

Drop box packing machine
Drop type case packer Manual

Operating instructions

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Part 1 Equipment overview

1. 1 Overview

The drop box packing machine is a new product developed by our company based on the advantages of similar international products, combined with the actual production of your company's products, and technologically improved. It is the current domestic advanced carton packaging equipment.

This equipment is controlled by PLC, fully automatic operation; advanced technology such as variable frequency speed regulation for transmission at all levels. It has the advantages of high degree of automation, reliable control, simple adjustment, convenient operation and maintenance, etc. It can be widely used in beverage, beer, chemical, food, pharmaceutical and other industries. It can perform secondary operations on solid products, bottled liquids and bagged products. Packaging, and can be used with automatic production lines.

The main parts of this machine are made of high-quality carbon steel and stainless steel. The electrical and pneumatic systems use imported components, such as: Siemens PLC, Taiwanese servo motor, German Pepperl+Fuchs sensor, French Schneider low-voltage electrical appliances, and geared motors. This equipment has a low failure rate. High reliability.

Part 2 Technical parameters

Theoretical maximum number of drops: 8-12 box/min

Practical maximum number of drops: 8-12 box/min

Compressed air: 0.35M³/min , 0.6Mpa

Voltage power: 380V/50Hz : 3KW

Total Weight: 1200kg

Part 3 Working principle

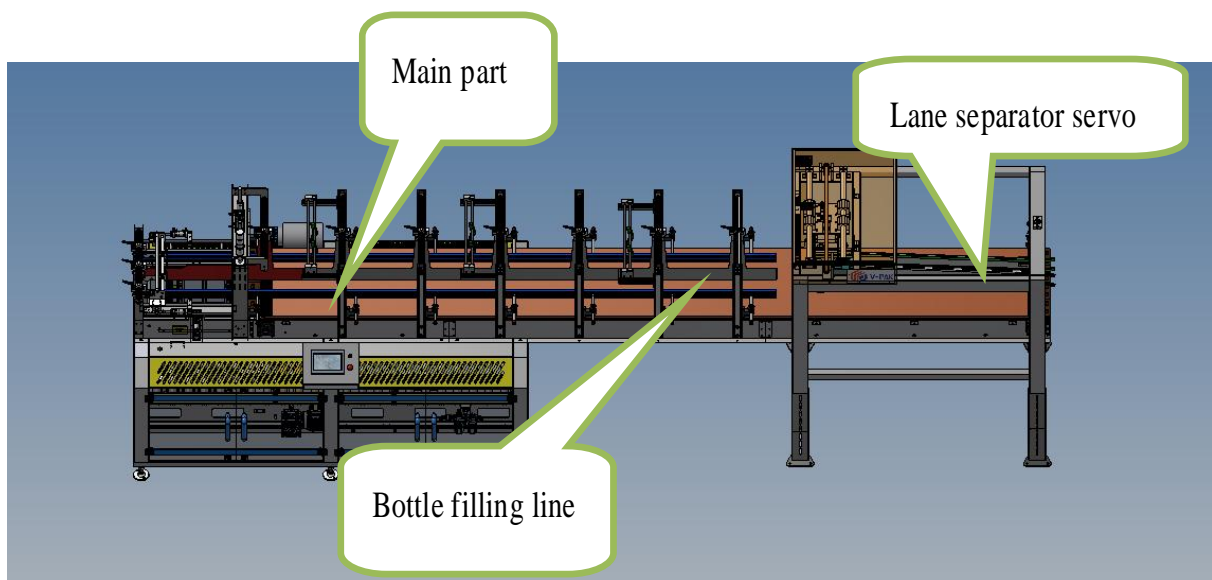
This conveyor adopts a flat modular net, which has the advantages of low noise, little damage to the product, and relatively stable when products in the conveying process.

Working principle: the whole cylinder of buffer is stretched out, the modular mesh belt conveys the products to the end, the carton positioning and lifting mechanism on the roller conveyor line, the box positioning and lifting, when the product quantity reaches the preset quantity and position, the sensor will sense the signal. The signal is transmitted to PLC, and then the PLC sends instructions to make the middle pressure bottle blocking cylinder block the product at its position, and buffer the entire row of cylinders to extend. At this time, the falling conditions are met. The jig retracts to locate the product at the drop station, and then falls into the box on the lift institution. After the drop is completed, the lifting mechanism descends, and the full box outputs.

