Designed by ZIVE LAB

Multichannel Impedance Monitor

ZIVE Z#

Designed to interface to an electronic load
or external potentiostat/galvanostat

For
Fuel Cell Stack
Battery pack
Supercapacitor
Solar Cell

WonATech

Feature

- For versatile AC impedance experiment of serial connected multi cells such as Fuel cell stack/ Battery pack etc.
- 6 signal input channel/1 signal output channel per set
- 5 series cells EIS measurement or 4 cells EIS with stack voltage EIS measurement
- Expandability of channels
- A flexible frequency generator/analyzer
- Generate various waveforms (eg. Sinusoidal etc)
- Designed for spectrum analysis in the electrochemical field
- Simulation and fitting with ZMAN™
- High current application with external load and/or potentiostat/galvanostat
- Software controlled function
- Graphic-based user-interface
- Dual real time graph (Bode, Nyquist, etc) during measurement

Description

For the past two decades, Electrochemical Impedance Spectroscopy (EIS) has emerged as the most powerful of electrochemical techniques for defining reaction mechanisms for investigating corrosion processes, and for the characterization of batteries and fuel cells.

Z# multichannel impedance monitor has independent 6 channels AI (analog input) board. So it provides real multichannel EIS monitor function synchronized.

Some other commercial multichannel impedance monitors use multiplexer to measure EIS sequentially. This kind of instruments takes a long time to measure EIS. EIS measurement is time domain, therefore synchronized measurement is essential.

Z# series provides all tools for the application of fuel cell stack, battery pack, multi cells and general electrochemical that requires study of multichannel EIS for serial connected cells.

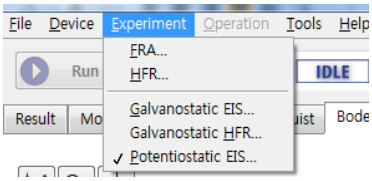
By employing electronic load, **Z#** can be used to determine the efficiency of fuel cell and anodic/cathodic process mechanisms by calculating impedance with the measurements of I and E at given frequency.
The complete system is software-controlled and all functions such as ranging, calibration, and measurements can be automated.

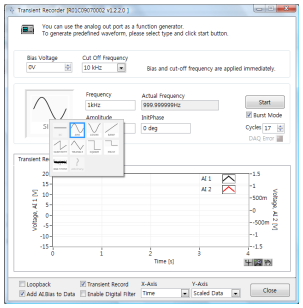
Software (Z100 Navigator)

Z100 navigator is **Z#** control software. This can be used with external potentiostat/galvanostat or electronic load by setting for impedance measurement or waveform generator.

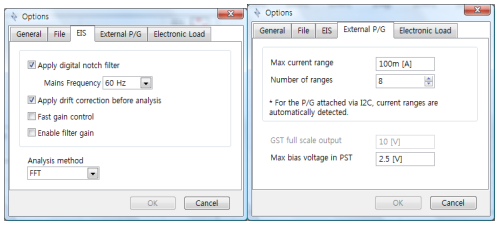
List of Impedance Techniques with Zcon

- Frequency response analyzer (FRA)
- High frequency resistometry (HFR)
- Galvanostatic electrochemical impedance spectroscopy (GEIS)
- Galvanostatic HFR (GHFR)
- Potentiostatic EIS (PEIS)

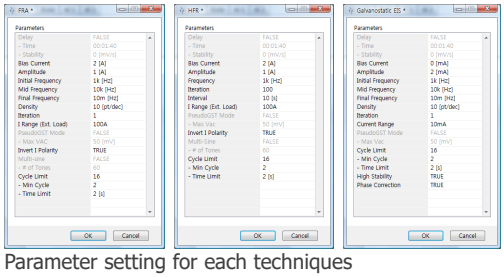




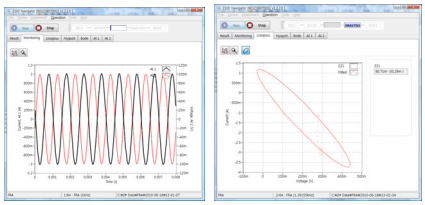
Transient recorder (waveform generator)
DC/Sine/Cosine/Ramp/Sawtooth/Square/Triangular/Pulse/ Multi-tone/ Arbitrary



