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Stretching the limits of impedance testing

1260

Impedance/gain-phase Analyzer

The 1260 Impedance/gain-phase Analyzer is - without doubt - the most powerful, accurate and flexible Frequency Response Analyzer available today.

In daily use by leading researchers wherever measurement integrity and experimental reliability are of paramount importance, 1260's solid reputation is frequently endorsed in published research papers in fields such as:-

- Corrosion studies
- Battery research and fuel cells
- Solar cells
- LCDs
- Bio-materials
- Ceramics / composites
- Electronic component development
- Civil engineering

Part of Solartron Analytical's extensive range of precision products designed to provide cost effective solutions for dc and ac analysis in electrochemical and materials research, 1260 offers an outstanding measurement specification for impedance spectroscopy:

Huge frequency range

Spanning 10μHz to 32MHz with 0.015ppm resolution, 1260 provides excellent coverage for virtually all chemical and molecular mechanisms - all in a single instrument.

Unbeatable accuracy

With an accuracy of 0.1%, 0.1°, measurements can be made with complete confidence, and even the most subtle changes in sample behavior detected and quantized.

Noise free analysis

1260 uses Solartron Analytical's patented single-sine correlation technique, which inherently removes the noise and harmonic distortion which plagues lesser instruments.

- Frequency resolution: 1 in 65 million (0.015ppm)
- 0.1%, 0.1° accuracy - unsurpassed by any similar instrument
- Resolution to 0.001dB, 0.01° - capturing every detail
- Measures impedances >100MΩ
- 2-, 3- and 4-terminal measurement configurations
- Polarization voltage up to ±40.95V
- Renowned ZPlot software package simplifies experiments and optimises throughput

Systems

When combined with other products from Solartron Analytical's range, including well-proven application software, 1260 can form the heart of an advanced electrochemical and materials measurement system, to provide superb accuracy, flexibility and reliability - even for the most complex research problems.

Impedance measurement

Virtually every liquid and solid is able to pass current when a voltage is applied to it. If a variable (ac) voltage is applied to the material, the ratio of voltage to current is known as the impedance. The measured impedance varies with the frequency of the applied voltage in a way that is related to the properties of the liquid or solid. This may be due to the physical structure of the material, to chemical processes within it or a combination of both.

The advantages of impedance measurement over other techniques include:-

- Rapid aquisition of data
- Accurate, repeatable measurements
- Non-destructive
- Highly adaptable to a wide variety of different applications.
- Ability to differentiate effects due to electrodes, diffusion, mass/charge transfer by analysis over different frequency ranges
- Equivalent circuit/modelling techniques for detailed analysis of results



1260 Impedance/gain-phase Analyzer Specification

Generator	Voltage mode	Current mode
ac Amplitude ≤10MHz	0 to 3V rms	0 to 60mA rms
>10MHz	0 to 1V rms	0 to 20mA rms
Maximum ac resolution	5mV	100µA
dc bias range	±40.95V	±100mA
Maximum dc resolution	10mV	200µA
Output impedance	50Ω±1%	>200kΩ at <1kHz

Frequency	range: 10µHz to 32MHz, max resolution: 10µHz error: ±100ppm, stability, 24hrs ±1°C: ±10ppm
Sweep types	frequency (log or lin), ac/dc voltage, ac/dc current
Maximum voltage	hi to lo: ±46V peak, lo to ground: ±0.4V peak
Maximum current	±100mA peak
Impedance	lo to ground: 100kΩ, <10nF
Connection	single BNC, floating shield
Output disable	contact closure or TTL logic 0

Input System	Voltage (2x)	Current
3 independent analyzers operating in parallel		
Ranges	30mV, 300mV, 3V	6µA, 60µA, 600µA, 6mA, 60mA
Maximum resolution	1µV	200pA
Full scale peak	±5V	±100mA
Inputs protected to	±46V	±250mA
Connections	single/differential BNC	single BNC
Shields	floating/grounded	-
Coupling	dc or ac (-3dB at 1Hz)	dc or ac (-3dB at Hz)

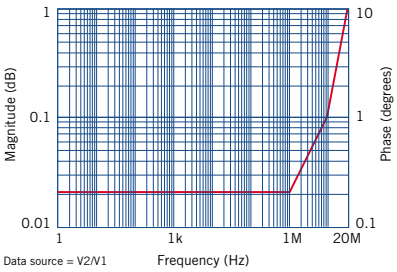
Input impedance		
Hi to shield	1Mohm, <35pF	≥600µA range, 1Ω
Shield to ground	10kohm, 330pF	<600µA range, 50Ω

Limits of error	Ambient temperature 20±10°C, integration time >200ms. Data valid for one year after calibration.

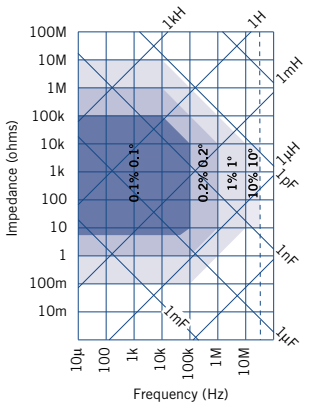
Results	
Variable	frequency, ac amplitude, dc bias
Measured parameters	voltage gain, phase, real, imaginary, Z, R, X, Y, G, B, V, I group delay, C, L, Q, D

Power supply	90 to 126V, 198 to 252V, 48 to 65Hz
Power consumption	230VA
Dimensions (w x h x d)	432mm x 176mm x 573mm (17in x 6.93in x 22.56in)
Weight	18kg (40lbs)
Operating temp. range	0 to 50°C (32 to 122°F)

Limit of error
Gain-phase measurements
Applies to all ranges at >10% full scale



Impedance Measurements
Applies for stimulation level of 1V for impedances >50Ω or 20mA for impedances <50Ω



Solartron Analytical is a world leader in instrumentation and software for the characterization of materials and electrochemical systems using precision electrical measurement techniques.

These techniques find particular use in the fields of corrosion, battery and fuel cell research, dielectric analysis and electrochemistry. The product portfolio includes industry standard frequency response analyzers, potentiostats, electrochemical software (Zplot and CorrWare) and battery test equipment.

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Solartron Analytical's Quality System is approved to BS EN ISO 9001:2008

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Unit B1 Armstrong Mall
Southwood Business Park
Farnborough GU14 0NR
United Kingdom
Tel: +44 (0) 1252 556 800
Fax: +44 (0) 1252 556 899

801 South Illinois Avenue
Oak Ridge
TN 37831
USA
Tel: (1) 865-425-1360
Fax: (1) 865-425-2410

solartron.info@ametek.com **www.solartronanalytical.com**

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