Flying Laser Marking Control System

User manual

Content

1. Overview 4

1.1. Software Introduction 4

1.2. User Manual Introduction 5

1.3. Software Installation Instruction 5

2. Operation 5

2.1 Log in 5

2.2 Creat A New File 6

2.3 Setting parameters 6

2.3.1 Laser Source Settings 6

2.3.2 Galvo Settings 7

2.3.3 Pen Settings 7

2.3.4 Mark Settings 8

2.3.5 Flowline Settings 8

2.4 Editing 9

2.5 Marking Verification 11

3. Software Introduction 11

3.1. Model Manager 11

3.1.1. Function Introduction 12

3.1.1.1. New 12

3.1.1.2. Copy 13

3.1.1.3. Delete 14

3.1.1.4. Import 15

3.1.1.5. Export 16

3.1.1.6. Manager 17

3.2. Editing 18

3.2.1. Basic Functions 18

3.2.2. Editing Area 19

3.2.2.1. Text 19

3.2.2.2. Shapes 29

3.2.2.3. Vector 30
3.2.2.4. Image 30
3.2.3. Interface function area 30
3.2.4. Editing FeaturesArea 31
3.3. Setting 37
3.3.1. Pen 37
3.3.2. Mark 42
3.3.3. Flowline 44
3.3.4. IO Parameters 45
3.3.5. Galvo 45
3.3.5.1. Galvo config 45
3.3.5.2. Galvo correct 46
3.3.5.3. Debug 46
3.3.5.4. Red laser config 47
3.3.5.5. Export/Import File 47
3.3.6. Lasers 47
3.3.7. User Aut 49
3.3.8. Language & Fonts 50
3.3.9. System 50
3.4. Marking Operation 52

1. Overview

1.1. Software Introduction

This version is still under revision and improvement. Please use it as a temporary version. This software has the following main functions：

The software supports user verification to prevent illegal operations.

Freely design the graphics to be processed.

Supports all fiber lasers, CO2 and end-pump lasers on the market. According to the different types of lasers, the software can be used to set the current, pulse frequency, duty cycle and other parameters.

Supports separate red light marking indication.

The software provides permission control to prevent parameters from being modified at will.

Support high-speed flight marking: suitable for assembly lines.

Support filling operations: provide straight line, ring, bow and other filling methods, can be filled at any angle, margin, border, spacing, etc. are adjustable.

Provide variable text function: fixed text, serial number, date, time, network communication, serial communication, etc.

Support 16 layers of processing parameters: each layer parameter can be customized arbitrarily, and multi-parameter marking can be easily realized.

Provide text input function, support single-line, double-line, dot matrix and TTF fonts, and support different fonts for Chinese and English.

Support marking dynamic files. When processing text and pictures, the file name is fixed, but the file content will change during processing.

Provide powerful editing functions: array, mirror, copy, alignment, cancel/restore, etc.

Provide simulation function: You can preview the marking trajectory of the graphics before marking operation.

Support secondary development: Provide secondary development SDK library to support users to carry out customized development, expand the functions of the existing marking system, and meet the needs of customers' special application occasions.

1.2. User Manual Introduction

- If the actual operation mode, function settings, etc. caused by software upgrades are inconsistent with this manual, the software shall prevail.
- Other product and company names mentioned in this article may be trademarks of their respective owners

1.3. Software Installation Instruction

- This software is green software, you can run it after decompression.
- You need to install the driver of the board.

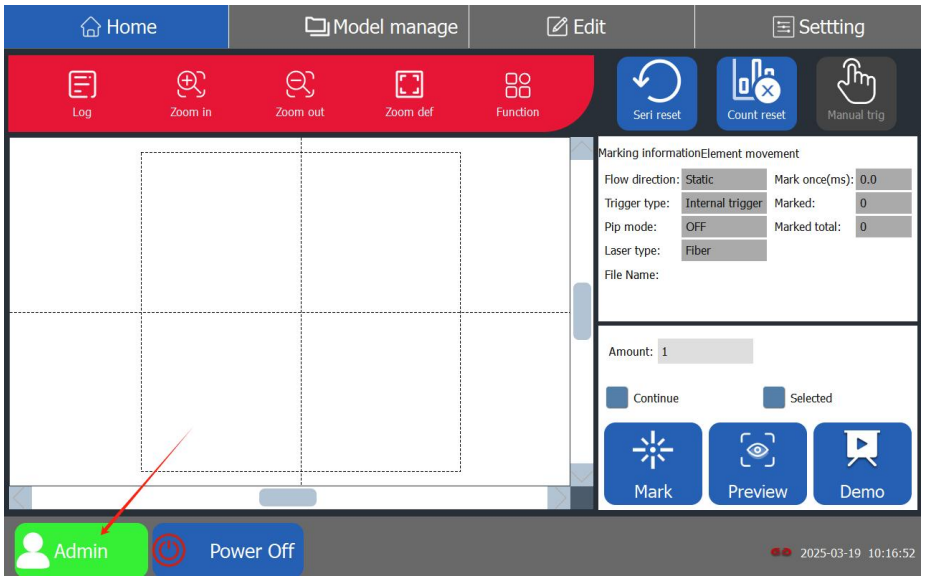
2. Operation

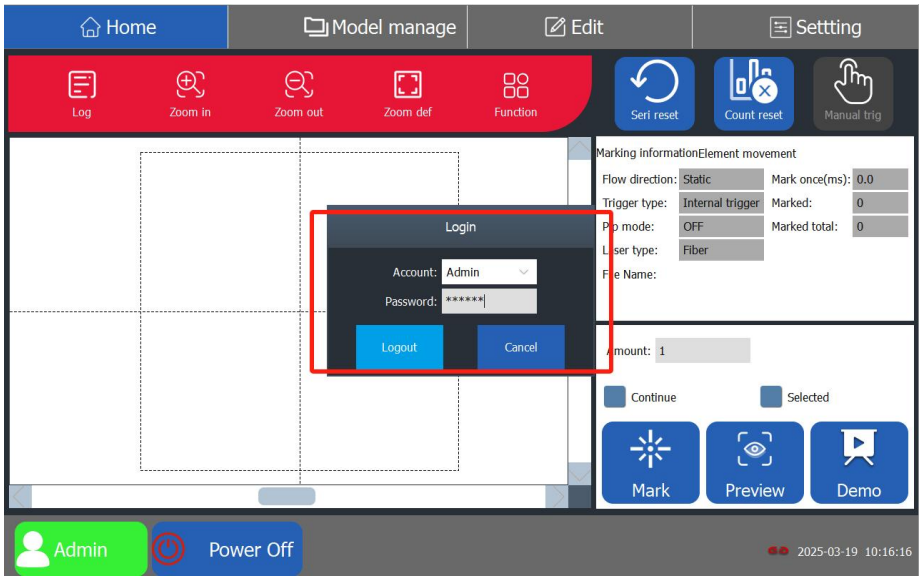
Here we will take how to generate a fixed text template file with the production date and batch number as an example.

2.1 Log in

After opening the software, first confirm whether the connection icon in the upper right corner is green. If it is red, please check the board connection first. Then log in (the default password for technicians is 111111).

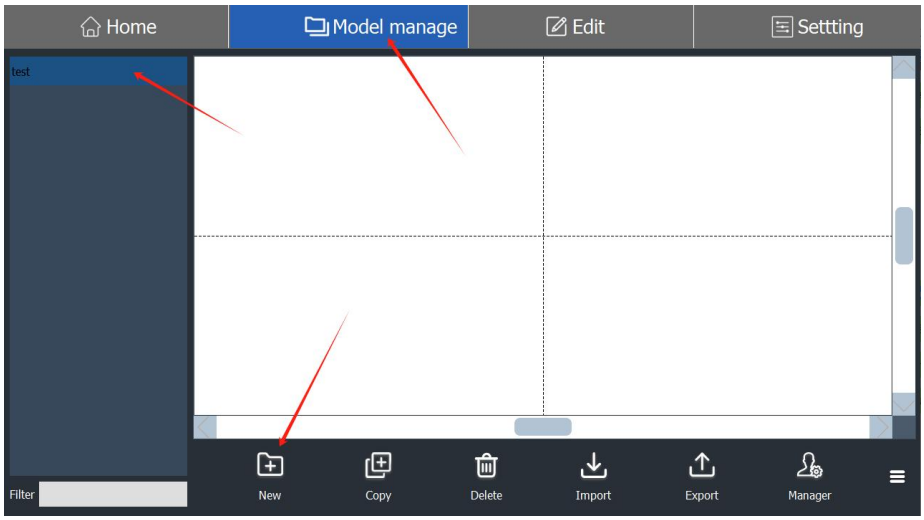
Note: If you are not logged in, you will not be able to perform any operations.





2.2 Creat A New File

Click "Model manage" interface and create a new file.

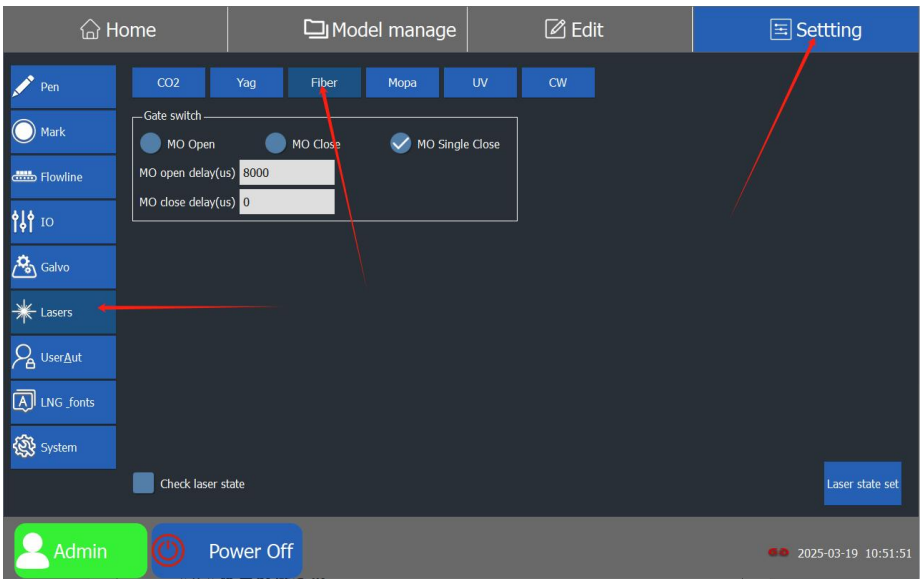


2.3 Setting parameters

Switch to parameters and set laser parameters, galvo parameters, pen parameters, marking parameters and flowline respectively.

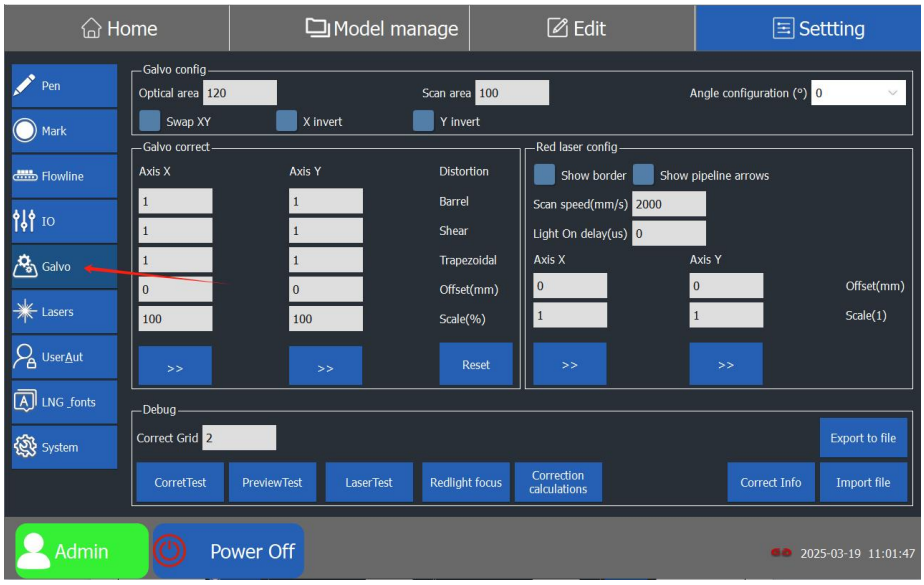
2.3.1 Laser Source Settings

Take the fiber laser as an example. After selecting the fiber, use the laser test to check whether the laser is emitting light normally. For light leakage treatment, if the laser has no light leakage, you do not need to check it.



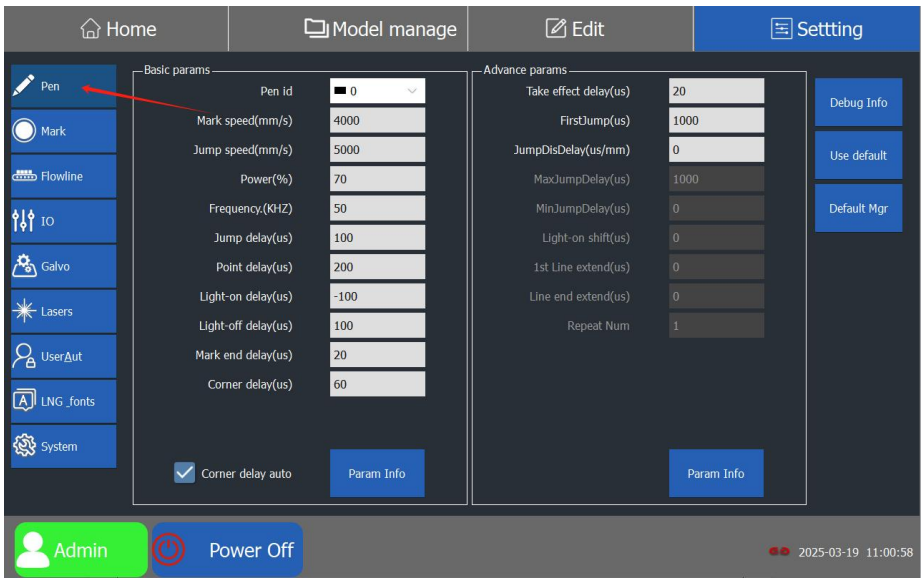
2.3.2 Galvo Settings

Set the format and working area according to the actual situation of the field mirror (the working area should be smaller than the format); adjust XY exchange, X reverse and Y reverse according to the actual marking effect; adjust the galvanometer correction parameters according to the calibration test marking effect; adjust the red light correction parameters according to the red light test effect.



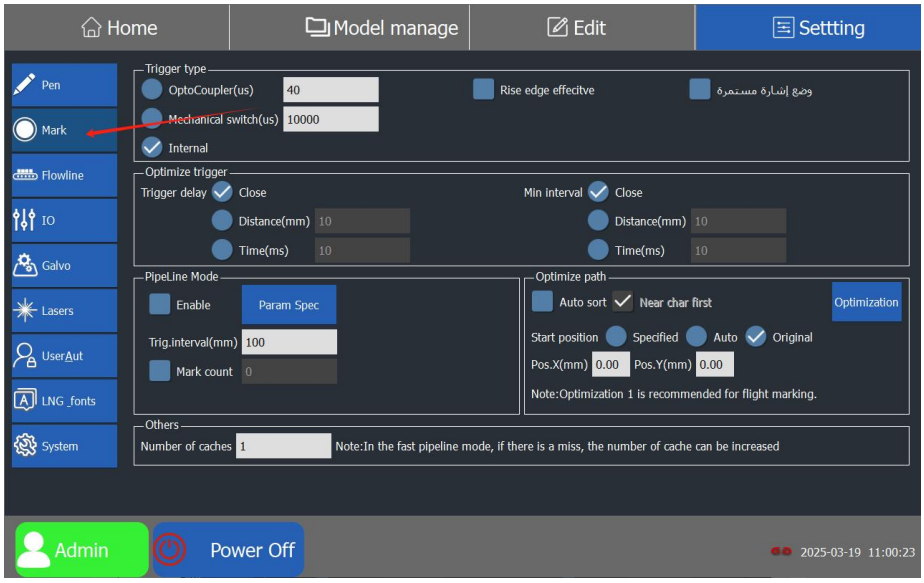
2.3.3 Pen Settings

Adjust the marking parameters appropriately according to the marking content.



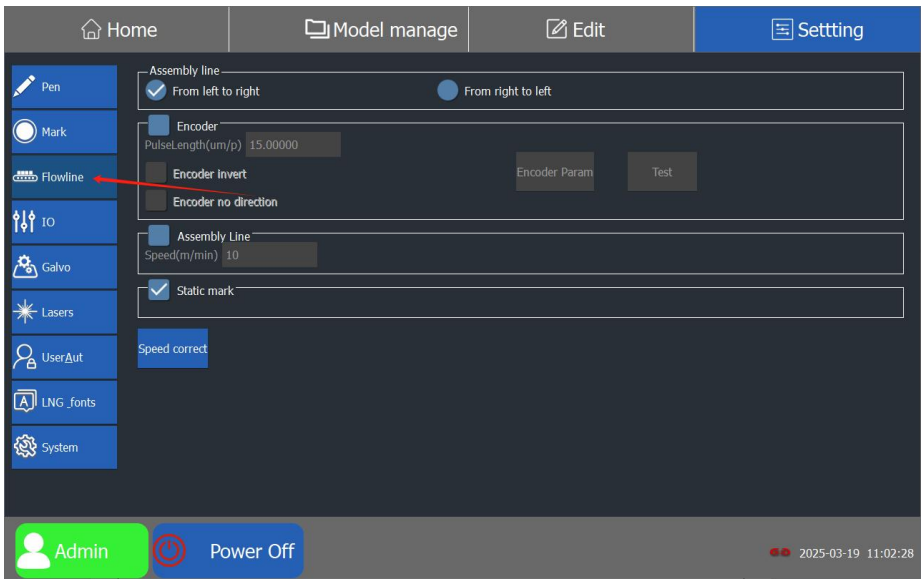
2.3.4 Mark Settings

When adjusting the effect, first set the parameters as shown below. After the effect is adjusted, adjust the trigger mode, trigger delay, minimum interval and starting position according to the actual situation of the flying shot.



