Beyond battery




# SOLUTIONS FOR BATTERIES

R&D
CELL
MODULE
PACK
CLIMATIC CHAMBER

HTDS
Hi-Tech Detection Systems

# HTDS: A PARTNER AT **EACH STAGE OF YOUR PROJECT**

HTDS – High Tech Detection Systems – is a French company specialized in the distribution and maintenance of Hi-tech detection systems.

HTDS offers a comprehensive range of electrochemical instrumentation and material characterization equipment, as well as various complementary solutions in the battery production sector (renewable energy sources and corrosion studies, material testing...) all from recognized providers: Ivium, Landt Instruments, Sanwood, Ametek Scientific Instruments...

Thanks to a local presence, close to our customers, we provide turn-key solutions including consulting, installation, training and maintenance services for all the equipment offered in our catalog. We have subsequently earned the trust of world leaders in academic and industrial fields.

**Focus on**

**A PERSONNALISED SUPPORT**

HTDS supports you at all stages of the implementation of your project:
- Writing/specification studies
- Technological proposal
- Installation
- Maintenance
- Training

# PRODUCT **RANGE**

Batteries is an increasingly important part of our everyday lives. They are everywhere: from mobile phones to computers and in all types of vehicles: bikes, cars, planes and even spaceships. Their expending areas of application requests more and more robustness as they are exposed to extreme electrical loads and numerous environmental factors. In the production process, one issue remains above all a priority: safety.

To guarantee safety, various tests series are necessary throughout the battery's development and QA stages. And this is precisely where our solution range comes into play. With our solutions, you will quickly and simply perform professional tests on your batteries throughout your development and production process for a granted quality result.

HTDS' product range goes from analyzers and cycling tester systems to climatic chambers and is divided in 5 categories:

R&D | Cell | Module | Pack | Climatic chambers



A total solution package on battery formation and grading assures automatic mass production of battery



Full experience on equipmenet integration assures safe and efficient production



A total solution package on battery health monito-ring and fire systems assures safety in production



Advanced battery testing solution satisfies a variety of battery production requirements

# OUR RANGE

## R&D





## CELL BATTERY SYSTEM





## MODULE BATTERY SYSTEM



## PACK BATTERY SYSTEM



## CLIMATIC CHAMBER



# SOLUTION
# FOR YOUR R&D

R&D for battery conception focuses on the study of the different parts and components of the battery: cathod, anod or electrolyte. HTDS proposes you various solutions to optimize the developpement of your batteries.

## IVIUM-N-STAT

### HIGH POWER MULTI-CHANNEL POTENTIOSTAT/GALVANOSTAT 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.

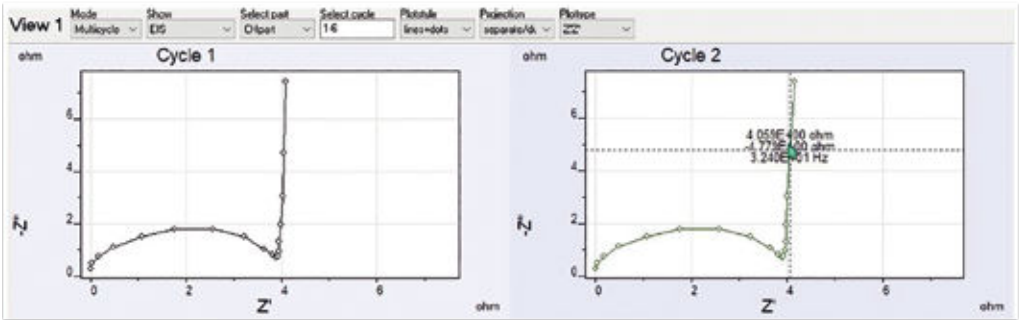
### EXPANDABILITY



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.

### 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.




| FEATURES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT<br>Up to +/-50V and +/-10A | | | CURRENT RANGE<br>100pA to 10A | | ACCURACY<br>+/- 3fA | | | |
| Rise Time<br>56ns | Accuracy<br>0,2% FS | GITT-PITT<br>testing<br>modes | 18 Bit ADC<br>System | dQ/dV<br>Curve | 1 microsec<br>timebase | True<br>3-Electode<br>System Test | DCIR Test | EIS<br>From 1 MHz<br>to 10 µHz |

Type of cells: Coin cells / Type D / Type DD

# CELL BATTERY SYSTEM

Whether you are working on a single cell or high volumes, HTDS provides you adapted solutions to check the life and cycle duration, capacities and internal resistances in the lower voltage ranges or at high currents.

