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Pragmatism and Truthfulness/Professional Innovation/People-oriented/Pursuit of Excellence

MACHINE-X

浙江御辰东智能科技有限公司
MACHINEXTECH CORPORATION LIMITED

新能源核心装备解决方案

NEW ENERGY CORE EQUIPMENT SOLUTIONS

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MACHINE-X

技术创新 驱动全球新能源装备发展

Through technological innovation, we lead the world in the development of new energy equipment

目录 CONTENT

01 COMPANY PROFILE 企业简介

浙江御辰东智能科技有限公司，专注于新能源核心装备的设计、开发、制造与应用。公司位于张江长三角科技城平湖园区，一期占地30,000平方米，含加工、制造、装配工厂及研发实验室。二期规划占地154亩，总投资15亿元，目标产值80亿元。

凭借深厚的材料处理工艺知识和技术储备，御辰东在锂电电极制备等领域取得显著成就，并拓展至钙钛矿光伏及扁线电机等新能源领域。公司秉持技术创新与跨行业应用理念，致力于为全球提供高效、可持续的新能源装备解决方案，推动新能源行业发展，构建清洁绿色未来。

新能源设备
New energy equipment

设计 / 开发
Design/Development

制造 / 应用
Manufacturing/Application

Specialized in the design, development, manufacturing and application of new energy equipment, Machine X is located in Zhangjiang Yangtze River Delta Science and Technology City. The phase I plant covers an area of 30,000 square meters and includes machining, manufacturing, assembly sections and R&D labs. The phase II plant is planned for 154 acres, with a total investment of 1.5 billion RMB and a target production value of 8 billion RMB.

With profound knowledge of in processing different material and knowhows accumulation, Machine X has made remarkable achievements in areas such as lithium-ion equipment. In addition, we have expanded our business to other new energy fields, such as photovoltaic and hairpin motors, etc...With the concept of technological innovation and cross-industry application, we are committed to offering new energy equipment solutions in an efficient and sustainable way to our clients across the globe, faster our pace in energy transition and shaping a greener world.

核心价值观： 务实求真，专业创新，以人为本，追求卓越
Core values： Pragmatism and Truthfulness/Professional Innovation/People-oriented/Pursuit of Excellence

使命： 持续为客户创造最大的价值
Mission： Continuously maximize value for our customers

愿景： 技术创新驱动全球新能源装备发展
Vision: Technological innovation drives global new energy equipment development

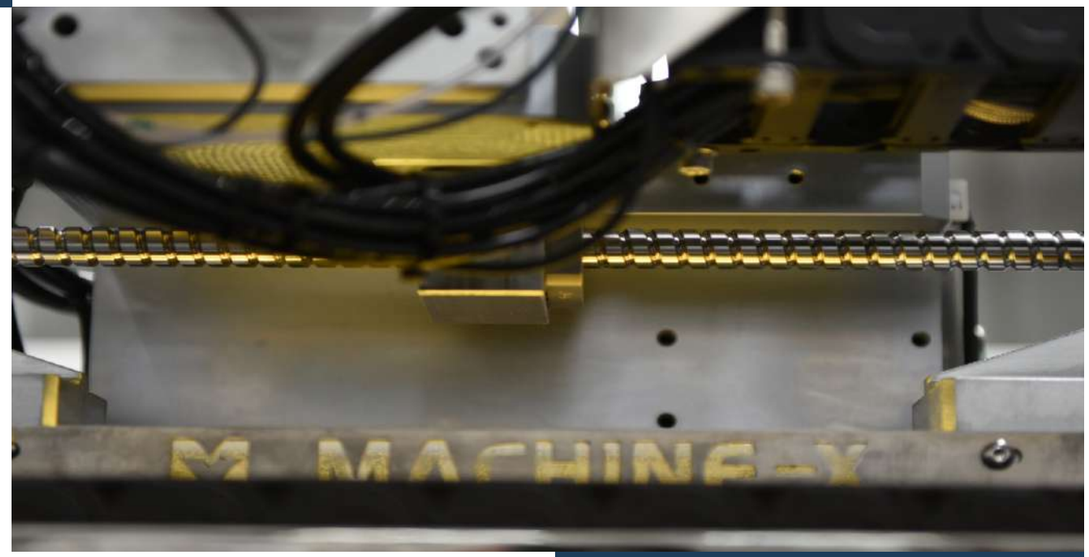
MACHINE-X

持续为客户 创造最大的价值
Continuously maximize value for our customers

02

Core Technologies and Applications

核心技术与应用



核心技术与应用

Core technologies and applications

多元化材料处理

拥有全面的材料处理能力，涵盖从各类锂电材料到钙钛矿光伏等先进材料，以及各类有机及无机体系的材料处理能力。我们的技术不仅局限于处理特定类型的材料，而是覆盖了一系列具有挑战性的新能源材料的新型处理方式。

