

# LIYU HYBRID DS20 Digital Guiding Belt UV Inkjet Printer User Manual



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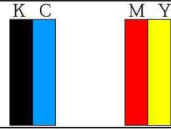

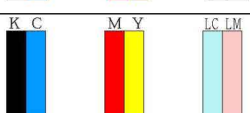
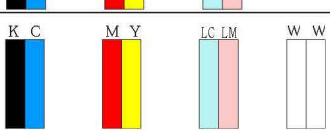
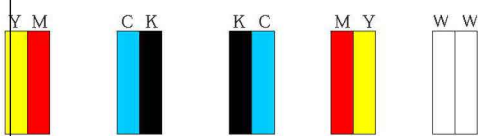
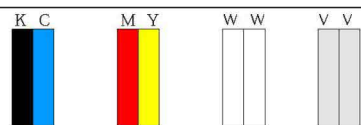
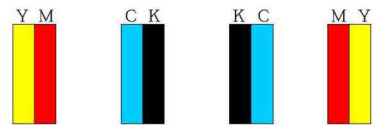
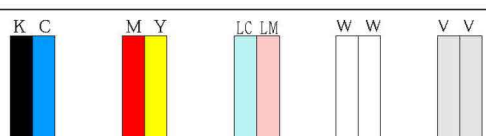
## Introduction

**Thank you very much for purchasing our LIYU DS Series Guiding Belt Inkjet Printer (hereinafter referred to as Inkjet Printer). Please carefully read the manual before using the 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 2.05m, 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.**

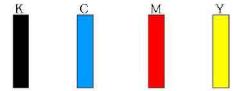
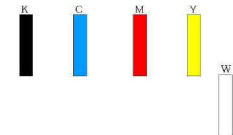
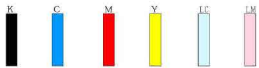
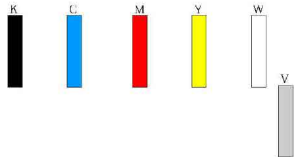
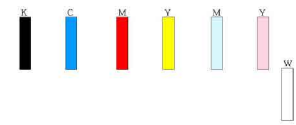
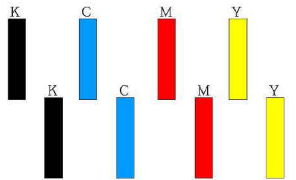
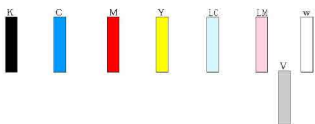
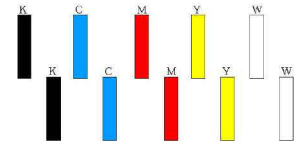
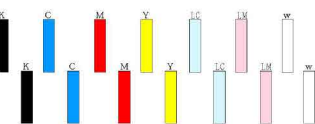
## Technical Specifications

The DS20 can be equipped with two kinds of print heads, Kyocera and Konica, as shown in the following table.

- **DS Kyocera KJ4A 3.5PL Print Head Machine Model Configuration List**

Number of print heads	Configuration type of print head (single row)	Diagram
2	4-color 2-print head	
3	4-color 2-print head and 1-white print head	
	6-color 3-print head	
4	6-color 3-print head (plus 1-white print head)	
	Double 4-color 4-print head	
	4-color 2-print head (plus 1-white print head and 1-gloss oil print head)	
5	Double 4-color 4-print head (plus 1-white print head)	
	6-color 3-print head (plus 1-white print head and 1-gloss oil print head)	

● **DS KONICA 6PL Print Head Machine Model Configuration List**

	Single row		Double row	
	Configuration type of print head	Diagram	Configuration type of print head	Diagram
1	4-color 4-print head		4-Color 5-print head plus 1-white print head	
2	6-color 6-print head		4-color 6-print head plus 1-white print head and 1-gloss oil print head	
3			6-color 7-print head and 1-white print head	
4			8-print head double 4-color 4-print head	
5			6-color 8-print head plus white 1-print head and gloss oil 1-print head	
6			10-print head double 4-color and 2-white print head	
7			14-print head double 6-color and 2-white print head	

## ● List of Main Technical Specifications

### ■ Machine Parameters

Machine Model	DS2000-UV-LED
Print Technology	Piezo continuous drop-on demand(DOD)
Type of Print Head	Kyocera_KJ4A single row/KONICA1024iSHE double row
Print Head Control	Use software to adjust the temperature and voltage of the print head.
Print head Configuration	KCMY/YMCKKCMY/KCMYLcLm/ (optional of white and gloss oil)
Maximum Printing Size	2.05 m
Maximum Resolution	600*2880 dpi
Fastest Print Mode and Efficiency	400x1200 4pass 60 m <sup>2</sup> /h      400X720 2pass 100 m <sup>2</sup> /h
Ink Type	UV Ink
Color Profile	K C M Y Lc Lm (optional)/ K C M Y Lc Lm W V (optional)
Ink Supply System	Automatic continuous ink supply with vacuum negative pressure
Scraping Device	Available
Media Absorption	Table vacuum absorption, frequency conversion segmented control
Table Pressure	25kg/m <sup>2</sup>
Drying Device	LED_UV lamp solidification
Package Size	5110*1790*2168 (mainframe)/ 2400*1180*1739 (auxiliary platform)
Machine Size	4760*1570*1780 (mainframe)/ 4760*3732*1780 (including an auxiliary platform in front and behind)
Machine Weight	About 2.3t/0.5t
Printing Interface	PCIE X1
Power interface	Mainframe 220V±10% 50HZ 3300W Fan/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, automatic ink scraping system and multilevel extension platform (optional), separated intelligent negative-pressure ink-supply system, human engineering mechanics design, THK mute guide, LED cold light source solidification.

## ■ Printing Efficiency List

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 four Kyocera 4-color print heads and KONICA1024iSHE as a sample.

DS_Kyocera_KJ Series (single row)	
Printing Mode	Working Efficiency
Draft Mode 400*1200 4pass	60 m <sup>2</sup> /h
Working Mode 400*1800 6pass	25 m <sup>2</sup> /h
High Precision Model 600*2400 8pass	13 m <sup>2</sup> /h

DS_KONICA1024iSHE Series (double row)	
Printing Mode	Working Efficiency
Draft Mode 400*720 2pass	100 m <sup>2</sup> /h
Draft Mode 600*1080 3pass	63 m <sup>2</sup> /h
Working Mode 600*1080 6pass	18 m <sup>2</sup> /h
High Precision Model 600*1440 8pass	14 m <sup>2</sup> /h

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 can not 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 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.

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## Chapter 1: Introduction to Basic Knowledge

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

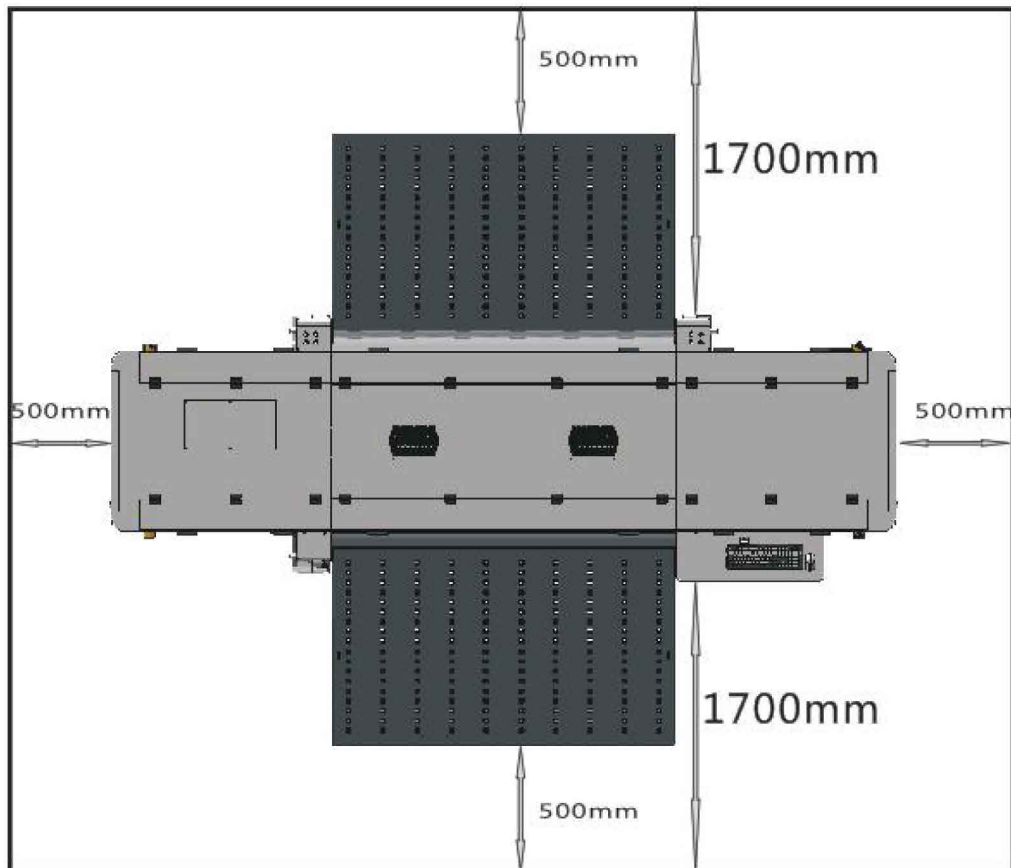
- Working conditions
  - Working space
  - Environmental requirements
  - Computer configuration requirements
- Appearance, name and functions of parts
  - DS20 Front view
  - DS20 Back view
  - Carriage view
- Machine unpacking and floor installation
- Consumables
  - Printing media
  - Ink and cleaning fluid
  - Maintenance tools

● **Working conditions**

■ **Working space**

There must be enough space surrounding the guiding belt printer so as to facilitate replacement of some commonly used spare parts, drawings output and ventilation. In addition, make room for maintenance (as shown below) with the aim of printer repair or spare parts replacement.

Installation and maintenance space is shown in the following figure:



**Note:** The space in the above figure is subject to an extended platform. If only soft materials such as soft film are used for printing, only a space of 1 M distance is reserved before and after the machine.

■ **Environmental Requirements**

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

Please try to keep the equipment working under the optimal working temperature and humidity; otherwise, the printing quality may drop and the service life of the machine may reduce.

Don't install the machine at the following locations:

- ✧ **In direct sunlight**
- ✧ **Location with vibration**
- ✧ **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**
- ✧ **Unstable location**

#### ■ **Computer configuration requirements**

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

**CPU: INTEL i5 or 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 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 brackets (two in front and two at the back). The fixed bolts of the machine and bottom box for easy

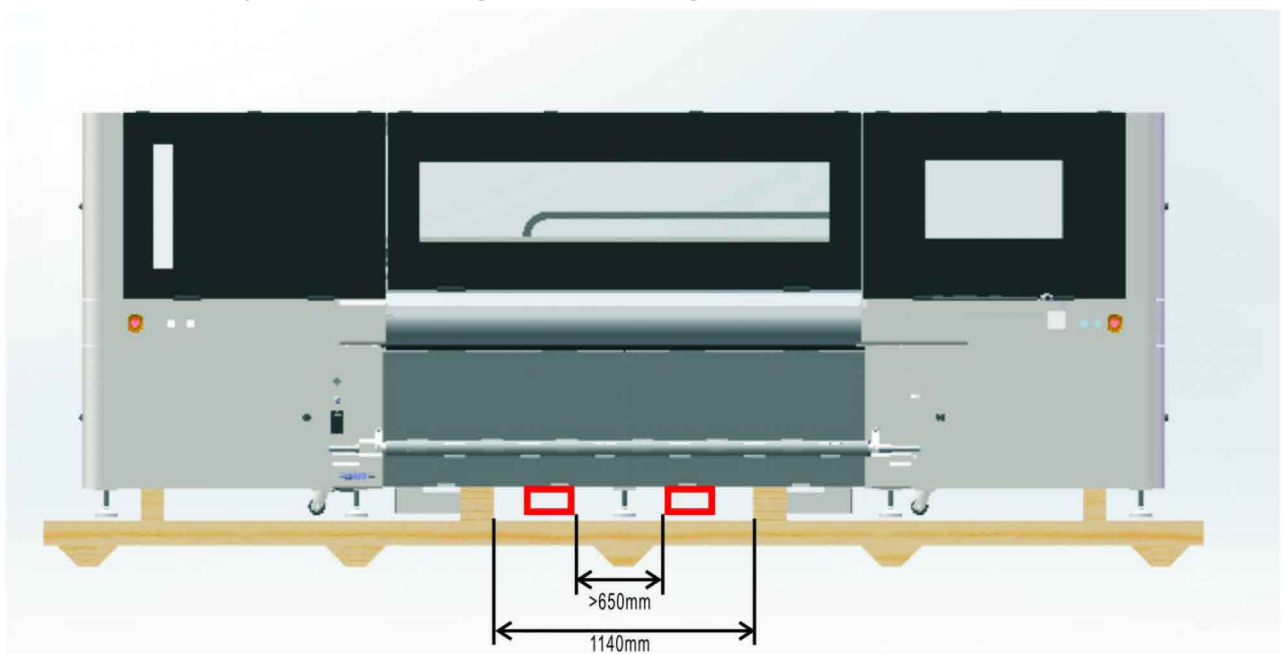


transport need to be removed. The positions of the packing pressing plate are as shown in the red logo below:



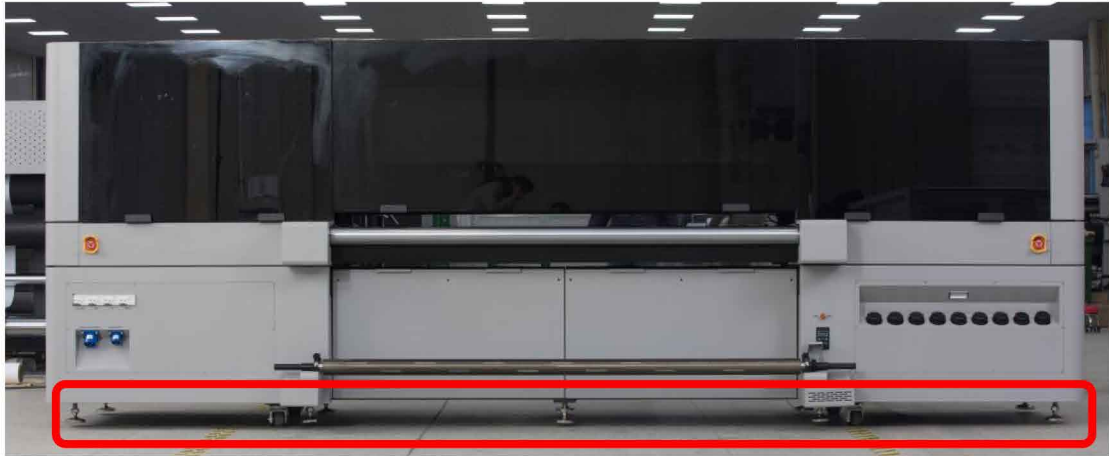
Forklift arm

4. When using a forklift to unload the machine, use a forklift of 5T or above 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.

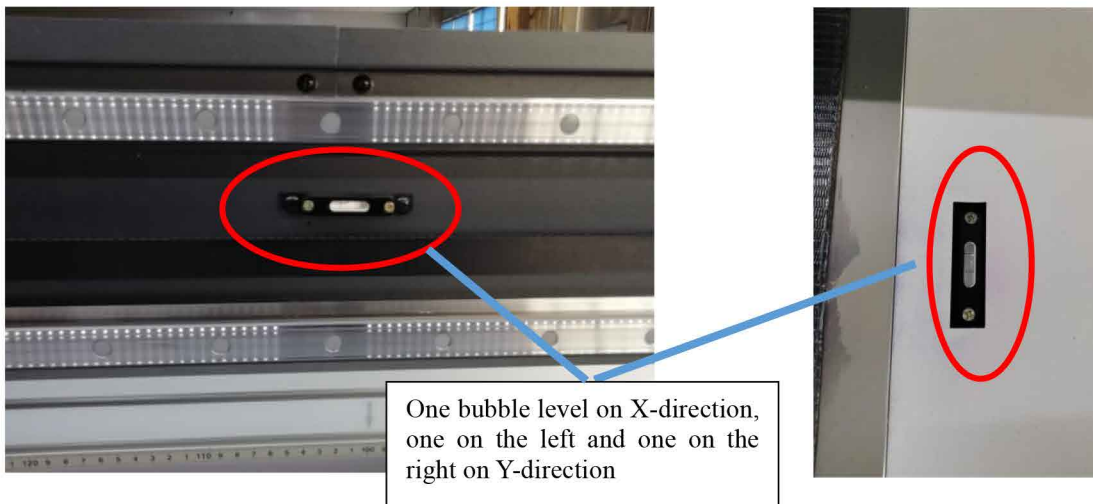


**Note: Due to the width of customer's door and the existence of step or gradient, the machine needs to enter directly when entering. Forklift can be used to lift from behind to assist in entering. And then, before forklift arm entering, open the side door first just to avoid damage to door due to forklift.**

5. Leveling machine. Unscrew the leg of the machine frame corner (10 places), make its universal caster wheels (four) suspended into other legs and far from the ground;

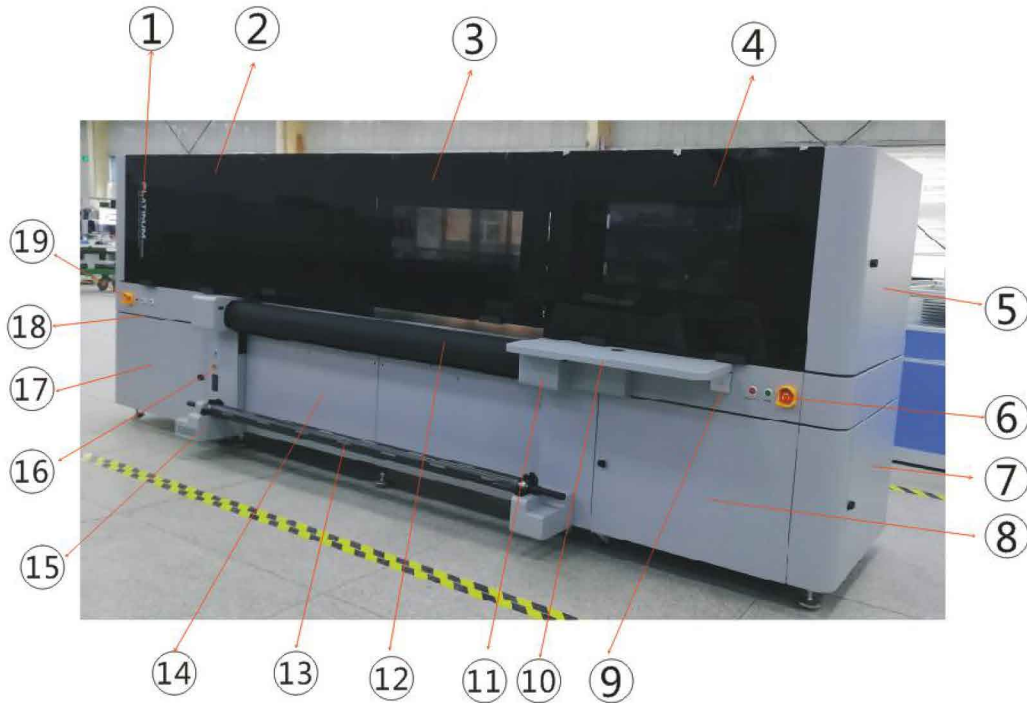


6. By adjusting the leg of the machine frame, level the machine by using the gradienter that comes with it (levelled before leaving factory), make the level vial of machine in the middle part, and the precision blister in the left or right of the middle within 1 grid.



