WonATech

9th EDITION

ELECTROCHEMICAL INSTRUMENTS ACCESSORIES BROCHURE

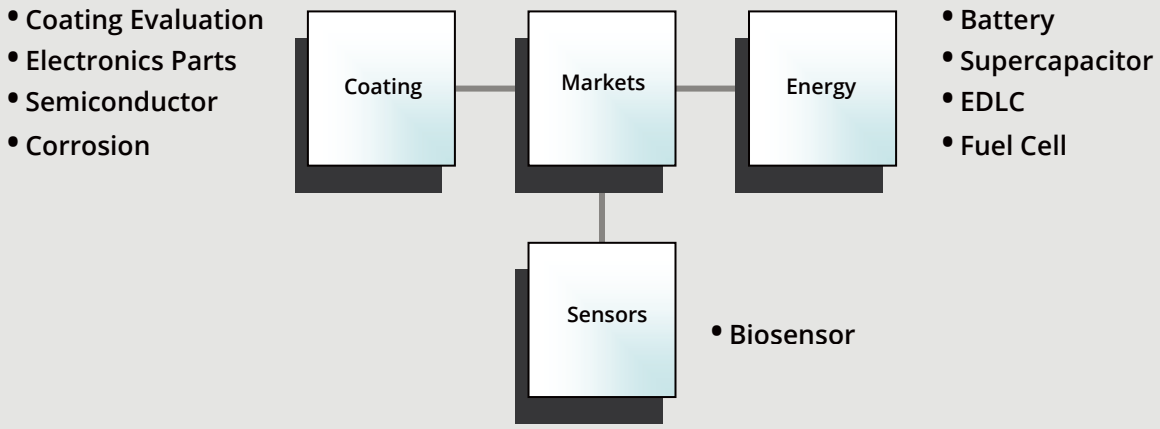
www.wonatech.com

Contents

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

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

Accessories

- For Battery Application : Battery Jig, Battery Clamp Stand&Cable, EIS 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.

Software

- EIS Data Analysis Software(ZMAN) / Simulation Software for Cyclic Voltammetrym(SIM4U) / ZIVE Data Manager

Single Channel Potentiostat/Galvanostat/(EIS)

WPG100 Series

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

Features

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

Standard Type WPG100ex

Mid power type WPG100S

Mid power type WPG100H8

Mid power type WPG100H12

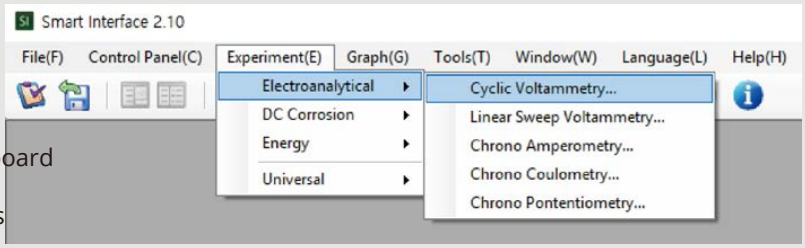
High Power Type WPG100HP

Specifications	WPG100ex	WPG100S	WPG100H8
• control voltage range	±10V(standard) or customer specified range	customer specified range (<±45V)	customer specified range (<±45V)
• voltage accuracy	±0.02% f.s.	±0.05% f.s. (<10V)	±0.05% f.s. (<10V)
• current range	8 ranges or customer specified range	6 ranges	6 ranges
• current accuracy	±0.02% f.s.	±0.05% f.s.	±0.1% f.s.
• compliance voltage	±12V(standard)	customer specified range (<±45V)	customer specified range (<±45V)
• sampling time	1msec	1msec	1msec
• size(WxDxH)	350x328x84mm	447x188x491.2mm	447.1x241x505.2mm

	WPG100H12	WPG100HP
• control voltage range	customer specified range (<±45V)	customer specified range (<±45V)
• voltage accuracy	±0.05% f.s. (<10V)	±0.1% f.s.
• current range	4 ranges	1 or 3 ranges depending on power
• current accuracy	±0.1% f.s.	±0.1% f.s.
• compliance voltage	customer specified range (<±45V)	customer specified range (<±45V)
• sampling time	1msec	1msec
• size(WxDxH)	464.1x285.4x626mm	

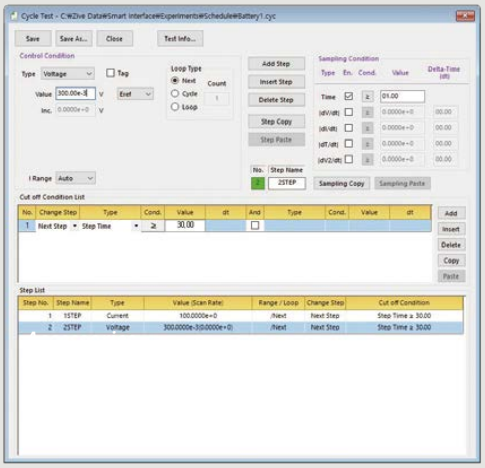
SI(Smart Interface) Software

- 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/(EIS)

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



Universal Test Mode

ZIVE SP Series

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

Features

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

ZIVE SP1

ZIVE SP2

ZIVE SP3

ZIVE SP5

ZIVE SP5H

ZIVE SP10

SHP1003

SHP1005

Single Channel Potentiostat/Galvanostat/(EIS) *Instruments*

Specifications

	ZIVE SP1	ZIVE SP2	ZIVE SP3	ZIVE SP5
• control voltage range	±10V, ±1V, ±100mV	±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)	±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)	5nA to 5A, 11 ranges (500pA)
• 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)	±0.02% f.s.(gain x1)>500nA
• compliance voltage	±12V	±12V	±20V	±10V
• slew rate	10V/µsec	15V/µsec	8V/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 ~ 2MHz	10µHz ~ 1MHz	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	digital: 3 output/2 input, analog: 1 output/3 input
• size(WxDxH)	160x329.4x83.3mm	93x302.5x167mm	195.2x313.2x117.1mm	169x254.6x361.3mm
• weight	2.5kg	2.95kg	3.7kg	7.65Kg

	ZIVE SP5H	ZIVE SP10	ZIVE SHP1003	ZIVE SHP1005
• control voltage range	±40V, ±4V, ±400mV	±5V, ±500mV, ±50mV	±3V, ±30mV, ±300mV	-1~+5V, -±500mV, ±50mV
• voltage accuracy	±4mV ±0.1% of setting	±0.02% fs(gain x1)	±0.02% fs(gain x1)	±0.02% fs(gain x1)
• current range (with gain)	1nA to 1A, 11 ranges (100pA)	10nA to 10A, 11 ranges (1nA)	100A~100nA, 10 ranges (100nA)	100A~100nA, 10 ranges (100nA)
• current accuracy	±0.1% f.s.(gain x1) >100nA	±0.03% f.s.(gain x1)>1uA	±0.03% f.s.(gain x1)>10uA f.s.	±0.03% f.s.(gain x1)>10uA f.s.
• compliance voltage	±40V	±6V	±3V	-1~+5V
• slew rate	7V/µsec	10V/µsec	1V/usec	1V/usec
• 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 ~ 600kHz	10µHz ~ 1MHz	10uHz ~ 50kHz	10uHz ~ 50kHz
• 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/1 input, analog: 1 output/3 input	digital: 3 output/1 input, analog: 1 output/3 input
• size(WxDxH)	169x254.6x361.3mm	239x361x241.2mm	447.1x600x241mm	447.1x600x241mm
• weight	7.65Kg		28kg	29kg

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

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

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.

Corrosion* Software Package

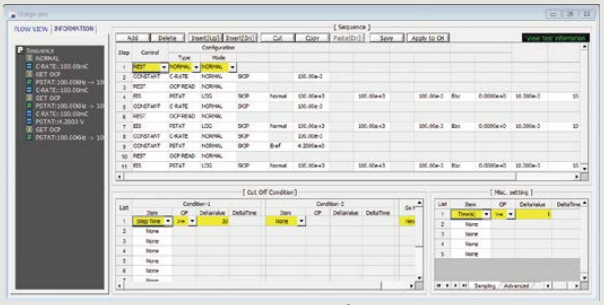
- Tafel
- Polarization resistance
- Potentiodynamic
- Galvanodynamic
- Cyclic polarization
- Ecorr vs. time
- Galvanic corrosion
- RpEc trend
- Reactivation potential
- Potentiostatic ECN
- Galvanostatic ECN
- ZRA mode ECN

(*) Corrosion technique supports IR compensation.

