

BZA 60

Battery Impedance Analyzer



- Impedance measurement of energy device ; battery , fuel cell or supercapacitors
- DC voltage measurement up to 60V
- Quick diagnosis of test cells
- Battery lifetime estimation
- LAN interface with PC
- ZMAN impedance analysis software
- Cell temperature monitoring
- No requirement of additional electronic load or power source

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 **BZA60** Battery Impedance Analyzer, which covers a broad range of battery test functions ranging from DC voltage (up to 60V) 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 **BZA60** is designed to measure battery impedance, dc voltage and battery temperature. There are several technique available such as galvanostatic EIS, HFR, R_s -psuedo 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 HighFrequencyResistance (C_s - C_p vs time and Z_{re} -Vdc vs. time plot) and R_s -psuedo R_p measurement (C_s - C_p vs time and R_s -psuedo R_p vs time pot) is provided. With these kind of informations, 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 **BZA60** 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.

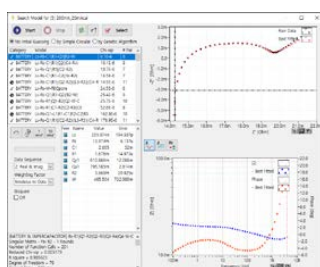
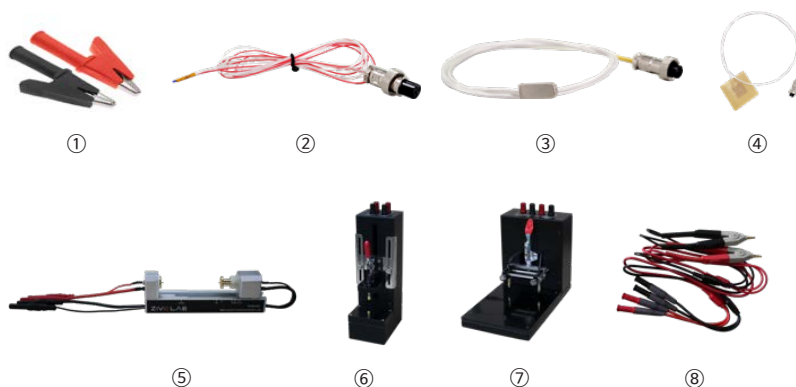
BZA 60 Battery Impedance Analyzer



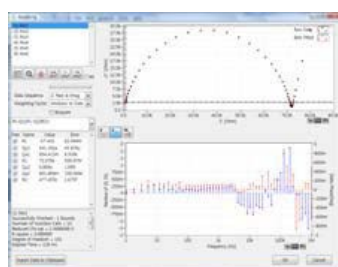
The **BZA60** Battery Impedance Analyzer consists of **BZA60** main body, 4mm banana cell cable with alligator clip, power adapter and LAN cable.

The following optional accessories are available.

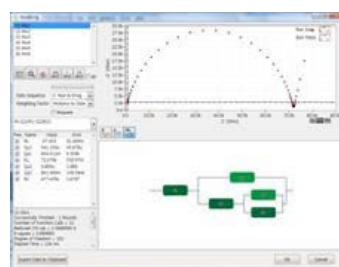
- Low impedance cable
- Cell cable modification
- Small alligator clip - ①
- Pt100 Temperature sensor wire type - ②
- tablet type - ③
- sheet type - ④
- High current cylindrical battery holder - ⑤
- 1 cell universal Jig - ⑥
- 1 cell pouch jig - ⑦
- Kelvin type small alligator clip cable (1M) - ⑧



