



KATOP®

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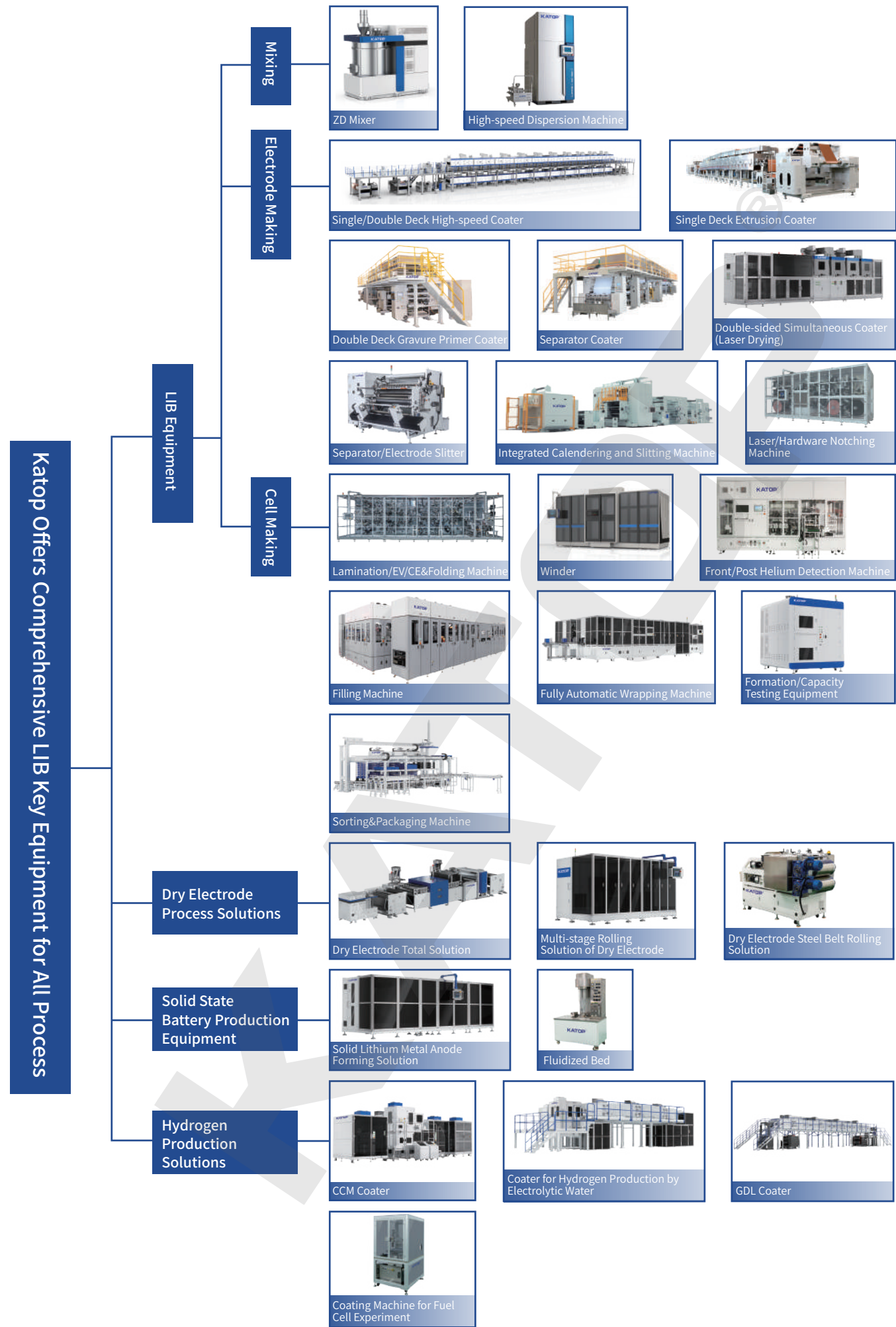
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KATOP®

**LIB Key
Equipment
Provider**



Jiangsu KATOP Automation Co., Ltd.

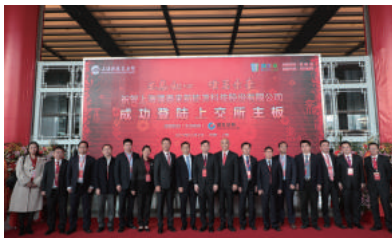


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Jiangsu KATOP (KATOP HQ)



PTL listed on Shanghai Stock Exchange



Signing the contract to build PTL South China Base



Sichuan KATOP completed and put into production



Jiangsu KATOP Automation Co., Ltd. founded

Company Profile

KATOP is a company dedicated to the R&D of innovative and effective production solutions for new energy industry. The company offers “Lab to Giga” turnkey solutions of LIB key equipment whether it’s for lab, pilot, small batch or for mass production.

The company currently has about 5,000 employees and multiple R&D/manufacturing facilities in Liyang, Wuxi, Yichun, Ningde, Shenzhen, Dongguan, Zhaoqing, Qionglai, Hong Kong SAR, Frankfurt. Meanwhile, KATOP also has service a network and partners in regions like South Korea, Japan, North America, India, etc.

In terms of technology, KATOP has witnessed and involved itself in the remarkable progress of the Chinese LIB industry from ground zero to high-speed development, during which valuable development and project experience is accumulated. As for solutions, apart from the featured series of coaters: double-sided simultaneous high speed coater, separator coater, gravure primer coater etc, KATOP also offers solutions for other key process like filling machine, formation, stacking, winding, slitting etc.

Corporate History

- 2005: Establish Shenzhen KATOP Automation Technology Co., Ltd.
- 2013: JoinPTL, Shenzhen KATOPAutomation Co.,Ltd. founded
- 2015: Jiangxi KATOP founded; exporting coater to Germany and developing overseas markets
- 2016: Ningde KATOP founded
- 2017: PTL listed on Shanghai Stock Exchange, Jiangsu KATOP founded
- 2019: Jiangsu KATOP as KATOP HQ
- 2020: Dongguan KATOP founded; KATOP Group integrates into 2 BUs+Strategic Product Dept.
- 2021: Contract signed to build PTL South China Base
- 2022: Sichuan KATOP and Dongguan KATOP Risheng founded
- 2023: Jiangsu KATOP Automation Co., Ltd. founded

Close Service

500+

Over 500 patents, utility model patents, and software copyrights

570,000 m²

Production and manufacturing base area

5,000+

Number of employees



| ZD Mixer



Product Overview

- The equipment is used for the mixing of LIB cathode and anode slurry

Product Parameters

Slurry mixing efficiency	40min/batch
Volume (effective volume)	MAX:12000L
Dispersion disk linear velocity	MAX:30m/s
Rotating speed of mixing drum	MAX:36r/min
Vacuum degree	2h≥-0.08Mpa
Cooling method	Water cooled/oil cooled

High-speed Dispersion Machine |



Product Overview

- It is a new-generation slurry making equipment based on thin-film, spin methodology for LIB and fuel cells featuring high dispersion efficiency and quality.

