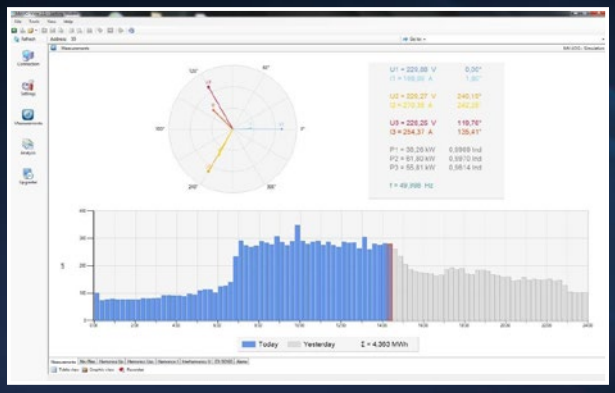
GOSSEN METRAWATT

Safety through Competence

MAVOLOG Pro

PQ-ANALYZER | CLASS A



Class A instrument per EN 61000-4-30 (edition 2)

- Excellent measuring accuracy (0.1%) for electrical quantities

Automatic evaluation of measurement results and report generation in accordance with EN 50160

- Examination of supply voltage limit values
- Substantiation for network service providers and customers

Active PQ management

- Detection of disturbances
- Acquisition of harmonics and voltage anomalies

Energy management

- Analysis of load characteristics and energy flow patterns

Mains Quality

Getting a Handle on Power Quality

The MAVO**LOG** | PRO is suitable for continuous monitoring of power quality at the utilities level as well as the transmission and distribution level, all the way down to the consumer level which is affected by losses in quality to a greater extent than the others. The more information is available concerning voltage quality, the more effectively problems, damage and malfunctions in production can be avoided. On the one hand, the MAVO**LOG** | PRO makes it possible to analyze applications data on the basis of applicable standards and, on the other hand, the instrument provides all of the functions required for industrial use. The measuring and evaluation standards used by the MAVO**LOG** | PRO correspond to IEC/EN 61000-4-30 international and European measuring standards, and to EN 50160:2011 with regard to data analysis. For subsequent analysis within the context of data from other measuring points, measured values and reports can be stored to internal memory at the MAVO**LOG** | PRO in order to reliably visualize complex systems on the basis of a multitude of data. Correlation of the measurements to various measuring locations necessitates highly accurate real-time clocks. The MAVO**LOG** | PRO offers various synchronization procedures to this end (NTP, GPS). All measured values, reports and alarms can be saved to internal memory and transferred at any time to memory cards, or read out via communications interfaces.

Main Features:

4 current and 4 voltage measurement inputs with auto-ranging
- 12.5 A and 1000 V RMS

Frequency range: 16 to 400 Hz
- Can be used in railway, mains supply and onboard electrical systems

High resolution
- Continuous sampling of voltage ad current measurement inputs at 32 kHz per channel

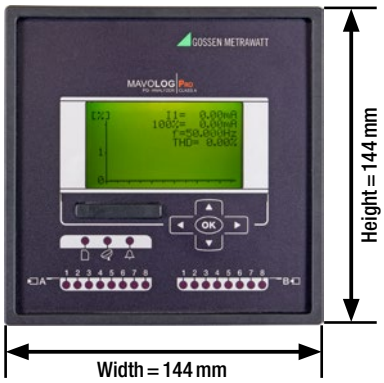
Up to 20 additional inputs and outputs
- 2 analog inputs – e.g. for temperature, direct sunlight and wind speed
- 2 analog outputs – for selectable measured quantities
- 8 digital inputs – e.g. for switching statuses
- 8 digital outputs – e.g. for rate meter pulses and masked alarms

Spectral analysis in accordance with EN 61000-4-7
- Up to the 63rd harmonic
- Acquisition of 10 user-defined sub-harmonics

Communications interfaces and protocols
- Ethernet, USB (type B), RS 232 / RS 485; TCP/IP, Modbus and DNP3

Extended flicker measurement per EN 61000-4-15
- For various voltage levels

Front Panel



Range of Applications:

Power analysis in low, medium and high-voltage systems
- Acquisition of energy flow patterns
- Ascertainment of current consumption
- Transparence for energy costs with assignment to cost centers
- Avoidance of peak loads

Protection and monitoring function for machines, systems and electrical installations
- Monitoring by means of numerous alarms / shutdown of consuming devices in case of overload

