



8th EDITION

ELECTROCHEMICAL INSTRUMENTS ACCESSORIES

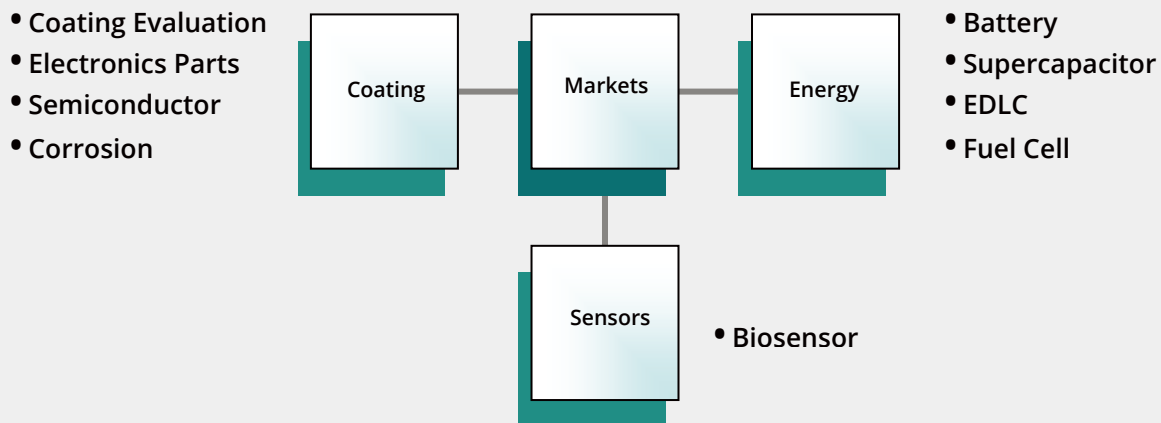
■ Contents

Who We Are	1
Single Channel Potentiostat/Galvanostat	2
WPG Series	
ZIVE SP Series	
Multi-Channel Potentiostat/Galvanostat	6
WMPG Series	
ZIVE MP Series	
Dual Channel Potentiostat	8
Bi-Potentiostat	9
Portable Potentiostat/Galvanostat	9
Battery Test System	10
WBCS3000 Series	
Fuel Cell Test Station	12
Smart2 Series	
Impedance Analyzer	13
BZA Series	
Cell Voltage/Temperature Monitor	15
Power Booster	16
Corrosion Cell Kit	17
Flat Cell Kit	18
Plate Cell Kit	19
Permeation Cell Kit	20
Photo Echem Cell Kit	21
Electrode Holder	21
Universal Electrode Holder / Flat Specimen Holder	
Faraday cage	22
Battery Jig	23
Battery & Coin Cell Jig / Dual Direction High Current Pouch Cell Holder / High Current Cylindrical Battery Jig	
Membrane Conductivity Cell	25
Cables	27
WPG & WMPG & WBCS System Cable / ZIVE System Cable / High Power Cables (Booster & high power unit) / cXM Cable / Z# Cable	
BZA Cable & option	29
Misc.	30
Softwares	32
ZMAN / IVMAN / SIM4U / ZIVE Data Manager software	

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 / Rack 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 / Cell Voltage Monitor / Cell Temperature 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

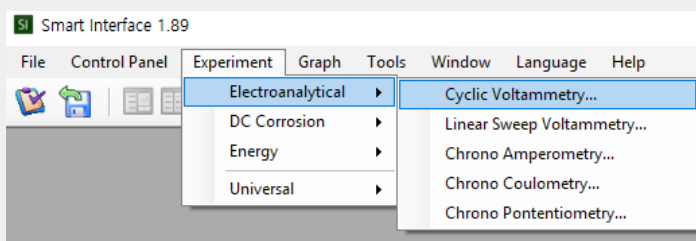


Specifications

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			
• 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	
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	

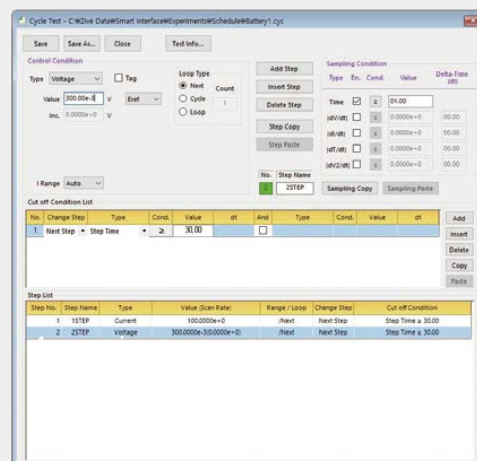
SI(Smart Interface) Software

- 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

- 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



Specifications

	ZIVE SP1	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)>500nA	±0.1% f.s.(gain x1) >100nA	±0.05% f.s.(gain x1) >100nA	±0.03% f.s.(gain x1)>1uA
• compliance voltage	±10V	±40V	±40V	±6V
• slew rate	10V/μsec	7V/μsec	10V/μsec	10V/μsec
• input impedance	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF	>2x10 ¹³ Ω 4.5pF
• frequency range	10μHz ~ 1MHz	10μHz ~ 600kHz	10μHz ~ 1MHz	10μHz ~ 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	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.

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

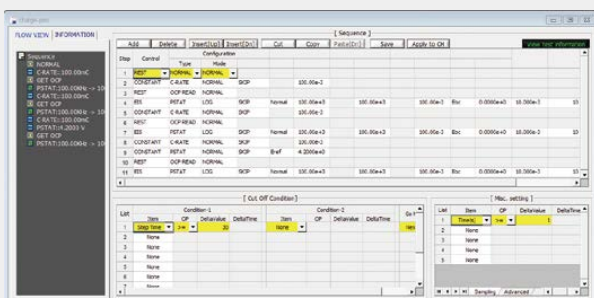
Electrochemical Analysis Software Package

- 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

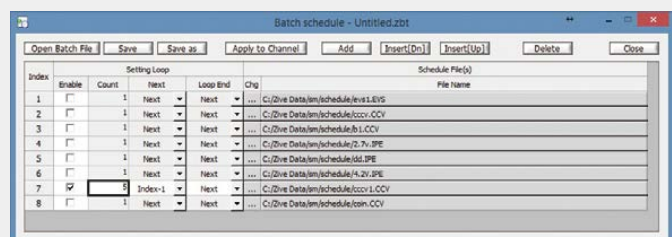
Corrosion* Software Package

- 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.



