.

To print an overview of the characteristics of one or all reference levels, proceed as follows:

- Click **Configuration** → **Configure Reference Level**. The **Configure Reference Level** dialog box appears.

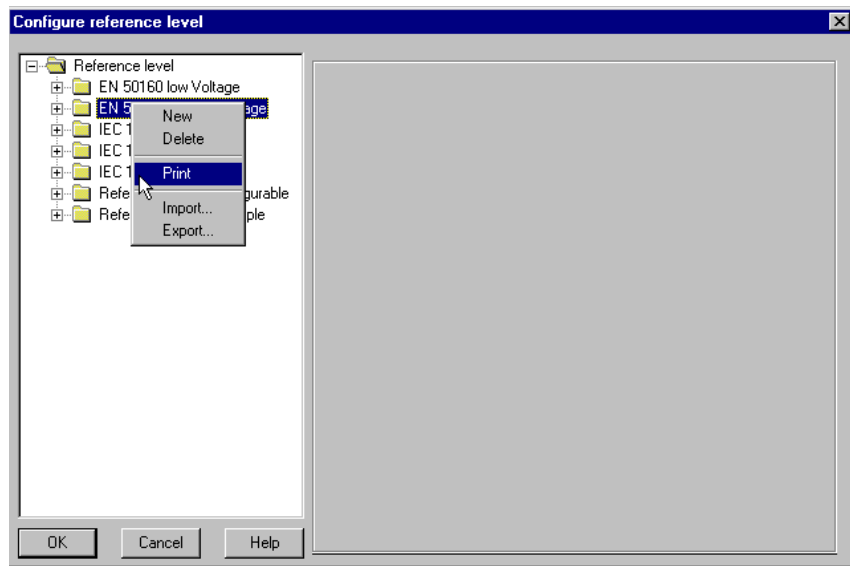


kbk\_0001.gif

Fig. 4-11 Configure Reference Level dialog box

- Open the folder structure to the required level by double-clicking the corresponding folder.

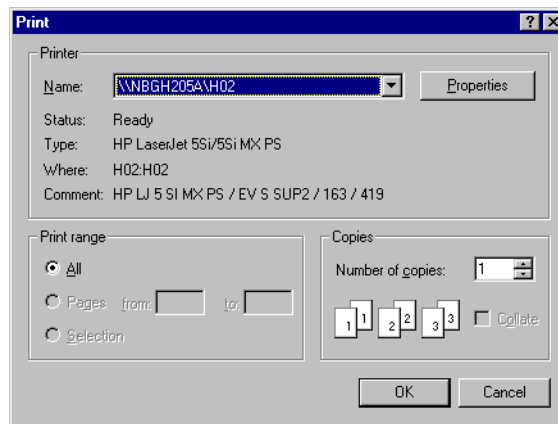
- Right-click the reference level whose overview you want to print. A pop-up menu appears.



kbk\_0014.gif

Fig. 4-12 Print reference level

- Click Print. The standard Windows **Print** dialog box opens.



kbk\_0015.gif

Fig. 4-13 Standard Windows **Print** dialog box

- Specify the required settings and confirm with **OK**. The overview is printed.

## 4.6 Exporting parameters

Reference levels, quality profiles and report templates you have configured for a specific evaluation can be saved as a file (exported) to make them available for subsequent use.

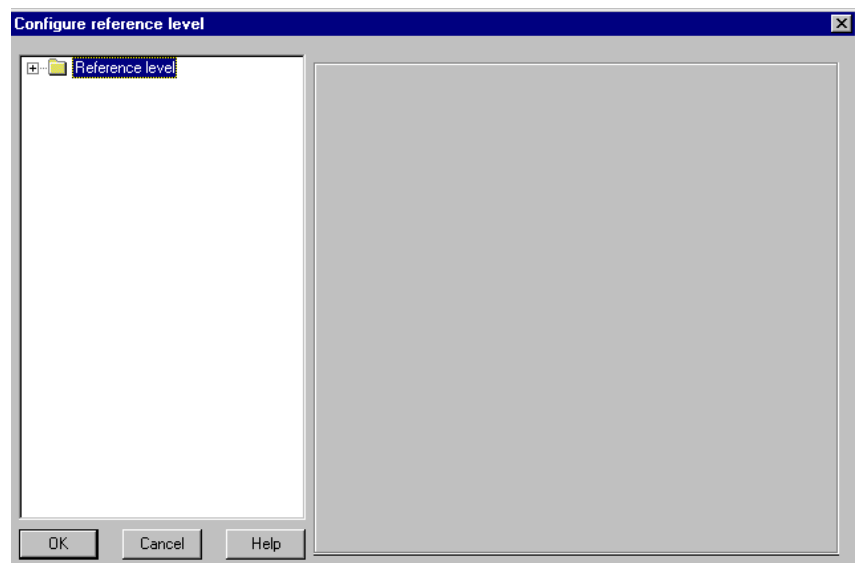
Table 4-1 File name extensions for exported parameters

Parameters	File name extensions
Reference level	.ref
Quality profile	.pro
Report template	.tpl

The following example deals with a reference level, but the procedure is the same as for reference levels, quality profiles and report templates.

To export a reference level, proceed as follows:

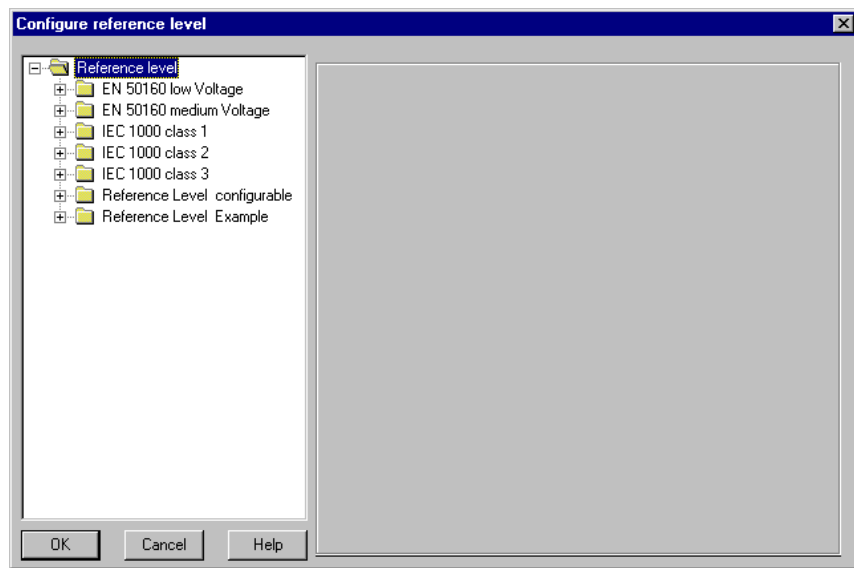
- Click **Configuration** → **Configure Quality Profile**. The **Configure Reference Level** dialog box appears.



kbk\_0001.gif

Fig. 4-14 Configure Reference Level dialog box

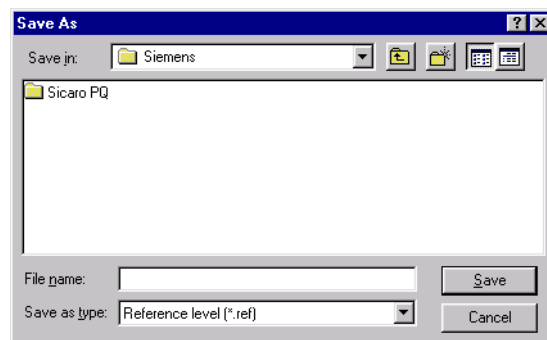
- Double-click **Reference Level**.  
This opens a folder that contains all the reference levels.



kbk\_0002.gif

Fig. 4-15 Configure Reference Level dialog box,  
folder containing all reference levels

- Right-click the reference level that you want to export.  
A pop-up menu appears.
- Click Export.  
The **Save As** dialog box appears.



kbk\_0012.gif

Fig. 4-16 Export Reference Level dialog box

- Select the folder and specify the required file name.
- Confirm with Save.  
The reference level is exported with the extension .ref.

## 4.7 Importing parameters

Reference levels, quality profiles and report templates that you have configured for a specific statistical evaluation and saved as a file (exported) can be made available for another statistical evaluation (import).

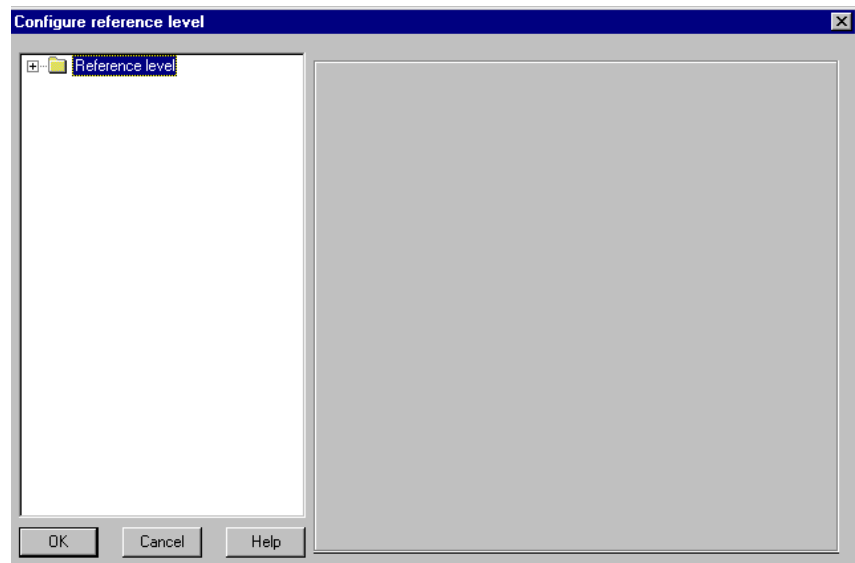
Table 4-2 File name extensions for imported parameters

Parameters	File name extensions
Reference level	.ref
Quality profile	.pro
Report template	.tpl

The following example deals with a reference level, but the method of procedure is the same as for reference levels, quality profiles and report templates.

To import a reference level, proceed as follows:

- Click **Configuration** → **Configure Quality Profile**. The **Configure Reference Level** dialog box appears.

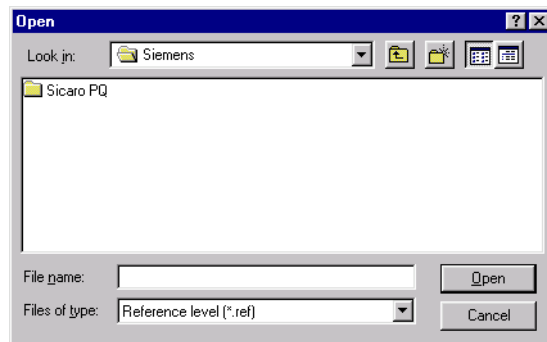


kbk\_0001.gif

Fig. 4-17 Configure Reference Level dialog box

- Right-click **Reference Level**. A pop-up menu appears.

- Click **Import**.  
The **Open** dialog box appears.



kbk\_0011.gif

Fig. 4-18 Import Reference Level dialog box

- Select the required reference level and confirm with **Open**.  
The reference level is imported.

## 4.8 Configuring reference levels

### 4.8.1 Overview

A reference level shows all characteristics which have to be taken into consideration for the statistical evaluation of measured data.

Characteristics of the reference level:

- Flicker Plt
- Flicker Pst
- Frequency
- Total harmonic distortion (THD)
- Slow voltage changes
- Voltage harmonics
- Current harmonics
- Voltage-related events
- Voltage asymmetry

**SICARO PQ** has preconfigured reference levels,

- whose characteristics are defined in a standard and
- whose characteristics can be defined as required.

#### Standard reference levels

The values of the characteristics of the standard reference levels are specified by one of the standards EN 50160, IEC 61000-2-2 or IEC 61000-2-4. Standard reference levels serve to define the standard-specific characteristics for statistical evaluation.

The characteristics frequency, slow voltage changes, flicker, asymmetry, voltage harmonics and current harmonics are checked by setting the period that a value is exceeded as a ratio of the reference period. The values for the overflows are defined in the standards.

The voltage-related events are checked by counting how many times the standard reference level is exceeded or undershot. Although the period of the over-ranges and underflows is defined, it only serves to classify an event.

The events are categorized as follows:

Table 4-3 Voltage exceeding and shortfall

Voltage interruption	Complete interruption of the supply voltage on at least one phase. Interruption means less than 1% of the nominal value (EN 50160)
Voltage dip	Reduction of the supply voltage to a value <90% (and > 1%) of the nominal value (EN 50160)
Voltage changes	Changes in the supply voltage of more than 5% (or 4%) of the nominal value (EN 50160)
Overvoltage	Increase of the supply voltage by a specific value. Specify whether these are to be absolute/relative values of the nominal value



**Note:**

The settings of the standard reference level cannot be modified.

---

The standards also contain statements which cannot be expressed in figures. These statements are not included in the reference levels and are therefore not taken into account in the statistical evaluation.

The following standard reference levels are available:

- EN 50160 Low Voltage
- EN 50160 Medium Voltage
- IEC 61000 Class 1
- IEC 61000 Class 2
- IEC 61000 Class 3



**Note:**

The user interface still refers to the former standard IEC 1000 which was renamed to IEC 61000.

---



**Note:**

The characteristics total harmonic distortion (THD) and current harmonics are not described in the standards. They are therefore not characteristics of the standard reference level.

---



**Free configurable reference levels**

If you do not wish the statistical evaluation of measured data to be based on a standard, free definable reference levels can be configured to suit your own requirements. Free definable reference levels are pre-assigned the values of a standard.

Table 4-4 Variable parameters of free definable reference levels

Characteristic	Parameters	Instance	Dimensions
Frequency	Averaging time Compatibility level  Limit value (may be violated)	Duration On/Off Limit values On/Off Period of compliance Limit values	s/min/h/d  %  % %
Slow voltage change	Averaging time Compatibility level  Limit value (may be violated)	Duration On/Off Limit values On/Off Period of compliance Limit values	s/min/h/d  %  % %
Flicker	Averaging time Compatibility level  Limit value (may be violated)	Duration On/Off Upper limit value On/Off Period of compliance Upper limit value	s/min/h/d  %  % %
Voltage asymmetry	Averaging time Compatibility level  Limit value (may be violated)	Duration On/Off Upper limit value On/Off Period of compliance Upper limit value	s/min/h/d  %  % %
Voltage harmonics	Averaging time  2nd – 50th harmonics	Duration Period of compliance Limit value	s/min/h/d % %

Table 4-4 Variable parameters of free definable reference levels

Characteristic	Parameters	Instance	Dimensions
Current harmonics	Averaging time 2nd – 50th harmonics	Duration Period of compliance Limit value	s/min/h/d % %
Total harmonic distortion (THD)	Averaging time Compatibility level  Limit value (may be violated)	Duration On/Off Upper limit value On/Off Period of compliance Upper limit value	s/min/h/d  %  % %
Voltage-related events	Limit value of overvoltage to voltage change (G6) Limit value of voltage change to normal range (G5) Limit value of normal range to voltage change (G4) Limit value of voltage change to voltage dip (G2) Limit value of voltage dip to voltage interruption (G1) Time limit until voltage dip (T2) Time limit between short-time and long-time interruption (T1)		% % % % % min min



**Note:**

You will find further details on the parameters in the Appendix "Evaluation methods".

## 4.8.2 Configuring free definable reference levels

For the characteristics that are not event-related (frequency, slow voltage changes, flicker, asymmetry, voltage harmonics and current harmonics), the limit values of the standards are specified as a percentage of the nominal value.

