3nd Edition

Electrochemical Instruments

Potentiostat/Galvanostat
Impedance Analyzer
Battery Test System
Fuel Cell Test System
Redox Flow Battery Test Sytem
Software
Accessories

Gateway to
Electrochemistry

WonATech

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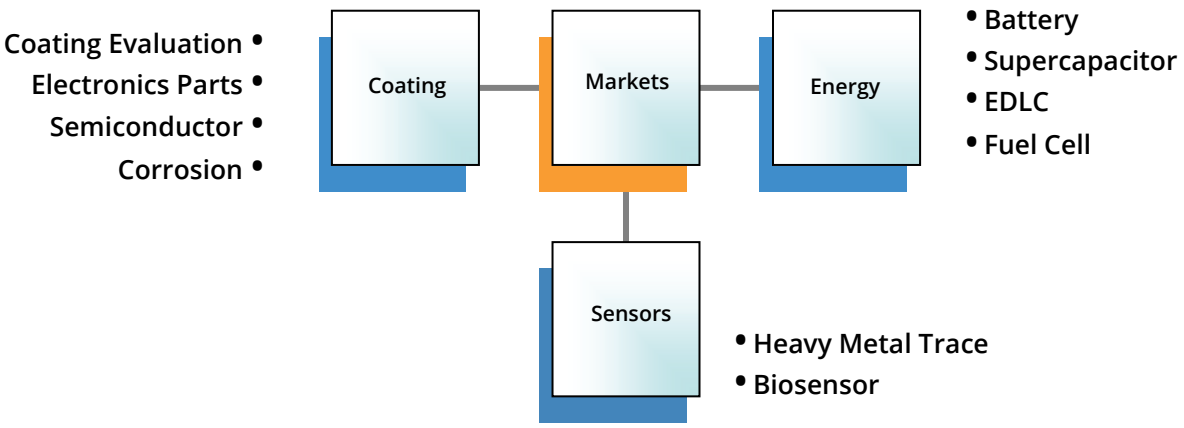
- Coin Cell Jig
- Pouch Cell Jig
- Coin Cell Holder
- Conductivity Test Jig
- Membrane Conductivity Cell
- Power Booster

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 not 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

- 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

Accessories

- For Fuel Cell Application : Fuel Cell Hardware Fixture, Membrane Conductivity Cell, Impedance Monitoring System, etc.
- For Battery Application : Battery Jig, Pouch Cell Jig, Coin Cell Holder, Cell Voltage & Temperature Monitoring System, Redox Flow Battery Test System, 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.

Single Channel Potentiostat/Galvanostat

WPG100 Series

The WPG series is an econmonical 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(option)
- LAN communication

Standard Type WPG100e | *Mid power type WPG100S* | *Mid power type WPG100H8* | *Mid power type WPG100H12* | *High Power Type WPG100HP* | *High Voltage Type WPG100SH*

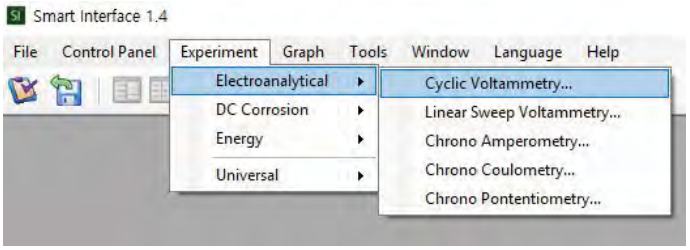
Specifications

	WPG100e	WPG100S	WPG100H8
• control voltage range	±10V(standard) or user demand specification	user demand specification (<±40V)	user demand specification (<±40V)
• voltage accuracy	±0.02% f.s.	±0.05% f.s.	±0.05% f.s.
• current range	8 ranges or user demand specification	6 ranges	6 ranges
• current accuracy	±0.02% f.s.	±0.05% f.s.	±0.1% f.s.
• compliance voltage	±12V(standard)	user demand specification (<±40V)	user demand specification (<±40V)
• sampling time	>500usec	>500usec	>500usec

	WPG100H12	WPG100HP	WPG100SH
• control voltage range	user demand specification (<±40V)	user demand specification (<±40V)	0 ~ +200V
• voltage accuracy	±0.05% f.s.	±0.1% f.s.	±0.5% f.s.
• current range	4 ranges	Maximum current depending on voltage range 1. bipolar 1)+/-5V, 200A 2)+/-10V, 160A 3)+/-20V, 80A 4)+/-30V, 50A 5)+/-40V, 10A 2. unipolar 1)-2V~+10V, 200A 2)-2V~+20V, 140A 3)-2V~+30V, 100A 4)-0V~+40V, 80A	4 ranges
• current accuracy	±0.1% f.s.	±0.1% f.s.	±0.1% f.s.
• compliance voltage	user demand specification (<±40V)	user demand specification (<±40V)	user demand specification (0 ~ +200V)
• sampling time	>500usec	>500usec	>500usec

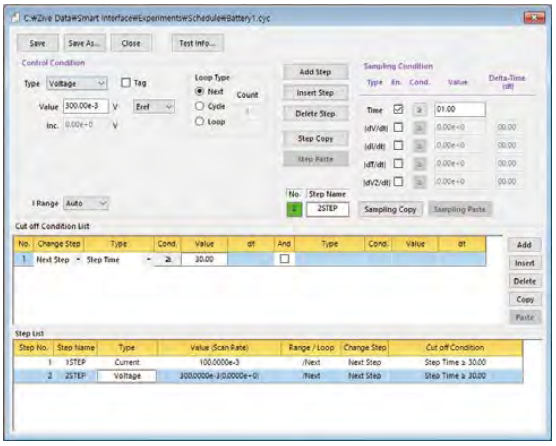
SI(Smart Interface) Software

- 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



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 sereis 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 2MHz.