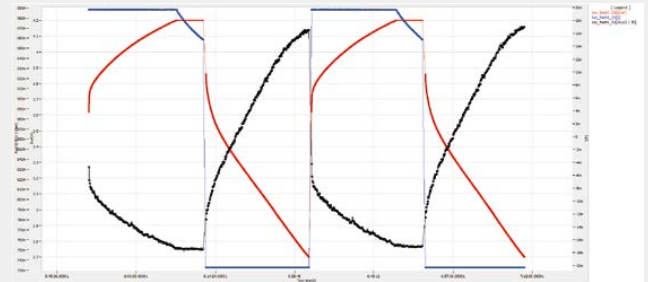
Sequence Editor



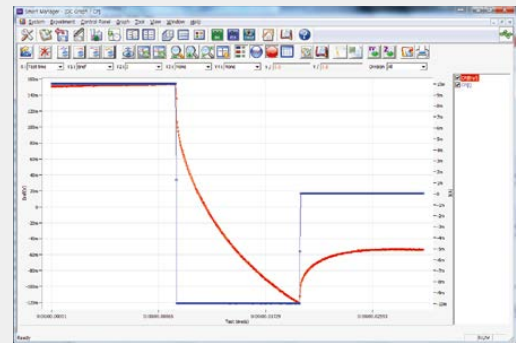
Batch Function

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
	OCV	OCV control
	Step	GSTAT
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
EIS	FAST-P	fast potential sweep control
	GSTAT	galvanostatic EIS
	PSTAT	potentiostatic EIS
	OCV	OCV EIS
	PSUEDO	pseudo galvanostatic EIS
	HFR G	galvanostatic HFR
	HFR P	potentiostatic HFR
	M sine G	galvanostatic multisine EIS
	M sine P	potentiostatic multisine EIS
	RTIP	potentiostatic real time EIS
RTIG	galvanostatic real time EIS	
ACV	AC voltammetry	
Rest		rest control
ZRA		ZRA control
Loop	PSTAT	voltage pulse control
Pulse	GSTAT	current pulse control
	GSINE	current sine wave control
	PSINE	potential sine wave control

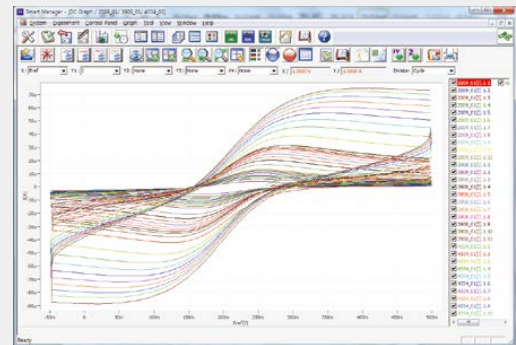
Control Task Parameters



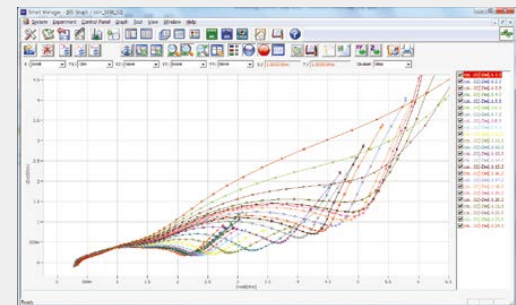
IR measurement(black line) during CC/CV Test



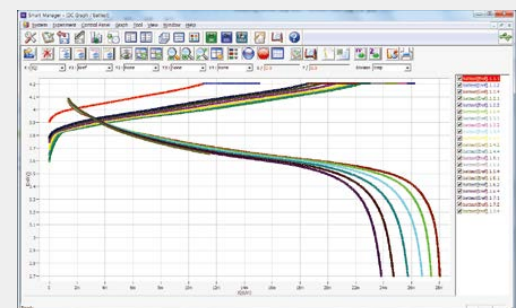
50usec sampling



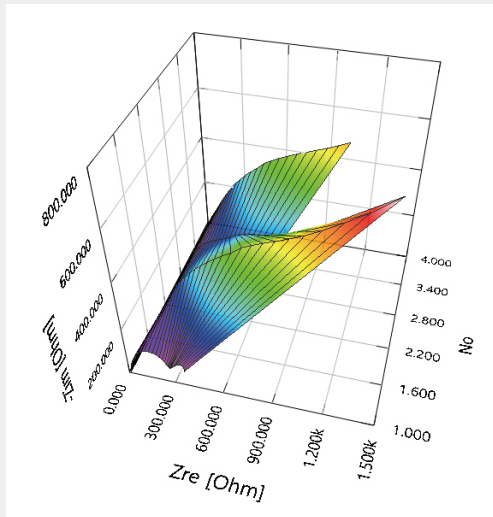
DC graph



EIS graph



BAT graph



Potentiostat EIS Measurement Plotted by ZMAN

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	WMPG1000Ls WMPG1000Le	WMPG1000S	WMPG1000M1 WMPG1000M2	WMPG1000D	WMPG1000H8	WMPG1000H12	WMPG1000HP
• control voltage range*1	±10V(standard)	±10V(standard)	±10V(standard)	customer specified range	customer specified range)	customer specified range	customer specified range
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.	±0.05% f.s	±0.05% f.s	±0.1% f.s.
• voltage resolution	16 bit(0.0015% f.s)	16bit(standard)	16bit(standard)	16bit	16bit	16bit	16bit
• 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)	5 ranges	5 ranges	4 ranges	3 or 1 range
• max. power per channel*3	200mWatt(WMPG1000Ls) 2Watt(WMPG1000Le)	50Watt	100Watt(WMPG1000M1) 200Watt(WMPG1000M2)	400Watt	800Watt	1200Watt	4kWatt
• current accuracy	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.	±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)	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)	10 ¹² Ohm (<10V)	10 ¹² Ohm (<10V)	10 ¹² Ohm (<10V)	10 ¹² Ohm(<10V)
• sampling time	*4	*4	*4	*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

