



SIMEAS Q80 quality recorder:
Voltage quality starts with measurement.

Answers for energy.

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Energy with quality – crucial for utilities and for industry



A reliable supply of electrical power is the backbone of our modern society. The focus today, however, is not just on the availability of energy but, to an increasing extent, also its quality. The increasing use of power electronic devices creates power quality problems. At the same time, customers are increasingly aware of power anomalies, and that poor voltage quality can lead to outages, production losses and high follow-up costs.

So whether you're a power supplier or operator of an industrial plant – it's clear that this is an issue that affects you.

In the utility sector: Voltage quality offers a competitive advantage

Voltage quality is becoming a decisive factor for many reasons – including rising competitive pressure, increased customer requirements, as well as the constant need to reduce costs and lower prices.

This quality begins with measurement. It's important to identify fault phenomena such as harmonics, undervoltages, flickering, and asymmetries in a timely manner and to pinpoint them – so that you can act fast when necessary and even be proactive.

In industry: Voltage quality protects assets

On the one hand, "good power quality" electricity with a consistent voltage is necessary in the operation of plants and processes in order to guarantee continuously high quality. In this case, measurements help verify the quality of the energy procured.

On the other hand, industrial production can cause perturbations in the electricity supply system with far-reaching consequences – including for the plant where they originate. In this case, clear verification helps to show that the problem was not in your company and helps to identify and solve it as well.

SIMEAS Q80 from Siemens: Voltage quality starts with measurement

You need to detect any problems that arise at an early stage – and be able to react correctly by taking specific actions. The basis for this is reliable recording and evaluation of the mains voltage according to generally recognized quality criteria. With SIMEAS Q80, Siemens provides the foundation for quality measurements so that the entire chain is monitored – from the power generator to the consumer.

As a provider of solutions for monitoring the quality of the electricity supply system, Siemens delivers more than just a snapshot display of a fault or anomaly.



Power quality throughout the entire energy conversion chain

Power quality measurement taken at the point of connection address the aspect of voltage performance by describing the quality of all system individual interfaces. Such criteria may be expressed in the form of so-called voltage characteristics, and can be defined as Gridcode that apply to the network interfaces, such as EN 50160.



SIMEAS Q80 is a complete recorder, providing full power quality functionalities as well as fault recorder functionality. It offers the largest local data storage capacity on the market – so you won't miss a thing!

SIMEAS Q80: Measuring voltage to ensure quality

Always on the safe side – no matter what criteria are applied

With SIMEAS Q80, the quality of the power supply system can be monitored across the board. This is based on the quality criteria defined in the European electricity supply system quality standard EN 50160 or other assessment criteria. Moreover, data that are above or below the defined threshold values are stored and can thus be used for a meaningful overall analysis.

In addition, SIMEAS Q80 also meets the standards of accuracy for a metering device, as required by standard IEC 61000-4-30-class A.

Proactive measures – for more reliability in your power supply network

Proactive measurement against interference: SIMEAS Q80 measuring devices are used wherever professional quality evaluation is needed in order to trace faults immediately, at all voltage levels.

SIMEAS Q80 delivers an informative profile of the supply system quality at the individual electrical system interfaces, that helps on the identification of sources of the disturbances. Companies with demand for high voltage quality can rely on verified incoming supply as well as early indications of faults. Another application area is integration of monitoring of regenerative forms of energy, for example when feeding wind or solar power into the grid.

Simple to use – from configuration to start-up

SIMEAS Q80 measuring devices are installed at the individual measuring points to monitor the supply system quality. Through a communication link (Ethernet or digital or analog modem), the devices are connected to a central processor for evaluation of their measurements. The device settings can be entered and viewed from this PC. This is the basis for the actual supply system quality analyses and reports, using the SIMEAS Q80 Manager program.

This program, which is based on Microsoft Windows, is intuitive and simple to use.

Generally speaking, start-up requires only a few steps and little effort – regardless of whether it is a single device or a system with several devices for monitoring the quality of the supply system.

Quality that can be seen – at all measuring points

The basis for verifying quality is a simple comparison of the threshold values: Every SIMEAS Q80 device delivers numerous measured values. These are automatically compared with the corresponding threshold values, according to the selected criteria (e.g. EN 50160), evaluated, clearly reported in tables and graphics and documented.

The reports themselves can be adapted to meet a user's specific requirements. This enables a fast general overview of the system quality at the individual measuring points.

Quality in all functions – from measurement to the report

SIMEAS Q80 is a user-friendly solution in every respect, offering a wide range of functions – from precise measuring data recording to automatic reporting:

- Display of measured data: voltage, current, power, frequency
- Detection of unbalanced system loads
- Detection of harmonic and intermediary harmonic oscillations
- Flicker monitoring
- Detection and monitoring of supply interruptions
- Analysis of main voltage signals
- Power flow direction
- Automatic notification in case of a fault – via e-mail, SMS
- Reporting



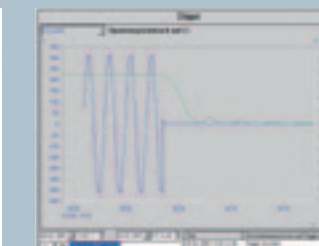
Parameterization

The SIMEAS Q80 Manager software has been designed with a user interface that has the look and functionality of Windows Explorer. Navigation is via the menu, with individual functionalities listed on the left-hand side in the Explorer view. This guarantees simple, intuitive use.



Trigger parameterization

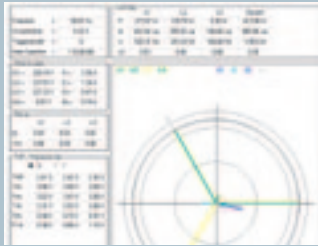
All available measurement quantities are parameterized clearly. The selection of the display of the particular trigger is activated by clicking on the box in the column labeled Trigger type.