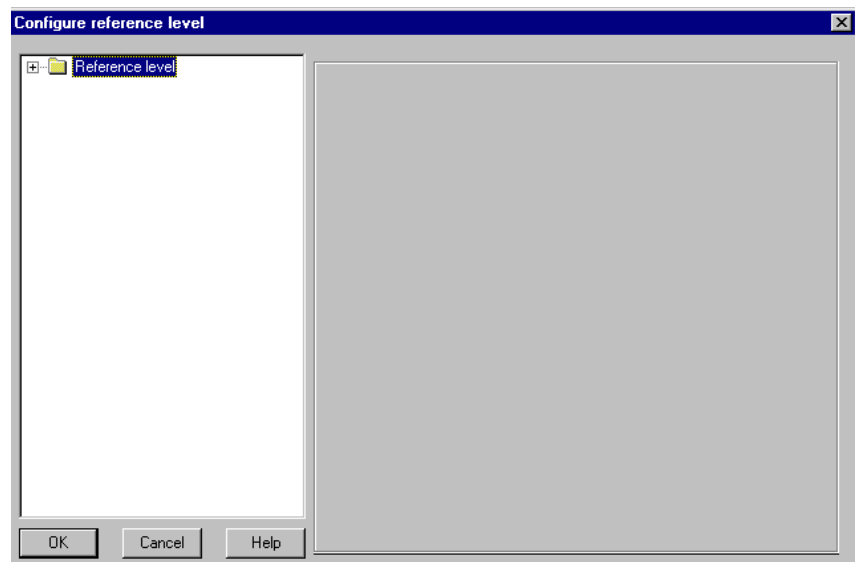
In the case of **IEC standards**, these are so-called **compatibility levels**.

The **standard EN 50160** usually specifies 95% values, i.e. the measured values may exceed or fall short of the limit value for 5% of the investigation period. This value is referred to as the **period of compliance**.

In the case of free definable reference levels, you can choose whether to enter a compatibility level or a limit value that allows a percentage violation. It is also possible to enter both.

To configure a free definable reference level, proceed as follows:

- Click **Configuration** → **Configure Reference Level**.  
The **Configure Reference Level** dialog box appears.



kbk\_0001.gif

Fig. 4-19 Configure Reference Level dialog box

- Double-click **Reference Level**.  
This opens a folder that contains all the reference levels.

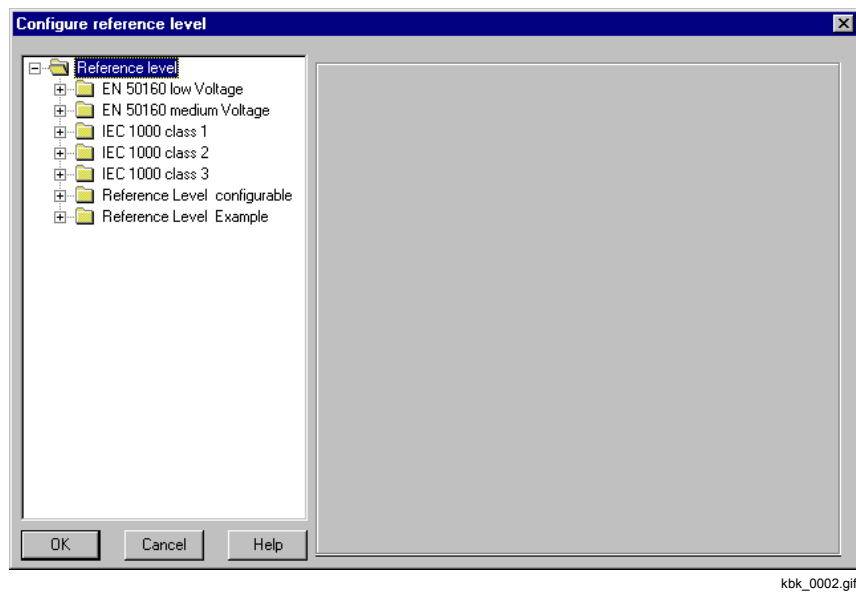


Fig. 4-20 Configure Reference Level dialog box,  
folder containing all reference levels

- Double-click the free definable reference level that you want to configure.  
This opens the folder containing the characteristics of the reference level.

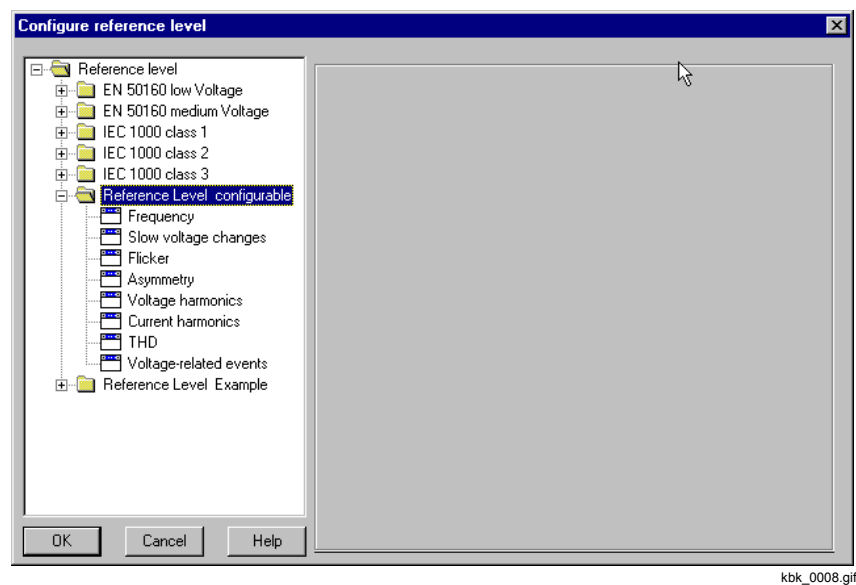


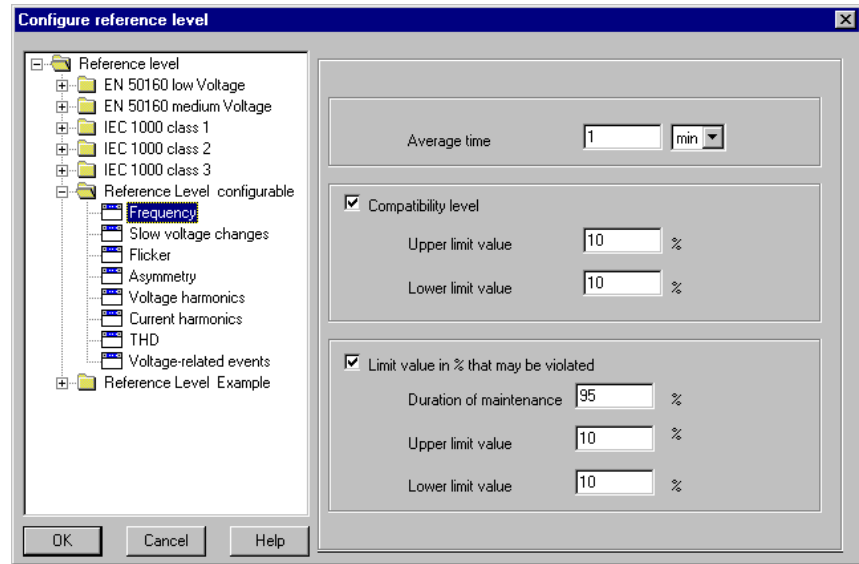
Fig. 4-21 Configure Reference Level dialog box,  
folder containing the characteristics of a free definable reference level

- Click the required characteristic.

**Procedure for characteristics that are not event-related**

The procedure for the characteristics frequency, slow voltage changes, flicker, asymmetry and total harmonic distortion is basically the same and is illustrated in the following example using the characteristic frequency.

The following dialog box appears:



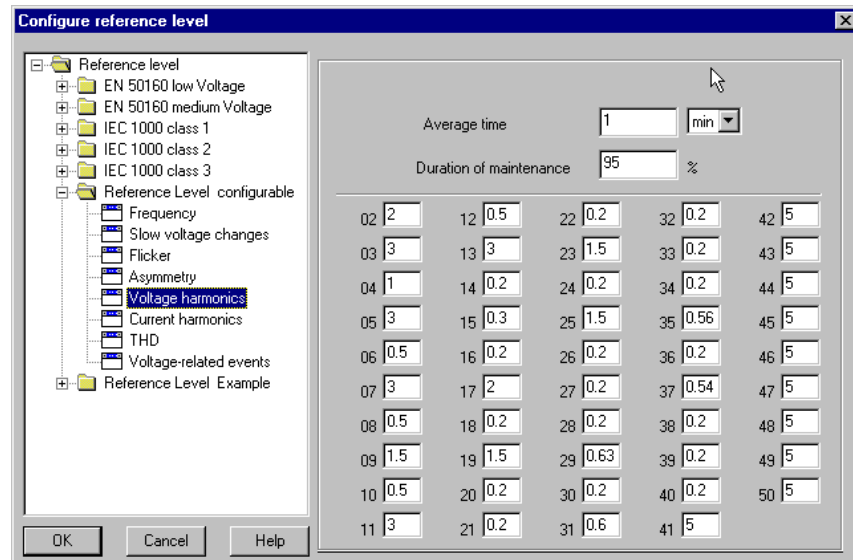
kbf\_0002.gif

Fig. 4-22 Configure Reference Level dialog box, dialog mask of the characteristic frequency

- Enter the numerical value and time unit for the averaging time.
- Specify whether the compatibility level is to be taken into account during the statistical evaluation and enter the upper and, if applicable, the lower limit value.
- Specify whether the limit value, which can be exceeded to a certain percentage, should be taken into consideration. Enter the percentage value for the period of compliance, the upper and, if necessary, lower limit value.

The procedure for the characteristics voltage harmonics or current harmonics is identical and is illustrated in the following example using the characteristic voltage harmonics.

The following dialog box appears:



kbo\_0002.gif

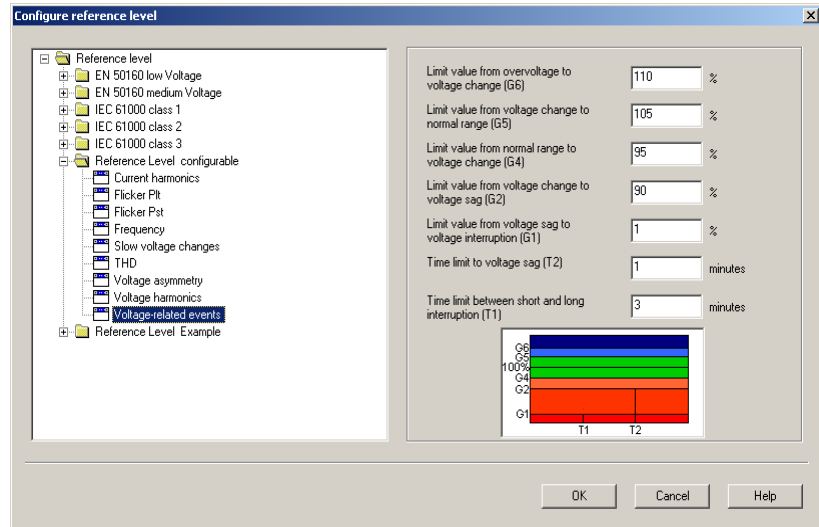
Fig. 4-23 Configure Reference Level dialog box, dialog mask of the voltage harmonics characteristic of a free definable reference level

- Enter the numerical value and the time unit for the averaging time and the percentage value for the period of compliance.
- Enter the percentage value of the 2nd – 50th harmonics. These values refer to the 1st harmonic.

## Procedure for event-related characteristics

Event-related characteristics are the voltage-related events; voltage interruption, voltage dip, voltage change and overvoltage (cf. description on page 19).

The following dialog box appears:



kbk\_0016.gif

Fig. 4-24 Configure Reference Level dialog box, dialog mask of voltage-related event of a free definable reference level

- Enter the corresponding limit values.

## 4.9 Configuring quality profiles

### Overview

Use the quality profiles to select those characteristics of the reference level you want to take into consideration for the statistical evaluation of measured data. Thus you can avoid integrating unnecessary data into your statistical evaluation.

This prevents inclusion of an unnecessary volume of data not required for the specific statistical evaluation.

The setting options of a quality profile are graded hierarchically. Highest priority is the selection of the overall characteristic, the selection of the phase is in second place and, in some cases, the selection of a subcharacteristic (e.g. the harmonic number) is in third place. If you do not include the overall characteristic in the evaluation, the settings of the other levels are automatically ignored.

Table 4-5 Setting options of a quality profile

Characteristic	Setting options
Frequency	Evaluation yes/no
Slow voltage changes	Evaluation yes/no Evaluation of individual phases yes/no
Flicker Plt Flicker Pst	Evaluation yes/no Evaluation of individual phases yes/no
Voltage asymmetry	Evaluation yes/no Evaluation of individual phases yes/no Voltage asymmetry yes/no Negative-phase-sequence system yes/no
Voltage harmonics	Evaluation yes/no Evaluation of individual phases yes/no Values of the 2nd to 50th harmonics yes/no
Current harmonics	Evaluation yes/no Evaluation of individual phases yes/no Values of the 2nd to 50th harmonics yes/no
Total harmonic distortion (THD)	Evaluation yes/no Evaluation of individual phases yes/no
Voltage-related events	Evaluation yes/no



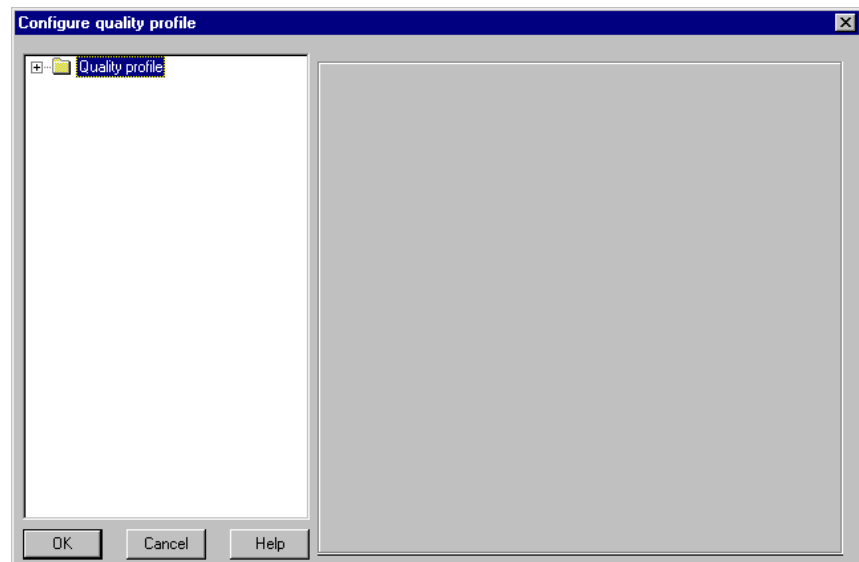
The following quality profiles are stored in **SICARO PQ** by default:

- Basic profile
- Harmonics check
- Power frequency and flicker
- Asymmetry
- Voltage changes
- Complete analysis
- Only VL 1

### Configuring quality profiles

To configure a quality profile, proceed as follows:

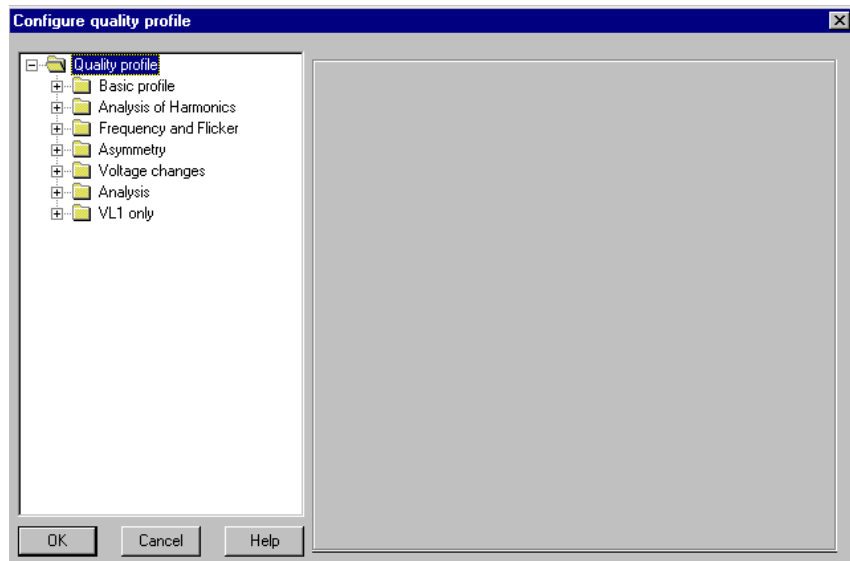
- Click **Configuration** → **Configure Quality Profiles**. The Configure Quality Profiles dialog box appears.



kqu\_0001.gif

Fig. 4-25 Configure Quality Profiles dialog box

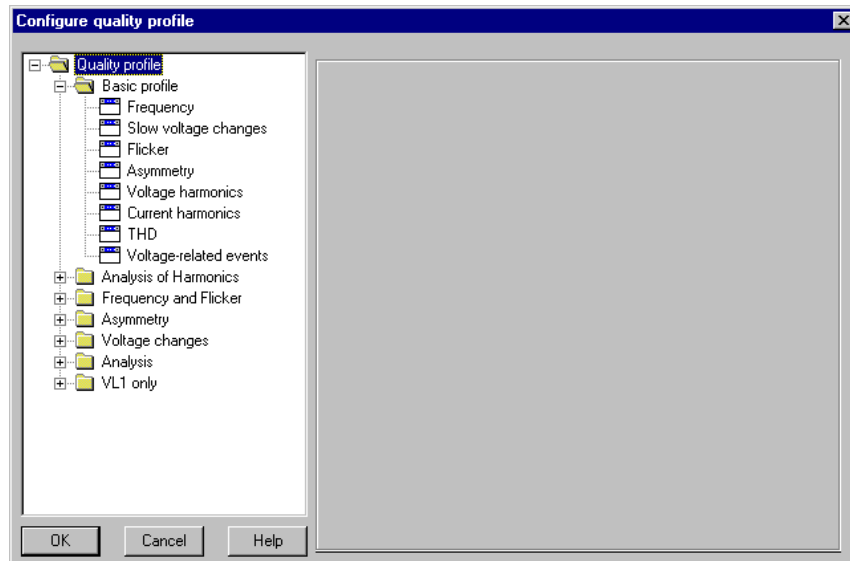
- Double-click Quality Profiles. This opens a folder that contains all the quality profiles.



kqu\_0002.gif

Fig. 4-26 Configure Quality Profiles dialog box, folder containing all the quality profiles

- Double-click the quality profile that you want to configure. This opens the folder containing the characteristics of the quality profile.



kqu\_0003.gif

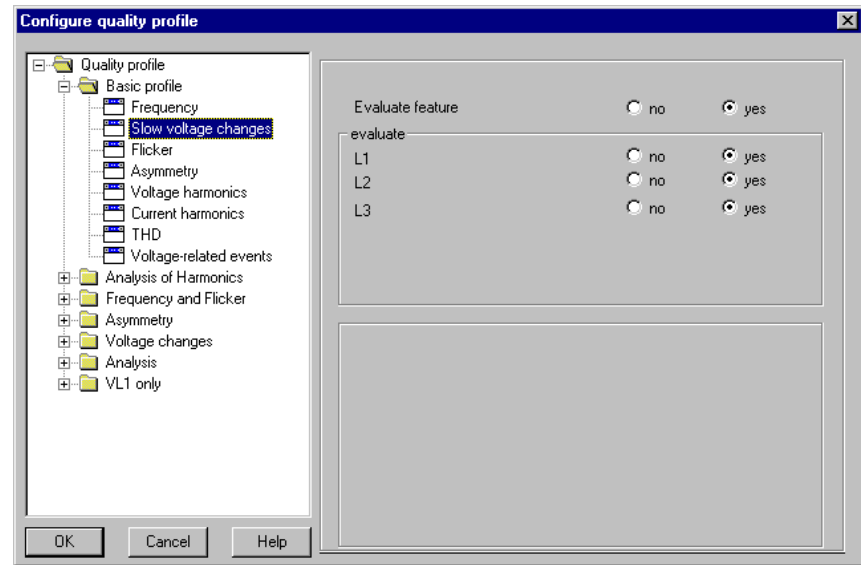
Fig. 4-27 Configure Quality Profiles dialog box, folder containing the characteristics of a quality profile

- Click the characteristic that you want to configure

**Procedure for characteristics that are not event-related**

The procedure for the characteristics; frequency, slow voltage changes, flicker, and total harmonic distortion is basically the same and is illustrated in the following example using the characteristic slow voltage changes.

The following dialog box appears:

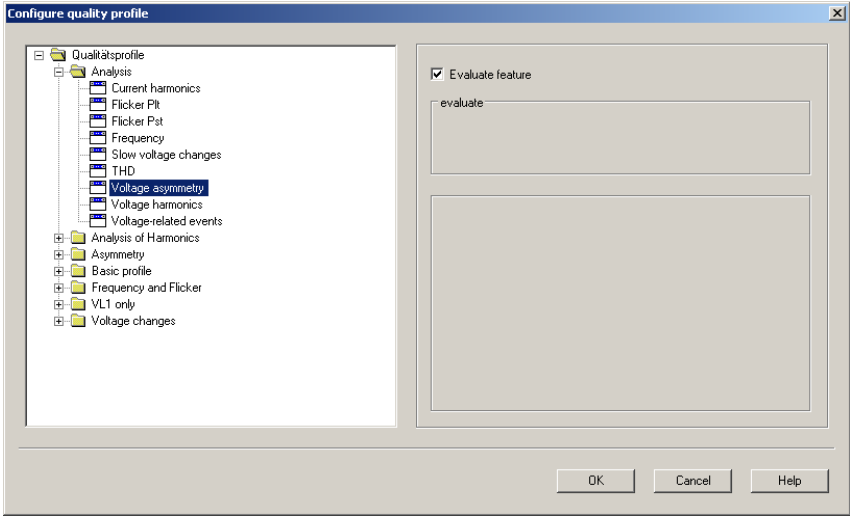


kqu\_0004.gif

Fig. 4-28 Configure Quality Profiles dialog box, dialog mask containing the characteristic of a quality profile

- Select whether the characteristic is to be evaluated.
- Select which phase(s) are to be evaluated.

- Select whether the characteristic is to be evaluated.

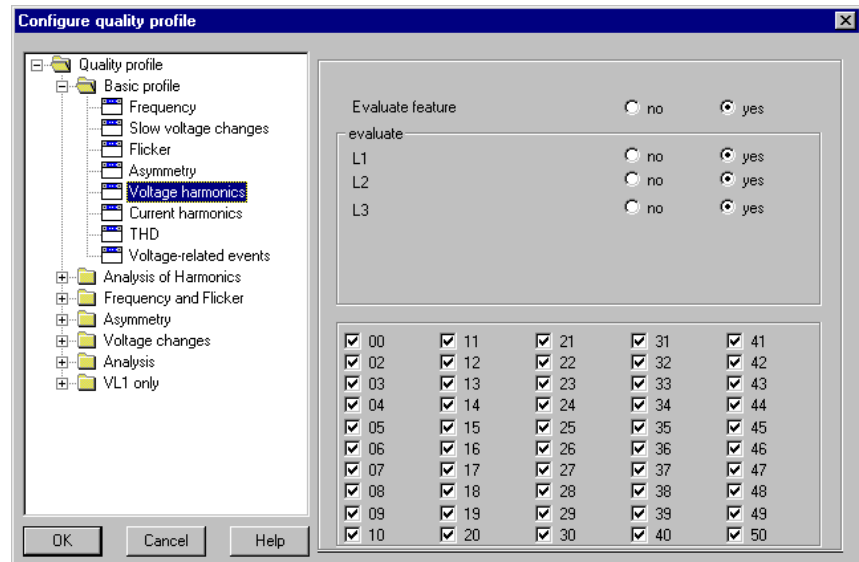


kqy\_0001.tif

Fig. 4-29 Configure Quality Profiles dialog box, dialog mask of the Voltage asymmetry characteristic of a quality profile

The procedure for the characteristics voltage harmonics or current harmonics is identical and is illustrated in the following example using the voltage harmonics characteristic.

The following dialog box appears:



kqy\_0002.gif

Fig. 4-30 Configure Quality Profiles dialog box, dialog mask of the voltage harmonics characteristic of a quality profile

- When you configure one of the characteristics voltage harmonics or current harmonics, select which limit values of the harmonics are to be evaluated.

### Procedure for event-related characteristics

Event-related characteristics are the voltage-related events; voltage interruption, voltage dip, voltage change and overvoltage (cf. description on page 19).

In the case of event-related characteristics, you can only select whether or not a characteristic is to be included in the statistical evaluation.

## 4.10 Configuring report templates

### Overview

The result of a statistical evaluation of measured data is displayed as a report. A report comprises an overview and at least one diagram.

The overview contains an indication for each investigated characteristic that has been subject to a limit value violation in a phase. In the case of event-related characteristics, the number of events that have occurred are listed for each event class (cf. also Standard reference levels on page 4-19).

The number of characteristics that are represented in a diagram depends on the type of diagram:

Table 4-6 Diagram types

Diagram type	Characteristics
Min/Max. diagram	Max. 5
Min/Max. single-column diagram	Max. 5
Day trend graph	Max. 5
Frequency graph	Max. 5
Fingerprint	Max. 10
CBEMA diagram	Characteristic voltage-related events only
Discrete frequency Discrete frequency (var. voltage level)	Characteristic voltage-related events only



#### Note:

You can only select characteristics that can be jointly represented in a single diagram.

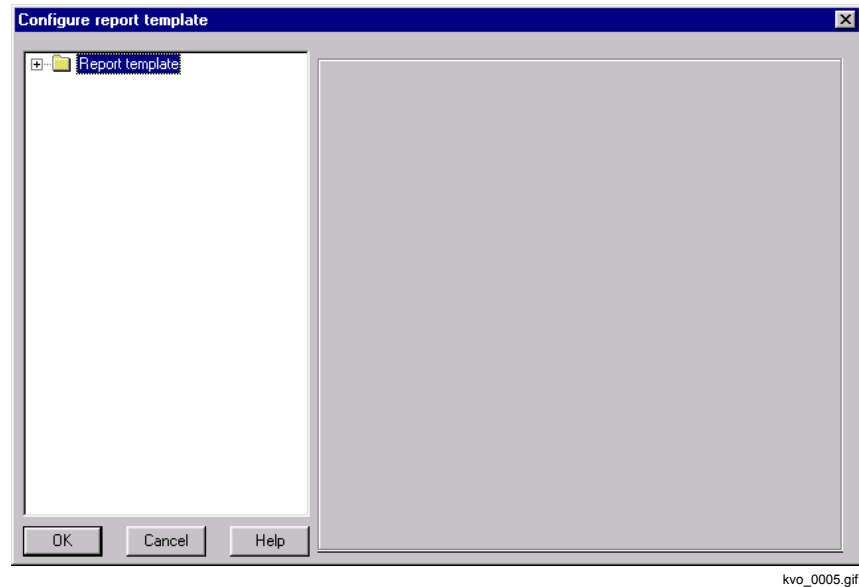
#### Diagrams

- can be added to a report template. Proceed as described in section 4.2.3.
- can be renamed. Proceed as described in chapter 4.3.
- can be deleted from a report template. Proceed as described in chapter 4.4.

**Configuring report templates**

To configure a new report template, proceed as follows:

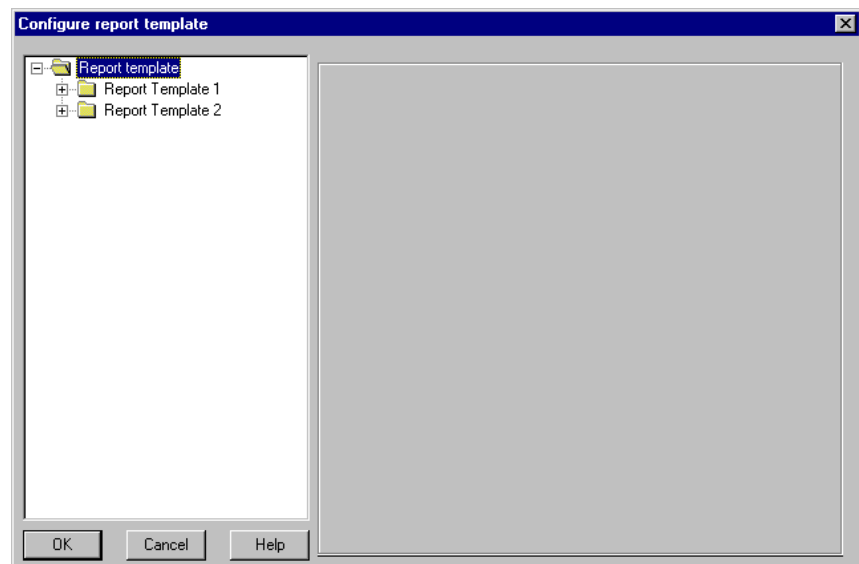
- Click **Configuration** → **Configure Report Template**. The **Configure Report Template** dialog box appears.



kvo\_0005.gif

Fig. 4-31 Configure Report Template dialog box

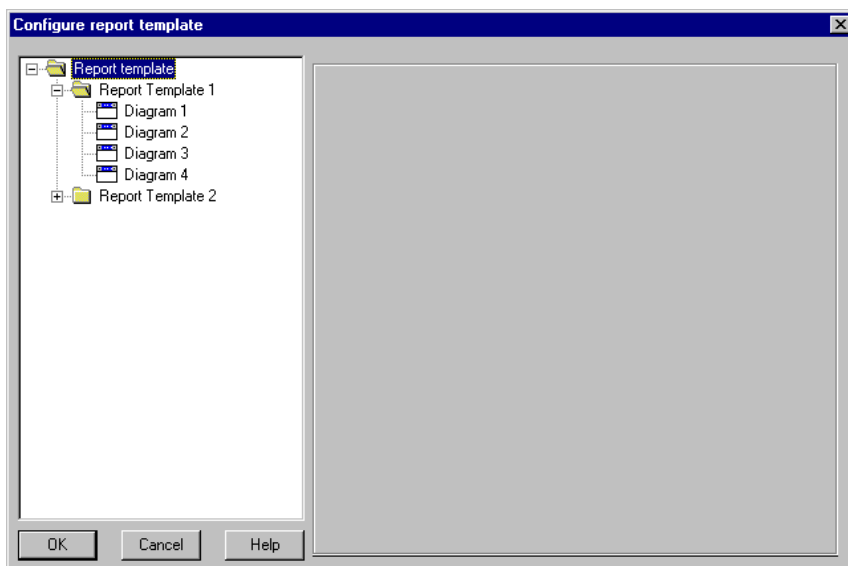
- Double-click **Report Templates**. This opens a folder that contains all the report templates.



