

J.S.Machine

股票代码: 000821



智
目

PIONEER OF SOLAR
INDUSTRY INTELLIGENT
EQUIPMENT MANUFACTURER

光伏行业智能装备制造领导者

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MAKE PV MANUFACTURING AS EASY AS POSSIBLE

SC-SOLAR 晟成光伏



COMPANY PROFILE

公司简介

苏州晟成光伏设备有限公司成立于2010年，是京山轻机（000821）的全资子公司，总部位于苏州高新区，占地面积68.6亩。现有员工3400多人，其中技术研发人员超900人，硕士及以上人才超60人。

晟成光伏主要从事光伏行业智能化装备的研发、制造、销售及服务，目前产品已远销美国、德国、法国、新加坡、韩国、日本、印度、巴西等全球31个国家和地区。晟成光伏不仅为客户提供光伏组件制造整体解决方案，兼容常规、双玻、半片、MBB、0BB、XBC、叠瓦等不同需求，同时也为光伏电池、硅片制造等领域提供相关智能装备以及MES系统。晟成光伏在TOPCon、HJT、钙钛矿等高效电池及组件装备领域均有先进技术储备以及实际产品销售，在光伏组件自动化产线细分领域市场份额排名第一。

晟成光伏专注创新、研发和品质的提升，目前已获得“国家级制造业单项冠军企业”“国家智能光伏试点示范企业”“国家高新技术企业”“江苏省企业技术中心”“江苏省工程技术研究中心”“江苏省工业设计中心”“江苏省专精特新小巨人企业”等多项政府荣誉。产品方面已获得671项知识产权，其中发明专利87项。此外，晟成光伏通过了ISO9001质量管理体系认证，产品获得CE、ETL、UL、TUV等认证，产品品质得到客户和社会各界的广泛认可。

晟成光伏真诚希望与广大客户朋友亲密合作，携手共进，助力光伏智造，共创绿色家园！

Suzhou Shengcheng Solar Equipment Co., Ltd. founded in 2010, is a wholly owned subsidiary of J.S.Machine (stock code: 000821). Headquartered in Suzhou New District, it covers an area of 45733m². The company currently employs over 3400 staff, including over 900 R&D personnel and over 60 master's degree or above talents.

Specializing in R&D, manufacturing, sales and service of intelligent equipment in solar industry, products of SC Solar have been distributed to 31 countries and regions all over the world, including USA, Germany, France, Singapore, South Korea, Japan, India, Brazil etc. SC Solar not only provides customers with turnkey solutions for solar module manufacturing, compatible with diversified requirements including conventional glass-back sheet, G2G, half-cell, MBB, 0BB, XBC, shingling modules production and so on, but also offers intelligent equipment and MES systems for the fields of PV cells and silicon wafer manufacturing. SC Solar has advanced technology in TOPCon, HJT and perovskite cell and module equipment fields, and ranks first in the market share of solar module production line segment.

SC Solar has advanced technology in TOPCon, HJT and perovskite cell and module equipment fields, and ranks first in the market share of solar module production line segment. Dedicated to innovation, R&D and continuous quality improvement, SC Solar has won numerous government honors such as "National Manufacturing Individual Champion Enterprise", "National smart photovoltaic pilot demonstration Enterprise", "High-tech Enterprise", "Jiangsu Enterprise Technology Center", "Jiangsu Engineering Technology Research Center", "Jiangsu Specialized New Small Giant Enterprise", and etc. In terms of product development, SC Solar has obtained 671 technical patents, of which 87 are invention patents. In addition, SC Solar has acquired ISO9001 quality management system certification, and the products have been approved by CE, ETL, UL, TUV certification of many countries. The product and service quality has been broadly recognized by customers and the society.

SC Solar sincerely wishes to cooperate with our clients and friends closely, make progress together, facilitate the PV intelligent manufacturing, and build up a green homeland.

PROJECT DISTRIBUTION

项目全球分布



31国家+地区
累计装机量700GW+
(截至2024年9月)
(Sep. 2024)

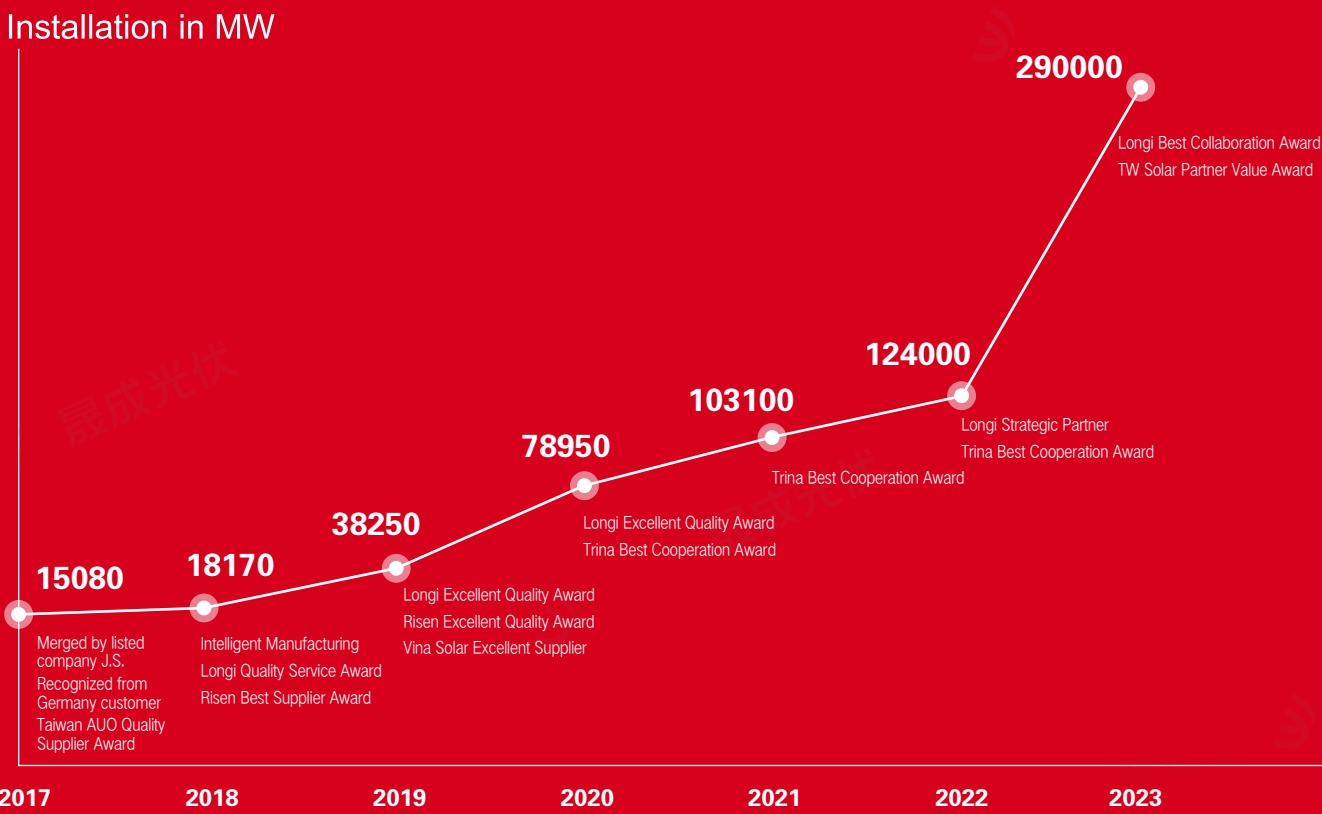
3000+ PROJECTS

800GW+ INSTALLED
BASE

PRIMARY CUSTOMER

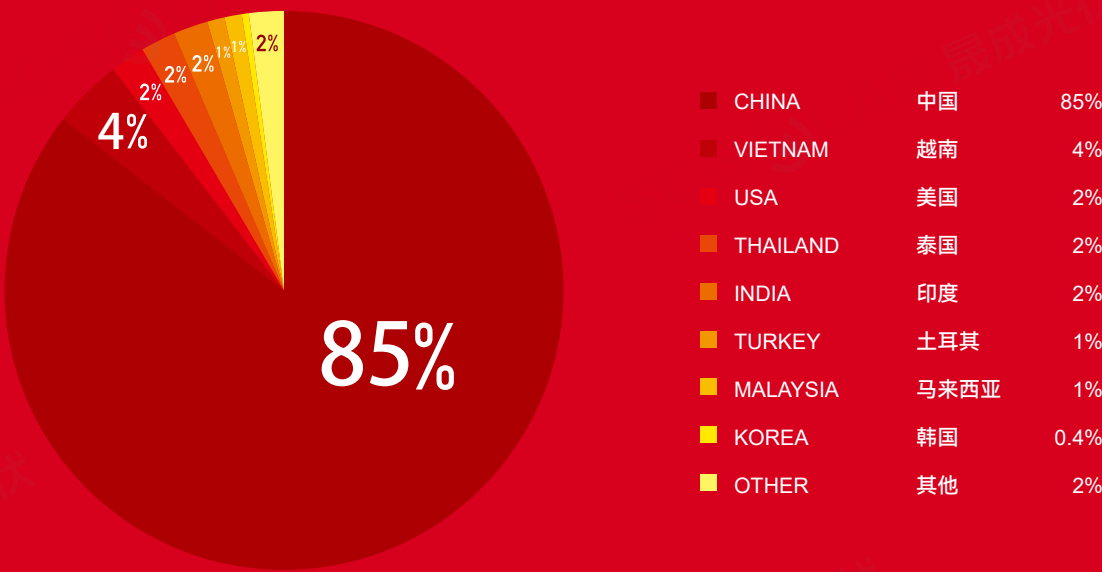
主要客户群体及装机量

年装机量 ANNUAL INSTALLATION BASE



Total 800GW+Installed
3000+projects as of September 2024

晟成前八大国家装机量占比 SC SOLAR INSTALLATION BASE RATIO OF TOP 8 COUNTRIES



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01 组件自动化整体解决方案

PV module manufacturing automation turnkey solution

SOLAR PANEL PRODUCTION LINE SOLUTION

太阳能光伏组件自动化生产线

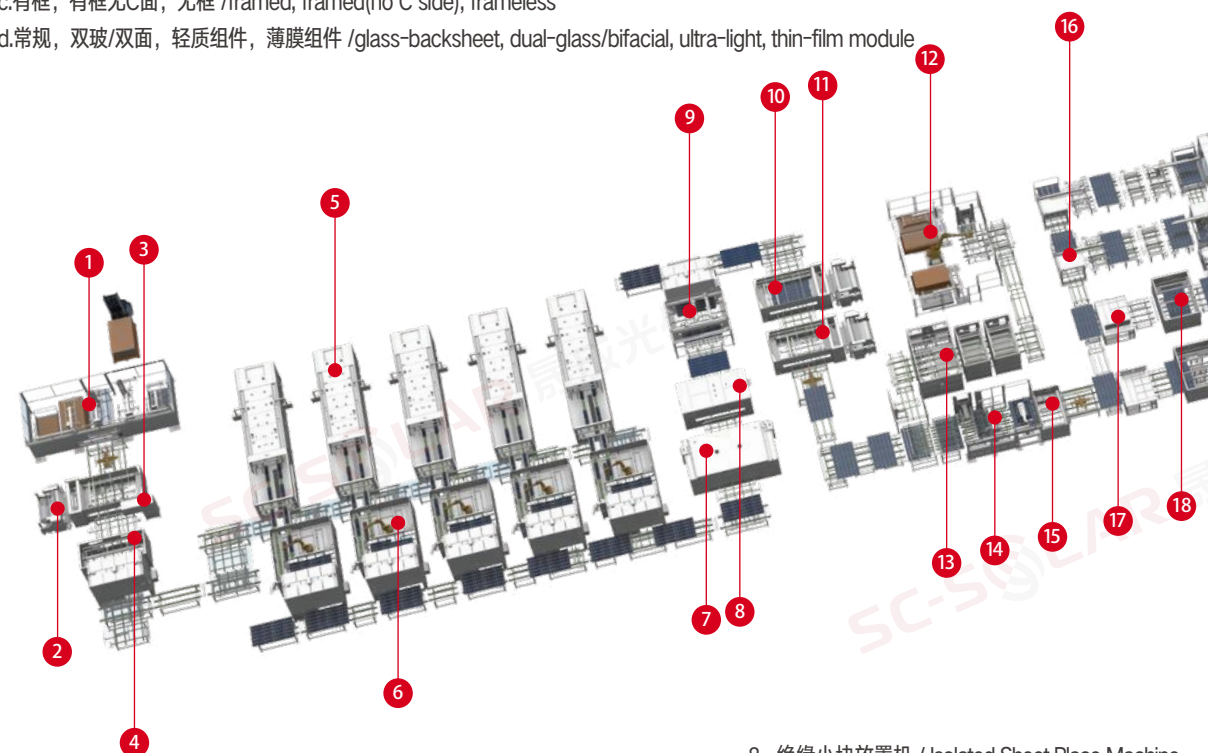
整线解决方案 Turnkey solution

适用组件范围 Compatible size:

- a.标准长 1640-2520(mm), 宽950-1450(mm) /standard length 1640-2520(mm), width 950-1450(mm)
- b.可定制化 /other specs customized

适用组件类别 Compatible module:

- a.无主栅, 5主栅, 多主栅, 背接触, 金属穿孔, 异质结, N型 /0BB, 5BB, MBB, XBC, MWT, HJT, N-TYPE
- b.全片, 半片, 叠瓦 /full-cell, half-cut cell, shingling
- c.有框, 有框无C面, 无框 /framed, framed(no C side), frameless
- d.常规, 双玻/双面, 轻质组件, 薄膜组件 /glass-backsheet, dual-glass/bifacial, ultra-light, thin-film module



- 1. 自动上玻璃机 / Auto Glass Loader
- 2. 一道EVA裁切铺设机 / 1st EVA Cutting & Layup
- 3. 玻璃面贴条码机 / Glass Barcode Labeling Machine
- 4. 胶膜刮平机 / EVA Flattening
- 5. 串焊机 / Stringer
- 6. 排版机 / Auto String Layout
- 7. 自动汇流条叠焊机 / Auto Bussing/ ICB Machine

- 8. 绝缘小块放置机 / Isolated Sheet Place Machine
- 9. 自动贴胶带机 / Auto String Taping
- 10. 二道EVA裁切铺设机 / 2nd EVA Cutting & Layup
- 11. 背板裁切铺设机 / TPT/Backsheet Cutting & Layup
- 12. 二道玻璃上料机 / Auto Glass Loader
- 13. 间隙贴膜 / Gap Film Dispensing
- 14. 双玻合片机 / 2nd Glass Loader
- 15. 自动引线折弯机 / Auto ICB Lead Bending
- 16. 双玻返修移栽 / Rework Station

高产出

High productivity

高稳定性

High stability

高自动化

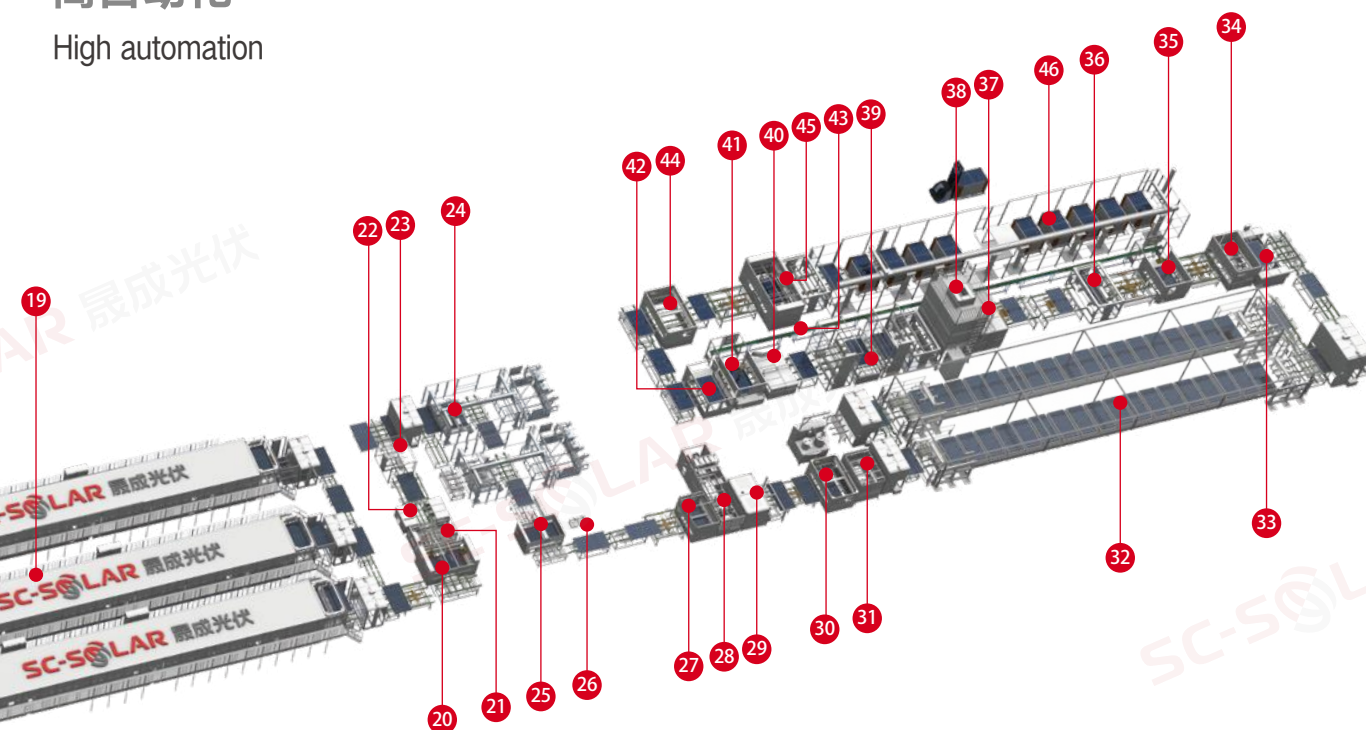
High automation

占地面积小

Low floor area

更好的成本优势

Better ROI

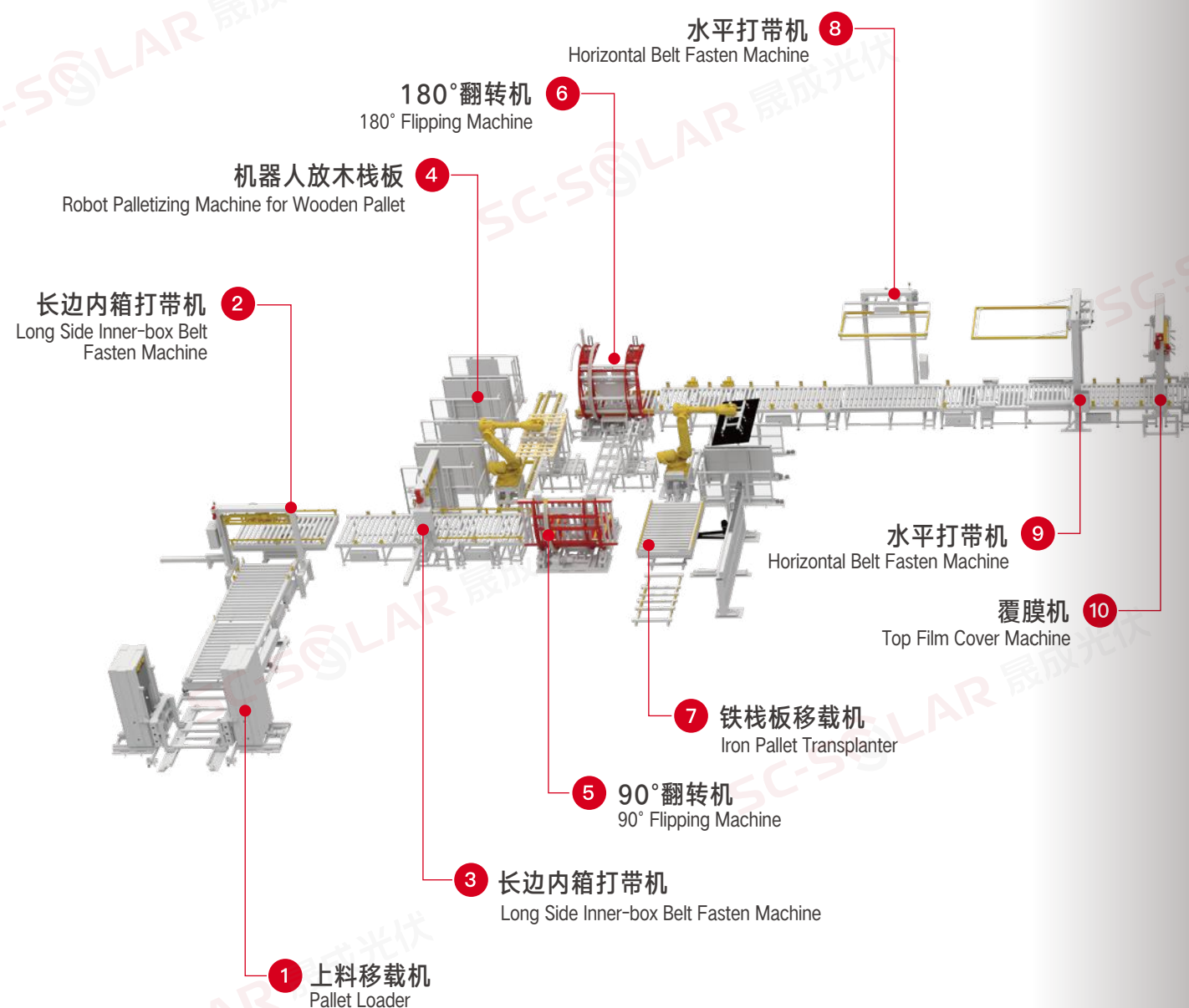


- 17. EL视觉检测一体机 / EL + VI Tester
- 18. 双玻封边机 / G2G Edge Taping
- 19. 层压机 / Laminator
- 20. 双玻撕胶带机 / G2G Edge Tape Remover
- 21. 自动修边机 / Auto Trimming
- 22. 修角机 / Corner Trimming Machine
- 23. 翻转检查 / Visual Inspection
- 24. 自动装框系统 / Framing System
- 25. 自动挑引线机 / Auto ICB Lead Picking Up
- 26. 接线盒涂胶机 / J-Box Dispensing Machine
- 27. 背板涂胶机 / Backsheet Dispensing Machine
- 28. 接线盒安装机 / J-Box Mounting Machine
- 29. 接线盒焊接机 / J-Box Soldering Machine

- 30. 接线盒灌胶机 / J-Box Potting Machine
- 31. 灌胶及边孔检测 / Potting Detection
- 32. 自动固化线 / Auto Curing Line
- 33. 自动锉角机 / Auto Filing Machine
- 34. 自动盖盖机 / J-Box Cover Installation Machine
- 35. 自动装工装 / Test Jig Loader
- 36. 翻板机 / Flipping Machine
- 37. 标片机 / Golden Module Storage Unit
- 38. IV功率测试 / IV Tester
- 39. 绝缘耐压测试机 / HI-pot Tester
- 40. EL测试仪 / EL Tester
- 41. 自动拆工装 / Test Jig Unloader
- 42. 自动贴标机 / Auto Labeling
- 43. 工装回流输送 / Test Jig Return Conveyor
- 44. 铭牌检测+三码校验 / Nameplate and Barcode Detection
- 45. 自动包护角机 / Auto Corner Protector Placement
- 46. 分档机 / Auto Palletizing Machine

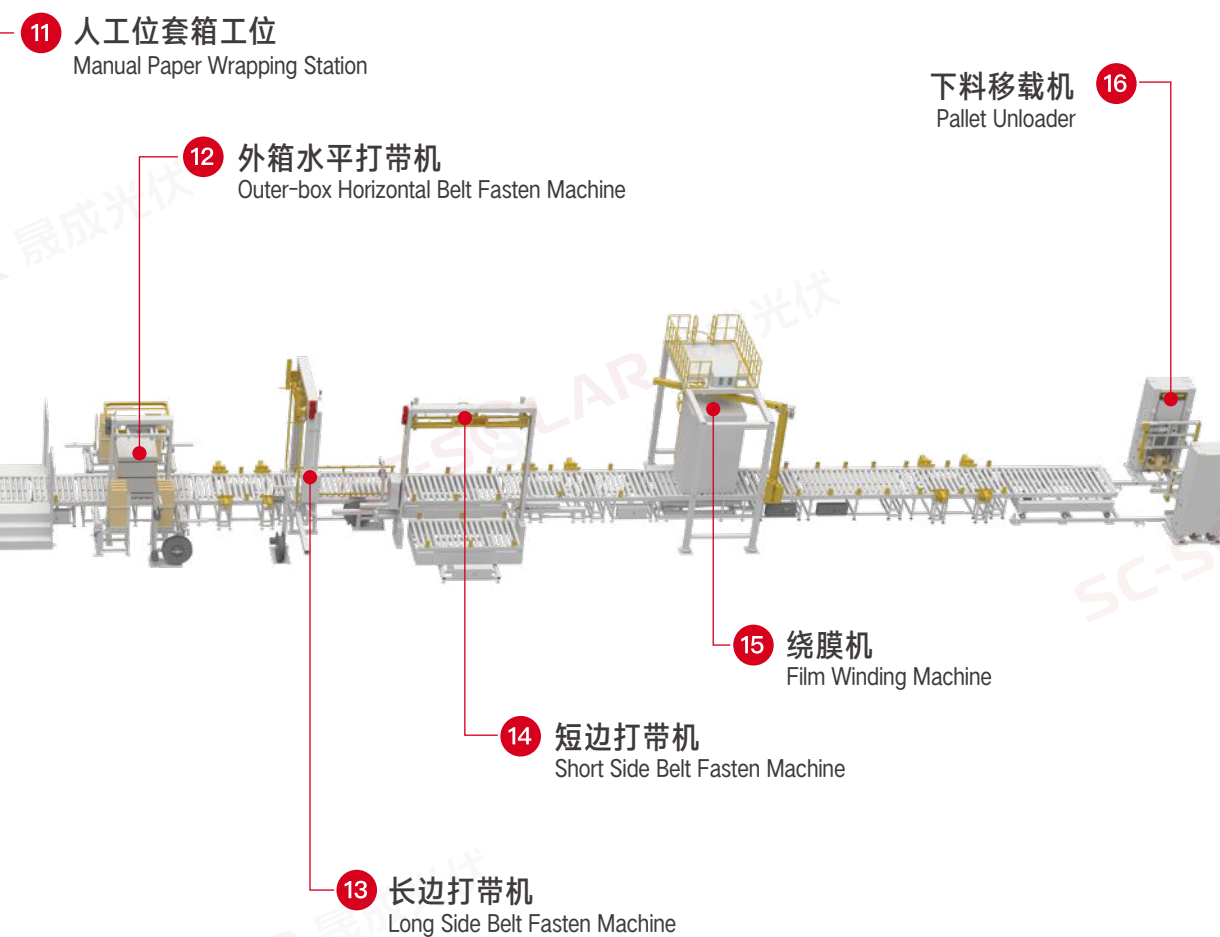
01 组件自动化整体解决方案

PV module manufacturing automation turnkey solution



PACKAGING LINE

包装线



INTELLIGENT EDGE-FINDING
EVA/POE CUTTING & LAYUP

智能寻边裁切机

功能描述

- 自动纠正一道/二道胶膜、背板铺设偏差。
- 自动热熔换卷，换料不停机。
- 玻璃伺服归正，不同版型组件一键式切换。

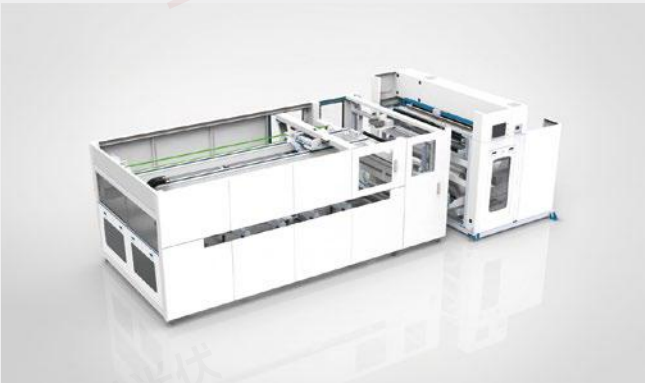
Features

- Automatic correction of the film/backsheet laying deviation.
- Automatic hot melt device, material change without stopping.
- Servo-controlled alignment of glass edges, one-click switching between different modules.



