

We take care of it.



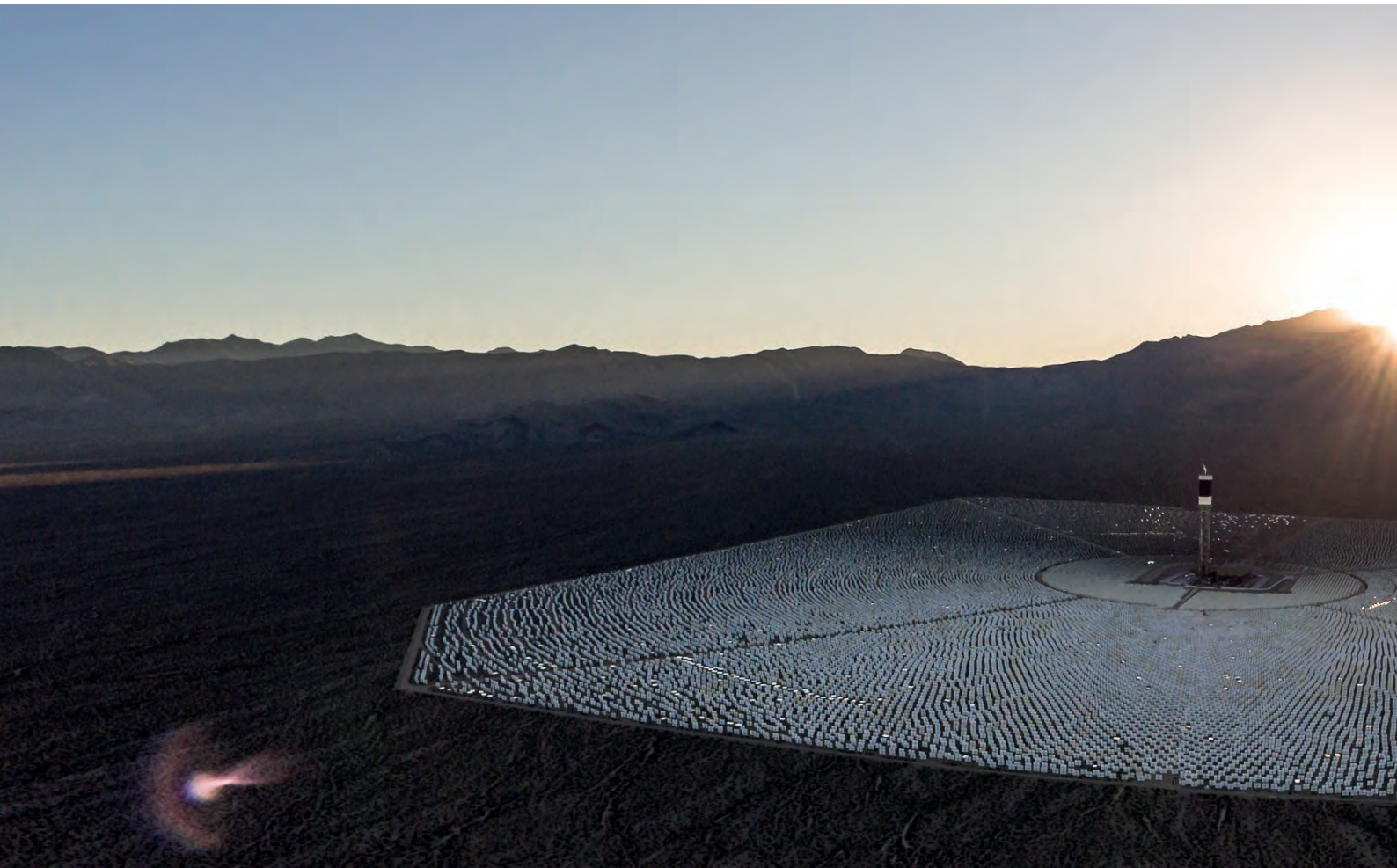
Keeping an eye on power quality

Power quality system with WinPQ visualization software



WinPQ

THE system solution for power quality monitoring, installed fault recorders and energy measurements in high, medium and low voltage grids



Electrical grids are currently undergoing radical change. Active power electronics as used in switching power supplies and inverters are ubiquitous. To achieve CO₂ reduction goals, small, renewable energy generators are being installed everywhere. Big, conventional power plants are disappearing.

Phenomena such as backfeeding, equipment overloads, voltage spikes at feed-in points and asymmetries are part of day-to-day business. This is a problem for highly optimized data centres and industrial controls that are sensitive to short dips in supply, harmonics and transient events. Even the stability of the grid is vulnerable.



The German Federal Court only ruled in 2014 that electricity also falls under the German product liability act. Ergo: Distribution grid operators are liable for damage caused by poor voltage quality.

With the combination of the Class A-certified PQSys family of measuring devices and the fully automated WinPQ server solution, A. Eberle offers a comprehensive voltage quality system that will stand up in court. It enables users to document, evaluate and prove the quality of the voltage at any time. Faults can be detected, the source determined and the cause remedied early.

All of the installed fault recorders and mobile grid analyzers from A. Eberle are supported and can be connected across grid levels, in

large numbers, to an SQL database server. Communication over SCADA protocols, such as IEC 61850, Ethernet, 3G/4G and analogue dial-up modems is possible.

The WinPQ software is at its absolute best when it comes to controlling large amounts of data. Automated reporting assistants automatically explore the database and report only the things you need to see. You can receive standards reports and alerts by email or in standard formats such as Comtrade, PQDiff or as a PDF document on the hard disk. It's that easy!

Our fine-tuned hardware and software solution enables you to keep an eye on the voltage quality at all times.



