Product Catalog

Rack type
Battery Test System

For
Battery/Fuel Cell
Supercapacitor/Solar Cell
Corrosion
Material Testing

WonATech

Rack based Battery Charge/Discharge System

- Battery cycle life test
- Fuel cell test
- Supercapacitor test
- Electrochemical experiment
- Potentiostat/Galvanostat circuit
- Various safety functions
- Universal graphic function
- Other application

There are seversal kinds of Rack type WBCS3000 series.
For low current application, The rack was designed including following channels.
- WBCS3000L series (Ls/Le/Lx)channels.
- WBCS3000S/WBCS3000M1/WBCS3000M2
- WBCS3000D/H8/H12/HP

Standard 3 kinds of racks are provided.
Basic Rack, For L /S/M1/M2 series
Wide Rack: shelf type for WBCS3000L32 series housing/ S,M1,M2 series housing
Deep Rack: For High power channels (WBCS3000D/H8/H12/HP)

Max configurable channel number per rack is depending on rack height.
Standard rack height is 1800mm height. The other height of rack is possible by customers demand.

Rack configuration was determined by cell cable connector location (Some model's cell cable connector direction is fixed) and /or rack mounted PC main body & monitor etc.

The following rack options are available.
Rack height
Warning light
Temperature/ Auxiliary voltage input

Low Power Type
- -

Rack model: Basic Rack for Ls,Le,Lx rack panel & shelf
Wide Rack for Ls32,Le32,Lx32 shelf

Rack height: 1800mm
Max channel number: 128 channels

Rack option (Basic Rack only)
Rack mounted PC/Monitor/Keyboard (Max 64ch per rack)
Temperature/ Auxiliary voltage input (Max 96ch per rack)
Emergency button
Molex connector 4channel cell cable

LRM: Front panel LED, Rear panel 4 ch cell connector (Molex) 4 ch cell cable
LFM: Front panel LED, Front panel 4 ch cell connector(Molex) & 4 ch cell cable
FC : Front panel LED, Front panel L type cell connector

WBCS3000Ls
Voltage range: ±5V
Max. current: ±10mA
Current ranges: 4 ranges (10mA,1mA,100uA,10uA)
Plug-in channel type: 16 channel per rack shelf

WBCS3000Le
Voltage range: ±5V
Max. current: ±100mA
Current ranges: 4 ranges (100mA, 10mA,1mA,100uA)
Plug-in channel type: 16 channel per rack shelf

WBCS3000Lx
Voltage range: -1V to 5V
Max. current: ±1A
Current ranges: 4 ranges (1A,100mA, 10mA,1mA)
Plug-in channel type: 16 channel per rack shelf

Mid Power Type
- -

Rack model: Basic Rack for S,M1,M2 subrack
Wide Rack for S,M1,M2 housing shelf

Rack height: 1800mm
Max channel number: Depending on model

Rack option (Basic Rack only)
Rack mounted PC/Monitor/Keyboard
Emergency button
Molex connector 4channel cell cable(S model only)

WBCS3000S
Max. power: 50Watt
Max. current: ±5A

WBCS3000M1
Max. power: 100Watt
Max. current: ±10A

WBCS3000M2
Max. power: 200Watt
Max. current: ±20A

High Power Type
- -

Rack model: Deep Rack
Rack height: depending on channel number & power
Rack option
Temperature/Auxiliary voltage input

WBCS3000D
Max. power per CH: 400Watt/ch

WBCS3000H8
Max. power per CH: 800Watt

WBCS3000H12
Max. power per CH: 1200Watt

WBCS3000HP
Max. power: per CH <4kWatt

Features

● **Potentiostat/Galvanostat Circuit**

- No switching time
  (charging to discharging, discharging to charging)
- Analog feedback control to keep constant voltage & current
- Capability of electrochemical experiments by controlling voltage versus reference electrode for positive voltage polarity only.

● **High Precision**

- 16 bit(0.0015% full scale) dual ADCs for data recording and DAC per channel for control.
- 0.02% to 0.1% full scale voltage control and reading accuracy depending on models
- 4 current ranges (automatic/manual selection) for WBCS3000S/Ls /Le/Lx/M1/M2/D/H8 models, 3 current ranges for WBCS3000H12 models and 1 or 3 current ranges for WBCS3000HP models.
- MOSFET type linear power supply circuit
- Shield cell cable to prevent EMI noise
- Digital coulometer is included: Every minimum hardware sampling rate, WBCS calculates capacity value.

● **Safety**

- Unique "Fail check" function
  : To protect the system and cell itself, the experiment will stop automatically when the measured value is different from control value due to battery failure or wrong cell connection, etc.
    e.g. Control value: 1A, Measured value: 500mA
           The experiment will stop automatically.
- System safety parameter
  : If the measured value is over system specification or user defined safety limit condition, the experiment stops automatically.
  : User defined safety condition setting
    User can input safety level depending on chemical properties of reactants in test cell.
- Automatic cell connection check
  : Before experiment, if the cell voltage value is over than stanby voltage range, program gives the warning message for the operator to check the cell connection.
- If operator presses stop button by mistake, a confirmation message box will appear.
- To prevent over current, a poly-switch is located in each channel. (Low and Mid power model only)
- Watchdog function:
  Stop "running channel(s)" when communication failure occurs.
- Even if a PC failure/communication failure happens, the system will work without data loss and will store the data by max. 300,000 data points per control board.
- If the main program is down by unstable operating system, the independent server program keeps the experiment (control & data acquisition) without dead time.
- For high power model, emergency switch is located per channel to activate the cell off when emergency happened

● **Maintenance & System Expansion**

- Plug-in module configures channels for the system (WBCS3000S/Ls/Le /Lx/M1/M2 models).
  : Plug-in module can be easily upgraded or can modify voltage/ current range. Also, if one channel is out of order, replacing the problematic channels is the easiest way to clean the problem.

