

7220 Series

3 Phase Power Analyzer with ≤ 30 ppm Accuracy

Setting New Standards for AC Power Measurements!



7220 SERIES FEATURES

- ◆ 3-Phase Plus Neutral Measurements
- ◆ Power ≤ 30 ppm for 3/10 Second Aggregation!
- ◆ Power ≤ 100 ppm for a Single Wave Form!
- ◆ Phase Angle < 10 micro-radians for 3/10 Second Aggregation!
- ◆ Phase Angle ≤ 100 micro-radians for a Single Period of a Wave Form!
- ◆ Able to Measure Any Signal Including Non-Sinusoidal and Quasi-Stationary!
- ◆ Built-In Oscilloscope Function
- ◆ High Resolution (5 Arms, 120/240 Vrms) and Low Resolution (125 Arms, 1000 Vrms) Modes
- ◆ High Resolution Display with Touch Front Panel!
- ◆ Clamp Set Available With Ratios Up To 1000:1

GUILDLINE INSTRUMENTS 7220 ASYNCHRONOUS POWER ANALYZER is a 3 phase AC Power Measurement Laboratory Standard designed for the most demanding power measurement applications today.

Innovative, patent pending sensing technology provides unprecedented current, voltage, power, and phase angle measurement accuracy and uncertainty. Patented pending and proprietary algorithms provide very accurate measurements starting from a single period of a wave form in addition to aggregated or averaged measurements. Asynchronous 24 bit A/D high speed conversion technology increases the dynamic range and accuracy of this instrument.

The 7220 uses asynchronous sampling with multiple high speed, wide band, analogue to digital (A/D) conversion. Coupled with a patent pending signal processing, the 7220 provides asynchronous sampling with very low uncertainties previously only available with very expensive synchronous power analyzers.

The 7220 Series Incorporates the Most Technologically Advanced Design for Testing Stationary & Quasi-Stationary Waveforms Available on the Market Today!

The unique design allows a single period of a non-synchronous, quasi-stationary signal to be measured with power uncertainties ≤ 100 ppm. This is a breakthrough in power measurements as no other commercially available power analyzer can provide a low uncertainty measurement for a single period of a noisy signal. For a sinusoidal signal with 3/10 Second Aggregation the Power uncertainty is ≤ 30 ppm.

This analytical capability does not exist with synchronous power analyzers which have much higher uncertainties for quasi-stationary signals, or can't measure them at all. As power grids get noisier due to alternative energy sources and power saving devices, the ability to measure noisy signals with low uncertainty is becoming critical!

7220 Series Asynchronous 3-Phase Power Analyzer

The 7220 Power Analyzer contains eight independent measurement channels used to monitor three phases and the neutral line for both voltage and current. Data is simultaneously converted into eight digital channels. For a 3/10 second aggregation on a sinusoidal signal, power measurement uncertainty is ≤ 30 ppm. For a power measurement of a single period of any wave form, including one with harmonics and frequency jitter, the power uncertainty is <100 ppm.

There is a built-in oscilloscope function which allows the incoming wave forms to be viewed visually.

The front panel contains an embedded controller with a high resolution color touch display. All measurement results are calculated from the incoming data streams and presented in real time on the screen. Results may be further aggregated, synchronized to the CUT (Coordinated Universal Time), and stored for documentation and further analysis. Test results can also be presented in a graphical form on the screen.

The rear panel is divided into four groupings, each consisting of a voltage input, a current input and a current fuse.



Rear View - 125 A Terminals

There are two current modes: optimized for 0-5 Ampere operation, and optimized for 0 – 125 Ampere operation. For 125 A the 7220 Power Analyzer provides the highest quality terminal connectors to handle the higher current. These terminal connections are the same as found on all Guildline High Current standards and provide the best possible connections with minimal affects due to noise. An optional adaptor/connector set is available to facilitate connections to a wide variety of equipment.

The functionality of the 7220 Power Analyzer can be expanded to provide specialized, customized measurements, or to conform to any National, or future International Standards. All calculations are performed by an imbedded Windows computer which can accept customer programs or special algorithms.

The 7220 Power Analyzer is built as a 5U bench top unit and does not require forced air cooling which reduces the measurement noise. Optionally the 7220 Power Analyzer can be installed in a 19" rack.