Fully automated grid monitoring

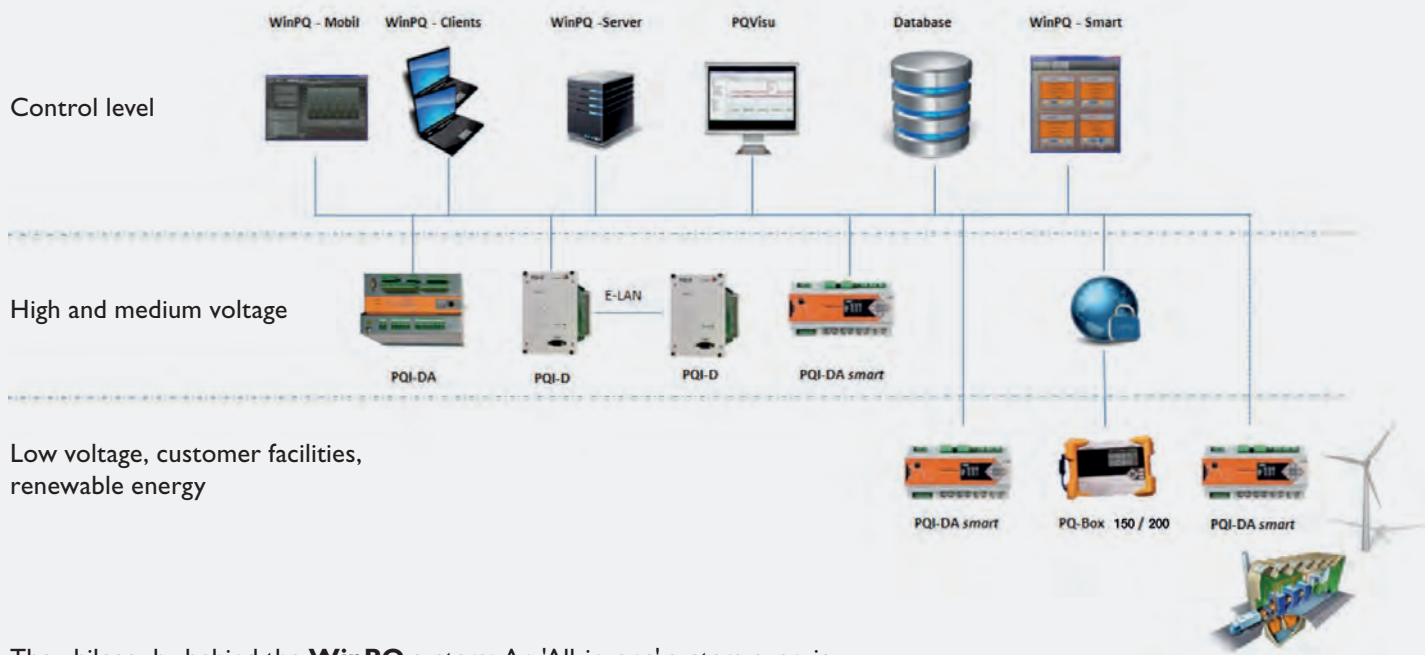
Views

Database management

Data analysis

Device and client management

WinPQ System solution for all installed fault recorders, power quality monitoring devices and mobile grid analyzer by A. Eberle
 Continuous power quality monitoring – from high voltage to the end customer as a system. Intuitive despite a large amount of data.



The philosophy behind the **WinPQ** system: An 'All-in-one' system overview

Keeping an eye on power quality

Unique: Power quality system with WinPQ visualization software

WinPQ database software

The WinPQ client-server software with database is an intelligent system solution that automatically monitors faults and the grid quality in parallel across several measuring devices. Different device versions are available for different requirements and voltage levels. The evaluation software supports all installed A. Eberle fault recorders. TCP/IP, fibre optics, RS-232, 3G, 4G and analogue modems can be used to communicate with the devices.

In addition, all of the data measured by the mobile grid analyzers can be imported into the database and correlated with the data on the installed devices.

The database is generally installed on a server to guarantee it's always running. The database supports any number of concurrent WinPQ clients.

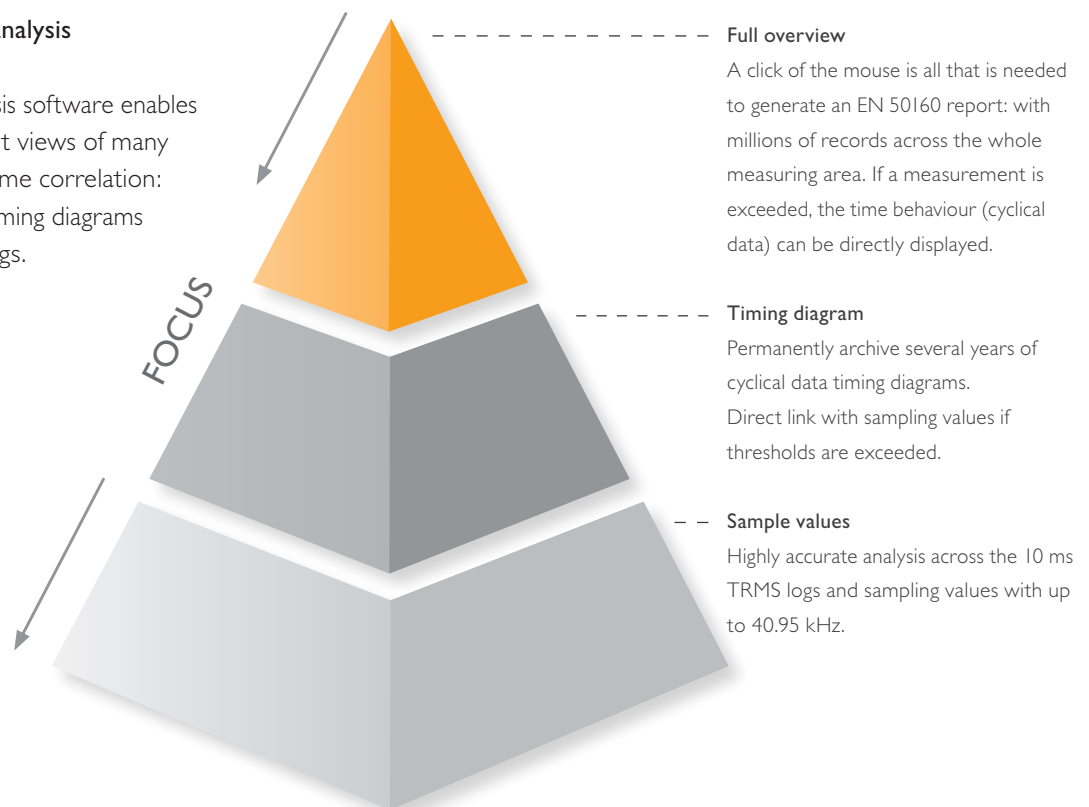
The system's key features include:

- All devices are read concurrently. This assures the system's fast response time.
- Automatic error log reporting and automatic creation of power quality reports, also for the control room.
- User-friendly software that enables you to easily monitor the many devices and large amount of data.

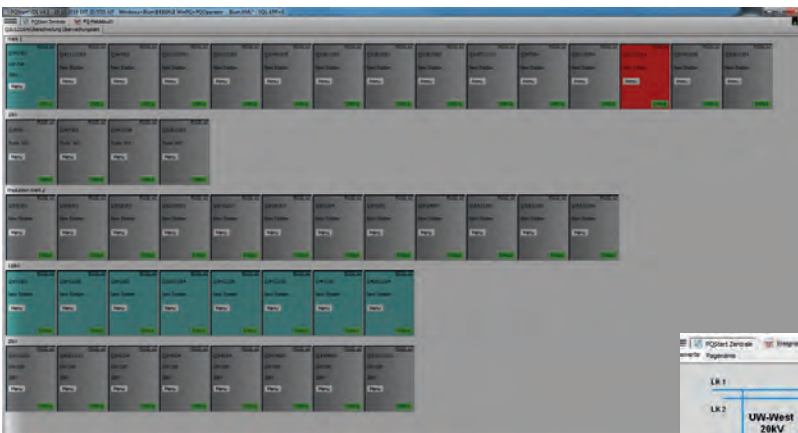
WinPQ can be used with the following databases: **MySQL**, **Maria DB**, **MS SQL** and **Oracle DB**.

The principle: Top-down analysis

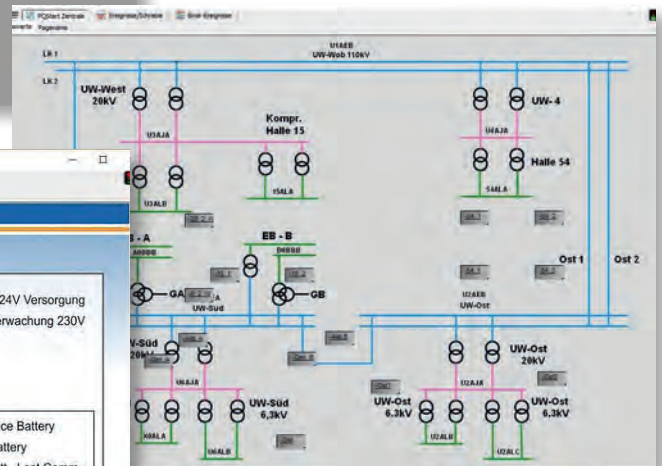
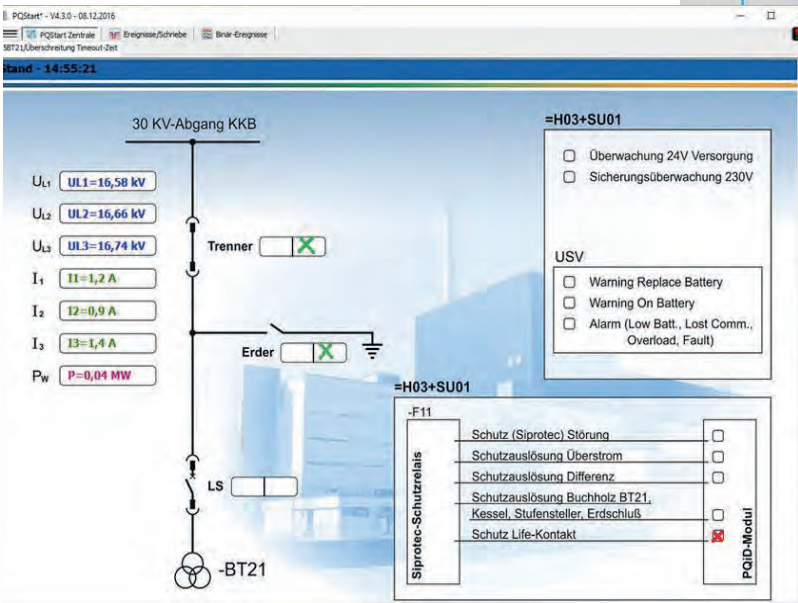
The WinPQ database analysis software enables you to easily create abstract views of many measurands that have no time correlation: from the measured data's timing diagrams to highly accurate error logs.



