6.0 High-speed Fly Laser Mark Control System

User's Manual

Table of Content

1. Overview

1.1. Software Overview

This version is still in the process of revision and improvement.As a temporary version,this software provides the following functions:

- The software supports user authentication to prevent illegal operations.
- Design the graphics and patterns for marking freely.
- Support all the fiber laser devices, CO_2 and end pumping lasers in the market. Adjust the parameters such as current, impulse frequency and duty ratio by software setting according to different types of laser devices.
- Support independent red light indication.
- The software provides the authorization management to prevent parameters from being modified randomly.
- Support high-speed fly mark: Applicable to assembly line.
- Support filling operation: Provide straight and annular filling, allow arbitrary angle filling and cross filing, adjust edge distance, edge frame and space.
- Provide variable text function: Fixed text, serial number, date, time, network communication, serial communication, etc.
- Support 16-layer marking parameters: Customize parameters of each layer optionally to realize multi-parameter mark easily.
- Text input function: Support single line, double lines, dot matrix, True Type font, and different settings of Chinese and English fonts.
- Marking of dynamic file: During text and picture processing, file name is unchanged, but file content changes.
- Powerful editing functions: Array, mirror, copy, alignment, cancel/redo, etc.
- Simulation function: Preview mark track of graphs before marking.
- Secondary development: SDK library supports user for custom-made development, expands the functions of the existing mark system and meets special application need, etc.

1.2. Description of the Manual

- When actual operation mode and function setting are inconsistent with this User's Manual because of software upgrading, the software shall prevail.
- Other products and company name in this User's Manual may be the trademark of relevant owners respectively.

1.3. Software Installation and Use Instructions

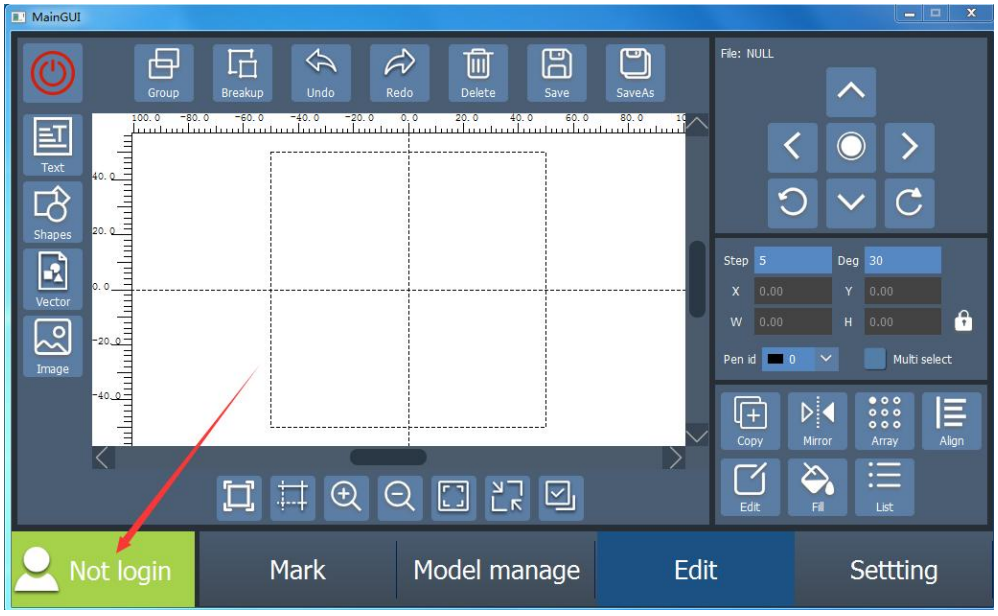
- The software is green software, so it can run after decompression.
- It is required to install the board driver.

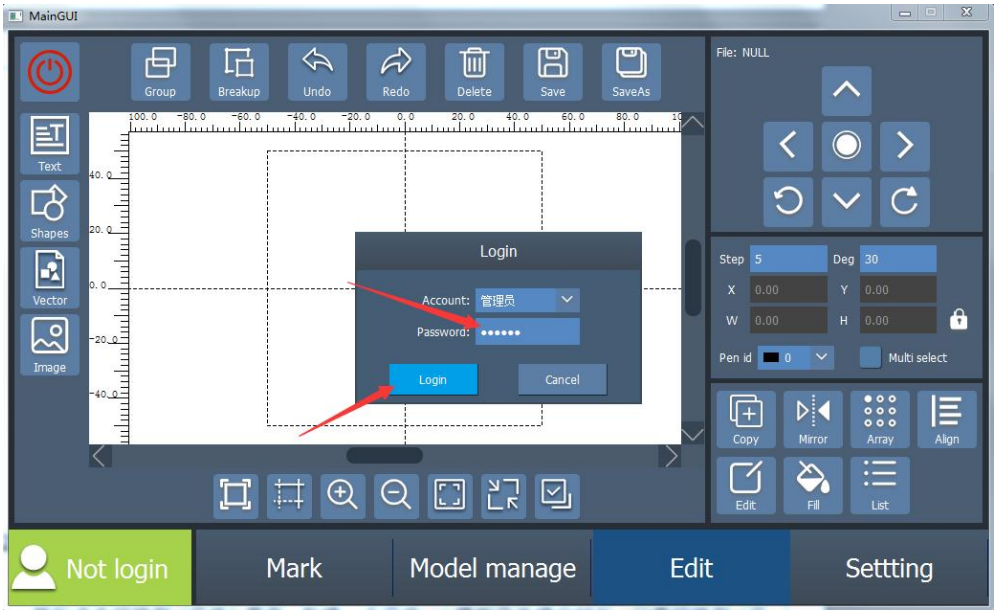
2. Quick Start

Here is an example about generating a fixed text template file with the production date and the batch number.

2.1 Log in

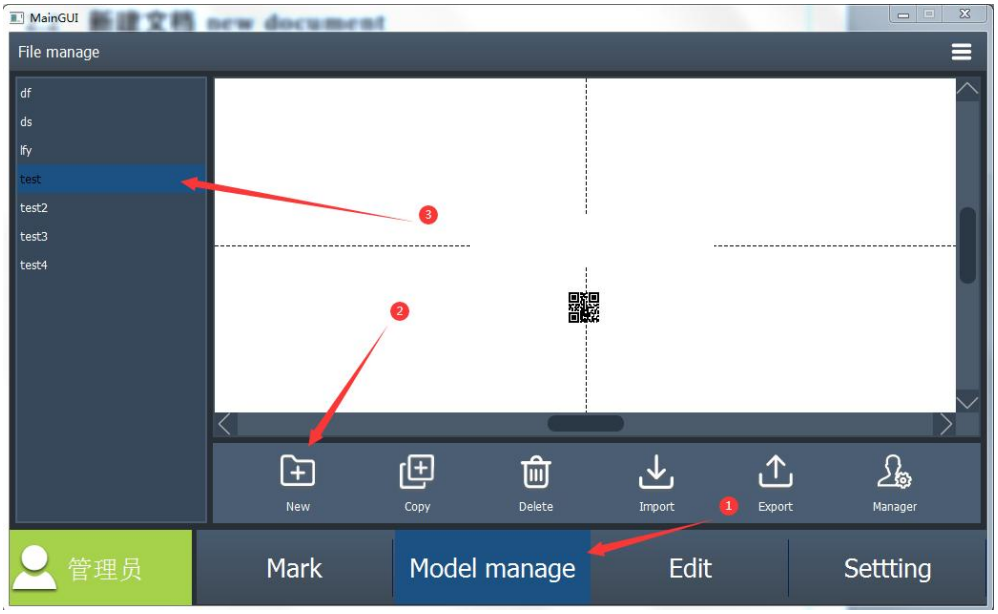
After opening the software, firstly confirm whether the connection icon in the upper right corner is green. If it is red, please check whether the board is connected. Then log in (the default password of the administrator is 111111). Note: You cannot perform any operations if you log out.





2.2new document

Click to switch to the file interface and create a new file. (After the template file is created, it will be automatically saved in the template file, as long as you switch to the file interface.)

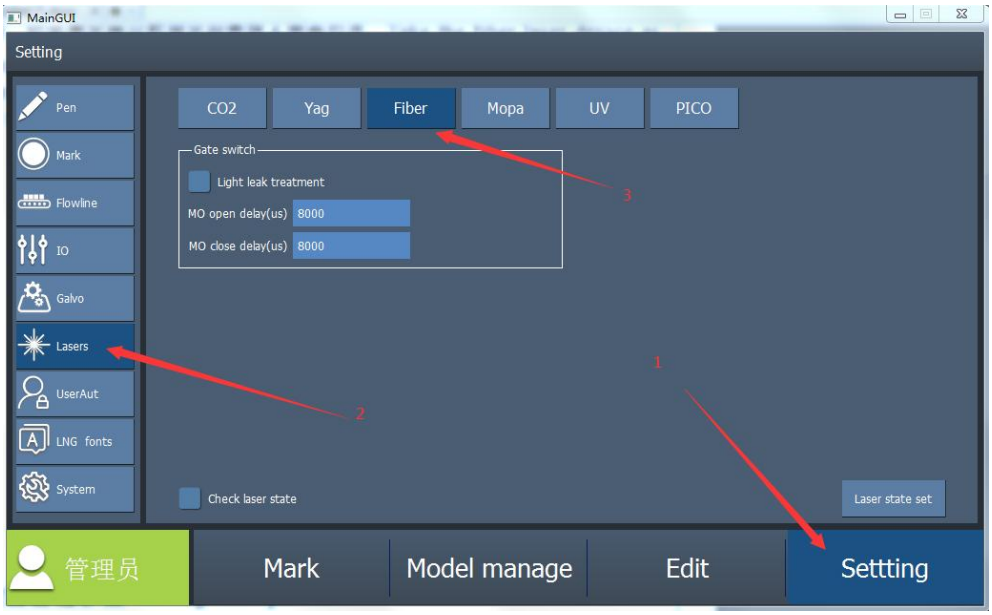


2.3set parameters

Switch to parameters, set laser parameters, regional parameters, pen list, marking parameters and assembly line, respectively

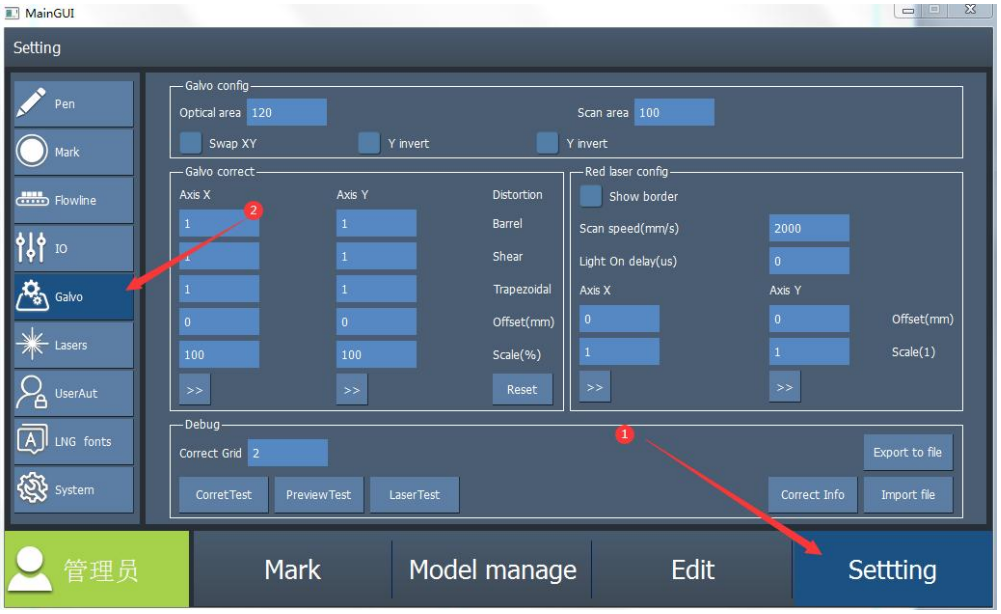
2.3.1 Set laser parameters

Take the fiber laser device as an example, after selecting the optical fiber, test to check whether the laser device emits light normally with the laser. If the light does not leak, there is no need to tick the box of light leakage.



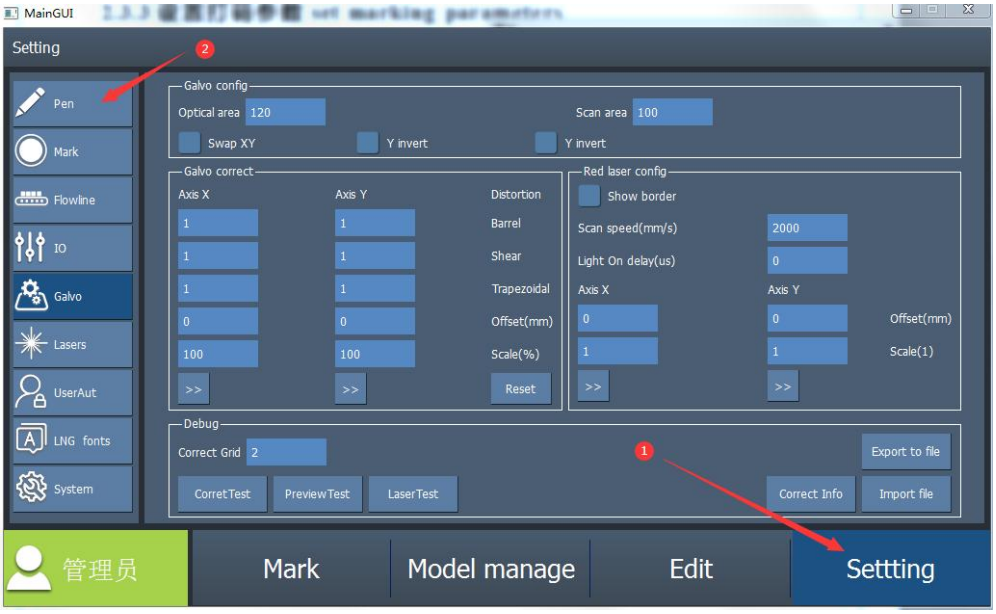
2.3.2 Set regional parameters

Set the format and work area according to the actual situation of the field lens (the work area should be smaller than the format). Adjust the XY exchange, X reverse and Y reverse according to the actual marking effect. Adjust the parameters of the galvanometer calibration according to the calibration marking effect. Adjust the parameters of red light calibration according to the effect of the red light indication.



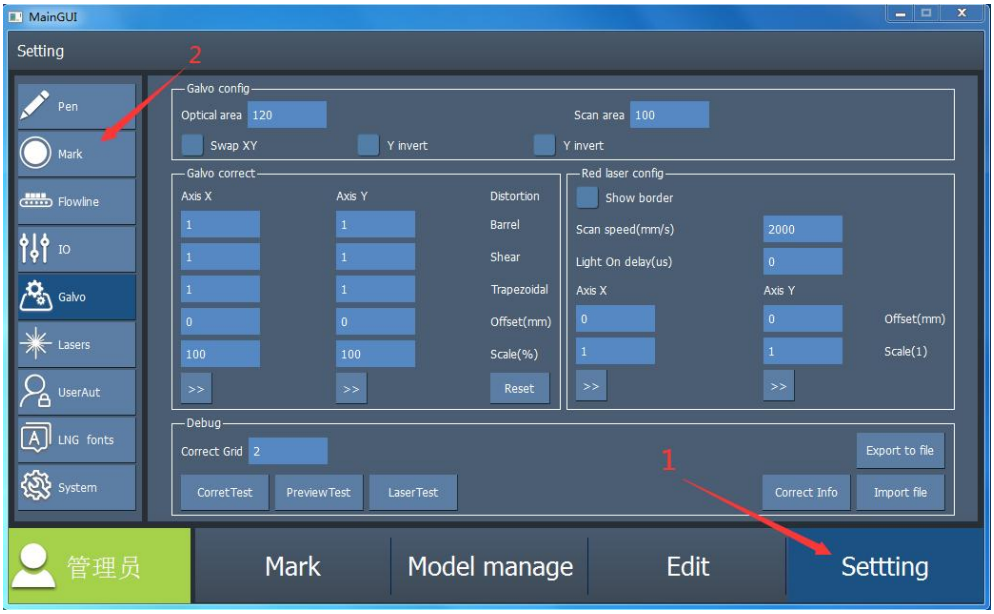
2.3.3 set marking parameters

Adjust marking parameters appropriately according to the marking content.



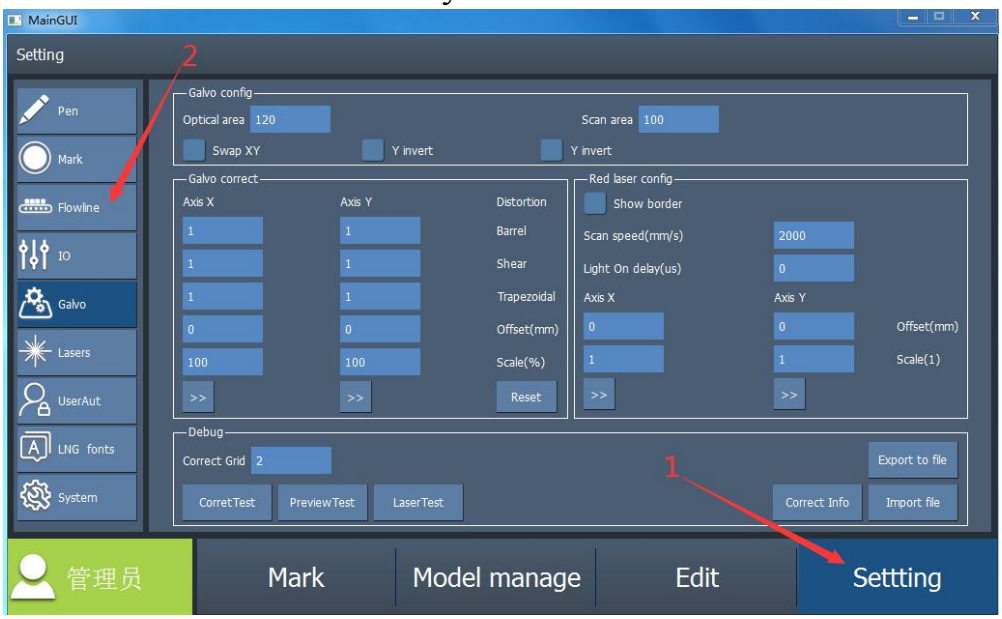
2.3.4 Set marking parameters

When adjusting the effect, set the parameters as shown below. After the effect is adjusted, adjust the trigger mode, trigger delay, minimum interval and starting point according to actual fly marking.



2.3.5 Set the assembly line

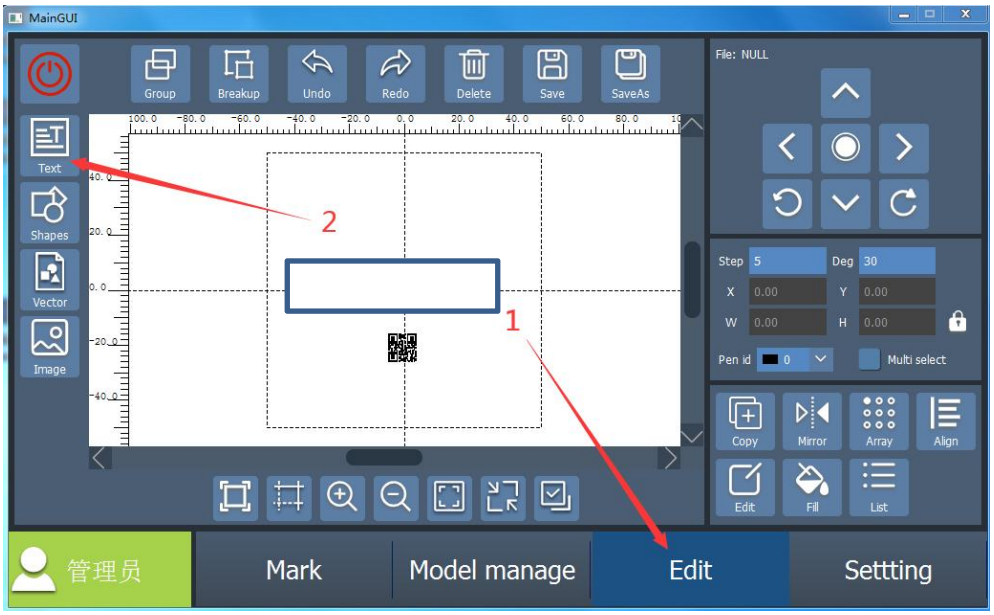
When adjusting the effect, set the parameters as shown below. After the effect is adjusted, adjust the direction of the assembly line according to the actual situation of the assembly line, and decide whether to use an encoder or a fixed assembly

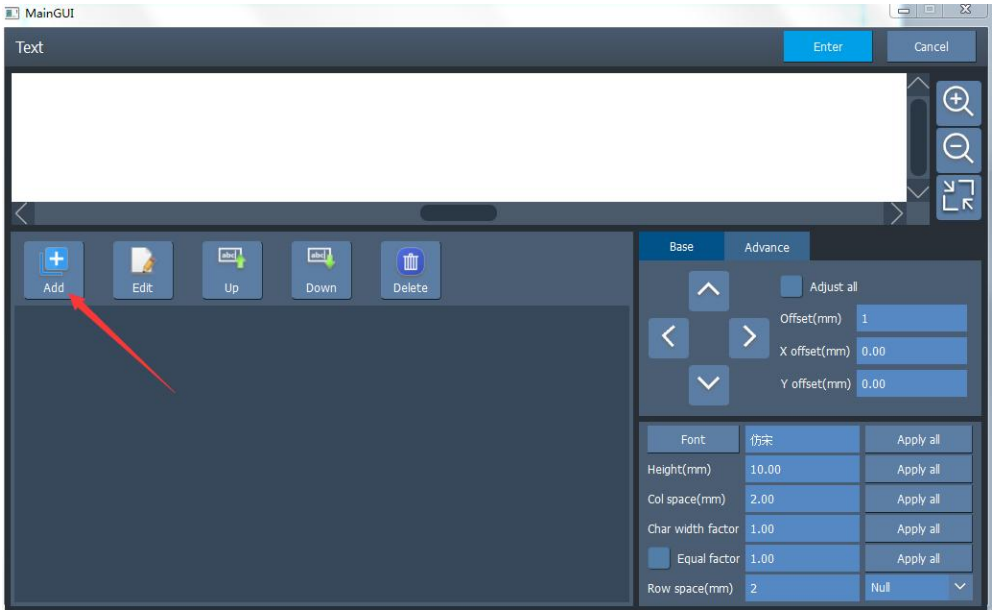


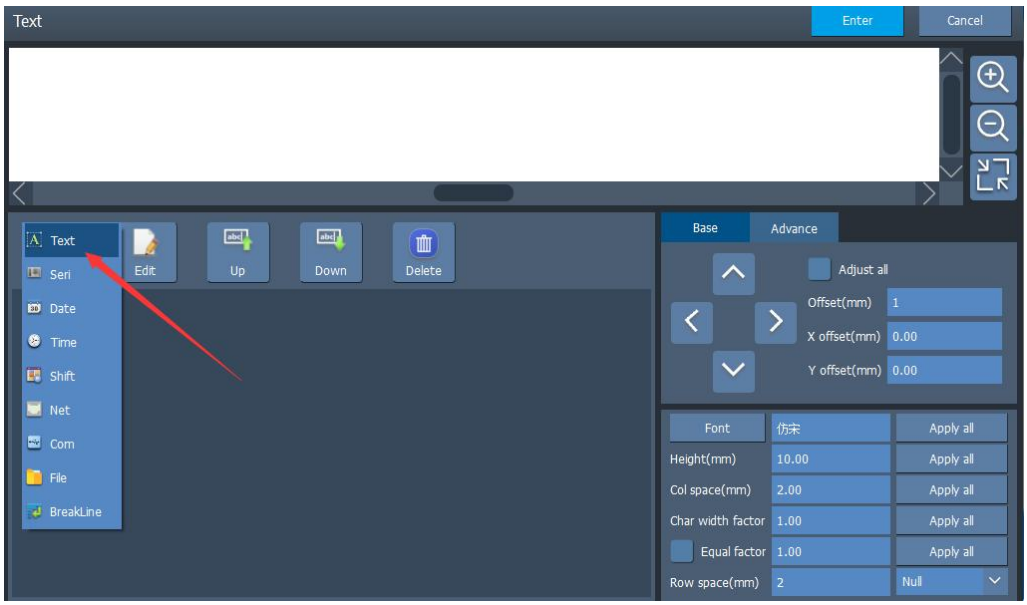
2.4edit content

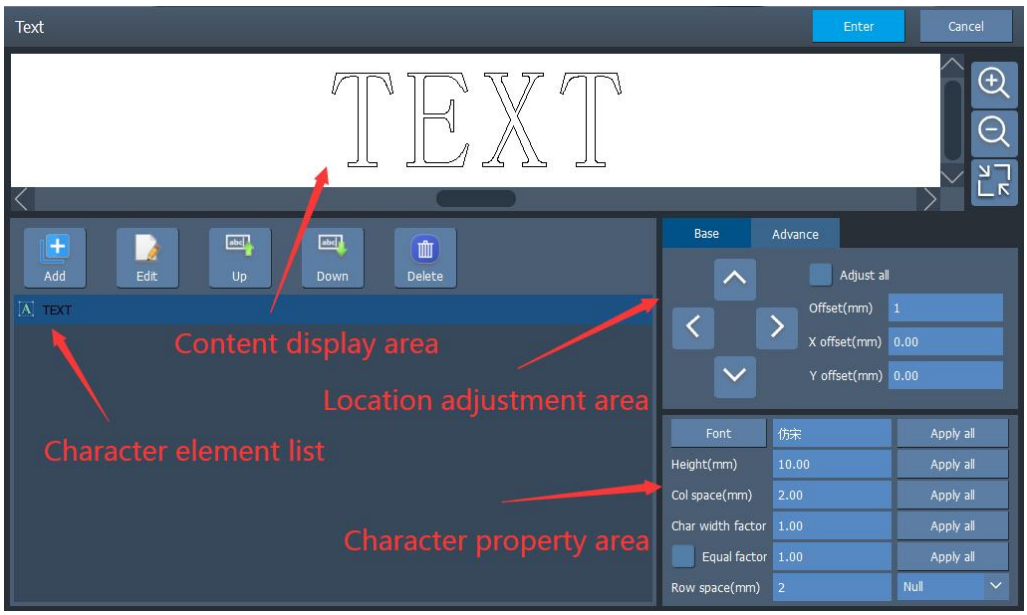
Switch to the editing interface to draw the fixed text(Note: If you want to make a mark on dark materials, you need to tick the box of “reverse” in the fixed text features). After the QR code is drawn, switch to the template interface to save the

