



# SZD-1021Auto Multi-color Screen Printing Machine



## Operation Manual

KC Printing Machine (Group) Limited



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## 1. Safety Precautions

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### Safety Precautions:

Special attention shall be paid to the mechanical and personal safety as listed below:

#### 1.1 Personal safety

##### 1. Protection of eyes

- (1) When the UV lamp is on, the machine cover shall not be opened. Wear UV safety mask when necessary so as to prevent the eyes from being hurt by the ultraviolet radiation.
- (2) When setting up the machine, the UV lamp shall not be turned on, unless necessary.
- (3) Other people close to the machine shall be informed not to watch the ultraviolet lamp tube inside the machine if they are not wearing the safety mask.

##### 2. Protection of skin

The same precautions as mentioned above shall be kept in mind: The exposed skin shall not get close to the light so as to prevent the skin from being burned by the ultraviolet radiation.

##### 3. Protection from toxic gases

- (1) Keep the working place well ventilated.
- (2) No solvent with oxide shall be placed in the working area. If any, it shall be removed away from the place as the toxic gases may be created when some oxides are radiated by the ultraviolet.

##### 4. Protection from electric shock

- (1) The coating of the cables shall be regularly checked to see if there is any damage because the electric shock from the exposed conductor can cause deaths and other severe accidents. If the cables have been damaged, the machine shall not be powered on. The damaged cables shall be replaced before the machine can be powered on again upon safety check.

#### 1-2 Mechanical safety

##### 1. Prevention from being hurt by the machine

***When the machine is running for printing, hands shall not be put inside the machine, particularly to the running parts, so as to avoid being hurt. If the machine needs to be adjusted, the emergency stop switch shall be first pressed to prevent the operator from being injured.***

- (1) ***Each time before start-up, the voltage of the power supply, the compressed air, the petroleum gas, including the electric circuit and conveying conduits, shall be checked to make sure that they are under normal conditions. Then machine can be turned on.***
- (2) ***Please don't use the objects like sticks to insert into the machine, including the control box, feeding machine, main and auxiliary printing units, etc. (particularly the cover of the UV part shall not be opened randomly). Nor use the improper methods like using the hammer or crow to strike the machine or pull, smash or pry the parts of the machine. If so, some parts of the machine may be deformed or damaged, which can affect the printing effects, or even make the machine not work any more.***
- (3) ***The inside of the machine box shall be kept clean and no oil stain shall be attached in it. If there is any oil stain, the cleaning agent shall be used to remove them. Never use the chemically strong solvent. Otherwise, the machine may be damaged.***

## 2. Application and Specification

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### 2-1 Application

This printing machine is specially used for printing different patterns on the objects with round shape or oval shape. As it is made up of several individual units to form a printing chain, it can be used for the purpose of multi-color printing. The materials to be printed can be plastic, glass, ceramics, metal, etc.

### 2-2 Specification

Speed	Round: 4000pcs/Hr	Oval: 5000pcs/Hr
Printing size:	Round: Diameter: 25-100mm	Length : 25-270mm
	Oval: Width: 25-120mm	Length : 25-270mm
Compressed air:	5Bar	
Liquefied petroleum gas:	1.5 Bar	
Weight:	*	
Dimensions:	Main and auxiliary unit: 1757mm*1000mm*1500mm	
	Auto-conveyor feeding device (optional): 3050mm*1300mm*1500mm	
	Auto-conveyor unload device (optional):	
Power:	Main and auxiliary unit 380VAC,3-PHASE; single unit: 5.6KVA	
	Auto-conveyor feeding device (optional): 380VAC,3-PHASE,1KVA	
	Auto-conveyor unload device (optional): 220VAC,1-PHASE,0.2KVA	

## 3. Installation and adjustment

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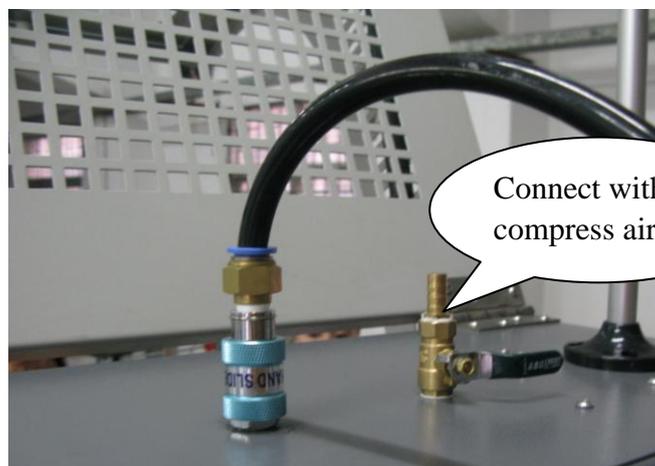
### 3-1 Installation

#### 1. Wiring of the power cables

- ① Connect the conforming cables to the power supply.
- ② **Note:** All the cables must comply with the above listed specifications

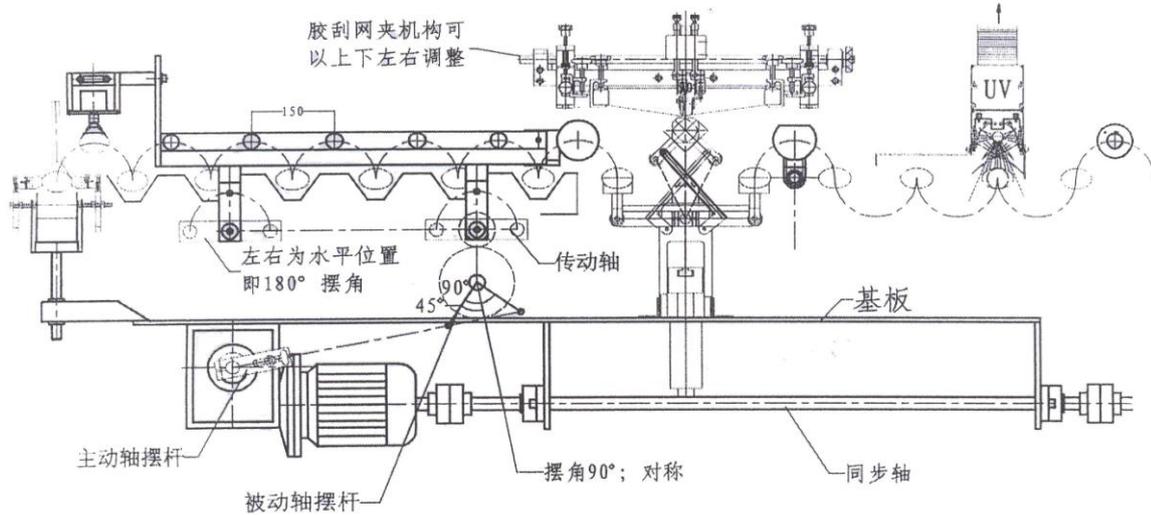
#### 2. The compressed air and the petroleum gas shall be introduced from the external side of the machine.

