

Electrochemical Instruments/Accessories

A collection of ZIVE electronic equipment, including a ZIVE SP2 power supply, a ZIVE SP1 power supply, a ZIVE SP3 power supply, a ZIVE SP4 power supply, a ZIVE SP5 power supply, and a ZIVE SP6 power supply. The equipment is shown against a blue background. The ZIVE SP2 is a small, black, rectangular unit with a digital display and two output terminals. The ZIVE SP1 is a larger, black, rectangular unit with a digital display and two output terminals. The ZIVE SP3 is a black, rectangular unit with a digital display and two output terminals. The ZIVE SP4 is a black, rectangular unit with a digital display and two output terminals. The ZIVE SP5 is a black, rectangular unit with a digital display and two output terminals. The ZIVE SP6 is a tall, black, rectangular unit with a digital display and two output terminals.

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- WopA Tech

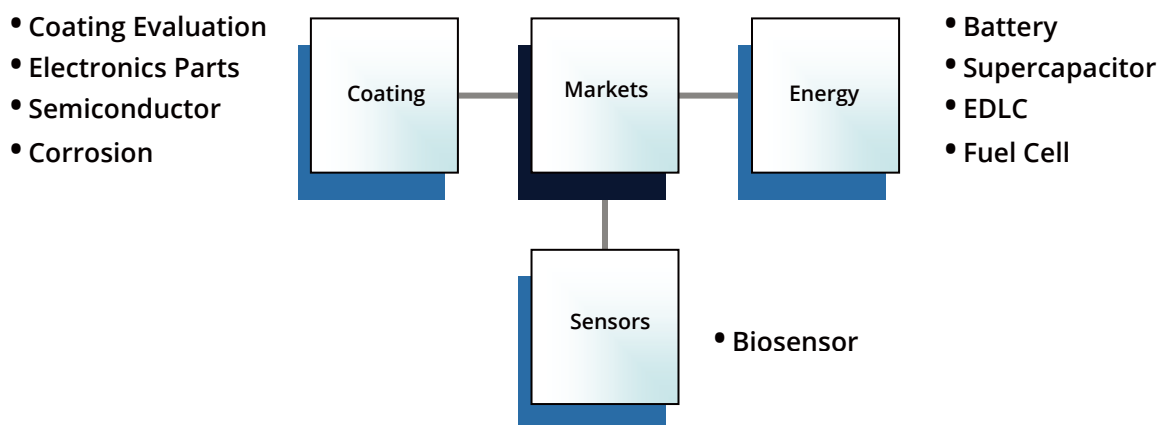
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■ Who We Are

Since we were established in 1991, we have concentrated our efforts in the development of products related to electrochemical application. With our sales and marketing know-how, we have been providing flexible solution to our customers but also playing a leading role in this field of business.

■ Applications



■ Product Line

With the constant effort to achieve excellent quality and competitive edge of our products, we have been designing high value added products listed below.

Potentiostat/Galvanostat/(EIS)

- Single & Multichannel Potentiostat/Galvanostat
- Dual-/Bi-Potentiostat
- Single & Multichannel Electrochemical Workstation
- Portable Potentiostat/Galvanostat

Battery Cycler System

- Standard Type / Low Current Type / Mid Power Type / High Power Type

Impedance Monitoring System

- Multichannel Impedance Monitor(Z#) / Single channel Impedance Monitor(Zcon)

Battery Impedance Analyzer

- High Voltage Battery Impedance Analyzer(BZA1000/BZA500M) / General Battery Impedance Analyzer(BZA60/BZA60M)

Fuel cell test system

- Single Cell PEMFC Test System / Single Cell DMFC Test System / Single Cell PEMFC,DMFC Hybrid Test System

Cell Voltage/Temperature monitor

- Cell voltage/Temperature Combi Monitor

Accessories

- For Battery Application : Battery Jig, Pouch Cell Jig, Coin Cell Holder etc.
- For Corrosion Application : Corrosion Cell Kit, Flat Cell Kit, Plate Test Cell Kit, etc.
- For Other Applications : Faraday Cage, Electrodes, Electrode Holder, Photoelectrochemical Cell Kit, Software, etc.
- Options for WonaTech Instruments : Cables, Temperature Sensor, Thermocouple, etc.

WPG100 Series

The WPG series is an economical potentiostat/galvanostat and it can be used for standard techniques such as cyclic voltammetry, controlled potential electrolysis, constant potential amperometry and potentiometry, square wave voltammetry, battery cycling test etc.

Features

- Economical type
- 16 bit ADC, DAC
- For long term experiment
- Accurate control & measurement
- Importing/exporting data file
- SI software : user friendly software and free upgrade
- Temperature & auxiliary voltage measurement
- LAN communication

*Standard Type
WPG100ex*



*Mid power type
WPG100S*



*Mid power type
WPG100H8*



*Mid power type
WPG100H12*



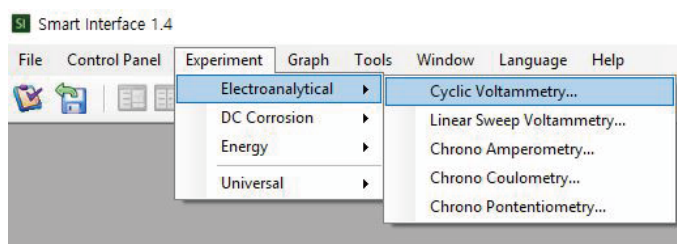
*High Power Type
WPG100HP*



Specifications	WPG100ex	WPG100S	WPG100H8
• Control voltage range	±10V(standard) or customer specified range	customer specified range (<±45V)	customer specified range (<±45V)
• Voltage accuracy	±0.02% f.s.	±0.05% f.s. (<10V)	±0.05% f.s. (<10V)
• Current range	8 ranges or customer specified range	6 ranges	6 ranges
• Current accuracy	±0.02% f.s.	±0.05% f.s.	±0.1% f.s.
• Compliance voltage	±12V(standard)	customer specified range (<±45V)	customer specified range (<±45V)
• Sampling time	1msec	1msec	1msec
	WPG100H12	WPG100HP	
• Control voltage range	customer specified range (<±45V)	customer specified range (<±45V)	
• Voltage accuracy	±0.05% f.s. (<10V)	±0.1% f.s.	
• Current range	4 ranges	1 or 3 ranges depending on power	
• Current accuracy	±0.1% f.s.	±0.1% f.s.	
• Compliance voltage	customer specified range (<±45V)	customer specified range (<±45V)	
• Sampling time	1msec	1msec	

SI(Smart Interface) Software

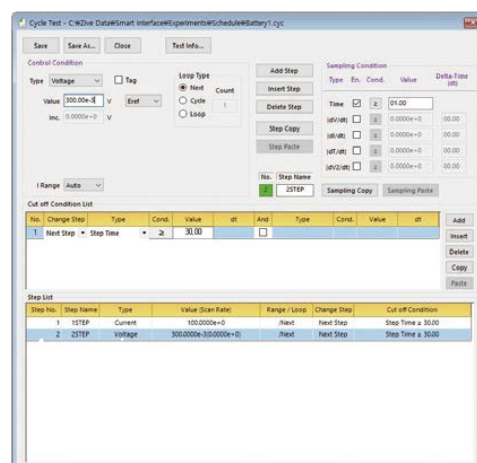
- 32bit/64bit OS environment
- TCP/IP communication
- Max. 200 steps
- Max. 10 cutoff(vertex) condition
- Max. 300,000 data point memory on control board
- Virtual control panel
- Various real time plots & universal axis graphs
- Data backup function
- WYSIWYG graphics
- User friendly software



Single Channel Potentiostat/Galvanostat

Instruments

- For Electroanalytical Measurement
 - Cyclic voltammetry
 - Linear sweep voltammetry
 - Chrono-amperometry
 - Chrono-coulometry
 - Chrono-potentiometry
- Corrosion Measurement
 - Tafel plot
 - Potentiodynamic
 - Potentiostatic
 - Galvanostatic
 - Cyclic polarization
 - Ecorr vs. time
 - Linear polarization resistance
- For Energy Test
 - Charge/Discharge(CC/CV) Test
 - Constant Current Charge/Discharge(CC/CC) Test
 - Steady state CV
 - Pstat IV curve
 - Gstat IV curve
 - Electrochemical Voltage Spectroscopy(EVS) Test
 - Galvanostatic Intermittent Titration Technique(GITT) Test
 - Potentiostatic Intermittent Titration Technique(PITT) Test



Universal Test Mode

ZIVE SP Series

The outstanding potentiostat/galvanostat/FRA, ZIVE SP series, are the best choice for the complete DC and impedance characterization of various electrochemical applications. The ZIVE SP series is equipped with a frequency response analyzer(FRA) for system as standard and it provides high performance impedance measurements over the frequency range up to 1MHz(2MHz).

Features

- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Compact size with full functions
- Front panel LCD display
- Wide current ranges for various applications
- Optional power booster for high current application is available upon request
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling time
 - 2usec or 3usec depending on data point number
- Voltage pulse or current pulse charge/discharge test(GSM,CDMA etc.)
- Sine wave function for ripple simulation in battery test package
- Internal 542,000 data point storage and continuing experiment regardless of PC failure
- Full software package supplied as standard for EIS, Energy Test, Electrochemical Analysis and Corrosion application



ZIVE SP1e



ZIVE SP2



ZIVE SP3



ZIVE SP5



ZIVE SP10

Specifications

	ZIVE SP1e	ZIVE SP2	ZIVE SP3
• Control voltage range	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV
• Voltage accuracy	±0.02% f.s(gain x1)	±0.02% fs (gain x1)	±0.02% fs (gain x1)
• Current range (with gain)	100nA to 1A, 9 ranges (10nA)	2nA to 2A, 11 ranges (200pA)	20nA to 2A, 10 ranges (2nA)
• Current accuracy	±0.05% f.s.(gain x1) >100nA f.s.	±0.02% f.s.(gain x1) >200nA f.s.	±0.02% fs (gain x1)
• Compliance voltage	±12V	±12V	±20V
• Slew rate	10V/μsec	15V/μsec	8V/μsec
• Input impedance	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF
• Frequency range	10μHz ~ 1MHz	10μHz ~ 2MHz	10μHz ~ 1MHz
• Aux port	1 analog input: ±10V	digital: 3 output/2 input analog: 1 output/3 input	digital: 3 output/1 input analog: 1 output/3 input
• Size(WxDxH)	160x330x81mm	93x305.7x158mm	195x313x105mm
• Weight	2.05kg	2.95kg	3.7kg

Specifications	ZIVE ^{SP5}	ZIVE ^{SP5H}	ZIVE ^{SP5HC}	ZIVE ^{SP10}
• Control voltage range	±10V, ±1V, ±100mV	±40V, ±4V, ±400mV	±10V, ±1V, ±100mV	±5V, ±500mV, ±50mV
• Voltage accuracy	±0.02% fs(gain x1)	±4mV ±0.1% of setting	±1mV ±0.05% of setting	±0.02% fs(gain x1)
• Current range (with gain)	5nA to 5A, 11 ranges (500pA)	1nA to 1A, 11 ranges (100pA)	1nA to 1A, 11 ranges (100pA)	10nA to 10A, 11 ranges (1nA)
• Current accuracy	±0.02% f.s.(gain x1)	±0.1% f.s.(gain x1) >100nA	±0.05% f.s.(gain x1) >100nA	±0.03% f.s.(gain x1) >1uA
• Compliance voltage	>500nA	±40V	±40V	±6V
• Slew rate	±10V	7V/μsec	10V/μsec	10V/μsec
• Input impedance	10V/μsec	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF	>2x10 ¹³ Ω 4.5pF
• Frequency range	2x10 ¹³ Ω 4.5pF	10μHz ~ 600kHz	10μHz ~ 1MHz	10μHz ~ 1MHz
• Aux port	10μHz ~ 1MHz	digital: 3 output/2 input, analog: 1 output/3 input	digital: 3 output/2 input, analog: 1 output/3 input	digital: 3 output/2 input, analog: 1 output/3 input
• Size(WxDxH)	179x378.4x270mm	179x378.4x270mm	179x378.4x270mm	240x372x241mm
• Weight	7.65Kg	7.65Kg	7.65Kg	

SM(Smart Manager) Software

- User defined test sequence using sequence file, technique menu and batch file
- Batch file : multiple combination of technique files and/or sequence files
- Easy to use and supports various electrochemical experiments including functions of system control, schedule file editor, real time graph, analysis graph, user calibration, and data file treatment etc.

Basic Techniques

- Potentiostatic
- Galvanostatic
- Double step potentiostatic
- Double step galvanostatic
- OCP measurement
- Potential sweep
- Current sweep
- Cyclic voltammetry
- Fast potential sweep
- Potentiostatic Ru measurement
- Galvanostatic Ru measurement
- Pulse mode for GSM & CDMA profile

EIS Software Package

- Potentiostatic EIS
- Galvanostatic EIS
- Pseudo galvanostatic EIS
- OCP* EIS
- Potentiodynamic PEIS
- Galvanodynamic GEIS
- Potentiodynamic HFR
- Galvanodynamic HFR
- Potentiostatic HFR
- Galvanostatic HFR
- Multisine potentiostatic EIS
- Multisine galvanostatic EIS
- Intermittent potentiostatic EIS
- Intermittent galvanostatic EIS
- RTI potentiostatic EIS
- RTI galvanostatic EIS

(*) The system measures open circuit potential before each frequency change and applies AC sine wave on this potential.

