MESSTECHNIK

POWER QUALITY
AND RENEWABLE TESTING

www.neo-messtechnik.com

Electrical measurement instruments are playing an essential role in development of all industries.

We want to contribute by providing high-quality products for test and measurement and by providing best possible services.

TABLE OF CONTENTS

EVOLUTION OF THE POWER GRID

From Power Generation via Transmission and Distribution Grids to changes in electrical equipment and energy consumption, the electrical power grid is constantly evolving.

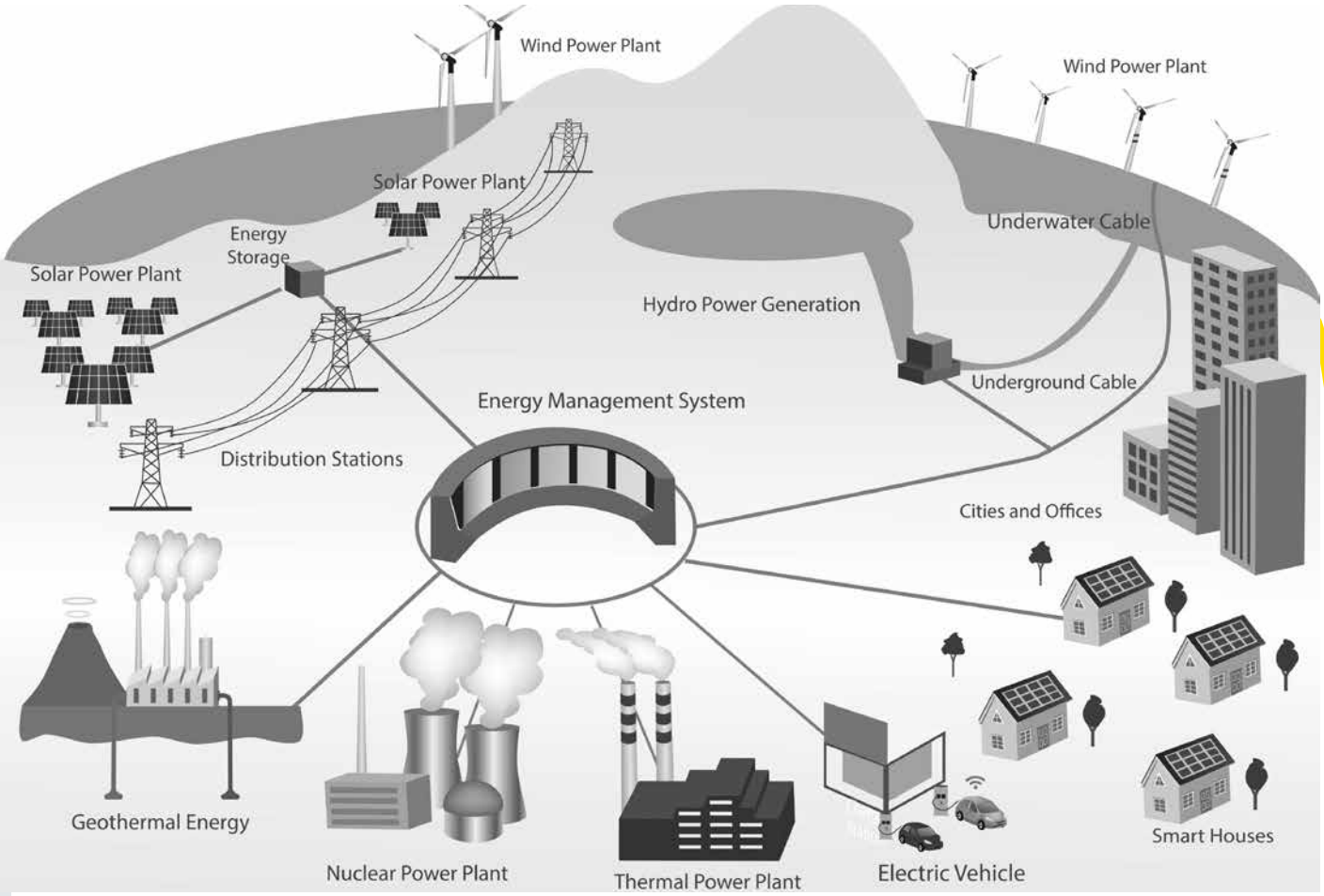
Changes in **Power Generation**:
- Large conventional plants are being replaced with a high number of small units (connected to Low-Voltage grids)
- There is a shift to non-dispatchable renewable energy
- Synchronous machines are being replaced by power-electronic interfaces

Changes in **Transmission** and **Distribution**:
- Advancements are being made in Power Electronic Equipment (Filters, STATCOM, etc.)
- Two-Way Power Flow are being introduced due to distributed generation
- HV AC cables and HVDC systems are being re-innovated
- There is an increased use in Power-Line communication

Changes in **Consumption**:
- Energy-efficient device usage is increasing
- There is an overwhelming proliferation of small devices on the grid
- There is an increase in Electric-Vehicles and Heat pumps
- There is almost a complete shift to active Power Electronics (motors, pumps, lighting,...)

These changes require new technologies such as ***Microgrids***, ***Demand Side management*** (DSM), ***Distributed Generation*** (DER), ***Distributed control*** (U, P), ***Feeder Reconfiguration***, etc.

The decrease in short-circuit power and destabilization of the grid require that the distributed generation units also need to provide services to the power grid. This services are defined in **Grid Codes** (international and national regulations).



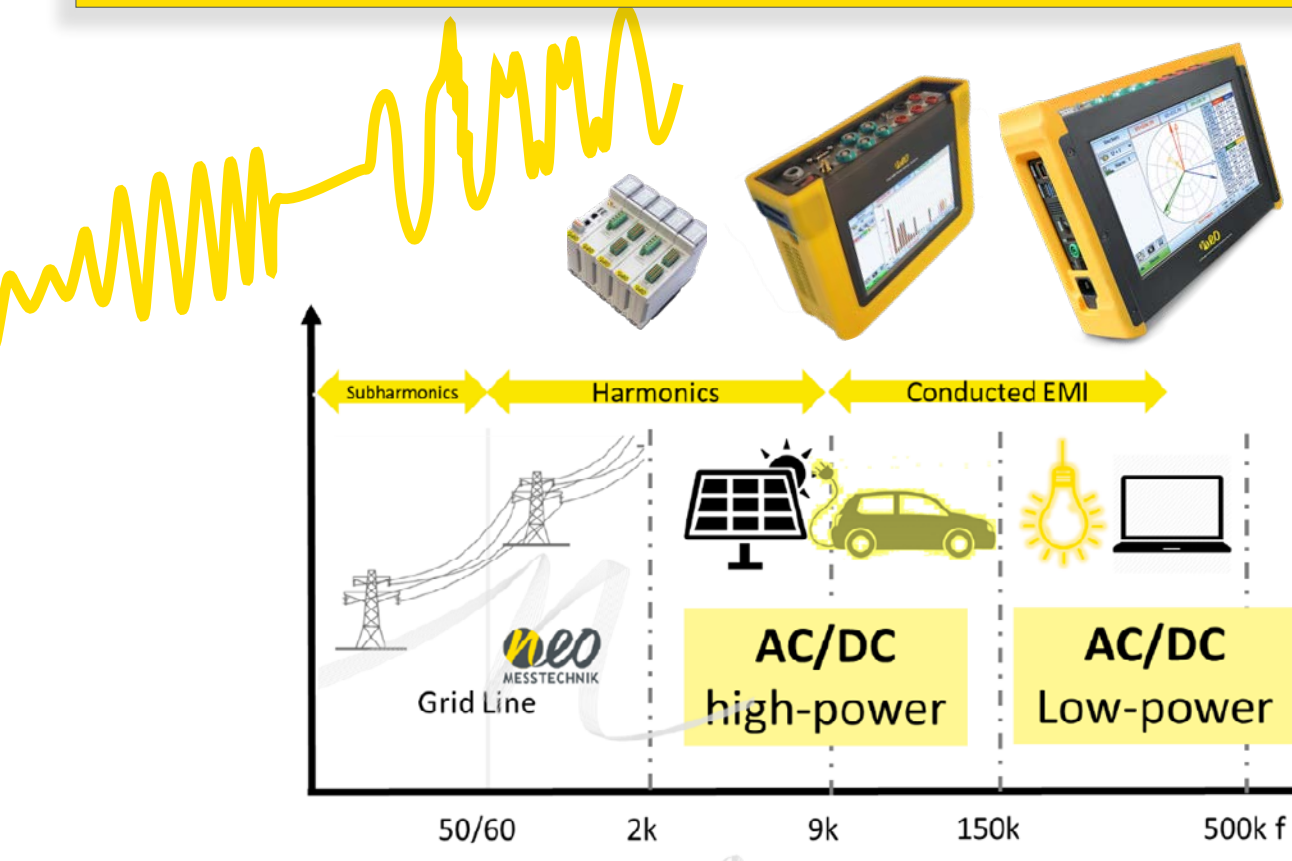
FUTURE OF POWER QUALITY

Classical Power Quality Analysis according to EN50160, including reports defined by the measurements of Voltage variations, Frequency, Harmonics (50th order), Flicker and Unbalance, are no longer sufficient.
Power Quality Analysis must adapt to the ever-evolving power grid, which requires additional measurements such as:

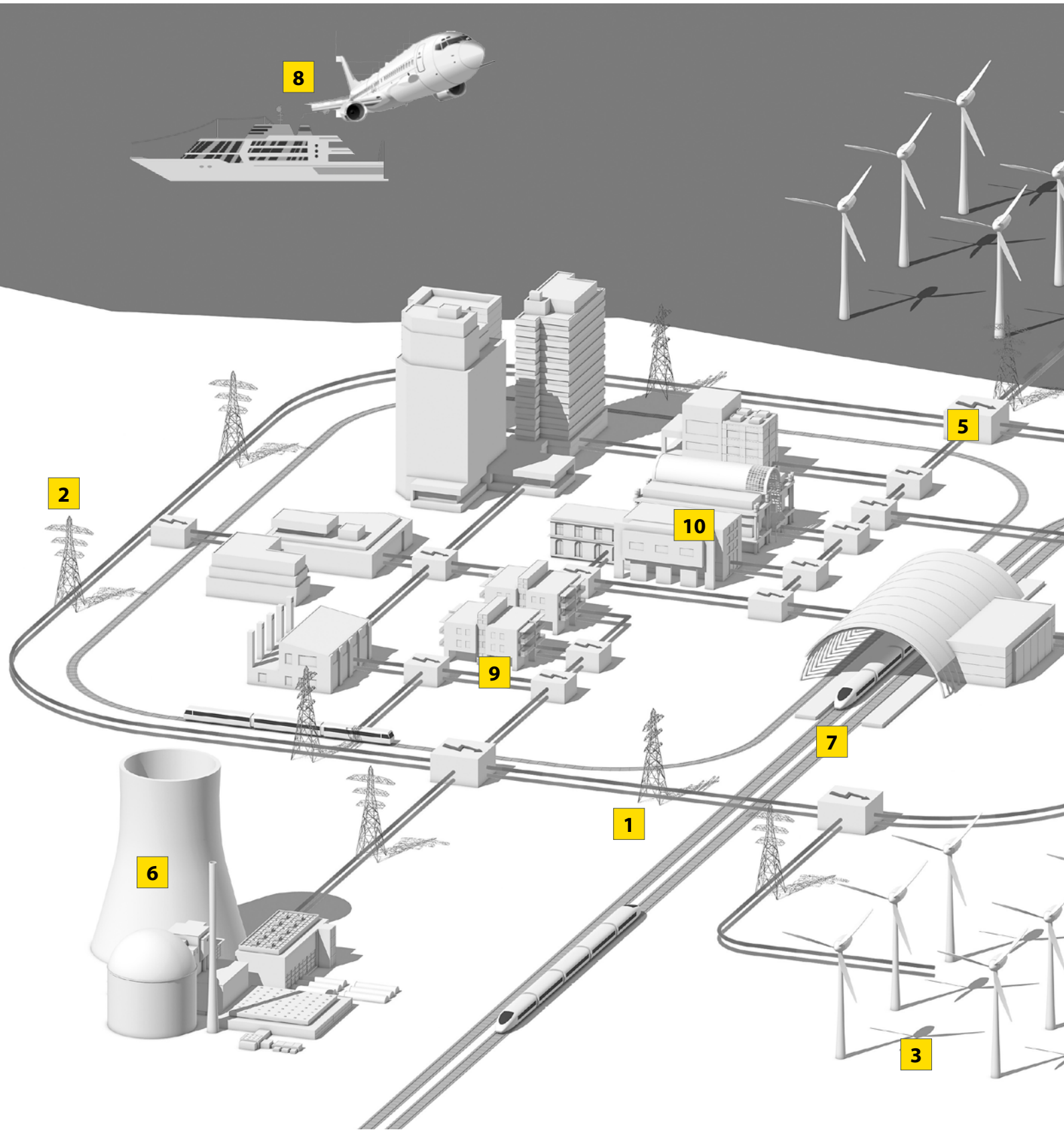
- ☑ Supraharmonics up to 150 kHz / 500kHz for voltage and current
- ☑ Disturbance Recording (1/2 period)
- ☑ Phase Angle jump recording
- ☑ Fast Frequency changes (1/2 period)
- ☑ Symmetrical components Analysis
- ☑ Resonances / Oscillations measurement
- ☑ Fast Switching processes
- ☑ DC offset
- ☑ Subharmonics
- ☑ Grid Impedance Measurement up to 150 kHz / 10 MHz
- ☑ PLC interference
- ☑ PQ Spreading Analysis (e.g. connection of multiple EV Chargers of same type)
- ☑ Analysis of PQ mitigation methods (e.g. lowering Harmonics can increase the level of Supraharmonics)

The NEO Advantage

NEO Messtechnik instruments are engineered and designed to fulfill all of these requirements. In addition to classical PQ Analysis and Reporting according to international standards (EN50160), it is possible to measure ***Suprharmonic currents and voltages***, to detect any ***Waveform deviation*** as well as any ***Disturbance*** (1/2 period based) or ***Dynamic processes*** in the electrical power grid (PMU).



APPLICATIONS



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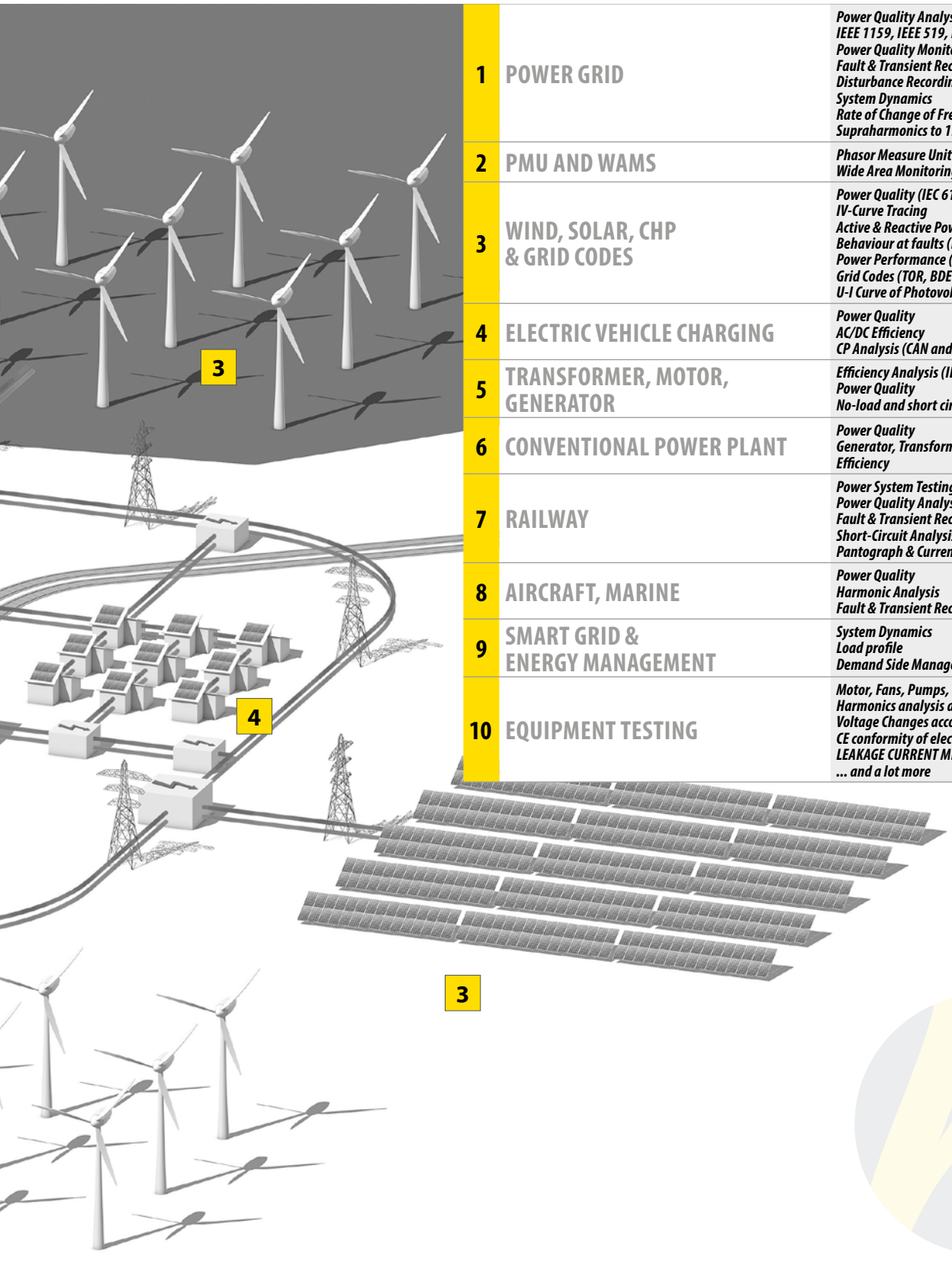


1	POWER GRID	*Power Quality Analysis (EN50160, IEC61000-2-2/-4/-12, IEEE 1159, IEEE 519, NRS048)* *Power Quality Monitoring System SCADA* *Fault & Transient Recording* *Disturbance Recording* *System Dynamics* *Rate of Change of Frequency (Rocof)* *Supraharmonics to 150kHz*
2	PMU AND WAMS	*Phasor Measure Unit (IEEE C37.118)* *Wide Area Monitoring System (WAMS)*
3	WIND, SOLAR, CHP & GRID CODES	*Power Quality (IEC 61400-21 / FGW-TR3)* *IV-Curve Tracing* *Active & Reactive Power (FGW-TR3)* *Behaviour at faults (LVRT, HVRT)* *Power Performance (IEC 61400-12)* *Grid Codes (TOR, BDEW, DACH-CZ)* *U-I Curve of Photovoltaic Systems*
4	ELECTRIC VEHICLE CHARGING	*Power Quality* *AC/DC Efficiency* *CP Analysis (CAN and PLC)*
5	TRANSFORMER, MOTOR, GENERATOR	*Efficiency Analysis (IEC 60076-1 / IEC60034)* *Power Quality* *No-load and short circuit testing*
6	CONVENTIONAL POWER PLANT	*Power Quality* *Generator, Transformer Testing* *Efficiency*
7	RAILWAY	*Power System Testing (AC & DC rails)* *Power Quality Analysis* *Fault & Transient Recording* *Short-Circuit Analysis* *Pantograph & Current Shoe Testing*
8	AIRCRAFT, MARINE	*Power Quality* *Harmonic Analysis* *Fault & Transient Recording*
9	SMART GRID & ENERGY MANAGEMENT	*System Dynamics* *Load profile* *Demand Side Management*
10	EQUIPMENT TESTING	*Motor, Fans, Pumps, Circuit Breaker, Filter testing ...* *Harmonics analysis according to IEC 61000-3-2 /-12* *Voltage Changes according to IEC 61000-3-3 /-11* *CE conformity of electrical devices (Harmonics, Flicker)* *LEAKAGE CURRENT MEASUREMENT* *... and a lot more*


neo
MESSTECHNIK

MOBILE POWER QUALITY

POWER QUALITY ANALYZER

PQA 8000

Power Quality

Harmonics, THD
Supraharmonics 500kHz
Unbalance etc.

