



WavePort/312P™

Power Measurement, Display, Storage, & Analysis Instrument with EasyPower® Measure™ Software

Features

- Combines five instruments into one
 - phasor/power factor
 - spectrum analyzer
 - demand meter
 - event monitor
 - cycle-by-cycle meter
- Displays graphs and tabular data in real time
- Captures survey data directly into PC disk database

WavePort/312P™ is a powerful yet easy-to-use electrical power measurement and analysis tool, capable of providing graphs and numeric tables of power parameters in real time. No other analyzer is capable of providing data to the user as quickly and easily as the WavePort/312P. It can be used as a stand-alone power quality monitor or as a user-interactive three-phase power analyzer. At a fraction of the price of other full-featured analyzers, WavePort/312P brings the processing power and familiar graphical-user interface of the PC to the power measurement industry.



WavePort/312P's compact, rugged enclosure protects the PC while maximizing portability

PC not included

See It As It Happens

When WavePort/312P is coupled with EasyPower® Measure™ software, the PC becomes the instrument. The measurement front-end streams voltage and current information directly to the PC as it is being collected. The PC performs all power calculations, provides the graphics and numeric tables, interfaces with the user, and stores the data. Without missing a cycle, this architecture produces unrivaled real-time performance, allowing the user to view wave shapes, calculated waveforms, and numeric tables at up to 10 updates per second. With WavePort/312P, blind data collection and lengthy uploads are gone forever.

The graphical-user interface provides real-time graphics and tabular information



Organize Your Data

As experienced power engineers know, measuring, viewing, and capturing power parameters is only the beginning. At the core of EasyPower Measure software (included with WavePort/312P) is its measurement database which organizes each captured event, whether

saved manually or automatically, as a uniquely accessible entity. Since this database is on the PC's hard drive, no upload process is required to view, move, or print the database or its entries. For

users that prefer to analyze the captured data on a desktop computer, simply transfer all or any portion of any measurement database from the laptop to your desktop.



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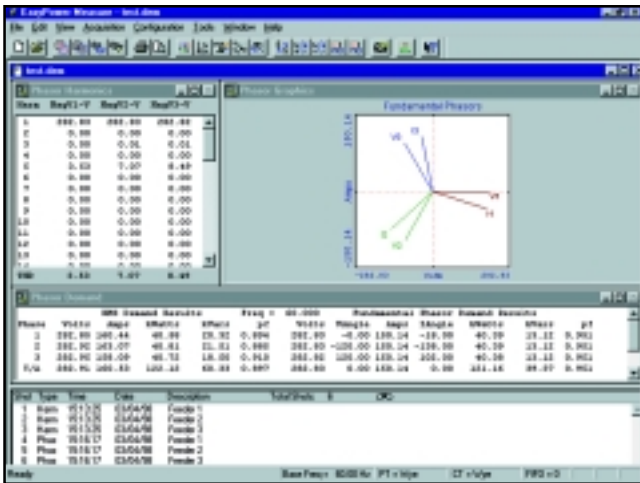
Reports in Minutes

If a report is required, use the built-in print functions or simply select the database entries of interest and copy any graphic and/or numeric element directly into a word processor or spreadsheet. No complicated report-writer is required. All data is accessible — both graphic and numeric.

EasyPower Measure Software

EasyPower® Measure is five measurement instruments in one. Switching between the measurement modes is as easy as a click on a tool bar button. All measurement modes allow the virtual front panel to be customized by resizing and repositioning windows. Three of the five measurement modes offer multiple data views so that focus is only on the graphs and tables of interest. Each measurement mode provides excellent real-time graphs and tabular data. Collect data, snap it in the database, instantaneously review data collected, and copy and paste graphics into other applications. For the first time, captured data can be seen in the user's customized format. Complete and unlimited access to all acquired data is available with EasyPower Measure software.

Phasor Diagram



In the Phasor Diagram measurement mode alone, EasyPower Measure provides more information than most other power analyzers. The real-time windows show graphic and tabular information at up to 10 updates per second at 60 Hz. The eight available views make the collected and calculated information

easy to understand and inspect. At any time during the measurement, click the snapshot button to store all of the present information into the measurement database.

