

Automotive
Energy & Power Analysis
Aerospace
Transportation
General Test & Measurement



Power Network Analyzers

DEWE-PNA

The DEWE-xxx-PNA systems are energy net analyzers which can persecute power quality analysis following exact standards and a lot more beyond that. The combination of high-capacity measurement software and flexible report generators enables the user to solve nearly every task in the field of energy measurement.

Another advantage is the configuration of the instruments. On the one side, we have the type DEWE-570 developed for the technician on site - stable, isolated and easy to operate. On the other side, there is the DEWE-module-based instrument such as the DEWE-2600-PNA. Its perfect flexibility of the hardware also allows complex applications in the fields of engineering and development.

Exact measurements according to IEC-61000-4-30 Class A, the power quality measurement standard, are also an absolute necessity and characteristics of our instruments.

Key Functions

- EN50160
- IEC61000-4-30 Class A
- Power rating
- Harmonics, including 2-9 kHz
- Interharmonics
- Flicker
- Symmetrical components
- Frequency
- DISDIP/Unipede statistics
- CBEMA/ITIC curve

Online Information

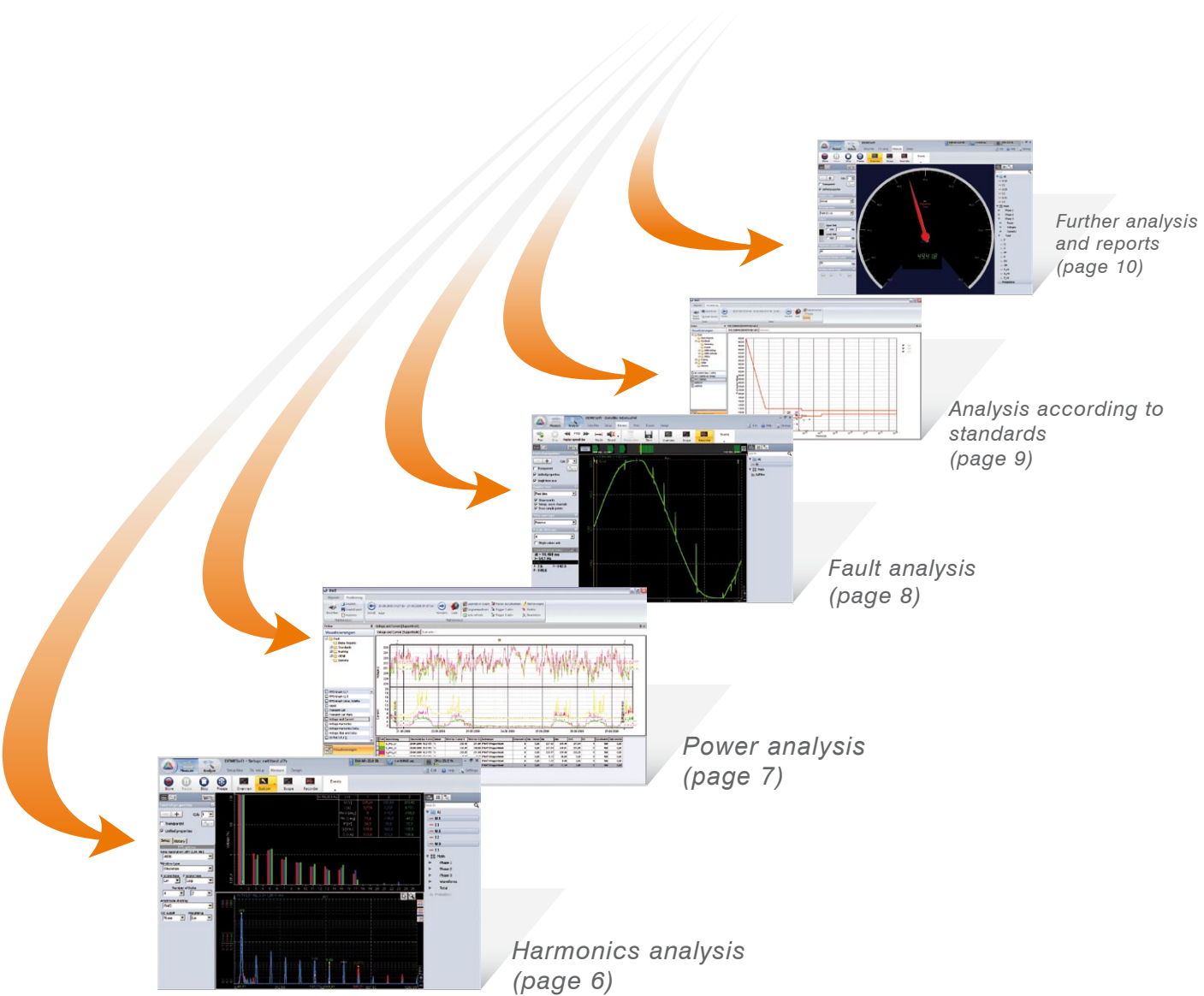
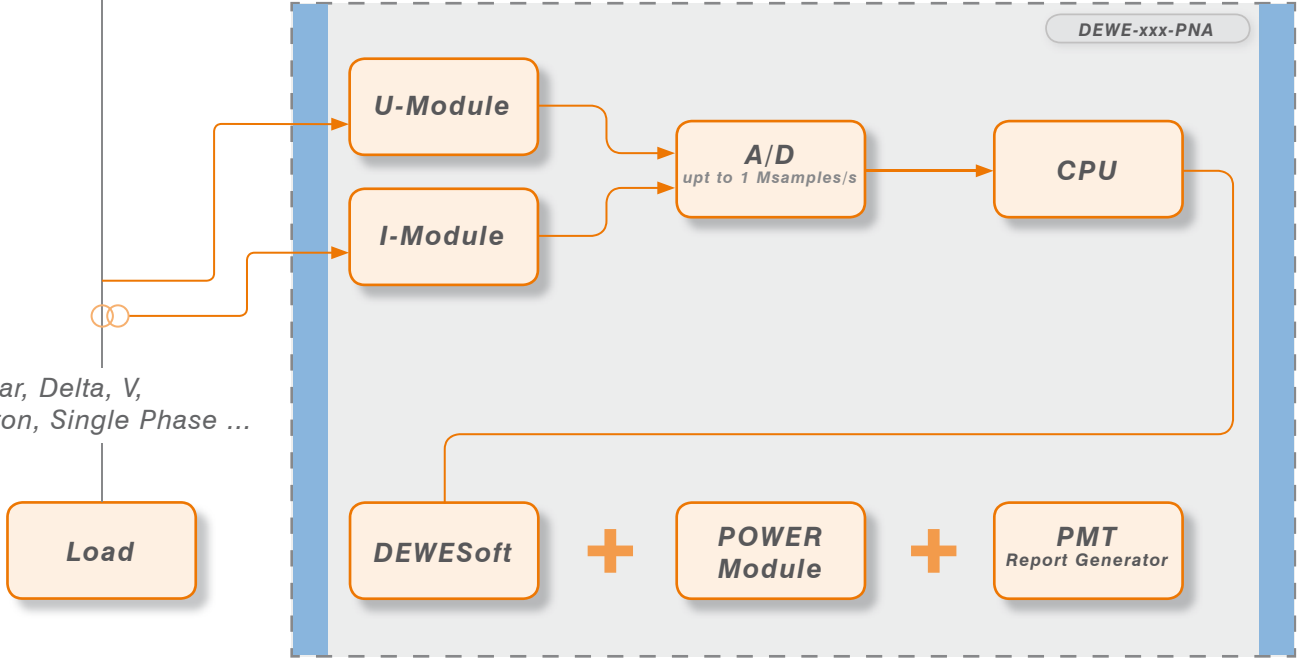
www.dewetron.info/power

