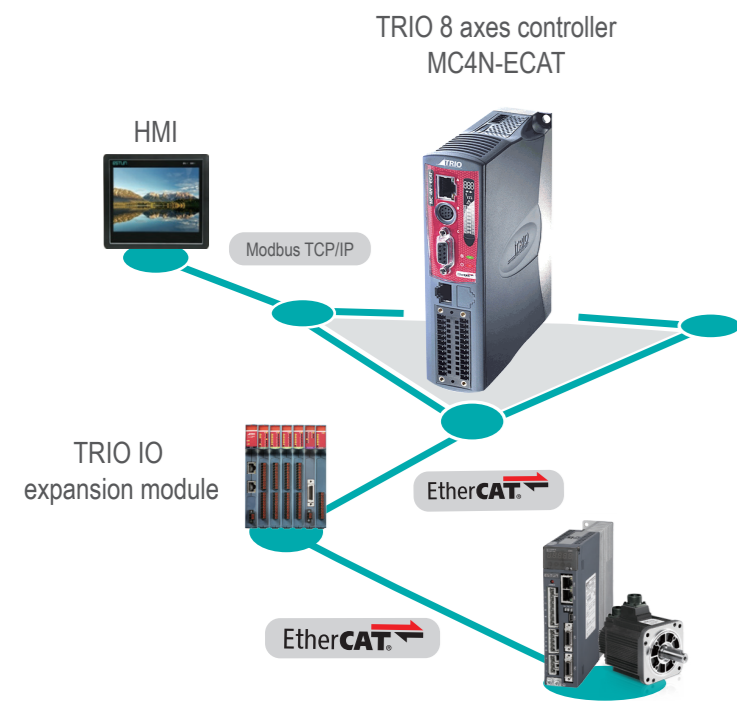


System Framework



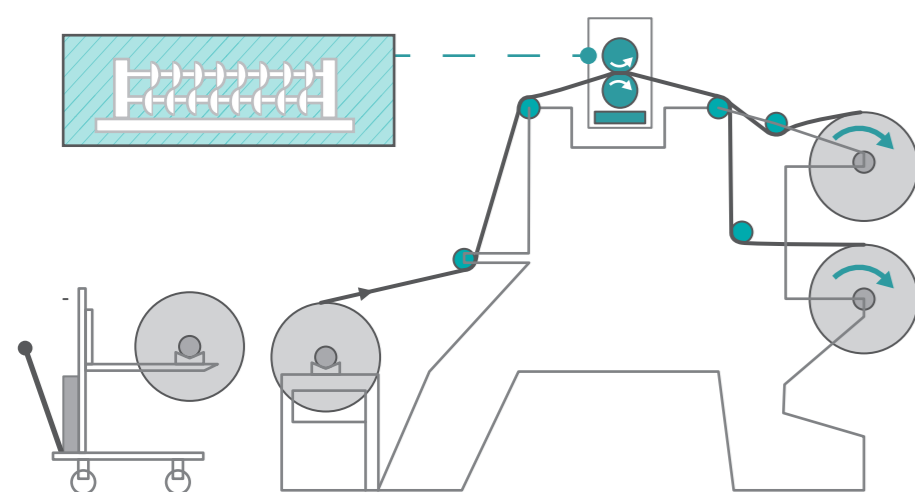
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	TRIO MC4N-ECAT
Servo driver	PRONET-XXAEG-EC
Power range	0.4KW-5KW