设备技术性能

切刀随拉料移栽一起运动，节拍快，最快节拍13s。
智能纠偏系统，自动纠正胶膜铺设位置，铺设精度±1.5mm。
自动换卷效率高，每次换卷时间小于30秒，换料不停机。



Functionality

The cutting knife moves together with the material pulling and transferring, the fastest cycle is 13s.
Intelligent correction system automatically corrects the positioning of the film, laying accuracy ±1.5mm.
High efficiency automatic roll changing, changing time less than 30s without stopping.



技术参数 Specifications

项目 Item	数值 Value
裁切精度 Cutting accuracy	±1.5mm
最快节拍 Cycle time	13s
适用版型 Compatible module size	长 length: 1650-2550(mm); 宽 width: 990-1450(mm)
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 32A, 50/60Hz
功率 Power	8kW
工作气压 Air pressure	0.5-0.8(MPa)
噪音 Noise	< 70dB
外形尺寸 Dimension (L×H×W)	6250*2750*2000(mm)
重量 Weight	约3500kg

FILM HANDING
MACHINE

胶膜整理机

功能描述

- 自动纠正一道胶膜和玻璃铺设偏差。
- 实现胶膜刮平和点烫定位功能。
- 玻璃伺服归正，不同版型组件一键式切换。

Features

- Automatic correction of 1st adhesive film and glass laying deviation.
- Realize the functions of film scraping and hot spot positioning.
- Glass servo alignment, one-click switching of different modules.



设备技术性能

通过视觉和伺服系统进行纠偏，精度高。
刮平机构由中向外同步刮平，效率高，刮平效果好。
四点热熔定位，保证纠偏后传输过程不产生二次偏移。
能适用各种类型偏差，且纠偏尺寸范围大。

Functionality

Through vision and servo system for deviation correction, high accuracy. The scraping mechanism from the middle to the outside synchronous scraping, high efficiency, scraping effect is good. Four-point hot melt positioning to ensure that the transmission process does not produce secondary offset after correction. Can be applied to various types of deviation, and the correction size range is large.



技术参数 Specifications

项目 Item	数值 Value
纠偏精度 Correction accuracy	±1mm
节拍 Cycle time	≤15s
适用版型 Compatible module size	长 length: 1650-2550(mm); 宽width: 990-1450(mm)
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 32A, 50/60Hz
功率 Power	4.5kW
工作气压 Air pressure	0.5-0.8(MPa)
噪音 Noise	≤70dB
外形尺寸 Dimension(L×W×H)	3530*1920*1885(mm)
重量 Weight	约2000kg

HIGH SPEED ROBOTIC STRING LAYUP

高速机器人摆串机

功能描述

- 串焊机端电池串输出适用单轨和双轨，双轨对接。
- 电池串定位方式：视觉定位。
- 主体框架结构为钢结构，牢固、可靠。
- 机器人速度快，定位精度高、稳定、可靠。
- 真空吸盘吸取电池串不留痕迹。
- 设备全自动控制，运行过程无需人员干预。
- 电池串吸附夹具具有真空检测功能，能有效避免电池片在抓取过程中掉落。
- 更换不同电池串可直接调用，必要时可部分调整。
- 支持上离线返修串。
- 满足横向版型、竖向版型及AB串版型组件。

Features

- The cell string output of the stringer can be applied to single-rail and double-rail.
- String positioning method: visual positioning.
- The main frame structure is steel, firm and reliable.
- The robot has fast speed, high positioning accuracy, stability and reliability.
- The vacuum suction cup sucks cell string without leaving traces.
- Fully automatic equipment control, no human intervention is needed during the operation.
- The cell string adsorption fixture has a vacuum detection function to prevent string falling.
- Replace the different cell strings directly, some adjustments needed if neccesary.
- Support online and offline rework of strings.
- Fit for horizontal, vertical and AB string module.



设备技术性能

节拍: 半片≤3.5s/串(玻璃进出料归正时间5s)
摆串精度: 串间距±0.4mm;
电池串到玻璃长短边距离±1mm
兼容电池片规格: 60片/72片/半片/MBB/MBB半片
稼动率: ≥98%
常规、半片、MBB碎片率: < 0.02%
视觉: 双影像系统, 分辨率0.05
噪音: ≤72dB



Functionality

Cycle time: half cell≤3.5s/pcs
Accuracy: string spacing ±0.4mm;
distance between string to the glass edge ±1mm
Compatible size: 60/72/half-cell/MBB/MBB half-cell
Rate: ≥98%
Fragment rate: <0.02%
Vision: dual image system, resolution of 0.05
Noise: ≤72dB



技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-SL54-RX-01
适用版型 Compatible module size	长length:1650-2550(mm); 宽 width: 990-1450(mm)
节拍 Cycle time	半片 half cell:3.5s/pcs (infeed, outfeed and alignment, 5s)
功率 Power	6kW
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 20A, 50/60Hz
工作气压 Air pressure	0.6-0.8(MPa)
耗气量 Air consumption	400L/min
设备重量 Weight	约3700kg
外形尺寸 Dimension(L×W×H)	3750*3750*2500(mm)

HIGH SPEED LAYUP MACHINE

高速排版机（直线电机款）

功能描述

- 实现电池串视觉定位自动高速排版。
- 实现电池串排版、电池串翻转(可选配)、电池串引线裁切(可选配)、串返修上料等功能。
- 可满足客户不同电池串版型要求，可一键切换。
- 玻璃伺服归正，不同版型组件一键式切换。

Features

- Realize visual positioning and automatic high-speed layup of strings.
- Realize the functions of string layout, string turnover (optional), lead cutting (optional), string repair feeding and etc.
- Can meet customer requirements of different cell string version, can be one-click switched.
- Glass servo alignment, one-click switching of different modules.



设备技术性能

排版节拍短，单串节拍2.5s。
配置相机视野范围广，切换版型更快。
对接兼容性更好，可对接更多型号的串焊机。



Functionality

Fast cycle time, the cycle time of single string is 2.5s.
The camera has wide field of vision and the switching time is faster.
Better docking compatibility, can be docking more models of stringer.



技术参数 Specifications

项目 Item	数值 Value
排版精度 Layup accuracy	±0.3mm
玻璃定位精度 Glass positioning accuracy	±1mm
节拍 Cycle time	≤30s(12串版型 12series)
适用版型 Compatible module size	长 length: 1650-2520(mm); 宽width: 1010-1410(mm)
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 32A, 50/60Hz
功率 Power	18kW
工作气压 Air pressure	0.5-0.7(MPa)
噪音 Noise	≤70dB
外形尺寸 Dimension(L×W×H)	4020*3160*2560(mm)
重量 Weight	约4500kg

AUTO BUSSING
MACHINE

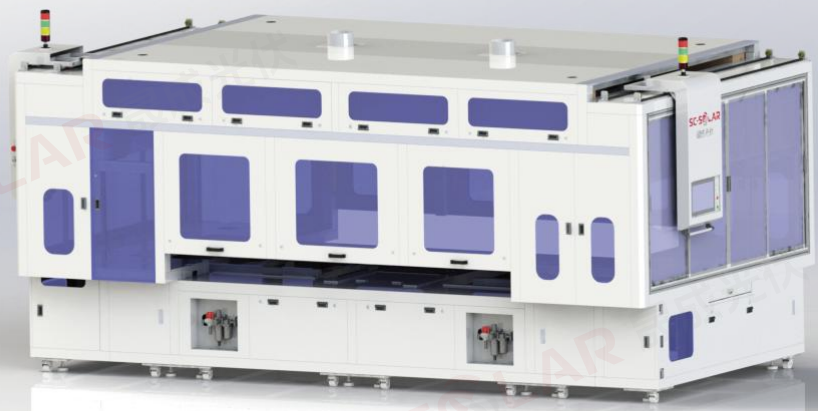
全自动叠焊机

功能描述

- 节拍快：常规组件节拍≤15s。
- 纠偏范围广：±30mm，理片精度≤0.3mm，支持叠串一次纠偏。
- 维修空间敞亮，切单时效快：30min-60min。
- 汇流条上料不停机。
- 虚焊检测功能。
- 助焊剂具有流量监测功能，喷头堵塞时开启反吹。
- 兼容50公斤以下汇流条。
- 旁路焊跳线采用模块化设计，可根据需要选配。
- 汇流带冲孔，刮黑漆（激光）功能可选配。

Features

- High-speed cycle time: ≤15s (conventional module).
- The deviation correction range ±30mm, cell accuracy ≤0.3mm, the lamination is supported for one-time deviation correction.
- Maintenance space clear, cutting single aging fast: 30min-60min.
- Bus bar feeding non-stop.
- With virtual welding detection function.
- The flux has a flow monitoring function, and the backflush is turned on when the nozzle is blocked.
- Compatible with ≤50kg bus bar.
- Bypass welding jumper adopts modular design, can be optional.
- Bus bar punching, black paint scraping (laser) function is optional.



设备技术性能

电池片规格：156*156-230*230(mm)/5BB-24BB
汇流带规格：卷状供料，料厚0.20-0.45(mm)，
宽4/5/6/7/8(mm)
焊带卷重量：大卷料卷50kg
组件节拍：15s
拉脱力与焊接效果：5BB≥4N，MBB≥2N
纠偏特性：理片精度高≤0.3mm，纠偏范围±30mm
视觉检测：头中尾共配置相机15个，支持叠片纠偏
焊接方式：电磁焊接
选配功能：单跳线、引出线冲孔、引出线冲圆角，
引出线激光除黑漆、虚焊检测、换料不停机



Functionality

Cell specification: 156*156-230*230(mm)/5BB-24BB
Bus-bar specification: roll feeding, material thickness 0.20-0.45(mm),
width 4/5/6/7/8(mm)
Welding tape reel weight: 50kg for large reel
Cycle time: 15s
Pull-off force and welding effect: 5BB≥4N, 9BB≥2N
Correction characteristics: high cell precision ≤0.3mm,
wide correction range ±30mm
Visual inspection: 15 cameras in the head, middle and tail, supporting
lamination correction
Welding method: electromagnetic welding
Optional functions: single jumper, lead line punching, lead line rounding,
lead line black paint scraping(laser), virtual welding detection, non-stop
refueling



技术参数 Specifications

项目 Item	数值 Value
适用玻璃尺寸 Applicable glass size	1640*2650(mm), 900*1500(mm)
节拍 Cycle time	≤15s
功率 Power	峰值50kW，平均功率约30kW Peak 50kW, average power about 30kW
电源 Power requirement	AC380V±5%，3P+1N+1PE（3相5线制 3-phase5-wire system）
气源 Air pressure	0.5-0.8(MPa)的干燥、干净压缩空气；用量：2m³/min 0.5-0.8(MPa)dry and clean compressed air; dosage: 2m³/min
重量 Weight	7000kg
外形尺寸 Dimension(L×W×H)	5635*2840*2450(mm)

LAYUP & BUSSING
INTEGRATION MACHINE

ALU-HBL 排版叠焊一体机



功能描述

- 节拍：常规半片组件节拍≤40s，对接高速串焊机。
- 自带纠偏系统，直线电机+绝对值伺服系统，纠偏精度≤0.3mm X轴采用直线电机，精度高；Y轴±100mm；不存在叠片问题。
- 可选配汇流条冲孔、冲倒角、激光除黑漆、汇流条上料不停机等功能；可选配虚焊检测功能；可选配汇流条点烫功能。
- 整体结构简单、便于维护。常规组件切单时效快：30-60min。
- 设备是一对一对接高速串焊机，相比较原来的布局降低了叠焊宕机对整线产能的影响。
- 焊接信息监控：自动追频、焊接能量监控MOS管温度焊头温度,数据可实时上传至MES系统。
- 设备集成了排版、叠焊、虚焊检测、汇流条点烫等功能使布局更加合理，减少了机械手抓取次数以及中间流转传输等环节，降低了整体布局成本，减少了场地的占用空间，提高了场地的利用率。

Features

- Cycle time: ≤40s, compatible with high-speed stringer.
- Equipped with a self-correction system, linear motor + absolute value servo system, correction accuracy ≤0.3mm. X-axis adopts linear motor with high precision; Y-axis±100mm. No cell overlap issue.
- Optional functions include busbar punching, chamfering, laser paint removal, and non-stop busbar loading. Optional virtual welding detection function. Optional busbar ironing function.
- Simple overall structure, easy to maintain. Fast single-cutting time for modules: 30-60min.
- The equipment is directly connected to the high-speed stringer, reducing the impact of cell overlap downtime on the line capacity compared to the original layout.
- Welding information monitoring: automatic frequency tracking, welding energy monitoring, MOS tube temperature, and soldering iron temperature, with data uploadable to MES system in real-time.
- The equipment integrates layout, cell overlap, virtual welding detection, and busbar ironing functions, making the layout more reasonable. It reduces the number of times the robot grabs and the intermediate transfer links, reduces the overall layout cost, reduces the space occupation of the site, and improves the utilization rate of the site.

设备技术性能

电池片规格：156*156mm-230*230(mm)/5BB-24BB
汇流条规格：卷状供料，厚度(0.20-0.45mm)，宽度4/5/6/7/8(mm)
汇流条重量：≤30kg
节拍：常规半片组件节拍≤40s
焊接拉力：5BB≥4N，9BB≥2N，MBB≥2N
纠偏特性：理片精度高≤0.3mm
视觉检测：理片纠偏头中尾采用6个相机，每组头中尾相机各一个，共两组，可对纠偏效果进行二次校验，不存在叠片问题。头中尾虚焊检测采用线扫相机，扫描精度高，
焊接方式：电磁感应焊接
选配功能：汇流条冲孔、冲倒角、激光除黑漆、汇流条上料不停机、虚焊检测、汇流条点烫功能等功能

Functionality

Cell specifications: 156*156-230*230(mm)/5BB-24BB
Busbar specifications: Coil feeding, thickness 0.20-0.45(mm), width 4/5/6/7/8(mm)
Busbar weight: ≤30kg
Cycle time: ≤40s
Welding tension: 5BB≥4N, 9BB≥2N, MBB≥2N
Alignment characteristics: High cell alignment accuracy ≤0.3mm
Visual inspection: 6 cameras are used for alignment at the head, middle, and tail of the cell, with one camera for each position in two sets, allowing for secondary verification of alignment effectiveness, with no cell overlap issues. Virtual welding detection at the head, middle, and tail is performed using line-scan cameras with high scanning accuracy.
Welding method: Electromagnetic induction welding
Optional functions: Busbar punching, chamfering, laser paint removal, non-stop busbar loading, virtual welding detection, busbar ironing function, etc.

技术参数 Specifications

项目 Item	数值 Value
适用玻璃尺寸 Applicable glass size	长 length: 1640-2550(mm); 宽width: 900-1450(mm)
节拍 Cycle time	≤40s
功率 Power	峰值 peak powe 35kW，平均功率约 average power 15kW
电源 Power repuirement	AC380V±5%，3P+1N+1PE
压缩空气 CDA	0.6-0.8(MPa)的干燥、干净压缩空气；用量：2000L/min 0.6-0.8 (MPa) dry, clean compressed air ; Consumption: 2000L/min
控制系统 Control system	PLC+触摸屏 touchscreen +CCD视觉检测 vision inspection
重量 Weight	7000kg
外形尺寸 Dimension(L×W×H)	6300*3200*2550(mm)

MODULE REPAIRING
MACHINE

组件返修机

ALU-HSR组件返修机，可拆卸与更换不良电池片和汇流条，兼容电池片166*166mm-230*230mm/9BB-20BB，兼容组件尺寸最大为2700*1500mm。

ALU-HSR module repairing machine, can remove and replace bad cells and busbars, compatible with 166*166mm-230*230mm/9BB-20BB cells, compatible module size up to 2700*1500mm.



功能描述

- 自动切换程序可实现210组件（不含跳线），半片组件和双玻组件的返修。
- 拆卸焊头每个单独控制，可对单组电池串拆卸和焊接。
- 外置送料单元，可进行OK串上料和NG串下料，并带有判断电池串方向的相机。
- 具有独特的理片结构；理片范围±20mm。
- 兼容更大尺寸的组件：2700*1500(mm)。

Features

- Compatible for 210 modules (excluding jumper wire), half-cell modules and double glass modules repairing.
- The disassembling welding head is controlled individually, can disassemble and weld a single string.
- External feeding unit for OK string feeding and NG string unloading, with a camera to judge the direction of string.
- Have unique devitation corretion mechanism, devitation corretion range ±20mm.
- Compatible with larger modules: 2700*1500(mm).

设备技术性能

电池片规格：166*166-230*230(mm)/9-20(BB)；
组件规格：A、166*166-185*185电池片：6串*10半片*2，6串*11半片*2,6串*12半片*2，6串*12半片*2，片间距0.5-4(mm)，串间距1-4(mm)；
B、210*210电池片：6串*10半片*2,6串*15三分片*2，片间距1-4(mm)，串间距1-4(mm)；
玻璃尺寸：最大 2700*1500(mm)；最小 1640*980(mm)
汇流带规格：卷状供料，料厚0.18-0.45(mm)，宽4/5/6/7/8mm，卷重≤30kg
汇流带与焊带拉力：> 5N/mm（喷涂助焊剂）
节拍：单串更换整体节拍85s
破损率：< 0.2‰(以片计算)
良率：≥99%（按组件单位计，流入汇流带焊接机的组件排版精度需在±0.5mm以内，多主栅标准相同）
稼动率：> 98%（不含维护时间）
焊接方式：电磁感应
组件输入/输出高度：950-980(mm)
向上折弯U/L形引线高度范围：10-25(mm)

Functionality

Cell size: 166*166-230*230(mm)/9-20(BB)
Module specifications:
A, 166×166-185×185 cell: 6 strings×10 half-cell×2; 6 strings ×11 half-cell×2; 6 strings ×12 half-cell×2;6 strings×12 half-cell×2; cell spacing 0.4-5 (mm), string spacing 1-4(mm);
B, 210×210 cell: 6 strings×10 half-cell×2;6 strings×15 one-third cell ×2; piece spacing 1-4(mm), string spacing 1-4(mm)
Glass size: Max 2700*1500(mm); Min 1640*980(mm)
Bus-bar specification: roll feeding, material thickness 0.18-0.45(mm), width 4/5/6/7/8mm, roll weight ≤30kg
Bus-bar and welding belt tension: >5N/mm(spraying flux)
Cycle time: 85s
Fragmentation rate: <0.2‰
Yield: ≥99%
Utilization rate: >98%
Welding mode: electromagnetic induction
Module input/output height: 950-980(mm)
Bend up U/L lead height range: 10-25(mm)

技术参数 Specifications

项目 Item	数值 Value
电源 Power requirement	AC380V±5%，3P+1N+1PE（3相5线制） AC380V±5%，3P+1N+1PE(3-phase5-wire system)
气源 Air pressure	0.5-0.8(MPa)的干燥、干净压缩空气；用量：2m³/min 0.5-0.8(MPa)dry and clean compressed air; dosage: 2m³/min
功率 Power	额定50kW，平均功率约35kW Rated 50kW, average power about 35kW
重量 Weight	6500kg
外形尺寸 Dimension(L×W×H)	5280*3866*2520(mm)

ISOLATED SHEET PLACE MACHINE

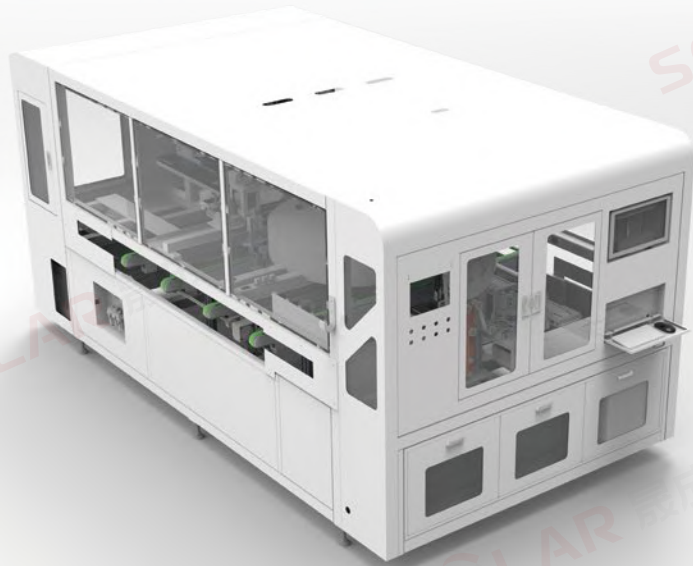
绝缘小块放置机

功能描述

- 兼容多种规格组件尺寸，伺服归正系统换型方便快捷。
- 小块现切现冲配合供料缓存皮带可以实现不停机换料。
- 视觉系统检测小块和引线状态，计算偏移量，由四轴机械手进行摆放。
- 可实现自动贴汇流条条码功能，并依靠视觉对贴付效果进行检测与反馈。

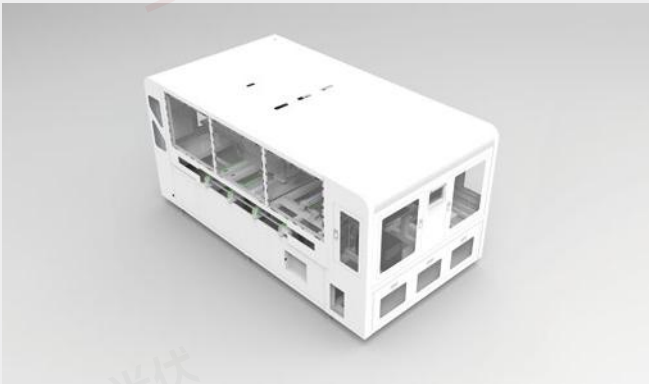
Features

- Compatibility with multiple module sizes, and a fast swap servo alignment system.
- Insulation block cutting combined with punching function with a feeding buffer conveyor makes possible material replacement non stop.
- The visual system detects the status of small blocks and ribbons by calculating the offset value. and arranges them using a four axis robotic arm.
- Auto barcode labelling function with visual system for checking how the barcode is well attached.



