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# Production Line For Intelligent Equipment **LITHIUM BATTERIES**

One-stop Solutions



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*Technological Progress  
Contributes to Social Development !!!*

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# COMPANY PROFILE

Mikrouna (Shanghai) Ind. Int. Tech. Co., Ltd.

Mikrouna is a German brand based on the concept of German business culture. The company is a high-tech enterprise that integrates research and development, production, and service. It is committed to providing customers with high-end intelligent equipment and services.

Our products include glove boxes for gas purification and automated production lines based on glove boxes. Their application fields include lithium battery preparation for various experimental research, perovskite and OLED photovoltaic cell preparation, isotope pharmaceuticals and nuclear applications.

By integrating the design, research and development resources, as well as production experience of Dongguan Fengyuan Lithium Battery Equipment Co., Ltd., and relying on more than 20 years of industrial experience and technological foundation, Mikrouna is committed to providing full-process solutions for trial line, pilot line, and large-scale production line of various solid and liquid lithium battery products through deep cooperation with domestic key university laboratories.

We have a professional product research and development team with over 100 technical personnel, including two researchers (professor-level senior engineers) and several senior engineers. We have a national major special research and development project and have tranformed multiple high-tech achievements. We have won several titles and certifications such as the high-tech enterprise certificate, certification of SRDI enterprises in Shanghai, China National Nuclear Corporation qualified supplier certificate, ISO9001, CE, UL, and other qualifications and certifications.

Mikrouna has established more than 20 service centers nationwide and R&D centers in Shanghai, Hubei, Shenyang, and Dongguan, and modern manufacturing factories in Shanghai and Hubei, with a complete production process chain. We can undertake the research and development, production, and manufacturing of various large and medium-sized customized automation equipment.

Mikrouna fully implements informatization management and have achieved large-scale standardized production of customized equipment relying on the ERP/PLM system to integrate the development of production management, supply chain management, quality management and other systems . Each product implements strict quality control, with full closed-loop traceability, ensuring timely and high-quality delivery and acceptance of equipment.

## MIKROUNA'S PRODUCTS FOLLOW STRICT GERMAN MANUFACTURING STANDARDS

### Company Mission

Technological progress contributes to social development

### Manufacturing Standards

German standards, nuclear standards

### Core Values

Fairness, Integrity, Technological Innovation, BrandStrategy, Social Responsibility, Abide by Laws and Regulations, and Teamwork



Mikrouna boasts 175 invention patents, utility model patents, and software copyrights, including 2 lithium battery equipment invention patents, 25 utility model patents, and 6 software copyrights.

# Solutions

Integrated Solution for Lithium Battery  
Intelligent Equipment



Process



Design



Production



Installation



After-sales Service

Provide you with a full-process equipment solution

# Products

Product Coverage > >

Dongguan Fengyuan Lithium Battery Research Institute of Mikrouna is mainly committed to providing customers with integrated solutions for intelligent production equipment of prismatic batteries, cylindrical batteries, pouch batteries, button batteries, lithium metal batteries, and solid-state batteries. So far, **we have a total of 15 successful cases, and 5 automated lithium battery production lines are under production.**

We can customize intelligent, high-precision, and highly stable new energy intelligent equipment according to customer requirements.

## Main product series

### Pouch Battery Preparation Equipment

It includes mixing, coating, rolling, cutting, stacking, welding, top-side sealing, baking, vacuum electrolyte injection, formation and grading, degassing and sealing, OCV test and sorting, etc

### Cylindrical Battery Preparation Equipment

It includes slitting, winding, testing, shell insertion, welding, grooving, electrolyte injection, sealing, sorting, etc

### Prismatic Battery Preparation Equipment

It includes mixing, coating, rolling, cutting, stacking, laser welding, helium leakage detection, baking, electrolyte injection, nail insertion, formation, nail removal, secondary electrolyte injection, upper sealing, laser pin welding, helium leakage detection, coating, thickness measurement, sorting, etc.

### Button Battery Preparation Equipment

It includes mixing, coating, drying, packaging, film coating, punching, etc

### Solid-state Battery Preparation Equipment

It includes sintering, crushing, screening, hot pressing, testing, packaging, etc.

### Lithium Battery Automation Equipment

It includes lithium battery production line, integrated supercapacitor baking and electrolyte injection machine, solid-state battery R&D experimental line, lithium battery automation production line, etc.

### Sodium Ion Battery Pilot Line

It includes automatic production line for sodium ion batteries

### Lithium Metal Preparation Equipment

It includes extruding machine, lithium strip winding mechanism, lithium-copper combination machine, calendaring machine, lithium ingot casting, etc.

