BP84F UV FLATBED PRINTER [8'X4'] FOR RIGID MEDIA SUBSTRATES

CHAPTER 1   SAFETY INSTRUCTIONS

1.1 Important Safety Instructions

Please read the following instructions before setting up the machine. Do observe thewarnings and instructions labeled on the machine.

Do not block any openings of the printer cover.

Do not insert any object into the notches of the printer. Please do not spill liquid tothe printer.

Only use AC 220V power supply.

Avoid using the same electrical circuit with some machines which switch on / offregularly (copier or air-condition system. etc.)

To avoid using socket controlled by wall-board switch or auto-timer.

Keep your computer system away from potential sources of electronic-magnetic interference, such as speaker and cordless telephone.

Never use damaged or worn power cord.

Never attempt to repair the machine without authorization by BesPrint.

As to following situations, please cut off the power, then call for service: when liquidsplash into the printer; when the printer crash or the enclosure damaged when the printer cannot work properly or a distinct change in performance occurs.

1.2 Notice for Printer Use

Do not move the print head by hand when the power is not cut off, as this may damage the printer.

Always use the power button to turn off the printer. When you press this button, the power will be cut off. Do not unplug the printer cable or USB line before the power iscut off.

Make sure the print head is in initial position and fixed it before moving the printer.

1.3 Notice for Ink Bottle Use

Please put the ink bottle out of reach by children and do not let them drink ink, ortouch the ink bottle.

If ink splash to skin, wash with soap and water. If the ink splashed into eyes, pleaserinse with water immediately and consult your doctor.

Regularly clean up the waste ink tank to avoid a high concentration of ink fumes.

1.4 Position of Printer Installation

Please place the printer at a horizontal platform, which is larger than printer. If it is tilted, the printer must be adjusted horizontal before proceeding next installation step.

Avoid to place the printer in an environment where the temperature and humidity are prone to dramatic changes. Prevent the printer from direct sunlight, strong light or heat sources.

Avoid to place the printer in a place where vibrating or shaking occurs easily

Leave enough space around the printer to make sure that the printer can work properly

1.5 Working environment

Keep the room temperature range from 20 to 30 degrees Celsius, humidity range from 40% to 60%. Air conditioning with temperature hygrometer are required. The machine must be kept away from strong interference sources of radiation while the floor must be flat.

1.6 Power Supply

The printer requires 2 outlets AC 220V and 15A.

The printer must be grounded (voltage between the encasement and earth cannot be greater than 1v, grounding resistance should be less than 3Ω)

Printer shall be equipped with UPS or voltage stabilizer.

Chapter 2 Equipment Installation

2.1 System Requirements for Computers

1) Recommended requirements for printer computer

● CPU: Core i7 and above, 3.20G HZ

● Memory: 8Gb above

● Hard disk: SSD 256Gb (at least 20Gb available space)

● Main board: support USB 2.0 and 3.0 interface

● Network Adapter

● Operation system: WIN7 64bit

2) Recommended requirements for Photoshop, AI, Photoprint, and ColorGATE

● CPU: I7 4770K above

● Memory: 16Gb 1600 above

● Hard disk: SSD 500Gb above (using NTFS format）

● Main board: support USB 2.0 and 3.0 interface

● Network Adapter

● Operation system: WIN7 64bit ultimate version

Chapter 3 Main Structure and Component

3.1 View

Ink Purge

| Emergency Stop | Suction Switch 2 | Suction Switch 1 | UV Light Switch | Dowel Pin Down | Dowel Pin Up |

| Ink Low | Negative Pressure system | Bottle-Heating Switch | Power Switch | Emergency Stop |

Bottle Heating Cotroller

Main Power Input

Vacuum Power

Power Switch

Vacuum Power

UV Power

UV Lamp2

UV Lamp1

UV Signal Output

Cooling water In/Out

Vacuum Valve
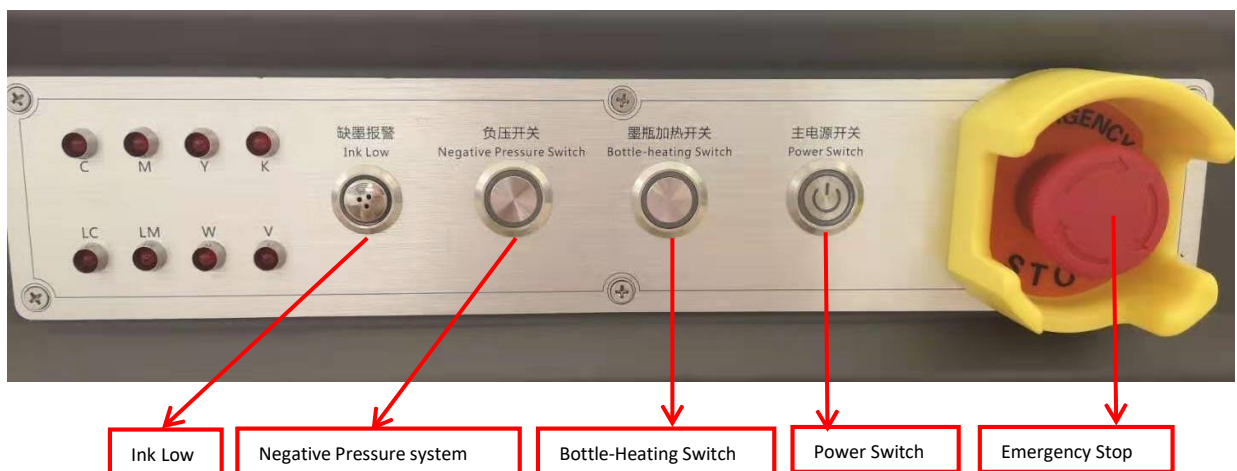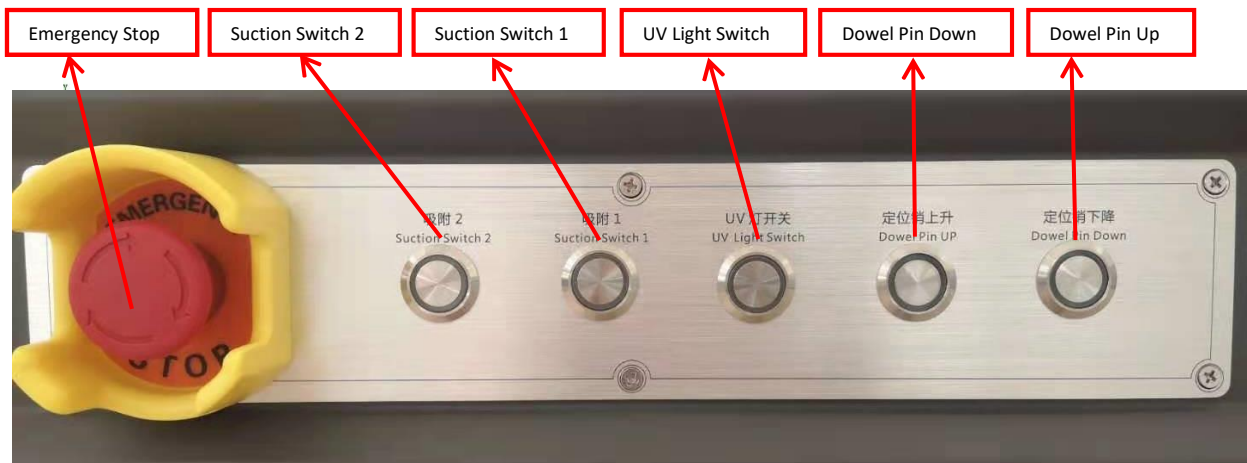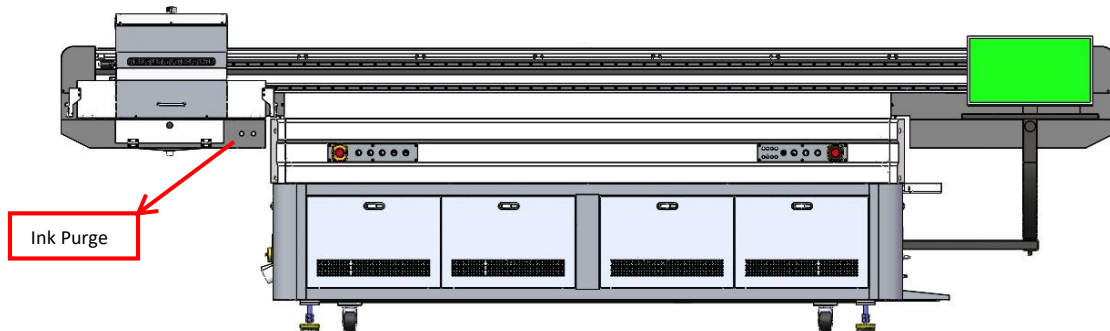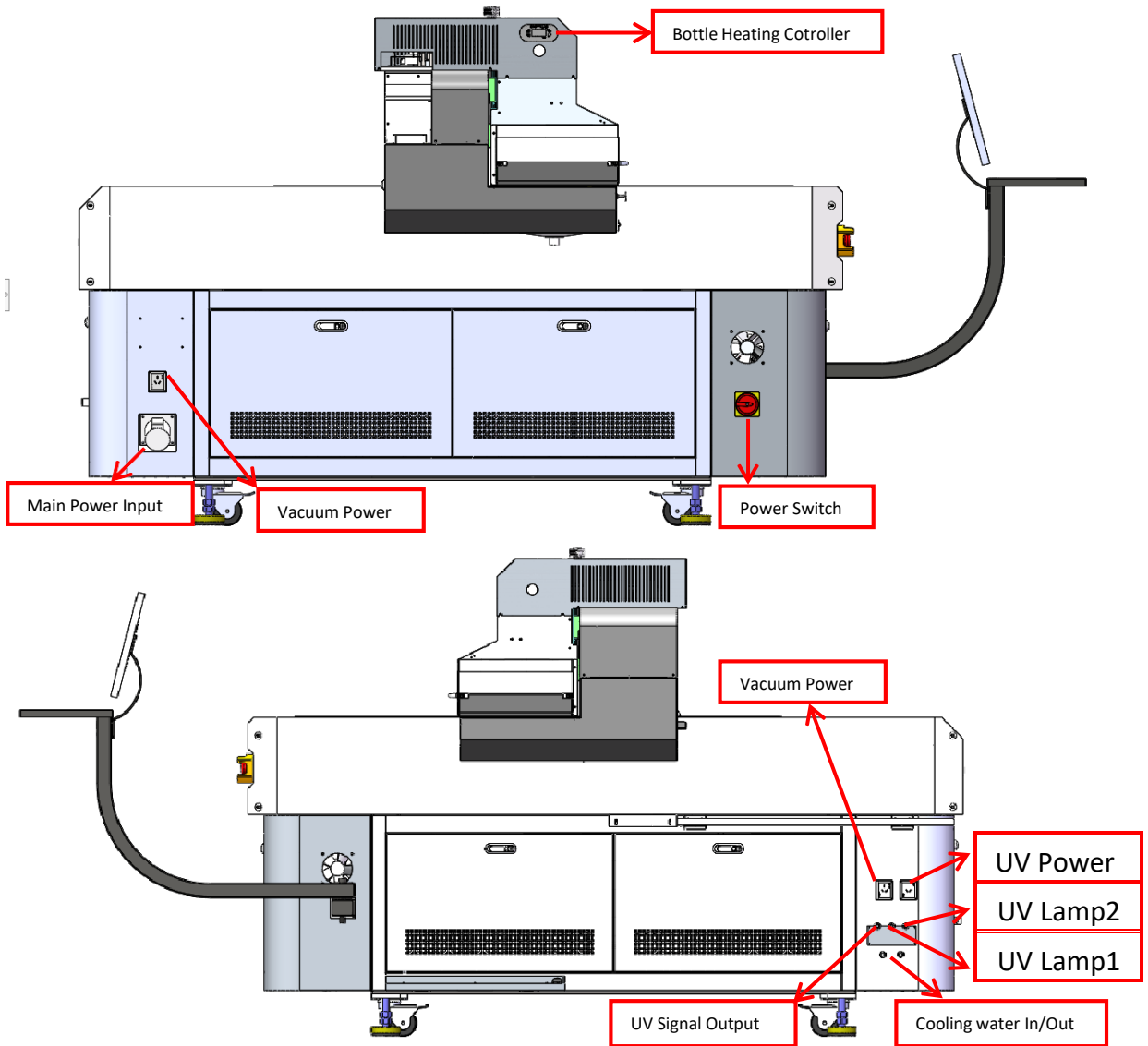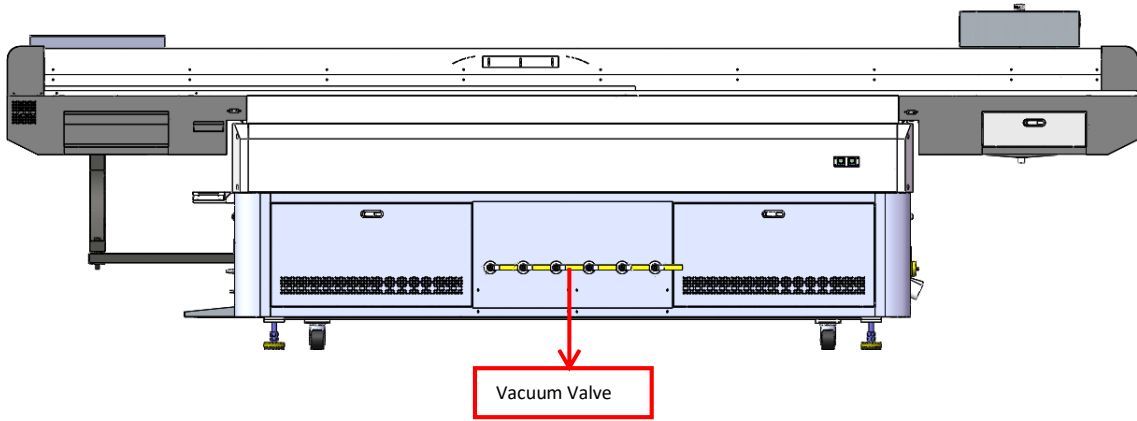
3.2 Ink Circuit and Air Pressure System
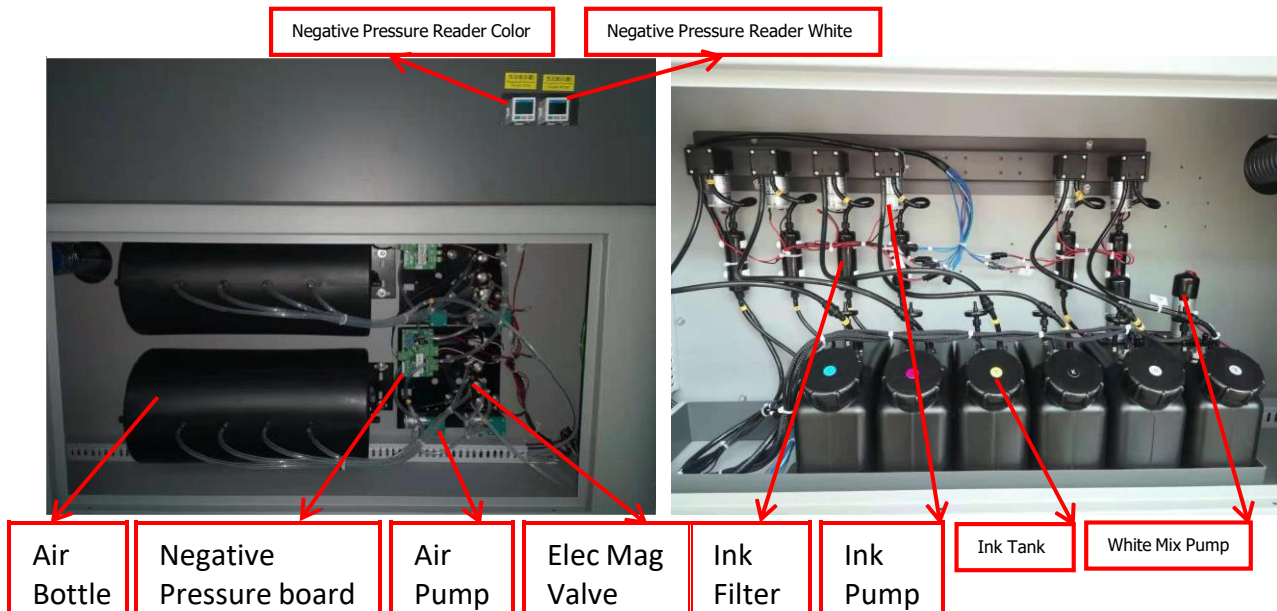
Name	Function
Air Bottle	Storing air
Air Pump	Provide positive / negative pressure
Ink Tank	Storing ink
Ink Pump	Pump the ink from main ink tank to the Sub-ink tank
Ink Filter	Filters the particles and impurities in ink
Negative Pressure Board	Control the negative pressure system
Elec-Mag Valve	Open/Close air channel
White Mix Pump	Stir the white ink
Color Negative Pressure Reader	Display the color ink negative pressure
White Negative Pressure Reader	Display the white ink negative pressure