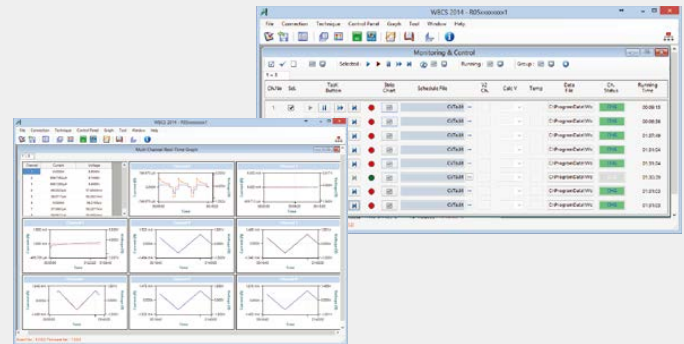
- 32bit/64bit OS environment
- TCP/IP communication
- Max. 200 steps
- Max. 10 cutoff(vertex) condition
- Max. 290,000 data point memory on control board
- Virtual control panel
- Various real time plots & universal axis graphs
- Data backup function
- WYSIWYG graphics
- User friendly software

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

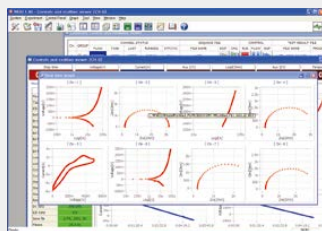
ZIVE MP5 & MP5H & MP5HC

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	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV
voltage accuracy	0.02% fs (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) (MP2A) 1nA to 1A, 10 ranges (1nA) (MP2F)	5nA to 5A, 11 ranges (500pA)
current accuracy	±0.05% f.s.(gain x1) >100nA	±0.02% f.s.(gain x1)>200nA (MP2A) ±0.03% f.s.(gain x1)>100nA f.s. (MP2F)	±0.02% f.s.(gain x1)>500nA
compliance voltage	±12V	±12V	±10V
slew rate	10V/μsec	15V/μsec(MP2A) 10V/μsec(MP2F)	10V/μsec
input impedance	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF
frequency range	10μHz ~ 1MHz	10μHz ~ 2MHz(MP2A)/1MHz(MP2F)	10μHz ~ 1MHz
aux port	1 analog input: ±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	13.9kg(4ch)	23.3kg(MP2A 8ch)	29kg(8ch)
	ZIVE MP5H	ZIVE MP5HC	ZIVE MP10
channel No/module	8channel/module	8channel/module	4channel/module
control voltage range	±40V, ±4V, ±400mV	±10V, ±1V, ±100mV	±5V, ±500mV, ±50mV
voltage accuracy	±4mV ±0.1% of setting	±1mV ±0.05% of setting	±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	±0.1%f.s.(gain x1) >100nA	±0.05% f.s.(gain x1)>100nA	±0.03% f.s.(gain x1)>1uA
compliance voltage	±40V	±40V	±6V
slew rate	7V/μsec	10V/μsec	10V/μsec
input impedance	2x10 ¹³ Ω 1pF	2x10 ¹³ Ω 4.5pF	2x10 ¹³ Ω 4.5pF
frequency range	10μHz ~ 600kHz	10μHz ~ 1MHz	10μHz ~ 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.



CH01	CH02	CH03	CH04
READY	READY	READY	READY
TIME 0:01:07	TIME 0:04:17	TIME 0:01:08	TIME 0:01:08
VOLT 0.0000V	VOLT 0.2000V	VOLT 0.2000V	VOLT 0.0000V
CURR 0.0000A	CURR 0.0000A	CURR 0.0000A	CURR 0.0000A
CAPA 0.0000uF	CAPA 0.0000uF	CAPA 0.0000uF	CAPA 0.0000uF

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.

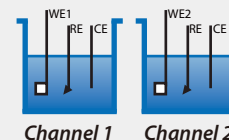
Features

- 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.

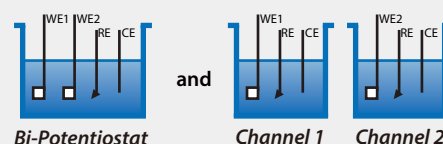
Features

- 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

Battery Test System

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 max. power per channel*3 current accuracy current resolution input impedance sampling time*4 	<ul style="list-style-type: none"> customer specified range ±0.05% f.s.(<10V) 4 ranges 800Watt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) *4 	<ul style="list-style-type: none"> customer specified range ±0.05% f.s.(<10V) 3 ranges 1200Watt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) *4 	<ul style="list-style-type: none"> customer specified range ±0.1% f.s. 3 or 1 range depending on power 4kWatt ±0.1% f.s. 16 bit(0.0015% f.s) 10¹² Ohm (<10V) *4
<p>*1: User can specify the voltage range within <80V for difference between high and low voltage</p> <p>*2: Depending on system specification.</p> <p>*3: power = max. voltage x max. current x 2</p>		<p>*4: - Without option 8~40 channels: 10msec 41~64 channels: 20msec 81~124 channels: 50msec</p>	<p>- With option 8~16 channels: 10msec 17~40 channels: 20msec 41~80 channels: 50msec 81~124 channels: 50msec (2 SIF boards required)</p>

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

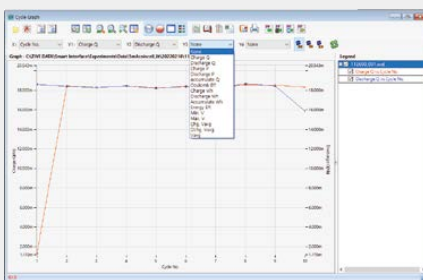
- Cyclic voltammetry
- Linear sweep voltammetry
- Chrono-amperometry
- Chrono-coulometry
- Chrono-potentiometry

Corrosion Measurement

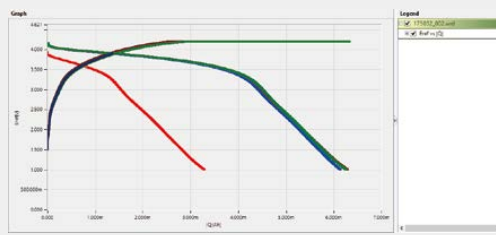
- Tafel plot
- Potentiodynamic
- Potentiostatic
- Galvanostatic
- Cyclic polarization
- Ecorr vs. time
- Linear polarization resistance

