

## Stationary, modular, comprehensive

### Features

- Full class A according to IEC 61000-4-30, confirmed by a certificate from an accredited laboratory
- Voltage inputs L1, L2, L3, N, E (5 terminals)
- L1, L2, L3, N, E currents (5 current transformers)
- Built-in **5 A or 1 A** current transducers, or a **variant without transducers, but cooperating with external transducers\***
- Possibility of indirect measurements with calculation results for the primary side
- Operation in 50 Hz, 60 Hz, 400 Hz networks
- Recording of voltage and current events along with waveforms
- **Design with or without transient measurement module**
- Measurement of more than 4,000 parameters
- 24-bit analog-to-digital converter
- Basic sampling rate of 80 kHz
- Conducted emissions monitoring in the 2...150 kHz band
- Two LAN ports, including one with the option of powering the meter with PoE (Power over Ethernet)
- Built-in rechargeable battery
- **Two mains power supply options: built-in power supply unit 85...264 V AC (120...300 V DC) or 18...60 V DC**
- 8 GB memory (microSD card)
- USB port for meter updates and data exchange
- Two binary inputs, two relay outputs, two RS-485 ports
- Relay output to monitoring analyzer operation (Watchdog)
- 1-wire input for external temperature sensors
- 2.4" touch screen
- DIN rail or wall mounting
- Expansion bus allowing connection of various external modules (e.g. GPS, LTE)
- Built-in web server for programming the meter, reading current data, viewing the list of recorded events with oscillogram/RMS display
- Time synchronization with the reference via NTP servers, IRIG-B (via built-in RS-485)
- **Optional GPS module and antennas**
- Measurement category CAT III 600 V (IV 300 V) for voltage inputs
- Measurement category CAT III 300 V for current inputs
- Possibility of sealing current and voltage inputs

\* coming soon

	I [A]	THDI [%]
L1	1.1900	14.52
L2	1.5700	13.22
L3	0.9102	10.58
N	0.0008	>999.9
E	2.9712	0.00

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## Description

Stationary meter designed to measure and record power supply parameters for compliance with standards and applicable laws, and with the ability to verify preset terms of a power sale/purchase contract.

Made in class A. Designed to be mounted on a DIN rail (with the possibility of mounting on a wall in a cabinet). Modular design allows adding new modules to expand the capabilities of the meter. The instrument allows measurements in 50 Hz, 60 Hz and 400 Hz networks.



## Additional features

### Standard transmission protocols

- Modbus TCP/IP
- Modbus RTU
- IEC 61850
- PQdif

### Web interface (webserver)

- Access to the interface from any web browser

## Variants

The PQM-750 can be configured in various ways. Each set of built-in internal modules is a separate sales index for the analyzer.

index:	What built-in power supply?	What built-in relays?	What built-in transducers?	Is there a transient module on board?
WMGBPQM750	AC1 DC1	R1 R2	CT0 CT1 CT5	- T1

-- no transient module  
T1 - transient module installed

CT0 - none, operation with external transducers\*  
CT1 - 1 A current transducers  
CT5 - 5 A current transducers

R1 - mechanical relays  
R2 - solid state relays\*

AC1 - 85...264 V AC / 120...300 V DC power supply unit  
DC1 - 18...60 V DC power supply unit

**Need help choosing a configuration?  
Contact our Customer Service.**



\* coming soon

## Modularity



**LCD 7" touch panel\***

The instrument can be expanded with additional communication protocols and physical and software functionality.

- GPS module with IRIG-B output and GPS module antenna (10 m / 20 m / 30 m)
- LTE GSM module\*
- I/O module\*
- LCD 7" touch panel for full operation of the analyzer at the mounting location\*



+



**GPS module**

It allows time synchronization via GPS.