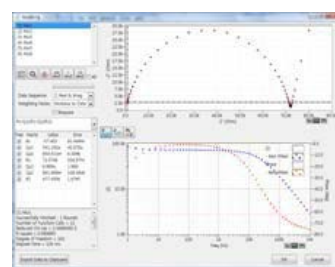
Automatic Model Searching



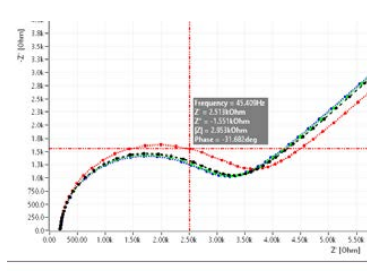
Fitting display



Modelling



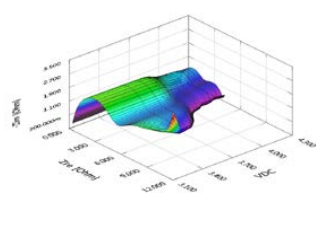
LEVM fitting



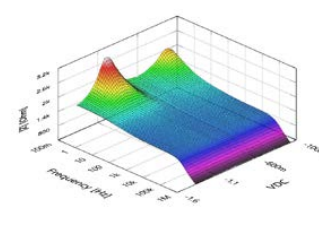
Cursor data display



Model editor & model library



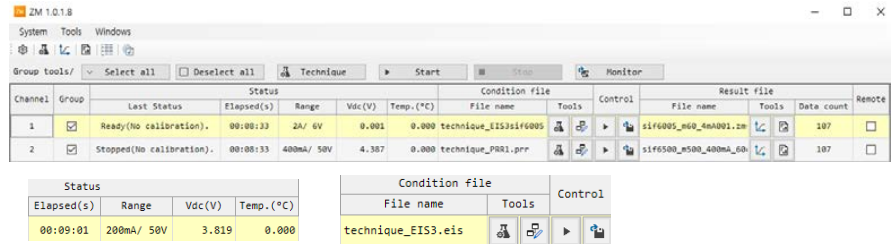
3D plot



BZA 60 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

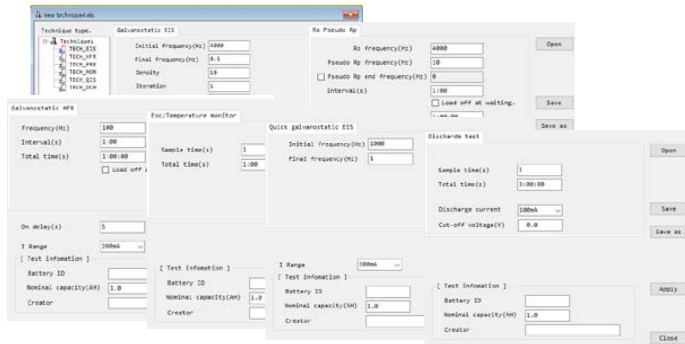


Channel	Group	Status	Elapsed(s)	Range	Vdc(V)	Temp.(°C)	Condition file	Tools	Control	Result file	Tools	Date count	Remote
1		Ready(No calibration).	00:00:33	2A/ 6V	0.001	0.000	technique_EIS316005			sif6005_m00_4m001.zm		107	
2		Stopped(No calibration).	00:00:33	400mA/ 50V	4.387	0.000	technique_PRR1.prr			sif6500_m500_400mA_60		107	

Status	Range	Vdc(V)	Temp.(°C)
00:09:01	200mA/ 50V	3.819	0.000

Condition file	Tools	Control
File name		
technique_EIS3.eis		

Technique selection & Parameter Input Box



Technique selection & Parameter Input Box

Technique type: Galvanostatic EIS

Initial frequency(Hz): 1000

Final frequency(Hz): 0.1

Range: 2A/ 6V

Rs frequency(Hz): 4000

Pseudo Rp frequency(Hz): 10

Pseudo Rp end frequency(Hz): 0

Interval(s): 1.00

Load off at waiting: Load off

Save as: Save

Quick galvanostatic EIS

Initial frequency(Hz): 1000

Final frequency(Hz): 1

Interval(s): 1.00

Discharge test

Sample time(s): 1

Total time(s): 1:00:00

Discharge current: 100mA

Cut-off voltage(V): 0.0

Save as: Save

On delay(s): 5

I Range: 100mA

Test Information:

Battery ID: 1.0

Nominal capacity(Ah): 1.0

Creator: 1.0

Battery ID: 1.0

Nominal capacity(Ah): 1.0

Creator: 1.0

Battery ID: 1.0

Nominal capacity(Ah): 1.0

Creator: 1.0

Battery ID: 1.0

Nominal capacity(Ah): 1.0

Creator: 1.0

Close

Technique menu

Real time plot and data monitoring

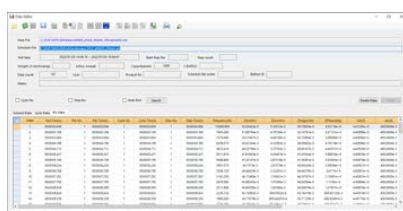
- Lissajous plot/ current, voltage vs. time for AC waveform
- Galvanostatic EIS (Quick galvanostatic EIS)
 - Nyquist plot / Bode Plot
- Rs-pseudo Rp/ HFR both
 - Cs, Cp vs time graph
- Zr, Vdc vs time graph (HFR)
- Rs-pseudo Rp vs time graph (Rs-pseudo Rp measurement)
- Vdc, Temperature vs time graph (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