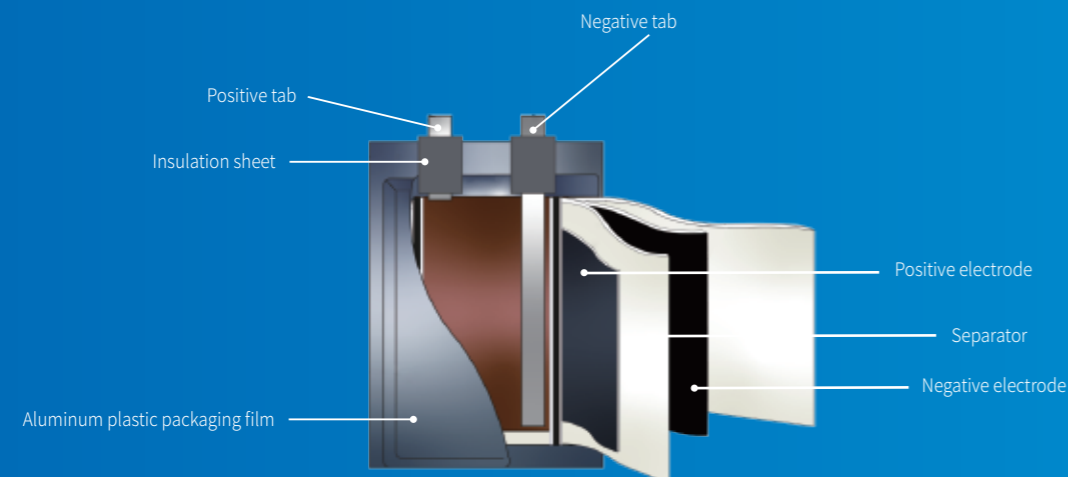
### Dry Electrode Production Equipment

It includes automatic dry film production line, powder rolling, film forming, combination, etc

# A. Pouch Battery Preparation Solution

## Introduction to Pouch Battery Production Process

The pouch battery trial line is a small-scale production line used for research, development, and testing of lithium-ion pouch batteries. The design purpose of the pilot line is to simulate the production process on a smaller scale, enabling battery manufacturers, researchers, and developers to test new materials, processes, and technologies before full-scale production.

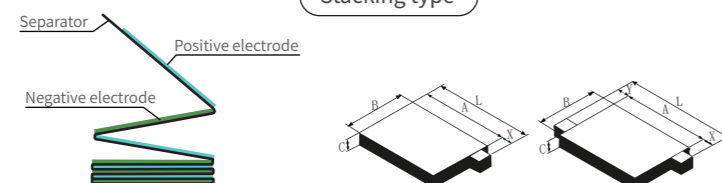


## Production Process of Pouch Batteries

### Winding type



### Stacking type



## Stacking Process of Pouch Battery

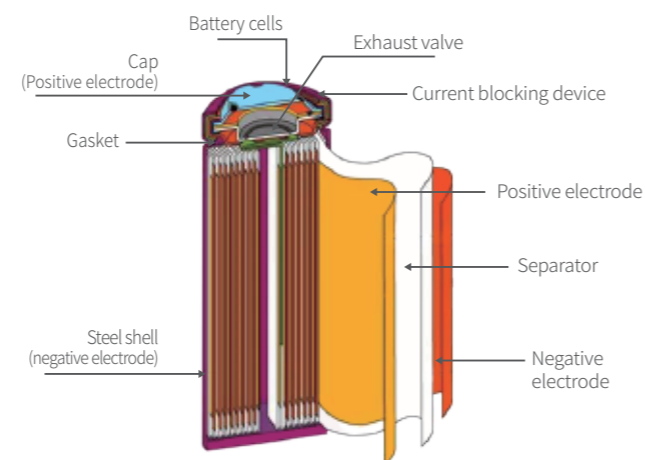


\*Customized winding and stacking process equipment

# B. Cylindrical Battery Preparation Solution

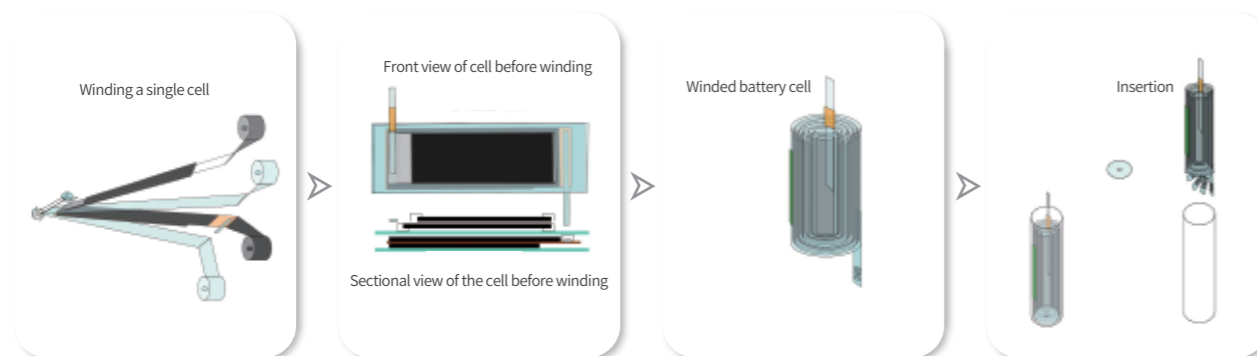
## Introduction to Cylindrical Battery Production Process

The earliest cylindrical lithium battery was the 18650 lithium battery invented by Japanese company SONY in 1992. Due to its long history, mature technology, and stable systematic quality, the 18650 cylindrical battery has a high market penetration rate. A typical cylindrical battery structure includes positive electrode cover, safety valve, PTC element, current cut-off mechanism, gasket, positive electrode, negative electrode, separator, and shell.