Electrochemical Analysis Software Package

- Chronoamperometry
- Chronocoulometry
- Chronopotentiometry
- Linear sweep voltammetry
- Sampled DC voltammetry
- Fast CV
- Fast LSV
- Differential pulse voltammetry
- Square wave voltammetry
- Differential pulse amperometry
- Normal pulsed voltammetry
- Reverse normal pulse voltammetry
- Differential normal pulse voltammetry
- AC voltammetry

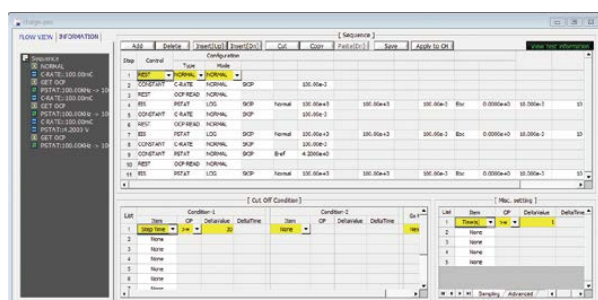
Corrosion* Software Package

- Tafel
- Polarization resistance
- Potentiodynamic
- Galvanodynamic
- Cyclic polarization
- Ecorr vs. time
- Galvanic corrosion
- RpEc trend
- Reactivation potential
- Potentiostatic ECN
- Galvanostatic ECN
- ZRA mode ECN

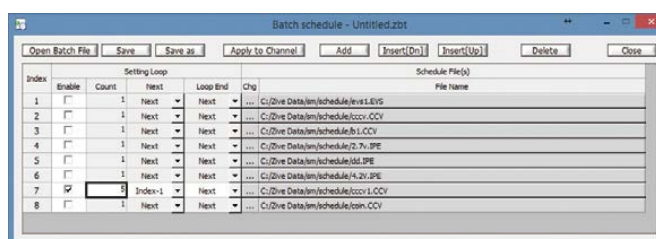
(*) Corrosion technique supports IR compensation.

Battery Software Package

- CC/CV test
- CC/CC test
- Discharge test
- EVS test
- Variable scan rate CV
- Pstat IV curve
- Gstat IV curve
- Steadystate CV
- GITT test
- PITT test



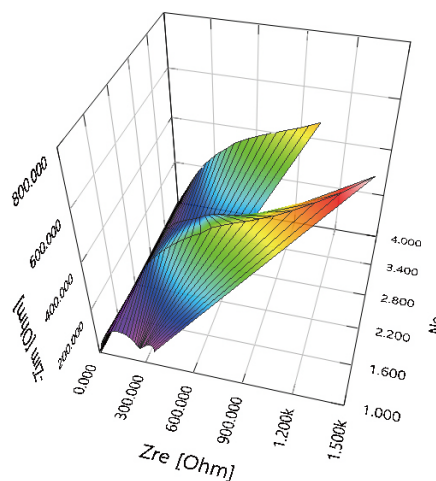
Sequence Editor



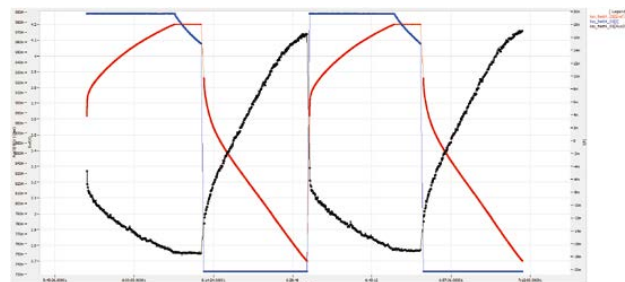
Batch Function

Control Mode		
constant	GSTAT	constant current control
	Crate	constant Crate control
	PSTAT	constant voltage control
	POWER	constant power control
	LOAD	constant load control
	CC-CV	constant current constant voltage control
	Crate-CV	Crate constant voltage control
	CP-CV	constant power constant voltage control
	CL-CV	constant load constant voltage control
	Id	constant current density control
	Is	constant specific current control
	OCP	OCP control
Step	GSTAT	current step control
	PSTAT	potential step control
	GSTAT	cyclic step current control
	PSTAT	cyclic step potential control
Sweep	GSTAT	current sweep control
	FAST-G	fast current sweep control
	PSTAT	potential sweep control
	FAST-P	fast potential sweep control
EIS	GSTAT	galvanostatic EIS
	PSTAT	potentiostatic EIS
	OCP	OCP EIS
	PSUEDO	pseudo galvanostatic EIS
	HFR G	galvanostatic HFR
	HFR P	potentiostatic HFR
	Msine G	galvanostatic multisine EIS
	Msine P	potentiostatic multisine EIS
	RTIP	potentiostatic real time EIS
	RTIG	galvanostatic real time EIS
	ACV	AC voltammetry
Rest		rest control
ZRA		ZRA control
Loop Pulse	PSTAT	voltage pulse control
	GSTAT	current pulse control
	GSINE	current sine wave control
	PSINE	potential sine wave control

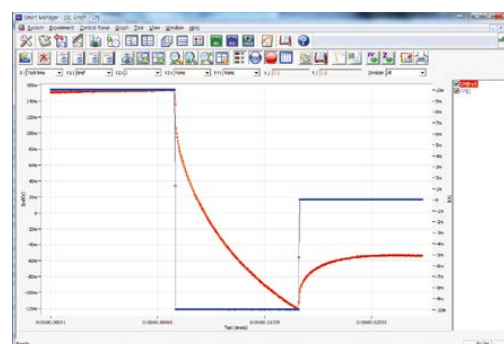
Control Task Parameters



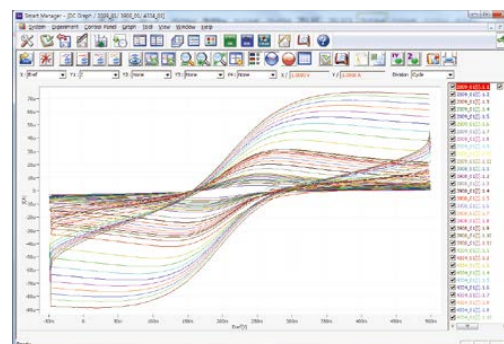
Potentiostat EIS Measurement
Plotted by ZMAN



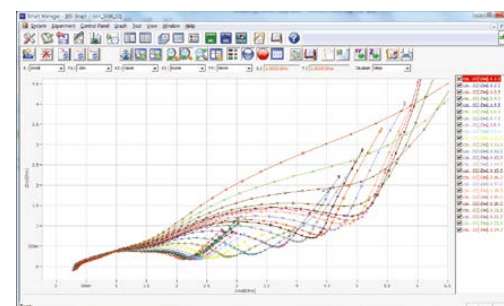
IR measurement(black line) during CC/CV Test



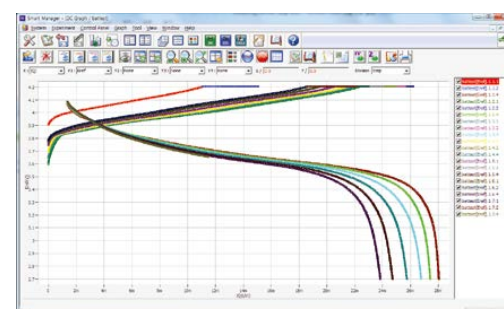
50usec sampling



DC graph



EIS graph



BAT graph

WMPG1000 Series

The WMPG series chooses plug-in type module with independent power suppliers per 8 channel substation. Each substation can be used as independent system with optional "StartUp Kit" or can be built up integrated system as add-on. These give flexibility to user's application.

Features

- 4 probe type true potentiostat/galvanostat circuit
- 16 bit ADC, DAC
- Easy channel expansion up to 128 channels
- Accurate control & measurement
- A system with fixed specification is available at affordable price
- SI software : user friendly software and free upgrade
- Optional temperature monitoring and auxiliary voltage monitoring available

Standard Type
WMPG1000S



Low Current Type
WMPG1000Ls/WMPG1000Le



Mid Power Type
WMPG1000M1



Mid Power Type
WMPG1000M2



Dual Channel Type
WMPG1000D



Power Type
WMPG1000H8



Power Type
WMPG1000H12



High Power Type
WMPG1000HP



Specifications

Specifications	WMPG1000Ls WMPG1000Le	WMPG1000S	WMPG1000M1 WMPG1000M2	
• Control voltage range* ¹	±10V(standard)	±10V(standard)	±10V(standard)	
• Voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.	
• Voltage resolution	16 bit(0.0015% f.s)	16bit(standard)	16bit(standard)	
• Current range* ²	5 ranges Max. ±10mA@10V(WMPG1000Ls) Max. ±100mA@10V(WMPG1000Le)	5 ranges Max. ±5A	5 ranges Max. ±5A@10V(WMPG1000M1) Max. ±10A@10V(WMPG1000M2)	
• Max. power per channel* ³	200mWatt(WMPG1000Ls) 2Watt(WMPG1000Le)	50Watt	100Watt(WMPG1000M1) 200Watt(WMPG1000M2)	
• Current accuracy	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.	
• Current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	
• Input impedance	10 ¹² Ohm	10 ¹² Ohm (<10V)	10 ¹² Ohm (<10V)	
• Sampling time	★ ⁴	★ ⁴	★ ⁴	
	WMPG1000D	WMPG1000H8	WMPG1000H12	WMPG1000HP
• Control voltage range* ¹	customer specified range	customer specified range)	customer specified range	customer specified range)
• Voltage accuracy	±0.05% f.s.	±0.05% f.s	±0.05% f.s	±0.1% f.s.
• Voltage resolution	16bit	16bit	16bit	16bit
• Current range* ²	5 ranges	5 ranges	4 ranges	3 or 1 range
• Max. power per channel* ³	400Watt	800Watt	1200Watt	4kWatt
• Current accuracy	±0.05%f.s	±0.1% f.s.	±0.1% f.s.	±0.1% f.s.
• Current resolution	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)
• Input impedance	10 ¹² Ohm (<10V)	10 ¹² Ohm (<10V)	10 ¹² Ohm (<10V)	10 ¹² Ohm(<10V)
• Sampling time	★ ⁴	★ ⁴	★ ⁴	★ ⁴

*1: User can specify the voltage range within <80V for difference between high and low voltage

*2: Depending on system specification.

*3: power = max. voltage x max. current x 2

*4: - Without option
8~40 channels: 10msec
41~64 channels: 20msec (2 SIF boards required)
- With option
8~16 channels: 10msec
17~40 channels: 10msec (2 SIF boards required)
41~64 channels: 20msec (2 SIF boards required)

SI(Smart Interface) Software

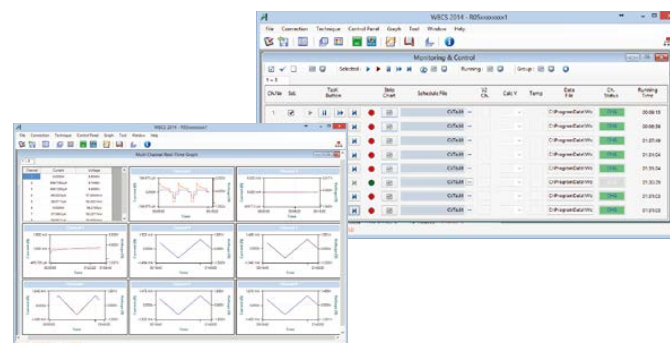
- 32bit/64bit OS environment
- TCP/IP communication
- Max. 200 steps
- Max. 10 cutoff(vertex) condition
- Max. 300,000 data point memory on control board
- Virtual control panel
- Various real time plots & universal axis graphs
- Data backup function
- WYSIWYG graphics
- User friendly software

For Electroanalytical Measurement

- Cyclic voltammetry
- Linear sweep voltammetry
- Chrono-amperometry
- Chrono-coulometry
- Chrono-potentiometry

Corrosion Measurement

- Tafel plot
- Potentiodynamic
- Potentiostatic
- Galvanostatic
- Cyclic polarization
- Ecorr vs. time
- Linear polarization resistance



For Energy Test

- CC/CV (Lithium battery) test menu
- CC/CC (NiCd(NiMH) battery) test menu
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- Electrochemical Voltage Spectroscopy(EVS) Test
- Galvanostatic Intermittent Titration Technique(GITT) Test
- Potentiostatic Intermittent Titration Technique(PITT) Test

ZIVE MP Series

The outstanding multichannel potentiostat/galvanostat/FRA, ZIVE MP series, is the best choice for the complete DC and impedance characterization of corrosion, coatings, sensors and other fundamental electrochemical analysis. And also, its versatile functions make it suited to other application including various energy sources and storage such as fuel cells, batteries, solar cells, and super capacitors.