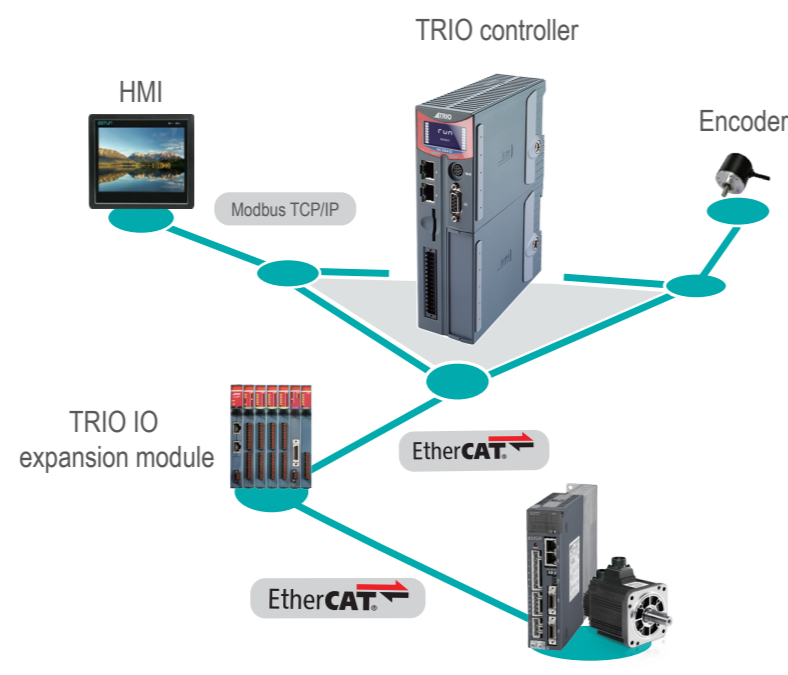
Solution Advantages

- Using EtherCAT field bus communication mode, fast response, strong anti-interference ability.
- The unwinding axis is unwound automatically. Through the tension closed-loop control, the unwinding speed is adjusted in real time, so that the surface tension of material is kept constant and tension fluctuation is small.
- The rewinding axis is controlled by tension taper to ensure the moderate internal stress of product.
- The actual product produced has no wrinkles, neat end surface. The hardness of curled surface is appropriate.
- The maximum cutting efficiency up to 200M/min, small material burr.

Technological Process



System Framework



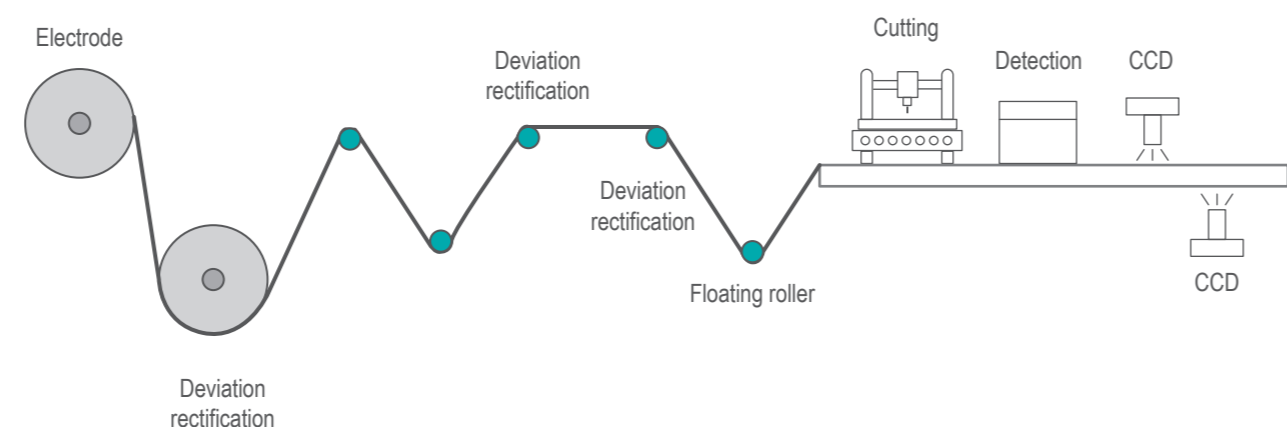
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	MC664-X
Servo driver	PRONET-XXAEG-EC
Power range	0.4KW-2KW