The cylindrical battery with lithium metal negative electrode adopts a mature winding process, with high automation, stable product quality, and relatively low cost. The consistency and stability of the produced cylindrical batteries have reached a high level. There are many models of **cylindrical batteries with lithium metal negative electrode**, such as common D-type and CR/ER type batteries.

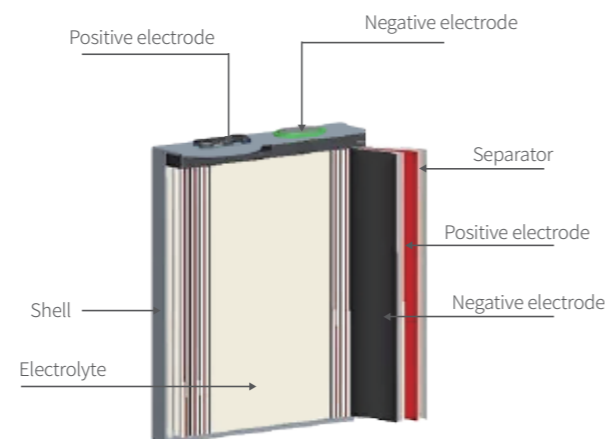
## Cylindrical Battery Production Process



# C Prismatic Battery Preparation Solution

## Introduction to Prismatic Battery Preparation Process

This solution plays a crucial role in driving the development of battery technology, improving battery performance, and ensuring the reliability of battery products in various industries and applications by testing, validating, and optimizing the prismatic battery cells before transitioning to mass production.



## Prismatic Battery Production Process



\*Customized winding and stacking process equipment



# D. Button Battery Preparation Solution

The button battery with lithium metal negative electrode mainly consists of the following parts: positive electrode shell, negative electrode shell, (positive/negative) electrodes, separator, gasket, spring piece, and electrolyte.

"C" in the commonly used button battery CR2032 indicates that the positive electrode is  $\text{MnO}_2$  and "B" in BR series means that the positive electrode is fluorinated carbon. "C" or "B" represents the button battery system, while "R" represents the battery's circular shape. The first two digits represent the diameter (in mm), and the last two digits represent the thickness (in 0.1 mm), the closer digits are chosen. For example, the approximate size of CR2032 battery is 20mm in diameter and 3.2mm in thickness.

## Button Battery Element

Button battery shell



Button battery gasket



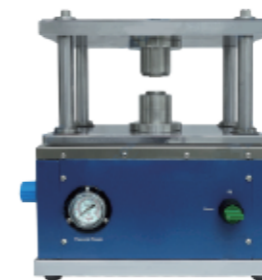
Button spring piece



Introduction to Button Battery Elements	
Parts	Introduction
Button battery shell	LIR2016, LIR2025, LIR2032, etc
Positive electrode	Generally, the coating is made of powdered lithium cobalt oxide, lithium iron phosphate, or lithium manganese oxide, and the current collector is a circular plate made of aluminum foil
Separator	The polyolefin film dominated by polyethylene and polypropylene
Negative electrode	A disc with metal lithium or graphite as coating and copper foil as current collector
Gaske	Metal circular plates ensure smooth and tight contact between the electrodes
Spring piece	It ensures that all parts of the battery are in good contact, usually spring pieces or foam nickel
Electrolyte	Organic solution of lithium hexafluorophosphate, etc

## Button Battery Equipment

Eco-friendly lithium batteries are the mainstream direction of battery development today, and the research and development of lithium battery materials and production processes are important foundations for the widespread application of this technology.

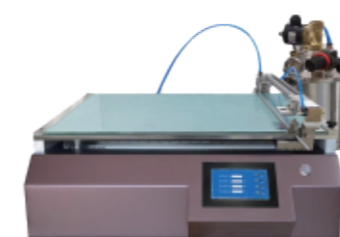


### Button battery packaging machine

Cylinder drives mold to seal button battery and the sealing pressure is controlled by manual valve

Small and lightweight, easy to be used in a glove box

Different molds help encapsulate and disassemble button batteries of different specifications, achieving multi-purpose use with one machine



### Button battery coating machine

- |                                 |                                 |
|---------------------------------|---------------------------------|
| High precision film applicator  | Stepless speed regulation       |
| Silent and vibration-free motor | Aluminum alloy/glass base plate |
| Touch screen control            | Controllable coating length     |



### Button battery punching machine

The upper punching die adopts high-precision slide rail guidance, with high punching accuracy and no burrs, burrs, or indentations

Small in size, easy to operate, flexible for use

The body is made of corrosion-resistant aluminum alloy material, with no rust

# E. Solid-state Battery Preparation Solution

Compared with lithium-ion batteries using liquid organic electrolytes, solid-state batteries have received high attention from researchers due to their high safety, high energy density, low manufacturing cost, and wide operating temperature range.

It can meet the evaluation and screening of solid-state battery materials, as well as the development and testing of finished battery cells.