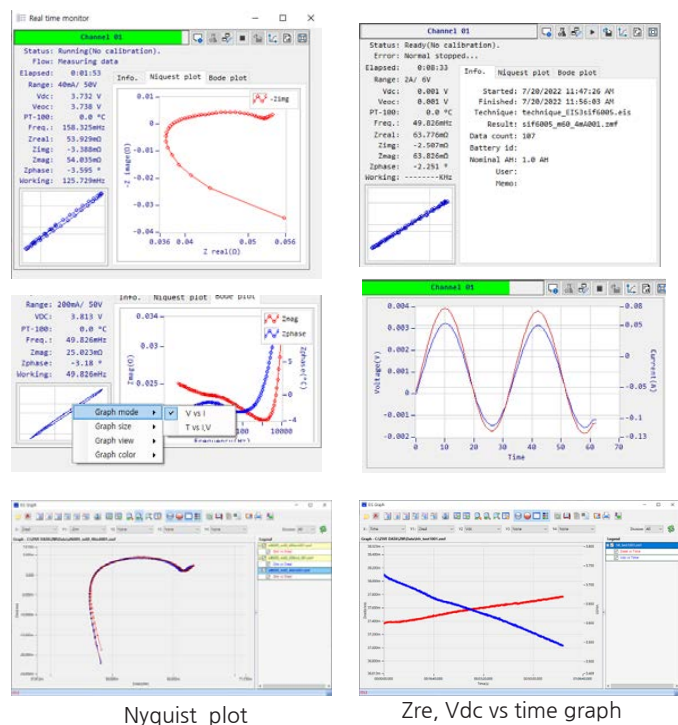
- Data editing
- File conversion to ascii format or Excel format
- Data filtering



Channel	Group	Status	Elapsed(s)	Range	Vdc(V)	Temp.(°C)	Condition file	Tools	Control	Result file	Tools	Date count	Remote
1		Ready(No calibration).	00:00:33	2A/ 6V	0.001	0.000	technique_EIS316005			sif6005_m00_4m001.zm		107	
2		Stopped(No calibration).	00:00:33	400mA/ 50V	4.387	0.000	technique_PRR1.prr			sif6500_m500_400mA_60		107	

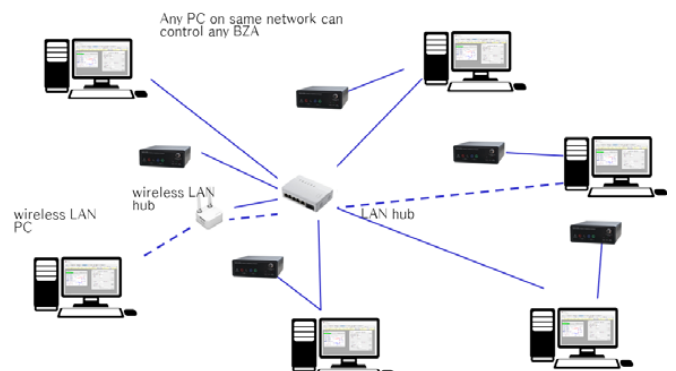
Note: For higher than 60V battery, Select 500V model(BZA500).

- Galvanostatic Electrochemical Impedance Spectroscopy
 - Bias & amplitude value is 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



Nyquist plot

Zre, Vdc vs time graph



BZA 60 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	60V/6V (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	160mm x 68mm x 180mm (WxHxD)
------	------------------------------

All specifications are subject to change without notice.



Designed by

ZIVELAB
www.zivelab.com

WonATech

WonATech Co., Ltd.
7 Neunganmal 1-gil, Seocho-gu,
Seoul, 06801, Korea
Tel: +82-2-578-6516 Fax: +82-2-576-2635
e-mail: sales@wonatech.com
website: www.wonatech.com

Local Distributor