Quest Battery Monitoring Solutions

BMS Site Controller

Model Number:	800515
Number of monitored strings:	6 max
Number of batteries, each string:	40 max
Monitored Batteries, all strings:	240 jars / batteries
Parameters monitored (each string):	Sting voltage, float current, ripple current, battery voltage delta, discharge status
Parameters monitored (each battery):	Terminal post DC voltage, terminal post temperature, battery & cell admittance. Float and discharge current will require optional sensor
Communication data interfaces:	internal SNMP proxy agent, internal web server, internal Telnet client, internal email client; proprietary 2x RJ-45 (P-Bus) * USB local programming and configuration serial interface; USB modem/GP serial port, six proprietary optically isolated serial sensor communications interfaces
Communications protocols:	TCP/IP, UDP, SNMP, HTTP, TELNET, SMTP, NTP
Mounting:	Rack or wall
Packaging:	Black ABS plastic 94VO
Power:	15-60VDC, 2W nom; (110/220VAC power pack available)
Size:	6.0 x 9.0 x 1.6 in. (152 x 229 x 41 mm)

BMS Sensors

Part number:	800720 2 volt	800710 12 volt
Operating range:	-40 to 176° F (-40 to +80° C)	
Communications interface:	Optically isolated RJ-45 (1200V)	
Battery interface:	Battery positive: Ring terminal with 12 inch wire Battery negative: Bracket on ring terminal with 12 inch wire	
Power requirements:	1.65-3.0VDC	8.0-16VDC
Power consumption:	<15ma nominal, 2/5A during admittance test	<15ma nominal, 2/7A during admittance test
Size:	1.5 x 3 x 0.75 in. (38 x 76 x 19 mm)	

Specifications subject to change without notice

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Quest Controls
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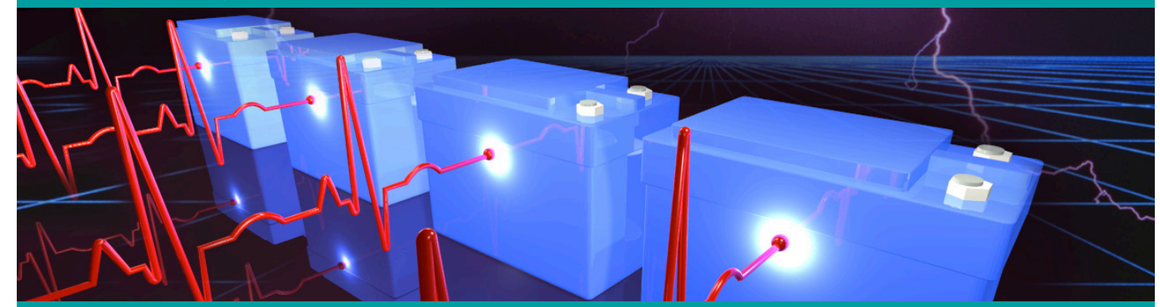
Quest Battery Monitoring Solutions

An Automated Approach to Actively Managing & Maintaining Battery Plants



Know the "state-of-health" of your batteries

Quest's Battery Monitoring System

The proliferation of high-capacity, high reliability backup power systems comes with multiple "costs-of-ownership." Mission critical UPS or DC power plant batteries require regular maintenance visits from personnel who perform visual inspections, make measurements of electrical parameters related to "state-of-health" and compile reports for submission and analysis by network maintenance managers. If the battery manufacturer's guidelines for environmental control, charging rates and regular maintenance are followed, a typical absorbed mat electrolyte primary cell can be expected to last 6 to 8 years, and a multi-cell monobloc can be expected to last 4 to 6 years, delivering reliable discharge performance when required.

- **Reduce UPS & DC Plant Downtime**
- **Reduce scheduled & emergency battery maintenance costs**
- **Extend battery life**
- **Justify warranty failures**
- **Provide remote visibility of battery health**

Manual maintenance in best cases is performed 2 to 4 times a year with paper reports generated. Manual ohmic measurements can vary with the meter, technician, placement of probes and force with which the probes are applied. The battery's environment between maintenance visits remains unknown as well as the number, duration and depth of the discharge events. Paper maintenance reports are typically not integrated into an enterprise database which could otherwise be mined to facilitate proactive "just in time" maintenance, battery replacement and inventory management. Consequently, actual battery life and run time often fall short of the expectation.

Recent technology developments have made it possible to provide a holistic automated approach to actively managing and maintaining battery plants. Quest enables operators to view the status of their enterprise at a glance and predict battery failures well in advance of the actual failure. Our system will provide:

- **Enterprise class system designed to manage thousands or tens of thousands of batteries from a single console using open standard interfaces**
- **Automated, consistent, continuous measurement data thereby dramatically increasing the reliability of the measurements and making historic trending simple**
- **Intelligent equalization which balances float charge across cells in the string reducing or eliminating gassing or sulphation caused by unequal charge on batteries**
- **Holistic approach to monitoring including voltages, ohmic measurements, individual cell temperature, ripple current, float current, ect.**
- **Facilities and environmental monitoring (generators transfer switches ambient temperature and humidity and multiple points and powering for external sensors.)**
- **Data logging or parameter data and discharge events (number, depth, duration, and performance of each cell during the event).**

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Quest Battery Monitoring Solutions

