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XINJE



2026

2026 Integrated Industry Solutions

Print and Package | Food and Beverage | Textile Sewing | Home building materials | 3C and Electronics manufacturing | Automotive equipment and manufacturing | energy | Smart Logistics | Informatization | Other



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XINJE

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COMPANY INTRODUCTION

Wuxi Xinje Electric Co., Ltd. (XINJE) is a well-known national enterprise specializing in the R&D and application of industrial automation products.


Since its establishment, the company has adhered to the tenet of "Independent Innovation, Promptness and Pragmatism", striving to enhance its R&D capabilities and product quality, and applying advanced scientific and technological achievements to strengthen its overall strength. Through continuous innovation and pioneering efforts, Xinje has remained at the forefront of the industry. It has successively been recognized as a High-Tech Enterprise, a Key Project Unit under the Six Major Actions for Strengthening Industry in Jiangsu Province, a Qualified Unit for Implementing Intellectual Property Standards in Jiangsu Province, a Provincial Engineering Technology Research Center, a Provincial Enterprise Technology Center, and a Provincial Engineering Center, and has obtained numerous patented technologies.


The company's core products include Programmable Logic Controllers (PLC), Human-Machine Interfaces (HMI), servo control systems, and variable frequency drives. It also provides a comprehensive range of advanced automation equipment, including intelligent machine vision systems, teaching-based robotic arms, robots, and information-based network solutions. Xinje closely serves end customers, provides competitive customized solutions for equipment manufacturers in segmented industries, and offers advanced and reliable automation product solutions for high-quality equipment suppliers. The company continuously helps enterprises improve productivity, reduce costs, and promote the common growth of corporate value and customer value.

To date, Xinje Electric has established 32 offices and 300 distributors across China, covering the entire country. Overseas, it has set up 1 subsidiary and 20 agents covering Europe, the Americas, Southeast Asia, the Middle East, and Africa. Its extensive sales network ensures comprehensive product demand, technical support, personnel training, and other services for numerous users worldwide.

Xinje Electric currently has more than 2,600 employees, an office building covering 20,000 square meters, an independent factory covering 71,000 square meters, 1 R&D center, 4 laboratories, and 42 training bases. The company also cooperates with many universities to cultivate young and outstanding technical talents.

With dedication, sincerity, a proactive team spirit, and efficient operations, Xinje has achieved remarkable results. In December 2016, Xinje was successfully listed on the Main Board of the Shanghai Stock Exchange (Stock Code: 603416). Guided by the business philosophy of "Innovation, Quality, Service", the company continuously develops and designs more reliable products and improves product quality. It is committed to becoming "a world-class supplier of intelligent and automated overall solutions" and building a well-respected brand in the industrial automation field.

 **32** branch offices

 **300** domestic distributors

 **2600+** employees

 **2000m²** office building

 **71000m²** independent factory building

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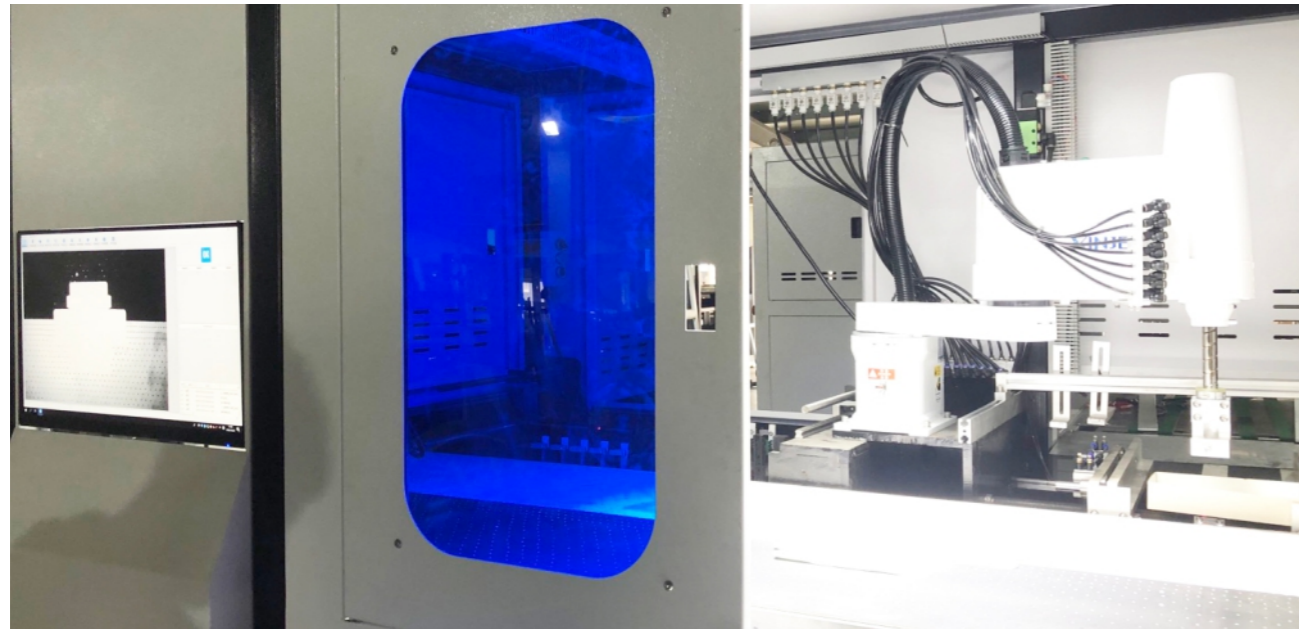


Print and Package

- Top & Bottom Cover With SCARA Robot
- Label Printing Machine System Solution
- Three-side Sealing Bag Machine Solution
- Pillow Packaging Machine Solution
- Soft Tissue Packing Machine Solution
- Cotton Towel Packaging Machine Solution
- Line-Scan Based Counting Machine Solution
- High-Speed Vertical Packaging Solution
- Rotary Paper Cutter Solution
- Single Pack Soft Tissue Machine Solution
- Tissue Folding Machine Solution



Top & Bottom Cover With SCARA Robot / Solution



Industry Background

Packaging industry has been developing rapidly. However, most packaging companies still rely on manual box pasting. Workers visually align or use indentations to attach top-and-bottom covers to outer paper.

This method involves high labor intensity, low efficiency, poor real-time performance, and is easily affected by human factors, making it difficult to meet current market requirements.

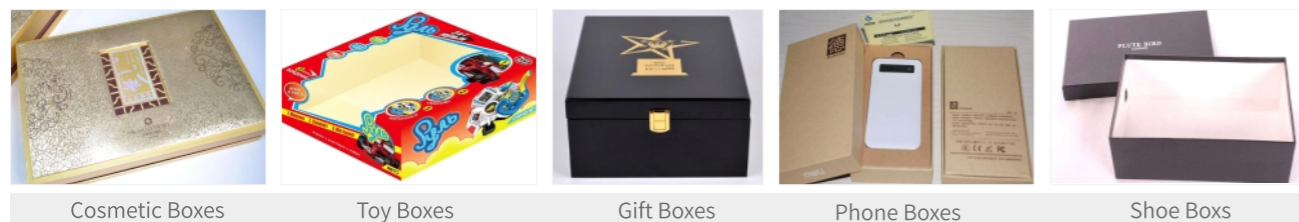
To address these industry challenges, XINJE has independently developed a top-and-bottom cover laminating system that integrates a SCARA robot and vision technology. It realizes full robotic hand-eye coordination: the vision system ("EYE") quickly locates positions, the controller ("BRAIN") sends commands, and the robot ("HAND") pastes boxes rapidly. This truly replaces traditional manual box pasting.

System Overview

XINJE' s independently developed SCARA Robot & Vision Top-and-Bottom Cover Laminating System mainly consists of a single camera, industrial PC and SCARA robot system. The vision system statically guides the robot to locate and grasp targets. The photoelectric sensor detects target arrival and stops the belt. The camera locates the target via external signals. The PC identifies the target position through image contour matching, then sends the position to the robot system to achieve static laminating.

Applicable Industries

XINJE's SCARA robot & vision top-and-bottom cover system is widely used in box pasting industry.



Advantages & Features

- Strong Adaptability**
 Most systems diagonal positioning, which requires camera adjustment for each product change. Our system supports direct new product setup for any wrapping paper within the camera' s field of view, without adjusting the camera, achieving true one-time calibration.
 With a working area of 600×900 mm, the system covers 90% of common wrapping paper sizes on the market, eliminating the trouble of frequent calibration for end users when changing products.
- Excellent Stability**
 From the camera, lens, underlying vision algorithm, to the robot motion controller, SCARA body and servo motors used, to the PC-end software, all are independently developed by XINJE, ensuring better stability. Also this system can also seamlessly interface with YAMAHA manipulators.
- Quick & Easy Product Changeover**
 The system stores all end products as recipe files. Each product size has its own independent pickup and positioning points. Switching between stored products only requires opening the corresponding file. New products can be added to the system in just 1–3 minutes with simple operation.
- High Versatility**
 The system features high versatility. It can not only be used for positioning top-and-bottom cover gift boxes, but also for leather positioning (including uncut right-angle leather paper), wine box positioning (staggered pasting) and other industries.
- Automatic Deviation Compensation**
 When new products are added to the system, it automatically calculates template deviation compensation values, eliminating the need for manual adjustment.

System Parameters

Number of Robots	1 unit (According to requirements)		
Number of Cameras	1 unit		
Cycle Time	Single Positioning - Gift Box	Dual Positioning - Gift Box	Leather Case
	40~45pcs/min	23~26pair/min	22~25pcs/min
Field of View	600*900mm (Camera Resolution 1200w)		
Positioning Principle	Static Positioning		
Positioning Accuracy	±0.2mm		
Camera Calibration Time	3-5min		
Mold Change Time	2-3min		

Field Applications



Unit Type Flexographic Printing Press / Solution



Industry Background

Unit-type flexo printing machines are widely used in the production of medium-to-high-end packaging products such as corrugated boxes, flexible packaging, self-adhesive labels, and folded color boxes. Driven by the rapid development of food, beverage, pharmaceutical, cosmetics, e-commerce logistics and other industries, demand for product packaging has been strong, and market requirements for printing quality have become increasingly higher. Thanks to its excellent printing quality and relatively low printing costs, flexographic printing has gained wide market recognition.

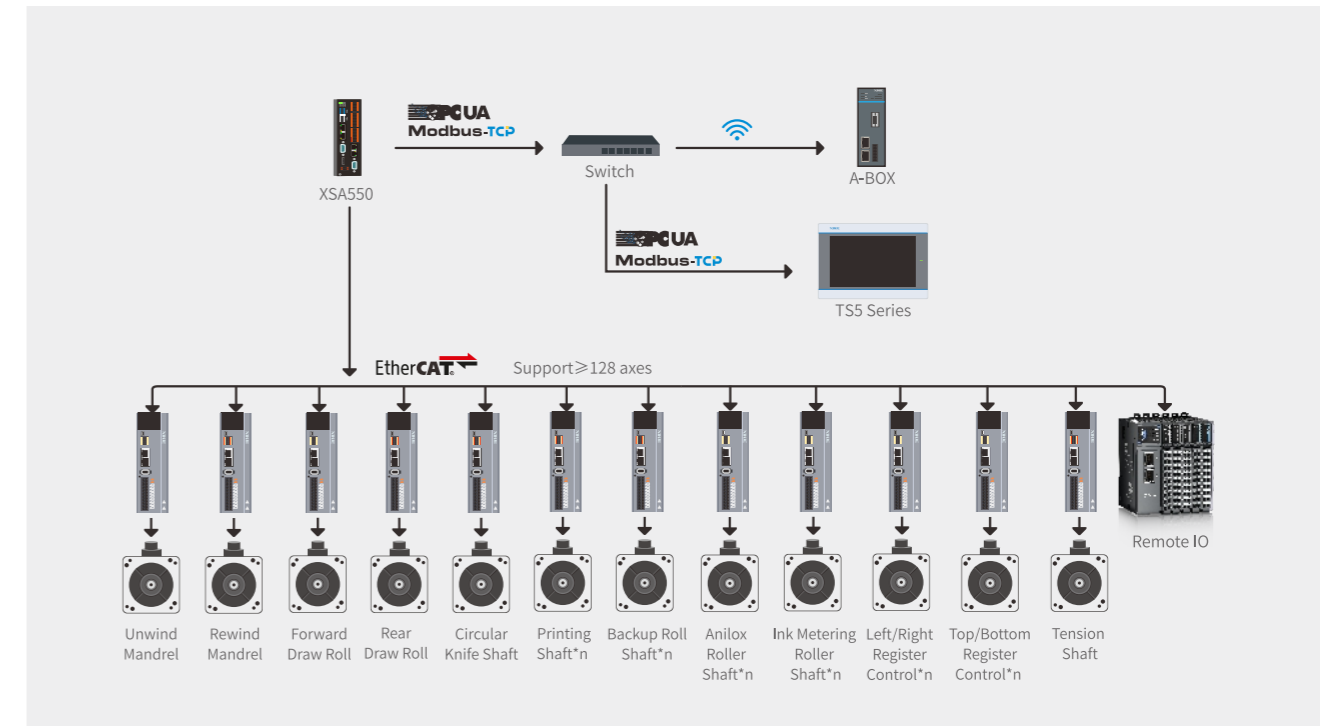


Process Flow

The unit-type flexo printing machine adopts an overall modular unit design, with each color corresponding to an independent printing unit. Units can be flexibly added or removed to meet printing requirements of 1 to 10 colors or more. All units are synchronized in speed via the control system through servo motors, ensuring synchronization throughout the entire process. During the entire printing process, printing materials first pass through the unwinding section to the web guide system. The traction shaft then maintains stable printing tension, and the material runs through each printing unit in sequence, with each unit completing one color printing to ensure accurate color overprinting. Meanwhile, after each color or upon completion of all printing, the ink is cured via hot-air drying or UV curing systems. Optional processes such as cold foil stamping, laminating, and die-cutting are then carried out, followed by the rear traction unit and finally the rewinding unit, thus completing the whole printing process.



System Topology



Solution Advantage

- High Precision & High Speed**
 Max speed up to 180 m/min, with primary and secondary printing accuracy of ± 0.05 mm.
- Easy Machine Adjustment**
 Ready for registration upon startup, reducing material costs. During printing, the system automatically tracks and registers colors with real-time compensation, saving labor.
- Rich Combinations**
 Printing, cold foil stamping, laminating, die-cutting, rotary cutting and other processes are optional, realizing multi-purpose in one machine.
- Stable Tension**
 During printing, you can freely choose open-loop or closed-loop tension to ensure stable printing tension and reduce defective products.
- Mature Technology**
 It is equipped with a mature library of various functional processes, enabling convenient import, stable operation and high efficiency.

Field Application



Three-side Sealing Bag Machine / Solution



Industry Background

Three-side seal bag machines are closely related to our daily lives. Daily packaging such as snack bags and facial mask packages all adopt this packaging method. Common raw materials are mostly composite materials, including paper-plastic composite, plastic-plastic composite, etc.



Control Scheme

Three-side seal bag machines mainly include unwinding, feeding, transverse sealing, longitudinal sealing and cutting processes.

Unwinding Section:

Adopt servo unwinding plus swing rod closed-loop tension control. By calculating the roll diameter and introducing PID for feedback control. Some machines are also equipped with a separate material storage mechanism.

Pull & Feeding:

Adopts two high-torque customized servo controls. With a unique pulling curve, both speed and accuracy are greatly improved. In fixed-length mode: Configure the cam table according to the position feedback from the spindle encoder to control the feeding length. In fixed-mark mode: The mark length is measured by a servo probe, and the feeding phase offset is modified by writing to the cam table in real time to achieve accurate registration.

The electronic cam curve solves the problem of offset in transverse sealing and punching of zipper plain bags at different speeds.

Transverse & Longitudinal Sealing:

As the core hot-pressing process for three-side seal bag forming, EtherCAT electronic cam control is adopted to ensure consistent hot-pressing time of the main frame at different speeds.

The electronic cam curve reduces overall machine vibration when the speed reaches 300 and above.

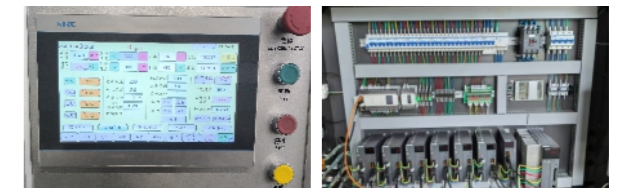
Constant Tension Control:

Dual traction adopts EtherCAT bus synchronization and special process algorithms, keeping the floating roller stable at different speeds and ensuring constant material tension.

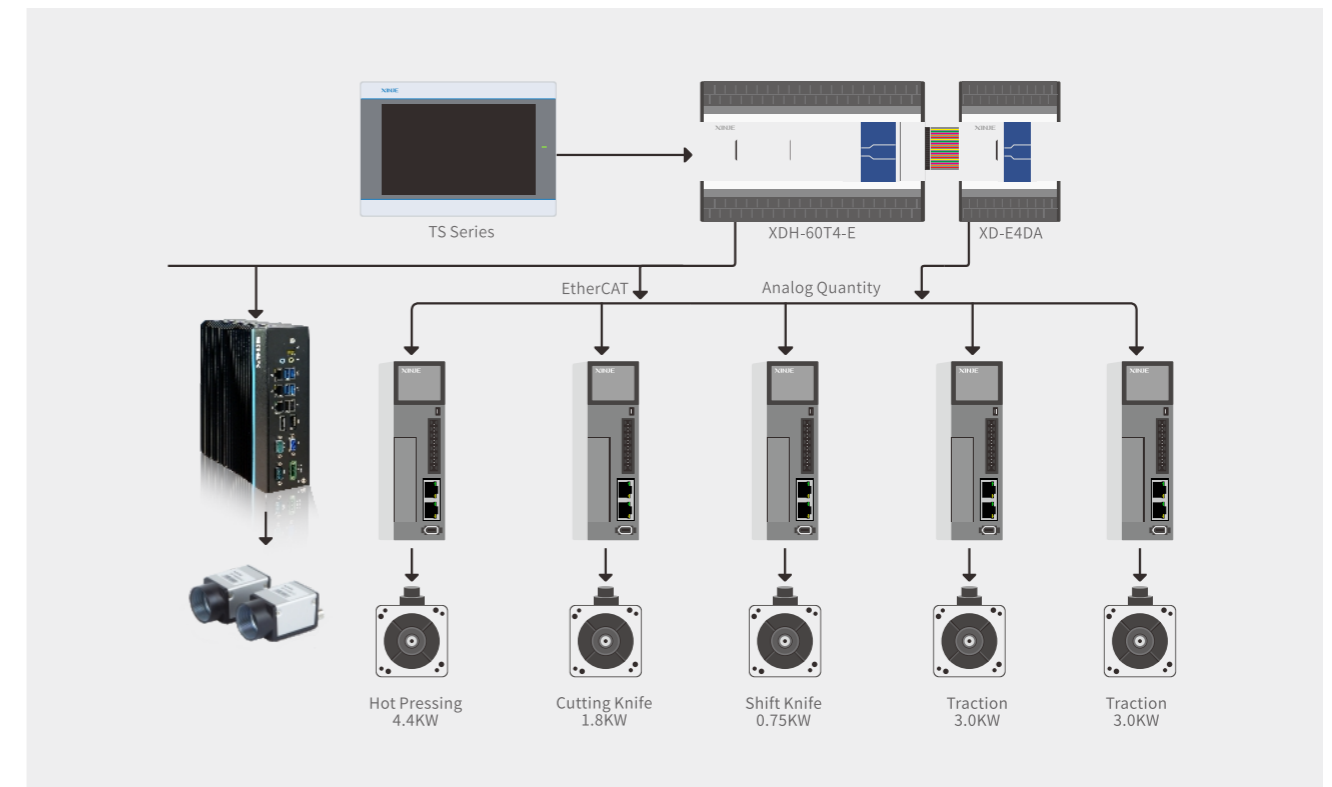
Solution Advantage

- Multiple sets of electronic cams are adopted to realize multi-axis motion, allowing real-time modification of material length and phase parameters during operation.
- It can be restarted directly after shutdown and power failure without homing/reset, reducing waste generation.
- The probe function is integrated, greatly improving bag making accuracy.
- CCD cutting for R-angle speed up to 18,000 pcs/h (300 pcs/s), with precision of ± 0.06 mm.
- When applied to eight-side sealing, the DM6C book-type servo saves 35% space and 20% energy.
- Equipped with a TS intelligent touch screen, it collects key data such as equipment faults and efficiency via the cloud, helping manufacturers better serve their customers.

Field Application



System Topology



Pillow Packaging Machine / Solution



Industry Background

Pillow packaging machine is a packaging device with three-side horizontal sealing, capable of bag making, filling, sealing, cutting and finished product output. It is widely used in automated production lines for food, hardware, daily chemicals, pharmaceuticals and other industries. It is suitable for regular block and cylindrical items such as biscuits, cakes, noodles, cosmetics and paper towels. Models with a belt tail frame can package products of variable length, such as bread, wires and pipes.

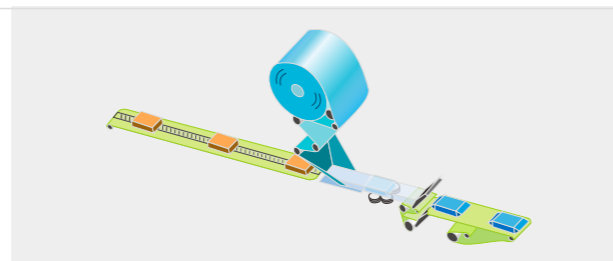
The motion curve of the horizontal sealing knife on traditional horizontal packaging machines is realized by mechanical cams, which involve complex installation, high operating noise, troublesome adjustment and low efficiency. With the rise of the high-end packaging market, demand for variable-length packaging is increasing, and traditional dual-frequency control cannot fulfill variable-length packaging.

To address these issues, XINJE has developed a horizontal packaging machine system covering both belt and shifting fork tail frames. It operates at high speed with stable and smooth performance, supporting fixed-length, fixed-mark and variable-length packaging. Functions include empty-pack prevention, torque-based material-cutting prevention and photoelectric material-cutting prevention.



System Principle

Film feeding and material feeding of the pillow packaging machine are carried out synchronously. The film feeding position is detected by a color mark sensor and a proximity switch respectively. The film is formed into a tubular film by a forming device and undergoes longitudinal heat sealing. Meanwhile, materials are fed into the tubular film and move forward together to the transverse sealing and cutting unit. The rotary or reciprocating transverse sealing and cutting knife performs transverse sealing and cutting on the tubular film, and the finished packaged products are output.



Solution Features

■ Stability and strong anti-interference capability

The electronic cam function and high-speed computing capability of XINJE PACK-30 motion controller play a key role, enabling the machine to run at high speed and stably while ensuring accurate cutting knife positioning.

■ Empty Bag Prevention Function

A special feature of the new three-servo automatic packaging machine. An empty slot sensor detects missing material on the shifting teeth. When an empty shifting fork reaches the former, the horizontal sealing knife shaft synchronizes with the three axes to maintain normal packaging, ensuring no empty bags.

■ Photoelectric anti-cut function

This function is realized through three-axis independent control. It improves packaging efficiency, but also protects the horizontal sealing knife from cutting misaligned materials, avoiding mechanical damage. Therefore, the misaligned material anti-cut function is essential for packaging machines.

■ Electronic cam function

Traditional packaging machines mostly adopt mechanical cam mechanisms to achieve synchronous film cutting. However, such mechanisms have many limitations in practical application. With technological advances and the emergence of digital servo technology, electronic cams can replace traditional mechanical cams in transmission and control systems to realize various complex reciprocating motions, simulating cam functions through digital systems.

■ Electronic cam features

- ①No mechanical contact failures such as inertia stress, elastic deformation or rigid impact existing in mechanical cam systems, making it more suitable for high-speed motion transmission.
- ②No wear. Once the cam transmission curve is designed, its shape remains unchanged, resulting in higher accuracy and better stability for the follower to repeatedly achieve the intended motion.
- ③The motion transmission curve can be easily modified by adjusting the corresponding motion parameters, greatly reducing production, installation and replacement costs.

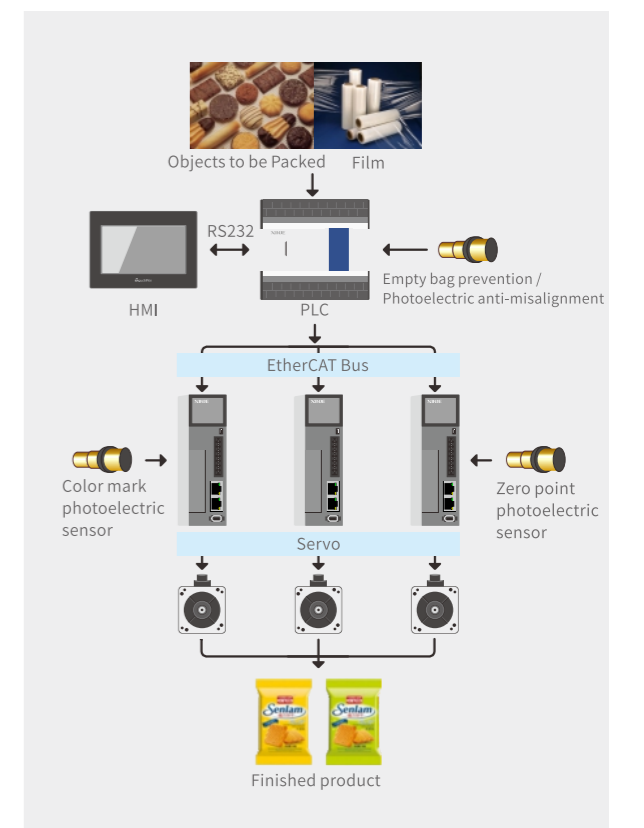
Field Application



Solution Advantage

- Automatically calculate material position, enabling one-key start after system initialization to minimize waste. Supports adjusting bag length, cutting point and feeding position during operation.
- Bag length can be set arbitrarily, ranging from tens of centimeters to several meters. It is automatically generated by the cam function inside the PLC without any mechanical adjustment.
- Built-in electronic cam delivers high flexibility. Equipment speed is determined by cutting frequency, roller diameter, bag length, servo rated speed and mechanical reduction ratio. For suitable bag lengths and transmission ratios, single-knife speed can reach up to 200 ppm.
- XINJE offers both pulse and EtherCAT bus solutions, suitable for various high-end and low-end models. The EtherCAT bus solution controlled by XDH series PLC features simple wiring, strong anti-interference, high precision and good versatility, with convenient later expansion and maintenance.
- Using the servo probe function, accuracy can reach ± 0.5 mm.

System Topology



Soft Tissue Packing Machine / Solution



Industry Background

The soft tissue packing machine is used for secondary packaging of single-package facial tissue. The packaged products feature an attractive appearance, easy portability, and enhanced protection for small soft packs. Targeting the

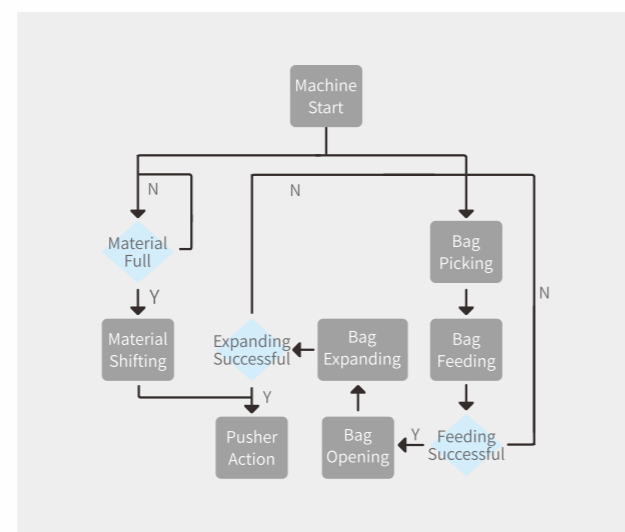
middle packing machine market, XINJE has developed an EtherCAT bus control solution characterized by high stability, increased productivity and enhanced equipment flexibility.

Equipment Introduction

The packaging machine system is equipped with protection functions such as bag feeding failure detection and bag opening failure detection. Supports 6-channel material handling, with any 1~6 channels available for intelligent material feeding distribution, ensuring continuous production. An intelligent alarm detection system monitors bag opening failure, material jamming, lifting timeout, bag picking failure, etc., enabling quick troubleshooting to resume production.



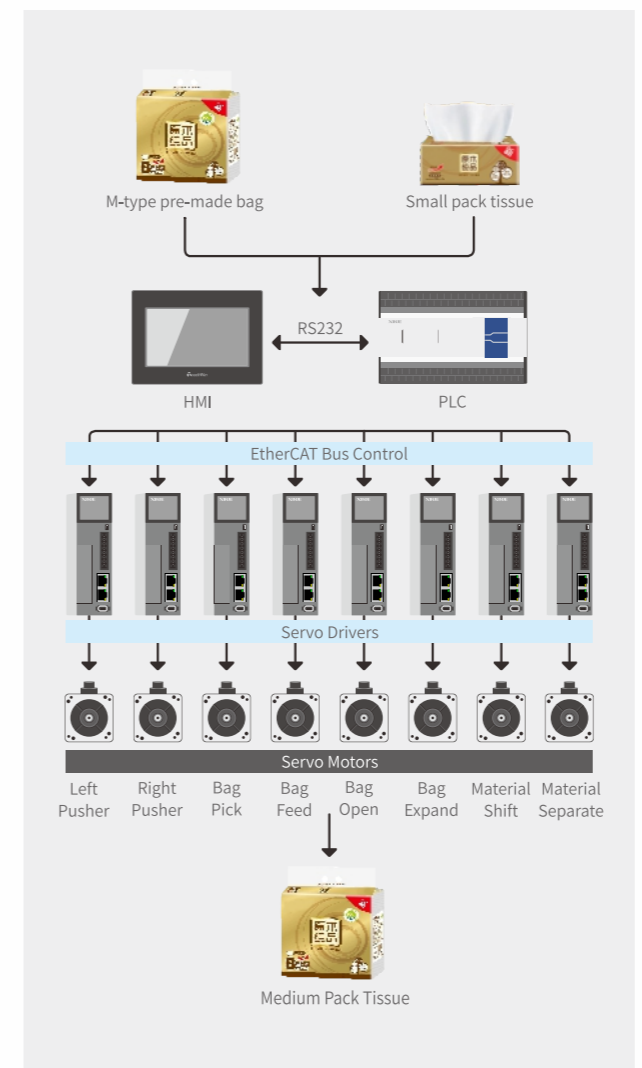
Process Flow



Control Solution

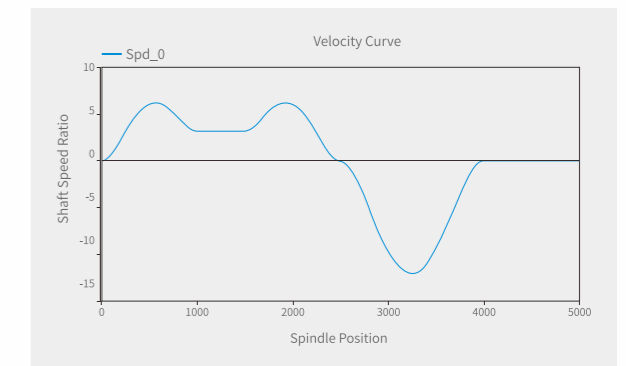
The system adopts multi-turn absolute servos for accurate and fast homing, preventing mechanical interference caused by fault homing. Each axis features jog interference protection to avoid mechanical collisions. Electronic cam curves for all axes are automatically generated internally, allowing easy adjustment of operation speed and actuation timing. Parameters such as bag feeding length, bag picking position, bag opening height, bag expanding position and pusher position can be modified during operation. The system supports single-step debugging: bag picking, feeding, opening and expanding can be operated independently, enabling quick verification of positions after format change. It also includes overall machine jog function to prevent mechanical impact during commissioning.

System Topology

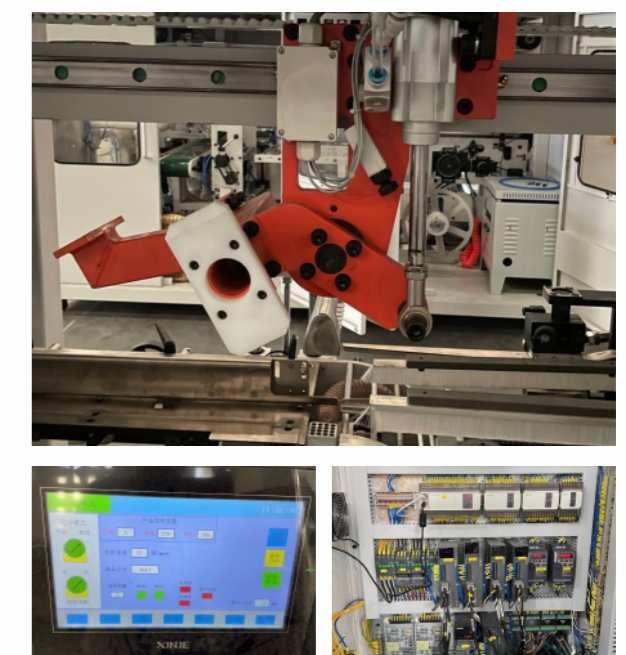


Solution Advantage

- Adopts XDH Series PLC, with EtherCAT control cycle of 1 ms, featuring strong anti-interference capability, fast control response and simple wiring.
- Adopts DS5C Series multi-turn absolute servo drive, enabling smarter, faster and smoother system homing.
- Adopts EtherCAT bus electronic cam solution as a whole. With 8-axis servo control, the speed can reach 40~50 bags per minute.
- The pusher supports low-speed material pushing cam curves, ensuring gentle and smooth bag feeding without package damage.



Field Application



Cotton Towel Packaging Machine / Solution



Solution Advantage

- Adopts cam curves for smooth motion and stable operation.**
 The cam curves of each axis feature adjustable master-slave axis position and adjustable acceleration/deceleration. Enables free curve optimization, resulting in smoother axis operation and lower noise.
- High bag making accuracy**
 The color mark signal is directly transmitted to the servo drive via a probe, without going through the PLC, thus shortening processing time and improving bag-making accuracy, with the maximum error controlled within 1mm.
- Comprehensive and convenient operation functions**
 Due to the EtherCAT bus technology, users can directly monitor and modify some servo parameters and view alarms on the touch screen. During commissioning, each axis can be enabled or disabled individually for easy troubleshooting; automatic operation can also be simulated for convenient debugging.

Field Application

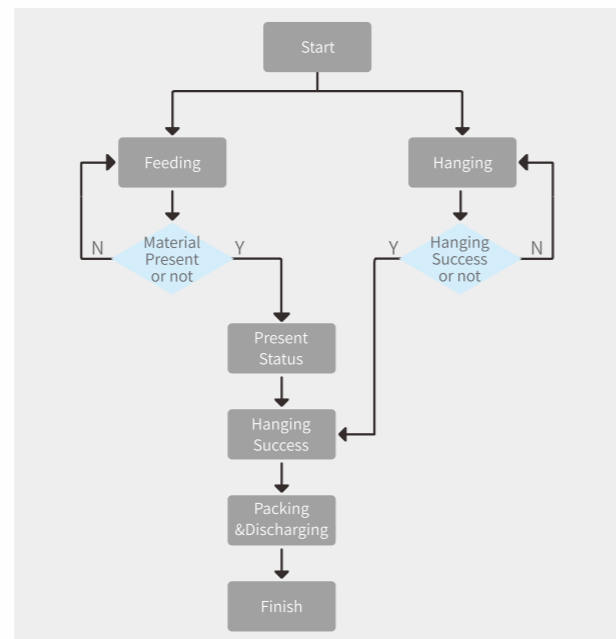


Industry Background

The cotton towel packaging machine's main function is to neatly push cotton towel into packaging bags, followed by sealing and discharging. Currently, the 10-servo automatic cotton towel packaging machine solution provided by XINJE achieves a maximum stable packaging speed of up to 60 bags per minute.

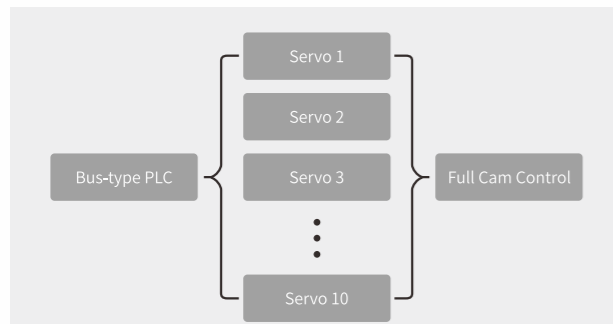
Process Principle

Process Flow: Cotton towels are fed via the feeding belt. When reaching the lifting section, the system checks whether the bag is properly hung. Then the pushing section pushes the product into the bag, the sealing unit presses down, and finally discharging is completed via the discharging belt.

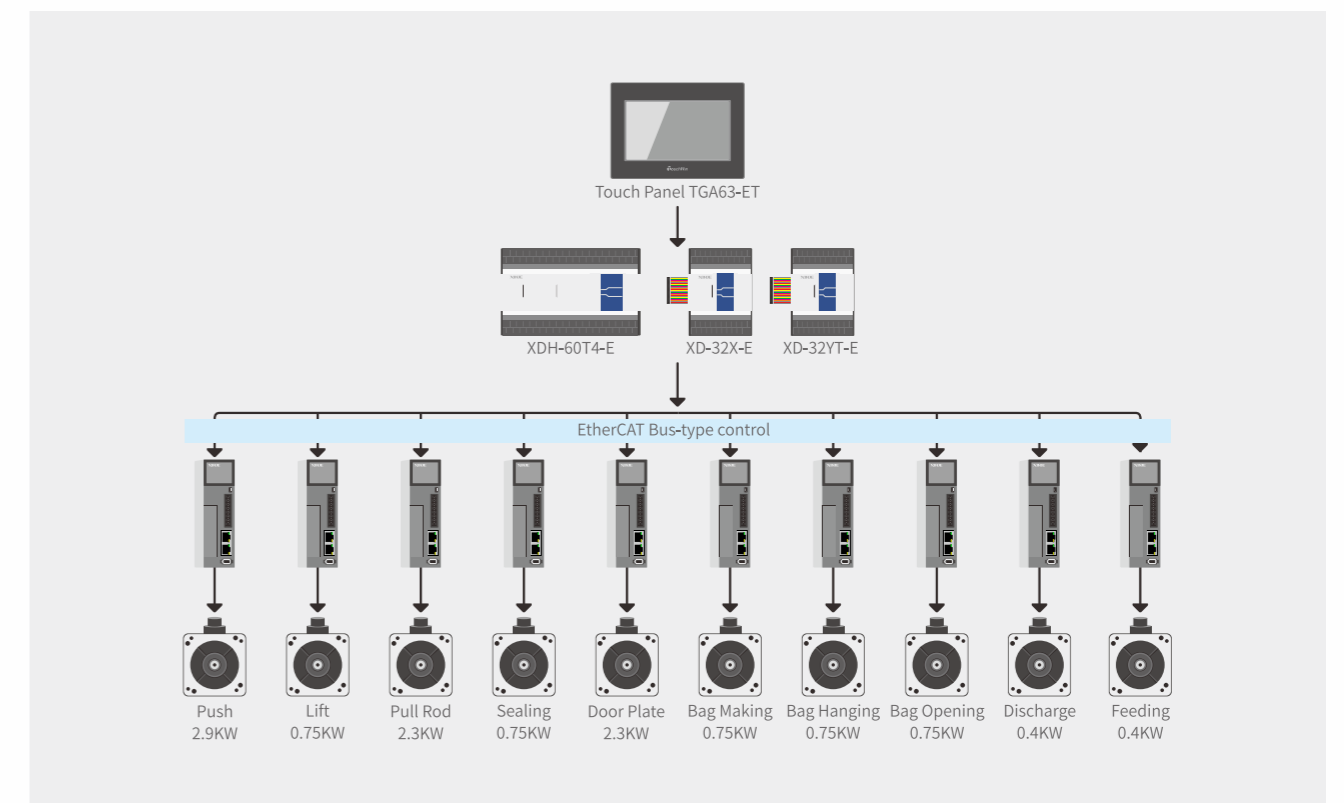


Control Scheme

The automatic cotton towel packaging machine adopts XDH Series PLC and connects with 10 servo drives via the EtherCAT bus. The wiring is simple, commissioning is flexible, and manual wiring costs are reduced. The machine adopts full electronic cam control, featuring smoother motion curves and more efficient action sequences.



System Topology



Line-Scan Based Counting Machine / Solution



Industry Background

With the development of large-scale industrial production technology, higher requirements for precise counting have emerged in product packaging and raw material supply. These requirements mainly apply to products with high output, small particle size, and high unit cost. Counting equipment on the market mainly includes electronic grain counters and visual counting machines. Visual counting machines are further divided into area-scan camera counting and line-scan visual counting. Among them, line-scan visual counting offers distinct advantages in industries such as pharmaceuticals,

seeds, and diamond counting, where products are small and require a large detection field of view.

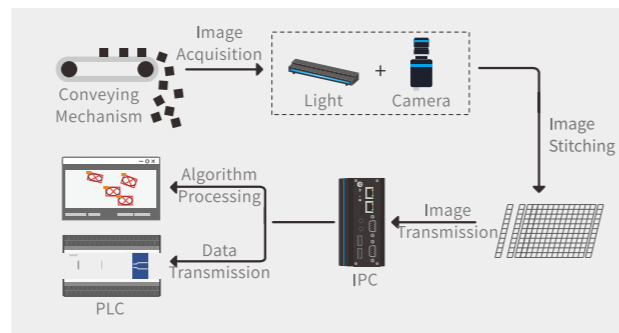
Applicable Industries

Counting of various light and small products such as tablets, capsules, hardware parts, packaged food, seeds, diamonds, etc.



Working Principle

The system mainly consists of an industrial computer, a line-scan camera and a PLC control system. After the camera captures images, the upper computer software in the industrial computer calculates the current quantity, the falling position of materials and the shape of shadows cast by objects, so as to reject materials that are too small or severely incomplete. The upper computer program integrates the industrial touch screen functions with the visual counting software, and saves electrical parameter recipes together with recognition parameter recipes, enabling one-key material change.



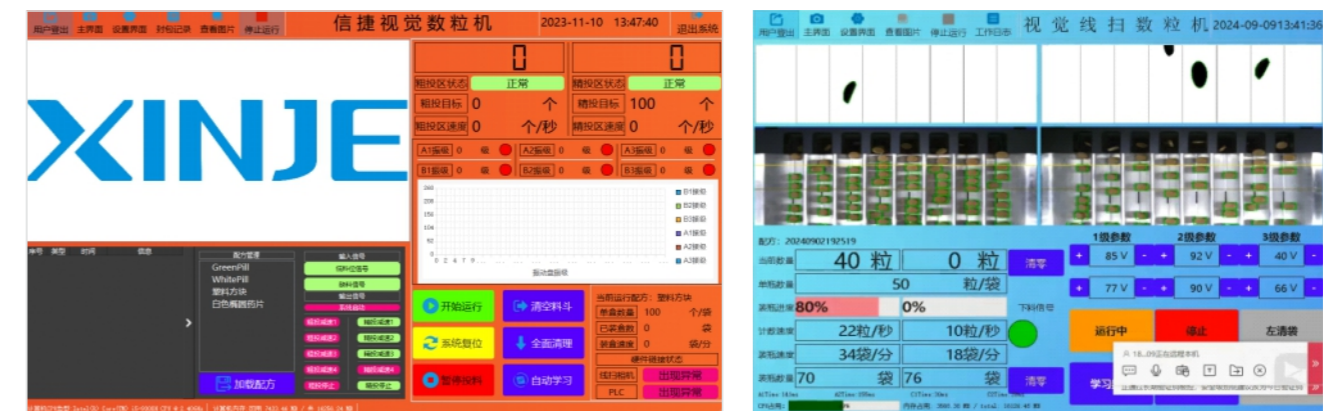
Solution Advantage

- Wide application range, not limited by specifications of different materials such as tablets, pills, capsules and transparent materials.
- Fast operation speed. Compared with traditional electronic schemes, the visual scheme increases production capacity by 15%, and the bottle filling accuracy reaches 99.9%, meeting GMP standards.
- The software features a built-in self-learning function, enabling one-key learning of material parameters and reducing debugging time wasted on material changeovers.

Industry Pain Points

- Traditional electronic counting schemes have weak dust resistance, resulting in missed counts, and frequent downtime due to maintenance.
- With the widespread adoption of GMP certification, manufacturers have raised standards for defective tablet rejection (rejecting tablets with a defect rate $\leq 20\%$).
- The counting system is required to be extremely stable, reducing after-sales service and maintenance costs.

System Interface



Field Application



Counting Machine With AI Operation Interface Dual-station Counting Machine Pull-Type Counting Machine

High-Speed Vertical Packaging / Solution



Industry Background

The flying-shear vertical packaging machine is mainly used for packaging granular materials such as rice and candy. Unlike ordinary low-speed vertical packaging machines, the horizontal and vertical seals of high-speed vertical packaging machines adopt a flying-shear mode, with a maximum speed of up to 170 bags per minute.

Working Principle

Multihead weigher:

Weigh and classify packaged materials, then pour them into a hopper for packaging.

Film pulling:

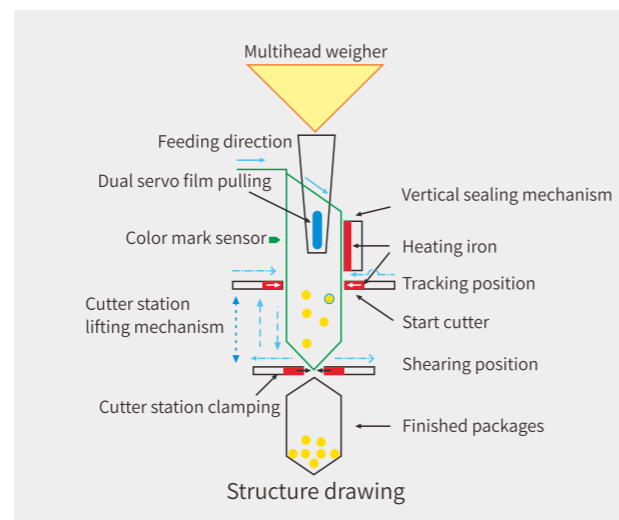
A mechanism that fits closely on the forming tube and drives the packaging film movement through belt friction.

Longitudinal sealing slide:

A mechanism for longitudinally heat-sealing the film formed into packaging bags.

Transverse sealing slide & cutter:

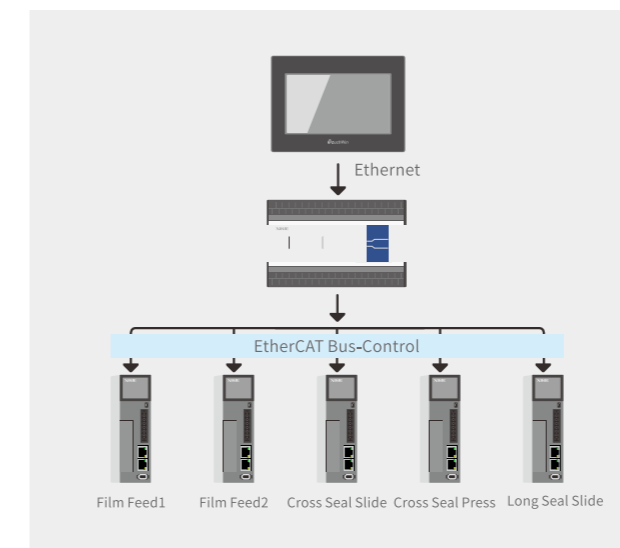
A mechanism that transversely heat-seals and cuts the packaged materials.



Control scheme

- Adopts a bus scheme with strong anti-interference capability, simple wiring and easy expansion.
- Film pulling is driven by two servos that require speed synchronization. Here, the gear binding function is used to bind the two film pulling axes to a virtual spindle simultaneously, achieving synchronous motion. The color mark section uses a color mark correction algorithm to compensate for errors in real time, ensuring packaging accuracy.
- The longitudinal sealing mechanism adopts an electronic cam, which performs periodic reciprocating motion including acceleration, synchronization, deceleration and return, based on the length of the longitudinal sealing heater.
- The transverse sealing section consists of a crank up-down flying-shear servo and a horizontal hot-pressing servo. The crank flying-shear motion is realized through a custom cam curve algorithm, ensuring synchronization between pressing and film feeding during transverse sealing.