Re-inventing Data Acquisition



Supply 3~, N, PE

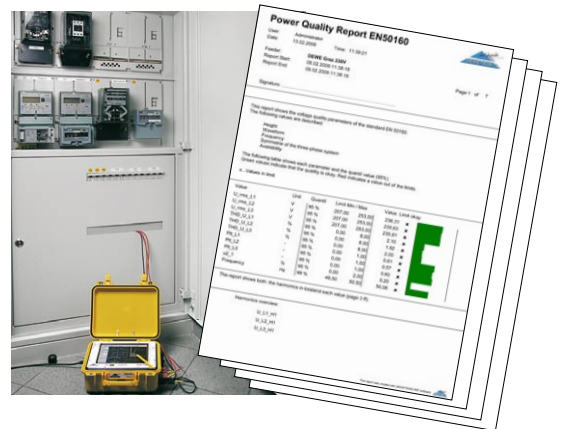
Star, Delta, V, Aron, Single Phase ...



The DEWETRON Power Quality Analyzers

EN50160 and other Norms

Due to the changing market power quality analyzers are getting more and more important. On the one side, the increasing use of electronic consumers causes system perturbations. On the other side, the number of blackouts has grown recently. Early detection of shortages is therefore necessary and trend analyzes of various parameters can be helpful. Additionally, the obligation to prove the quality of the power supply system has changed and commercial aspects are also getting more and more important.



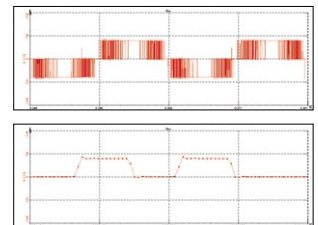
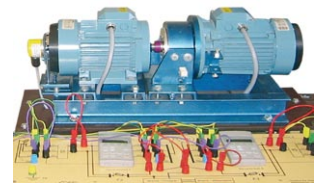
Disturbance Analysis

Simple recordings of voltage are source for the interpretation of power supply. In order to be able to be more precise and find solutions, it is not sufficient to calculate the voltage by means of average values of 10 minutes. Transient recorders with acquisition rates of Mega Hz even detect fastest disturbance peaks and are essential for the exact analysis.