It can be used for process validation to convert electrolytes from liquid to semi-solid and then to full solid state.

The verification and performance testing of various systems of solid-state batteries such as polymers, oxides, sulfides, and the preparation of lithium batteries can be achieved through the construction of dry clean rooms and glove boxes.

Mikrouna provides a complete solution for solid-state battery research, including a range of related equipment from chemical raw materials to testing.

## Preparation of solid electrolyte materials (ball milling, sintering, crushing, screening, etc.)

Ball milling



Sintering



Crushing



Screening



## Dry preparation of electrolyte film/electrodes (film preparation, coating, induction heating, etc.)

Film preparation



Coating



Induction heating



## Wet preparation of electrolyte film/electrodes (slurry production, coating, rolling, etc.)

Slurry production



Coating



Rolling



## Solid state battery assembly (lithium strip cutting, lithium metal stacking, hot pressing, tab welding, sealing, cold isostatic pressing, etc.)

Lithium strip cutting



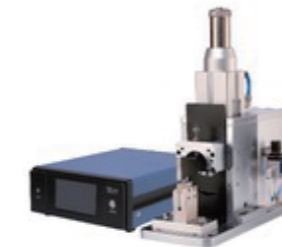
Lithium metal stacking



Hot pressing



Tab welding



Sealing



Cold isostatic pressing



## Battery testing (electrochemical station, internal resistance detector, charge and discharge tester, high and low temperature chamber, etc.)

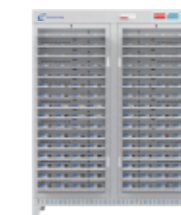
Electrochemical station



Internal resistance tester



Charge and discharge tester



High and low temperature chamber



# F. LITHIUM BATTERY AUTOMATION EQUIPMENT

The overall design and manufacturing of automated production lines are applied in industries such as consumer electronics, flexible displays, automobiles, intelligent home appliances, robots, energy conservation and environmental protection.

## Lithium battery production line



## Supercapacitor baking - electrolyte injection integrated machine



## Solid-state battery R&D experimental line



## Lithium battery automated production line

This production line can achieve fully automatic code scanning, electrolyte injection, weighing, liquid replenishment, and sealing in the super purification glove box, achieving completely unmanned and automatic production, greatly saving labor costs, improving production capacity, product quality and yield, and achieving profit growth for customers. This production line is a revolution in the production of lithium batteries/supercapacitors.



## Research equipment for lithium metal battery and solid-state battery

Integrated lithium metal filmmaking, lamination, welding, packaging, insulation testing, and vacuum injection sealing functions

The transition warehouse has a vacuum baking function

Control water oxygen below 1ppm

## Lithium metal negative electrode automatic forming machine



## Sodium ion battery automated production line

This production line can independently complete the operations of quantitative powder injection, tunnel furnace type segmented continuous high-temperature heating, quantitative electrolyte injection, automatic sealing welding, negative electrode heating, automatic sodium injection, and automatic vacuum welding of ring sealing end caps. Finally, it is sent out of the discharge bin through the transmission line. The entire production process achieves automatic transmission and production, making it a relatively complete and advanced automatic production line for sodium ion batteries.



# G. LITHIUM METAL PREPARATION EQUIPMENT

Lithium, the third element in the periodic table is the lightest metal element in nature. The lightweight nature of lithium enables the emergence of lithium magnesium alloys, a high-strength lightweight metal with excellent heat resistance, conductivity, and impact resistance. But unlike other important metals such as iron, copper, and aluminum that can be used as materials, lithium also plays multiple roles in energy and enjoys the reputation of being an "energy metal in 21st century".



## Extruding machine

Applied to the lithium extrusion process, it has an independent power mechanism and electrical system, and adopts button centralized control. The process action is controlled by a PLC controller, which can achieve two operation modes: inching and semi-automatic.

The switchable mold can adjust the width and thickness of the lithium strip after lithium ingot extrusion.

It is equipped with lithium strip winding function.



## Lithium ingot casting

Lithium alloy mixing

Fully sealed argon gas protection glove box

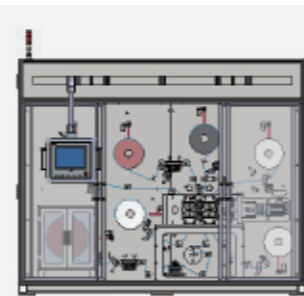
Casted into ingots



## Calendering machine

Lithium strip calendering

Winding, unwinding and release film forming



## Lithium/Copper Laminator

Lithium copper strip rolling combination and coiling

Low tension control

Realize the coiling of ultra-thin lithium strips

Lithium copper strip combination and coiling

# H. Dry Electrode Production Equipment

The dry film preparation technology avoids the use of any solvent in the preparation of lithium batteries, thus solving the following problems:

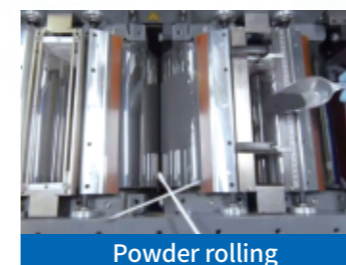
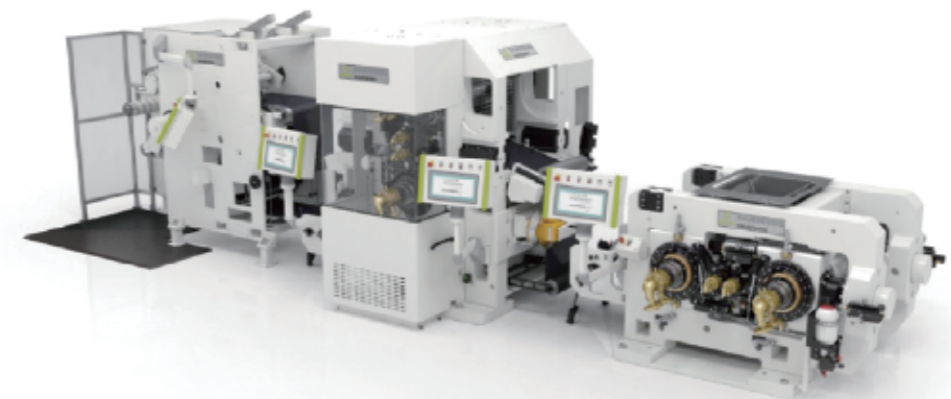
**Cost reduction:** Dry electrode technology saves solvents, as well as the cost of solvent evaporation, recovery, and drying equipment.

**Inhibition of layering:** Dry electrode technology does not use solvents during the mixing process of electrode components. Therefore, during the dry mixing process, due to the shear and friction of the mixer and particles, different components of the electrode material can be evenly distributed. Moreover, due to the absence of slurry during the dry mixing process, there is no longer electrode layering caused by solvent evaporation.

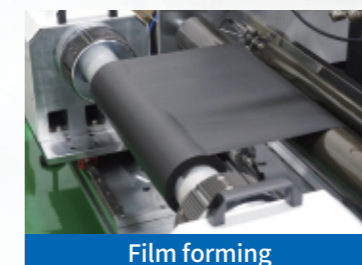
**No restrictions on electrode thickness:** dry film technology can easily control electrode thickness and uniformity of thick electrodes, without generating cracks. It has unique advantages in preparing thick electrodes.

**Compatible with sulfide solid-state electrolytes:** Dry film technology avoids the use of organic/polar solvents and only requires a small amount of adhesive during the film making process, making it particularly suitable for preparing sulfide all solid-state batteries. The dry film preparation technology is helpful in preparing solid-state sulfide electrolyte film and maintain its high ionic conductivity, as it does not involve the use of solvents that react with sulfide solid-state electrolyte.

## Automatic dry film production line



Powder rolling



Film forming



Combination

# 01 Double Planetary Mixer

Slurry Production

### Equipment features

Double axis planetary mixing, free of dead corners.

It is made of high-quality SUS304 stainless steel, resistant to acid and alkali corrosion.

Multiple speed operations can be carried out, and the mixing speed and time of each section can be set.

The automatic lifting function of the mixing tank allows for jog operation and smooth operation.

Equipped with slurry temperature detection function, real-time monitoring of slurry temperature.

Vacuum environment is conducive to effectively eliminating bubbles generated during the mixing process, and maintaining a good vacuum effect.



Technical parameters	
Power	Single phase AC220V $\pm$ 10% (customizable AC110V), frequency 50Hz/60Hz, power 1600W (including vacuum pump power 2350W)
Vacuum	Vacuum degree Max-0.095Mpa (pressure drop less than 5KPa within 8 hours), customer provides centralized vacuum source or optional vacuum pump
Operating environment	Recommended ambient temperature: 25 $\pm$ 3 $^{\circ}$ C, humidity: 30~90RH, no vibration or electromagnetic interference
Mixing propeller	Two twists frame mixing propeller, one dispersion plate and one scraper
Revolution speed	MAX.47rpm
Mixing speed	MAX.295rpm
Dispersion speed	MAX.1800rpm
Mixing time	0~9999min settable
Tank volume	Total volume 2.9L, maximum effective volume 2L (minimum mixing volume 350ml)
Tank size	internal diameter $\Phi$ 150mm * H165mm (with water jacket, optional with chiller and hot water bath)
Equipment size	L575mm * W345mm * H750mm (including handle L575mm * W545mm * H75

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 02 Extrusion Coating Machine

Electrode Coating

### Equipment features

The internal structure of the extrusion head is manufactured into a cavity based on fluid mechanics theory, ensuring uniform pressure at the extrusion seam.

Installation and adjustment: Convenient installation and disassembly, meeting the multi-directional adjustment of the coating process.

It adopts imported precision metering pumps for feeding, driven by precision servo motors to ensure accurate slurry flow rate.

The gap between the extrusion head and the steel roller is adjusted through full closed-loop control.



