

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 ($500\mu\Omega \sim 50\Omega$), 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, R_s -pseudo R_p 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 (C_s - C_p vs time and Z_{re} - V_{dc} vs. time plot) and R_s -pseudo R_p measurement (C_s - C_p vs time and R_s -pseudo R_p vs time plot) is provided. With these kind of information, it is easy to see changes in the R_s and R_{ct} 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

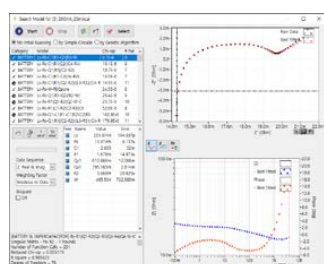


CATIII 1000Volt cell cable with standard 1000Volt alligator clip

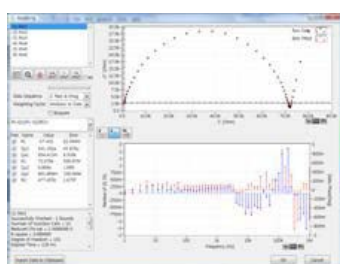
The **BZA1000A** Battery Impedance Analyzer consists of **BZA1000A** main body, a high voltage cell cable with 1000V alligator clip, power adapter and LAN cable.

The following optional accessories are available.

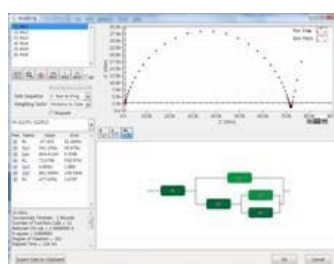
- Low impedance cable
- Cell cable modification
- Large alligator clip - ①
- Pt100 Temperature sensor wire type - ②
- Pt100 Temperature sensor tablet type - ③
- Pt100 Temperature sensor sheet type - ④
- High current cylindrical battery holder - ⑤
- 1 cell universal jig - ⑥
- 1 cell pouch jig - ⑦
- Kelvin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



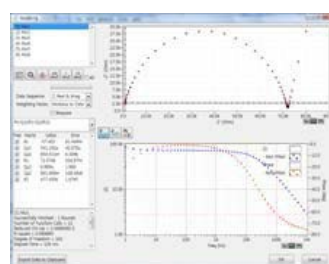
Automatic model searching



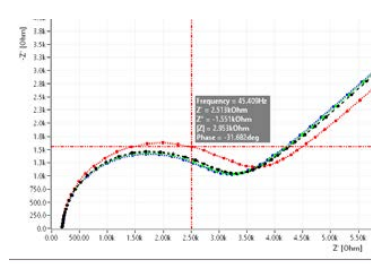
Fitting display



Modelling



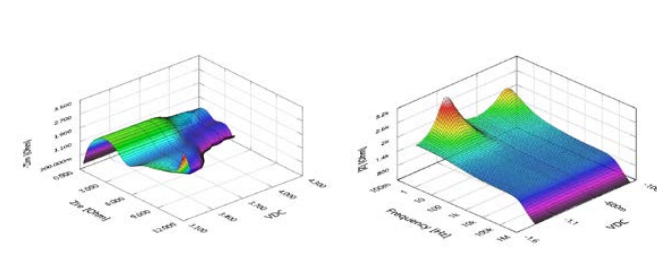
LEVM fitting



Cursor data display



Model editor & model library

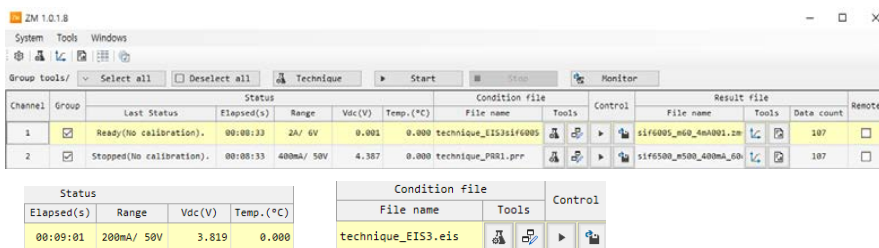


3D plot

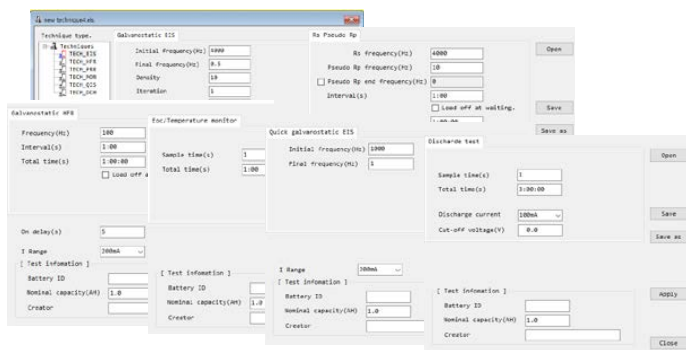
BZA1000A High Voltage Battery Impedance Analyzer

