昊中自动化
HAOZHONG AUTOMATION

COMPANY ADDRESS /
公司地址 /

济南昊中自动化有限公司（总部）
地址：山东省济南市长清区平安中路999号
电话：0531-58755018
传真：0531-87901760
网址：http://www.jnhaozhong.com/

Jinan Haozhong Automation Co., Ltd. (Headquarters)
Address: No. 999 Ping An Middle Road, Changqing District, Jinan City, Shandong, China
Tel: +86-0531-58755018
Fax: +86-0531-87901760
Website: http://www.jnhaozhong.com/

济南昊中上海办事处
地址：上海市浦东新区新金桥路1888号40幢（凯龙金领大厦东楼）515室
电话：021-61732538
海外网站：www.jnhaozhongtech.com
海外业务邮箱：marketing@jnhaozhongtech.com

Jinan Haozhong Shanghai Office
Address: Room 515, Building 40, No. 1888 Xinjinqiao Road, Pudong New Area, Shanghai (East Building of Kailong Jinling Mansion)
Tel: 021-61732538
Overseas Website: www.jnhaozhongtech.com
Overseas Business Email: marketing@jnhaozhongtech.com

昆山昊硕云智能科技有限公司
地址：昆山市开发区昆嘉路616号

Kunshan Haoshuoyun Smart Technology Co. Ltd.
Address: No. 616 Kunjia Road, Development Zone, Kunshan City, Jiangsu, China

浙江昊中智能科技有限公司
地址：浙江省湖州市红丰路1366号3幢12层1213-165

Zhejiang Haozhong Smart Technology Co. Ltd.
Address: Rm. 1213-165, 12th Floor, Bldg 3, No. 1366 Hongfeng Road Huzhou city, Zhejiang, China

广州昊中智能科技有限公司
地址：广州市番禺区化龙镇金山大道东503号金雁佳园18号楼201号/202号

Guangzhou Haozhong Smart Technology Co. Ltd.
Address: Rm. 201/202, Bldg. 18, Jinyanjiayuan, No. 503 Jinshan Ave. East, Hualong Town, Panyu District, Guangzhou City, China

昊中自动化公众号
WeChat Official Account QR Code

昊中自动化国际网址
QR Code for Overseas Websites

昊中自动化中国网址
Company website QR code

昊中自动化
HAOZHONG AUTOMATION

HAOZHONG AUTOMATION

济南昊中自动化

公司介绍
Company Profile

济南昊中自动化有限公司成立于2011年5月，是一家专业研发、制造冲压自动化生产线的国家重点“专精特新”小巨人企业，公司先后荣获国家专精特新“小巨人”企业、国家高新技术企业、省级“专精特新”、“瞪羚企业”、山东省制造业高端品牌培育企业、山东省数字经济“晨星工厂”企业、济南市级企业技术中心、济南市工业设计中心、济南市一企一技术中心、济南市单项冠军企业、济南市绿色工厂、及央视《强国智造》重点报道企业，致力于打造中国自主研制高速柔性机械手第一品牌。

Jinan Haozhong Automation Co., Ltd. was founded in May 2011. It is a national key **Specialized, Refined, Differential and Innovative (SRDI) Little Giant Enterprise** specializing in the R&D and manufacturing of stamping automatic production lines.The company has been awarded a number of honors, including National SRDI Little Giant Enterprise, National High-tech Enterprise, Provincial SRDI Enterprise, Gazelle Enterprise, Shandong High-end Manufacturing Brand Cultivation Enterprise, Shandong Digital Economy "Morning Star Factory", Jinan Municipal Enterprise Technology Center, Jinan Industrial Design Center, Jinan One Enterprise One Technology R&D Center, Jinan Single-item Champion Enterprise, and Jinan Green Factory. It has also been specially reported by CCTV in the program Powerful Nation · Intelligent Manufacturing. The company is committed to building China's top independent brand of high-speed flexible manipulators.

公司总部位于山东省济南市，并先后在国内上海、广州、昆山、湖州设立分支机构，以便更好地为客户实现服务和产业升级。

Headquartered in Jinan, Shandong Province, the company has successively set up branches in Shanghai, Guangzhou, Kunshan and Huzhou across China, to better support customers' after-sales service and industrial upgrading.

公司新工厂于2023年6月投入使用，占地13600余平方米，其中六层办公楼建筑面积约 6000 平方米，五跨生产车间面积达 8000 余平方米，厂区内设精密装配车间（配备三坐标测量仪）、四序串联冲压线自动化系统验证测试平台等检测及试验设施，成为国内一流的自动化装备研发制造基地。公司产品服务于国内外各汽车制造厂及其配套企业，国外出口包括美国、墨西哥及欧洲和亚洲各国，和国际知名企业如安德里茨集团及旗下舒勒、乐铁等有广泛的合作，公司正在快速走向国际化。

The company's new factory was put into operation in June 2023, covering an area of over 13,600 square meters. Among them, the six story office building has a construction area of approximately 6,000 square meters, and the five span production workshop spans more than 8,000 square meters.The factory is equipped with inspection and testing facilities including a precision assembly workshop (equipped with a coordinate measuring machine) and a verification and test platform for four process tandem stamping line automation systems, making it a first class R&D and manufacturing base for automation equipment in China.

Our products serve domestic and overseas automobile manufacturers and their supporting enterprises. Export destinations include the United States, Mexico, as well as various countries in Europe and Asia. We maintain extensive cooperation with internationally renowned enterprises such as Lotte. The company is rapidly moving toward internationalization.

HAOZHONG AUTOMATION

公司有一支经验丰富，技术精湛、服务一流的优秀队伍。目前员工数量200余人，其中专职研发人员100余人，高级职称12人。目前拥有国内发明专利22项、实用新型35项目，国际专利（美国、日本）2项。

The company boasts an outstanding team with rich experience, exquisite technology and first class service. It currently employs more than 200 staff members, including over 100 full time R&D personnel and 12 senior professional title holders.Up to now, we hold 22 domestic invention patents, 35 utility model patents, and 2 international patents (the United States and Japan).

公司主要产品为冲压生产线自动化系统，包括串联冲压线、多工位生产线、热成形生产线、落料线等形式。其中串联线自动化囊括了标准机器人7轴、6轴、高速单臂、双臂机械手、直线机械人等所有自动化形式。同时还致力于大型冲压线的自动化升级改造服务，为企业创造最大的价值。

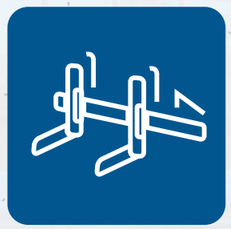
Our core products cover comprehensive stamping automation systems, including tandem press lines, multi-station transfer press lines, hot forming press lines and blanking lines. Among them, tandem press lines cover full-range automated solutions, such as 6-axis & 7-axis robots , high-speed single-arm & dual-arm feeder and linear robots. In addition, we provide automated upgrading and renovation services for large-scale stamping lines, helping customers maximize economic benefits and comprehensive value.

