# Battery Check in Seconds

Validating performance with EIS Technology

The battery is the weakest link that causes half of all system failures. Battery diagnostics has been lagging, but technology is available which observes capacity fade to fully use each battery with call to replace before failure.

The **Spectro CM-24** rapid-tester models a battery against a matrix to secure *Minimum Operational Reserve Energy (MORE)* on capacity, the leading health indicator.

Capacity in 30 sec.
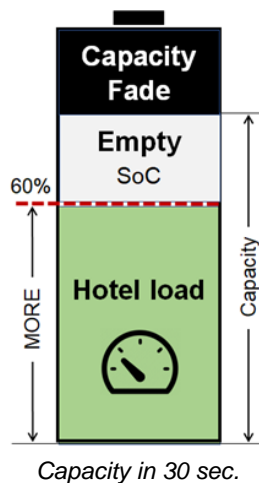
Threshold Setting

Pass/fail levels for deep-cycle batteries are commonly set to 60%. A PASS assures a full day service; FAIL calls for replacement or lower duty.

The *Spectro CM-24* comes with a matrix of choice with ability to download other matrices from the Matrix Library with Cloud Analytics, a web app that stores test results and shares data with fleet supervisors.

Spectro CM-24 battery rapid-tester

Capacity governs battery life

How does Spectro™ work?

A frequency scan produces a Nyquist plot that models a battery against a matrix to extract capacity, state-of-charge (SoC) and other characteristics. The test is non-invasive and accuracy rests on the *Matrix Integrity Level (MIL)* MIL can be improved by scanning additional batteries of same-model but diverse performance levels to capture all anomalies.

The EIS Direct-Drive tests batteries in 30 seconds with capacities of up to 300Ah. The batteries do not get agitated and the *Spectro CM-24* stays cool. Scientists predict that battery diagnostics will gravitate to Multi-Model EIS, the patented technology that Spectro™ uses.

Checking Battery Match

Battery runtime is ruled by the weakest link of serially connected batteries. Matching can be checked by measuring leftover charge with the *Spectro CM-24*. Charge levels of a well-matched string should be within 10%. Replace a low performing battery with a pack of similar capacity.


Discovering the weakest link

Operation

Test-settings are entered by the host with results shown in numbers and graphical form. Storing test results in CadexCloud is optional.

The 30-second test keeps batteries mission-ready. For best result, test batteries before critical engagements or once a month.

Knowing the capacity of each battery removes sudden downtimes and tells when batteries should be replaced. This lowers cost of ownership and protects the environment.

Connectivity leads to cloud analytics
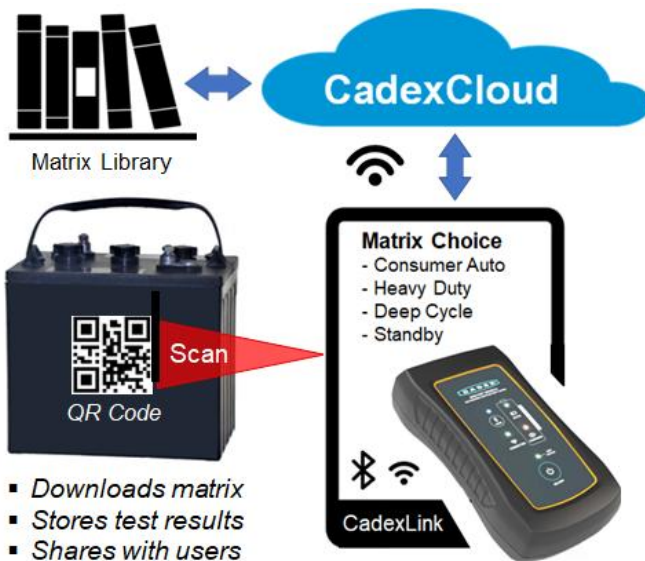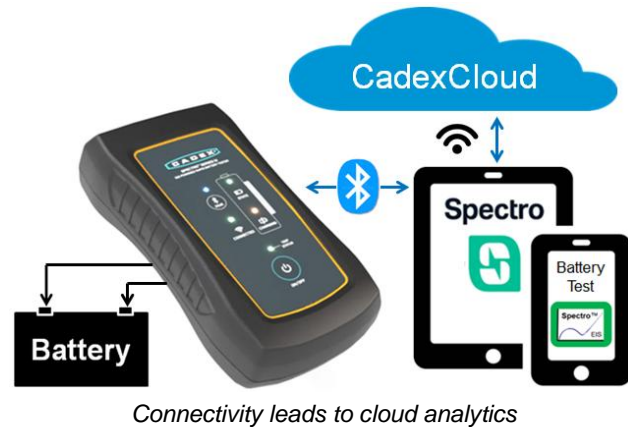
Viewing battery history by QR code

Historic Test Data

Servicing batteries can be simplified by attaching an QR code. A scan connects to the CadexCloud to store test results and download matrices by forming an open battery test platform.

Capacity Thresholds

Pass/fail settings can be changed by selecting matrices with different MORE thresholds. This enables keeping top performers for critical uses while using working packs for normal duties. The goal is to quickly check the batteries to get mission-ready.

Specifications

- Uses multi-model electrochemical impedance spectroscopy (EIS) to read capacity, CCA and SoC.
- Test time is 30s with a scanning frequency of 2,000Hz to 4Hz. Frequencies to 0.1Hz are available.
- Includes matrix of choice; additional matrices can be downloaded from CadexCloud.
- Capacity pass/fail set to 60%. Other settings on request. Measures internal battery resistance.
- Test ranges: 3–12V; 24V; 35–300Ah. Extended range to 48V nominal is on request.
- Internal battery performs 250 tests between charges.
- Unit connects to a host by Bluetooth and Cloud Analytics by Wi-Fi.
- 1 meter (40") test cable connects to DB15; USB-C charges internal battery with AC adapter.
- D: 182mm (7.16"); W: 96mm (3.78"); H: 47mm (1.85").430g net (0.94 lb.). Comes in transit case:
- Complies with CSA/UL/CE. RoHS. REACH, RED, WEEE, ISTA 3A, IP52 and FCC Type A.

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