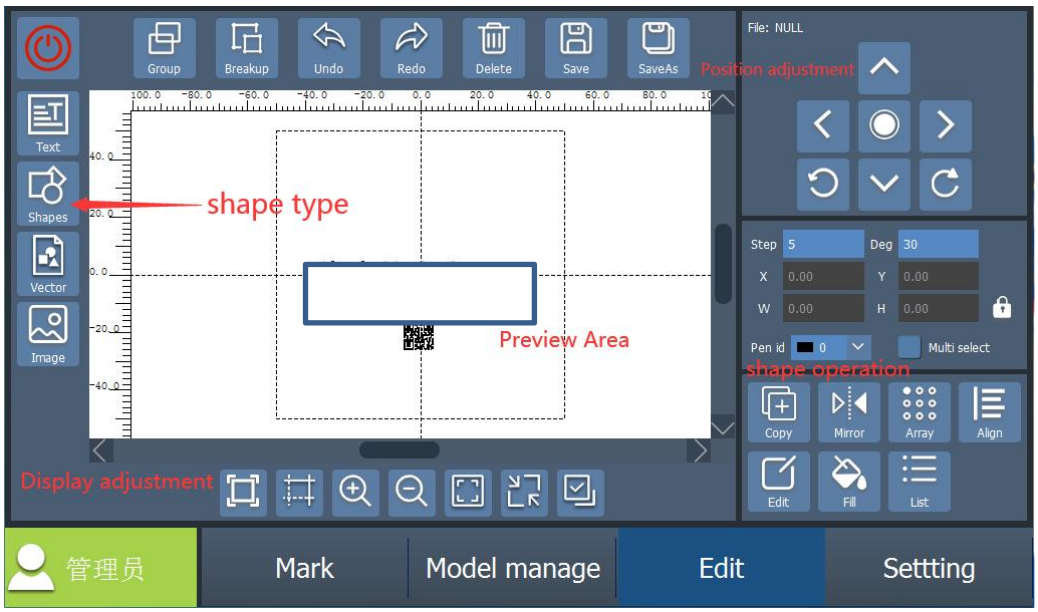
current content all at once.





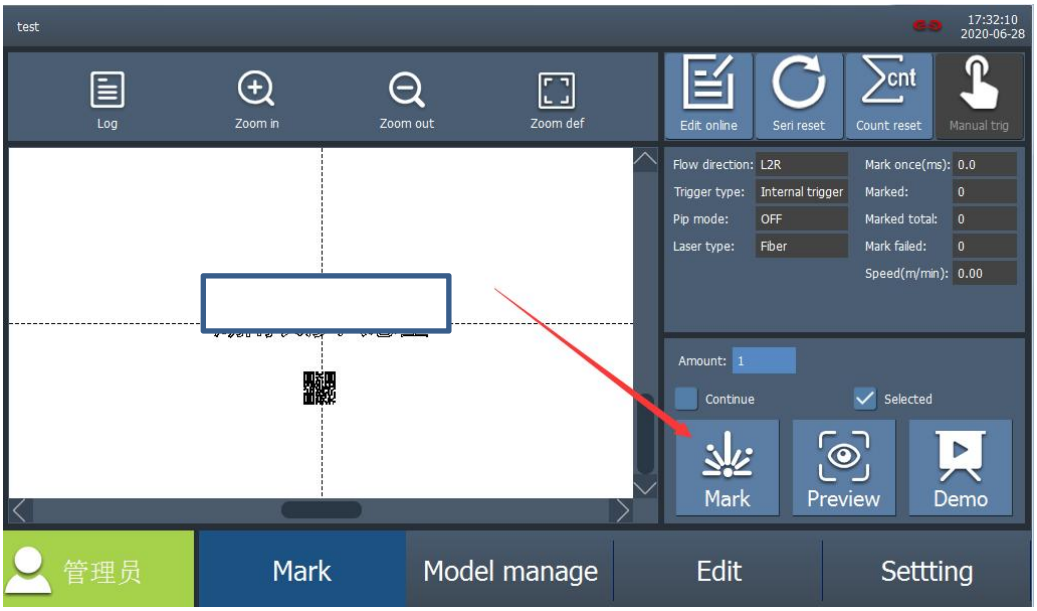

Text
Enter
Cancel
Text
Seri
Date
Time
Shift
Net
Com
File
BreakLine
Edit
Up
Down
Delete
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font 仿宋 Apply all
Height(mm) 10.00 Apply all
Col space(mm) 2.00 Apply all
Char width factor 1.00 Apply all
Equal factor 1.00 Apply all
Row space(mm)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


Text
Enter
Cancel
TEXT
Add
Edit
Up
Down
Delete
TEXT
Content display area
Location adjustment area
Character element list
Character property area
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font 仿宋 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



2.5marking authentication

Switch to the marking interface to observe the marking effect.



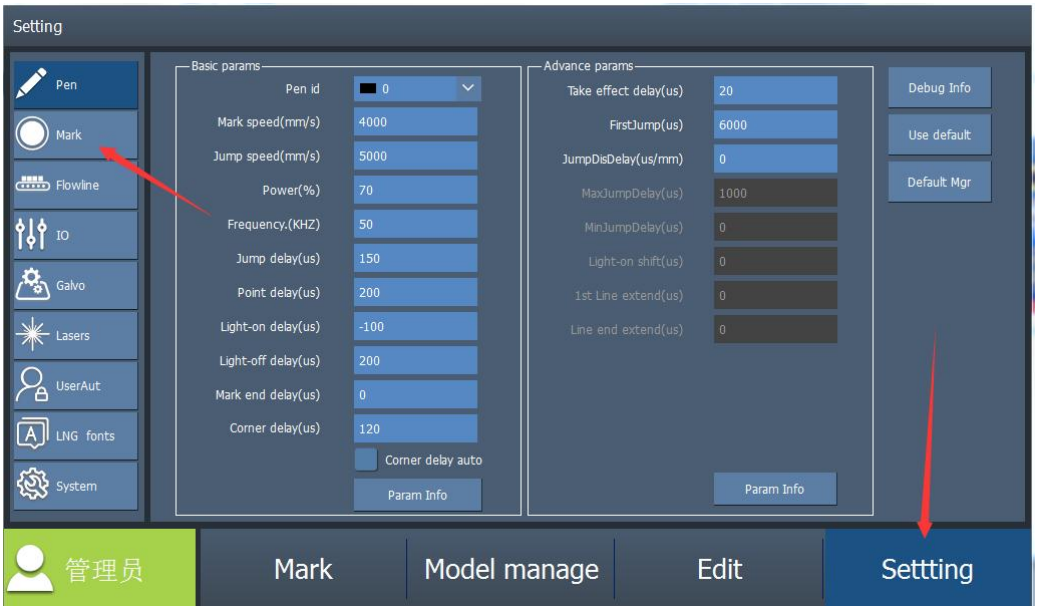
2.6marking parameters and assembly line.

If the static marking effect is good, switch to the settings interface to set the marking parameters and assembly line.

2.6.1 Set marking parameters

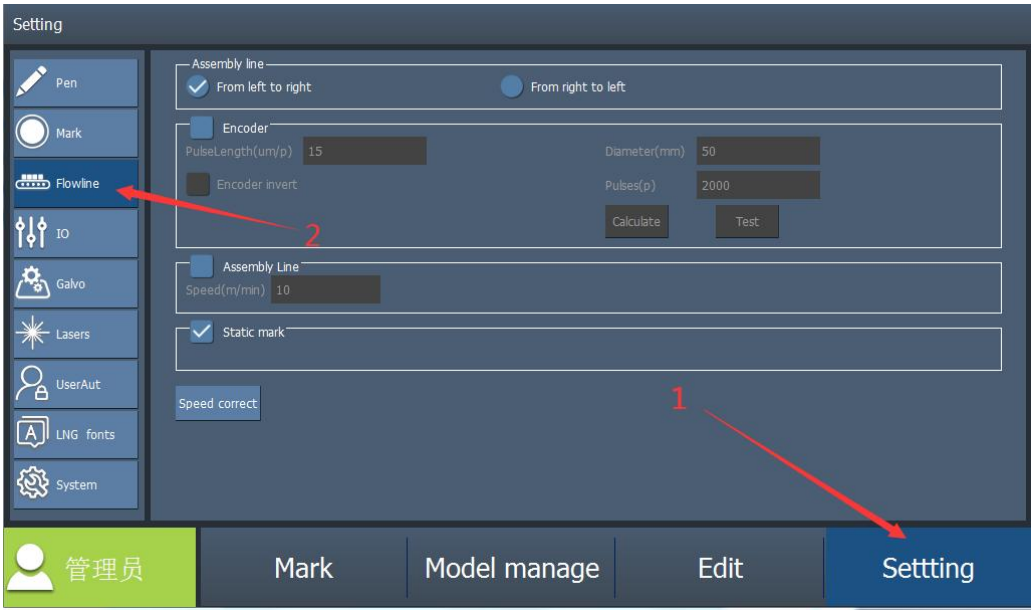
Select the trigger mode, trigger delay, and minimum trigger interval according

to the actual situation. It is OK to use a designated point or automatically-selected point as the starting point. For a designated point, generally set the X Coordinate, and the specific value is half of the work area minus the size of the first marking content, and then decide the positive and negative values according to the direction of the assembly line.



2.6.2 Set the assembly line

Under the condition that the marking speed and the delay are matched, the neatness of the shapes during fly marking can be adjusted by adjusting the impulse distance. This parameter is calculated by filling in the diameter of the encoder and cycle impulse.

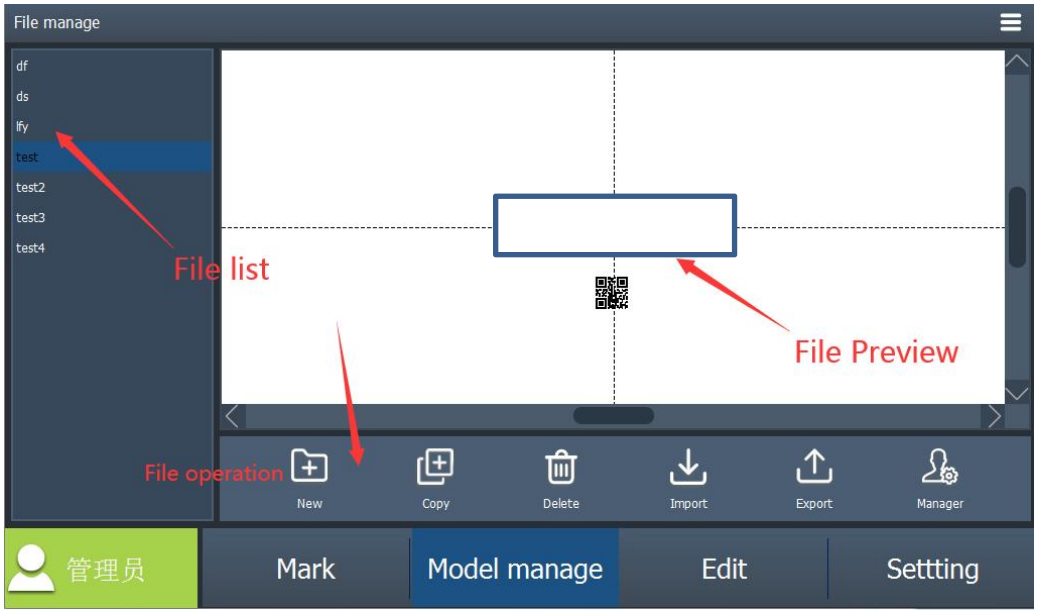


After all the parameters are adjusted to perform normal fly marking, switch to the file interface to save the content. Each time when you open the software, you can start working by just loading the file template.

3. Description of the Software

3.1. file management

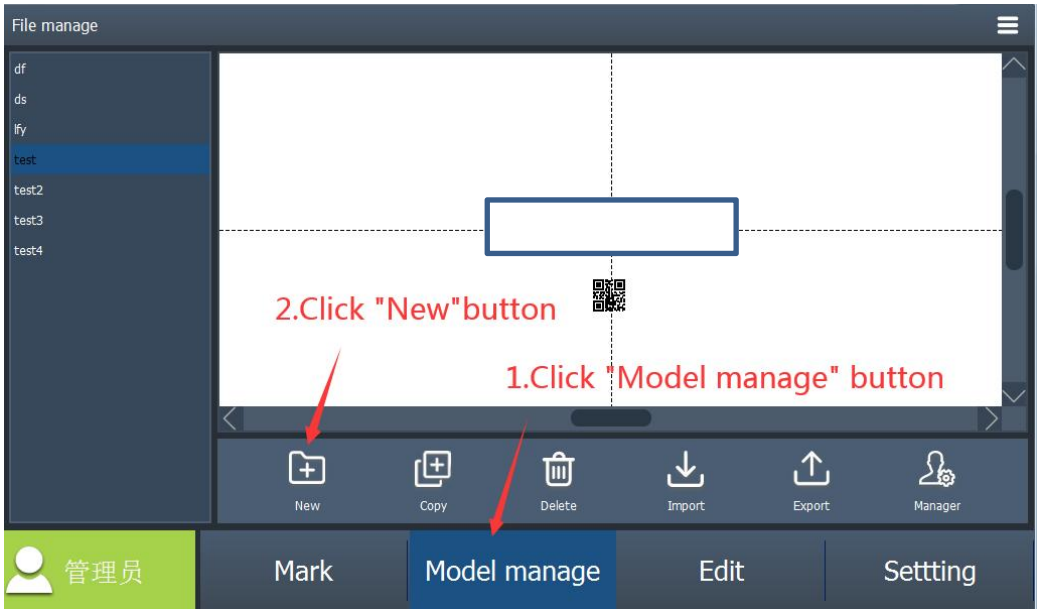
File management is a functional group that manages the user's template files, including six sub-functions: new folder, copy, delete, import, export, and manage.

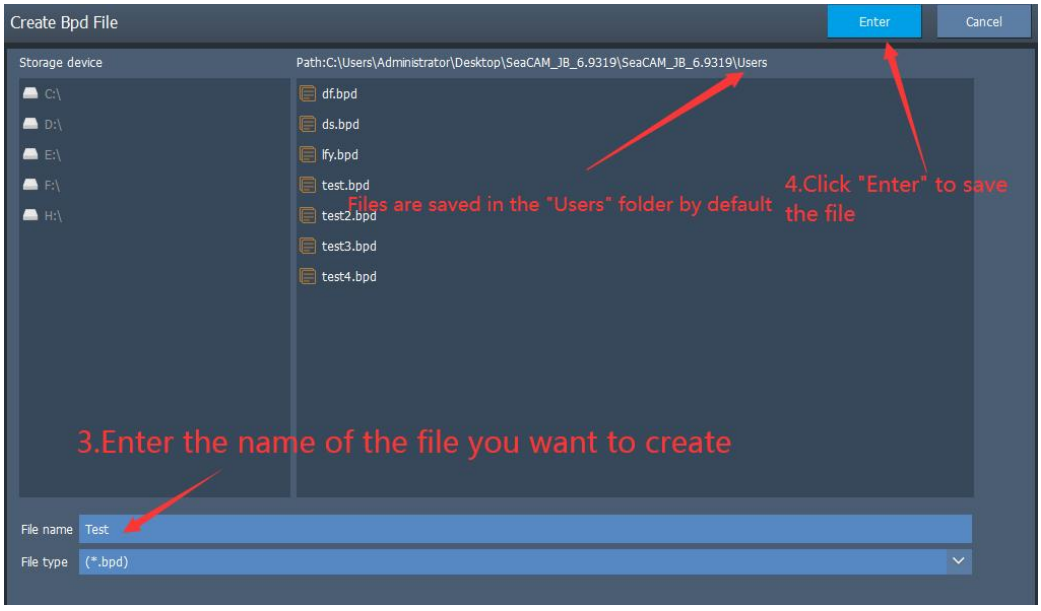


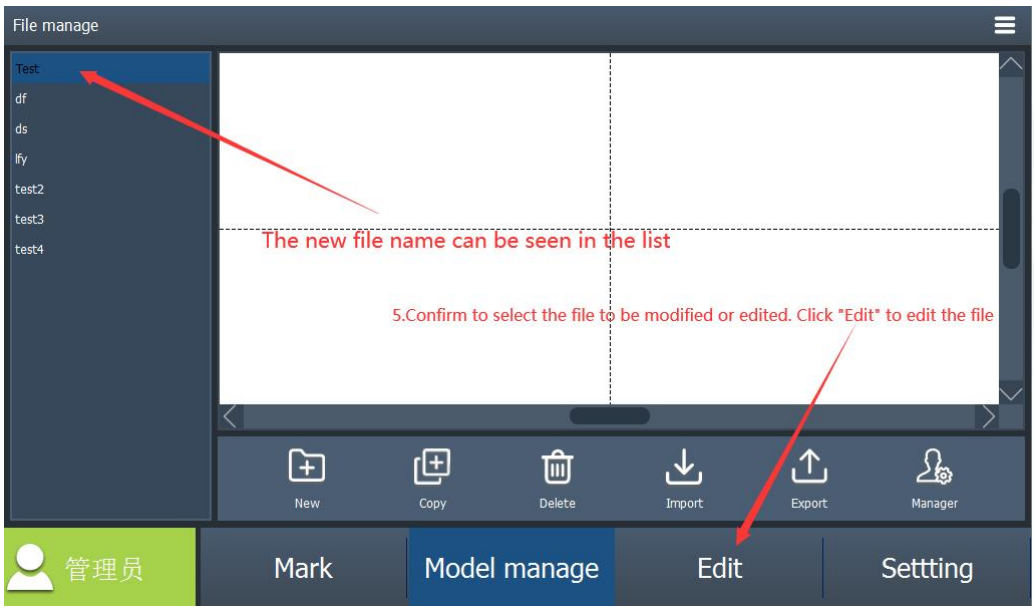
- New folder: Create a new blank template file.if there is no template file,click save directly in the editing interface,which has the same effect
- Copy: Copy the selected template file.
- Delete: Delete the selected template file.
- Import: Import a template file from a designated location.
- Export: Export a template file to a designated location.
- Manage: Namely the file manager, which can add, delete and change all files.

3.1.1. Function description

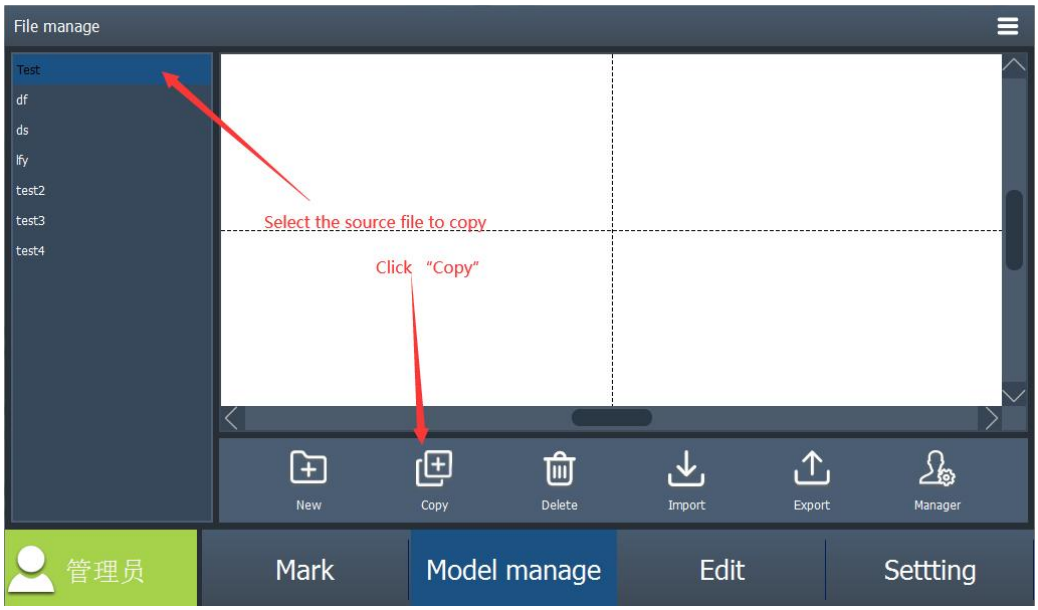
3.1.1.1. new folder

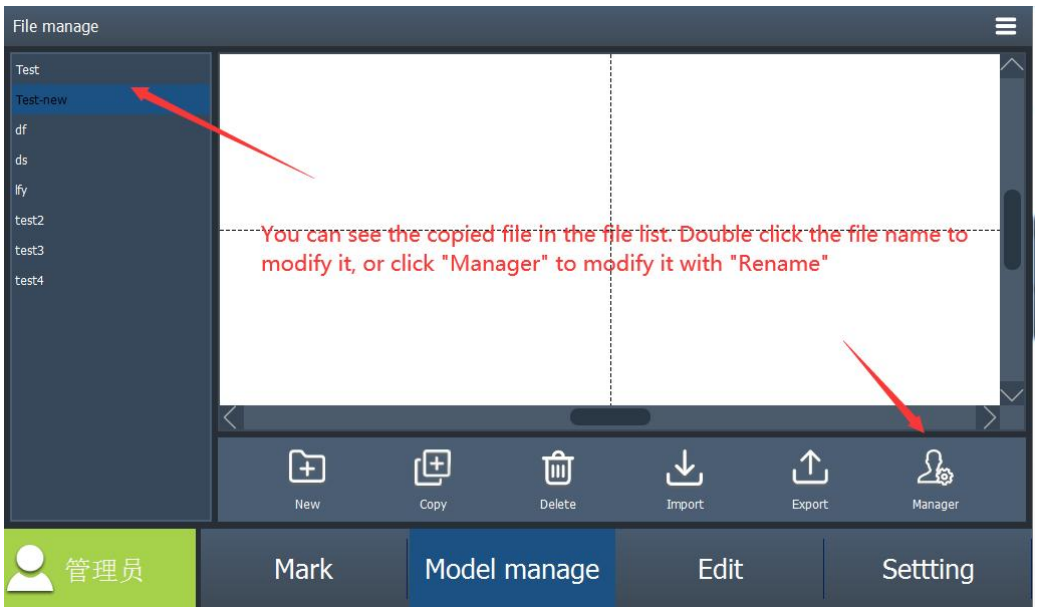




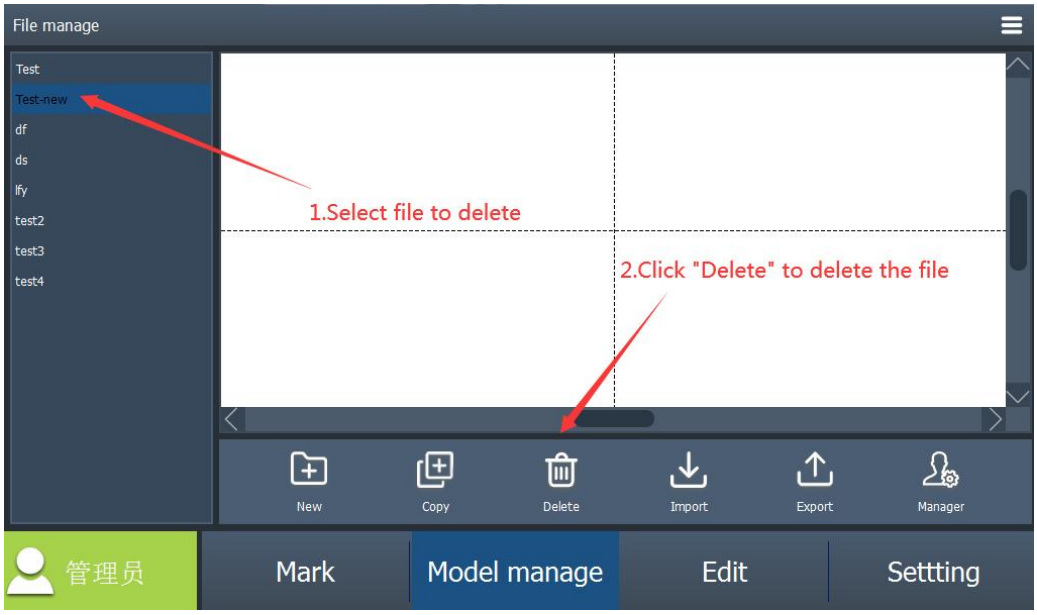

File manage
Test
df
ds
lfy
test2
test3
test4
The new file name can be seen in the list
5.Confirm to select the file to be modified or edited. Click "Edit" to edit the file
New
Copy
Delete
Import
Export
Manager
管理员
Mark
Model manage
Edit
Settting

