High-Resolution Inkjet Printing System

Operation and Maintenance

Manual

Inkjet Printer System
Operation And Maintenance Manual

This manual is for use in the maintenance of LD-Series UV Inkjet Printer System.

Users of this inkjet printer are warned that is essential to read，understand and act according to the information given in Part 1: Health and Safety.

We has a policy of continuous product improvement, the Company therefore reserves the right to modify the specification contained in this manual without notice.

For sales, service and inks please contact:

HEALTH AND SAFETY

Basic Requirements

When used correctly, printing inks do not cause problems. However, everybody using them should be familiar with the appropriate safety standards and be aware of the precautions that should be taken.

- Proper standards of industrial practice relating to cleanliness and tidiness must be maintained.
- Inks and their containers must be stored and handled with care.
- All who come into contact with inks must be properly instructed in their use.

Directions for safe working practices vary according to the environment. The following are broad principles so that necessary precautions may be taken.

- Contact with the mouth must be avoided. If contact with mouth, Wash out mouth with water.
- Contact with the eyes must be avoided. Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact with the eyes, Immediately flush eyes with room temperature water for at least 15 minutes, keeping eyelids open. In case of accidental eye contact, avoid concurrent exposure to the sun or other sources of UV light which may increase the sensitivity of the eyes.
- Contact with the skin should be avoided, Chemical-resistant, impervious

gloves complying with an approved standard should be worn at all times, If contact with the skins, Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Do NOT use solvents or thinners. In case of accidental skin contact, avoid concurrent exposure to the sun or other sources of UV light which may increase the sensitivity of skin.

- Good ventilation is necessary. In case of inadequate ventilation use a properly fitted air-purifying or air-fed respirator complying with an approved standard.
- Any used cleaning materials, e.g. rags, paper wipers, are a potential fire hazard. They must be collect for safe disposal after use.

Storge

Store between the following temperatures: 5 - 35 °C

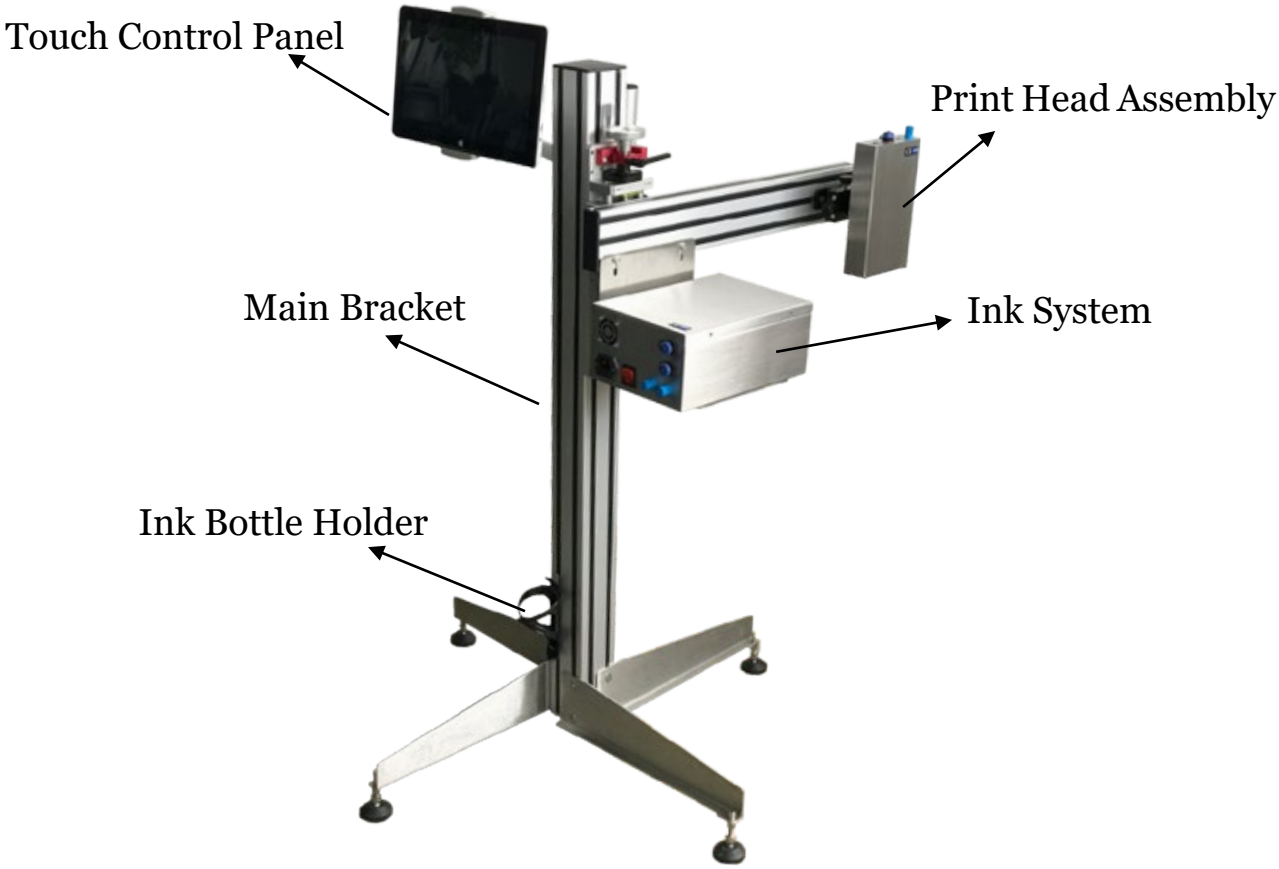
Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use.

Fire Risk

- For an electrical fire, do not use water. The power must be removed first.
- Suitable extinguishing media: Use dry chemical, CO_2

Printing inks and associated fluids must not be treated as ordinary waste. They must be disposed of using approved methods according to local regulations.

Printing System Introduction



Specification Sheet

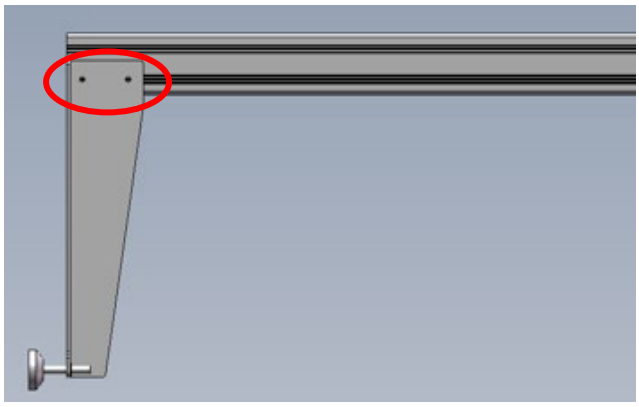
	LD50	LD70	LD70Plus	LD100	LD200
Print Height	32.4mm	72mm	72mm	32.4mm	54mm
Resolution	300DPI	180DPI	360DPI	300DPI	600DPI
Nozzle	Industrial grade piezoelectric nozzle				
Nozzle Quantity	1-4 Nozzles				
OS system	Support Windows7 64site				
Nozzle Direction	360° any Direction				
Print Mode	Single or Continue printing				
Nozzle Cleaning	One-click easy cleaning				
Power Supply	AC100-240 V/AC 100W				

Main bracket Installation

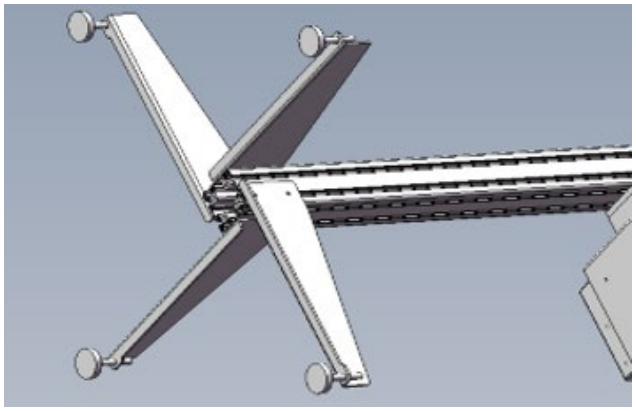
Main Bracket-bill of material

No	Accessory code	Item	Model	quantity
1	CL20525	Industry aluminum profiles	8080*1100mm	1 set
2	CL20527	Printhead regulator	LD	1 set
3	CL20528	Floor stand	LD	4 pcs
4	CL20529	Screw slide	LD	1 set
5	CL20530	Ink bottle holder	LD	1 set
6	CL20542	Industry aluminum profiles	3090*800mm	1 set

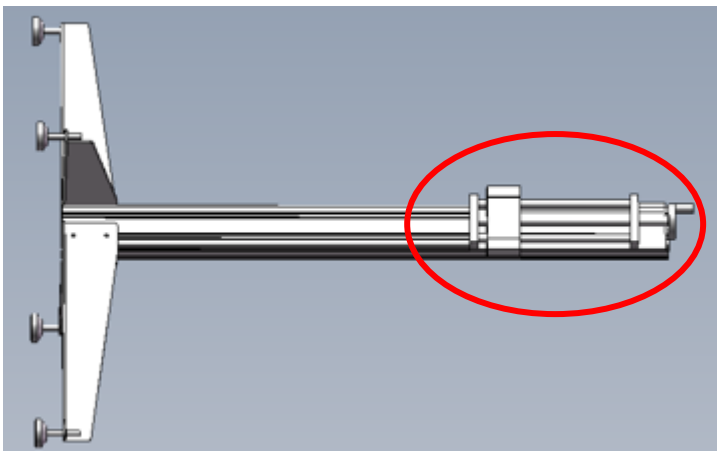
1. Use 8080*1100mm industry aluminum profile and floor stand firstly
2. Use 2 Internal hexagonal screws to fix floor on one side of 8080*1100 aluminum profile. Make sure four floor stands fix at the same height.



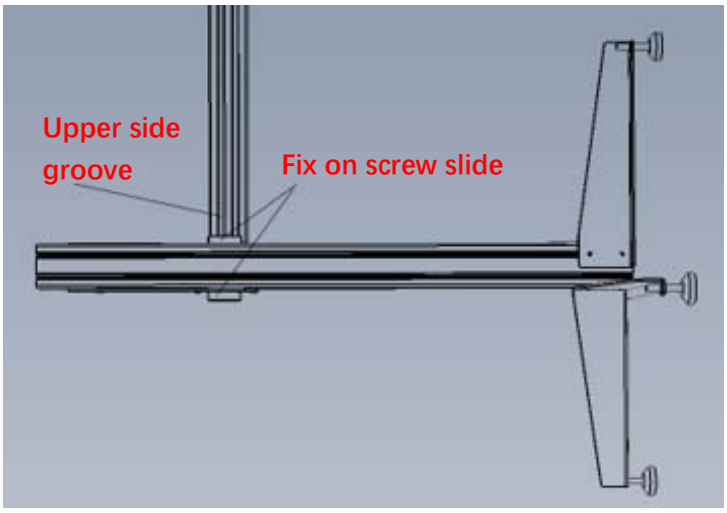
3. Install 4 feet, keep the same height and make sure the screw cap is tight.



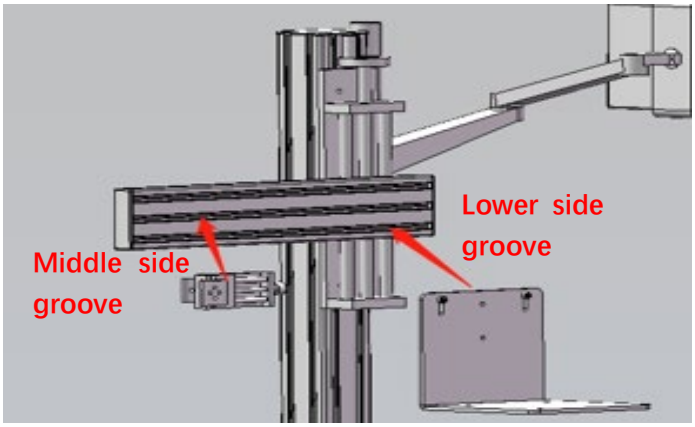
4. Use 4 Internal hexagonal screws to fix screw slide on 8080*1100 aluminum profiles.