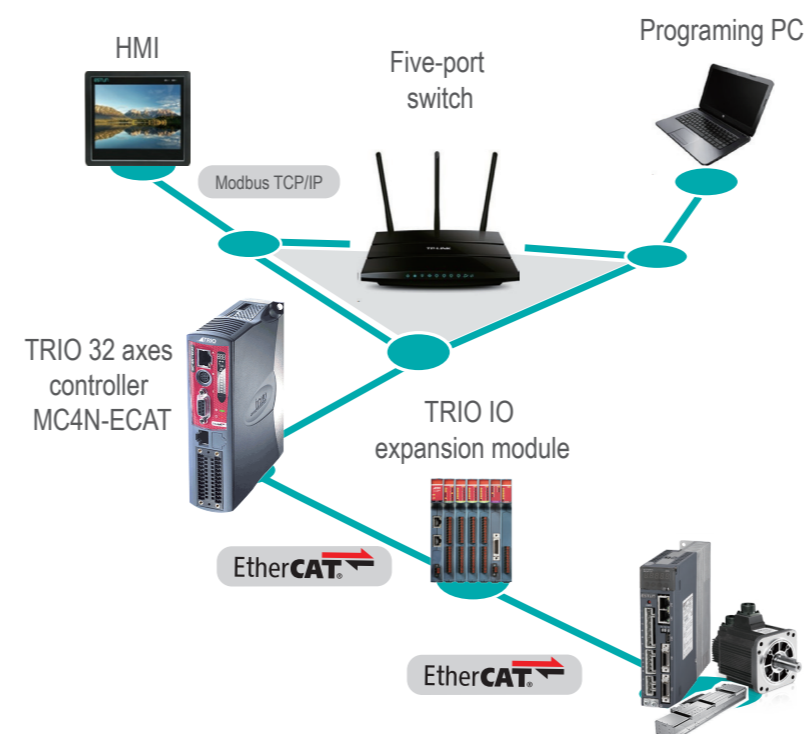
Solution Advantages

- Using TRIO controller to realize multi-axis synchronous control. The front and rear traction, storage, punching and other stations maintain precise synchronization with accuracy that is less than 0.01mm.
- The EtherCAT field bus is used in whole system for high speed communication, easy maintenance and strong anti-interference.
- Built-in winding and unwinding tension control algorithm in controller to ensure tension control accuracy and punching precision.
- Through the front and rear storage mechanism to achieve continuous punching without stopping. Punching efficiency is 200PPM, slice punching accuracy is $\pm 0.01\text{mm}$.

Technological Process



System Framework



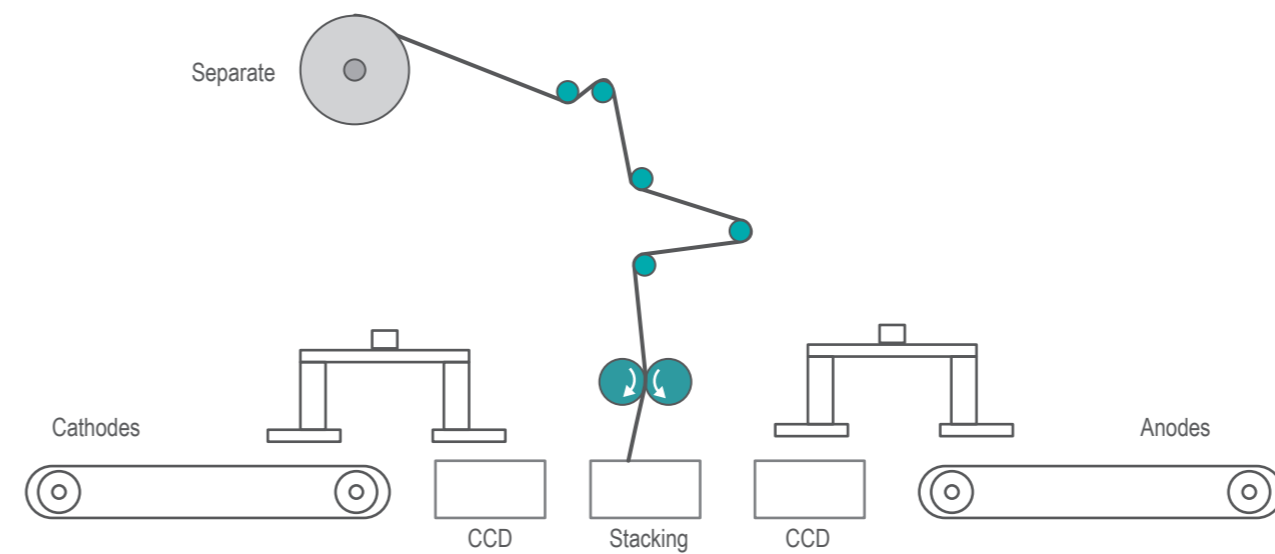
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	MC4N-ECAT
Servo driver	PRONET-XXAEG-EC