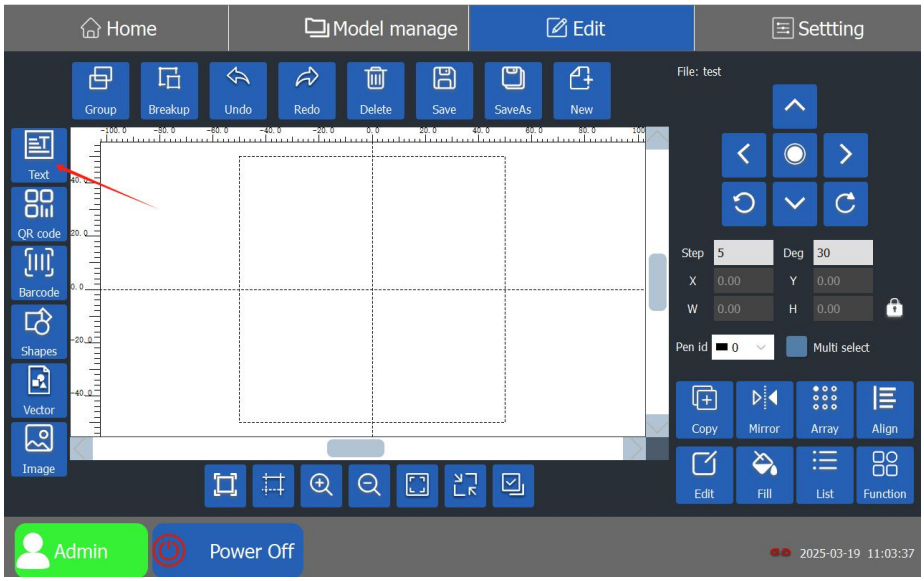
2.3.5 Flowline Settings

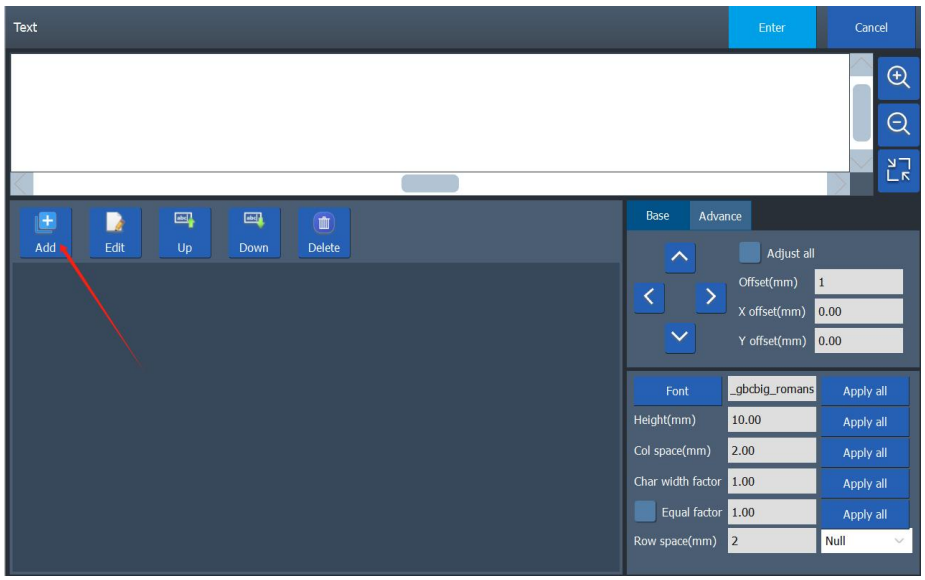
When adjusting the effect, first set the parameters as shown below. After the effect is adjusted, adjust the pipeline direction according to the actual situation of the pipeline, and whether to use an encoder or a fixed pipeline.

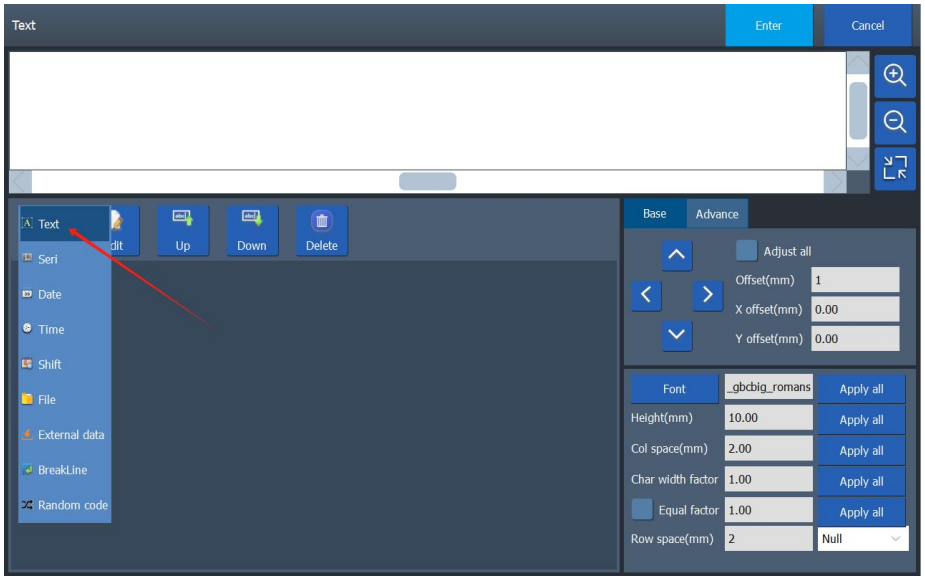


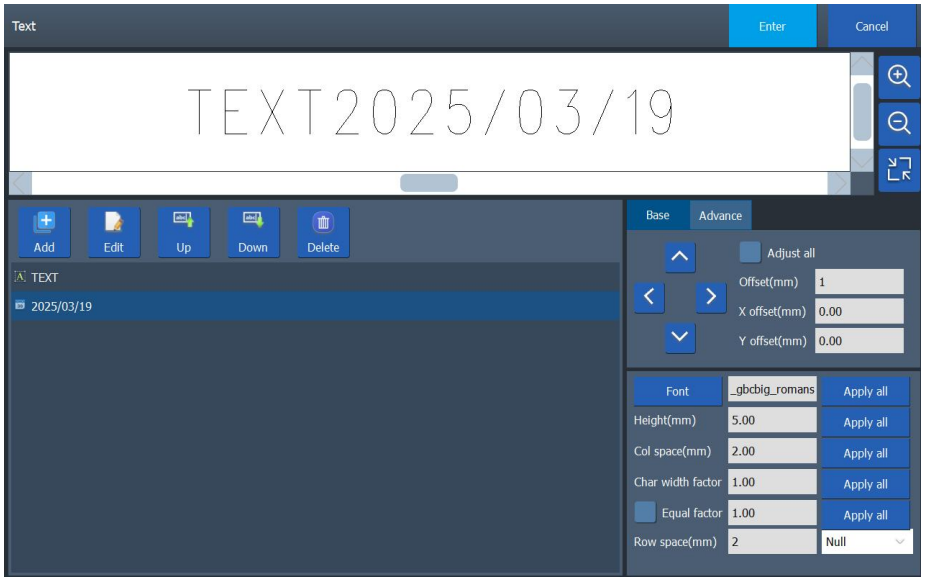
2.4 Editing

Switch to the editing interface to draw fixed text (note that if you want to print on dark materials, you need to check the reverse option in the fixed text properties). After drawing the QR code, switch to the template menu to save the current content.



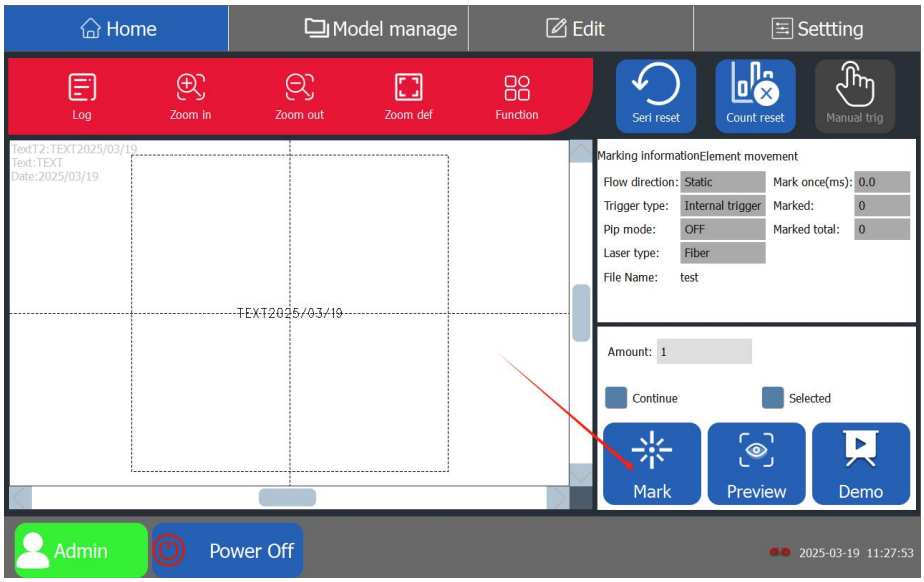

Text
Enter
Cancel
Add
Edit
Up
Down
Delete
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font _gbcbig_romans Apply all
Height(mm) 10.00 Apply all
Col space(mm) 2.00 Apply all
Char width factor 1.00 Apply all
Equal factor 1.00 Apply all
Row space(mm) 2 Null


Text
Enter
Cancel
Text
Seri
Date
Time
Shift
File
External data
BreakLine
Random code
Up
Down
Delete
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font _gbcbig_romans Apply all
Height(mm) 10.00 Apply all
Col space(mm) 2.00 Apply all
Char width factor 1.00 Apply all
Equal factor 1.00 Apply all
Row space(mm) 2 Null


Text
Enter
Cancel
TEXT2025/03/19
Add
Edit
Up
Down
Delete
TEXT
2025/03/19
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font _gbcbig_romans Apply all
Height(mm) 5.00 Apply all
Col space(mm) 2.00 Apply all
Char width factor 1.00 Apply all
Equal factor 1.00 Apply all
Row space(mm) 2 Null

2.5 Marking Verification

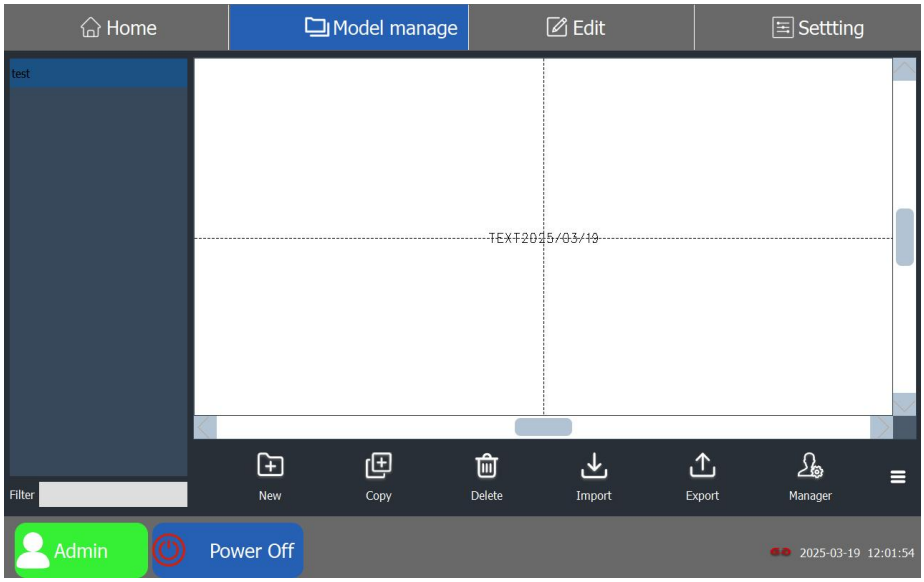
Switch to the Home interface and observe the effect after marking. After the static inkjet printing effect is adjusted, switch to the setting interface to set the inkjet printing parameters and assembly line.



3. Software Introduction

3.1. Model Manager

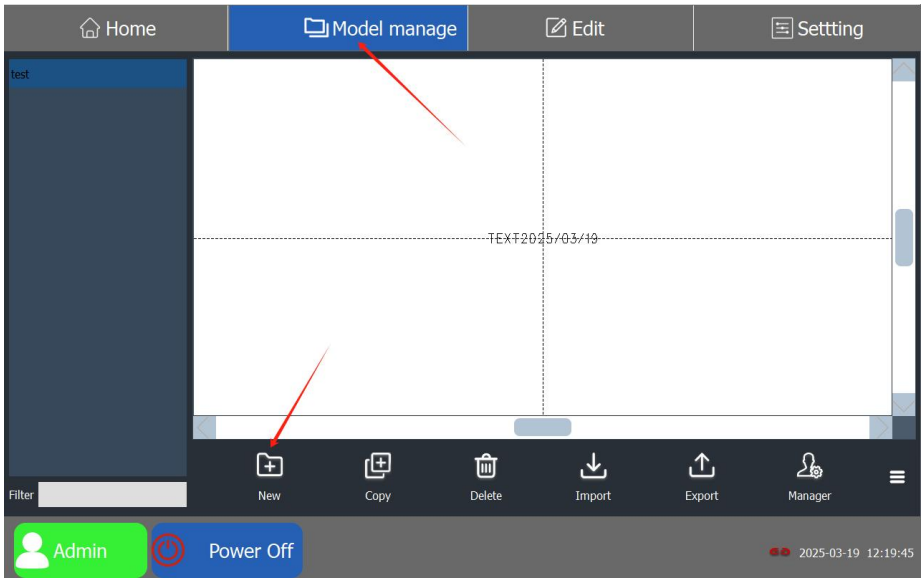
Model manage is a functional group for managing user template files, including six sub-functions: create, copy, delete, import, export and manage. (File operation in the software is to operate the files in the users folder, and does not affect the files in other folders)

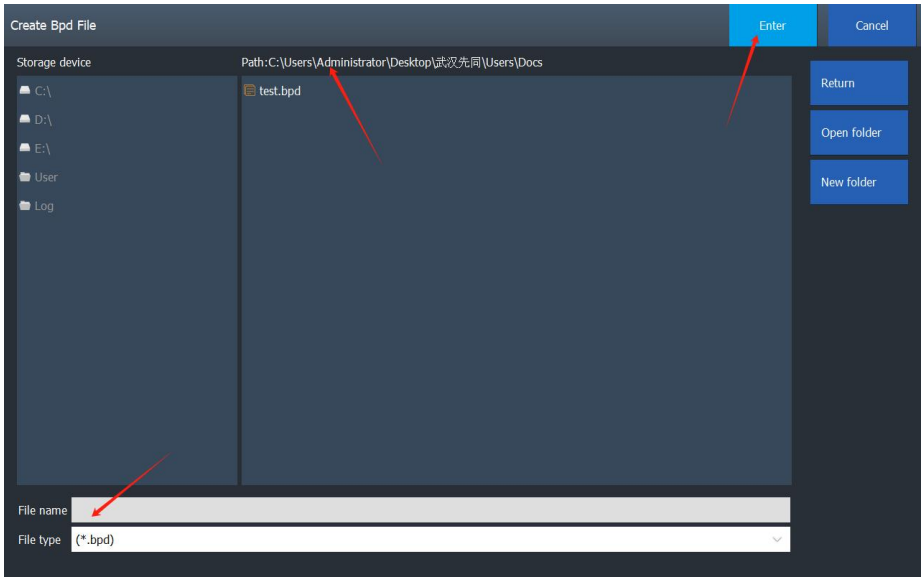


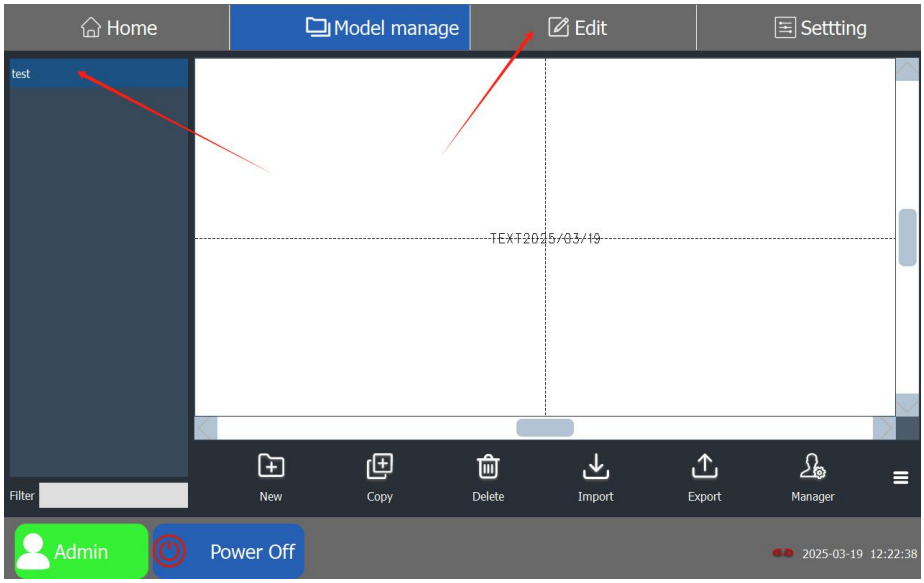
- New： Create a blank template file. If there is no template file, click Save directly in the editing interface to achieve the same effect.
- Copy：Copy the currently selected template file
- Delete：Delete the currently selected template file
- Import：Import a template file from the specified location.
- Export：Export the currently selected template file to a specified location.
- Manager：It is a file manager that can add, delete and modify all files.

3.1.1. Function Introduction

3.1.1.1. New





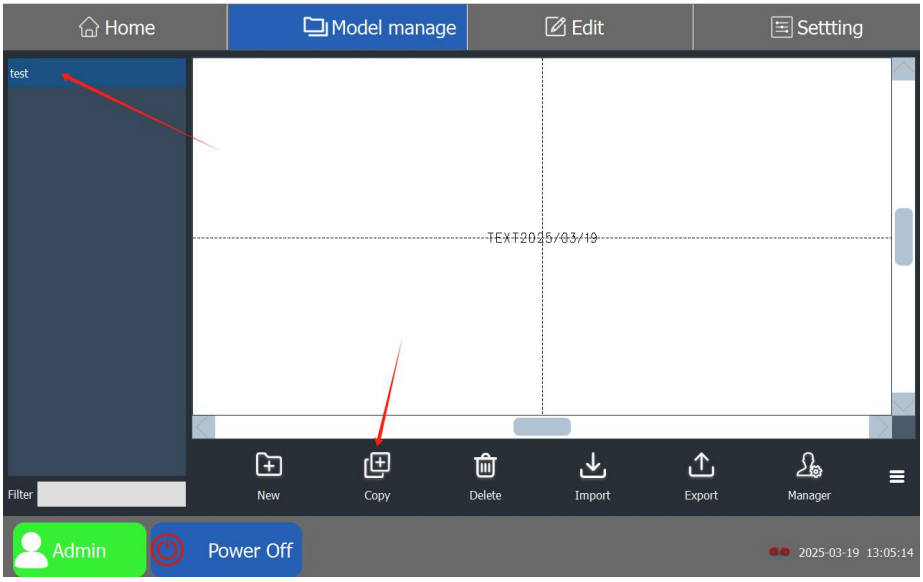


Select the file you want to modify or edit. Click "Edit" to edit the file

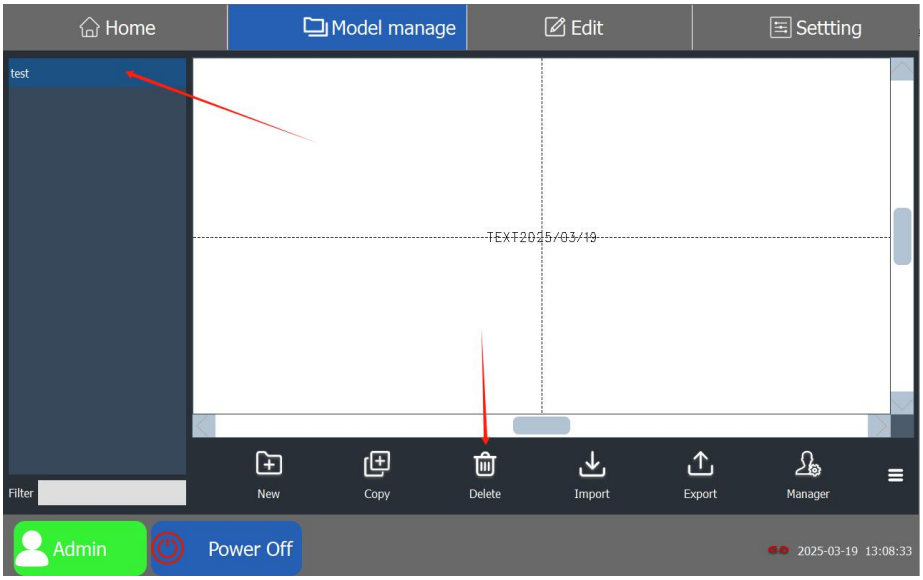
3.1.1.2. Copy

Select the source file to be copied - Click "Copy"

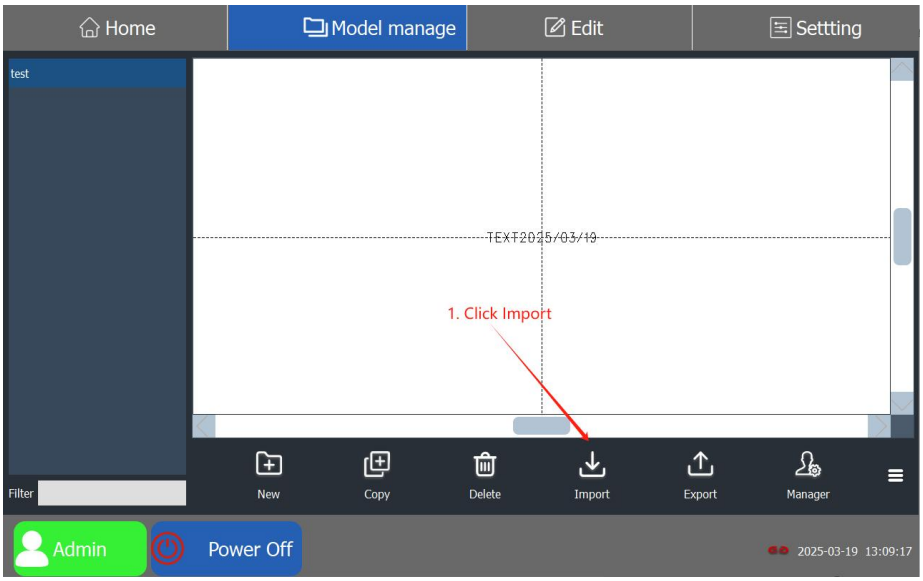
You can see the copied file in the file list. Double-click the file name to modify it or click "Manage" and use "Rename" to modify it.