- ① The pressure of the compressed air and the petroleum gas must



comply with the above listed specifications (see the specifications)

- ② **Note:** Clean and water-free compressed air shall be used so as to guarantee the smooth work of the machine. If the requirements over the compressed air are ignored, the pneumatic units may have failures earlier than expected.

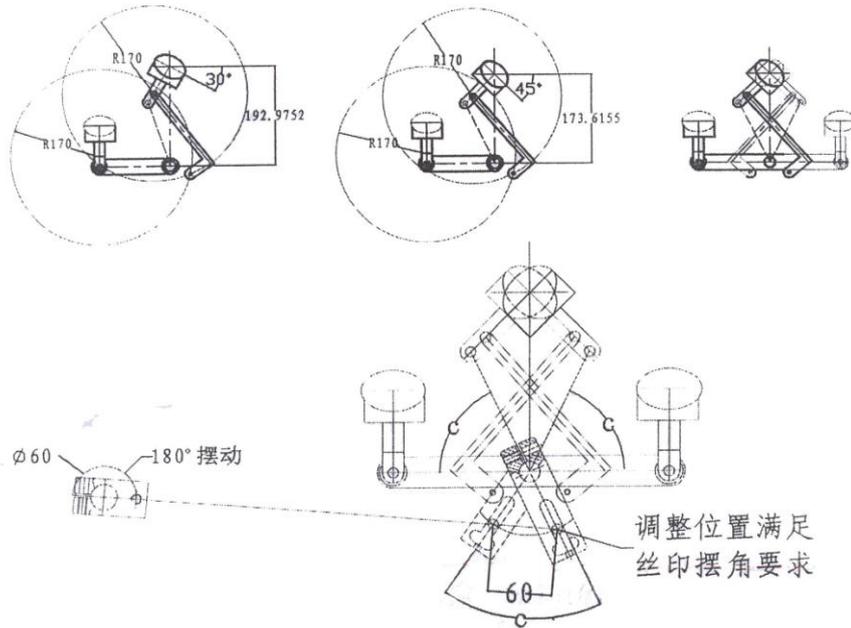


2) 丝印摆角的调整: 图示;

60° 摆动时

90° 摆动时

90° 对称摆动时



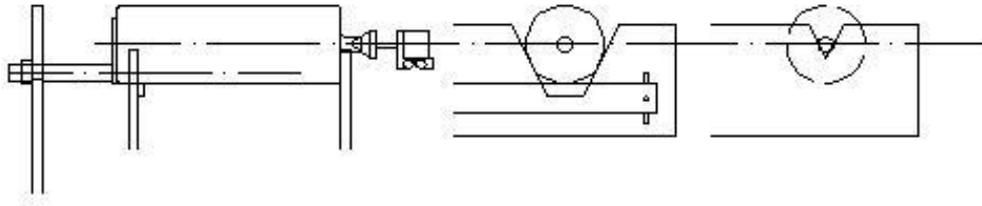
### 3. Adjustment

#### 3-2 Adjustment

- 1) Swing angle adjustment (limited position adjustment); as shown in the picture below: first adjust the pendulum bar on the driving shaft to enable the driven shaft swings to a 90 degree angle, 180 degree for transmission shaft. And then make it horizontal for the pendulum bar's left and right limits on transmission shaft. So it is with the



other half.



The squeegee mechanism can be adjusted up and down, right and left

left and right limits are horizontal (180 degree swing angle)

driving shaft pendulum bar

passive shaft pendulum bar

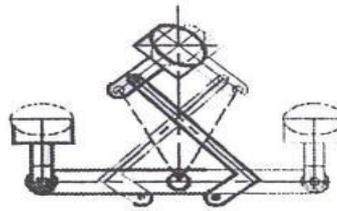
conveying shaft

swing angle

base board

symmetry

synchronization shaft



2) Printing swing angle adjustment: see picture below:

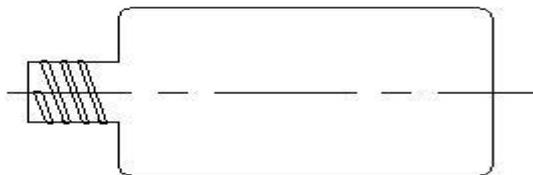
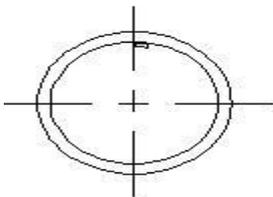
60 degree

90 degree

90 degree symmetry swinging

Swing

Adjust position till the printing swing angle requirement is met.



### 3. Adjustment

#### 3) Conveyor bottle adjustment

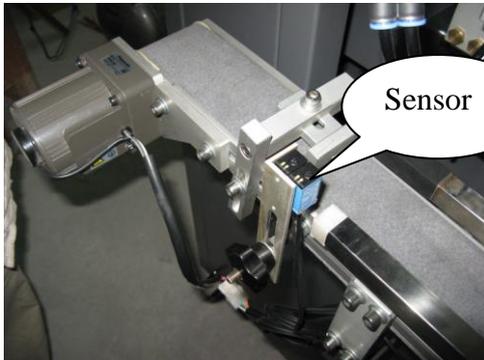
a) Adjustment done according to the shape of the bottle: run the mechanism to a limited position, clip the bottle by the holder air cylinder (within the allow range), adjust the two holding boards till the bottle is held nicely, and then lock all parts tight. (Holding board can be made independently for bottle with special shape)

See picture below:



Adjust the width of conveyer

b) The printing unit should have its own holding board, the requirement: box shaped, air suction connection; the part that needs to be silk printed need frequent adjustment.



Sensor

c) The holder movement is controlled by a computer program, various operation speed requires different movement angles; it is adjustable on the touch screen. (When adjusting the machine, use the Step button to control, and program is set separately)

#### 4) Print positioning

For flat bottle, the position is based on its bottom; for a round bottle, the positioning is much more complex: normally, a positioning slot is set under the bottom; but some are positioned on the bottle screw or a specified point. No matter which approach is applied, two independent suits are needed to be made, one is for pre-positioning, and the other is for positioned printing. For pre-positioning, allow 365 degree turning to seek the position point, when in positioned printing, requires little turning space before properly positioned, hence to ensure topping proceeds precisely.

