Model 4301
Modular Power Analyzer

An All-Purpose Digital Measurement Instrument for Power Conversion Device Testing

NH Research, Inc.

Model 4301 Modular Power Analyzer

- 0.1% reading and 0.1% range accuracy
- Up to 16 Power Analyzer modules in a single chassis
- 25 standard AC and DC, static and dynamic measurements
- Dual DSPs with 1MHz sampling rate
- 6 voltage and current ranges plus auto-ranging for increased accuracy
- Peak-Peak noise measurements, 10Hz - 20MHz
- Two Digital Logic Inputs per module
- Chassis communications through a PC/LAN with LabVIEW and IVI-compliant drivers

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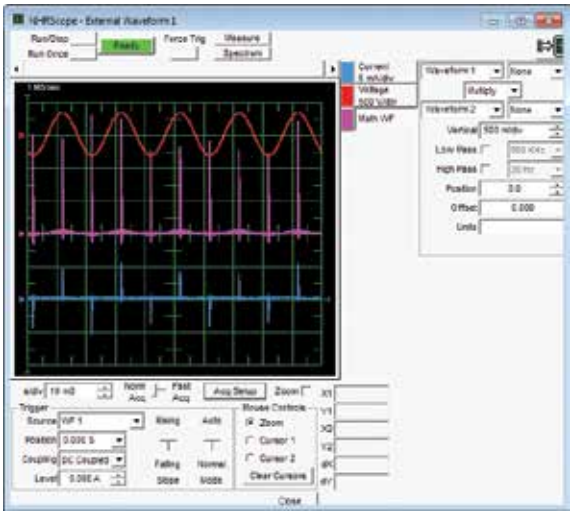
Applications

The Model 4301 Power Analyzer is primarily designed for use in automated test environments configured for simultaneous testing of multiple power conversion UUTs. The Analyzer's advantage in this application are speed, size and measurement performance. Speed is achieved through having a single instrument capable of making a wide range of measurements dedicated to each test channel. Test system size is minimized through the modular single-card design, 16 of which can be fitted into a multi-instrument chassis. Measurement performance is achieved by deriving an extensive number of high accuracy measurements from a digitized waveform. This last capability is particularly useful where input as well as output measurements are necessary to precisely calculate UUT efficiency.

3 Instruments in 1 Through Waveform Digitization

The 4301 Analyzer can be thought of as functionality equivalent to three instruments: a power meter, a multimeter and an oscilloscope. This capability is achieved through the Analyzer's state-of-the-art, dual A/D converters with a 1MHz sampling rate that provides the data to make practically any power-conversion-related static or dynamic measurement provided by the three types of instruments above.

Another benefit of the high-speed digitization rates provided by the Digital Power Analyzer is its oscilloscope function. This allows the display of both voltage and current waveforms for analysis of high-speed transients that ordinarily wouldn't be caught by previous generation power meters.



Power Analyzer oscilloscope panel

Model 4301 Power Analyzer Measurement Specifications

Measurements Available	**Voltage:** VDC, VRMS, Vpk+, Vpk- **Current:** IDC, IRMS, Ipk+, Ipk-, Creat Factor **Power:** Average, True, Apparent, Reactive, Power Factor **Frequency:** AC **Waveform:** Rise Time, Fall Time, Settling Time, Turn-On Time, Hold-Up Time, Event, THD **Timing:** Trigger-In Time, DIN State & Time **Record Length:** 256K points	
DC Voltage	Range Resolution Accuracy	±15/30/60/120/250/600 VDC 14/15 Bits 0.1% of reading + 0.1% of range
DC Current	Range Resolution Accuracy	±0.01/0.05/0.2/1/5/20 IDC 13 Bits 0.1% of reading + 0.1% of range
AC Voltage TRM AC+DC TRMS	Range Resolution Accuracy	17/70/350VAC, 16 Bits, CF=1.7 9/35/150VAC, 15 Bits, CF=3 0.1% of reading + 0.1% of range
AC Current TRM AC+DC TRMS	Range Resolution Accuracy	0.01/0.05/0.2/1/5//20AAC, 15 Bits, CF=3 0.005/0.02/0.1/0.5/2/10AAC, 14 Bits, CF=6 0.1% of reading + 0.1% of range
Power Average, True, Apparent, Reactive	Range Accuracy Resolution	Current range times Voltage range 0.1% of reading + 0.1% of range Current range and Voltage range
Power Factor	Range Accuracy Resolution	0 to 1 0.5% of reading, + 0.5% of range Current range and Voltage range
Frequency	Range Accuracy	10 - 1000Hz 0.5% of reading
Waveform Rise Fall Settling Turn-On Hold-Up Time, Event, THD	Voltage Bandwidth Current Bandwidth Amplitude Accuracy Time Accuracy Sample Rate Record Length Trigger Range Resolution	DC to 500khz DC to 100khz 2% of DC Range 2% of DC Range 0.5% of reading + 1/Sample Rate Up to 1MS/s 256k points System Trigger, DINs, Voltage Same as Voltage or Current
Peak to Peak Noise	Range Bandwidth Accuracy Resolution	2.5V, 0.25V Peak to Peak 10hz to 20Mhz 3% of range, @ 1Mhz 12 Bits
DIN Timing	Range Accuracy Resolution	7 days 0.05% of reading ±100uSeconds 100nanoSeconds

The 4300 chassis with Model 4301 Power Analyzers and Model 4350 DC Loads

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