Choosing the Right PowerSight Model

There are three main PowerSight models to choose from: the PS4500 Power Quality Analyzer, the PS3500 Energy Analyzer, and the PS2500 Power Monitor.

- The PS4500 provides complete analysis in power quality applications (swell / dip / inrush / transient / harmonic detection) in addition to supplying exact measurements of all common power quantities
- The PS3500 is oriented toward complete power analysis and reporting with helpful power quality capabilities. It is a price vs performance leader.
- The PS2500 provides basic power analysis and is best suited for large site surveys or for those with a limited budget.

No matter what your needs or budget, there is probably a PowerSight model that is right for you.

All models offer attractive combinations of price, performance, size, and ease of use and Our technical support is second to none.

Comparison Table between PowerSight models**

The following table lists key features and how they apply to each model. Features that end with an asterisk ("*") have explanatory notes in the next section. Cells that are in bold and highlighted in **green** are key features that distinguish the model from the PS3500. Cells that are highlighted in **red** are features that compare less favorably with the PS3500.

Basic measurement abilities	PS2500	PS3500	PS4500
Basic sampling rate*	16usec	16usec	**8usec**
Samples per cycle (@ 60Hz)	130	130	**2083**
Basic RMS measurement rate*	once per second	once per second	**every cycle of every channel**
True 3-phase*	Yes, 7 channels	Yes, 7 channels	Yes, 7 channels
Setup of power configuration	automatic	automatic	automatic
Single phase measurements	Yes	Yes	Yes
Split phase measurements	Yes	Yes	Yes
Three phase wye and delta	Yes	Yes	Yes
4 wire delta measurements	Yes	Yes	Yes
Open delta measurements	Yes	Yes	Yes
2CT/2PT metering measurements	Yes	Yes	Yes
AC/DC voltage and current measurement*	Yes	Yes	Yes
400 Hz system measurements	Yes	Yes	Yes

Logging	PS2500	PS3500	PS4500
Logging capacity	65534 records with SD memory card	65534 records with SD memory card	65534 records with SD memory card
Logging variables	68 maximum	68 maximum	68 maximum
Logging rate (set by user)	1second-99minutes	1second-99minutes	1second-99minutes
Start/Stop at programmed time	Yes	Yes	Yes
Auto-start logging when power present	**Yes**	no	no
Max/Min/Ave/Present value of V,A,W, etc	Yes	Yes	Yes

Harmonics	PS2500	PS3500	PS4500
Harmonics analysis capability	1-50th on PC, 1-25th on meter with HAO option	1-50th on PC, 1-25th on meter	**1-65th on PC, 50th on meter, to the 31st at 400Hz**
Harmonics direction	Yes, in software	Yes, in software	Yes, in software
THD calculation	4 seconds/channel	4 seconds/channel	**every cycle of every channel**
K factor	Yes, in software	Yes, in software	Yes, in software
Crest factor	Yes for V and A	Yes for V and A	Yes for V and A

Swell/Dip/Sag/Surge/Inrush	PS2500	PS3500	PS4500
Swell (surge) triggering/capture*	check each second	check each second	**Checks every 1/2 cycle of every input**
Dip (sag) triggering/capture*	check each second	check each second	**Checks every 1/2 cycle of every input**
Inrush current capture*	check each second	check each second	**Checks every 1/2 cycle of every input**
Swell/Dip/Inrush capacity	view consumption log	view consumption log	**Up to 15000 records, standard**
Swell/Dip/Transient triggered waveform capture	no	no	**Up to 100 graphs of 12 cycles, standard**
RMS graph of swell/dip by 1/2 cycle	no	no	**Up to 2000 graphs of 100 cycles, standard**
Simultaneous measurement of power / harmonics / swell / dip / transients*	no	no	**Yes**

High speed transient	PS2500	PS3500	PS4500
High speed transient capture*	no	accumulate on 1 channel	**Check every 8usec on every input**
Transient capacity	none	999 summary	**Up to 15000 in log, 100 wavesets**