国家重点“专精特新”小巨人企业，国家级专精特新“小巨人”企业

National-level Specialized, Refined, Differential and Innovative "Little Giant" Enterprises,

HAOZHONG AUTOMATION

高速高柔性单臂生产线



高速热成形生产线

高速多工位搬运生产线

老、旧冲压生产线自动化升级改造

目录
contents

串联冲压生产线自动化解决方案
Automation Solutions for Tandem Press Line

常规串联自动化冲压生产线是一种由多台冲压机按工序顺序排列，通过机械手或机器人实现自动上下料和工序传递的自动化生产线。
A conventional tandem press automation line is a fully automated production system comprising multiple presses arranged in sequential order, with robotic or mechanical feeder systems facilitating automatic loading, unloading, and part transfer between stations.

其主要组成部分包括冲压机、机械手或机器人、线首设备（如拆垛装置、分张装置、对中装置）、线尾设备（如皮带机、机器人）以及集中控制系统。
Its primary components include **presses, feeder or robots, Front of Line (FOL) equipment** (such as destacking units, sheet separation devices, and centering system), **End of Line (EOL) equipment** (such as belt conveyors and unloading robots), and a **centralized control system**.

生产线通过各设备的协同工作，完成从板材上料、冲压加工到成品下料的全流程自动化生产。
Through the synchronized operation of all subsystems, the line achieves fully automated production spanning the entire workflow—from raw blank loading and multi-stage press forming to finished part unloading.

其优势在于适用范围广，能够满足多样化冲压件的生产需求，尤其适合大型覆盖件等复杂产品的加工。
The primary advantage of the tandem press line lies in its **broad application scope and exceptional flexibility**. It is capable of accommodating a diverse range of stamped parts, making it particularly well-suited for the production of **large body panels and complex geometry parts**.

这种生产线广泛应用于汽车、家电、五金等行业，尤其适用于生产工艺复杂、产品质量要求高且需要频繁切换生产的场景。
This configuration is widely utilized across the **automotive, home appliance, and metal hardware** industries, especially in scenarios involving **complex processes, high surface quality requirements, and frequent die changeovers**.

高速高柔性单臂生产线
High-speed and high-flexible single-arm feeder

随着汽车冲压自动化生产线的快速发展，压机间物料传送的高速柔性、稳定性十分关键。
With the rapid development of automatic stamping lines for automobiles, the high-speed, flexible and stable material transfer between presses has become very critical.

为满足客户的需求，我司组建研发团队，自主研发、设计、生产出在美国、日本同时取得专利的单臂机械手产品HSR。
To meet customer demands, our company has set up a professional R&D team, independently developing, designing and manufacturing the single-arm feeder--HSR, which has obtained patents in both the United States and Japan.

此六轴联动式高速高柔性机械手结合我司自主研发的多轴联动控制系统，联合国内顶尖大学清华大学教授团队通过动力学分析优化出最优轨迹曲线，保证机械手能快速、平稳、准确的完成规定动作曲线，满足高速冲压自动化线生产的需求。
This type of high-speed, highly-flexible six-axis coordinated feeder was developed on the basis of our proprietary multi-axis coordinated control system in collaboration with Tsinghua University professors who crafted the optimal trajectory curve through kinetic analysis. Such feeders can exercise specified action curves in a quick, smooth and accurate way so as to meet the needs of high-speed stamping automation.

HSR具有自动化程度高、速度快、运行平稳、布局紧凑等优点，特别适用于压机间距5200—6000mm，生产节拍最快可达到18SPM。
HSR features high automation level, fast speed, stable operation and compact layout. It is especially suitable for press spacing of 5200-6000 mm, with a maximum production cycle of up to 18 SPM.

线首部分
Front of Line (FOL) Section

1. **拆垛系统**：将汽车钢板垛料拆成单张板料
   Destacking System: Separates stacked automotive steel blanks into individual sheets.
2. **清洗机**：清洗钢板板料，保证钢板清洁
   Washer: Cleans the steel blank surface to ensure optimal cleanliness prior to forming.
3. **涂油机**：对成形过程中较大拉伸的钢板进行涂油
   Oiling Machine: Applies drawing oil to blanks requiring significant material stretch during the forming process.
4. **皮带机**：钢板通过清洗机/涂油机的传送机构
   Belt Conveyor: Serves as the transfer mechanism conveying blanks through the washing and oiling units.
5. **对中系统**：板料进入首台压机前进行对中，确保板料进入压机的位置一致性
   Centering System: Precisely positions and centers the blank prior to entry into the first press, ensuring consistent placement accuracy within the die.

压机间传送单元
Inter-Press Transfer Section

1. **压机间传送**：上料机械手、压机间机械手、下料机械手
   Inter-Press Transfer Units: Comprising **loading robots/feeders, inter-press transfer robots/-feeders**, and **unloading robots/feeders**.
2. **ATC**：实现端拾器的自动更换
   ATC (Automatic Tooling **Change)**: Enables the automatic exchange of tooling to accommodate different part geometries.

线尾部分
End of Line (EOL) Section

1. 穿梭机 **Shuttle**
2. 摆件机器人 Un**loading Robot**
3. 皮带机 **Belt Conveyor**
4. 检验和照明 **Inspection Station and Lighting Syste**

优势：
Advantages:

研发资源：昊中凭借主要工程技术人员多年在冲压自动化行业的经验积累，专门成立了冲压前沿产品的研发部门，拥有冲压自动化整线规划、仿真、模拟平台。

R&D: Leveraging the extensive hands-on experience of our core engineering team in the press automation industry, Haozhong has established a dedicated R&D department focused on cutting-edge press line technologies. The company possesses a comprehensive **whole-line planning, simulation, and emulation platform** for press automation systems.

技术资源：昊中领导及核心技术人员为压力机出身，掌握了压力机的运动曲线及结构，更有利于实现压力机与自动化送料的匹配及整线集成。

Technology: Haozhong's leadership and key technical personnel have deep roots in **press engineering and manufacturing**. This intrinsic understanding of **press motion profiles and mechanical structures** provides a distinct advantage in achieving seamless **synchronization between press operation and automated feeding systems**, ensuring superior **total line integration**.

学院资源：昊中与清华大学博士团队建立了长期的战略合作，为冲压自动化设备及整线的动力学分析、曲线轨迹优化、在线仿真、离线仿真等关键技术突破提供技术保障。

University Collaboration: Haozhong maintains a long-term strategic partnership with a **doctoral research team from Tsinghua University**. This collaboration provides critical technical support for breakthroughs in key areas, including **kinetic and dynamic analysis of press automation equipment, motion curve trajectory optimization, online simulation, and offline simulation**.

伺服驱动数量 Number of servo drives		6
可适应压机间距 Applicable press spacing		5200~6000mm
重复定位精度 Repeated positioning accuracy	直线Linear	±0.2mm
重复定位精度 Repeated positioning accuracy	旋转Rotary	±2 arcmin
端拾器+最大板料重量 Tooling + maximum sheet weight		100kg
一模双件中心距驱动 Center distance drive for two-cavity die		伺服Servo
端拾器自动快换 Automatic quick change for tooling		标配Standard
最高生产节拍 maximum production rate		18SPM

产品效果图
Product Render

公司内整线模拟测试场景
On-site full-line simulation test in Haozhong workshop

产品实际应用场景
On-site Application

直线七轴连续生产线
The seven-Axis robot automation production line

直线七轴机械手采用高强度铝型材，通过大量分析计算极大缩小其高度，以提高其适应性；
The 7th-axis linear feeder is made up of high strength aluminum profiles. Its height is minimized through analysis and calculation to improve its adaptability.

