Energy Regenerative Lithium Battery Automatic Formation And Capacity Grading Testing System

Item Number: CD04

Introduction

Discover high precision energy regenerative lithium battery automatic formation and capacity grading testing systems featuring independent 128 channel architecture four wire measurement grid energy feedback and seamless MES database integration for advanced cell production.

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Application	Description	Key Benefit
High-Volume Commercial Cell Formation	Initial solid electrolyte interphase (SEI) layer formation and cell activation for high-density lithium-ion battery cells under tightly regulated constant-current and constant-voltage regimes.	Ensures uniform, chemically stable SEI film growth across all 128 channels, maximizing long-term cycle life and initial Coulombic efficiency.
Production Capacity Grading and Binning	Automated high-throughput capacity sorting using multi-variable criteria such as total discharge capacity, plateau voltage, and dynamic discharge curves.	Delivers ultra-narrow capacity distribution bands for precision module and pack matching, reducing cell-to-cell imbalance in battery packs.
Pilot-Line Cell Chemistry R&D	Advanced electrochemical formulation testing involving specialized formation protocols, high-rate stepping up to 20A, and multi-cycle endurance evaluation.	High-fidelity data recording (0.1 mV / 1 mA resolution) and flexible 32-step recipe generation accelerate rapid iteration of novel battery chemistries.
Quality Assurance and Lot Screening	Comprehensive incoming and outgoing quality control audits, measuring open-circuit voltage, capacity retention, DC resistance indicators, and leakage currents.	Full barcode-to-channel binding and automated MES database synchronization provide unbroken regulatory compliance and quality traceability.
Energy-Efficient Pilot Degradation Testing	Long-term continuous charge-discharge cycling across multi-cell pilot batches to evaluate capacity fade, degradation kinetics, and thermal performance.	Grid-tied energy recovery captures discharge energy, slashing electrical utility consumption and heat dissipation inside environmental test enclosures.
Second-Life Battery Sorting and Re-grading	Evaluation and re-characterization of retired electric vehicle and energy storage cells to determine residual capacity and dynamic voltage curves.	Robust multi-step grading software categorizes degraded cells quickly and accurately into appropriate secondary energy storage applications.

Specification Parameter	Value / Technical Detail
Product Item Number	CD04
Channel Capacity	128 Channels (Completely independent CC/CV sources)
Charge / Discharge Current Range	300 mA to 20,000 mA (20 A) per channel
Current Measurement Accuracy	±(0.05% FS + 0.05% RD)
Current Resolution	1 mA
Voltage Measurement Range	0 mV to 5,000 mV (5 V)
Charge Voltage Range	0 mV to 4,500 mV (4.5 V)
Discharge Voltage Range	1,800 mV to 4,500 mV (1.8 V to 4.5 V)
Voltage Measurement Accuracy	±(0.05% FS + 0.05% RD)

Specification Parameter	Value / Technical Detail
Voltage Resolution	0.1 mV
Time Measurement Range & Accuracy	999 minutes per step, Accuracy: ±0.1%
Cabinet Polling Speed	≤ 3 seconds for full 128-channel inspection cycle
Step Attributes	Constant Current Charging (CC), Constant Current-Constant Voltage Charging (CC-CV), Constant Current Discharging (CC), Rest (Sleep)
Step Cut-Off Conditions	Current, Voltage, Time, Capacity, Capacity Step-Delta
Max Programmed Steps per Recipe	32 Steps
Max Programmed Cycles	256 Cycles
Grading Methods	Capacity grading, Time grading, Capacity + Curve grading, Time + Curve grading, Capacity + Voltage grading, Fixed-point Voltage grading
Energy Recovery Power Efficiency	Charging Output Max Efficiency: ≥ 70%; Grid Recovery Max Efficiency: ≥ 65%
Calibration Method & Period	Full digital software calibration; 6-month calibration stability retention
Hardware & Software Protection	Over-voltage, under-voltage, over-current, under-current, over-capacity, leakage current (Dual hardware/software protection for charge over-voltage and discharge under-voltage)
Data Recording Telemetry	OCV, average voltage, step operating time, current, cumulative capacity, plateau capacity, step curve profiling, capacity-band grouping statistics
Real-Time Dynamic Curve Plotting	Voltage vs. Time (V-t), Current vs. Time (I-t), Capacity vs. Time (C-t), Energy vs. Time (E-t), Capacity vs. Voltage (C-V)
Barcode Integration	1D and 2D barcode scanner support; sequential scanning, channel-skipping scanning, full channel-to-barcode binding
Data Storage Architecture	Local detailed raw logs per run, local summary MDB result files, remote server centralized database sync with MES integration capability
Communication Interface	Industrial RS485 serial bus
Supervisory Control Capacity	1 to 20 units per host computer (Recommended: 10 units per host workstation)
Channel Status Indicators	Independent multi-color LED indicators per channel
Operating Input Power	Three-phase AC 380V ± 10%, 50 Hz
Total Equipment Power Consumption	≤ 15 kW
System Frame Dimensions (L × W × H)	2030 mm × 700 mm × 2020 mm (Reference nominal)