Multichannel Impedance Monitor





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

For Fuel Cell Stack Battery pack Supercapacitor Solar Cell



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 ZMANTM
- 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 stacks 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 anod ic/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.



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

Multichannel Impedance Monitor Z#

O Step







AC Signal Input (power spectrum) Re





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

Post-

Analog Out	as Signal Generator		Gain/Attenuation
# of Channels	1		Reconstruction Filter
configuration	Single-ended		
Maximum Output	-11.0 to +11.0 V (DC + AC)		Gain Error
Voltage Offset	< 0.5 mV, software corrected zero		
DC Bias	Range	Resolution	Analog In
	0.0 to 5.0 V	0.076 mV	# of Channels
	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	Configuration
	-2.5 to +2.5 V	0.076 mV	Maximum Input
	-2.5 to +7.5 V	0.153 mV	Voltago Offect
AC Waveform			Pandwidth
Predefined Type	be DC, Sine, Cosine, Ramp,		
	Sawtooth, Triangle, Sq	uare, Pulse, Multi-tone	
Frequency Range	1 uHz to 100kHz Resolution:		Pre-Allenuation
5000 steps/decade		decade	Post-Gain/Attenuation
Frequency Accuracy	Typ. 75 ppm, Max ±200 ppm		Anti-aliasing Filter
Frequency Stability	<pre>< 2 ppm @ 1 kHz < 20 ppm @ 10 kHz < 200 ppm @ 100 kHz < 200 ppm @ 100 kHz</pre>		Anti-aliasing ritter
			CMDD
	< 2000 ppm(0.2%) @ 1 MHz		CHIKK
Amplitude	1 mVpp to	5 Vpp	

-44 dB to +40 dB with 6 dB step,

automatic gain selection 10 to 150 kHz 8th order low pass filter with 10kHz step or By-Pass < 0.5 %

as Frequency Analyzer

voltage input aximum 60Ch in daisy chain confi uration Differential ±100 V < 0.5 mV, software corrected zero 550 kHz 110 kOhm -20dB (×0.1) -44 dB to +40 dB (×100) with 6 dB step or x200, x400, x800, x1600 10 to 150 kHz 8th order low pass filter with 10 kHz step or By-Pass > 80 dB @ 1 kHz, > 60 dB @ 10 kHz, > 40 dB @ 100 kHz (refer to the below graph)

Multichannel Impedance Monitor Z#



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 0 to 50 C, 0 to 90% humidity Condition (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
- **3**rd 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)

80-s	Sterre -
	-
	101111

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.

Designed by ZIVE LAB www.zivelab.com



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