PowerMark Laser Marking System User ’s Manual

Forum:www.laser400.com

Version	Date	Log
V1.0	2022/5/25	Add version

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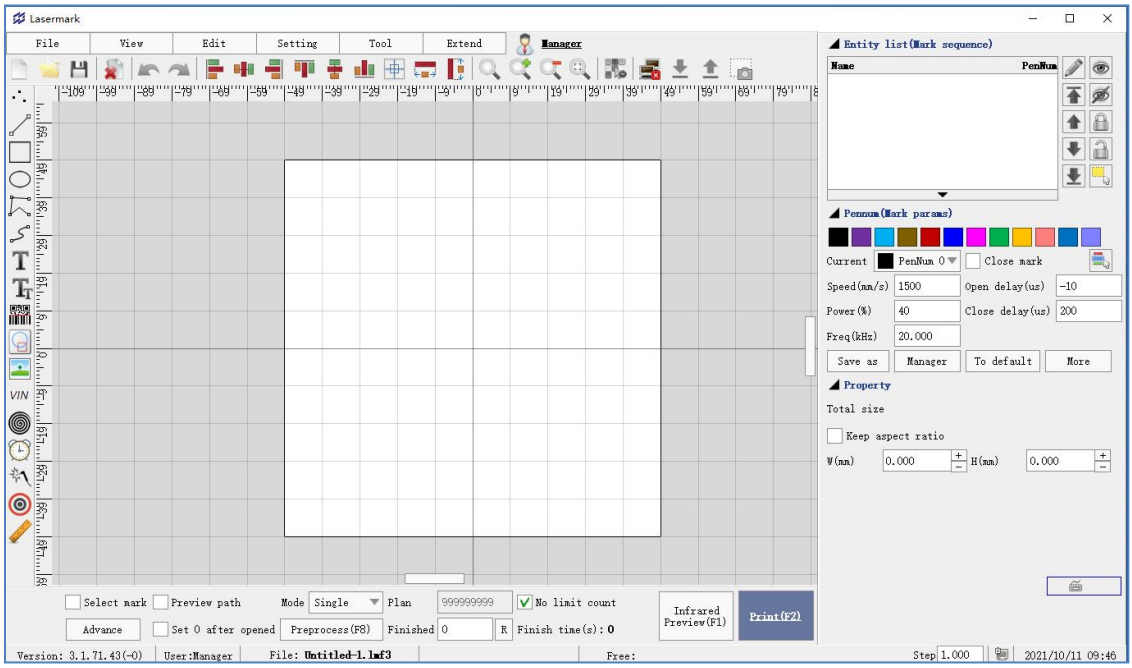


Figure 1-1

2 File Menu

The File Menu implements regular document operations, including new, open, save as, save, and resource import and export. As shown in Figure 2-1.

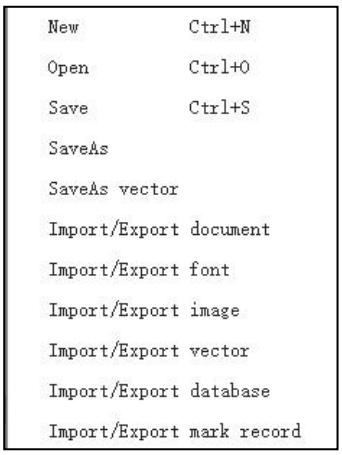


Figure 2-1 File Menu

2.1 New

The New menu is used to create a new document containing a blank editing area, and the shortcut key is CTRL+N.

When you click the new menu or press the shortcut key, if there is a document currently being edited, the user will be prompted to save, and then a dialog box for entering the file name will pop up and create a new blank document, as shown in Figure 2-2.

Figure 2-2 New file name input

The corresponding button of the new menu in the shortcut toolbar is  , click this button to achieve the same function.

2.2 Open

The open menu is used to open the file saved in the laser marking machine, the suffix is lmf3, and the shortcut key is CTRL+O.

When you click to open the menu or press the shortcut key, a file selection dialog box will pop up, as shown in Figure 2-3.

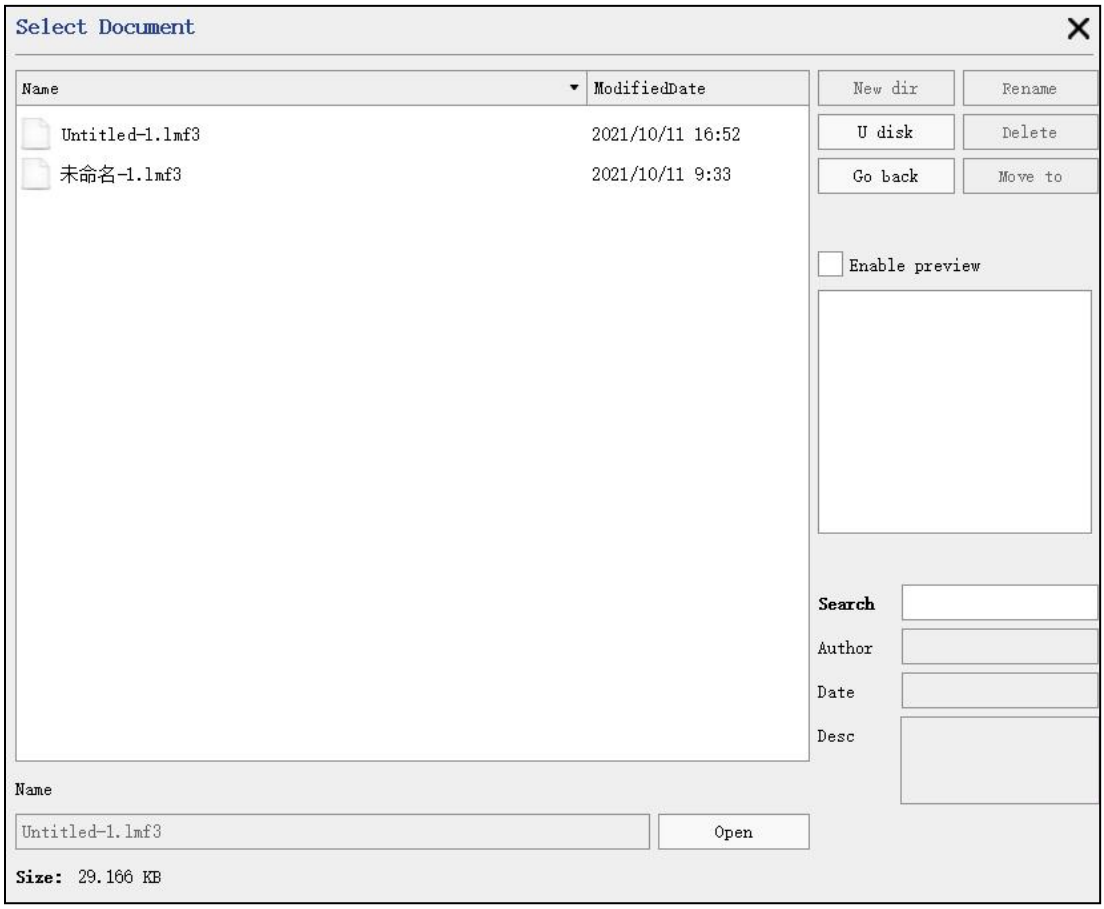


Figure 2-3 Select file dialog

In the select file dialog box, you can click the file name in the file list area as needed, and then click the select button to open the document. If the document is saved in a subdirectory, you can double-click the subdirectory item to open the subdirectory for browsing and selection. At the same time, when you select a file, you can rename or delete it. Support the keyboard up, down, left, and right to select documents. After selecting the document, you can view the author, date and description of the document creation on the right.

Click [Modification Time] in the title bar to display the latest modification time of the file from top to bottom.

Enter keywords to quickly find files.

If the current U disk (note: only FAT32 format U disk is currently supported) has been inserted into the control panel, you can open the files in the U disk.

Tick [Enable Preview] to preview the currently selected document (Note: If the document contains a lot of content, there may be a freeze when switching between documents. If the freeze is serious, it is recommended to uncheck the preview function).

The corresponding button in the shortcut toolbar to open the menu is  , Click this button to achieve the same function.

2.3 Save As

The Save As menu is used to save the document currently being edited as a file with a different file name, as shown in Figure 2-4.

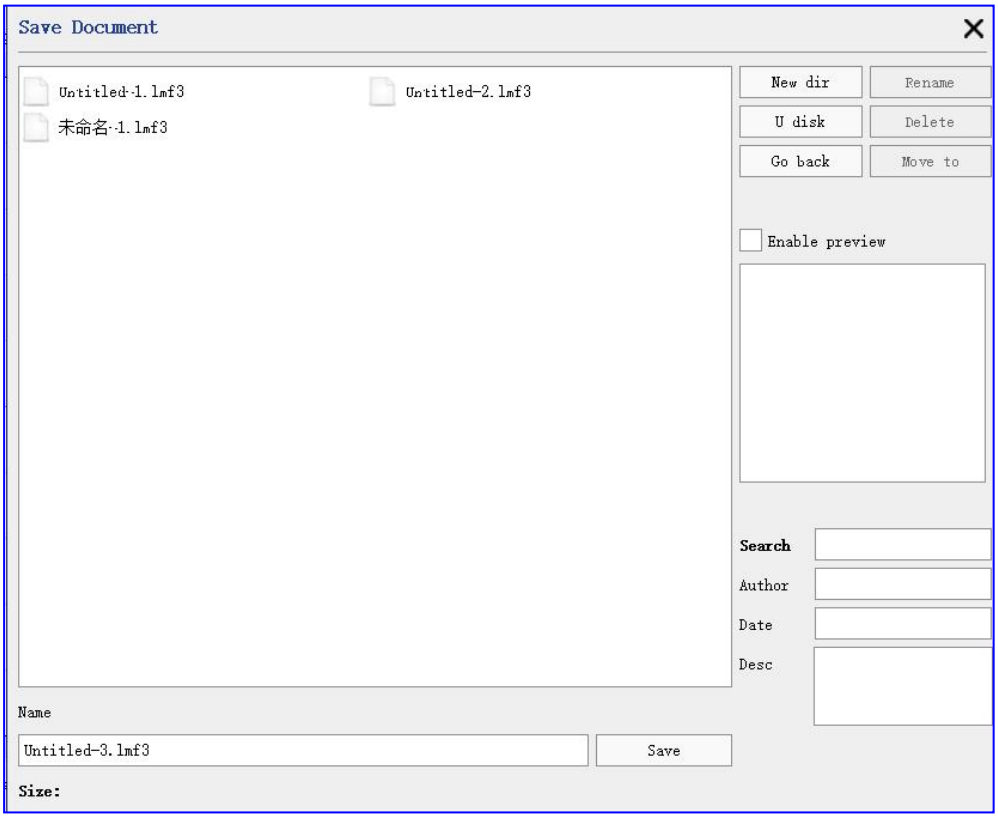


Figure 2-4 Save file dialog box

In the Save File dialog box, you can save the current document as a arbitrarily named file, or select an existing file to overwrite.

