

Powertek

Phase Angle Voltmeter

A new generation of versatile measurement instruments

GP1700

10uHz to 1MHz



GP1735

10uHz to 35MHz



Versatility without compromise

In a world where engineers from many different application areas require ever increasing speed, flexibility and measurement accuracy, Powertek introduce a new generation of versatile measurement instruments that offer leading performance in every mode without the compromise on accuracy or the additional cost that is commonly associated with such flexible instruments.

Utilising the latest DSP and FPGA technology to optimise the use of innovative analogue hardware, many measurements functions can be derived with great precision from the basic elements of true rms voltage on two measurement channels plus the phase angle between them. It is from this fundamental relationship between independent voltages and their relative phase angle that the phrase 'Phase Sensitive Multimeter' was derived and this is also the key to the unique combination of performance versatility and value provided by the GP range.

Whether you will make use of just one or all six of the primary measurement modes included in the GP1700 and GP1735, you can be sure of the exceptional accuracy, speed and ease of use that only the latest design technology can provide.



Frequency Response Analyser



GP1700 with Powertek injection transformer testing an SMPS

Incorporating a digital signal generator, two differential auto-ranging voltmeters, auto-scale frequency plots and intuitive setup stored into non-volatile memory; the GP range brings accurate and simple to operate frequency response analysis within the grasp of many who could not previously consider an FRA

Features

- Differential inputs
- Fast sweep with up to 20 frequency steps per second
- DFT analysis giving exceptional noise rejection
- Automatic Gain/Phase margin computation
- Storage of results into non-volatile memory

FRA Example applications

- Power supply gain and phase analysis
- Electronic filter design and test
- Speaker and amplifier test
- Mechanical vibration analysis
- Electro-Mechanical control loop analysis

FREQUENCY RESPONSE ANALYSER					
gain margin	22.2dB	@ 9.566kHz	phase margin	88.8°	@ 894.0Hz
26	251.737Hz	+17.44dB		+073.449°	
27	269.550Hz	+16.02dB		+074.658°	
28	286.407Hz	+15.16dB		+074.942°	
29	305.622Hz	+14.53dB		+075.111°	
30	326.034Hz	+13.98dB		+075.430°	
31	347.810Hz	+13.40dB		+075.793°	
32	371.040Hz	+12.68dB		+075.568°	
33	395.622Hz	+11.73dB		+076.376°	
34	422.260Hz	+10.67dB		+077.802°	
35	450.462Hz	+9.535dB		+079.448°	
36	480.549Hz	+8.152dB		+081.136°	
37	512.649Hz	+7.462dB		+082.687°	
38	546.895Hz	+6.476dB		+084.041°	
39	583.412Hz	+5.497dB		+085.177°	
40	622.378Hz	+4.567dB		+086.092°	
41	663.948Hz	+3.679dB		+086.744°	
42	708.292Hz	+2.822dB		+087.157°	
43	755.559Hz	+1.996dB		+087.346°	
44	806.065Hz	+1.195dB		+087.325°	
45	859.903Hz	+0.438dB		+087.088°	

FRA table with cursor point selected

Selection of the most suitable display format is very easy, switching between real time, tabular or graphical presentation from any mode with a single key stroke

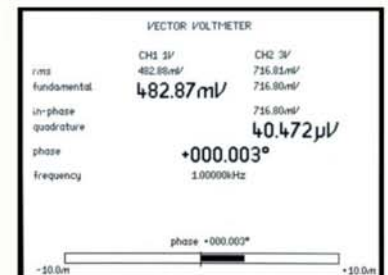
FREQUENCY RESPONSE ANALYSER			
gain	+0.438	dB	
phase	+087.088	°	
CH1 magnitude	59.636m	V	
frequency	859.903	Hz	

Real time mode at cursor point

In real time mode, the display functions are user selectable and can be presented in any order and at any of three zoom levels. Cursor keys can then be used to adjust amplitude and frequency with selectable step size to provide complete control of test conditions.

Phase Angle Voltmeter

Unique to the PAV mode is a null meter display that provides the feel of traditional analogue instruments while maintaining the precision of a 6 digit phase display and 1 milli-degree phase resolution.



A high stability signal generator with direct digital synthesis, true rms sensing voltmeters and discrete fourier analysis combine to provide phase measurement accuracy beyond any comparable product.

Features

- Simultaneous measurement of all functions
- Synchronised to internal or external frequency source

PAV Example applications

- Electrochemical materials analysis
- Current transformer testing
- Phase meter calibration

LCR Meter



Whether using an external shunt, an LCR Active Head or the Impedance Analyser Interface; LCR mode provides all impedance parameters quickly and accurately either at single frequencies or over a user defined frequency sweep.