System Topology



Solution Advantage

- The scheme includes various feeding methods such as multihead weigher and screw, featuring flexible application and strong adaptability.
- It is equipped with an anti-empty bag function. The entire process adopts a cam clutch function, enabling soft start and stop as well as stable operation.
- By adopting the probe + electronic cam method, high-speed and high-precision packaging effect is achieved, with a maximum speed of up to 170 bags per minute and a cutting accuracy of $\pm 1\text{mm}$.
- Bus scheme ensures simple wiring, strong anti-interference, high precision, and convenient later expansion and maintenance.

Field Application



Rotary Paper Cutter / Solution

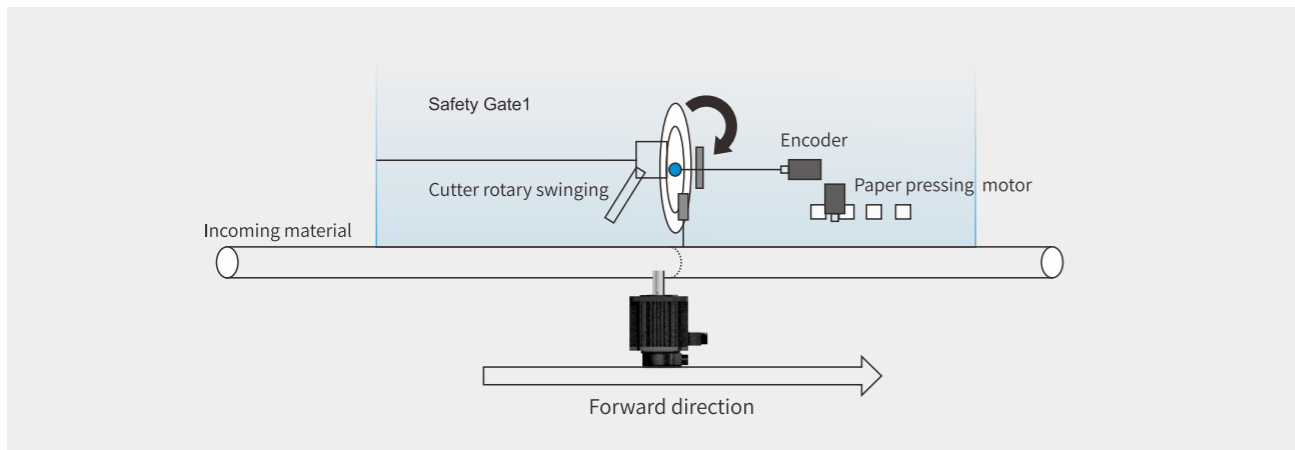


Industry Background

Rotary paper cutter is the next process after the folding machine. It cuts the paper strips from the folding machine into set lengths, removes excess waste during the process, and finally cuts the strips into blocks before conveying them to the downstream small packaging machine.

Working Principle

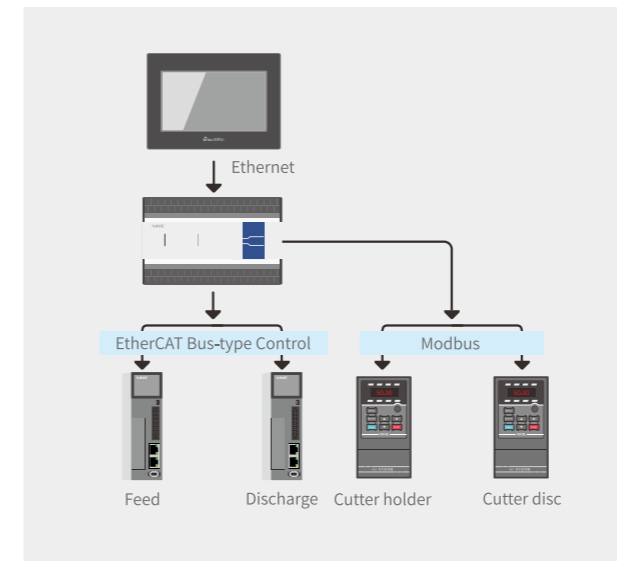
The rotary cutting process uses two inverters to control the cutter: one drives the cutter head to rotate, and the other controls the swinging motion of the cutter holder. During automatic operation, the cutter holder rotates at a constant speed, and paper feeding must be performed within this interval. When the cutter holder leaves the path, it triggers a photoelectric sensor, which initiates paper feeding.



Control scheme

- Both pulse and bus solutions are available to meet different requirements.
- The cutter holder adopts an inverter + encoder scheme, which is more cost-effective compared to the servo scheme.
- The paper infeed and outfeed servos adopt an electronic cam scheme, ensuring smooth coordination and stable start-stop operation.

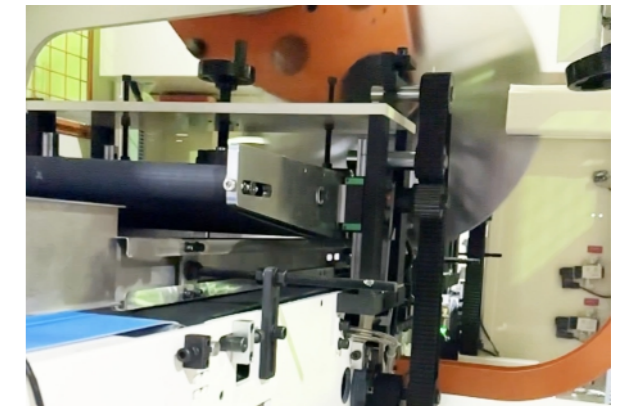
System Topology



Solution Advantage

- The feeding axis is controlled by an electronic cam, ensuring stable start and stop. The maximum speed can reach 380 cuts per minute, with an error within 1 mm.
- The system is fully functional, including material jamming prevention, waste blowing, waste draining and other functions, adaptable to various scenario requirements.
- The system adopts electronic cam combined with cutter disc photoelectric dual protection, realizing real-time following of the cutter holder and belt to protect the cutter.

Field Application



Single Pack Soft Tissue Machine / Solution

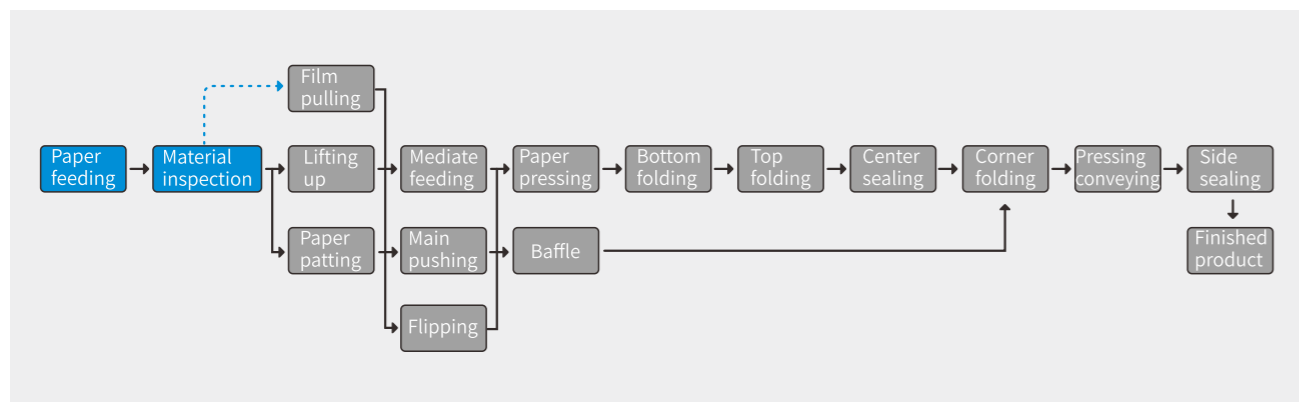


Industry Background

The single packaging machine is mainly used for packaging soft facial tissues. As the next process after the rotary cutter, it wraps the single tissue stacks cut by the large rotary cutter with plastic film. The finished product is the soft facial tissue used in daily life.

Working Principle

The process of the soft tissue single packaging machine is as follows: Servo-controlled belts arrange the tissue stacks and feed them orderly into chain hooks. The chain hooks convey the stacks to a lifting platform and push them upward, while the bottom film mechanism completes the film feeding. A pusher then sends the tissue stacks and packaging film to the paper pressing station, where top and bottom edge folding is performed, followed by center sealing. Finally, corner folding, pressing and conveying, and side sealing of the tissue package are completed in sequence.



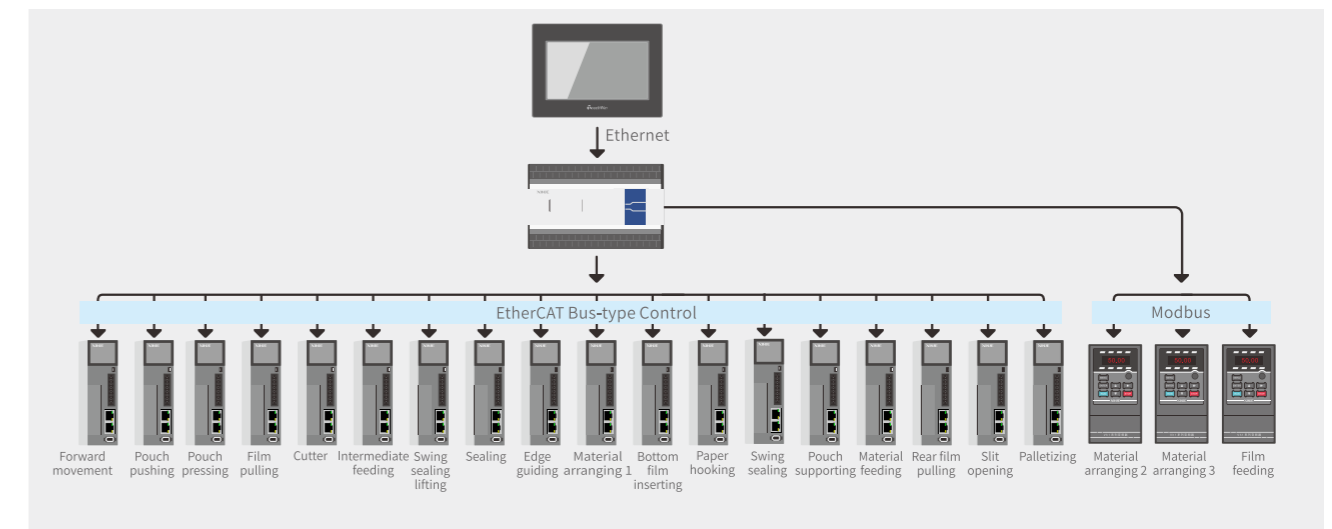
Control scheme

- Adopts a bus scheme with strong anti-interference capability, simple wiring and easy expansion.
- Full electronic cam control ensures smooth curves and coordinated, fluid motion of all axes.
- The feeding section uses a photoelectric sensor for real-time position correction, ensuring accurate feeding. The material arranging section operates gently without impact according to real-time material changes.
- Film pulling uses a color mark correction algorithm for precise color mark positioning, with a smooth, impact-free film pulling curve.

Solution Advantage

- EtherCAT bus electronic cam scheme enables angle control of all components and close coordination of movements, with a maximum speed of up to 280 packs per minute.
- Electronic cam curves for each axis are automatically generated internally, and axis motion parameters can be modified during operation.
- The acceleration and deceleration curves of film pulling are smoother to avoid film shaking, ensuring high film pulling accuracy up to ± 0.5 mm.

System Topology



Field Application



Tissue Folding Machine / Solution



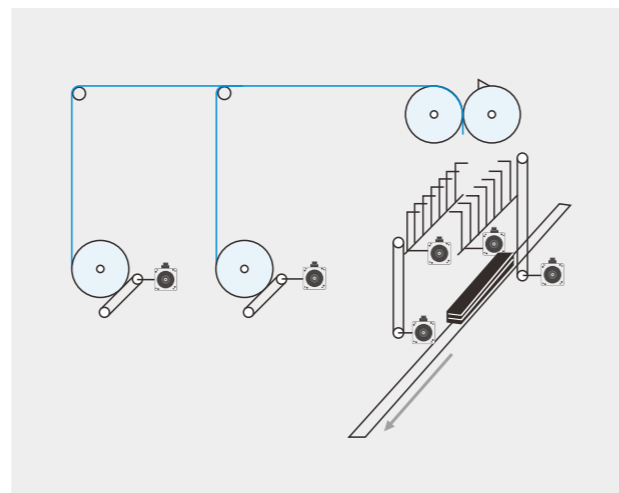
Industry Background

The tissue folding machine is the first process in the post-processing line for soft pack tissues. It slits and cross-folds raw paper through mechanical cam operation. Traditional folding machines require manual slitting, while modern fully automatic folding machines can perform in-machine slitting, automatically slitting according to the set number of sheets, as well as edge trimming.

Working Principle

The tissue folding machine is driven by an inverter-powered main motor, which drives a 400W absolute servo as an absolute encoder, and the rear frame paper feeding follows the main machine in a synchronous follow-up manner.

Slitting is performed by the main machine driving a mechanical cam. After the tissues are produced, they are cross-folded with each other, and the front and rear grippers cooperate to complete strip splitting, edge folding and other actions. The front and rear grippers are controlled by servos to move up, down, left and right in coordination, automatically splitting strips according to the set number of paper sheets, and then conveying the separated paper strips to the lower belt.



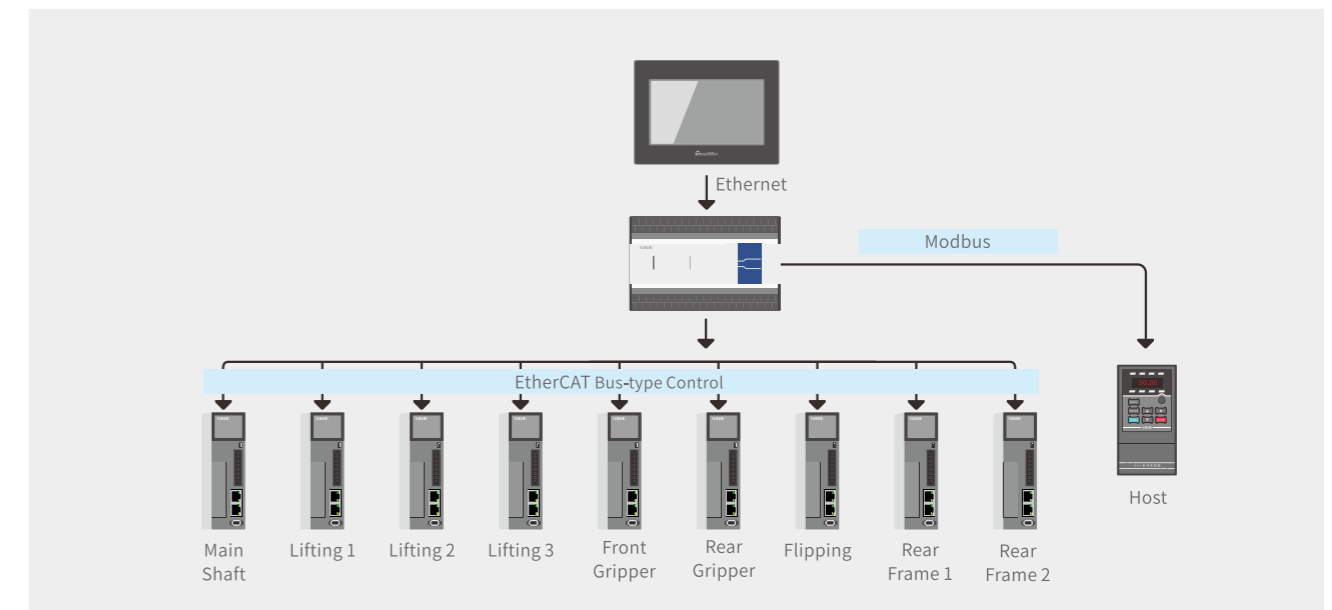
Control scheme

- Adopts a bus control scheme.
- The main encoder uses an absolute servo instead of a traditional encoder.
- The paper separating action adopts cam following control for more stable coordination.

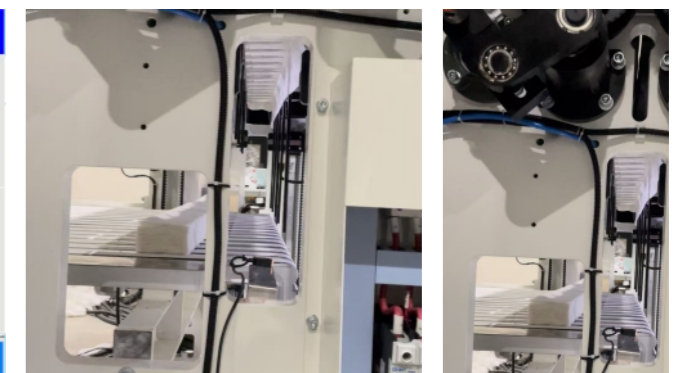
Solution Advantage

- Electronic cam solution: the paper separating action follows the main shaft encoder, ensuring high paper separating accuracy.
- EtherCAT bus enables simple wiring, strong expandability and anti-interference performance.
- The main shaft adopts an absolute servo instead of an encoder, so data transmission is free from external interference and operation is more stable.
- Paper receiving speed matches the main shaft for stable paper receiving, with a speed of up to 120 meters per minute.

System Topology



Field Application





Food and Beverage

- Checkweighing and Sorting Solution
- Suction Molding Machine System



Checkweighing and Sorting / Solution



Industry Background

Dynamic checkweighers, also known as weight sorters, are automatic production line checkweighing equipment widely used in industries such as pharmaceuticals, food, beverages, health products, cosmetics, electronics, daily chemicals and packaging. They can detect the weight of products on the production line in real time online and handle unqualified products accordingly.

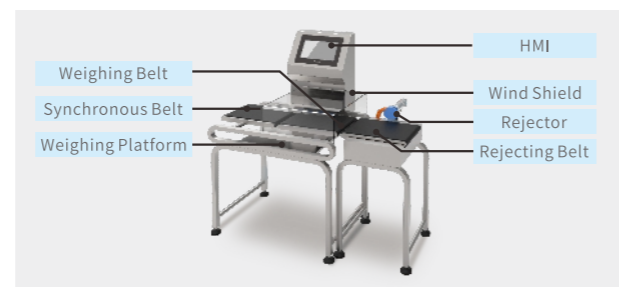
Traditional manual sorting is not only inefficient but also prone to human error, so automatic multi-stage sorting has become a mainstream trend in the market.

Multi-stage sorting has a broad market and is widely used in the sorting of eggs, fruits, seafood, aquatic products, meat, poultry and other products, with diverse mechanical structures for different products.

Working Principle

Automatic checkweighing and sorting machines are designed to convey items, perform online weight detection and judgment, and execute rejection or output weight results based on the judgment.

Automatic checkweighing and sorting machines mainly consist of a power conveying unit, a weighing unit, a main controller (PLC), a human-machine interface, and a sorting and rejection mechanism. The power conveying unit comprises a motor driver, motor, transmission mechanism and conveyor belt, and is mainly responsible for conveying the items to be sorted. The weighing unit mainly includes a weighing platform, load cell, signal cable and XINJE XD-E1WT-CW weighing module, which is used to capture and collect the weight of moving items in real time. The main controller controls belt movement, exchanges data with the HMI, processes and judges weight signals, and outputs control signals for rejection and checkweighing results. The HMI realizes human-machine interaction, and also supports parameter setting and recipe storage functions. The sorting and rejection mechanism performs corresponding rejection actions according to the commands issued by the main controller.



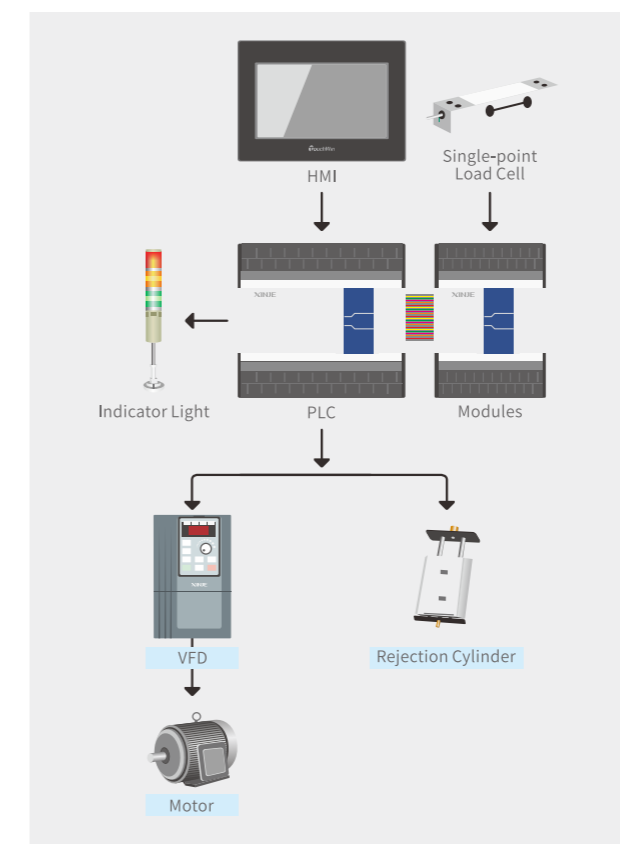
The working process is as follows:

After materials are fed from the sorting belt and accelerated to the belt speed to maintain relative static, the system automatically samples the items during weighing according to the preset detection mode and detection algorithm. After weighing and sampling are completed, the weight result or grade is output. When the object moves to the rejection belt, the rejection unit performs corresponding rejection actions on the items according to the judgment result from the weighing unit.

Solution Advantage

- Flexible and convenient**
 Adopts XINJE XD5 series high-performance PLC with fast operation speed, flexible expansion and support for secondary development.
- Strong adaptability**
 Built-in rolling rejection function, which effectively solves the contradiction between rejection distance and weighing speed.
- Large-capacity storage**
 With sufficient large capacity to record and permanently store detection data. A USB flash drive can be inserted to export report data.
- Easy debugging**
 Equipped with on-screen oscilloscope and serial port oscilloscope technology, it visualizes the entire debugging process, eliminating the trouble of traditional blind debugging and making debugging convenient.
- High precision**
 Adopts XINJE XD-E1WT-CW weighing module with high accuracy and good stability. It has a built-in rich filter library to flexibly adapt to various working conditions, prevent zero drift. The comprehensive detection accuracy can reach 2‰-3‰ (depending on equipment conditions).
- Powerful functions**
 Built-in 10-grade weighing and sorting function, realizing both checkweigher and classifier in one machine.
- Wide application range**
 Supports storage of multiple groups of material recipes, with easy switching and adjustable sorting speed.
- Supports remote monitoring and cloud storage**
 Equipped with XINJE network module and cloud platform, it can provide powerful cloud database and report functions.

System Topology



Field Application



Food and Beverage
 Textile
 Home building materials
 3C and Electronics manufacturing
 Automotive equipment and manufacturing
 Energy
 Smart Logistics
 Informatization
 Other

Suction Molding Machine System / Solution



Industry Background

Suction molding machine, also known as a thermoplastic molding machine, uses vacuum suction to form thermoplastic sheets such as PVC, PET, PETG, APTT, PP, PE and PS. These sheets are heated and softened through molds to form vacuum covers of various shapes or attached to the surfaces of products with different shapes. According to sheet thickness, blister forming is divided into thin-sheet blister and thick-sheet blister.

Suction molding machine can be used in plastic packaging, food packaging, pharmaceuticals, industrial cooling tower water deflectors and other industries.



Food Packaging Plastic Packaging Medicine

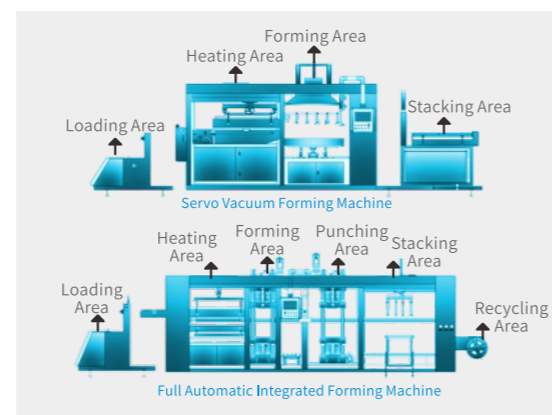
Control Scheme

The suction molding machine system includes bus control and pulse control schemes. Bus control features high precision, servo position retention after power-off, simple wiring, strong anti-interference, alarm warning and torque monitoring. Pulse control is cost-effective, highly compatible and supports other mainstream servos.

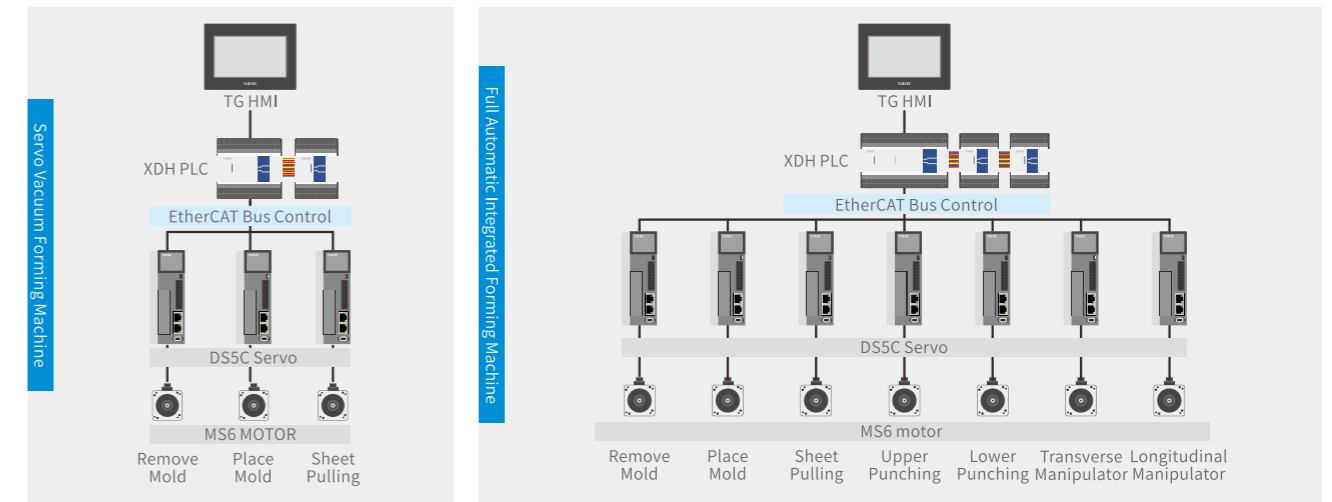
System Principle

A suction molding machine mainly consists of a feeding zone, heating zone, forming zone, punching zone, stacking zone, waste recycling zone and other related sections.

- 1. Furnace Heating:** Delay the furnace operation. After heating, the pulling servo pulls the sheet. When the sheet reaches the set position, the upper and lower mold servos start forming. After forming, demolding is performed by vacuum, water spray, cold air and other cylinders. The upper and lower molds return to the safe position after the set delay.
- 2. Punching Section:** Pressurize the sheet. The dual servos move to the fixed position, the pressurizing cylinder applies pressure, then the cutter operates. After completion, the cut sheets are sorted.
- 3. Manipulator Loading & Unloading:** The manipulator waits, retracts and picks materials at multiple positions. It takes and stacks the cut sheets, then the conveyor transports them.



System Topology



Solution Advantage

- Higher safety**
High-power absolute-value servos are used for enhanced safety. Safety zone protection and soft limit protection are developed, and internal torque is calibrated to prevent machine damage and unnecessary losses caused by human error.
- Smoother and faster motion**
Multi-stage optimization is applied to the upper and lower mold movements in the forming area, the core part of the blister machine, to avoid jerky motion caused by two-stage positioning.
- Better temperature control adaptability**
With PLC and temperature controllers, supporting up to 400 temperature control channels for temperature modification and display. It features automatic temperature adjustment tuning, diagnoses temperature control faults for each station ID, identifies faulty stations, and outputs corresponding alarm codes.
- Easier function switching for the integrated manipulator**
The manipulator supports three general functional modes: in-mold, direct stacking, and out-mold. When the corresponding mode is selected, the system switches to the matching interface and enables corresponding safety protection, avoiding potential hazards caused by incorrect parameter settings. Meanwhile, the manipulator interface is equipped with one-key positioning, automatic running position setting, and enhanced safety protection, providing customers with greater peace of mind.
- Industry-leading efficiency**
The integrated machine achieves an idle efficiency of 53 cycles per minute, exceeding the 50 cycles per minute of competing products. Its actual maximum production speed reaches 30 cycles per minute. Featuring high-speed servos and two-stage speed design, its performance is industry-leading.
- User-friendly design**
 1. Random password lock
 2. Function selection: Provides versatile function options with one-key on/off control for improved operational convenience.
 3. Batch temperature control: Supports batch on/off control of the temperature control interface, batch temperature setting, horizontal and vertical temperature configuration, and temperature alarms, greatly improving the user experience.
 4. Timing retention: Power-off retention is applied to delays of various process actions, with real-time action status display for intuitive viewing of action sequences and station operation status.
 5. Supports rotation speed and torque monitoring, clearly displaying the running status of each servo.
 6. Absolute position setting: An open system interface allows configuration of the servo origin and limits, making it easier to adjust height and safety protection ranges.

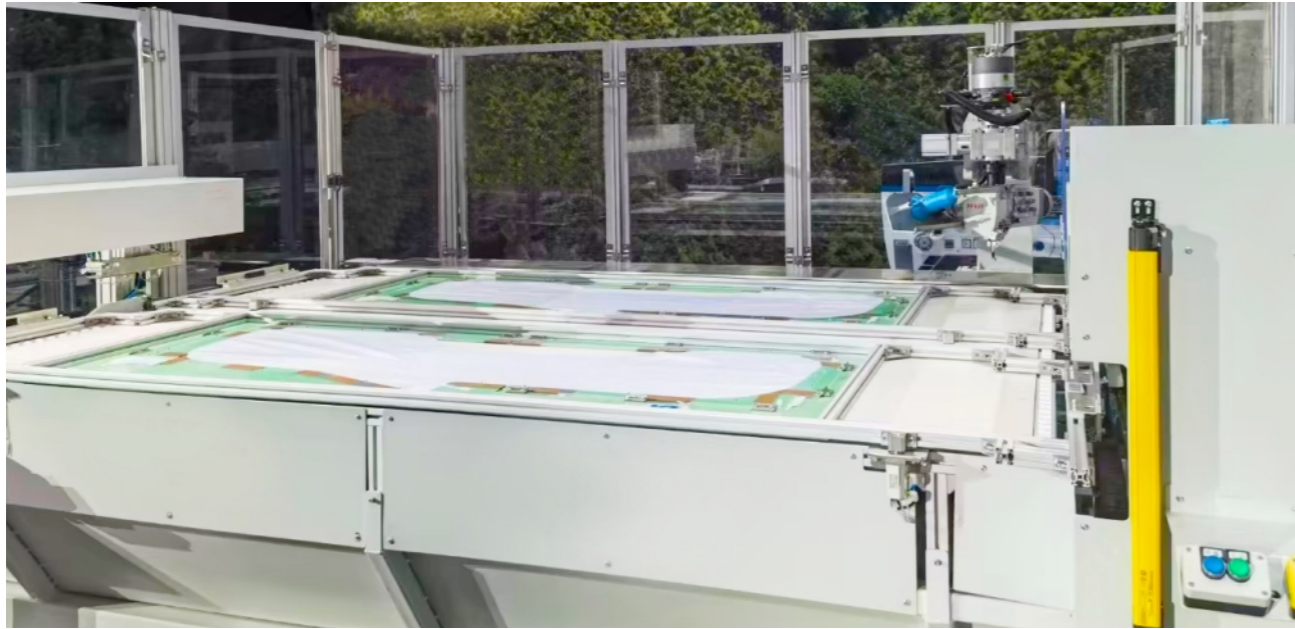


03

Textile Sewing

- 6-Axis Rotary Head Template Sewing Machine
- Automatic Laser Pocket Opening Machine
- Four-Side Seaming Solution
- Microfiber Towel Machine Solution
- Single/Double Circular Knitting Machine
- Textile Carding Machine System Solution
- Textile Spinning Frame Electronic Drafting
- Rotary Special-Shaped Screen Printing Machine

6-Axis Rotary Head Template Sewing Machine / Solution



Industry Background

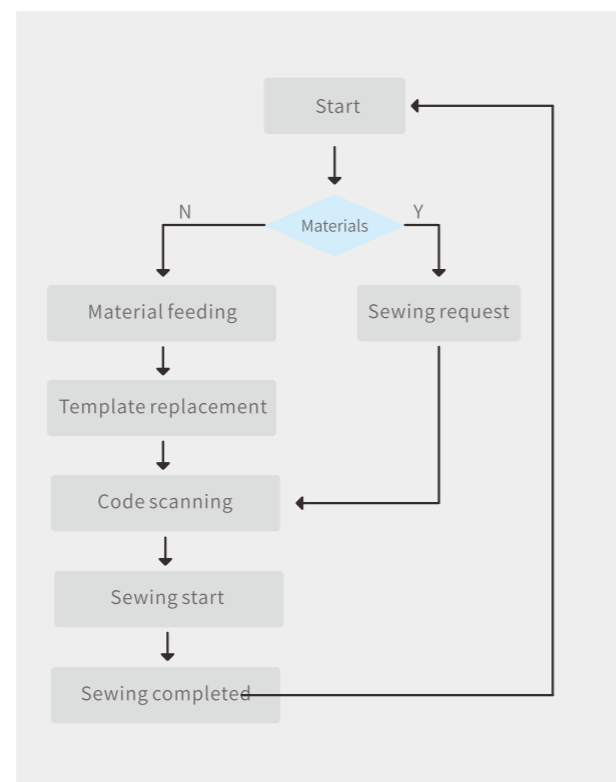
Currently, the sewing technology for automotive airbags fails to meet high-efficiency requirements for complex patterns. XINJE 6-axis rotary head template machine technology has successfully filled this market gap. By importing DXF graphic files via a USB drive, pattern sewing accuracy is guaranteed, suitable for sewing automotive airbags and various other products.



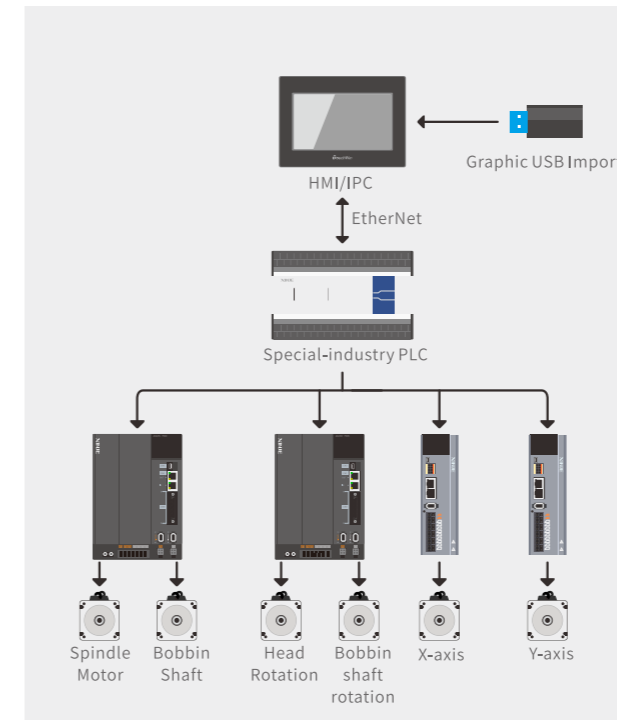
Solution

- Adopts absolute encoders and DS5L2 servo system for motion control, featuring high responsiveness and excellent sewing quality.
- Uses touch-integrated controller with pulse-type motion control PLC to improve operation experience and equipment appearance.
- Applies customized software for convenient pattern modification.

Process Flow



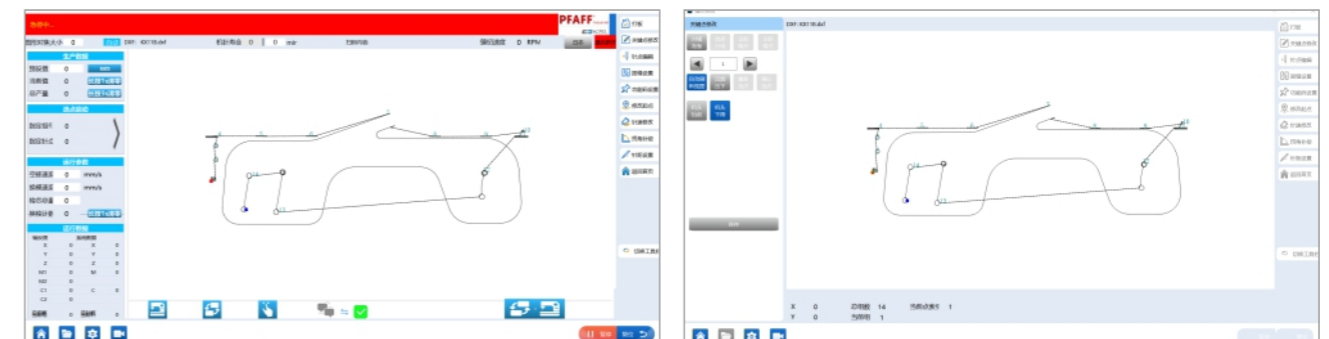
System Topology



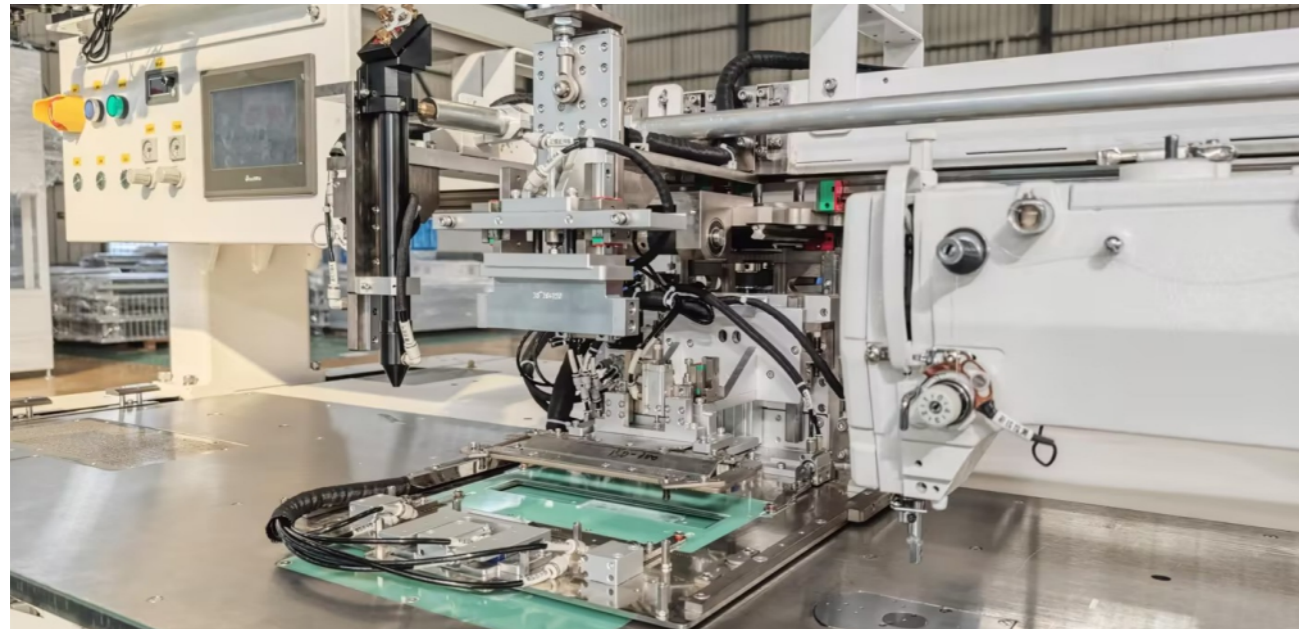
Solution Advantage

- Graphics are drawn in CAD software and imported, effectively correcting sewing stitch errors caused by mechanical deviation.
- Sewing stitch quality and overall product quality are significantly improved. After optimization, raw material waste rate is reduced to 2%.
- Sewing efficiency is enhanced by optimizing cycle time, with overall smoother operation. Sewing time for one material piece is shortened from 5 minutes to 3 minutes and 40 seconds.
- Supports secondary programming via PLC ladder logic, allowing customers to adjust sewing motion sequences as needed.

System Interface



Automatic Laser Pocket Opening Machine / Solution



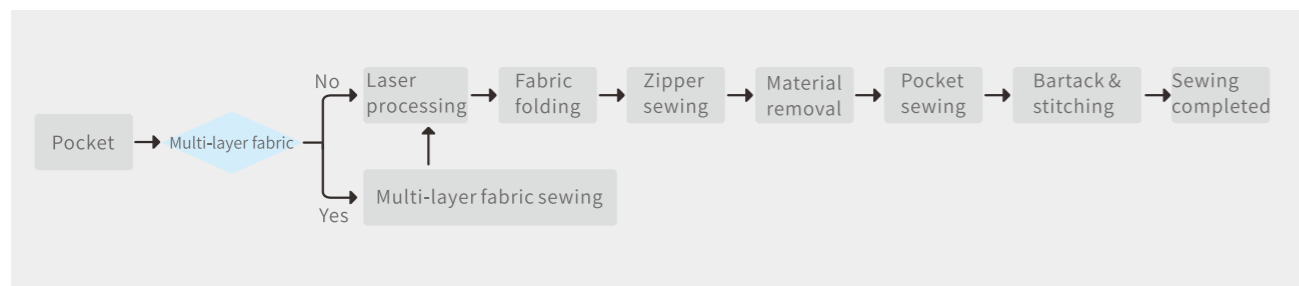
Industry Background

To address the challenge of automatic sewing for real & fake garment pockets, XINJE has developed a graphic path sewing control solution. By adjusting template graphic parameters, this solution realizes sewing of real & fake pockets in various sizes, greatly reducing reliance on manual operation.

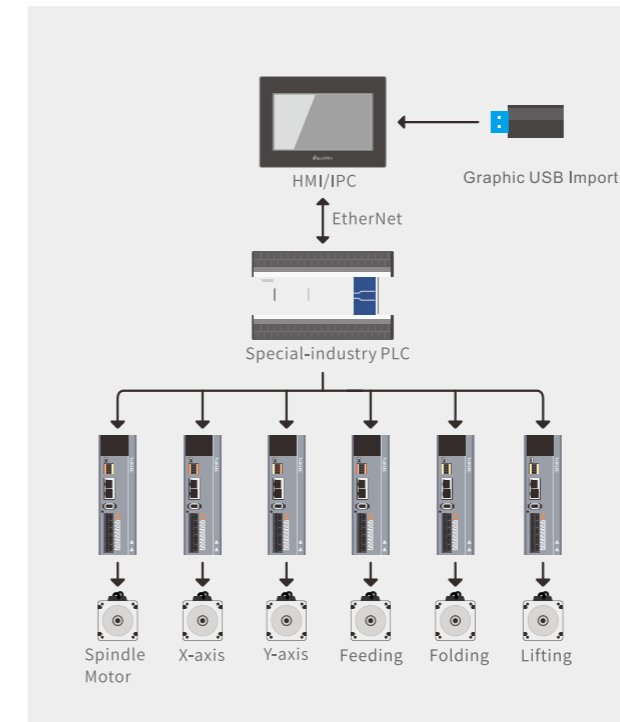
Solution

- CAD HMI + PLC multi-axis motion control, convenient for customer secondary development.
- DS5L2 servo for multi-axis synchronous control, high responsiveness, excellent sewing quality.
- Custom template patterns with guided user interface operation.

Process Flow



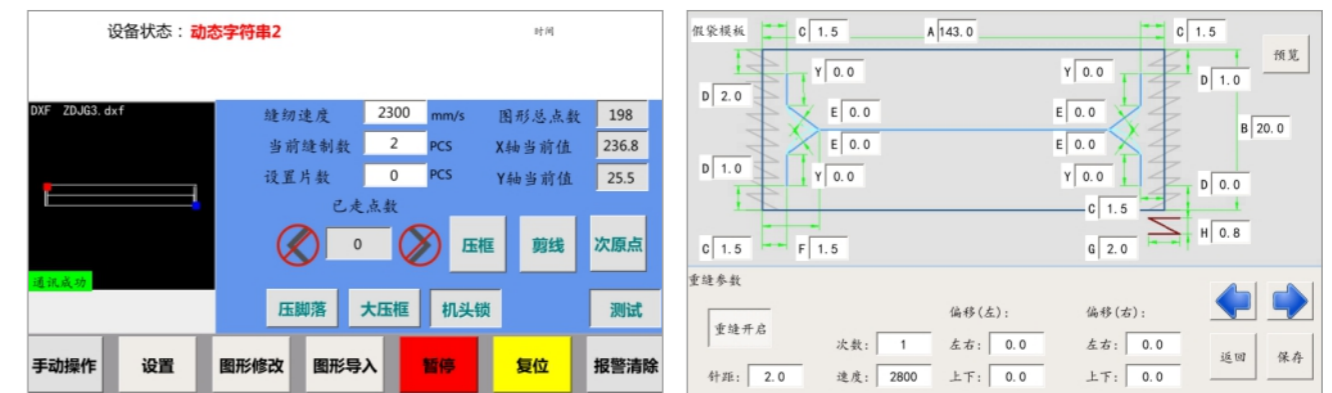
System Topology



Solution Advantage

- Smooth sewing speed variation and vibration suppression. DS5L2 high-performance servo drive with advanced speed control algorithm effectively reduces vibration during sewing, stably increases speed, and achieves sewing efficiency of 3,000 stitches per minute.
- The HMI allows users to easily set graphic parameters including laser, pocket and bartack functions, and enables pattern updates based on requirements.
- In case of thread breakage, the system can automatically return to any designated point to resume sewing, effectively reducing the defect rate by 5%–10%.
- Supports secondary programming via PLC ladder logic, enabling customers to adjust sewing motion sequences according to specific needs.

System Interface



Four-Side Seaming / Solution



Industry Background

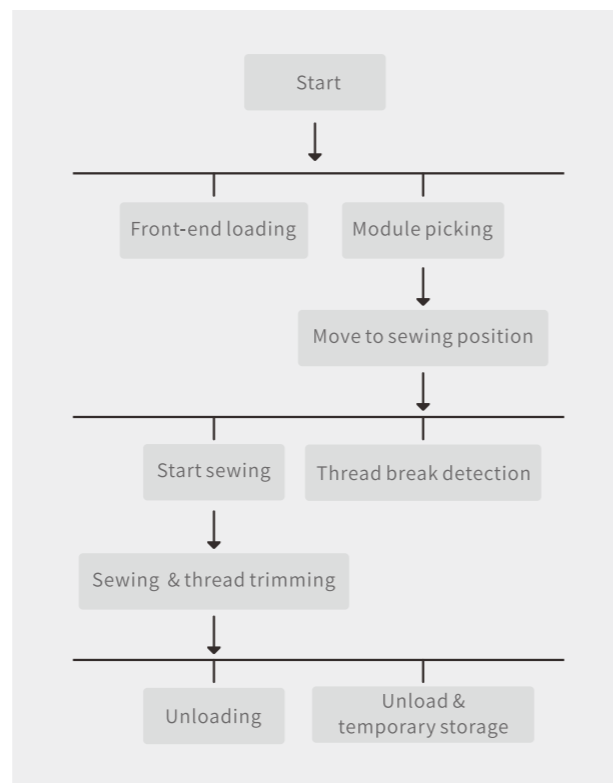
Currently, towel edge-overlock sewing technology on the market is limited to straight lines. To solve the sewing of rounded corners and other complex patterns, XINJE has developed a sewing control solution based on graphic path control. This solution allows users to import DXF graphic files via USB drive to realize sewing of various patterns, suitable for towels, mouse pads, dishcloths, mops, badges, knitted hats and other products.



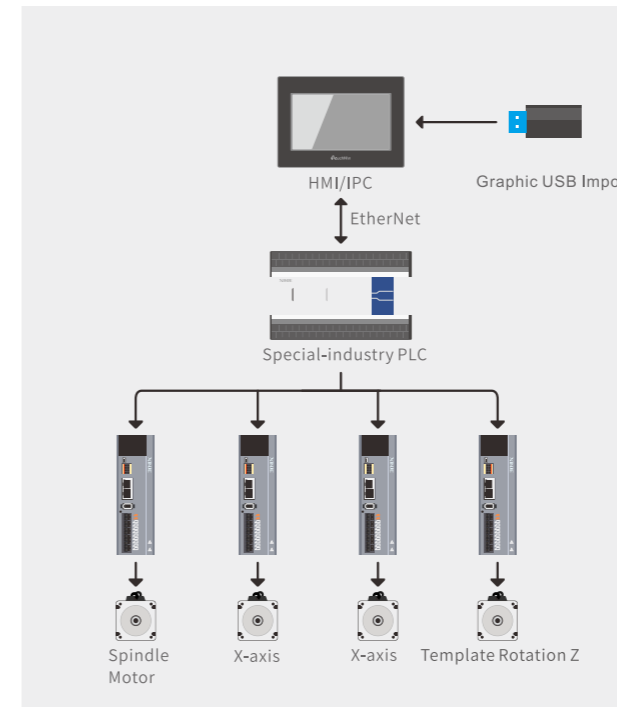
Solution

- Multi-axis linkage realized by pulse-type motion control PLC + HMI supporting CAD (DXF) import.
- Equipped with high-performance DS5L2 servo for high responsiveness and smooth operation.
- Dual-station simultaneous sewing improves production efficiency.