Features

- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Vompact 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)	0nA to 2A, 10 ranges (2nA)
• current accuracy	±0.05% f.s.(gain x1)>100nA	±0.02% f.s.(gain x1)>200nA	±0.02% fs (gain x1)
• compliance voltage	±12V	±12V	±20V
• slew rate	10V/μsec	15V/μsec	8V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||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: 2 output/1 input analog: 1 output/3 input
• size(WxDxH)	160x330x81mm	93x305.7x158mm	195x313x105mm
• weight	2.05kg	2.95kg	

Single Channel Potentiostat/Galvanostat

Specifications

	ZIVE SP5	ZIVE SP5HC	ZIVE SP5H	ZIVE SP10
• control voltage range	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±40V, ±4V, ±400mV	±5V, ±500mV, ±50mV
• voltage accuracy	±1mV ±0.05% of setting (reading)	±1mV ±0.1% of setting (reading)	±4mV ±0.1% of setting (reading)	±1mV ±0.05% of setting (reading)
• 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	±0.1% f.s.(gain x1) >500nA	±0.1% f.s.(gain x1) >100nA	±0.2% f.s.(gain x1) >100nA	±0.1% f.s.(gain x1) >1uA
• compliance voltage	±10V	±40V	±40V	±6V
• slew rate	10V/μsec	10V/μsec	7V/μsec	10V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||4.5pF	>$2x10^{13}\Omega$||4.5pF
• frequency range	10μHz ~ 1MHz	10μHz ~ 1MHz	10μHz ~ 600kHz	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	7.7Kg

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

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

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

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

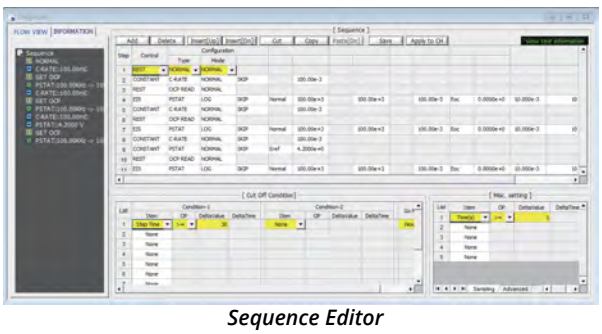
Corrosion* Software Package

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

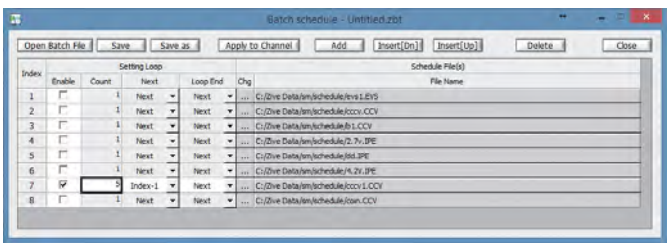
(*) Corrosion technique supports IR compensation.

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

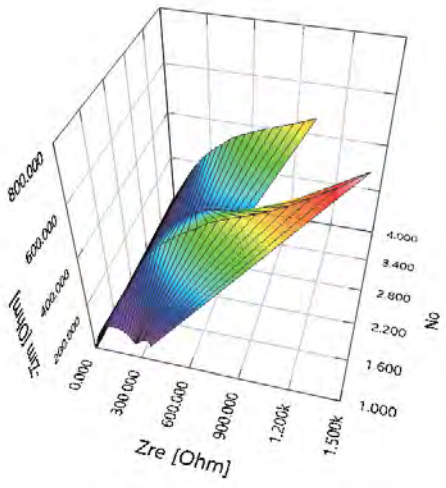


Batch Function

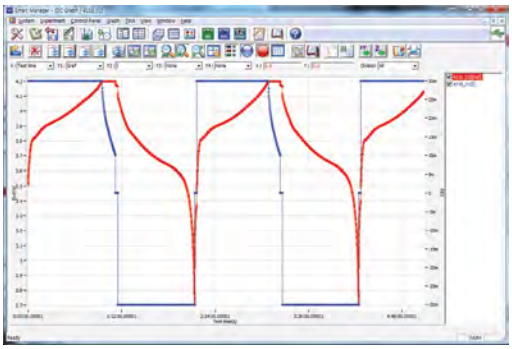
Single Channel Potentiostat/Galvanostat

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
	MsineG	galvanostatic multisine EIS
	MsineP	potentiostatic multisine EIS
Rest		rest control
ZRA		ZRA control
Loop		loop control
Pulse	PSTAT	voltage pulse control
	GSTAT	current pulse control
	GSINE	current sine wave control
	PSINE	potential sine wave control

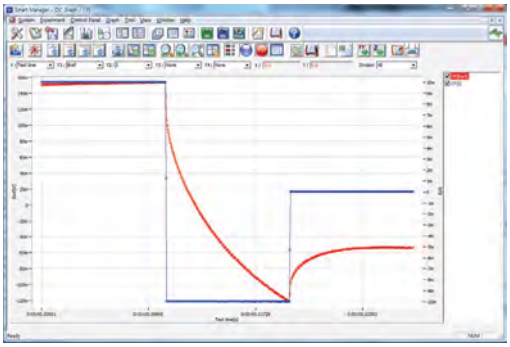
Control Task Parameters



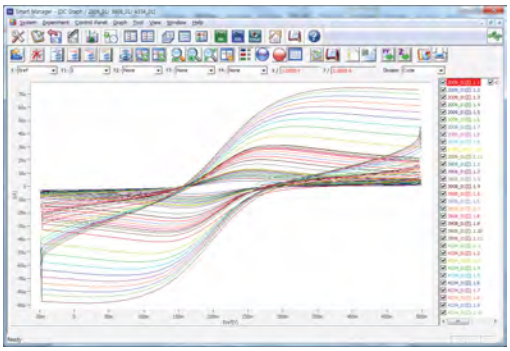
Potentiostat EIS Measurement Plotted by ZMAN



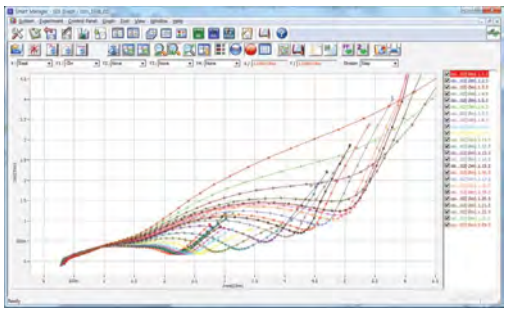
CC/CV Test



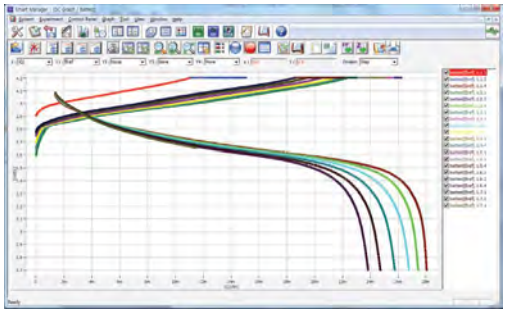
50usec sampling



DC graph



EIS graph



BAT graph

Multi-Channel Potentiostat/Galvanostat

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
• 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	16bit(standard)	16bit(standard)	16bit(standard)
• current range*2	Max. ±10mA@10V(WMPG1000Ls) Max. ±100mA@10V(WMPG1000Le) 5 ranges	Max. ±1A 5 ranges	Max. ±5A@10V(WMPG1000M1) Max. ±10A@10V(WMPG1000M2) 5 ranges
• 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	±0.0015% f.s	±0.0015% f.s.	±0.0015% f.s.
• input impedance	10^{12} Ohm	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)
• sampling time	*4	*4	*4