Displaying measuring points/system overview



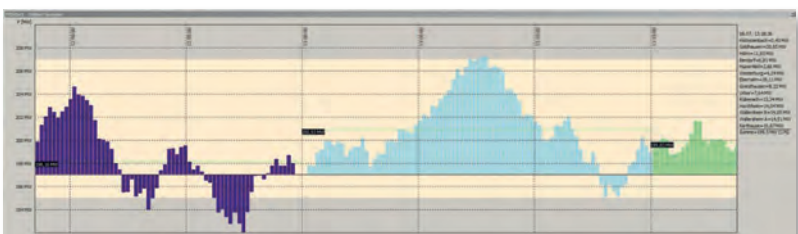
WinPQ offers a number of display options for measuring points. Devices can be arranged in an industry accepted grid plan or several hundred measuring points by voltage level and region. Online measurement data can be displayed directly in the graphic or device tile and configured with threshold monitoring.



If a proprietary grid plan was entered in WinPQ, any number of status messages and measured values can be displayed in the interface in user-definable places.

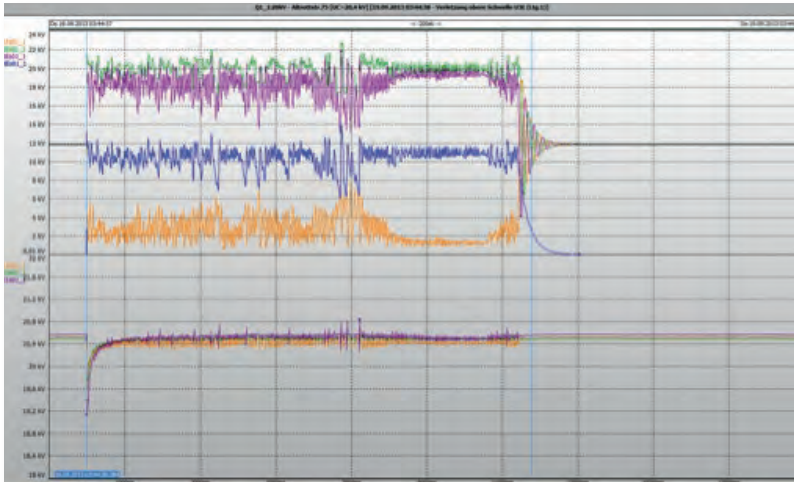
A screenshot of the WinPQ software interface showing a detailed table of measured values for various substations. The table is organized into columns for different substations, including U1 Kabarett, U1 Ecoment, U1 Barock, U1 Rubenbühl, U1 Eppend, U1 Werfächer, U1 Hebel, U1 Eben 10kV, and U1 Eben 20kV. Each column contains multiple rows of data, including voltage levels (e.g., U2=18.8 kV, U3=18.8 kV), current levels (e.g., I1=11.2 A, I2=12.0 A, I3=13.4 A), and power levels (e.g., P=0.04 MW). The table provides a comprehensive overview of the measured values across the entire grid area.

Data can be selected from the many measured values and messages in all of the device tiles.



Other options: Calculate and display an online measurement. This example displays the cumulative load across all substations in one grid area.

Fault recorder

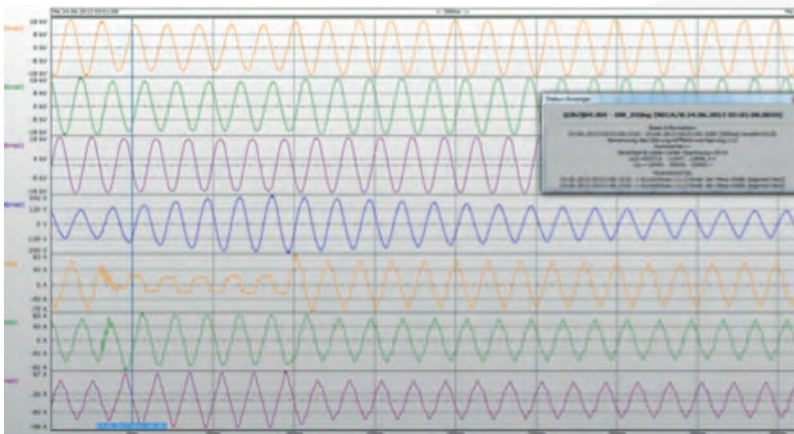


½ period recorder TRMS average values of all voltages (phase-to-phase and phase-to-ground), currents, active power, reactive power, apparent power and frequency

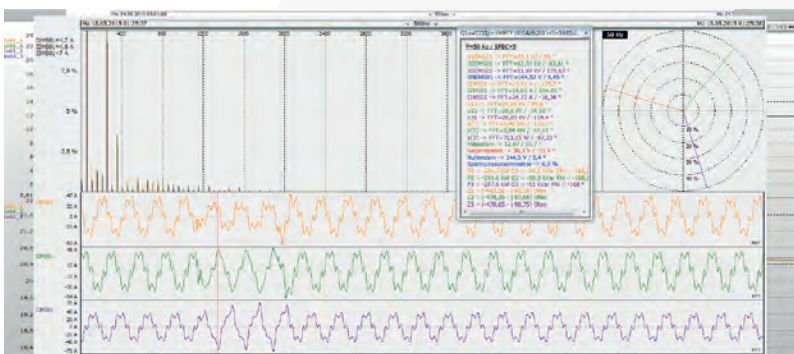
The devices have several fault recorders with different sampling rates with different levels of detail and recording lengths. There is an extensive menu of trigger criteria for recorders. The duration and pre-event time are user definable.

The devices have the capability of adjusting the recording length independently of the fault duration on the grid.

The WinPQ system can display several error logs from different installed and mobile grid analyzers in a diagram. Messages, PQ events and binary signals can also be displayed and used in other calculations and correlations with measuring data.



