



KINTEK SOLUTION

Grooving 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 Cell Grooving Machine

Item Number: GC06



Introduction

Engineered for high-precision cylindrical battery fabrication, this semi-automatic grooving machine provides programmable depth control, electrolyte-resistant digital operation, and rapid 400 units per hour processing for 18650, 21700, and 26650 cell cases in advanced battery research and pilot lines.

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Application	Description	Key Benefit
Lithium-Ion 18650 & 21700 Cell Assembly	Forming uniform seal-retaining grooves on standard commercial steel cylindrical cases prior to crimping.	Delivers consistent groove depth within ±0.1 mm to guarantee hermetic cap sealing and avoid electrolyte leakage.
High-Capacity 26650 Prototyping	Processing heavy-duty cylindrical steel housings for energy storage and electric vehicle research.	Accommodates larger form factors with rigid structural support and adjustable grooving depths from 1.2 mm to 2.0 mm.
Aluminum Electrolytic Capacitor Housing	Indenting circumferential retention channels on miniature to mid-sized aluminum casing shells up to Φ30 mm.	Gentle, controlled radial pressure prevents wall deformation on softer aluminum substrates during high-speed rotation.
Battery R&D & Formulation Pilot Lines	Conducting pilot-run cell fabrication to evaluate novel anode/cathode materials and electrolyte formulations.	Fast mechanical changeover between cell formats with intuitive PLC parameter storage reduces trial setup downtime.
Academic & Industrial Materials Research	Teaching and prototyping advanced electrochemical energy storage architectures in university and institutional labs.	Safe, ergonomic benchtop footprint featuring simple maintenance protocols and digital speed verification.
Supercapacitor Enclosure Preparation	Fabricating structural retaining grooves in thin-walled metallic enclosures for high-rate supercapacitor cells.	Preserves casing concentricity and structural integrity through ultra-smooth, motorized rotary forming.

Parameter	Specification (GC06)
Product Identifier	GC06
Control Architecture	PLC Touchscreen Controller with Digital Parameter Display
Input Hardware	Corrosion-Resistant Metallic Waterproof Pushbuttons
Compatible Housing Materials	Stainless Steel, Nickel-Plated Steel, Aluminum Enclosures
Supported Cylindrical Form Factors	18650, 21700, 26650, and other standard cylindrical steel cases
Capacitor Shell Compatibility	Aluminum capacitor casings up to Φ30 mm outer diameter
Grooving Depth Range	1.2 mm – 2.0 mm (Continuously Adjustable)
Grooving Width Range	1.1 mm – 1.5 mm (Standard blade thickness configuration)
Machining Accuracy	±0.1 mm
Tooling Blade Service Life	> 1,000,000 cycles
Production Throughput	Up to 400 pieces / hour (Semi-Automatic)
Rotational Speed Adjustment	Digitally displayed variable-speed governor
Operating Compressed Air Pressure	0.5 MPa – 0.7 MPa (Pneumatic drive)
Electrical Power Requirements	220V AC / 50 Hz Single Phase

Parameter	Specification (GC06)
Rated Power Consumption	140 W
System Dimensions (L × W × H)	740 mm × 250 mm × 350 mm
Net Weight	37 kg
Maintenance Lubrication Target	Guide pillars, rotary bushings, sliding rails, and drive assemblies

Cylindrical Capacitor Casing Cnc Grooving And Pre Sealing Machine

Item Number: GC03



Introduction

Engineered for precision energy storage manufacturing this CNC cylindrical capacitor casing grooving and pre sealing machine delivers servo driven accuracy rigid concentric collet clamping and superior sealing consistency for demanding pilot and industrial supercapacitor cell assembly production lines.

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Application	Description	Key Benefit
Supercapacitor Pilot Manufacturing	Automated casing grooving and top-edge pre-crimping for 60-series cylindrical ultracapacitors.	Micron-level groove depth consistency (± 0.02 mm) ensures accurate internal gasket seating and electrolyte retention.
High-Power Battery Cell Assembly	Processing metal casings for high-capacity cylindrical lithium and hybrid energy storage cells.	Eliminates casing deformation and material thinning through smooth servo-controlled rotary feed profiles.
Commercial Energy Storage R&D	Prototyping custom cylindrical casing geometries, alternative wall thicknesses, and specialized sealing profiles.	Rapid parameter adjustments via HMI recipes without requiring mechanical teardown or manual re-shimming.
Automated Module Component Prep	High-reliability shell preparation for energy storage cells integrated into heavy-duty grid and automotive packs.	High concentricity and strict out-of-roundness control prevent assembly misalignments during downstream pack welding.
Custom Shell Sealing Lines	Hermetic pre-sealing and roll-grooving for non-standard diameter cylindrical capacitors and metal containers.	Modular collet clamping easily adapts to custom shell diameters while preserving standard automation kinematics.