An Automated Approach to Actively
Managing & Maintaining Battery Plants

Scaleable, Feature-rich & Flexible

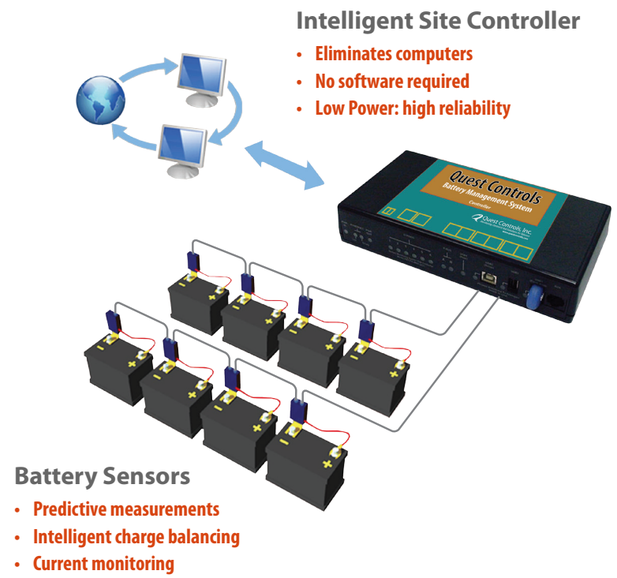
Enterprise-class System: Quest's BMS client-server architecture scales seamlessly and economically from the smallest of battery site installations to extremely large enterprise. The advanced, all solid-state site control unit automates the data collection process for a site, and all sites are unified into a holistic monitoring network using your enterprise's intranet or the public internet. Management software choices are diverse, ranging from just your web browser to sophisticated power monitoring applications

Predictive Measurements: In the past, monitoring systems were notorious for providing an overwhelming amount of arcane data, but very little in the way of predictive management information. Our BMS makes measurements that are indicative of each battery's condition in the useful life-cycle, alerting you when it's time to perform preventive maintenance or replace batteries in order to avoid failure. You'll know the condition of your batteries and how much time you have to take preventive actions.

Current Monitoring: A family of P-Bus compatible current monitoring modules can be connected to Quest's BMS site control unit. The float-current monitoring sensor can measure and monitor DC charging currents as low as 20ma and as high as 6 amps, with 10ma resolution. A discharge monitoring sensor measures high DC currents up to 500 amps with 1 amp resolution. In addition, the float sensor also monitors ripple current in the charging system.

Sophisticated Logging: Each site controller is equipped with a large non-volatile, solid-state logging memory that records more than 2 years of batter performance data. The log files are stored in a removable USB flash drive that can read locally or remotely over your network. Among the data stored are periodic snapshots of every monitored parameter, details of each battery's performance during discharge events, and alarm conditions, recorded in an industry-standard ".csv: format.

Built-in Web Interface: Each BMS site controller has a sophisticated web server built into it. Using your computer's web browser, you can view any monitored parameter in real-time, set alarm thresholds and provision descriptive labels each site, string, and battery. You can also set the state of all controllable features, make tests on demand, and control other facilities equipment. For many users, no software is required except the web browser that comes with every computer.



Battery Monitoring System Architecture

Charge Equalization: Quest's BMS's patent-pending automatic charge equalization feature keeps the charge level of each battery in a string almost perfectly balanced. Charge imbalance is a leading cause of premature battery failure, leading to batteries becoming overcharged or undercharged. Charge balancing is widely recognized as a life-extending process that promotes battery health and lower batter maintenance and replacement costs. Quest's BMS is the only battery monitoring system that extends battery life and lowers ownership costs.

Freedon of Software: Almost every other battery monitoring system available requires expensive, reliability lowering "server" computers at each site. Our BMS is built on the concept of "freedom of software". Your choices range from built-in server to public domain or proprietary software of your choice. Through its open, industry-standard SNMP data interface, you can use the enterprise management software tools that work best for your integration and maintainability needs.

Why Is This The Most Advanced Battery Monitoring System On The Market Today

Quest Battery Monitoring System is designed to be the most complete enterprise-class monitoring and management system available on the market today. During the design phase, Quest gathered input from numerous telecom, cable, power generation and wireless operators and we built our system using open industry protocol standards.

Quest BMS offers unprecedented scalability, providing a cost-effective monitoring solution whether your enterprise has one site or tens of thousands of sites. Our holistic approach provides powerful, predictive information that allows you to proactively manage the health of your batteries, lowering your maintenance costs and actually extending battery life expectancy.

Never before have operators been able to obtain executive level reports on the status of every location so easily. Quest provides operators with consistent, continuous and predictive battery information, while eliminating unnecessary manual maintenance visits. Operators also have instant access to information from generators, transfer switches, HVAC and facilities status.

The Quest system consumes less power and is more reliable than any of our competitors' systems, which typically require a complex, unreliable PC server at each monitored location. These advantages, coupled with our ability to intelligently balance the charge across individual cells/batteries in a string, make the Quest System an essential tool for any operator concerned with power reliability.

How Does It Work

A lead acid battery can be characterized by an equivalent circuit of three resistances that limit its performance:

- **A current-limiting resistance (Relectrolyte) attributable to the battery chemistry**
- **A current-limiting resistance (Rmetal) attributable to the internal connections**
- **A self-discharge resistance (Rleakage) which causes the battery to lose charge even when no load is connected**

These internal parameters are commonly called "ohmic" measurements, and "admittance" is a composite of all the battery's ohmic parameters. Ohmic measurements, together with individual battery temperature are widely recognized as leading indicators of a battery's state-of-health.

Each BMS sensor generates a digitally synthesized sinusoidal AC test signal (Itest) which is passed through the battery terminals in order to measure the battery's admittance. A site control unit communicates with each of the sensors to collect these admittance measurements, along with battery voltage and terminal post temperature.