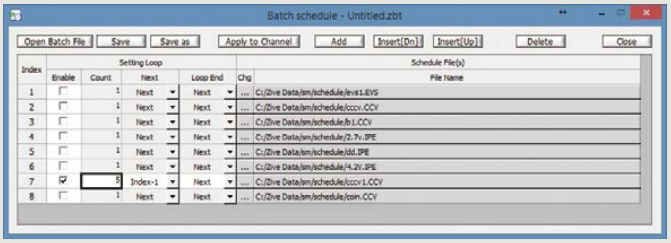
Battery Software Package

- 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

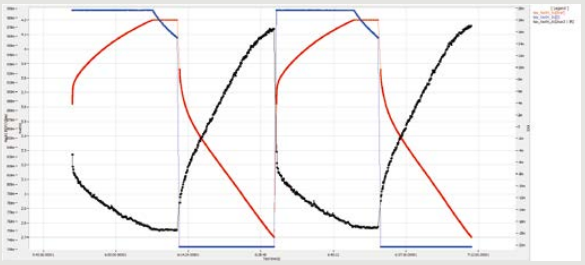
Single Channel Potentiostat/Galvanostat/(EIS)



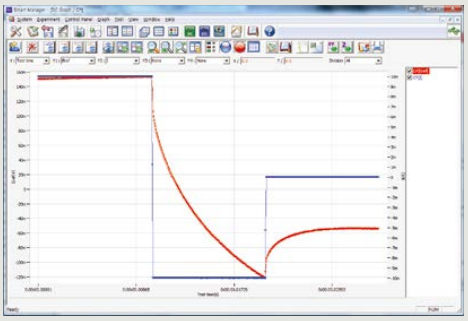
Sequence Editor



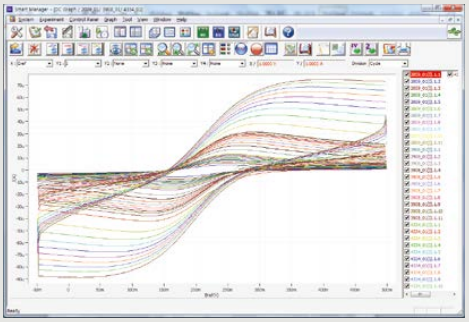
Batch Function



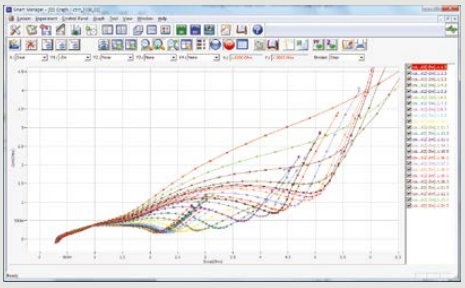
IR measurement(black line) during CC/CV Test



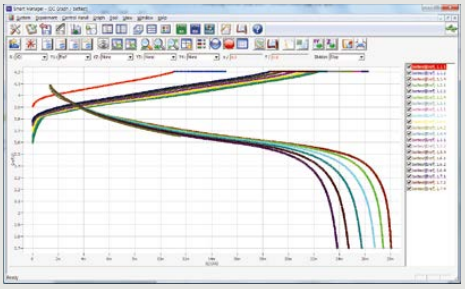
50usec sampling



DC graph



EIS graph

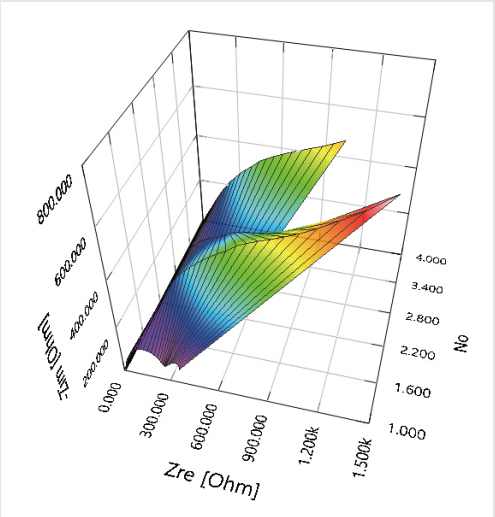


BAT graph

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
Sweep	GSTAT	current sweep control
	PSTAT	potential sweep control
	FAST-G	fast current 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
FRA	GSTAT	galvanostatic EIS
	PSTAT	potentiostatic EIS
	HFR G	galvanostatic HFR
	HFR P	potentiostatic HFR
Rest		
ZRA		
Pulse	Vpulse	voltage pulse control
	Ipulse	current pulse control
	GSINE	current sine wave control
	PSINE	potential sine wave control

SP1/MP1/PP1e/SP3/MP3 model does not support FRA function.

Control Task Parameters



Potentiostat EIS Measurement Plotted by ZMAN

Multi-Channel Potentiostat/Galvanostat/(EIS)

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	16 bit(0.0015% f.s)	16bit(standard)	16bit(standard)
• current range*[2]	5 ranges Max. ±10mA@10V(WMPG1000Ls) Max. ±100mA@10V(WMPG1000Le)	5 ranges Max. ±5A	5 ranges Max. ±5A@10V(WMPG1000M1) Max. ±10A@10V(WMPG1000M2)
• max. power per channel*[3]	200mWatt(WMPG1000Ls) 2Watt(WMPG1000Le)	50Watt	100Watt(WMPG1000M1) 200Watt(WMPG1000M2)
• current accuracy	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.
• current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)
• input impedance	10^{12} Ohm	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)
• sampling time	*[4]	*[4]	*[4]
• size(WxDxH)	350x328.1x83.6mm	446.7x454.4x196.3mm	446.7x498.7x285.9mm(WMPG1000M1) 446.7x625.4x374.5mm(WMPG1000M2)

	WMPG1000D	WMPG1000H8	WMPG1000H12	WMPG1000HP
• control voltage range*[1]	customer specified range	customer specified range)	customer specified range	customer specified range
• voltage accuracy	±0.05% f.s.	±0.05% f.s	±0.05% f.s	±0.1% f.s.
• voltage resolution	16bit	16bit	16bit	16bit
• current range*[2]	5 ranges	5 ranges	4 ranges	3 or 1 range
• max. power per channel*[3]	400Watt	800Watt	1200Watt	4kWatt
• current accuracy	±0.05%f.s	±0.1% f.s.	±0.1% f.s.	±0.1% f.s.
• current resolution	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)	16 bit(±0.0015% f.s)
• input impedance	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)	10^{12} Ohm(<10V)
• sampling time	*[4]	*[4]	*[4]	*[4]
• size(WxDxH)	447.1x505.2x241mm	447.1x505.2x241mm	446.1x626x285.5mm	

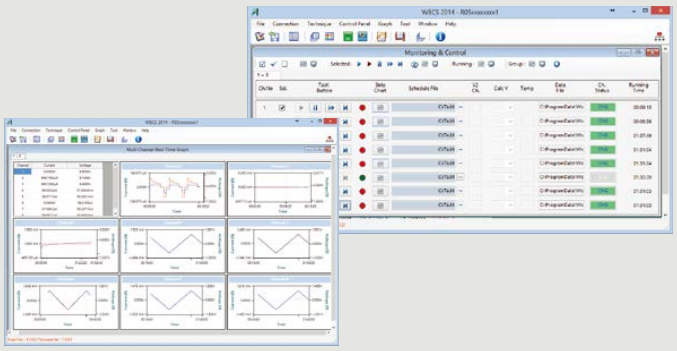
*1: User can specify the voltage range within <80V for difference between high and low voltage
*2: Depending on system specfication.
*3: power = max. voltage x max. current x 2

*4: Without option (Max 64 channels) 10msec
With option (AuxV and/or Temperature input) (Max 32 channels) 10msec

Multi-Channel Potentiostat/Galvanostat/(EIS)

SI(Smart Interface) Software

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



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

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

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

ZIVE MP Series

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

Features

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

ZIVE MP1
8 channel System

ZIVE MP1
4 channel System

ZIVE MP2A

ZIVE MP5

ZIVE MP10

Multi-Channel Potentiostat/Galvanostat/(EIS)