- Channel expansion :
  The channels of rack type battery test system can be expanded up to 128 channels
  per system.
  Manufacturer or distributor's engineer can install additional channel at user site.
- Automatic data backup function
- While one or more channels is working, the calibration for the other channels in rest mode is available.
- Each channel has a poly switch instead of fuse. (Low power and Mid power system only)
- Easy calibration software
- Stable TCP/IP communication
- Automatic firmware upgrade

Options

● **Auxiliary voltage & temperature measurement**

- User can assign any temperature input or auxiliary voltage input to single or multiple channel(s) data set by his/her demand.
- Customized auxiliary voltage range and temperature range is available.

● **Mixed model configuration available**
  eg) 32channel WBCS3000Ls + 32channel WBCS3000Lx in one rack

● **Various Battery jig/holder etc**

- Coin cell jig
- Universal jig
- Pouch cell jig
- Prismatic cell jig
- Coin cell holder
- Cylindrical battery holder
- Pouch cell clamp
- Coin cell clamp

● **Rack mount PC/monitor/Keyboard for L/S series**

● **4ch Molex cell cable connector for L/S series**

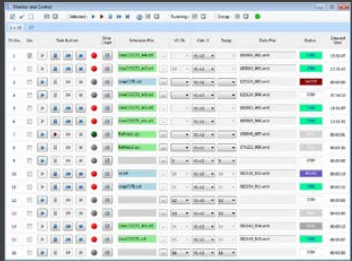● **Emergency switch for L/S series**

Specifications

- Circuit: potentiostat/galvanostat linear circuit
- 4 Kelvin probe type connection
- Maximum channels per PC: 128 channels
- Voltage range: unipolar or bipolar
- Current(reading & control) accuracy
  : 0.02~0.1% f.s. depending on model
- Sampling time varies depending on number of channels.
      Without option
      - 8~40 channels system: 10msec
      - 41~80 channels system: 20msec
      - 81~128 channels system: 50msec
      With Option
      - 8~16 channels system: 10msec
      - 17~40 channels system: 20msec
      - 41~80 channels system: 50msec
      - 81~128 channels system: 50msec (2 SIF boards)
- Auxiliary voltage measurement range: bipolar(option)
- Temperature measurement type: K type thermocouple(option)

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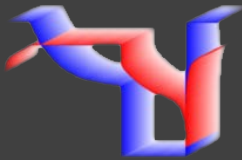
- 32bit/64bit OS environment
- TCP/IP communication
- Max. 200 steps
- Max. 10 cutoff(vertex) condition
- Max. 300,000 data point memory per control board
- Single/multichannel control panel
- Various real time plots & universal axis graphs
- Data backup function
- WYSIWYG graphics
- User friendly software

Virtual Control Panel

- BCO (Button click operation): User can do any task just by clicking the button: NO MENU SELECTION

- Easy assignment of cycle test condition file to channel with combo box selection at anytime.
- Synchronized changes of cycle test condition for selected multiple channels.
- Real time dual channel(V & I) strip chart displays for selected channel or for all running channels with time scrolling mode or whole window mode.
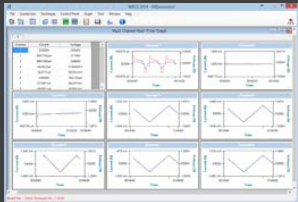
Multichannel real time graph
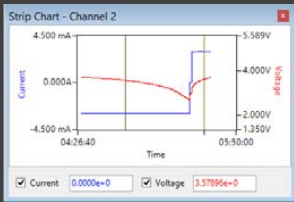
Single channel real time graph

- Status bar displays channel status.
- Various task functions: run, stop, suspend, moving step, etc.
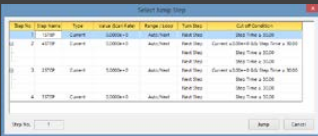
Jump step function

- Assign temperature and AuxV channel on virtual control panel
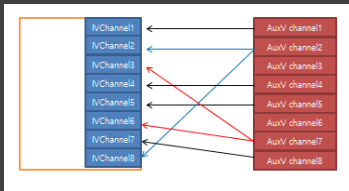
- Single channel & multichannel control/monitor panel

