

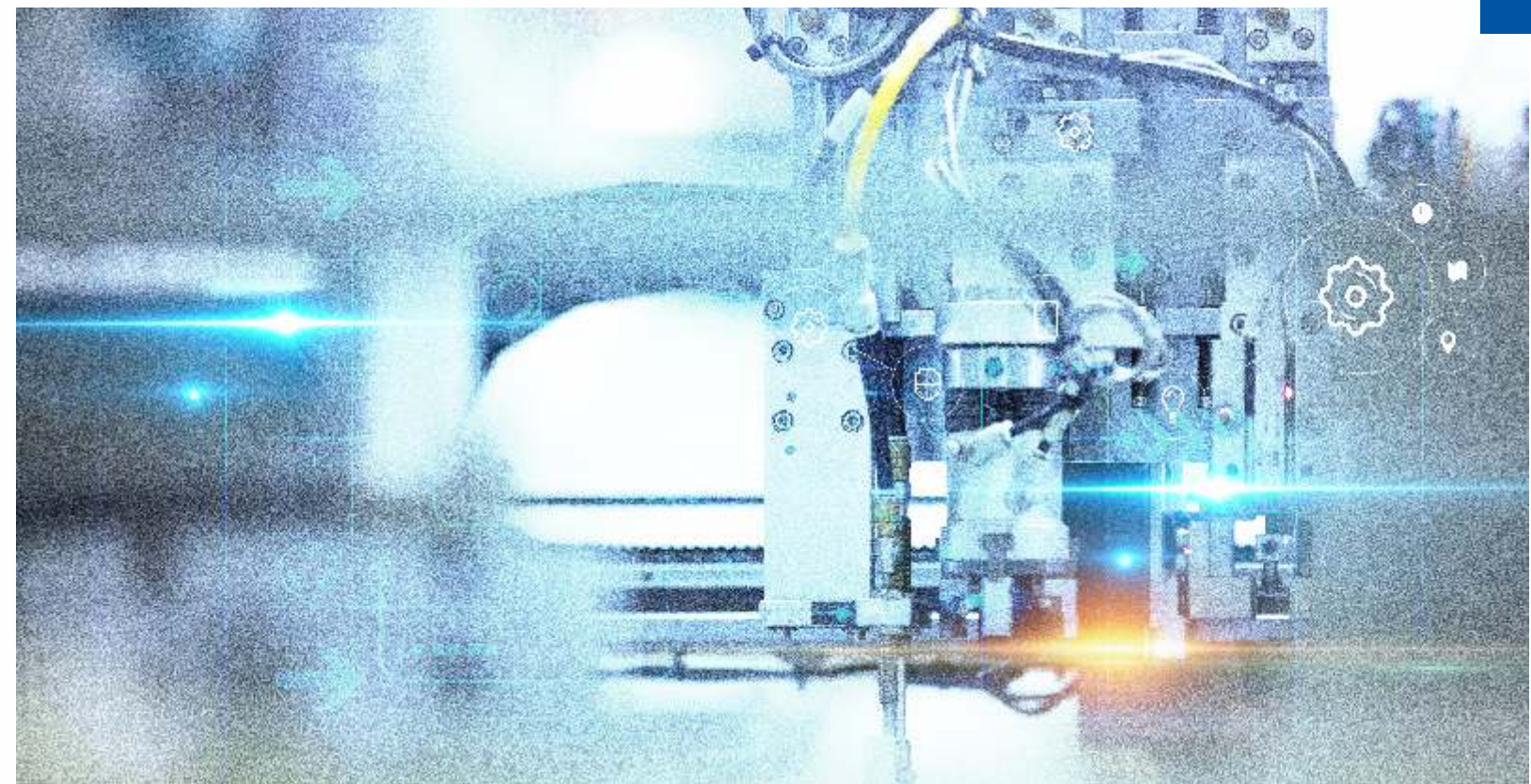


W E C O N T E C H N O L O G Y

WECON TECHNOLOGY · 维控科技

# INDUSTRY APPLICATION MANUAL

( Issue No.2 )