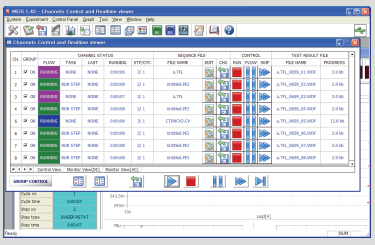
Specifications

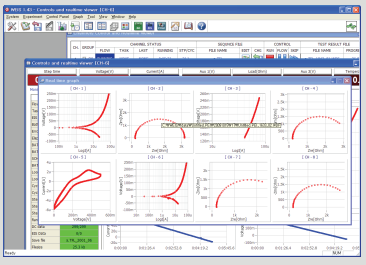
	ZIVE MP1	ZIVE MP2A	ZIVE MP5
• channel No/module	4 or 8channel/module	8channel/module	8channel/module
• control voltage range	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV	±10V, ±1V, ±100mV
• voltage accuracy	0.02% fs (gain x1)	±0.02% fs (gain x1)	±0.02% fs (gain x1)
• current range (with gain)	100nA to 1A, 9 ranges(10nA)	2nA to 2A, 11 ranges (200pA)	5nA to 5A, 11 ranges (500pA)
• current accuracy	±0.05% f.s.(gain x1) >100nA	±0.02% f.s.(gain x1)>200nA	±0.02% 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)	199.4x465.6x315mm(4ch system) 448x466x208mm(8ch system)	459.5x223.8x519.5mm	464.5x285.5x519.5mm
• weight	6.9kg(4ch system)	23.3kg(8ch system)	29kg(8ch system)

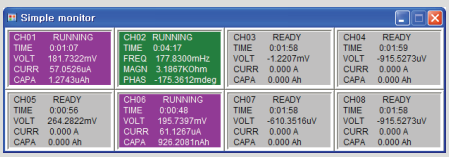
	ZIVE MP10
• channel No/module	4channel/module
• control voltage range	±5V, ±500mV, ±50mV
• voltage accuracy	±0.02% fs (gain x1)
• current range (with gain)	10nA to 10A, 11 ranges (1nA)
• current accuracy	±0.03% f.s.(gain x1)>1uA
• compliance voltage	±6V
• slew rate	10V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF
• frequency range	10μHz ~ 1MHz
• aux port	digital: 3 output/2 input, analog: 1 output/3 input
• size(WxDxH)	464.5x519.5x285.5mm
• weight	25kg(4ch system)

SM(Smart Manager) Software for multichannel

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







Dual Channel Potentiostat

Instruments

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

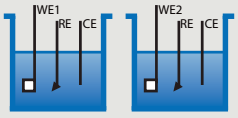
- Versatile high quality Potentiostat/Galvanostat/Impedance Analyzer
- Compact size with full functions
- Front panel LCD display
- Ideal for biosensor research, FET sensor, permeation test etc.
- 14 EIS techniques capability including multisine technique
- iR compensation and measurement
- High speed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

Specifications

ZIVE BP2A

• channel No/module	2channel/module
• control voltage range	±10V, ±1V, ±100mV
• voltage accuracy	0.02% fs (gain x1)
• current range (with gain)	2nA to 2A, 11 ranges(200pA)
• current accuracy	±0.02%f.s.(gainx1)>200nA
• compliance voltage	±12V
• slew rate	15V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF
• frequency range	10μHz ~ 2MHz
• aux port	digital: 3 output/2 input analog: 1 output/3 input
• size(WxDxH)	198.2X281.9X362.6mm
• weight	9.25kg

BP2A



Cell configuration

Bi-Potentiostat

Instruments

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

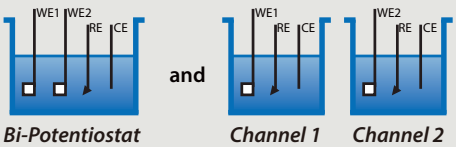
- Versatile high quality dual channel potentiostat/galvanostat/impedance analyzer
- Bi-potentiostat
  - two fully independent channels
  - dual working electrodes with one reference and one counter electrode configuration available
- Compact size with full functions
- Front panel LCD display
- Ideal 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

Specifications

ZIVE BP2F

• channel No/module	2channel/module
• control voltage range	±10V, ±1V, ±100mV
• voltage accuracy	0.02% fs (gain x1)
• current range (with gain)	1nA to 1A, 10 ranges(1nA)
• current accuracy	±0.03% f.s.(gain x1)>100nA
• compliance voltage	±12V
• slew rate	10V/μsec
• input impedance	$2x10^{13}\Omega$||4.5pF
• frequency range	10μHz ~ 1MHz
• aux port	digital: 3 output/1 input analog: 1 output/3 input
• size(WxDxH)	242.6X252.3x304.1mm

BP2F



Cell configuration

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 with Jig)
WBCS3000Le32RJIG

Low Current Type(64CH with Jig)
WBCS3000Le64RJIG

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)	WBCS3000Le32/64RJIG	WBCS3000Lx32
• control voltage range*[1]	±5V(standard)	±5V(standard)	-1V to +5V(Lx) (standard)
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• current range*[2]	4 ranges Max. ±10mA@5V(WBCS0000Ls,Ls32) Max. ±100mA@5V(WBCS3000Le,Le32)	4 ranges Max. ±100mA	4 ranges Max. ±1A
• max. power per channel*[3]	200mWatt(WBCS3000Ls,Ls32) 2Watt(WBCS3000Le,Le32)	2Watt	6Watt
• 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]	*[4]
• size(WxDxH))	350.2x328.1x84.2mm(WBCS0000Ls/Le) 541x454.6x253.8mm(WBCS0000Ls32/Le32)	541x455x253.5mm(Le32RJIG)	541x502x317.3mm

Battery Test System

Specifications

	WBCS3000S	WBCS3000M1/M2	WBCS3000D
• control voltage range*1	±5V(standard)*1	±5V(standard)	customer specified range
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.05% f.s.(<10V)
• current range*2	4 ranges Max. 5A	4 ranges	4 ranges
• max. power per channel*3	50Watt	100Watt(M1)/200Watt(M2)	400Watt
• current accuracy	±0.02% f.s.	±0.05% f.s.	±0.05% f.s.
• current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)
• input impedance	10^{12} Ohm	10^{12} Ohm	10^{12} Ohm (<10V)
• sampling time*4	*4	*4	*4
• size(WxDxH)	447x196x454mm	447.1x498.7x287mm(M1) 464.7x625.4x375.6mm(M2)	447x505x241mm

	WBCS3000H8	WBCS3000H12	WBCS3000HP
• control voltage range*1	customer specified range	customer specified range	customer specified range
• voltage accuracy	±0.05% f.s.(<10V)	±0.05% f.s.(<10V)	±0.1% f.s.
• current range*2	4 ranges	3 ranges	3 or 1 range depending on power
• max. power per channel*3	800Watt	1200Watt	4kWatt
• 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)	16 bit(0.0015% f.s)
• input impedance	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)	10^{12} Ohm (<10V)
• sampling time*4	*4	*4	*4
• size(WxDxH)	447.1x498.7x287mm	464.1x626x285.5mm	

*1: User can specify the voltage range within <80V for difference between high and low voltage
*2: Depending on system specfication.
*3: power = max. voltage x max. current x 2

*4: - Without option
1~32 channels system: 10msec
33~40 channels system: 20msec
41~64 channels system: 50msec
65~128 channels system: 50msec
- With option
1~16 channels system: 10msec
17~40 channels system: 20msec
41~64 channels system: 50msec
65~128 channels system: 50msec option

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

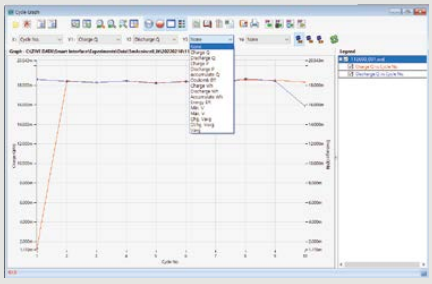
- Cyclic voltammetry
- Linear sweep voltammetry
- Chrono-amperometry
- Chrono-coulometry
- Chrono-potentiometry

Corrosion Measurement

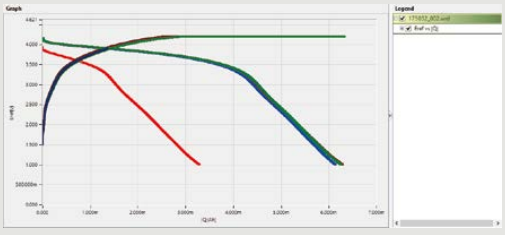
- Tafel plot
- Potentiodynamic
- Potentiostatic
- Galvanostatic
- Cyclic polarization
- Ecorr vs. time
- Linear polarization resistance