Multichannel control panel

Single channel control/monitor panel

- VOI(Value of Interest) bar is located in upper side of 'control/monitor' window. The first value on the far left indicates the elapsed time after the experiment starts. The other parameters can be selected or be hidden at user's discretion.
  The selectable parameters are voltage, current, auxiliary, temperature, load, power, capacity, and energy.
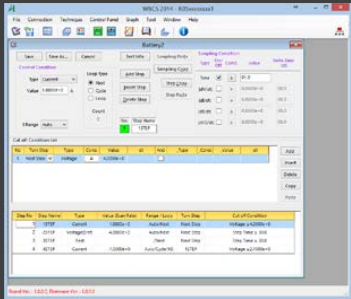
Elapsed Time	Voltage(V)	Current(A)	Power(W)	Auxiliary(V)	Temperature(°C)
00:00:50	1.5m	0.000	0.000	181.3m	0.0

Voltage control

Step Time	Voltage(V)	Current(A)	Power(W)	Auxiliary(V)	Temperature(°C)
00:00:20	3.887	-50.0m	-194.4m	237.4m	0.0

Current control

Schedule Editor

- One stop test condition creation/modification
- Multiple input parameters available
- Max. 200 test steps
- Control parameters
  - Constant voltage, LastV
  - Constant current, LastI
  - Constant power
  - Constant load
  - C-rate
  - Voltage scanning, current scanning
  - Conditioning potential
  - Conditioning current
  - Rest
  - LastVscan
  - CstepV(Staircase Voltage Sweep)
  - CstepI(Staircase Current Sweep)
  - CC/CV, CL/CV, CP/CV, Crate/CV
  - Id, Is control
- Step flow is defined by next step, loop and cycle.
- Cut-off conditions can be set by
  : step time, voltage, current, dV/dt, dI/dt, cycle time, loop time, capacity, -dV, Whr, Ahr, temperature, Aux voltage, dT/dt, Eoc, stepend
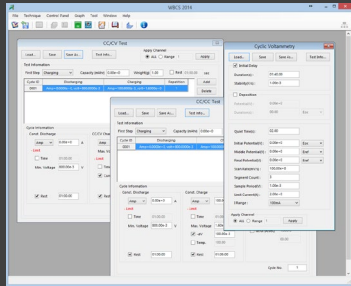
Cutoff condition

- Data sampling condition by each step
  : time, dV/dt, dI/dt, dT/dt, dV2/dt
- And/Or logic for cut-off condition settings
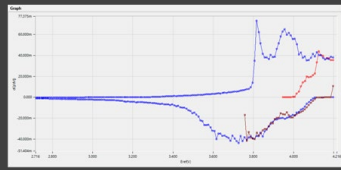
## *Menu Selection (Pre-defined techniques)*

■ Energy Test

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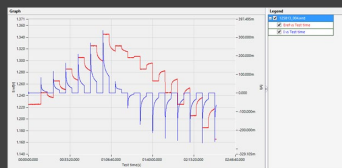- PITT (Potentiostatic intermittent titration technique) test
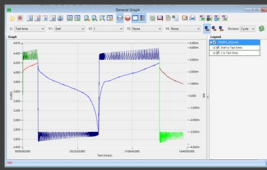
EVS test raw data

EVS graph format (dQ/dV vs. V)
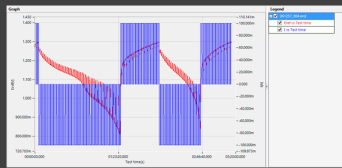
GITT test

PITT test_raw data

■ Electroanalytical Techniques

- 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

Simple Monitor

- Real time display: time, voltage, current, channel status
- Channel status color display: charging, discharging, standby, idle, calibration

Grouping

- Classification/grouping channels by user's purpose
- Labeling each group by operator name, chemistries etc.
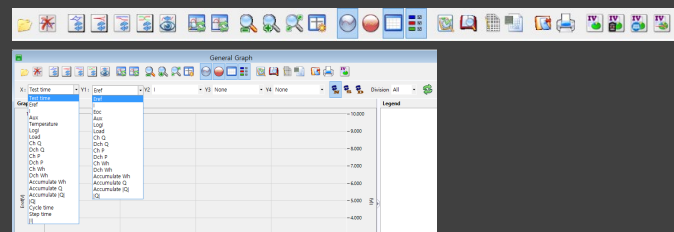- Group monitor is available by this setting
- Group control

Detailed Monitor

- Displayed test data: status, running time, step number, cycle number, step time, current range, current, voltage, capacity, power, energy, Aux V, Calc V, temp, cycle file name, data file name, and file size.
- Detailed monitor type selection: All channels, running channels only, and grouped channels.
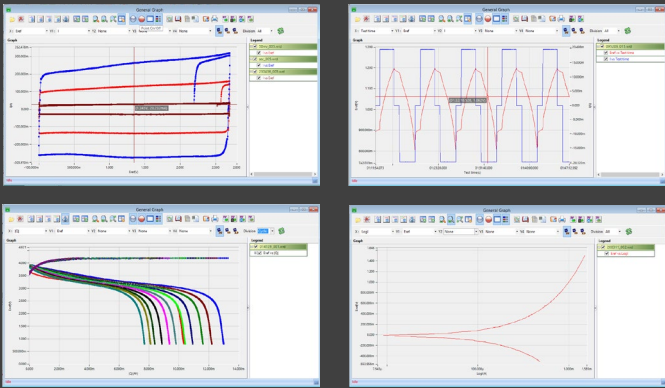- Activated character only for running channels.