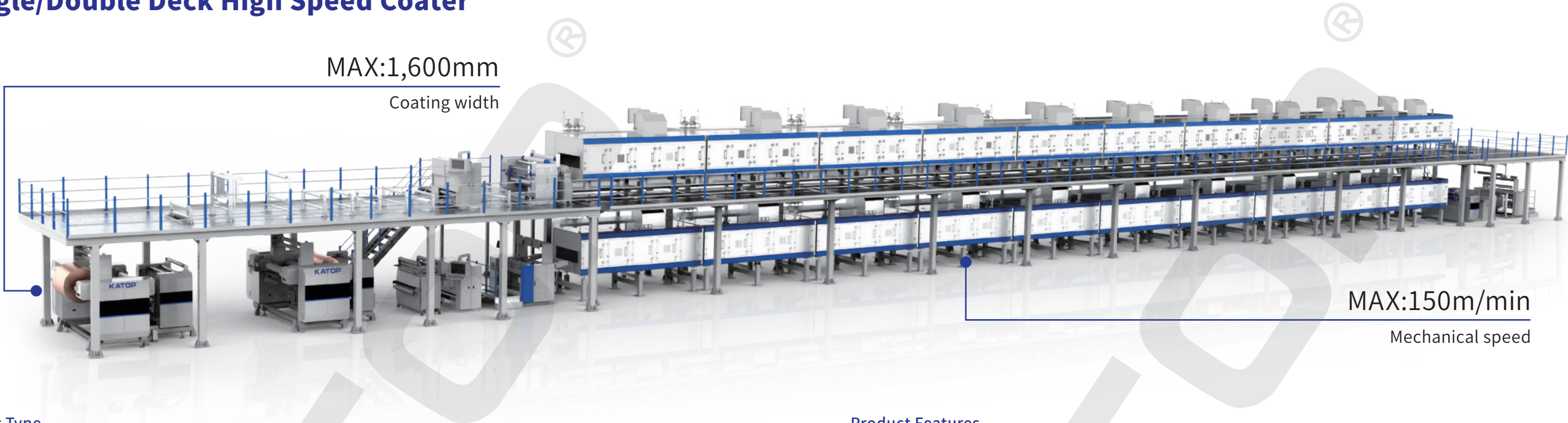
Product Features

- Compatible with continuous feeding and batch feeding
- Support timed dispersion and continuous dispersion
- Exchangeable rotor and convenient type change for different slurry types
- Real-time monitoring of the inlet and outlet temperature of the slurry, the pressure in the chamber and the operation conditions of the equipment
- Adopt sanitary SUS304 stainless steel for the parts in contact with slurry, easy to clean.

Product Parameters

Equipment type	KDHS-11L/H	KDHS-240L/H
Rotation speed	MAX:15,000 RPM	MAX:5,000 RPM
Processing capacity	MAX:11L/H	MAX:240L/H
Installed power	3.7KW	55KW
Linear velocity	≥40m/s	≥50m/s
Materials contacting liquid	SUS304 (standard) ceramic (optional)	

Single/Double Deck High Speed Coater



Product Type

Equipment Type	Dimension(L*W*H)	Substrate width (mm)	Dryer	Heating mode
KC-SD-800-50.50-A.A	76000*6000*6000	650	50	Heat transfer oil/steam
KC-SD-1000-50.50-A.A	76000*6200*6000	850	50	Heat transfer oil/steam
KC-SD-1200-60.60-A.A	86000*6500*6000	1050	60	Heat transfer oil/steam
KC-SD-1400-60.60-A.A	86000*7000*8500	1250	60	Heat transfer oil/steam
KC-SD-1600-60.60-A.A	86000*7400*8500	1450	60	Heat transfer oil/steam

Coating product parameters	Value
Coating method	Slot die
Coating width	MAX:1600mm
Coating speed	MAX:150m/min
Coating dimension accuracy	≤±0.3mm
Coating weight accuracy	±1%
Coating surface density	5~30mg/cm²
Substrate thickness	AL 9~20μm/Cu 4.5~20μm
Reel diameter/weight	MAX:Φ1200mm/3000kg

Equipment parameters	value
Mechanical speed	MAX:150m/min
Roller width	MAX:1600mm
Speed accuracy	≤0.05%
Coating roller circle run-out	≤1.5μm (Laser measurement)
Tension	30~500N/±2N
Dryer temperature	MAX:150°C/±2°C

Product Features

- **Intelligentization**
 - Closed-loop control of surface density
 - MES linkage
 - PC linkage
 - AGV linkage
 - CCD dimension closed-loop
 - Intelligent maintenance
 - Automatic cleaning of slot die
 - Modular bus control
- **Advanced Technology**
 - Compatible for both strip, cathode/anode electrode insulation coating process
 - Dual chamber slot die available for double-layer coating
 - Large-width substrate coating pre-cutting function (one divides into two)
- **Dryer**
 - Customized nozzle, air volume, air inlet and exhaust layout as per process
 - Steam, oil, infrared and other combined heating, featuring energy saving and high efficiency
 - Optimized design according to the simulation of wind and temperature field of dryer
 - Blast-proof safety design
- **Quality Monitoring**
 - Surface density measurement
 - Temperature measurement of electrode surface
 - Passive roller speed detection
 - NG marking
 - NMP concentration detection
 - Water content detection
 - CCD monitoring of dimension and appearance
 - Code scanning of incoming materials
- **Control Of Copper, Metal Dust**
 - Copper, zinc and nickel free design where contacting slurry and electrode
 - Anti-metal friction design of the whole machine
 - Cutter dedusting
 - Iron removal and filtration of slurry
 - Hot air/fresh air filtration
 - FFU dust compartment
- **Key Components**
 - Brand guarantee
 - Patented structure design, extended service life and convenient maintenance
 - Some parts are self-made to ensure quality and delivery on schedule