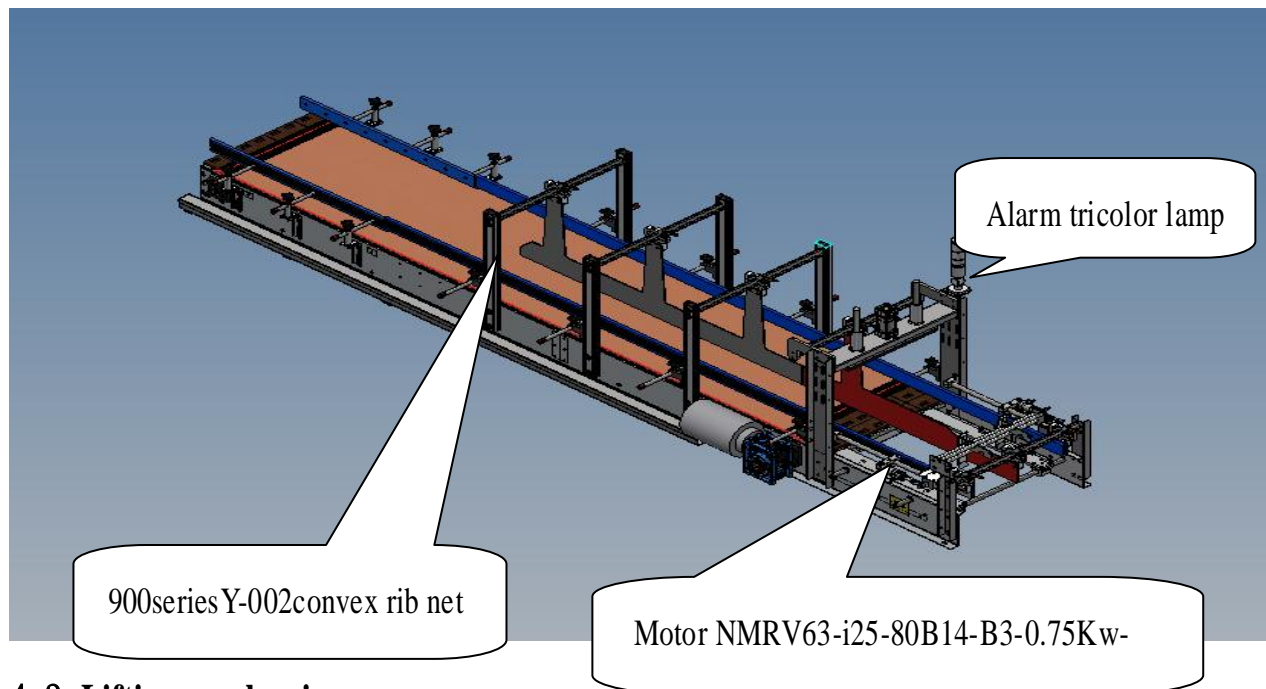
Part 4 Mechanical description

The mechanical part of this machine is mainly divided into module net conveyor, bag drum part, box conveying part, connecting rod and lifting mechanism part, here are the introduction of the mechanical part.

