



Newsletter

Fall Harvest



Electrochemistry Research & Testing — Beyond Battery Testing

To many people in the industry, Arbin is known primarily as a supplier of battery testing instruments. Although our testing systems are used mainly for battery testing, they have capabilities that are suitable for a broader range of electrochemical research and testing applications. One such specialized system is **MSTAT**—Arbin’s Multi-Station Multi-Electrode Potentiostat/Galvanostat—

Arbin’s **MSTAT** consists of multiple PST/GST control channels that are capable of controlling electrodes independently in a common bath. A multi-electrodes PST/GST is necessary in order to perform comparative or combinatorial tests on the properties of different materials under the same electrolytic environ-

ment, where a common electrolyte guarantees that each of the test materials is subjected to identical conditions. It performs many useful electrochemical analyses; such as current scan, chronoamperometry, chronocoulometry, chronopotentiometry, cyclic voltammetry and linear sweep voltammetry; independently on each electrode.

MSTAT Features

- Each channel can function as an independent PST/GST. Each channel can be referred to as its own reference electrode (RE).
- In multi-electrode applications, each channel accommodates an individual RE, or several channels can share one RE (such as in a combinatorial cell). This results in accurate control

and measurement and enables individual IR drop compensation. Channels share ground as the counter electrode (CE).

- Advanced software package, **MITS Pro** (Multiple Integrated Testing System Software), provides flexible scheduling, user-friendly interface, distributed system control and DAQ and easy automatic or manual maintenance and calibration.
- A unique mathematic filter is included in the software to reduce the appearance of fluctuations in current or voltage, inherent in digitalized control systems.
- Each channel can be used as a standard battery tester.

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24-channel MSTAT system — (-2)- 2V, 0.001A/0.0001A/0.00001A, up to 0.002W. The system is expandable to 64 channels, by adding up to 40 channels of max 100mA per channel.



4-channel MSTAT system — 2-10V, 0.5A/0.01A/0.001A, up to 5W with high speed pulse testing capability and auxiliary pH measurement inputs.



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Applications of MSTAT

- General electrochemistry R&D techniques include Cyclic Voltammetry, Chronopotentiometry, Linear Sweep Voltammetry, Chronocoulometry, Potentiodynamic Polarization, Potentiostatic Polarization Curve, Cyclic Polarization, Galvanodynamic Polarization, and Galvanostatic Polarization.
- Industrial R&D applications include battery anode or cathode development, corrosion materials research, electro-catalyst evaluation of fuel cells, electro-synthesis and electro-chromic materials investigation, electrochemical plating technology, biosensor/immuno-sensor research, photovoltaic applications and double-layer super capacitor technology.

Arbin Customers Using MSTAT

University of Maryland Department of Mechanical Engineering

<http://www.wam.umd.edu/~smela/>

Arbin MSTAT is used in the fabrication and operation of conjugated polymer micro-electro-mechanical systems

(MEMS). The group's research focuses on combining organic materials with silicon to make new devices. The Arbin system is used to deposit and characterize the polypyrrole layers in the micro-actuators. These "artificial muscles" have potential biomedical and micro-robotics applications.

National Renewable Energy Laboratory for Electrochromic Windows Research

<http://www.nrel.gov/buildings/windows/facilities.html>

NREL possesses several multi-channel Arbin PST/GST systems for data acquisition and computerized electronic control of voltages and currents delivered to electrochromic (EC) test devices. When used in conjunction with the environmental test chamber, the multi-channel systems can be programmed to provide sophisticated electrical protocols (trapezoidal voltage ramps, current limits, etc.) for simultaneous long-term cycling of EC devices as specified by various manufacturers.

Special Offer

Arbin currently offers a special price on a 4-channel MSTAT. See details on this page. ☼

Tech Support Updates

The Importance of an Emergency Repair Disk for Windows

Occasionally problems occur with PCs. Files can become corrupted or hard drives can crash. The problems could be with your registry, system files, partition boot sector, or

startup environment.

One of the best measures you can take to minimize downtime in the event of one of these situations is to create an Emergency Repair Disk (ERD). This allows you to take advantage of the repair functions of windows and

Expires 10/31/2002

Special Offer for \$9,995!

Arbin BT4+ or MSTAT4+ for battery & electrochemistry testing

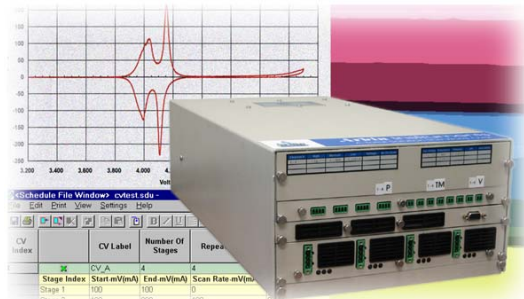
- Four-channel system, three current ranges per channel
- Up to 10V, 2A per channel
- Portable plug & play system, weighs only 28 lbs
- PST/GST functions
- Pulse testing functions (GSM/CDMA, iDen, user-defined pulse functions)
- Include 4 of each: auxiliary voltage, auxiliary thermistor, and auxiliary pressure inputs
- Include testing software
- Delivered in 2 weeks

More info at:

<http://www.arbin.com/Products/BT4/BT4.htm>

<http://www.arbin.com/Products/MSTAT4/MSTAT4.htm>

or call our sales engineers at 979-690-2751



Tech Support...

may avoid the necessity of a complete reinstall of Windows and supporting software including MS Office and Arbin's MITS software.

The ERD is created through the Backup program of Windows. You will need one 3.5" floppy disk.

To start Backup, click **Start**, point to **Programs**, point to **Accessories**, point to **System Tools**, and then click **Backup**.

On the **Tools** menu, click **Create an Emergency Repair Disk**

Follow the instructions that appear on your screen.