● **Appearance, name and functions of parts**

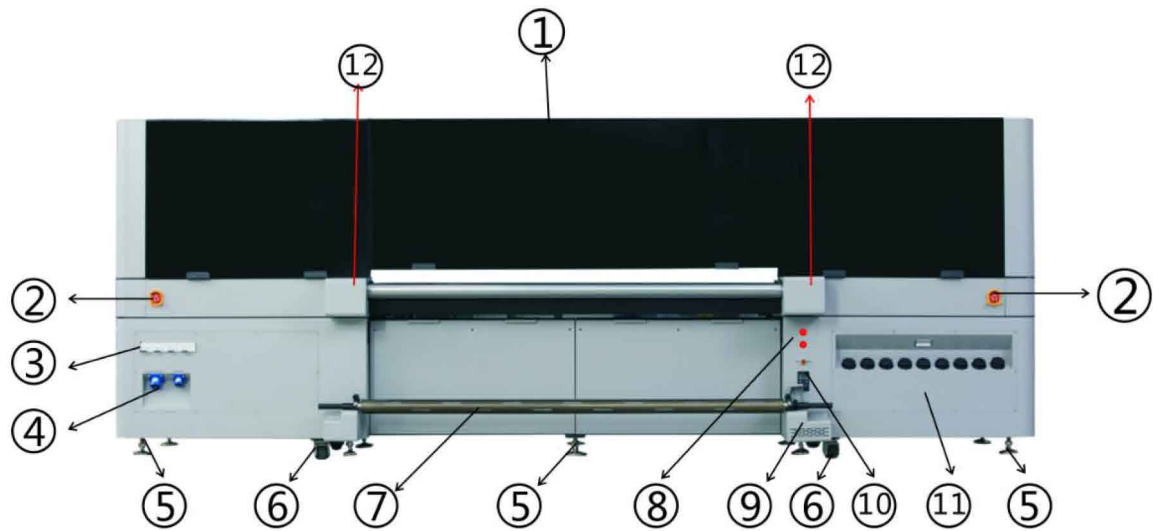
■ **DS\_20XX Front view**



Code	Name of parts	Description
1	Machine LOGO	Synthesizing effect of back mounted LED phosphor screen
2	Left carriage bin	Drive tensioning assembly in the scanning direction of the carriage, cleaning and maintenance position, cleaning and ink pressing position, ink scraping device.
3	Central printing bin	Printing area in this position. LED lighting inside.
4	Displayer	This bin is the original point for the carriage, and it is in the flash spraying position in normal state. The displayer is also mounted behind the glass.
5	Right bin gate	It's the position for the release button of X-direction motor and motor assembly, which is also the position for replacing flash spraying cloth.
6	Right button	Right to left: right emergency stop, start, high pressure of print head (Ricoh machine does not

		have this button).
7	Lower Right Box	For placing the host.
8	Lower right box in front	With circuit control board and switching power supply inside.
9	PC switch	Computer external power switch, USB interface.
10	Keyboard pallet	For placing keyboard and mouse.
11	Y-direction motor	Y-direction motor, reducer
12	Guiding belt	Front main guiding belt roller, rear tensioning roller, guiding belt.
13	Front take-up rod	For cloth taking-up during printing with soft materials.
14	LED backlight	For watching the effect during printing with backlight materials. (Optional)
15	Media take-up motor	For controlling positive and negative rotation of motor.
16	Control button	For controlling the positive and negative rotation and adjusting the torque of the cloth taking-up motor; backlight switch.
17	Lower Left Box	There is a negative pressure system inside for controlling the lifting pressure of the front and rear positioning rods.
18	Color-changing light strip	Blue during printing and red during stopping.
19	Left button	From left to right are left emergency stop, start, color negative pressure gauge and white negative pressure gauge

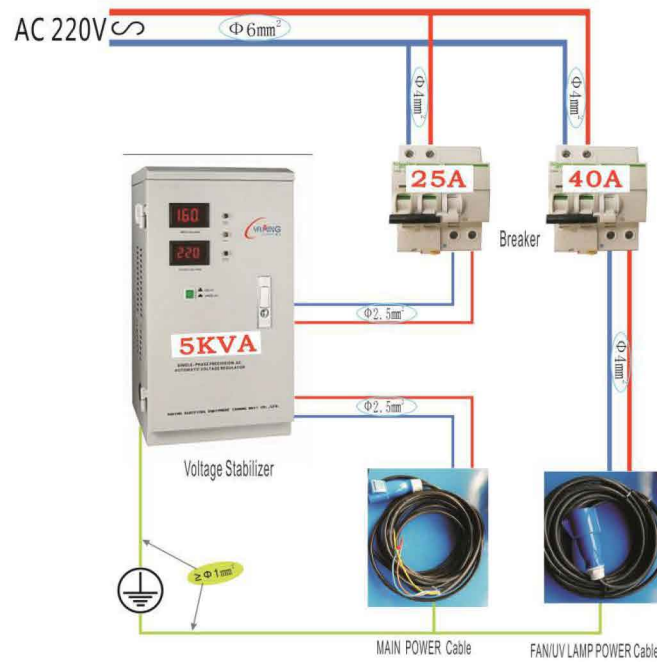
■ DS\_20XX Back view



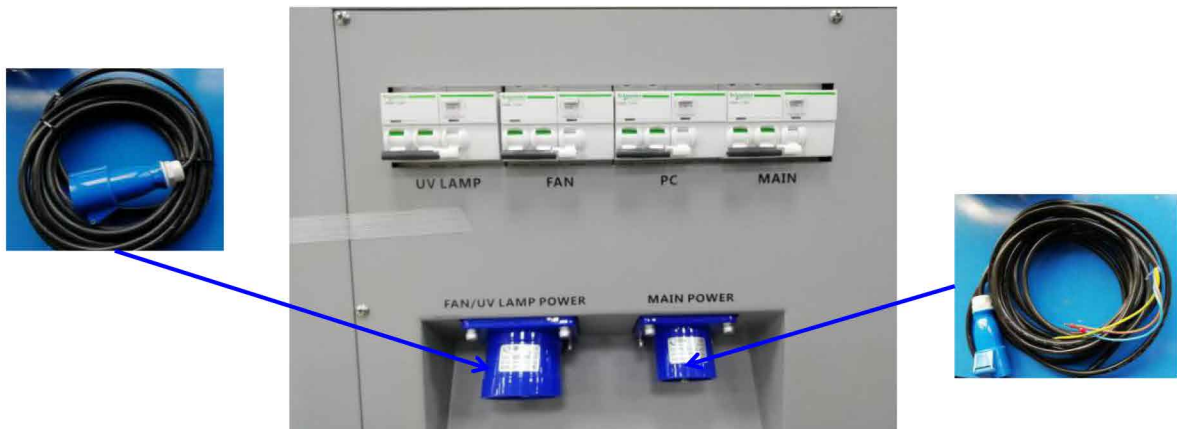
Code	Name of parts	Description
1	Upper cover part	Upturned tempered glass mainly.
2	Emergency stop	Totally five, one on the handle and one on the front, rear, left and right of the machine.
3	Machine main switch	They are UV LAMP (UV lamp main switch), FAN (adsorption main switch), PC (computer switch), MAIN (machine main switch).
4	Main power interface	FAN/UV LAMP POWER (main entry of adsorption UV lamp) and MAIN POWER
5	Leg	For adjusting the level and fixing of the machine.
6	Pulley	For facilitating the moving of machine on flat ground.
7	Feeding rod	Feeding inflatable rod, an inflatable roller for fixing the materials.
8	Alarm	Above is the main ink tank alarm and below is the liquid waste alarm of automatic ink scraping.
9	Media feeding motor	The cloth feeding motor controls the operation of cloth feeding rod.
10	Feeding control	For control of positive and negative rotation of the cloth feeding motor and torque adjustment.
11	Main ink tank	Position of adding ink
12	Control panel for back operation	One on the left and one on the right, which can control printing, positioning, adsorption, and the rise and fall of the back pressure bar.

■ DS power wiring schematic diagram and power interface:

## DS20 LIYU Hybrid printer the POWER wiring diagram



The above figure shows the wiring diagram of DS guiding belt machine. The customer's inlet bus adopts the diameter of 6mm<sup>2</sup>. Two air switches (circuit breakers) are respectively passed, 25A and 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.



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

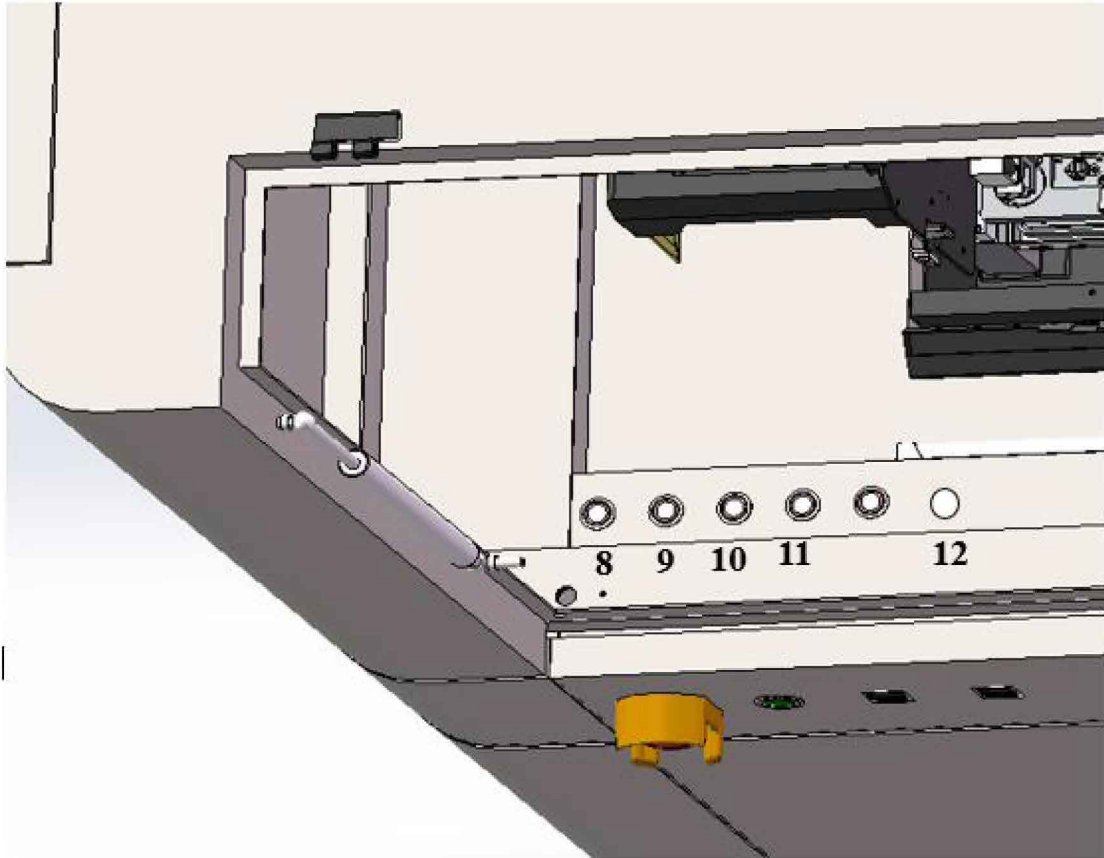
### ■ Introduction to function keys

**1. Front left panel:**



S/N	English	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	COLOR	Control the negative pressure of color ink path (including gloss oil).
4	WHITE	Control the negative pressure of white ink path.
5	B LIGHT	Print backlight material and check printing quality.
6	REV&FWD	For controlling of forward and reverse rotation and stopping of take-up torque motor in front of the machine
7	MOTOR CONTROL	For adjusting the moment of the torque motor

**2. Left internal side of the front panel:**



S/N	English	Description
8	FLUSH	Power the positive pressure pump and use atmospheric pressure to press the ink out of the print head.
9	CLEAN	Connect the scavenging pump, supply the cleanout fluid to the print head, and clean it.
10	MAINTAIN	For making carriage ascend or descend at the leftmost end of the beam, and facilitating the manual cleaning of the print head
11	AUTO WIPER	It can realize the function of ink scraping by manual operation.
11A	MOISTURIZE	It can realize the function of one-key moisturizing and print head protection after shutdown.
12	LIGHT	To clearly see the surface of print head during maintenance.

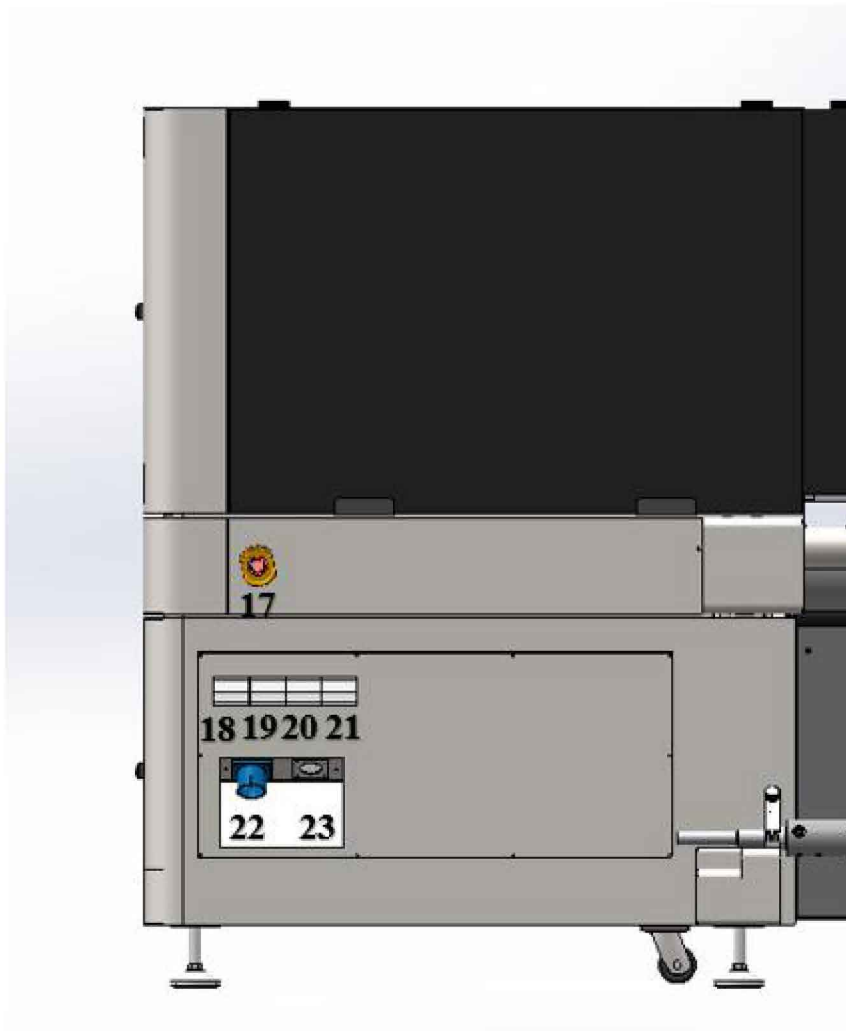


**3. Front right panel:**



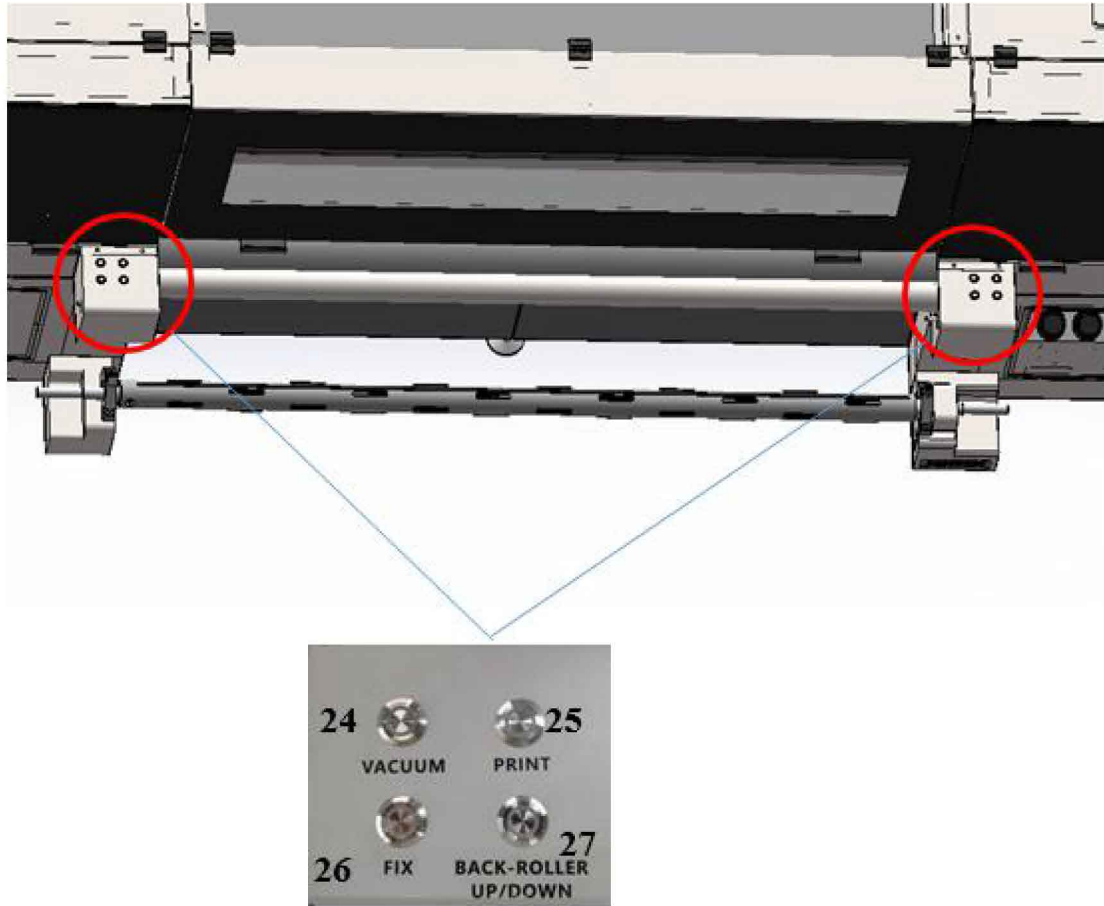
S/N	English	Description
13	PC POWER	The computer can be started up or restarted without starting up the computer cabinet, with a USB interface.
14	POWER	2 in total in the front of the machine, one on the left and one on the right, for machine startup.
15	JET VOLTAGE	A button for print head power supplying. (Ricoh machine as the operation indicator light of the print head)
16	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop

#### 4. Rear left panel



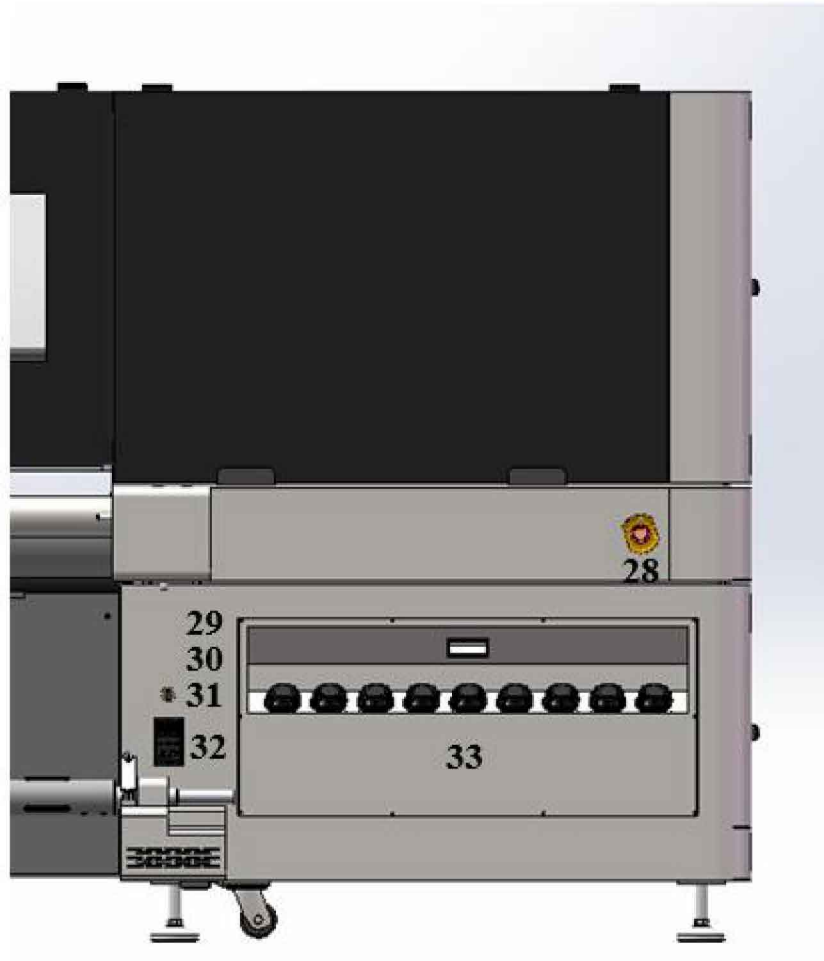
S/N	English	Description
17	EMERGENCY STOP	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
18	UV LAMP	Main switch for controlling UV power
19	VACUUM	Main switch for controlling adsorption power
20	PC	Main switch for controlling computer power
21	MAIN	Main switch for controlling inkjet printer power
22	FAN/UV LAMP POWER	Main input of adsorption/UV power
23	MAIN POWER	Main input of inkjet printer power.

**5. Rear middle panel:**



S/N	English	Description
24	VACUUM	Three in total, one on the left and one on the right of the back, and one on the top of the hand-held box. The front and back can be independently controlled to open and close.
25	PRINT	One on left and one on right. Easy to print from the back (there is a print job on the software).
26	FIX	Three in total, one on the left and one on the right of the back, and one on the top of the hand-held box. Positioning rod up and down, positioning function of media.
27	BACK-ROLLER UP/DOWN	To control back roller up and down.

**6. Rear right panel:**



S/N	English	Description
28	<b>EMERGENCY STOP</b>	A total of 4 in the front and at the back, mainly for switch of the machine power supply and emergency stop
29	<b>Ink alarm</b>	Alarm when lacking of ink in the ink tank.
30	<b>Effluent alarm</b>	Alarm when the effluent tank is full.
31	<b>REV&amp;FWD</b>	For controlling of forward and reverse rotation and stopping of take-up torque motor
32	<b>MOTOR CONTROL</b>	For adjusting the moment of the torque motor
33	<b>Ink</b>	Main ink tank (including ink supply system of ink pump and filter inside).

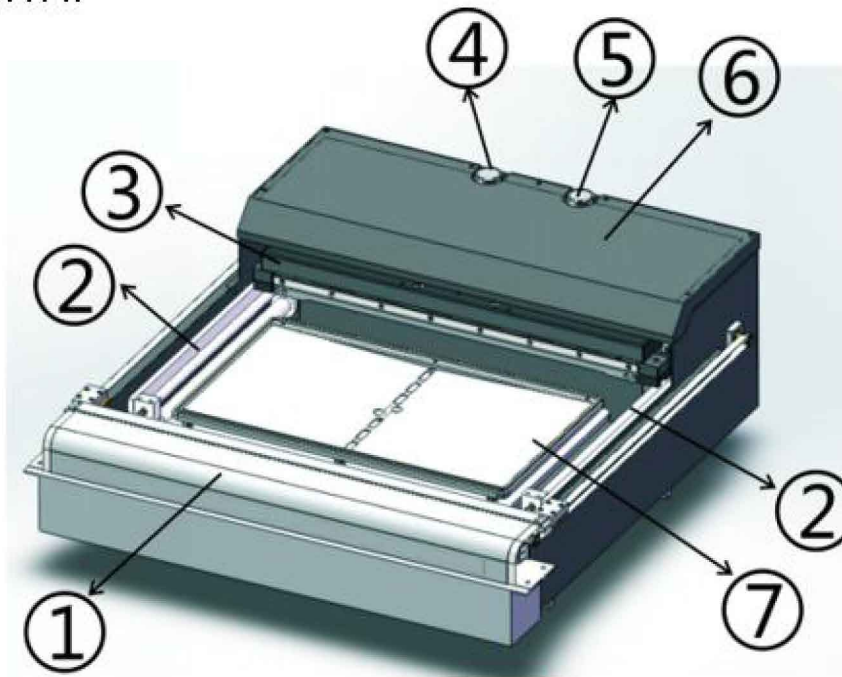
**7. Introduction of hand-held box buttons:**



S/N	English	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	Functional area	All functions are shown in the figure above.