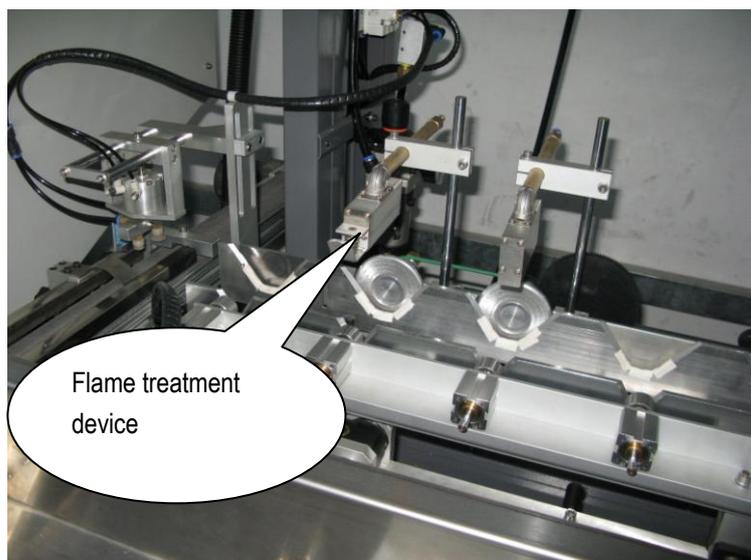
Bottom register slot  
Bottle mouth register

#### 5) Flame treatment:

The bottle surface need flame treatment to increase ink adhesion. To adjust the flame, first please open air flow to suitable current, and then release gas till suitable current is met.

#### 6) UV drying.

There are three levels for UV drying and the maximum power is 4KW. Choose proper level for UV drying according to

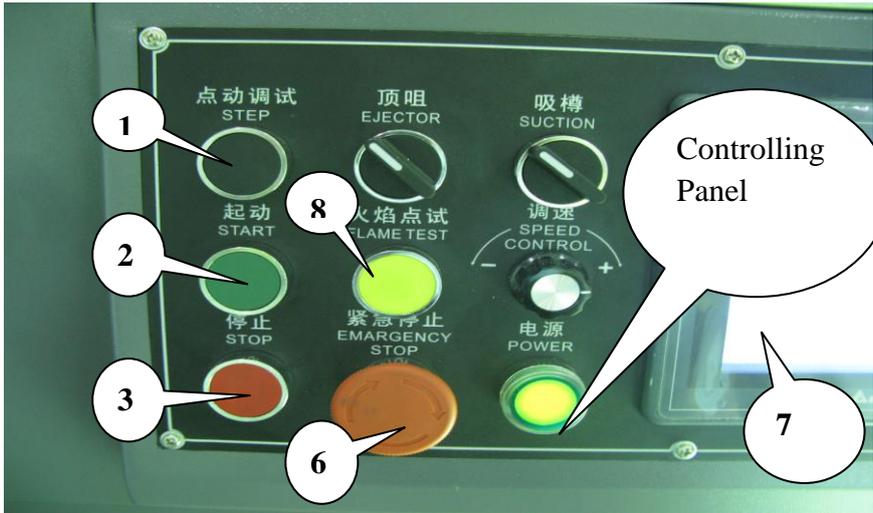


Flame treatment device

material, thickness of ink and printing speed; you can also change its lightness through adjusting the UV lamp box. The automatic on-off UV reflective shade is set through the touch screen. To save power and reduce temperature, the UV power will be switched to the lowest level when the machine stops. The UV bulb should be changed regularly: open the front board of the lamp box, release both sides of clips, take out the lamp holder, and change the bulb with a same specification. (Do not change to other bulb with different specifications, because the light bulb may be subject to different manufacturer.)

## 4. Main Control Panel and Controlling Parts

### 4-1 See the figure of the main and auxiliary control board



#### 1. Step--Jog button

When the pressure of the supplied air is normal, the machine will run if this button is pressed and stop if released. The machine will continuously run in Step state if this button is pressed without release. Check to see if there is any emergency stop.

**Note:** If the Machine is developed with two or

multi-colors, the whole machine will perform the same functions even if just press the button of any auxiliary machine.

#### 2. Start—Button for running the machine

When press Start

Button on the touch screen, the machine will send out indicating sound and begin to run after this button is pressed.

#### 3. STOP—stop running button

In the state of continuous running, press this button and the machine will stop after current printing cycle is finished.

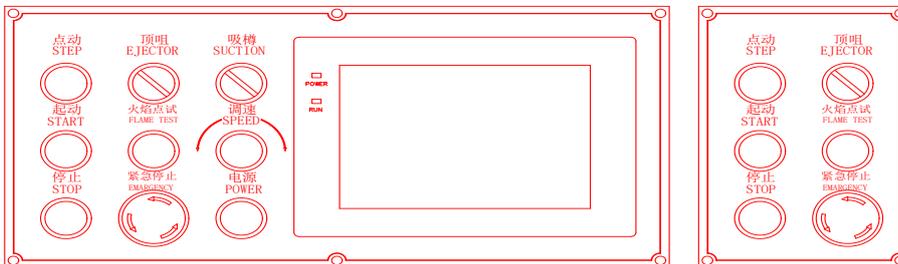
#### 4. VACUUM—vacuum suction switch

When it is at the “ON” position, it means the power for the vacuum pump has been turned on and it will perform the function of vacuum air suction.

When it is at the “OFF” position, it means the power for the vacuum pump has been turned off and it will stop performing the function of vacuum air suction.

#### 5. SPEED—Printing speed control

It is used for adjusting the running speed of the whole machine. Rotate it counter-clockwise to slower down the





speed and rotate it clockwise to increase the speed.

### 6. EMER STOP—Emergency stop button

Press this button and the machine will stop running immediately.

### 7. Touch screen

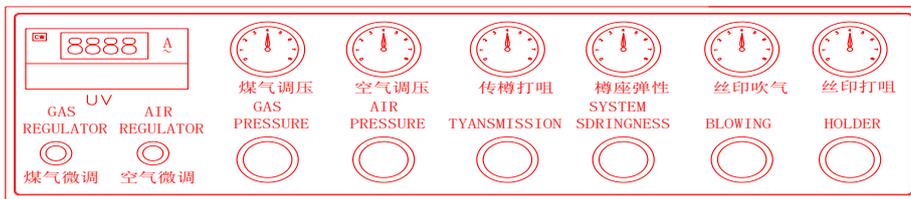
The touch screen displays different information of the machine. With this touch screen, the machine can be controlled and the settings can be altered easily. Please see the operation instructions for the details.

**Note:** The touch screen shall not be polluted by the corrosive liquid (like printing ink, thinner or plate washing chemical, etc.)

### 8. FLAMER—Button for ignition

In the standby status, press this button and the flamer will be started up and the petroleum will be connected. This button won't be effective in the status of automatic running.

