KINTEK SOLUTION

Winding Machine Catalog

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KINTEK SOLUTION

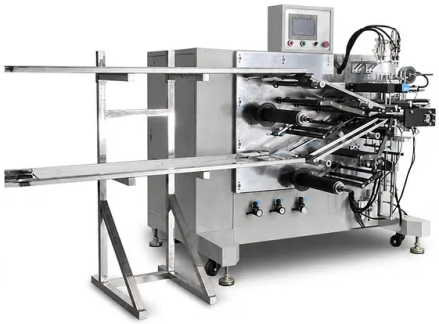
COMPANY PROFILE

>>> About Us

KINTEK Solution is a technology-driven innovator specializing in comprehensive laboratory equipment for battery R&D and advanced materials research. Our portfolio spans the entire cell fabrication workflow—from mixing, coating, and precision pressing (automatic, heated, isostatic) to cell assembly and testing. Also essential in ceramics and powder metallurgy, our systems prioritize precision, safety, and repeatability, empowering researchers and industrial labs to achieve groundbreaking results.

Semi Automatic Cylindrical Battery Winding Machine For Lithium Ion Cell Production

Item Number: JR07



Introduction

Semi automatic cylindrical battery winding machine delivers precision electrode alignment, automated separator tension control, and integrated termination taping for high yield lithium ion cell assembly across pilot scale and industrial production lines.

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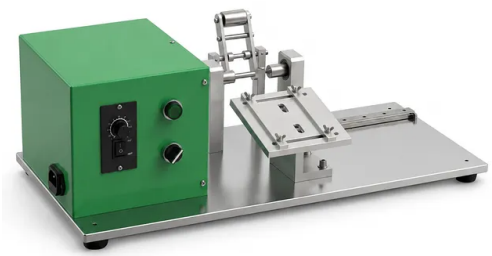
Application	Description	Key Benefit
Next-Generation 46-Series Cylindrical Cells	Pilot winding of large-format 4680, 4695, and 46120 cylindrical power cells with thick electrodes.	Accommodates cell diameters up to 60 mm and heavy coating loadings without core deformation.
Standard Commercial Cell Prototyping	Assembly of 18650, 21700, 26650, and 32140 format lithium-ion energy storage cells.	Rapid tooling changeovers for quick switching between diverse dimensional standards.
Sodium-Ion Battery Development	Specialized winding of emerging sodium-ion cathode and anode ribbon materials with ultra-sensitive tension profiles.	Smooth, low-impact tension regulation eliminates foil tearing and edge cracking.
Solid-State / Semi-Solid Cell Assembly	Precision layer winding combining advanced ceramic-coated polymer separators with thin lithium metal or composite foils.	Precise alignment within ±0.5 mm prevents internal edge-to-edge shorting.
Supercapacitor Core Fabrication	High-speed cylindrical winding of activated carbon electrode sheets and porous dielectric separators.	Supports electrode lengths up to 7000 mm with uniform compaction and low equivalent series resistance (ESR).
Academic and Industrial Battery R&D	Iterative validation of novel slurry formulations, current collector foil thicknesses, and binder chemistries.	High-yield manual insertion workflow reduces raw material waste during small batch trials.

Specification Parameter	Technical Detail (Item: JR07)
Equipment Item Number	JR07
Applicable Finished Cell Outer Diameter (OD)	Φ28 mm – Φ60 mm
Winding Needle Pin Diameter Specification	Φ8.0 mm – Φ15.0 mm (Customized per client requirements; 1 set included)
Positive Electrode (Cathode) Length Range	600 mm – 7000 mm
Positive Electrode (Cathode) Width Range	178 mm – 318 mm
Positive Electrode (Cathode) Thickness Range	0.100 mm – 0.200 mm
Negative Electrode (Anode) Length Range	600 mm – 7000 mm
Negative Electrode (Anode) Width Range	178 mm – 318 mm
Negative Electrode (Anode) Thickness Range	0.100 mm – 0.200 mm
Separator Supply Material Width Range	180 mm – 320 mm
Separator Material Thickness Range	0.016 mm – 0.045 mm
Separator Supply Reel Inner Diameter (ID)	76.2 mm (3.0 inches)
Separator Supply Reel Maximum Outer Diameter (OD)	250 mm