高效的材料制备工艺

我们的制备工艺在提高材料性能方面起到了关键作用。通过精准的混合、涂覆或干燥、检验等技术，我们能够大幅提高材料制备的一致性和质量。

创新的研发能力

不断进行技术创新和优化，以适应新材料和新应用的需求。在自研测试平台上，我们的研发团队在各类材料的应用和处理技术上持续进行深入研究。

跨行业的技术应用

技术应用不局限于单一行业，而是跨越了多个新能源领域。这种多元化的技术应用能力证明了我们的技术不仅先进，也具有广泛的适应性。

Diversified materials handling

We have comprehensive material handling capabilities covering a wide range of materials from all types of lithium-ion materials to advanced materials such as chalcogenide photovoltaics, as well as all types of organic and inorganic systems. Our technology is not limited to treating specific types of materials, but covers a range of challenging new energy materials in new ways.

Efficient material preparation processes

Our preparation processes play a key role in improving material properties. Through precise mixing, coating or drying, inspection and other techniques, we are able to significantly improve the consistency and quality of material preparation.

Innovative R&D capabilities

Continuous technological innovation and optimization is carried out to adapt to the needs of new materials and applications. On our self-developed test platform, our R&D team continues to conduct in-depth research on the application and processing technologies of various materials.

Cross-industry technology application

Technology applications are not limited to a single industry, but span multiple new energy fields. This diversified technology application capability proves that our technology is not only advanced, but also widely adaptable.

03

Intelligent equipment for manufacturing
lithium-ion battery

锂电池智能生产设备

MACHINE-X

制浆工程 HE高效匀浆机

Slurry Engineering HE Mixing machine

设备介绍 Equipment Introduction

一种新型正负极浆料的混合和均质的设备，罐底电机负责驱动内桶同步旋转，配合桶内刮刀，使罐内浆料更快均匀捏合和分散。内桶采用动态夹套冷却的方式，能对浆料温度控制带来更优越的冷却效果。新型搅拌机采用全新搅拌方式，提升浆料稳定性，对包覆材料更为友好，对高固含量的浆料体系提供搅拌实现方式，为锂电行业未来材料变化提供宽泛工艺窗口。

A new type of mixing equipment for anode and cathode slurries .A bottom-mounted motor that drives the inner barrel to rotate synchronously. This combined with the scraper inside the barrel, enables faster and more uniform kneading and dispersion of the slurry in the tank. The inner barrel adopts a dynamic jacket cooling system, providing superior temperature control and cooling efficiency for the slurry. The new mixer employs an innovative stirring method, enhancing slurry stability and offering better compatibility with coating materials. It also provides an effective mixing solution for high solid-content slurry systems, delivering a broad process window to accommodate future material variations in the lithium battery industry.

技术参数 Technical Parameters

1. 搅拌效率：≤60min/罐
2. 内筒转速：≤35rpm
3. 有效容积：35L~1500L
4. 分散盘线速度：≤25m/s
5. 真空度：≤-0.08MPa
6. 浆料温度：≤50℃

1. Mixing efficiency: ≤60min/tank
2. Inner cylinder speed: ≤35rpm
3. Effective volume: 35L~1500L
4. Dispersing disk line speed: ≤25m/s
5. Vacuum degree: ≤-0.08MPa
6. Slurry temperature: ≤50℃

功能特点 Functional Features

1. 高效制浆，快速稳定；
2. 结构紧凑，占地更小；
3. 从35L到1500L多容积选择，适应实验室到量产需求；
4. 浆料温度准确测量及控制；
5. “一键”故障自检技术，可实现电气系统智能自检、故障定位、故障信息提示功能；

1. Efficient pulping, fast and stable;
2. Compact structure, occupies a smaller area;
3. From 35L to 1500L multi-volume selection, to adapt to the laboratory to mass production needs;
4. Accurate measurement and control of pulp temperature;
5. "One-key" fault self-test technology, which can realize intelligent self-test of the electrical system, fault localization and fault information prompting function;

MACHINE-X

制片工程 高精密涂布机

Electrode sheet Engineering High Precision Coating Machine

设备介绍 Equipment Introduction

一种将电极材料通过涂布挤压头连续均匀涂覆在箔材上的极片生产设备。

An electrode sheet production equipment for continuously and uniformly coating an electrode material onto a foil material by means of a coating extrusion head.

