

Prismatic Aluminum Shell Battery Negative Pressure Formation And Grading Machine

Item Number: CD02



Introduction

Optimize cell manufacturing with this advanced aluminum shell battery negative pressure formation machine featuring precise vacuum control, dual closed-loop accuracy, high-temperature activation, and automated capacity grading for high-yield prismatic lithium-ion production lines.

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Application	Description	Key Benefit
Prismatic EV Cell Formation	High-temperature negative-pressure electrochemical activation of aluminum-cased automotive lithium-ion cells.	Accelerates uniform SEI film creation while continuously extracting generated gas to avoid delamination and pouching.
Capacity Grading & Sorting	Precise charge-discharge cycling and energy measurement across wide multi-range currents for production sorting.	±0.05% FS accuracy guarantees narrow cell capacity bins, maximizing pack consistency and operational safety.
Direct Current Internal Resistance (DCIR) Testing	Programmable multi-pulse charging and discharging sequences with 100 ms minimum pulse widths and millisecond switching.	Provides instant, accurate internal resistance profiling at custom state-of-charge (SOC) operating points.
Battery R&D & Formulation Optimization	Evaluation of novel electrolyte additives, high-nickel cathodes, and silicon-carbon anodes under thermal-vacuum environments.	High-frequency 10 Hz sampling and flexible 10-layer nested loops reveal nuanced electrodynamic performance.
Energy Storage System (ESS) Cell Validation	Long-cycle formation protocols (up to 65,535 cycles) for heavy-duty prismatic cells requiring stringent physical constraint.	Mechanical torque clamping ensures flat cell geometry and eliminates internal delamination under high current.
Quality Assurance & Defect Screening	Low-voltage discharge testing down to 1.5 V and micro-current CV cutoff screening to detect micro-shorts and high self-discharge.	Sensitive 0.2 mA cutoff monitoring isolates defective cells early before battery pack integration.

Specification Category	Parameter Details	Engineering Value (Model: CD02)
Mechanical & Cell Sizing	Compatible Cell Geometry	Prismatic Aluminum-Case Lithium-Ion Cells
	Cell Thickness Range	25 mm to 55 mm
	Cell Height Range	80 mm to 150 mm
	Cell Width Range	100 mm to 160 mm (Customizable)
	Fixture Configuration	8 cells per clamp group (manual / torque wrench control)
Formation Environment	Vacuum Injection Port	Custom sealing cover plate design included
	Operating Formation Temperature	Ambient +15°C to 70°C
	Negative Pressure (Vacuum) Range	-15 kPa to -75 kPa (Built-in vacuum source: -90 kPa)
Channel & Control Architecture	Control Mode	Independent channel control with parallel channel support
	Circuit Topology	Constant current & constant voltage dual closed-loop
	Signal Resolution	AD: 24-bit; DA: 16-bit
	Connection Scheme	4-wire Kelvin connection (voltage & current sensing)
	Input Impedance	≥ 100 MΩ

Specification Category	Parameter Details	Engineering Value (Model: CD02)
Voltage Performance	Output Voltage Range	25 mV to 5.0 V
	Minimum Discharge Voltage	1.5 V (at 2 m cable length)
	Voltage Accuracy	±0.05% of Full Scale (FS)
	Voltage Stability	0.1% of Full Scale (FS)
Current Performance	Current Output Ranges	Range 1: 1A Range 2: 6A Range 3: 12A Range 4: 30A
	Minimum Output Current	5 mA
	Current Accuracy	±0.05% of Full Scale (FS)
	Current Stability	0.1% of Full Scale (FS)
Power & Dynamic Response	CV Cutoff Current Limits	Range 1: 0.2 mA Range 2: 1.2 mA Range 3: 2.4 mA Range 4: 6.0 mA
	Maximum Output Power	150 W per channel
	Power Accuracy & Stability	Accuracy: ±0.1% of FS Stability: 0.2% of FS
	Current Rise Time	≤ 1 ms (10% to 90% of FS)
	Charge/Discharge Switching Time	≤ 10 ms (-90% to 90% of FS)
	Sampling Rate	10 Hz (Minimum time interval: 100 ms)
	Power Efficiency	> 65%
Operating Modes & Logic	Charge/Discharge Modes	CC, CV, CCCV, CP, Pulse, CR Discharge, Follow Mode
	Cutoff Criteria	Voltage, Current, Relative Time, Capacity, Energy, -ΔV, Custom Variables
	Pulse Cycling Parameters	Min pulse width: 100 ms; Up to 32 pulses/step; Cont. charge/discharge switch
	Cycle & Step Capacity	1 to 65,535 cycles; ≤ 255 steps/cycle; Loop nesting < 10 layers
	Working Step Time Range	≤ 8,760 hours/step (Format: 00:00:00.000)
Utility & Facility Inputs	DCIR Testing	Integrated calculation using customizable sampling points
	Electrical Power Supply	AC 380V ±10%, 50 Hz, 3-Phase; Total Power: ~3 kW
	Compressed Clean Air Supply	0.6 to 0.8 MPa (Pressure fluctuation ±1%; water/oil removed)
	Dry Nitrogen Supply	0.1 to 0.3 MPa
Physical & Environmental	Built-in Vacuum Capability	-90 kPa
	Ingress Protection Rating	IP20
	Acoustic Noise Level	< 75 dB (Measured at 1 meter)
	Operating Temperature / Humidity	0°C to 45°C / 30% to 75% RH (Non-condensing, non-corrosive)
	Protective Grounding	Dedicated safety earthing required
	Dimensions (W x D x H)	Approx. 1200 mm x 900 mm x 1850 mm
	Equipment Weight	Approx. 400 kg
	Exterior Finish	Light Grey (RAL 7035 standard or customer specified)