Process Flow



System Topology



Solution Advantage

- Supports drawing and importing graphics via CAD software, effectively compensating for sewing stitch errors caused by mechanical deviation.
- Equipped with the high-performance DS5L2 servo drive, sewing speed is stably increased from 3,000 to 4,000 stitches per minute.
- Enables sewing of fine patterns with a minimum fillet diameter of 10mm.
- Supports secondary programming via PLC ladder logic, allowing customers to adjust sewing motion sequences as required.

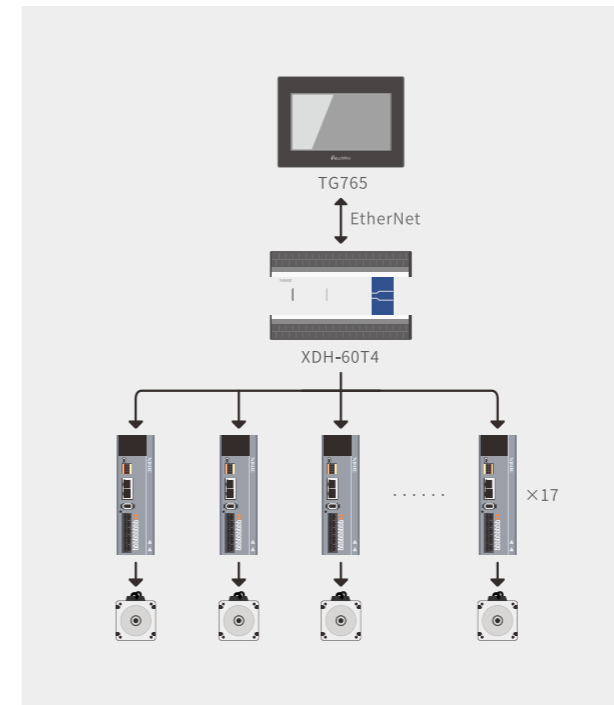
System Interface



Microfiber Towel Machine / Solution



System Topology



Solution Advantage

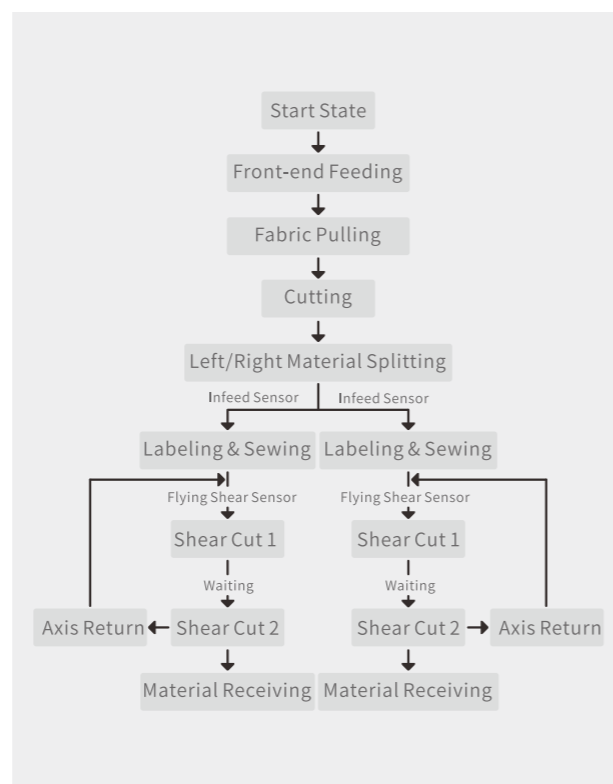
- Reduces manual operation, allowing one operator to monitor multiple machines.
- Improves thread cutting quality and product quality, reducing the defect rate to 2%.
- Shortens fabric spacing to avoid material waste; the thread waste cost saved per machine per day is equivalent to one worker's daily wage.

Industry Background

With annual towel consumption reaching tens of billions of pieces, XINJE has launched its 4th-generation microfiber towel machine system to help manufacturers boost productivity, reduce manual intervention and labor costs, shorten fabric spacing, avoid material waste, and improve cutting accuracy and edge-finishing performance.



Process Flow



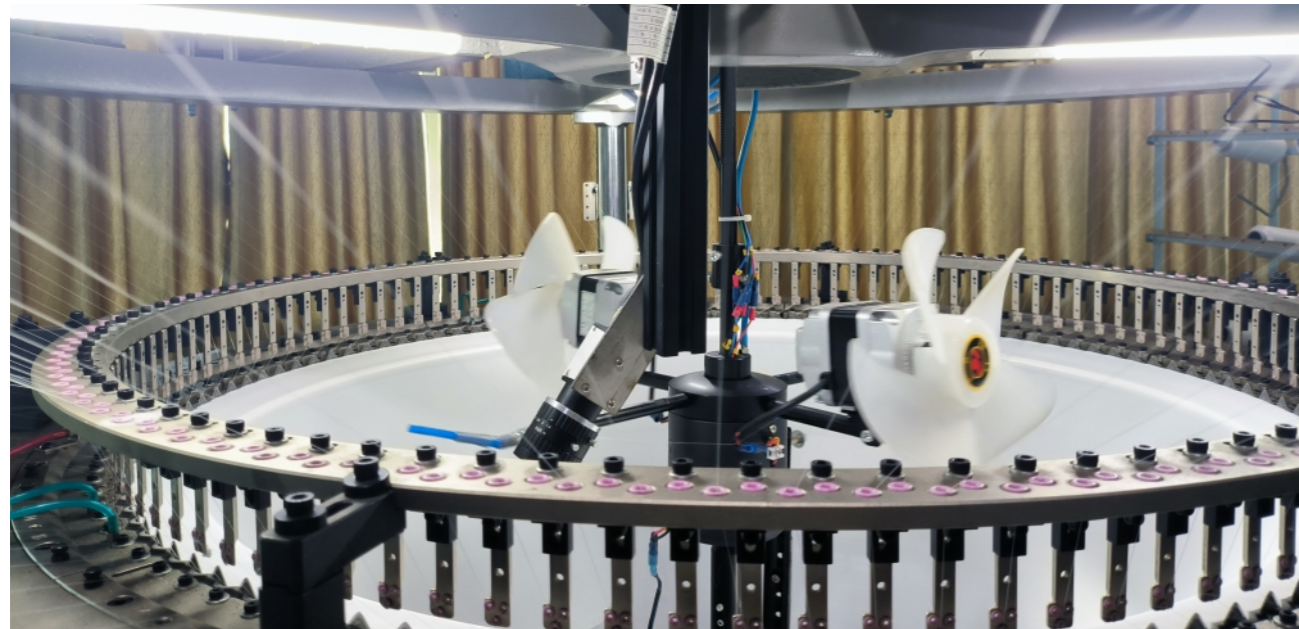
Solution

- Motion control is realized by XDH series bus controller and DS5C2 servo system, featuring high responsiveness and excellent sewing stitch quality.
- Electronic cam flying shear is adopted for thread trimming, which improves cutting accuracy and edge-sealing effect compared with the fixed cylinder trimming method used in previous generation products.

System Interface

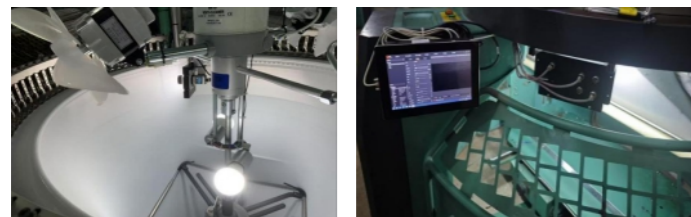


Single/Double Circular Knitting Machine / Solution



Detection Solution

Based on machine learning and AI algorithms, determining the presence and type of defects. Enables 24/7 real-time inspection. Through real-time monitoring and timely shutdown, the production of defective products is reduced.



Internal Full Inspection Solution

Side Mounting Solution

Single Jersey Machine with Single Industrial Camera

Applicable Models: Single Jersey Machines, Rib Machines
Advantages: Easy installation, unaffected by air blow pipes, fans, or needle cylinder replacement

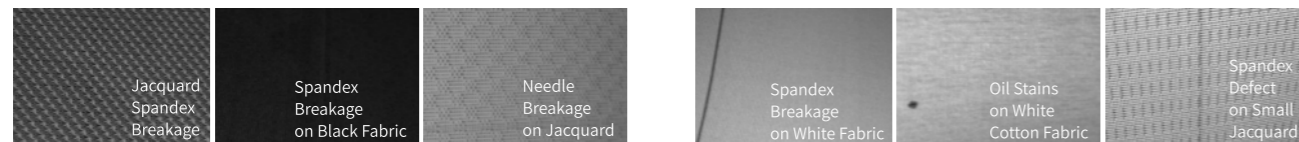
Single Jersey Machine with Single Industrial Camera

Applicable Models: Single Jersey Machines
Advantages: No blind spots, enabling full inspection

Double Jersey Machine with Single Industrial Camera

Applicable Models: Double Jersey Machines
Advantages: Easy installation, unaffected by air blow pipes, fans, or needle cylinder replacement

Detection Function



Detectable Fabric Types:

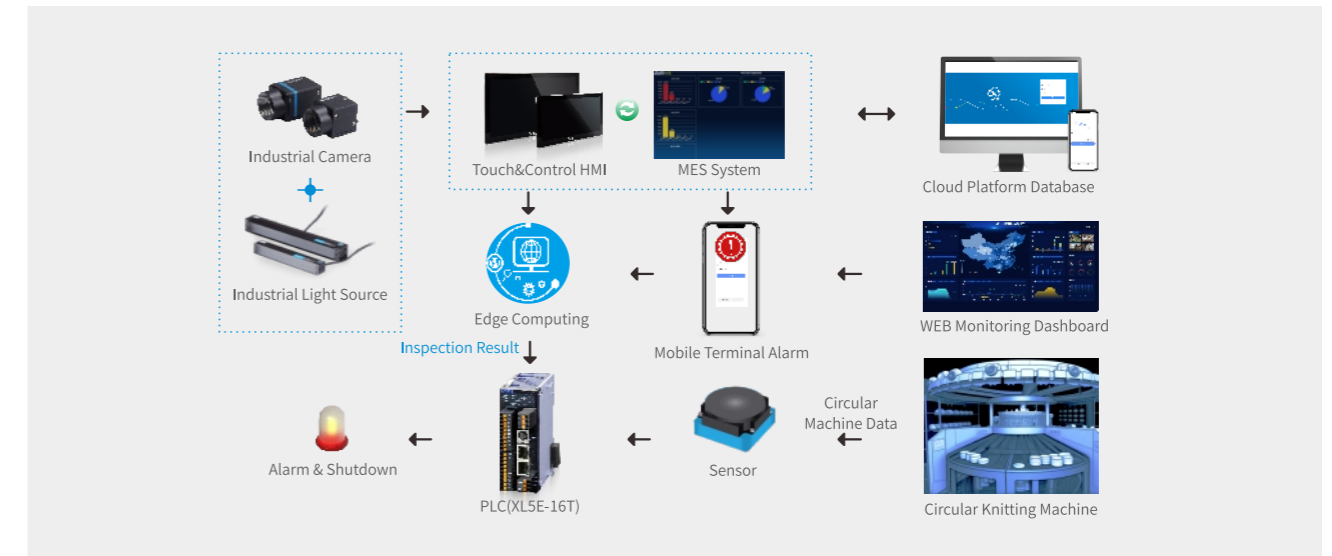
Plain fabric, fleece fabric, twill fabric, staircase knit fabric, striped fabric, small jacquard fabric

Detectable Fabric Colors:

White, black, regular gray, striped and colored fabrics, etc.

Defect Type	Broken Yarn	Broken Needle	Bar Defect	Yarn	Oil Needle	Vertical Streak	Faulty Needle	Spandex Breakage	Bottom Yarn Breakage	Oil Stain	Lint	Hole	Missed Stitch
Detection Rate	98%	98%	95%	95%	98%	95%	95%	98%	98%	93%	90%	98%	93%

System Topology



Solution Advantage

- 95% High Detection Rate**
10% above the industry standard, delivering superior quality control.
- 1mm Precision Inspection**
AI-enabled detection captures yarn-level defects, achieving millimeter-grade quality control.
- Modular Installation**
Plug-and-play design reduces installation costs by 90% with flexible, convenient deployment.
- Double Jersey Machines Solution**
First customized inspection system compatible with all types of double jersey circular knitting machines.
- Intelligent Stop Strategy**
Supports customizable defect stop rules and sensitivity adjustment.
- AI Intelligent Classification**
Deep learning accurately identifies the root cause of defects, enabling refined production management.
- Jacquard Inspection Breakthrough**
Pioneering defect inspection technology for small jacquard fabrics, filling the industry gap.

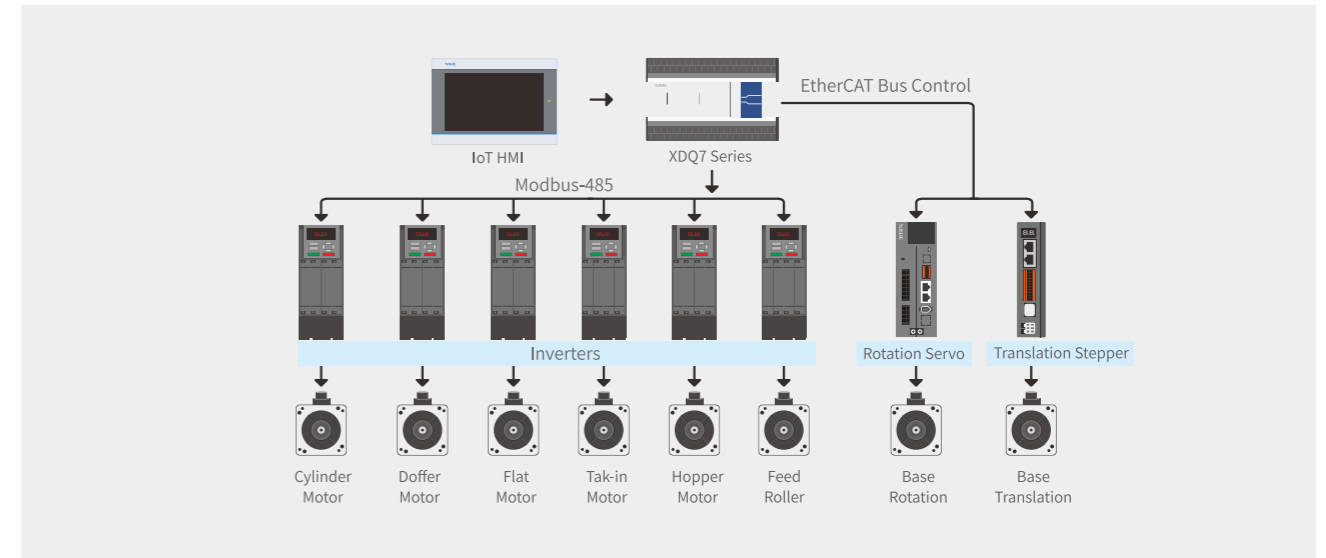
Field Application



Textile Carding Machine System / Solution



System Topology



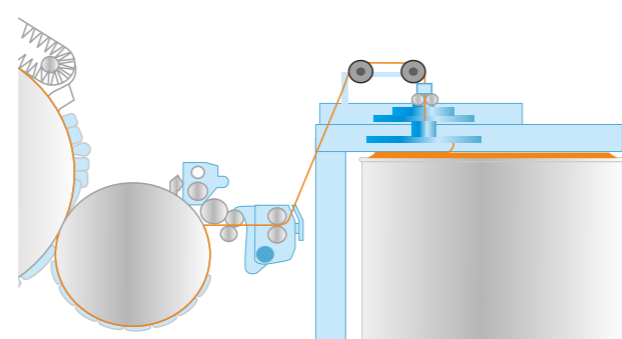
Industry Background

Carding machines are mainly used for carding cotton fibers while removing impurities such as cotton seeds and short lint. They improve the quality and production efficiency of textile products, making them indispensable equipment in textile manufacturing. At present, the carding machine industry is developing toward intelligence, green production and high-end performance to meet market demand for high-quality, high-efficiency products.



System Principle

Carding machines process laps from the previous process or fiber materials fed from the hopper into slivers of specified dimensions, which are then stored in cans for subsequent processes. During production, autolevelling ensures consistent sliver quality, while capacity-increasing devices raise the sliver capacity per can, reducing can changes and threading operations, lowering labor intensity, and improving sliver quality.



Control Scheme

The main production section of the carding machine system (carding, sliver forming) uses Modbus-485 to control the frequency converter, while the capacity expansion section adopts a bus solution. Based on data collected by sensors, the autolevelling system controls the cotton hopper and cotton feeding inverters via algorithms to ensure sliver quality. This reduces density at the center and edge of the sliver can, increases density in the central coiling area, and realizes sliver capacity expansion.

Solution Advantage

- Capacity expansion can be optionally added based on customer requirements, with convenient and flexible switching.
- Industry-exclusive capacity expansion control scheme with high expansion ratio: 1m sliver cans achieve over 100% maximum capacity increase, reducing can changes by 50%. Reduces labor for can handling and sliver splicing, minimizing quality defects caused by poor splicing.
- Fewer sliver cans required, cutting customer space occupation by 30% and reducing can & labor costs by 20%.
- Sliver features smooth surface, low lint, high uniformity, small weight variation, no sticking or flying during high-speed unwinding.
- Real-time sliver quality monitoring reduces manual inspection workload by 50%.
- The expert system uploads and analyzes operation data and quality information from blowing, carding, combing and drawing units via network, optimizing production configuration and improving production performance.

Field Application



Textile Spinning Frame Electronic Drafting / Solution



Industry Background

A spinning frame is a spinning machine that drafts, twists and winds semi-finished roving or sliver into spun yarn bobbins during spinning. It largely determines the output and quality of spun yarn.

Traditional spinning frames are controlled by one main motor, with other sections driven by gears and other transmission devices. XINJE's complete solution for spinning frames includes two versions: full-frequency control and full-servo control. By adopting multiple motors for independent control of each part, it effectively reduces energy consumption and machine wear, and facilitates equipment maintenance and process modification. With market development, a two-in-one all-electric solution has also been developed and widely used at many customer sites.

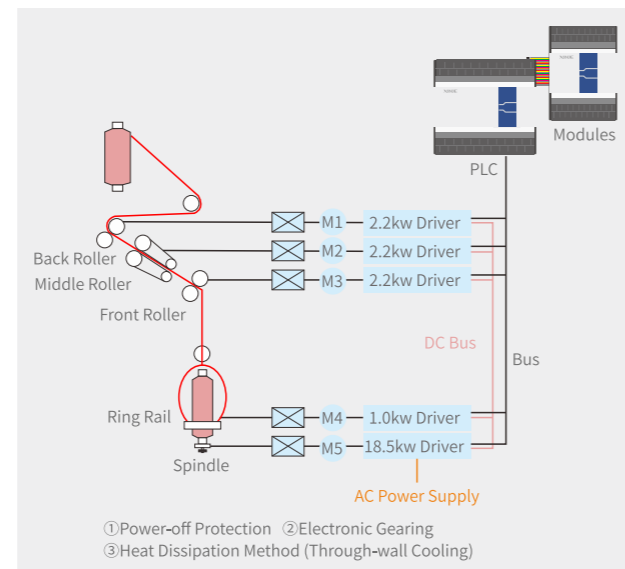
Control Scheme

The all-electric system for spinning frames includes two solutions: full-servo bus control and full-frequency conversion bus control. The bus control scheme features high precision, simple wiring and strong anti-interference capability. All rollers are independently controlled, enabling spinning of special yarns such as slub yarn and segment-colored yarn. The machine adopts common DC bus wiring for synchronous power-off. Equipped with the TS5 series IoT touch screen, it can connect to the cloud platform for real-time operation data monitoring, production output reporting and production status analysis.

The system records the status of each axis in real time and issues early warnings to avoid shutdowns due to alarms, making it easier for customers to troubleshoot causes. It can be optionally connected to a winding machine to reduce labor intensity.

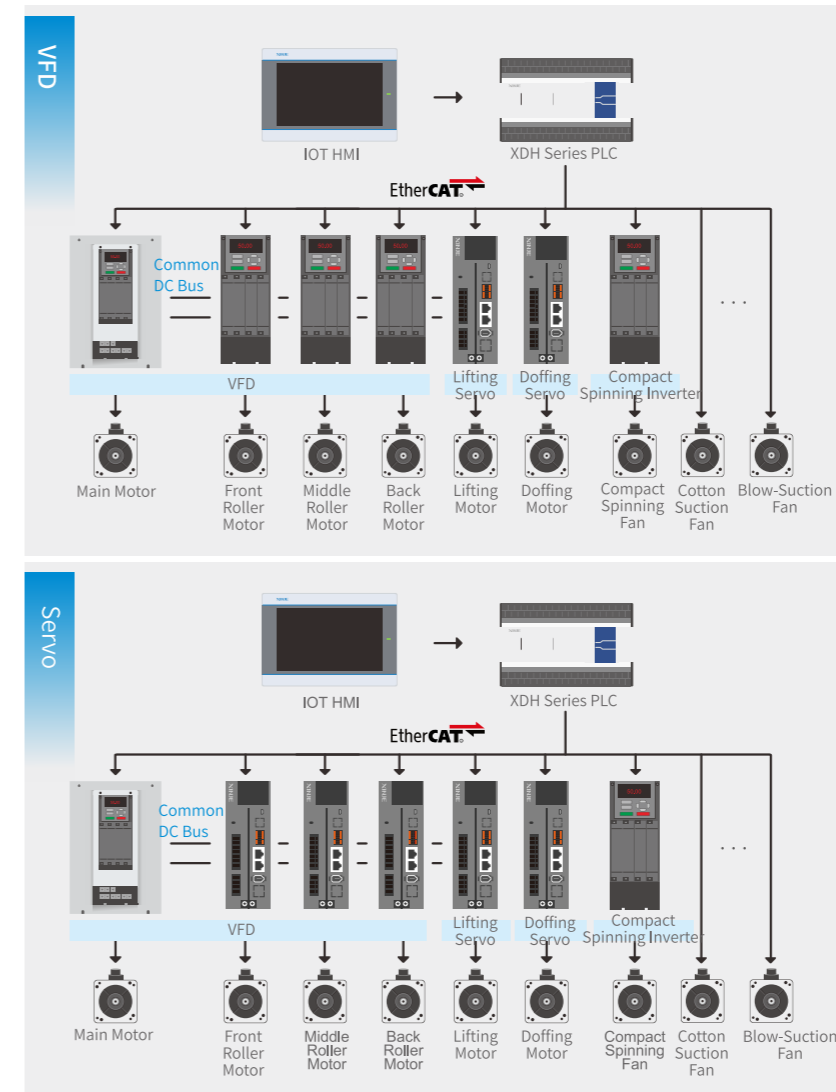
System Principle

Roving passes through the yarn guide horn and enters the drafting unit comprising back rollers, middle rollers and front rollers for drafting. The drafted strand is delivered from the front rollers and wound onto a high-speed rotating bobbin, and the ring plate forms the yarn into a cop of specified shape and strength. When the bobbin on the spinning frame is fully wound, the collective doffing device initiates the doffing process to remove the full bobbin and insert an empty one onto the spindle, allowing the spinning frame to restart production.



- ① Power-off Protection
- ② Electronic Gearing
- ③ Heat Dissipation Method (Through-wall Cooling)

System Topology



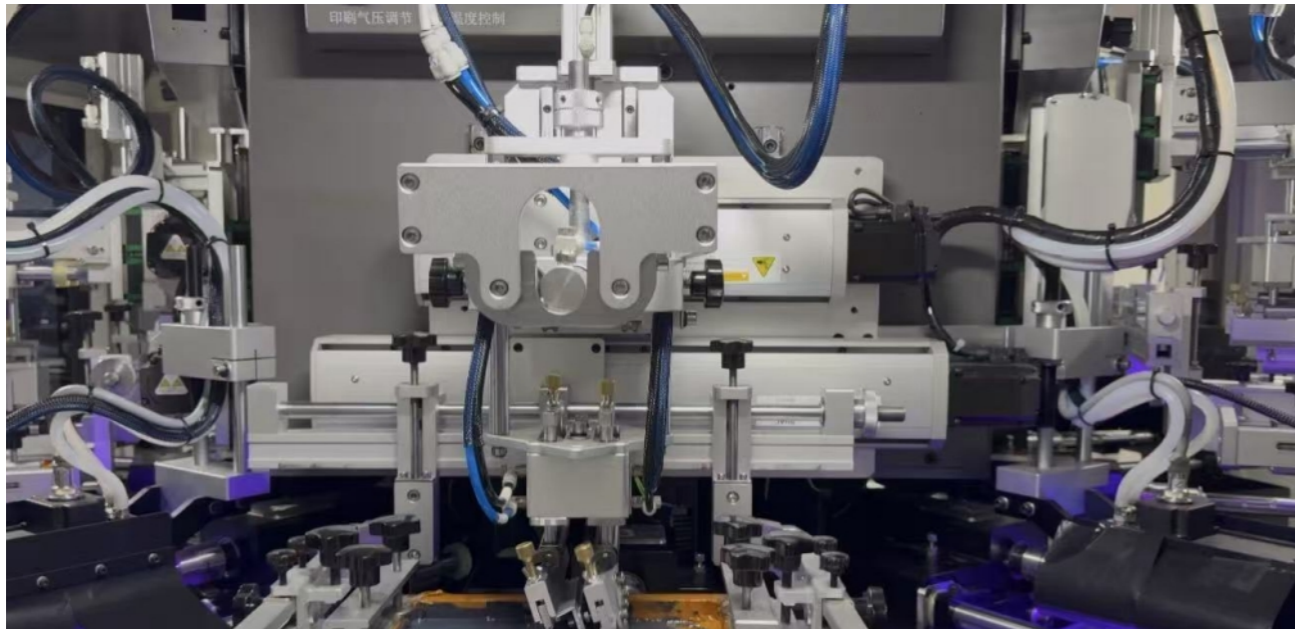
Field Application



Solution Advantage

- Multiple piecing actions result in fewer yarn breakages during start/stop; breakage rate per 1000 spindles is controlled at 0.5%.
- High synchronization with speed fluctuation within 1%; no uneven twist during start/stop. Whole-machine common DC bus control ensures no yarn breakage during power failure and stable operation under voltage fluctuations.
- New forming algorithm increases capacity by 5%~10% compared with traditional models and reduces yarn slippage in winding.
- One-click yarn count change cuts process replacement time by 50%, which can be completed by technicians alone.
- Online maintenance of product indicators, quality traceability, automatic production reporting, and 5% lower production management cost.
- Efficient and stable collective doffing system greatly improves overall spinning efficiency and reduces labor and maintenance costs.

Rotary Special-Shaped Screen Printing / Solution



Industry Background

Automatic screen printing machines, as crucial printing equipment, are widely used in textile, plastic, electronic and other industries.

Modern automatic screen printing machines integrate advanced control systems and precise positioning technology to achieve high-precision printing. Meanwhile, driven by digitalization and intellectualization, the equipment is developing towards integration. With advanced data processing and analysis software, production efficiency and operational flexibility are further improved.

In the future, the equipment will continuously optimize printing technologies and image processing algorithms, realize diversified functions, and meet customized requirements of various customers.

System Principle

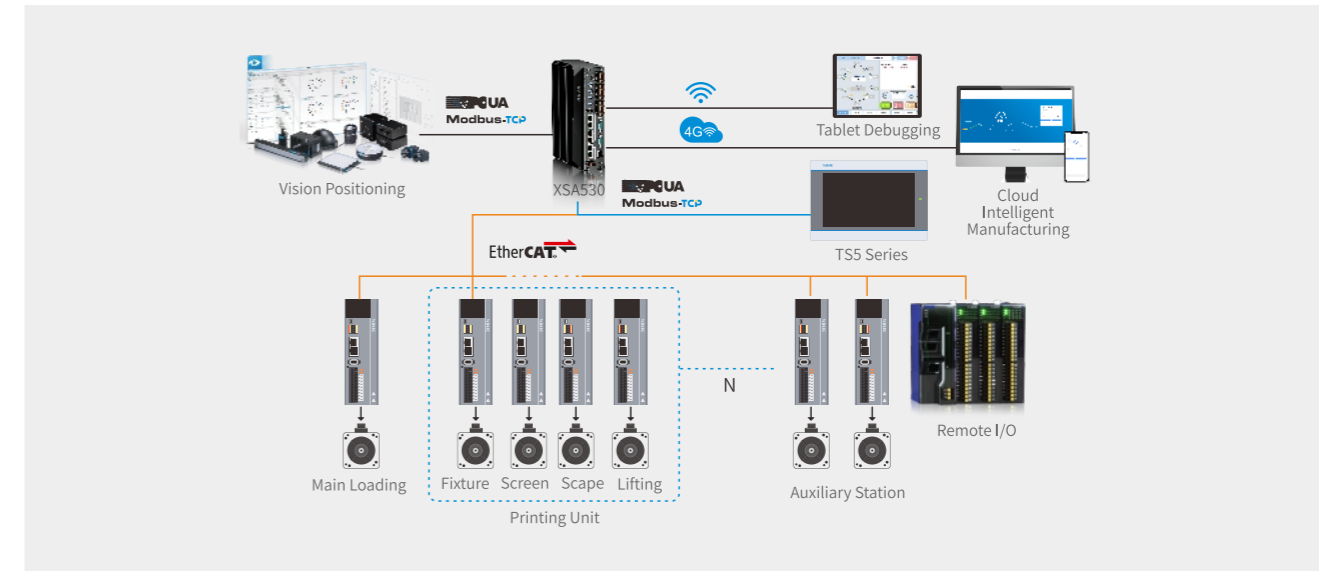
Products are placed on the feeding conveyor belt manually or mechanically and transported to the feeding station. The feeding mechanism realizes precise feeding and simultaneous flying-shot visual positioning. Afterwards, the products sequentially undergo dust removal and surface treatment such as flame treatment, before entering the high-precision line-scan vision station for final positioning.

Positioning data is synchronously transmitted to the printing unit in real time to ensure accurate multi-color overprinting. UV curing is performed immediately after each color printing to guarantee firm ink adhesion. After all-color printing is completed, finished products are automatically unloaded by the blanking mechanism and conveyed to the packaging process, realizing efficient and high-quality integrated production.

Control Scheme

This system adopts a **vision-motion integrated** control architecture. Centered on the high-performance XINJE XSA-530-W controller, it integrates multi-axis motion control and machine vision processing capabilities. Combined with DS5C2 series servo drives and high-precision optical encoder motors, a high-response, high-precision closed-loop control system is constructed. It achieves a color registration accuracy of **±0.1 mm** in multi-color overprinting processes and maintains stable long-term operation.

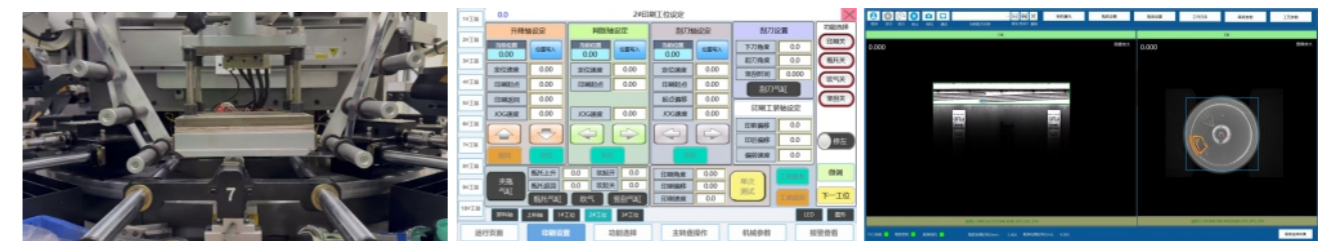
System Topology



Solution Advantage

- High-Precision with Stable & Reliable Performance**
 Adopting XSA series high-performance industrial controllers, it ensures **±0.1 mm** overprinting accuracy** and achieves more stable system operation.
- High-Efficiency Production with Automatic Cycle Matching**
 Paired with C2 series high-performance servo drives, it reaches a maximum printing speed of 3600 Pcs/h. With automatic printing cycle matching, operating smoothly with higher efficiency.
- Multi-Functional Integration & User-Friendly Operation**
 Integrated design of flying-shot imaging, line-scan vision and gold stamping functions, supporting one-click switching for special-shaped products.
- Open Interfaces for Easy System Integration**
 Supporting OPC UA and tag communication, it seamlessly connects with MES systems to support fully automatic upstream and downstream production lines.
- Standardized Development for Rapid Deployment**
 Program development complies with PLCopen specifications. Its built-in process library contains various curves for special-shaped products, shortening development cycles and accelerating system deployment.

Field Application



04

Home Building Materials

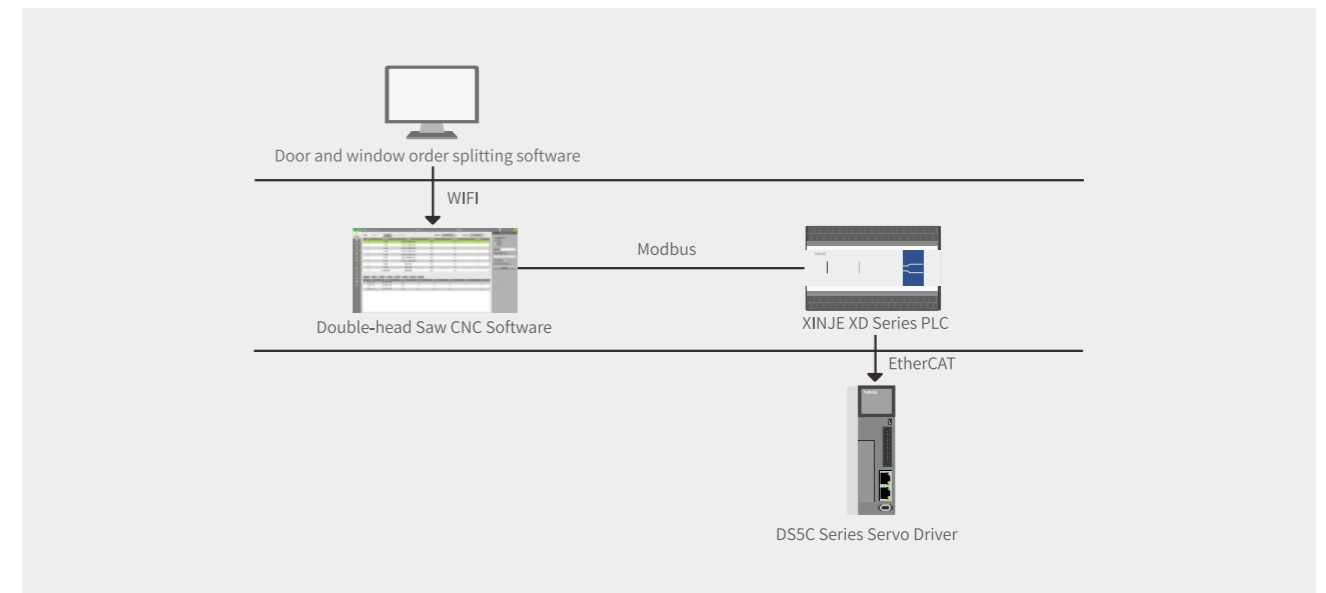
- Aluminum Profile Door and Window Processing System
- Aluminum Profile Double Traction Machine
- Automatic Frame Assembly Machine System



Aluminum Profile Door and Window Processing System / Solution



System Topology



Industry Background

Compared with plastic doors and windows and UPVC doors and windows, aluminum alloy doors and windows have great advantages. Their product categories and performance have been steadily improved, and the overall market size of aluminum alloy doors and windows has grown rapidly in recent years.

Nowadays, manufacturers of aluminum profile processing

equipment are pursuing lower cost, higher efficiency, diversified functions and higher precision. To adapt to the fierce market competition and meet the overall processing requirements of aluminum profile doors and windows, XINJE Engraving Industry Project Department has launched a variety of solutions, including sawing centers, saw-milling centers and end milling equipment.

01 / Aluminum Double-Head Saw

System Introduction

The aluminum profile double-head saw is a cutting equipment for aluminum profiles, serving as the first process in door and window processing. Featuring high cutting dimensional

accuracy, simple operation, reliable performance and advanced technology, it is ideal for mass production of aluminum and plastic doors and windows.

System Functions

The control system adopts pulse servo drive control, matched with an industrial computer equipped with upper computer software; the system supports flexible selection of multiple machine models including non-swing internal swing type, non-swing external swing type, swing internal swing type and swing external swing type, provides various processing modes such as short material cutting, standard material cutting, long

material cutting and nesting processing to adapt to cutting requirements of materials with different lengths, and is equipped with a printing function that automatically generates and prints QR codes to provide processing information for subsequent end milling machines and drilling-milling machining centers.

Solution Advantage

- Adopt upper computer CNC software, and can also call interface data by scanning codes to achieve code-scanning order placement.
- Adoption of servo pulse control solution ensures cutting accuracy while achieving higher cost performance.
- Support multiple cutting modes including short material, standard material, long material and nesting cutting to adapt to processing requirements of profiles with different lengths.
- Free switching among various machine models is available: non-swing internal swing, non-swing external swing, swing internal swing and swing external swing.
- Built-in printing function enables printing of QR codes, profile information and customer details.
- Automatic calculation of required length compensation for external swing angle is realized according to the selected swing angle and input or measured profile height.
- One-click measurement of profile height is supported to facilitate swing angle compensation calculation for external swing processing.
- Equipped with magnetic grid feedback function, real-time monitoring of processing platform moving position and dynamic compensation for platform movement errors are realized.

Field Application



Precision
 Intelligent
 Specialized
 Home building materials
 3C and Electronics
 and manufacturing
 Innovative equipment
 Energy
 Smart
 Logistics
 Information
 Other

Aluminum Profile Door and Window Processing System / Solution

02 / Aluminum Drilling and Milling Machine

System Introduction

For aluminum profile door and window processing, abundant basic graphic templates and various hinge patterns are integrated. Fast processing speed and high machining

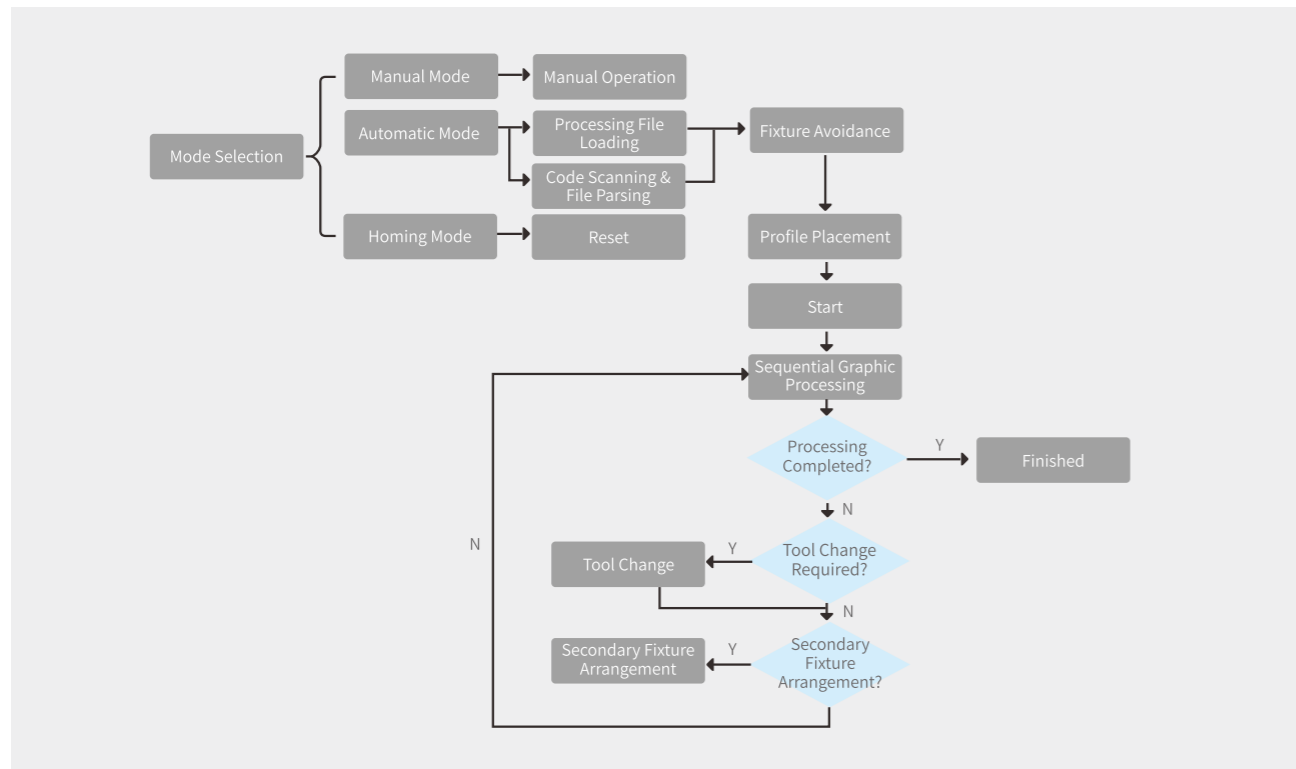
accuracy are achieved with graphic error within 0.05 mm. Diverse functions and powerful overall performance are realized.

System Functions

The aluminum profile drilling and milling machine mainly consists of five components: integrated touch industrial computer, XDH series motion control PLC, DS5C1 series servo drives, MS5 servo motors and VH6 series inverters. EtherCAT bus control is adopted for servo-driven processing. Integrated touch industrial computer: supports processing graphic editing, processing data calculation, running trajectory transmission to PLC, and features user-friendly interface. XDH series controller: executes PLC programs, processes IO signals and drives corresponding servo motion. Boasting powerful

functions, XDH series PLC adopts EtherCAT bus control, and intelligent network construction is easily realized based on Ethernet communication. DS5C1 series EtherCAT servo drives and MS5 servo motors: constitute the execution mechanism of the system. Featuring compact size, high-speed bus communication and convenient operation, corresponding actions are performed according to motion signals sent by the controller. VH6 series inverter: performs spindle start, stop and rotating speed regulation according to control signals from PLC.

Process Flow



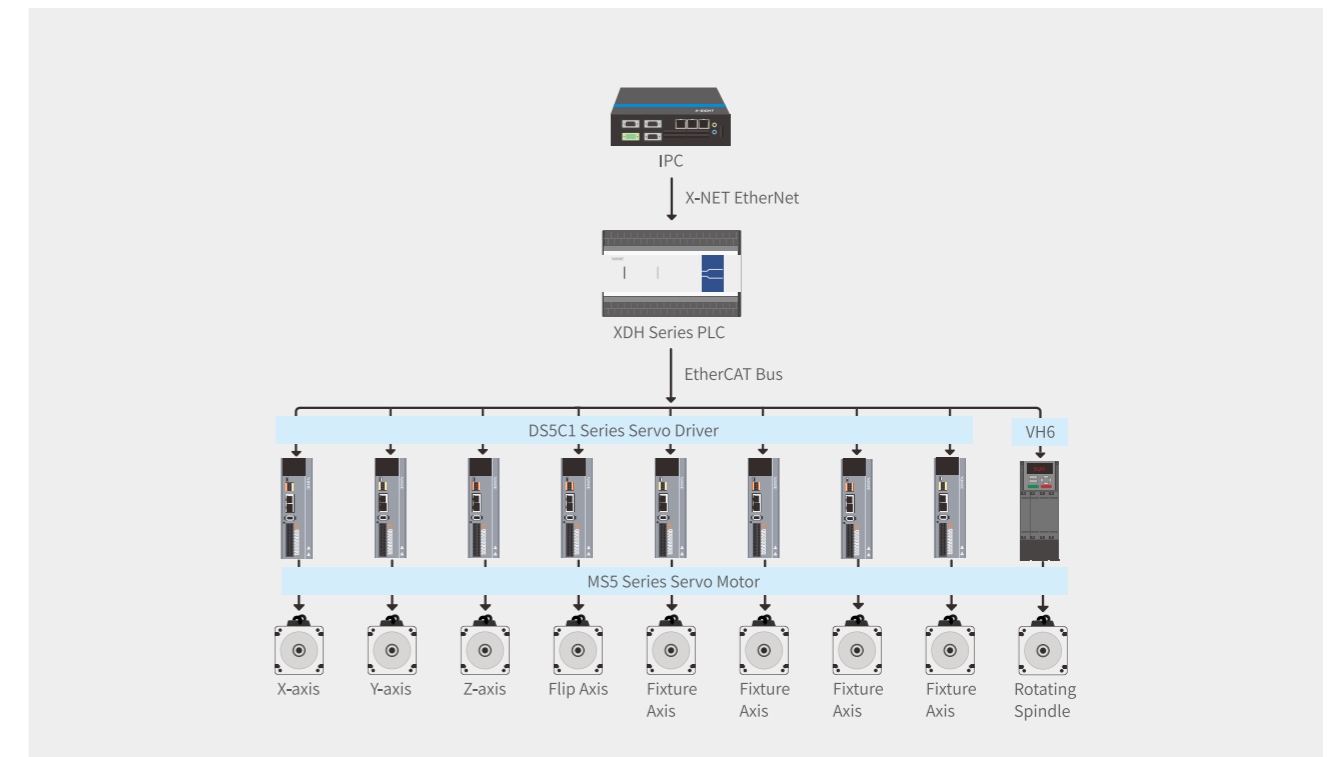
Solution Advantage

- Adoption of EtherCAT bus communication
- Strong scalability is achieved. Data interaction can be completed through interface docking with door and window design software via configured input address.
- High automation degree supports on-site graphic editing with user-friendly and easy-to-learn operation.
- Built-in automatic tool change function facilitates user operation.
- Machine fault diagnosis and system log recording functions are integrated.
- High processing efficiency is realized with fully automatic program operation without manual intervention.
- Adoption of XINJE DS5C servo drives equips with self-tuning function for automatic servo parameter adjustment
- Laser processing is available for higher processing frequency.

Field Application



System Topology



Aluminum Profile Door and Window Processing System / Solution

03 / Aluminum Sawing Center Solution

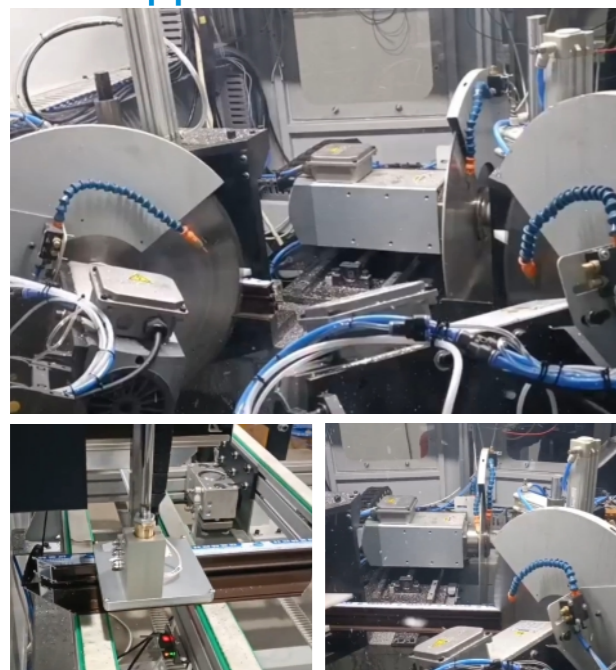
System Introduction

Aluminum Profile Sawing Center is a special cutting system for aluminum profiles. Equipped with three saw blades, it adopts servo feeding for 45° cutting with high efficiency. It supports long-time automatic high-speed processing of various materials with cutting precision within 0.2 mm. It is mainly applicable to aluminum alloy profiles, PVC profiles and thermal insulation aluminum profiles. Fully controlled by CNC system, it achieves automatic 45° and 90° cutting.