Technical parameters	
Width of base materials	Max.1200m
Coating speed	Max.100m/min
Coating method	Continuous, intermittent, zebra stripes
Drying method	Electric heating, steam heating, and oil heating
CPK	$\geq$ 1.33
Dimensional tolerance for coating width	$\pm$ 0.2mm
Misalignment tolerance of the front and back surfaces of the coating	$\pm$ 0.3mm
Fault rate	$\leq$ 1.0%
Winding alignment	$\leq$ 1mm

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 03 Continuous Roller Press

Electrode Rolling

## Functional description

**Suitable system:** Suitable for continuous, intermittent coating and longitudinal blank continuous rolling process of electrode plates in lithium batteries and supercapacitor systems

**Roll layout:** Two rolls are horizontally arranged up and down, and both rolls rotate at the same speed

**Adjustable range of roller gap:** 0-2mm, with consistent left and right gaps between the two rollers

**Rolling accuracy:**  $\pm 0.0025\text{mm}$  deviation in thickness behind the roller, ( $\pm 0.003\text{mm}$  deviation in thickness before the roller for electrodes)

**Working speed of the rolling mill:** 0~5r/min, stepless adjustable, and the upper and lower rolls have equal linear speed



Technical parameters	
Rolling method	Cold rolling/hot rolling
Coating thickness	60-250um
Width of base materials	Max1500mm
Roller width	Max1600mm
Roller diameter	$\phi 400-950\text{mm}$
Mechanical speed	Max 150m/min
Gap control	AGC servo control or wedge iron mechanism

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 04 Automatic Slitting Machine

Electrode Slitting

## Equipment features

The slitting adopts a gapless roller shear method, with a non-adjustable knife model and maximum output of eight

Imported electrical components are required; emergency stop switches are installed on the main operating side, and safety guards are installed on the feeding side

Install S78-100 adjustable shock-absorbing rubber pads on all four legs of the entire machine

Equipment spray coating color: warm gray IC according to international standard



Technical parameters	
Power	AC 220V/50Hz, Power 1KW
Discharge pallet	2mm stainless steel plate or customized according to customer requirements
Working method	Manual feeding
Maximum slitting width	400mm
Accuracy of slitting width	$< \pm 0.1\text{mm}$
Burr	$< 0.01\text{mm}$
Electrode thickness	0.08~0.2mm
Reducer noise	$< 60\text{ dB}$

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 05 Automatic Electrode Die-cutting Machine

Electrode Die-Cutting



### Equipment features

This machine adopts a microcomputer numerical control device, with the length, quantity, and feeding speed of slicing freely set, high accuracy, low loss, and machine design that conforms to ergonomic principles, making it easy to operate. It can be equipped with conveyor belts.

The use of lightweight carbon fiber rollers reduces the weight of the rollers from 2.8kg to 0.5kg, providing effective technical support for high-speed die-cutting.

Technical parameters			
Voltage	380V/50HZ (Three phases and four wires)	Power	5.5kw
Template area (die cutter outer frame)	760*450mm	Die-cutting range	400*700mm (Material width direction)
Maximum material width	750mm	Effective die-cutting area	720*400mm
Unwinding diameter	Max.500mm	Electrode forming accuracy	±0.2mm
Die cutting speed	0-30 times/minute (depending on the feeding length)	Color tracking sensing device	± 0.15mm (gap coating)
Pressure accuracy	0.03mm	Die cutting burr	≤0.02mm
Die cutter type	Laser die cutter	Waste collection	Automatic downward discharge

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 06 Automatic Stacking Machine

Stacking

### Equipment features

The positive and negative electrode grippers are separate to avoid mixing of positive and negative materials.

Active constant tension unwinding of the separator, with a path correction device.

The positive and negative electrode handling mechanisms are arranged independently and can be adjusted separately. They use soft suction nozzles and plastic guide pillars to prevent generation of metal chips.

The separator can be automatically cut by a resistance heating tube cutter to cut, and the separator incision is neat without wire drawing.

The device has an automatic adhesive application function, and after completing the adhesive application, the battery cells are automatically stacked.



Technical parameters	
Power	Single phase AC220V ± 10%, frequency 50Hz, power 5KW
Air source	0.5-0.8MPa compressed air
Vacuum source	The pressure is better than -40Kpa (the equipment comes with a vacuum generator)
Stacking type	Z-shaped stacking
Efficiency	About 1.0S to 2.0S/piece (depending on the size of the electrode)
Stacking accuracy	≤ ± 0.5mm (relative position size between electrodes, number of stacking layers is 21)
Separator roll diameter	Max.φ400mm

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 07 Aluminum Plastic Film Molding Machine

## Shell punching

### Equipment features

Rolled aluminum plastic film feeding, formed products stretch evenly, without any scratches, edges or corners

Driven by gas-liquid pressurized cylinder, adjustable molding pressure and molding speed

High-strength frame with upper and lower precise templates to ensure molding accuracy

The robotic arm automatically feeds the material, with minimized belt deviation and precise length cutting dimensions

The molded shape can be made according to customer requirements, and the equipment is equipped with a standard set of molds

PLC control, HMI operation, convenient and easy to use



# 08 Integrated Top-Side Sealing Machine

## Top-Side Sealing

### Equipment features

The pressure of double top-sealing and side-sealing can be adjusted separately

Operation displayed on a touch screen, controlled by an industrial computer

Double top-sealing and side-sealing can be carried out simultaneously, both soft and hard sealing can be used. The holding time or delay time of each cylinder can be adjusted