Specification Parameter	Technical Detail (Item: JR07)
Termination Tape Width Range	10 mm – 90 mm
Termination Tape Thickness Range	0.010 mm – 0.035 mm
Termination Tape Reel Inner Diameter (ID)	76.2 mm (3.0 inches)
Termination Tape Reel Maximum Outer Diameter (OD)	150 mm
Electrode Width Tolerance Requirement	< ±0.2 mm
Electrode Camber ("S" Curve) Tolerance	< ±1.0 mm / 500 mm
Separator Reel Telescoping Error Limit	< ±0.2 mm
Separator-to-Separator Alignment Precision	< ±0.5 mm
Electrode-to-Electrode Alignment Precision	< ±0.5 mm
Finished Cell End-Face Cross-Section Alignment	±0.5 mm (Guaranteed anode wraps cathode, separator wraps anode)
Production Qualification Yield Rate	≥ 98% (Excluding raw material defects)
Input Electrical Power Supply	AC 220V ±10%, Single-Phase, 3 kVA, 50 Hz
Compressed Air Supply Requirement	≥ 0.40 MPa (Dry, filtered pneumatic supply)
Equipment Overall Dimensions (L × W × H)	1850 mm × 1750 mm × 1650 mm (Excluding extended electrode feed guides)
Equipment Net Weight	Approx. 1000 kg

Lithium Battery Electrode Manual Winding Machine For Cylindrical And Pouch Cells

Item Number: JR06



Introduction

Accelerate battery prototyping with this manual winding machine for pouch, cylindrical, and supercapacitor cells. Featuring stepless speed control, bidirectional rotation, and multi-axis guide plate positioning, it delivers precise winding tension and defect-free core assemblies every single cycle.

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Application	Description	Key Benefit
Cylindrical Battery Prototyping	Winding anode, cathode, and separator layers into tight cylindrical jelly rolls up to 35 mm in diameter and 90 mm in length.	Guarantees tight core concentricity and uniform outer diameter for seamless can insertion.
Prismatic Pouch Cell Fabrication	Winding flat electrode-separator assemblies for soft-package lithium-ion cells with adjustable width and thickness settings.	Eliminates interfacial bubbling and electrode edge overhang, reducing short-circuit risks.
Supercapacitor Core Assembly	Integrating thick activated carbon or porous nanomaterial electrodes with porous separators into dense capacitive cores.	Delivers consistent packing density and low internal equivalent series resistance (ESR).
Solid-State & Gel Battery R&D	Processing advanced solid electrolyte composite membranes and thin metallic or alloy foils under controlled manual tension.	Minimizes mechanical stress and micro-cracking on brittle or pressure-sensitive experimental separators.
Academic & Industrial R&D Testing	Rapid turnaround of small-batch experimental cell designs using newly synthesized binder formulations or active chemistries.	Accelerates screening cycles with minimal material waste and tool-free parameter reconfigurations.

Parameter	Specification (Item No. JR06)
Power Supply	220 V / 50 Hz
Rated Power Consumption	25 W – 40 W
Winding Rotational Speed	0 – 170 rpm (Continuously Variable / Stepless)
Rotational Direction	Bidirectional (Forward / Reverse)
Applicable Flat (Pouch) Cell Dimensions	Length: 20 – 100 mm Width: 20 – 80 mm Thickness: Up to 30 mm max (customizable)
Applicable Cylindrical Cell Dimensions	Outer Diameter: ≤ Φ35 mm Length: ≤ 90 mm
Standard Cylindrical Mandrel Diameter	Φ3 mm (Interchangeable)
Mandrel Types Supported	Round Mandrel & Square/Flat Mandrel Components
Guide Slot Plate Adjustability	3-Axis Adjustable (Up/Down, Left/Right, Forward/Backward)
Actuation Mechanism	Electric Motor Drive with Foot-Pedal Valve Control
Overall Equipment Dimensions (L × W × H)	550 mm × 310 mm × 280 mm
Total Equipment Weight	25 kg