Harmonics Analysis

The topic harmonics also becomes a new important aspect. If you have done the analysis of up to the 25th or even 50th harmonics, you can now go far beyond that. The frequency spectrum of 2-9 Hz has been redefined and in the future it will be analyzed in 200 Hz bands. The combination of this new standard and the formerly used harmonics standards is the main task of up-to-date power quality analyzers. DEWETRON has acted on this subject by creating the very latest generation of software and covering the whole spectrum of harmonics, interharmonics, frequency bands and grouping methods. Standard measurements with pre-defined and standardised setups are included or individual settings can be done by the users themselves.



Flicker and More

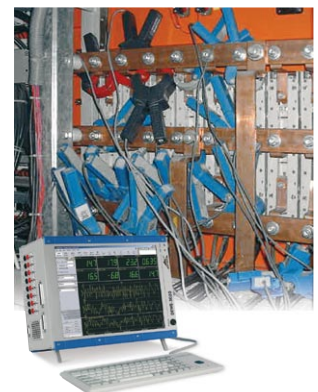
The standard software package includes flicker, unbalance, calculation of power and frequency etc. as well as a report generator with which one can print pre-defined reports (e.g. EN50160) on the one side and create individual reports on the other side.

Energy Analysis

The consumption of energy as well as the energy costs are rising. The reduction of energy costs is hence one major topic of interest. Treaties and prices are relevant – the effective consumption as well. In order to be able to reduce the consumption, one has to know the exact energy consumption and the internal power flow.

In order to be able to measure this, multi-channel measurement instruments are necessary. Using these instruments one can measure the consumption on several lines at the same time. This can also be done in parallel ways in different distribution boxes or even buildings.

With the help of the report generator one can create simple reports on power flow and distribution of energy consumption. The export interfaces support a quick exchange of data with other analysis software packages.








	DEWE-571-PNA DEWE-571-PNA-1MS	DEWE-571-PNA- 4U12I	DEWE-3020-PNA	DEWE-2600-PNA	DEWE-5000-PNA	DEWE-838-PNA
Usage	portable	portable	portable	portable	portable	fix installed
Sampling rate per channel	20 kS/s					
Standard	20 kS/s					
Option	up to 1 MS/s	-	up to 1 MS/s	-	-	-
Voltage supply	Battery powered ¹⁾	Battery powered ¹⁾	90 to 260 V _{AC}	Battery powered ¹⁾	90 to 260 V _{AC}	85 to 265 V _{AC}
Dimensions (W x D x H)	360 x 300 x 150 mm (14.2 x 11.8 x 5.9 in.)	360 x 300 x 150 mm (14.2 x 11.8 x 5.9 in.)	380 x 295 x 155 mm (15 x 11.6 x 6.1 in.)	409 x 240 x 291 mm (16.1 x 9.4 x 11.5 in.)	460 x 351 x 200 mm (18.1 x 13.8 x 7.9 in.)	160 x 115 x 166 mm (6.3 x 4.6 x 6.5 in.)
Weight	typ. 6 kg (13 lb.)	typ. 6.4 kg (12.8 lb.)	typ. 8.5 kg (19 lb.)	typ. 15.5 kg (34 lb.)	typ. 17 kg (37 lb.)	typ. 1.5 kg (3.3 lb.)
Input specifications						
Voltage						
Voltage channels	4				3	
Voltage range	± 1400 V peak				400 V	
Bandwidth	DC to 300 kHz				20 kHz	
Required DAQ module	MDAQ-PQL-SUB-HV		DAQP-HV		internal	
Current						
Current channels	4	12	4		-	
Clamps	yes				-	
Direct current input	yes		-		yes	
Flexible coils	yes				-	
Current range	5 A		-		5 A	
Direct input	5 A	5 A	-	-	-	5 A
Clamps	depending on clamps	depending on clamps	depending on clamps	depending on clamps	depending on clamps	depending on clamps
Flexible coils	3000 A	3000 A	3000 A	3000 A	3000 A	3000 A
Required DAQ module	-		DAQP-LV		-	
Additional channels						
Additional channels	16 slow		with expansion rack	8 fast + EPAD		EPAD opt.
Functions						
Multiple 3 phase systems	yes				yes	
Voltage, current	yes				voltage	
Power, frequency	yes				frequency	
Harmonics, Interharmonics, THD	yes				harmonics	
Flicker	yes				yes	
Symmetrical components	yes				yes	
Period values, disturbance rec.	yes				yes	
Fast transient recorder	yes				yes	
Report generator	yes				yes	
Network Monitoring	yes				yes	
EN50160	with PMT reporting tool (DEWESOFT-OPT-DB)				yes	
Wide band power analysis	DEWE-570-PNA-1MS	-	with DEWE-ORION series boards		-	
EMC						
Power supply	4 kV (surge and burst)	4 kV (surge and burst)	2 kV (surge and burst)	4 kV (surge and burst)	2 kV (surge and burst)	2 kV (surge and burst)
Voltage input	4 kV (surge and burst)				4 kV (surge and burst)	
Direct current input	4 kV (surge and burst)				n.a.	