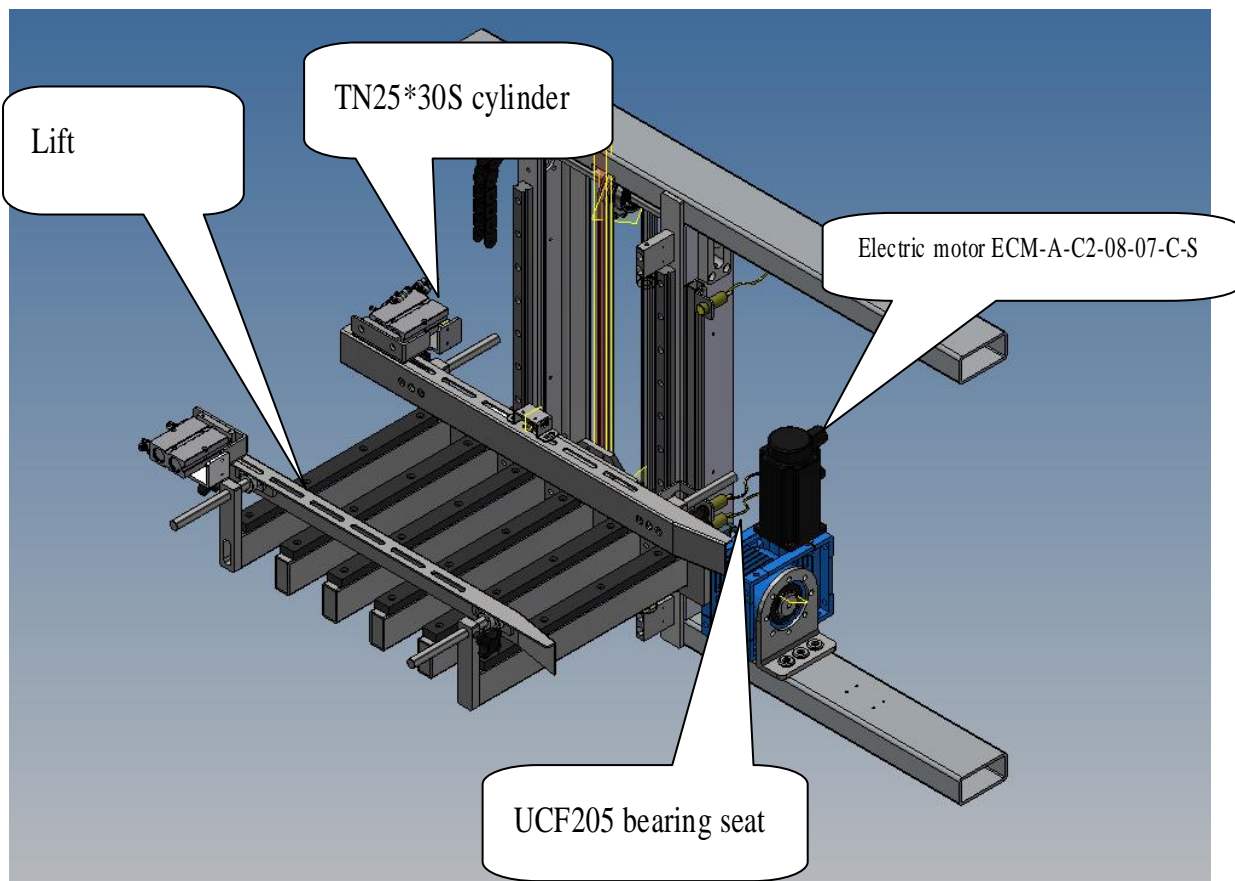
4.1. General layout of the equipment



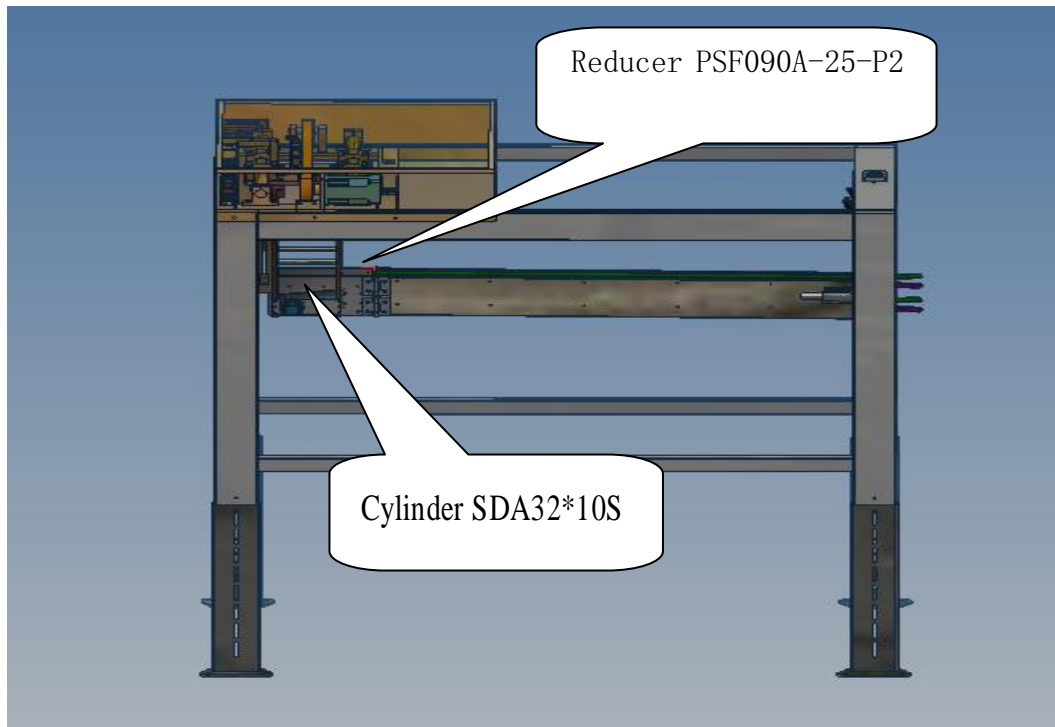
4.2 Boxes filling line



4.3 Lifting mechanism



4.4 Lane separator servo



Use servo motor and synchronous belt to drive the bottle for effective and accurate left and right separation

Part 5 Operation and use

Security information

! Attention: Imagine that when an error occurs, it may lead to unstable operation of the system.

! Caution: It is assumed that when an error occurs, there is a danger that it may lead to Injury or minor injury, and material loss.

! Danger: It is assumed that when an error occurs, it is dangerous and may lead to death Or serious injury.

✧ personnel safety responsibilities

For Operator

- **Operator means the person who operates the system**
- **Operators or other security officials must do the following things:**
 - **Check that all relevant regulations, precautions and laws are in compliance.**
 - Ensure that only professionals operate on the machine.
 - Ensure that all personnel are familiar with the relevant operating instructions and can follow the instructions.
 - It is prohibited for non-professional personnel to engage in machine related operations.

✧ For Professional staff

Professional personnel refers to the person who has professional training, practical work experience, corresponding quality, knowledge of relevant standards and regulations, has the ability to prevent accidents, and can complete the corresponding operation authorized by the person in charge of factory safety, and can detect and avoid potential hazards.

✧ Common security knowledge

- This safety knowledge is incomplete. If you have any questions, please contact our company.
- This machine may cause harm to personal safety and itself, such as:
 - Non-professional personnel engaged in machine related operations.
 - Improper operation and misuse of the machine.
- Only when the conditions are perfect, can the machine be run.
- No modification of the program and electrical control system can be made. If you need to change, you must contact us.

- Electronic control cabinet must be installed in a place where fire conditions are perfect, such as desiccant must be placed in the electronic control cabinet when there is excessive air humidity.
- ✧ Safety knowledge of Operational use
 - **! Danger: All power terminals will keep in charged for 3 minutes after the main power is off.**
 - **! Danger: When the safety door is opened, it is strictly prohibited to start the machine.**
 - Frequent periodic switching off the main power supply will cause internal input current overload in some devices (such as Siemens PLC、 frequency converter), the fastest allowing switching frequency to be 1time/3 minutes.
 - Electronic control box temperature should not exceed 85°C. Please improve the ventilation condition when the temperature exceeds 85°C.
 - Before assembling or maintaining the electronic control system, The staff must release the static charge carried on their bodies.

5.1 Inspection before use

After the machine is installed, turn on the power on / off (pay attention to stop immediately) to verify that the three-phase motor is running in the correct direction, to ensure that the pressure and flow rate of compressed air (0.4 m³/min-8bar) check the motors, for Whether the bearing needs lubricating oil (calcium sodium based butter), no oil operation, check and ensure that all is normal before starting the machine, at the same time, check whether the operating parts are normal, fasteners are loose, the components run well before normal use.

Check that the safety facility function is normal.

5.2 Notes

Temperature is the key factor affecting the life of the frequency converter, the surrounding temperature must be controlled within the range of -10~50°C which is allowed by the frequency converter.

Do not test the insulation performance of the control circuit of the frequency converter. The frequency converter contains high voltage lines. Before checking the frequency converter, the power supply should be turned off and the POWER lamp (also used as charging indicator lamp) should be extinguished.

Because of the high switching frequency of frequency converter and solenoid valve, there is a large leakage current, the frequency converter, motor, housing must be grounded, and zero line, ground wire separately. The power supply line of this machine must be introduced by leakage switch.

Pneumatic ternary parts require edible lubricating oil to prolong the service life of cylinder and ensure product quality.

It is forbidden to connect the electromagnetic contactor to the output end of the frequency converter for the start / blackout machine (or frequency converter), and it is also forbidden to connect the power supply to the output terminal of the frequency converter.

5.3 Electrical working principle

Box packaging machine is controlled by touch screen and programmable controller (PLC). The electrical part is composed of main circuit and control circuit.

The main circuit is composed of main drive which is controlled by servo, conveying motor which is controlled by frequency converter.

The control circuit is programmed by programmable controller (PLC) and touch screen terminal to realize logic control. All input signals are supplied by 24 V power supply inside the PLC. The output signal is driven by 220 V AC power relay or 24 rectifier power supply to drive solenoid valve and indicator lamp.

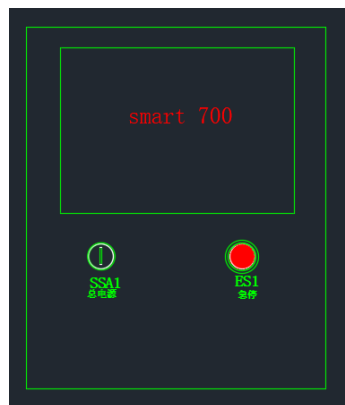
5.4 Machine Operation Guide

■ Before starting the machine, carefully check whether the transmission parts are stuck, whether there are sundries on the conveyor belt, whether it is correct, whether the power supply and gas source are connected, and wait for all the conditions to be ready.