5. Use 2 Internal hexagonal screws to fix 3090*800 aluminum profile on screw slide. The profile should fix on the upper side groove.

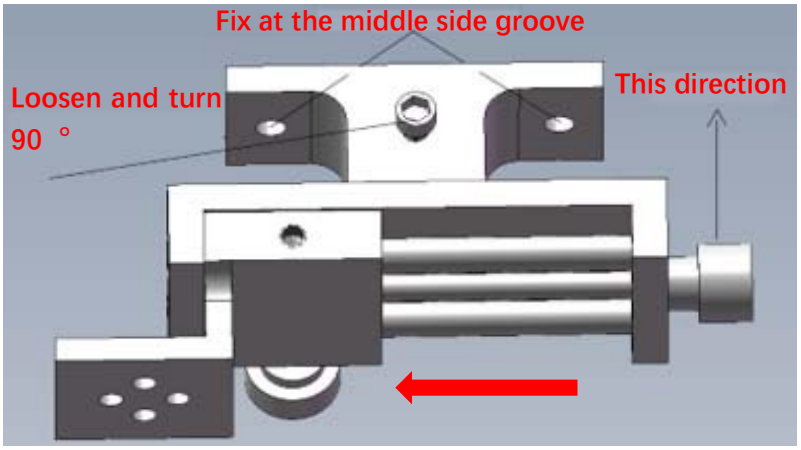


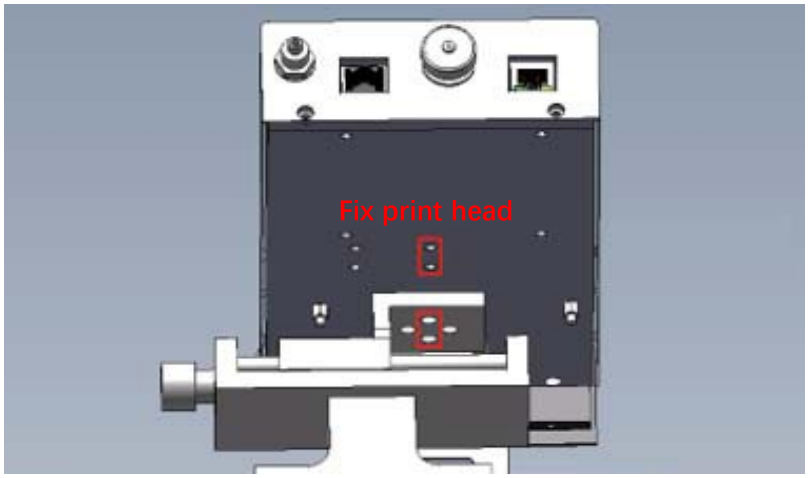
6. Use Internal hexagonal screws to fix Printhead regulator at the middle side groove and fix L type ink system holder at the lower side groove.

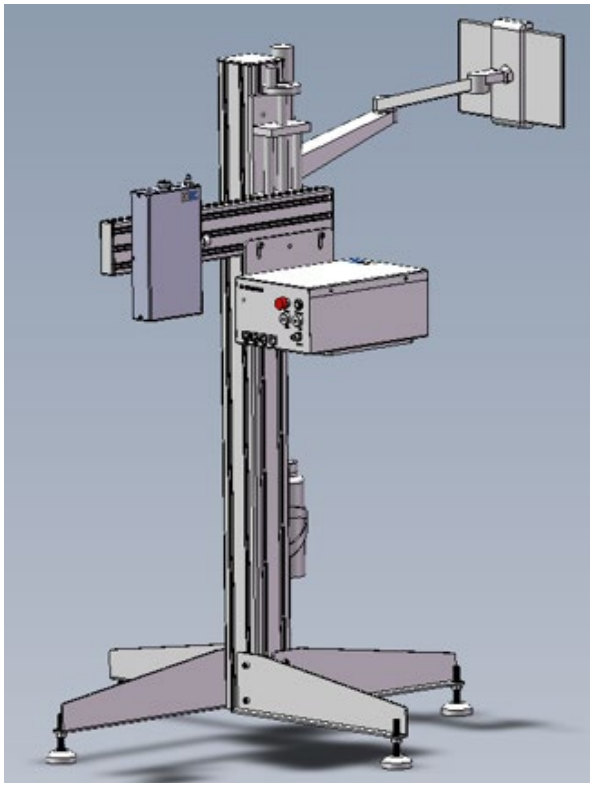


7. Use Internal hexagonal screws to fix ink system on L type profile.

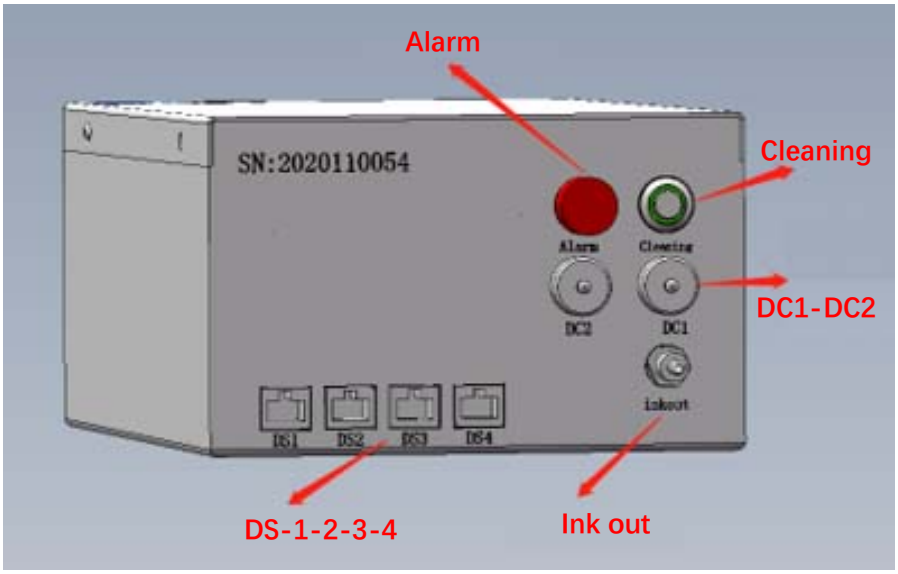
8. install print head as below picture shows.



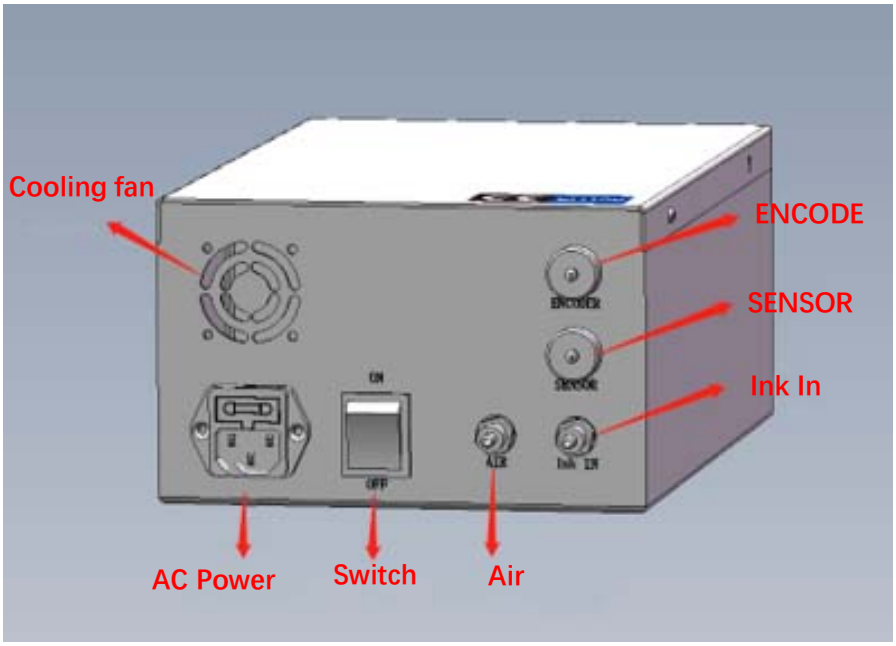




Interface Specification

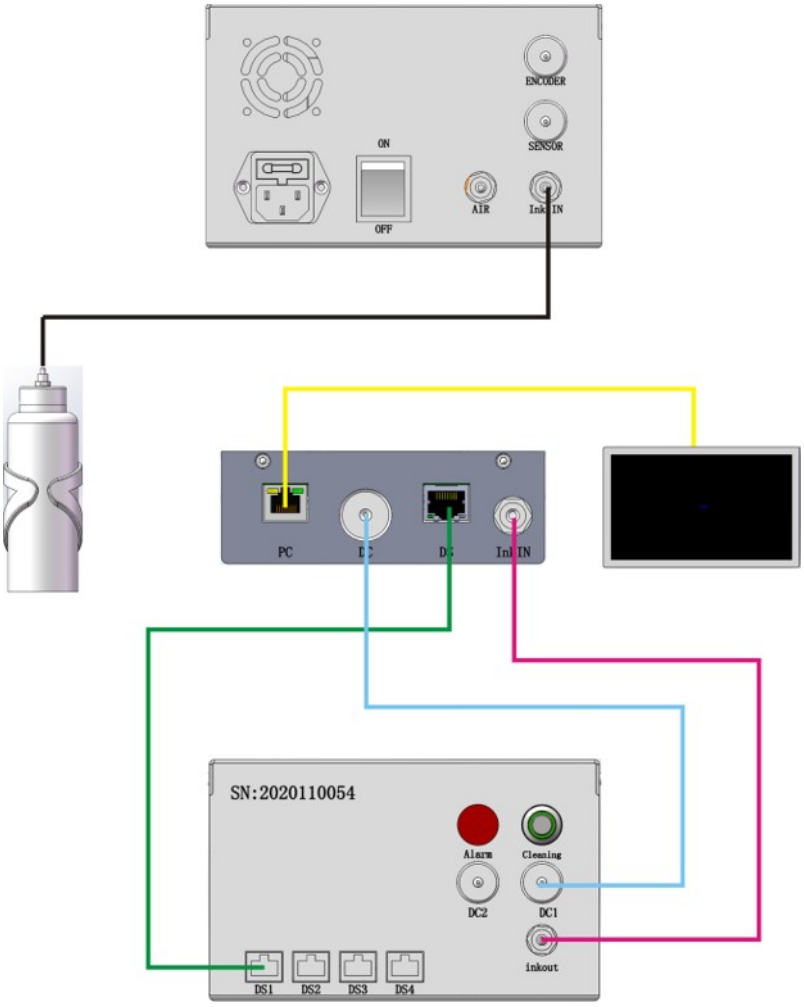


- **Alarm:** Alarm buzzer, When there is ink shortage, the sound and light alarm will be issued continuously, and the fault can be judged by the fault code of the ink system main board.
- **Cleaning:** squeeze ink switch, each press can continuously deliver positive pressure into the ink cartridge, forcing ink or cleaning fluid to output from “INK OUT”, which can be used for nozzle cleaning, nozzle exhaust bubble, ink path emptying, etc.
- **DC1/DC2:** Printhead power output connector, each DC interface can support two printheads.
- **Ink out:** Ink output interface, connect the print head "Ink in" interface, if it is through a one-turn multi-connector, it can supply ink to multiple printheads
- **DS1/DS2/DS3/DS4:** Four sets of encoder and sensor signals are connected to the printhead "DS" interface to provide production line speed date and trigger signals for printhead.