¹⁾ External AC power supply (100 to 240 V_{AC}) included, external DC power supply (9 to 36 V_{DC}) optional

DAQ Amplifiers

Module	Input type	Ranges	Accuracy	Bandwidth (BW), Filters (LP = lowpass)	Isolation (ISO), Overvoltage protection (OP)
 DAQP-LV-B, -SC	Low voltage	10 mV, 20 mV, 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2.5 V, 5 V, 10 V, 25 V, 50 V	0.05 % range + 0.05 value	BW: 300 kHz LP: 10, 30, 100, 300 Hz, 1, 3, 10, 30, 100, 300 kHz	OP: 350 V _{DC} ISO: 350 V _{DC} , 1 kV _{RMS} with banana plugs
 DAQP-HV-B, -SC	High voltage	±20, ±50, ±100 V ±200, ±400, ±800, ±1400 V	0.1 %	BW: 300 kHz LP: 10, 30, 100, 300 Hz, 1, 3, 10, 30, 100, 300 kHz	ISO: 1.8 kV _{RMS}
 DAQP-LA-SC	Direct current input (0.1 Ohm internal shunt)	30 A peak; 10 A peak; 3 A; 1 A; 0.3 A; 0.1 A	0.1 %	BW: 300 kHz LP: 10, 30, 100, 300 Hz, 1, 3, 10, 30, 100, 300 kHz	ISO: 1 kV _{RMS}



The DEWESoft Power Measurement Software

The option POWER for the DEWESoft (DEWESoft-OPT-POWER) is an absolutely high-performance tool for the calculation of power and other similar parameters – the capacity to multiply current and voltage is not the only feature it has. This toolbox is an excellent combination of many features and nearly all applications can be realised by using DEWETRON equipment.

Beside the exact calibration the frequency calculation is a central feature of this software. 50 Hz and 60 Hz are a must – for us also 16 2/3, 400 and 800 Hz as well as DC software and variable frequencies (driver) are a necessity. Due to the high acquisition rate (mainly dependent on the AD card in use, up to 1 MS/s) and the DAQP-HV module there is no limitation of the acquisition of PWM drivers (300 kHz electrical band width) and the calculation of active and reactive power, power factor etc ... The toolbox with the power quality parameters such as harmonics, interharmonics, THD, symmetric components, flicker and its combination with the numerous trigger possibilities make the equipment a power analyzer with nearly no limitations. Several screen elements such as vector scopes, harmonics monitor, oscilloscope and diagrams allow a perfect online visualisation of the data.

The integration of counter inputs, video and CAN-Bus offers additional data sources. The mathematical library additionally offers the possibility to calculate parameters such as torque and angular velocity or even determine the efficiencies online.

Wiring Schematics

Various wiring schematics allow the following connections of instruments: single-phase connection, star-connection, delta-connection, V-connection, Aron-connection, two-phase-connection and a combined star-/delta-connection – of course all with or without electric current.



Harmonics Analysis

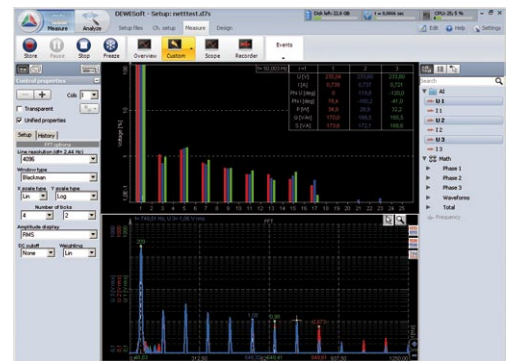
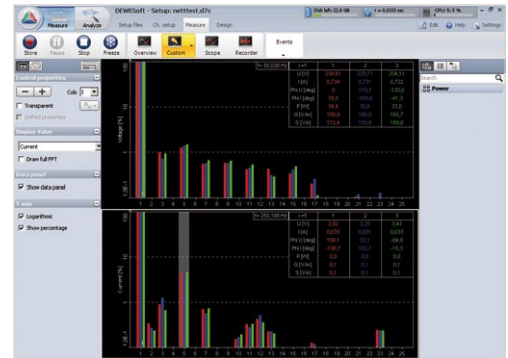
Measure

FFT – Harmonics Analysis

- U, I, P and Q
- Individual setup of the number of harmonics including DC-component
(Example: 20 kHz sampling rate = 200 harmonics @ 50 Hz)
- Interharmonics, groups or single values
- According to IEC 61000-4-7
- Calculation corrected to the actual real frequency
- THD, THD even, THD odd, K-Factor, TIHD
- Trigger on each parameter
- Background harmonics
- Grouping methods for harmonics and interharmonics free configurable: for example the number of bins and the frequency groups „200 Hz“ according to IEC 61000-4-7

