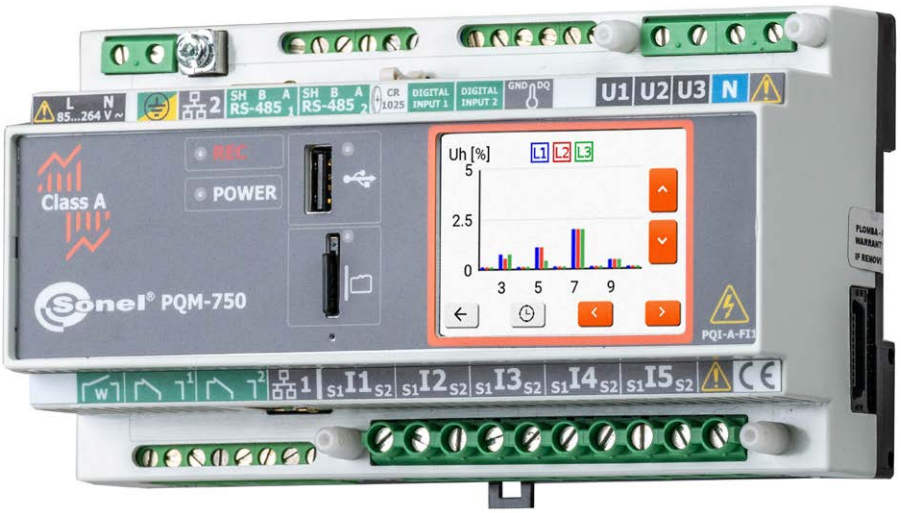
Power quality analyzer

PQM-750

index: WMGBPQM750AC1R1CT5



TRANSIENT RECORDER
OPTION

GPS
OPTION

GSM
OPTION

TOUCH SCREEN

CLASS A
IEC 61000-4-30

EVENTS

CAT III
600 V

IP30

Stationary, modular, comprehensive

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.

	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

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 current transformers 5 A (**optional: 1 A***), possibility of indirect measurements with calculation results for the primary side (**optional: version with external current transformers***)
- Operation in 50 Hz, 60 Hz networks, operation in 400 Hz* networks
- Recording of voltage and current events along with waveforms
- 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)
- Power supply 85...264 V AC (120...300 V DC), built-in rechargeable battery
- 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***
- 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

Additional features

Standard transmission protocols

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

Web interface (webserver)

- Access to the interface from any web browser

Modularity

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

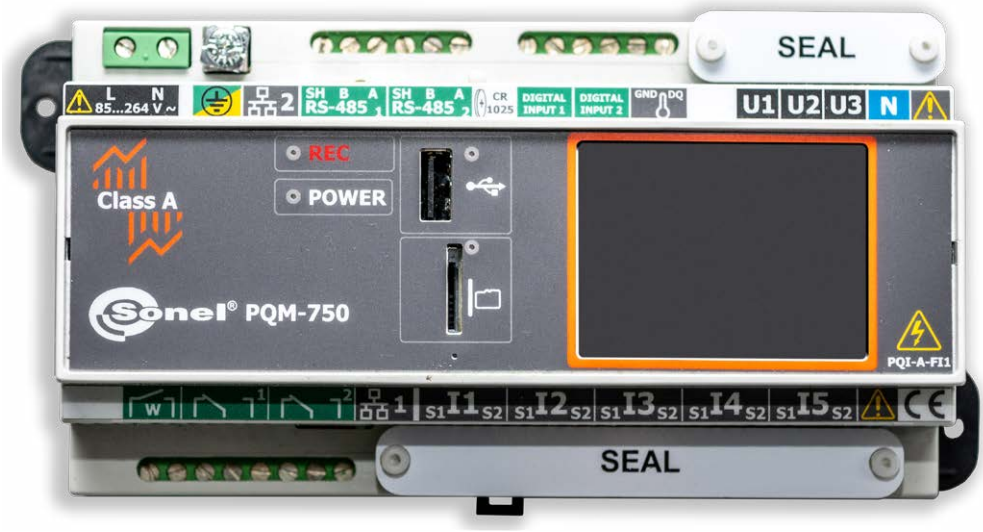
Additional internal modules*

- Transient module
- SSR relay module
- 18...60 V DC power supply unit

Additional external modules*

- LTE GSM module
- GPS module with IRIG-B output
- I/O module
- LCD 7” touch panel for full operation of the analyzer at the mounting location