Features

- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Wide current ranges for various applications
- Optional power booster for high current application is available upon request
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling
: 2usec or 3usec depending on data point number
- Voltage pulse or current pulse charge/discharge test(GSM,CDMA etc.)
- Sine wave function for ripple simulation in battery test package
- Internal 542,000 data point storage and continuing experiment regardless of PC failure
- Full software package supplied as standard for EIS, Energy Test, Electrochemical Analysis and Corrosion application



ZIVE MP1
8 channel System

ZIVE MP1
4 channel System

ZIVE MP2A

ZIVE MP2F
4 channel System

ZIVE MP5 & MP5H & MP5HC

ZIVE MP10

Specifications	ZIVE MP1	ZIVE MP2A/MP2F	ZIVE MP5
• Channel No/module	4 or 8channel/module	8channel/module (MP2A) 4channel/module (MP2F)	8channel/module
• Control voltage range	$\pm 10V, \pm 1V, \pm 100mV$	$\pm 10V, \pm 1V, \pm 100mV$	$\pm 10V, \pm 1V, \pm 100mV$
• Voltage accuracy	0.02% fs (gain x1)	$\pm 0.02\%$ fs (gain x1)	$\pm 0.02\%$ fs (gain x1)
• Current range (with gain)	100nA to 1A, 9 ranges(10nA)	2nA to 2A, 11 ranges (200pA) (MP2A) 1nA to 1A, 10 ranges (1nA) (MP2F)	5nA to 5A, 11 ranges (500pA)
• Current accuracy	$\pm 0.05\%$ f.s.(gain x1) >100nA	$\pm 0.02\%$ f.s.(gain x1)>200nA (MP2A) $\pm 0.03\%$ f.s.(gain x1)>100nA f.s. (MP2F)	$\pm 0.02\%$ f.s.(gain x1)>500nA
• Compliance voltage	$\pm 12V$	$\pm 12V$	$\pm 10V$
• Slew rate	10V/ μ sec	15V/ μ sec(MP2A) 10V/ μ sec(MP2F)	10V/ μ sec
• Input impedance	$2 \times 10^{13}\Omega$ 4.5pF	$2 \times 10^{13}\Omega$ 4.5pF	$2 \times 10^{13}\Omega$ 4.5pF
• Frequency range	10 μ Hz ~ 1MHz	10 μ Hz ~ 2MHz(MP2A)/1MHz(MP2F)	10 μ Hz ~ 1MHz
• Aux port	1 analog input: $\pm 10V$	digital: 3 output/2 input(MP2A) 3 output/1 input(MP2F)	digital: 3 output/2 input,
• Size(WxDxH)	199x455x388mm(4ch system) 448x426x208mm(8ch system)	analog: 1 output/3 input 448.7x535.4x188.4mm (MP2A) 199x455x388mm(MP2F 4ch housing)	analog: 1 output/3 input 448.7x535.4x277.3mm
• Weight		23.3kg(MP2A 8ch)	29kg(8ch)
	ZIVE MP5H	ZIVE MP5HC	ZIVE MP10
• Channel No/module	8channel/module	8channel/module	4channel/module
• Control voltage range	$\pm 40V, \pm 4V, \pm 400mV$	$\pm 10V, \pm 1V, \pm 100mV$	$\pm 5V, \pm 500mV, \pm 50mV$
• Voltage accuracy	$\pm 4mV \pm 0.1\%$ of setting	$\pm 1mV \pm 0.05\%$ of setting	$\pm 0.02\%$ fs (gain x1)
• Current range (with gain)	1nA~1A, 11 ranges (100pA)	1nA to 1A, 11 ranges (100pA)	10nA to 10A, 11 ranges (1nA)
• Current accuracy	$\pm 0.1\%$ f.s.(gain x1) >100nA	$\pm 0.05\%$ f.s.(gain x1)>100nA	$\pm 0.03\%$ f.s.(gain x1)>1uA
• Compliance voltage	$\pm 40V$	$\pm 40V$	$\pm 6V$
• Slew rate	7V/ μ sec	10V/ μ sec	10V/ μ sec
• Input impedance	$2 \times 10^{13}\Omega$ 1pF	$2 \times 10^{13}\Omega$ 4.5pF	$2 \times 10^{13}\Omega$ 4.5pF
• Frequency range	10 μ Hz ~ 600kHz	10 μ Hz ~ 1MHz	10 μ Hz ~ 1MHz
• Aux port	digital: 3 output/2 input, analog: 1 output/3 input	digital: 3 output/2 input, analog: 1 output/3 input	digital: 3 output/2 input, analog: 1 output/3 input
• Size(WxDxH)	448.7x535.4x277.3mm	448.7x535.4x277.3mm	465x545x286mm
• Weight	29kg(8ch)	29kg(8ch)	25kg(4ch)

SM(Smart Manager) Software for multichannel

- User defined test sequence using sequence file, technique menu and batch file
- Batch file : multiple combination of technique files and/or sequence files
- Easy to use and supports various electrochemical experiments including functions of system control, schedule file editor, real time graph, analysis graph, user calibration, and data file treatment etc.



Dual Channel Potentiostat

The dual channel potentiostat/galvanostat/FRA, ZIVE BP2A, is designed to support dual cells and each cell consists of one working electrode, one reference electrode and one counter electrode. It is suitable for sample characterization simultaneously or independently with the complete DC and impedance test.

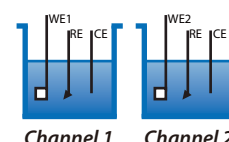
Features

- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Compact size with full functions
- Front panel LCD display
- Ideal for biosensor research, FET sensor, permeation test etc.
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling
: 2usec or 3usec depending on data point number
- Internal 542,000 data point storage and continuing experiment regardless of PC failure
- Full software package supplied as standard for EIS, Energy Test, Electrochemical Analysis and Corrosion application



BP2A

Cell configuration



The ZIVE BP2F, a dual channel potentiostat/galvanostat/FRA, is to support dual-working-electrode cell with one reference and one counter electrode configuration(bi-potentiostat) for sample characterization. Each channel can conduct DC and impedance test simultaneously and/or independently. The ZIVE BP2F can be setup to run 2-electrode, 3-electrode, or 4-electrode measurements with a simple setup change.

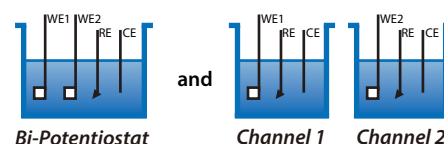
Features

- Versatile high quality dual channel potentiostat/galvanostat/impedance analyzer
- Bi-potentiostat
 - two fully independent channels
 - dual working electrodes with one reference and one counter electrode configuration available
- Compact size with full functions
- Front panel LCD display
- Ideal for biosensor research, FET sensor, permeation test etc.
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling
 - : 2usec or 3usec depending on data point number
- Internal 542,000 data point storage and continuing experiment regardless of PC failure
- Full software package supplied as standard for EIS, Energy Test, Electrochemical Analysis and Corrosion application



BP2F

Cell configuration



Portable Potentiostat/Galvanostat/EIS

The portable potentiostat/galvanostat/FRA, ZIVE PP1e & PP3 are for use in the laboratory or in the field. The system is housed in a plastic case which is guaranteed waterproof to 5 meters under water. Though a slim style tablet PC is included as standard, you can also use your own laptop computer. Multiple PP1e or PP3 units can be linked together for multichannel system configuration. PP3's internal potentiostat/galvanostat circuit is floating type to enable pipe corrosion measurement.

Features

- Portable high quality Potentiostat/Galvanostat/Impedance Analyzer
- Light weight and compact size with full functions
- Wide current ranges for various applications such as corrosion, general electrochemistry, sensor, battery, fuel cell, super capacitor, solar cell application etc.
- 14 EIS techniques capability(option) including multisine technique
- High speed data sampling
 - : 2usec or 3usec depending on data point number
- 3 measurement/control voltage ranges & 9(PP1e), 10(PP3) measurement/control current ranges
- Internal 542,000 data point storage and continuing experiment regardless of PC failure
- Full software package supplied as standard for EIS, Energy Test, Electrochemical Analysis and Corrosion application



ZIVE PP1e

ZIVE PP3

Specifications

ZIVE BP2A/BP2F

ZIVE PP1e

ZIVE PP3

Control voltage range	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV
Voltage accuracy	±0.02% fs(gain x1)	±0.02% f.s(gain x1)	±0.02% f.s(gain x1)
Current range (with gain)	2nA ~ 2A, 11 ranges (200pA) (BP2A) 10nA ~ 1A, 10 ranges (1nA) (BP2F)	100nA ~ 1A, 9 ranges (10nA)	10nA ~ 1A, 10 ranges (1nA)
Current accuracy	±0.02% f.s.(gain x1)>200nA(BP2A) ±0.02% f.s.(gain x1)>100nA(BP2F)	±0.05% f.s.(gain x1)>100nA	±0.03% f.s.(gain x1)>100nA
Compliance voltage	±12V	±12V	±20V
Slew rate	15V/μsec (BP2A) 10V/μsec (BP2F)	10V/μsec	8V/μsec
Input impedance	>2x10 ¹³ Ω 4.5pF	>2x10 ¹³ Ω 4.5pF	>2x10 ¹³ Ω 4.5pF
Frequency range	10μHz ~ 1MHz	10μHz ~ 1MHz	10μHz ~ 1MHz
Aux port	digital: 3 output/2 input(BP2A), 2 output/1 input(BP2F) analog: 1 output/3 input	1 analog input: ±10V	digital: 3 output/1 input, analog: 1 output/3 input
Size(WxDxH)	209X378X270mm (BP2A) 232.6X324.6x243.3mm (BP2F)	411x321x165mm	411x321x165mm
Weight	9.25Kg (BP2A)	4.4Kg	4.4Kg

WBCS3000 Series

The battery cycler, WBCS3000 series, chooses plug-in type module with independent power suppliers per 8 channel substation. Each substation can be used as independent system with optional "StartUp Kit" or can be built up integrated system as add-on. These give flexibility to user's application.

Features

- 4 probe type true potentiostat/galvanostat circuit
 - for battery test (Li battery, Ni-MH, NiCd etc), supercapacitor test and fuel cell test etc.
 - can perform general electrochemical experiment such as cyclic voltammetry
 - no switching time between charge and discharge step
- 16 bit ADC, DAC : accurate control & measurement
- Easy channel expansion up to 128 channels
- Auxiliary voltage, temperature measurement option
- User friendly software and free upgrade
- LAN communication

Low Current Type
WBCS3000Ls/WBCS3000Le



Low Current Type(32CH)
WBCS3000Ls32/WBCS3000Le32



Low Current Type(32CH)
WBCS3000Lx32



Standard Type
WBCS3000S



Mid Power Type
WBCS3000M1



Mid Power Type
WBCS3000M2



Dual Channel Type
WBCS3000D



Power Type
WBCS3000H8



Power Type
WBCS3000H12



High Power Type
WBCS3000HP



Specifications	WBCS3000Ls(32) WBCS3000Le(32)	WBCS3000Lx32	WBCS3000S
• Control voltage range	±5V(standard)	-1V to +5V(Lx) (standard)	±5V(standard)*1
• Voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• Voltage resolution	0.15mV(standard)	0.15mV(standard)	0.15mV(standard)*1
• Current range	4 ranges Max. ±10mA@5V(WBCS0000Ls,Ls32) Max. ±100mA@5V(WBCS3000Le,Le32)	4 ranges Max. ±1A@-1V to +5V	4 ranges Max. ±5A@5V*2
• Max. power per channel*3	200mWatt(WBCS3000Ls,Ls32) 2Watt(WBCS3000Le,Le32)	6Watt	50Watt
• Current accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• Current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)
• Input impedance	10 ¹² Ohm	10 ¹² Ohm	10 ¹² Ohm
• Sampling time	*4	*4	*4

*1: User can specify the voltage range within <80V for difference between high and low voltage

*2: Depending on system specification.

*3: power = max. voltage x max. current x 2

*4: - Without option

8~40 channels: 10msec

41~64 channels: 20msec

81~124 channels: 50msec

- With option

8~16 channels: 10msec

17~40 channels: 20msec

41~80 channels: 50msec

81~124 channels: 50msec (2 SIF boards required)

Specifications

	WBCS3000M1	WBCS3000M2	WBCS3000D
<ul style="list-style-type: none"> Control voltage range*1 Voltage accuracy Current range*2 Max. power per channel*3 Current accuracy Current resolution Input impedance Sampling time*4 	<ul style="list-style-type: none"> ±5V(standard) ±0.02% f.s. 4 ranges 100Watt ±0.05% f.s. 16 bit(0.0015% f.s) 10¹² Ohm ★4 	<ul style="list-style-type: none"> ±5V(standard) ±0.02% f.s. 4 ranges 200Watt ±0.05% f.s. 16 bit(0.0015% f.s) 10¹² Ohm ★4 	<ul style="list-style-type: none"> customer specified range ±0.05% f.s.(<10V) 4 ranges 400Watt ±0.05% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) ★4
	WBCS3000H8	WBCS3000H12	WBCS3000HP
<ul style="list-style-type: none"> Control voltage range*1 Voltage accuracy Current range*2 	<ul style="list-style-type: none"> customer specified range ±0.05% f.s.(<10V) 4 ranges 	<ul style="list-style-type: none"> customer specified range ±0.05% f.s.(<10V) 3 ranges 	<ul style="list-style-type: none"> customer specified range ±0.1% f.s. 3 or 1 range depending on power
<ul style="list-style-type: none"> Max. power per channel*3 Current accuracy Current resolution Input impedance Sampling time*4 	<ul style="list-style-type: none"> 800Watt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) ★4 	<ul style="list-style-type: none"> 1200Watt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) ★4 	<ul style="list-style-type: none"> 4kWatt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) ★4

*1: User can specify the voltage range within <80V for difference between high and low voltage

*2: Depending on system specification.

*3: power = max. voltage x max. current x 2

*4: - Without option
8~40 channels: 10msec
41~64 channels: 20msec
81~124 channels: 50msec

- With option
8~16 channels: 10msec
17~40 channels: 20msec
41~80 channels: 50msec
81~124 channels: 50msec (2 SIF boards required)

SI(Smart Interface) Software

- 32bit/64bit OS environment
- TCP/IP communication
- Max. 200 steps
- Max. 10 cutoff(vertex) condition
- Max. 300,000 data point memory on control board

- Virtual control panel
- Various real time plots & universal axis graphs
- Data backup function
- WYSIWYG graphics
- User friendly software

For Electroanalytical Measurement

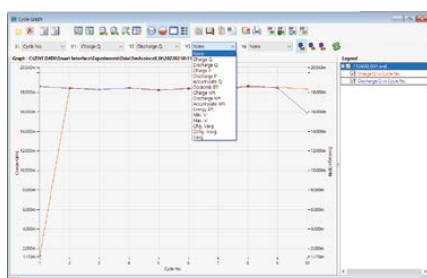
- Cyclic voltammetry
- Linear sweep voltammetry
- Chrono-amperometry
- Chrono-coulometry
- Chrono-potentiometry

Corrosion Measurement

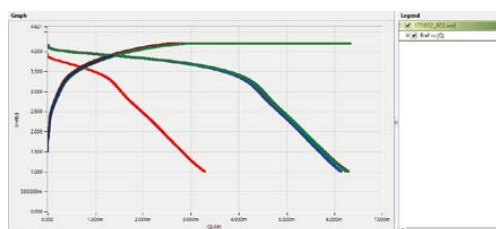
- Tafel plot
- Potentiodynamic
- Potentiostatic
- Galvanostatic
- Cyclic polarization
- Ecorr vs. time
- Linear polarization resistance

For Energy Test

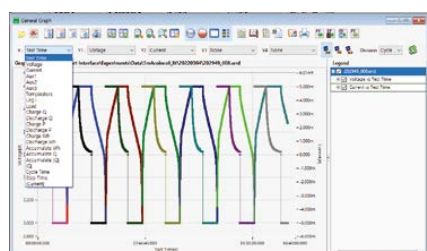
- Charge/Discharge(CC/CV) Test
- Constant Current Charge/Discharge(CC/CC) Test
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- Electrochemical Voltage Spectroscopy(EVS) Test
- Galvanostatic Intermittent Titration Technique(GITT) Test
- Potentiostatic Intermittent Titration Technique(PITT) Test



Cycle graph



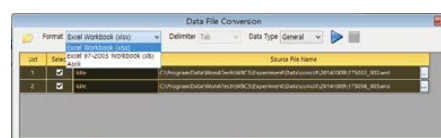
Voltage vs. |capacity| graph



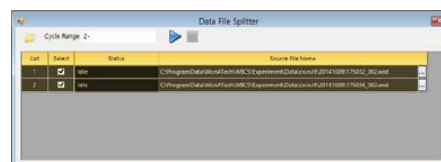
General graph



Channel status display



Data conversion to ASCII & Excel



Data file split by cycle number

Smart2™ Series - Fuel Cell Test System for single cells

The Smart2™ series are an advanced, reliable, compact fuel cell test equipment and hardware for testing single cells with options available for PEMFC and PEM/DM FC testing services. Our control and measurement software with powerful graphical user interface makes you easy to operate the system.