技术参数 Technical Parameters

1. 机械速度：≤150m/min
2. 主辊跳动：≤1μm（激光打表）
3. 模头重复定位精度1μm
4. 辊面宽度：450mm~1600mm
5. 张力：30~500/±2N
6. 主辊线速度精度≤0.05%
7. 烘箱温度：≤150℃/±2℃
8. 接带成功率≥99.9%
9. 能耗降低：20%

1. Mechanical speed: ≤150m/min
2. Main roll runout: ≤1μm (laser marking)
3. Die head repeat positioning accuracy 1μm
4. Roll surface width: 450mm~1600mm
5. Tension: 30~500/±2N
6. Accuracy of main roller line speed ≤0.05%
7. Oven temperature: ≤150℃/±2℃
8. Success rate of tape splicing ≥99.9
9. Energy consumption reduction: 20%

功能特点 Functional Features

1. 收放卷不降速自动换卷，接带成功率≥99.9%，残余尾料长度控制在100m以内；
2. 机头高精度间隙调整结构，可实现在线式自动调整模头间隙，并实现设备自动标刀功能；
3. 精密计量型螺杆泵为涂布提供稳定的流量，且可实现与在线式面密度测量仪的闭环控制，保证纵向面密度精度稳定性；
4. 新型干燥烘箱，通过自适应内部循环风与外部通道的余热回收实现降低设备能耗的效果。
5. 整机六段张力单独控制控制，自适应PID控制算法实现双闭环张力高精度控制，带来稳定收卷效果。
6. “一键”故障自检技术，可实现涂布机电气系统智能自检、故障定位、故障信息提示功能。
7. 优异的人机交互，实现四位一体化分级权限管理。
8. 优异的防呆功能，简易地操作实现复杂的设备功能，提升系统运行稳定性。

1. Automatic roll change without speed reduction for winding and unwinding, the success rate of tape splicing is ≥99.9%, and the length of residual tail material is controlled within 100m;
2. High-precision gap adjustment structure of the machine head can realize online automatic adjustment of the die head gap, and realize the automatic knife marking function of the equipment.
3. Precision metering screw pump provides stable flow for coating, and it can realize closed-loop control with on-line surface density measuring instrument to ensure the stability of longitudinal surface density accuracy;
4. New drying oven, through the self-adaptive internal circulating wind and external channels of waste heat recovery to achieve the effect of reducing energy consumption of the equipment.
5. The whole machine is controlled by six sections of tension individually, and the adaptive PID control algorithm realises double closed-loop tension control with high precision, which brings stable rewinding effect.
6. "One key" fault self-test technology can realize intelligent self-test, fault localization and fault information prompting function of the electrical system of the coating machine;
7. Excellent human-computer interaction, realizing four integrated hierarchical authority management.
8. Excellent anti-dumbness function, easy operation to realize complex equipment functions, enhance system stability.

制片工程 凹版涂布机

Electrode sheet Engineering Gravure Coating Machine

设备介绍 Equipment Introduction

一种对基材进行底层涂覆的设备，通过凹版涂布的方式将导电剂均匀涂覆与铜箔铝箔表面并控制其尺寸精度与厚度均匀性；

An apparatus for primer coating of substrate, uniformly coating conductive agent on the surface of copper foil and aluminum foil by gravure coating and controlling its dimensional accuracy and thickness uniformity.

技术参数 Technical Parameters

1.机械速度：200m/min
2.涂布速度：150m/min
3.基材幅宽：500-1600mm
4.涂布宽度：Max 1600mm
5.涂布尺寸精度：≤±0.3mm
6.涂布厚度精度：±0.3μm
7.涂布干厚：1-10μm
8.收卷对齐度：±0.5mm

1. Mechanical speed: 200m/min
2.Coating speed: 150m/min
3.Substrate width: 500-1600mm
4.Coating width: Max 1600mm
5.Coating size accuracy: ≤±0.3mm
6.Coating thickness accuracy: ±0.3μm
7. Coating dry thickness: 1-10μm
8. Reel alignment: ±0.5mm

功能特点 Functional Features

1. 对顶夹紧式版辊结构可在线调整横向位置，保证横向尺寸精度；
2. 高效干燥烘箱，通过自适应内部循环风外部通道的余热回收实现降低设备能耗；
3. 整机自适应PID控制张力，双闭环张力高精度控制保证稳定收放卷；
4. 设备一键自检保证开机稳定性，降低设备操作门槛；
5. 双面凹版涂布，通过高精度传感器保证正反面套印精度；

1. Counter-top clamping type plate roller structure can be adjusted online for transverse position to ensure transverse dimensional accuracy;
2. High-efficiency drying oven, through the self-adaptive internal circulation wind external channel waste heat recovery to achieve the reduction of equipment energy consumption;
3. Adaptive PID control tension of the whole machine, double closed-loop tension high-precision control to ensure stable winding and unwinding;
4. One-key self-test of the equipment to ensure the stability of the boot, reducing the threshold of equipment operation;
5. Double-sided gravure coating, through high-precision sensors to ensure the front and back overprinting accuracy;

制片工程 辊压机

Electrode sheet Engineering Calendering machine

设备介绍 Equipment Introduction

一种将涂布后成卷的正/负极片经过连续对辊装置，将极片均匀碾压至工艺要求的厚度，并自动完成整齐收卷。

A kind of positive/negative electrode sheet which is formed into a roll after coating passes through the continuous roll pairing device to crush the electrode sheet uniformly to the thickness required by the process, and completes the neat rewinding automatically.