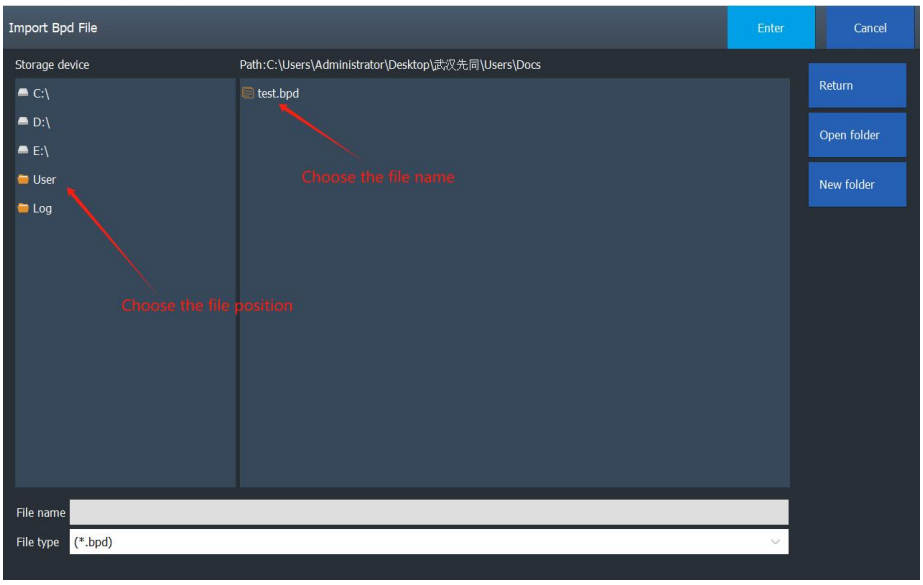

Home
Model manage
Edit
Settting
test
TEXT2025/03/19
Filter
New
Copy
Delete
Import
Export
Manager
Admin
Power Off
2025-03-19 13:05:14

3.1.1.3. Delete

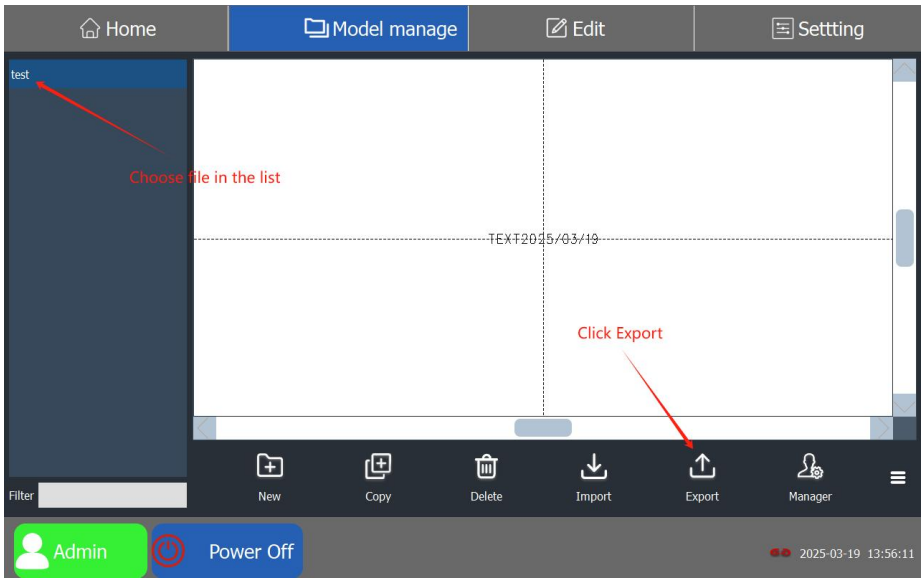

Home
Model manage
Edit
Setting
test
TEXT2025/03/19
Filter
New
Copy
Delete
Import
Export
Manager
Admin
Power Off
2025-03-19 13:08:33

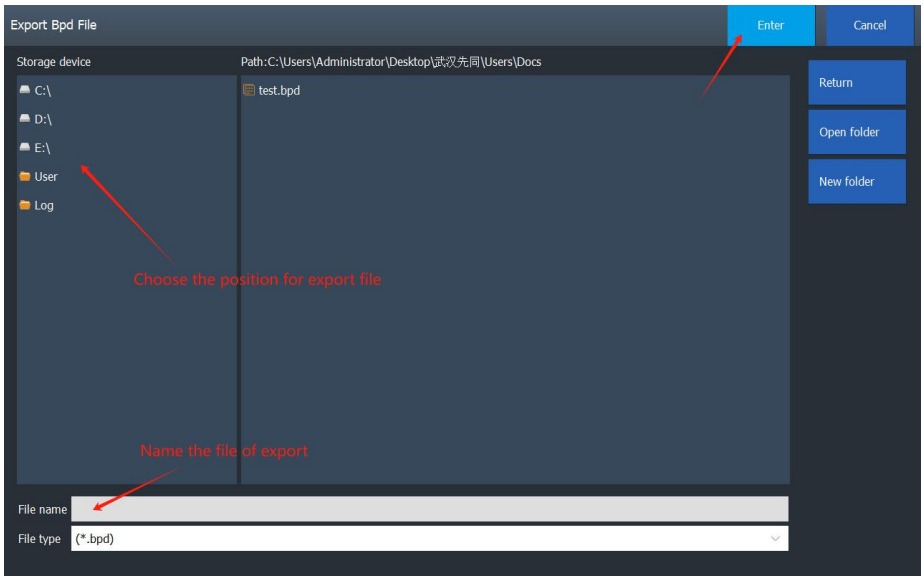
3.1.1.4. Import


Home
Model manage
Edit
Settting
test
TEXT2025/03/19
1. Click Import
Filter
New
Copy
Delete
Import
Export
Manager
Admin
Power Off
2025-03-19 13:09:17

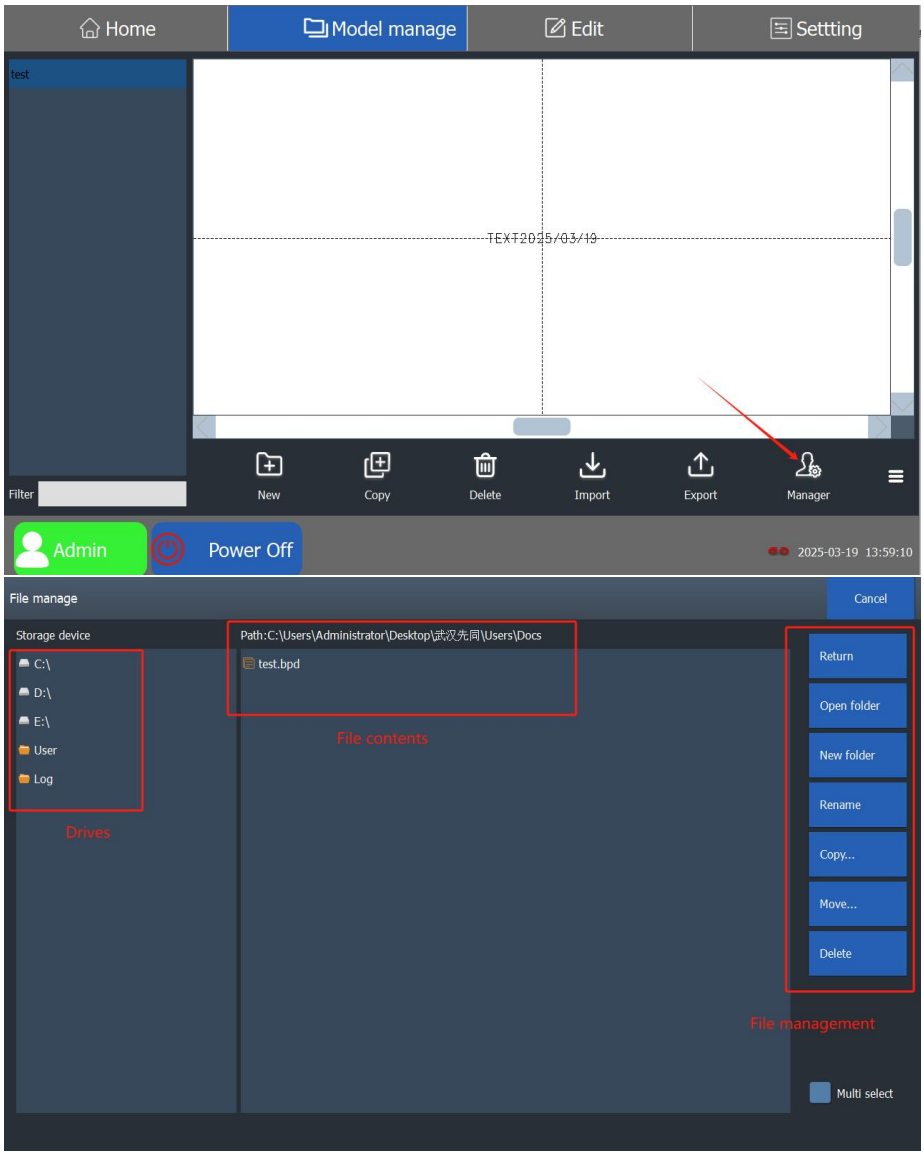

Import Bpd File
Enter
Cancel
Storage device
Path:C:\Users\Administrator\Desktop\武汉先同\Users\Docs
C:\
D:\
E:\
User
Log
test.bpd
Choose the file name
Choose the file position
Return
Open folder
New folder
File name
File type
(*.bpd)

3.1.1.5. Export


Home
Model manage
Edit
Settting
test
Choose file in the list
TEXT2025/03/19
Click Export
Filter
New
Copy
Delete
Import
Export
Manager
Admin
Power Off
2025-03-19 13:56:11

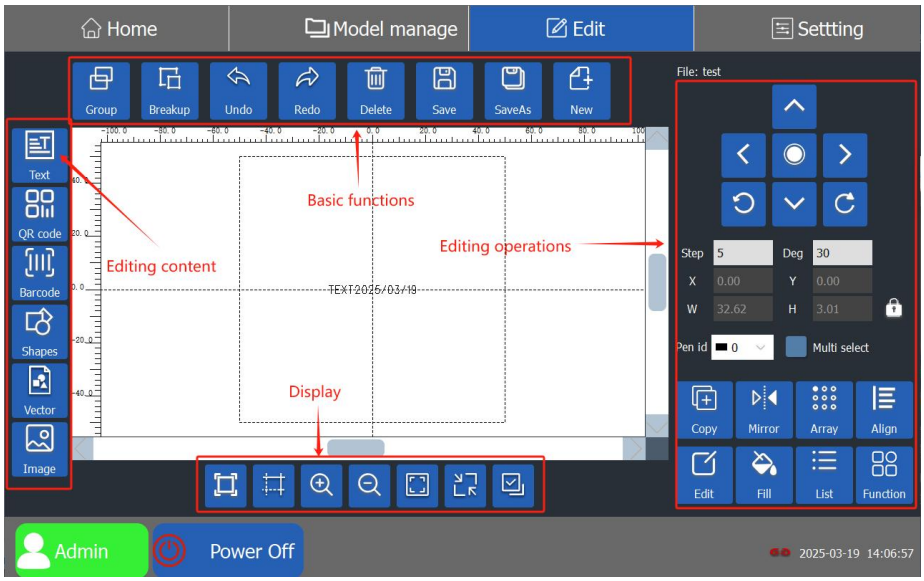

Export Bpd File
Enter
Cancel
Storage device
Path:C:\Users\Administrator\Desktop\武汉先同\Users\Docs
C:\
D:\
E:\
User
Log
test.bpd
Return
Open folder
New folder
Choose the position for export file
Name the file of export
File name
File type
(*.bpd)

3.1.1.6. Manager



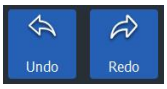
3.2. Editing

Editing is a functional group for drawing and editing various primitives, including drawing (text, QR code, barcode, geometric primitives, vector graphics and pictures), editing, filling, mirroring, arraying, moving, rotating and other sub-functions.



3.2.1. Basic Functions

: Group the selected contents and dissolve the selected group.



: When performing graphic editing, if you are not satisfied with the current operation, you can use "Undo" to cancel the current operation and return to the state of the last operation; after undoing the current operation, you can use the "Redo" function to restore the canceled operation. This is one of the most commonly used functions for editing work.

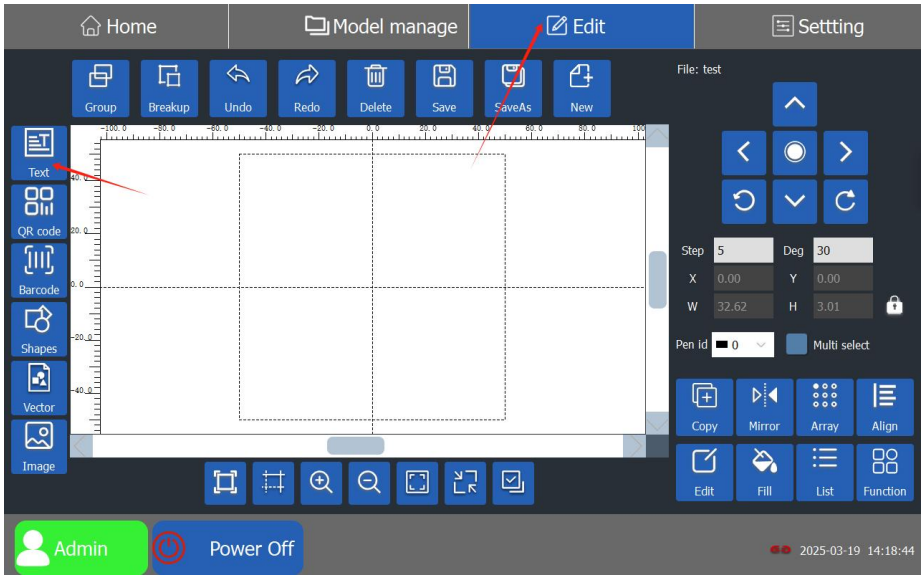
: Delete unnecessary contents

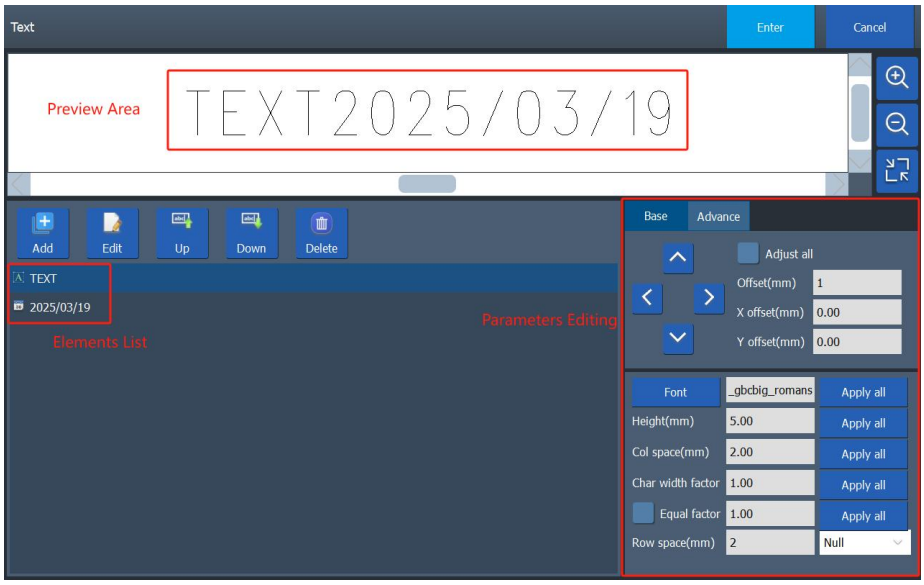
: If there is no template file, use this function to create a template file and save the current content. If there is a template file, use this function to save the current content.

: Save the current file with a different file name, generally used to save backup files

3.2.2. Editing Area

3.2.2.1. Text





3.2.2.1.1. Preview Area

Display all the contents of the current text.