Features

- Fully integrated compact size
- Suitable for 100Watt single cell
- 3 models are available
- Automatic purge gas control
- External anode & cathode line and cell temperature control
- Fully automatic operation by PC control
- Built-in electronic load
- Stoichiometric control is available
- Nafion™ membrane type humidifiers (Smart2 PEM/DM, Smart2 PEM model only)
- Various safety functions including watch-dog function
- Powerful software with independent data analysis software

Standard Configuration - Smart2™ PEM/DM & Smart2™ PEM

- Solenoid valve : 5ea
 - fuel gas, oxidant gas, purge gas, water refill control for humidifiers
- MFC for Anode and Cathode (2set)
- Check valve : 6ea
 - each MFC has two check valve at in & out
 - purge gas for anode & cathode
- 3 Way valve : 2ea for wet gas or dry gas selection
- Methanol pump: 1et (Smart2 PEM/DM model only)
- Humidifier : 2set & Automatic water feeding for humidifier: 1ea
- Back pressure regulator : 2ea & Pressure sensor: 2ea
- Temperature controller(with line heater & thermocouples) : 7set
 - humidifier Temperature controller : 2set
 - gas line temperature controller for inside the instrument : 2set
 - gas line temperature controller for outside the instrument : 2set
 - cell temperature controller : 1set
- Temperature monitor only : 2 points with thermocouples
 - inside the anode & cathode gas line
- Electronic Load : 1set
- System controller including DAQ system with emergency button
- Control PC(option) with Smart software
- Interface boards with LAN cables



Smart2 PEM/DM



Smart2 PEM

Standard Configuration - Smart2™ DM

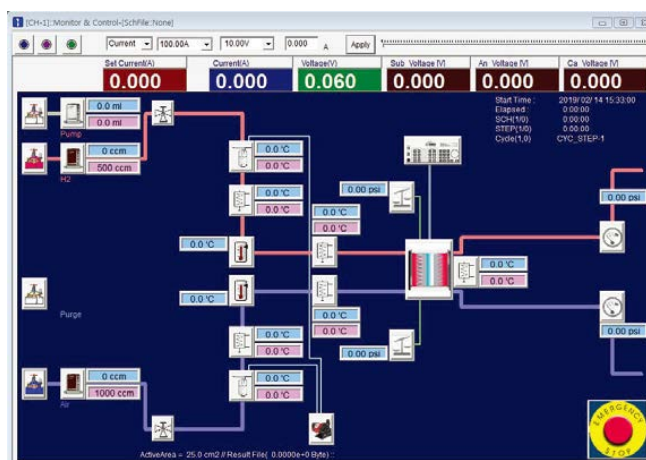
- Solenoid valve : 2ea
 - oxidant gas, purge gas
- MFC for Anode and Cathode : 2set
- Check valve : 3ea
- Temperature controller(with line heater & thermocouples) : 5set
 - gas line temperature controller for outside the instrument : 2set
 - humidifier&gas line temperature controller for inside the instrument : 2set
 - cell Temperature controller: 1set
- Electronic Load : 1set
- System controller including DAQ system with emergency button
- Control PC(option) with Smart software
- Interface boards with LAN cables



Smart2 DM

Software

- Simple and easy operation
- Real-time graphic data output
- User friendly graphical user interface(GUI)
- Continuous data logging
- Background server program
- Independent data managing software
- Button click & play mode
- VOI(Value of Interest) displaying selection
- Colorful display of each module status



Optional Equipments

- Impedance Monitor
- External potentiostat/galvanostat
- Zero voltage booster
- Fuel cell hardware fixture
- Conductivity Cell
- Conductivity Jig

Impedance Monitor

Zcon™ Single Channel Impedance Analyzer

The Zcon™ is an impedance analyzer for single channel application and provides all tools for the application of fuel cell stack, battery pack, and general electrochemical study requiring EIS measurement using external electronic load or potentiostat/galvanostat. By employing electronic load, Zcon™ 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.

Features

- Designed for spectrum analysis in the electrochemical field
- For versatile AC impedance experiment using external electronic load or potentiostat/galvanostat.
- 2 signal input channel(current & voltage)/1 signal output for sinewave
- Flexible frequency generator/analyzer
- Generate various waveforms(e.g. sinusoidal etc.)
- 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
- Free analysis using ZMAN impedance analysis software without license code
- Two models are available depending on voltage range
 - Zcon : ± 10 V
 - ZconH : ± 100 V

Zcon™ Impedance Analyzer



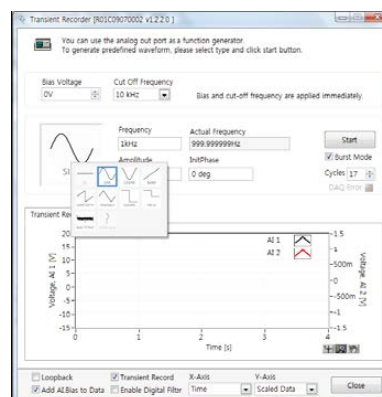
Zcon™ supports external electronic load & potentiostat
 • TDI Dynaload XBL series electronic load
 • 3rd parties potentiostat/galvanostat

Specifications

Analog Out (as single generator)		Analog In (as frequency analyzer)	
• No. of channel	1	• No. of channel	2 (each for current & voltage input)
• Configuration	single-ended	• Configuration	differential
• Max. output	-11.0 to +11.0 V(DC+AC)	• Max. common mode voltage	± 10 V(Zcon)
• Frequency range	1uHz to 100kHz		± 100 V(ZconH)
• Frequency resolution	5000 steps/decade	• Bandwidth	550kHz
• Amplitude	1mVpp to 2Vpp	• Input impedance	110kOhm

Software - Z100 Navigator

- Operation software for Zcon™ and Z#™ system
- It 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)

Z#™ Multichannel Impedance Analyzer

The Z#™ series provide all tools for the application of fuel cell stack, battery pack, multi-cells and general electrochemical study requiring multichannel EIS for serial connected cells. It has independent 6 channel AI(analog input) board. So it can provide real synchronized multichannel EIS monitor function. Some other commercial multichannel impedance monitors use multiplexer to measure EIS sequentially. This kind of instruments take long time to measure EIS. Because EIS measurement is time domain, synchronized measurement is essential.

Features

- Designed for spectrum analysis in the electrochemical field
- 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
- Measuring fuel cell stack EIS and simultaneously recording up to 4 individual cells from the stack
- Channel expandable up to 30
- Flexible frequency generator/analyzer
- High current application with external load and/or potentiostat/galvanostat
- Generate various waveforms (e.g. Sinusoidal etc.)
- Simulation and fitting with ZMAN™
- Software controlled function
- Graphic-based user-interface
- Dual real time graph (Bode, Nyquist, etc.) during measurement



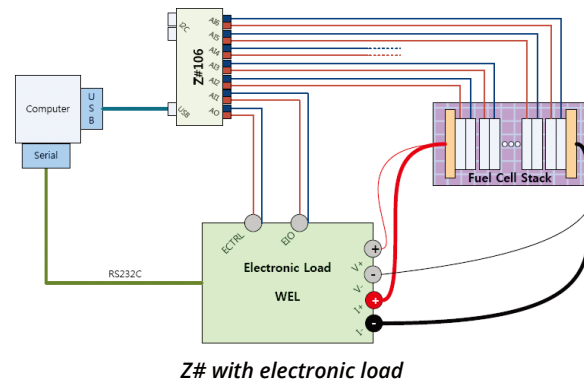
Z# Impedance Analyzer

Z#™ supports external electronic load & potentiostat

- TDI Dynaload XBL series electronic load
- 3rd parties potentiostat/galvanostat

Specifications

Analog Out (as single generator)		Analog In (as frequency analyzer)	
• No. of channel	1	• No. of channel	voltage input
• Configuration	single-ended		maximum 60Ch in daisy chain configuration
• Max. output	-11.0 to +11.0 V(DC+AC)	• Configuration	differential
• Frequency range	1uHz to 100kHz	• Max.input	±100V
• Frequency resolution	5000 steps/decade	• Bandwidth	550kHz
• Amplitude	1mVpp to 5Vpp	• Input impedance	110kOhm



Battery Impedance Analyzer

Single/Multi-Channel Battery Impedance Analyzer

The BZA Serieies are battery impedance analyzers.

These can measure battery impedance. Fixed frequency impedance or whole impedance spectra. Also, these can measure open circuit potential and battery temperature using optional PT100 sensor.

Independent impedance analysis software package ZMAN™ can read the data file and fit the equivalent circuit models automatically so user can determine the battery status.

Features

- Impedance measurement of battery, battery pack, & ESS(energy storage system)
- Quick diagnosis of batteries
- Battery lifetime estimation
- LAN interface with PC
- Cell temperature monitoring
- Automatic equivalent circuit searching and various impedance analysis functions are possible using ZMAN™ impedance analysis software
- Expandable up to 32 channels (Multi channels model)



*Single Channel
BZA60(Max. 60V)*



*Single Channel
BZA1000A(Max. 1000V)*



*Multi Channel
BZA60M(Max. 60V)*



*Multi Channel
BZA500M(Max. 500V)*

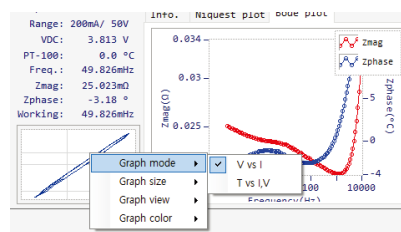
Specifications	BZA60/60M	BZA500M	BZA1000A
<ul style="list-style-type: none"> Impedance measurement <ul style="list-style-type: none"> measurement range accuracy frequency range current amplitude (p-p) DC voltage measurement <ul style="list-style-type: none"> ADC resolution input range AC voltage measurement <ul style="list-style-type: none"> ADC resolution input range AC current measurement <ul style="list-style-type: none"> ADC resolution input range Sinewave generator <ul style="list-style-type: none"> frequency range frequency accuracy frequency resolution DAC resolution output gain Temperature measurement <ul style="list-style-type: none"> input accuracy Size(WxHxD) 	500uΩ ~ 50Ω ±1% magnitude (1mΩ - 50Ω) ±1° phase 0.05Hz ~ 10kHz 400uA ~ 2A 24 bit 60V/6V (dual range) 24 bit ±250mV 24 bit 4ea (2A, 200mA, 20mA, 2mA) 0.05Hz ~ 10KHz < 0.1% 65535/decade 10 bit 2ea(X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA) RTD probe (PT100) Max 1 °C 160 x 60 x 180 mm (BZA60) 207 x 234 x 280mmmm (BZA60M)	500uΩ ~ 50Ω ±1% magnitude (1mΩ - 50Ω) ±1° phase 0.05Hz ~ 10kHz 400uA ~ 2A 24 bit 500V/50V (dual range) 24 bit ±250mV 24 bit 4ea (2A, 200mA, 20mA, 2mA) 0.05Hz ~ 10KHz < 0.1% 65535/decade 10 bit 2ea(X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA) RTD probe (PT100) Max 1 °C 270 x 309 x 302mm	500uΩ ~ 50Ω ±1% magnitude (1mΩ - 50Ω) ±1° phase 0.05Hz~4kHz 400uA ~ 2A 24 bit 1000V/100V (dual range) 24 bit ±250mV 24 bit 4ea (2A, 200mA, 20mA, 2mA) 0.05Hz ~ 4KHz <0.1% 65535/decade 10 bit 2ea (X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA) RTD probe (PT100) Max 1 °C 300mm x 60mm x 300mm

ZM(Impedance Manager) Software

- Independent examination from the PC is available after the test starts.
- A various scope of parameters for the test is adjustable that are used in the test.
- Even if you lose connection of BZA and PC, if the device is powered on, the device will continue experiment. Memory can be saved after the connection recovers.
- Data is saved in the form of binary format that is compatible with the ZMAN software thus can be transformed into the text (CSV, TXT).

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-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)



Technique selection & Parameter Input Box

- Galvanostatic Electrochemical Impedance Spectroscopy
 - Bias & amplitude value is determined by current range setting
 - Parameters: Frequency range, data density, iteration
- Rs-psuedo Rp measurement
 - Rs frequency, psuedo 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

■ Multichannel Voltage/Temperature Monitoring System

The cXM is a flexible systems to monitor voltage and/or temperature, suitable for use in a wide variety of applications. The system can equip max 128 input signal (voltage or temperature) channels. You can order 8ch temperature input with 16 channel voltage input combi module or 32 channel voltage or temperature input module.

eg.)