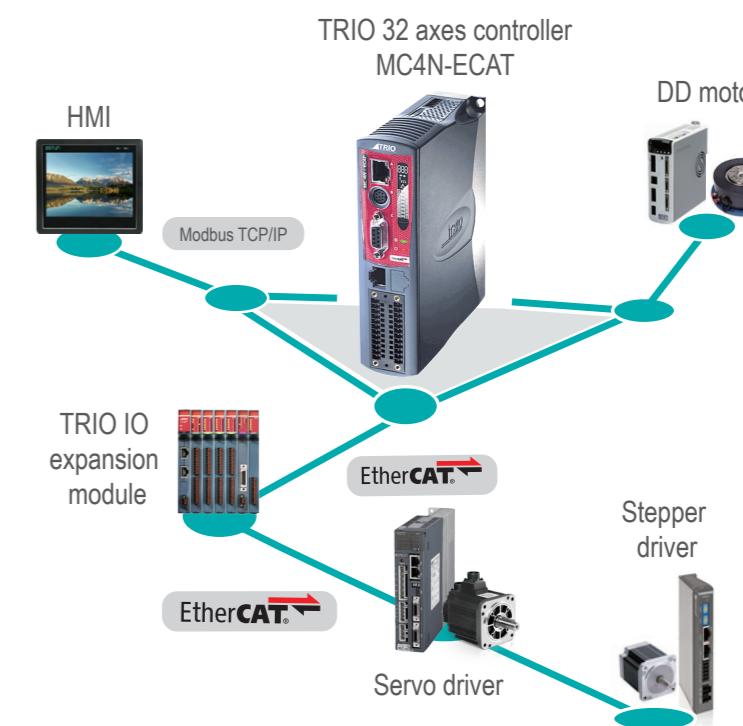
Solution Advantages

- Efficiency improvement: multi-axis synchronous Cam control algorithm + adaptive unwinding synchronization algorithm + linear motor; single-station lamination efficiency reaches 0.6PCS, which increased the efficiency by more than 40%.
- Precision improvement: servo tension control + pendulum PID adjustment to ensure diaphragm tension stability; diaphragm correction accuracy $\leq \pm 0.3\text{mm}$; visual positioning to ensure pole piece alignment accuracy $\leq \pm 0.1\text{mm}$.
- Quick changeover: adaptive changeover algorithm, automatic match for different type of battery cells.
- Simple wiring, saving electrical cabinet space: EtherCAT field bus communication. Using integrated stepper drive, servo drive, linear motor drive.

Technological Process



System Framework



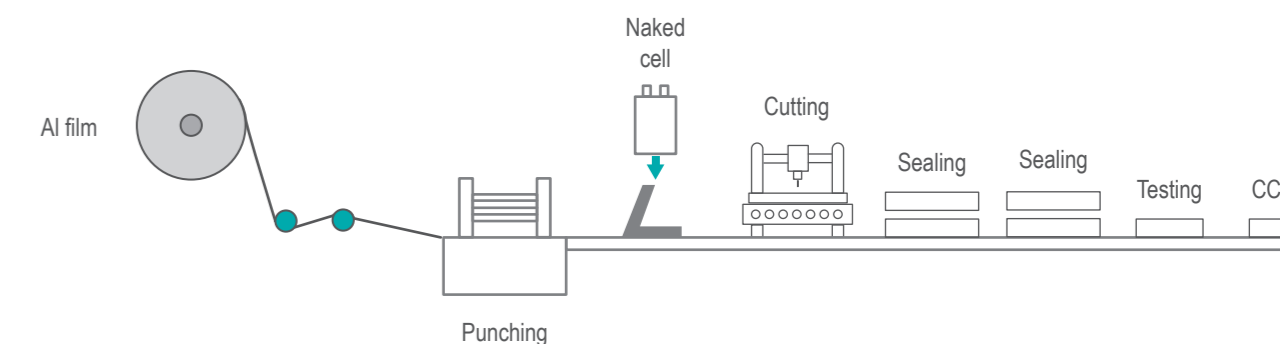
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	MC4N-ECAT
Servo driver	PRONET-XXAEG-EC
Power range	0.4KW-5KW, 17 servos+8 steppers+1 DD motor