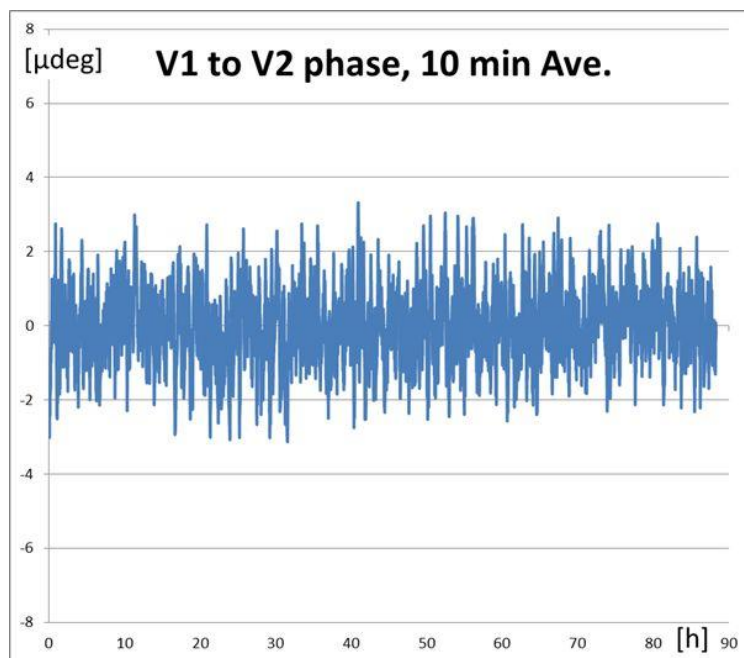
OPERATION: The 7220 Power Analyzer can be used to analyze power in 1-, 2-, 3-phase, Δ , and Y configurations; and with 50 Hz, 60 Hz, and 400 Hz systems. Phase angle measurements can be made between any two channels. This includes voltage and current for each phase plus neutral; two currents from any phase plus neutral; and two voltages from any phase plus neutral. The 7220 can measure key power parameters as defined by IEC 61000 International Standards.

Additionally, the 7220 Analyzer can provide precise measurements for quasi-stationary signals and synchronous signals, with capability to track fast voltage, current, power, phase and frequency changes down to a period to period base. It is not dependent on hardware or software frequency synchronization so will always provide measurement data even in the presence of frequency jitter.

7220 Series Asynchronous 3-Phase Power Analyzer

Just how good is the 7220? During Guildline's testing of the 7220 Power Analyzer, phase angle measurements were taken continuously over a 90-hour period. When averaged over 10 minutes the standard deviation of the phase angle was within $\pm 3 \mu\text{deg}$ or $\pm 0.05 \mu\text{rad}$.

The graph on the right shows the outstanding stability of the 7220 Power Analyzer and the industry-leading phase angle measurement capability.



Specifications

BASIC MEASUREMENTS	
Voltage	U(1), U(10/12), U(150/180), Urms(+½), Urms(-½), Uav+, Uav-, Up-p, Crest Factor
Current	I(1), I(10/12), I(150/180), Irms(+½), Irms(-½), Iav+, Iav-, Ip-p, Crest Factor
Power	Instantaneous, Apparent, Real, Reactive, Power Factor, Distortion
Energy	One and three phase Energy cumulative power (J, Wh, or kWh)
Frequency	f(1), f(10/12), f(150/180), f(10s)
Harmonics	Voltage and Current Harmonics (up to #64), Subharmonics and Interharmonics
Phase angle	Any input to any input phase shift for the fundamental and harmonics
3 Phase	Power, Voltage and Current Balance, Symmetrical Components

INPUT SPECIFICATIONS	VOLTAGE	CURRENT
Number of Inputs	4	4
Maximum Input	150 V _{rms} / 1000 V _{rms}	5 A _{rms} / 125 A _{rms}
Maximum peak Input	$\pm 230 \text{ V}_{pk}$ / $\pm 1500 \text{ V}_{pk}$	$\pm 22 \text{ A}_{pk}$ / $\pm 180 \text{ A}_{pk}$
Input Impedance	2 M Ω 20 pF	<60 m Ω , <32 $\mu\Omega$
Common Mode Rejection (50/60 Hz)	>110 db (2 mV/600V)	<50 nS (>30 μA /600 V)
High Sensitivity Range	1:3.33 (180 V _{rms})	1 : 2 : 23
Input Bandwidth	10 kHz anti-aliasing filter	10 kHz anti-aliasing filter
Crest Factor	2.1 @ 600V _{rms}	>1.4 @ 5 A, >7 @ 10 A, >1.4 @ 125 A

7220 Series Asynchronous 3-Phase Power Analyzer

Specifications (23 °C ± 2 °C)	
Power Accuracy	Voltage Accuracy
≤ 30 ppm for 10 Second Aggregation	≤ 25 ppm for 10 Second Aggregation
≤ 100 ppm for a Single Period of a Wave Form	≤ 70 ppm for a Single Period of a Wave Form
Current Accuracy	Phase Angle Accuracy
≤ 5 ppm for 10 Second Aggregation	≤ 10 micro-radians for 10 Second Aggregation
≤ 30 ppm for a Single Period of a Wave Form	≤ 100 micro-radians for a Single Period of a Wave Form
Channel Skew ≤ 100 ns	
Resolution	24 bit conversion on all channels
Sampling Speed	94 kSPS continuous for all channels

General Specifications			
Communication	2 x USB 2.0, 1 x Ethernet	Safety IEC61010-1, Annex K	Cat. II 1000 V, Cat. III 600 V
Operating Temperature		15 °C – 35 °C	60 °F – 105 °F
Dimensions (Width x Height x Depth)			Weight
441 mm x 238 mm x 470 mm	17 3/8" x 9 3/8" x 18 1/2"		20 kg 44 lbs

ORDERING INFORMATION	
7220	3-Phase Power Analyzer
	Operation Manual and Certificate of Conformance included
/SM	Service Manual – Optional Manual
	Voltage and Current Lead Sets Available
	Clamp-On Meter Set Available

Guildline IS DISTRIBUTED BY:
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