- 1) 4 set of 32 channel voltage input:
Total 128ch voltage monitoring
- 2) 2set of 32 channel voltage input and 2set of 32 channel temperature input:
64ch voltage and 64 channel temperature monitoring
- 3) 4 set of combi module:
32 channel temperature and 64 channel voltage monitoring

For safety purposes, when it detects that the operating voltage/temperature is out of the defined range, alarm will be activated.

Features

- Combi module for Voltage & Temperature Measurement
- CVM(cell voltage monitoring) configuration or CTM(cell temperature monitoring) configuration available
- Battery Pack Potential /Temperature Measurement
- Corrosion Potential Measurement
- Cell Voltage Monitoring Of Electrolyzers Or Other Electrochemical Multicells
- Environmental Monitoring
- Modular, Low Profile Mechanical Design
- Independent Monitoring System With PC Via LAN (USB option)
- Max 128 signal input per system is available

Voltage Monitoring

- Voltage range : $\pm 10V$ or $\pm 5V$ for each channel
- Voltage range in common mode : $\pm 275V$ for all channel
- Resolution : 14 bit (16 bit option)
- Sampling time : 100ms per channel
- Input impedance
 - differential : 800kOhm
 - common mode : 200kOhm
- 10/100 Ethernet PC direct
(Full speed USB 2.0 interface, option)



16ch temperature input & 32ch voltage input



64ch voltage input



32ch temperature input & 64ch voltage input

Temperature Monitoring

- Sensor type : insulation K-type thermocouple
- Resolution : 14bit, 0.25°C
- Detects thermocouple shorts to GND or VCC
- Sampling rate : max. 100 samples/sec
- 8channel in combi module or 32ch in temperature module (32ch module's connector is Dsub)

cX Software

- Works with PC application software
- LAN communication
- Alarm safety & cut-off condition
- Supply .ini files to control cX software(option)

Power Booster for ZIVE series

- For ZIVE series
- For high voltage/high current application
- Modular type design
- EIS capability
- Sine wave simulation available
- Simple operation and accurate result
- Safety features for user and instrument itself
- Part number : ZB series

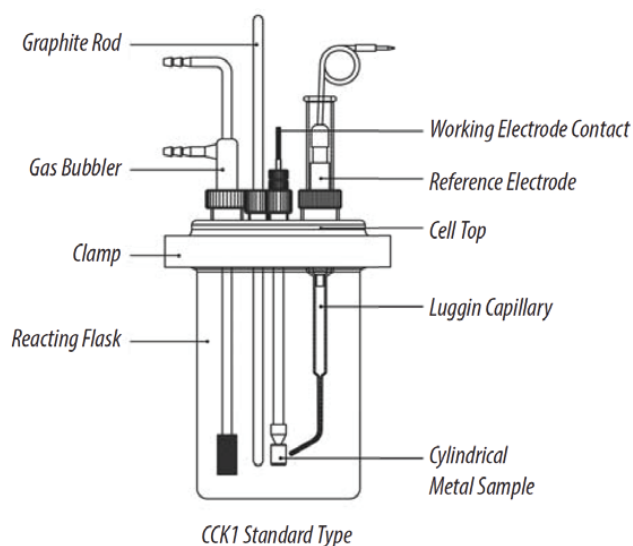


Housing (Size)	Model	Max. V	Max. I (>-1V or 2V)	Max. I (Bipolar)	Power Dissipation(Watt)
ZB1 (229x388x550)	ZB530B	5V		30A	450
	ZB1030U/1020B	10V	30A	20A	459/480
	ZB2015U/2010B	20V	15A	10A	409/480
	ZB408U/405B	40V	8A	5A	410/480
ZB2 (273x388x550)	ZB560B	5V		60A	900
	ZB1060U/1040B	10V	60A	40A	918/960
	ZB2035U/2020B	20V	35A	20A	955/960
	ZB4015U	40V	15A		770
ZB3 (403x388x550)	ZB1090U/1060B	10V	90A	60A	1,377/1,440
	ZB2050U/2030B	20V	50A	30A	1,365/1,440
	ZB4025U/4015B	40V	25A	15A	1,283/1,440
ZB4 (533x388x550)	ZB1080B	10V		80A	1,920
	ZB2060U/2040B	20V	60A	40A	1,683/1,920
	ZB4030U/4020B	40V	30A	20A	1,539/1,920
ZBR2 (682x982x750)	ZB5190B	5V		190A	3,800
	ZB10160B	10V		160A	3,840
	ZB20120U/2080B	20V	120A	80A	3,480/3,840
	ZB3090U/3030B	30V	90A	30A	3,447/2,160
	ZB4070U/4035B	40V	70A	35A	3,591/3,360

Model Name ****B is for voltage bipolar type, ****U is for voltage unipolar type [minimum voltage -1V or -2V]

* Customized specification is available. Please contact WonATech sales team.

The CCK series corrosion cell kit is based on a standard glass reaction flask, 1 liter ~ 500ml. All wetted parts are made of chemically resistant materials such as Teflon, Pyrex and SUS 316. The standard cell configuration consists of a cylindrical metal sample working electrode, a gas bubbler, and a luggin capillary. A graphite rod as counter electrode, a reference electrode and a flat specimen holder could be ordered separately as an option. The water-jacketed type corrosion cell kit made with Teflon are also available.



CCK1, Standard Type
With
Optional FSH2 & Thermometer

WCCK1, Water-Jacketed Type
With
Optional FSH2 & Thermometer

Specifications

Vial volume (depending on model)	CCK series : 500 ml & 1 liter WCCK series : 500 ml & 1 liter
Cylindrical sample holder material	
Tube	Pyrex®, 6.35 mm dia.
Compression gasket	Teflon®
Cylindrical metal sample	Steel
Chemical compatibility	
Wetted materials	Pyrex®, Teflon®
Non-wetted materials	Above, plus stainless steel and Viton®
Reference electrode(option)	
Type	SCE or Ag/AgCl reference electrode
Size	9 mm diameter OD, 110 mm long
Counter electrode(option)	
Graphite rod	6 mm diameter, 30 cm long
Flat specimen holder(option)	
Specimen diameter	FSH2 : 15.5 mm ~ 22 mm FSH15 : 18.5 mm~25 mm dia.
Specimen thickness	0.3 ~ 5.8 mm

All specifications are subject to change without notice.

Parts Included For CCK1 & WCCK1

Cell vial	Pyrex®, 1L
Cylindrical metal sample & tube	Steel / Pyrex®, 6.35mm dai. x 4.35mm dia.
Cell clamp	Stainless steel
Luggin capillary	Pyrex®
Gas bubbler	Pyrex®
Cell Top	Teflon®
Other miscellaneous parts such as stopper / O-ring	MC Nylon® / Viton®

Please contact us for other replacement parts.

Ordering Guide

Description	Part No.
Standard type	
1 liter volume	CCK1
500 ml volume	CCK05
Water-jacketed type	
1 liter volume	WCCK1
500 ml volume	WCCK05

Components can vary depending on the type of cells.

Optional Items

Description	Part No.
Flat specimen holder	
Active area : 11.28 mm dia.	FSH2
Active area : 15 mm dia.	FSH15
Counter electrode	
Graphite rod, 150mm long	GR002H
Graphite rod, 300mm long	GR002
Reference electrode	
Saturated calomel reference electrode	WA1001
Ag/AgCl reference electrode	WA1004
Mercury/Mercurous Sulfate Reference Electrode	WA1005



FSH2



GR002



WA1001

Replacement Parts

Description	Part No.
Cylindrical specimen rod For CCK1, WCCK1, CCK5, WCCK5	CSH2
Luggin Capillary For CCK1, WCCK1, CCK5, WCCK5	LGCKK1
Glass vial For CCK1	GVCKK1
For WCCK1	GVWCCK1
For CCK05	GVCKK05
For WCCK05	GVWCCK05
Gas bubbler For CCK1, WCCK1	GBCKK1
For CCK05	GBCKK05
Clamp For CCK1, WCCK1	CLCKK1
For CCK05, WCCK05	CLCKK05

Teflon cell top 1 For CCK1, WCCK1	CTCKK1
For CCK05, WCCK05	CTCKK05
Teflon cell top 2 For CCK1, WCCK1	CTCKK1-2
For CCK05, WCCK05	CTCKK05-2
Flat specimen holder head For FSH2	FSH2H
For FSH15	FSH15H



Flat Cell Kit

The flat cell kit was designed to evaluate plate material such as metal(coupons), semi-conducting plate, etc. A sample plate will be placed one sample holder by fixing knob and maximum 300ml sample volume is acceptable. A water jacketed version is also available. A graphite plate which is placed in one side of the cell is supplied with a cell and can be used as a counter electrode. A Luggin capillary is also included while a reference electrode should be purchased separately. Instead of graphite plate, a platinum wire can be also used as counter electrode by putting through either of the ports on the cell body. You can select PTC1 or PTC2 plate test cell kit for small solution volume, which is explained on next page.



FCK2 Standard Type



WFCK2 Water-Jacketed Type

Features

- Ideal for testing of flat specimen
- Easy to use
- Fast and easy disassembly
- Detachable counter electrode
- Two opening areas

Specifications

Sample test area	
One side	1 cm ²
The other side	5 cm ²
Sample thickness	Up to 20 mm
Cell volume	
FCK15	up to 150 ml
FCK2&WFCK2	up to 300 ml
Material	
Cell body	Pyrex®
Cell end	Polycarbonate
O-ring	Viton®

All specifications are subject to change without notice.

Applications

- Polarization test
- Galvanic corrosion
- Electrochemical noise measurement
- EIS measurement
- Cyclic voltammetry

Ordering Guide

Description	Part No.
Standard type	
Cell volume, 150ml	FCK15
Cell volume, 300ml	FCK2
Water-jacketed type	
Cell volume, 300ml	WFCK2

Flat Cell Kit

Accessories

Optional Items

Description	Part No.
Reference electrode	
Saturated calomel reference electrode	WA1001
Ag/AgCl reference electrode	WA1004
Mercury/Mercurous Sulfate Reference Electrode	WA1005

Replacement Parts

Description	Part No.
Glass vial	
For FCK15	GVFCK15
For FCK2	GVFCK2
For WFCK2	GVWFCK2
Luggin capillary for FCK15, FCK2, WFCK2	LGFCCK
Graphite plate electrode for FCK2	GR001



LGFCCK



GR001

Plate Cell Kit

Accessories

The plate test cell kit, PTC1, is designed to evaluate plate material such as metal(coupons), semi-conducting plate, etc. In evaluation, a sample plate will be placed between two cell blocks. A counter electrode (graphite rod or Pt wire type) and a reference electrode should be ordered separately.

- PTC1 has an electrode holder part, a solution block part, a bottom block part and a thickness adjustment dial knob.
- The active area, which is to be exposed to electrolyte, can be selected by O-ring's position.



PTC1



Active area will be determined by O-ring's position.

Specifications

Sample test area	width: >15mm, thickness: 0.1~10mm
Materials	Teflon®
Active area	
Using small O-ring	1 cm ²
Using large O-ring	5 cm ²

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Plate test cell	PTC1

Optional Items

Description	Part No.
Reference electrode	
Saturated calomel reference electrode - 9mm OD, KT glass tip	WA1001
Ag/AgCl reference electrode - 9mm OD, KT glass tip	WA1004
Counter electrode	
Graphite rod - 6mm dia. 15cm long	GR002H

Plate Cell Kit

Accessories

The plate test cell, PTC2, is a simple cell for electrochemical testing of coated samples. Also it can be a perfect choice for measuring EIS(Electrochemical Impedance Spectroscopy) of painted metal specimens. The PTC2 is very easy to assemble.

Specifications

Sample	
Size	60x60mm or more
Thickness	>7mm
Dimensions	
Base	Approx. 132x90x10mm(WxDxH)
Cell body	
- internal diameter & length	31.5mm, 80mm long
Hole diameter	9.3mm dia. & 6.5mm dia.

All specifications are subject to change without notice.

Parts Included

Cell body	Pyrex®
Base and cell top	Teflon®
Cell clamp	Stainless steel
O-ring	Viton®

Ordering Guide

Description	Part No.
Plate test cell	PTC2



PTC2

Optional Items

Description	Part No.
Reference electrode	
Saturated calomel reference electrode - 9mm OD, KT glass tip	WA1001
Ag/AgCl reference electrode - 9mm OD, KT glass tip	WA1004
Counter electrode	
Graphite rod - 6mm dia. 15cm long	GR002H

Replacement Parts

Description	Part No.
Clamp	CLPTC2
Glass vial	GVPTC2
Teflon cell top	CTPTC2

Permeation Cell Kit

Accessories

The permeation cell kit, PMC1, is a spinoff of flat specimen cell kit, FCK2 series, and is designed for permeation test. A membrane or a permeation foil can be placed between two glass half cells.

Two graphite plates which can be used as counter electrode and two Luggin capillary are included as standard. Membrane and reference electrode should be ordered separately.

Specifications

Sample test area	
One side	1 cm ²
The other side	5 cm ²
Dimensions	
Cell vial volume	150ml x 2 ea
Chemical Compatibility	
Wetted materials	Pyrex®, Polycarbonate

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Permeation Cell Kit - Standard type	PMC1
Permeation Cell Kit - Water-jacketed type	WPMC1



Permeation Cell Kit, Standard Type



Permeation Cell Kit, Water-Jacketed Type

The photoelectrochemical cell having a wide optical window is designed to characterize electrode material under lighting condition. The 2 or 3 electrode test is available. Based on a standard model, PCELL1, the attachments are interchangeable between cells according to user's applications. It is a gas tight sealed cell.



PCELL1
- Standard Model

Specifications

Materials	Cell body: PEEK Optical window: quartz glass Others: SUS 304, Viton O-ring	
Dimensions		
optical window dia.	18mm	
cell dimensions	74.3x40x110mm(WxDxH) (PCELL1)	
Electrolyte volume	Max. 6ml (PCELL1)	
Sample size	for PCELL1&2 Width: >25mm Height: 25~62mm	for PCELL3&4 Width: <8mm Height: <22mm
Counter electrode	Coiled Pt wire (included)	
Reference electrode	6mm OD electrode available (option)	

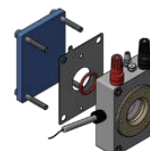
All specifications are subject to change without notice.