Single Deck Extrusion Coater



Product Type

Equipment type	Dimension(L*W*H)	Substrate width(mm)	Dryer	Heating mode
KC-SD-800-36-A.A	47000*3000*3100	700	36 (4m/section)	Electric/heat transfer oil/steam

Product Parameters

Coating product parameters	value	Equipment parameters	value
Coating method	Continuous slot die coating	Mechanical speed	MAX:50m/min
Coating width	MAX:650mm	Roller width	MAX:800mm
Coating speed	MAX:40m/min	Speed accuracy	≤0.3%
Coating dimension accuracy	≤±0.3mm	Coating roller circle run-out	≤1.5μm (Laser measurement)
Coating weight accuracy	±1%	tension	30~500N/±2N
Coating surface density	5~30mg/cm²	Dryer temperature	MAX:150°C/±2°C
Substrate thickness	AL 9~20μm/Cu 4.5~20μm		
Reel diameter/weight	MAX:Φ800mm/800kg		

Separator Coater



Product Type

Equipment type	Dimension(L*W*H)	Substrate width(mm)	Dryer	Heating mode
KC-CS-750-12-M.M	20000*2800*2900	650	12	Electric
KC-CS-1100-16.16-A.A	30000*3200*3500	1000	16	Electric/heat transfer oil/steam
KC-CS-1300-16.16-A.A	30000*3600*3500	1200	16	Electric/heat transfer oil/steam
KC-CS-1400-16.16-A.A	30000*3800*3500	1300	16	Electric/heat transfer oil/steam
KC-CS-1700-16.16-A.A	30000*4100*3500	1500	16	Electric/heat transfer oil/steam

Product Parameters

Coating product parameters	CCS value	PCS value
Coating method	Microgravure continuous coating	Rotating nozzle coating
Coating speed	MAX:120m/min	MAX:100m/min
Coating width		MAX:1500mm
Rewinding tension		3~5N
Coating thickness accuracy		±0.3μm
Single side dry film thickness		0.5~10μm
Substrate thickness		5~20μm
Reel diameter/weight		MAX:Φ400mm/100kg

| Double Deck Gravure Primer Coater



Product Features

- Suitable for LIB primer coating, support continuous, intermittent and zebra coating
- Tandem coating of two sides
- Support different coating forms by using gravure rollers with different patterns
- The diameter of the gravure roller ranges between D200~650 mm, suitable for the mainstream intermittent coating process in the industry
- Automatic displacement adjustment by servo motor of the front/rear/left/right
- Compact design with small footprint
- FFU dust-isolation compartment optional

Product Type

Equipment type	Dimension(L*W*H)	Substrate width(mm)	Dryer	Heating mode
KC-G-800-16.16-A.A	24000*4500*4000	650	16	Electric/heat transfer oil/steam
KC-G-1000-16.16-A.A	24000*4800*4000	800	16	Electric/heat transfer oil/steam
KC-G-1200-16.16-A.A	24000*5200*4000	1000	16	Electric/heat transfer oil/steam
KC-G-1400-16.16-A.A	24000*5700*5000	1200	16	Electric/heat transfer oil/steam
KC-G-1600-16.16-A.A	24000*6300*5000	1400	16	Electric/heat transfer oil/steam

Product Parameters

Coating product parameters	value	Equipment parameters	value
Coating method	Gravure intermittent/continuous coating	Equipment roller width	MAX:1600mm
Coating width	MAX:1500mm		
Coating speed	MAX:200m/min		
Coating dimension accuracy	≤±0.3mm	Tension range/accuracy	30~200N/±3N
Coating thickness accuracy	±0.3μm		
Single side dry film thickness	1~10μm		
Substrate thickness	AL 9~20μm/Cu 4.5~20μm	Maximum dryer temperature	MAX:120°C/±2°C
Reel diameter/weight	MAX:Φ1000mm/3000kg		

Laboratory Coater



Product Type

Model	Equipment type	Dimension(L*W*H)	Substrate width(mm)	Dryer	Heating mode
Laboratory extrusion coater	KC-SD-480-6-M.M	13000*2500*2500	400	6	Electric
Laboratory transfer coater	KC-M-480-6-M.M	8500*2300*2300	400	6	Electric
Multi-function laboratory coater	KC-LC-400-4.5-M.M	6000*2500*2500	300	4.5	Electric

(1) Laboratory transfer coater

Coating product parameters	value
Coating method	Transfer coating
Coating width	MAX:380mm
Coating speed	MAX:3m/min
Weight accuracy	±1.5%
Coating dimension accuracy	≤±0.5mm
Coating surface density	5~30mg/cm ²
Reel diameter/weight	MAX:Φ250mm/150kg

(2) Laboratory extrusion coating machine

Coating product parameters	value
Coating method	Slot die continuous/intermittent extrusion coating
Coating width	MAX:380mm
Coating speed	MAX:3m/min
Coating dimension accuracy	≤±0.3mm
Coating weight accuracy	±1.0%
Coating surface density	5~30mg/cm ²
Substrate thickness	AL 9~20μm/Cu 4.5~20μm
Reel diameter/weight	MAX:Φ600mm/500kg



(3) Multi-function laboratory coater

Coating product parameters	Extrusion coating parameter value	Microgravure coating parameter value
Coating method	Extrusion coating	Micro gravure coating
Coating width	MAX:300mm	MAX:300mm
Coating speed	MAX:3m/min	MAX:15m/min
Coating weight accuracy	±1%	±0.3μm
Coating surface density	5~30mg/cm ²	1~10μm
Reel diameter/weight	MAX:Φ350mm/100kg	MAX:Φ350mm/100kg

Product Features

- The laboratory coater features compact structure and various coating methods, which is widely used in laboratory coating research
- Saving slurry, simple operation and high safety