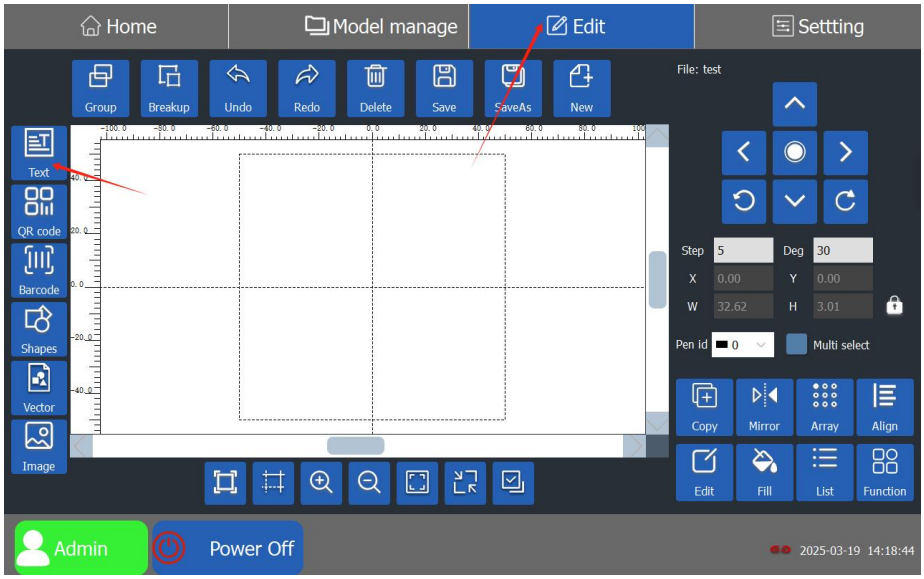
3.2.2.1.2. Elements List

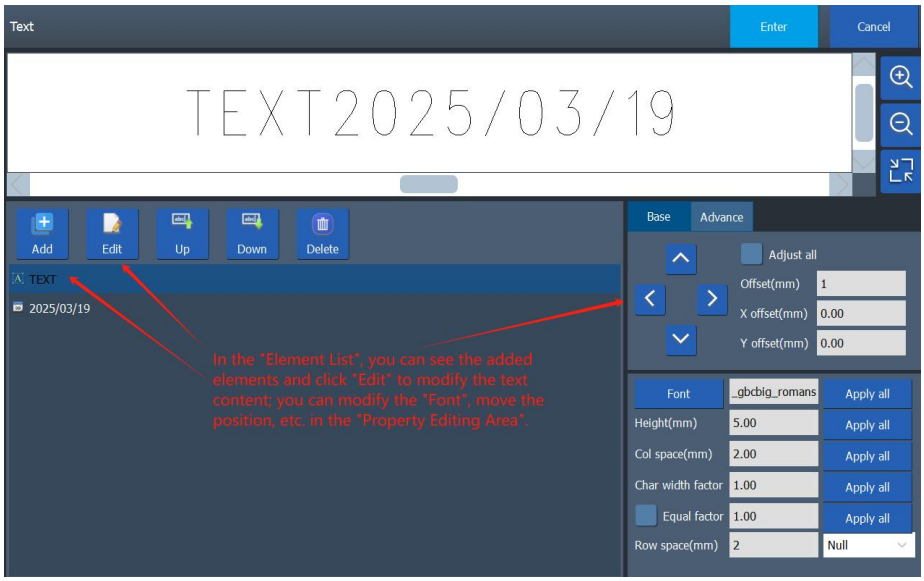
Each element in the text content will be displayed here. After selecting, you can use the edit button below to perform corresponding operations.

- **Add:** Add new elements and press this button to edit them.

- **Edit：** Select an existing element and press this button to edit, modify properties, etc.
- **Up/Down：** Modify the position of the selected element
- **Delete：** Delete the selected element

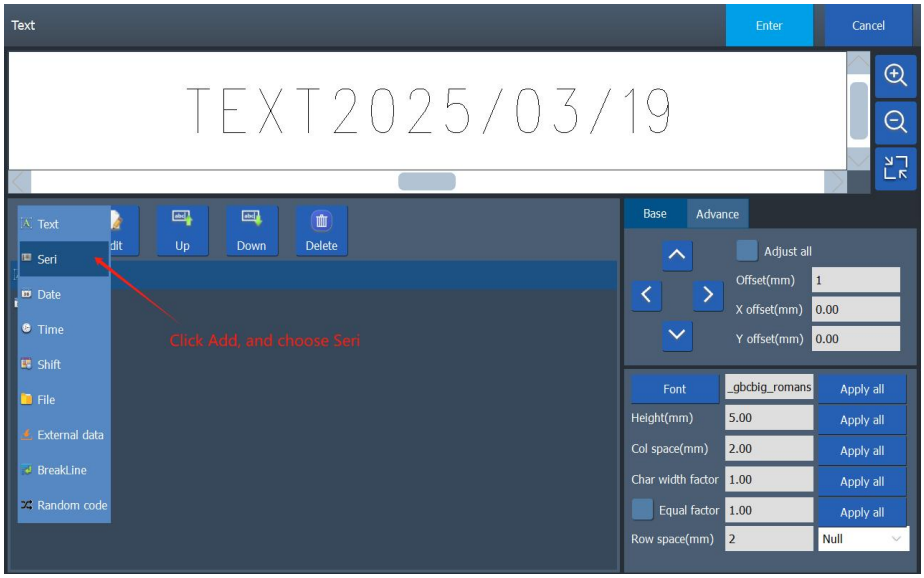
3.2.2.1.3. Fixed Text

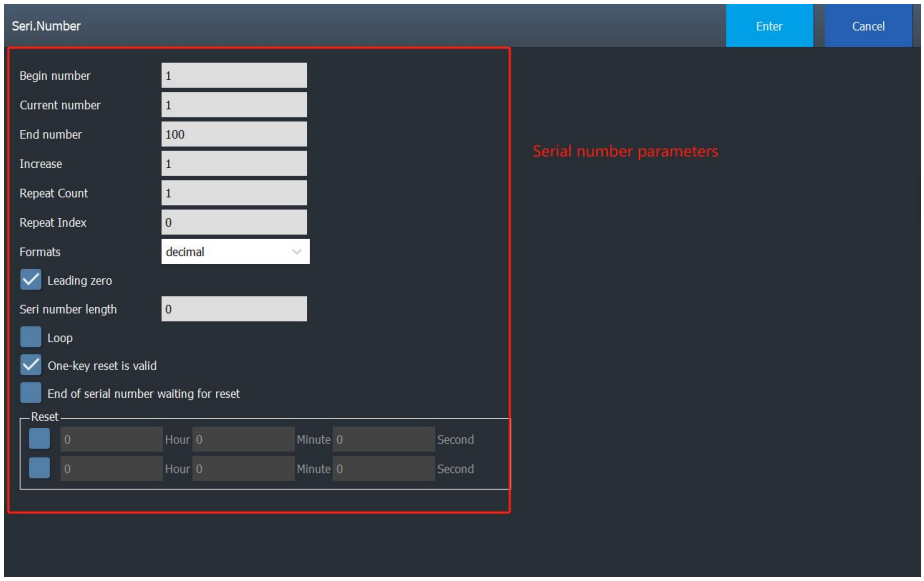




3.2.2.1.4. Serial Number

The text element (serial number) that changes in fixed increments during processing. As shown in the figure (the previous steps can refer to the fixed text addition steps)：



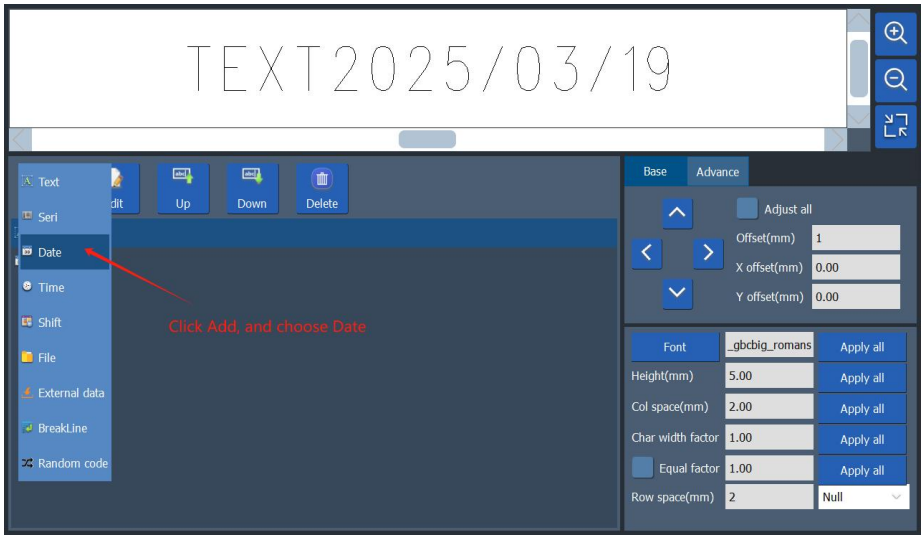


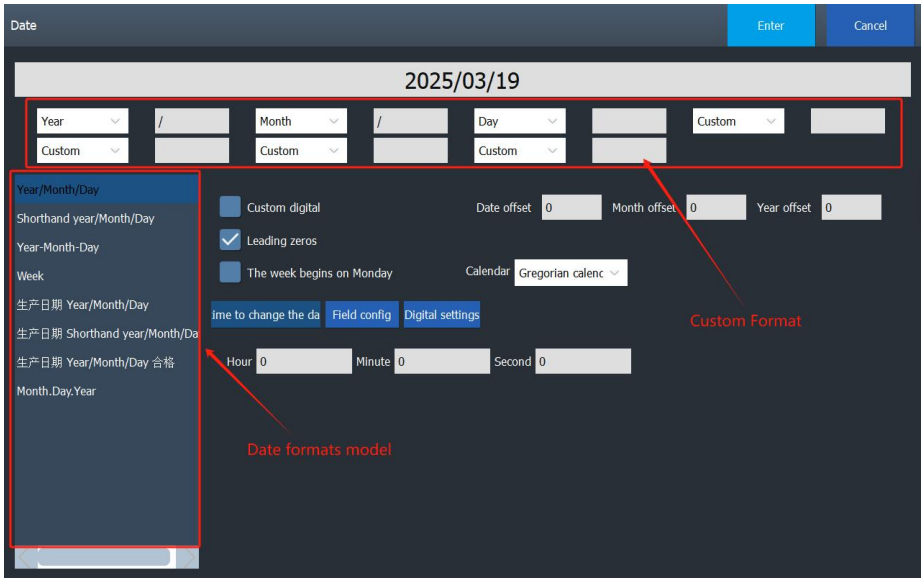
- Begin number：The number at which the serial number starts.
- Current number：Current serial number.
- End number：The number of digits in the serial number group and when the processed serial number is equal to the serial number value, the processing of the serial number group is completed.
- Increase：The amount by which the sequence number of this group is increased.
- Repeat count：It means that each value of the serial number will become the next serial number only after it is processed to the specified number.

- Formats： Refers to the base mode of the serial number. The default options are decimal, hexadecimal uppercase, and hexadecimal lowercase.
- Leading zero： Whether to display the 0 in front of the serial number
- Loop： After marking the end sequence number, whether to automatically start marking from the start sequence number.

3.2.2.1.5. Date

During the processing, the system automatically takes the text elements of the date information from the computer. A variety of date formats are provided by default for selection, and the default format can also be modified. As shown in the figure (the previous steps can refer to the fixed text addition steps):

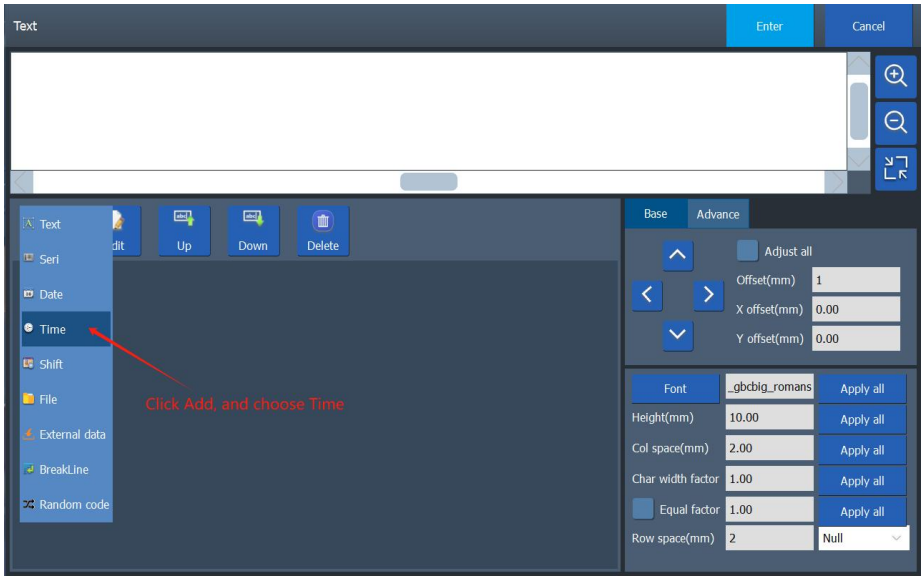


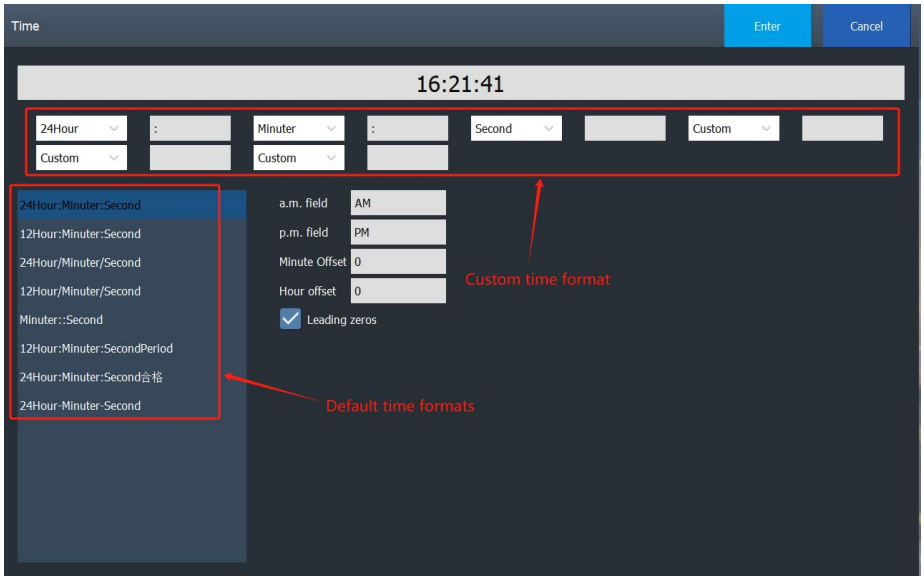


3.2.2.1.6. Time

During the processing, the system automatically takes the text elements of time information from

the computer. A variety of time formats are provided by default for selection, and the default format can also be modified. As shown in the figure (the previous steps can refer to the fixed text addition steps):



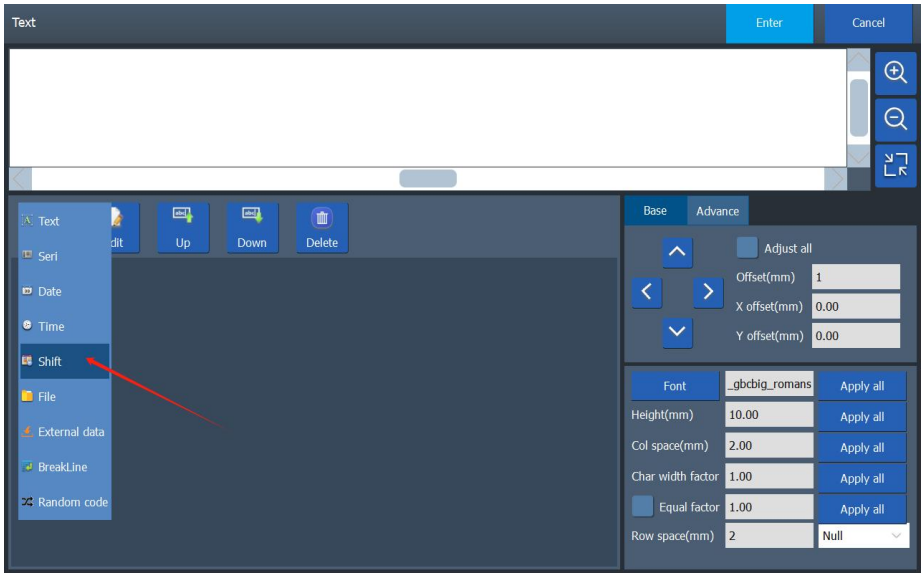


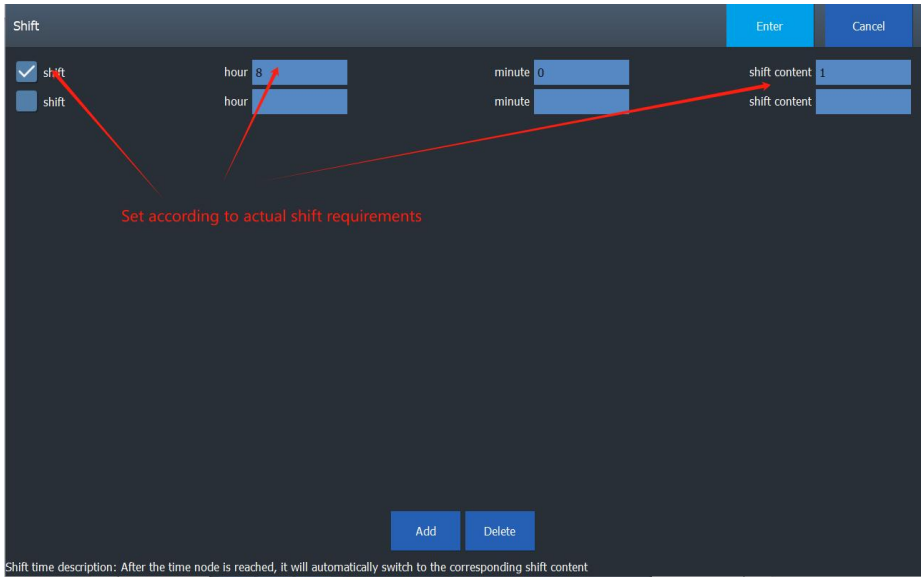
- Leading zeros：Whether to display the time padding 0
- Default format selection： Built-in multiple time formats, after selecting, you can make personalized modifications in the custom format window.
- Custom format：Select the element to be defined in the drop-down box, and enter the content of the element in the input box
- AM Field/PM Field：Customize the character content displayed in different time periods

3.2.2.1.7. Shift code

It is used to set the working shift (equivalent to the function of timing code skipping). As shown

in the figure (the previous steps can refer to the steps of adding fixed text).