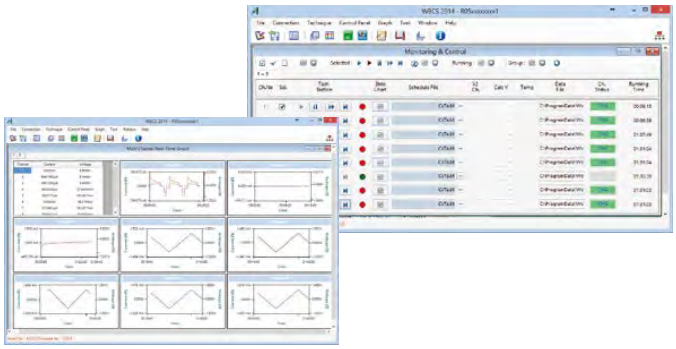
	WMPG1000D	WMPG1000H8	WMPG1000H12	WMPG1000HP
• control voltage range*1	customer's specified range (<±40V)	customer's specified range (<±40V)	customer's specified range (<±40V)	customer's specified range (<±40V)
• voltage accuracy	±0.05% f.s.	±0.05% f.s	±0.05% f.s	±0.1% f.s.
• voltage resolution	16bit	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 ±40V. *2: Can vary depending on systems. *3: power = max. voltage x max. current x 2
*4: 8~16ch system : 20msec / 17~32 ch system : 25msec / 33~128 ch system : 50msec

Multi-Channel Potentiostat/Galvanostat

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

Multi-Channel Potentiostat/Galvanostat

Specifications

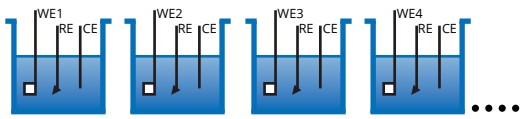
	ZIVE MP1	ZIVE MP2A/MP2F	ZIVE MP5
• channel No/module	4 or 8channel/module	8channel/module (MP2A) 4channel/module (MP2F)	8channel/module
• control voltage range	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV
• voltage accuracy	±1mV ±0.05% of setting(reading)	±0.02% fs (gain x1)	±1mV ±0.05% of setting(reading)
• 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	±0.1% f.s.(gain x1) >100nA	±0.02% f.s.(gain x1)>100nA f.s.	±0.1% f.s.(gain x1)>500nA
• compliance voltage	±12V	±12V	±10V
• slew rate	10V/μsec	15V/μsec	10V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||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/2 input, analog: 1 output/3 input
• size(WxDxH)	199x455x388mm(4ch system) 448x426x208mm(8ch system)	448.7x188.4x535.4mm (MP2A) 199x455x388mm (MP2F)	448.7x535.4x277mm
• weight		23.3kg(8ch) (MP2A)	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(reading)	±1mV ±0.1% of setting(reading)	±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	±0.2%f.s.(gain x1) >100nA	±0.1% f.s.(gain x1)>100nA	±0.02% f.s.(gain x1)>1uA
• compliance voltage	±40V	±40V	±6V
• slew rate	7V/μsec	10V/μsec	10V/μsec
• input impedance	$2x10^{13}\Omega$||1pF	$2x10^{13}\Omega$||4.5pF	$2x10^{13}\Omega$||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)	

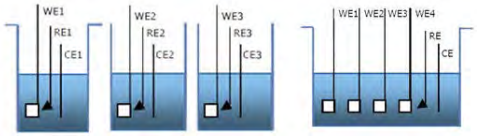
SM (Smart Manager) Software

- 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.

Cell Configuration available for ZIVE MP2A



Cell Configuration available for ZIVE MP2F



CH1 CH2 CH3 Multi Working Electrode

Dual Channel Potentiostat

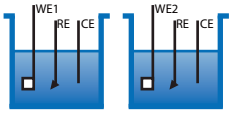
The dual channel potentiostat/galvanostat/FRA, ZIVE BP2A, is designed to support dual cells and each cell consists of one working electrode, one reference electrode and one counter electrode. It is suitable for sample characterization simultaneously or independently with the complete DC and impedance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

Features

- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Compact size with full functions
- Front panel LCD display
- Ideal for bio sensor research, FET sensor, permeation test etc.
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling
- 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



Channel 1 *Channel 2*

Bi-Potentiostat

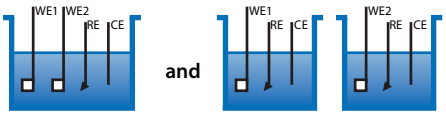
The ZIVE BP2F, a dual channel potentiostat/galvanostat/FRA, is to support dual-working-electrode cell with one reference and one counter electrode configuration(bi-potentiostat) for sample characterization. Each channel can conduct DC and impedance test simultaneously and/or independently. The ZIVE BP2F 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 independe
  - dual working electrodes with one reference and one counter electrode configuration available
- Compact size with full functions
- Front panel LCD display
- Ideal for bio sensor research, FET sensor, permeation test etc.
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed data sampling
- 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



Bi-Potentiostat *Channel 1* *Channel 2*

Portable Potentiostat/Galvanostat

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 labtop 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. PP1e's optional external battery pack can be used instead of AC/DC adapter.

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
  : burst mode(50usec/sample), normal mode(1msec/sample)
  & fast sweep mode(2usec or 3usec/sample)

ZIVE PP1e ZIVE PP3

- 3 measurement voltage ranges and 12(BP),11(PP3), 10(PP1e) 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

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) 1nA ~ 1A, 10 ranges (1nA) (BP2F)	100nA ~ 1A, 9 ranges (10nA)	10nA ~ 1A, 10 ranges (1nA)
• current accuracy	±0.02% f.s.(gain x1)>200nA	±0.05% f.s.(gain x1)>100nA	±0.2% f.s.(gain x1)>100nA
• compliance voltage	±12V	±12V	±20V
• slew rate	10V/μsec	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, analog: 1 output/3 input	1 analog input: ±10V	digital: 3 output/1 input, analog: 1 output/3 input
• size(WxDxH)	209X270X378mm (BP2A) 232.6X243.3x324.6mm (BP2F)	411x321x165mm	411x321x165mm
• weight	9.25Kg (BP2A)	4.4Kg	4.4Kg