* 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 **U** for L1, L2, L3+N/PE
- Phase-to-phase RMS voltages **U** for **L12**, **L23**, **L31**
- RMS currents **I** of all phases + N + PE
- Crest factor **CF** of voltages and currents
- Network frequency **f** for L1
- Active power **P** for L1, L2, L3
- Active power **P1** (**separated 50 Hz**) for L1, L2, L3
- Reactive power **Q** for L1, L2, L3
- Reactive power **Q1** (**separated 50 Hz**) for L1, L2, L3
- Apparent power **S** for L1, L2, L3
- Apparent power **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 $\mathbf{P1}_{3F}$, $\mathbf{Q1}_{3F}$, $\mathbf{S1}_{3F}$
- **cosφ** for L1, L2, L3, $\mathbf{cos\varphi}_{3F}$
- Power factor **PF** for L1, L2, L3, $\mathbf{PF}_{3F}$
- **tgφ** for L1, L2, L3, $\mathbf{tg\varphi}_{3F}$
- Distortion power **D** for L1, L2, L3
- Three-phase total distortion power $\mathbf{D}_{3F}$
- Distortion power factor **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 256th in current and voltage
- Interharmonics up to 256th 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 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 I_1, I_2, I_3, 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: Tw (analyzer internals), Tz1…Tz4 (1-wire)

Parameters

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

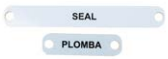
m.v. – measured value

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

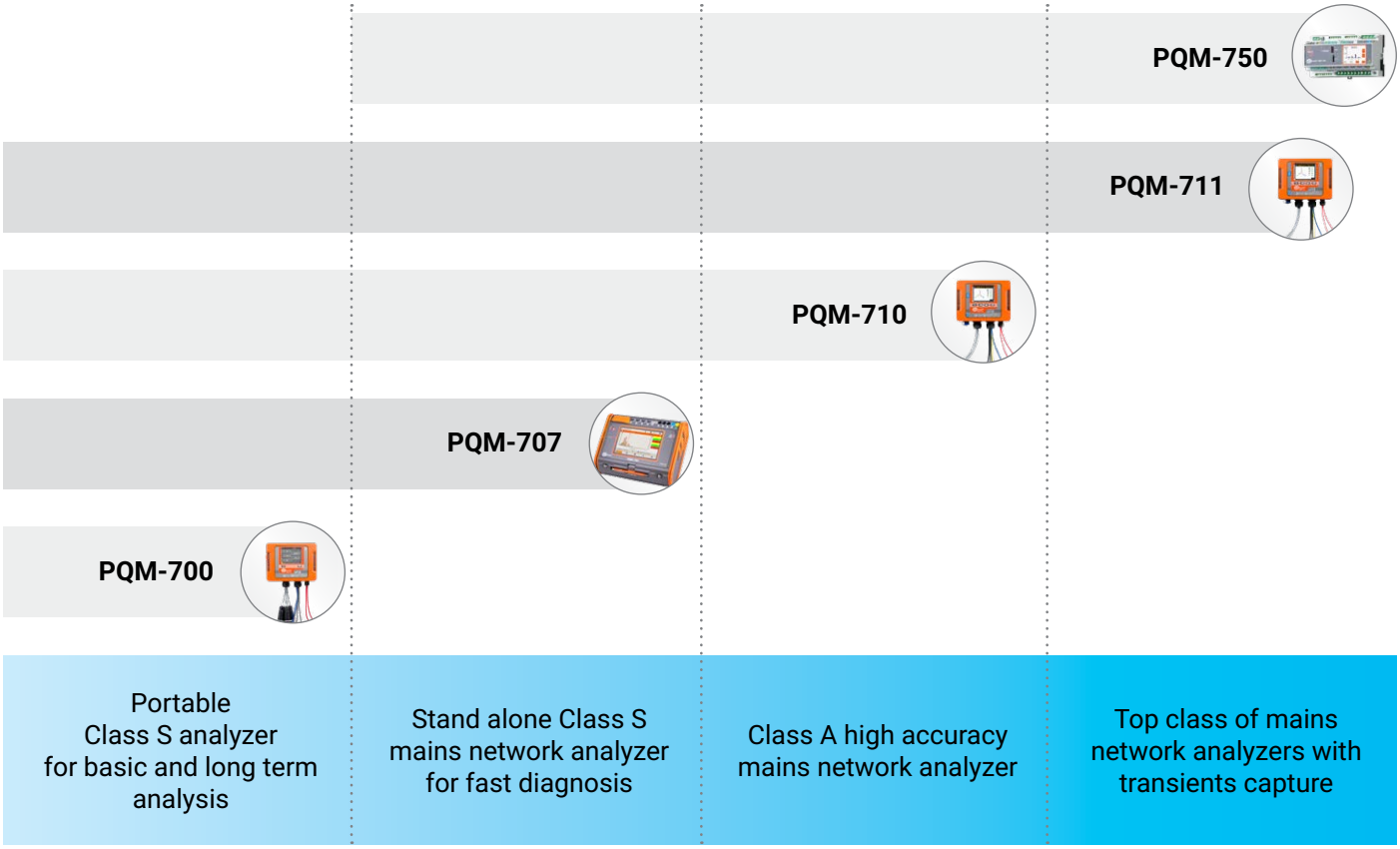
WAPRZRJ451X5EKR

Factory calibration certificate

Optional accessories

Additional communication protocols*
Internal transient module*
Internal SSR relay module*
Internal 18...60 V DC power supply unit*
External GPS module with external antenna*
External GSM LTE module with external antenna*
External module of additional inputs/outputs*
External 7" LCD touch panel*
Calibration certificate with accreditation

* coming soon



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