Data Sheet

B&K PRECISION

EIS Battery Analyzer
## Swept frequency technique
BA8100

USB   LAN   RS232

The BA8100 uses EIS (Electrochemical Impedance Spectroscopy), a swept frequency technique for evaluating the internal electrochemical and electrical properties of a battery under test. EIS is a method to characterize the impedance of a battery by stimulating it with a small amplitude AC signal.

This instrument performs galvanostatic EIS on individual cells or strings not exceeding 80 V, making it ideal for energy storage and conversion systems. Sweeping the stimulus AC signal provides a graphical plot of the battery's response revealing a composite view of the battery's internal properties. Select specific frequencies to evaluate interconnections, deterioration of plates, electrodes, or electrolyte.
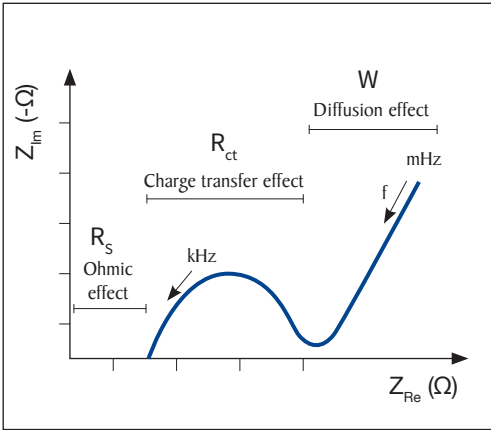
Analyze data using Nyquist plot
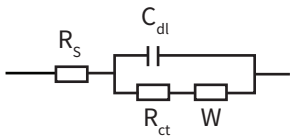
Randles cell

Features and benefits

- Fixed frequency measurements from the front panel

- Swept stimulus frequency with included software

- Maximum input voltage of 80 V

- EIS frequency range of 50 mHz to 10 kHz

- Programmable DC and AC current settings

- Measurements include impedance Z, phase angle θ, voltage and current

- Simple 4-wire test connection

- LAN, USB (COM), and RS232 interfaces standard

| Key Specifications	
Impedance Z	Accuracy: ±(0.5% of reading + 5 µΩ)
Rated Voltage	0.5 V to 80 V
Rated Current	0.5 A to 3 A DC
Frequency Range	0.05 Hz to 10 kHz

Applications
The BA8100 brings EIS technology out of the research lab and into the industrial market, with a price-performance ratio suited for incoming inspection, battery second use (B2U), battery stack service, and manufacturing.

Operation highlights

PC software

Enhance the capabilities of the BA8100 with the provided application software. Facilitate measurement setup with automatic sample rates and input gain control. Acquire and log data across linear, logarithmic or custom frequency sweeps at different current amplitude levels. Analyze data using the provided Nyquist and Bode plot tools or through user's choice of software. Additional features include a meter display, voltage plot and current plot for verifying the latest measurements.
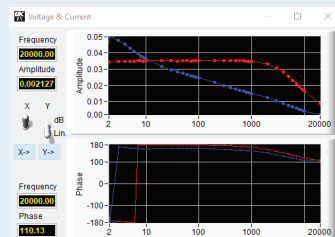
Control Panel
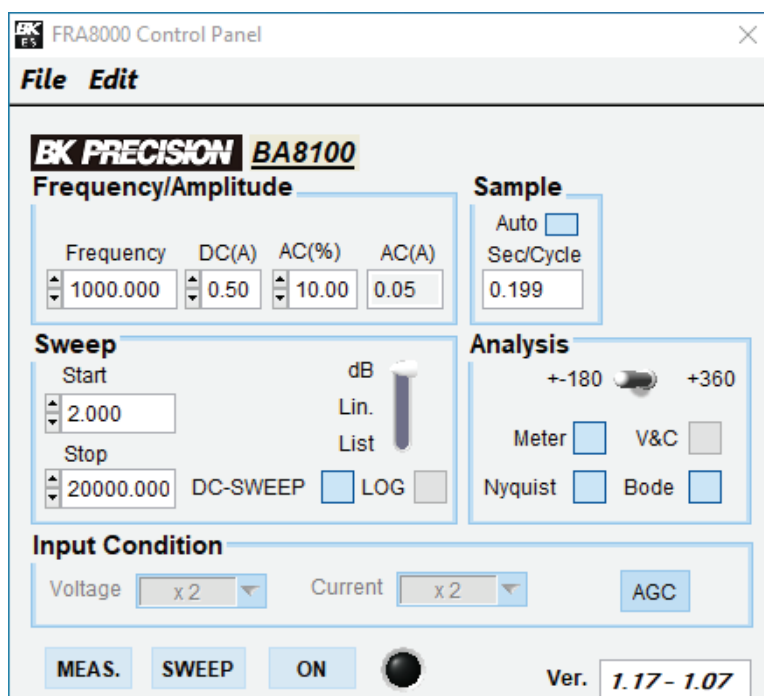
Meter

The meter feature displays the measurements that are currently being acquired by the BA8100.
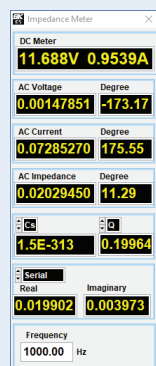
Voltage and current

The voltage and current plot displays the magnitude and phase of the acquired AC voltage and current in the frequency spectra.