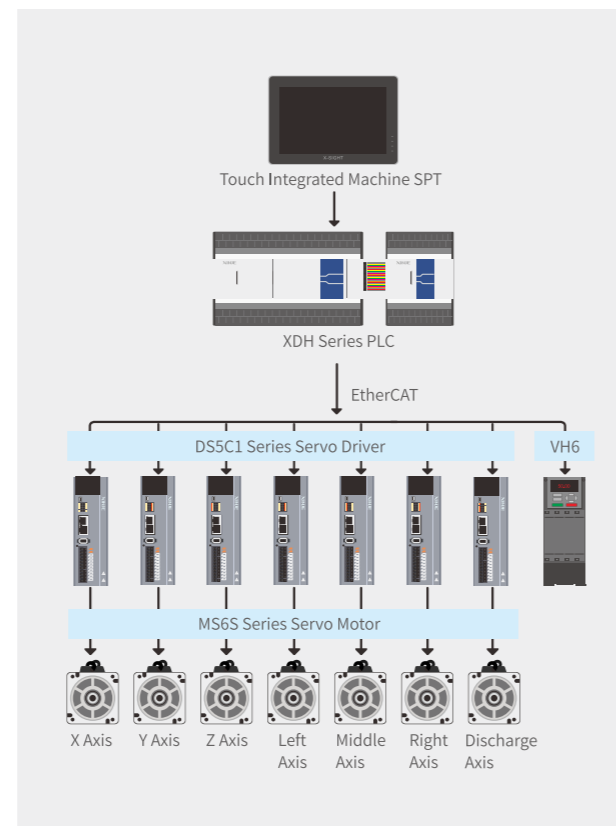
Control Solution

The industrial computer is equipped with upper computer software for the aluminum profile sawing center. The control system adopts XINJE XDH series PLC, and the drive system adopts XINJE absolute value servo. The software supports multiple order placement modes including online ordering and code scanning ordering. Servo control is adopted for 45° saw blades to improve processing efficiency. Both standalone and linked operation modes are available. With printing function, the system automatically generates and prints QR codes to provide processing information for subsequent end milling machines and drilling-milling machining centers.

Field Application



System Topology



Solution Advantage

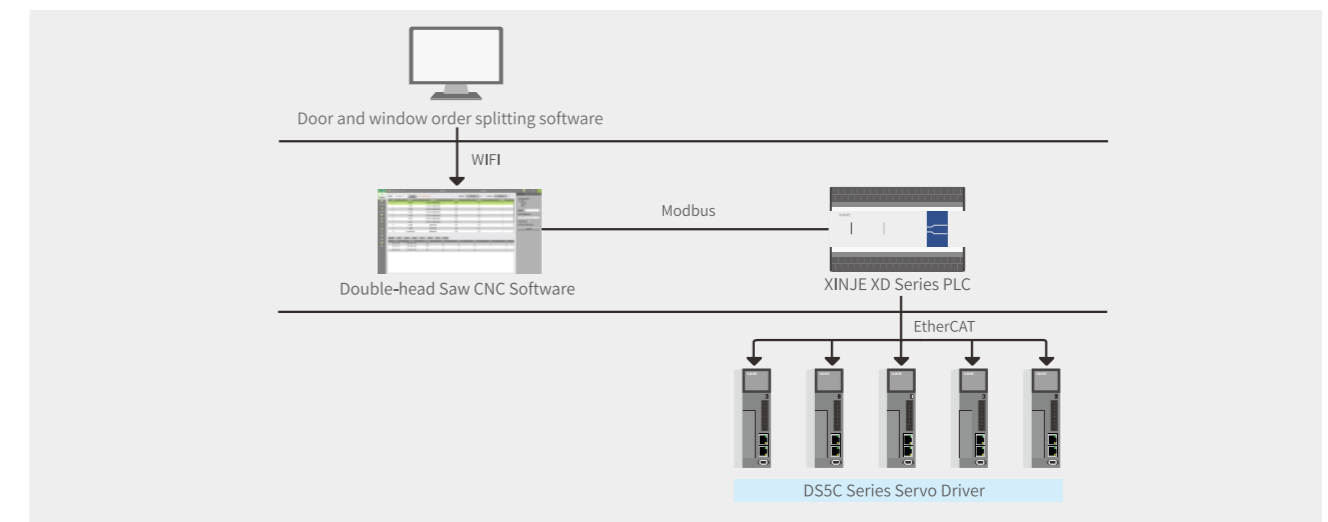
- Wide application range, including double-sided 45°, double-sided 90°, single-sided 45° and single-sided 90°.
- Adopting EtherCAT bus communication, supporting maximum 64-axis control.
- Equipped with XINJE DS5 series servos with auto-tuning function, which can automatically adjust servo parameters for higher precision.
- With machine fault diagnosis and system log functions.
- Built-in processing file editing manager: users can manage, edit and modify files at any time without affecting ongoing processing.
- With automatic homing function.

04 / Aluminum End Milling Machine Solution

System Introduction

The aluminum profile end milling machine is a tool for cutting the end face of aluminum profiles. XINJE has various end milling machine equipment such as 3-axis, 5-axis, 7-axis and 15-axis, providing overall solutions. It can also be distinguished according to the number of processing blades, including double-blade processing, triple-blade processing, four-blade processing and other end solutions.

System Topology



Solution Advantage

- Adopt upper computer CNC software. Call pre-saved corresponding-name files via code scanning to realize code-scanning order placement.
- Adopt EtherCAT servo control solution with 1ms bus control synchronization cycle.
- Equip automatic tool allocation function to greatly reduce user workload, realize higher system intelligence and simpler operation.
- Equip manual tool allocation function to enable independent configuration of processing tools and processing sequences per user demands.
- Match dual-spindle system to realize horizontal/vertical tool switching on Spindle 1 and combined tool installation on Spindle 2.

Control Solution

The control system adopts the EtherCAT bus control solution. It realizes motion control by matching the upper computer CNC software and XDH series PLC. The software is equipped with dual systems: automatic tool splitting and manual tool splitting. Combined with the dual-spindle system, Spindle 1 can rotate to switch between horizontal and vertical tools. Equipped with a free tool combination system, it can install combined tools to complete multiple milling grooves in one milling operation.

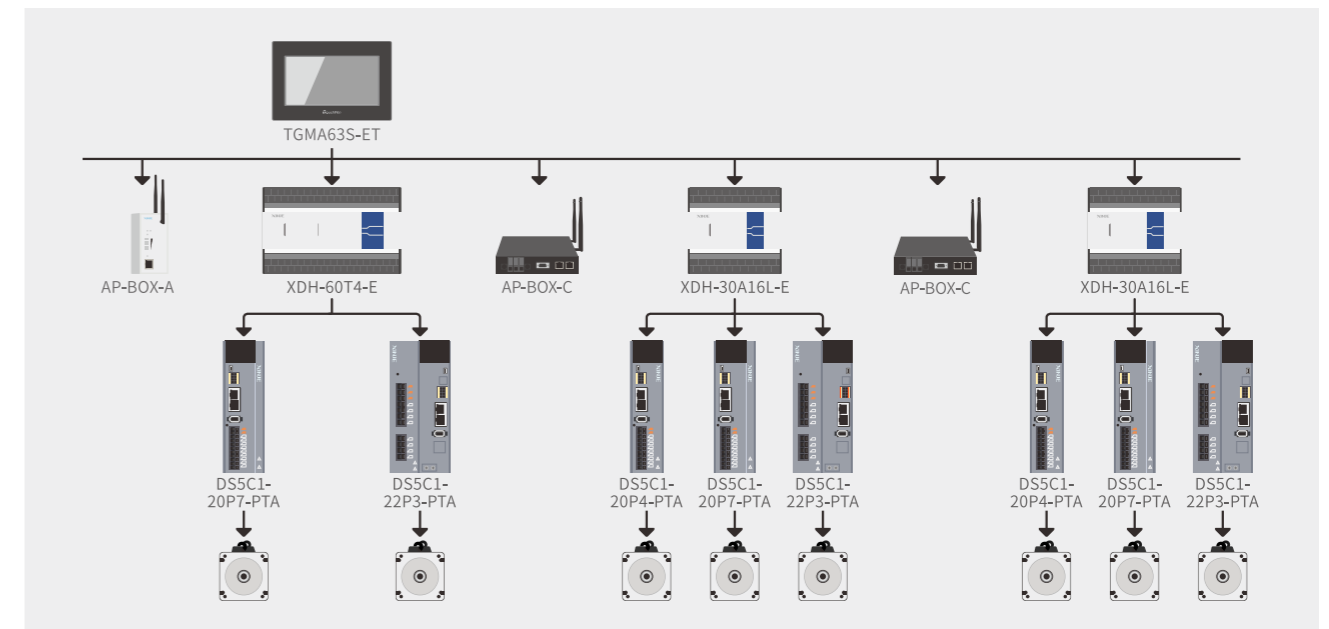
Field Application



Aluminum Double Traction Machine / Solution



System Topology



Industry Background

Aluminum profile tractor is key auxiliary equipment for extruders to produce aluminum and aluminum alloy profiles. Realize automatic traction and automatic cutting of aluminum materials. Fixed aluminum bars are extruded from front-end equipment. Traction operation prevents deformation of extruded aluminum bars, and effectively eliminates torsion, bending and waviness of profiles after die exiting. With

growing demand for aluminum profiles across industries, market demand for aluminum profile tractors keeps rising. Develop an integrated control system with wireless intercommunication among three PLCs and EtherCAT bus control for the profile tractor market. The system supports diversified operation modes, featuring high production efficiency and excellent stability.

Equipment Introduction

Adopt speed and torque limited operation mode for the whole aluminum profile double tractor system, with speed and friction force function set by interval distance. Judge and call corresponding speed and friction force data according to the distance moved by traction trolleys to ensure more stable extruded profile effect. Realize alternate work between two traction trolleys during automatic operation to effectively improve production efficiency. Set multiple limiting conditions such as automatic judgment on the rationality of various data, actions and positions to reduce manual misoperation and enhance the safety of equipment system use. Add processing prompts for various system faults or servo alarm information, and equip with the function of optional forced system operation in emergency stop state to help users quickly troubleshoot and restore normal equipment production.

Control Solution

Adopt high-performance network module for wireless communication, with excellent anti-interference performance and fast roaming technology at typical 50ms response. The bus control solution features high precision, power-off position data retention and strong anti-interference capability. Design semi-automatic traction function. Split all actions in automatic operation to realize single-step inching operation under semi-automatic traction mode, facilitating various operations during equipment debugging.

Solution Advantage

- Adopt XDH series PLC with EtherCAT control cycle of 1ms
- Use DS5C1 series multi-turn absolute value servo drive for fast and accurate positioning.
- Alternate operation of dual traction trolleys effectively improves production efficiency.
- The system adopts real-time switching between torque control.
- Adopt humanized design concept, with semi-automatic traction and forced control functions.



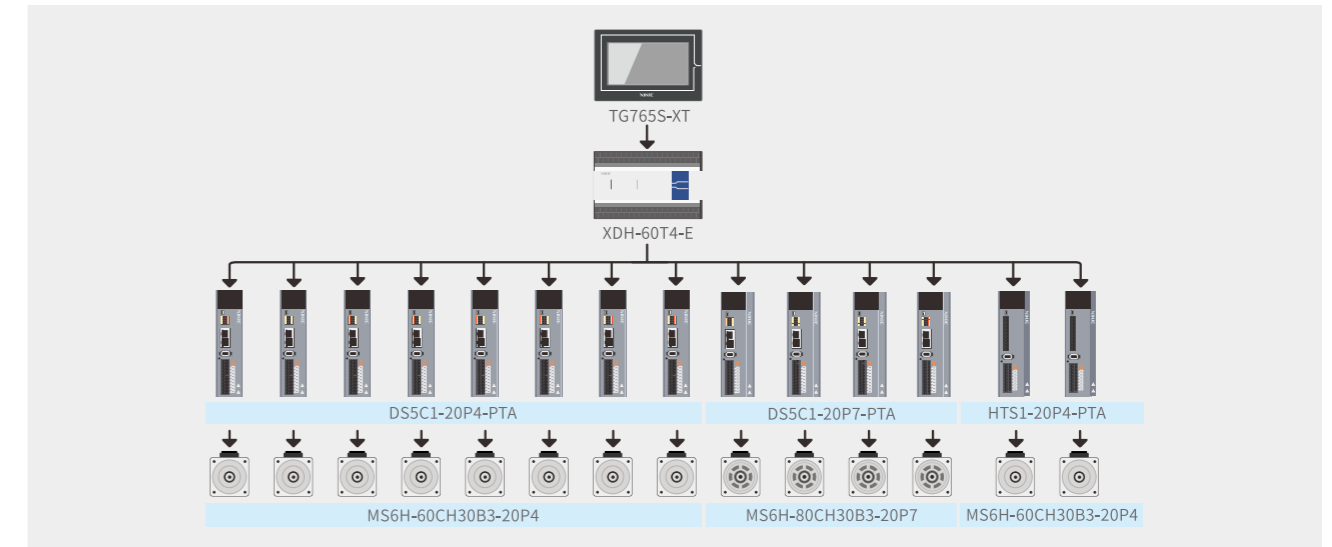
System Interface



Automatic Frame Assembly Machine System / Solution



System Topology

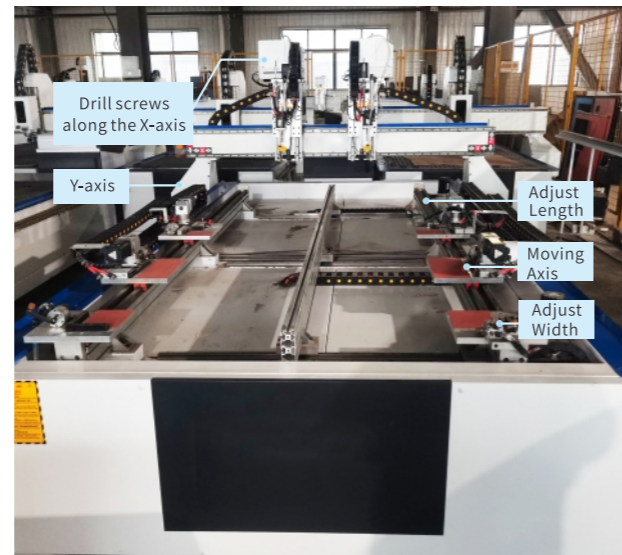


Industry Background

Automatic frame assembly presents remarkable advantages over manual frame assembly. Firstly, greatly improve production efficiency. Secondly, achieve higher machining precision and eliminate errors caused by manual operation. Finally, feature simple operation and accessible alarm record query. The equipment is mainly applied in frame assembly of honeycomb panels. With wide application and huge market demand of honeycomb panels, the company's servo drivers fully meet processing technology and precision requirements for popularization and application.

Process Principle

Input relevant parameters such as plate length and plate width in recipe interface. Adjust length and width dimensions according to recipe data on automatic interface. Automatically calculate moving positions based on set quantity of processing screws. Set reasonable torque and rotation parameters for electric screwdriver mechanism. After placing plates and edge wrapping strips, perform automatic screw driving according to set parameters including dimension, position and speed.



Control Solution

XINJE automatic frame assembly machine system solution adopts XDH series PLC with EtherCAT configuration information window to simplify programming. EtherCAT control system requires no hubs or switches, featuring high efficiency, easy debugging and stronger system stability. The solution adopts DS5C1 series servo drivers, supporting standard EtherCAT protocol master station, complying with CIA402 standard, supporting two-channel high-speed probe function, with communication cycle $\leq 1\text{ms}$ (32 axes) in all modes. Equip standard RJ45 industrial Ethernet fast interface. Both power terminals and input/output terminals of the driver are pluggable terminals for more convenient and quick wiring.

Solution Advantage

- Equipped with servo special machine with more functions. Dedicated servo machine is user-friendly. Realize quick coordination with PLC and low programming workload.
- Support default two-stage speed and torque limitation with high torque precision.
- Equip two thread-seeking functions. Adopt position and torque thread-seeking modes to improve thread-seeking accuracy.
- Support torque compensation function. Calibrate over-torque and under-torque conditions by adjusting torque compensation coefficient parameters.
- Equip post-fastening loosening function. Keep motor shaft in free state for quick screwdriver bit slot separation.

System Interface



Field Application

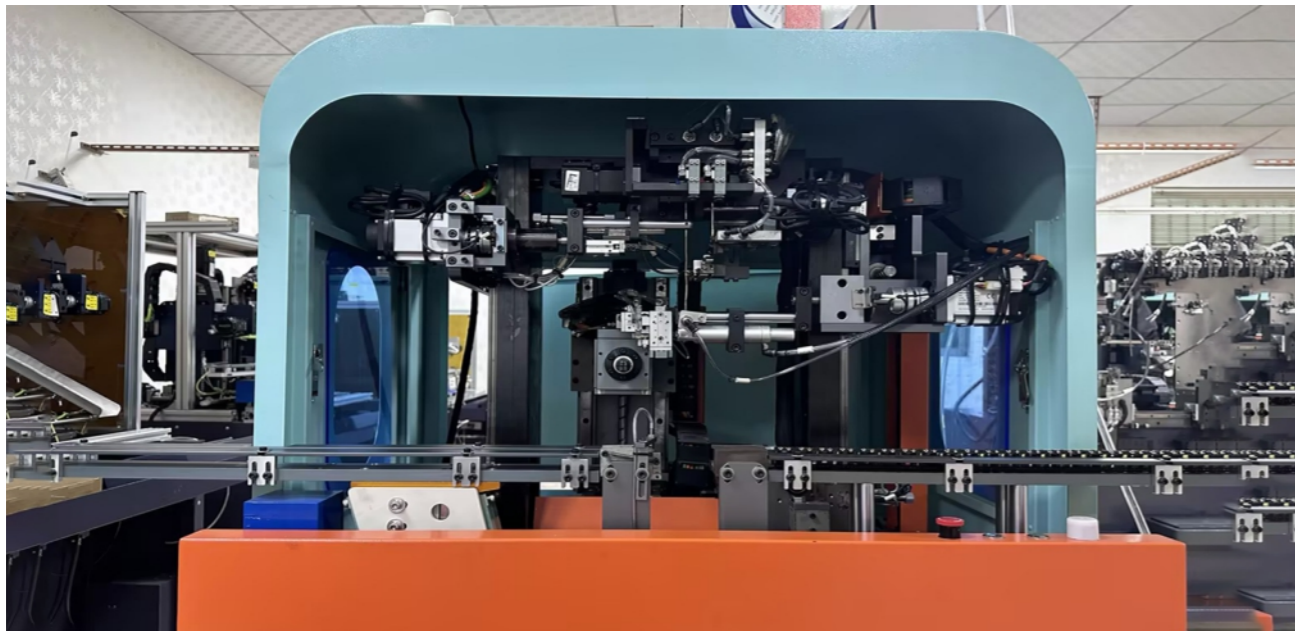


05

3C and Electronics Manufacturing

- Single-axis Dual-arm Winding Machine System Solution
- Needle Internal Winding Machine System Solution
- Block Winding Solution
- Vertical Winding Solution
- Screw Fastening System Solution
- Servo Press Assembly System Solution
- Integrated Shell-Insertion and Welding Machine Solution
- Vision-assisted Material Pasting Solution

Single-axis Dual-arm Winding Machine System / Solution



Industry Background

To meet requirements of high efficiency and high output, the single-axis dual-arm winding machine adopts programmable controller as control core. Cooperate with servo motors, pneumatic control components and execution accessories to realize functions including automatic bushing, automatic pin winding, automatic wire arranging, automatic wire cutting,

automatic tape wrapping and automatic bobbin loading & unloading. This machine features extremely high production efficiency and greatly reduces manual dependence. It is widely applied in multiple fields including tool industry, household appliance industry, electronics industry and automobile industry.

Control Solution

The single-axis dual-arm winding machine system adopts XDH series controller and DS5C series servo. Relying on tertiary platform and free editing function, the system realizes precise positioning, spiral interpolation, arc interpolation,

conventional winding, fine winding, automatic bushing, automatic wire cutting, automatic tape wrapping and automatic bobbin loading & unloading, achieving full automation and higher added value of equipment.

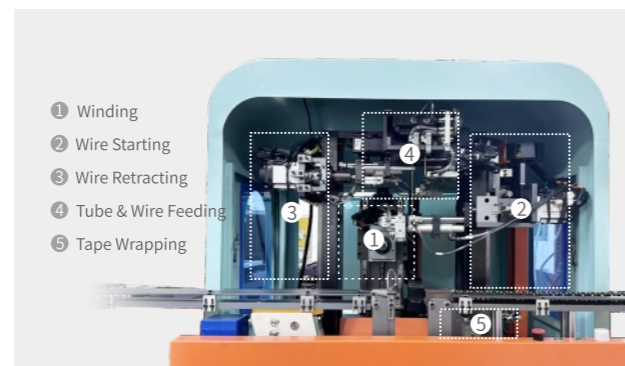
Process Principle

The single-axis dual-arm winding machine consists of 11 servo axes and 2 stepping axes. Structurally, it is divided into winding mechanism, wire starting mechanism, wire retracting mechanism, tube feeding mechanism and tape wrapping mechanism.

Winding mechanism (X, Y, Z, U axes): Performs arrangement control and processing on coils during winding to make windings compact and integrated.

Wire starting mechanism (Y, Z, wire starting rotation axis): Realizes wire pin winding of tail wire and fixes enameled wire during wire arrangement to make windings compact and integrated.

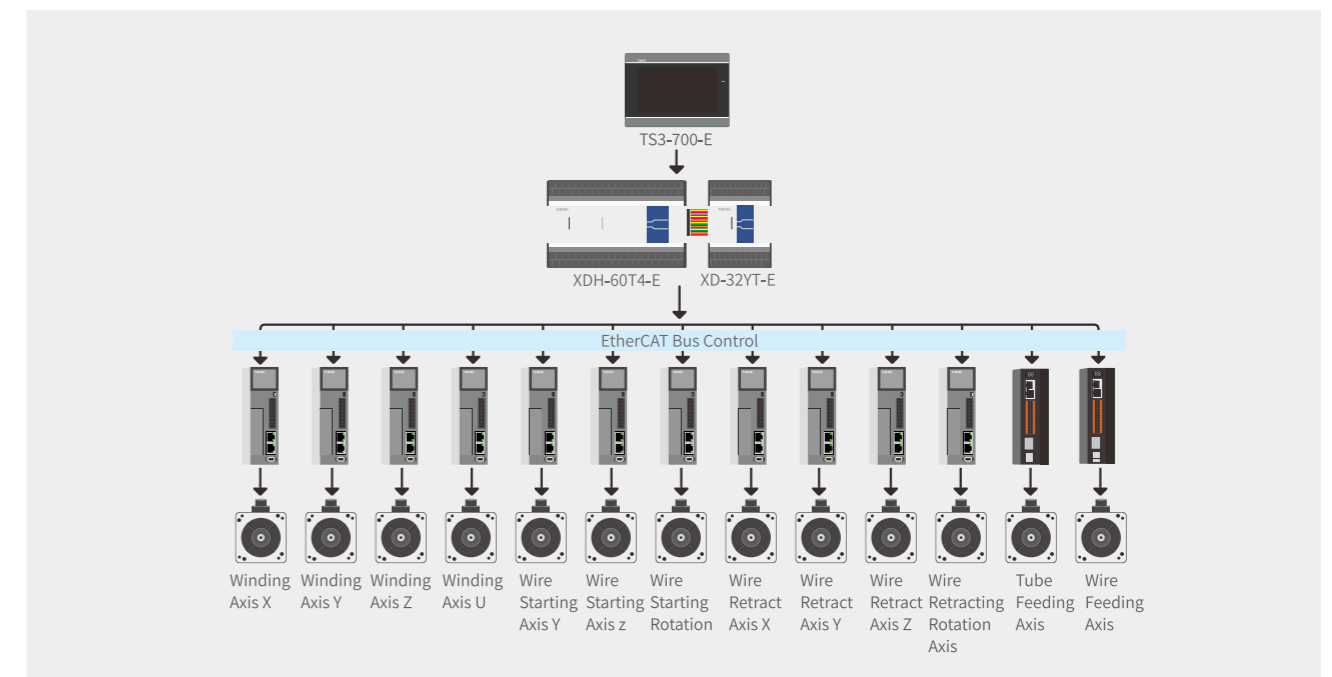
Wire retracting mechanism (X, Y, Z, wire retracting rotation axis): Processes head wire pin winding and tail wire during winding to make wire at pin winding position neat.



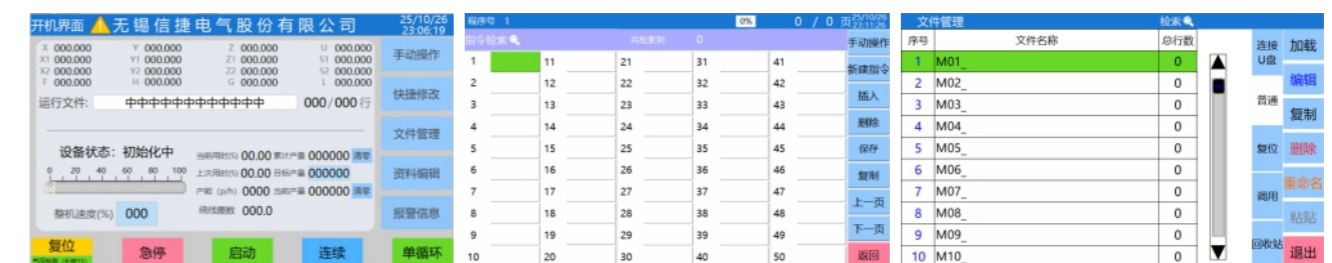
Solution Advantage

- Complete functions with flexible invocation**
 Call subroutines and wait for tasks;
 Customize and edit homing action sequence;
 Realize single-axis positioning, multi-axis positioning, linear interpolation and spiral interpolation.
- Flexible winding modes**
 The system meets three winding process requirements: conventional winding, head wire stacking and tail wire stacking, and satisfies fine winding requirements of various product models.
- Tertiary platform with free editing**
 The winding solution adopts the tertiary platform to achieve a CNC-like operating system. It provides 500 steps of sequence editing space, supports maximum 8 concurrent tasks to realize more complex functions, and reserves 30 program spaces to meet customized winding requirements.

System Topology



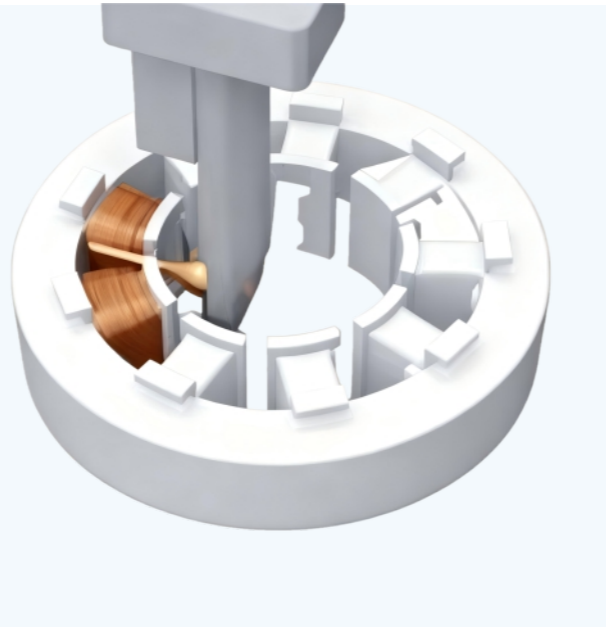
System Interface



Needle Internal Winding Machine System / Solution

Industry Background

Winding of brushless motor stator is a complicated process in motor production. To meet requirements of high efficiency and high output, electronic cam is adopted for motor stator winding. Free programming is available for winding of various products. This machine features extremely high production efficiency and greatly reduces manual reliance. One operator can supervise multiple devices simultaneously. Combined with automatic loading and unloading devices, 24-hour continuous processing is realized with stable product quality, which is highly suitable for high-volume production scenarios.



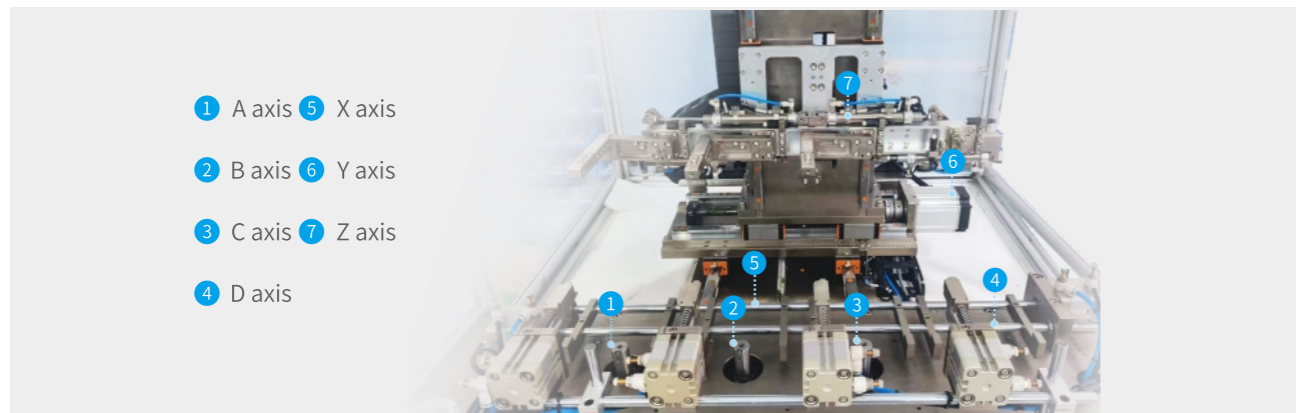
Widely applied in various fields such as power tool industry and small household appliance industry.

Control Solution

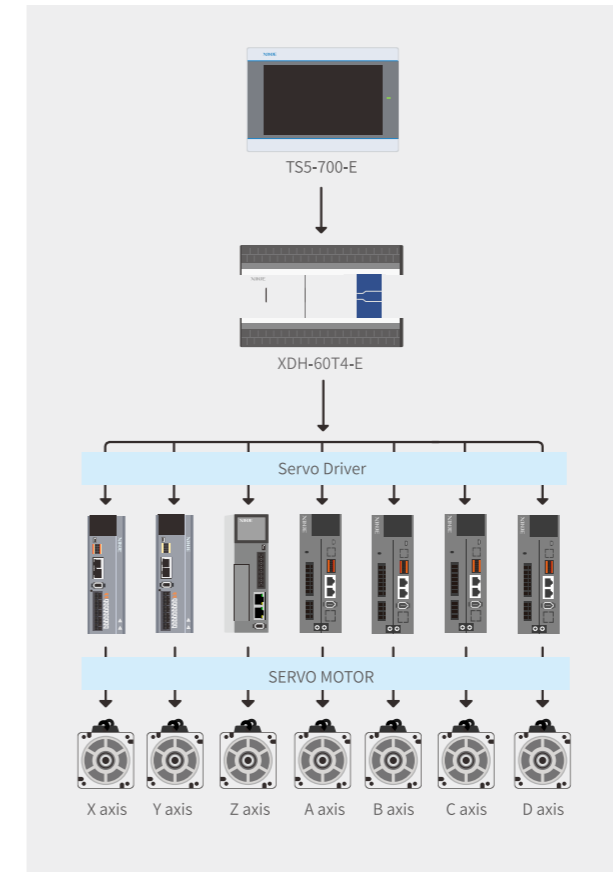
The needle-type inner winding machine adopts a bus control solution, which features high precision, simple wiring and strong anti-interference performance. The system applies graphical block programming, where instructions can be directly inserted in the programming window and displayed in block form to make the program process clear at a glance for convenient troubleshooting and modification. Optimized internal task instructions are adopted with open parallel executable instructions, supporting up to 4 parallel tasks for simultaneous execution.

Technological Process

First, place the stator into the stator slot, which is then fixed by the air cylinder. The X, Y and Z axis motors move to proper positions for corner winding. After corner winding is finished, the X, Y and Z axis motors move to the initial winding position to start winding. The A axis (rotation axis) is prohibited from rotating while the needle nozzle is inside the stator slot, and the A axis operates only after the needle nozzle moves out of the stator slot. The Z and A axes cooperate with each other to complete winding. Upon completion of winding, the X, Y and Z axes move for slot-changing winding. After winding of all slots is finished, all axes return to the safe position, and the stator slot cylinder is released to complete the entire winding process.



System Topology



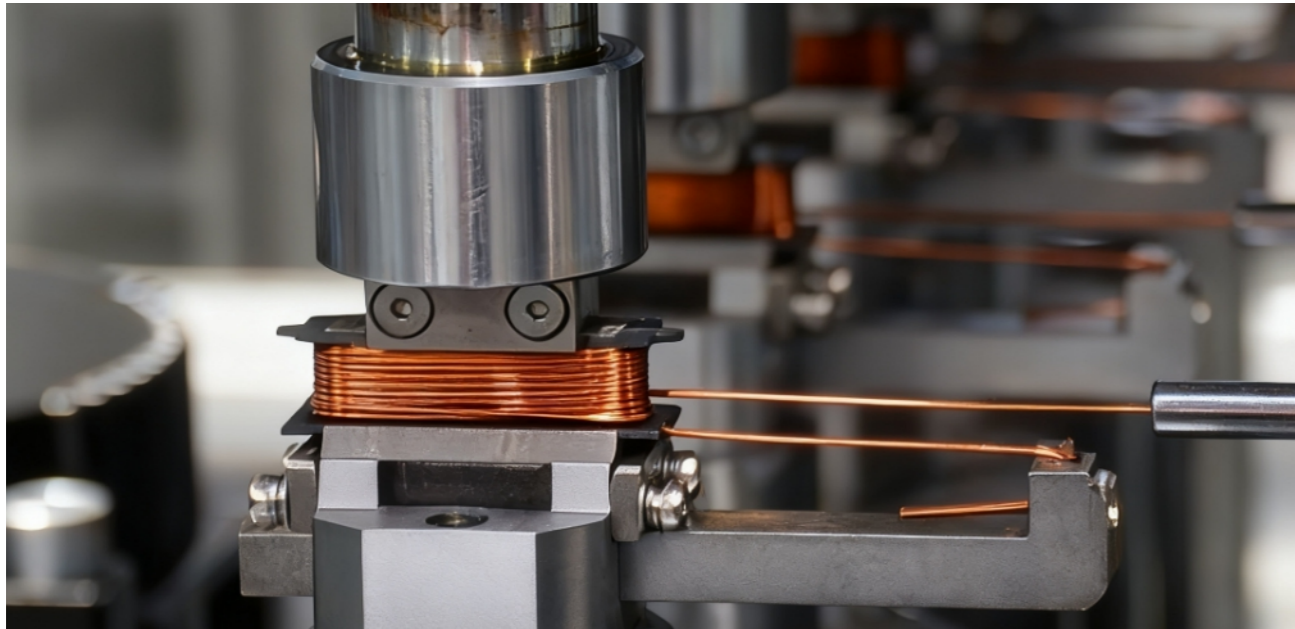
Solution Advantage

- Higher openness
 1. Open programming: Winding instructions on the touch screen can be modified individually or globally, greatly reducing programming time.
 2. IO definition: Users can configure the relationship between input points and output points according to actual requirements.
- Better convenience
 1. Program debugging: Abundant prefabricated functions and instructions for direct programming and invocation.
 2. After-sales learning: Simple operation facilitates end-user understanding and saves training time.
- Humanized design
 1. Safety performance: Developed safe area protection, hard limit protection and soft limit protection to prevent equipment damage and unnecessary losses caused by manual operation errors.
 2. Special technology: The Z-axis stroke is adjustable during winding, meeting the requirement that the stroke increases along with the rise of winding layers.
 3. Logic execution mode: Supports subroutine and task editing to achieve more concise and diversified programming.

System Interface



Block Winding / Solution



Industry Background

Block stator winding machine is an automatic device specially designed for winding motor stators with high slot filling rate. Traditional integrated stator winding features complex operation, and is prone to problems such as uneven winding and insulation layer damage. In addition, errors occurring during integrated stator winding are extremely difficult to repair, which may result in complete stator scrappage and increased production costs. In contrast, block stator winding divides the stator into multiple independent modules. This divide-and-conquer method not only simplifies the winding process, but also improves winding precision, production efficiency and product consistency, as well as remarkably reduces production costs, perfectly adapting to the diversified and variable demands of modern industrial production.

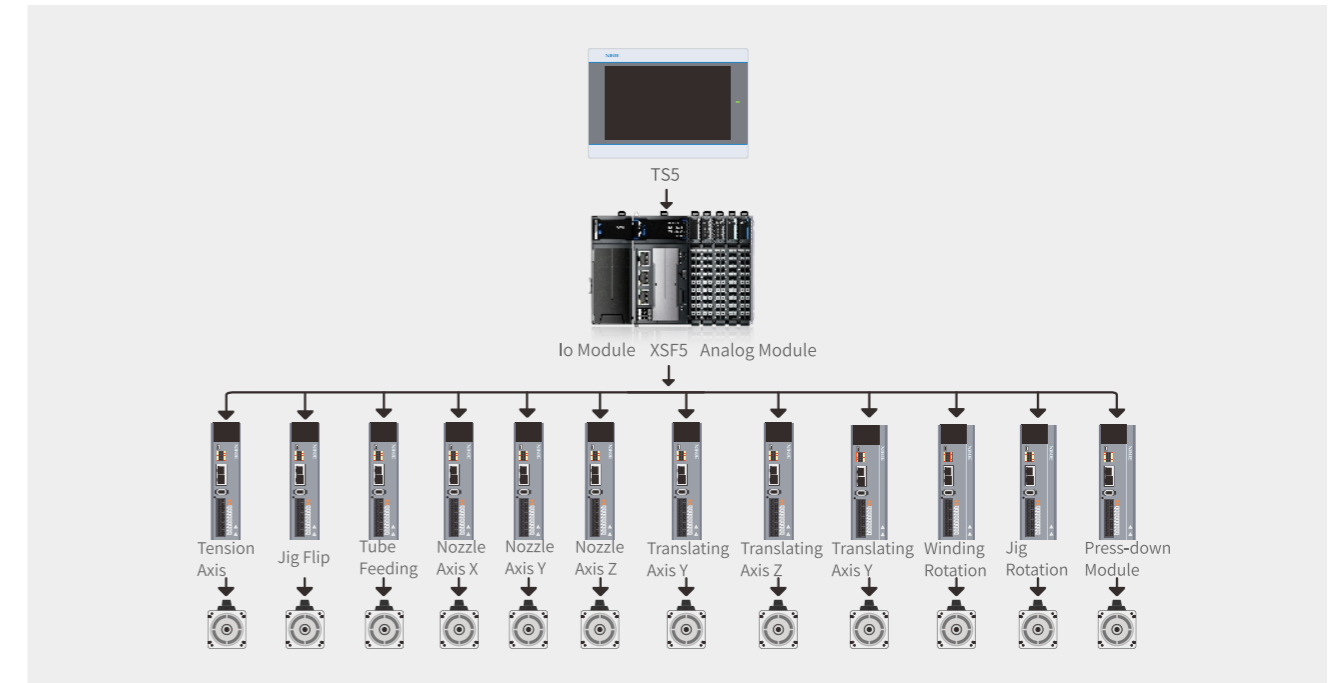
Control Solution

The flying fork external winding machine adopts a bus control solution, which boasts advantages including high precision, simple wiring and strong anti-interference capability. The system applies graphical block programming, allowing direct instruction insertion in the programming window with block display, making the entire program process clear at a glance and facilitating troubleshooting and modification for users.

Technological Process

It fixes the segmented iron cores on the winding fixture, and the winding needle winds coils on each segmented core separately. Afterwards, these segmented cores are assembled into a complete round stator, achieving efficient and precise winding throughout the production process. Compared with traditional integrated stator winding, the modular design of the segmented stator winding machine enables more flexible winding, and can easily adapt to stators of various shapes and sizes.

System Topology



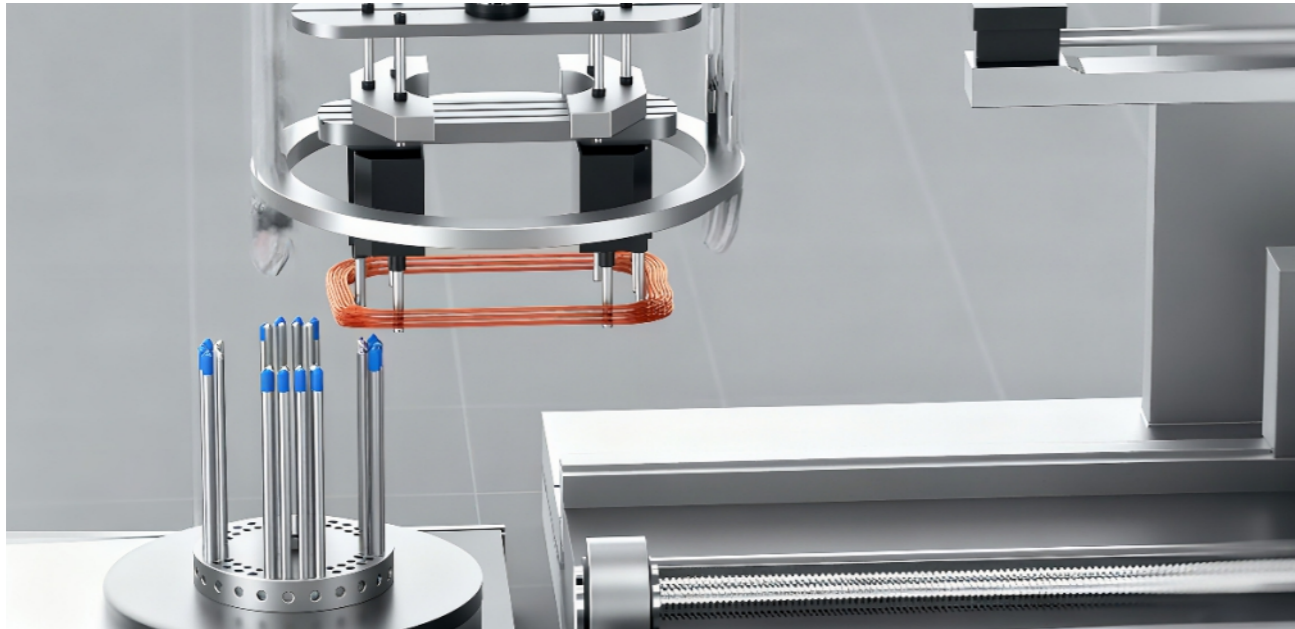
Solution Advantage

- Active wire releasing can be adopted to control wire tension, with wire tension amplitude and fluctuation reduced by over 50%.
- Winding speed is doubled, wire elongation rate is reduced by 50%, and product qualification rate reaches above 99%.
- Adopts XINJE open programming with simple operation, reducing programming steps by over 80%.
- Custom instruction libraries can be developed according to customer requirements to better adapt to scenario-based applications of different users.

System Interface



Vertical Winding / Solution



Industry Background

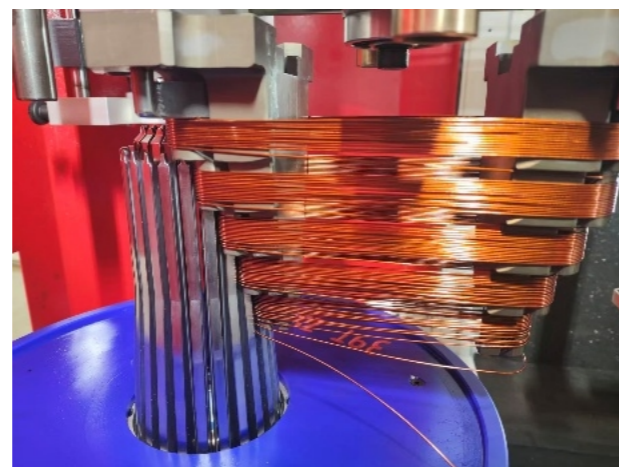
Electric power is applied in all aspects of daily life. The demand for high slot filling rate of three-phase asynchronous motors has increased significantly, and the market has put forward requirements for higher stability, comprehensive performance and higher efficiency. Such motors can be applied in household appliances, industry, automobile and other fields.

Control Solution

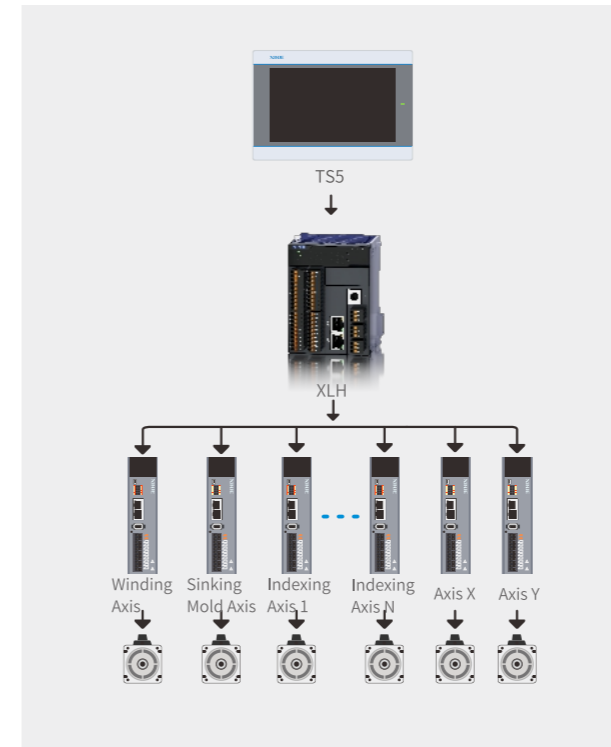
The system adopts EtherCAT electronic cam control. Even at high speed, the sinking mold axis can well follow the main winding axis, which improves winding speed and greatly optimizes the sinking mold effect. Coils can be neatly arranged in the wire-hanging cup jig. It is especially suitable for winding stators with high slot filling rate and small slot openings. A series of processes including automatic wire skipping, automatic wire cutting and automatic indexing are completed in one step. Parameters can be set on the human-machine interface, and winding tension is adjustable. The machine supports continuous winding, discontinuous winding and non-interval sinking mold functions.

Technological Process

The overall operation is as follows: the winding axis winds the copper wire on the winding rod around the mold. The sinking mold axis adjusts the position of the winding mold to distribute the copper wire on different sections of the mold. After winding is completed, all copper wires on the mold are sunk into the wire cup. Each section of the mold corresponds to a separate slot inside the wire cup. Meanwhile, the wire clamping and cutting head adjusts the outgoing wire length of the copper wire during the process, and cuts off the copper wire after winding. All copper wires placed after each mold sinking into the wire cup form one coil package. The copper windings of one stator are composed of such coil packages.



System Topology



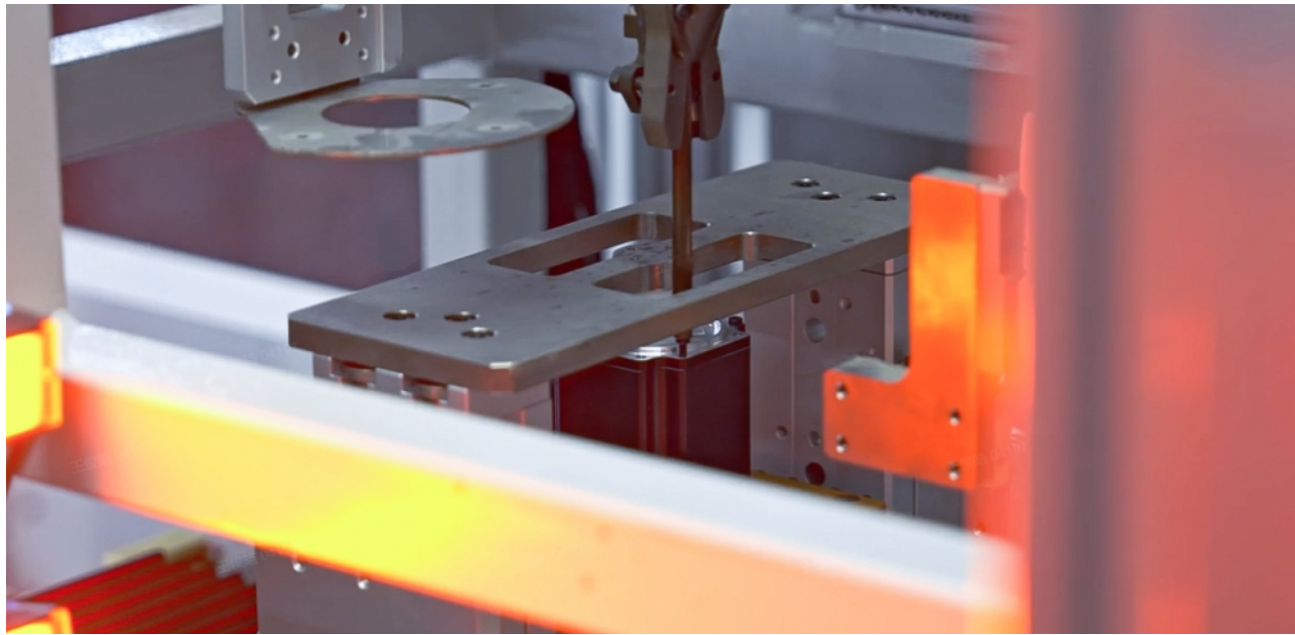
Solution Advantage

- High-speed sinking mold mode features wide adaptability, compatible with various rotating speeds and molds.
- The maximum speed of high-speed sinking mold reaches 1500–2000 RPM.
- Wire cutting modes can be selected arbitrarily according to indexing parameters.
- Adopts POU modular programming, which is easy to adjust and maintain.
- Cooperating with the full set of XINJE solutions including paper inserting, coil inserting, shaping, binding and precision turning, it forms a fully automatic production line.