Graphics

- Multiple plot format
  - General graph
  - Cycle graph
- General graph format

• Cycle graph format

General Function of Graph

• Multi-parameters
• Plot overlay: max. 20 plot
• Universal graphics: any combination of X,Y1,Y2,Y3,Y4 axis parameters
• Automatic updating plot with reloading button for running channel data
• Automatic/manual scale and polarity selection for each axis

• Cross-hair pointer by mouse click/arrow key displays coordinate values on graph
• Mouse zooming
• Density, specific value display

• Copy to clipboard function to use in other application software
• Grid on/off and dot/line selection
• ASCII file conversion or Excel file conversion of graph data only
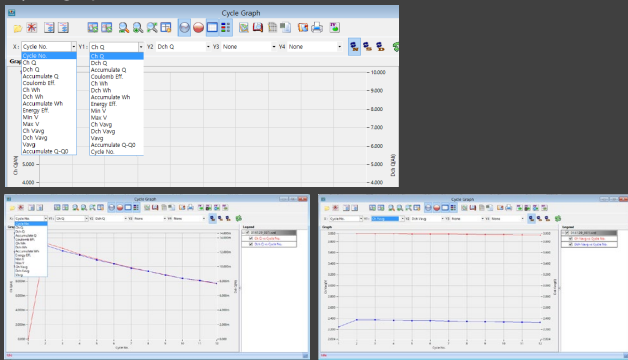

• Parameter change without reloading the data file
• Data set On/Off: Data can be visible or invisible by selecting/ deselecting the data set.
• Rest step data hidden function
• Advanced graph setting
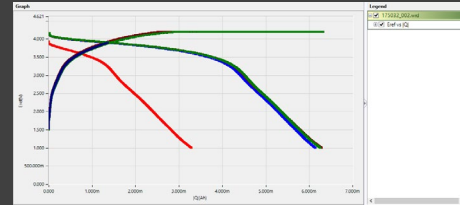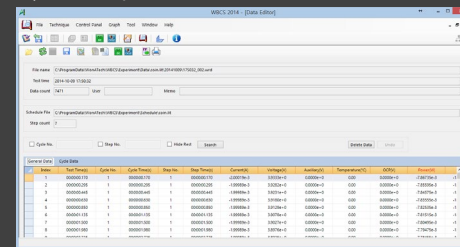

Voltage vs. |capacity| graph

Tools
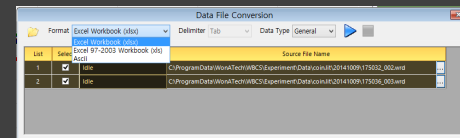
• Data Editor
  - General data report
  - Cycle data report
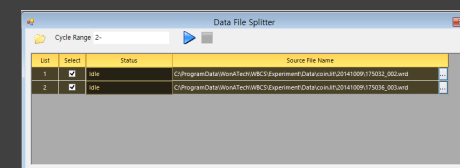

  * Data editing
  * Data filtering

• Data Conversion
  - Multiple data conversion(ASCII, Excel)
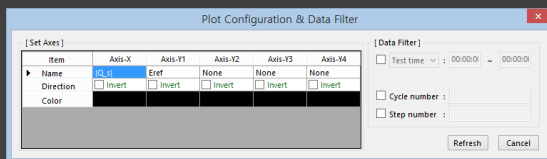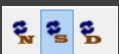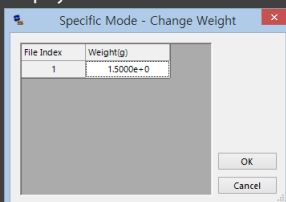

  - Data file splitter by cycle number

• Calibration
  - User can calibrate channel(s) while other channels are running.
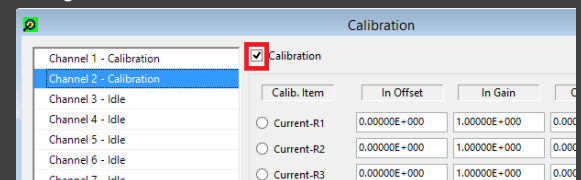
• Data backup
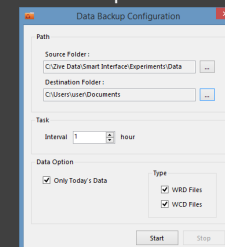
Independent Data Analysis Software

The WBCS data format can be used for independent data analysis software IVMAN™ at free of charge.

IVMAN™ software package consists of
• IVMAN 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)
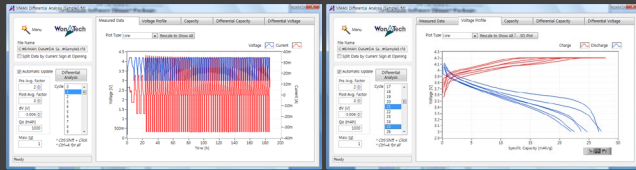
Measured data

V vs. Q
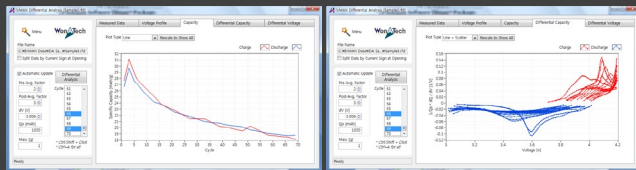
Cycle graph

dQ/dV vs. V

IVMAN™ Photovoltaic Cell Analysis
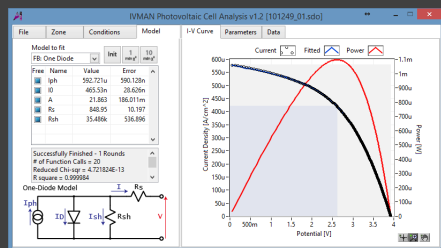
• Automatic analysis of parameters
  - open circuit voltage, open circuit current, max. power, efficiency
    photo induced current, diode quality factor, series resistance, etc.