## 4. Main control board and controlling parts





#### **9. GAS regulator—control valve for the flux of petroleum gas**

It is used for adjusting the flux of the petroleum gas supplied to the flaming device. Rotate it counter-clockwise to reduce the volume and rotate it clockwise to increase the volume.

#### **10. AIR regulator-- control valve for the flux of air**

It is used for adjusting the flux of air supplied to the flaming device. Rotate it counter-clockwise to reduce the volume and rotate it clockwise to increase the volume.

#### **11. GAS pressure—Pressure gauge of the petroleum gas and adjustment valve for the pressure**

It is used for adjusting the pressure of the petroleum gas supplied to the flamer. After the cap is pulled upwards, turn clockwise to increase the pressure and rotate it counter-clockwise to reduce the pressure.

**Note:** Normally, the pressure of the petroleum gas shall be adjusted to around **1.5Bar**.

#### **12. AIR pressure-- Air Pressure gauge and adjustment valve for the pressure**

It is used for adjusting the pressure of the compressed air supplied to the flamer. After the cap is pulled upwards, rotate it clockwise to increase the pressure and rotate it counter-clockwise to reduce the pressure.

**Note:** Normally, the pressure of the petroleum gas shall be adjusted to around **1.5Bar**.

#### **13. SQUEEGEE—Button for adjusting the pressure of the squeegee**

It is used for adjusting the pressure of the squeegee to control the thickness of the ink layer. Pull the cap upwards and rotate it clockwise to increase the pressure, and the ink layer will become thinner; rotate it counter-clockwise to decrease the pressure, and the ink layer will become thicker. Such adjustment is necessary for the ink with different viscosities.

#### **14. BLOWING—Button for adjusting the blowing pressure**

It is used for adjusting the blowing pressure of the top printing place. Such adjustment shall be done with the reference of the size and thickness of the plastic bottle.

#### **15. AMP METER—Current meter of the UV lamp**

It displays the work current of the UV lamp.

#### **16. AIR ( ON/OFF ) --Compressed air switch**

It controls the connection and disconnection of the air source. When it is set to the “ON” position, the air source is connected; when it is set to the “OFF” position, the air source is cut off.

#### **17. SQUEEGEE ( UP/DOWN ) --Switch for the lifting and lowering down of the squeegee.**

It controls the automatic lifting up and lowering down of the squeegee. When it is set to the “UP” position, the squeegee will be automatically lifted up; when it is set to the “Down” position, the squeegee will be automatically lowered down.

## **4. Main control table and controlling parts**

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### **4-2 Description of the touch screen**

This machine adopts the operation-display control system composed of the advanced module type program controller and the touch screen. The control of the machine and the setting of the parameters can be realized through the touch screen. It is easy and simple. The controlling interfaces of the touch screen are introduced as follows: The introduction here is the preliminary knowledge for the operation of this machine, which the operator must fully understand. Any person who has not read this section shall not operate the machine. Particularly if the machine has



not been adjusted or set for the normal work conditions, such improper operations may bring about damages or accidents. Thus the operations of machine shall be conducted after this Operation Manual is fully read and the related contents like the adjustment of the machine and operation instructions are fully understood so as to avoid accidents. The touch screen shall not be polluted by the corrosive liquid to avoid damages. The touch screen will display the literal contents in about twenty seconds after the main electric box is electrified.

Waiting for you to turn on the POWER ON switch off the main control table and cut off the power of the electric cabinet. After the POWER ON switch off the main control table is turned on, the following menu for monitoring will be popped up:

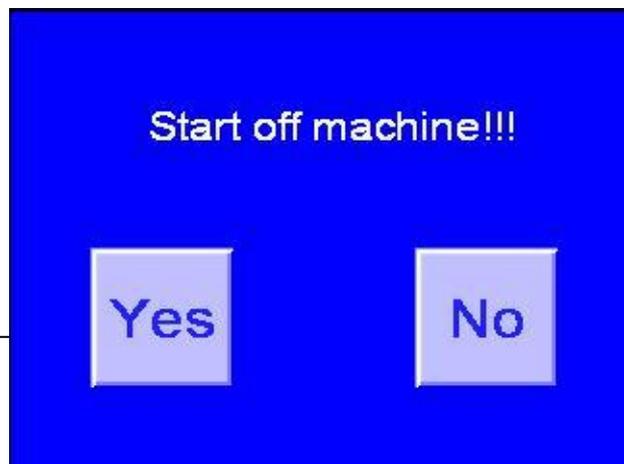
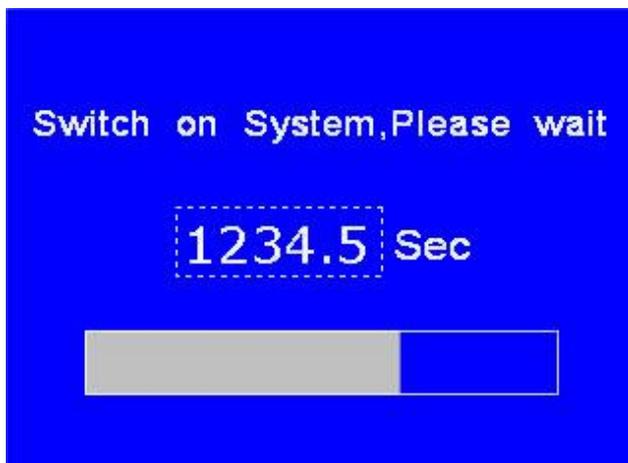


**The monitoring menu has five lines:**

The first line shows the interface name, date and time from left to right.

The second line shows the real-time angle of the main shaft, the number of the printed quantity and running speed of the machine from left to right.

**4. Main control table and controlling parts**



The third line counter reset. Slightly press this key the number will be cleared to 00000.

The fourth line has the Start-up key and the Turn-off key from left to right.

In the state of one-cycle Jog running, slightly press this key and the following will be displayed on the screen:

After the system is confirmed, slightly press the key "NO" to return to the monitor interface. Press this key



slightly and the following will be displayed on the screen:

Then the UV system enters into the state of preheating (when the machine is in the state of automatic running, start the UV system and the machine will stop running), and turn on the counter when UV is started for working. The time of preheating is 30 seconds till the long rectangle is fully filled with black, which means the UV system has finished the preheating and the machine can be started for normal production. Then the interface will automatically return to the monitoring state. The fifth line of the monitoring interface has the Maintenance and Parameter Setting Key, Slightly Pressing Maintenance Key, and its displays include the keys of input state, output state, alarming list, records, calendar and clock, archives, directory and monitor.