3.1.1.2. copy

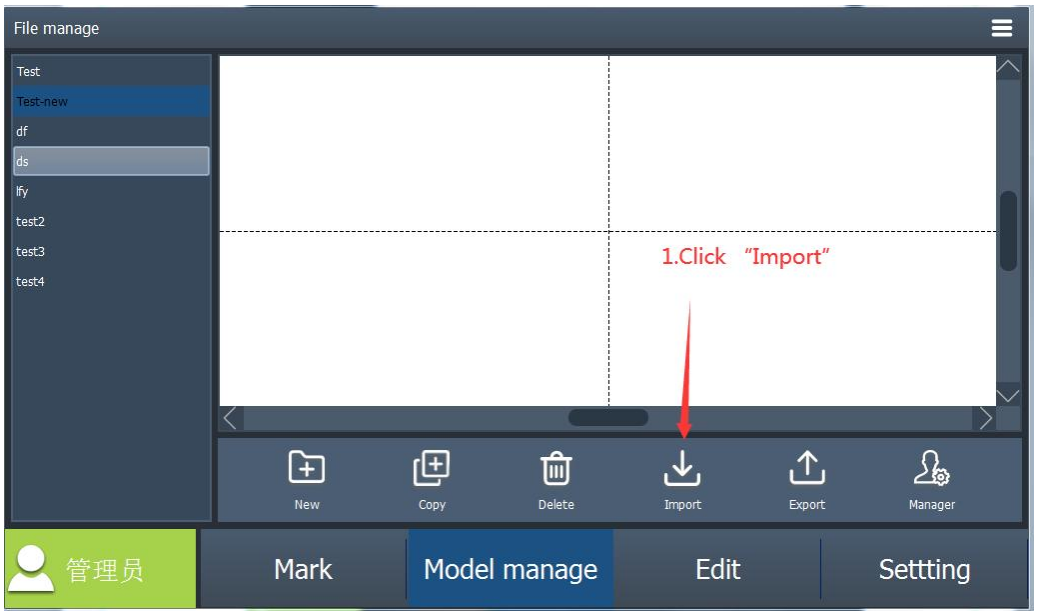

File manage
Test
df
ds
lfy
test2
test3
test4
Select the source file to copy
Click "Copy"
New
Copy
Delete
Import
Export
Manager
管理员
Mark
Model manage
Edit
Settting

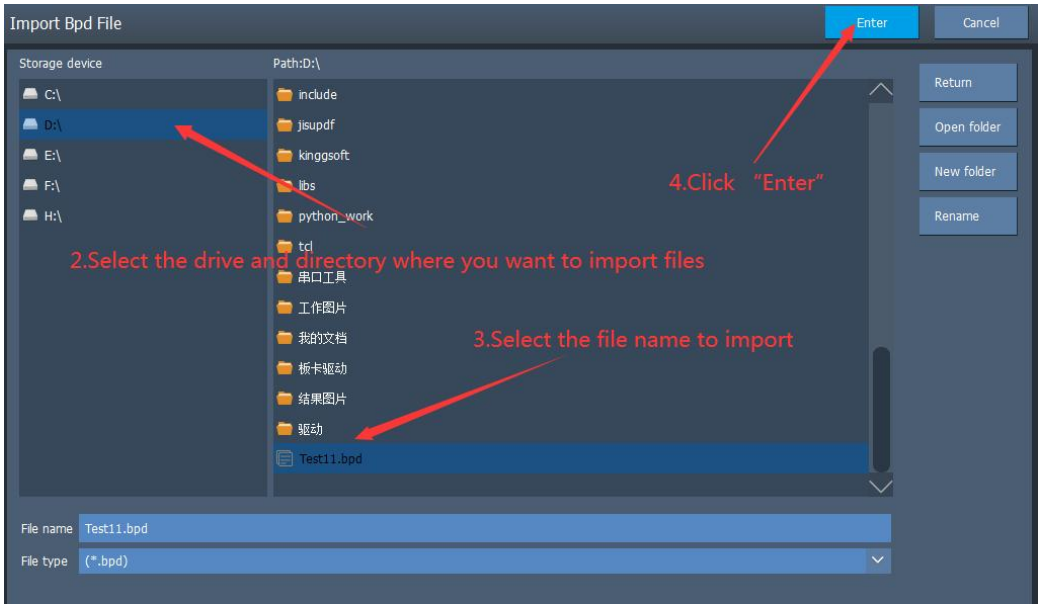

File manage
Test
Test-new
df
ds
lfy
test2
test3
test4
You can see the copied file in the file list. Double click the file name to modify it, or click "Manager" to modify it with "Rename"
New
Copy
Delete
Import
Export
Manager
管理员
Mark
Model manage
Edit
Settting

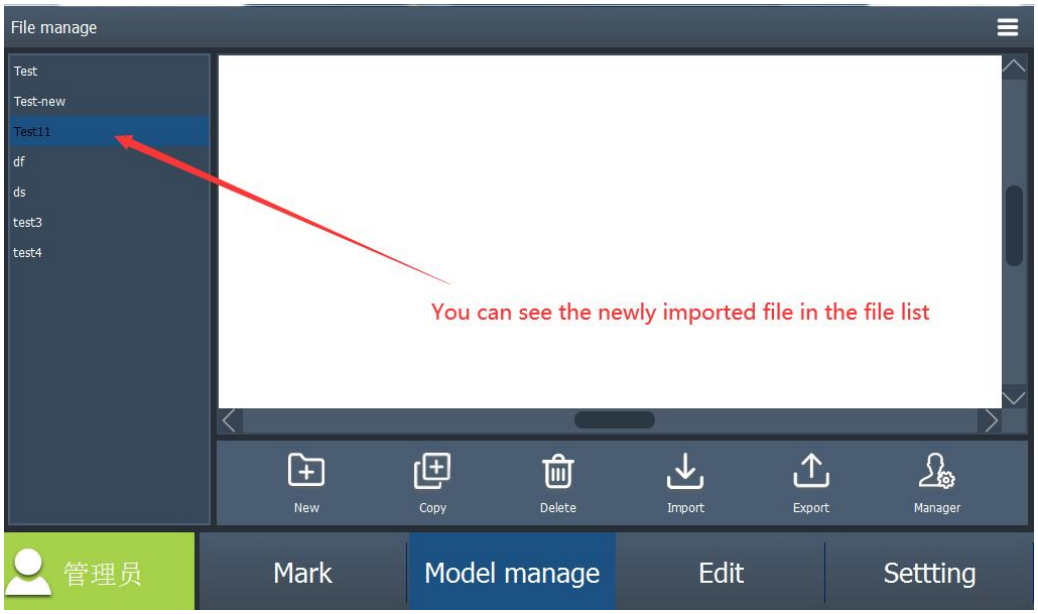
3.1.1.3. delete


File manage
Test
Test-new
df
ds
lfy
test2
test3
test4
1.Select file to delete
2.Click "Delete" to delete the file
New
Copy
Delete
Import
Export
Manager
管理员
Mark
Model manage
Edit
Settting

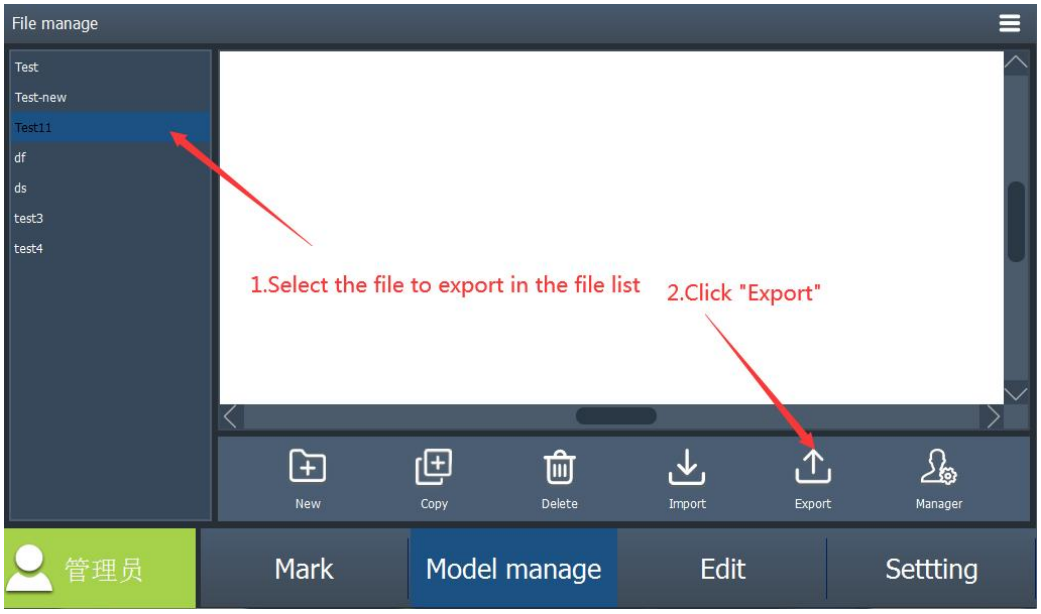
3.1.1.4. Import Files

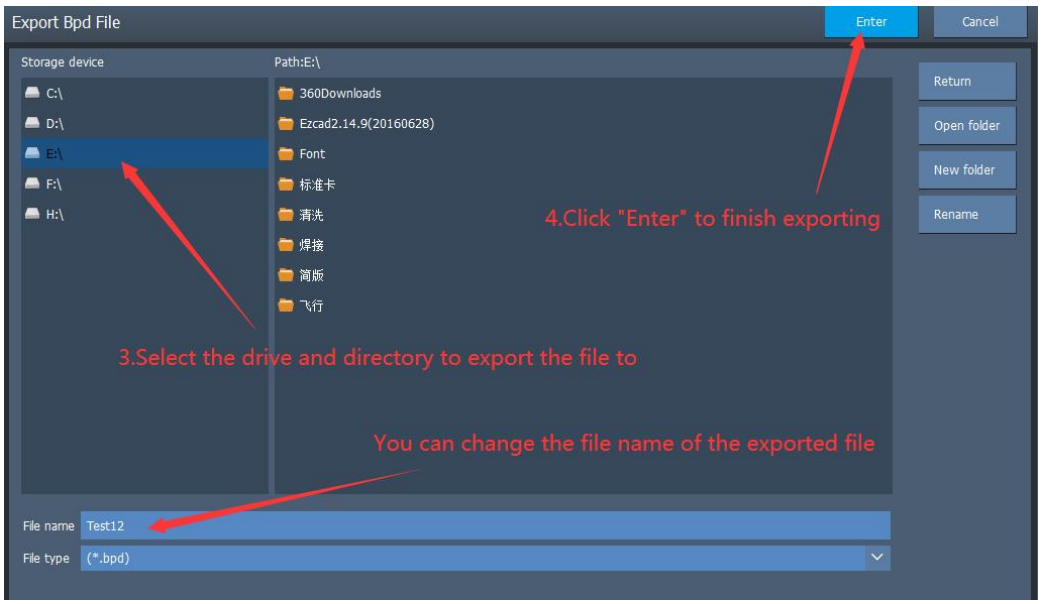




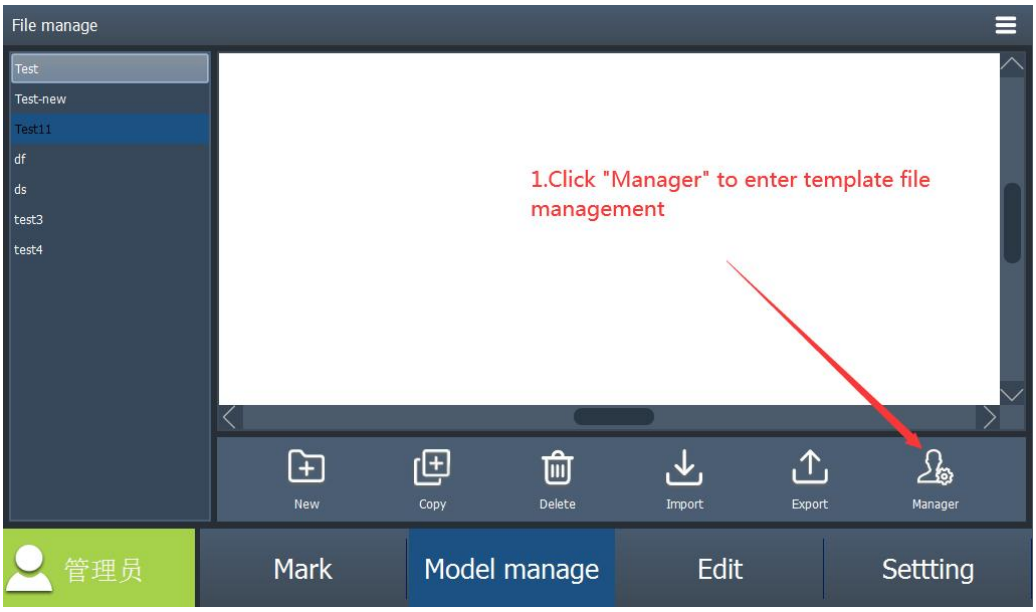


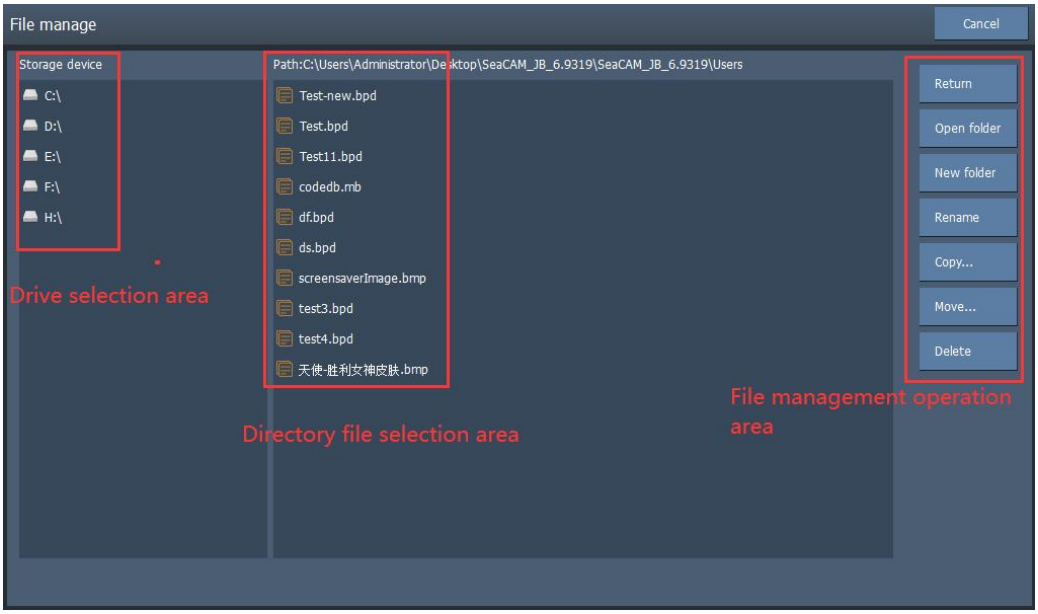
3.1.1.5. Export Files




Export Bpd File
Enter
Cancel
Storage device
Path:E:\
C:\
D:\
E:\
F:\
H:\
360Downloads
Ezcad2.14.9(20160628)
Font
标准卡
清洗
焊接
简版
飞行
Return
Open folder
New folder
Rename
4.Click "Enter" to finish exporting
3.Select the drive and directory to export the file to
You can change the file name of the exported file
File name
Test12
File type
(*.bpd)

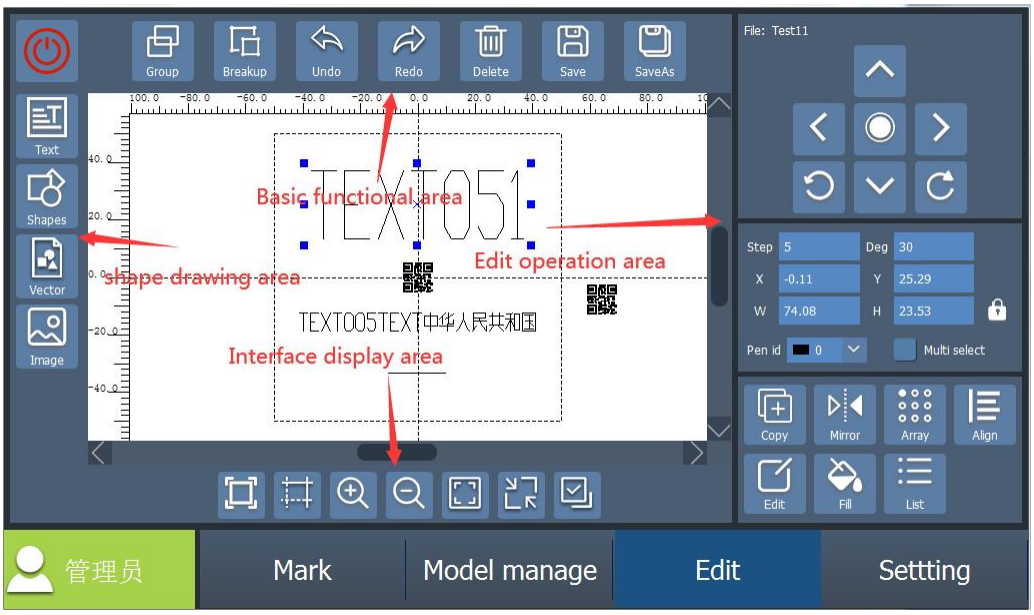
3.1.1.6. Manage


File manage
Test
Test-new
Test11
df
ds
test3
test4
1.Click "Manager" to enter template file management
New
Copy
Delete
Import
Export
Manager
管理员
Mark
Model manage
Edit
Settting


File manage
Cancel
Storage device
C:\
D:\
E:\
F:\
H:\
Path:C:\Users\Administrator\Desktop\SeaCAM_JB_6.9319\SeaCAM_JB_6.9319\Users
Test-new.bpd
Test.bpd
Test11.bpd
codedb.mb
df.bpd
ds.bpd
screensaverImage.bmp
test3.bpd
test4.bpd
天使-胜利女神皮肤.bmp
Return
Open folder
New folder
Rename
Copy...
Move...
Delete
Drive selection area
Directory file selection area
File management operation area

3.2. Editing

Editing is a functional group for drawing and editing various shapes, including drawing (text, QR code, bar code, shapes, vector graphics and pictures), editing, filling, mirroring, arraying, moving, rotating, etc.



3.2.1. Basic Functions

: Group the selected plural shapes & ungroup the selected group.

: If you are not satisfied with current operation during graphic editing, you can use “Undo” to cancel current operation and return to the previous status. After undoing the current operation, you can use “Redo” to restore the operation which has been canceled. It is one of the most commonly used function for editing.

: Delete the shape you do not need.

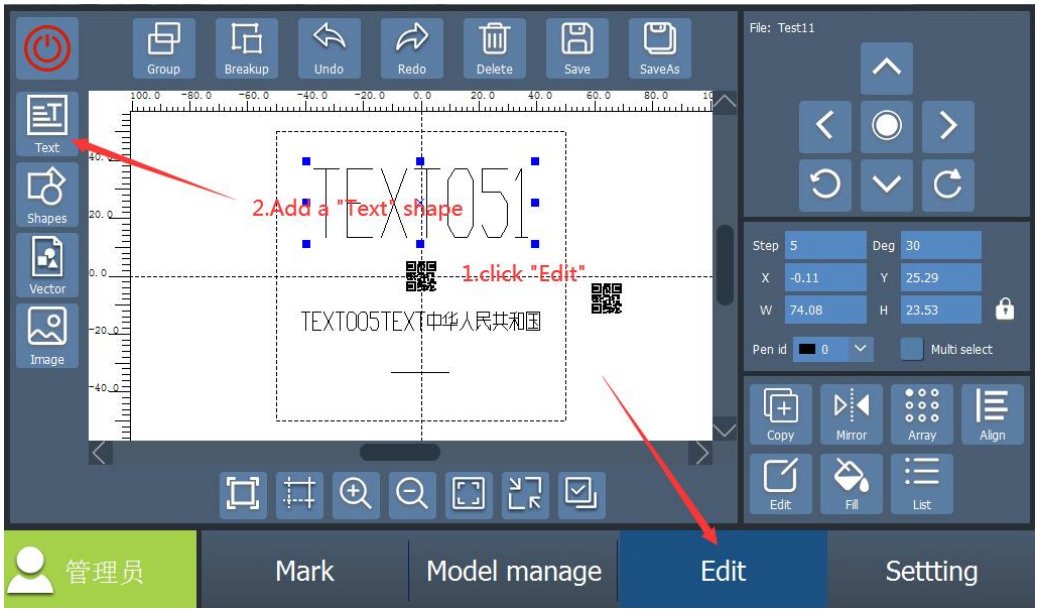
: This function can create a template file and save the current content when no template file is created. It can save the current content when there is a template file.