LCR Head – 10uHz to 5MHz
IAI – 10uHz to 35MHz

GP1700 with LCR Active Head

GP1735 with Impedance Analyser Interface

Features

Wide frequency range
Freq, Phase and Tan Delta to 6 digits
Passive shunt or active head options
Graph or table of any function
Sweep results store to memory

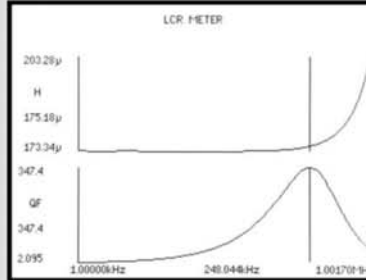
LCR Example applications

- Component testing
- Electrochemistry
- Circuit impedance analysis
- Testing resonance

LCR METER	
magnitude	CH1 10V/ 355.47mV CH2 30mV/ 1.7724uV
capacitance	series: 693.6pF parallel: 693.6pF
resistance	12.5502 4.19502
tan δ	0.00005
phase	-089.997°
frequency	1.00000kHz

6 digit resolution and exceptional phase stability permit testing of the most demanding components such as low ESR capacitors

Any point in a sweep can be selected with a cursor and viewed in a detailed results table.



RMS Voltmeter

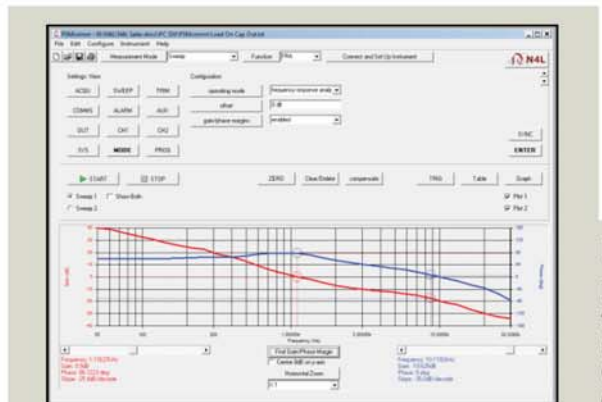
In addition to providing the raw data from which all other functions are derived, each channel can be used directly for applications requiring precision rms measurement. Unlike many voltmeters, AC and DC components are quantified separately and dBm, peak, CF and surge values are displayed.

Both units utilise independent differential circuits permitting simultaneous analysis of two points at a different potential. For example, the input and output on voltage converter or two windings on a transformer.

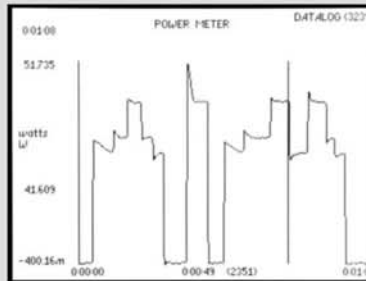
Harmonic Analyser

The Harmonic Analyser mode simultaneously measures individual harmonic components and total harmonic distortion values on both measurement channels.

Discrete Fourier Transform algorithms permit fundamental harmonic components to be quantified accurately even in the presence of noise and distortion.



Power Meter



Watts graph with cursor at log no. 2351

POWER METER		
watts	30.233W	30.095W
V/A	33.988V/A	33.794V/A
pf	0.890	+0.901
CH1	241.96V	241.95V
CH2	140.47mA	130.02mA
frequency	49.910Hz	+025.682*
HD	11.558mW	0.038%
W hours	470.45mWh	430.74mWh
V/A hours	523.11mWh	463.21mWh
pf average	0.935	0.930
A hours	2.117Amh	2.026Amh

Real time display after datalog

The combination of true rms measurement channels, precision phase analysis, high speed computation and a versatile graphic display provide an ideal solution to many applications that involve rapid changes in power.

Features

Real time true rms measurement with no missed data.
Synchronisation with fundamental down to 10ms period.
Datalog of up to 4 functions stored into non-volatile memory.
Watch results during datalog capture with scroll display.
Real time DFT harmonic analysis.

Power Meter applications

- Power profile testing
- SMPS standby analysis
- Distortion analysis
- PFC testing

PC control, data capture and file storage

PSMcomm software provides control of all primary PSM functions with graphical or tabular data presentation, dual cursor measurements, an automatic gain phase margin function plus print, copy, save to file and firmware download.

CommVIEW PC software supplied as standard, provides script file instrument control, result storage in .txt format and firmware download.

Powertek GP1700 and GP1735

Accessories and Ports

Standard accessories	
Probes	2 off with GP1700 – 4 off with GP1735
Leads	Output, RS232, Power
Software	CommVIEW
Documentation	Calibration Certificate, User Manual



Ports	
RS232	Baud rate to 19200 RTS/CTS flow control
Parallel	8 output, 4 input – 25 Pin D Type
Analog output	0V to +4V on any measured function – BNC
Sync output	Pulse synchronised to generator
Extension ports (N4L accessories)	2
LAN (option L)	15 pin female D type and 6 pin mini-din
GPIO (Option G)	10/100 base-T Ethernet auto sensing RJ45 IEEE488.2 compatible



System specifications

GP17xx	
Datalog	
Functions	Up to 4 measured functions user selectable
Datalog Window	From 10ms with no gap between each log
Memory	RAM or non-volatile up to 8000 records
High Speed Data Streaming	
Rate	1500 readings/s max
Window	660us to 1s Synchronized to waveform
Buffer	8000 results
General	
Display	320 x 240 dot LCD – white LED backlight
Alarm	Any displayed function hi, lo, inside window, or outside window
Program stores	100, one loaded on power up
Sweep stores	30, all parameters in any sweep function
Remote operation	Full capability, control and data
Size	170H x 350W x 250D mm approx
Temperature	5 to 35°C
Weight	4kg approx
Power supply	90-264V rms 47-63Hz 30VA max