Voltage measurement	PS2500	PS3500	PS4500
Provision for input ratios for PTs/CTs*	Yes	Yes	Yes
Direct measure of phase-neutral voltage (Rated input)	1-600Vrms	1-600Vrms	1-600Vrms
Direct measure of phase-phase voltage	3-1040Vrms	3-1040Vrms	3-1040Vrms
Peak voltage measurement	2400V	2400V	1000V
DC voltage (Rated input)	1-600Vdc	1-600Vdc	1-600Vdc
Direct voltage measurement with accessories*	1-15,000 Vrms	1-15,000 Vrms	1-15,000 Vrms
Voltage measurement with input ratios	0.5-999MVrms	0.5-999MVrms	0.5-999MVrms
Voltage measurement accuracy*	+/-0.5%	+/-0.5%	**+/-0.1%**
Display resolution (100-400V)	1V	0.1V	0.1V

Current measurement	PS2500	PS3500	PS4500
AC/DC current measurement*	Yes	Yes	Yes
Neutral current measurement	Yes	Yes	Yes
Amp measurement with accessories*	1ma-5000Arms	1ma-5000Arms	1ma-5000Arms
Amp measurement with input ratios	1ma-999MArms	1ma-999MArms	1ma-999MArms
Current measurement accuracy*	+/-0.5%	+/-0.5%	**+/-0.1%**
Display resolution (100-400A)	1A	0.1A	0.1A
Automatic current probe identification and scaling	Yes	Yes	Yes
Flex, DC, and all other probes do not require batteries	Yes	Yes	Yes

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Power related	PS2500	PS3500	PS4500
True power measurement (W)	Yes	Yes	Yes
Apparent power measurement (VA)	Yes	Yes	Yes
Reactive power measurement (VAR)	Yes	Yes	Yes
Power measurement accuracy*	+/-1.0%	+/-1.0%	**+/-0.25%**
Regenerative power	Yes	Yes	Yes
True power factor (TPF)	Yes	Yes	Yes
Displacement power factor (DPF)	Yes, via PC	Yes	Yes
Peak demand period, peak demand, peak ave. KVA	Yes, via software report	Yes, via keypad and software report	Yes, via keypad and software report
Phase angle (V-A, V-V, A-A)	Yes	Yes	Yes
Phasor diagram display	Yes, via PC	Yes, via PC	Yes, via PC
Phase imbalance (V and A)	Yes, via PC	Yes, via PC	Yes, via PC
Energy measurement (KWH)	Yes, via PC	Yes	Yes
Cost measurement	Yes, via PC	Yes	Yes

Other measurements	PS2500	PS3500	PS4500
Fundamental frequency measurement*	45-66, 360-440Hz	45-66, 360-440Hz	**22-200Hz, 360-440Hz**
Duty cycle / on-off cycles*	Yes, via PC	Yes	Yes

Other key features	PS2500	PS3500	PS4500
Internal memory	4M, compressed	4M compressed	**16M with MEM2 option**
Detection of errors in connections, wiring, setups*	**Errors in plain English**	via 6-step sequence	**Errors in plain English**
On-Line predictive motor maintenance option	no	no	**Yes, with option**
High frequency spectrum analysis option	no	no	**5KHz - 100KHz, FAO option**
Firmware update via email	no	no	**Yes**

Input/Output	PS2500	PS3500	PS4500
Analysis Software	included	Included	included
Report generating software	included	included	included
Display	text, hi res graphics on PC	text, hi res graphics on PC	text, hi res graphics on PC

Manual waveform capture*	via PC	Unlimited via SD memory card	Unlimited via SD memory card
Screen snapshot mode	unlimited via software	unlimited via software	unlimited via software
Printing	Yes, via PC	Yes, via PC	Yes, via PC
Communications type	Bluetooth wireless	Bluetooth wireless	Bluetooth wireless
Communications speed*	9600 bps	9600 bps	**up to 57.6Kbps**
Integration with automated systems	Yes	Yes	Yes
Multi-lingual	No	Yes	Yes
Keyboard	1 button	Yes, 24 keys	Yes, 24 keys
Real-time clock	Yes	Yes	Yes

Included accessories	**PS2500**	**PS3500**	**PS4500**
Voltage probes*	4 included, deluxe elephant clamp type	4 included, deluxe elephant clamp type	4 included, deluxe elephant clamp type
Carrying case*	soft case included	several options	several options
Communications cable	None required	None required	None required
Wall charger	Barrel-type included	Barrel-type included	Barrel-type included