Solution Advantages

- Using TRIO motion controller to realize multi-axis control while supporting servo, stepper motor, DD motor, etc.
- Supporting XYZ robot multi-axis linkage. Supporting DD motor to achieve multi-station linkage. Equipment operation efficiency is increased to 15PPM, product superiority $\geq 99\%$.
- Automatic rectification of the system material coil, tension control of aluminum film automatic floating roller.
- Servo punching shell system, adjustable depth, flexible and convenient.
- The system supports separate packaging and testing of the right and left corners of the battery, and the code is NG sorted and placed separately.

Technological Process



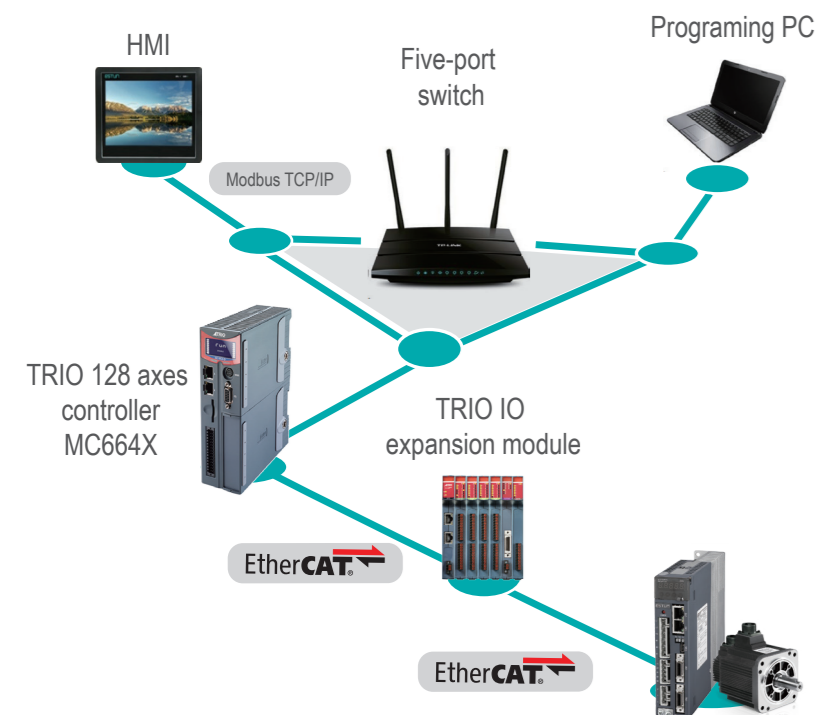
Integrated Tab Forming & Winding Machine For Cylindrical Battery