3.3 Electrical system

RICOH-GEN5-8H(SATA)示意图
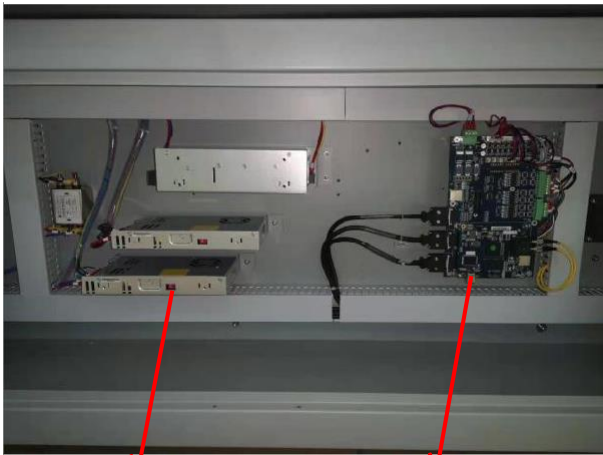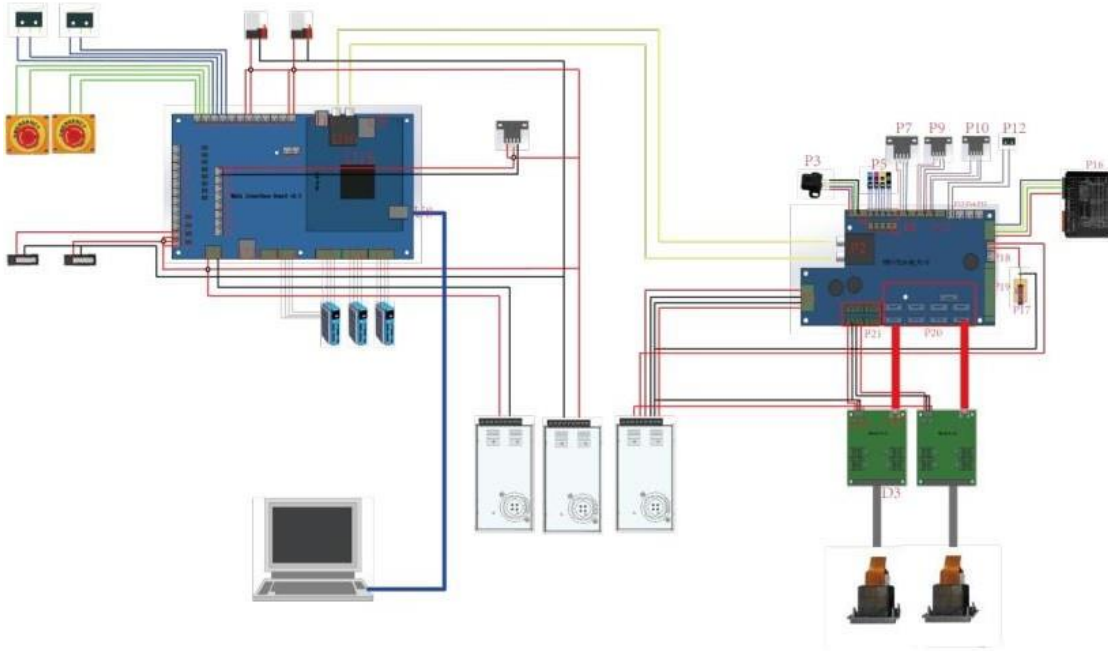
24V DC Power Supply Box   Mainboard   Y Axis servo Driver 2   Y Axis servo Driver 1   X Axis servo Driver

Name	Function
Main board	Control printing system
24V DC Power Supply Box	Supply power for printing system
X Axis servo Driver	Control the X axis movement
Y Axis servo Driver 1	Control the Y axis movement
Y Axis servo Driver 2	Control the Y axis movement

3.4 Carriage and LED UV Lamp Control System

Negative pressure tank

| UV Lamp 1 | Sub ink tank | 3-way manual valve | Height Sensor | UV Lamp 2 |

LED UV Lamp Control System
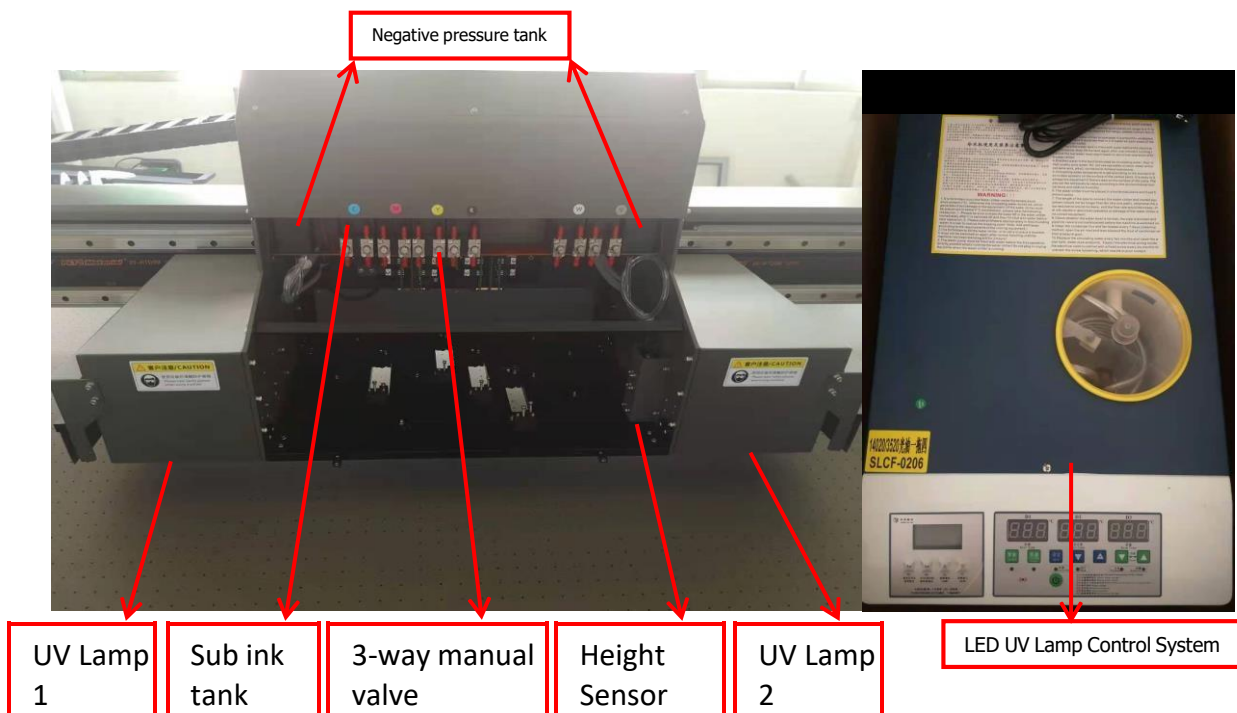
Name	Function
Negative pressure tank	Increase stability of negative pressure
Sub-ink tank	Supply ink to the printhead directly
Three-way Manual Valve	Control the open or close between the print head and the ink circuit, also the switch of cleaning liquid and ink
LED UV Lamp Control System	Control the power of the UV lamps

UV lamp 1	Ink curing
UV lamp 2	Ink curing
Height Sensor	Detect material height

3.5 Mainboard InstructionAs

shown below:
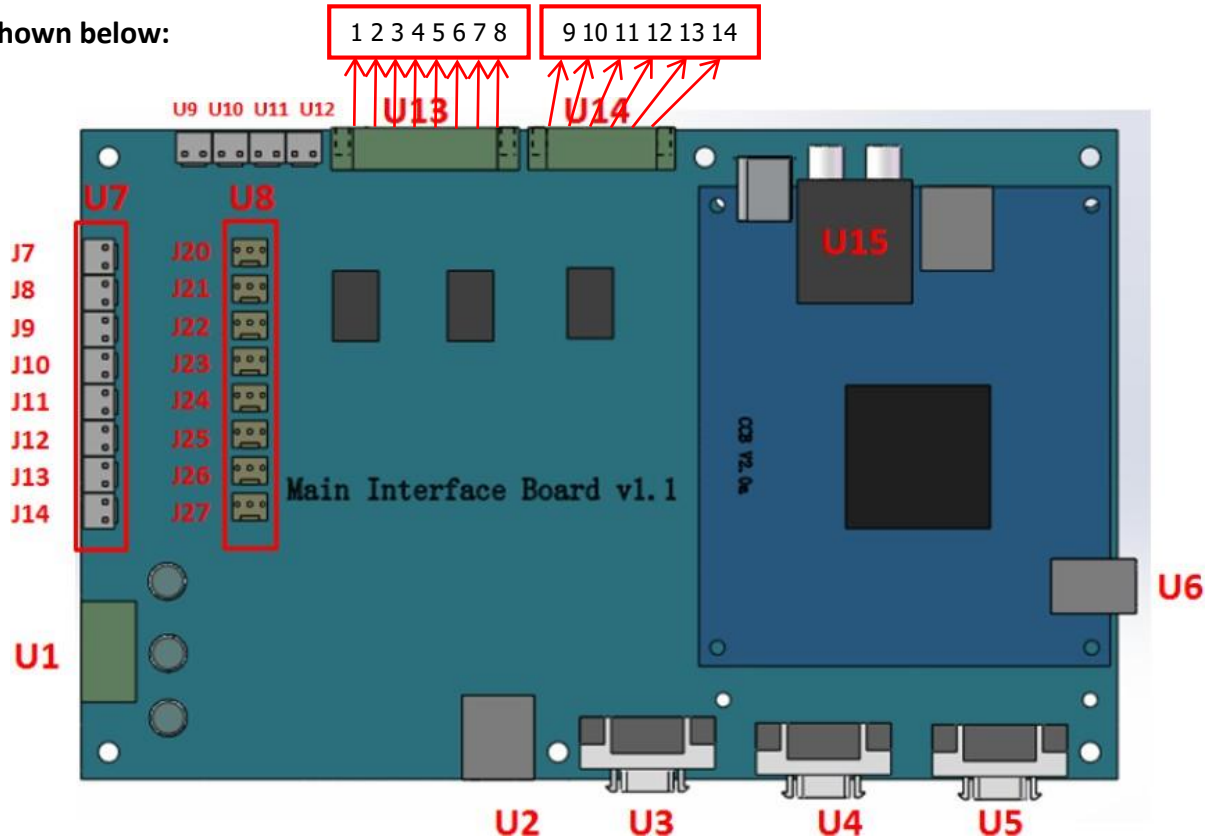
NO	Function Introduction	NO		
U1	+24V DC Power	U9		Left Emergency Switch
U2	Network	U10		Right Emergency Switch
U3	Differential X Axis Motor	U11		Left Limit Switch
U4	Differential Y1 Axis Motor	U12		Right Limit Switch
U5	Differential Y2 Axis Motor		1	GND
U6	USB2.0 Cable		2	Spare Port
J7	Spare Port		3	Spare Port
J8	Spare Port	U13	4	C Supply Ink
J9	Spare Port		5	M Supply Ink

