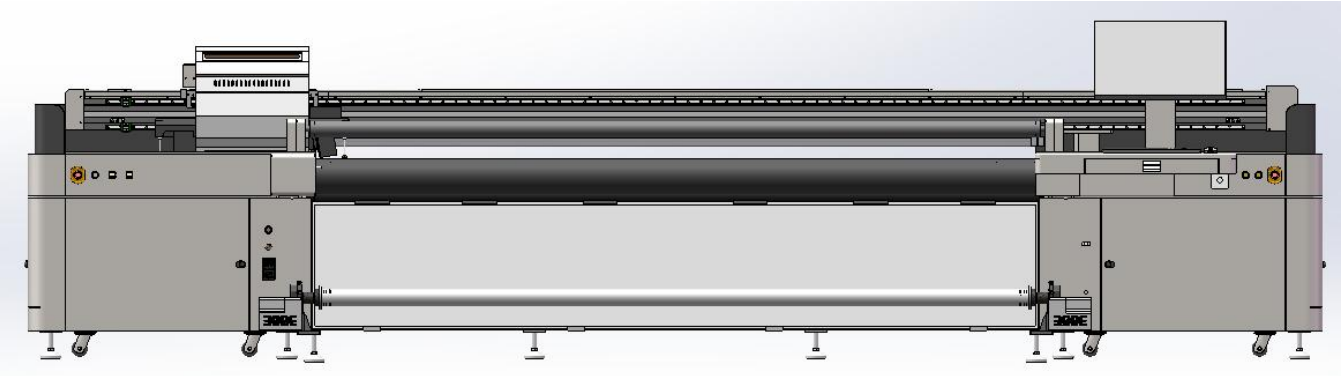
LIYU HYBRID DS32 Digital Guiding Belt UV Inkjet Printer

User Manual (S1 System)



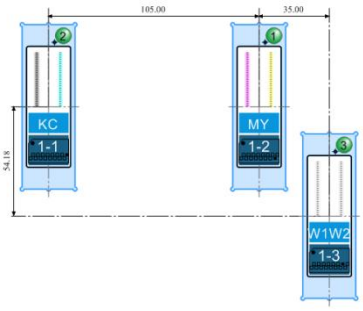
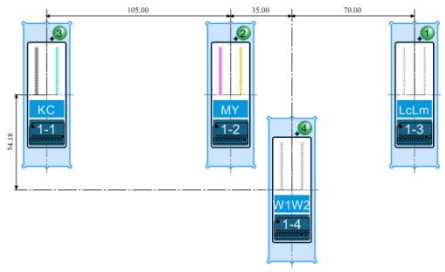
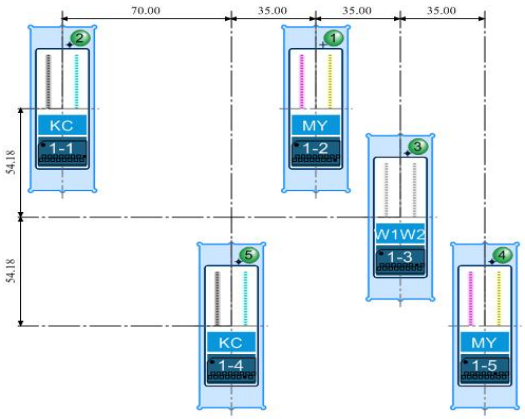
Content

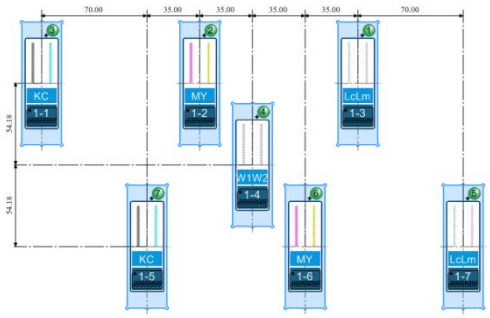
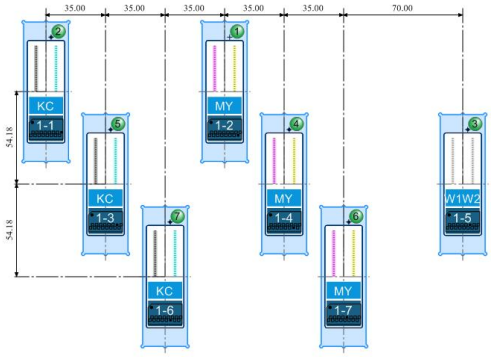
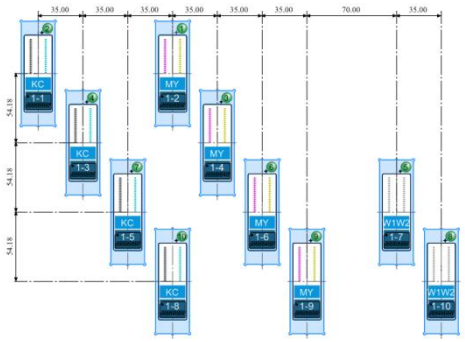
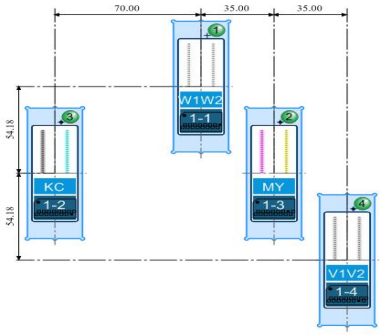
Introduction

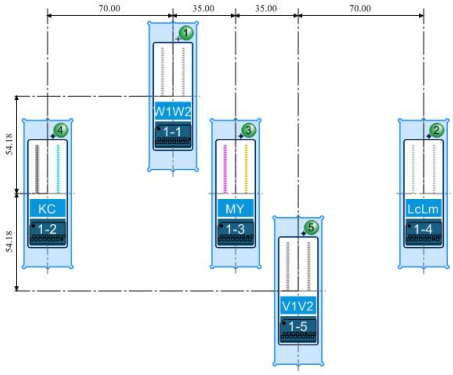
Thank you very much for purchasing our LIYU DS Series Guiding Belt Inkjet Printer (hereinafter referred to as Guiding Belt UV Inkjet Printer). Please carefully read the manual before using the Guiding Belt UV Inkjet Printer and put the manual at the place within easy reach at any time. The guiding belt inkjet printer adopts environmentally friendly UV ink, with the maximum width of 3.2m, and the thickest material of 50mm. The operational manual describes the features of the printer, parts name, information that should be known before using the equipment and the basic operation, for instance, how to switch on and off and how to set various parameters of the printer. Please carefully read the following contents before reading Chapter One: Safety Precautions and Operation Cautions.

Technical parameters

The print head of RICOH G5 or G6 is applied to the DS32 by using S1 system. In addition, any configuration as required by the customer can be realized by upgrading the new layout. At present, the highest level of print head is four rows Ricoh print head, as respectively shown in the following table.

	Ricoh G5 or G6	
	Configuration type of print head	Diagram
1	3-Print head 4C+2W 4C2W0V CW\WC\C\W	
2	4-Print head 6C+2W 6C2W0V CW\WC\C\W	
3	5-Print head 2X4C+2W 4C2W0V CWC\CW\WC\C\W	

4	**7-Print head** **2X6C+2W** **6C2W0V** **CWC\CW\WC\C\W**	
5	**7-Print head** **3X4C+2W** **4C2W0V** **CWC\CW\WC\C\W**	
6	**8-Print head** **4X4C+4W** **4C2W0V** **CW\WC\C\W**	
7	**4-Print head** **4C+2W+2W** **4C2W2V** **WCV\WC\CV\W**	

8	**5-Print head** **6C+2W+2W** **6C2W2V** **WCV\WC\CV\W**	

Note: The above configurations are commonly used. Any special requirements should give priority to the order.

● *List of Main Technical Parameters*

■ Machine Parameters

Machine model	**DS3200-UV-LED**
Print technology	**Piezo continuous drop-on demand(DOD)**
Type of print head	**RICOH G5&G6 (Max four rows)**
Print head control	**Use software to adjust the temperature and voltage of the print head.**
Print head configuration	**KCMY/KCMYLcLm/ (optional of white and gloss oil)**
Maximum printing size	**3.2 m**
Maximum resolution	**635*2880 dpi**
Fastest print mode and efficiency	**635x900 3pass 60 ㎡/h / 635X900 3pass 70 ㎡/h**
Ink type	**UV ink**
Color profile	**K C M Y Lc Lm W V (optional)**
Ink supply system	**Automatic continuous ink supply with vacuum negative pressure**
Scraping device	**N/A**
Media absorption	**Table vacuum absorption, pressure regulation and segmented control**
Table pressure	**25kg/m²**
Drying device	**LED_UV lamp solidification**
Package size	**Main engine: 6340*1938*2168/Auxiliary platform and take-up and feeding system: 3982*1750*1204**
Machine size	**Main engine (including take-up and feeding system): 6020*2220*1775; including 2 extension platforms: 6020*3732*1775**
Machine weight	**About 3 tons (the main engine)/1 ton (2 extension platforms and 2 take-up and feeding systems)**
Printing interface	**Usb3.0**
Power interface	**Mainframe 220V±10% 50HZ 3300W Fan: 220V±10% 50HZ 6000W UV lamp 220V±10% 50HZ 5000W**
Environmental requirements	**Temperature 15 ℃ ~ 30 ℃ Relative humidity 40% ~ 80%**
RIP Software	**Photo print/Caldera**
Machine characteristics	**Intelligent constant pressure adsorption, full-auto guide belt guiding, independent temperature control for auxiliary ink tank, folding extension platform (optional), intelligent pressure negative-pressure ink-supply system, human engineering mechanics design, THK mute guide, LED cold light source solidification, independent single and double winding take-up and feeding system, alarm tips when the ink supply level is short of ink and the waste liquid is full, print stop when it is short of ink, anti-collision and collision stop function, automatic circular printing function, and automatic media altimetry.**

■ *Table of Printing Efficiency*

The printing speed of DS series guiding belt printer is mainly decided by numbers of print heads in rows and printing modes. This table shows the printing efficiency by taking three rows of Ricoh G6 print heads as a sample.

DS_RICOH G6 Series (Three Rows)	
Printing Mode	**Working Efficiency**
Draft Mode 635*600 4pass	80m^2/hour
Working Mode 635*1200 8pass	50m^2/hour
High-precision Mode 635*1800 12pass	38m^2/hour

Note: The printing quality can be ensured by properly adding feather values according to the state of different print heads.

Important Particulars

The negligence of precautions mentioned below may seriously affect the working conditions of the equipment, equipment service life or the service life of relevant parts, or even cause the permanent damages of relevant parts, and may endanger staff's physical and mental health in some cases. Please operate in strict accordance with instructions.

1. Please carefully read the requirements for working space and working environment of the machine in this manual and strictly abide by the requirements. Otherwise, it will affect the working state of the machine, machine service life or service life of parts, or even endanger staff's physical health;

2. Please use the ink designated by the manufacturer, otherwise, it may affect the printing effects or even cause the permanent damage of print head;

3. During the operation and maintenance process of the machine, please be sure to avoid the contact of ink and non-cleaning fluid, so as to prevent the ink from any chemical reaction which may cause machine damage;

4. Since the waste fluid generated from the machine will pollute the environment, please properly dispose of the waste fluid in accordance with the requirements of local environmental protection department;

5. The auxiliary ink box, filter, ink pump, air pump, liquid pump, refill tube, guiding belt and print heads of the machine all belong to wearing parts and shall be replaced periodically as per the service condition.

6. The platform cannot be overloaded, otherwise, the platform could be damaged or its accuracy could be changed.

Safety Precautions

To ensure that operators will properly use the equipment and prevent equipment damages and unnecessary casualties, please carefully read the following safety precautions:

Please use the voltage as specified on the nameplate and never plug several devices into one power outlet at the same time to avoid fire disaster.

Please check and ensure the equipment has been grounded reliably. Otherwise, disturbance may be caused and lead to abnormal image printing of the machine.

Never dismantle or transform the equipment by yourself, otherwise, such accidents as fire disaster, electric shock and other accidents may be caused.

Keep the circuit control section of the equipment away from metal objects or liquid, otherwise, it will cause circuit board damage, fire disaster or other accidents.

Never connect the power line of the equipment with wet hands, otherwise electric shock may occur.

In the event of the following situations, please switch off the equipment and contact the local dealer if necessary:

1. The switch is insensitive or doesn't work.

2. When the inkjet printer makes abnormal sound or produces smoke.

3. When any metal object or liquid splashes into the electric control part of the equipment.

4. When problems that operators fail to settle arise.

5. When the guiding belt is seriously abraded or breaks, it needs to be replaced.

Operation Precautions

Power Supply

1. Inkjet printer shall be installed near the power source convenient to use and the connecting outlet must be solid and reliable.

2. Relatively stable power supply in accordance with technical specification of inkjet printer shall be used, and it should be mandatory to install the voltage stabilizer, and the USP (uninterruptible power supply) is the recommended one.

3. Connect the power line to a separate outlet and never share the same power outlet with other equipment.

4. Pay attention to the order of power on and off so as to avoid damages to print head.

5. In case of unstable local voltage, please use voltage stabilizer to guarantee the stable voltage and choose the famous brand products, because inferior products may cause equipment fault or damage electrical component of the equipment (including print head).

Inkjet Printer

1. Don't place any undesired objects on the platform of the inkjet printer so as to avoid damages to print head.

2. In case of any maintenance for the machine as regards electrical control, please be sure to disconnect the power of inkjet printer.

3. Never touch the surface of print head with hands or hard objects.

Regular Inspection and Maintenance

- ✧ **Fill lithium base grease in mechanical parts with grease gun on a regular basis, and fill in the ink carriage linear guide and the lifting screw rod of the carriage in Z direction once for every week under normal printing.**
- ✧ **See contents in Chapter Maintenance and Service for maintenance method of ink and print head.**

CONTENTS

Chapter 1 Introduction to Basic Knowledge

This chapter dwells on the necessary information for inkjet printer operation. Please understand the necessary information before reading other chapters. Contents of this chapter:

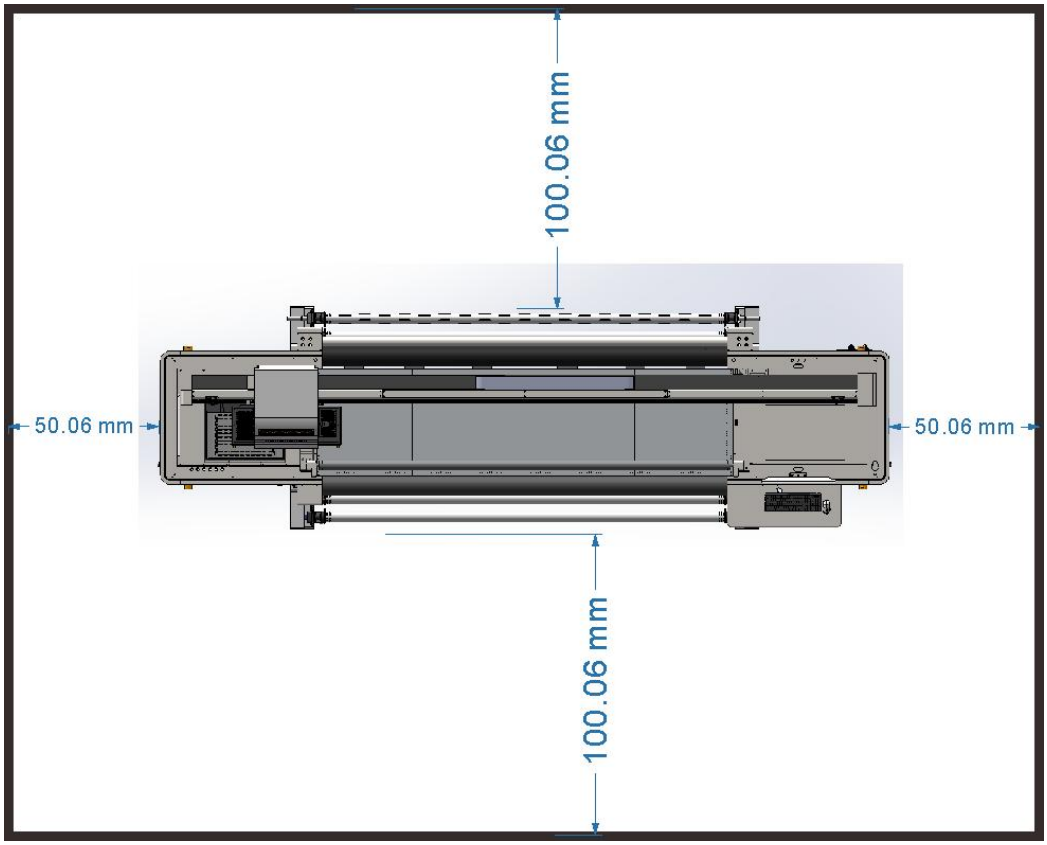
- **Working conditions**
  - **Working space**
  - **Environmental requirements**
  - **Computer configuration requirements**
- **Appearance, name and functions of parts**
  - **DS32 Front view**
  - **DS32 Back view**
  - **DS power wiring schematic diagram and power interface:**
  - **Introduction to function keys**
  - **Carriage view**
- **Machine unpacking and floor installation**
- **Consumables**
  - **Printing media**
  - **Ink and cleaning fluid**
  - **Maintenance tools**

● *Working conditions*

■ Working space

Around the guiding belt must be sufficient space to leave room for maintenance, such as replacing some common parts and print media, as follows:

Installation and maintenance space is shown in the following figure:



Note:

1. DS32 Main engine (including take-up and feeding system): 6020*2220*1775; 2 extension platforms: 6020*3732*1775

Note: The space in the above figure is subject to no extended platform. If front or rear extended platform is used, at least a space of 2.5m distance shall be reserved before and after the printer.

◆ Environmental requirements

The optimal working temperature and humidity of the printer: temperature 23℃ - 26℃, humidity 40% RH ~80% RH.

Please try to keep the printer (machine) working under the optimal working temperature and humidity; otherwise, the printing quality may drop and its service life may reduce.

Don't install the machine at the following locations:

- ✧ **In direct sunlight**
- ✧ **Vibrant and unstable location**
- ✧ **Dusty places**
- ✧ **Location with drastic temperature variation**
- ✧ **Location with great air mobility**
- ✧ **Near the air-conditioning or heater**
- ✧ **Place likely to be wetted**
- ✧ **Place likely to produce other polluting gas**

◆ Computer configuration requirements

The minimum configuration requirements for the software operation of the product are as follows:

CPU: INTEL i5 and above.

Mainboard: brand mainboard of high quality, with PCIE slot.

Display card: Graphic display card with video memory above 1G.

Memory: Memory above 8G.

Hard disk: Over 50 G room is left, please use NTFS format as the hard disk format.

Operating system: WIN7 and above, 64-bit Professional or Ultimate

● *Machine unpacking and floor installation*

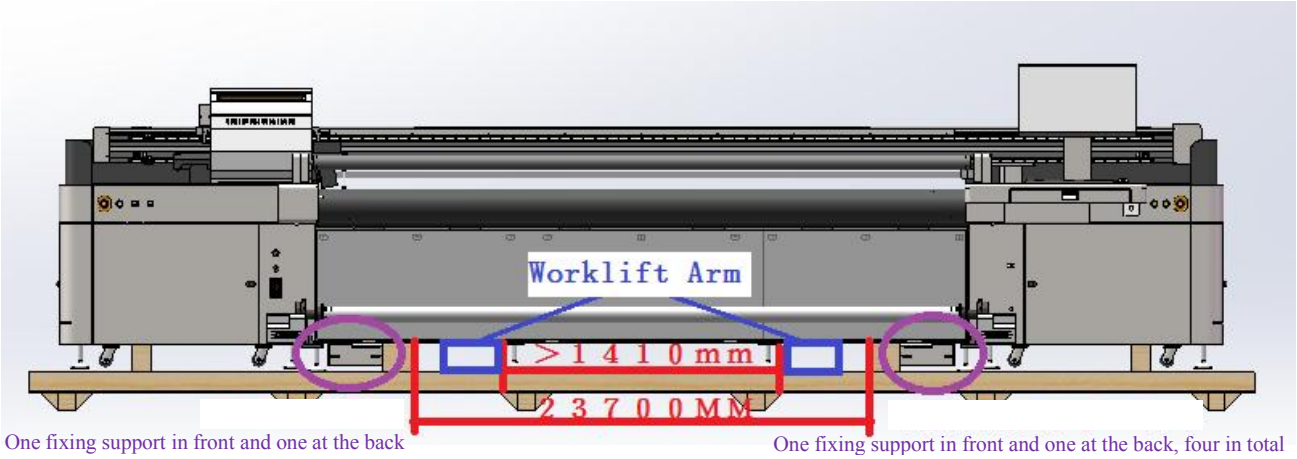
1. Fastening steel strips and fixed bolts are attached on the packing box, please cut off the steel strips before unpacking. Remove the fixed bolts of the packing box in turn, 5 sides in total, take down the side plate and top cap of the packing box; Some of the machines will be sent out according to the order requirements, only having the packing chassis fixed machine, with rain cloth and tin foil attached on it, the positions of the steel strip bolts are as shown in the red logo below:

2. Remove the 30 fixed bolts of the packing box in turn, take down the side plate and top cap of the packing box; the positions of the bolts are as shown in the red logo below:

3. Remove the connecting bolts on the packing plate in turn, where're 4 fixing

supports (two in front and two at the back). The fixed bolts of the machine and bottom box for easy transport need to be removed. The positions of the packing pressing plate are as shown in the purple circles below:

4. A 5T or above forklift may be used to unload the machine. The position of the forklift should be in the middle of the machine to ensure the center of gravity. After the machine is unloaded smoothly, push the machine to the designated location (**When unloading the machine, pay attention to the operation safety**). With reference to the schematic diagram, operate according to the actual situation under the premise of ensuring stable unloading.



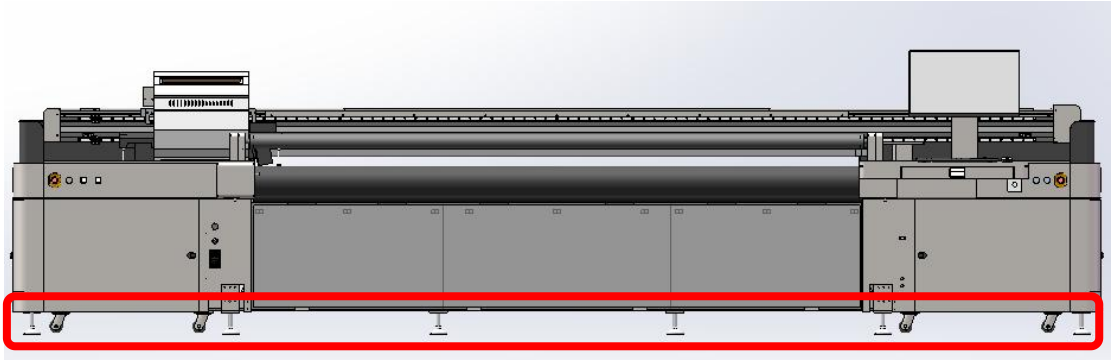
One fixing support in front and one at the back

One fixing support in front and one at the back, four in total

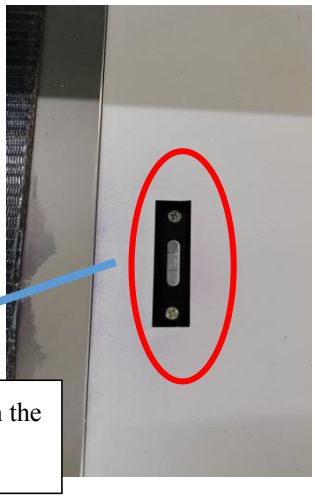
Note: Due to the width of customer's door and the existence of step or gradient, the machine needs to enter directly when entering. Forklift can be used to lift from behind to assist in entering.

In particular cases, when the forklift forks the machine from left or right, the side door must be opened first, and wooden blocks must be padded on the forklift inserts. This can prevent the damage of the door due to forklift problems. As shown in the following figure:

5. Leveling machine. Unscrew the leg of the machine frame corner, make its universal caster wheels suspended into other legs and leave from the ground;



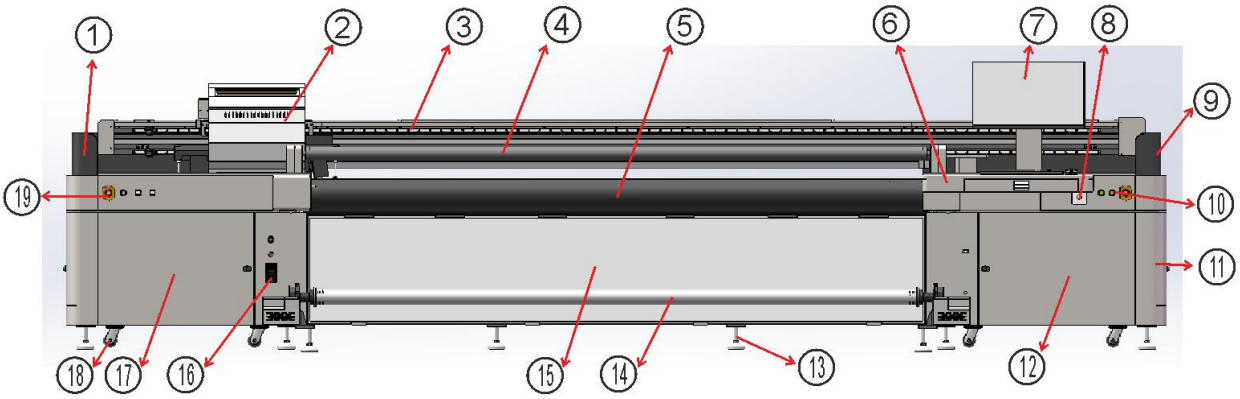
6. By adjusting the leg of the machine frame, level the machine by using the gradienter that comes with it (levelled before leaving factory), make the level vial of machine in the middle part, and the precision blister in the left or right of the middle within 1 grid.



One bubble level on X-direction, one on the left and one on the right on Y-direction

● *Appearance, name and functions of parts*

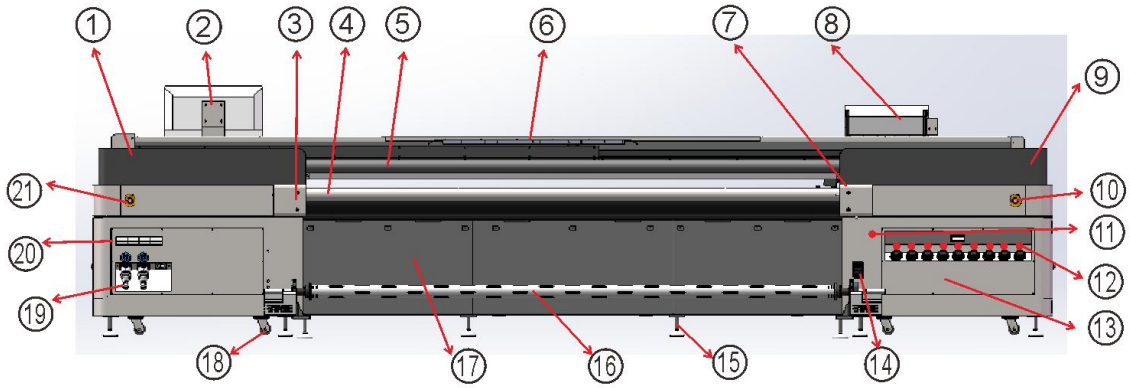
◆ **DS_32XX Front view**



Code	Name of parts	Description
1	Upper safety fences	Peripheral fence, appearance and safety.
2	Printing carriage head	Print head, auxiliary ink tank, carriage board and other crucial components.
3	Girde	Main components of printing carriage for operation.
4	Front pressure bar	When printing hard materials, it can play the role of fixing.
5	Mesh belt	Front main guiding belt roller, guiding belt, rear tensioning roller, electric machinery and speed reducer
6	Keyboard pallet	For placing keyboard and mouse. Drawer at the bottom for tools storage
7	Display support	The installation position for display
8	USB interface	Computer external USB interface. For users to plug USB.
9	Upper safety fences	Peripheral fence, appearance and safety.
10	Right button	Right to left: right emergency stop, start, sensor switch of media measurement
11	Lower right box	For placing the host. All power switches are inside installed.
12	Lower right box in front	Control cabinet of circuit board; there are main board, deviation correction board and main control components inside.

13	**Leg**	**For adjusting the level and fixing of the machine.**
14	**Take-up rod**	**It is a 3.3m inflatable rod, which can be forward and reverse.**
15	**LED backlight**	**For watching the effect during printing with backlight materials. (Optional)**
16	**Feeding control**	**For control of positive and negative rotation of the cloth feeding motor and torque adjustment.**
17	**Lower left box**	**There is a negative pressure system inside for controlling the lifting pressure of the front and rear positioning rods.**
18	**Pulley**	**For facilitating the moving of machine on flat ground.**
19	**Left button**	**From left to right are left emergency stop and start buttons**

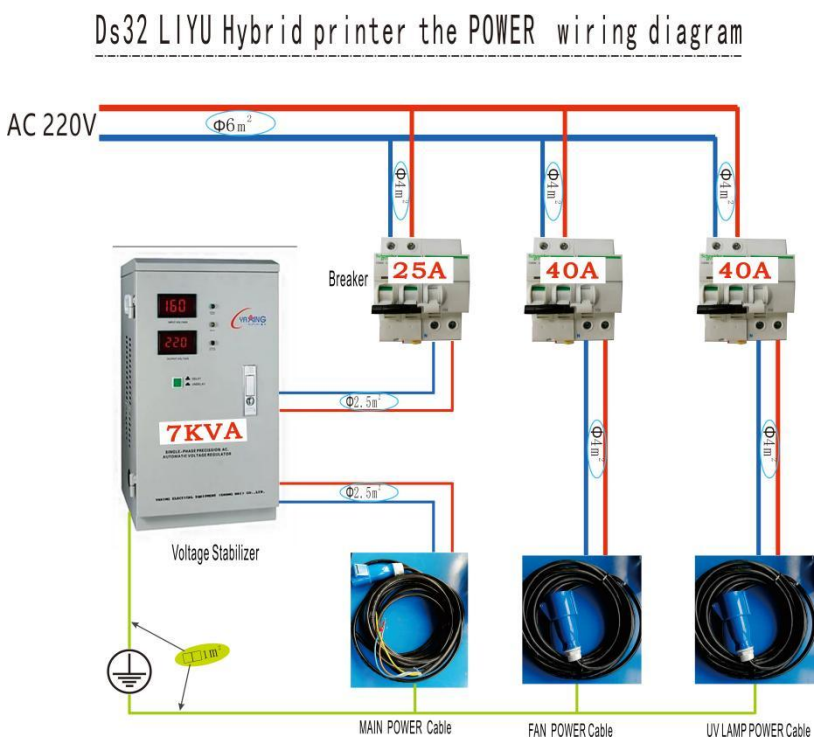
◆ **DS_32XX Back view**



Code	Name of parts	Description
1	**Upper safety fences**	**Peripheral fence, appearance and safety.**
2	**Display support**	**For fixing the display.**
3	**Tension screws**	**For tensioning and adjusting the guiding belt.**
4	**Transition rod**	**For cloth feeding transition, which facilitate feeding.**
5	**High ceiling bar**	**For soft material transition.**
6	**Girde**	**Main components of printing carriage for operation.**
7	**Control panel for back operation**	**One on the left and one on the right, which can control printing, printing suspend and continue printing, positioning, adsorption, and the rise and fall of the back pressure bar.**
8	**Printing carriage head**	**Print head, auxiliary ink tank, carriage board and other crucial components.**
9	**Upper safety fences**	**Peripheral fence, appearance and safety.**
10	**Back emergency stop**	**Four in total, one on the front, rear, left and right.**

11	Effluent alarm	Give an audible and visual alarm in case of full waste liquid tank.
12	Main ink tank alarm	Give an audible and visual alarm when lacking of ink in the mian ink tank. To distinguish KCMYLCLMWVF
13	Main ink tank	Position of adding ink.
14	Feeding control	For control of positive and negative rotation of the cloth feeding motor and torque adjustment.
15	Leg	For adjusting the level and fixing of the machine.
16	Feeding rod	Feeding inflatable rod, an inflatable roller for fixing the materials.
17	Absorption fan cabinet	The absorption fan is installed inside this door.
18	Pulley	For facilitating the moving of machine on flat ground.
19	Main power interface	It can be divided into UV LAMP POWER (main input of adsorption UV lamp), FAN POWER (main input of adsorption power) and MAIN POWER (main engine power input)
20	Machine main switch	They are UV LAMP (UV lamp main switch), FAN (adsorption main switch), PC (computer switch), MAIN (machine main switch).
21	Back emergency stop	Four in total, one on the front, rear, left and right.