Ordering Guide

Description/Part No.

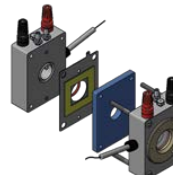
PCELL1 - Standard

- Standard type
- One optical window mounted in front of electrolyte chamber



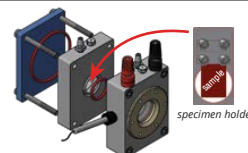
PCELL2

- Two optical windows arranged to face each other
- Suitable for absorbance measurement with a transparent electrode



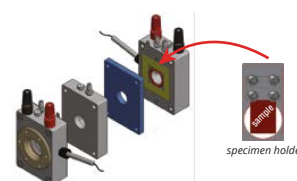
PCELL3

- Cell kit with a specimen holder
- Small sample can be fixed inside the electrolyte chamber



PCELL4

- Cell kit with a specimen holder
- Small sample can be fixed inside the electrolyte chamber



Electrode Holder

Universal Electrode Holder

The universal electrode holder, UEH1, is designed to hold various sizes of electrode. The UEH1 has 4 holes to hold electrodes and three of them have a screw to adjust its hole size. The hole size is available from 1.6mm to 10mm. The material of plate is Teflon®, which has high resistance to chemicals and its white color helps user to recognize a tiny change of samples during experiments.

Specifications

Holes		
Number of holes	4	
Hole size	1.6mm dia. x 1ea 6.2mm dia. x 1ea 9.6mm dia. x 1ea 10mm dia. x 1ea	
Rod		
Material	Stainless steel	
Diameter	6mm diameter	
Length	Max. 150mm	

All specifications are subject to change without notice.



Universal electrode holder, UEH1,
with optional electrodes and glass vial

Ordering Guide

Description	Part No.
Universal electrode holder	UEH1

Electrode Holder

Accessories

Flat Specimen Holder

The FSH series are sample holders to accommodate flat specimens.

- Pyrex® tube : 6.3mm dia.



Ordering Guide

Description	Part No.
Flat Specimen Holder Active area : 11.28mm dia. Sample size : 15.5mm~22mm dia. / 0.3~5.8mm thickness	FSH2
Flat Specimen Holder Active area : 15mm dia. Sample size : 18.5mm~25mm dia. / 0.3~5.8mm thickness	FSH15

All specifications are subject to change without notice.

Replacement Parts

Description	Part No.
Flat specimen holder head for FSH2	FSH2H
Flat specimen holder head for FSH15	FSH15H

Faraday Cage

Accessories

The faraday cage, Farad2, is an essential item for electroanalytical experiments. It is well designed to block out external EMI noise and firmly enclosure all the components of electrochemical cell (electrodes, vials, etc.). The spacious interior allows you to set up electronic components or systems easily.



Specifications

Material	
Exterior	powder-coated steel
Interior	powder-coated steel with Teflon®-coated bottom
Window	fine SUS mesh embedded in acryl plates
Access	
Number of holes	2
Size	10mm dia.
Position	right hand side and back side
Dimensions	
Overall	300 x 398 x 300mm(WxHxD)
Window	100x300mm(WxH)

All specifications are subject to change without notice.

Ordering Guide

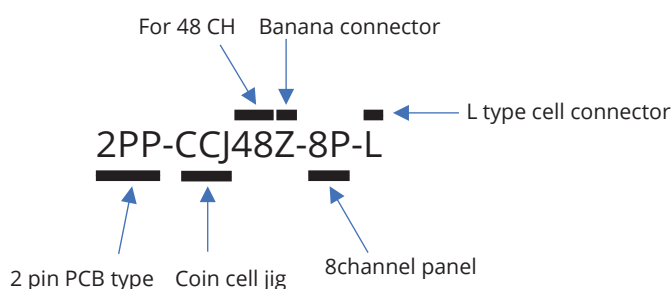
Description	Part No.
Faraday cage	Farad2

Battery Jig

Features

- Easy to hold cylindrical cell, coin cell, pouch cell , prismatic cell
- Wide contact point with noble coated contact area
- 4 contact point type(Kelvin probe) is available to minimize voltage drop for high current application.
- Individual channel operation is available.
- Can be moved to fit cell size

ex)



Ordering Guide

	Part No.	Description
1st	2PD	2 Pin Pull down type
	2PL	2 Pin Lever type
	2PP	2 Pin PCB type
	4PL	4 Pin Lever type
	4PK	4 Pin Knob type
2nd	CCJ	Coin cell jig
	PCJ	Pouch cell jig
	UCJM	Mid current Universal cell jig
	UCJH	High current Universal cell jig
	PRCJ	Prismatic cell jig
3rd	Channel No.	Channel Quantity
4th	Z	Banana connector panel
	H	For High temperature
		Normal type
5th	4P	4ch per panel
	8P	8ch per panel
	16P	16ch per panel
	20P	20ch per panel
6th	S	S type cell connector
	L	L type cell connector
	M	M type cell connector

PCJ1(1ch)



- 4 pin lever type Pouch Cell Jig
- 1 channel
- Kelvin type banana connectors
- For small size pouch cell

UCJ1A(1ch)



- 4 pin lever type Universal Cell Jig
- 1 channel
- Kelvin type banana connectors

2PD-CCJ8-8P-S



- 2 pin pull down type Coin Cell Jig
- 8 channel
- 8ch per panel
- S type cell connector

2PP-CCJ8Z-8P



- 2 pin PCB type Coin Cell Jig
- 8 channel
- Banana connector panel
- 8ch per panel
- 8 cell banana connectors (option)

4PL-PCJ8-4P-M



- 4 pin lever type Pouch Cell Jig
- 8 channel
- 4ch per panel
- M type cell connector

4PL-CCJ8Z-8P



- 4 pin lever type Coin Cell Jig
- 8 channel
- Banana connector panel
- 8ch per panel
- 8 cell banana connectors (option)

4PL-UCJM8Z-8P



- 4pin lever type Mid Current Universal Cell Jig
- 8 channel
- Banana connector panel
- 8ch per panel
- 8 cell banana connectors (option)

4PK-UCJH4-4P



- 4 pin knob type High Current Universal Cell Jig
- 4 channel
- 4ch per panel
- For high current experiment

4PK-PRCJ1



- 4 pin probe knob type Prismatic Cell Jig
- 1 channel
- For prismatic battery or pouch cell

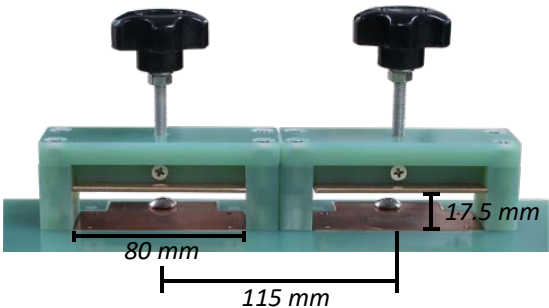
Dual Direction High Current Pouch Cell Holder

Features

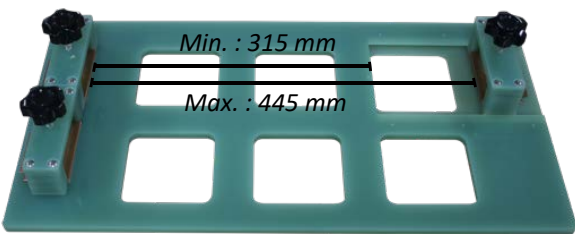
- Easy to hold pouch cell using Knob
- Kelvin probe type 4pin contact
- Bidirectional and unidirectional measurements available
- Epoxy material with excellent chemical resistance and heat resistance
- Part No. : DDPCH



Cell size - Uni direction



Cell size - Bi direction



High Current Cylindrical Battery Jig

These battery jig is for single cell high current cylindrical battery test and having length adjustable function. For this purpose these should be designed for kelvin type 4 probe connection to minimize voltage drop by cable resistance and/or contact resistance etc. Max current is 30Amp.

There are two type of High current Cylindrical Battery Jig by battery length One is model HCCBJ65L for standard size battery up to 65mm length and the other is model HCCBJ100L for long size battery up to 100mm length.



HCCBJ65L



HCCBJ100L

Specifications

Model	HCCBJ65L	HCCBJ100L
Maximum battery diameter	30 mm	
Minimum battery contact diameter	14 mm	
Maximum battery length	65mm	100mm
Current path diameter	14mm	
Minimum battery length	1mm	
Length × Width × Height	136 x 24 x 43mm	172 x 24 x 43mm
Cable Connectors	4ea of 4mm banana	
Weight	208g	240 g

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
High current cylindrical battery jig - max. battery length : 65mm	HCCBJ65L
High current cylindrical battery jig - max. battery length : 100mm	HCCBJ100L

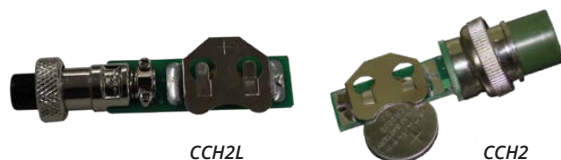
Coin Cell Holder & Clamp Cable

Accessories

Coin Cell Holder

For WMPG/WBCS System

- Direct connect to cell connector



Ordering Guide

Description	Part No.
For low current model - WMPG1000Ls/Le/Lx, WBCS3000Ls/Le/Lx	CCH2L
For standard current model - WPG, WMPG, WBCS3000S	CCH2

For ZIVE System

- D-SUB connector type



Ordering Guide

Description	Part No.
For 20mm dia. coin cell - ZIVE SP1, SP2, MP1, MP2, BP2	CCH3-20
For 24mm dia. coin cell - ZIVE SP1, SP2, MP1, MP2, BP2	CCH3-24

Clamp Cable

Features

- Easy to hold coin cell, pouch cell or batteries having lead line
- Clamp type battery holder

- 4 contact point type(Kelvin probe) to minimize voltage drop for high current application
- Individual channel operation is available

Coin Cell Clamp Cables



Ordering Guide

Description	Part No.
Max 1Amp for L type cable end - 1m cable length	CCCL
Max 5Amp for S type cable end - 1m cable length	CCCS
Max 5Amp for Banana female connector end - 30cm cable length (CCCB)	CCCB

Pouch Cell Clamp Cables



Ordering Guide

Description	Part No.
Max 1Amp for L type cable end - 1m cable length	PCCCL
Max 5Amp for S type cable end - 1m cable length	PCCS
Max 5Amp for Banana female connector end - 30cm cable length	PCCB

Universal Clamp Cables



Ordering Guide

Description	Part No.
Max 10Amp universal clamp cable - 30cm cable length	UCCB
Max 10Amp universal clamp cable - 1m cable length	SKAC

For High Voltage Battery



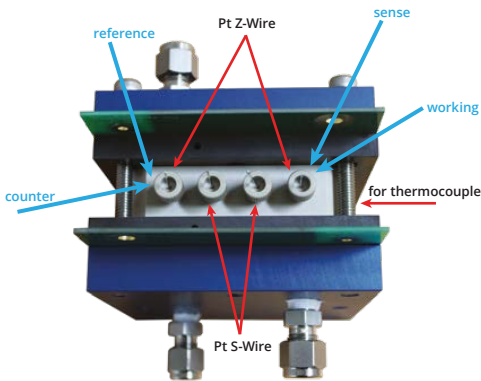
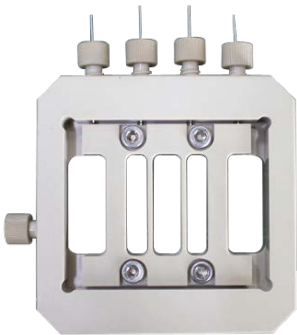
Ordering Guide

Description	Part No.
Max 10Amp 1000V battery - 1m cable length	LKAC

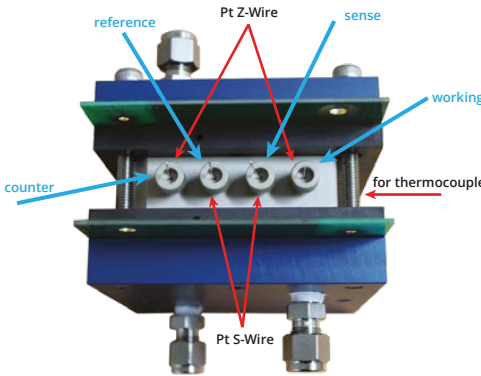
The membrane conductivity cell, MCC, is designed to measure ionic conductivity by simply loading a membrane into cell hardware. The MCC adopts a 4 point probe for measuring conductivity. By passing current through two outer electrodes and measuring the voltage through the inner electrodes, it allows the measurement of the conductivity. In the 4-electrode configuration, there is virtually no current flow at the inner voltage sensing electrodes. Therefore, polarization does not occur. The second benefit of the 4-electrode sensor is its tolerance of electrode coating. Since the 4-electrode technique measures potential drop rather than resistance, the measurement remains accurate, despite minor coating. The 2 probe measurement is also available by attaching the working and sensing electrical connections to the cathode side while attaching the counter and reference electrical connections to the anode side. Please see the configuration below.

By placing the conductivity cell between the anode and cathode conduction plate, you can simply assemble the conductivity cell into your fuel cell hardware.

- Supports 2 or 4 electrode measurement
- Material
 - Cell body : PEEK
 - Wire : platinum
- Operating temperature : to 130 °C
- Fuel cell hardware available
 - : 5, 25 cm² fuel cell test hardware
 - (not included, provided by WonATech)
- Easy to assemble



Connecting for a 2-electrode measurement



Connecting for a 4-electrode measurement

Specifications

Material	
Cell, clamp & nut	PEEK
Electrode(S-wire/Z-wire)	Platinum
Dimensions	
Conductivity cell	76.2x76.2x20 mm(WxHxD)
Conductivity clamp	48x50x7 mm(WxHxD)
S-wire (inner electrodes)	84 mm long x 1.0 mm dia.
Z-wire (outer electrodes)	120 mm long x 1.0 mm dia.
Access	
Voltage measurement (S-wire)	two, inner ports
Current measurement (Z-wire)	two, outer ports
Temperature measurement	one, side port

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Membrane conductivity cell	MCC

Because the conductivity of a material is directly linked with ohmic losses, the measurement of ionic conductivity is crucially important in order to evaluate the performance of a newly synthesized material such as ion exchange membrane(IEM) and proton exchange membrane(polymer electrolyte membrane, PEM).