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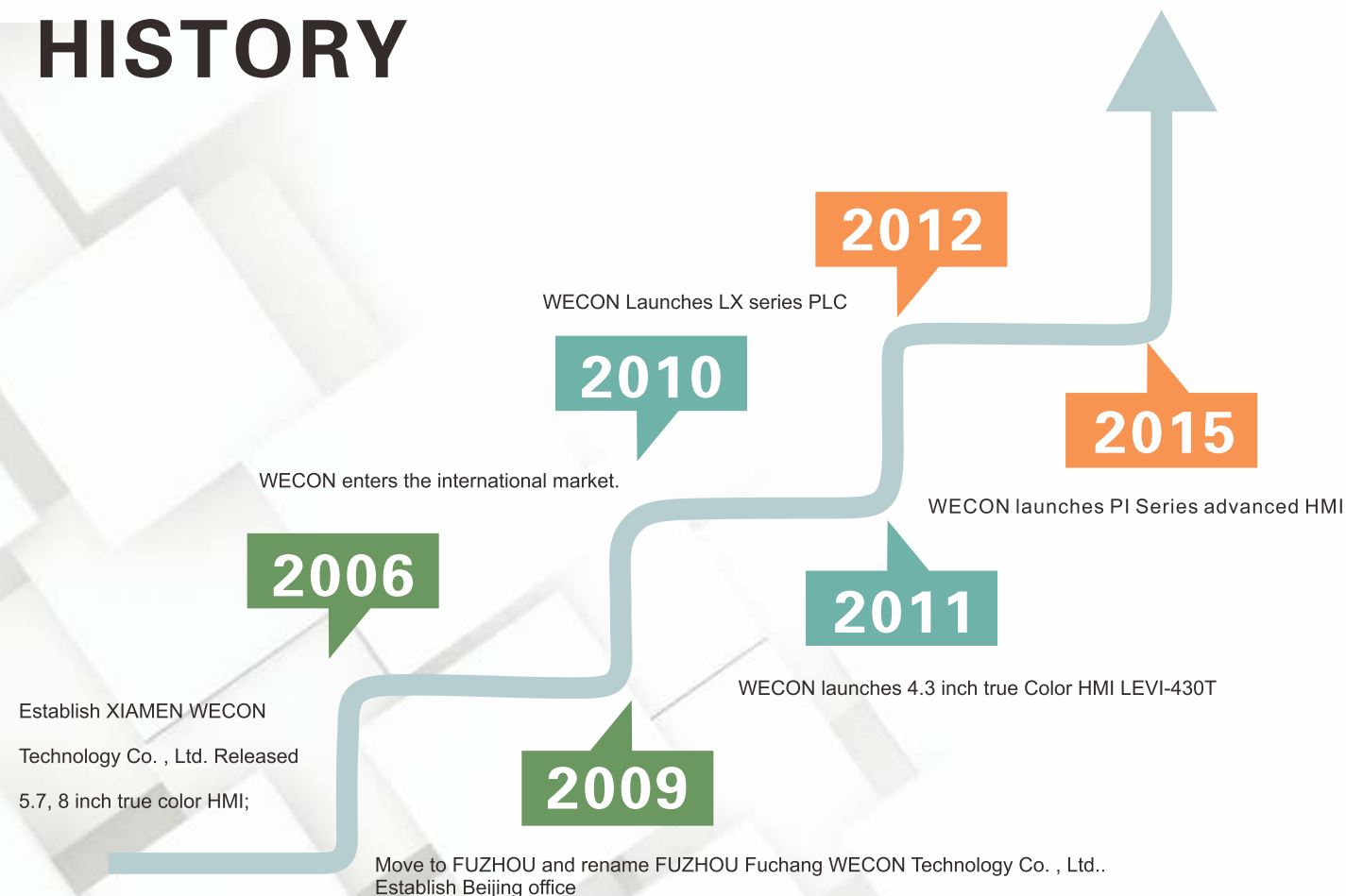


## INTRODUCTIONS

### » Brief Introductions Of Company

WECON Technology Co., Ltd. (commonly referred to as WECON) is a Chinese high technology company, headquartered in Fuzhou, Fujian. That independently develops, manufactures, supports and sells Human Machine Interface, Programmable Logic Controller. WECON products are widely used in machinery and equipment, metallurgy, chemical, oil and other industries. They are favored by many foreign customers.