Monitoring analysis and recording of relevant mains quantities
- Ascertainment of more than 200 different mains quantities
- Acquisition of all measured voltage quantities per IEC/EN 61000-4-30 (class A)
- Evaluation of measurement data per EN 50160 (mains quality standard)

Clarification of disturbances
- Fast reaction to events

Minimization of the risk of failure and downtime
- By means of continuous monitoring

Energy cost management
- Potential savings thanks to detection of reactive power generators and power guzzlers

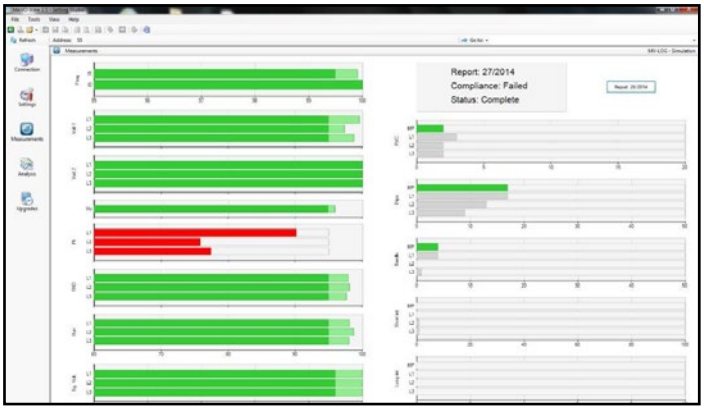
Rear Panel

MAVO-View Software

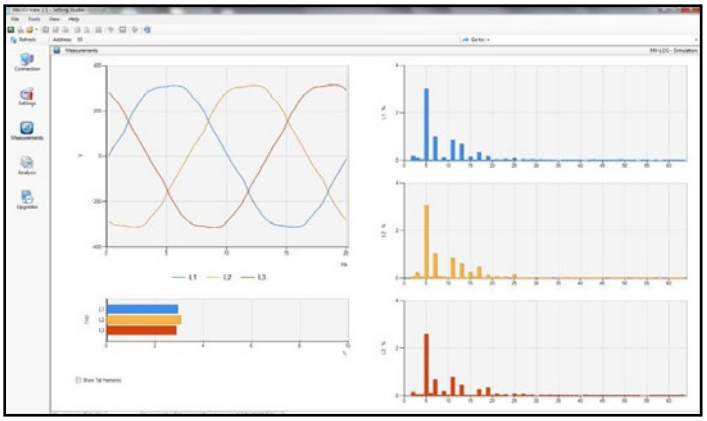
License-free MAVO-View configuration and evaluation software makes it possible for users to quickly and easily view and analyze mains monitoring data. With very simple and intuitive operation, it generates PQ reports with meaningful details by simply pressing a key.

Local devices can be remote accessed via the RS 485 / RS 232 communications interface, USB or Ethernet. Measurement results can be subsequently exported to CSV or PQDI format.

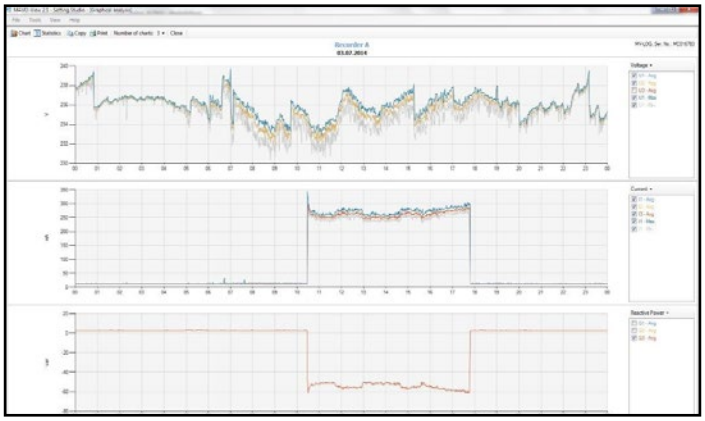
The vector diagram and the multimeter function (top half of the monitor) provide information regarding the momentary load status. The bar chart (bottom half of the monitor) indicates previous and anticipated daily load characteristics.



