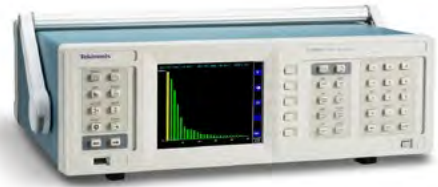


# POWER ANALYZERS

Fully characterize your power-electronics design from input to output with Tektronix power analyzers. Designed for precision measurement of power-electronics circuits and devices, these analyzers give you what you need to measure conversion efficiency and perform compliance testing on single-phase or 3-phase devices.



	PA1000 SINGLE-PHASE	PA3000 MULTI-PHASE
Channels	1	4
Basic Accuracy (V & I)	± 0.04%	± 0.04%
Measurement Bandwidth	DC, 0.1Hz - 1MHz	DC, 0.1Hz - 1MHz
Max Voltage and Current (internal shunt)	600Vrms / 20A RMS	600Vrms / 30A RMS

## CHOOSING YOUR POWER ANALYZER

Power analyzers are used for testing a wide range of power-electronics devices, from cell-phone chargers to 1000kW grid-connected inverters. To help you choose the best analyzer for your application, consider the criteria below.

### 1 Number of Inputs

Power analyzers are available in both fixed configurations (typically single-channel) and modular configurations. If your application is limited to single-phase devices, a single-channel analyzer may meet your needs. But if you need to measure conversion efficiency on these devices, a two-channel analyzer is required.

Testing of 3-phase devices of course requires a multi-phase analyzer. In many cases, two channels will be all you need for a two-wattmeter measurement on 3-wire inputs or outputs. A four-channel analyzer can measure both input and output simultaneously, to determine conversion efficiency.

### 2 Measurement Bandwidth

How much bandwidth is enough? The measurement bandwidth you need is usually determined by the switching speed of the device-under-test, or the highest-order harmonic that you are testing requires. Switching speeds of tens or hundreds of kHz are common in today's designs. But new semiconductor technologies promise to increase speeds up to 2x or more in the near future. Choose an analyzer that is capable of measuring your highest frequencies of interest, with some headroom for future-proofing.

### 3 Compliance Testing for Regulatory Standards

If your application requires you to know that your device is compliant with regulatory standards such as IEC61000 for harmonics, or ENERGY STAR™ for energy efficiency, you need an analyzer capable of meeting the test requirements specified by the standard. Even better, look for an analyzer supported by software applications that can automate instrument setup and reporting of test results in the exact format required for your application.

### 4 Current Shunts: Internal or External?

Will you be measuring milliamperes or hundreds of amperes? Power analyzers vary in the features they offer for direct current inputs or connection to external current transducers. Ideally, the analyzer should have internal current shunts that allow you to connect your device directly, for best accuracy. If you will be testing a range of devices at different power levels, you may value both high- and low-range shunts. Finally, if your application requires external current transducers (usually required for current >30 Amps), make sure there are transducers available that are well-matched to the analyzer and offer the accuracy you need.

### 5 Remote Communication

Will you have a need to control the analyzer remotely or transfer measurement data to your PC? If so, you will want to look for an instrument that features the communication ports you need. Depending on the analyzer model, some ports may be standard features or extra-cost options; be careful to choose the right instrument configuration that meets your requirements.



## PA1000 Power Analyzer

The Tektronix PA1000 is a single-phase, single-channel power analysis solution that is optimized for fast, efficient, and accurate power consumption testing to international standards. Its compact size, DMM-like user-interface, graphical display, and powerful software enable users to quickly visualize, analyze, and document the power consumption efficiency of next-generation devices, including standby power measurements and harmonic analysis.

MODEL	PA1000
Description	PA1000 Single-Phase Power Analyzer
Basic Accuracy (V & I)	0.04% (45-850 Hz)
Bandwidth	1 MHz
Voltage Input Range	Up to 600 V <sub>RMS</sub>
Current Range (internal shunts)	20 μA to 20 A <sub>RMS</sub>

- Harmonic analysis to IEC/EN 61000-3-2 / 4-7 (pre-compliance testing to the 50th order)
- Standby power analysis to IEC 62301 / EN 50564 (full compliance testing as low as 5 mW)
- 1 MHz bandwidth
- ±0.04% basic accuracy
- USB, LAN, and GPIB interfaces (standard)
- Easily and accurately measure harmonic performance, standby power, and more with the optional breakout box, and free PWRVIEW software.