技术参数 Technical Parameters

1.机械速度≤140m/min，生产速度≤120m/min
2.轧辊宽度≤1500mm，有效轧制宽度≤1400mm
3.轧制力控制精度：≤±0.5T
4.张力控制精度：10~500N/≤±3N，500-1200N/≤±4N
5.辊面硬度：≥HRC68
6.轧辊加工精度：圆跳动≤1.0 μm，直线度≤2.0 um
7.轧辊计米精度：≤0.3%
8.自动换卷接带成功率：≥99.9%
9.设备产品的合格率：≥99.9%
10.辊压后极片厚度精度：≤±1.5um
11.热轧辊面温度均匀性精度：≤±2℃

1. Mechanical speed ≤ 140m/min, production speed ≤ 120m/min
2. Roll width ≤1500mm, effective rolling width ≤1400mm
3. Rolling force control accuracy: ≤±0.5T
4. Tension control accuracy: 10~500N/≤±3N, 500-1200N/≤±4N
5. Roll surface hardness: ≥HRC68
6.Processing accuracy of rolls: round runout≤1.0 μm, straightness≤2.0 um
7.Meter counting precision of rolls: ≤0.3%
8. Successful rate of automatic roll change and strip pick-up: ≥99.9%.
9. Qualified rate of equipment products: ≥99.9%
10. Thickness accuracy of pole piece after rolling: ≤±1.5um
11. Precision of temperature uniformity of hot roll surface: ≤±2℃.

功能特点 Functional Features

1.收放卷不降速自动换卷接带，接带成功率≥99.9%；
2.在线激光测厚，厚度闭环反馈控制系统，辊压后极片厚度精度可达±2um
3.交叉辊自研技术：利用轧辊交叉角度实现辊凸度调整，可减少弯缸压力，降低能耗，同时提高极片厚度均匀性及压实密度；
4.轧辊中间增压自研技术：解决宽幅辊压机辊压后的极片中间厚两边薄的问题
5.张力双闭环控制技术，张力动态波动范围±3N；
6.可选轧辊热压、冷压以及双机连轧；
7.“一键”故障自检技术，可实现设备电气系统智能自检、故障定位、故障信息提示功能；

1.Automatic tape change without slowing down the speed of winding and unwinding, and the success rate of tape catching is ≥99.9%;
2. Online laser thickness measurement, closed-loop thickness feedback control system, the thickness accuracy of the pole piece can reach ± 2um after rolling.
3. Cross-roller self-developed technology: the cross angle of the rolls is used to realize the adjustment of roll convexity, which can reduce the pressure of the bending cylinder, reduce energy consumption, and at the same time, improve the thickness uniformity and compaction density of the pole piece;
4. Self-researching technology of pressurization in the middle of the rolls: solving the problem of thinness in the middle and thinness in the two sides of the pole piece after rolling in the wide roll press.
5. Tension double closed-loop control technology, tension dynamic fluctuation range ± 3N; 6. Optional roll hot pressing, cold pressing and double machine continuous rolling;
7. One key" fault self-test technology, can realize the equipment electrical system intelligent self-test, fault location, fault information prompt function;

制片工程 辊压分切一体机

Electrode sheet Engineering Calendering&slitting machine

设备介绍 Equipment Introduction

一种将涂布后成卷的正/负极片经过连续液压对辊装置，将极片均匀碾压至工艺要求的厚度，再分切成符合工艺要求宽度的多条极片，并收卷整齐。

A kind of positive/negative electrode sheet which is formed into a roll after coating is passed through a continuous hydraulic roller device, and the electrode sheet is uniformly milled to the thickness required by the process, and then slit into a plurality of electrode sheets which meet the width required by the process, and wound up in a neat roll.

技术参数 Technical Parameters

1.机械速度≤140m/min，生产速度≤120m/min
2.轧辊宽度≤1500mm，有效轧制宽度≤1400mm
3.轧制力控制精度：≤±0.5T
4.张力控制精度：10~500N/≤±3N，500-1200N/≤±4N
5.辊面硬度：≥HRC66
6.轧辊加工精度：圆跳动≤1.0 μm，直线度≤2.0 um
7.弯辊装置：8支弯辊油缸，弯辊力100 t，控制精度±0.5 T
8.计米精度：≤0.3%
9.自动换卷接带成功率：≥99.9%
10.设备产品的合格率：≥99.9%
11.辊压后极片厚度精度：≤±1μm
12.热轧辊面温度均匀性精度：≤±2℃
13.分切宽度精度：≤±0.5mm
14.收卷整齐度：≤±0.5mm