Specification Category	Parameter	GC03 Performance Value
Dimensional Accuracy	Sealed Casing Height Accuracy	± 0.05 mm
	Grooving Height Accuracy	± 0.05 mm
	Grooving Depth Accuracy	± 0.02 mm
Operational Performance	Throughput / Capacity	≥ 3 pcs/min
	Equipment Availability (Uptime)	98%
	Tooling & Die Service Life	$\geq 5,000,000$ cycles
Processing Compatibility	Standard Casing Compatibility	Diameter 60-series cylindrical battery & supercapacitor shells
	Custom Diameter Options	Fully customizable tooling available upon request
	Grooving Method	Rotary mold roller forming
	Clamping Mechanism	Automatic pneumatic sleeve-type collet clamp
	Drive Mechanism	Dual servo motor & precision ball screw assembly
Utility Requirements	Control Architecture	Integrated PLC with Touchscreen HMI
	Input Power Supply	220V AC, 50 Hz, Single Phase
	Rated Power Consumption	2.5 kW

Specification Category	Parameter	GC03 Performance Value
Physical & Environmental	Operating Air Pressure	0.5 to 0.7 MPa (Adjustable, Dry Compressed Air)
	Compressed Air Consumption	0.2 m ³ /min
	Machine Dimensions (L × W × H)	1100 mm × 900 mm × 1700 mm
	Net Equipment Weight	800 kg
	Floor Load-Bearing Requirement	> 800 kg/m ²
	Operating Ambient Temperature	15°C to 30°C
	Ambient Relative Humidity	30% to 80% RH (Non-condensing)
	Logistics / Elevator Transport Envelope	Ground clearance < 1.9 m; Elevator min: W 1.1 m × H 1.8 m × D 1.3 m

Automatic Cylindrical Battery Grooving Machine For Cell Assembly

Item Number: GC05



Introduction

Streamline pilot-scale battery manufacturing with this automatic cylindrical cell grooving machine. Engineered for precision depth control, high throughput, and multi-format compatibility across 18650, 21700, and 26650 steel casings, it guarantees uniform sealing preparation and long-term operational durability.

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Application	Description	Key Benefit
18650 Lithium-ion Pilot Production	Automatic peripheral grooving on standard 18650 steel casings prior to cap placement and final crimping.	Delivers uniform groove positioning to guarantee hermetic sealing and accurate internal cap seat leveling.
21700 High-Capacity Cell Assembly	Forming structural retention grooves in 21700 cylindrical shells for electric mobility and power tool battery packs.	Accommodates high-strength steel casings with consistent ± 0.1 mm precision across continuous batches.
26650 Energy Storage Cell Prototyping	Precision grooving for large-diameter energy storage cylindrical cells utilizing dedicated modular die sets.	Prevents casing deformation while forming deep, robust retention ledges for heavy-duty internal jelly rolls.
Next-Gen Sodium-ion & Solid-state R&D	Experimental cell housing preparation for emerging chemistries requiring tight mechanical containment.	Allows micro-adjustable depth control to test diverse casing thicknesses and custom sealing gasket designs.
Supercapacitor Shell Grooving	Precision grooving of thin-walled aluminum or steel supercapacitor casings for rapid automated sealing lines.	Ensures smooth material deformation without micro-cracking or wall thinning along the casing circumference.
University & Institutional Research	Small-to-medium batch cell fabrication for fundamental materials characterization and electrochemistry studies.	Streamlines student and researcher workflows with user-friendly touchscreen automation and low maintenance.

Specification Parameter	GC05 Configuration Details
Model Designation	GC05
Compatible Tooling / Mold Types	Standard: 18650 series tooling Optional: 21700, 26650, and custom cylindrical cell sizes
Grooving Depth Range	1.0 - 3.0 mm (Continuously adjustable)
Grooving Width Range	1.1 - 1.5 mm (Determined by grooving blade thickness)
Processing Accuracy	± 0.1 mm
Grooving Tool Service Life	> 3,000,000 cycles
Production Throughput	6 pieces/min
Electrical Power Supply	AC 220V $\pm 10\%$, 50 Hz
Rated Power Consumption	0.2 kW
Pneumatic Supply Requirement	0.5 MPa - 0.7 MPa compressed air
PLC Controller	Samkoon (三星) Programmable Logic Controller