For Energy Test

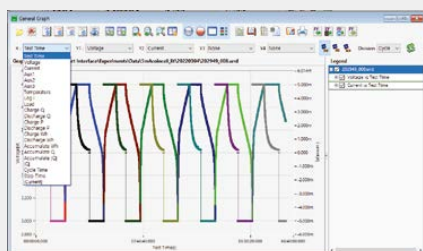
- Charge/Discharge(CC/CV) Test
- Constant Current Charge/Discharge(CC/CC) Test
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- Electrochemical Voltage Spectroscopy(EVS) Test
- Galvanostatic Intermittent Titration Technique(GITT) Test
- Potentiostatic Intermittent Titration Technique(PITT) Test



Cycle graph



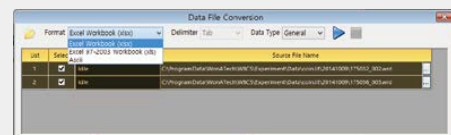
Voltage vs. |capacity| graph



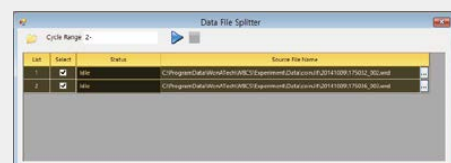
General graph



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

** The Smart™ series can be exported to countries where factory trained engineers can support customers.

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

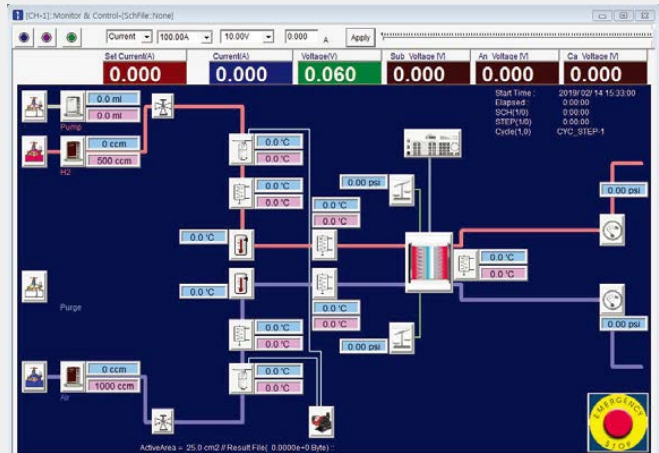
- Solenoid valve : 2ea
 - oxidant gas, purge gas
- MFC for Anode and Cathode : 2set
- Check valve : 3ea
- Temperature controller(with line heater & thermocouples) : 5set
 - gas line temperature controller for outside the instrument : 2set
 - humidifier&gas line temperature controller for inside the instrument : 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

Battery Impedance Analyzer

Single/Multi Channel Battery Impedance Analyzer

The BZA Series 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

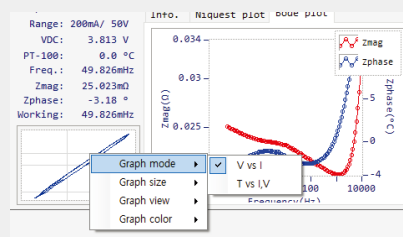
	BZA60/60M	BZA500M	BZA1000
• Impedance measurement			
- measurement range	500uΩ ~ 50Ω	500uΩ ~ 50Ω	500uΩ ~ 50Ω
- accuracy	±1% magnitude (1mΩ - 50Ω) ±1° phase	±1% magnitude (1mΩ - 50Ω) ±1° phase	±1% magnitude (1mΩ - 50Ω) ±1° phase
- frequency range	0.05Hz ~ 10kHz	0.05Hz-4kHz	0.05Hz-4kHz
- current amplitude (p-p)	400uA ~ 2A	400uA ~ 2A	400uA ~ 2A
• DC voltage measurement			
- ADC resolution	24 bit	24 bit	24 bit
- input range	60V/6V (dual range)	500V/50V (dual range)	1000V/100V (dual range)
• AC voltage measurement			
- ADC resolution	24 bit	24 bit	24 bit
- input range	±250mV	±250mV	±250mV
• AC current measurement			
- ADC resolution	24 bit	24 bit	24 bit
- input range	4ea (2A, 200mA, 20mA, 2mA)	4ea (2A, 200mA, 20mA, 2mA)	4ea (2A, 200mA, 20mA, 2mA)
• Sinewave generator			
- frequency range	0.05Hz ~ 10KHz	0.05Hz ~ 10KHz	0.05Hz ~ 4KHz
- frequency accuracy	< 0.1%	< 0.1%	< 0.1%
- frequency resolution	65535/decade	65535/decade	65535/decade
- DAC resolution	10 bit	10 bit	10 bit
- output gain	2ea(X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA)	2ea(X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA)	2ea (X1, X0.2) total 8 current ranges (2A, 400mA, 200mA, 40mA, 20mA, 4mA, 2mA, 400uA)
• Temperature measurement			
- input	RTD probe (PT100)	RTD probe (PT100)	RTD probe (PT100)
- accuracy	Max 1°C	Max 1°C	Max 1°C
• Size(WxHxD)	160 x 60 x 180 mm (BZA60) 207 x 234 x 280mmmm (BZA60M)	270 x 309 x 302mm	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).