Full FFT

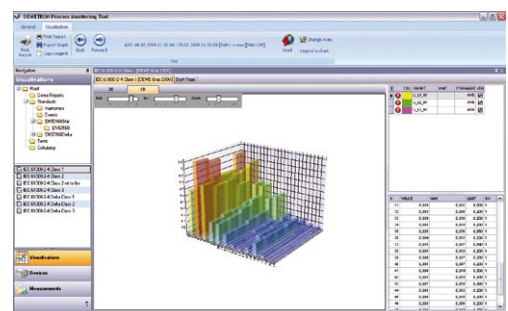
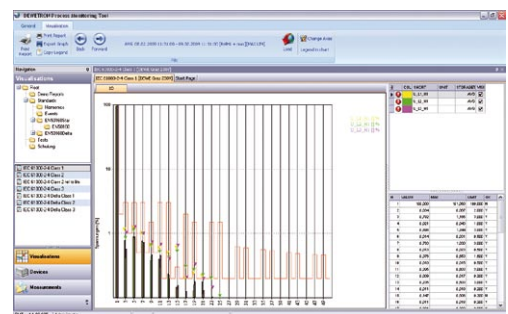
- In addition to the harmonics FFT a full frequency based FFT is available.
- All frequencies can be analyzed with this function
- Trigger on FFT patterns
- Selectable Filters (Hanning, Hanning, Flat Top, Rectangle, ...)



Analyze

FFT – Spectra

- Individual number of harmonics (25, 50, ...)
- Voltage, current, active power, reactive power, phase angle, impedance
- Limits according standards (EN50160, IEC61000-2-4, individual definition)
- Max | Avg | 95% calculation and comparison against limits
- Timestamp or intervals of data presentation
- More subgraphs per page possible
- More datalines in one graph
- Direct comparison of different locations
- Zoom In | Zoom Out Function
- Report Printing function
- 3D graph



Power Analysis

Measure

Power Calculation

- P, Q, S, D
- Cos Phi, power factor
- P, Q, cos Phi for each harmonic
- Symmetrical components (positive, negative and zero sequence components)
- Period values (1/2 cycle, cycle, overlapping ...)

Recorder

- Recording of all parameters in individual intervals
- Individual screens can be defined
- Zoom in and out
- Storing fast (full sampling rate) or reduced (e.g. 600 sec.)
- Detailed zoom-in to pulse width!

X/Y Recorder

- Orbitals can be generated online
- N over M as example for this function

Analyze

Diagrams

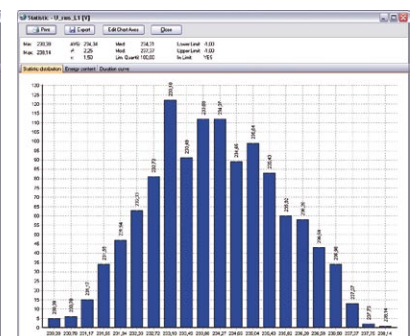
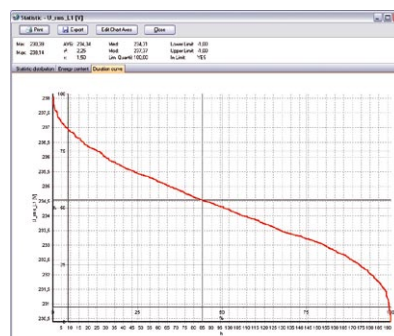
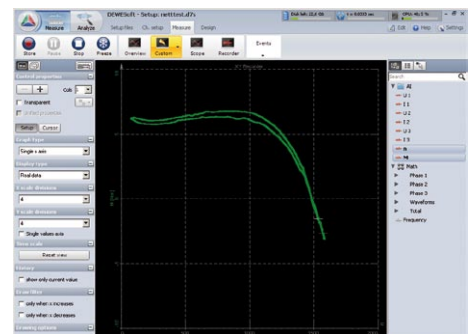
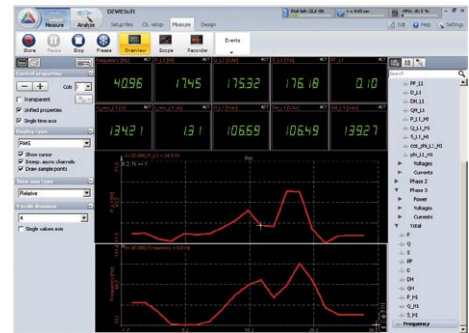
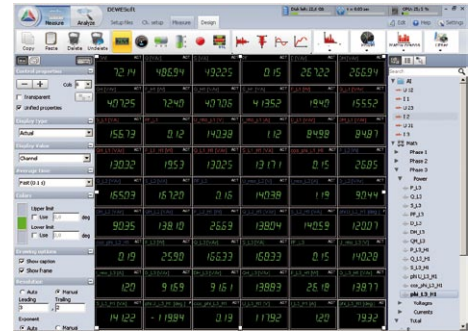
- Single diagrams or multiple diagrams on one page
- Individual number of channels per diagram
- Graphical view or statistical view in a table
- Table individual configurable
- Min / Max / Avg calculation
- Up to 5 percentage calculations (eg 95% value) per channel
- Direct comparison of different locations
- Direct comparison of different days
- Zoom in / zoom out function
- Report printing function
- Math channels

Histograms

- Histogram calculation
- Med / Stddev / Var / Mod calculation
- Individual definition of sidebands
- Report printing function
- Energy line