Battery Test System

WBCS3000 Series

The battery cycler, WBCS3000 series, choose plug-in type module with independent power suppliers per 8 channel substation. Each substation can be used as independent system with optional Stand Alone 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 (except fixed specification system)
- Auxiliary voltage, temperature measurement, current pulse capability option
- User friendly software and free upgrade
- LAN communication

Low Current Type
WBCS3000L32/WBCS3000Le32

Low Current Type(32CH)
WBCS3000L/WBCS3000Le

Low Current Type(32CH)
WBCS3000Lx

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 WBCS3000Le	WBCS3000Ls32 WBCS3000Le32 WBCS3000Lx32	WBCS3000S
• control voltage range*1	±5V(standard)	±5V(Ls/Le), -1V to +5V(Lx) (standard)	±5V(standard)
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• voltage resolution	16 bit	16 bit	16 bit
• current range*2	Max. ±10mA@5V(WBCS0000Ls) Max. ±100mA@5V(WBCS3000Le) 4 ranges	Max. ±10mA@5V(WBCS0000Ls32) Max. ±100mA@5V(WBCS3000Le32) Max. ±1A@-1V to +5V(WBCS3000Lx32) 4 ranges	Max. ±5A@5V 4 ranges
• max. power per channel*3	200mWatt(WBCS3000Ls) 2Watt(WBCS3000Le)	200mWatt(WBCS3000Ls32) 2Watt(WBCS3000Le32) 6Watt(WBCS3000Lx32)	50Watt
• current accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• current resolution	16 bit	16 bit	16 bit
• input impedance	10^{12} Ohm	10^{12} Ohm	10^{12} Ohm (<10V)
• sampling time	*4	25msec	*4

*1: User can specify the voltage range within (V+)-(V-)<80V.
*2: Can vary depending on systems.
*3: power = max. voltage x max. current x 2
*4: 8~16ch system : 20msec / 17~32ch system : 25msec / 33~128 ch system : 50msec.

Battery Test System

Specifications

	WBCS3000M1	WBCS3000M2	WBCS3000D
• control voltage range*1	±5V(standard)	±5V(standard)	user's specification *1
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.
• voltage resolution	16 bit	16 bit	16 bit
• current range*2	Max. ±10A@5V 4 ranges	Max. ±20A@5V 4 ranges	4 ranges
• max. power per channel*3	100Watt	200Watt	400Watt
• current accuracy	±0.05% f.s.	±0.05% f.s.	±0.05% f.s.
• current resolution	16 bit	16 bit	16 bit
• input impedance	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)
• sampling time*4	*4	*4	*4

	WBCS3000H8	WBCS3000H12	WBCS3000HP
• control voltage range*1	user's specification *1	user's specification *1	user's specification *1
• voltage accuracy	±0.05% f.s.	±0.05% f.s.	±0.1% f.s.
• voltage resolution	16 bit	16 bit	16 bit
• current range*2	4 ranges	3 ranges	1 or 3 range depending on power
• max. power per channel*3	800Watt	1200Watt	4000Watt
• current accuracy	±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)	±0.0015% f.s.
• input impedance	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 (V+)-(V-)<80V.
*2: Can vary depending on systems.
*3: power = max. voltage x max. current x 2
*4: 8~16ch system : 20msec / 17~32ch system : 25msec / 33~128 ch system : 50msec.

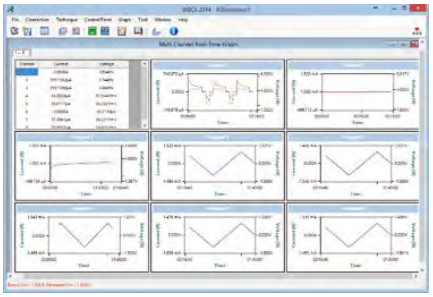
SI(Smart Interface) Software

- *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*

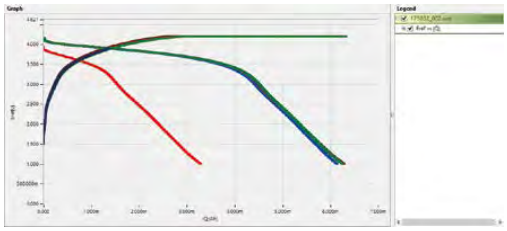
For Electroanalytical Measurement
- Cyclic voltammetry
- Linear sweep voltammetry
- Chrono-amperometry
- Chrono-coulometry
- Chrono-potentiometry

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

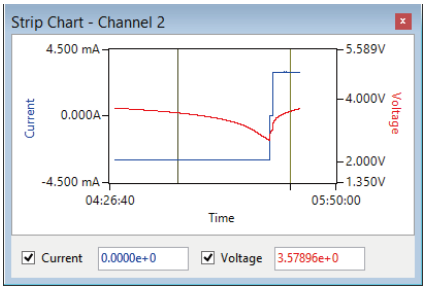
For Energy Test
- Charge/Discharge(CC/CV) Test
- Constant Current Charge/Discharge(CC/CC) Test
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- Electrochemical Voltage Spectroscopy(EVS) Test
- Galvanostatic Intermittent Titration Technique(GITT) Test
- Potentiostatic Intermittent Titration Technique(PITT)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



Multichannel real time graph



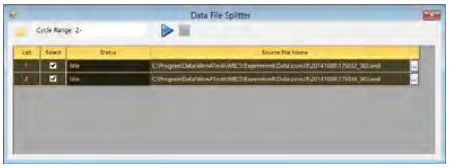
Voltage vs. |capacity| graph



Single channel real time graph

Channel status display

Data conversion to ASCII & Excel



Data file split by cycle number

Fuel Cell Test Station

Smart2™ Series – 100Watt Fuel Cell Test System

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 single cell (PEMFC, PEM/DMFC)
- 2 models are available : SMART2PEM/DM™, SMART2PEM™
- 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 for fuel and oxidant gas
- Various safety functions including watch-dog function
- Powerful software with independent data analysis software

