

### **BZA1000A** High Voltage Battery Impedance Analyzer



- Impedance measurement of battery, battery pack, & ESS (Energy Storage System)
- DC voltage measurement up to 1000V
- Quick diagnosis of batteries
- Battery lifetime estimation
- LAN interface with PC
- ZMAN impedance analysis software
- Cell temperature monitoring

Electrochemical impedance spectroscopy (EIS) is a widely used experimental technique to gain a deeper insight into the electrochemical processes of batteries. EIS cannot only provide detailed kinetic information, but can also be used to monitor changes in battery properties. EIS is a very sensitive technique, and offers a useful information about battery systems, such as :

- · Battery lifetime
- · Battery temperature
- · Internal defect

The BZA1000A Battery Impedance Analyzer, which covers a broad range of battery test functions ranging from DC voltage (up to 1000V) and impedance test ( $500u\Omega \sim 50\Omega$ ), is an ideal test tool for performance testing of individual stationary batteries, battery banks and ESS (Energy Storage Systems).

The BZA1000A was designed to measure battery impedance, DC voltage and battery temperature. There are several techniques available such as galvanostatic EIS, HFR, Rs-seudo Rp measurement, Voltage-Temperature monitor etc. This shows real time information including related plot formats. With galvanostatic EIS, Nyquist plot and Bode plot is provided in real time. And High Frequency Resistance (Cs-Cp vs time and Zre-Vdc vs. time plot) and Rs-pseudo Rp measurement (Cs-Cp vs time and Rs-pseudo Rp vs time plot) is provided. With these kind of information, it is easy to see changes in the Rs and R<sub>ct</sub> values that correlate to the battery's state of health(SoH) and state of charge (SOC), allowing user to evaluate battery performance.

EIS data from BZA1000A can be analyzed with ZMAN impedance analysis software by automatic model searching and automatic fitting. Proper model library for user's batteries can be grouped to minimize the analysis time.

The user-friendly interface, compact design and rugged construction ensure optimal performance, test results and reliability.

# BZA1000A High Voltage Battery Impedance Analyzer



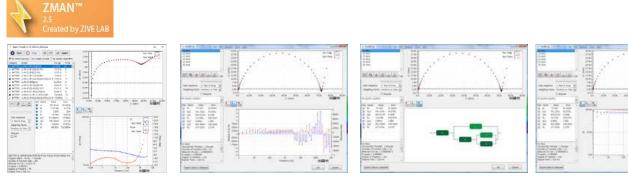


CATIII 1000Volt cell cable with standard 1000Volt alligator clip

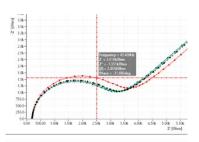
The BZA1000A Battery Impedance Analyzer consists of BZA1000A main body, a high voltage cell cable with 1000V alligator clip, power adapter and LAN cable. The following optional accessories are available.

- Low impedance cable
- Cell cable modification
- Large alligator clip ①
- Pt100 Temperature sensor wire type - ② tablet type - ③ sheet type - ④
- High current cylindrical battery holder (5)
- 1 cell universal Jig 6
- 1 cell pouch jig ⑦
- Kelvin type small alligator clip cable (1M) (8)
- Kelvin type large alligator clip cable (1M) (9)





Automatic model searching

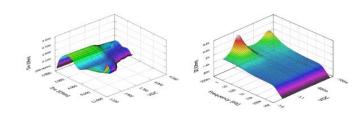


Cursor data display

Fitting display

Modelling





Model editor & model library

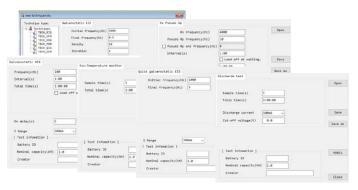
3D plot

### BZA1000A High Voltage Battery Impedance Analyzer

#### **Control Screen**

- Multichannel operation under mixing configuration with different model is available
- Real-time monitoring of current/voltage range, measured voltage value, and measured temperature value regardless of a test is started. (Data are not logged.)
- Displaying schedule file and data file name
- Schedule file selection/modification
- Start/Stop operation
- Channel nick name display