采用独立的伺服电机，伺服控制集成于机器人控制柜中；
Equipped with independent servo motors, the servo control system is integrated in a robot control cabinet.

与机器人连接方式采用法兰连接，可满足不同型号的机器人，增强其通用性；
Flange coupling is adopted to connect robots of different types and enhance its adaptability.

直线七轴采用上下两层皮带缠绕，末端端拾器处可实现倍速直线运动，提高其生产节拍。
The linear 7th-axis is wrapped by two layers of belts, and the speed of linear movement can be doubled at the end pickup so as to improve its takt time.

生产线同步运行过程中，机器人可实现同步调速。
During the synchronous operation of the press line, the robot can achieve synchronous speed regulation.

昊中技术优势
Haozhong Advantages

1 小行程冲压线同步连续运行技术
Compact Stroke Continuous Synchronization Running Technology

常规同步线一般首序压机行程要求1400mm，后序不小于1250mm；伺服压机线行程一般要求1300mm。
我司有首序压机小行程实绩，包括1250mm甚至1250mm。
Conventional synchronized tandem lines typically require a minimum stroke of **1,400 mm** for the lead press and **1,250 mm** for subsequent presses; servo press lines generally require a stroke of **1,300 mm**. Haozhong has a proven track record of implementing **reduced-stroke lead presses**, achieving successful integration with strokes as low as **1,250 mm and even 1,200 mm**.

2 机器人+压机整线连续运行
Continuous Running line of Robot+ Press

可实现机器人（及7轴）同步跟随。
Enables **synchronous following** of robots (including 7th-axis linear tracks) with the press slide motion.

提升节拍同时可减小机械冲击，节能，稳定性好。
Increased Cycle Time: Achieves higher throughput while simultaneously reducing mechanical shock and vibration.

节能：节能约30%（相对于断续模式）
Energy Saving: Approximately 30% reduction in energy consumption compared to intermittent (start-stop) mode.

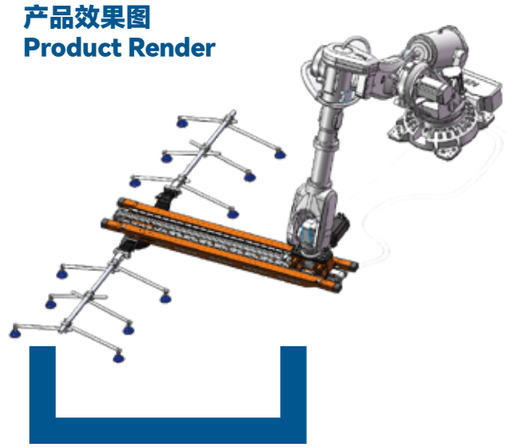
降噪：噪音下降20%,国内某知名主机厂实测约80DB左右
Noise Reduction: Noise levels are reduced by 20% . On-site measurements at recorded levels as low as approximately 80 dB(A) .

维护：冲压时冲击小，压机、模具维护成本大幅下降
Low Maintenance: Minimized impact forces during stamping significantly lower maintenance costs and extend the service life of both presses and tooling.

伺服轴数量 Number of servo axis	6+1
七轴行程 7th-axis stroke	±1750mm
可适应压机间距 Applicable press spacing	5500~6500mm
水平速度 Horizontal velocity	5m/s
水平加速度 Horizontal acceleration	20m/s²
重复定位精度 Repeated positioning accuracy	±2mm
端拾器+最大板料重量 maximum weight of Tooling + sheet	100kg
端拾器自动快换 Automatic quick change for Tooling	选配Optional
最高生产节拍 Maximum Cycle time	12SPM

注：可根据客户需要选择ABB、KUKA、Fanuc、安川等机器人
Notes: ABB, KUKA, Fanuc, Yaskawa and other robots can be selected according to customer needs.

产品效果图
Product Render



产品实际应用场景
On-site Application

六轴机器人生产线
6-Axis Robot Automation Production Line

六轴机器人自由度多，可灵活完成复杂轨迹动作（如工件翻转、多角度取放），适应不同模具和产品切换。通过编程快速调整生产节拍和工艺路径，满足多品种混线生产需求。

The 6-axis robot offers extensive degrees of freedom, enabling flexible execution of complex trajectory motions—such as **part flipping and multi-angle pick-and-place operations**—to readily accommodate various die configurations and product changeovers. Through rapid programming adjustments, the system can quickly adapt **production cycle** time **and process paths** to meet the demands of **high-variety production**.

搬运重复定位精度可达±2mm，确保冲压件一致性，减少废品率。

Repeatable positioning accuracy for part handling reaches ±2 mm, ensuring consistent stamping quality and reducing scrap rates.

全流程自动化无缝衔接，生产节拍最高可达12SPM。24小时连续运行，大幅提升设备利用率（OEE）。

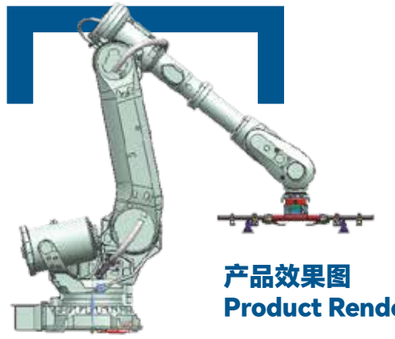
Fully automated, seamless workflow integration achieves a maximum production rate of **12 SPM (Strokes Per Minute)**. Capable of **24/7 continuous operation**, the system significantly enhances **Overall Equipment Effectiveness (OEE)**.

支持物联网（IoT）和数字孪生技术，实时监控设备状态、能耗和故障预警。通过机器学习优化冲压参数（如压力、速度），延长模具寿命。

The system supports **IoT (Internet of Things)** connectivity and **digital twin** technology, enabling real-time monitoring of equipment status, energy consumption, and predictive fault warnings. Machine learning algorithms further optimize press parameters (e.g., force, speed) to extend die service life.

六轴机器人自动化冲压线通过"柔性化、高精度、高效率"的自动化方案，解决了传统冲压工艺依赖人工、换模时间长、安全隐患多等问题，尤其适合高端制造业对“小批量、多品种、高质量”的生产需求，是工业4.0背景下冲压车间升级的常规入门级解决方案。

The 6-axis robotic automation press line delivers **a flexible, high-precision, and high-efficiency** automation solution. It effectively addresses the inherent challenges of traditional press operations—namely **heavy reliance on manual labor, lengthy die change times, and elevated safety risks**. It is particularly well-suited to the **low-volume, high-mix, high-quality** production requirements of advanced manufacturing sectors. As such, it represents the **standard entry-level solution** for press shop modernization within the **Industry 4.0** paradigm.