## DEVELOPMENT HISTORY



## Transformer Production Line(hot Tin Machine)

### Introduction

The produced transformer needs further treatment, that is, the pin needs to be scalded with tin. This device is the so called tinning machine on the transformer production line.

### Process Requirements

The mechanical structure can be divided into five parts, which are picking, soaking, tinning, workpiece output and transformer marking.



### Solution

The control system mainly uses WECON HMI PI8000 and PLC LX3V-2424MT.

In the selection of HMI, PI8000 series HMI was selected because customers need remote APP and camera to monitor mechanical running status.

This device sets the position of the work piece for different working stages on the touch screen. After starting machine, it will move to different locations according to the settings, then returns to the origin position, and so on and so on.

### Advantages

- The marking process is totally automatic, no need for manual operation.
- The machine can process 8 transformer at a time, it takes 1.5s to produce a product on average.
- Using the stepping motor to control the position, it is more accurate and stabler.
- By using WECON PLC high-speed pulse instructions to control the speed and location.
- WECON HMI remote app function and camera function make the device more intelligent.

## Cake Machine

### Introduction

Cake machine is mainly used for all kinds of bread, cakes, biscuits and various types of crisp food. The production process is simple, convenient and comes with dual function i.e. rolling and stretching. After the processing of the cake machine, the processed food has a better baking effect and the better color and flavor.

### Process Requirements

The dough to be processed is placed on a conveyor belt. Set the height and times of press, belt rotation speed and other parameters on the HMI. Presse the reset button, the roller will rise to the highest position. Press the start button, the conveyor belt with a dough get through back and forth under the roller. There is a photoelectric switch detects the dough around the roller. If the dough is detected, the conveyor will stop automatically. The roller will automatically drop according to the setting parameters, which makes the dough become thinner gradually. Eventually, the thickness of the dough reaches the setting value.

### Solution

The control system mainly uses the WECON HMI LEVI700LK and PLC LX3V-1212MR.

- The Inverter controls the speed and operation direction.
- Servo motor controls the height of the roller, which improves the accuracy of lift movement.
- It will decline respectively according to the setting frequency and height.
- Using photoelectric switch to detect dough, if the dough get through, the belt will stop running.
- Conveyor belt drives dough, which get through under the controller back and forth, then it will make the dough become thinner gradually.

### Advantages

WECON 7-inch single com port HMI is economical and practical. precise positioning servo control by the LX3V series PLC with the max 200khz output pulse frequency.



## Riveting Machine

### Introduction

Riveting machine is a new riveting equipment based on cold rolling principle. It means to rivet things together with rivets. The device has compact structure, stable performance, convenient operation and safety. Riveting machine mainly complete the assembly by rotating and pressure, The common types include pneumatic, oil pressure and electric model or single head, double head.

### Process Requirements

The displacement sensor detects whether the height of the lock lever is qualified, and the optical fiber sensor detects whether there is material on the base plate, the machine hand assembles and transports the material, and finally performs riveting, riveting height detection, and lettering process.



### Solution

The control system mainly consists of WECON HMI LEVI700LK, PLC LX3V-3624MT, and expansion module LX3V-16EX\*4, LX3V-16EY\*2 and LX3V4AD\*2.

### Advantages

- The cooperation and logic control between the machine hand.
- When the production line is full, need to pause the feed and the alarm for each action not in place.



## CNC Machine

### Introduction

With the development of Industry 4.0 and the trend of production automation, most of the factories using CNC machine in China are gradually changing the manual loading and unloading from manual to mechanical automatic, which solves the problem of labor intensity, low efficiency, and operation hazards when loading and unloading manually. In order to improve work efficiency, and make the production line develop into a flexible manufacturing system, to meet the requirements of automated production in the modern machinery industry, according to the specific production process, combined with the actual structure of the machine tool, the NC lathe robot has emerged.

### Process Requirements

By using the CNC lathe robot, the multiple processing objects on the material trays are sequentially loaded and unloaded according to the stipulated order and cooperated with CNC lathes to complete the customer's processing requirements.

