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This technical data sheet states the performance specifications and operating conditions for the CM-Series™ Continuous Monitoring, ElectroChemical Battery System (CM1000™ and CM2000™). The CM1000™ and CM2000™ are advanced, continuous (permanent) battery monitoring systems used for accurately measuring chemical and electrical battery health in terms of Sulfation, Dryout, Life Fraction (CELScan® Parameters), Impedance (or view results as Admittance / Conductance), Voltage and Temperature. For further information about the benefits, applications, operation, equipment configuration and service products of the CM1000™ and CM2000™, please refer to the Global Energy Innovations' website.

Performance Specifications and Operating Conditions
Continuous Monitoring - Lead Acid / NiCad Batteries / Other Battery Chemistries

Continuous Monitoring - Data Aggregator

The Data Aggregator, receives information from the CELSender™ Modules (CELScan®). Data is processed, stored and transmitted to the Enterprise Software - IBMS™ (Intelligent Battery Management System) Software.

POWER SUPPLY	
AC Option	110 - 230 VAC (50/60 Hz)
DC Option	24 and 48 VDC
Backup Power	Standard with built-in UPS (1U rack)
CELL / BATTERY	
Inputs (CELSender™ Modules)	1 to 256 per String (up to 8 strings per Aggregator, Max. 1024 cells total)
Modules	CELSender™ (CELScan® Technology)
String Voltage	0 to 900 (± 450 VDC)
Ripple Detection	AC Ripple Detection
CURRENT	
Inputs	1 per String
Sensor	Auxiliary Shunt (Standard and included with CELSender™ Module
Measurement Range	0 - 2500 A
Accuracy	± 1%
TEMPERATURE	
Room (Ambient)	up to 4 Sensors
Accuracy	± 1°C (1.8°F)

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INPUTS	
Digital	4
Analog	16 (2 per string for string voltage; remaining available for other use)
OUTPUTS	
Relay	4
Rating	30 A @ 30 VDC; 250 VAC
Settings	Configuration to various alarms and conditions
SYSTEM MEMORY	
Internal Solid State Drive	30 GB Standard
PHYSICAL DIMENSIONS	
Width	440 mm (17.3 inches)
Depth	205 mm (8.1 inches)
Height	90 mm (3.5 inches) - 2U or 3U (Not including 1U Backup UPS)
TEMPERATURE	
Operating	0° to 55° C (32° to 131° F)
Storage	20° to 70° C (-4° to 158° F)
DATA RATES	
Data Rates	Voltage, Current, Temperature: Selectable down to 1 point per second
	CELScan® and Other: Varies depeding on size of String.
PORTS	
Service	Ethernet (Compatible with RS232, USB)
Communication	Ethernet 10/100 Mbps (Compatible with RS232 and Modbus)

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Continuous Monitoring - CELSender™ Module (CELScan®)

The Continuous Monitoring CELSender™ Module (CELScan®) attaches to individual cells or batteries and measures Voltage, Impedance (or view results as Admittance / Conductance in IBMS™), Temperature, as well as the various CELScan® parameters (Sulfation, Dryout and Life Fraction). This data is sent to the Data Aggregator for processing and reporting to IBMS™ (Intelligent Battery Management System)™ Software.

CELScan® PARAMETERS *(CM2000™ Feature)*	
Sulfation | Dryout	Battery charge capacity loss due to Sulfation and Dryout
Range	0 - 100% (Relative to the amount of battery charge capacity degradation)
Accuracy	± 2.5%
Life Fraction	General battery health indicator incorporating Sulfation, Dryout, Grid Corrosion and other failure modes.
Range	0 - 100% (Relative to the amount of battery degradation)
Accuracy	± 5%
IMPEDANCE	
Range	50 µΩ - 1Ω (Single Module) – View results as Impedance or Admittance (Conductance)
Accuracy	± 1%
Resolution	0.001 mOhms maximum and varies with ranges
STRAP IMPEDANCE	
Range	1 µΩ - 1Ω (Ability to measure one strap per Module)
Accuracy	± 1%
Resolution	0.001 mOhms maximum and varies with ranges
VOLTAGE	
Range	0.2 - 17 VDC (Single Module)
Accuracy	± 0.15%
Resolution	± 0.001 VDC
TEMPERATURE	
Range	-10°C to 70°C (32°F to 158°F)
Terminal Measurement Locations	Positive and Negative Post of Battery
Additional Measurement Locations	6 Additional optional locations available (Cells 1-6 for 12 V Battery)
OTHER	
Maximum Input Voltage	± 19 VDC
Isolation	600 VDC
Power	Powered by Communication line
Interface to Data Aggregator	RS485

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Enterprise Software - IBMS™ (Intelligent Battery Management System)™ Software

IBMS™ is the Enterprise Software used to review and monitor your battery health. Event handling may be used to notify the user via SMS or E-mail when critical events occur. IBMS™ has the option of using a Cloud-based, Oracle® database storage and backup solution or a local Nexus database running on your local computer or server of choice. Both solutions come standard with the CM-Series™ Systems at no additional cost.