### SHIPS WITH PRODUCT

- Lead Set
- User Manual
- AC Power Cord
- Certificate of Traceable Calibration
- 3-year Product Warranty

### RECOMMENDED ACCESSORIES

PWRVIEW: Complete Power Analysis PC Suite for compliance testing, visualizing signals, analyzing data and documenting results.  
Application notes, whitepapers and videos at [tek.com/application/power-measurement](http://tek.com/application/power-measurement)

### RECOMMENDED ACCESSORIES

- CL200: Current Clamp, 0.5A - 200A, for Tektronix Power Analyzers
- CL1200: Current Clamp, 0.1A - 1000A, for Tektronix Power Analyzers
- BB1000-XX: Breakout Box simplifies connections to AC power cords. NA, EU, UK versions
- PA-LEADSET: Replacement Lead Set for Tektronix Power Analyzers (One Channel Lead Set)

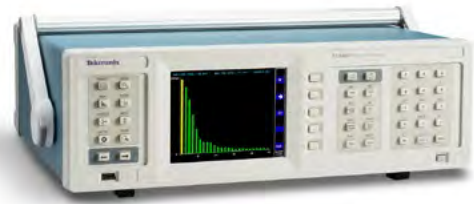
### RECOMMENDED SERVICE

- C3: Calibration Service 3 Years
- C5: Calibration Service 5 Years
- D1: Calibration Data Report
- D3: Calibration Data Report 3 Years (with Opt. C3)
- D5: Calibration Data Report 5 Years (with Opt. C5)



BB1000-UN Universal Breakout Box

**LEARN MORE** [Click here to learn about Power Supply measurements using the PA1000.](#)



## PA3000 Power Analyzer

The Tektronix PA3000 is a 1 to 4 channel power analyzer optimized for testing today's single and multi-phase, high efficiency power conversion products and designs. Use it to quickly visualize, analyze, and document power efficiency, energy consumption, and electrical performance to the latest regional and international standards including Level VI, EnergyStar, CEC, IEC 62301, and CQC-3146.

MODEL	PA3000 1CH	PA3000 2CH	PA3000 3CH	PA3000 4CH
Input Modules	1	2	3	4
Basic Accuracy (V & I)	±0.04%	±0.04%	±0.04%	±0.04%
Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz
Voltage Input	Up to 600 V <sub>RMS</sub> (2000 Vpk)	Up to 600 V <sub>RMS</sub> (2000 Vpk)	Up to 600 V <sub>RMS</sub> (2000 Vpk)	Up to 600 V <sub>RMS</sub> (2000 Vpk)
Current Input	80μA to 30A	80μA to 30A	80μA to 30A	80μA to 30A

- 1 to 4 channels supports single-and three phase applications; Up to 600 V<sub>RMS</sub> (2000Vpk) and 30 A<sub>RMS</sub> direct input
- 10 mW standby power measurement
- 1 MHz bandwidth and harmonic analysis to 100th order
- ±0.04% basic voltage and current accuracy
- USB and LAN interfaces standard (GPIB option)
- Free PWRVIEW software
- The PA3000's full color display provides intuitive readout of measured values. View measurements in full color graphical, tabular, or vector format.
- Application specific test modes simplify test setup and analysis for Standby Power, Energy Integration, Ballasts, and Motor Drives.

### SHIPS WITH PRODUCT

PWRVIEW: Complete Power Analysis PC Suite for compliance testing, visualizing signals, analyzing data and documenting results; Stackable Test Lead Set (1 set per input channel); Built-in ±15 V power supply for external current transducers; Calibration Certificate; User Manual and AC Power Cord; 3-year Product Warranty

### RECOMMENDED ACCESSORIES

- CT-60-S: Fixed-Core Current Transducer, High Accuracy, up to 60 A
- CT-200-S: Fixed-Core Current Transducer, High Accuracy, up to 200 A
- CT-1000-S: Fixed-Core Current Transducer, High Acc., up to 1000 A (requires external power supply)
- CT-100-M: Fixed-Core Current Transducer, Hall Effect, up to 100 A
- CT-200-M: Fixed-Core Current Transducer, Hall Effect, up to 200 A
- CT-1000-M: Fixed-Core Current Transducer, Hall Effect, up to 1000 A
- CL200: Current Clamp, 0.5 A–200 A, for Tektronix Power Analyzers
- CL1200: Current Clamp, 0.1 A–1000 A, for Tektronix Power Analyzers
- BB1000-XX: Breakout Box simplifies connections to AC pwr cords. NA, EU, UK versions.
- PA-LEADSET: Replacement stackable banana test leads, safety shrouded with insulated alligator clips, 1000 V CAT II, 30 A. (Set of four for one channel)
- PA-EXT-LEADSET: Replacement stackable 2 mm Test Leads for External Current Sensor Input

### RECOMMENDED SERVICE

- PA3000 C3: Calibration Service 3 Years
- PA3000 C5: Calibration Service 5 Years
- PA3000 D1: Calibration Data Report
- PA3000 D3: Calibration Data Report 3 Years (with Option C3)
- PA3000 D5: Calibration Data Report 5 Years (with Option C5)
- PA3000 G3: 3 Year Gold Care Plan
- PA3000 G5: 5 Year Gold Care Plan
- PA3000 R5: Standard Warranty Extended to 5 Years

**LEARN MORE** [Download the "Fundamentals of AC Power Measurements" Application Note.](#)

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