■ Operating Panel Description

The operation part of the packing machine panel consists of a touch screen, a master power key switch and an emergency stop button.

1. The panel switch is shown below:



1) power switch: used to cut off and turn on the main power supply.

2) Emergency stop button: used to control machine emergency stop.

■ Starting and Stopping of Packing Machine

1. start operation.

Packing machine is divided into manual operation, reset start and automatic start.

1) manual operation: In the stop state, you can operate each manual button in the touch screen manual screen.

2) reset start: In the stop state, press "reset" press button, at this time each packing machine each mechanical action returns to the initial position, after the reset completes, the packing machine enters the ready state.

3) automatic start: After the packing machine is ready, press "start" button, three color lights green lamp lights, it means that it is in automatic start state, packing machine operating automatically.

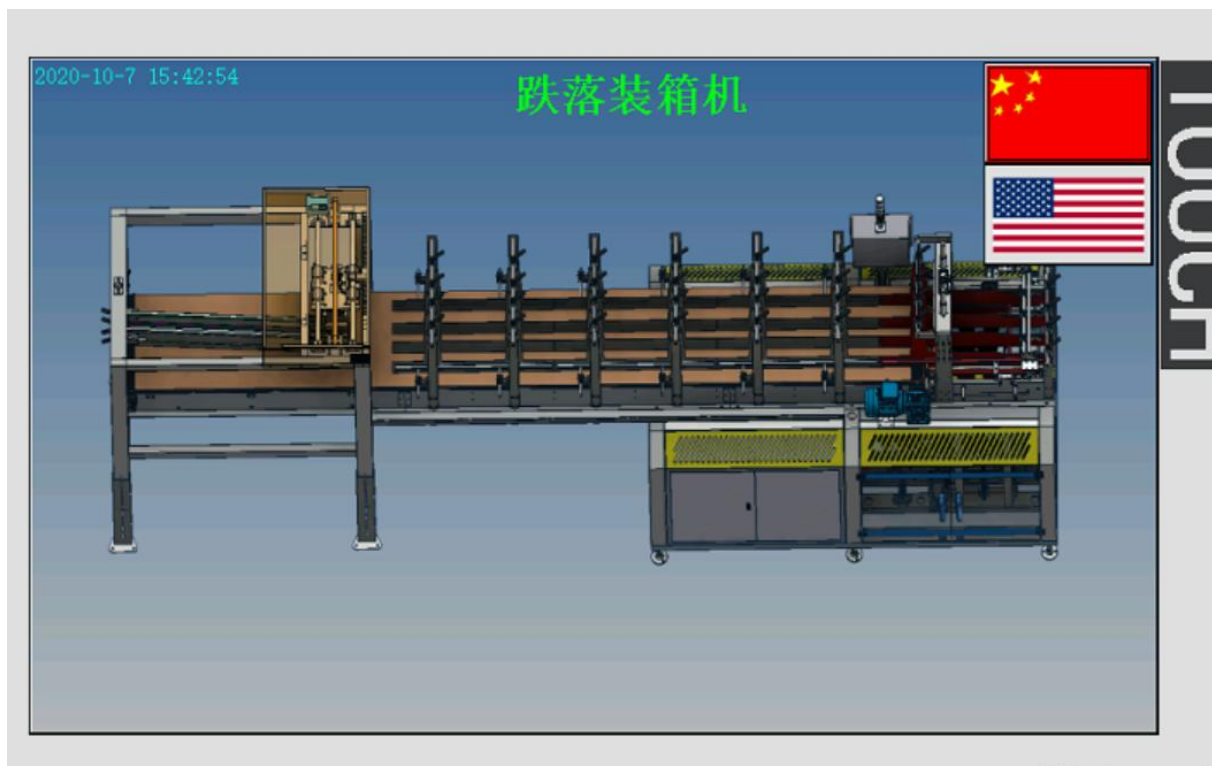
2. Stop operation

1) packing machine in the start state, press "stop" button, packing machine stop, tricolor light turn from green light to orange light.

2) packing machine in the start state, press "stop" button, packing machine stop, three-color lamp green lights out, red lights, orange lights, buzzer alarms. Rotate "stop" button to loosen, alarm stops.

