**IVIUM TECHNOLOGIES**

# Experts in Electrochemistry & Battery Testing


IVIUM TECHNOLOGIES

innovative solutions for electrochemical research

# Vertex

## ALL-ROUND ENTRY LEVEL POTENTIOSTAT/GALVANOSTAT/ZRA

The Vertex series is our line of all-round entry level potentiostat/galvanostat/ZRA instruments. Each Vertex instrument is available with optional impedance analyser/FRA for EIS. The instruments have been specifically designed to be affordable and robust; the cell cable uses the reliable and durable Ivium standard HD15 connector and the cell connection terminals are the well known 4mm banana plugs. The 1.3m cell cable with individually shielded leads is included.

The wide range of voltage and current capability offers a solution for all applications, including educational, basic electrochemistry, high current (battery) testing, electrolyser research and development.

Each Vertex instrument is capable of all standard electrochemical techniques and includes a complete suite of Iviumsoft control and data processing software.

*"EXCELLENT BASIC POTENTIOSTAT THAT CAN DO ALL ELECTROCHEMISTRY"*

*"AN AFFORDABLE SOLUTION FOR EVERY APPLICATION"*

THE VERTEX IS AVAILABLE IN 9 POWER CONFIGURATIONS

**Basic**
- ±100mA / ±21V
- ±350mA / ±13V

**With peripheral I/O**
- ±100mA / ±10V
- ±1A / ±10V

**High power**
- ±1A / ±20V
- ±1A / ±50V
- ±2A / ±20V
- ±5A / ±10V
- ±10A / ±5V

KEY SPECIFICATIONS
- WE/RE/S/CE 4-electrode configuration
- User selectable grounded/floating operation
- Data acquisition rate 300kHz
- Optional FRA/EIS 10µHz to 250kHz/1MHz
- Peripheral analog/digital I/O
- Various modules and power boosters available

VERTEX BASIC SMALL SIZE

VERTEX WITH PERIPHERAL I/O

VERTEX.S HIGH POWER

VERTEX.S HIGH POWER

| VERTEX OVERVIEW | Vertex.One | Vertex.C | Vertex.100mA | Vertex.1A | Vertex.20V1A | Vertex.50V1A | Vertex.20V | Vertex.5A | Vertex.10A |
|---|---|---|---|---|---|---|---|---|---|
| Current compliance | ±100mA | ±350mA | ±100mA | ±1A | ±1A | ±1A | ±2A | ±5A | ±10A |
| Maximum output Voltage | ±21V | ±13V | ±10V | ±10V | ±20V | ±50V | ±20V | ±10V | ±5V |
| **Potentiostat** | | | | | | | | | |
| Applied potential range | ±10V; 0.08mV res. | | ±10V; 0.08mV res. | | ±10V; 0.08mV res. | | | | ±5V; 0.08mV res. |
| Applied potential accuracy | 0.2% or 2mV | | 0.2% or 2mV | | 0.2% or 2mV | | | | 0.2% or 2mV |
| Current ranges | ±100pA to ±100mA | | ±100pA to ±100mA | ±100pA to ±1A | ±100pA to ±1A | | | ±100pA to ±10A | ±100pA to ±10A |
| Measured current resolution | 0.003% of CR, min. 3fA | | 0.003% of CR, min. 3fA | | 0.003% of CR, min. 3fA | | | | 0.003% of CR, min. 3fA |
| Measured current accuracy | 20pA + 0.025% of FSR | | 20pA + 0.025% of FSR | | 20pA + 0.025% of FSR | | | | 20pA + 0.025% of FSR |
| **Galvanostat** | | | | | | | | | |
| Galvanostatic current ranges | ±10nA to ±100mA | | ±10nA to ±100mA | ±10nA to ±1A | ±10nA to ±1A | | | | ±10nA to ±10A |
| Measured potential ranges | ±1mV to ±10V | | ±1mV to ±10V | | ±1mV to ±10V | | | | ±1mV to ±10V |
| Measured potential resolution | 0.0008% of range; min. 7nV | | 0.0008% of range; min. 7nV | | 0.0008% of range; min. 7nV | | | | 0.0008% of range; min. 7nV |
| **Impedance analyser** | | | | | | | | | |
| Frequency range | Optional 10µHz to 250kHz | 10µHz to 1MHz | Optional 10µHz to 1MHz | | Optional 10µHz to 1MHz | | | | Optional 10µHz to 1MHz |
| Amplitude | 0.15mV to 2.0V, or 0.03% to 100% of CR | | 0.15mV to 2.0V, or 0.03% to 100% of CR | | 0.15mV to 2.0V, or 0.03% to 100% of CR | | | | 0.15mV to 2.0V, or 0.03% to 100% of CR |
| **Bipotentiostat** | | | | | | | | | |
| Current/offset | —— | Optional ±35mA, ±2V vs. RE or WE | Optional ±35mA, ±2V vs. RE or WE | | Optional ±35mA, ±2V vs. RE or WE | | | | —— |
| **Peripheral** | | | | | | | | | |
| Analog/Digital I/O | Anin1, ±10V | | 2 An in;1 An out; 1 Dig in; 3 Dig out; I/E out; AC out;Channel X/Y out | | 2 An in;1 An out; 1 Dig in; 3 Dig out; I/E out; AC out; Channel X/Y out | | | | 2 An in;1 An out; 1 Dig in; 3 Dig out; I/E out; AC out;Channel X/Y out |