设备技术性能

小块裁切精度: $\pm 1\text{mm}$
冲孔精度: $\pm 0.5\text{mm}$
节拍: $< 14\text{s}$
噪音: $< 70\text{dB}$
标签材质: 兼容PER、合成纸、PE、PVC、PP等材质
条码尺寸: 长 40-60(mm); 宽 6-12(mm)
条码检测: 条码打印完成具有检测打印清晰度、校对条码一致性汇流条条码粘贴完成后, 检测是否贴歪及破损



Functionality

Sheet cutting accuracy: $\pm 1\text{mm}$
Punching accuracy: $\pm 0.5\text{mm}$
Cycle time: $< 14\text{s}$
Noise: $< 70\text{dB}$
Label material: compatible with materials such as PER, synthetic paper, PE, PVC, PP, etc
Barcode size: length 40-60(mm); Width 6-12(mm)
Barcode detection: Check if the barcode is clearly printed and its consistency with incoming glass barcode. After the busbar code is printed, detect whether the barcode is crooked or damaged



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	宽 width: 990-1450(mm); 长 length: 1640-2550(mm)
电源 Power requirement	AC380V $\pm 5\%$, 3P+1N+1PE, 16A, 50/60Hz
功率 Power	5kW
工作气压 Air pressure	0.5-0.7(MPa)
外形尺寸 Dimension(L×W×H)	4200*2200*2100(mm)
重量 Weight	约2500kg

AUTO STRING
TAPING

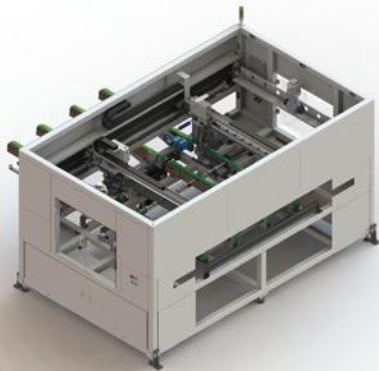
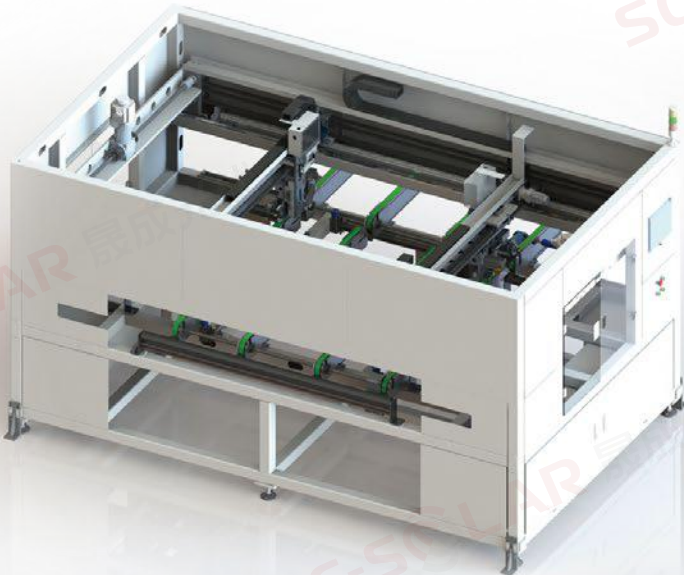
自动贴胶带机

功能描述

- 整体结构由玻璃归正输送单元，贴胶带系统，真空系统等组成。
- 轮盘式贴胶带机头，提高效率。
- 伺服电机传动贴胶带机构，高速度，高精度。
- 贴胶带系统采用丝杆模组带动吸盘上的胶带下压。硅胶吸盘可以增加下压缓冲，避免刚性接触，减少电池片破片和隐裂的概率。
- 线体多点支撑，滚轮位置自由调节，避免虚贴。

Features

- The overall structure consists of aglass alignment, a taping system, a vacuum system, and etc.
- Wheel-disc type tape head, improve efficiency.
- The servo motor drive drives the tape mechanism, high speed and high precision.
- The taping system uses a lead screw to drive the tape on the suction cup to press down. The sponge suction up can increase the buffer to avoid rigid contact and reduce the probability of chip fragmentation and cracking.
- Multi-point support, free adjustment of roller position, avoid faker sticker.



设备技术性能

组件定位精度：±1mm，定位归正无震动
更换胶带时间：≤60s
胶带粘贴位置偏差：±2mm
贴胶带时碎片率：≤0.05%
不同版型切换时间：在系统内已有版型，一键切换5min/人，新版型20min/人
一体式旋转头，真空稳定；可整体拆换，切换定长（更换时间<10min）；卡套式吸盘不用胶水，快速拆卸
操作模式：手动/自动
噪音：≤60dB
人机界面：中英文模式
贴胶带良率：>99.95%

Functionality

Module positioning accuracy: ±1mm
Tape change time: ≤60s
Taping positioning accuracy: ±2mm
Fragment rate:≤0.05%
Change over time: Existing version of the system, One-button switch 5min/ person , New version 20min/ person
Integrated rotating head, vacuum stability; Can be replaced as a whole (replacement time < 10min); Using sleeve type sucker, no glue, fast disassembly.
Operation mode:Auto/Manual
Noise: ≤60dB
HMI: Chinese/English mode
Yield: >99.95%

技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-AT30-CS-01
适用版型 Compatible module size	长 length: 1640-2550(mm); 宽 width: 980-1450(mm)
设计节拍 Cycle time	Cycle time节拍≤14s（36个点，四头，含进出料时间） (36 points, 4 heads, including infeed and outfeed time)
工作气压 Air pressure	0.6-0.8(MPa)
功率 Power	9.2kW
归正方式 Aligenment method	四边对中归正 four sides alignment
胶带长度 Tape length	标准长度 standard length 12/16/18/20/22/25mm
胶带宽度 Tape width	5-10mm（如有其他长度/宽度可定制） (Other lengths/widths can be customized)
胶带卷规格 Tape specification	内径 inner diameter Φ77±1mm,外径 external diameter ≤Φ200mm
外形尺寸 Dimension(LxWxH)	3350*3550*1750(mm)

AUTO ICB LEAD
BENDING

引线折弯机

功能描述

- 兼容多种规格组件尺寸，伺服归正系统换型方便快捷。
- 通过可靠的视觉系统检测来料状态、引导定位、成品检查。
- 运动单元由伺服电机驱动，速度快，精度高，稳定可靠。
- 实现自动引线折弯，放高温布或贴胶带（二选一），兼具贴背板条码功能。
- 三处引线同时操作，节拍14s，速度快，效率高。
- 伺服控制与产品柔性接触，安全性高。
- 贴胶带、贴条码良率≥99.5%，稳定可靠，节省人工。

Features

- Compatibility with multiple module sizes alongside fast change-over servo alignment system.
- A reliable vision system for detecting the status of incoming material, guiding positioning process and inspecting finished products.
- The motion unit is driven by servo motor with high speed, high precision, stable and reliable.
- Auto ICB lead bending, Teflon patch or tape placement.(choose either of them as needed) and backsheet barcode attaching.
- The three leads bound simultaneously in 14 seconds, effective and efficient.
- Flexible contact between servo control and products ensures sound safety standards.
- Over 99.5% of yield rate in taping and bar code labelling that is stable and reliable and labor-saving.



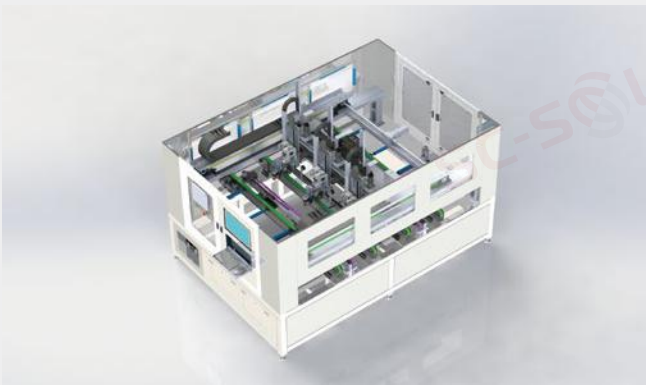
设备技术性能

常规、半片、MBB碎片率：≤0.04%
兼容电池片规格：60片半片/72片半片/MBB半片
高温布换料频率：≥11小时/次
视觉系统：来料检测、引导定位、成品检查
视觉精度：≤±0.1mm
输送方向：横向输送
机械定位:伺服/气缸归正
稼动率:>99%
环境温度：15℃-30℃
环境湿度：5%-75%（不结露）



Functionality

Normal, half-cell, MBB fragmentation rate: ≤0.04%
Compatible cell specifications: 60 half-cell/72 half-cell/MBB half-cell
High temperature cloth changing frequency: ≥11 hours/time
Vision system: incoming material inspection, guiding positioning, final product inspection
Visual accuracy: ≤±0.1mm
Conveying direction: horizontal conveying
Mechanical positioning: servo or cylinder alignment
utilization rate: >99%
Ambient temperature: 15℃-30℃
Environmental humidity: 5%-75% (no dewfall)



技术参数 Specifications

项目 Item	数值 Value
适用玻璃尺寸 Compatible glass size	长边 Long side: 1600-2500(mm) 短边 Short side: 900-1500(mm)
节拍 Cycle time	≤16s
功率 Power	≤7.5kW
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 20A, 50/60Hz
工作气压 Air pressure	0.6-0.8(MPa)
耗气量 Air consumption	200L/min
噪音 Noise	≤75dB
重量 Weight	2500kg
外形尺寸 Dimension(L×W×H)	3700*2200*2100(mm)

AUTO EDGE
TAPING

双玻封边机

功能描述

- 整体结构由组件传输单元、四边归正、升降平台、伺服丝杠、胶带封边伺服模组、真空系统等机构组成。
- 伺服电机、模组结合带动封边机构封边,速度快,精度高。
- 封边系统包括胶带固定机构、胶带封边黏贴机构、封边机构、压平机构和切断机构等。
- 胶带黏贴、压平机构的滚轮采用聚氨酯软性材质粘贴和压平胶带,有效防止刚性材质接触玻璃,避免电池片破损和隐裂。



Features

- The whole structure is composed of transmission unit, four-side-alignment, lifting platform, servo screw, tape sealing servo module, vacuum system and so on.
- The servo motor and the module combine to drive the edge banding mechanism to seal the edge, the speed is fast and the precision is high.
- The sealing system includes tape fixing mechanism, tape sealing and pasting mechanism, sealing mechanism, flattening mechanism, cutting mechanism, etc.
- The roller of tape and flattening mechanism adopts polyurethane flexible material to prevent the rigid material from contacting the glass and to avoid the probability of cell chips and cracks.

设备技术性能

组件定位精度: $\pm 1\text{mm}$, 定位归正无震动
更换胶带时间: $\leq 30\text{s/卷}$
整体节拍: $\leq 14\text{s}$
不同板型切换时间: 60cell $\leftrightarrow$ 72cell 换线一键切换 (伺服)
常规 $\leftrightarrow$ 半片 $< 10\text{min/1人}$
封边效果: 无褶皱, 无气泡, 无隐裂
操作模式: 手动/自动
噪音: $\leq 60\text{dB}$
人机界面: 中英文模式
封边良率: $> 99\%$



Functionality

Module positioning accuracy: $\pm 1\text{mm}$
Tape change time: $\leq 30\text{s/roll}$
Cycle time: $\leq 14\text{s}$
Change over time: 60cell $\leftrightarrow$ 72cell one button switch
normal $\leftrightarrow$ half-cell $< 10\text{min/1 person}$
Taping effect: no fold, no bubble, no crack
Operation mode: Auto/Manual
Noise: $\leq 60\text{dB}$
HMI: Chinese/English mode
Yield: $> 99\%$

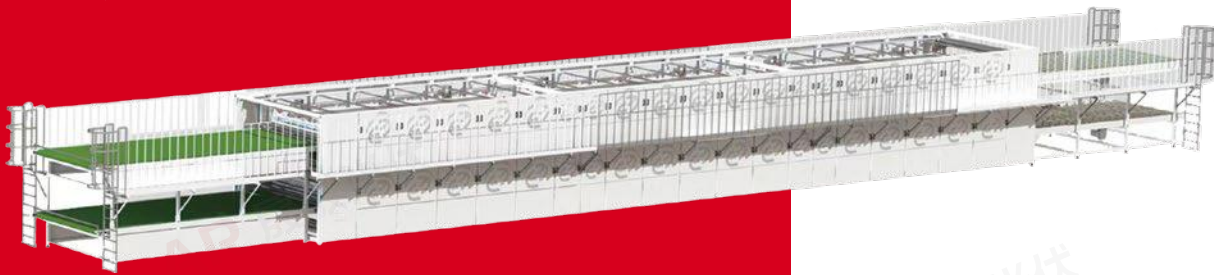


技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-ES28-DG-01
适用版型 Compatible module size	长 length: 1650-2550(mm); 宽 width: 990-1450(mm)
设计节拍 Cycle time	$\leq 14\text{s}$
归正方式 Aligenment method	四边对中归正 four sides alignment
胶带长度 Tape length	500m-1000m
胶带宽度 Tape midth	宽度 width: 25-40(mm); 厚度 thickness: 0.06-0.10(mm)
胶带卷规格 Tape roll specification	内径 inner diameter $\Phi 77\pm 1\text{mm}$; 外径 external diameter $\leq \Phi 330\text{mm}$
工作气压 Air pressure	0.5-0.7(MPa)
功率 Power	$\leq 6.5\text{kW}$
外形尺寸 Dimension(LxWxH)	3810*2720*1950(mm)

LAMINATOR

层压机



晟成层压机机型主要包括单层单腔/双腔/三腔，双层单腔/双腔/三腔，三层单腔/双腔/三腔等，可根据客户要求定制。

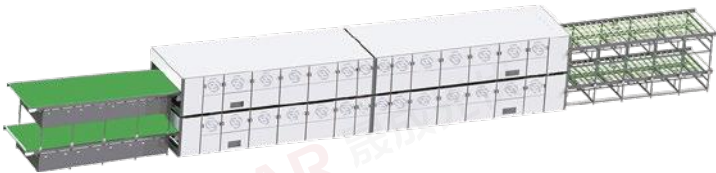
The main model includes single-layer& single-chamber/double-chamber/three-chamber laminator, double-layer & double-chamber/three-chamber laminator, three-layer & single-chamber/ double-chamber/three-chamber laminator etc., it can be customized according to customer requirements.

层压机加热方式主要有油加热和电加热，可根据客户需求定制规格型号。

Laminator heating method: oil heating and electric heating, other sizes as per customer requirements will be customized.



单层双腔层压机
Single-layer& double-chamber
Laminator



双层双腔层压机
Double-layer& double-chamber
Laminator



三层双腔层压机
Three-layer& double-chamber
Laminator

设备技术性能

操作便捷简单
台面温度均匀性高
设备运行更稳定可靠
节能，清洁，环保
高配置，成品率高

Functionality

Easy operation
Excellent temperature uniformity
More stable and reliable performance
Power saving, clean, environmental protection
Higher configuration, high yield



技术参数 Specifications

设备型号 Model	2700mm*8700mm		2700mm*9400mm		2700mm*10000mm	
	OL	EL	OL	EL	OL	EL
加热方式 Heating method	油加热 Oil heating	电加热 Electric heating	油加热 Oil heating	电加热 Electric heating	油加热 Oil heating	电加热 Electric heating
作业温度 Working temperature	室温RT-180℃		室温RT-180℃		室温RT-180℃	
温度均匀性 Temperature uniformity	±1.5℃		±1.5℃		±1.5℃	
温度精度 Temperature accuracy	±1℃		±1℃		±1℃	
传输精度 Transmission accuracy	±3mm		±3mm		±3mm	
成品良率 Yield	99.99%		99.99%		99.99%	
工作噪音 Noise	≤80dB		≤80dB		≤80dB	

FULLY AUTOMATIC
ELECTROMAGNETIC HEATING
MULTI-LAYER LAMINATOR

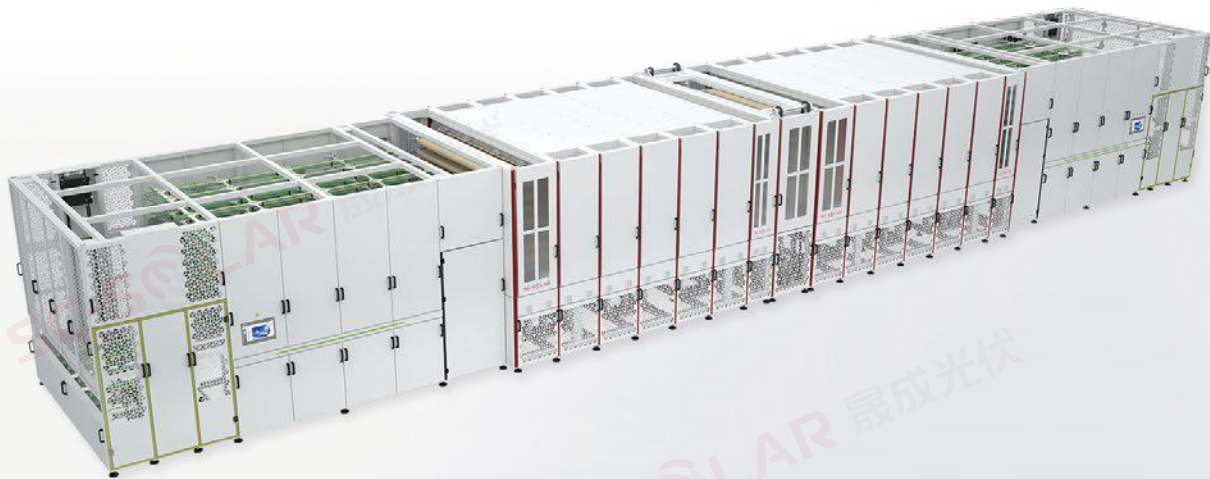
全自动电磁加热多层层压机

六大优势

- 小空间
- 超低的组件工艺能耗
- 故障自我整定修复，可及时下达至设备人员
- 大产能
- 5G信息化控制管理系统
- 人员成本降低

Six major advantages

- Small footprint
- low energy consumption
- Fault self-adjustment
- High production capacity
- 5G information control management system
- Reduced personnel costs



功能描述 Features

- 8层腔室（有效层压面积2820mm*4320mm，182/210组件一压24）
8-layer chamber (effective lamination area 2820mm*4320mm, 182/210 module 1 pressure 24)
- 温度分层控制，上下室均温电加热系统。升温速率PID实时调节，升温速率调节范围1.0℃~2.0℃/min
Temperature stratified control, upper and lower chamber temperature equal electric heating system. The temperature rise rate PID is adjusted in real time, and the temperature rise rate adjustment range is 1.0℃~2.0℃/min
- 真空分层控制；抽真空时间压缩至180s
Vacuum stratified control; The vacuum time is compressed to 180s
- 独立传输定位，伺服驱动
Independent transmission positioning, servo drive
- 液压升降系统+直线导轨辅助机构
Hydraulic lifting system + linear guide auxiliary mechanism
- 出料采用伸缩式堆栈，组件冷却方式采用液冷技术，提高冷却效率；降温速度可调，5分钟内降温至40℃以下
Retractable stack is adopted for unloading and liquid cooling technology is adopted for module cooling to improve cooling efficiency. The cooling speed is adjustable, and the temperature drops to bellow 40° in 5 minutes
- 进料采用伸缩式堆栈，与流水线对接升降机组件归正+8层层位组件归正一体化结构设计，输入精度更高，伺服加直线导轨运行稳定高效
The loading adopts the retractable stack, the integrated structure design of the lift module normalization +8 layer position module normalization, the input accuracy is higher, and the servo plus linear guide rail is stable and efficient
- 多层层压机整机尺寸：25000mm*3950mm*4150mm
Multi-layer laminator size: 25000mm*3950mm*4150mm
- 全动态数字MES控制系统，50寸MES数据显示器
Full dynamic digital MES control system, 50 "MES data display

PICK&PLACE SYSTEM FOR LAMINATE FRAME

双玻自动取放框

功能描述

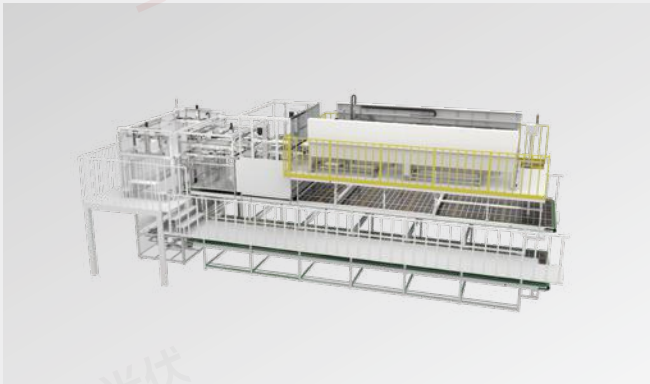
- 整体结构由取框组件、放框组件、顶框组件、回流传输单元、四边归正和上料缓存单元组成。
- 伺服电机和模组结合带动层压框Z轴升降，水平移栽采用伺服电机和同步带驱动，速度快，精度高。
- 顶框组件包括吸盘单元、顶框机构等，有效解决层压后EVA粘框的问题，确保高效取框。
- 回流传输单元采用两侧可调式5皮带输送，每隔3节设置归正，确保层压框平稳移动，且在层压机顶部设置平台，方便检修维护。
- 上料缓存单元采用多套先进后出堆栈机构，满足更多层压框的存储与进出，确保持续供料，实现高效放框。

Features

- The overall structure consists of the frame taking, the frame placing, the frame lifting, the return transmission unit, the four-side normalization and the feeding buffer unit.
- The combination of servo motor and module drives the Z-axis of the lamination frame to rise and fall, and the horizontal transplanting is driven by servo motor and synchronous belt, with high speed and high precision.
- The frame lifting part includes suction cup unit, frame lifting mechanism, etc., which can effectively solve the problem of EVA sticking to the frame after lamination and ensure efficient frame removal.
- The backflow transmission unit adopts the adjustable 5 belt conveyor on both sides and sets the normalization every 3 sections to ensure the smooth movement of the laminated frames, and the platform is set on the top of the laminator for easy maintenance.
- The feeding and buffering unit adopts multiple sets of first-in-last-out stacking mechanisms to meet the storage and entry and exit of more laminated frames, ensure continuous material supply, and achieve efficient frame placement.

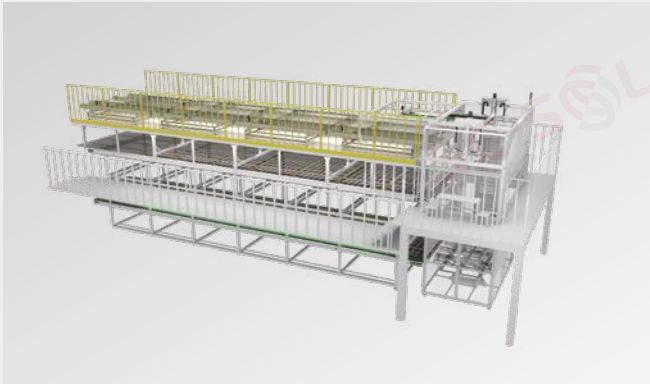
设备技术性能

上框归正准确，取放框定位精度≤2mm
整体节拍：≤22s
不同板型切换时间：≤20min/1人
取放框效果：定位准确，无粘框，无隐裂
操作模式：手动+自动
噪音：≤60dB
人机界面：中英文模式
取放框良率：>98%



Functionality

The frame alignment is correct and accurate, and the positioning accuracy of the pick-and-place frame ≤2mm
Cycle time: ≤22s
Change time: ≤20min/1 person
Pick and place frame effect: accurate positioning, no sticking frame, no cracking
Operation mode: Auto+Manual
Noise: ≤60dB
HMI: Chinese and English mode
Yield: >98%



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长 length: 1650-2520(mm); 宽 width: 990-1450(mm)
设计节拍 Cycle time	≤22s
归正方式 Alignment method	四边对中归正 Four-sided alignment
每套堆栈层数 The number of stacking layers per set	≥10
每套码垛层数 The number of palletizing layers per set	≥60
工作气压 Air pressure	0.5-0.7(MPa)
功率 Power	13kW
外形尺寸 Dimension(L×W×H)	54630*6000*5650(mm) (具体参照层压机规格) 54630*6000*5650(mm) (refer to laminator specifications)

G2G EDGE TAPE
REMOVER

双玻撕胶带机

功能描述

- 整体结构由输送单元、四边归正、伺服升降、真空系统，撕胶带模块，废料收集等机构组成。
- 伺服系统、模组结合驱动撕胶带机构撕胶带、速度快，精度高。
- 撕胶带模块包含胶带固定、胶带起头、胶带撕除、胶带缠绕、胶带退料机构等。
- 撕胶带全套动作采用伺服力矩控制，有效防止胶带中途断裂；废胶带缠绕成团方便清理。

Features

- The overall structure is composed of conveying unit, four side alignment, servo lifting, vacuum system, tape tearing, waste collection and other mechanisms.
- The servo motor and the module combine to drive tape tearing mechanism to tear the tape, the speed is fast and the precision is high.
- Tape ripping module includes tape fixing mechanism, tape starting mechanism, tape tearing mechanism, tape winding mechanism, tape returning mechanism and so on.
- The whole action of tape tearing adopts servo torque control, which effectively prevents the tape from fracturing in the middle. Wrap the waste tape into a ball for easy cleaning.