U7	J10	Spare Port		6	Y Supply Ink
	J11	Spare Port		7	K Supply Ink
	J12	UV lamp Power		8	Lc Supply Ink
	J13	UV lamp shutter		9	GND
	J14	UV lamp shutter		10	Lm Supply Ink
U8	J20	X Origin	U14	11	W Supply Ink
	J21	Y POS-LMT		12	V Supply Ink
	J22	Y NEG-LMT		13	White circulatory system
	J23	Y1 Origin		14	Spare Port
	J24	Reserve	U15		Fiber A B
	J25	Y2 Origin			
	J26	Spare Port			
	J27	Spare Port			

3.6 Head Board Instruction
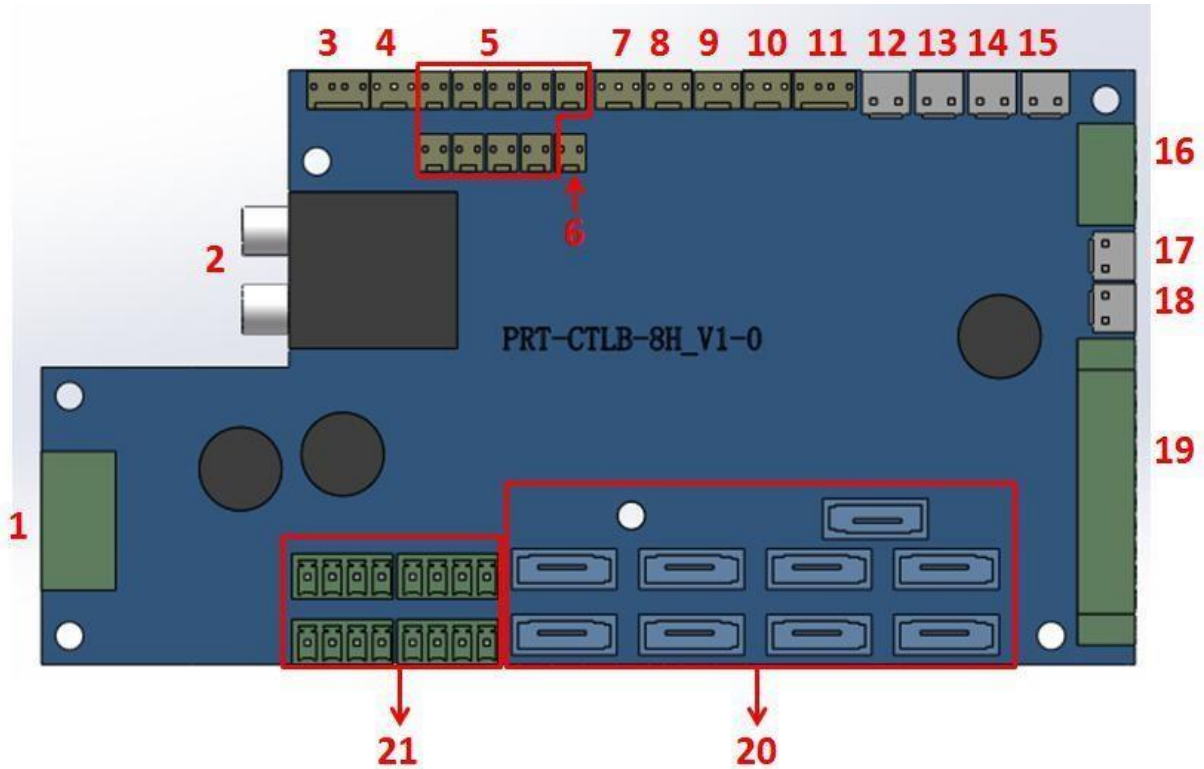
NO	Function Introduction	NO	Function Introduction
1	+24V DC5A Power	12	X Emergency Switch
2	Fiber A B	13	Spare Port
3	Raster Encoder	14	Spare Port
4	Spare Port	15	Spare Port
5	C/M/Y/K/Lc/Lm/W/V Supply Ink	16	Z motor driver
6	Safe supply Ink	17	Detect Height sensor
7	Carriage lifter Origin	18	Spare Port
8	Spare Port	19	Spare Port
9	Carriage POS-LMT	20	SATA Cable Port Connect Headboard and Printhead

10	Carriage NET-LMT	21	Head board +37V Input
11	Carriage lifter raster		

3.7 Printhead cable connection
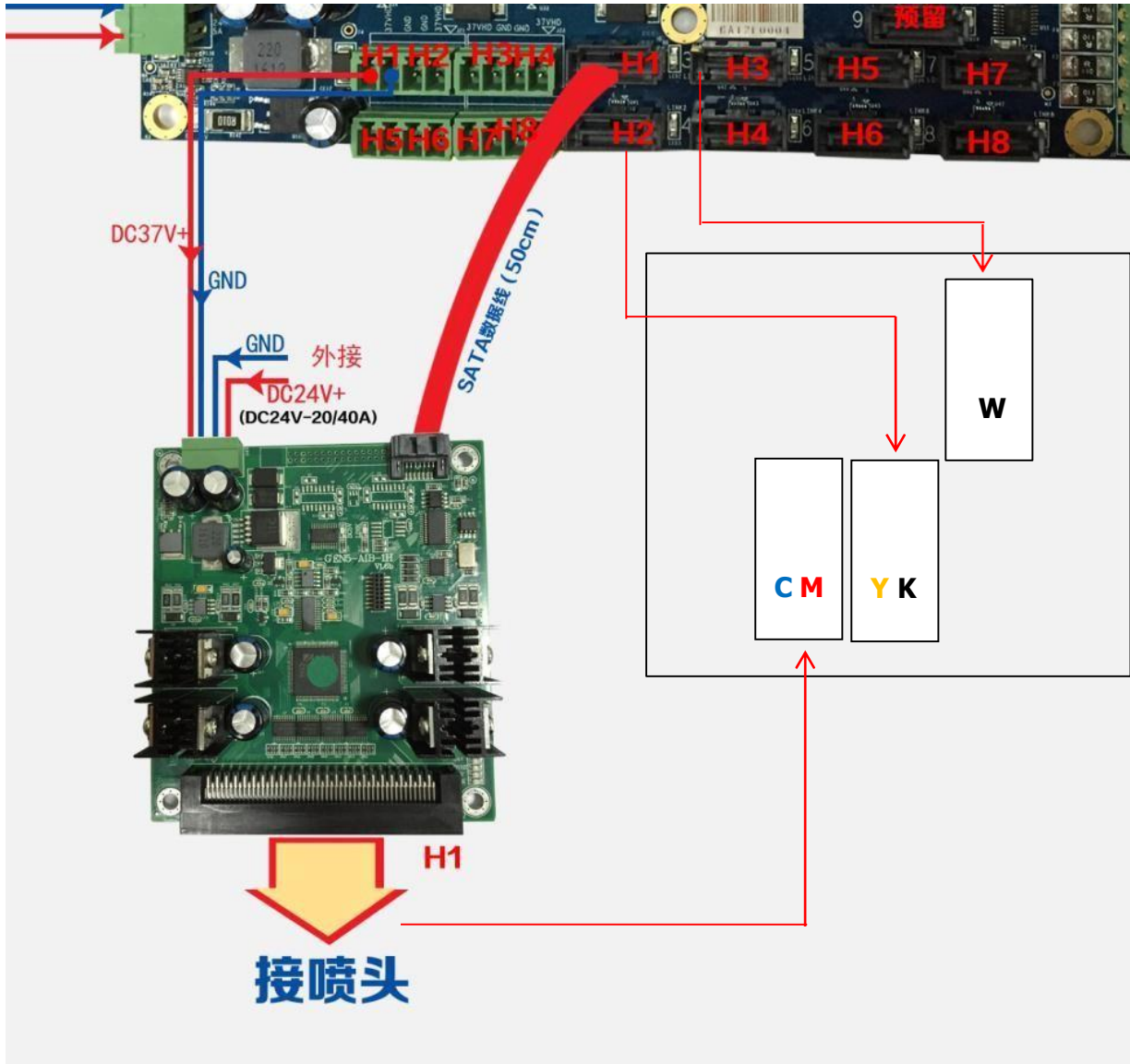
Printhead cable must be properly installed, otherwise the head will be burnt out
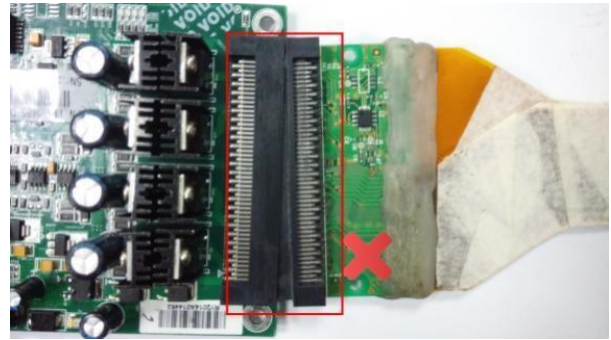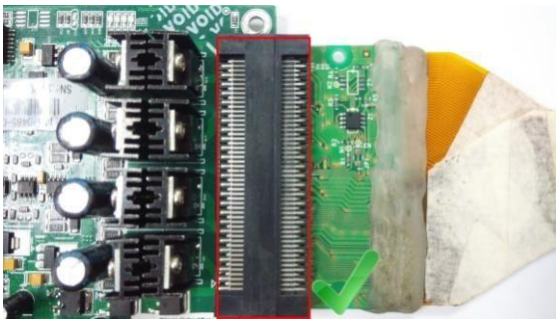
Note that the connection is unique regardless of the installation mode of the head plate, otherwise,the head or cephalic plate may be burnt out.

3.8 Main Characteristics parameters

Print Head Set: Standard 2/3/4/5/6pcs GEN5

Print Resolution: X Direction 720 DPI; Y Direction 600DPI/900DPI/1200DPI

Color: 4/6 Colors + white+varnish

Printing mode: 4,6,8,12 pass

RIP: Photoprint

Output preview: Prn/Prt Preview files can be displayed

Print head: Can independently start/stop ink firing of each print head.
Smart printing: Skip white function

Multiple printing: Can be setup to print multi-page image or different image files continuously.
High speed Ink flashing: Can return the carriage to home position to perform ink flashing when the system is at suspend or ready state, which helpsto stabilize print head condition.
Ink flashing: To prevent the print head getting clogged when not print.
Color strip: To prevent print head getting clogged; displaying the current printhead condition.
Parameter adjustment: Horizontal, vertical, media advance, and bi-directional printing parameters can be adjusted during printing.
Printing Direction: Support unidirectional, bidirectional, and up-side down printing
Feathering: Increase the smoothness of the cohesion between the passes.
Chinese/English UI: Users friendly interface.

Computer configuration

1）Basic configuration：

- CPU：2.0GHZ
- Memory：4GB or above
- Hard disk：300 GB
- Main Board：USB2.0
- Network Device Support
- Operating System：WIN7 64bit

2）Suggested configuration：

CPU: I7 4770K

Memory: 8GB or above

Hard disk: 300 GB or above   (NTFS format)
Main Board：USB2.0

Chapter 4 Basic Operation

4.1 Software Installation

1. When connecting the USB cable for the first time, the PC system will notify the userthat a new hardware is found and the driver of this control board will be installed automatically. If the automatic driver installation has failed, then installing the driver manually is needed. The installation procedure is as follows.
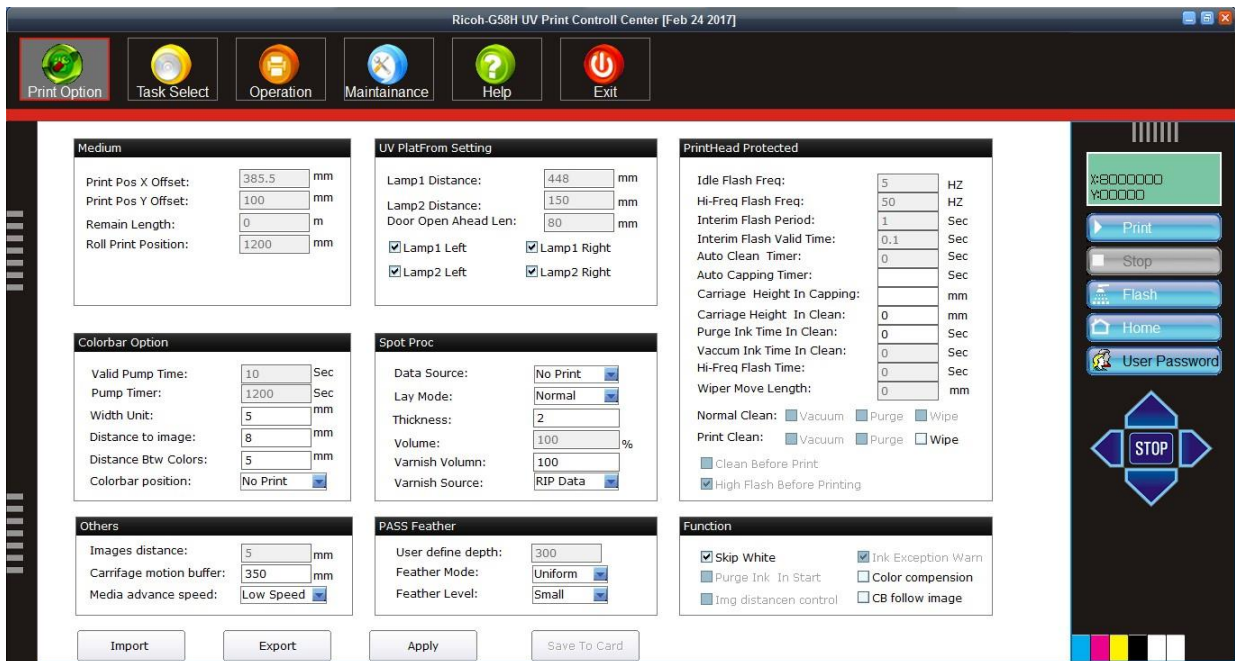