Antenna with 10 m cable



Antenna with 20 m cable



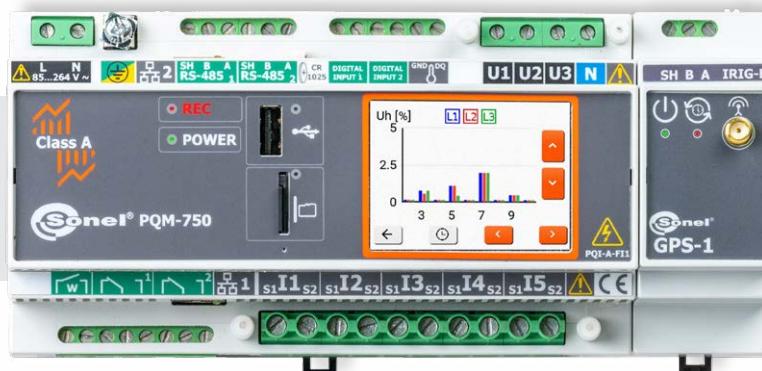
Antenna with 30 m cable



**I/O module\***



**LTE GSM module\***



\* coming soon

## Measured parameters

Built-in software (web interface – webserver) allows you to configure the device and view actual data. It allows measurement of the following parameters.



- Phase RMS voltage  $\mathbf{U}$  for L1, L2, L3+N/PE
- Phase-to-phase RMS voltages  $\mathbf{U}$  for L12, L23, L31
- RMS currents  $\mathbf{I}$  of all phases + N + PE
- Crest factor  $\mathbf{CF}$  of voltages and currents
- Network frequency  $\mathbf{f}$  for L1
- Active power  $\mathbf{P}$  for L1, L2, L3
- Active power  $\mathbf{P1}$  (**separated 50 Hz**) for L1, L2, L3
- Reactive power  $\mathbf{Q}$  for L1, L2, L3
- Reactive power  $\mathbf{Q1}$  (**separated 50 Hz**) for L1, L2, L3
- Apparent power  $\mathbf{S}$  for L1, L2, L3
- Apparent power  $\mathbf{S1}$  (**separated 50 Hz**) for L1, L2, L3
- Three-phase total power  $\mathbf{P}_{3F}$ ,  $\mathbf{Q}_{3F}$ ,  $\mathbf{S}_{3F}$
- Three-phase total power  $\mathbf{P1}_{3F}$ ,  $\mathbf{Q1}_{3F}$ ,  $\mathbf{S1}_{3F}$
- $\mathbf{cos\phi}$  for L1, L2, L3,  $\mathbf{cos\phi}_{3F}$
- Power factor  $\mathbf{PF}$  for L1, L2, L3,  $\mathbf{PF}_{3F}$
- $\mathbf{tg\phi}$  for L1, L2, L3,  $\mathbf{tg\phi}_{3F}$
- Distortion power  $\mathbf{D}$  for L1, L2, L3
- Three-phase total distortion power  $\mathbf{D}_{3F}$
- Distortion power factor  $\mathbf{DPF}$  for L1, L2, L3
- Shape of phase voltages and currents for events
- Phase diagrams for currents and voltages
- Active energy for L1, L2, L3 – taken  $\mathbf{E}_{p+}$  or given  $\mathbf{E}_{p-}$
- Three-phase active energy – drawn  $\mathbf{E}_{p3F+}$  or given  $\mathbf{E}_{p3F-}$
- Inductive reactive energy for L1, L2, L3 for consumption –  $\mathbf{E}_{qL+}$
- Capacitive reactive energy for L1, L2, L3 for consumption –  $\mathbf{E}_{qc+}$
- Three-phase reactive energy for consumption – inductive  $\mathbf{E}_{qL3F+}$  and capacitive  $\mathbf{E}_{qc3F+}$
- Apparent energy for L1, L2, L3 –  $\mathbf{E}_s$
- Three-phase apparent energy  $\mathbf{E}_{s3F}$
- Harmonics  $\mathbf{h}_n$  to 256<sup>th</sup> in current and voltage
- Interharmonics up to 256<sup>th</sup> in current and voltage
- Angles between current and voltage harmonics
- Monitoring of 2...150 kHz bandwidth
- $\mathbf{U}_{dc}$  phase voltage components
- Shares of harmonic currents and voltages in relation to RMS value (%) –  $\mathbf{h}_{nr}$
- Shares of harmonic currents and voltages in relation to the fundamental harmonic  $\mathbf{h}_1$  (%) –  $\mathbf{h}_{nf}$
- $\mathbf{THD}_R$  for voltages and currents calculated against RMS value (%)
- $\mathbf{THD}_F$  for voltages and currents calculated relative to the fundamental harmonic (%)
- $\mathbf{TID}_R$  for voltages and currents calculated against RMS value (%)
- $\mathbf{TID}_F$  for voltages and currents calculated relative to the fundamental harmonic (%)
- Active and reactive harmonic powers
- K-factor for  $\mathbf{I}_1$ ,  $\mathbf{I}_2$ ,  $\mathbf{I}_3$ ,  $\mathbf{I}_N$
- **Factor K (Europe)**
- Symmetrical voltage components: zero  $\mathbf{U}_0$ , direct  $\mathbf{U}_1$ , inverse  $\mathbf{U}_2$
- Symmetrical components of current: zero  $\mathbf{I}_0$ , direct  $\mathbf{I}_1$ , inverse  $\mathbf{I}_2$
- Short-term light flicker factor  $\mathbf{P}_{st}$
- Long-term light flicker factor  $\mathbf{P}_{lt}$
- Voltage unbalance
- Current unbalance
- Transients U up to 6000 V
- Ripple control signals
- Temperatures:  $\mathbf{T}_w$  (analyzer internals),  $\mathbf{T}_z1$ ... $\mathbf{T}_z4$  (1-wire)

