



SI-9300R Battery Analyzer

The Solartron Analytical SI-9300R is a modular, multichannel battery analyzer that offers unrivaled measurement and diagnostic capabilities for the analysis of battery cell technologies intended for energy and power applications.



More Than a Cycler

Industry demand for better batteries with higher capacity, shorter charge time and longer life represents a significant measurement challenge. Solartron Analytical has developed a suite of battery measurement and analysis tools intended for high power cells based on direct insights from the market and understanding of customer workflows.

Each module consists of five independent analyzer channels, each capable of 3 kW power. Up to eight modules can be installed in a 42U rack (40 channels) or four modules in 24U rack option (20 channels).

Key Measurement Specifications

- Regenerative technology to reduce power and increase channel packing density
- Flux Gate Current Sensor Technology for high accuracy and excellent temperature stability
- Current Accuracy of 0.03% FSR, 300 A, 20 A and 2 A current Ranges
- 10 kHz Solartron Analytical EIS on board on every channel as standard with real-time EIS fitting for instant cell diagnostics
- Up to 10 V polarization suitable for single cells and small eV modules
- Two auxiliary voltage measurement channels on every channel for DC and EIS anode/cathode characterization
- Patent pending Direct to Disk technology for increased system reliability and reduced PC high channel count data overload
- Ability to parallel channels of module for 1000 Amp measurements
- Patent pending EIS SoH algorithm for NISSAN LEAF and other pouch cell formulations for rapid cell grading applications

Save Energy, Optimize Power



Regenerative Technology



Multiple current ranges,
300 Amp · 20 Amp · 2 Amp



Impedance measurement
as standard



Real-time data analysis

Regenerative Technology

End users are conscious of cost of ownership and cost of test. The SI-9300R utilizes regenerative technology that reduces operating costs.



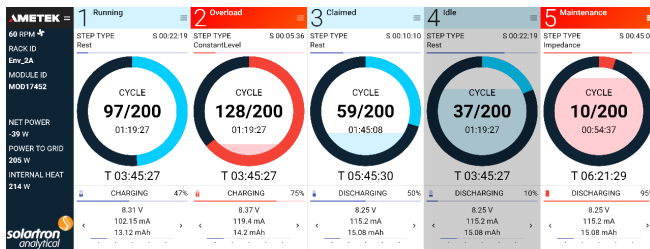
REDUCING COST OF TEST

Energy recovery algorithms in software either return current to the grid or actively balance energy within a module to achieve energy savings of up to 90% versus non return to grid technology representing significant energy and cost savings.



CONSERVING SPACE

Since energy is recycled, little space is required for cooling of electronic components. This allows the SI-9300R to achieve a high channel count density in a single 19" cabinet – up to three times the number of channels compared with non-regenerative systems. When test space constraints represent a challenge, the SI-9300R maximizes test capabilities while optimizing lab space.



Multi-range, Flux Gate Sensor Technology

The system utilizes a three-current range, flux gate sensor. It is ideally suited for both high C Rate tests and trickle charge measurements with no loss in accuracy nor precision. Flux gate sensor technology offers up to five times better temperature stability than shunt technology. As a result, accuracy is not compromised by temperature changes in the measurement circuitry.

Temperature Measurement

Our PoE (power over ethernet), temperature measurement unit offers time-stamped temperature or voltage measurement. Up to 16 measurements per analyzer channel are possible. Operators no longer need to manually correlate temperature measurements with other data sets.

