Semi Automatic Lithium Ion Battery Z Fold Stacking Machine For Prismatic And Pouch Cell Stacking

Item Number: DP06

Introduction

Accelerate lithium-ion battery cell development with this high-precision semi-automatic Z-fold stacking machine. Featuring active separator tension control, secondary positioning, multi-sheet prevention, and micro-lift buffering, it delivers consistent alignment accuracy and high yield for advanced R&D pilot lines.

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Application	Description	Key Benefit
Prismatic Lithium-Ion Battery R&D	Precision Z-folding of alternating cathode and anode sheets for high-energy-density prismatic power cells.	Eliminates internal short risks through ±0.2 mm adjacent electrode alignment and micro-lift knife buffering.
Pouch Cell Pilot Line Manufacturing	Semi-automated batch stacking for electric vehicle (EV) and energy storage system (ESS) pouch cell prototyping.	Delivers high cycle throughput (1.3–1.6 s/pcs) with minimal tooling changeover time between cell dimensions.
Solid-State and Advanced Cell Development	Stacking of brittle or ultra-thin ceramic-coated separators and advanced dry-process or wet-coated electrodes.	Gentle vacuum manipulation and dancer-controlled web tension preserve fragile experimental active layers.
Sodium-Ion Battery Assembly	Assembly of alternative chemistry cells requiring precise tension control and strict particulate-free processing.	Multi-point dust extraction modules prevent cross-contamination and conductive debris build-up.
Academic & Industrial Battery Labs	Flexible small-to-medium batch cell assembly across varied electrode dimensions (80–200 mm length).	User-friendly PLC interface allows rapid layer reconfiguration and material testing without hardware modifications.

Specification Parameter	Value / Detail
Product Item Number	DP06
Stacking Technology	Semi-Automatic Z-Fold Continuous Separator Stacking
Stacking Speed	1.3 – 1.6 seconds per piece (electrode sheet)
Auxiliary Handling Time	15 – 20 seconds (cell transfer and reset)
Equipment Pass Rate	99% (defects attributable strictly to machine operation)
Equipment Operating Rate (Uptime)	98% (faults attributable strictly to machine operation)
Total Rated Power	2.0 kW
Control Architecture	Industrial PLC with Full-Color Touchscreen HMI

Alignment Metric	Tolerance Specification
Electrode-to-Separator Center Deviation	±0.4 mm
Separator End-Face Alignment Accuracy	±0.3 mm
Adjacent Electrode Sheet Alignment Accuracy	±0.2 mm
Overall Finished Electrode Stacking Accuracy	±0.3 mm

Alignment Metric	Tolerance Specification
Separator Serpentine Web Error	< 1.0 mm / 1000 mm
Electrode Die-Cutting Tolerance Requirement	< 0.2 mm

Material Type	Length (mm)	Width (mm)	Thickness (mm)	Core / Roll Dimensions
Cathode & Anode Sheets	80 – 200 mm	80 – 150 mm	0.07 – 0.25 mm	Sheet material (die-cut, flat)
Electrode Tabs	8 – 20 mm (Tab extension)	8 – 20 mm (Tab width)	—	Same-side tab orientation
Separator Web	Continuous roll	80 – 155 mm	0.02 – 0.04 mm	Inner: φ76.2 mm (3"), Max Outer: φ300 mm

Cell Parameter	Dimension Range / Specification
Finished Cell Thickness (H)	5 – 20 mm
Finished Cell Width (W)	80 – 150 mm
Finished Cell Length (L)	80 – 200 mm (excluding tab extension)
Tab Length Extension (Q)	≤ 20 mm
Tab Width	≤ 20 mm
Outer Separator Wrapping	Automated blank fold reserve; manual tail wrap and tape application
Stacking Layer Capacity	Programmable within the 5–20 mm cell thickness envelope

Subsystem Module	Quantity	Engineering Functionality & Features
Stacking Platform Mechanism	1 Set	Four sets of presser knives with crossing action and micro-lift buffering.
Robotic Manipulator Assembly	1 Set	Servo motor and ground ball screw driving a 4-gripper pick-and-place transfer head.
Separator Payoff & Web Guiding	1 Set	Active motor unwinding, floating dancer roller tension control, and dynamic EPC edge tracking.
Secondary Positioning Stations	2 Sets	Pneumatic push-gauge alignment blocks with integrated dust collection nozzles.
Electrode Magazine Cassettes	2 Sets	Magazine-style auto-elevating cartridges with constant height tracking, air knives, and separation brushes.
Separator Cutting Unit	1 Set	Controlled electric resistance heating wire for clean thermal cut-off.
Cell Unloading Mechanism	1 Set	Pneumatic clamp manipulator transferring stacked cores to the manual taping station.
Chassis & Structural Frame	4 Units	Heavy-duty dual main frame and precision ground sub-baseplates for vibration isolation.
Enclosure & Safety System	1 Set	Industrial aluminum profile safety canopy with interlocked transparent access panels.
Vacuum System	1 Set	High-flow compressed air-driven vacuum ejector network for multi-cup pick heads.

Utility / Environmental Parameter	Operating Standard
Input Electrical Supply	AC 220V Single-Phase, 50/60 Hz (Voltage fluctuation within ±10%)
Pneumatic Supply Pressure	0.5 – 0.7 MPa (5 – 7 kgf/cm²)
Compressed Air Consumption	100 L/min
Physical Dimensions	1550 mm (W) x 1250 mm (L) x 1850 mm (H)
Net Machine Weight / Floor Load	Approx. 800 kg / Floor load capacity > 450 kg/m²
Ambient Operating Temperature	5 – 35 °C
Operating Relative Humidity	5 – 55% RH (Non-condensing)
Atmospheric Cleanliness	Free from conductive dust, corrosive chemicals, toxic vapors, and salt-laden air
Vibration & Magnetic Interference	Isolation from external high-magnitude magnetic fields and structural shock/vibration