



Class A remote analysis

Features

- The included **touch screen computing device** is a virtual display allows to easy operate the analyzer.
- Remote control and data transfer through a built-in GSM modem (GPRS).
- Anti-theft feature – SMS notification in the event of position change (built-in GPS receiver).
- Real-time clock synchronized to GPS protocol.
- Remote control of the analyzer via Wi-Fi and the **Sonel Analysis Mobile** application.

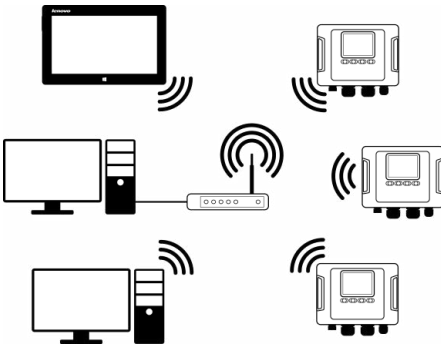
Measured parameters

- **Transients up to ± 8000 V with max. sampling frequency 10 MHz.** Minimal transient time is **650 ns** (only PQM-711)
- **Voltages L1, L2, L3, N, PE (five measurement inputs)** – average, minimum, maximum and instant values within the range up to 1000 V, interoperability with voltage transducers.
- **Currents L1, L2, L3, N (four measurement inputs)** – average, minimum, maximum and instant values, current measurement within the range up to 6 kA (depending on applied current clamp), interoperability with current transducers.
- Measurement of control signals up to 3000 Hz.
- Crest factors for current (CFI) and voltage (CFU).
- Frequency within the range of 40 Hz – 70 Hz.
- Active power (P), reactive power (Q), distortion power (D), apparent power (S) with identification of the nature of reactive power (capacitive, inductive).
- Calculation of reactive power using the Budeanu method and IEEE 1459 method.
- Active energy (E_p), reactive energy (E_q), apparent energy (E_s).
- Power factor, $\cos\phi$, $\tan\phi$.
- K factor (transformer overload caused by the harmonics).
- Up to 50th harmonics for voltage and current.
- Interharmonics measured as groups.
- Total Harmonic Distortion (THD) for voltage and current.
- Short-term (PST) and long-term (PLT) flicker (IEC 61000-4-15 class A).
- Unbalance of voltage (IEC 61000-4-30 class A) and current.
- Current events detection including waveforms recording.
- Current and voltage events recording with waveforms (up to 1 s) and $RMS_{1/2}$ graphs with 30 s maximum recording time.
- Current and voltage waveforms recording after each averaging period.



Wide range of mains to analyze

- With rated frequency 50/60 Hz
- With rated voltages: 64/110 V; 110/190 V; 115/200 V; 120/208 V; 127/220 V; 133/230 V; 220/380 V; 230/400 V; 240/415 V; 254/440 V; 265/460 V; 277/480 V, 290/500 V, 400/690 V
- Direct current
- Systems:
 - » single-phase
 - » split-phase with common N
 - » three-phase – WYE with and without N conductor
 - » three-phase – Delta
 - » three-phase – WYE and Delta Aron
 - » with current and voltage transducers



Capabilities

PQM-710 and PQM-711 have all the advantages of the PQM-702 and PQM-703 analyzers: a **built-in GPS receiver** ensuring real time clock accuracy and an integrated **GSM modem** that facilitates remote analyzer operation. Like PQM-703, PQM-711 is also equipped with a **transient recorder** (sampling frequency 10 MHz, voltage range **up to ± 8000 V**).

A dedicated computing device with Sonel Analysis software significantly increases the functionality and freedom of handling measurements and diagnostics of power quality. An additional trump card of the analyzers is the built-in **Wi-Fi communication module**, providing a number of advantages: no restrictions on file transfer, no data transfer costs, use of local wireless infrastructure... This gives the user the opportunity to adapt to the conditions prevailing on the site. They can supervise measurements from a convenient location – for example, an area without electromagnetic interference.