# Parameters

Parameter	Measuring range	Max. resolution	Accuracy
<b>Alternating voltage (TRMS)</b> <small><math>U_{L-L MAX} = 2000 \text{ V}</math> for <math>U_{L-E MAX} = 1000 \text{ V}</math></small>	0.0...1000.0 V	4 significant digits	$\pm 0.1\% U_{\text{din}}$
<b>Crest Factor</b>			
Voltage	1.0...6.5 (1.65 for voltage of 690 V)	0.01	$\pm 5\%$
Current	1.00...10.00	0.01	$\pm 5\%$
<b>Alternating current (TRMS)</b>	0...20 A	4 significant digits	$\pm 0.2\%$
<b>Frequency</b>			
50 Hz and 60 Hz mains	40.000...70.000 Hz	0.001 Hz	$\pm 0.01 \text{ Hz}$
400 Hz mains	340.00...460.00 Hz	0.01 Hz	$\pm 0.1 \text{ Hz}$
<b>Active power</b> <small>IEC 62053-22 class 0,2S</small>	depending on voltage and current ratio	4 significant digits	$\pm 0.2\%$
<b>Reactive power</b> <small>IEC 62053-24 class 0,5S</small>	depending on voltage and current ratio	4 significant digits	$\pm 0.5\%$
<b>Apparent power</b>	depending on voltage and current ratio	4 significant digits	$\pm 0.2\%$
<b>Active energy</b> <small>IEC 62053-22 class 0,2S</small>	depending on voltage and current ratio	4 significant digits	$\pm 0.2\%$
<b>Reactive energy</b> <small>IEC 62053-24 class 0,5S</small>	depending on voltage and current ratio	4 significant digits	$\pm 0.5\%$
<b>Apparent energy</b>	depending on voltage and current ratio	4 significant digits	$\pm 0.2\%$
<b>cos<math>\phi</math> and power factor (PF)</b>	-1.000...1.000	0.001	0.05
<b>tan<math>\phi</math></b>	-10.000...10.000	0.001	depends on error of active and reactive power
<b>Harmonics and interharmonics</b>			
Voltage	DC, 0...256	4 significant digits	$\pm 0.05\% U_{\text{din}}$ for m.v. $< 1\% U_{\text{din}}$ $\pm 5\%$ m.v. for m.v. $\geq 1\% U_{\text{din}}$
Current	0...256	4 significant digits	$\pm 0.15\% I_{\text{din}}$ for m.v. $< 3\% I_{\text{din}}$ $\pm 5\%$ m.v. for m.v. $\geq 3\% I_{\text{din}}$
<b>THD-F</b>			
Voltage	0...20%	0.01%	$\pm 0.3\%$ (absolute error)
Current	0...100%	0.01%	$\pm 0.3\%$ (absolute error)
<b>Active and reactive power of harmonics</b>	depending on voltage and current ratio	4 significant digits	—
<b>Angle between current and voltage harmonics</b>	-180.0...+180.0°	0.1°	$\leq 0.05^\circ$ for $n = 1$ $\leq 1^\circ$ for $2 \leq n \leq 60$ at $f_{\text{nom}} = 50 \text{ Hz}$ $\leq 4^\circ$ for $61 \leq n \leq 256$ at $f_{\text{nom}} = 50 \text{ Hz}$
<b>K-Factor</b>	1.0...50.0	0.01	$\pm 10\%$
<b>Flicker index</b>	0.20...10.00	0.01	$\pm 5\%$
<b>Unbalance factor</b>			
Voltage and current	0.0...20.0%	0.1%	$\pm 0.15\%$ (absolute error)
<b>Measurement of control signals</b>			
Voltage	up to 15% $U_{\text{din}}$ at $f_R = 5\text{...}30000 \text{ Hz}$	4 significant digits	unspecified for $< 1\% U_{\text{din}}$ $\pm 0.15\%$ for $1\text{...}3\% U_{\text{din}}$ $\pm 5\%$ for $3\text{...}15\% U_{\text{din}}$
<b>Emissions in band</b>			
2...9 kHz	a single frequency that is multiple of 200 Hz	0.01 V	$\pm 0.1\% U_{\text{din}}$ for m.v. $< 2\% U_{\text{din}}$ $\pm 5\%$ m.v. for m.v. $\geq 2\% U_{\text{din}}$
8...150 kHz	a single frequency that is multiple of 2 kHz	0.01 V	$\pm (5\% + 0.1 \text{ V})$

