Battery Testing & Research Solutions

BT-2X43

The BT-2X43 series consists of specially designed potentiostat/galvanostat testing stations for testing batteries and electrochemical research. This product is intended to provide economical entry level testing solutions for use in quality control or R&D testing that requires significant batch samples for product qualification. The product typically ranges from 12 to 40 channels per chassis.

MODEL	VOLTAGE	CURRENT
BT-2043	-10V to 10V	±100mA/1mA/10µA
BT-2143	-10V to 10V	±500mA/10mA/100µA

Primary Applications:

- Life cycle testing for qualification of materials
- Quality control for incoming materials
- Quality control for sampling final products
- Pilot production
- Thin film cells
- Not intended for supercapacitor testing

Key Features

- This series is targeted for large volume testing with multiple independent channels which can each function as a PST/GST with their own reference electrode

- Each channel is capable of three current ranges with 14 bit resolution and 0.02% accuracy

- Channels can be operated in parallel for increased current-handling capacity

- For current less than 100mA, the system includes auto-calibration

- Each channel in the test station will be safely controlled by a user-defined group voltage clamp set in the software and applied at the hardware level.

- The system will not allow the voltage to go above or below the set clamp values on all channels ensuring that batteries stay within the safety settings.

- Advanced software package, MITS Pro (Multiple Integrated Testing System, professional version), provides flexible scheduling, user-friendly interface, distributed system control and data acquisition

- Software provides easy data analysis and plotting based in Data Watcher or Microsoft Excel

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Hardware Specifications

SERIES	2043	2143
Bipolar Linear Circuit Type	Provides zero switching time between charge and discharge	
Voltage Range (max/min)	-10V to 10V	
Accuracy of Voltage Control & Reading	±4mV, 0.02% Full Scale Resolution	
Current Ranges Provided 0.02% Full Scale Resolution ∗ 0.05% accuracy for 10µA low range	High: 100mA ± 40µA Medium: 1mA ± 0.4µA Low: 10µA ± 10nA	High: 500mA ± 200µA Medium: 10mA ± 4µA Low: 100µA ± 40nA
Minimum V at Maximum Current	~10V @ 100mA	~10V @ 500mA
Maximum Continuous Power Output/Channel	1W	5W
Current Rise Time	100-150µS Time required for current output to get from 10%-90% of requested value	
Current and Voltage Resolution	14 Bit or 0.006%	
Voltage Clamp	Group Voltage Clamp	
Auto-Calibration	Includes internal auto-calibration for product with current between 100µA and 100mA	Includes internal auto-calibration for product with current between 100µA and 100mA. Also available for additional cost with external auto-calibration option for 1A to 10A
Connection for Batteries	Standard 6 ft. cables with alligator clips Arbin can also provide different battery holder options to allow easy engagement of the device to the test station	
Connection to Computer	TCP/IP	
Ventilation Method	Air cooled, front-to-rear airflow	
Room Operating Temperature	10 to 35 degrees C	
Computer Specifications	PC with 22" flat-screen monitor is included, preloaded with our MITS Pro testing software	

CHASSIS SIZE OPTIONS	CHANNEL NUMBER OPTIONS	
5U Chassis 12.5" X 25" X 10.5"	20 Channels 110V or 220V Single Phase	12 Channels 110V or 220V Single Phase
11U Chassis 15" X 30" X 25"	40 Channels 110V or 220V Single Phase	32 Channels 110V or 220V Single Phase

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Software Control Specifications

Current† (A)	Outputs constant current to the cell or battery at the value specified Positive current refers to charge and negative current refers to discharge
Voltage† (V)	Outputs constant voltage to the cell or battery at the value specified
C-Rate†	C-Rate is a method for indicating the discharge as well as the charge current of a battery. It can be expressed as I=M∗C where I=current A; C=battery capacity; M is the C-rate value.
Rest†	The battery is disconnected from the charge/discharge circuit but remains connected to the voltage measurement circuit to enable open-circuit voltage measurement
Power† (W)	Outputs constant power to the cell of battery at the value specified.
Load† (Ohm)	Applies a constant resistance load to the battery at the value specified. The load control type will always produce a negative current.
Set Variables†	Change test related variables including channel capacity, energy and all test counter variables.
Current Ramp† Voltage Ramp	Generates a current/voltage ramp with a positive scan rate for increasing current/voltage, and negative scan rate generates decreasing current/voltage ramp.
Current Staircase† Voltage Staircase	Generates a current/voltage staircase with increasing current/voltage, and negative decreasing current/voltage staircase with adjustable step amplitude.
Voltage Cycle V	This mode, commonly called Cyclic Voltammetry, permits the user to create linear sweeps in one step, eliminating the need to jump steps to reverse sweep directions
Current and Power Simulation†	Non-standard time-domain functions may be inputted from external sources such as ASCII data streams and used as control parameters for repetitive tests
DC Internal Resistance	This function applies a 10-pulse train with 1ms pulse width of the specified magnitude following a constant-current charge or discharge step
Formula†	Equips the user to control and limit schedule steps according to dynamic mathematical equations in addition to constants or instantaneous channel data
End Conditions	Time, Voltage, Current, Capacity, Energy, ΔV, DV/dt, formula, meta-variables, and other combinations
Channel Paralleling	Channels may be operated in parallel for increased current-handling capabilities. NOTE: Control types marked with (†) are available in parallel mode
Data Logging Rate	During a standard step: 40-150 data points per second, per PC
Network Capabilities	Provide TCP/IP access for networking
Data Result File	Imported into Microsoft Excel; Arbin's Excel Data Pro macro included for easy data manipulation
Data File Content	Channel data; test time, step time, voltage, current, capacity, energy, first/second derivative of I or V, auxiliary input data (optional). Statistical data: cycle #, cycle capacity/energy, max voltage, etc.

Control types marked with (†) are available in parallel mode

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Auxiliary Options &

Arbin Instruments provides a wide variety of auxiliary modules for expanding the capability of the main I, V control circuitry. Each module plugs securely to the bus board. These auxiliary modules are classified as input, input/output, and control modules.

Input Modules: Auxiliary inputs can be used to record desired data as well as to terminate or regulate charge and discharge processes based upon measured conditions. Selectable inputs are of V (voltage), T (temperature), and P (pressure).

Input / Output Modules: Digital I/O is an integrated peripheral on/off control. The output commonly is used to control valves and switches. The input allows an external control signal to control testing procedure.

Control Modules: Arbin provides control modules for Auto-Calibration, Smart Battery Testing, External Charger, Temperature Chamber Interface, and AC Impedance Measurement.

For more information please visit: www.arbin.com/products/accessories/auxiliaries.htm

Safety & UPS Features

Several safety provisions are provided in every Arbin system. There are multiple levels of fusing provided inside the system for further protection at the channel/board and power supply levels. The software also has several safety functions with which the user can avoid over charging the cells, over discharging, overheating, etc.

Smart UPS:
(optional)
This option uses a small Smart UPS to back up power to the computer only. This allows the system to automatically resume tests after a stop due to brief power interruption. There is provision for the user to intervene if desired before the channels resume. This is an essential component for any user with an unreliable power source unless the entire facility is on backup power.

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