SIEMENS
Ingenuity for life

Power quality in power supply systems

Higher system availability enhances competitiveness

Maintaining a high-quality power supply poses challenges for energy providers.
A reliable electrical power supply system is the very backbone of our society. Today, the focus is not only on ensuring the availability of power, but increasingly also on the quality. The growing use of power electronics and frequency converters – due to the rising share of renewable energy sources in the power feed-in mix – is diminishing the voltage quality. Considering the far-reaching consequences this can have, problems of this nature are unacceptable. The increasingly competitive market and the wide-ranging demand for reducing environmental impacts, increased efficiency, and lower costs pose additional challenges for energy providers.

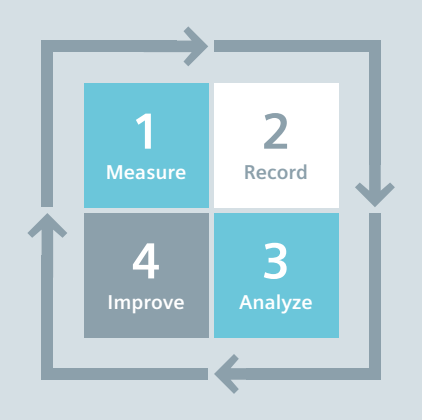
Understand the problems – take action
Understanding the problems that can arise from voltage fluctuations is the first step toward developing standards and solutions.

Power quality (PQ) monitoring can help detect fault phenomena early and identify the cause, leading to proactive initiation of countermeasures. Examples of such phenomena include voltage events such as dips, interruptions, and overvoltage conditions as well as flicker, asymmetries, harmonics, and so-called supraharmonics in the 2- to 150-kHz range, which can be caused by inverters in modern power generation systems.

Broad-scale grid quality monitoring of specified criteria is essential to ensure the transparency that is needed to enable rapid intervention. Such criteria are stipulated, for example, in the European standard EN 50160 on voltage characteristics in public distribution grids. But measured data that are outside the defined limit values must also be recorded and saved. This is the only way to achieve meaningful, comprehensive analysis of power quality.

Siemens Power Quality and Measurement solutions for power providers
Siemens offers you a complete, proven portfolio of power quality solutions developed and certified to current codes and standards. These seamlessly measure and document the continuity of the power supply, enabling you to foresee potential problems and initiate timely countermeasures.

With the SICAM product family from Siemens, the continuous measurement of voltage quality and thus a higher supply quality is no longer a challenge. Ideally, measurement begins at the time that the system is turned over to customers and at critical system interfaces, using our Class-A devices SICAM Q100 or SICAM Q200. For measuring campaigns, our SICAM P855 is also recommended – a Class-S device developed in accordance with IEC Standard 61000-4-30. Our SICAM PQS / SICAM PQ Analyzer software products assess the archived measured PQ data and fault records, thereby significantly enhancing the transparency of the power supply and facilitating identification and elimination of grid faults and failures.



Process for improving the quality of electric power supply

Our PQ systems are compliant with the following international PQ standards:

- IEC 61000-4-30 defines the measurement techniques, accuracy requirements, and interpretation of grid quality parameters for Class-A and Class-S devices.
- IEC 62586-2 defines the functional tests and measuring uncertainty for power quality instruments (PQI).
- EN 50160 specifies how the essential characteristics of grid voltage are to be evaluated.

* Source: Leonardo Energy, www.leonardo-energy.org

siemens.com/powerquality

The SICAM product family

- IEC 61850 specifies how the collected data and information are to be forwarded.
- The data formats are standardized for fault records in the form of IEEE 1159 (PQDif) and COMTRADE.

Benefits for power providers and their customers
PQ monitoring with SICAM Power Quality and Measurement:

- Provides maximum transparency throughout the distribution grid, thus delivering important information to the grid operator as well as its customers. When procuring system components, for example, this information helps ensure adequate dimensioning for immunity to interference and faults.
- Contributes to identifying potentials for energy saving.
- Helps operators prioritize their investments and thus invest in a targeted manner.

SICAM P855

Device to record, display, and analyze electrical variables in accordance with IEC 61000-4-30: **Class S**, EN 50160

SICAM Q100

Device to record, display and analyze electrical variables in accordance with IEC 61000-4-30: **Class A**, EN 50160

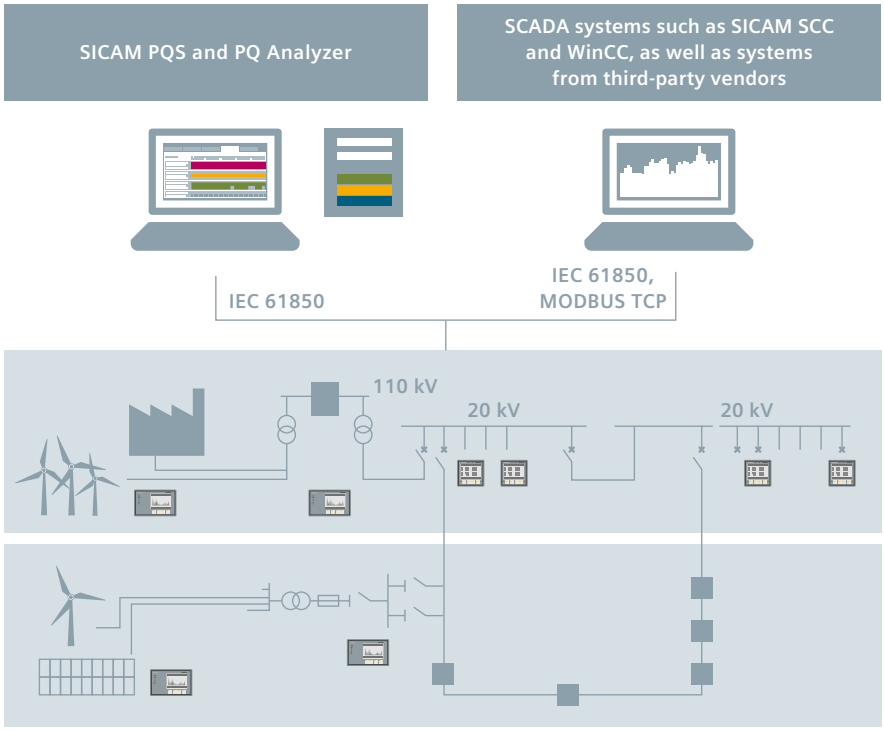
SICAM Q200

Device to record, display, and analyze electrical variables in accordance with IEC 61000-4-30: **Class A**, EN 50160, recording and evaluation of high-frequency disruptions (2–150 kHz) and high-resolution transients

SICAM PQS / SICAM PQ Analyzer
Software to evaluate archived PQ measurement data and fault records – makes the job of rectifying power network faults easier and faster

- Enables simpler and more efficient predictive maintenance plans for grid systems.
- Increases power availability and voltage quality every day, around the clock, to improve overall performance and achieve greater customer satisfaction.
- Promotes higher energy efficiency while decreasing CO_2 emissions by identifying optimization measures, thus reducing costs and environmental impact.

Siemens supports your efforts to sustainably integrate renewable energy sources in the power grid.



Published by
Siemens Industry, Inc.

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Article No.: EMDG-B10116-4AUS
Printed in Germany
HL 16122552 WS 01170.5