1. Mechanical speed ≤ 140m/min, production speed ≤ 120m/min
2. Roll width ≤1500mm, effective rolling width ≤1400mm
3. Rolling force control accuracy: ≤±0.5T
4. Tension control accuracy: 10-500N/≤±3N, 500-1200N/≤±4N
5. Roll surface hardness: ≥HRC66
6.Processing accuracy of rolls: round runout≤1.0 μm, straightness≤2.0 um
7.Bending roller device: 8 bending roller cylinders, bending roller force 100 t, control accuracy ± 0.5 T
8.Meter counting precision: ≤0.3%
9. Successful rate of automatic roll change and belt connection: ≥99.9%.
10. Qualified rate of equipment products: ≥99.9%
11. Thickness accuracy of pole piece after rolling: ≤±1μm
12. Precision of temperature uniformity of hot roll surface: ≤±2℃.
13. Slitting width precision: ≤±0.5mm
14. Reeling neatness: ≤±0.5mm

功能特点 Functional Features

1. “一键”故障自检技术，可实现设备电气系统智能自检、故障定位、故障信息提示功能；
2. 辊缝压力闭环控制、位置闭环控制双模式；
3. 采用IO-LINK连接技术，提升控制精度和传感器智能化水平；
4. 升辊过程中运行模糊PID算法快速调节伺服比例阀开度，确保两侧主辊升辊同步误差在0.5s以内；
5. 主缸压力和弯缸压力双PID调节，辊压中压力波动值+0.5T以内;

1. One key" fault self-test technology, can realize the equipment electrical system intelligent self-test, fault location, fault information prompt function;
2. Closed-loop control of the roll seam pressure and closed-loop control of the position of the dual-mode;
3. Adoption of IO-LINK connecting technology, which improves the control accuracy and the level of intelligent sensors;
4. Fuzzy PID algorithm is used to quickly adjust the servo proportional valve opening during the roller lifting process to ensure that the synchronisation error of the two main rollers is within 0.5s.
5. master cylinder pressure and bending cylinder pressure double PID regulation, pressure fluctuation value in the roller pressure + 0.5T or less;

制片工程 分切机(自动换卷/手动换卷)

Electrode sheet Engineering Slitter (automatic coil change/manual coil change)

设备介绍 Equipment Introduction

一种将电池极片及有色金属板材或卷材进行纵向分切至所需要的尺寸规格并保证一定工艺要求的设备

A kind of equipment to longitudinally slit the battery pole piece and non-ferrous metal plate or coil to the required size specification and ensure certain process requirements.

技术参数 Technical Parameters

1.机械速度≤140m/min，生产速度≤120m/min
2.辊面宽度：≤1600mm
3.分切宽度范围：32-1600mm
4.张力控制精度：10~500N/≤±3N
5.设备产品的合格率：≥99.9%
6.设备故障率：≤1%
7.分条后切口毛刺：纵向≤5μm，横向≤5μm
8.分切宽度精度：≤±0.3mm
9.收卷整齐度：≤±0.3mm
10.计米精度：≤0.3%
11.极片边缘切口无卷边、裂口、褶皱、拉伸、露箔、明显的锯齿状等质量缺陷

1. Mechanical speed ≤ 140m/min, production speed ≤ 120m/min
2. Roll surface width: ≤1600mm
3. Slitting width range: 32-1600mm
4. Tension control precision: 10-500N/≤±3N
5. Qualified rate of equipment products: ≥99.9%
6. Failure rate of equipment: ≤ 1%
7.Cutting burr after slitting: longitudinal ≤5μm, transverse ≤5μm
8. Slitting width precision: ≤±0.5mm
9. Reeling neatness: ≤±0.3mm
10. Meter counting precision: ≤0.3%.
11. No quality defects such as crimping, cracking, folding, stretching, exposed foils, obvious jaggedness, etc. on the edge cut of the pole piece.

制片工程 激光模分一体机

Electrode sheet Engineering Laser notching&slitting integrated machine

设备介绍 Equipment Introduction

一种对正/负极极片箔材区域高速连续的极耳成型设备; 保证极耳毛刺，肩高，热影响区，并对分切后的极片收卷的自动化设备。

A high-speed continuous lug forming machine for positive/negative electrode foil area; ensures lug burrs, shoulder height, heat-affected zone, and automated equipment for winding of slit lugs.

技术参数 Technical Parameters

1.机械速度60-200m/min, 生产速度120m/min
2.过辊有效宽度：≤900mm
3.收放卷卷径：≤φ800mm
4.切割方式：一出一，兼容一出二
5.切割尺寸精度：≤±0.1mm
6.热影响区：≤50μm
7.切割漏金属：≤50μm
8.切割毛刺：≤7μm（以基材为基准）
9.切割金属熔珠≤15μm

1. Mechanical speed 60-200m/min,Production speed 120m/min
2. Effective width of over-roll: ≤900mm
3.Diameter of winding and unwinding rolls: ≤φ800mm
4. Cutting mode: one out of one, compatible with one out of two
5. Cutting size precision: ≤±0.1mm
6. Heat-affected zone: ≤50μm
7.Cutting metal leakage: ≤50μm
8.Cutting burr: ≤7μm (based on the substrate)
9. Cutting metal fusion bead ≤15μm