# pocketSTAT2tm

## HANDHELD POTENTIOSTAT/GALVANOSTAT/ZRA WITH INTEGRATED IMPEDANCE ANALYSER

The pocketSTAT2 is a complete electrochemical measurement instrument with the size of a smart phone. It has been specifically designed for (field) measurements such as corrosion evaluation and analytical chemistry, but suits any low current electrochemical application. The pocketSTAT2 is powered via USB and can be controlled from any Windows PC/tablet/laptop.

### APPLICATION

- Field measurements
- Corrosion
- Coating testing
- Analysis
- Use in a glove box/fume hood

### KEY SPECIFICATIONS

- USB powered
- Size: 16/22 x 6.7 x 1.9cm
- Scan range: ±10V @ ±30mA
- FRA/EIS: 10µHz to 1MHz
- Acquisition rate: up to 300,000 pnts/s

### ALSO AVAILABLE: BLUETOOTH & BATTERY MODULE

The iBlue is a simple plug&play module that contains a battery pack for powering the pocketSTAT2 and at the same time provides a Bluetooth connection between the instrument and your computer. This is ideal for using the pocketSTAT2 in awkward and difficult to reach places. The battery pack operates the pocketSTAT2 for > 5 hours; it is compatible with all models of pocketSTAT2.

ULTRA-LOW CURRENT VERSION

### POCKETSTAT OVERVIEW

| | pocketSTAT2 | pocketSTAT2.LC |
|---|---|---|
| Electrode connections | 4: WE, CE, RE, S (and GND) | 3: WE, CE, RE |
| Current compliance | ±30mA | ±30mA |
| Maximum output Voltage | ±10V | ±10V |
| **Potentiostat** | | |
| Applied potential range | ±10V; 0.08mV res. | |
| Applied potential accuracy | 0.2%, or 2mV | |
| Current ranges | ±100pA to ±10mA | ±10pA to ±10mA |
| Measured current resolution | 0.003% of range; min 3fA | 0.003% of range; min 0.3fA |
| Measured current accuracy | 20pA + 0.025% of FSR | |
| **Galvanostat** | | |
| Galvanostatic current ranges | ±10nA to ±10mA | ±10pA to ±10mA |
| Measured potential ranges | ±1mV to ±10V | |
| Measured potential resolution | 0.0008% of range, min. 7nV | |
| **Impedance analyser** | | |
| Frequency range | 10µHz to 1MHz | |
| Amplitude | 0.15mV to 2.0V, or 0.03% to 100% of CR | |
| WE bias current | <20pA | <20fA |
| Impedance limit | $>10^{12}$ Ω // 2pF | $>10^{15}$ Ω // 0.2pF |
| **Peripheral** | | |
| Analog input 1 | ±10V | ——— |
| Compatibility | Various modules & multiplexers | ——— |



# CompactStattm

24 BIT INSTRUMENT


## PORTABLE USB POWERED POTENTIOSTAT/ GALVANOSTAT/ZRA WITH INTEGRATED IMPEDANCE ANALYSER

The CompactStat is a high end portable potentiostat that can be powered from the USB port of a laptop or PC without additional power supply. With its small footprint (<600 gram) and low power consumption, the CompactStat provides a truly mobile electrochemical measurement station that is ideal for use both in the lab and in the field. Its exceptionally high measurement resolution of 24bits gives it a unique level of measurement and control. Among its many applications are corrosion, analytical, nano, bio and battery/fuel cell/electrolyser testing.