设备技术性能

- 组件定位精度: $\pm 1\text{mm}$
- 清理废料时间: 1800-2000(pcs)
- 整体节拍: $\leq 18\text{s}$
- 不同板型切换时间: $< 10\text{min}$
- 撕胶带效果: 无残留、无划痕、无粘连
- 操作模式: 自动/手动
- 工作噪音: $< 75\text{dB}$
- 人机界面: 中英文模式
- 撕胶带良率: $\geq 98\%$



Functionality

- Module positioning accuracy: $\pm 1\text{mm}$
- Waste cleaning time: 1800-2000(pcs)
- Cycle Time: $\leq 18\text{s}$
- Change over time: $< 10\text{min}$
- Tape tearing effect: no residue, no scratches, no adhesion
- Operation mode: Auto/Manual
- Noise: $< 70\text{dB}$
- HMI: Chinese/English mode
- Yield: $\geq 98\%$



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长length: 1700-2550(mm); 宽 width: 990-1450(mm)
进料方式 Feeding method	长边进料 (LEL)
兼容组件波形范围 Compatible module waveform range	0-5(mm)
兼容组件厚度 Compatible module thickness	4-10(mm)
胶带规格 Tape specification	宽度width: 30-40(mm); 厚度 thickness: 0.06-0.10(mm)
适应封边类型 Applicable edge type	全封边双玻组件, 结尾处胶带头长度 $\geq 50\text{mm}$ Full edge double glass module, the length of tape head at the end is $\geq 50\text{mm}$
功率 Power	$< 8\text{kW}$
电源 Power requirement	380V, 50Hz, AC $\pm 5\%$
压缩空气 CDA	0.6-0.8 (MPa), 300L/min
外形尺寸 Dimension(L×W×H)	4200*2500*2100(mm)

AUTO
TRIMMING

自动修边机

功能描述

- 伺服电机驱动模组传动，直线导轨导向，确保精准到位，平稳运行。
- 四边同时进行切割，削边机四角采用可顶升式吸盘结构。
- 修边机刀片采用圆弧刃口，二次修边刀片采用直刀刃，切削工整干净。
- 削边后切面平滑，不会对玻璃造成损伤。
- 刀片采用快换结构，更换快捷便利。

Features

- Servo motor drives module transmission, linear guide to ensure accurate and stable operation.
- Four edges cutting at the same time, the four corners adopt jacked suction cup structure.
- The blade adopts arc edge to cut clean, second trimming blade adopt straight blade to cut clean.
- The cut surface is smooth after trimming, which will not cause damage to the glass.
- The blade adopts quick change structure, easy to replace.



设备技术性能

- 阻挡归正方式：单侧阻挡，两边归正
喂料方式：滚筒电动夹料
更换刀片时间：≤180s
整体节拍：≤23s
设备换型时间：≤20min
削边时碎片率：≤0.05%
操作模式：手动+自动
工作噪音：≤60dB
人机界面：中英文模式
修边良率：>98.5%



Functionality

- Alignment blocking: one side block, two sides alignment
TFeeding method: electric roller clamping
Tape change time: ≤180s
Cycle time: ≤23s
Change time: ≤20min
Fragment rate: ≤0.05%
Operation mode: Auto/ Manual
Noise: ≤60dB
HMI: Chinese/ English mode
Yield: >98.5%



技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-TR25-K8-01
适用版型 Compatible module size	长 length: 1640-2550(mm); 宽 width: 950-1450(mm)
节拍 Cycle time	竖向≤19s, 横向≤16s Vertical ≤19s, horizontal ≤16s
工作气压 Air pressure	0.6-0.8(MPa)
功率 Power	≤2.2kW
外形尺寸 Dimension(LxWxH)	3200*2210*1620(mm)

AUTO FRAME
LOADER

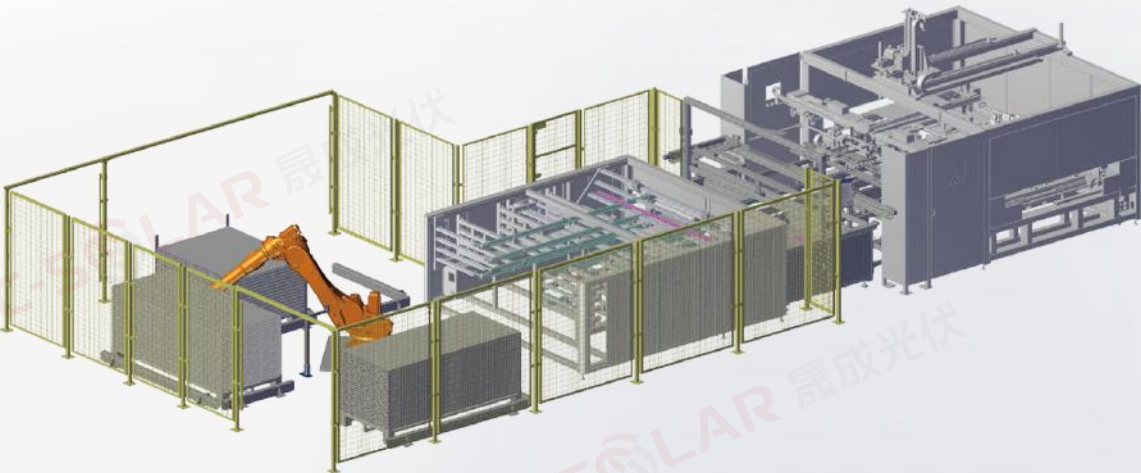
整托边框上料机

功能描述

- 实现边框的自动检测、抓取、上料、分料。
- 实现无人上料，换料不停机等。
- 可满足客户不同边框要求，兼容性强。
- 视觉检测，挑出不良产品。
- 缓存70套边框，满足换料不停机。
- 可以人工换料，兼容AGV小车自动换料。

Features

- Realize automatic detection, grasping, feeding and dividing of the frame.
- Realize unmanned feeding, refueling without stopping, etc.
- Can meet the different requirements of frames, strong compatibility.
- Visual inspection, pick out defective products.
- Cache 70 sets of frames to meet the non-stop refueling.
- Can be manual refueling, compatible with AGV car automatic refueling.



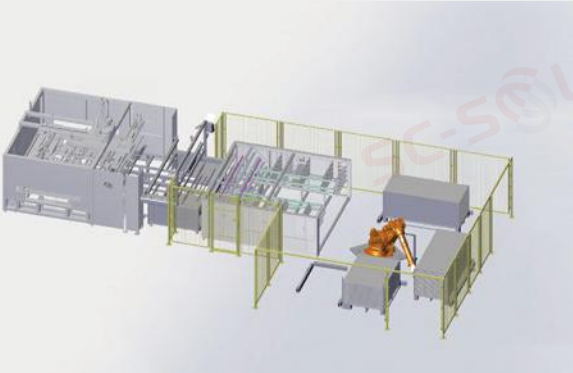
设备技术性能

视觉拍照引导，自动抓取边框。
正常一次性抓取8根边框，如遇边框之间间隙大，可以多次抓取边框，满足智能抓取，减少人工干涉。
视觉拍照可以检测出不良边框。
缓存70套边框，一次性自动送出有规律的4根。满足下一工位生产。
提高产线自动化率，为无人车间做准备。



Functionality

Guided by the visual system, the machine can automatically clamp the frame.
Under normal circumstances, 8 frames can be gripped at one time, and if there is a big gap between them, the frames can be captured several times in ways that reduce manual intervention.
The visual system is designed to detect NG frames.
The machine with buffer capacity of 70 sets of frames has the potential to feed 4 frames at one time to facilitate next work station.
This equipment promises to make the assembly line more automated, thus laying the groundwork for the ongoing unmanned factory.

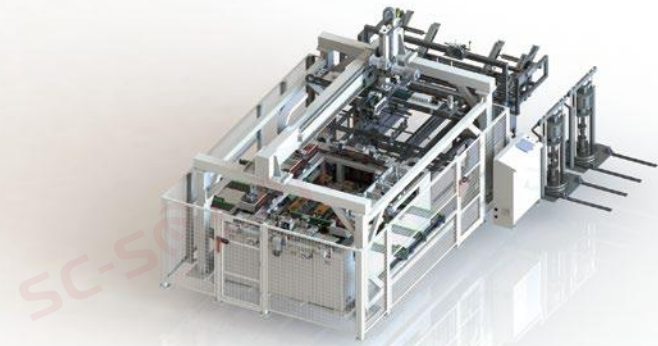


技术参数 Specifications

项目 Item	数值 Value
长边框 Long frame	1650~2520(mm)
短边框 Short frame	990~1450(mm)
节拍 Cycle time	≤16s
兼容边框B面尺寸 Compatible B-side frame size	30~35(mm)
电源 Power requirement	AC380V±5%，3P+1N+1PE，20A，50/60Hz
功率 Power	15kW
工作气压 Air pressure	0.6~0.8(MPa)
噪音 Noise	≤70dB
外形尺寸 Dimension(L×W×H)	6000*5000*4000(mm)
重量 Weight	约2500kg

FRAMING
MACHINE

高位组框机

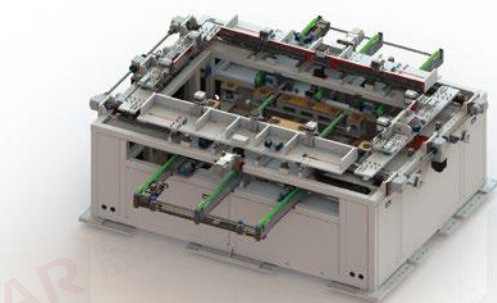


功能描述

- 人工摆放铝框至打胶移动平台或边框料仓平台，平台自动移动，双胶头自动打胶，运行平稳可靠。配置边框料仓（边框料斗不掉料）、固瑞克及PCF系统。
- 双胶头打胶系统运行平稳，出胶均匀。
- 采用三段速打胶机，三段速度均可单独设定。四根边框的三段速可以单独设定。
- 抓取边框采用气动手指夹取，可兼容无C边边框。
- 高位组框机采用的组框机构高于输送线，可预先放置边框，加快组框节拍。
- 长短边采用伺服+丝杆传动，短边组角力可达2T。
- 铝框与装框机接触面 > 90%，边角正面无溢胶，不损伤边框膜，可适应无膜边框。
- 装框机放置边框底板、侧挡板采用40Cr/SKD11材质表面抛光，淬火后硬度要求达到55以上。

Features

- The aluminum frame is manually placed on the glue dispensing platform, the platform automatically moves, the glue is automatically dispensed, and the equipment runs smoothly. Configure the frame silo (the frame hopper does not drop), the Graco pump and the PCF system.
- The rubberizing system runs smoothly and the glue is evenly distributed.
- With a three-stage speed glue machine, the three-stage speed can be set separately.
- The capturing frame is clamped by pneumatic fingers, which is compatible with no C-side frame.
- The frame machine adopts frame mechanism higher than the conveyor, the frame can be placed in advance to improve cycle
- The long and short sides are driven by servo + screw, and the Angle of the short side can reach 2T.
- The contact surface of aluminum frame and framing machine is > 90%, no glue overflow on the front of the edges and corners, no damage to the frame film, it can adapt to the frame without film.
- The frame bottom plate and the side baffle with 40Cr/SKD11 material for surface polishing. After quenching, the hardness is required to be above 55.

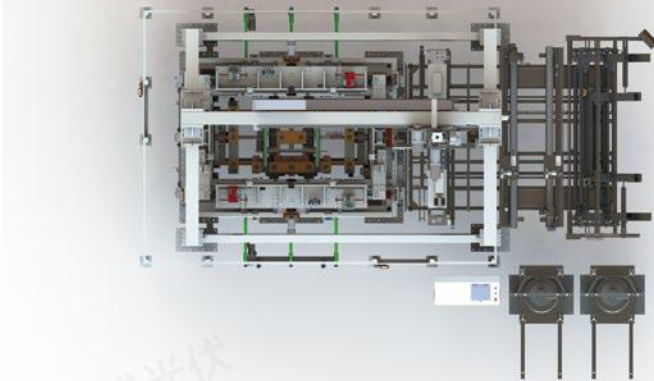


设备技术性能

组件边角错位精度：≤0.3mm
精度：长短边±1mm，对角线≤1.5mm；
去除材料偏差，长短边的头、中、尾偏差±1mm
均匀溢胶：合格率 > 98%
归正方式：伺服归正+气缸归正
漏水孔错位：≤0.3mm
边框边角间隙：≤0.3mm
不同板型切换时间：≤2h
操作模式：手动/自动
工作噪音：≤60dB
人机界面：中英文模式

Functionality

Module corner misalignment accuracy: ≤0.3mm
Accuracy: long and short sides ±1mm, diagonal≤1.5mm;
head,middle and tail deviation of long and shaort sides ±1mm
Evenly overflowing glue: pass rate > 98%
Alignment method: servo alignment + cylinder alignment
Leakage hole displacement: ≤0.5mm
Conner gap: ≤0.3mm
Change over time: ≤2H
Operation mode: Auto/ Manual
Noise: ≤60dB
HMI: Chinese/ English mode



技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-FM150-SN-01
适用版型 Compatible module size	长 length: 1640-2450(mm); 宽 width: 980-1450(mm)
设计节拍 Cycle time	≤20s
工作气压 Air pressure	0.6-0.8(MPa)
功率 Power	10kW
外形尺寸 Dimension(LxWxH)	7800*4000*3600(mm)

FOUR-CORNER CLEANING

SYSTEM

四角清洗系统

功能描述

- 适用于目前主流的所有组件类型。
- 采用吹气及无纺布清洁，边框表面清理更干净。
- 设备稳定、布局紧凑。
- 采用伺服系统，操作简单、灵活。
- 标准化、模块化程度高，换型便捷。
- 可选符合UL/CE标准的元器件。

Features

- Suitable for all mainstream module types.
- Utilizes blowing and non-woven fabric cleaning for a cleaner surface.
- Stable equipment with a compact layout.
- Operates with a flexible servo system.
- High degree of standardization and modularization, type-changing more convenient.
- Optional components compliant with UL/CE standards.



技术参数 Specifications

项目 Item	数值 Value
适用组件类型 Compatible module type	常规、双玻、半片、叠瓦 Glass-back sheet/G2G/Half-cell/Shingling
适用组件尺寸 Compatible module size	长 Length: 1800-2500(mm)); 宽 Width: 900-1350(mm)
清洁方式 Cleaning method	吹气+无纺布擦拭 Blowing + Non-woven fabric
节拍 Cycle time	14s
外形尺寸 Dimension(LxWxH)	2800*4000*2000(mm)
重量 Weight	1800kg
传输高度 Transportation height	950±50mm
稼动率 Utilization rate	98% (VDI 3423)
噪音 Noise	≤ 75dB
电源 Power requirement	AC 3 phase, 380V/N/PE, 50Hz, 10KVA
压缩空气 CDA	0.4-0.6(MPa), 一个接入点 one drop, 400L/min
换型时间 Change time	10min
PLC	汇川 Inovance
HMI	汇川 Inovance
材料 Material	90g 35-40mm 无纺布 non-woven fabric

AUTO SUPPORT BAR
PLACING

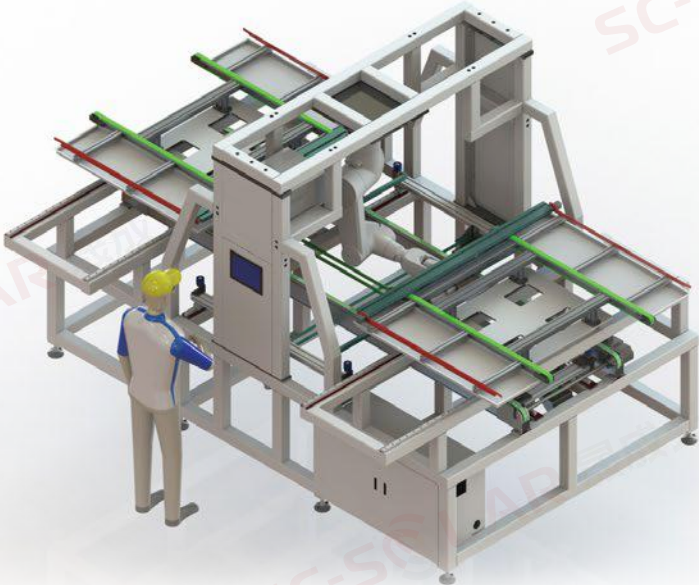
背筋放置机

功能描述

- 整体结构由组件归正输送单元、背筋储存供料单元、机械手放置系统等组成。
- 组件可同进同出，加快工作节拍。
- 双供料系统，增加背筋储存数量。
- 采用触摸屏界面，可进行切换组件规格、手动操作、报警信息等参数设置。

Features

- The overall structure is composed of a module alignment and conveying unit, a support bar storage and feeding unit, and a manipulator placement system.
- The modules can be in and out at the same time, improving cycle time.
- Double feeding system to increase the storage quantity of support bars.
- Touch screen interface, switch module specifications, manual operation, alarm information and other parameter settings.



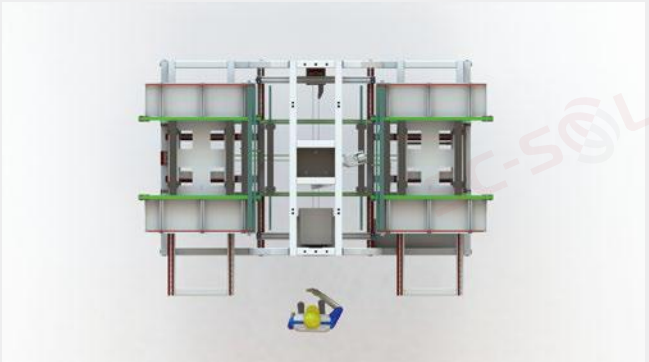
设备技术性能

组件定位精度：±1mm（定位归正无震动）
背筋储存数量：200pcs（可兼容双背筋组件）



Functionality

Module positioning accuracy: ±1mm
(the positioning is normalized without vibration)
Storage quantity of support bars: 200pcs
(compatible with double support bar modules)



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长 length: 1650-2550(mm); 宽 width: 980-1650(mm)
节拍 Cycle time	≤18s
工作气压 Air pressure	0.5-0.7(MPa)
耗气量 Air consumption	400L/min
功率 Power	5kW
外形尺寸 Dimension(L×W×H)	3400*2570*2300(mm)
重量 Weight	1800kg

AUTO SUPPORT BAR
INSTALLATION MACHINE

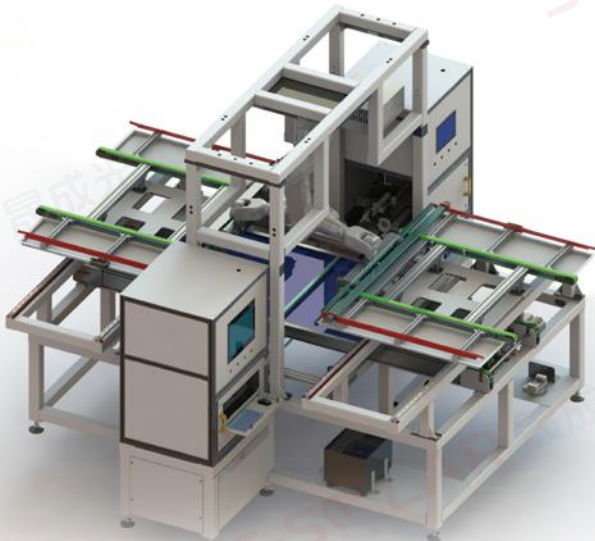
背筋自动安装机

功能描述

- 整体结构由组件归正输送单元、背筋定位机构、自动打螺丝系统等组成。
- 螺丝机伺服驱动，自动切换；组件可同进同出，加快工作节拍。
- 相机拍照定位螺丝钉位置，机械手放置背筋，精准定位安装孔位置。
- 采用触摸屏界面，可进行切换组件规格、手动操作、报警信息等参数设置。
- 具备螺钉出料检测、螺钉滑牙检测和螺钉浮锁检测功能。

Features

- The overall structure is composed of a module alignment conveying unit, a support bar positioning mechanism, an automatic screwing system, etc.
- The screw machine is driven by servo, automatic switching; to ensure that the modules can be in and out at the same time, improving cycle time.
- The camera takes a picture to locate the screw position, and the manipulator places the support bars and aligns the position of the mounting hole.
- Touch screen interface, switch module specifications, manual operation, alarm information and other parameter settings.
- With screw discharge detection, screw sliding detection, screw floating lock detection.



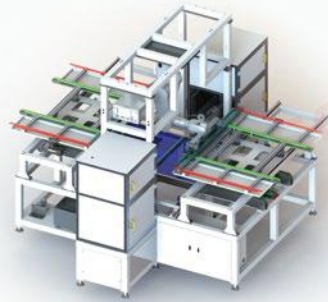
设备技术性能

组件定位精度±1mm，定位归正无震动
扭力要求：11.5±1.5Kgf.cm（ST3.5*32mm）
可兼容双背筋组件
可不停机补充螺钉



Functionality

Module positioning accuracy: ±1mm
Torque requirements: 11.5±1.5Kgf.cm(ST3.5*32mm)
Compatible with double support bar modules
Replenish screw without stop



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长 length: 1650-2550(mm); 宽 width: 980-1450(mm)
节拍 Cycle time	≤18s
工作气压 Air pressure	0.5-0.7(MPa)
耗气量 Air consumption	400L/min
功率 Power	5kW
外形尺寸 Dimension(L×W×H)	3100*3750*1900(mm)
重量 Weight	2000kg

BACKSHEET DISPENSING
MACHINE

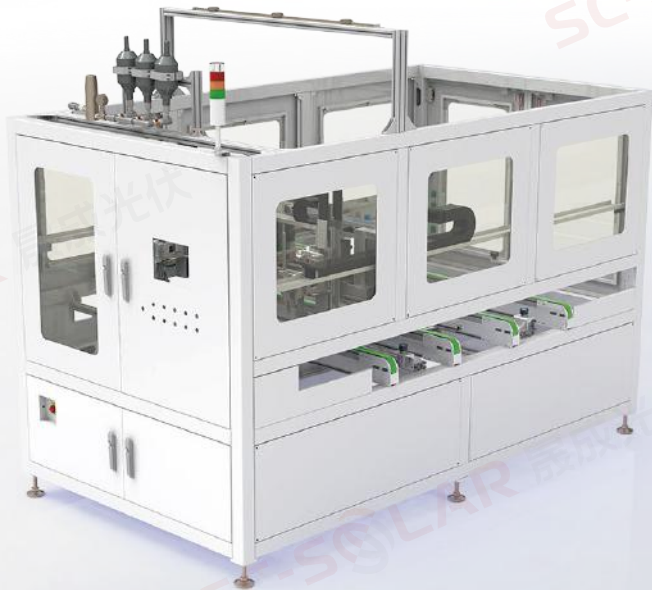
背板涂胶机

功能描述

- 打胶机满足一般长宽规格的组件使用。
- 引线定位方式：机械定位。
- 主体框架结构为钢结构，牢固、可靠。
- 设备速度快，定位精度高、稳定、可靠。
- 设备全自动控制，运行过程不需要人员干预。
- 切换版型及归正可实现一键操作，程序直接调用。

Features

- The Backsheet Dispensing Machine meets the requirements for modules of general length and width specifications.
- Lead positioning method: Mechanical positioning.
- The main frame structure is made of steel, sturdy and reliable.
- The equipment operates at high speed with precise, stable, and reliable positioning accuracy.
- The equipment is fully automatically controlled, requiring no manual intervention during operation.
- Module type switching and alignment can be achieved with one-button operation, directly calling the program.