In the right column, you can enter the author, creation date and description of the document.

2.4 Save

The Save menu is used to save the currently edited document, and the shortcut key is CTRL+S.

If the currently edited document is a newly created document, the Save As function in section 2.3 will be executed, which will not be repeated here.

The corresponding button of the Save menu in the shortcut toolbar is  , Click this button to achieve the same function. If the current document cannot be saved (such as no editing, etc.), it will be displayed as  ， It cannot be clicked at this time.

2.5 Import/export Documents

For the shortcut operation menu, please refer to [Upgrade Management] for details.

2.6 Import/Export Fonts

For the shortcut operation menu, please refer to [Upgrade Management] for details.

2.7 Import/export Pictures

For the shortcut operation menu, please refer to [Upgrade Management] for details.

2.8 Import/export Vector Graphics

For the shortcut operation menu, please refer to [Upgrade Management] for details.

2.9 Import/export Database

For the shortcut operation menu, please refer to [Upgrade Management] for details.

2.10 Import/export Marking Records

For the shortcut operation menu, please refer to [Upgrade Management] for details.

3 View

The view menu realizes the zoom display operation of the work area, as shown in Figure 3-1:

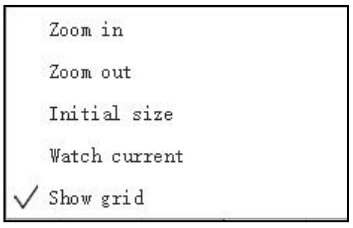


Figure 3-1

Click to enlarge or on the toolbar  button can zoom in the work area to display the content；

Click on the small or toolbar  button can reduce the display content of the work area;

Click on the original size or on the toolbar  button to restore the original display size of the workspace；

Click to observe the current or toolbar  button can zoom in to display the currently selected mark；

Click Show Grid to switch the display/non-display of the grid in the work area;

4 Edit

The edit menu realizes the edit operation of the mark, as shown in Figure 4-1.

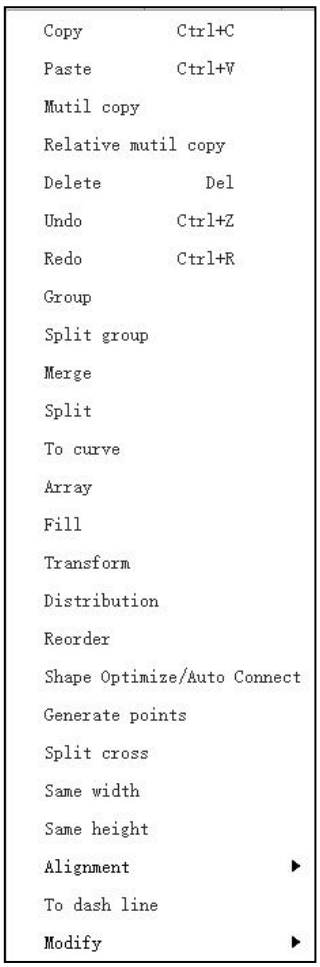


Figure 4-1

4.1 Copy

The copy menu is used to copy the currently selected marker. This operation supports copying multiple markers. The shortcut key of the copy menu is CTRL+C.

4.2 Paste

The effect of pasting is shown in the Figure4-2, 4-3.

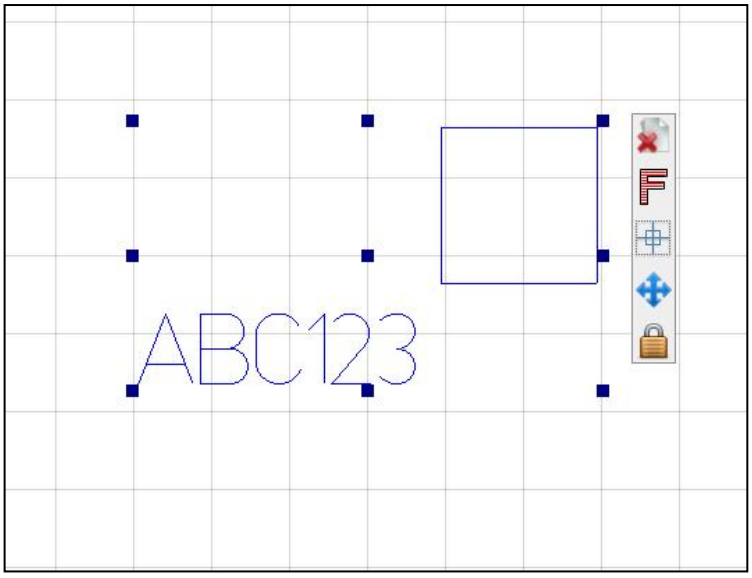


Figure 4-2 Select a normal text and a graphic

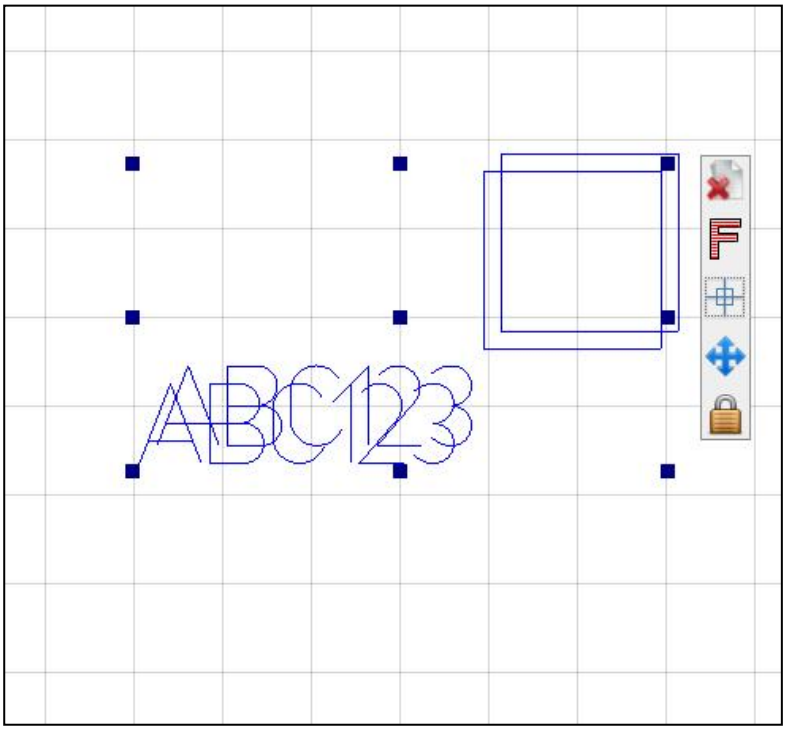


Figure 4-3 After pasting, a new marker with the same parameters will be generated directly in the upper right corner

4.3 Mutil Copy

The Mutil Copy menu is used to copy the currently selected marker according to the selected parameters, as shown in Figure 4-4。

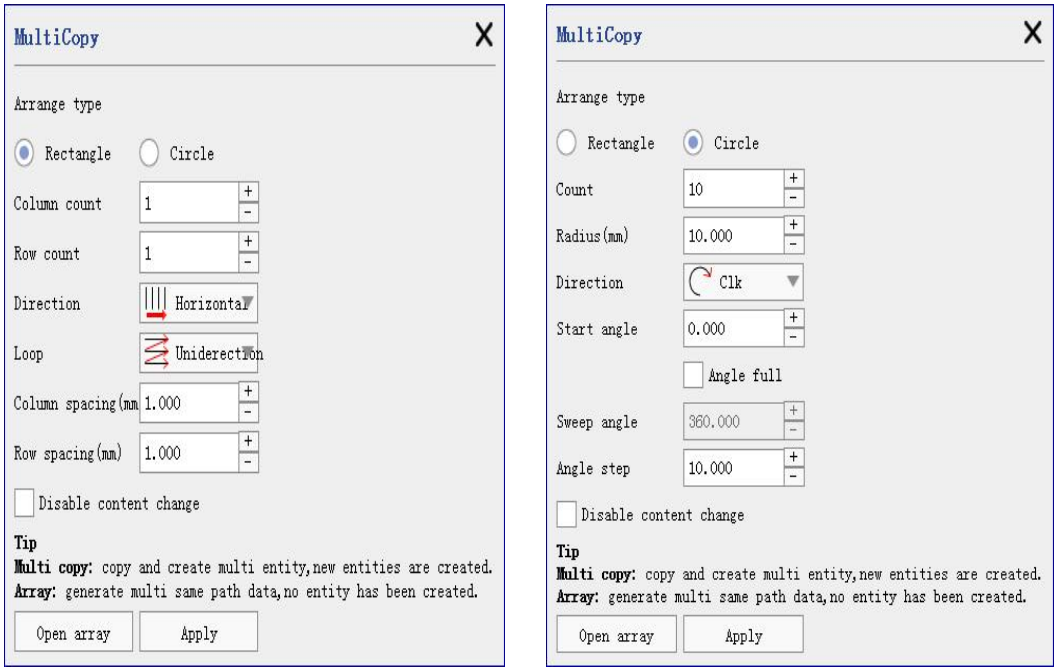


Figure 4-4 Mutil Copy

The Mutil Copy function is similar to the copy function. The difference is that the Mutil Copy is to perform multiple copies according to the set parameters. The parameter description is as follows:

4.3.1 Rectangular Arrangement

Column count: indicates the number of selected markers displayed in the horizontal direction of the editing area.

Row count: indicates the number of selected markers displayed in the vertical direction of the editing area.