Oscilloscope recorder with 10 kHz – 40 kHz sampling rate



Extensive analysis options and FFT calculation functions



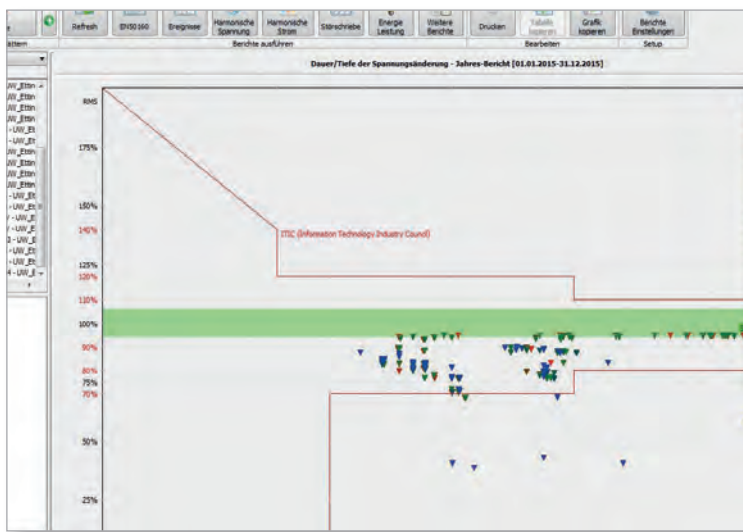
Power quality report and statistics



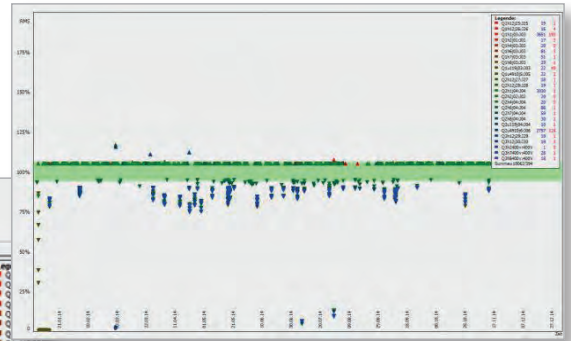
WinPQ offers an extremely wide range of power quality reports and statistics. There are detailed reports per measuring point and overview reports for a group of devices or voltage level or grid area.

ITIC report examples

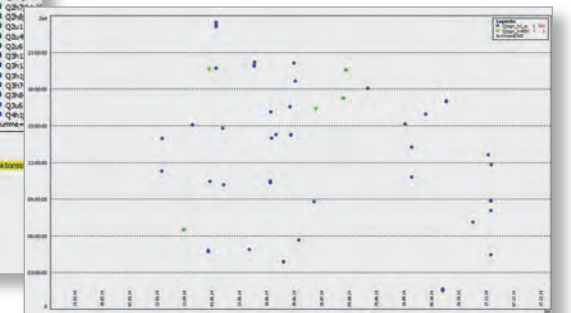
The graphic shows all voltage events in a device group over an arbitrary period of time. The error log is accessed from the event.



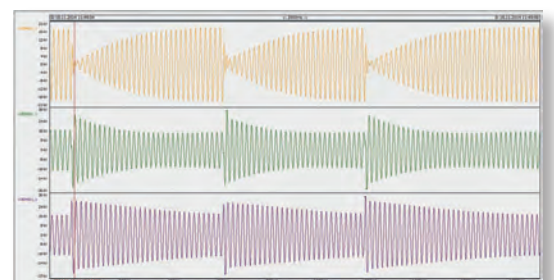
Voltage dips and swells sorted by date and duration



Voltage dips and swells sorted by date and depth

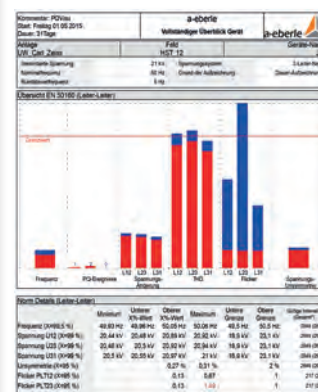
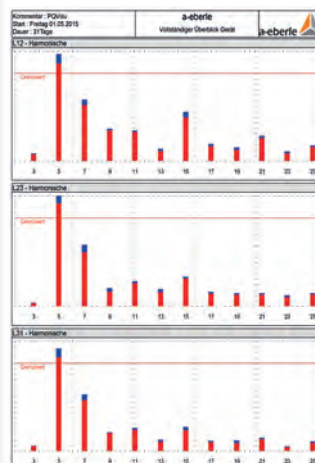
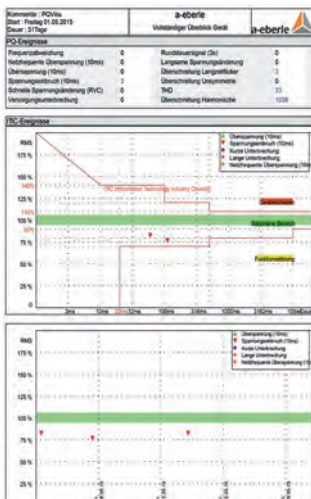


Voltage dips and swells sorted by time and depth



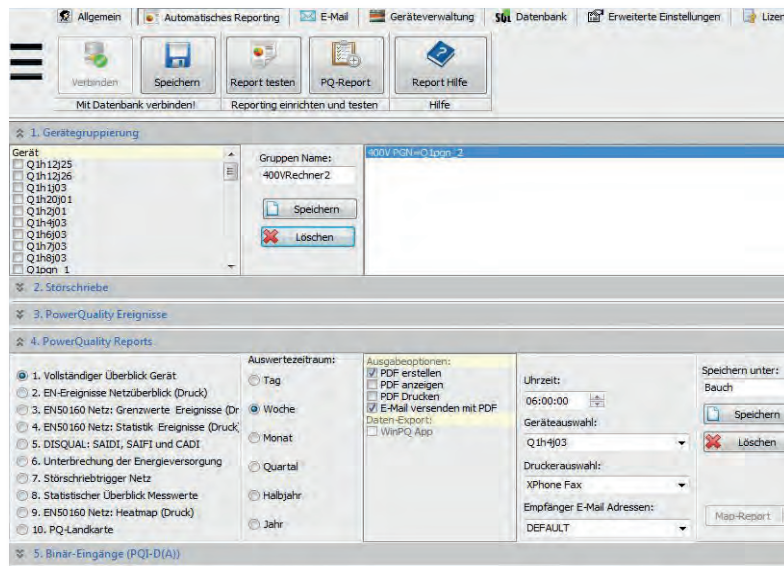
Double-clicking on one of the points opens the corresponding error log

EN 50160 report examples



Parameter		L12 - 95%	L12 - 90%	L23 - 90%	L23 - 80%	L31 - 90%	L31 - 80%
U _{min} (V)	7.80%	3.14%	7.80%	3.14%	7.80%	3.14%	
U _{max} (V)	2.7%	0.27%	0.425%	0.168%	0.168%	0.203%	
U _{avg} (V)	0.1%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{std} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{min} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{max} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{avg} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{std} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{min} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{max} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{avg} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	
U _{std} (V)	0.3%	0.037%	0.226%	0.161%	0.216%	0.176%	

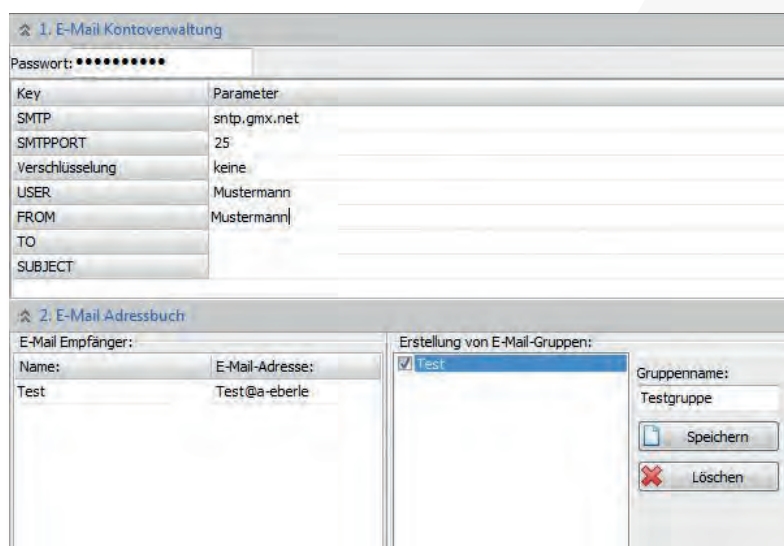
Automatic reporting



The devices automatically send faults to the database as soon as they occur. PDF documents are created automatically and can be sent to email addresses or printers.