- **Tabular Integer Harmonics, 1-50:** All voltages (Vs) and currents (Is), all magnitudes and angles
- **Tabular Demand:** RMS, fundamental phase, fundamental sequence, and single harmonic demand quantities for all phases
- **Graphics:** Waveforms for all Vs and Is, fundamental, sequence, and single harmonic phasor diagrams

Event/Demand Capture



For capturing power anomalies and logging demand data automatically, simply set up the capture parameters in the Event/Demand Capture measurement mode. EasyPower Measure examines every cycle, automatically storing events in the database that exceed a trigger threshold. A handy trigger table and waveform windows provide real-time feedback during monitoring. After monitoring, review events and logged demand information easily with EasyPower Measure's integrated database. No separate "event view" mode is necessary.

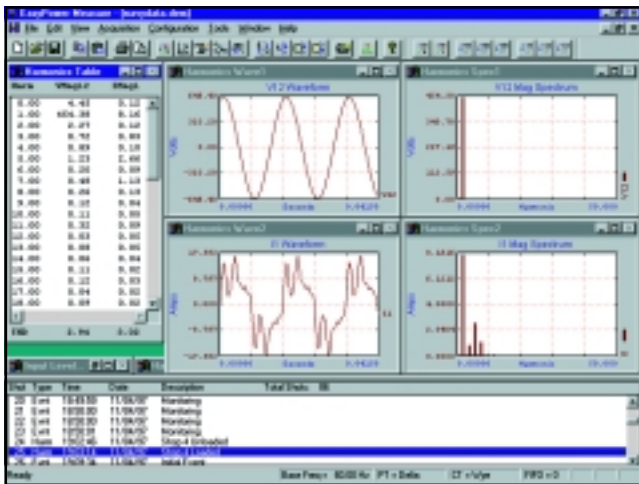
- **Event Graphics:** Waveforms for all Vs and Is
- **Demand View Graphics:** Minimum, maximum, and average Vs and Is, watts and volt-amperes reactives (VAR), and frequency over the demand interval; your choice of four harmonics and THD for all Vs and Is (maximized over the demand interval)
- **Event Tabular:** Trigger table and event extreme values (peak, min RMS, max RMS) for all Vs and Is



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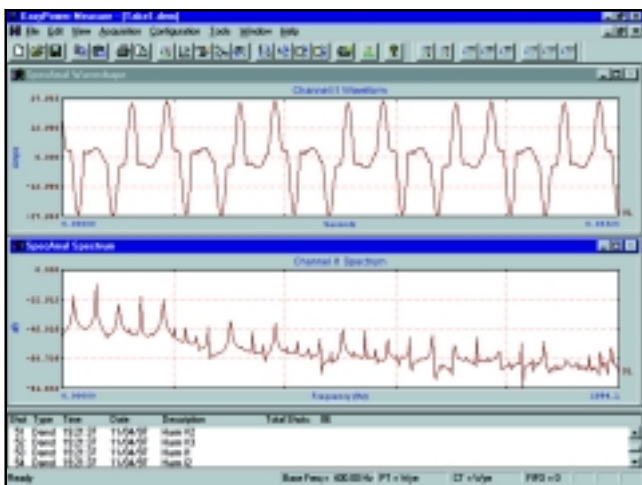
Detailed Harmonics



EasyPower Measure's Detailed Harmonics measurement mode calculates both integer and non-integer frequencies, in contrast to most power analyzers that provide only integer harmonics. This is especially important when monitoring random varying harmonic loads, as found in arc furnaces for example. Using this measurement mode, power problems relating to harmonics are easily discovered and documented, including compliance to the IEEE 519 standard. Eight views allow easy inspection of captured data.

