POWER 1000

Universal Power Measuring Instrument for all Electrical Systems



- Complete power analysis with simultaneous measurement of all relevant electric supply quantities
- Power and energy analysis in power supply systems, as well as at the outputs of frequency converters
- Harmonic analysis up to the 50th harmonic including sub-harmonics
- Flicker analysis in accordance with EN 61000-4-15
- 8 isolated measuring circuits (4 voltage and 4 current), 100 kHz sampling rate per measuring circuit
- Color touch-screen display, 5½", ¼ VGA
- Storage of measurement data / settings to plug-in CF memory card or USB memory stick
- Transient measurements, 1300vpk as short as 10usec
- USB interfaces for PC, external printer/memory/keyboard
- Ethernet TCP/IP with integrated web server for remote control and read-out
- 4 digital status inputs for indicating consumer operating states
- 4 digital control inputs for synchronizing the measuring interval, and for use as meter inputs
- 1 relay output for alarms
- Internal rechargeable battery with charging controller for power failures
- Worldwide use is made possible with a broad range variable power pack (85 to 250 V AC/DC)

The POWER 1000 is suitable for broadband measurement of electrical quantities in DC systems, as well as single and 3-phase AC systems with any load and line frequencies of up to 1000 Hz. Even in systems with variable frequency – at frequency converter outputs –the POWER 1000 is first choice, for a wide range of applications:

Energy Technology

- Measurement in low and medium-voltage* systems including features for evaluating power quality indices
- Measurement and recording of electrical operating parameters for wind turbine generator systems together with wind speed*
- Measurement and recording of electrical operating parameters for photovoltaic energy systems together with light intensity*

Electrical Engineering

- EMC testing of electrical devices and systems, including harmonics and flicker
- Measurement of static and dynamic alternating and direct current quantities at electrical/electronic products in R&D, manufacturing, the test lab and for service applications

* requires additional transducer

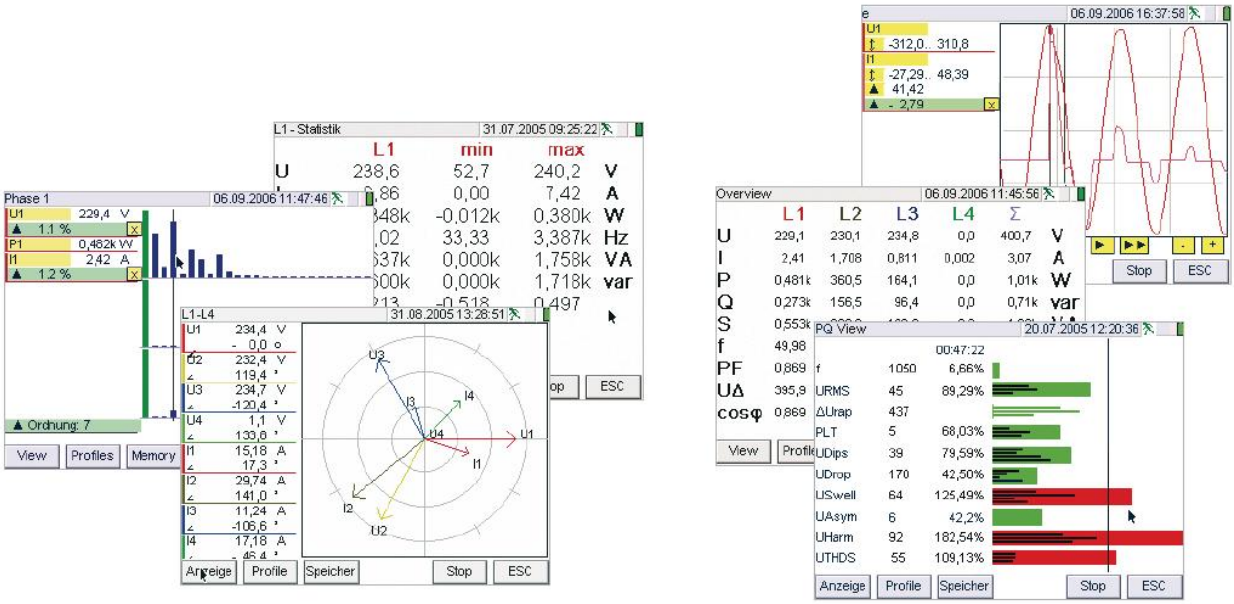
Building Services and Operations Technology

- Acquisition and recording of mains power anomalies for the clarification of interference in the electrical installation and at power consumers
- Recording and analysis of start-up and operating performance of standby generating plants
- Measuring and recording of characteristic electrical quantities for dimensioning static VAR compensators, and testing it for correct functioning
- Load and energy consumption measurements in electrical distribution systems or at operating equipment for the detection of critical operating states or potential energy cost-savings