2. After driver installation, user can see the device name In Device Manager.

4.2 User Interface Introduction

The software comprised of 4 parts: print option, task select, operation and maintenance.In daily operation, only "task select: and "operation" are used, which makes the control system software easier to user.
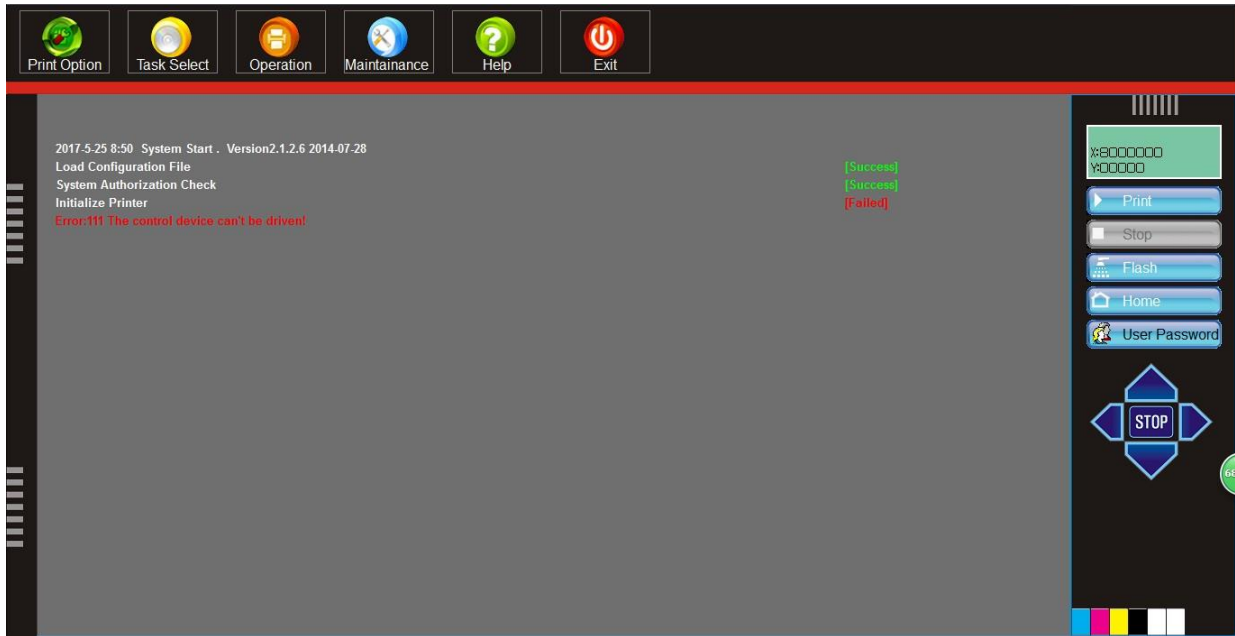
4.3 Main Menu

Find the shortcut icon named RYPC.exe, double click the icon and start the software, it will show
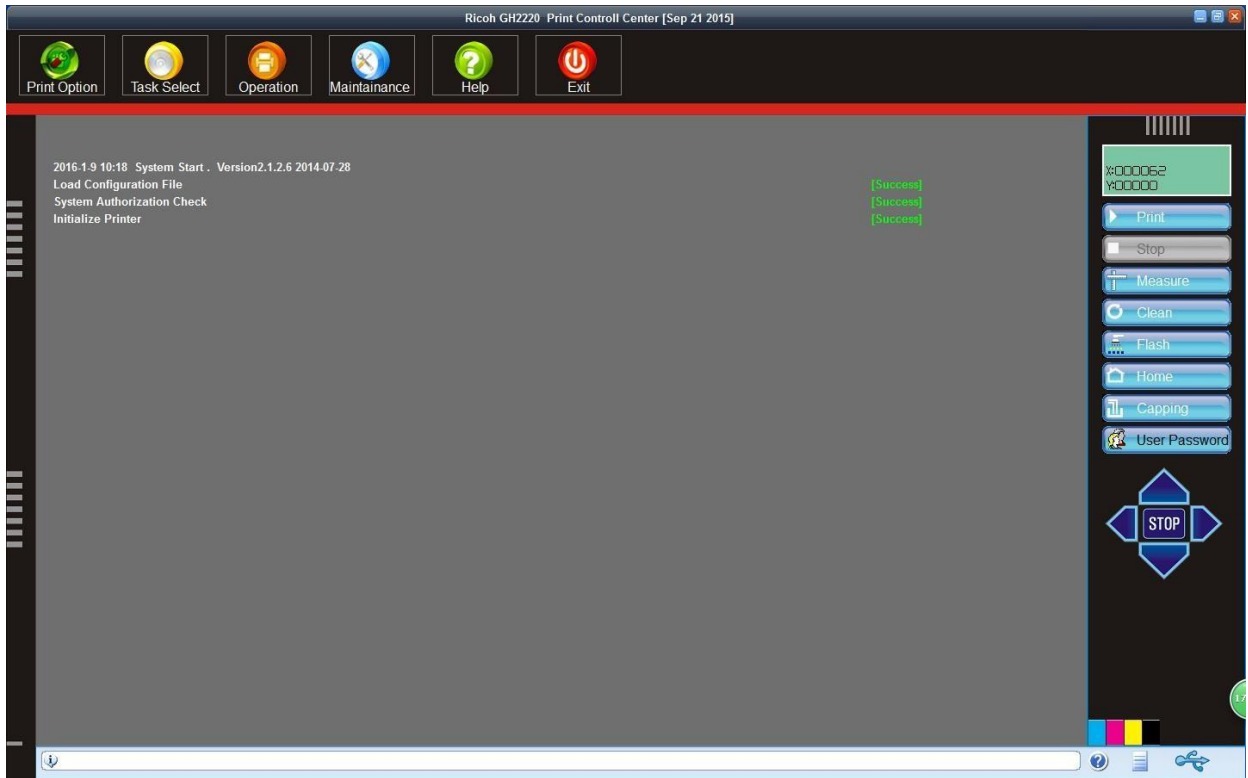
theinterface of control system on the screen.

Notice: If error occurred during system initialization, the result will be displayed in red on the screen, the system is not operational at this condition. The user has to fix the error and restart the control system software until the results are all green.

| Print Option | Task Select | Operation | Maintainance | Help | Exit |

Open File   Open File   Status

Speed: High   X Origin: 100   mm
Prt-Dir: Bi-Dir   Y Origin: 100   mm

Task Information

File Name:
Resolution:
Image Size:
RIP Type:
Process Mode:

Status

Print Status:
Real Output:
Remain Time: 00:00:00
Progress:

X:8000000
Y:00000

Print
Stop
Flash
Home
User Password

STOP

Index	Task Name	Image Size	Pass	Status	Piece	Refer Time	Print Time	
809	Caldera_Test_Pri...	W:141.4mm H:99.9mm (0.01sq...	8P	Ready	1	08:53:42	00:00:00	

4.3.1 Function Button

	Function
Print	Print the image that you have selected
Stop	Stop the current printing process, the printing process cannot be restarted again if you click it.
Measure	Measure the edge and width of material automatically by measure device.
Clean	Execute the cleaning operation, the operatingparameter can be installed in the system install dialog.
Flash	Open/Close the print head flashing status
Home	Reinitialize the origin position of the carriage andmove it to the origin position
User Password	Input the password and you can enter the maintenance mode, it is for the engineer to adjustment parameter, there no need for thecommon operator to entrance this mode, theinitial passwords is 000000

	Move Left		Move backward
	Move Right		Move forward
	Stop		Origin Position

4.3.2 Information display area
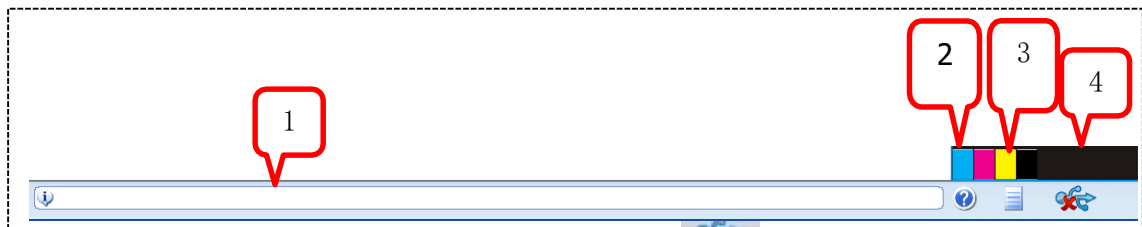
N0	Function	NO	Function

1	Warning and error information display area	2	If there is no ink will beflashing alarm
3	Print status, the edge finder, signal display	4	USB connect is ok USB is disconnected

4.4 Print Option Tab

Before printing, make sure all the parameters match the job requirement. Clicking theleft

side ![Print Option icon] icon can open that page.
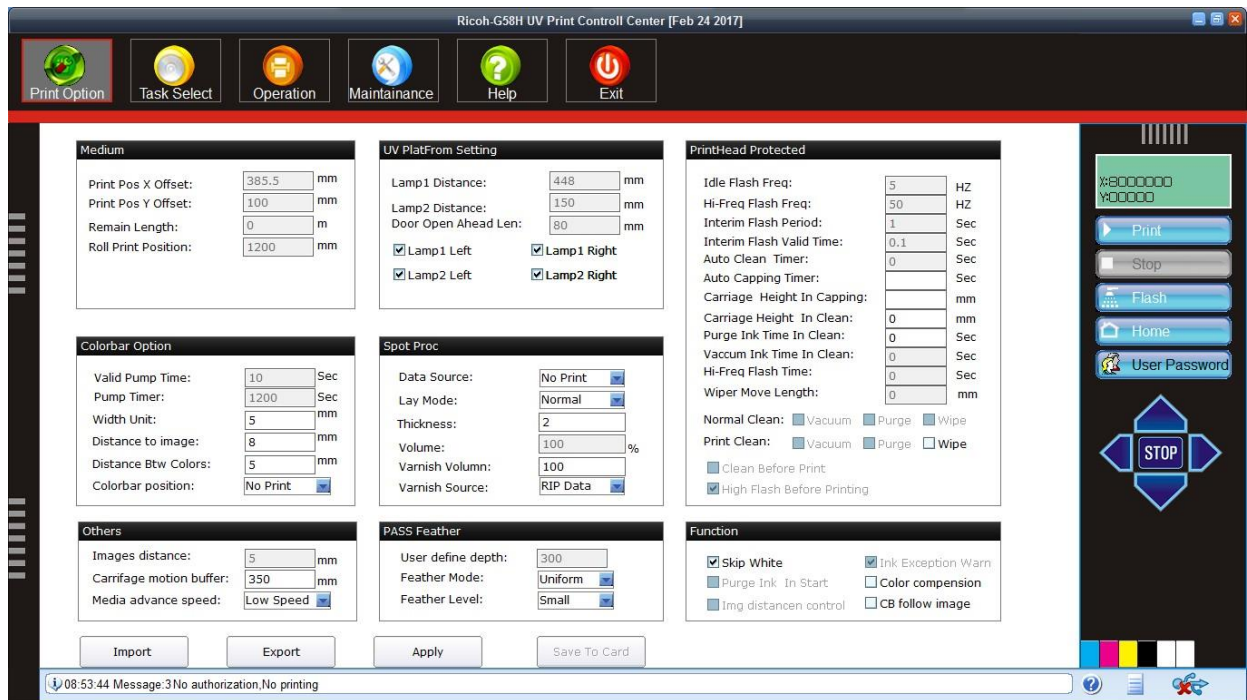
	Print ori X-offset	these 2 values define the starting positionof the printing area, normally they are predefined and no need to change
	Print ori Y-offset	
Medium	Carriage motion buffer	This value is used to adjust the car movement distance, Normally it is predefined , no need to modify
	Media advance speed	Y-axis stepping speed selection
	Valid pump time	Each working period of Ink pump
	Pump timer	The working frequency of pump
	Width unit	Color bar width
	Distance to image	Distance between color bar and the job edge

Ink Cycle & color bar option	Distance between colors	Distance among each color in the color bar
	Color bar position	Define the position of color bar relative to the job image
	Full white ink volume	Output volume of white ink