◆ **DS power wiring schematic diagram and power interface:**



The above figure shows the wiring diagram of DS guiding belt machine. The

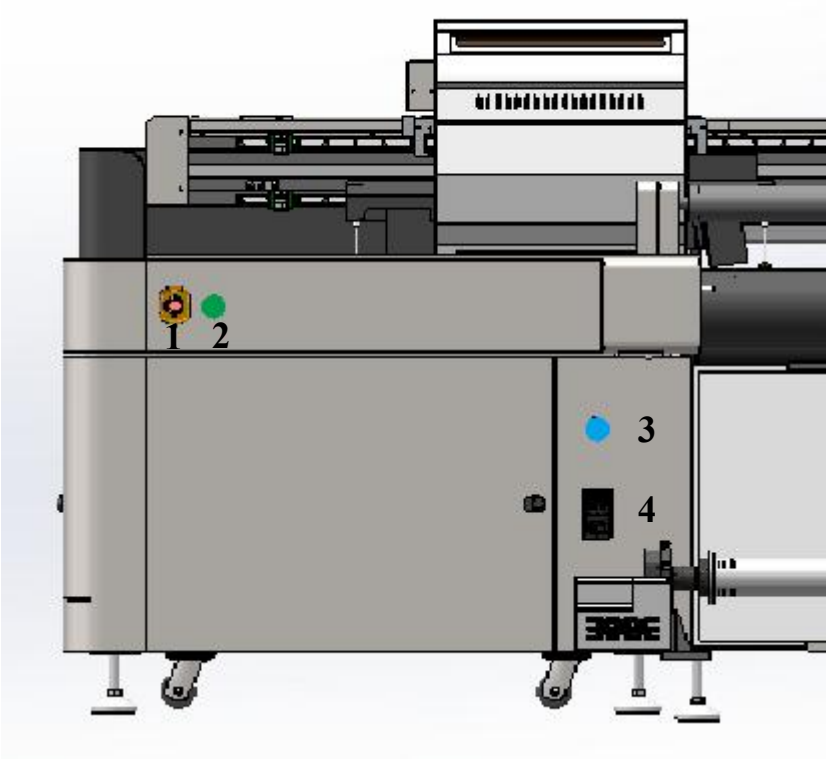
customer's inlet bus adopts the diameter of 6mm². Three air switches (circuit breakers) are respectively passed, 25A and the two 40A. For the stability of the machine operation, it is necessary to install a voltage stabilizer (as shown in the figure above). Underpinning shall be connected to during ground connection.

Tip: please connect the air compressor before power on!

Connect the battery plug to the machine separately, switch on all the circuit breakers of control, and then the machine can be energized. Then the machine can be powered on.

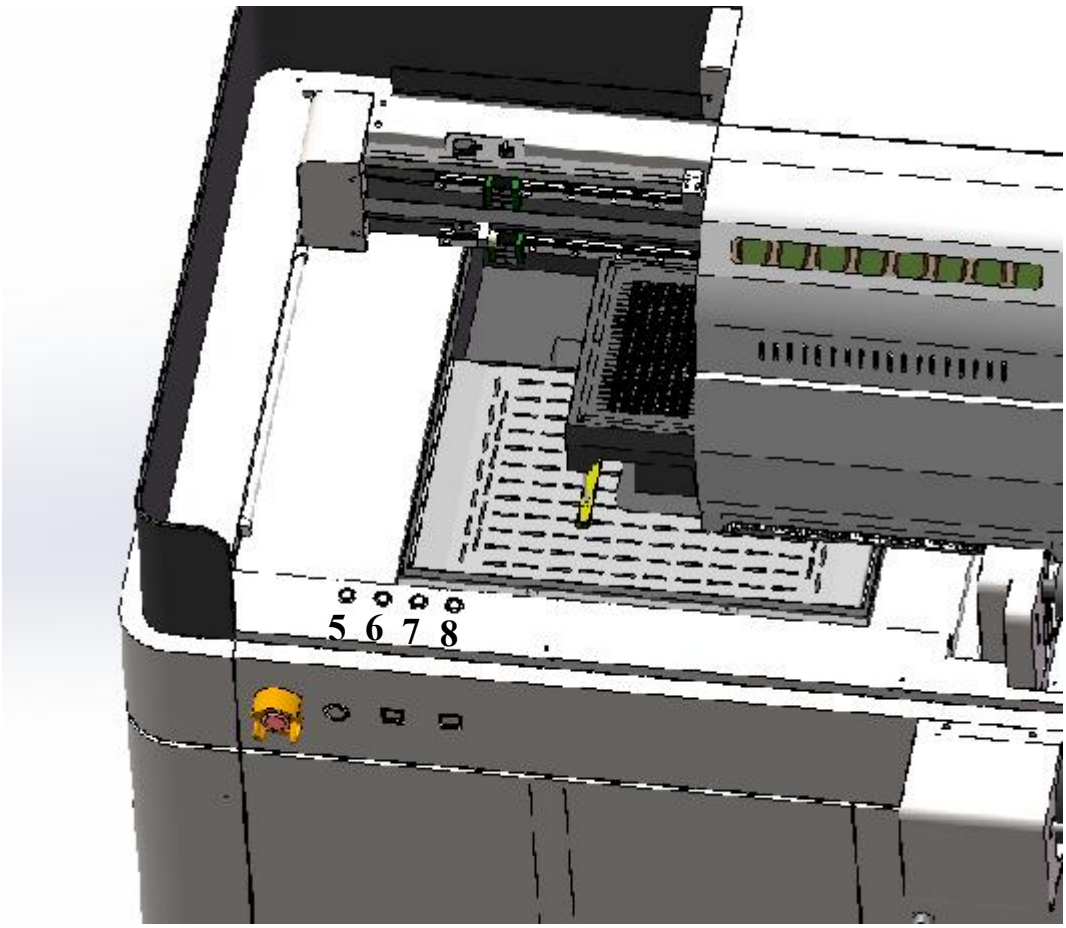
- **Introduction to function keys**

1. Front left panel:



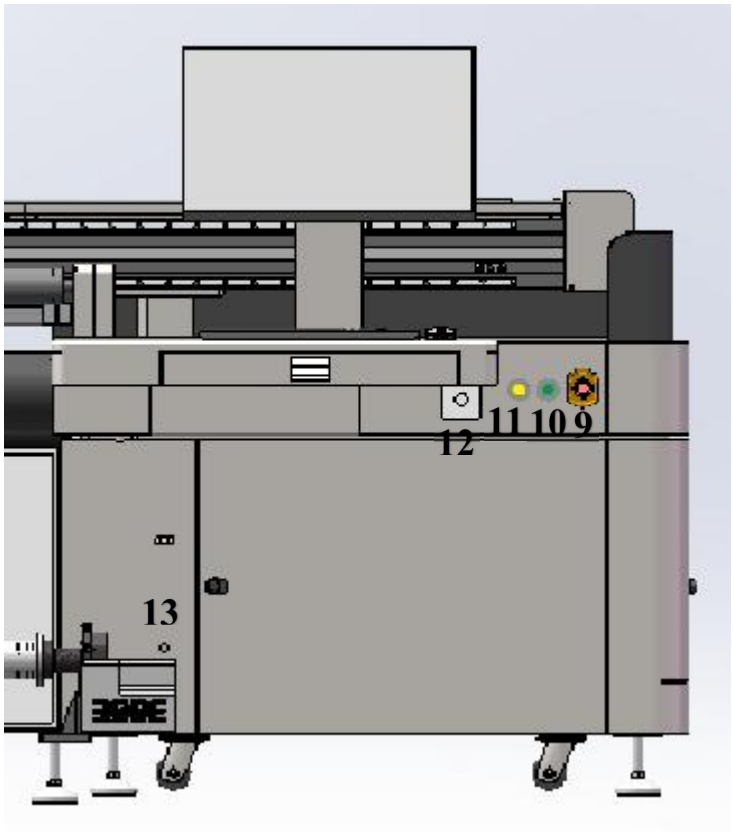
S/N	English abbreviation	Description
1	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
2	POWER	2 in total in the front of the machine, one on the left and one on the right, for machine startup.
3	B LIGHT	Print backlight material and check printing quality.
4	MOTOR CONTROL	For adjusting the moment of the torque motor

2. Left internal side of the front panel:



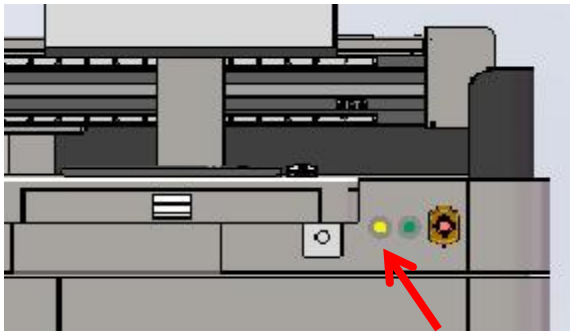
S/N	English abbreviation	Description
5	FLUSH	Power the positive pressure pump and use atmospheric pressure to press the ink out of the print head.
6	CLEAN	Connect the scavenging pump, supply the cleanout fluid to the print head, and clean it.
7	MAINTAIN	For making carriage ascend or descend at the leftmost end of the beam, and facilitating the manual cleaning of the print head
8	LIGHT	To clearly see the surface of print head during maintenance.

3. Front right panel:



S/N	English abbreviation	Description
9	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
10	POWER	2 in total in the front of the machine, one on the left and one on the right, for machine startup.
11	MEDIA SENSOR	If the button is not pressed, it is the default state. An error will be reported and paused because the media cannot be detected when it ends printing. If you press the switch, the media sensor will not detect the material.
12	USB	Plug USB with no need of opening the bin of computer.
13	AIR	For connecting inflatable gun to supply inflatable gun

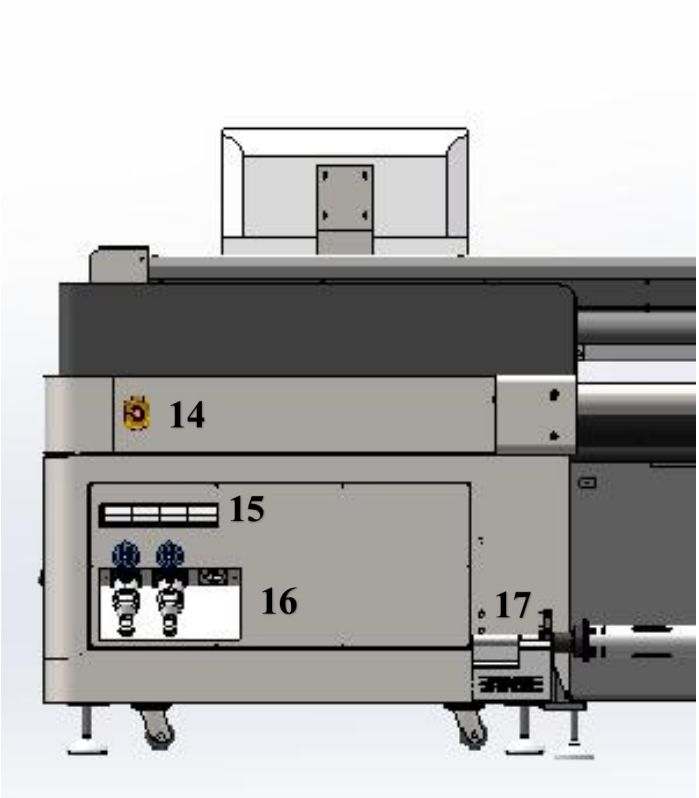
Switch and sensor of media measuring:



Media measuring function works: If the switch is not pressed, the media is in the effective state by default. In case of media shortage, there will be a prompt of maedia shortage in the control interface.

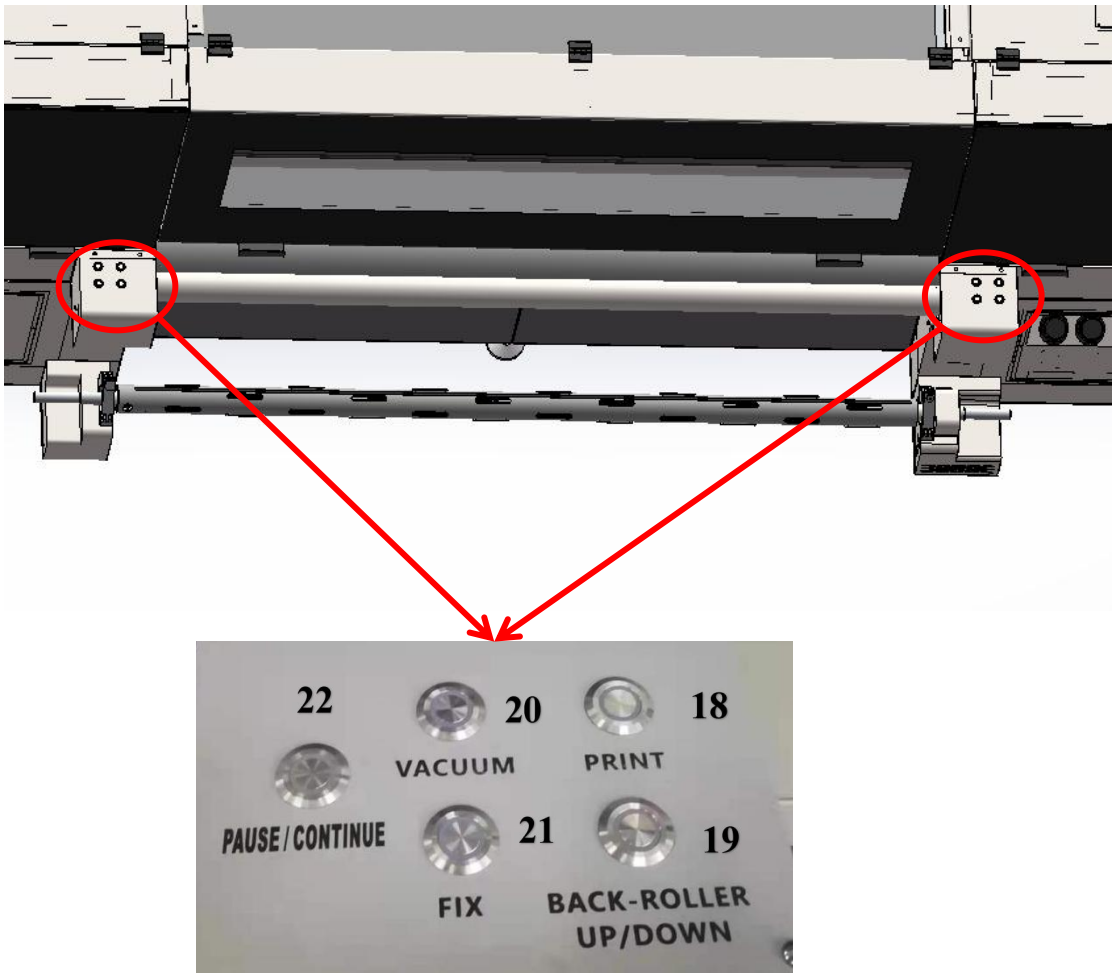
Off state of media measuring function: If you want to continue printing after media shortage is detected, press the MEDIA SENSOR to continue printing. As long as the MEDIA SENSOR is pressed, the media shortage will not be detected.

4. Rear left panel



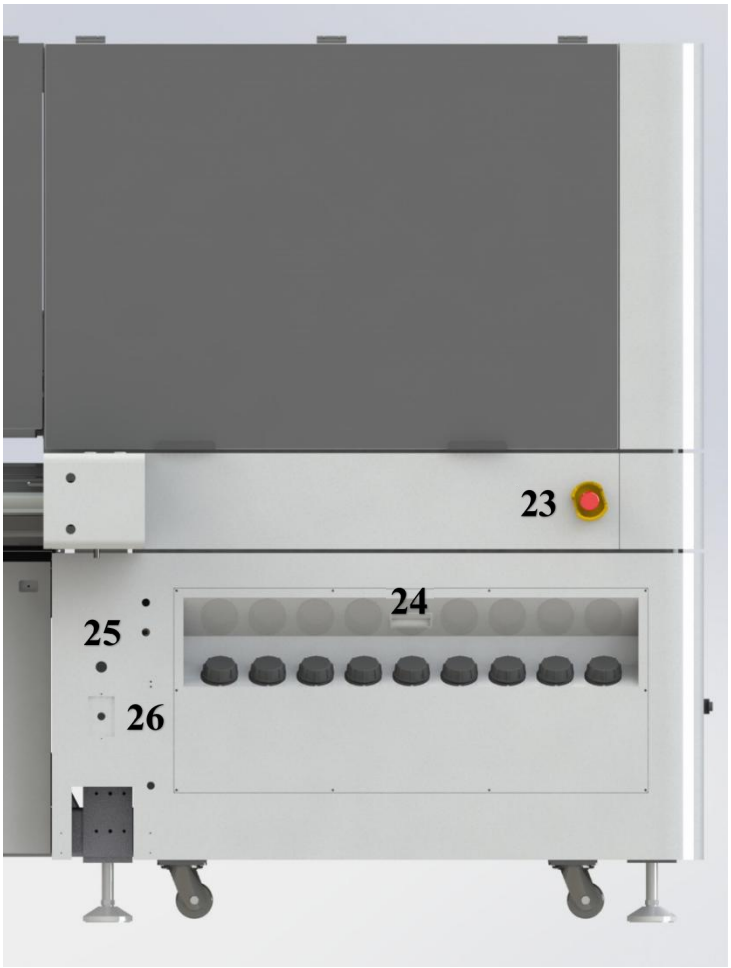
S/N	English abbreviation	Description
14	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
15	UV LAMP	Main switch for controlling UV power
	VACUUM	Main switch for controlling adsorption power
	PC	Main switch for controlling computer power
	MAIN	Main switch for controlling inkjet printer power
16	UV LAMP POWER	Main input of UV power
	FAN POWER	Main input of adsorption power
	MAIN POWER	Main input of inkjet printer power
17	AIR	For connecting inflatable gun to supply inflatable gun

5. Rear middle panel:



S/N	English abbreviation	Description
19	PRINT	One on left and one on right. Easy to print from the back
20	BACK-ROLLER UP/DOWN	To control back roller up and down.
20	VACUUM	Two in total, one on the left and right of the back. It can be independently controlled absorption to open and close.
21	FIX	Two in total, one on the left and one on the right of the back. Positioning rod up and down, positioning function of media.
22	PAUSE/CONTINUE	Easy to pause and continue from the back.

6. Rear right panel:

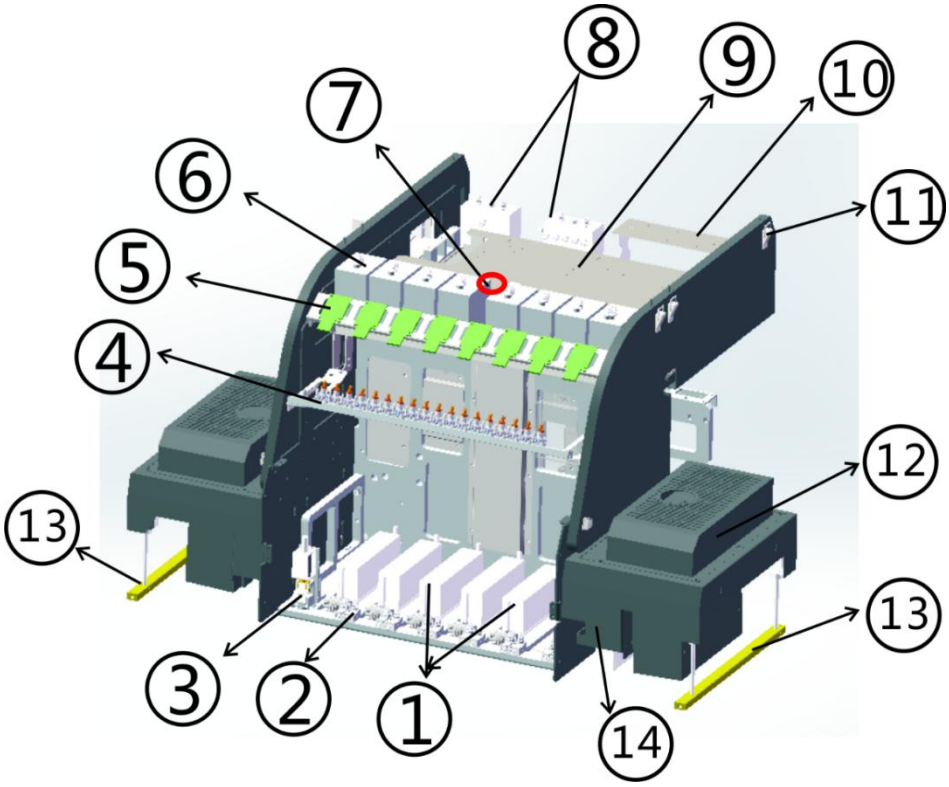


S/N	English abbreviation	Description
23	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
24	Ink alarm	Alarm when lacking of ink in the ink tank.
25	Effluent alarm	Alarm when the effluent tank is full.
26	MOTOR CONTROL	Motor controller of take-up and feeding system, forward and reverse control

7. Introduction of hand-held box buttons (optional) :

S/N	English abbreviation	Description
1	EMERGENCY STOP	Four on the model, one on the handle lever, five in total. Mainly for switch of the machine power supply and emergency stop
2	SCREEN	Display the LIYU logo normally. During VACUUM adjustment, the VACUUM value is displayed as a percentage standard.
3	Handle lever	For controlling forward, backward, leftward, rightward, upward and downward movement.
4	All functions are shown in the figure above.	

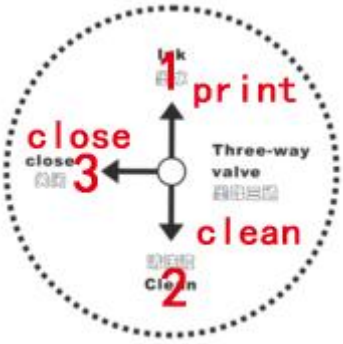
◆ **Carriage view**



S/N	Name of parts	Description
1	Print heads	Deciding numbers and positions of print heads according to print heads types.
2	Two-way valve body	It has two states, which can be used to discharge the gas in the print head.
3	Height measurement system	It's used for automatic measurement of medium height by handle operation and software operation.
4	Three-way valve body assembly	It has three states. It's used for printing, cleaning and closing.
5	Temperature control board	For adjusting the temperature of each auxiliary ink tank to the specified settings.
6	Auxiliary ink tank	Level 2 buffer negative pressure works as the ink in the main ink tank is filled to the auxiliary one.
7	Z lifting motor	To control the height of the print head.
8	Waste liquid tank	It's used for suck-back protection. Refluent ink will be stored here. It has two types: color and white.
9	Carriage board	For controlling ignition signal and data of print head.
10	Signal switchboard	For transferring all sensor signals from the carriage to the movable board and PCIE board through this adapter board.

11	Cover lock	For fixing the cover plate lock of carriage.
12	LED UV lamp	It is used to solidify UV ink. According to the machine configuration, air-cooled and water-cooled UV lamp can be equipped.
13	Left/right collision protection switch	When hitting an exorbitant foreign object during printing, the carriage will stop and the switch will protect the machine.
14	Electrostatic removal device	One on left and one on right.

1. The following pictures are details for three working statuses of the three-way valve body:

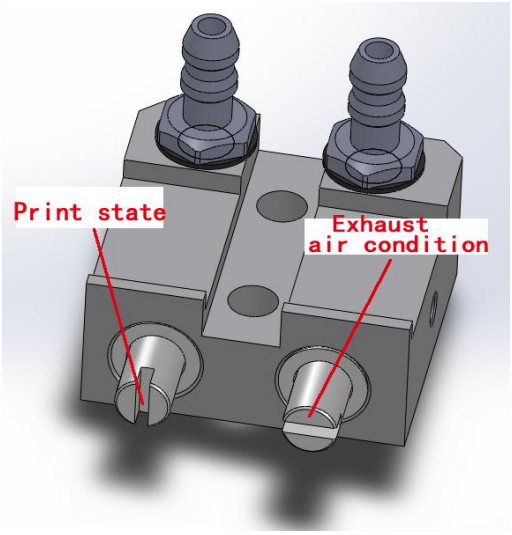


State 1: Working state, when the equipment is in normal operation, especially in printing, the valve shall be upward.

State 2: Cleaning state, when it's time to clean the print head with cleaning fluid, please place the valve downward.

State 3: Off state, when the equipment is shut down, place the valve in closed direction.

2. Introduction to two statuses of two-way valve assembly:



Print state: upon printing for daily work, the valve core is vertical and valve body is closed.

Air-extraction state: When it is required to extract the air out from print heads, making the valve core rotate 90°, pressing ink at the same time and reinstate the valve core in print status after the air is fully discharged.

● *Consumables*

■ Printing media

The common media for the inkjet printer include such commonly used media for advertising equipment as PVC, PMMA, and glass and wall cloth. Please pay attention to the following matters as regards media purchase, storage, use and disposal:

✧ Inferior medium may reduce the printing quality, so it is suggested you select the high quality printing media.

✧ Do not store the media vertically so as to avoid clutter or damaged edge, especially for plate media, please place the plate media on flat surface and avoid any deformation of the plate.

✧ Do not preserve the media in the environment with great temperature and humidity changes, instead, the media shall be preserved in clean and tidy environment with proper temperature and humidity.

✧ Do not use the printing media with scratch, wrinkle, curl and surface bulge for the coiled material. The use of this kind of printing media may result in equipment failure or damage when printing.

✧ Ensure the clean and tidy printing surface of the media during printing, free from any dust and clutter, otherwise, equipment failure or damage may occur.

■ Ink and cleaning fluid

The print head of inkjet printer belongs to high precision equipment. Therefore, the ink quality will greatly affect the printing quality and the service life of print head. Please use the ink and cleaning fluid recommended by the manufacturer and pay attention to the following items at the same time:

✧ Failure to use the ink as recommended may cause lowered printing quality or equipment damage.

✧ The guarantee period of ink is 12 months in general (calculated from the production date), so please use the ink within guarantee period.

✧ Make sure that there is plenty of ink in main ink bottle during the working period of the machine.

✧ Ink should be kept in a shady and cool place.

✧ Since ink and cleaning fluid are strong acid or alkaline liquid, please store them properly and try to avoid skin contact, let alone swallow, and keep it away from eyes.

■ Maintenance tools

Please use the cleaning fluid recommended by the manufacturer to clean the print head, moreover, use the specialized wiping paper recommended by the manufacturer to wipe the print head, otherwise, it may lead to the permanent damage to the print head.