Direct to Disk Technology

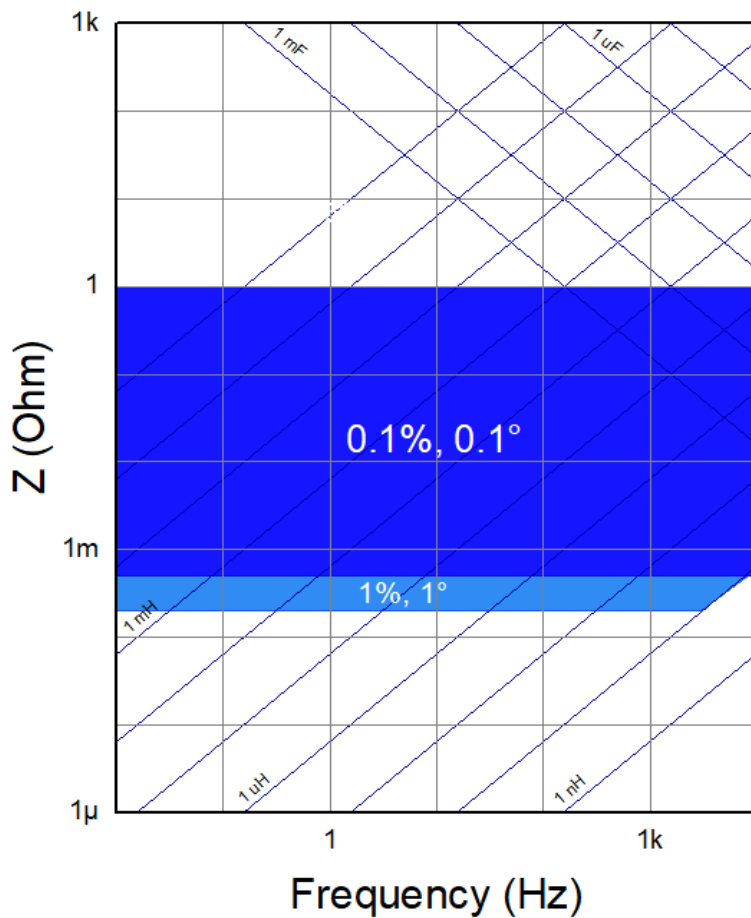
The SI-9300R Battery Analyzer uses revolutionary Direct to Disk technology for data storage (patent pending). In this system, the cyclers themselves directly store data to central network drives without assistance from the PC. This increases system reliability, vastly reduces PC data loading, reduces network traffic, and ensures data are transferred with minimal delay. As the PC is not responsible for storing data, should there be a power outage, there is zero effect on test completion. This releases the PCs to perform core functions for which they are well designed, such as: organizing which tests to run, system monitoring and data analysis. The additional benefit is that PCs can easily be added, relocated, removed from the network without affecting test execution.

Affordable, EIS as Standard

Solartron has incorporated its renowned FRA technology on each measurement channel. Unlike expensive multiplexed solutions, Solartron has been able to deliver this capability without increasing the cost of the system. Furthermore, each channel has two auxiliary voltage measurement channels as standard allowing impedance measurements on individual anode and cathode within a cell. The SI-9300R offers all of this plus the ability to live fit EIS data while tests are in progress for instant cell diagnostics.

SI-9300R Impedance Accuracy

EIS accuracy is a key feature of this system:



EIS CONTOUR MAP

The system has been optimized for EIS measurements of pouch and prismatic cells.



NISSAN LEAF SoH Algorithm In collaboration with the Warwick Manufacturing Group (WVG, UK), Solartron Analytical has developed a State of Health Algorithm specifically for NISSAN LEAF modules. Unlike time consuming pulse power tests, our patented algorithm can provide the SoH of a cell in less than three minutes with an accuracy of +/- 3%. This provides significant cost and time benefits for grading cells for second life applications.

Measurement Configuration

| | |
|---------------------------------------|---|
| Cell Connections | 4 terminal |
| Current Measurement | |
| Max Current | 300 Amp (60 s pulse), 200 Amp continuous |
| Current Ranges | 300 Amp, 20 Amp, 2 Amp |
| Current Accuracy | 0.03% FSR |
| Voltage Measurement | |
| Compliance | +300 mV to +10 V |
| Measured Accuracy | ≤ ±0.01% Setting |
| Measured Voltage Resolution | ≤ 40 µV |
| Cell Control | |
| Applied Potential Accuracy | 0.02% FSR |
| Applied Current Accuracy | 0.03% FSR |
| Slew Rate | 200 Amp step in < 1 ms |
| Impedance Measurement | |
| EIS Frequency Range | 10 mHz to 10 kHz |
| EIS Frequency Resolution | 1 mHz |
| EIS Max AC current amplitude | 10 Amp RMS |
| Temperature Measurement Option | |
| Number of channels | 16 channels per measurement unit |
| Thermocouples | K, J |
| Additional Voltage Inputs | |
| Number of channels | 2 per main measurement channel (enables DC V and EIS measurement) |
| Other | Same specifications as main voltage measurement channel |
| Additional Hardware | |
| DAC | 1 per module |
| Digital I/O | 1 per module, TTL protocol |
| Dimensions | |
| 42U Cabinet | 8 modules [4U size] per cabinet, 40 channels, 2050H x 1000D x 620W (mm) |
| 24U Cabinet | 4 modules [4U size] per cabinet, 20 channels, 1255H x 1000D x 620W (mm) |
| Power | 3 phase, 200 Vac to 480 Vac, Return to Grid |
| Options | |
| Uninterruptable Power Supply | |
| NAS Drive | |

Specifications subject to change.

▶ Learn more at www.ameteks.com.