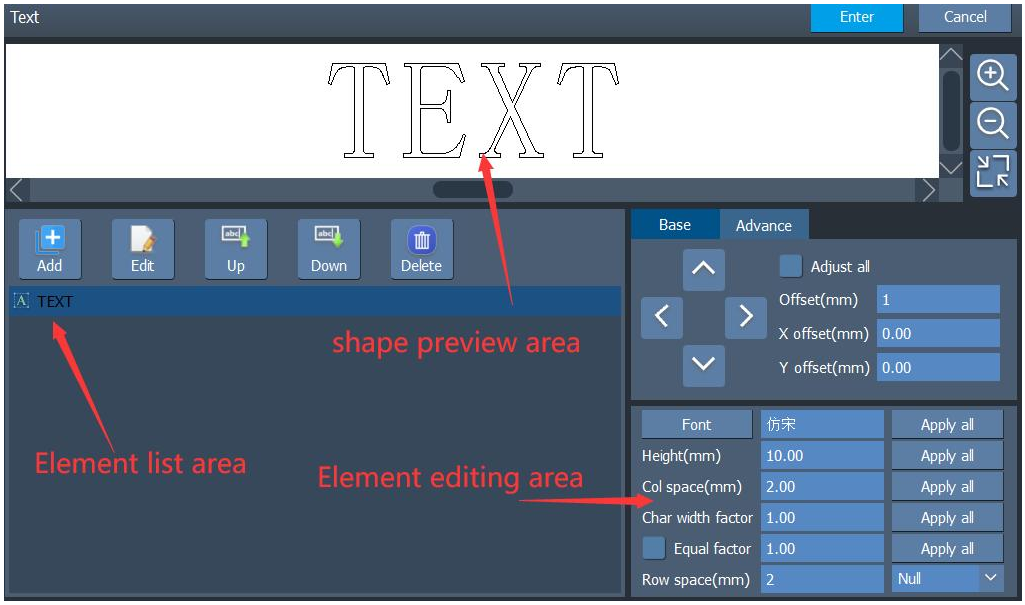
: save the current file with a different file name,generally used to save the

backup file

3.2.2. Drawing area of shape

3.2.2.1. Text shape





3.2.2.1.1. The Preview Window

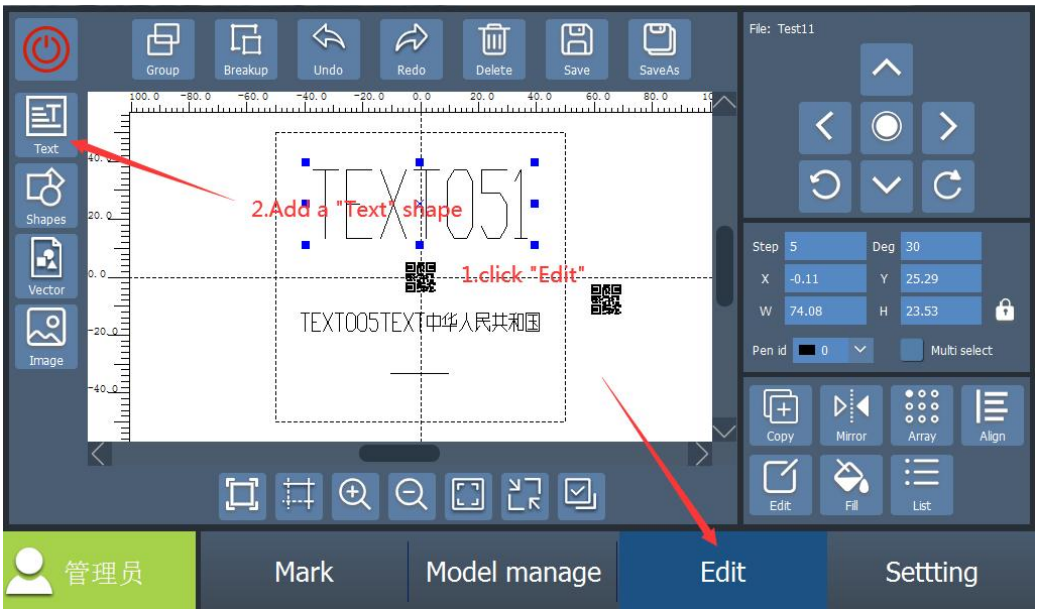
All contents of the current text will be displayed here.

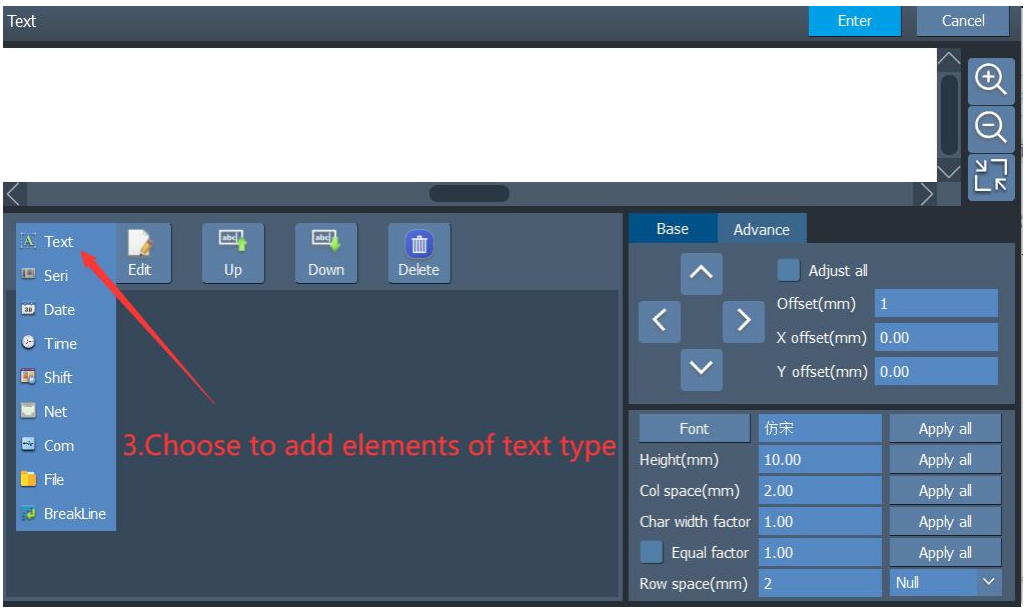
3.2.2.1.2.

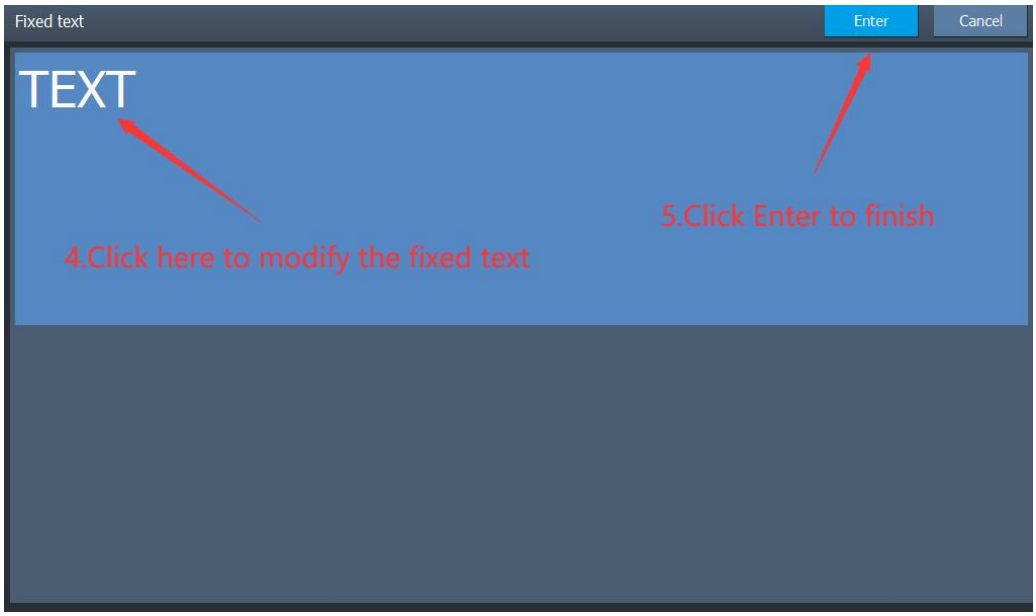
Each element in the text is displayed here. After selecting, use the edit button below to perform the corresponding operations.

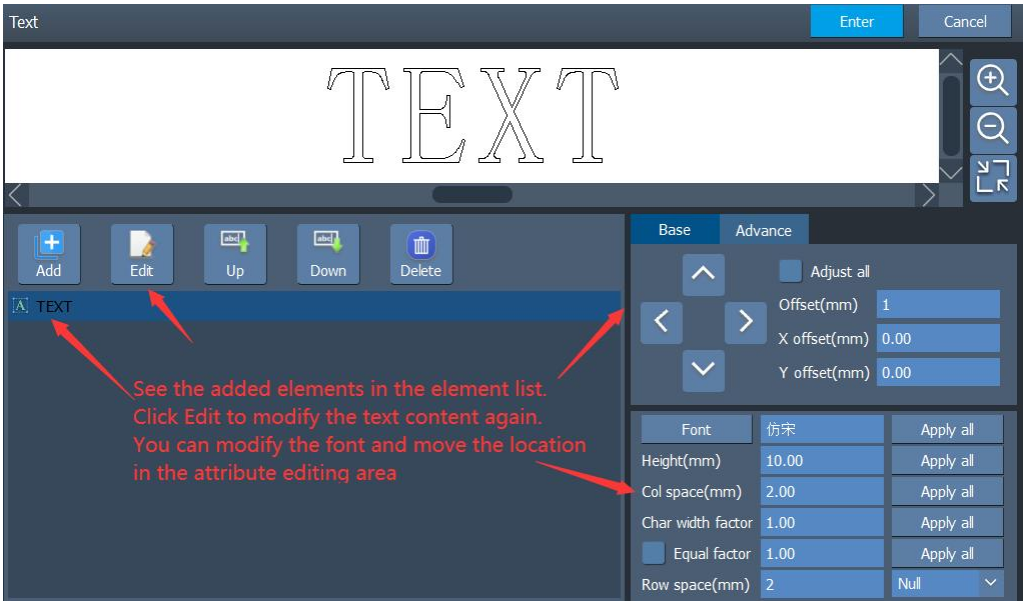
- **Add**:add a new element and press this button to edit it
- **Editing:** Select the existing element, and press the editing button to edit.
- **Move Up/Move Down:** Modify the location of the selected elements.
- **Delete:** Delete the selected elements.

3.2.2.1.3. Fixed Text



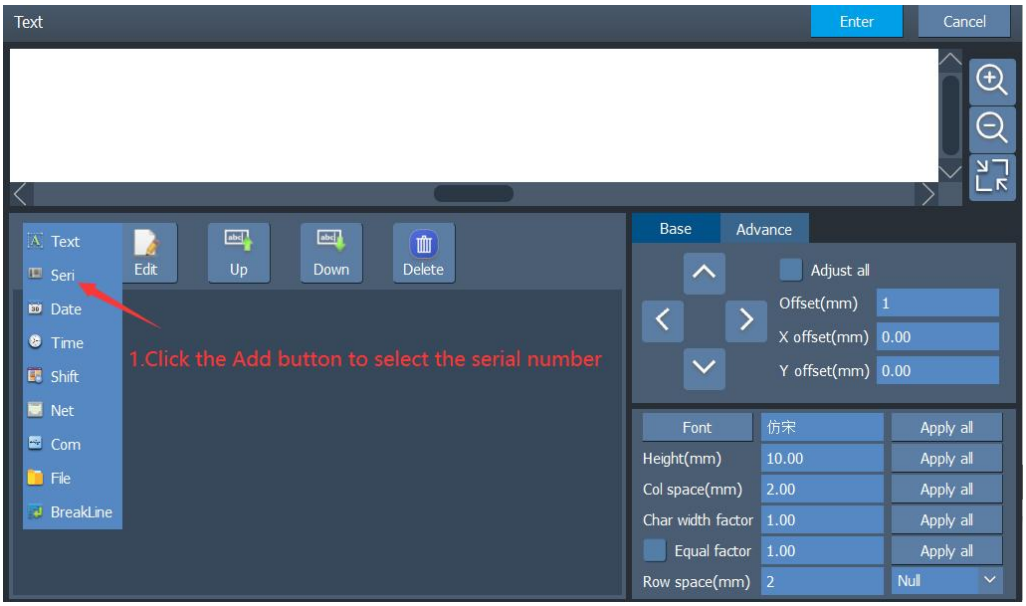

Text
Enter
Cancel
Text
Seri
Date
Time
Shift
Net
Com
File
BreakLine
Edit
Up
Down
Delete
3.Choose to add elements of text type
Base
Advance
Adjust all
Offset(mm)
1
X offset(mm)
0.00
Y offset(mm)
0.00
Font
仿宋
Apply all
Height(mm)
10.00
Apply all
Col space(mm)
2.00
Apply all
Char width factor
1.00
Apply all
Equal factor
1.00
Apply all
Row space(mm)
2
Null

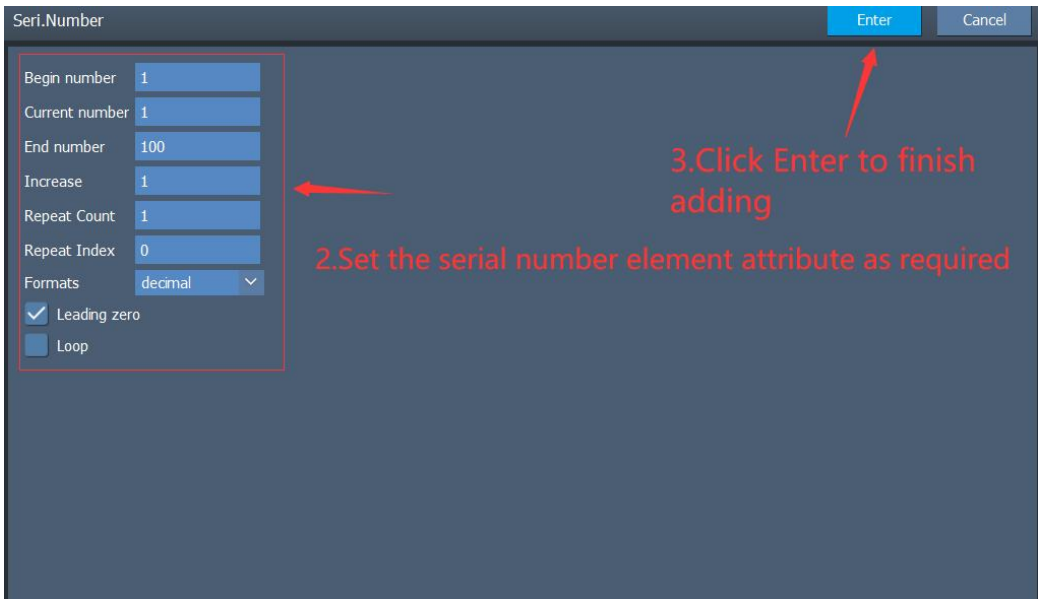

Fixed text
Enter
Cancel
TEXT
4.Click here to modify the fixed text
5.Click Enter to finish



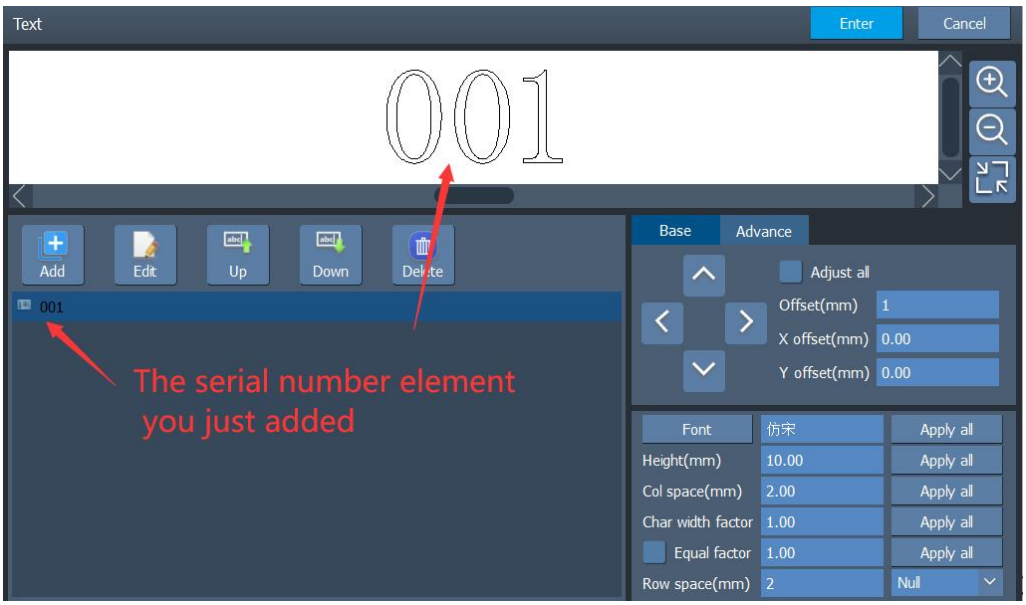
3.2.2.1.4. Serial Number

Text elements that change in fixed increments during processing, as shown below:(For the previous steps,please refer to the fixed text adding step)



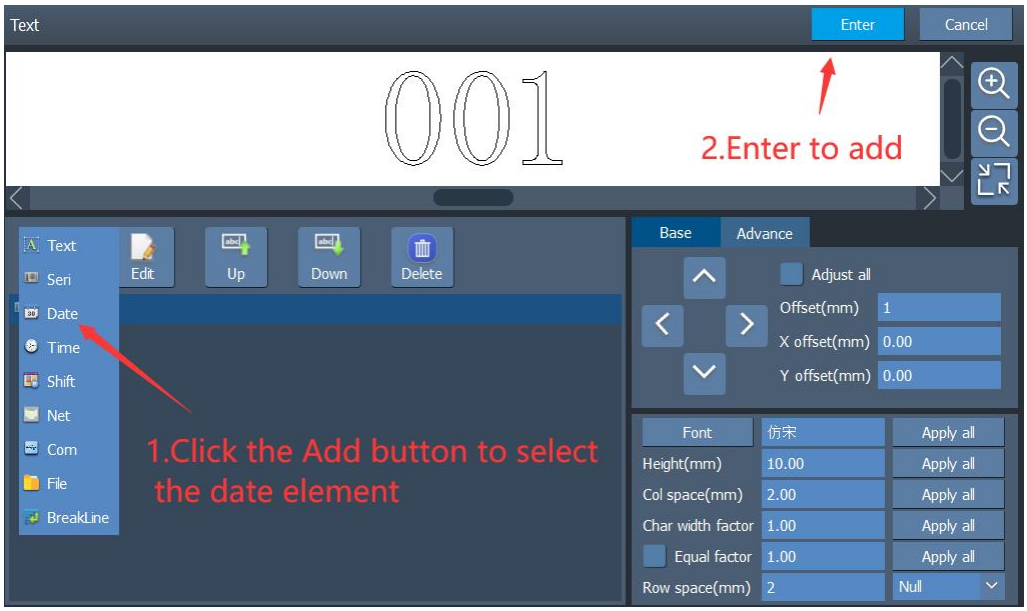


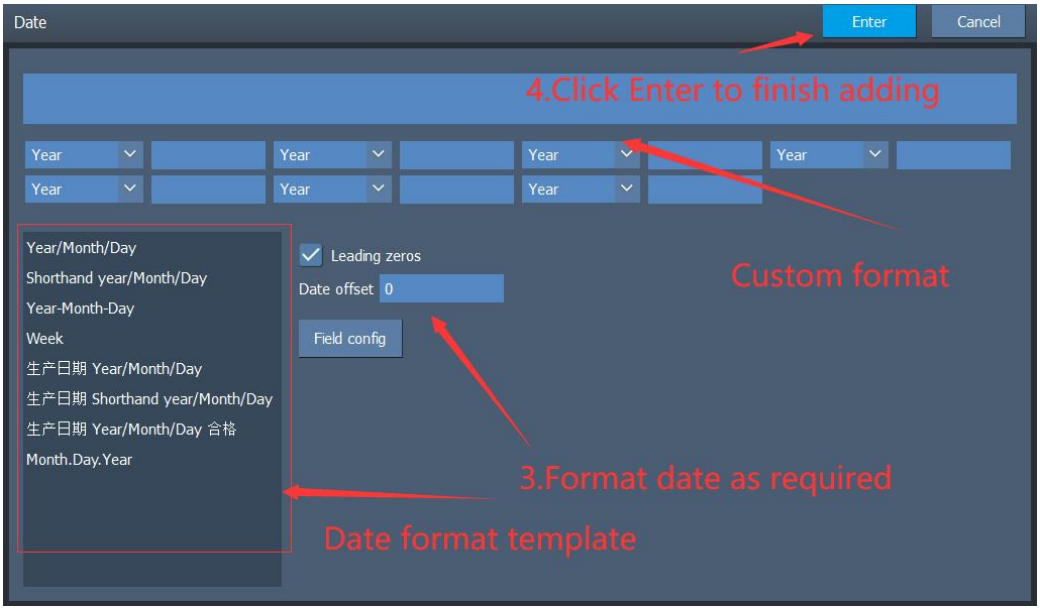
- **Starting serial number:** The digit when the serial number begins.
- **Current serial number:** The digit of the current serial number.
- **Ending serial number:** The digit of the serial number in the group. When the processed serial number is equal to the ending serial number, the serial number in the group ends the processing.
- **Increment:** The increment of the serial number of the group.
- **Number of repetitions:** Each value of the serial number of the group will become the next serial number after processed to the designated number.
- **Positional notation:** The positional notation of the serial number of the group. The default selections are decimal system, hexadecimal uppercase, and hexadecimal lowercase.
- **Leading zero:** Whether to display the complement digit 0 in front of the serial number.
- **Data cycle:** After marking the ending serial number, whether to automatically mark from the starting serial number.



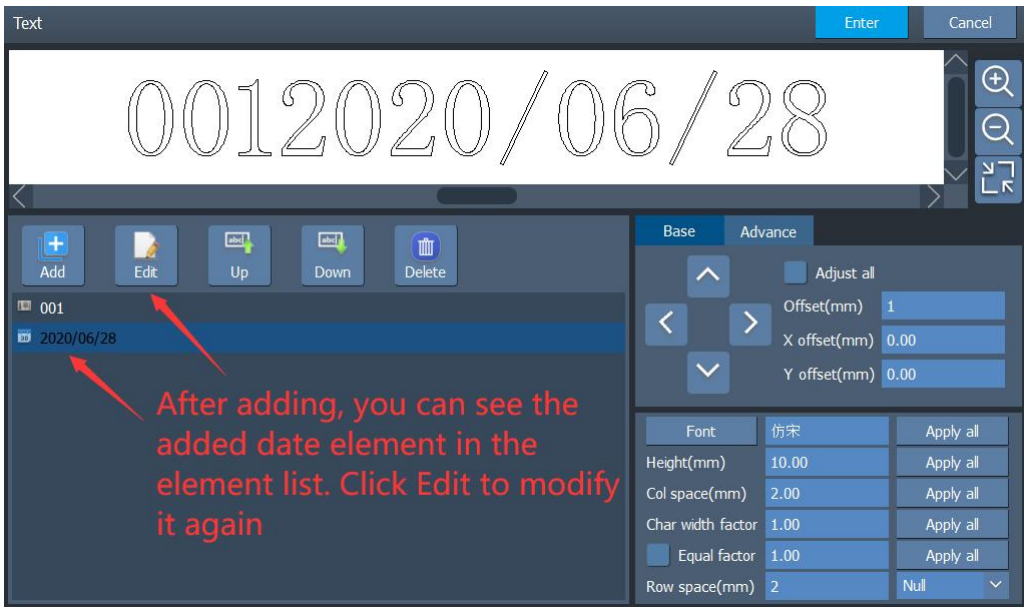
3.2.2.1.5. Date

During processing, the system automatically selects the text element of date from the computer. A variety of date formats are provided by default for selection, and the default format can be modified as shown below:



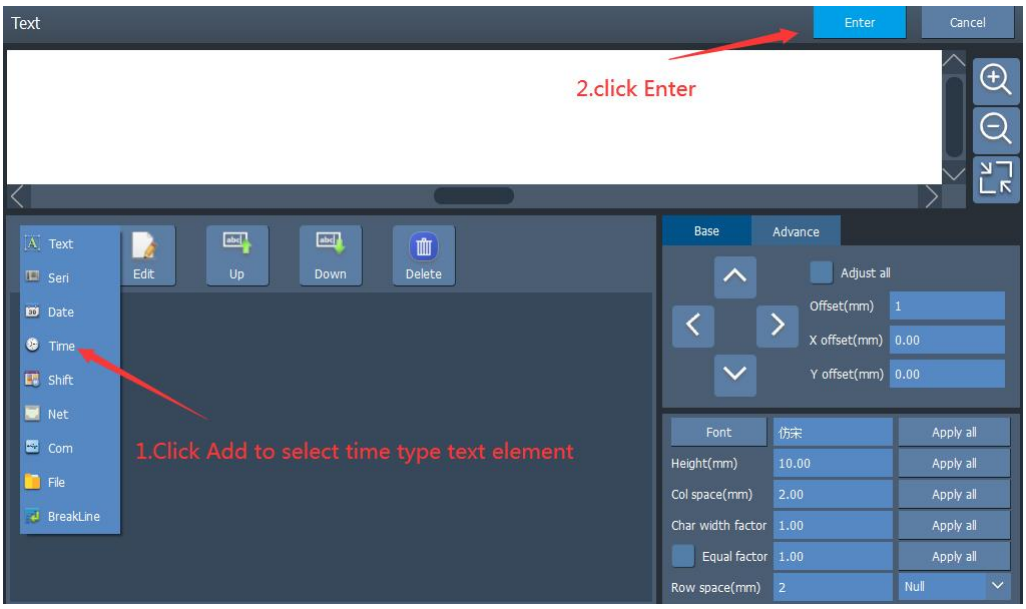


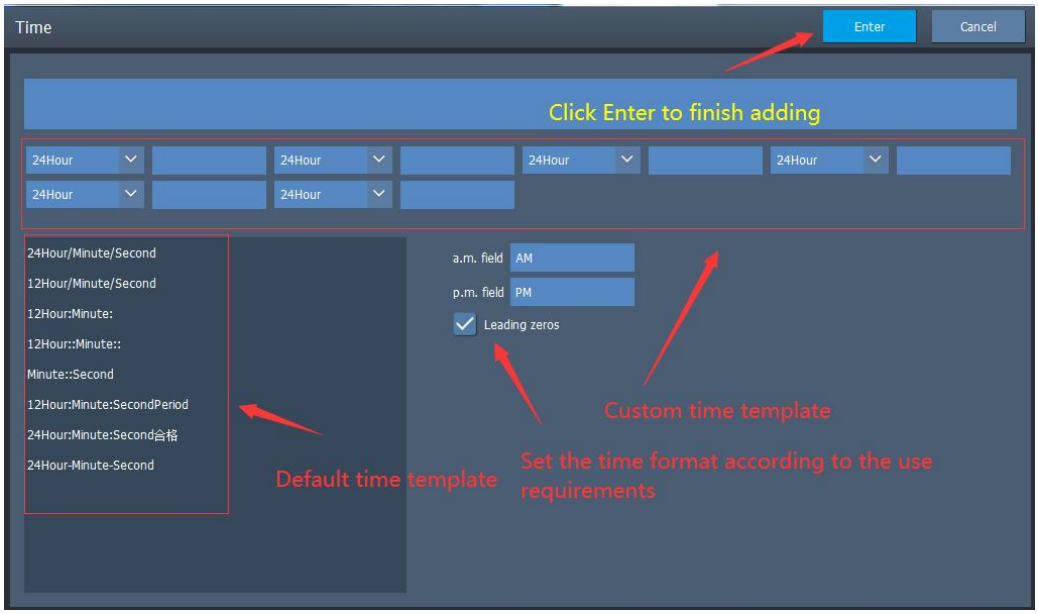
- **Preview window**: Preview the current date.
- **Default format selection**: There are multiple built-in date formats. After selection, make personalized modifications in the custom format window.
- **Numeric field setting:** Select the element to be defined in the drop-down list, and enter the content of the element in the input box.
- **Numeric field customization**: Customize the display of week and English month. For example, English week and English abbreviations of months.
- Date **offsets:** Add or subtract the value from the date to display and mark it.