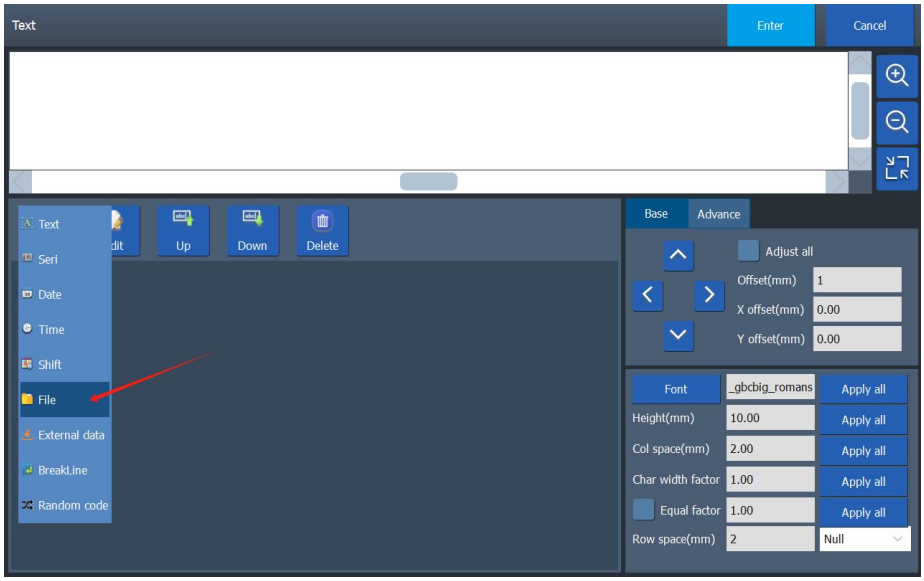


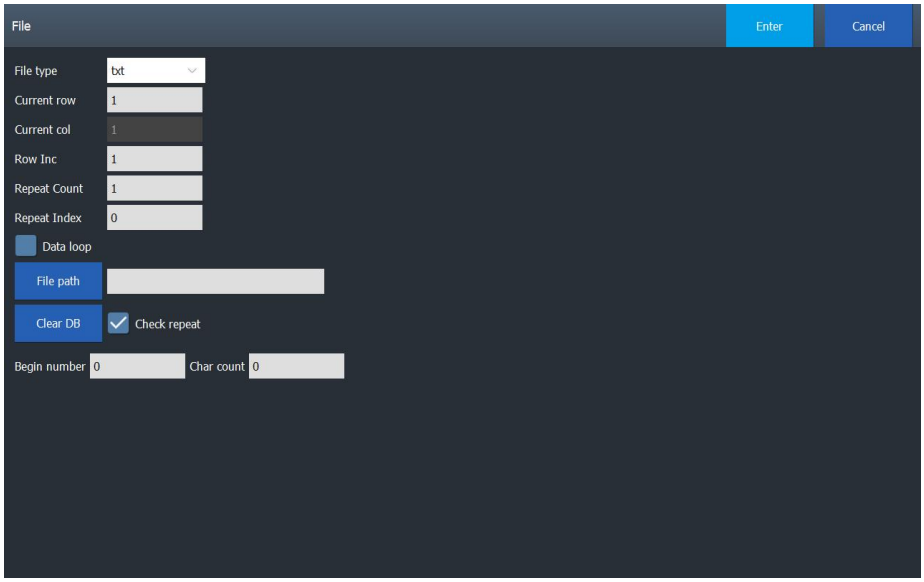
- Shift time：The start time of each shift can be set to the minute. When the set time comes, it will become the shift corresponding to this time.
- Shift content：The name and code of each shift.

3.2.2.1.8. File

File elements are text elements to be processed that are read line by line from a txt or Excel file during the processing process. As shown in the figure:

Note: The file content must have the same number of characters per line and there cannot be blank lines.





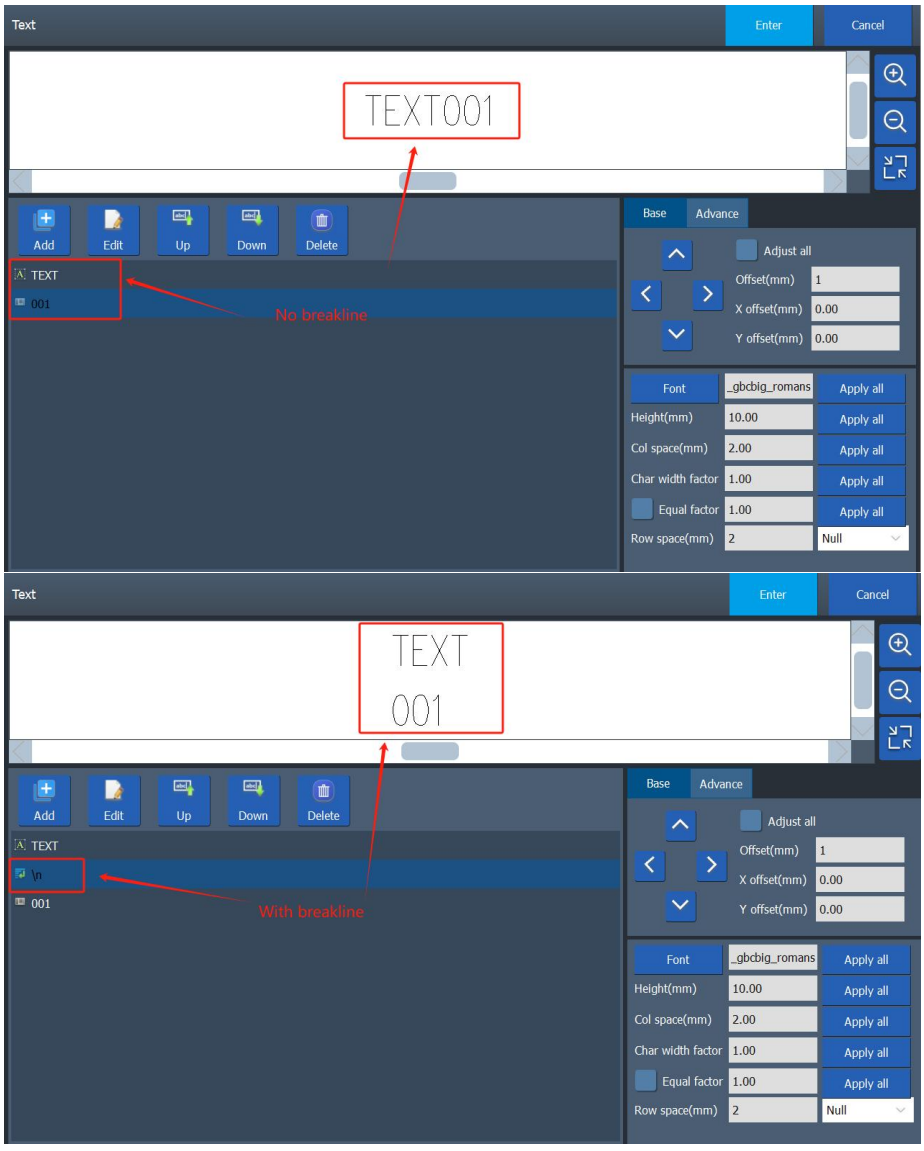
- File Type：Select the type of associated file, support TXT and CSV
- Current row：Data start row.
- Current col：Data start column.
- Row Increase：Skip a few lines each time to read the content for marking.
- Repeat Count:
- Repeat Index
- Data loop：When the file content is read to the last line, whether to read it in a loop.
- File path：Specify the path of the associated file.

Clear DB： Clear the files saved to prevent duplicate mark.

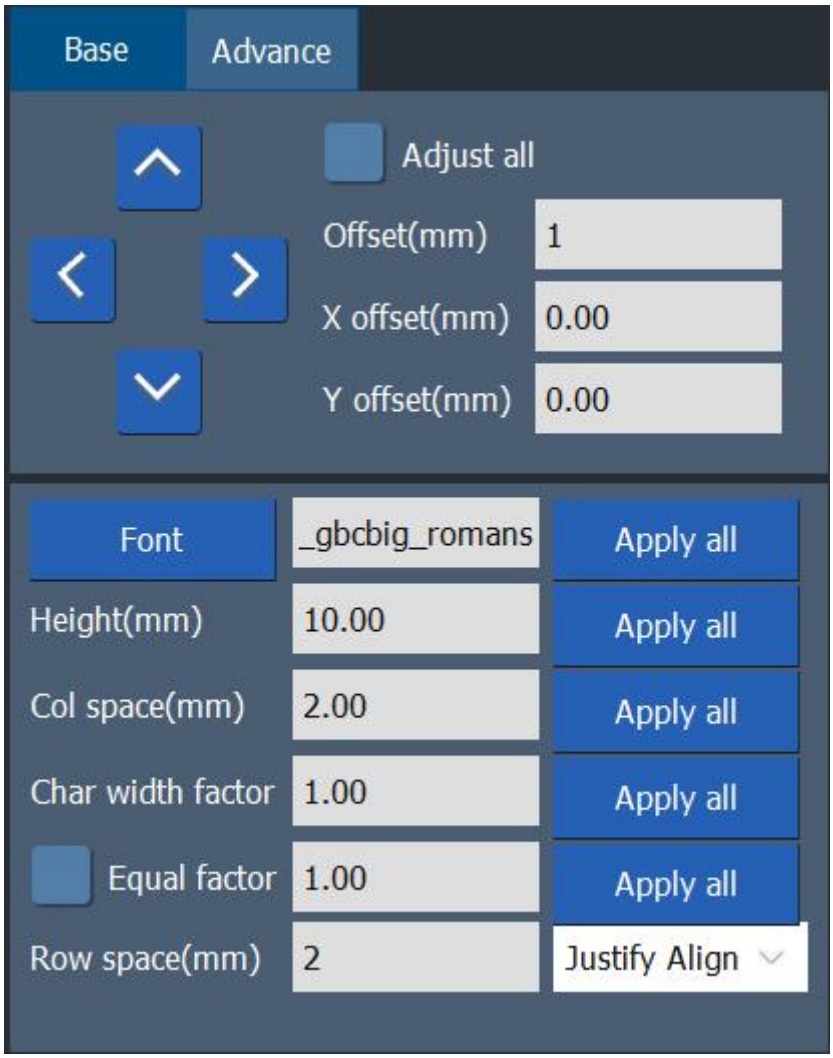
Check repeat： After checking, if the content is found to be marked, the marking will stop.

3.2.2.1.9. BreakLine

Inserting a line break between two text elements in a text list will allow the two text elements to be displayed in separate lines. In the absence of a line break, the text elements in the default text list are all in one line.



3.2.2.1.10. Base Parameters



Font： Select the font of the text. Four types of fonts are supported: single-line, double-line, dot matrix and TTF.

Height（mm）： Font height。

Col space（mm）： Distance between characters.

Char width factor： Arrange characters according to the set character width.

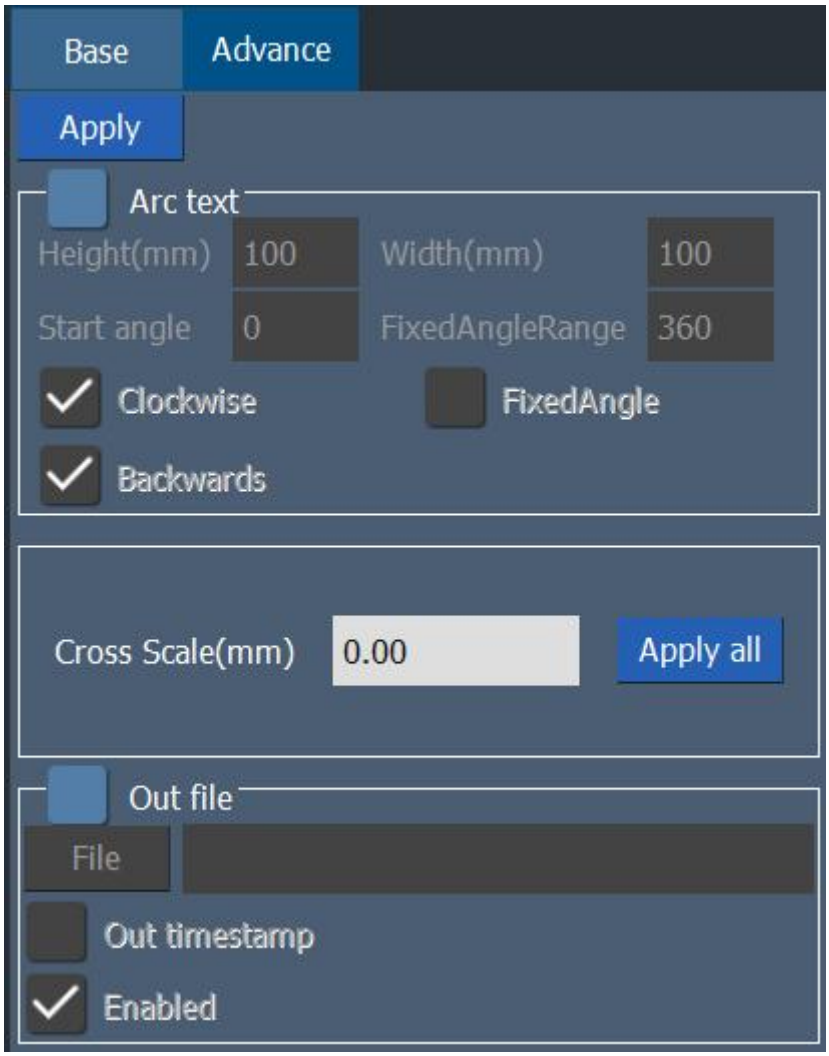
Equal factor： Arrange characters according to the set placeholder width.

Row space（mm）： Distance between characters in each line.

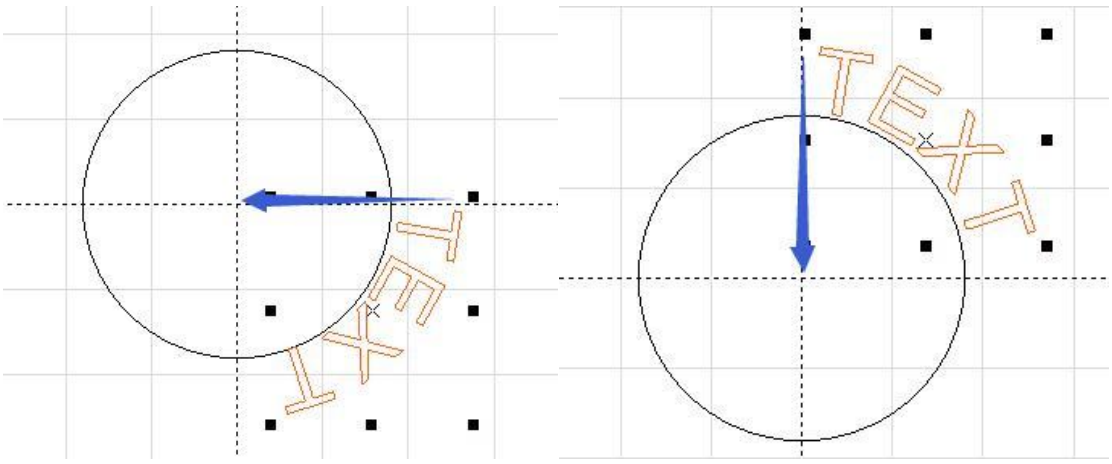
Justify Align： Modify the alignment of text primitives

Apply all： After clicking Apply All, this parameter will take effect on the text of all elements in the primitive.

3.2.2.1.11. Advance Parameters



- **Apply：** Make advanced parameters take effect immediately.
- **Arc text：** Whether to allow the current arc function to take effect.
- **Height/Wdith：** If the width and height are the same, it is equivalent to the diameter of the arc. If they are inconsistent, it becomes an elliptical arc.
- **Start angle：** Refers to the angle basis of text alignment, with the leftmost side of the text as the starting angle basis. As shown in the following figure:

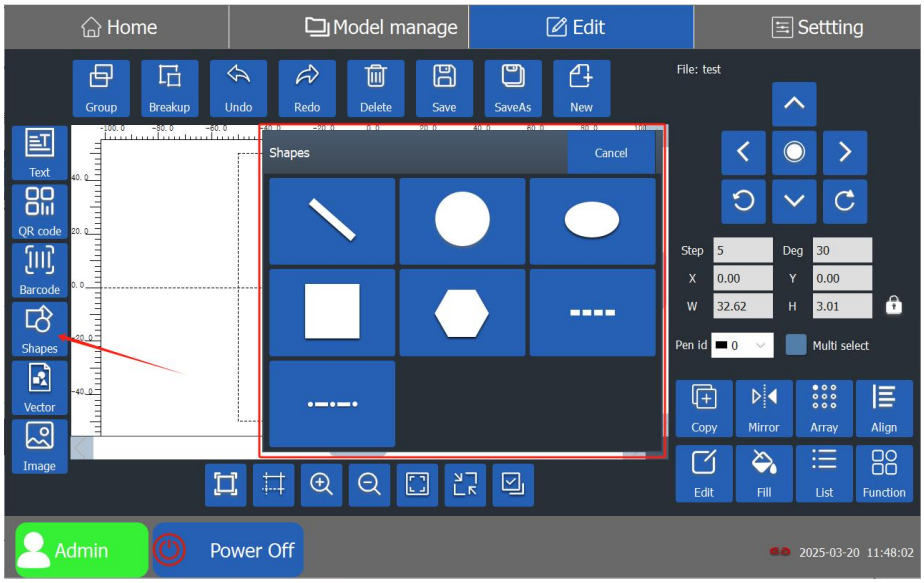


The left side is the base angle = 0, and the right side is the base angle = 90.

- **Fixed angle：** If this parameter is selected, no matter how much text is entered, the system will shrink the text within the limited angle.
- **Clockwise：** Circularize the string and arrange it in clockwise order.
- **Backwards：** Mirror the string in the Y direction.

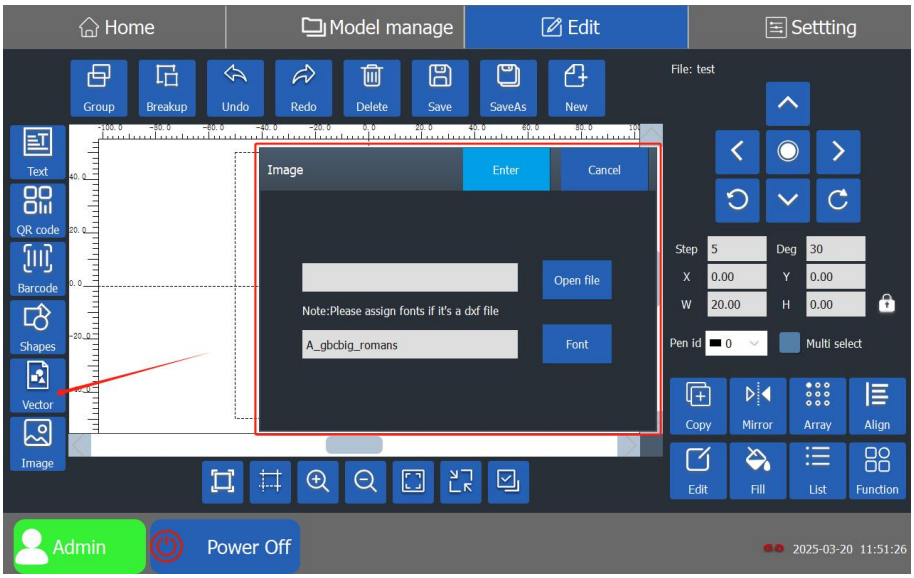
3.2.2.2. Shapes

Draw lines, circles, ellipses, points, polygons, rectangles and triangles as shown.



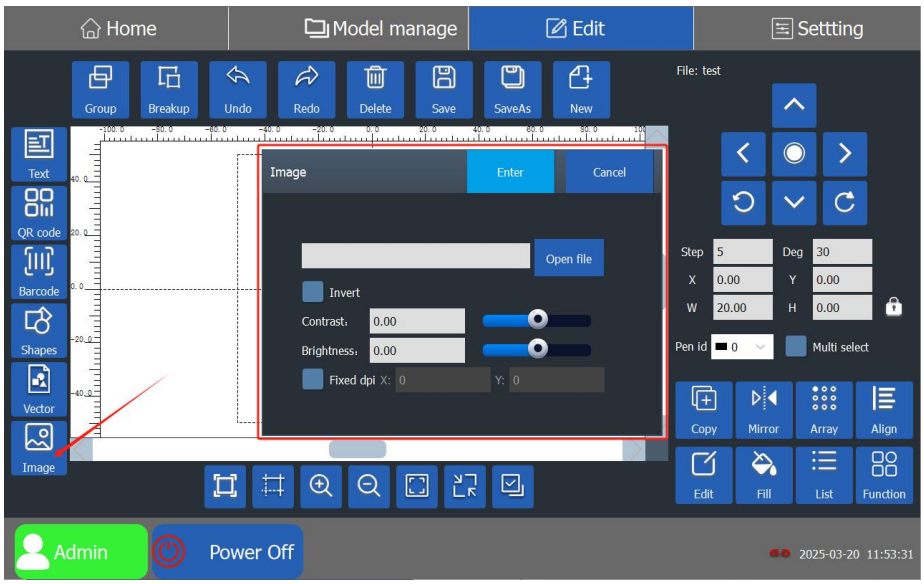
3.2.2.3. Vector

The current software supports vector graphics in three formats: DXF, PLT and AI.