System Dynamics

Phasor Measure Unit (PMU), Rate of Change of Frequency (RoCoF), WAMS, etc.

Transients

1/2 period values, Phase Angle jumps, Resonances, Switching etc.

Power

Active, reactive, apparent power, PF, harmonic power, energy, etc.

HIGH **ACCURACY**	0.05%
HIGH **SAMPLING RATE**	124kS/s or 1MS/s
HIGH **RESOLUTION**	18bit
HIGH **DYNAMIC RANGE**	0.5mA to 150kA
HIGH **SAFETY CATEGORY**	CAT IV 600V
DATA **STORAGE**	up to 1TB SSD

Batterie
4h
90 Wh

Display
10.1 inch
Multi-Touch

Isolation
6kV

Standards
IEC61000-4-30
Class A

HIGHLIGHTS

SMART TOUCH
The large 10.1 inch full-HD Smart Touch display responds immediately without any delay with intuitive operation like on a mobile phone.

MOBILE OPERATION
The integrated battery pack allows an operating time of up to 4 hours of operation. 5 LEDs indicate the remaining battery capacity. There is no need for an external power supply or special connectors... plug and play.

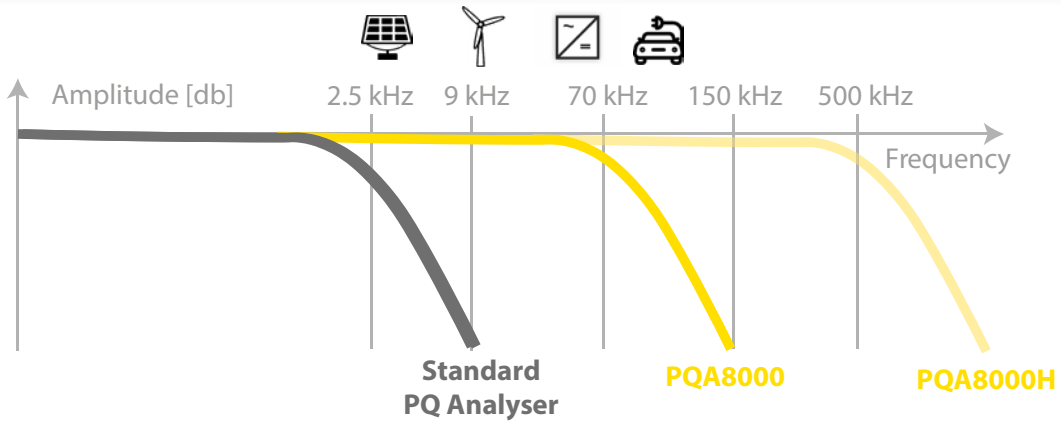
GPS
Integrated GPS enables high-precision time measurements & synchronization, which is ideal for PMU applications.

LARGE SSD
The instrument is equipped with two SSD disks. One is dedicated for the OS and application software, and the other one is equipped for data storage (up to 1 TB).

INTERFACES
The instrument provides an easy integration with other analog and digital signals such as temperature. The interfaces include USB 3.0, TCP/IP, LAN, Wifi, Bluetooth, RS232, Modbus, 104, DIO, and CAN.

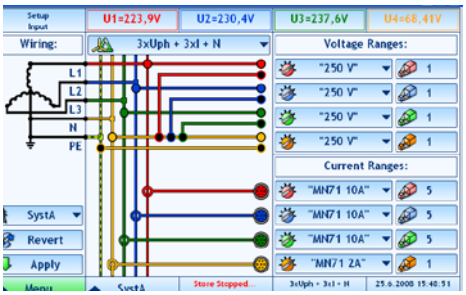
SENSOR SUPPLY
The instrument can provide excitation for your current sensors,
and there is no need for batteries or external power supplies.

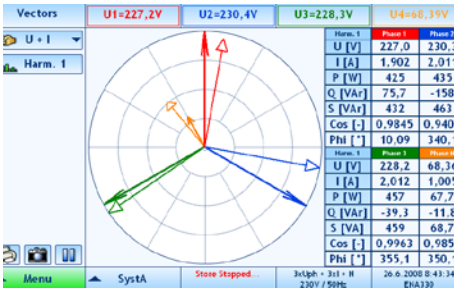
SUPRAHARMONICS UP TO 500 kHZ FOR VOLTAGE AND CURRENT
Conventional PQ Analyzers, even if they are Class A certified, are not sufficient for modern measurement applications. We use the best available components to ensure the highest safety category and also the highest accuracy. NEO instruments offer high bandwidth (up to 1 MHz) and correct the frequency dependent behavior of current & voltage sensors as well as integrated electronics to achieve the best possible measurement results.
THE REFERENCE INSRUMENT



1 SETUP

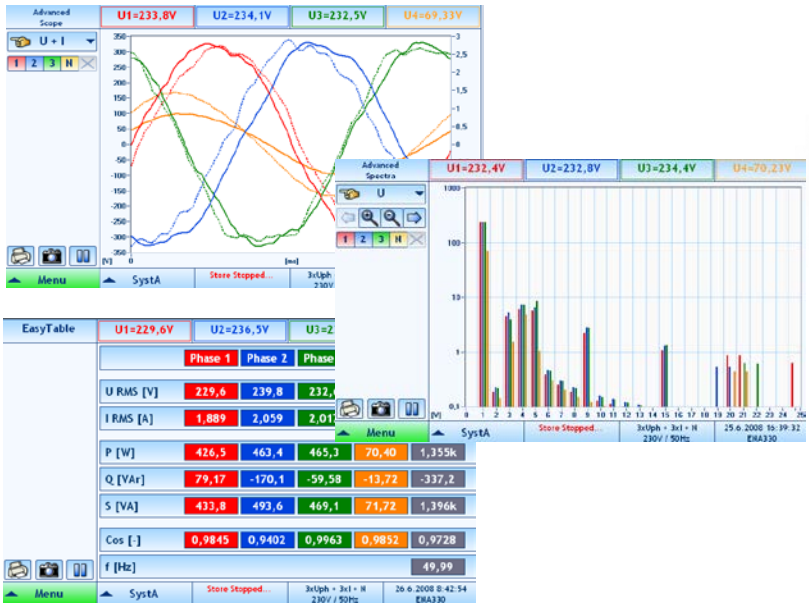
The instrument has a clear structure that shows schematics with explanations.





2 MEASURE

During measurements the user can define widgets such as Scopes, Vector Scopes, Harmonic FFTs, Tables, and Recorders.



TRULY INTUITIVE

Intuitive Measurement menus: Cleary structured and explicit menus

HIGHLIGHTS

3 ANALYZE

Sophisticated functions include PQ Data, Transients, Disturbances, and Alarms.

4 REPORT

The instrument can automatically generate reports and professional documentation. The user can create reports that include all relevant information (location, comments, company logo, etc) directly on-site or during post processing. PDF reports that are saved on the instrument are always available and can be shared directly via email.

Report EN50160

Database SCADA

Remote Connection

5 EXPORT

Data can be exported into CSV, XLS, PDF, Comtrade, and PQDiff.

6 OTHER PROGRAMS

The instrument uses Microsoft Windows© as the operating system. Programs such as Microsoft Excel, Word or Matlab can be added as well as Email messaging services.

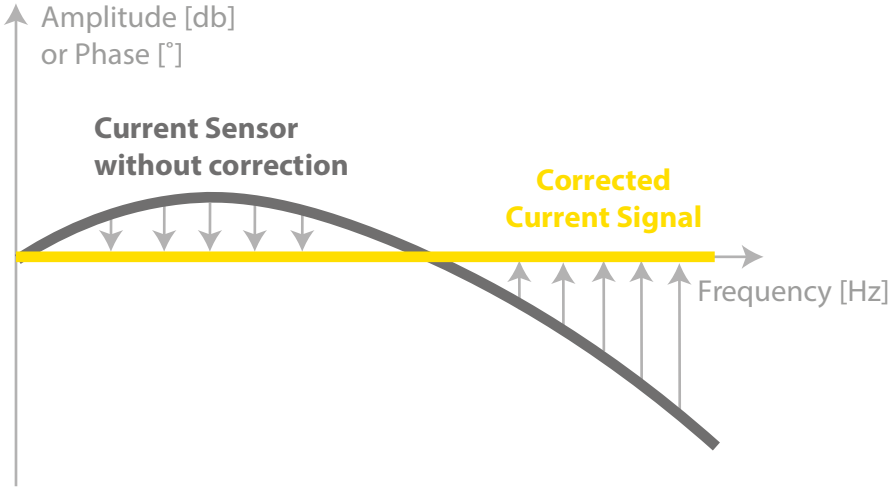
HIGHEST PRECISION

The NEO way of Sensor Integration

All current sensors offered by NEO Messtechnik are industry proven for different applications.
We use and improve on the best available sensors in the market.

1) FREQUENCY DEPENDENT CALIBRATION

The NEO sensor integration calibrates each sensor over a wide frequency bandwidth and corrects frequency dependent phase shift and amplitude damping. This enables high precision from DC to high-frequency measurements.



2) MEASUREMENT RANGE DEPENDENT CALIBRATION

In addition, the sensors will calibrated for each measurement range using multiple points.
The calibration will typically cover points from 1% to 100% of the nominal measurement range.
This will improve the accuracy and precision, especially at low current (e.g., 1% of nominal measurement range).

All sensors will be delivered with a standard calibration, which improves the accuracy compared to nominal specifications, whereas the NEO calibration will be performed on each individual sensor and needs to be ordered separately.

INSTRUMENT OPTIONS

MESSTECHNIK

PQA8000

4x Voltage Input 1600V DC
4x Current Input (Rogowski, Clamp)
CAN / RS485

PQA8000-P

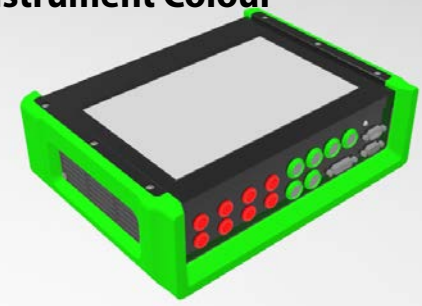
4x Voltage Input 1600V DC
6x Current Input (Rogowski, Clamp)
2x Analog Input (± 10V)
CAN / RS485 / DIO

PQA8000-M

4x Voltage Input 1600V DC
8x Current Input (Rogowski, Clamp)
CAN / RS485 / DIO

CUSTOMIZE DESIGN

Instrument Colour



Customize the color of the rubber perimeter

Connector Color

-select the color of the connectors to match cabling or standards

In addition, the transport bag of the PQA8000 device can be embroidered with company logos.

SPECIFICATIONS & ACCESSORIES

GENERAL SPECIFICATIONS

PC	Microsoft® Windows 10 IOT(64 bit) Intel® Quad Core Processor and 8GB RAM Locked OS for reliable operation Multilanguage Support
Storage	256GB SSD for OS and application software 256GB SSD dedicated for Data storage
Display	10.1 inch Capacitive Multi-Touch TFT LCD Sunlight Readable / 800cd
Battery	Li-Ion Battery 90Wh up to 4h operation
Power Supply	115V / 230V AC
Interfaces	3x USB, 1x Ethernet, WiFi, 1x HDMI
Dimensions	298 x 225 x 95 mm 11.8 x 8.8 x 3.7 inch
Weight	4kg / 8.8pound
Temperature Range	Operating: 0 to 60°C (32°F to 140°F) Storage: -20 to 80°C (-4°F to 176°F)
IP Class	IP2X
Accessories	Transport Bag and Keyboard included
Standards & Certification	IEC61010-1 (2011) / IEC61010-2-030 / IEC 61000-4-3 / IEC 61000-4-4 / LVD Directive 2014 / EMC Directive 2014/ Rohs Directive 2015/ EN 61000-3-2 / EN 61000-3-3 / EN 61326-1 / EN 55011 +A1, Class A

OPTIONS AND ACCESSORIES

SSD Upgrade	Upgrade to 512GB or 1TB data storage
GPS	Integrated GPS receiver and GPS mouse
GSM	Integrated Modem for telecommunication
DC Power	DC Power supply input +9V …. +36V DC
Dust Cover	Protect PQA8000 instrument in tough environments
Transport Case	Ruggedized Pelican-Case (IP67), with foamed insert adapted for the measurement instrument and pullout handle
color Code	Color code for all voltage and current inputs
Temperature Sensor	Thermocouple Type K temperature sensor on DSUB15 input
Radiation Sensor	Pyranometer Sensor on DSUB15 input
Current Sensor	See Chapter Accessories
Test Leads	See Chapter Accessories

SPECIFICATIONS

MESSTECHNIK

VOLTAGE INPUTS

Inputs	4x
Range	Standard: 1600V/ 800V MV-Version: 600V / 20V
Accuracy	0.05% f.s.
Isolation	6kV isolation
Safety	CAT III 1000V CAT IV 600V
Impedance	10 MΩ

CURRENT INPUTS

Inputs	PQA8000: 4x PQA8000-P: 6x PQA8000-M: 8x
Accuracy	0.05% f.s.
Type	Clamp or Rogowski
Instrument Ranges Clamp	2mV to 10V (15x Ranges)
Integrator Rogowski Range	1A to 300kA
Additional Analog Inputs (AIN)	1V, 2V, 5V, 10 V
Sensor Supply	±15V / 9V
TEDS	Automatic Sensor Detection*
Impedance	10 MΩ

ANALOG DIGITAL CONVERSION (A/D)

Sampling Rate / Resolution	PQA8000: 124 kS/s / 24bit PQA8000H: 1 MS/s / 18bit
Filters	Analogue and Digital Automatic Anti-Aliasing Filter

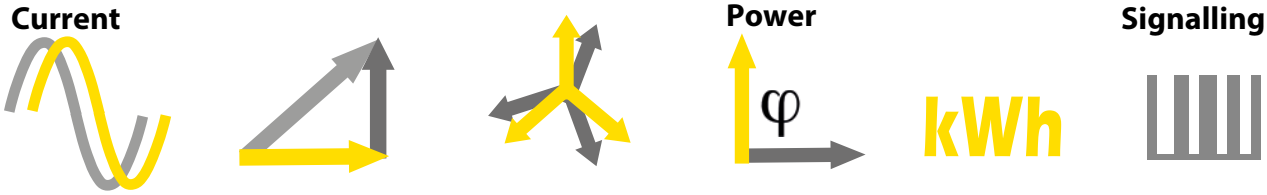
DIGITAL I/O & INTERFACES

Digital In/Out	Adjustable Trigger max. 350V
CAN, RS485	Selectable Termination

POWER QUALITY

POWER

Voltage Current | Power | Vector | Reactive Power | Energy | Digital Signalling



Power Calculation	P, Q, S, PF, cos phi, D, DH, QH
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Energy	Total, positive, negative (P, Q, P+, P-, Q+, Q-)
Efficiency	DC / AC, U-I Curve for PV
Wiring	DC, 1-Phase, 2-Phase, 3-Phase Star and Delta

WAVEFORM & TRANSIENTS

Transients | Resonances Oscillations | Switching | DC Offset | Overvoltage | Undervoltage

MIN, MAX, RMS, AVE	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
ENVELOPE / WINDOW	U, I
DELTA	dU, dI, df, dP, etc.
DERIVATE (RATE OF CHANGE)	dU/dt, df/dt etc. … per ms, number of periods or half-period
COMBI-TRIGGER	Combination of triggering including mulitple conditions
VOLTAGE SIGNALLING	Threshold
RAPID VOLTAGE CHANGES (RVC's)	dU, dc, dt
EN50160	Trigger on any EN50160 parameter (Max, Quantil)

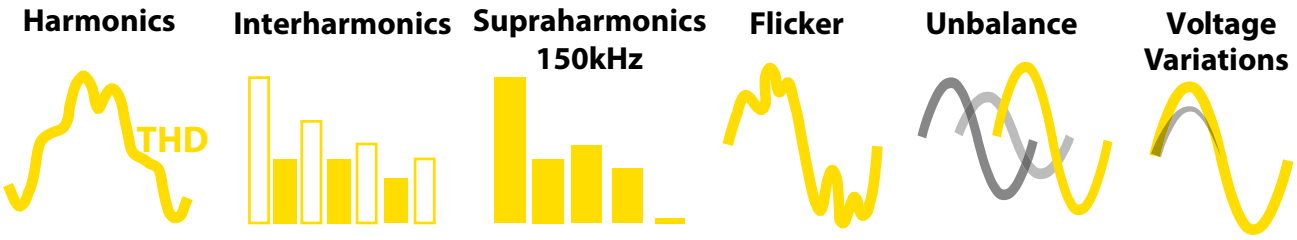
COMPLYING STANDARDS

POWER QUALITY, HARMONICS, FLICKER:
IEC61000-4-30 Ed. 3 Class A / IEC61000-4-7 / IEC61000-4-15 /
IEC62586-2 Ed. 2 / IEC62586-1
PUBLIC GRID, RAILWAY AND INDUSTRY
EN50160 / EN50163 / IEC61000-2-2 / IEC61000-2-4 (Class 1; 2; 3) /
IEEE519 / IEEE 1159 / IEC61000-2-12 / NRS048
WIND POWER, RENEWABLES AND GRID CODES
IEC61400-21 / IEC61400-12 / FGW-TR3 / VDE N-4105 / VDE N-4100 /
VDE N-4110 / D-A-CH-CZ / BDEW / ROCOF / IEEE C37.118-2005 (PMU)
MOTORS, TRANSFORMERS AND ELECTRICAL EQUIPMENT
IEC60034 / IEC 60076-1 / IEC61000-3-2 / IEC61000-3-3 / IEC61000-3-11 / IEC61000-3-12

CLASS A++

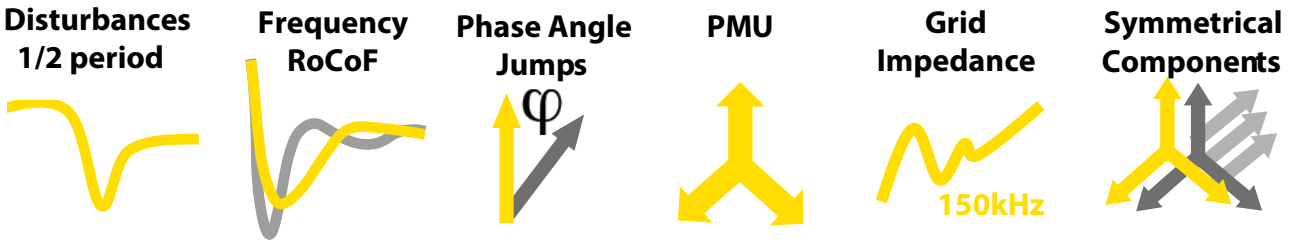
MESSTECHNIK

POWER QUALITY



according to IEC 61000-4-30 Ed.3 and IEC 62586	
Harmonics (Voltage, Current, Phi, Power)	Class A
Interharmonics	Class A
THD U, THD I	Class A
Higher Frequencies (200Hz band)	2 - 9 kHz (can be calculated from 0 to definable upper limit)
Higher Frequencies (2000Hz band)	8 - 150 kHz / 500 kHz for voltage and current (PQA 8000H)
Symmetrical Components & Unbalance (Pos-, Neg- and Zero Sequence)	Class A
Rapid Voltage Changes	Class A
Flicker (PST, PLT, Pinst)	Class A
Voltage Events (dip, swell, interruption – time, extrema, length)	Class A
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Time Synchronisation	Class A

DISTURBANCES AND SYSTEM DYNAMICS



1/2 PERIOD TRIGGER	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
PHASE ANGLE TRIGGER	phi
SYMMETRICAL COMPONENTS	Pos., Neg., Zerosequence
RATE OF CHANGE FREQUENCY (ROCOF)	df/dt
Phasor Measure Unit (PMU) according to IEEE C37.118	Total Vector Error 0.01% (typ.) Angle Error 0.003°(typ) Timestamp Accuracy 0.1 µs up to 50 fps / via TCP / open PDC format / Offline storage possible

ADDITIONAL FEATURES INCLUDE

- ☑ compounded trigger settings
- ☑ definable pre-triggers and post-time extensions

POWER QUALITY ANALYZER

PQA 7000

Power Quality

Harmonics, THD Supraharmonics, Symmetrical components etc.