Integrated Tab Forming & Winding Machine For Prismatic Battery



System Framework



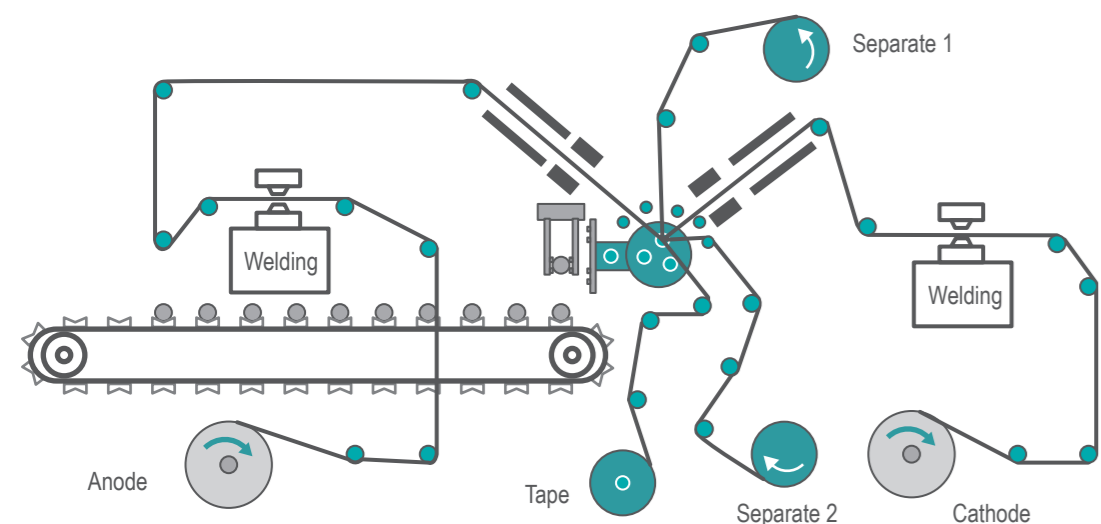
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	MC664-X
Servo driver	PRONET-XXAEG-EC
Power range	0.4KW-2KW

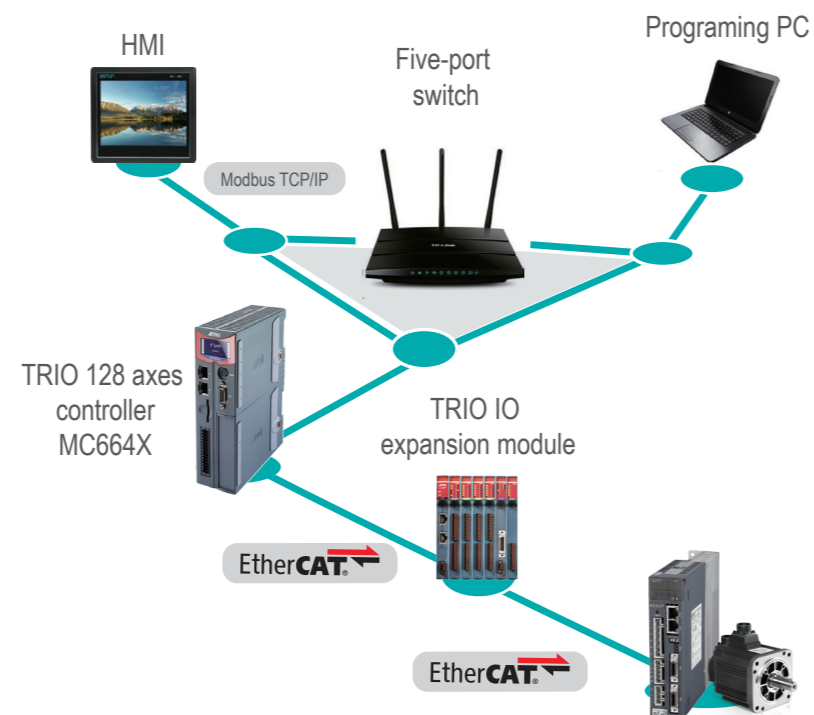
Solution Advantages

- The system uses TRIO MC664X 128 axes multi-axis bus motion controller, and it can control different brands of linear motors, servo drives, stepper drives in real time through EtherCAT high-speed bus, which has high openness.
- The built-in 2-way TOUCHPROBE in servo drive for high-precision positioning and fixed-length control of traction axis.
- TRIO controller provides sophisticated chasing shear algorithm instructions for simultaneous control of encoder axes and cutter axes, improving cutting accuracy and efficiency.
- Setting swing arm servo to torque mode to achieve tension control with a tension fluctuation range of less than 10%.
- Controller stores winding CAM data, and the maximum winding speed exceeds 3000mm/s.