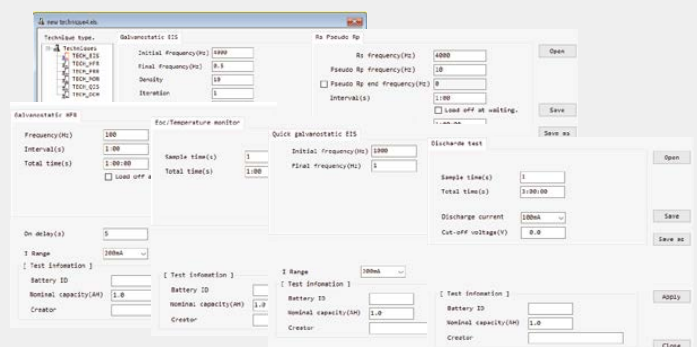
• Real time plot and data monitoring

- 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

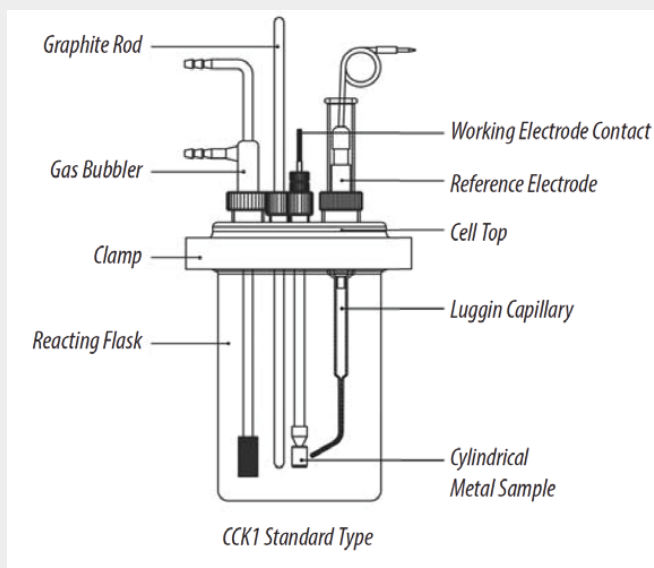
- For ZIVE series
- For high voltage/high current application
- Modular type design
- EIS capability
- Sine wave simulation available
- Simple operation and accurate result
- Safety features for user and instrument itself
- Part number : ZB series



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/4010B	40V	15A	10A	770/960
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(ZB20120U)]
 * 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	LGCK1
Glass vial For CCK1	GVCK1
For WCCK1	GVWCCK1
For CCK05	GVCK05
For WCCK05	GVWCCK05
Gas bubbler For CCK1, WCCK1	GBCK1
For CCK05	GBCK05
Clamp For CCK1, WCCK1	CLCK1
For CCK05, WCCK05	CLCK05

Teflon cell top 1 For CCK1, WCCK1	CTCK1
For CCK05, WCCK05	CTCK05
Teflon cell top 2 For CCK1, WCCK1	CTCK1-2
For CCK05, WCCK05	CTCK05-2
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	GWWFCK2
Luggin capillary for FCK15, FCK2, WFCK2	LGFCK
Graphite plate electrode for FCK2	GR001



LGFCK



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)	

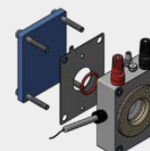
All specifications are subject to change without notice.

Ordering Guide

Description/Part No.

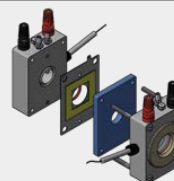
PCELL1 - Standard

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



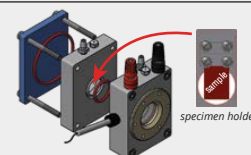
PCELL2

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



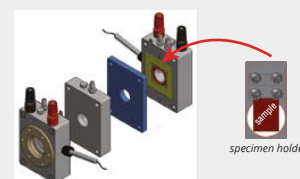
PCELL3

- 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 x300mm(WxHxD)
Window	100x300mm(WxH)

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Faraday cage	Farad2

Battery Jig

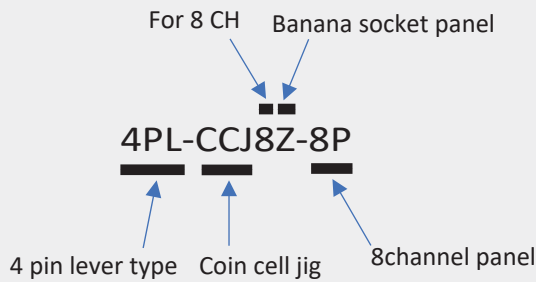
Features

- Holds different sizes of 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

Ordering Guide

	Part No.	Description
1st	4PL	4 Pin Lever type
	4PK	4 Pin Knob type
2nd	CCJ	Coin cell jig
	UCJM	Universal cell jig
	UCJH	Universal jig for high current
	PCJ	Pouch cell jig
3rd	Channel No.	Channel Quantity
4th		Normal type
	Z	Banana socket panel
5th	4P	4ch per panel
	8P	8ch per panel

ex)



- 4PL-CCJ8Z-8P
- 8 channel Coin Cell Jig
 - 4pin lever type
 - banana socket panel (without jig cable)
 - 8ch per pannel



- 4PL-UCJM8Z-8P
- 8 channel Universal Cell Jig
 - 4 pin lever type
 - banana socket panel (without jig cable)
 - 8ch per pannel



- 4PK-UCJH4-4P
- 4 channel universal jig for high current
 - 4 pin knob type
 - 4ch per panel



- 4PL-PCJ8-4P
- 8 channel Pouch Cell Jig
 - 4 pin lever type
 - 4ch per pannel
 - including 3m jig cables



- UCJ1A
- 1 channel universal jig
 - 4pin lever type



- PCJ1
- 1 channel Pouch Cell Jig
 - 4pin lever type
 - For small size pouch cell

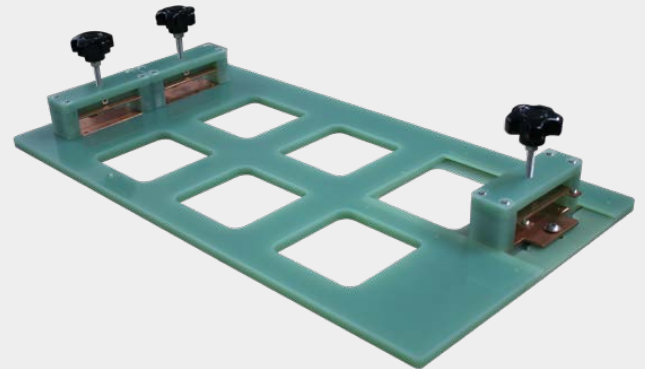


- PRCJ1
- 1 channel Prismatic Cell Jig
 - 4 pin probe knob
 - For prismatic battery or pouch cell