技术参数 Specifications

项目 Item	数值 Value
适用组件类型 Compatible module type	常规、双玻、半片、叠瓦 Glass-back sheet/G2G/Half-cell/Shingling
适用组件尺寸 Compatible module size	长 Length: 1650-2520(mm); 宽 Width: 990-1450(mm)
节拍 Cycle time	≤14s
精度 Accuracy	安装定位精度 Mounting Positioning accuracy≤±0.2mm 重复安装精度 Repeatable mounting accuracy≤±0.05mm
外形尺寸 Dimension(L×W×H)	3300*1800*2600(mm)
重量 Weight	2100kg
传输高度 Transportation height	950±50mm
安装良率 Installation yield	≥99.9%
稼动率 Utilization rate	≥99.9%
噪音 Noise	≤ 60dB
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 25A, 50/60Hz
压缩空气 CDA	0.6-0.8(MPa), 一个接入点 one drop, 300L/min
功率 Power	10kW
环境温度 Environmental temperature	-20~50℃
环境湿度 Environmental humidity	5%-75%(不结露 no dewfall)
PLC	汇川 Inovance
HMI	汇川 Inovance

AUTO ICB LEAD
PICKING UP

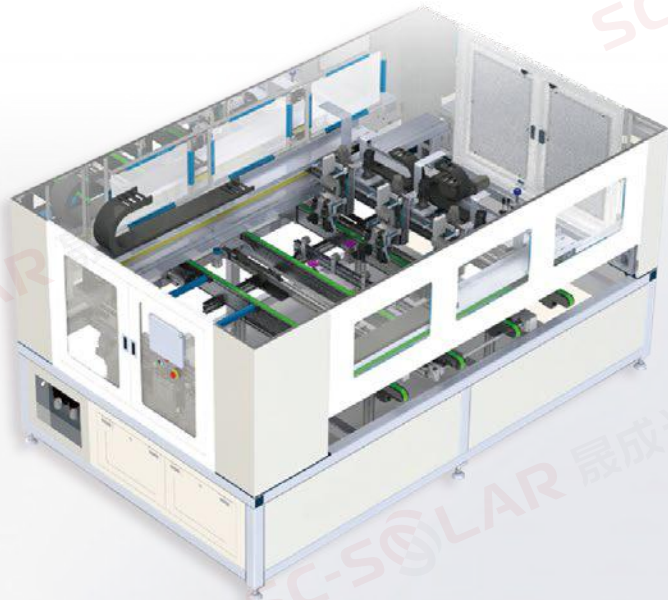
自动挑引线机

功能描述

- 兼容多种规格组件尺寸，采用伺服归正系统，换型快捷。
- 运动单元由伺服电机驱动，速度快，定位精度高、稳定、可靠。
- 实现自动挑引线，取高温布或撕胶带（二选一）。
- 三处引线同时操作，节拍16s，速度快，效率高
- 伺服控制与产品柔性接触，安全性高。
- 可选配高温布自动堆叠功能，省心省力。

Features

- Compatible with a variety of specifications and module sizes, servo correction system, convenient and quick to change the model.
- The motion unit is driven by a servo motor, with fast speed, high positioning accuracy, stability and reliability.
- Realize automatic pick lead, take high temperature cloth or tear tape (two options).
- The three leads are operated at the same time, the cycle time is 18s, very fast and efficient.
- The servo control is in flexible contact with the product, high security.
- Optional high-temperature cloth automatic stacking function, save worry and effort.



设备技术性能

常规、半片、MBB碎片率：≤0.04%
兼容电池片规格：60片半片/72片半片/MBB半片
高温布换料频率：≥11小时/次
输送方向：横向输送
机械定位：伺服归正
稼动率：≥98%
噪音要求：≤75dB
环境湿度：5%-75%（不结露）
环境温度：15℃-30℃



Functionality

Fragmentation rate of normal, half-cell, MBB: ≤0.04%
Compatible cell specifications: 60 half-cell / 72 half-cell / MBB half-cell
High temperature cloth changing frequency: ≥11 hours/time
Conveying direction: horizontal conveying
Mechanical positioning: servo correction
Utilization rate: ≥98%
Noise level: ≤75dB
Environmental humidity: 5%-75% (no dewfall)
Ambient temperature: 15℃-30℃



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长 length 1600-2500(mm); 宽 width 900-1500(mm)
节拍 Cycle time	≤16s
功率 Power	≤5.5kW
电源 Power requirement	AC380V±5%, 3P+1N+1PE, 20A, 50/60Hz
工作气压 Air pressure	0.6-0.8(MPa)
耗气量 Air consumption	200L/min
设备重量 Weight	2000kg
外形尺寸 Dimension(L×W×H)	3600*2200*1900(mm)

J- BOX AUTOMATIC MOUNTING MACHINE

接线盒自动安装机

功能描述

- 适用于目前主流的所有组件类型。
- 可结合组件类型，电池片间距，安装不同线盒。
- 高速、稳定、布局紧凑。
- 使用可移动示教器，操作简单，灵活。
- 标准化、模块化程度高，可兼容多种线盒。

Features

- Suitable for all current mainly module types.
- Can base on different panel type and cell spacing to install different J-Box.
- High speed, stability and compact layout.
- Simple and flexible operation with using removable teach pendant.
- High degree of standardization and modularity, compatible with various J-Boxes.



技术参数 Specifications

项目 Item	数值 Value
适用组件类型 Compatible module type	常规、双玻、半片、叠瓦 Glass-back sheet/G2G/Half-cell/Shingling
适用组件尺寸 Compatible module size	长 length: 1600-2500(mm); 宽 width:900-1400(mm)
来料方式 Material feeding method	正负极料框来料/中间级振动盘来料 Positive & Negative Electrode Frame Incoming / Intermediate Shaker Incoming
线盒抓取方式 J-Box grabbing method	夹爪 Clamping jaw
节拍 Cycle time	14s
外形尺寸 Dimension(L×W×H)	4940*2000*2500(mm)
重量 Weight	4t
传输高度 Transportation height	950±50 mm
稼动率 Utilization rate	95% (VDI 3423)
噪音 Noise	≤75dB
电源 Power requirement	AC 3 phase, 380V/N/PE, 50Hz, 20KVA
压缩空气 CDA	0.4-0.6 Mpa, 一个接入点 one drop, 400l/min
换型时间 Change time	1h
PLC	汇川 Inovance
HMI	汇川 Inovance

J-BOX LASER SOLDERING MACHINE

接线盒激光焊接机

功能描述

- 设备对接前后设备，产品自动进出。
- 设备采用XYZ行架移动机构，自动伺服归正，可适应不同版型的接线盒位置偏差。
- 设备采用视觉引导,自动适应接线盒及引线的不同位置、角度偏差。
- 设备采用伺服控制三组压线机构，可独立对引线进行压平。
- 设备采用激光焊接模块快速移动同时焊接各处引线。
- 设备全自动控制，运行过程不需要人员干预。
- 设备使用视觉加温度感应模块，自动判断焊接质量。

Features

- The soldering machine docks with other equipment, allowing for automatic loading and unloading of products.
- The equipment utilizes XYZ gantry moving mechanism with automatic servo correction, adaptable to position deviations of different J-boxes.
- The equipment utilizes visual guidance to automatically adapt to variations in the positions and angular deviations of J-boxes and lead wires.
- The equipment utilizes servo-controlled three-group wire pressing mechanisms, capable of independently flattening lead wires.
- The equipment employs a laser soldering module to rapidly move and weld lead wires at various points simultaneously.
- The equipment operates fully automatically, without the need for human intervention during operation.
- The equipment uses a visual and temperature sensing module to automatically assess welding quality.



技术参数 Specifications

项目 Item	数值 Value
适用组件类型 Compatible Module type	常规、双玻、半片、叠瓦 Glass-back sheet/G2G/Half-cell/Shingling
适用组件尺寸 Compatible module size	长 Length: 1600-2550(mm); 宽Width: 900-1450(mm)
节拍 Cycle time	16s
外形尺寸 Dimension(L×W×H)	3200*1800*2000(mm)
重量 Weight	2200kg
传输高度 Transportation height	950±50mm
稼动率 Utilization rate	95% (VDI 3423)
噪音 Noise	Max 75dB
电源 Power requirement	AC 3 phase, 380V/N/PE, 50Hz, 15KVA
压缩空气 CDA	0.4-0.6(MPa), 一个接入点 one drop, 400L/min
冷却方式 Cooling method	水冷 Water cooling
换型时间 Change time	1h
PLC	汇川 Inovance

J-BOX DETECTION
MACHINE

接线盒检测

功能描述

- 整体结构由组件输送单元，铅房，探测器成像系统等组成。
- 伺服进给，自动切换，保证组件可同进同出，节省工作节拍。
- 组件自动传送至设备内，探测器自动成像判别。
- 采用触摸屏界面，可进行切换组件规格、手动操作、报警信息等参数设置。

Features

- The overall structure consists of convey unit, lead chamber, detector imaging system, etc.
- Servo feed, automatic switching, ensure that the modules can be feed in/out at the same time, save cycle time.
- The modules are automatically transmitted to the equipment, the detector automatically performs visual detection.
- Use touch screen interface to set the parameters such as module specifications, manual operation and alarm information.



设备技术性能

节拍：≤16s
可利用工时：> 23小时/天
稼动率：≥99%
流线速度：800-1200(mm/s)，可调整
接线盒焊接方式：电阻锡焊
一次通过率：> 99.95%
版型切换时间：≤1min



Functionality

Cycle time: ≤16s
Available working hours: >23h/day
Utilization rate: ≥99%
Streamline speed: 800-1200mm/s (can be adjusted)
J-box welding method: resistance tin welding
One-time pass rate: > 99.95%
Change time: ≤1min



技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长 length: 1650-2520(mm); 宽 width: 900-1400(mm)
光管类型 Light tube type	微焦斑闭管 Microfocal spot closed tube
光管功率 Power	90kV
光管电流 Current	0.05-0.7(mA)
成像面积 Imaging area	157*157(mm)
空间分辨率 Spatial resolution	3.2LP/MM
铅房辐射 Lead chamber radiation	< 1uSv/Hr
检测模式 Detection mode	直拍式，多点探测（点数≤3） Straight shot, multi-point detection (points≤3)
采集时间 Acquisition time	0.5s
设备输送高度 Equipment transfer height	950±30mm

J-BOX COVER INSTALLATION
MACHINE

接线盒自动盖盖机

功能描述

- 布局紧凑，可在现有产线上集成使用
- 兼容单接线盒、三分体接线盒等常规多种线盒种类，换型便捷
- 集成了合盖后常规质量等检测功能
- 盒盖缓存量大，上料方便
- 可选符合UL/CE标准的元器件
- 可选灌胶固化检测功能

Features

- Compact layout, can be integrated into existing production lines.
- Compatible with various common types of J-boxes such as single and triple J-boxes, with convenient type switching.
- Incorporates standard quality inspection functions after cover closing.
- Large buffer capacity for cover storage, easy loading.
- Optional components that meet UL/CE standards.
- Optional adhesive curing inspection function.



技术参数 Specifications

项目 Item	数值 Value		
适用组件类型 Compatible module type	常规单接线盒 Single J-box	半片、双玻三接线盒 Half-cell, G2G triple J-box	叠瓦 Shingling
适用组件尺寸 Compatible module size	长 length: 1600-2500(mm); 宽 width: 900-1400(mm)		
节拍 Cycle time	14s		
接线盒盖缓存数量 Number of J-box cover caches	≥4h		
接线盒盖供料方式 J-box cover feeding method	振动盘 Vibration feeder		
合盖前灌胶检测功能 Pre-sealing Adhesive Inspection Function	固化检测、灌胶检测 Curing quality & potting quality		
外形尺寸 Dimension(L×W×H)	3000 x 1800 x 2450 (mm)		
重量 Weight	2000kg		
传输高度 Transportation height	950±30mm		
组件进料方式 Feeding method	长边进料 (LEL)		
稼动率 Utilization rate	95% (VDI 3423)		
噪音 Noise	Max 70dB		
电源 Power requirement	AC 3 phase, 380V/N/PE, 50Hz, 15KVA		
压缩空气 CDA	0.4-0.6(MPa), 一个接入点one drop, 400L/min		
换型时间 Change time	2h		
PLC	汇川 Inovance		

AUTO FILING
MACHINE

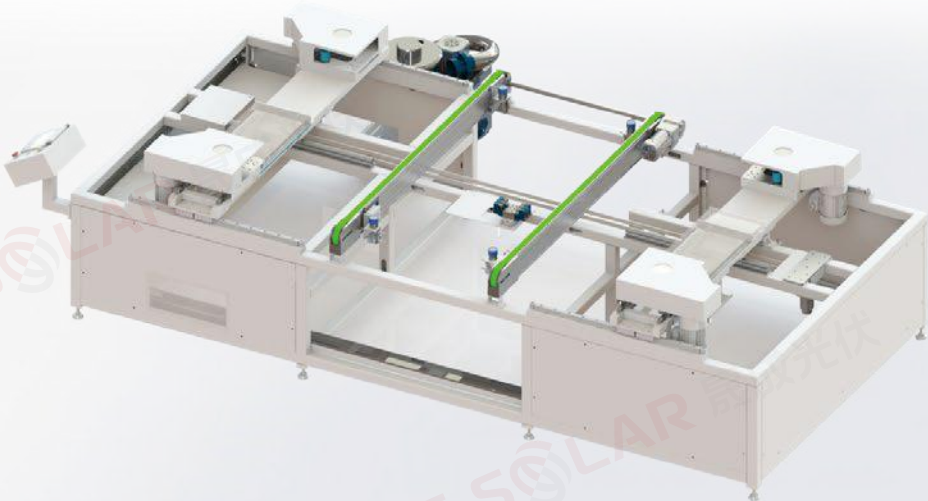
自动锉角机

功能描述

- 伺服电机驱动，同步带传动，直线导轨导向，保证到位精准和运行平稳。
- 设备全自动控制，运行过程无需人员干预。
- 四角同时进行锉角，四角采用电机带动砂带锉角。
- 砂带快换结构，更换快速方便。
- 锉角后切面平滑，对玻璃不会造成损伤。

Features

- Servo motor and synchronous belt drive, linear guide to ensure accurate and smooth operation.
- Automatic control of equipment, operation process without personnel intervention.
- The four corners are filed at the same time, and the four corners are driven by the motor.
- Sand belt fast change structure, quick and convenient replacement.
- Smooth section after filing corners, will not cause damage to the glass.

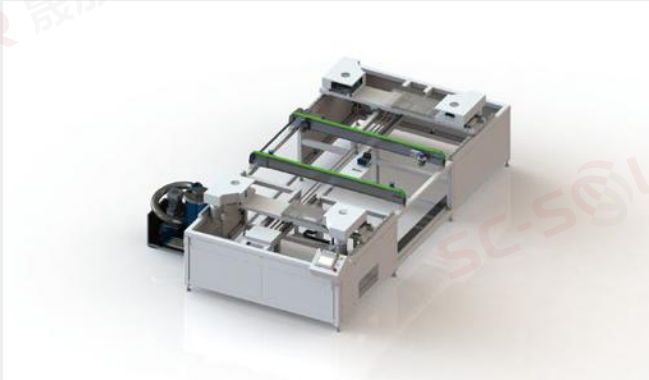
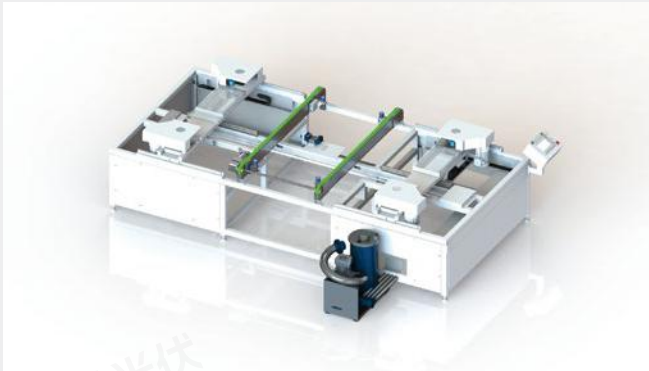


设备技术性能

- 设备换型时间: ≤10min
- 砂带使用周期: ≥30000次
- 锉角精度: ±1mm
- 工作噪音: ≤80dB

Functionality

- Change time: ≤10min
- Sand belt service cycle: ≥30000 times
- Accuracy: ±1mm
- Noise: ≤80dB

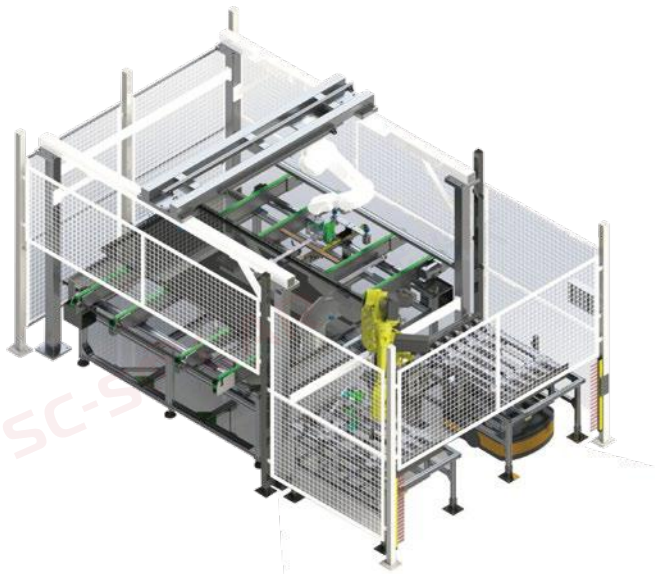


技术参数 Specifications

项目 Item	数值 Value
适用版型 Compatible module size	长length: 1700-2550(mm); 宽 width: 990-1450(mm)
进料方式 Feeding method	长边进料 (LEL)
兼容组件波形范围 Compatible module waveform range	0-5(mm)
兼容组件厚度 Compatible module thickness	4-10(mm)
胶带规格 Tape specification	宽度width: 30-40(mm); 厚度 thickness: 0.06-0.10(mm)
适应封边类型 Applicable edge type	全封边双玻组件，结尾处胶带头长度≥50mm Full edge double glass module, the length of tape head at the end is ≥50mm
功率 Power	< 8kW
电源 Power requirement	380V, 50Hz, AC±5%
压缩空气 CDA	0.6-0.8 (MPa), 300L/min
外形尺寸 Dimension(L×W×H)	4200*2500*2100(mm)

TEST JIG
LOADER

自动装工装



高清相机采集 HD camera capture

视觉定位分析 Visual positioning analysis

自动抓取安装 Auto crawl and install



技术参数 Specifications

项目 Item	数值 Value	项目 Item	数值 Value
适用组件尺寸 Compatible size	L: 1640-2500(mm); S: 900-1450(mm)	功率 Power	10kW
适用组件版型 Compatible version	210向下兼容所有常规/半片/单双玻组件（所有组件版型） Compatible with all conventional, half-cell, single glass and double glass module (Maximum size of 210mm)	电压 Voltage	380V 50HZ
生产节拍 Cycle time	≤20s/pcs	气压 Pressure	0.5-0.8(MPa)
回流方式 Rotation method	适配AGV（或人工、回流线） Compatible with manual,AGV,return line	接管口径 Tube size	∅ 12mm
兼容导线长度 Compatible wire length	300mm-1700mm（可定制custo mizable）	耗气量 Air consumption	4L/min
视觉定位精度 Positioning accuracy	±0.2mm	外形尺寸 Equipment size(L×W×H)	4600*2850*2500(mm)

TEST JIG
UNLOADER

自动拆工装



HD camera capture 高清相机采集

Visual positioning analysis 视觉定位分析

High-speed calculation execution 高速计算执行



技术参数 Specifications

项目 Item	数值 Value	项目 Item	数值 Value
适用组件尺寸 Compatible size	L:1640-2500(mm); S: 900-1450(mm)	功率 Power	7kW
适用组件版型 Compatible version	210向下兼容所有常规/半片/单双玻组件（所有组件版型） Compatible with all conventional, half-cell, single glass and double glass module (Maximum size of 210mm)	电压 Voltage	380V 50Hz
生产节拍 Cycle time	≤20s/pcs	气压 Pressure	0.5-0.8(MPa)
回流方式 Rotation method	适配AGV（或人工、回流线） Compatible with manual,AGV,return line	接管口径 Tube size	∅ 12mm
兼容导线长度 Compatible wire length	300mm-1700mm（可定制custo mizable）	耗气量 Air consumption	2L/min
视觉定位精度 Positioning accuracy	±0.2mm	外形尺寸 Equipment size(L×W×H)	4600*2850*2500(mm)

AUTO
LABELING

自动贴标机

功能描述

- 整体结构由输送归正、吸标、贴标、真空系统等组成。
- 伺服电机带动贴标机构，高速度，高精度。
- 吸标、贴标系统采用丝杆和同步带传送。精准快速吸标、贴标，贴标时采用压缩弹簧进行缓冲。
- 采用滚轮滚压条码和名牌，确保条码、名牌与组件牢固贴合。

Features

- The overall structure consists of transportation correction, suction labeling, labeling, and vacuum system.
- Servo motor drives the labeling mechanism, high speed and high precision.
- The suction and labeling system is delivered by a screw and timing belt. Accurate and fast suction and labeling. A compression spring for buffering when labeling.
- Rolling the bar code and brand name with the roller to ensure that bar code and brand name are firmly attached to the module.



设备技术性能

组件定位精度：±1mm，定位归正无震动
设计节拍：整体节拍≤23s
归正方式：四边归正
贴标位置偏差：±1mm
不同板型切换时间：<3min
碎片率：≤0.05%
操作模式：手动/自动
工作噪音：≤60dB
人机界面：中英文模式
贴胶带良率：>98.5%



Functionality

Module positioning accuracy: ±1mm
Cycle time: ≤23s
Alignment: four side alignment
Label position deviation: ±1mm
Change over time: <3min
Fragment rate: ≤0.05%
Operation mode: Auto/ Manual
Noise level: ≤60dB
HMI: Chinese/ English mode
Yield: >98.5%



技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-AL26-CS-01
适用版型 Compatible module size	长 length: 1640-2400(mm); 宽 width: 950-1400(mm)
设计节拍 Cycle time	≤23s
工作气压 Air pressure	0.5-0.7(MPa)
功率 Power	2.5kW
外形尺寸 Dimension(LxWxH)	3400*2100*1700(mm)

AUTO CORNER
PROTECTOR INSERTING

自动包护角机

功能描述

- 整体结构由玻璃归正输送单元、包护角系统、真空系统等组成。
- 伺服进给，自动切换，确保组件可同进同出，加快工作节拍。
- 自动进行组件上护角并沿折痕折叠。
- 采用触摸屏界面，可进行切换组件规格、手动操作、报警信息等参数设置。

Features

- The overall structure consists of alignment and conveyor unit, a corner protector inserting system and vacuum system.
- Servo feeding automatic switching, to ensure module entering and exiting, saves cycle time.
- Paper protector inserts automatically and then folds along the creases.
- Touch screen interface for changing module specifications, manual operation type, alarm information and other parameter setting.



设备技术性能

组件定位精度：±1mm，定位归正无震动
归正方式：四边对中归正
更换护角时间：≤180s
不同板型切换时间：60cell<-->72cell 换线一键切换（伺服）
常规<-->半片 <30min/1人
操作模式：手动/自动
工作噪音：≤60dB
人机界面：中英文模式



Functionality

Module positioning accuracy: ±1mm
Alignment: four side alignment
Change paper protector time: ≤180s
Change over time: 60cell <-->72cell one button switch
Normal<-->half-cut module<30min/1person
Operation mode: Auto/ Manual
Noise: ≤60dB
HMI: Chinese/ English mode

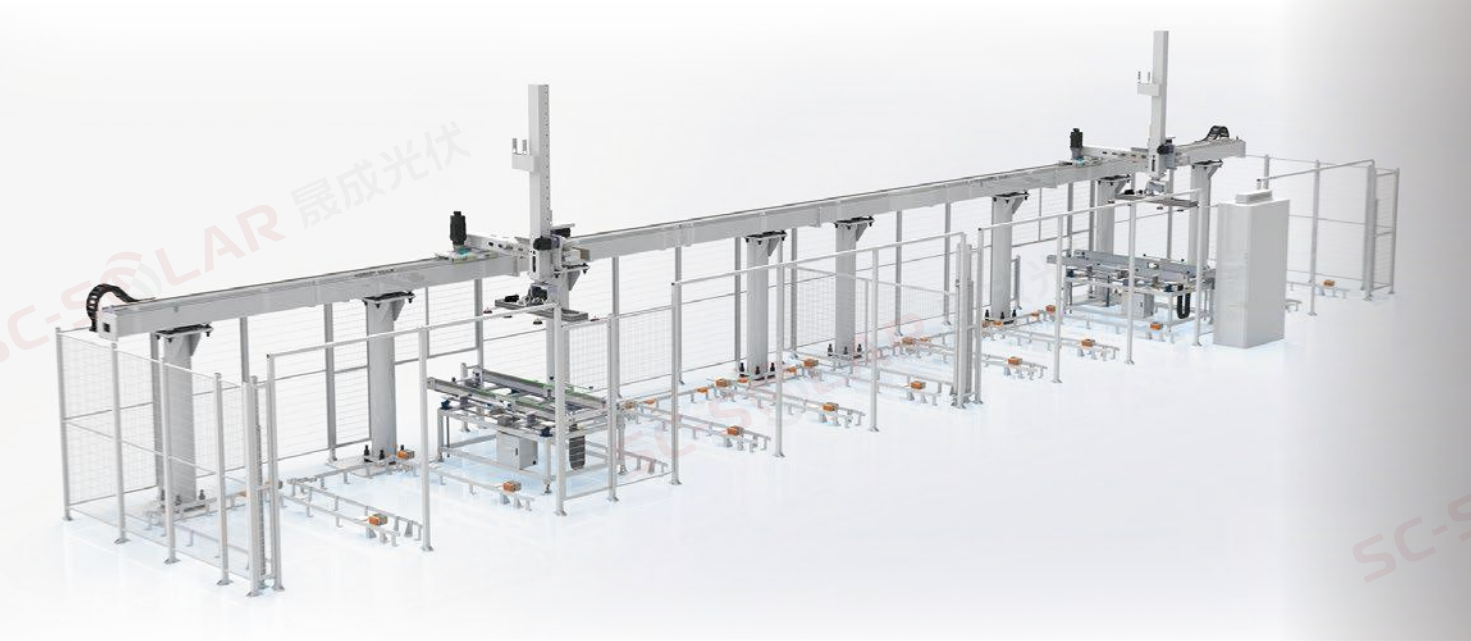


技术参数 Specifications

项目 Item	数值 Value
型号 Model	SC-CG25-CS-01
适用版型 Compatible module size	长 length: 1650~2550(mm); 宽 width: 990~1450(mm)
设计节拍 Cycle time	≤20s
工作气压 Air pressure	0.5~0.7(MPa)
功率 Power	8kW
外形尺寸 Dimension(LxWxH)	4150*1860*2000(mm)
重量 Weight	2800kg
边框高度 Frame height	30~45(mm)
护角材质 Protector material	三层瓦楞纸tri-wall corrugated paper, 牛皮纸kraft paper
护角厚度 Protector thickness	瓦楞纸1±0.2(mm), 牛皮纸0.3~0.5(mm) corrugated paper 1±0.2(mm), kraft paper 0.3~0.5(mm)
护角盒存放护角数量 Protector storage number	≤500pcs

01

组件自动化整体解决方案
PV module manufacturing automation turnkey solution



MODULE VERTICAL
PALLETIZING SYSTEM

组件垂直码垛系统

功能描述

- 适用于目前主流的所有组件类型和装箱方式。
- 可结合组件纸箱设计完成常规边框组件的垂直装箱和双玻组件的垂直装箱。
- 高速、稳定、布局紧凑。
- 使用可移动示教器，操作简单，灵活。
- 标准化、模块化程度高，可通过增加2&3轴实现模块扩展。

Features

- Applicable to all current mainstream module types and packing methods.
- Capable of vertical packing for regular frame modules and double-glass modules through combined module box design.
- High-speed, stable, and compact layout.
- Utilizes a movable teach pendant for simple and flexible operation.
- High degree of standardization and modularization, with module expansion possible by adding 2 & 3 axes.