- **AC Power:** AC power access interface.
- **Switch:** Ink system Master switch control.
- **Cooling fan:** Continue to provide heat dissipation treatment for the ink system, if the fan does not work, it should be replaced in time.
- **Encode:** Encode interface, The standard configuration of the encoder is 2000PR differential type, and the encoder wheel diameter is 50mm.
- **Sensor:** Sensor interface, The standard configuration of the sensor is NPN optical fiber reflection sensor, and other types of sensors of NPN can also be selected.
- **Ink in:** Ink enters the ink cartridge from this interface, which connects to an ink bottle.
- **Air:** This interface must not be blocked during use, otherwise it will cause the nozzle to drop ink continuously. This interface is also the expansion interface of the negative pressure.

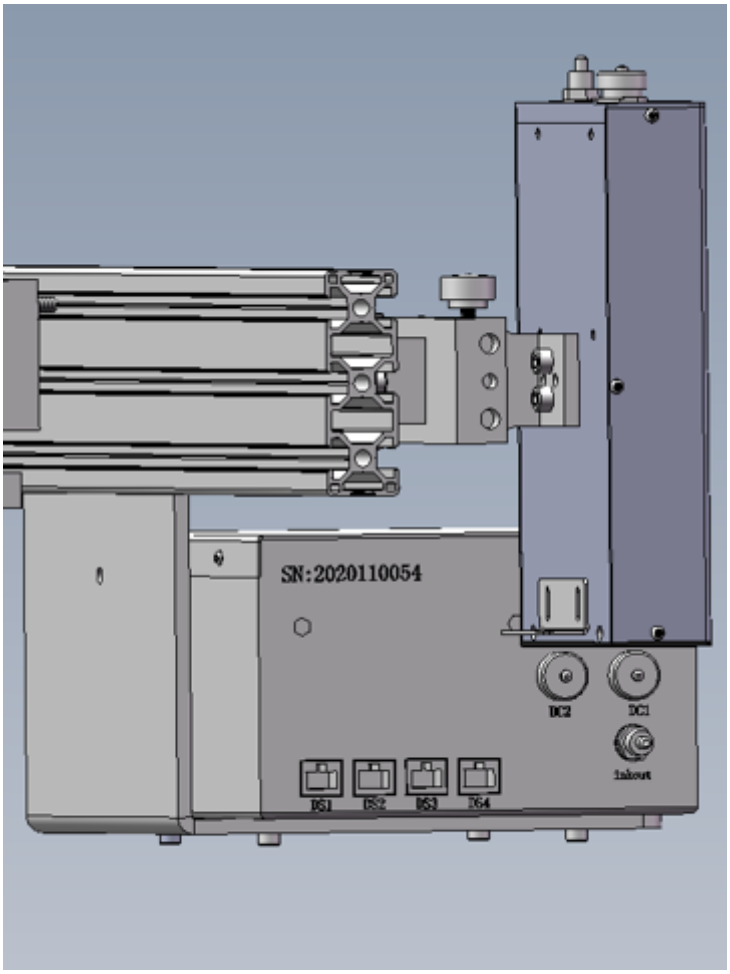
Connection Instructions



- PC interface on printhead connect with Touch Control Panel.
- DS interface on printhead connect with DS1/DS2/DS3/DS4.

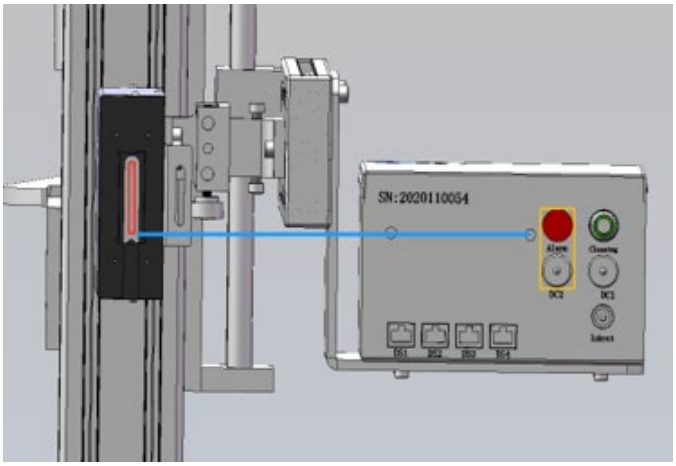
  Ps: DS and PC interface are the same type, pls plug by color label, don't insert them wrong.
- DC interface on printhead connect with DC1/DC2.
- Ink bottle connect with Inkin on ink system.
- Ink out interface Connect a 10-15 cm ink tube and then connect the nozzle through the disc-shaped nozzle filter.

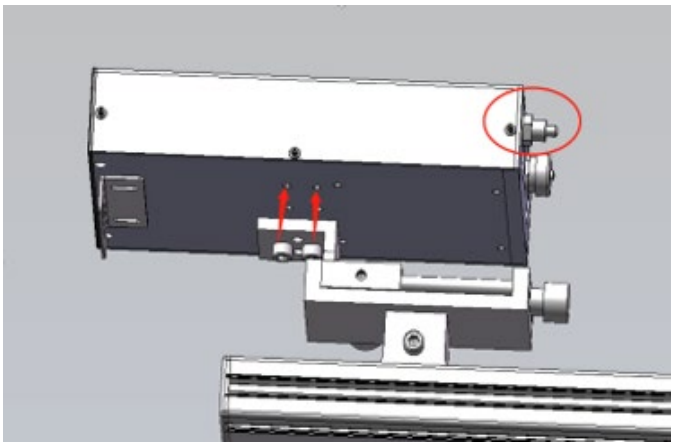
Vertical Spray Printing

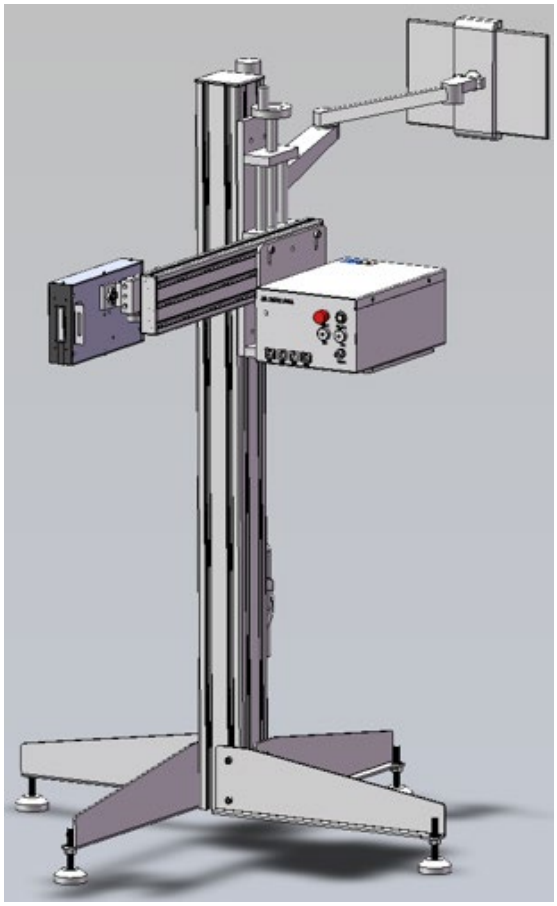


- The relative height difference between the nozzle and the ink cartridge is as shown in the figure, please controlled within 10MM above the DC interface.
- If the nozzle is too high, it will cause poor ink supply, printing deinking and disconnection.
- If the print head is too lower than the ink cartridge level, it will cause the print head to drip ink continuously.
- The height of the Ink system can be adjusted by adjusting the installation height of the L profile.

Side Spray Printing

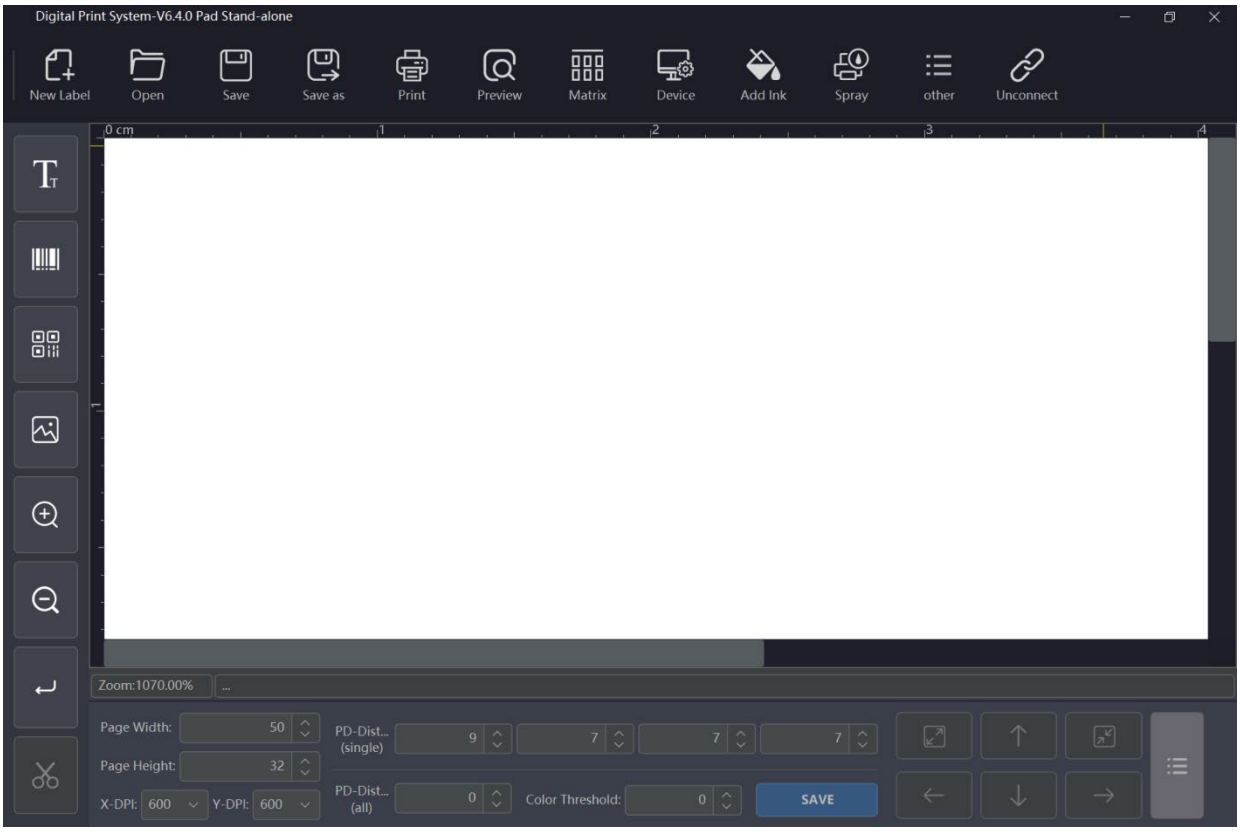




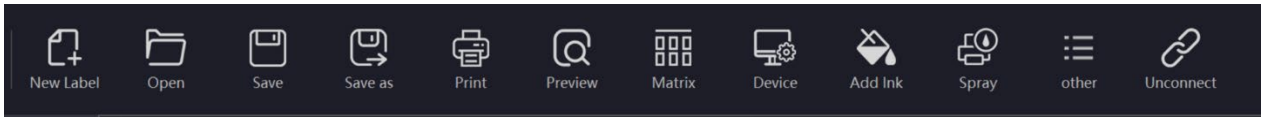


- The nozzle height should maintain between the two interfaces of the frame.
- If the nozzle is too high, it will cause poor ink supply, printing deinking and disconnection.
- If the print head is too lower than the ink cartridge level, it will cause the print head to drip ink continuously.
- Connect the printhead as shown on left figure.
- “Ink in” interface should be at the top of printhead.
- The height of the Ink system can be adjusted by adjusting the installation height of the L profile.