### THE COMPACTSTAT IS AVAILABLE IN 4 POWER CONFIGURATIONS

- ±30mA @ ±10V
- ±800mA @ ±10V
- ±250mA @ ±20V
- ±30mA @ ±100V

### LOW NOISE AND GALVANIC ISOLATION

The CompactStat is electrically isolated from power lines and PC. It has superior noise immunity and is capable of determining very small signals, required in nanotechnology applications. Additionally, the instrument can be applied in situations where the sample must be disconnected from the common ground (floating).

### COMPACTSTAT OVERVIEW

| | Standard | CompactStat.h10800 | CompactStat.h20250 | CompactStat.h10030 |
|---|---|---|---|---|
| Current compliance | ±30mA | ±800mA | ±250mA | ±30mA |
| Maximum output Voltage | ±10V | ±10V | ±20V | ±100V |
| **Potentiostat** | | | | |
| Applied potential range | ±4V; 0.01mV res. (20bit) / ±10V; 0.02mV res. | | ±20V; 0.04mV res. | ±100V; 0.2mV res. |
| Applied potential accuracy | 0.2% or 1mV | | | |
| Current ranges | ±1pA to ±1A | | | |
| Measured current resolution | 0.00001% of CR, min. 0.6aA | | | |
| Measured current accuracy | 10pA + 0.025% of FSR | | | |
| **Galvanostat** | | | | |
| Galvanostatic current ranges | ±100pA to ±1A | | | |
| Measured potential ranges | ±1mV to ±10V | | ±1mV to ±20V | ±1mV to ±100V |
| Measured potential resolution | 0.00001% of range; min. 0.05nV | | | |
| **Impedance analyser** | | | | |
| Frequency range | 10µHz to 3MHz | | | |
| Amplitude | 0.15mV to 2.0V, and 0.03% to 100% of CR | | | |
| **Peripheral** | | | | |
| Analog/Digital I/O | 8 An in; 2 An out; 2 Dig in; 3 Dig out; I/E out; AC out; Channel X/Y out | | | |
| Compatibility | All options and modules | | | Some options and modules |

# IviumStat

24 BIT INSTRUMENT


## HIGH END GENERAL PURPOSE POTENTIOSTAT/ GALVANOSTAT/ZRA WITH INTEGRATED IMPEDANCE ANALYSER

The IviumStat is a high end high power potentiostat with an exceptionally high 24bit resolution. That makes the instrument well suited for applications that require a wide dynamic range. The IviumStat is compatible with our complete range of modules and options. Applications include research, corrosion, battery/ fuel/cell/electrolyser testing, analysis, bio- and nano electrochemistry, etc.

THE IVIUMSTAT IS AVAILABLE IN 2 POWER CONFIGURATIONS

- ±5A @ ±10V
- ±2A @ ±50V

### EXPANDABILITY

The IviumStat is fully compatible with all options and modules, including: integrated Bipotentiostat and True Linear Scan, the MultiWE32, ModuLight, multiplexers, QuickScan and all current and voltage boosters.

### COMPLETE SOLUTION

The IviumStat offers a complete package. The hardware includes a built-in high-performance Frequency Response Analyser and all the standard electrochemical techniques. Complete measurement and data processing software is included.

### AUTOMATION

Multiple analog and digital input and output ports are available that can be used to monitor and control peripheral equipment. The software integrates this functionality.