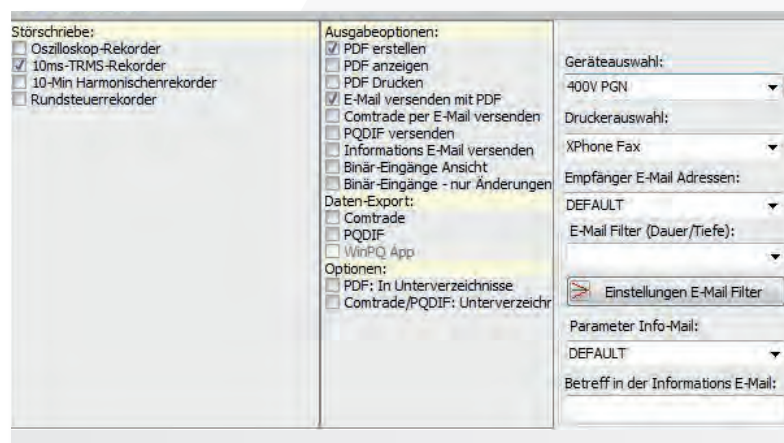
The system automatically archives power quality reports and long-term statistics. 3D graphics help keep track of the many devices in a grid area or voltage level.

Alert management



A separate flow plan can be created for each measuring point: Which fault from which event size should be reported to whom?

Alerts can be reported optically, acoustically or by email and text message. Acknowledge functions, pop-up windows and sound are available to report alerts.