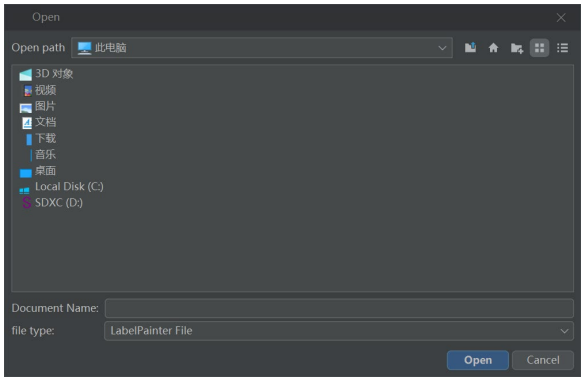
Software Operation



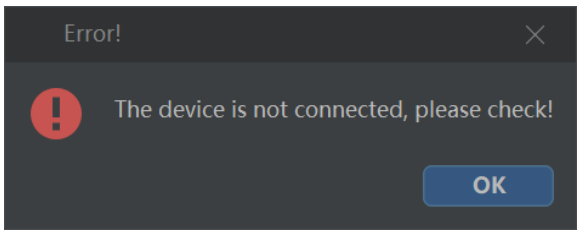
Main Menu



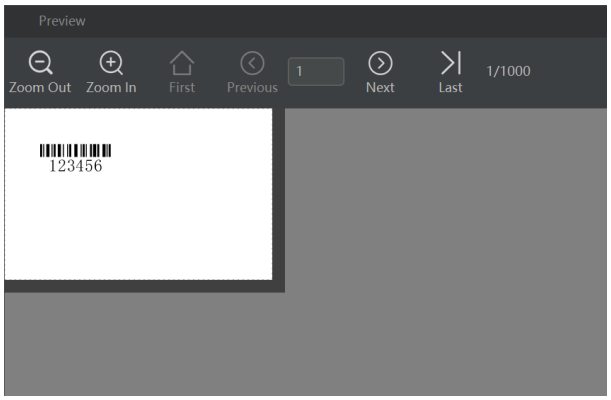
- **New Label:** Make a new template or file.
- **Open:** Open a saved template or file.



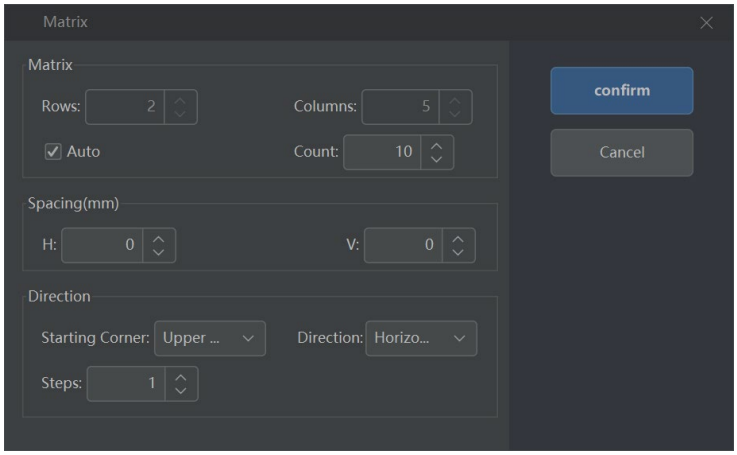
- **Save:** Save the edited template or file.
- **Save as:** The current editing content is saved with another template name.
- **Print:** Print current template. (the printhead must connected, if not will show as below error)



- **Preview:** Simulation display printing effect.

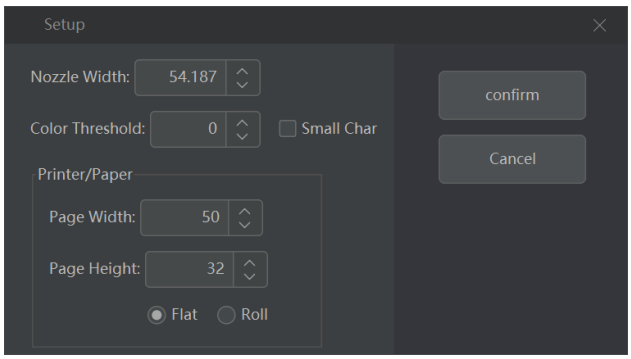


- **Matrix:** When editing multiple columns or multiple rows of the same size and form of content, you only need to edit a single content. Using the matrix function, you can edit and print templates in batches.



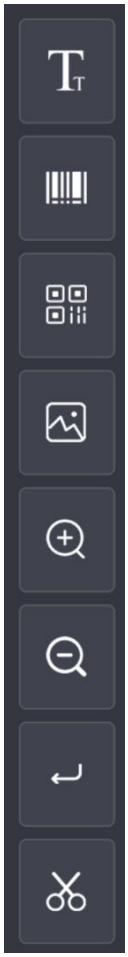
- **Device:** Adjust the hardware parameters (detailed introduction at the back of this manual).

- **Add ink:** Recharge the ink usage of the system.
- **Spray:** Force the print head to eject ink, and test whether the print head connection is normal.
- **Other:** Alignment, system default parameter setting



- **Unconnect/Connect :** Display print head connection status.

Quick edit menu



Insert text

Insert one-dimensional code

Insert two-dimensional code

Insert image

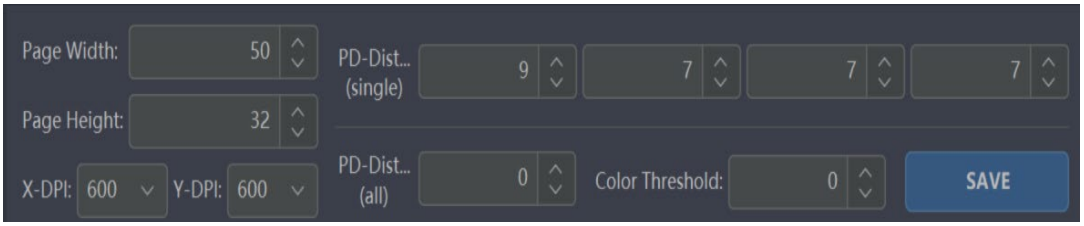
Canvas zoom in

Canvas zoom out

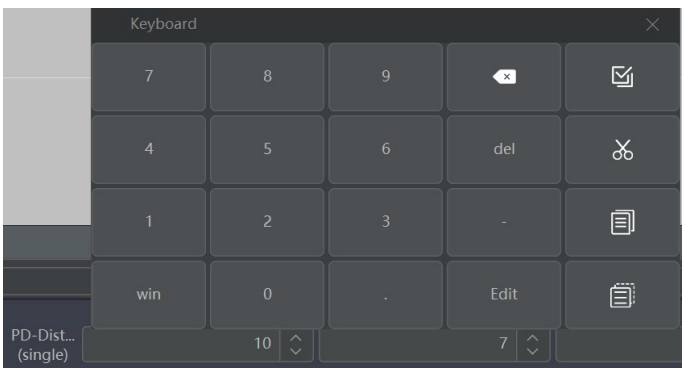
Return to the last step

Delete

Printing Parameters

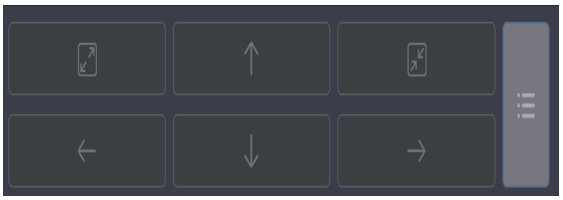


- **Page Width：** Width in the feeding direction, the size of the template in the direction of movement.
- **Page Height:** The height of the nozzle direction, set according to the actual size of the nozzle.
- **X-DPI:** Refers to the number of dots printed by 1 inch in the direction of movement, the larger the value, the thicker the print.
- **Y-DPI:** Cannot be modified, determined by the physical properties of the nozzle.
- **PD-Dist.(single):** From left to right is the delay of the four print heads, and the distance from the photosensor of each print head to the print content can be set individually.
- **PD-Dist.(all):** Increase or decrease the distance of all photosensor at the same time, decrease the display of negative numbers.



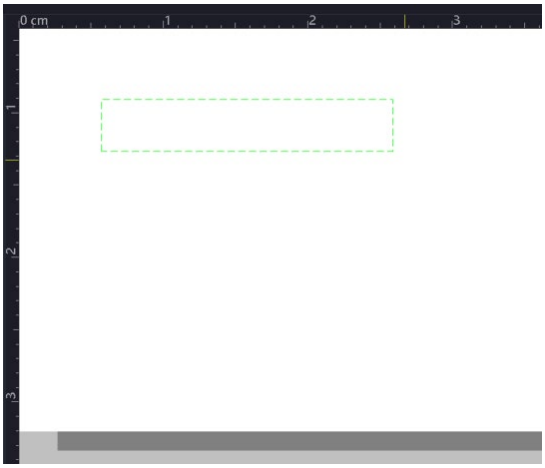
	Select all
	Cut
	Copy
	Paste

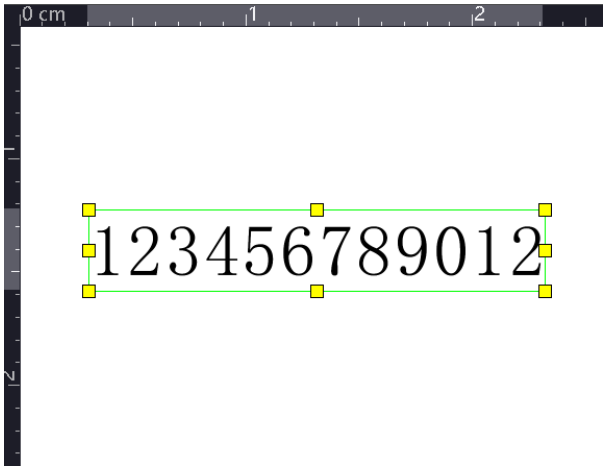
- **Save:** Save all parameters after adjustment
- **Edit content fine-tuning**