#### 4. Main control table and controlling parts



Slightly press the key of Input Status, the menu of input state will be popped up:

The round circle indicates the input status. The circle will be fully filled green when PLC has the input signals.

Slightly press the Maintenance key to return to the maintenance menu.

Slightly press the key of Output Status to pop up the menu of output menu.



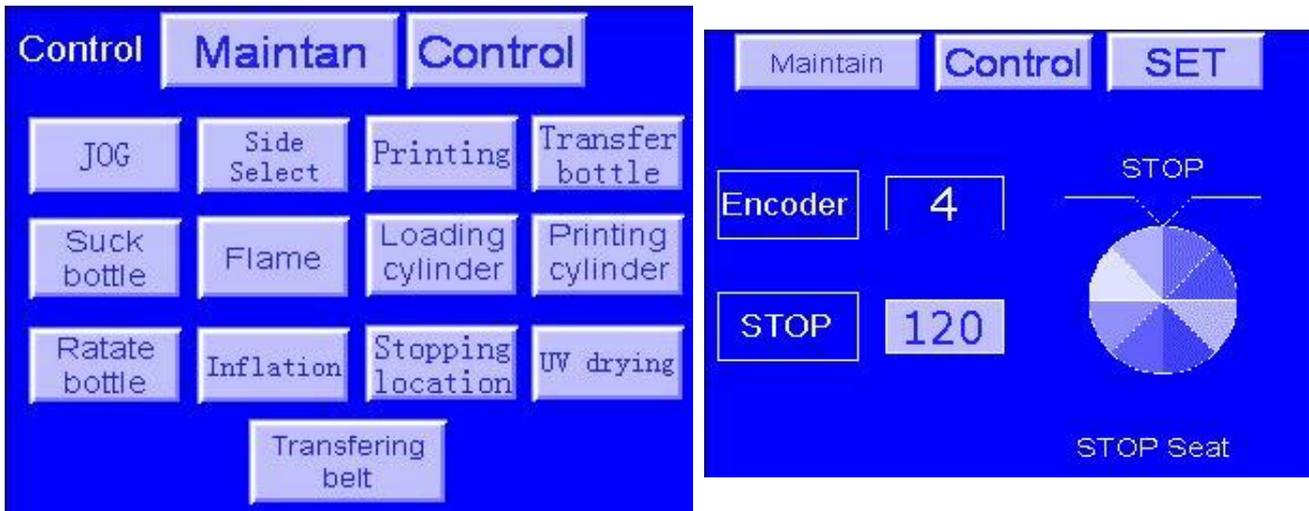
#### 4. Main control table and controlling parts

The round circle indicates the output state. The circle will be fully filled red when PLC has the input signals.

Slightly press the Maintenance key to return to the maintenance menu. Slightly press the key of Alarm List to pop up the Alarm List Menu.

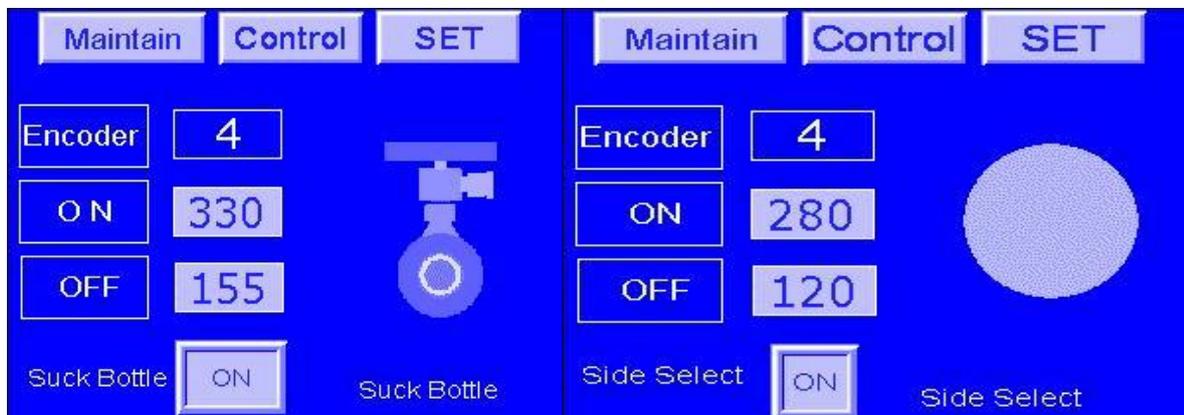
The Records menu records the operations of the buttons. Slightly press the Up and Down arrow keys to display more recorded operations. Slightly press the Maintenance key to return to the Maintenance menu; slightly press the Calendar and Time key, the following interface will be popped up:

Slightly press the Parameter Set key to pop up the Parameter Set menu:



#### 4. Main control board and controlling parts

Slightly press the Stop Position key to pop up the Menu:



The machine is waiting for you to input the value of the stop angle by touching the numeric keyboard.

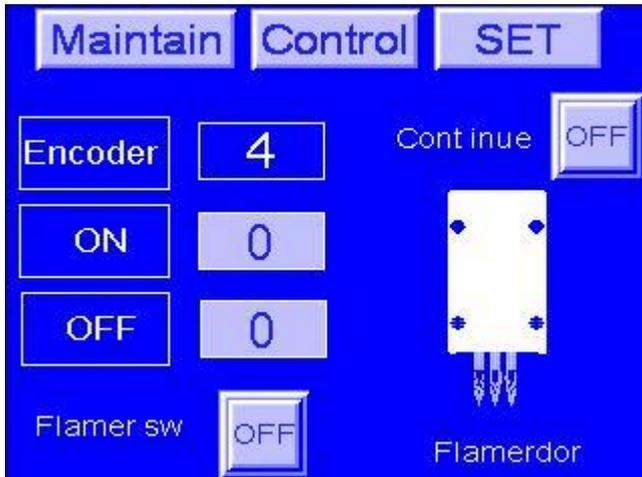
Slightly press the Parameter Setting key to pop up the Parameter Setting menu:

Slightly press the Face Selection key to pop up the Face Selection menu and set the angles of rotating and returning.

#### 4. Main control board and controlling parts

Slightly press the Parameter Setting key to pop up the Parameter Setting menu:

Slightly press the Flame button to pop up the flame setting menu and set the ON or OFF state for Flame Treatment.