IVMAN™ Main Software

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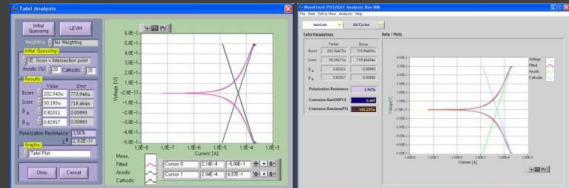
Tafel initial fitting

Tafel analysis result
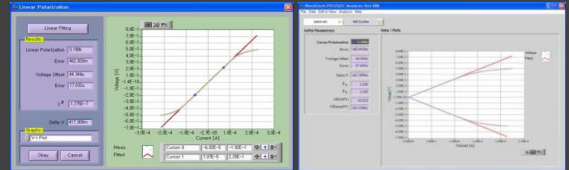
Polarization resistance fitting

Polarization analysis result
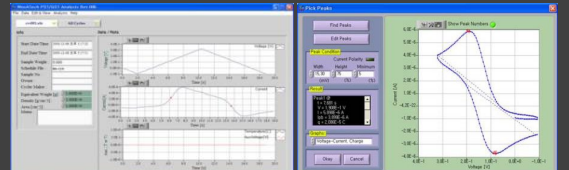
Time graph

Find peak menu
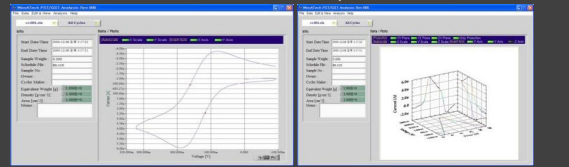
CV graph

3D graph

IVMAN™ Tafel Analysis

• Simple Tafel calculation
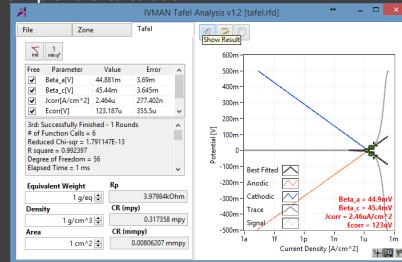
Extractor

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

Peak Find Module

• Independent peak finding software

WBCS3000Ls/Le/Lx Low power Type

Wide Rack Le/Lx combi
Rack FC option
Rack LRM option
Rack LRM with Rack mount PC option
Rack Molex cable
Rack Molex cable connector

Application

- For low current application
- Micro battery application
- Sensor application
- Electroanalytical application

The rack type WBCS3000L series are designed for low current applications and can be a best choice for coin cell/micro battery studies. The potential control range is specified depending on customer's specification. Up to 128 independent channels can be installed per one rack.
The system has 4 current ranges. It use a local area network(LAN) for communication with a computer.

Options

- Temperature monitoring
- Auxiliary voltage monitoring
- Rack mounted PC option
- Emergency switch
- Coin cell holder
- Battery jig
- Molex cell cable

Specifications

Control voltage range	±5V(standard) :WBCS3000Ls(Le) -1V to +5V: WBCS3000Lx
Control current range	4 ranges
LED	Run: 1ea
Input impedance	10^{12} Ohm
Cell connection	4 probe type, alligator clip cables
Max. channel No.	128
Voltage accuracy	±0.02% f.s.
Current accuracy	±0.02% f.s.

Voltage Control/Measurement

Full scale ranges	±5V(standard) :WBCS3000Ls(Le) -1V to +5V: WBCS3000Lx
Resolution (16 bits)	0.15mV(standard) @±5V

Current Control/Measurement

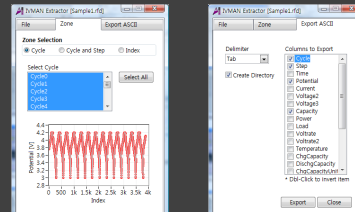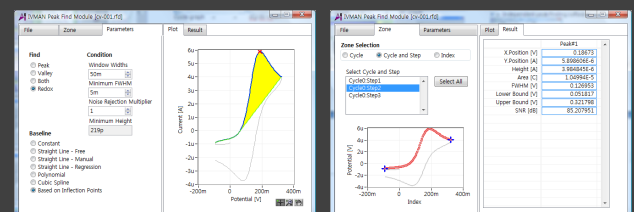|	
Full scale ranges	Max. 10mA@5V(WBCS3000Ls) Max. 100mA@5V(WBCS3000Le) Max. 1A@-1V to +5V(WBCS3000Lx)
Resolution	16 bit(0.0015% f.s)
Communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

All specifications are subject to change without notice.