Direction: When the selected mark increases the number of rows and columns at the same time, in which direction the new mark will be generated when copying, which will affect the marking order of the mark. There are two directions: horizontal and vertical.

The horizontal direction means that the marks are generated in the order from left to right and top to bottom. Take the number of rows and columns as 3 and copy the serial number "01" as an example, as shown in Figure 4-5.

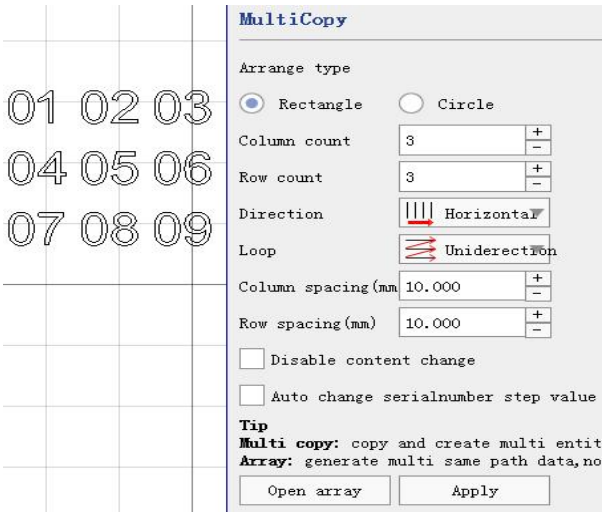


Figure 4-5 Marking effect generated in the horizontal direction

The vertical direction indicates that the marks are generated in order from top to bottom and from left to right, and the effect is shown in Figure 4-6.

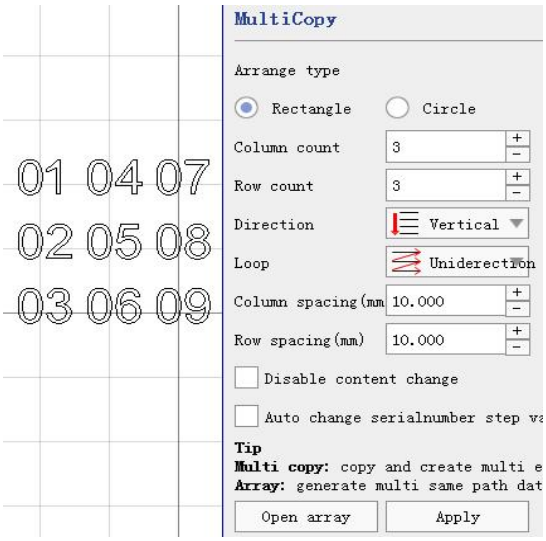


Figure 4-6 Marking effect generated in the vertical direction

Loop: indicates the rule for the direction of copying when the selected mark increases the number of rows and columns, which can be divided into two types: one-way and two-way. One-way has been explained in Figures 4-5 and 4-6. Two-way means copying back and forth (such as switching from left to right, then switching from right to left, or from top to bottom, then switching from bottom to top). direction).

Column spacing: By setting the column distance, you can change the distance between the newly generated mark and the original mark in the horizontal direction, taking the leftmost side of the mark as the reference.

Row spacing: By setting the line spacing, you can change the vertical distance between the newly generated mark and the original mark, taking the top of the mark as the reference.

4.3.2 Circular Arrangement

Count: Indicates the total number after copying.

Radius: The radius of the circle.

Direction: clockwise and counterclockwise.

Start angle: the start angle of the circle where the current mark is located.

Angle full: According to the distribution angle and the number, the angle spacing is automatically calculated and distributed evenly (for example, the number is 8, the distribution angle is 360, and the angle spacing is 45 degrees).

Sweep angle: the total angle range from the first to the last.

Angle step: the angle between adjacent marks. After **checking the angle is full**, this value cannot be set.

Take copying the serial number "01" as an example, the effect is shown in Figure 4-7.

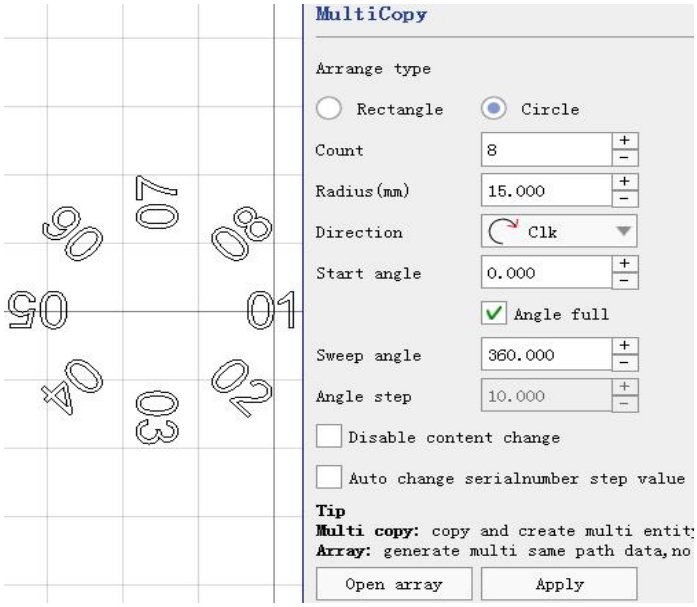


Figure 4-7 Circular arrangement copy

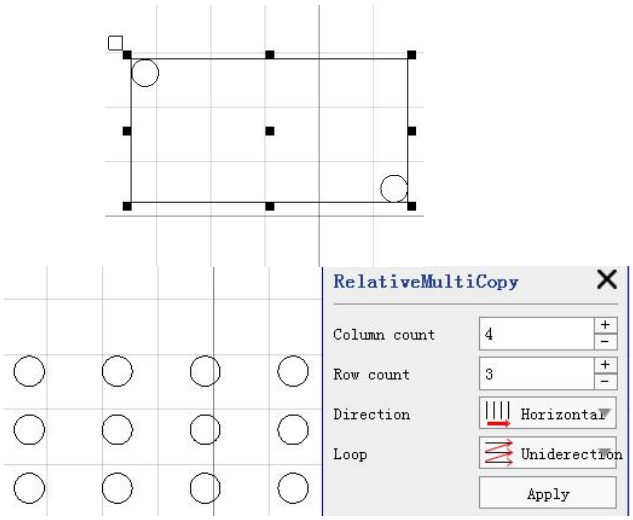
Disable content change: whether to update the content of the copied tag. If checked, the copied mark content will remain unchanged, if not checked, the copied mark content will be updated automatically (such as serial number, database, etc. will be updated to the next data)

Auto change serialnumber step value: If the copied tag contains a serial number, the step value of the serial number will be changed to the total number of copies currently, if 4 copies are copied, the step value of the serial number will be changed Is 4.

4.4 Relative Copy

Relative copy is to copy the corresponding number of rows and columns between the two markers under the condition of selecting two markers of the same type and size. The effect is shown in 4-8 and 4-9.

4-8 two round marks selected



4-9 Copy the corresponding row and column marks

4.5 Delete

The delete menu is used to remove the selected mark from the current editing area. The shortcut key is Del (Delete). The delete operation can be restored through the undo menu.

The corresponding button of the delete menu in the shortcut toolbar is  , Click this button to achieve the same function. There is also a delete menu in the floating menu bar.

4.6 Undo

The undo menu is used to cancel the last operation, and the shortcut key is CTRL+Z.

Cancellation is mainly used for mark editing operations, including but not limited to mark position movement, content modification, parameter modification, etc., as well as addition and deletion of marks. The undo operation can be performed multiple times until the initial editing state. After saving the current document, Undo cannot be clicked until after the next editing operation.

The corresponding button of the undo menu in the shortcut toolbar is  ， Click this button to achieve the same function. If there is no operation that can be undone, it will be displayed as  ， It cannot be clicked at this time.

4.7 Redo

Redo menu is used to cancel the last revoke operation， and the shortcut is CTRL+R。

Redo is mainly used after the undo operation. If the last operation of the current user is undo, the redo function will work. Otherwise, the redo menu cannot be used. Redo operations can be executed multiple times until all undo operations are cancelled. While saving the current document, redo cannot be clicked until after the next undo operation.

The corresponding button of the redo menu in the shortcut toolbar is  ，click this button to achieve the same function. If there is no operation that can be redone, it will be displayed as  ， it cannot be clicked at this time.

4.8 Group/Split Group

The group operation keeps the original attributes of the selected mark and combines it into a group mark, which is convenient for operations such as moving, zooming, selecting, and copying.

The Split Group operation separates the group mark into multiple marks before merging.

The mark type remains unchanged. For example, a rectangle and a circle are grouped, and after split group, it is restored to a rectangle and a circle mark.

4.9 Merge/Split

The Merge menu is used to merge the current selection mark into a new mark and remove the unique attributes of each mark itself. The combined mark can be modified like other marks, such as position movement and size modification, as well as operations such as copy, multiple copy, and delete. The combined mark can be combined with other marks again.

The Split operation separates the marker into multiple polygons, and each polygon generates a new marker independently.

If the mark to be separated contains more than 100 polygons, the separation is performed in units of 100 polygons. For example, if the mark to be separated contains 320 polygons, 4 combined marks (corresponding to 100, 100, 100, 20 polygons) are separated first, Then the mark to be modified can be completely separated.

If the mark to be separated contains less than 100 polygons, then all the polygons in the mark are separated.

4.10 To Curve

To convert other objects into curve objects, see [8.5 Curve] for editing operations.

4.11 Array

Array menu it is used to generate multiple contents according to the selected parameters from the currently selected marker. As shown in Figure 4-10.

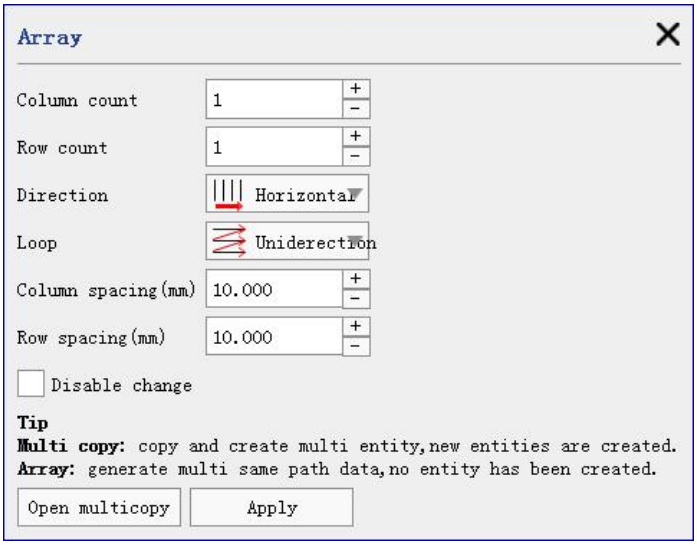


Figure 4-10

The new mark formed by the array is similar to the effect after [4.3.1 Rectangular Arrangement], the difference is that the mark after the array is still a single mark, and the mark after multiple copies is multiple marks.