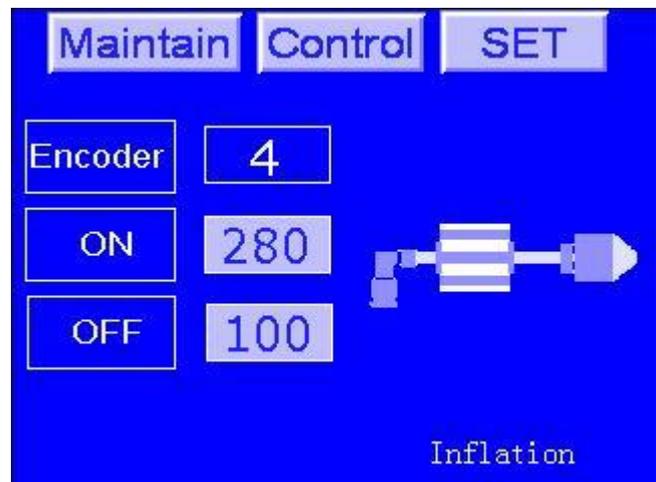
Flame Treatment of printing units is in the ON status and the machine is in the Standby status. In this case, the trial switch of the flamer is effective. When the machine is in the state of automatic running, the flaming device will automatically work.

Slightly press the Parameter Setting key to pop up the Parameter Setting menu.

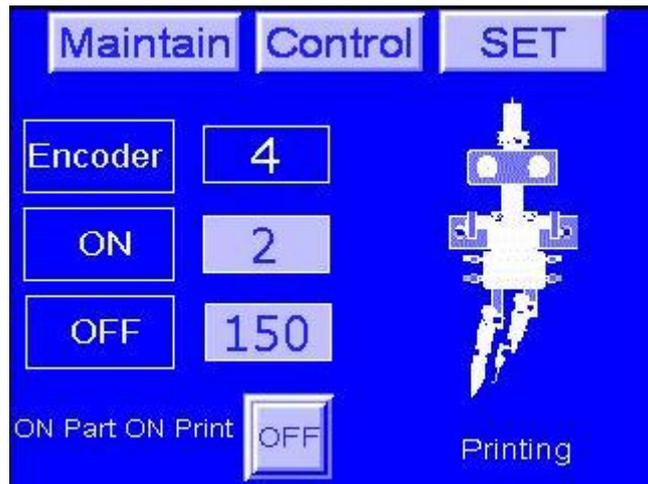
Slightly press the Blowing key to pop up the Blowing setting menu and set the Start/End angle for blowing.

Slightly press the Parameter Setting key to pop up the Parameter Setting menu.

Slightly press the Squeegee key to pop up the Squeegee menu and set the Start/End angle of the Squeegee for printing units.



#### 4. Main control board and controlling parts



Set No-part No-print to the “ON” state for printing units. The squeegee won’t work until the workpiece is available. The No-print switch of the counter (Only set Non-printing to the “ON” state fir #1 printing unit) will detect the adjustment of distance and location, and make adjustment according to the workpiece to be printed.

Slightly press the Parameter Setting key to pop up the Parameter Setting menu.

Slightly press the UV Drying key to pop up the Drying setting menu and set the state of UV drying for printing units.



This menu can be used for setting the “ON” or “OFF” state of the power, “ON” or “OFF” state of the lamp shade, the switching-over of the UV power between high, medium and low levels, UV work time and UV air-discharging. After the UV system is normally started up for preheating, the operations of turning on or off the lamp shade and UV power switching-over between high, medium and low levels can only be done in the state of automatic running. When in the state of automatic running, the power of UV system can be turned on or off. If the UV system needs to be started again, the related operations for starting up the UV system can only be done after the UV system is cooled upon five minutes of discharging the air.

The mark indicating the OFF state of the lamp shade is the lower half of the corresponding circle, whereas the mark indicating the ON state of the lamp shade is the upper half of the corresponding circle.

The way of indicating the high, medium and low levels of the UV power is that the corresponding

## 4. Main control board and controlling parts

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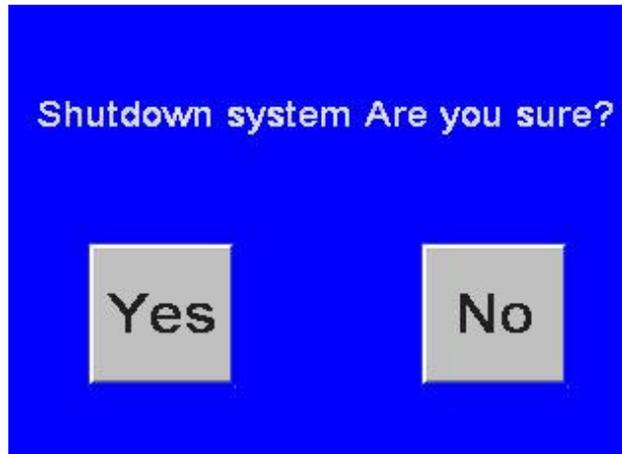
icon is filled.

UV work time counting will record the life time of the lamp tube. The time counting shall be cleared when the lamp tube is replaced.

The mark indicating the UV air-discharging is the corresponding icons of the exhaust fan and the clock.

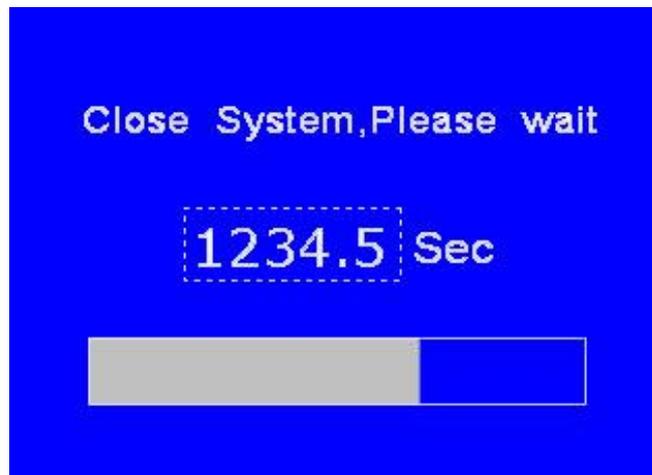
Slightly press the Monitor key to pop up the Monitor menu.

Slightly press the OFF key to pop up the OFF menu for turning off the machine.



After confirming to shut off the system, slightly press the NO key to pop up the Monitor menu:

Slightly press the YES key to pop up the System-off menu:



After the UV system is shut off, wait for another five minutes till the rectangle is fully filled as the air is discharged.