System Interface



Screw Fastening System / Solution

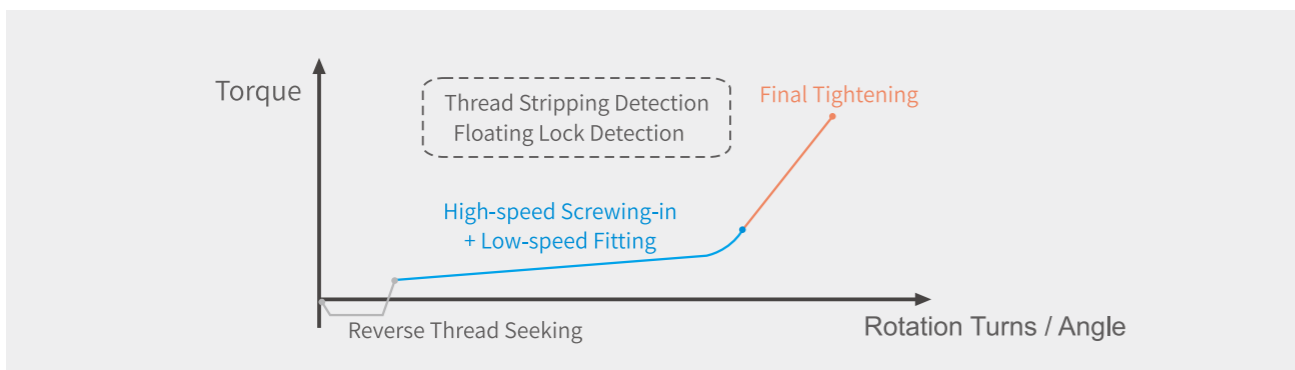


Industry Background

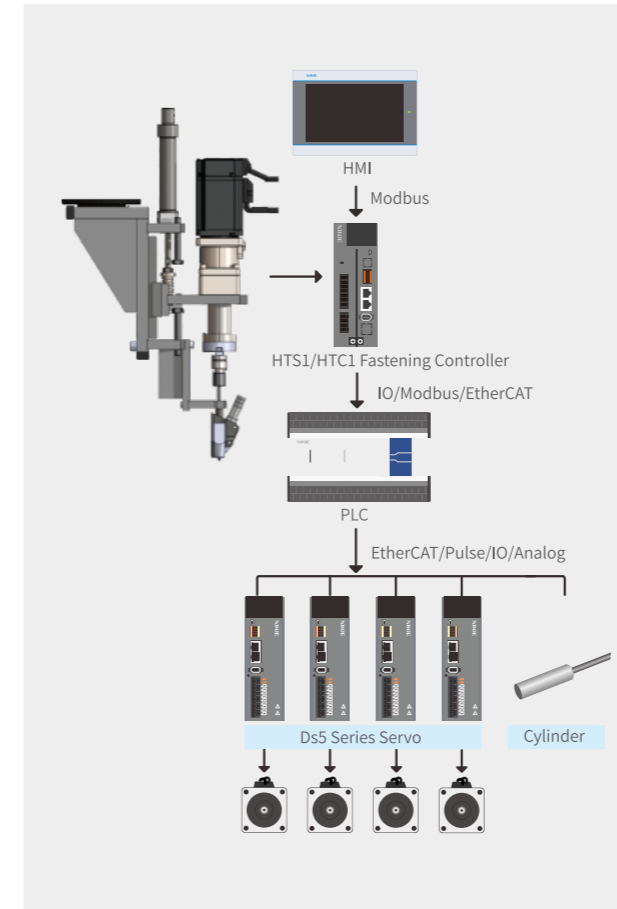
For a long time, manual labor has been relied on for assembly operations in numerous traditional labor-intensive enterprises. A large proportion of total screw fastening time is consumed by essential actions including picking, moving, waiting and alignment. In addition, a large number of screw fastening stations are required on each production line, resulting in a sharp rise in labor and management costs. The adoption of automatic screw fastening equipment can greatly improve production efficiency, significantly reduce labor costs, and achieve long-time high-efficiency continuous operation.



Technical Principle



System Topology



Solution Advantage

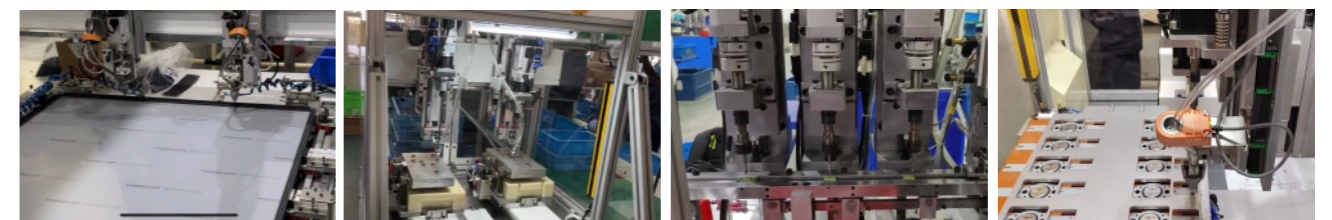
Functional Advantages

- **Multiple fastening strategies**
Built-in 8 groups of task recipe parameters (expandable), which can be quickly switched and called via I/O signals to realize alternate fastening of screws with various specifications.
- **Torque Calibration**
Losses caused by mechanical structure can be accurately corrected through torque calibration.
- **Real-time Monitoring**
Real-time display fastening stage, torque output, fastening turns, fastening time and other data during the tightening process.
- **NG Detection**
Identify abnormal conditions such as floating lock and thread stripping through multiple methods and send out alarm signals.
- **Fastening Stage Signal Switching**
High and low fastening speeds can be switched via I/O signals, and fastening completion can be identified accordingly.

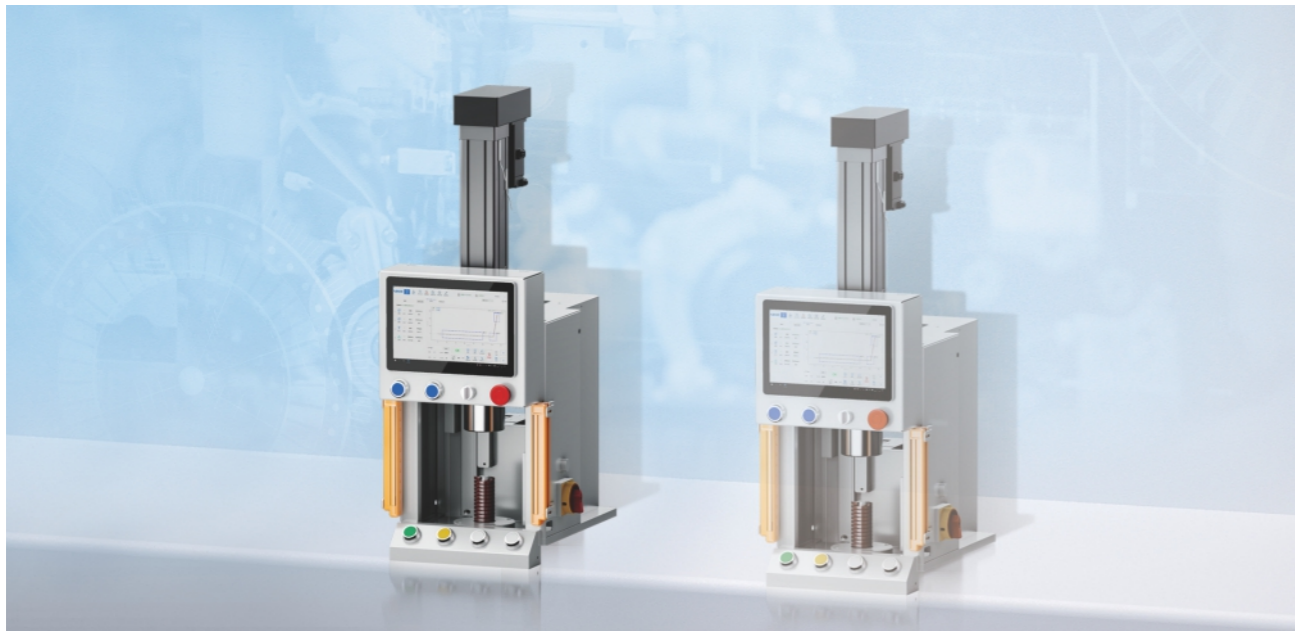
Performance Advantages

- **High Torque Precision**
Torque accuracy reaches $\pm 3\%$.
- **High-Speed Fastening**
Maximum rotating speed up to 4000rpm.
- **High Sampling Frequency**
Data sampling frequency up to 4000Hz.
- **Flexible Wiring**
Optional front and rear wire output of the motor.

Field Application



Servo Press Assembly System / Solution



Industry Background

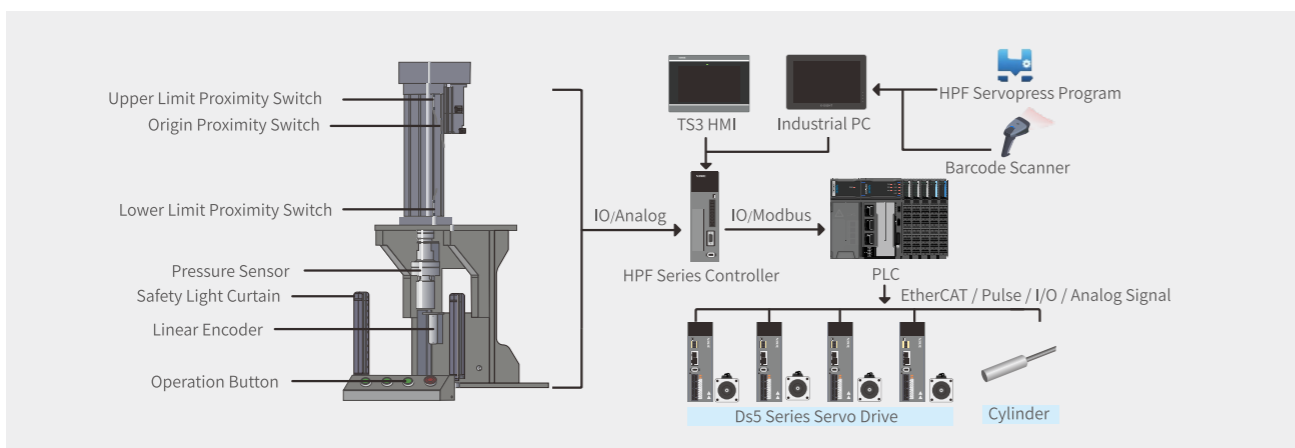
Servo press-fitting system features precise force control and displacement control, high automation and flexibility, meeting the requirements of precision manufacturing and customized production.

XINJE servo press-fitting system solution integrates servo drive, motion control, curve monitoring, data storage and process recipe management. It achieves higher pressure control precision, faster closed-loop response speed, more flexible press-fitting action programming and simpler operation, and has gained high recognition from numerous customers.

Process Principle

The HPF series servo press-fitting system highly integrates a complete pressure assembly control system with a servo drive to realize drive-control integration. Meanwhile, pressure sensors and external linear encoders are directly connected to the controller of the servo press-fitting system. Compared with traditional control solutions, its closed-loop chain is shorter, achieving faster press-fitting speed and more stable press-fitting performance. When applied to single-station press equipment, it can directly connect external components, realize human-machine interaction through HMI or all-in-one touch device, and function as an independent minimum system. When applied to automatic production lines, it can be controlled by PLC and achieve coordinated actions with other stations on the production line via I/O or Modbus communication.

System Topology



Solution Introduction

Touch Screen Control Solution

For cost-sensitive users, we offer a touch screen-based solution, which realizes basic operation control, real-time display of position-pressure curves, and storage of more than 100 sets of recipe parameters. This solution is cost-effective and supports secondary development.



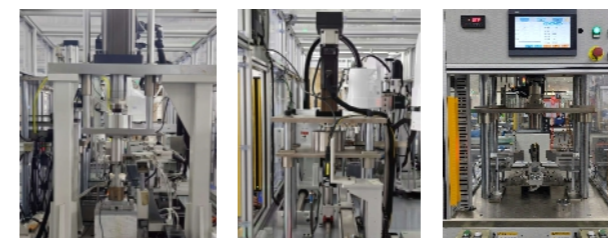
Integrated Controller Solution

This solution achieves easier operation access, higher data sampling frequency (200Hz, 4 channels), complete press-fitting curve data storage, unlimited recipe quantity, and multi-user permission management. It has been comprehensively upgraded in terms of data interaction and user experience, and can meet more professional application scenarios.



Field Application

Servo press-fitting system is mainly applied to assembly production of interference fit workpieces. In motor manufacturing industry, procedures including rotor pressing into iron core, front and rear bearing assembly, front end cover assembly, stator pressing into housing, spline assembly and rotor pressing into stator all adopt servo press-fitting system.



Solution Advantages

Functional Advantages

- High Flexibility**
Built with abundant press-fitting action modules, it supports 64-step flexible programming.
- Convenient Interaction**
Compatible with I/O control and Modbus communication control, it facilitates interaction with external equipment to realize synchronous or interleaved actions.
- Simple Operation**
Graphical interaction is available via HMI or upper computer software with low operation threshold.
- Complete Functions**
Support real-time data collection, historical data storage, curve detection, sensor calibration, position closed-loop control and other functions, capable of meeting most press-fitting application scenarios.

Performance Advantages

- Excellent Precision**
Position accuracy reaches 0.01 mm, and pressure accuracy is 5% FS.
- High-Speed Pressure Establishment**
Pressure rises from 0 kgf to over 1000 kgf within 1 second at maximum, with overshoot no higher than 5% FS.
- Rapid Response**
Direct sensor connection to servo drive achieves sampling frequency up to 5 kHz. Short closed-loop chain fundamentally improves system responsiveness.
- Real-Time Monitoring**
200 Hz high curve sampling frequency authentically reflects real-time pressure, position and speed status.

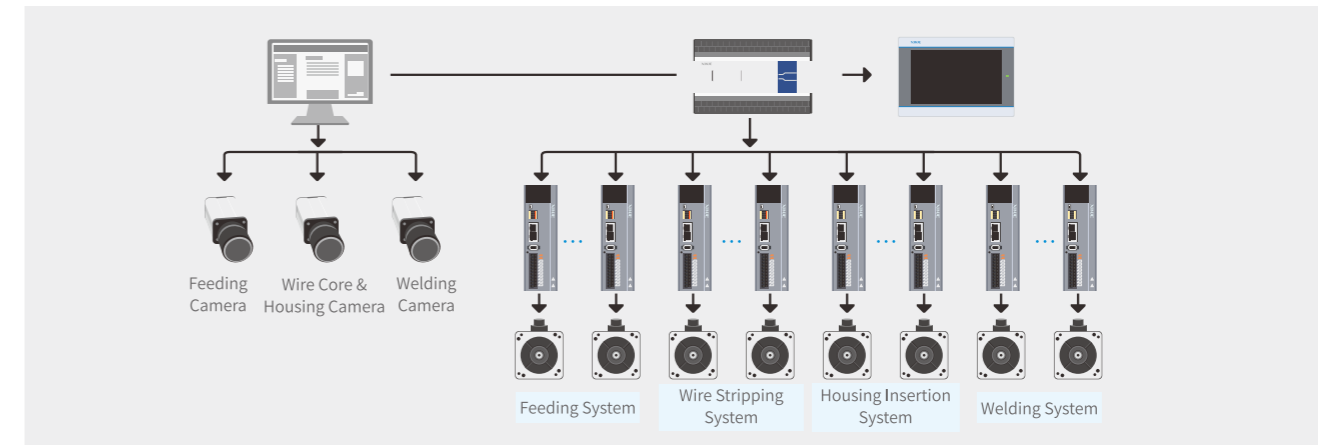
Main Parameters

IO	12 inputs/8 outputs
Communication Mode	RS485/RS232
Analog Input	±10V
Sampling Frequency	5kHz
PID Operation Frequency	100Hz
Pressure Control Precision	3‰
Position Repeatability	0.01mm
Free Programming Steps	64
Detection Quantity	10
Preset Detection Modes	12
Curve Sample Frequency	200Hz/4 Channels
Touch Screen Support	YES
Integrated Controller Support	YES

Integrated Shell-Insertion and Welding Machine / Solution



System Topology

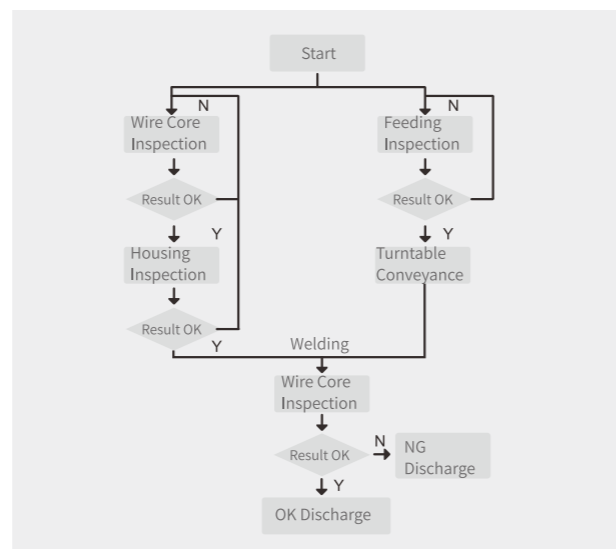


Industry Background

With continuous improvement of quality requirements in the wire harness industry, vision-based process quality inspection and finished product inspection have gradually become standard configuration in production. XINJE has developed an integrated solution based on PLC and vision control for housing insertion machines in the wire harness industry. Integrated control is realized in automatic feeding, wire harness quality inspection, plastic housing inspection, and solder joint quality inspection of microphone, Type-C, speaker and servo interface components, effectively improving equipment competitiveness and product quality stability.

System Principle

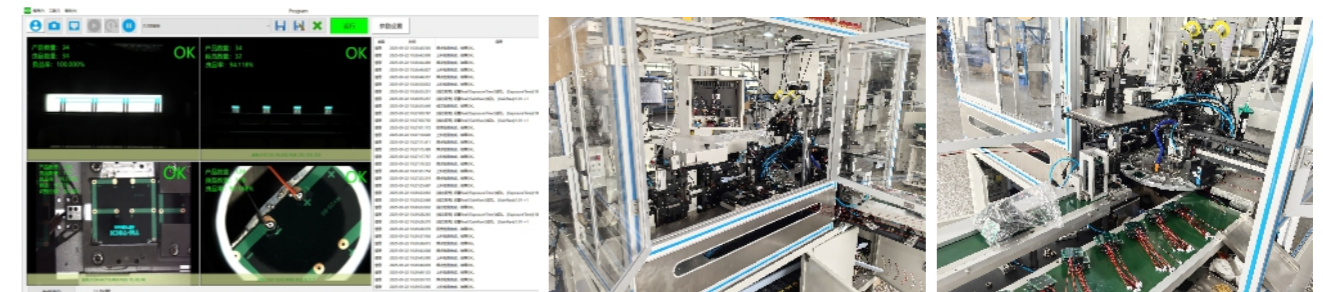
The system mainly consists of industrial computer, area scan camera and PLC control system. After PLC triggers feeding camera for image acquisition, product angle is calculated by upper computer software on industrial computer to realize deviation correction feeding. Wire and housing camera controlled by PLC collects images of wire core and plastic housing separately, and inspection is completed via upper computer software on industrial computer to output OK or NG signals. After workpieces enter welding station through turntable, welding camera performs image acquisition, and AI inference is conducted by upper computer software on industrial computer to output OK or NG inspection signals. Multi-group identification parameter recipe storage is supported by system upper computer with one-key switching function to meet rapid production change requirements.



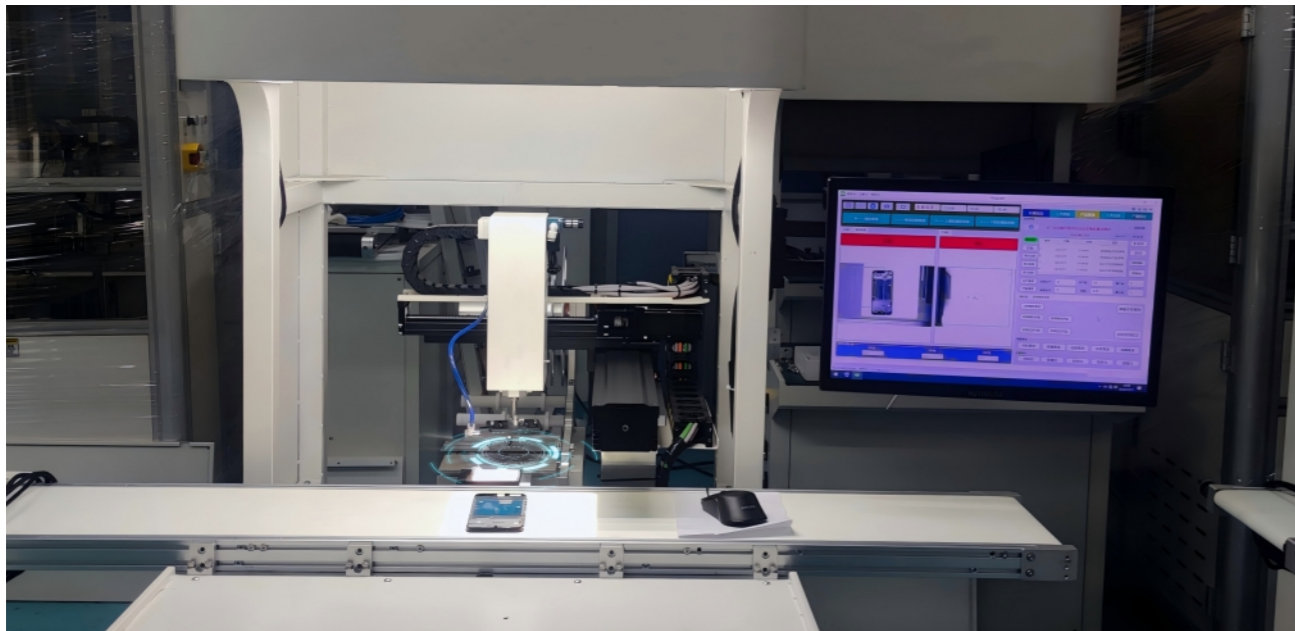
Solution Advantage

- Remarkably improved system detection stability**
 AI algorithms are adopted for solder joint inspection. Compared with traditional algorithms, product yield is improved by 50%.
- Ultra-fast response and precise identification**
 - Average detection speed reaches 60 milliseconds, far exceeding manual operation limit, perfectly adapting to high-speed production rhythm and greatly increasing production capacity.
 - Extremely low false alarm rate of only 0.1% achieves high detection reliability, minimizes misjudgment of qualified products, reduces costs and guarantees outgoing product quality.
- High working efficiency**
 For speaker products, system processing capacity reaches 800 pieces per hour, effectively improving production capacity and production efficiency.
- Convenient operation and easy mastery**
 The system is equipped with one-key recipe switching function for material change, featuring user-friendly interface and simple operation, which greatly reduces training cost and operation threshold for end users. Required recipe can be selected with one single click, followed by automatic precise calling of all parameters to adapt to various products with different specifications, materials and process requirements.

Field Application



Vision-assisted Material Pasting / Solution



Industry Background

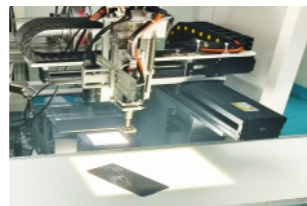
Common visual labeling machines reach a production capacity of 1200 to 2000 pieces per hour. Equipped with CCD vision recognition system, visual attaching machines achieve precision up to ± 0.1 mm or higher. High cost is involved in traditional manual attaching work. 24-hour continuous operation is realized on visual attaching machines to save abundant labor cost. For example, visual film attaching machines applied in mobile phone 3C industry reduce 70% labor cost compared with manual film attaching. Diverse product attaching scenarios are covered. Rapid switching of label rolls with different specifications is realized via modular design. Adaptation to attaching on products with various materials including flat and curved surfaces is achieved, and customized solutions according to special industrial demands are also available.



Single Head, Dual Cameras



Dual Heads, Dual Cameras



Single Head, Three Cameras

System Principle

Machine Vision System

Upper Camera: High-definition industrial camera (black cylinder, conveyor backlight), suspended above material conveyor belt with lens aligned to incoming material positioning area.

Lower Camera: High-definition industrial camera (coaxial light source), embedded in workbench surface with lens aligned to nozzle material picking position. Deviation correction data is projected to right-side screen in real time.

Four-axis Motion System

X-axis (horizontal movement): Driven by stepping motor with ball screw, spanning the top of equipment.

Y-axis (vertical movement): Driven by servo motor (red housing) with ball screw, mounted on right upright column.

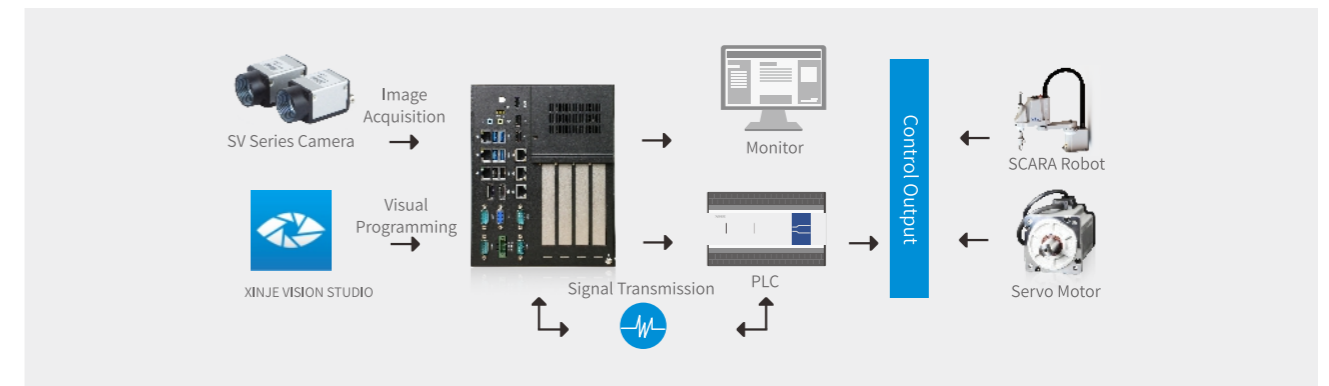
Z-axis (lifting movement): Stepping motor integrated with pneumatic assistance, with attaching head connected at terminal end.

Q-axis (rotary deviation correction): Stepping motor controlled rotary platform, integrated beneath attaching head.

System Principle

Based on self-developed XINJE Vision platform, CCD vision intelligent positioning is applied in attaching machine solutions to realize high-precision lamination. XINJE attaching system features excellent flexibility and compatibility. Diversified attaching tasks are adapted according to different production requirements and process specifications. Seamless connection is realized between this platform and other XINJE automation equipment including PLC and servo systems to further enhance production stability and reliability.

System Topology



Solution Advantage

- Hybrid Programming for More Intuitive Operation**
 Hybrid programming integrates PLC interface and vision interface, realizing integrated equipment and vision control on a single display screen. Operation convenience is improved. Parameter setting and status monitoring can be completed on the unified interface for operators. Rapid data transmission and sharing between PLC and vision system achieve higher-precision attaching operation. More compact equipment layout reduces display quantity, saves space and cuts overall costs.
- Real-time Error Alarm Display**
 Events related to project compilation and operation are displayed in real time. Red alarm status is triggered upon abnormal conditions, with detailed error information fed back in the log bar.
- One-key Recipe Switching for Various Products**
 One-key recipe switching realizes rapid adjustment of diversified production parameters. Prod0 uction flexibility and adaptability are greatly improved. Product changeover time is effectively shortened to provide solid and reliable support for diversified production.
- Production Capacity Statistics**
 Production capacity statistics support efficiency evaluation, production planning formulation, equipment performance analysis, cost accounting, performance assessment, process optimization and market decision-making support.

Field Application

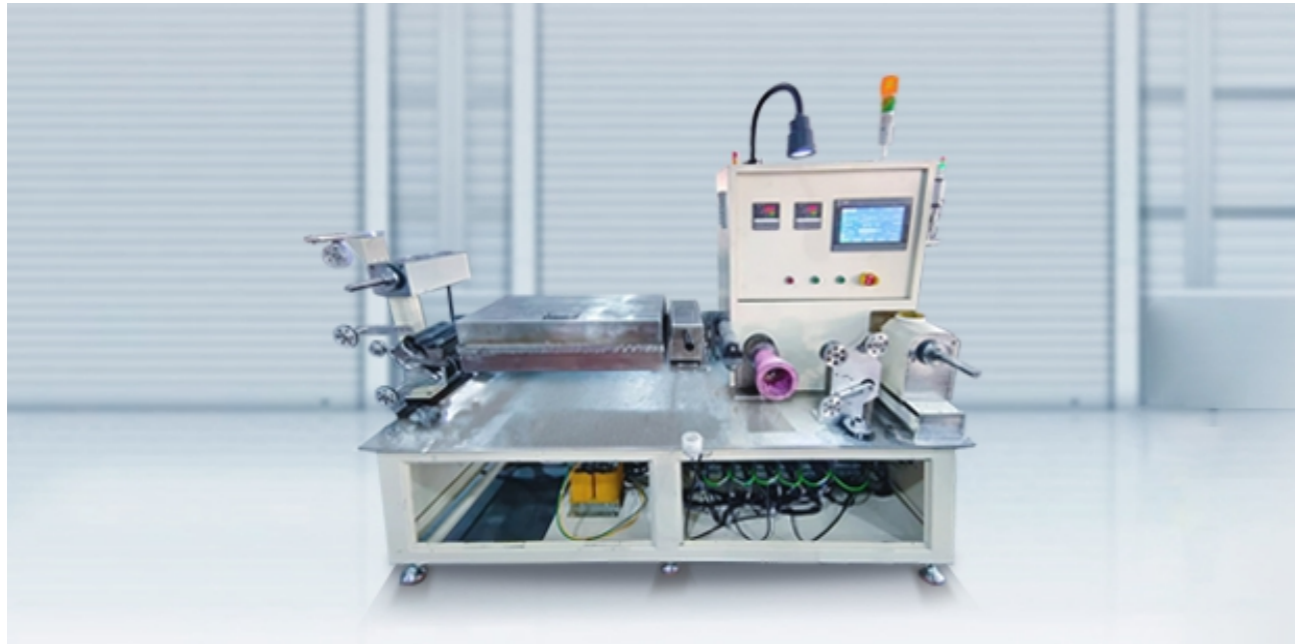


06

Automotive Equipment and Manufacturing

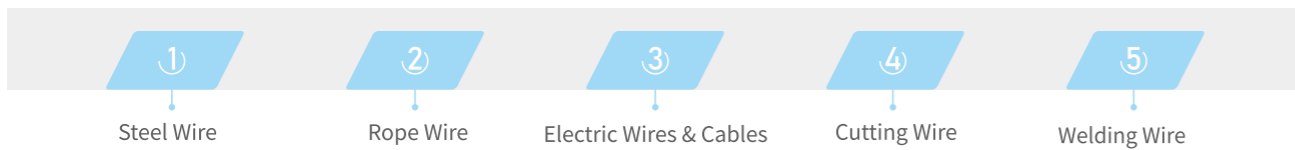
- Tungsten Wire Drawing Machine System Solution
- Metal Tube Bending Integrated Solution
- Mobile Machinery Integrated Solution

Tungsten Wire Drawing Machine System / Solution



Industry Background

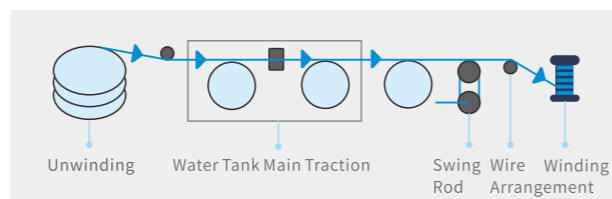
Wire drawing is a process that forms thick raw materials into fine wires of specified dimensions through multi-stage drawing. A wire drawing machine mainly consists of an unwinding unit, multi-stage drawing heads, a wire guiding unit, and a winding unit, which processes wires to the required size and spools them neatly on reels. By control mode and mechanical structure, it can be divided into water tank type, pulley type, and straight-line type. By application, it includes metal, plastic, and bamboo/wood wire drawing machines. Metal wire drawing machines are widely used in steel wire, rope wire, electric wires and cables, cutting wire, welding wire, and other industries.



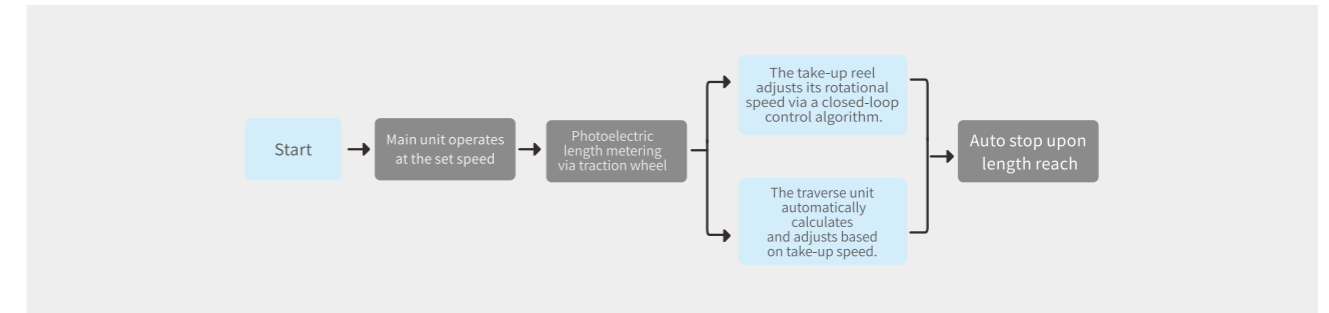
01 / Water Tank Type Wire Drawing System Solution

System Principle

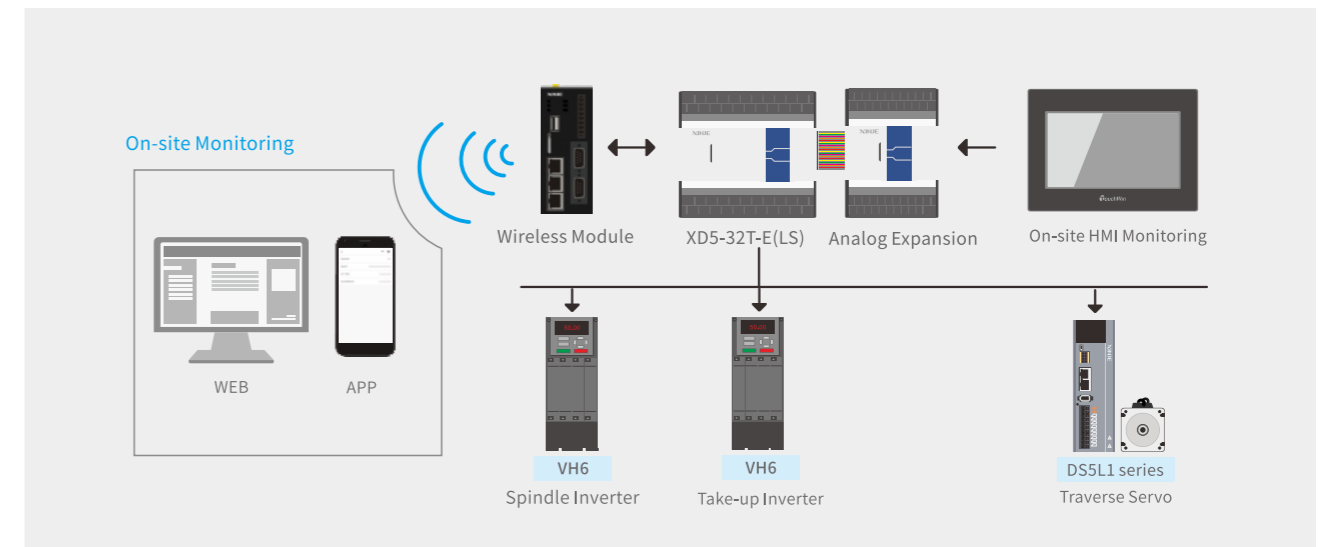
Water tank wire drawing machines are suitable for drawing various medium and fine gauge metal wires. By placing the drawing die in a water tank, the steel wire is processed to the required size through multi-stage drawing, and then wound onto a fixed spool according to the set length via the take-up and traverse mechanism. The equipment mainly consists of wire unreeling, multi-stage drawing, traverse and take-up units. Among them, take-up and traverse are the core parts of the control system, which directly determine the quality of the finished steel wire.



Process Flow



System Topology



Solution Advantages

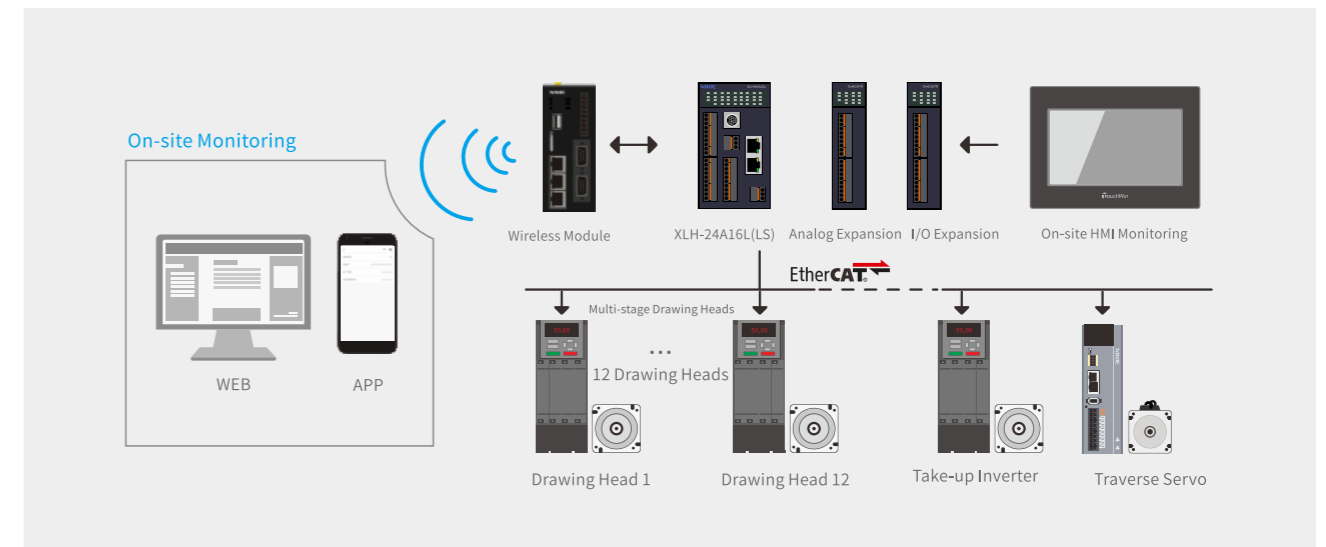
- The take-up unit features smoother start, stop, acceleration and deceleration. Adopting Xinje VH6 high-performance vector inverter with closed-loop PID take-up control, the take-up frequency control is stable and reliable.
- The system supports stepper/servo traverse solutions for better wire arrangement. Compared with traditional inverter traverse, which has poor reversing performance, stepper/servo traverse features faster response, better effect and higher consistency.
- Equipped with automatic traverse compensation, it can automatically adjust edge wire arrangement to ensure a neat and uniform wire surface.
- Simple parameter setting and easy operation. The system is equipped with wire breakage detection, drive alarm detection, length pre-warning, automatic stop at set length and emergency stop. It also supports real-time production statistics, alarm statistics, manual debugging and inching operation.
- It supports the extension of Xinje informatization products and cloud platform functions, enabling remote program updates, as well as remote monitoring of equipment data and operating status via mobile phones or computers.
- We offer the HL-100 integrated water tank wire drawing solution. It integrates PLC, inverter and stepper driver, delivering a more compact structure, lower cost and labor savings.

Tungsten Wire Drawing Machine System / Solution

Applications



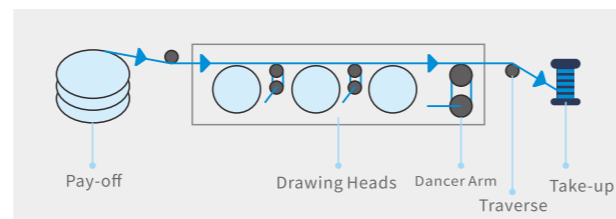
System Topology



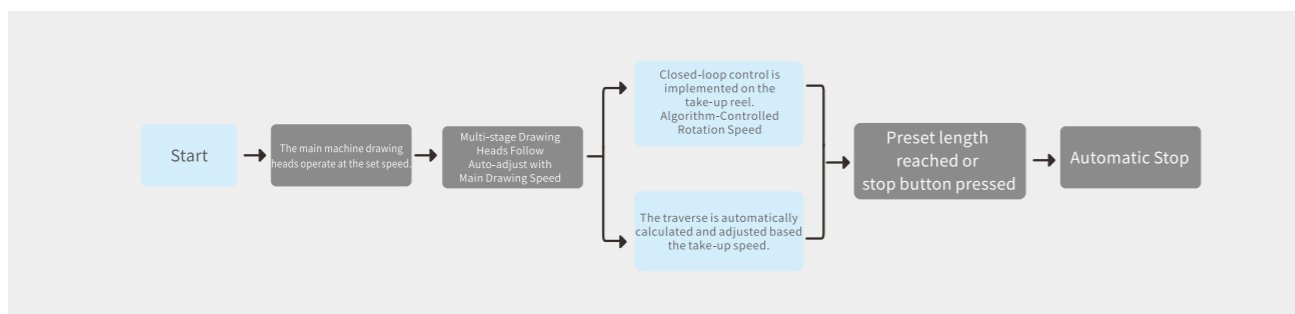
02 / Straight-Line Wire Drawing System Solution

System Principle

Straight-line wire drawing machine processes steel wire to the required size in one pass through step-by-step cold drawing. It features high speed, high efficiency, no bending or twisting, strong cooling and high cost performance. The equipment mainly consists of unreeling, multi-stage drawing, traverse and take-up units.



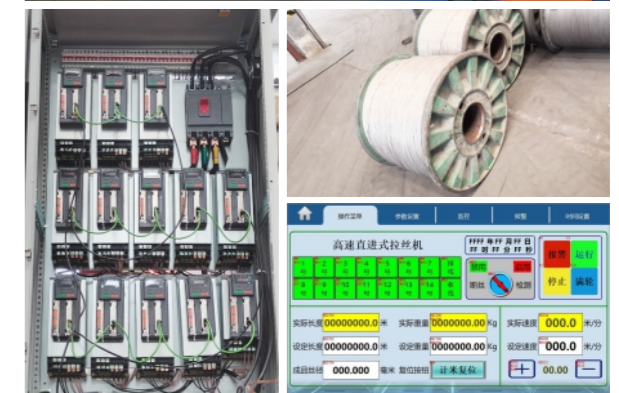
Process Flow



Solution Advantages

- Multi-head units feature faster response and better synchronization. Equipped with VH6 high-performance vector inverter and optional encoder PG card, it delivers stable control in vector speed mode. Multi-stage drawing heads achieve real-time speed synchronization and stepless frequency control. PID tension control ensures stable wire drawing, and the main machine speed can be adjusted during production.
- Easy wiring and simple troubleshooting. The EtherCAT bus solution uses network cable connections, greatly reducing on-site wiring. It can work with remote distributed IO expansion modules to further simplify cabling and save labor and material costs.
- Process parameters are saved as recipes for easy recall. The number of drawing heads can be selected or modified. Up to 100 recipe groups can be stored and switched.
- Comprehensive alarm system ensures flexible operation and debugging. Equipped with wire break detection and inverter alarm, the system alerts in real time and shuts down safely to reduce production loss and ensure capacity. Supports common functions such as single-head jog, overall jog, and overall linkage.
- The take-up inverter uses analog dancer arm feedback and PID algorithm to keep the dancer arm stable at the mid-position, achieving constant tension control.
- The traverse motor automatically adjusts its speed based on the take-up speed to ensure consistent pitch.
- Supports die skipping, allowing any drawing capstans to be switched on or off freely for easier production of different wire specifications.
- Supports expansion of Xinje information products. With cloud platform extension, remote program update, data monitoring and status checking can be realized on mobile or PC by adding Xinje information products.

Applications



Metal Tube Bending Machine System / Solution



Industry Background

Metal tube benders are widely used metal processing equipment, capable of bending metal tubes of various specifications and shapes. They are mainly applied in aerospace, automotive, construction, metallurgy, chemical, medical equipment and other industries.

In the automotive industry, tube benders are critical equipment for manufacturing exhaust pipes, transmission oil pipes, brake pipes, fuel pipes and other components. In home appliances, they are widely used to produce refrigerant pipes and drain pipes for air conditioners, refrigerators and other cooling equipment.

To meet industry demands, Xinje has launched a metal tube bending machine system suitable for bending copper, aluminum and steel tubes. Featuring 3D functions, it supports 3D dynamic display, processing simulation and interference inspection. With high processing speed, high precision, stable performance and complete functions, this system can be widely used in the above-mentioned industries.

System Principle

The metal tube bending machine is mainly used for bending copper tubes, aluminum tubes, steel tubes and other pipes. The system converts YBC data into axis position information and realizes tube forming through servo motions of feeding, rotation and bending.

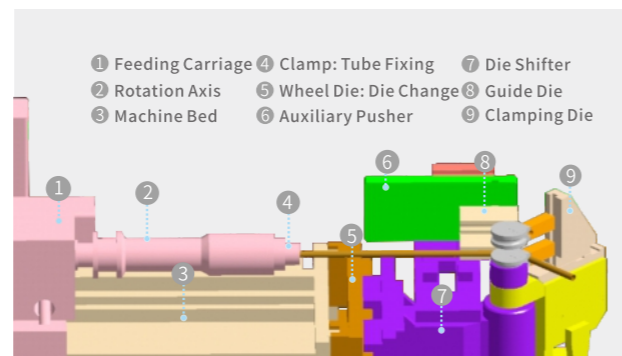
The working process is as follows: The feeding carriage moves to the waiting position, and tubes are loaded manually or by a robotic arm. After pressing the start button, the clamp holds and fixes the tubes. When the two-hand start is triggered, the system performs automatic tube bending. After bending, tubes are unloaded manually or by a robotic arm.

The bending motion is automatically generated by the system, and users can also modify it via custom functions. With abundant process parameters, the system can meet the requirements of most tube processing.

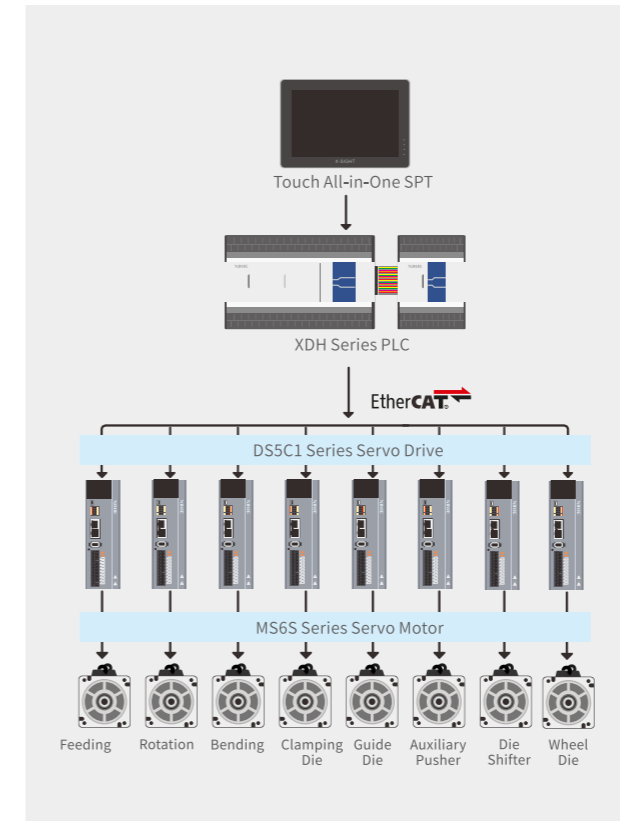
Control Solution

The metal tube bending machine system adopts the EtherCAT bus solution. It boasts high positioning accuracy, position memory, simple wiring, high communication efficiency and strong anti-interference capability. It also supports forward-looking planning, smooth movements and diverse customized actions.