Zoom in	Up	Zoom out	Step size setting
Left	Down	Right	

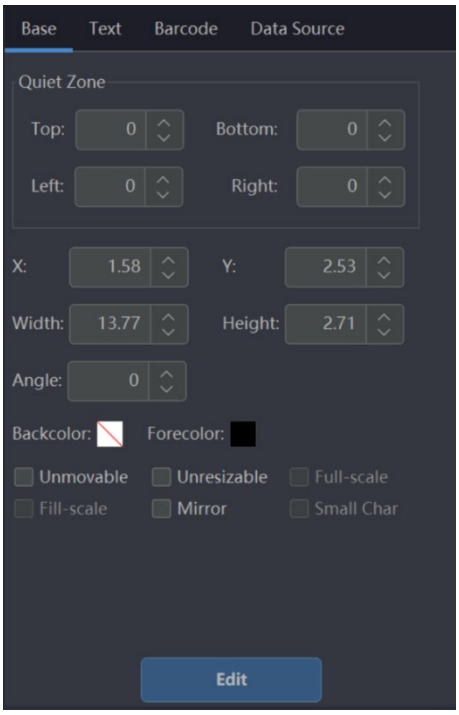
Content editing method

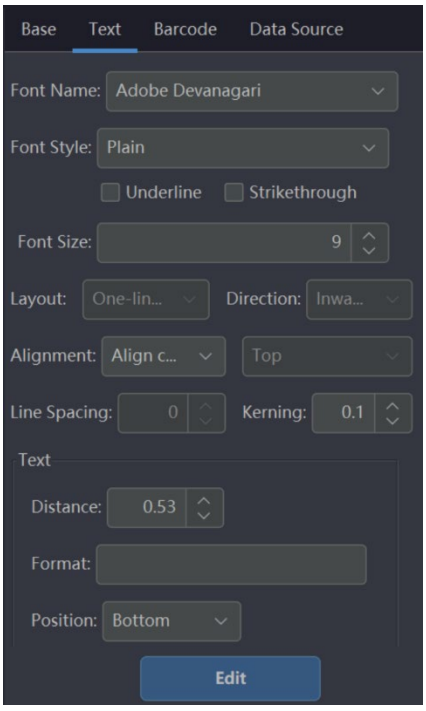




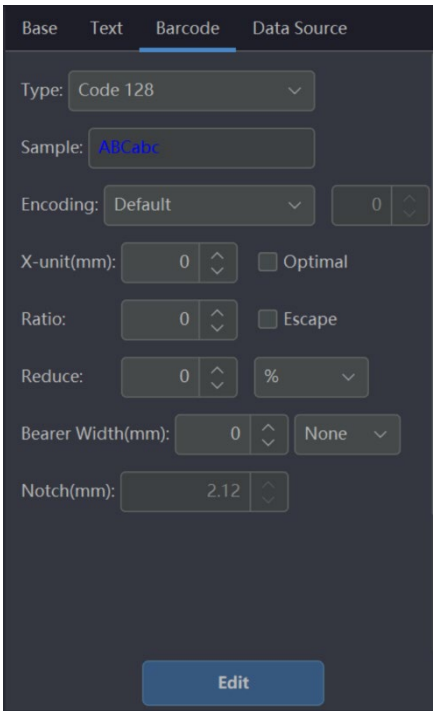
- Select the editing content type (text, barcode, two-dimensional code, picture) in the upper left corner of the software, and use drag-and-drop drawing. In the canvas, press and hold the left button of the mouse (touch the screen with your finger), drag to the lower right corner of the target area and release the left mouse button (finger off the screen) to complete the rectangular area drawing.
- All four types of content require data source-driven loading.

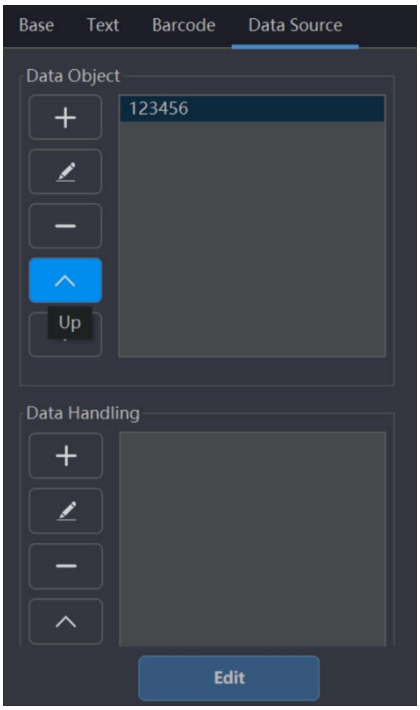
Content attribute settings





- **Base:** Adjust the size of the upper, lower, left, and right blank areas; X/Y is the coordinate position of the content; Width/height refers to the size of the content; Angle is the content rotation angle.
- **Text:** Parameter adjustment for text attributes.

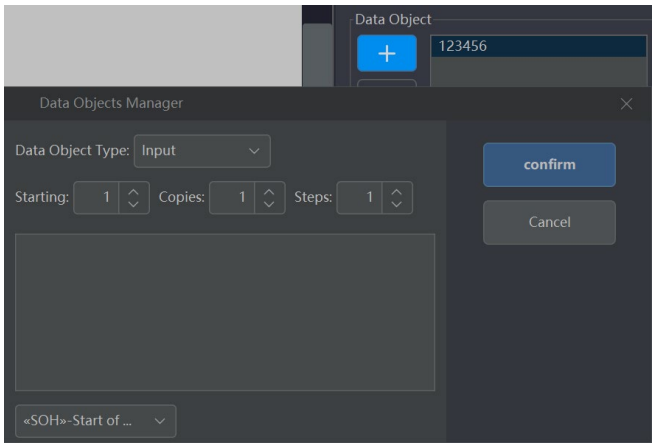


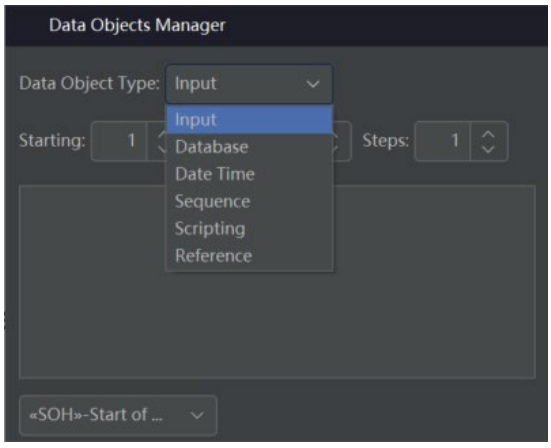


- **Barcode:** Parameter adjustment for 1-D and 2-D code attributes.

- **Data object**

“Add”, “edit”, “delete”, “up” and “down” to complete the editing and definition of the content, click "Edit" to save the parameters.

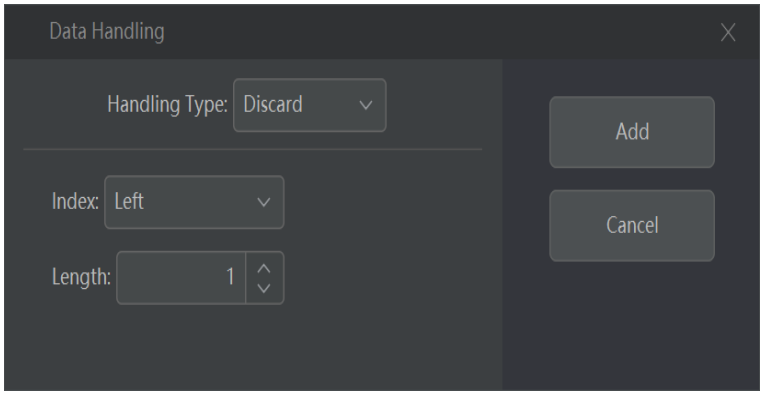


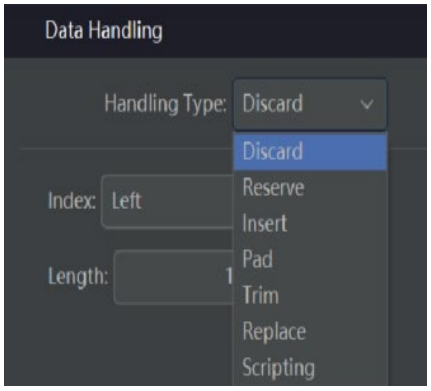


Date object type mainly include “input”, “database”, “date time”, “sequence”, “scripting”, “reference”.

Each graph can add multiple data objects (sortable, editable).

- **Data handling**

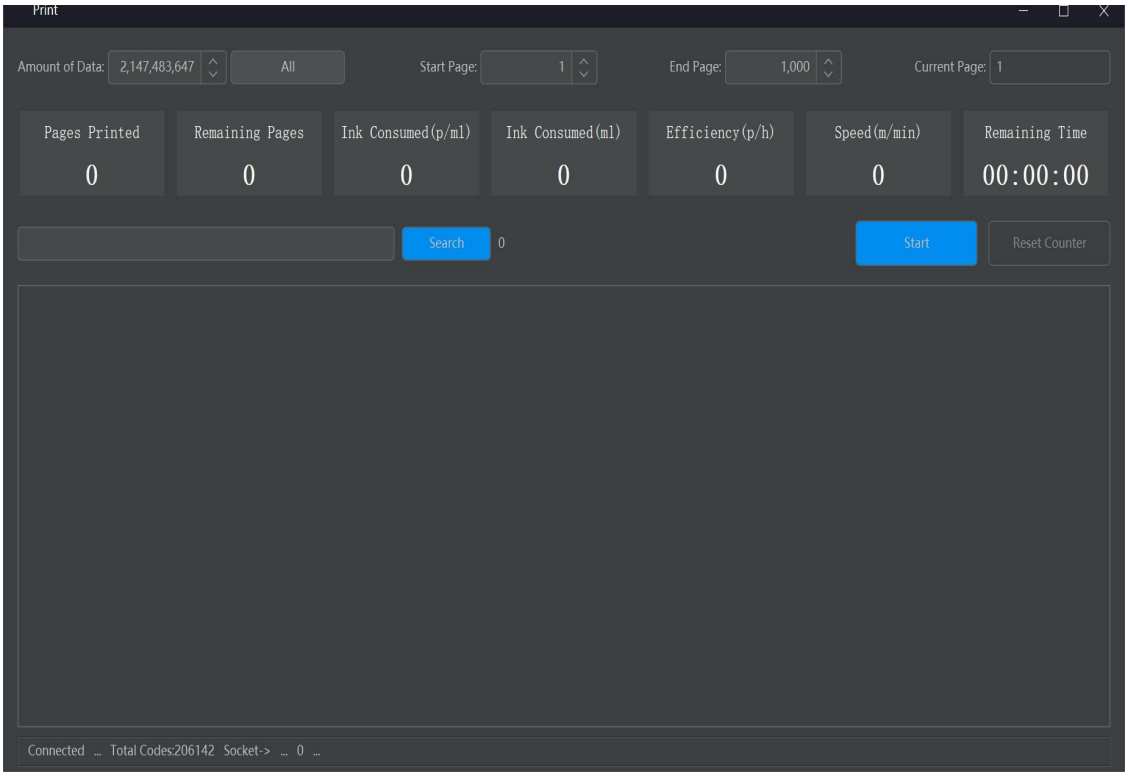




Handling type： Discard, reserve, insert, pad, trim, replace, scripting, The content can be advanced definition.