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	≥98% (qualified finished jelly rolls)
	Equipment Availability (Uptime)	≥95%
Tooling & Mandrel Range	Cylindrical Winding Pin Diameter	Φ3.5 mm – Φ5.0 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/m²)
	Standard Exterior Finish	International Standard Warm Grey 1C (custom coatings available upon request)

Cylindrical Battery Semi Automatic Winding Machine For Precision Lithium Ion Cell Assembly

Item Number: JR05

Introduction

Engineered for precision battery fabrication, this semi-automatic cylindrical cell winding machine integrates servo-driven needle rotation, dynamic dual-separator tension regulation, automated transverse termination taping, and integrated dust removal to ensure flawless jelly-roll alignment and high-yield manufacturing.

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Application	Description	Key Benefit
Lithium-Ion Cylindrical Cell R&D	Fabrication of experimental cylindrical jelly rolls using novel active cathode/anode formulations, silicon-dominant anodes, and ultra-thin separators.	Provides precise tension and speed control to handle fragile experimental electrode materials without tearing or layer misalignment.
Pilot-Scale Pilot Line Production	Medium-scale manufacturing of commercial cylindrical formats (e.g., 18650, 21700, 26650, and 4680 series) for pre-market qualification.	Bridges the throughput gap between manual winding fixtures and fully automated lines with high consistency and automated taping.
Sodium-Ion Battery Prototyping	Winding of emerging sodium-ion cylindrical cells utilizing thick aluminum current collectors on both positive and negative electrodes.	Robust servo torque and adjustable clamping mechanics accommodate thicker foil substrates without core slippage or deformation.
Solid-State and Hybrid Cell Development	Interleaving and winding of flexible solid composite electrolytes or coated polymer separators with high-capacity electrode strips.	Active smooth tension modulation prevents micro-cracking and stretching in delicate solid electrolyte separator membranes.
Customized Industrial Battery Packs	Small-batch, high-mix assembly of specialized cylindrical cells for medical devices, aerospace instrumentation, and robotics.	Rapid tooling changeover allows flexible transitions between varying cell diameters and needle pin specifications within minutes.
Quality Assurance and Benchmarking	Comparative testing of separator puncture resistance, foil tensile limits, and winding tension thresholds in academic and industrial laboratories.	Transparent control over mechanical parameters enables rigorous validation of raw material performance under repeatable winding dynamics.

Category	Parameter	Specification (Item No. JR05)
Basic System Specifications	Input Power Supply	AC 220V ±10%, 1.5 kVA, 50 Hz
	Compressed Air Requirement	0.4 – 0.6 MPa (Clean, dry air supply)
	Total Equipment Weight	Approx. 500 kg
	Overall Dimensions (L × W × H)	1750 mm × 1350 mm × 1570 mm (Excluding electrode feed tray extension)
	Winding Needle Diameter	Φ6.0 mm – Φ10.0 mm (1 custom-matched set included per customer specification)
Mechanical Units & Mechanisms	Machine Frame & Base Plate	1 complete heavy-duty structural steel set with anti-vibration leveling mounts
	Winding Pin Mechanism	1 complete single-needle counter-piercing unit with automatic needle switching
	Electrode Feeding Units	2 independent guide sets (positive and negative electrode channels)
	Separator Supply Units	2 independent active unwinding sets with dynamic tension tracking
	Taping Apparatus	1 complete transverse automatic tape applicator and precision cut-off unit
	Dust Removal Mechanism	Integrated active brush and vacuum/particle collection assembly at feed path