System Dynamics

Phasor Measure Unit (PMU), Rate of Change of Frequency (RoCoF), WAMS, etc.

Transients

1/2 period values, Phase Angle jumps, Resonances, Switching etc.

Power

Active, reactive, apparent power, PF, harmonic power, energy, etc.

HIGH **ACCURACY**	0.05%
HIGH **SAMPLING RATE**	48 kS/s
HIGH **RESOLUTION**	24bit
HIGH **DYNAMIC RANGE**	0.5mA to 150kA
HIGH **SAFETY CATEGORY**	CAT IV 600V
DATA **STORAGE**	up to 256 GB

Isolation

6kV

Standards

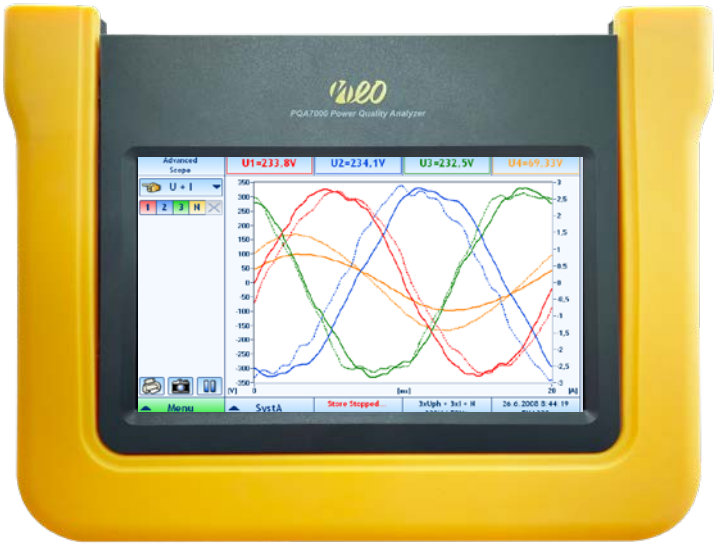
IEC61000-4-30 Class A

HIGHLIGHTS

SMART TOUCH
The 7 inch Smart Touch display responds immediately without any delay with intuitive operation like on a mobile phone.

MOBILE OPERATION
The integrated battery pack allows an operating time of up to 6 hours of operation. 5 LEDs indicate the remaining battery capacity. There is no need for an external power supply or special connectors... plug and play.

GPS
Integrated GPS enables high-precision time measurements & synchronization, which is ideal for PMU applications.



STORAGE
The instrument offers an internal memory of 32 GB which can be extended up to 256GB. The storage can further be increased by a USB disk.

INTERFACES
The instrument provides an easy integration with other analog and digital signals such as temperature. The interfaces include USB 3.0, TCP/IP, LAN, Wifi, Bluetooth, RS232, Modbus, 104, DI, and CAN.

SENSOR SUPPLY
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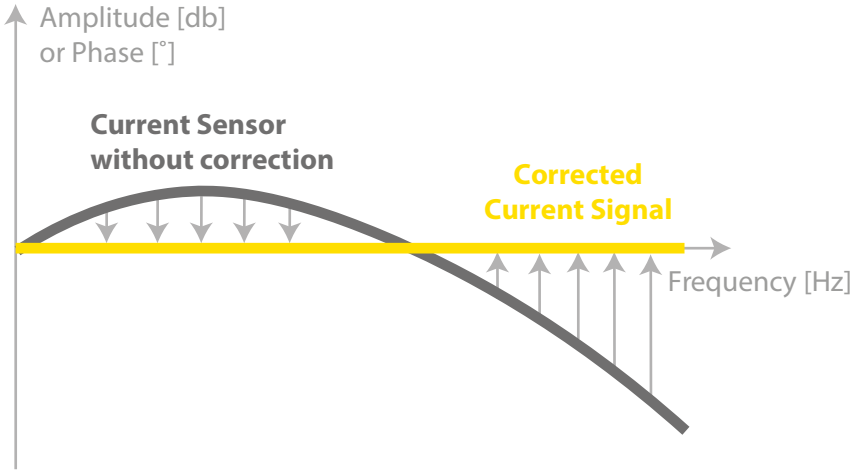

1 SETUP

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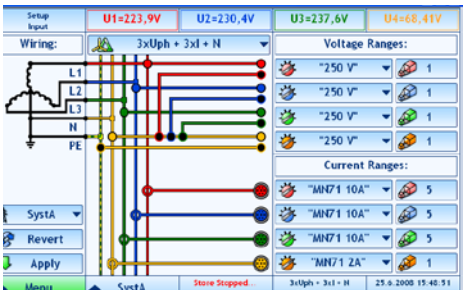
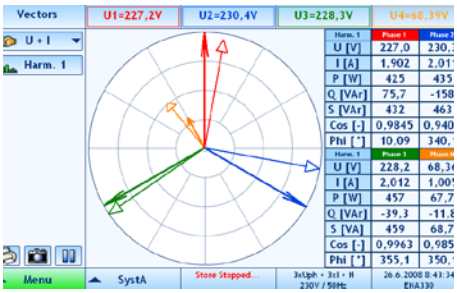
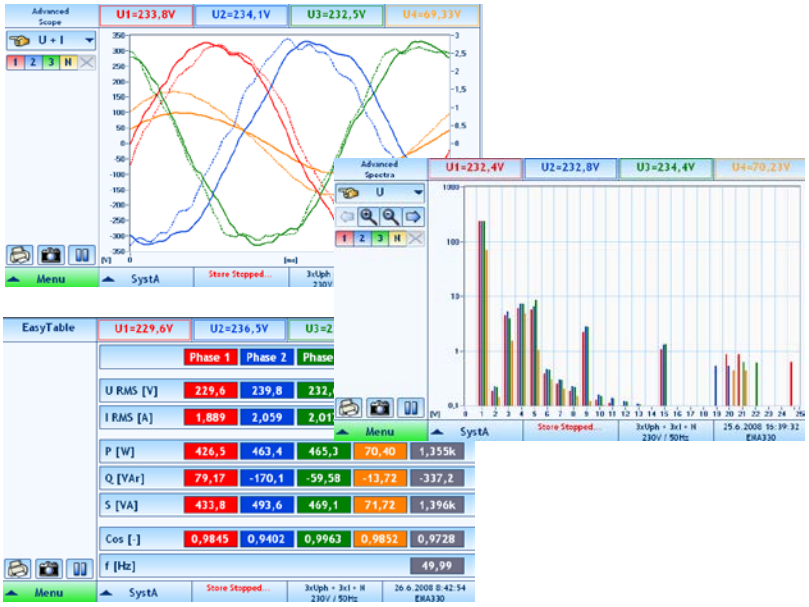




2 MEASURE

During measurements the user can define widgets such as Scopes, Vector Scopes, Harmonic FFTs, Tables, and Recorders.



TRULY INTUITIVE

Intuitive Measurement menus: Cleary structured and explicit menus

HIGHLIGHTS

3 ANALYZE

Sophisticated functions include PQ Data, Transients, Disturbances, and Alarms.

4 REPORT

The instrument can automatically generate reports and professional documentation. The user can create reports that include all relevant information (location, comments, company logo, etc) directly on-site or during post processing. PDF reports that are saved on the instrument are always available and can be shared directly via email.

Report EN50160 | **Database SCADA** | **Remote Connection**

5 EXPORT

Data can be exported into CSV, XLS, PDF, Comtrade, and PQDiff.

6 OTHER PROGRAMS

The instrument uses Microsoft Windows© as the operating system. Programs such as Microsoft Excel, Word or Matlab can be added as well as Email messaging services.

HARDWARE

GENERAL SPECIFICATIONS

PC	Microsoft® Windows 10 IOT(64 bit) Intel® Quad Core Processor and 4GB RAM Multilanguage Support
Storage	32GB
Display	7 inch Capacitive Multi-Touch TFT LCD Sunlight Readable
Battery	Li-Ion Battery 80Wh up to 6h operation
Power Supply	10-30 V DC
Interfaces	2x USB, 1x Ethernet, WiFi
Dimensions	250 x 190 x 80 mm 9.84 x 7.5 x 3.2 inch
Weight	2,3kg / 5 pound
Temperature Range	Operating: 0 to 60°C (32°F to 140°F) Storage: -20 to 80°C (-4°F to 176°F)
IP Class	IP2X
Accessories	Transport Bag and Keyboard included
Standards & Certification	IEC61010-1 (2011) / IEC61010-2-030 / IEC 61000-4-3 / IEC 61000-4-4 / LVD Directive 2014 / EMC Directive 2014/ Rohs Directive 2015/ EN 61000-3-2 / EN 61000-3-3 / EN 61326-1 / EN 55011 +A1, Class A

HIGHLIGHTS

MESSTECHNIK

VOLTAGE INPUTS	
Inputs	4x
Range	1600V/ 800V
Accuracy	0.05% f.s.
Isolation	6kV isolation
Safety	CAT III 1000V CAT IV 600V
Impedance	10 MΩ

CURRENT INPUTS	
Inputs	5x
Accuracy	0.05% f.s.
Type	Clamp or Rogowski
Instrument Ranges Clamp	2mV to 10V (15x Ranges)
Integrator Rogowski Range	1A to 300kA
Sensor Supply	±15V
TEDS	Automatic Sensor Detection*
Impedance	10 MΩ

ANALOG DIGITAL CONVERSION (A/D)	
Sampling Rate	48 kS/s
Resolution	24 bit
Filters	Analogue and Digital Automatic Anti-Aliasing Filter

DIGITAL IN & INTERFACES	
Digital In	Adjustable Trigger
CAN, RS485	Selectable Termination

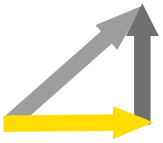
OPTIONS AND ACCESSORIES	
Storage Upgrade	Upgrade to 256 GB data storage
GPS	Integrated GPS receiver and GPS mouse
Transport Case	Ruggedized Pelican-Case (IP67), with foamed insert adapted for the measurement instrument and pullout handle
Color Code	Color code for all voltage and current inputs
Current Sensor	See Chapter Accessories
Test Leads	See Chapter Accessories

POWER QUALITY

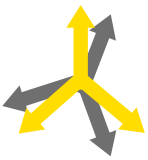
POWER

Voltage Current

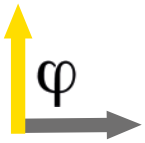
Power



Vector



Reactive Power



Energy

Digital Signalling

Power Calculation	P, Q, S, PF, cos phi, D, DH, QH
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Energy	Total, positive, negative (P, Q, P+, P-, Q+, Q-)
Efficiency	DC / AC, U-I Curve for PV
Wiring	DC, 1-Phase, 2-Phase, 3-Phase Star and Delta

WAVEFORM & TRANSIENTS

Transiente

Resonanzen Oszillationen

Schaltvorgänge

DC Offset

Überspannung

Unterspannung

MIN, MAX, RMS, AVE	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
ENVELOPE / WINDOW	U, I
DELTA	dU, dI, df, dP, etc.
DERIVATE (RATE OF CHANGE)	dU/dt, df/dt etc. … per ms, number of periods or half-period
COMBI-TRIGGER	Combination of triggering including mulitple conditions
VOLTAGE SIGNALLING	Threshold
RAPID VOLTAGE CHANGES (RVC's)	dU, dc, dt
EN50160	Trigger on any EN50160 parameter (Max, Quantil)

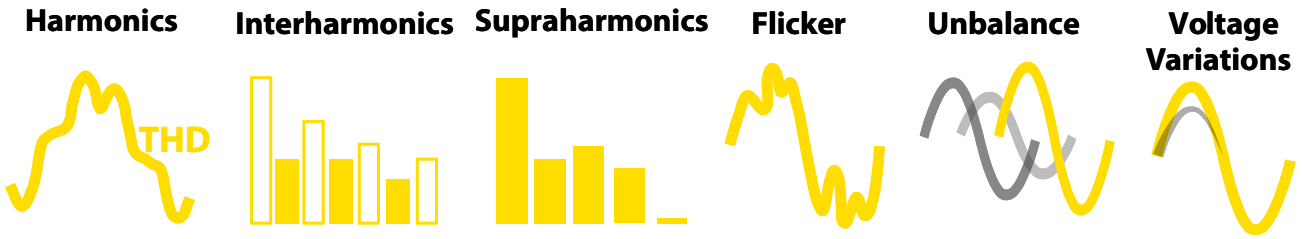
COMPLYING STANDARDS

POWER QUALITY, HARMONICS, FLICKER:
IEC61000-4-30 Ed. 3 Class A / IEC61000-4-7 / IEC61000-4-15 /
IEC62586-2 Ed. 2 / IEC62586-1
PUBLIC GRID, RAILWAY AND INDUSTRY
EN50160 / EN50163 / IEC61000-2-2 / IEC61000-2-4 (Class 1; 2; 3) /
IEEE519 / IEEE 1159 / IEC61000-2-12 / NRS048
WIND POWER, RENEWABLES AND GRID CODES
IEC61400-21 / IEC61400-12 / FGW-TR3 / VDE N-4105 / VDE N-4100 /
VDE N-4110 / D-A-CH-CZ / BDEW / ROCOF / IEEE C37.118-2005 (PMU)
MOTORS, TRANSFORMERS AND ELECTRICAL EQUIPMENT
IEC60034 / IEC 60076-1 / IEC61000-3-2 / IEC61000-3-3 / IEC61000-3-11 / IEC61000-3-12

CLASS A++

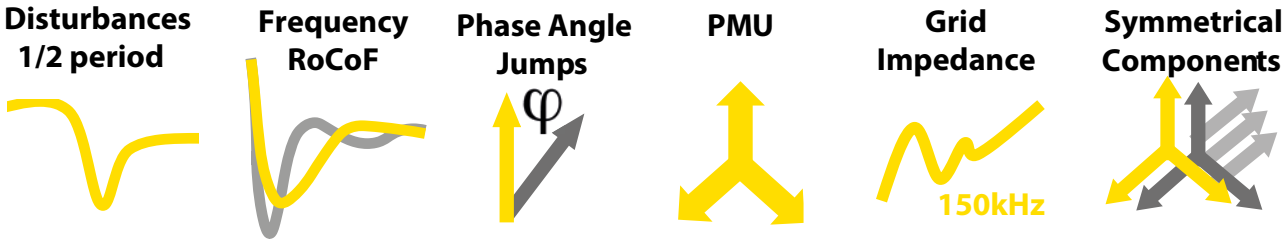
neo MESSTECHNIK

POWER QUALITY



according to IEC 61000-4-30 Ed.3 and IEC 62586	
Harmonics (Voltage, Current, Phi, Power)	Class A
Interharmonics	Class A
THD U, THD I	Class A
Higher Frequencies (200Hz band)	2 - 9 kHz (can be calculated from 0 to definable upper limit)
Higher Frequencies (2000Hz band)	20 kHz for voltage and current
Symmetrical Components & Unbalance (Pos-, Neg- and Zero Sequence)	Class A
Rapid Voltage Changes	Class A
Flicker (PST, PLT, Pinst)	Class A
Voltage Events (dip, swell, interruption – time, extrema, length)	Class A
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Time Synchronisation	Class A

