

PQM3000

Class A rack 19" power quality analyzer for CTs or current clamps

- Two different models, for CTs or current clamps
- Rack 19" mounting
- Harmonics and interharmonics measurement
- Data recording for further EN 50160 analysis
- Data recorded in standard PQDIF and CSV file formats
- Embedded web server
- Communication on Ethernet and 3G networks
- Included external GPS module for accurate timing
- Internal rechargeable backup battery
- Certified according to **IEC/EN 61000-4-30:2015 Ed.3**, Class A for voltage characteristics



» General features

PQM3000 is a high-end power quality analyzer, able to monitor and record the major power quality parameters. It provides an accurate measurement, voltage characteristics are monitored according to Class A specification. At the same time it acts as event/fault recorder, capable to store a high number of voltage events and disturbances, frequency variations, inrush current, etc. Additional PQ data can be recorded, such as Flicker, Unbalance, Harmonics and Interharmonics, Mains Signalling. It also provides standard power measurement data for three-phase systems. Extra voltage and current measurement channels give the possibility to monitor Neutral Potential and Earth Leakage current.

PQM3000 is available in 2 models: one for external standard CTs with 1 or 5A output and another one for current clamps with 1 or 3V output. In this way maximum flexibility is granted even on existing plants.

The powerful recording features give the possibility to capture and record all types of standard and PQ data simultaneously. All this information can be recorded for long time period due to the high memory capacity, in this way a complete EN 50160 analysis can be performed. Events and disturbances provide also waveform recording together with RMS values. Recordings can be transferred in different ways: user can download them directly through web interface or set an automatic scheduled data upload to a remote server.

PQM3000 includes different communication ports so the user can access it in different ways. The Ethernet ports on the front and rear panels allow complete control on the instrument: web access for real-time monitor, device setup, stored data transfer, maintenance operations. The integrated mobile network router gives the possibility to manage the device by using 3G network if the Ethernet communication is not available. The RS485 port is dedicated to data reading of PQMGPS1, i.e. the external GPS module provided with the instrument. PQMGPS1 provides accurate time information regardless of the location where the meter is installed in a distributed monitoring system.

Moreover, different I/O channels are provided to enhance the instrument features. An user-friendly multilingual interface is provided for web server which simplify the full access to instrument operations.

» Benefits

- Additional voltage and current measurement channels in comparison with other standard three-phase devices.
- Current inputs for CTs or for clamps to grant an accurate current measurement.
- Continuous monitoring of the power quality and Class A certified measurements for voltage characteristics.
- Simultaneous recording of events, Min/Avg/Max LOG and energy counters.
- Several possibilities for instrument data transmission: Ethernet, Modbus TCP, 3G network.
- User-friendly instrument web interface with multilingual pages.

» Applications

- Power monitoring & control systems
- Switchboards, gensets, motor control centers, etc.
- Individual machine load monitoring
- Power demand analysis and management
- Harmonics monitoring
- Remote metering and cost allocation
- Motor inrush current studies

» Related products

- *PQMGPS1* external GPS module
- *PQM-Tool* Class A monitoring software tool
- *PQM-Analyzer* for data analysis according EN 50160

» Main features

Measurements

- Voltage direct connection up to 1000 VLL or through PT for MV and HV systems.
- 4th voltage channel for measurement of potential difference between Neutral and Protective Earth.
- 5 current channels to be used with CTs or clamps according to the model.
- 4th current channel dedicated for Neutral current measurement, for both models the current measuring range (CT primary and secondary, clamp full scale and voltage output) can be programmed together with the main three-phase channels.
- 5th current channel reserved for Earth Leakage monitoring, with separate current measuring range setup to ensure different sensitivity from the main channels.
- Three-phase 3 and 4 wire or single-phase operating mode.
- Suitable for 50 and 60 Hz systems.
- Fast simultaneous sampling on all 9 channels, at 1024 samples/cycle.
- All measured voltage characteristics certified according to IEC/EN 61000-4-30:2015 Ed.3, Class A.
- Measurement of additional power quality parameters, such as K Factor.