产品效果图
Product Render

出口墨西哥生产线厂内测试实景图
Factory Acceptance Testing (FAT) Photo — Press Line for Mexico Customer

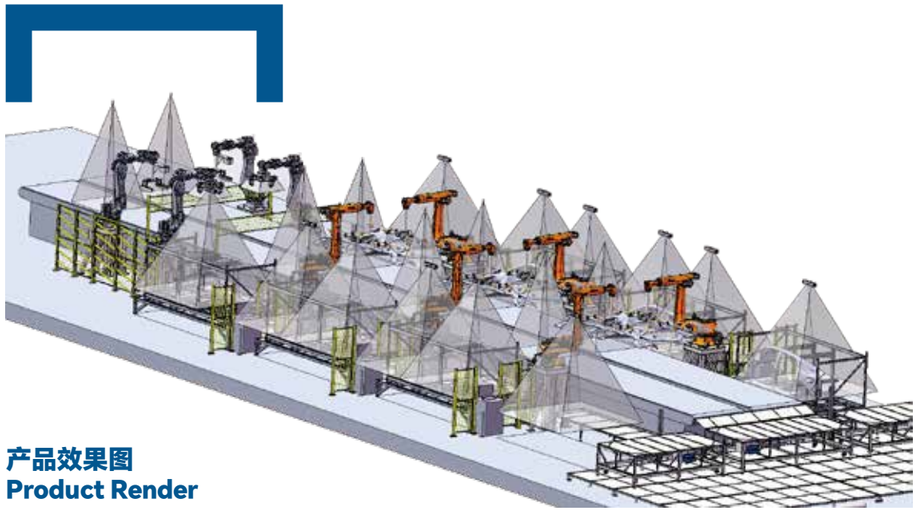
线末自动装箱
Automatic Racking System (ARS)

该系统利用视觉定位技术，结合机器人、伺服皮带输送机联合控制，实现机器人自动抓取零件装框的功能，降低人工成本，提高效率，消除人工装箱的安全风险。

This system utilizes vision positioning technology in conjunction with coordinated control of robots and servo belt conveyors to enable automated robot pick-and-place racking of stamped parts into bins or racks. The solution effectively reduces labor costs, enhances operational efficiency, and eliminates safety risks associated with manual part handling and racking .

我司线末装箱有以下功能
The ARS has the following features:

1. 可实现16SPM以下双件独立自动装箱；
   Capable of independent automatic packing for double parts below 16 SPM.
2. 可满足悬挂、间隔悬挂、叠放、间隔叠放等不同形式的内外板装箱要求；
   The packing requirements for inner and outer panels in various forms, including hanging, interval hanging, stacking and interval stacking.
3. 可根据质检人员指示信息或自动视觉检测系统信息实现不良品独立装框，或放行线尾人工收取；
   Defective products can be racked in a separate case or manually collected at the end of the line according to the instructions of quality inspection personnel or the automatic visual inspection system;
4. 在整线换模过程中可自动完成端拾器更换；
   The tooling can be replaced automatically during the ADC process in the whole line;
5. 料框周转可采用AGV自动转运或叉车转运。
   Material cases can be transported by AGV or forklift.



产品效果图
Product Render

线末自动装箱系统主要构成
Composition of the ARS in end of line

序号 Serial No.	项目 Item	简介 Descriptions
01	出料皮带机 Discharge belt conveyor	步进、连续模式 Step by step, continuous mode 中间可预留人工检测通道 An aisle may be reserved for manual inspection
02	装箱机器人 Packing robot	ABB、KUKA、FANUC供选 ABB, KUKA and FANUC are optional
03	机器人地轨（选配） Robot rail track	
04	二层平台及安全防护 Two-layered platform and safety protection	层两侧放置库位，每库位可容纳1个大料框或2个小料框，每个库位配快速卷帘门 上层设旋转双工位ATC支架，ATC区域安全围栏封闭 平台区域可供存放端拾器 Storage positions are arranged on both sides of the ground floor. Each position can hold one large material frame or two small material frames, and each storage position is equipped with a fast rolling shutter door. The upper floor is provided with a rotary dual-station ATC bracket, and the ATC area is fully enclosed with safety fencing. The platform area is available for storing end effectors.
05	抓件视觉引导 Visual guidance for pickup	2D相机做抓件视觉引导 2D camera for part picking visual guidance
06	放件视觉引导 Visual guidance for drop-off	采用3D相机做放件视觉引导 Adopt 3D cameras for part placing visual guidance.

产品车间安装调试图
Field Installation & Commissioning Photo

产品生产现场应用实景图
On-site Application Photo

在线质检
Online Quality Inspection System

汽车钣金冲压件在线质检系统根据冲压工件型号自动调取视觉检测配方，通过先进的机器人视觉技术，融合深度学习算法与图像处理技术，模拟人类视觉系统，对冲压成型钣金件进行全方位、高精度检测，替代人员质检，提高检测可靠及稳定性，有效减少瑕疵品流出概率。同时配备周期性的人工抽检，可以有效防止大规模的不良流出。

Online Inspection System for Automotive Stamping Parts automatically calls up visual inspection recipes based on the specific stamping part model. Leveraging advanced robotic vision technology, it integrates deep learning algorithms with image processing techniques to simulate the human visual system, performing comprehensive, high precision inspection on stamped sheet metal parts. The system replaces manual quality control, significantly enhancing inspection reliability and stability, and effectively reducing the probability of defective products leaving the line. Additionally, periodic manual sampling inspection is incorporated to effectively prevent the outflow of large scale non conforming products.

检测缺陷种类：能够精准识别成型钣金件的多种常见缺陷，如麻点、压伤、变形、多孔和少孔、开裂、起皱等缺陷

Defect Detection Capabilities: The system accurately identifies common stamping defects including **pitting, indentation, deformation, missing/extra holes, cracking, and wrinkling**.

检测数据管理：可自动记录监测数据，生成详细的质量报告，为生产过程的质量追溯与工艺优化提供有力的数据支持。

Inspection Data Management: The system automatically logs all inspection data and generates detailed quality reports. This provides robust data support for quality traceability throughout the production process and facilitates process optimization.

拆垛单元（钢铝混线）
Destacking Unit (For Steel & Aluminum Parts)

拆垛单元可以将料垛上的板料依次的抓取并输送到生产线上。我公司的拆垛单元具有生产稳定、效率高、适应范围广等特点，可以根据客户生产线特点提供最佳的拆垛解决方案，可实现钢铝混线生产，并满足各类生产节拍，适用于各类串联线、多工位及热成形生产线。

The destacking unit picks up sheet materials one by one from the material stack and conveys them to the production line. Our destacking unit features stable operation, high efficiency and wide adaptability. It can provide customized optimal destacking solutions according to customer line conditions, support mixed production of steel and aluminum sheets, and meet various production cycle requirements. It is widely applicable to tandem lines, multi-station lines and hot stamping production lines.

优势：
Advantages:

1. 适应多种板料材质：磁性材料（钢板等）、非磁性材料（铝板等）。
   Compatible with various sheet materials: magnetic materials (such as steel sheets) and non-magnetic materials (such as aluminum sheets).

2. 拆垛台车功能丰富：具有行走功能、升降功能、末料检测功能、防撞功能等。
   Fully functional destacking trolley: equipped with traveling, lifting, residual material detection and anti-collision functions.

3. 提供多种样式的分张器：手持分张器、摆臂分张器、自动分张器（可做配方控制）。
   Multiple separator options: manual separator, swing-arm separator and automatic separator with recipe control.