WBCS3000S Standard Type(Mid power type)

Application

- Battery cycle life test
- Fuel cell test
- Solar cell test
- Supercapacitor test
- Material test

The WBCS3000S is a research grade battery charge/discharge test system in an 8-channel substation and each channel can be used independently or simultaneously. Maximum power of each channel is 50Watt and the system can be configured with custom specification not exceeding 50Watt in power range. The WBCS3000S has 4 current ranges, which is suitable for various electrochemical applications. The WBCS3000S is designed with a local area network (LAN) for communication with a computer.

Options

- Temperature monitoring
- Auxiliary voltage monitoring
- Coin cell holder
- Battery jig

Specifications

Control voltage range	±5V(standard) [*1]
Control current range	4 ranges
LED	Run: 1ea, Mode: 2ea
Input impedance	10^{12} Ohm
Cell connection	4 probe type, alligator clip cables
Max. channel No.	128
Voltage accuracy	±0.02% f.s.
Current accuracy	±0.02% f.s.

Voltage Control/Measurement

Full scale ranges	±5V(standard) [*1]
Resolution (16 bits)	0.15mV(standard) [*1]

Current Control/Measurement

Full scale ranges	Depending on system specification Max. 5A@±5V
Resolution	16 bit(0.0015% f.s)
Communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

* 1: User can specify the voltage range within <80V for difference between high and low voltage.
All specifications are subject to change without notice.

WBCS3000M1 100Watt Mid Power Type

WBCS3000M1Rack

Application
- Suitable for power device application
- Battery cycle life test
- Fuel cell test
- Supercapacitor test

The WBCS3000M1 rack system are designed for energy device application such as battery pack, solar module, and fuel cell stack, etc. This model is derived from the standard WBCS series battery cycler system for higher power application with 4 current ranges and maximum power of each channel is 100Watt. The system can be configured with custom specification not exceeding its maximum power. One PC can control maximum of 128 channels.

Options
- Temperature monitoring
- Auxiliary voltage monitoring
- Battery jigs

Specifications

Control voltage range	±5V(standard) *1
Control current range	4 ranges
LED	Run: 1ea, Mode: 2ea
Input impedance	10^{12} Ohm
Cell connection	4 probe type, alligator clip cables
Max. channel No.	128
Voltage accuracy	±0.02% f.s.
Current accuracy	±0.05% f.s.
Voltage Control/Measurement	
Full scale ranges	±5V(standard) *1
Resolution (16 bits)	0.15mV(standard) *1
Current Control/Measurement	
Full scale ranges	Depending on system specification Max. 100Watt for WBCS3000M1
Resolution	16 bit(0.0015% f.s)
Communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

* 1: User can specify the voltage range within <80V for difference between high and low voltage. All specifications are subject to change without notice.

WBCS3000M2 200Watt Mid Power Type

WBCS3000M2 Rack with rack mounted PC opdtion

Application
- Suitable for power device application
- Battery cycle life test
- Fuel cell test
- Supercapacitor test

The WBCS3000M2 rack system are designed for energy device application such as battery pack, solar module, and fuel cell stack, etc. The WBCS3000M2 rack system are derived from the standard WBCS series battery cycler system for higher power application with 4 current ranges and maximum power of each channel is 200Watt. The system can be configured with custom specification not exceeding its maximum power. One PC can control maximum of 128 channels.

Options
- Temperature monitoring
- Auxiliary voltage monitoring
- Battery jigs

Specifications

Control voltage range	±5V(standard) *1
Control current range	4 ranges
LED	Run: 1ea, Mode: 2ea
Input impedance	10^{12} Ohm
Cell connection	4 probe type, alligator clip cables
Max. channel No.	128
Voltage accuracy	±0.02% f.s.
Current accuracy	±0.05% f.s.
Voltage Control/Measurement	
Full scale ranges	±5V(standard) *1
Resolution (16 bits)	0.15mV(standard) *1
Current Control/Measurement	
Full scale ranges	Depending on system specification Max. 200Watt for WBCS3000M2
Resolution	16 bit(0.0015% f.s)
Communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

* 1: User can specify the voltage range within <80V for difference between high and low voltage. All specifications are subject to change without notice.
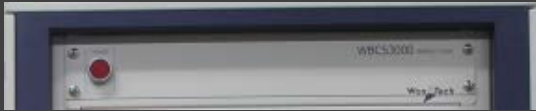
High power rack system

General

WBCS3000 high power rack system can be configuratble with following channels.

  . WBCS3000D channel
  . WBCS3000H8 channels
  . WBCS3000H12 channels
  . WBCS3000 HP channels

The high power rack system can be configured with different models. (Mixed configuration) upto Max 128 channels.
Each rack will include 8 channel controllers with power switch and if user want to add temperature or auxiliary voltage input option, these option will be located in 8 channel controller.

Hardware specification is same as WBCS3000HPC series to control 8channel.

WBCS3000 high power rack system uses deep type rack (depth is much longer than other rack model) in order to include high power supplies.
This requires to decrease temperature of hot air flow from heat sinks.
Some model needs open load power cable to connect to switch board directly.
Electrical breaker, terminal block etc are prepared for safety.
Stardard rack height is 1800mm but some model's height might be changeable dueing to channel number and maximum power per channel etc.

