GPS LTD.

PQA-8000

Three-Phase Power Quality Analyser

KEY FEATURES

- 4 voltage and 4 current channels, neutral included
- Line 1.0 to 2000 V · phase 1.0 to 1000 V
- 10 mA to 6000 A, depending on the sensor fitted
- Harmonics to the 50th · THD, DF and K factor
- 150 transient captures · 100 s inrush mode
- 300-day trend recording to a 2 GB card
- 12,800 alarm logs across 40 parameter groups

Four Channels, Every Parameter, 300 Days.

A three-phase analyser measuring four voltages and four currents at once, so the neutral is a measured channel rather than an assumption. Analogue capture runs on two 16-bit synchronous converters at up to 1 MSPS, with the DSP locking the sampling rate to mains frequency, which is what keeps a transient from falling between samples.

One pass covers the full set: true RMS voltage and current, DC component, peaks and crest factor, half-cycle minima and maxima, harmonics to the 50th with sequence harmonics, THD and distortion factor, active, reactive and apparent power and energy, power factor and displacement factor, transformer K factor, flicker and three-phase unbalance. Waveforms, phasor diagrams and harmonic bar charts show on screen throughout.

Four recording modes run alongside the live display: 150 transient captures between user-set start and stop times, a 100-second inrush record for motor starting, 20 trend parameters written every five seconds to the internal 2 GB card for about 300 days, and alarms across 40 parameter groups holding 12,800 entries.

IDEAL FOR

- Power quality audits and compliance records
- Fault finding on dips, swells and interruptions
- Harmonic surveys on drives and rectifier loads
- Motor starting and installed capacity studies
- Substations, petrochemical, rail and mining

REFERENCE AND WORKING CONDITIONS

Influence quantity	Reference condition	Working range
Ambient temperature	23 ±2 °C	−10 to 40 °C
Relative humidity	40 to 60%	Below 80%
Phase voltage	100 V ±1%	1.0 to 1000 V
Line voltage	200 V ±1%	1.0 to 2000 V
Current	5 A ±1%	10 mA to 6000 A
Grid frequency	50 Hz ±0.1 Hz	40 to 70 Hz
Phase shift, active power and energy	cosϕ = 1	cosϕ 0.2 to 1.0
Phase shift, reactive power and energy	sinϕ = 1	sinϕ 0.2 to 1.0
Harmonic content	Below 0.1%	0.0 to 100%
Voltage unbalance	Below 10%	0.0 to 100%
Instrument supply	DC 9.8 V ±0.1 V	DC 9.5 to 10.5 V

Accuracy figures below are quoted under the reference conditions above and assume an ideal current sensor, perfectly linear and with no phase shift. Sensor error from the current sensor table adds to them. Strong external electric and magnetic fields should be avoided.

MEASUREMENT ACCURACY

Measurement	Range	Resolution	Maximum error in the reference range
Voltage, current and frequency			
Frequency	40 to 70 Hz	0.01 Hz	±0.03 Hz
Phase voltage, true RMS	1.0 to 1000 V	0.1 V	±(0.5% rdg + 5 digits)
Line voltage, true RMS	1.0 to 2000 V	0.1 V	±(0.5% rdg + 5 digits)
DC voltage	1.0 to 1000 V	0.1 V	±(1.0% rdg + 5 digits)
Current, true RMS	10 mA to 6000 A	1 mA	±(0.5% rdg + 5 digits)
Phase voltage peak	1.0 to 1414 V	0.1 V	±(1.0% rdg + 5 digits)
Line voltage peak	1.0 to 2828 V	0.1 V	±(1.0% rdg + 5 digits)
Current peak	10 mA to 8484 A	1 mA	±(1.0% rdg + 5 digits)
Crest factor	1.00 to 3.99	0.01	±(1% rdg + 2 digits)
Crest factor	4.00 to 9.99	0.01	±(5% rdg + 2 digits)
Power and energy			
Active power	0.000 W to 9999.9 kW	0.001 W	±(1% + 3) at cosϕ ≥ 0.8 · ±(1.5% + 10) at 0.2 ≤ cosϕ < 0.8
Reactive power	0.000 var to 9999.9 kvar	0.001 var	±(1% + 3) at sinϕ ≥ 0.5 · ±(1.5% + 10) at 0.2 ≤ sinϕ < 0.5
Apparent power	0.000 VA to 9999.9 kVA	0.001 VA	±(1% rdg + 3 digits)
Active energy	0.000 Wh to 9999.9 MWh	0.001 Wh	±(1% + 3) at cosϕ ≥ 0.8 · ±(1.5% + 10) at 0.2 ≤ cosϕ < 0.8
Reactive energy	0.000 varh to 9999.9 Mvarh	0.001 varh	±(1% + 3) at sinϕ ≥ 0.5 · ±(1.5% + 10) at 0.2 ≤ sinϕ < 0.5
Apparent energy	0.000 VAh to 9999.9 MVAh	0.001 VAh	±(1% rdg + 3 digits)
Power factor	−1.000 to 1.000	0.001	±(1.5% + 3) at cosϕ ≥ 0.5 · ±(1.5% + 10) at 0.2 ≤ cosϕ < 0.5
Displacement factor, DPF	−1.000 to 1.000	0.001	ϕ ±1°
tanϕ, at VA ≥ 50 VA	−32.76 to 32.76	0.001	ϕ ±1°
Phase angle	−179 to 180°	1°	±2°
Harmonics and distortion, at Vrms above 50 V			
Harmonic ratio, orders 1 to 50	0.0 to 99.9%	0.1%	±(1% rdg + 5 digits)
Harmonic angle	−179 to 180°	1°	±3° orders 1 to 25 · ±10° orders 26 to 50
Total harmonic ratio, THD or THD-F	0.0 to 99.9%	0.1%	±(1% rdg + 5 digits)
Distortion factor, DF or THD-R	0.0 to 99.9%	0.1%	±(1% rdg + 10 digits)
Transformer K factor	1.00 to 99.99	0.01	±5%
Three-phase unbalance	0.0 to 100%	0.1%	±1%

