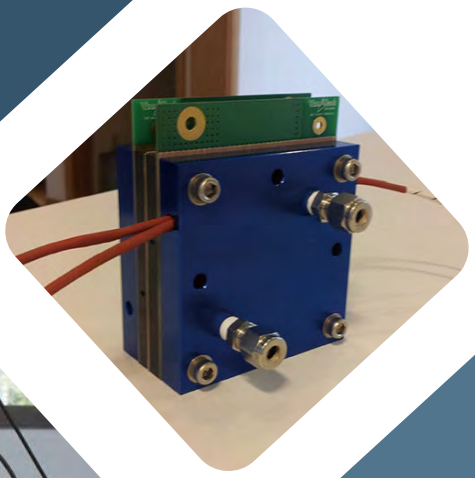
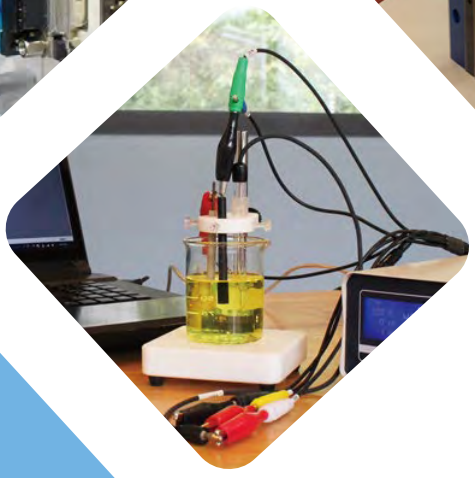
EChem
Accessories





# ACCESSORIES CATALOG 2021

## For Electrochemical Experiments

WonATech

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## *For Electrochemical Experiments*


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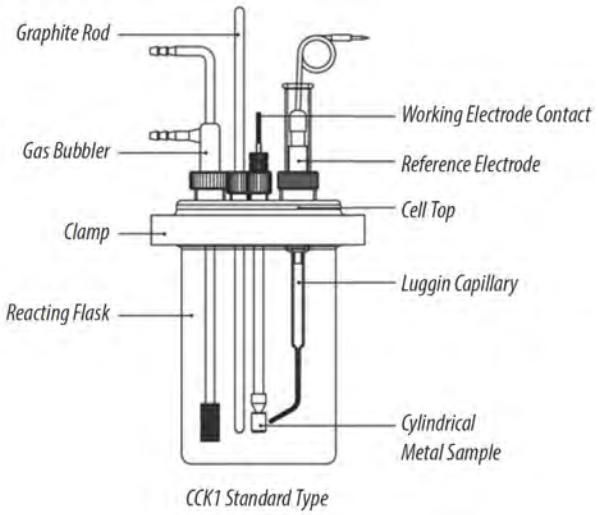
# Corrosion Cell Kit

The CCK series corrosion cell kit is based on a standard glass reaction flask, 1 liter ~ 100ml. 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 graphite rod, a counter electrode, a gas bubbling tube, and a reference electrode in 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 and alkaline resistance 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<br>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 |
| Pt flag counter electrode | active area :<br>Pt plate type : 1cm², 4cm², 5cm² |
| Flat specimen holder(option) | |
| Specimen diameter | FSH2 : 15.5 mm ~ 22 mm<br>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®,<br>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

| | |
|---|---|
| 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

| | |
|---|---|
| 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 |


*FSH2*


*GR002*


*WA1001*

# 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 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 corros
- Electrochemical noise measurement
- EIS measurement
- Cyclic voltammetryion

## Specifications

| | |
|---|---|
| Sample test area | |
| One side | 1 $cm^2$ |
| The other side | 5 $cm^2$ |
| Sample thickness | Up to 20 mm |
| Cell volume | up to 300 ml |
| Material | |
| Cell body | Pyrex® |
| Cell end | Polycarbonate |
| O-ring | Viton® |

All specifications are subject to change without notice.