Smart2PEM™ for PEMFC

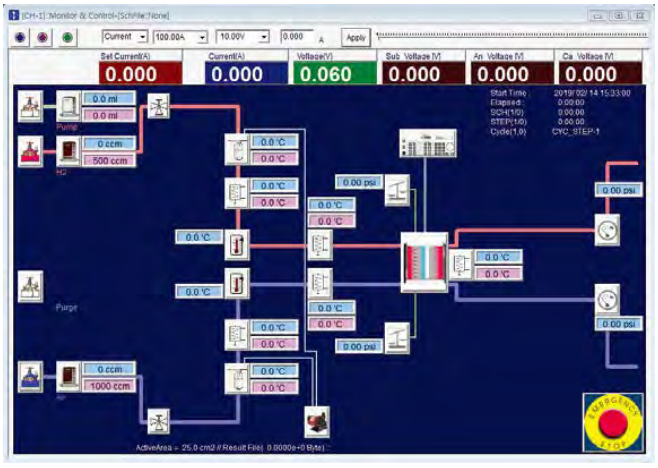
Standard Configuration

- Solenoid valve: 5ea
  (fuel gas, oxidant gas, purge gas, water refill control for humdiifiers)
- MFC for Anode and Cathode (2set)
- Check valve: 6ea (Each MFC has two check valve at in & out ;
  Purge gas out for anode & cathode)
- 3 Way valve: 2ea for wet gas or dry gas selection
- Humidifier : 2set & Automatic water feeding for humidifier: 2ea
- Back pressure regulator : 2ea & Pressure sensor: 2ea
- Temperature controller(with line heater & thermocouples): 7set
  - Humidifier Temperature controller 2set,
  - Instrument inside gas line Temperature controller:2set,
  - Instrument outside gas line Temperature controller: 2set
  - Cell Temperature controller: 1set
- Electronic Load 1set
- System controller including DAQ system with emergency button
- Control PC(option) with Smart software

Smart2™ for PEM/DMFC

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

- H2 Gas detectors
- Impedance Monitor
- External potentiostat/galvanostat
- Zero voltage booster
- Fuel cell hardware fixture
- Conductivity Cell
- Conductivity Jig

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

Flow Cell Controller

The FC1 Flow Cell Cntroller is a basic controller from SMART2 fuel cell test system controller family and it is specially designed for process control purposes. It is suitable for operating parameters for other devices such as MFC, heating device, solution supply pump, rotator, etc. For example, user can build his/her own system for monitoring flow cell performance by connecting relevant components and equipments.

It contains two general purpose AI(analog input)/AO(analog output) in the range of 0 ~ 10V, which are located on the front panel and other signal in/out ports on the back panel. And it communicates with a computer by the way of a Local Area Network(LAN).

The FC1 supports various safety features including watchdog, emergency button, limit values, etc. for both personal safety and instrument protection. A GUI(graphical user interface) provides an easy-to-use powerful interface for novice and adavanced users.

Features

Flow Cell Controller, FC1

- Gas or liquid flow speed control
- Flow on/off control
- Temperature control
- External humidifier control
  (gas flowing on/off, dry/wet gas selection etc.)
- Rotator control
- Comes with 2ea analog inputs and 2ea analog outputs
- A software with powerful graphical user interface.
- The various safety functions are provided to protect the cell and system from being damaged.
- LAN communication

General Specifications

- Analog to digital converter(ADC)
  - input voltage range : 10V
- Digital to analog converter(DAC)
  - output voltage range : 10V
- Max. sampling interval : 1 sec
- Analog in(AI) port, 2ea
  - input voltage range : 0~10V
  - input impedance : 10 GOhms
- Analog out(AO) Port, 2ea
  - output voltage range : 0~10V
- MFC port, 2ea
- temperature control port
- sensing port
- valve control port, 12ea

Additional Modules

- MFC module, GM1
- temperature module, TM1
- humidifier module, HM1

Flow Cell Controller Usage Examples

Fuel Cell Test Application

System Configuration
- MFC(Mass Flow Controller)
- Methanol pump
- Humidifier
- Temperature measurement
- Pressure measurement etc.

Redox Flow Batteries Application

System Configuration
- Liquid flow control
- Temperature control
- Potentiostat/Galvanostat

RDE(Rotating Disk Electrode) Test Application

- Rotating System(RPM Control)

Chlor-Alkali Process

- Pump control
- Temperature control etc.

Flow Cell for Electrochemical Synthesis

- Pump control
- Temperature control etc.

Solid State Battery Application

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 : ±100V

Zcon™ Impedance Analyzer

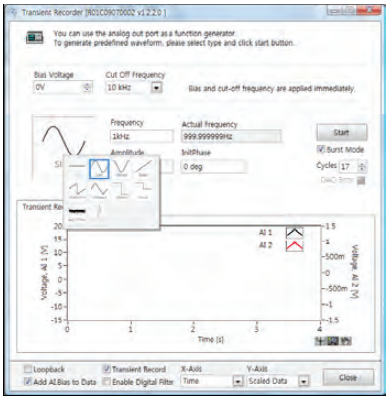
Zcon™ supports external electronic load & potentiostat
• TDI Dynaload RBL488 series electonic load
• 3rd parties potentiostat/galvanostat

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	±10V(Zcon) ±100V(ZconH)
• frequency range	1uHz to 100kHz		
• 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)

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 : ±100V

Zcon™ Impedance Analyzer

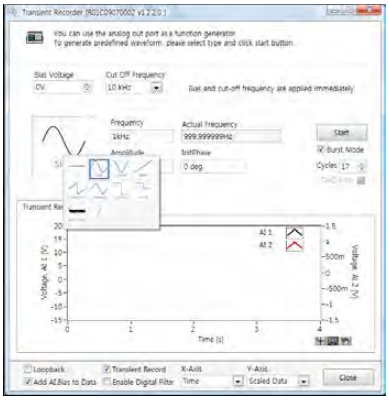
Zcon™ supports external electronic load & potentiostat
• TDI Dynaload RBL488 series electonic load
• 3rd parties potentiostat/galvanostat

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	±10V(Zcon) ±100V(ZconH)
• frequency range	1uHz to 100kHz	• bandwidth	550kHz
• frequency resolution	5000 steps/decade	• input impedance	110kOhm
• amplitude	1mVpp to 2Vpp		

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)

Impedance Monitor

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

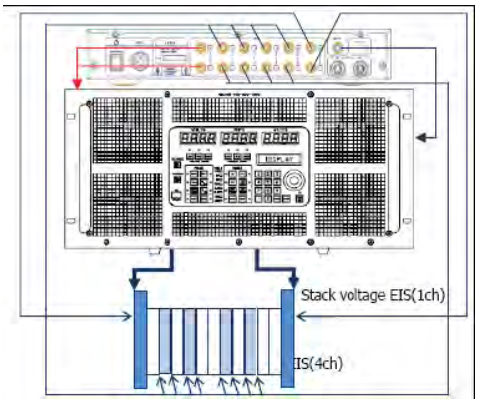
- Designed for spectrum analysis in the electrochemical field
- For versatile AC impedance experiment of serial connected multi cells such as fuel cell stack/battery pack etc.
- 6 signal input channel/1 signal output channel per set
- Measuring fuel cell stack EIS and simultaneously recording up to 4 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