For Energy Test

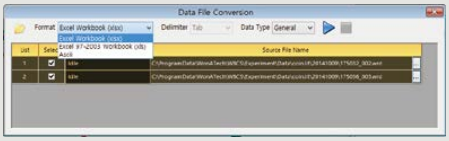
- Charge/Discharge(CC/CV) Test
- Constant Current Charge/Discharge(CC/CC) Test
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- Electrochemical Voltage Spectroscopy(EVS) Test
- Galvanostatic Intermittent Titration Technique(GITT) Test
- Potentiostatic Intermittent Titration Technique(PITT) Test



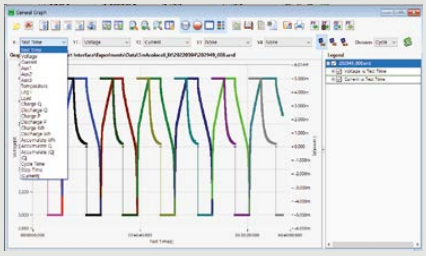
Cycle graph



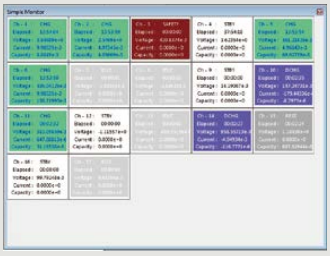
Voltage vs. |capacity| graph



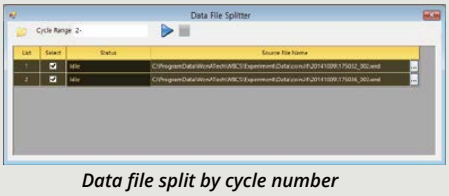
Data conversion to ASCII & Excel



General graph



Channel status display



Data file split by cycle number

Battery Test System

WBRS Series

The WBRS series is a system equipped with a battery cycler in a rack, and can be configured with up to 32/64/128/256 channels in one rack. WBRS series is perfect choice for battery cell test.

Features

- 4 probe type true potentiostat/galvanostat circuit
  - No switching time (charging to discharging, discharging to charging)
  - Analog feedback control to keep constant voltage & current
  - Capable of testing anode materials, cathode materials, and complete cells, including half-cell experiments
- 16bit ADC, DAC: High resolution of 0.0015% f.s. (control and data storage)
- Max channel numbers per rack is 128, 64 or 32 depending on the model
- Auxiliary voltage, temperature measurement option (not available in WBRS10_256 channel system)
- User friendly software

WBRS10-128 *WBRS20-128* *WBRS50-128* *WBRS100-64* *WBRS200-32*

Specifications	WBRS10-128	WBRS20-128	WBRS50-128
• control voltage range	±5V	±5V	-1V ~ +5V
• voltage accuracy	±0.02% f.s.	±0.02% f.s.	±0.02% f.s.
• voltage resolution	0.15mV	0.15mV	0.15mV
• current range	1A, 100mA, 10mA, 1mA 4 ranges	2A, 200mA, 20mA, 2mA 4 ranges	5A, 500mA, 50mA, 5mA 4 ranges
• max. channel number	128	128	128
• min. channel number	32	32	32
• current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)
• input impedance	1Tohm	1Tohm	1Tohm
• sampling time	50msec	50msec	50msec
• size(WxDxH)	724x690x1400mm	724x690x1400mm	724x1015x1800mm

	WBRS100-64	WBRS200-32
• control voltage range	-1V ~ +5V	-1V~+5V
• voltage accuracy	±0.02% f.s.	±0.02% f.s.
• voltage resolution	0.15mV	0.15mV
• current range	10A, 1A, 100mA,10mA 4 ranges	20A, 2A, 200mA, 20mA 4 ranges
• max. channel number	64	32
• min. channel number	16	8
• current resolution	16 bit(0.0015% f.s)	16 bit(0.0015% f.s)
• input impedance	1Tohm	1Tohm
• sampling time	50msec	50msec
• size(WxDxH)	724x1015x1800mm	724x1015x1800mm

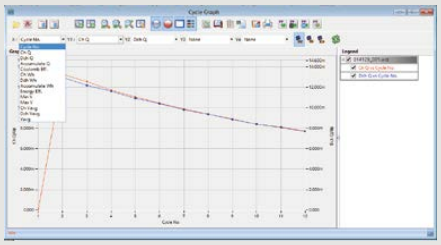
BI(Battery Interface) Software

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

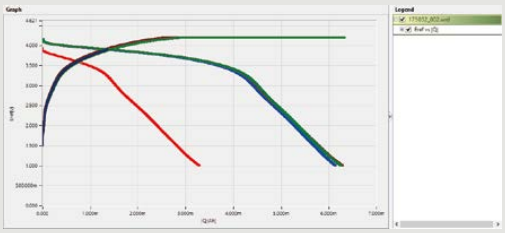
For Energy Test

- CC/CV (Lithium battery) test
- CC/CV (Lithium battery) test
- CC/CC (NiCd(NiMH) battery) test
- Steady state CV
- Pstat IV curve
- Gstat IV curve
- EVS (Electrochemical voltage spectroscopy) test
- GITT (Galvanostatic intemittent titration technique) test
- PITT (Potentiostatic intermittent titration technique) test

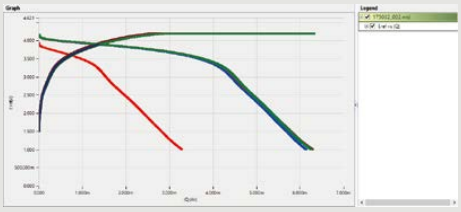
User Defined Test Procedure



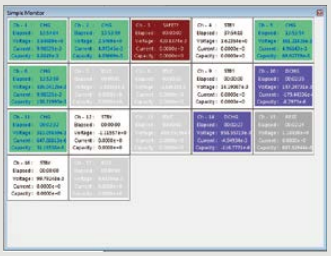
Cycle graph



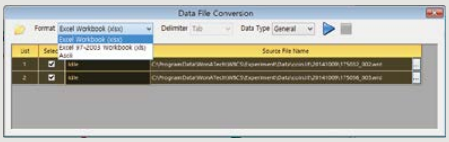
Voltage vs. |capacity| graph



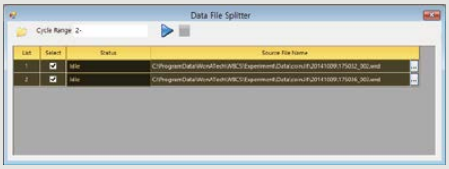
General graph



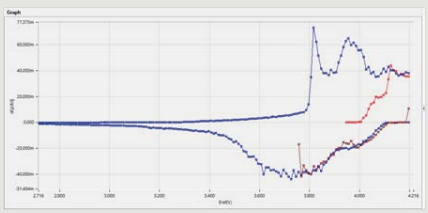
Channel status display



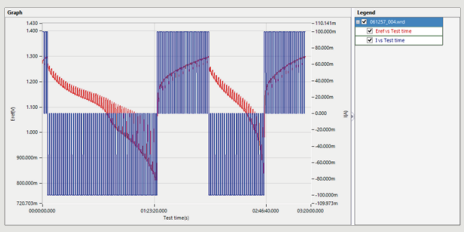
Data conversion to ASCII & Excel



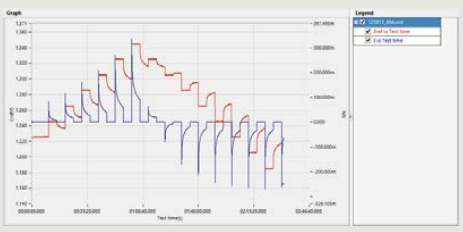
Data file split by cycle number



EVS graph



GITT test



PITT test

Fuel Cell Test Station

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
- 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
- BPR operates manually

** 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: 1ea (Smart2 PEM/DM model only)
- Humidifier : 2set & Automatic water feeding for humidifier: 1ea
- Back pressure regulator : 2ea & Pressure sensor: 2ea
- Temperature controller(with 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