Chapter 2 Basic Operation

This chapter illustrates the basic actions of machine installation and operation.
The main content of this Chapter:

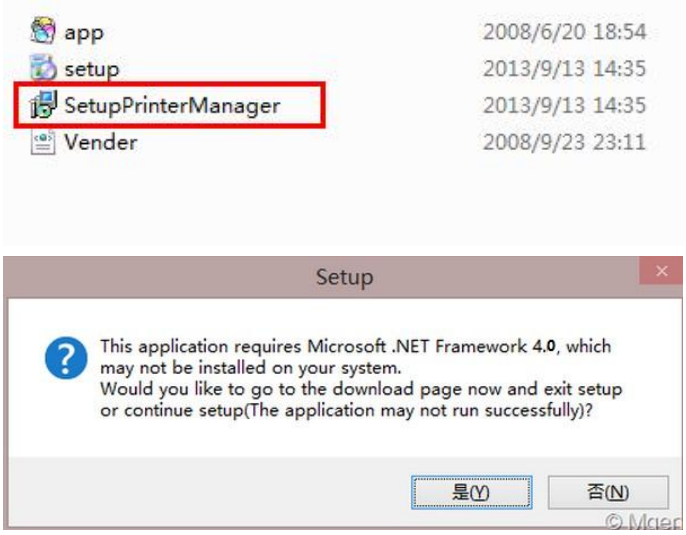
- Introduction to PrintManager
  - **Ⅰ. Installation Steps of PrintManager**
  - **Ⅱ. Interface Introduction**
  - **Ⅲ. Software Setting**
  - **IV. Job Editing and Printing**
  - **V. Setting Options**
  - **Ⅵ. Height Measurement**
  - **Ⅶ. Input and Output of Waveforms**
  - **Ⅷ. Tool Options**
  - **Ⅸ. Ink Counting**
  - **Ⅹ. Factory Setting**
  - **Ⅺ. Calibration Wizard**
- **Installation and adjustment of print head**
  - **Introduction of RICOH G5/G6 print head**
  - **Print head installation**
- **Function introduction of DS_Ricoh**
  - **Power ON**
  - **Power OFF**
  - **Control function of pinch roller in PrinterManager**
  - **Correction function**

- **Automatic ink scraping control function**
- **Positioning rod function**
- **Setting parameter of the middle support**
- **Feeding method for material take-up and feeding**
- **Dual negative pressure system**

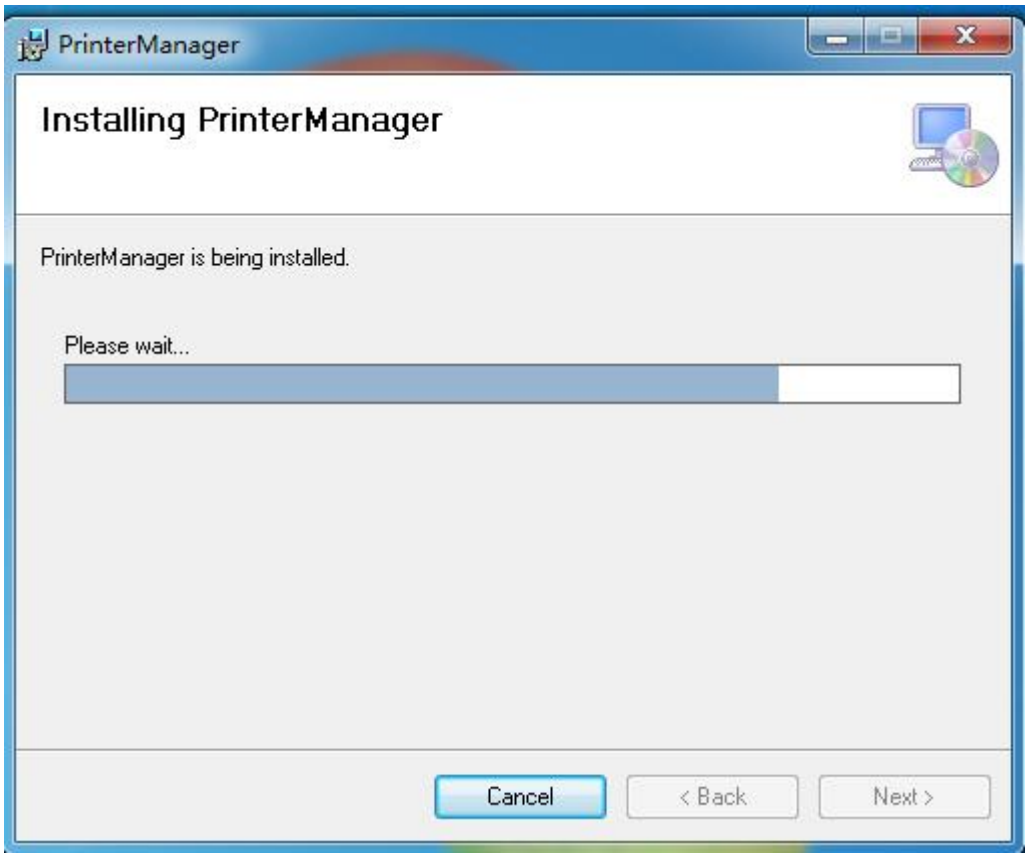
● *Introduction to PrintManager*

Ⅰ. Installation Steps of PrintManager

1.1 Open the installation folder, double-click the red icon, and follow the prompts to install. But you need to make sure that DotNetFrameWork V4.5 or above is installed on your PC before installation, if not, the following error will be reported during installation;



If yes, the installation will continue;

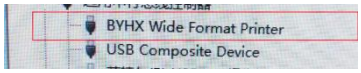


After the installation is complete, the following PM icon will appear on the PC desktop.

1.2 If PM has been installed before, please clear it first: right click PM-open file location

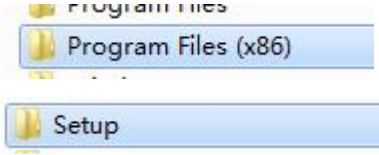
Double-click ClearEnv, as shown in the figure below
Start PM directly if it has not been installed before.

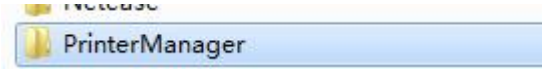
Connect the USB cable, start the machine, "BYHX Wide Format Printer" will be found in the "Device Manager" - “Universal Serial Bus Controller” of the computer, indicating that the Driver has been installed successfully. As shown below:



1.3[Tips] If power is off while running PM, it may be caused by the following reasons:

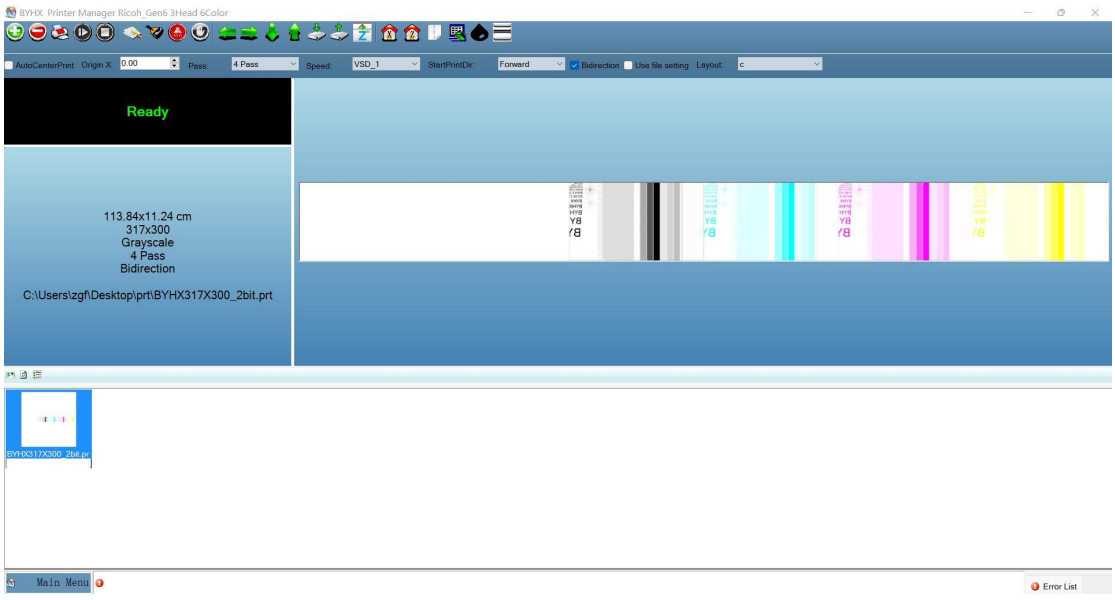
1. Printer is not started;
2. USB is not connected or it is connected but the driver is not installed successfully, reinstall the driver;
3. Install USB 3.0: click control panel → device manager → universal serial bus controller → double-click FX3→ update driver software → manually find the driver → install software.





Ⅱ. Interface Introduction

2.1 Diagram of PM normal startup



2.2 Icon function description:

For icon function, please move the cursor over this icon, and the icon's description will appear after 1s.

 : Add  : Cancel  : Print  : Pause or recover

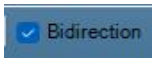
 : Stop  : Check nozzle  : Clean print head  : X-axis moving

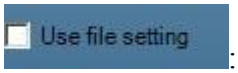
 : Y-axis moving  : Status list for PM operations

 : Set current Z position as print origin  : Height measurement button

 : Move to Z origin  : Move to X origin  : Setting tab

 : Set X origin  :Set pass quantity

 : Carriage speed  ： Bidirectional printing

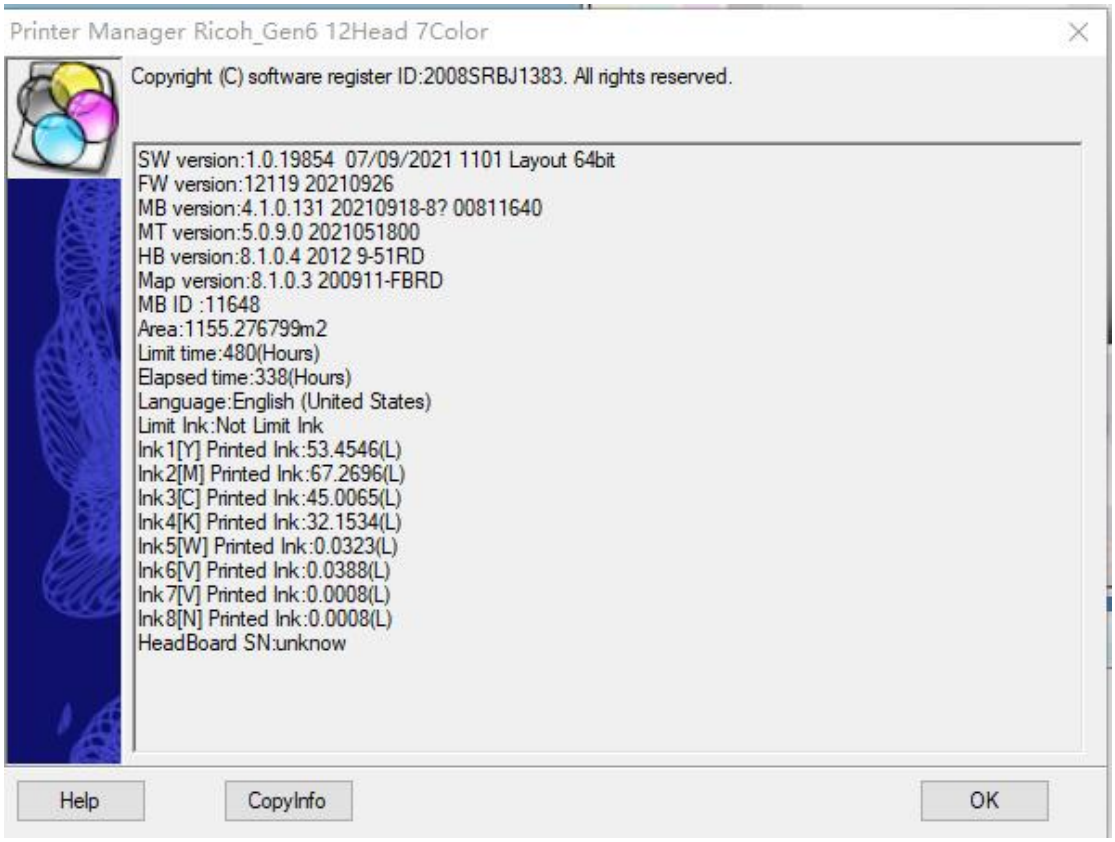
 : Use file setting  : Select the current layout;

 : Control the ink direction of unidirectional printing;

III. Software Setting

3.1 Help

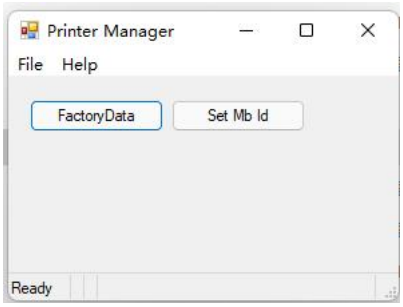
Click Main Menu-Help-About-Get Factory Settings Password



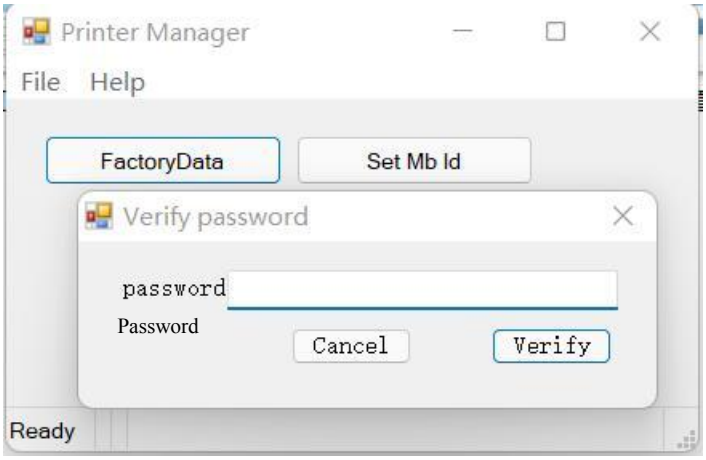
SW version: PM version information
MB version: Main board version information
MT version: DSP version information
HB version: Driver board version information
Map version: Print head board version information
ID: 40911 (core-board No.)
Limit time: Permanent (unlimited)
Elapsed time: 0Hour (running time: 0h)
Language: Chinese (simplified)
Limit ink: Not limit ink
C Printed ink0(L): No cyan printed ink
M Printed ink0(L): No magenta printed ink
Y Printed ink0(L): No yellow printed ink
K Printed ink0(L) : No black printed ink
Mainboard ID of DS guiding belt machine and factory setting password: 00811620 or 00811640

3.2 PM model parameter configuration

3.2.1: Turn off PM, right click PM icon - open file location - FactoryWrite.exe

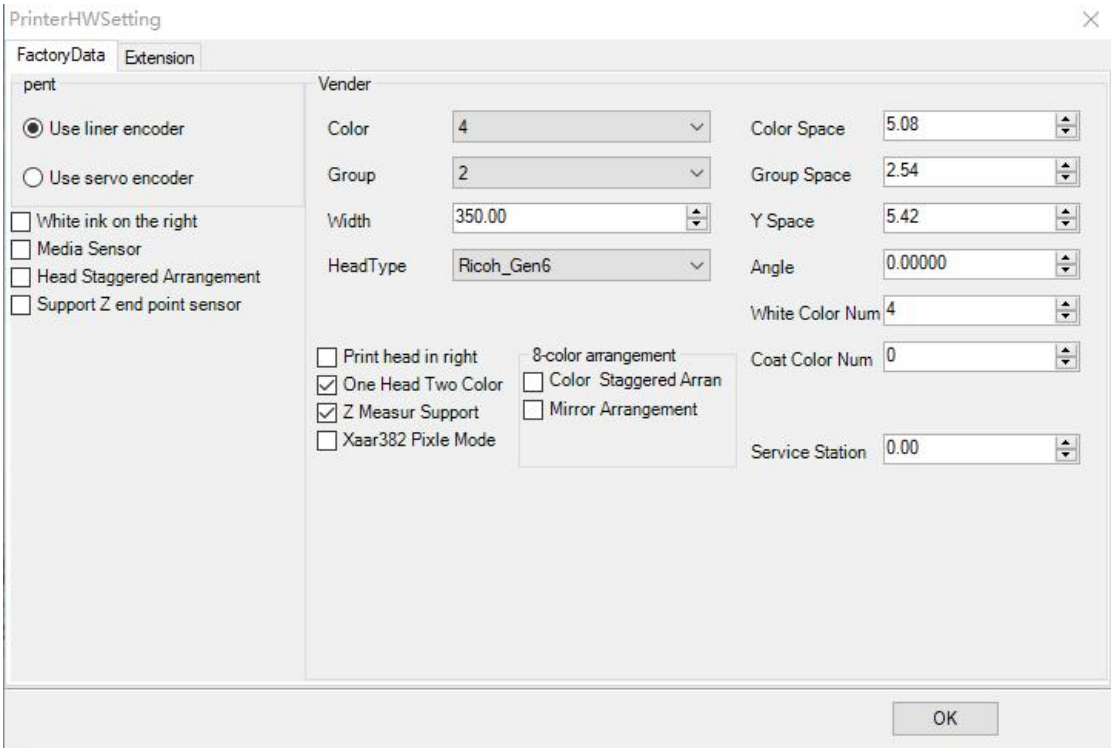


3.2.2 Click “factory data”



Password: Manufacturer ID (i.e. 00811620), click to verify and enter the factory setting interface

3.3 Enter the factory setting interface



Color: Set according to the color to be used; for 6-color, set it to 6;

Group: Set according to the actual number of groups to be used, for 1 group KCMYLcLm, set to 1;

Width: Set according to the actual machine length;

HeadType: Ricoh-Gen6 (Note: Ricoh-Gen6 should be selected for both GEN5 print head and GEN6 print head);

Print Head in right: If selected, it is the right origin, if not, it is the left origin. Set according to whether the head is on the left or on the right;

One Head Two Color**: One print head is provided with two colors;**

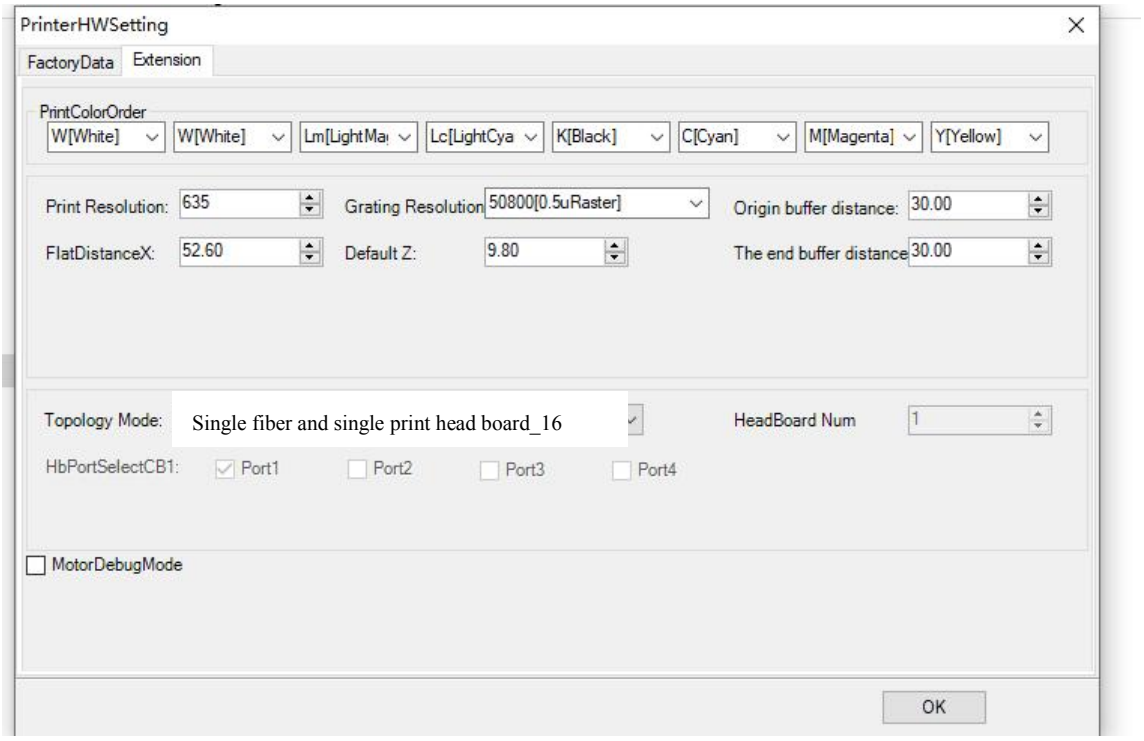
Support Z-axis measurement: This function is targeted for machines with height measuring function, and check it in case of height measurement.

Coding number: Set according to the actual conditions;

White number: Set according to the actual conditions; After setting the white ink, the parameters of white ink mixing and white ink circulation will be showed on the software;

Number of tectorial membrane color: Set according to the actual conditions;

3.4 Extend the setting interface



1. X encoder resolution DPI: It is related to the resolution of grating, and 1200DPI shall be selected for 300DPI grating; 50800 [5u grating] shall be selected for 5u metal grating or magnetic grating.

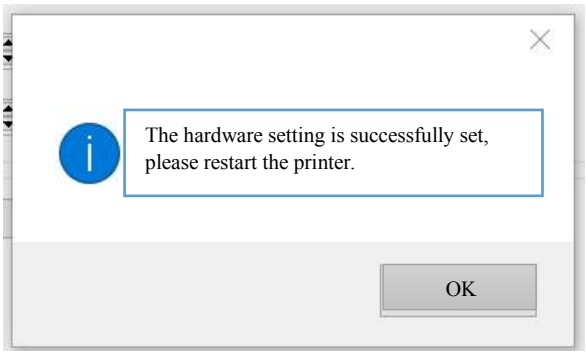
Buffer distance for origin and destination: Different printing ignition methods will lead to different setting distances, and please contact the supplier for the set value;

Platform distance X: adjusting the printing position in X direction, and the parameter needs to be greater than or equal to the buffer distance;

Platform distance Y: adjusting the printing position in Y direction, either positive or

negative;
Topology mode and number of print head board: Select according to the number of print head boards actually used; When the number of print heads are less than or equal to 8, select single print head board and single fiber_8, and select single fiber and single print head board_16 for more than 8 print heads;
1 port selection of switchboard: Check according to the number of print head boards actually used, check No.1 port for one print head board, No. 1 and No.2 ports for two print head boards, which cannot be skipped to check them.
There is no need to set the Z default position and debugging mode.

3.5 Click "OK" when the configuration is complete and restart the printer according to the prompts



If you click “sure to report error”, the information in the above figure will not be prompted. You can check the error according to the report or send the screenshot to LIYU after-sales service department for troubleshooting.

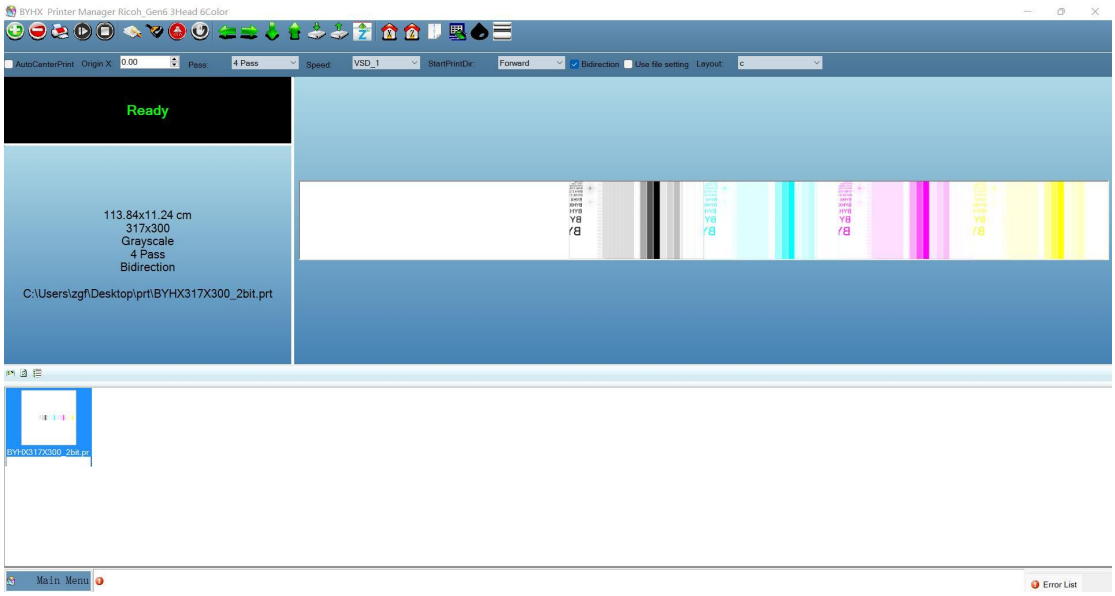
IV. Job Editing and Printing

4.1 Add job

Select the prt or prn to be printed

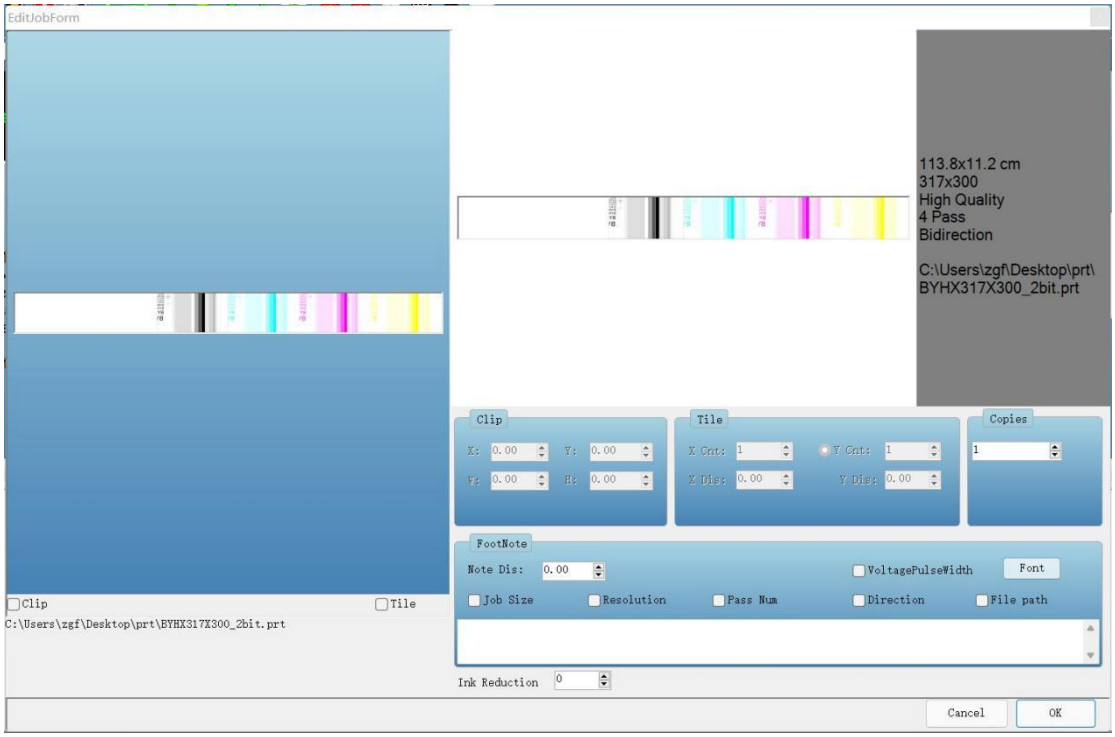
4.2 Status bar

The left area displays the information of the job, including the size, resolution, gray level and file path of the job;



4.3 Job preview and editing

1: The job in the preview area displays the job editing and preview window

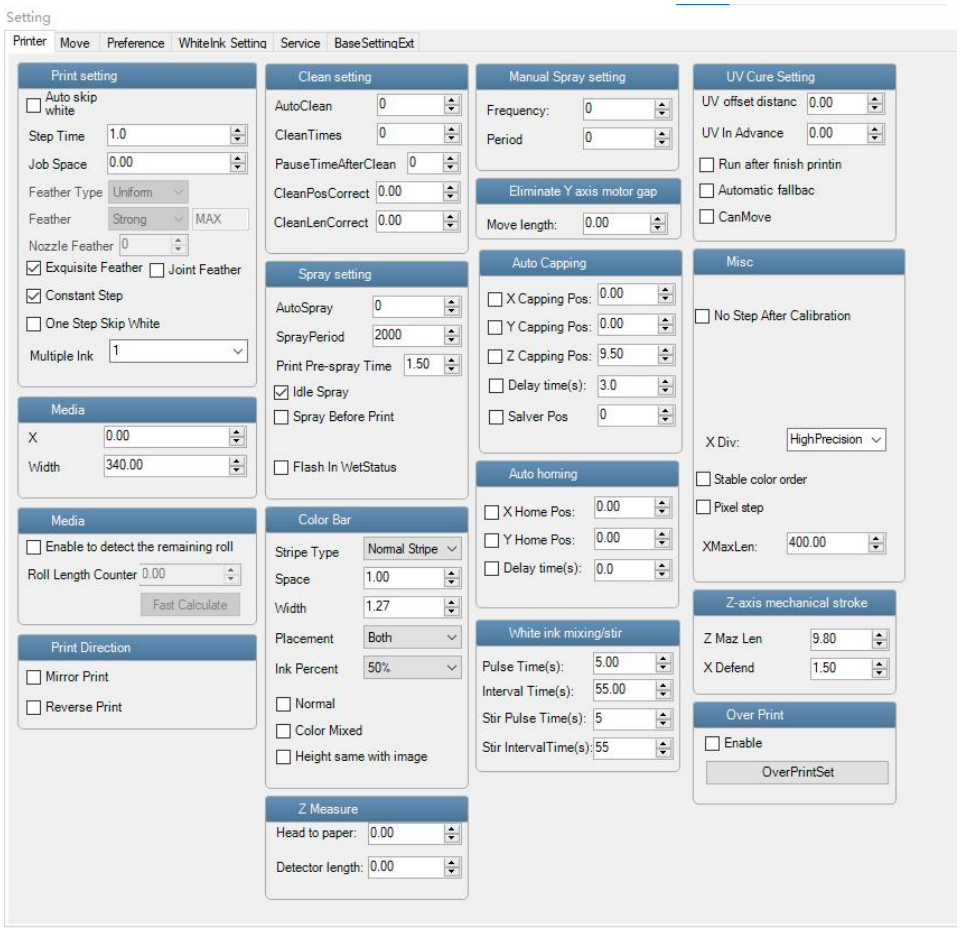


Check cut: The printing area in the screenshot can be selected
Check collage: The printing quantity of the cut area or the whole picture can be set
Print copy(ies): The number of consecutive prints
Footnote: It will add job information automatically when printing it, and if checked, the selected parameters of this job will be printed out.
Ink reduction: This parameter can be used to reduce the amount of ink;
The gray area on the right shows the information of the prt/prn document and their locations.