kvo\_0002.gif

Fig. 4-32 Configure Report Template dialog box folder containing all report templates

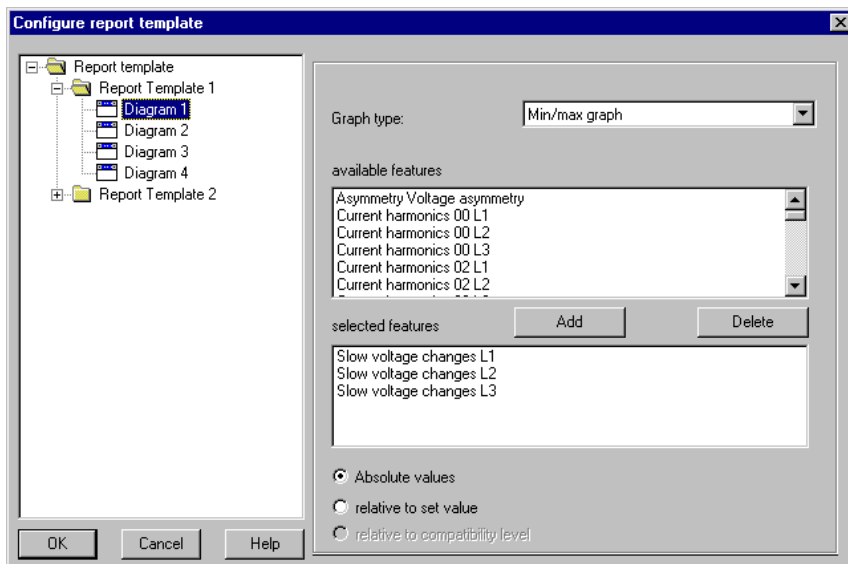
- Double-click the report template that you want to configure.  
This opens a folder containing all the diagrams of the report template.



kvo\_0003.gif

Fig. 4-33 Configure Report Template dialog box,  
folder containing the diagrams of a report template

- Click the diagram that you want to configure.  
A dialog box appears.



kvo\_0004.gif

Fig. 4-34 Configure Report Template dialog box,  
dialog mask of the diagram of a report template



- Select the diagram type from the drop-down list box.
- Select the required characteristics from the **Available Characteristics** box and click the **Add** button.  
The characteristics appear in the **Selected Characteristics** box.
- Select whether the absolute/relative values of the nominal value or the compatibility level are to be represented.
- Repeat this process until you have configured all the diagrams of the report template.
- Click **OK**.  
The report template is configured.

## 4.11 Diagram types

### 4.11.1 Overview

#### Occurred errors

At the beginning of the overview the errors occurred during the report creation are listed and described.

**While creating this report the following errors have been detected:**

The data of the channel 1 has been measured with a meantime of 600.000 sec.  
 The evaluation assumes a meantime of 10.000 sec.  
 The data will not be used.

Diag01.tif

Fig. 4-35 Example of an error

In the above example the averaging time used in the reference level template is incorrectly configured.

- In the reference level template, configure the averaging time corresponding to the set averaging time of the respective quality recorder.  
 If a standard template was used for report creation, you have to create a new reference level template and to correctly enter the averaging time in the template.
- Prepare a new report.

#### Average values

**Average values :**

Characteristic	Compatibility level		Percentage violation		Coverage
	LL	UL	LL	UL	
Frequency	OK.	OK.	OK.	OK.	96 %
Slow voltage changes L1-L2			OK.	viol.	94 %
Slow voltage changes L2-L3			OK.	viol.	94 %
Slow voltage changes L3-L1			OK.	viol.	94 %
Flicker L1-L2				OK.	94 %
Flicker L2-L3				OK.	94 %
Flicker L3-L1				OK.	94 %
Voltage asymmetry				OK.	94 %
Voltage harmonics 02 L1-L2				OK.	96 %
Voltage harmonics 03 L1-L2				OK.	96 %
Voltage harmonics 04 L1-L2				OK.	47 %

Diag02.tif

Fig. 4-36 Example, average values

Due to measuring gaps the coverage in the above shown example is not 100%. The device may have been switched off or not all of the data has been transmitted from the device. Please check your system configuration.

Limit violations are identified with **n. ok.** and highlighted in red.

## Event statistics

### Event statistics :

Result type	Count		
	1-phase	2-phase	3-phase
Short interruptions	1	3	0
Long interruptions	0	1	0
Fast changes	0	1	0

Diag04.tif

Fig. 4-37 Example, event statistics

Event types are listed. The number of events sorted according to the respective phases is specified for each event type.

## Event list

### Event list :

Date/Time	Duration	Extreme value %	Involved phases	Result type
06/21/05 18:00:00.000	00:14:31.023	88.8	L1;L2	Voltage dip
06/21/05 18:24:30.970	00:00:00.059	88.79	L2;L3	Fast change
06/21/05 18:34:30.976	00:00:00.040	0.328	L1;L2	Short interruption
06/21/05 18:45:30.977	00:00:00.040	88.787	L1;L2;L3	Voltage dip
06/21/05 18:55:40.973	00:00:00.050	0.363	L3	Short interruption
06/21/05 19:10:40.951	00:00:00.050	0.125	L1;L2	Short interruption
06/21/05 19:25:40.938	00:02:58.994	0.00984	L2;L3	Short interruption
06/21/05 19:38:39.888	00:03:00.993	0.0104	L1;L3	Long interruption
06/21/05 19:51:40.995	00:00:00.041	110.72	L3	Overvoltage
06/21/05 19:52:30.830	00:00:00.040	88.776	L3	Voltage dip
06/21/05 20:02:30.835	still running	2.5977	L1;L2;L3	Voltage dip

Diag03.tif

Fig. 4-38 Example, event list

Events are specified in the event list according to their chronological sequence.

### 4.11.2 Min/max graph

#### Example

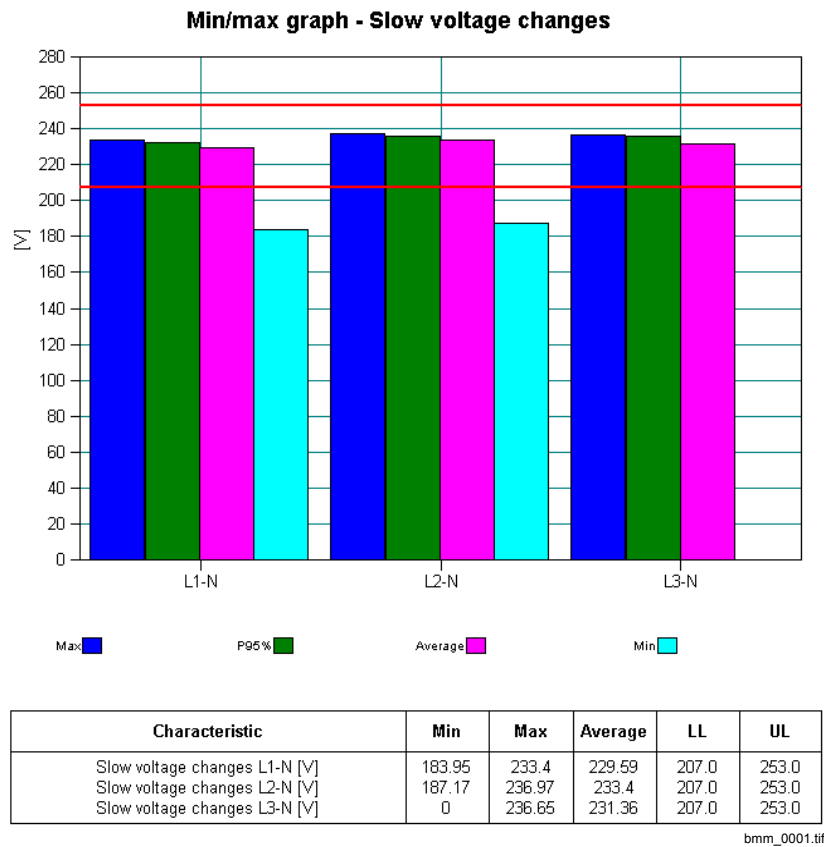


Fig. 4-39 Example of a min/max graph

The horizontal (red) lines indicate the parameterized limit values LL (lower limit) and UL (upper limit).

In the above example, the min column for the voltage L3-N is not visible since the measured value was 0 V (see table).

#### Graph bars

The min/max graph shows the following values for up to 10 characteristics in the form of side by side bars:

- Maximum
- 95% value (95% of the measured values have not fallen below this value within the reporting period)
- Average
- Minimum
- Limit values (lower limit and upper limit) predefined by the reference level

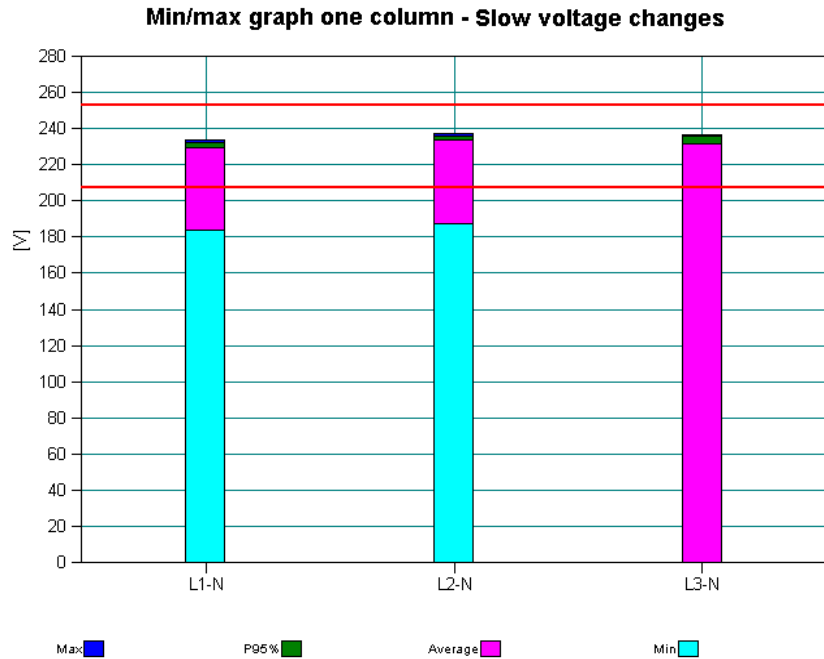
**Types of characteristics**

The following types of characteristics can be selected:

- Flicker Plt L1 to L3
- Flicker Pst L1 to L3
- Frequency
- Distortion factor L1 to L3
- Slow voltage changes L1 to L3 (RMS value characteristic of the voltage)
- Voltage harmonics L1 to L3
- Current harmonics L1 to L3
- Voltage asymmetry

**4.11.3 Min/max graph one column**

**Example**



Characteristic	Min	Max	Average	LL	UL
Slow voltage changes L1-N [V]	183.95	233.4	229.59	207.0	253.0
Slow voltage changes L2-N [V]	187.17	236.97	233.4	207.0	253.0
Slow voltage changes L3-N [V]	0	236.65	231.36	207.0	253.0

bmm\_0002.tif

Fig. 4-40 Example of a min/max graph one column

The horizontal (red) lines indicate parameterized limit values.

In the above example, the min column for the voltage L3-N is not visible since the measured value was 0 V (see Table).

**Column elements**      The min/max graph one column shows the following values for up to 20 characteristics over the entire time range in one column:

- Maximum
- 95% value (95% of the measured values have not fallen below this value within the reporting period)
- Average
- Minimum
- Limit values preset by the reference level

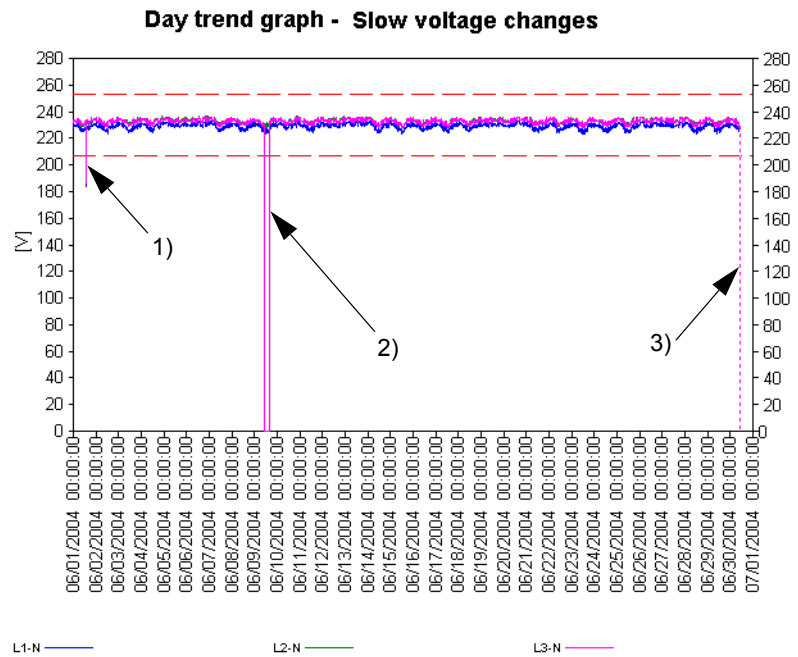
**Types of characteristics**

The following types of characteristics can be selected:

- Flicker Plt L1 to L3
- Flicker Pst L1 to L3
- Frequency
- Distortion factor L1 to L3
- Slow voltage changes L1 to L3
- Voltage harmonics L1 to L3
- Current harmonics L1 to L3
- Voltage asymmetry

### 4.11.4 Day trend graph

#### Example



Characteristic	Min	Max	Average	LL	UL
Slow voltage changes L1-N [V]	183.95	233.4	229.59	207.0	253.0
Slow voltage changes L2-N [V]	187.17	236.97	233.4	207.0	253.0
Slow voltage changes L3-N [V]	0	236.65	231.36	207.0	253.0

ktd\_0001.tif

Fig. 4-41 Example of a day trend graph

The example shows:

1. The parameterized lower limit is transgressed.
2. A voltage surge of phase L3 to value 0 V.
3. A measuring gap (dotted vertical line). Measured data are missing, coverage is less than 100%.



**Note:**

If measuring gaps occur often, it may be caused by a faulty time synchronization with the device.

## Curve graph

The day trend graph shows the progress for up to 5 characteristics over the selected time range in the form of curves. In addition, the limit values used are marked as lines.