4. 拆垛可以采用六轴机器人，也可采用我公司研发的桁架机械手，桁架机械手有单拆垛和双拆垛两种。
   Flexible destacking forms: available with 6-axis robots or self-developed gantry feeder. Gantry feeder are offered in single-head and dual-head destacking feeder configurations.

5. 拆垛端拾器上每个吸盘可独立控制通断。
   Each suction cup on the destacking end effector can be independently controlled for on-off switching.

6. 具有双料检测功能。
   Equipped with double-sheet detection function.

干式清洗机
Dry washer

随着汽车外覆盖件铝合金材料的广泛应用，适合钢板和铝板，特别是铝板清洗的干式清洗机逐步被越来越多的客户选用。

As aluminum alloys are widely used as automobile outer coverings, dry washer for steel and aluminum plates, especially the later, are gradually needed by more and more customers.

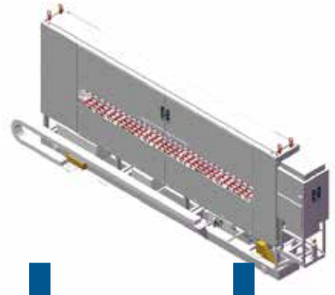
干式清洗机具有以下优点：恒定均匀的清洁质量；不需要洗涤介质，避免环境污染；清洁各种坯料，适合钢、铝等其他材质；低运营成本，不需要清洗油或者少量的清洗油；低维修成本；占地面积小。

The dry washer features the following advantages: Constant and consistent cleaning quality;No need for cleaning media, avoiding environmental pollution;Capable of cleaning various blanks, suitable for steel, aluminum and other materials;Low operating cost with no or only a small amount of cleaning oil required;Low maintenance cost;Small floor space occupation.

产品实际应用场景
On-site Application

型号 Model No.	QXB-20Z	QXB-30Z	QXB-40Z
最大板料宽度 Maximum sheet width	2000mm	3000mm	4000mm
最小板料宽度 Minimum sheet width		400mm	
最小板料长度 Minimum sheet length		400mm	
板料厚度 Thickness of sheet		0.5~4mm	
生产线速度 Linear speed in processing		60~150m/min	
毛刷带清洗速度 Brush cleaning speed		60~150m/min	
毛刷带数量 Number of brush straps		上下2条Two straps up and down	
油雾收集 Oil mist collector		机械式Mechanical type	
离线功能 Offline functions		标配Standard configuration	

产品效果图
Product Render



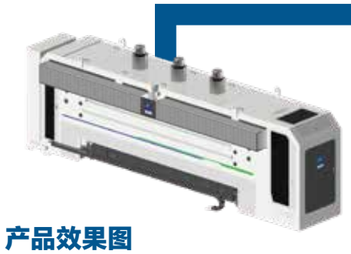
湿式清洗机
Wet washer

湿式清洗机主要用于对冲压生产线中的板料进行清洗，包括整机移动、油雾收集、清洗油箱泵站、喷油清洗、板料引入、板料清洗、板料挤干、自动润滑、上下刷辊重合度自动调节、上箱体自动升降、电气控制、机身等机构和功能。

The wet washer is mainly used for cleaning sheet materials in stamping production lines, integrating mechanisms and functions including complete machine movement, oil mist collection, cleaning oil tank and pump station, oil spray cleaning, sheet feeding, sheet cleaning, sheet squeezing and drying, automatic lubrication, automatic alignment adjustment of upper and lower brush rollers, automatic lifting of the upper cabinet, electrical control, and machine body structure.

板料清洗后，清洗机可在板料表面留下约0.8-1.5g/m²（可以调节）的油膜，属于国内领先水平；辊子的旋转驱动为4个电机独立驱动，引入辊和挤干辊的上辊旋转是通过摩擦力驱动的，辊子品牌为国外知名品牌。

After sheet cleaning, the washer can leave an adjustable oil film of approximately 0.8-1.5 g/m² on the sheet surface, reaching a leading domestic technical level.The rollers are independently driven by four motors. The upper rollers of the feed-in rollers and squeeze rollers operate by friction drive. All rollers adopt internationally renowned brands.



产品效果图
Product Render

板料厚度Thickness of sheet	0.5-3mm
板料宽度Width of sheet	500-4000mm
板料长度 Length of sheet	500-2000mm
板料材质 Sheet material	非镀锌钢板、镀锌钢板、热轧钢板、冷轧钢板、铝板 Non-galvanized steel plate, galvanized steel plate, hot-rolled steel plate, cold-rolled steel plate, aluminum plate
引入辊数量 Number of introduction rollers	2（1对）2 (1 pair)
引入辊表面材料 Surface material of introduction rollers	聚氨酯或无纺材料 Polyurethane or nonwovens
清洗辊数量 Number of cleaning rollers	2（1对）2 (1 pair)
清洗辊表面材料 Surface material of cleaning rollers	尼龙纤维 Nylon fiber
挤干辊表面材料 Surface material of drying rollers	无纺材料 Non woven material
残余油膜厚度 Residual oil film thickness	0.8-1.5g/㎡
板料的通过速度 Linear speed of sheet	60m/min-120m/min，使用变频调速方式 60m/min-120m/min, frequency conversion speed regulation mode
过滤器 Strainer	双筒过滤器（标配） Double cylinder filter (standard)
清洗剂 Detergent	矿物清洗油，粘度在40度时小于10cSt Mineral cleaning oil, viscosity less than 10cSt at 40℃
油雾收集 Oil mist collector	机械式 Mechanical type

产品实际应用场景
On-site Application

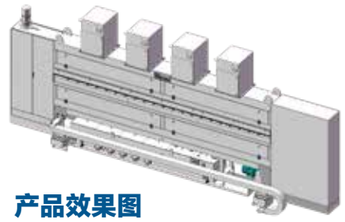
板料涂油机
Oiling machine

板料涂油机系统采用标准模块化设计，包括喷枪及控制单元、油箱单元、供油单元、加热单元、电气控制单元、油雾抽吸单元和板料输送单元。用于普通钢板、镀锌钢板的上下表面均匀涂敷拉延油，

TThe sheet metal oiling machine system adopts a standard modular design, consisting of a spray gun and control unit, oil tank unit, oil supply unit, heating unit, electrical control unit, oil mist extraction unit, and sheet conveying unit. It is used to evenly apply drawing oil on the upper and lower surfaces of ordinary steel sheets and galvanized steel sheets.

根据设定的模式，坯料上下面均可被喷敷深拉油，喷涂量根据需要可以调节。涂油机可根据现场情况安装有行走系统（标配）、AC变频驱动，按照铺设导轨行走，可实现在线和离线功能，开进开出设有检测装置，实现整线连锁。

According to the set mode, deep drawing oil can be sprayed on both the upper and lower surfaces of the blanks, and the spraying volume is adjustable as required.Equipped with a traveling system (standard configuration) and AC variable frequency drive, the oiling machine travels along laid guide rails. It supports online and offline working modes. Detection devices are installed at the entry and exit positions to realize interlocking with the entire production line.