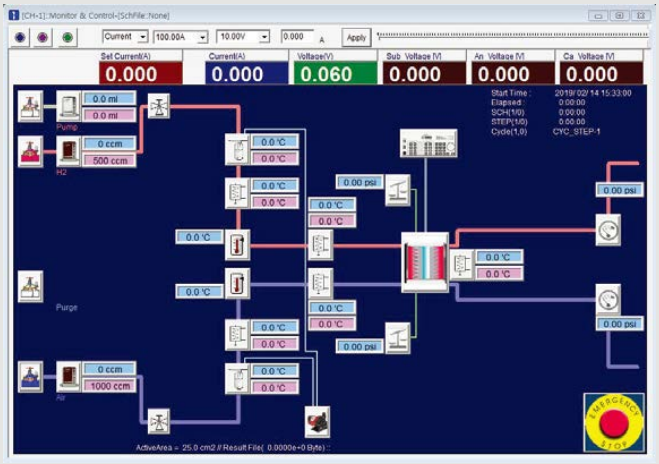
- Solenoid valve : 2ea
  - oxidant gas, purge gas
- MFC : 1ea
- Methanol pump: 1ea
- Check valve : 3ea
- Temperature controller(with heater & thermocouples) : 4ea
  - gas line temperature controller for outside the instrument : 1ea
  - humidifier&gas line temperature controller for inside the instrument : 1ea (each, total 2ea)
  - cell Temperature controller: 1ea
- Electronic Load : 1set
- System controller including DAQ system with emergency button
- Control PC(option) with Smart software
- Interface boards with LAN cables

Smart2 DM

Fuel Cell Test Station

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

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 XBL series electronic load
• 3rd parties potentiostat/galvanostat

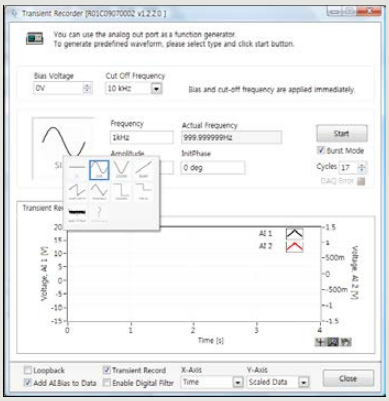
Specifications

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

Impedance Monitor

Software - Z100 Navigator

- Operation software for Zcon™ and Z#™ system
- It can be used with external potentiostat/galvanostat or electronic load by setting for impedance measurement or waveform generator
- List of impedance techniques with Zcon™
  - frequency response analyzer (FRA)
  - high frequency resistometry (HFR)
  - galvanostatic electrochemical impedance spectroscopy (GEIS)
  - galvanostatic HFR (GHFR)
  - potentiostatic EIS (PEIS)



Transient Recorder (Waveform Generator)

Z#™ Multichannel Impedance Analyzer

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

Features

- Designed for spectrum analysis in the electrochemical field
- For versatile AC impedance experiment of serial connected multi cells such as fuel cell stack/battery pack etc.
- 6 signal input channel/1 signal output channel per set
- Measuring fuel cell stack EIS and simultaneously recording up to 5 individual cells from the stack
- Channel expandable up to 30
- Flexible frequency generator/analyzer
- High current application with external load and/or potentiostat/galvanostat
- Generate various waveforms (e.g. Sinusoidal etc.)
- Simulation and fitting with ZMAN™
- Software controlled function
- Graphic-based user-interface
- Dual real time graph (Bode, Nyquist, etc.) during measurement

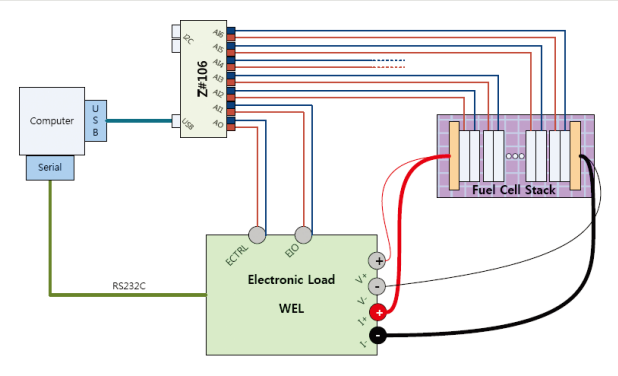
Z# Impedance Analyzer

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

Impedance Monitor

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 electronic load

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)

Battery Impedance Analyzer

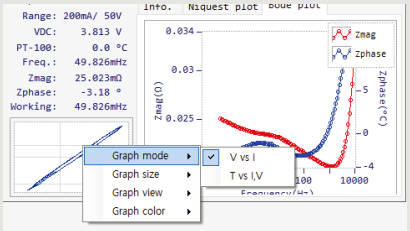
Specifications	BZA60/60M	BZA500M	BZA1000A
• Impedance measurement			
- measurement range	500uΩ ~ 50Ω	500uΩ ~ 50Ω	500uΩ ~ 50Ω
- accuracy	±1% magnitude(1mΩ - 50Ω) ±1° phase	±1% magnitude(1mΩ - 50Ω) ±1° phase	±1% magnitude(1mΩ - 50Ω) ±1° phase
- frequency range	0.05Hz ~ 10kHz	0.05Hz ~ 10kHz	0.05Hz ~ 10kHz
- 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	500V/50V	1000V/100V
• AC voltage measurement		24 bit	
- ADC resolution	24 bit	±250mV	24 bit
- input range	±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 ~ 10kHz
- 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℃	Max 1℃	Max 1℃
• Size(WxHxD)	160x68x180mm(BZA60) 207x234x280m(BZA60M)	270x309x302mm	220mmx68mmx250mm

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).

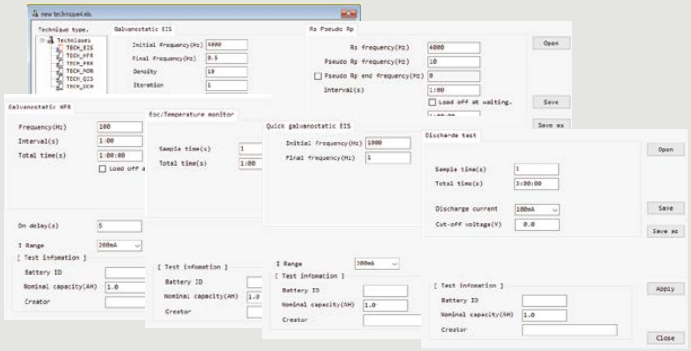
Real time plot and data monitoring

- 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



Power Booster

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

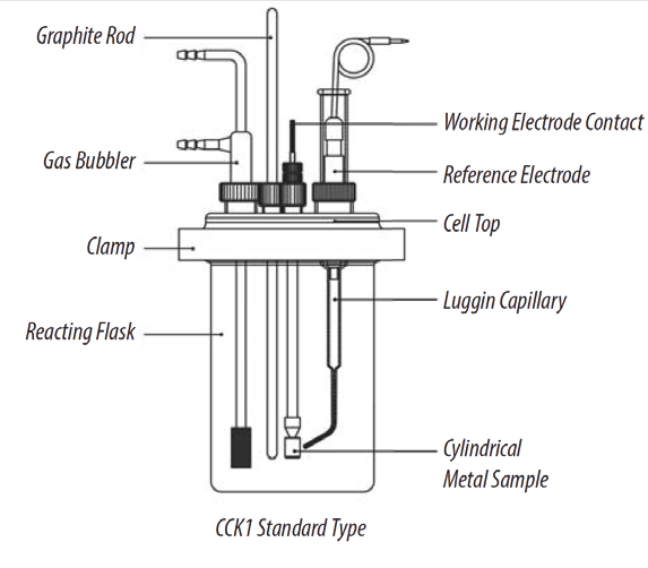
ZB1 *ZB2*

Housing (Size)	Model	Max. V	Max. I (Bipolar)	Power Dissipation(Watt)
ZB1 (W229xH388.3xD550mm)	ZB530B	5V	30A	450
	ZB1020B	10V	20A	480
ZB2 (W272.6xH388.6xD550mm)	ZB560B	5V	60A	900
	ZB1040B	10V	40A	960
	ZB2020B	20V	20A	960

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

Corrosion Cell Kit

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

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

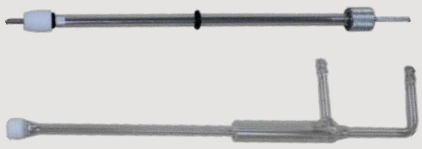
Description	Part No.
Flat specimen holder	
Active area : 11.28 mm dia.	FSH2
Active area : 15 mm dia.	FSH15
Counter electrode	
Graphite rod, 150mm long	GR002H
Graphite rod, 300mm long	GR002
Reference electrode	
Saturated calomel reference electrode	WA1001
Ag/AgCl reference electrode	WA1004
Mercury/Mercurous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

FSH2 *GR002* *WA1001*

Corrosion Cell Kit

Replacement Parts

Description	Part No.
Cylindrical specimen rod For CCK1, WCCK1, CCK5, WCCK5	CSH2
Luggin Capillary For CCK1, WCCK1, CCK5, WCCK5	LGCCK1
Glass vial	
For CCK1	GVCCK1
For WCCK1	GVWCCK1
For CCK05	GVCCK05
For WCCK05	GVWCCK05
Gas bubbler	
For CCK1, WCCK1	GBCCK1
For CCK05	GBCCK05
Clamp	
For CCK1, WCCK1	CLCCK1
For CCK05, WCCK05	CLCCK05
Teflon cell top 1	
For CCK1, WCCK1	CTCCK1
For CCK05, WCCK05	CTCCK05
Teflon cell top 2	
For CCK1, WCCK1	CTCCK1-2
For CCK05, WCCK05	CTCCK05-2
Flat specimen holder head	
For FSH2	FSH2H
For FSH15	FSH15H



CSH

GBCCK1

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

Applications

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

Specifications

Sample test area	
One side	1 cm²
The other side	5 cm²
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.