Today ion exchange membranes are receiving considerable attention and are successfully applied for desalination of sea and brackish water and for treating industrial effluents. And proton exchange membrane(PEM) is one of the key components for various consumer related applications for fuel cells, e.g. automobiles, back-up power, portable power etc. For example, in PEMs, protons can transport in two directions, across the membrane and through the membrane. This results in two conductivities, in-plane conductivity and through-plane conductivity. For PEM fuel cells, through-plane conductivity measurement is more meaningful than in-plane because proton transfer occurs in the through-plane direction.

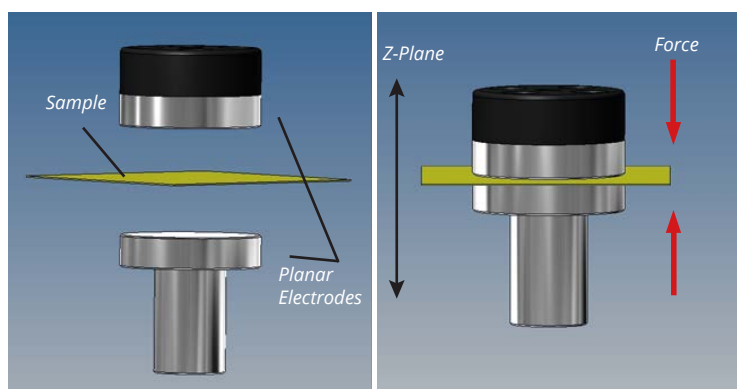
The conductivity of the membrane can be calculated based on the measured resistance by the following equation:

$$\sigma = \frac{L}{RWT}$$

where σ is the membrane conductivity(S/cm), L is the length between the electrodes, R is the measured resistance, W is the membrane width, and T is the membrane thickness.



MCJ1 (Through-Plane Conductivity Test Jig)



The MCJ1 Through-plane conductivity test jig helps user to setup a 2-probe electrochemical cell consisting of 2 stainless steel probes that sandwiches the membrane to measure through-plane conductivity of membranes. The MCJ1 is designed to hold a membrane by pulling a lever.

Normally, a number of galvanostatic alternating current(AC) electrochemical impedance spectroscopic (EIS) techniques or DC techniques are used to estimate the membrane conductivity. User can set up a perfect system with one of ZIVE series Electrochemical Workstation with MCJ1 conductivity test jig for through-plane conductivity measurements.

Specifications







Sample size	>30mm diameter
Sample thickness	max. 40mm
Sample contact material	304 stainless steel
Overall dimensions	70 x 135 x 133.7mm(WxDxH)
Connection	4mm banana plug

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Through-plane conductivity jig	MCJ1







For WPG/WMPG/WBCS System

	
<i>Shield Cell Cable for WBCS3000S/WMPG1000S</i>	<i>Shield Cell Cable for WBCS3000L(Le,Lx)/WMPG1000L(Le)</i>
	
<i>Shield Cell Cable for WBCS3000M/WMPG1000M</i>	<i>Shield Cell Cable for WPG100ex</i>
	
<i>BNC to alligator cable for WPG/WMPG/WBCS series</i>	<i>Rack 8channel cell cable for rack mount</i>

Ordering Guide

Description	Part No.
Shield Cell Cable for WBCS3000S/WMPG1000S	
1M	BC1
1.5M	BC1.5
2M	BC2
3M	BC3
Shield Cell Cable for WBCS3000L(Le,Lx)/WMPG1000L(Le)	
1M	BCL1
1.5M	BCL1.5
2M	BCL2
3M	BCL3
4M	BCL4
Shield Cell Cable for WBCS3000M/WMPG1000M	
1M	MBC1
1.5M	MBC1.5
2M	MBC2
3M	MBC3
5M	MBC5
Shield Cell Cable for WPG100ex	
1.5M	PC1.5
BNC to alligator cable for WPG/WMPG/WBCS series	
1M	BN1
1.5M	BN1.5
2M	BN2
3M	BN3
Rack 8channel cell cable (3m) for rack mount	RACK8C

For ZIVE System

	
<i>cell cable for SP1/MP1/PP1e</i>	<i>cell cable for SP2/MP2A/BP2A/SP3/PP3</i>
	
<i>cell cable for SP5/SP5H/SP5HC/MP5/MP5H/MP5HC/SP10/MP10</i>	<i>Aux cable</i>
	
<i>ZRA cable</i>	<i>FRA cable</i>

Ordering Guide

Description	Part No.
Cell cable (10cm) for SP1/MP1/PP1e/SP2/MP2A/BP2A/SP3/PP3	ZC10
Cell Cable for SP1/MP1/PP1e	
1M	ZC1C100
2M	ZC1C200
3M	ZC1C300
Cell Cable for SP2/MP2A/BP2A/SP3/PP3	
1M	ZC2C100
2M	ZC2C200
3M	ZC2C300
Extention Cell cable(4 meter) for SP2/MP2A/BP2A	ZC2C400E
Cell Cable for SP5/SP5H/SP5HC/MP5/MP5H/MP5HC/SP10/MP10	
1M	ZC5C100
2M	ZC5C200
3M	ZC5C300
Aux cable (1.5 meter)	ZAUXC
ZRA cable(1.5m)	ZRAC
FRA cable(1.5m)	FRAC

For High Power Cell Cable

Ordering Guide For WPG/WMPG/WBCS/ZIVE

Description	Part No.
High power cell cable for 10Amp	
1.5M	H10BC1.5
3M	H10BC3
High power cell cable for 50Amp	
1.5M	H50BC1.5
3M	H50BC3
High power cell cable for 100Amp	
1.5M	H100BC1.5
3M	H100BC3
High power cell cable for 200Amp	
1.5M	H200BC1.5
3M	H200BC3

For Booster Interface Cable

Ordering Guide For ZIVE

Description	Part No.
Booster I/F cable (2M) including I2C for SP1,MP1	ZBIFC1
Booster I/F cable set (ZC2 to booster I/F and I2C cable for SP2,MP2,SP3,BP2F,MP3)	ZBIFC2
Booster I/F cable set (ZC5 to booster I/F and I2C cable for SP5,MP5,SP10,MP10)	ZBIFC5
ZC2 to booster Interface	ZC2BIF
ZC5 to booster Interface	ZC5BIF
Booster I2C cable (2M)	ZBI2C



Booster I/F cable including I2C for SP1,MP1



ZC2 to booster I/F cable for SP2,MP2,SP3,BP2F,MP3



ZC5 to booster I/F cable for SP5,MP5,SP10,MP10



Booster I2C cable

For cXM

Ordering Guide

Description	Part No.
CX voltage input cable (16ch) 3meter length	CX_V16C3
CX voltage input cable (16ch) 2meter length	CX_V16C2
CX voltage input cable (16ch) 1.5meter length	CX_V16C15

For Z#



Z# AO cable








Z# AI cable

Ordering Guide

Description	Part No.
Z# AO cable (1.5meter)	Z#AOC
Z# AI cable (1.5meter)	Z#AIC

Cable

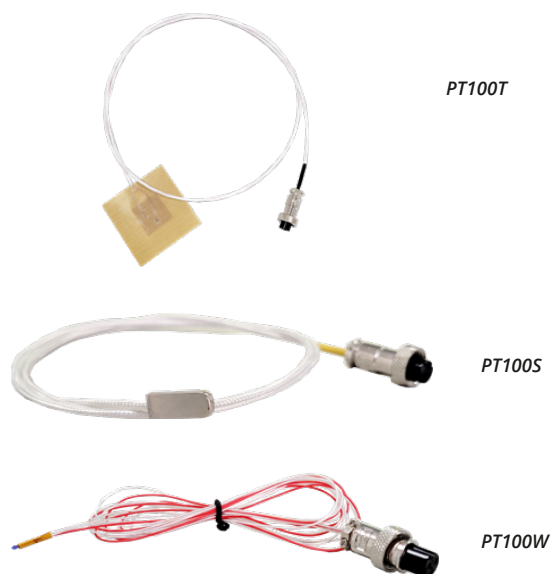
For BZA100&1000

	
<i>BZA60 cell cable</i>	<i>BZA1000 cell cable</i>
	
<i>Large alligator cable</i>	<i>Small size Kelvin alligator cable</i>
	
<i>Medium size Kelvin alligator cable</i>	<i>Large alligator clip</i>
	
<i>Mid alligator clip</i>	

Ordering Guide

Description	Part No.
BZA100 cell cable(1M)-banana connector	BZA60C1
BZA1000 cell cable(1M)-banana connector	BZA1000C1
Large alligator cable 1M	LKAC
Small size Kelvin alligator cable 1M	SKAC
Medium size Kelvin alligator cable 1M	MKAC
Large alligator clip (CATIII1000V) 99mm	LAC
Mid alligator clip (CATIII1000V) 84.3mm	MAC

PT100 Temperature Sensor



Ordering Guide

Description	Part No.
PT100 temperature sensor	
tablet type	PT100T
sheet type	PT100S
wire type	PT100W

BZA Portable Option

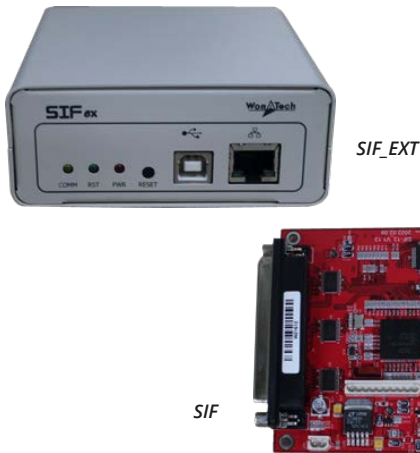
Ordering Guide

Description	Part No.
BZA Portable Option	
for BZA60	BZAP60
- including: Battery Pack (20,000mAh), Fiber Plastic Bag, Wireless Lan kit	
for BZA1000	BZAP1000
- including: Battery Pack (20,000mAh), Fiber Plastic Bag, Wireless Lan kit	

Misc.

Accessories

SI Interface For WMPG/WBCS



Ordering Guide

Description	Part No.
SIF external module	SIF_EXT
SIF board	SIF

Channel Extension Board For WMPG/WBCS

Ordering Guide

Description	Part No.
Channel Extension Board & cable per channel	
For WBCS3000S/WMPG1000S	EXT
For WBCS3000M1/WMPG1000M1	EXTM1
For WBCS3000M2/WMPG1000M2	EXTM2

Aux Voltage Measurement For WMPG/WBCS



Ordering Guide

Description	Part No.
Aux Voltage Measurement	
8ch module	AUX8
8ch module for M1 module	AUX8/M1
8ch module for M2 module	AUX8/M2
8ch module for high power controller	AUX8/H

Does not include auxiliary cable(BA).

Temp Measurement For WMPG/WBCS



Ordering Guide

Description	Part No.
Temp Measurement	
8ch module	TEMP8
8ch module for M1 module	TEMP8/M1
8ch module for M2 module	TEMP8/M2
8ch module for high power controller	TEMP8/H

Includes K-type thermocouple(1.5m).

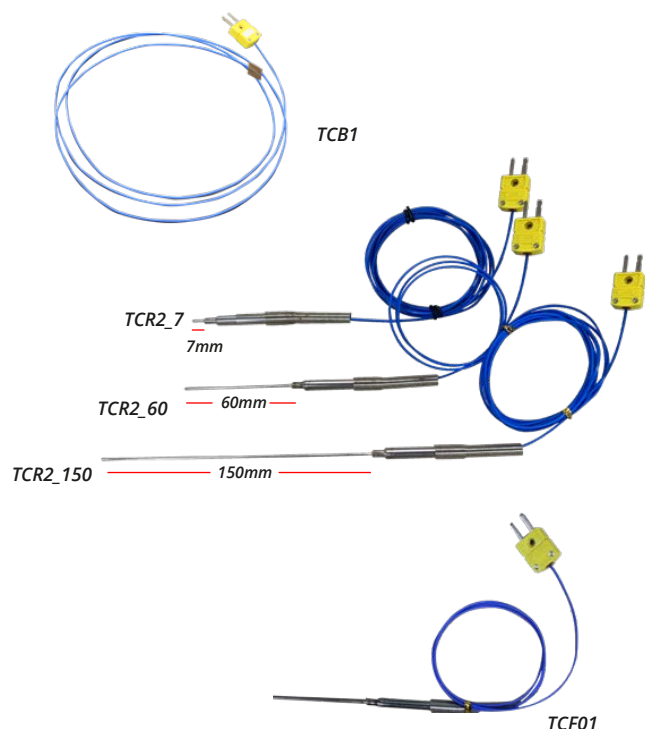
PC mounting For Ls/Le rack model only



Ordering Guide

Description	Part No.
PC mounting option without PC/Monitor	RACK_PC
Ls, Le rack model only	

■ Thermocouple



⦿ Ordering Guide

Description	Part No.
Thermocouple-Ktype bead terminal	
1M	TCB1
1.5M	TCB1.5
3M	TCB3
Thermocouple-Ktype(rod type) 2M	
7mm rod type	TCR2_7
60mm rod type	TCR2_60
150mm rod type	TCR2_150
Thermocouple-K type for fuel cell hardware fixture	TCF01

■ Zero Voltage Booster For Smart2

⦿ Ordering Guide

Description	Part No.
Zero voltage booster	TCB1
inside machine	ZVBi
outside machine	ZVBo