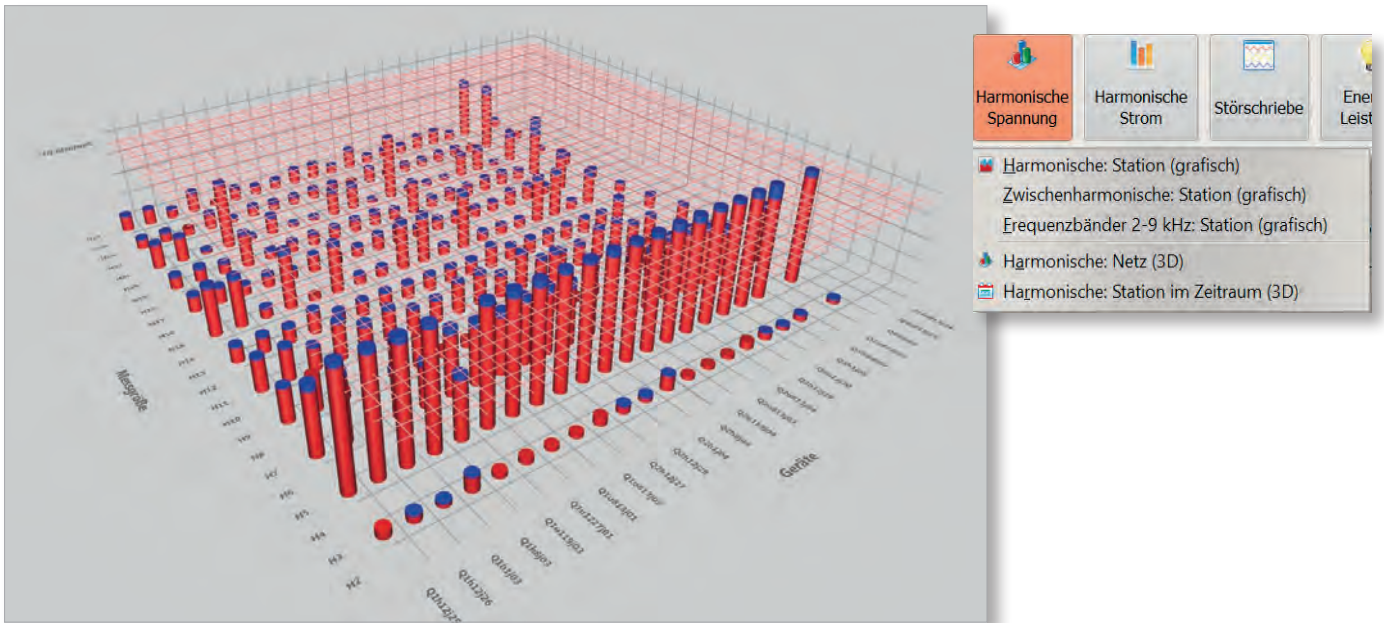
WinPQ

**Keeping an eye on
power quality**

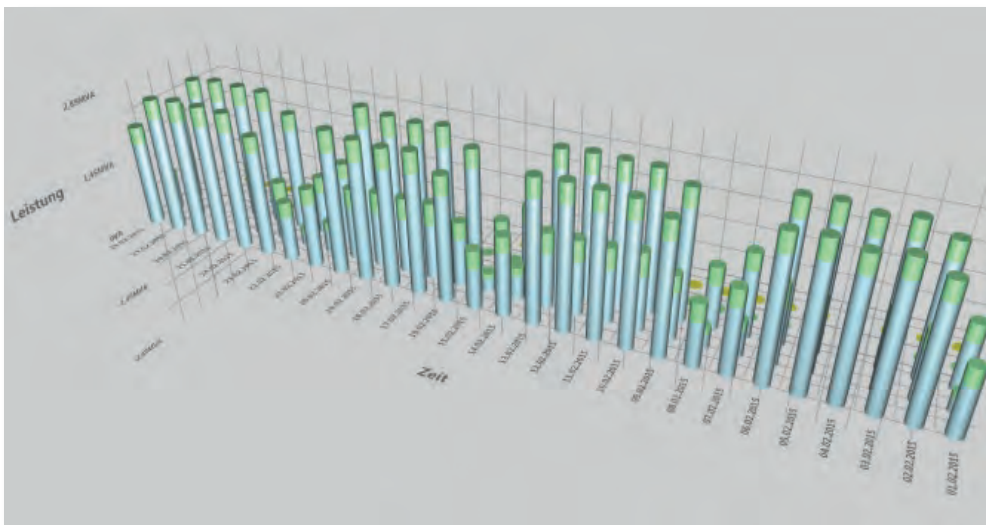




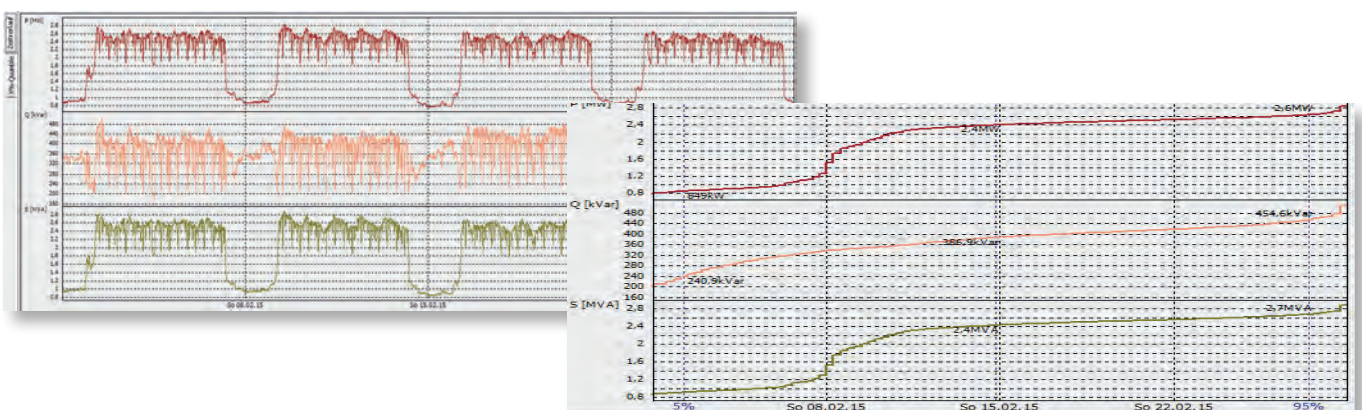
3D and 4D graphics



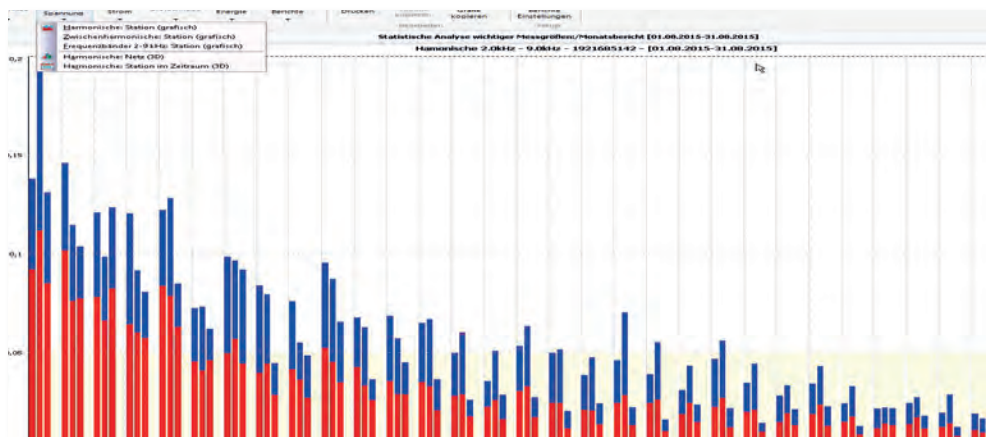
3D and 4D graphics provide an overview of many stations across several measured values



Analysis of the load profiles of several stations across arbitrary periods. Clicking on a bar opens the timing diagram for this situation or the cumulative frequency analysis (see below).

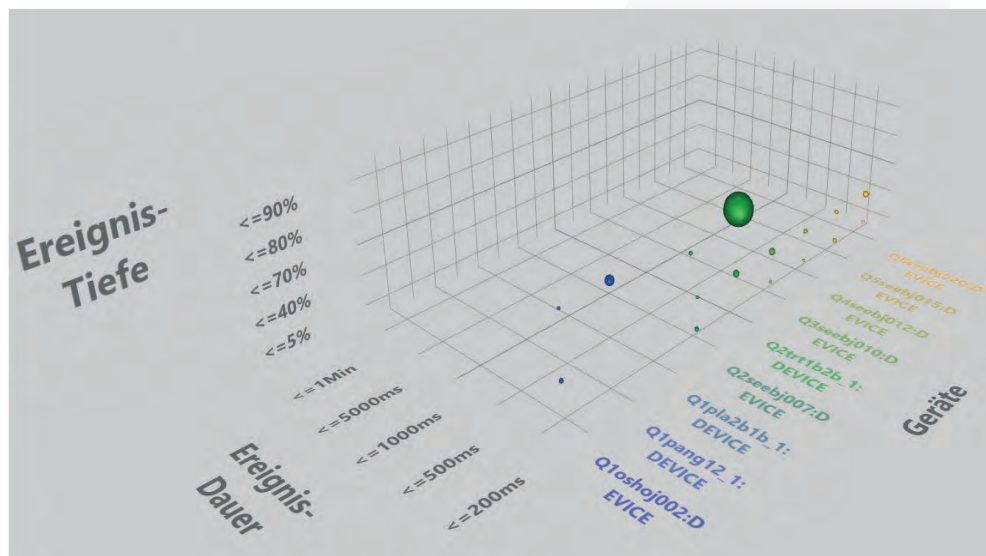


Voltage and current harmonics reports in accordance with IEC 61000-4-7 up to 9 kHz



View of all voltage or current harmonics 2nd to 50th. Harmonics and frequency bands 2 kHz to 9 kHz in accordance with IEC 61000-4-7 is possible. All measured values are displayed with the corresponding threshold for the specified standard.

4D report



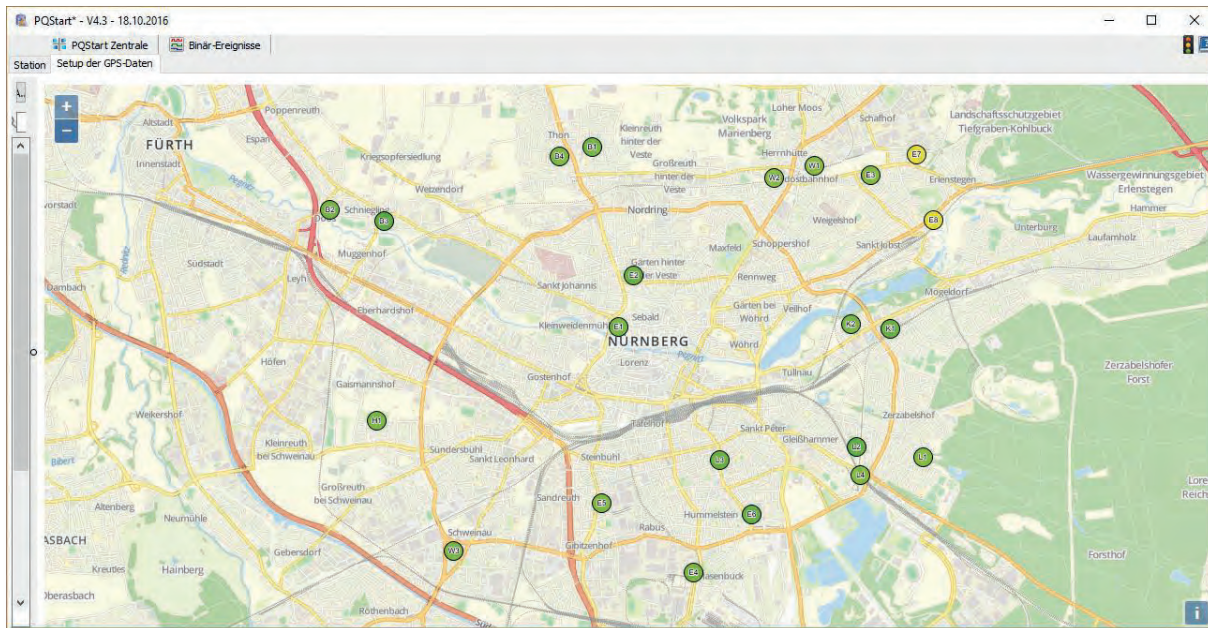
The number of grid events in a voltage level or device group can be displayed over an arbitrary period of time in a four-dimensional overview report.

Gerät	Ereignisse						10-Min-Messgrößen						10-Min-Harmonische																									
	FC	VS	VD	FVC	SI	LI	OV	US	FRQ	UU	U	THD	PLT	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22	H23	H24	H25	
H2J01 - J01																																						
H4J03 - J03																																						
H6J03 - J03																																						
H7J03 - J03																																						
U491J05 - J05																																						
U611J03 - J03																																						
H2J02 - J02																																						
H4J04 - J04																																						
H6J04 - J04																																						
H7J04 - J04																																						
U491J06 - J06																																						
U611J04 - J04																																						
H2400V - 400V																																						
H7400V - 400V																																						
U1112J03 - J03																																						
U611J05 - J05																																						
U813J06 - J06																																						
U1112J04 - J04																																						

Heatmap view: Shows standards violations over a large number of measuring points.