IBMS MAIN FEATURES	
Inventory Overview	Immediate view of fault conditions with individual batteries or cells. Rapidly review hundreds of battery strings with a glance.
Advanced Report Generation	String and Cell History Reporting for Impedance, Voltage, Sulfation, Dryout, Temperature and Other. Export to PDF format. View your results as Impedance or Admittance (Conductance) in IBMS™. Our free Oracle® Appliance is compatible with SAP® Crystal Reports.
Define & Setup Inventory Structure	Define your inventory structure - Company, Region, Site, String, Battery, Cell. Personalize the naming of batteries and cells to your industry standards, and change the names of the inventory levels to fit your personal and company requirements.
Rapid Configurations	Use IBMS™ to setup the configuration of Battery Types, Alarm Settings, String Configurations General Test Settings & Inventory Configurations.
Basic & Advanced Views	Select between Basic and Advanced user settings (views). The Advanced user view allows for advanced functions such as Baseline Adjustment.
U.S. & European Conventions and Language Modules	Select between U.S. and European conventions such as Date, Temperature (°F/°C), and others. Various Language Modules available - French, Spanish, German.
Automated Baseline Adjustment	Use our patent pending baseline adjustment tool for adjusting the baseline values of batteries and cells in new and aged strings. Our patent pending algorithms rapidly calculate correct impedance, sulfation and dryout baseline values so you don't have to guess anymore.
Rapid Database Backup	Backup your entire IBMS™ database at any time using the Backup Data feature. Sync to the Cloud using our Free Optional Oracle® Database Sync feature.
Data Export	Export Test Results and Configurations effortlessly to Microsoft Excel or XML formats. Also export in IBMS™ format and re-import into any other IBMS™ Continuous Monitoring System database.
Data Import	Import Test Results and Configurations from other devices and other IBMS™ installations.
Event Handling	Automated notifications via SMS and E-mail for critical events (alarm conditions).
Firmware Updates	Automated firmware updates via the internet and IBMS™ Enterprise Software. Firmware updates carry the latest features for your System.
Rapid Online Feature Activation	Purchase and activate new features for your System using IBMS™ Software and our Online Feature Activation Server. Upgrade at the click of a button from the CM1000™ to the CM2000™ System. Trial features may be activated for testing.

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CM-Series™ Data Sharing	Test results, configurations and data may be shared between the EC-Series™ Handheld Analyzers and the CM-Series™ Continuous Monitoring (CM1000™ and CM2000™) Systems. Data from both systems are aggregated into one database (repository) for easy access. Since data from both Systems are interoperable, switching back and forth or upgrading to Continuous Monitoring is seamless at any site or across your entire organization.
Local and Remote (Enterprise) Database Setup Options	Local and remote (Enterprise) database setup options. Switch between local and remote database at the click of a button. Access your remote database through any internet connection. Multiple users may access the same database simultaneously. Users may setup and configure multiple remote or local databases. Sync to the Cloud and / or use our Oracle®-based Enterprise feaure at no additonal cost. Our Oracle® Enerprise Appliance is compatible with SAP® Crystal Reports.

CM1000™ and CM2000™ Options

CM1000™ Continuous Monitoring	▪ Voltage ▪ Impedance (View your results as Impedance or Admittance / Conductance in IBMS™) ▪ Temperature ▪ Current Upgradable from the CM1000™ to the CM2000™ System via remote firmware update.
CM2000™ Continuous Monitoring (CELScan® Features Included)	▪ Voltage ▪ Impedance (View your results as Impedance or Admittance / Conductance in IBMS™) ▪ Temperature ▪ Current ▪ Sulfation and Dryout (CELScan® Feature) ▪ Life Fraction Readout (CELScan® Feature)

SYSTEM REQUIREMENTS	
Processor	Intel Pentium 2.7 GHz or Similar
Operating System	Windows XP, Vista, 7 or 8
System Memory	2 GB RAM minimum (4 GB Recommended)
Hard Drive Space	200 GB Recommended
Other Drives	CD or DVD for installation (Not required if downloading thru Ethernet)
Display	1024 x 768 (1600 x 900 Recommended)

System Requirements are for a Laptop or PC used to run IBMS™. Hard drive size requirements will vary depending on users selection of Cloud-based storage or local option settings.

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