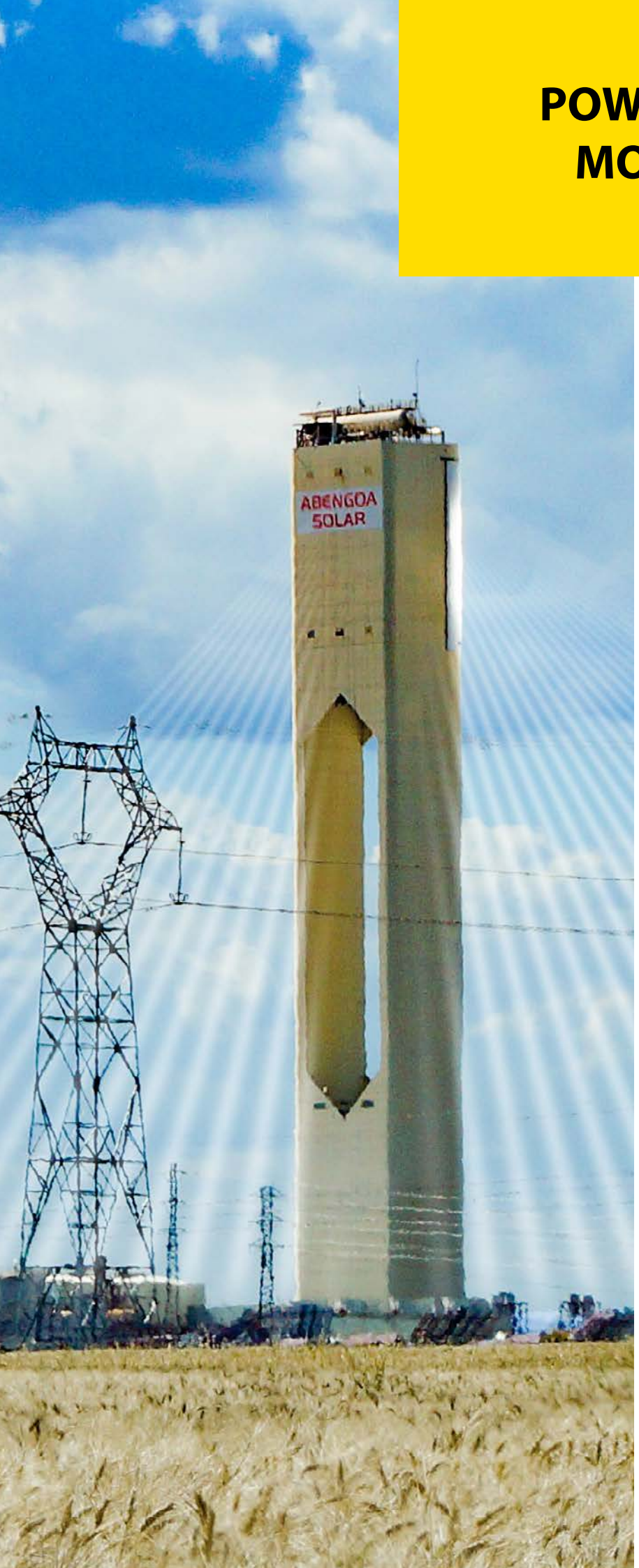
DISTURBANCES AND SYSTEM DYNAMICS



1/2 PERIOD TRIGGER	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
PHASE ANGLE TRIGGER	phi
SYMMETRICAL COMPONENTS	Pos., Neg., Zerosequence
RATE OF CHANGE FREQUENCY (ROCOF)	df/dt
Phasor Measure Unit (PMU) according to IEEE C37.118	Total Vector Error 0.01% (typ.) Angle Error 0.003°(typ) Timestamp Accuracy 0.1 µs up to 50 fps / via TCP / open PDC format / Offline storage possible

ADDITIONAL FEATURES INCLUDE

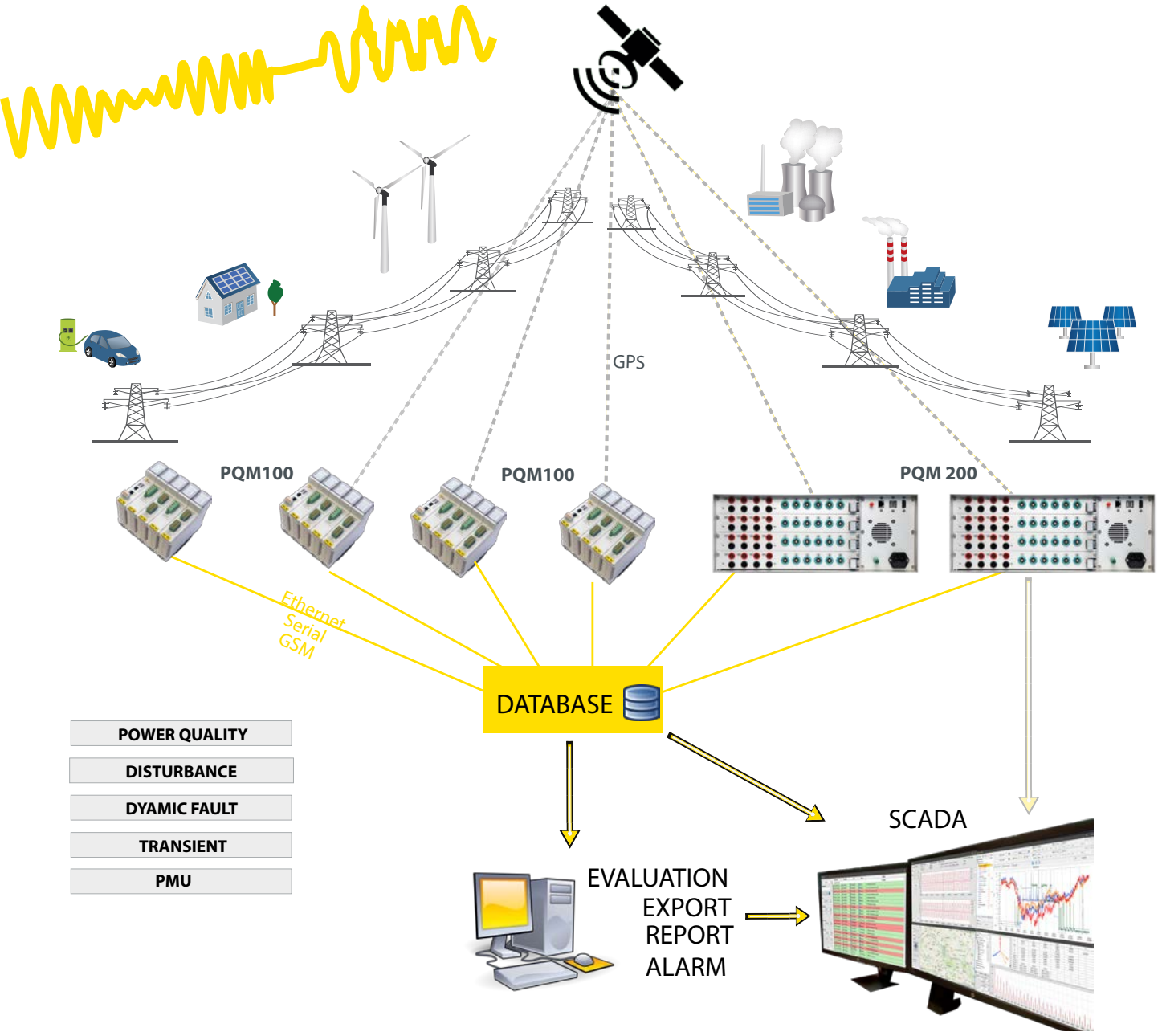
- ☑ **compounded trigger settings**
- ☑ **definable pre-triggers and post-time extensions**



POWER QUALITY MONITORING

neo MESSTECHNIK

OVERVIEW


GPS
PQM100
PQM100
PQM 200
Ethernet
Serial
GSM
DATABASE
POWER QUALITY
DISTURBANCE
DYAMIC FAULT
TRANSIENT
PMU
SCADA
EVALUATION
EXPORT
REPORT
ALARM

PQM 100

Power Quality

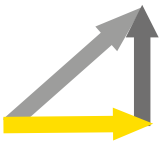
Harmonics, THD Supraharmonics, Symmetrical components etc.

System Dynamics

Phasor Measure Unit (PMU), Rate of Change of Frequency (RoCoF), WAMS, etc.

Transients

1/2 period values, Phase Angle jumps, Resonances, Switching etc.

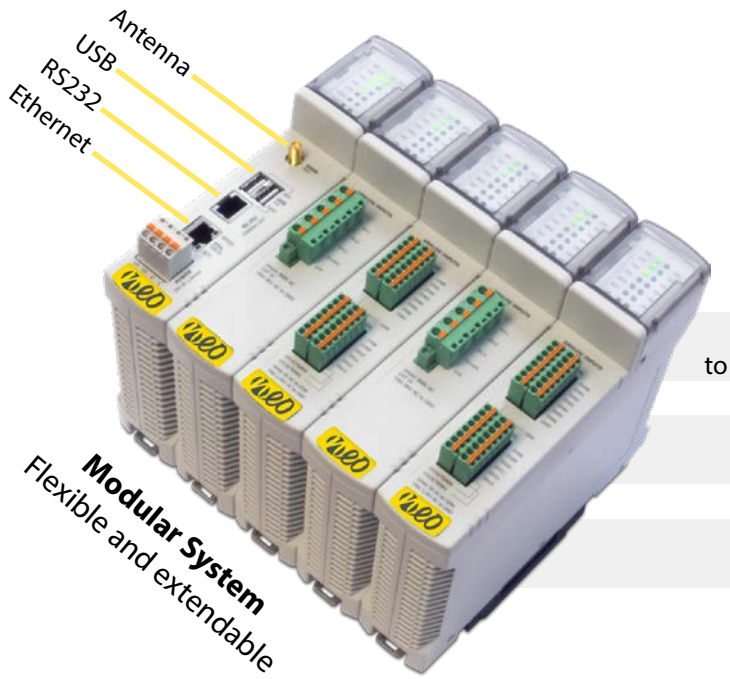


Power

Active, reactive, apparent power, PF, harmonic power, energy, etc.

ACCURACY	0.1%
SAMPLING RATE	16kS/s or 32kS/s
RESOLUTION	24bit
SAFETY CATEGORY	CAT IV 300V
MODULAR SYSTEM	up to 64 ch

PQM 100



LIVE DATA
to SCADA (IEC61850/ 60870-5-104 /Modbus)

HISTORY DATA
to SQL Database

LOCAL DATA
via USB storage

HYBRID DATA STORAGE	DATA ON-DEMAND	REMOTE CONFIGURATION	REMOTE LOCATION
Even if the connection is lost all data are stored locally and will be transmitted after reconnection.	All data can be transferred continuously or just triggered on demand.	The instrument can be configured remotely or locally. Either option also can be disabled.	All data can be transmitted via Ethernet and via a GSM connection.

TECHNICAL SPECIFICATIONS

Operating Temperature	- 25°C up to + 60°C
Storage Temperature	- 30°C up to + 80°C
Humidity	< 95%, no condensation
Nominal Voltage Input	24V DC
Nominal operation input current / power	0,5A / 12W (max. 1,5A / 36W)
Protection	IP20
Power Quality	Class A (according to EN61000-4-30 Ed.3)
Dimensions	180 x 120 x 158 mm (h x w x d)
Weight	1.5kg
Interfaces	Ethernet, USB, Serial Port, RS232(e.g. for reading data of revenue meter)
Data File Format	.csv (for local storage)

Full technical specifications can be downloaded at:
www.neo-messtechnik.com
or requested via
support@neo-messtechnik.com

SPECIFICATIONS

PQM-100 is based on modular architecture, allowing combination of one CPU module and up to 6 selected input modules into one device. The input modules are providing input signal isolation, filtering and A/D conversion. The CPU module is equipped with FPGA real-time controller for the calculation of all parameters and to provide all interfaces and data storage.

CPU MODULE	
CPU	CPU module (667 MHz dual-core, FPGA, real-time OS) with 8-32 GB SD card, Ethernet, serial port, USB for data download and direct PC connection, 24V DC (power supply not included)
OPTIONS	- PQM100-CPU-GPS: extended with an integrated GPS receiver - PQM100-CPU-GPS-F: extended with a fiber optic interface for GPS

INPUT MODULES	
All analog input modules are providing 24 bit sigma-delta A/D conversion.	
HV4	4 channel high voltage input module, 300V RMS range (measuring up to 600V RMS), 16 kS/s or 32 kS/s per channel, 6kV isolation, CAT IV 300V, 1MΩ Input Impedance
HV4LV4	4 channel high voltage input module, 300V RMS range (measuring up to 600V RMS), 16kS/s or 32 kS/s per channel, 6kV isolation, CAT IV 300V, 1MΩ Input Impedance 4 channel low voltage input module, 1V RMS range, 16 kS/s per channel, 2.5kV isolation
LV16	16 channel low voltage input module, 1V RMS range, 16kS/s per channel. 2 channels can be switched to temperature measurement with PT1000
LV8	8 channel low voltage input module, 1V RMS range, 16 kS/s per channel
LA5-1	5 channel current input module, 1A RMS range, 16 kS/s per channel
LA5-5	5 channel current input module, 5A RMS range, 16 kS/s per channel
DIO	8x Digital Input (24 V DC, galvanic isolated, CAT III 150V) 4x Digital Out (Relays, 8A/250V AC, galvanically isolated, CAT III 300V)

PQM 100

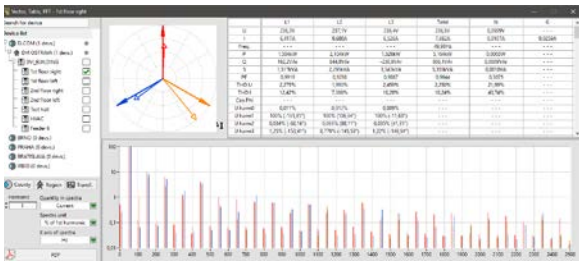
TURNKEY SOLUTIONS

We can provide turnkey solution for your project. After discussing the requirements, we will create a specification book including plans (circuit plan, item list, etc.) and schematics.

After approval you will receive your turnkey measurement solution. One example is shown in the picture. In addition to the measurement instrument, other electrical equipment such as a power supply, protection,wiring etc. is provided in a cabinet.

PQM-SCADA

PQM-SCADA is the enterprise management software for Power Quality Analyzers. PQM-SCADA software shows real-time data of all the PQ instruments as well as historical data stored in a central server or cloud storage. Data visualization, data analysis, report generation (EN50160), and notifications are just a few of the powerful features of PQM-SCADA software.



PQM MONITORS

	PQM 100	PQM 200
		
Accuracy	0.1%	0.05%
Sampling Rate	16kS/s or 32kS/s	144kS/s
Resolution	24bit	24bit
Safety	CAT IV 300V	CAT IV 600V

PQM 200

Power Quality

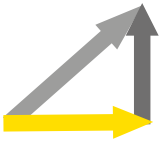
Harmonics, THD Supraharmonics, Symmetrical components etc.

System Dynamics

Phasor Measure Unit (PMU), Rate of Change of Frequency (RoCoF), WAMS, etc.

Transients

1/2 period values, Phase Angle jumps, Resonances, Switching etc.



Power

Active, reactive, apparent power, PF, harmonic power, energy, etc.

ACCURACY	0.05%
SAMPLING RATE	124kS/s
RESOLUTION	24bit
SAFETY CATEGORY	CAT IV 600V
MODULAR SYSTEM	up to 40 ch
DESKTOP or RACK-MOUNT	

PQM 200

LIVE DATA
to SCADA (IEC61850/60870-5-104/Modbus)

HISTORY DATA
to SQL Database

LOCAL DATA
via USB storage

HYBRID DATA STORAGE	DATA ON-DEMAND	REMOTE CONFIGURATION	REMOTE LOCATION
Even if the connection is lost all data are stored locally and will be transmitted after reconnection.	All data can be transferred continuously or just triggered on demand.	The instrument can be configured remotely or locally. Either option also can be disabled.	All data can be transmitted via Ethernet and via a GSM connection.

PQM-200 is a computer-based Power Quality Monitor with up to 48 input channels. It combine functionalities of a Power Quality Monitor, Disturbance Recorder, Power Fault Recorder, Transient Recorder, Phasor Measure Unit (PMU) and high precision energy meter. The input modules are fully-isolated (isolation voltage 6kV) and provide a synchronized sampling rate of 144 kS/s per channel and 24 bit resolution. An Automatic Anti-Aliasing filter together with extremely low-noise ensures signal quality and signal processing.

COMPUTER BOARD	
CPU	Intel i5 or i7 (optional) 8GB RAM (optional 16GB or 32GB) 1TB HDD (optional 256GB SSD + 2TB HDD)
OPTIONS	GSM modem (integrated) GPS Antenna
INPUT MODULES	
Each instrument can be equipped by 4 input modules	
4HV4LV	4 channel high voltage input module 1600V 4 channel low voltage input module up to 10V (Clamp or Rogowski) Optional: 1x CAN2.0B and 1x RS485 Interface Optional: 8x Digital In and 2x Digital Out
4HV4LA	4 channel high voltage input module 1600V DC 4 channel current input module up to 5A rms (max. 20A) Optional: 1x CAN2.0B and 1x RS485 Interface Optional: 8x Digital In and 2x Digital Out
4HV6LV	4 channel high voltage input module 1600V 6 channel low voltage input module up to 10V (Clamp or Rogowski)
4HV6LA	4 channel high voltage input module 1600V DC 6 channel current input module up to 5A rms (max. 20A)
16DI16DO	16x Digital input and 16x Digital output 1x CAN2.0B, 1x RS485

HIGH-VOLTAGE (HV) INPUT SPECIFICATION	
Measurement Range	1600V
Accuracy	0.05%
Safety and Isolation	6kV isolation (60 sec) CAT III 1000V / CAT IV 600V
Sampling Rate	124kS/s per channel (selectable)
A/D Conversion	24 bit sigma-delta A/D conversion with an automatic Anti-Aliasing Filter
Bandwidth	70kHz (Alias-free)
Input Impedance	3.8MOhm
Connector Type	Banana, Screw Terminal

LOW-VOLTAGE (LV) INPUT SPECIFICATION	
Measurement Range	2mV, 20mV, 200mV, 1V, 2V, 5V, 10V
Input Type	Clamp or Rogowski (Integrator inside instrument)
Accuracy	0.05%
Sampling Rate	124kS/s per channel (selectable)
A/D Conversion	24 bit sigma-delta A/D conversion with an automatic Anti-Aliasing Filter
Bandwidth	70kHz (Alias-free)
Input Impedance	10MOhm
Excitation Voltage	±15V /12V / 3.3V
Connector Type	LEMO, DSUB9

CURRENT (LA) INPUT SPECIFICATION	
Measurement Range	5A rms (max. 20A peak)
Accuracy	0.05%
Sampling Rate	124kS/s per channel (selectable)
A/D Conversion	24 bit sigma-delta A/D conversion with an automatic Anti-Aliasing Filter
Bandwidth	70kHz (Alias-free)
Connector Type	Screw Terminal

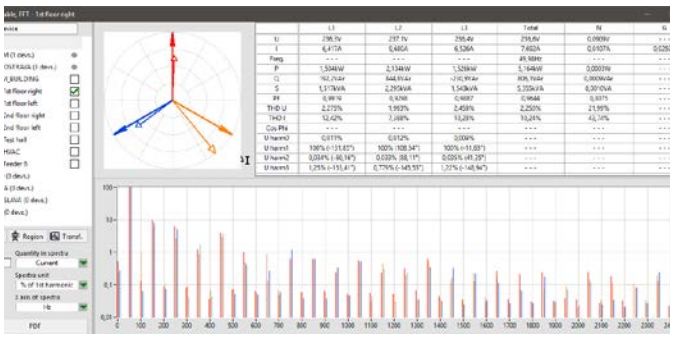
DIGITAL IN / OUT SPECIFICATION	
Digital In	1kV isolation / adjustable trigger levels
Digital Out	PhotoMOS Relais, 350Vp / 0,12A
CAN 2.0B	1kV isolation
RS-485	1kV isolation