选项 Options

- 符合UL/CE标准的元器件
UL/CE standard components
- 常规组件，双玻组件抓手快换装置
Gripper changing tools
- 装箱抓手浮动装置
Floating mechanism inside the gripper
- 装箱质量检测
Quality check system
- 组件翻转装置
Module flipping tools



技术参数 Specifications

项目 Item	数值 Value	
适用组件类型 Compatible Module type	常规、双玻、半片、叠瓦 normal/double-glass/half-cut/shingling	
适用组件尺寸 Compatible module size	长 length: 1600-2520(mm); 宽 width: 900-1450(mm)	
码垛方式 Palletizing method	水平/垂直码垛 horizontal/vertical	
组件抓取方式 Module grab method	吸盘 suction cup	
节拍 Cycle time	14s	
垛位 Number of stacking positions	≤6	≤12
外形尺寸 Dimension(LxWxH)	15000*4200*4800(mm)	28000*4200*4800(mm)
重量 Weight	7000kg	13000kg
传输高度 Transportation height	950±50 mm	
稼动率 Utilization rate	95% (VDI 3423)	
噪音 Noise level	Max 70dB	
电源 Power requirement	AC 3 phase, 380V/N/PE, 50Hz, 20kVA	
压缩空气 CDA	0.4-0.6(MPa), 一个接入点 one drop, 600L/min	
换型时间 Change time	1 h	
PLC	汇川 Inovance	
HMI	汇川 Inovance	



TEXTURING EQUIPMENT

WAFER LOADER / UNLOADER

制绒上下料机

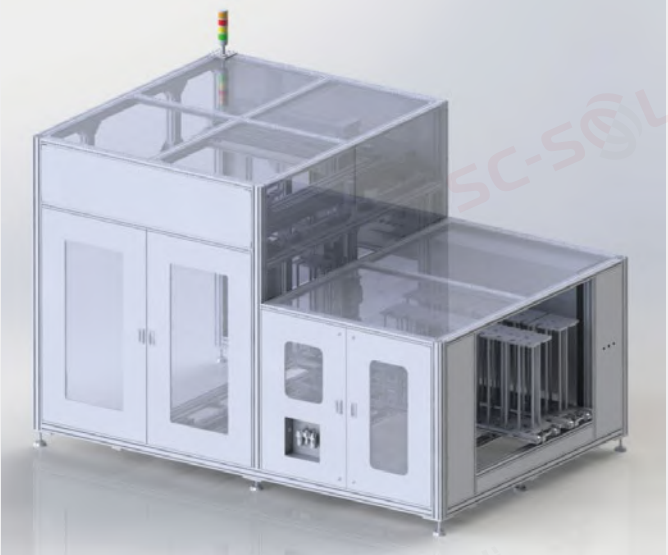
设备功能 Function	兼容硅片尺寸 Compatible wafer size
制绒工艺设备的自动上下料 Texturing equipment automatic loading and unloading	182*182±0.5mm-230*230±0.5mm

设备技术性能

上下料方式：叠片盒倒100槽花篮
产能：单道≥4000片/小时
破片率：≤0.03%，（A类片，仅统计由自动化造成的碎片）
开机率：≥98.5%
MTBF≥500小时
MTTR≤1小时
预留MES接口，支持数据上传

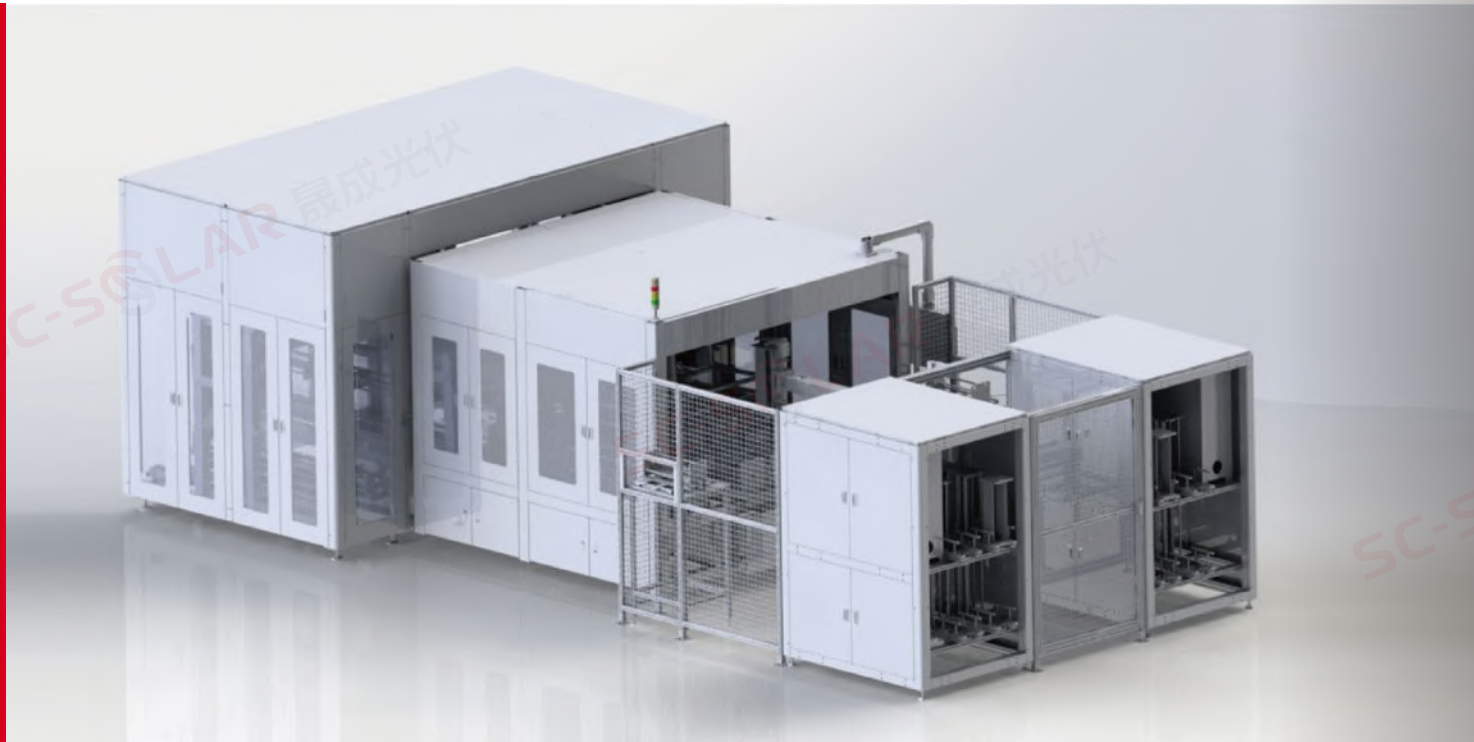
Functionality

Loading / unloading method: transfer wafer from stack box to 100 slot cassette.
Throughput: single track≥4000pieces/hour
Capacity rate: ≤0.03%,(A type wafer, only statistics of broken caused by automation)
Up Time: ≥98.5%
MTBF≥500 hours
MTTR≤1 hours
Reserve MES interface to support data upload



技术参数 Specifications

项目 Item	数值 Value
型号 Model	PUM8000
电源 Power requirement	AC380V±10%，50Hz±5%，15kW
工作气压 Air pressure	最小 Min: 0.6MPa
环境 Environment	温度 Temperature: 17℃-34℃；湿度 Humidity: < 80%
外形尺寸 Dimension(L×W×H)	上料机 Loader: 2900*2100*1920(mm) 下料机 Unloader: 2000*1650*1840(mm)



INLINE DIFFUSION WAFER TRANSFERING MACHINE

在线扩散插片机

设备功能 Function

- 在线扩散插片机
Inline diffusion wafer inserting machine

兼容硅片尺寸 Compatible wafer size

- 182*182±0.5(mm)-230*230±0.5(mm)

可选项 Options

- 可根据客户要求选配方阻检测
Choose the sheet resistance test according to customer requirements

说明 Description

- 吸盘为陶瓷材质，耐高温、耐氧化及硬度高，不易对硅片表面产生氧化等印记。
The material of the sucker is ceramic, so it has high temperature resistance, oxidation-resistivity and high hardness, and that is not easy to make mark on wafer surface.
- 吸盘在三维空间内分别采用伺服控制方式，可调节性强，位置精度高，大大降低了碎片率以及不良率。
In three dimensions, the suckers use servo control manner, so it is easy to tune and the position accuracy is high. The wafer broken rate and defect rate can drop down a lot.
- 真空发生器就近安装在吸盘上方，降低管路损耗的同时加快响应时间。
The vacuum maker is installed near the top of the sucker, that can drop down the pipeline lose and improve the response time.

设备技术性能

硅片 I :边长182mm，厚度160-220(μm)
硅片 II :边长230mm，厚度160-220(μm)
花篮传输轨道可兼容，花篮端面尺寸不变
设备产能：10000片/小时
开机率：>99%，
破片率：<0.03%
花篮：100槽，中间有空档；上下花篮4通道，
上料暂存2个花篮，下料暂存2个花篮
预留AGV对接空间，相关感应器及通讯接口。

Functionality

Wafer size: length 182mm/230mm, thickness 160-220μm
Cassette track is compatible and cassette size no need to change
Capacity: ≥ 10000 pieces / hour
Uptime: >99%
Fragmentation rate: <0.03%,
Cassette: 100 slots , space in middle; loading and unloading 4 tracks, loading stage 2 cassettes, unloading state 2 cassettes
Reserve AGV space, relevant sensors and communication interfaces.



技术参数 Specifications

项目 Item	数值 Value
型号 Model	SAM16000
电源 Power requirement	AC380V±10%, 50Hz±5%, 15kW
工作气压 Air pressure	最小 Min 0.6MPa
环境 Environment	温度 Temperature: 17℃-34℃; 湿度 Humidity: < 80%



ETCHING EQUIPMENT

WAFER LOADER / UNLOADER

刻蚀上下料机

设备功能

Function

- 刻蚀工艺设备的自动上下料（8道/10道）
Etching equipment automatic loading and unloading
(8 lanes/10 lanes)

设备技术性能

上下料方式：100槽花篮
产能：12000片/小时
破片率：≤0.01%，（A类片，仅统计由自动化造成的碎片）
开机率：≥99%
MTBF≥500小时
MTTR≤1小时
预留MES接口，支持数据上传功能

兼容硅片尺寸

Compatible wafer size

- 182*182±0.5(mm)-230*230±0.5(mm)

Functionality

Loading and unloading manner: 100 slot cassette
Capacity: 12000pieces/hour
Fragmentation rate: ≤0.01%,(A type wafer, only statistics of broken caused by automation)
Up time:≥99%
MTBF≥500hours
MTTR≤1hour
Reserve MES interface to support data upload

说明

Description

- 上料与下料设备结构基本相同。
The loading and unloading equipment structure is basically the same.
- 与工艺设备进行信号交互，确保安全生产。
Signal interaction with process equipment to ensure safe production.
- 花篮具有放反防呆检测功能。
Including fool-proofing detection function for cassette placing reversely.
- 硅片进出花篮轨道有两组，可交替进行传输，提高产能。
There are two sets of tracks for wafer flowing in and out of the cassette, which can transfer alternately to increase productivity.
- 硅片传输轨道采用伺服驱动，具有变速功能，以减少硅片摩擦及撞击阻挡。
The wafer transfer track is driven by servo and has a variable speed function to reduce wafer friction and impacting block.
- 具有硅片缓存盒，以规避更换花篮时的产能损失。
It has a wafer buffer box to avoid the loss of capacity when replacing the cassette.
- 为便于操作，满花篮全部从下轨道进出。
For convenient operation, the full cassettes all flow in and out from lower track.
- 具有硅片导向功能，防止卡片。
Including wafer guiding function to prevent wafer blocking.
- 下料设备可以增加翻片功能。
Unloading station can add wafer flipping function.



技术参数

Specifications

项目	Item	数值	Value
型号	Model	EUM8000	
电源	Power requirement	AC380V±10%，50Hz±5%，15kW	
工作气压	Air pressure	最小 Min 0.6MPa	
环境	Environment	温度 Temperature: 17℃-34℃；湿度 Humidity: < 80%	

HIGH SPEED WAFER
TRANSFER MACHINE

高速倒片机



ALD在线倒片机主要分为花篮传输轨道，舟传输轨道，硅片自动上料系统，硅片自动下料系统，软件控制系统等，可与生产线充分匹配，提高工作效率。

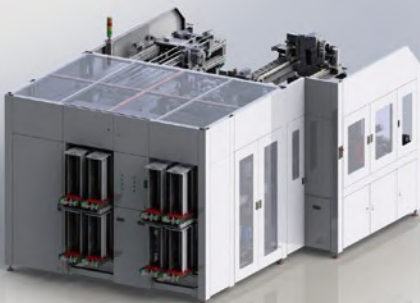
ALD inline wafer transfer machine includes cassette transfer track, boat transfer track, auto wafer loading and unloading system and software control system. That can be fully matched with the production line to improve work efficiency.

功能描述

- 4道花篮轨道，两两交替省去换花篮时间，提高生产效率。
- 进出花篮2组缓存台，每组可缓存20个花篮。
- 可同时满足2台AGV同时对接。
- 金属舟传输轨道有2个上下料位，可独立运行，且都有90°翻转功能。
- 耐高温，稳定性高，吸盘顶齿侧齿均为陶瓷。
- 吸盘位100片一组，提高生产效率。
- 触摸屏界面，可显示报警信息、参数设置、舟的使用次数及是否需要维修清洗等。

Features

- 4 lanes cassette tracks, fulfill non-stop during cassette exchange and improving production efficiency.
- There are 2 sets of cache tables, each set can cache 20 cassettes.
- 2 AGVs can be connected at the same time.
- The metal boat transfer track has two loading and unloading positions,which can run independently and both have 90° flipping function.
- High temperature resistance, high stability, the top and side teeth of the sucker are ceramic.
- The suction cup is grouped by every 100pcs to improve production efficiency.
- The touch screen interface can display alarm information, parameters setting,the number of boat using times and whether needs to be repaired or cleaned.



设备技术性能

硅片：可兼容182-230(mm)，厚度160-220(μm)
花篮传输轨道可兼容，花篮端面尺寸不变
设备产能：16000片/小时（硅片花篮互导：16000片/小时，花篮舟互导：16000片/小时）
开机率>98%，破片率<0.08%（含破损、崩边、开裂及其他损伤），划伤<0.1%，EL不良<0.3%（含EL划伤、黑斑及其他不良）
花篮：100槽，槽间距：4.76mm，中间有空档
上下花篮4通道，上料暂存2个花篮，下料暂存2个花篮
金属舟：200槽，槽间距：2.38mm，每槽面对面两片硅片
导片机金属舟摆放位自带翻转、水平推拉及金属舟定位夹紧功能，翻转过程动作平稳保证硅片与金属舟无相对位移。（直立摆放的金属舟翻转90°至水平并具有识别金属舟放反功能）
预留AGV对接空间、相关感应器及通讯接口。

Functionality

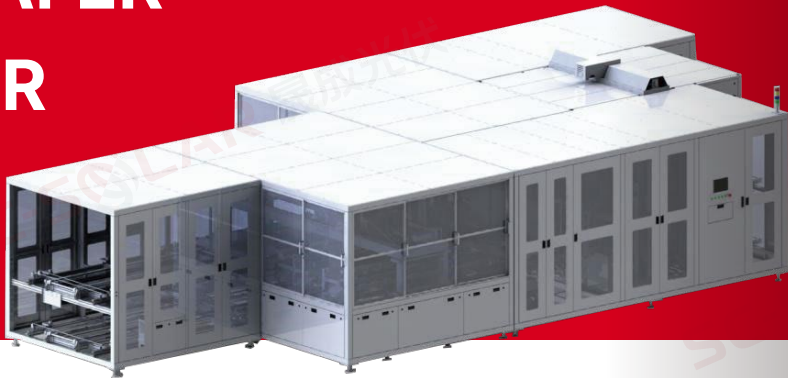
Wafer size: length 182-230(mm), thickness 160-220(μm)
Cassette transfer tracks compatible, and the cassette header size fixed.
Throughput: 16000pcs/hour(wafer and cassette interexchange: 16000 pcs/hour, cassette and boat interexchange: 16000pcs/hour).
Uptime: > 98, Fragmentation rate: <0.08%, Scratch: <0.1%, EL failure: <0.3%
Cassette:100 slots,4.76mm distance between slots and with gap in middle. 2 cassettes buffer in loading station and 2 cassettes buffer in unloading station. 4 lanes of loading and unloading cassettes
Metal boat: 200 slots, and 2.38mm distance between two slots, each slot has two face-to-face wafers
The boat position is equipped with function of turning over, horizontal pushing/pulling,and boat positioning and clamping function. The movement of turning over is stable to ensure that there is no relative displacement between the silicon wafer and the boat.(Vertical boat turn over 90° to horizontal,and can identify reverse of boat)
Reserve AGV docking space, related sensors and communication interface.

技术参数 Specifications

项目 Item	数值 Value
型号 Model	SRM16000
电源 Power requirement	380VAC, 3相5线制 3 phase 5 wires 50Hz, 10kW/pcs
工作气压 Air pressure	0.5-0.6(MPa), 200L/min
环境 Environment	温度 Temperature: 0℃-34℃; 湿度 Humidity: ≤60%
噪音 Noise	≤70dB

ALD EQUIPMENT WAFER
LOADER / UNLOADER

板式ALD上下料机



本设备自动化主要用于理想ALD自动化上下料，包括花篮自动上下料机构，硅片传输机构，石墨载板传输机构，取放片机构，主设备信号对接处理以及AGV对接信号处理。

The automation of this equipment is mainly used for Ideal ALD wafer automatic loading and unloading, including automatic cassette loading and unloading mechanism, silicon wafer transmission mechanism, graphite carrier plate transmission mechanism, pick-and-place mechanism, main equipment signal docking processing and AGV docking signal processing function.

功能描述

- 4道花篮轨道，2道上料，2道下料，上下层空满花篮可互切，均满足AGV对接需求。
- 接触石墨载板的传输同步带均采用特殊定制耐高温、耐磨材质。
- 吸盘采用特殊定制陶瓷吸盘。
- 硅片定位采用三面伺服规整和机械托举定位，有效提高放片精度。
- 取放片工位采用分体式，取片和放片处于不同工位；同时在取片工位后配备清理机构，可有效清理载板上的粉尘和碎片。
- 取放片模组均采用直线电机，提高机台的稳定性。
- 采用双触摸屏界面，界面可显示报警信息、参数设置等。

Function description

- 4 lanes cassette tracks, 2 loading, 2 unloading, the upper and lower empty cassettes can be switched to each other, all meet the needs of AGV docking.
- The transmission belt contacting the graphite carrier plate is made of special customized high temperature and wear-resistant materials.
- The suction cup adopts special customized ceramic suction cup;
- Silicon wafer positioning adopts three-side servo regularization and mechanical lift positioning, which effectively improves the accuracy of wafer placement.
- The pick-and-place station adopts a split type, and the pick-and-place station is not in the same station. At the same time, a cleaning mechanism is equipped after the pick-up station to effectively clean the dust and debris on the carrier board.
- The pick and place modules all use linear motors to improve the stability of the machine.
- Using dual touch screen interface, the interface can display alarm information, parameter settings, etc.

设备规格

硅片尺寸：可兼容18X-230(mm)，厚度150-220(μm)
设备产能：14000片/小时（182尺寸）；
11000片/小时（210尺寸）
开机率：≥99%
碎片率：≤0.02%（182尺寸），≤0.03%（210尺寸）
不良率：≤0.02%（包含吸盘印、皮带印、划伤等）
硅片摆放精度：±0.4mm（排片采用二次定位校准）
去金属化：花篮传输同步轮采用硬质塑胶和注塑，防止磨粉，花篮接触部位全部采用POM材质，无金属接触；
MTTR：<60分钟，MTBF≥500小时

Specifications

Wafer size: compatible with 18X-230mm, thickness 150-220um.
Equipment capacity: 14000 pieces/hour (182mm), 11000 pieces /hour(210mm)
Uptime: ≥99%
Fragmentation rate: ≤0.02% (182mm), ≤0.03% (210 mm)
Defect ratio: ≤0.02% (including suction cup marks, belt marks, scratches, etc.)
Wafer placement accuracy: ±0.4mm (the arrangement of wafers adopts secondary positioning calibration)
De-metallization: The cassette transmission synchronizing wheel is made of rigid plastic and injection molding to prevent powder grinding. The contact parts of the cassette are all made of POM material, without metal contact
MTTR: <60 min, MTBF≥500 h

技术参数 Specifications

项目 Item	数值 Value
电源 Power requirement	380VAC, 3相5线制 3 phase 5 wires 50Hz, 60Hz
压缩空气 CDA	0.6-0.8(MPa), 400L/min
氮气气压 Nitrogen pressure	0.6-1.0(MPa), 3000L/min
工作环境 Working environment	温度 Temperature: 17℃-34℃；湿度 Humidity: ≤80%
噪音 Noise	≤70dB



ANNEALING/OXIDATION WAFER TRANSFERING MACHINE

退火/氧化插片机

设备功能 Function

- 退火/氧化插片机
Annealing/oxidation wafer inserting machine

设备技术性能

硅片 I：边长182, 厚度160-220(μm)
硅片 II：边长210, 厚度160-220(μm)
花篮传输轨道可兼容，花篮端面尺寸不变。
设备产能：10000片/小时
开机率：> 99%
破片率：< 0.03%
花篮：100槽，中间有空档；上下花篮4通道，
上料暂存2个花篮，下料暂存2个花篮
预留AGV对接空间，相关感应器及通讯接口。

兼容硅片尺寸 Compatible wafer size

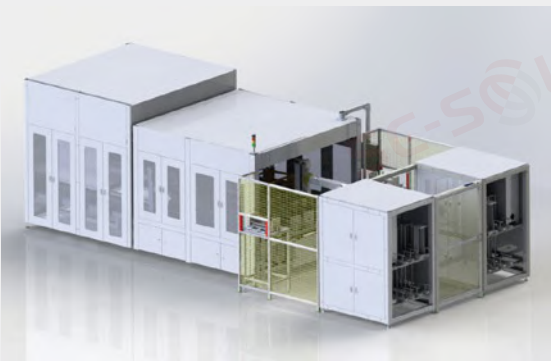
- 182*182±0.5(mm)-230*230±0.5(mm)

Functionality

Wafer size: length 182mm/230mm, thickness: 160-220μm
Cassette track is compatible and cassette size no need to change.
Throughput: ≥ 10000 pieces / hour
Uptime: >99%
Fragmentation rate: <0.03%
Cassette: 100 slots , space in middle; loading and unloading
4 tracks, loading stage 2 cassettes, unloading state 2 cassettes
Reserve AGV space, relevant sensors and communication interfaces.