## 8. Introduction to adjustment of ink scraping system

Front of scraping system:



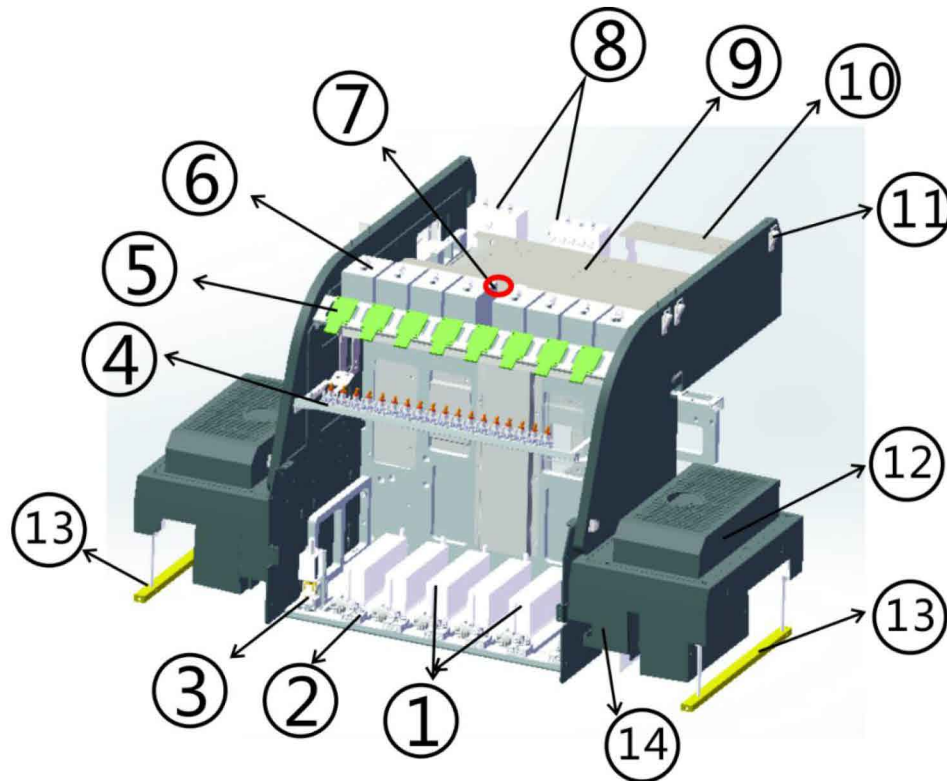
Code	Name of parts	Description
1	Front baffle	When the wiper moving forward, scrap ink to prevent splashing.
2	Linear cylinders	One on the both side respectively to control the movement of wiper
3	Wiper	For cleaning the wiper on surface of print head.
4	General intake of linear cylinders	For controlling 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:**



Cod e	Name of parts		Description
1	AIR PLATE UP	LEFT	Adjust the air pressure to control the speed and force of the tray cylinder downward
		RIGHT	
2	AIR PLATE DOWN	LEFT	Adjust the air pressure to control the speed and force of the tray cylinder upward
		RIGHT	
3	PLATE GASOMETER	PLATE GASOMETER	To control the intake air pressure of plate
4	AIR FOR FLUSH	AIR FOR FLUSH	To control the intake air pressure of flush
5	WIPER GASOMETER	WIPER GASOMETER	To control the intake air pressure of wiper
6	AIR WIPER FRONT	LEFT	Adjust the air pressure to control the speed and force of the wiper backward
		RIGHT	
7	AIR WIPER BACK	LEFT	Adjust the air pressure to control the speed and force of the wiper forward
		RIGHT	

### 9. Carriage view

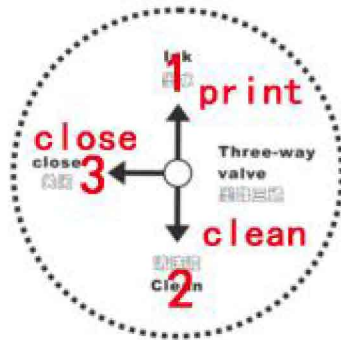


Code	Name of parts	Description
1	Print heads	This machine has a Kyocera print head in a single row. Deciding the numbers of print heads and putting them on right positions according to machine types.
2	Two-way valve body	It has two states, which can be used to discharge the gas in the print head.
3	Height measurement system	It's used for automatic measurement of medium height by handle operation and software operation.
4	Three-way valve body assembly	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.

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

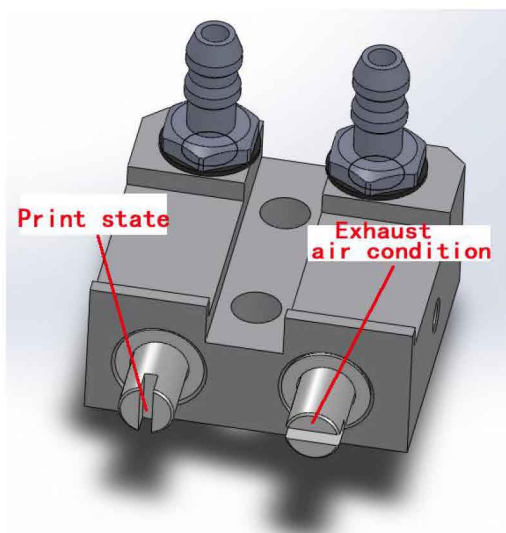


State 1: Working state, when the equipment is in normal operation, especially in printing, the valve shall be upward.

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.

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



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

Air-extraction status: 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**

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### ■ **Printing media**

The common media for the inkjet printer include such commonly used media for advertising equipment as PVC, PMMA, 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 six 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:

- **Computer connection**
  - Installation environment for LYprint
  - Installation steps for PCIE driver
  - Connect and plug the PC external switch control line
  - Installation of LyPrint software driver
- **Installation and adjustment of print head**
  - Introduction of Kyocera print head
  - Installation of Kyocera print head
  - Kyocera print head FFC interface
  - ◆ Introduction to KONICA 1024i print head
  - ◆ Installation of Konica 1024i print head
  - ◆ Protective casing of the Konica 1024i print head FFC interface
- **Switch order of the DS printer**
  - Power ON
  - Power OFF
- **Introduction of DS functions in LyPrint**
- **Printing methods of various materials**
- **Correction function**
- **Positioning rod function**

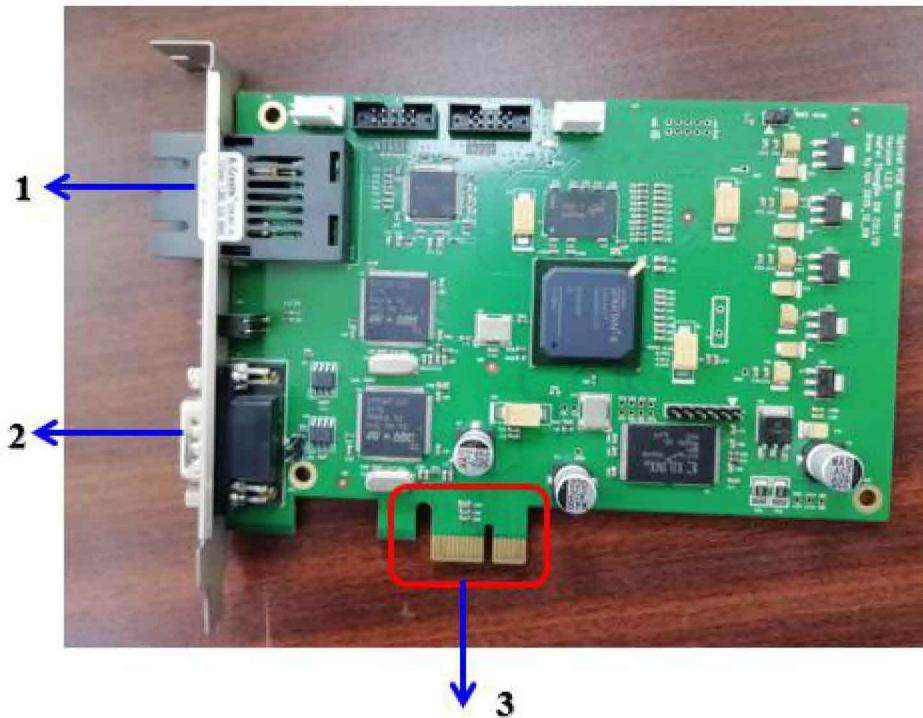
● **Computer connection**

■ **Installation environment for LYprint**

Please apply WIN7 64-bit and WIN10 64-bit operating systems to secure the normal working of the software.

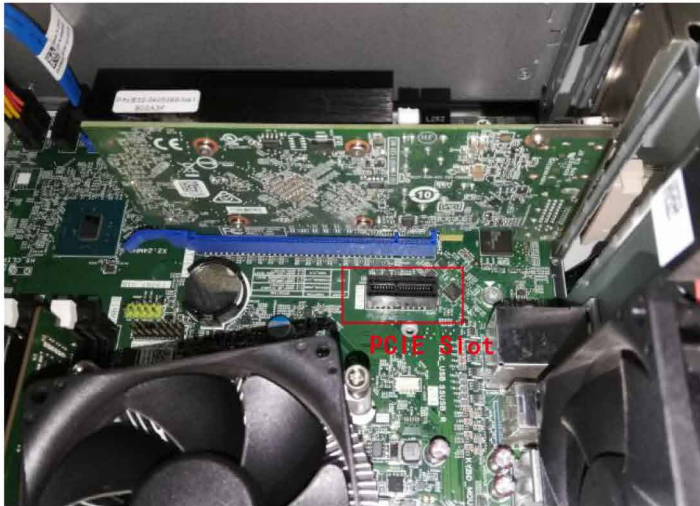
■ **Installation steps for PCIE driver**

1. Plug PCIe card into its slot at first, double click the file **LiYu PCIe(1.0.8).exe** after the computer is started.

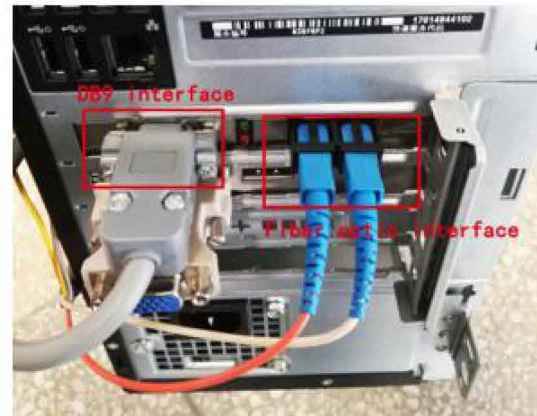
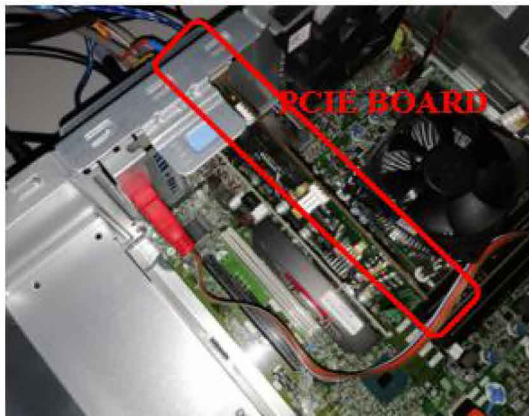


S/N	Function	Description
1	Fiber interface	The fiber interface is connected to the carriage board. In principle, the TX on the PCIE card is connected to the RX of the carriage board; the RX on the PCIE card is connected to the TX of the carriage board.
2	DB9 interface	The interface signal with the transmission function is connected to the motion control board, the hand-held box plate and the ink supply board.
3	PCIE pins	It's plugged and fixed into the PCIE slot connector on the computer motherboard.

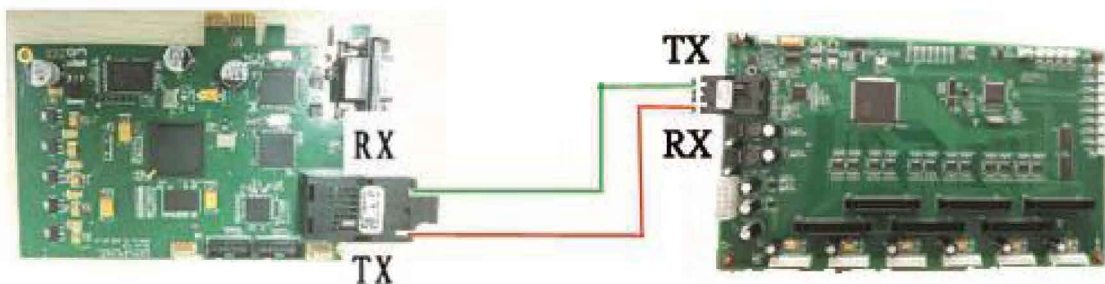
2. PCIe X1 interface shall be provided in PC configuration; unstable factors would exist if X4, X8, X16 interfaces are used. Plug and fix the PCIe card into the PCIe interface on the computer motherboard as shown in the following figure.



3. After plugging in as shown in the figure below, connect the machine to the DB9 interface of the PCIe card, tighten the screw, and then connect the corresponding interface of the fiber.

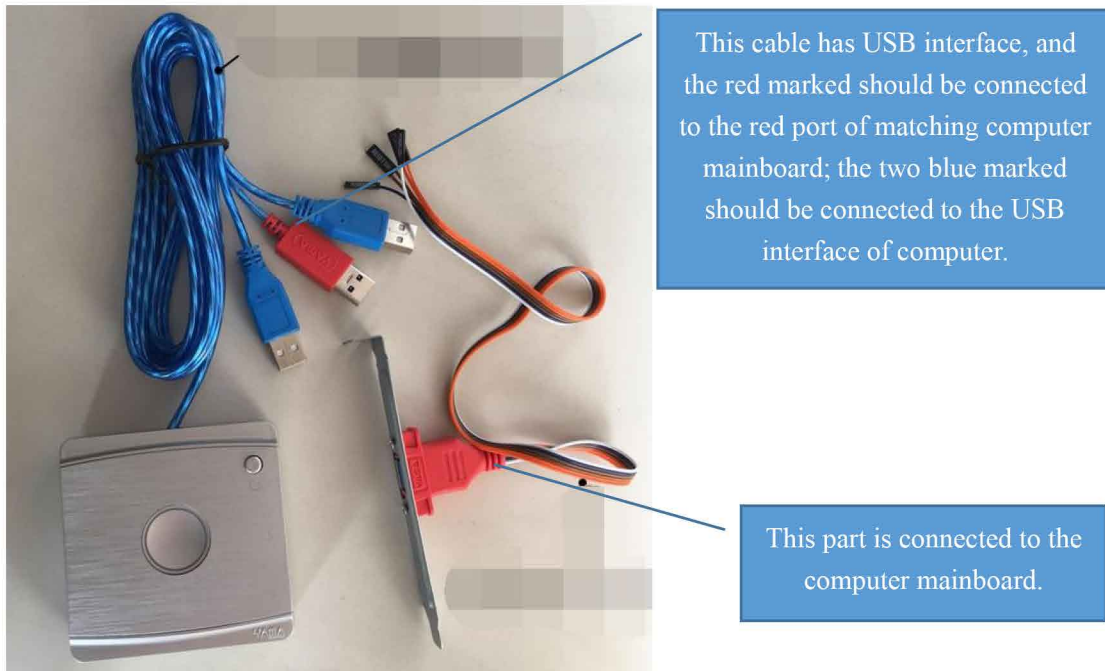
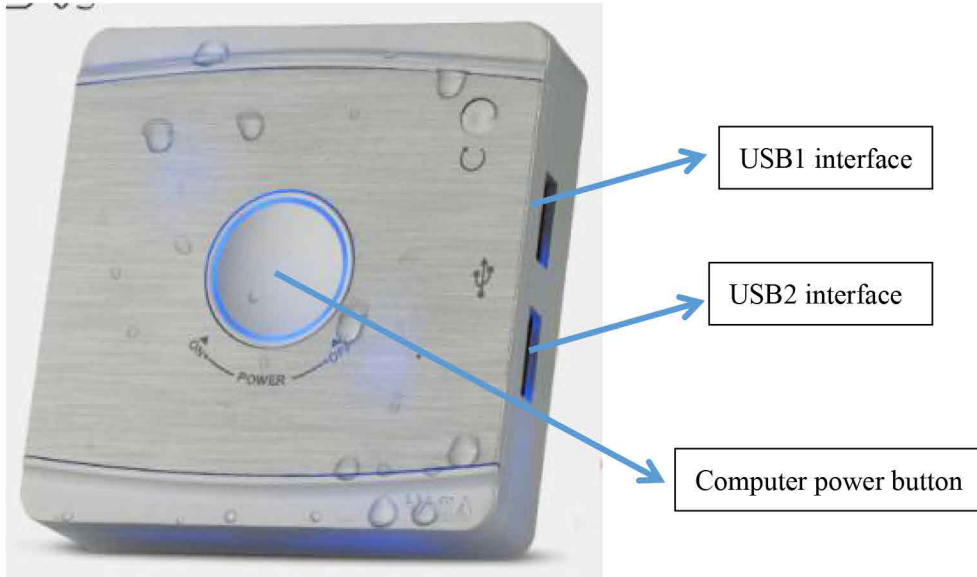


4. Fiber installation and connection with the carriage board in corresponding method. The connection method is as shown below:

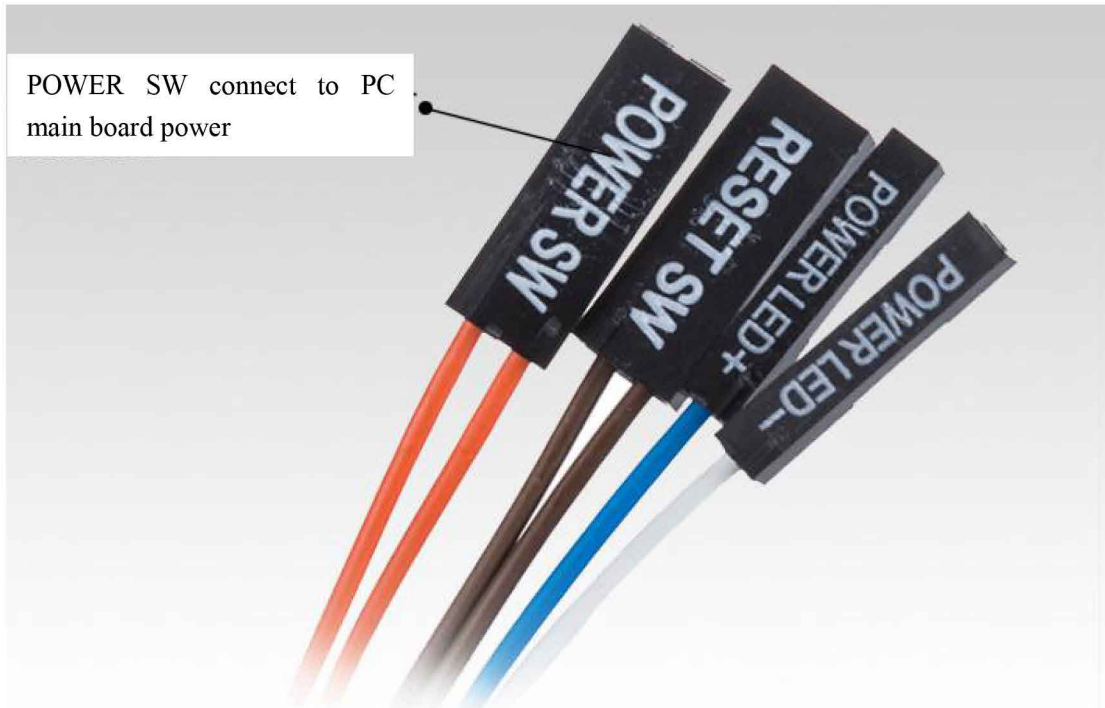


■ **Connect and plug the PC external switch control line:**

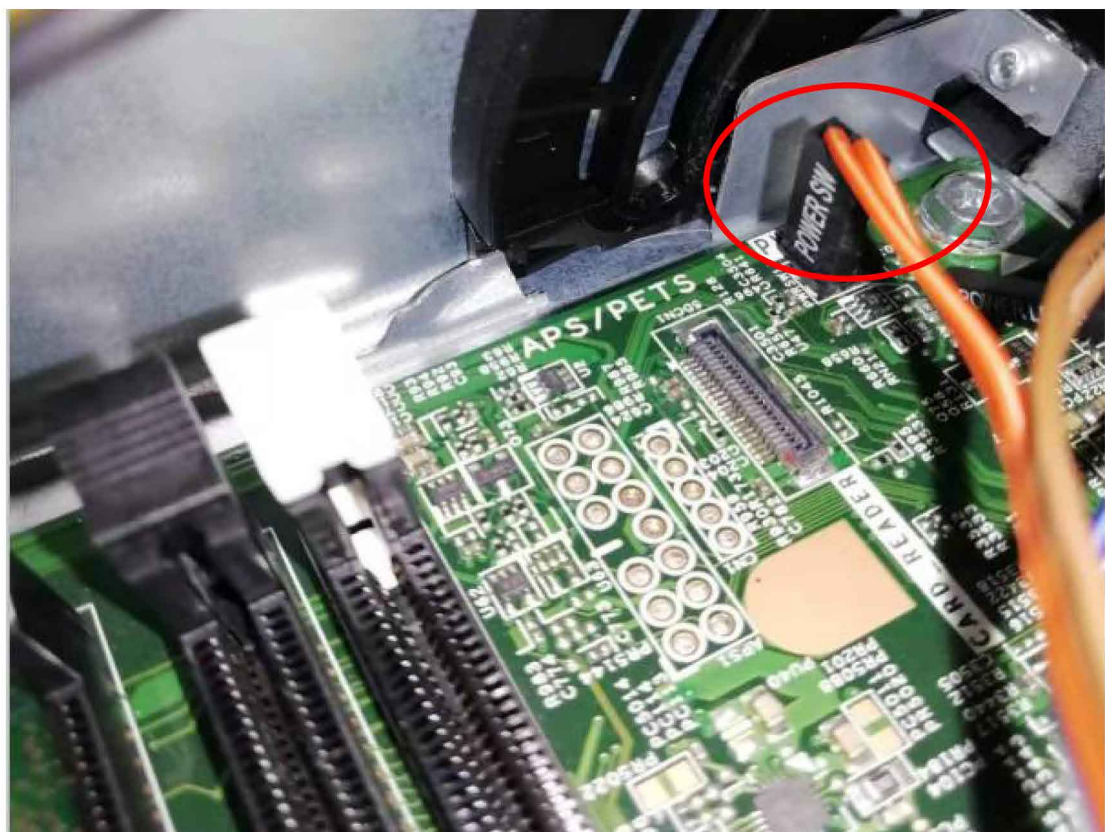
1. Introduction of external PC switch effect:



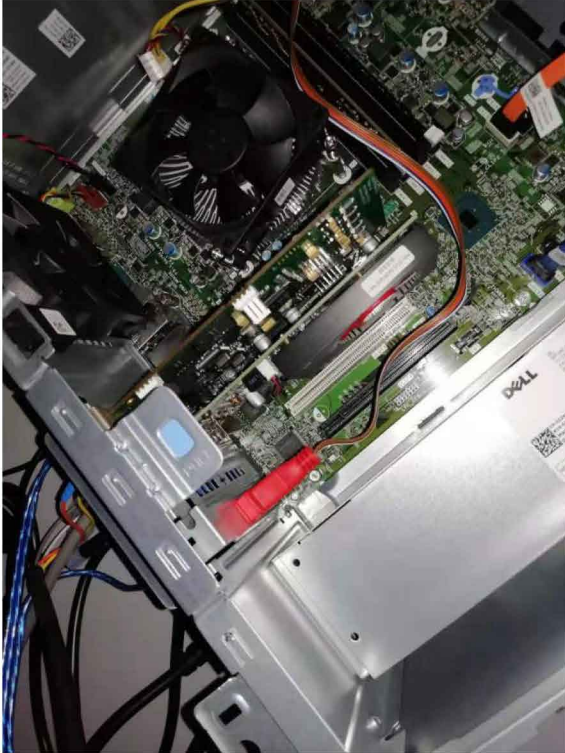
2. Connect POWER SW to PC start control wiring position of the PC main board