Separator Slitter



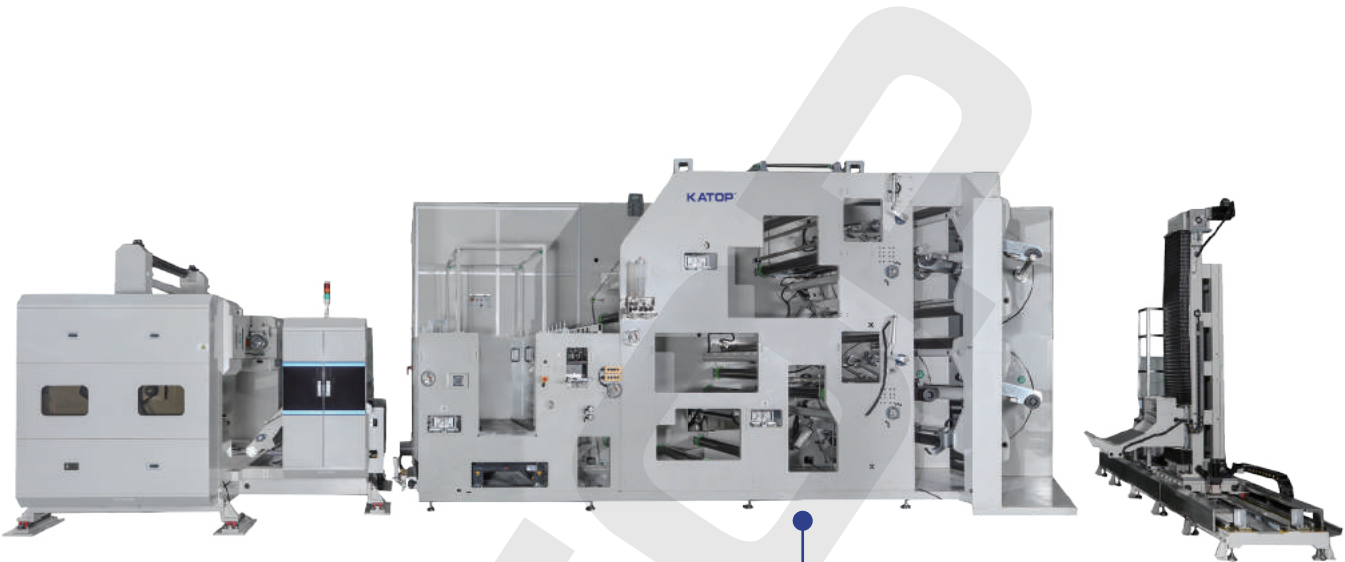
Product Features

- The equipment is used for the splitting of LIB separator
- Equipped with a spiral reciprocating device to collect leftover material, which can greatly reduce operation time of discharging leftover material and improve equipment OEE
- Upper straight cutter, lower straight cutter and round cutter switchable
- Adapt to different incoming separators, can be configured with CCD detection system to detect width and film surface defects online and can easily switch pressure rewinding and gap rewinding modes. Edge warping pressing device available

Product Parameters

Slitting speed	MAX:300m/min
Qualification rate	≥99%
Utilization rate	≥98%
Maximum unwinding diameter	850mm
Minimum slitter width	35mm
Unwinding correction accuracy	±0.2mm
Slitting width accuracy	±0.1mm

Electrode Slitter



Product Features

- Traditional round cutter and automatic cutter arrangement system can be installed
- Electronic cutter and hob are universal
- High slitting speed, maximum 100m/min
- The hob is driven separately, the radial runout of the lower cutter shaft ≤ 0.007mm, and the axial runout of the cutter shaft ≤ 0.005mm
- Easy to operate, user-friendly HMI, High slitting accuracy

Product Parameters

Slitting speed	MAX:100m/min
Qualification rate	≥99%
Utilization rate	≥98%
Maximum unwinding diameter	850mm
Minimum slitter width	35mm
Unwinding deviation correction accuracy	±0.2mm
Cutting width accuracy	±0.1mm
Slitting burr	Horizontal burr ≤ 8 μm, Vertical direction exceeds the foil surface ≤ 7μm

| Integrated Calendering and Slitting Machine



Product Parameters

Mechanical speed	MAX:120m/min
Calendering width	MAX:1400mm
Cold/hot roller	Optional
Roller specification	Φ900×1500mm
Roller no-load radial jump	≤±0.002mm
Thickness uniformity of electrode after rolling	≤±0.002mm
Main cylinder/bending cylinder pressure	700T/200T
Installation accuracy of roller	≤50μm
Slitting width accuracy	≤±0.3mm
Slitting burr	Longitudinal: ≤7μm; Horizontal: ≤14μm
Rewinding alignment	≤±0.5mm
Qualification rate	≥99.5%
Equipment failure rate	≤1%

Doule-side Simultaneous Coater (Laser Drying)



Product Overview

- The equipment is used for double-sided simultaneous coating process of wet electrode production line