Optios

• Temperature monitoring
• Auxiliary voltage monitoring

WBCS3000D 400Watt Dual Channel Type

Application

• Power device application
• Battery/Super capacitor test
• Solar cell test, Fuel cell test
• For multichannel application

The WBCS3000D system is designed for Mid power application (max 400Watt/ch) such as battery, solar module, fuel cell, supercapacitor etc. The WBCS3000D has dual channel in one shelf insided of high power rack..

Customized specification is available. Up to 16 independent channels can be configured in one rack . One PC can control maximum of 128 channels.

Typical models for WBCS3000D channels are
• ±5V @ 25Amp   WBCS3000D_525B
• -1V to 10V @ 25Amp   WBCS3000D_1025U
• -1V to 21V @15Amp   WBCS3000D_2115U

Options

• Temperature monitoring
• Auxiliary voltage monitoring

Specifications

Control current range	4 ranges
LED	Run: 1ea, Mode: 2ea, Irange: 4ea
Input impedance	10^{12} Ohm for <10V
Cell connection	4 probe type, alligator clip cables
Max channel no.	128
Voltage accuracy	±0.05% f.s.(<10V)
Current accuracy	±0.05% f.s.

Current / Voltage Control/Measurement

Resolution (16 bits)	0.0015% f.s

Power Configuration Map
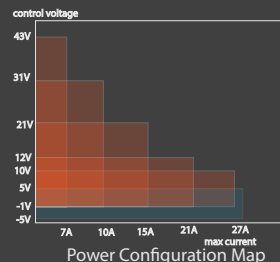
Maximum current depending on

voltage range
1) Max 27A @ ±5V
2) Max 26A @ -1V~+10V
3) Max 21A @ -1V~+12V
4) Max 15A @ -1V~+21V
5) Max 10A @ -1V~+31V
6) Max 7A @ -1V~+43V

communication	TCP/IP
Sampling time	Without option －8~40 channels system: 10msec －41~80 channels system: 20msec －81~128 channels system: 50msec With Option －8~16 channels system: 10msec －17~40 channels system: 20msec －41~80 channels system: 50msec －81~128 channels system: 50msec (2 SIF boards)

All specifications are subject to change without notice.

WBCS3000H8 800Watt Power Channel Type

Application

- Power device application
- Battery/Super capacitor test
- Solar cell test, Fuel cell test
- For multichannel application

The rack system consists of WBCS3000H8 channels are designed for power application (max 800Watt/ch) such as battery pack, solar module, fuel cell stack, super capacitor, etc. Each rack can be configured max 8 channels and one rack includes 8 channel controller.

Customized specification is available and   one PC can control maximum of 128 channels.

Typical models for WBCS3000H8 are
- ±5V @ 46Amp   WBCS3000H8_546B
- -1V to 10V @ 46Amp   WBCS3000H8_1046U
- -1V to 21V @ 30Amp   WBCS3000H8_2130U
- -1V to 43V @15Amp   WBCS3000H8_4315U

Options
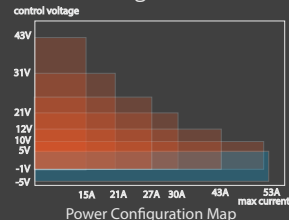
- Temperature monitoring
- Auxiliary voltage monitoring

Specifications

Control current range	4 ranges
LED	Run: 1ea, Mode: 2ea, Irange: 4ea
Input impedance	10^{12} Ohm for <10V
Cell connection	4 probe type, alligator clip cables
Max channel no.	128
Voltage accuracy	±0.05% f.s.(<10V)
Current accuracy	±0.1% f.s.

Current / Voltage Control/Measurement

Resolution (16 bits)	0.0015% f.s

Full scale ranges

Power Configuration Map

Maximum current depending on voltage range
1) Max 53A @ ±5V
2) Max 52A @ -1V~+10V
3) Max 43A @ -1V~+12V
4) Max 30A @ -1V~+21V
5) Max 27A @ -1V~+24V
6) Max 21A @ -1V~+31V
7) Max 15A @ -1V~+43V

communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

All specifications are subject to change without notice.

WBCS3000H12 1200Watt Power Channel Type

Application

- Power device application
- Battery/Super capacitor test
- Solar cell test, Fuel cell test
- For multichannel application

The rack system consists of WBCS3000H12 channels are designed for power application (max 1200Watt/ch) such as battery pack, solar module, fuel cell stack, supercapacitor etc. Each rack can be configured max 8 channels and one rack includes 8 channel controller.
Customized specification is available. one PC can control maximum of 128 channels.
Typical models for WBCS3000H12 are
- -1V to 5V @ 90Amp   WBCS3000H12_590U
- -1V to 10V @ 80Amp   WBCS3000H12_1080U
- -1V to 21V @ 45Amp   WBCS3000H12_2145U
- -1V to 43V @25Amp   WBCS3000H12_4325U
- -1V to 68V @15Amp   WBCS3000H12_6815U

Options

- Temperature monitoring
- Auxiliary voltage monitoring
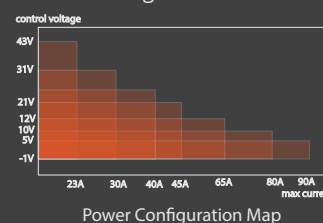
Specifications

Control current range	3 ranges
LED	Run: 1ea, Mode: 2ea, Irange: 3ea
Input impedance	10^{12} Ohm for <10V
Cell connection	4 probe type, alligator clip cables
Max channel no.	128
Voltage accuracy	±0.05% f.s.(<10V)
Current accuracy	±0.1% f.s.