Modular

Exemplary Configurations with different types of connectors

TECHNICAL SPECIFICATIONS	
Operating Temperature	0°C up to + 50 °C (32°F to 122°F)
Storage Temperature	-20°C to + 80°C (-4°F to 176°F)
Humidity	< 95%, no condensation
Nominal Voltage Input	85-264V AC / 47-63Hz
Protection	IP20
Power Quality	Class A (according to EN61000-4-30 Ed.3)
Dimensions	19" 4x height units 170 x 484 x 381 mm (h x w x d)
Weight	8.8kg
Interfaces	Ethernet, USB, WiFi, Bluetooth, RS232(optional)
Data File Format	.csv (for local storage)

We are also happy to send you a hard copy of the catalog.
Just send us an email to sales@neo-messtechnik.com



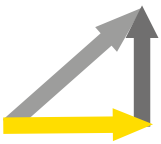
	PQM 100	PQM 200
		
Accuracy	0.1%	0.05%
Sampling Rate	16kS/s or 32kS/s	144kS/s
Resolution	24bit	24bit
Safety	CAT IV 300V	CAT IV 600V

POWER QUALITY

POWER

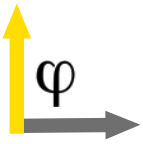
Voltage
Current

Power



Vector

Reactive Power



Energy

Digital Signalling

Power Calculation	P, Q, S, PF, cos phi, D, DH, QH
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Energy	Total, positive, negative (P, Q, P+, P-, Q+, Q-)
Efficiency	DC / AC, U-I Curve for PV
Wiring	DC, 1-Phase, 2-Phase, 3-Phase Star and Delta

WAVEFORM & TRANSIENTS

Transients

Resonances Oscillations

Switching

DC Offset

Overvoltage

Undervoltage

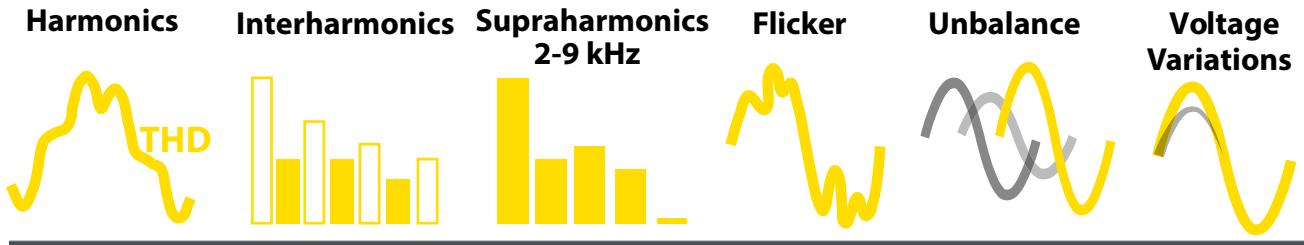
MIN, MAX, RMS, AVE	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
ENVELOPE / WINDOW	U, I
DELTA	dU, dI, df, dP, etc.
DERIVATE (RATE OF CHANGE)	dU/dt, df/dt etc. … per ms, number of periods or half-period
VOLTAGE SIGNALLING	Threshold
EN50160	Trigger on any EN50160 parameter (Max, Quantil)

COMPLYING STANDARDS

POWER QUALITY, HARMONICS, FLICKER:
IEC61000-4-30 Ed. 3 Class A / IEC61000-4-7 / IEC61000-4-15 /
IEC62586-2 Ed. 2 / IEC62586-1
PUBLIC GRID, RAILWAY AND INDUSTRY
EN50160 / EN50163 / IEC61000-2-2 / IEC61000-2-4 (Class 1; 2; 3) /
IEEE519 / IEEE 1159 / IEC61000-2-12 / NRS048
WIND POWER, RENEWABLES AND GRID CODES
IEC61400-21 / IEC61400-12 / FGW-TR3 / VDE N-4105 / VDE N-4100 /
VDE N-4110 / D-A-CH-CZ / BDEW / ROCOF / IEEE C37.118-2005 (PMU)
MOTORS, TRANSFORMERS AND ELECTRICAL EQUIPMENT
IEC60034 / IEC 60076-1 / IEC61000-3-2 / IEC61000-3-3 / IEC61000-3-11 / IEC61000-3-12

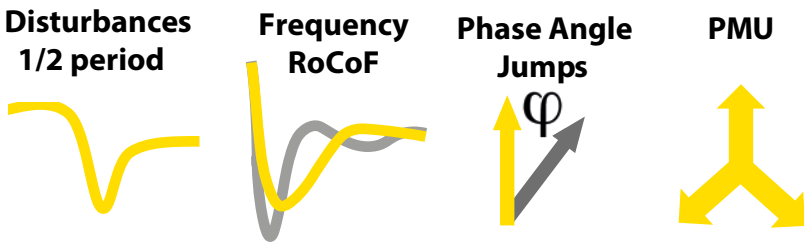
CLASS A

POWER QUALITY

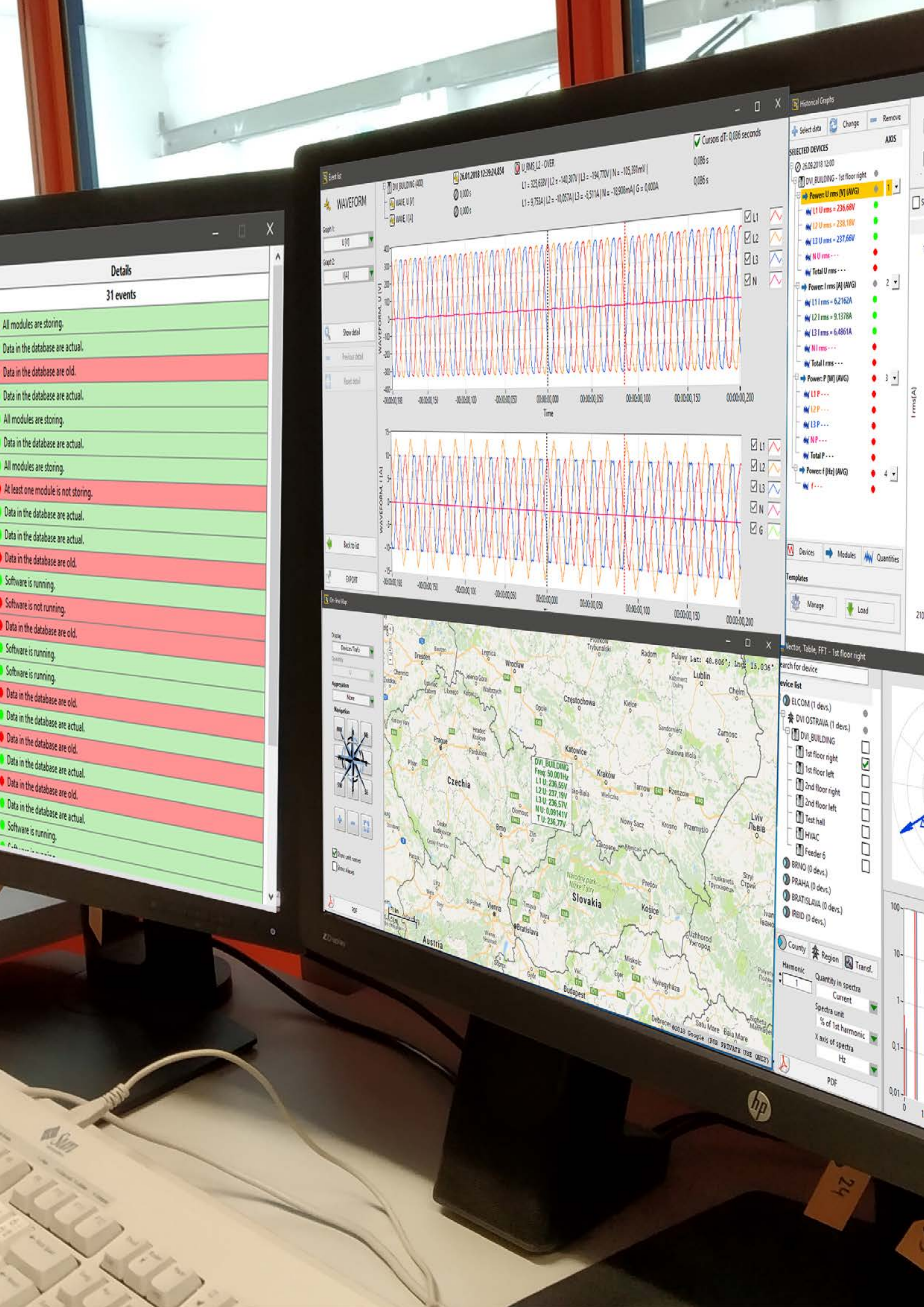


according to IEC 61000-4-30 Ed.3 and IEC 62586	
Harmonics (Voltage, Current, Phi, Power)	Class A
Interharmonics	Class A
THD U, THD I	Class A
Higher Frequencies (200Hz band)	2 - 9 kHz (only PQM 200)
Higher Frequencies (2000Hz band)	-
Symmetrical Components & Unbalance (Pos-, Neg- and Zero Sequence)	Class A
Rapid Voltage Changes	Class A
Flicker (PST, PLT, Pinst)	Class A
Voltage Events (dip, swell, interruption – time, extrema, length)	Class A
Frequency	10 sec, AVE, MIN, MAX
Voltage, Current	RMS, AVE, MIN, MAX, ½ Period-values, 200ms, 10s, 10min
Time Synchronisation	Class A

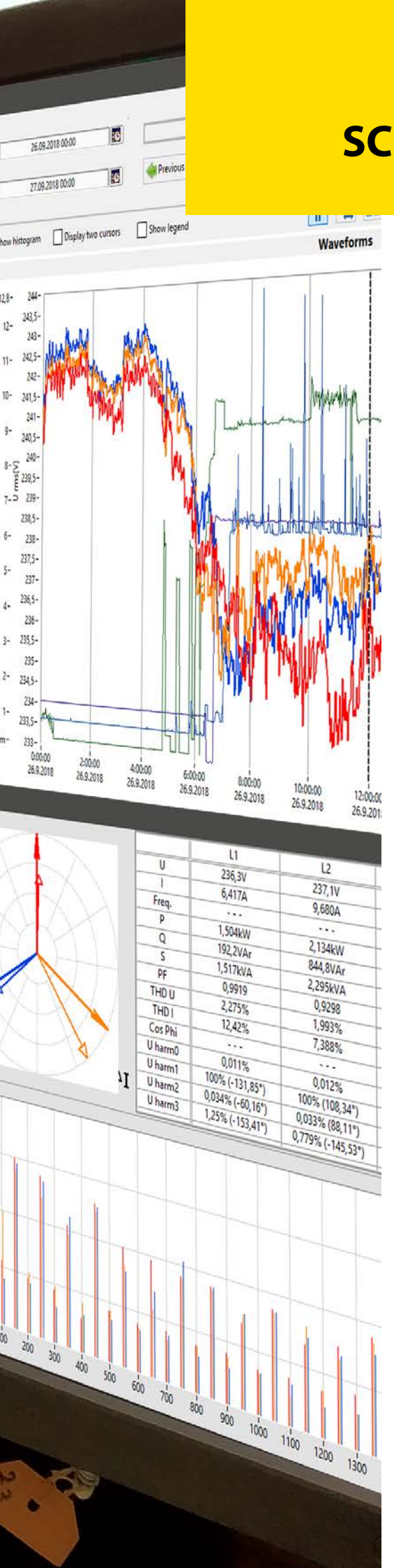
DISTURBANCES AND SYSTEM DYNAMICS



1/2 PERIOD TRIGGER	U, I, P, Q, S, f, PF, phi, THD, Harmonics, Interharm., Unbalance, etc.
PHASE ANGLE TRIGGER	phi
SYMMETRICAL COMPONENTS	Pos., Neg., Zerosequence
RATE OF CHANGE FREQUENCY (ROCOF)	df/dt
Phasor Measure Unit (PMU) according to IEEE C37.118	Total Vector Error 0.01% (typ.) Angle Error 0.003°(typ) Timestamp Accuracy 0.1 µs up to 50 fps / via TCP / open PDC format / Offline storage possible


Details
31 events
All modules are storing.
Data in the database are actual.
Data in the database are old.
Data in the database are actual.
All modules are storing.
Data in the database are actual.
All modules are storing.
At least one module is not storing.
Data in the database are actual.
Data in the database are actual.
Data in the database are old.
Software is running.
Software is not running.
Data in the database are old.
Software is running.
Software is running.
Data in the database are old.
Data in the database are actual.
Data in the database are old.
Data in the database are actual.
Data in the database are old.
Data in the database are actual.
Software is running.
WAVEFORM
Cursors dT: 0,086 seconds
Historical Graphs
Select data
Change
Remove
SELECTED DEVICES
Devices
Modules
Quantities
Templates
Manage
Load
Vector, Table, FFT - 1st floor right
Device list
ELCOM (1 devs.)
DVI OSTRAVA (1 devs.)
DVI_BUILDING
1st floor right
1st floor left
2nd floor right
2nd floor left
Test hall
HVAC
Feeder 6
BRNO (0 devs.)
PRAHA (0 devs.)
BRATISLAVA (0 devs.)
IRBID (0 devs.)
County
Region
Transf.
Harmonic
Quantity in spectra
Current
Spectra unit
% of 1st harmonic
X axis of spectra
Hz
PDF
Czechia
Slovakia
Austria
DVI_BUILDING
Freq: 50,001Hz
L1 U: 236,55V
L2 U: 237,19V
L3 U: 236,57V
N U: 0,09141V
T U: 236,77V
Navigation

DATABASE
SCADA & CLOUD

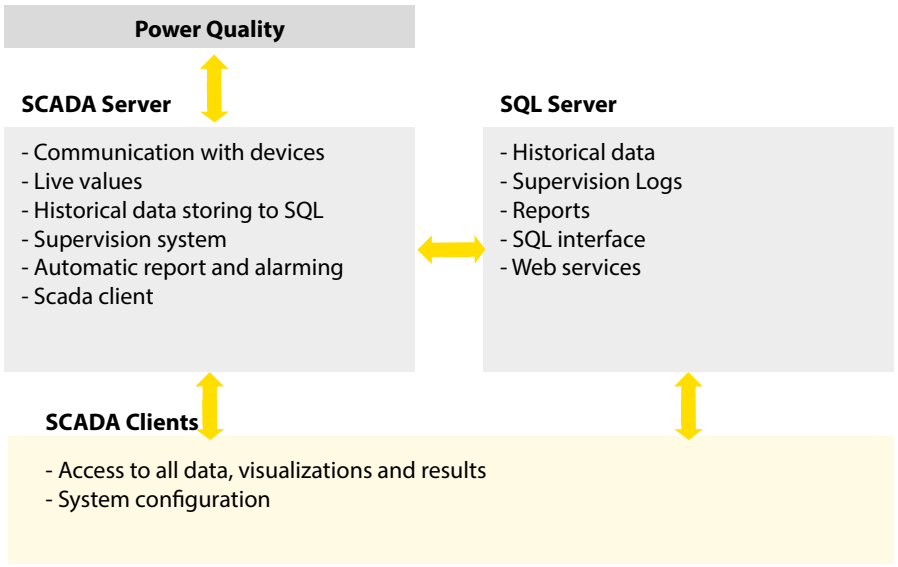


neo MESSTECHNIK

INTRODUCTION

PQM-SCADA is the enterprise management software for Power Quality Analyzers and Disturbance Recorders. PQM-SCADA software shows real-time data from all the PQ instruments as well as historical data stored in a central server or cloud storage.

- Real-Time Data
- Historical data
- Multiple Visualization
- Automatic Report Generation (EN50160)
- Notifications, Alarm, Email, SMS
- Remote meter configuration
- User Management tool



This central software can communicate with hundreds of instruments, and can support third party PQ meters (if documentation is provided). Data migration from existing data bases is possible as well as interfaces. Typical usage of PQM-SCADA is to monitor power quality and other parameters of the transmission or distribution grid.

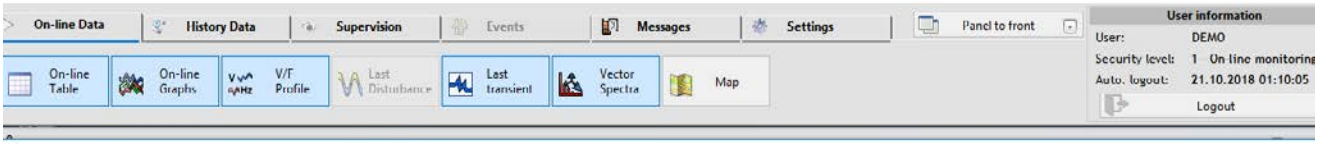
CONNECTIVITY & INTERFACES

The PQM-SCADA system can communicate with other systems, and can also provide data to any third party system. The User Management tool allows an unlimited number of users to be added with different access and security levels.

PQM SCADA

OVERVIEW

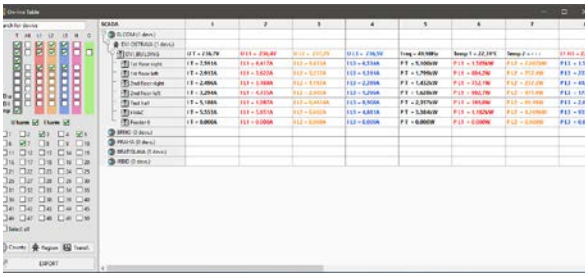
This PQM-SCADA enterprise is an easy-to-use software solution which allows the user to visualize live-data, historical data or reports. The multi-screen capability gives the user the ability to design their own visualization screens including the use of multiple monitors. User-management with different access and security levels is integrated…. even the possibility to give your customers access to view limited data. The following picture shows the Overview & Configuration menu.



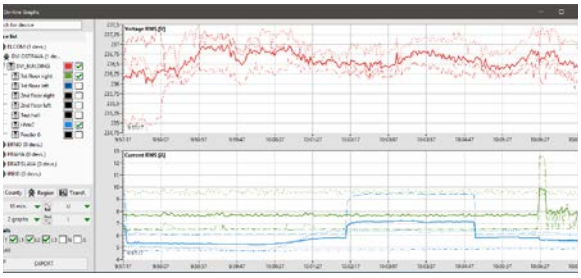
LIVE DATA

All visualizations are flexible and can easily be configured (parameters, colors, etc.). All graphs can be shown simultaneously.