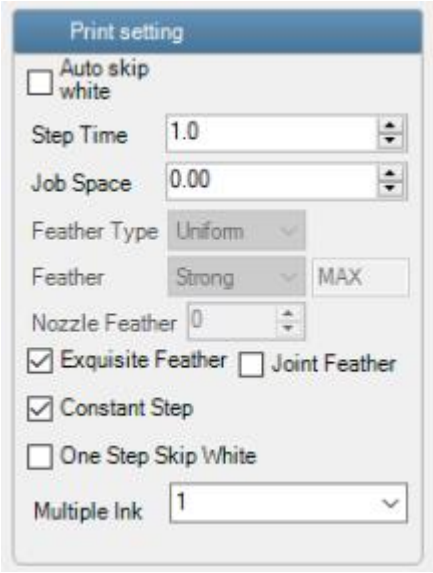
V. Setting Options

Main menu—Setting—Edit

5.1 Printer



(1) Printing setting



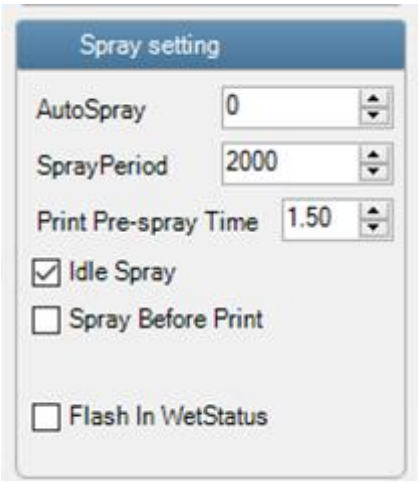
Auto skip white: when there is no data in XY directions, it can be stepping and realize printing without scan;
Y continuous printing: it is used on flatbed machine, and can print at the Y position without moving to Y origin;
Skip white time: increasing the time of X-axis movement in skip-white process, which is conducive to the drying of ink on media and paper receiving;
Job space: the space between two jobs;
Feather type: choosing the feather mode, with common using of gradient and even;
Feather intensity: choosing feather intensity, including normal, moderate, and strong;
Fine feather and constant stepping: feather mode;
Feather between print heads: used when there are multiple group of print heads. It is the transfer position of feather print heads;
One-step skip white: used with auto skip white;
Ink volume: controlling the volume of colorful ink with the default of 1, and using multiple times of ink volume in printing;

(2) Media: media setting

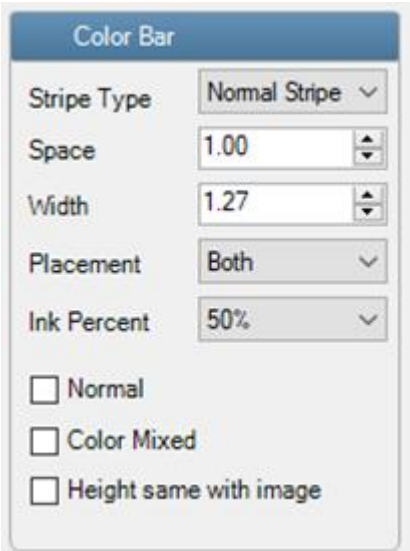
X: Origin
Width: the maximum width in X direction that the printer can print
Y: Origin
Length: the maximum width in Y direction that the printer can print

(3) Printing direction

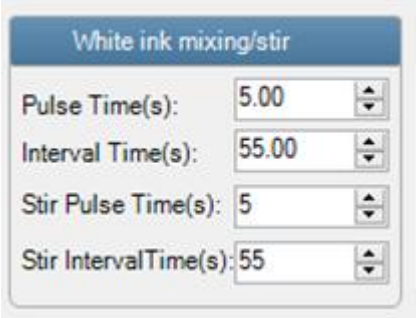
(4) Clean setting



Auto flash spray: setting the unit as pass, and returning to origin for a flash spray after printing the set pass value;
Flash spray cycle: controlling the cycle of idle flash spray when the carriage is at the X origin, unit: ms;
Duration of flash spray before printing: the duration of flash spray before printing;
Idle flash spray: idle flash spray switch of carriage at the X origin;
Flash spray before printing: switch of flash spray before printing;
(5) Color bar setting

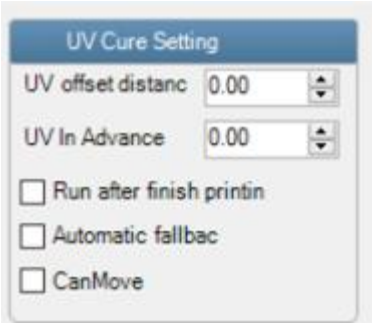


Distance: distance of color ramp
Width: width of color bar
Position of color bar: (Both Sides, Left, Right, No)
Normal: separate printing of different color ramps
Color overlapping: printing with overlapped color
Same height as image: the color ramp is the same height as the image
(6) Manual flash spray setting: setting the frequency and cycle of manual flash spray;
(7) Circulation \ mixing of white ink



Setting the time of circulation and mixing functions of white ink;

（8）Setting of UV lamp solidification

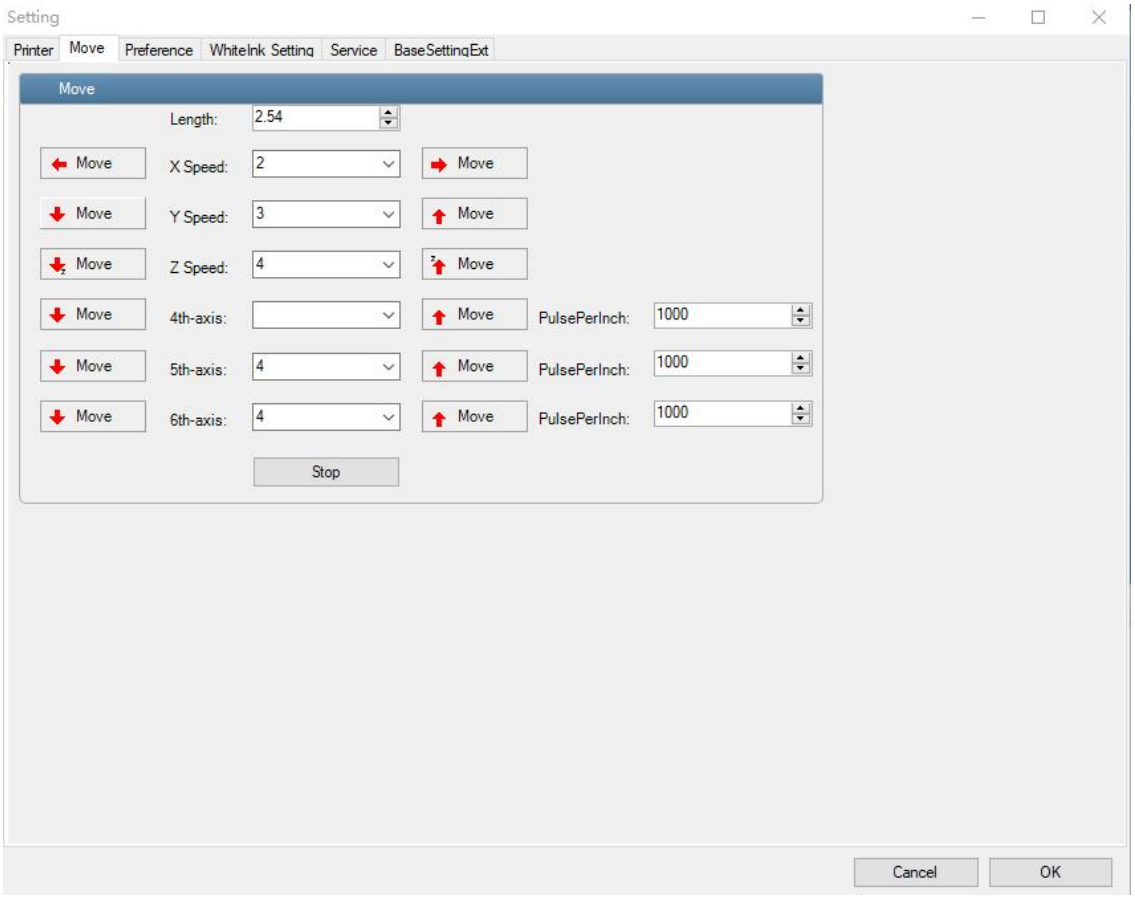


Turning on the setting to delay the solidification of curable varnish on flatbed machine, and set the offset distance.

（9）X-printing speed

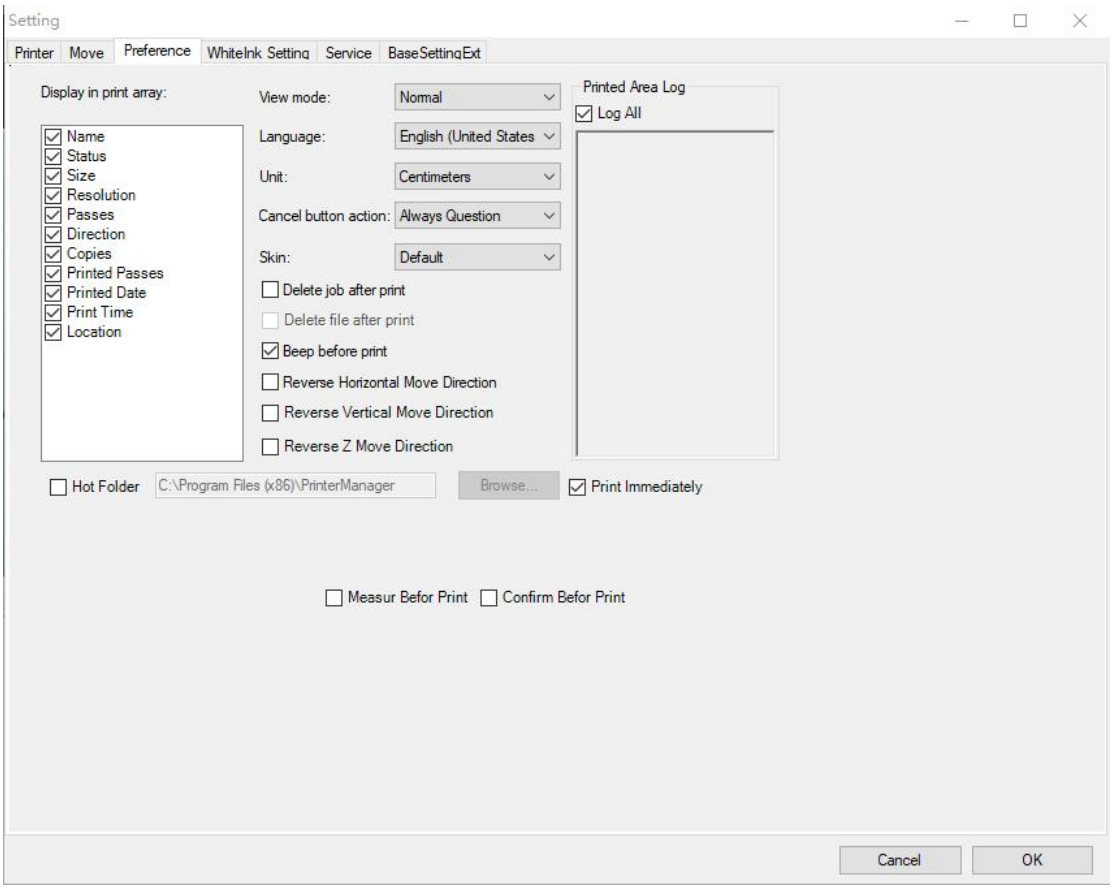
X Div: it can be divided into high-precision mode and high-speed mode;

5.2 Moving



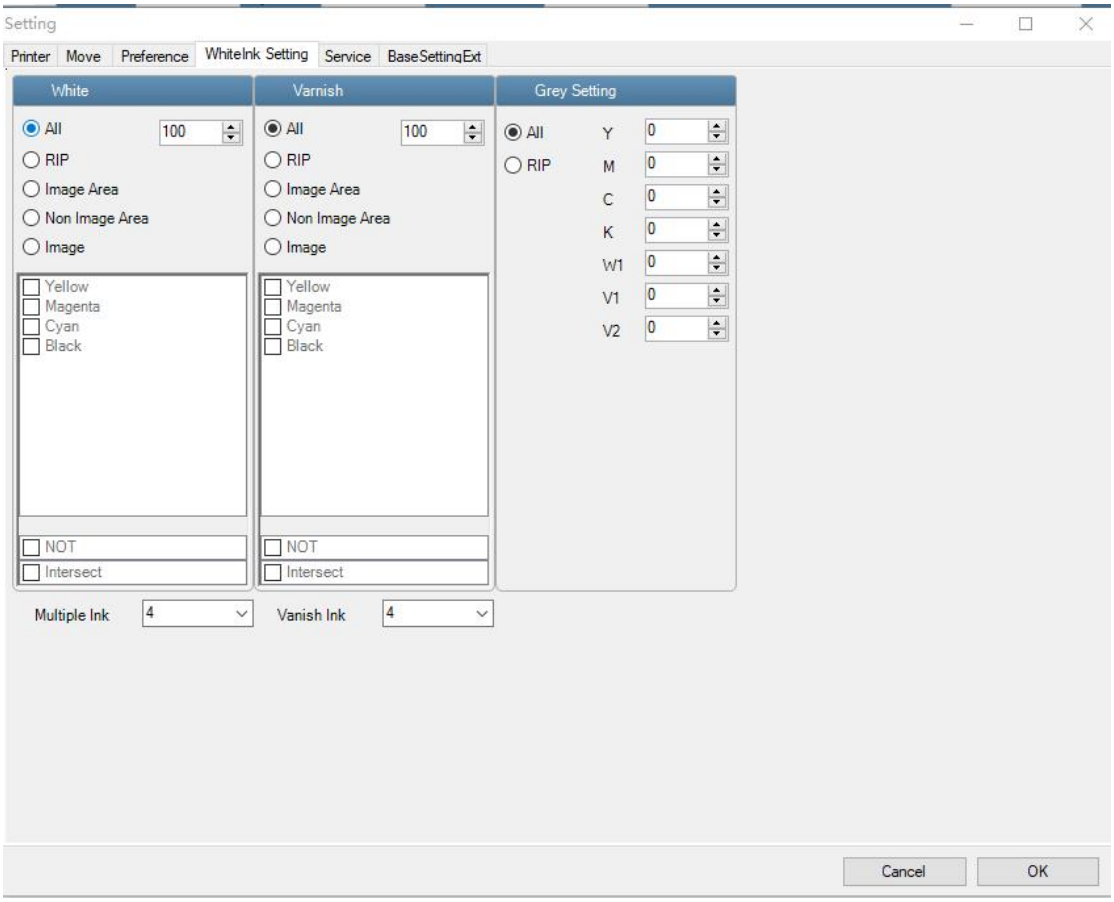
The moving speed in this interface can control the speed of moving button on the main interface;

5.3 Preference



Checking mode: normal, wide screen, and old interface;
Language: simplified Chinese, traditional Chinese, and English. Setting language according to the needs, which requires a language password;
Unit: setting the unit displayed in the software;
Cancel the printing default, Skin: default;
Delete the job after printing: the switch of deleting the job after printing;
Delete the file after printing: this function can be selected when selecting “delete the job after printing”, and the files in the computer can be deleted;
Reverse of motion from left to right, front and back, reverse of Z axis: reverse switch of the motion button on the main interface, and it does not affect the printing movement direction.
Hotfolder: used with “print now”. When the new prt file is placed in the selected folder path, the print action will be performed immediately;
Measurement before printing: click the print button to pop up the height measuring interface, then you can choose to remeasure the height or print it immediately;
Confirm before printing: click the print button to pop up the OK interface, then you can confirm and print with the current Z position as the print origin;

5.4 White ink setting



The whole figure: set the whole job with white background, and the white ink output can be set as required

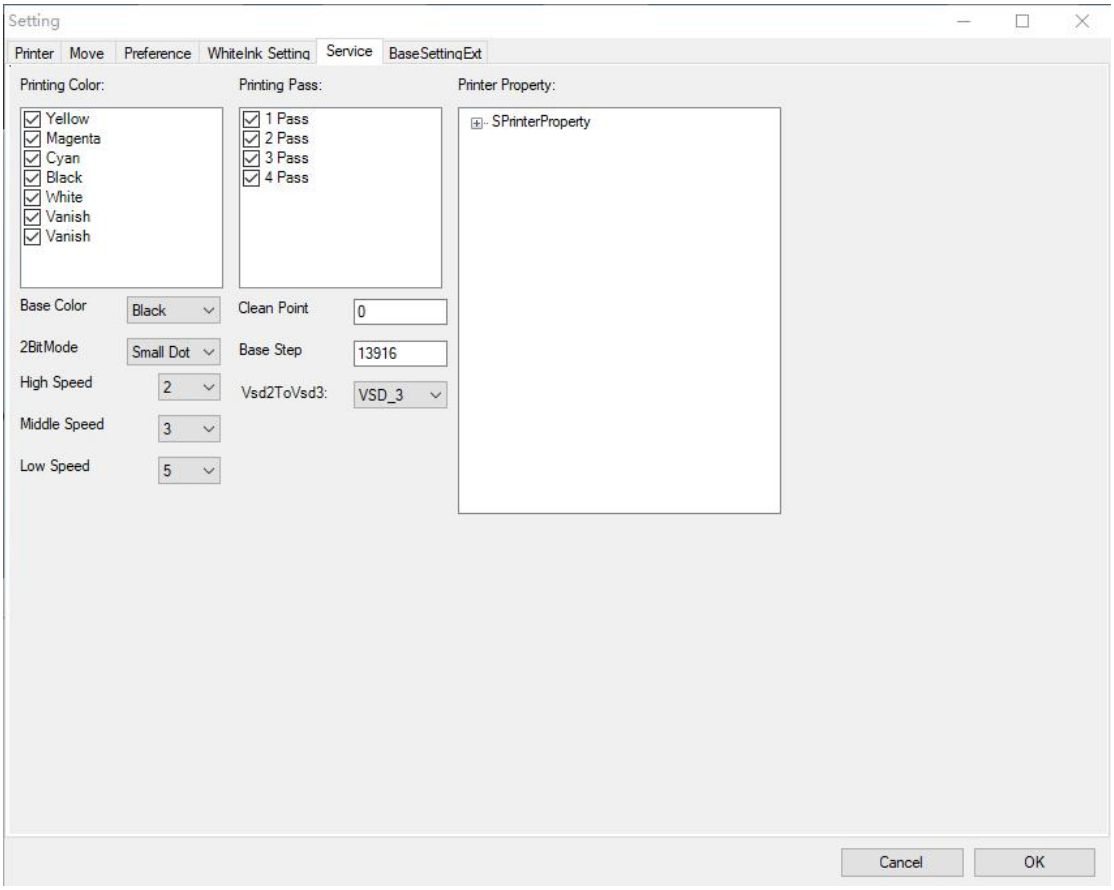
RIP: print white ink where there is data

Image: if you check this option, the color channel below will be lighted up, and it is optional to specify a color and print white under it according to the job.

Ink amount: set the ink amount of white ink for printing under the above settings, which is one times by default.

After the varnish is configured, it will also be displayed on this interface, and the configuration method is the same as that of white ink;

5.5 Service



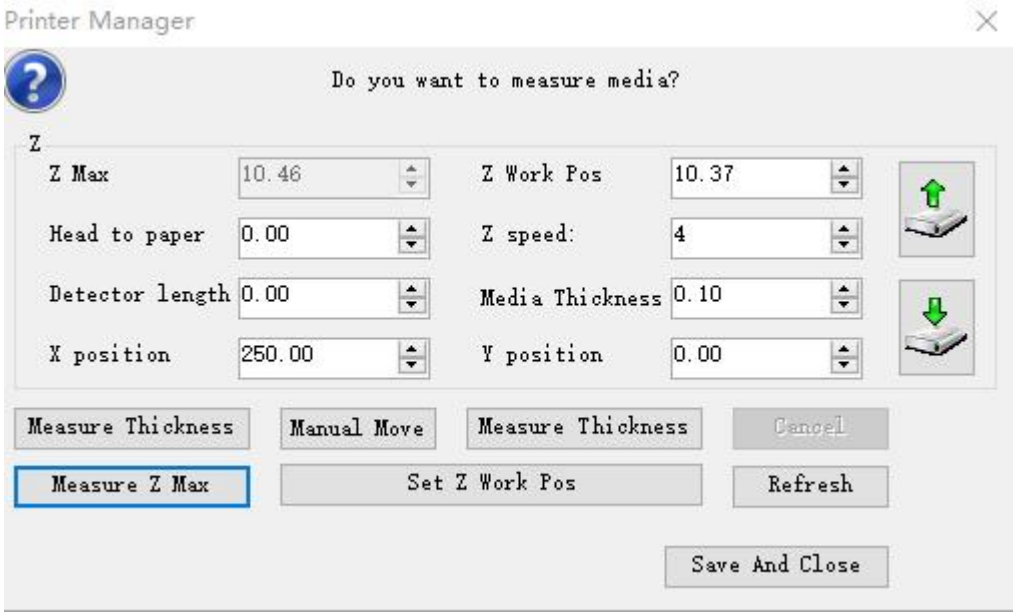
Print color set: this parameter can be used to determine whether the ink is inkjet or not;

Base color: set base colors for printing;

2BitMode: carry out print nozzle check to calibrate the dot type used for printing;

Use defaults for other parameters;

VI. Height Measurement



Max Z stroke:

Press the button of automatical measurement to measure the max Z stroke, and the measured position is controlled by the following XY directions; The parameter can be manually modified. After the machine is installed, the max Z stroke needs to be measured in the first step of height measurement;

Distance between media and print head:

This parameter can control the actual height of the print head from the media after measuring. During the height measurement, once triggered, the probe will move again according to the value set in this parameter, with a minimum of 0; For example, if the height between media and print head is set to 0, and after height measurement, the height of the print head to the print media is measured to be 1.5mm by caliper. If the value of the height from the print head to the media is changed to 0.5mm, then, you need to measure the height again. At this time, the height from the print head to the print media is 2.0mm;

Length of probe:

It is suggested to set this value to 0 all the time;

Z job position:

This parameter will be updated automatically after the height measurement or manual input of the value of material thickness, and this parameter does not need to be modified;

Material thickness:

This parameter will be automatically updated after the height measurement;

If the value of material thickness is known, you can also manually input it to this position, then click close and save it, and it will automatically move Z to the set height to print according to the set parameters during printing;

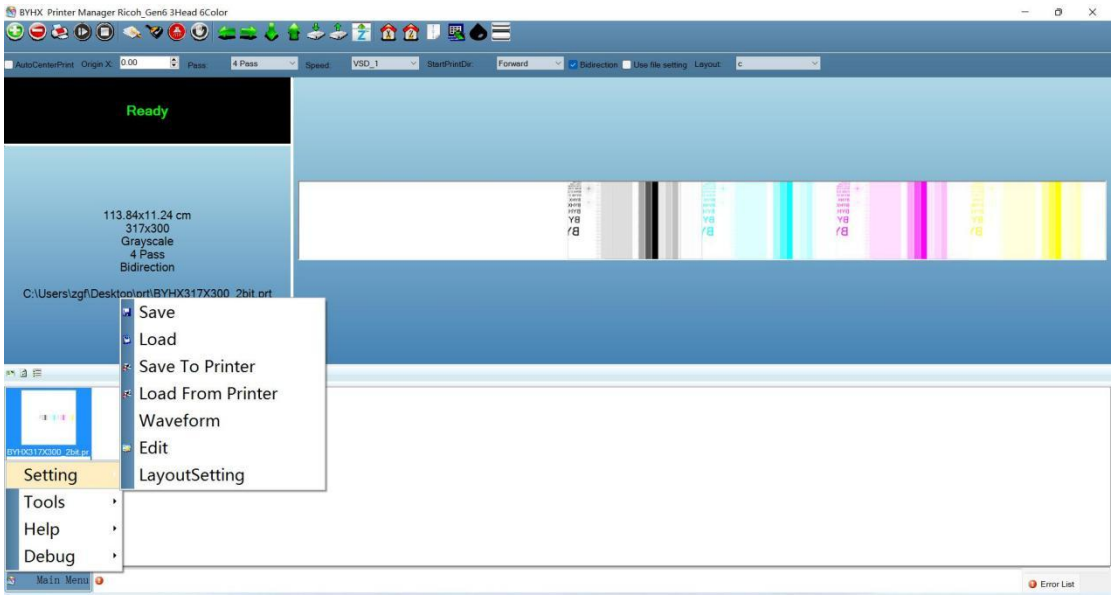
Measuring position X, measuring position Y:

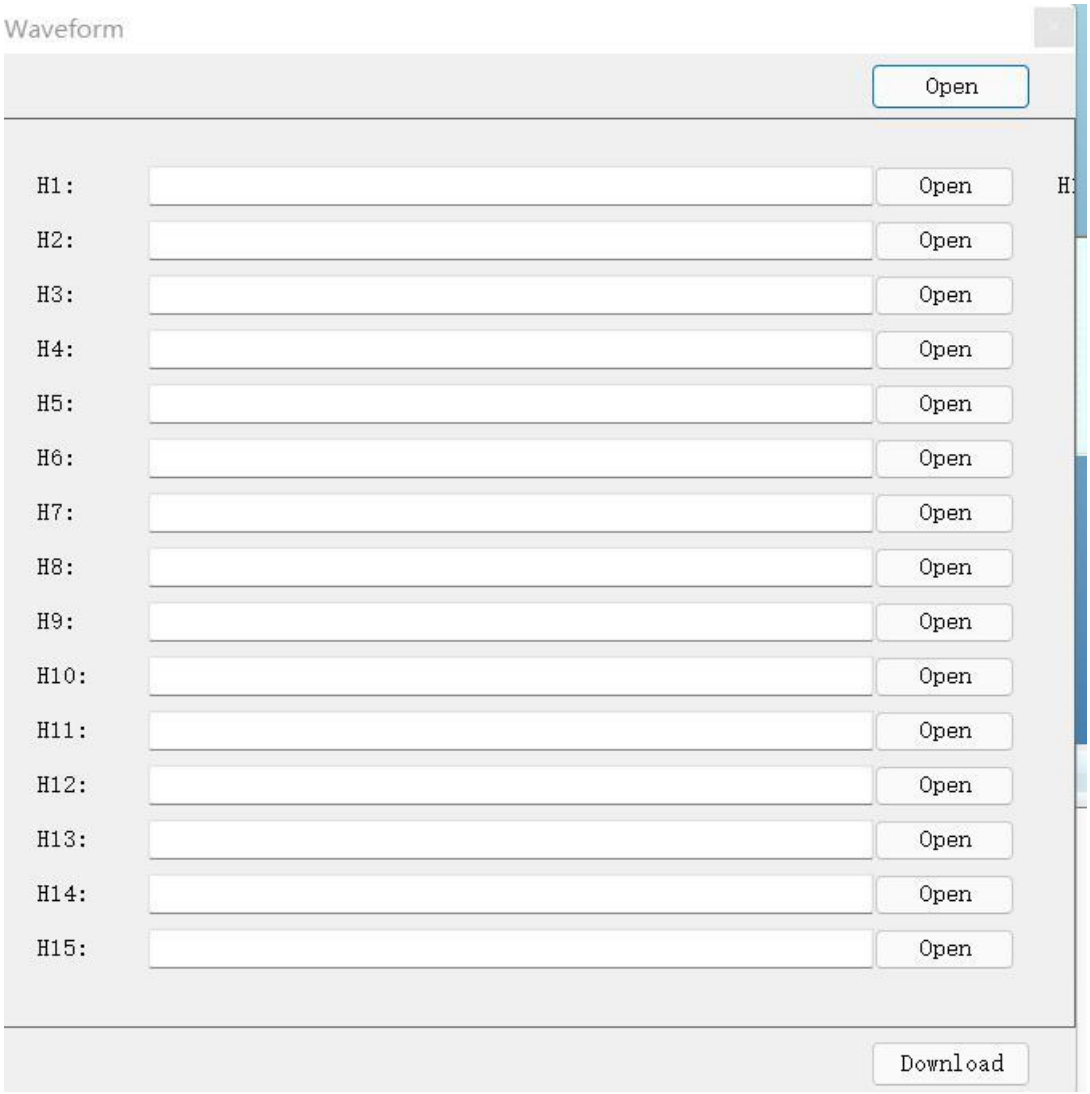
Used with automatic positioning height measurement and max stroke measurement;

Automatic positioning height measurement:
After pressing this button, the carriage will move according to the set measuring position X and Y, and carry out height measurement after reaching;
Manual movement:
Move according to the parameters set in the interface;
Manual positioning height measurement:
After press this button, the carriage will conduct height measurement at the current position without moving to X or Y, but you need to move it manually;
Max Z stroke measurement:
After pressing this button the carriage will move according to the set measuring position X and Y, and carry out max Z stroke measurement after reaching. Besides, you need to set the correct Z resolution before using this function;
Set the print origin of Z direction:
Press this button to set the height of Z as the printing height by default, and the value of material thickness will be updated accordingly; The effect of it is same as that of setting the Z printing origin in the main interface;
Cancel:
It is used to cancel the current action in the progress, and it can be cancelled during the height measurement or manual movement;
Z axis moving upwards and downwards button:
It can control the lift and fall of the Z axis, and the effect of it is same as that of the main interface;
Close and save
If there is any parameter modification, make sure that you press this button. Clicking the X in the upper right corner will not save the modified parameters;

VII. Waveform Import and Export

Main menu→Setup→Waveform import and export



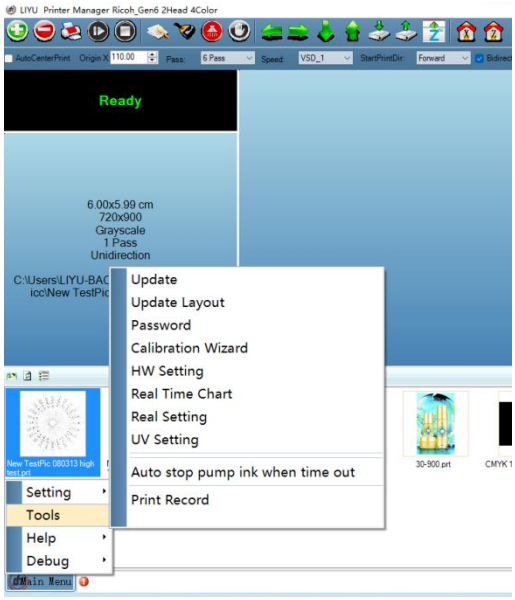


This function is used to load waveform. H1-16 corresponds to 1-1, 1-2.....1-16 in the layout package；

Click “Open” to select the waveform to be downloaded. After selection, click “Download”. After downloading, you will be prompted that the download is completed without restarting the printer;

VIII. Tool Options

Main menu→Tool



8.1 Upgrade

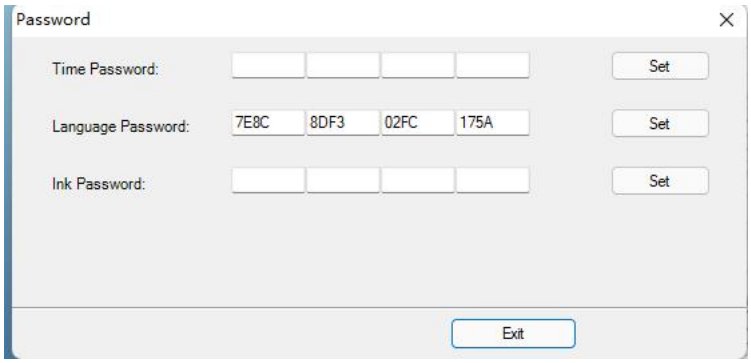
Upgrade the version of the driver board for print head board of MainBoard, and the upgrade package is provided by BHYX;

8.2 Print head layout upgrade

Upgrade the free layout version arranged for print head, which is used for the actual arrangement of print head and the corresponding software;