3.2.2.4. Image

After importing the bitmap, the software will automatically modify it to a 256-level grayscale bitmap and perform grid processing.



Invert: You can switch between dark or light-colored materials by checking this option.

3.2.3. Interface function area

: Maximize the work area display.

: Make the scope box of the hidden working area and the center crosshairs.

: Enlarge or reduce the display of the working area.

: Restore the default work area display size.

: Maximize the display of the currently selected element.

: Select all elements in the work area.

3.2.4. Editing FeaturesArea

- , , , and Step: Move the selected element up, down, left, and right. The moving distance is the step parameter.

- : The center button can place the element at any position directly in the center of the working area.

- , and Deg(degree): Click the left or right icon to rotate the element. The rotation angle is the angle parameter.

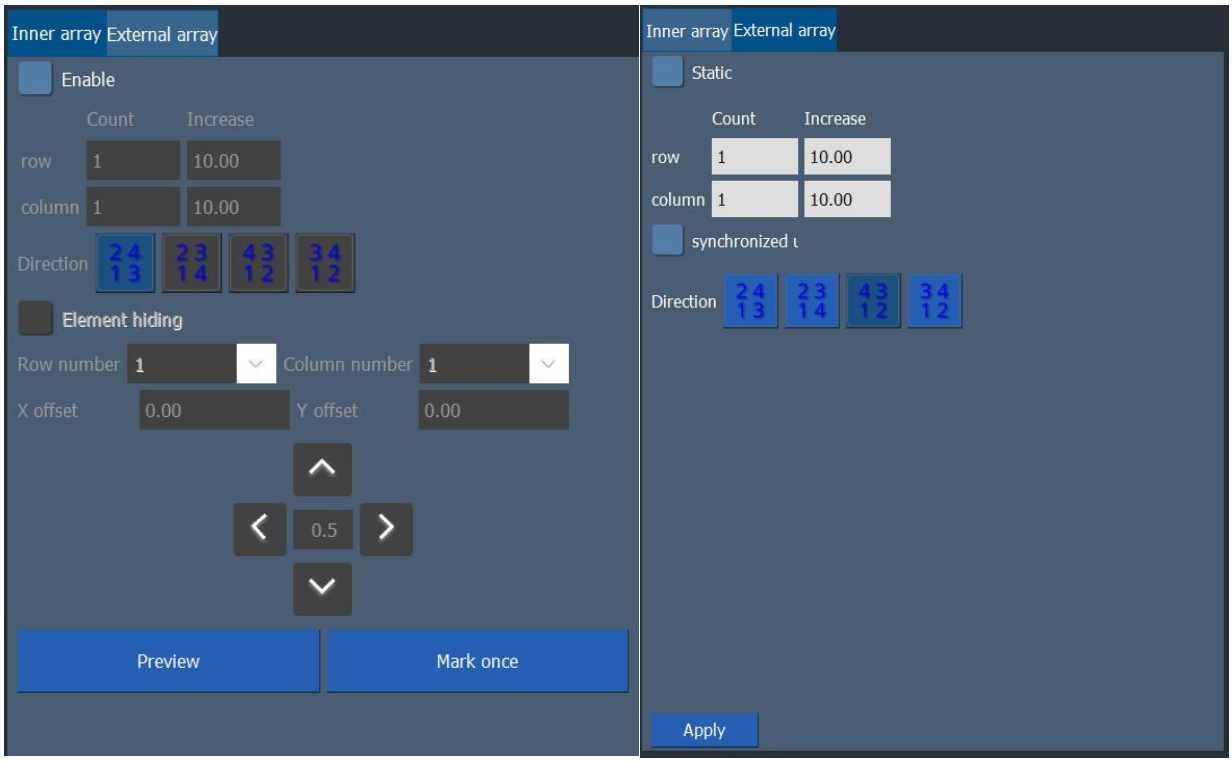
- **Pen ID:** Each object needs a pen for marking. By default, it is the first pen. In order to distinguish different pens, we define different colors for different pens. The pen parameter editing location is in the setting pen parameters.

- **Copy:** Copy the selected element (there will be an icon in the upper left corner of the working area), and click any blank area in the working area to paste it.

- **Mirror**

Click to switch between horizontal and vertical mirroring

- **Array**



- ◆ **Count:** The number of arrays in the horizontal or vertical direction

- ◆ **Increase:** The distance between horizontal or vertical graphics after the array

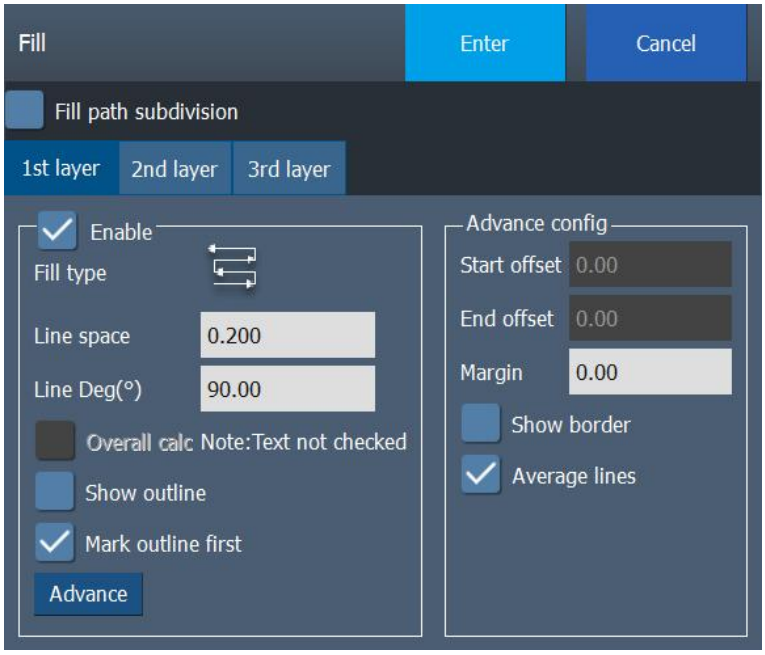
◆ **Direction：** Switch the order of the graphics elements in the array to be horizontal or vertical

● **Align：** Arrange the selected multiple elements according to the selected alignment

● **Edit：** Modify the content of the selected graphic element (text, QR code, barcode)

● **Fill**

Fill can fill the specified figure. The figure to be filled must be a closed curve, as shown in the figure.



◆ **Enable：** Whether to allow the current filling parameters to be valid.

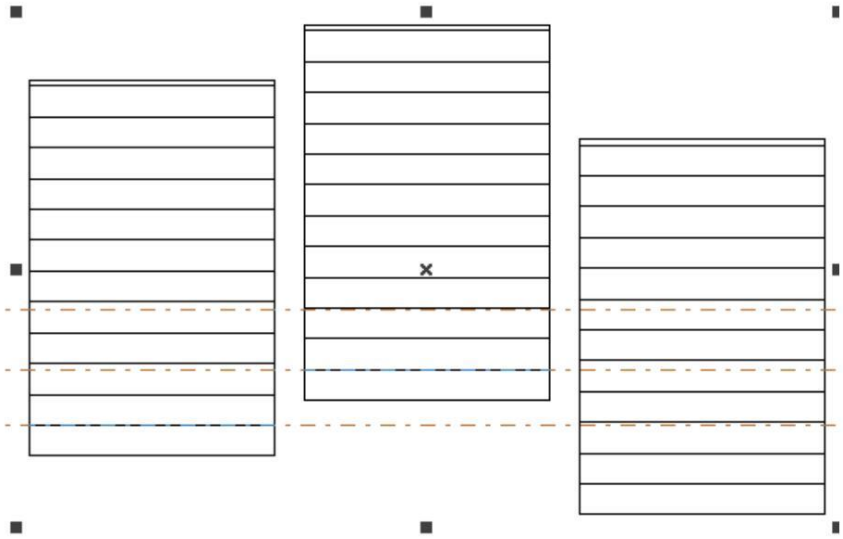
◆ **Show outline：** Indicates whether to display and print the outline of the original graphic. That is, whether the filled graphic retains the original outline.

◆ **Over Cal(Calculation)：** It is an optimization option. If this option is selected, all objects that do not contain each other will be calculated as a whole when filling calculations are performed, which will increase the processing speed in some cases. (If this option is selected, it may cause a decrease in computer computing speed), otherwise each independent area will be calculated separately. For the sake of convenience, we will now give a special example to illustrate this function.

Example: Draw three independent rectangles in the workspace, with a fill line spacing of 1mm and a fill degree of 0.

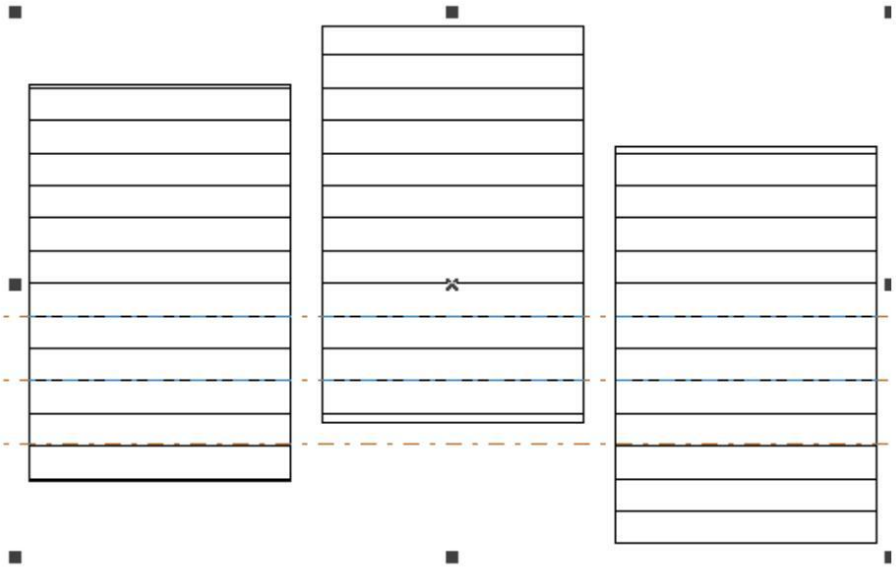
◆ **Uncheck "Over Cal"：** During processing, the filling lines will be printed in the order of

processing in the object list, that is, the filling line of one object will be printed first and then the next one. As shown in the figure:



Uncheck “Over Cal”

◆ **Check “Over Cal”：** During processing, all the filling lines are printed at one time, that is, the filling lines of the same row in several objects are printed together. As shown in the figure:



Check “Over Cal”

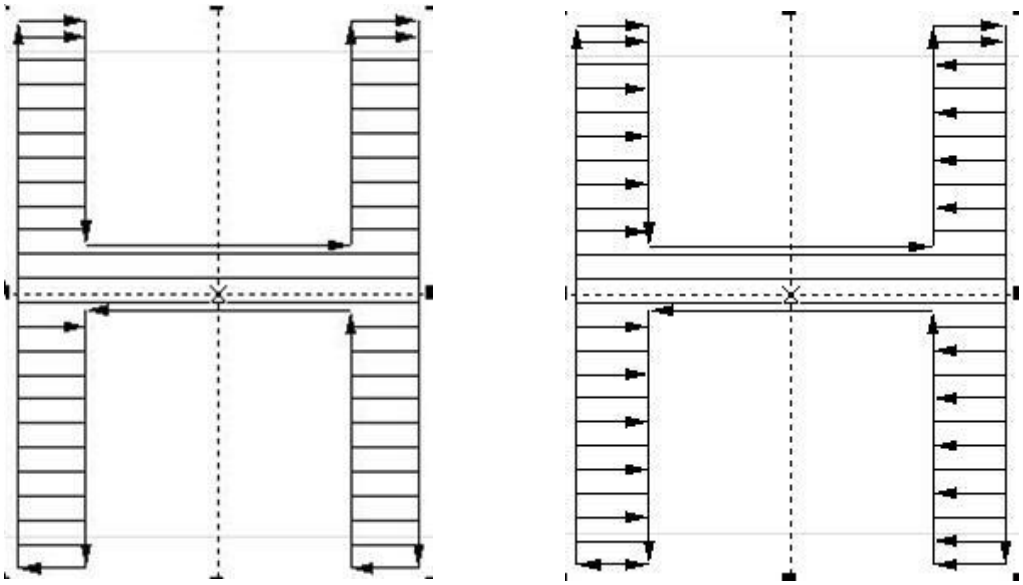
◆ **Show border：** Refers to adding a contour graphic around the outside of the fill line after the fill calculation is completed.

◆ **Average line：** Solve the problem of uneven distribution of fill lines at the beginning and end of the filled object. Due to the size of the filled object and the fill line spacing setting, the fill

lines may be unevenly distributed at the beginning and end of the filled object after filling. In order to simplify the operation, this function is added to achieve the purpose of evenly distributing all fill lines without the user having to reset the line spacing. After selecting this option, the software will automatically fine-tune the fill line spacing based on the fill line spacing set by the user to make the fill lines evenly distributed.

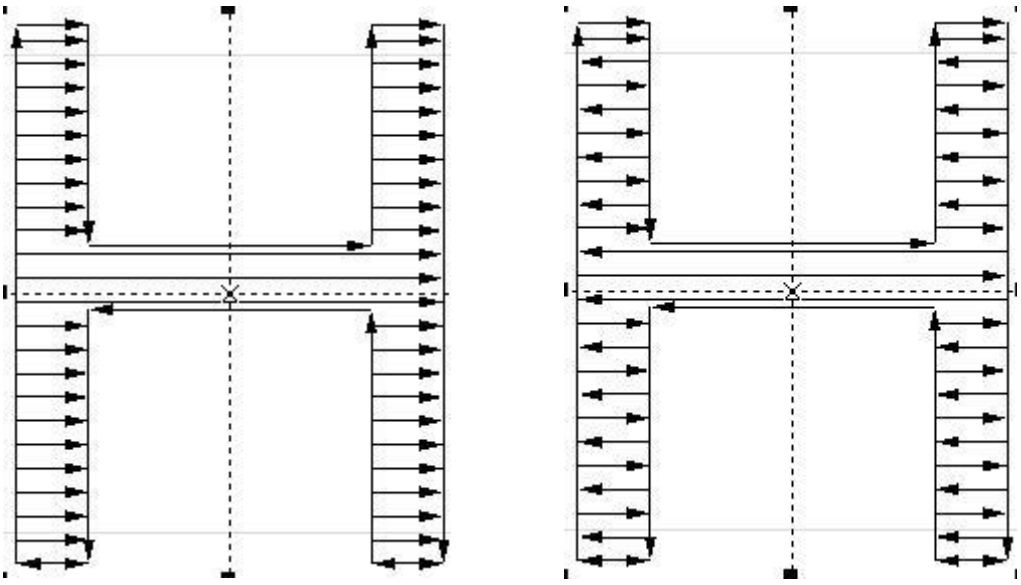
Fill Type

- Optimize bidirectional filling： Similar to bidirectional fill, but a connecting line is created between the ends of the fill lines.
- Optimize arch filling：Similar to bow fill, it will still jump to fill in the blank areas of the object.



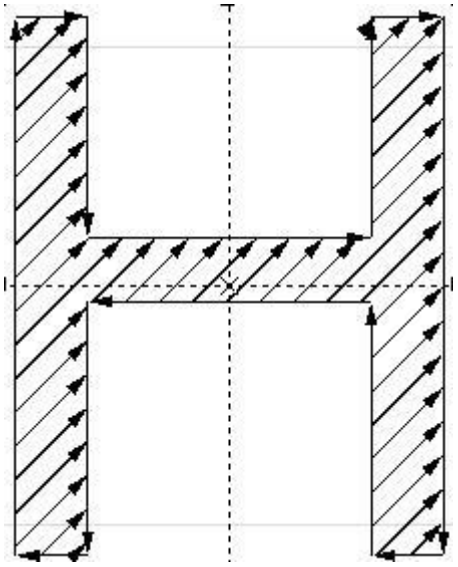
The left side shows optimized bidirectional filling, and the right side shows optimized arch filling.

- **One-way filling：** The fill line always fills from left to right.
- **Bidirectional filling：** The fill line is first filled from left to right, then from right to left, and the rest is filled in a cycle.



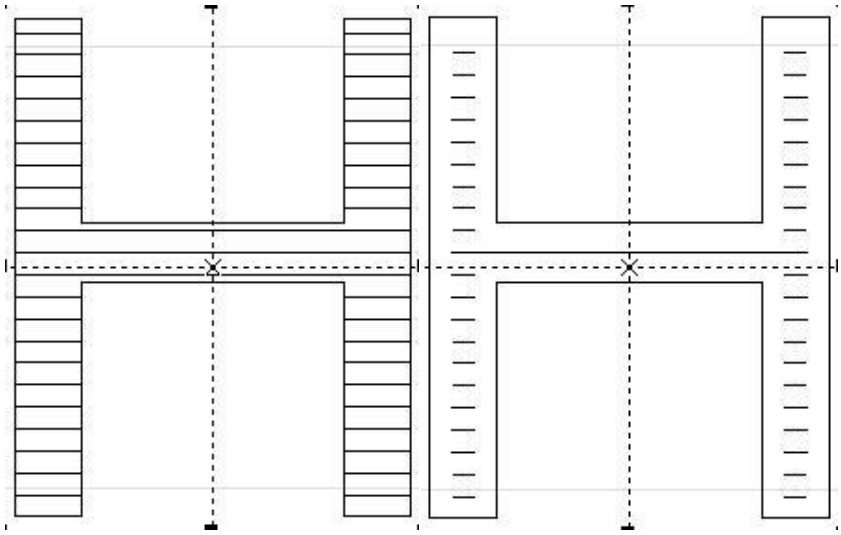
The left one is one-way filling, the right one is bidirectional filling

- **Line Space（mm）：** Refers to the distance between adjacent fill lines.
- **Start Offset（mm）：** Refers to the distance between the first fill line and the border.
- **End Offset（mm）：** Refers to the distance between the last fill line and the border.
- **Line Deg（°）：** Refers to the angle between the fill line and the X-axis. The figure shows the fill pattern when the fill angle is 45 degrees.



Fill Angle is 45 degrees

◆ **Margin：** Refers to the distance between the fill line and the outline object when all fill calculations are performed. As shown in the figure, the distance between the fill line and all edges of the object is the margin.