## Ordering Guide

| | |
|---|---|
| Standard type | FCK2 |
| Water-jacketed type | WFCK2 |

## Optional Items

| | |
|---|---|
| Reference electrode | |
| Saturated calomel reference electrode | WA1001 |
| Ag/AgCl reference electrode | WA1004 |

## Parts Included

| | |
|---|---|
| Graphite plate | GR001 |
| Luggin capillary | LGFCK |

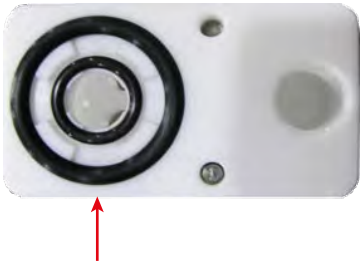
Please contact us for other replacement parts.

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

*PTC1*



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

## Specifications

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

All specifications are subject to change without notice.

## Ordering Guide

| | |
|---|---|
| Plate test cell | PTC1 |

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<br>- 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

| | |
|---|---|
| Plate test cell | PTC2 |

## Optional Items For PTC1 & PTC2

| | |
|---|---|
| Reference electrode | |
| Saturated calomel reference electrode<br>- 9mm OD, KT glass tip | WA1001 |
| Ag/AgCl reference electrode<br>- 9mm OD, KT glass tip | WA1004 |
| Counter electrode | |
| Graphite rod<br>- 6mm dia. 15cm long | GR002H |

# Permeation Cell Kit

The pearmeation 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 graphte plates which can be used as counter electrode and two Luggin capilary 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

| | |
|---|---|
| Permeation Cell Kit<br>- Standard type | PMC1 |
| Permeation Cell Kit<br>- 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<br>optical window: quartz glass<br>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<br>for PCELL3: width: <18mm, height: <22mm |
| Counter electrode | coiled Pt wire (included) |
| Reference electrode | 6mm OD electrode available (option) |

All specifications are subject to change without notice.

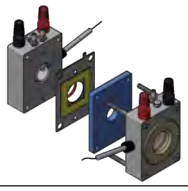
## Ordering Guide

PCELL1 - Standard

- standard type
- one optical window mounted in front of electrolyte chamber

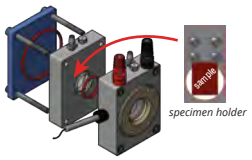
PCELL2

- two optical windows arranged to face each other
- suitable for absorbance measurement with a transparent electrode



PCELL3

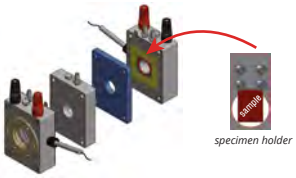
- cell kit with a specimen holder
- small sample can be fixed inside the electrolyte chamber




*specimen holder*

PCELL4

- cell kit with a specimen holder
- small sample can be fixed inside the electrolyte chamber




*specimen holder*

# Electrode & Electrode Holder

## Pt Plate Electrode

The Pt plate electrode is made up with a supporting rod with a suitable sized piece of Pt foil at the end. The rod is shielded by a glass tube. This Pt electrode can be served as working electrode or counter electrode.

### Specifications

| | |
|---|---|
| Pt foil | |
| Active area | 1cm², 4cm², 5cm² |
| Pt plate thickness | 0.2mm |
| Rod | |
| Material | stainless steel |
| Isolated glass tube | 6mm dia. |
| Length | 250mm(rod + contact pin) |

All specifications are subject to change without notice.

### Ordering Guide

| Active area | Pt plate |
|---|---|
| 1cm² | PFL1 |
| 4cm² | PFL4 |
| 5cm² | PFL5 |

## 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.

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

### Specifications

| | |
|---|---|
| Holes | |
| Number of holes | 4 |
| Hole size | 1.6mm dia. x 1ea<br>6.2mm dia. x 1ea<br>9.6mm dia. x 1ea<br>10mm dia. x 1ea |
| Rod | |
| Material | stainless steel |
| Diameter | 6mm diameter |
| Length | Max. 150mm |

All specifications are subject to change without notice.