Category	Parameter	Specification (Item No. JR05)
Control & Drive System	Programmable Logic Controller (PLC)	Panasonic AFRX-C60T Industrial Motion Controller
	Human-Machine Interface (HMI)	MCGS 7-Inch True-Color Industrial Touchscreen Display
	Main Winding Actuator	Panasonic Industrial AC Servo Motor & Precision Drive
	Tension Modulation Actuator	Leadshine (Li-San) High-Precision Stepping Motor System
	Detection Sensors	Panasonic / Daochuan High-Response Optical & Proximity Sensors
	Pneumatic Components	AirTAC / Xingzhen Precision Valves, Regulators, and Pneumatic Cylinders
Safety & Diagnostic Systems	Alarm Management	Program-embedded real-time fault detection with automatic emergency stop
	Fault Indication	Visual and audible onscreen diagnostic alerts with step-by-step troubleshooting
	System Reset Function	One-touch operational and alarm reset mechanism
Included Accessories	Documentation	1 complete set of operating, calibration, and maintenance manuals
	Standard Accessories	1 full toolkit and wearable replacement kit (as detailed in packing manifest)

Automatic Cylindrical Lithium Battery Winding Machine For Cell Assembly

Item Number: JR02

Introduction

Optimize commercial cell manufacturing with this automatic cylindrical lithium battery winding machine featuring servo driven turntable indexing segmented tension control dual semi needle winding rapid five minute changeovers and comprehensive integrated short circuit testing for zero defect battery fabrication

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Application	Description	Key Benefit
18650 & 21700 Power Cell Manufacturing	Continuous winding of high-capacity cylindrical battery cores for electric vehicles, e-mobility, and cordless power tools.	Delivers high-speed cycle times with precise tension control to eliminate electrode fracture.
Energy Storage System (ESS) Cells	Fabrication of durable cylindrical cells optimized for residential and industrial grid storage arrays.	Maintains tight separator overhang to prevent internal short circuits and ensure long cyclic life.
Consumer Electronics Battery Assembly	Production of standard and custom-sized cylindrical cells (e.g., 16650, 18500) for portable electronics.	Flexible recipe management and 5-minute needle tooling changeover optimize multi-SKU lines.
Sodium-Ion Cylindrical Cell Pilot Lines	Precision winding of emerging sodium-ion and thick-coated advanced chemistry electrode materials.	Active dust extraction and segmented proportional tension prevent active material delamination.
High-Rate Cylindrical Cell Assembly	Winding specialized power cells with multi-tab or continuous through-welded tab configurations.	Accommodates up to two tabs per electrode plate without causing local thickness bulging or misalignment.
Solid-State & Hybrid Electrolyte R&D	Prototype fabrication of multi-layer cylindrical jelly rolls incorporating ultra-thin polymer separators.	Integrated static elimination and low-friction guiding prevent delicate separator tearing.

Parameter Category	Specification Details (Item: JR02)
Product Item Number	JR02
Cathode Material Width	40 mm – 66 mm
Cathode Material Thickness	0.1 mm – 0.2 mm
Cathode Roll Outer Diameter (Max)	≤ φ400 mm (Inner Diameter: φ76.2 mm / 3.0 inch)
Anode Material Width	42 mm – 68 mm
Anode Material Thickness	0.1 mm – 0.2 mm
Anode Roll Outer Diameter (Max)	≤ φ400 mm (Inner Diameter: φ76.2 mm / 3.0 inch)
Separator Material Width	44 mm – 70 mm
Separator Material Thickness	0.015 mm – 0.030 mm
Separator Roll Outer Diameter (Max)	≤ φ300 mm (Inner Diameter: φ76.2 mm / 3.0 inch)
Termination Tape Width	20 mm – 60 mm
Termination Tape Thickness	0.02 mm – 0.05 mm