Displaying data

PQM-710 and PQM-711 can be operated using a **touch screen computing device** equipped with **dedicated, pre-installed software**. The user can supervise the measurements and conduct diagnostics while maintaining mobility – he doesn't even have to be near the analyzer. In typical applications, the device plays the role of a remote display and an intermediate storage of measurement data with the functionality of a router. Therefore, the user can also connect to it using a wireless network – for example, to transfer the collected registrations to a desktop computer.



Application

PQM-710 and PQM-711 are widely used in the professional power industry. They provide full 4-quadrant analysis, meeting the needs of energy consumers and producers, such as renewable energy, including photovoltaic and wind farms. They enable forecasting failures in distribution networks. They provide analysis of the load capacity of networks and transformers, as well as recording their current states. In addition, they are powerful investment tools. Thanks to PQM-710 and PQM-711, the user will obtain the necessary data for development of power infrastructure, predict potential problems, and finally – verify the correctness and quality of implementation.








Parameters

Parameter		Measuring range	Max. resolution	Accuracy
Alternating voltage (TRMS)	—	0.0...1000.0 V or 0.0...760.0 V*	4 significant digits	$\pm 0.1\% U_{nom}$
Crest Factor	Voltage	1.00...10.00 (≤ 1.65 for voltage of 690 V)	0.01	$\pm 5\%$
	Current	1.00...10.00 (≤ 3.6 for I_{nom})	0.01	$\pm 5\%$
Alternating current (TRMS)	—	depending on clamp**	4 significant digits	$\pm 0.1\% I_{nom}$ (error does not account for clamp error)
Frequency	—	40.00...70.00 Hz	0.01 Hz	± 0.01 Hz
Active, reactive, apparent and distortion power	—	depending on configuration (transducers, clamps)	4 significant digits	depending on configuration (transducers, clamps)
Active, reactive and apparent energy	—	depending on configuration (transducers, clamps)	4 significant digits	as power error
cos ϕ and power factor (PF)	—	-1.00...1.00	0.01	± 0.03
tan ϕ	—	-10.00...10.00	0.01	depends on error of active and reactive power
Harmonics and interharmonics	Voltage	DC, 1...50	as for alternating voltage True RMS	$\pm 0.05\% U_{nom}$ for m.v. < 1% U_{nom} $\pm 5\%$ m.v. for m.v. $\geq 1\% U_{nom}$
	Current	DC, 1...50	as for alternating current True RMS	$\pm 0.15\% I_{nom}$ for m.v. < 3% I_{nom} $\pm 5\%$ m.v. for m.v. $\geq 3\% I_{nom}$
THD	Voltage	0.0...100.0% (relative to RMS value)	0.1%	$\pm 5\%$
	Current			$\pm 5\%$
Active and reactive power of harmonics	—	depending on configuration (transducers, clamps)	depends on minimum current and voltage values	—
Angle between current and voltage harmonics	—	-180.0...+180.0°	0.1°	$\pm (n \times 1^\circ)$
K-Factor	—	1.0...50.0	0.1	$\pm 10\%$
Flicker index	—	0.20...10.00	0.01	$\pm 5\%$
Unbalance factor	Voltage and current	0.0...20.0%	0.1%	$\pm 0.15\%$ (absolute error)
Measurement of control signals	Voltage	up to 15% U_{nom} at 5.00...3000.00 Hz	4 significant digits	unspecified for <1% U_{nom} $\pm 0.15\%$ for 1...3% U_{nom} $\pm 5\%$ for 3...15% U_{nom}
Measurement of transients (PQM-711)	Voltage	± 8000 V	4 significant digits	$\pm (5\% + 25$ V)

m.v. – measured value

* Depending on analyzer version

** F-1A1, F-2A1, F-3A1 clamp: 0...1500 A AC (5000 A_{pp}) • F-1A, F-2A, F-3A clamp: 0...3000 A AC (10 000 A_{pp}) • F-1A6, F-2A6, F-3A6 clamp: 0...6000 A AC (20 000 A_{pp})
C-4A clamp: 0...1000 A AC (3600 A_{pp}) • C-5A clamp: 0...1000 A AC/DC (3600 A_{pp}) • C-6A clamp: 0...10 A AC (36 A_{pp}) • C-7A clamp: 0...100 A AC (360 A_{pp})