4.12 Fill

The Fill Menu is used to fill the currently selected marker according to the rules, and the marker to be filled must be a closed curve. You can select multiple marks for filling, and the filling effect between each mark does not affect each other.

The fill menu button appears in the floating menu bar, and it appears after clicking the mark. The icon is  . The fill menu is shown in Figure 4-11.

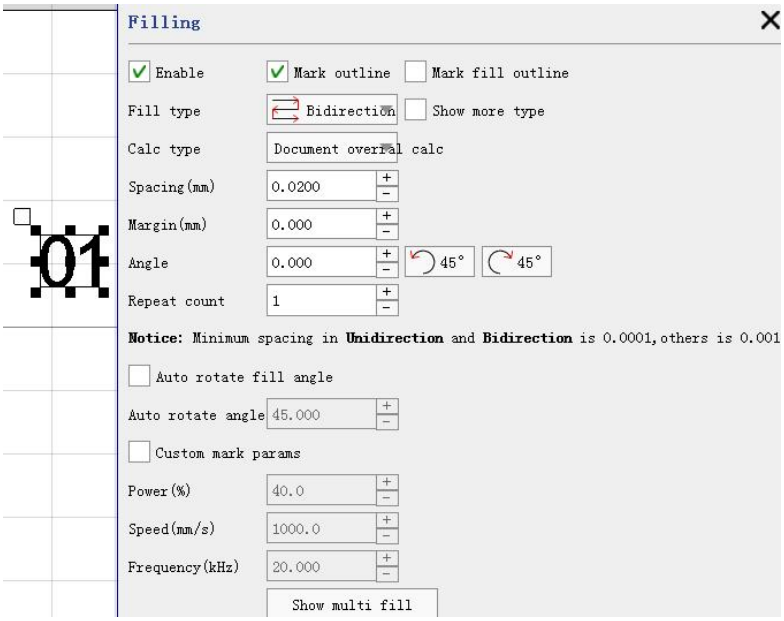


Figure 4-11

Mark outline: whether to mark the original contour.

Mark fill outline: whether to mark the outline of the filled content. If the margin value is 0, the original contour will be marked; if the margin value is greater than 0, the contour of the filled part will be marked.

Show more type: the ring fill option is not displayed by default (filling large content is easy to freeze), check this option to display it.

Bidirection (default): refers to filling back and forth (first from left to right, and then from right to left to switch back and forth).

Unidirection: refers to always filling from left to right.

Bow: similar to two-way filling, when the upper and lower filling lines belong to the filling area, they will be automatically connected together.

Ring shape: shrink from outside to inside to no filling.

Calc type: the overall calculation of the document means that the fill line is based on the entire document, and the starting fill line positions of different marks are the same (because they are in the same document); the overall calculation of the object means that the fill line is based on the marked object, and the fill is calculated separately The starting position of the line. See 4-12 for the effect**.**

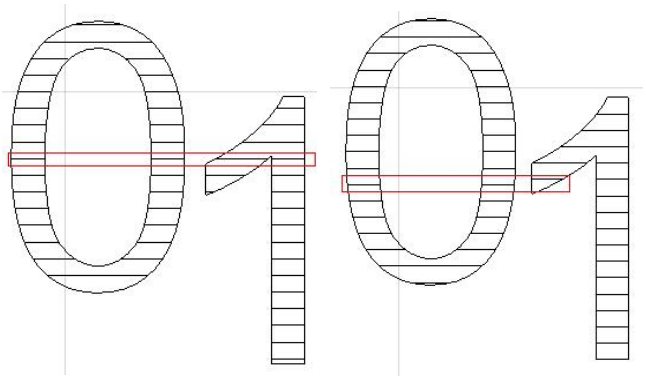


Figure 4-12 Two text tags, the left picture is the overall calculation of the document, the right picture is the overall calculation of the object

Spacing: The value of the spacing between two filling lines. The larger the value, the sparser the filling effect. On the contrary, the denser the filling effect (fullness).

Margin: the distance between the filling line and the outline of the mark.

Angle: the rotation angle of the filling line.

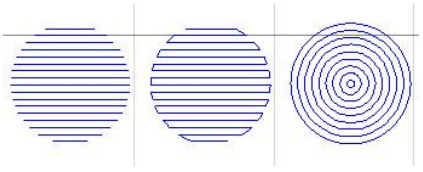
Repeat count: the number of repeated markings on the filled line.

Auto rotate fill angle: after each marking, the filling line will be rotated according to the automatic rotation angle.

The filled mark can choose whether to customize the marking parameters. If it is not checked, the default is the parameter set by the pen number, and the user can modify it as needed.

If customers need to mark the same filling mark multiple times, they can click the Show Multiple Filling button on the filling interface, and the settings of the three filling layers will not interfere with each other. The marking sequence is fill 1->fill 2->fill 3.

Figure 4-13 From left to right are one-way/two-way, bow-shaped, circular filling



4.13 Transform

Transform Menu including move, zoom, rotate, flip and tilt, the shortcut buttons is  , as shown in Figure 4-14.

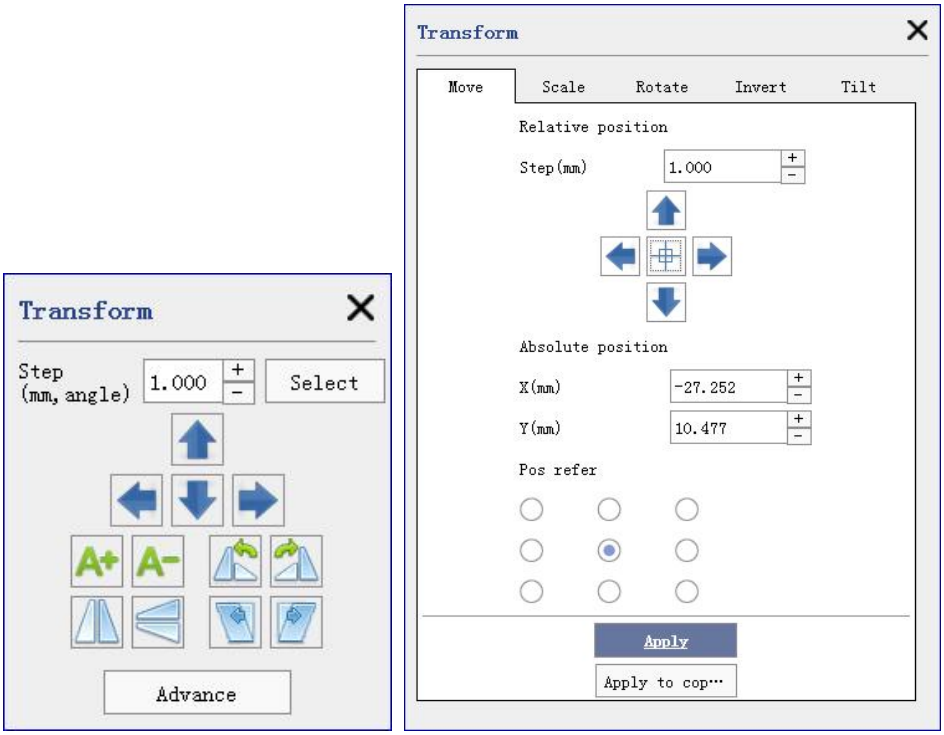


Figure 4-14 The left side is the simple transformation, and the right side is the advanced transformation

Move: It is divided into two parts: relative position and absolute position. The relative position can modify the step length of each movement, and then select  our direction buttons are used to move; the absolute position is based on the X and Y coordinate values input by the user, select the corresponding coordinate reference (that is, which one of the nine small squares in the mark selection box is the reference), and move to the coordinate value Position and absolute position settings need to be clicked to take effect.

Scale: It is to directly modify the width and height attributes of the marker. If you check Keep aspect ratio, when you modify one of the width or height, the other will be modified proportionally; otherwise, it will not.  it becomes bigger and smaller in proportion.

Rotate: The user can choose counterclockwise or clockwise rotation and the angle according to the needs. Note that the angle here is a relative angle instead of an absolute angle.  Rotate 90 degrees to the left and right.

Invert: There are two modes, namely horizontal line flip and vertical line flip. Among them, the flipped horizontal line reference and vertical line reference are selected by the coordinate

reference below.  Flip horizontal lines and flip vertical lines.

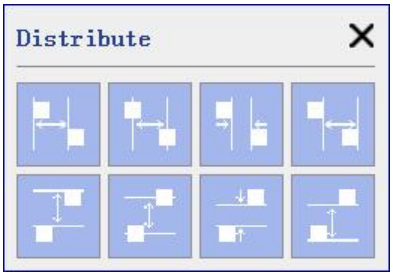
Tilt: The interface is similar to the rotating interface, the difference is that the rotation is the change in the angle of the mark according to the coordinate reference, and the tilt is the inclination of the mark. The angle here is still a relative angle.。

4.14 Distribution

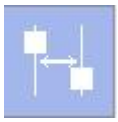
The function of distribution is to re-typeset multiple marks selected in the editing area according to the specified distribution method, so that they are distributed in the editing area at regular and equal intervals. The interface is shown in Figure 4-15.

Figure 4-15

There are 8 distribution rules, namely left end, horizontal center, horizontal spacing, right end, top end, vertical center, vertical spacing, bottom end.



 ：At the left end, use the left line of the mark as the basis for isometric left margin typesetting.

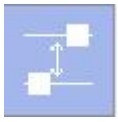
 ： Horizontal center, typesetting with equal center spacing based on the marked vertical bisector.

 ： Horizontal spacing, based on the mark spacing as the basis for the left and right equidistant typesetting.