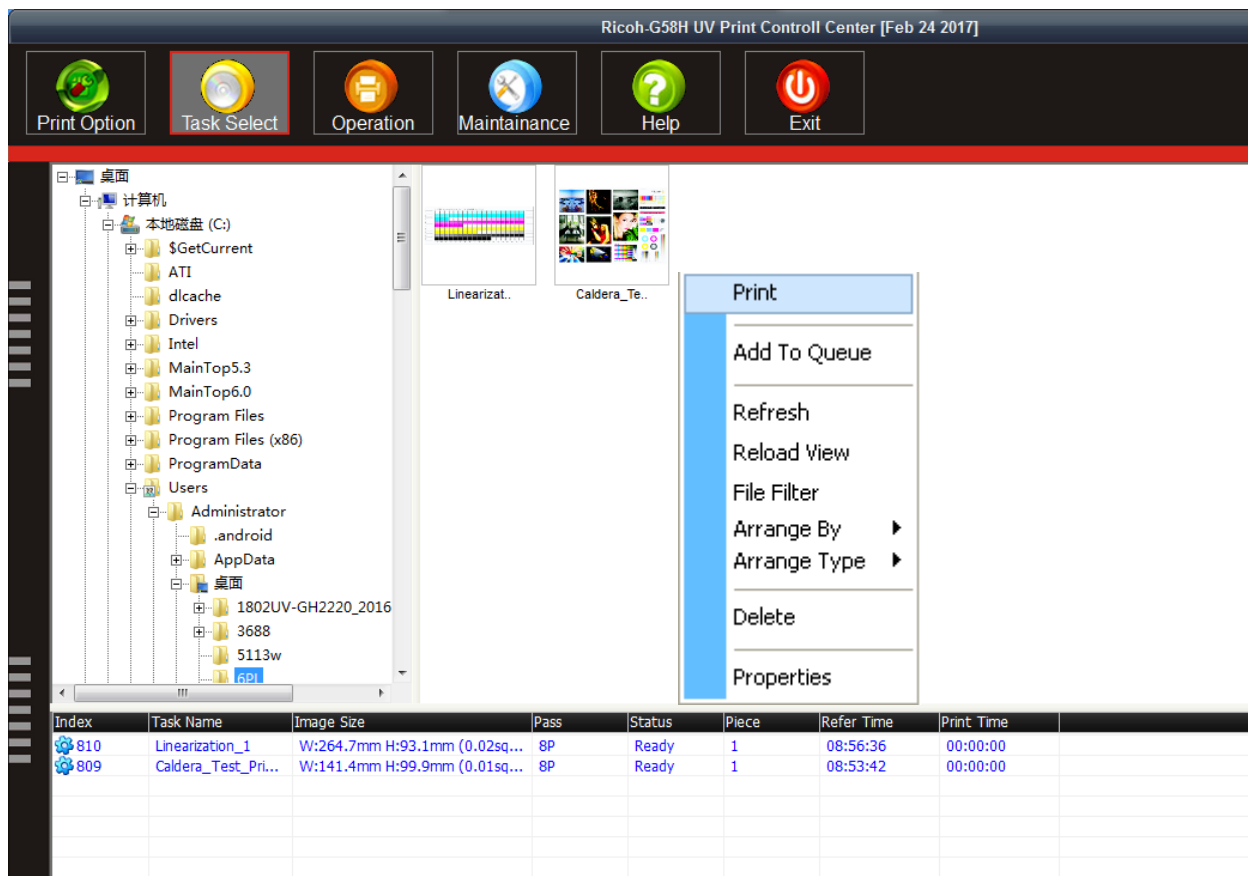|		
PASS Feather	User define depth	User-defined feather depth value, thegreater the value, the deeper the degree of feather
	Edge feather mode	Optional feathering ink jet modes
	Edge feather level	Optional feathering fixed depths
UV Platform Setting	Lamp 1 distance	Distance between Lamp1 to white head
	Lamp 2 distance	Distance between lamp2 to white head
	Door open ahead lens	The distance from the current position of lamp to the job edge when the UV LED lamp turned on
	Lamp1 left-work	UV LED lamp1 turns on when carriage moving from left to right
	Lamp1 right-work	UV LED lamp1 turns on when carriage moving from right to left
	Lamp2 left-work	UV LED lamp2 turns on when carriage moving from left to right
	Lamp2 right-work	UV LED lamp2 turns on when carriage moving from right to left
Spot Proc	Data source	Select mode of white ink printing
	Lay mode	To set special print mode based on requirement
	Thickness	Number of white layer
	spacing interval of color & white printing	To enter spacing interval of white printing and color printing
	Varnish source	Select Varnish Print Mode
Print Head Protected	Frequency of Idle flash	Ink flashing frequency when printer is on standby mode
	Frequency of high flash	Ink flashing frequency when printer is working
	Interim flash period	Time interval of each ink flashing
	Interim flash valid time	Time period between each ink flashing
	Auto flash cycle	Time interval between each ink flashing when printing
	High flash before print	Click to print, the carriage high-speedflash once, then start printing
	Skip white	Automatically skip the part of the blank data in the job

Function	CB(Color bar) follow image	The height of the color bar is the same as the height of the job
	Image distance control	Accurate the picture spacing when doing multiple prints

	Ink exception warn	On / off low ink volume alarm
	Color compensation	It is mainly used for color compensation when printing by bi- directions
	Purge ink in start	Automatically purge ink when the software is open
Function key	Import	Import the system parameters file that was exported before
	Export	Export system parameters files
	Load from Card	Load the data parameters that have been saved to the board.
	Save to card	Save the current data parameters to the board.
	Apply	You need to click the app before you can change the parameters

4.5 Task Select Tab

Click this icon can open the **task select tab**. It composes of directoryviewer, RIP file preview and print queue.

1. How to add job

a). Select the folder which stored RIP file from the directory viewer, the software willload all the RIP files in this folder automatically if they can be recognized.

b). There are several ways to add the RIP file to the print queue from RIP file previewarea

***Multi-Select Job :keep holding the Ctrl key and mouse left clicking at the same time can select multiple items,** it can also use mouse to drag and select multiple items.After selected the items, right click the mouse and sub menu will pop up, select "print" or"add to queue" option.

***Adding Task by Dragging:** Drag the RIP file from the RIP file preview area to the printqueue area, confirmation window will pop up, and click "print" will add the selected RIP file to print queue.

***Adding Task by Right Click:** Right clicking on the print queue will pop up a submenu, select " open from file " It will pop up a file browser , select a RIP file and add to the printqueue.

## 2. RIP file preview area function

a). Preview RIP file display according to the different sorting orders.

Preview image can be displayed according to the file name, size and date, it can be set according to descending or ascending order. When in operation, right click to pop up the function menu, select corresponding sorting order.
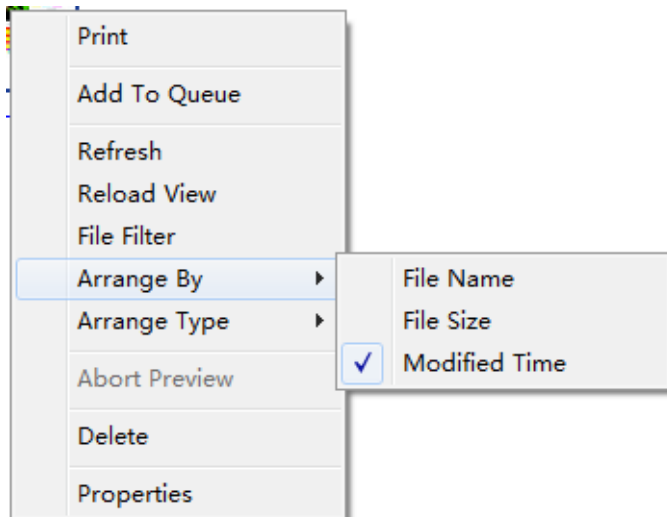
b). Preview image display with filtering

RIP files preview can be displayed based on filtering rule. Setting the filtering rule by left clicking on the "File Filter" item at the function menu. After clicking this item, thefollowing message box will pop up. Filtering setting will be saved and applied even software restart next time
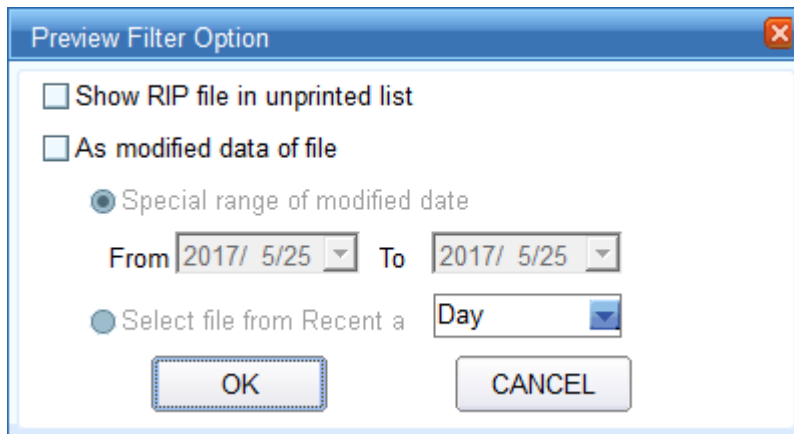
c). RIP file directory refresh

If there are some changes in the RIP file directory, e.g. Addition of new RIP file, user can refresh preview files by clicking the "Refresh" item in the function menu. The shortcut key is F5 in the keyboard.

d). RIP file delete

User can directly delete the RIP file in the RIP file preview area. Please note that the RIP file will be permanently deleted from the hard disk after perform this operation

3. Task property edit

When adding print task, the system will pop up the print task property setup confirmation window. It allows user to edit the print task setting

RIP file information

Display the size, resolution, number of color and RIP format. W stands for width, H stands for height, X means printing dpi of the x direction and Y means the printing dpi of the Y direction of the print job. C means the color number.

Print Mode

The default setting is to supply full ink amount to print with the defined print pass. User can change the pass number to adjust the print quality.
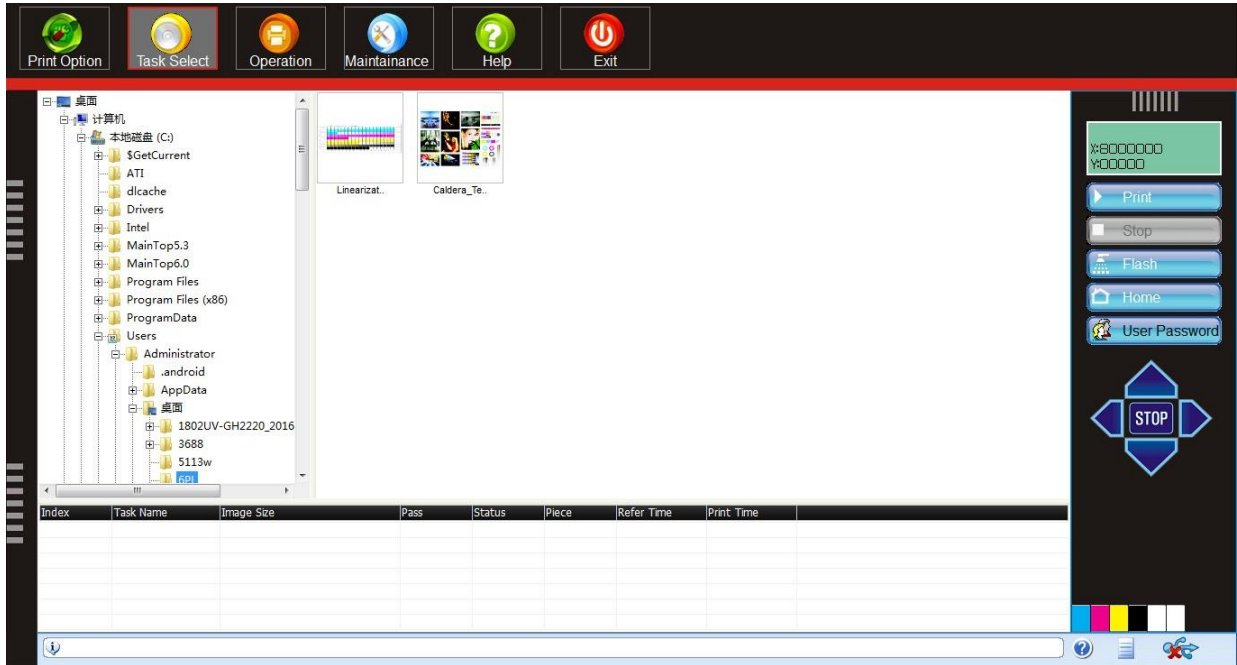
Region Printing

This function is used in print partial area of RIP file. The user can circle the printing areawith the mouse for print. Or input the region data in the region setup option

Multi-page Printing

This function enable the multi-page printing in X and Y direction.

4.1 Print sequence operation

The printer will print according to the print sequence. The user can adjust the printsequence, print setting, and task deletion at the print sequence area.
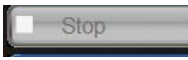
Print sequence display information:

Index	System will assign each print task an different number
Task Name	Name of the task, at default it is the RIP file name
Image Size	Actual print size
Pass	Number of print pass set for the print task.
Status	Status of the task: Ready, Printing, Paused and Aborted
Refer Time	The time when the print task is sent to the print sequence
Print Time	The time taken while the print task is printing

Operation Introduction

Start to print : Clicking [Print] button or right click the menu and select "start

printing" can start the print sequence.