## CELL BATTERY TESTING SOLUTIONS



### 340A SERIES - HIGH PRECISION BATTERY TESTERS

The multi-current range battery test systems M340A, G340A, D340A and D350A are designed for precision battery charge/discharge test, coulombic efficiency (current efficiency) test and supercapacitor test. Voltage and current test accuracy go down to 0.01% of the selected range. The sampling rate can go as high as to 0.01s (100Hz) with minimum pulse interval of 2ms.

#### Key Measurement Specifications

- Support half cell, three-electrode cell (with reference electrode) in the voltage range of ±5V (0-10V in option), current range 100µA to 40A (depending on the model)
- High rate charge and discharge tests. With 100C (0.6min) charge/discharge, the inaccuracy of capacity is less than 0.1%
- Full measurement records of voltage, current, coulombic efficiency, capacitance, internal resistance (DCIR) and more for precision energy storage materials research

| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT +/-5V +/-5A | | CURRENT RANGE 150µA-5mA | | | | ACCURACY +/- 1.5nA | |
| Rise Time 1ms | Accuracy 0,01% FS | Charge & Discharge Working Mode | 24 Bit ADC System | dQ/dV Curve | 4 or 5 Range | Three-Electode System Test | DCIR Test $DCIR=\frac{\Delta V}{\Delta I}=\frac{V_n-V_0}{I_n-I_0}$ |

Type of cells: Coin cells / Type D / Type DD / Super capacitor / Pouch cells / Prismatic cells

### IVICYCLE
### HIGH CHANNEL COUNT RACK-MOUNTABLE BATTERY

The IviCycle is a multi-channel test system with a fixed number of channels per unit.
The IviCycle unit can optionally be equipped with FRA/EIS in such a way that each channel has its own integrated FRA/EIS for parallel impedance testing (parallel, not multiplexed!).



| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT +/-5V +/-3A | | CURRENT RANGE 10nA to 1A | | | | ACCURACY +/- 20 pA | |
| Rise Time 1ms | Accuracy 0,025% FS | Charge & Discharge Working Mode | 18 Bit ADC System | dQ/dV Curve | 8 Range | EIS Measurement Channel | DCIR Test $DCIR=\frac{\Delta V}{\Delta I}=\frac{V_n-V_0}{I_n-I_0}$ |

Type of cells: Coin cells / Type D / Type DD / Super capacitor / Pouch cells / Prismatic cells

# CELL
# BATTERY SYSTEM

## OCTOSTAT

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



The OctoStat is a multi-channel test system with 8 fixed channels per unit, each featuring its own dedicated FRA/EIS and temperature input. Its integrated DataSecure stores all data independently from the PC, ensuring uninterrupted measurements even in case of communication loss or computer failure — making it ideal for long-term testing.
The system is housed in a 19-inch rack-mountable chassis.

#### CONNECTION

- USB
- LAN / Ethernet

#### EXPANDABILITY

Multiple OctoStats can be combined in a single rack and controlled from one PC. Channels are automatically named and stored in data files for easy identification.

#### SIMULTANEOUS CONTROL

With IviumSoft, users can control individual or all channels in sync, and display data per channel or collectively on one screen.

| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT<br>+/-10V +/-10A | | CURRENT RANGE<br>+/-100pA to 10A | | | | ACCURACY<br>+/- 20pA | |
| Rise Time<br>4µs | Accuracy<br>0,025% FS | Charge & Discharge<br>Working Mode | 18 Bit ADC<br>System | dQ/dV<br>Curve | 9 Ranges<br>max | EIS Measurement<br>/ Channel<br>10µHz to 1MHz | DCIR Test<br>$DCIR = \frac{\Delta V}{\Delta I} = \frac{V_1 - V_0}{I_1 - I_0}$ |

Type of cells: Coin cells / Type D / Type DD / Super capacitor / Pouch cells / Prismatic cells