| IVIUMSTAT OVERVIEW | Standard | XRe |
|---|---|---|
| Current compliance | ±5A | ±2A |
| Maximum output Voltage | ±10V | ±50V |
| **Potentiostat** | | |
| Applied potential range | ±10V; 0.02mV res. (20bit) | ±10V; 0.02mV res. (20bit) / ±50V; 0.1mV res. |
| Applied potential accuracy | 0.2% or 1mV | |
| Current ranges | ±1pA to ±10A | |
| Measured current resolution | 0.00001% of CR, min. 0.6aA | |
| Measured current accuracy | 10pA + 0.025% of FSR | |
| **Galvanostat** | | |
| Galvanostatic current ranges | ±100pA to ±10A | |
| Measured potential ranges | ±1mV to ±10V | ±1mV to ±50V |
| Measured potential resolution | 0.00001% of range; min. 0.15nV | |
| **Impedance analyser** | | |
| Frequency range | 10µHz to 8MHz | |
| Amplitude | 0.15mV to 2.0V, or 0.03% to 100% of CR | |
| **Peripheral** | | |
| Analog/Digital I/O | 8 An in; 2 An out; 2 Dig in; 3 Dig out; I/E out; AC out; Channel X/Y out | |
| Compatibility | All options and modules | |



# XP


## HIGH POWER POTENTIOSTAT/GALVANOSTAT/ZRA

The XP range of potentiostats has been specially designed for high power applications such as battery research, electrolysis and fuel cell development. It is a merger of a potentiostat and a booster in a single housing and is equipped with a full color display that shows real time measurement results. The XP has all the advantages of both the potentiostat and the booster, such as switching through all current ranges with full resolution at low ánd high power, high bandwidth to facilitate impedance measurements at high power, etc. It is equipped with an EMergency Off (EMO) functionality, as well as a direct connection for a thermocouple to monitor temperature. Both are accessible directly from the front panel. The XP is capable of all standard electrochemical techniques and includes a complete suite of IviumSoft control and data processing software.

THE XP IS AVAILABLE IN 3 POWER CONFIGURATIONS

- ±10A @ ±40V
- ±20A @ ±20V
- ±40A @ ±10V

### SPECIAL FEATURES:

- Full color display that shows real time measurement results and graphs.
- Direct thermocouple connection.
- Integrated Current Interrupt function.
- Separate cell cables for low and high currents to ensure the best performance.
- 19inch rack mountable housing.

### APPLICATION

The XP is a high power potentiostat that has been designed for applications such as:

- Battery research
- (Bio) Fuel cell measurements
- Electrolysers
- Electrodialysis

| XP OVERVIEW | XP10 | XP20 | XP40 |
|---|---|---|---|
| Current compliance | ±10A | ±20A | ±40A |
| Maximum output Voltage | ±40V | ±20V | ±10V |
| **Potentiostat** | | | |
| Applied potential range | ±10V; 0.08mV res. | ±10V; 0.08mV res. | ±10V; 0.08mV res. |
| Applied potential accuracy | 0.2% or 2mV | | |
| Current ranges | ±100pA to ±10A | | |
| Measured current resolution | 0.003% of CR, min. 0.3pA | | |
| Measured current accuracy | 20pA + 0.025% of FSR | | |
| **Galvanostat** | | | |
| Galvanostatic current ranges | ±10nA to ±10A | | |
| Measured potential ranges | ±1mV to ±10V | | |
| Measured potential resolution | 0.0008% of range; min. 7nV | | |
| **Impedance analyser** | | | |
| Frequency range | 10µHz to 500kHz | | |
| Amplitude | 0.15mV to 2.0V, or 0.03% to 100% of CR | | |
| **Peripheral** | | | |
| Analog/Digital I/O | 2 An in;1 An out; 1 Dig in; 3 Dig out; I/E out; AC out;Channel X/Y out | | |

# Ivium-n-Stat

## HIGH POWER MULTI-CHANNEL POTENTIOSTAT/ GALVANOSTAT/ZRA WITH INTEGRATED IMPEDANCE ANALYSER

The Ivium-n-Stat is a state-of-the-art multi-channel potentiostat/galvanostat with integrated impedance analyser in each channel. It can be operated in grounded or in floating mode. The variety of different channels, the high sensitivity, and the separate or synchronous control of channels allow the Ivium-n-Stat to be used in a wide range of applications from research to production testing.

VAROUS CHANNELS AVAILABLE

- ±2.5A / ±10V (optional BipotentioStat)
- ±5A / ±10V (optional BipotentioStat)
- ±10A / ±5V
- ±2A / ±20V
- ±1A / ±50V

**Dual channel dModule**
- 2 x ±500mA / ±20V
- 2 x ±2.5A / ±10V
- 2 x ±1A / ±20V

**Integrated EIS**
All channels include integrated FRA/EIS as standard 10µHz - 250kHz (Optional High Frequency upgrade to 1MHz).