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

Optional Items

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

Replacement Part

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

LGFCK

GR001

Plate Cell Kit

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 cm²
Using large O-ring	5 cm²

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

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.

PTC2

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

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

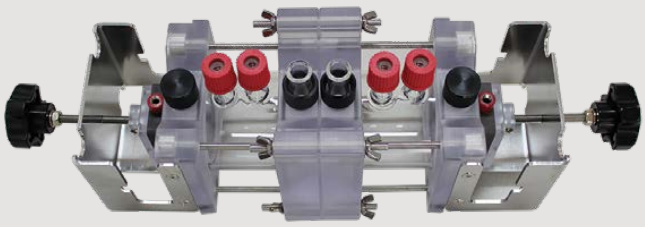
Replacement Part

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

Permeation Cell Kit

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.



Permeation Cell Kit, Standard Type

Permeation Cell Kit, Water-Jacketed Type

Specifications

Sample test area	
One side	1 cm2
The other side	5 cm2
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

Photo Echem Cell Kit

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

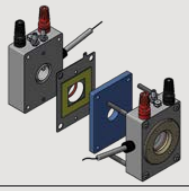
Description/Part No.

PCELL1 - Standard

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

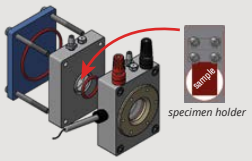
PCELL2

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



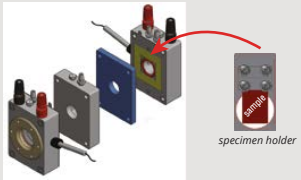
PCELL3

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



PCELL4

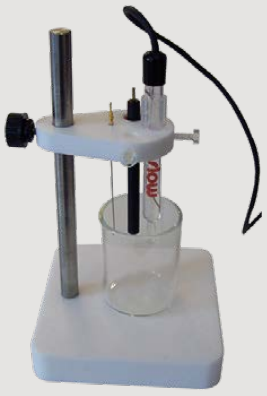
- Cell kit with a specimen holder
- Small sample can be fixed inside the electrolyte chamber



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.

Ordering Guide

Description	Part No.
Universal electrode holder	UEH1

Does not include electrodes and glass vial.

Electrode Holder

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

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

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

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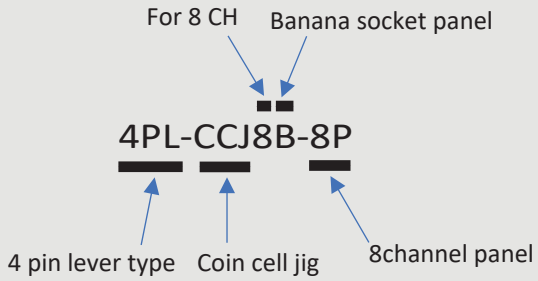


Ordering Guide

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

4PL-CCJ8B-8P

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

4PL-UCJM8B-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

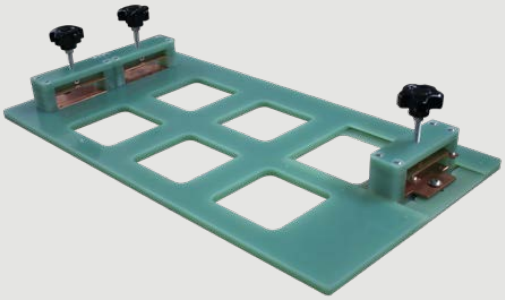
- 1 channel Pouch Cell Jig
- 4pin lever type
- For small size pouch cell

PRCJ1

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

Battery Jig

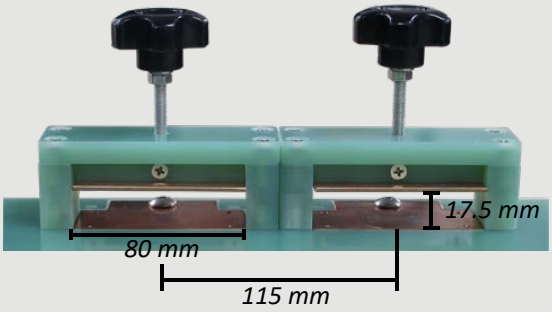
Dual Direction Pouch Cell Jig



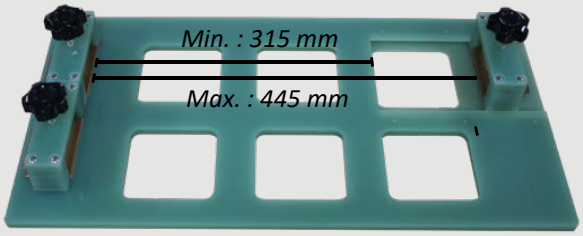
Features

- 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



Ordering Guide

Description	Part No.
Dual direction high current pouch cell holder (427mm)	DDPCH427
Dual direction high current pouch cell holder (560mm)	DDPCH560
Bi directional high current pouch cell holder	BDPCH

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

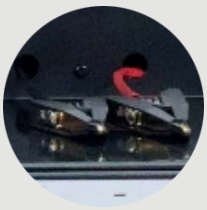
Description	Part No.
High current cylindrical battery jig - max. battery length : 65mm	HCCBJ65L
High current cylindrical battery jig - max. battery length : 100mm	HCCBJ100L

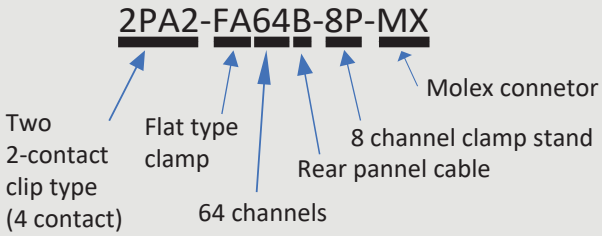
Battery Clamp Stand&Cable

Battery Clamp Stand

Features

- Can easily fix coin cell
- Clamp type that connects to terminals in a clip
- Minimizes voltage drop with a Kelvin probe
- Individual channel operation is available





Ordering Guide

Description	Part No.
Pouch Jig for 64 channel: rear panel cablel	2PA2-FA64A-8P-MX

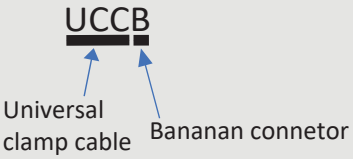
Battery Clamp Cable

Features

- Can easily fix coin cell
- Clamp type that connects to terminals in a clip
- Minimizes voltage drop with a Kelvin probe
- Individual channel operation is available
- Max. current : 10A

Ordering Guide

Description	Part No.
Universal clamp cable -30cm cable length	UCCB



EIS Cell Jig

This jig is designed for EIS measurements on coin cell or cylindrical cell. It allows for easy handling of coin/cylindrical cell using a clamp lever and ensures reliable connection with a Kelvin probe type 4-pin contact. The spring-loaded contact provides a wide contact area, enhancing measurement stability.

