

Efficient and Accurate Ways to Identify Bad Cells in a Battery Pack with Heltec Energy Advanced Battery Testers

CHENGDU, GUANGDONG, CHINA,
September 9, 2026 /EINPresswire.com/
-- Diagnosing Battery Failure Beyond
Static Voltage Limits

Maintenance technicians dealing with multi-cell power configurations frequently encounter a frustrating diagnostic anomaly: an assembled pack exhibits a seemingly normal total voltage across its primary terminals during standby, yet its operational runtime drops precipitously under load. When a vehicle or an energy storage unit returns with severe range depletion, visual inspection yields no physical clues, and a basic overall voltage reading fails to isolate the internal point of failure. How to identify bad cells in a battery pack? Relying on macroscopic measurements to evaluate

complex multi-series networks is fundamentally insufficient, as localized, quantifiable screening of individual cell capacity and internal resistance is required to uncover hidden structural flaws. The inability of traditional methodologies to detect a deteriorating cell stems from basic electrical circuit behaviors. In a series configuration, static open-circuit voltage measurements often mask severe voltage depression occurring under dynamic loads. A standard digital multimeter cannot replicate real-world operational stress or quantify actual capacity loss. For instance, a deeply degraded cell—with an actual capacity below 60%—may still charge to a normal voltage threshold when idle, only to collapse rapidly during discharge and trigger early system-level protection cut-offs. Because a genuine failing cell manifests through severe capacity loss or abnormally elevated alternating current internal resistance (AC IR), uncovering these underlying anomalies requires dedicated testing hardware. To resolve this diagnostic bottleneck, [Chengdu Heltec Energy Technology Co., Ltd. \(Heltec Energy\)](#) supplies high-precision diagnostic instrumentation engineered to execute parallel single-cell capacity and resistance analysis,



serving as an industry-verified solution for isolating sub-standard cells.

Precision Methodologies with Heltec Energy Hardware

Isolating defective internal components within complex assemblies demands an integrated testing approach. Heltec Energy addresses these technical requirements through [specialized hardware arrays](#) designed to evaluate individual electrical characteristics.

1. Definitive Capacity Calibration

The primary method for confirming a degraded cell involves complete, programmed galvanostatic cycling.

Utilizing the programmable HT-BCT series battery capacity testers or the

specialized HT-CC series whole-pack capacity load testers, technicians execute automated charge, discharge, rest, and cyclic profiles. These systems log continuous data, allowing users to calculate the exact ampere-hour (Ah) or watt-hour (Wh) delivery of individual cells. Any single cell or series string that fails to yield at least 60% of its nominal manufactured capacity during a standard discharge cycle is flagged as a compromised candidate requiring removal or downgrading.

2. Advanced Internal Resistance Verification

Capacity data is further validated through integrated AC internal resistance testing. Because capacity testing requires extended runtime, internal resistance profiling serves as a rapid secondary diagnostic mechanism. Heltec Energy capacity analyzers feature onboard AC IR measurement capabilities. If the internal resistance of a specific cell deviates by more than 20% from the baseline average of the pack, or if an isolated cell demonstrates an abrupt spike in resistance under active loads, the cell is locked as a confirmed point of failure.

3. Non-Invasive Parallel Screening for Large Packs

For large industrial or electric vehicle battery packs, disassembly for individual cell testing creates excessive labor overhead. Heltec Energy multi-channel isolated parallel testers overcome this issue by allowing high-throughput testing without disconnecting the primary pack connectors. Operating with independent channel parameters—such as a single-channel range of 0.3V to 5V and adjustable currents up to 50A (scalable to 200A via parallel configuration)—the hardware profiles multiple single cells simultaneously. The architecture integrates comprehensive protection mechanisms, including overvoltage, reverse connection, disconnection, and intelligent thermal management, ensuring safe operation during high-current diagnostic procedures.



4. Synchronized Testing and Active Balancing

To optimize workflow efficiency, specialized diagnostic instruments combine data acquisition with real-time energy redistribution. The HT-CJ series analysis and equalization instruments perform active balancing via energy transfer while simultaneously executing capacity testing. Instead of wasting energy as heat through passive resistors, these units transfer charge from higher-voltage cells to lower-voltage cells. This dual action allows technicians to identify permanent physical degradation while resolving reversible cell imbalances in a single operational step, minimizing overall equipment connection time.

Structured Post-Diagnostic Decision Framework

Once the hardware compiles precise data points, maintenance operations can pivot from generalized troubleshooting to a structured, data-driven disposition matrix. In a scenario where capacity testing confirms all cells remain well above the 60% threshold and the AC IR profile shows tight homogeneity, the pack is deemed physically healthy. Technicians can install a permanent Heltec Energy active balancer to mitigate future drift, extending the overall lifecycle of the assembly.

Alternatively, when diagnostics isolate a single cell or a localized series string with severe capacity depletion or high resistance, the repair protocol dictates replacing only that specific cell. Following the physical replacement, the pack undergoes a complete re-balancing cycle to match the new cell with the existing string. In cases where multiple series strings exhibit widespread degradation and high resistance variance, localized repairs become unviable, and the assembly is either routed for second-life applications—such as stationary energy storage cascading—or decommissioned entirely for material recycling.

Conclusion

Isolating defective cells within a multi-cell configuration requires moving past basic voltage checks toward precise, quantified metrics. The comprehensive instrument matrix provided by Chengdu Heltec Energy Technology Co., Ltd. addresses this need by integrating independent capacity testing, precise internal resistance profiling, and active equalization into an optimized diagnostic ecosystem. This targeted methodology allows operators to quickly evaluate cell health, avoiding the high costs of premature full-pack replacements.

As industrial electronics, material handling equipment, and localized energy networks adopt increasingly diverse battery chemistries, maintaining precise cell-level consistency remains central to system safety and operational reliability. Industrial manufacturing facilities, specialized battery repair networks, and global distribution partners seeking to upgrade their testing workflows can coordinate with technical application engineers to select appropriate hardware configurations based on specific battery pack dimensions and current capacities. For detailed technical data sheets, compliance documentation, or specific product inquiries, please visit:

<https://www.heltec-energy.com/>

chengdu heltec energy Technology Co., Ltd
chengdu heltec energy Technology Co., Ltd

+ +86 18583756538

[email us here](#)

This press release can be viewed online at: <https://www.einpresswire.com/article/940789953>

EIN Presswire's priority is source transparency. We do not allow opaque clients, and our editors try to be careful about weeding out false and misleading content. As a user, if you see something we have missed, please do bring it to our attention. Your help is welcome. EIN Presswire, Everyone's Internet News Presswire™, tries to define some of the boundaries that are reasonable in today's world. Please see our Editorial Guidelines for more information.

© 1995-2026 Newsmatics Inc. All Right Reserved.