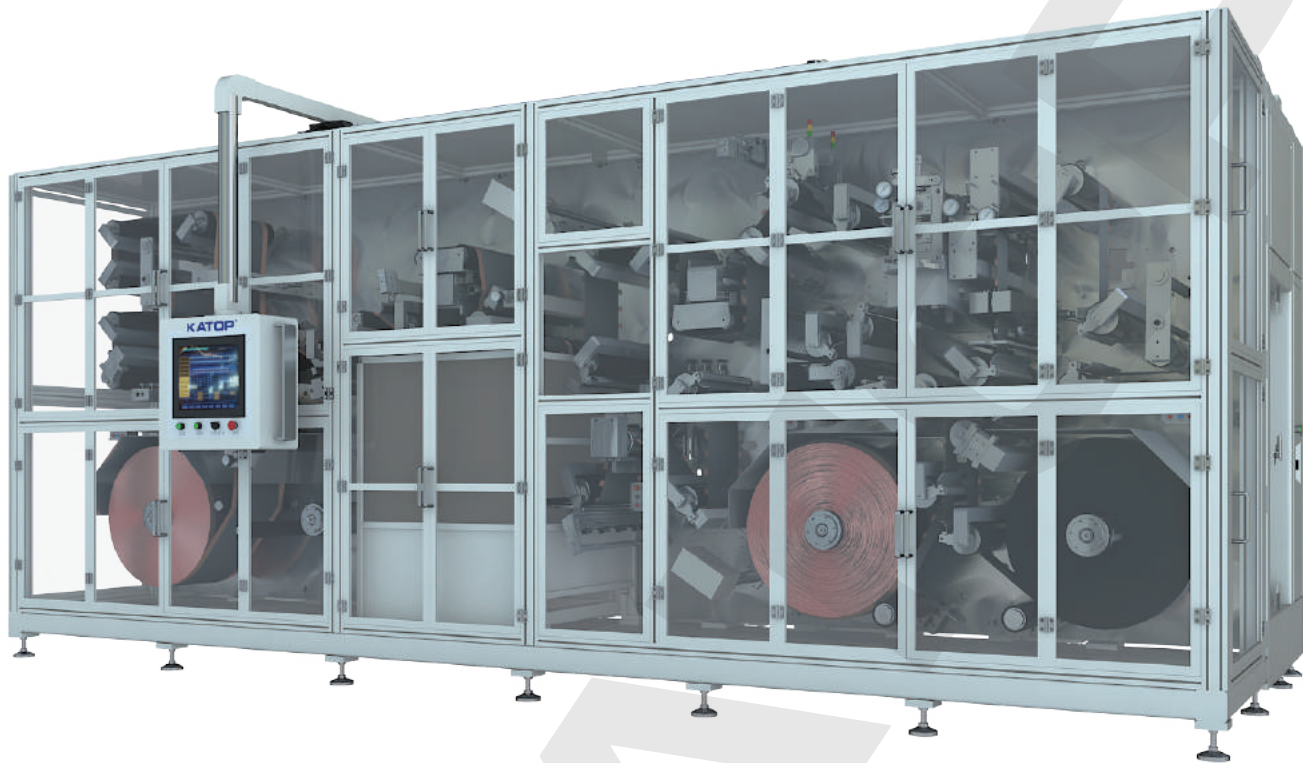
Product Features

- A&B side simultaneous coating at the same time, B side coating without back roller
- Laser heating and drying, extremely high output optical power density, up to 120w/cm²
- Four-section tension control. Independent tension control of side A&B coating
- Very high drying efficiency with small footprint

Product Parameters

Operation speed	MAX:15m/min
Roller width	800mm
Coating width	700mm
Air supply/exhaust volume	2400 Nm ³ /h
Dryer temperature	MAX:150℃

| Laser Notching Machine



Product Features

- Automatic cutting and forming of single/double sides of LIB electrode tab; automatic slitting; No consumables, fast speed and stable cutting quality
- Automatic tab spacing adjustment and tab model change as per process; Flexible notching of different spacing and shapes for different cells
- With electrode and rewinding dedusting removal during notching; CCD detection, photoelectric sensor detection, ionizing air knife dedusting
- With the function of cutting MARK holes (for winding process)
- With CCD detection and electrode buffer function; recalculate the starting position of incoming defective materials to save electrodes
- With function of dust removal and automatic waste edge compression and collection to prevent secondary pollution

Product Parameters

Electrode width range	200~600mm
Qualification rate	≥99.5%
Utilization rate	≥98%
Speed	MAX:120m/min
Electrode burr	≤10μm
Heat affected zone	≤80μm
Cutting dimension accuracy	±0.2mm

Hardware Notching Machine |



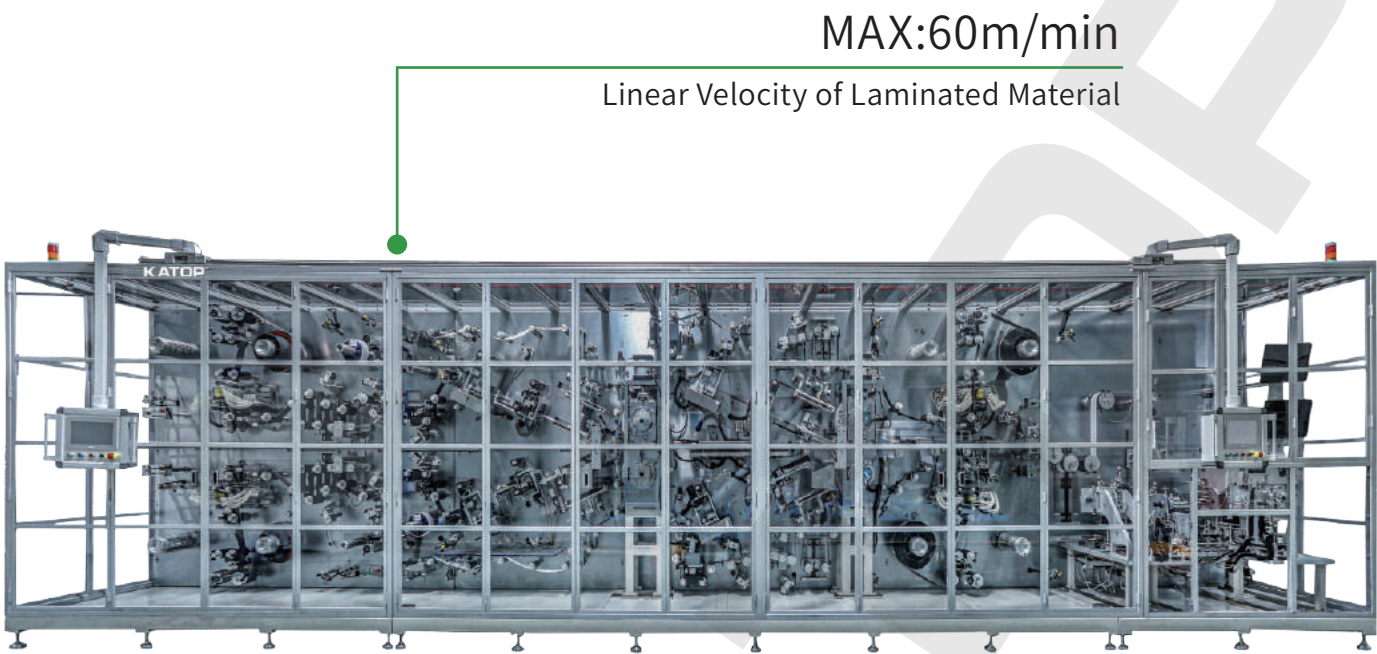
Product Features

- Automatic unwinding, splicing and EPC dedusting
- Tension control system to control electrode tension
- Automatic tab and chamfer forming with hardware mold
- CCD detects the appearance quality of both sides of the electrode
- Cut into pieces
- Dust removal treatment of upper and lower surface of electrode
- CCD detects electrode dimension
- Automatic rejection and collection of NG products
- Unloading of good products (material box/belt)

Product Parameters

Electrode width range	W: 100~200mm H: 150~300mm Chamfer: ≥ R2
Qualification rate	≥99.5%
Utilization rate	≥98%
Capacity	PPM≥220 (W=150mm)
Electrode dimension accuracy	±0.2mm
Electrode burr	≤10μm
Mold life	> 1, 000, 000 times
Mold change time	≤0.5h