Technological Process



System Framework



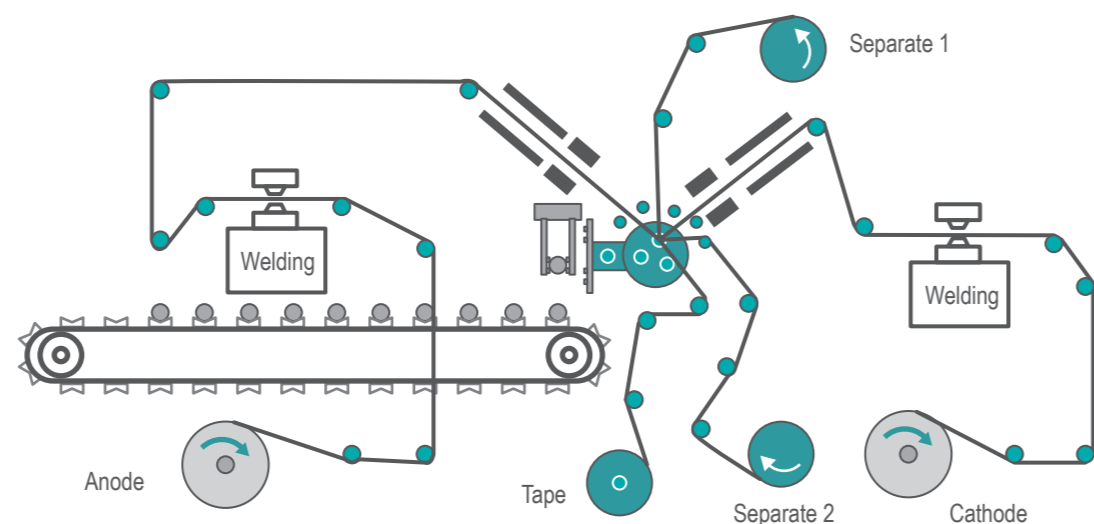
Product Configuration

Name	Specification
HMI	ESV-0097N
Motion controller	MC664-X
Servo drive	PRONET-XXAEG-EC
Power range	0.1KW-3KW

Solution Advantages

- The system uses TRIO MC664X 128 axes multi-axis bus motion controller, and it can control different brands of linear motors, servo drives, stepper drives in real time through EtherCAT high-speed bus, which has high openness.
- The built-in 2-way TOUCHPROBE in servo to realize high-precision position and fixed-length control of the traction axis.
- TRIO controller provides sophisticated chasing algorithm instructions for simultaneous control of encoder axis and cutter axis to ensure cutting accuracy and efficiency.
- Setting swing arm servo to torque mode to achieve tension control with a tension fluctuation range of less than 10%.
- The controller can realize wire-winding self-learning algorithm for special-shaped products, and the maximum winding line speed is 2000mm/s.

Technological Process



ESTUN Automation Co. Ltd. started its business in offering an automation control system for Metal Forming Machinery in 1993 at Nanjing, China. Now ESTUN Automation becomes a leading global product, system and service provider of key industrial automation components/systems, industrial robots and advanced intelligent manufacturing systems.

The Automation Business Group of ESTUN Automation offers a comprehensive product portfolio of servo and motion control products/systems/solutions for General Motion Control and Metal Forming applications. Servo drives, servo motors and EtherCAT based servo systems have been widely used for various Machine Automation applications and served for its global and domestic customers for more than 17 years.

As a global company, ESTUN Automation has 7 oversea branches and serves customers in more than 60 countries and regions. ESTUN Automation will be relentlessly pursuing the excellence in Advanced Motion control solutions, Industrial Robotics (as well as service Robots for rehabilitation, etc.) and Intelligent Manufacturing Systems through collaborating with global subsidiaries and partners, such as TRIO Motion Technology; ESTUN Industrial Technology, Europe; M.A.I. GmbH & Co. KG; Euclid Lab; Barrett Technology, etc. in better serving its global customers.



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