Specification Parameter	GC05 Configuration Details
User Interface	Samkoon (10.4") Color Touchscreen Display
Sensors & Detection	Panasonic Optical & Position Sensors
Pneumatic Components	AirTAC Cylinders & Solenoid Valves
Lead Screws & Linear Guides	TBI Motion Precision Components
Guide Shafts & Bearings	MYT Precision Linear Motion Systems
Electrical Control Components	Chint Industrial Low-Voltage Apparatus
Drive Motor System	Bangshuo Dedicated Drive Motor
External Dimensions (L × W × H)	550 mm × 600 mm × 720 mm
Equipment Net Weight	50 kg

Vertical Cylindrical Battery Grooving Machine

Item Number: GC07



Introduction

Engineered for cell assembly, this high precision vertical cylindrical battery grooving machine delivers uniform depth control, programmable touchscreen operation, and robust tooling durability for battery research laboratories, pilot production lines, and supercapacitor manufacturing facilities seeking superior process repeatability.

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Application	Description	Key Benefit
Lithium-Ion Battery R&D	Forming uniform circumferential grooves on prototype cylindrical steel cans prior to electrolyte filling and final crimping.	Prevents internal component shift and ensures tight mechanical sealing tolerances for reliable electrochemical testing.
Pilot-Scale Cylindrical Cell Assembly	Performing semi-automated grooving on small-to-medium batch runs of commercial battery formats.	Reaches throughput rates up to 400 EA/H with repeatable ± 0.1 mm depth accuracy across production batches.
Aluminum Supercapacitor Manufacturing	Precision grooving of thin-walled aluminum capacitor shells with outer diameters up to $\Phi 30$ mm.	Produces controlled deformation without cracking or thinning the lightweight aluminum casing material.
Large-Format Cylindrical Cell Development	Custom-tooled processing for next-generation large-format cells, including 32700 and 4680 formats.	Modular chuck and blade architecture easily adapts to high-capacity commercial energy storage geometries.
Sodium-Ion and Solid-State Cell Prototyping	Mechanical casing preparation for emerging cell chemistries utilizing specialized housing alloys.	High-rigidity mechanical positioning accommodates varied casing hardness levels without tool chatter.
Educational and Industrial Research Facilities	Practical fabrication training and process parameter optimization in university cleanrooms and corporate research labs.	User-friendly PLC interface and compact footprint enable safe, straightforward operation in multi-user settings.

Parameter	Specification (GC07)
Product Item Number	GC07
Workpiece Loading Orientation	Vertical
Grooving Depth Range	1.2 – 2.0 mm (Adjustable)
Grooving Width Range	1.1 – 1.5 mm (Determined by blade thickness)
Machining Accuracy	± 0.1 mm
Cutter Blade Service Life	> 1,000,000 cycles
Production Capacity	Semi-automatic, up to 400 EA/H
Primary Compatible Workpiece Range	Aluminum capacitor shells & cylindrical steel cans up to $\Phi 30$ mm
Large-Format Customization Options	Available for 32700, 4680, and custom large cylindrical formats
Control System	Programmable Logic Controller (PLC) with Touchscreen Interface
Operating Power Supply	220 V / 50 Hz
Rated Power Consumption	200 W
Required Pneumatic Pressure	0.5 – 0.7 MPa

Parameter	Specification (GC07)
Equipment Dimensions (L x W x H)	420 x 370 x 550 mm
Equipment Net Weight	50 kg

Cylindrical Battery Grooving Machine Automatic And Manual Benchtop Cylindrical Cell Groover

Item Number: GC01



Introduction

Engineered for cylindrical battery research and pilot-scale assembly, this precision grooving machine provides stepless speed regulation, exact pneumatic depth control, interchangeable tooling, and seamless glovebox integration for consistent, defect-free cell casing fabrication.

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Application	Description	Key Benefit
Lithium-Ion Battery Prototyping	Precision grooving of 18650, 21700, and 26650 nickel-plated steel cans for research cells.	Guarantees exact gasket seat height and depth to prevent electrolyte leakage during high-pressure cycling.
Supercapacitor Shell Grooving	Forming circumferential support beads on thin-walled aluminum canisters for high-power EDLCs.	Prevents casing fracture through smooth, stepless rotational speed and controlled radial force.
Solid-State Cell Assembly	Mechanical pre-crimping and bead formation on specialized cylindrical shells under inert glovebox conditions.	Sealed, anti-rust architecture operates safely inside anhydrous argon atmospheres without outgassing.
Small-Batch Pilot Production	Continuous foot-switch-actuated processing of cylindrical cells at throughputs up to 8 units per minute.	Maximizes batch output consistency while minimizing operator fatigue through automatic pneumatic actuation.
Electrolyte Filling Optimization	Processing precision grooves to hold internal top insulators in place prior to precision automated electrolyte injection.	Maintains strict internal clearance tolerances for automated needle insertion and seal placement.
Academic Materials Validation	Comparative testing of experimental casing alloys, plating thicknesses, and structural wall variations.	Wide adjustment range (0-10 mm depth, 0-20 mm height) accommodates diverse experimental canister geometries.