### Ordering Guide

| | |
|---|---|
| Universal electrode holder | UEH1 |

## Flat Specimen Holder

The FSH series are sample holders to accommodate flat specimens.

• Pyrex® tube : 6.3mm dia.

### Ordering Guide

| | |
|---|---|
| Flat Specimen Holder<br>Active area : 11.28mm dia.<br>Sample size : 15.5mm~22mm dia. / 0.3~5.8mm thickness | FSH2 |
| Flat Specimen Holder<br>Active area : 15mm dia.<br>Sample size : 18.5mm~25mm dia. / 0.3~5.8mm thickness | FSH15 |

# Faraday Cage

The faraday case, 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 | 30mm dia. |
| Position | right hand side and back side |
| Dimensions | |
| Overall | 318 x 311 x409mm(WxDxH) |
| Window | 100x300mm(WxH) |

All specifications are subject to change without notice.

## Ordering Guide

| | |
|---|---|
| Faraday cage | Farad2 |

# Battery Jig

## Battery & Coin Cell Jig

- Easy to hold cylindrical cell and/or coin cell
- Wide contact point with gold coated contact area
- 4 contact point type(Kelvin probe) is available to minimize voltage drop or 2 contact probe type.
- Individual channel operation is available.
- Rack type is available.

**UCJ1**
- Jig for a single coin cell
- Easy to hold a coin cell by pulling the lever
- Banana connector type

**CCJ8F2-8PS**
- Jig for 8 channel coin cells
- 2 probe type coin cell jig for WBCS series battery cycler
- 8ch per panel
- S type cell connector

## Ordering Guide

| | Part No. | Description |
|---|---|---|
| 1st | CCJ | Coin cell jig*1) |
| | UCJ | Universal cell jig*2) |
| 2nd | Channel No. | Number of channels required |
| 3rd | F2 | 2 pin probe |
| | F4 | 4 pin probe |
| 4th | Z | 4 cell banana connector |
| | H | For High temperature |
| | - | Normal type |
| 5th | -L | Lever type |
| | - | Normal type |
| 6th | 4P | 4ch per panel |
| | 8P | 8ch per panel |
| 7th | S | S type cell connector |
| | L | L type cell connector |
| | M | M type cell connector |

1) Height fixed type only 2) Height adjustable

# Battery Jig

**CCJ8FZ2-8P**

- Jig for 8 channel coin cells
- 2 probe type coin cell jig for ZIVE series, general battery cycler and potentiostat having banana connectors
- 8ch per panel
- Gap between the pins cannot be adjustable.

**CCJ200F2-L20P**

- Jig for 200 channel coin cells
- 2 probe type coin cell jig for WBCS series battery cycler
- Lever type
- 20ch per panel

## Pouch Cell Jig

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

*PPJ4F4-4PS*

*PPJ1(1ch)*

*PPJ24-4P*

### Ordering Guide

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

1) * : number of channels

## Coin Cell Holder

### *For WPG/WMPG/WBCS System*

- Direct connect to cell connector

*CCH2L*

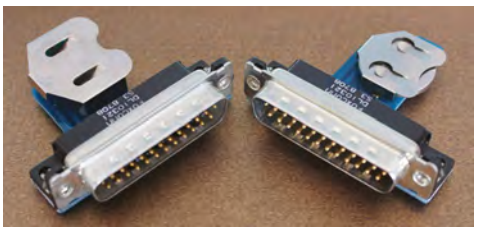
*CCH2*

### Ordering Guide

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

### *For ZIVE System*

- D-SUB connector type



### Ordering Guide

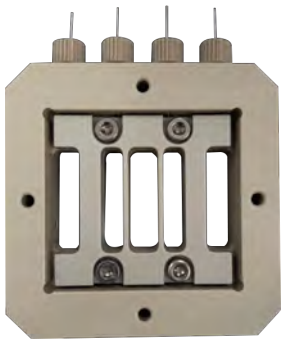
| Description | Part No. |
|---|---|
| For CR2032 coin cell | CCH3-20 |
| For CR2450coin cell | CCH3-24 |