说明 Description

- 吸盘为陶瓷材质，耐高温、耐氧化且硬度高，不易对硅片表面产生氧化等印记。
The material of the sucker is ceramic, so it has high temperature resistance, oxidation-resistivity and high hardness, and that is not easy to make mark on wafer surface.
- 吸盘在三维空间内分别采用伺服控制方式，可调节性强，位置精度高，大大降低了碎片率以及不良率。
In three dimensions, the suckers use servo control manner, so it is easy to tune and the position accuracy is high. The wafer broken rate and defect rate can drop down a lot.
- 真空发生器就近安装在吸盘上方，可在降低管路损耗的同时加快响应速度。
The vacuum maker is installed near the top of the sucker, that can drop down the pipeline loss and improve the response time.



技术参数 Specifications

项目 Item	数值 Value
电源 Power requirement	AC380V±10%, 50Hz±5%, 15kW
工作气压 Air pressure	最小 Min 0.6Mpa
环境 Environment	温度 Temperature: 17℃-34℃; 湿度 Humidity: < 80%



PE WAFER INSERTING
MACHINE

PE插片机

设备功能

Function

- PE 工艺设备的自动上下料
PECVD equipment automatic loading and unloading

设备技术性能

型号：TPM8000
上下料方式：100槽花篮
产能：≥4500片/小时
破片率：≤0.03%（A类片，仅统计由自动化造成的碎片）
开机率：≥99%
MTBF≥500小时
MTTR≤1小时
预留MES接口，支持数据上传
机器人：史陶比尔TX90L

兼容硅片尺寸

Compatible wafer size

- 182*182±0.5(mm)–230*230±0.5(mm)

Functionality

Loading / unloading method: 100 slot cassette
Capacity: ≥4500 pieces / hour
Fragmentation rate: 0.03%, (A type wafer, only statistics of broken caused by automation)
Up time: ≥99%
MTBF≥500 hours
MTTR≤1 hour
Reserve MES interface to support data upload
Robot: Staubli TX90L

说明

Description

- 花篮上下料集中在设备同一侧,提高设备的可操作性。
The cassette loading and unloading mechanism is in same side of the equipment to improve the operability.
- 花篮升降采用伺服模组控制。The cassette lifting up and down system is controlled servo module.
- 预留碎片检测、翘片检测、不良抓取模组。
Fragmented and curled wafer inspection, detective picking out function are reserved.
- 预留CCD色差检测、不良抓取功能。
Wafer CCD color difference detection and picking out function are reserved as optional.
- 采用旋转翻片方式，减少硅片接触，降低不良率。
Using rotary flipping wafer manner to reduce wafer contact and minimize defect wafer.
- 吸盘主体采用航空铝，具有良好的力学性能，吸嘴采用陶瓷材质，具有弹簧柔性定位功能。
The main part of sucker using aviation aluminum, and that has good mechanical property. The suction nozzle is made of ceramic material and has spring flexible positioning function.
- 使用六轴机器人进行取放片提高控制灵活性。
Using six axis robot for wafer picking and placing to promote the control flexibility.
- 石墨舟采用伺服传递方式，为了减少机器人的定位偏差同时提高效率，采用舟工作移位的方式来完成硅片的取放。
The carbon boat using servo transfer manner. In order to reduce the robotic positioning deviation and improve efficiency at the same time, adopt boat work moving manner for wafer picking and placing.



PHOTOVOLTAIC
SMART CARRIER
光伏智能运载车



灵活多变，可搭载光伏花篮等多种设备。车型小巧，无转弯半径，无需改造工厂便可快速部署。自动充电，多重安全防护，安全快捷。

Flexible and adaptable, it can be equipped with a variety of equipment such as photovoltaic baskets. The compact size of the car has no turning radius and can be deployed quickly without the need to rebuild the factory. Automatic charging, multiple security protection, safe and fast.



伺服系统
Servo system

灵活移动，响应迅速
Flexible movement and quick response



视觉系统
Visual system

自动避障，安全可靠
Automatic obstacle avoidance, safe and reliable



调度系统
Dispatch system

可对接ERP系统，调度系统自动计算路径，超高效运行
Can be connected to the ERP system, the scheduling system automatically calculates the path, and runs ultra-efficiently

技术参数 Specifications		
基本信息 Basic Information	外形尺寸 Dimension	940*650*250(mm)
	车体自重 Body weight	135kg
	电显方式 Electric display	液晶显示屏 LCD
	控制系统 Control System	韩信系统 Han Xin System
运载信息 Carrying information	运载能力(负载)Load	600kg
	前进速度 Forward speed	1.5m/s
运行信息 Operational information	导航方式 Navigation method	激光 Laser
	行走方向 Walking direction	双轮差动 Two-wheel differential
	最小转弯半径 Minimum turning radius	自旋 Spin
	障碍物检测范围 Obstacle detection range	0-8000(mm)
精度 Precision	定位精度 positioning accuracy	±2mm
	导航精度 Navigation accuracy	±5mm
电池信息 Battery information	充电方式 charging method	自动在线充电 / 手动充电 Automatic online charging / manual charging
	充电时间 Charging time	4h(10A)或 2h(20A)
	运行时间 operation hours	8h
驱动方式 Drive mode	电机类型 Motor type	伺服电机 Servo motor
	输出功率 Output Power	2x400w
其他 other	安全系统 Security system	激光避障、安全触边 Laser obstacle avoidance, safe touch
	报警形式 Alarm form	声、光报警 Audible alarm

INTELLIGENT LOGISTICS
- STACKING AGV
智能物流-堆垛AGV



3D 自然导航，超强环境适用性，加长双叉，更适应光伏行业。自动堆垛AGV替代传统叉车，更少人员、更多安全、更高效率。

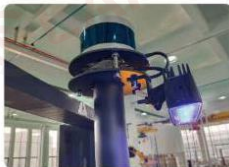
3D natural navigation, super-environmental adaptability, extended double fork, more suitable for the photovoltaic industry. Automated stacking AGV replaces traditional forklifts with fewer people, more safety and greater efficiency.



显示界面 | UI
信息实时显示，随时了解设备运行状况。
Real-time display of information, keep abreast of equipment health.



举升机构 | Lifting mechanism
承重可达1000kg，举升高度可达1.6m。
Load capacity up to 1000kg, lift height up to 1.6m.



视觉系统 | Visual system
基于雷达的二次定位，整体定位精度可达10mm。
Based on radar secondary positioning, the overall positioning accuracy can reach 10mm.



雷达系统 | Radar system
全向雷达，采用自然导航，无需调整基础设施，具备超高环境适应能力。
Omnidirectional radar, using natural navigation, no need to adjust infrastructure, with high environmental adaptability.

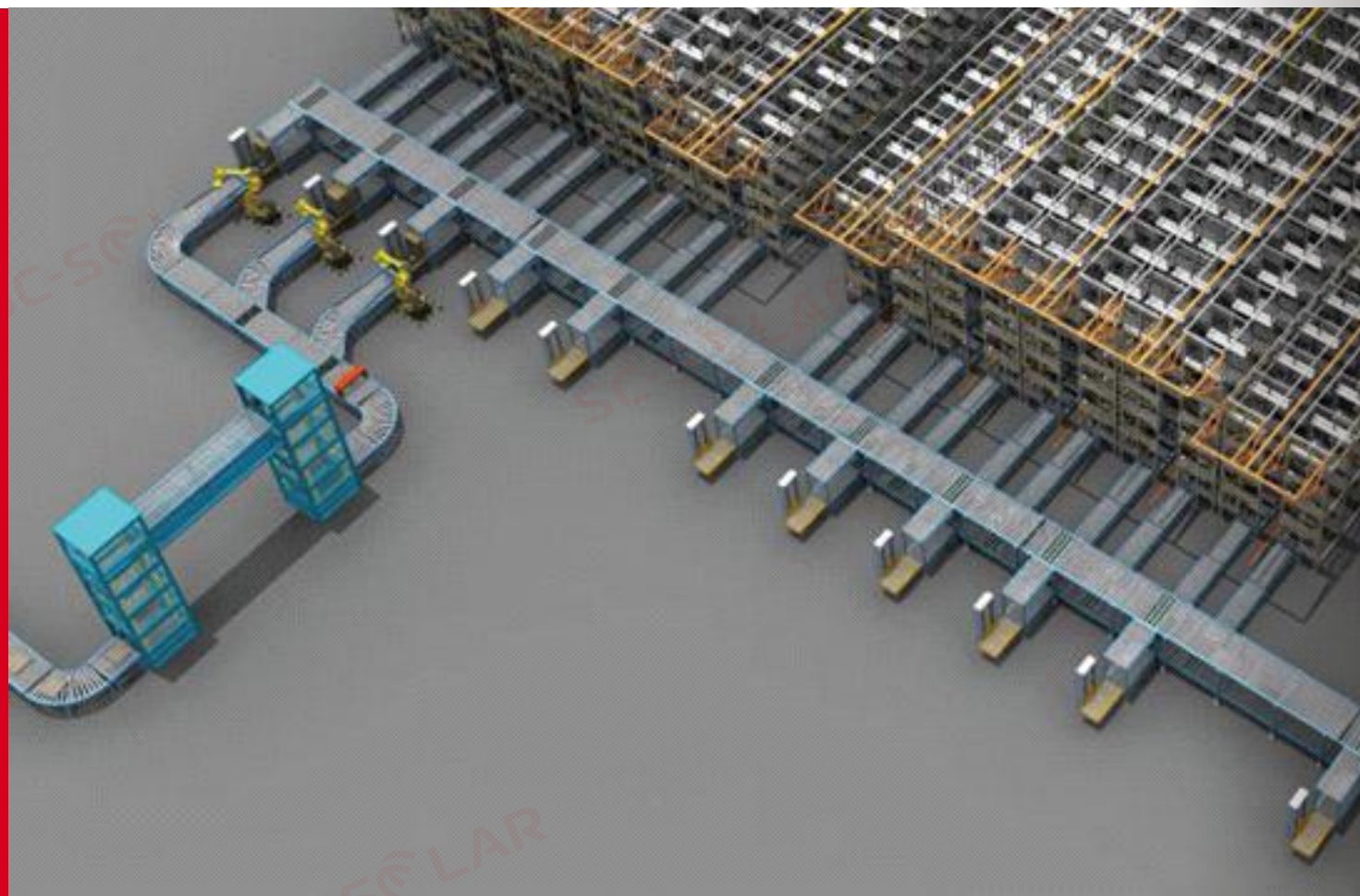


调度系统 | Dispatch system
可对接ERP系统，调度系统自动计算路径，超高效运行。
Can be connected to the ERP system, the scheduling system automatically calculates the path, and runs ultra-efficiently.

技术参数 Specifications		
基本信息 Basic Information	外形尺寸 Dimension	2095*990*2175(mm)
	车体自重 Body weight	850kg
	电显方式 Electric display	液晶显示屏 LCD
	控制系统 Control System	韩信系统 Han Xin System
运载信息 Carrying information	运载能力(负载)Load	1500kg
	前进速度 Forward speed	1.2m/s
运行信息 Operational information	举升高度 Lift height	1.6m
	导航方式 Navigation method	激光 Laser
	行走方向 Walking direction	两轮驱动 Two-wheel drive
	最小转弯半径 Minimum turning radius	1630mm
精度 Accuracy	障碍物检测范围 Obstacle detection range	0-8000(mm)
	定位精度 positioning accuracy	±2mm
电池信息 Battery information	导航精度 Navigation accuracy	±5mm
	充电方式 charging method	自动在线充电 / 手动充电 Automatic online charging / manual charging
	充电时间 Charging time	4h(10A)或 2h(20A)
驱动方式 Drive mode	运行时间 operation hours	8h
	电机类型 Motor type	交流电机 AC motor
其他 other	输出功率 Output Power	1.5kW
	安全系统 Security system	激光避障、安全触边 Laser obstacle avoidance, safe touch
其他 other	报警形式 Alarm form	声、光报警 Audible alarm

04 智能仓储系统

Stereoscopic warehouse system



STEREOSCOPIC WAREHOUSE SYSTEM

智能仓储

自动化立体智能仓储，是一套利用自动化存储设备与计算机管理系统共同协作的智能系统，可以实现立体仓库的高层合理化、存取自动化以及操作简便化。

根据每个客户的具体需求及条件，量身定做高效节能、经济实惠的立体仓库。

Auto three-dimensional intelligent storage, is a system realized via collaboration of auto storage devices with computer management system. High-layer rationalization, storage and fetch automation, and operation simplification to be realized for 3-D S storage.

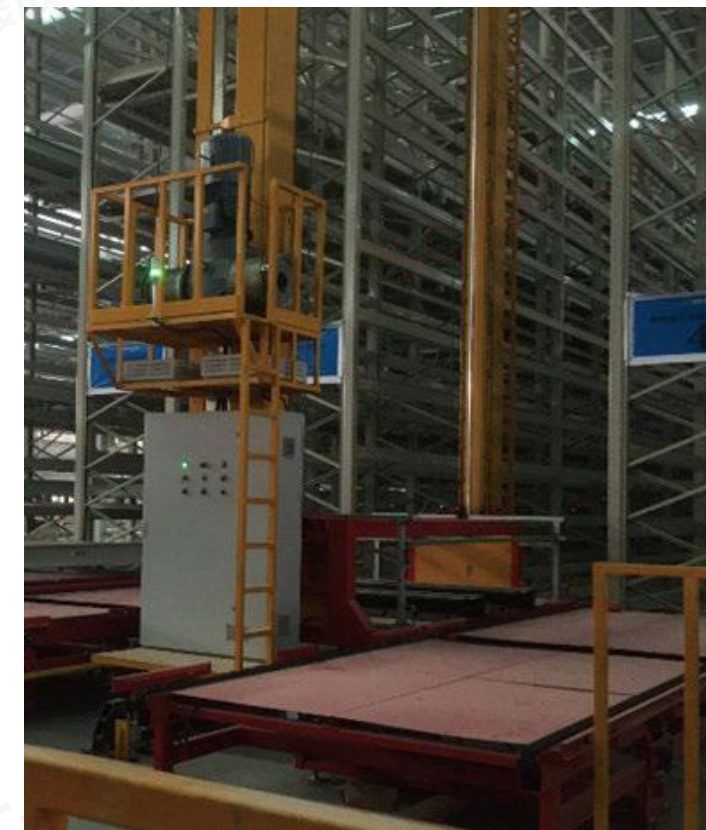
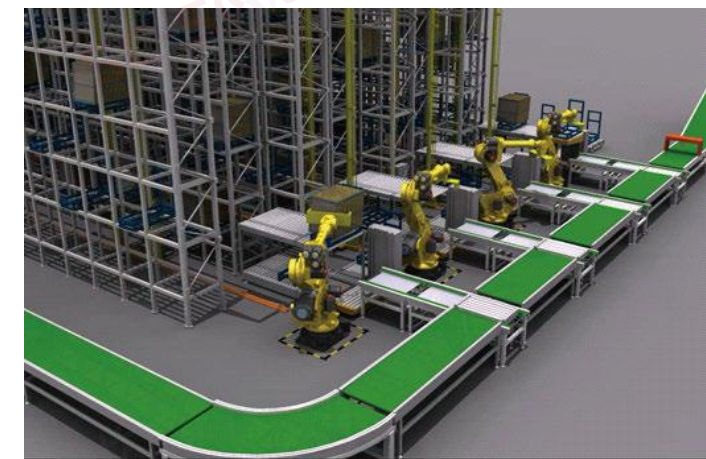
On customer' requirements and conditions to customize and design an high efficient, energy-saving, economical and practical 3-D Warehouse.

系统特点

- 标准化设计；
- 高端的机械、电气配置，设备可靠性高；
- 多重机械、电气安全保护及运行联锁措施，安全系数高；
- 采用国际知名品牌减速电机；
- 垂直及行走方向采用激光绝对认址方式；
- 信息传输采用红外光通讯（或无线通讯）；
- 采用国际知名品牌的可编程控制器；
- 具备载货单元外形检测及重量检测；
- 管式或柔性滑触线供电；
- 可与周边的各种物流设备结合，形成完整的自动化物流存储系统；
- 系统可实现维修、手动、单机自动和联机自动控制模式。

Features

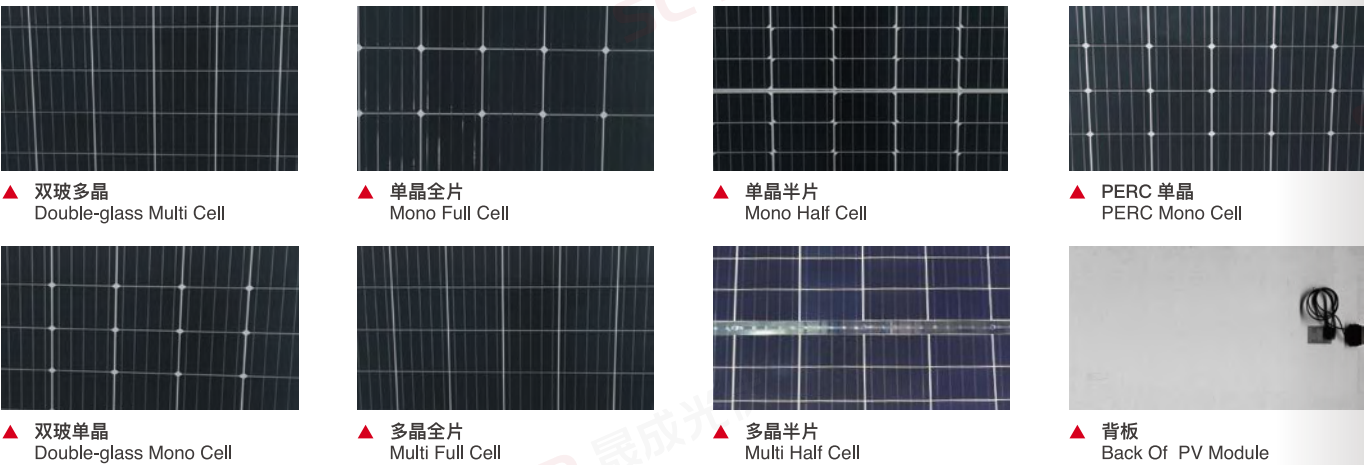
- Standardized design;
- Advanced mechanical and electrical configuration, high reliability of equipment;
- Multiple mechanical, electrical safety protection and operation interlocking measures with high safety factor;
- Adopt international famous brand geared motors;
- Vertical and mobile direction adopts laser absolute addressing mode;
- Information transmission uses infrared optical communication(or wireless communication);
- Adopting programmable controllers of internationally renowned brands;
- It has the shape detection and weight detection of the cargo unit;
- Pipe or flexible sliding contact power supply;
- Can be combined with various logistics equipment in the surrounding to form a complete automated logistics atorage system;
- The system can achieve maintenance, manual, single automatic and linkage control mode.



MODULE APPEARANCE
AUTO DETECTION SYSTEM

外观检测自动识别系统

光伏组件类型Compatible PV Module Type

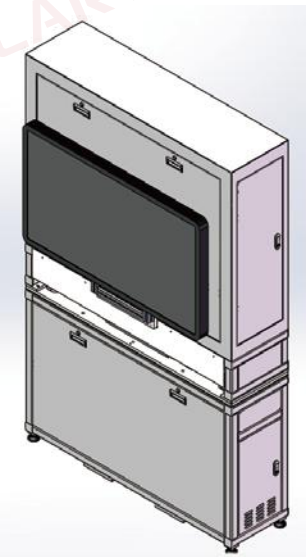


检测主要缺陷示例图What are we inspecting?



产品特色Features

- 实时在线检测，提高生产检测效率，同时极大降低流水线的人力成本。
Real-time on-line detection improves the efficiency of production detection and greatly reduces the labor cost of the pipeline.
- 实现对缺陷进行自动识别与判断，自动报警和上传检测数据。
Automatic identification and judgment of defects, automatic alarm and upload detection data.
- 条码自动识别，适应多种类型的组件，对于常规组件、非常规组件可进行自动识别与标识。
Automatic Bar Code Recogniton; Adapt to various types of PV module, automatic identification and labeling of conventional PV module, unconventional PV module.
- 快速进行产品切换，适用小量多样的组件类型。
Fast product changing-over; Adapt to small yield and diverse PV module.
- 自主学习功能，边检测边学习，不仅能提高当前产品类型的准确度，还能学习新的产品类型。
Autonomous learning function, while testing while learning; not only can improve the accuracy of current product types, but also learn new product types.
- 与ERP系统对接，实现检测设备的远程化管理。
Connect with ERP system to realize remote management of testing equipment.



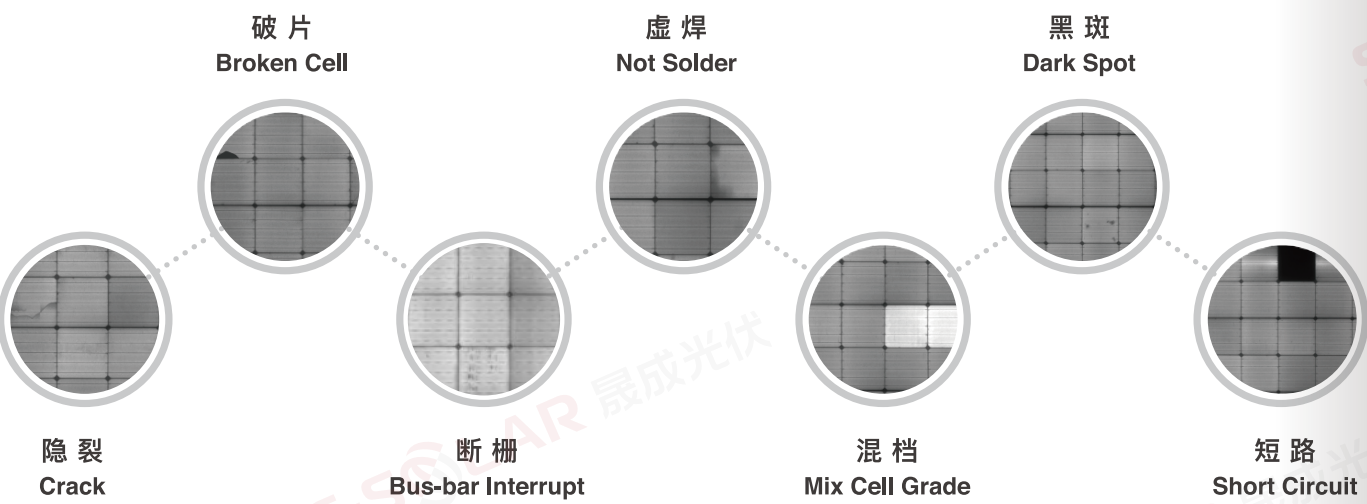
技术参数Specifications

产品型号Product model	HDC-MI900	HDC-MIL901
组件类型Module type	单、多晶电池片组件(60、72片)、双玻电池组件、半片电池组件、PERC 单晶 Mono、Multi cell(60、72)、Double-glass、Half cell、PERC Mono cell	
背板Back of PV Module	缺陷类型Type of defect	
检测区域Detection region	凹坑Pits	
	鼓包Swelling	
	划破Laceration	
	划伤Scratches	
	脏污Dirt	
电池片Cell	气泡Bubble	
	破片Broken Cell	
	划伤Scratches Cell	
	串间距、片间距异常Abnormal of cell and cluster spacing	
	焊带过长Overlong welding strip	
其他区域Other regions	锡渣、锡丝Tin dross;Tin wire	
	昆虫Insect	
	白色EVA褶皱EVA fold	
	脏污Dirt	
	正面 + 背面同时检测(可选仅正面检测)Front + Back (Only Front)	
检测方式Detection mode	彩色高端线扫 + 黑白高端线扫High-end Color line scan + black and white line scan	
相机配置Camera	高端定制光源High-end customized light source	
光源配置Light source	自动判断Automatic	
缺陷判断方式Defect judgment method	55 寸大屏显示(显示内容可自由切换)55 inch large screen display	
显示方式Display	2m*1m	
组件大小Size	无No	
边框Frame	短边进Short edge entry	
进板方式Entry mode	18m/s	
运动速度Speed	Max 25s	
检测时间Detection time	无No	
流水线Assembly Line	有Yes	
设备尺寸(mm) Dimension	1450*400*2400(L×W×H)	1450*4600*2400
设备重量(kg) Weight	450	500
电柜尺寸(mm) Power Cabinet Dimension	300*750*1100(L×W×H)	
供电要求Power Supply	AC220V/50Hz/16A	
设备功率Power	2.2kW	2.7kW
其他模块Additional Features	条码识读, 缺陷统计, 自动报警功能Identify barcode; Defect statistics; Automatic alarm function	

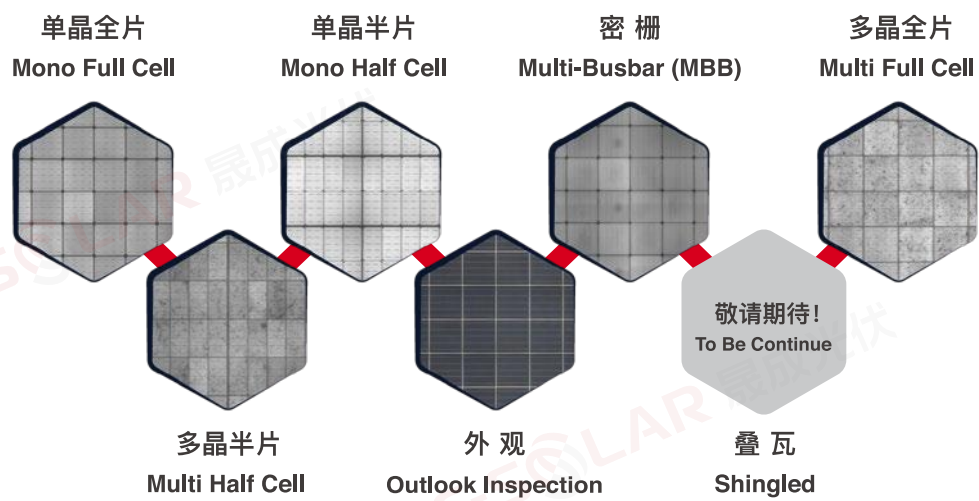
EL AUTO IMAGE
RECOGNITION SYSTEM

EL影像自动识别系统

我们在检测什么？ What are we inspecting?



