

Laboratory Semi Automatic Stacking Machine For Lithium Battery Cell Assembly

Item Number: DP07



Introduction

Designed for advanced battery research, this laboratory semi-automatic stacking machine delivers precise Z-fold cell assembly with servo-driven constant tension control, automated robotic vacuum pickup, and compact glovebox compatibility, ensuring superior layer alignment and repeatable pouch cell prototyping performance.

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Application	Description	Key Benefit
Lithium-ion Pouch Cell Prototyping	Assembly of multilayer pouch cells using standard transition metal oxide cathodes and graphite anodes.	Delivers repeatable layer alignment ($\leq \pm 0.3$ mm) to prevent short circuits and ensure uniform current distribution.
Lithium Metal & Solid-State Cell Assembly	Stacking ultra-thin, delicate lithium foil anodes and solid-state separator interfaces within an argon-purified environment.	Gentle robotic vacuum manipulation prevents foil deformation, tearing, and surface oxidation during placement.
Novel Battery Chemistries R&D	Fabricating experimental sodium-ion, potassium-ion, and multivalent battery coin/pouch hybrid cells.	Rapidly adjustable tooling accommodates custom electrode geometries without costly changeover tooling.
Separator Material Evaluation	Evaluating ultra-thin ceramic-coated, polymer, and composite separator membranes under controlled mechanical tension.	Closed-loop tension control prevents membrane stretching, pinhole formation, and uneven separator tensioning.
Supercapacitor Stack Fabrication	Interleaving activated carbon electric double-layer capacitor (EDLC) or pseudo-capacitive electrodes with porous membranes.	Rapid cycle indexing and high layer counts (up to 100 layers) enable consistent fabrication of thick capacitive stacks.
Electrode Coating Quality Benchmarking	Fabricating baseline multi-layer cells to validate pilot-scale slot-die and doctor-blade slurry coating formulations.	Eliminates manual assembly variances, ensuring electrochemical metrics directly reflect slurry and coating quality.

Specification Parameter	Value / Range (DP07)
Stacking Method	Continuous Z-fold stacking with roll separator interleave
Operating Method	Manual electrode staging; automated robotic vacuum pickup, automated separator feed with constant tension control
Suction Vacuum Degree	Better than -65 kPa
Stacking Alignment Accuracy	Stacking neatness $\leq \pm 0.3$ mm (relative electrode positioning across 25 layers)
Electrode Sheet Width	40 mm to 90 mm
Electrode Sheet Length	40 mm to 100 mm (in tab direction, excluding tab length)
Maximum Tab Length	Up to 15 mm
Maximum Stacking Thickness	Up to 15 mm (programmable up to 100 layers maximum)
Separator Roll Outer Diameter	Maximum $\varnothing$ 200 mm
Separator Roll Core Size	3.0-inch (76 mm) inner diameter, air expansion shaft clamping
Stacking Speed (Standard Electrodes)	4 to 6 seconds per sheet (excluding initial cell setup time)
Stacking Speed (Lithium Metal Foils)	6 to 8 seconds per sheet (excluding initial cell setup time)

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Electrical Power Requirements	Single-phase AC 220V $\pm 10\%$, 50Hz/60Hz, 0.4 kW (110VAC customizable)
Pneumatic Supply Requirements	0.5 MPa to 0.8 MPa clean dry compressed air / inert gas
Overall Equipment Dimensions	L800 mm $\times$ W600 mm $\times$ H720 mm
Total Equipment Weight	120 kg