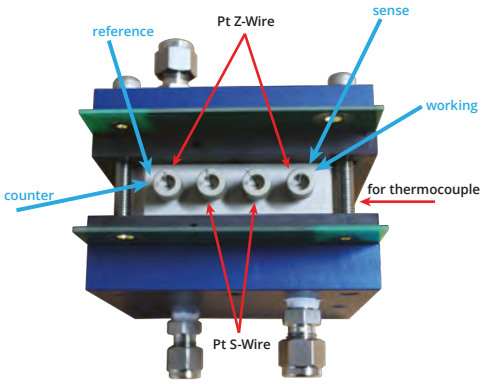
# Membrane Conductivity Cell

The membrane conductivity cell, MCC, is designed to measure ionic conductivity by simply loading a membrane into cell hardware. The MCC adopts 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 below configuration.

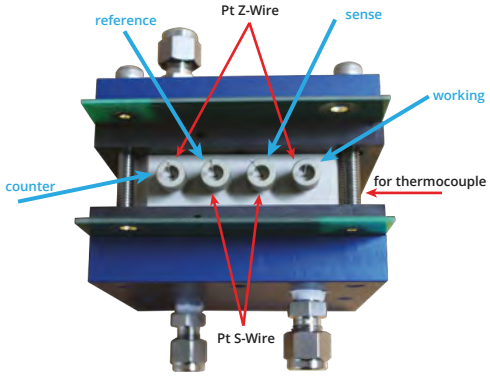
By placing the conductivity cell between the anode and cathode conduction plate, you can simply assemble the conductivity cell into your fuel cell hardware.

- Supports 2 or 4 electrode measurement
- Material
  - cell body : PEEK
  - wire : platinum
- Operating temperature : to 130˚C
- Fuel cell hardware available
  : 5, 25 $cm^2$ 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

| | |
|---|---|
| Membrane conductivity cell | MCC |

# Through-Plane Conductivity Jig

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

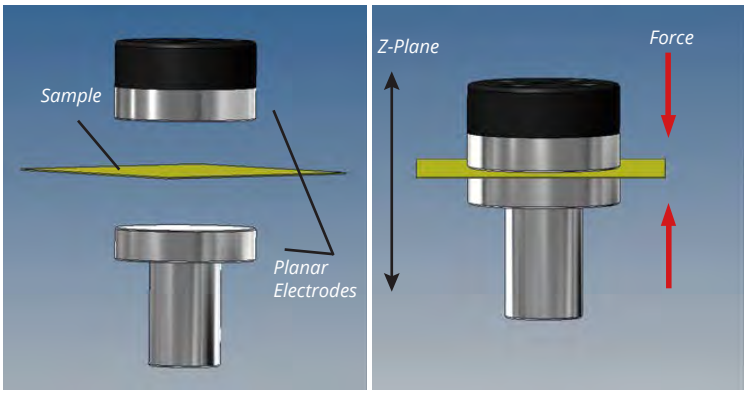
Today ion exchange membranes are receiving considerable attention and are successfully applied for desalination of sea and brackish water and for treating industrial effluents. And proton exchange membrane(PEM) is one of the key components for various consumer related applications for fuel cells, e.g.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

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

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

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

*MCJ1 (Through-Plane Conductivity Test Jig)*




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

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

## Specifications

| | |
|---|---|
| Sample size | >30mm diameter |
| Sample thickness | max. 40mm |
| Sample contact material | 304 stainless steel |
| Overall dimensions | 70 x 135 x 174mm(WxDxH) |
| Connection | 4mm banana plug |

All specifications are subject to change without notice.