**Main frame**
- Maximum 8 modules
- Stackable up to 64 channels
- EMO available

### EXPANDABILITY
The Ivium-n-Stat main frame contains 8 slots for a maximum of 16 channels and can be stacked up to 8 frames and a maximum of 64 channels. Modules are encased for easy handling so that users can upgrade the number of channels in a simple plug and play manner. An integrated peripheral port with multiple analog and digital input and output signals is available which can be used to monitor and control peripheral equipment. The software integrates this functionality.

### SIMULTANEOUS CONTROL
The IviumSoft allows control of separate channels or all channels simultaneously with synchronized start. Data can be plotted per channel or simultaneously for all channels on a single screen.

DUAL CHANNEL d-MODULES

| AVAILABLE CHANNEL MODULES | 2x 500mA / 20V | 2x 2.5A / 10V | 2x 1A / 20V |
|---|---|---|---|
| **Channel performance** | | | |
| Number of channels in module | 2 | 2 | 2 |
| Current compliance | ±500mA | ±2.5A | ±1A |
| Maximum output Voltage | ±20V | ±10V | ±20V |
| **Potentiostat** | | | |
| Applied potential range | ±10V; 0.08mV res. | | |
| Applied potential accuracy | 0.2% or 2mV | | |
| Current ranges | ±100pA to ±10A | | |
| Measured current resolution | 0.003% of CR, min. 3fA | | |
| Measured current accuracy | ±20pA + 0.025% of FSR | | |
| **Galvanostat** | | | |
| Galvanostatic current ranges | ±10nA to ±10A | | |
| Measured potential ranges | ±1mV to ±10V | | |
| Measured potential resolution | 0.0008% of range; min. 7nV | | |
| **Impedance analyser** | | | |
| Frequency range | 10µHz to 250kHz standard; 1MHz optional | | |
| Amplitude | 0.15mV to 2.0V, and 0.03% to 100% of CR | | |
| **Bipotentiostat** | | | |
| Current/offset | —— | | |
| **Peripheral** | | | |
| Analog/Digital I/O | Anin1: ±10V | | |

SINGLE CHANNEL s-MODULES

| 2.5A / 10V | 5A / 10V | 2A / 20V | 1A / 50V | 10A / 5V |
|---|---|---|---|---|
| | | | | |
| 1 | 1 | 1 | 1 | 1 |
| ±2.5A | ±5A | ±2A | ±1A | ±10A |
| ±10V | ±10V | ±20V | ±50V | ±5V |
| | | | | |
| ±10V; 0.08mV res. | | | | ±5V; 0.08mV res. |
| 0.2% or 2mV | | | | |
| ±100pA to ±10A | | | | |
| 0.003% of CR, min. 3fA | | | | |
| ±20pA + 0.025% of FSR | | | | |
| | | | | |
| ±10nA to ±10A | | | | |
| ±1mV to ±10V | | | | |
| 0.0008% of range; min. 7nV | | | | |
| | | | | |
| 10µHz to 250kHz standard; 1MHz optional | | | | |
| 0.15mV to 2.0V, and 0.03% to 100% of CR | | | | |
| | | | | |
| Optional, ±35mA, ±2V vs. RE or WE | | | —— | |
| | | | | |
| 2 An in; 1 An out; 1 Dig in; 3 Dig out; I/E out; AC out; Channel X/Y out | | | | |

# OctoStat

DATASECURE INTEGRATED

## HIGH PERFORMANCE RACK-MOUNTABLE BATTERY TEST SYSTEM WITH INTEGRATED IMPEDANCE ANALYSER

The OctoStat is a multi-channel test system with a fixed number of 8 channels per unit. Each channel is equipped with its own dedicated FRA/EIS and an input for temperature measurement. The OctoStat has an integrated DataSecure that stores all data independent of the PC to ensure that in the event of communication loss or computer crash, the measurement will continue and measurement data is never lost. This system stability makes the OctoStat a perfect system for long term testing applications. The OctoStat is built into a 19inch rack-mountable housing.