## 5. Operation instructions

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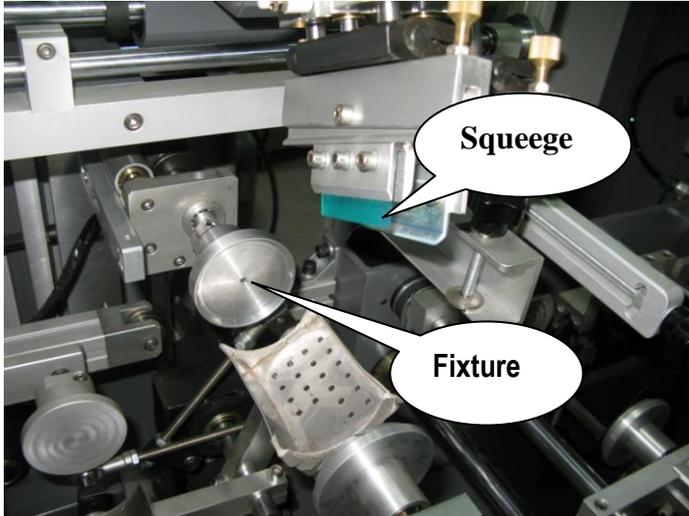
### 5-1. Operation instructions

The basic operations depicted in this section are suitable for the machine which has been properly adjusted and set and is ready for printing. In order to avoid accidents, please don't operate the machine if it has not been adjusted and set for related items. The operator shall read this Manual carefully before the operations. Particularly, Section of "4. Main Control Table and Controlling Parts" shall be fully understood.

### Start-up

① Turn on the switch for the main power in the power distribution cabinet and make sure everything is normal. Then turn on the POWER ON switch for the main control. The green indicator of the work power will be on. In this case, the operator can check the information of the electronic terminal (Touch screen) and alter the settings if necessary.

② After the work power is turned on, the operator can press the Step button for trial running so as to check the work conditions of different parts of the machine.



③ Slightly press the main ON key on the touch screen, turn on the UV power to start up the UV system. The touch screen will display the preheating process of the UV lamp.

④ After the UV lamp is preheated, press the key RUN. The machine will send out a long sound and the green lamp in the tower lamp at the left top of the main unit will be on. Then the machine starts running.

#### Normal stop

Press the STOP key on the main control board, the machine will stop after one printing cycle is

finished. At the same time, the yellow lamp in the tower lamp will be on. Then turn off the flaming device, close the UV shade and set all the in-use UV lamps to the LOW level as the standby state.

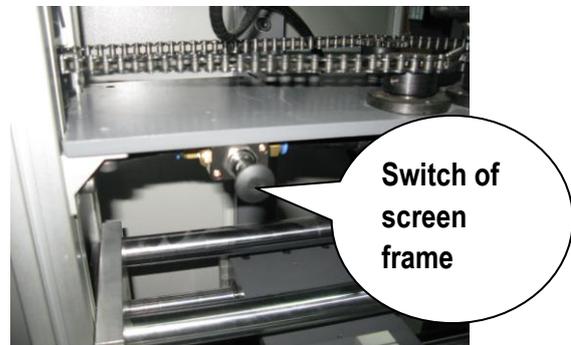
#### Emergency stop

**Press the switch of EMER.STOP, the machine will stop running immediately. . At the same time, the yellow lamp in the tower lamp will be on. Then turn off the flaming device, close the UV shade and set all the in-use UV lamps to the LOW level as the standby state.**

**Note:** Release the emergency stop switch and turn on the START key (both the main control table and the touch screen have one), then the machine will keep its previous running.

#### Turn off

If the machine needs to be turned off after the printing is finished, the operator can press the OFF switch on the touch screen so as to first stop the feeding. After the printing of the workpiece which has entered into the machine is finished, the machine will automatically stop running. Then the UV lamp will be off and the exhaust fan begins to work. In the final stage, first turn off the work power, then turn off the power switch in the main control box and turn off the compressed air and gas. After this, all the operation procedures of turning off the machine have been completed.



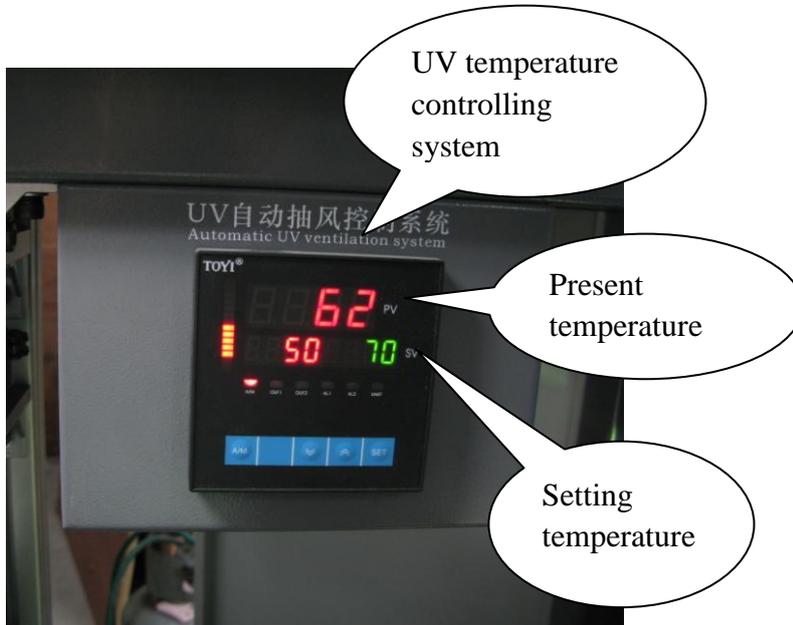
## 6. Maintenance

### 6-1 Mechanical maintenance (1)

The maintenance of machine covers many aspects of management. The following are only the basic

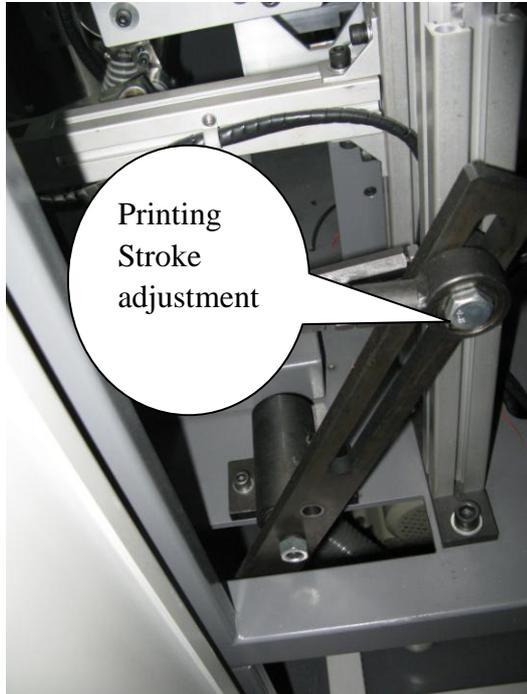
requirements needed for the normal running of the machine. For other aspects of maintenance, such as the cleaning of the inside of the machine, external surface of the machine, peripheral working place and the ambient environment, shall be done by means of related regulations stipulated thereabout to achieve standard management.