产品效果图
Product Render

板料涂油机的优势：涂油机装有双筒过滤器，过滤能力最小可达10μm；涂油机喷油量为0.5-4.0g/㎡,可根据用户不同要求调整。

Advantages of the oiling Machine:The machine is equipped with a dual-barrel filter, with a minimum filtration precision of up to 10μm. The oil spraying capacity ranges from 0.5 to 4.0 g/㎡, which can be adjusted according to different user requirements.

产品实际应用场景
On-site Application

型号 Model No.	TYA-20Z	TYA-30Z	TYA-40Z
最大板料宽度 Maximum sheet width	2000mm	3000mm	4000mm
最小板料宽度 Minimum sheet width		400mm	
最小板料长度 Minimum sheet length		300mm	
板料厚度 Thickness of sheet		0.5~6mm	
生产线速度 Linear speed in processing		60~150m/min	
油膜厚度 Oil film thickness		0.5~4g/㎡	
过滤精度 Accuracy of filtration	10/20μm可选 10/20μm optional		
油雾收集 Oil mist collector	静电式Static electricity type		
喷油方式 Oil spray mode	上下面喷涂Spray on upper and lower surfaces		
喷涂区域 Area of spraying	可编程控制Programmable control		
油温控制 Oil temperature control	标配Standard configuration		
离线功能 Offline function	标配Standard configuration		

输送皮带机
Belt Conveyor System

输送皮带机作为现代工业自动化系统中的核心物流设备，广泛应用于物料的水平、倾斜及转角输送。凭借结构简洁、运行平稳、维护便捷等优势，已成为智能制造产线中高效衔接各工序的关键环节。

As a core material handling component within modern industrial automation systems, the belt conveyor is widely utilized for **horizontal, inclined, and angled transfer** of materials. Distinguished by its **simple structure, smooth operation, and ease of maintenance**, it serves as a critical link ensuring **efficient connectivity between sequential production processes** in smart manufacturing lines.

我司自主研发的伺服控制皮带输送机，融合高响应伺服驱动系统与模块化机械架构，支持连续运转模式与高精度步进定位模式，灵活适配自动装箱、分拣、码垛及装配等多种应用场景，为客户提供柔性、可靠、智能化的物料输送解决方案。

Our in-house developed **servo-controlled belt conveyors** integrate **high-response servo drive systems** with a **modular mechanical architecture**. They support both **continuous running mode** and **high-precision indexing (step) mode**, providing flexible adaptation to diverse applications including **automated packing, sorting, palletizing, and assembly**. Haozhong delivers **flexible, reliable, and intelligent** material handling solutions tailored to customer requirements.

核心组成部分
Core Components

1 驱动装置：采用高性能伺服电机+精密减速机构，配合高刚性联轴器，实现精准启停、无级调速与动态同步控制。

Drive Unit: Equipped with a high-performance servo motor paired with a precision gear reducer and high-rigidity coupling, the drive unit delivers precise start/stop control, stepless speed regulation, and dynamic synchronization capabilities.

2 输送带：作为承载与传输物料的核心部件，可选配PU、PVC、橡胶、特氟龙或食品级材质，满足不同行业对耐磨、防静电、耐油、耐高温等性能需求。

Conveyor Belt: As the core component responsible for material carrying and transfer, the conveyor belt is available in a range of material options including **PU, PVC, rubber, Teflon, and food-grade compounds**. These options address diverse industry requirements for **abrasion resistance, anti-static properties, oil resistance, and high-temperature tolerance**.

3 托辊与滚筒：高精度无缝钢管托辊有效支撑皮带运行；主动/从动滚筒经动平衡处理，确保运行平稳、张力均匀，有效防止跑偏。

Idler rollers and drums: High-precision seamless steel tube idler rollers provide reliable belt support and guidance. Driving and driven drums undergo dynamic balancing to ensure **smooth operation, uniform belt tension, and effective prevention of belt mistracking**.

4 机架结构：整体采用高强度碳钢焊接或工业铝型材框架，结构稳固、安装便捷，保障整机长期运行的几何精度与稳定性。

Frame Structure: The overall frame is constructed from **heavy-duty welded carbon steel** or **industrial aluminum profiles**, delivering **robust structural integrity and ease of installation**. This design ensures long-term geometric precision and operational stability throughout the conveyor's service life.

产品优势
Product Advantages

1 高精度输送控制
High-Precision Conveyor Control

伺服闭环系统实现±0.1mm级重复定位精度，完美匹配自动装箱、视觉定位、机器人协同等高要求场景。
The servo closed-loop system achieves repeatable positioning accuracy of ±0.1 mm, seamlessly meeting the demands of high-requirement applications such as **automated Racking, vision-guided positioning, and robotic coordination**.

2 模块化快装设计
Modular Quick-Install Design

标准化单元结构，支持快速拼接与非标定制，大幅缩短交付周期，降低现场安装与后期维护成本。
Featuring **standardized modular construction**, the system supports **rapid assembly and custom configuration**, significantly reducing **delivery lead times** and minimizing **on-site installation and long-term maintenance costs**.

3 节能高效，绿色运行
Energy Efficient & Eco-friendly Operation

优化传动效率与智能启停逻辑，显著降低空载能耗，符合国家“双碳”目标与绿色工厂建设标准。
Optimized **transmission efficiency** combined with **intelligent start/stop logic** substantially reduces **no-load energy consumption**, aligning with national **"Dual Carbon" goals** and **green factory construction standards**.

4 高可靠性与长寿命
High Reliability & Long Life

关键部件采用高强度合金、工程塑料及防腐处理工艺，适应粉尘、潮湿、温差大等严苛工业环境。
Critical components are manufactured from **high-strength alloys, engineering plastics**, and feature **anti-corrosion treatments**, ensuring robust performance in **harsh industrial environments** characterized by **dust, moisture, and wide temperature fluctuations**.

5 广泛物料兼容性
Wide Material Compatibility

无论是异形板、中空板、蜂窝板，还是钢板、铝板、塑料件、纸箱等各类规则或不规则物料，均可稳定、无损输送。
The system reliably and gently conveys a diverse range of materials—whether **irregularly shaped panels, hollow-core sheets, honeycomb panels, steel plates, aluminum sheets, plastic components, or cartons**—ensuring **stable, damage-free transport** for both regular and irregular items.

热成形生产线自动化系统
Automation System of Hot Forming Line

该生产线由拆垛单元、双臂机械手送料机构及线尾板料输送机三部分组成，可选配自动装箱系统。
This line consists of a destacking unit, a dual-arm mechanical transfer feeder, and an end-of-line panel conveyor, with an optional automated racking system.

双臂机械手有Transfer和Feeder两种运行方式，可循环完成夹紧、抬起、进给、落下、松开、退回等动作，实现对板料的快速搬运。
The two-arm Feeder has a typical structure of X, Y and Z axes with two operation modes of Transfer and Feeder. It can do the movements of clamp, lift, feed, fall, release and return in a cycle to realize the rapid handling of the plate.

Transfer模式适用于压机行程较小而立柱间距较大、模具较窄的场合，对长薄板料搬运更具优势。机械手X轴和夹钳端拾器可无干涉的停留在压机内部，占用压机冲压时间少，整线节拍更快。
Transfer mode is suitable for both short press strokes, and large column spacing, narrow molds. It is well-suited to move long and thin sheets. The manipulator X axis and the end pickup gripper can stay inside the press without mutual interference, occupying less stamping time. This is conducive to a shorter takt time of the whole line.