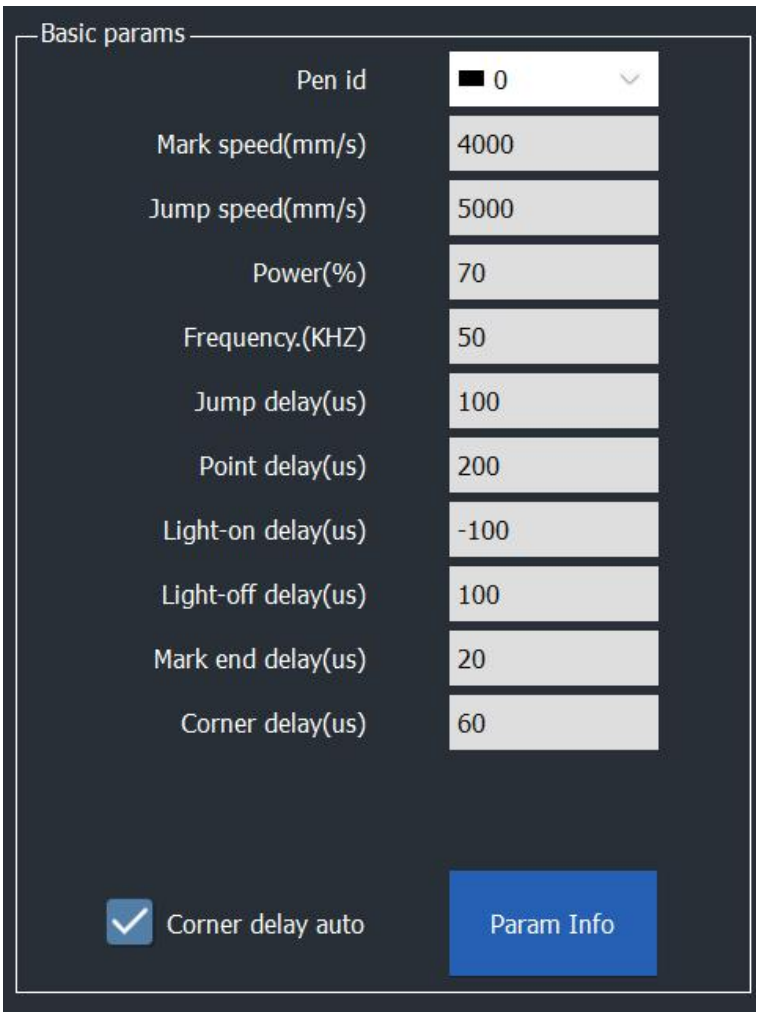
Margin Examples

- **List：** The graphics elements in the list can be sorted and managed (the marking order is from top to bottom in the list), or deleted.

3.3. Setting

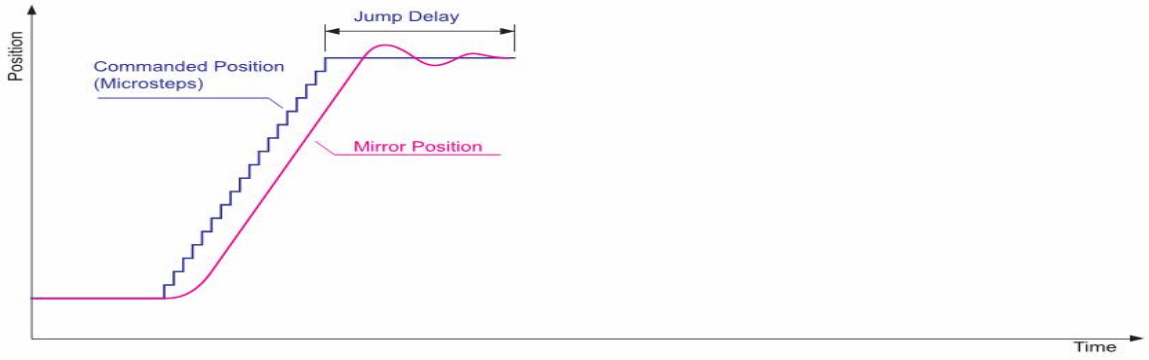
3.3.1. Pen

- Basis Params



- **Pen id：** Choose different pen numbers from 0 to 15 for configuration. Each pen number corresponds to a color.
- **Mark speed（mm/s）：** The speed at which the galvanometer moves during marking.
- **Jump speed（mm/s）：** The speed of the galvanometer during empty jump. The empty jump speed is usually adjusted together with the jump delay. The greater the empty
- **Power（%）：** The output power of the laser, the range is 0% ~ 100%
- **Frequency（kHz）：** The pulse frequency of the laser, the range refers to the laser type.
- jump speed, the greater the jump delay is required.
- **Jump delay（us）：** Delay value of jump position；

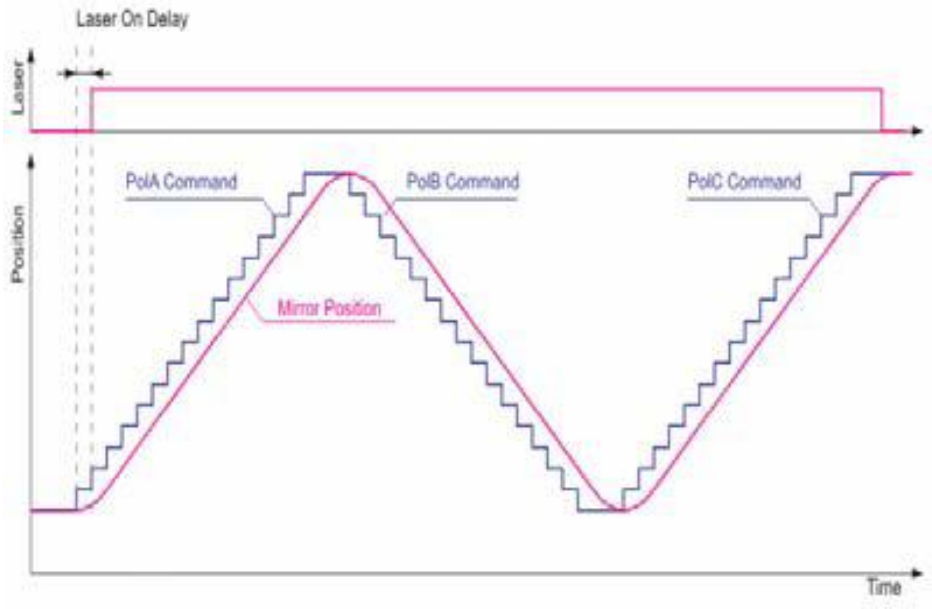
Function：Wait until the galvanometer jumps to the target point before continuing to execute the next vector command;



Jump delay diagram

- **Point delay（us）：** The time taken to plot each point.

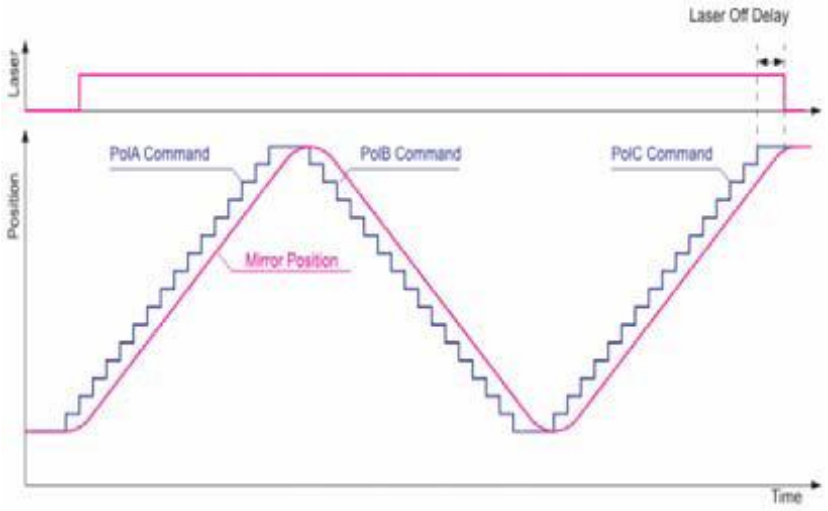
- **Light-on delay（us）：** The delay time of laser on at the beginning of marking. Setting the appropriate delay time parameter can eliminate the "match head" that appears at the beginning of marking, but if the delay time is set too large, it will cause the phenomenon of missing pens at the beginning. It can be a negative value, which means that the laser emits light in advance.



Schematic diagram of light-on delay

- **Light-off delay（us）：** The delay time of laser shutting off at the end of marking. Setting appropriate laser shut-off delay parameters can eliminate the phenomenon of non-closing at the end of marking, but if the laser shut-off delay is set too large, it will cause "match heads"

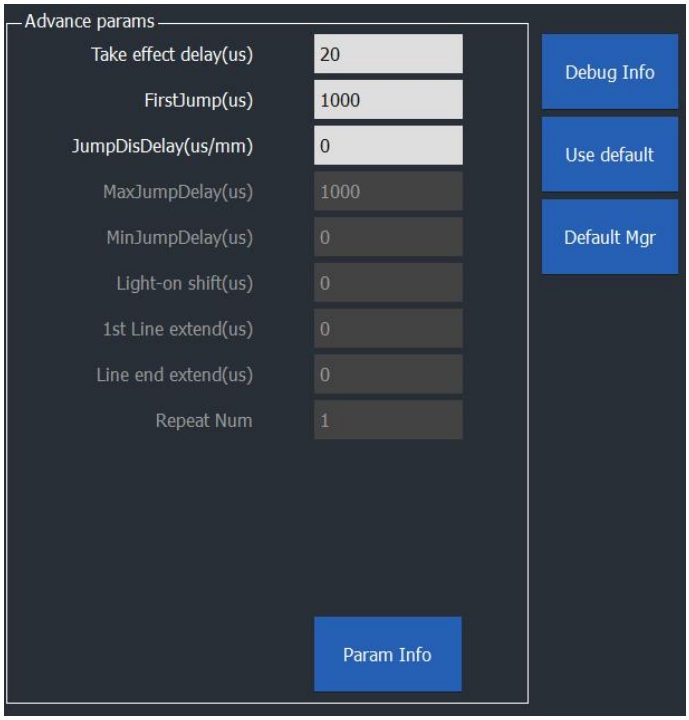
to appear at the end. It cannot be a negative value.



Schematic diagram of light-off delay

- Mark end delay（us）：Galvanometer delay after laser light is turned off (0, +∞);
- Function: To ensure the accuracy and precision of the galvanometer trajectory at the unpointed position, and to a certain extent, to reduce the tailing phenomenon of the IPG laser;
- Corner delay（us）：Delay time between each section when inkjet printing.

- Advance Params



- **Take effect delay（us）：** Each time the pen number is switched, it will be executed unconditionally for a period of time to ensure that the parameter changes take effect.
- **First Jump（us）：** The first jump during marking will add a certain delay on top of the original jump delay.
- **Light-on shift（us）：** There will be a time difference between the galvanometer and the laser when they execute commands. Usually the galvanometer is about 100us slower than the laser. This parameter is used to compensate.

■ **1st Line extend（us）：**

■ **Line end extend（us）：**

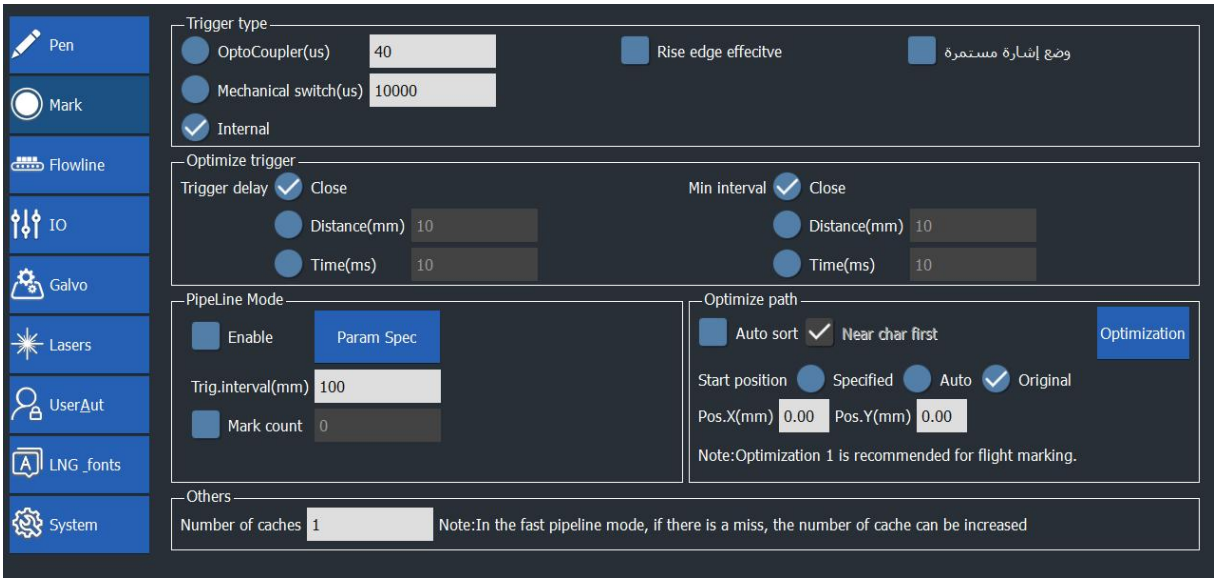
Use default： Replace the current parameter configuration with the default parameter configuration.

	Too large	**Too small**	**Whether it can be negative.**
Mark Speed	The strokes produced are not fine enough, sparse, have no depth, and the marking speed is fast	The marking strokes are fine, dense, and deep, but the marking speed is slow.	NO
Ligh-on delay	It will cause the beginning paragraph to be missing	The "match head" phenomenon that appears at the beginning of marking	Yes (Negative value means the laser emits light early)
Ligh-off delay	It will cause the "match head" emphasis to appear in the ending section	The inkjet printing is not closed after completion	NO
Jump speed	The processing time of empty strokes is short, and the total marking time is reduced, but the strokes will be connected and the galvanometer movement will be unstable.	The processing time of empty strokes is long, and the total marking time increases	NO

Jump delay	The galvanometer has fully rotated and stayed for a while before processing the next stroke, which increases the marking time.	The PC starts processing the next stroke before the galvanometer is fully rotated. There will be scattered points at the beginning of the stroke, and the pen will shake.	NO
Corner Delay	It will increase the inkjet printing time and there will be a focus phenomenon at the corners.	Rounded corners when marking at right angles	NO
Mark end delay	There are key points at the corners, and the marking time is increased	At high speeds, the end of the effective vector trajectory is incomplete and prone to deformation	NO

Pen parameter setting size comparison table

3.3.2. Mark



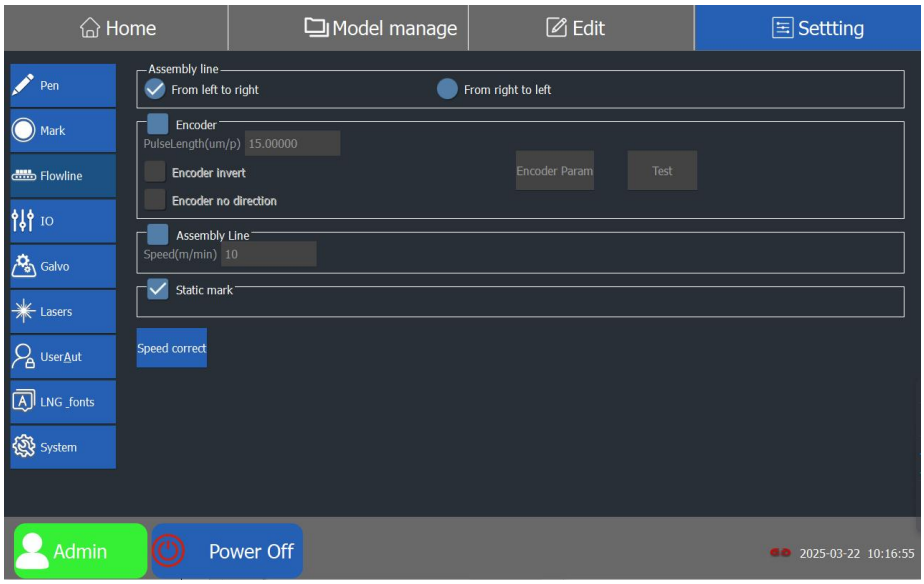
Trigger Mode:

- **OptoCoupler/Mechanical switch:** Select different triggering modes. Photoelectric triggering corresponds to the GD interface on the board, and foot triggering corresponds to the JT interface on the board.

- **Internal：** Software automatically triggers marking.
- **Optimize trigger ：**
- **Trigger delar：**
- **Distance（mm）：** The distance the production line continues to move after the signal is triggered until marking.
- **Time（ms）：** The interval time from the inkjet signal to the marking.
- **Min interval：** When a customer's product has holes, it may cause multiple triggers. To avoid this, set a minimum trigger interval to avoid the hole problem.
- **Distance：** Adjacent triggers must be greater than this distance, otherwise they are filtered out.
- **Time：** Adjacent triggers must be greater than this time, otherwise they are filtered out.
- **Pipeline Mode：** Whether to enable pipeline mode.
- **Trig. interval(mm)：** Marking interval distance.
- **Mark count：** Distance trigger times.
- **Optimize path：**
- **Start position：** Set the coordinate position of the starting marking element.
- **Specified：** Specify the starting coordinates of the first marking element.
- **Auto：** Automatically set the starting coordinates of the primitives according to the pipeline direction.
- **Original：** The coordinates of the elements are not changed.
- **Others：**

- **Number of caches：** Set the number of items saved in the cache. It cannot be set to 0.

3.3.3. Flowline



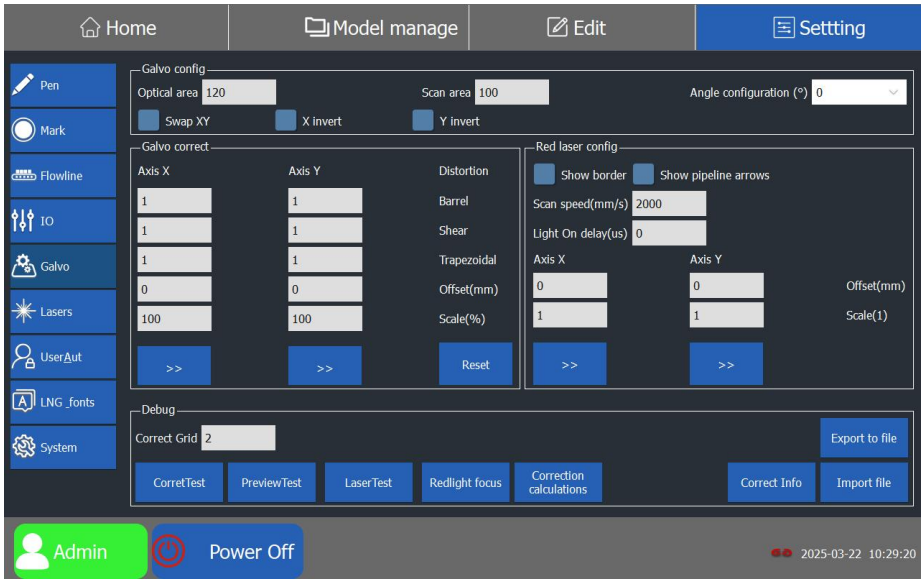
- **Assembly line：**
  - ◆ From left to right/ From right to left：Running direction of the assembly line.
- **Encoder：**
  - ◆ **Encoder invert：** Exchange the input signals of the encoder AB phase.
  - ◆ **Encoder Param - Diameter（mm）：** The diameter of the encoder.
  - ◆ **Encoder Param - Pulse：** Pulse of one circle of encoder.
  - ◆ **Pluse length（um/pulse）：**The moving distance of each pulse of the encoder.
  - ◆ **Test：** Display the speed of the current assembly line.
  - ◆ **Assembly speed：** Select the mode of using a fixed assembly line for flying inkjet printing. Set the fixed speed value, which corresponds to the current.
- **Static mark：** The mark is sprayed when the assembly line is stationary.
- **Speed correct：** When the assembly line is fixed, this function can be used to observe whether

the assembly line speed and inkjet marking match.