Power requirements	**PS2500**	**PS3500**	**PS4500**
Rechargeable battery capacity	8-10 hours	8-10 hours	**10-12 hours**
Rechargeable battery type	Ni-Cad	Ni-Cad	**Li-ion**
Display of battery capacity	no	no	**Yes**
Power requirement	12VDC @ 500ma	12VDC @ 500ma	12VDC @ 500ma
Power itself from the line	with Line-to-DC option	with Line-to-DC option	with Line-to-DC option

Environmental/Safety	**PS2500**	**PS3500**	**PS4500**
Size	4"x8"x1.75"	4"x8"x1.75"	4"x8"x1.75"
Weight	less than 2 pounds	less than 2 pounds	less than 2 pounds
Operating temperature	0 - 50 C (32 - 122 F)	0 - 50 C (32 - 122 F)	0 - 50 C (32 - 122 F)
Operating Humidity Limit	70% non-condensing	70% non-condensing	70% non-condensing
Safety Certification	EN 61010-1 600V Cat IV	EN 61010-1 600V Cat IV	EN 61010-1 600V Cat IV

Notes and Explanations of the Comparison Table**

Basic sampling rate. This is the basic rate at which inputs are sampled. However, most samples are unnecessary for most measurements so many are not used, depending on the model. The PS2500 and PS3500 use samples sufficient to do RMS measurements of voltage and current including the components of the first 25 harmonics. All models use samples sufficient to analyze harmonics to the 50th harmonic of a 60 Hz fundamental when creating waveforms. The PS3500 uses its highest rate of 16 usec when detecting transients. The PS4500 uses its 8 usec rate to simultaneously measure transients, swells, dips, harmonics, and power measurements on all channels.

Basic RMS measurement rate. The PS2500 and PS3500 look at 2 cycles of each channel every second and do complete measurements of relevant parameters during normal operating modes. Thus one measurement is generated every second, regardless of the recording rate. The PS4500 does complete measurements of every cycle of every channel, regardless of the recording rate. Therefore, the PS4500 misses nothing in its measurements and every measurement is inherently more accurate. All models are inherently more accurate than competing products that only do measurements when they are about to create a new record in their log.

True 3-phase. Unlike other instruments of this size, PowerSight is a true 3-phase meter. This means that all three phases and totals are accurately measured. Voltage, current, power, and power factor are not estimated. Instruments with only one voltage and one current channel cannot measure 3-phase power without making assumptions that are usually not true in the real world.

Works with all power systems. PowerSight models are meant to be used on any power system anywhere in the world. They can accurately measure single phase, two phase (split phase), three phase, 3- ½ phase (4 wire delta), DC, 2CT/2PT, 3CT/3PT, regenerative, 50Hz, 60Hz, 400Hz, DC, variable frequency, phase-phase, phase-neutral, 69/120V, 120/208V, 200V, 240V, 277/480V, 600V systems. Accessories are available for direct connection to voltages as high as 15,000V, to bus bars, and multiple cable pairs.

Voltage measurement accuracy. Accuracy for PS2500 and PS3500 is stated as a percent +/- 0.2V between 0.5-399.9V, +/-2V between 400-3,999V. Accuracy for the PS4500 is stated as a percent of reading +/-0.2V between 0.5-399.9V, +/-2V between 400-3,999V.

Current measurement accuracy. Accuracy for PS2500 and PS3500 is stated as a percent +/- 0.2A between 0.1-399.9A, +/-2A between 400-3,999A for an

HA1000. Add to the stated accuracy the percentage for any other probe that is used. Accuracy for the PS4500 is stated as a percent of reading +/- the accuracy of the probe (other than an HA1000).

Power measurement accuracy. Add to the stated accuracy the percentage for any probe used, other than the HA1000.

Swell (surge) triggering/capture. Swells are detected by PS2500 and PS3500 as part of the normal 1 second measurement interval. The PS4500 detects swells lasting as little as ½ cycle and measures every ½ cycle of every channel. When detected, the swell can be recorded to a file, can have its RMS profile captured and graphed for every ½ cycle for the length of the swell, and/or can have 12 cycles of the waveform captured for the swell.

Dip (sag) triggering/capture. Dips are detected by PS2500 and PS3500 as part of the normal 1 second measurement interval. The PS4500 detects any dip lasting as little as ½ cycle while it measures every ½ cycle of every channel. When detected, the dip can be recorded to a file, can have its RMS profile captured and graphed for every ½ cycle for the length of the dip, and/or can have 12 cycles of the waveform captured for the dip.