CURRENT SENSORS

Sensor	Jaw	Current true RMS	Current error	Phase error
008 pointed small clamp	7.5 × 13 mm	10 mA to 99 mA	±(1% + 3 digits)	±1.5° at Arms ≥ 20 mA
		100 mA to 10.0 A	±(1% + 3 digits)	±1°
020 round clamp	20 × 20 mm	0.10 A to 0.99 A	±(1% + 3 digits)	±1.5°
		1.00 A to 100 A	±(1% + 3 digits)	±1°
050 round clamp	50 × 50 mm	1.0 A to 9.9 A	±(2% + 3 digits)	±3°
		10.0 A to 1000 A	±(2% + 3 digits)	±2°
300R Rogowski coil, with integrator	Φ300 mm	10 A to 199 A	±(1% + 3 digits)	±3°
		200 A to 6000 A	±(1% + 3 digits)	±2°
External transformer, optional	Instrument port	1 mA to 500 mA	Selected transformer ±1%	±1°

Sensors are optional and supplied in sets of four, one per channel. Sensor error adds to the instrument accuracy above. The 300R is a flexible Rogowski coil with an integrator and will close around a busbar or a bundle that a rigid jaw will not reach.

MEASUREMENT AND RECORDING FUNCTIONS

WAVEFORM AND PHASOR
Real-time waveforms on all four voltage and four current channels · automatic phasor diagram · harmonic ratio bar charts, each phase in its own colour

HARMONIC ANALYSIS
Orders 0 to 50 on current and voltage: ratio, RMS value, minimum and maximum, and sequence harmonics · apparent power of each harmonic · THD, distortion factor and transformer K factor

TRANSIENT CAPTURE
Fluctuations, swells, dips, short interruptions, transient overvoltage, inrush current and instantaneous distortion · 150 events stored between user-set start and stop times

INRUSH CURRENT
Follows a motor start for about 100 s, storing every cycle · RMS rise and fall curve, starting current envelope, and all four current and voltage waveforms

TREND RECORDING
123 parameters available · 20 recorded simultaneously at one point every 5 s to the internal 2 GB card, about 300 days · bar chart or curve, with or without minima and maxima

ALARMS
40 parameter groups, each with its own limit and minimum over-limit time · 12,800 log entries · covers voltage, current, unbalance, harmonic ratio, frequency, power and THD

SCREENSHOTS AND OUTPUT
60 screen captures from any page, time and test mode stamped automatically · USB to the PC software for live waveforms, transients, trends, alarm lists and screenshots

SET-UP
Wiring method and grid type · current sensor and voltage ratio · reactive power calculation with or without harmonics · trigger thresholds · curve colours, contrast and brightness · English or Chinese menus with on-screen help

GENERAL SPECIFICATIONS

Code	Item	Part Number
PQA-8000	Intelligent multifunctional power quality analyser, 3-phase 4-channel harmonic detector with 5.6-inch LCD	478000

CHANNELS
4 voltage and 4 current, ABC three phase plus neutral · line 1.0 to 2000 V · phase 1.0 to 1000 V · current 10 mA to 6000 A depending on the sensor · 40 to 70 Hz

DISPLAY
5.6-inch colour LCD, 640 × 480 dots, display area 116 × 88 mm · backlit for dark places and night work

PROCESSING
DSP and ARM dual processor · two 16-bit four-channel synchronous converters at up to 1 MSPS · DSP above 200 MHz, sampling locked to mains frequency

MEMORY AND COMMUNICATION
Internal flash for 60 screenshots, 150 transient captures and 12,800 alarm logs · 2 GB card for trend records · USB to the PC software

POWER
Rechargeable 9.6 V lithium pack with external charger · about 490 mA in normal use, 10 hours continuous · five-bar battery indicator, shutdown 1 minute after the low warning

AUTO POWER OFF
Does not shut down while an alarm campaign, transient search, inrush capture or trend recording is pending or running · otherwise 15 minutes without a keypress, then 1 minute's warning

INSULATION AND PROTECTION
Test voltage input impedance 1 MΩ · withstands 3700 V 50 Hz between circuit and shell for 1 minute · insulation to shell ≥ 10 MΩ · double insulated with a vibration-proof sheath

SAFETY
IEC 61010, CAT III 1000 V and CAT IV 600 V · IEC 61010-031 · IEC 61326 · pollution degree 2

ENVIRONMENT
Operating −10 to 40 °C, below 80% RH · storage −10 to 60 °C, below 70% RH

LEADS
Voltage test leads 3 m · current sensor leads 2 m · the conductor under test should sit at the geometric centre of the jaw

DIMENSIONS · WEIGHT
277.2 × 227.5 × 153 mm (l × w × h) · 2.41 kg instrument with battery · clamps 168 g, 252 g, 463 g and 280 g each · about 10.8 kg packed

WARRANTY
1 year, subject to product registration with GPS LTD · service and calibration available

WHAT'S IN THE BOX

- PQA-8000 power quality analyser
- Instrument case
- Current clamps, four types, four of each, sixteen in total (optional)
- Test leads, five: yellow, green, red, blue and black
- Crocodile clips, five
- Charger
- USB data cable
- Software CD
- Manual, warranty card and certificate of conformity

SENSORS AND LEADS · Current sensors are ordered separately and supplied in sets of four, one per channel. Voltage leads are 3 m and sensor leads 2 m