## Ordering Guide

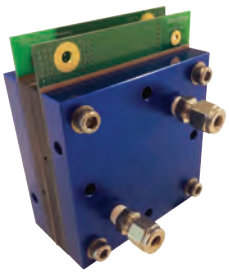
| | |
|---|---|
| Through-plane conductivity jig | MCJ1 |

# Fuel Cell Hardware Fixture

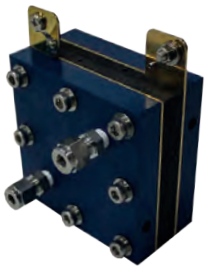
- For PEMFC, DMFC
- Max.operating temperature : 120˚C or 180˚C
- Active area : 5, 25cm²
- Components
  : serpentine flow pattern, cartridge heater(2),
  current collector(2), cell graphite(2), end plate(2), connector
- Thermal Jacket is available as an option.
- MEA is not included.

## Ordering Guide

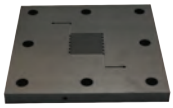
| Active Area | Max. Temp. | Part No. |
|---|---|---|
| 5cm² | 120˚C | SCFC5 |
| 25cm² | 120˚C | SCFC25 |
| 5cm² | 180˚C | SCFC5H |
| 25cm² | 180˚C | SCFC25H |



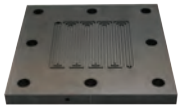
*• SCFC*** fuel cell hardware*



*• SCFC***H fuel cell hardware*



*• single serpentine for SCFC5*



*• triple serpentine for SCFC25*

# Power Booster

The ZIVE ZB series boosters are a new generation of single or multi-channel high current instrumentation and they are designed to increase the maximum current and/or maximum voltage of ZIVE series potentiostat/galvanostat.

The ZIVE ZB series boosters have full dc capabilities and are ideal for a wide range of electrochemical applications including high speed voltage/current pulse techniques. And impedance analysis techniques such as single- and multi-sine and HFR test, etc. are also available. Wide frequency ranges covering 10uHz to 1kHz(10kHz) depending on system power enables user to characterize energy storage devices and electrochemical cells over their full frequency range.

This ZIVE ZB series boosters are designed as stand alone type or rack mounted type and have multiple booster modules placed inside it. The power capability can be growing by adding module units to the existing system (factory configuration).

*ZB1* *ZB2* *ZB3*

- ***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***

*ZB4*

*Rack Type*

# Power Booster

## Specification

| Control & Measurement | |
|---|---|
| Maximum Power Dissipation | 3,840Watt |
| Maximum Current | 200A |
| Minimum Frequency | 10uHz |
| Maximum Frequency | 1kHz ~ 10kHz (depending on power) |
| Current Range | single |
| Voltage Range | single |
| Input Impedance | $10^{13}$ Ohm |
| Accuracy | 0.05% ~ 0.1% f.s. (depending on power) |
| Resolution | 16 bit |
| Rise Time | 5usec ~ 500usec (depending on power) |
| Cooling Method | forced air flow |
| Data Aquisition | >50usec |

* T* This booster needs ZIVE workstation, booster interface cable and cell cable.
The speci□cations are subject to change without notice.

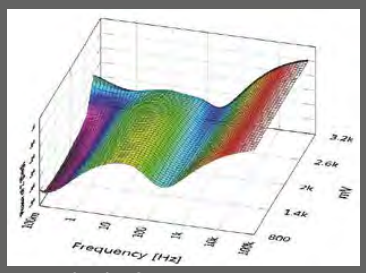
## Ordering Guide

| 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 | 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 |

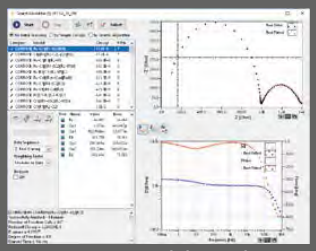
Model Name ****B is for voltage bipolar type, ****U is for voltage unipolar type [minimum voltage −1V or −2V(ZB20120U)]
* Customized speci cation is available. Please contact WonATech sales team.

