

Semi Automatic Cylindrical And Prismatic Lithium Ion Battery Winding Machine

Item Number: JR03



Introduction

Engineered for high-precision lithium-ion cell production, this semi-automatic cylindrical and prismatic battery winding machine provides programmable stepper tension control, interchangeable mandrels, and automated pin extraction to ensure uniform winding consistency, low internal resistance, and outstanding 98% yields across demanding pilot lines.

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Application	Description	Key Benefit
Cylindrical Lithium-Ion Cell Assembly	Precision winding of standard cylindrical cell formats (e.g., 18650, 21700, and custom sizes) using dedicated cylindrical mandrels.	Maintains tight radial winding density and stable core geometry, ensuring uniform electrolyte wetting and prolonged cycle life.
Prismatic Energy Storage Cell Prototyping	Interleaving and winding of rectangular electrode webs for compact consumer electronic and automotive prismatic battery prototypes.	Eliminates corner stress cracking and electrode delamination through controlled flat-mandrel tensioning profiles.
Next-Generation Separator & Solid-State R&D	Processing advanced ultra-thin ceramic-coated separators, solid-state composite membranes, and high-nickel electrode materials.	Gentle, constant-speed handling prevents micro-tears, separator pinholes, and active material flaking during core winding.
Battery Pilot Production Facilities	Semi-automated batch production of specialized cells for aerospace, medical devices, defense electronics, and unmanned vehicles.	Combines high takt times (up to 7 ppm) with flexible changeovers, bridging laboratory prototypes into scalable pre-production.
Aqueous vs. Solvent-Based Chemistry Studies	Comparative evaluation of cell performance utilizing water-based binders versus standard solvent-based (NMP) cathode and anode formulations.	Single-side adjustable feeding channels adapt seamlessly to variations in web stiffness, coating thickness, and substrate surface friction.
Academic & Industrial Materials Science Testing	Precise fabrication of reproducible test jelly rolls for evaluating novel binder formulations, silicon-anode blends, and fast-charging characteristics.	High mechanical consistency (≤ 0.5 mm alignment) isolates electrochemical variables from mechanical assembly defects.
Custom Tab & Core Geometry Development	Winding customized electrode sheets with varied tab configurations, staggered leads, and multi-layer protective outermost wraps.	Programmable electrode entry orders and customizable outer wrapping options accommodate diverse internal cell geometries.

Parameter Classification	Technical Specification	Engineering Values / Operational Details
Model Identifier	Equipment Model Code	JR03
Winding Accuracy	Alignment Precision	≤ 0.5 mm
Production Throughput	Cylindrical Format Takt Time	5 – 7 ppm (based on standard 750 mm electrode length)
	Prismatic Format Takt Time	3 – 5 ppm (based on standard 750 mm electrode length)
	Process Yield Rate	$\geq 98\%$ (qualified finished jelly rolls)
	Equipment Availability (Uptime)	$\geq 95\%$
Tooling & Mandrel Range	Cylindrical Winding Pin Diameter	$\Phi 3.5$ mm – $\Phi 5.0$ mm
	Prismatic Combined Mandrel Width	38 mm – 60 mm

Parameter Classification	Technical Specification	Engineering Values / Operational Details
Process Compatibility	Supported Electrode Types	Oily (solvent-based) electrodes, water-based electrodes
	Supported Separator Types	Polyolefin microporous, ceramic-coated, and composite membranes
	Feed Guide Adjustment	Single-side adjustable guide plate width
Control & Operation	Operator Interface	Digital touchscreen HMI with programmable parameter setup
	Feeding Order Options	Cathode-first then anode, or Anode-first then cathode
	Outer Wrap Termination	Outer separator wrap or Outer electrode wrap (selectable)
	Winding Mechanism	Stepper motor drive with constant-speed regulation
	Needle Extraction	Automatic pneumatic extraction
	Unloading & Taping	Manual adhesive taping and finished cell unloading
Acoustic & Safety Standards	Operational Noise Level	≤80 dB (measured at 1.0 m distance, excluding material peeling)
	Industrial Safety Standard	Compliant with GB 5226.1 mechanical and electrical safety codes
	System Identification	Standard engraved rating plate (name, model, power, serial number)
Facility & Utilities	Compressed Air Supply	0.4 – 0.8 MPa, flow rate ≥50 L/min
	Electrical Power Supply	AC 220V, Single-Phase, 50/60 Hz (voltage fluctuation < ±10%)
	Rated Power Consumption	1.0 kVA
Environmental Conditions	Operating Temperature	20°C – 35°C
	Relative Humidity	5% – 55% RH
	Cleanroom Standard	Class 100,000 (ISO 8) or cleaner; free from corrosive, flammable, or explosive gases
Physical Properties	Machine Net Weight	Approximately 200 kg (floor load rating ≤500 kg/m ²)
	Standard Exterior Finish	International Standard Warm Grey 1C (custom coatings available upon request)