Energy consumption diagram

Energy duration line



Fault Analysis

Measure

Fault recorder

- Trigger on all parameters of the power module!
- U, I, P, Q, S, D, cos Phi, power factor, ...
- Each harmonic!
- Pos-, neg-, zero-sequence systems

Very fast glitch detection (MS/s)

Edge-, filtered edge- and window-trigger



Trigger on rising edge when the threshold has been crossed



Trigger on falling edge when the threshold has been crossed

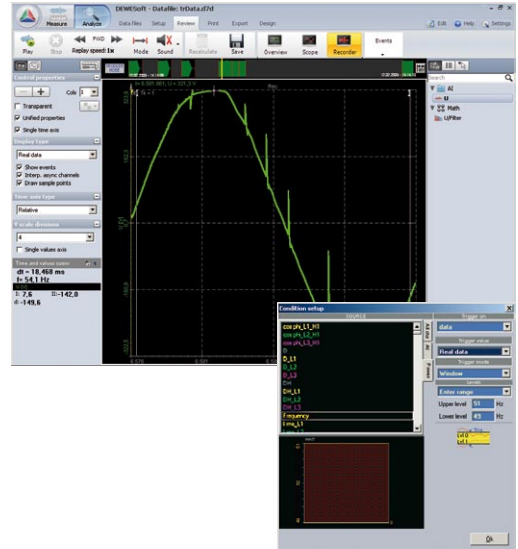


Trigger when signal enters the range between two definable threshold levels



Trigger when signal leaves the range between two definable threshold levels

Further trigger functions: pulse width, window and pulse width, slope, FFT and time



Analyze

Fault Lists

- Listings of faults
- Filters like time, channel, type etc..
- Automatic update function
- Confirmation support
- Report printing function

Fault Diagrams

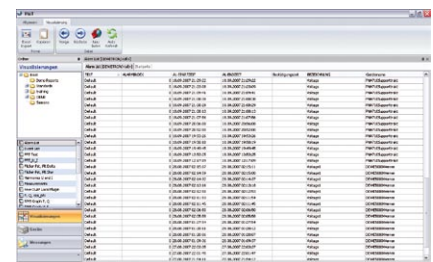
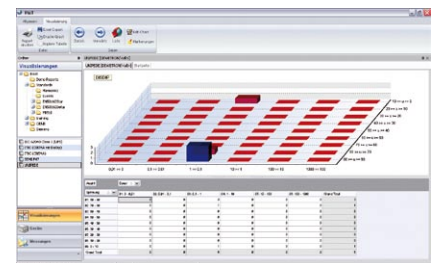
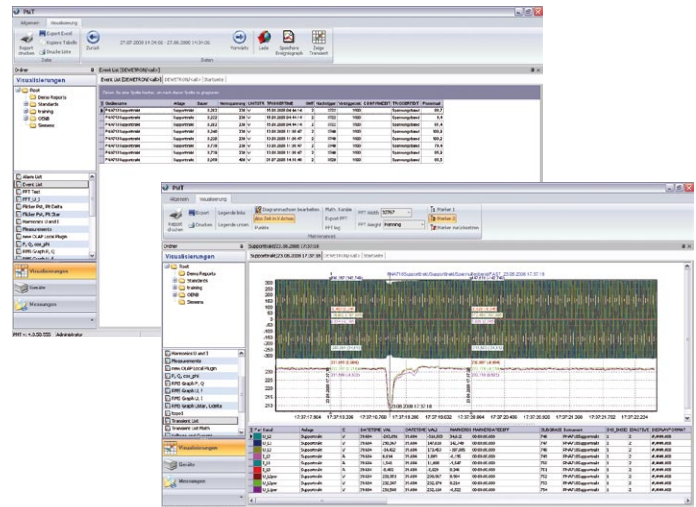
- Waveform presentation of faults
- RMS shape calculation
- Different setups for different faults
- Report printing function
- FFT
- Math channels

DIS DIP Statistics

- Statistics like DISDIP / Unipede etc..
- Individual limits
- Individual time settings
- Graphical or table element
- Report printing function

Alarm Lists

- Alarm list definition
- Automatic update function
- Confirmation support
- Report printing function



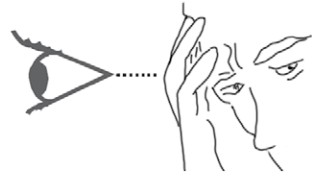
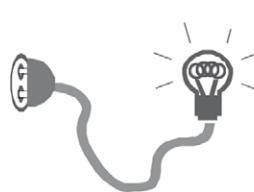
Analysis according to Standards

Measure

- Setups according to certain standards
- prepared or user-definable
- PQ according to EN501610
- Harmonics according to IEC 61000-4-7
- Flicker according to IEC 61000-4-15
- Measurement according to IEC 61000-4-30 class A

Flicker

- According to IEC 61000-4-15
- P_{ST} and P_{LT} with flexible intervals
- Individual recalculation intervals