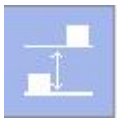
 : Right end, with equal right margin typesetting based on the right line of the

mark.

 : Top, set the top margin with equal top margin based on the top edge of the mark.

 : Vertical center, based on the horizontal bisector of the mark for layout with equal center spacing.

 : Vertical spacing, based on the marked spacing as the basis for typesetting up and down equally spaced.

 : Bottom, use the bottom line of the mark as the basis for typesetting with equal bottom margins.

4.15 Reorder

Sort the selected marks horizontally/vertically. As shown in Figure 4-16.

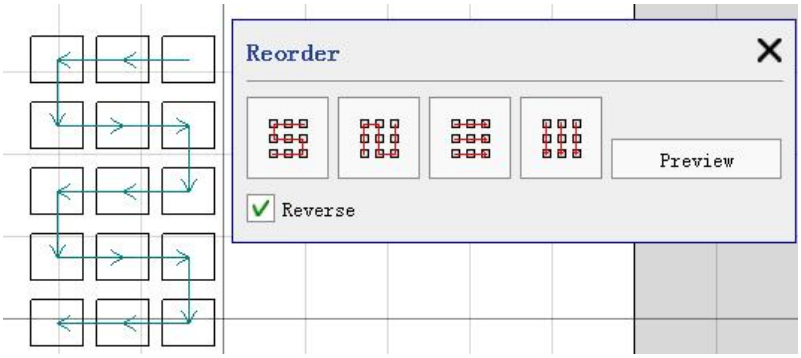
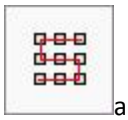
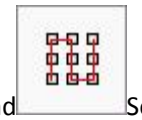
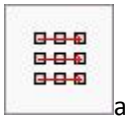
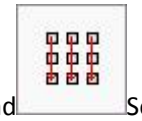


Figure 4-16

 and  Sort the horizontal and vertical bows.

 and  Sort horizontally and vertically in one direction.

4.16 Shape optimize/Auto connect

Shape optimize of the path to facilitate filling. As shown in Figure 4-17.

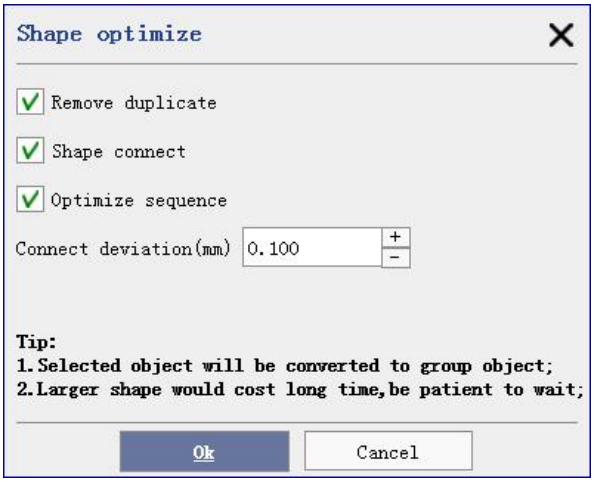


Figure 4-17

Remove duplicate: remove the coincident line path.

Shape connect: adjacent lines with connection error within the connection error value range are complete paths.

Optimize sequence: some lines that seem to be connected together may be out of order, as shown in the left figure of Figure 4-18, even if the line connection is checked, it will not work. At this time, check the optimize line order, that is It can be transformed into the path shown in the picture on the right of 4-18, and the lines are connected successfully**.**

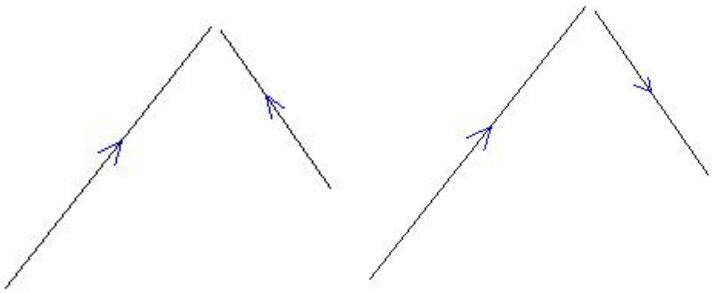


Figure 4-18

4.17 Generate Points

Generate Points set from the selected marker outline. As shown in Figure 4-19.

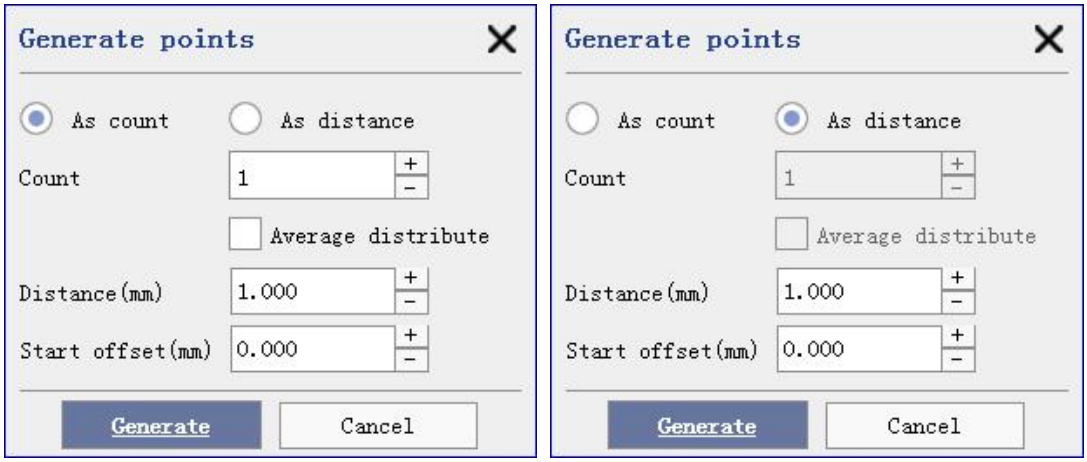


Figure 4-19

As count: create multiple points according to the number and spacing.

As distance: create in sequence from the first point to the last point of the marking outline according to the spacing value.

Start offset: Refers to how long to start before calculating and generating points.

4.18 Remove Intersection

Used to remove the intersection point inside the mark or between different mark lines。

4.19 Constant Width Setting

Set the width of the selected object to a uniform width.

The button of monospace setting in the menu bar is  。

4.20 Contour Setting

Set the height of the selected object to a uniform height.

The button for contour setting in the menu bar is  。

4.21 To Dashed Line

Turn the selected object line into a dashed line. As shown in Figure 4-20.

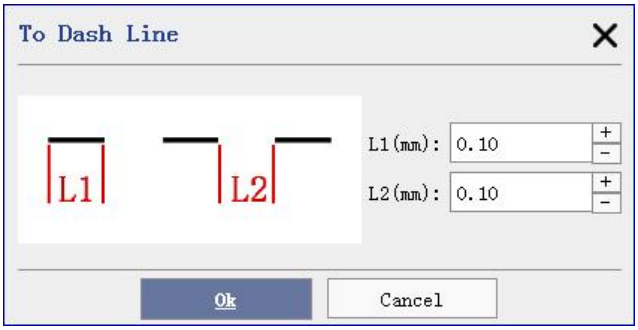


Figure 4-20

L1(mm)： The length of the short line in the dashed line, in millimeters.

L2(mm)： The length of the interval (ie blank) between the two short lines in the dashed line, in millimeters.

4.22 Clip

Cut off the intersection of the specified marking lines. As shown in Figure 4-21.

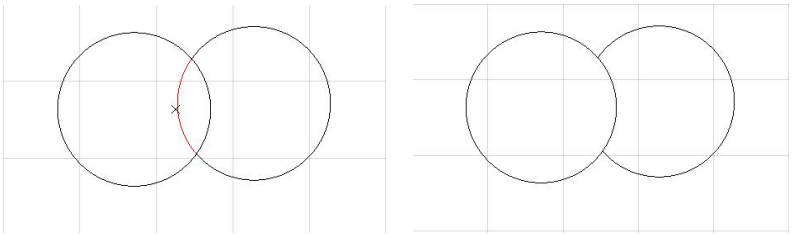


Figure 4-21

4.23 Sculpt

Process or optimize the lines that intersect the markers. As shown in Figure 4-22.

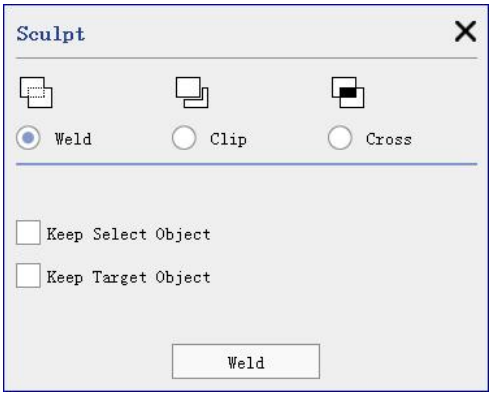


Figure 4-22

Weld: Fuse the intersecting marks and remove the lines that mark the intersecting part.

Clip: Cut off the original part of the target object.

Cross: Merge the intersecting marks, and only keep the intersecting part of the marks.

Keep Select Object: Do not delete the original object after the operation.

Keep Target object: Do not delete the target object after the operation.

4.24 Offset

According to the selected mark, create a mark that is offset in the direction of the mouse. As shown in Figure 4-23.

图 4-23

Offset distance: the offset distance between the newly created mark and the selected mark, in millimeters.

Number: The number of newly created tags.

Delete old curve: After creating a new offset mark, delete the selected mark.

5 Tools Bar

5.1 Axis Center

 To move the selected mark to the center of the view.

5.2 View

 Restore the initial size of the view.

 Zoom in the view area.

 Zoom out the view area.

 Watch current view area.

5.3 Login

 ， the engineer's default password is 000000. The administrator default password is 111111.

Login (CTRL+L): When not logged in, the user has no editing authority and can only open the edited document for marking.

Login can choose the status of engineer or administrator. The engineer can modify the document, and the administrator adds the modification of the hardware parameters of the laser marking machine (such as laser calibration, etc.) based on the engineer's authority. Engineer authority can log in automatically (if checked).

5.4 Hide Quick Toolbar

 To set whether to show/hide the quick bar.