8.3 Password

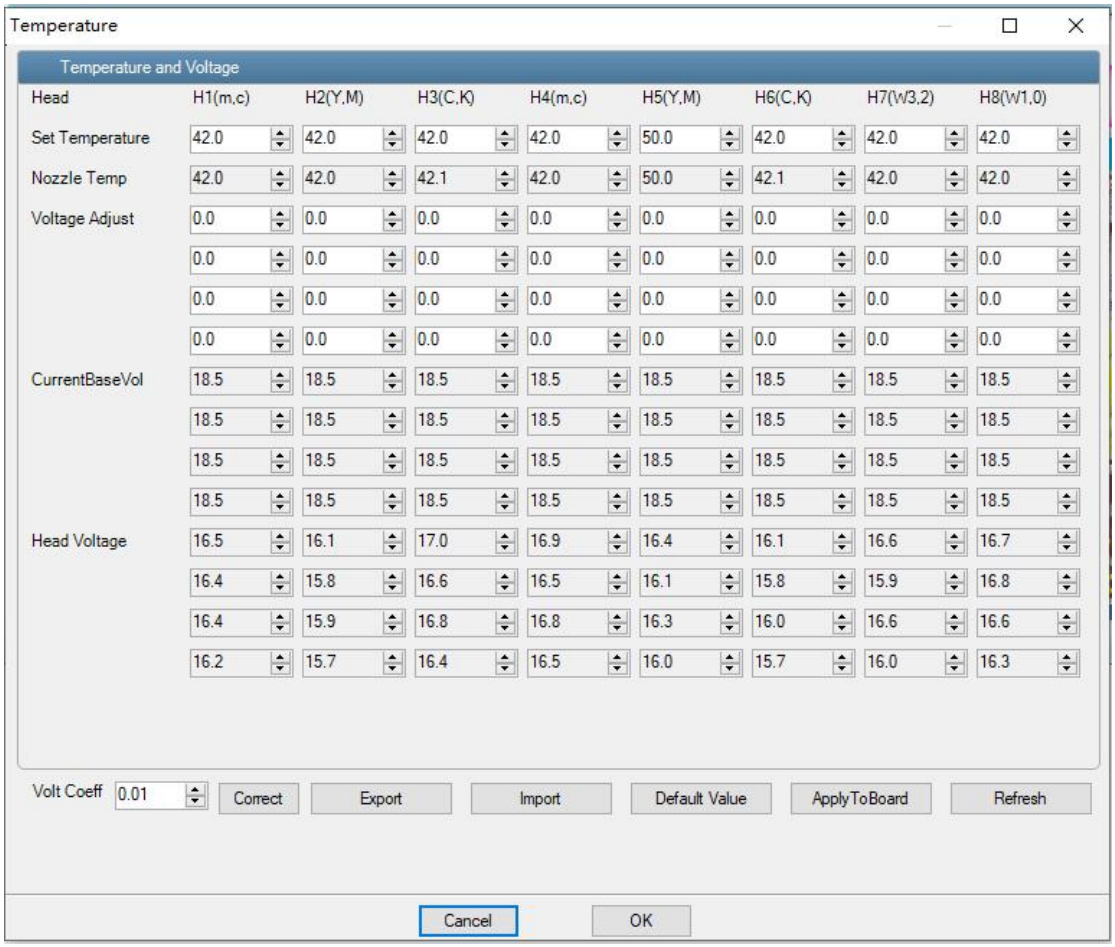
For inputting time password and language password;



8.4 Calibration wizard

Adjust the physical angle of print head and calibrate it by the software. The detailed calibration wizard will be introduced in the following chapters;

8.5 Real-time setting



Setting temperature: set the temperature according to the ink viscosity. Generally, UV ink is set at 40-45°;

Print head temperature: display the real-time temperature of the currently connected print head. If the print head is not read, it is displayed as 0;

Correction voltage: slightly adjust the voltage parameters of each row of print head, and the recommended setting range is ±2;

Current reference voltage: display the platform voltage of the current waveform;

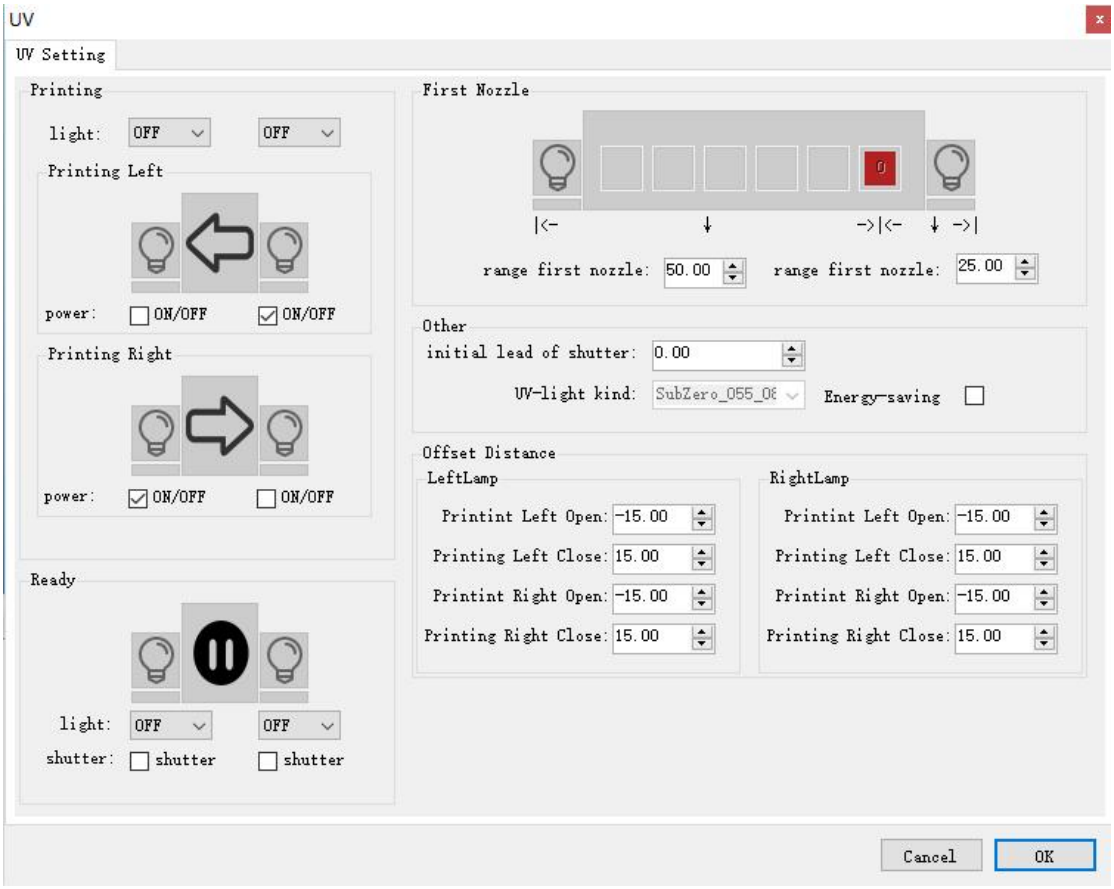
Export to file: save the currently set parameters to a file;

Import from file: export to the file generated by the file to import. This operation is only for the same inkjet printer with the same configuration;

Apply to MainBoard: save the set parameters. Click this button to save after modifying the correction voltage and temperature;

Update: refresh the current interface;

8.6 UV setting

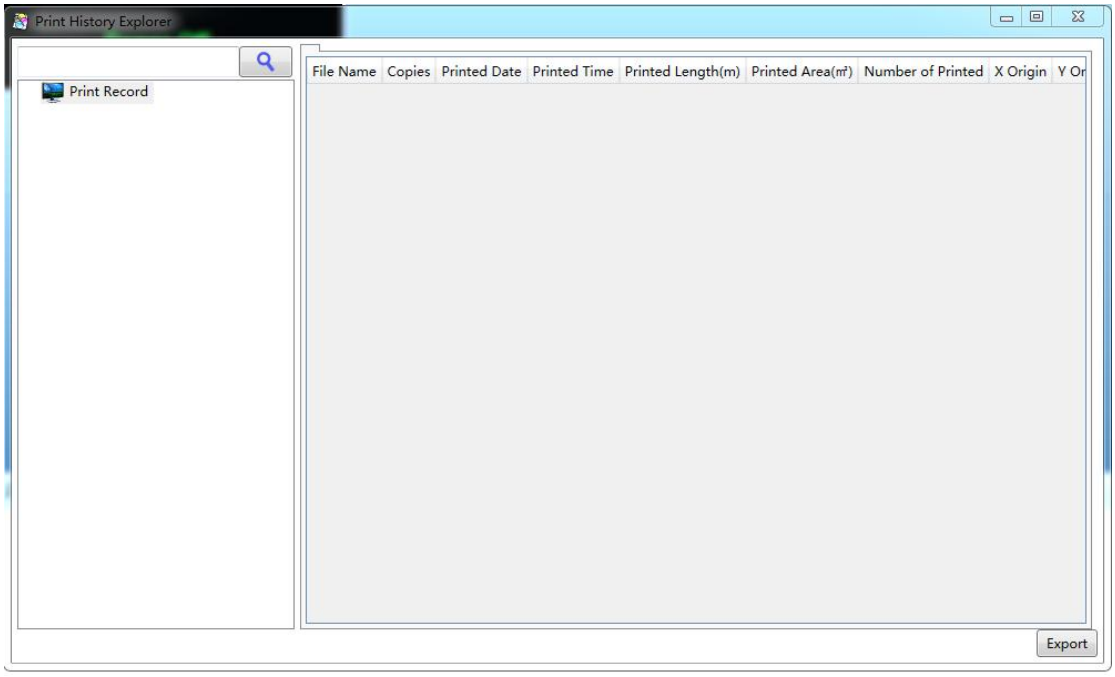


You can set the UV signal output when printing and ready respectively;
You can set the distance from the UV Lamp to the nozzle and fill it in according to the actual measured size;
Offset distance: you can set the advance on and delay off signals. The on is set to negative and the off is set to positive;

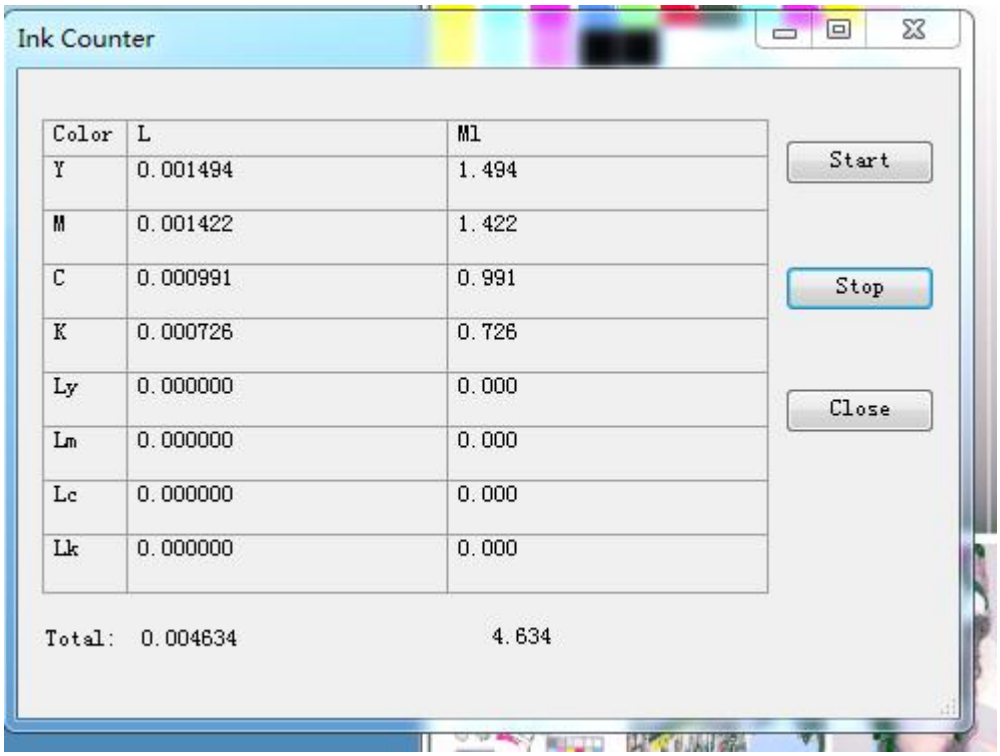
8.7 Automatic stop after ink pump timeout

The switch for whether to stop automatically after the pump ink timeout, which is used to prevent the ink from reflowing to the negative pressure;

8.8 Printing record



IX. Ink Counting

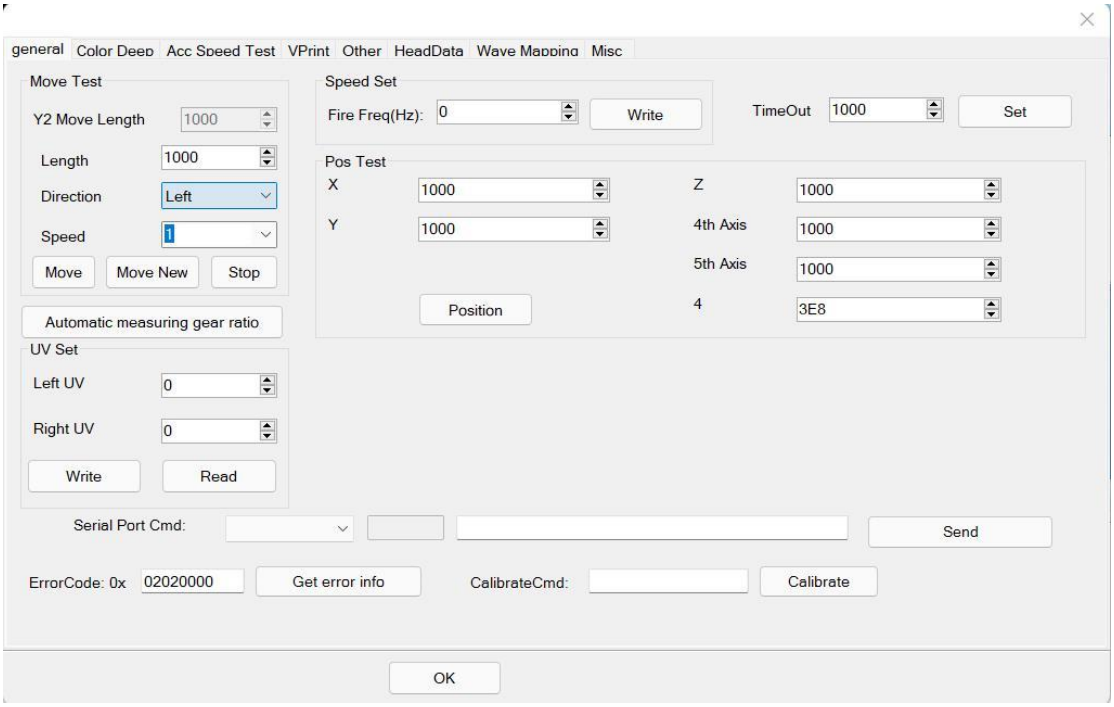


Select the job chart, right-click and select ink counting to calculate the ink used in this job;

X. Factory Debugging

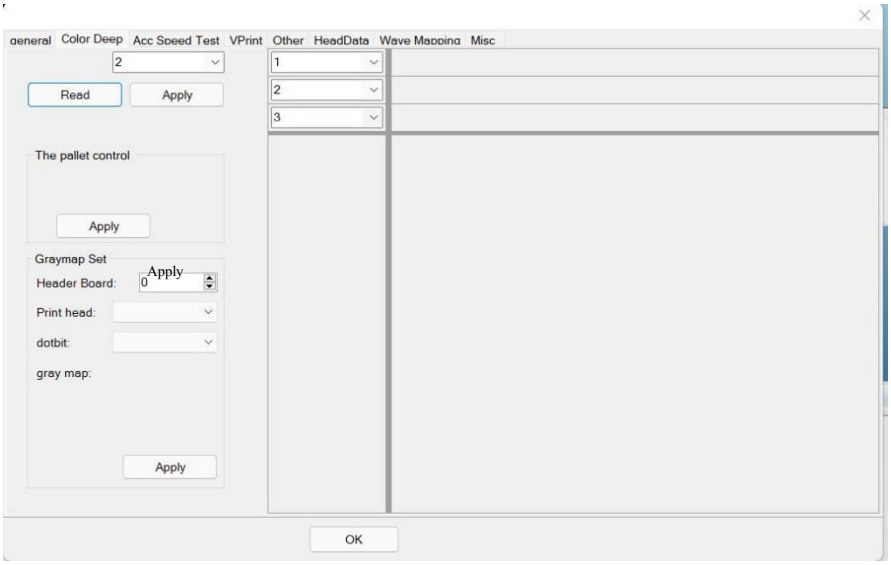
Main menu→Debugging→Factory debugging

10.1 General



Fire Freq (Hz): used to set the temporary firing frequency. After entering the parameters, click “Write” to enable it, restart the printer and restore the default value;
Movement test: used to measure the gear ratio parameters of each axis and view the feedback;

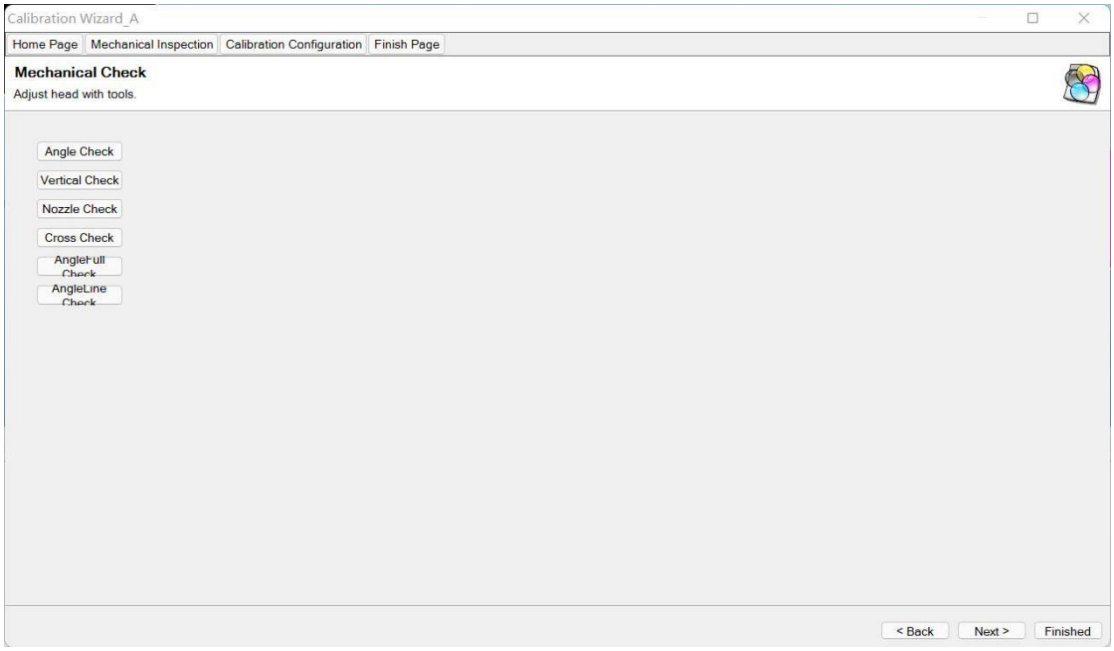
10.2 Colordeep



This is the interface for grayscale setup, and that of Ricoh shall be set to 2;
Click “Read”. If it is displayed as 1, set it to 2, and click “Apply”.

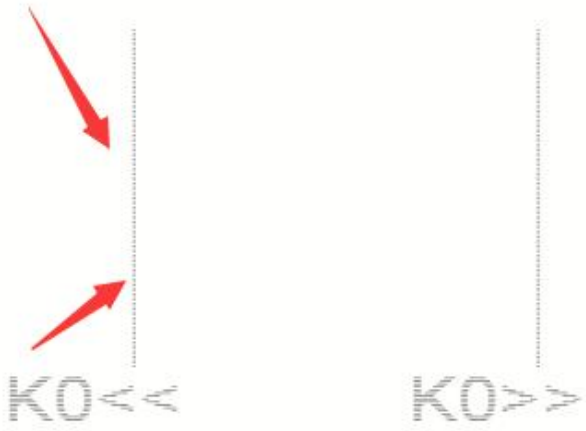
XI. Calibration Wizard

Main menu→Tool→Calibration wizard



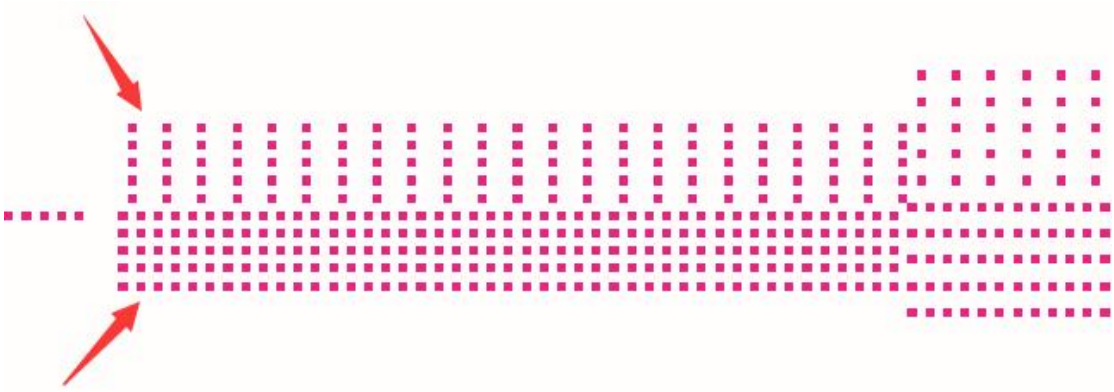
11.1 Angle check

Set the starting point of printing in X and Y direction, and click “Angle check”, as shown in the figure below:



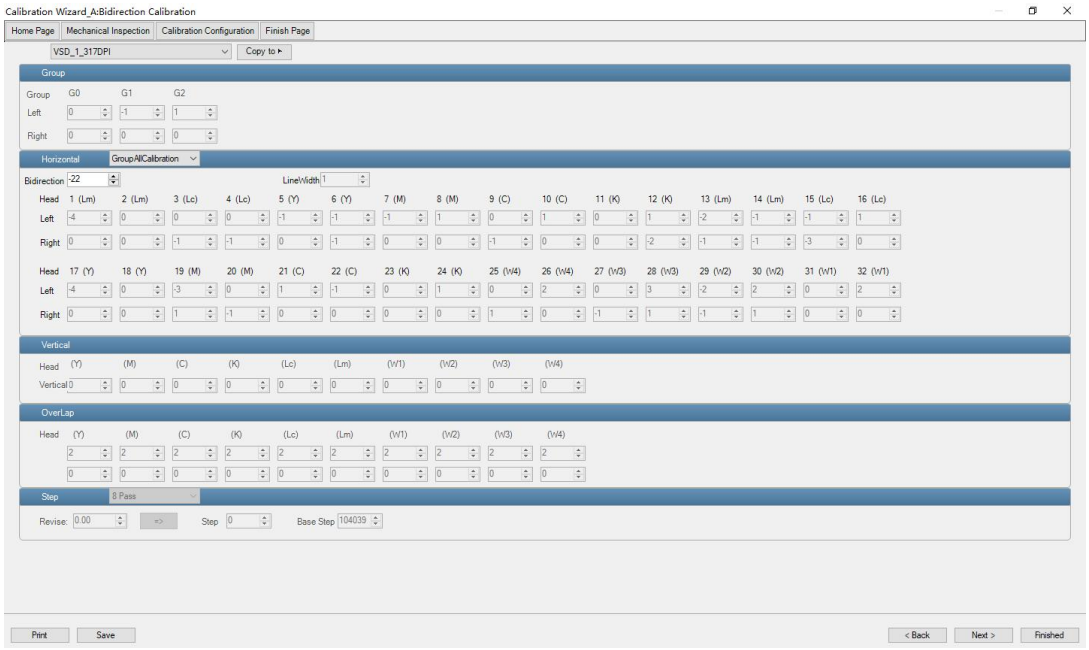
Check whether the upper and lower lines of color labels coincide. If so, it indicates that the print head is installed vertically, otherwise, the perpendicularity needs to be corrected by mechanically adjusting the installation angle of the print head. If the upper and lower lines do not coincide, it is recommended to print and observe.

11.2 Vertical check



The top 5 rows of nozzles are punched by one print head (with an interval of one nozzle), and the lower nozzles are punched by another print head. The ideal effect is shown in the figure above. If the upper and lower print heads overlap, the neat 5 rows of print heads cannot be seen.

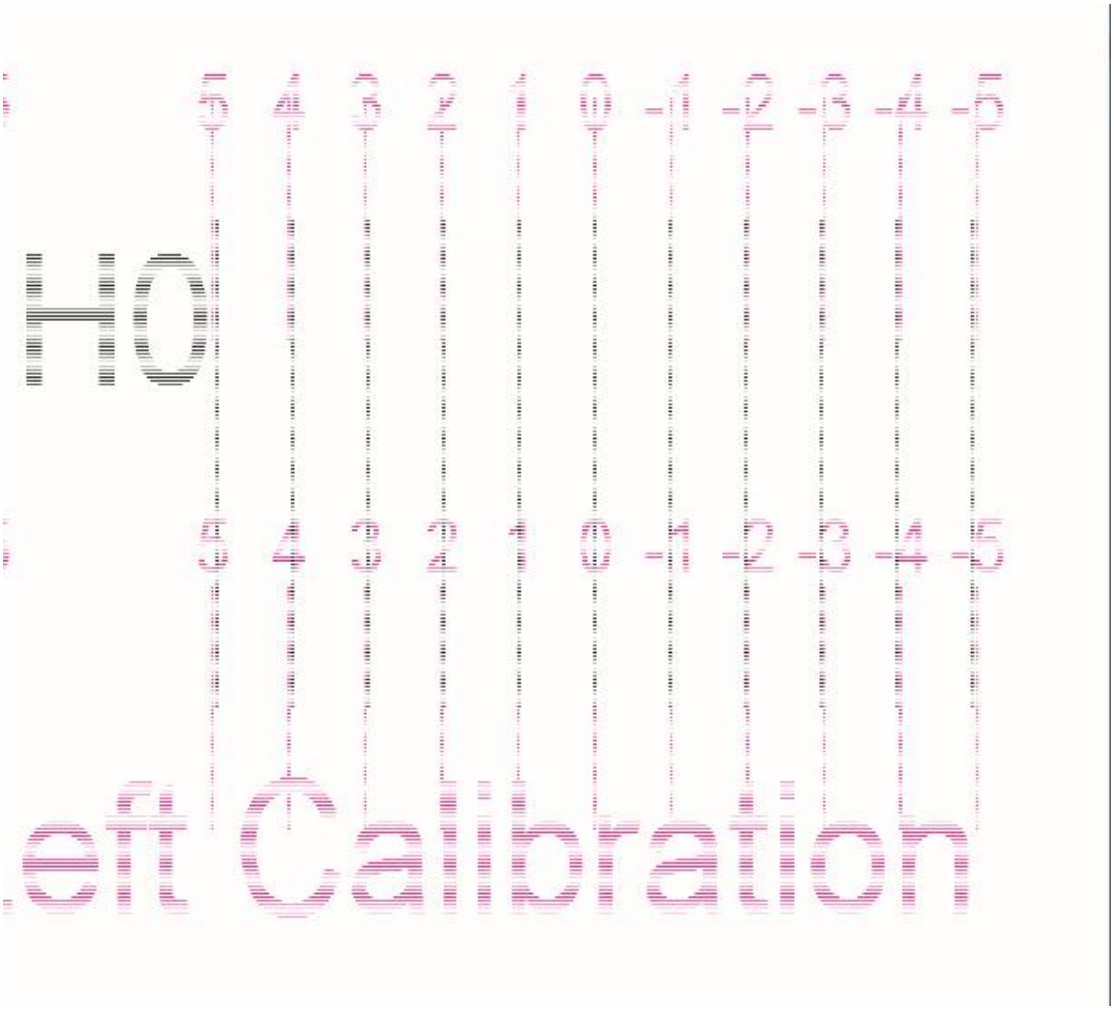
11.3 Color register calibration



(1) During control calibration, it can calibrate high precision (high speed of 720, medium speed of 720, low speed of 720) and high speed (high speed of 360, medium speed of 360, low speed of 360) according to the customer's needs. Click “Next”, the corresponding calibration box will display bright color, and the rest will be gray. Click “Print” in the lower left corner to print the test line. Enter the corresponding value, and click “Save” to carry out the next calibration.

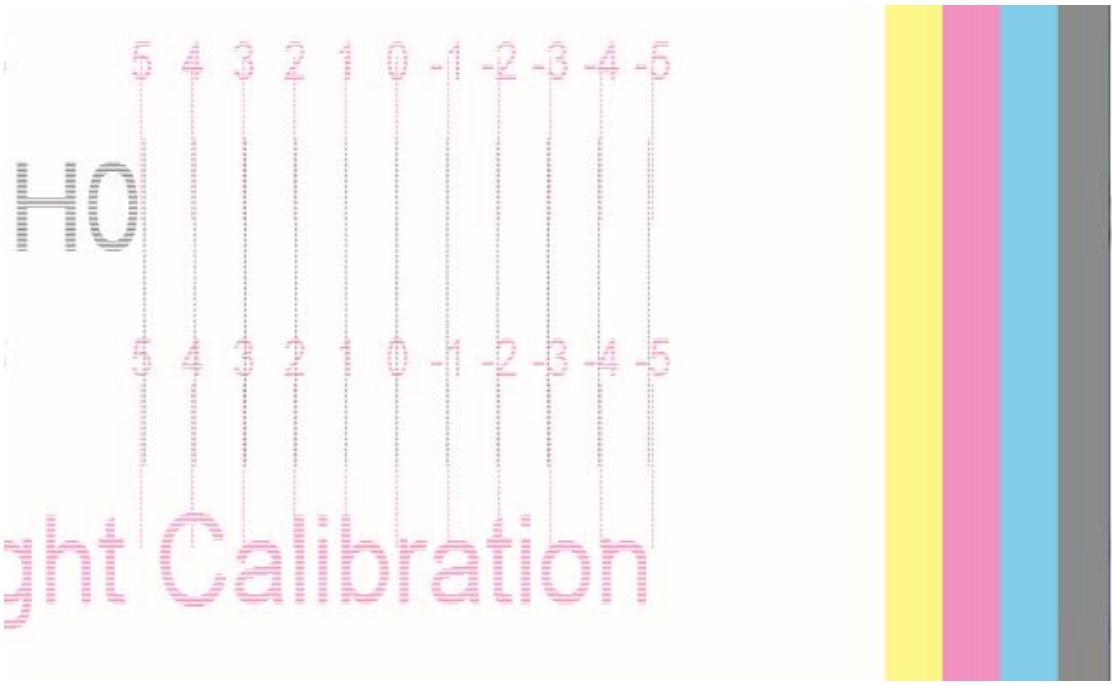
Calibrate the left (reverse) and right (forward) twice, find the line with the best coincidence, and fill the corresponding value back into the corresponding number box. If there is no complete coincidence, it can also be estimated and read from the middle of the two values with the best coincidence. (G0 represents the first group of color print heads, all other rows are aligned with the first row, and the calibration line is black)

(2) Left calibration



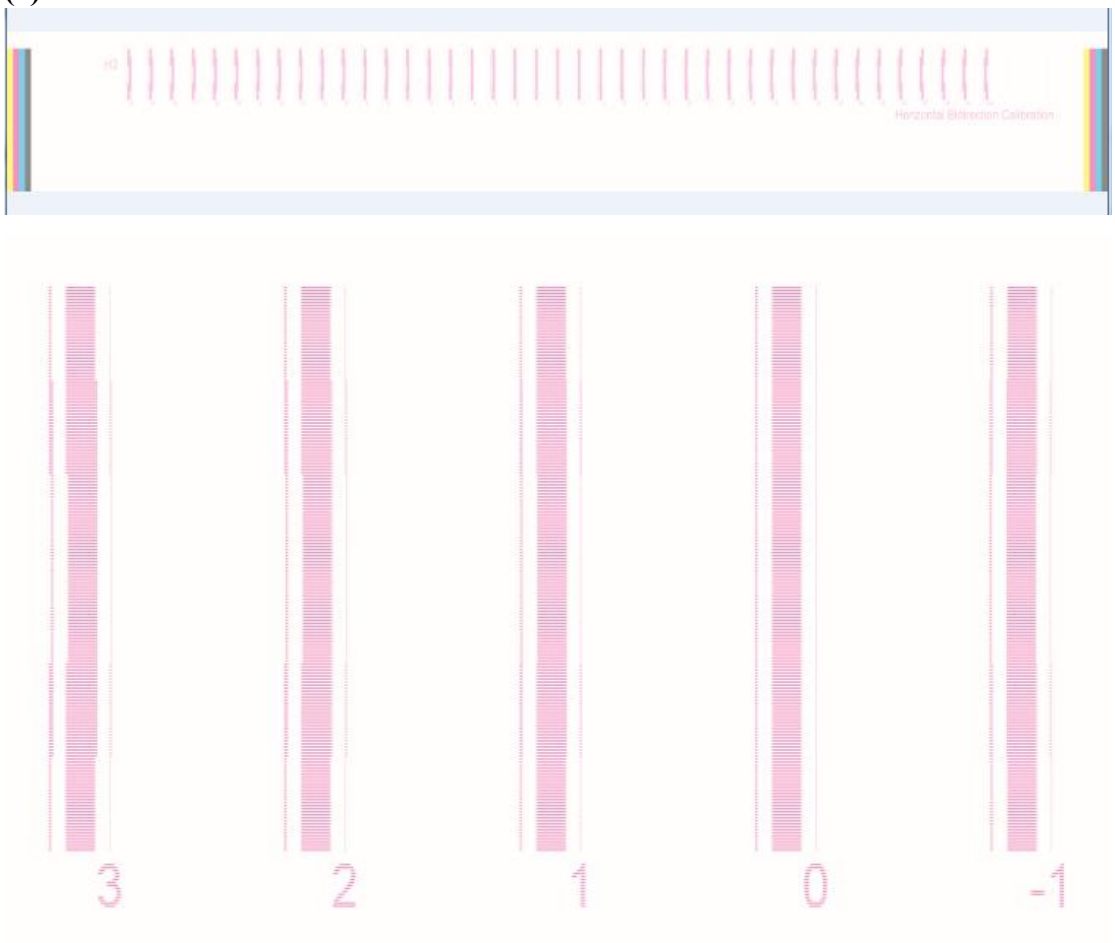
Left calibration means that the carriage prints and ejects to the left. The ideal effect is that the value 0 is on the same line. Otherwise, select the value on the same line and fill it in the corresponding position of the software.