The system offers multiple editing methods: YBC, XYZ and 3D file editing, along with custom editing. Users can directly insert Chinese instructions into the programming window for a clear and intuitive program flow, facilitating error checking and modification. The system supports both online and offline simulation. After programming, users can perform offline simulation to check for collisions and interferences in the machining file, and adjust movements to avoid interferences based on the simulation results.



System Topology



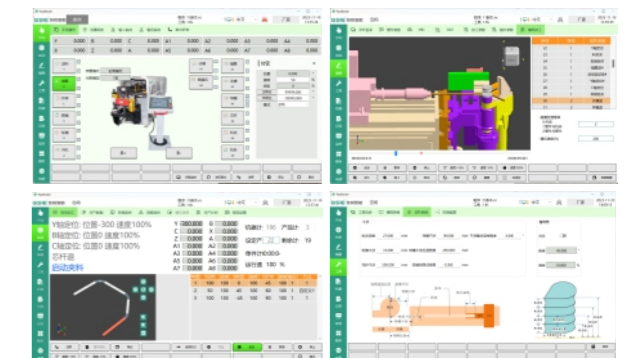
Applications



Solution Advantages

- **Enhanced Compatibility**
 1. Mechanism Type: Each mechanism can be configured as cylinder, oil cylinder or axis.
 2. Mechanism Quantity: The maximum number of controllable axes is currently 13.
 3. Mode Selection: Diverse mode options including start clamp, start bending, and return to loading position after unloading.
 4. Multilingual Support: Supports Chinese, English and Spanish.
- **Enhanced Openness**
 1. Program Editing: YBC Programming, XYZ Programming, 3D File Programming, and User-Defined Programming.
 2. Program Debugging: Abundant parameters and instructions for direct writing or referencing.
- **Enhanced Convenience**
 1. Position Calibration: Supports power-off retention, eliminating the need for homing on each startup.
 2. After-sales & Training: Simple operation for easy understanding, reducing training time.
 3. Process Migration: Enables system-external communication via USB flash drive.
 4. IO Configuration: Integrates commonly used I/Os based on industry characteristics, saving debugging time.
 5. Mechanical Parameters: For Xinje products, mechanical and servo parameters can be modified directly on the system interface.
- **Humanized Design**
 1. Safety Performance: Equipped with safe zone protection, hard limit protection and soft limit protection to avoid unnecessary losses.
 2. Troubleshooting: Provides fault diagnosis, system log and alarm record functions for easy troubleshooting.
 3. Software Startup: Supports enabling or disabling auto-startup on power-on.
 4. System Password: Features multi-level passwords that can be modified by users.
- **Special Processes**
 1. Offline & Online Motion Simulation to reduce tube material waste.
 2. Real-time motion display to indicate the current operation step.
 3. Tube display and preview functions available.
 4. Automatic interference detection function.
 5. Multi-file cyclic production scheduling function.

System Interface



Mobile Machinery System / Solution



Industry Background

China's construction machinery industry is at a critical stage of transforming from a large manufacturing country to a strong manufacturing power. At present, China has more than 1,300 vehicle manufacturers, covering automobiles, motorcycles, special vehicles, three-wheeled automobiles and low-speed trucks.

Mobile machinery mainly includes construction machinery, aerial work equipment, sanitation vehicles, agricultural machinery, etc. Its control modes are generally divided into mechanical control and hydraulic control. To ensure efficient, safe and stable operation, controllers with high stability, strong anti-interference capability and fast computing speed are required to coordinate the work of various systems and adapt to different working environments.

01 / Agricultural Vehicles

- Agricultural Power Machinery
- Farmland Construction Machinery
- Soil Tillage Machinery
- Planting & Fertilizing Machinery
- Crop Protection Machinery
- Farmland Irrigation & Drainage Machinery
- Farmland Irrigation & Drainage Machinery
- Agricultural Product Processing Machinery
- Livestock Machinery
- Agricultural Transport Machinery



System Introduction

Agricultural machinery refers to various types of machinery used in crop planting, livestock production, as well as the primary processing and handling of agricultural and livestock products. It includes agricultural power machinery, farmland construction machinery, soil tillage machinery, planting and fertilizing machinery, crop protection machinery, farmland irrigation and drainage machinery, crop harvesting machinery, agricultural product processing machinery, livestock machinery, agricultural transport machinery, and more.

System Topology



Solution Advantages

- Intelligent human-machine interface with automatic video and audio control.
- Intelligent control of header, straw returning, operation statistics, etc.
- Platform-based remote management, data statistics and informatized customer service.
- Fault diagnosis and intelligent alerts for the whole vehicle's electrical circuit and control system.

02 / Engineering Vehicles

- Heavy-Duty Transport Vehicles
- Large Cranes
- Excavators
- Bulldozers
- Road Rollers
- Loaders
- Engineering Emergency Vehicles
- Power Emergency Repair Vehicles
- Government-Specific Engineering Vehicles



System Introduction

Engineering vehicles are the backbone of construction projects. Their application has drastically boosted construction progress and significantly reduced manual labor.

Common engineering vehicles include: heavy-duty transport vehicles, large cranes, excavators, bulldozers, road rollers, loaders, power emergency repair vehicles, engineering emergency vehicles, government-specific engineering vehicles, etc.

System Topology



Solution Advantages

- By integrating modern automatic control theory with sensor detection technology, intelligent hydraulic cylinders are applied to the posture detection of excavators, achieving the goals of working area limitation, digging torque limitation and intelligent operation.
- Multiple display units and controllers exchange data via the bus, ensuring the safety and flexibility of the control system. Additionally, it can connect with communication systems such as GPS and GSM to realize remote diagnosis, cluster control and management of the control system.

Mobile Machinery System / Solution

03/ Sanitation Vehicles

- High-pressure Washing Truck
- Fecal Suction Truck
- Water Sprinkler Truck
- Garbage Truck
- Sewage Suction Truck



System Introduction

Sanitation vehicles are special-purpose vehicles designed for urban appearance maintenance and cleaning. They are mainly used for the cleaning and upkeep of urban environmental hygiene, waste management stations, urban roads, residential communities, green belts and other municipal facilities. Common types include water sprinkler trucks, garbage trucks, sewage suction trucks, fecal suction trucks, high-pressure washing trucks, etc.

System Principle

The electric control system for garbage compression trucks enables remote control. It supports interlock between the button panel and transmitter to prevent logical confusion and misoperation. Indicator lights provide real-time status indication and alarm display. CAN bus communication is adopted to reduce wiring harnesses and greatly improve the level of intelligence.

System Topology



Solution Advantages

- Jog Control**
Realizes the operations of tipping bucket, sliding plate, scraper, push plate and loading mechanism.
- Indicator Light Monitoring**
The panel indicator lights monitor whether the actions have reached their limit positions.
- Emergency Stop**
Pressing the emergency stop button halts all actions immediately.
- Panel Interlock**
An interlock is established between the cab panel, rear body panel and remote controller to prevent misoperation.
- Operation Cycle**
The cycle function can be customized according to customer requirements.

04 / Aerial Work Vehicle

- Scissor Type
- Articulated Boom Type
- Truck-mounted Type
- Straight Boom Type
- Spider Lift



System Introduction

The aerial work vehicle mainly consists of hydraulic systems including the power take-off, oil pump, foldable work arm, rotation mechanism, center rotary joint, work bucket, hook, and outriggers, etc.

Types: Scissor type, straight boom type, articulated boom type, spider lift, and truck-mounted type, etc.

Solution Advantages

- All variable valves are controlled by PWM signals output from the controller, with other sensors as input conditions. The PLC controls the output of PWM signals and indicator signals to achieve various automatic functions within a safe range.
- The entire vehicle uses CAN bus communication, which reduces the number of cables between the upper and lower parts, lightens the weight of the boom, and facilitates installation and maintenance.

System Topology



07

Energy

- Four-spindle Multi-wire Saw Solution
- Large-scale Commercial & Industrial Energy Storage EMS & TMS Solution
- High-speed Electrode Slitting Machine Solution

Large-scale C&I Energy Storage EMS & TMS / Solution



Industry Background

Energy storage is a core component and key supporting technology for smart power grids, high-proportion renewable energy systems, and "Internet +" smart energy. Vigorously developing energy storage is an indispensable way to improve the utilization rate of renewable energy and achieve the "dual carbon" goals. As a high-quality flexible resource, energy storage can provide peak shaving, frequency regulation, backup power, black start, demand response and other

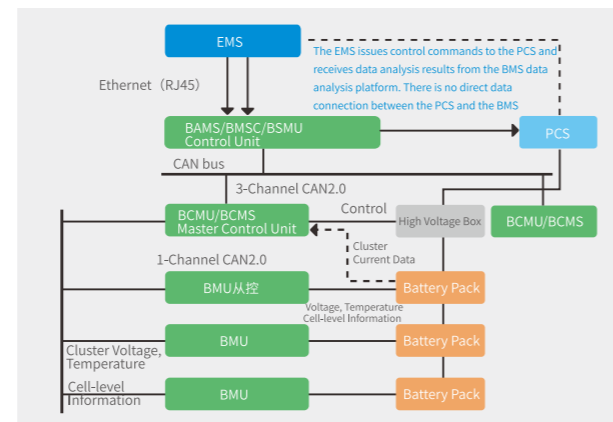
services, serving as an important means to enhance the flexibility, economy and safety of the power system. The Xinjie energy storage EMS dedicated controller has rich interfaces, adopts automotive-grade anti-vibration and high-temperature design, and can adapt to harsh environments such as wide temperature range, intense vibration and strong electromagnetic interference, ensuring stable and reliable operation.

01 / Energy Storage Energy Management System (EMS)

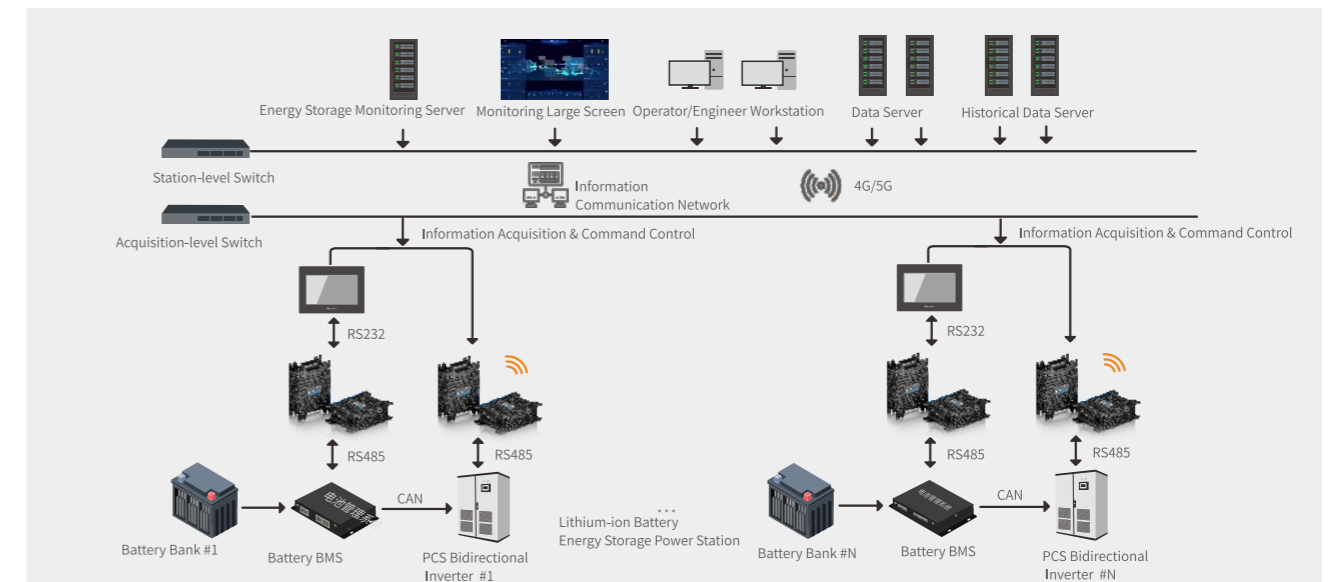
Process Principle

The EMS realizes the monitoring and energy management of the energy storage power station, and is connected to the PCS, BMS, as well as auxiliary equipment such as air conditioners, fire protection and environment monitoring.

- It receives AGC and AVC dispatching commands and feeds back execution data to the dispatching system.
- Implement the battery SOC balancing strategy.
- Capable of communicating with the operation and maintenance platform.



System Topology



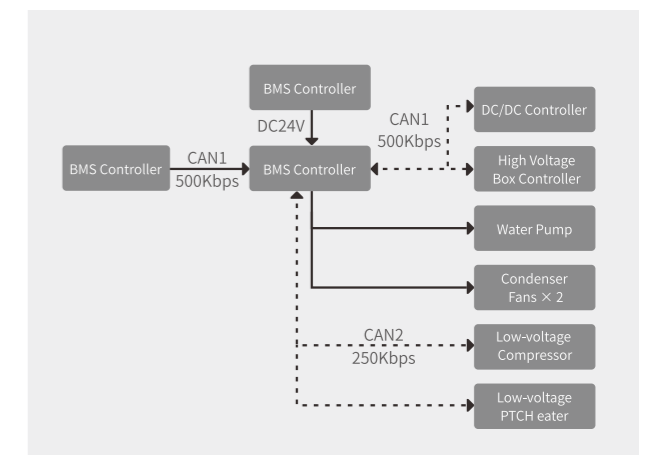
Solution Advantages

- Supports multiple communication protocols including RS485, RS232 and CAN, enabling full access to device data.
- The EMS coordinates the coordinated operation of the energy storage system and renewable energy. It smooths the output fluctuation of renewable energy through charge and discharge control, improving the reliability and stability of power supply.
- Displays the real-time charging/discharging status and key operating data of the energy storage station.
- Performs real-time data acquisition and monitoring of core operating information, including rated power, rated capacity and number of operating PCS.

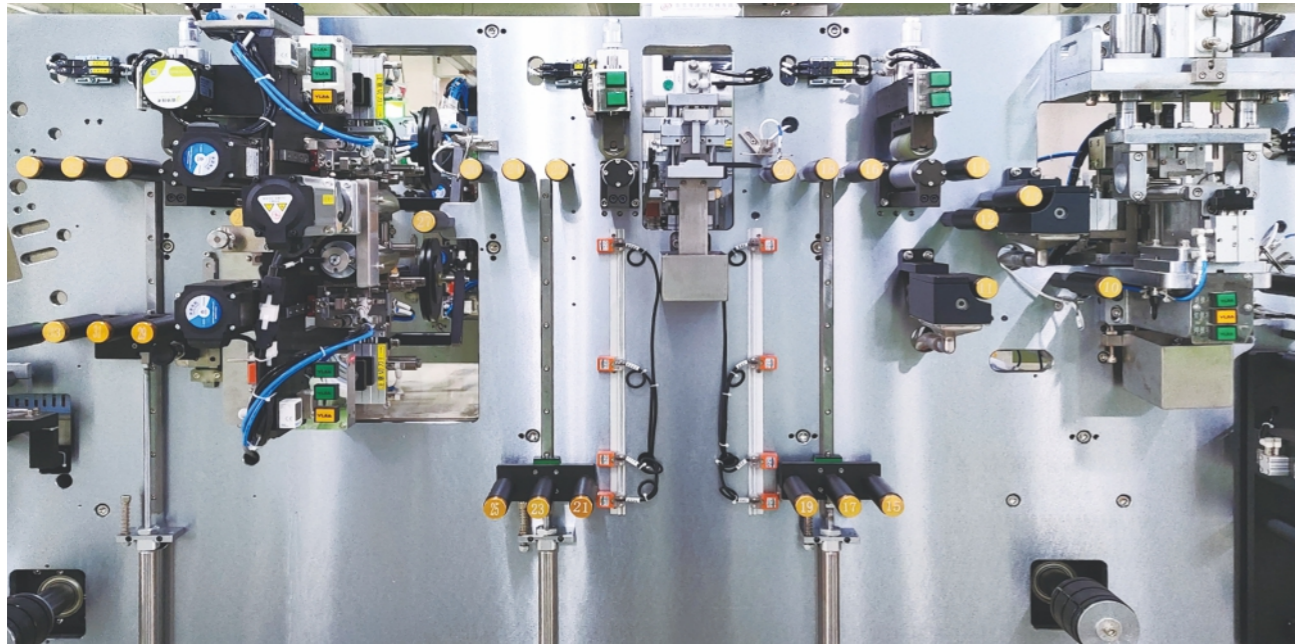
02 / Battery Thermal Management System (BTMS)

Core IntroductionThe performance of lithium-ion batteries and other cell types varies significantly with ambient temperature: low temperature shortens service life and reduces runtime, while high temperature accelerates heat generation, posing the risk of thermal runaway and combustion beyond critical thresholds. Hence, the Battery Thermal Management System (BTMS) is essential for precise battery temperature control.

Xinjie BTMS Product AdvantagesThe Xinjie BTMS battery thermal management unit adopts a separate design for BMS and TMS controllers. Unlike traditional integrated solutions, this design simplifies maintenance—eliminating the need to replace the entire BMS unit—and lowers long-term upgrade and service costs. It ensures higher reliability by fully utilizing TMS performance and reducing overall failure rates. Equipped with multi-channel high-precision acquisition modules and an independent PID algorithm, the unit works with the upper computer software to achieve fully automatic closed-loop temperature control based on set values. Adopting an active air-cooling solution, it delivers higher cooling efficiency, easier maintenance and no leakage issues. All components have undergone rigorous environmental testing, enabling stable operation in a wide temperature range of -40°C to 85°C.



High-speed Electrode Making Machine / Solution



The electrode making machine is mainly divided into 3 stations: tab welding, tape application, and material receiving.

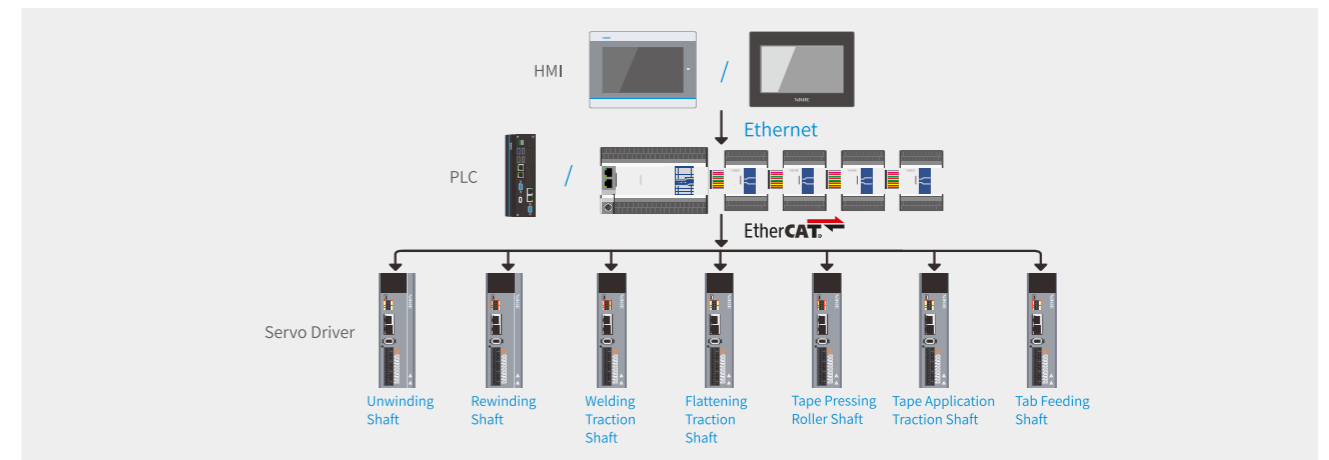
- The tab welding station comprises a welding traction shaft, unwinding shaft, unwinding dancer arm, and rear-mounted tab feeding unit.**

The welding traction pulls the electrode forward. The unwinding shaft automatically adjusts its speed based on the traction speed and the diameter of the electrode roll, keeping the unwinding dancer arm stable within a set floating range. Meanwhile, the tab feeding unit feeds tabs synchronously. The welding traction positions the welding area on the electrode via a fiber optic sensor, and finally completes the welding of tabs to the electrode.
- The tape application station comprises a tape application traction shaft, upper and lower tape pulling shafts, and upper and lower tape pressing rollers.**

The upper/lower tape pressing rollers use a positioning fiber optic sensor to apply the suction-held tape to the electrode via flying shear.
- Two material receiving modes: rewinding and sheet cutting.**
 - The rewinding unit consists of a tape application traction shaft, a rewinding shaft, and a rewinding dancer arm. The operating principle of rewinding is similar to unwinding, with the key difference being that the welding traction starts and stops during operation, whereas the tape application traction runs continuously without stopping.
 - The sheet cutting unit consists of a tape application traction shaft, a sheet cutting traction shaft, and a floating roller between them. It is mainly designed to meet the production requirements of semi-automatic winding machines, and a material collecting machine may be equipped to replace manual stacking of electrodes.

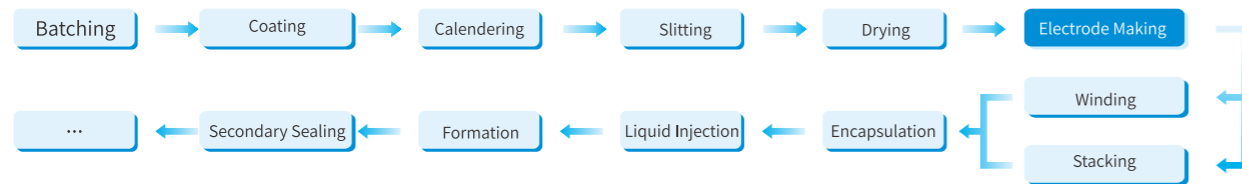
Additionally, between the tab welding station and the tape application station, functions such as tab flattening (to remove burrs after tab welding) and arc cutter (to trim the exposed end of the tab into a circular arc) may be added.

System Topology

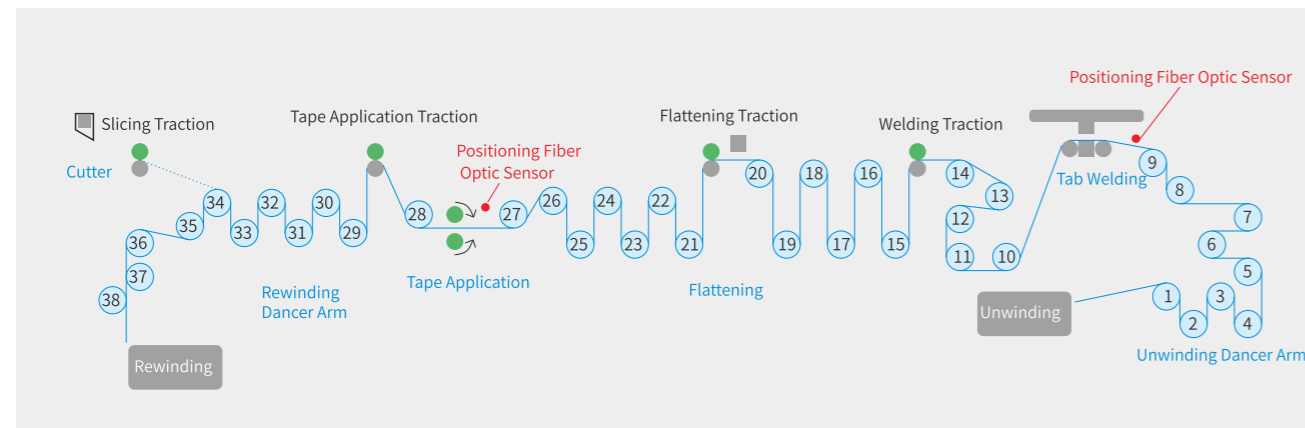


Equipment Introduction

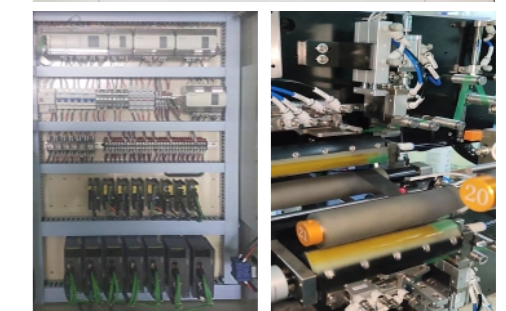
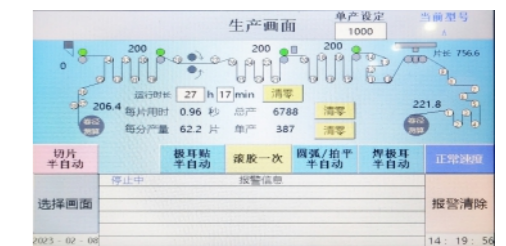
The electrode making machine is used to weld tabs on battery electrodes and apply insulating tape at the tab welding areas and the blank margins of electrodes, providing qualified semi-finished products for subsequent processes. It supports models with 2-tab tape, 4-tab tape, 6-tab tape, 8-tab tape, and dual-welding & dual-tab applications. According to the material receiving method, it can be divided into roll-to-roll and sheet cutting types.



Process Principle



Application



Solution Advantages

- Excellent Unwinding Stability**
 During normal operation, the unwinding dancer arm will not reach the upper or lower limit, and no roll whipping phenomenon will occur.
- Excellent Unwinding Deviation Correction Performance**
 It ensures that the tab fold pitch error of tabs welded on the electrode is controlled within 0.3mm.
- High-Precision Tape Application**
 Wrinkle-free tape application on both electrode sides, with tolerance within 0.2mm (lateral) and 0.3mm (longitudinal).
- Stable Operation**
 The speeds of the tab welding and tape application stations are automatically matched to ensure consistent production efficiency. No missed welding or missed tape application occurs during start-stop operations.

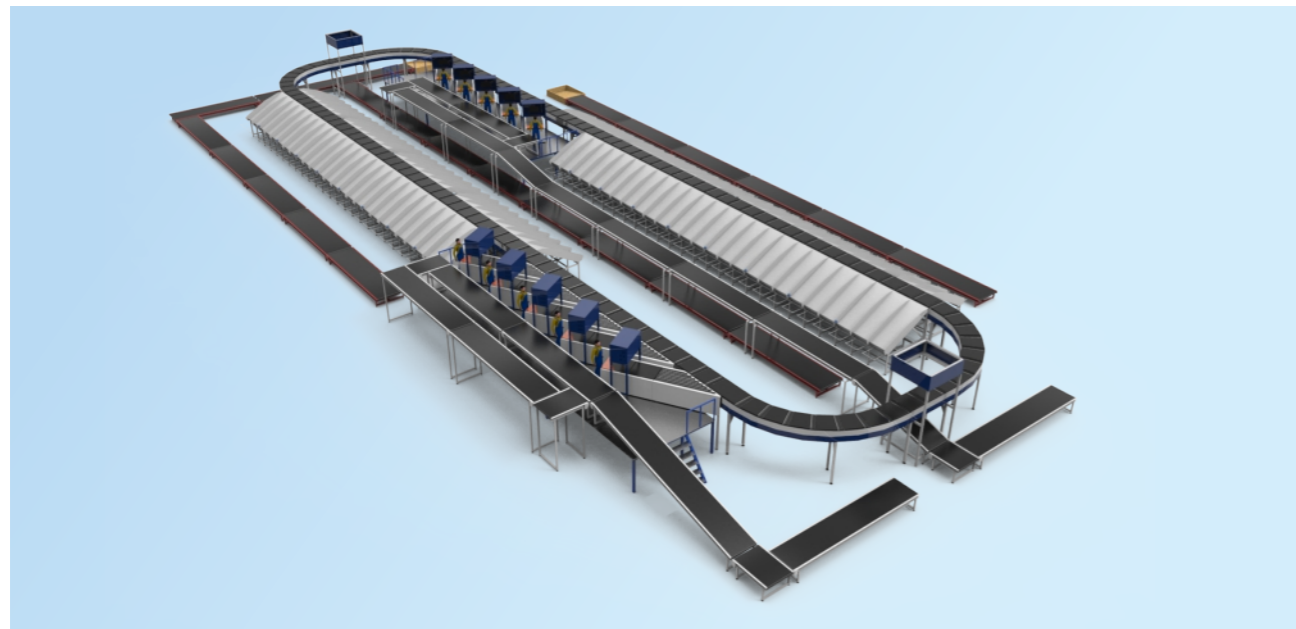
08

Smart Logistics

- Cross-belt Sorting Solution
- Matrix Sorting System Solution
- Mobile Robot System Solution
- Automated Stereoscopic Warehouse Solution
- Automatic Material Handling System Solution
- Stacker Crane Solution
- Shuttle-Based Carton Robot System Solution
- Roller Conveyor System Solution
- Automatic Palletizing Machine Solution
- 3D Vision-Guided Depalletizing/Palletizing Solution

Cross-belt Sorting / Solution

01 / Circular Cross-belt Sorter



Industry Background

The cross-belt sorter is currently the model with the highest sorting efficiency and best accuracy in automated logistics equipment. With its unique sorting principle, it can optimally handle sorting of goods under 700 * 500 * 400, solving issues at transfer centers or large-scale sorting sites such as high volume of small-to-medium parcels, high error rates in manual sorting, and high site operation and maintenance costs.

System Introduction

The circular cross-belt sorter primarily obtains parcel information via interaction between the master controller and the upper-level computer, then controls the slave stations and carts to reach designated positions for sorting small-to-medium parcels. With high speed and sorting efficiency, it is widely used in large distribution centers and transfer yards.

Control Scheme

Control Scheme Characteristics for the Main Loop Section

Main Loop Section:

Primarily responsible for real-time data exchange with the upper-level computer, acquiring parcel and sorting information via its integrated 100M Ethernet port; Performs zoning processing of sorting tasks, distributing tasks in blocks; Monitors the circular operation status in real time, including speed, cart position, sorting completion actions, etc. Achieves real-time speed control of the circular cross-belt via the frequency converter, regulated by a PID algorithm.

Induction Station Section:

The inducer is configured with a Xinjie Ethernet-enabled PLC and Xinjie's self-developed weighing module, paired with logistics-specific servos to implement the automated induction solution. Utilizing Xinjie's latest self-developed induction algorithm, it achieves synchronized speed planning between the induction station and the main loop, eliminating the need to pre-plan parcel position on the inducer.

Performance Table:

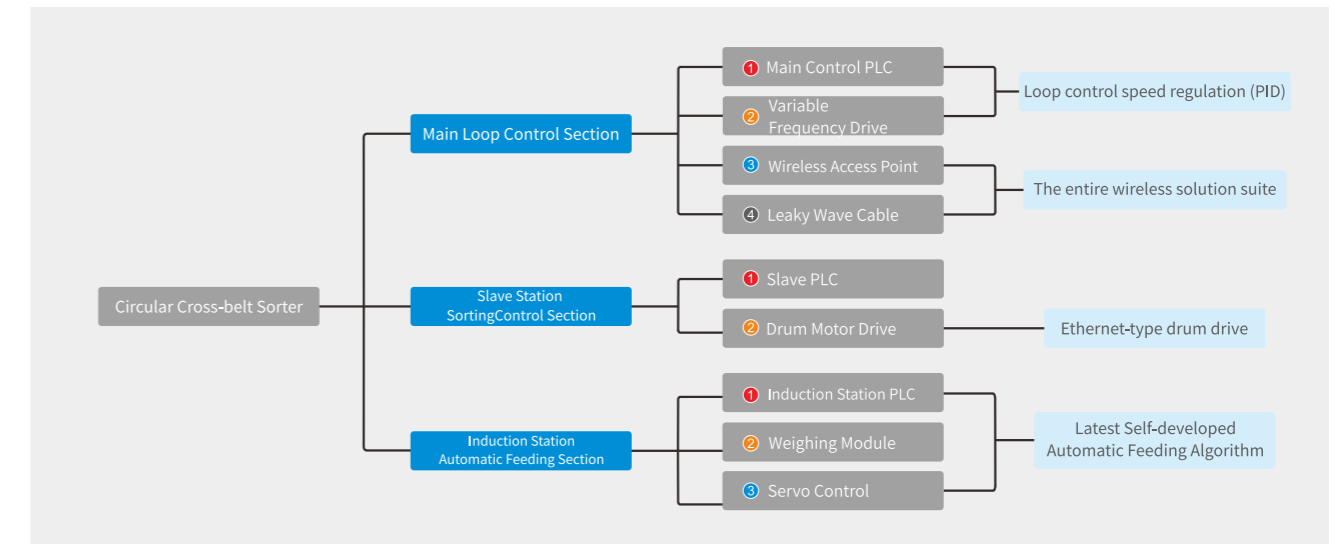
Maximum Line Speed	Induction Efficiency	Weighing Accuracy	Mechanical Structure	Data Interface
2.8m/s	About 2500 pieces/h	±3g	Three/four-stage induction /unmanned feeding	TCP/IP

Control Scheme Characteristics for Slave Stations

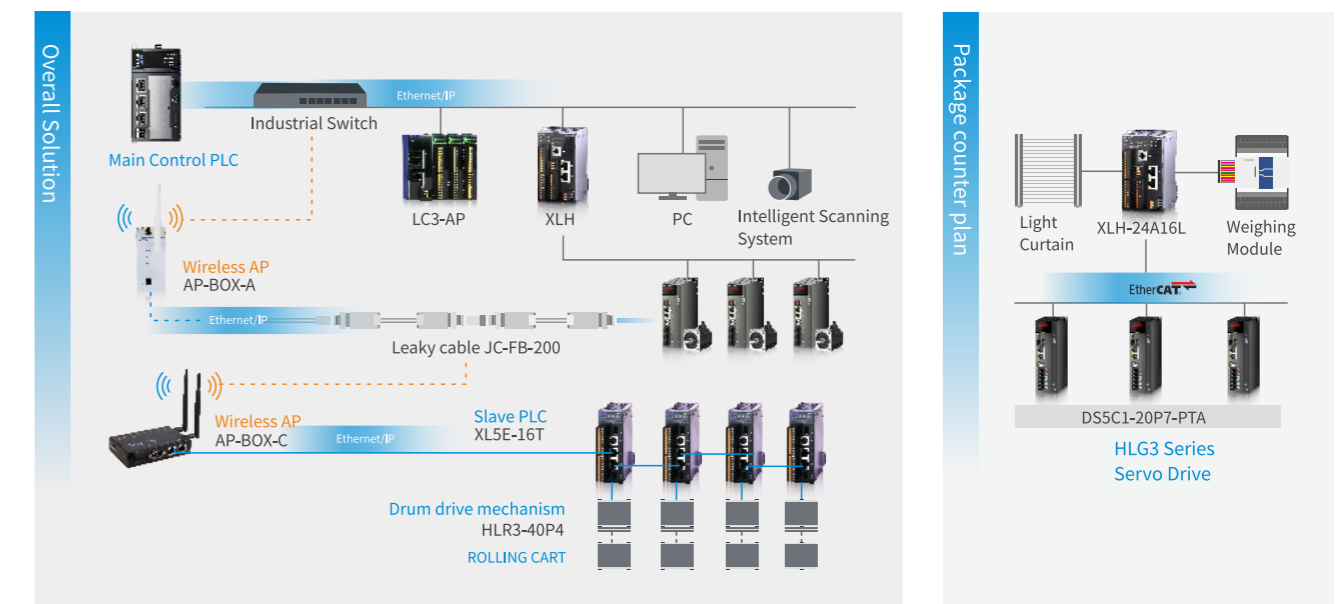
The slave station PLC controls the sorting carts, with each PLC equipped with a 100M Ethernet port. If Ethernet communication is used to control Xinjie roller drives, it is recommended that each slave station

control 30 to 40 roller drives. This can enable the sorting action to return packages and monitor the accuracy of each sorting completion in real time.

System Principle



System Topology



System Advantages

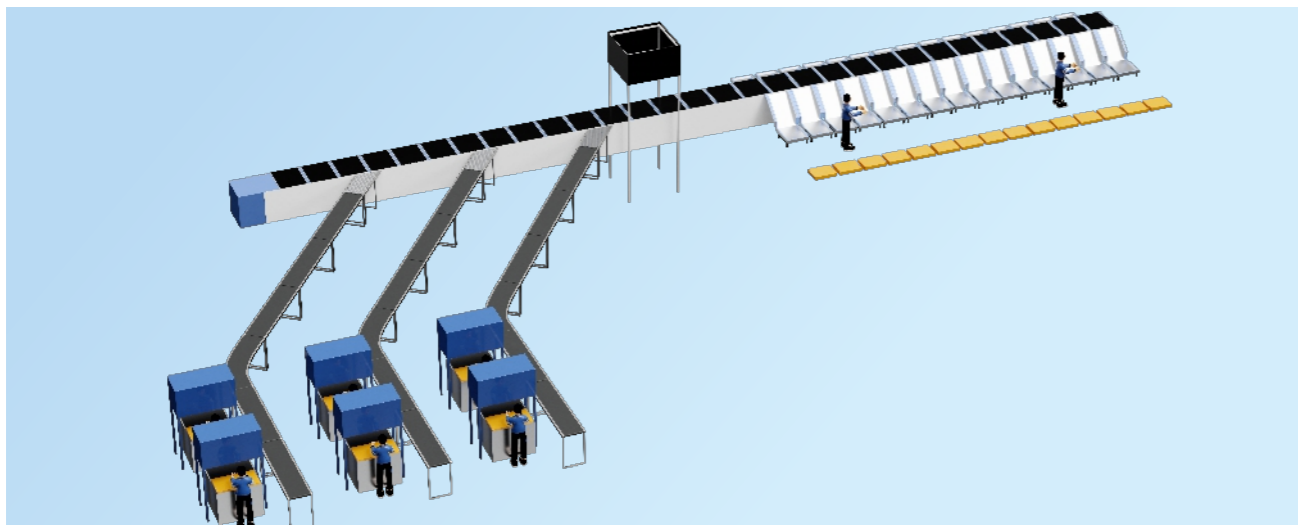
- 100% solution localization rate; Xinjie provides all control-related electrical products required for the project, along with corresponding programs and on-site implementation services.
- Maximum supported loop speed: 2.8m/s; Induction rate: 2000~2500 units/h; Weighing accuracy: ±20g; Cart quantity: under 500 units.
- Provides standalone module adaptation services for customer systems, including: localized standalone chute system; localized standalone induction station; localized standalone loop cart, etc.

Cross-belt Sorting / Solution

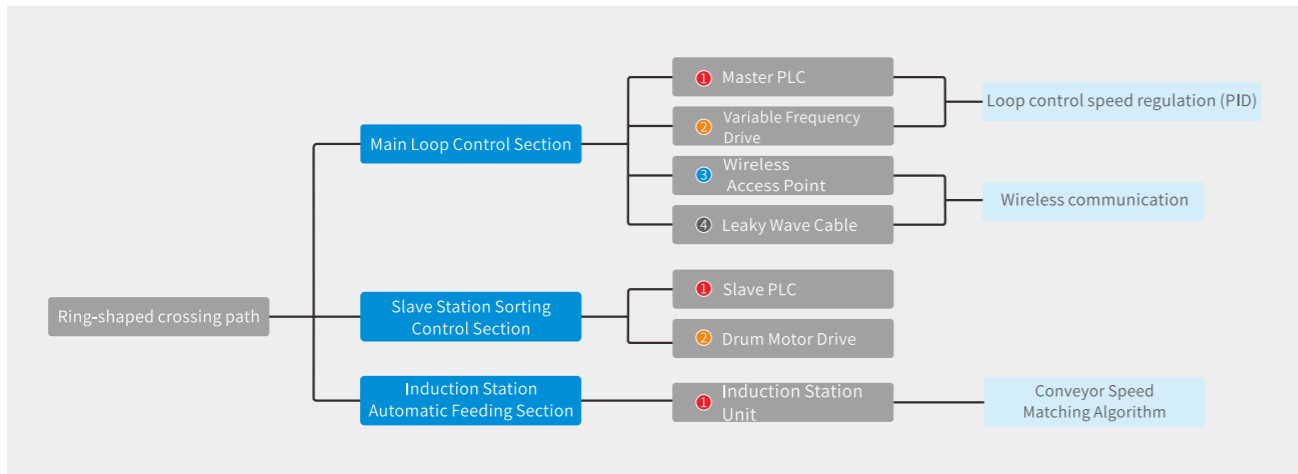
Field Applications



02/ Narrow-belt Cross-belt Sorter



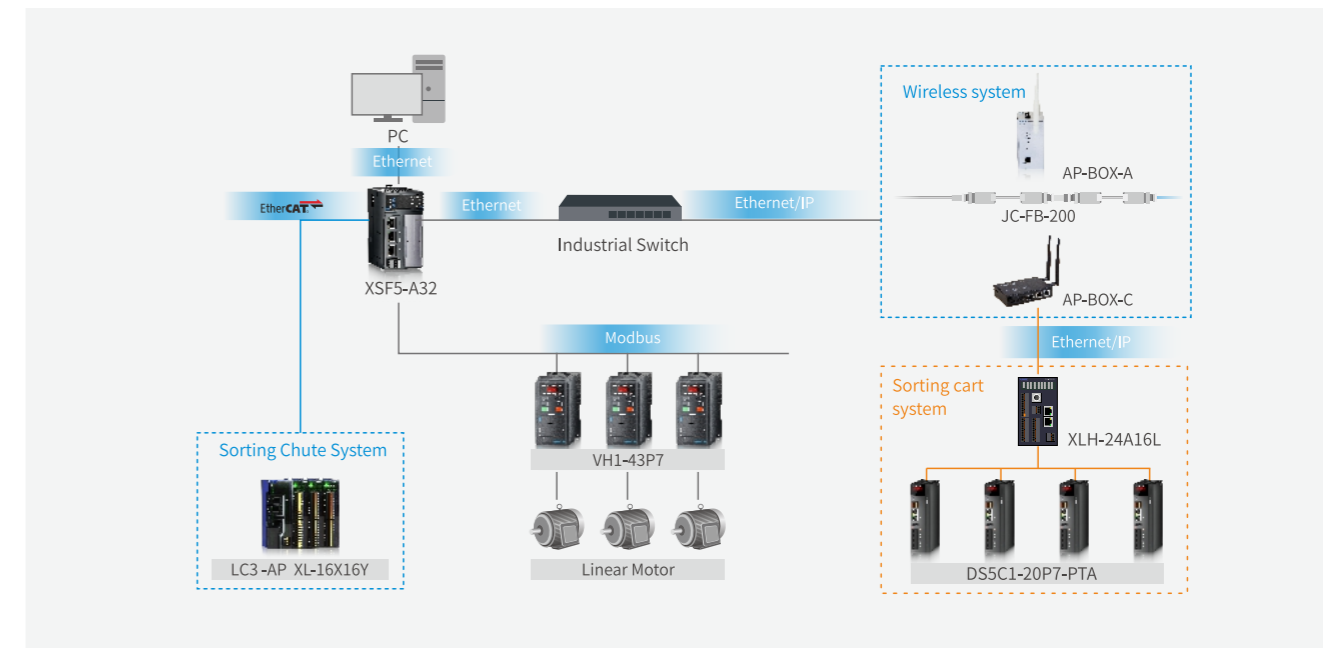
System Principle



System Advantages

- 100% localization rate; Xinje supplies all control-class electrical products required for the project, along with corresponding programs and on-site implementation services.
- Fully standardized programs; enable touchscreen parameter debugging, allowing self-debugging at a maximum of two field sites.
- Free customized program development is provided for requirements beyond the standard program scope

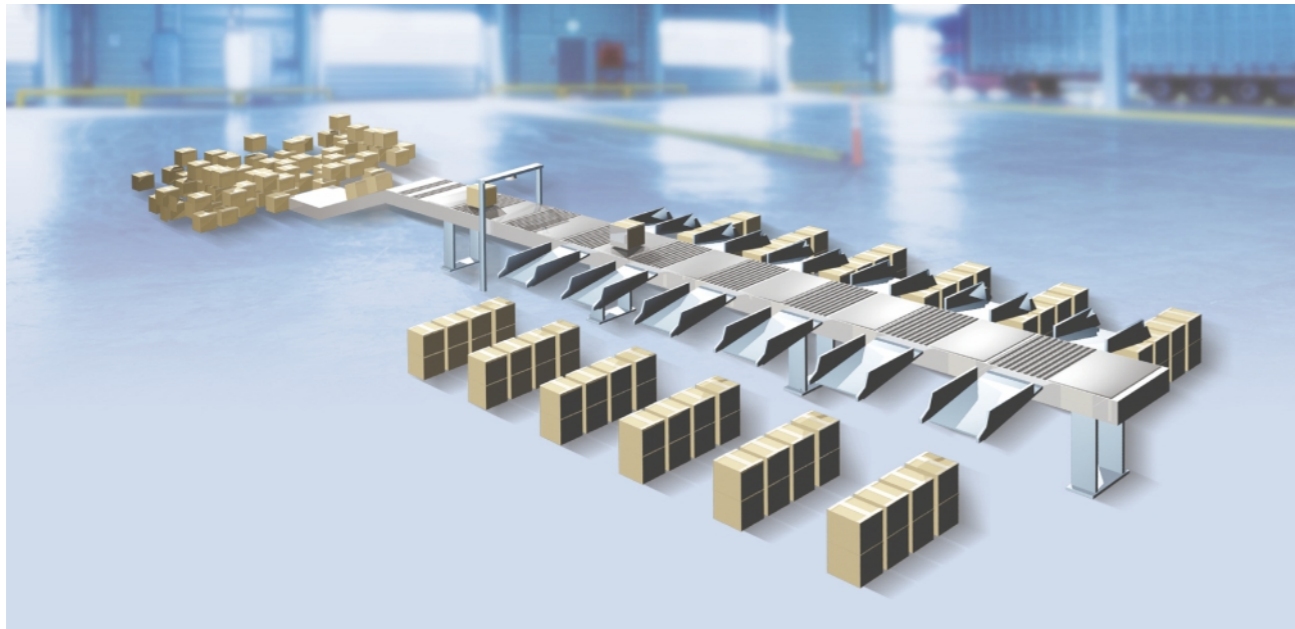
System Topology



Field Application



Matrix Sorting System / Solution



Industry Background

Matrix Sorting System components are flexible and variable; different sorting mechanisms can be selected based on different working conditions.

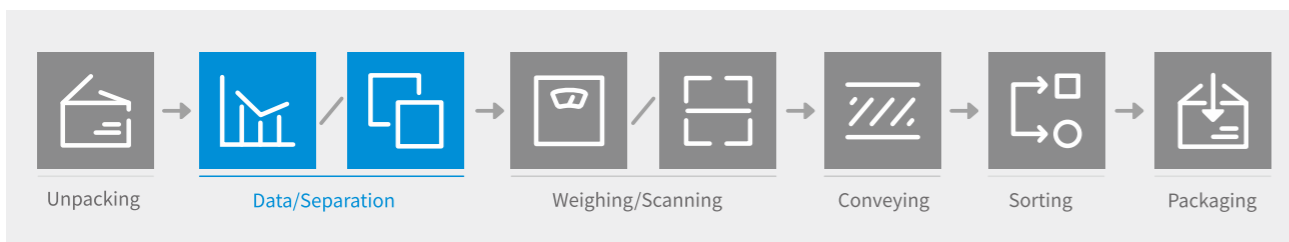
Applicable Industries

In-plant conveying, Port inbound, Port outbound, Pharmaceutical, Automotive, Books, Footwear & Apparel

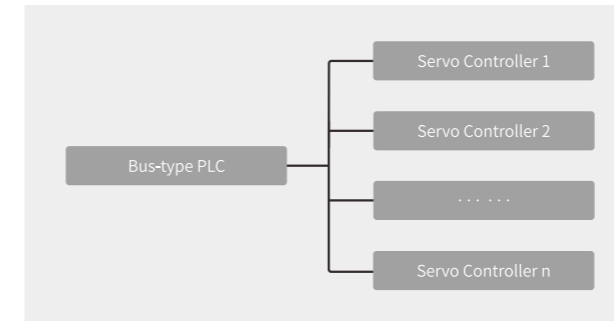
01 / Single-item Separation Solution

System Introduction

As the first process of matrix sorting, traditional conveying equipment has the single function of conveyance; even with a spacing function, there is a cost-efficiency mismatch. Single-item separation equipment can align, separate, and queue parcels intelligently, arranging large quantities of goods accumulated on belt conveyors into single items with a set pitch. Cooperating with subsequent sorting equipment can save significant labor costs.