- **Tabular Integer Harmonics & Non-Integer Frequencies, 1-50:** All Vs and Is, all magnitudes and angles, IEEE 519 report
- **Graphics:** Waveform and spectra magnitudes and angles for all Vs and Is

Spectrum Analyzer



For a detailed real-time look at the spectrum of any voltage or current, the Spectrum Analyzer measurement mode provides two graphics: time waveform and spectrum. The Spectrum Analyzer includes user-selectable sample rates up to 500 kHz, a

user selectable range from 128 to 4,096 points per cycle, and an optional Hamming window applied to the time waveform. Like all graphics in EasyPower Measure, the mouse is used to zoom in and out, scroll the waveform, and drag cursors to show numeric data on the waveform.

- **Graphics:** Single channel waveform and spectrum for any V or I

Cycle-By-Cycle



The Cycle-by-Cycle measurement mode provides all of the necessary real-time calculations and displays to perform a detailed load impact power survey — without missing a single cycle. Scrolling graphics show cycle-by-cycle voltage, current, watt, VAR, and frequency variations in real time. The autosnap feature provides continuous, uninterrupted collection of cycle-by-cycle data to the database.

- **Graphics:** Average three-phase RMS for all Vs, Is, and total three-phase power; all RMS Vs and Is, all watt (P) and reactive power (Q), and frequency

Frequency Following

EasyPower Measure software includes a proprietary and industry exclusive frequency-following algorithm. No specialty hardware is necessary — all following of the fundamental frequency is performed via software on fixed sample rate data. This robust algorithm even handles loss of synchronizing phase. This feature can be switched on or off easily in the system configuration where system base frequency is user-defined.

400-Hz Power Measurement

When measuring 400-Hz power with the WavePort/312P, a higher sample frequency is used, allowing the harmonic resolution to be comparable to that of a 50 to 60 Hz measurement. Typical analyzers claim 400 Hz compatibility, but actually sample the waveform at 50 to 60 Hz speeds, yielding a harmonic output with nearly one tenth the resolution. For avionics power applications, WavePort/312P provides unmatched performance.



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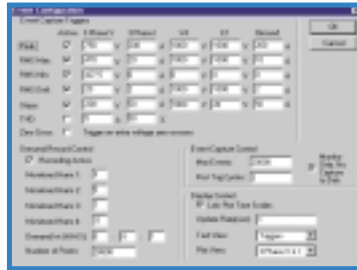
The measurement database built into EasyPower Measure provides an unparalleled level of organization to power survey data. Each stored event is accessible as an independent entity, regardless of whether it was captured manually through the Snapshot button, or automatically through the Event/Demand Capture or Cycle-by-Cycle measurement modes. Unlike typical power measurement instruments that contain small internal storage

memories, EasyPower Measure organizes your data in an easy-to-use database resident on the PC's high-capacity hard disk, providing instant access to any entry. No more long uploads followed by hours of sifting through unorganized data. To write reports, simply scroll through the database copying and pasting any displayed element, in either graphic or numeric form, into a word processor or spreadsheet.

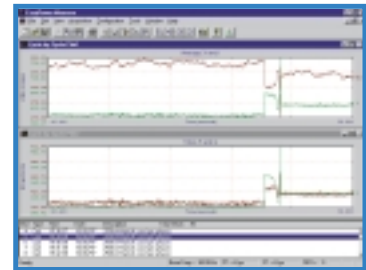
Watch real-time graphs and tabular data in any measurement mode. See something you like – take a snapshot



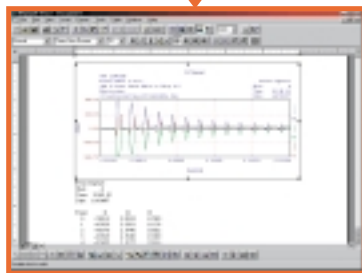
Set up event capturing to automatically record an event into the database



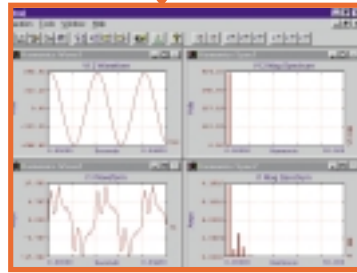
Use Cycle-By-Cycle mode to auto-record to the database, without missing a cycle