							
	C-4A	C-5A	C-6A	C-7A	F-1A1 / F-1A / F-1A6	F-2A1 / F-2A / F-2A6	F-3A1 / F-3A / F-3A6
	WACEGC4AOKR	WACEGC5AOKR	WACEGC6AOKR	WACEGC7AOKR	WACEGF1A1OKR WACEGF1AOKR WACEGF1A6OKR	WACEGF2A1OKR WACEGF2AOKR WACEGF2A6OKR	WACEGF3A1OKR WACEGF3AOKR WACEGF3A6OKR
Rated current	1000 A AC	1000 A AC 1400 A DC	10 A AC	100 A AC	1500 / 3000 / 6000 A AC		
Frequency	30 Hz...10 kHz	DC...5 kHz	40 Hz...10 kHz	40 Hz...1 kHz	40 Hz...10 kHz		
Output signal level	1 mV / 1 A	1 mV / 1 A	100 mV / 1 A	5 mV / 1 A	77.6 μ V / 1 A	38.8 μ V / 1 A	19.4 μ V / 1 A
Max. diameter of measured conductor	52 mm	39 mm	20 mm	24 mm	360 mm	235 mm	120 mm
Minimum accuracy	$\leq 0.5\%$	$\leq 1.5\%$	$\leq 1\%$	0.5%	1%		
Battery power	—	✓	—	—	—		
Lead length	2.2 m	2.2 m	2.2 m	3 m	2.2 m		
Measurement category	IV 300 V	IV 300 V	IV 300 V	III 300 V	IV 600 V		
Ingress protection	IP40				IP67		

SONEL ANALYSIS

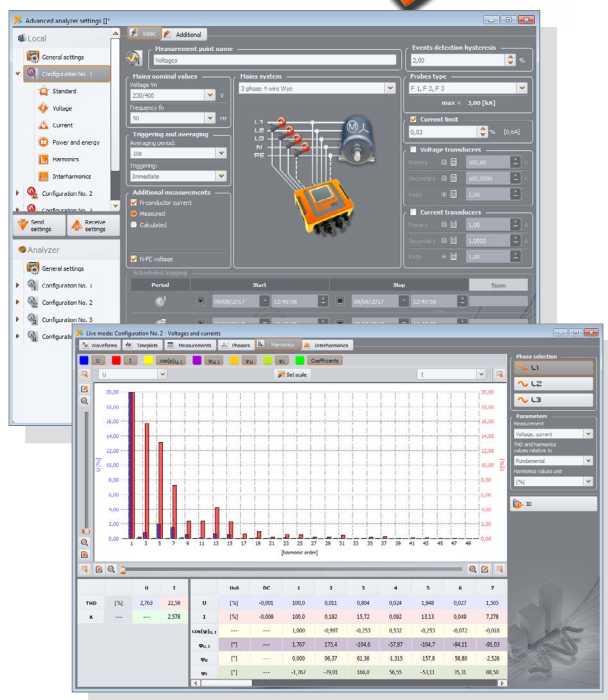


Sonel Analysis software – application delivered as standard accessory, indispensable for working with PQM-series analyzers. It enables:

- analyzer configuration,
- data reading from logger,
- preview of network parameters in real time (with capability of reading via GSM modem),
- deletion of data in the analyzer,
- data presentation in tables,
- data presentation in charts,
- data analysis in compliance with standard EN 50160 (reports) and other user defined reference conditions,
- independent support of multiple analyzers,
- analyzer firmware updates.

The software enables readout of selected parameters and their visualization in real time. These parameters are measured independently from the registration saved on the memory card. The user can view:

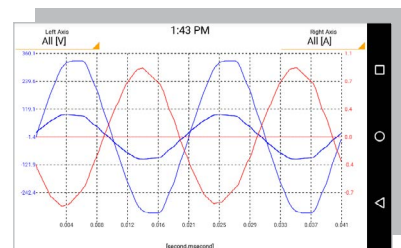
- charts of voltage and current progression (oscilloscope),
- charts of voltage and current over time,
- phasor diagram,
- measurements of multiple parameters,
- harmonics and harmonic powers,
- interharmonics.



