

Battery Aging, Charging and Testing System

A Precise, Single Cabinet Solution for High Volume Battery and Capacitor Conditioning

A SINGLE SYSTEM FOR POWER CELL THERMAL AGING, PRECISION LOAD TESTING AND CHARGING

V I Engineering has combined three critical power cell conditioning functions into a single cabinet system that provides fully automated, thermal aging (forming), precision load testing and "constant current, constant voltage" recharging. This flexible and accurate device simultaneously conditions up to 450 individual power cells in 15 varying lots while monitoring the voltage, current, resistance and impedance of each unit under test (UUT).

CONFIGURABLE FOR ALL TYPES OF STORED POWER DEVICES

The first installation of this product was built to the exacting biomedical specifications for Lithium-Ion batteries, but advanced hardware and software design allow easy configuration for most stored power devices including Ni-CAD, Ni-MH, and Lead Acid batteries, plus capacitors, super capacitors, fuel cells and more.



Performance, accuracy, and flexibility in a proven ready to install package

INTEGRATED COMPONENTS

This unique system utilizes the most advanced and dependable COTS (commercial off the shelf) technology available including:

- ◆ Durable and robust PXI chassis and controller.
- ◆ Precision "laboratory grade" ovens.
- ◆ An LCR meter measures in-process impedance.
- ◆ A PXI module acquires in-process voltage & current.
- ◆ A DMM provides high resolution measurements used to calculate in-process voltage and current calibration parameters.

The delivered system includes all necessary custom designed load boards, fixtures, and trays to suit each customer's specific power cell requirements for electrical properties, size, and quantity. A wide range of alternate instruments may be specified based on accuracy and production requirements.

RELIABLE AND SCALABLE SOFTWARE

Software functionality is based on a highly scalable and reliable application developed with National Instruments' LabVIEW™. The system architecture was developed with advanced programming techniques that allow the application to scale from 50 to 2000 channels by making simple configuration changes. Programming logic also includes a built in system self check and calibration routine for each individual channel.

FULLY VALIDATED

The software application was developed, verified, and validated using strict regulatory agency guidelines. System validation included unit testing to assure accuracy and consistent quality, followed by extensive "black box" testing to confirm correct and dependably reproducible results.



High capacity model undergoing validation testing

KEY BENEFITS

- ◆ Multi-function performance at 90% less cost "per channel" than stand-alone devices.
- ◆ Independent, programmable control of current, voltage, load and power for each channel.
- ◆ Flexible control allows simultaneous handling of multiple battery types in a single run.
- ◆ Scalable from 50 to 2000 channels with only simple configuration changes.
- ◆ High accuracy - 0.02% FSR control of current or voltage.
- ◆ Configurable pulsing with synchronized DAQ.
- ◆ Measures both internal battery and system level resistive, inductive and capacitive components.
- ◆ Multiple current ranges on every channel for high accuracy over a wide, dynamic range.
- ◆ Over current discharge protection.
- ◆ Designed for upgradeability, easy maintenance and dependable performance.

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VI ENGINEERING, INC.
VALUE • INTEGRITY

Complete Test and Measurement Solutions that Exceed Expectations

COTS Software and Instrumentation

- ◆ VIE Battery Burn-in software application (LabVIEW source code available)
- ◆ VIE Battery LLM2005-01-030 (Load Multiplexing Card)
- ◆ VIE Battery BP2005-02-001 (Card rack & backplane)
- ◆ VIE Battery TF2005-03-015 (Fixturing trays)
- ◆ VIE SMIB custom multiplexing board
- ◆ NI PXI 1042Q chassis
- ◆ NI PXI 8196 controller w/GPIB, plus controller memory and hard drive upgrades
- ◆ NI PXI-6528, Industrial DIO Module
- ◆ NI PXI-6031E, Multi-function MIO Module
- ◆ NI PXI 8464 CAN Card (internal communication)
- ◆ NI PXI 4072 LCR Meter
- ◆ NI PXI 4071DMM
- ◆ NI PXI 8423 RS485 Serial

Specifications

Capacity	50 - 2000 channels
Temperature Range	32°C to 200°C
Temperature Uniformity	9 point calibration $\pm 1^\circ\text{C}$
Discharge Profile (Accuracy $\pm 1\%$)	
Load On Current Low	10 μA - 100 μA
Load On Current Medium	1 mA - 100 mA
Load On Current High	1 A - 2 A. Accuracy of $\pm 0.1\%$
Timing Resolution	0.1 to 99 seconds in .1 increments
System Leakage Current	< 320 nA (all loads off)
Re-Charge	
Charge Current	1 mA - 50 mA, in increments of 0.1 mA. (Accuracy $\pm 1\%$)
Charge Voltage	1 V to 5 V, in increments of 0.01 V. (Accuracy $\pm 1\%$)
Measurements	
Current (Low and Medium)	$\pm 1\%$ of reading; $\pm 0.02\%$ FSR
Current (High)	$\pm 0.1\%$ of reading
Voltage	± 1.0 mV
Sampling Time Low	± 0.1 second for measurement < 99 seconds
Sampling Time High	1 second for measurement > 99 seconds
Contact Resistance	± 0.01 Ohm (using 4-wire measurement)
Current Range per Channel	10 μA - 2.00 A
Voltage Range per Channel	1.00 V - 5.00 V
Current Ranges per Channel	4 (for greater accuracy)
Accuracy	0.02% FSR for 5V
DAQ Speed (pulse test)	1 K samples/sec - 3 K samples/sec

V I Engineering

V I Engineering is an experienced systems integrator that provides automated test and measurement systems, engineering information management, and LabVIEW productivity tools to Fortune 500 customers in the automotive, life sciences, manufacturing, and aerospace industries. We are also a leading Select Integrator in National Instrument's Alliance program.

VISTA

VISTA is V I Engineering's branded line of software tools, process consulting, and advanced design training that improves programming productivity and quality through the implementation of software engineering best practices for the development, management, and release of LabVIEW and TestStand applications of any size.

ENGINEERING INFORMATION MANAGEMENT

The EIM team provides software solutions that improve the efficiency of Test Planning, Execution, Analysis, and Document Management. Clients gain productivity through automated reporting, and fast, easy access to all their engineering intelligence.

CUSTOM FABRICATED TEST HARDWARE

With the addition of experienced hardware engineers, V I Engineering now designs and fabricates a wide range of PCBs and fixtures. Plus, our new 3,000 sq. ft. build area allows us to fully assemble and validate almost all types of automated testing equipment in-house.

Locations

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