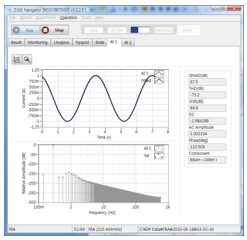
Environment setting menu



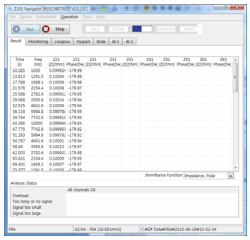
Parameter setting for each techniques



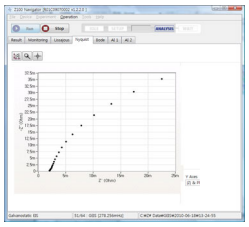
Monitoring Lassajous plot



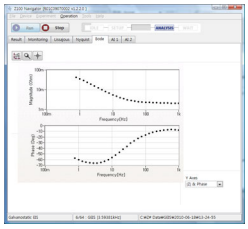
AC Signal Input (power spectrum)



Result



Real time Nyquist plot



Real time Bode Plot

- **ZMAN™ will be supplied for analysis of Z# data free of charge. Please refer to ZMAN introduction.**

System Configuration

Hardware (controller), software, USB cable, Power adapter
Electronic Load (option)

EIS Data Analysis by ZMAN Software

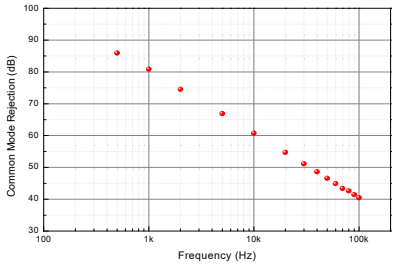
Single PC Auth copy is supplied at free of charge for Z#.
(Please refer to the separate ZMAN catalogue.)

Specification

Analog Out	**as Signal Generator**	
# of Channels	1	
configuration	Single-ended	
Maximum Output	-11.0 to +11.0 V (DC + AC)	
Voltage Offset	< 0.5 mV, software corrected zero	
DC Bias	Range	Resolution
	0.0 to 5.0 V	0.076 mV
	0.0 to +10.0 V	0.153 mV
	-5.0 to +5.0 V	0.153 mV
	-10 to +10.0 V	0.305 mV
	-2.5 to +2.5 V	0.076 mV
	-2.5 to +7.5 V	0.153 mV
AC Waveform		
Predefined Type	DC, Sine, Cosine, Ramp, Sawtooth, Triangle, Square, Pulse, Multi-tone	
Frequency Range	1 uHz to 100kHz Resolution: 5000 steps/decade	
Frequency Accuracy	Typ. 75 ppm, Max ±200 ppm	
Frequency Stability	< 2 ppm @ 1 kHz	
	< 20 ppm @ 10 kHz	
	< 200 ppm @ 100 kHz	
	< 2000 ppm(0.2%) @ 1 MHz	
Amplitude	1 mVpp to 5 Vpp	
Post-Gain/Attenuation	-44 dB to +40 dB with 6 dB step,	

Gain/Attenuation	automatic gain selection
Reconstruction Filter	10 to 150 kHz 8th order low pass filter with 10kHz step or By-Pass
Gain Error	< 0.5 %

Analog In	**as Frequency Analyzer**
# of Channels	Total 6, usually 1 for current input and 5 for voltage input Maximum 60Ch in daisy chain configuration
Configuration	Differential
Maximum Input	±100 V
Voltage Offset	< 0.5 mV, software corrected zero
Bandwidth	550 kHz
Input Impedance	110 kOhm
Pre-Attenuation	-20dB (×0.1)
Post-Gain/Attenuation	-44 dB to +40 dB (×100) with 6 dB step or ×200, ×400, ×800, ×1600
Anti-aliasing Filter	10 to 150 kHz 8th order low pass filter with 10 kHz step or By-Pass
CMRR	> 80 dB @ 1 kHz, > 60 dB @ 10 kHz, > 40 dB @ 100 kHz (refer to the below graph)