Parameter Category	Specification Details (Item: JR02)
Termination Tape Roll Outer Diameter (Max)	≤ φ150 mm (Inner Diameter: φ76.2 mm / 3.0 inch)
Electrode Tab Constraints	≤ 2 tabs per single electrode; through-weld process recommended; exposed length < 25 mm
Infeed Sequence Configuration	Software-switchable between Cathode-First and Anode-First infeed modes
Electrode Slicing & Quality Tolerances	Slitting width tolerance < ±0.05 mm; coating wave < 1 mm; camber/camber bend < 0.3 mm / 1000 mm; roll telescoping < ±1 mm
Defective Material Tracking	Automatic detection of color-coded optical defect marks for manual splice/fault identification
Compatible Core Formats	Cylindrical diameter φ16 mm – φ28 mm; applicable core width 50 mm – 60 mm
Winding Needle Changeover Duration	≤ 5 minutes
Electrical Power Supply	Single-Phase AC 220 V ± 10%, 50 Hz
Total Power Consumption	Approximately 10 kW
Compressed Air Requirements	5.0 – 7.0 kgf/cm² (0.5 – 0.7 MPa), flow rate ~100 L/min (clean, dry, non-corrosive, non-explosive)
Pneumatic Separation	Air blow-off circuit physically isolated from main air preparation FRL filter unit
Operational Noise Level	Conforms to TJ36-79 & GB3096-82; idle noise ≤ 75 dB(A) at 1 m distance; cutting/loaded noise ≤ 85 dB(A)
Overall Equipment Dimensions	Approximately 2400 mm (L) × 1500 mm (W) × 2100 mm (H) (excluding conveyor extensions)
Machine Physical Mass	Approximately 3000 kg
Control Cabinet Layout	Right-hand mounted electrical enclosure to maintain unhindered downstream process flow

Supercapacitor Automatic Winding Machine Electrode Sheet Winder

Item Number: JR04

Introduction

Discover high precision automatic supercapacitor electrode winding solutions engineered for continuous tension control web alignment integrated short circuit inspection and reliable cell assembly in demanding energy storage pilot lines and commercial battery manufacturing environments worldwide.

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Application	Description	Key Benefit
Electric Double-Layer Supercapacitors (EDLC)	Automated winding of high-surface-area activated carbon electrodes and porous separators into cylindrical cores.	Delivers uniform interlayer contact and ultra-low internal equivalent series resistance (ESR).
Lithium-Ion Hybrid Supercapacitors (LiC)	Precision layer assembly combining lithium-doped battery electrodes with capacitor-grade counter electrodes.	Prevents mechanical damage to pre-lithiated foil coatings through non-destructive tension control.
High-Power Automotive Start-Stop Modules	High-throughput fabrication of large-diameter cylindrical cells designed for rapid regenerative energy capture.	Guarantees tight outer diameter tolerance (±0.1 mm) for automated insertion into metal can housings.
Renewable Energy Grid Smoothing Capacitors	Assembly of long-sheet electrode groups (up to 6000 mm length) for heavy-duty stationary storage cells.	High-precision web length tracking prevents volumetric energy variance across production batches.
Industrial Pulse Power Systems	Fabrication of compact, high-reliability wound energy storage units utilized in medical pulse and aerospace devices.	100% inline short-circuit testing guarantees zero dielectric breakdown under extreme discharge rates.
Advanced Pilot Line Cell Development	Flexible parameter configuration for rapid testing of novel slurry coatings, dry electrodes, and ultra-thin separators.	Tool-less adjustment accommodates broad electrode width (80–160 mm) and thickness (100–320 µm) ranges.

Parameter Category	Specification Parameter	Technical Value / Description
Product Identifier	Equipment Model	JR04
Process Flow Architecture	Automated Process Sequence	Separator Loading → Termination & Protective Tape Feeding → Cathode/Anode Feeding → Tape Splicing Detection → Electrode Core Winding → Length Control → Termination & Protective Tape Application → Short-Circuit Dielectric Test → Defect Discrimination & Output
Cathode (Positive) Sheet	Feeding Method	Continuous Roll Unwinding
	Single Sheet Length Range	600 mm – 6000 mm
	Width Range	80 mm – 160 mm
	Width Tolerance	±0.1 mm
	Thickness Range	100 µm – 320 µm
	Thickness Tolerance	±10 µm
	Maximum Supply Reel Outer Diameter	Ø 400 mm