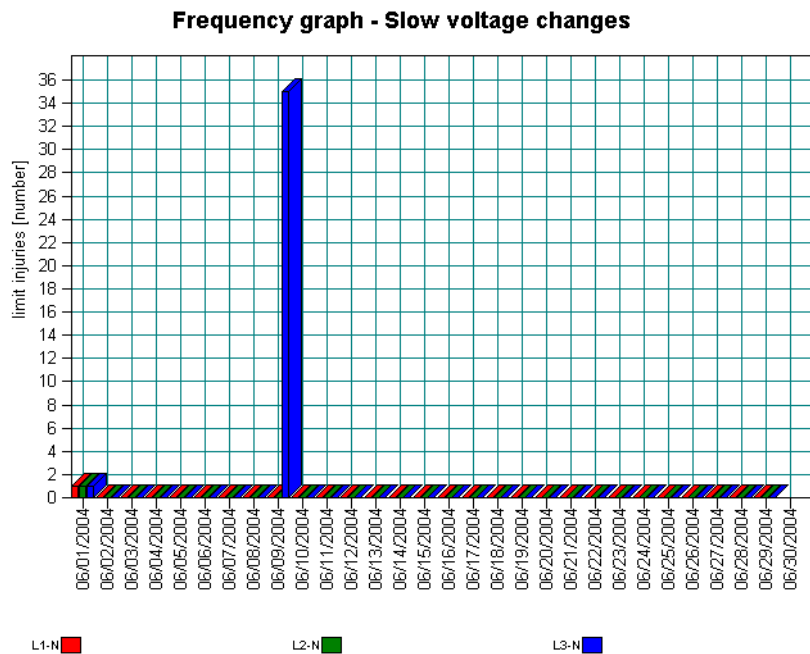
## Types of characteristics

The following types of characteristics can be selected:

- Flicker Plt L1 to L3
- Flicker Plt L1 to L3
- Frequency
- Distortion factor L1 to L3
- Slow voltage changes L1 to L3
- Voltage harmonics L1 to L3
- Current harmonics L1 to L3
- Voltage asymmetry

## 4.11.5 Frequency graph

### Example



Characteristic	Min	Max	Average	LL	UL
Slow voltage changes L1-N [V]	183.95	233.4	229.59	207.0	253.0
Slow voltage changes L2-N [V]	187.17	236.97	233.4	207.0	253.0
Slow voltage changes L3-N [V]	0	236.65	231.36	207.0	253.0

bhd\_0001.tif

Fig. 4-42 Example of a frequency graph



A frequency graph shows how often limit values are violated in a sub-interval of the evaluation period. Up to 5 characteristics can be displayed.

The x-axis represents the time in intervals. The y-axis represents the number of violations within a time interval.

The results are displayed in the graph as columns.

On the left of this example you see violation of average values.

On the rightmost of the graph (30.06.2004) you see a measuring gap – the columns are not displayed, since not all data is available. The coverage is less than 100%.

### **Types of characteristics**

The following types of characteristics can be selected:

- Flicker Plt L1 to L3
- Flicker Pst L1 to L3
- Frequency
- Distortion factor L1 to L3
- Slow voltage changes L1 to L3
- Voltage harmonics L1 to L3
- Current harmonics L1 to L3
- Voltage asymmetry

### 4.11.6 Fingerprint

#### Example

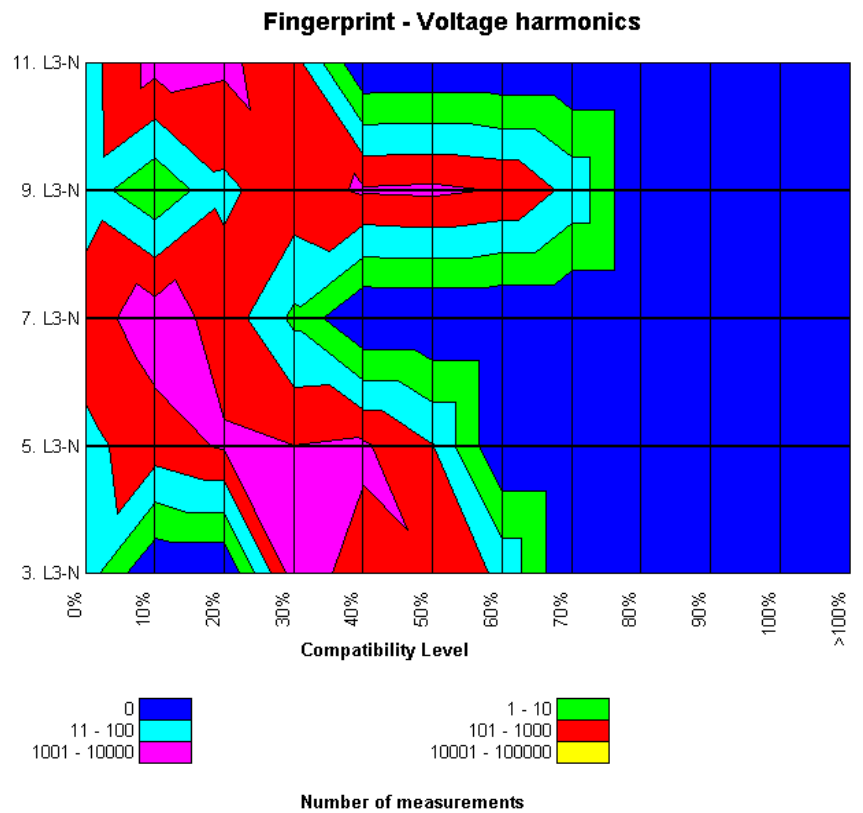


Fig. 4-43 Example of a fingerprint graph

#### Representation of harmonics

The fingerprint is a two-dimensional representation of harmonics over a specific evaluation period. Up to 10 harmonics can be displayed. The progress in time is not considered in this representation. The x-axis represents percentages to compatibility level in discrete steps. The y-axis represents the numbers of harmonics in discrete steps as well. The frequency of average values is identified by different colors. Thus, a two-dimensional pattern is created which is characteristic of a system.

#### Types of characteristics

The following types of characteristics can be selected:

- Voltage harmonics L1 to L3
- Current harmonics L1 to L3

### 4.11.7 CBEMA curve

#### Example

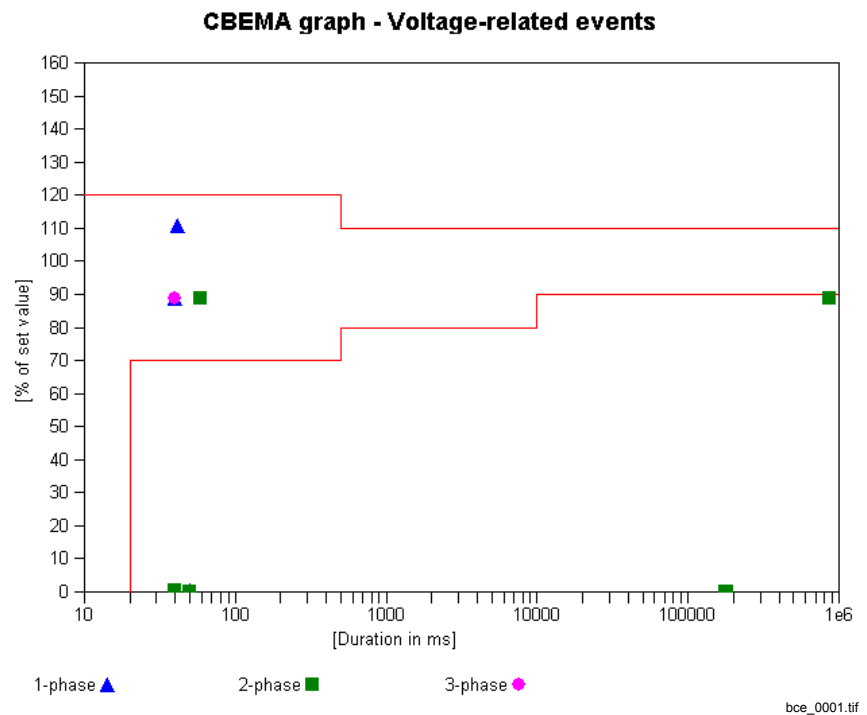


Fig. 4-44 Example of a CBEMA graph

The CBEMA curve specifies size and duration of unwanted voltage events. Points outside the lower limit can cause disconnection of the consumer, while points outside the upper limit can result in such device failures as e.g. insulation faults, overvoltage trip or overexcitation. The CBEMA curve is binding for all devices which are intended for network operation.

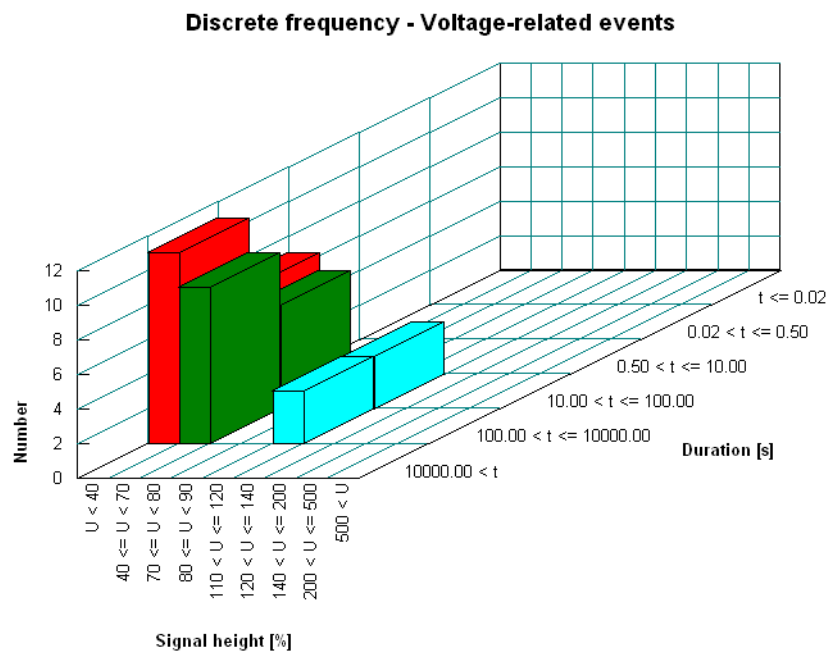
#### Types of characteristics

Only the characteristics type

- voltage-related events is represented.

## 4.11.8 Discrete frequency

### Example



Duration [s]	U < 40	40 <= U < 70	70 <= U < 80	80 <= U < 90	110 < U <= 120	120 < U <= 140	140 < U <= 200	200 < U <= 500	500 < U
t <= 0.02	0	0	0	0	0	0	0	0	0
0.02 < t <= 0.50	0	0	0	0	0	0	0	0	0
0.50 < t <= 10.00	0	0	0	0	0	0	0	0	0
10.00 < t <= 100.00	7	6	0	0	3	0	0	0	0
100.00 < t <= 10000.00	11	9	0	0	3	0	0	0	0
10000.00 < t	0	0	0	0	0	0	0	0	0

bdh\_0001.tif

Fig. 4-45 Example of a discrete frequency graph

### 3D Graph

A discrete frequency graph is a three-dimensional representation in which the number of voltage-related events is represented depending on the height and duration of the events.

The x-axis represents the signal height indicated in per cent in intervals. The x-axis also represents the duration in intervals. The y-axis represents the number of events in the respective intervals.

The z-axis with the time intervals and the x-axis with the intervals of signal heights indicated in per cent define a rectangular surface in the level. The number of events is represented for each surface.

### Types of characteristics

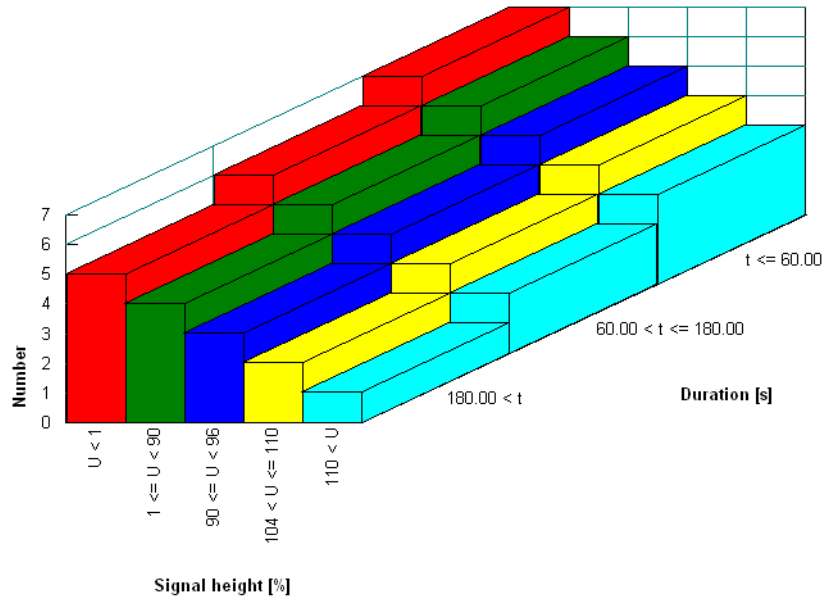
Only the characteristics type

- voltage-related events is represented.

### 4.11.9 Discrete frequency (var. voltage level)

**Example**

**Discrete frequency (var. voltage level) - Voltage-related events**



Duration [s]	U<1%	1%<=U<90%	90%<=U<96%	104%<U<=110%	110%<U
t<=60.00	7	6	5	4	3
60.00<t<=180.00	6	5	4	3	2
180.00<t	5	4	3	2	1

bdh\_0002.tif

Fig. 4-46 Example of a discrete frequency graph

**3D diagram**

The representation of this diagram corresponds to that of the diagram in section 4.11.8.

The scaling of the x axis and y axis refers to the reference levels of the voltage-related events.

**Types of characteristics**

Only the characteristics type

voltage-related events

is displayed.

## 4.12 Configuring HTML export

You can convert reports into HTML format. Conversion is carried out using standardized HTML templates that let you create a page-orientated display of your report in an HTML browser. Each page contains a header and footer containing details of the statistical evaluation.

To customize the display to suit your own requirements, you need to configure the HTML templates. **SICARO PQ** has an integral ASCII Editor which enables the user to edit the HTML source code of the templates. The source code contains key words which refer to other HTML files or to settings, such as the implemented reference level. The key words and their meaning are contained in an overview in the **Configure HTML Export** dialog box (cf. below).



**Note:**

Always ensure that you have a backup of the HTML templates before you make any changes to the configuration settings.



**Note:**

To configure the HTML templates, you require a basic knowledge of HTML.

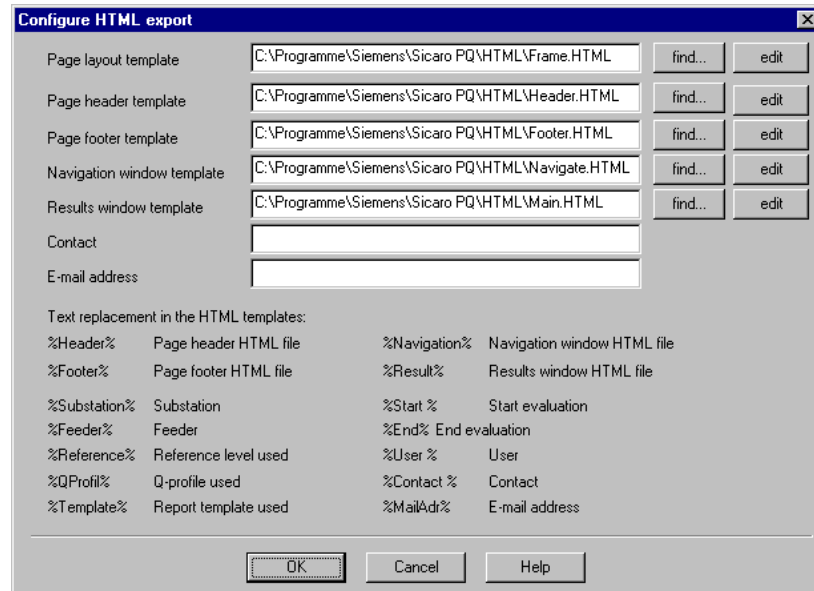
---

HTML templates:

- Page layout template
- Page header template
- Page footer template
- Navigation window template
- Results window template

To configure the HTML templates, proceed as follows:

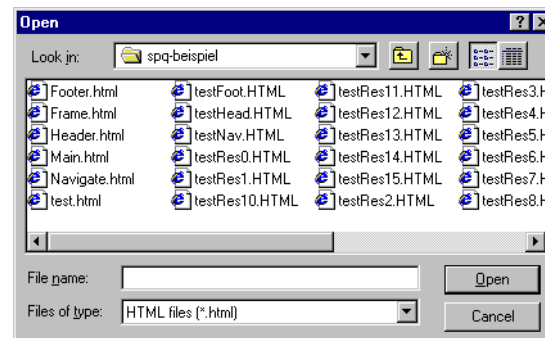
- Click **Configuration** → **Configure HTML Export**. The **Configure HTML Export** dialog box appears.



kht\_0001.gif

Fig. 4-47 Configure HTML Export

- If you have already created the HTML files with your own templates, click **Find** next to the template that you want to configure. The **Open** dialog box appears.



kht\_0002.gif

Fig. 4-48 Find HTML template dialog box

- Select the HTML file that contains your template and confirm with **Open**. The HTML file with your template is loaded.