Feeder模式适用于压机行程较大而左右间距较小的场合，端拾器从板料上方进行抓取，整体厚度较高，上下料时模具开口要求较大。运行轨迹简单，机械手的节拍更高。
Feeder mode is applicable to working conditions with a large press stroke and a small left-right spacing. The end effector grabs the sheet material from above, featuring a relatively high overall thickness and requiring a larger mold opening for loading and unloading. Its running trajectory is simple, enabling the manipulator to achieve a higher cycle speed.

其特点为：速度快、负载大、柔性高、适用板料尺寸广；刚性高、输送距离长、定位准确、输送平稳；操作简单、维护方便、故障率低。
Feeder mode features high speed, heavy load capacity and great flexibility, compatible with a wide range of sheet sizes.It also boasts high rigidity, long conveying distance, precise positioning and stable operation.Additionally, it is easy to operate, convenient to maintain and low in failure rate.

线首部分：拆垛机、上料台车、磁力分张、打码机构、双料检测等；
Front of Line (FOL) Section: Destacking Unit, Loading Cart, Magnetic Separation Device, Marking Unit, Double Blank Detection, etc.

压机热成形单元：压机上下料机械手、端拾器
Press Hot Forming Section: Press Loading and Unloading Feeder and the end effector

线尾部分：出料输送机
End of Line (EOL) Section: Discharge Conveyor

优势：
Advantages:

设计精益，运行高速平稳：传送机械臂的运动轨迹来自于一个优化的数学模型，传送运动完全实时地与压机的滑块位置同步。智能数字交流伺服驱动执行精密的实际位置和速度的线性运动，提供十分平稳，光滑的传送，加紧/松开，提升/下降的运动轨迹，大大提升设备的寿命。

Lean design with high-speed and stable operation:The motion trajectory of the transfer arm is derived from an optimized mathematical model, and the transfer movement is fully synchronized with the slide position of the press in real time.The intelligent digital AC servo drive performs precise linear motion of actual position and speed, delivering extremely stable and smooth motion trajectories for transferring, clamping/un-clamping, lifting/lowering, which greatly extends the service life of the equipment.

高效率，为客户创造高价值：自动化控制系统和压机、加热炉系统高效协同，使加热炉、压机更能充分发挥重资产的性能，提高生产效率，为客户创造更高价值。我司有当前最快节拍6SPM的实绩。

High Efficiency for Superior Customer Value: The automation control system is seamlessly integrated with the press and roller hearth furnace, enabling these high-value capital assets to perform at their maximum potential. This synergy enhances overall production efficiency and delivers greater value to the customer. Howzen holds a proven track record of achieving a maximum cycle rate of 6 SPM in hot forming applications.

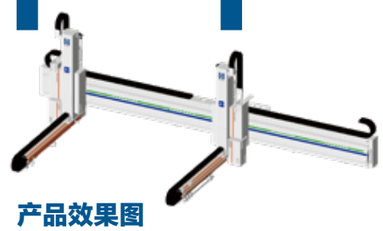
高安全，降低企业运营风险：采用欧标的安全标准，无论是从硬件上，还是安全逻辑方面都更具有优势，保证人员和设备的安全。

Enhanced Safety & Reduced Operational Risk: Designed in full compliance with European safety standards, the system provides superior protection in both hardware configuration and safety logic architecture, ensuring the safety of both personnel and equipment while mitigating operational liabilities.

丰富配置可供选择：机械手可采用多种伺服系统，力士乐、伦茨、三菱、西门子等伺服系统可以满足各个厂家不同的需求。全部国际品牌的配套件、完善的软件技术，维护简单、极低的故障率。

Flexible Configuration Options: The transfer system supports a wide range of servo drive platforms, including Rexroth, Lenze, Mitsubishi, and Siemens, offering the flexibility to meet diverse customer specifications. Featuring globally sourced, premium-brand components and comprehensive software solutions, the system ensures simplified maintenance and exceptionally low failure rates.

X轴（进给退出）行程 X axis (feed and return) travel	0-4200mm
Y轴（夹紧松开）行程 Y axis (clamp and release) travel	0-1200mm
Z轴（提升下降）行程 Z-axis (lift and fall) travel	0-750mm
重复定位精度 Repeated positioning accuracy	±0.2mm
单臂机械手负载 Load of single-arm manipulator	100kg
端拾器更换是否开出 Tooling replacement mode	选配Optional
最高生产节拍 Maximum cycle time	6SPM



产品效果图
Product Render

产品现场应用实景图
On-site Application Photo

多工位生产线自动化系统
Automation system of Multi-Station Transfer line

该生产线由拆垛（钢铝混合）单元、三次元搬送机构及线尾皮带机三部分组成。
This production line consists of three units: the destacking unit (steel-aluminum mixed)， the three-dimensional transfer, and the EOL belt conveyor.

三次元搬运送料机构采用笛卡尔坐标系定位方式，通过直线传动模块实现夹紧-松开、举升-下降、移送-回退3个动作。
The three-dimensional feeder adopts Cartesian coordinate positioning, and realizes three sets of actions — clamping/unclamping, lifting/lowering, transferring/retracting — via linear transmission modules

采用气动快换装置，伺服电机驱动，阶跃响应速度快，重复定位误差小。
Pneumatic quick change devices and servo motor drives make for quick step responses with few repeated positioning errors.

线首拆垛单元由上料台车、磁力分张装置、拆垛机械手、皮带输送和对中机构组成。
The destacking unit at the front of line is composed of loading trolley, magnetic Separator device, ,destacking robot arm, belt conveyor and centering system.

铝板采用气动分张、真空皮带传输，可实现钢、铝板节拍无差别生产。
Aluminum sheets adopt pneumatic sheet separator and vacuum belt conveying, enabling non-differentiated cycle production for both steel and aluminum sheets.

线中送料单元为三坐标机械手，双臂多工位伺服送料系统将料片从落料工位/首工位搬移到模具的下一步工位中。
The feeding system between stations with three-coordinate Feeder. The two-arm multi-station servo feeder moves the sheet from the first station to the next station for stamping.

工件依次通过多工位的移送、横杆的搬送，一直到模具的最后一道工序，并放置到出料带上，由人工检查和装箱。
Workpieces are sequentially transferred through multiple stations and conveyed by cross beams until the final stamping operation in the die. Afterwards, they are placed onto the discharge belt for manual inspection and packaging.

优势：
Advantages:

多工位生产线具有效率高、占地面积小、成本低的突出优势。
The multi-station production line features outstanding strengths including high efficiency, small footprint and low cost.

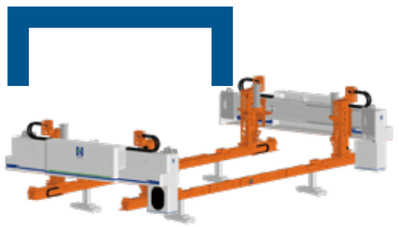
高效率，为客户创造高价值：我司三次元最快带料生产节拍可以达到30SPM，铝板可实现与钢板同样节拍。
High efficiency to create high value for customers: The maximum production rate of our Transfer system reaches 30 SPM. Aluminum sheets can be produced at the same cycle rate as steel sheets.