3.2.2.1.6. Time

During processing, the system automatically selects text elements of time from the computer. A variety of time formats are provided by default for selection, and the default format can be modified as shown below:(For the previous steps,please refer to the fixed text adding step)

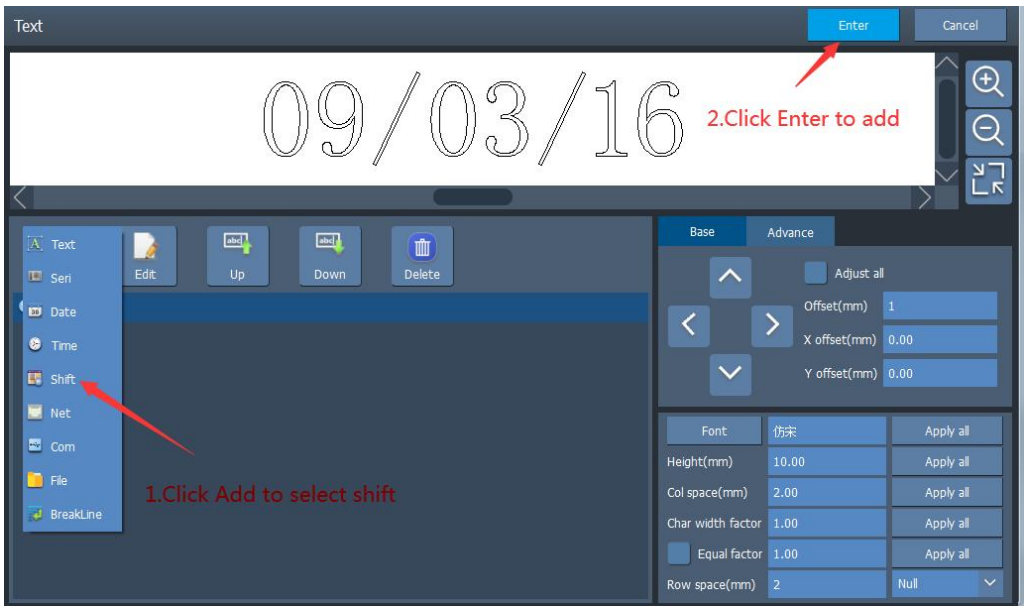


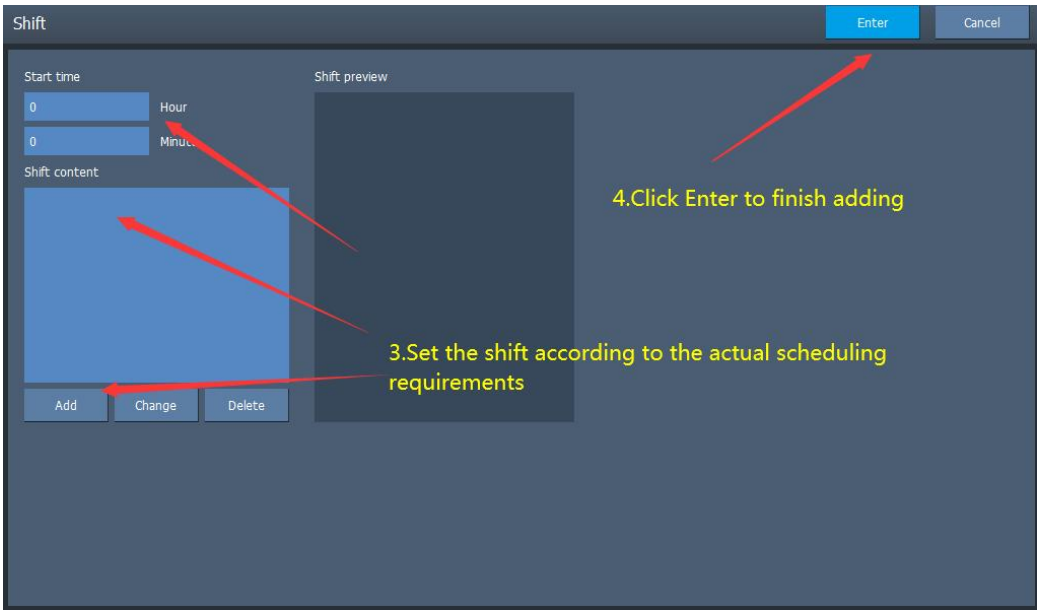


- **Leading zero:** whether to display the complement digit 0 of time.
- **Default format selection:** a variety of time formats are built-in.After selection,you can customize them in the custom format window
- **Field Customization**: drop down box select the element to be defined input box input element content
- **AM/PM numeric field:** Customize the character content displayed by time period

3.2.2.1.7. Shifts

It is used to set the shifts (equivalent to the time hopping function) as shown below:(For the previous steps,please refer to the fixed text adding step)



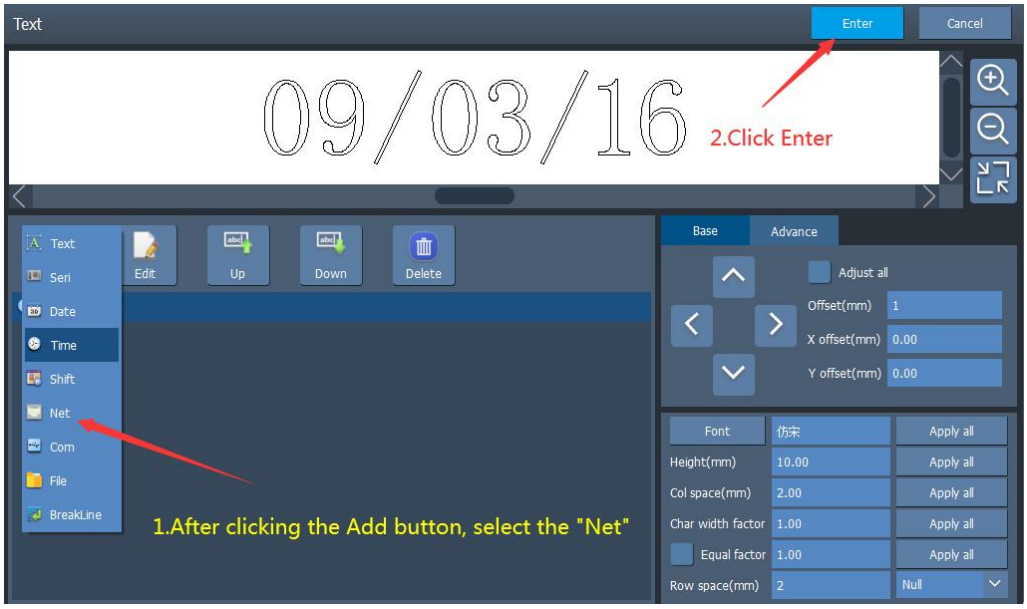


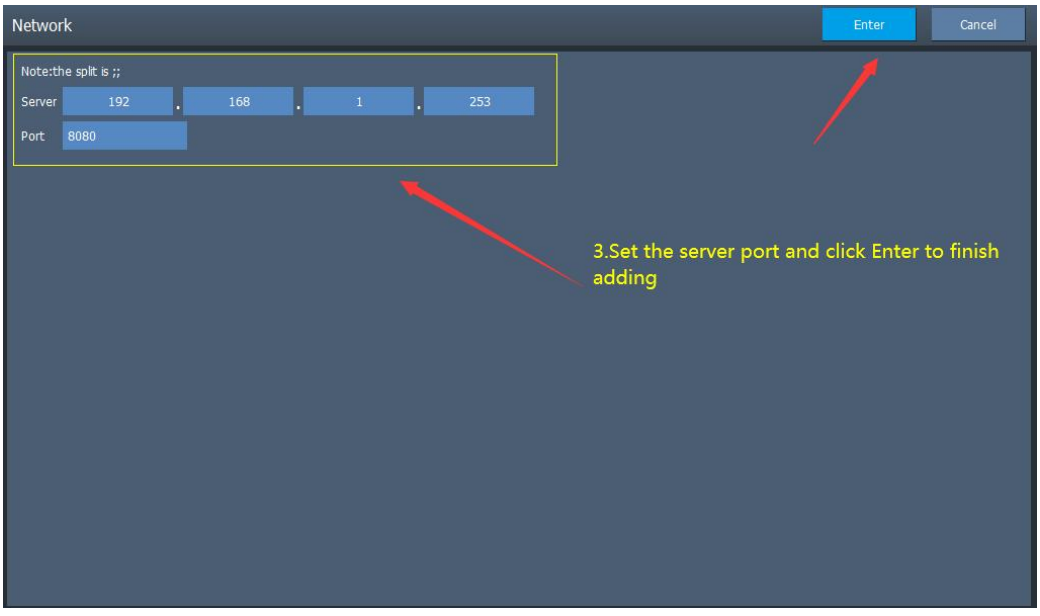
- **Starting time:** The starting time for each shift can be set to minute. When it is the set time, it will display the shift corresponding to the time.
- **Shift content:** The name and code of each shift.

3.2.2.1.8. Internet Access

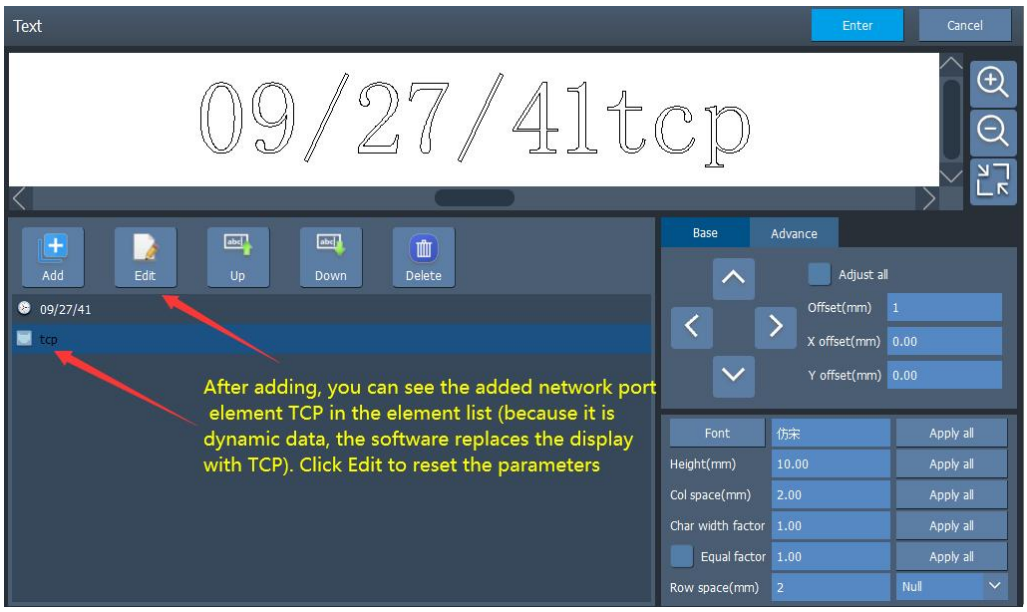
The network communication element is an element that the system automatically reads text from the network through the computer internet access

during processing as shown below(For the previous steps,please refer to the fixed text adding step)





- **Server:** The IP address of the server.
- **Interface number:** Select the interface number used for network communication.



This function is exemplified as follows:

Suppose there is a customer who needs to process 10,000 workpieces. The marking content on the workpiece is a serial number,He and another The serial number of the workpiece is one-to-one correspondence(the opposite serial number is random). so every time before processing, the customer must read real-time the content to be processed on a server (IP: 192.168.0.1, Interface number: 1000) from the local area network.such Processing together at the same time,there will be no mistakes.

1．Open the software, choose to draw the QR code, and then select the internet access. The system will pop up the dialog box as shown above. Fill the server's IP in the IP address parameter box, which is 192.168.0.1. The interface parameter is set to the interface number used for communication, which is 1000. Note: the internet access parameter must be the same as the interface parameter set on the server, otherwise it will be unable to communicate.

2．Press the "Marking" button to start processing, the high-speed fly mark system will immediately send "CMD" to the server through the internet access, and wait for the server to reply.

3．When the server finds that the internet access receives the order of "CMD",

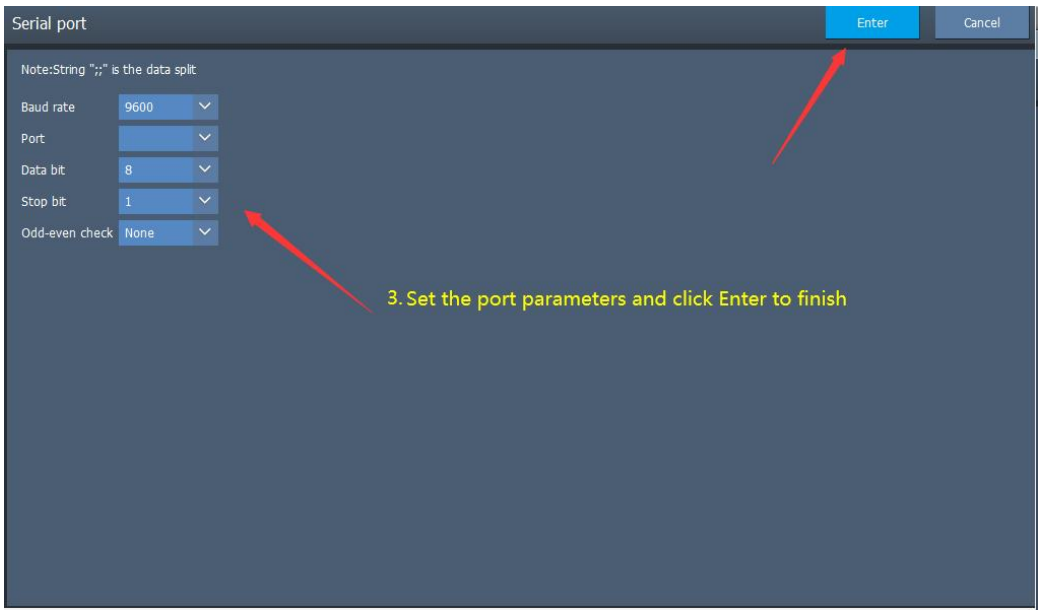
it will immediately read the database to obtain the text to be processed, and then answers the high-speed fly mark system through the internet access.

4．After the high-speed fly mark system obtains the text to be processed, it will immediately update the processed data to the work area and board.

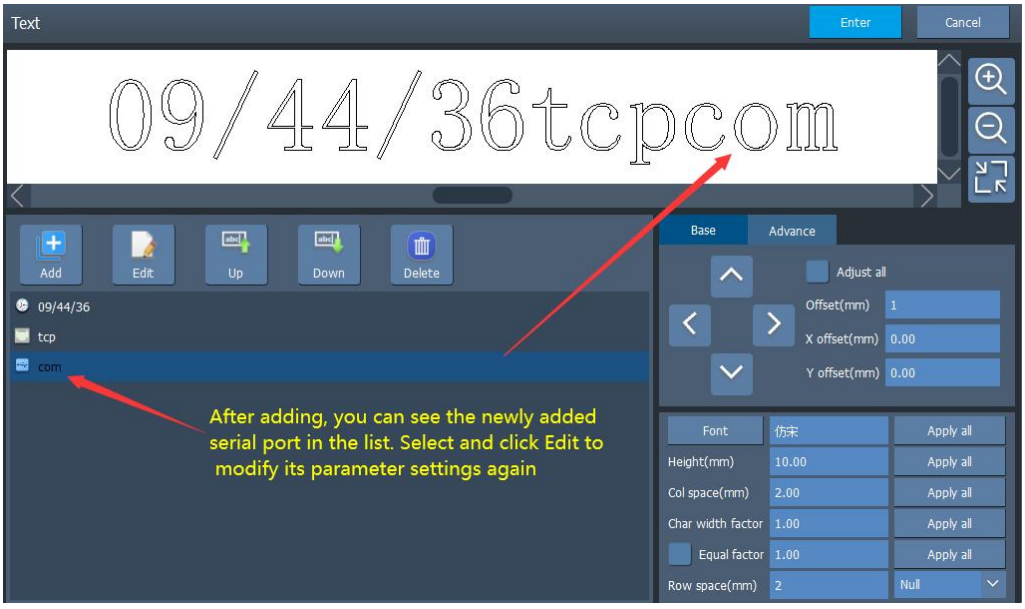
5．After the board receives the processed data, it will immediately control the mark device to process the workpiece.

3.2.2.1.9. Serial Ports

The communication element of a serial port is an element that the system automatically reads text from the peripheral through the serial port of the computer during processing as shown below:



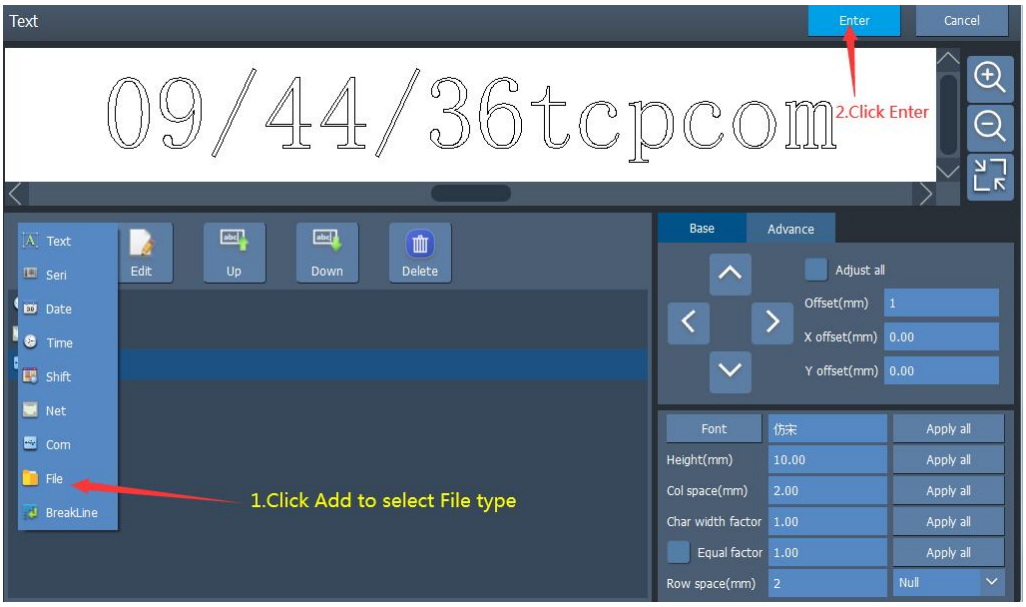
- **Baud:** Select the baud used for serial communication
- **Interface:** Select the serial port number used by the computer to connect with external devices
- **Data bit:** Select the data bit used for serial communication
- **Stop bit:** Select the stop bit used for serial communication
- **Parity:** Select the parity bit used for serial communication

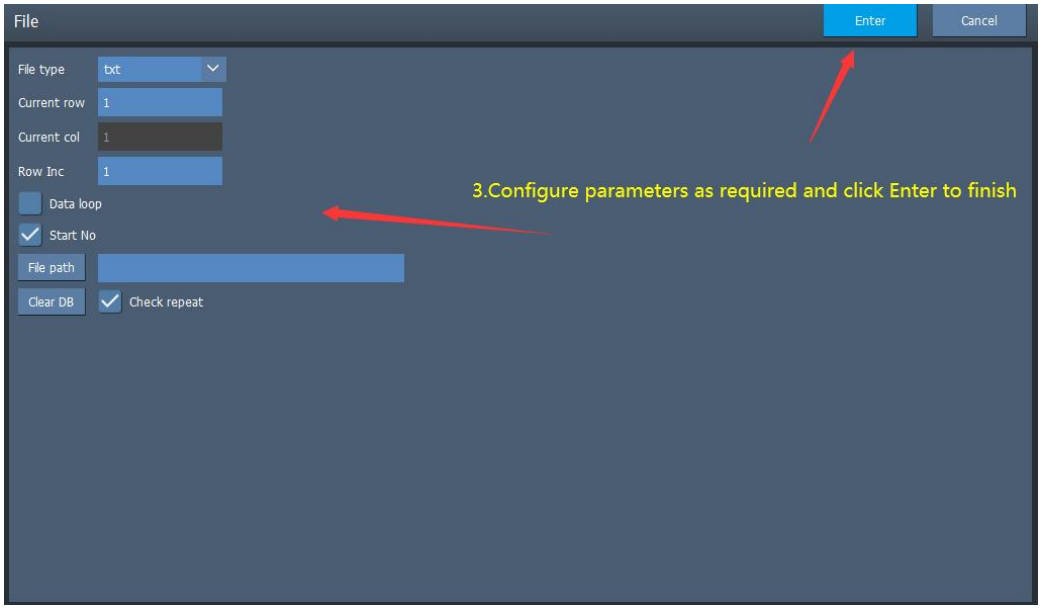


3.2.2.1.10. Files

The file element is a text element to be processed line by line from a txt or Excel file during processing as shown in Figure:

Note: The content of the file must have the same number of characters in each line, and there must be no blank lines.





File type: Select the type of associated file, support TXT and CSV

Current line number: The line from which to start reading the processed data.

Current column number: The column from which to read the processed data.

Line increment: jump a few lines at a time to read the content for marking

Data cycle: Whether to read the file again and again when reading the last line of the file.

Whether to mark the current line: Whether the content of the current line is marked. If no, mark from the next line of the current line.

File path: Specify the path of the associated file.

Clear cache: Clear files saved to prevent weight codes.