## OCTOBOOST 16000

### HIGH CURRENT BATTERY TEST SYSTEM



The OctoBoost16000 offers a flexible high current solution for both the OctoStats or Ivium single channel instruments. Channels can be combined to increase current up to ± 128Amps.

| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT<br>(2 models available)<br>+/-5V +/-16A \| -2V to 9V +/- 16A | | CURRENT RANGE<br>+/-10A to 100A | | | | ACCURACY<br>+/- 300QA | |
| Rise Time<br>4Qs | Accuracy<br>0,025% FS | Charge & Discharge<br>Working Mode | 18 Bit ADC<br>System | dQ/dV<br>Curve | 2 Ranges<br>max | EIS Measurement<br>/ Channel<br>10µHz to 1MHz | DCIR Test<br>$DCIR = \frac{\Delta V}{\Delta I} = \frac{V_1 - V_0}{I_1 - I_0}$ |

# CELL
# BATTERY SYSTEM

Industry demands for better batteries with higher capacity, shorter charge time and longer life represents a significant measurement challenge. HTDS proposes a suite of battery measurement and analysis tools intended for high power cells based on direct insights from the market and understanding of customer workflows.

## SI-9300R

The SI-9300R is a modular, multichannel battery analyzer that offers unrivaled measurement and diagnostic capabilities for the analysis of battery cell technologies intended for energy and power applications.



### Key Measurement Specifications

- 10 kHz EIS on board on every channel as standard with real-time EIS fitting for instant cell diagnostics
- Two auxiliary voltage measurement channels on every channel for DC and EIS anode/cathode characterization
- Ability to parallel channels for 1000 Amp measurements

| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT 10V 300A | | CURRENT RANGE 2A to 300A | | | | ACCURACY +/- 600µA | |
| Regenerative Technology | Accuracy 0,01% FS | Charge & Discharge Working Mode | 24 Bit ADC System | dQ/dV Curve | 3 Range | EIS Measurement / Channel | DCIR Test |

Type of cells: Coin cells / Type D / Type DD / Pouch Cells / Prismatic

## SI-6200 BATTERY ANALYZER

The new SI-6200 analyzer is more than just a battery cycler, it has a range of capabilities that are usually only found in research-grade equipment including impedance EIS measurements per channel (from 1 mHz to 20 kHz). Designed for testing battery materials, coin-cells, supercapacitors and micro fuel-cells (MFC), the SI-6200 has the flexibility to test; higher power (10 W) devices by connecting synchronized channels in parallel (up to 2 Amps).



| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT 5V 5A | | CURRENT RANGE 20µA to 200mA | | | | ACCURACY +/- 40pA | |
| Rise Time 1ms | Accuracy 0,01% FS | Charge & Discharge Working Mode | 24 Bit ADC System | dQ/dV Curve | 5 Range | EIS Measurement Channel | DCIR Test |

Type of cells: Coin cells / Type D / Type DD / Super capacitor / Pouch cells / Prismatic cells

# CELL & MODULE
# BATTERY SYSTEM

## NEBULA 5V

The Nebula-5V Series is a power battery tester designed for precision battery charge/ discharge test, coulombic efficiency (current efficiency) test. Voltage and current test accuracy go down to 0.02% of the range. The sampling rate can go as high as to 0.02s with minimum pulse interval of 10ms.
This instrument is ideal for laboratory high performance battery testing and quality control.



| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT 5V 300A | | CURRENT RANGE 50 to 300A | | | ACCURACY 0,15mA & 0,1mV | | |
| Rise Time <4ms | Charge & Discharge Working Mode | Accuracy 0,02% FS | Pulse Test | Regenerative Technology | Static/dynamic SOC test | 24 Bit ADC/DAC system | DCIR Test |

Type of cells: Type D / Type DD / Pouch Cells / Prismatic

## NEBULA 120V

The Nebula Series is a battery module tester specifically designed for laboratories with high performance to run automated test on battery modules. Our module battery system (MBS) can be made on demand to meet specific needs tailored to your needs or we also have a standard series composed with various systems. With our module testers, you can easily perform precise high-current testing, check typical SLI batteries, as well as large and small lithium modules for stationary or mobile applications.