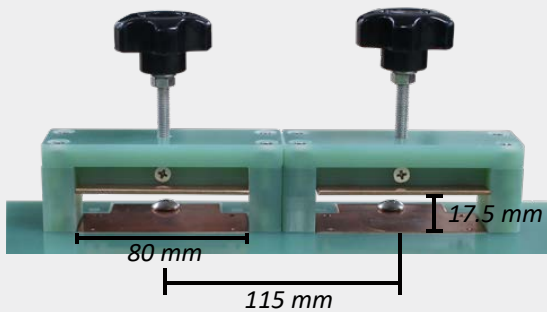
Knob type Dual Direction Pouch Cell Jig

Features

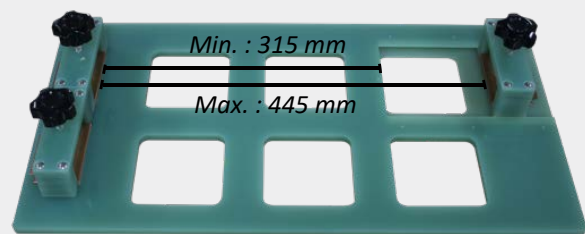
- Easy to hold pouch cell using Knob
- Kelvin probe type 4pin contact
- Bidirectional and unidirectional measurements available
- Epoxy material with excellent chemical resistance and heat resistance



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

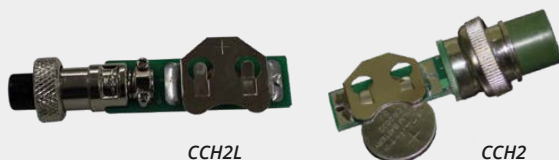
Coin Cell Holder & Clamp Cable

Accessories

Coin Cell Holder

For WMPG/WBCS System

- Direct connect to cell connector



CCH2L

CCH2

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

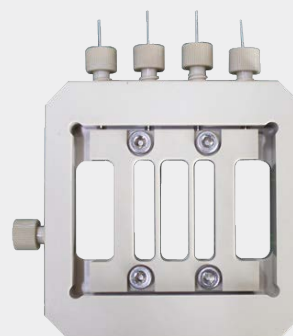
Membrane Conductivity Cell

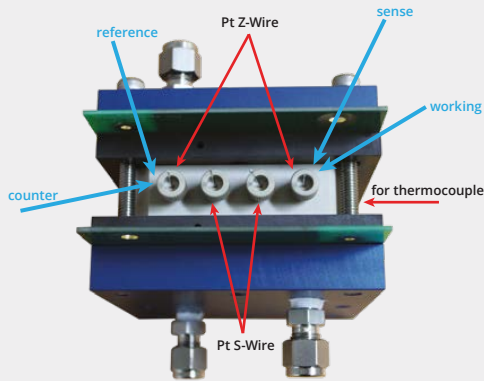
Accessories

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.

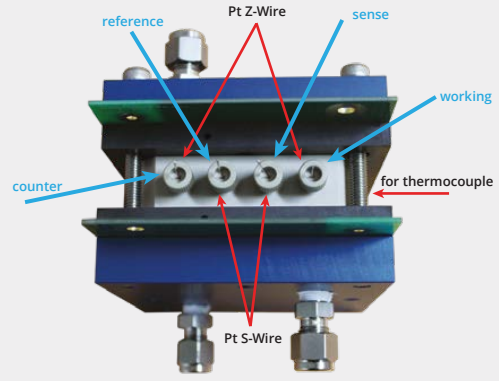
By placing the conductivity cell between the anode and cathode conduction plate, you can simply assemble the conductivity cell into your fuel cell hardware.

- 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







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 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 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

Cable

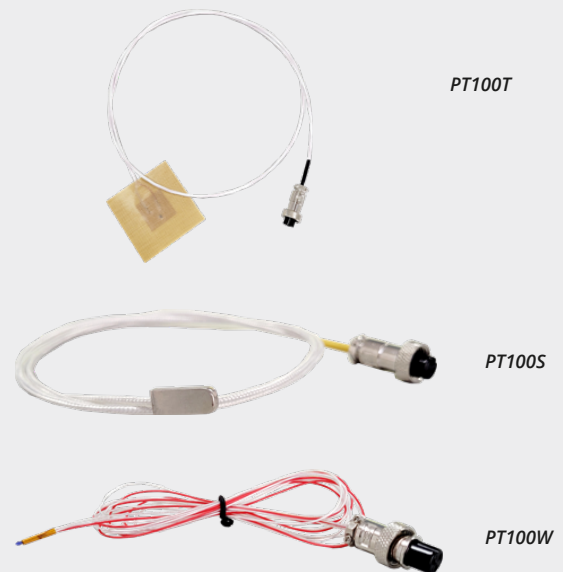
For BZA100&1000

	
<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

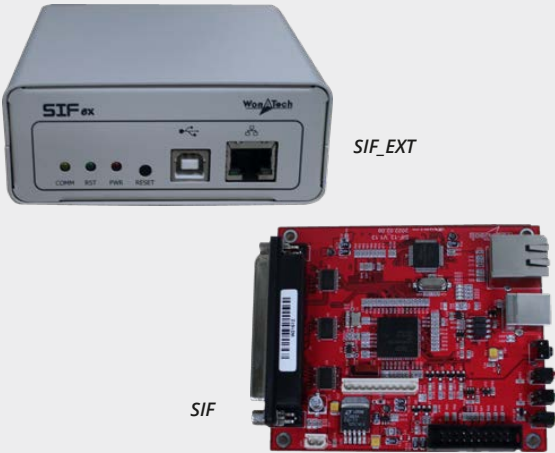
Description	Part No.
PT100 temperature sensor	
tablet type	PT100T
sheet type	PT100S
wire type	PT100W

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	

SI Interface For WMPG/WBCS



Ordering Guide

Description	Part No.
SIF external module	SIF_EXT
SIF board	SIF

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).