For Coin Cell

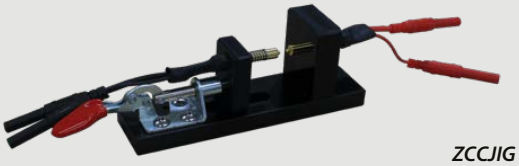
Specifications

Max current	10A
Maximum coin cell height	7.7mm
Dimension	140(W)x36(D)x54(H)mm

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
EIS Coin Cell Jig	ZCCJIG



ZCCJIG

For Cylindrical Cell

Specifications

Max current	ZJIGL : 10A ZJIGM : 50A
Available cylindrical cell size	ZJIGL : 14500,18500,16340,10440 ZJIGM :18650,26650,32650,21700,32700
Dimension	ZJIGL : 186(W)x35(D)x54(H)mm ZJIGM : 198(W)x57(D)x60(H)mm

All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
EIS Cylindrical Cell Jig (Max.10A)	ZJIGL
EIS Cylindrical Cell Jig (Max.50A)	ZJIGM

ZJIGL

ZJIGM

Coin Cell Holder

For WMPG/WBCS System

Direct connect to cell connector

CCH2L

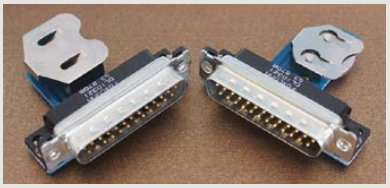
CCH2

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

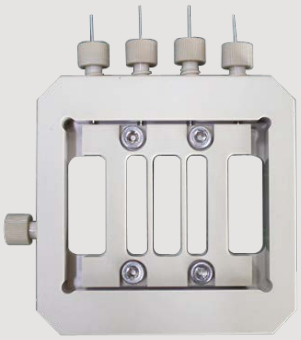
Description	Part No.
For 20mm dia. coin cell - ZIVE SP1, SP2, MP1, MP2, BP2	CCH3-20
For 24mm dia. coin cell - ZIVE SP1, SP2, MP1, MP2, BP2	CCH3-24

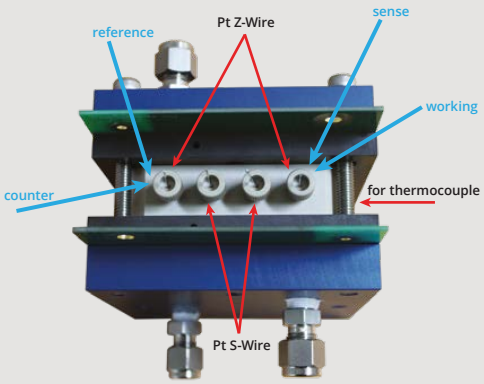
Membrane Conductivity Cell

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.

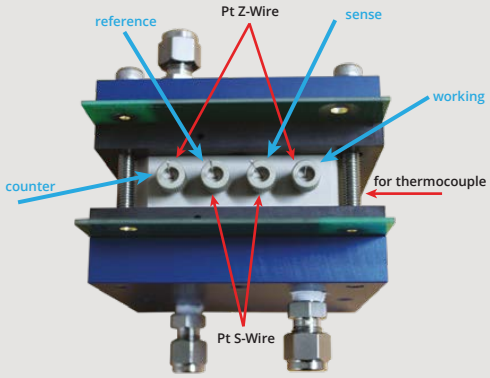
By placing the conductivity cell between the anode and cathode conduction plate, you can simply assemble the conductivity cell into your fuel cell hardware.

- 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

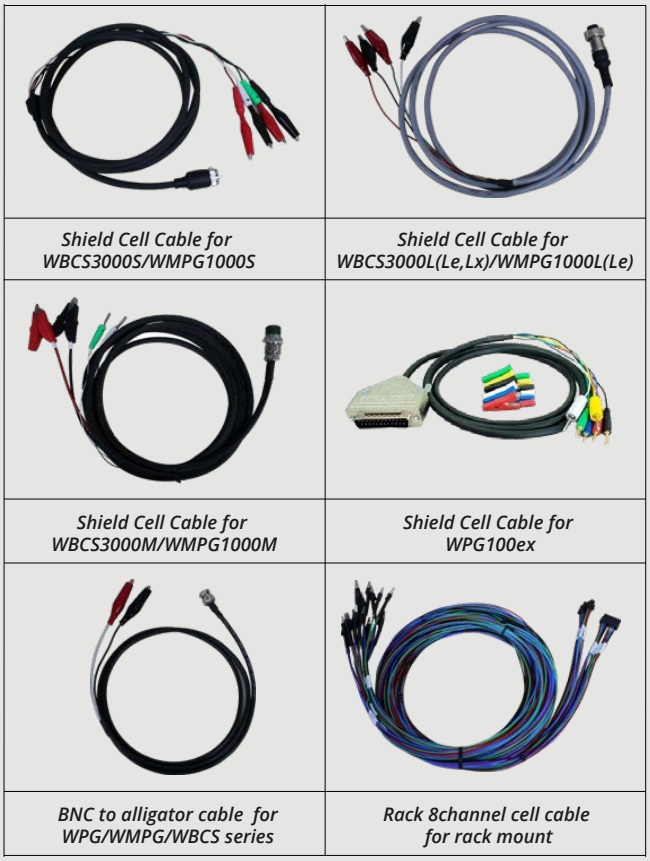
All specifications are subject to change without notice.

Ordering Guide

Description	Part No.
Membrane conductivity cell	MCC

Cable

For WPG/WMPG/WBCS System

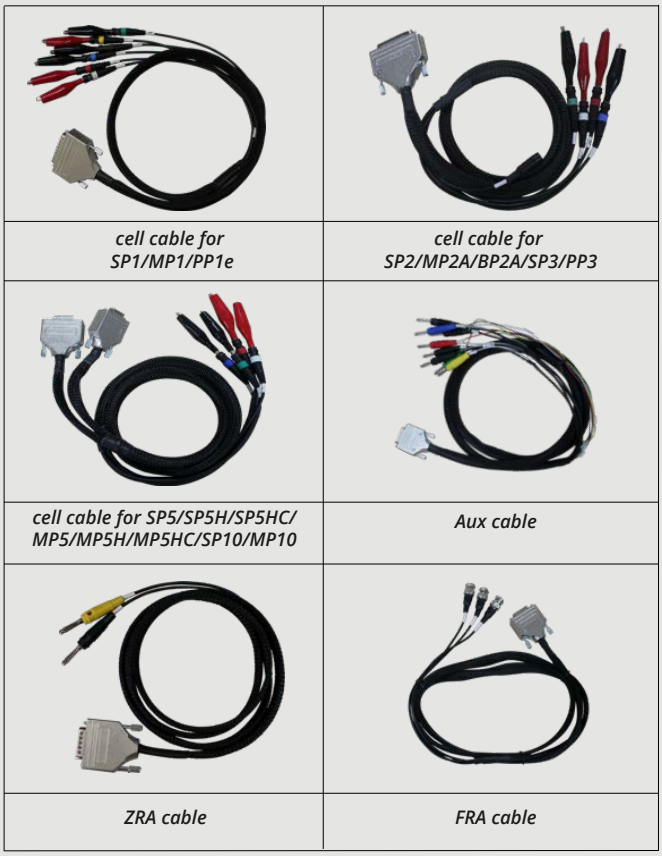


Shield Cell Cable for WBCS3000S/WMPG1000S	*Shield Cell Cable for WBCS3000L(Le,Lx)/WMPG1000L(Le)*
Shield Cell Cable for WBCS3000M/WMPG1000M	*Shield Cell Cable for WPG100ex*
BNC to alligator cable for WPG/WMPG/WBCS series	*Rack 8channel cell cable for rack mount*

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



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

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
Cell Cable for SHP1003	
WE/CE cable set(1m)	ZC1003C100
RE/WS/Aux1 cable set(1m)	ZVC100
Aux cable (1.5 meter)	ZAUXC
ZRA cable(1.5m)	ZRAC
FRA cable(1.5m)	FRAC

Cable

For High Power Cell Cable

Ordering Guide For WPG/WMPG/WBCS/ZIVE

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

For Booster Interface Cable

Ordering Guide For ZIVE

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

Booster I/F cable including I2C for SP1,MP1

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

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

Booster I2C cable

For Z#

Z# AO cable

Z# AI cable

Ordering Guide

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

For Jig Cable

Ordering Guide For Jig

Description	Part No.
4channel Molex connector jig cable 3meter with open lead	4MOLEXJC-3
4channel Molex connector jig cable 3meter with alligator clip	4MOLEXCC-3

BZA Cable&Option

Cable

For BZA60&1000

BZA60 cell cable

BZA1000 cell cable

Large alligator cable

Small size Kelvin alligator cable

Medium size Kelvin alligator cable

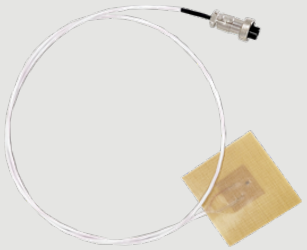
Large alligator clip

Mid alligator clip

Ordering Guide

Description	Part No.
BZA100 cell cable(1M)-banana connector	BZA60C1
BZA1000 cell cable(1M)-banana connector	BZA1000C1
Large alligator clip(CATIII1000V) 99mm	LAC
Mid alligator clip(CATIII1000V) 84.3mm	MAC
Small Alligator clip(CATII300V) 55mm	SAC1000
Small Alligator clip	SAC60
Large alliagator calble 1M	LKAC
Small size Kelvin alligator cable 1M	SKAC
Medium size Kelvin alligator cable 1M	MKAC

PT100 Temperature Sensor



PT100T

PT100S

PT100W

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 - including: Battery Pack (20,000mAhr), Fiber Plastic Bag, Wireless Lan kit	BZAP60
for BZA1000 - including: Battery Pack (20,000mAhr), Fiber Plastic Bag, Wireless Lan kit	BZAP1000

SI Interface For WMPG/WBCS

SIF_EXT

SIF

Ordering Guide

Description	Part No.
SIF external module	SIF_EXT
SIF board	SIF

Channel Extension Board For WMPG/WBCS

Ordering Guide

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

Aux Voltage Measurement For WMPG/WBCS

8ch module for M1

Ordering Guide

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

Does not include auxiliary cable(BA).