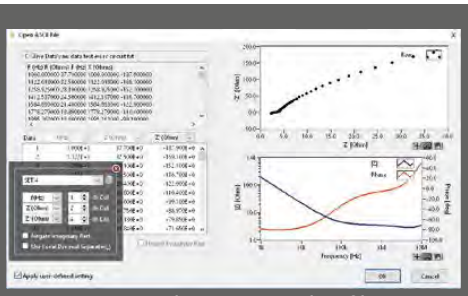
## EIS Data Analysis Software, ZMAN™

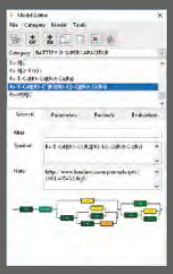
- Model simulation and fitting
- 2D- and 3D-Bode- and Nyquist plots
- Automatic equivalent circuit model search function
- Project concept to handle multiple EIS data analysis
- parameter plot from fitted elements value
- compatible with data format from Zahner, Gamry, Ametek etc. (License code is needed)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



3D Bode plot for series measurement

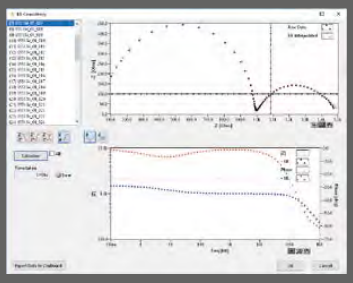

Automatic model searching

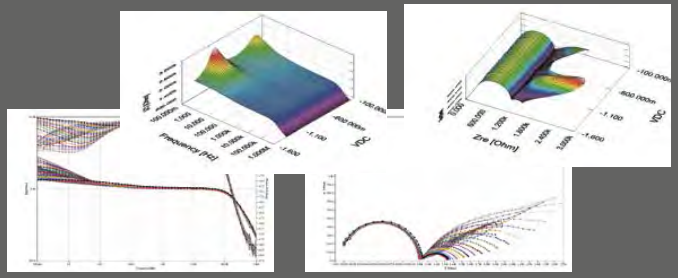
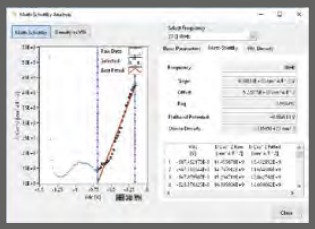

Importing 3rd parties ASCII data file

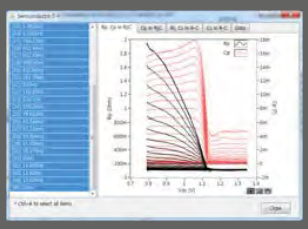



Model editor & model library


Finding data file menu


KK consistency



Mott-Schottky analysis window

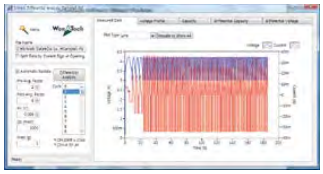

C/R-V graph

## DC Data Analysis Software, IVMAN™

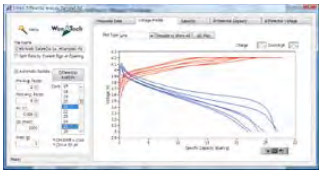
IVMAN™ software package consists of
- IVMAN software
- IVMAN utilities
  - IVMAN main software
  - IVMAN differential analysis software
  - IVMAN photo voltaic cell analysis.
  - IVMAN Tafel analysis
  - IVMAN extractor
  - IVMAN peak find module

### IVMAN DA™ Battery Test Data Analysis Software

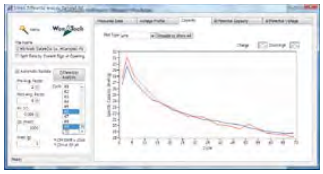
- Battery test data analysis
- Electrochemical voltage spectroscopy (dQ/dV vs. V)
- Voltage vs. Capacity analysis (V vs. Q)
- Cycle graph (Q vs. cycle)
- Differential voltage graph(dV/dQ vs. Q)