5.5 Helps

 , Powermark Laser system help button.

6 Setting

The setting menu is shown in Figure 6-1.

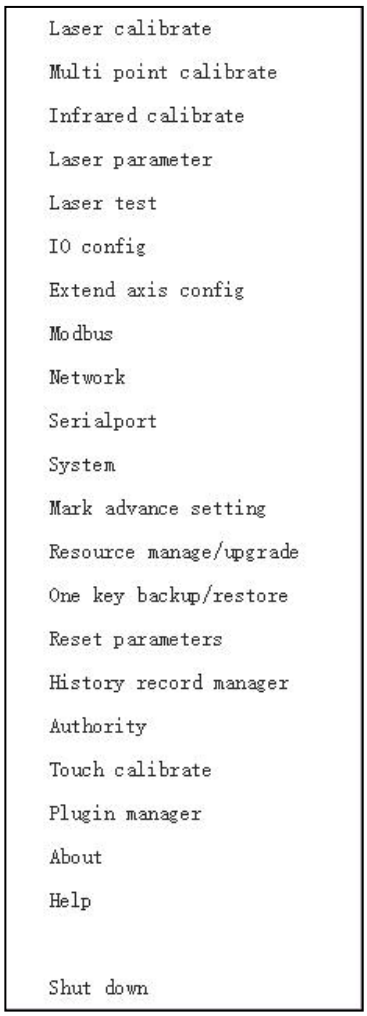


Figure 6-1

6.1 Laser calibrate

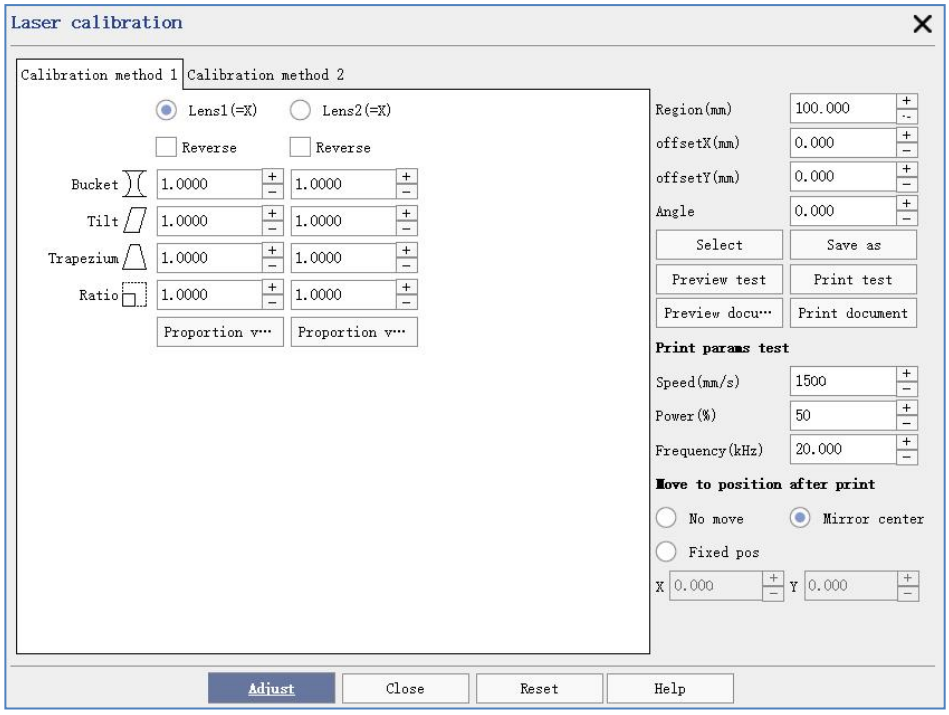


Figure 6-2-1 Calibration method 1

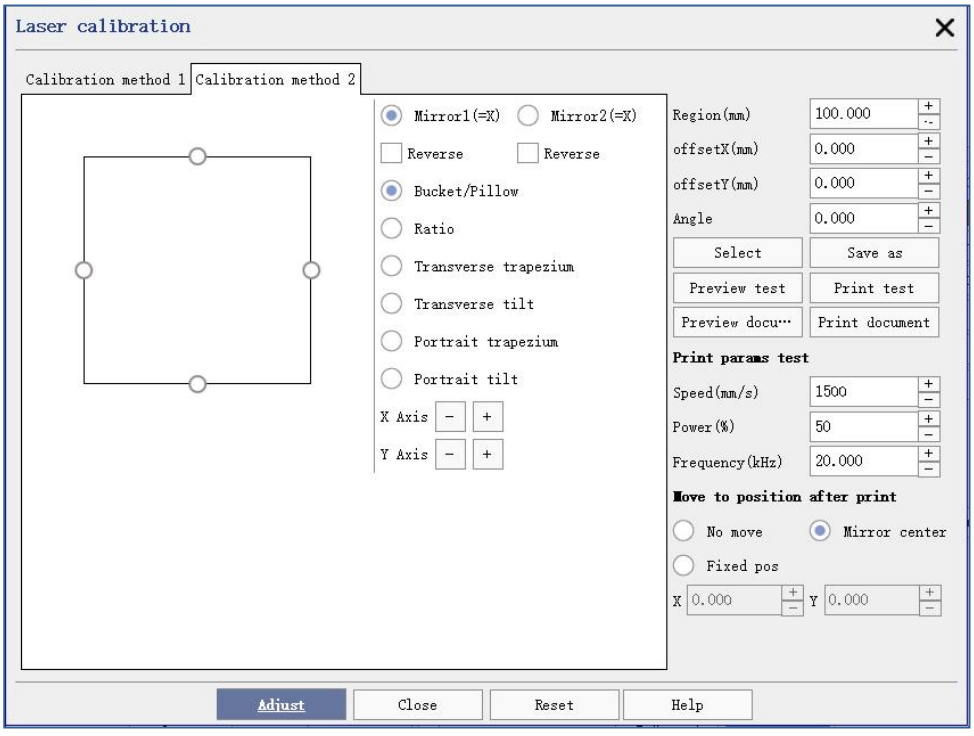


Figure 6-2-2 Calibration method 2

The galvanometer of the laser marking machine is composed of two galvanometers. Due to some physical characteristics of the lens and optical path problems, the actual engraved graphics

will be deformed. Properly adjusting the lens parameters will make the actual engraved graphics and the graphics designed in the software converge.

Lens1=X: It means that the galvanometer output signal 1 of the control card is the X axis of the user coordinate system, and the galvanometer output signal 2 is the Y axis of the user coordinate system.

Lens2=X: It means that the galvanometer output signal 2 of the control card is the X axis of the user coordinate system, and the galvanometer output signal 1 is the Y axis of the user coordinate system.

Reverse: Indicates that the output of the current galvanometer is reversed.

 **Bucket:** When barrel deformation occurs, this parameter needs to be accurately corrected.

 **Tilt:** When parallelogram deformation occurs, this parameter needs to be accurately corrected.

 **Trapezium：** When trapezoidal deformation occurs, accurate correction of this parameter is required.

 **Ratio:** If the expected size of the graph (the drawing size set in the software) and the actual size (the size of the graph sample actually engraved) do not match, the zoom ratio can be adjusted to correct it.

Region： The size of the working area is generally set to the actual maximum marking range corresponding to the galvanometer.

Offset X&Y： Under all normal conditions, the value of this field only needs to be set to X=0 and Y=0. If it is found that the engraved position is 5m to the right of the expected position, you should enter -5m in the X item of this column; the rest can be deduced by analogy.

Angle： The whole marking is rotated counterclockwise by a certain angle, in degree. Note that this parameter can only be set after calibration.

The sequence of lens parameter correction steps is as follows：

1、Galvanometer coordinate system calibration;

2、Galvanometer Reverse calibration；

3、Bucket calibration；

4、Tilt calibration；

5、Trapezium calibration；

6、Ratio calibration；

7、Offset calibration；

Step 1、Galvanometer coordinate system calibration

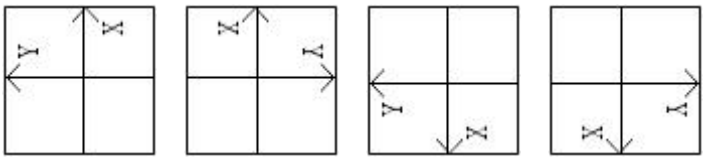
①Please Reset all current parameter；

②Adjust the focal length of the galvanometer；

③Set the area size， default is 100mm；

④Click Print test button；

⑤Check the marked X-axis, Y-axis and the position of the arrow. If one of the following four effect diagrams appears, select [Lens2 (=X)];



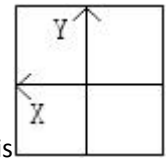
⑥The calibration of the XY axis coordinate system of the galvanometer is completed, please proceed to the following operations;

Step 2、Galvanometer Reverse Calibration

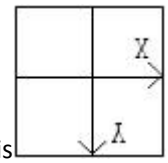
①Default [Reverse] of X-axis and Y-axis are not checked;

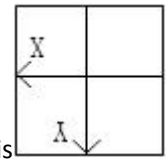
②Click Print test button；

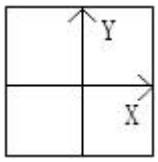
③Check the marking effect

- If the effect is 

， please check the [Reverse] of X axis；

- If the effect is 

, If the effect is；
- If the effect is 

, please check the [Reverse] of Y axis；
- If the effect is 

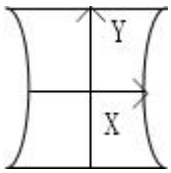
, it means that the galvanometer reverse correction has been completed, please proceed to the following operations；

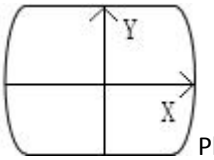
Step 3、Bucket Calibration

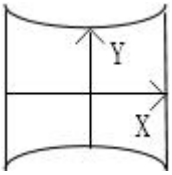
①The default X-axis and Y-axis [**Bucket**] parameters are both 1.0；

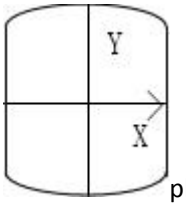
②Click Print test button；

③Check the marking effect.