Print sequence stop: Click [Stop] button or right click the menu and select" stop

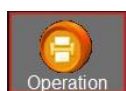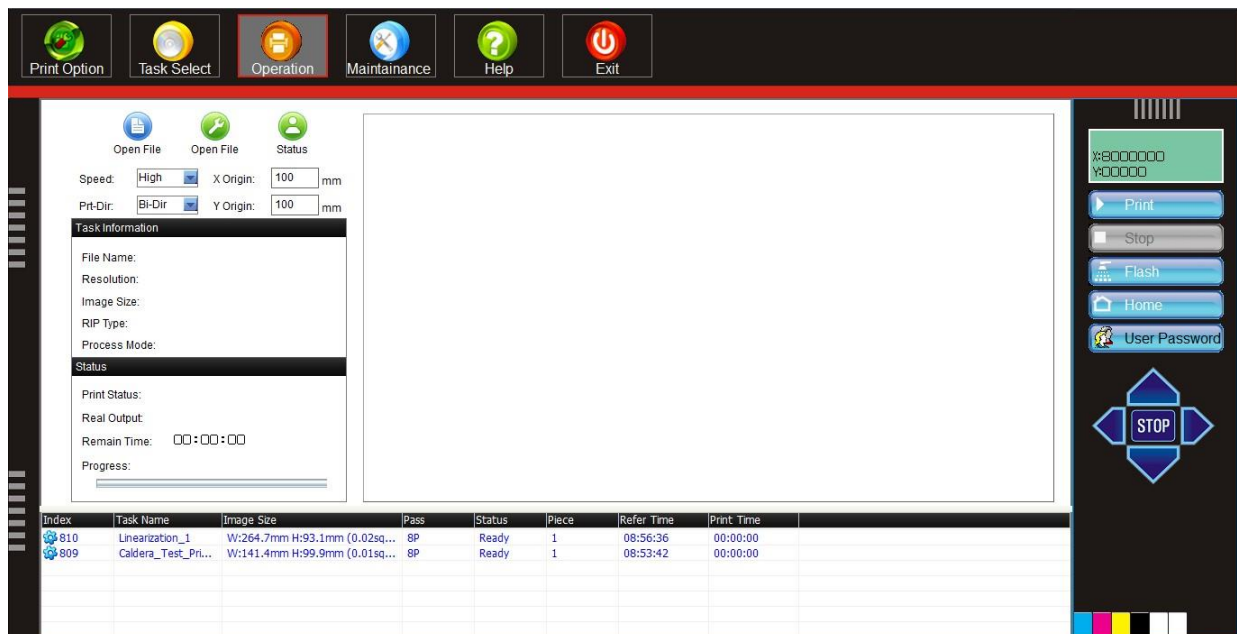print sequence" can stop the print sequence.

Adjust print sequence : Adjust the print sequence by mouse right click at the selectedprint task and adjust its sequence in the pop-up menu.
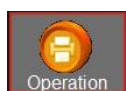
Task deletion: Select the task in the print sequence (also can select multiple tasks) andpress delete key or select "Delete" option in the menu option by right clicking the task.

Adjust print task setting: Double clicking on the print task, or right click on the print task and select task property in the pop up menu. The task property window will be popped up and user can change the task setting.

Cancel current print task: Abort the current print task. But it would not cancel the print sequence, the next task will be executed when current task finished.

4.2 Operation Tab

Click [Operation] to open operation tab. This tab is used for print control, task information,status display and print preview.

Printing control composes of the following options:

Open File	add the rip file to print sequence

Print Position	Set the current position as print start position
Status	Print 2 bit print head status diagram for checking the nozzles condition
Speed	Set the current X direction printing speed: High, Middle and Low speed for select
Print-Dir	Set the printing direction: left, right or bi-direction for select
X origin	Set the X direction starting point
Y origin	Set the Y direction starting point
Task Information	Display printing task size and resolution
Real Output	Display the production rate at current print mode, Calculated as thesquare meters per hour
Remain Time	Display the time left for completing current printing task
Progress	Display the percentage of complete of the current printing .It is also displayed in preview area.
Print preview	To preview the current print job

4.3 Maintenance Tab

Click to open this tab. Maintenance tab comprised of 4 sub-tabs: calibration,motion ,print head voltage and system information

4.3.1 Calibration

1. **Print head status** Click "Print head status" item in the menu, the printer will print out the following image.

This image can be used to check the status of each nozzle and their alignment.

At the following two situation, user need to perform calibration:

1. Operate the printer for first time
2. When the colors are misaligned
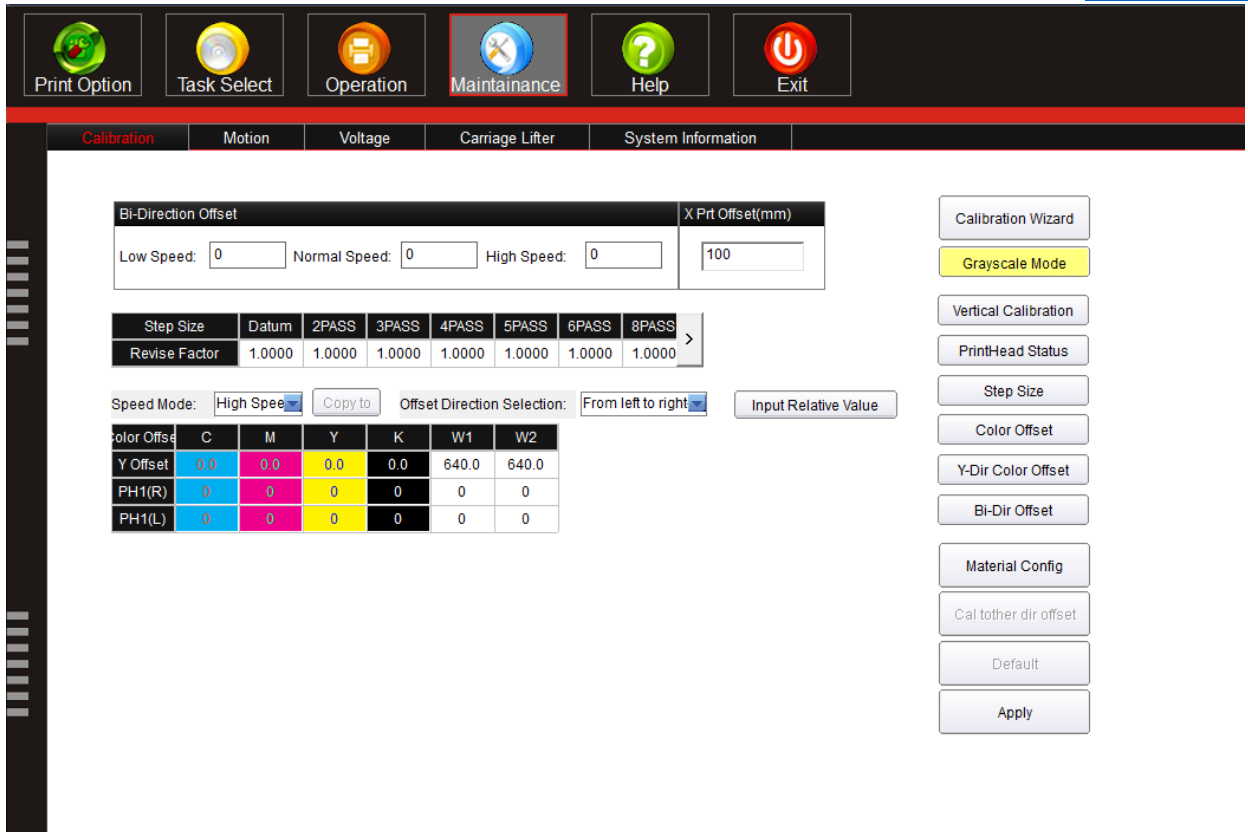
3. Mechanical Calibration

Mechanical calibration are no.1 and no.5 of the buttons at right side.

Clicking no.1 and no.5 to check whether the physical position of the print heads are leveled and not tilted. Physical deviation of horizontal and vertical is too large, adjustment is done by adjusting the print head back plate.

3.1 Print head vertical calibration

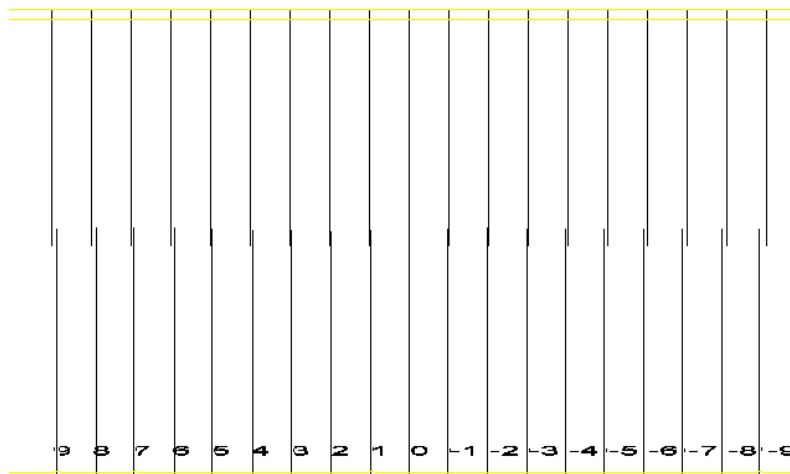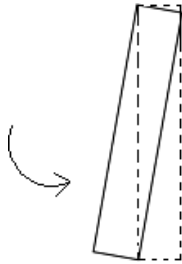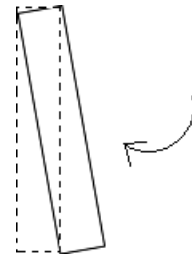Check if the no.0 lines are connected, if they are connected means the tilt of the print head is correct. Otherwise, the user need to perform mechanical calibration on the printhead installed position, as the following two diagrams:

When the negative lines are connected   When the positive lines are connected

When the -2 is at the best state   When the 2 is at the best state

3.2 Print head Y direction offset calibration

Print out the "Y-Dir Color Offset" item in calibration menu. find the best vertical aligned adjusting color matched with the base color**. Plus the correspondent value with the original value can get the new value.**

Note: First adjust the mechanical position to ensure the 0 lines are most aligned then adjust by software. The user can not adjust Y direction physical offset by solely based on the parameters in the system.For calibrating X direction may affect the calibration of Y direction ,user need to produce accurate calibration(the most aligned lines at 0) for both X and Y calibration same time to get best calibration effort.

Click [Y-Dir Color Offset] button to print, As shown below:
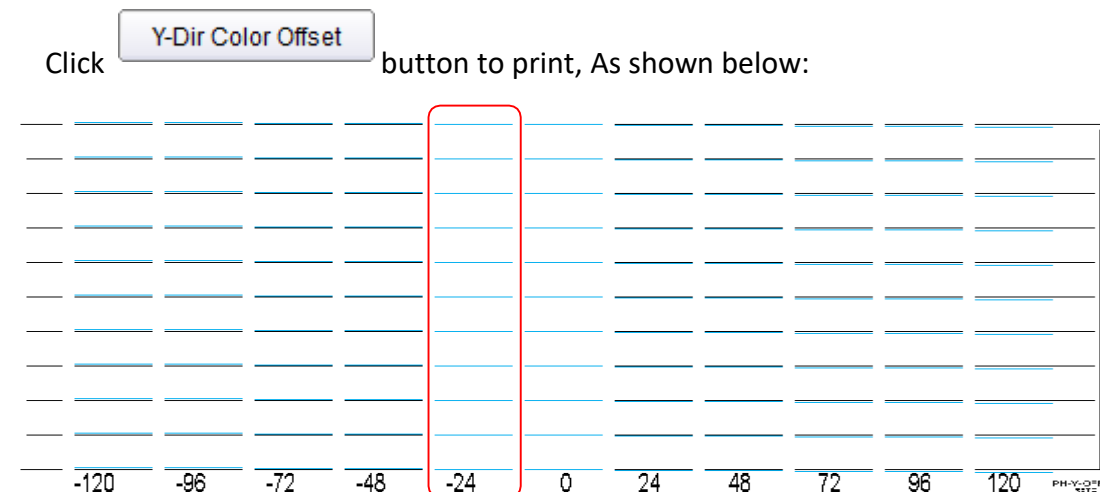
Abnormal state: (k:-24 is at the best state, enter -24 in the revision box of K, The other three colors such as black adjustment)

Speed Mode: High Spee ▼	Copy to	Offset Direction Selection:	From left to right ▼
Color Offse	C	M	Y	K	
Y Offset	0	0	0	0	Enter -24
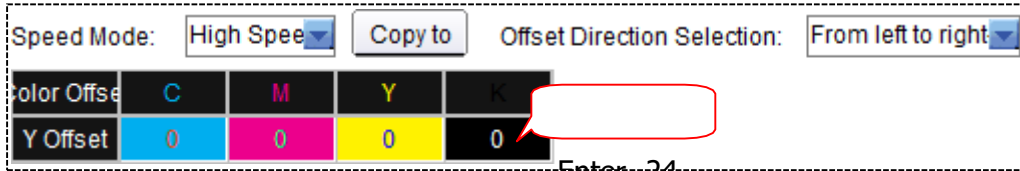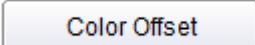
3.3 Print head's offset calibration in X Dir

The offset value is different at different direction and different speed. Therefore we need to adjust the offset value based on different printing direction and speed.
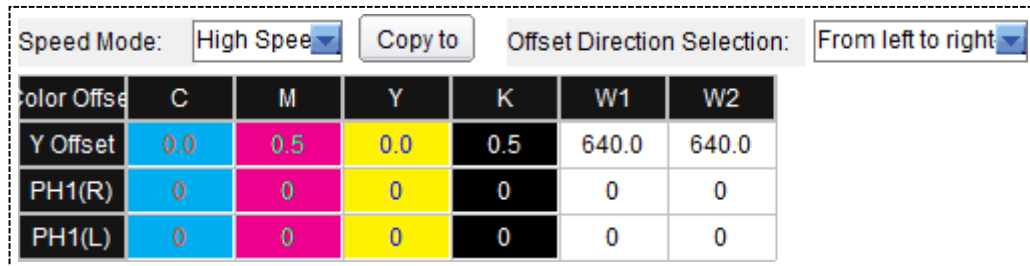
1 Select the printing direction and printing speed you want to calibrate.
2 Click "Color Offset" item in the menu.
3 Print the corresponding calibration diagram.