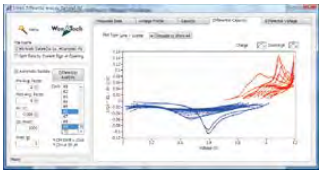
*Measured data*



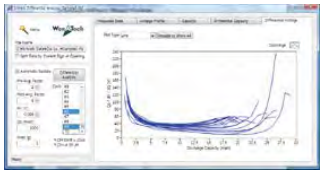
*V vs. Q*



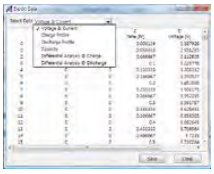
*Cycle graph*



*dQ/dV vs. V*

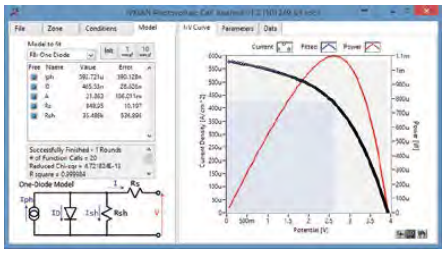


*dV/dQ vs. Q*



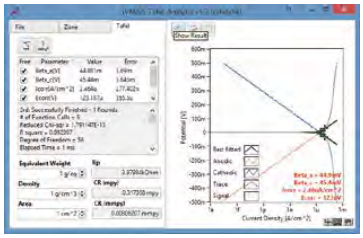
*Export ASCII file*

### IVMAN™ Photovoltaic Cell Analysis



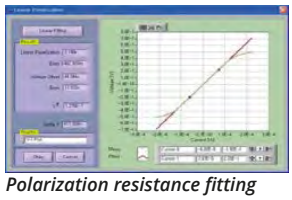
### IVMAN TA™ Tafel Analysis

- Simple Tafel calculation

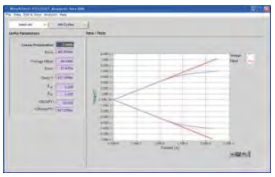


### IVMAN™ Main Software

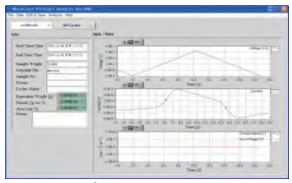
- Ideal for DC corrosion data analysis and electro-analytical data analysis
- Initial guessing function on Tafel analysis etc.



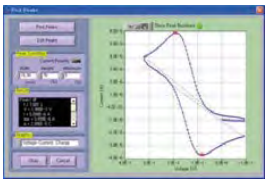
*Polarization resistance fitting*



*Polarization analysis result*

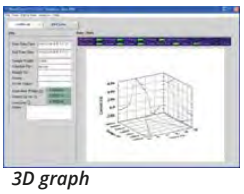


*Time graph*



*Find peak menu*

*CV graph*



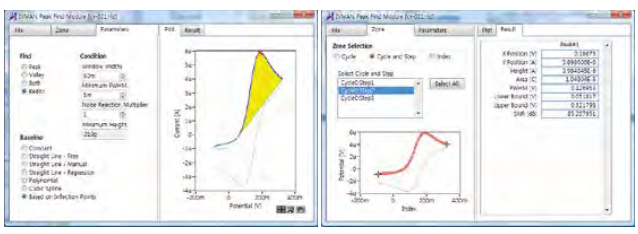
*3D graph*

### IVMAN EX™ Extractor

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

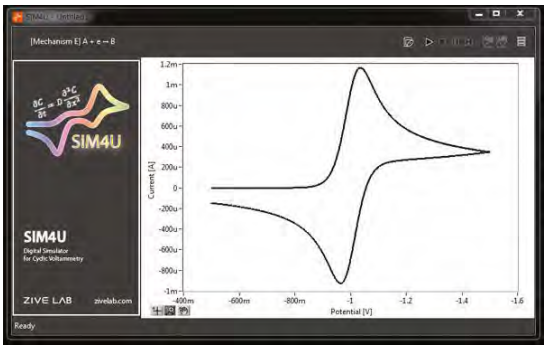
### IVMAN PF™ Peak Find Module

- Independent peak finding 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



*Designing the Solution for Electrochemistry*



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