(3) Right calibration



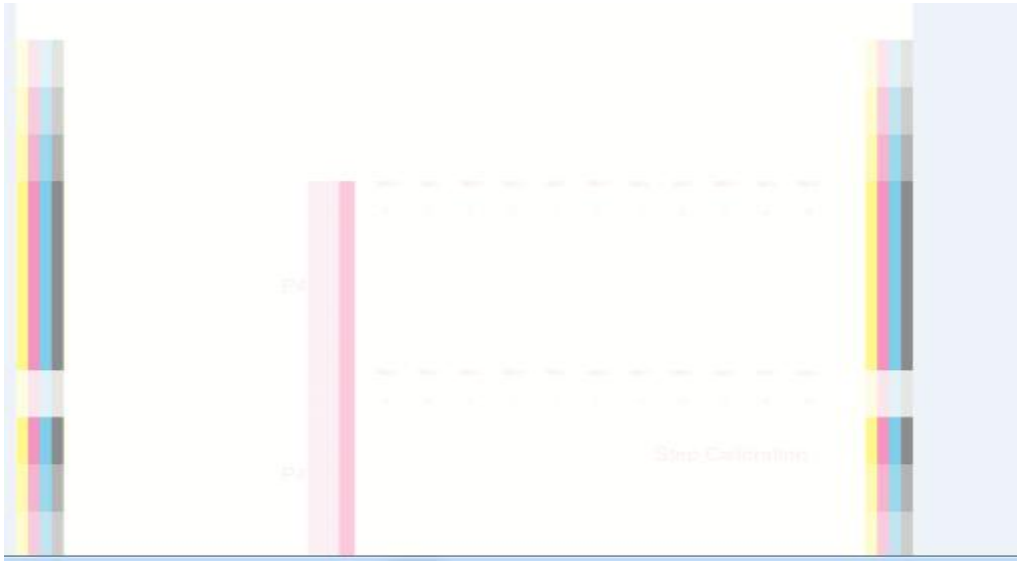
Right calibration means that the carriage prints and ejects to the right. The ideal effect is that the value 0 is on the same line. Otherwise, select the value on the same line and fill it in the corresponding position of the software.

(4) Bidirectional calibration



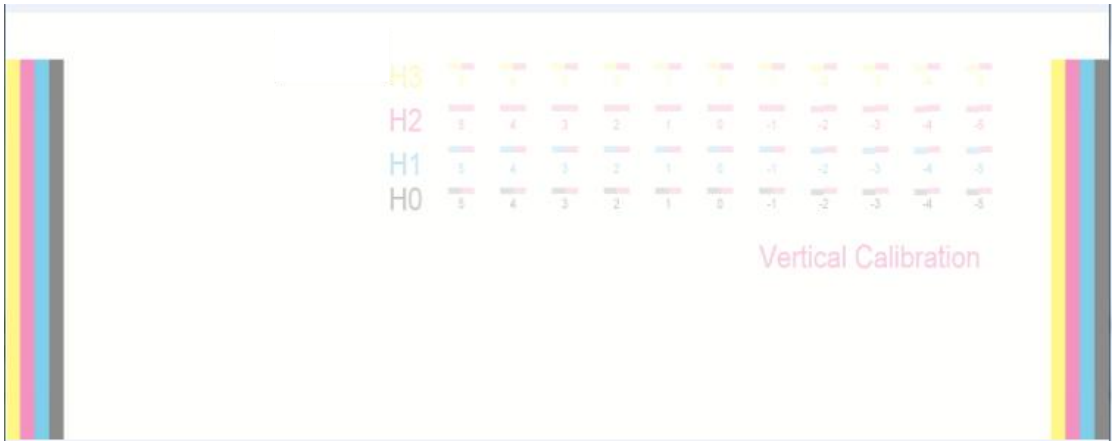
Bidirectional calibration means that the carriage prints and ejects bidirectionally. The ideal effect is that the value 0 is on the same line. Otherwise, select the value on the same line and fill it in the corresponding position of the software.

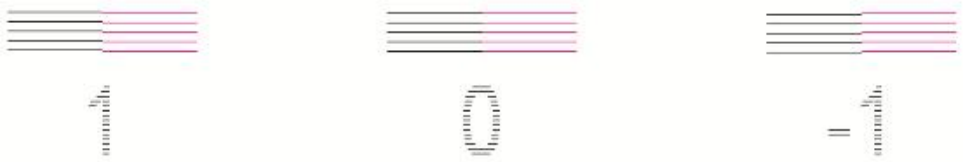
(5) Stepping check



Stepping calibration means that the carriage prints and ejects in the Y direction. The ideal effect is that the value 0 is on the same line. Otherwise, select the value on the same line and fill it in the corresponding position of the software.

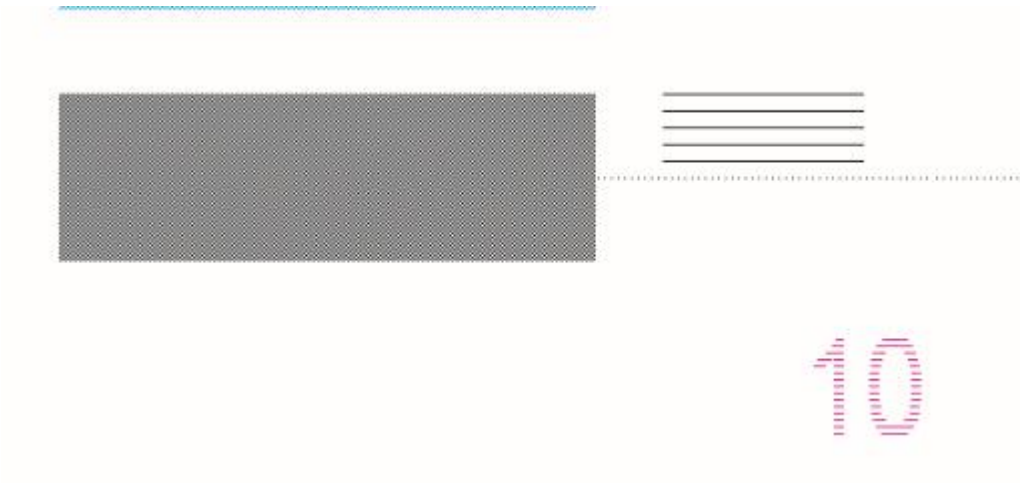
(6) Vertical check





Vertical calibration means that the software calibration of print head and nozzle in the Y direction. The ideal effect is that the value 0 is on the same line. Otherwise, select the value on the same line and fill it in the corresponding position of the software.

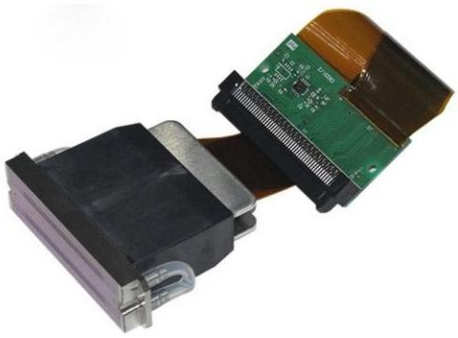
(7) Overlap calibration



Overlap calibration is to adjust whether there is nozzle overlap between the first and the second group of print heads with the same color. The ideal effect is that the color blocks are evenly distributed without white lines and black lines. If there is overlap, fill the figure corresponding to the overlap of dotted line and solid line into the corresponding position of the software.

● *Installation and Adjustment of Print Head*

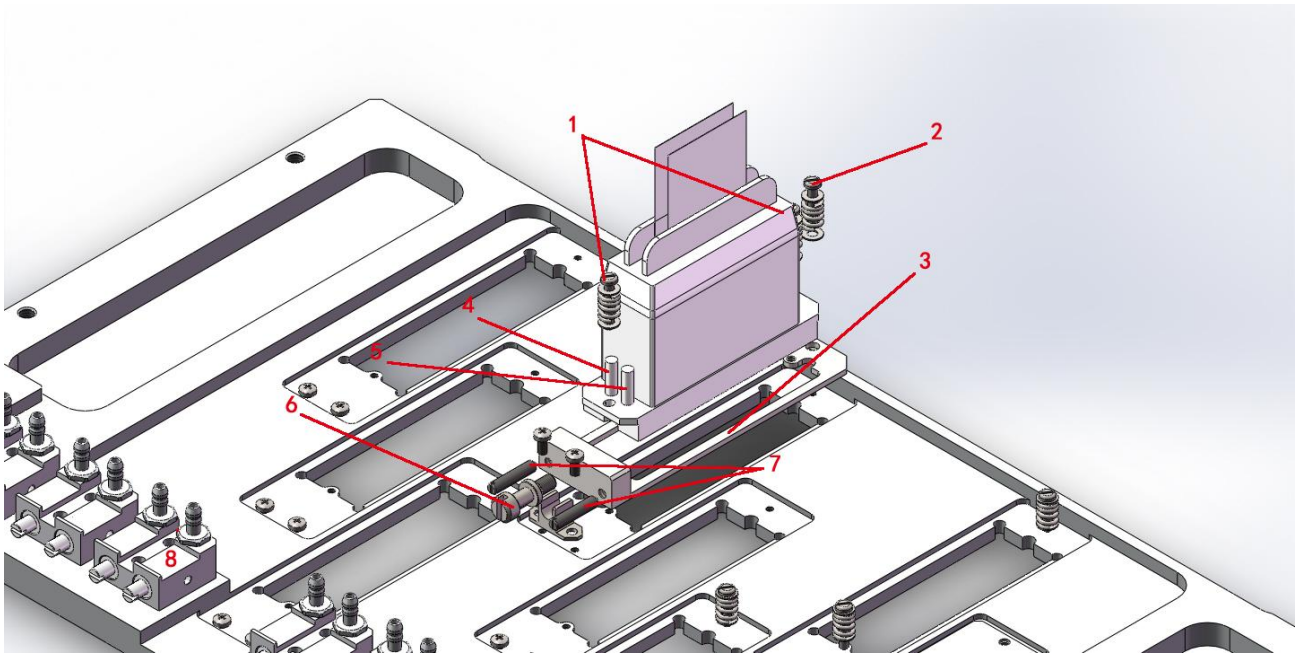
◆ Introduction of RICOH G5/G6 print head



A high precision and high speed print head is widely used in the printer industry, and is also the most mainstream print head now supporting with 7PL ink dot and 4 level grayscale printing. There are two rows of ink outlet at the bottom of G5/G6 head on each side, each row is divided into two groups, and each group has 320 nozzles, and a print head has 320X4=1280 nozzles in all.

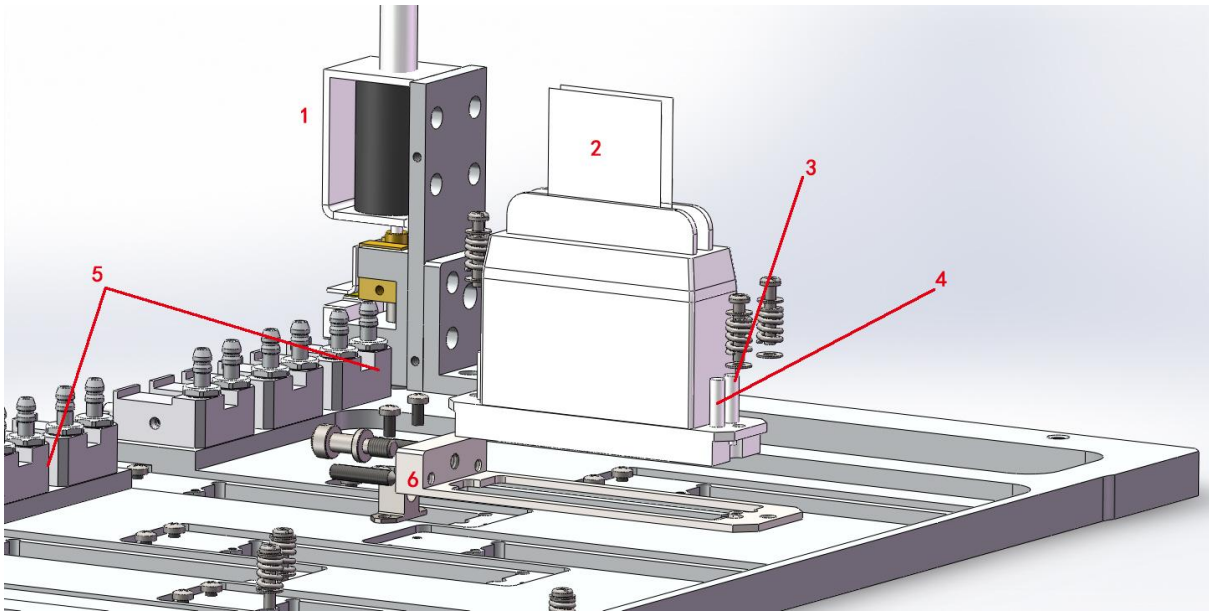
◆ **Print head installation**

1. Place clean non-woven fabrics under the bottom plate of print head, so as to avoid soiling nozzle panel or blocking nozzle during print head installation process.
2. Please unpack the print head as careful as possible to avoid damaging it.
3. The following figure is the installation diagram:



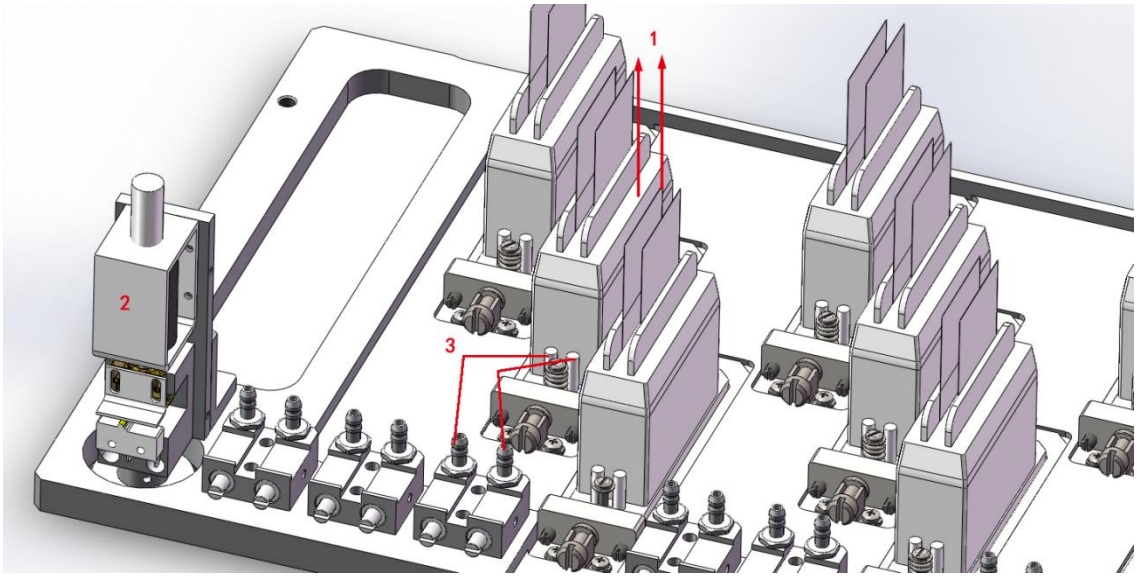
Installation Diagram a of Print Head Ricoh

Code	Name of parts	Description
1	Mounting screw for print head	Fix the print head on the adjusting support
2	Mounting screw for adjusting support	Fix the adjusting support
3	Adjusting support for print head	To adjust the physical position of the print head
4	Ink outlet 1	Connecting the two-way valve body for exhausting air
5	Ink outlet 2	Connecting the two-way valve body for exhausting air
6	Vertical adjusting screw for print head	To adjust the front and back physical position of the print head
7	Inclined adjusting screw for print head	To adjust the inclined physical position of the print head
8	Two-way valve body	To keep pressure differential and exhaust air inside the print head.



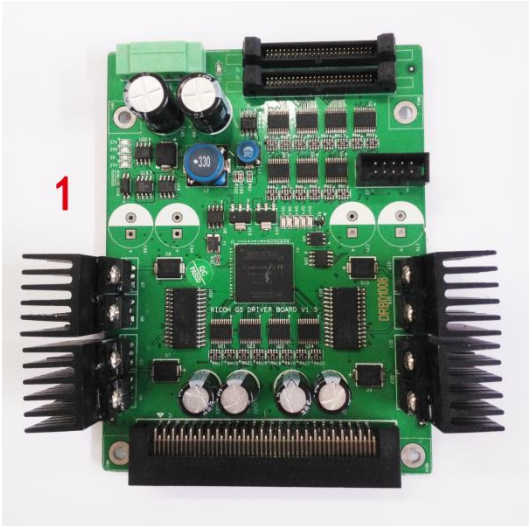
Installation Diagram b of Print Head Ricoh

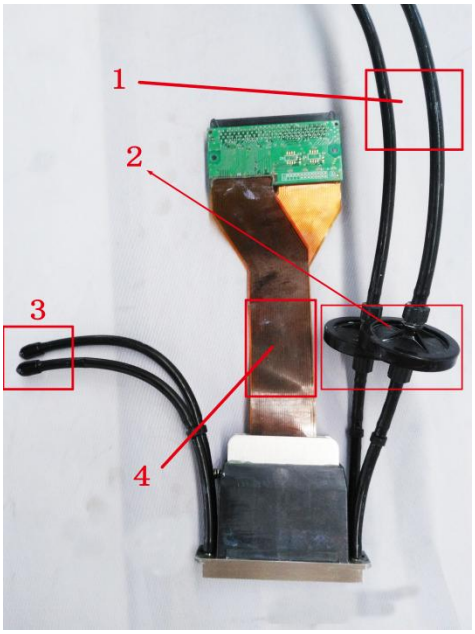
Code	Name of parts	Description
1	Height measurement system	To measure the height of printing media
2	Print head cable	Connect the driver board for print head
3	Ink inlet 1	Connect the three-way valve body
4	Ink inlet 2	Connect the three-way valve body
5	Two-way valve body	To keep pressure differential and exhaust air inside the print head.
6	Adjusting support	To adjust the physical position of the print head



Installation Diagram of Print Head Ricoh

Code	Name of parts	Description
1	Ink inlet connecting the three-way valve joint mouth	The ink enters into the print head through the three-way valve body
2	Height measurement system	To measure the height of printing media
3	Ink outlet connecting the two-way valve joint mouth	To exhaust the air and waste ink inside the print head



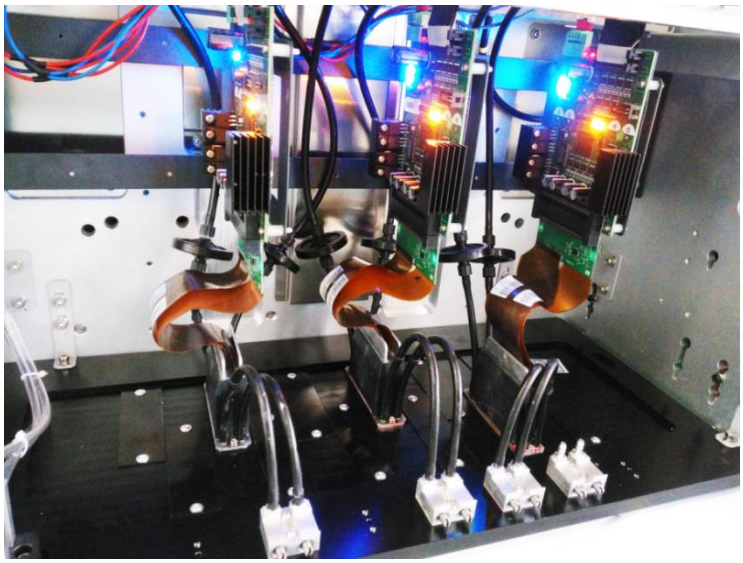


Code	Name of parts	Description
1	Driver board for print head	To provide the voltage and data required by the print head
2	Connecting the three-way valve body assembly	The ink enters into the print head through the three-way valve body

3	Butterfly filter	Filter the impurities of the ink
4	Connecting the two-way valve body	To exhaust the air and waste ink inside the print head
5	Print head cable	Connect the driver board for print head

Please use the special mounting screw provided in the fitting box to fix the print head, winding the USB cable by using the acetate insulated rubber tape before installation to protect it before installation.

Effect Picture after Installation:



● *Switch order of the DS printer*

◆ Startup (please pay attention to foreign objects on the guiding belt when start up the DS machine)

➢ **Startup processes**

1. Connect the input power of the machine, and push on the leakage protection switch of general power on the rear left.
2. Unscrew the **emergency stop buttons** on the four corners in the front and at the back of the machine **(including the emergency stop switch on the handheld box)**.
3. Remove the moisturizing tray (models without automatic ink scraping function).
4. Turn on the computer and start the PrinterManager software.
5. Press the **start button** on the left or right side of the machine. After the inkjet printer starts, first correct the two origins before and after the rod self-inspection——》 the carriage rises to the highest point——》 to the left to the origin——》 the carriage drops to the height set before by the software——》 correct the rod to the middle position——》 get ready (automatic ink scraping system: before power on, the external air compressor pump needs to work in advance to ensure that the air pressure reaches the set value. Start——》 drop the moisturizing tray——》 correct the two origins before and after the rod self-inspection——》 the carriage rises to the highest point——》 to the left to the origin——》 the carriage drops to the height set before by the software——》 correct the rod to the middle position——》 get ready)
6. Unscrew the three-way ink path valve body and press the **ink pressing button** to allow the ink flow from the auxiliary ink tank into the print head through the three-way ink path valve body and then flow out; the air can be exhausted through the blowoff valve.
7. Press “Automatic maintenance”, the carriage rises to the highest position, which is convenient to clean the print head surface. (The automatic ink scraping system can be operated automatically, which is described in detail below.)
8. Put in the print material, set the print height and original point.
9. Start printing.

➢ **Ink pressing of the print head during printing**

In case of printing disconnection during printing, click "Automatic cleaning” or “Maintenance” in the software. The carriage will move to the leftmost end of the beam and rise to the highest after printing current PASS. After manual inking, clean the print head surface, click “Maintenance”, the carriage will automatically return to the last printing height and continue printing.

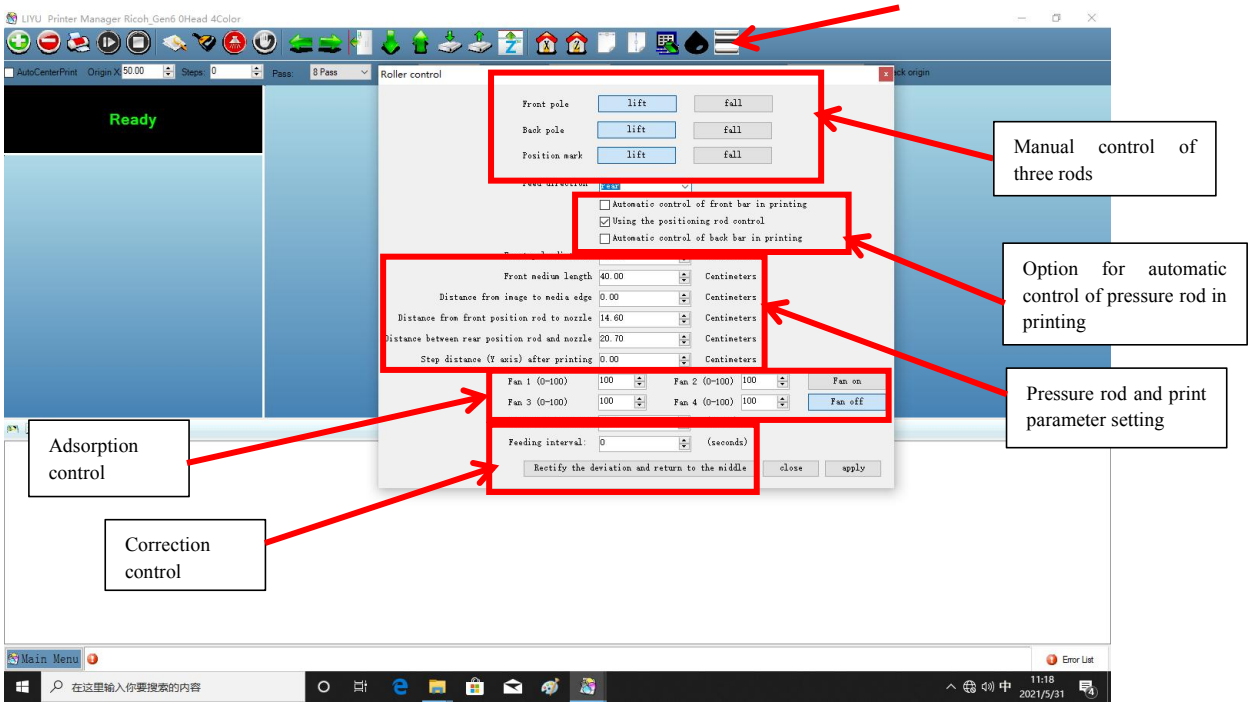
◆ Power OFF

Power off processes

1. Press the emergency stop switch, close the moisturizing tray and the ink valve body.
2. Shutdown the computer.
3. Pull down the leakage protection switch of the main power supply of the machine.

◆ Control function of pinch roller in PrinterManager:

1. Printing setting of the front pressure roller, positioning rod and back pressure roller: the equipment offers positioning function and rise and down functions of the front and back pressure rollers. You may set these functions in the dialog box “Pressure rod setting”. You can also open the dialog box “Pressure rod setting” by clicking the icon in main interface. Open the window as follows:

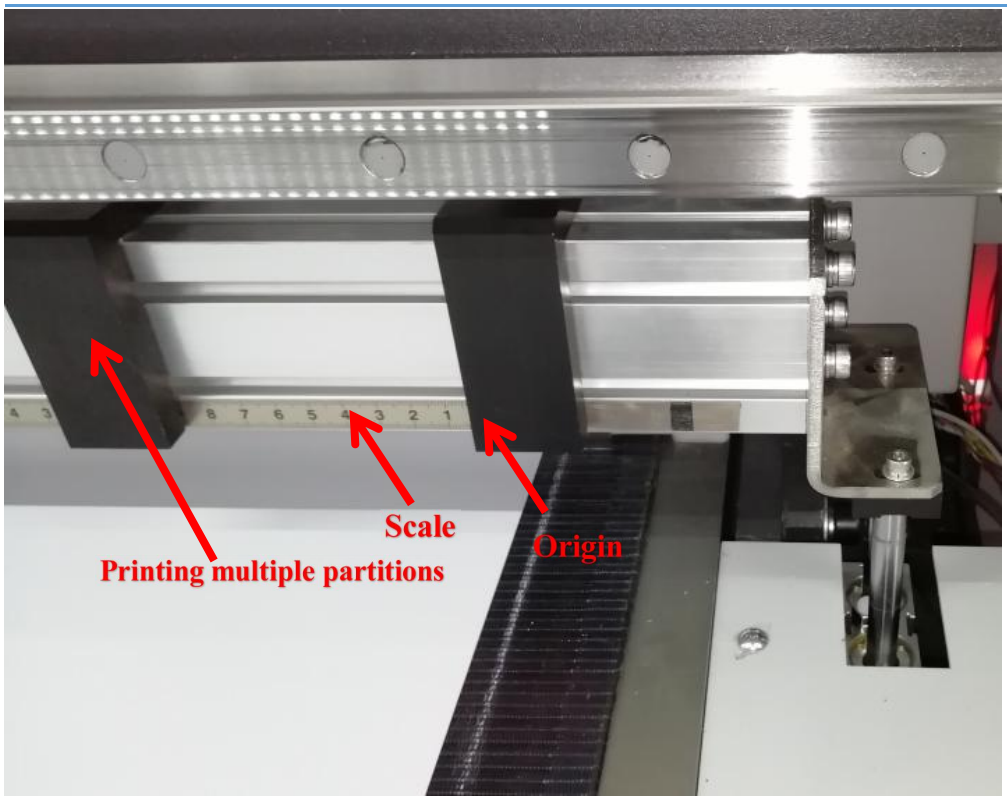


- Feeding direction: it is divided into front and rear feeding, that is, it is positioned in front or rear of the positioning rod.
- Automatic control of front rod in printing: select to automatically control in printing; if not selected, it will not be executed.
- Use the positioning rod: select to execute automatically. It is mainly used for plate printing.
- Automatic control of rear rod in printing: select to execute automatically. It is mainly used for plate printing.
- Front rod distance: the distance from the front rod to the starting position of the print head. After selecting the automatic control of front rod in printing, when the material steps to the set distance, the front rod will automatically lower to flatten the material.
- Front media length: this option takes effect when the feeding direction is selected as front. It is mainly used for the actual material length during front printing.