Sonel Analysis Mobile



Mobile version of the program supports PQM-711 and PQM-710 power quality analyzers. It can be downloaded from the www.sonel.com website.



Standard accessories



3 x crocodile clip, black, 1 kV, 20 A
WAKROBL20K01



AZ-1 power supply adapter (mains plug/banana inputs)

WAADAAZ1



Straps for mounting on a pole – set – 1.2 m

WAPOZOPAKPL



Touch screen computing device



Crocodile clip, blue, 1 kV, 20 A
WAKROBU20K02



Voltage adapter with M4/M6 thread – set 5 pcs

WAADAM4M6



DIN rail mounting bracket with positioning catches

WAPOZUCH3



Data transfer and analysis

USB cable
WAPRZUSB

Sonel Analysis software
WAPROANALIZA4



AC-16 line splitter

WAADAAC16



4 x magnetic voltage adapter – set

WAADAUMAGKPL



2 x fasteners and bands for mounting the analyzer

WAPOZUCH4



L8 carrying case, backpack for PQM

WAFUTL8

Optional accessories



F-1A flexible clamp
($\Phi=360$ mm)

1.5 kA: WACEGF1A10KR
3 kA: WACEGF1A0KR
6 kA: WACEGF1A60KR



F-2A flexible clamp
($\Phi=235$ mm)

1.5 kA: WACEGF2A10KR
3 kA: WACEGF2A0KR
6 kA: WACEGF2A60KR



F-3A flexible clamp
($\Phi=120$ mm)

1.5 kA: WACEGF3A10KR
3 kA: WACEGF3A0KR
6 kA: WACEGF3A60KR



C-4A clamp
(Φ 52 mm)
1000 A AC

WACEG4A0KR



C-5A clamp
(Φ 39 mm)
1000 A AC/DC

WACEG5A0KR



C-6A clamp
(Φ 20 mm)
10 A AC

WACEG6A0KR



C-7A clamp
(Φ 24 mm)
100 A AC

WACEG7A0KR



L2 carrying case
for clamps

WAWALL2



Magnetic voltage adapter

black
WAADAUMAGKBL
blue
WAADAUMAGKBU



Flat test clip
(grip – banana socket) (5 pcs)

WASONKCB1KPL



Test clips with steel jaws – set (5 pcs)

WASONKGB1KPL



Adapter for control terminals (5 pcs)

WAADAPRZKPL1



AGT-16T industrial socket adapter
16 A / 32 A

WAADAAGT16T
WAADAAGT32T



ASX-1 piercing adapter – set (4 pcs)

WAADAPRZASX1



PQM magnetic strap (2 pcs)

WAPOZUCH5



AGT-16C three-phase socket adapter
16 A / 32 A (PEN)