可以测试的组件类型 Compatible Cell Type



新产品快速爬坡 Fast Ramping Time for New Product



密栅、叠瓦、双面等产品焊接点检测
串EL自动判定快速定位异常发生点，缩减工艺窗口寻找周期
Multi-Busbar, Shingled, Bi-facial & ect. product welding point detection
Automatic detection of abnormal occurrence points by String EL function and reduction of searching period on monitor.

判定、返修人力精简 Lean on Manpower for Manual Detection & Rework



串EL自动判定可将缺陷串卡在串返修处
减少了组件返修的数量和难度，精简了组件返修人力
With string EL AI, defective strings can be repaired beforehand and therefore reduces workload at the panel repair station.

电池片损失降低 Reduce Loss of Cell



串EL自动判定引入避免焊机至层前EL过程中的WIP批量不良，从而有效降低因焊机批量不良导致的破片率
Automatic String EL Detection can avoid massive defect WIP occurrences from Stringer to Pre-Lamination EL, it can prevent massive defect string produced by stringer.

质量良率提升 Improve Quality Yield

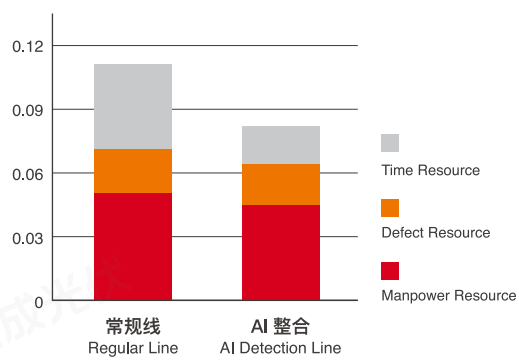


前后道组件EL自动判定统一质量标准，避免人员因疲劳操作导致的漏检，从而消除前道EL漏检提升良率
With standardized of detection protocol, Pre & Post Lamination module EL automatic detection can reduced human dependent factor which cause miss detection due to fatigue for long operation can improve yield.

产线快速切换 Fast Change-over Time



小量多样的市场需求愈发明显，通过智能判定快速定位并解决异常，帮助客户不再为虚焊隐裂而担忧
Multiple type product market demand is becoming more and more obvious, the core role of rapid positioning and intelligent judgment in solving abnormal situations is to help customers stop worrying about hidden cracks in virtual welding.

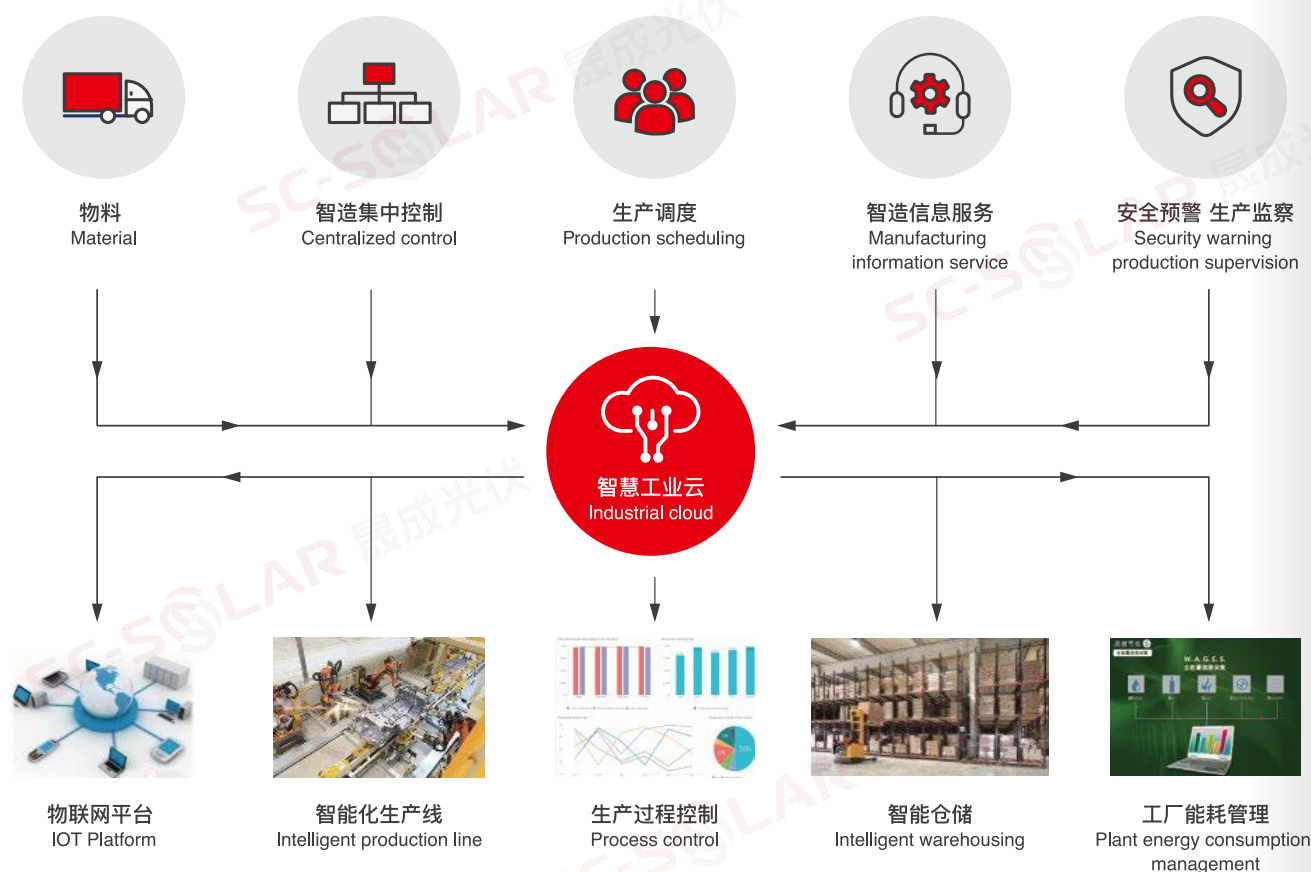


A 公司密栅产品引入智能判定前后对比
Comparisons of AI Detection before and after of Multi-Busbar

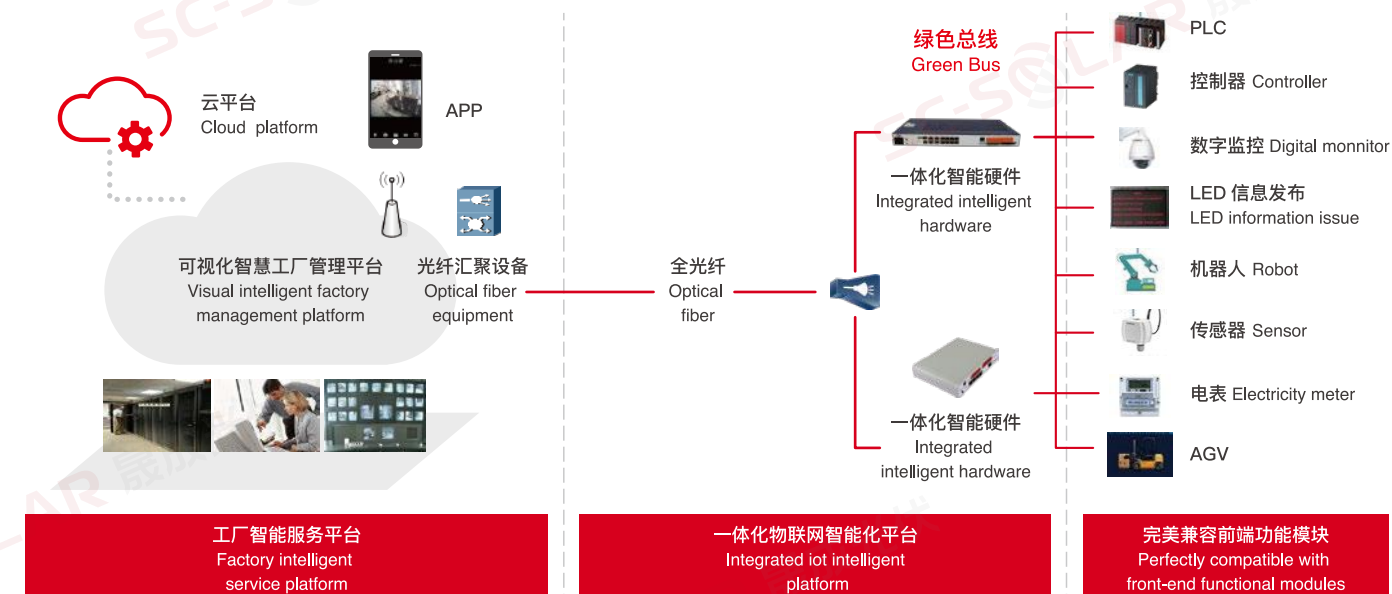
单线生产指标 Single Line KPI	原模式 Original	智能判定 AI Detection
组件日产量(块) Daily Module Output (piece)	1800	2330
满产达成时间(天) Reach Full Product Capacity (day)	5	2
组件返修率(%) Module Rework Rate (%)	18.2	5.7
组件返修人力(人) Module Rework Manpower (pax)	12	4
串返修率(%) String Rework Rate (%)	4.3	3.8
串返修人力(人) String Rework Manpower (pax)	5	5
破片率 / 工损率(%) Defect Rate (%)	0.32	0.28
串焊机日均故障时间(h) Stringer Daily Downtime (h)	1.87	1.15
焊接不良成品降级率(%) String Down Grade Rate (%)	0.15	0.05
年创造收益(万元) Annual revenue generation (10K RMB)		354

SMART FACTORY MANAGEMENT SYSTEM

智慧工厂管理系统(i-SEAP)



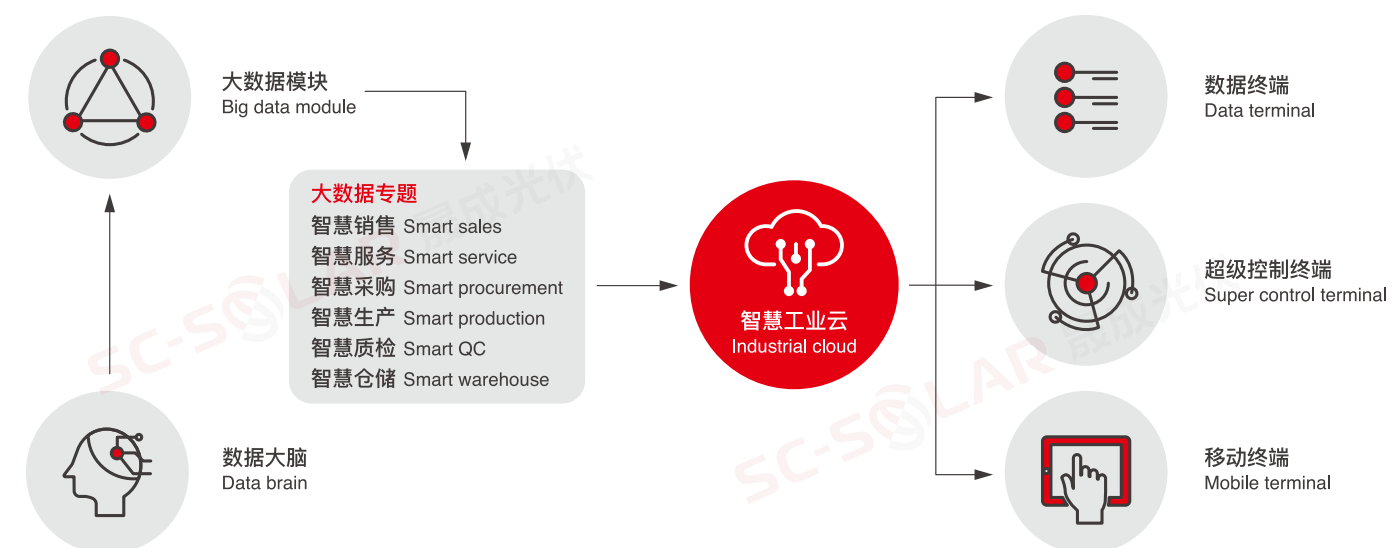
智慧工厂-工业物联网 Smart factory - industrial Internet of things



以智能感知和云架构控制系统为核心生产控制手段，采用工业物联网技术，将传感器网络技术应用用于供应链系统，以智能传感器、智能设备为基础，实现数据自动采集、生产环节智能检测和生产流程的自动化控制，并为生产过程优化提供基础支持。

Intelligent perception and cloud architecture control system as the core means of production control, Industrial iot technology, the application of sensor network technology in the supply chain system, based on Intelligent sensor, intelligent equipment, realize automatic data collection, production Intelligent monitoring, automatic control of the whole producing process, and provide foundation support for the production process optimization.

智慧工厂 – 工业大数据 Smart factory - industrial big data



工业大数据应用将企业数据和外部数据等各类要素信息进行同步采集、管理和调用，通过对各类活动数据进行统计分析、特征提取、关联挖掘、模式识别和深度学习的智能分析方法，实现对活动数据的认知和预测。所有分析数据通过两个平台的实时传输接口，反馈至“企业数据云”和“工业大数据云”，并发布至“企业互联和互动门户”。

Applications of industrial big data synchronize the acquisition, management, and calling of data from enterprises and external. Through intelligent analysis methods, such as atatistical analysis, feature extraction, association mining, pattern recognition and deep learning etc, realize cognition and prediction of activity data. The analysis data is transmitted to "enterprise data cloud" and "industrial big data cloud" through the real-time transmission interface of the two platforms, and all data is released to the "enterprise Internet" and "interactive portal" through the cloud platform.

SMART FACTORY-MES

智慧工厂-生产执行系统(SC-MES)

- 改善企业生产计划的制定和调整

Improve the formulation and adjustment of production plan

● 改善设备管理状况

Improve equipment management

● 加快企业生产计划执行状况的反馈速度

Speed up the feedback speed of production plan execution

● 消除企业中的信息孤岛, 实现企业内部的信息共享

Eliminate the information island in the enterprise, realize the information sharing within the enterprise

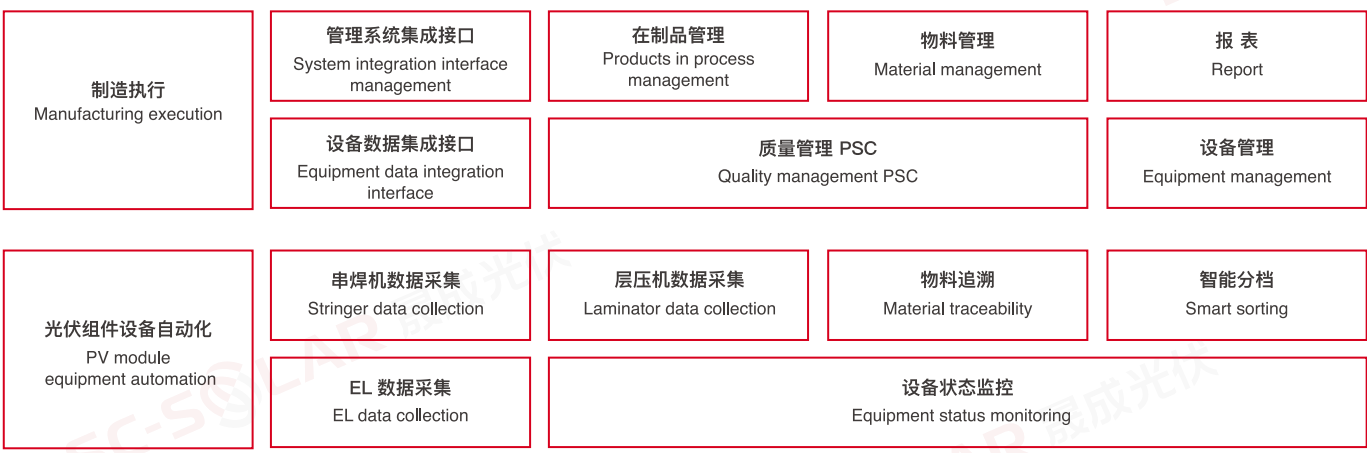
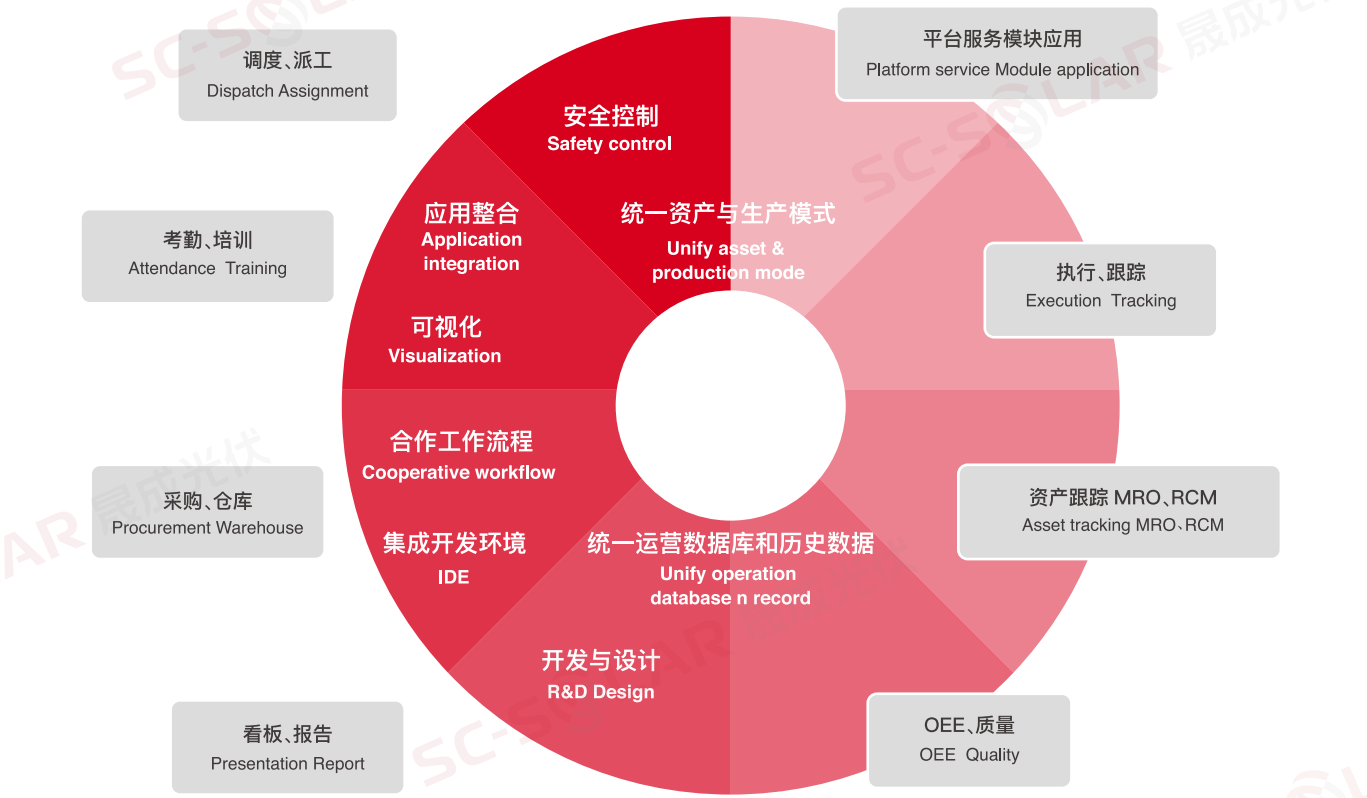
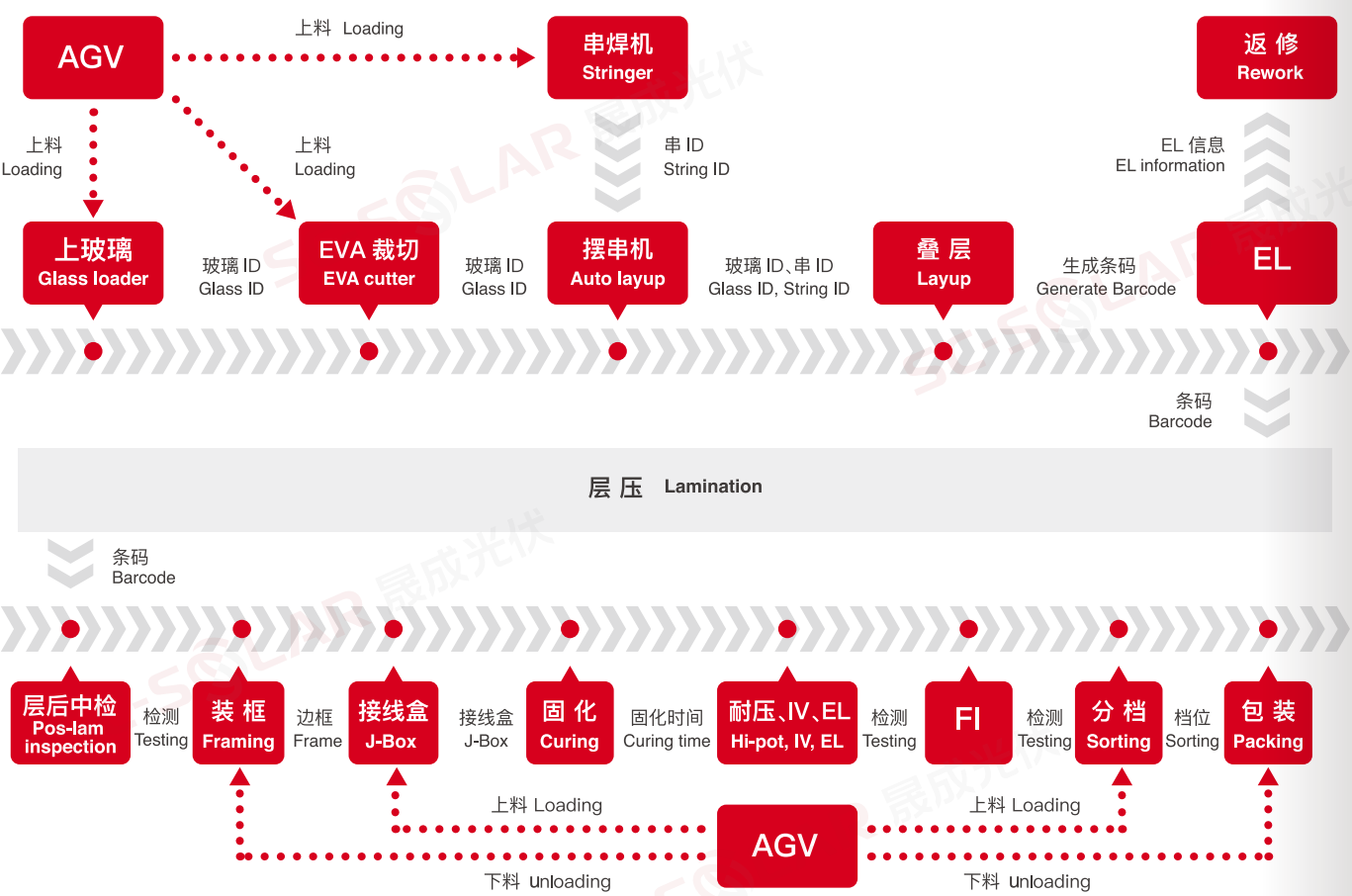
● 极力改善生产过程中的质量控制力度

Improve the quality control in the production process

● 极大地改善了企业的实时数据报表能力

Greatly improve the real-time data reporting capabilities of enterprises

智慧工厂 -MES 主要管控站点



MES 亮点

MES Features

- 融合性: 系统和设备高度融合, 软件驱动设备

Integration: Highly integrated system and equipment, software driver device
- 信息中枢: MES系统双向通讯, 提供整个供应链的生产活动信息, 无缝对接ERP, 避免信息孤岛, 实时大屏监控

Information center: MES system two-way communication, provide production activity information of whole supply chain, seamless connect ERP, avoid information island, real-time large screen monitor board.
- 可追溯: 全生命周期产品追溯, 全生命周期设备追溯

Traceability: Full life cycle product traceability, full life cycle equipment traceability
- 实时性: MES实时收集并处理数据和信息

Real-time: MES collects and processes data and information in real time