### APPLICATIONS

- E-bike
- Robot sweeper
- UAV
- E-vehicle
- Module, battery PACK Energy storage bus




| FEATURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| MAX VOLTAGE & CURRENT 120V 150A | | CURRENT RANGE up to 125A | | | ACCURACY 1mA & 1mV | | |
| Rise Time <5ms | Charge & Discharge Working Mode | Accuracy 0,05% FS | Pulse Test | Regenerative Technology | Static/dynamic SOC test | Support RS485/CAN protocole | DCIR Test |

# PACK

Test driving profiles for a high-voltage battery in no time, and simulate driving cycles, the start-stop function or battery charge states with our pack testers.

## NEBULA NEH SERIES

The Nebula NEH series with the new SiC technology is a a highly efficient cycle test system based on state-of-the-art technology, which allows to realistically simulate the environment of the future battery pack application in order to test the high-power battery pack comprehensively and improve its functions and safety. It enables seamless high-voltage testing of battery packs up to 1000V. Leveraging its regenerative power supply, a significant portion of 96% consumed energy is efficiently harnessed through the DC link or reintegrated into the grid, maximizing sustainability and cost efficiency.

### APPLICATIONS

- E-bike
- Module, battery PACK
- UAV
- Energy storage bus



### FEATURES

| MAX VOLTAGE & CURRENT 800V 1200A | | CURRENT RANGE 150A to 600A | | | ACCURACY +/-45mA | | |
|---|---|---|---|---|---|---|---|
| Rise Time <4ms | Charge & Discharge Working Mode | Accuracy 0,03% FS | Pulse Test | Regenerative Technology | Static/dynamic SOC test | Support RS485/CAN /LAN protocole | DCIR Test |

### High Frequency Power Supply

**AC Side: 20 kHz**
**DC Side: 40 kHz**

By fully utilizing high-frequency power supply, the entire system achieves reduced weight, rapid current response, and compact equipment dimensions.

### Fully Modular Structure

**AC Side: 80kW x 4**
**DC Side: 120kW x 4**

- Ease of maintenance
- Convenient spare parts repair and replacement
- Rapid service response

### SiC Three Level Technology

**Significantly reducing switching losses and improving efficiency:**

- Unidirectional charging and discharging efficiency can reach 94.5% to over 96.1%
- Max. efficiency of 98% between channels
- DC/DC efficiency up to 99%
- Low grid harmonics
- Stable long-term operation under high temperature and high voltage conditions.

### Cabinet in parallels

**Supports 2 or 3 cabinets in parallel without degrading**

After parallel connection, the current range automatically expands without affecting current accuracy and voltage accuracy, as well as current response time.

# CLIMATIC **CHAMBERS**

Temperature climatic chambers simulate a range of temperature and humidity conditions to test components and products, especially for those exposed to outdoor temperature and humidity conditions, such as energy storage, materials processing...Our test chambers are mainly configurated with international famous brand components (Tecumseh, Bitzer, Schneider, Rainbow...). They provide reliable and continuous performance.
Our range of temperature / humidity climatic chambers meet all needs offering a variety of temperatures and sizes for battery test solutions.

## Battery Environmental Reliability

Our cutting-edge battery environmental reliability test machines are meticulously designed to conduct a comprehensive array of applied tests, ensuring the resilience and performance of batteries in various conditions.

These include:

- Damp Heat
- Low Pressure
- Temperature Cycling
- Temperature Storage.
- Thermal Abuse
- Vibration
- Dust-proof Test
- Rain and Water-proof Test
- Salt Fog Test
- Mechanical Shock
- Free Fall/Drop Test
- Performance Test
- Safety Test

## Battery Safety Standards

Our testing capabilities adhere to an extensive list of international safety standards, including but not limited to:
UL Standards, UN Transportation Testing, IEC Standards, Other Industry Standards (IEC, IEEE, ISO, ECE...).

## Custom-Made Sizes and Models

Recognizing the unique needs of our clients, HTDS offers custom-made sizes and models for our testing chambers, ensuring a perfect fit for specific testing requirements.