掌握核心技术，真正的防抖动：与清华大学合作研发数学模型和曲线，在和压机、模具配合时三次元在最高生产节拍时抖动量也非常微小，稳定可靠。
Core technology & excellent anti-vibration performance: We cooperate with Tsinghua University to develop dedicated mathematical models and motion curves. When cooperating with presses and dies, the Feeder sysytem maintains extremely slight vibration even at the maximum production speed, ensuring stable and reliable operation.

灵活性，解决客户维护问题： 三次元可采用多种伺服系统，力士乐、伦茨、三菱、西门子等可以满足各个厂家不同的需求，全部国际品牌的配套件、完善的软件技术，维护简单、极低的故障率。
High flexibility and easy maintenance: The Tthree-dimensional handling equipment is compatible with multiple servo systems, such as Rexroth, Lenze, Mitsubishi, Siemens and other international brands, to meet differentiated requirements of different manufacturers. Equipped with full-range international brand components and mature software technology, it features simple maintenance and ultra-low failure rate.

高安全，降低企业运营风险：采用欧标的安全标准，不管是从硬件上，还是安全逻辑方面都更具有优势，保证人员和设备的安全。
High safety to reduce operational risks: Designed in full compliance with European safety standards, it possesses superior performance in both hardware configuration and safety logic, effectively ensuring the safety of operators and production equipment.

X轴行程 X axis stroke	0-1500mm
Y轴行程 Y axis stroke	0-1000mm
Z轴行程 Z axis stroke	0-300mm
重复定位精度 Repeated positioning accuracy	±0.2mm
端拾器自动更换 Automatic Tooling changing(ATC)	标配 Standard configuration
最高生产节拍 Maximum production SPM	30SPM



产品效果图
Product Render

产品
现场应用实景图
On-site
Application Photo

产品车间安装调试图
Product workshop installation and commissioning photo

老、旧冲压生产线的自动化升级改造

Retrofit and Upgrade of Existing Press Lines

在制造业的激烈竞争中，根据企业发展需要，往往需要把冲压生产线整体由A工厂搬迁至B工厂，同时对压力机及其自动化装备进行升级改造。我司具有多条冲压生产线搬迁及升级改造的业绩，为企业带来全新发展机遇。

In the fiercely competitive manufacturing industry, enterprises often need to relocate entire stamping production lines from Factory A to Factory B according to their development requirements, while conducting upgrading and renovation on presses and their automated equipment. Our company has rich project experience in the relocation, upgrading and retrofitting of numerous stamping production lines, bringing new development opportunities for enterprises.

在搬迁方案中，最大程度对压力机及自动化装备进行利旧，同时根据现有的先进技术对压力机及自动化进行改造甚至完全升级自动化装备。在改造过程中，确保用当前常见的元器件匹配系统并替换老旧的各类元器件。通过对现有设备控制系统、上下料流程、自动化搬运设备、一键换模等关键环节进行优化，实现冲压生产的高效、精准与智能，全面提升生产效率与产品质量，确保以最低成本的方式提升老旧生产线的能力。

Retrofit and Relocation Strategy: In the relocation plan, we maximize the reuse of existing presses and automated equipment. Meanwhile, we renovate the presses and automation systems, and even fully upgrade the automated equipment by adopting cutting-edge modern technologies.

During the renovation process, we ensure that outdated components of all types are replaced with commonly available standard parts that are fully compatible with the system.By optimizing key links including the existing equipment control system, loading and unloading procedures, automated handling equipment, and one-click die change function, we achieve high-efficiency, high-precision and intelligent stamping production. This comprehensively improves production efficiency and product quality, and enhances the capacity of old production lines in the most cost-effective manner.

典型案例：从中国沈阳搬迁整条原德国米勒万家顿冲压生产线至中国南京，距离2000多公里，升级改造4台压力机，同时更换掉原有双臂自动化系统，搭配我司的单臂高速搬运系统，并根据客户场地实际情况，将生产线长度由70米缩短至58米，实现生产线整体升级。

Typical case: A case study involved relocating a complete Weingarten press line over 2,000 kilometers from SAIC-GM's Shenyang facility to its Nanjing plant. The project included the retrofit and upgrade of four mechanical presses, replacement of the existing SpeedBAR automation system with Haozhong's high-speed single-arm Feeder system, and optimization of the line layout to reduce total length from 70 meters to 58 meters—delivering a fully upgraded, space-efficient production asset.

昊中自动化老旧冲压线改造业绩
Cases for Retrofit and Upgrade of Automation system for Press Lines

序号 Serial No.	品牌 Branding	改造完成时间 SOP/Year	客户名称 Client	主要实施的改造内容 the main scope of Modernization
01	Müller Weingarten	2025	上汽集团某冲压工厂 A press shop of SAIC Motor	整线搬迁、升级，整线自动化搭配昊中单臂机械手、新式FOL和EOL系统。 The entire production line is being relocated and upgraded, with full automation featuring Haozhong single-arm feeders and new FOL and EOL systems.
02	JIER	2024	广汽新能源汽车有限公司某冲压工厂 A press shop of GAC New Energy Automobile	KUKA机器人7 轴线断续改连续并提升整线节拍至Max12SPM。 Retrofit the KUKA robot's 7th axis from intermittent to continuous operation to boost overall line to Max. 12 SPM.
03	ABB	2024	上汽集团某冲压工厂 A press shop of SAIC Motor	用西门子系统替代DOPPING电气控制系统。 Upgrade the electrical control system by replacing the existing Dopping system with a Siemens-based solution
04	CHIN FONG+SEYI Taiwan，China	2023	长春某汽车工业股份有限公司 A Changchun-based Automobile corporation	拆除原双臂机械手更换为新的机器人7轴自动化。 Retrofit the existing dual-arm feeders with a new 7-axis robotic unit automation.
05	Müller Weingarten	2023	上汽集团某冲压工厂 A press shop of SAIC Motor	单台压机机搬迁、更新控制系统并增加新的液压和润滑泵站系统。 Relocate the single press, upgrade its control system, and add new hydraulic and lubrication pump station systems.
06	ABB+JIER	2023	广汽新能源汽车有限公司某冲压工厂 A press shop of GAC New Energy Automobile	整线断续运行模式改为连续模式，提高生产效率、降低能耗。 Convert the entire production line from intermittent to continuous operation to enhance productivity and lower energy usage.
07	H&F，Japan	2021	昆山某汽车零部件有限公司 A Kunshan-based Auto Part corporation	自动化利旧改造并配以昊中Transfer系统。 Retrofit for automation by reusing existing equipment and adding a Haozhong Transfer system.
08	Komatsu, Japan	2021	上汽华域集团某冲压工厂 A press shop of HASCO of SAIC Motor	2000T多工位增加铝板功能和增加工位数、更换PLC系统。 Upgrade the 2000T transfer press with aluminum plate capability, additional workstations, and a new PLC system.
09	Müller Weingarten	2021	沈阳机械制造有限公司 A Machinery Manufacturing corporation in Shenyang	2900T多工位电气系统升级改造。 Electrical system upgrade and retrofit for the 2900T transfer press.