WAADAAGT16C
WAADAAGT32C



AGT-16P three-phase socket adapter
16 A / 32 A

WAADAAGT16P
WAADAAGT32P



AGT-63P three-phase socket adapter
63 A

WAADAAGT63P



XL2 carrying case

WAWALXL2



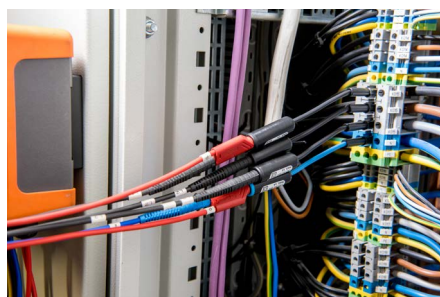
GPS antenna

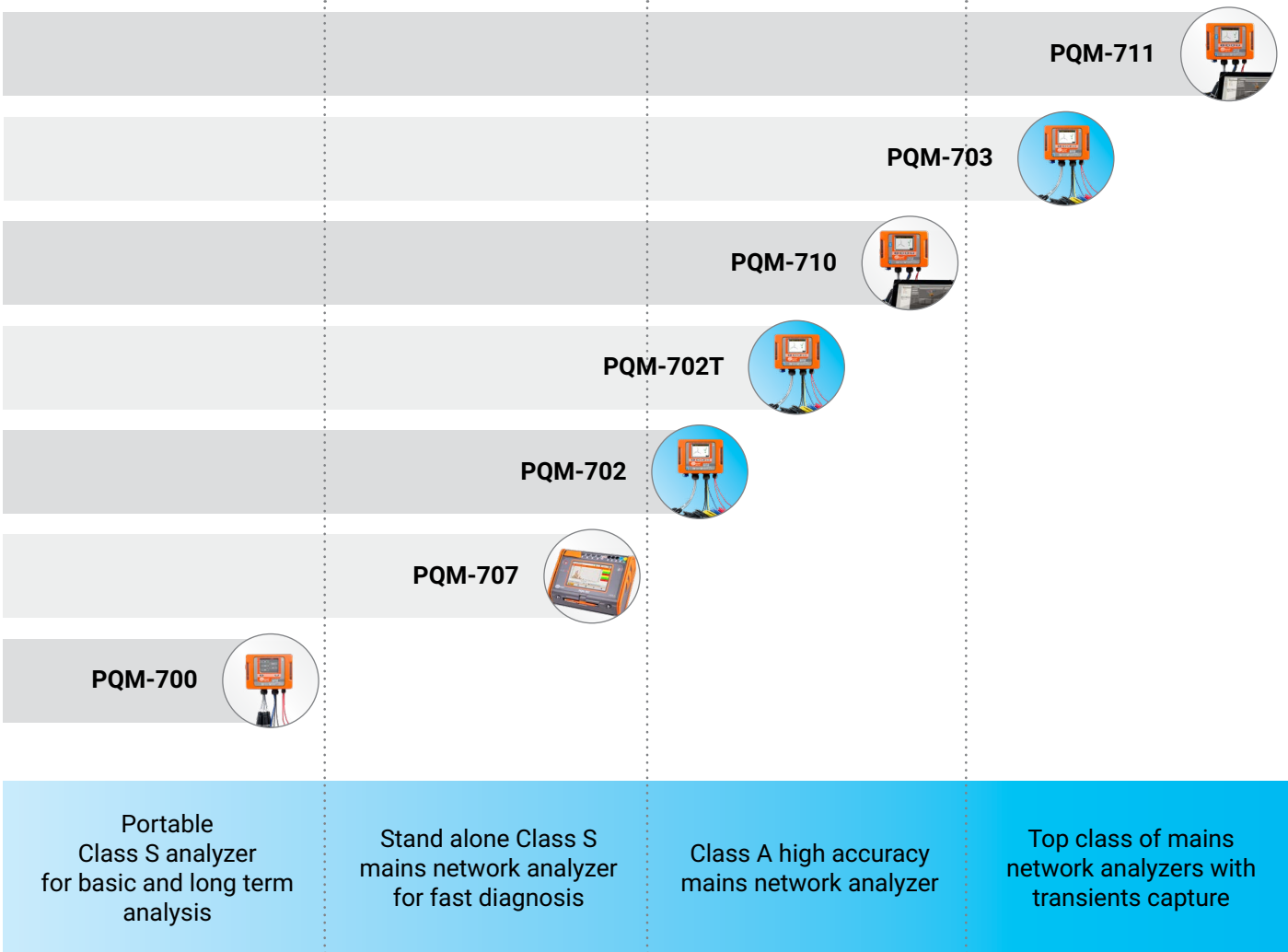
WAPOZANT10GPS



GSM repeater

WAPOZANTREPEATER





INSULATION RESISTANCE METERS

MIC-30 INSULATION RESISTANCE METER

MIC-5010 INSULATION RESISTANCE METER

MIC-10k1 INSULATION RESISTANCE METER

EARTH RESISTANCE AND RESISTIVITY METERS

MIRU-30 EARTH RESISTANCE AND RESISTIVITY METER

MIRU-200-GPS EARTH RESISTANCE AND RESISTIVITY METER

POWER QUALITY ANALYZERS

PQM-700 POWER QUALITY ANALYZER

PQM-711 POWER QUALITY ANALYZER

Accessories for power quality analyzers

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