ISO 9001/ISO14001

SGS CE Certificate

# CLIMATIC **CHAMBERS**

## OUR CLIMATIC CHAMBERS




**High and low temperature explosion-proof test chamber**




**Precision high temperature oven**




**Double-layer battery oven**



**Walk-in high temperature explosion-proof chamber**

| SAFETY EQUIPMENT | 0-3 | 4 | 5 | 6/7 | ATEX GUIDELINES |
|---|---|---|---|---|---|
| Visual and audible alarms | ✓ | ✓ | ✓ | ✓ | |
| Electric door lock | | ✓ | ✓ | ✓ | |
| Mechanical door lock and retaining brack | ✓ | ✓ | ✓ | ✓ | |
| Particle trap | | ✓ | ✓ | ✓ | |
| Fire detection via CO gas or temperature measurement | | ✓ | ✓ | ✓ | |
| Flushing unit with $N_2$ or with $CO_2$ | | ✓ | ✓ | ✓ | |
| Water flushing or high-pressure water mist system *optional* | | ✓ | ✓ | ✓ | |
| Rupture disc (higher pressure level) | | | ✓ | ✓ | |
| Pressure-resistant inner tank *optional* | | | | ✓ | |
| $N_2$ permanent inertisation | | | | | ✓ |
| $O_2$ measuring unit *optional* | | | | | ✓ |
| Various gas sensors (e.g. $H_2$, HC) *optional* | | | | | ✓ |

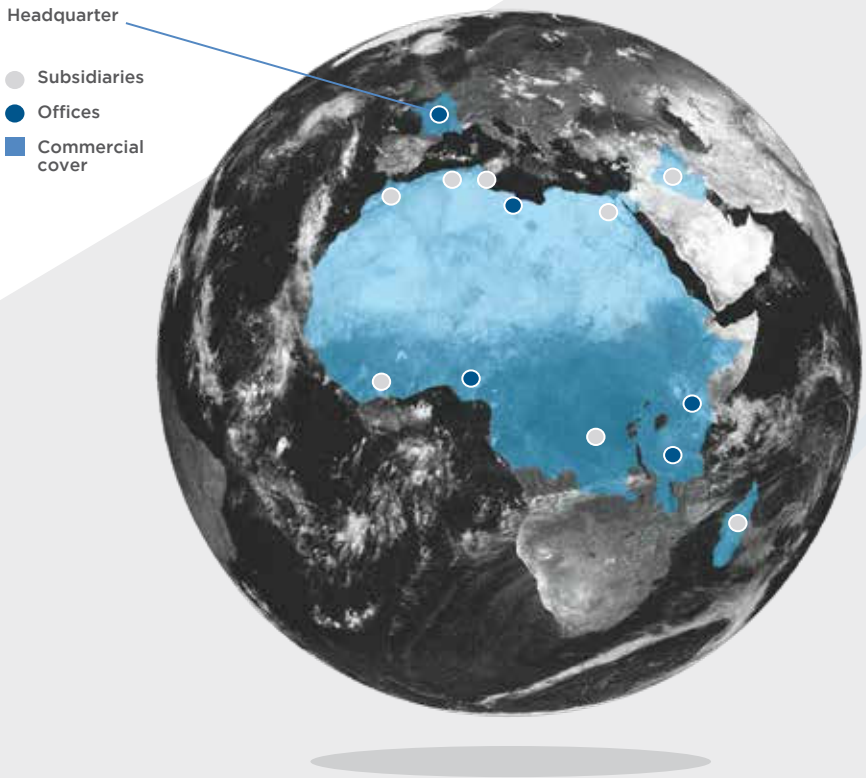


# OUR INTERNATIONAL NETWORK

HTDS (Hi-Tech Detection Systems) is a company specialized in
the distribution and maintenance of high-tech detection systems in France and abroad.

HTDS offers a full range of detection solutions dedicated to the following areas:
Electrochemistry and electrical test - Security - Product Inspection - Analytical Sciences
- Nuclear and Radiation Protection – Optoelectronics

HTDS's exclusive partners for electrochemistry are recognized as world leaders in their field.




Follow us!

www.htds.fr
info@htds.fr

HTDS
Hi-Tech Detection Systems

Parc d'Activités du Moulin de Massy - 3, rue du Saule Trapu - BP 246 91882 Massy cedex - France
Phone: +33 (0)1 64 86 28 28 - Fax: +33 (0)1 69 07 69 54 - info@htds.fr