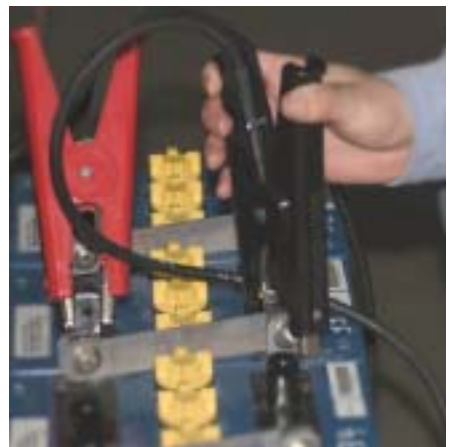
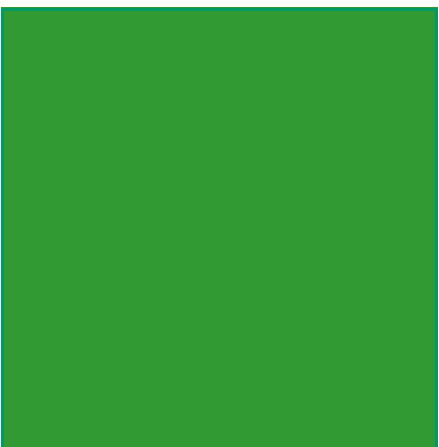
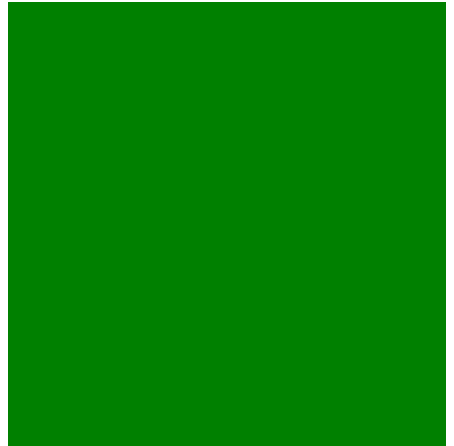




## The Interrogator™:

A modular handheld  
battery testing solution



## The Interrogator™ Battery Analyzer



The Interrogator™ is the most advanced handheld measurement device on the market for industrial batteries.

It is fully programmable and can be configured with various software modules to expand its measuring capabilities.

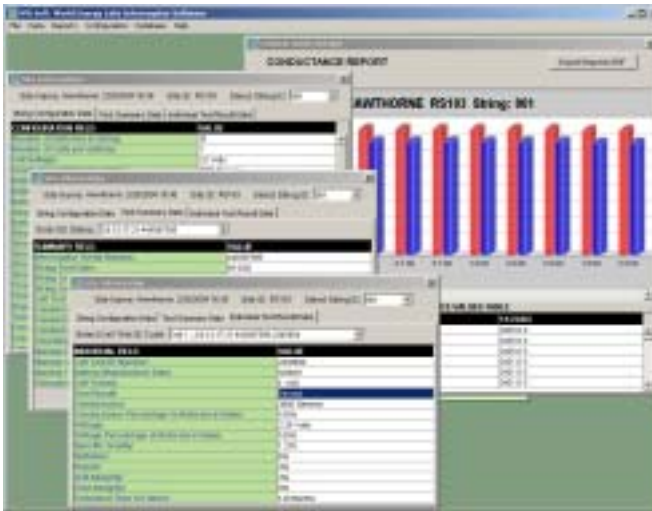
The Interrogator™ is the first handheld device in the market to utilize multiple frequency measurements and time domain analysis to obtain precise information regarding the health of batteries. This approach to battery health measurement generates an abundance of information and technical insights into the true failure modes of batteries.

The standard software on each Interrogator™ allows users to test industrial batteries of any chemistry with the industry standard tests of voltage and conductance.