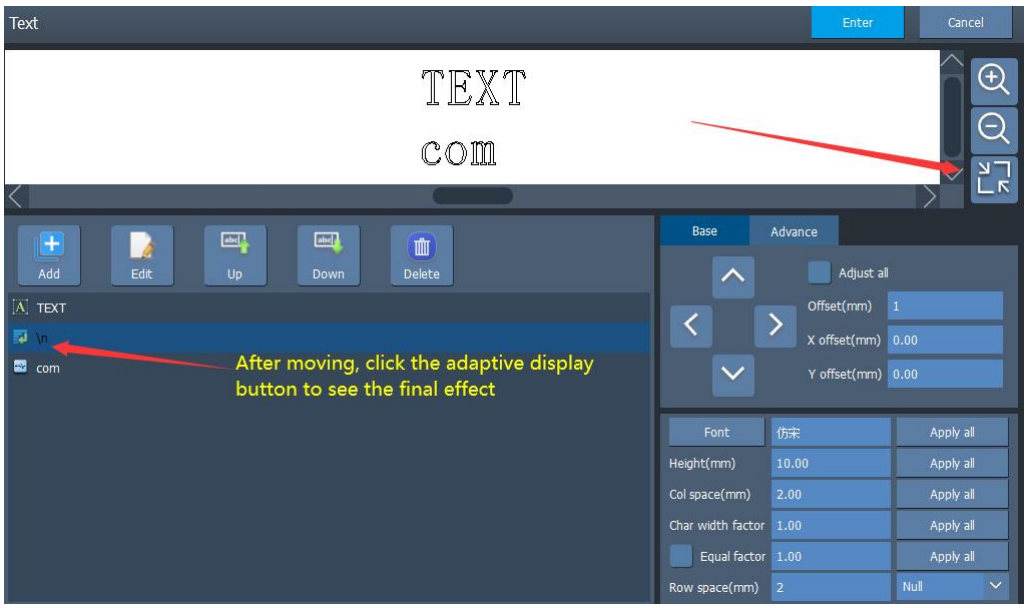
Check the weight code: After checking, stop marking if it is found the content is already marked

3.2.2.1.11. Line Break

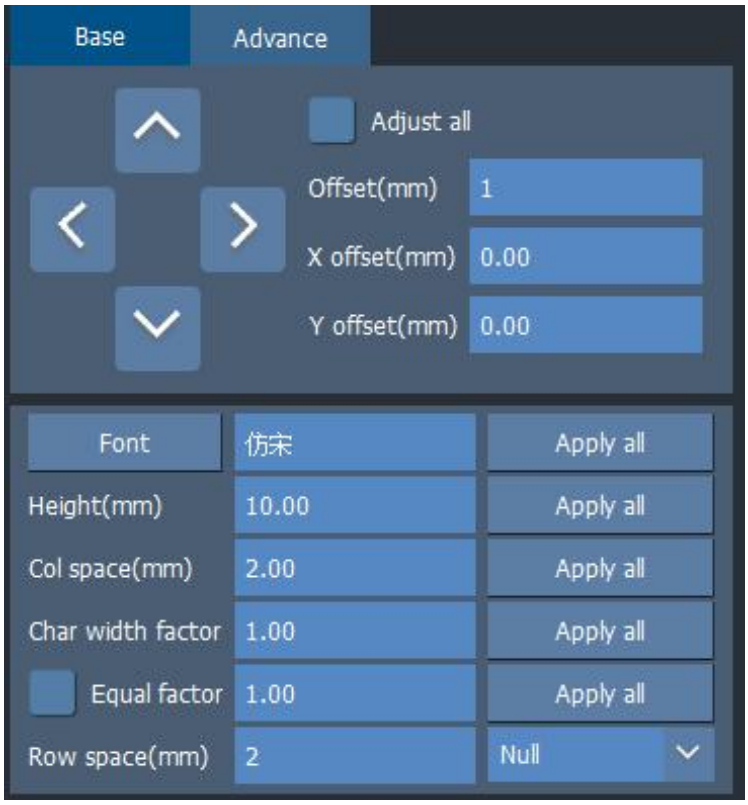
Insert a line break between two text elements in the text list to allow the two text elements to be displayed on separate lines. In the absence of line breaks, the text elements of the default text list will be all on one line.


Text
Enter
Cancel
TEXTcom
Text
Seri
Date
Time
Shift
Net
Com
File
BreakLine
Edit
Up
Down
Delete
1. Click add, select BreakLine
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font 仿宋 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
TEXTcom
Add
Edit
Up
Down
Delete
TEXT
com
\n
In the list, you can see the added breakline. Use the move up and move down to change the position of the breakline. We will move the breakline between text and com, and click Enter to finish
Base
Advance
Adjust all
Offset(mm) 1
X offset(mm) 0.00
Y offset(mm) 0.00
Font 仿宋 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



3.2.2.1.12. Basic Parameters



Font: Select the font of the text. Support single line, double lines, dot matrix, True Type font.

Height (mm): The height of font sizes.

Letter-spacing (mm): The space between letters.

Word width factor: arranges characters according to the set character width

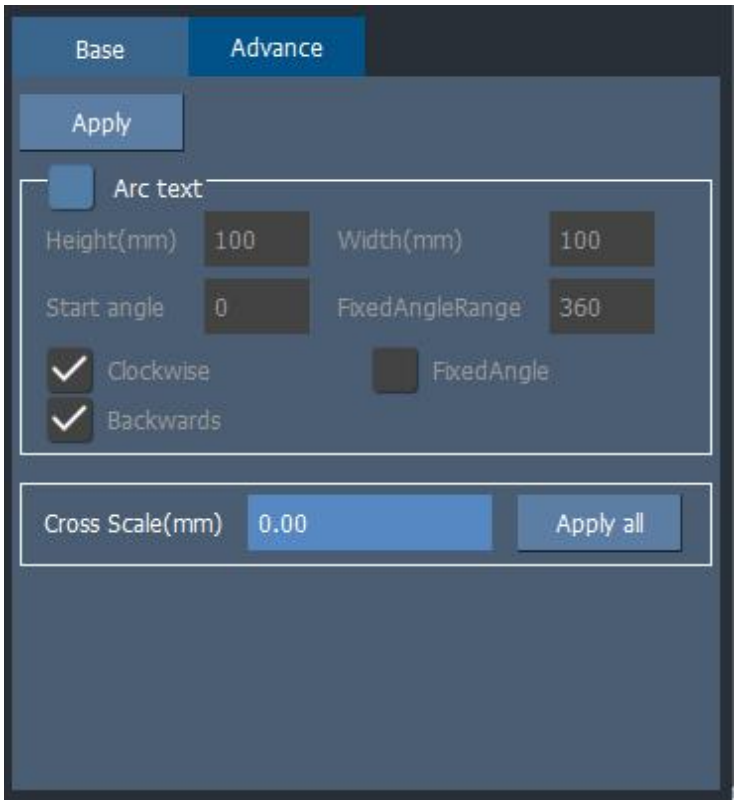
Equal width factor: arranges characters according to the set occupation width

Leading (mm): The space between adjacent lines of type.

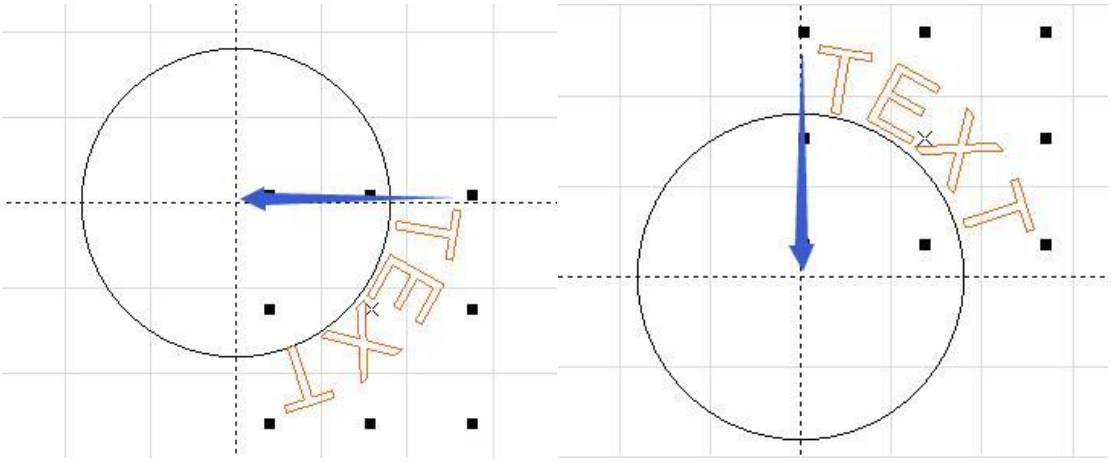
Alignment: changing the alignment of text elements

Apply all:after clicking apply all,this parameter will take-effect on the text of all elements in the element

3.2.2.1.13. Advanced Parameters

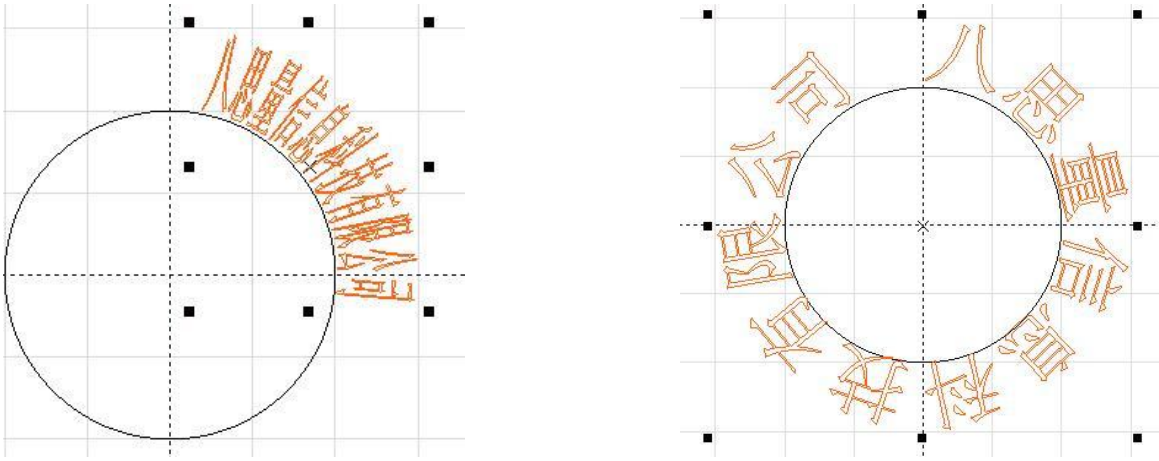


- **Application:** let the advanced parameters take effect immediately.
- **Arc fonts:** Whether to allow the current arc function to take effect.
- **Width/Height:** If the width and height are the same, it is equivalent to the diameter of the arc, and if they are not the same, it will become an elliptical arc.
- **Start angle:** The benchmark of text alignment, with the leftmost side of the text as the start angle as shown below:



On the left the benchmark angle = 0, on the right the benchmark angle = 90.

- **Fixed angle:** If this parameter is selected, no matter how many characters are entered, the system will limit the text in a certain angle.



On the left, the angle range is limited,

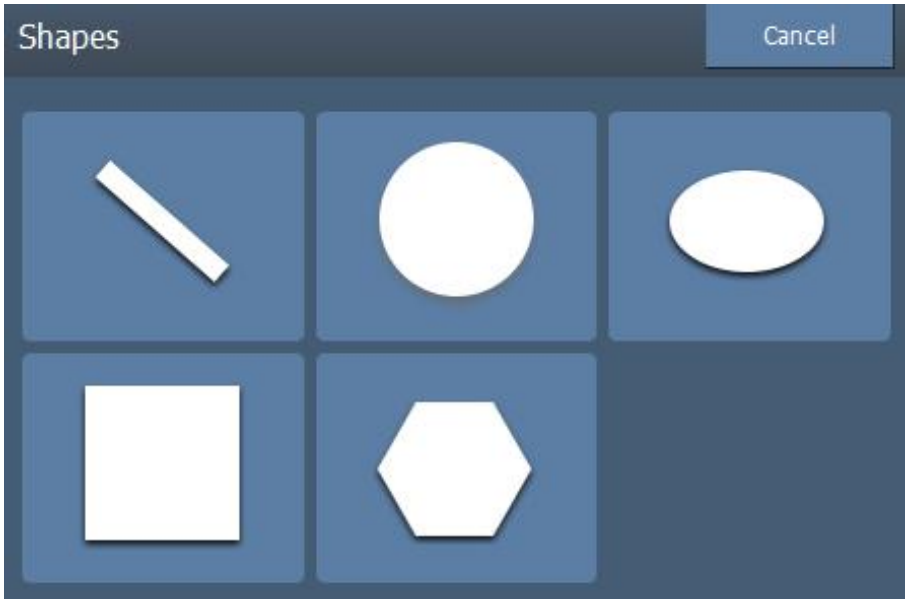
and on the right, the angle range is not limit.

Clockwise: Arrange the string in a clockwise direction after arcing.

Text outward: Mirror the string in the Y direction of the string.

3.2.2.2. Shapes

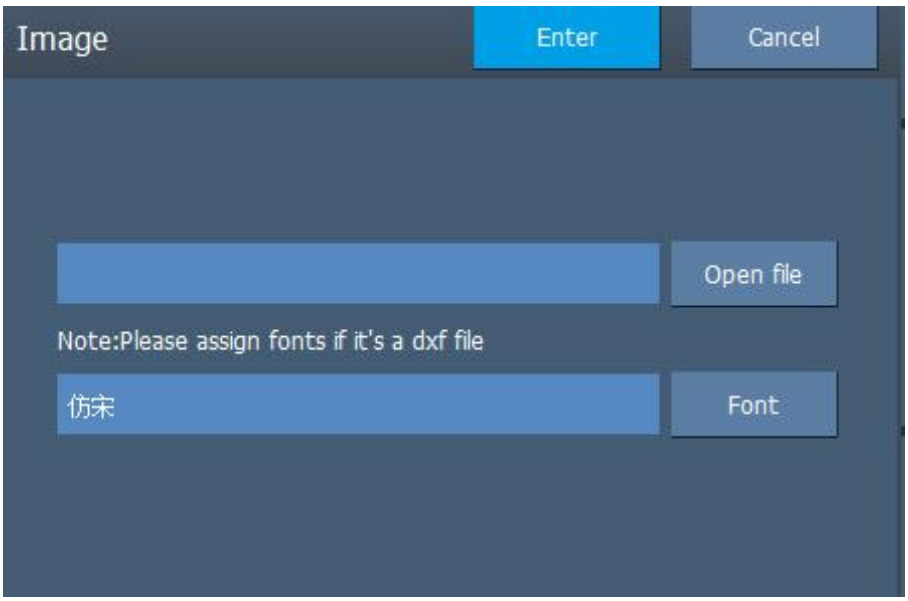
Used to draw straight lines, circles, ellipses, dots, polygons, rectangles and triangles as shown below:



- **Polygon**: Draw a polygon with customized edge number.\

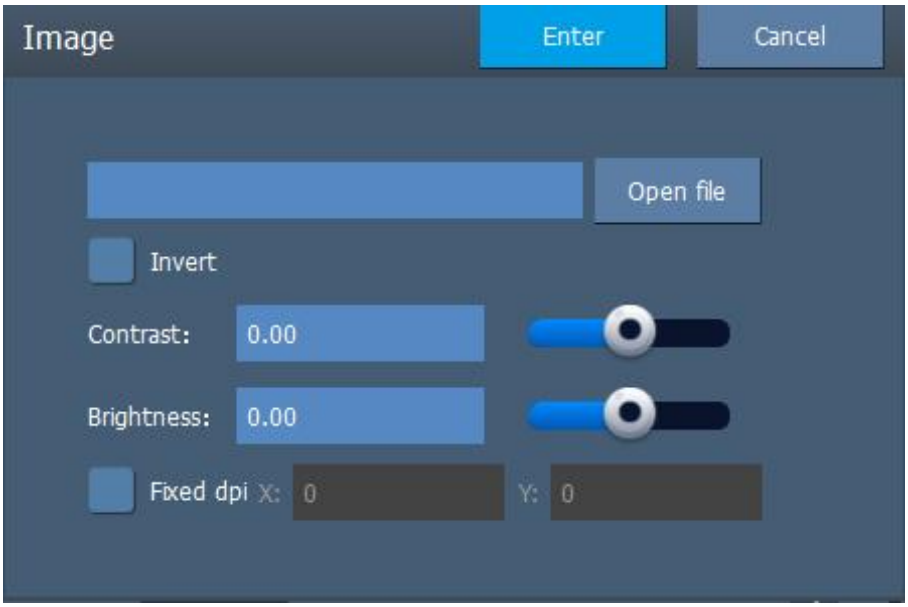
3.2.2.3. Vector Graphics

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



3.2.2.4. Bitmap

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



Reversal: Marking on dark or light materials can be converted by ticking this option.

3.2.3. Interface Functions

 : Maximize the display of the work area.

 : Hide the range box in the work area, the center cross.

 : Zoom in or zoom out the display of the work area.

 : Restore the default display size of the work area.

 : Maximize the currently selected shape.

 : Select all shapes in the work area.

3.2.4. Editing Functions

- 、 、 、 **and Step (mm):** Move up, down, left, and right to carry out movement of shape and the movement distance is the step length.
- : Click Center can directly put shape at any position in the center of work area.
- **Angle, left rotation and right rotation:** Click Left Rotation or Right Rotation to rotate shape. The angle of each rotation is the angle (°) parameter.
  - **Pen number:** Each object needs a pen when marking. The first pen is chosen by default. In order to distinguish different pens, we define different colors for different pens. Pen list is edited in the setting of pen list.

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

- **Mirror**

  - **Proportion:** Set the percentage of the X-axis and Y-axis of mirroring object and original object.
  - **Mirror mode**: Click it to switch between different mirror modes of horizontal mirror, vertical mirror and diagonal mirror.
  - **Position of datum point:** Set the position of mirroring datum point of mirroring object and original object.

- **Array**

  - **Number of horizontal/vertical arrays**: The number of horizontal or vertical arrays when arraying.
  - **Horizontal/vertical increment:** The space between horizontal or vertical shapes after arraying.
  - **Direction**: Switch the marking order of the array to horizontal or vertical.
  - **Mode:** Switch the shape marking arraying method to unidirectional or

bidirectional

- **Alignment:** Arrange the selected plural shapes according to the selected alignment mode.

- **Edit:** Modify the content of selected shape (text, QR code, bar code)

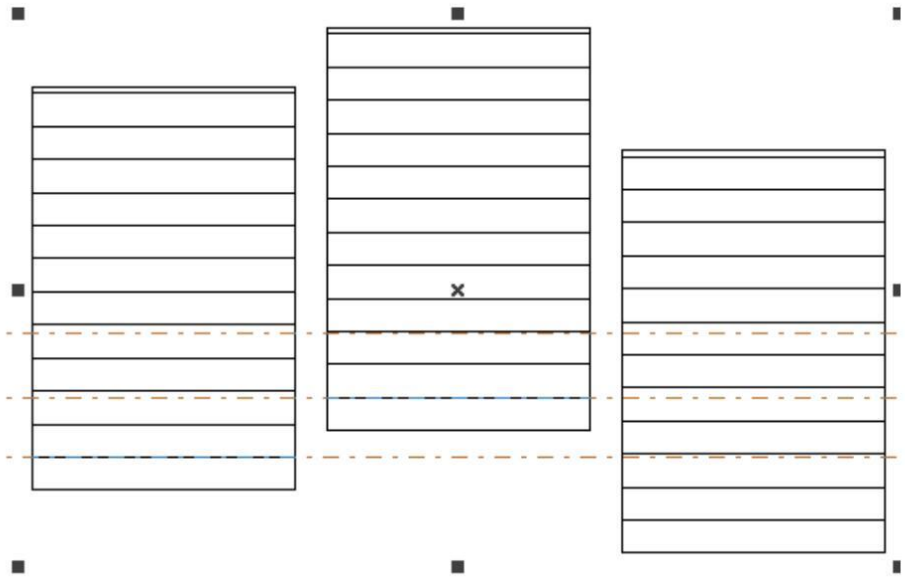
- **Fill:**
  - **Fill:** Fill can carry out filling of the designated graph. The graph to be filled must be closed curve, as shown below:

  - ◆ **Enable filling:** Allow current filling parameter to be valid or not.
  - ◆ **Enable outline:** Whether to display and mark the outline of original graph or not. That is, filling graph maintains original outline or not.
  - ◆ **Whole computing**: It is an optimal option. If you select the option, take all the objects which do not contain each other as a whole for calculation during filling calculation. It will increase the marking speed under some circumstances. (If you select the option, the

computer computing speed will be reduced), otherwise, calculate each independent area respectively. For the convenience of description, we take a special example to describe the function.

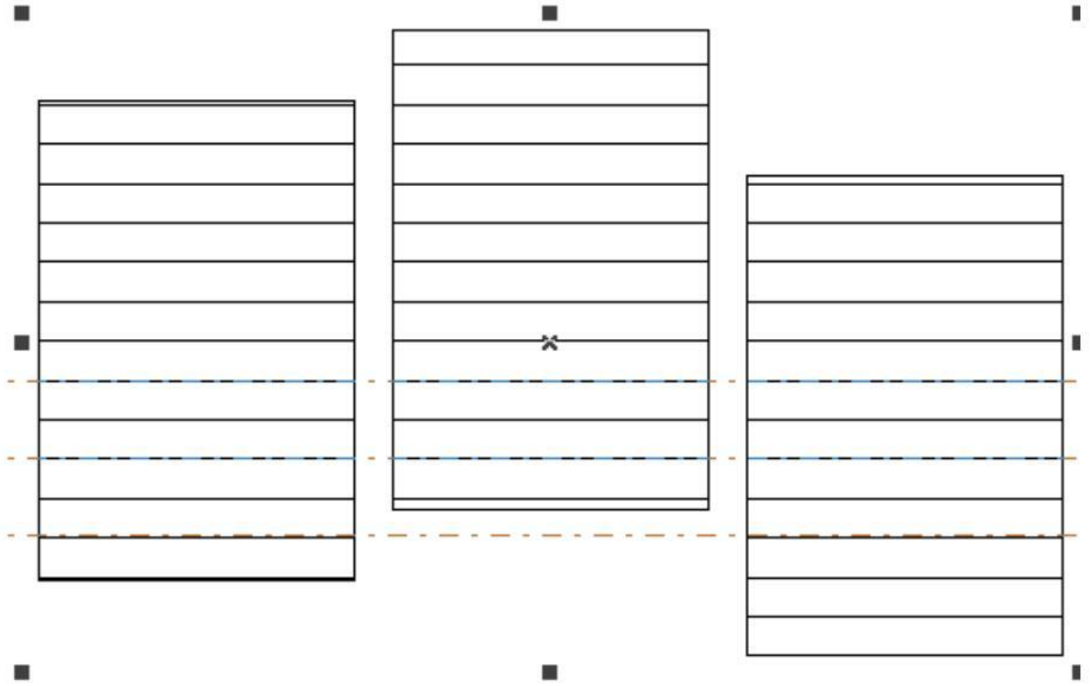
Example: Draw three independent rectangles in work space, with fill line space of **1mm** and filling degree of 0°. **Do not tick "Whole Computing":** mark the fill lines according to the marking sequence in the list of objects during processing. That is, mark the filling graph of an object, and then mark the next one, as shown below:

◆



Do not tick "Whole Computing"

◆ **Tick "Whole Computing"**: Mark all the fill lines during processing. That is, mark the fill lines of several objects at the same line together, as shown below:



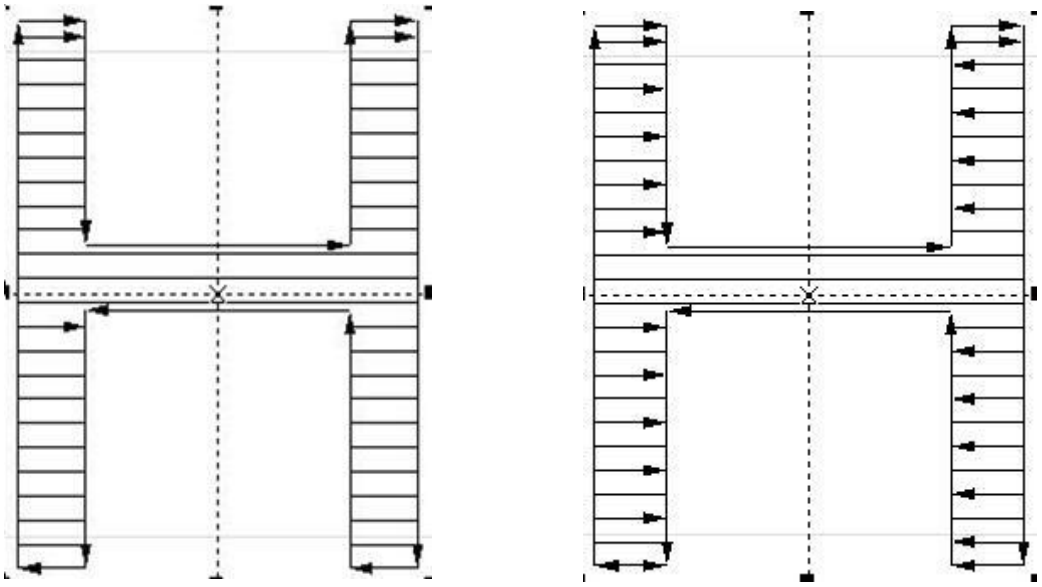
Tick Whole Computing

- **Average Fill line:** Solve uneven distribution of fill line at the beginning and end of filling object. Due to the settings of size and fill line space of filling object, there may be the phenomenon of uneven distribution of fill line at the beginning and end of filling object after filling. For simplifying operation, and reaching the purpose of even distribution of all the fill lines under the circumstance that the user will not reset line space, add the function. After selecting the option, the software will implement automatic fine adjustment of fill line space on the basis of fill line space set by the user, so that the fill line is distributed evenly.
- **Roll round:** Increase an outline graph around fill line after completion of filling calculation.

Filling Types

-  **Optimizing bi-directional filling:** Similar to bi-directional filling, but there is connecting line between ends of fill line.