Inrush current capture. Inrush current is measured by PS2500 and PS3500 as part of the normal 1 second measurement interval. The PS4500 detects inrush current lasting as little as ½ cycle as it measures every ½ cycle of every channel. When detected by the PS4500, the inrush can be recorded to a file, can have its RMS profile captured for every ½ cycle for the length of the inrush, and/or can have 12 cycles of the waveform captured for the inrush.

High speed transient capture. High speed transient capture is done in limited fashion in the PS3500 as part of the Disturbance Monitoring mode of operation. Only one channel is monitored during this mode. The transient threshold can be set roughly, in approximately 24V increments. Transients are detected when they exceed an absolute value of voltage that includes the fundamental sine wave. When detected, the transient is “accumulated”. This means that it is added to a running total of transients that have occurred on the channel since disturbance monitoring began. The worst transient that is detected has the following information available on the meter: the time/date that it occurred, the peak absolute value of the transient, the length of time it lasted, and its rise time. Transients of at least 32 usec can be detected and measured in 16usec increments.

The PS4500 detects transients on all channels simultaneously, while doing all other measurement functions simultaneously. The transient threshold can be set in 1V increments and can be set to detect absolute values (as with the PS3500)

or relative values (where the fundamental periodic waveform is removed). When a transient is detected, the transient information of time/date, maximum value, and duration can be added to a log and waveform can be captured to a file. Transients of at least 16 usec can be detected and measured in 8usec increments.

Simultaneous measurement of power / harmonics / swell / dip / transients. The PS3500 performs power measurement and limited swell and dip measurement on all channels simultaneously. It pauses to do harmonics and it operates in a special mode to detect transients. The PS4500 performs power, harmonic, swell, dip, and transient analysis simultaneously on all channels.

AC/DC voltage and current measurement. All PowerSight models use the same probes interchangeably. This includes AC and DC current measurement and direct voltage measurement up to 15,000 Vrms with the 15KVP.

Fundamental frequency measurement. All models can operate in fixed 50Hz, fixed 60Hz, and fixed 400Hz modes. The PS2500 and PS3500 can also track frequencies between 45 and 66 Hz and between 360 and 440 Hz. The PS4500 can track frequencies between 22 and 200 Hz for tracking the output of a variable speed drive. It also can track from 360 to 440 Hz. In either of the 400 Hz modes, the PS4500 calculates harmonics to the 31st.

Duty cycle / on-off cycles. The PS3500 and PS4500 can determine the duty cycle of operation. This is the proportion of time that a unit under test is “on”. The user sets the value of current considered to be the “on” value. In addition, estimates of number of on-off cycles per hour, per week, and per month and the average “on” and “off” times are continually estimated during monitoring.

Provisions for input ratios for PTs and CTs. PowerSight automatically identifies each current probe when it is connected and assigns the correct input ratios for correct measurements. In addition, the user can enter ratios to be used for specific measurement sessions. These ratios can be entered via our PSM software or entered directly using the keypad with the PS3500 and PS4500.

Voltage measurement with accessories. Special high voltage probes can be used for direct measurement of voltages to 15,000Vrms. However, these probes require the user to enter an input ratio.

Current measurement with accessories. A wide range of current probes are available for measuring any current. They are interchangeable and self-identifying so no input ratio needs to be entered into the meter. New current probes are added as the need arises. No current probes require batteries.

Detection of errors in connection. The PS3500 has our Checkout Connections feature whereby the customer proceeds through a 6 step process to help the user determine that the connections are all correct. The PS4500 and PS2500 have the powerful SureStart™ Logging feature that uses artificial intelligence to analyze the connections, wiring, and setup parameters in order to report what problems are likely to exist before you begin monitoring.

Carrying cases. There are various carrying case options including soft cases, hard cases, and weather-resistant. The meter may be operated and carried in the weather-resistant carrying case and in the SCAS2 soft case.

Typical system cost. This is a cost comparison of typical systems. Actual systems usually cost more or less than shown, depending on the options chosen. The PS2500 system is a PS2500 with 3 HA1000 probes and without the Harmonics Option. The PS3500 system is a PS3500 with 4 HA1000 current probes and a CAS3 hard shell carrying case. The PS4500 system is a PS4500 with 4 FX3000 current probes and a CAS3 hard shell carrying case.

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