Speed Mode: High Spee ▼	Copy to	Offset Direction Selection:	From left to right ▼		
Color Offse	C	M	Y	K	W1	W2
Y Offset	0.0	0.5	0.0	0.5	640.0	640.0
PH1(R)	0	0	0	0	0	0
PH1(L)	0	0	0	0	0	0

During the adjustment, find the best offset value from the diagram. It is as follows: -2,find the best horizontally aligned adjusting color matched with the base color -2, the corresponding offset value plus the original offset value gets the new offset value.

For example, select *"**Calibration use gray mode**"*, *"**High Speed**"*, *"**From right to left**"*

for calibration, then click   Color Offset   to print, As shown below:
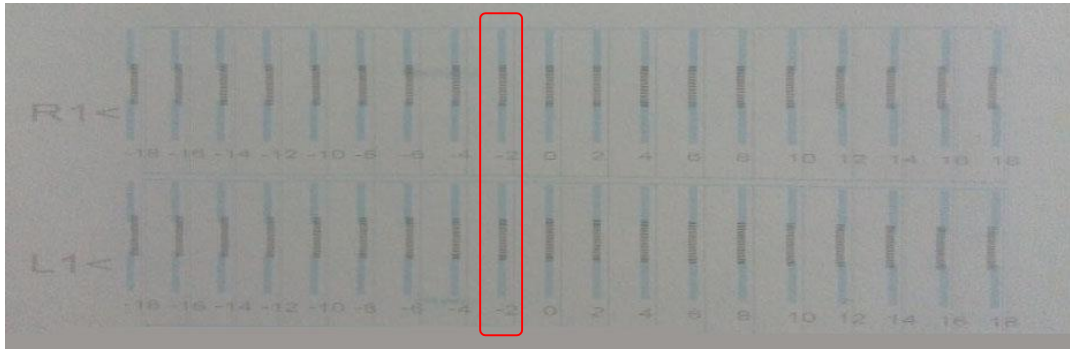
Abnormal state: (position 0 is unaligned, -2 is at the best state, the original value in the adjustment box subtracts 2)

For example, select "**Calibration use gray mode**", "**High Speed**", "**From left to right**" for calibration,

then click [Color Offset] to print, As shown below:

Speed Mode:	High Spee▼	Copy to		Offset Direction Selection:		From right to lef▼
Color Offse	C	M	Y	K	W1	W2
Y Offset	0.0	0.5	0.0	0.5	640.0	640.0
PH1(R)	0	0	0	0	0	0
PH1(L)	0	0	0	0	0	0

Abnormal state: (position 0 is unaligned, -2 is at the best state, the original value in the adjustment box subtracts 2).

1. Bi-directional printing calibration

Because of the different print speed, there will be a position gap when you use the bi-directional printing. So, you should revise the come and go difference. Choose the related speed difference in the print test menu, it will print the correct picture shown as following:
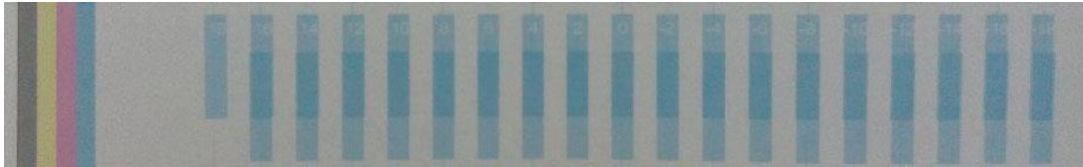
For example, select High Speed for calibration, As shown above:

Abnormal state: (position 0 is unaligned, -12 is at the best state, the original value in the adjustment box subtracts 12)

The partial enlarged view of the test pattern as shown in figure below:
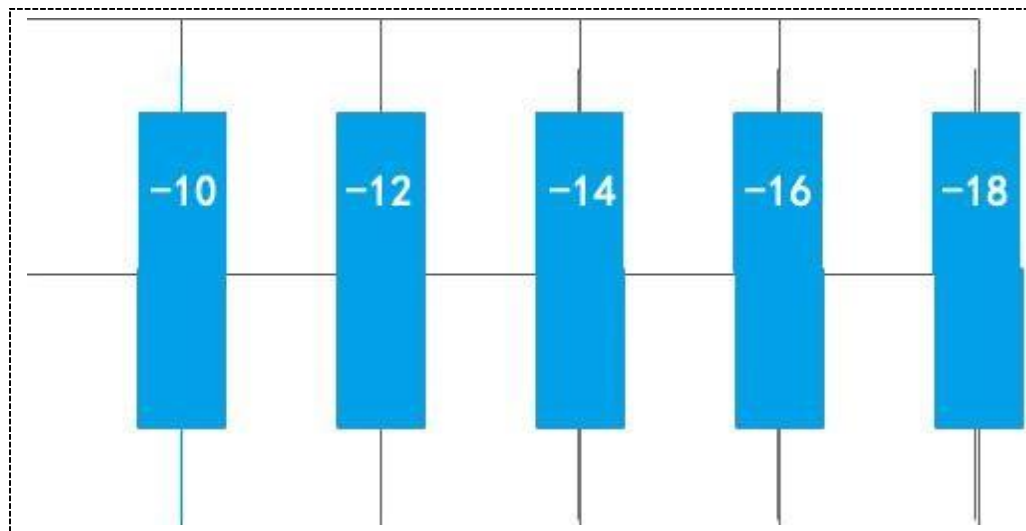
Abnormal state: (position 0 is unaligned, -12 is at the best state, the original value in the adjustment box subtracts 12)
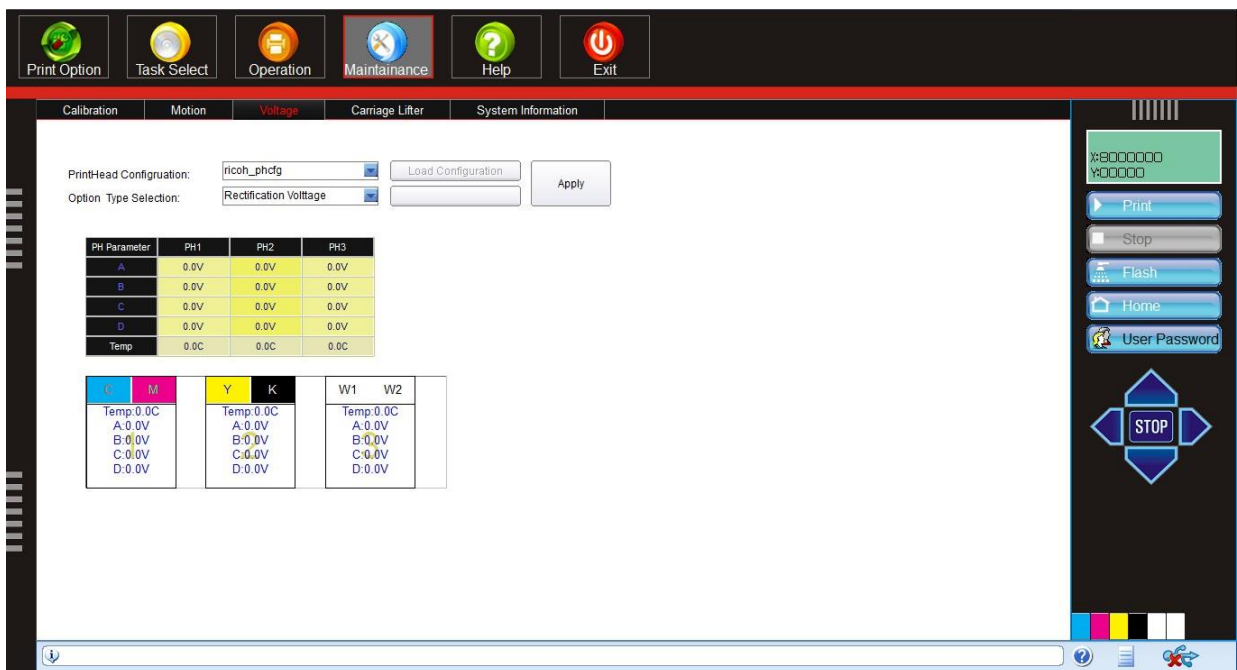
4.3.2 Print Head Voltage Tab

Click "**Maintainance**" button, then click "**Voltage**" as shown below:

PH Parameter	PH1	PH2	PH3
A	0.0V	0.0V	0.0V
B	0.0V	0.0V	0.0V
C	0.0V	0.0V	0.0V
D	0.0V	0.0V	0.0V
Temp	0.0C	0.0C	0.0C

Base Voltage

PrintHead Configuration	The choose of coefficient allocation file based on the choose of wave file you used
Load Configuration	Load Wave Configuration
Apply	Save every modification
Option Type Selection	Consist of three parts, Standard Voltage, Rectification Voltage, Printhead Temperature
STD-V	Every print head have its reference voltage, fill in the reference voltage when the device is installed
Rec-vol	Voltage Adjust
V/T	Show the current temperature and voltage, these values are just for reference and can not be modified

Real-time print head temperature and voltage display function:

1. The temperature and voltage of each print head will be displayed at this window

2. When background color is red, it means that the voltage setting is wrong, when the background color is white, it means that the voltage adjustment is correct and the printhead voltage is within the acceptable range. When the color is gray, it represent that theautomatic voltage adjustment work has been stopped.

3 Option type selection: if we need to adjust the print head voltage during the printing,you can

switch to the voltage rectification option to adjust the print head work voltage.

4. Temperature: Set the work temperature of the print head according to different ink.

4.3.3 Motion Tab

1. The parameters of the page has been set by default, no special circumstances, noneed to change it.

2. If you need to change it, you need to enter the user password   to dochange.
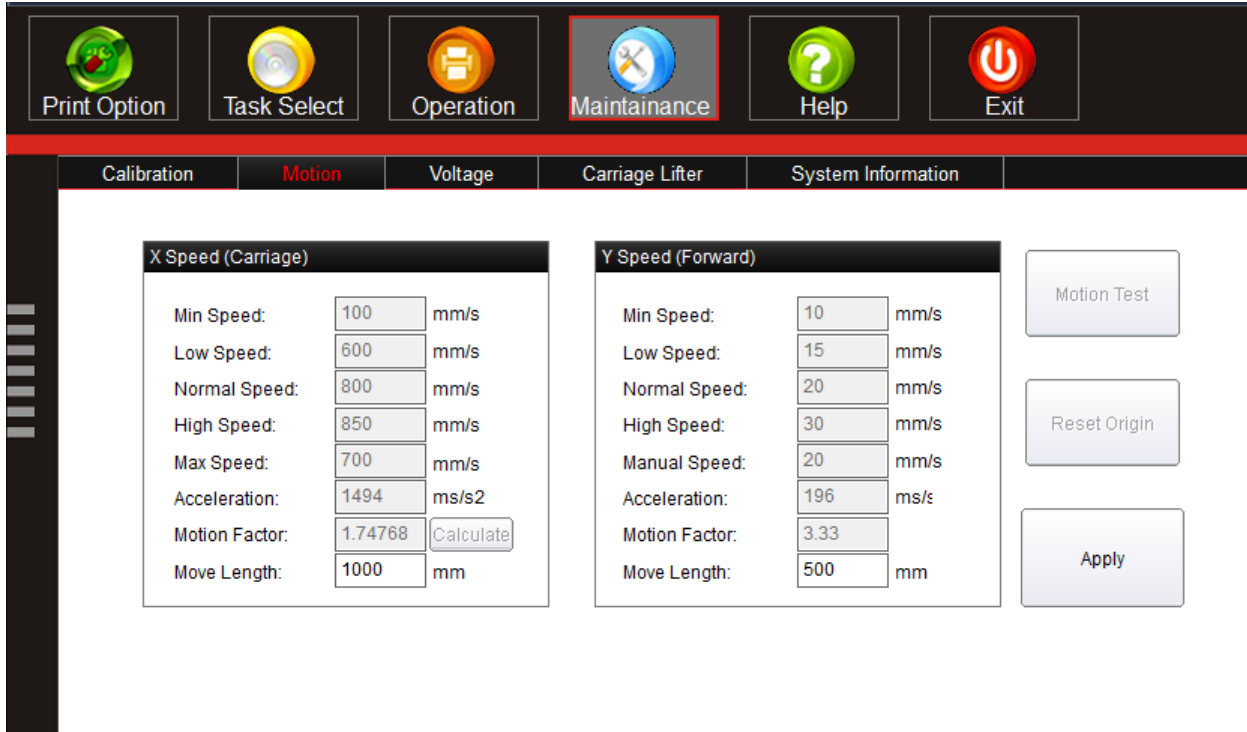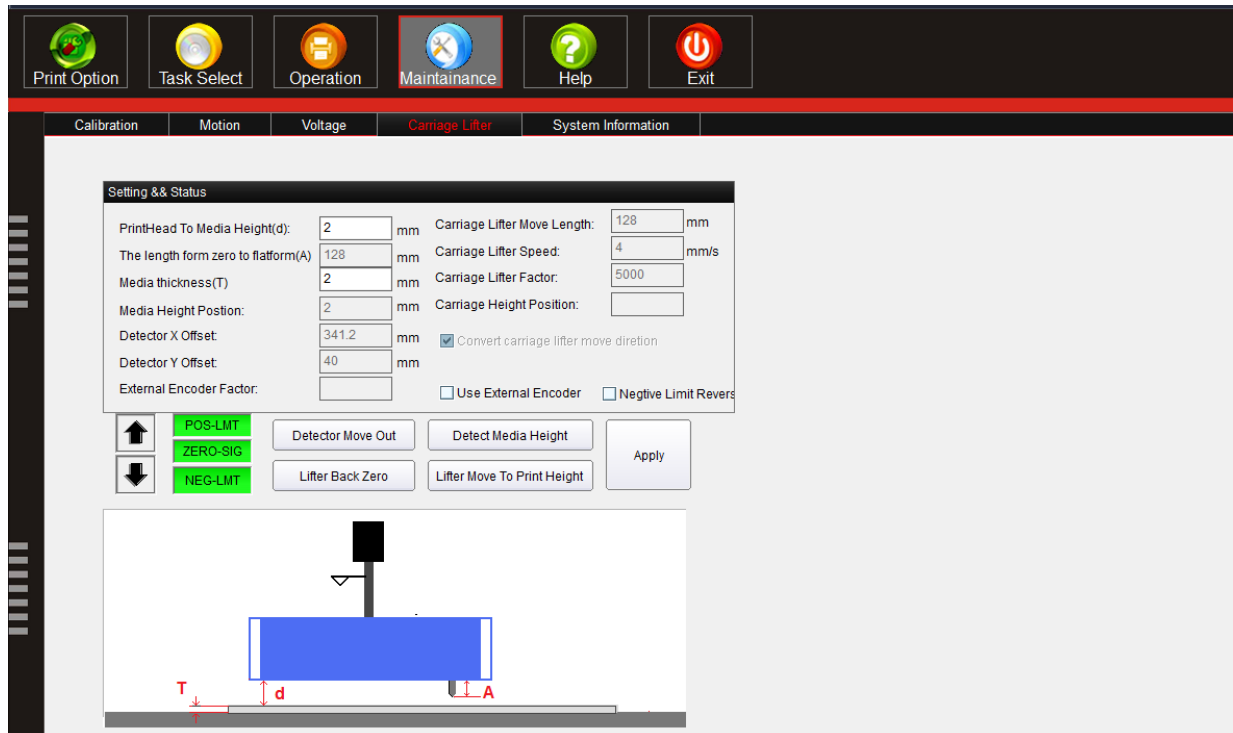
Speed of X Axis (carriage)	Min speed	Per second moving distance of carriage when it is moving manually
	Low speed	Per second moving distance of carriage **when low speed printing mode is selected**
	Normal speed	Per second moving distance of carriage **when normal-speed printing mode is selected**
	High speed	Per second moving distance of carriage **when high speed printing mode is selected**
	Max speed	**Carriage return speed when unidirection printing mode is selected**
	Acceleration	When the carriage switches the direction of movement between right and left, due to inertia reasons, need an acceleration