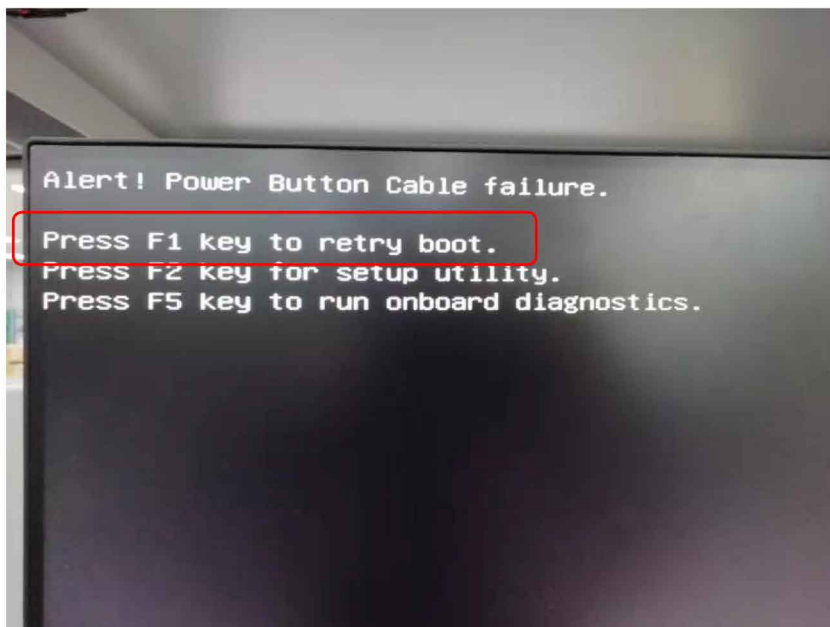
Take the following figure as an example:



3. The final result is as follows, please complete the installation of PC external computer power button.



4. Start the computer and the following information will appear; press F1 to enter the WINDOWS interface, as shown below:



#### ■ Installation of LyPrint software driver



DiGiM.bin	2008/12/23 10:02	BIN 文件	6 KB
DiGiS.bin	2008/12/23 9:36	BIN 文件	5 KB
DiGiSS.bin	2015/10/28 10:16	BIN 文件	1 KB
ENUHelpFile.mht	2013/7/2 9:40	MHT 文件	8,853 KB
<b>LiYu PCIe(1.0.0.8).exe</b>	<b>2016/12/8 16:02</b>	<b>应用程序</b>	<b>5,526 KB</b>
liyupt.dll	2017/10/18 14:13	应用程序扩展	10 KB
lyprint.apw	2015/4/10 16:10	APW 文件	1 KB
LyPrint.exe	2017/10/18 15:13	应用程序	4,855 KB
lyprint.ini	2018/1/9 14:06	配置设置	21 KB

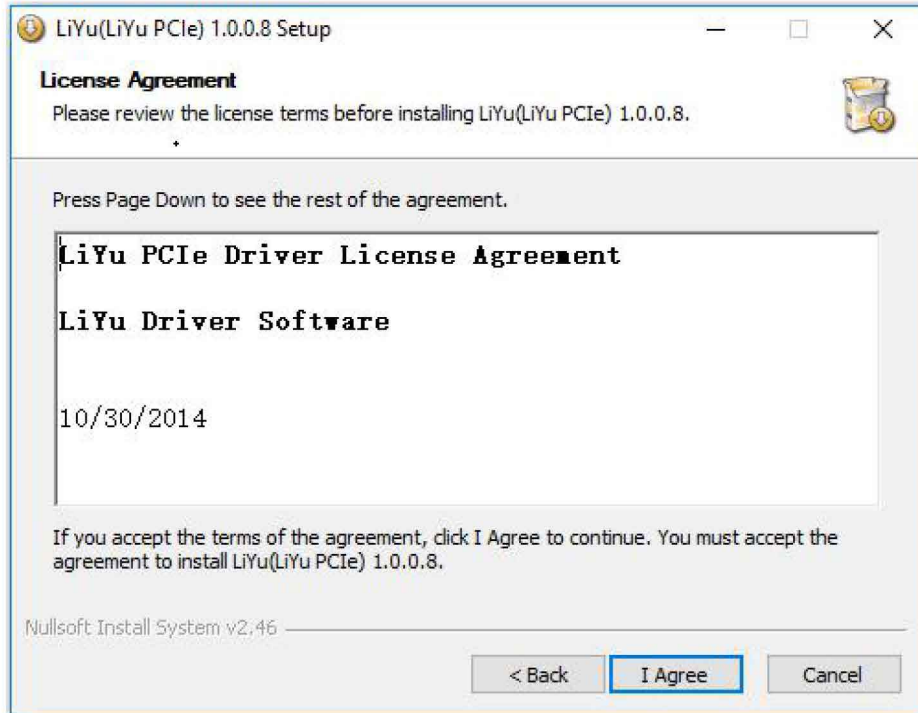
The following interface pops up.



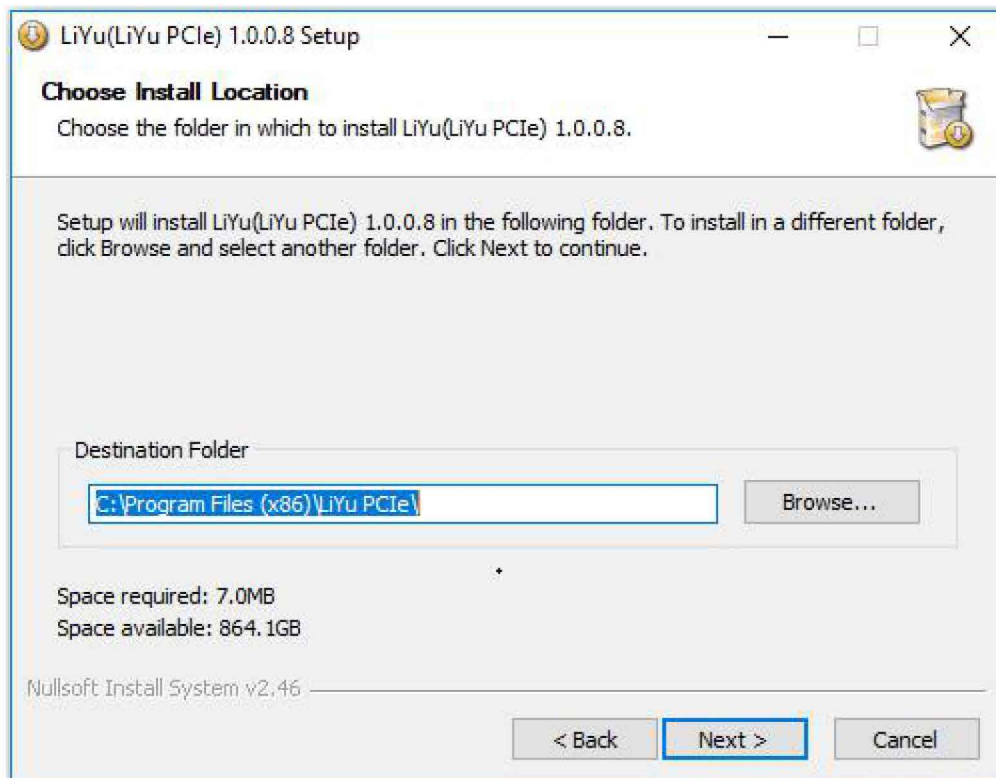
Select required language, then click “OK”.



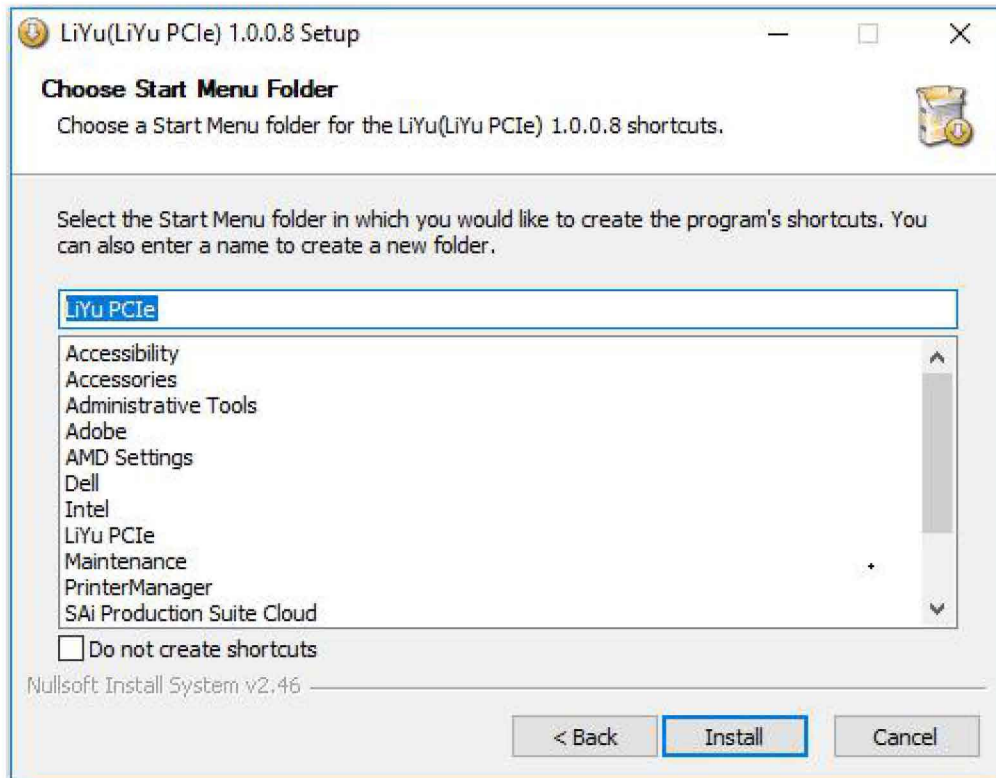
Click “Next”.



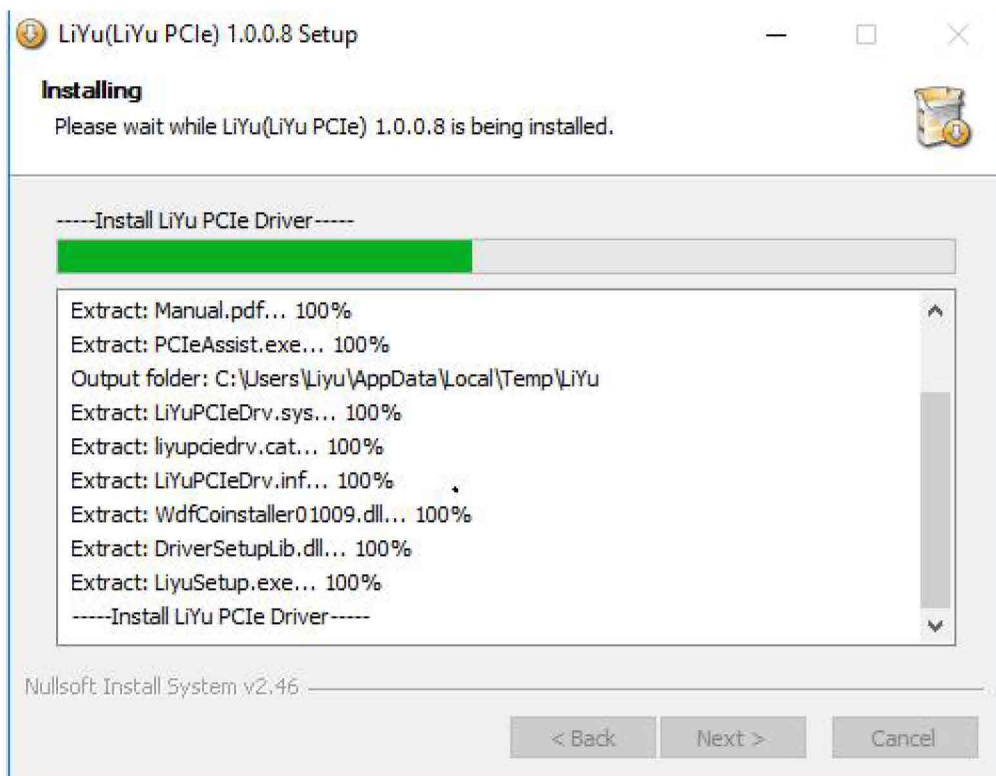
Select the required installation path, then click “Next”.

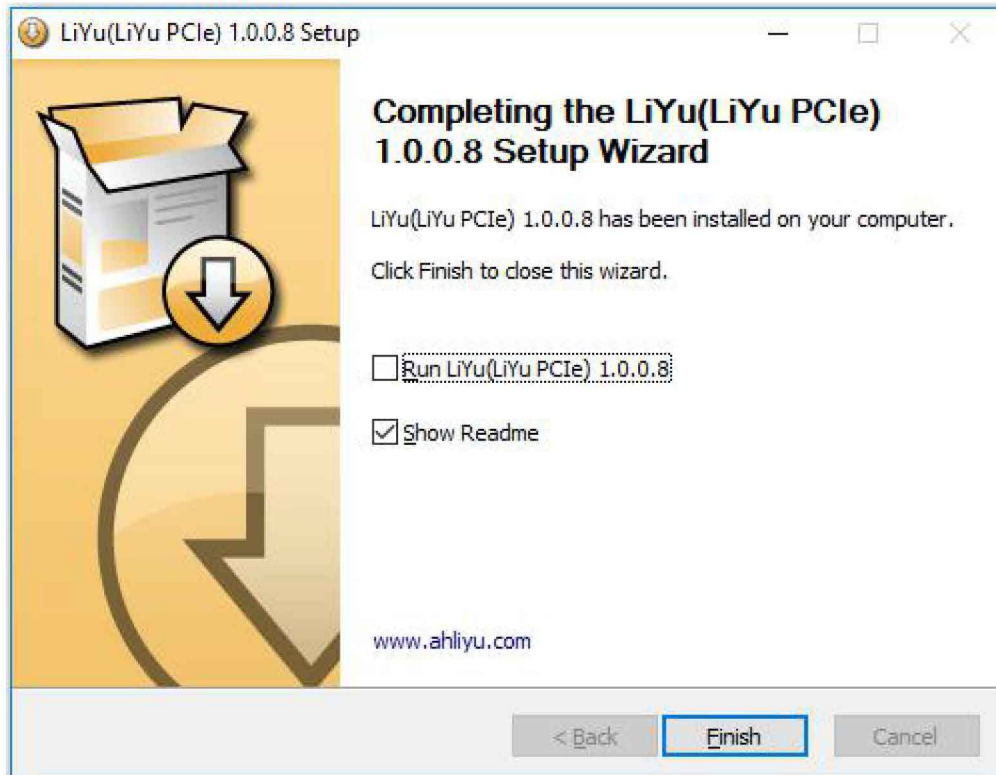


Click “Next”.

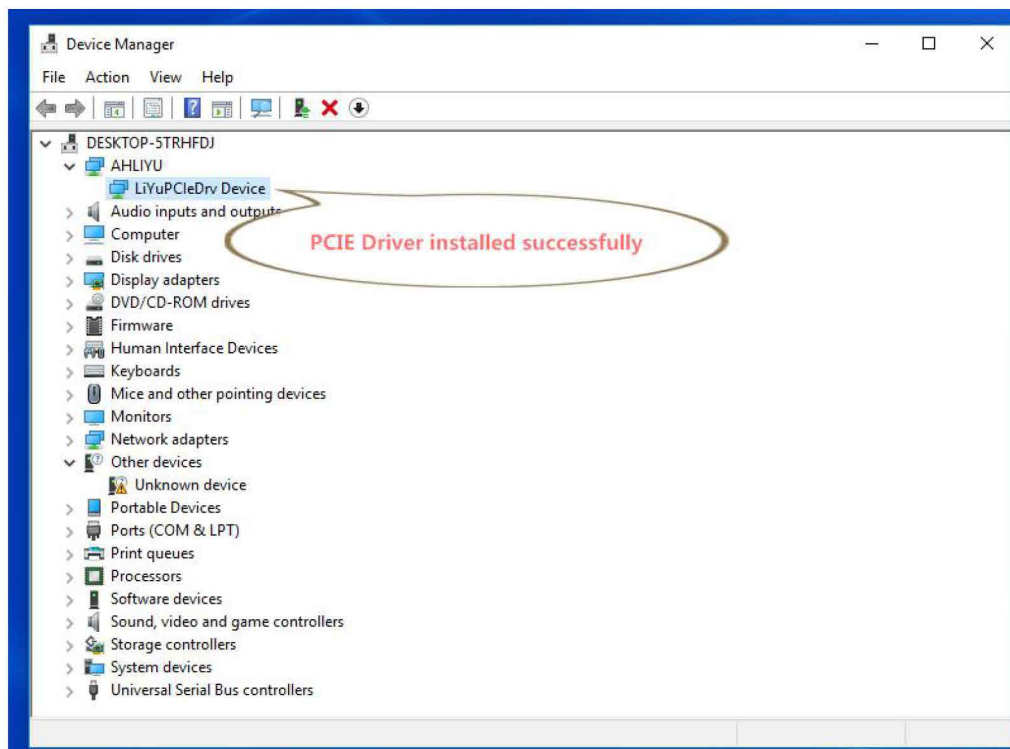


Please click "Install" when the prompt is pop up during the installation.





The driver has been successfully installed if the content in DevManView is shown as the figure above.

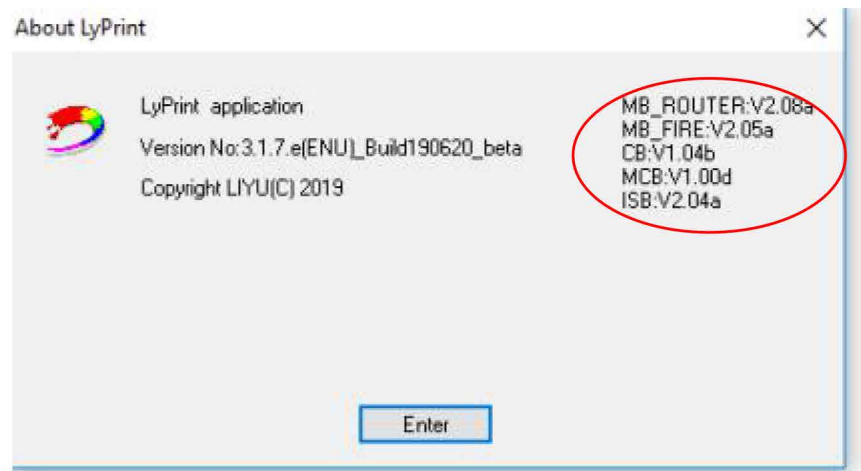
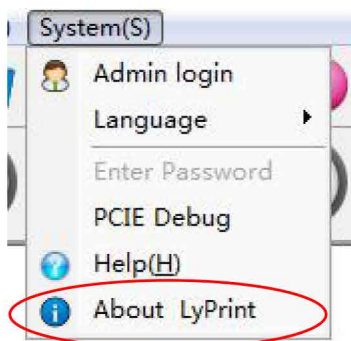


Unscrew the emergency stop button on both sides or the emergency stop button on the handle.

Start the Inkjet Printer and click to start. The carriage will automatically reset to the right side of the flash and spray position.

Double-click the Lyprint icon to pop up the Lyprint operation interface. And the carriage will reset left and right at the same place. The bottom left side of the software shows the state of “Disconnected” to “Ready”, indicating that the machine and software are normally connected and the ink supply pump starts to pump ink from the main ink tank into the auxiliary ink tank. This process will be accompanied by the negative pressure meter and electromagnetic valve, and when the ink injection of each auxiliary ink tank reaches the liquid level sensor, the ink supply will be finished.

In order to determine the online connection of software and machine, the SYSTEM>About LyPrint of LyPrint software can be used.



**Description:**

- |  |   |
|--|---|
| ✧ MB_ROUTER: V2.08a and MB_FIRE:V2.05a | Version Number of PCIE board fixed                          |
| ✧ CB: V1.04b                           | Version Number of carriage board and firmware program       |
| ✧ MCB: V1.00d                          | Version Number of motion control board and firmware program |
| ✧ ISB: V2.04a                          | Version Number of ink supply board and firmware program     |

Please refer to random documents [ENUHelpFile.mht](#)  
[CHSHelpFile.mht](#) (Lyprint Chinese Operation Manual)  
(Lyprint English Operation Manual)

## ● **Installation and adjustment of print head**

### ■ **Introduction to Kyocera-KJ print head**

The 2656 nozzles of Kyocera KJ4A series can eject about 150 million dots per second. In order to improve the speed, the following measures are adopted: (1) increasing the driving frequency; (2) improving the shape of print heads; (3) adjust the waterproof membrane materials. 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 3.5 ink dot, which supports the grayscale printing.

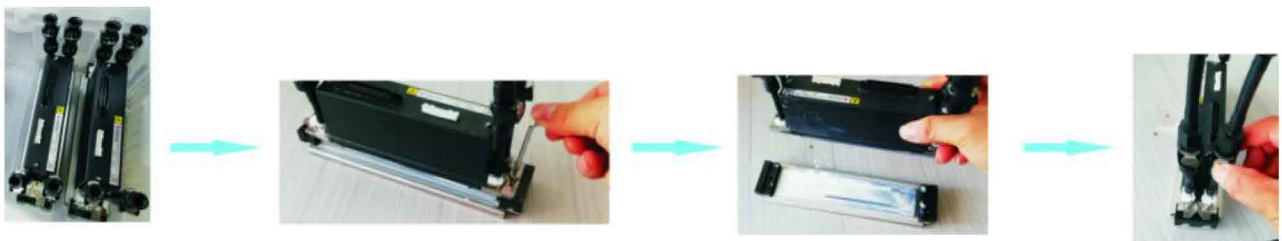


### ■ **Installation of Kyocera print head**

Some print heads of the machine have not been installed onto the machine. Therefore, this chapter will start from the installation of single print head to the machine. If print heads have been installed onto the machine, please omit the illustration of print head installation.

1. First install the bottom plate of print head onto the machine and 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.