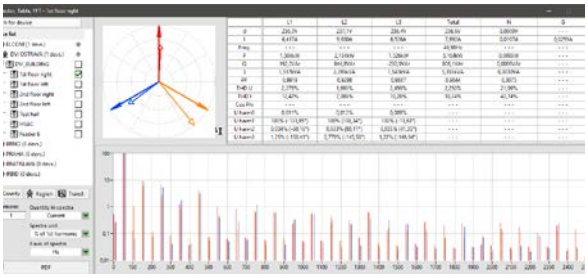
TABLES



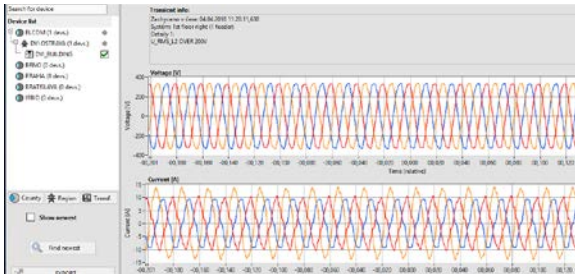
GRAPHS



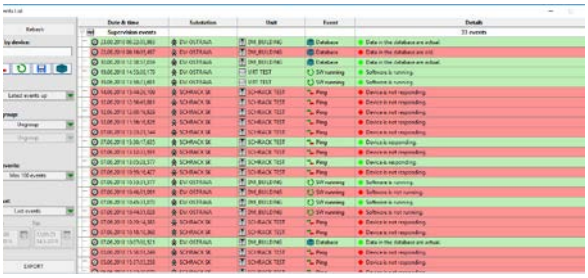
VECTOR / HARMONICS



LAST TRANSIENT / DISTURBANCE



SUPERVISION



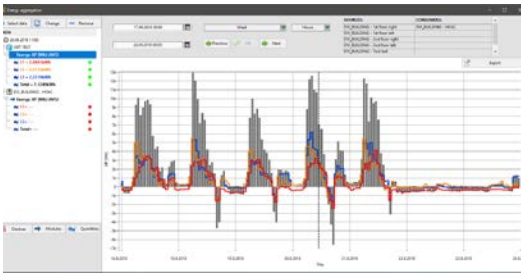
MAPS

HISTORICAL DATA

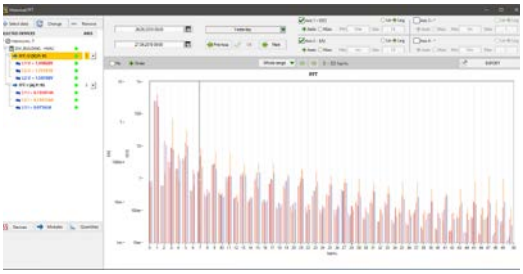
The powerful analysis capabilities allows for comprehensive data analysis inside the enterprise software.

GRAPHS

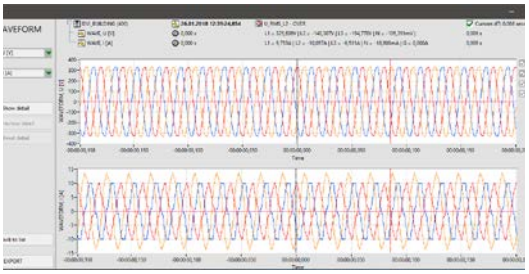
ENERGY



FFT

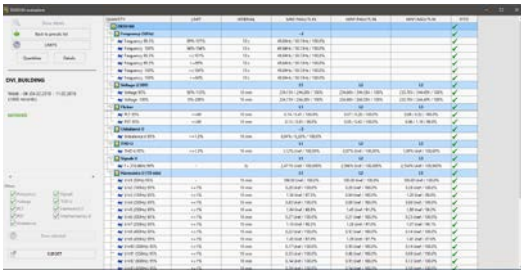


TRANSIENTS / WAVEFORM

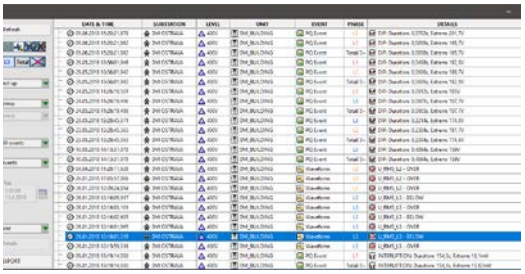


HISTOGRAM

AUTOMATIC EN50160 REPORT



EVENT LIST



EVENT STATISTICS

ADDITIONAL FEATURES

There are additional features such as alarms, notifications, emails and SMS services. All PQM and PQA meters can be configured remotely (firmware, software, configuration etc.). This powerful system monitors each device status and its fault state. The supervision overview distinguishes between two states: OK and Failed. Some of the functions available for monitoring include: ping, sw running, data storing, data in the database, etc.

APPLICATIONS

PMU - PHASOR MEASUREMENT UNIT

Highest Precision Synchrophasor Measurement

PMU - The Phasor Measurement Unit is a device for accurate synchrophasor measurements. The measurement results are used for the online detection of the electrical grid status. This principle is based on comparing the phase angles of the fundamental harmonic measured at different points of the distribution or transmission network using several devices at synchronized points in time.

High-Accurate GPS Receiver
The meter has to be equipped by the internal/external GPS for receiving synchronous timestamps.

Additional Sensor and Range calibration
The additional sensor and measurement range calibration (see chapter PQA8000 calibration) enables for highly accurate measurement results.

IEEE C37.118
The PMU firmware measures voltage and current phasors, frequency, and calculates the positive symmetrical components of voltages and currents. The measured data is sent to the superior system according to the IEEE C37.118 communication protocol. By default, the device fully complies with the requirements of IEEE C37.118, which defines the PMU accuracy in stabilized state and a communication protocol for real-time phasor transmission.

The PQA8000 instrument offers a built-in GPS receiver together with highly-accurate voltage inputs and
- Total Vector Error 0.01% (typ.)
- Angle Accuracy 0.003° (typ.)

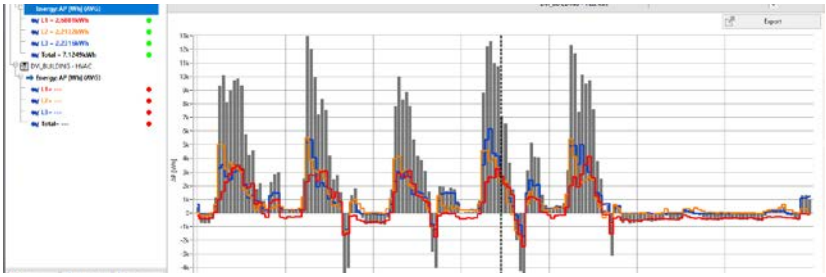
WAMS - Wide Area Monitoring System

Phasor angle differences between various parts of the transmission grid are an indicator of grid health and can provide early warning in the case of developing power system disturbances that can lead to grid separation known as islanding, or even blackout. The accurate measurement of the phasor angles across the grid is made possible by the use of GPS-synchronized phasor-sampling clocks. Nationwide networks of time-synchronized phasor measurement units (PMUs) are called Wide Area Monitoring Systems (WAMS).

The main features of the WAMS systems are the visualization and monitoring of phasors , islanding detection, resynchronization and black start detection, oscillations detection, stability and voltage monitoring. The results can also be transmitted to SCADA

ENERGY MEASUREMENT

Meter input modules are designed to measure one 3-phase voltage and multiple 3-phase current systems. The intention of this meter is typically to monitor the distribution transformer powering multiple output feeders. The functionality of multi-feeder-monitors is similar to a PQ meter, with the possibility of measuring up to 10x the number of 3-phase feeders in total. The multi-feeder-monitor also provides detailed information about the power and energy consumption of each feeder




Delamination,
Discoloration
PID
Shading
Cell Crack
Soiling & Dirt
Corrosion

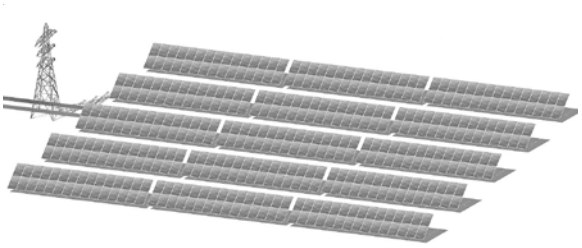
SOLAR / PV TESTSYSTEMS

MULTI-CHANNEL IV CURVE TRACER

SOLAR PHOTOVOLTAIC POWER PLANTS

The number of solar power plants has been steadily increasing over the past years. Photovoltaic systems are known for:

- Long lifetime
- Low aging effects
- Low maintenance
- Low operating costs
- Easy Installation
- Robust



Nevertheless different kind of faults in PV systems can occour.

Performance losses of **>10%** within **3 years** are very common

Most faults are not detectable by visual inspection

Mismatch losses of PV strings are **10x** to **100x** times higher than defect panels

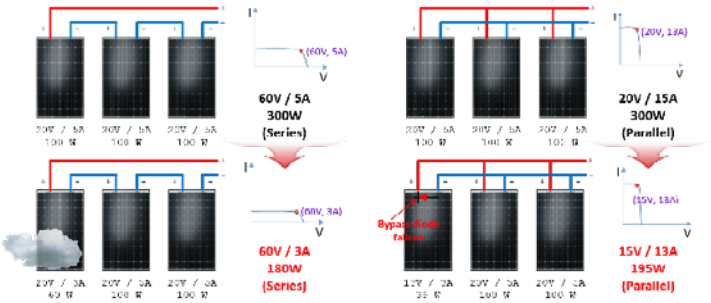
Faults

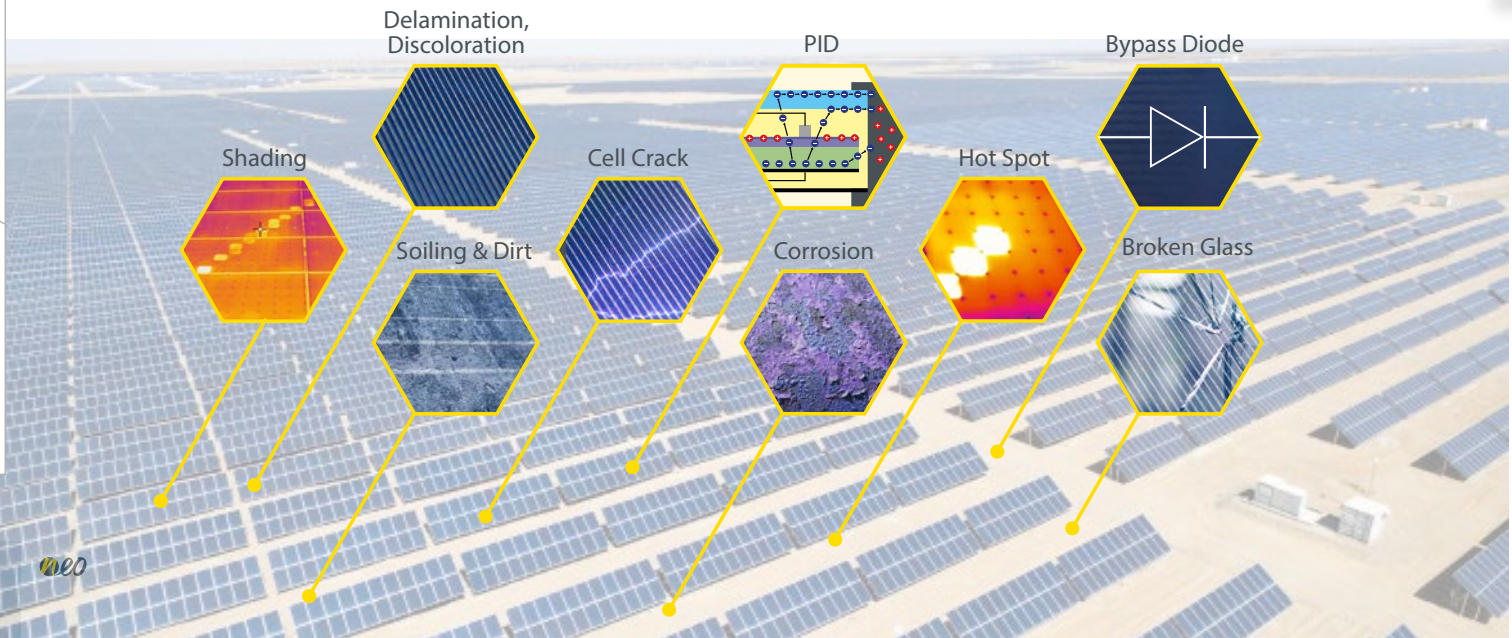
Possible faults at photovoltaic panels and systems are:

- Mismatch Losses
- Hotspots
- Potential Induced Degradation
- Shading
- Bypass diode defect
- Cell Cracks
- Glass breakage
- Soiling
- Snail Trails
- Delamination
- Discoloration
- Corrsoin
- etc.

Mismatch Losses

Mismatch losses occur at serial or parallel connection of PV panels due to differing electrical characteristics. The reasons for mismatch can be: different panels, different elevation, shading, hotspots, PID, any other faults. The following picture gives an explanation of the losses due to serial (left) and parallel (right) connection:

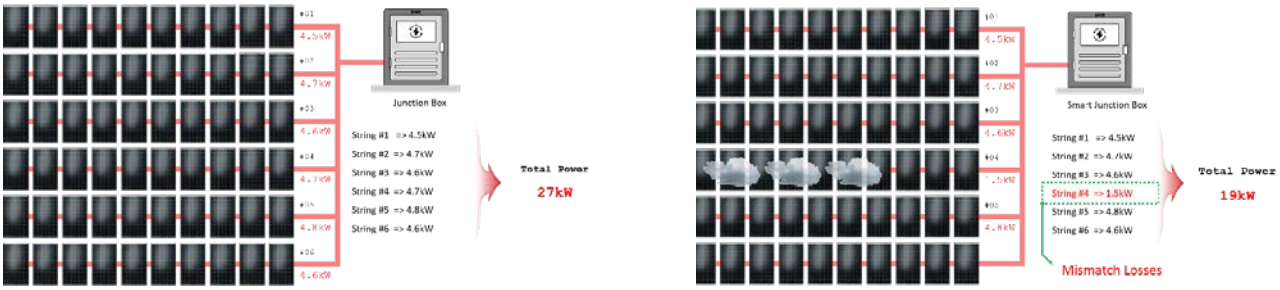




IV CURVE TRACING

Example Mismatch Losses PV park

In solar farms usually a combination of series and parallel connection of PV panels is used in order to use the full MPP input range of inverters. Via series connection panels will be connected to a PV-String. Connecting this PV strings together via parallel connection will represent a PV-Array. If now one string of the PV-array will reduce it's output power due to any defective module or tempory shading, not only the power of this string will be reduced. The whole system voltage (parallel connection of voltage sources) will decrease and the power of the whole array decreases. In the example below the output power of the array will be reduced by 8 kW (30%) instead of 3kW (10% reduction at string) due to this Mismatch losses.



Inspection Methods

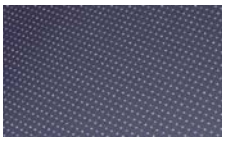
Beside visual inspection the following inspection methods are used:

- Thermal Imaging

This technique is most used for inspection of PV plants. It requires Know-How for execution and analysis of the measurements. Often drones are required and the power plant needs to be in full operation (heat). It allows
detection of different kind of faults and to find broken components. Nevertheless Mismatch losses and PID can not be detected.

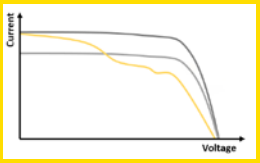
- Electroluminescence

This technique is mainly done in laboratories. Modules will get activated by current injection. Measurements are done without solar radiation (by night). It allows detailed analysis of PV panels. Nevertheless mobile measurement systems are not available. The systems require high power for signal injection.



IV Curve Tracing

This technique will record the voltage and current profile (IV curve) of PV panels starting at the openc-circuit voltage (Voc) to the short-circuit current (Isc). Depending of the shape of the curve, different faults can be detected.



Multi-Channel IV-Curve Tracer

PV MASTER 70

Safety
Measurement system for safety and performance check.

Leakage
Detection of leakage currents

Diagnosis
Automatic detection of Mismatch, Hotspot, PID, Shading, Bypass Diode, etc.

Efficiency
Power & efficiency according to IEC62446-2

Measurement of solar radiation, panel and ambient temperature and conversion to STC

AI (artificial intelligence) for automatic system diagnostic and performance

CPU		Intel© Processor E3940 @ 1,6 GHz	
RAM		8 GB	
SSD		2x 256GB SSD	
OS		Windows 10 IoT	
Display		10.1 " TFT LCD Display(Touch), 800cd, 1280x800	
PC Interface		2 x USB, 1 x Ethernet, 1x RS-485 1 x WiFi	
Channel	Voltage	20 CH(for IV curve) + 2 CH(for potential voltage)	
	Current	20 CH (IV curve)	
Measurement Range	Voltage	1100 [V] (IV curve), 1600 [V] (potential voltage)	
	Current	40 [A] (IV curve)	
ADC	ADC Type	Delta-Sigma ADC	
	Sampling Rate	Max. 144 kS/s	
Analog Input	BNC Type	1 CH (10 V)	
	Thermocouple (K-Type)	Channel	2 CH
		Temp. Range	-100℃ to 300℃
Power Supply		90 ~ 250 VAC / 47 ~ 63 Hz	
Size (Width x Length x Height)		487 x 325 x 175 mm 19.2 x 12.8 x 6.9 inch	
Temperature Range	Operation		
	Storage	-20℃ to 80℃ -20℃ to 80℃ / -4°F to 176°F	

20 CHANNELS
Simultaneous measurement and diagnostics of up to 20 strings (channels) using Time-Sync technology.

up to 1600V / 40A
Designed for high-power applications (high voltage / high current)

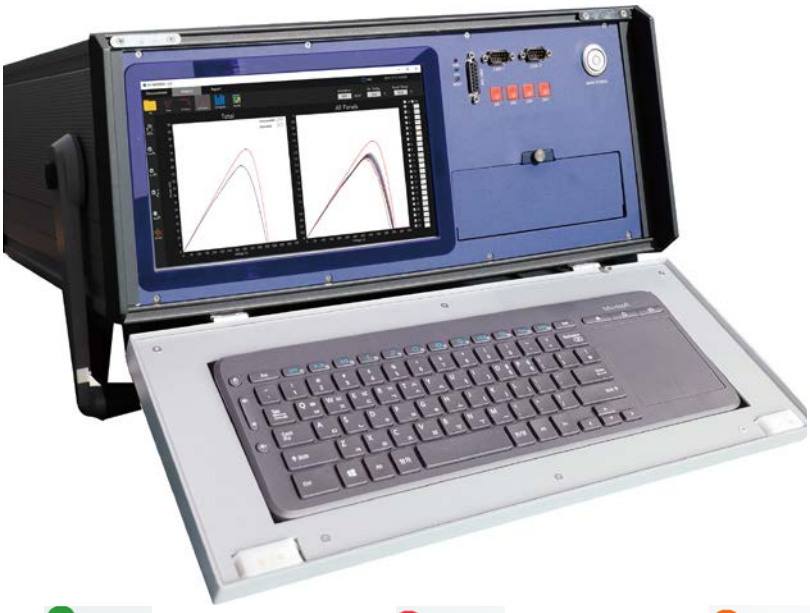
MOBILE OPERATION
The integrated battery pack allows an operating time of up to 4 hours of operation.

SMART TOUCH
The 10.1 inch Smart Touch display responds immediately without any delay with intuitive operation like on a mobile phone.