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

PC mounting For Ls/Le rack model only



Aux Voltage Measurement For WMPG/WBCS



Ordering Guide

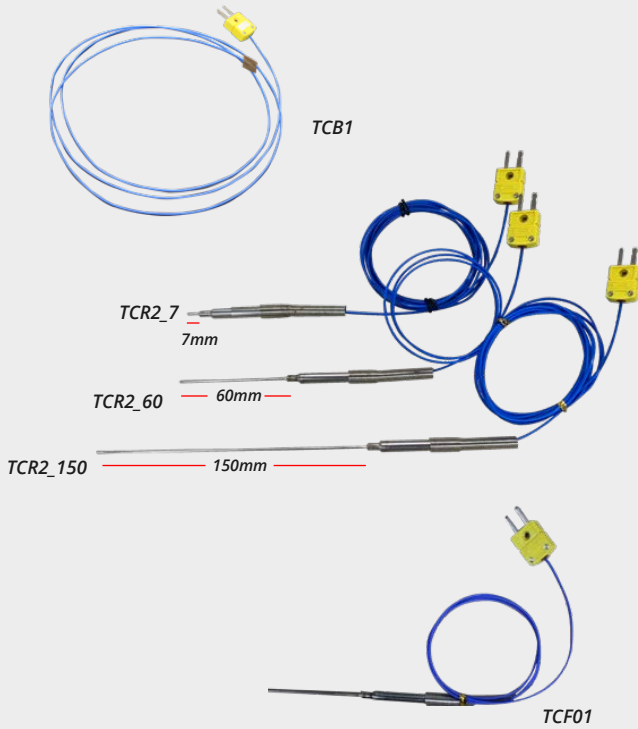
Description	Part No.
Aux Voltage Measurement	
8ch module	AUX8
8ch module for M1 module	AUX8/M1
8ch module for M2 module	AUX8/M2
8ch module for high power controller	AUX8/H

Does not include auxiliary cable(BA).

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

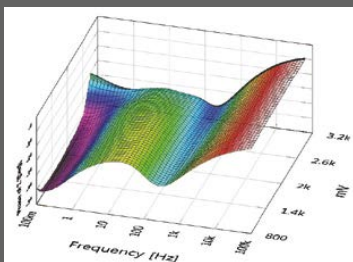


Ordering Guide

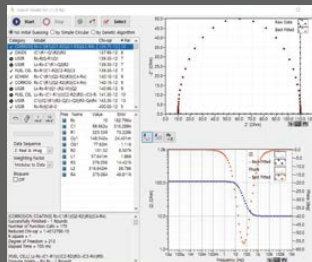
Description	Part No.
Dummy Cell	Dummy1

EIS Data Analysis Software, ZMAN™

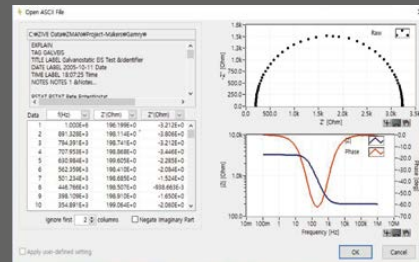
- Model simulation and fitting
- 2D- and 3D-Bode- and Nyquist plots
- Automatic equivalent circuit model search function
- Project concept to handle multiple EIS data analysis
- parameter plot from fitted elements value
- compatible with data format from Zahner, Gamry, Ametek etc. (License code is needed)
- 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



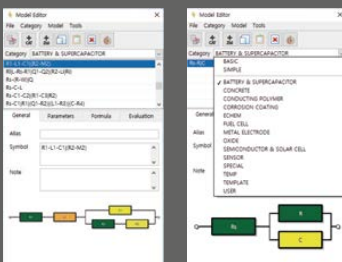
3D Bode plot for series measurement



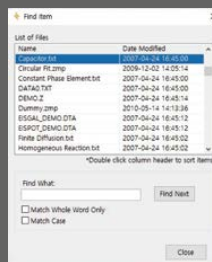
Automatic model searching



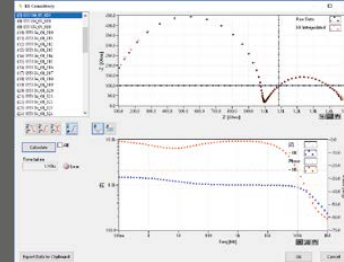
Importing 3rd parties ASCII data file



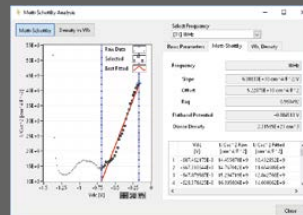
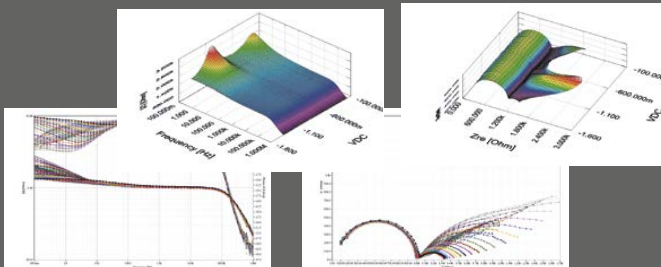
Model editor & model library