Drive Technology

- Power measurements at electrical motors with simultaneous recording of mechanical quantities such as RPM, torque, pump pressure or flow rate*
- Determination of characteristic motor values during operation with a frequency converter
- Vehicle and Aircraft Manufacturing, Shipbuilding
- Measurements at generators and power consumers in DC automotive electrical systems
- Power and harmonics measurements in locomotives and railway electrical systems
- Power and harmonics measurements for onboard electrical systems in aircraft and ships

Symbol	Measured Quantity	Unit of Measure	Chan 1-2-3	Chan4	Sum 1-3
Ux	L-N voltage, RMS value	V	X	X	X
UΔx	L-L voltage, RMS value	V	X	X	
Ix	Phase current, RMS value	A	X	X	X
Px	Active power	W	X	X	X
Sx	Apparent power	VA	X	X	X
Qx	Reactive power	var	X	X	X
Dx	Distortion power	var	X	X	X
Qcx	Compensation power for reaching setpoint of cosφ	var	X	X	X
WP+x	Active energy import	Wh	X	X	X
WP-x	Active energy export	Wh	X	X	X
WSx	Apparent energy	VAh	X	X	X
WQx	Reactive energy	varh	X	X	X
cosφx	Displacement power factor	--	X	X	
φx	Phase-shift angle	°[degrees]	X	X	
PFx	Power factor (P/S)	--	X	X	X
CFUx	Voltage crest factor	--	X	X	X
CFIx	Current crest factor	--	X	X	X
fx	Voltage frequency	Hz	X	X	
ux(t)	Voltage waveshape	V	X	X	
ix(t)	Current waveshape	A	X	X	
px(t)	Active power waveshape	W	X	X	
AsymU	Voltage unbalance of the 3~ system	%			X
SeqU	Phase sequence of the 3 voltages	123/321			X
FLICKER					
Pmt*x*	Momentary flicker for voltage	U*x*	X	X	
Pst*x*	Short-term flicker (10 min.) for voltage	U*x*	X	X	
Plt*x*	Long-term flicker (2 h) for voltage	U*x*	X	X	
HARMONIC DISTORTION					
***Vx* THD, V*x* THDG, V*x* THDS**	Total, Group total, and Subgroup total harmonic distortion for voltage	%	X		
V*x* PWHD	Partial weighted harmonic distortion for V x within an adjustable range from hmin to hmax	%	X	X	
***Vx* H0, V*x* H1, V*x* H2 …V *x* H50**	Voltage of DC component, Fundamental, and harmonic group for Ix (absolute and relative to VxH1)	V, %	X	X	
V*x* HG1 …V*x* HG50, V*x* HS1 …V*x* HS50,	Voltage of harmonic group and subgroup (absolute and relative to VxH1)	V, %	X	X	
V*x* IG1 …V*x* IG49 V*x* IS1 …V*x* IS49	Voltage of inter-harmonic group and subgroup (absolute and relative to VxG1)	V, %	X	X	
I*x* THD, I*x* THDG, I*x* THDS	Total, Group total, and Subgroup total harmonic distortion for current	%	X	X	
I*x* PWHD	Partial weighted harmonic distortion for Ix within an adjustable range from hmin to hmax	%	X	X	
I*x* H0, I*x* H1, I*x* H2 …I*x* H50	Current of DC component, Fundamental, and harmonic group for Ix (absolute and relative to IxH1)	A, %	X	X	
I*x* HG1 …I*x* HG50, I*x* HS1 …I*x* HS50,	Current of harmonic group and subgroup (absolute and relative to IxH1)	A, %	X	X	
I*x* IG1 …I*x* IG49 I*x* IS1 …I*x* IS49	Current of inter-harmonic group and subgroup (absolute and relative to IxG1)	A, %	X	X	
P*x* H0,P*x* H1, P*x* H2 …P*x* H50	DC, Fundamental, h2 ... h50 power component of Px (absolute and relative to PxH1)	W, %	X	X	
∏ U*x* H0 …∏U*x* H50	Phase angle of harmonic h0 ... h50 for U*x* to fundamental voltage UxH1	°[degrees]	X	X	
∏ I*x* H0 …∏I*x* H50	Phase angle of harmonic h0 ... h50 for I*x* to fundamental current IxH1	°[degrees]	X	X	