- Distance from image to media edge: when the value is set, that is, when printing, the middle distance between the starting position of the image and the media.
- Distance from the front positioning rod to the print head: when feeding in front, debug and set the setting value when the starting position of the image coincides with the front of the positioning rod. This value is set by the debugging personnel and does not need to be modified by the customer.
- Distance from the rear positioning rod to the print head: when rear feeding, debug and set the setting value when the starting position of the image coincides with the front of the positioning rod. This value is set by the debugging personnel and does not need to be modified by the customer.
- Stepping distance after printing: for plate, it is used to increase the blank distance when the image is smaller than the material size in order to prevent the positioning rod from pressing on the material.
- Fan setting: generally there are 4 wind zones, and the adsorption value can be set from 0 to 100. The higher the value, the greater the suction. On the right is the switch application for adsorption.
- Correction offset: sets the movement distance of correction. It is generally set from 1500 to 2000.
- Feeding interval: mainly used for cyclic continuous printing of plate. It is used to extend the normal printing interval after the first material is printed, when it is inconvenient for feeding due to the large material.

◆ Positioning rod function

The positioning rod is controlled by the left and right cylinders. The positioning rod is provided with forward and reverse scale in the front and rear, and the scale partition can be moved at will, which can effectively solve the problem of printing multiple gaps.



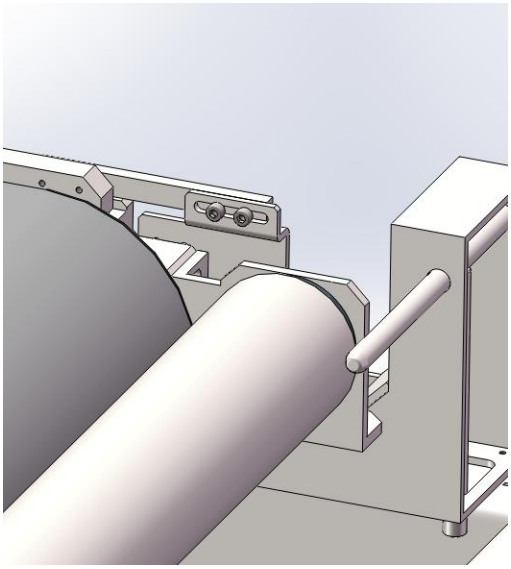
Feeding in front

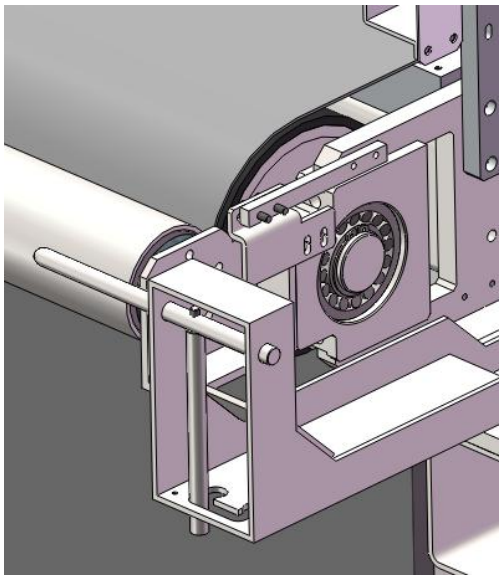
◆ The correction function:

The correction system is consists of correcting roller,shielding photoelectric switch, stepping motor, driving screw and limit switch. Considering the deviation of the conveyor belt due to uneven tension at the two ends, the correction roller is used as an adjustment mechanism. One end of the correction roller is fixed, in which a rotatable circular bearing is installed. The other end can detect the deviation signal of the guiding belt via shielding photoelectric switch, control the rotation of step motor; it moves back and forth to adjust the structure of the conduction band (there's a limit switch for adjustment of the screw rod), so that the tension at both ends of the conduction band can be balanced.

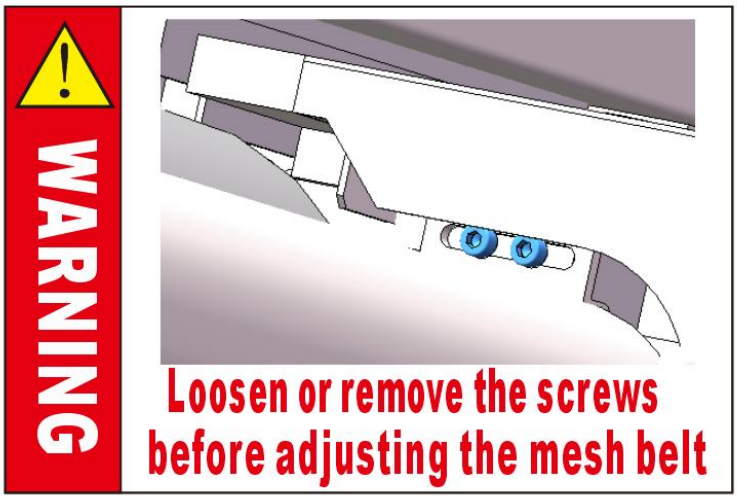
1. Introduction to tensioning device fixation:

1.1 In order to reduce the impact of the looseness of the guiding belt during transportation, fixtures are installed on both sides of the tension roller, as shown in the following figure:





1.2 Please loosen specified screws before adjusting the guiding belt, and it is better to fix the screws again to ensure that the guide belt will not be affected after adjustment.



2. Adjust the guiding belt to the middle position

2.1 After the guiding belt is installed, the left and right screws of the tension roller need to be tightened according to the deviation of the guiding belt, so that the tension roller can tension the guiding belt. Adjustment principle: The end to which the guiding belt is offset needs to be tensioned and adjusted.

Left adjustment of the tension roller

Right adjustment of the tension roller

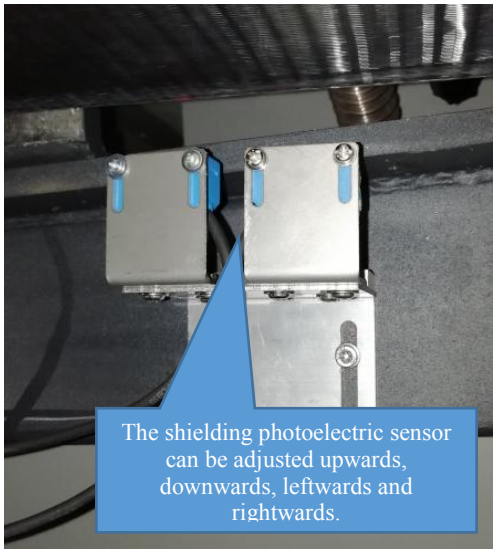
2.2. Adjustment method of the shielding photoelectric sensor position:

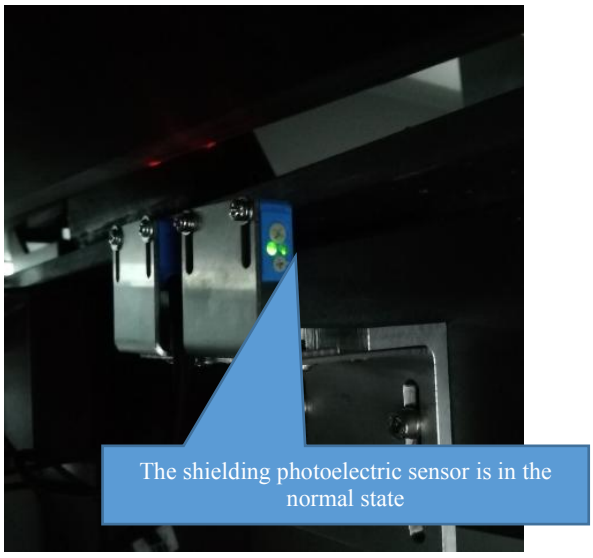
In order to correct the guiding belt deviation fast and accurately, two photoelectric sensors are installed with a dislocation less than 2 mm, and the guiding belt is driven between the two photoelectric sensors. It can be divided into three states:

When the guiding belt is between the two photoelectric sensors, the yellow and green lights of the internal sensor are on, and the external photoelectric sensor has only one green light on;

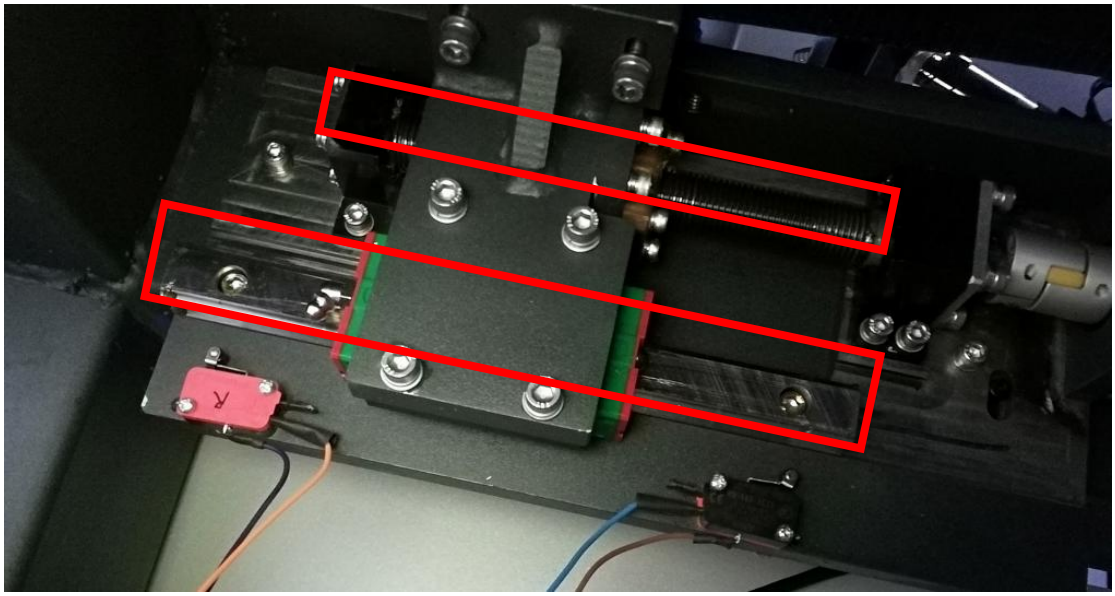
When the guiding belt is offset to the leftmost side, the yellow and green lights of the internal sensor and external sensor are on;

When the guiding belt is offset to the rightmost side, only the green lights of the internal sensor and external sensor are on;





3. Maintenance of the motor screw rod: Be sure to apply advanced grease to the screw rod and guide rail every month.



4. Initialization action of deviation correction:

Move forward to the limit switch first——》Then move backward to the limit switch——》After the carriage reset——》Return to the middle position

5. Working state of correction rod:

If the guiding belt always moves to the left when it moves forward, the correction rod will move forward to correct it to the middle position.

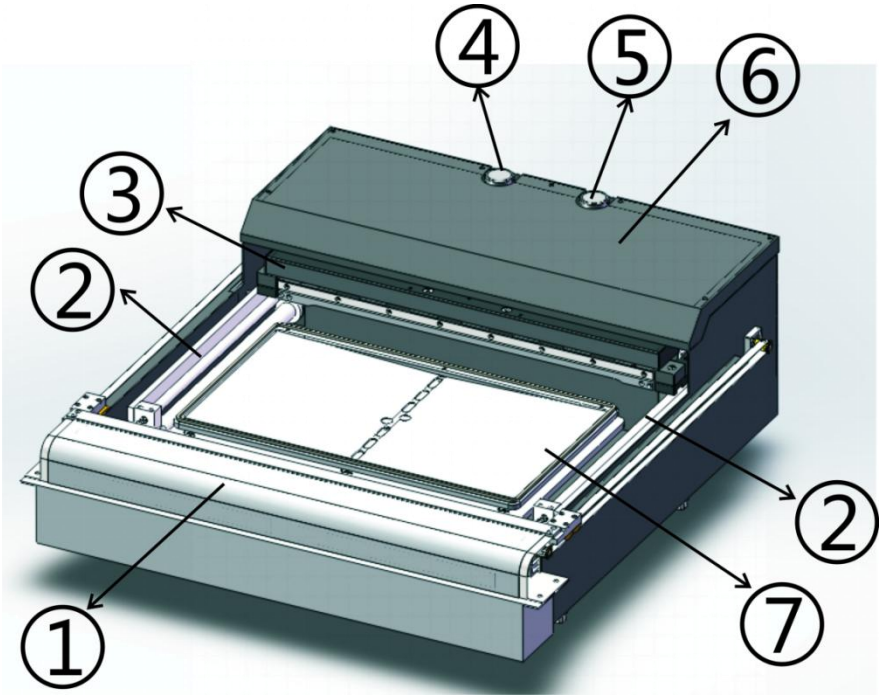
If the guiding belt always moves to the right when it moves forward, the correction rod will move backward to correct it to the middle position.

If the guiding belt always moves to the left when it moves backward, the correction rod will move backward to correct it to the middle position.

If the guiding belt always moves to the right when it moves backward, the correction rod will move forward to correct it to the middle position.

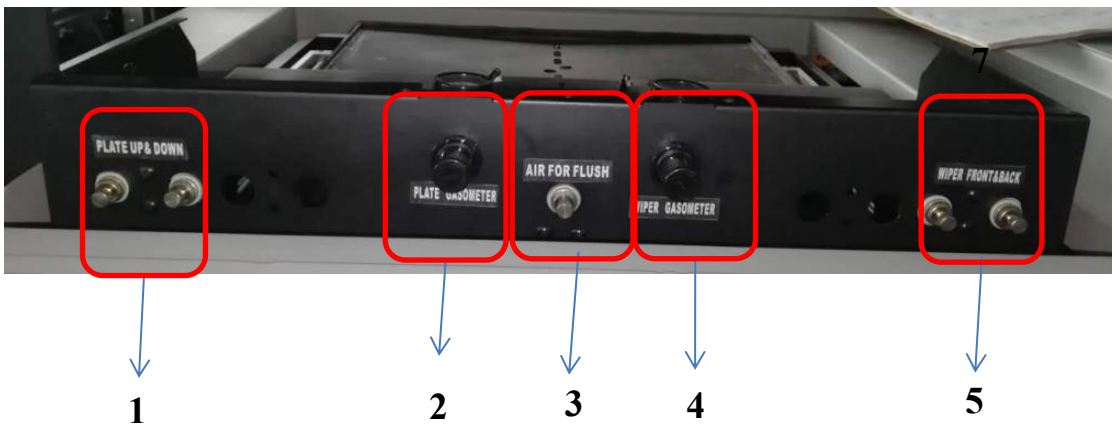
◆ Automatic ink scraping control function:

Front of scraping system:



Code	Name of parts	Description
1	Front baffle	When the wiper moving forward, scrap ink to prevent splashing.
2	Linear cylinders	One on the both side respectively to control the movement of wiper
3	Wiper	For cleaning the wiper on surface of print head.
4	General intake of linear cylinders	For controlling the total air inflow for back and forth movement of wiper.
5	General intake of lifting cylinders	For controlling of total air inflow for tray up and down.
6	Back cover plate	There are air pipe joints inside to control front and back, up and down, and cleaning fluid.
7	Moisturizing tray	For moisturizing the tray.

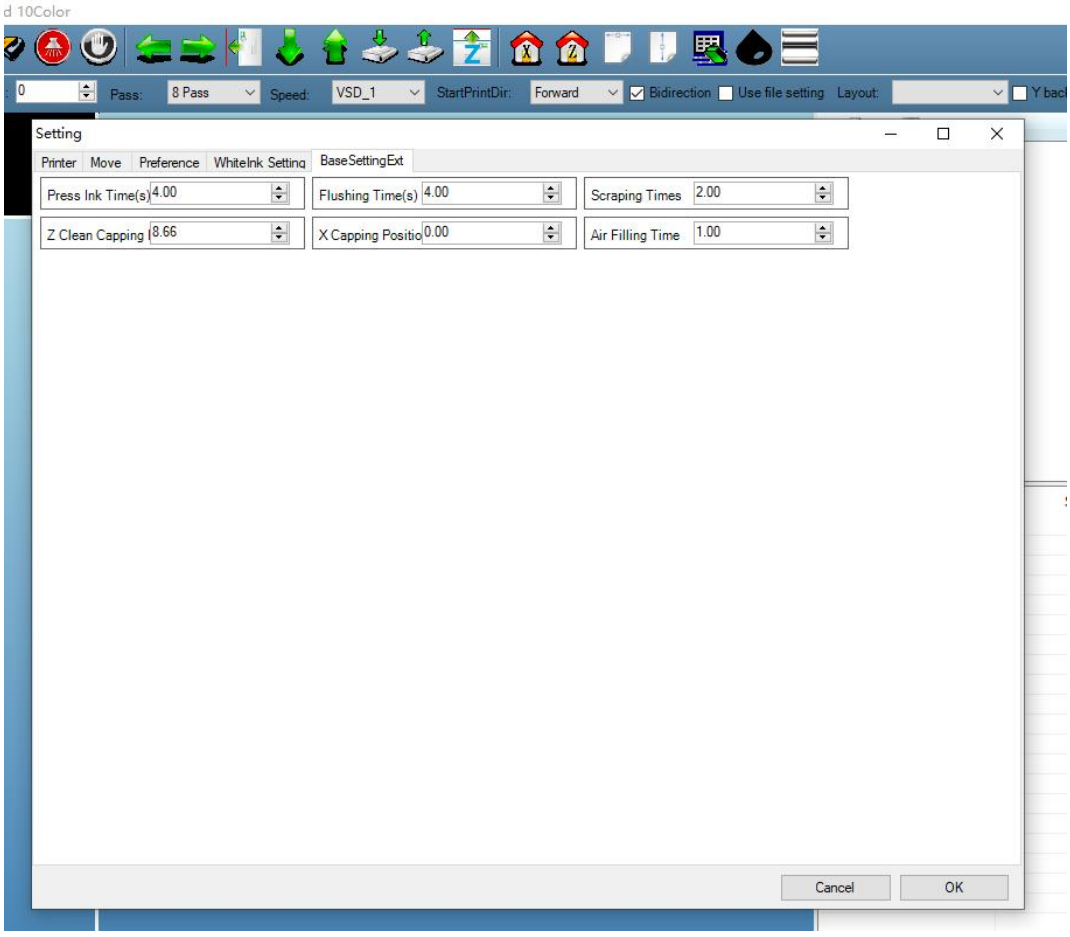
Back of scraping system:



Code	Name of parts		Description
1	Up and down control buttons of plate	PLATE UP&DOWN	Adjust the air pressure to control the speed and force of the tray cylinder upward or downward
2	Plate gasometer	PLATE GASOMETER	To control the intake air pressure of plate
3	Air pressure for flush	AIR FOR FLUSH	To control the intake air pressure of flush
4	Wiper gasometer	WIPER GASOMETER	To control the intake air pressure of wiper
5	Front and back control buttons of wiper	WIPER FRONT&BACK	To adjust the air pressure to control the speed and force of the wiper forward or backward

Note: Plate gasometer and wiper gasometer control the air pressure of above and below the moisturizing tray as well as forward and backward movements of the wiper. The normal air pressure value is 0.3kpa instead of more than 0.4kpa.

1. .Parameter setting of automatic ink scraping interface in PrinterManager software: Edit - Setting - Basic setting extension



- Ink pressing time: in seconds, the automatic ink pressing time after setting.
- Flushing time: in seconds, set the flushing time after each wiper operation.
- Wiper times: the number of round-trip scraping times of the wiper can be controlled.
- Z-axis cleaning and moisturizing position: based on the wiper, the carriage drops to the height where the wiper can touch the print head surface. The higher the value, the lower the height, and the smaller the value, the higher the height.
- X-axis moisturizing position: the position of the bottom board of print head on the wiper can be set.
- Air supply time: in seconds, it is mainly used to clean the cleaning fluid on the wiper by air flushing after flushing the wiper.

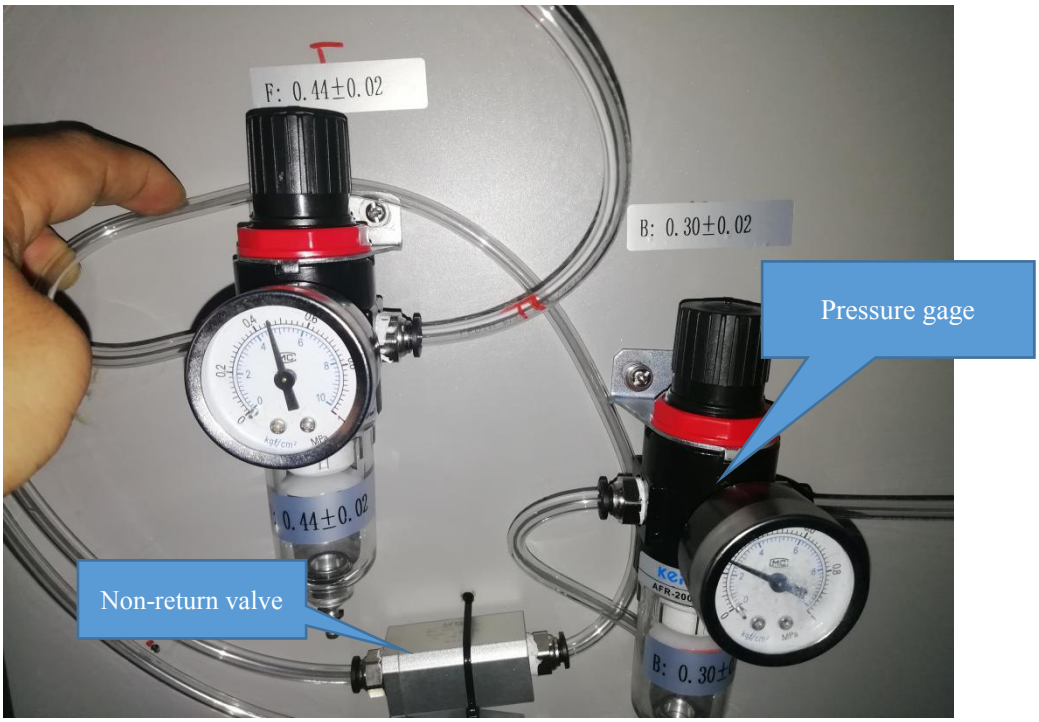
2. Movement and flow of ink scraping control:

The wiper can push forward and backward by adjusting the size of the air valve. When you click "Ink scraping" in PrinterManager, the cleaning fluid will first flush the wiper, then air flush the cleaning fluid on the wiper by air flushing. The carriage will rise and then drop, the wiper will push forward, the carriage will rise, and the wiper will return. If the number of wiper times is set, the carriage will drop, the wiper will push forward, the carriage will rise, and the wiper will return. Flush the wiper with cleaning fluid again, and then flush the cleaning fluid on the wiper by air flushing.

◆ Setting parameter of the middle support

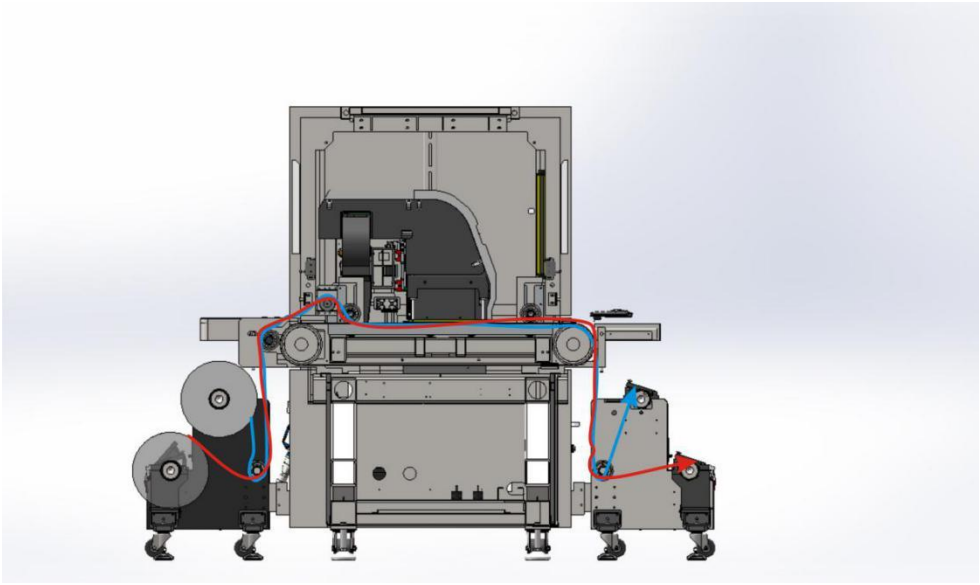
The middle support is jacked up by the cylinder, and controls the air pressure for the air inlet of the cylinder. A group of pressure gauges and check valves are added to the front and back respectively. These can control the air pressure in a specified pressure range and lock the air source in a certain period of time, and keep the cylinder to support rubber rollers.

	Pressure range	Unit	Note
Pressure gage of the front support	0.44 ± 0.02	Kpa	
Pressure gage of the back support	0.30 ± 0.02	Kpa	



◆ Feeding method for material take-up and feeding

As an independent system, the take-up and feeding function of DS32 printer enables to print two rolls of materials. When installing the printer, special attention shall be paid to the height and power connector. The following figure is the diagram of feeding. If the printing material is soft, the rear pressure bar of the high ceiling bar will be used. If the printing material is hard, like carriage sticker or banner, it may be absorbed and printed by directly passing the rear pressure bar to the guiding belt, without passing the high ceiling bar.



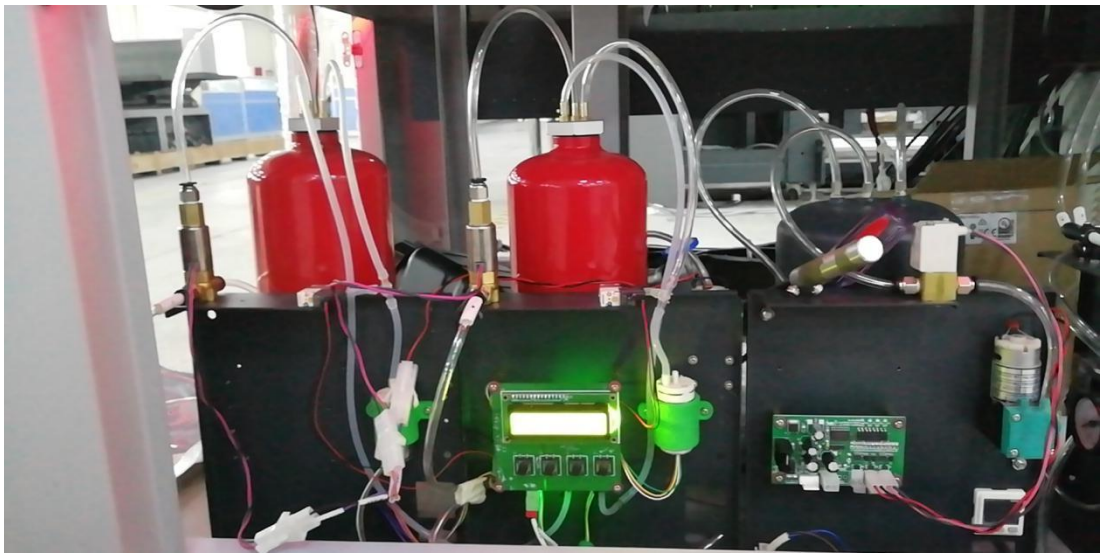
Notes: red lines are for double-roll feeding, while blue lines for single-roll feeding.

Four outer joints and four gas filling nozzle are set to combine with the double take-up and feeding system. Besides, reduce forward and reverse rotary knobs, and use the control panel to operate.

REV: Reverse Control STOP: Stop FWD: Forward Control

◆ Dual negative pressure system

Provided with the differential negative pressure system, the DS32 printer enables the measurement accuracy reaching 0.01KP, so that the negative pressure system is more stable. In addition, the system is simple to set up and operate. (Please see the Chapter III—Negative pressure adjustment for the detailed setting method)



Chapter 3 System Function

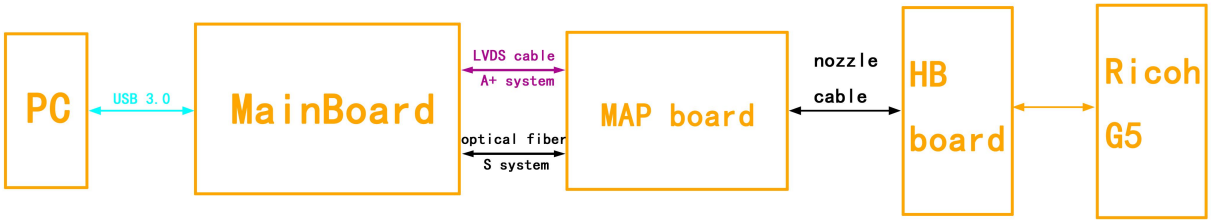
Contents of this chapter:

- **Introduction to DS_Ricoh Ricoh System Function**
  - **Core Component**
  - **PC**
  - **Main Board**
  - **Carriage Board**
  - **HB Board**
  - **Ricoh Print Head**

● *Introduction to DS Ricoh System Function*

◆ Core Component

The core part of the DS Ricoh system is made up of PC+Main board + MAP board + HB board+Ricoh, as shown below:



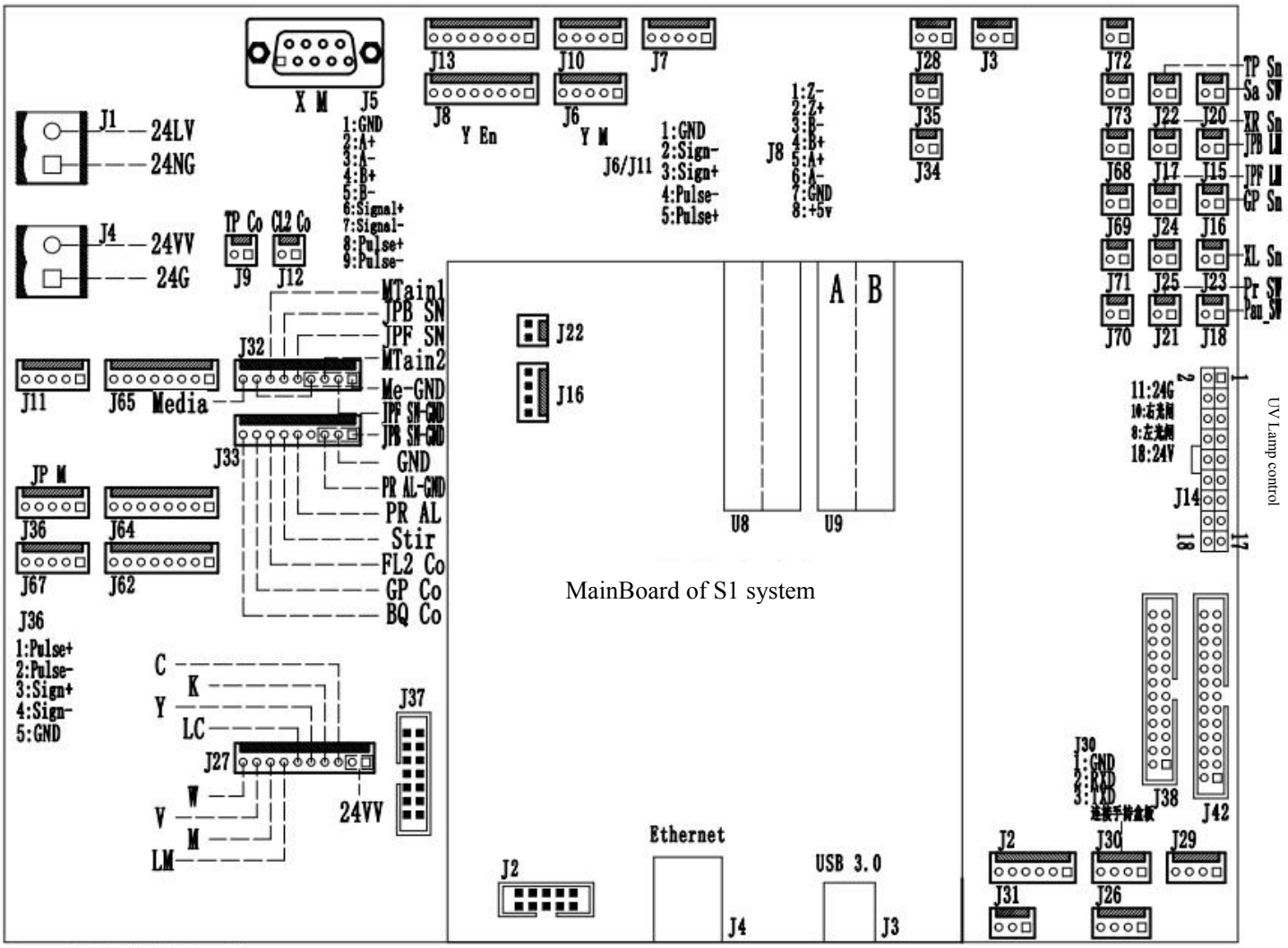
The five parts are described below.