Recordings & data storage

- Voltage event recording (sags, swells, interruptions) with storage of ½c RMS values and waveforms.
- Sag/swell recording on 4th voltage channel with storage of ½c RMS values and waveforms.
- Rapid Voltage Changes measurement and event recording.
- Power frequency variation monitoring and recording with ½c RMS values and waveforms.
- "Slow" event recording on Frequency, Unbalance Ratio, Flicker, Voltage THD and Mains Signalling variations.
- Overcurrent recording on three-phase current channels with storage of ½c RMS values and waveforms.
- Data LOG function for Min/Avg/Max values of selectable parameters, at programmable rate.
- Energy counter LOG at programmable rate.
- Functional event LOG to report the changes of device operating status, useful to keep the instrument condition under control.
- Digital input status change LOG.
- Automatic data upload to FTP server started by frequency events or scheduled at preset time day by day.
- Recordings containing big amount of data ½c RMS with waveform and Min/Avg/Max are recorded directly in standard PQDIF files.
- For other type of recordings, "slow" events, Energy LOG, Functional LOG, Digital input LOG, data is provided in standard CSV files.
- In case of a failure on the PQM auxiliary power line, the monitoring and recording functions remains active due to the backup battery.

Inputs & outputs

- 11 isolated digital inputs for remote management of control signals.
- 4 isolated analog outputs for real time parameter variation transmission.

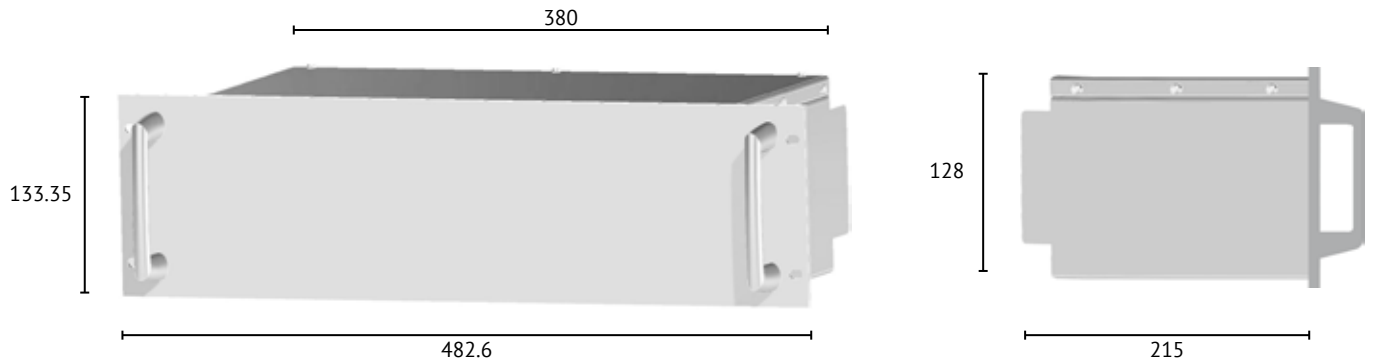
Communication

- Two Ethernet ports, one designed for a permanent installation on the instrument rear and one for occasional connections on the front panel.
- RS485 port dedicated for GPS data reading.
- Integrated router for 3G mobile communication useful if Ethernet connection is not possible.

Data analysis

- Standard file formats gives the possibility to have a quick view and analysis on all stored data without any special software.
- PQM-Analyzer software is provided to perform statistical analysis and generate reports on recorded data according to EN 50160 PQ standard.

» Technical drawing (mm)