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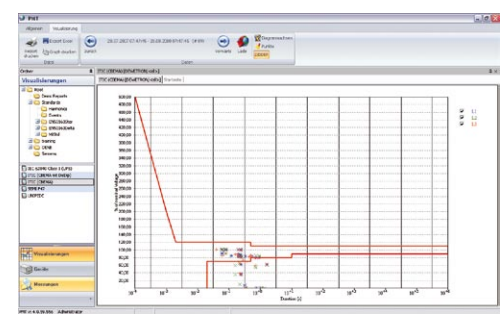


Analyze

- EN-50160
- IEC 61000-2-4 class 1, 2, 3
- Harmonics freely adjustable (for example: IEC 61000-3-x)
- Built in report generator for flexible reports
- Combination of certain diagrams in one report
- Tables
- FFT spectra
- Fault statistics
- CBEMA curve
- All other visualization-elements are supported
- Summary report for more instruments
- Automated report generation and print support

CBEMA/ITIC curve

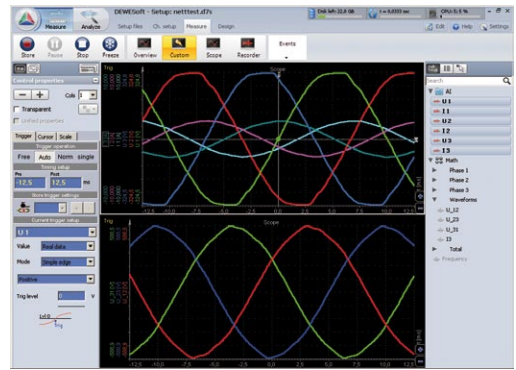
- Statistics like CBEMA, SEMI F47 etc..
- Individual limits
- Individual time settings
- Combination with DISDIP possible
- Graphical view
- Report printing function



Further Analysis

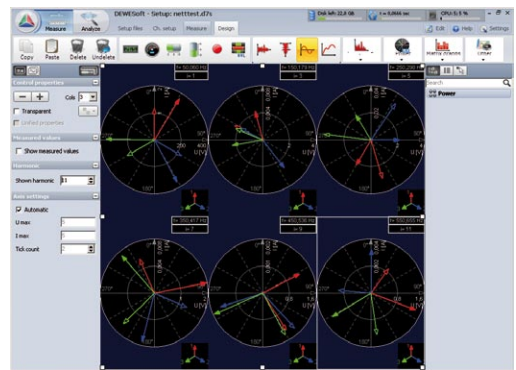
Scope

- Selectable graphs
- U1, U2, U3, U12, U23, U31: Line to line and line to earth voltages are supported
- Up to 8 graphs in one diagram
- Zoom in and out are supported online
- Waveforms can be stored



Vector Scope

- Vector scope for 3 phase systems
- Each individual harmonic can be shown
- More vector scopes can be displayed on one screen
- Different power systems can be shown on one screen
- With the "transparent" function direct comparisons of phasors are possible



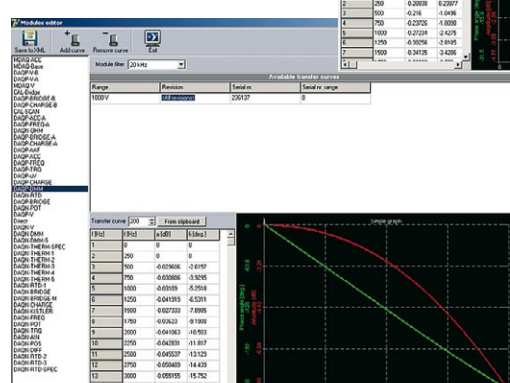
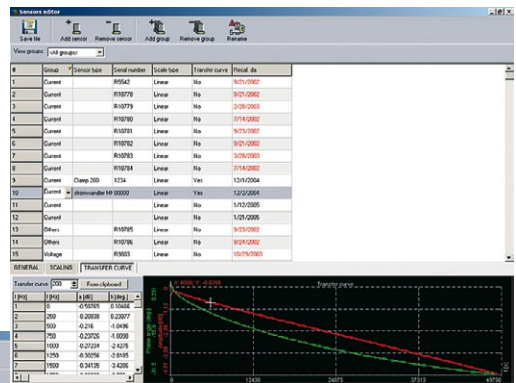
Frequency Calculation

The software PLL guarantees a very accurate frequency calculation (mHz). On one system multiple power systems can be measured and each can have its own frequency. With the use of the different instruments from DEWESoft the values can be shown in several ways.



Calibration/Accuracy

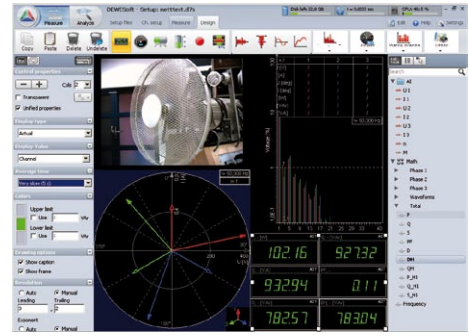
The high accuracy of the calculation can be reached because of the calibration function in the frequency domain. With this unique technology amplitude and phase can be corrected for the full frequency range from DC up to whatever the hardware can sample (kilosamples up to megasamples per second). All internal curves like filter response or multiplexer shift are corrected inside the software and the sensor database includes correction curves for each clamp, Rogowski coil, transformer or which sensor ever is used.