- If you have not yet created any HTML files with your own templates, click **Edit** next to the template that you want to configure. An ASCII Editor starts with the HTML source code of the template.

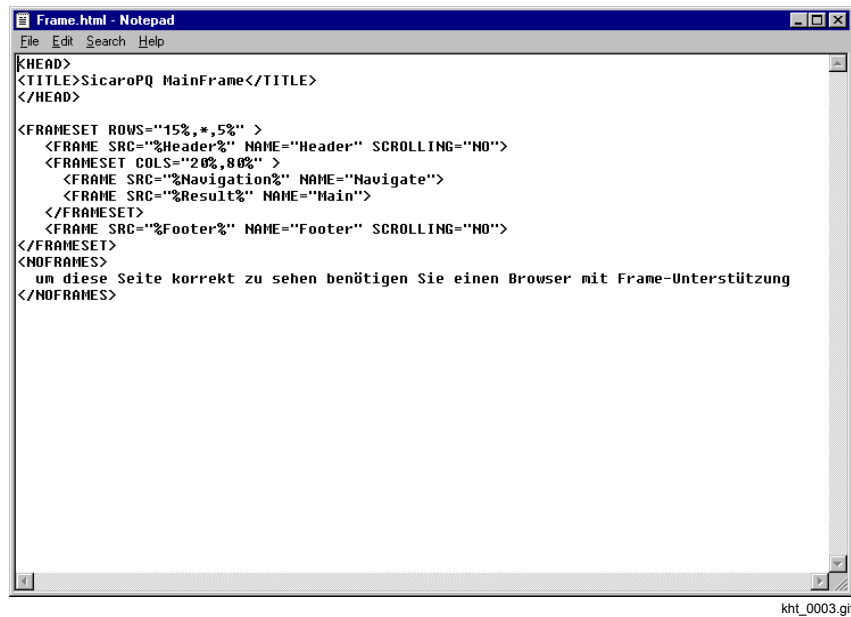


Fig. 4-49 HTML Editor

- Carry out the required changes and save the modified template with the name of your choice.
- Repeat this procedure to configure the other HTML templates to your requirements.
- If applicable, enter a contact and e-mail address in the cells provided. References to these details are contained in corresponding key words in the page footer template.
- Click **OK**.  
The templates for the HTML export of reports are configured.



# Creating a report

# 5

## Overview

This chapter describes how to statistically evaluate your measured data and display the result on the screen as a report.

## Contents

---

5.1	Manual creation of a report	5-2
5.2	Report creation using the task scheduler	5-4

---

## 5.1 Manual creation of a report

**SICARO PQ** creates reports directly from the archive of the **SICARO Q Manager** project. The archive has the file extension **PQArch** and is located in the project folder. Alternatively to the archive you can also select the file (\*.prj) of the **SIMEAS Q Manager** project.

Since a **SICARO Q Manager** project (and thus the archive) may contain several devices (measuring points), the device name has to be additionally selected from a list.

Using this information, **SICARO PQ** queries the archive for the time range available and enters these values in the two time fields in the **Create statistics** dialog box.

By means of the prefilled time fields you can see for which times data is present (gaps in the recording are not included). The data can be both measured values and archive messages.

Proceed as follows in order to manually create a report:

- Select **New** from the menu **File** →. The **Create statistics** dialog box is opened.

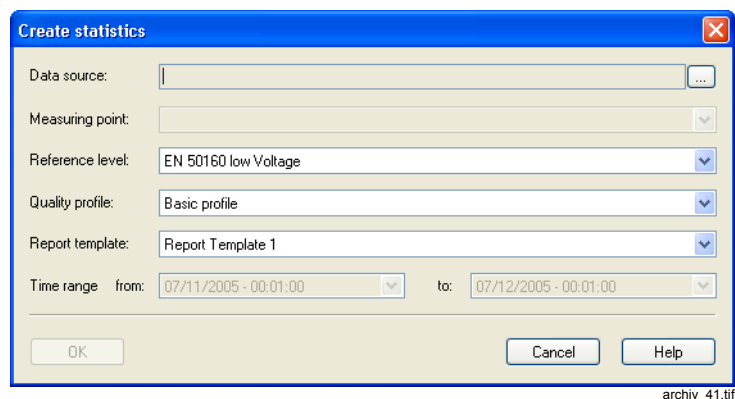


Fig. 5-1 Create statistics dialog box

- Click the ... button to the right of the field **Data source**. The **Open** window is displayed.

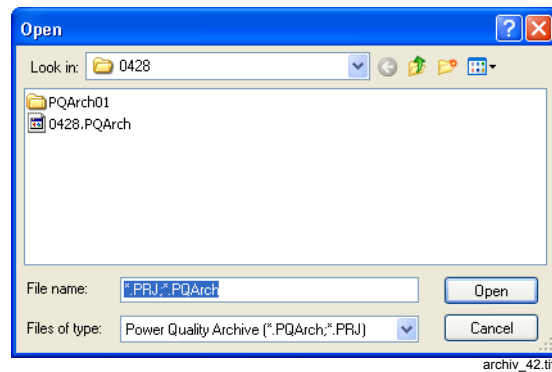


Fig. 5-2 Archive selection

- Select the archive (\*.PQArch) for which a report should be created.
- Click **Open**.
- Select the **Measuring point**, **Reference level**, **Quality profile** and the **Report template** from the drop-down lists.
- Select the desired **Reporting period**. The period for which data are present is preset.
- Confirm by clicking **OK**. The report is created and displayed.

## 5.2 Report creation using the task scheduler

The task scheduler allows you to cyclically generate automatic reports. Before a report can be generated automatically, you have to configure a report job.



### Note:

The task scheduler is a Windows component and is used by **SICARO PQ** to create the reports in time.

During a task set up/change you may be asked for a Windows password.

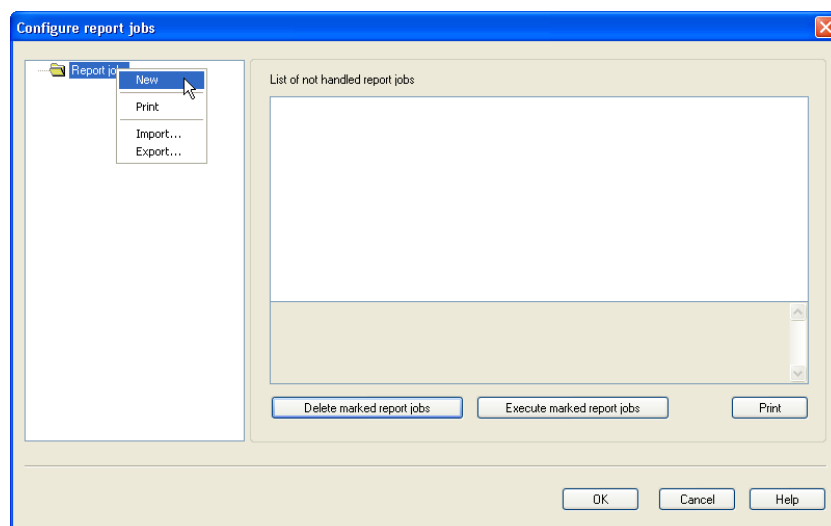
In order to create/activate a task, the **Scheduled Tasks** has to be started. The Windows Help contains further information. The scheduled tasks can be found in the Windows Start menu under **Programs → Accessories → System Tools → Scheduled Tasks**.

If multiple jobs are planned in Windows Scheduler make sure that there are at least 60 minutes difference between their execution.

### 5.2.1 Configuring a report job

How to configure a report job:

- In the **SICARO PQ** select the **Configuration → Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click **Report jobs** and select **New** from the context menu to create a new report job.



archiv\_31.tif

Fig. 5-3 Creating a new report job

The **Create report job** window opens.

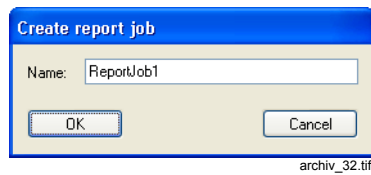


Fig. 5-4 Entering a name for the report job

- Enter a name for the new report and confirm with **OK**. The report job is generated.
- Click the new report job in the left half of the window. The parameters of the report job are displayed.

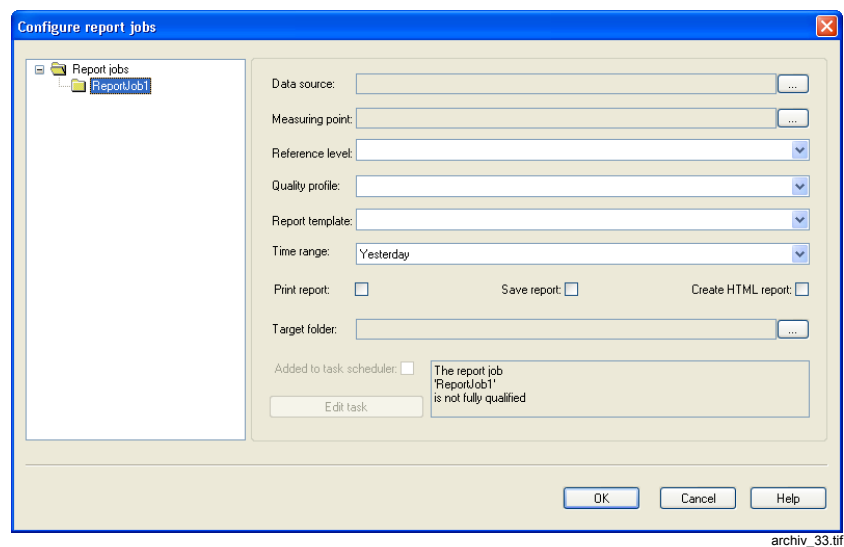


Fig. 5-5 Configuring a report job

- Click the ... button to the right of the field **Data source**. The **Open** window is displayed.

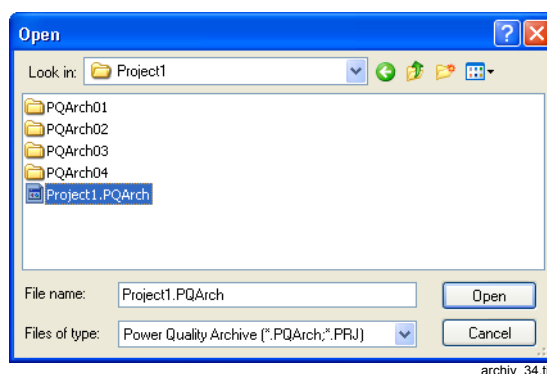


Fig. 5-6 Archive selection

- Select the archive (\*.PQArch) for which a report should be created. Alternatively you can also select the **SIMEAS Q Manager** project (\*.prj).
- Click **Open**.
- Click the ... button to the right of the field **Measuring points**. The **Select measuring point** dialog box is displayed.

The selection list shows all measuring points (**SIMEAS Q** devices) whose data are in the archive.

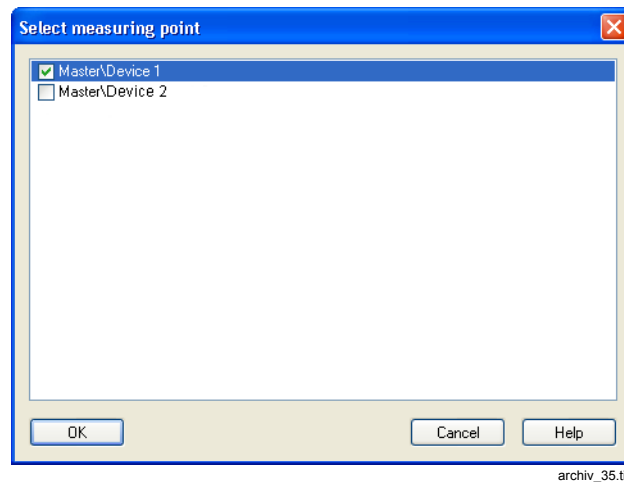


Fig. 5-7 Select measuring point

- Select the measuring points for which a report is to be created and confirm with **OK**.
- Select the **Reference level**, **Quality profile**, **Report template** and the **Reporting period**.
- Select one of the following options: **Print/save the report** or **Create HTML report**. You can activate several options.
- Enter the **Target folder** of the report.

The created report will be in a subfolder (e.g. Master\Device\_1\ReportJob1\2005\_07\_11\_\_00\_00\_00-2005\_07\_12\_\_00\_00\_00) of the target folder.

If the option **Print report** is selected, no target folder has to be indicated.

### Enabling the task scheduler

- Enable the option **Add to task scheduler**. Enabling the **Add to task scheduler** option opens the dialog box for task scheduling.
- Select the **Schedule** tab.

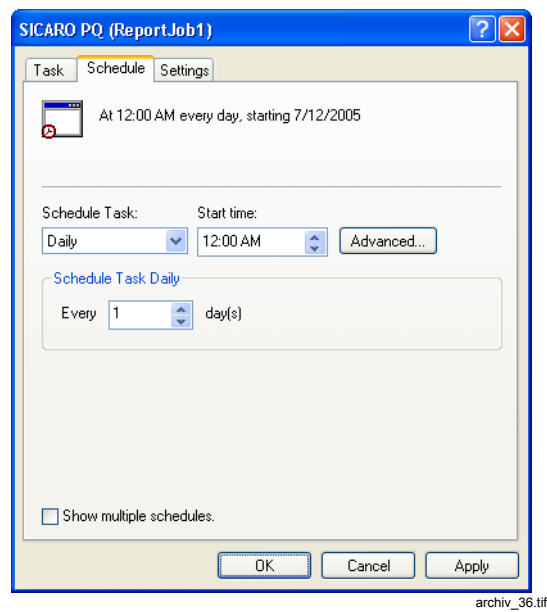


Fig. 5-8 Task scheduler

- Configure the task. The Windows Help contains further information.
- Click the **Apply** button.  
The **Define account information** window opens.

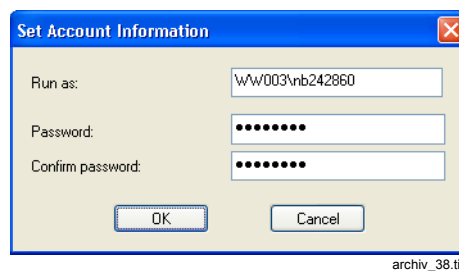


Fig. 5-9 Define account information

- Enter the user and the associated Windows password.
- Click **OK** to close the window.

**Note:**

In the task scheduler you can define whether a task has to be executed when no user is logged into the computer. The Windows Help contains further information.

- Click **OK** to close the task scheduler.  
The configuration of the report job is finished.