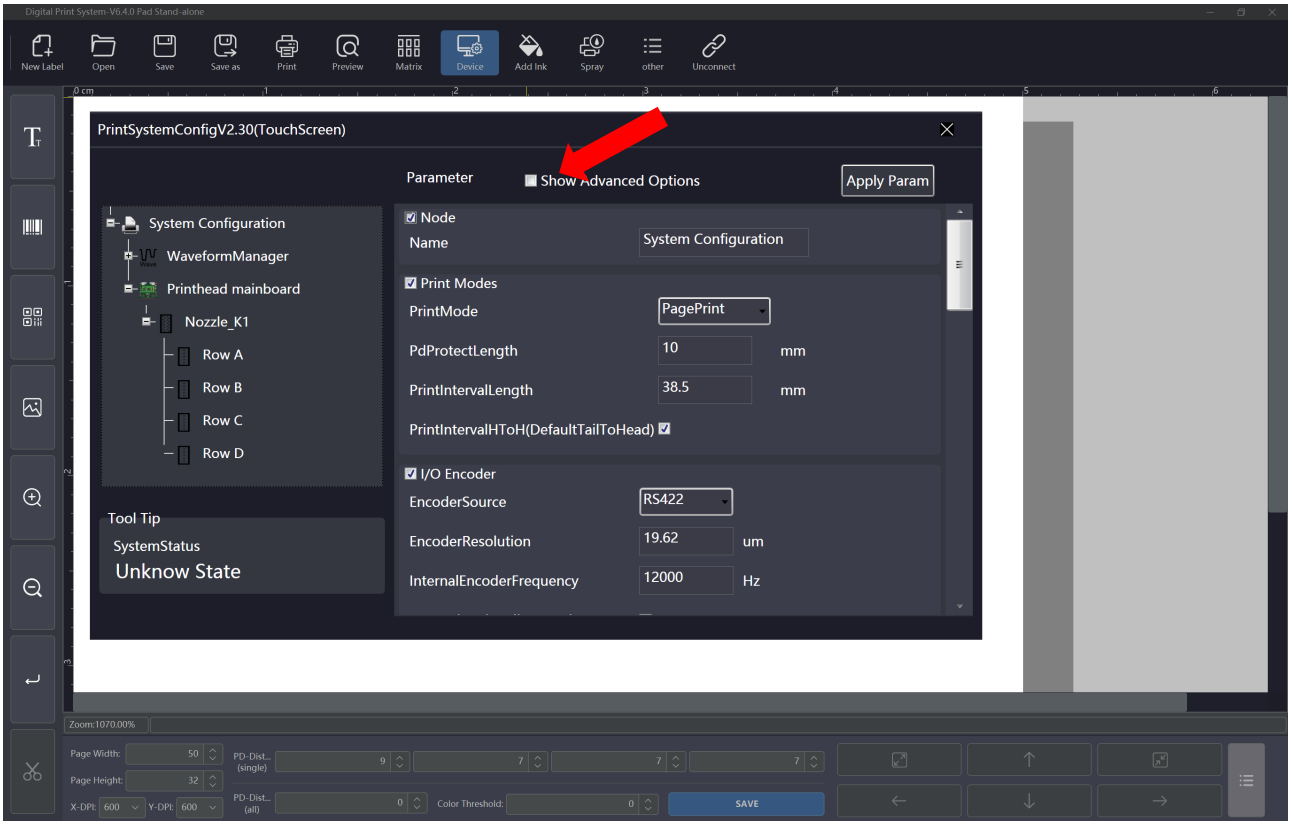
Each data object can add multiple processing methods (sortable, editable).

Print



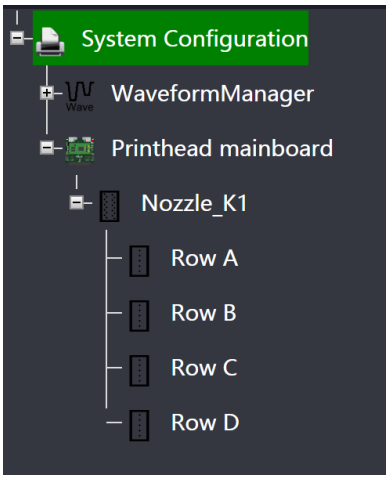
- **Amount of Data:** the total amount of data currently printed.
- **Start Page:** start printing from this page number.
- **End Page:** which page number to end printing.
- **Current Page:** which page is currently printed.
- **Pages Printed:** the number of completed printing.
- **Remaining pages:** how many pages are left in the current job.
- **Ink consumption:** the content of this article, the quantity that can be printed per milliliter of ink.
- **Total ink consumption:** total ink consumption in this printer.
- **Efficiency:** How many pieces per hour.
- **Speed:** The current speed of the production line.
- **Remaining time:** How much time will be needed to complete the task

LD50/100/200 Equipment parameter setting-engineer menu

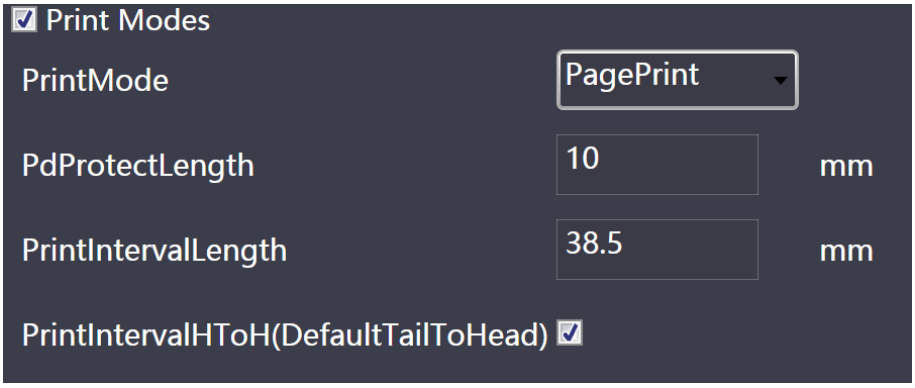


- Open the "Device" menu and enter the engineer's advanced mode.
- Click "show advanced options" and enter the password “123”, you can modify hidden advanced parameters.
- After each parameter is modified, click "Apply Param" to save the parameters.

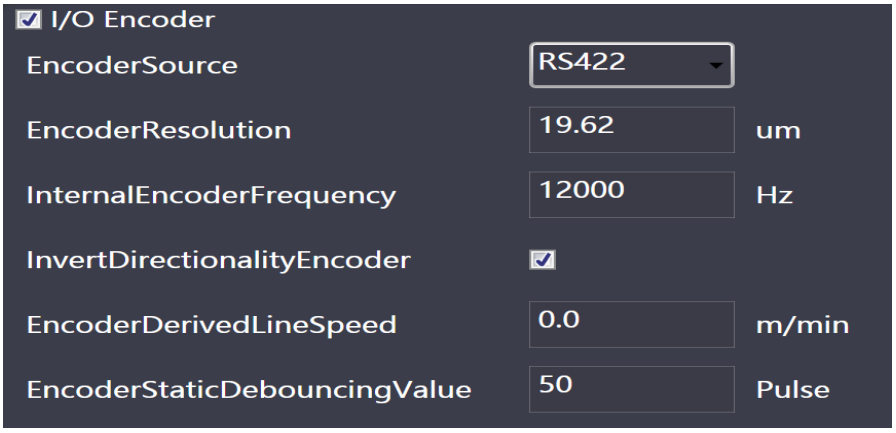
tree structure interface parameter



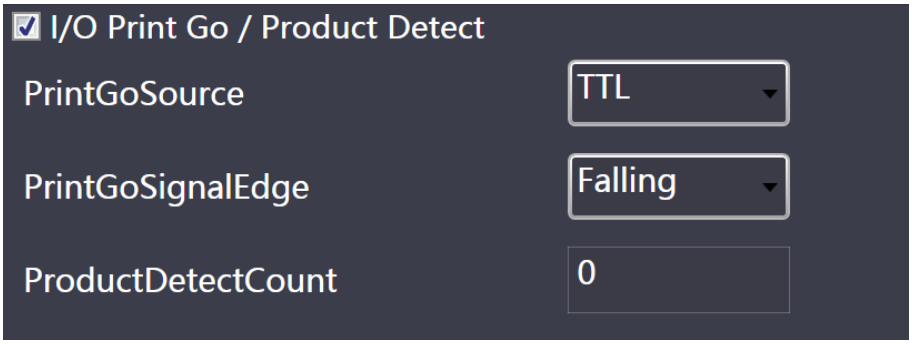
System Configuration	System main parameters
Waveform Manager	Wave form parameters
Printhead mainboard	Printhead board parameters
Nozzle_k1	Nozzle parameters
Row A/B/C/D	Two or four rows of nozzle parameters



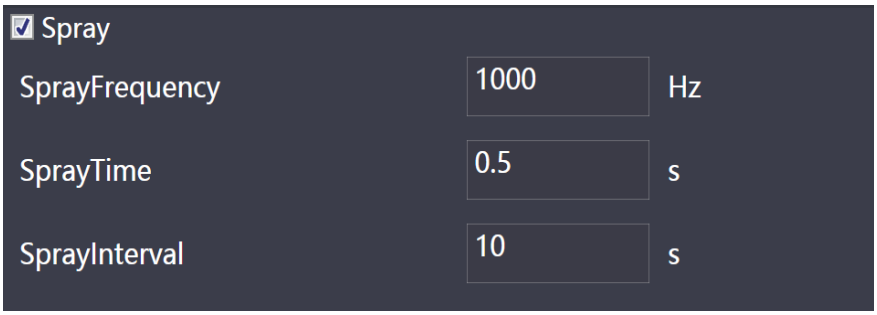
- **The print modes:** continue print and page print.
- **Pd protect length:** Used to ignore false trigger signals between two consecutive color scales.
- **Print interval length:** During continuous printing, the printing interval between the end of the previous label and the beginning of the next label.



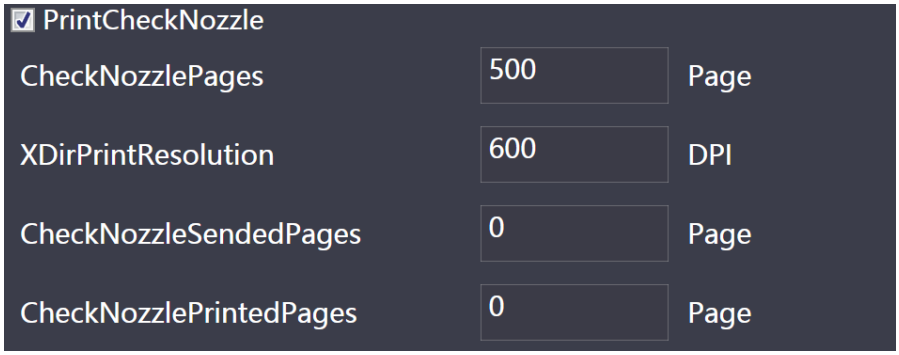
- **Encoder source:** Internal and RS422
- **Encoder resolution:** 2000PR is 19.62.
- **Internal Encoder Frequency:** Test the internal virtual encoder frequency.
- **Invert Directional Encoder:** Encoder forward and reverse.
- **Encoder Derived Line Speed:** Encoder speed actually returned.
- **Encoder Static Debouncing Value:** Used to solve the slight encoder speed error caused by jitter when the platform is stationary.



- **PD style:** TTL and software.
- **Print gosignal Edge:** Rising trigger and falling trigger.\
- **Product Detect Count:** The actual number of triggers during printing is the actual number of printed pages.

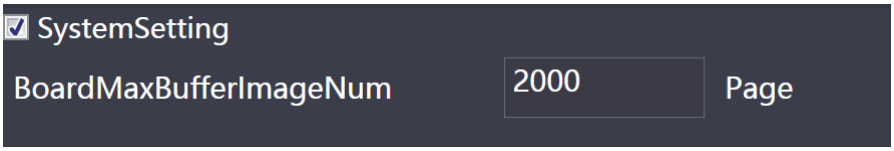


- **Spray Frequency:** 1000Hz.
- **Spray Time:** Flash duration.
- **Spray Interval:** Time between each flash spray.



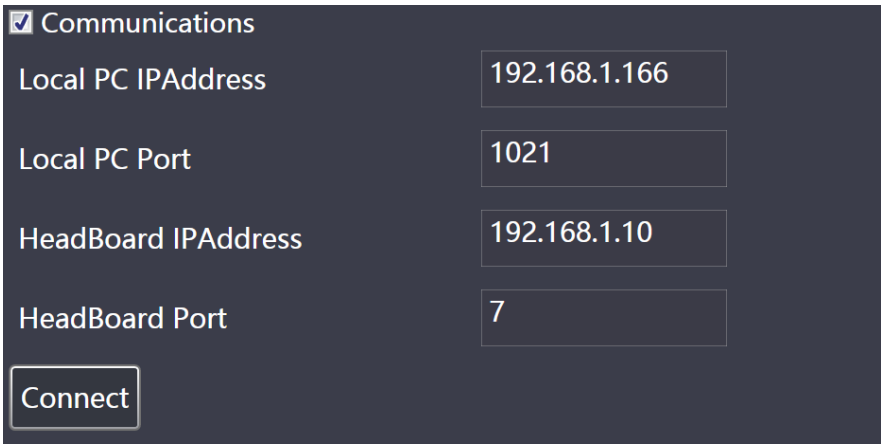
- **Check Nozzle pages:** Printhead test page number

- **X Print Resolution:** X-direction printing resolution.
- **Check Nozzle Sended Pages:** Number of pages actually sent to the board.
- **Check Nozzle Printed Pages:** Number of pages actually printed.