- If the X axis effect is 

please reduce the X bucket parameter；if 

Please increase the X bucket parameter；
- If the Y axis effect is 

please reduce the Y bucket parameter；if 

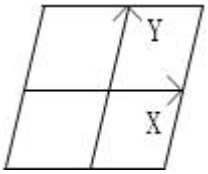
please increase the Y bucket parameter；

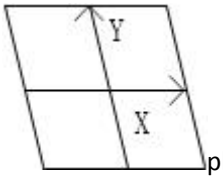
Step 4、Tilt Calibration

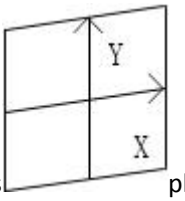
①The default X-axis and Y-axis tilt (parallelogram) parameters are1.0；

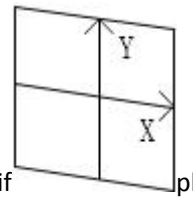
②Click Print test button；

③Check the marking effect

- If the X axis effect is 

please reduce the X tilt parameter；if 

please increase the X tilt parameter；
- If the Y axis effect is 

please reduce the Y tilt parameter；
- if 

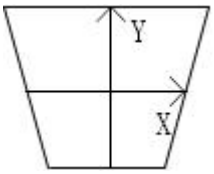
please increase the the Y tilt parameter；

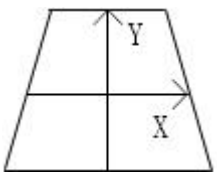
Step 5、Trapezium Calibration

①The default trapezium parameters of X axis and Y axis are1.0；

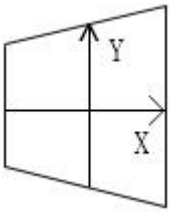
②Click Print test button；

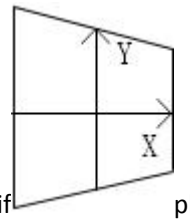
③Check the marking effect

- If the X axis effect is 

please reduce the X trapezium parameter；if 

please increase the X trapezium；

■ If the Y axis effect is 

please reduce the Y trapezium parameter；if 

please increase the Y trapezium parameter；

Step 6、Scale Calibration

①The default scale parameters of X axis and Y axis are1.01.0；

②Click Print test button；

③Measure the width of the marked rectangle, if it is not equal to the expected width, click the corresponding X axis Proportion v…，enter the expected width into【Target size】，enter the measured width into【Actual size】， Click OK and go back to the test operation in step ②；

④Measure the height of the marked rectangle, if it is not equal to the expected height, click the corresponding to the Y axis Proportion v…，enter the expected height into【Target size】，enter the measured height into【Actual size】，Click OK and go back to the test operation in step ②；

Step 7、Offset Calibration

①The default Offset parameters of X axis and Y axis are1.01.；

②Click Print test button；

③If the marked position is to the right than expected, decrease the X offset parameter; otherwise, increase the X offset parameter；

④ If the marked position is higher than expected, decrease the Y offset parameter; otherwise, increase the Y offset parameter；

DB15 Galvanometer interface description

The galvanometer control signal is a digital signal, which can be directly connected to the digital galvanometer. Since the digital signal transmission protocols used by the digital galvanometer are not exactly the same, it is necessary to confirm which transmission protocol the digital galvanometer uses. This product now only supports XY2-100 protocol。Note：Digital signal is recommended to use shielded twisted pair connection。

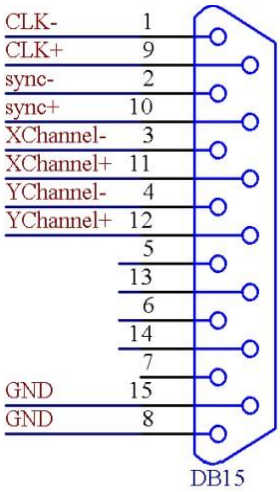


Figure 6-3 DB15 Galvanometer interface description

Pin number	Signal name	Specific instructions
1, 9	CLK-/CLK+	Clock signal-/clock signal+
2,10	SYNC-/SYNC+	Sync signal-/Sync signal+
3,11	XChannel-/ XChannel+	Galvo X signal-/ Galvo X signal +
4,12	YChannel-/ YChannel+	Galvo Y signal-/ Galvo Y signal+
5,13	NULL	Reserve
6,14	NULL	Reserve
7	NULL	Reserve
8,15	GND	land

6.2 Multi-Point Calibration

Including 9-point calibration, 25-point calibration and Excel calibration. For specific calibration methods, please refer to "Help for Multi-point Calibration"。

6.3 Infrared calibration

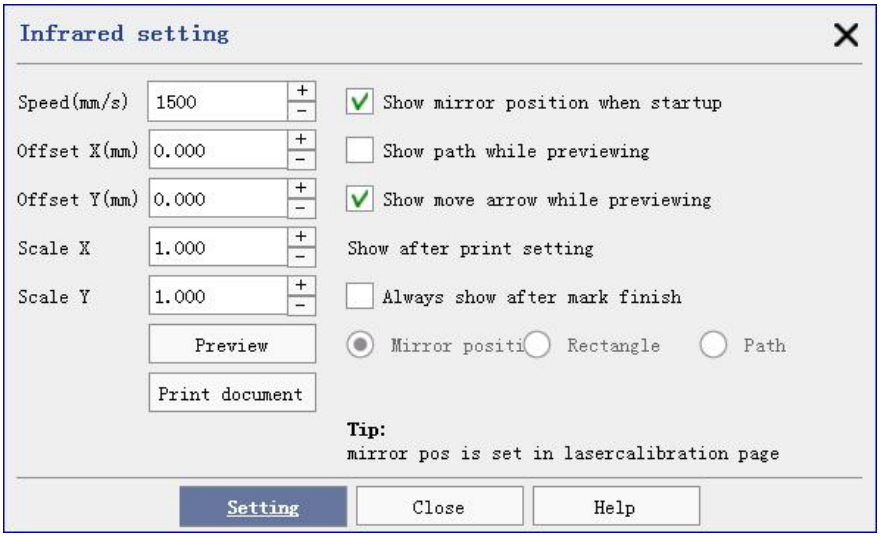


Figure 6-4 Infrared calibration interface

Generally, the laser marking machine is equipped with red light to realize functions such as preview and positioning. Since the position of the red light is generally not coincident with the position of the laser light, the red light needs to be corrected。

Before the red light is calibrated, the laser must have been calibrated.

Speed: during red light preview, the swing speed of the X and Y galvanometers.

Offset X: Comparison of red light preview and actual marking, offset value on X axis.

Offset Y: Comparison of red light preview and actual marking, offset value on Y axis.

Scale X: The red light preview is compared with the actual marking size, and the zoom on the X axis is zoomed in and out.

Scale Y: The red light preview is compared with the actual marking size, the zoom on the Y axis is zoomed in and out.

Show mirror position when start up: A red dot will be displayed at the center of the galvanometer after power-on.

Show path while previewing: When unchecked, after pressing red light to preview, a red light will indicate a rectangle of processing area. When checked, after pressing the red light preview, the specific marking path will be displayed. Note that when the marking file is too large (such as a picture), the effect of using red light to preview the outline is not good, and only a rectangle of the processing area is displayed.

Preview: Preview the current document after modifying the parameters, support the keyboard to move up, down, left, and right to modify the parameters. After stopping the preview, the calibration parameters will be automatically updated.

6.4 Laser Parameter

6.4.1 Fiber

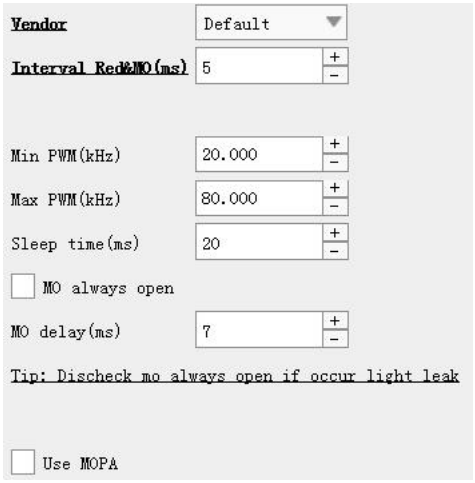


Figure 6-5 Fiber laser parameter interface

Min PWM : the minimum allowable frequency of the pwm signal of the laser.

Max PWM : the maximum allowable frequency of the pwm signal of the laser.

MO delay: Before the fiber laser emits light, the main oscillator needs to be turned on in advance. The light can only be emitted after the 7ms main oscillator is turned on by default. For specific delay, please check the laser instruction manual of the specific model.

Sleep time: After the fiber laser is finished marking, the main oscillator needs to be turned off to save energy. After the default laser marking is finished, after 20ms, the main oscillator is turned off. When frequent and fast marking is required, the sleep delay can be increased to make the interval between two markings shorter than the sleep delay, reducing the frequent switching of the main oscillator of the fiber laser.

Enable MOPA: When the laser is MOPA, please check this option.

Power Mapping: Set the ratio of the user-defined power to the actual power to achieve the printing effect corresponding to the actual power.

Vendor: You can select the laser manufacturer and model/serial, and automatically update the above parameters.