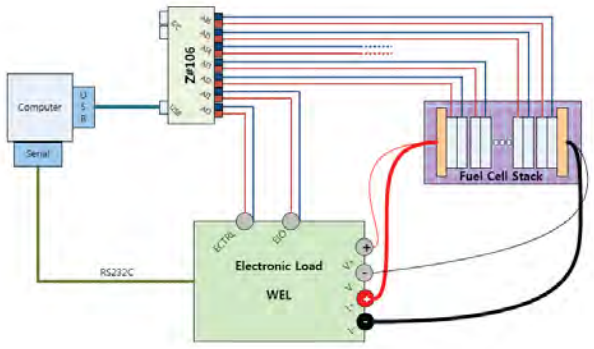
Z#™ supports external electronic load & potentiostat
• TDI Dynaload RBL488 series electonic load
• 3rd parties potentiostat/galvanostat

Specifications

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



Z# with Dynaload RBL488 series electronic load



Z# with WonATech's electronic load

Impedance Monitor

Battery Impedance Analyzer

The BZA100LZ/BZA1000 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 storate system)
- DC voltage measurement up to 1000V
- Quick diagnosis of batteries
- Battery lifetime estimation
- LAN interface with PC
- cell temperature monitoring
- ZMAN impedance analysis software

BZA100

BZA1000

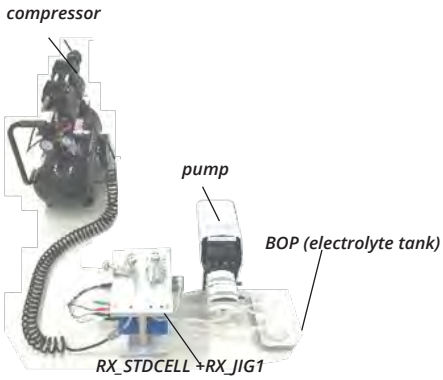
Specifications

	BZA100	BZA1000
• Impedance measurement		
- mesurement range	200uΩ ~ 30Ω	200uΩ ~ 50Ω
- frequency range	0.01Hz ~ 40kHz	0.05Hz-4kHz
- current amplitude (p-p)	400uA ~ 2A	400uA ~ 2A
• DC voltage mesurement		
- ADC resolution	24 bit	24 bit
- input range	100V/10V	2ea (100V, 1000V)
• AC voltage mesurement		
- ADC resolution	24 bit	24 bit
- input range	±250mV	±250mV
• AC current measurement		
- ADC resolution	24 bit	24 bit
- input range	4ea (2A, 200mA, 20mA, 2mA)	4ea (2A, 200mA, 20mA, 2mA)
• Sinewave generator		
- frequency range	0.01Hz ~ 40KHz	0.05Hz ~ 4KHz
- frequency accuracy	< 0.1%	<0.1%
- frequency resolution	0.01% or 5000 steps/decade	0.01% or 5000 steps/decade
- DAC resolution	10 bit	10 bit
- ouput 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)
• Temperature measurement		
- input	RTD probe (PT100)	RTD probe (PT100)
- Accuracy	Max 1℃	Max 1℃
• Size	160mm x 60mm x 180mm (WxHxD)	300mm x 60mm x 300mm (WxHxD)

Redox Flow Battery Test System

- For charge/discharge test of a single cell
- Impedance measurement available
- Temperature control and measurement
- Electrolyte flow control with a dual channel peristaltic pump
- Max. 4 channel control with a PC
- Support various safety functions

ZIVE SP5

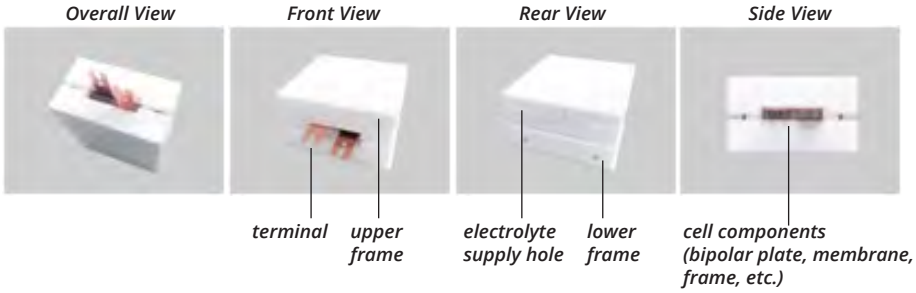


Cell & Jig

- Manual flow control
- Pump
  - for electrolyte circulation
  - 3 roller pump, 2-channel pump head
  - flow rate : max. 200ml/min
- BOP(electrolyte tank)
  - consists of : electrolyte tank, tube(Viton), one touch tube connector
  - material : PTFE body, PMMA head
  - volume : < 80ml
- Compressor for jig
  - max. 8 bar
- Electrolyte : Vanadium 1.7M, 3.5+

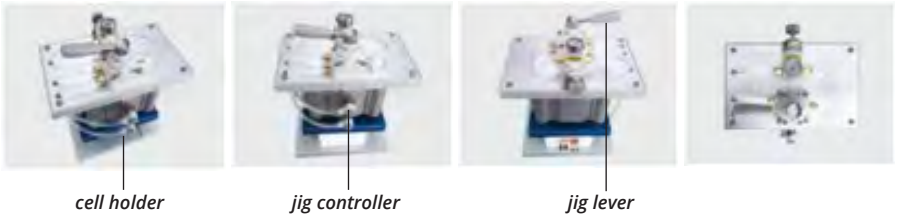
Redox Flow Battery Cell, RX_STDCELL

- Easy to assemble/dissemble
- Various active area : max. 70x70mm(49cm2)
- Material : PTFE



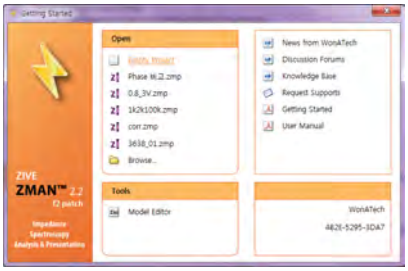
Jig for Test Cell, RX-JIG1

- For RX_STDCELL
- For preventing electrolyte leakage
- Needs an air compressor



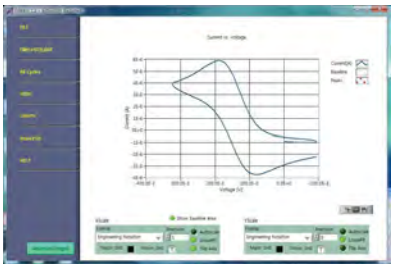
For Data Analysis Software

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.(needs license code)
- Various weighting algorithm
- Model library and user model
- KK plot
- Batch fitting for project data
- Impedance parameter simulation