## 6-2. Mechanical maintenance(2)



### Daily maintenance

Everyday when the machine is started up, running, or before it is turned off, the operator shall watch on or listen to the machine to see if there is any abnormality. If the running is abnormal, or if the abnormal sound is heard, the operator shall immediately check the machine to see if there is any mechanical failure. If the abnormality is caused by improper lubricating, the transmission parts like the slide shaft, rotating joint, ball bearing shall be checked and more grease shall be added.



**Monthly maintenance** When the machine works till the end of the month, the operator shall check the moving joint parts and add more grease. If the grease becomes solidified, the solidified grease shall be removed and the related place shall be cleaned with gasoline. Then add the new grease.

**Half-year maintenance** Normally, the maintenance shall be done once every half a year. In this case, the operator shall check the moving joint parts to see if there is any rust, wearing, solidification of the grease, etc. If any, relevant measures shall be taken timely to deal with it.

**Annual maintenance** When the machine has run for one year, the operator shall check the machine in whole, including each mechanical part, to see if there is any rust, wearing, solidification of the grease, etc. If any, relevant measures shall be taken timely to deal with it.



If there is any question, please contact the local distributors.

### Circuit Diagram of 102 Full-auto Multi-color Screen Printing Machine

Gas pressure regulating  
Air pressure regulating



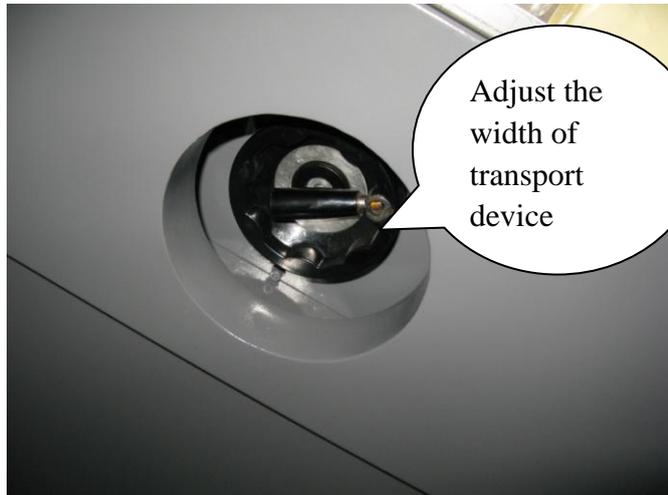
Water-removing Valve

Transparent tube  
Gas

Feeding suction cup  
Swinging holder  
Lamp Shade Cylinder  
Squeegee and ink flooding blade  
Solenoids  
Air supply  
Pressure switch

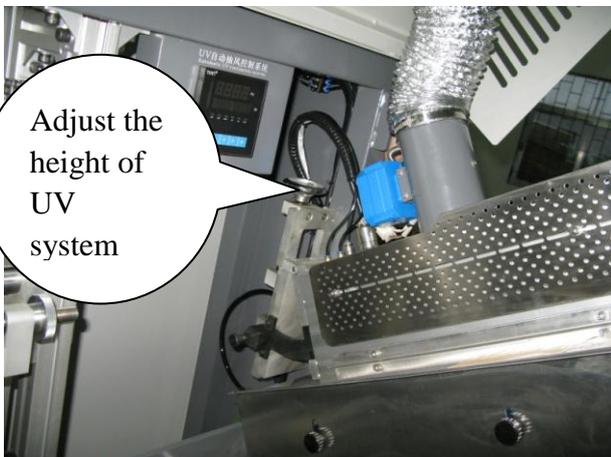
System springness  
Blowing  
Holder  
Transmission  
Air tank

Circuit Control Diagram-1 of 102 Full-auto Multi-color Screen Printing Production Line



Adjust the width of transport device

Frequency converter  
#1 Main motor  
#2 Main motor



Adjust the height of UV system

#1 Lighting  
#2 Lighting  
Feeding motor  
#1 Gas valve  
#2 Gas valve  
Heat emission fan:

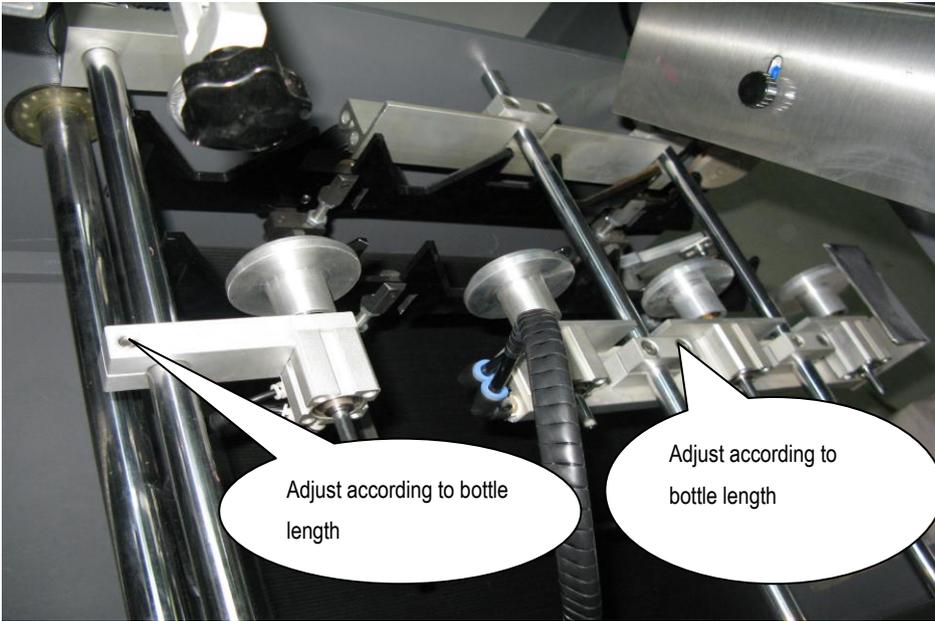
Circuit Control Diagram-2 of 102 Full-auto Multi-color Screen Printing Production Line

Black wire Igniter  
Red wire High voltage wire



Circuit Control Diagram-5 of MS102 Full-auto Multi-color Screen Printing Production Line

Mutual inductor Vacuum pump Exhaust fan



Heat emission fan  
Circuit Control  
Diagram-6 of MS102  
Full-auto Multi-color  
Screen Printing  
Production Line

Mutual inductor  
Vacuum pump  
Exhaust fan  
Heat emission fan  
Circuit Distributing  
Diagram-61 of MS102  
Full-auto Multi-color  
Screen Printing  
Production Line

Circuit Distributing Diagram-2 of MS102 Full-auto Multi-color Screen Printing Production Line