◆ PC

To guarantee the computer and the chassis grounding wire conform to the specifications. See the computer configuration requirements in the previous chapter for details.

◆ MainBoard

The MainBoard is the core of DS, all commands and actions are given by the MainBoard. Currently, the MainBoard of DS mainly uses S1 system, as shown below:

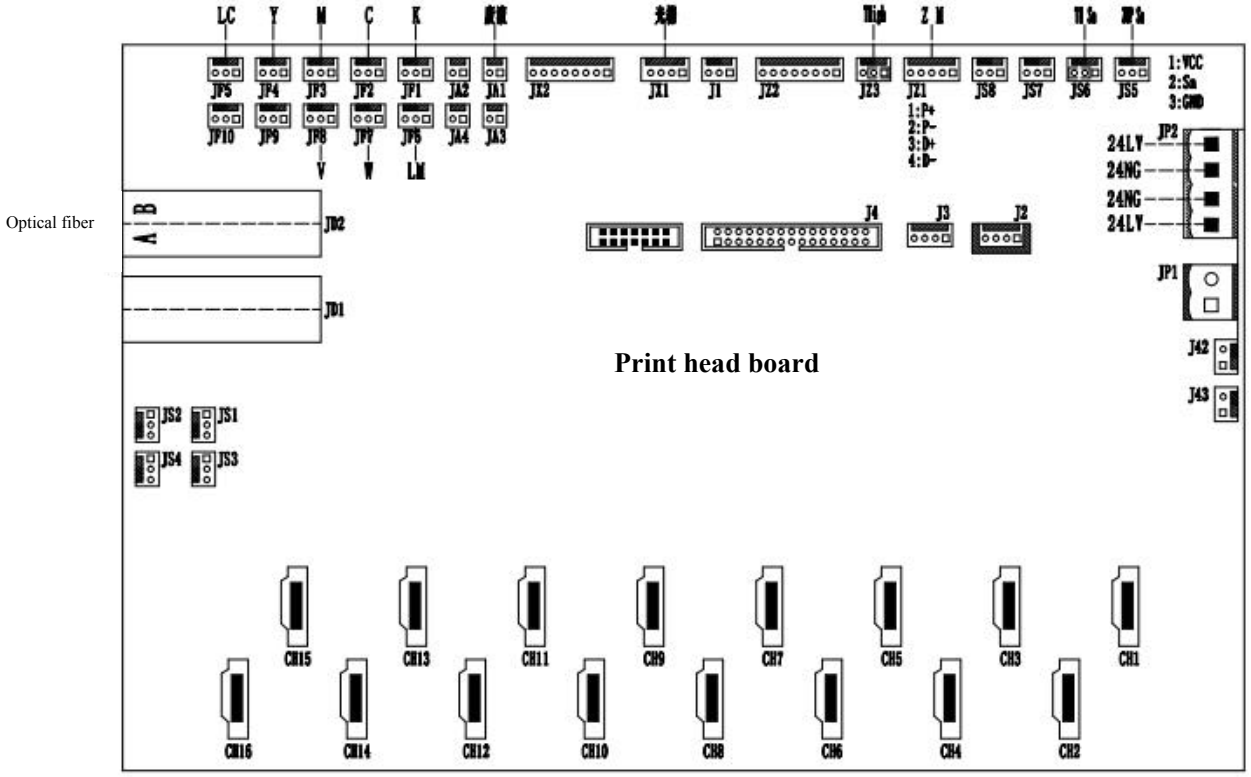


Note: the square pin of MainBoard is 1 pin

J20：Sa Sw	Anti-collision switch for carriage
J22：TP Sn	Limit sensor of moisturizing tray
J17：XR Sn	X Right limit sensor
J23：XL Sn	X Left limit sensor
J15: JPB LM	Limit switch after correction
J15: GP Sn	Limit sensor of wiper
J24：JPF LM	Limit switch before correction
J21：Print	Print
J18:PAUSE	Pause
J30：TRX	Handle control board
J6:Y M	Y-direction motor signal control
J8：Y_En	Y-direction motor encoder feedback signal
J5: X M	X-direction motor signal control
J1:24LV	MainBoard power supply
J4:24VV	Ink supply power supply of MainBoard

J32:MTain	Maintenance, material measurement and correction sensor signal
J33：Stir	Stirring, automatic ink scraping control and alarm before printing
J36:JP M	Correction motor control signal
J27 PUM M	Ink supply pump signal control
J14: UV Lamp control	UV Lamp control line
J3 USB3.0	USB interface
U9: Optical fiber	Optical fiber socket A and B

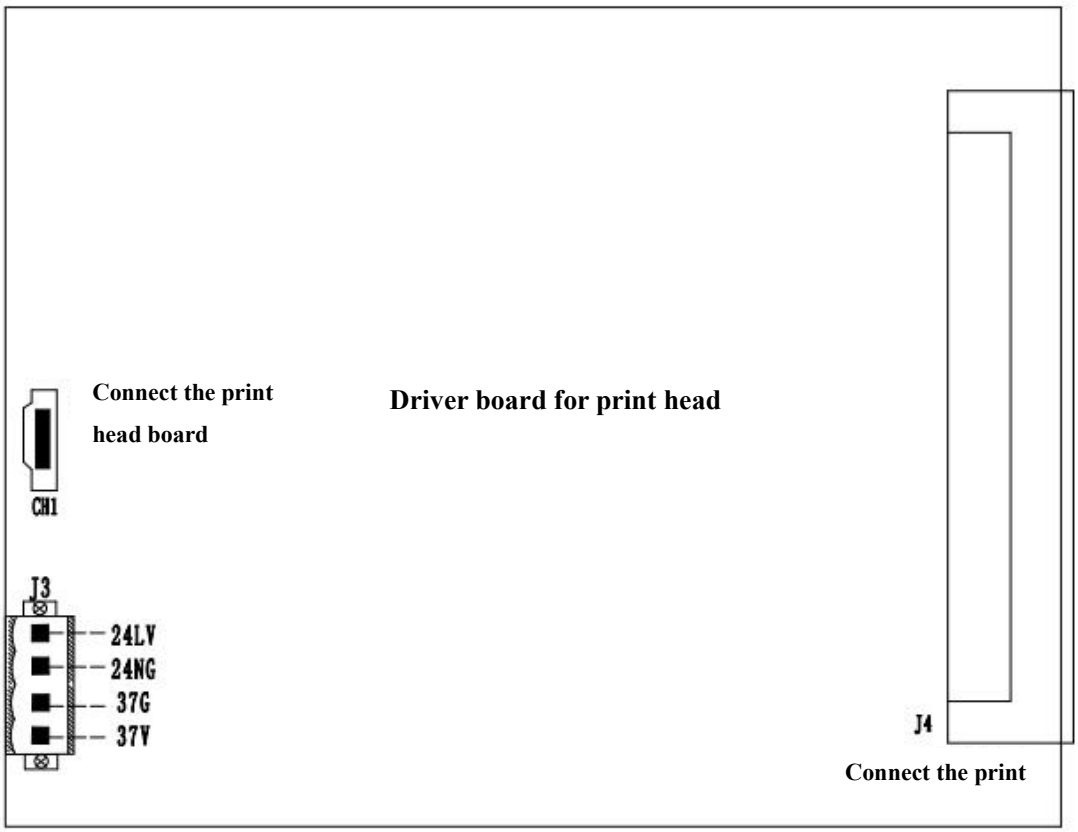
◆ Carriage Board



Carriage Board transfers the data received by the MainBoard to HB Board until print head, and transfers the feedback data from the print head, granting signal and liquid level signal data to MainBoard until PC.

JP2:24LV and 24NG	**Carriage board input power supply**
JS5:ZUP Sn	**Height measurement sensor signal interface**
JS6:TH Sn	**Height measurement limit**
JZ1:Z_M	**Z-direction motor signal interface**
JZ3:THigh	**Height measurement signal**
JX1:Grating	**Grating decoder signal interface**
JA1：Liquid waste	**Liquid waste box signal interface**
JF1-8:K/C/M/Y/LC/LM/W/V	**Auxiliary ink box liquid level signal interface**
JD2:Optical fiber	**Optical fiber signal interface**
CH1-16:USB	**Connected to USB of driver board for print head**

◆ HB Board



As the driver board for print head, HB Board plays a role in driving the print head, providing with voltage and data needed by the print head.

Board interface label:

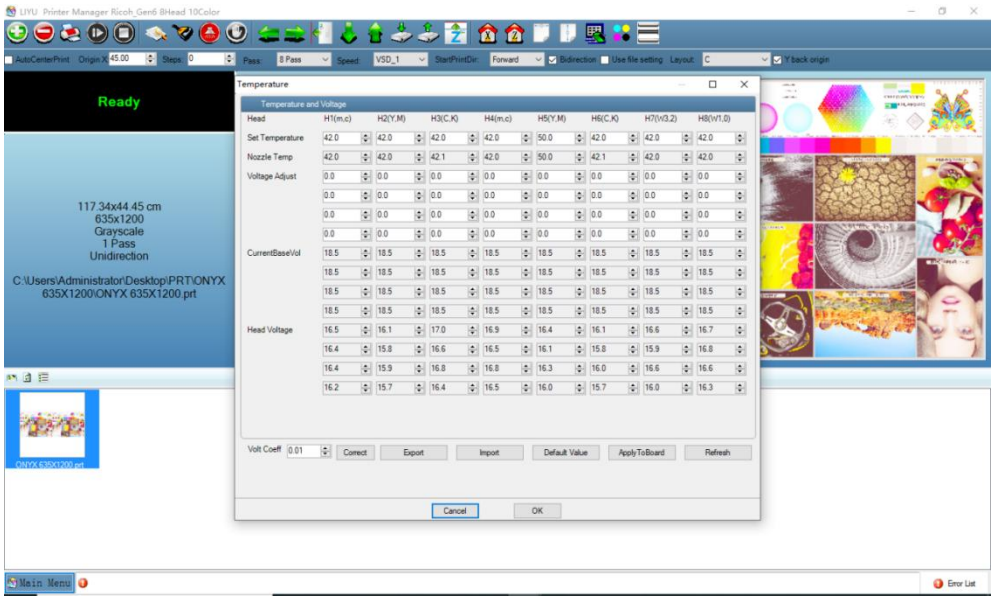
CH1: Connect the print head board CH1-16

J3: 24LV/24NG & 37V/37G input power supply

J4： Interface and socket of print head cable

◆ Ricoh G5/G6

The print head is the last link of printing on medium by the ink droplet in the system, therefore, the voltage, temperature and waveform of the print head must be set correctly, so that the perfect ink droplet can be printed.


Ready
117.34x44.45 cm
635x1200
Grayscale
1 Pass
Unidirection
C:\Users\Administrator\Desktop\PRT\ONYX 635X1200\ONYX 635X1200.prt
Temperature
Temperature and Voltage
Head
Set Temperature
Nozzle Temp
Voltage Adjust
CurrentBaseVol
Head Voltage
Volt Coeff
Correct
Export
Import
Default Value
ApplyToBoard
Refresh
Cancel
OK
Main Menu
Error List

Chapter 4 Ink addition and the control of positive and negative pressure

- ***Add ink and fill the print head with ink***
  - **Inject ink into the main ink tank**
  - **Inject ink into the auxiliary ink box**
  - **Fill the print head with ink**
- ***Positive pressure ink***
- ***Negative pressure adjustment***

● *Add ink and fill the print head with ink*

◆ Inject ink into the main ink tank

You can find the inking port of the main ink box on the left side of the machine. Please infuse ink in accordance with the colors marked on the main ink boxes. The following is schematic diagram:

◆ Inject ink into the auxiliary ink box

Before injecting ink into the auxiliary ink box, make sure that there is enough ink in the main ink box.

✧ Ensure that there is enough ink in the main ink bottle and conduct inspection of the machine before starting;

✧ When energizing the printer at the first time, auxiliary ink boxes are empty, so ink pumps of different colors will work automatically to pump ink from main ink boxes into auxiliary boxes;

✧ When all the ink pumps stop working, it means all the auxiliary ink tanks have been injected with ink;

✧ The transient buzzer sound during the process may be resulted from rather long ink pump route and timeout;

✧ In the event of ink pump not working or prolonged alarming of buzzer, please switch off the machine in time and examine. In case of failure to settle the problem, please contact the local dealer or after-sales department of our company immediately.

◆ Fill the print head with ink

Since it is a very important operation to inject ink into the print head, please operate in strict accordance with requirements. There are two critical operations, namely print head cleaning and venting.

Print head cleaning:

The new print head must be purged with cleaning fluid before being injected with ink for the first time because protective liquid has been injected into the nozzle of print head, so the ink can only be injected into until the protective liquid being cleaned.

In view of the power of cleaning fluid pump, it is suggested that you clean a single print head every time. First, put the three-way valve of single print head at purging state with other print head valves off, then unscrew corresponding two-way valve and press Cleaning button, the cleaning fluid will flow out from the two-way valve through the ink chamber of the print head. About one or two seconds later, close the two-way valve and make the cleaning fluid cascade out from nozzle for about five seconds. Clean other print heads according to the above method. After five minutes, clean all the print heads again as per the above method.

Venting of print head:

Inject ink into the print head after cleaning print head. Venting operation shall be conducted together with ink injection with the specific operation process as follows:

1. It is also suggested that you conduct venting for every single print head, that is to say, venting operation is conducted for only one print head every time with valve body of other print heads off.

   First of all, put the corresponding three-way valve body in a working state.
2. Unscrew the corresponding two-way valve core to ensure a smooth ink outlet. Press positive pressure button and impress ink from the auxiliary ink tank into the print head, then ink will flow out from two-way valve core. Observing the flow state of the ink from the ink outlet and closing the two-way valve as a blast of the ink falls plumb down without air bubbles, then the ink flows out from the jet orifice. (Tips: it may takes long to impress ink for the first time with such long pipelines, moreover, there is no sufficient ink in the auxiliary ink tank, please hold on for a while after positive pressure so as to enable ink supply system to refill the auxiliary ink tank and then continue positive pressure);
3. Carry out the above operation for every print head in succession. Place all three-way valves of the ink path in working state after completing venting for all print heads. Press Positive Pressure button and impress ink for all colors again, then complete ink injection of print heads.
4. Meanwhile, in case of bubble found in ink tube leading to print head, which affects ink out of the print head, the above method can also be adopted to carry out venting operation.

● *Positive pressure ink*

Positive pressure ink refers to impressing ink of the auxiliary ink tank into the print head by pressing positive pressure button, flush through the nozzle blocked not so seriously and eliminate the air in the print head, as well as solve some common problems of printing disconnection. You can impose positive pressure to either a single print head or several or all print heads with the specific operation steps as follows:

✧ Pushing the carriage to the non-operating position, i.e. the leftmost of the machine.

✧ Making sure that the ink-path three-way valve corresponding to the print head required to press ink stays in the state of working; the ink-path three-way valves corresponding to other print heads shall be rotated to the closing state if other print heads are on the same color.

✧ Rotating the air-channel three-way valve according to each color to the state of the positive pressure.

✧ Press positive pressure button and hold for a while, observe the ink out status of print head and release positive pressure button when you feel ink flowing smoothly.
Wait for two seconds and wipe the nozzle surface with clean non-woven fabrics.

● *Negative pressure adjustment*

■ Introduction to Dual Negative Pressure Control System:

The dual negative pressure control system consists of three parts: **one main control board**, a set of **air pumps** and two **air buffer tanks**. The air pump consists of two PWM speed control no-return air pumping diaphragm pump and two air evacuation solenoid valves.

The system board card and buffer tanks are shown by the following figures.

(Fig. 1)

(Fig. 2)

■ System Parameters Description:

The effective measurement and control range of this board card is **0~ -7kp**. The accuracy will not be guaranteed for those beyond this range. The pressure sensor will be damaged when the pressure range exceeds **+14 ~ -21kp**.

The measuring accuracy of this product can reach 0.01KP. However, the pressure shown is close to the standard atmosphere, which cannot be referred as an absolute atmospheric

value of the reference due to the lack of strict mathematical correction. It cannot be used as an absolute atmospheric pressure reference. Meanwhile, negative pressure values with error may be obtained by setting the same negative pressure parameters for different negative pressure control board due to the error of each sensor.

In order not to frequently rotate peristaltic pump to adjust the pressure, the default adjustment range of this system is set pressure value of ±0.02 KP. The air pump or peristaltic pump can only be started to adjust the pressure if it is larger or smaller than this range. Therefore, the actual control accuracy of this system is ±0.02 KP.

■ Instructions:

When the system is powered up normally, the first line on the screen (the top line) shows the current negative value collected by the sensor in A-channel and the setting value of A-channel. The second line shows the current negative pressure value collected by sensor in B-channel and the setting value of B-channel.

Setting key: When the Setting key is pressed, the system enters the parameter setting interface. Every time the key is pressed, the setting menu jumps backward and cycles in turn.

In the setting mode, the size setting of the parameters is set by Setting Selection key 1 and Setting Selection key2.

When the setting is finished, press the OK key to save the parameters into the system, and exit the setting mode.

During the reset of the sensor in A-channel or B-channel, it is necessary to hold down the Setting Selection key 2 and then press the OK key before the sensor can be reset. This setting is to avoid the misoperation to reset the sensor.

By pressing the Parameter Selection key 1 and the OK key at the same time, the negative pressure adjustment of A-channel can be ceased. After pressing these two keys again, the negative pressure adjustment of A-channel can be resumed. The negative pressure of A-channel can be ceased temporarily by this function.

By pressing the Parameter Selection key 2 and the OK key at the same time, the negative pressure adjustment of B-channel can be ceased. After pressing these two keys again, the negative pressure adjustment of B-channel can be resumed. The negative pressure of B-channel can be ceased temporarily by this function.

■ Introduction to Parameter Setting:

Parameter 1: Set vacuum A

The parameter is negative pressure parameter that should be maintained when setting the A-channel negative pressure. After setting, the system will automatically control the peristaltic pump and adjust it to the set pressure value.

Parameter 2: Correct zero A

Press the OK key in the setting screen. A-channel negative pressure will automatically correct the 0 pressure difference. *Note Zero correction must be carried out without any pressure difference or with direct connection to the atmosphere. As there are errors in the electronic devices and the incoming voltage, 0 pressure needs to be corrected before it can be

used.

Parameter 3: MotorA base V

The parameter is to set A-channel negative pressure to adjust the rotating speed of pneumatic peristaltic pump at low speed, including 16 levels of speed available for adjustment and setting. The minimum peristaltic pump speed means the method of slowly rotating the peristaltic pump to regulate the air pressure in this system when the air pressure parameter is close to the set value. The motor of the peristaltic pump will work at full speed when there is a big gap between the pressure measured by the pressure sensor and the set value; the speed of the peristaltic pump will decrease to achieve the purpose of approaching the set value at soft /variable speed, instead of just switching control, when the pressure approaches the set valve, so that the fluctuation of the pressure in the system can be minimized.

Parameter 4: Set vacuum B

The parameter is negative pressure parameter that should be maintained when setting the B-channel negative pressure. After setting, the system will automatically control the peristaltic pump and adjust it to the set pressure value.

Parameter 5: Correct zero B

Press the OK button in the setting screen. B-channel negative pressure will automatically correct the 0 pressure difference. *Note Zero position must be corrected without any pressure difference or directly connected to the atmosphere. As there are errors in the electronic devices and the incoming voltage, 0 pressure needs to be corrected before it can be used.

Parameter 6: MotorB base V

The parameter is to set B-channel negative pressure to adjust the rotating speed of pneumatic peristaltic pump at low speed, including 16 levels of speed available for adjustment and setting.

Parameter 7: Software version

The parameter only displays the software version of the system so that the after-sales service personnel can determine the functions of the system.

■ Cautions:

1） The airtightness of the whole air route system should be guaranteed. If air leakage occurs, the air pump will work frequently, resulting in a decrease in the service life of the pump. Please check the airtightness if the air pump is found to be adjusted once 3~5 seconds.

2） Strictly prevent liquid and ink from entering the whole air system. The negative pressure sensor and rapid extraction diaphragm pump will be damaged once the ink and liquid entering.

3） **Air tube connected on the negative pressure sensor** must be a separate one way air tube on the negative pressure buffer tank. Do not share an air tube with the air pump. Sharing may cause the system to produce great fluctuations, and the peristaltic pump will be frequently adjusted by positive and negative rotation.

4） 24V DC power supply is applicable for the system. 12V supply power may be adopted according the situation, while 40V supply power may burn down the electronic

components of the system. The connection of AC high voltage will break down all the components.

Chapter 5 Maintenance and Service

Contents of this chapter:

- **Daily maintenance instructions**
- **Print head maintenance instructions**
- **Maintenance of drive system**
- **Maintenance of ink route system**
- **Maintenance of LED solidification system**
- **Maintenance of electrostatic eliminator**
- **Ink use guidelines**

● *Daily maintenance instructions*

1. Keep the working environment of the printer clean and ventilated, and clean dust and ink on the printer periodically;

2. Keep the work surface clean. Every time before starting it up, check whether the working board is cleaned, to avoid scratching the print head;

3. Inject lithium base greases into the slider by grease gun every one month operation, to reduce its frictional resistance against the guide rail and extend its service life;

4. Maintain an appropriate belt tightening of the ink carriage timing belt. The belt tightening of the ink carriage timing belt can be adjusted after removing the upper left end cap. After the adjustment, connecting screws must be fixed tightly;

5. Every time after finishing refilling ink, make sure the cover of the main ink tank is screwed tightly. Wipe off residual ink on the outer wall of the tank;

6. For positive pressure printing, after wiping the print head, flash spray for around 10 seconds first before printing pictures, to achieve sound meniscus formed by ink droplets in the nozzle;

7. The area around the orifice must be maintained clean. No residual ink, dust or fiber is allowed. Orifice shall not be scratched;

8. Since the ink and the cleaning fluid contain strong solvent, they mustn't contact electrical components and wires. Were ink or cleaning fluid spilled on them accidentally, they would be wiped off cleanly as soon as possible;

9. Clear liquid waste in the liquid waste box in time;

10. Every day before the startup and shutdown, it is recommended to print nozzle test chart to check whether the nozzle is in normal condition. Provided that ink outflows brokenly, press the ink or clean the nozzle to make it work properly.

● *Print head maintenance instructions*

As the core component, the print head is much expensive and sensitive, which requires good maintenance. Otherwise, print quality and its service life would be seriously affected. Print head maintenance instructions are as follows:

1. In using the printer, please use the ink appointed by the manufacturer. Do not change the ink at will, or it might lead to malfunction of print head;

2. When the device stops running, maintenance methods of different sorts should be adopted in accordance with the length of downtime:

✧ If printer downtime is within a working day and you are not willing to turn it off, it should be set under the state of flash spray. Before the flash work, please confirm the status of print head. If it is not in a good condition, do the ink press operation first;

✧ If the downtime is over 12 hours to 1 day, it is recommended that the valve knob can be screwed to the closed state, the ink carriage can be stopped on the left, and the moisturizing tray shall be lifted up.

✧ If the downtime is over 3 days, clean up the ink within the print head following its cleaning method, inject a little cleaning liquid into it (leave some cleaning liquid in the print head when cleaning). The power off the machine, leaving it in the moisturizing state.

3. Scrubbing the nozzle panel

✧ Every time when pressing ink with positive press or after cleaning the print head, scrub the nozzle panel. Wipe away residual ink and cleaning liquid on the nozzle panel, to prevent it dropping onto the printer or print media;

✧ When scrubbing the nozzle panel, dedicated non-woven fabrics should be used, and make sure of its cleanness. Non-woven fabrics contaminated by dust, stain ,oil or water, especially the one which has been used to scrub ink, should not be used to wipe the nozzle panel, as ink on it can lead to a seriously blocked nozzle;

✧ Scrub the nozzle panel along a single direction rather than back and forth. Do not scrub it with great strength, but touch it lightly, to avoid damage of nozzle surface;

✧ Dispose the used non-woven fabrics properly. Do not reuse it.

4. Adjusting the print head condition in printing

- ✧ To guarantee print quality, please make sure every nozzle on the print head is in good condition, whose condition can be improved by pressing ink with positive Negative pressure or doing the cleaning. The following items are very important to guarantee the nozzle condition;

- ✧ The requirement of printer's working environment shall be maintained well, especially the temperature. The print head temperature shall be between 15℃ and 26℃.Print quality may be affected if the temperature is below 15℃ or above 28℃;

- ✧ Make sure the print head exhaust completely, and no bubble remains in it;

- ✧ Adjust voltage and negative pressure of print head. A higher print head voltage can improve the accuracy and color saturation of ink droplets, but it can cause the ink outflow to be frequently broken as well, so the best balance shall be adjusted.

● *Maintenance of drive system*

The drive system includes high-speed guide rail, lead screw, slider, driving gear and corresponding motor, driver, and sensor. Please clean up the oil and dust on the surface of guide rail, lead screw, and sensor regularly, and add appropriate amount of anti-rust oil and grease to the moving parts every month;

● *Maintenance of ink route system*

Given that the ink route system is one of the core components of the printer, the stability of ink supply of the ink route system directly affects the ink flow of the print head. Therefore, it is recommended to replace the filter of the system every half year; Once the main ink tank is short of ink, add it in time; Clean the waste liquid timely if there is a small amount of ink in the air tank on the head of the carriage.

● *Maintenance of LED solidification system*

Please clean the dust on the cooling fan and filter screen of the control cabinet of UV lamp regularly to keep the heat dissipation of the box in good condition. The solidified ink and dust on the surface of the UV lamp cap glass can be cleaned regularly with alcohol and other solvents; In addition, add antifreeze and purified water in the ratio of 1:1 during freezing in cold areas. During freezing period, it shall be replaced with purified water every three months and it is recommended

to use purified water in the south.

The meaning of fault code for water cooling power box of UV lamp is as follows:

- E0: Abnormal communication of 2 circuit boards. Generally, it is due to the damage or loose of the connecting wires between two boards.
- E1: Over temperature protection. When the water temperature is higher than +C0 (target value), over temperature protection fault will output a signal of interruption.
- E2: Low temperature protection. When the temperature is lower than -C0 (target value), low temperature protection fault will output a signal of interruption.
- E3: Water lack protection. If the water pump can't pump water, the water pipe or the water flow is blocked, the water lack protection will be activated to output the signal of interruption.
- E4: Fault of refrigeration system. The fault causes include the damage of the ventilating fan, the blockage of the condenser by dust, and the poor air inlet, and it will output the signal of interruption.
- E5: High voltage protection. Start protection when the high voltage switch is off. Output the signal of interruption.
- E6: Low voltage protection. Start protection when the low voltage switch is off. Output the signal of interruption.
- E7: Over room temperature protection. Output the signal of interruption.

● *Maintenance of Electrostatic Eliminator*

Customers can clean the pinpoint of ion stick according to the environment of the workshop in time. Pen brush and dust-free cloth can be used to dip anhydrous alcohol and gently wipe the dust and carbon deposits around the pinpoint of the ion stick. Attention during cleaning: ①The power must be turned off for 5 minutes before cleaning; ②After cleaning, it is necessary to wait for the alcohol to volatilize completely before power on. It is not allowed to use any other organic solvent to clean the pinpoint of the ion stick; ③When there is no static electricity in the printed material, the electrostatic eliminator must be turned off. When printing metal materials, the electrostatic eliminator must be turned off.

● *Ink use guidelines*

1. Special note:

Any part of the ink or ink path shall not touch water or any solution containing water molecule, otherwise gel would come into being which will block the ink path and even the print head.

2. Safety instructions:

Some chemical substances contained in ink are of very low toxicity and irritation, which will irritate eyes and respiratory system and cause allergic reaction. Contact with ink can be

effectively reduced with sound ventilating device and personal protective devices. When dealing with ink, acrylic gloves and work clothes should be worn. If ink spills onto the skin, it should be washed immediately with soap-suds. Eating, drinking and smoking are forbidden in the workspace.

3. Storage of ink:

Ink should be stored in sealed containers and placed in a cool, dry place with good ventilation no long-period exposure to light (including indoor sunlight, illumination light, etc.) and with temperature of 10℃～40℃. Although ink has a storage duration of 12 months, it recommended to use it up within 3 months. Pay attention to the production date. Out-of-date ink cannot be used. Ink viscosity is greatly affected by temperature and varies according to different seasons, especially in summer and winter, which would have influence on printing quality. In addition, ink producers would make adjustment in ink viscosity in keeping with seasons. Thus, you must see to it that you choose ink on the basis of actual environmental temperature.