Specification Parameter	Technical Detail / Value (GC01)
Product Identifier	GC01
Machining Precision	±0.1 mm
Groove Depth Adjustment Range	0 – 10 mm (Continuously Adjustable)
Groove Blade Position Adjustment Range	0 – 20 mm (Axial Position Adjustable)
Grooving Blade Width	1.1 – 1.6 mm (Standard tooling; matched to blade thickness)
Spindle Rotational Speed	Continuously adjustable up to ~300 r/s (Stepless)
Operational Throughput	6 – 8 pieces/min (Operator skill and canister material dependent)
Operating Modes	Dual Mode: Manual Setup Calibration / Automatic Foot-Pedal Cycling
Feed Control Mechanism	Dual Pneumatic Cylinder System (Independent Clamp & Forming Actuation)
Compressed Air Supply Requirement	0.45 – 0.6 MPa (Clean, Dry, Non-Lubricated Compressed Air)
Electrical Power Rating	Single Phase 220V AC ±10%, 50 Hz, 140 W
Chassis & Structural Materials	High-Strength Alloy Chrome Steel with Eco-Friendly Plating & Protective Spray Finish
Atmospheric Compatibility	Standard Ambient Air Cleanroom or Inert Atmosphere Glovebox (Argon/Nitrogen)

Specification Parameter	Technical Detail / Value (GC01)
External Dimensions (L × W × H)	740 mm × 220 mm × 470 mm

Semi Automatic Battery Bottom Welding And Grooving Machine 2 In 1 Cylindrical Cell Grooving And Spot Welder

Item Number: GC04



Introduction

Optimize cylindrical cell assembly with this semi automatic bottom welding and grooving machine delivering high precision shoulder height control automated infeed outfeed and reliable 20 to 30 PPM output for battery pilot lines and commercial manufacturing facilities worldwide.

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Application	Description	Key Benefit
18650 Battery Cell Assembly	High-speed bottom tab spot welding and can opening roll-grooving for standard 18650 lithium-ion energy cells.	Maintains uniform ± 0.05 mm shoulder height consistency, maximizing seal reliability during downstream electrolyte filling and crimping.
21700 Power Cell Manufacturing	Precision forming and high-reliability welding for high-capacity 21700 cylindrical battery formats used in mobility and storage packs.	Ensures robust mechanical tab bonding and precise groove depth under adjustable pneumatic pressures tailored for thicker cell casings.
Battery R&D and Prototyping Lines	Flexible pilot-scale assembly of custom cylindrical cells with frequent adjustments to casing alloy chemistry, wall thickness, and tab materials.	Allows rapid parameter tuning for weld current, pulse duration, and grooving cutter stroke on an interactive digital touchscreen interface.
Pilot Pre-Production Validation	Turnkey fabrication station for testing new cell designs, internal current collectors, and safety vent groove geometries prior to high-volume tooling release.	Provides integrated pull-force testing, short-circuit pre-checks, and comprehensive cycle counting to validate process capability metrics.
Supercapacitor and Custom Cell Fabrication	Tab attachment and precision grooving of heavy-duty cylindrical housings for hybrid energy storage devices and specialized capacitor cans.	Delivers up to 4 kg spring-loaded welding pressure and highly repeatable dimensional accuracy across non-standard casing profiles.

Specification Category	Parameter	GC04 Technical Value
Model Identification	Item Code	GC04
Core Capabilities	Primary Functions	Semi-automatic bottom spot welding and roll-grooving (2-in-1 integrated configuration or standalone operation)
	Applicable Cell Types	18650 and 21700 Cylindrical Steel Casing Batteries
	Production Throughput	20 to 30 PPM (PPM varies depending on operator handling speed)
Forming & Grooving Precision	Grooving Inner Diameter Precision	± 0.05 mm
	Shoulder Height Precision	± 0.05 mm
	Total Height Precision	± 0.1 mm
	Casing Mouth Precision	± 0.1 mm
Welding System & Controls	Spot Welding Pressure (Spring)	4 kg (Optional, optimized for pointed needle spot welding)
	Programmable Welding Parameters	Voltage, Current, Pulse Duration, Interval Time, Power, Resistance Verification
	Welding Quality Control	Pull-force testing capability, Current alarm, Resistance validation, Pin maintenance diagnostics