Lamination&Folding Machine



Product Overview

- The equipment is used for lamination process
- It integrates the functions of unwinding, notching, cutting, lamination, stacking, taping and unloading
- CCD detects defects and tab dimension; CCD positioning accuracy: $\pm 0.05\text{mm}$
- Constant speed control of lamination section, stable tension of separator and electrode
- Replaceable tools, easy to change, and wide compatibility range

Product Features

- Integrating tab forming
- Automatic splicing, improving equipment OEE and efficiency
- IR, thickness, weight measurement, hot pressing function
- Seamless docking with AGV to achieve high automation

Product Parameters

Linear velocity of laminated material	MAX:60m/min
Qualification rate	$\geq 99\%$
Utilization rate	$\geq 98\%$
Capacity	$\leq 0.1\text{s/PCS}$
Adjacent electrode alignment	$\leq \pm 0.3\text{mm}$
Overall alignment	$\leq \pm 0.5\text{mm}$

Integrated EV cutting&stacking Machine



Product Overview

- The equipment is designed for the EV electrode making and stacking
- Electrode coil feeding, V-angle tab cutting, cutting to piece, dedusting, electrode feeding, separator unwinding, CCD positioning, tension correction, CCD detection, translational stacking, automatic collecting tail coil, automatic taping, automatic unloading etc.

Product Features

- Unique design: the equipment is highly integrated, combining electrode making and stacking
- Powerful software: stepless speed regulation, dynamic display of all devices, one-press type change
- Pioneering design: positioning the first separator to completely solve the first major defect in stacking production

Product Parameters

Overall dimension	13000x4800x2600mm
Qualification rate	$\geq 99\%$
Utilization rate	$\geq 98\%$
Single-station stacking speed	$\leq 0.55\text{s/pcs}$
Alignment accuracy of adjacent electrodes	$\pm 0.2\text{mm}$
Overall alignment accuracy of electrode	$\pm 0.3\text{mm}$
Separator end alignment accuracy	$\pm 0.3\text{mm}$
Auxiliary time	$\leq 8\text{s}$

| Integrated CE cutting&stacking Machine



0.5 s/pcs
Single-station stacking speed

Product Overview

- This equipment is mainly used for the cutting and stacking of CE cells
- Electrode coil feeding, electrode cutting, electrode positioning, separator unwinding, Z-type stacking, alignment detection, hot pressing, single side cathode stacking, unloading

Product Features

- High accuracy: Electrode alignment $\pm 0.15\text{mm}$, CPK>1.33
- Advantages: High equipment efficiency, strong stability, and high stacking accuracy

Product Parameters

Overall dimension(L*W*H)	12000*5000*2600mm
Qualification rate	$\geq 99\%$
Utilization rate	$\geq 98\%$
Single-station stacking speed	0.5 s/pcs
Alignment accuracy of electrode	$\pm 0.15\text{mm}$
Adapt to different cell size ranges	L:50~150mm W:30~120mm T:3~8mm

Winder |



Product Overview

- This equipment is mainly used for the automatic winding of prismatic EV cells
- Main functions: active unwinding, automatic coil changing, servo closed-loop low tension measurement and control system, EPC correction, snake-shaped correction, linear correction of feeding clamping, FFU and dedusting system, electrode protection taping, automatic removal of incoming defects, tab folding detection, online detection of electrode defects, online detection of CCD alignment, cell clamping and unloading, pre-pressing and cold pressing, code scanning weighing and data tracing system

Product Features

- With the patent of independent polygonal winding pin, which can realize circular winding
- With multi-level high-accuracy correction system; accurately detects the alignment of the opposite side through CCD, which can better achieve the alignment control between the electrode and the separator, reduce the overhang defect, and improve the yield rate

Product Parameters

Overall dimension(L*W*H)	6200*2600*2610mm
Qualification rate	$\geq 99\%$
Utilization rate	$\geq 98\%$
Winding speed	$\geq 3.5\text{m/s}$
Tension fluctuation	$\leq \pm 5\%$ electrode $\leq \pm 2\%$ separator
PPM	PPM ≥ 10 (Designed capacity PPM ≥ 20)
Alignment control	$\leq \pm 0.3\text{mm}$

Front/Post Helium Detection Equipment

Filling Machine



MAX:45PPM
Capacity

Product Overview

- The equipment is used for air tightness test of aluminum power cell after welding and before filling
- Feeding mode: two cells as a group
- Data acquisition system: acquire and save the corresponding traceability record of each product simultaneously, bind it with the cell barcode, generate .csv file and save it in the designated folder of the IPC to access by Party A's information management system

Product Features

- Stable helium injection with low misjudgment rate
- Well designed fixture inside the chamber enables rapid type change and strong compatibility
- With large leakage detection function to reduce helium consumption and chamber cleaning frequency
- Equipped with helium recovery port to improve helium utilization rate

Product Parameters

Overall dimension(L*W*H)	6000*2700*2500mm
Qualification rate	≥99%
Utilization rate	≥98%
Weight	6500kg
Electrical supply	AC220V 1KW
Capacity	PPM≥20
Compatibility range	T:12.5~17.5mm W: 120~148mm H: 63.5~95mm
Technical parameter	Battery leakage rate 9.9 x 10 ⁻⁶ mPa. m/s

Product Features

- High-efficiency isobaric filling machine, efficiency improvement>40%, reducing 30%~50% of aging time. Reducing high temperature aging time and the volume of 2nd filling
- The equipment is mainly used for the filling of prismatic cell, which can realize automatic code scanning, weighing before and after filling, Hi-pot test, vacuum filling (quantitative/variable), wiping, nail insertion etc.