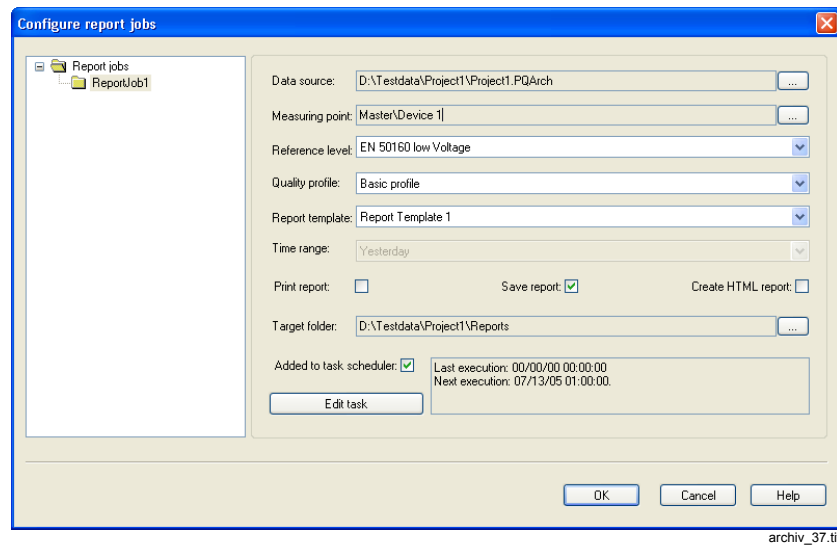


Fig. 5-10 A report job is configured

- Click **OK** to close the **Configure report jobs** window.

## 5.2.2 Modifying a report job

You can modify the created report job any time in order to change e.g. the reporting period.

How to modify a report job:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Select the report job you wish to modify. The settings of the report job are displayed.
- Enter your modifications.



### Note:

You can change the reporting period only if the **Add to task scheduler** option is unchecked. Once the reporting period is changed, a new task has to be configured.



**Editing a task**

- Click the **Edit a task** command button. The task scheduler is started.
- Enter your modifications (e.g. start time) and confirm with **OK**.

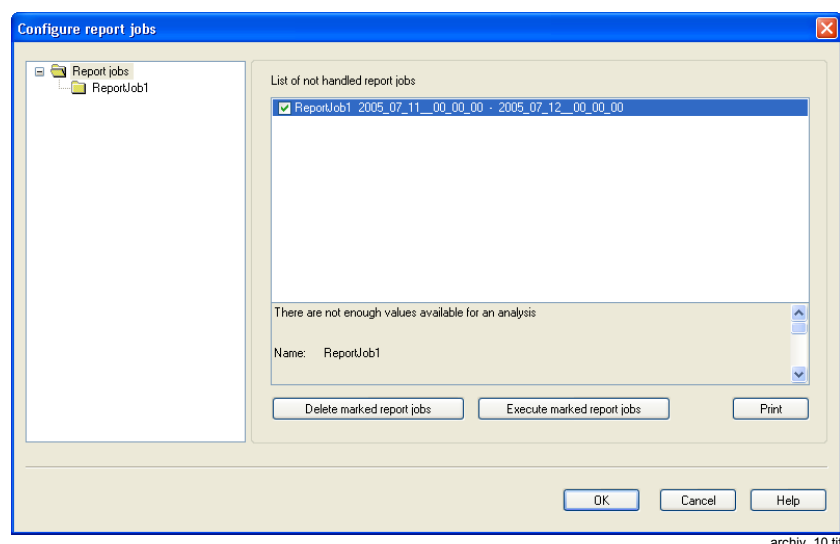
**5.2.3 Editing failed report creation**

Report jobs that were executed incompletely (i.e. no report was generated) are compiled in a list. A reason why a report creation has failed may be, for instance, a faulty network connection to the archive. A reason why a report creation has failed is specified in the lower part of the list.

You can manually start jobs that have not been executed.

How to manually start failed report creations:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Click **Report jobs** in the left half of the window. The incompletely executed report jobs are listed.



archiv\_10.tif

Fig. 5-11 Listing of faulty report jobs

- Select the jobs to be executed.
- Click the **Start marked report jobs** button. The marked report jobs are executed and deleted from the list.

Report jobs that were not executed can also be deleted by applying the button **Delete marked report jobs**.

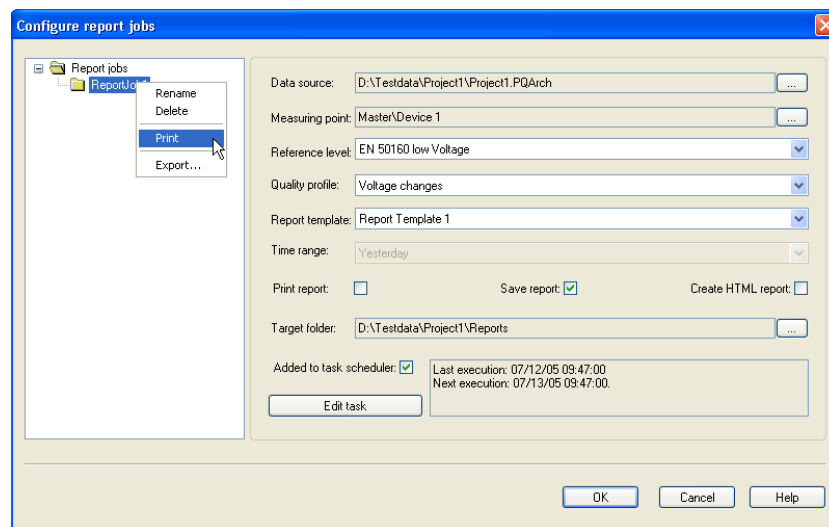
## 5.2.4 Printing report jobs

You can print the following views:

- The settings for a report job.
- The settings for all created report jobs.

**Printing a report job** How to print the settings of a report job:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click the report job you wish to print in the left half of the window.



archiv\_39.tif

Fig. 5-12 Printing a report job

- Select **Print** in the context menu. The Windows standard print dialog box opens.
- Define the desired settings and confirm with **OK**. The report job is printed.

---

**Note:**

Print on a physically existent and activated printer only (not, for example, Adobe PDF).

---

**Printing all report jobs**

How to print all created report jobs:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click on **Report jobs** in the left half of the window.
- Click the **Print** button. The Windows standard Print dialog box opens.
- Define the desired settings and confirm with **OK**. All report jobs are printed.

**5.2.5 Exporting/importing a report job**

You can export existing report jobs and re-import them into other projects.

**Exporting a report job**

How to export a report job:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click the report job which you want to export.
- Select **Export** in the context menu. The **Save as** window opens.
- Select the path for saving the file and enter the file name.
- Click the **Save** button. The report job is exported.

**Exporting all report jobs**

How to export all report jobs:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click **Report jobs**.
- Select **Export** in the context menu. The **Save as** window opens.
- Select the path for saving the file and enter the file name.
- Click the **Save** button. The report jobs are exported into the indicated file.

Upon importing the file all report jobs it contains are generated.

### Importing report jobs

How to import report jobs:

- In the **SICARO PQ** select the **Configuration** → **Configure report jobs** menu item. The window **Configure report jobs** opens.
- Right-click **Report jobs**. The **Open** window opens.
- Select the import file and click **OK**.

All report jobs contained in the import file are imported and subsequently displayed.

# 6

## Displaying and saving a report

**Overview** This chapter describes the options available for displaying and saving a report.

<b>Contents</b>	6.1	Overview	6-2
	6.2	Saving a report	6-3
	6.3	Opening a report	6-4
	6.4	Printing a report	6-5
	6.5	Converting a report to HTML	6-6

## 6.1 Overview

Once you have statistically evaluated your measured data, the report containing the results of this evaluation appears on the screen. It comprises an overview and the diagrams that you configured previously (cf. chapter 4.10).

You can display the overview or a diagram in the View window of the **SICARO PQ** screen by clicking the required section of the report in the Navigation window.

In addition, you can also:

- save a report
- open a report
- print a report
- convert a report to HTML.

A report cannot be subsequently modified. If, for example, you would like to extend a report by adding a diagram, you need to change the report template (cf. chapter 4.10) and create a new report (cf. chapter 5.1).

## 6.2 Saving a report




**Note:**

Reports on the statistical evaluation of measured data are saved in **SI-CARO PQ** format with the extension **.spq**.

---

To save a report, proceed as follows:

- Click the  icon in the toolbar.  
or  
click **File**→ **Save**.  
The report is saved under the name displayed in the title bar.  
Or
- Click **File**→ **Save As**.  
The standard Windows **Save As** dialog box opens.
- Select the folder in which you want to save the report, and enter the name of the report.
- Confirm with **OK**.  
The report is saved under the entered name in the selected folder.

## 6.3 Opening a report




**Note:**

Reports on the statistical evaluation of measured data are saved in **SI-CARO PQ** format with the extension **.spq**.

---

To open a saved report, proceed as follows:

- Click the  icon in the toolbar.  
Or  
Click **File**→ **Open**.  
The standard Windows **Open** dialog box opens.
- Select the folder and the report that you want to open.
- Confirm with **Open**.  
The required report opens.  
Or
- Click **File** and then the required file in the list of the last files opened.  
The required report opens.



## 6.4 Printing a report

**Note:**

When the appropriate software is installed, you can print the report or send it as a fax.

---

**Requirements:**

You must have created a new report (cf. chapter 5.1) or have opened an existing report (cf. chapter 6.3).

To display a print preview of a report, proceed as follows:

- Click **File**→ **Print Preview**.  
This opens the window with the print preview of the report.


To print a report, proceed as follows:

---

**Note:**

Print on a physically existent and activated printer only (not, for example, Adobe PDF).

---

- If you want to change the settings for the printer, click **File**→ **Printer Setup**.  
The standard Windows Printer Setup dialog box opens.
- Specify the required settings and confirm with **OK**.  
The settings for the printer are modified.
- Click the  icon in the toolbar.  
Or  
Click **File**→ **Print**.  
The standard Windows **Print** dialog box opens.
- Specify the required settings and confirm with **OK**.  
The report is printed.

## 6.5 Converting a report to HTML

You can convert reports into HTML format. Conversion is carried out using standardized HTML templates that let you create a page-orientated display of your report in an HTML browser. Each page contains a header and footer containing details of the statistical evaluation. To customize the display to suit your own requirements, you need to configure the HTML templates (cf. chapter 4.12).



**Note:**

To configure the HTML templates, you require a basic knowledge of HTML.

---

To convert a report to HTML, proceed as follows:

- Click **File**→ **HTML Export**.  
The **Save As** dialog box appears.
- Select the folder and enter the name for the HTML files.
- Confirm with **Save**.  
The report is converted to HTML.



**Note:**

The conversion produces several HTML files. The HTML files with the templates are identified by the name you assigned and an abbreviation for the corresponding template. For example, the HTML file with the template for the footer is called <namefoot.htm>. If you want to see the result of the conversion in a browser, start the <name.htm> file.

---

# Appendix

# A

## Contents

A.1	Standards	A-2
A.2	Evaluation methods	A-4
A.3	Reference levels	A-8
A.4	Error messages	A-16

## A.1 Standards

**SICARO PQ** analyses to which extent the characteristics of the supply of voltage correspond to the specifications of standards at a specified point in the network.

### Standards

The following standards form the basis for the statistical evaluation of measured data:

- ❑ EN 50160, Voltage characteristics of electricity supplied by public distribution systems, USEnglish version, prEN 50160:1993
- ❑ IEC 61000-2-2 (modified) or EN V 61000-2-2: 1993, Guide to electromagnetic environment for low-frequency line-conducted disturbances and signaling in low-voltage public power supply systems.
- ❑ IEC 61000-2-4 or EN V 61000-2-4: 1994, Electromagnetic compatibility (EMC). Environment. Compatibility levels in industrial plants for low-frequency line-conducted disturbances.

These standards distinguish between low voltage and medium voltage.

The standard IEC 61000-2-4 defines the following quality classes:

- ❑ Class 1 applies to protected supplies and contains the highest quality requirements
- ❑ Class 2 applies to points of common coupling with public networks
- ❑ Class 3 applies to station-internal connecting points in an industrial environment

The standard EN 50160 makes a distinction between two types of networks, those which are linked to a power grid and those which are not linked to such a system. The standard reference levels are the basis for a network linked to a power grid. If you want to examine a non-linked network (seperate network), you need to configure a free definable reference level (cf. chapter 4.8.2).

- Characteristics**      The standards define specifications for the following supply voltage characteristics:
- Frequency of supply voltage
  - Level of supply voltage
    - Slow voltage changes
    - Fast voltage changes
    - Voltage dips
    - Short interruptions
    - Long interruptions
    - Mains frequent overvoltages
    - Transient overvoltages
    - Flicker
  - Voltage asymmetry of supply voltage phases
  - Waveform of supply voltage
    - Harmonics
    - Inter-harmonics
    - Superposed signal voltages

## A.2 Evaluation methods

All line-conducted disturbance effects that affect a network will have an influence on the supply voltage. Therefore the supply voltage serves as an indicator for power quality.

Essentially the power quality can only be determined by using statistical evaluation methods, due to the fact that the supply voltage is observed over a very long time period and is affected by numerous disturbance effects. For each characteristic a different evaluation method is applied.

The values of the following characteristics are determined by setting the time a value is exceeded relative to the reference period:

- ❑ Frequency of supply voltage
- ❑ Slow voltage changes
- ❑ Flicker
- ❑ Voltage asymmetry of supply voltage phases
- ❑ Harmonics

The following characteristics are examined by determining the number of times a limit value is exceeded. These characteristics are referred to as voltage-related events:

- ❑ Fast voltage changes
- ❑ Voltage dips
- ❑ Short interruptions
- ❑ Long interruptions
- ❑ Line frequency overvoltages

The following section describes the methods of evaluating the supply voltage characteristics.

## A.2.1 Frequency

The frequency is evaluated using continuous recordings. The duration of a recording and the averaging time are defined only in the standard EN 50160. The standard distinguishes between networks with and without connection to an integrated power grid as well as between low and medium voltage.

## A.2.2 Level of supply voltage

The following characteristics are evaluated in the same way as the frequency:

- Slow voltage changes
- Flicker

Continuous recordings of the voltage time curve or the flicker level of the observed phases are required as input data.

To check the following characteristics, you require transient recordings of disturbances for all network phases at the feeder point:

- Fast voltage changes
- Voltage dips
- Short interruptions
- Long interruptions
- Line-frequency overvoltages
- Transient overvoltages

In the case of voltage-related events, it is not necessary to have the complete fault record for the statistical evaluation of measured data. A list of the events in the reference period provides sufficient data.

The list can be generated from the fault records and average value recordings.

A voltage-related event shows that the nominal voltage has been exceeded or fallen short of by a specific value.

Properties of a voltage-related event:

- Starting time of the event
- Duration of the event
- Level of the event (as a percentage of the nominal value)
- Number of phases affected

Voltage-related events are divided into various classes.

Limit values are used to distinguish between the different classes.

Table A-1 Classes of voltage-related events

Class	Description
Voltage interruption	Complete interruption of the supply voltage on at least one phase. Interruption means less than 1% of the nominal value (EN 50160)
Voltage dip	Reduction of the supply voltage to a value < 90% and 1% of the nominal value (EN 50160).
Voltage change	A change in the supply voltage greater than 5% of the nominal value in the case of low voltage or 4% of the nominal value in the case of medium voltage (EN 50160).
Overvoltage	Increase of the supply voltage by a specific value. These are sometimes specified as absolute values and sometimes as relative values of the nominal value.
Short-time interruption	Voltage-related event lasting less than 3 minutes.
Long-time interruption	Voltage-related event lasting longer than 3 minutes.