Parameter Category	Specification Parameter	Technical Value / Description
	Supply Reel Core Inner Diameter	Ø 75.8 mm
Anode (Negative) Sheet	Feeding Method	Continuous Roll Unwinding
	Single Sheet Length Range	600 mm – 6000 mm
	Width Range	80 mm – 160 mm
	Width Tolerance	±0.1 mm
	Thickness Range	100 μm – 320 μm
	Thickness Tolerance	±10 μm
	Maximum Supply Reel Outer Diameter	Ø 400 mm
	Supply Reel Core Inner Diameter	Ø 75.8 mm
Separator Web	Feeding Method	Continuous Roll Unwinding
	Width Range	80 mm – 160 mm
	Width Tolerance	±0.1 mm
	Thickness Range	16 μm – 50 μm
	Thickness Tolerance	±4 μm
	Maximum Supply Reel Outer Diameter	Ø 350 mm
	Supply Reel Core Inner Diameter	Ø 75.8 mm
Tape Subsystem	Tape Compatibility	Termination Tape & Protective Outer Wrap Tape
	Application Mode	Fully Automated Precision Dispensing and Cutting
Functional Modules	Inspection & Quality Control	Length Tracking, Auto Tension Regulation, Dynamic Edge Rectification, Hi-Pot Short-Circuit Test, Foil Joint Detection
Electrical Specifications	Power Supply Requirements	Single Phase AC 220V, 50/60 Hz, 10 kW
	Allowable Voltage Fluctuation	±10%
Pneumatic Requirements	Compressed Air Supply Pressure	0.45 MPa – 0.6 MPa
	Air Consumption Rate	10 L/min
Environmental Conditions	Operating Ambient Temperature	20°C – 35°C
	Operating Relative Humidity	30% – 55% RH
	Ambient Air Quality Standard	Cleanroom or Dry Room; Free of Corrosive Gases, Flammable Vapors, and Conductive Dust
Physical Dimensions	Overall Equipment Footprint (L × W × H)	2500 mm × 1700 mm (including dust canopy) × 2000 mm
	Total Machine Net Weight	3000 kg

Semi Automatic Cylindrical Lithium Ion Battery Winding Machine

Item Number: JR01

Introduction

Engineered for precision cylindrical lithium-ion cell assembly, this semi-automatic winding machine delivers active tension control, integrated dust removal, automated tape termination, and high-yield electrode alignment for advanced pilot line and laboratory battery manufacturing workflows.

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Application	Description	Key Benefit
Lithium-Ion Battery Pilot Lines	Mid-volume prototype fabrication and validation of commercial cylindrical formats including 14500, 18650, and 21700 cells.	Delivers mass-production quality alignment and tension control without the tooling cost of fully automated lines.
Advanced Battery Materials R&D	Evaluation of novel cathode/anode active materials, ultra-thin foil current collectors, and ceramic-coated separators.	Gentle web handling and adjustable speed curves accommodate delicate or brittle experimental electrodes.
Next-Generation Sodium-Ion Prototyping	Precision cylindrical jelly roll fabrication using thicker or stiffer sodium-ion electrode materials and specialized separators.	High mechanical rigidity and custom winding pin diameters prevent electrode cracking and delamination during tight-radius turns.
Solid-State & Hybrid Electrolyte Assembly	Winding flexible composite solid-state electrolyte membranes with matched electrode pairings under controlled dry-room conditions.	Closed-loop active tensioning prevents localized stress concentrations, wrinkling, or micro-fracturing of brittle solid electrolyte layers.
University & Institutional Research	Academic cell prototyping, energy storage device research, and electrochemistry failure analysis studies.	Fast specification changeover and quick-change winding pin sets allow diverse experimental matrices on a single machine.
Custom Industrial & Medical Battery Cells	Low-to-medium batch manufacturing of specialized high-reliability cylindrical cells with non-standard dimensions or thick multi-tab designs.	Highly configurable winding speeds, tape lengths, and needle diameters ensure tailored production to exact customer standards.