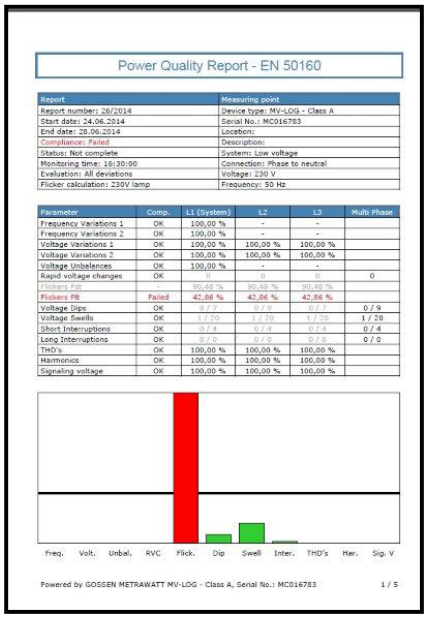
Evaluation of the measurement results in accordance with EN 50160 is possible in graphic as well as tabular format.



The real-time display indicates the system's harmonic load.



Representation of the timeline of minimum, mean and maximum values for up to 40 measured quantities acquired by four recorders with different sampling intervals.



Power Quality Report - EN 50160

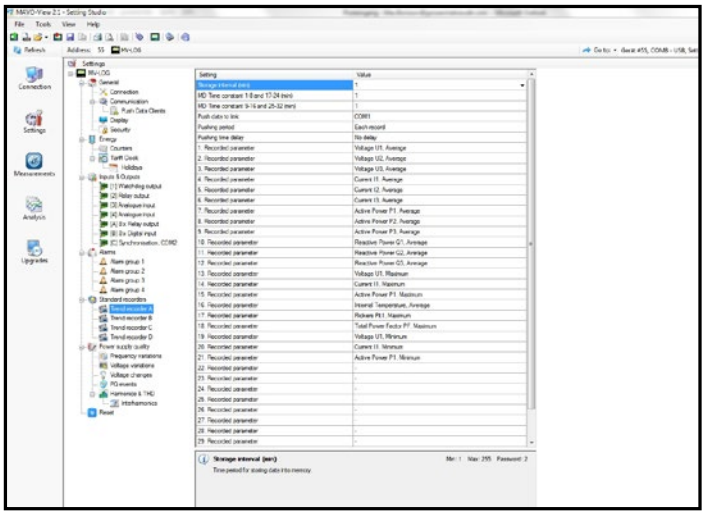
Report	Measuring point
Report number: 28/2014	Device type: MV-LOG - Class A
Start date: 24.06.2014	Serial No.: MC016783
End date: 28.06.2014	Location:
Compliance: Failed	Description:
Status: Not complete	System: Low voltage
Monitoring time: 16:30:00	Connection: Phase to neutral
Evaluation: All deviations	Voltage: 230 V
Flicker calculation: 230V lamp	Frequency: 50 Hz

Parameter	Comp.	L1 (System)	L2	L3	Multi Phase
Frequency Variations 1	OK	100,00 %	-	-	
Frequency Variations 2	OK	100,00 %	-	-	
Voltage Variations 1	OK	100,00 %	100,00 %	100,00 %	
Voltage Variations 2	OK	100,00 %	100,00 %	100,00 %	
Voltage Unbalances	OK	100,00 %	-	-	
Rapid voltage changes	OK	0	0	0	0
Flickers Pst	-	90,48 %	90,48 %	90,48 %	
Flickers Plt	Failed	42,86 %	42,86 %	42,86 %	
Voltage Dips	OK	0 / 7	0 / 5	0 / 7	0 / 9
Voltage Swells	OK	1 / 20	1 / 20	1 / 20	1 / 28
Short Interruptions	OK	0 / 4	0 / 4	0 / 4	0 / 4
Long Interruptions	OK	0 / 0	0 / 0	0 / 0	0 / 0
THD's	OK	100,00 %	100,00 %	100,00 %	
Harmonics	OK	100,00 %	100,00 %	100,00 %	
Signaling voltage	OK	100,00 %	100,00 %	100,00 %	

Freq. Volt. Unbal. RVC Flick. Dip Swell Inter. THD's Har. Sig. V

Powered by GOSSEN METRAWATT MV-LOG - Class A, Serial No.: MC016783 1 / 5

Generate a PQ report concerning all relevant characteristic values with just two clicks for your customer or client.



Self-explanatory, intuitive, menu-driven operation results in the correct setting (configuration) in just a few steps.

MAVO-Database

MAVO-Database software is available for the purpose of managing and analyzing measurement data from several instruments. The database includes modern software solutions, permits monitoring of large numbers of measuring points and can be fully matched to customer requirements.
The software is being utilized successfully all over the world for visualization, monitoring, analysis and storage of data regarding energy consumption, power quality and switching statuses with users ranging from independent energy consultants right on up to large network service providers.