Four station disc mounting structure: double top-sealing, side-sealing with rotary disc structure

The temperature of the double top-sealing and side-sealing heads is controlled by a temperature control module, which can be operated on the touch screen

The sealing head structure adopts double linear guide rails, and high-strength S136 quenching treatment is used to connect the main body of the head. Tuning is available for parallel adjustment



Technical parameters	
Power	Single phase AC220V $\pm$ 10% (customizable AC110V), frequency 50Hz/60Hz, power 1.5KW
Air source	0.5-0.8MPa compressed air
Molding pressure	Max.3T (servo motor)
Film-pressing pressure	Max.30T (gas-liquid pressurized cylinder, 0.5Mpa) adjustable
Mold opening stroke	About 90 mm
Reference production capacity	150-200pcs/h, depending on the proficiency of the operator
Counting methods	Touch screen display

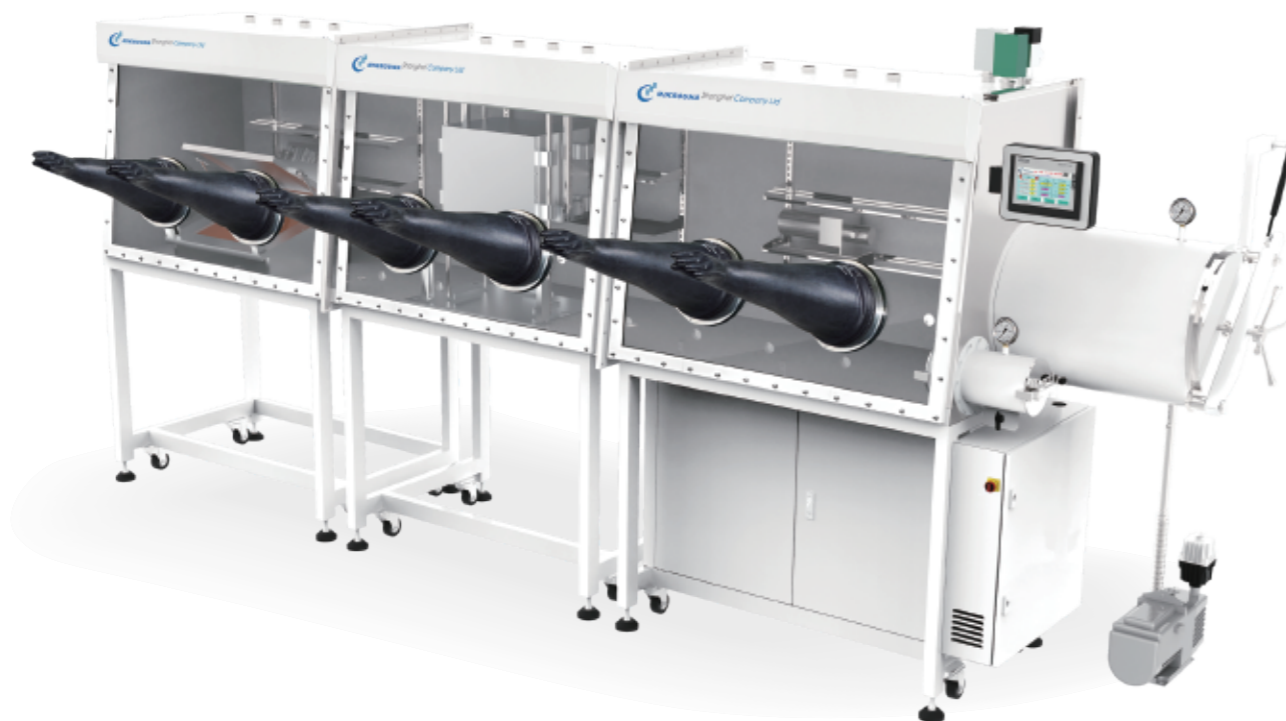
The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

Technical parameters	
Power	Single phase AC220V ( $\pm$ 10%), frequency 50Hz, power: approximately 2.5KW
Work efficiency	7-9PPM (note: sealing time $\leq$ 3 seconds)
Compressed air	$\geq$ 0.6MPa
Battery tray specifications	200 * 350mm (note: the replacement requires customized trays according to the cell size)
Heat sealing temperature	$\leq$ 250°C
Sealing time	Adjustable from 0s to 99s, 5s to 10s recommended
Front and rear sealing heads	Parallelism $\leq$ 0.03mm

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 09 Electrolyte Injection Sealing Equipment

Electrolyte Filling and Sealing in Glove Box

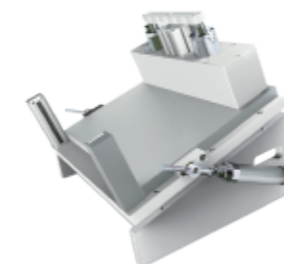


## Equipment features

- Baking, electrolyte injection, standing and sealing
- System integration, integrated control, easy operation
- Adjustable injection speed to prevent electrolyte splashing during injection
- Good sealing performance, no dripping or leakage
- The glove box adopts laser welding technology
- Water and oxygen content < 1PPM