Other Functions

Video

The parallel usage of the synchronous DEWESoft VIDEO function allows the user to store videos in parallel with the data recording and opens a wide range of applications – whenever optical information is needed!



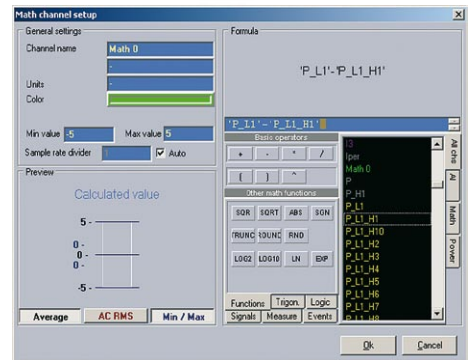
Remote Control

With the remote control ability the instrument can be configured and the data can be evaluated from your office or wherever you are.



Math Functions

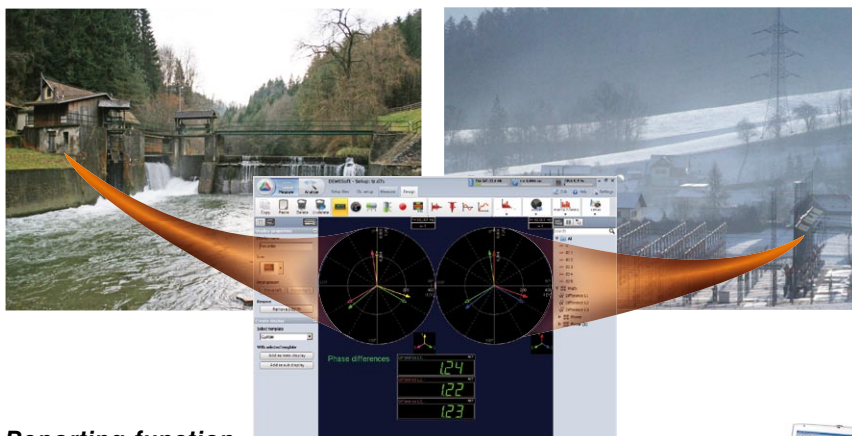
With the additional MATH function of DEWESoft calculations of for example efficiency, difference of input, output and phase angle differences can be implemented easily. Use all POWER parameters as input value!



- Arithmetic functions
- Trigonometric functions
- Logic function
- Signal generator
- Event functions
- d/dt, integration
- Highpass-, lowpass- and bandpass-filters
- Transfer curve function

GPS and NET

With the use of the GPS function a comparison of different units on different locations is possible. Phasor measurement and angle comparisons are a typical application of this function.



Reporting function

- Direct report printout
- Data export for enhanced post analysis in other applications
- PMT as reporting and analysis tool









Notification







(for permanent installed systems)




- E-Mail
- SNMP

Accessories - Current Clamps for DEWE-570-PNA series

Models	Input range	Accuracy	Description
PNA-CLAMP-5 	5 A	≤ 1 %	AC current clamp (small design) Voltage output
PNA-CLAMP-10 	10 A	≤ 1 %	AC current clamp (small design) Voltage output
PNA-CLAMP-20 	20 / 200 A	≤ 1 %	AC current clamp (small design) Voltage output
PNA-CLAMP-1000 	1000 A	≤ 1 %	AC current clamp Current output
PNA-FLEX-300-45 	300 / 3000 A	≤ 1 %	Flexible current transformer (45 cm length)
PNA-FLEX-300-80 	300 / 3000 A	≤ 1 %	Flexible current transformer (80 cm length)

Accessories- Shunts and Current Clamps for DEWE-xxx-PNA series

Models	Input range	Accuracy	Description
PNA-CLAMP-20-B 	20 / 200 A	≤ 1 %	AC current clamp (small design) Voltage output
PNA-A100-200-45 	200 / 2000 A	≤ 1 %	Flexible current loop (45 cm length)
PNA-A100-200-80 	200 / 2000 A	≤ 1 %	Flexible current loop (80 cm length)
PNA-A100-1000-120 	1000 / 10000 A	≤ 1 %	Flexible current loop (120 cm length)
PNA-A100-300-45 	300 / 3000 A	≤ 1 %	Flexible current loop (45 cm length)
PNA-A100-300-80 	300 / 3000 A	≤ 1 %	Flexible current loop (80 cm length)

Models	Input range	Accuracy	Description
DAQ-SHUNT-3 	5 A	±0.1 % < 10 ppm	100 mOhm Shuntbox Current input via 2x 2 meter cable with banana plugs Voltage output via 2x 0.3 meter cable with banana plugs
DAQ-SHUNT-4 	5 A	±0.1 % < 10 ppm	100 mOhm Shuntbox Current input via 2x safety banana jacks Voltage output via 2x 0.3 meter cable with banana plugs
DAQ-SHUNT-5 	5 A	±0.1 % < 10 ppm	100 mOhm Shuntbox Current input via 2x safety banana jacks Voltage output via 2x safety banana jacks

Re-inventing Data Acquisition

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