功能特点 Functional Features

1.毛刺小，热影响小，切割端面品质高
2.毛刷除尘、负压吸尘、风刀除尘，超声波除尘、FFU、除尘风机等多重粉尘和异物对策，无粉尘残留，安全性高
3.可配置双放双收，双放单收，双放四收，极卷高精度自动换卷，超高速激光切割系统，高效异物管控措施
4.张力双闭环控制技术，张力波动范围+2N、可实现激光在线打标、箔材缺陷在线检测

1. Small burrs, low thermal influence, high quality of cutting end face.
2. Brush dust removal, negative pressure dust suction, wind knife dust removal, ultrasonic dust removal, FFU, dust removal fan and other multiple countermeasures against dust and foreign matter, no dust residue, high security
3. Configurable double-put double-receiving, double-put single-receiving, double-put four-receiving, high-precision automatic roll change, ultra-high-speed laser cutting system, and efficient foreign matter control measures.
4. Tension double closed-loop control technology, tension fluctuation range +2N, can realize laser on-line marking, foil defects on-line detection.

制片工程 极片激光刻蚀机

Electrode sheet Engineering Electrode laser etching machine

设备介绍 Equipment Introduction

本设备为锂电池极片全自动飞行刻线机，主要用于电芯极片区域涂层的刻蚀工艺，可兼容连涂、间涂等涂敷材料，设备通过极片放卷和收卷的连续走带，经过纠偏定位之后，由双激光工位分别连续对A面和B面活性物质的指定区域进行快速烧除，气化，膨胀，剥离；以去除约定范围以及深度敷料，并使之达到刻蚀品质及电芯性能要求。

This equipment is a lithium battery pole piece automatic flight etching machine, which is mainly used for the etching process of the coating of the core electrode area. It can be compatible with continuous coating, intercoating and other coating materials. Through the continuous walking belt of pole release and winding, after correction and positioning, the double laser station continuously performs rapid burning,gasification, expansion and peeling of the designated area of Aside and Bside active substances respectively; in order to remove the agreed range and depth dressing, and make it meet the requirements of etching quality and cell performance.

技术参数 Technical Parameters

1.尺寸外观：4950mm*2600mm*2500m
2.兼容极片：宽度：45-200mm；卷径：700mm；
3.兼容材料：石墨负极；掺硅石墨负极；正极：LFP、NMC
4.加工精度：线深±5um；线宽±10%；线间距±100um；
5.激光模组：水冷-cw；2000w±%2；1064±2.5nm；
M^2≤1.2；准直&聚焦：f125&f350；振镜速度:200rad/s
6.除尘模组：风刀+吸尘+全包除尘腔室+毛刷除尘+超声波除尘
7.纠偏模组：纠偏精度±0.1mm；纠偏行程±40mm
8.检测系统：CCD在线检测；3D扫描在线检测

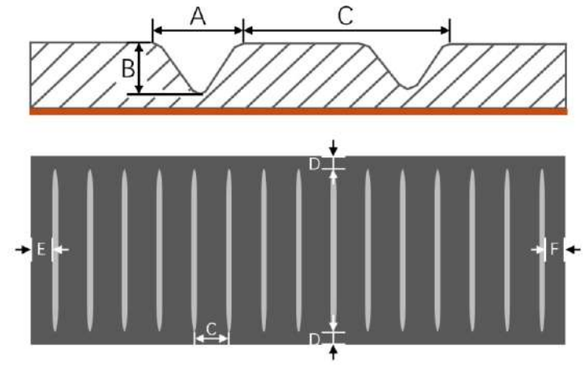
1.Size and appearance：4950mm*2600mm*2500m；
2.Compatible polar film：Width: 45-200mm；Maximum roll diameter: 700mm；
3.Compatible materials: graphite negative electrode; silicon doped graphite negative electrode；Positive: LFP, NMC
4.Processing accuracy：Line depth: ±5um； Line width: ±10%； Line spacing :±100um；
5.Laser module：Mode: Continuous water cooling；2000w±%2；1064±2.5nm；
M^2≤1.2；Optical path configuration:f125, f350；
Microscope speed：200rad/s
6.Dedusting module : Air Knife + Dust Extraction + All-inclusive Dedusting Chamber + Brush Dedusting + Ultrasonic Dedusting
7.Correction module：Correction accuracy: ±0.1mm；Correction stroke: ±40mm；
8.Detection system： CCD online full inspection；3D scanning online sampling；

功能特点 Functional Features

1.适用于各种窄幅尺寸生产需求，满足各类涂布方式来料，幅宽最大兼容200mm
2.加工精度高，流水线速度快，最高能达到25m/min加工流水线速度
3.多方位除尘系统，能有效去除加工过程中产生的粉尘，金属颗粒等；工位除尘模拟效率达99.6%
4.能实现各类不良检测，来料贴标检测；能在线实时监测刻蚀精度并同步上传mes系统

1. It is suitable for the production needs of all kinds of narrow sizes, and meets all kinds of coating methods. The maximum width is compatible with 200mm.
2. High processing accuracy, fast assembly line speed, up to 25m/min processing line speed
3. The multifaceted dust removal system can effectively remove dust, metal particles, etc. generated in the processing process; the s imulation efficiency of dust removal at the station reaches 99.6%.
4. It can realize all kinds of bad detection and labeling detection; it can monitor the etching accuracy online in real time and upload the mes system synchronously.

