# Pin Bed Cylindrical Battery Formation And Capacity Grading System With Energy Feedback

## Item Number: CD01

### Introduction

Optimize lithium cell manufacturing with this energy regenerative pin bed battery formation and capacity grading system featuring 768 independent channels DSP digital control ultra low harmonic distortion and up to 50 percent lower power consumption across high volume production lines

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| Application | Description | Key Benefit |
|---|---|---|
| Cylindrical Lithium-Ion Formation | Executes solid electrolyte interphase (SEI) layer formation on freshly assembled cylindrical cells under tightly regulated CC/CV regimes. | Ensures uniform SEI growth, long cell cycle life, and low internal impedance across mass production batches. |
| Commercial Capacity Grading | Conducts automated charge-discharge cycling to precisely measure discharge capacity, coulombic efficiency, and voltage plateaus. | Delivers high-speed sorting accuracy with 0.1mA current resolution and 0.1mV voltage resolution for consistent pack matching. |
| Battery Pack Sorting & Binning | Segregates mass-produced cells into granular performance bins based on capacity ratings, discharge curves, and nominal operating characteristics. | Minimizes capacity mismatch within downstream multi-cell battery packs, preventing premature pack degradation. |
| Cell Aging & Self-Discharge Testing | Evaluates post-formation open-circuit voltage (OCV) retention and static degradation over prolonged controlled rest cycles. | Automated multi-step safety profiles enable continuous, unattended multi-day verification runs without operator intervention. |
| Pilot Line Process Optimization | Facilitates rapid validation of novel electrolyte formulations, electrode thicknesses, and formation protocols on pilot cell batches. | Channel-level programming flexibility allows simultaneous execution of diverse test recipes across modular tiers. |
| Quality Assurance & Reliability Audits | Performs continuous stress cycling, cycle life benchmarking, and lot conformance testing on incoming cell shipments. | High power module MTBF (30,000 hours) and biannual calibration cycles guarantee repeatable audit compliance. |

| Specification Parameter | Technical Value / Standard |
|---|---|
| Equipment Item Code | CD01 |
| Total Channel Capacity | 768 Independent Channels per Cabinet (256 Channels / Tier, 3 Tiers) |
| Supervisory Control Capability | 1 Master Computer controls up to 6 Equipment Cabinets (4,608 Channels) |
| Total Connected Power Capacity | 28.8 kW |
| Rated Channel Power | 30 W per Channel |
| Grid Input Configuration | Three-Phase 5-Wire (3P+N+PE) |
| Grid Input Voltage Range | 380 Vac ±15% (Withstands up to 450 Vac static input for 1 hour) |
| Grid Input Frequency | 50 Hz ±10% |
| Grid Power Factor (PF) | > 0.99 (Conditions: Full configuration, rated grid voltage, full load charge/discharge) |
| Grid Inrush / Surge Current | ≤ 10 A |
| Total Harmonic Current Distortion (THDI) | < 5% |
| Channel Voltage Range | Charge: 0 V to 5 V \| Discharge: 2 V to 5 V |
| Channel Current Range | Charge: 20 mA to 6 A \| Discharge: 20 mA to 6 A |

| Specification Parameter | Technical Value / Standard |
|---|---|
| Battery-Side Input Impedance | > 100 kΩ |
| Current Measurement Accuracy | ±(0.05% FS + 0.05% RD) |
| Voltage Measurement Accuracy | ±3 mV |
| Current Display Resolution | 0.1 mA |
| Voltage Display Resolution | 0.1 mV |
| Time Setting / Sampling Resolution | 1 s |
| Voltage Noise and Ripple | ≤ 50 mV (Vpp) |
| Current Rise Time (90% Load) | ≤ 50 ms |
| Channel Startup Time (90% Load) | ≤ 50 ms |
| System Charging Efficiency | > 70% (Condition: 380 Vac grid, full battery discharge load) |
| Energy Feedback Regeneration Efficiency | > 65% (Condition: 380 Vac grid, full battery discharge load) |
| Primary Controller Architecture | Industrial-Grade High-Performance DSP Microcontroller |
| Communication Protocol / Interface | 10M Ethernet Port |
| Cabinet Status Display | Integrated Multi-Segment LED Panel Display |
| Power Module Reliability (MTBF) | ≥ 30,000 Operating Hours |
| Recommended Calibration Interval | Current: Every 6 Months \| Voltage: Every 6 Months |
| Operating Temperature Range | 0 °C to 45 °C |
| Environmental Storage Standard | Conforms to GB/T 4798.1-2005 |