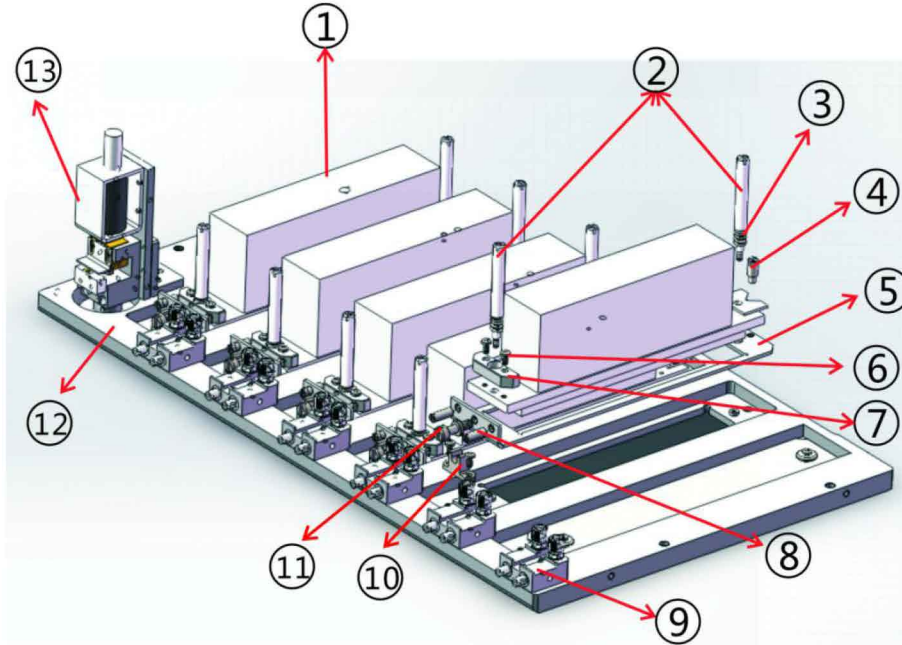
2. Remove the packing of print head according to the order below and take down the protection cover under print head (the protection cover is used to protect nozzle panel).





**Note: when inserting a new plug, the metal button on the plug must be pressed. Otherwise the sealing ring on the quick coupling can easily be broken, leading to ink leakage and air leakage.**

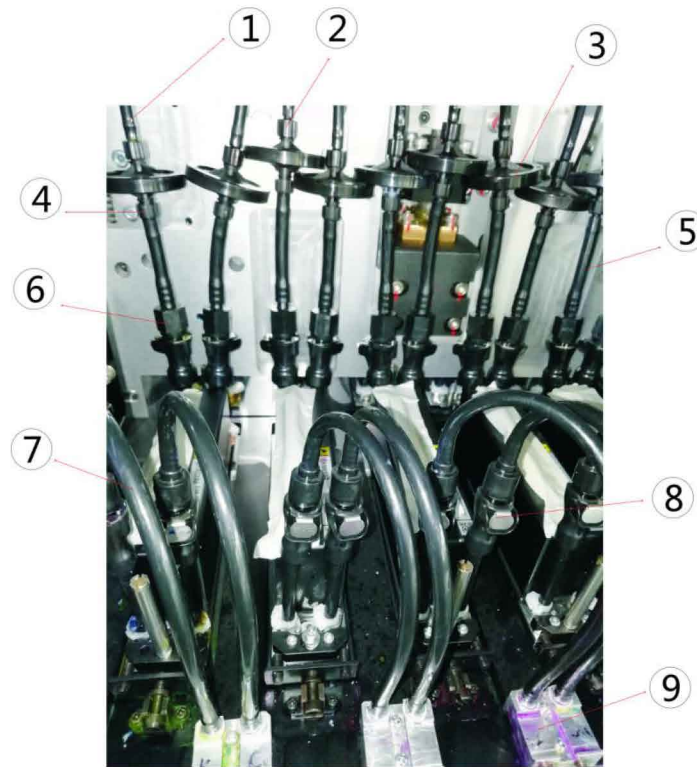
3. Place the print head to the adjusting support, and then the appointed nozzle position.



Code	Name of parts	Description
1	Kyocera print head	Type: Kyocera-KJ4A
2	Mounting screw for print head, 2 for each print head	Fix the print head on the adjusting support.
3	Spring: 2 for each print head	Keep the effect of fixed print head
4	Positioning pin of print head One in total for each	Keep the effect of fixed print head
5	Holder of print head One in total for each	Adjustment base for print head installation
6	M3x10 crossing pan screw Two in total for each	To fix the adjustment block of print head
7	Adjustment block of print head One in total for each	To adjust the inclined physical position of the print head
8	Slotted set screws with cone point	To adjust the inclined physical position of the print head.
9	Two-way valve body	It can be used to discharge the gas in the print head.

10	Vertical calibration screw of print head	To adjust the front and back physical position of the print head.
11	Vertical calibration base	To adjust the front and back physical position of the print head.
12	Bottom board of print head	To install the base plate of print head
13	Height measuring electromagnetic valve	To measure the effect of medium thickness.

4. Connect the ink pipe between the ink line valve body and the print head, as shown in the following figure:



Code	Name of parts	Description
1	Φ4x6 ink tube	Connect to the filter from three-way valve body
2	Ink inlet connector for filter	Connector with outer diameter of Φ4
3	Butterfly filter	15UM
4	Ink outlet connector for filter	Connector with outer diameter of Φ6
5	Φ6x8 ink tube	Connect to the quick coupling for print head from filter outlet
6	Quick coupling for print head	Connector with outer diameter of Φ6
7	Φ4x6 ink tube	Connect to two-way valve body from print head outlet.
8	Quick coupling	The print head is equipped with a quick coupling. Before

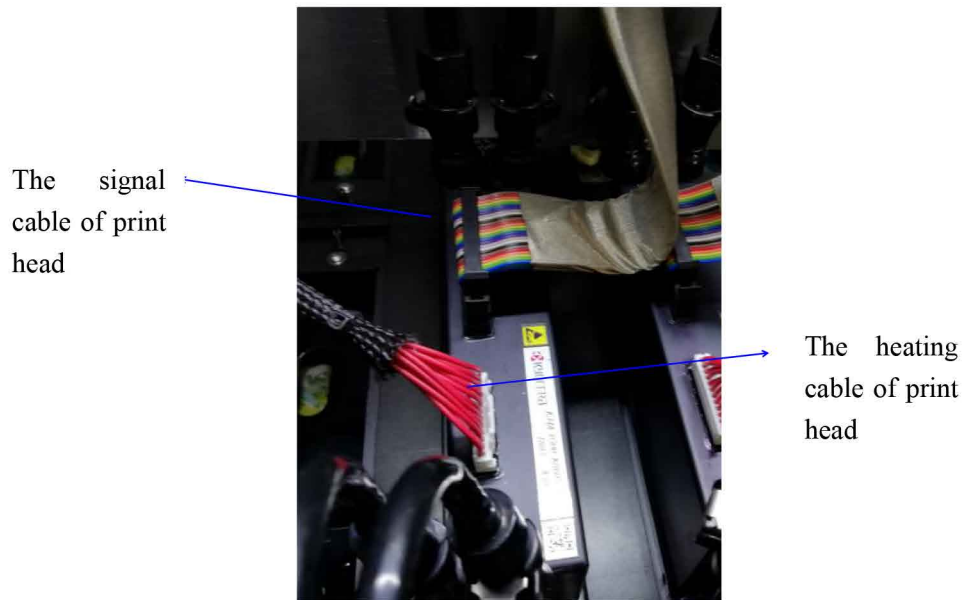


	for print head	inserting, please be attention to press down the metal piece.
9	Two-way valve body	It can be used to discharge the gas in the print head.

**Note: Please fix a rubber cap onto the connector of the two-way valve body unused, so as to prevent air leakage.**

■ **Kyocera print head FFC interface**

1. Kyocera print head has two interfaces, the one is signal cable of print head, the other is heating cable of print head. The effect is as following figure.



2. The carriage board has two types of interfaces: the black interface (marked by the red frame) is for signal line of the print head and the white interface (marked by the blue frame) is for the heating line of the print head. As shown in the following figure:

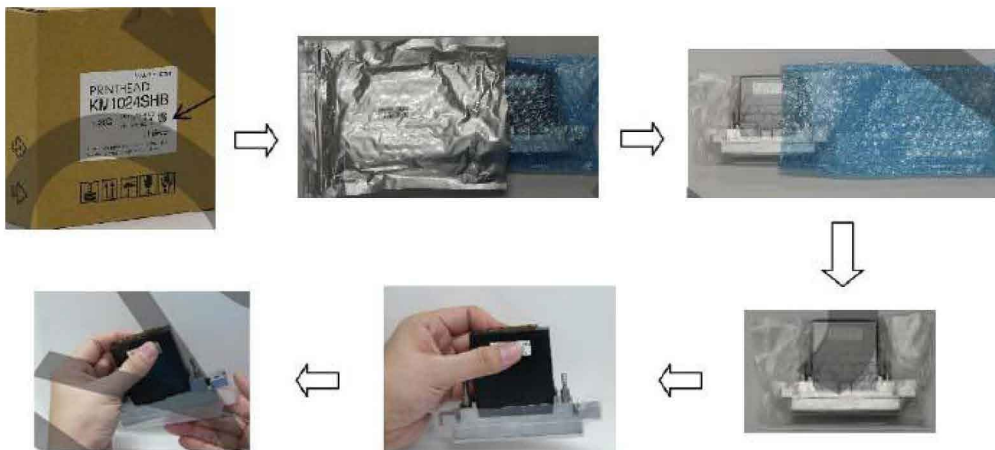


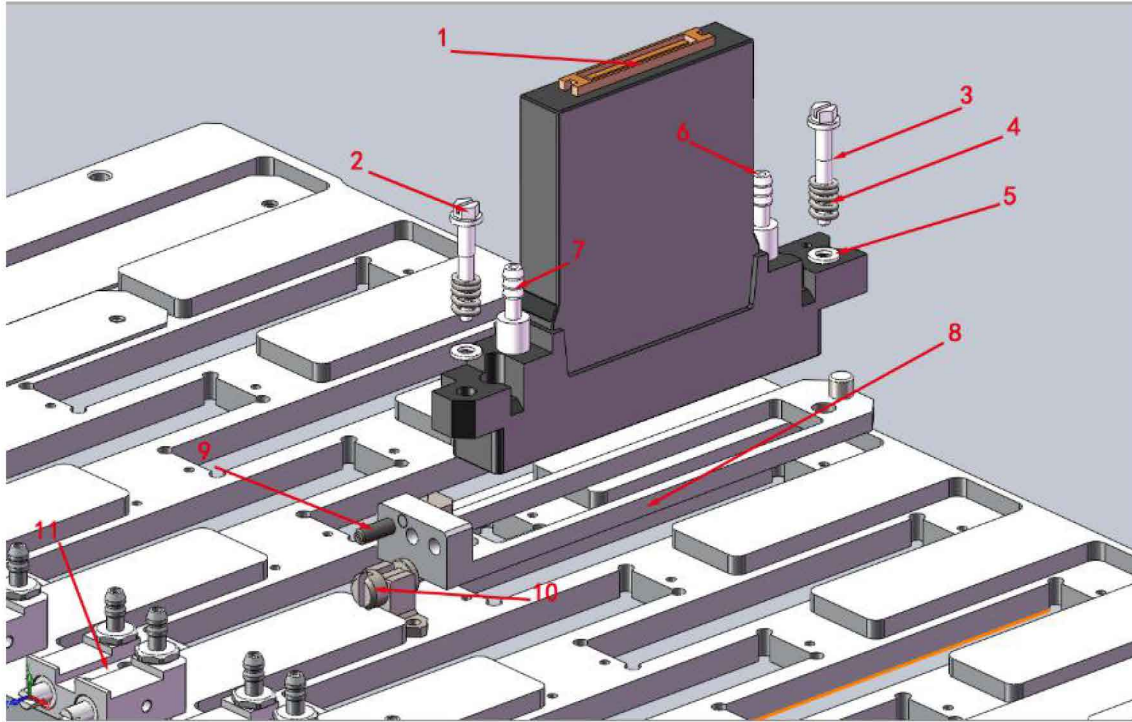
The print head identification is shown on the package of each print head. Please input referenced voltage into “Voltage Setting” of LyPrint.

### ◆ Installation of KONICA 1024i print head

Some print heads of the machine have not been installed onto the machine. Therefore, this chapter will start from the installation of single print head to the machine. If print heads have been installed onto the machine, please omit the illustration of print head installation.

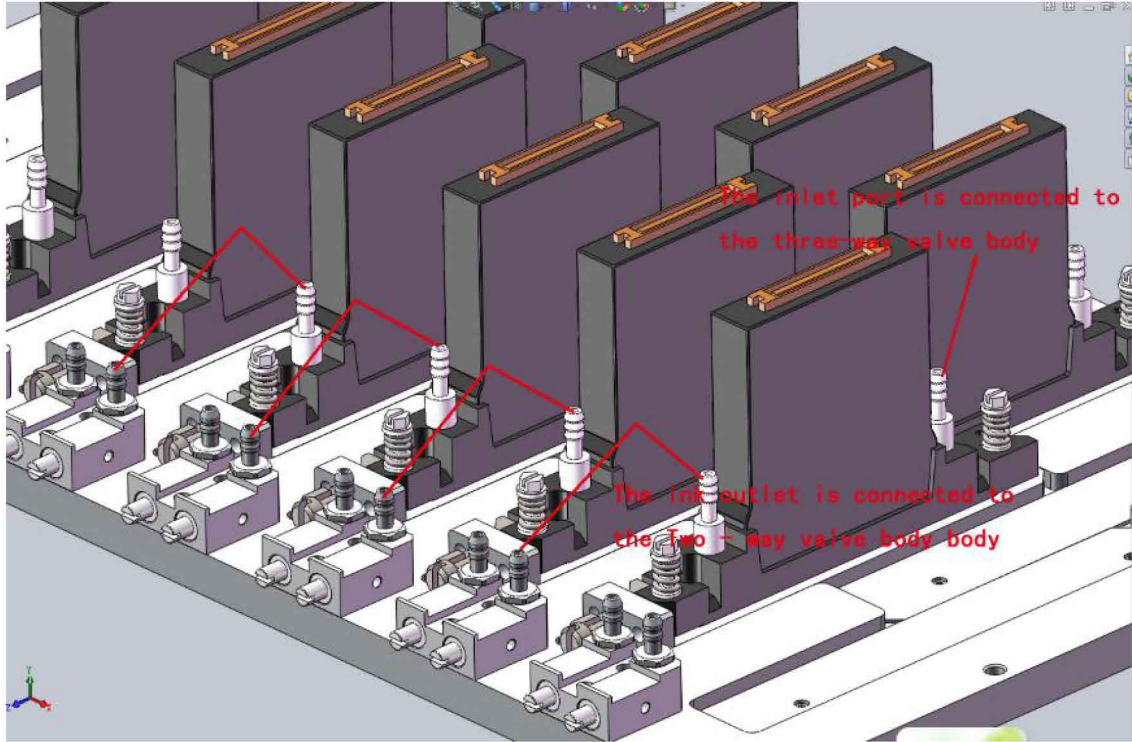
5. First install the bottom plate of print head onto the machine and place clean non-woven fabrics under the bottom plate of print head, so as to avoid soiling nozzle panel or blocking nozzle during print head installation process.
6. Remove the packing of print head according to the order below and take down the protection cover under print head (the protection cover is used to protect nozzle panel).
7. Place the print head to the adjusting support, and then the appointed nozzle position.





Installation Diagram of Print Head Konica 1024i

Code	Name of parts	Description
1	Print head FFC interface	Connect the driver board for print head to transmit the data signal.
2	Mounting screw for print head	Fix the print head on the adjusting support.
3	Mounting screw for print head	Fix the print head on the adjusting support.
4	Spring	Keep the effect of fixed print head
5	Spacer	Keep the effect of fixed print head
6	Ink inlet	Connect the outlet of three-way valve to supply the print head with the ink.
7	Ink outlet	To exhaust the air inside the print head to balance the differential pressure.
8	Adjusting support for print head	To adjust the physical position of the print head.
9	Inclined adjusting screw for print head	To adjust the inclined physical position of the print head.
10	Vertical adjusting screw for print head	To adjust the front and back physical position of the print head.
11	Two-way valve body	It can be used to discharge the gas in the print head.

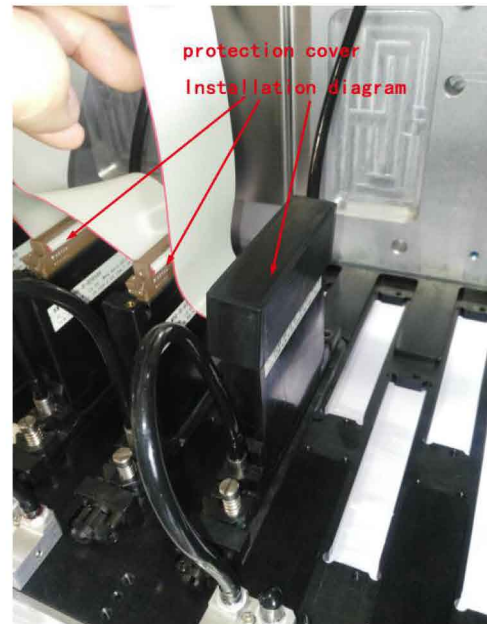


Installation Diagram of Print Head RKonica1024i

Please use the rubber cap for the used two-way valve to prevent leakage.

◆ **Protective casing of the KONICA 1024i print head FFC interface**

The protective casing shall be used to protect the FFC interface to prevent FFC interface from being contaminated by ink and cleaning fluid, the effect is shown below.





## ● **Switch order of the DS printer**

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

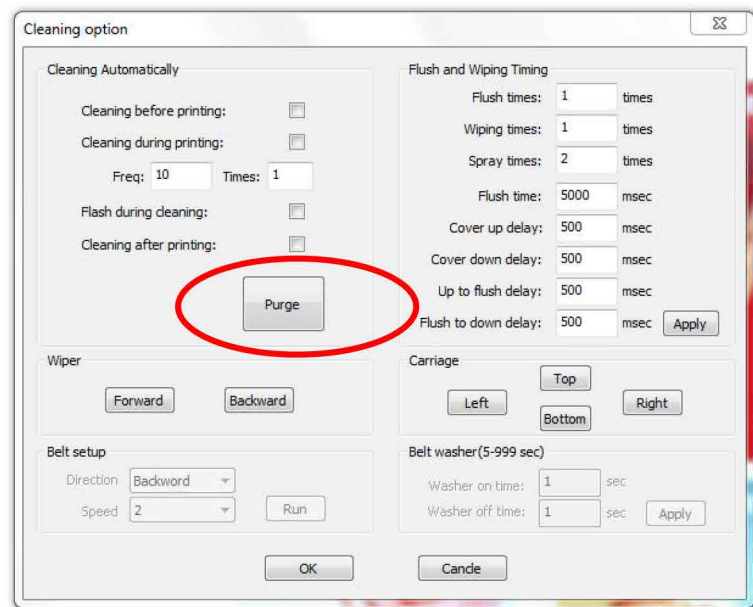
#### ➤ **Startup processes**

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. Turn on the computer and start the LyPrint software.
4. Press the **start button** on the left or right side of the machine. Start the machine, and the moisturizing state is automatically canceled. At this time, the moisturizing tray is lowered, and the carriage rises and starts to move from the left to the right and stops at the rightmost flash spaying position of the grille.
5. Press **print head high pressure button** to make the print head work (some systems do not need this process).
6. Click the “Clean” icon on the software, and the carriage moves down from the rightmost end to the leftmost end.
7. 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.
8. Press **automatic scraping button**, the scraping brush can move back and forth for several times. Clean up the ink on the surface of print head.
9. For steps 7 and 8, automatic ink pressing and scraping process can also be achieved through **automatic cleaning function** in the software.
10. Put in the print material, cancel the flash spray print, and set the print height and original point.

When the software is in ready state, then print.

#### ➤ **Ink pressing of the print head during printing**

When disconnection occurs during the printing process, click the “automatic cleaning” function in the software and click “PURGE” in the popped-up window. The carriage head will move to the leftmost end of the grille to fall, and after automatic ink pressing, the ink wiper will start to move back and forth to remove the ink from the surface of print head. After the scraping brush returns to the rearmost end, it will be automatically flushed. The carriage head returns automatically to the last print position and continues to print.



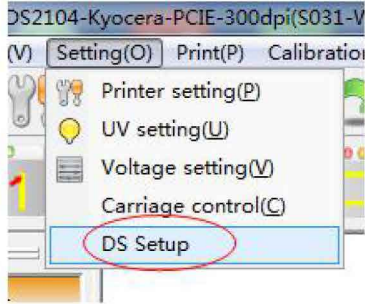
## ■ Power OFF

### Power off processes

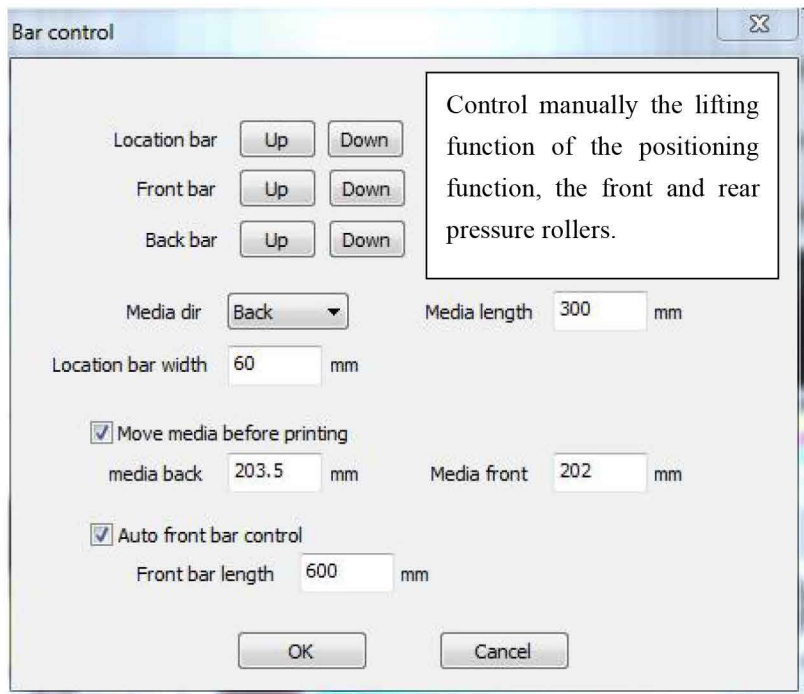
1. If in the flash spray state, first cancel the flash spray.
2. Press the moisturizing button, (the carriage will moves down from the rightmost end of the girde to the leftmost end), close the ink valve body.
3. Close the **print head high pressure button** (some systems do not need this process).
4. Press the **Emergency Stop** switch. At this time, the moisturizing tray will automatically rise until under the print head bottom board.
5. Shutdown the computer.
6. Pull down the leakage protection switch of the main power supply of the machine.