Triggers

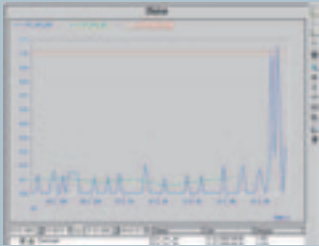
Triggers are used in SIMEAS Q80 solely for recording the momentary value at a sampling rate of 10 kHz.

SIMEAS Q80 Manager – a tool for multiple applications: parameterization, evaluation, analysis and reporting.



Evaluation

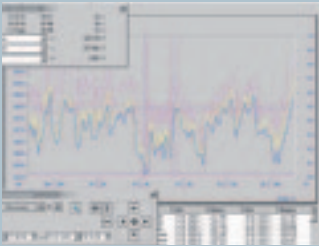
Various measurement values can be displayed in the evaluation. The pointer diagram shows the angle between the phases. The relationship of the angles indicates asymmetry.



Flicker measurement data list

A flicker measurement data list indicates, for example

- Long-term flicker
- Short-term flicker
- Momentary values



R.M.S. values through continuous monitoring

Rapid changes in the R.M.S. voltage and current values are recorded with the characteristic curves.



Analysis

The results of parameterization and evaluation are summarized and depicted in the power quality report. Using the complete overview of the measurement results, it is easy to immediately see where, for example, threshold limits have been exceeded.



Quality means reliability – advantages of using SIMEAS Q80

Greater reliability:
At an early stage, you are able to detect where critical states are developing and arrive at the right conclusions through trend analysis.

Reduced risk:
Unambiguous measurement results provide the basis for taking appropriate steps. Thus, inadequate supply quality can be identified – and the risk of damage to the electricity supply system and production outages can be significantly reduced.

Higher quality:
By taking specific action in case of problems with the supply system or recurring interference, supply system quality and customer satisfaction are considerably improved.

Ready for Smart Grids:
Providing state-of-the-art power quality is one of the main challenges in a system

view of the modern grid. Hence power quality measurement is a mandatory condition requirement.

Less time expenditure:
Automatic reporting means considerably faster and easier assessment and analysis of the quality of the supply system.

Greater legal certainty:
Quality documentation of the supply system based on the appropriate criteria, in order to be prepared for any cases where doubt might arise – whether as a utility or the operator of an industrial plant.

Responsible action:
Better supply system quality also means lower system losses and consequently a reduction in CO₂ emissions along the energy value chain. This guarantees responsible actions for people and the environment.

Siemens – integrated solutions for power supply

As an integrated solutions provider along the entire power supply value chain, Siemens offers a harmonized range of products and solutions from a single source – from power generation to “smart metering.” Together with our customers, we actively promote the development of power supply networks that lead to more intelligence, transparency, decentralization, and proactive control.

The role of SIMEAS Q80 in this is to permanently monitor and analyze the quality of the electricity supply system, acting as an important module for a reliable and highly available system.

Because Siemens is a large, globally operating company, our customers are always on the safe side – whether they’re looking for specific innovations, professional consulting, long-term partnership, or local proximity.

Technical features	
Power supply	10 to 60 VDC
Power consumption	< 12 W
Input voltage	4 voltage inputs
Input voltage range	±1,000 V eff
Sampling rate	10 kHz
Accuracy	< 0.1 % of reading
Input current	4 current inputs
Input current range	1 A/5 A
Sampling rate	10 kHz
Accuracy	< 0.1 % of measuring
Digital output	4 outputs (up to 230 V R.M.S./350 VDC)
Digital input	4 inputs (up to 230 V R.M.S./350 VDC)
Communications interfaces	Ethernet (TCP/IP), modem
External synchronization	GPS/DCF 77 real-time clock for synchronization with absolute time
Memory capacity	2 GB CompactFlash card (up to 16 GB upgradeable)
Measurement standards	IEC 61000-4-30-class A
	IEC 61000-4-15
	IEC 61000-4-7
Standards for voltage quality analysis	Voltage quality in accordance with EN 50160 or according to individually defined criteria
Voltage, current	R.M.S. values after every half period
	Curve plots (reduced half-period R.M.S. values)
Flicker	Short-term (Pst), long-term (Plt) and momentary values (Pf5)
Frequency	40 – 60 Hz (50 Hz) and 50 – 70Hz (60 Hz)
Harmonics	Voltage, current up to 50th harmonic, THD
Intermediate harmonics	Up to 10 frequencies (5 ... 3,000 Hz, resolution 5 Hz)
Symmetry	Zero/positive/negative phase-sequence system/asymmetry
Power	1-, 2-, 3-phase, total (active, apparent, reactive power)
Phase angle	< 1° up to 2.5 kHz
Trigger functionality	For voltage and current: r.m.s. trigger, curve form trigger, signal frequency trigger
Voltage events	Overvoltage, voltage dips, interruptions, fast voltage change, slow voltage change
Ride-through time	≤ 1 second



Voltage quality and reliability: the most important criteria

- Constant waveform
- Constant frequency
- Symmetry
- Constant mean values over a long period
- No impairment due to load changes and load peaks
- Reliable supply whenever electricity is needed

Typical supply system phenomena that impair voltage quality

- Interruptions of the power supply
- Voltage dips
- Harmonics
- Transients
- Asymmetries
- Variation from rated frequency
- Flicker

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Power Distribution Division
Order No. E50001-G720-A133-V1-4A00
Printed in Germany
Dispo 06200
GB 090340 61/22165 WS 07091.0

Printed on elementary chlorine-free bleached paper.

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