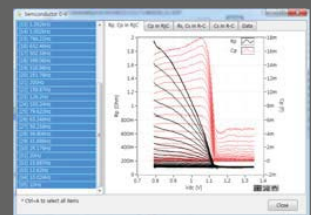
Finding data file menu



KK consistency



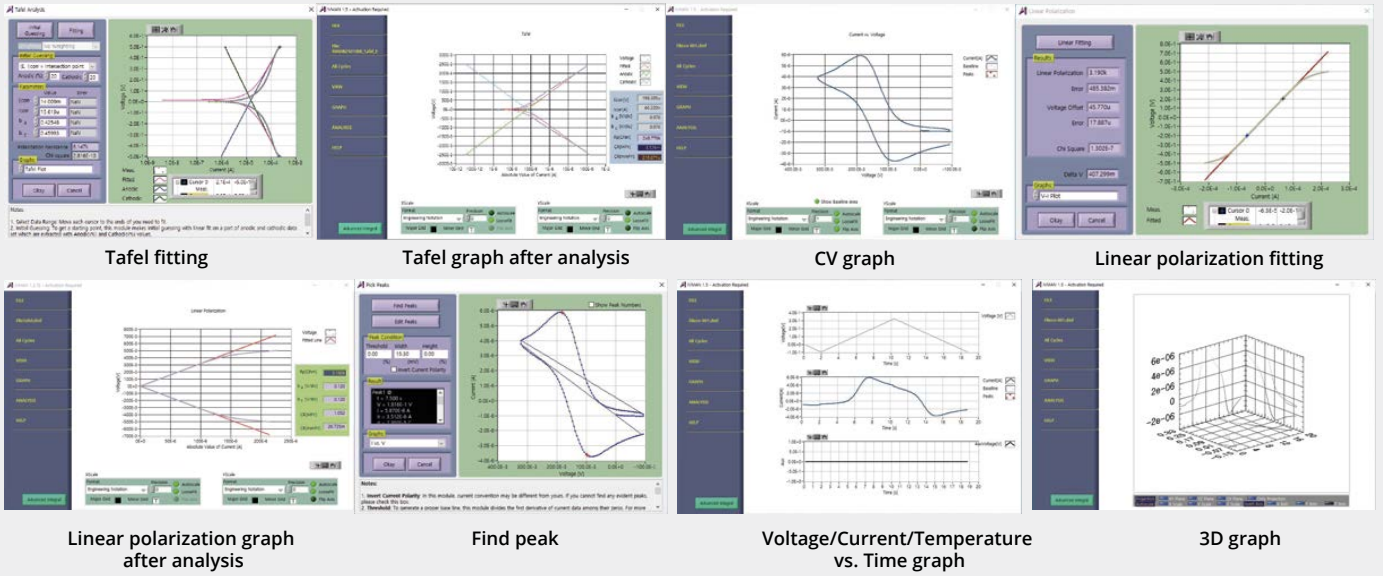
Mott-Schottky analysis window



C/R-V graph

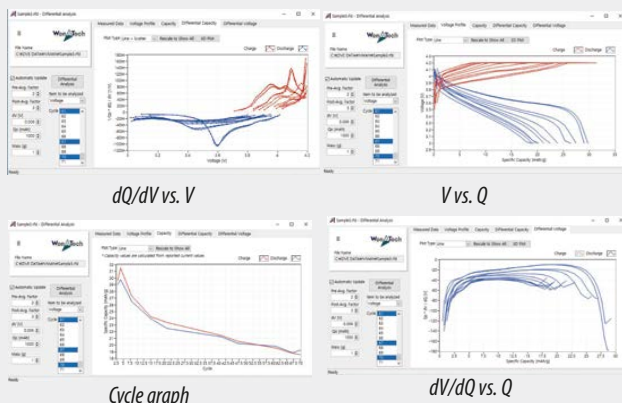
DC Data Analysis Software, IVMAN™ Main Software

- 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)

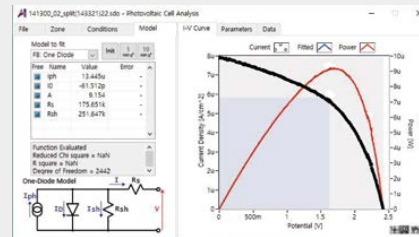


Optional Software for WonATech data, IVMAN™ Option Software

- 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
- 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)

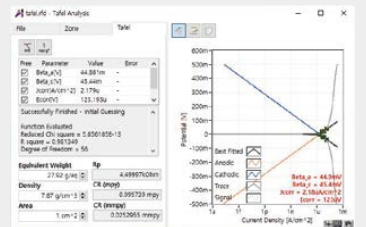


2) IVMAN™ Photovoltaic Cell Analysis



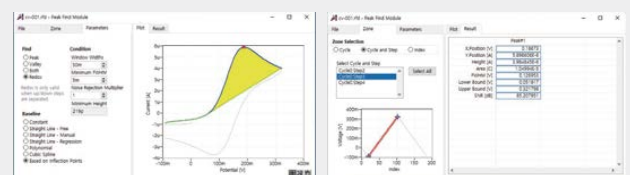
3) IVMAN TA™ Tafel Analysis

- Simple Tafel calculation



4) IVMAN PF™ Peak Find Module

- Independent peak finding software

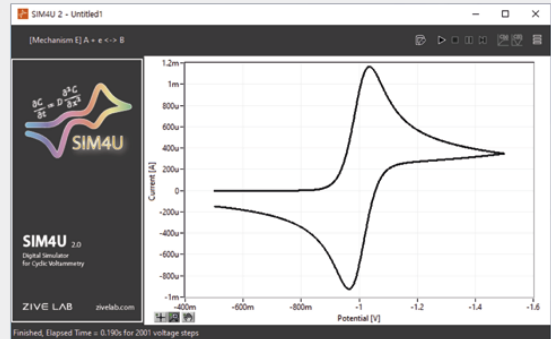


5) IVMAN EX™ Extractor

- 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.

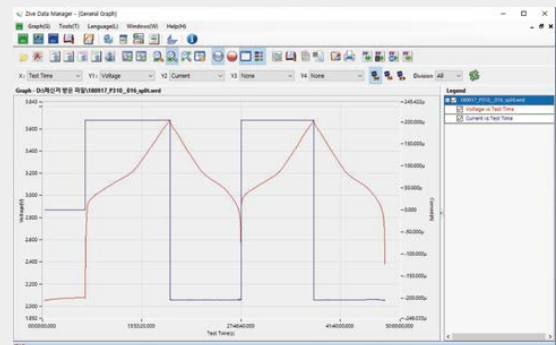


* Downloaded for free from www.zivelab.com.

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

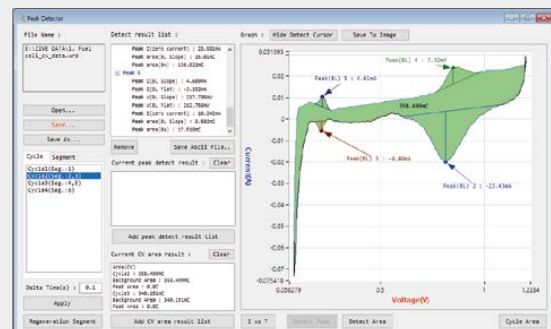
Main functions

- Split data file by cycle or batch
- Resampling function
- Multi working electrodes data format convert
- Substract 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.

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