## ■ Introduction of DS functions in LyPrint:

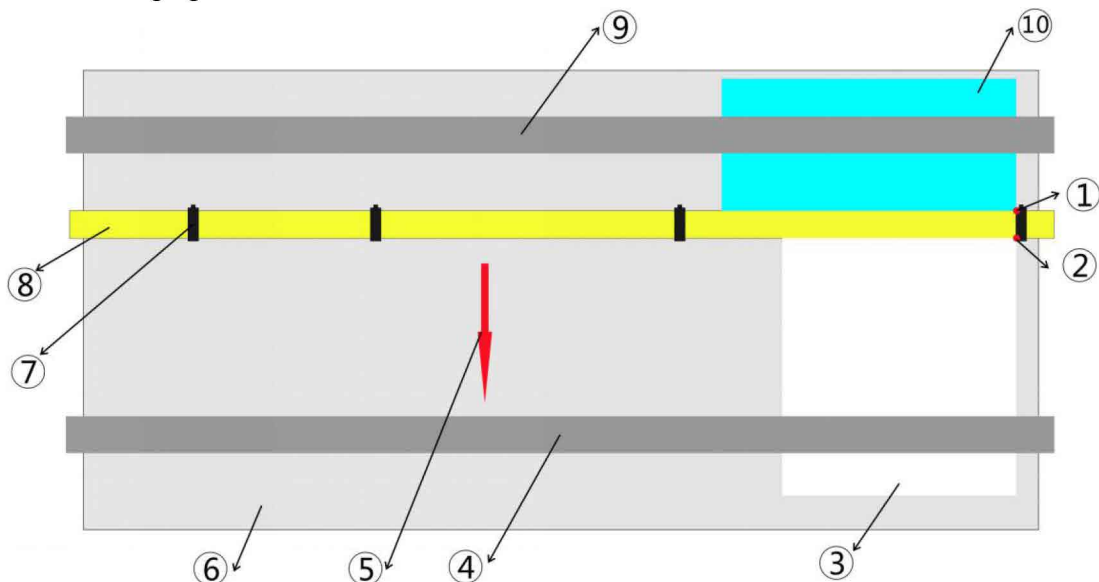
1. Printing setting of the front pressure roller, positioning rod and back pressure roller: the equipment offers positioning function and rise and down functions of the front and back pressure rollers. You may set these functions in the dialog box "setting-DS setting". You can also open the dialog box "DS setting" by clicking the icon in LiyuPrint main interface.



Open the window as follows:



- Media direction: setting to choose positioning from Front or Back. As shown in the following figure:





Code	Name of parts	Description
1	Back original point	Positioning point to load from back.
2	Front original point	Positioning point to load from front.
3	Front printing media	Diagram of printing media for material loading from the front
4	Front pressure roller	When media printing is beyond the adsorption range of the platform, it may warped. After setting distance, the front and back pressure rollers will automatically drop, or you can manually control the lifting and down.
5	Arrow	Movement direction of guiding belt during printing
6	Guiding belt	The Guiding belt is the main printing drive mechanism.
7	Partition	There are four partitions, which can be used when printing multiple copies between media.
8	Positioning rod	For positioning.
9	Back pressure roller	Before printing, putting down the back pressure roller will greatly increase the flatness of media.
10	Back printing media	Diagram of printing media for material loading from the front

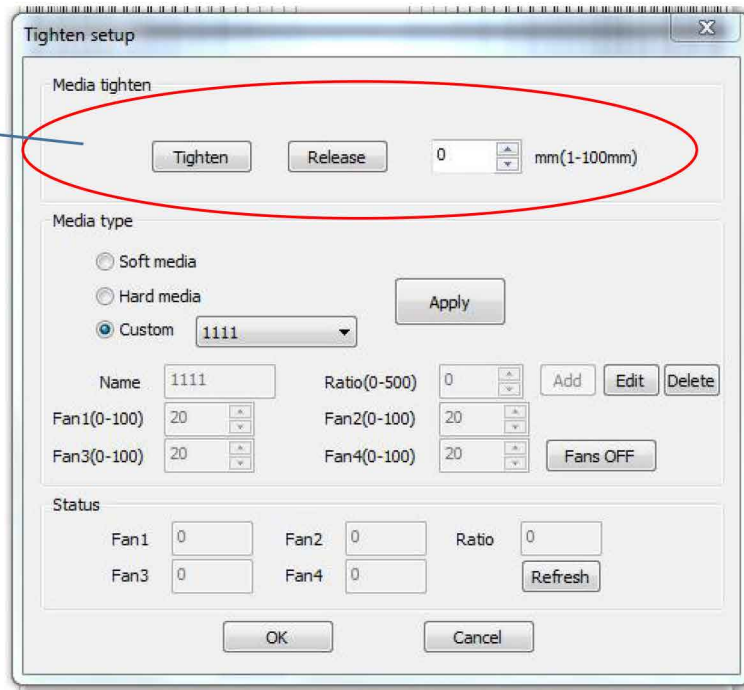
- Media length: If the setting media is loaded and positioned from the front, set the length of the printing media, so that it can be printed to the starting point of the media. If the setting media is fed and positioned from the back, then the value is automatically invalid.
- Automatic movement before printing: the starting point of two different values of feeding and positioning from the front and back can be set to make positioning more accurate.
- Automatic control of the front pressure roller when printing: the length of the printing media can be set so that the front pressure roller can press the media when the media is printed below the front pressure roller to prevent the media from warping.

2. Platform adsorption settings: these functions are set in the “Tighten setup” icon on LiyuPrint main interface, click to open the dialog box.



Open the window as shown below:

This setting is specific to FS models. Omit here.



- Media type: In the media type, you can set and save the adsorption value of various materials and, so that you can choose reuse without need to remember the parameters of this media when replacing the same material next time, it can be divided into soft, hard, and custom media.
- In the custom, you can set and save the adsorption value of various media (name the media).
- Adsorption shutdown: you can shutdown the platform through the software.
- Current status: you can refresh the adsorption value of the current platform, and the adsorption value of the platform is based on the percentage as a reference standard.

■ **Various printing processes and methods:**

❖ **Printing process of soft materials**

1. The feeding and printing process (the media feeding motor is under tension status when printing)
  - 1.1. Centering the soft material or penetrating the soft material to the air shaft at the origin point, and tensioning the air shaft;
  - 1.2. According to the material width, press the **adsorption main switch** to open the corresponding adsorption area; (the soft membrane is generally set at 40%, and the flex banner is set at 70%)
  - 1.3. According to the material winding direction, rotate the **positive and negative knobs of the back torque motor** to release the material to the middle position of the platform;
  - 1.4. Turn off the **positive and negative knobs of the back torque motor**, turn on the **adsorption main switch (behind the machine)**, press the **lift and down button of the back pressure roller**, so as to lower the pressure roller;

1.5. Unscrew the **positive and negative knobs of the back torque motor** to make sure the feeding motor is under tension status.

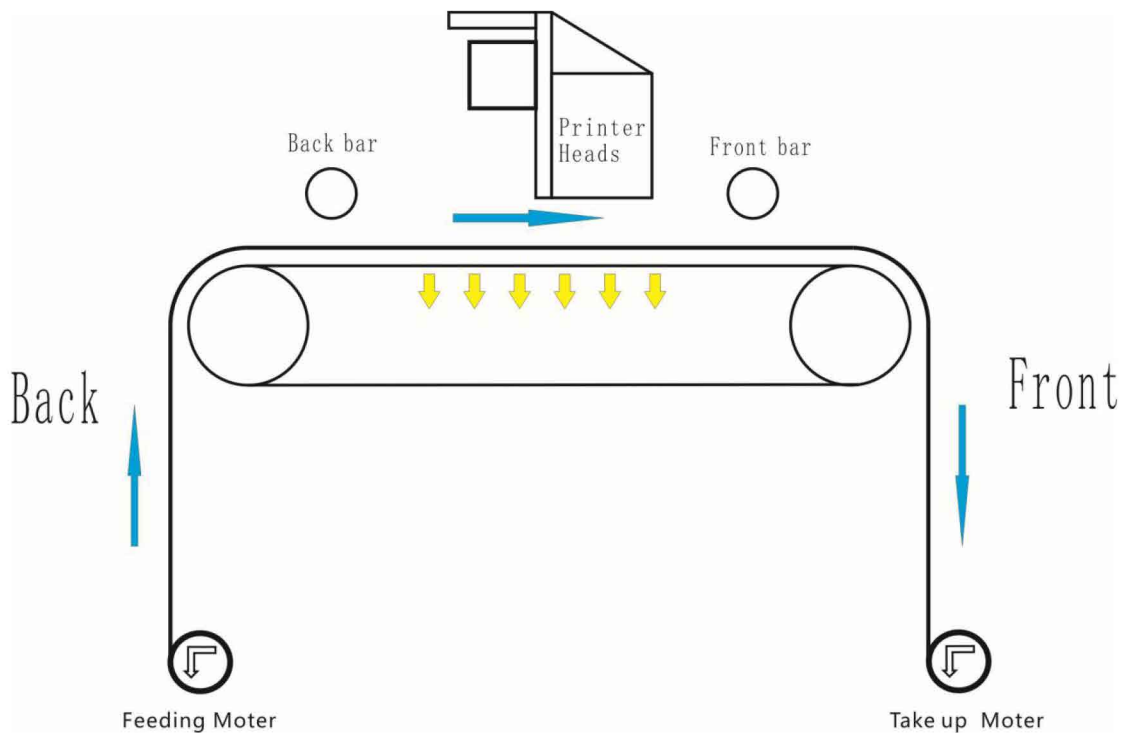
1.6. Use **forward and backward** movement (hand-held box or software control) to move forward to the air shaft, and fix it on the penetrated and tightened roller (note: the original points shall be same);

1.7. Adjust the status of the soft material on the platform, and rotate the **adsorption adjustment button** in the corresponding area according to the material characteristics to adjust the adsorption of each partition.

1.8. Use the **height measuring function** in the software to determine the height and set the original point.

1.9. Turn on the UV lamp and print.

❖ **Printing process of hard materials**



2.1. When printing hard materials, it is usually necessary to use an auxiliary platform, one piece at the front and one piece at the back. If more than 3 meters of materials need to be printed, two auxiliary platforms shall be installed at the front and back respectively.

2.2. Insert the bars connecting the front and back auxiliary platforms with the machine to adjust the height and level of the platform.

2.3. Press the **positioning button**, lower the positioning rod, place the material behind the positioning rod, and position the original point. Press back adsorption switch to hold the printing material.

2.4. Press the **back lift roll button** to allow the back roller fall and press onto the printing material.

2.5. After **automatic height measurement** and setting of the original point

2.6. There should be a Y original icon in the software to test, calibrate and modify parameters. Draw a line with the reference of the positioning rod and start the Y origin test. The software will draw the line to coincide with the actual line to calibrate. If coincidence does not occurs, add or subtract the value in the software alignment window until the actual line coincides with the software printing line.

2.7. Turn on the UV lamp and print.

❖ **Continuous printing function:**

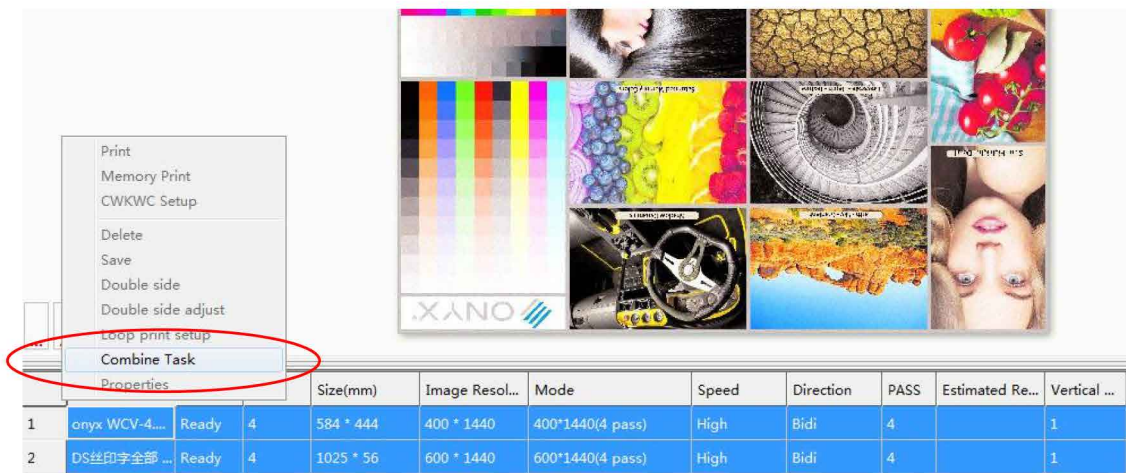
**Introduction to the function:**

The automatic continuous printing function is designed to meet the customers' requirements for fast printing of plate materials. After the customer completes the generation of a batch of printed image files, continuous printing operations are required. However, in the case of an operator, if back-end feeding is frequent, front-end printing will cause complicated operation procedures and waste a lot of time. Therefore, only one operator is required to feed the material at the back end, and the front-end software printing operation can be completed automatically.

**Operational process:**

1. Adjust the equipment to printing state, and place files that need continuous printing on LIYUPRINT software:

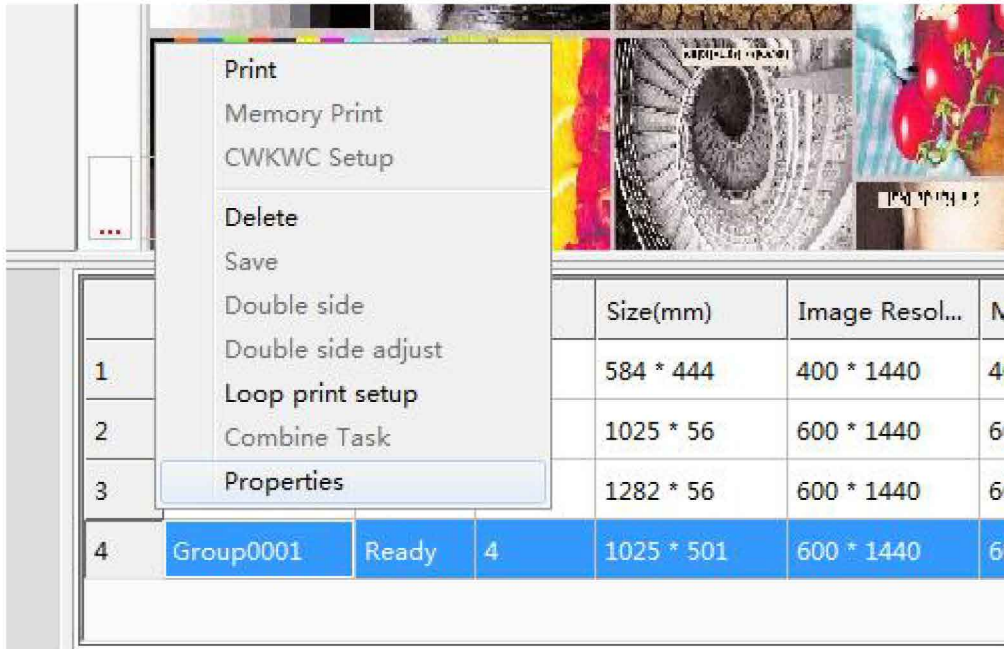
You can select all the printing job at the same time.



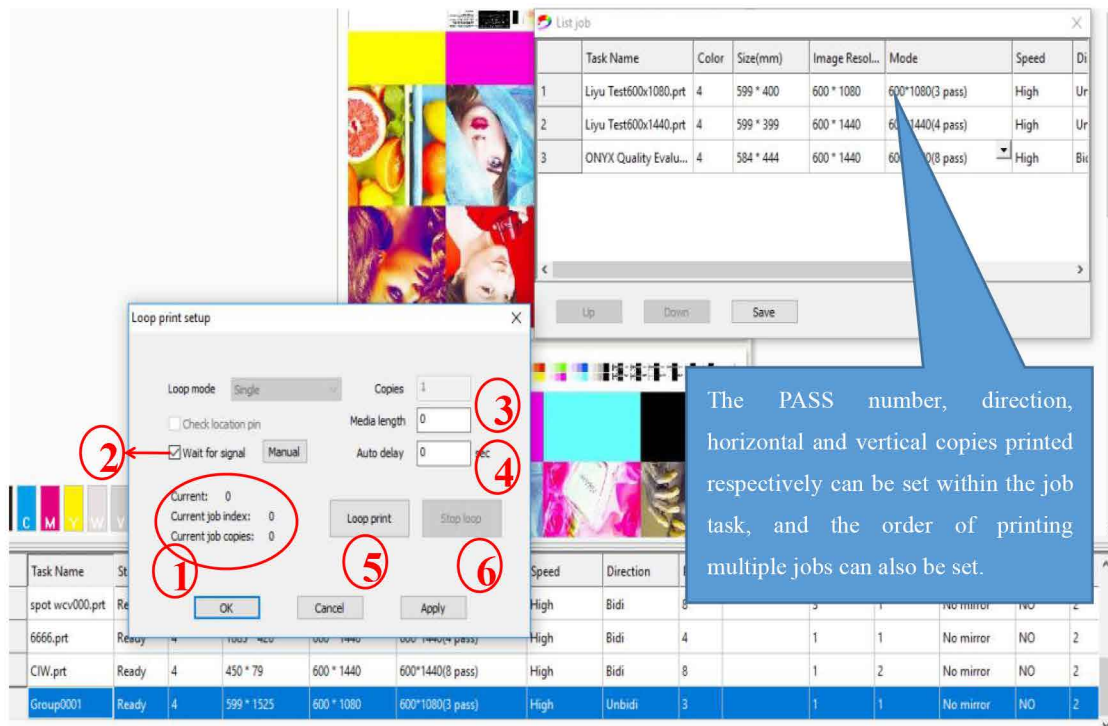
Group the two selected job into a new GROUP0001.

4	Group0001	Ready	4	1025 * 501	600 * 1440	600*1440(4 pass)	High	Bidi	4		
---	-----------	-------	---	------------	------------	------------------	------	------	---	--	--

Rightly click the grouped job and select "Properties" to set the task list of the job; select "Loop Print Setup" to set printing related settings.



Loop print can be started after setting the original point of job, media thickness, number of copies, PASS number and other related settings.



In the loop print setup:

- ① The number of copies and serial numbers of the current print job can be displayed.
- ② Waiting for the handle button: when selected, after each job is printed, the next job can be printed only by pressing the print button on the handle or the print button on the back, thus allowing sufficient time for the customer to feed. If it is not selected, the next job will be printed automatically within the default time (generally, the interval is 20 seconds).

- ③ Media length: This setting is to set the length of the printing media. If the media is larger than the size of the image, in order to make sure the positioning rod do not press the printed media to set a larger sized image (generally set the size of the currently printed media), the positioning rod will fall beyond the media before falling.
- ④ Auto delay: When setting up automatic circular printing, in order to allow customers more time to feed, a delay time can be set to lengthen the time of waiting after each job being finished before the next job if performed.
- ⑤ Start button of loop print.
- ⑥ The stop button of loop print: if you click the button, all the printing job will be stopped; if you click the cancel button on the software, the current printing job will be canceled, and the next job will be printed automatically.

2. Operator goes to the back of the machine. Put down the positioning rod and place the printing material at the original set behind the positioning rod.

3. When the operator clicks the print button, the device will automatically raise the positioning rod, guide the material to the designated original point, and start printing the first job in the continuous printing list.

4. After printing, the equipment automatically completes the advance operation of blank material (if the material is longer), and drops the positioning rod after detecting that the first piece of material completely passes over the positioning rod.

5. The operator starts the feeding process of the second piece of material and clicks the print button to start the printing operation of the second job.