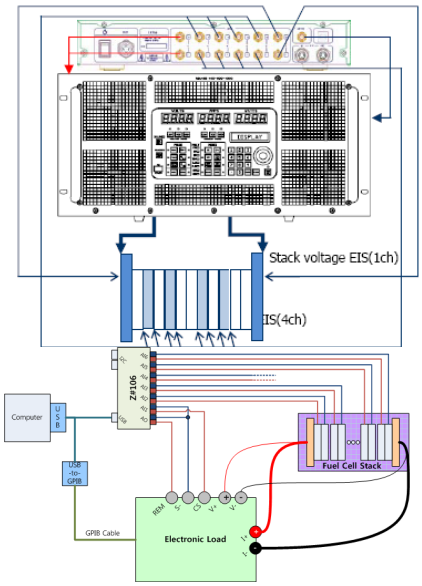
Expansion Ports

I2C In & Out	Reserved for future

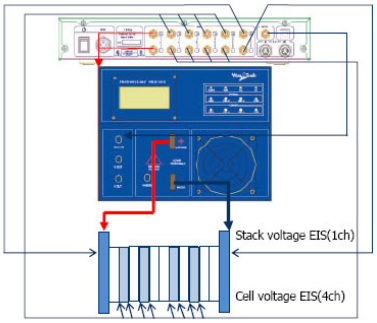
General

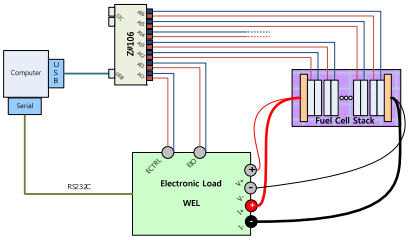
Interface	USB 2.0 high speed
Power	External 50W AC-DC Adapters, +5/+15/-15VDC with AC Input of 100 to 240V, 2A, 50/60 Hz
Operation Condition	0 to 50 °C, 0 to 90% humidity (non-condensing)
Warranty	1 year parts and labor on defects in materials and workmanship

Front Panel & Rear Panel

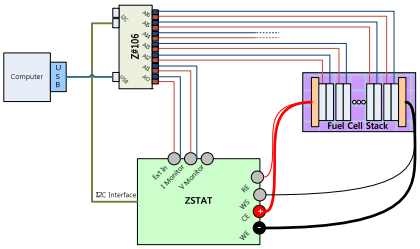


Z#106 with Dynaload RBL488 series load





Z#106 with WonATech WEL series load



Z#106 with WonATech ED2 potentiostat/galvanostat

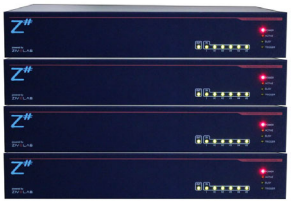
Supporting External Load/Potentiostat

- TDI dynaload RBL488/XBL series
- WonATech WEL Load
- ED2 potentiostat/galvanostat
- 3rd parties potentiostat/galvanostat

Above models are fully PC controlled with Z#.

Other model might need to set some of the parameters by manually.
Please contact with your regional distributor about other 3rd party products' availability with Z#.

20 cell EIS measurement configuration (example)



For 20 cells EIS measurement, 4 set of Z#106 is needed. Then you can measure EIS of 20 cells or 19 cells with one total fuel cell stack (or battery pack).
One Z#106 will work as master and other 3 set of Z#106 works as slaves.

Designing the Solution for Electrochemistry

Designed by

ZIVE LAB

www.zivelab.com

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

Local Distributor

ISO 9000 & ISO 14000 Qualified