» Parameters overview

| PARAMETER GROUP | LIST | MEASURE | EVENT | LOG | OUTPUTS |
|--|--|---------|-------|-----|---------|
| Voltages | ULN, ULL, U4N, U4L, U Σ | ● | ● | ● | ● |
| Currents | IL, IN, IEL, I Σ | ● | ● | ● | ● |
| Powers | PL- Σ , QL- Σ , SL- Σ | ● | | ● | ● |
| Power Factors | TPFL- Σ , DPFL | ● | | ● | ● |
| Frequency | F | ● | ● | ● | ● |
| Phase Order | - | ● | | | |
| Volt Symmetrical Components | U0, U1, U2 | ● | | ● | ● |
| Volt Unbalance Ratios | u0, u2 | ● | ● | ● | |
| Volt Deviations (under, over) | ULN, ULL | ● | | | ● |
| Flickers | PinstL, PstL, PltL | ● | ● | ● | |
| Harmonics up to 50th & Interharmonics | ULN, ULL, IL, PL, QL | ● | | ● | ● |
| Total Harmonic Distortions and K Factors | ULN, ULL, IL, KL | ● | ● | ● | ● |
| Mains Signallings | 5 x ULN | ● | | | |
| Phase Angles | U-U, U-I | ● | | | ● |
| Energy Counters (4Q) | active, reactive, app. Σ | ● | | ■ | ● |
| Rapid Voltage Changes | ULN | | ● | | |
| Flagging | Sag, Swell, Interruption | | | ● | |
| Aggregated values | Voltage characteristics | ● | | | |
| Waveforms | ULN, ULL, IL | ● | ● | | |
| Mean values | ULN, F, Flicker, Unbal, THDU | □ | ● | | |

NOTES:

- Some of the parameters are not available for all functions, for more details refer to the user manual.
- LOG function means Min/Avg/Max recording, except for Energy counters (■).
- Parameters in MEASURE column can be displayed or read by communication port, except for Mean values (□).

» Specifications

POWER SUPPLY

| | |
|------------------------------|--------------------------------------|
| Auxiliary power voltage: | 85...285 VAC 50/60 Hz / 65...250 VDC |
| Auxiliary power consumption: | 15 VA max |
| Fuse: | 250 VAC / 500 mA T type delayed |
| Backup battery: | Li-Ion, 2500 mAh (>15 min autonomy) |

MEASUREMENT INPUTS

| | |
|--|---|
| Three-phase voltage inputs for direct connection / PT: | P-N: max 580 V RMS CAT III, L-L: max 1000 V RMS CAT III |
| U4 voltage input for direct connection: | max 580 V RMS CAT III |
| Voltage input crest factor: | 2 |
| Voltage input impedance: | >2 M Ω /phase |
| CT model - CT secondary: | selectable 1A, 5A RMS |
| CT model - maximum current: | 7A RMS |
| CT model - CT input burden: | 0.04 VA |
| Clamp model - clamp output full scale: | selectable 1V, 3V RMS |
| Both models - crest factor: | 3 |
| Frequency range: | 42.5...57.5 Hz / 51...69 Hz |
| Frequency reference channel: | Phase 1/Line 12 voltage |
| Sampling: | Simultaneous, 51.2 kHz @50 Hz |

ACCURACY

| | |
|-----------------------|---|
| Three-phase voltage: | $\pm 0.1\%$ Un over 10 ... 150% Un range |
| U4 voltage: | $\pm 0.2\%$ measurement |
| Currents: | $\pm 0.2\%$ measurement (device) |
| Powers: | $\pm 0.2\%$ measurement |
| Frequency: | ± 8 mHz |
| Harmonics: | Class 1 (IEC/EN 61000-4-7) |
| Realtime clock (RTC): | <1s in 24h without synchronisation; <5ms with GPS synchronisation |
| Active energy: | Class 0.5S, compliant to IEC/EN 62053-22 |
| Reactive energy: | Class 1, compliant to IEC/EN 62053-23 |

I/O CHANNELS

| | |
|------------------------------|--|
| Digital inputs: | 11 optoisolated, 24 VDC $\pm 20\%$ |
| 1PPS synchronisation input: | 1 optoisolated, 24 VDC $\pm 20\%$ |
| Analog outputs: | 4 optoisolated, 4 ... 20 mADC, max load 500 Ω |
| Digital input delay time: | max 10 ms |
| 1PPS input delay time: | max 50 ns |
| Digital input consumption: | max 7 mADC |
| 1PPS input consumption: | max 1 mADC |
| Analog output reaction time: | max 200 ms |

MEMORY

| | |
|-------------------|--------------------------|
| System memory: | 128 MB Flash, 256 MB RAM |
| Recording memory: | 4 GB (16 GB optional) |