Multi-Channel IV-Curve Tracer

MESSTECHNIK

PV MASTER 80



Measurement of solar radiation, panel and ambient temperature and conversion to STC

AI (artificial intelligence) for automatic system diagnostic and performance

1 Safety
Measurement system for safety and performance check (option)

2 Leakage
Detection of leakage currents (option)

3 Diagnosis
Automatic detection of Mismatch, Hotspot, PID, Shading, Bypass Diode, etc.

4 Efficiency
Power & efficiency (IEC62446-2)

CPU		Core i7 - 8700 (3.2 GHz)	
RAM / SSD		16 GB / 500GB	
OS		Windows 10 IoT Enterprise 2019 LTSC	
Display		10.1 " Display(Touch)	
PC Interface		6 x USB, 1 x HDMI, 2 x Ethernet, 1 x RS-485	
Channel (1 Module, max 6)	Voltage	4 CH (Max. 24 CH)	
	Current	4 CH (Max. 24 CH)	
Measurement Range	Voltage	1100 [V]	
	Current	40 [A]	
ADC	ADC Type	SAR ADC	
	Sampling Rate	Max. 1 MS/s	
Analog Input	BNC Type	1 CH (10 V)	
	D - SUB (9 PIN) Type	1 CH (10 V) (±12, 15, 24V External Power)	
	Thermocouple (K-Type)	Channel	2 CH
		Temp. Range	-100℃ to 300℃
Power Supply		90 ~ 250 VAC / 47 ~ 63 Hz	
Size (Width x Length x Height)		470 x 517 x 207 mm 18.5 x 20.35 x 8.14 inch	
Temperature Range	Operation	0℃ to 60℃ / 32°F to 140°F	
	Storage	-20℃ to 80℃ / -4°F to 176°F	

24 CHANNELS
Simultaneous measurement and diagnostics of up to 24 strings (channels) using Time-Sync technology.

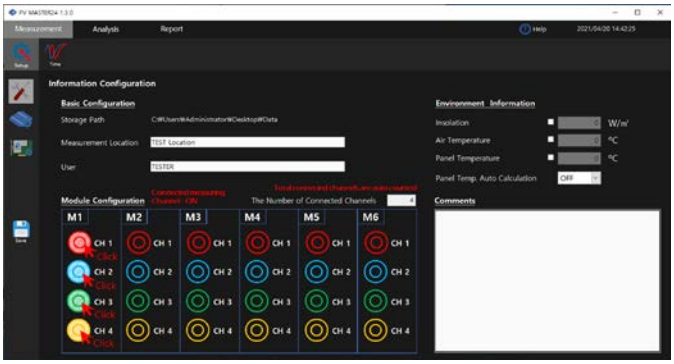
1100V / 40A
Designed for high-power applications (high voltage / high current)

RACK MOUNT
Ruggedized unit for both labrotary and field tests.

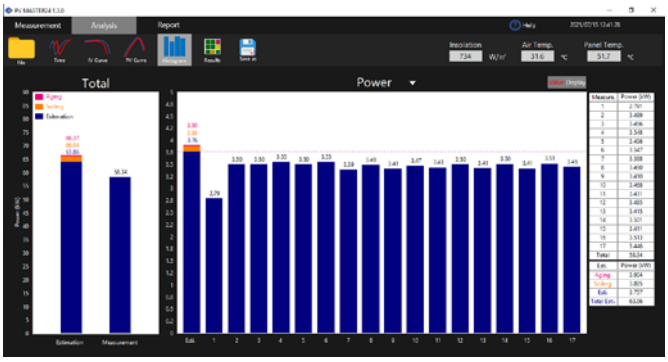
SMART TOUCH
The 10.1 inch Smart Touch display responds immediately without any delay with intuitive operation like on a mobile phone.

Software

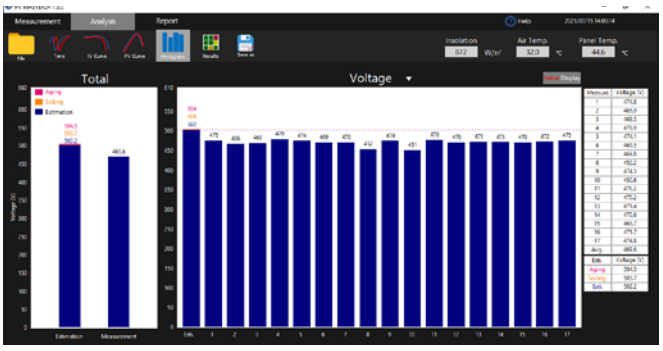
EASY CONFIGURATION



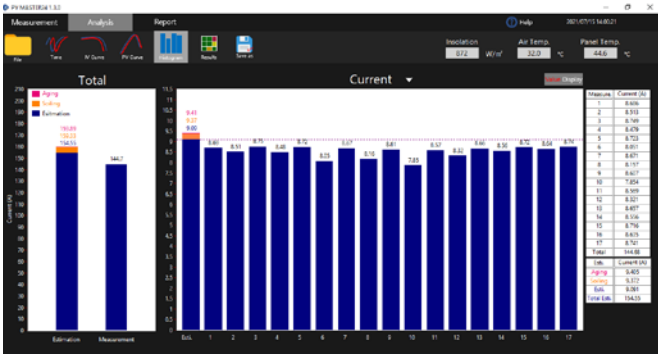
MULTI-CHANNEL POWER ANALYSIS



MULTI-CHANNEL CURRENT

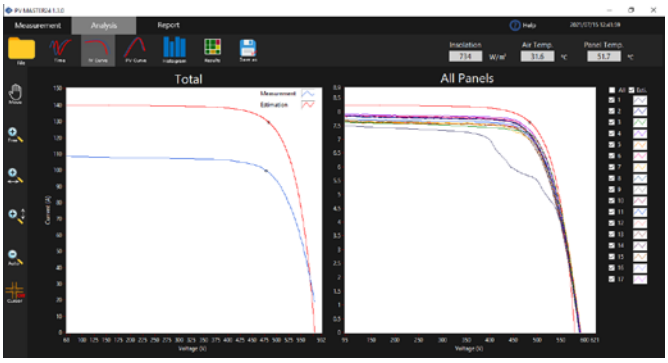


MULTI-CHANNEL VOLTAGE

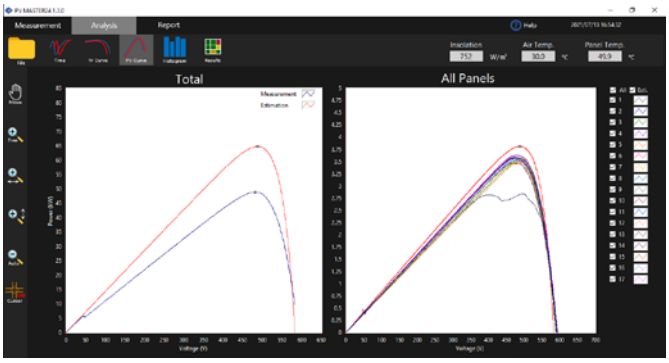


Highlights

MULTI-CHANNEL IV-CURVE



MULTI-CHANNEL PV-CURVE



AUTOMATIC DIAGNOSTIC

FAULT DETECTION:
- Mismatch Losses
- Bypass diode breakage
- Potential Induced Degradation (PID)
- Hotspot
- Shading
- Leakage

and a lot more...

IEC 62446-2
INTERNATIONAL STANDARD
NORME INTERNATIONALE

ACCESSORIES

AC CLAMPS

CLAMP-5AC

Type	Iron-Core
Range	5 A
Bandwidth	20 kHz
Accuracy	0,5 - 6A: ± 0,5 % of reading (with NEO calibration typ. ≤ 0.2 %) 0,1 - 0,5A: ± 1 % of reading (with NEO calibration typ. ≤ 0.3 %) 5mA -0,1 A: ± 2 % of reading (with NEO calibration typ. ≤ 0.8 %)
Phase	1 - 12A: ± 0,5 ° (with NEO calibration typ. ≤ 0.5 °) 0,5 - 1A: ± 1 ° (with NEO calibration typ. ≤ 0.5 °) 5mA - 0,5 A: ± 2 ° (with NEO calibration typ. ≤ 1 °)
Sensitivity	100 mV/A
Dimensions	102 x 34 x 24 mm (Clamp Opening d = 15mm)

CLAMP-20AC

Type	Iron-Core
Range	20 A
Bandwidth	20 kHz
Accuracy	0,5 - 20A: ± 1 % of reading (with NEO calibration typ. ≤ 0.5 %) 5mA - 0,5 A: ± 2 % of reading (with NEO calibration typ. ≤ 1 %)
Phase	0,5 - 20A: ± 2 ° (with NEO calibration typ. ± 0.5 °) 5mA - 0,5 A: ± 2 ° (with NEO calibration typ. ± 1 °)
Sensitivity	10 mV/A
Dimensions	102 x 34 x 24 mm (Clamp Opening d = 15mm)

CLAMP-200AC

Type	Iron-Core
Range	200 A
Bandwidth	10 kHz
Accuracy	100 - 240 A: ± 1% of reading (with NEO calibration typ. ≤ 0.8 %) 10 - 100 A : ± 2,5% of reading (with NEO calibration typ. ≤ 1 %) 0,5 - 10 A: ± 3,5% of reading (with NEO calibration typ. ≤ 2 %)
Phase	100 - 240 A: ≤ 2,5° (with NEO calibration typ. ≤ 1.5°) 10 - 100 A : ≤ 5° (with NEO calibration typ. ≤ 3°) 0,5 - 10 A: not specified
Sensitivity	10 mV/A
Dimensions	135 x 51 x 30 mm (Clamp Opening d = 22mm)

CLAMP-1000AC

Type	Iron-Core
Range	1000 A
Bandwidth	10 kHz
Accuracy	100A - 1200 A : 0,3% (with NEO calibration typ. ≤ 0.2 %) 10A - 100 A: 0,5% (with NEO calibration typ. ≤ 0.3 %) < 1A: 2 % (with NEO calibration typ. ≤ 1 %)
Phase	100A - 1200 A: 0,7° (with NEO calibration typ. ≤ 0.3°) 10A - 100 A: 1° (with NEO calibration typ. ≤ 0.5°) < 1A: not specified
Sensitivity	1 mV/A
Dimensions	216 x 111 x 45 mm (Clamp Opening d = 53mm)

CENTER ADAPTER

This adapter can be used for small cable diameters to optimize the cable position and improve accuracy. This adapter is available upon request for all current sensors.

AC COILS & SPLIT-CORE

MESSTECHNIK

AC ROGOWSKI COILS

FLEX-MINI-3000

Type	Rogowski coil
Range	30A / 300A / 3000A / 30kA
Bandwidth	PQA7000: up to 20 kHz PQA8000: up to 70 kHz PQA8000H: up to 500 kHz
Accuracy	1% (with NEO calibration typ. ≤ 0.3 %)
Coil Length	170 mm (Ø 45 mm)

FLEX 3000

Type	Rogowski coil
Range	30A / 300A / 3000A / 30kA
Bandwidth	PQA7000: up to 20 kHz PQA8000: up to 70 kHz PQA8000H: up to 500 kHz
Accuracy	1% (with NEO calibration typ. ≤ 0.3 %)
Coil Length	450 mm (Ø 125 mm)

FLEX 6000

Type	Rogowski coil
Range	30A / 300A / 3000A / 30kA
Bandwidth	PQA7000: up to 20 kHz PQA8000: up to 70 kHz PQA8000H: up to 500 kHz
Accuracy	1% (with NEO calibration typ. ≤ 0.3 %)
Coil Length	800 mm (Ø 250 mm)

Flexible Length, Flexible Coil Diameter, Flexible Bandwidth, Flexible Scaling, Flexible cable length on request
Rogowski Coils for measurements up to 150kA are available.

AC SPLIT-CORE SENSORS

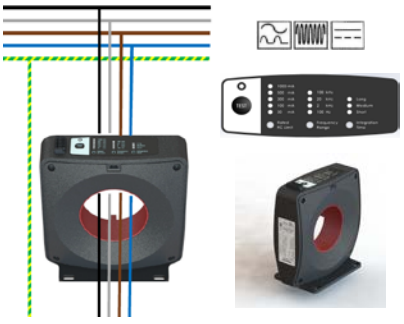
SPLIT-10A / 32A / 63A

Type	Split-Core
Version	10 Arms / 32 A ms / 63A rms
Bandwidth	3 kHz
Accuracy	Class 1 (IEC 61869-2) (with NEO calibration typ. ≤ 0.5 %)
Sensitivity	333mV at nominal current
Dimensions	32mm x 33.5mm 45.5mm (Clamp Opening Ø 10 mm)

SPLIT-10A / 32A / 63A

Type	Split-Core
Version	10 Arms / 600 Arms
Bandwidth	20 kHz
Accuracy	Class 1 (IEC 61869-2) (with NEO calibration typ. ≤ 0.5 %)
Sensitivity	333mV at nominal current
Dimensions	59.2mm x 89.2mm 32.5mm (Clamp Opening Ø 32,5 mm)

RESIDUAL CURRENT SENSOR AC+DC (RCM)



Type	Fluxgate
Range	DC and AC residual current measurement of Type B/B+ in the range 0-2Arms
Bandwidth	100 kHz
Application	Single Phase, 3-Wire, 4-Wire
Rated Voltage	690V
Rated Current	100A / 300A
Output	4-20mA Relay Output (DO/DI)
Power Supply	24V DC
Dimensions	156.1mm x 151.1mm x 69.4mm (Clamp Opening Ø 70 mm)

AC/DC HALL CLAMPS

CLAMP-300DC

Type	Hall sensor
Range	300A DC
Bandwidth	DC to 150 kHz
Accuracy	1 % + 2 mA (with NEO calibration typ. ≤ 0.3 %)
Sensitivity	20 mV/A
Overload Capability	500A DC (1min)
Dimensions	205 mm x 60 mm x 15 mm (Clamp opening d = 32 mm)

CLAMP-2000DC

Type	Hall sensor
Range	2000A DC
Bandwidth	DC to 20 kHz
Accuracy	2.5 % +/- 0.5A (with NEO calibration typ. ≤ 1.5 %)
Sensitivity	1 mV/A
Dimensions	205 mm x 60 mm x 15 mm (Clamp opening d = 32 mm)

AC/DC SPLIT CORE

SPLIT-300DC

Type	Hall sensor
Range	300A DC
Bandwidth	DC to 150 kHz
Accuracy	1 % + 2 mA (with NEO calibration typ. ≤ 0.3 %)
Sensitivity	10 mV/A
Dimensions	205 mm x 60 mm x 15 mm (Clamp opening d = 32 mm)

ICS-10A

Type	Hall sensor
Range	10 A peak (Overload Capabilty 80A for 1sec)
Bandwidth	150 kHz
Accuracy	0.5% (with NEO calibration typ. ≤ 0.1 %)
Sensitivity	208 mV/A
Dimensions	62 mm x 42 mm x 25 mm
Safety Category	CAT II 1000V / CAT III 600V

IPCS-XXA

Type	Zero-Flux transducer
Range	IPCS-10A: 10A rms IPCS-25A: 25A rms IPCS-50A: 50A rms
Bandwidth	500 kHz
Accuracy	0.01%
Sensitivity	IPCS-10A: 40 mV/A IPCS-25A: 20 mV/A IPCS-50A: 10 mV/A
Dimensions	130 mm x 65 mm x 50 mm
Safety Category	CAT II 600V

AC/DC ZERO-FLUX SENSORS

MESSTECHNIK

AC/DC ZERO FLUX TRANSDUCERS

IT-65S

Type	Zero-Flux
Range	60A rms (from -40° to +85°C)
Bandwidth	DC to 800 kHz
Accuracy	0.0033% of f.s.
Sensitivity	600:1
Dimensions	77 mm x 93mm x 78 mm (Opening d = 26 mm)

IN-500S

Type	Zero-Flux
Range	500A rms (from -40° to +85°C)
Bandwidth	DC to 520 kHz
Accuracy	0.0015% of f.s.
Sensitivity	750:1
Dimensions	106 mm x 128 mm x 104 mm (Opening d = 36 mm)

IN-1000S

Type	Zero-Flux
Range	1000A rms (from -40° to +85°C)
Bandwidth	DC to 440 kHz
Accuracy	0.0012% of f.s.
Sensitivity	1500:1
Dimensions	106 mm x 128 mm x 104 mm (Opening d = 38 mm)

IN-2000S

Type	Zero-Flux
Range	2000A rms (from -40° to +85°C)
Bandwidth	DC to 140 kHz
Accuracy	0.0012% of f.s.
Sensitivity	2000:1
Dimensions	191 mm x 231 mm x 153 mm (Opening d = 70 mm)

POWER SUPPLY

SINGLE CHANNEL POWER SUPPLY WITH INTEGRATED SHUNT

Power Supply	±15V (for Zero-Flux Transducers, AC/DC Clamps, etc.)
Max. Power Output	1200 mA
Integrated Measuring Resistor	selectable - 1 Ohm, 5 Ohm, 10 Ohm with 0.01% Accuracy
Power Supply	DC Version: 10-30 V DC AC Version: 100-230V AC
Dimensions / Weight	106x120x36mm (l x w x h) / Weight: 350g
Temperature Range	-10°C to +45°C
Connector	Sensor supply: DSUB9 Output Signal: BNC

VOLTAGE MEASUREMENT

HIGH VOLTAGE DIVIDERS, TRANSFORMERS AND ISOLATED TRANSDUCERS

We offer different types of high-voltage adapters for measurements above 1600V DC. The portfolio covers voltage dividers, voltage transformers and isolated voltage dividers. Please contact your local sales partner or support@neo-messtechnik.com.

ALIGATOR CLIP

Current	max. 36A
Voltage	CAT III 1000V / CAT IV 600V
Colours	red, black, blue, green, yellow, white, purple, brown, grey, yellow-green
Plugs	Ø 4 mm
Dimensions	92 x 38 mm

SAFETY TEST LEAD

Current	max. 25A
Voltage	CAT III 1000 V
Cross Section	1,5 mm²
Colours	red, black, blue, green, yellow, white, purple, brown, grey, yellow-green
Plugs	Ø 4 mm
Length	0,25 m / 1 m / 2 m ... others on request

SAFETY TEST LEAD FUSED

Current	max. 25 A (Fuse: 0.5A)
Voltage	CAT III 1000 V
Cross Section	1,5 mm²
Colours	red, black, blue, green, yellow, white
Plugs	Ø 4 mm
Length	0,25 m / 1 m / 2 m ... others on request

ACCESSORIES

We offer a wide range of testing and measurement accessories. Please check our webpage or contact us for more information regarding the following accessories. In addition we also provide custom-made solutions according to your needs.