Specification Category	Parameter	GC04 Technical Value
Mechanical & Process Tuning	Grooving Adjustments	Main head down-stroke distance, cutter advance distance, groove depth, shoulder height
	Pneumatic Grooving Tuning	Adjustable forming air pressure adapted to varying casing alloys and thicknesses
	Auxiliary Process Functions	Automatic oiling/lubrication, Short-circuit detection, Fixture in-place auto-sensing
Electrical Specifications	Input Power Supply	Single-phase / 3-phase, 220V - 380V AC, 50 Hz (32A industrial connector)
	Total Machine Power	4500 W
Pneumatic Requirements	Required Operating Air Pressure	0.5 to 0.6 MPa (Clean, dry compressed air source)
	Air Inlet Pipe Dimensions	Outer Diameter $\Phi 10$ mm $\times$ Inner Diameter $\Phi 8$ mm
	Air Exhaust / Consumption Flow	0.113 L/s
Physical & Safety Characteristics	External Dimensions (Docked Overall)	L 2280 mm $\times$ W 850 mm $\times$ H 1520 mm
	Equipment Weight	200 kg
	Safety Systems	Protective exterior enclosure, optical safety light curtain, alarm diagnostics
	User Interface	Touchscreen HMI with manual debugging, automatic operation, and real-time cycle counting

Aluminum Case Small Capacitor Grooving And Sealing Machine

Item Number: GC02



Introduction

Engineered for precision battery and capacitor manufacturing, this aluminum case small capacitor grooving and sealing machine delivers synchronized grooving and roll-crimping with high concentricity, 98 percent operational availability, and tooling life exceeding 500,000 cycles for reliable hermetic sealing performance.

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Application	Description	Key Benefit
Aluminum Electrolytic Capacitors	Simultaneous circumferential grooving and hermetic roll-crimping on standard Φ16 mm and custom aluminum can housings.	Guarantees consistent seal compression against rubber end seals, preventing electrolyte evaporation and extending component operational life.
Miniature Supercapacitors (EDLCs)	Precision groove indentation and curl-sealing for small cylindrical electric double-layer capacitors used in power backup and pulse applications.	Ensures high concentricity and uniform mechanical pressure without risking separator pinch or internal terminal short-circuits.
Small Cylindrical Battery Assembly	Sealing of miniature cylindrical primary and secondary battery cells (such as specialized lithium-ion and nickel-based micro-cells).	Achieves moisture-tight hermetic mechanical closures with zero shell wall thinning and tight axial height tolerances.
Electronic Component Pilot Lines	Batch pilot manufacturing, process optimization, and sample prototyping for custom-dimensioned passive energy components.	Compact tabletop footprint with rapid tooling interchangeability enables agile transitions between different can diameters.
University and Corporate R&D	Materials evaluation, electrolyte containment testing, and mechanical casing integrity studies in advanced electronics laboratories.	Highly reproducible mechanical parameters allow researchers to isolate formulation variables from packaging variations.

Automotive Sensor Electronics	Encapsulation and end-sealing of cylindrical aluminum sensor housings containing delicate passive filtering capacitors.	Robust mechanical lock resists thermal cycling and intense mechanical vibration encountered in automotive under-hood environments.
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Parameter	Specification (GC02)
Product Item Number	GC02
Applicable Component Type	Aluminum shell small capacitors and miniature cylindrical energy cells
Standard Process Diameter	Φ16 mm aluminum casing
Diameter Customization Range	Fully customizable tooling available for alternative shell diameters
Primary Operational Processes	Synchronized circumferential grooving and rotary roll-crimping / edge-folding
Sealing / Flanging Mechanism	Rotary die mold roll-sealing (spin-crimping)
Operational Availability Rate	≥ 98%
Tooling and Die Service Life	≥ 500,000 cycles (under standard operating conditions)
Grooving Tool Material	High-hardness wear-resistant imported alloy steel
Tool Infeed Guidance	High-precision linear motion guide rails
Operating Power Supply	220V AC / 50 Hz
Rated Power Consumption	0.2 kW (200 W)

Parameter	Specification (GC02)
External Dimensions (L × W × H)	300 mm × 240 mm × 570 mm
Net Equipment Weight	Approximately 40 kg
Structural Housing	Ergonomic geometric enclosure with protective powder-coated finish



Kintek Solution

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