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

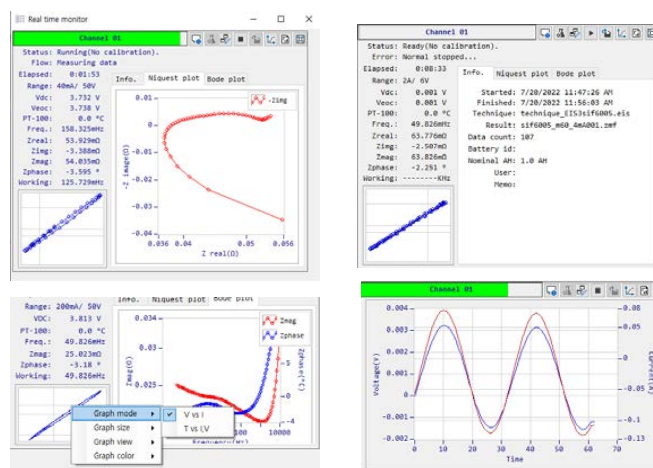


Technique menu

- 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, pseudo Rp frequency setting
 - Interval & Total time setting
- High frequency resistance measurement(HFR)
 - HFR frequency setting
 - Interval & Total time setting
- Eoc - Temperature monitor
- Quick galvanostatic EIS for screening
- Constant current Discharge test

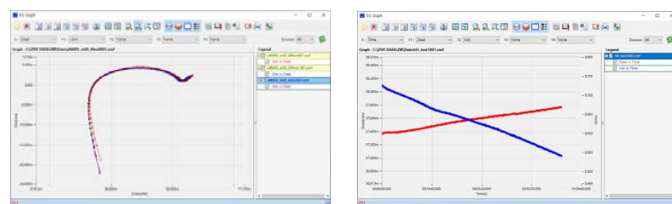
Real time plot and data monitoring

- 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

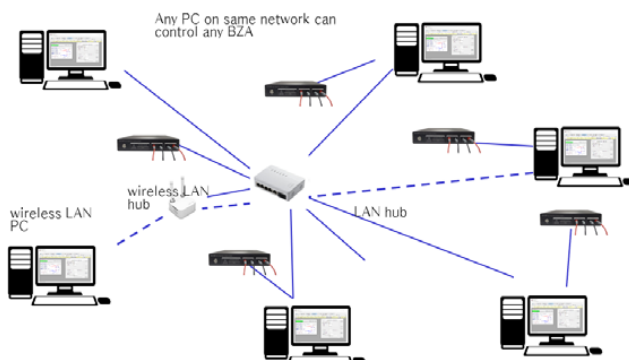
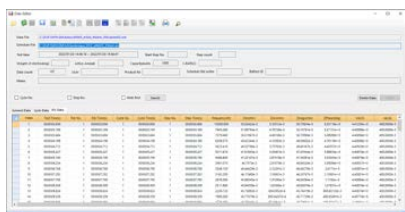


Nyquist plot

Zre, Vdc vs time graph

Report function

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



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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● 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

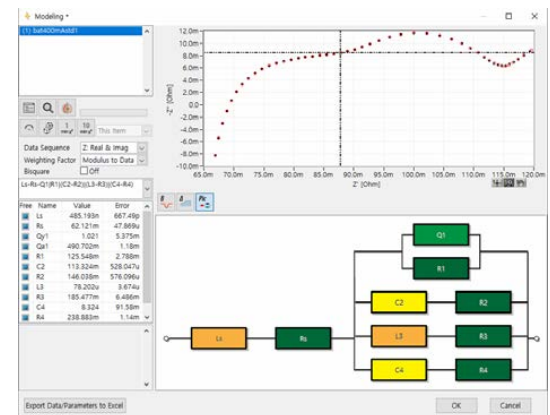
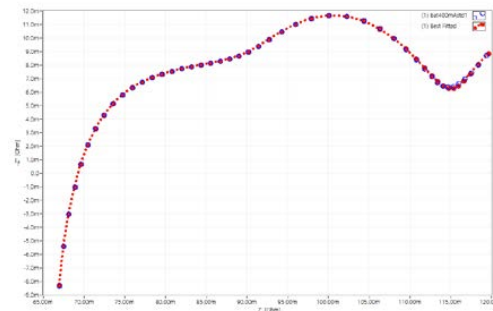
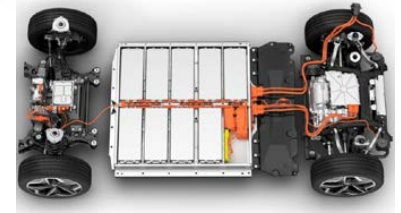
Communication

Interface	LAN communication
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General

Size	220mm x 68mm x 250mm (WxHxD)
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All specifications are subject to change without notice.



Designed by

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