	Motion Factor	A motion parameter that matches motor drive parameters
	Move Length	Distance value of single displacement
	Min speed	Per second moving distance of cross beam when start printing

Speed of Y-Axis (Forward)	Low speed	Per second moving distance of cross beam when low speed printing mode is selected
	Normal speed	Per second moving distance of cross beam when normal speed printing mode is selected
	High speed	Per second moving distance of cross beam when high speed printing mode is selected
	Manual speed	Per second moving distance of cross beam when manual speed printing mode is selected
	Acceleration	When the cross beam switches the direction of movement between forward and backward , due to inertia reasons, need an acceleration
	Motion factor	A motion parameter that matches motor drive parameters
	Move length	Distance value of single displacement

4.3.4 Carriage Lifter Tab

1. Print head to media height: When the job printing, the distance between the print head and the media.

2. The distance from zero position to platform(A): the distance between the print head surface and the media when the carriage at z axis zero position.

3. Media thickness: the thickness of the print media.

4Carriage Lifer move length: the length of movement of the carriage lifter from positive limit to negative limit.

5. Carriage Lifter Speed: the movement speed of the carriage lifter.

6. Carriage Lifter Factor: the relational factor of the pulse data and stepping distance.

7. Carriage Height Position: the actual distance from the nozzle to the carriage lifter at current moment.

8. Lifter Move to Print Height: when user clicked this button, the carriage lifter will move to an appropriate height based on the print head to media distance and media thickness.

Setting Method：

1. Print head to Media Height: This option is a fixed value, generally set the standard value as 1.5mm.

2. The length from zero position to platform(A) and lifter max move length(B): In principle, these two values are the same, and the specific value has been set in the factory.

3. Carriage Lifter Speed and factor: no need to change.

4. The software can calculate the best printing height automatically according to the media thickness.

4.9 Printer on Procedure

Introduction: the printer is controlled fully by the PC, therefore user should pay attention to the USB connect status between the printer and PC during printing operation so as to ensure the data transmission is stable.

```
┌──────────────┐   ┌──────────┐   ┌─────────────────┐
│ Switch on    │──▶│ Open     │──▶│ Software starts  │
│ the printer  │   │ the pcs  │   │ the initalization│
└──────────────┘   └──────────┘   └─────────────────┘
                                           │
                                  ┌──────────────────────┐
                                  │ Open the three-way valve│
                                  └──────────────────────┘
                                           │
                                  ┌──────────────────────┐
                                  │ Verify the negative pressure│
                                  └──────────────────────┘
                                           │
                                  ┌──────────────────┐
                                  │ Purge, Clean, Print│◀──┐
                                  └──────────────────┘   │
                                  ┌──────────────────┐  ┌──────────────┐
                                  │ Set Print Origin │  │ Nozzle missing│
                                  └──────────────────┘  └──────────────┘
          ┌──────────────┐        ┌──────────────┐
          │ Calibration  │        │ Nozzle check │
          └──────────────┘        └──────────────┘
                        ┌──────────────┐
                        │  Print job   │
                        └──────────────┘
```
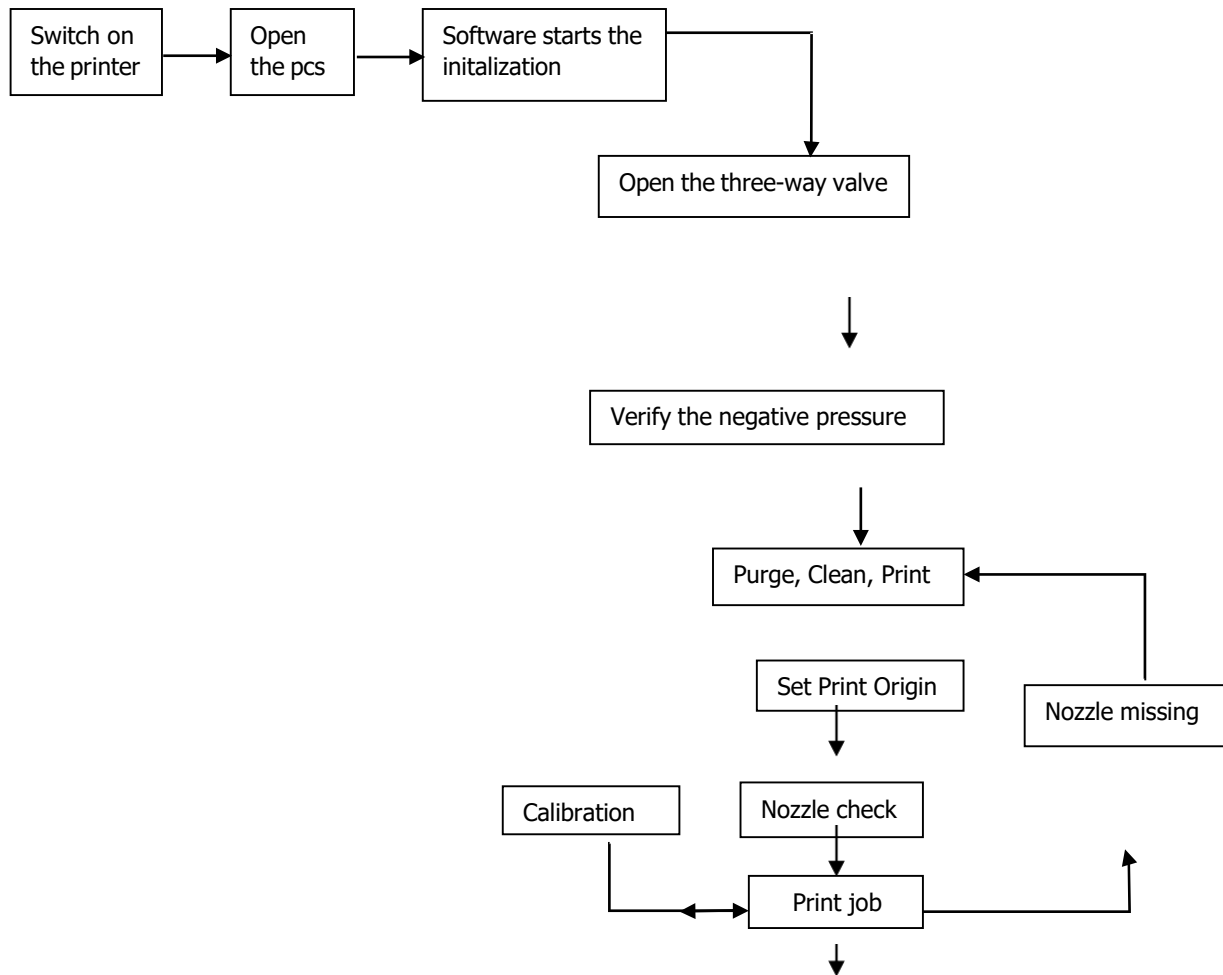
Note on the start up procedure:

1. Constantly check whether the negative pressure is normal or not. Correct negative pressure affects the printing result. The negative pressure may be changed after the printer shut down for a long time and then adjustment may be needed.

2. Purpose of printing head status diagram: to check if the print head is working normally, to check whether the nozzles are clogged and to prevent any unexpected condition. User are required to print the print head status diagram before starting to print jobs and before shutting

down the printer. The print head status diagram should be used to makesure proper cleaning is done and the diagram should be kept as record for future to compare and find out whether the print head condition has changed.

3. When starting up the printer for the first time and when the printer is used for a long time, user should check whether the printer is in good condition by performing calibration function.

4.10 Printer off Procedure

```
┌─────────────┐        ┌─────────────────┐        ┌──────────────────┐
│ Exit control│ ─────> │ Close 3-way valve│ ─────> │ Switch off Printer│
│ software    │        │                 │        │                  │
└─────────────┘        └─────────────────┘        └──────────────────┘
```
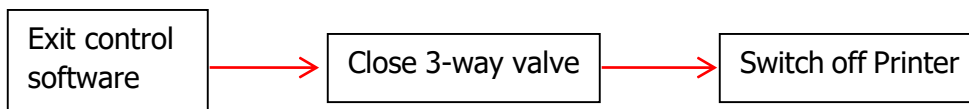
Note on shutdown procedure:

1. When shutting down the printer, user must exit the control software first so that the software can save the correct parameter values. If user first shutdown the printer, it maycause the parameter values lost
2. During the normal working days, user does not need to shut down the printer and keep the printer at standby condition with a proper setting on ink flashing parameter. User should shut down the printer only the printer needs to shut down for over 3 days and user should keep the print head surface soaked with flush.

Chapter 5 Maintenance Guide

5.1 Basic cleaning method: Push "Purge" button then use a non-woven cloth to wipe the surface of the print head. (Please note that user should not purge ink in the print head with positive pressure over 20kpa).
Warning: using other kind of material to wipe the print head may cause the print head getting clogged or damaged.

5.2 How to recover clogged nozzles/deflected nozzles

Cleaning procedure

Put some cleaner on the non-woven cloth, wipe the bottom of the printheads for a few minutes. Purge inks, wipe the printheads with a new non-woven cloth. Test print and check if it's better. If not, Repeat the same procedure.

5.3 Daily maintenance:

1) Print "Print head status diagram" before start printing jobs and after finish all printing jobs of that day, so as to ensure the print head condition is normal.

2) It is recommended to leave the printer and computer on all the time. Open the flashing mode in the software to ensure the machine flash.

3) If electricity is cut off everyday. Use moisturizer (for GH2220) and PE wrap,non-woven cloth.

4) Close the three-way valves. Move the carriage to home position and shut down the machine.

5) Put some cleaner on the non-woven cloth and put it under the printheads. Use the wrap the printheads to avoid the cloth from fall down and dry the printheads.

5.4 Short-term Shut Down Maintenance (7 days)

1) Close the three-valve inks. Move the carriage to home position and shut down the machine.

2) Unscrew the exhaust end of the print head, and wait until the ink inside the ink tube and print head has completely leaked out.

3) Tap a non-woven cloth which soaked with cleaning flush under the print head surface. Then use cling wrap to wrap the cloth and print head together to keep the nozzles wet.

4) Turn off the votage stabilizer. Take out the plug of machine.

5.5 Long-term Power off Maintenance (over 1 week)

1) Use cleaning liquid to clean the whole ink supply system.

2) Maintain the print heads according to short-term printer shutdown routine.

Notice: In order to ensure the ink supply system is working well, user should change ink filters per 3 months. When user need to dismount the print head for storage, please refer to "Storing print head procedure". If the print head shall be stored for over 2 months, user should check the print head condition per 2 months by installing it back to the printer for testing, and pack it for storing again. The environment for

storing print head should be: Temperature 5-30 „C, Humidity 10-85%RH; avoiding exposing the print head under direct sunlight.

5.6 Storing print head procedure

The maintenance if the printheads need to be taken out.

Clean the print head thoroughly. Put some moisturizer in the printheads. * Dismount the print head and tubes. Wrap the print head"s surface with non-woven cloth. Put the moisturizer on the non-woven cloth and seal the print head with cling wrap.