极片激光刻蚀机示意图 Schematic diagram of pole laser etching machine



项目	图标	单位	兼容范围	公差	检测模式
刻线宽度	A	um	80-200	±1	3D在线检测
刻线深度	B	um	10-50	±1	3D在线检测
线间距	C	mm	≥0.3	±0.1	2D在线检测
辅料边缘距离	D	mm	/	±0.5	2D在线检测
头部边缘距离	E	mm	/	±2	2D在线检测
尾部边缘距离	F	mm	/	±2	2D在线检测
线长	L	mm	50-200	±1	/

Item	Icon	Unit	Compatibility range	Allowance	Detection mode
Scribing width	A	um	80-200	±1	3D online inspection
Cutting depth	B	um	10-50	±1	3D online inspection
Distance between lines	C	mm	≥0.3	±0.1	2D online inspection
Accessory edge distance	D	mm	/	±0.5	2D online inspection
Head edge distance	E	mm	/	±2	2D online inspection
Trailing edge distance	F	mm	/	±2	2D online inspection
Line length	L	mm	50-200	±1	/

制片工程 接触式高真空智能烘烤线

Electrode sheet Engineering Contact high vacuum intelligent baking line

设备介绍 Equipment Introduction

一种通过对电芯接触加热，并给予高真空环境，快速干燥电芯的自动线设备。

An automated line device that uses contact heating for battery cells and applies a high vacuum environment to quickly dry the cells.

技术参数 Technical Parameters

1.温度范围：RT ~110.0℃
2.温场均一性：±2.0℃
3.极限真空（绝对真空）：≤5Pa
4.真空漏率：≤5Pa*L/s
5.24H真空泄漏量：≤100pa
6.极限真空变形量：≤2mm
7.在线水含量测量范围：1~5000ppm
8.在线水含量测量精度：±10ppm
9.表面温度：RT+10℃

1. Temperature range: RT ~110.0℃
2. Temperature uniformity: ±2.0℃
3. Ultimate vacuum: ≤5Pa
4. Vacuum leakage rate: ≤5Pa*L/s
5. 24-hour vacuum leakage: ≤100Pa
6. Ultimate vacuum deformation: ≤2mm
7. Online moisture measurement range: 1~5000ppm
8. Online moisture measurement accuracy: ±10ppm
9. Surface temperature: RT+10℃

功能特点 Functional Features

1. 干燥效率高：高真空结合精准控温，以280电芯为蓝本，干燥周期可控制在6小时，314电芯干燥周期8小时。
2. 运行能耗低：升温后运行能耗3%，智能电表可监控
3. 适用电芯范围广：适用于方形，软包，圆柱电芯
4. 加热方式全面：可选电加热，油加热，水浴
5. 结构形式多样：可选多层，大腔体结构
6. 搬运系统丰富：可选用多种搬运系统，机器人适用多层:RGV适用大腔体；堆垛机适用两台腔体堆叠，可根据使用场景选配
7. 节拍组合灵活:模块化设计，单线可根据需求组合产能，方形10~40ppm；软包10~40ppm，圆柱50~200ppm
8. 在线水含量判断：可选配水含量在线测量系统，实时数据，具备智能判断，减少人工测水，提高烘烤效率
9. 智能化生产：可任意组合工步，安全防呆前提下自由设置截止条件，提升设备智能化
10. 维护简单，降本增效：电加热特殊设计的防真空放电方案，可将放电控制在ppm级别，定制高真空密封件，寿命为常规密封件2倍以上；油加热，水浴定制开发高精度线性阀，2年免维护

1. High drying efficiency: With precise temperature control in a high vacuum, drying time for 280 battery cells is 6 hours, and 314 battery cells is 8 hours;
2. Low energy consumption: After heating, energy use is reduced to 3%, with smart meters for monitoring;
3. Wide applicability: Suitable for prismatic, pouch, and cylindrical battery cells;
4. Comprehensive heating options: Choose from electric, oil, or water bath heating;
5. Flexible structure: Options for multi-layer or large chamber designs;
6. Varied handling systems: Robots for multi-layers, RGV for large chambers, stackers for dual-chamber stacking, customizable for different scenarios;
7. Flexible production rates: Modular design allows capacity adjustments—prismatic: 10-40ppm; pouch: 10-40ppm; cylindrical: 50-200ppm;
8. Online moisture detection: Optional system for real-time data and intelligent moisture control, reducing manual intervention and improving efficiency;
9. Intelligent production: Steps can be freely combined, with safety mechanisms in place, allowing for flexible cut-off condition settings to enhance equipment intelligence;
10. Easy maintenance: Special anti-vacuum discharge design for electric heating, vacuum-grade seals lasting twice as long, and custom precision valves for oil and water bath systems, maintenance-free for two years.