Bode plot

The Bode plot tool displays the phase shift and magnitude changes of impedance across the applied frequency range. Additional graphs are available to display the changes occurring in different parameters.
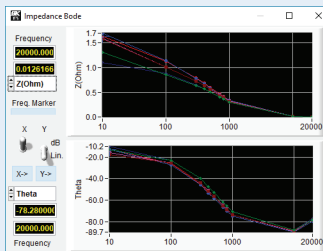
Nyquist plot

The Nyquist plot graphs the real versus the imaginary part of impedance as functions of frequency. Enable "Freq. Marker" to select and display the frequency at which a point was measured.
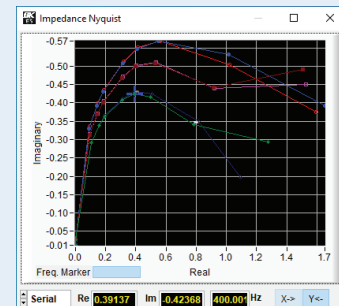
Performance verification

Knowing your instrument is working at its best is critical to battery testing. The BA8100 includes the TLC81 Self-Test Fixture that is used for verifying your instrument's performance and ensuring measurement accuracy. Consisting of a low inductive 5 mΩ precision resistor, the TLC81 and BA8100 require an external power supply during the verification and compensation process.

TLC81 plugged-in to the front panel

Connected to external DC source suppling 5 V and 3 A

Test lead compensation

The openings on each side of the TLC81 are designed to compensate for the resistance introduced by the test leads.

Test lead compensation

Simple 4-wire connection

Front panel

OLED display
OLED screen for easy viewing of
configuration and measurements

Rotary control knob
Precisely increment and
decrement input values

Input terminals
4-terminal Kelvin input terminals for higher accuracy
and quick connection to device under test

**Function
keys**

Numerical keypad
Input values directly

Rear panel

**LAN
interface**

**USB
interface**

**Universal
AC input**

**Chassis
ground**

**RS232
interface**

Specifications

Note: All specifications apply to the unit after a temperature stabilization time of 30 minutes over an ambient temperature range of 23 °C ± 5 °C.

BA8100		
Input		
Voltage		0.5 V to 80 V
Power		200 W maximum (dissipated by internal load)
Settings		
Current	DC	0.5 A to 3 A (dissipated by internal load)
	Modulating AC Current	50 mArms to 300 mArms (10% of DCA typical)
Modulating Frequency	Range	0.05 Hz to 10 kHz
	Resolution (Auto)	0.001 Hz to 0.1 Hz
	Accuracy	0.01% of setting
Displayed Parameters		
Primary		X, Z, V, I, Freq.
Secondary		Rs, Rp, Xs, Xp, Cs, Cp, Ls, Lp, Q, D, and θ
Measurements		
Voltage 4-wire	Range	0 V to 80 V
	Resolution	0.1 mV
	Accuracy (ACI = 0) [1]	0.05% of reading + 0.05% of full scale
DC Sink Current	Range	0 A to 3 A
	Resolution	0.1 mA
	Accuracy (ACI = 0) [1]	0.5% of reading + 0.1% of full scale
Resistance R Auto sampling interval (8 to 10 cycles) and auto range enabled	Displayed Digits	5 digits including sign
	Resolution	1 µΩ
	Accuracy (10 Hz to 10 kHz)	±(0.5% of reading + 5 µΩ)
Impedance Z Auto sampling interval (8 to 10 cycles) and auto range enabled	Displayed Digits	5 digits including sign
	Resolution	1 µΩ
	Accuracy (10 Hz to 10 kHz)	±(0.5% of reading + 5 µΩ)
Phase Angle θ	Range	-180° to 180°
	Resolution	0.01°
	Accuracy	±0.3°
General		
AC Input		100 VAC to 240 VAC, 50/60 Hz
UUT Connector		4-terminal banana jack
I/O Interfaces		LAN, USB (Virtual COM), RS232
Operating Temperature		32° F to 104° F (0° C to 40° C)
Storage Temperature		14° F to 122° F (-10° C to 50° C)
Dimension (W x H x D)		8.5 " x 3.5" x 14.6" (215 x 90 x 370 mm)
Weight		9.9 lbs (4.5 kg)
Software		Bundled software for fixed or frequency sweep, Nyquist and Bode plots
Warranty		3 Years
Standard Accessories		Power cord, kelvin clip test leads, calibration certificate, calibration test fixture (TLC81)

(1) The accuracy of DC voltage and current should be under no modulation condition (i.e. AC current = 0).

About B&K Precision

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Our headquarters in Yorba Linda, California houses our administrative and executive functions as well as sales and marketing, design, service, and repair. Our European customers are most familiar with B&K through our French subsidiary, Sefram. Engineers in Asia know us through our B+K Precision Taiwan operation. The independent service centers in Singapore and Brasil service customers in Singapore, Malaysia, Vietnam, Indonesia and South America, respectively.

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● B&K Precision group member   ● Independent service center   ● Service center location

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ISO9001:2015

Certification body NSF-ISR
Certificate number 6Z241-IS8

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