Product Parameters

Capacity	MAX:45PPM
Filling accuracy	≤ ±0.6% (filling volume1400g)
Filling volume CMK	≥1.67
Filling method	Efficient isobaric
Qualification rate	≥99.8%
Utilization rate	≥98%
Positive pressure	0~1.5MPa
Vacuum pressure	≤-95Kpa
Weighing system accuracy	± 0.1g (maximum range 10kg)

Fully Automatic Wrapping Machine



Product Overview

- The equipment is used for U-shaped or zigzag wrapping of prismatic cell on wide and narrow sides, and insulation test to improve battery safety

Product Features

- Unique design: unique blue film correction&tension control device design to ensure the wrapping accuracy
- The convex design of the film pressing roller prevents the NG film wrapping caused by the battery bulging
- Fool-proof safety: all areas that may contact the battery are insulated, and the manipulator has fool-proof function

Product Parameters

Overall dimension(L*W*H)	10300*4500*2500mm
Qualification rate	≥99%
Utilization rate	≥98%
Capacity	PPM≥15
CMK	≥1.67
Positioning accuracy (X, Y, Z axis)	±0.1mm
Test over-kill rate	≤0.1%

Unwinding Dryer



Product Features

- The equipment mainly composes of unwinding, EPC, tension control, dryer, cooler and rewinding devices
- Electrode passes by hot oil roller and is dried quickly after contact to meet the requirements of water content
- Appearance quality: No wrinkle, no damage, and no folding of electrodes

Product Parameters

Water content	Cathode PPM<400, Anode PPM<300
Rewinding alignment	±1mm
Maximum reel diameter/weight	≤Φ700mm/800kg
Foil speed	MAX:100m/min
Dryer foil length	Hot roller contact ≥ 5m, Dryer area ≥ 10m
Hot air temperature	MAX:230℃
Hot roller temperature	MAX:250℃

Formation/Capacity Testing Equipment



Standard Configuration

- Energy recovery power supply
- Knurled probe
- Automatic smoke exhaust and drainage system
- Fire sprinkler system
- Vacuuming system
- Automatic calibration tooling
- Smoke temperature detection system
- Production control system

Optional Configuration

- Compression tray
- Water-air integrated spray system
- High-temperature thermostatic cabinet
- Other tooling: vacuum detection tooling, temperature calibration tooling, nozzle removing and installing tooling etc
- Convenient knurling probe

Product Features

- Energy recovery function, energy saving and environment-friendly
- Fast response and high detection accuracy
- Automatic fire protection, safe production
- Automatic smoke exhaust and drainage system, low pollution
- Real-time adjustable compensation of negative pressure, stable and accurate negative pressure control
- High accuracy temperature acquisition, constant temperature control system, good temperature uniformity
- Automatic calibration design, long calibration cycle
- Abnormality real-time monitoring: contact impedance, polarity, temperature, smoke, voltage, current, etc
- Compatible with various battery types and dimensions, easy to replace
- Modular design, convenient maintenance and non-stop maintenance
- Interaction with MES information, local data saving function

Power supply specification	Series power supply	Parallel power supply
Voltage specification	5V	120V/160V/240V/320V 480V/640V/720V
Current specification (customizable)	3A/6A/12A/30A/60A/120A 150A/200A/400A/500A	60A/120A/200A
Number of channels	1	24/32/48/64/96/128/144
Current/voltage accuracy	±0.05% FS	
Channel features	<ul style="list-style-type: none">• Single channel control/multi-channel control/complete machine control• Energy recovery type, energy saving and environment friendly	<ul style="list-style-type: none">• Adopt composite series charging and discharging technology. The discharged energy can be fed back to the power grid, and can be used in the DCDC internal network. Compared with the conventional feed-back equipment, the energy saving ≥ 20%• DC micro-grid bus system, high charging and discharging efficiency of the whole equipment• With CV charging and discharging mode, single channel switching function
Charge-discharge voltage range	0mV~5000mV	
Charging mode	CC charging, CV charging,CCCV charging	
Maximum charging efficiency of power module	≥80%	≥90%
Charging cut-off conditions	Voltage, current, time, capacity, temperature, voltage difference, etc	
Discharging mode	CC discharging, CV discharging	
Maximum discharge efficiency of power module	≥75%	≥85%
Discharge cut-off conditions	Voltage, current, time, capacity, temperature	
Maximum feedback efficiency of the system	≥70%	≥80%
Current response time	≤20ms	≤40ms
Data recording time	>1S	
Editable work steps	256	
Power factor	>0.98 (full load)	
Protection function	Power-off data protection, power-off pause continuation, over-charge and over-discharge protection, over-current and under-current protection, capacity protection, over-temperature protection, current fluctuation abnormal protection, charging voltage rise abnormal protection, discharge voltage drop abnormal protection, island effect protection, power module over-high temperature protection, battery reverse connection, poor crimping contact detection, bypass protection, etc	

| Sorting & Packaging Machine



Product Overview

- The equipment is mainly used for the grading& packaging of prismatic cells through robot and barcode scanning
- It also comes with functions of code scanning detection, information binding to QR code, automatic photo taking before the battery is put into the plastic tray, and placing NG cells into NG slot for manual processing

Product Features

- High space efficiency and small footprint
- Highly reliable anti dropping structure, effectively preventing battery dropping and short circuit
- Short Z-axis stroke featuring high pick&place efficiency
- Equipment efficiency scaleable

Product Parameters

Overall dimension(L*W*H)	6000*3500*2300mm
Qualification rate	≥99%
Utilization rate	≥95%
Weight	5000kg
Capacity	PPM≥15
Compatibility range	T:12.5~17.5mm W:120~148mm H:63.5~95mm

Dry Electrode Total Solution



Product Overview

- The equipment is used for dry electrode making
- Realize uniform mixing and material fibrosis through dry mixing equipment
- It can realize uniform feeding and continuous film forming
- The separator is thinned and compounded at a uniform rate to ensure the thickness and consistency of the film

Product Features

- Integrated powder processing, feeding and conveying, film forming, two-stage thinning, and current collector lamination
- Whole line solution, continuous film forming, improving equipment continuity
- Slurry saving, easy operation and high safety
- Realize uniform mixing and material fibrosis through dry mixing equipment

Product Parameters

Mechanical speed	MAX:15m/min
Operation speed	MAX:10m/min
Rolling thickness accuracy	±2μm
Roller width	500mm
Pressure	10~50T
Minimum tension	4N

| Multi-stage Rolling Solution of Dry Electrode



Product Overview

- The equipment is used for double-sided lamination process of cathode and anode electrode after hot-pressing and thinning with foil
- It integrates functions such as thinning, lamination and winding
- Realize double-sided lamination at the same time

Product Features

- Realize continuous thinning and lamination of film
- Ensure the film is thinned and laminated without any disconnection, and ensure the thickness uniformity of $\pm 2\mu\text{m}$
- Tension, pressure and temperature are controllable to reduce the risk of disconnection