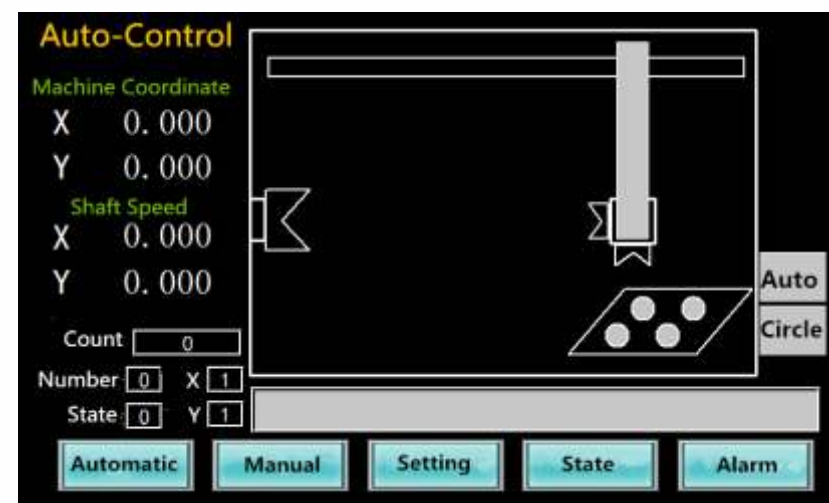
### Solution

The control system mainly uses WECON HMI LEVI-700EL and PLC LX3V-3624MT

The PLC programmed the completion signal, start signal, two axes positioning signal of the CNC lathe, to control the mechanical loading and unloading. PLC communicate with servo and read the value of absolute encoder, to be close-loop control, so that the axes move accurately, reduce the errors.

### Advantages

- The key of handling the CNC lathe robot located on some details such as material switching, material level switching and program suspension etc.
- The close-loop control of servo, correct current position based on encoder feedbacks.



## High Speed Stranding Machine

### Introduction

Stranding machine is a twisted mechanical equipment widely used in various types of soft/hard conductor wires (copper wire, enameled wire, tin plated wire, copper clad steel, copper clad aluminum, etc.) and electronic wire (such as: power line, headphone line, telephone line, PVC wire, network cable, etc.) Twisted mechanical equipment, so as to make multiple single conductors are twisted into one strand, and reach the requirements of wire rod.

### Process Requirements

In the fully automatic mode, the speed of the turnplate is automatically adjusted by the encoder to ensure a constant pitch length so as to produce qualified products.

The master PLC collect the speed information, and make multiple calculation of parameters such as pitch, uses the wireless communication module to transfer data to slave PLC on turnplate. it can be worked safe and efficient by PLC analog output and controlled servo speed to reach a constant lay length value. The speed will adjust automatically. (The mechanical internal turnplate can be connected to 220VAC only, unable to access other signals. But using the wireless communication module will successfully solve this problem)

### Solution

The control system of high-speed stranding machines uses WECON LEVI700EL, PLC LX3V-1412MT and BD module LX3V-2AD2DA-BD. PLC communication worked through wireless MODBUS communication, and the servo was used by the speed control mode.

### Advantages

- To ensure the constant lay length.
- Wireless MODBUS communication.



## Automatic Winding Machine

### Introduction

The Automatic Winding Machine is used in factories who produces wire products, such as the Mini-USB cables, Power cables and electric cables. Its size is small, the work table is set at workers' convenience, which highly improves production efficiency. With the WECON PLC and HMI, we can set different modes, when power on it, workers choose the mode on HMI, then the machine can run all the time. When the machine is in error, the alarms appear in HMI, we can find the error correctly and timely.

### Process Requirements

This system includes one servo and 5 stepper motors. The whole assembly line includes "Convey Material", "Winding" and "Feeding". High precise position moving control saves material and keeps worker safer.

### Solution

The control system uses the PI8070N HMI, LX3V-1412MT-A PLC, LX3V-16EY and LX3V-4PG.

The PLC communicates with Stepper Motors, and make the high precision moving control. PI8070 HMI support remote control function, with the WECON Smart APP, users can control the machine remotely.

### Advantages

LX3V-4PG expansion module improves the accuracy of movement.