## Glove box parts

### Vacuum pre-sealing machine

[>>>](#)


The sealing head positioning adopts 2 columns, is controlled by dual cylinders, with flexible movement and accurate guidance to ensure the parallelism requirements of the product after edge sealing

Vacuum degree can reach -0.99KPa, ensuring product sealing requirements

Working speed>300pcs/h

Adjustable hot pressing temperature (room temperature~250 ° C)

Adjustable heat sealing time (0-99.9 seconds)

Production capacity counting

High and low temperature alarm function

### Vacuum standing machine

[>>>](#)


The vacuum is maintained stably, with minimized decrease in vacuum degree

Function in multi stage circulation operation helps to achieve more complete electrolyte fusion

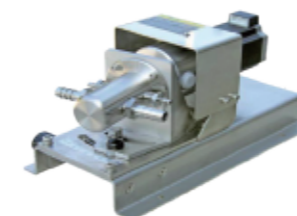
Adopting two columns and dual cylinder control, flexible movement, accurate guidance, ensuring the requirements of product sealing

Linear guide rail

Electromagnetic valve

Extreme vacuum: In the case of an empty box, the chamber vacuum pressure is less than 15Pa

### Electrolyte injection pump

[>>>](#)


Pouch battery vacuum direct injection, capable of achieving -85KPa vacuum injection

High precision  $\pm 0.5\%$ , high stability

Discharge pressure 0.3MPa

The flow rate is easy to adjust, with a single revolution output of 2.9ml/rev, revolution speed of 1-9 rev/s, and a flow rate of 26ml/s

Automatic cleaning to reduce pump jamming

### Heating chamber

[>>>](#)


Water and oxygen content can be controlled below 1PPM

The heating temperature of the transition chamber can be controlled and can reach 250 ° C

Cooling device installed at the flange

# 10 Hot Pressing Formation Machine

Formation

## Equipment features

Horizontal design with multi-channel stacking and flexible use

It can achieve multi stage heating and pressure conversion, and the temperature and pressure of each stage can be set independently

High precision chip heater with good temperature uniformity, long service life, and adjustable temperature

PLC control, HMI operation, with various alarm and protection functions

Special positive and negative tab wiring fixture design, with good and stable contact



Technical parameters	
Power	Three phases five wires AC380V ± 10%, frequency 50Hz, power approximately 23KW
Operating environment	Recommended ambient temperature is 25 ± 15 °C, relative humidity is 30%~75%, without strong electromagnetic field interference or corrosive gas erosion
Air source	0.5~0.8MPa
Tab method	Pouch battery with dual-end tabs
Pressure direction	Horizontal
Heating temperature	Room temperature+10 °C~90 °C, accuracy ± 4 °C (temperature difference between different layers within the same layer of fixture)
Temperature rise rate	Rise from room temperature to 80 °C in 20 minutes
Heating plate	About 200W/piece
Battery size	Customized according to customer battery cells
Formation equipment	Standard 5V6A battery tester, customizable according to customer requirements
Charging and discharging indicators	Constant current charging, constant voltage charging, constant current dreamsummit

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# 11 Energy Saving Feedback Grading Equipment

Grading

## Equipment features

The equipment is mainly composed of a computer, communication interfaces, and a battery formation and grading cabinet.

The battery formation and grading cabinet includes a thimble type fixture and a placement fixture board body; It consists of upper computer control software, middle computer control system (CPU) board, constant current and constant voltage source (lower computer), and key operation panel.

This device is a polymer series battery energy-saving feedback type grading cabinet, which adopts an automatic unclamping method when the motor is pressed down, effectively improving the clamping efficiency (the fixture can be customized according to the battery cell).



Technical parameters	
Workflow control method	Whole cabinet control
Maximum power output of the device	10KW
Fixture mode	Automatically unclamp by motor
Sampling inspection cycle	≤3s
Voltage measurement range	0-5V, resolution ratio 0.1mV
Battery voltage range	Charge: 0-4.5V, discharge: 4.5-1.8V
Voltage accuracy	±0.05%FS+0.05%RD
Current range	Charge 0005-3A, discharge 0.005-3A, resolution 0.1mA
Current accuracy	±0.05%FS+0.05%RD
Power efficiency	The charging and discharging power adopts energy-saving power supply, and the discharging energy of the power is fed back to the power grid.
Equipment calibration method	Software digital calibration (calibration tooling)
Thermal energy conversion efficiency of equipment working environment	Low

The appearance and configuration photos are just for your reference . Please refer to the contract for detailed information.

# Partners

## List of some partners



# Service Network



## 2 major manufacturing factories

We have manufacturing plants in Shanghai and Hubei, and service centers in Beijing, Guangzhou, Shenzhen, Dongguan, Xi'an, Zhengzhou, Wuhan, Nanjing, Fuzhou, Hangzhou, Ningbo, Changsha, Hefei, Chengdu, Kunming, Changchun, Tianjin, Jinan, Qingdao and Dalian.