Parameter Category	Specification Item	Value / Standard (JR01)
Model Identifier	Item Number	JR01
Cell Dimensions	Applicable Finished Cell Outer Diameter	Ø10 mm – Ø25 mm (e.g., 14500, 18650, 21700, 26650)
Winding Needle	Winding Pin Diameter Range	Ø2.5 mm – Ø8.0 mm (one standard set included, custom sized to order)
Winding Needle	Mechanism Type	Single-needle counter-penetration structure
Production Capacity	Throughput Speed	7 – 11 pcs/min (standard rated at 8 pcs/min depending on electrode length/width)
Product Yield	Qualified Finishing Rate	≥ 98% (excluding non-equipment or incoming material defects)
Positive Electrode (Cathode)	Material Length	200 mm – 3000 mm
Positive Electrode (Cathode)	Material Width	25 mm – 68 mm (strip width: 24 mm – 69 mm)
Positive Electrode (Cathode)	Material Thickness	0.1 mm – 0.2 mm
Negative Electrode (Anode)	Material Length	200 mm – 3000 mm
Negative Electrode (Anode)	Material Width	25 mm – 68 mm (strip width: 24 mm – 69 mm)
Negative Electrode (Anode)	Material Thickness	0.1 mm – 0.2 mm

Parameter Category	Specification Item	Value / Standard (JR01)
Separator Material	Roll Width	24 mm – 69 mm (overall range: 25 mm – 70 mm)
Separator Material	Thickness Range	0.016 mm – 0.045 mm
Separator Material	Roll Dimensions	Inner Diameter: 76.2 mm (3.0 in) / Max Outer Diameter: 250 mm
Termination Tape	Roll Width	8 mm – 40 mm
Termination Tape	Thickness Range	0.010 mm – 0.035 mm
Termination Tape	Roll Dimensions	Inner Diameter: 76.2 mm (3.0 in) / Max Outer Diameter: 150 mm
Process Geometry	Winding Layer Order	Separator fully encases Negative Electrode; Negative Electrode encases Positive Electrode
Alignment Accuracies	Separator Alignment Error	< ±0.5 mm (under standard incoming material tolerances)
Alignment Accuracies	Electrode Alignment Error	< ±0.5 mm (under standard incoming material tolerances)
Alignment Accuracies	Finished Cut-Face Alignment	±0.5 mm
Incoming Material Tolerances	Electrode Width Deviation Requirement	< ±0.2 mm
Incoming Material Tolerances	Electrode 'S' Camber / Bending Error	< ±1.0 mm per 500 mm length
Incoming Material Tolerances	Separator Roll Stepped-Tower Error	< ±0.2 mm
Automation Features	Process Sequence	Manual electrode feed → Auto winding → Auto pin index → Auto tape termination → Auto core discharge
Tape Application	Taping Method	Horizontal application (perpendicular to tabs), non-tensioning flat bonding
Dust Removal	Particulate Elimination	Dual-side electrode dust clearing apparatus included
Separator Decoiler	Feed Mechanism	Dual-roll active unwinding with proximity sensor tension modulation
Control & Automation	Programmable Logic Controller (PLC)	Panasonic AFRX-HC60T
Control & Automation	Human-Machine Interface (HMI)	7-inch True Color Touchscreen (MCGS / Igerlon)
Drive Motors	Winding Drive Motor	Panasonic High-Precision Servo Motor System
Drive Motors	Tension Control Motors	High-Precision Stepper Motors (Yankong / Shenzhen Li-San)
Sensing System	Optical & Proximity Sensors	Panasonic / JYC / DFC Sensor Array
Pneumatic System	Pneumatic Components & Valves	AirTAC / Xingzhen Precision Pneumatics
Safety & Diagnostics	Alarm System	Built-in fault alarm, automatic fault shutdown, real-time diagnostic messaging, one-key reset
Utility Requirements	Input Power Supply	AC 220V ±10%, 50 Hz, 1.5 kVA single phase
Utility Requirements	Compressed Air Supply	0.4 MPa – 0.6 MPa (dry, filtered, non-lubricated)
Physical Dimensions	Overall Equipment Size (L × W × H)	1660 mm × 1300 mm × 1570 mm (excluding electrode feeder overhang)
Physical Dimensions	Equipment Weight	Approximately 800 kg
Documentation & Spares	Included Accessories	1 Full Operating Manual, 1 Standard Spare Parts Kit (per packing list), 1 Winding Needle Set

Kintek Solution
Head Quarter: No.89 Science Avenue, High-Tech Zone,
Zhengzhou, China

info@kindle-tech.com | https://kinteksolution.com