- **Board Max Buffer Image Num:** Used to set the number of buffers in the board, used in conjunction with the dynamic board function in the printhead board.

Printhead Mainboard Parameter

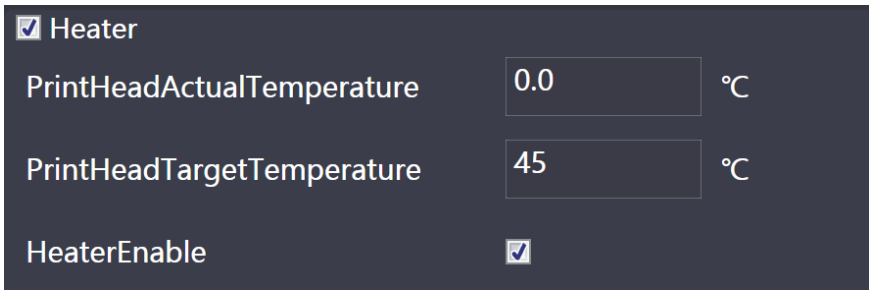


- **Local PC IP Address:** 192.168.1.166 (Default)
- **Local PC Port:** 1021 (Default)
- **Headboard IP Address:** 192.168.1.10 (Default)
- **Headboard Port:** 7 (Default)

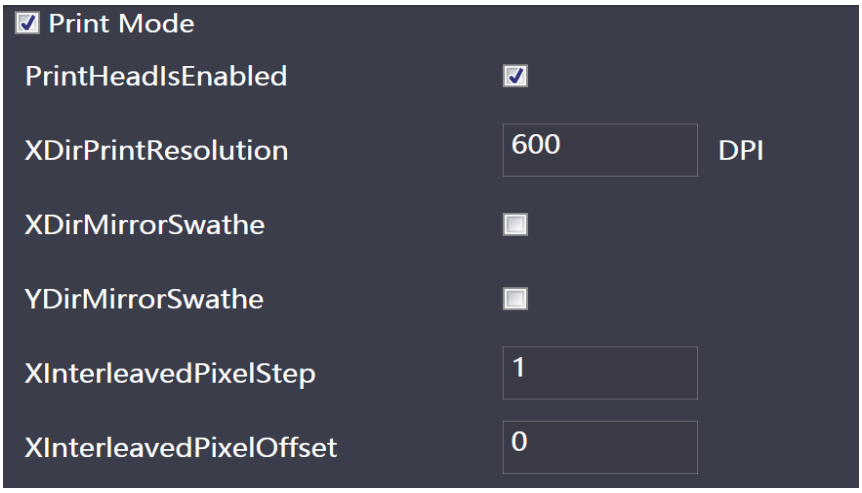
Nozzle related parameters:

- LD50 adopts external auxiliary heating, and the temperature setting is 35-45 degrees according to the ink waveform.

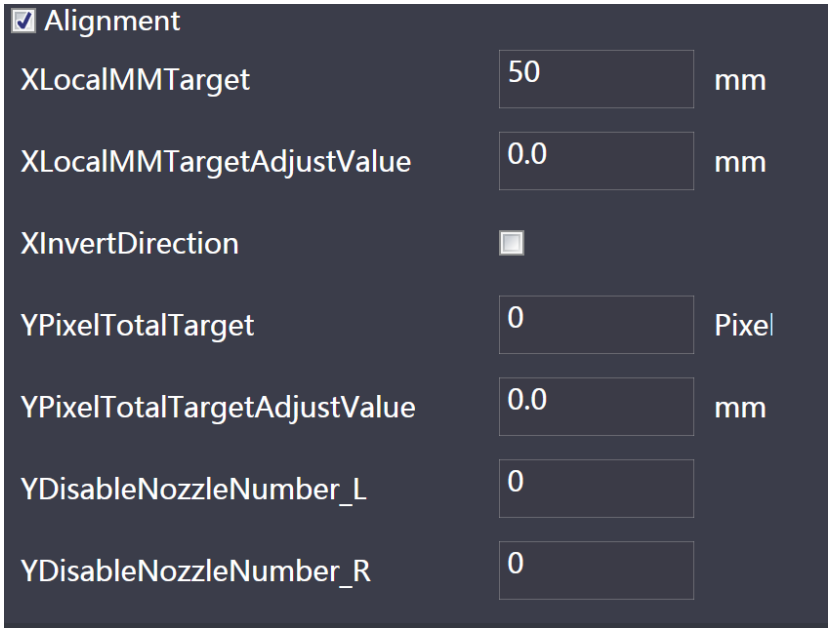
- LD100/LD200 adopts heating in the nozzle, and the temperature setting is set to 40-45 degrees according to the ink waveform.



- **Print Head Actual Temperature:** Actual measured temperature of the nozzle.
- **Print Head Target Temperature:** The target temperature set by the nozzle.
- **Heater Enable:** Heating switch.



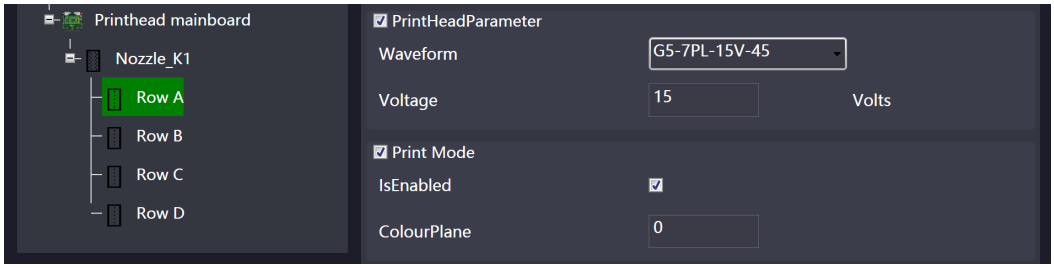
- **Printhead enable:** Nozzle switch.
- **X Direction Print resolution:** The actual printing resolution in the X direction is subject to the template.
- **X Direction Mirror Swathe:** Mirror swathe switch.
- **Y Direction Mirror Swathe:** Mirror swathe switch.
- **X Inter Leaved Pixel Step:** X direction core stepping.
- **X Inter Leaved Pixel Offset:** X direction Pixel offset.



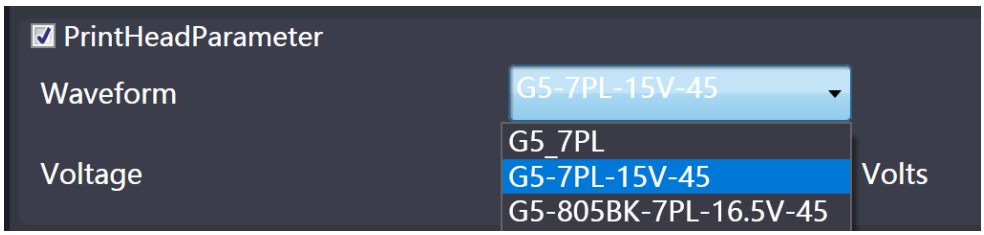
- **X Local MM Target:** The distance from the nozzle to the electric sensor.
- **X Local MM Target Adjust Value:** It is used to dynamically adjust the printing position of the paper feeding direction during the printing process. This function does not take effect immediately. The data buffered by the board must be printed, and then the print data can be re-sent according to the adjusted parameters.
- **X Invert Direction:** Equivalent to reverse installation of the nozzle or 180° rotation of the nozzle.
- **Y Pixel Total Target:** The starting data in the Y direction, the default is zero for single print head, and 0, 1280, 2560, etc. for multi-head splicing.
- **Y Pixel Total Target Adjust Value:** Dynamic adjustment in Y direction, basically consistent with X direction.
- **Y Disable Nozzle Number_L:** Disabled on the left.
- **Y Disable Nozzle Number_R:** Disabled on the right.

- Flash spray frequency and effective spray time.

Four Rows （A/B/C/D）setting

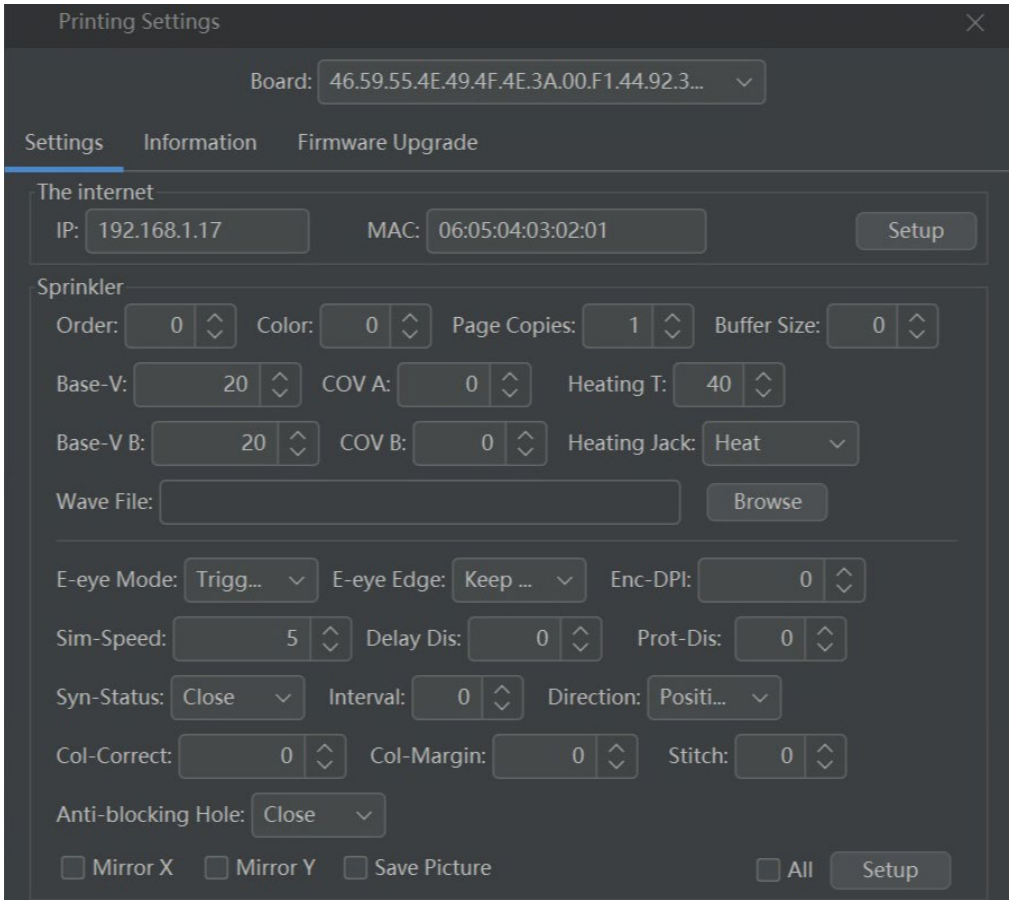


- **Waveform:** Actual waveform of current nozzle.
- **Voltage:** The actual voltage of the current nozzle, the general voltage value is between 12-22V, according to the factory voltage, no need to adjust.
- **IsEnable:** Nozzle Row switch.
- **Color Plane:** Different color channels.



- G5: Nozzle style.LD50-GH2220， LD100-G4, LD200-G5.
- 805BK: Ink style, choose according to the actual ink used.
- 7PL: Wave drop size, Normally use 7PL.
- 16.5V: Drive voltage value of each Nozzle.
- 45: Setting value of nozzle heating temperature.