COMMUNICATION

| | |
|----------------------------------|---|
| Ethernet ports: | 2 Auto MDIX RJ45 10/100 Base Ethernet |
| GPS port: | 1 RS485 optoisolated, 9600 bps |
| GPS antenna (on PQMGPS1 module): | Active patch antenna, SMA connector |
| Protocols: | HTTP, HTTPS, FTP, SFTP, NTP, NMEA, Modbus TCP |
| Integrated router: | GPRS/UMTS-3G/HSPA |

RTC SYNCHRONISATION

| | |
|-------------------------|----------------|
| Synchronisation system: | NTP and/or GPS |
|-------------------------|----------------|

ENVIRONMENTAL CONDITIONS

| | |
|--------------------------------------|----------------------------|
| Installation and use code: | PQI-A-FI1 |
| Operating temperature (limit range): | FI1, 3K6 -25 ... +55°C |
| Storage temperature: | -25 ... +75°C |
| Relative humidity: | 95% max without condensing |
| Altitude: | max 2000 m AMSL |

MECHANICAL CHARACTERISTICS

| | |
|-----------|---|
| Mounting: | Rack 19" 3U |
| Size: | Front (LxH): 482.6x133.35mm, Rear (LxHxD): 380x128x215 mm |
| Weight: | 4000 g |

STANDARDS

| | |
|---------------------|--|
| Product compliance: | IEC/EN 62586-1, IEC/EN 62586-2 |
| Certification: | Class A, IEC/EN 61000-4-30:2015 Ed.3 for voltage |
| Safety: | CAT III power supply, insulation class 2, 600 V |
| Directive: | 2006/95/EC LV, EN 61010 |
| EMC: | 2004/108/EC EMC, EN 50081-2, EN 50082-2, EN 61326/A1, EN 55011:1998+A1:1999+A2:2002, EN 61000-6-2/-4-2/-4-3/-4-4/-4-5/-4-6/-4-11 |

» 15 Digit Order Code

PQM3000



Labelling

A = Algodue
C = Custom (instrument name, label, manual, web server)



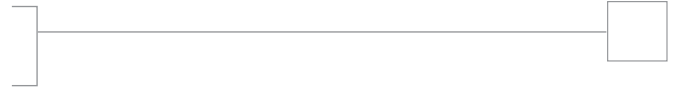
Quick guide language

U = English/Italian
I = Italian/English
D = German/English
F = French/English
E = Spanish/English



Power supply

A = 85...285 VAC / 65...250 VDC
R = 19...60 VDC



Current input model

6 = For CTs
C = For current clamps



Communication ports

R = 2 Ethernet, 1 router



GPS for synchronisation

E = External PQMGPS1 module



X

X

Recording memory

4 = 4 GB
6 = 16 GB



X

X

Inputs & Outputs

B = 11 digital inputs, 4 analog outputs



» Default Configurations

LEGEND:

CT=instrument with current inputs for CTs (CTs NOT included)

Clamp=instrument with current inputs for clamps (clamps NOT included)

GPS for synchro=external GPS module (PQMGPS1) for RTC synchronisation, provided with the instrument

DI=11 digital inputs

AO=4 analog outputs

| DEFAULT CONFIGURATION | ORDER CODE | CURRENT INPUT MODEL | | COMMUNICATION | | GPS FOR SYNCHRO | RECORDING MEMORY | | I/O | |
|-----------------------|-----------------|---------------------|------------|---------------|--------|-----------------------|------------------|-------|-----|----|
| | | For CTs | For Clamps | ETHERNET | ROUTER | External with PQMGPS1 | 4 GB | 16 GB | DI | AO |
| PQM3000 4GB CT | AQPAUA6REXX4XXB | ● | | ● | ● | ● | ● | | ● | ● |
| PQM3000 4GB Clamp | AQPAUACREXX4XXB | | ● | ● | ● | ● | ● | | ● | ● |
| PQM3000 16GB CT | AQPAUA6REXX6XXB | ● | | ● | ● | ● | | ● | ● | ● |
| PQM3000 16GB Clamp | AQPAUACREXX6XXB | | ● | ● | ● | ● | | ● | ● | ● |

Other order codes on request (MOQ 30 pcs)

NOTE:

- Subject to change without notice

- The code made up of 15 digits including the X



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