Shot	Type	Time	Date	Description	Total Shots: 86
20	Evnt	18:49:59	11/04/97	Monitoring	Database
21	Evnt	18:50:00	11/04/97	Monitoring	
22	Evnt	18:50:00	11/04/97	Monitoring	
23	Evnt	18:50:01	11/04/97	Monitoring	
24	Harm	19:02:46	11/04/97	Shop 4 Unloaded	
25	Harm	19:03:14	11/04/97	Shop 4 Loaded	
26	Evnt	19:09:34	11/04/97	Initial Event	



To develop reports, copy & paste any numeric or graphic data into a word processor or spreadsheet application



Quickly scroll through database entries to display each entry's graphic and tabular information



Print selected graphics or summary information instantaneously

Shot	Type	Time	Date	Description	Total Shots: 86
20	Evnt	18:49:59	11/04/97	Monitoring	Database
21	Evnt	18:50:00	11/04/97	Monitoring	
22	Evnt	18:50:00	11/04/97	Monitoring	
23	Evnt	18:50:01	11/04/97	Monitoring	
24	Harm	19:02:46	11/04/97	Shop 4 Unloaded	
25	Harm	19:03:14	11/04/97	Shop 4 Loaded	
26	Evnt	19:09:34	11/04/97	Initial Event	

Copy to another EasyPower Measure database retaining only those shots wanted



WavePort/312P™

Specifications & Ordering Information

Specifications

General

Voltage Inputs: (4) 1250V peak differential inputs using sheathed banana safety connectors

Current/Low Voltage Inputs: (4) 5V peak differential inputs with standard BNC connectors and a 10M Ohm input impedance

Channel-To-Channel Skew: Approximately 5 ns

Programmable Input Channel Range:

Voltage: 7 ranges from ±12.5V to ±1250V peak
7 ranges, current clamp-dependent

High Voltage Accuracy: ±0.05% FS

Current Accuracy*: ±0.025% FS

Measurement Resolution: 12 bit

Sample Frequency: 128 samples per cycle nominal, 256 points per cycle max

Single Channel Max Sample Rate: 500 kHz

RMS Response Time: 1 cycle

Frequency Measurement: 10 to 500 Hz; resolution 0.1 Hz

Harmonic Measurement: 0-50th harmonic, integer and non-integer frequencies

Capture Memory: PC's hard drive (nonvolatile)

Operating Power: 90 to 240V, 50 to 60 Hz

Environment: 0° to 40°C; 100% RH, non-condensing

Dimensions: 470 mm W x 369 mm D x 191 mm H (18.5" x 14.5" x 7.5")

Notebook PC Requirements:

Minimum System Requirements: 150-MHz Pentium® processor, 800 Mbyte hard drive, 16 Mbyte RAM, 800 x 600 display, and one Type II PC-Card slot

Operating System: All versions of Windows®

WavePort/312P's external connectors allow it to be operated with the lid open or closed



Ordering Information

Description	Part No.
Measurement hardware; voltage cables; and phasor diagram measurement mode software	WavePort/312P

Accessories

Pentium®-class Controller with Microsoft® Office Software	PV-CTRL
Cable bag	PV-Bag
Current clamps	Probe/x
PC-Card/EPP interface card and cable	WBK20A**

Software

Description	Part No.
Event/demand capture option	EDC
Cycle-by-cycle option	CBC
Detailed integer and non-integer harmonics and spectrum analyzer option	DHS
400 Hz measurement capability	FHH
Base software only; includes Phasor Diagram mode	EZPM
3-module package including EDC, CBC, and DHS options	TMP
4-module package including EDC, CBC, DHS, and FHH measurement capability	TMP-400

EasyPower® Measure™ is developed by **Electrical System Analysis, Inc.**, developers of the **EasyPower®** line of electrical power system software.

* Does not include inaccuracies in clamp or other current transducers

** Although the measurement equipment is easily attached to the PC via its parallel port, parallel-port speeds vary from PC to PC. It is often necessary to use a high-speed PC-Card adapter, such as the WBK20A, to ensure reliable, real-time communications. If you are unsure of the performance of your built-in parallel port, contact our factory for assistance.