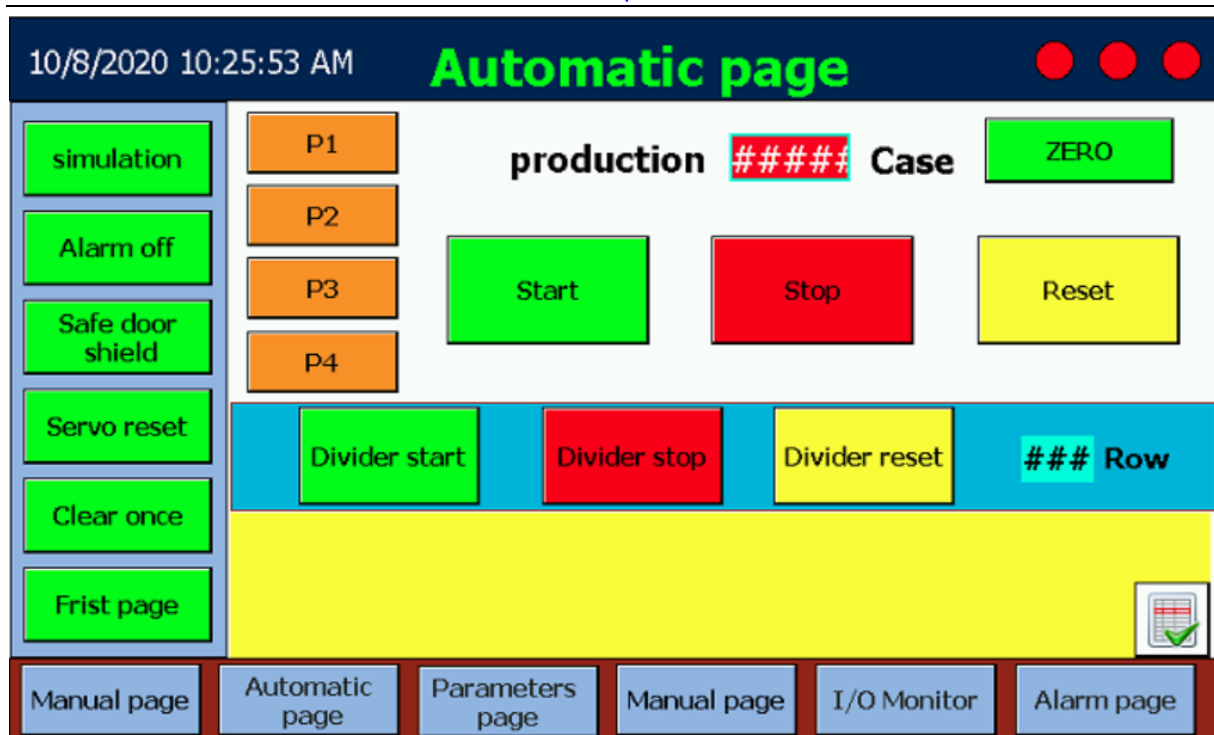
■ Touch screen operation

After the packing machine is electrified, the touch screen enters the initial picture as follows:



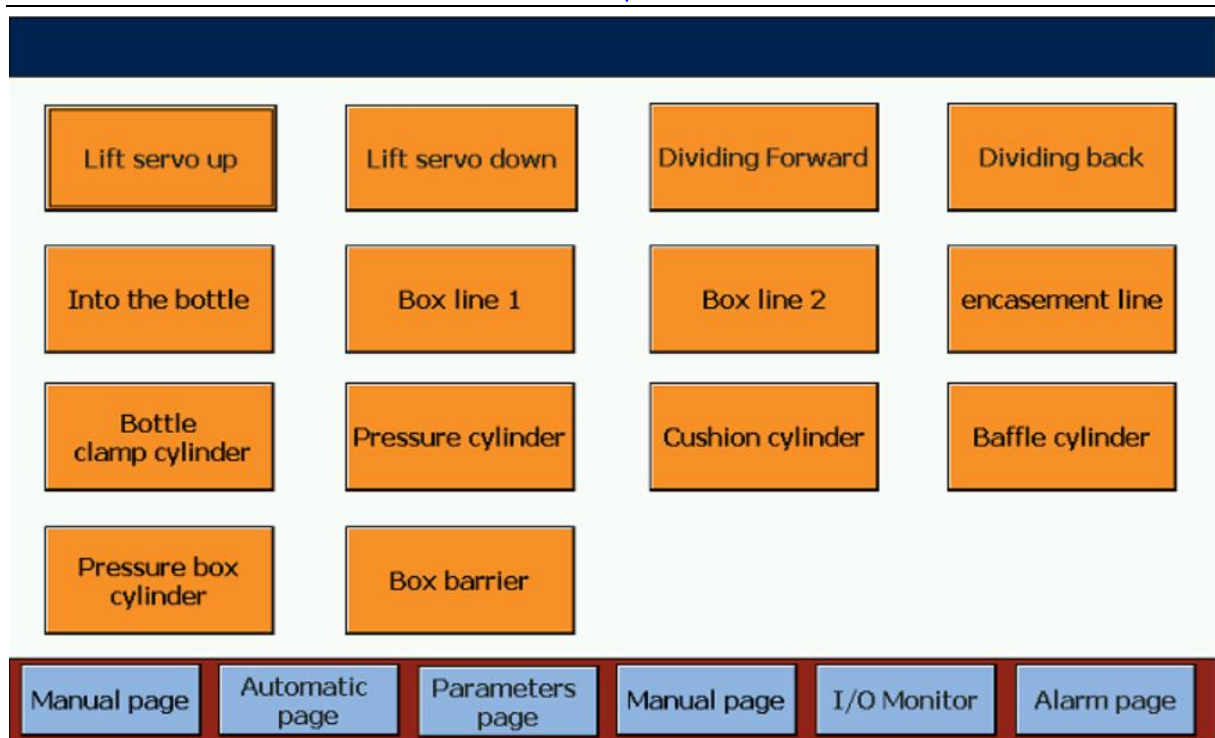
Click the picture to enter the automatic screen.

[Automatic Screen] as shown below:



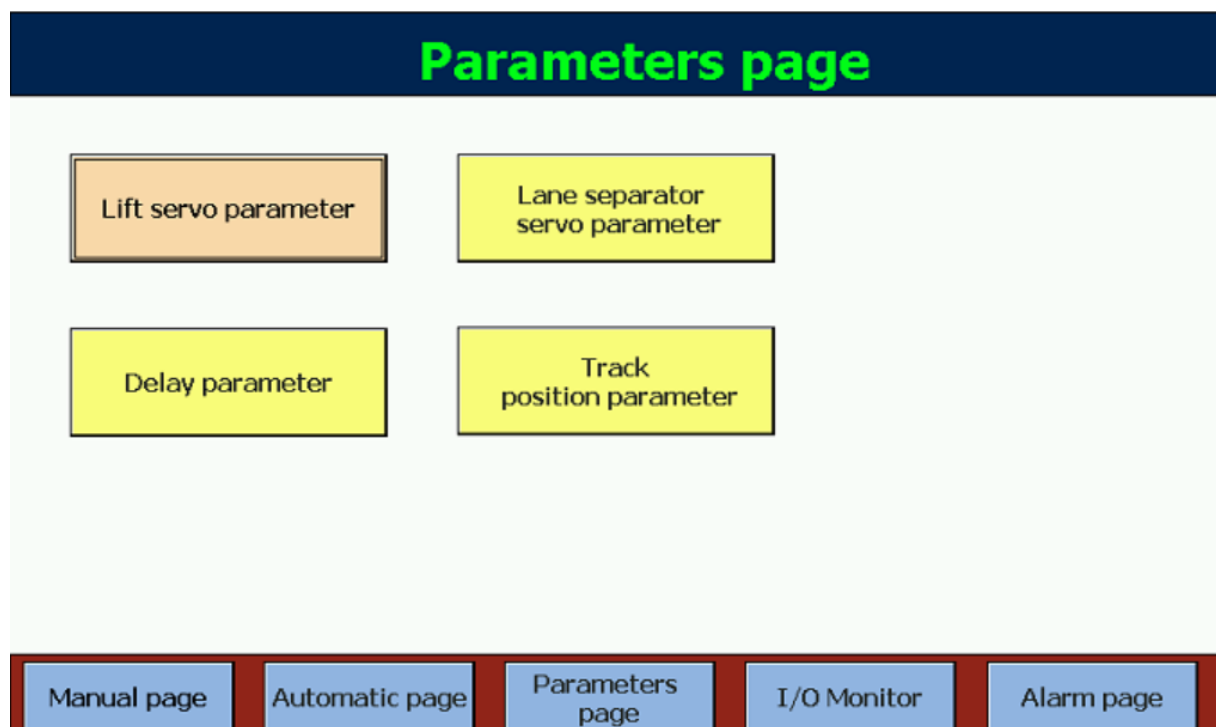
- 1) production —— shows the number of current production of boxes;
- 2) Zero——clear productions to zero;
- 3) clear once——At the end of production, put the remaining products into boxes
- 4) alarm off—— Turn off buzzer;
- 5) servo reset—— Reset of servo failure;
- 6)safe door shield——when pressed,safe door open and no alarm.
- 7) simulation——Use during testing.