Choosing **Also back up the registry to the repair directory** will save your current registry files in a folder within your *systemroot/repair* folder. This is useful if you need to recover your system in the event your hard disk has failed. This also can be used if the ERD is misplaced. ☼

Second Generation Arbin Dew Point Humidifier—DPHII

Arbin engineers recently came up with a breakthrough invention of a re-designed dew point humidifier (DPH). The DPH has been used as a component inside Arbin integrated fuel cell testing system—*FCTS*—, to achieve saturated gas stream at dew point temperature prior to delivery into the fuel cell.

The DPHII has improved greatly in performance. A preliminary test at 10slpm shows that beginning at ambient temperature, the DPH is able to deliver saturated gas at a 70°C dew point within minutes. The relative humidity of the humidified gas is kept at 100% at the DPH out-

let. This improved-efficiency DPH comes in a unit that is up to ten times smaller than previous design. For an integrated humidifier unit with boiler and mixer for flow rate from 20slpm to a few thousands slpm, this DPH unit could be the most compact gas-stream humidifier available in the market.

The compact size, high energy efficiency and high performance features of the DPHII make it possible to be used not only for a fuel cell testing system but also in a fuel cell engine, as well as other new usages in chemistry, biochemistry, chemical engineering and other fields.



A newly designed 10slpm Arbin dew point humidifier—DPHII. The unit is about 10 inches long and weighs 12 lbs.

PEM Fuel Cell Research.... continues from page 4

more information, visit the institution website (French only) at: <http://www.inrs-ener.quebec.ca/>

The system for INRS is a one-channel FCTS of 0-5V, 100A/10A and up to 500W. It has 3 fuel lines that feed into the fuel cell — one for hydrogen, one for oxygen and another for methanol.

Each of the hydrogen and oxygen lines has a 30slpm humidifier to keep the gases at certain humidity levels. The hydrogen feed line is set to deliver up to 10slpm (standard liter per minute) flow rate, and the oxygen feed line is capable of flow rates up to 5slpm. The methanol line is equipped with a pump that controls up

Israel Section of the Electrochemical Society Meeting Report

The annual meeting of the Israel Section of The Electrochemical Society was held on June 16, 2002 at Bar-Ilan University. The meeting, organized by Professor. D. Aurbach, Section Chairman, drew an audience of about 100 participants representing academic institutions, industries and companies. This year meeting was dedicated to the memory of Dr. Baruch Zinger, a fellow electrochemist who was killed in a terrorist attack on December 2, 2001. The meeting opened with two addresses in memory of Dr. Zinger, delivered by Professor D. Aurbach (Bar-Ilan University) and Professor I. Rubinstein (Weizmann Institute). It was followed by a full scientific program, starting with a keynote lecture given by this year's guest of honor, Professor L. L. Miller of the University of Minnesota, who talked about "Redox chemistry of oligothiophenes in solution and in devices".

The morning session continued with five invited talks delivered by Professor E. Gileadi (Tel-Aviv University), Dr. Y. Ein-Eli (Technion, Haifa), Professor J. Becker (Ben-Gurion Uni-

versity, Beer-Sheva), Professor I. Willner (Hebrew University, Jerusalem), and Professor R. Tenne (Weizmann Institute, Rehovot). The lunch break was combined with a poster session. The afternoon session included twelve short talks given by graduate students and postdoctoral fellows. The event ended with a ceremony, where prizes donated by the Zinger family were presented to two students who won awards for the best short talk and poster presentation. The meeting was a continuation of what has become a tradition of highly successful gatherings and the central event of the electrochemical community in Israel.

Mr. Benny Zviran represented Arbin at the exhibition showing Arbin's 8-channel system. He has served as Arbin Israel representative for sales and support since 1998 and can be reached at the following address:

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Email: benny@escbaz.com,
Homepage: www.escbaz.com

couple inputs. Standard safety alarm set is also included.

Orders for a 2-channel and a 4-channel FCTS have been received from Arbin customers in the USA and are now in production stage. These systems will be used also in the R&D of PEM fuel cell.



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1-channel integrated fuel cell testing system (FCTS) for H₂-O₂ PEM fuel cell and direct methanol fuel cell testing — 0-5V, 100A/10A and up to 500W

PEM Fuel Cell Research with Arbin FCTS

Among various fuel cell systems available in the market and under research today, the proton exchange membrane fuel cell (PEMFC), also known as the solid polymer fuel cell (SPFC), seems to attract the most attention because of its evident advantages over the other types of fuel cells. These advantages include low operating temperature, compact size, no corrosive fluid hazards, free cell orientation and high power density. Because of these favorable characteristics, PEMFC has been developed for use in the automo-

tive power industry, requiring tens of kW power; as well as the portable electronic industry, requiring only a few watts per fuel cell.

With booming interest from the government and industry in fuel cell commercialization, fuel cell R&D has been intensified to make fuel cell useful and acceptable in various applications. Different aspects of the fuel cell and its applications need to be researched and tested. The PEMFC R&D includes, but is not limited to research in the electrolyte used, electrode structure and catalyst, water management, method of cooling/heating the fuel cell, method of connecting cells, fuel cell operating temperature/pressure and reactants used.

Arbin's fuel cell testing system, FCTS, has served as an instrument in PEM fuel cell R&D for many companies and research institutions. One of the research institutions is the INRS Energie-Materiaux of Quebec, Canada. The INRS Energie-Materiaux is one of the 8 research centers of the National Scientific Research Institute forming the University of Quebec network. This specific center is dedicated to new materials research, laser-materials interaction and energy processes. In the field of materials research, the team of Professor Jean-Pol Dodelet is working on fuel cells, more specifically on catalysts for PEM and DMFC (direct methanol fuel cell). For

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