Temp Measurement For WMPG/WBCS

8ch module for M1

Ordering Guide

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

Includes K-type thermocouple(1.5m).

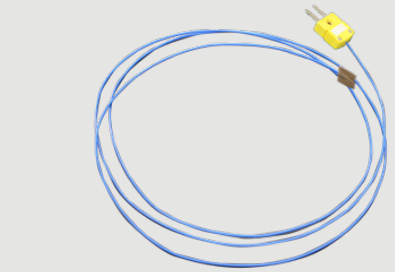
PC mounting For Ls/Le rack model only

Ordering Guide

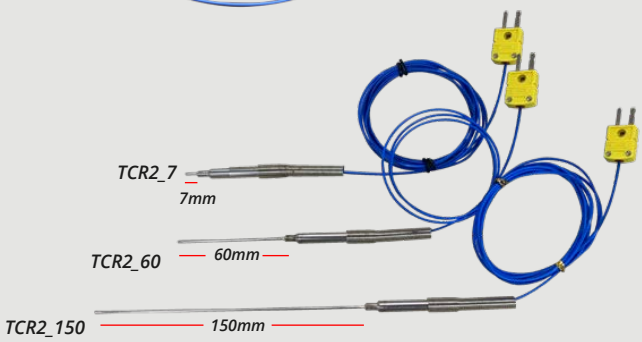
Description	Part No.
PC mounting option without PC/Monitor	RACK_PC

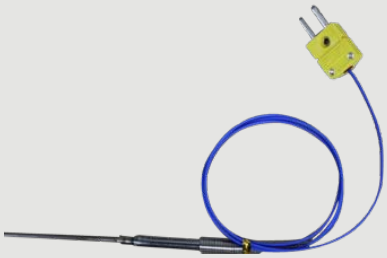
Ls, Le rack model only

Thermocouple



TCB1





TCF01

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 (inside machine)	ZVBi
Water Trap (2set for anode & cathode) - outside machine	TRAP2o
Additional MFC including piping, solenoid valve and check valves <5SLPM	MFCS

Power Adapter

SP1PA

SP2PA

Ordering Guide

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

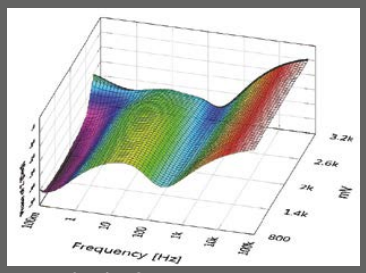
Dummy Cell

Ordering Guide

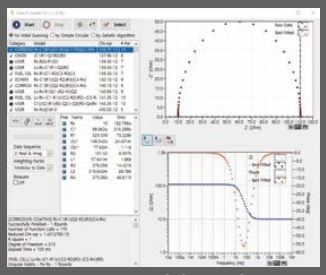
Description	Part No.
Dummy Cell	Dummy1

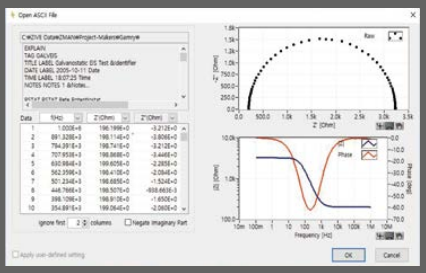
EIS Data Analysis Software, ZMAN™

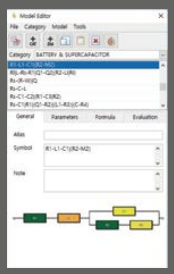
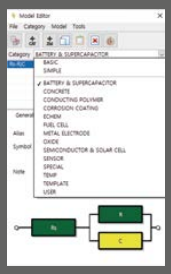
- Model simulation and fitting
- 2D- and 3D-Bode- and Nyquist plots
- Automatic equivalent circuit model search function
- Project concept to handle multiple EIS data analysis
- parameter plot from fitted elements value
- compatible with data format from Zahner, Gamry, Ametek etc. (License code is needed)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

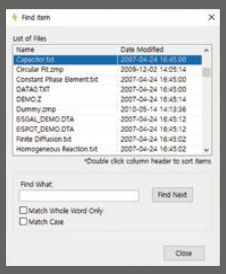


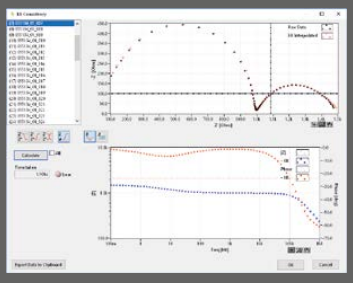
3D Bode plot for series measurement

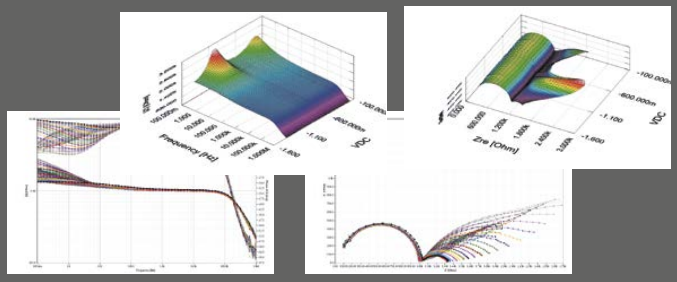

Automatic model searching

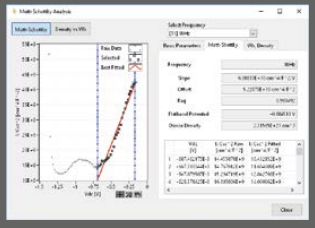

Importing 3rd parties ASCII data file

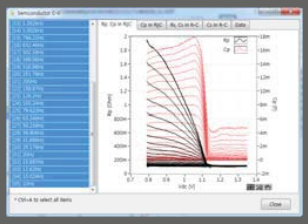


Model editor & model library


Finding data file menu


KK consistency



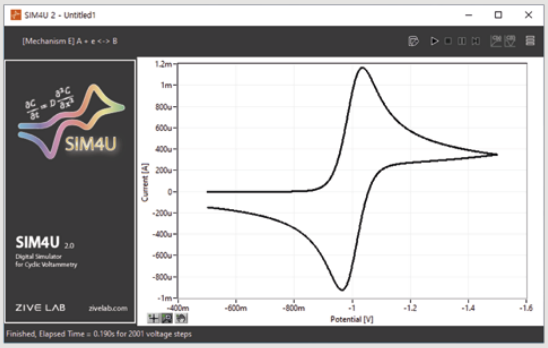

Mott-Schottky analysis window


C/R-V graph

Software

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.

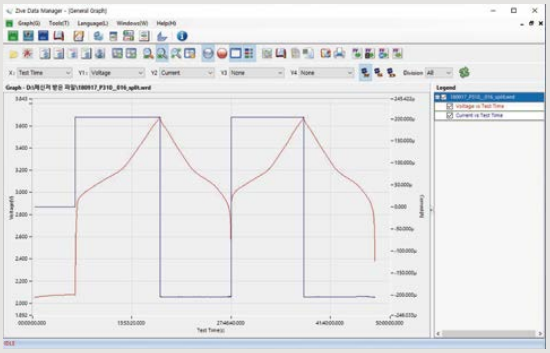


* Downloaded for free from www.zivelab.com.

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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