Measurement specifications

	GP1700	GP1735
Frequency Response Analyser		
Measurement	Magnitude, gain (CH1/CH2 or CH2/CH1), gain (dB), offset gain (dB), phase (°)	
Frequency range	10uHz to 1MHz 20mHz to 500kHz with ext source	10uHz to 35MHz 20mHz to 35MHz with ext source
Gain accuracy in dB	0.02dB < 1kHz 0.05dB < 10kHz 0.1dB + 0.001dB/kHz < 1MHz	0.01dB + 0.001dB/kHz < 1MHz 0.1dB + 0.04dB/MHz < 35MHz
Phase accuracy	0.02° < 10kHz 0.02° + 0.003°/kHz < 1MHz	0.02° < 10kHz 0.05° + 0.0001°/kHz < 35MHz
Frequency source		Generator or CH1 input
Measurement Speed		Real-time DFT, no missing data Up to 100 readings per second
Filter		Selectable from 0.2 seconds
Resolution		5 or 6 digits

Vector Voltmeter	
Measurement	In-phase, quadrature, tan ϕ , magnitude, phase, in-phase ratio, rms, rms ratio, LVDT differential, LVDT ratiometric
Frequency range	10uHz to 1MHz 20mHz to 500kHz with ext source
Basic accuracy (ac)	0.05% range + 0.05% reading + 0.05mV < 1kHz Basic + 0.02%/kHz < 10kHz Basic + 0.2% + 0.002%/kHz < 1MHz
	Basic + 0.001%/kHz < 10kHz Basic + 0.002%/kHz < 1MHz Basic + 1.6% + 0.4%/MHz < 35MHz

LCR Meter	
Functions	L, C, R (ac), Q, tan delta, impedance, phase – Series or parallel circuit
Frequency range	10uHz to 1MHz
Current shunt	External or N4L active head or Impedance Analysis Interface
Ranges (LCR Head or IA)	Inductance – 100nH to 10kH Capacitance – 10pF to 1000uF Resistance – 10m Ω to 100M Ω
Basic accuracy	0.1% + tolerance of selected current shunt
Sweep capability	All ac functions

True RMS Voltmeter	
Channels	2
Frequency range	DC to 1MHz
Measurement	rms, ac, dc, peak, cf, surge, dBm
Basic accuracy (ac)	As VVM + 0.2mV
Accuracy (dc)	0.1% range + 0.1% reading + 1mV
	DC to 1MHz 1MHz to 35MHz fundamental only
	As VVM + 0.05mV
	0.1% range + 0.1% reading + 0.5mV

Power Meter	
Measurements	W, VA, PF, V, A, - total, fundamental and integrated, power harmonics
Frequency range	20mHz to 1MHz 1MHz to 35MHz fundamental only
Current shunt	External or use N4L power adaptor
Current accuracy	As voltage + external shunt tolerance
Watts accuracy	0.15% VA range + 0.15% reading + external shunt tolerance
	0.1% VA range + 0.1% reading + external shunt tolerance

Harmonic Analyser	
Scan	Single or series
Frequency range	10uHz to 1MHz
Measurement	Harmonic, series THD or difference THD
Max harmonic	50

	GP1700	GP1735
Input Ranges		
Inputs	2 differential	2 balanced differential
Connectors	Isolated BNC	Dual grounded BNC
Coupling		ac or ac+dc
Max input	100Vpk from earth	10Vpk from earth
Input ranges	100V, 30V, 10V, 3V, 1V, 300mV, 100mV, 30mV, 10mVpk	10V, 3V, 1V, 300mV, 100mV, 30mV, 10mV, 3mV, 1mVpk
Scaling		1 x 10 ⁻⁹ to 1 x 10 ⁹
Ranging		Full auto, up only or manual
Input impedance	1M // 50pF (exc. leads)	1M // 30pF (exc. leads)
Signal Generator		
Type		Direct digital synthesis
Frequency	10uHz to 1MHz	10uHz to 35MHz
Waveforms	Sine, triangle, square, sawtooth	Sine, square (1MHz)
Accuracy (with no trim)	Frequency $\pm 0.05\%$ Amplitude $\pm 5\% < 100kHz$ Amplitude $\pm 10\% < 1MHz$	Frequency $\pm 0.05\%$ Amplitude $\pm 5\% < 10MHz$ Amplitude $\pm 10\% < 35MHz$
Impedance		50 Ω $\pm 2\%$
Output voltage		0V to $\pm 10Vpk$
Output resolution	5mV	50uV to 5mV level dependent
Offset		0V to $\pm 10Vpk$
Offset resolution		$\pm 10mV$
Clock rate	11.52MHz	150MHz
Connector		Grounded BNC

All specifications at 23°C +/- 5°C. These specifications are quoted in good faith but Powertek reserves the right to amend any specifications at any time without notice

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