Features:

◢ Data acquired by the measuring instrument for all measured mains quantities, as well as status and alarm messages and PQ reports, are stored centrally **to an SQL database** on a server with high levels of availability. Various rights can be assigned to users for accessing the data by means of a browser.

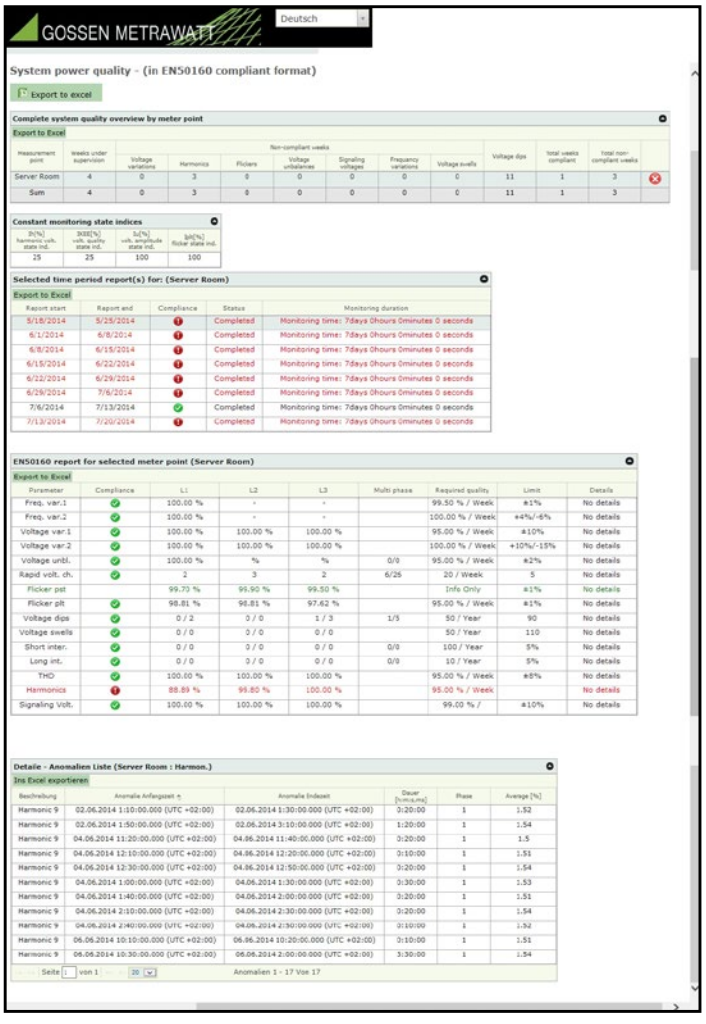
◢ The **open system architecture** permits connection to other back-end applications within the company such as ERP and CRM systems, or other IT systems.

◢ **Connection to existing SCADA systems**
MAVO-Database permits real-time communication with a wide-ranging spectrum of SCADA systems.

◢ **Monitoring and evaluation of voltage quality in accordance with EN 50160 with automatic report generation**
For the substantiation of power quality to network service providers / customers (for the enforcement of rights specified by the tariff)

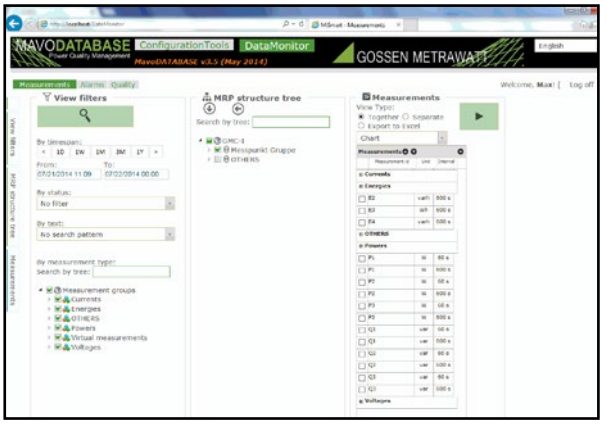
◢ **As opposed to other PQ systems, data is transferred to the database by means of a push process.**
As a result, an alarm is generated promptly (alarm contact, e-mail) in the event that an error should occur.

◢ **Export of measurement data in PQDIF format** for further processing with other software applications, or for comparison with measurement results from other measuring systems.