### CONNECTION
- USB
- LAN / Ethernet

### EXPANDABILITY
Different OctoStats can be combined in the same rack and connected/ controlled from the same computer. Upon connection to the PC all channels of each unit are automatically assigned ascending channel names. These channel names are also automatically stored in all data files for easy data retrieval.

### 19INCH RACK-MOUNTABLE HOUSING
Each OctoStat unit is built into a 19inch rack-mountable housing. Multiple units and combinations of OctoStats can be built into the same rack.

### SIMULTANEOUS CONTROL
The IviumSoft control software allows control of separate channels or all channels simultaneously with synchronized start. Data can be plotted per channel or simultaneously for all channels on a single screen.

### EACH CHANNEL
- Dedicated embedded FRA/EIS
- Dedicated software for battery testing
- Capable of EIS during DC charge/discharge
- Overload handled via clamping (not shut-off) so measurements continue

| OCTOSTAT OVERVIEW | OctoStat30 | OctoStat200 | OctoStat5000 | OctoBoost16000 |
|---|---|---|---|---|
| **Channel performance** | | | | Powerbooster |
| Current compliance | ±30mA | ±200mA | ±5A | ±16A |
| Maximum output Voltage | ±10V | ±10V | ±10V | -2 to +9V, or ±5V |
| Channel combination | No | No | No | Yes* |
| **Potentiostat** | | | | |
| Applied potential range | ±10V; 0.08mV res. | | | -2 to +9V, or ±5V |
| Applied potential accuracy | 0.2%, or 2mV | | | 0.2%, or 2mV |
| Current ranges | ±100pA to ±10mA | ±100pA to ±100mA | ±100pA to ±10A | ±10A, ±100A |
| Measured current resolution | 0.003% of CR, min. 3fA | | | 0.003% of CR, min. 0.3mA |
| Measured current accuracy | ±20pA + 0.025% of FSR | | | 0.025% of FSR |
| **Galvanostat** | | | | |
| Galvanostatic current ranges | ±10nA to ±10mA | ±10nA to ±100mA | ±10nA to ±10A | ±10A, ±100A |
| Measured potential ranges | ±1mV to ±10V | | | |
| Measured potential resolution | 0.0008% of range; min. 7nV | | | |
| **Impedance analyser** | | | | |
| Frequency range | 10µHz to 100kHz standard; 1MHz optional | | | 10µHz to 10kHz |
| Amplitude | 0.15mV to 2.0V, and 0.03% to 100% of CR | | | |
| **Peripheral** | | | | |
| Analog/Digital I/O | 1 Anout, 2 Anin; ±10V | | | —— |

**Channels can be combined to increase current, for example 4x ±32A, 2x ±64A, 1x ±64A and 4x ±16A, 1x ±128A, etc.*

# DataSecure

## DATA STORAGE & CONNECTION MODULE

### DATASECURE & µDATASECURE

The Ivium DataSecure module stores data from your entire running measurement, independent from your PC: Even if your computer fails the measurement will continue and your data will never be lost! During your experiment you can "log-on" at any time to stream available data to your PC. Or just stay connected and stream data real-time.


- Never lose data
- Operate independent of computer
- WIFI | LAN | USB connection
- Ideal for fume hood, glove box or remote places
- Supports all single- and multichannel Ivium instruments

**OPTIONS & MODULES:**

• BIPOTENTIOSTAT • TRUE LINEAR SCAN • QUICKSCAN
• CURRENT INTERRUPT MODULE • HIGH VOLTAGE BOOSTERS • HIZ MODULE
• LC MODULE • MULTIWE32 • MULTIPLEXERS • LIGHT SOURCES • PDA
• HIGH CURRENT BOOSTERS • PLT • MEA • TEMPERATURE MODULES
• CE LINK • PERIPHERAL INTERFACING • REMOTE CONNECTION
• CUSTOM MODULES ON REQUEST

**ACCESSORIES:**

• RRDE • ELECTRODES • GLASS CELLS • BATTERY HOLDERS • FARADAY CAGE
• 19INCH RACK • SPECIAL CABLES • TEST CELLS • MCF CELL • OPTICAL BENCH

- Ivium offers 3 years warranty on our instruments
- IviumSoft is included for free with each potentiostat purchase

Ivium Technologies
Eindhoven, the Netherlands
www.ivium.com
info@ivium.com



IVIUM TECHNOLOGIES

innovative solutions for electrochemical research