Characteristic	Specification	Notes
VOLTAGE INPUTS		
Quantity	4	Mutually isolated
Connection	Two 4 mm safety sockets each	Red (high), black (low)
Connection options	Single phase, 2-phase (split-phase), 3-phase wye or delta	
Input impedance	4 M□// 5 pF	
Coupling	AC / AC+DC	
Input range	0 to 150 V / 300 V / 600 V / 900 V	Manually selectable
Scaling factors	0.001 to 99,999 V/V	Individually adjustable for each input
Overload withstand	Continuous: 1200 VRMS, transient (1.2/50 µs): 6000 Vpeak	
CURRENT INPUTS	For clamp-on probes or shunts	
Quantity	4	Mutually isolated
Connection	Two 4 mm safety sockets each	Red (high), black (low)
Connection options	3xL + N, 3xL, 2xL + N (two-wattmeter method)	L1, L2, L3, N (calculated)
Input Impedance	1 M□// 5 pF	
Coupling	AC / AC+DC	
Input range	0 to 300 mV / 3 V	Manually selectable
Scaling factors	0 / 0.001 to 99,999 V/V	Individually adjustable for each input
Overload withstand	Continuous: 400 VRMS, transient (1.2/50 µs):1000 Vpeak	
VOLTAGE and CURRENT		
Sampling rate	100 kS/s	Simultaneously at each
Sampling resolution	16 bit	
Frequency range	DC, 15 Hz to 10 kHz	
Crosstalk attenuation	-60 dB between voltage channels, -95 dB between voltage and current	
DIGITAL INPUTS		
Quantity	4	Floating, common reference point
Functions	Display and record state, count pulses	
Connection	Plug-in connectors with screw terminals	
DC input signal	Low: <3V, High: 5 to 24V	
Overload withstand	30V, continuous	
CONTROL INPUTS		
Quantity	4	
Functions	Start/Stop recording; Synch demand interval	
Connection	Plug-in connectors with screw terminals	
DC input signal	Low: <2V, High: 4 to 5V	
Overload withstand	6V, continuous	
ALARM OUTPUT		
Function	Floating relay contact for Limit exceed, 30V @ 1A max	

Accuracy	Range	15-65-Hz	DC – 1000Hz	1-10KHZ
RMS VOLTAGE	1.0 to 900 V rms	+/- 0.2% rdg +/- 0.1% range	+/- 0.4% rdg +/- 0.2% range	+/- 1% rdg +/- 0.5% rng
RMS CURRENT	0.0 to 3.00 A rms	+/- 0.2% rdg +/- 0.1% range	+/- 0.4% rdg +/- 0.2% range	+/- 1% rdg +/- 0.5% rng
POWER	V & I dependent	+/- 0.5% rdg +/- 5% range		
V HARMONIC – Absolute V	1.0 to 900 V rms	+/- 3% rdg +/- 0.1% range	+/- 5% rdg +/- 0.2% range	
Phase Angle	-180* to + 180*	1 deg * Harm#	2 deg * Harm#	
VTHD	0 to 200%	2%	4%	
I HARMONIC – Absolute I	0.0 to 3.00 A rms	+/- 0.2% rdg +/- 0.1% range	+/- 0.4% rdg +/- 0.2% range	
Phase Angle	-180* to + 180*	1 deg x Harm#	2 deg x Harm#	
I THD	0 to 200%	2%	4%	
FREQUENCY				
	15 To 99.9	+/- 0.05% rdg +/- 1 digits		
	100 to 999	+/- 0.1% rdg +/- 2 digits		
	1KHz to 10Khz	+/- 0.2% rdg +/- 3 digits		
	> 10KHz	+/- 0.5% rdg +/- 5 digits		

Display: Color LCD touch screen, ¼ VGA, 320x240 pixels, CCFL backlight
Memory: Internal 50M Flash, plug-in Compact Flash card, plug-in USB data storage media
Time Clock: 10msec resolution, max 5 sec per month drift
Power Supply: 85-250VAC/DC, 45-400Hz, 40W max, 20 minute backup battery (after 2 hr charging)
USB Host: USB 1.1 Interface for recording data and setups, and installation of firmware updates
Slave: USB 1.1 Interface for remote control of instrument, and transfer of measurement and setup files
Ethernet: 10/100 Base T (RJ45), Protocols: TCP/IP, HTTP, FTP
Operating Range: 0 to 40 deg C within spec, -10 to 50 deg C with reduced accuracy;
max 95%RH w/o condensation for 0 to 25deg C, max 75% 25 to 40 deg C
2000 M altitude
Physical Dimensions: 290 x 245 x 140 mm, 2.4 kg without accessories
Mechanical Protection: Housing IP30, Terminals IP 20
Electrical Safety: Safety Class I per IEC 61010-1, Measuring: 600V CAT IV, 1000V CAT III
Electromagnetic Compatibility: Per EN 61236, compiles with EC directive 89/336

STANDARD ACCESSORIES:

- (1) set of cables for voltage measurement inputs including 4 pairs of measurement cables (length: approx. 2 m) with test probe and plug-on alligator clips
- (3) short measurement cables with 4 mm safety plugs (stackable) for bridging measurement inputs
- (1) power cable with protective contact plug and inlet plug
- (1) USB-A interface cable
- (1) Ethernet interface cable
- (1) stylus pen
- (1) printed copy of operating instructions
- (1) CD ROM with latest operating instructions, technical data sheet and respectively measuring notes
- (1) lockable carrying case for instrument and accessories

OPTIONAL ACCESSORIES:

- Current clamp-on probes (1-1000A), flexible probes (1 to 20KA); shunts 20mA to 16A)
- DranView software

DRANETZ BMI

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CAT IV DKD Calibration Certificate