Maps

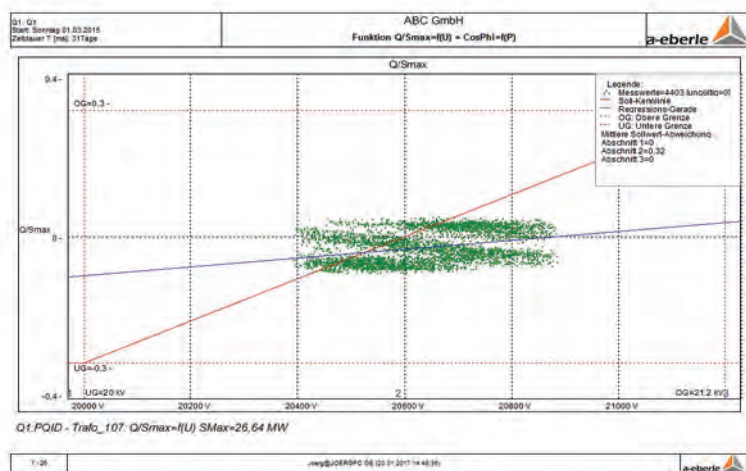


The 'Maps' option displays all of the stations on the map by their geographic coordinates. The maps are available offline. An internet connection is not needed.

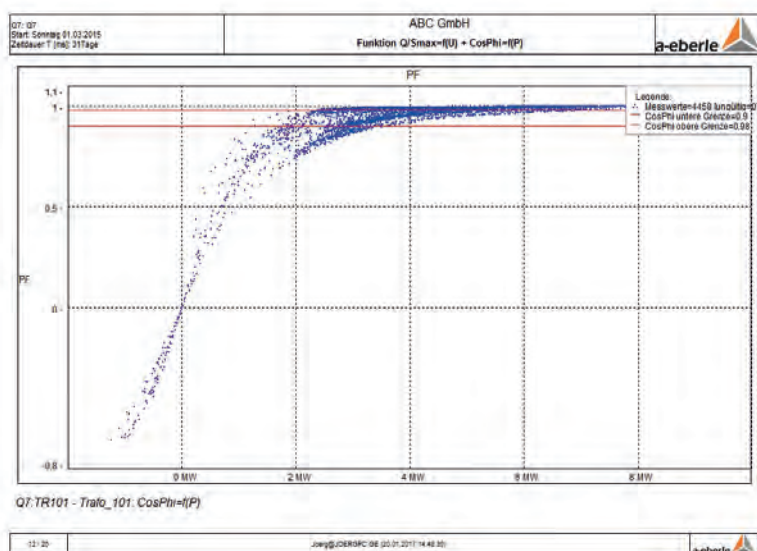


Many of the available measured values can be displayed graphically on the map as coloured bars. The graphics or charts can display the current voltage level, load flow and power quality reserves.

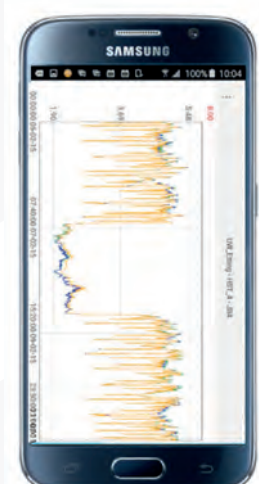
Power-generating systems / CosPhi characteristic for feeder



A target CosPhi can be required for power-generating systems based on the power that is fed-in or sourced. The 'CosPhi characteristic' option in WinPQ can be used to monitor this function and generate a report manually or automatically.



WinPQ App

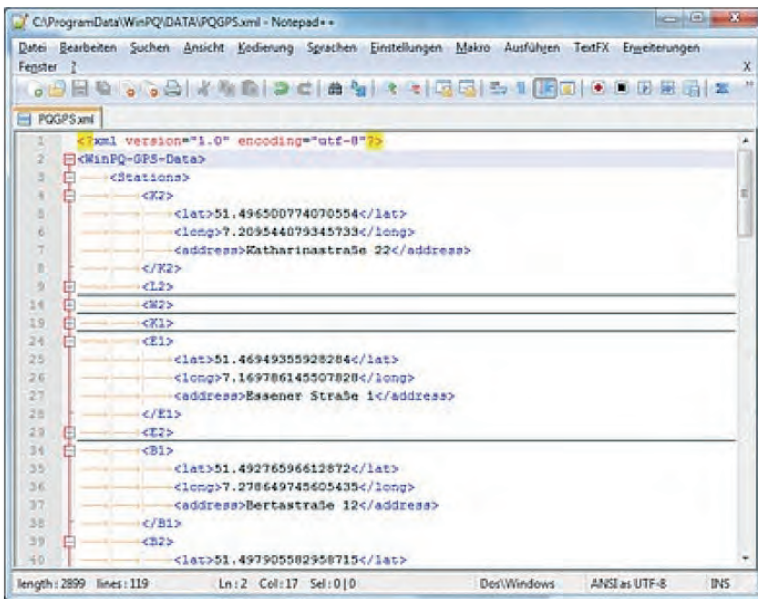


Selected measurement data and error logs can be sent per WinPQ app. These measurement data can be analyzed and zoomed into on a smartphone. The following data are available in the app:

- Oscilloscope images
- ½ interval RMS logs
- Long-term measurement data (load profile, current, voltage, THD, flicker, etc.)
- PQ events

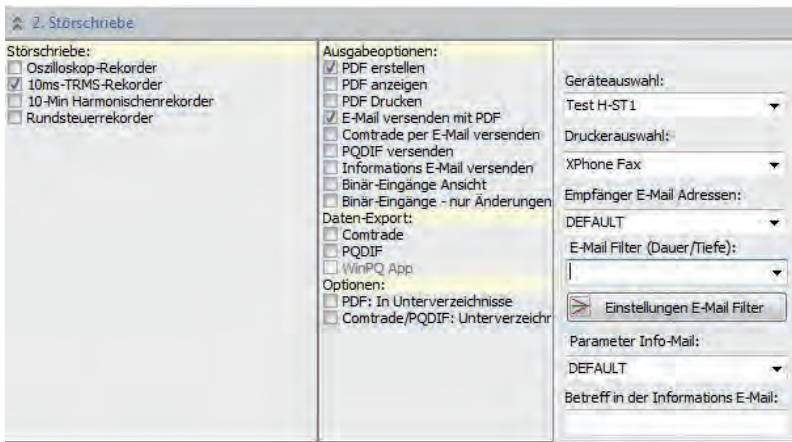


XML data export for Nequal interface

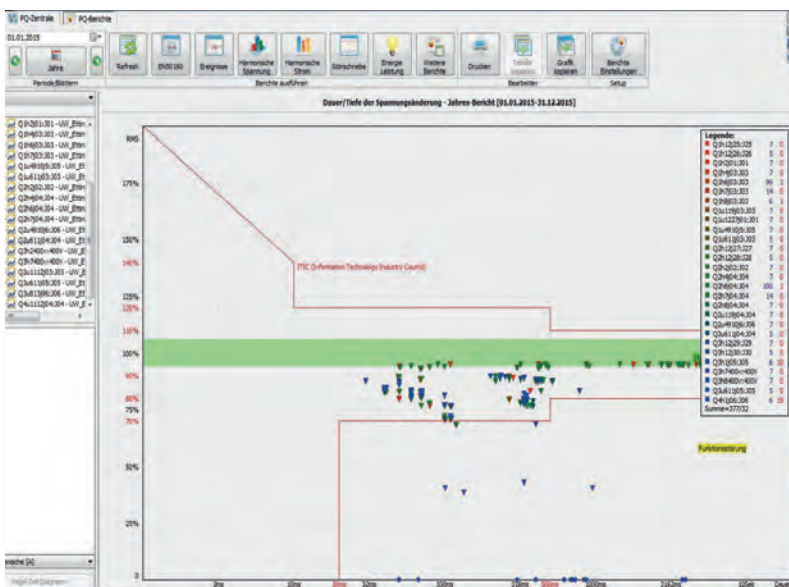


XML data export interface for Switzerland and Austria

Selective email dispatch



The **Selective email dispatch** option enables inbound error logs to be weighted by depth, height and event duration, and then reported and sent by email when the specified threshold is reached. Several weighting levels by duration and depth/height can be configured.