■ Power Adapter



SP1PA

SP2PA

⦿ Ordering Guide

Description	Part No.
Power adapteppr	
for SP1	SP1PA
for SP2	SP2PA

■ Dummy Cell

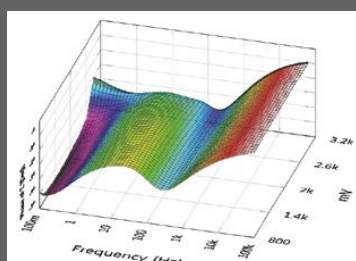


⦿ Ordering Guide

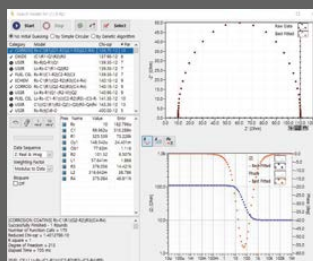
Description	Part No.
Dummy Cell	Dummy1

EIS Data Analysis Software, ZMAN™

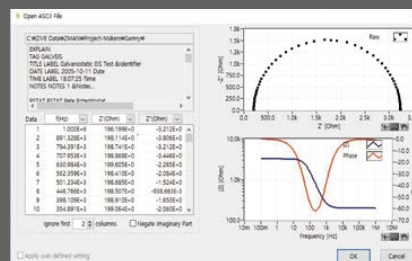
- Model simulation and fitting
- 2D- and 3D-Bode- and Nyquist plots
- Automatic equivalent circuit model search function
- Project concept to handle multiple EIS data analysis
- parameter plot from fitted elements value
- compatible with data format from Zahner, Gamry, Ametek etc. (License code is needed)
- Various weighting algorithm
- Model library and user model
- KK plot
- Batch fitting for project data
- Impedance parameter simulation
- Interpolate bad data
- Black-Nichols plot
- 3D graph setting option
- Improved model editor
- Application model library for automatic searching
- Parameter simulation of model
- Genetic algorithm option for initial guessing
- Automatic initial guessing
- Trace movie function on fitting
- Free for ZIVE's data format(*.seo, *.wis) analysis (no license code required)
- Circle fitting
- Data editing available (insert, delete, edit)
- Add/subtract element parameters
- Add/subtract model parameters
- Impedance, Z in polar, admittance, Y in Polar, modulus, M in polar, dielectric constant, E in polar. data display
- Empty cell capacitance calculation
- Find file function
- Data replacement by formula function
- Cursor data display
- Model finding result automatic sorting by Chi square value
- R, C R, L R, Q preview & graphic
- ZHIT function
- Mott-Schottky analysis
- Donor density vs. Vfb graph
- C vs. voltage graph



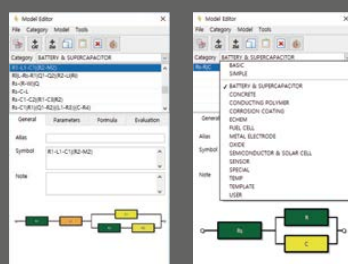
3D Bode plot for series measurement



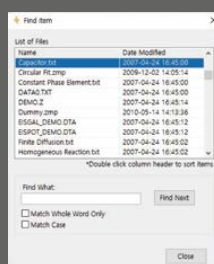
Automatic model searching



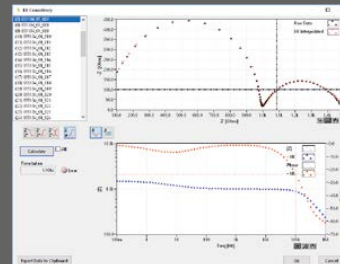
Importing 3rd parties ASCII data file



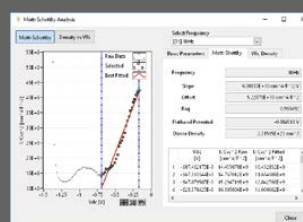
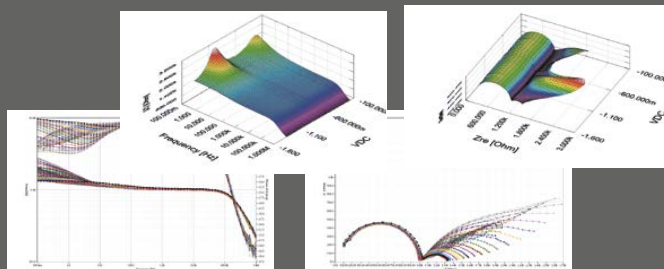
Model editor & model library



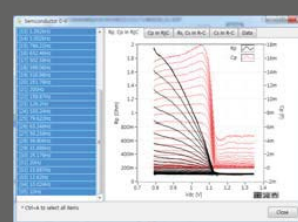
Finding data file menu



KK consistency



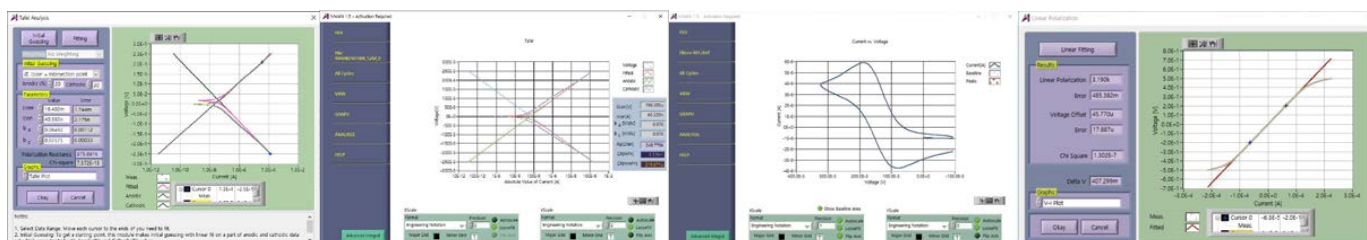
Mott-Schottky analysis window



C/R-V graph

DC Data Analysis Software, IVMAN™ Main Software

- Electrochemistry data(CV, Tafel, etc.) analysis software
- Tafel analysis function
 - Initial guessing
 - Automatic fitting
 - Corrosion rate calculation
- Linear polarization automatic fitting and analysis function
- Peak search function
- Support various graph function
- Various analysis functions as simple math, interpolation, smoothing, (semi) derivative, (semi) integral, etc.
- Report function
- 3rd party product data analysis (needs license code)
- Free for WonATech products data format analysis (no needs license code)

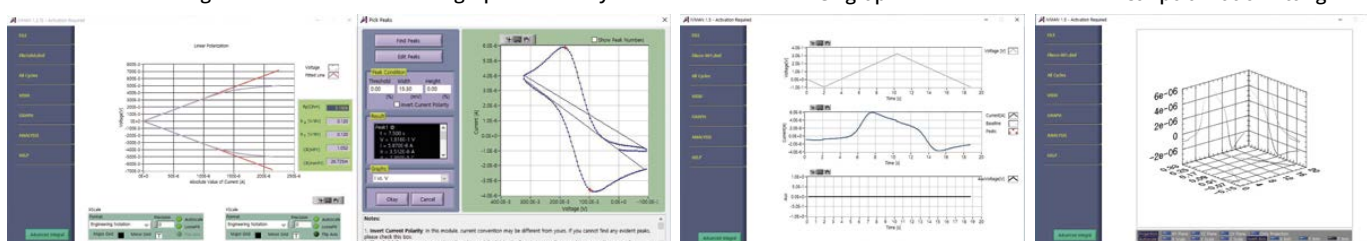


Tafel fitting

Tafel graph after analysis

CV graph

Linear polarization fitting



Linear polarization graph after analysis

Find peak

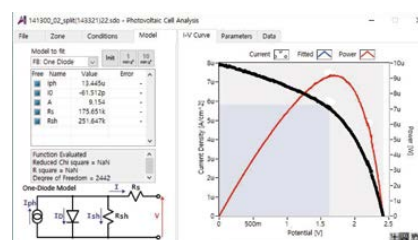
Voltage/Current/Temperature vs. Time graph

3D graph

Optional Software for WonATech data, IVMAN™ Option Software

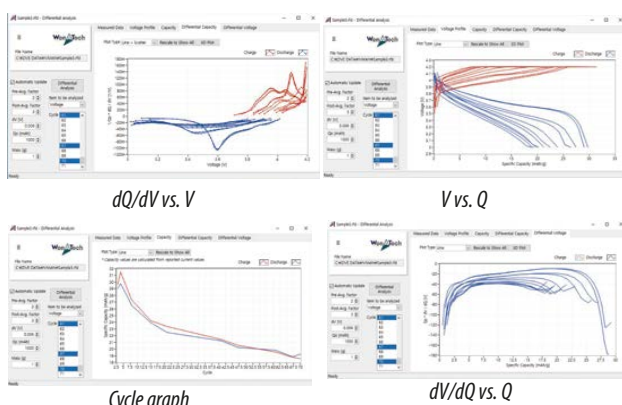
- IVMAN Optional packages are scientific software packages for WonATech data files only.
- IVMAN™ option software packages include;
 - 1) IVMAN Differential analysis software
 - 2) IVMAN Tafel analysis software
 - 3) IVMAN Photo voltaic cell analysis.
 - 4) IVMAN Peak find module
 - 5) IVMAN Extractor
- No needs license code

2) IVMAN™ Photovoltaic Cell Analysis



1) IVMAN DA™ Battery Test Data Analysis Software

- Battery test data analysis
- Electrochemical voltage spectroscopy (dQ/dV vs. V)
- Voltage vs. Capacity analysis (V vs. Q)
- Cycle graph (Q vs. cycle)
- Differential voltage graph(dV/dQ vs. Q)

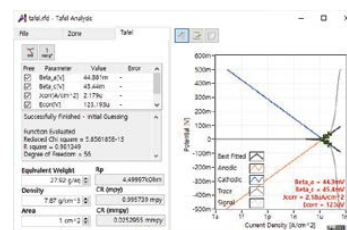
 dQ/dV vs. V V vs. Q

Cycle graph

 dV/dQ vs. Q

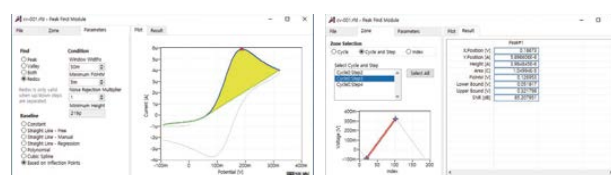
3) IVMAN TA™ Tafel Analysis

- Simple Tafel calculation



4) IVMAN PF™ Peak Find Module

- Independent peak finding software

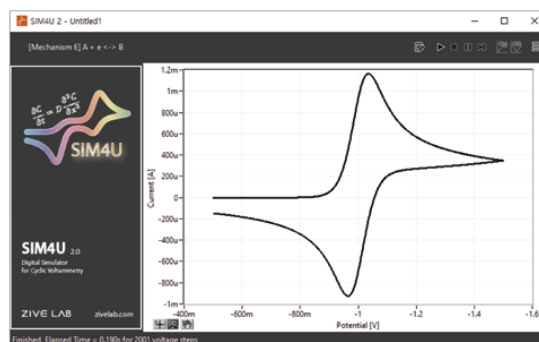


5) IVMAN EX™ Extractor

- Extracting data by cycle number or step
- Exporting ASCII file

Simulation Software for Cyclic Voltammetry, SIM4U **Freeware**

- Single or multiple charge transfer steps and first and second-order chemical steps can be used.
- Cyclic voltammetry method is used for simulation.
- 1D simulation of semi-infinite diffusion processes is used
- The pre-equilibrium can be applied before simulation.
- The effect of uncompensated resistance and double layer capacitance can be simulated.
- Measured data and simulated data can be seen together in the plot.

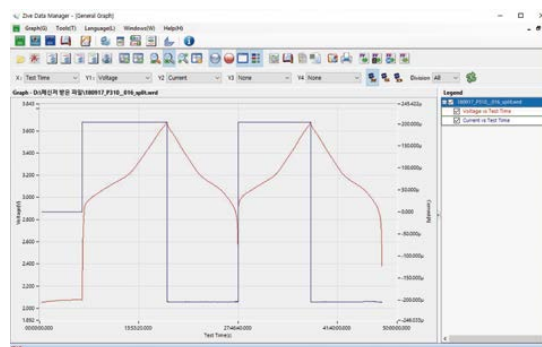


* Downloaded for free from www.zivelab.com.

Software for SI data & SM data set, ZIVE Data Manager **Freeware**

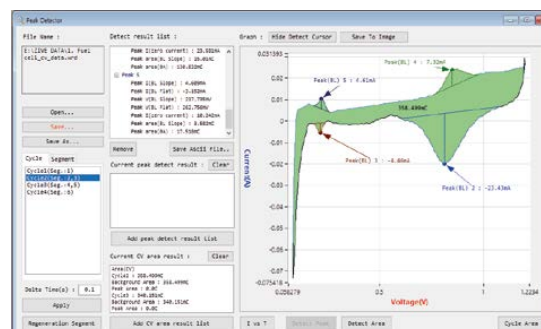
Main functions

- Split data file by cycle or batch
- Resampling function
- Multi working electrodes data format convert
- Subtract current function between two data files
- DC graph, cycle graph, EIS graph function
- Data exporting to Excel or ASCII format
- Data overlay with SI data and SM data



Peak Detector (CV analysis)

- Voltammogram peak finding and analysis
- Cycle area measurement
- IV curve, It curve display



* This software is only for WonATech data files.
Downloaded for free from www.zivelab.com.

Find Your Solution With Us ...



Battery



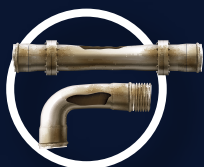
Super Capacitor



Solar Cell



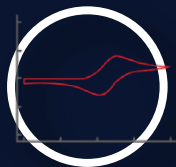
Fuel Cell



Corrosion



Sensor



General



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7, Neunganmal 1-gil, Seocho-gu,
Seoul, 06801, Korea
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Fax: +82-576-2635
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website: www.wonatech.com
www.zivelab.com

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ISO 9000 & ISO 14000 Qualified