制片工程 运风式高真空智能烤箱

Electrode sheet Engineering Pneumatic high vacuum intelligent oven

设备介绍 Equipment Introduction

一种通过运风将空间整体均匀升温后，给予高真空环境，快速干燥极片或电芯的干燥设备。

A drying device that uses airflow to uniformly heat the entire space, then applies a high vacuum environment for the rapid drying of electrode sheets or battery cells.

技术参数 Technical Parameters

1.温度范围：RT ~250.0℃
2.升温速率：10℃/min
3.温场均一性：±2.0℃
4.极限真空（（绝对真空）：≤5Pa
5.真空漏率：≤5Pa*L/s
6.24H真空泄漏量：≤100pa
7.极限真空变形量：≤2mm
8.在线水含量测量范围：1~5000ppm
9.在线水含量测量精度：±10ppm
10.腔体锁温性能：≤3℃/h
11.表面温度：RT+10℃

1. Temperature range: RT ~250.0℃
2. Heating rate: 10℃/min
3. Temperature uniformity: ±2.0℃
4. Ultimate vacuum: ≤5Pa
5. Vacuum leakage rate: ≤5Pa*L/s
6. 24-hour vacuum leakage: ≤100Pa
7. Ultimate vacuum deformation: ≤2mm
8. Online moisture measurement range: 10~5000ppm
9. Online moisture measurement accuracy: ±10ppm
10. Chamber temperature retention performance: ≤3℃/h
11. Surface temperature: RT+10℃

功能特点 Functional Features

1. 广域使用，经济高效：温度范围广，适用于不同体系极片，3C类电芯干燥效率高于接触式
2. 高效锁温，恒温干燥：恒温后高真空环境下平均温度跌落≤3℃/h，满足电芯高真空恒温干
3. 真空度提升，降本增效：极限真空更高，漏率小，同等条件下真空干燥效率更高，降低干燥周期，3C电芯干燥周期小于2小时
4. 温场一致性，提升产品质量：温场一致性高，产品干燥一致性更好，最终产品一致性更高
5. 水含量判断，降本增效：集成水含量实时数据，具备智能判断功能，减少人工测水，提高烘烤效率
6. 配方编辑，提升智能化：可任意组合工步，安全防呆前提下自由设置截止条件，提升设备智能化
7. 维护简单，降本增效：定制高真空航插代替密封圈，减少易损件，腔体强度提高，稳定性更好，两年免维护

1. Wide area use, economical and efficient: wide temperature range, suitable for different system pole, 3C type cell drying efficiency is higher than the contact type
2. Efficient temperature lock, constant temperature drying: after constant temperature, the average temperature drop under high vacuum environment is less than 3℃/h, to meet the needs of high vacuum constant temperature drying of the battery cell
3. The vacuum degree is improved, the cost is reduced and the efficiency is increased: the limit vacuum is higher, the leakage rate is smaller, the vacuum drying efficiency is higher under the same conditions, the drying cycle is reduced, and the drying cycle of 3C cell is less than 2 hours
4. Temperature field consistency, improve product quality: high temperature field consistency, product drying consistency is better, the final product consistency is higher
5. Water content judgment, reduce cost and increase efficiency: integrated water content real-time data, with intelligent judgment function, reduce manual water measurement, improve baking efficiency
6. Formula editing, improve intelligence: can be any combination of work steps, safety and anti-stay under the premise of free to set cutoff conditions, improve equipment intelligence
7. Simple maintenance, cost reduction and efficiency: customized high vacuum air insert instead of sealing ring, reduce wearing parts, cavity strength, better stability, two years maintenance-free

04

Service Guarantee

服务保障

响应速度 Response time

- 1h — 重大异常，1h提供解决措施
  1h-Major abnormality, 1h to provide solution measures

终身服务 Lifetime service

- 终身 — 设备全生命周期内终身服务
  Lifetime - Lifetime service during the whole life cycle of the equipment

一对一服务 One-on-one service

- 免费 — 提供设备检测维修维护的培训及合理化建议
  Free - Provide training and rationalization advice on equipment testing, repair and maintenance
- 24h — 技术团队一对一服务，24h不间断服务
  24h - One-to-one service by technical team, 24h uninterrupted service

合作伙伴 Cooperative Partner

协鑫光电 GCL OPTOELECTRONIC

鹏辉 GREAT POWER

晶鹏能源

PEROVS 众能光电科技

ZENERGY

VREMT

浙江大学 ZHEJIANG UNIVERSITY 1897

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北京航空航天大学 BEIHANG UNIVERSITY 1952

BATTERO TECH

CATL 宁德时代

HUNA 湖钠能源

ZEEKR

武汉理工大学 WUHAN UNIVERSITY OF TECHNOLOGY

SIEMENS

HYPER 禾浦

MACHINE-X