【manual page】: In the start screen click the "manual page" button to enter the manual operation screen. As shown below:



note: Manual operation screen can start each motor and control each cylinder action.

【parameters page】: in Screen switch bar, click the "parameter page" button to enter the parameters page. The parameters page is as follows:



Note : click button to enter the corresponding parameters setting

1) lift servo parameter

Lift servo parameter

Acceleration time	####	ms	Deceleration time	####	ms
Return velocity	#####	P/S	Creep speed	#####	P/S
Automatic speed	#####	P/S	Manual speed	#####	P/S
P1 Position	#####	P	P2 Position	#####	P
P3 Position	#####	P	P4 Position	#####	P

Lift servo Current value #### P

Lift servo up

Pushing back

ZERO

parameter update

Manual page

Automatic page

Parameters page

Manual page

I/O Monitor

Alarm page

2) lane position parameter

Lane position parameter

NO.1	#### P	NO.6	#### P	<div style="background-color: #FF8C00; padding: 10px; border: 1px solid black; margin-bottom: 5px;">P1</div> <div style="background-color: #FF8C00; padding: 10px; border: 1px solid black; margin-bottom: 5px;">P2</div> <div style="background-color: #FF8C00; padding: 10px; border: 1px solid black; margin-bottom: 5px;">P3</div> <div style="background-color: #FF8C00; padding: 10px; border: 1px solid black;">P4</div>	<div style="background-color: #00FF00; color: #000; padding: 20px; border: 1px solid black; font-weight: bold;">SAVE</div>
NO.2	#### P	NO.7	#### P		
NO.3	#### P	NO.8	#### P		
NO.4	#### P	NO.9	#### P		
NO.5	#### P	NO.10	#### P		