3.3.4. IO Parameters

- **Marking:** Set the corresponding output port to output high level or low level during marking.
- **Mark once:** Set the level type and time of the corresponding output port after each marking is completed.

3.3.5. Galvo



3. 3. 5. 1. Galvo config

- **Optical area（mm）：** Set the range of the galvo.
- **Scan area（mm）：** Set the size of the working area.
- **XY swap:** The reference of the X/Y axis of the galvanometer.
- **X/Y invert:** Set the galvanometer output to the reverse direction.

3. 3. 5. 2. Galvo correct

Calibrate the galvanometer, and the two vertical rows correspond to galvanometer X and galvanometer Y respectively.

- **Barrel：** Indicates the barrel or pillow correction coefficient, the default coefficient is 1.0 (parameter range 0.5-1.5).
- **Shear：** Indicates the parallelogram correction coefficient, the default coefficient is 1.0 (parameter range 0.5-1.5).
- **Trapezoidal：** Indicates the trapezoidal correction coefficient, the default coefficient is 1.0 (parameter range 0.5-1.5).
- **Offset（mm）：** Adjust the deviation between the actual marking element and the expected element position.
- **Scale（%）：** Scalability ratio, the default value is 100%. When the actual size of the mark is different from the software icon size, this parameter needs to be modified. When the actual size of the mark is smaller than the design size, increase this parameter value; when the actual size of the mark is larger than the design size, reduce this parameter value. When setting the ratio, you can directly press , and then a dialog box as shown in the figure will pop up. We can input the size set in the software and the actual marking size measured, and the software will automatically calculate the expansion and contraction ratio.

3. 3. 5. 3. Debug

- **Correct Test：** Draw a rectangular frame according to the set parameters to check whether the

correction effect meets the requirements.

- **Preview Test：** Test whether the red light changes correctly according to the red light parameters.
- **Laser Test：** Check whether the laser is emitting light normally.

3.3.5.4. Red laser config

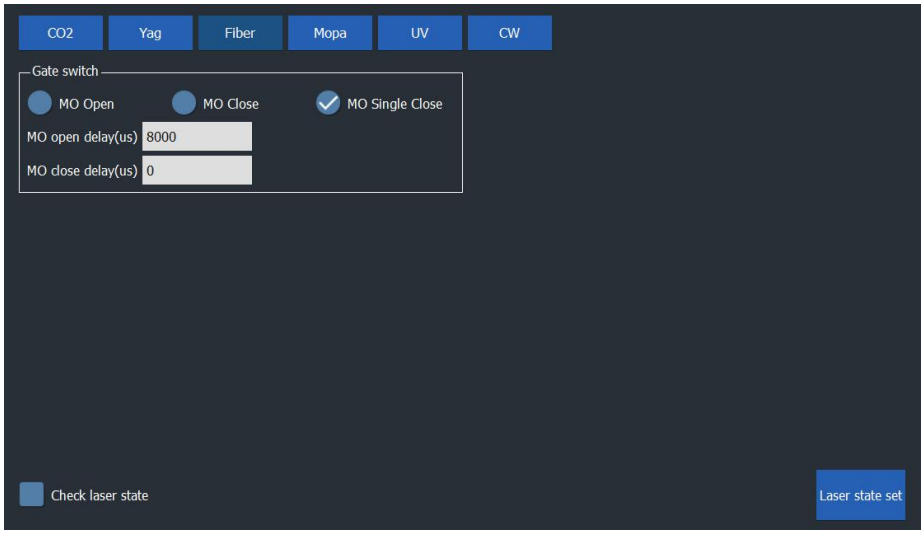
- **Show border：** After checking, the outline of the primitive can be displayed.
- **Scan speed（mm/s）：** The speed at which the red light appears; the slower the speed, the more obvious the red light path; the faster the speed, the clearer the outline of the red light.
- **Light On delay（us）：** Delay time for the red light to turn on.
- **Axis X（mm）：** Make the frame or outline of the red light offset by a set distance in the X direction.
- **Axis Y（mm）：** Make the frame or outline of the red light offset the set distance in the Y direction.
- **Scale X/Y：** Refers to the size deviation between the red light and the laser. Adjusting this parameter can make the laser and the red light completely overlap.

3.3.5.5. Export/Import File

Save the current calibration value to a file/read the saved calibration file.

3.3.6. Lasers

Set the laser type currently used and set related basic parameters, as shown in the figure.



CO2

- Preionization：Enable pre-ionization signal. Some manufacturers' CO2 lasers need this signal to work properly, such as the lasers of SYNRAD in the United States.。
- Pulse Width：Pulse width of pre-ionization signal.
- Pluse Frequency：The pulse frequency of the pre-ionization signal.
- Supression the first pulse：This function is to solve the problem of "heavy first point" when marking on CO2 machine, when the laser power is too strong or the interval is too long, the laser energy is accumulated, and the phenomenon of "heavy first point" is caused when starting to spray.
- Starting power：The starting power of the first pulse.
- Power increase：The power increment value of each pulse until the set power value.

CO2/YAG/UV

Light leak treatment： The processing method of gate signal delay time. When the laser is unstable, check the light leakage processing. During the marking process, each time the laser is turned on/off, the corresponding gate signal on/off delay time will be executed first. If the light leakage processing is not checked, during the marking process, the gate signal on/off delay time is only executed once at the starting position.

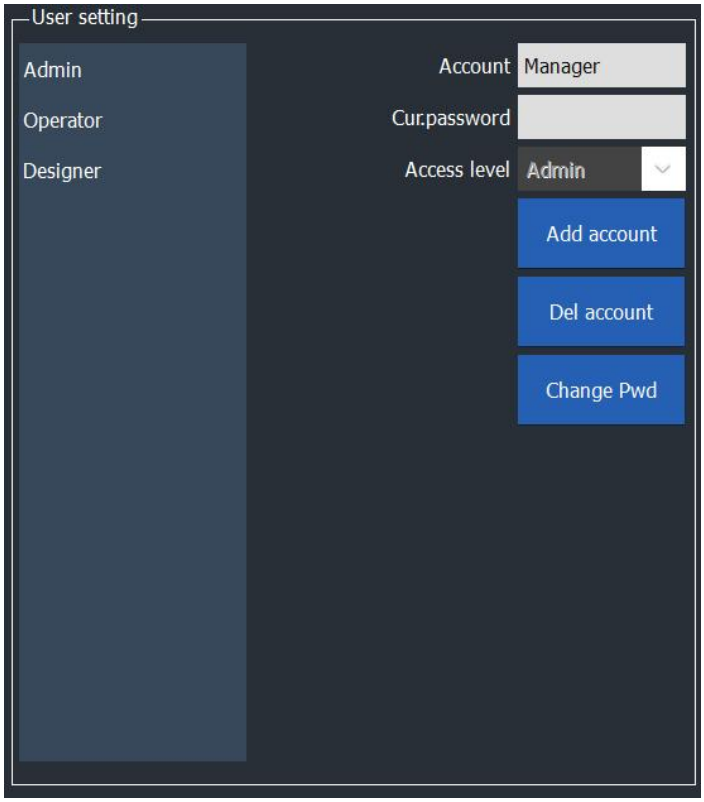
- Gate open delay（us）：Before the laser is turned on, the gate signal is turned on delay time.
- Gate close delay（us）：Before the laser is turned off, the gate signal is turned off for a delay time.
- YAG
- PWM enable：Generate a modulation signal of a certain frequency at the PWM pin.

- YAG/UV
- Pulse width invert： Change the PWM pulse high level to low level, the corresponding low level to high level and shift it by the corresponding phase angle to meet the PWM low level effective Q driver requirements.。
- Fiber/MOPA
- MO Open/ Close（ms）： The MO needs to be turned on in advance before the laser emission pin is turned on; set the time for the MO to turn on/off.

3.3.7. User Aut

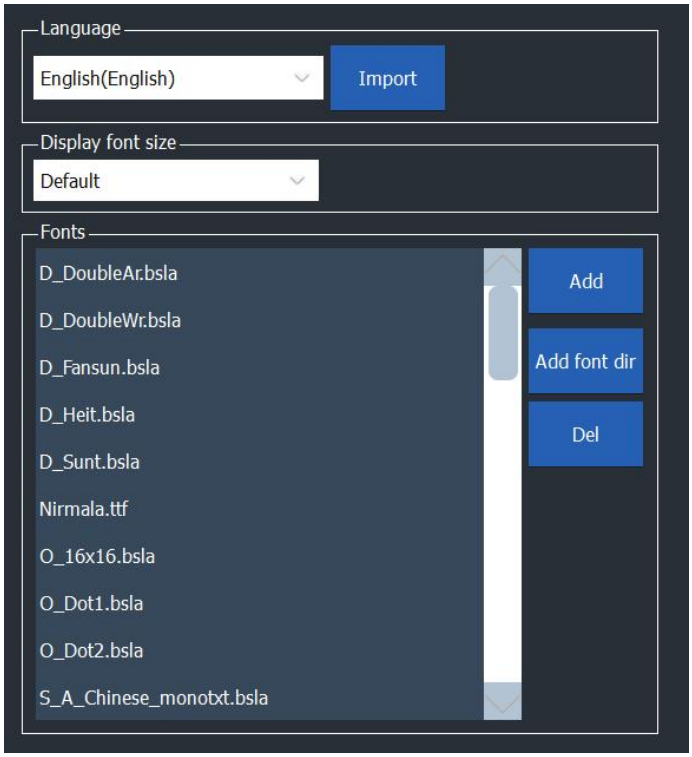
Set different permissions for different users. Three user levels are provided by default.

User Setting



Manage users, such as adding, deleting, changing passwords, and permission levels.

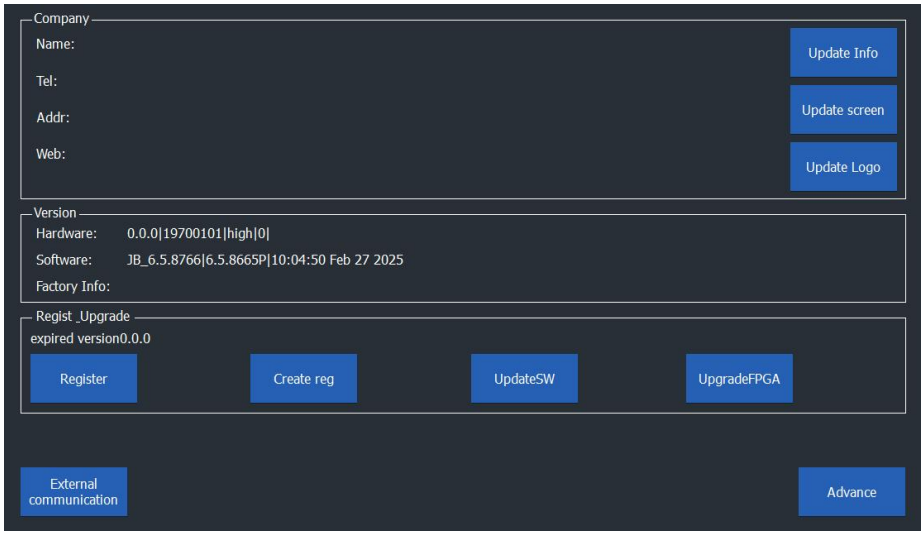
3.3.8. Language & Fonts



Language: Select the language of the software. Currently, Simplified Chinese and English are provided.

Fonts: Manage the existing fonts of the software. You can import fonts from a specified location or delete existing fonts. Currently, only fonts in .bsla format are supported, which need to be converted using a font conversion tool.

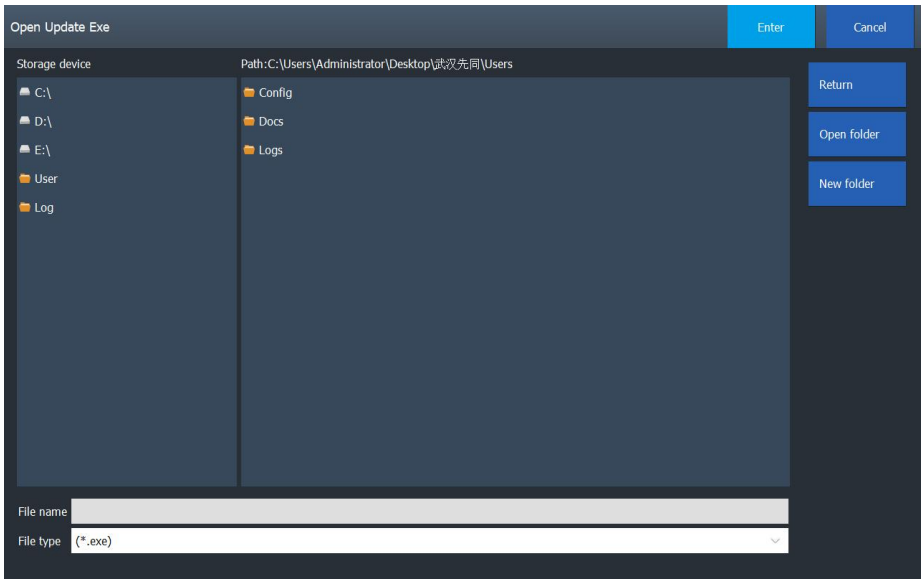
3.3.9. System



◆ Company:

◆ Update Info: Import the specified XML file to change the company information.

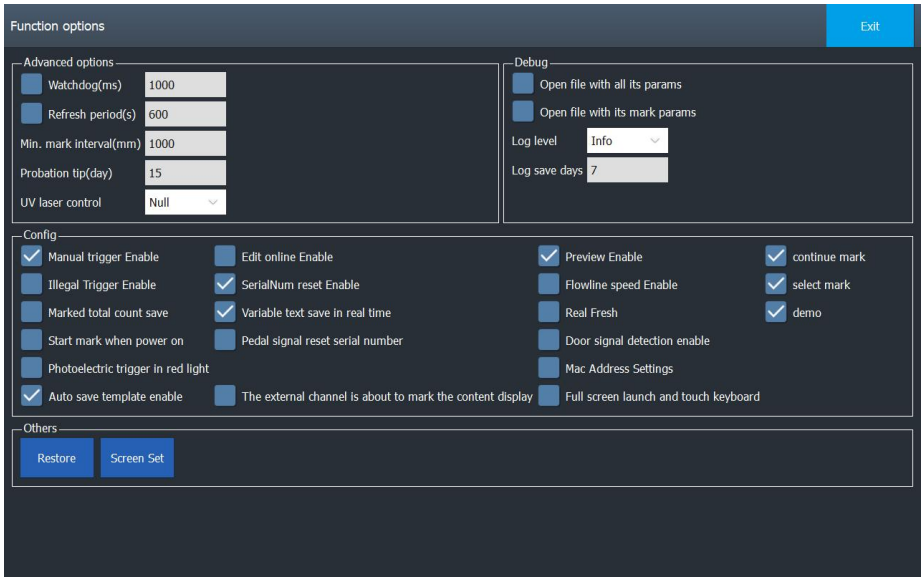
- Update screen：Specify a bitmap file that meets the requirements to change the boot screen.
- Verion：Display software and hardware version numbers.
- Register Upgrade： Display the current software activation status and provide registration, upgrade and other functions.
- Register： Specify the registration file generated by the manufacturer to complete the registration.
- Create register： Generate a file containing the local information and provide it to the manufacturer for registration.
- Update SW：Upgrade the current software version.
- Update FPGA：Upgrade the hardware version.



Click the "Upgrade Software" button and select the provided upgrade tool.

Enter the upgrade program. The red box is to select the new installation package to be upgraded. The green box is to specify the files or folders that are not allowed to be modified under the original program (this is generally not necessary). Click to start the installation and wait for the installation to complete.

- **Advance**



1. Advanced options

- Watchdog（ms）：If no signal from the host computer is received within the set time, it will reset and the corresponding output port will output a signal.
- Refresh period（s）：Even if not triggered, the time element in the marking content will be automatically updated according to the set time.
- Min. Mark interval（mm）：This parameter will only affect the software's calculation of the appropriate assembly line speed and will not affect the actual marking. It does not need to be set.
- Probation tip：If it is a trial version, the alarm will be triggered based on how much time is left until the trial period ends.

2. **Config：** Switches for some advanced functions. Note that the pipeline mode can only be used with board FPGA version 12.12.X or higher.

3. Debug：

Open file with all its params： After checking, all parameters will be saved in the template.

4. Others

Restore： All settings can be restored to factory settings.

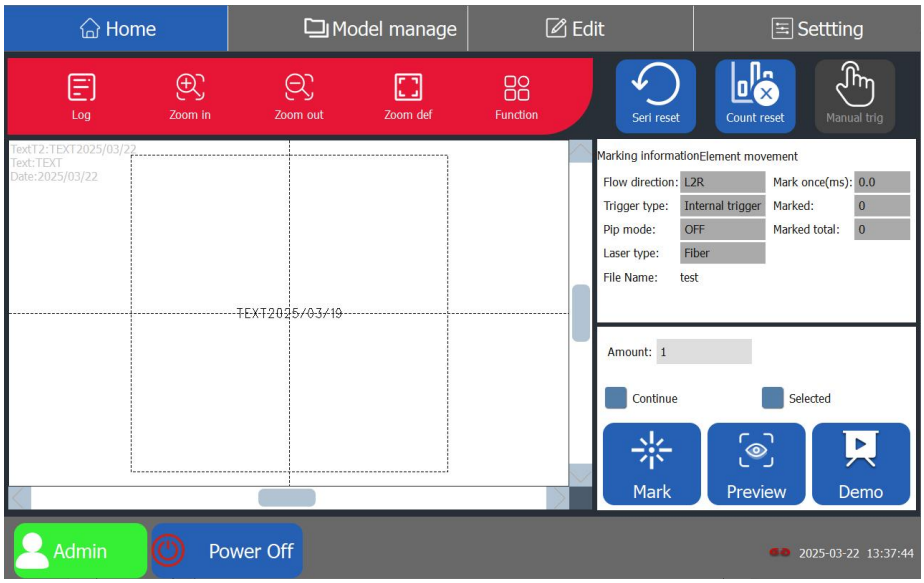
3.4. Marking Operation

The "Marking" interface is the laser operation interface for the designed file. Before formal

marking, please repeatedly debug the marking parameters and carefully check the design files to avoid unnecessary losses!

Notice： Since laser can cause irreversible damage to your body, you should be careful when operating it and irrelevant personnel should stay away from the operation area.

The "Marking" interface is mainly divided into five parts: "Status Bar", preview area, optional functions, parameter display, and marking operation.



- **Log** : Click to view some information during the software running, which can help to find the cause of the fault.
- **Seri reset (serial number reset)：** Select a sequence number and use this function to reset the sequence number to the desired number. If no element is selected, all sequence numbers will be reset to the starting sequence number.
- **Count reset：** During the marking process, you can use the count reset function to reset the number of times the marking has been done.
- **Manual trig：** After setting the non-internal trigger mode, you can directly use this function to print.