When a voltage-related event affects more than one phase, the length of the event corresponds to the maximum lengths individual phases are fallen short of/exceeded. Similarly the level of the event is determined as the minimum level of the individual phases. In an extreme case, it is possible, for example, that only one phase <1% and the other phases are >1% but < 90%. In this case, the voltage-related event is evaluated as a multiphase interruption, even though some phases only show voltage dips.

If there is overvoltage in one phase and a dip appears in another phase at the same time, only the dip will be taken into consideration. The voltage-related event "overvoltage" is therefore not recorded.

### A.2.3 Voltage asymmetry

The voltage asymmetry is a measure for the angle between the individual phases and their r.m.s. values. The r.m.s. values of all phases should be identical with a symmetric angle. For example, in the case of networks with three phases, there should be a shift of 120° between all three phases.



Quality recorders can measure positive phase-sequence systems and negative-phase-sequence systems and deliver the results as a continuous recording. The voltage asymmetry is calculated from the ratio of negative and positive phase-sequence systems.

The standards therefore make statements on the level of the negative-phase-sequence system in relation to the positive phase-sequence system. Continuous average values of the positive and negative-phase-sequence systems are required for input data.

#### **A.2.4 Voltage harmonics**

The voltage harmonics are determined from the 2nd to the 51st harmonic, even if the standards only specify limit values for up to the 40th harmonic. The distortion factor (total harmonic distortion - THD) is also taken into account.

The limit values in the standards are specified as compatibility levels and listed in table form. The specifications are relative to the value of the first harmonic. The first harmonic must have a minimum value in order to avoid an overflow when dividing by the first harmonic.

If the first harmonic remains under the minimum value, the measurement is regarded as invalid and the investigation cannot be carried out. When configuring the reference levels, the minimum value for the first harmonic is set as a relative value of the nominal voltage.

Continuous average values of the individual harmonics and the THD are applied for the input variables.

#### **A.2.5 Current harmonics**

The standards do not contain any specifications for currents and power. The measuring devices, however, also show measured data for these characteristics. Especially for the harmonics it would be reasonable to make an analysis of the currents. Due to this fact it is possible to evaluate the harmonics of the currents of the free definable reference levels.

Average value recordings are required for the statistical evaluation. The limit values are specified as a relative value to the first harmonic. All harmonics can be evaluated, right through to the 51st harmonic.

An overflow has to be avoided when dividing by the first harmonic. A limit value cannot be specified for the harmonics of the currents as there is no reference current and therefore no nominal value. It is assumed that the first harmonic has the greatest amplitude. Otherwise the measurement will be considered as invalid.

## A.3 Reference levels

The measuring devices cannot produce measured data for all characteristics defined in the standards. Based on this, the following characteristics are not contained in the reference levels:

- Transient overvoltages
- Inter-harmonics
- Superposed signal voltages

For characteristics that are not event-related, the limit values of the standards are specified as a percentage of the nominal value. In the case of IEC standards, these are so-called compatibility levels.

The standard EN 50160 usually specifies 95% values, i.e. the measured data may exceed or fall short of the limit value for 5% of the investigation period. In some cases, limit values are also specified. Compliance with these values is mandatory.

In the case of free definable reference levels, you can enter a compatibility level or a limit value that allows a specified probable violation. It is also possible to enter both. The level of probability must also be entered.

The following section describes the presettings of the reference levels.

### A.3.1 Frequency

Table A-2 Presettings of the frequency characteristic of the standard reference levels

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
Averaging time	10 s	10 s	10 s	10 s
Compatibility level - upper limit	4%	1%	1%	2%
Compatibility level - lower limit	-6%	-1%	-1%	-2%
99.5% value - upper limit	1%	Not specified	Not specified	Not specified
99.5% value - lower limit	-1%	Not specified	Not specified	Not specified

### A.3.2 Slow voltage changes

Table A-3 Presettings of the slow voltage changes characteristic of the standard reference levels

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
Averaging time	10 min.	10 min.	10 min.	10 min.
Compatibility level - upper limit	Not specified	8%	10%	10%
Compatibility level - lower limit	Not specified	-8%	-10%	-15%
95% value - upper limit	10%	Not specified	Not specified	Not specified
95% value - lower limit	-10%	Not specified	Not specified	Not specified

### A.3.3 Flicker

Limit values for the flicker level are defined only in the standard EN 50160. However, there are no specifications for the averaging time of the measured values. For this reason, the presetting for power frequency is applied. However, in the standard EN 50160 it can also be freely selected by the user. The IEC standards do not generally include analysis of the flicker level.

Table A-4 Presettings of the flicker characteristic of the standard reference levels

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
Averaging time	10 s	Not specified	Not specified	Not specified
Compatibility level	Not specified	Not specified	Not specified	Not specified
95% value	10%	Not specified	Not specified	Not specified

### A.3.4 Voltage asymmetry

Table A-5 Presettings of the asymmetry characteristic of the standard reference levels

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
Averaging time	10 min.	10 min.	10 min.	10 min.
Compatibility level	Not specified	2%	2%	3%
95% value	2%	Not specified	Not specified	Not specified

### A.3.5 Voltage harmonics

The following table shows the presettings of the standard reference level, i.e. of the various standards. In the case of EN 50160, these are 95% values, in the case of IEC standard, compatibility levels. The values in the table are percentage values of the first harmonic. Due to the large number of values, users can only specify one limit value per harmonic. However, they can specify whether the value is a compatibility level or a limit value which may be exceeded (whereby a percentage of the investigation interval must be specified).

Table A-6 Presettings of the standard reference level for voltage harmonics

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
Averaging time	10 min.	2.5 min	2.5 min	2.5 min
2	2	2	2	2
3	5	3	5	6
4	1	1	1	1.5
5	6	3	6	8
6	0.5	0.5	0.5	1.5
7	5	3	5	7
8	0.5	0.5	0.5	1
9	1.5	1.5	1.5	1.5
10	0.5	0.5	0.5	1
11	3.5	3	3.5	5
12	0.5	0.5	0.5	1
13	3	3	3	4.5
14	0.5	0.2	0.5	1
15	0.5	0.3	0.3	2

Table A-6 Presettings of the standard reference level for voltage harmonics

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
16	0.5	0.2	0.2	1
17	2	2	2	4
18	0.5	0.2	0.2	1
19	1.5	1.5	1.5	4
20	0.5	0.2	0.2	1
21	0.5	0.2	0.2	1.75
22	0.5	0.2	0.2	1
23	1.5	1.5	1.5	3.5
24	0.5	0.2	0.2	1
25	1.5	1.5	1.5	3.5
26	Not specified	0.2	0.2	1
27	Not specified	0.2	0.2	1
28	Not specified	0.2	0.2	1
29	Not specified	0.63	0.63	3.08
30	Not specified	0.2	0.2	1
31	Not specified	0.6	0.6	1
32	Not specified	0.2	0.2	1

Table A-6 Presettings of the standard reference level for voltage harmonics

Parameters	EN 50160	IEC 61000 Class 1	IEC 61000 Class 2	IEC 61000 Class 3
33	Not specified	0.2	0.2	1
34	Not specified	0.2	0.2	1
35	Not specified	0.56	0.56	2.1
36	Not specified	0.2	0.2	1
37	Not specified	0.54	0.54	2.73
38	Not specified	0.2	0.2	1
39	Not specified	0.2	0.2	1
40	Not specified	0.2	0.2	1
41 - 51	Not specified	Not specified	Not specified	Not specified

All harmonics (through to the 40th harmonic) must also be included in the THD for the standard EN 50160. However, as this is calculated automatically, this figure (number of harmonics to be taken into account) is not set here.

### A.3.6 Current harmonics

The standards do not contain any specifications for current and power. However, the measuring devices also supply measured data for these characteristics. Especially for the harmonics it would be reasonable to make an analysis of the current. Due to this fact it is possible to evaluate the harmonics of the current of the free definable reference levels.

The same limit values apply as for the voltage harmonics (cf. chapter A.3.5).

### A.3.7 Voltage-related events

The following characteristics are referred to as voltage-related events:

- ❑ Fast voltage changes
- ❑ Voltage dips
- ❑ Short-time interruptions
- ❑ Long-time interruptions
- ❑ Line frequency overvoltage

In order to classify the voltage-related events, limit values referring to the level and length of the event are specified. Some of the limit values distinguish between medium voltage (MV) and low voltage (LV) (cf. table A-1). These specifications can be set for the reference levels EN 50160 medium voltage and EN 50160 low voltage.



Table A-7 Presettings of the characteristic voltage-related events of the standard reference levels

Parameters	Comment	Presetting	
		LV	MV
Limit value of overvoltage to voltage change	Data as percentage value of nominal voltage	110%	110%
Limit value of voltage change to normal range	Data as percentage value of nominal voltage	105%	104%
Limit value of normal range to voltage change	Data as percentage value of nominal voltage	95%	96%
Limit value of voltage change to voltage dip	Data as percentage value of nominal voltage	90	90
Limit value of voltage dip to voltage interruption	Data as percentage value of nominal voltage	1%	1%
Limit value between short and long-time interruptions	Data in seconds	180s	180s

### Frequency

The frequency of voltage-related events specified in the standards are guiding values. According to EN 50160, there can be 10 to 1,000 voltage dips annually. The greater part of the dips must not last longer than 1 second with a depth of > 60%. The IEC standards define compatibility levels for a length of 3 seconds and a depth of 10%.

During statistical evaluation, the frequency of individual classes are determined by voltage-related events (cf. table A-1).

## A.4 Error messages

If you have any questions regarding error messages, please contact the Siemens hotline:

- Phone.: +49 (0)180-524 7000
- Fax: +49 (0)180-524 2471

## References

- /1/ EN 50160, Voltage characteristics of electricity supplied by public distribution systems, USEnglish version, prEN 50160:1993*
- /2/ IEC 1000-2-2 (modified) or EN V 61000-2-2: 1993, Guide to electromagnetic environment for low-frequency line-conducted disturbances and signaling in low voltage public power supply systems.*
- /3/ IEC 1000-2-4 or EN V 61000-2-4: 1994, Electromagnetic compatibility (EMC). Environment. Compatibility levels in industrial plants for low-frequency line-conducted disturbances.*



# Glossary

<b>100% value</b>	Smallest relative deviation from the nominal value that is not exceeded in the reference period.
<b>95% value</b>	Smallest relative deviation from the nominal value which will not be exceeded in 95% of the reference period.
<b>Analysis of power quality</b>	Another name for <b>SICARO PQ</b> .
<b>Asymmetric network</b>	Polyphase system in which not all phases are evenly loaded with consumers.
<b>Averaging time</b>	Multiple of the → base time. Extreme values are produced during the averaging time.
<b>Base time</b>	Time period of time wherein an average value is determined on the basis of the sampling values. These average values are used to produce extreme values within → the averaging time period. The averaging time should be an integer multiple part of the base time.
<b>Browser</b>	Software for displaying HTML files (amongst others).
<b>Continuous recording</b>	Recording of measured data in a defined time reference.
<b>Control box</b>	Box for enabling or disabling functions. Several boxes can be enabled at the same time.
<b>DAKON</b>	Abbreviation for data concentrator. A PC can link up to the data concentrator in order to evaluate measured data and call up data. The data concentrator can pass on commands to other devices linked to it. .
<b>Dialog mask</b>	Part of dialog box for entering data.

<b>Drop-down list box</b>	Box in which entries can be inserted through selection from a drop-down list.
<b>Feeder point</b>	Point in the network to which the quality measuring device is connected. In the case of <b>OSCO P</b> , the feeder point is defined by the network, the station and the feeder.
<b>Flicker</b>	Measurement for voltage fluctuations in low-voltage distribution.
<b>HTML</b>	Hyper Text Markup Language, standard for the exchange of information in the World-Wide Web.
<b>Medium voltage</b>	Voltages of the voltage levels between 1kV und 35kV. Abbreviation: MV.
<b>Navigation window</b>	Part of a dialog box that displays the → parameters as a folder structure. Clicking or double-clicking the structure icon navigates you to the required → dialog mask.
<b>Negative-phase-sequence system</b>	Polyphase system in which phases L1, L2 and L3 are all out-of-phase by 120° in an anticlockwise direction.
<b>Nominal voltage</b>	Voltage used to denote a network. It represents the normal value (as r.m.s. value) of the voltage in this network.
<b>OSCILLOSTORE</b>	<b>SIEMENS</b> fault recorder.
<b>OSCO P</b>	Program system for station management system. Operates with <b>SIEMENS</b> fault recorders ( <b>OSCILLOSTORE</b> and <b>SIMEAS R</b> ); operation with protection equipment is planned.
<b>Parameters</b>	→ reference level, → quality profile, → report template. Parameters define the form and scope of the evaluation and the form of the report and need to be configured before the statistical evaluation of measured data.
<b>Period</b>	Time span during which the measured data of a network are evaluated.
<b>Positive phase-sequence system</b>	Polyphase system in which phases L1, L2 and L3 are all out-of-phase by 120° in a clockwise direction.
<b>Quadbase</b>	Relational database system used by <b>OSCO P</b> where all the data of the connected devices are managed.

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<b>Quality profile</b>	→ Parameter specifying which characteristics of the reference level are to be statistically evaluated and to what degree.
<b>Quality report</b>	Graphical processing of statistical evaluation. The term has two meanings. On the one hand it is a report of the result of a concrete evaluation, on the other hand it is a template or an example for a concrete report.
<b>Reference level</b>	→ Configuration parameter that specifies the values for the statistical evaluation of measuring results. These include limit values, averaging times, frequencies and intervals. Standard reference levels represent the specifications of a standard. While free reference levels are based on a standard, the individual values can be modified.
<b>Report template</b>	→ Configuration parameter that specifies how a statistical evaluation of measured data is to be displayed.
<b>Sicaro PQ</b>	Software for the statistical evaluation of measured data of quality recorders.
<b>SIMEAS Q</b>	<b>SIEMENS</b> power quality recorder.
<b>spq file</b>	<b>SICARO PQ</b> format for saving reports.
<b>Standard parameter set</b>	Factory-set parameter data record.
<b>Statistics module</b>	→ <b>SICARO PQ</b> .
<b>Supply voltage</b>	Voltage at the feeder point. For some statistical evaluations, a phase needs to be used representatively. In the case of voltage changes, all three phases are taken into account.
<b>Symmetric network</b>	Polyphase system wherein all phases are charged equally with loads.
<b>THD</b>	Total harmonic distortion.
<b>Threshold value</b>	Limit value that triggers an action e.g. status indication, warning or disconnection. Several threshold values can be specified for a single measured value.
<b>Transients</b>	Overvoltages caused by electromechanical switching actions.

**UC**                      Abbreviation for utility company.

**Voltage level**            → Nominal voltage.



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| <input type="checkbox"/> Automation  | <input type="checkbox"/> Building services management and air-conditioning technology |
| <input type="checkbox"/> Mining  | <input type="checkbox"/> Heavy machine construction, handling engineering             |
| <input type="checkbox"/> Chemical industry   | <input type="checkbox"/> Pipeline networks  |
| <input type="checkbox"/> Power generation  | <input type="checkbox"/> Ship building, navigation                                    |
| <input type="checkbox"/> Energy distribution, control and instrumentation technology | <input type="checkbox"/> Environmental technology                                     |
| <input type="checkbox"/> Gas, water and sanitary networks                            |   |
| <input type="checkbox"/> Other   |   |

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Title of the manual: SICARO PQ  
Order No. of the manual: E50417-H1176-C119-A2

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