#### ■ 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. Adjust the guiding belt to the middle position

1.1. 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

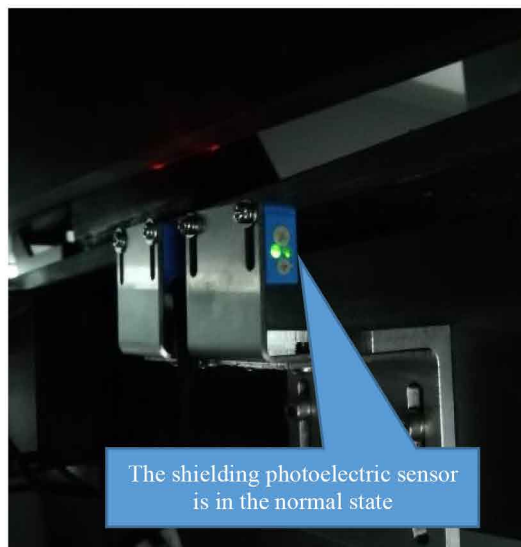
### 1.2. Adjustment method of the shielding photoelectric sensor position:

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;

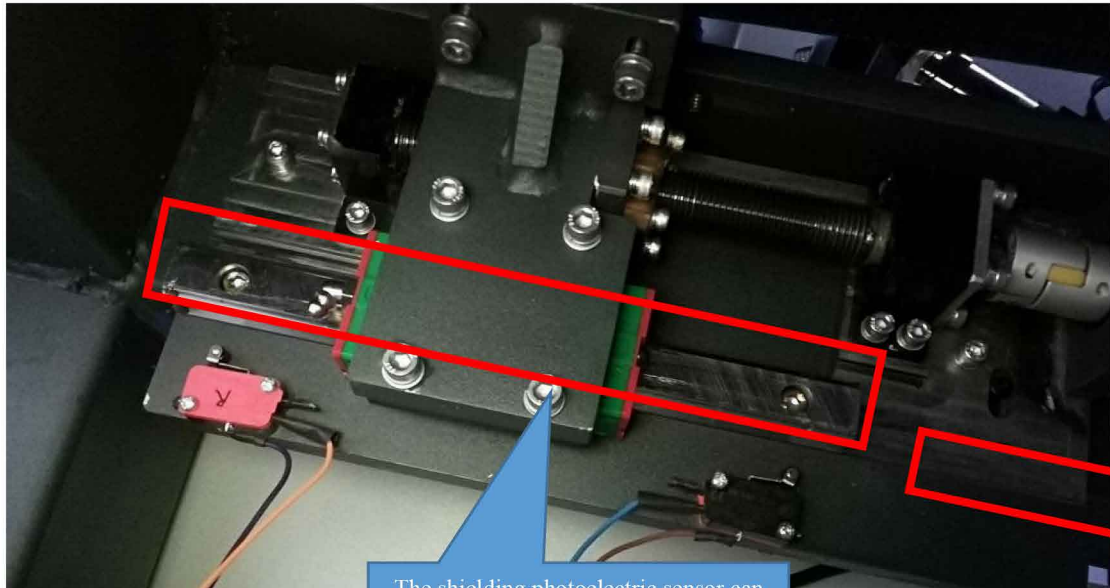
When the guiding belt is offset to the leftmost side, the yellow and green lights of the internal sensor and external sensor are on;

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



The shielding photoelectric sensor is in the normal state

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

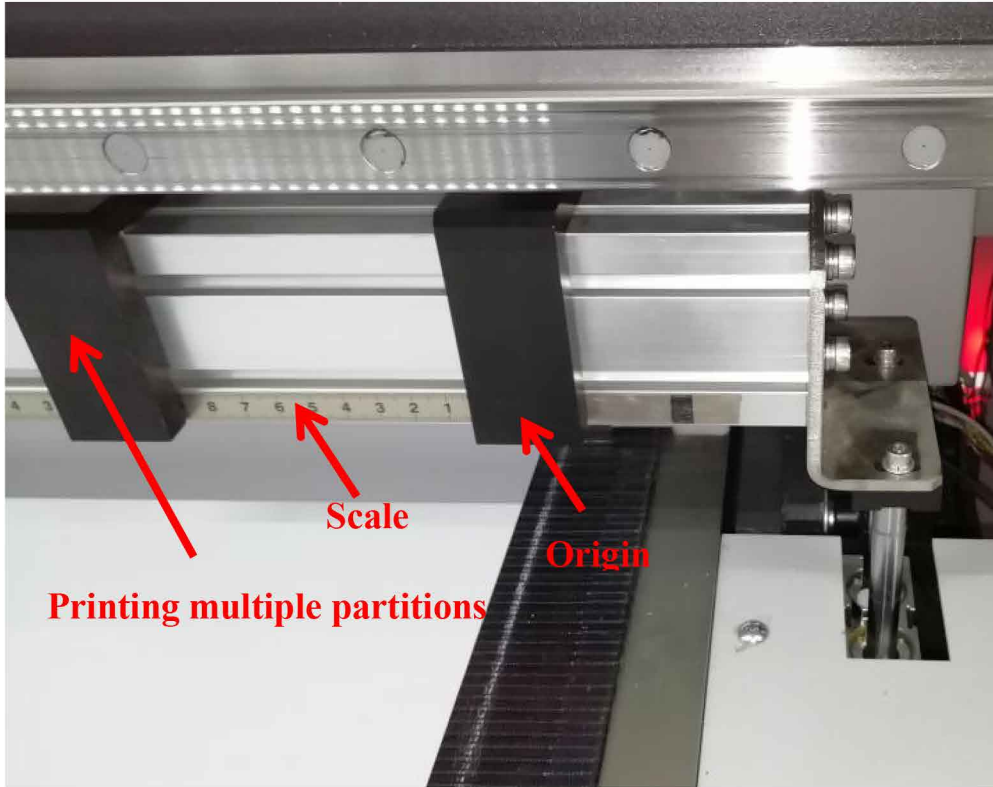


The shielding photoelectric sensor can be adjusted upwards, downwards, leftwards and rightwards.

## ■ Positioning rod function

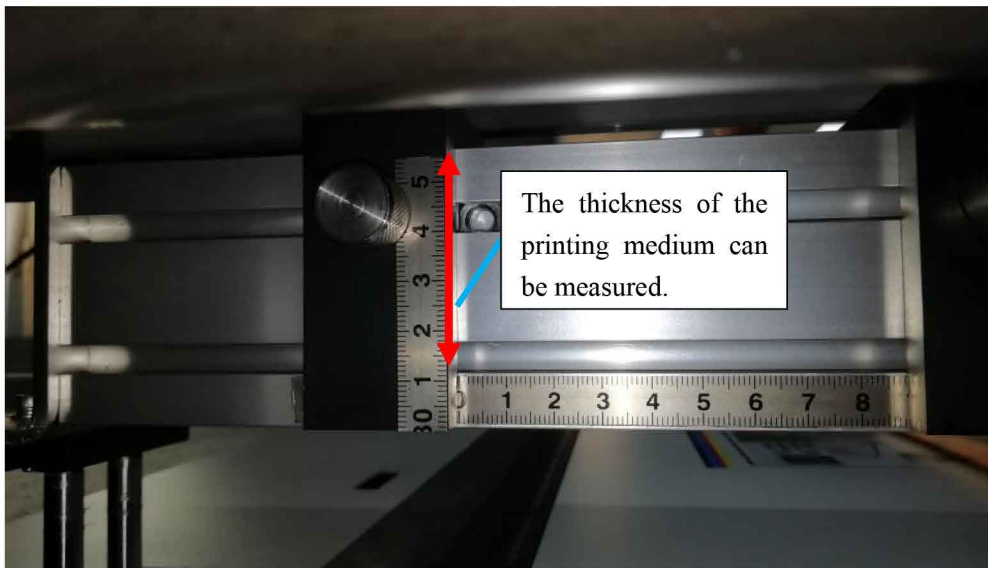
1. The positioning rod is controlled by the left and right cylinders. The positioning rod is provided with forward and reverse scale in the front and rear, and the scale partition can be moved at will, which can effectively solve the problem of printing multiple gaps.





### Feeding in front of the positioning rod

2. A scale for measuring medium thickness is added on the origin partition of feeding material behind the positioning rod. Actual value can be input on the software for faster and easier operation after measuring the thickness of the printing medium.



### Feeding in rear of the positioning rod

# Chapter 3 Ink addition and the control of positive and negative pressure

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- 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, 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, tighten 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.
5. 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***

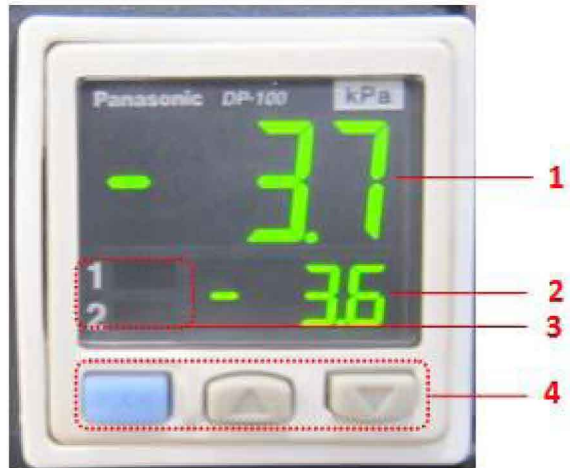
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Since negative pressure is an important parameter for guarantying print quality, the operation of its adjustment is crucial. The target of adjustment is to make ink form meniscus in every nozzle printer. As long as sound meniscus is maintained, we can assure that ink droplets are ejected at a high speed with few flight drops. Vacuum negative pressure system is applied to KC to control the ink droplet.

### **Introduction to the vacuum negative pressure system:**

The foregoing section has introduced that two-way negative pressure design is provided for KC series products. One is for colorful print heads and the other is for white print heads. However only one-way negative pressure design for solvent products. The reason of this design is that there is a larger difference between the viscosity of the white ink and that of others, so an exclusive negative pressure control is provided for the white, with the purpose of achieving better printing quality.

### **Introduction to the vacuum pressure switch (negative pressure gauge):**



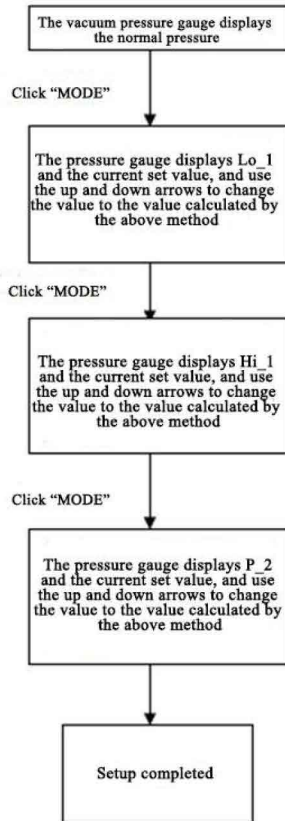
The vacuum pressure switch is shown in the figure, and the function of each area is introduced as follows:

- |   |  |
|---|--|
| <b>1: Pressure display area</b>         | <b>It displays the current pressure in the vacuum tank</b>                                   |
| <b>2: Setting pressure display area</b> | <b>It displays the set pressure value</b>  |
| <b>3: Signal output prompt</b>          | <b>It prompts the current output states of UT1 and OUT2</b>                                  |
| <b>4: Button operation area</b>         | <b>MODE: Mode setting, the up and down keys are used for setting values or turning pages</b> |

Note: **Please refer to reference file 2 for detailed operation of the vacuum pressure gauge or read the manual of the vacuum gauge.**

#### **Vacuum negative pressure adjustment**

Corresponding parameters have been set when the machine leaves the factory. However, the set valves may be needed to be micro-adjusted accordingly according to the local environment. You may adjust negative pressure value setting as per the following method:



The above is the setting method for setting value in differential mode, and the setting method in EASY mode is similar. But you only need to set values of P-1 and P-2. For more details, please refer to detailed operation of vacuum pressure gauge.

## Chapter 4 System Function

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Contents of this chapter:

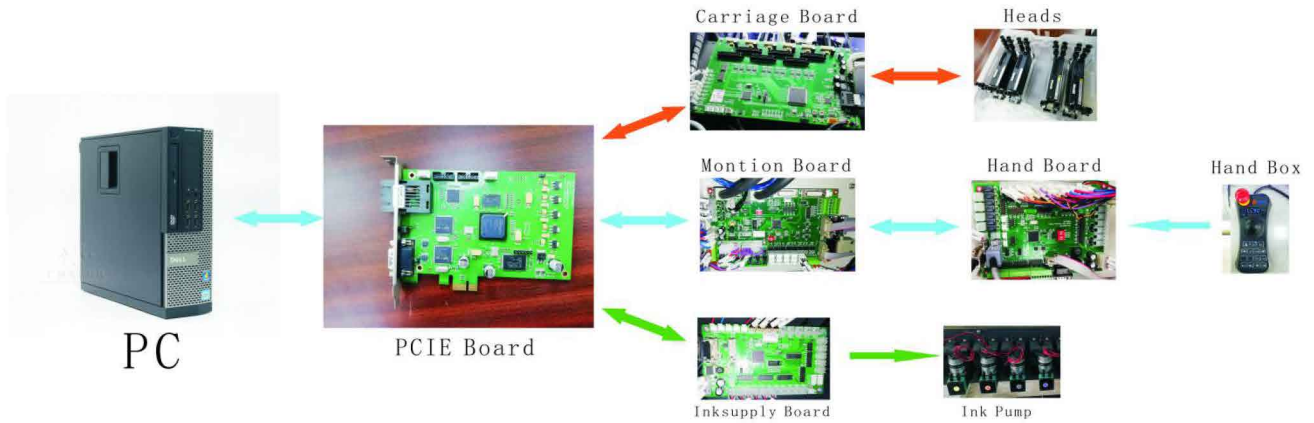
- Core Component
- PC
- PCIE board
- Koycera Heads Carriage board
- Konica Heads Carriage board

- **Motion board**
- **Hand-held box plate**
- **Correction plate**

- **Core Component**

The core part of the DS\_20xx Kyocera-KJ4A system is made up of PC+PCIE board + Carriage board+Motion board + Driver board+Kyocera KJ4A, as shown below:





Detailed description is as follows:

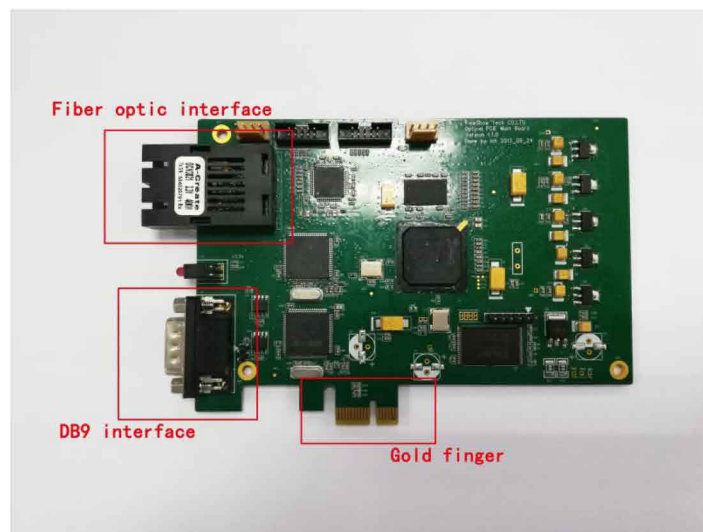
- **PC**

To guarantee the computer and the chassis grounding wire conform to the specifications. The requirements of the computer configuration have been introduced.

- **PCIE board**

PCIE board is the core of the DS machine. All commands and actions are issued by PCIE board. This circuit board is suitable for all KM1024i series, GEN5 and Kyocera print head machines, and is suitable for 1bit and 2bit printing.

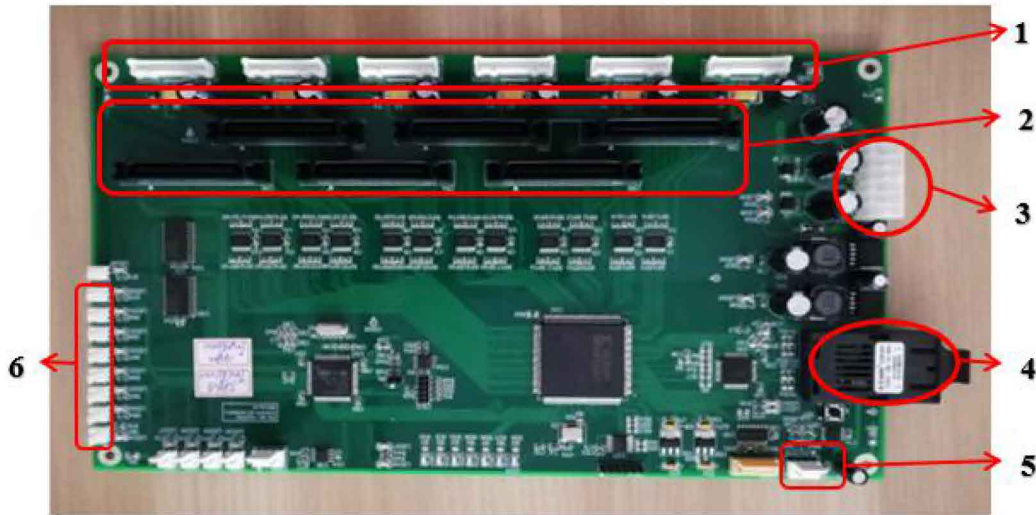
As shown in the figure below: during installation, firm screws of signal line interface should not be loosened.



- **Koycera Carriage board**

The main functions of Carriage board are receiving printing date of the print head, print head data loading and print control, print head temperature, voltage compensation control

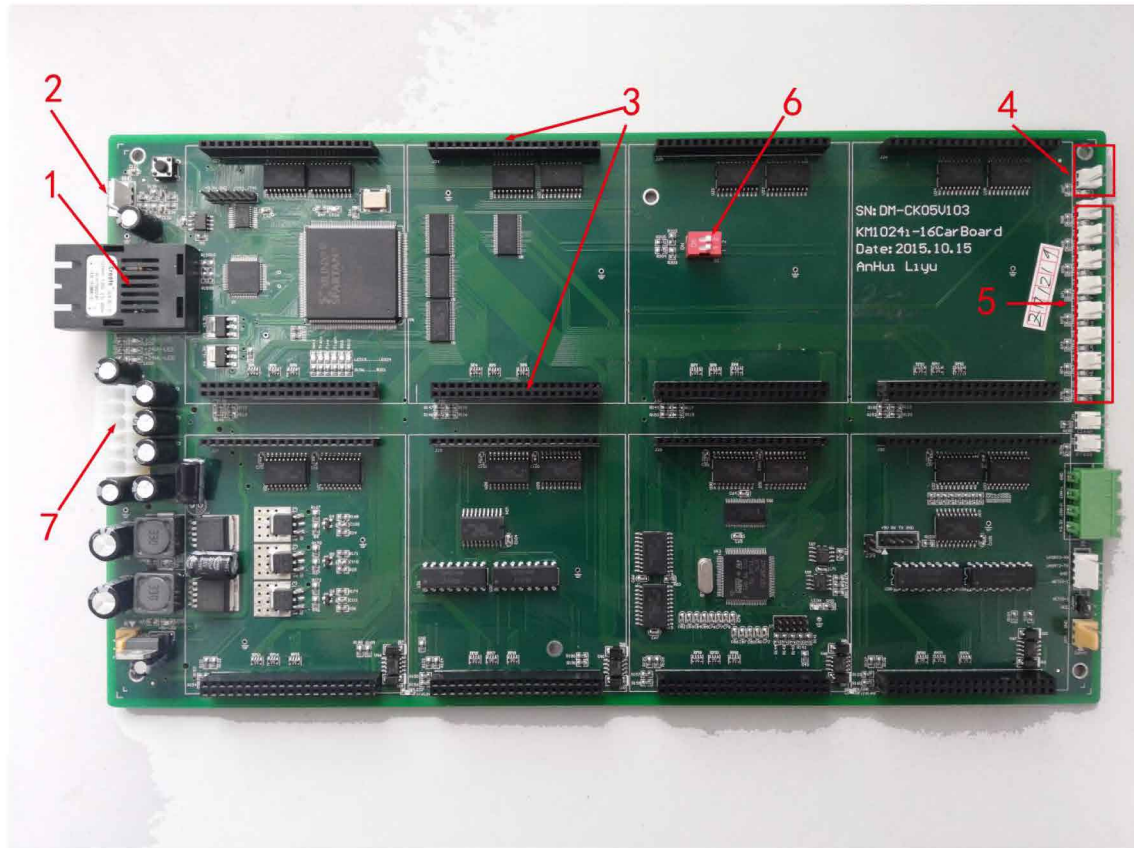
and liquid level detection. The schematic diagram is as shown below:



Code	Name of parts	Description
1	Power line interface for Kyocera print head	Connecting from carriage board to print head power line interface
2	Signal line interface for Kyocera print head	Connecting from carriage board to print head signal line interface
3	Power interface for board card	Provide power for carriage board
4	Fiber interface	Connecting TX\RX to PCIE board respectively
5	Optical grating decoder interface	Connect the optical grating decoder.
6	Interface signal for waste liquid tank and auxiliary ink tank	The sequence from the fixing screw of the board card is waste liquid signal, followed by KCMYLCLMWV.
7	Power interface for board card	Provide power for carriage board

● **Konica Carriage board**

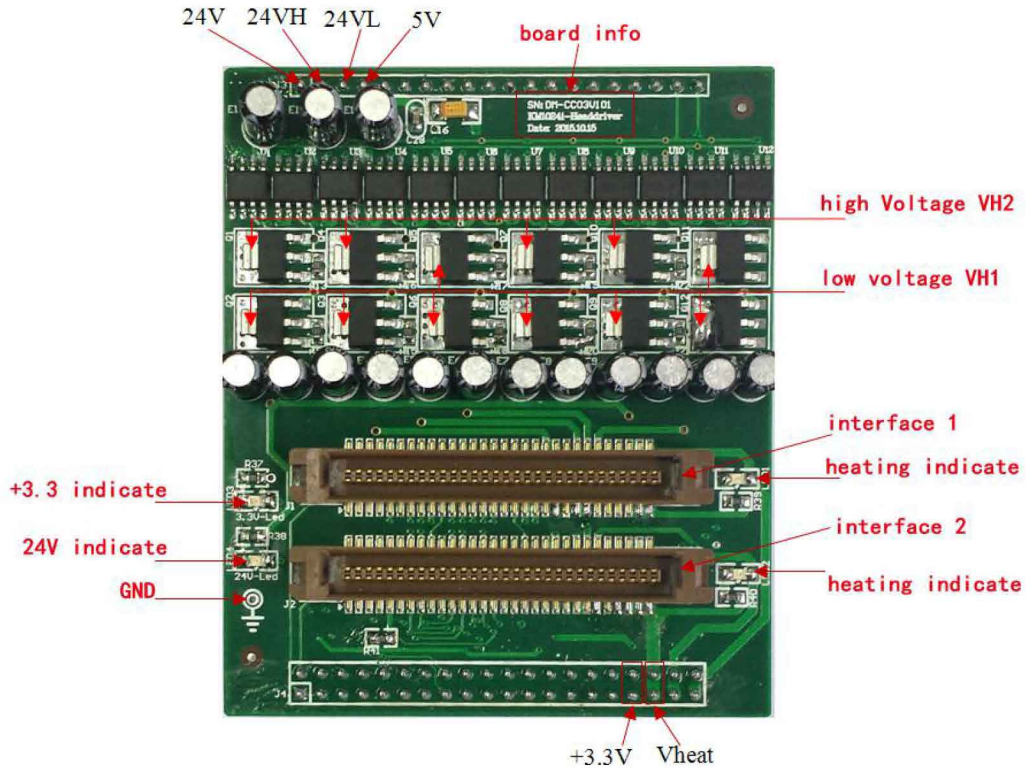
The main functions of Carriage board are receiving printing date of the print head, print head data loading and print control, print head temperature, voltage compensation control and liquid level detection. The following is the example of 14PL carriage board (CK05V105 for 6PL carriage board), figure as follow:



Code	Name of parts	Description
1	Fiber interface	Connect TX, RX respectively.
2	Optical grating decoder interface	Connect the optical grating decoder.
3	Driver board interface for print head	Be careful not to insert the pin obliquely during installation of the driver board for print head.
4	Liquid level signal of waste liquid tank	The whole machine stops running once the signal in the waste liquid tank is valid.
5	Supply ink liquid level signal	Guarantee printing is stable ink supply.
6	Dial switch	Do not toggle this switch, otherwise it will cause abnormal operation.
7	Power interface for board card	Provide power for carriage board

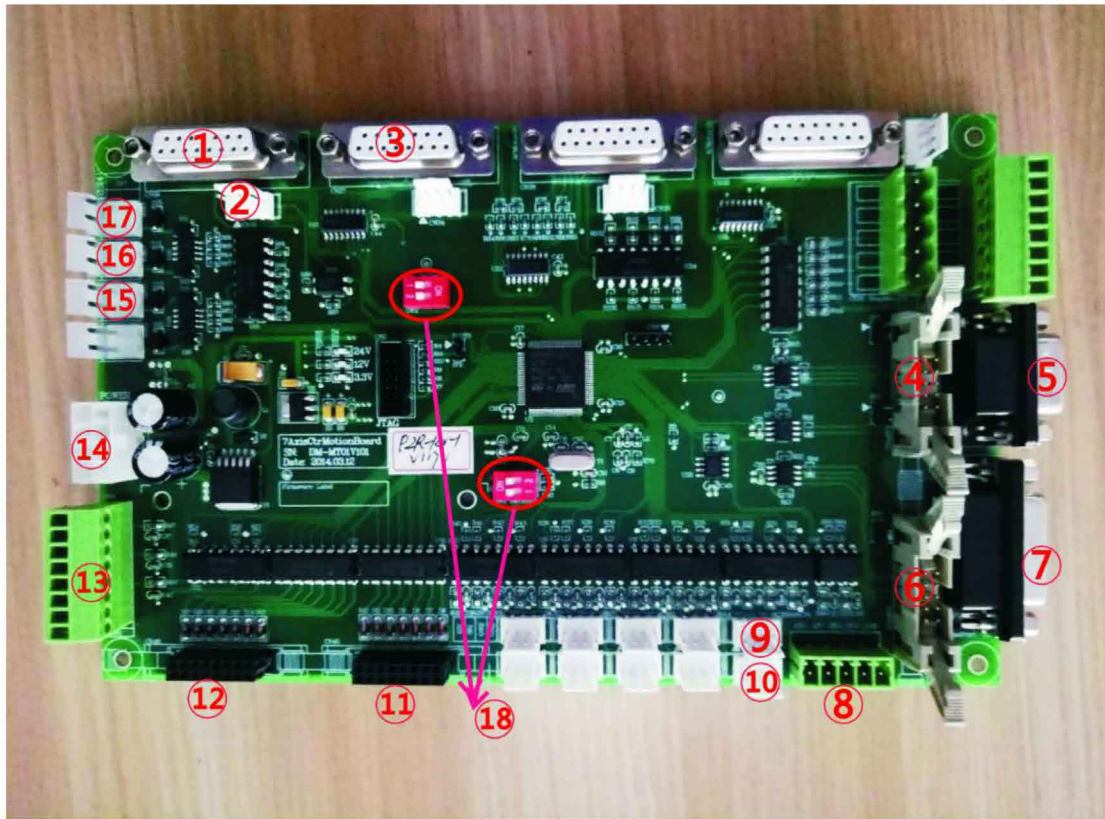
● Driver board

As shown on the right, as the driver board for print head, Driver board plays a role in driving the print head, providing with voltage and data needed by the print head.