Ø 4MM & Ø 2MM ACCESSORIES

HIGH VOLTAGE

ADAPTERS

BNC / HF / Micro Test

MEASURING KITS

TESTING POLES / PROBES

ADDITIONAL HARDWARE

CABLES

CABLE REELS

GROUND RODS / LEAD HOLDERS

STORAGE

DIDACTIC ACCESSORIES

The catalogue with all products and detailed information can be downloaded at: www.neo-messtechnik.com

We are also happy to send you a hard copy of the catalog. Just send us an email to support@neo-messtechnik.com


TOP OF EUROPE

MEASUREMENT SERVICES

SYSTEM INTEGRATION

MEASUREMENTS

Electrical:
Voltage, Current, Power, Power Quality, Impedance, Resistance, Isolation, Grouding, etc.

Mechanical:
Acceleration, Strain Gage, Speed, Torque, Vibration, etc.

Others:
Temperature, GPS, Video (high-speed, thermal),
Data via Interfaces (RS232, CAN, Ethercat, etc.)

SYSTEM INTEGRATION

With our vast experience in the test & measurement market and our expertise for different applications and software programs we would be happy to support your next measurement project in the field or lab. We can integrate existing hardware as well as provide guidance in choosing the besthardware on the market to fit your needs.

TURNKEY SOLUTIONS

We can provide turnkey solution for your project. After discussing the requirements, we will create a specification book including plans (circuit plan, item list, etc.) and schematics. After approval you will receive your turnkeymeasurement solution.
One example is shown in the picture. In addition to the measurement instrument, other electrical equipment such as a power supply, protection, wiring etc. is provided in a cabinet.

OTHER SERVICES

- Application Engineer to support measurements
- Data Analysis
- Measurement Optimizations

MEASUREMENT SERVICES

HIGH-VOLTAGE APPLICATIONS

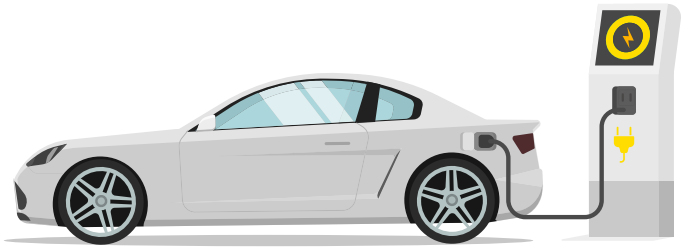
- Short Circuit Tests 16,7Hz / 15kV Railway Grid
- Disturbance & Transient Record Transmission & Distribution Grid
- Transformer and HVDC Efficiency Measurement (230V to 400kV)
- Interference Current Measurement
- Inductive Coupling Detection
- System Dynamics ROCOF / PMU
- Power Quality

GRID IMPEDANCE MEASUREMENT

Grid Impedance Measurement (Z, phi, Re, Im, R, X / Zero-, Postivie- Negative Sequence)
- Fundamental Frequency Impedance (50Hz / 60Hz /...)
- Grid Impedance up to 10 kHz (Higher Frequencies)
- Grid Impedance up to 150 kHz (Supraharmonics)
- Grid Impedance up to 10 MHz (PLC)
- Interaction Inverter

EQUIPMENT TESTING

- Resonances / Oscillations
- Switching Operations
- Distortion Analysis (THD, Unbalance)
- Overvoltage Detection DC-DC converters (e.g. 230V / 24V)
- Transients / Disturbances
- EV Charging Station Problem Detection
- Supraharmonics
- Inductive Coupling
- Photovoltaic System Testing (Performance, Safety,..)



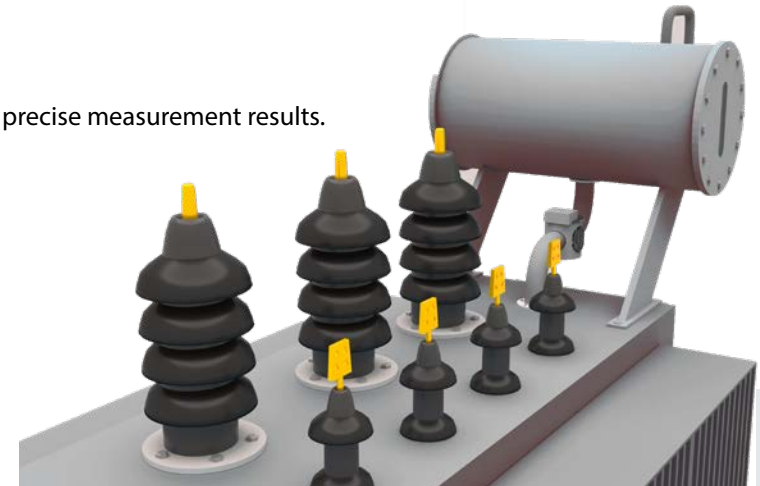
INTERNATIONAL STANDARDS

Evaluation according to national and international standards:

Grid:	EN50160, IEC61000-2-2/-4/-12, IEEE 1159, IEEE 519, NRS048
Renewable:	FGW-TR3, IEC61400-21, IEC61400-12, BDEW, TOR
Motor, Transformer:	IEC 60076-1 / IEC60034
Equipment:	IEC 61000-3-2 /-12 and IEC 61000-3-3 /-11

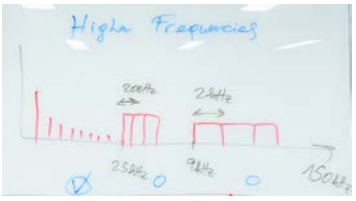
EFFICIENCY ANALYSIS

Using best available technology on the market for highly precise measurement results.
- EV Charging Stations
- Motor
- Generator
- Inverter
- Transformer
- HVDC



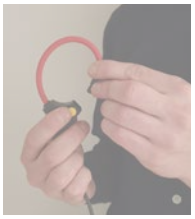
TRAINING & RENTAL

TRAINING



While designing the user-interface of our products our goal is to make it as user friendly and intuitive as possible. Nevertheless we offer various training possibilities in addition to all documentation such as technical manuals and training manuals:

> **On-Site Training**
Perfect for groups and hands-on training directly at the customers' project site
> **In-House Training**
Perfect for hands-on training in our lab with different DUT's such as motors, transformers etc.
> **Remote Training**
Perfect for quick trainings or special measurement applications at remote locations

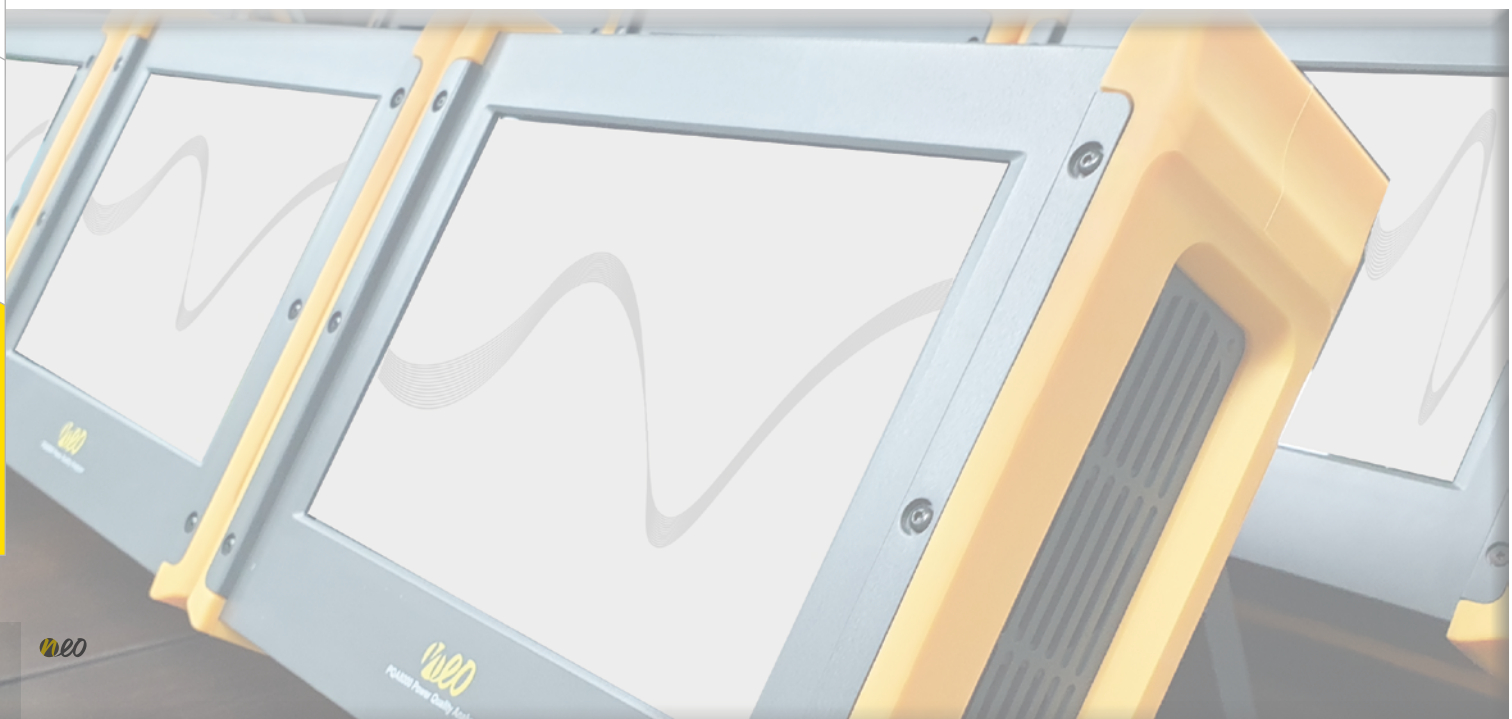


Besides training for our products we also offer general training courses for electrical applications incl.:
- Electrical Safety of electric vehicles
- Electrical Safety (EN50110)
- Measurment and data acquisition
- Testing of electrical installations (E8101)

RENTAL SERVICES

Measurement Instruments:
Power Analyzers
Power Quality Analyzers
FFT Analyzers
Data Logger
Scope
Frequency Generators
Calibrators
Installation Tester
Grounding Resistance Meter

Accessories:
Current Sensors
Voltage Dividers, Transformers
Measurement Adapters
Extension Cables
Power Supplies & Battery Packs
Ruggedized Measurement Computer
and a lot more



CALIBRATION SERVICE

MESSTECHNIK

CALIBRATION

The NEO R&D center is equiped with the most advanced calibration and testing equipment (Omicron, Fluke, Rohrer, etc.). Before your NEO data acquisition system is delivered, it is calibrated. Detailed calibration reports for your measurement system are included in the scope of delivery or can be requested at anytime.

It is recommended to calibrate your instrument at regular intervals. The standard norm across nearly every industry is annual calibration. In addition to extensive calibration and adjustment services we also carry out rigorous inspections that range from product functionality to sensors and accessories. This is a type of service that only manufacturers can provide.

We offer the following calibration services:

> ***Manufacturers Certificate:***
Instrument Calibration, Power Calibration, Power Quality Calibration, Current Sensor Calibration, Banwidth Calibration up to 150kHz

> ***Accredated ISO Certificate*** (ISO17025, AKD/ÖKD) together with our partners:
Instrument Calibration, Power Calibration, Current Sensor Calibration

ON-SITE CALIBRATION
All manufacturer certificates also can be issued directly on-site. This is especially useful for permanent installations or to reduce down-time.

TOTAL CARE PACKAGE

The total care package for your measurement instruments will cover:
- Annual Calibration of instruments and sensors
- Warranty Extension
- Fast turn around times
- On-Site or In-House Services


neo
MESSTECHNIK

COMPANY

SWITZERLAND

Office ZÖBERN

Training Center VIENNA

AUSTRIA

Mission:
To provide innovative, high-quality products that reflect the understanding of our customers needs for their specific application.

COMPANY PROFILE

NEO MESSTECHNIK

NEO Messtechnik is a young company with extensive experience.

EXPERIENCE

> 20 years of experience in the data acquisition market (DEWETRON, DEWESoft, Chauvin Arnoux, NORMA etc.)
> 20 years of experience in the Power & Power Quality markets
> 20 years in hardware and software development (Samsung, LG, etc.)

PHILOSOPHY

INNOVATION and **PARTNERSHIP** are basic elements in our companies philosophy.
> Together with strong partners, our goal is to provide the best available technology for our clients.
> Each project should build a long-term relationship between our clients and NEO Messtechnik
> Research and Development is driven by a deep understanding of our customers needs
> We believe in the continuous investment of Research & Development

OUR COMMITMENT

> Innovative products with the highest quality
> Deep technical expertise
> Knowledgeable sales and support team

COMPANY COLORS

We combine **TRADITION** with **INNOVATION**. Therefore we have chosen the company colors based on early measurement instruments like of NORMA Vienna. These instruments were known for their high quality and precision. The color yellow combines the elements of brass, copper and varnished wood that were used in these instruments. This color is our symbol for combining **old values with young ideas.**

SERVICE & SUPPORT

FREE SUPPORT HOTLINE

Customer orientation is our promise. Therefore we offer a free support hotline.
In addition, we offer maintenance contracts for projects with extended services for our customers like defined reaction times, spare part availability, etc.

support@neo-messtechnik.com

TRAINING

While designing the user interface of our products, our goal was to make it user friendly and intuitive as possible. Nevertheless we offer various training possibilities, see Chapter "Measurement Services".

SERVICE AND REPAIR

The NEO Messtechnik can provide service and repairs for any of our products. Long-spare part availability and Upgrade options is one of our contributions to ensure low-resource usage. For information regarding service and repairs please contact your local distributor first or NEO Messtechnik directly.

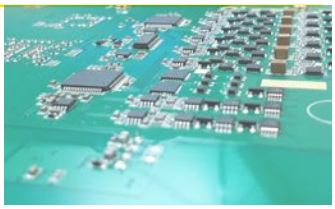
WARRANTY EXTENSION

Our HIGH QUALITY allows us to provide an EXTENDED WARRANTY.
Neo only uses high quality components which have been used for some of the most-demanding applications worldwide. All components are internationally recognized brands which are also audited regularly. Neo provides one of the best warranties in the business. The 2 year warranty not only applies to the OEM instrument but also to sensors and accessories. This included warranty can be extended and on-site warranty services can be provided.

QUALITY

HIGHEST QUALITY

Selecting the best available components for our instruments allows to provide our customers with an extended warranty for our products. In addition, all instruments are rigorously tested (thermal tests, shock & vibration, aging, drop tests, long-term tests, performance tests, etc.)

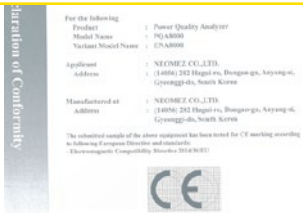


LEADING IN SAFETY

Overvoltages from power lines down to factories can be higher than normal operating voltages. To avoid any kind of electrical accident, NEO Messtechnik emphasizes the importance of a safe instrument design. For example, the high-voltage inputs of the PQA 8000 instrument (CAT IV 600V) are isolated up to 6kVp while maintaining high precision (0.05%) and high sampling (up to 1MS/s).
This is **world-leading technology.**

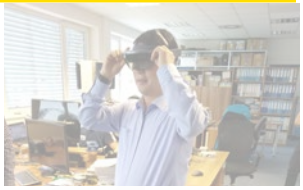
COMPLIANCE WITH INTERNATIONAL STANDARDS

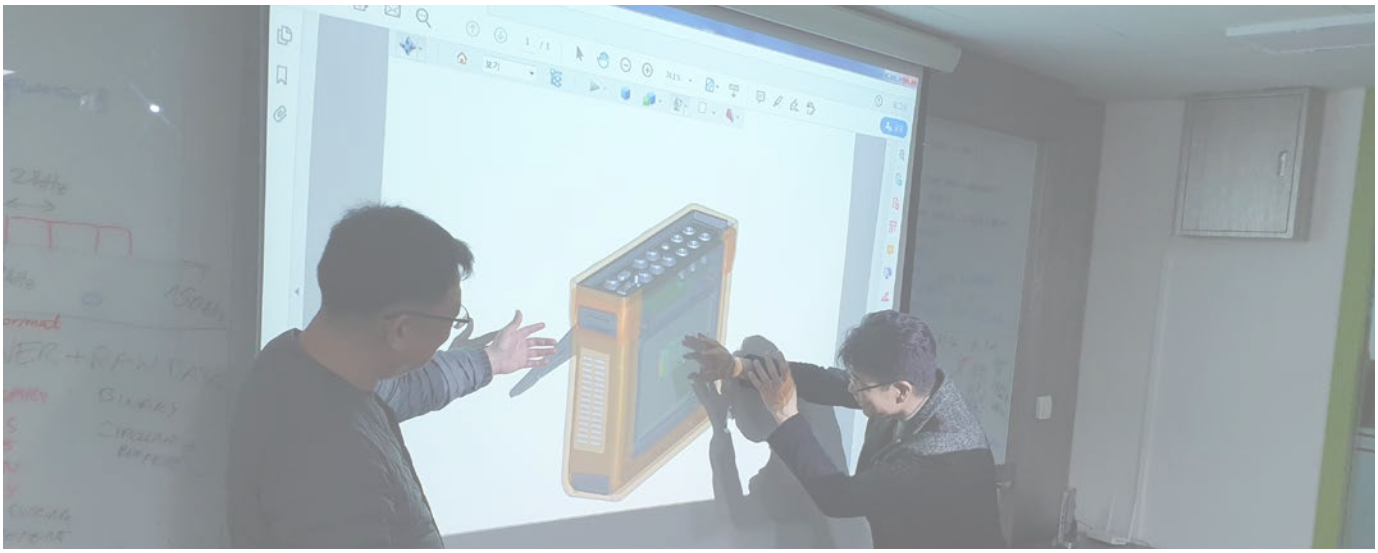
All instruments are designed according to international standards for electrical safety and compatibility. Among others, all products comply with these standards:
LVD Directive 2014 / EMC Directive 2014 / Rohs Directive 2015
EN 61000-3-2 / EN 61000-3-3 / EN 61326-1 / EN 55011 +A1, Class A



LATEST TECHNOLOGY

It is important to us to continuously adapt to the latest technologies. Right now we are participating in research projects for Virtual Reality, Artificial Intelligence for electrical equipment condition monitoring and others.





SOCIETY & ENVIRONMENTAL

"We want to create an environment where every employee maximizes their skills and contributes to society. This philosophy is the backbone for everything we do."

SILVER AGER PROGRAM

In both the Austrian and Switzerland offices, retired people are working for NEO Messtechnik part time. We value the deep knowledge of our "Silver Agers" and want to give them the chance to actively participate. Activities include Service & Repair of instruments, organizational tasks or hardware development. Our "Silver Agers" can define their working hours and working environment themselves.

SOCIAL RESPONSIBILITY

NEO Messtechnik contributes to social community and environmental conservation programs.
> Support of disabled people (cooperation with Behindertenintegrationswerkstätte Ternitz)
> Support of the Dreamivil project in Ghana (dreamivill.com)
> Support of tree planting projects (clickatree.com)

ENVIRONMENTAL IMPACT

> NEO Messtechnik guarantees long product life cycles, spare part availability and repair services to ensure low resource usage.
> Among others NEO products support the integration of renewable and environmental friendly power sources and also help to promote energy savings.

NOTES

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