Evaluation of voltage quality in accordance with EN 50160

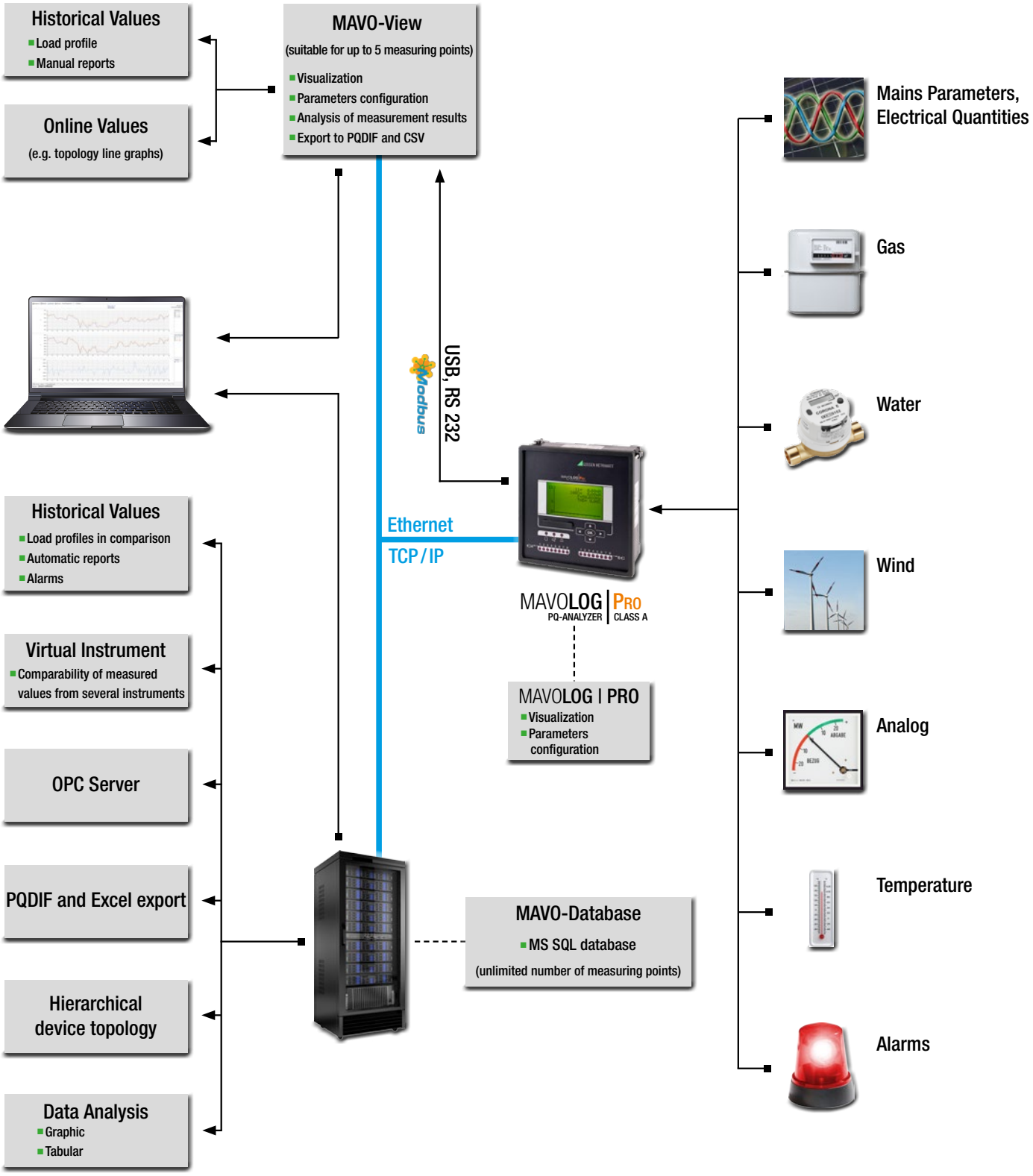
Load characteristics, current, voltage, power and much more can be displayed in separate or superimposed diagrams.



Data records from several instruments are saved to the database. Diverse measured quantities from various instruments can be compared for compliance with, for example, limit values and standards.

Sample System – MAVOLOG | PRO PQ-ANALYZER CLASS A

The more operating parameters are available, the more effectively malfunctions and damage to electrical systems and equipment can be prevented. The MAVOLOG | PRO permits a detailed analysis of the system status on the basis of international and European standards, as well as by acquiring various analog and digital signals, and switching statuses.



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Printed in Germany · Subject to change without notice · 1/07.14 · Order no. 3-337-336-03