● **Motion board**

As the motion control board, motion board mainly realizes the motion control of X, Y and Z motors, together with the control of UV lamp and ink scraping.



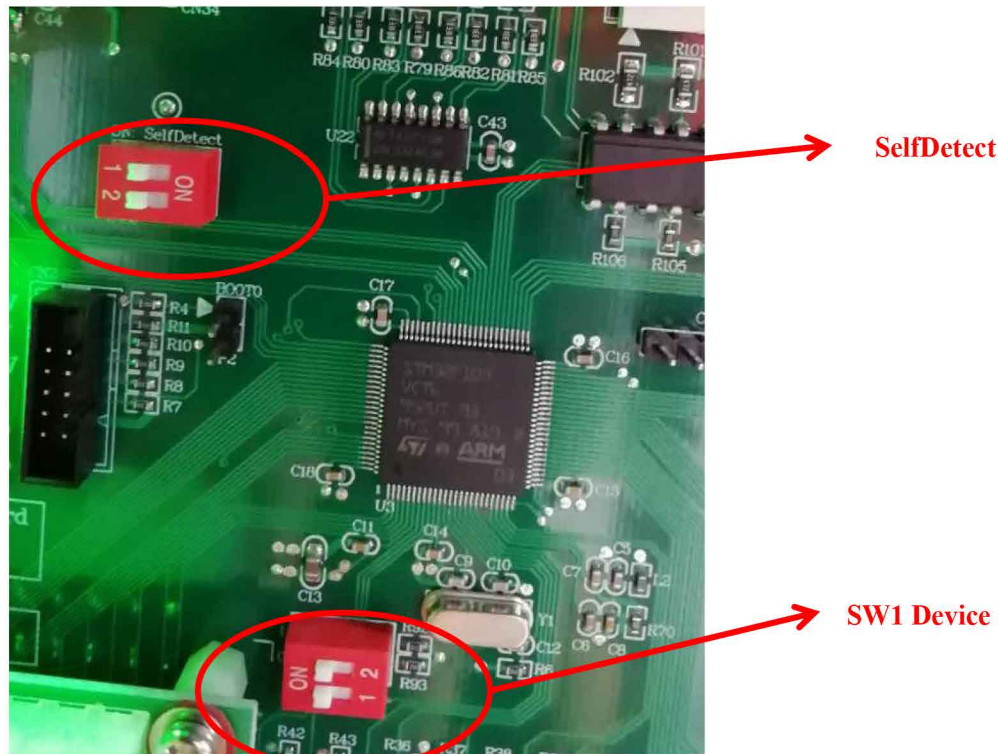
Code	Name of parts	Description
1	Y Motor control signal interface	Control the motion of motor in X direction
2	X Left limit switch & X Right limit switch	The limiting plays an function of protection.
3	Control signal interface of the guiding belt motor	For controlling the movement of the guiding belt driving roller motor
4	To hand-held box plate	Connect the signal of the hand-held box plate
5	USB	Connect to PCIE board and ink supply board respectively
6	Connect to the control relay of the UV lamp	Control the power of UV lamp
7	Adapter board interface for sensor signal on the carriage	Connect the sensing signal on the carriage for transmission
8	Interface for maintenance function	To achieve the maintenance function
9	X Left limit sensor	It is a photoelectric sensor that plays a role in limiting and positioning
10	X-right limit sensor	It is a photoelectric sensor that plays a role in limiting and positioning
11	UV Lamp control 2	Control the signal of UV lamp
12	UV Lamp control 2	Control the signal of UV lamp

13	Ink scraping sensor signal	Control the automatic ink scraping sensor
14	Power for board card	Provide power for motion control board
15	Height measurement control signal interface	Control of measuring the height of medium automatically
16	Signal interface for automatic ink pressing	Control the automatic ink pressing
17	Signal interface for automatic cleaning	Control the automatic cleaning blade after ink scraping
18	Dial switch	Dedicated to DS

Note: The dialing switch in item 18 is DS. Special gear: (different settings for different models)

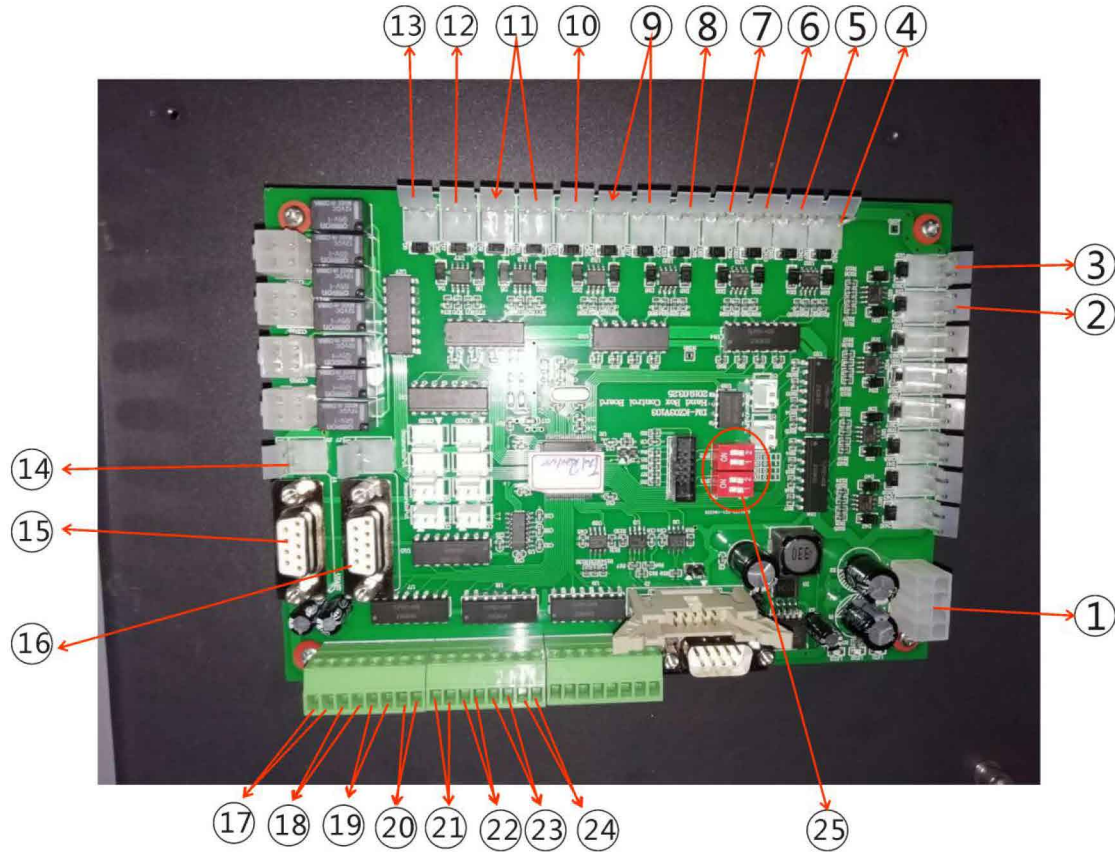
1. Set SelfDetect dialing switch to 1|2 state (working mode);
2. The automatic scraping is effective when dialing the SW1 Devices from 1 to ON; the motor of roller shutter is effective when dialing 2 to ON. Dialing 2 to OFF for printer without roller shutter.

As shown in the following figure:



- Control plate for hand-held box

Function of the hand-held box:



Code	Name of parts	Description
1	Power interface	24V and 12V
2	Signal interface for right back adsorption button	Adsorption button control
3	Signal interface for left back adsorption button	Adsorption button control
4	Empty	Reserved
5	Signal interface for front and rear lever landing alarm	Landing alarm
6	Signal interface for lights of the printing bin	Control the lighting of the printing bin
7	Signal interface for red light strip	Red means ready mode
8	Signal interface for blue light strip	Blue means printing mode
9	Signal interface for positioning rods for left and right buttons in the rear	Control the left and right positioning rods
10	Signal interface for	Control the solenoid valve of the

	<b>solenoid valve of the positioning rod</b>	<b>positioning rod</b>
<b>11</b>	<b>Signal interface for back rod for left and right buttons in the rear</b>	<b>Control the left and right rear pressure bar</b>
<b>12</b>	<b>Signal interface for solenoid valve of the rear pressure bar</b>	<b>Control the solenoid valve of the rear pressure bar</b>
<b>13</b>	<b>Signal interface for solenoid valve of the front pressure bar</b>	<b>Control the solenoid valve of the front pressure bar</b>
<b>14</b>	<b>Emergency stop interface</b>	<b>Control the emergency stop</b>
<b>15</b>	<b>Hand-held box interface</b>	<b>Control the hand-held box</b>
<b>16</b>	<b>Adsorption conversion interface</b>	<b>Control the Adsorption frequency converter</b>
<b>17</b>	<b>Signal interface for adsorption button indicator</b>	<b>Indicator signal</b>
<b>18</b>	<b>Signal interface for indicator of repeat print button</b>	<b>Indicator signal</b>
<b>19</b>	<b>Signal interface for indicator of positioning rod button</b>	<b>Indicator signal</b>
<b>20</b>	<b>Signal interface for indicator of rear pressure rod button</b>	<b>Indicator signal</b>
<b>21</b>	<b>Signal interface for cylinder sensor of front pressure rod</b>	<b>Control the cylinder signal</b>
<b>22</b>	<b>Signal interface for cylinder sensor of rear pressure rod</b>	<b>Control the cylinder signal</b>
<b>23</b>	<b>Signal interface for cylinder sensor of positioning rod</b>	<b>Control the cylinder signal</b>
<b>24</b>	<b>Ink scraping signal</b>	<b>Control the ink scraping signal</b>
<b>25</b>	<b>Dial switch</b>	<b>Settings may vary from model to model.</b>

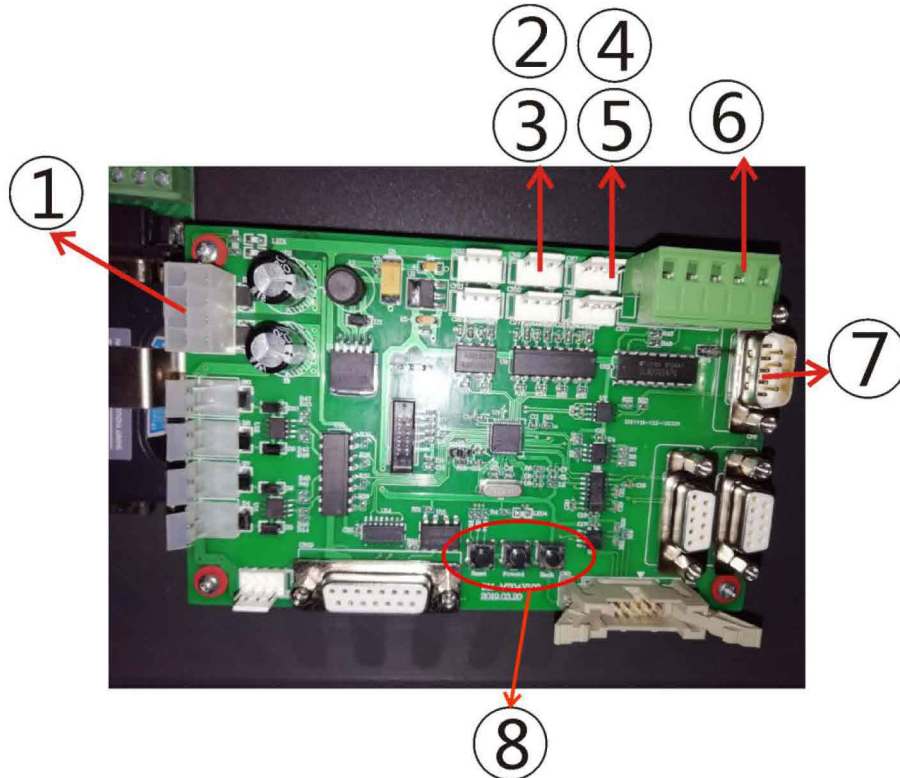
Note: In item 25, when the dial switch corresponds to the DS guiding belt printer: dial D0, D1 to OFF, and D2, D3 to ON:

OFF		D0
OFF		D1
	ON	D2
	ON	D3



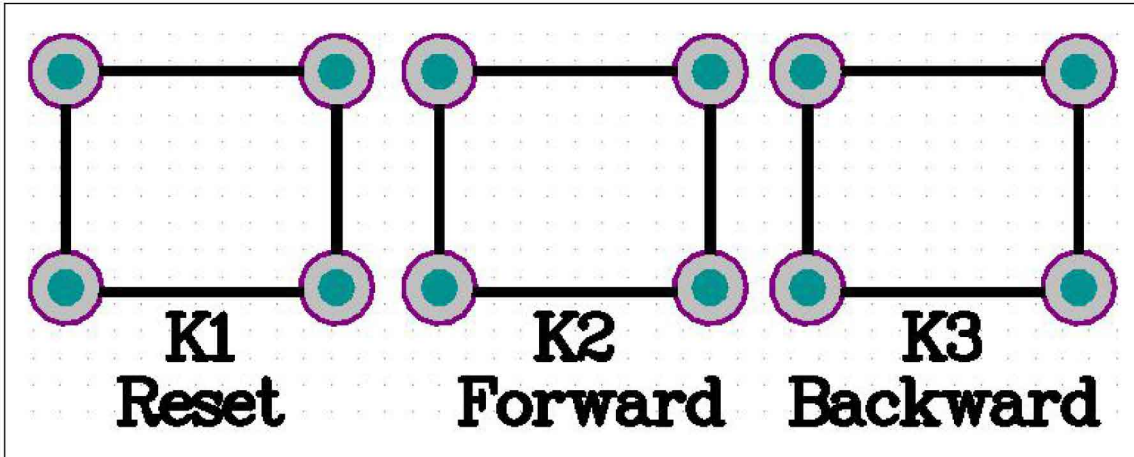
● **Correction plate**

Use the sensor to get the current location of the guiding belt. Adjust the correction roller according to the operation of the guiding belt to achieve the location correction when the guiding belt moves and keep it in the center of the platform.



Code	Name of parts	Description
1	Power line interface	24V and 12V
2	(Front) Interface for correction sensor of guiding belt	Control the limit of correction rod
3	(Rear) Interface for correction sensor of guiding belt	Control the limit of correction rod
4	(Front) Interface for limit switch of correction rod	Control the right deviation of guiding belt
5	(Rear) Interface for limit switch of correction rod	Control the left deviation of guiding belt
6	Signal interface for correction motor	Control the corrector motor
7	Interface for connecting to movable board	Connecting to movable board
8	Onboard manual button	Explains as follows

Explanation: onboard manual button functions are as follows:



K1 Reset button	Short press	The correction shaft will return to the middle, and the automatic correction will be enabled. System indicator action: None
	Long press	The correction shaft will reset (the shaft travel will be measured and return to the middle), and the automatic correction will be enabled. System indicator action: the indicator goes out first and lights after a long press time, and the state of long press state will be reminded. The shaft will carry out reset action after releasing the button.
K2 Forward button	Short press	The correction shaft steps forward at a fixed distance, and the automatic correction will be disabled. System indicator action: the indicator goes out and will not light again. And a prompt that the board card will not perform the automatic correction program now will be appeared. The board car can only perform the automatic correction program after short/long press the Reset button or power on again, and the indicator will return to flash.
	Long press	The correction shaft continues forward until the maximum shaft travel is reached, and the automatic correction will be disabled. System indicator action: the indicator goes out first and lights after a long press time, and the state of long press state will be reminded. The system will perform manual shaft movement until the button is released. The system indicator will go out again and will not light again. And a prompt that the board card will not perform the automatic correction program now will be appeared. The board car can only perform the automatic correction program after short/long press the Reset button or power on again, and the indicator will return to flash.

K3 Backward button	Short press	The correction shaft steps backward at a fixed distance, and the automatic correction will be disabled. System indicator action: the indicator goes out and will not light again. And a prompt that the board card will not perform the automatic correction program now will be appeared. The board car can only perform the automatic correction program after short/long press the Reset button or power on again, and the indicator will return to flash.
	Long press	The correction shaft continues backward until the maximum shaft travel is reached, and the automatic correction will be disabled. System indicator action: the indicator goes out first and lights after a long press time, and the state of long press state will be reminded. The system will perform manual shaft movement until the button is released. The system indicator will go out again and will not light again. And a prompt that the board card will not perform the automatic correction program now will be appeared. The board car can only perform the automatic correction program after short/long press the Reset button or power on again, and the indicator will return to flash.

## Chapter 5 Maintenance and Service

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Contents of this chapter:

- **Daily maintenance instructions**
- **Print head maintenance instructions**
- **Ink use guidelines**

## ● ***Daily maintenance instructions***

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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***

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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.

## ● ***Ink use guidelines***

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### **1. Special Note:**

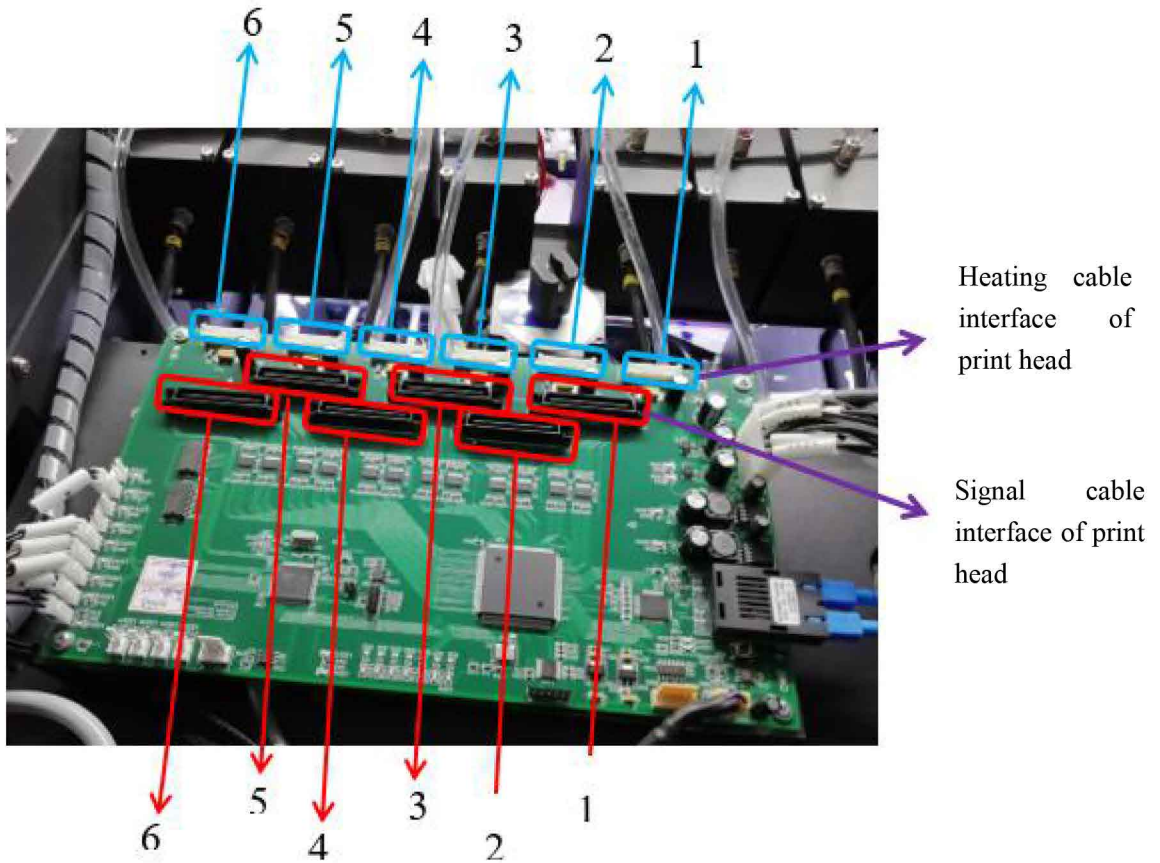
Any part of the ink or ink path shall not touch water or any solution containing water molecule, otherwise gel would come into being which will block the ink path and even the print head.

### **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.



◆ Introduction of KONICA 1024i 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 14PL and 6PL ink dot, among them the 6PL supports the grayscale printing. Two rows of ink eyelets are respectively on both right and left sides of the bottom of each 1024i print head; 512 nozzles stand in each row and a print head has 512x2=1024 nozzles.