For users of Industrial Lead Acid batteries the measurement capabilities of their Interrogator™ unit can be extended with the following software modules:

- > **Sulfation.** Measures directly the sulfation on the cell plates and relates this to the ability of the cell to deliver charge.
  - > **Electrolyte Dry-Out.** The Interrogator™ can determine the level of dry out in electrolyte starved systems. Users can now perform tests on VRLA, GEL and AGM batteries that were previously impossible.
  - > **Post/Strap Connection Integrity.** The Interrogator™ can be configured to measure and record the inter-cell conductivity and provide the user with an immediate warning if the post strap connection requires cleaning and tightening.
  - > **Grid Degradation.** State-of-health of the cell related to the level of grid corrosion and grid growth present in the cell.
  - > **Discharge Performance.** Tells the user how well the tested cells will perform at a user specified discharge rate. This provides the user with an accurate picture of how long mission critical batteries will actually deliver charge.
  - > **State-of-Charge.** Indicates the current state-of-charge (SOC) of the cell under test.
  - > **Time to Failure.** Estimated time to failure (in months) before the overall state-of-health of the cell falls to 0%, corresponding to an ability to deliver 80% or less of the intended capacity of the cell.
  - > **Overall State-of-Health.** This value is calculated from the multiple SOH parameters tested.
- 68MB On-Board Flash Memory.**  
Allows full data capture for over 1000 cells. Test data is fully transferable to a PC using the companion software. The system is fully user configurable for any site and string combination.

**WELSoft™ The Interrogator™ Companion Software**



- > Fully Windows® 98/2000//NT/XP compatible.
- > Upload data directly from the Interrogator™ to PC.
- > Download site and battery string data to the Interrogator™ for use in the field.
- > Manage all battery test data and site configuration data with one software application.

- > Export raw data to popular data analysis software packages such as Microsoft® Excel® for complete data analysis flexibility .
- > Create automated reports to analyze historical data trends.
- > Upload new software enhancements & algorithms to the Interrogator™.

**A Complete Battery Testing Package**



Includes:

- Interrogator™ Unit
- Rechargeable Li-Ion battery pack
- Battery Pack Recharger
- DC to AC Car Adapter
- Kelvin Clips
- Carrying Case with Shoulder Strap
- Hard Case for Transport Protection
- IR Temperature Probe
- Interrogator™ User Manual
- Companion Software WELSoft™

## Interrogator™ Product Specifications

The Interrogator uses WEL patented technology to determine the open circuit or float voltage internal cell conductance for any battery chemistry. Using additional analysis software the Interrogator can determine the progression of the underlying failure mechanisms as well as the State of Health for Lead Acid cells and batteries from 0 to 17 Volts DC. The cells or batteries can be fully, or partially discharged or on float during a testing cycle.

**Test Voltage Range:** 0 – 17.0 Volts DC  
**Voltmeter Resolution:** 5 mV

**Conductance Range:**  
3 ranges (and Auto-Range):  
0 – 1,000 Siemens  
0 – 10,000 Siemens  
0 – 100,000 Siemens

**Conductance Resolution:** 0.1% for each test range

**Calibration:** Auto-Calibration, no manual calibration necessary

**Advanced State-of-Health Parameters:**  
Fully expandable testing capability through additional software analysis modules that are available from World Energy Labs. Please contact World Energy Labs directly for availability.

**Protection Circuitry:** Auto-detect and reset  
Polarity Insensitive (Auto-detect)

**Carrying Strap:** Included adjustable nylon strap

**Environmental:**  
Operation: 0 to 45 Deg. C  
Storage: -20 to 60 Deg. C  
90% RH non-condensing

**Physical / Mechanical:**  
Dimensions: Approx: 262 x 84 x 51 mm  
(3.31 x 10.31 x 2.02 in)  
Weight: Approx: 3 lbs. (1.3 kg.)

**Keypad:** Stainless Steel Dome with polycarbonate overlay

**Data Link:** RS232

**Display:** 320 x 240 LCD FSTN  
Transreflective, LED back-light  
Viewing Area: 78 x 59 mm (3.07 x 2.32 in)

**Data Storage:**  
64 MB On Board Flash Memory.  
Allows full data capture for 1024 individual tests for any number and combination of locations, strings and string lengths.

**Interrogator Internal Power Source (Battery):**  
Type: Lithium-Ion Internal (Replaceable)

**Programmability:**  
Full setup flexibility either via PC or Interrogator™ user interface for the number of sites, strings per site, cells per string etc. New analysis software modules can be installed via RS232 Port on PC using the accompanying software 'WELSoft™'.

**Lithium-Ion Battery Charger:**  
Input Voltage: 90-250 VAC  
Frequency: 47-63 Hz  
Output Voltage: 12.6 VDC

**Probes:** Kelvin Clips with custom jaws

**Case Material:** ABS Plastic (Acid Resistant)

*Details subject to Change*

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