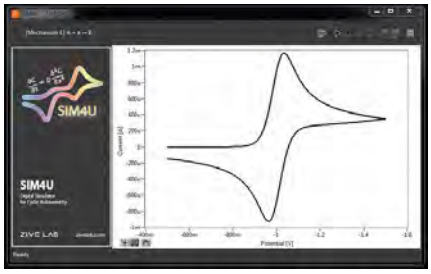
DC Data Analysis Software, IVMAN™



- Electrochemical analysis software
- Ideal for DC corrosion data analysis & electro-analytical data analysis
- Initial guessing function on Tafel analysis
- Automatic Tafel fitting
- Polarization resistance fitting
- 3D graph
- Find peak function
- Interpolation, differentiation, integration etc.
- Reporting function

Simulation Software for Cyclic Voltammetry, SIM4U*

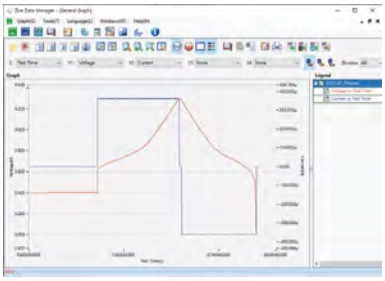
- Single or multiple charge transfer steps and first and second-order chemical steps can be used
- Cyclic voltammetry method is used for simulation
- 1D simulation of semi-infinite diffusion processes is used
- The pre-equilibrium can be applied before simulation
- The effect of uncompensated resistance 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.

ZIVE Data Manager software for SI data & SM data set

- Split data file by cycle or batch
- Resampling function
- Multi working electrode data format convert
- Substract current function between two data files
- Data overlay with SI data and SM data



* downloaded for free from www.zivelab.com.

Accessories

Corrosion Cell Kit

- Vial volume : 1 liter
  - CCK series : 500 ml to 1 liter
  - WCCK series : 500 ml to 1 liter
- Material : Teflon®, Pyrex® and SUS316
- Kit includes cylindrical metal sample, Luggin capillary, gas bubbler, glass vial, etc.*1
- Counter electrode(graphite rod or Pt plate/mesh electrode) & reference electrode are not included.

*1: Can vary depending on cell kit.

Standard Type	Water Jacketed Type
	
CCK1 ***with optional flat specimen holder & theremometer***	***WCCK1*** ***with optional flat specimen holder & theremometer***

Type	Vial Volume	Part No.
Standard type	1 liter	CCK1
Standard type	500 ml	CCK05
Water-jacketed type	1 liter	WCCK1
Water-jacketed type	500 ml	WCCK05

*1: Components can vary depending on model.

Flat Cell Kit

- Sample test area
  - one side : 1cm²
  - the other side : 5 cm2
- Sample thickness : up to 10mm
- Cell volume : 300ml
- Graphite plate as counter electrode is included.
- Reference electrode is not included.
- Material : Pyrex® & polycarbonate
- Part number
  - standard type : FCK2
  - water-jacketed type : WFCK2

Standard Type	Water Jacketed Type
	
FCK2	***WFCK2***

Plate Material Testing Cell

PTC1

- Sample size
  - width: >15mm
  - thickness: 0.1~10mm
- Electrodes are not included.

PTC1

PTC2

- Sample size
  - size: 60x60mm or more
  - thickness: >7mm
- Electrodes are not included.

PTC2

Permeation Cell Kit

- For permeation test
- A membrane or a permeation foil can be placed between two glass half cells.
- Vial volumne : 150ml x 2 ea
- Two graphte plates as counter electrodes and two Luggin capilary are included as standard.
- Membrane and reference electrode should be ordered separately.
- Part number :
  - standard type : PMC1
  - water-jacketed type : WPMC1

PMC1
Permeation Cell Kit, Standard Type

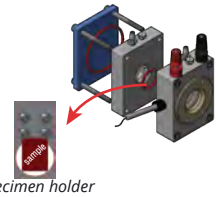
WPMC1
Permeation Cell Kit, Water-Jacketed Type

Accessories

Photo Echem Cell Kit

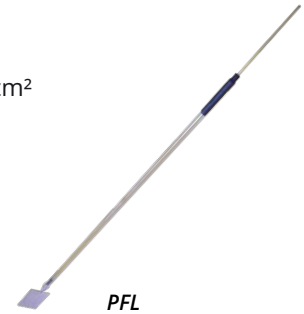
- A wide optical window is designed to characterize electrode material under lighting condition.
- 2 or 3 electrode test is available
- A gas tight sealed cell
- Based on a standard model, PCELL1, the attachments are interchangeable between cells ccording to user's applications.
- Materials :
  - cell body: PEEK
  - optical window: quartz glass
  - others: SUS 304, Viton O-ring
- 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(option)

PCELL1
Standard Model

Part No. / Description	
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*	 *specimen holder*
PCELL4	
• cell kit with a specimen holder *• small sample can be fixed inside the electrolyte chamber*	 *specimen holder*

Pt Plate Electrode

- Active area : 1cm², 4cm², 5cm²
- OD : 6mm
- Part No.
  - PFL1 : 1cm²
  - PFL4 : 4cm²
  - PFL5 : 5cm²



PFL

Flat Specimen Holder

- Sample holder for a flat specimen
- Pyrex® tube : 6.3mm dia.

FSH2

Universal Electrode Holder

- Max. hole size
  1x 10mm dia.
  1x 9.6mm dia.
  1x 6.2mm dia.
  1x 1.6mm dia.
- Max. height : 150mm
- Material : Teflon® & stainless steel
- Part number : UEH1

UEH1

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

Accessories

Faraday Cage

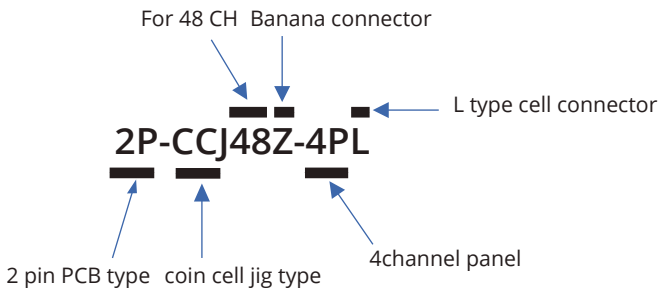
- Dimensions
  - overall : 300Wx398Hx300Dmm
  - window : 100Wx300Hmm
- Material
  - exterior : powder-coated steel
  - interior : powder-coated steel with Teflon®-coated bottom
  - window : fine SUS mesh embedded in acryl plates
- Access
  - 2 holes, 10mm dia.
  - position : right hand side & back side
- Part number : Farad2