System Principle



Control Scheme

This equipment adopts the Xinjie EtherCAT Bus Solution; the controller is the XDH series, supporting Ethernet communication, EtherCAT bus, interpolation following, and other motion commands.

Separation Section:

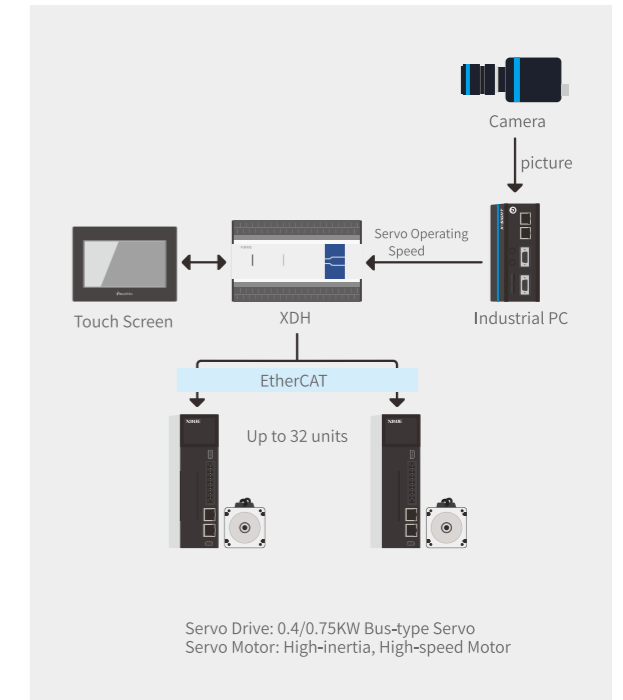
A 0.4KW bus-type servo and high-inertia, high-speed motor are selected, with a rated speed: 3000 rpm, supporting 3x overload.

Dispenser Section:

Considering one servo typically drives multiple belts, a 0.75KW bus-type servo and high-inertia, high-speed motor are selected.

The electrical scheme is mature, with standardized programs and parameterized debugging. Compatible with Dahua/Hikvision protocols, communication frequency with the IPC can reach under 10ms. The number of axes, acceleration/deceleration can be adjusted in real-time based on site conditions; programming is flexible. It can monitor module congestion to control the start/stop of the entire machine.

System Topology



Field Application



Matrix Sorting System / Solution

02 / DWS Solution

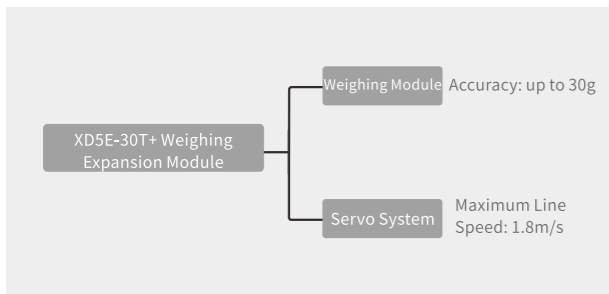
System Introduction

As a high-precision conveying device integrating weighing and scanning, the DWS (Dynamic Weighing and Scanning System) maximizes the saving of manual sorting processes through cooperation with upstream and downstream sorting equipment, improving work efficiency, reducing labor, and cutting costs.

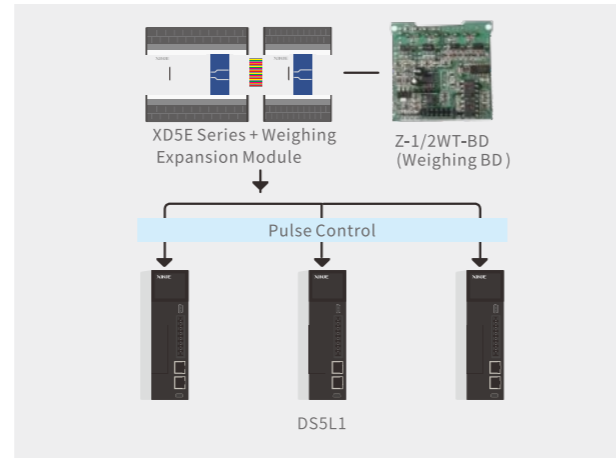


System Principle

The primary function of the DWS is to handle scanning, weighing, and dimensional measurement in the pre-sorting stage. It typically employs dynamic weighing, conducts the weighing, and uploads data in real-time to the host computer for interaction with the database.



System Topology



System Features

- Execution Efficiency: ~6,000 units/h; Maximum Line Speed: 2.2m/s.
- Maximum Weighing Accuracy: ~5g.
- Controller, expandable with weighing and other BD boards. Supports 4-channel 100KHz pulse output; can drive up to 4 pulse-type servos; integrates a 7-inch display.
- Controller has a built-in 10/100M adaptive Ethernet port for rapid integration with cameras and WCS.
- Industry-specific Servo: 0.75KW, provides higher cost-effectiveness.

03 / Diversion-Convergence Conveying and Sorting Solution

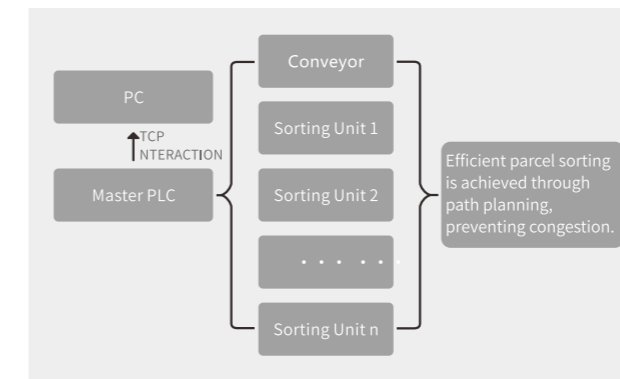
System Introduction

Traditional conveying equipment possesses only the singular function of transport; even with spacing functionality, a cost-efficiency mismatch exists. A singulation unit can align, separate, and intelligently queue parcels, thereby arranging large volumes of goods accumulated on the conveyor line into single units with a preset pitch. Integration with downstream sorting equipment can substantially reduce labor costs.



System Principle

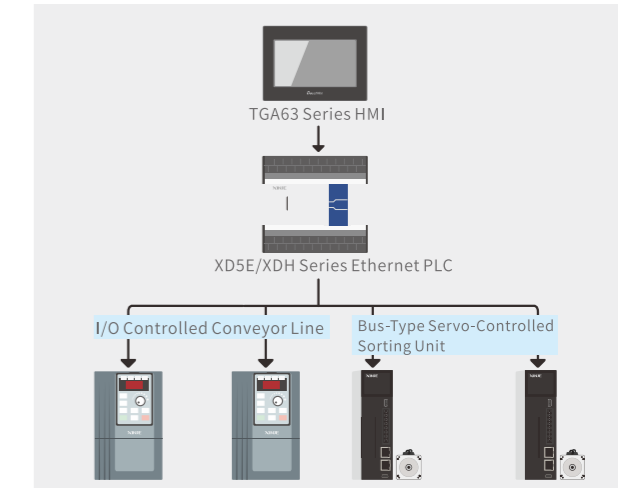
Diversion-Convergence Conveyor Sorting is a control method that achieves diversion and convergence by controlling conveyor start/stop via path planning and parcel priority, completing sorting through various means such as lift-and-transfer.



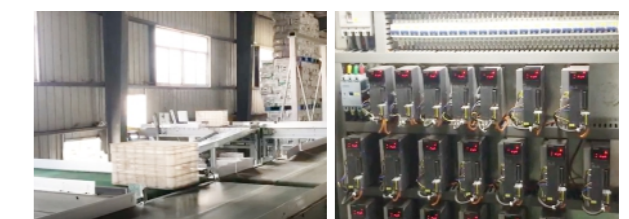
System Features

- Efficiency: 3000~4000 pcs/h; Line Speed: 1.5~1.8 m/s.
- The controller features dual built-in 100M Ethernet ports, supporting free-format Ethernet communication (e.g., TCP/IP) with the host computer. Communication frequency can reach 10ms.
- Onboard I/O supports up to 36 inputs/24 outputs, with expandability for multiple I/O modules.
- Diversified solutions support multiple sorting methods: lift transfer, swing wheel, narrow belt, etc.
- Rational site planning enables rapid and efficient parcel route control.

System Topology



Field application

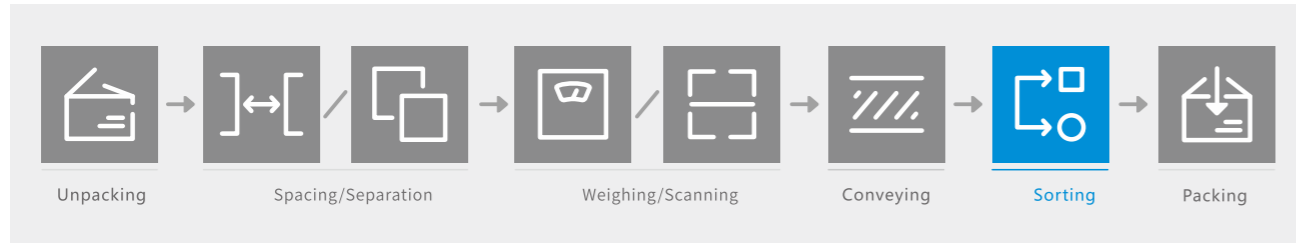


Matrix Sorting System / Solution

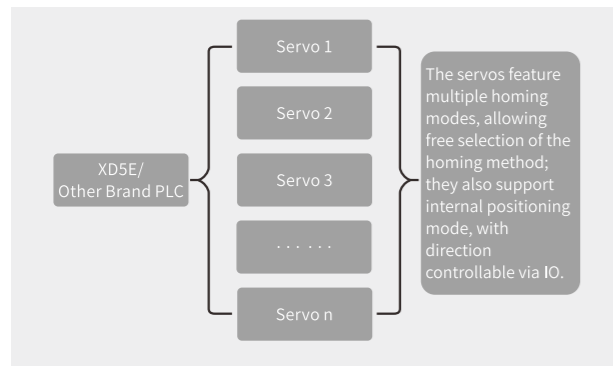
04 / Swing Wheel/Swing Arm Sorter Solution

System Introduction

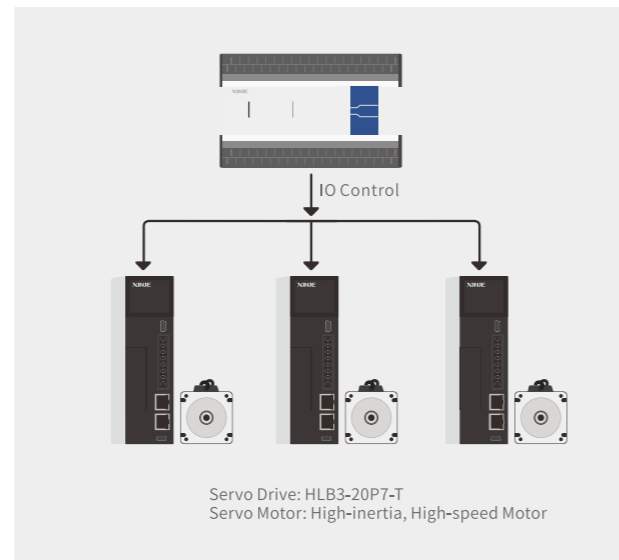
For the modular operation mode of swing wheels, Xinjie has developed an IO-controllable servo control mode, supporting selectable 35-segment internal positioning modes and 8 homing methods, adaptable to various field application scenarios.



System Principle



System Topology



Field application



Control Scheme

Adopts an internal positioning mode scheme, using XD5/XD5E series PLCs and a dedicated 0.4KW/0.75 swing wheel servo system, supporting 5 inputs/4 outputs, with both PNP and NPN wiring configurations optional. Swing angle is set via the internal positioning mode; pulse segments are selected via IO, supporting up to 35 internal position segments.

05 / Narrow-belt Sorter Solution

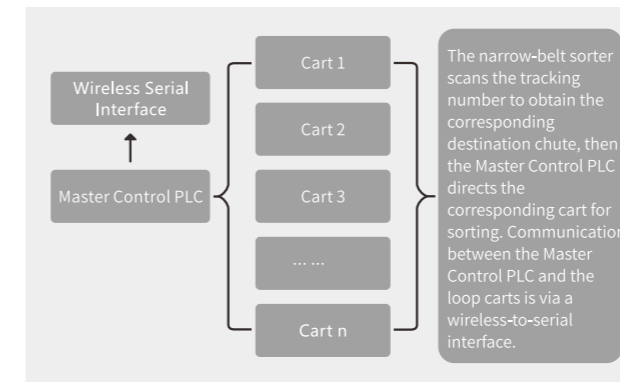
System Introduction

The narrow-belt sorter's prototype originates from the linear cross-belt sorter, but its control principle is significantly different. It is a new type of high-speed matrix sorter, offering faster speed and lower cargo pitch requirements compared to traditional swing-arm sorters, albeit with a slightly higher overall cost than conventional matrix sorters.

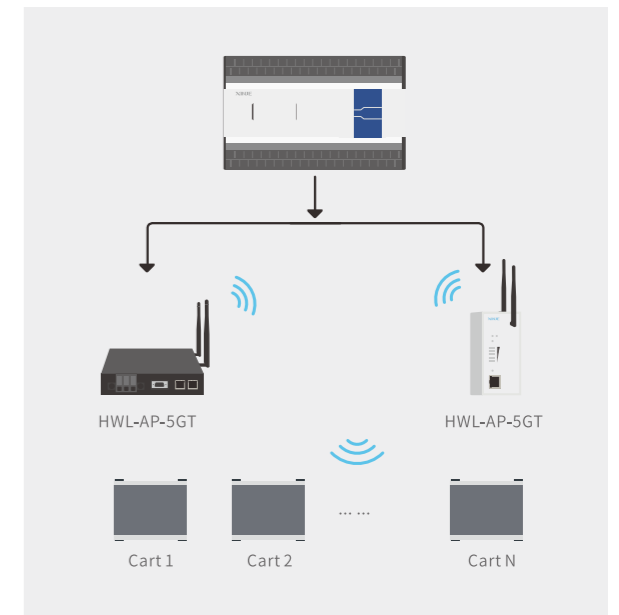


System Principle

Merging and diverting conveyor sorting is a control method that utilizes path planning and parcel priority to control conveyor start/stop, achieving split, merge, and sorting via various means such as lift-and-transfer.



System Topology



Control Scheme

Utilizing Xinje's self-developed Ethernet-to-serial technology, wireless control of cart sorting is achieved. Proprietary algorithms enable real-time judgment of cargo position and the number of occupied carts, allowing sorting of both large and small items.

Scheme Performance:

Loop Speed	Mis-sort Rate	Cart Quantity
2M/S	99.99%	About 500

Mobile Robot System / Solution



Industry Background

With the widespread adoption of information technology and big data applications, traditional warehousing and logistics operation methods can no longer meet the rapidly growing business demands. It is imperative to accelerate the automation and intelligent construction of warehousing and logistics. The introduction of smart warehousing enables efficient integration of production and logistics, thereby

enhancing enterprise production efficiency. For different operational segments, Xinje focuses on solving industry pain points. Through extensive field testing, it has accumulated rich on-site debugging experience and developed various solutions, enabling rapid deployment and long-term stable system operation.

01 / Magnetic Stripe Navigation Differential-Drive AGV Solution

System Introduction

The magnetic stripe navigation differential-drive AGV is primarily designed for goods handling with loads under 1 ton. It can automatically engage loads via lift or roller transfer mechanisms, featuring fixed task paths, high travel accuracy, and stable operation. Its application significantly improves work efficiency and is widely used for production line material handling in automotive, 3C, and manufacturing industries.

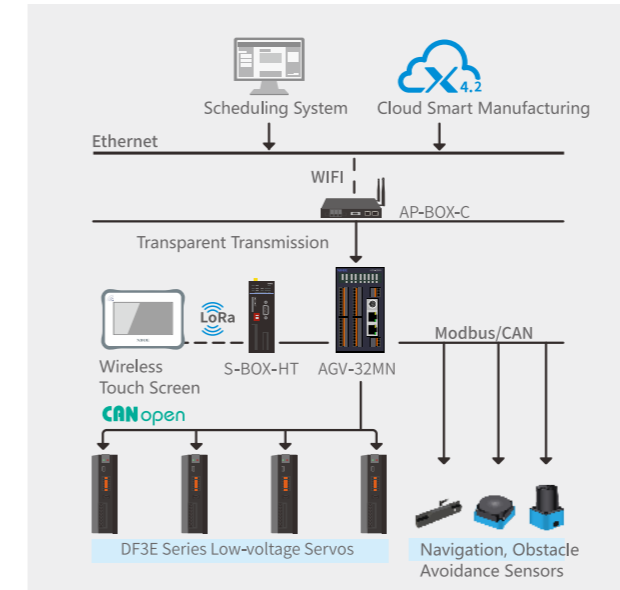
Control Scheme

The control system collects signals from magnetic guidance sensors, RFID sensors, laser anti-collision sensors, and safety bumpers. It navigates based on pre-set task path trajectories, performs differential speed control of the drive wheels using data from the magnetic sensors to achieve correction and steering, ensuring the AGV follows the magnetic stripe stably. When the RFID sensor detects functional tags deployed along the AGV's path, the AGV executes functions such as branch selection, in-place rotation, and stopping, thereby realizing navigation control, functional control, and safety protection for the AGV.

System Advantages

- Standardized vehicle control programs ensure rapid project deployment.
- Features standardized low-level motion control interfaces, supporting independent secondary development at the logic layer.
- Supports control of both single and dual differential-drive motion models.
- Integrates control for various transfer mechanisms like rollers and lifts, offering rich functional options.
- Supports visual path editing, standalone autonomous path planning, and online system scheduling.
- Wireless HMI communication enables visual parameter display and convenient modification.
- Provides customized services to meet specific customer requirements.

System Topology



Technical Parameters

Project	Parameters	Project	Parameters
Navigation Method	Magnetic Stripe Navigation	Operating Speed	0-60m/min
Control Method	Differential Control	Load Capacity	0-1000Kg
Travel Direction	Bidirectional Travel	Stopping Modes	Gradual Stop, Emergency Stop
Travel Functions	Forward, Reverse, In-place Rotation	Protection Methods	Laser Obstacle Avoidance, Safety Edge
Positioning Accuracy	±10mm	Protection Range	Adjustable up to 3m
Traveling Accuracy	±10mm	Drive Unit	Single Drive Unit Dual Drive Unit

Field application



02 / Magnetic Stripe Navigation Steering Wheel AGV Solution

System Introduction

Magnetic stripe navigation steering wheel AGVs are primarily used for handling loads over 1 ton. The steering wheel structure enables flexible omnidirectional movement. Through the coordination of lifting mechanisms, shared functions, and platforms, handling efficiency is improved, labor and time costs are reduced, and factory production automation is enhanced.

System Advantages

- Standardized whole-vehicle control program, enables rapid project deployment.
- Features standardized low-level motion control interfaces, supports autonomous secondary development at the logic layer.
- Features motion control algorithms for multiple vehicle types (single steering wheel, dual steering wheels, quad steering wheels, etc.), meeting diverse customer site requirements.
- Supports visual path editing, standalone autonomous path planning, and online system scheduling.
- Wireless HMI communication, visual parameter display, convenient modification.
- Provides customized services to fulfill customer requirements.

Control Scheme

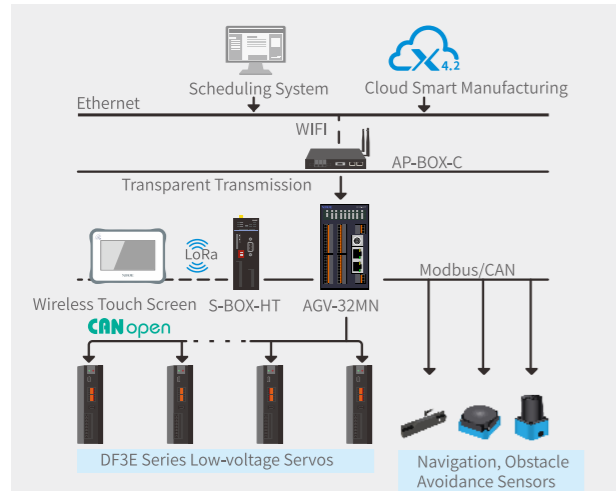
The control system utilizes a steering mechanism (drive + rotation) for drive control. The steering angle of the mechanism's rotation axis is controlled based on data from the magnetic guide sensor. Combined with the calculated driving axis speed, this enables deviation correction and steering during motion, ensuring the AGV follows the set task path stably. When the RFID sensor detects functional tags deployed on the AGV's path, the AGV executes functions like branch selection, in-place rotation, and stop, realizing navigation control, functional control, and safety protection.

Technical Parameters

Project	Parameters	Project	Parameters
Navigation Method	Magnetic Stripe Navigation	Operating Speed	0-40m/min
Control Method	Steering Wheel Control	Load Capacity	0-4000Kg
Travel Direction	Bidirectional Travel	Stopping Modes	Gradual Stop, Emergency Stop
Travel Functions	Forward, Reverse, In-place Rotation, Translation	Protection Methods	Laser Obstacle Avoidance, Safety Edge
Positioning Accuracy	±10mm	Protection Range	Adjustable up to 3m
Traveling Accuracy	±10mm	Chassis Model	Single Steering Wheel, Dual Steering Wheels, Quad Steering Wheels

Mobile Robot System Solution / Solution

System Topology

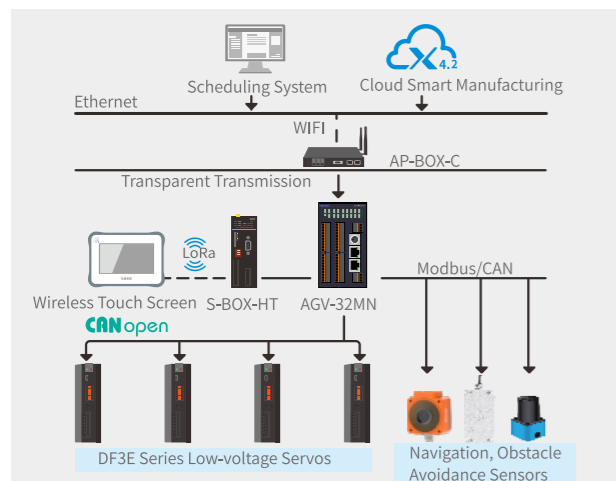


03 / QR Code Navigation AGV Solution

System Introduction

The QR code navigation AGV is primarily designed for handling light-load goods, with models focusing on rotation, lifting, and multi-layer tote handling. Its flexible path, high positioning accuracy, and fast speed are widely applied in scenarios like line-side warehouses, production line workstations, and tote-to-person systems.

System Topology



Field application



Control Scheme

The control system adopts a dual-wheel differential drive method. It processes and computes signals from laser obstacle avoidance, safety edges, QR code image capture by the on-board camera, and real-time data from the inertial navigation sensor. This converts discrete QR codes into a continuous path for deviation correction, ensuring stable AGV travel. It also enables functions like forward, reverse, in-place rotation, and stop, fulfilling navigation control, functional control, and safety protection requirements.

System Advantages

- Single-vehicle commissioning completed within 2-3 hours, ensuring rapid project deployment.
- Features standardized low-level motion control interfaces for direct function calls.
- Supports independent secondary development of logic-layer functions for flexible adaptation to non-standard requirements.
- Integrates algorithm processing for Hikvision and Dahua cameras, offering strong compatibility.
- High positioning accuracy: achieves $\pm 3\text{mm}$ positional accuracy, orientation accuracy $< \pm 1^\circ$.
- Capable of stable operation at speeds up to 2.2m/s, resulting in higher handling efficiency.
- Provides customized services to meet diverse customer non-standard requirements.

Technical Parameters

Project	Parameter	Project	Parameter
Navigation Method	QR Code + Inertial Navigation	Operating Speed	0-2.2m/s
Control Method	Differential Speed Control	Load Capacity	0-1000Kg
Travel Direction	Bidirectional Travel	Transfer Method	Lift + Rotation, Roller
Walking Function	Forward, Reverse, In-place Rotation	Rotation Mode	Following, Tracking
Positioning Accuracy	$\pm 3\text{mm}$	Stopping Modes	Gradual Stop, Emergency Stop
Traveling Accuracy	$\pm 10\text{mm}$	Protection Methods	Laser Obstacle Avoidance Safety Edge
		Protection Range	Adjustable up to 3 meters

04 / AGV Scheduling System Solution

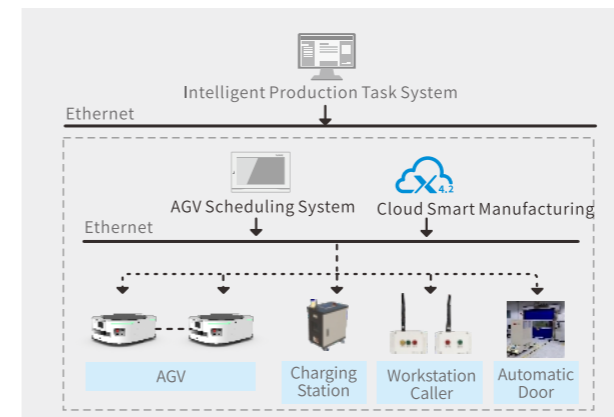
System Introduction

The AGV Scheduling System is a system capable of centrally monitoring, controlling, and dispatching multiple AGVs simultaneously. It is mainly used in scenarios with a large number of AGVs, complex routes, and frequent transport tasks. It can be integrated with material calling systems to make material handling more user-friendly, automated, and unmanned.

Control Scheme

The system primarily addresses scenarios with multiple AGVs operating in the same area. It acts as the master station deployed on the same local area network alongside AGVs, chargers, and workstation callers (slave stations). It automatically assigns vehicles based on task data, and performs functions like path planning, traffic management, command issuance, and automatic charging for the AGV fleet, while also monitoring vehicle status, alarms, and real-time positions. This satisfies application environments with numerous routes and frequent, complex transport needs.

System Topology



Field Application



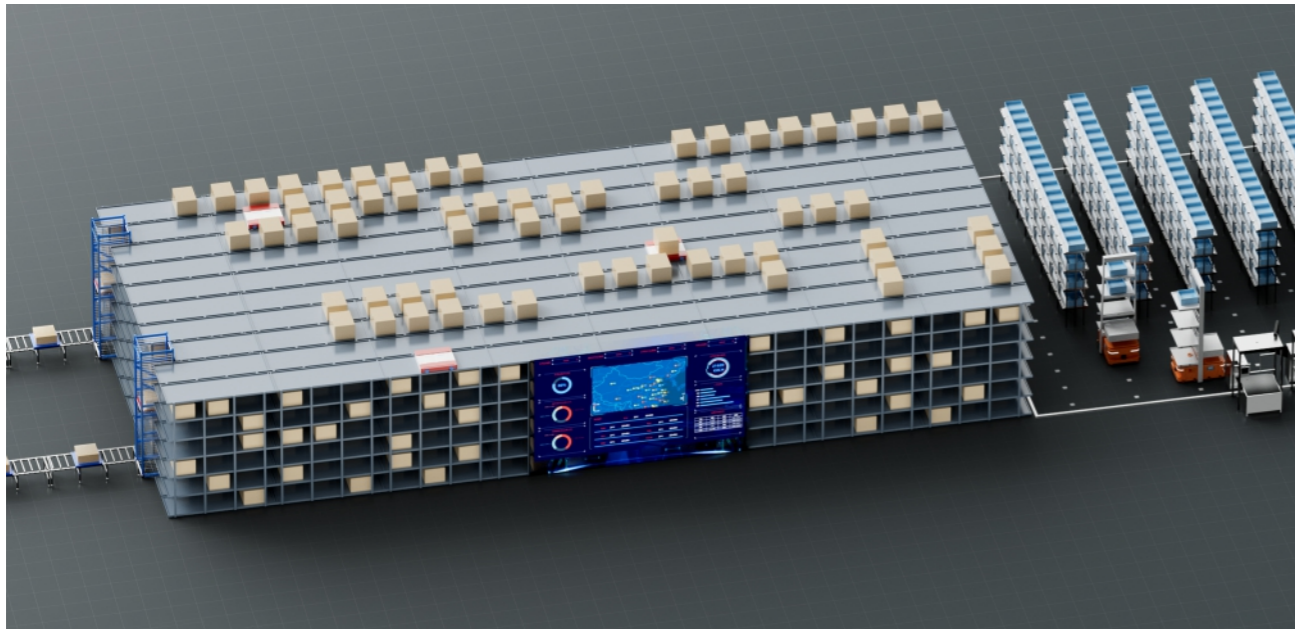
System Advantages

- Task Generation: Automatically generates tasks by receiving calls from workstations and data from upper-level systems.
- Vehicle Allocation: Automatically assigns the optimal vehicle to execute tasks based on vehicle status.
- Path Planning: Automatically plans the optimal path for AGVs and makes dynamic adjustments.
- Traffic Control: Performs real-time traffic control for multiple AGVs to prevent congestion.
- Automatic Charging: Monitors AGV battery status, automatically assigns charging tasks when reaching low battery to ensure continuous operation.
- Real-time Monitoring: Displays vehicle status information, alarm information, current location, etc.

Field application



Automated Stereoscopic Warehouse / Solution



Industry Background

Traditional warehousing faces challenges such as low space utilization, low operational efficiency, and high labor costs. With technological advancements and enterprise storage demands, the dense storage industry continuously pursues higher operational efficiency, lower costs, and better environmental sustainability. Through technological innovation and development, the dense storage industry is gradually transitioning from traditional models to intelligent, automated, and sustainable forms.

In automated storage/retrieval systems, Four-way Shuttles coordinate with Reciprocating Lifts. They operate on rails across different shelf layers and aisles. Under the control and scheduling of the Warehouse Monitoring System, they perform tasks like vehicle loading/unloading, cargo transfer, conveyor docking, and traversal, enabling multi-layer, multi-vehicle simultaneous operation in the dense warehouse. Four-way Shuttles handle fixed-point storage, retrieval, and transfer of goods. Lifts manage cargo-conveyor docking, inter-layer cargo transfer, and vehicle re-leveling. This breaks down barriers between layers, extending 2D storage space into 3D, significantly improving storage utilization and achieving dense storage.

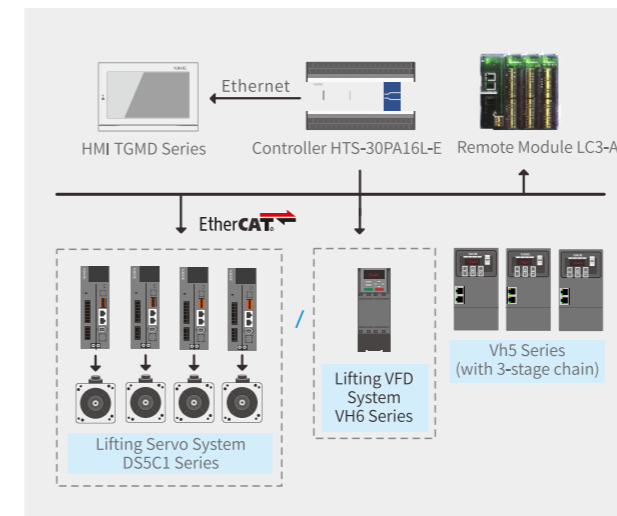


01 / Reciprocating Lift Control Scheme

The system employs an XDQ series motion controller, utilizing an EtherCAT bus to control a two-axis/four-axis servo-driven lifting platform (or a variable frequency drive system via EtherCAT). Gear binding ensures multi-axis synchronization. Combined with rack-and-pinion mechanics and motor absolute encoders, it achieves

precise target layer positioning, enables rapid soft start/stop. The complete system guarantees the load platform's four-corner deviation is within 2mm. Leveraging the high responsiveness of the motion control bus, it monitors parameters like lifting speed, platform position, load torque, and status alarms in real-time.

System Topology



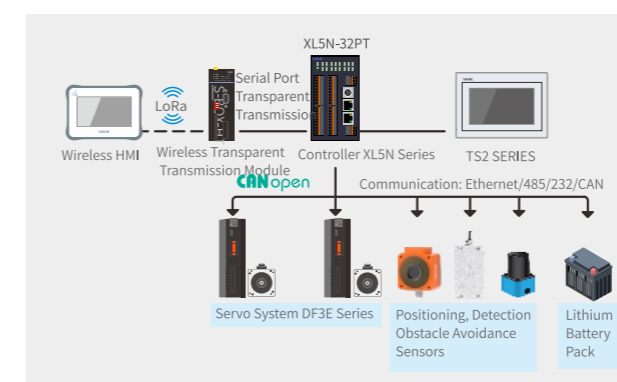
System Features

- Operating Parameters: Load capacity 1.5T-1.8T, linear speed 800mm/s (mechanically allows up to 1m/s), acceleration/deceleration time 1s.
- High Responsiveness: Bus communication cycle of 1ms ensures high synchronization for two-axis/four-axis operation.
- Fault Handling: Features one-click leveling for two-axis/four-axis systems, enabling rapid response to platform anomalies and efficient restoration.
- Safety: Predictive braking; the brake system engages 500ms prior to device failure, preventing platform sinking and eliminating tilt-related safety hazards.
- Low Temperature: For cold storage applications, servo motors are capable of operating in low-temperature environments down to -20°C.
- Technical Service: Customizes operation interfaces and program systems per client process requirements, and provides system upgrade/maintenance technical services.

02 / Four-way Shuttle Control Scheme

The Four-way Shuttle employs the XL5N series bus motion controller, utilizing a CANopen bus with a low-voltage servo system for motion control. It offers high responsiveness, convenient wiring, and strong anti-interference capability. It adopts a card-type ultra-thin PLC and compact motors to minimize internal space occupancy. The main unit features built-in multi-type communication ports (Ethernet, 485, 232, CAN) to integrate onboard barcode readers, distance sensors, battery information, etc. It executes tasks like storage, retrieval, and transfer under the scheduling of the Warehouse Management System.

System Topology



System Features

- Operating Parameters: Load capacity 1.5T, no-load speed 1.5m/s, full-load speed 1.2m/s, acceleration 0.4m/s².
- Positioning Accuracy: Direction reversal time and precise positioning can achieve 2.0s, with an accuracy of ±2mm.
- Performance: Utilizes high-inertia motors for soft start/stop. The drive and motor feature 3x overload capacity, improving shuttle running efficiency.
- Fault Handling: Equipped with an MTG wireless HMI, enabling remote single-unit scheduling for convenient fault handling.

Field Application



Stacker Crane / Solution



Industry Background

The stacker crane is the most critical legacy equipment in an Automated Storage and Retrieval System (AS/RS), serving as the system's primary actuator. It handles all storage and retrieval operations, achieving motion in three degrees of freedom (X, Y, Z). The X-axis corresponds to horizontal travel; the Y-axis to vertical lifting; and the Z-axis to fork

extension/retraction. For storage, the crane picks goods from the input/output station and precisely deposits them onto storage racks. For retrieval, it extracts goods from storage racks and places them onto the I/O station, from where other conveying equipment transports them to other locations.

Control Scheme

Xinje Stacker Crane Solution 1 employs XLQ7 series controllers with either variable frequency drive (VFD) or servo systems, connected via an EtherCAT motion control bus, to achieve highly flexible start/stop and high-precision control for the travel, lift, and fork extension actions. Solution 2 utilizes Xinje's high-performance dual closed-loop servo series, including the DM6C, to enhance the motion performance of equipment traditionally using VFD closed-loop control.

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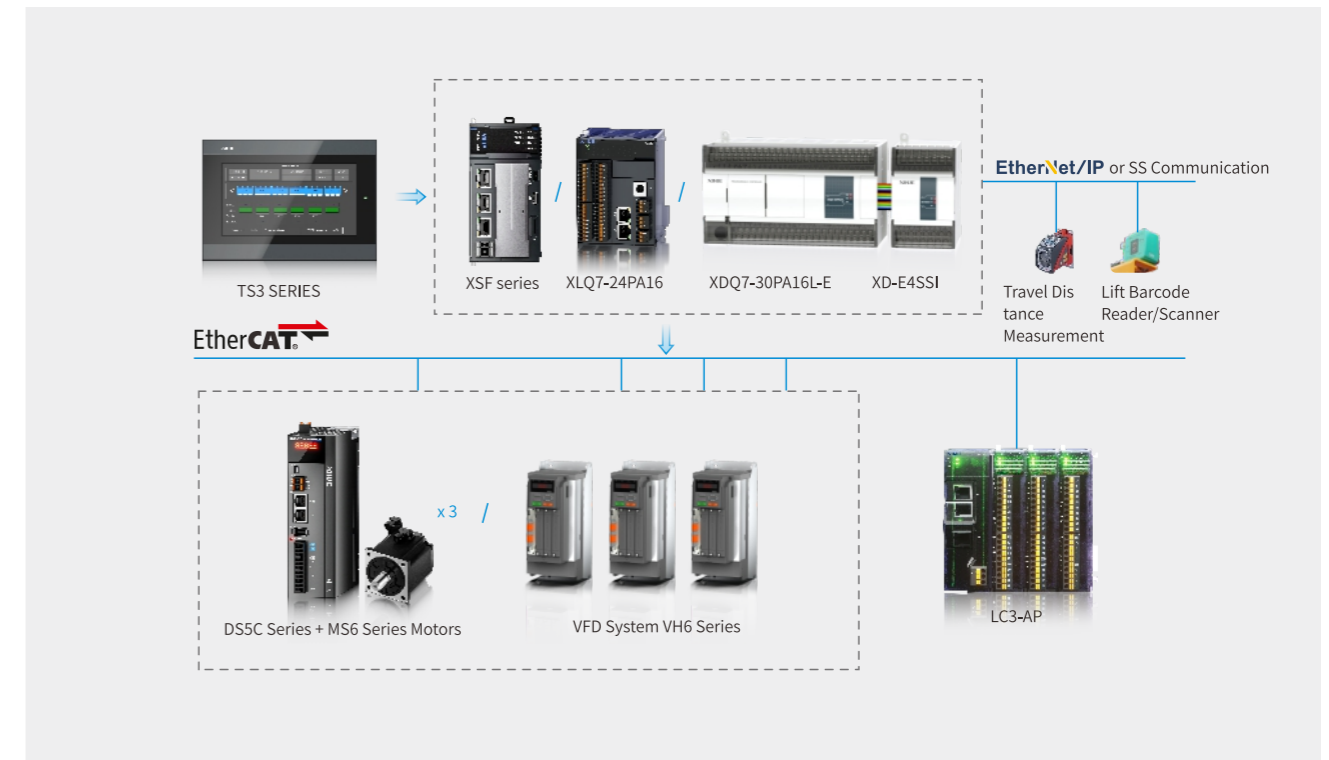
② Laser distance measurement sensors on the travel and lift axes provide operational data to the servo drive's SSI interface, establishing speed and position dual closed-loop control within the servo drive.

A flexible speed control scheme is adopted to reduce impact during speed changes, significantly shortening the buffering distance during starts/stops, thereby improving stacker efficiency.

System Advantages

- Internal PID algorithms process information to establish position and speed dual closed-loop control, correcting deviations caused by wheel slippage, ensuring control stability and positioning accuracy of ±1mm.
- The EtherCAT bus solution features a control synchronization cycle of 16 axes/1ms, offering fast communication speed and strong anti-interference capability.
- The flexible speed control scheme ensures smoother operation at high speeds, reduces mechanical impact, and significantly enhances storage/retrieval operational efficiency.
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System Topology



Technical Parameters

Project	Parameter		
Control Method	Speed/Position Dual Closed-loop		
Communication Method	EtherCAT / Wireless AP / Leaky Wave Cable / SSI / Ethernet/IP		
Function Modes	Jog / Manual / Semi-automatic / Standalone / Online Scheduling		
Load Capacity	≤500Kg	500Kg-5000Kg	≥5000Kg
Horizontal Travel Speed(MAX)	240m/min	180m/min	160m/min
Travel Acceleration	1.0m/s ²	0.6m/s ²	0.5m/s ²
Vertical Lift Speed(MAX)	90m/min	60m/min	40m/min
Lift Acceleration	1.0m/s ²	0.5m/s ²	0.4m/s ²
Positioning Method	Laser / Barcode / Encoder		
Positioning Accuracy	±1mm		
Power Supply Method	Conductor Rail, AC380V Supply		

System Interface



Shuttle-Based Carton Robot System / Solution



Industry Background

The Shuttle-Based Carton Robot System is a 3D dense-storage automated warehouse system, a specialized variant of the stacker crane, suited for efficient, intelligent picking in low-level rack-based dense carton storage. It possesses the following characteristics:

High Compatibility and Flexibility:

The system exhibits high rack compatibility, has low requirements for warehouse floor flatness, enables rapid on-site deployment, and can flexibly interface with various types of docking stations.

System Introduction

The robot communicates in real-time with the host computer, receiving commands containing target storage location coordinates, task type, and carton parameters. After validation, it converts coordinates into motion parameters and invokes the map to plan the optimal path. The travel axis adopts a drive-wheel structure, utilizing multiple methods for real-time position calculation. The lift axis adopts a timing-belt structure, employing a synchronization algorithm. The travel and lift axes move simultaneously to the target storage location and await pick/place commands. Pick and place actions are completed via the servo and the loading platform's extension fork and pitch adjustment mechanism. After task completion, it performs a self-check; success triggers closed-loop feedback to the host, failure triggers an alarm and logs the cause. It then executes new tasks as instructed or returns to the standby area.

Efficient Material Handling Capability:

It can integrate with carton-handling AGVs, conveyor systems, transfer systems, etc., to construct various smart warehouse scenarios. It is applicable to multiple application scenarios such as AS/RS-line-side distribution and goods-to-person picking.

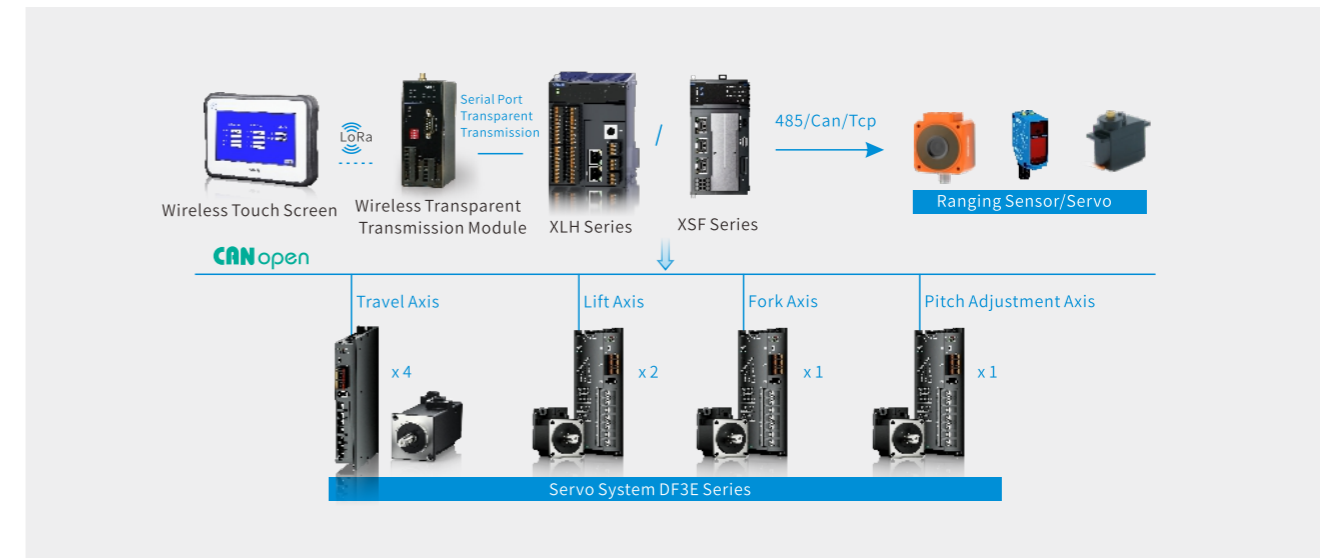
Space-Saving Design:

Effectively saves space and increases storage density, solving operational challenges in narrow aisles.

Control Scheme

This scheme is controlled via the EtherCAT bus. The travel axis is a drive-wheel structure (four motors total), utilizing multi-axis synchronization and vertical torque balancing algorithms (low-voltage CANopen, command-less). The lift axis is a timing-belt structure (two motors total), using a synchronization algorithm. The loading platform's extension fork and pitch adjustment each use one motor, paired with a servo for handling goods. During operation, it interacts in real-time with the host for tasks. After acquiring a task, the travel and lift axes move simultaneously to the target location, await the pick/place command, and complete the action via the servo and the platform's extension fork and pitch adjustment mechanism.

System Topology



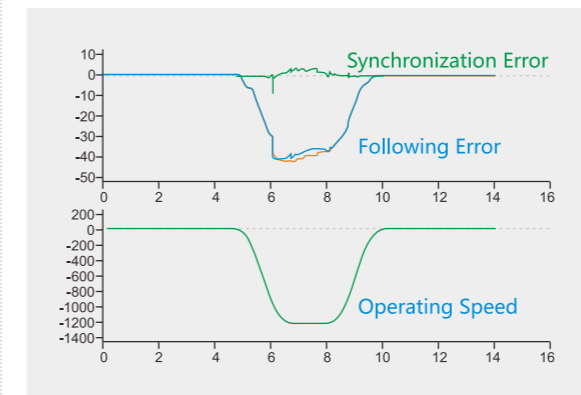
Solution Advantages

Operating Parameters

Load capacity: 30-100kg; Horizontal speed: 4m/s, Acceleration: 2m/s²; Lift speed: 3m/s, Acceleration: 3m/s².

Positioning Accuracy

Precise positioning: ±1mm.



Easy to debug

Compared with most of the operating parameters of competing products, which need to be frequently rewritten in the driver during debugging, all the algorithms and configurations of XJIE are integrated into the PLC. They can be modified remotely through the PLC, offering high flexibility.

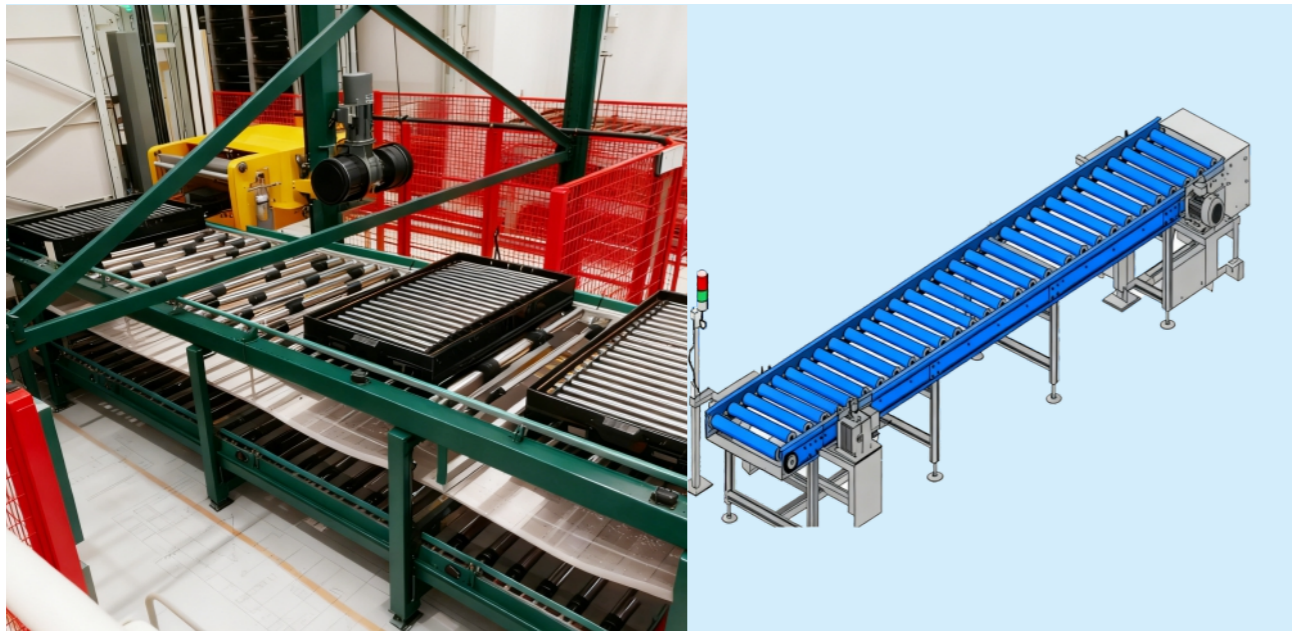
System Interface



Field Application



Roller Conveyor System / Solution



Industry Background

The roller conveyor line industry is a key component of smart manufacturing and logistics automation. It encompasses logistics equipment that enables the automated transportation of materials such as boxed goods, palletized goods, and large individual items through powered drive or gravity guidance. It is widely used in production manufacturing, warehousing and logistics, e-commerce express delivery, food and pharmaceuticals, and other fields. As a core component of modern logistics automation systems, it undertakes critical functions such as point-to-point material conveying, buffering, and sorting interface.