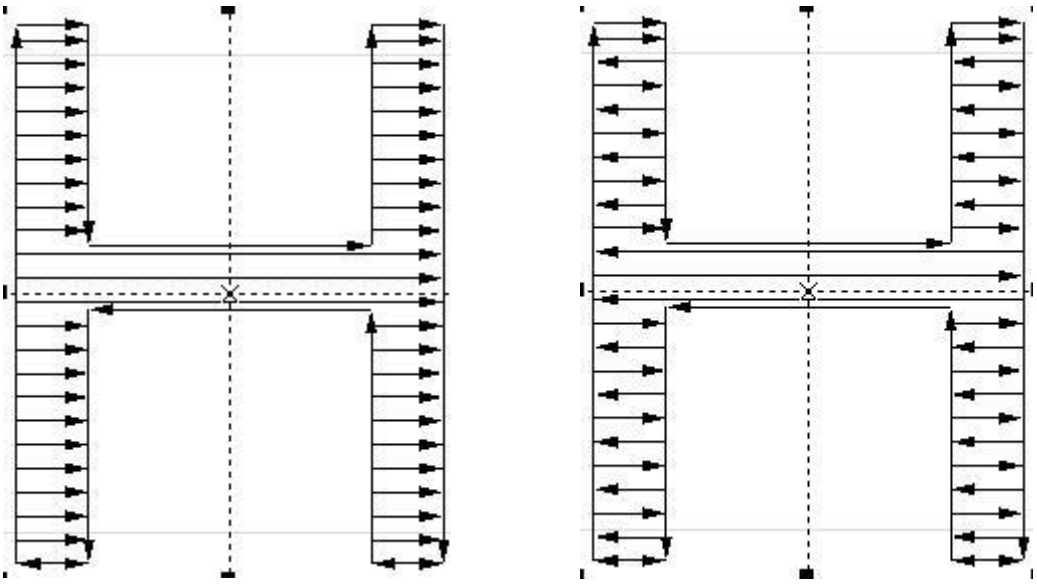
-  **Optimizing arch filling:** Similar to arch filling, jump the area with blank object.



Optimizing Bi-directional Filling on the left, Optimizing Arch Filling on the right

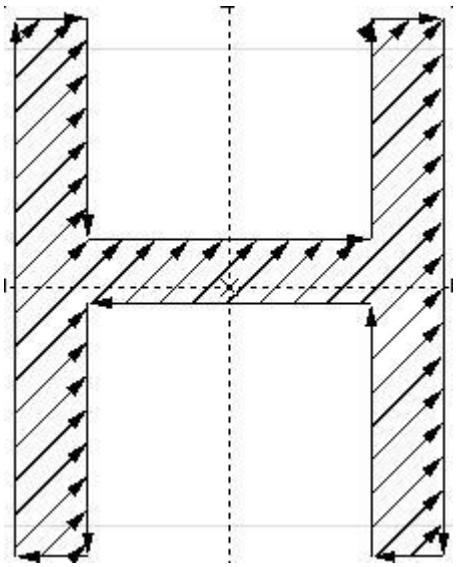
-  **One-way Filling:** Fill line from left to right.

-  **Bi-directional Filling:** Fill line from left to right firstly, and then fill line from right to left. The remaining line implements circular filling.



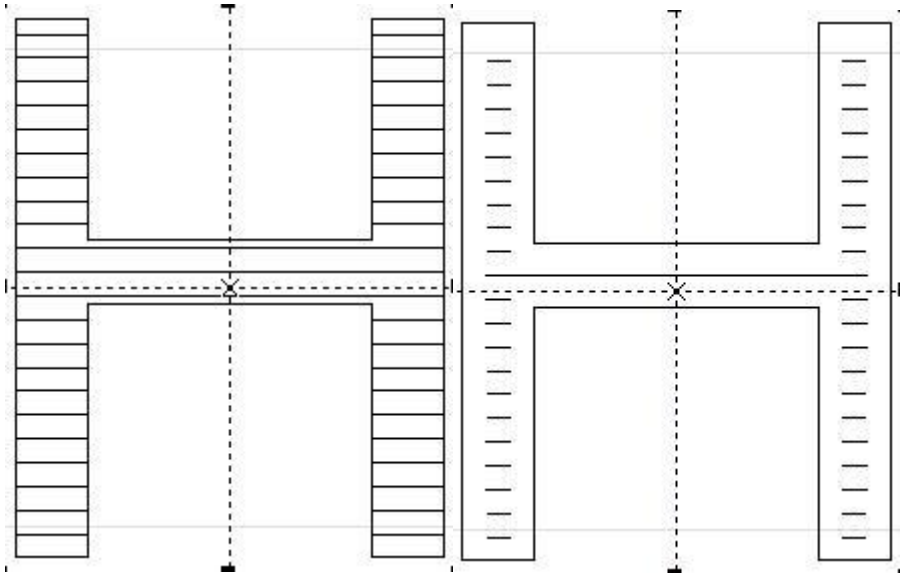
One-way Filling on the left, Bi-directional Filling on the right

- **Line space (mm):** refer to the distance between neighboring lines of fill line.
- **Start offset (mm):** refer to the distance between the first fill line and boundary.
- **End offset (mm):** refer to the distance between the last fill line and boundary.
- **Filling Angle (°):** refer to the included angle between fill line and X axis. The filling graph with filling angle of 45°is shown below:



filling angle of 45°

- **Edge Distance:** refer to the distance between fill line and outline object during overall filling calculation. As shown below, the distance between fill line and all the edges of object is edge distance.
-



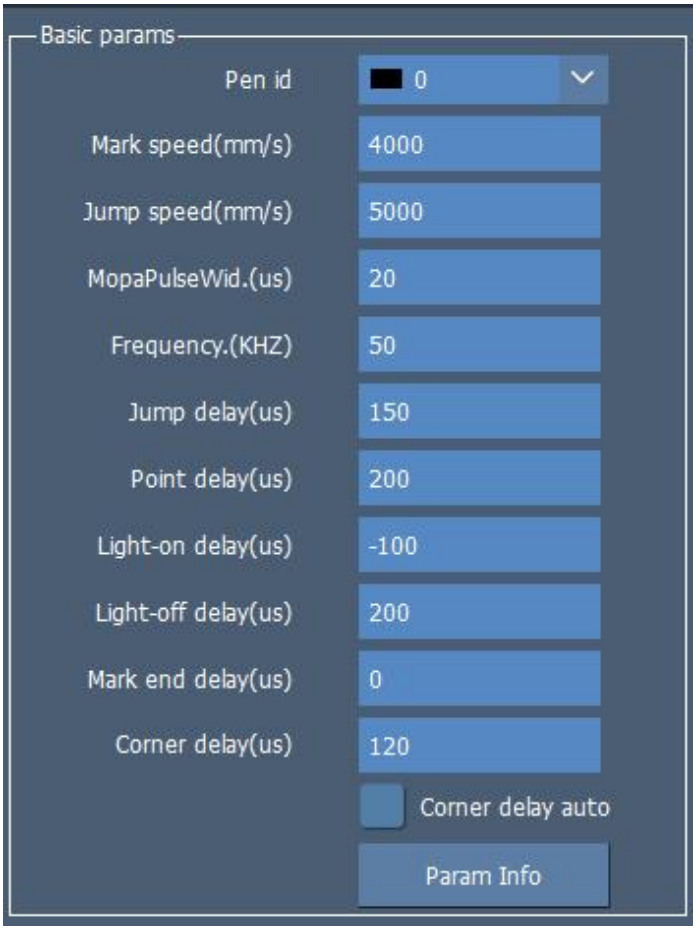
Edge Distance Example

- **List:** Sort and manage the graphs in the list (the marking order is from top to bottom in the list), or delete it.

3.3. Settings

3.3.1. Coding parameters

- **Basic Parameters**

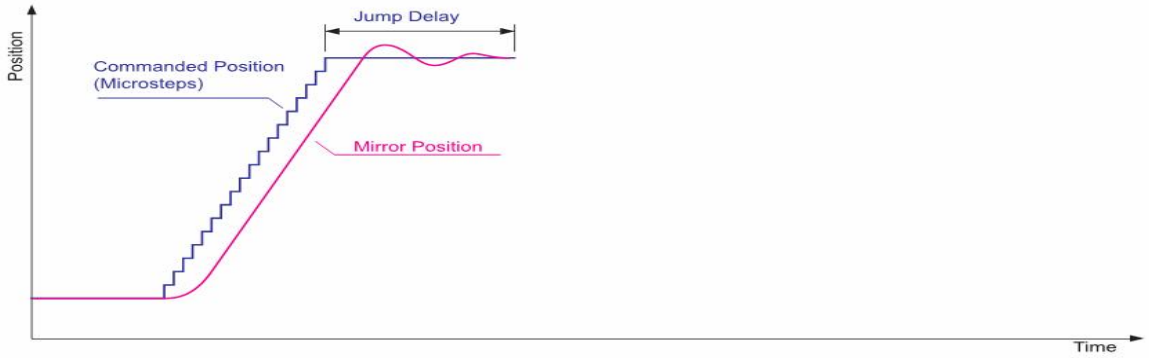


- **Pen number**: Select the pen with 0 to 15 numbered for configuration. Each pen number corresponds to one color.
- **Power (%)**: Range value of output power of laser device is 0% ~ 100%.
- **Frequency (kHz):** It refers to laser's pulse frequency whose adjustment range is based on the type of laser device.
- **Speed (mm/s)**: Running speed of galvanometer when marking.
- **Jump speed (mm/s):** Refer to the running speed of galvo during empty

jump. Empty jump speed is usually debugged with jump delay. The higher the empty jump speed, the more jump delay time.

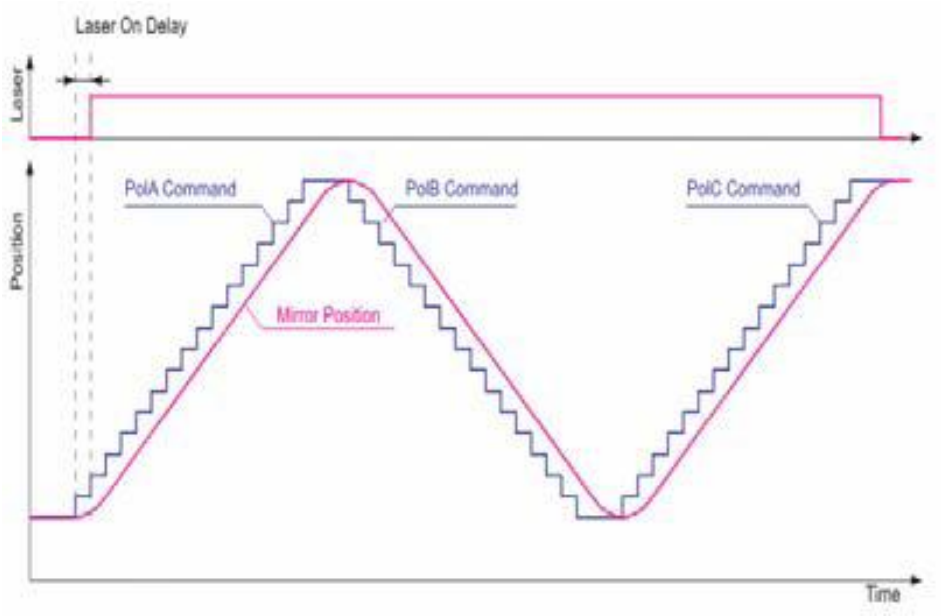
- **Jump position delay (us):** The delay value of jump position

Function: Continue to execute the next vector command after galvo jumps to the target point.



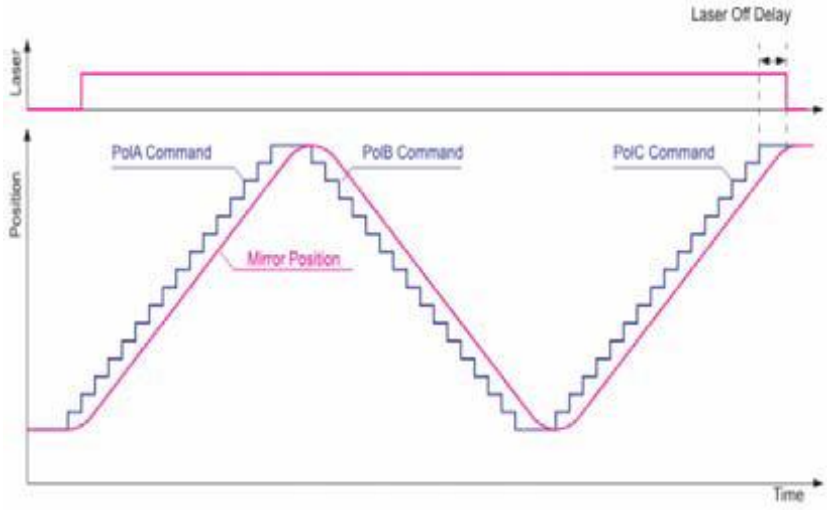
Jump delay example

- **Pulse width (us):** Ratio of output signal frequency to width
- **Mopa pulse width:** Set the pulse width of Mopa laser device
- **Point time (us):** This parameter is used to set the marking time if there are dot objects.
- **LaserOn:** The laser starting delay time at the beginning of marking. Appropriate setting of LaserOn delay parameter can eliminate “Burn-in”, but long-term delay will cause blank stroke. Negative value is allowed, and it means advance marking of laser.



LaserOn delay diagram

- **LaserOff delay (us):** The laser closing delay time at the end of marking. Appropriate setting of LaserOff delay parameter will eliminate non-closed phenomenon at end of marking. But too long LaserOff delay will cause "Burn-in" at the end. Negative value is not allowed.



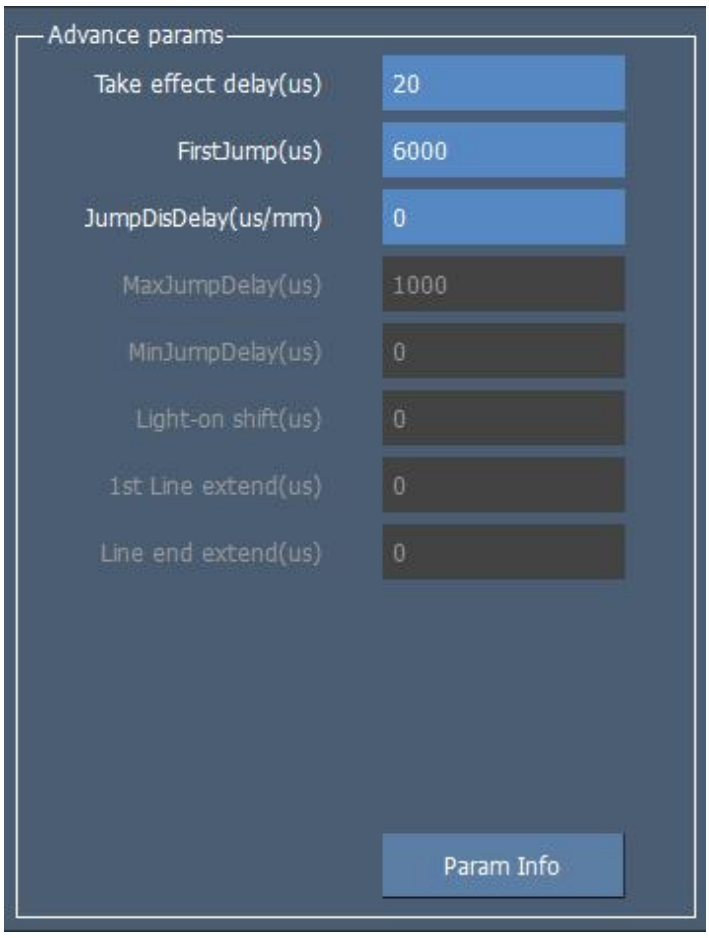
LaserOff delay diagram

- **Effect delay (us):** Execute a period for each switching of pen number unconditionally to guarantee effect of the change.

- **Shape end delay (us):** Galvanometer delay (0, + ∞) after laser off

  Role: Guarantee the accuracy and veracity of galvanometer track at end position. **Alleviate trailing phenomenon of IPG laser device to certain extent.**

- **Advanced Parameters**



- **LaserOff lag (us):** There is time difference between execution of command by galvanometer and laser device. Normally, the galvanometer is about 100us slower than laser device. Use the parameter for compensation.
- **First jump delay (us):** First jump during marking, increase certain delay on the basis of original jump delay.

- **First pen delay (us):**
- **Extension of the two ends of line (us):**
- **Corner delay (us):** Delay time between marking sections
- **Corner delay changeable:** The smaller the corner angle is, the smaller the delay is. After enabling the function, ensure the mark quality of both right angle and arc.
-

Save default parameter: Take each parameter under ordinary parameters as the default parameter, and save it.

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

Comparison of Settings of Pen List

	Too Big	**Too Small**	**Negative or Not**
Speed	Bad stroke, rapid marking speed	Fine stroke, slow marking speed	No
LaserOn delay	Burn-in effects at the start point	“Match end” focus point in the beginning	Yes (Negative value refers to advance laserOn)
LaserOff delay	“Match end” focus point in the end	Non closure at the end	No

Jump speed	Short disposal time of empty stroke, decrease total marking time, but strokes will be connected together, and galvo movement is not stable	Long disposal time of empty stroke, increase the marking time	No
Jump position delay	Dispose next stroke after galvo speeds up and stops for a period, increase the marking time	PC starts to dispose next stroke after galvo slows down. Scattered point occurs at the start of stroke, and oscillations will occur at the start of a vector.	No
Corner delay	Increase the marking time, focus point at corner	Round appears during marking of right angle	No
Shape end delay	Focus point at corner, increase the marking time.	Under high speed, incomplete at the end of valid vector, easy deformation	No

3.3.2. Marking modes:

Trigger modes:

- **Photoelectric trigger/pedal trigger:** Select different trigger modes. The photoelectric trigger corresponds to the GD interface on the board, and the pedal trigger corresponds to the JT interface on the board.
- **Internal trigger:** Trigger marking automatically in the software

Trigger optimization:

- **Trigger delay:**
  - **Delay distance (mm):** Execute marking after how far the assembly line moves.
  - **Delay time (ms):** Execute marking after how long the assembly line moves.

- **Minimum distance:** Holes on customer's product may cause multiple triggers. To avoid this situation, set a minimum trigger interval.
  - **Distance:** The adjacent trigger must be greater than this distance, otherwise it should be filtered out.
  - **Time:** The adjacent trigger must be greater than this time, otherwise it should be filtered out.

- **Pipeline mode:** Whether to enable pipeline mode
  - **Trigger distance (mm):** The distance between marks.
  - **Marking times:** The times before the trigger.

- **Path optimization:**
  - **Starting position:** Set the coordinate position of the shape.
    - **Designation:** Designate the starting coordinate of the first marked shape.
    - **Automation:** Automatically set the starting coordinates of shapes according to the direction of assembly line.
    - **Original:** The coordinates of the shape are not changed. The coordinate should be the same with that of the shape in the work area.

- **Others:**
  - **Number of caches:** Set the number of cache saved, and it cannot be 0.

3.3.3. Assembly Line

- **Direction of assembly line:**

- From right to left/left to right: Set the running direction of the assembly line.

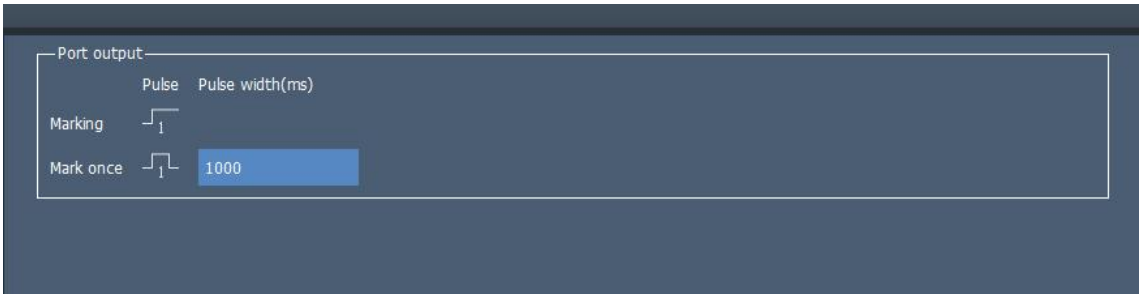
- **Encoder:**
  - **Encoder reverse:** Exchange the input signal of encoder AB phases.
  - **Diameter (mm):** The diameter of the encoder.
  - **Pulse per revolution:** Pulse per one full revolution of the encoder.
  - **Pulse distance (um/pulse):** Movement distance of each pulse of encoder
  - **Calculation:** Calculate the pulse distance of assembly line based on the diameter and the pulse per revolution.
  - **Speed measurement:** Display the current speed of assembly line.

- **Fixed-speed assembly line:** Select the mode of fixed assembly line for fly mark.
  - **The speed of assembly line** (**m/min**): Set a fixed speed, and the value shall conform to current speed of assembly line.

- **Static mark:** Static mark of assembly line

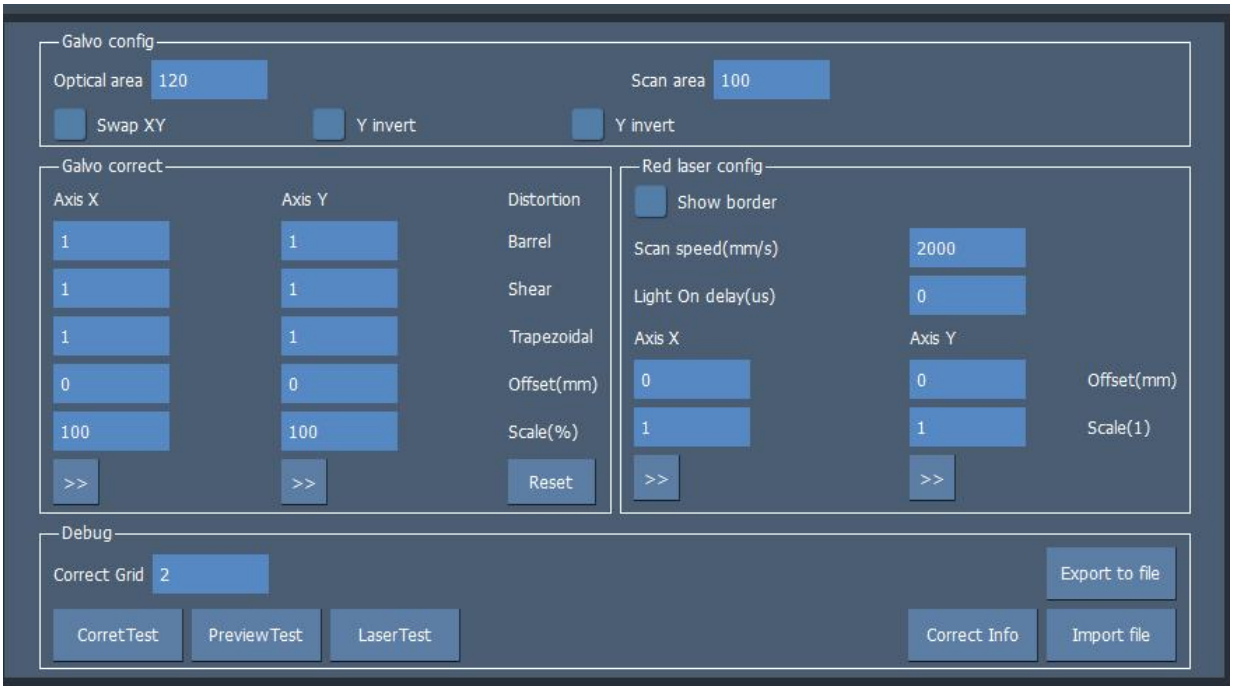
- **Calibration of the speed of assembly line:** When the assembly line is fixed, use this function to observe whether the speed of the assembly line matches the mark.

3.3.4. IO Parameters



- **Marking:** Set whether the corresponding output interface outputs high or low electrical level when marking.
- **Single marking**: Set the type and time of electrical level output by the corresponding output interface after completing each marking.

3.3.5. Regional Parameters



Regional Parameters

Setting of galvanometer: Set the datum of X/Y axis and range of galvanometer.

3. 3. 5. 1.

- **Static area (mm):** Set the range of galvanometer.

- **Work area (mm):** Set the size of work area.
- **XY exchange:** Datum of galvo X/Y.
- **X/Y reverse:** Set the output inversion of galvo.

3.3.5.2. Correction of Galvanometer

Correct galvanometer, two vertical corrections are corresponding to galvanometer X and Y respectively.