Current / Voltage Control/Measurement

Resolution (16 bits)	0.0015% f.s

Full scale ranges

Power Configuration Map

Maximum current depending on voltage range
1) Max 90A @ -1V~+5V
2) Max 80A @ -1V~+10V
3) Max 65A @ -1V~+12V
4) Max 45A @ -1V~+21V
5) Max 40A @ -1V~+24V
6) Max 30A @ -1V~+31V
7) Max 23A @ -1V~+43V

communication	TCP/IP
Sampling time	Without option - 8~40 channels system: 10msec - 41~80 channels system: 20msec - 81~128 channels system: 50msec With Option - 8~16 channels system: 10msec - 17~40 channels system: 20msec - 41~80 channels system: 50msec - 81~128 channels system: 50msec (2 SIF boards)

All specifications are subject to change without notice.

WBCS3000HP High Power Type

● Application

- For power device application
- Battery/Super capacitor test
- Solar cell test, Fuel cell test
- For multichannel application
- Rack mounted model

The WBCS3000HP series is designed for high power application such as battery pack, solar module, fuel cell stack, electroplating, etc. The WBCS3000HP is derived from the standard WBCS series battery cycler system for higher power application with 1 or 3 current ranges. The system can be configured to meet customer needs. Customized specification is available. Up to 8 independent channels can be connected to one 8 channel controller. Additional channels can be added up to a maximum of 128 channels.

● Options

- Temperature monitoring
- Auxiliary voltage monitoring

● Specifications

Control current range	3 or 1 range depending on power
LED	Run: 1ea, Mode: 2ea
Input impedance	10^{12} Ohm
Cell connection	4 probe type, alligator clip cables
Max. channel No.	128
Voltage accuracy	±0.1% f.s.
Current accuracy	±0.1% f.s.

Current / Voltage Control/Measurement

Resolution (16 bits)	0.0015% f.s

Full scale ranges	Maximum current depending on voltage range

Power Configuration Map
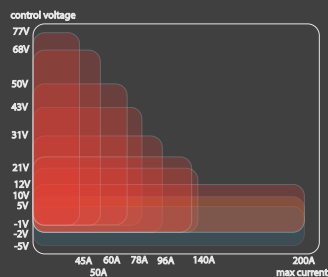
voltage range
1) Max 200A @ ±5V
2) Max 200A @ -2V~+10V
3) Max 200A @ -2V~+12V
4) Max 140A @ -2V~+21V
5) Max 130A @ -2V~+24V
6) Max 96A @ -2V~+31V
7) Max 78A @ -1V~+43V
8) Max 68A @ -1V~+50V
9) Max 50A @ -1V~+68V
10) Max 45A @ -1V~+77V

Communication	TCP/IP
Sampling time	Without option − 8~40 channels system: 10msec − 41~80 channels system: 20msec − 81~128 channels system: 50msec With Option − 8~16 channels system: 10msec − 17~40 channels system: 20msec − 41~80 channels system: 50msec − 81~128 channels system: 50msec (2 SIF boards)

All specifications are subject to change without notice.

Rack Configuration Example

One rack can be configured with different models

● *Mid power Type – Mixture Rack*

- 24 channel Rack
  : 10V, 1A(8ch) + 5V, 2A(8ch) + 7V, 100mA(8ch)

● *Mid power Type & Low power Type – Mixture Rack*

- 48 channel rack
  : 5V, 1A(16ch) + 5V, 100mA(32ch)
- WBCS3000S substation + channel 5set + Modified channel 3set

● *Mid power Type & High Power Type - Mixture Rack*

- 22 channel Rack
  : 5V, 1A(16ch) + 10V, 25A(4ch) + 21V, 15A(2ch)

● *High Power Type & Mid Power Type - Mixture Rack*

- 8 channel system
  : 21V, 15A(4ch) + 10V, 25A(2ch) + 5V, 10A(2ch)

Jigs

● *Battery Jig & Coin Cell Jig*

- For cylindrical cell and/or coin cell
- 2 pin PCB type or 4 pin Lever type depending on models
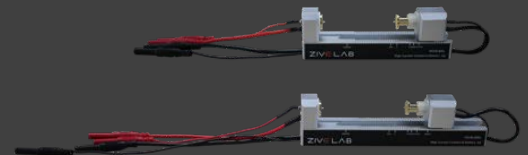- Rack type is available

● *Cell Holder*

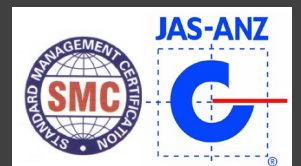for WBCS3000S series

for WBCS3000L series

● *Pouch Cell Jig*

- It can be directly connected to the WBCS systems.
- Lever type

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