Control Scheme

In practical applications, the roller conveyor line forms a closed-loop conveying network through seamless end-to-end connections between areas such as warehouse receiving, storage and transfer, outbound sorting, or inter-process junctions in workshops. The conveyor system receives task instructions issued by the WCS (Warehouse Control System) in real-time based on order requirements and inventory data, automatically dispatches material conveying routes. It can also cooperate with scanning devices to verify cargo information during the process, ultimately achieving precise and efficient automated flow of goods from external receiving, inbound storage, to order picking, outbound distribution.

System Introduction

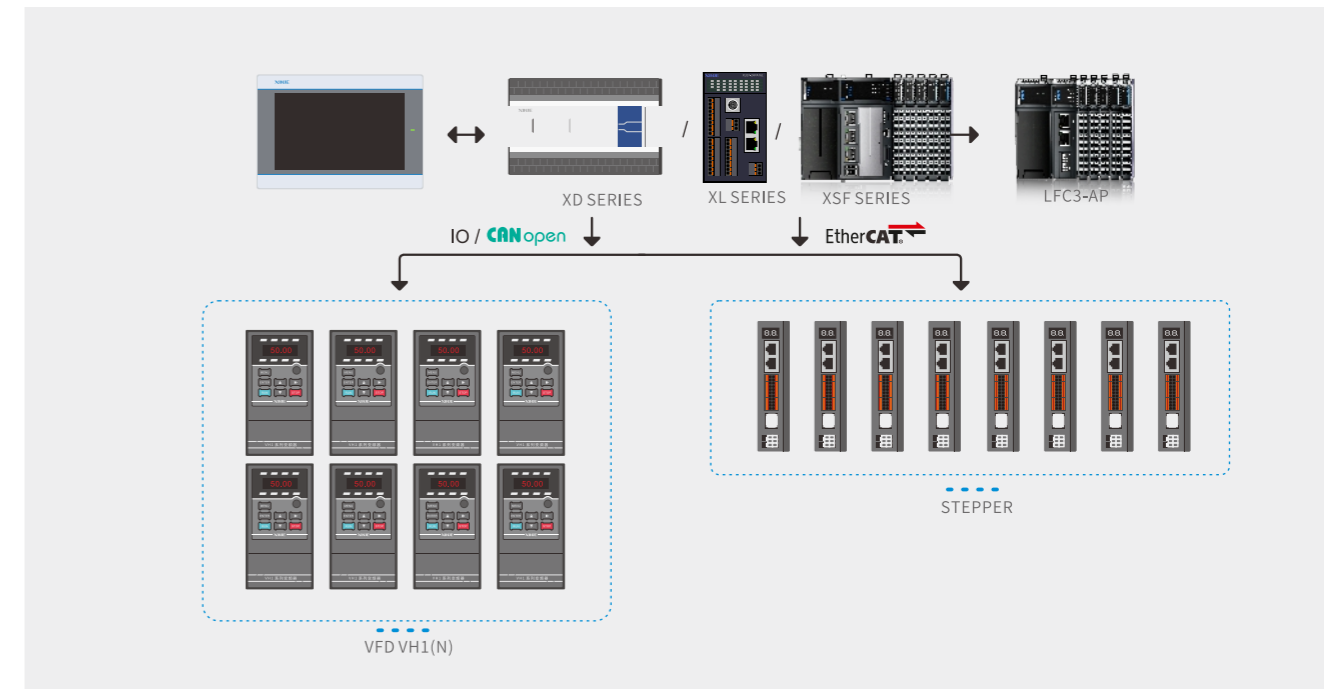
Roller conveyor line systems are divided into two control schemes: bus control and IO control.

Bus Control Scheme: The bus control scheme is used for high-precision position and speed control. It offers advantages such as high positioning accuracy, position recording during abnormal power loss, simple wiring, and strong anti-interference capability. It is suitable for large, complex logistics lines (e.g., multi-segment, cross-area warehouse sorting lines), meeting automation requirements for high cycle times and multi-task coordination. In the semiconductor industry, the conveyor line can interface with overhead hoist transports (OHT) via the E84 communication protocol to achieve automated material transport and full-process

monitoring.

IO Control Scheme: The IO control scheme offers high adaptability, with core advantages including simple architecture, lower cost, and convenient debugging. It is suitable for simple logistics lines (e.g., single-segment conveyance, fixed-path workshop process transfer lines). This scheme can flexibly integrate weighing modules, RFID modules, or camera scanning modules to achieve real-time material information update and tracking.

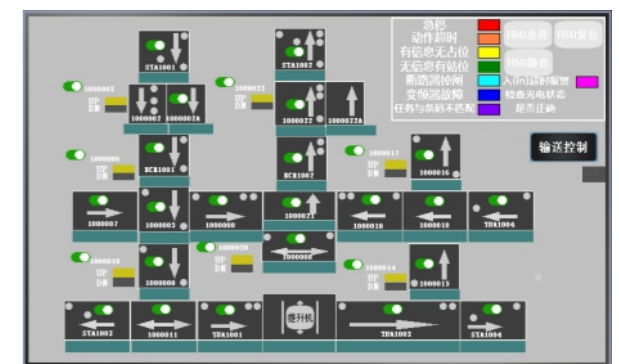
System Topology



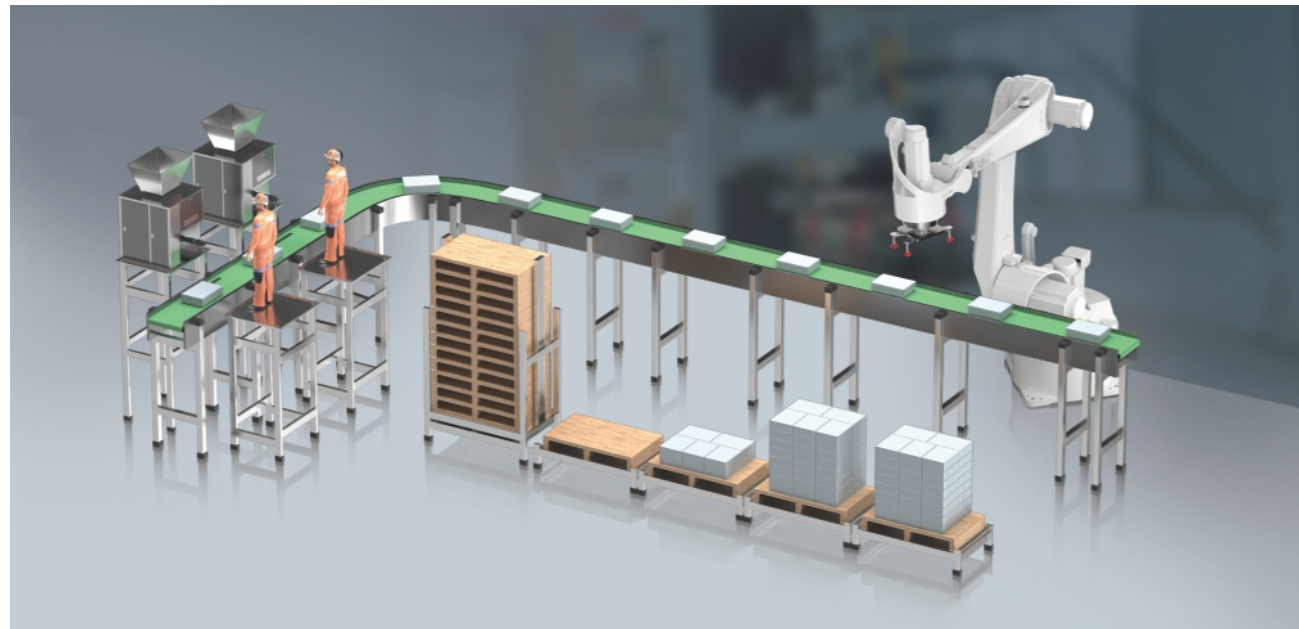
Solution Advantages

- Standardization of core components enables quick association and deployment across different sites, with simple and rapid commissioning.
- Seamless coordination with AGVs, shuttle cars, sorters, stacker cranes, and WCS systems forms a complete logistics closed loop, achieving "conveying-sorting-storage" full-process automation.
- Real-time communication between the PLC and the host computer system enables core functions like path planning, speed synchronization, and material diverting, supporting 1-millisecond level synchronous control precision.
- Safety Protection: Features fault diagnosis and alarm functions. It can monitor parameters like motor torque, temperature, and roller speed in real-time. Upon abnormality, it automatically warns, logs fault information, and immediately triggers shutdown to prevent personnel and equipment damage.
- The conveyor line integrates functions such as weighing, dimension detection, and barcode verification.
- Space Optimization: Allows double-layer layout (upper layer for inbound, lower layer for outbound), saving over 30% of floor space.

System Interface



Automatic Palletizing Machine / Solution



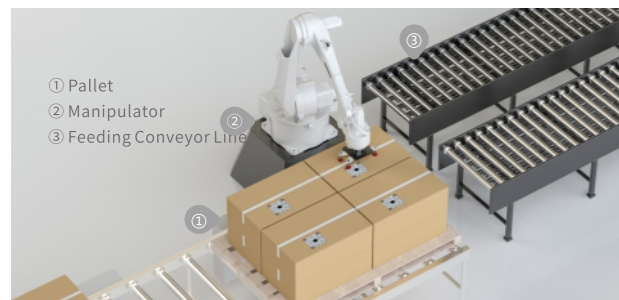
Industry Background

In recent years, with the gradual disappearance of China's demographic dividend, the labor market structure has also undergone a significant transformation. Industries involving simple, repetitive, and labor-intensive tasks are increasingly facing labor shortages and recruitment difficulties. The high cost of manual labor has imposed substantial pressure on various sectors including industry, manufacturing, and warehousing. Palletizing machines, leveraging advantages such as low cost, flexible operation, precise palletizing, and lower energy consumption, have gained favor from numerous enterprises in

manufacturing, warehousing, logistics, pharmaceuticals, tobacco, food, and other industries. Currently, China is in a critical period of transformation and upgrading from traditional equipment to advanced manufacturing equipment. Driven by robust demand from domestic enterprises, the potential of China's palletizing market is becoming increasingly prominent, with promising future development prospects.

System Principle

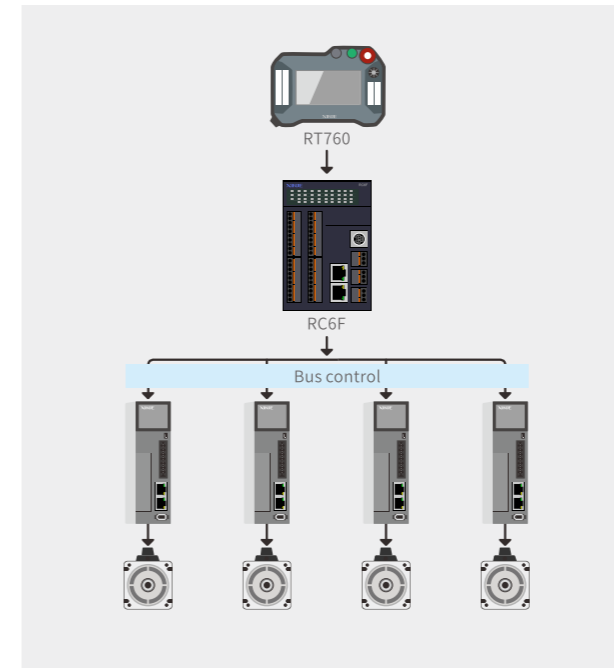
After materials are packaged in the upstream process, they are first conveyed and organized by a conveyor belt to a designated pickup area. The palletizer's gripper then places the materials onto the pallet according to pre-set parameters and stacking patterns. Once the pallet is fully loaded, the gripper returns to the standby position. A forklift then transports the completed pallet to the warehouse. Finally, after an empty pallet is fed into the workstation, the palletizer continues its operation.



Control Scheme

Automatic palletizers can be categorized into two main types based on mechanical structure: gantry/Cartesian palletizers and articulated palletizing robots. Gantry/Cartesian palletizer systems adopt Xinje's XD series PLC and RT711 teach pendant bus solution, offering advantages such as simple wiring, high servo precision with fast response, and position retention after power loss. Articulated palletizing robot systems utilize the professional RC6F robot controller paired with the new RT760 teach pendant. Their advantages in high efficiency, quality, and stability play a significant role in helping enterprises advance towards automation and intelligent development.

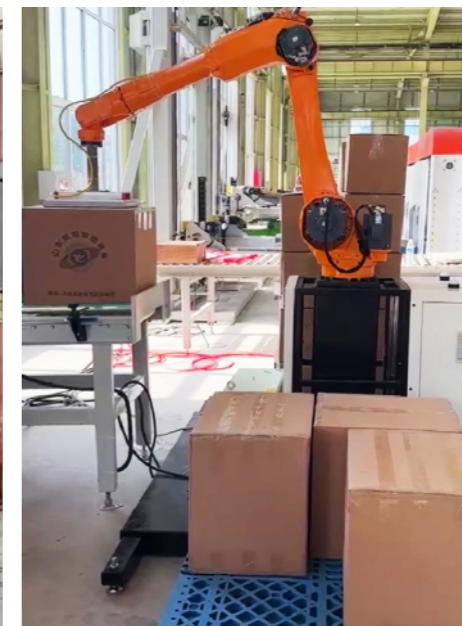
System topology



System Advantages

- Diverse Selectivity**
 Conventional models, including gantry, high-level, column, and articulated types, all have mature solutions. They cover three control methods: pulse, bus, and EtherCAT. Customers can make multiple selections based on their actual needs.
- Flexible Customizability**
 Additional functions can be added to the program via provided interfaces, facilitating easy secondary development. Simultaneously, the HMI interface can be custom-designed to create an exclusive style for the customer's product.
- Comprehensive Process Package**
 The palletizing process package integrates multiple functions such as process parameter setting, one-click pattern generation, and dual-pallet operation on a single machine. Incorporating differences in palletizing methods across industries, it designs palletizing functions for four pattern types: matrix, spiral, layer, and custom. This meets customers' diverse palletizing needs, eliminating cumbersome teaching tasks.
- Powerful Feature Set**
 The palletizing robot system employs block-based programming, allowing operators to freely add motion commands, thereby improving programming efficiency. It features complete four-axis linkage and interpolation functions. During operation, smooth transitions between multiple trajectory segments are possible without stopping, enhancing robot operational efficiency.

Field Application



3D Vision-Guided Depalletizing/Palletizing / Solution



Industry Background

Initial depalletizing/palletizing tasks relied primarily on manual labor. However, with rising domestic labor costs and the younger generation's increasing reluctance to engage in repetitive, high-intensity, and poor-conditioned physical work, recruitment difficulties have become a prominent issue. Manual depalletizing/palletizing has limited speed, is prone to fatigue, and cannot meet the demands of continuous, high-intensity operation. Due to vast differences in object size, shape, material, and packaging, early automation solutions could only handle objects with pre-set positions and orientations, failing to manage such non-standard, mixed-load stacks, which significantly limited the solution's applicability. Xinje's AI+3D Vision-Guided Depalletizing/Palletizing Solution was developed to address this. It guides robots in handling and transferring various logistics units (cartons, sacks, crates, etc.). By equipping robots with "eyes" and a "brain", it solves the challenge of traditional automation struggling with complex, variable depalletizing scenarios, significantly improving logistics turnover efficiency in food, FMCG, retail, express delivery, pharmaceutical, chemical, and other fields.



System Introduction

In modern production lines, diverse carton types, irregular stack patterns, and high-intensity manual handling are bottlenecks constraining efficiency and automation. Our intelligent 3D vision depalletizing/palletizing solution is designed for this purpose. It integrates advanced 3D vision, AI algorithms, and robot control, significantly improving material handling efficiency, transfer speed, and system flexibility. It is widely applied for automated depalletizing/palletizing tasks involving cartoned, bagged, or boxed materials in industries such as food & beverage, FMCG, express logistics, pharmaceuticals, and automotive parts.

Solution Advantages

- Fast deployment: For typical depalletizing scenarios, rapid deployment can be completed within 2 days.
- High picking efficiency: Vision algorithm detection cycle exceeds 3600 pieces per hour.
- Employs advanced AI and 3D algorithms, achieving a recognition success rate above 99.9%.
- Intelligently identifies different stack patterns, automatically plans the optimal path, eliminating the need for recipe switching.
- Widely compatible with various robotic arm types (quaternions, Euler angles, XYZ coordinates).

System Topology



Control Scheme

The control scheme adopts a 3D camera + robotic arm + Industrial PC configuration. First, the 3D camera captures point cloud data and 2D color images. The vision software running on the IPC processes this data, with its algorithm intelligently segmenting adjacent cartons. Path planning and obstacle avoidance algorithms then determine the optimal depalletizing sequence. Finally, the grasping pose is sent to the robotic arm to execute the depalletizing process.

On-site Application



09 Informatization

- Textile Equipment Cloud-Integration Solution
- PV & Li-Battery Pack Line MES Solution
- Workshop Production Line Informatization Solution

Textile Equipment Cloud-Integration / Solution



System Introduction

To address the need for a quick overview of overall workshop production management and equipment status in the textile industry, the Textile Equipment Cloud-Integration Solution utilizes Ethernet-based PLCs (or gateways) and a Cloud-based Smart Manufacturing Platform. It enables functions such as operational monitoring, production scheduling management, user management, and order detail tracking.

Working Principle

Production parameters are mapped/acquired from the equipment. The raw data is transmitted to the platform via Ethernet-based PLCs or gateways. The platform then processes this raw data utilizing edge computing and visualization technologies, ultimately presenting the results in formats such as charts and reports.

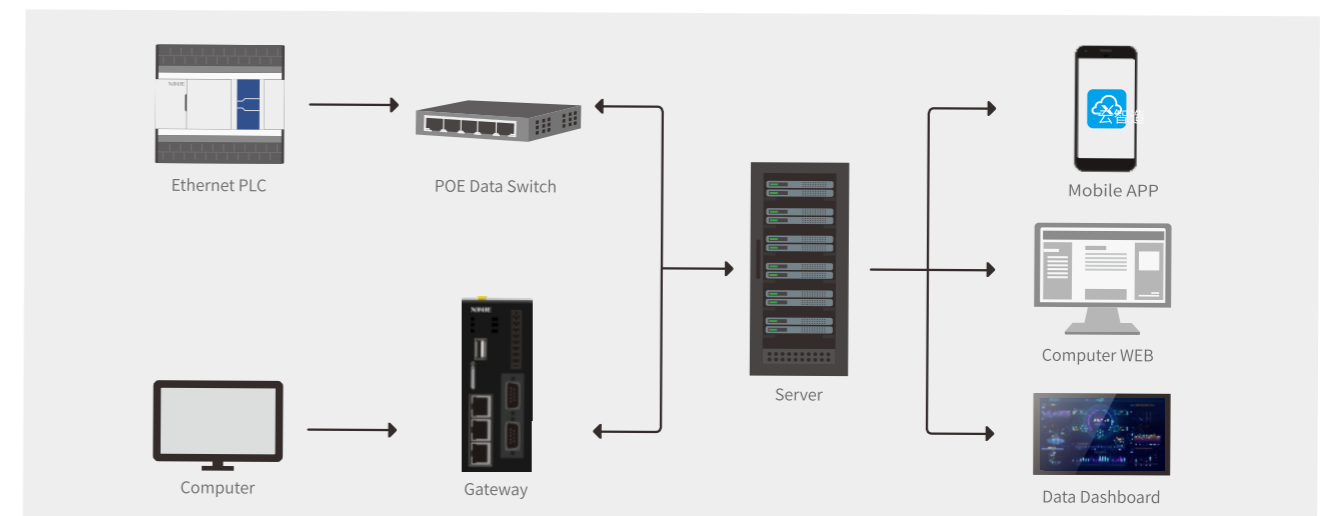
System Advantages

- IoT-enabled HMI**
 The HMI features built-in IoT connectivity, eliminating the need for an external gateway
- Automated Data Logging**
 Supports scheduled automatic data logging and manual one-click export, offering flexible recording methods.
- Multi-terminal Access**
 Enables real-time viewing of production progress, capacity efficiency, and other metrics on large display dashboards and office computers.
- Remote Diagnostics**
 Facilitates remote equipment debugging, allows for one-click switching of production specifications.
- System Integration**
 Various standard API interfaces for seamless integration with MES/ERP systems. A MySQL database supports the storage of diverse equipment data.
- Data Security**
 Features LAN deployment, isolated data transmission to prevent leaks, and ensures network integrity without interference.

System Functions

- Operational Monitoring**
 In the workshop production process, centralized monitoring of equipment status is conducted. Production information is aggregated and displayed by workshop dimension, including operational availability rate, daily cumulative output ranking, etc.
- Personnel Performance**
 Through the binding of personnel IDs with equipment, the integration of employees with production performance is clarified. This facilitates salary calculation, and generates detailed performance reports for traceability in case of subsequent disputes regarding assessments.
- Production Statistics**
 Centralized statistics are conducted on the production status of all equipment across multiple workshops. This includes production progress ranking for each machine, operational efficiency, and operational availability rates.
- Shift Production Details**
 Per-shift equipment downtime ratio, output quantity, and output value are recorded. This enables real-time monitoring of workshop efficiency, swift identification of reasons for low equipment efficiency, and prompt corrective actions to ensure all looms operate at high efficiency.

System Topology



System Interface



PV & Li-Battery Pack Line MES / Solution



System Introduction

The Manufacturing Execution System (MES) for energy storage lithium battery production monitors and manages the production process in real time, improves efficiency, optimizes resources, enhances product quality, reduces waste and cost, strengthens data integration and analysis capabilities, enables rapid response, supports customized production, ensures regulatory compliance and standardized management, and is an indispensable tool in modern manufacturing.

System Advantages

- **Raw Material Screening**
Based on production requirements and product quality standards, battery cells are screened to ensure consistency of the battery module product.
- **Barcode Traceability**
Traceability barcodes are generated from raw materials and serve as carriers for production line data binding, linking process parameters and inspection results from each station.

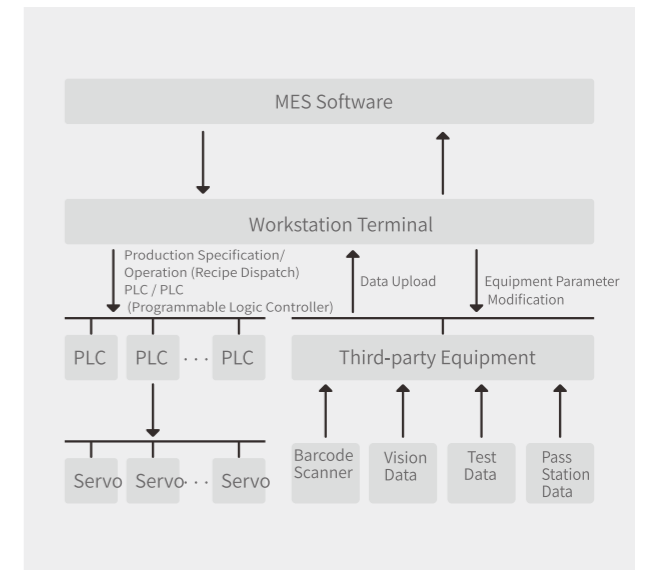
Working Principle

Product parameters from each production line stage are saved to a database, enabling both production visualization at each stage and data exchange at key stages, thereby providing traceable data support for the final product.

- **Data Transmission**
Using the unique traceability barcode, data from vision systems and End-of-Line (EOL) testing is transmitted between different processes, ensuring stable production flow operation.
- **Production Control**
Based on defined work orders, raw material usage is controlled, current work order progress on the production line is displayed, production efficiency is monitored, and real-time adjustments and optimizations are performed.

System Functions

- **Code Scanning & Verification**
Acquires raw material barcodes, matches them with factory test data, and performs dual-layer validation and screening by comparing with actual measurements.
- **Product Traceability**
Enables post-production traceability of key manufacturing data, such as module tests and raw material tests, to rapidly identify issues.
- **Production Management**
Defines product parameters, consolidates multiple orders into batches, sets production schedules, and centralizes the manufacturing of individual products for streamlined management.
- **Equipment Management**
Manages parameter communication interfaces for production equipment at each process station, enabling rapid reconfiguration and matching during adjustments or replacements.
- **Barcode Binding**
Establishes reciprocal binding between individual component barcodes and the final product barcode, facilitating post-sales issue tracing.



System Interface



Workshop Production Line Informatization / Solution



System Introduction

Aiming at prevalent issues in manufacturing workshops such as the data black box and information silos, Xinje has launched the Workshop Production Line Informatization Solution. This solution is data-driven, providing enterprise managers with a global perspective. Through the production line data

dashboard, the operational status, production capacity, and energy consumption of each equipment can be monitored in real-time. Leveraging a unified information platform, it enables real-time monitoring and report generation, driving decision-making with data.

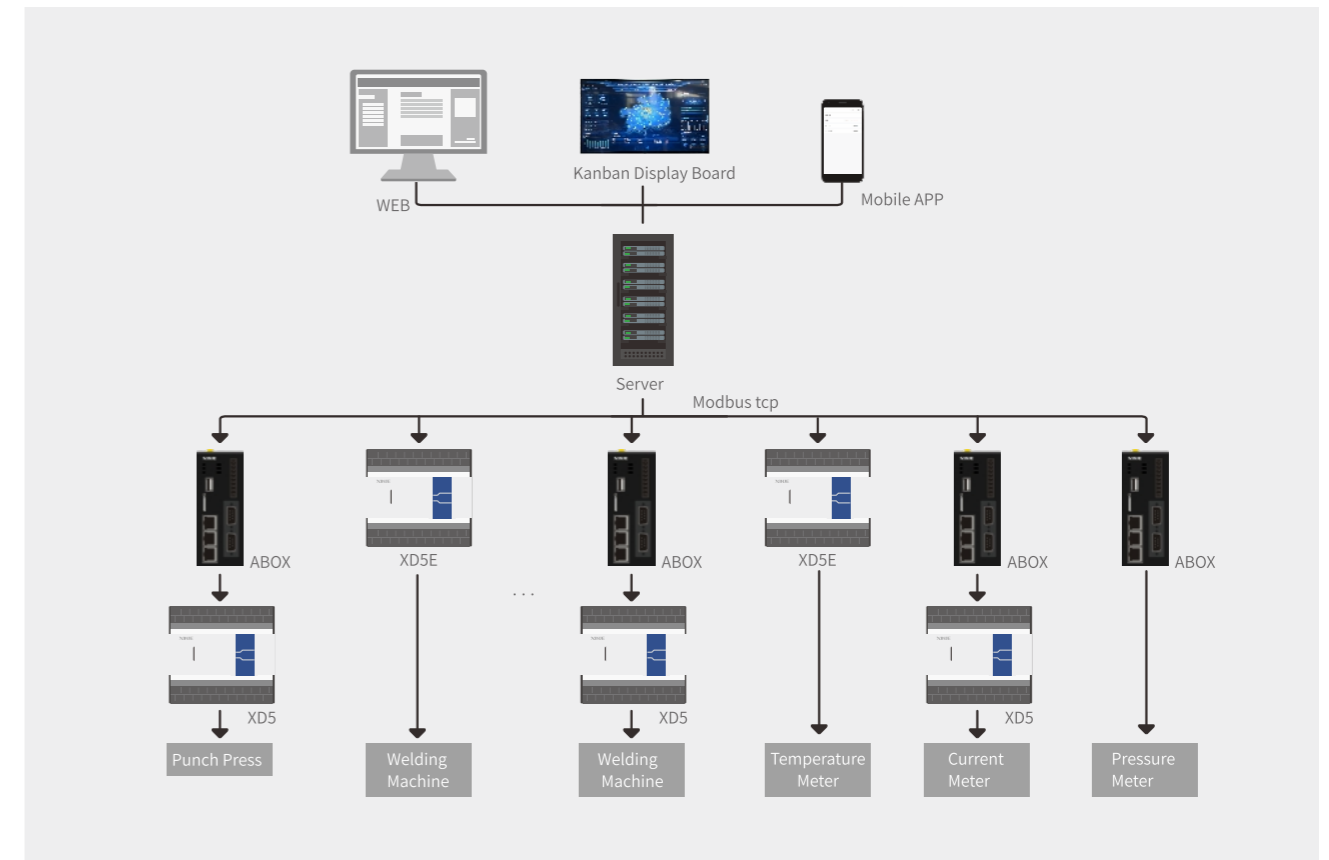
System Functions

- **Data Monitoring**
Customizable data dashboards, integrated with real-time video, enable centralized monitoring and flexible visualization of the status of various production line equipment.
- **Production Capacity Analysis**
Based on precise shift schedules and production capacity rules, customized production capacity reports are provided, making the equipment efficiency and production performance clearly visible at a glance.
- **Alarm Logging**
Immediate fault alarms, automatic data recording, in-depth analysis of downtime causes, precise bottleneck identification, establishing a closed-loop improvement from passive response to active optimization.
- **Operation and Maintenance Management**
Creates and maintains equipment maintenance plans, generates repair work orders upon faults, tracks the entire handling process, forming a traceable closed loop.

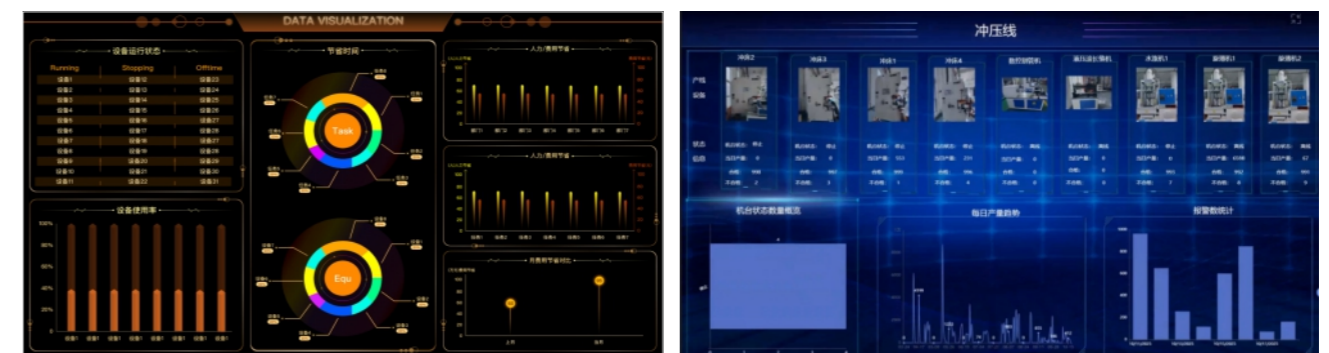
System Advantages

- **Information Security**
Supports deployment in a pure LAN environment, with core data stored and circulated locally, eliminating external network interference, preventing data leakage risks.
- **Data Integration**
Breaks down equipment data barriers, aggregates critical parameters via standard interfaces, enabling unified visualization and analytical processing within the platform
- **Data-Driven**
Real-time monitoring of production line equipment status and process parameters, accurate recording and analysis of downtime causes and efficiency bottlenecks, providing a data foundation for predictive maintenance and lean improvement.
- **System Integration**
Provides standard API interfaces, supports upward integration with management systems such as MES and ERP, driving collaboration and decision-making across the entire business chain.

System Topology



System Interface



10 Other

- Dental Milling Machine System Solution
- Tubular Furnace Cascade Temperature Control Solution
- Diaper Industry Solution

Dental Milling Machine System / Solution



Industry Background

Driven by increasing demand for oral health and cosmetic dentistry, along with continuous technological innovation, the aging population and rising living standards are fueling the need for high-quality dental prosthetics, which in turn promotes the growth of the dental milling machine market.

Compared to traditional impression methods, dental prosthetics produced via optical 3D scanning and CNC milling offer advantages such as high machining precision and production efficiency, enabling the fabrication of more complex restorations.

Control Scheme

The dental milling machine utilizes an HLH-A5 five-axis dedicated PLC. It connects to five servo drives via an EtherCAT bus for the X, Y, Z, A, and B axes, and controls the inverter via RS485 communication to operate at a set frequency.

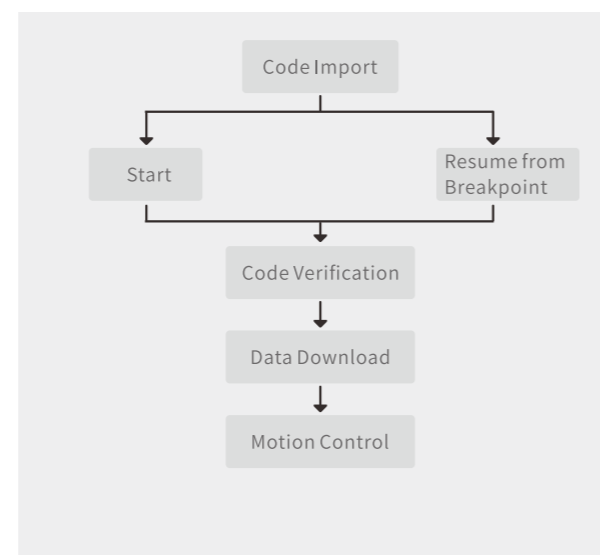
NC machining files can be imported via cloud platform or USB drive. The system parses the file to extract machining coordinates, tool number, spindle speed, and identifies dry/wet cutting mode to call the corresponding workpiece coordinate system offset. Processing can start from the beginning or resume from the last interruption.

The system manages tool life based on accumulated machining time and provides dust collector cleaning reminders. Machining precision can be fine-tuned by running specific calibration block code to ensure product quality.

Furthermore, the system incorporates torque detection, air pressure and coolant level monitoring, as well as temperature monitoring and control functions.

Process Principle

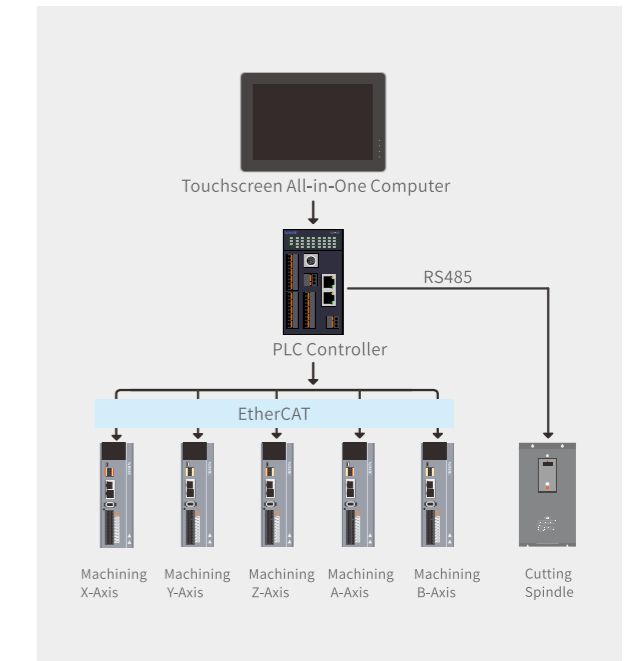
Machining code is imported via an all-in-one touch panel PC. The host computer parses the machining file trajectory and transmits position data. The PLC executes five-axis group coordinated motion to control the machining spindle for cutting.



Solution Advantages

- High Precision**
 The finished product surface is smooth, flat, and free of edge chipping.
- High Processing Efficiency**
 Processing time surpasses industry average; no detailed polishing required after path optimization.
- Informatization Features**
 Supports remote machining file transfer, FTP transfer, and automatic system upgrade functionality.
- Compact Product Size**
 The product's form factor is significantly reduced compared to motion control cards, saving substantial electrical cabinet space.
- High Stability**
 The touchscreen all-in-one computer features stable quality, passing ESD and surge immunity tests, enduring frequent power cycling, and remaining stable in high/low-
- Video Recording**
 Equipped with video functionality, enabling direct monitoring of the machining chamber and video storage for troubleshooting.
- Preload Function**
 The machining start process includes complete code verification; operation does not stall midway even with large code volumes.

System Topology



Field Application



Zirconia Monolithic Crown, Bridge, Veneer



Resin Full Denture



Glass-Ceramic Veneer



Titanium Disk Full Denture

Tubular Furnace Cascade Temperature Control / Solution



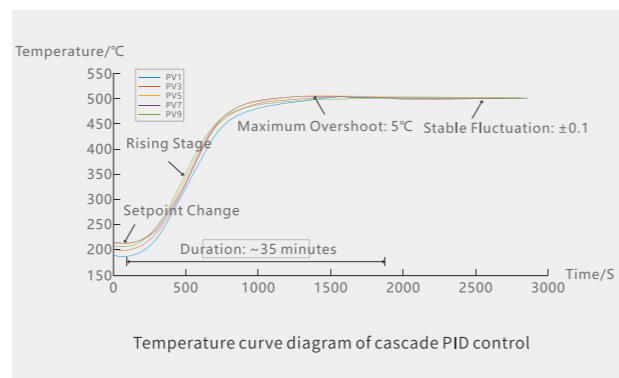
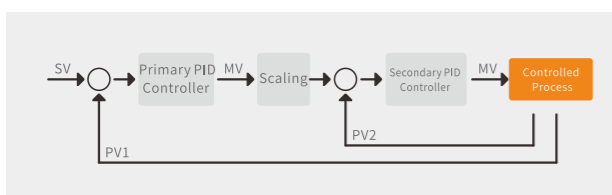
Industry Background

Tubular furnaces are widely used in PECVD, LPCVD, ALD, boron diffusion, phosphorus diffusion, and other process steps within the photovoltaic industry, holding a significant position in photovoltaic production. Tubular furnaces are widely used in PECVD, LPCVD, ALD, boron diffusion, phosphorus diffusion, and other process steps within the photovoltaic industry, holding a

significant position in photovoltaic production. In the cascade temperature control sector for photovoltaics/semiconductors, imported brands like azbil, PMA, and Eurotherm dominate market share. Xinjie has achieved algorithmic breakthroughs in this field, with solutions validated in the market.

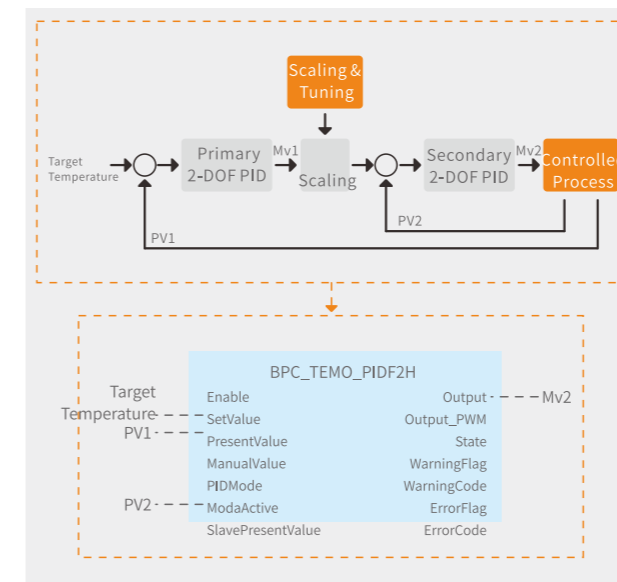
System Principle

PID cascade control employs two PID controllers in series. The setpoint of the primary PID controller is the target temperature; its output becomes the setpoint for the secondary PID controller, whose output drives the final control element. PID cascade control leverages the secondary loop to eliminate internal disturbances, enhancing adaptability to load changes in the controlled process. This system is primarily applied in scenarios with large process lag and time constants, strong and frequent disturbances, significant load variations, and high demands on control quality.



Control Scheme

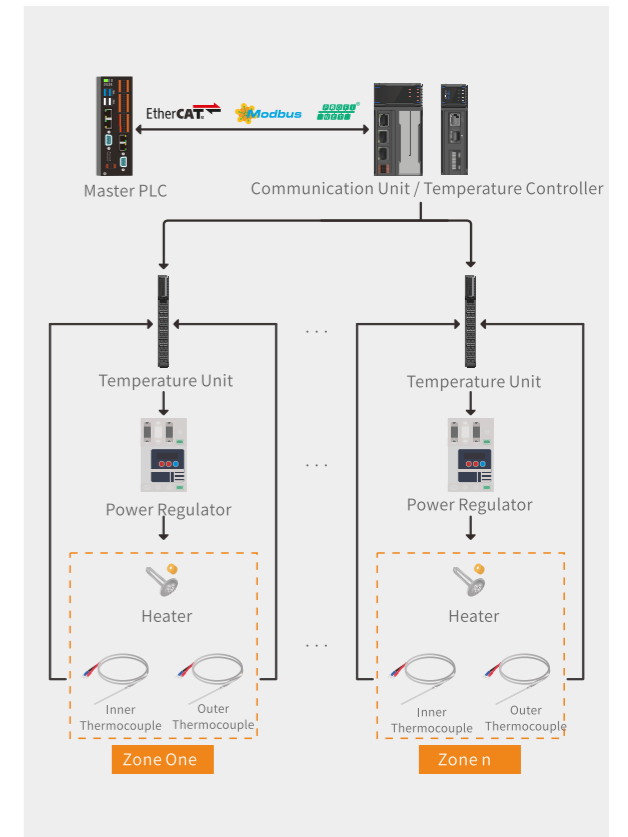
Xinjie has developed a 2-DOF PID cascade control solution for tubular furnace temperature control, targeting applications with significant lag and intense, frequent disturbances. Due to the interdependent nature of the two PID controllers in cascade, parameter tuning is challenging. Xinjie's scaling and tuning algorithm simplifies cascade control commissioning to the level of single-loop PID tuning, easily handling complex processes. Furthermore, the solution incorporates scaling and tuning on top of basic cascade control, significantly reducing commissioning time.



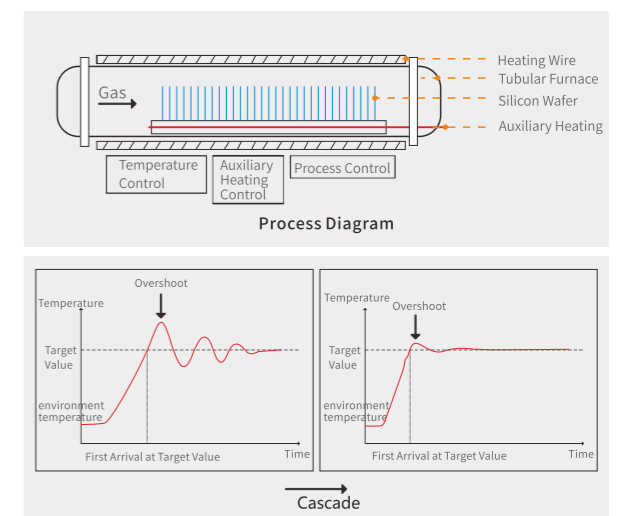
Solution Advantages

- High Control Accuracy: Cascade PID control minimizes drastic PID fluctuations caused by minor system temperature variations, enhancing control precision.
- Fast Response Speed: Cascade PID control enables faster response to temperature changes; rapid signal transfer between controllers allows the entire temperature control system to respond quickly.
- High-Precision Temperature Acquisition: Acquisition accuracy: 0.1%.
- Ease of Programming: Modular, encapsulated instructions enable faster programming.
- Ease of Debugging: Dedicated PC-based debugging software for the module simplifies commissioning.
- Dedicated Algorithms: Unique scaling auto-tuning and cascade auto-tuning algorithms simplify parameter adjustment.
- Anti-interference, with inter-channel isolation, adapts to various complex field environments.

System Topology



Field Application



Diaper Industry / Solution



Industry Background

With the rapid development of the social economy, the variety of products in the hygiene products industry has become increasingly diverse, and their functions have continuously improved, bringing much convenience to daily life and enhancing living standards. The manufacturing process for hygiene products is relatively complex, requiring the composite forming of multiple materials according to product specifications. Furthermore, amidst the fast pace of modernization, the hygiene products industry needs to simultaneously enhance production efficiency and quality, transforming complex and cumbersome operational methods to align with lean production. In response to such market demand, Xinje has launched an automated hygiene product production line.

It can perform synchronized alignment, bonding, roll-pressing, cutting, and folding of multi-layer composite materials under strict process requirements, with an error not exceeding 1 mm. The average production time per finished product is only 0.1 seconds, enabling high-speed operation of 600 pieces per minute.

Xinje's automation solutions have gained the trust and favor of industry clients due to their outstanding performance and superior quality.

Process Principle

The main functional requirements for parts of the production line include unwinding-rewinding, synchronization, cam curves, and deviation correction. Xinje's unwinding-rewinding system features an automatic roll diameter correction function. When the input material roll diameter is unreasonable, it performs intelligent calculation and correction through tension and speed, ensuring stable operation during material changeover. The "synchronization function" is used for various composite conveying processes within the production line. The "electronic shaft" ensures high-precision phase synchronization; its intelligent material stretch compensation function allows free setting of material length, enabling the same equipment to be used for producing various diaper models.

The "cam curve" technology is primarily used for cutting materials on the production line; curves can be freely switched to accommodate varying product lengths and shapes. The "deviation correction" technology module enables rapid correction via a deviation correction machine, reducing the scrap rate during material changeover.

System Principle

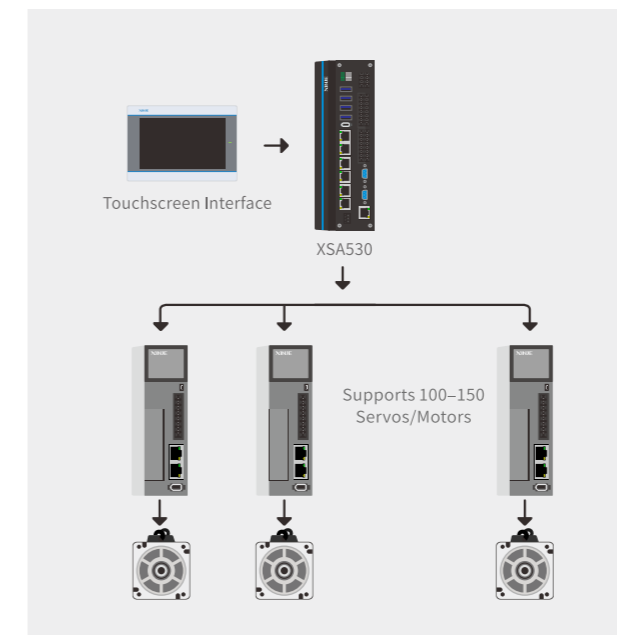
Diaper production lines are mainly categorized into baby diaper and adult diaper production lines; the production process primarily consists of the production line unit, stacking unit, and intermediate packaging unit. The figure below is a schematic diagram of diaper production line equipment. The main function of the production line is to process different materials—such as waterproof non-woven fabric, composite cotton core, polymer material, and acquisition-distribution layer non-woven fabric—through glue spraying, laminate them layer by layer, and then form them into finished diaper products through processes like arc cutting, longitudinal folding, final cutting, triple-folding, and waste removal. The finished products enter the stacker for packaging via the stacking transfer unit, resulting in group-packaged diaper products.



Control Scheme

The diaper production line adopts a complete electronic cam solution, mainly consisting of the front-end production line, stacking, and intermediate packaging units. The production line section controls 110 servo drives; the stacking and intermediate packaging sections use electronic gear synchronization to control 18 servo drives.

System Topology



Solution Advantages

Communication between controllers utilizes the EtherCAT bus; communication between the controller and servo drives also uses the EtherCAT bus. The entire system offers advantages such as clear network architecture, reasonable bus load, and high stability.

Hardware:

Utilizing the EtherCAT bus control tasks on the XSA530 Codesys platform significantly improves system responsiveness. A master-slave architecture program is developed, leveraging the rich motion control algorithm library of Codesys, enabling precise positioning and rational path planning throughout the diaper machine's motion process.

Safety Features:

Web Service-based network visual programming and remote monitoring; redundancy and safety control.

Algorithm Features:

Buffered tension control, utilizing PID algorithms, ensures stable operation of material during zero-speed splicing. Servo-driven, digital dimensional changes ensure synchronized operation throughout the entire process. Automatic packaging system, with customizable automatic packaging machines and automatic palletizers.

Field Application