Example: In an industrial plant, equipment fails when the voltage dips to -17 % for a period of 350 ms.

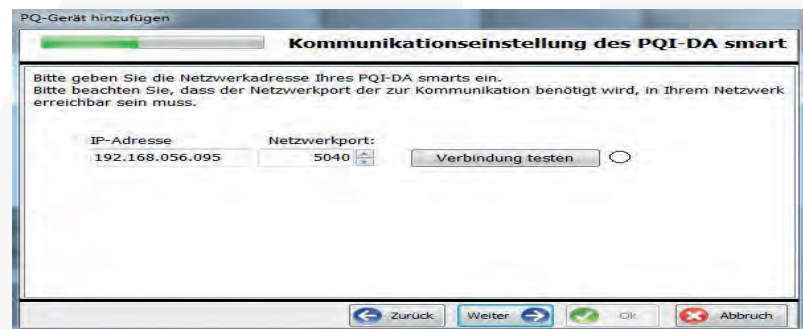
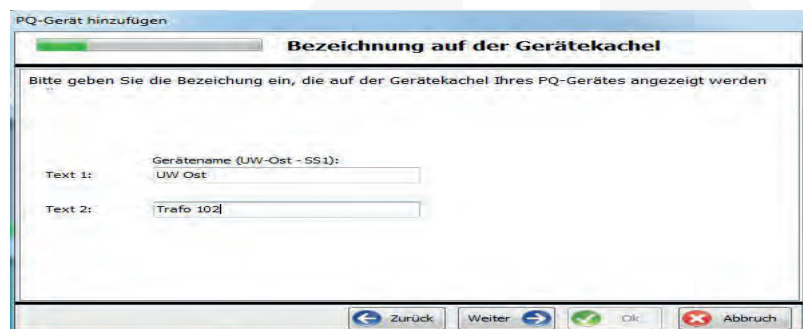
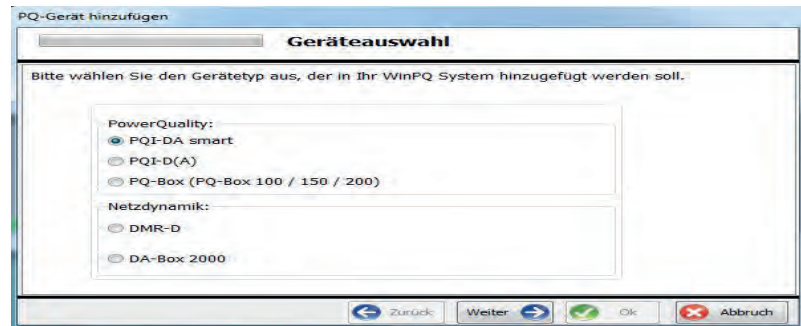
Device configuration

Adding new measuring points has never been so easy. A wizard walks the user through the setup for a new measuring device. All of the background processes needed to install the hardware are also configured automatically.

The software already has pre-defined templates for a high, medium and low-voltage grid, as well as for industrial grids.

The following standards are stored in the software and automatically updated by A. Eberle when necessary:

- EN50160
- IEC61000-2-2
- IEC61000-2-12
- IEC61000-2-4 Class 1, 2, 3
- D-A-CH-CZ Guideline



WinPQ

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System requirements

Program	Purpose	Server/ Client	TCP port
MySQL (mysqld.exe)	Database server	Server	3306
PQRS232Server (PQRS232Server.exe)	RS232 conversion software	Server	1701,1702,...
PQReport, PQVisu, PQStart (PQReport.exe, PQVisu.exe, PQStart.exe)	Read and display MySQL data	Client	3306
PQPara (PQPara.exe)	Communicate with the devices through the PQRS232 server	Client	1701,1702,...
PQManager (PQManager.exe)	Transfer files from the devices to the database	Client	1701,1702,...
WuT-Com	Configure COM server	Client	1111, 8000
PQSmartManager, WinPQSmart (PQSmartManager.exe, WinPQSmartManager.exe)	Access to PQI-D smart devices	Client	5040

WinPQ with database: Recommended system requirements

Operating system: Windows 10/Windows Server 2016
Processor: 4+ cores
RAM: 8 GB

WinPQ with database: Minimum system requirements

Operating system: Windows 7; 8; 10/
Windows Server 2008 - 2016
Processor: at least 2 cores
Storage: 20 GB + 500 MB per station per year (when using standard profiles)
RAM: at least 4 GB

User management/Security BDEW (IT security)

User management is becoming increasingly important in medium and large enterprises. Each user can be assigned specific rights and groups. Pre-defined access permissions can be assigned through the rights. All users, passwords, and rights are stored encrypted in a database.

Database maintenance and backup

A number of fully automated backup and maintenance mechanisms are available for operations running many devices. Automatic backups to external hard drives, deletion of repositories in the database after a certain time. Example: Ripple control recorders are stored in the database for only three months and then automatically deleted.

Adding external devices or components

If additional measurement inputs are needed for temperature, light and messages, external devices can be added to the system solution through Modbus TCP/IP, enabling the system to be easily extended by a number of options.

Exporting measurement data

WinPQ offers the following export formats for the manual or automatic export of data:
PQDIF • COMTRADE • XML • TXT

WinPQ software versions

WinPQ up to 2 measuring devices MySQL	900.9080
WinPQ up to 2 measuring devices MariaDB	900.9080.10
WinPQ up to 10 measuring devices MySQL	900.9071
WinPQ up to 10 measuring devices MariaDB	900.9071.10
WinPQ up to 100 PQI-D MySQL	900.9079
WinPQ up to 100 PQI-D MariaDB	900.9079.10
WinPQ unlimited number of measuring devices MySQL	900.9077
WinPQ corporate licence MySQL – unlimited number of devices and users	900.9088
WinPQ extension from 2 to 10 measuring devices	900.9072
WinPQ extension from 2 to unlimited number of measuring devices	900.9063
WinPQ extension from 10 to unlimited number of measuring devices	900.9068
WinPQ extension from 10 to corporate licence	900.9069
WinPQ extension from 255 to corporate licence	900.9067
WinPQ extension by another 3 PC clients	900.9065
Software options through licence code	
Power-generating systems (CosPhi characteristic for each plant)	900.9075
Nequal export interface (Switzerland/Austria)	900.9076
Report extension pack (energy/power/3D/4D charts)	900.78.01
Android app for WinPQ	900.78.02
COMTRADE data import pack (import data from third-party systems)	900.78.03
ZFA pack (remote counter reading and evaluation in WinPQ)	900.78.04
Fault-dependent mail dispatch of error logs	900.78.05
Maps – 2D and 3D maps of Germany	900.9052.01
Maps – 2D and 3D maps of Austria	900.9052.02
Maps – 2D and 3D maps of Switzerland	900.9052.03
Maps – 2D and 3D customer-specific maps	900.9052.99
Maintenance/updates	
WinPQ update with mSQL database update	900.9062
WinPQ update without MySQL database update	900.9064
MySQL versions - database update for WinPQ	900.9085
Service contract, BDEW Whitepaper for WinPQ, mSQL database, firmware	900.9086



WinPQ

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A. Eberle offers a variety of installed and mobile fault recorders and grid analyzers.



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