#### Technique selection & Parameter Input Box



Technique menu

#### Real time plot and data monitoring

- · Lissajous plot/ current and voltage vs. time for AC waveform
- Galvanostatic EIS (Quick galvanostatic EIS) - Nyquist plot / Bode plot
- Rs-psuedo Rp/ HFR both
- Cs, Cp vs. time graph
- Zre, Vdc vs. time graph (HFR)
- Rs-psuedo Rp vs. time graph (Rs-psuedo Rp measurement)
- Vdc, Temperature vs. time graph (Discharge test)
- Eoc, Temperature vs. time graph (Eoc\_temp monitor)

#### Graph function

- Short cut icon for Nyquist, Bode, Rs-Cs vs. frequency, Cs-Cp vs time, Zre-Vdc vs. time, Vdc-T vs. time
- Universal axis graphic (User selectable parameters for each axis)
- Excel, ascii format conversion on graph
- Max 20 plots overlay
- Zoom, Move, Cursor display

#### Report function

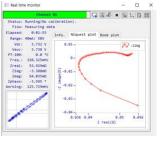
- Data editing
- File conversion to ASCII format or Excel format
- Data filtering

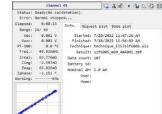
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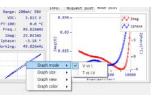
Note: For lower than 500V battery, Select economic 500V model (BZA500). For lower than 60V battery, Select economic 60V model (BZA60).

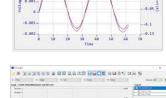
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- Galvanostatic Electrochemical Impedance Spectroscopy
  - Bias & amplitude value are determined by current range setting
    Parameters: Frequency range, data density, iteration
- Rs-pseudo Rp measurement
  Rs frequency, psuedo Rp frequency setting
- Interval & Total time settingHigh frequency resistance measurement(HFR)
- High frequency resistance measurement(HFR
  HFR frequency setting
- Interval & Total time setting
- Eoc Temperature monitor
- Quick galvanostatic EIS for screening
- Constant current Discharge test

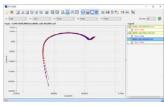








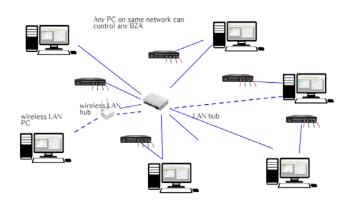
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Nyquist plot

Zre, Vdc vs time graph



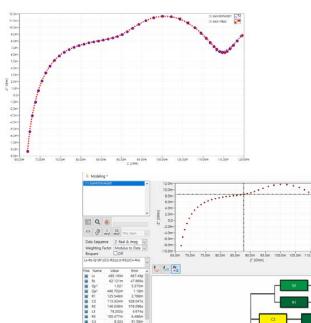
## BZA1000A High Voltage Battery Impedance Analyzer

### • Specifications

Impedance Measurement	
Measurement range	500uΩ ~ 50Ω
Accuracy	±1% magnitude (1mΩ - 50Ω) ±1° phase
Frequency range	0.05Hz ~ 10kHz
Current amplitude (p-p)	400uA ~ 2A
DC Voltage Measurement	
ADC resolution	24 bit
Input range	1000V/100V (dual range)
AC Voltage Measurement	
ADC resolution	24 bit
Input range	±250mV
AC Current Measurement	
ADC resolution	24 bit
Current sensing resistors	4ea (2A, 200mA, 20mA, 2mA)
Sinewave Generator	
Frequency range	0.05Hz ~ 10KHz
Frequency accuracy	< 0.1%
Frequency resolution	65535/decade min 465uHz
DAC resolution	10 bit
Output gain	2ea(X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA)
Temperature Measurement	
Input	RTD probe (PT100)
Accuracy	Max 1°C
Communication	
Interface	LAN communication
General	
Size	220mm x 68mm x 250mm (WxHxD)







Designed by





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