The Winding machine improves production efficiency, and save material and human costs.

Easy operation by using PLC and HMI to control and display the parameters.



## Weighing Machine

### Introduction

Weighing Machine works for sorting material based on the weighting process of dynamic weighting scales. It is widely used in the automatic weighing equipment such as pharmaceutical, food, chemical and other industries production line. The machine is capable of real-time and on-line detection of unqualified and overweight products in the production line, and can remove the unqualified products.

### Process Requirements

The machine has 3 processing parts: conveyor, weighting, and removing. The speed of conveyor is controlled by inverter, the weighting parts support optoelectronic signal and zero point weighting. In the removing part, the PLC find unqualified products, and transfer to removing area.

The whole process: packing finished; products conveyed to removing part, and PLC store weighting data, if weighting unqualified it conveyed to removing area.

### Solution

The control system mainly uses the WECON HMI LEVI700LK, PLC LX3V-1212MT-A, and the module LX3V-2WT



### Advantages

- By using WECON PLC and HMI, it is easy to change and add the program,
- Good compatibility. This system fits most of the weighing Machine in the production line.
- With 12 inputs and 12 outputs, two of the 12 outputs support high speed pulse. The plc supports extension modules.
- The resolution of weighing module is 24 bits, with higher accuracy and adjustable sampling cycle. Compared with pure Machine, our solution provide multi spare inputs and outputs terminals. Precision is much higher than weighting instruments, when the product weights 500g, 1000g or 1500g, the error range could be  $\pm 4g$ .



## Automatic Silk Screen Printing Machine

### Introduction

The automatic silk screen printing machine uses flat screen printing board which fits many kinds of material and multiple styles supported. Be renewed by WECON products, this machine can be applied to more applications, it is not limited in paper printing, it can be used in cloth printing also. The equipment has longer life than before, better efficiency and better stability, it can provide better printing quality and effectiveness.

### Process Requirements

The main processing of this equipment: it is made up of 6 hands, each hand has a printing knife, a ink knife, and an inverters to control the motor moving, each hand can work & print alone as well. There is a rotation axis in the center of the machine, its angles are controlled by servo motors. When a procedure finished, the printing process will move forward and choose processing times manually, and will put into dryers.



### Solution

This control system mainly uses WECON PLC & HMI, the models are: LX3V-3624MT, LX3V16EYR, LX3V-16EX, LEVI-102E.

This machine could work on Manual Mode, Half-Automatic Mode, Automatic mode and Back To Origin mode. The manual mode is operate by buttons; half-automatic mode is controlled by a foot-switch which control a single action; the automatic mode can be automatic running continuously according to the parameters been set. And Back to Origin Mode Servo positioning function was helped by PLC high speed pulse output. Every operation been finished, the pulse auto cleared, after each rotation, it automatically compensate for the error.

### Advantages

- This equipment uses WECON PLC to realize the servo positioning function.
- The most important technical methods are using DRVI instructions to realize pulse positioning, excute the actions in order and correct timing. WECON PLC can be program easily.
- HMI in this equipment has the function of payment by installments.

## Automatic Color Pencil Assembly Machine

### Introduction

Automatic Color Pen Assembly Machine is that automatic assembling watercolor pen, pen and other types of pen, with reverse, pen mouth, rice head, copper head, fiber head, big hat, hat and complete assembly process function.

### Process Requirements

Each vibration table sends accessories, the spindle drives each axis to move forward , through the spindle encoder to locate the assembly process action of different interval. Which could automatic detection of defective products, and automatic pick out for the defective products.

### Solution

The control system used WECON LEVI-700EL hmi, LX3V-2416MT4H PLC.

The main program is as follows: PLC communicate with inverter, control the rotating speed. Using the encoder on sprindle to positioning the working angle. using high-speed counter C252 (with Z phase), and the CAM instruction to realize all actions.

### Advantages

- The system uses the encoder to realize interval positioning, which mainly use ABSD instruction. The ABSD instruction could excute the multi-segment comparison, which realizes CAM control. The form, the counter, etc. are set in absolute manner.
- Additional with offset counter, defective products tracking program, making the system to be more reliable.