Lane separator Forward

Lane separator back

servo current value #### P/S

Manual page

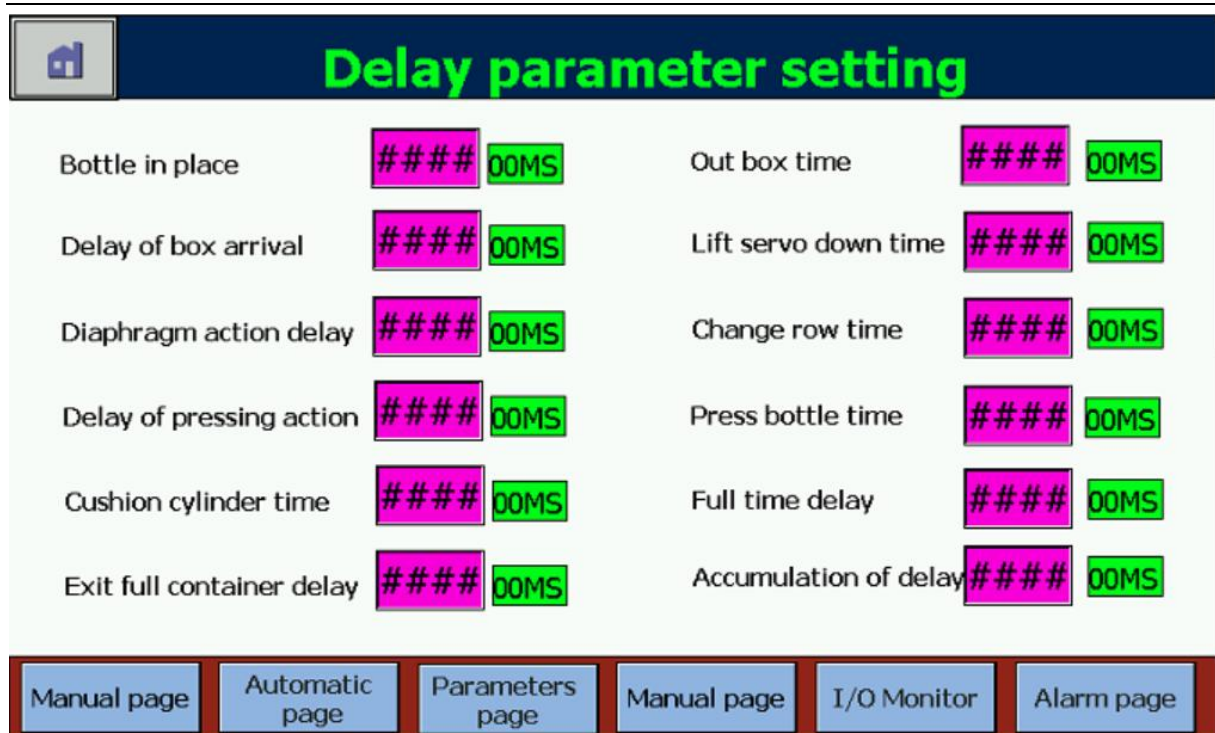
Automatic page

Parameters page

I/O Monitor

Alarm page

3) delay parameter setting

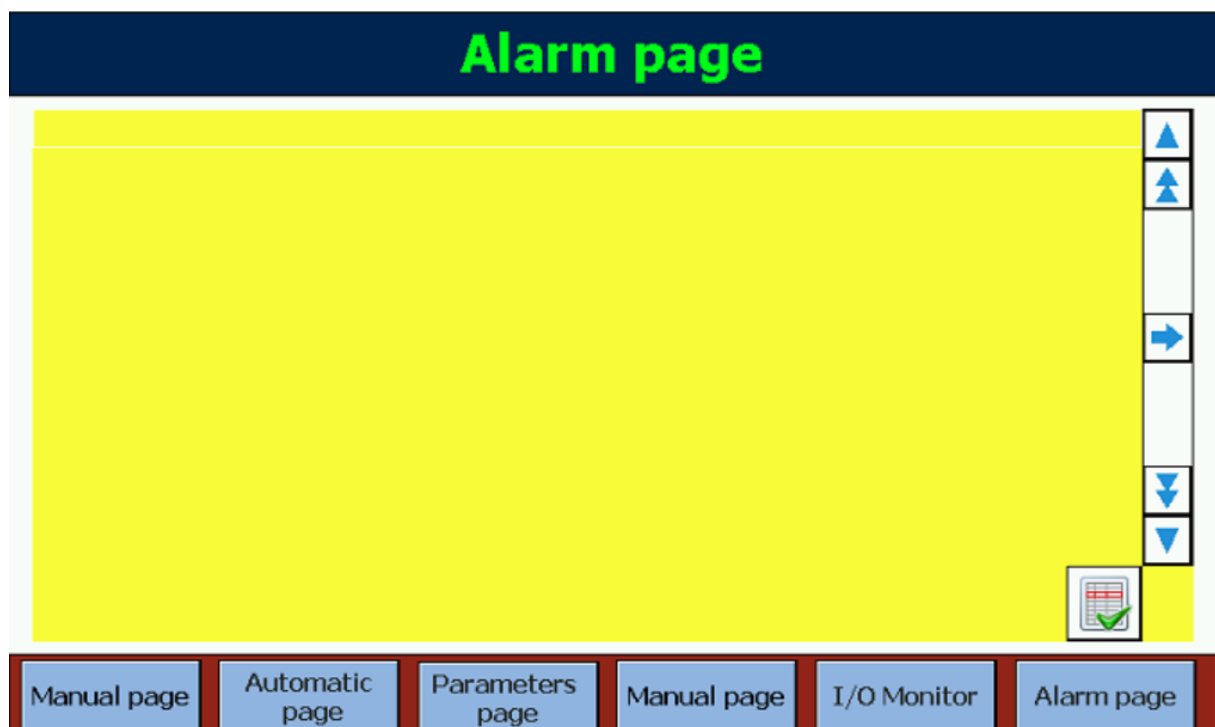


Parameter	Value	Unit
Bottle in place	####	00MS
Delay of box arrival	####	00MS
Diaphragm action delay	####	00MS
Delay of pressing action	####	00MS
Cushion cylinder time	####	00MS
Exit full container delay	####	00MS
Out box time	####	00MS
Lift servo down time	####	00MS
Change row time	####	00MS
Press bottle time	####	00MS
Full time delay	####	00MS
Accumulation of delay	####	00MS

Manual page Automatic page Parameters page Manual page I/O Monitor Alarm page

Note : setting each action delay.

【alarm page】: in Screen switch bar, click the "alarm page" button to enter the alarm page. The alarm page is as follows:



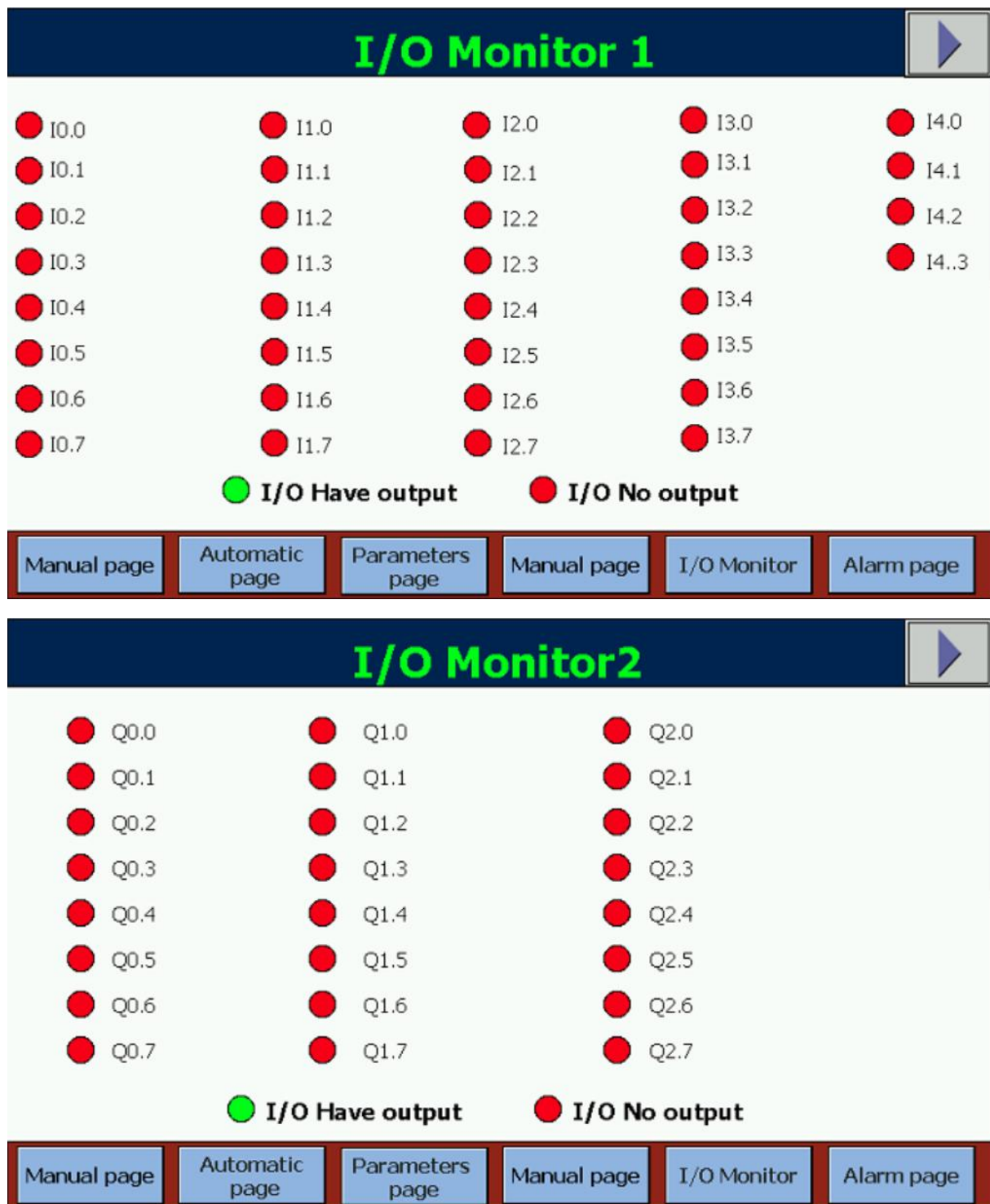
Alarm page

Manual page Automatic page Parameters page Manual page I/O Monitor Alarm page

Note : real-time display alarm.

【I/O monitor】: in Screen switch bar, click the "I/O monitor" button to enter the I/O monitor page.

The I/O monitor page is as follows:



Note : I/O monitor page can monitor PLC input and output.

Part 6 Transport and installation

6.1 Equipment packaging

The machine is mainly divided into conveyor, packaging machine and electrical parts for separate packaging, the body should be connected with the packing box seat fastening, can not have relative movement; each body, generally covered with foam plastic and film, and tape bandage, to prevent damage to the machine.

6.2 Equipment transportation

The packing box shall not be tilted or inverted during transporting, the bottom of the machine must be taken as the lifting point, and the lifting tilt of the whole machine shall not be greater than 10.

6.3 Installation of equipment

This set of equipment does not need to install anchor bolts.

After the machine is docked with the integral drum line, adjust the support height of the rear end of the integral drum line to ensure the correct height with the machine and the level of the frame.

The electrical connection must be connected to the three-phase four-wire 380 V、50Hz AC power supply, the cable must meet the power requirements of the machine, using $3 \times 6 \text{ mm}^2 + 2 \times 4 \text{ mm}^2$ cable and access to grounding cable to make the machine reliable grounding.

The compressed air is connected to the equipment with pneumatic ternary parts, that is, the $\Phi 12$ hose is inserted into the gas storage tank of the equipment, the working air pressure is adjusted well through the regulator, the input air pressure is about 0.8 Mpa, the compressed air quantity is 0.5 m³/min, the output air pressure is 0.7 Mpa.

Part 7 Common Troubleshooting

Fault phenomenon	Possible causes	Measures
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Cylinder doesn't work	1. Cylinder failure 2. Low air pressure 3. Solenoid valve coil burnt or valve core stuck	1. Clean cylinder, lubricate and replace sealing ring 2. Adjust pressure to normal pressure 3. Replace coil or clean spool
Box packing machine stop working	1. View alarm record on touch screen	Solve the problem according to the alarm record, then reset
Frequency converter fault	1. Unreasonable parameter setting 2. Electric motor stuck	Check the converter instructions, solve the corresponding problems, and then power off.

Part 8 Maintenance

➤ Mechanical maintenance

- Lubricating systems such as reducer, sprocket, bearing, oil injection cup provide for the addition of grease and lubricating oil;
- Check the fasteners before each shift, make sure there is no loosening condition;
- Pressure air to clean equipment surface dust, electronic control box dust, remember to do daily dust removal.

➤ Electrical maintenance

- Pneumatic components such as cylinder, solenoid valve, gas plate, speed regulating valve and so on can be manually adjusted to check if it's good or bad and operational reliability, the cylinder mainly check whether there is leakage and stagnation phenomenon, solenoid valve can be manually forced to determine whether the electromagnetic coil burned or

valve block;

- The main part of electrical equipment is PLC and frequency converter, other switch input signal, output signal inspection and maintenance, can be checked by the control PLC input and output signal indicator lights, such as check whether the switch elements are damaged, whether the line is broken, the output elements (relays, indicator lights, solenoid valve coils, etc.) are working properly;
- PLC and frequency converter is a static machine with semiconductor components as the center. In order to prevent the failure due to the influence of temperature, humidity, dust, vibration and so on, and the aging and life of the parts used, routine inspection must be necessary;

➤ Precautions for maintenance inspection

- The operator himself confirms the power on and off to prevent misoperation;
- Not long after the converter disconnects the power supply, before checking, make sure that the load indicator lamp on the printing board off, and the multimeter is used to confirm that the voltage between the terminals of the main circuit of the converter is below the DC30V before checking;
- PLC and frequency converter, with running power indication, fault abnormal indication, should be understood in advance. We should also understand the electronic thermal relay in the frequency converter parameter table, the setting of acceleration and deceleration time and so on, and record the set value in advance when normal;

➤ Routine inspections

- whether the motor running normally and the program running normally;
- whether the installation environment normal

- whether there are abnormal vibration, abnormal sound
- Whether abnormal overheating, discoloration condition appears.
- Regular inspections
- ! Stop running the equipment before checking the location that needs to be checked regularly**
- Clean air filters
- Fastening inspection and strengthening: due to vibration, temperature changes, screws, bolts and other fasteners will be loose, so it is necessary to check regularly and fasten it;
- Check and replace cooling fans, smooth capacitors, relays ;

Part 9 Spare parts list

Part 10 Circuit diagram

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We manufacture the packing machine , the end of packing line system

such as palletizer robot , pallet dispenser/stacker/magazine stretch wrapper,

ergonomic pallet strapping machine,pallet conveyor ,corner applicator,tray erector

and former ,case erector & carton sealing machine