Product Parameters

Mechanical speed	MAX:15m/min
Operation speed	MAX:5m/min
Film thickness	$\geq 70\mu\text{m}$
Rolling thickness accuracy	$\pm 2\mu\text{m}$
Roller width	400mm
Film width	300mm

Dry Electrode Steel Belt Rolling Solution |



Product Overview

- The equipment is used for hot-pressing film forming process of cathode and anode powder and bulk material of LIB
- Integration of film forming, conveying, rewinding, trimming and other functions
- Realize continuous film forming

Product Features

- Solve the problem of continuous material transportation and multiple rolling, and realize continuous film forming
- Adjustable temperature and pressure

Product Parameters

Mechanical speed	MAX:15m/min
Operation speed	MAX:5m/min
Film thickness	1~5mm
Rolling thickness accuracy	$\pm 0.5\text{mm}$
Roller width	500mm
Film width	300mm

Roll-to-Roll



Product Overview

- It is used to realize the film formation and thinning of dry electrode powder

Product Features

- The equipment is sophisticated, and the equipment placement is not limited by the venue
- The operation is convenient and meets the operational needs of the glove box
- The double rollers are driven independently to realize the flexible operation of the equipment

Product Parameters

Mechanical speed	MAX:1.5m/min
Roller diameter	96mm
Roller width	200mm
Effective roll width	120mm
Operating temperature	≤200℃
Rolling pressure	1T on one side, 2T in total,Display accuracy 0.1%
Calendering thickness accuracy	±10μm

Soild Lithium Metal Anode Forming Solution



Product Overview

- The equipment is used for lithium strip calendering and lamination

Product Features

- Support simultaneous film thinning, trimming, and single/double sided lithium lamination
- One lithium strip into two
- The calendering area can be filled with carbon dioxide and other pretreated gases

Product Parameters

Mechanical speed	MAX:10m/min
Operation speed	MAX:3m/min
Roller width	450mm
Film width	300mm
Roller surface temperature	15℃~100℃
Rolling thickness accuracy	±2μm

Fluidized Bed



Product Overview

- The equipment suspends the powder materials in the reaction vessel through air blast, which can fully mix the materials, or achieve the effect of coating or granulation by atomizing the coating solvent

Product Features

- Adopt unique rotating disc with blades. One equipment can be used for mixing, granulation, coating and other processes
- Affected by the rotating compaction of the blades and rotors in the fluidized bed, and affected by the flow drying of hot air at the periphery, it can granulate and coat the powder with strong adhesion and agglutination that is difficult to be processed by other equipment

Product Parameters

Processing capacity	1L
Air volume	MAX:2m³/min
Temperature	80℃
Motor speed	MAX:800r/min
Air consumption	15m³/H
Electric heater	1.3KW 220V

CCM Coater (Cathode)



Product Overview

- The equipment is used for CCM film coating of fuel cell
- Equipped with online dimension, alignment and defect detection, platinum load detection, combined mode intermittent control solution

Product Features

- Adopt extrusion direct coating method to improve coating efficiency and slurry utilization
- Can realize zebra coating, intermittent coating and continuous coating
- It can be used from low to high viscosity slurry

Product Parameters

Coating speed	MAX:5m/min
Coating width	MAX:300mm
Coating dimension accuracy	±1mm
Applicable substrate thickness	58~100 μm (including back film)
Deviation of coating dry film thickness	±0.5μm
Maximum dryer temperature	MAX:130℃
Temperature control accuracy of single section of dryer	±3℃

CCM Coater (Anode)



Product Overview

- The equipment is used for CCM electrode coating of fuel cell
- Equipped with online dimension, alignment and defect detection, platinum load detection, combined mode intermittent control solution

Product Features

- Adopt extrusion direct coating method to improve coating efficiency and slurry utilization
- Can realize zebra coating, intermittent coating and continuous coating
- It can be used from low to high viscosity slurry

Product Parameters

Coating speed	MAX:3m/min
Coating width	MAX:300mm
Coating dimension accuracy	±1mm
Applicable substrate thickness	50~200 μm (including back film)
Deviation of coating dry film thickness	±5%
Coating alignment on two sides	±1mm
Maximum heating temperature	MAX:60°C

Coater for Hydrogen Production by Electrolytic Water



Product Overview

- Applicable for the coating of electrode for PEM electrolytic water hydrogen production
- Fully automatic film ripping and covering

Product Features

- Zebra coating, intermittent coating and continuous coating by slot die
- Equipped with online dimension, alignment and defect detection, platinum load detection

Product Parameters

Coating width	MAX:600mm
Coating speed	MAX:5m/min
Coating dimension accuracy	±1mm
Applicable substrate thickness	50~180 μm (excluding back film)
Maximum dryer temperature	MAX:150°C
Temperature control accuracy of single section of dryer	±3°C

GDL Coater



Product Overview

- Applicable to GDL carbon paper coating process, integrating unwinding, coating, drying, traction and rewinding
- Cylinder open-top dryer and film threading operation platform are convenient
- Operation of auxiliary threading device and can realize high-temperature threading operation

Product Features

- Continuous coating through slot die extrusion/scrapper
- Adopt drive rollers in the dryer to reduce material tension and deformation
- Multi-stage tension control, temperature control
- Automatic metering and speed control device
- EPC correction

Product Parameters

Coating width	Customized
Coating speed	MAX:5m/min
Coating width accuracy	±1mm
Coating wet film thickness	20~150μm
Maximum heating temperature of drying section	MAX:200℃
Maximum heating temperature of dryer in sintering section	MAX:360℃

Coater for Fuel Cell Experiment



Product Overview

- The equipment is used for fuel cell process validation and slurry formula parameter adjustment
- The equipment is of high operation accuracy. The speed fluctuation of X-axis is 5 %, and the positioning accuracy of Z-axis is 5 μm
- Good coating and operation stability, and operating speed is kept within 0.5% at low speed.
- Low power consumption, 3kW, compatible with different slurries

Product Features

- Slurry saving, easy operation and high safety
- Compact structure design and small floor area

Product Parameters

Coating speed	MAX:0.6m/min
Coating speed accuracy	5‰
Coating wet film thickness range	30~100μm
Deviation of coating dry film thickness	± 10% (platinum load Pt)
Coating method	Slot die extrusion coating
Mechanical operation speed	MAX:12m/min

Contact KATOP®

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