LD70/70Plus Equipment parameter setting-engineer menu



- Order: Arranging order When there are multiple nozzles.
- Color: Ink color (match the waveform), black ink choose 0.
- Page copies: Printing quantity of every single induction.
- buffer size: The number of page buffers in the software.
- Base-V: Base voltage.
- Cov A：Manually adjust the voltage of column A.
- Heating-T: Target temperature to be reached.
- Base-V B: B Base voltage.
- Cov B：Manually adjust the voltage of column B. (in 1020)
- Heating Jack: Heating method selection--internal heating/UV lamp heating. The output interface function selection of the print head board is used to

control heating or UV lamp.

- Wave file: Select the corresponding waveform file.
- E-eye mode: Electric eye mode selection: Trigger/Simulate/Ignore
- E-eye edge: The electric eye model is a choice of open and closed.
- Enc-DPI: Encoder resolution.
- Sim-speed: No encoder to set the speed.
- Delay Dis: Coding distance setting after induction.
- Prot-Dis: This distance range can only receive one electric eye trigger.
- Syn-Status: Synchronizer Status --Open/Close.
- Interval: Distance setting between 2 prints.
- Direction: Forward/Reverse.
- Col-correct: Delay setting for nozzle ABC column.
- Col-Margin: Setting the distance between group nozzles.
- Stitch: When multiple nozzles are spliced, the overlapping width of two adjacent nozzles.
- Anti-blocking Hole: Whether the anti-clogging function is enabled for the print head without image data.
- Mirror X: Image flip in X direction.
- Mirror Y: Image flip in Y direction.
- Save Picture: The data storage image which sent by the inkjet software to the board is used for test comparison and tracking.
- All: Optional, whether to copy all parameters to all boards.
- Setup: Save and apply all parameters to the device.

Use and Maintain

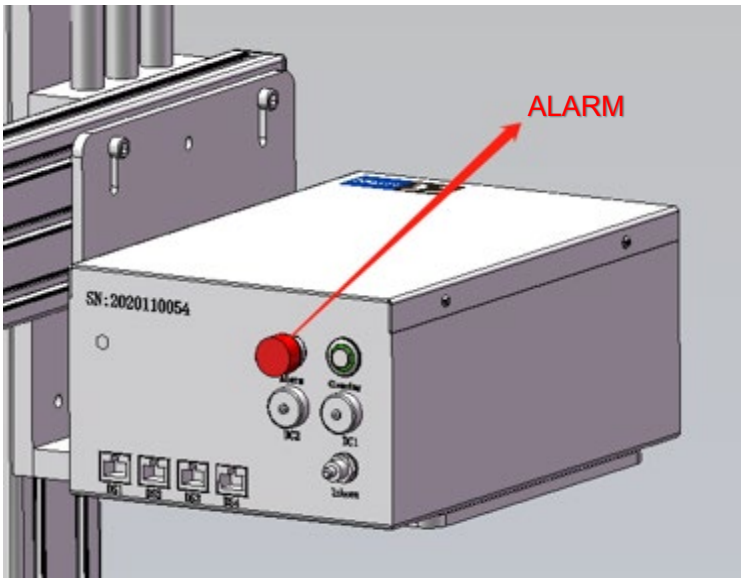
Notes for printing equipment

- The nozzle is absolutely not allowed to be directly irradiated or reflected by the uv curing lamp, which can easily cause the nozzle to block.
- The nozzle cannot be scratched by hard objects, especially sharp things, otherwise it will damage the nozzle and affect the printing effect.
- The nozzle is a consumable part, and the surface of the nozzle is not allowed to touch any liquid except the ink and cleaning agent certified by our company.
- When not in use for more than 5 days, wipe the surface of the nozzle with a cleaning cloth containing cleaning fluid, put a clean nozzle special wipe cloth in the protective cover of the stainless steel nozzle, and cover the nozzle to prevent light and dust.
- If the nozzle is not used for a long time, regular maintenance is required. After performing the normal startup process every week, squeeze the ink once or twice, and print the test content to ensure that the nozzle is not blocked.
- Please use the special consumables designated by our company. Failures caused by the use of consumables that have not been certified by our company are not covered by the warranty.
- The nozzle should be wiped with the designated wiper cloth for nozzles. Unqualified wipes will damage the nozzles and cause the nozzles to be blocked.
- The equipment is strictly prohibited to be disassembled privately during the warranty period, and the operation must be standardized under the guidance

of the engineer. The equipment damage caused by the private disassembly will be borne by the user.

- The equipment requires independent power supply and independent grounding to prevent voltage instability and electrostatic interference.
- It is forbidden to use ink beyond the expiration date or recycled waste ink.

Fault warning system (code shows on mainboard)



- Code 04 is an ink replenishment fault, the ink cartridge level sensor is always in a low level state, the possible reasons are as follows:
  1. Ink bottle empty: replace with new ink, restart the software.
  2. Ink pump failure: the ink pump cannot draw ink, replace the ink pump.
  3. Ink circuit mainboard failure: replace the ink circuit mainboard.
  4. The pipeline is not smooth: check whether the pipeline from the ink bottle to the ink path is bent or compressed.
- Code 05 is the ink cartridge overflow protection, check whether the float of the liquid level sensor is working normally, and discharge the ink appropriately.

FAQ Solutions

- The software shows that the hardware is not connected

  1. The interface light of the printhead connected to the computer does not light up.

     a) Re-plug the network cable and confirm that the network cable is connected properly.

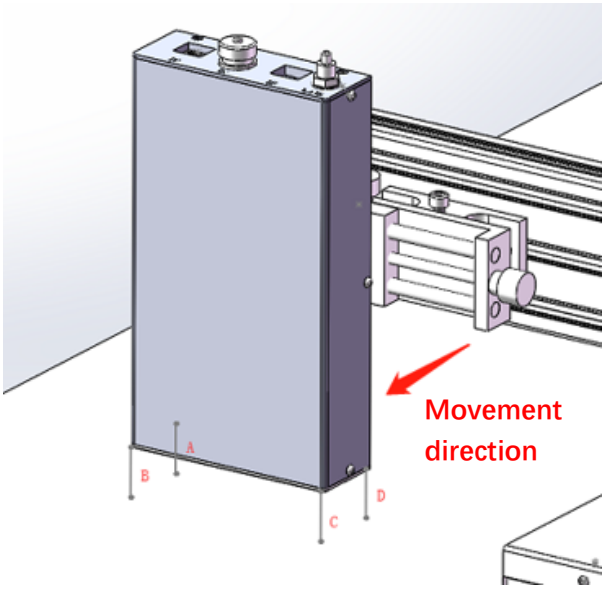
     b) Correctly set the IP address of the computer which connected to the printhead.

     c) Confirm whether the USB interface connection is normal, you can judge whether the dongle light is on.

  2. Confirm whether the ink system power supply and printhead power supply are normal.

  3. The IP address of the device parameter in the coding software and the IP address of the computer network card must be the same. The software defaults to set the IP address as 192.168.1.166.

- How to deal with ghosting of printed content



1.Check whether the plane of the printhead is parallel to the plane of the printed object.

2.Whether the nozzle is perpendicular to the movement direction of the printing object.

3. Confirm that the relevant settings in the equipment parameters are correct.
    a) Take the standard 50MM diameter encoder wheel as an example, the resolution value of the software external encoder is set to: 19.62.
    b) Select or cancel the print head reverse installation option, and check whether the printing effect has changed.
    c) When using the internal encoder, the set simulation speed is inconsistent with the actual production speed.

- How to deal with poor printing effect
    1. Print a test strip immediately after squeezing the ink to understand the status of the printhead.
    2. The related reasons for the poor printing effect are as follows, which shall be eliminated one by one.
        a) The nozzle hole is blocked, mainly due to curing lamp irradiation, long-term exposure of the nozzle to the air, external damage to the nozzle surface, use of unqualified or expired ink, contact of the nozzle with other chemical liquids, aging or damage to the circuit, etc.
        b) The best distance between the nozzle and the surface of the object to be printed is within 2mm, the maximum is 5mm, the closer the print is, the clearer the print will be.
        c) Whether the printer has a good independent grounding, free from external interference such as static electricity and wind blowing nozzles.

d) Whether the software settings are correct, such as ink temperature, voltage, wave type, the correct parameters, see the ink parameter table.

e) Whether the ink system and the printhead are installed correctly, and whether the relative liquid level difference is accurate.

f) The curing lamp is too far away from the printhead, causing serious ink diffusion on the surface of the printed object.

g) The printing material is different, use a clean white paper to test the effect or use a nozzle wipe to clean the surface of the printing material and try again.

- After squeezing the ink, it can print normally but the duration is not long.

1. The relative liquid level difference between the ink system and the nozzle is inaccurate.

a) Ink system installation is too high: When the print content is incomplete, use a special wiping cloth to gently wipe the surface of the printhead, and test print. If the print content is complete, it is judged that the printhead surface is silted due to the high installation of the ink path host, reduce the ink system installation height appropriately. Adjust and test spray several times until stable operation.

b) Ink system installation is too low: If the print head cannot be restored by wiping the print head without squeezing the ink according to the above method, squeeze the ink to observe whether there are bubbles discharged from the nozzle. If there are bubbles, it is judged that the

ink system is installed too low, the ink in the nozzle returns to the ink path and bubbles enter the nozzle, Appropriately increase the installation height of the ink system, and try spraying repeatedly until it runs stably.

2. Exceeds the maximum ink supply capacity of the print head.

   When part of the content is incomplete, stop printing for a few minutes, and then start printing. If the content is complete, this situation is generally caused by excessive ink output from the nozzle.

   Try to reduce the production line speed, reduce the XDPI value, reduce the printing frequency, use a single wave, reduce the printing content or size etc. to reduce the ink consumption per unit time to observe whether the problem is solved.

- The solution when the printhead does not print.

1. No printing caused by incorrect hardware and software settings.

   a) Place a piece of white paper under the print head and press the software "spray" to observe whether there are ink spray marks on the white paper. If there is, it can be judged that the hardware and software settings are not correct.

   b) Click to start printing. When using an external encoder, turn on the production line, keep the encoder wheel rotating, and observe whether there is a speed value on the print screen. If the speed value is 0, check whether the encoder is installed correctly; adjust the synchronizer parameter setting "InvertDirectionalityEncoder" "Select

or uncheck the option, whether the speed can be detected normally.

c) The software can detect the speed, manually trigger the sensor, and observe whether the page number on the printing screen increases with the number of inductions. If it cannot be increased correctly, check whether the sensor is installed correctly; if the page number can be increased correctly, check whether the distance setting of the PD distance is accurate, and you can hold it by hand Place the white paper under the printhead. When the production line is running normally, manually trigger the sensor to see if ink is ejected. If so, use the printed object to test print and adjust the distance of the PD.

d) The above operations still cannot solve the problem. Check the nozzle settings in the Device settings to confirm whether each column of nozzles has been checked "This column is enabled", the voltage value is set accurately, and the range is between "15-20V".

e) To adjust the "device setting", you need to stop printing, after saving the parameters, start printing to check the adjustment effect.

2. No printing caused by hardware problems or incorrect installation.

a) Place a piece of white paper under the print head and press the software "spray" to observe whether there are ink spray marks on the white paper. If there is, it can be judged that the hardware and software settings are not correct.

b) Wipe the printhead with a wiping cloth or wipe the printhead after squeezing ink. Perform the first step. If there are ink traces, readjust

the installation position of the ink system and printhead according to the instructions before.

c) If no ink is ejected after performing step 2, check whether the coding software shows that it is connected. If it shows that it is not connected, perform the instructions before to ensure that the software shows that it is connected.