Farad2

Battery & Coin Cell Jig

- easy to hold cylindrical cell and/or coin 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

ex)

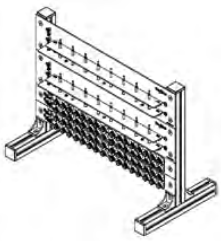


	Part No.	Description
1st	2P	2 Pin PCB type
	2PL	2 Pin Lever type
	4PL	4 Pin Lever type
2nd	CCJ	Coin cell jig *1)
	UCJ	Universal cell jig *2)
3rd	Channel No.	Channel Quantity
4th	Z	4 cell banana connector
	H	For High temperature
		Normal type
5th	4P	4ch per panel
	8P	8ch per panel
	16P	16ch per panel
	20P	20ch per panel
6th	S	S type cell connector
	L	L type cell connector
	M	M type cell connector

UCJ1(1ch)

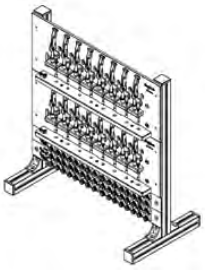
- 1 cell universal cell jig
- 4 pin probe lever type
- kelvin type banana connectors
- Upper part is movable to fit battery size

2P-CCJ16Z-8P



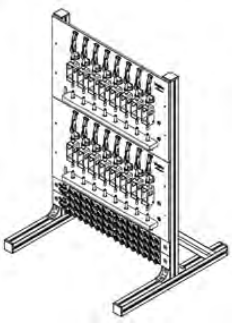
- PCB type coin cell jig
- 16 channel
- 2 pin probe
- 8ch per panel
- 16 cell banana connectors option

2PL-CCJ16Z-8P



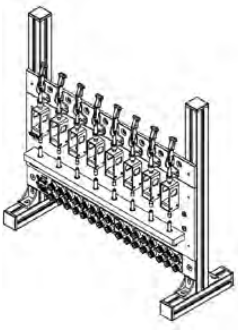
- coin cell jig
- 16 channel
- 4 pin probe
- 8ch per panel
- 16 cell banana connectors option

4PL-CCJ16Z-8P



- coin cell jig
- 16 channel
- 4 pin probe lever type
- 8ch per panel
- 16 cell banana connectors option

4PL-UCJ8Z-8P



- universal cell jig
- 8 channel
- 4 pin probe lever type
- 8ch per panel
- 8 cell banana connectors option
- Upper part is movable to fit battery size

Accessories

High current cylindrical battery jig

- For coincell-sized to larger cylindrical batteries (up to 26650 in diameter or 21700 in length)
- Up to 19A
- Maximum battery diameter : 30 mm
- Maximum battery length : 70 mm
- Minimum battery length : 1 mm
- Length × Width × Height: : 137 x 24 x 43.7 mm
- Cable Connectors : 4ea of 4mm banana
- Part number : HCCBJ

HCCBJ

Coin Cell Holder

For WPG/WMPG/WBCS Series

- D-irect connect to cell connector

CCH2

CCH2L

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

For ZIVE Series

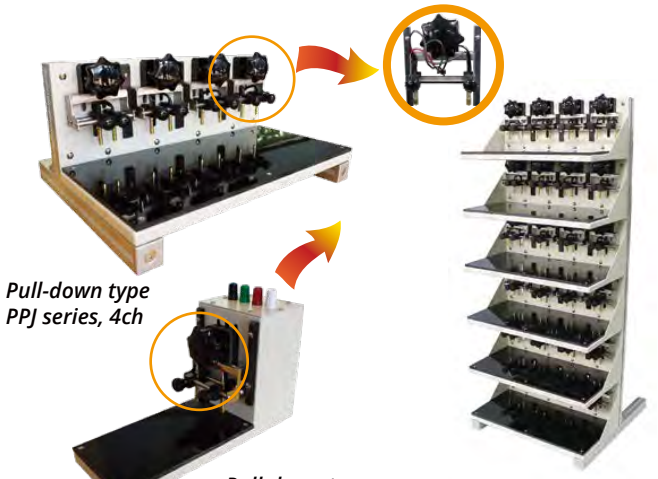
- D-SUB connector type

Description	Part No.
For CR2032 coin cell	CCH3-20
For CR2450 coin cell	CCH3-24

Pouch Cell Jig

PPJ Series

- Pull-down contact type
- 4 contact point type(Kelvin probe)



Pull-down type PPJ series, 4ch

Pull-down type PPJ series, 1ch

Pull down type PPJ24

Contact Type	Part No.
pull-down contact type	PPJ*[1)]

1) * : number of channels

Conductivity Test Jig

- Designed to measure through-plane conductivity of membranes
- EIS measurement
- 2 probe type
- Part number : MCJ1

MCJ1

Membrane Conductivity Cell

- For measuring conductivity of membrane embedded in a fuel cell
- 4 point probe type
- Easy to assemble
- Cell material : PEEK
- Operating temperature : to 130˚C
- Fuel cell hardware available : 5, 25 cm^2 fuel cell test hardware (not included, provided by WonATech)
- Part number : MCC

MCC

Accessories

Power Booster

- 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 : ZIVE series

ZB1

ZB2

ZB3

Rack Type

ZB4

Housing	Model	Max.V	Max.I(<-2V)	Max. I (Bipolar)	Power Dissipation(Watt)
ZB1	ZB530B	5V		30A	450
	ZB1030U/1020B	10V	30A	20A	459/480
	ZB2015U/2010B	20V	15A	10A	409/480
	ZB408U/405B	40V	9A	5A	410/480
ZB2	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	ZB1090U/1060B	10V	90A	60A	1,377/1,440
	ZB2050U/2030B	20V	50A	30A	1,365/1,440
	ZB4025U/4015B	5V	25A	15A	1,365/1,440
ZB4	ZB5100B	5V		100A	1,500 * 국내용
	ZB1080B	10V		80A	1,920
	ZB2060U/2040B	20V	60A	40A	1,683/1,920
	ZB4030U/4020B	40V	30A	20A	1,539/1,920
ZBR2	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 speci cation is available. Please contact WonATech sales team.

Designing the Solution for Electrochemistry

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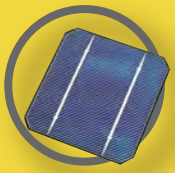
Battery

Super Capacitor

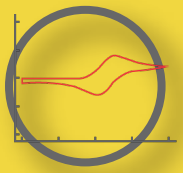


Solar Cell

Fuel Cell

Corrosion

Sensor



General Electrochemistry

Catalog WAT-GPC6-1 printed on Feb 2021. Specifications subject to change without prior notice

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