m.v. – measured value

## Standards

Made in class A of the IEC 61000-4-30 standard, the instrument is compliant:

- Product standards:
  - » **IEC 62586-1** – Power quality measurement in power supply systems – Part 1: Power quality instruments (PQI)
  - » **IEC 62586-2** – Power quality measurement in power supply systems – Part 2: Functional tests and uncertainty requirements
- Standards for measuring network parameters:
  - » **IEC 61000-4-30** – Electromagnetic compatibility (EMC) – Testing and measurement techniques – Power quality measurement methods
  - » **IEC 61000-4-7** – Electromagnetic compatibility (EMC) – Testing and Measurement Techniques – General Guide on Harmonics and Interharmonics Measurements and Instrumentation for Power Supply Systems and Equipment Connected thereto
  - » **IEC 61000-4-15** – Electromagnetic compatibility (EMC) – Testing and Measurement Techniques – Flickermeter – Functional and Design Specifications
  - » **EN 50160** – Voltage characteristics of electricity supplied by public electricity networks
- Safety standards:
  - » **IEC 61010-1** – Safety requirements for electrical equipment for measurement control and laboratory use. Part 1: General requirements
  - » **IEC 61010-2-030** – Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits
- Standards for electromagnetic compatibility:
  - » **EN 55032** – Electromagnetic compatibility of multimedia equipment – Emission Requirements
  - » **IEC 61000-6-5** – Electromagnetic compatibility (EMC) – Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment

## Standard accessories



Seal for voltage and current terminals (set of 2 pcs.)

WAPOZPLOKPL



Fork terminal for grounding terminal

WAZACWID



8 GB microSD card

WAPOZMSD8



Wall mounting kit

WAPOZUCH17



LAN network cable, shielded, 1.5 m

WAPRZRJ451X5EKR



Factory calibration certificate

## Optional accessories

External GPS module

WAMODGPS1

External antenna for GPS module 10 m / 20 m / 30 m

WAPOZANT10MODGPS1 / WAPOZANT20MODGPS1 / WAPOZANT30MODGPS1

External GSM LTE module with external antenna\*

External module of additional inputs/outputs\*

External 7" LCD touch panel\*

Calibration certificate with accreditation

\* coming soon

PQM-700



Portable  
Class S analyzer  
for basic and long term  
analysis

PQM-707



Stand alone Class S  
mains network analyzer  
for fast diagnosis

PQM-710



Class A high accuracy  
mains network analyzer

PQM-750



PQM-711



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network analyzers with  
transients capture



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