- **BarrelAdj:** Refer to barrel or pillow-like correction coefficient. Default coefficient is 1.0 (reference range: 0.5-1.5).
- **LeanAdj:** Refer to the correction coefficient of parallelogram, and the default coefficient is 1.0 (reference range: 0.5-1.5).
- **TrapezoidAdj:** refer to the correction coefficient of trapezoid, and the default coefficient is 1.0 (reference range 0.5-1.5).
- **OffsetAdj (mm):** Adjust the offset between the actually marked shape and the predicated shape position.
- **ScaleAdj (%):** It refers to the flex percentage, and the default is 100%. This parameter will be adjusted when the trim size marked is different from the setting size. If the trim size is smaller than the designed one, users can raise this parameter; if the trim size is bigger than the designed one, users can lower this parameter.
- **Scale:** When setting scale, press  directly. At this time, Fig. 2-10 will pop up. We can enter the dimension set in software and the measured actual mark size, and the software will calculate the scale automatically.

Setting of Scale

3.3.5.3. Modulation

- **Laser test:** Check whether the laser emits light normally.
- **Correction test**: Draw a rectangular box according to the set parameters to check whether the correction meets the requirements.
- **Red light test:** Test whether the red light changes correctly according to the red light parameters.

3.3.5.4. Red Light Correction

- **Enable display outline:** Display the outline of shape.
- **LaserOn delay:** The delay time of laser on.
- **The speed of red light (mm/s)**: Display speed of red light. The slower the speed, the more obvious the red light path. The faster the speed, the clearer the red light outline.
- **Offset position X (mm):** Refer to the set distance after deviating the frame or outline of red light to X direction.
- **Offset position Y (mm):** Refer to the set distance after deviating the frame or outline of red light to Y direction.
- **Scale X/Y:** Refer to the size deviation of red light and laser. Adjust the parameter to fully coincide laser and red light.

3.3.5.5. Export/Import Files

Save the current correction value as a file/read the saved corrected file.

3.3.6. Laser Parameters

Set the types of the used laser device, and set relevant basic parameters, as shown below:

Laser Parameters

CO2

- **Enable preionization:** Enable preionization signal. CO_2 laser devices of some manufacturers require such signal for normal work, such as laser device of SYNRAD.
  - **Pulse width:** Pulse width of preionization signal.

- **Pulse frequency:** Pulse frequency of preionization signal.

◆ **First pulse depress:** This function aims to solve mark on CO_2 machine. Too strong laser power, longer interval, or more laser energy saving will cause the phenomenon of "First Point Heavy" at the beginning of mark.

- **Start power:** Power of first pulse.
- **Power increment:** Power increment of each pulse, till the set power value.

CO2/YAG/UV

Leakage: Treatment of door signal delay time. When laser is unsteady, tick the Leakage. During marking, each LaserOn/LaserOff will execute related door signal on/off delay time. If you fail to tick the Leakage during marking, execute a door signal on/off delay time only at the start position.

- **Door signal on time (us):** Door signal on delay time before laserOn.
- **Door signal off time (us):** Door signal off delay time before laserOff.

YAG

◆ **Enable PWM signal:** Produce the modulating signal of certain frequency at PWM pin.

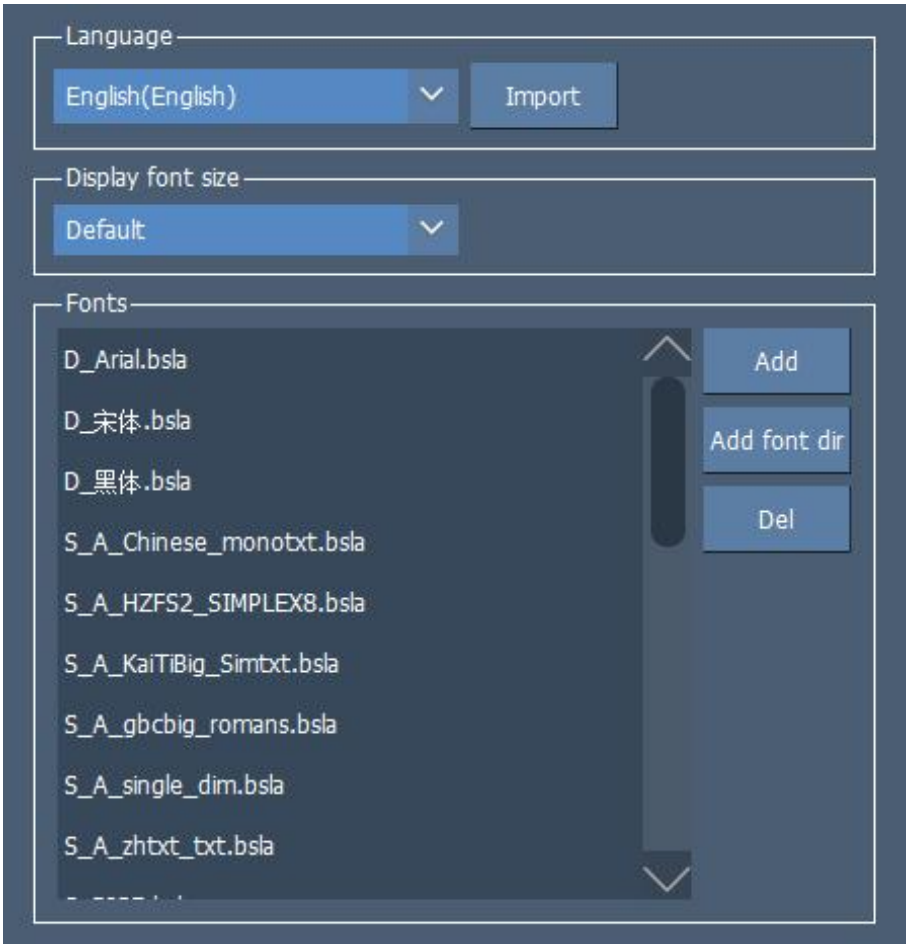
YAG/ultraviolet

◆ **Pulse width reversal:** Change PWM pulse is changed from high level to low level and vice versa. Deviate it to a corresponding phase angle to meet the requirements of PWM low-level and effective Q driver.

Fiber/ MOPA

- **MO on/off time (ms):** Open MO before opening laser device transmission pin, set the MO on/off time.

3.3.7. Languages and Fonts

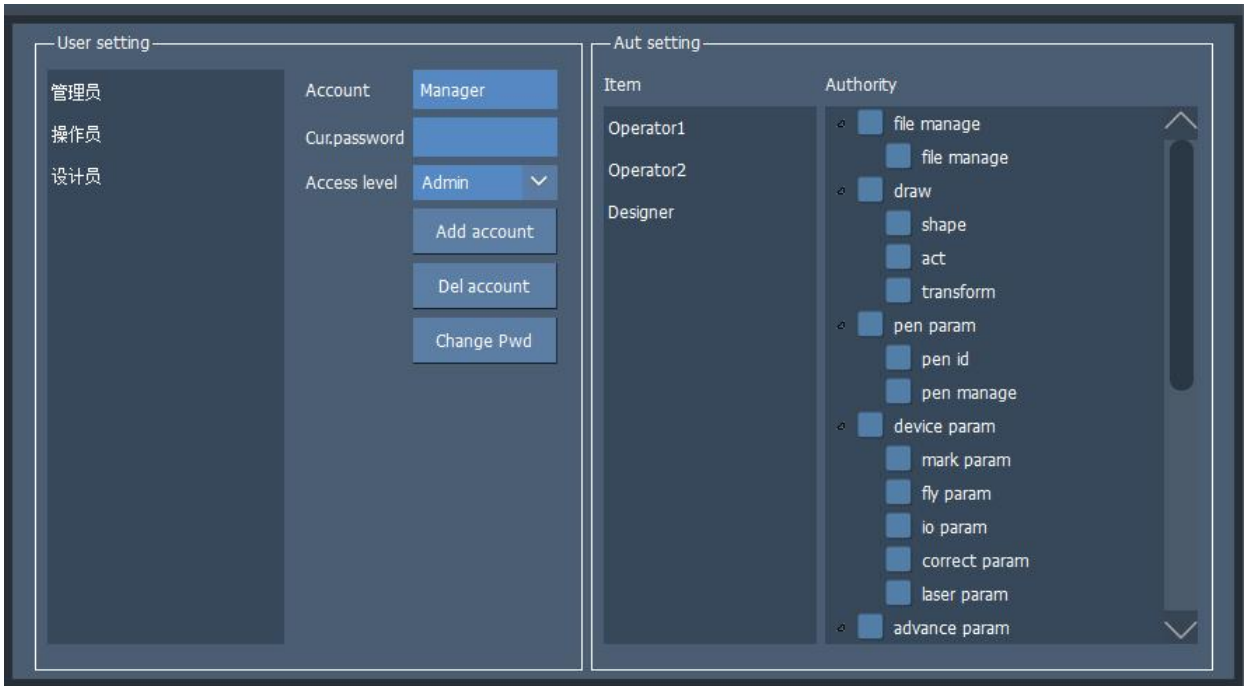


Language: Choose the language of the software. Currently, Simplified Chinese and English are available.

Fonts: Manage existing fonts in the software. You can import the fonts in the specified location or delete the existing fonts. Currently, only fonts in .bsla format are supported. You need to use a font conversion tool to convert them.

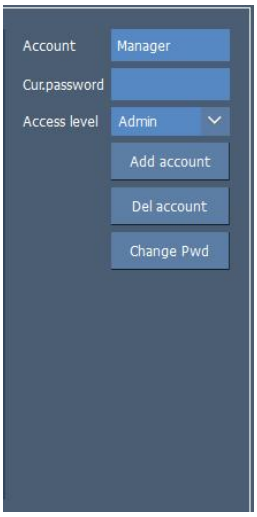
3.3.8. Permission Parameters

Different permissions can be set for different users. Three user levels are provided by default.



Permission Parameters

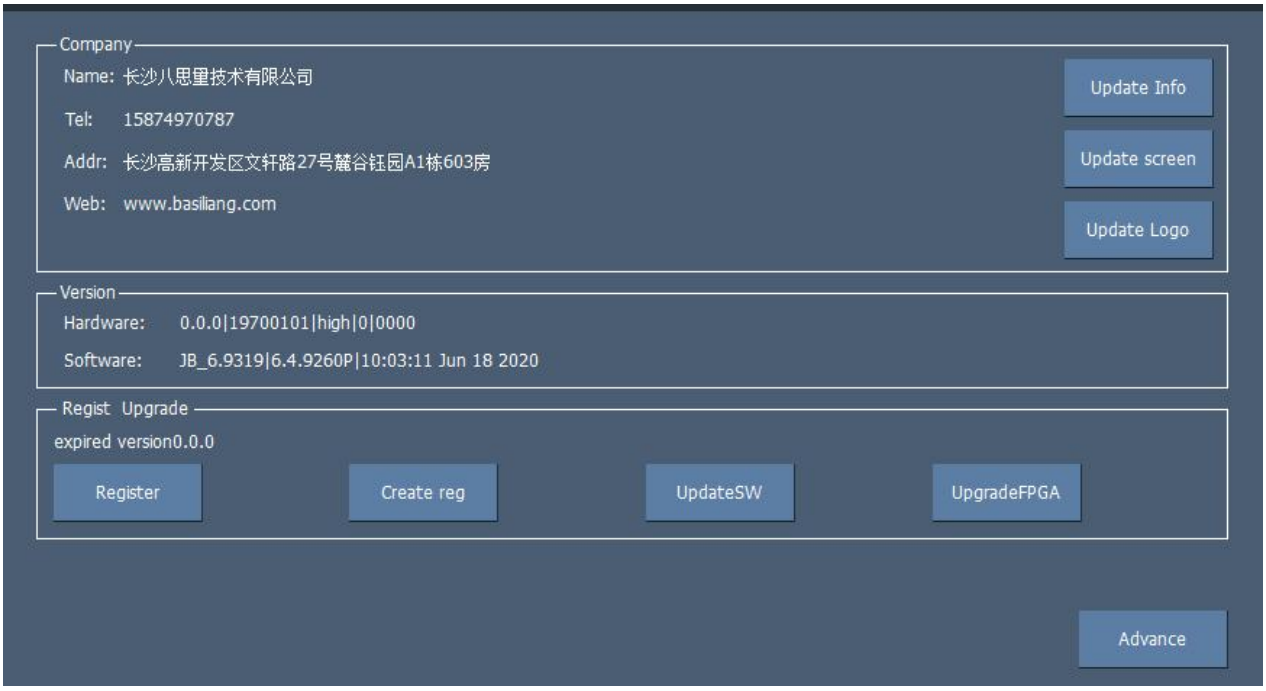
3.3.9. User Management



User Management

Users can be managed, such as adding, deleting, changing passwords and permission levels.

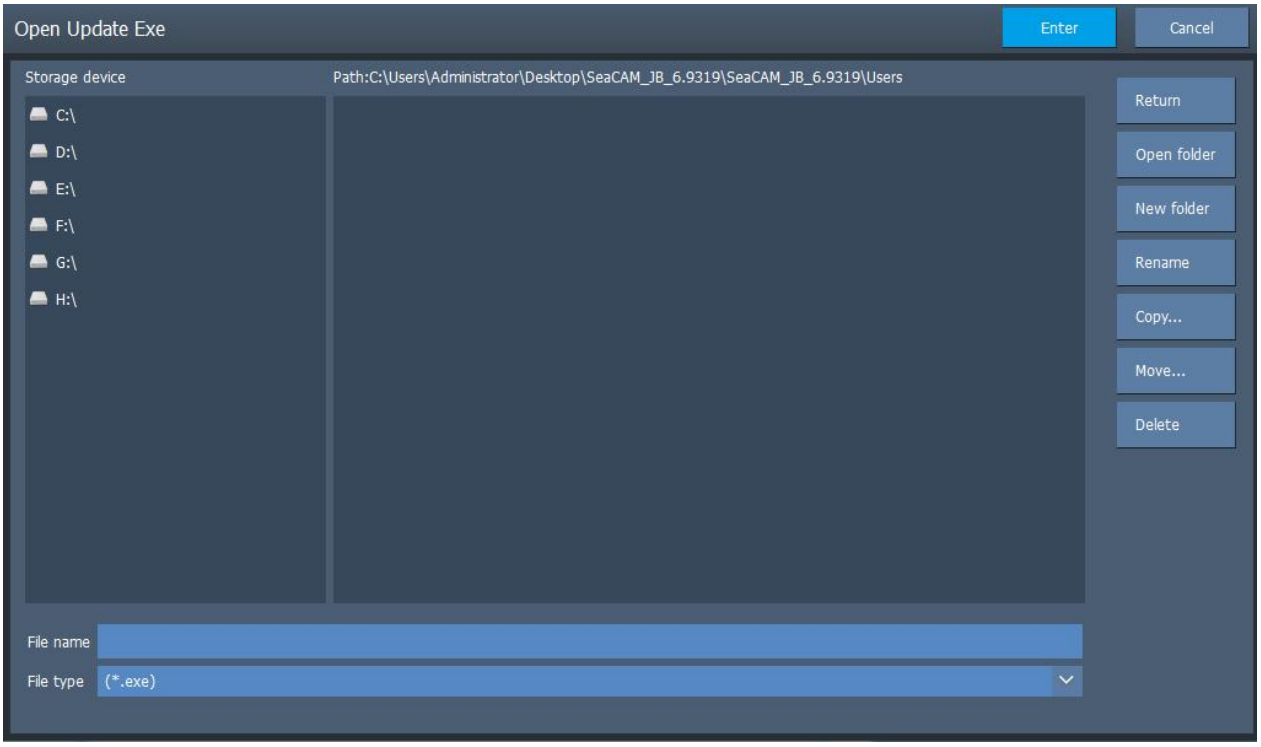
3.3.10. System



- **Company information:** Display information related to the company.
  - **Update:** The company information can be changed by importing the specified XML file.
  - **Update the start screen:** Specify the bitmap file that meets the requirements to change the start screen.

- **Version information:** Display the version numbers of software and hardware

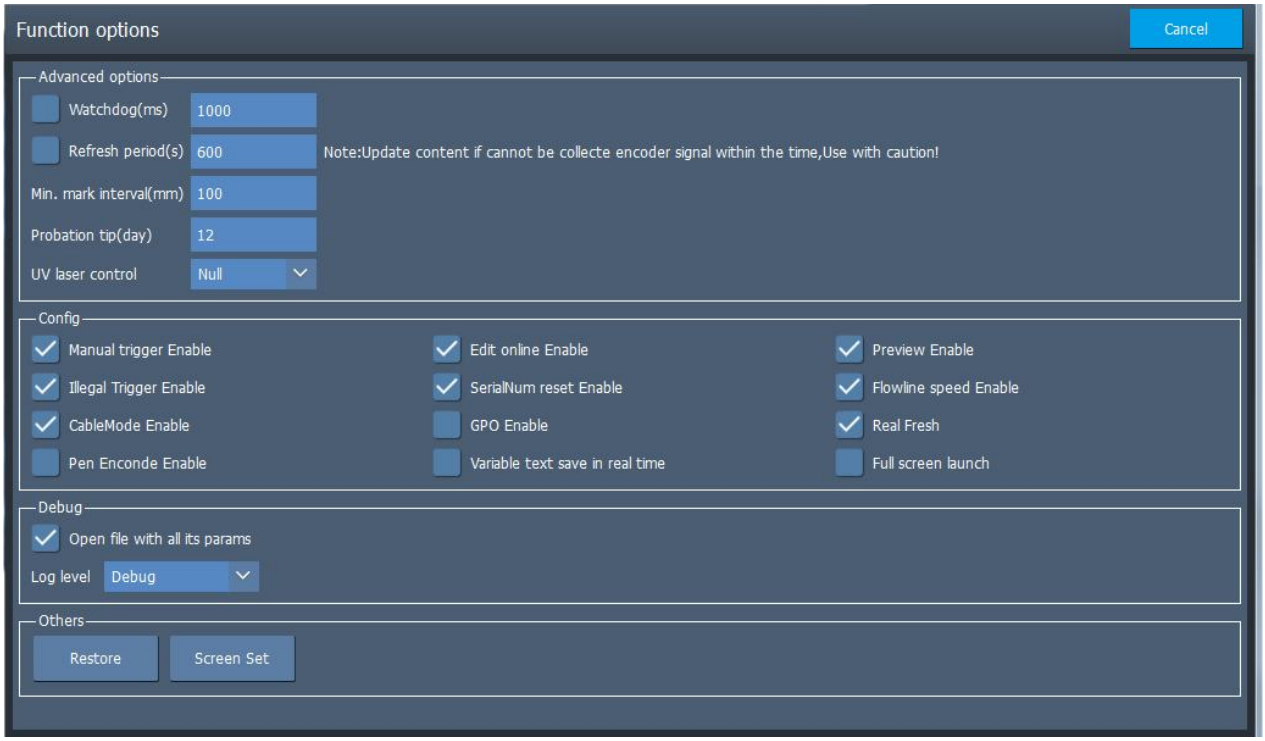
- **Registration and upgrade:** Display the activation status of the current software, and provide functions such as registration and upgrade.
  - **Registration information:** Complete the registration with the registration file generated by the designated manufacturer.
  - **Generate a file:** Generate a file containing the information of this computer for manufacturer to register.
  - **Upgrade FPGA**: Upgrade the hardware version.
  - **Upgrade software**: Upgrade the current software version.



Click the “Upgrade Software” button and select the upgrade tool provided by Basiliang.

Enter the upgrade program, the red box is to select the new installation package to be upgraded, the green box is the files or folders that are not allowed to be modified under the original designated program (generally no need to be processed), click to start the installation, and wait for the installation to complete.

◆ Advanced Functions



1. Advanced Functions

- **Enable watchdog (ms):** If there is no signal from the host computer within the set time, it will be reset, and the corresponding output interface will output the signal.
- **Timed update (s)**: Even if not triggered, the time element in the marking content will be automatically updated according to the set time.
- **Minimum logistics distance** (mm): This parameter will only affect the calculation of the suitable assembly line speed of the software, and will not affect the actual marking. It is not necessary to set it.
- **Trial period reminder**: If it is a trial version, how long will it be before the trial period ends.

2. **Function configuration:** Some advanced function switches. Among them, note that the assembly line mode can only be used with the board FPGA12.12.X and above.

3. Debugging:

a) **SDK code test log**: Open it to read related logs in

b) **test log:** Open it  to read the related log in

c) **Open all attributes of the template:** Tick it to save all parameters in the template.

4. Others

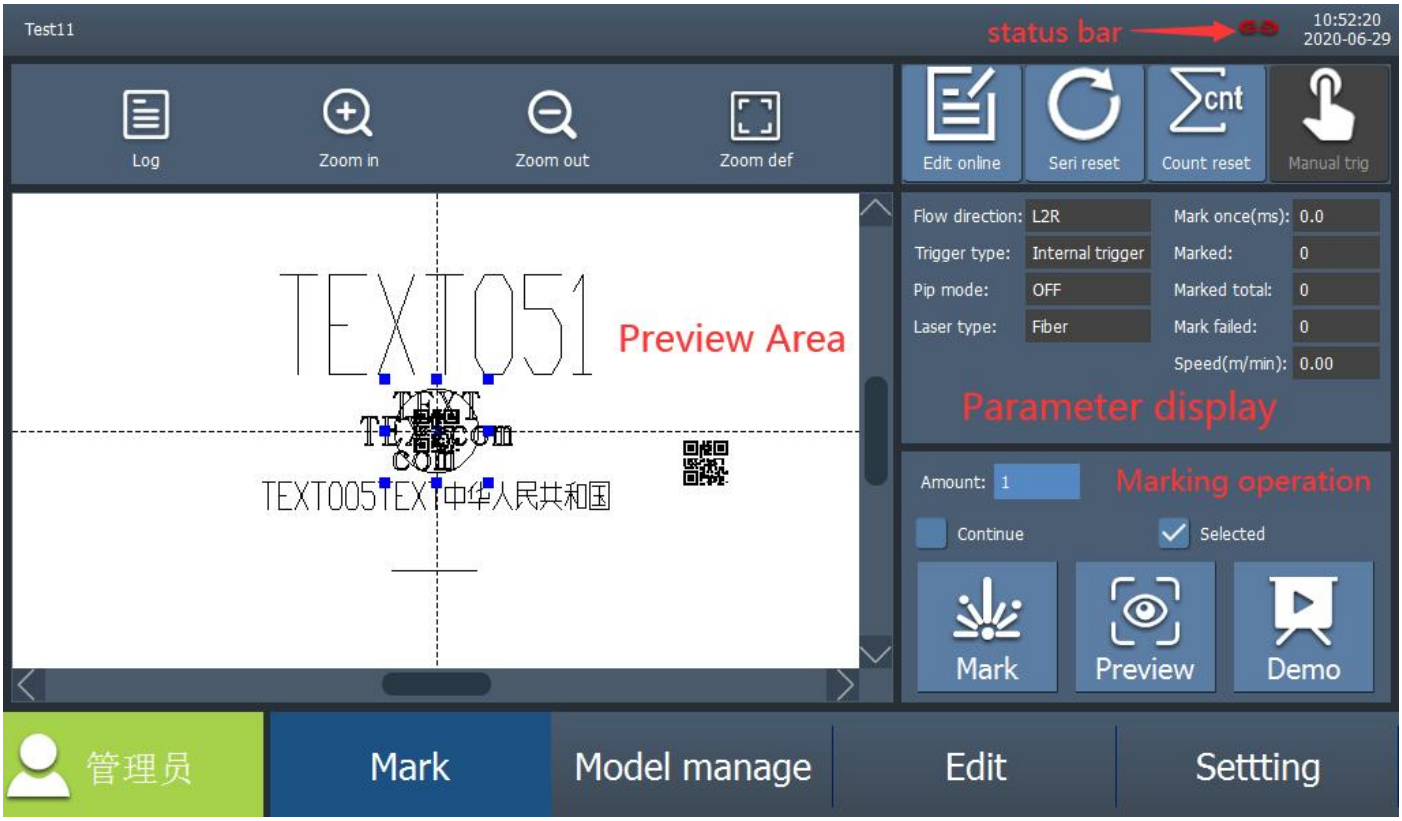
Factory reset: All settings can be reset to the factory state.

3.4. Marking

The "marking" window is a laser operation interface for the designed files. Before the official marking, please repeatedly debug the marking parameters and carefully check the design documents to avoid unnecessary losses!

Note: since the laser can cause irreversible damage to your body, you should be careful during operation, and irrelevant personnel should be far away from the operation area.

The marking window is mainly divided into five parts: status bar, preview area, optional function, parameter display and marking operation.



- Log:Click in to view some information during the software operation. Help to find the cause of the fault.
- **Number of false triggers:** If it is triggered again during marking, the trigger will be counted as a false one.
- **Serial number reset:** Select a serial number to use this function, you can reset the serial number to the wanted number. Without selecting any shape, all serial numbers will be reset to the starting serial number.
- **Count clearing:** in the process of code spraying, count clearing function can be used to clear the number of times of code spraying and other values.
- **Manual trigger**: After setting the non-internal trigger mode, you can use this function to mark directly.