Fiber laser DB25 PIN description

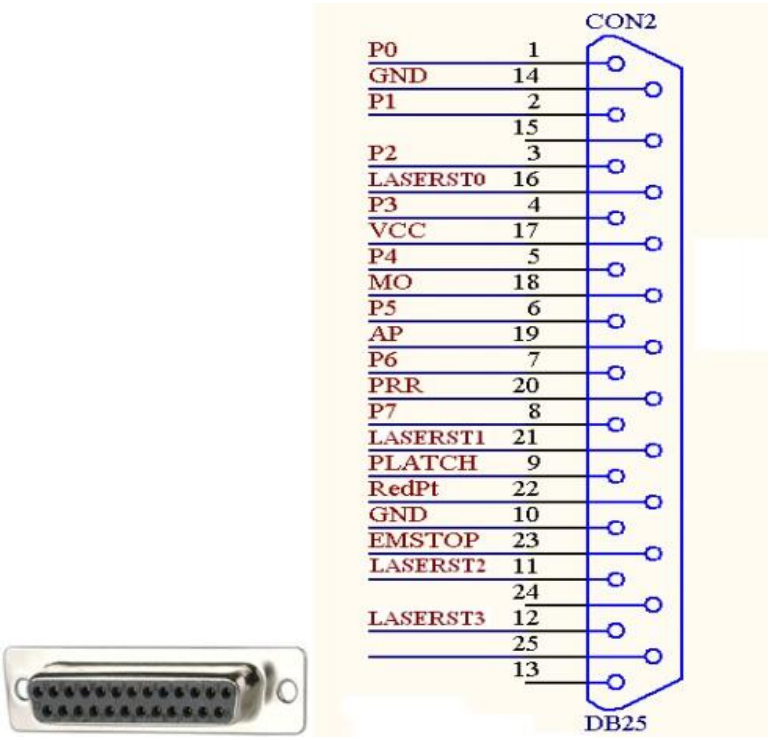


Figure 6-6 fiber laser DB25 PIN

Pin number	Signal name	Specific description
1-8	P0-P7	Laser power. TTL output
9	PLATCH	Power latch signal. TTL output
10,14	GND	Reference ground of control card
11,12,16,21	LASERST0-3	Laser status input
17	VCC	5V power output of control card
18	MO	Main oscillator switch signal. TTL output
19	AP	Power amplifier switch signal. TTL output
20	PRR	Repetitive pulse frequency signal. TTL output
22	RedPt	Red light indication. TTL output
23	EMSTOP	Emergency stop switch signal. TTL output
13,15,24,25		This pin is floating, not connected

6.4.2 CO_2

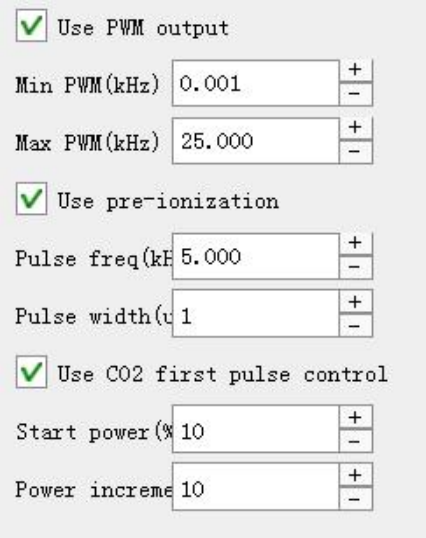


Figure 6-7 CO2 laser parameter interface

Enable PWM output: the co2 laser enables pwm to control the power. After disabling this, the power of the co2 laser cannot be adjusted. It is always marked with the maximum power, and other parameters have no effect.

Min PWM: the minimum allowable frequency of the pwm signal of the laser.

Max PWM: the maximum allowable frequency of the pwm signal of the laser.

Use pre-ionization: enable the pre-ionization signal. Some co2 lasers need this signal to work normally.

Pulse freq: The pulse frequency of the pre-ionization signal.

Pulse width: The pulse width of the pre-ionization signal.

Start CO2 first pulse suppression: This function is to solve the problem of marking on CO2 machines, the laser power

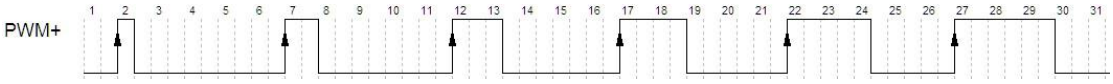
If it is too strong or the interval time is longer, the laser energy will accumulate more, which will cause the phenomenon of "first dot repetition" at the beginning of marking.

Start power: After the light is emitted, the power of the first pulse is the percentage of the set marking power.

Power increment: starting from the first pulse, the percentage increase of the next pulse

will increase to the set marking power.

Example: Suppose you need to type a "TEXT" text, the marking power is set to 80%, the starting power is 10%, and the power increment is 20%. After switching on, the power of the first pulse is 8%, the power of the second pulse is 24%, the power of the third pulse is 40%, the fourth pulse is 56%, the fifth pulse is 72%, the sixth pulse is 80%, and the rest is 80%. , Until the light is off. As can be seen from the figure below, the pulse width continues to increase to the specified power since the light is turned on.



Power Mapping: Set the ratio of the user-defined power to the actual power to achieve the printing effect corresponding to the actual power. Most co2 lasers can use the default power mapping, and the coherent co2 laser power mapping table needs to be modified, and its maximum power only corresponds to 60%.

CO_2 laser DB25 pin description

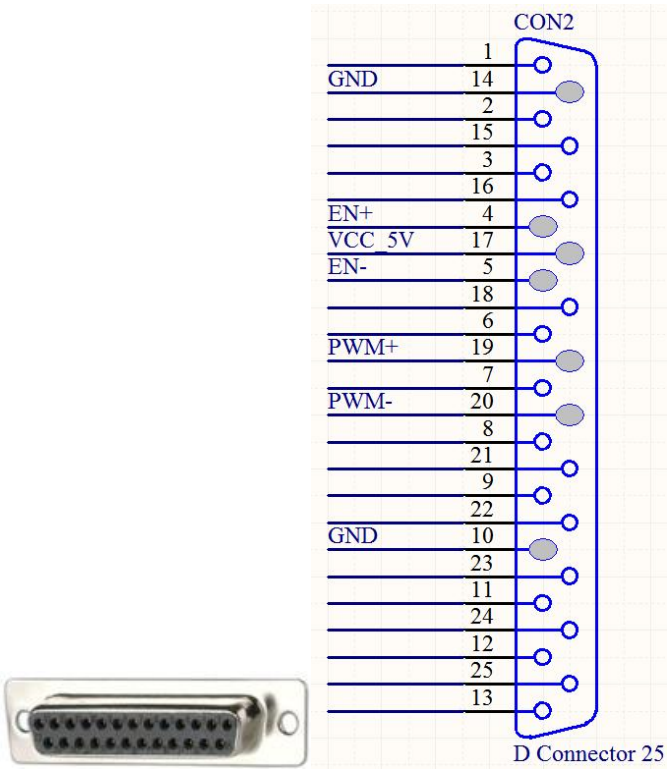
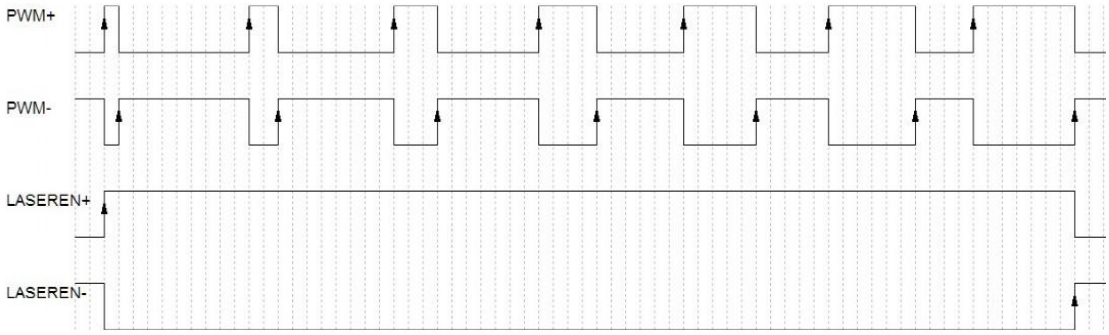


Figure 6-8 C0 laser DB25 Pin

Pin number	Signal name	Specific description
4	P3 (CO2_LASER_EN+)	Co2 laser enable signal +. TTL output
5	P4(CO2_LASER_EN-)	co2 laser enable signal -. TTL output
19	AP(CO2_PWM+)	co2 laser pwm+ output. TTL output
20	PRR(CO2_PWM-)	co2 laser pwm- output. TTL output
10,14	GND	Reference ground of control card
17	VCC	5V power output of control card

co2 Laser waveform



Illustrate：

(1) Pin 19 is the PWM+ signal of co2 laser. Corresponding to the PWM+ of the waveform diagram;

(2) Pin 20 is the PWM-signal of the co2 laser. Corresponding to the PWM- of the waveform diagram;

(3) Pin 4 is the co2 laser enable signal +. Corresponding to the LASEREN+ of the waveform diagram;

(4) Pin 5 is the co2 laser enable signal -. LASEREN-corresponding to the waveform graph；

Generally, the co2 laser only needs to be connected to pin 19 to be able to mark normally. When some laser marking needs PWM differential signal, it is necessary to connect 19 pins and 20 pins at the same time. There are also some lasers that need to be connected to the enable signal, so pin 4 must be added; when the enable signal is differential, it needs to be connected to pin 4 and pin 5 at the same time.

Example 1: The M series CO2 laser of Wuhan Jingshi Optoelectronics Technology Co., Ltd. only needs PWM pin 19 and reference ground pin 10.

Example 2: Diamond G100/G150/E150 laser needs an enable signal pin 4, a pair

of differential signal pins 19 and 20, and the reference terminal ground pin 10.

6.4.3 YAG

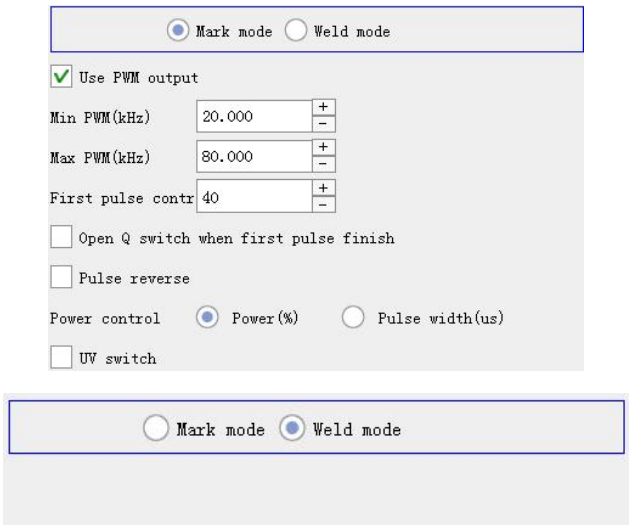


Figure 6-9 YAG laser parameter interface

It is divided into marking mode and welding mode. In different modes, the pen number (marking parameter) interface is different. If the laser is used for marking, please select the **marking mode**; if it is used for welding, please select the **welding mode**.

Use PWM output: YAG (ultraviolet) laser enables PWM control power. After disabling this, the YAG (ultraviolet) laser power cannot be adjusted。

Min PWM: the minimum allowable frequency of the pwm signal of the laser.

Max PWM: the maximum allowable frequency of the pwm signal of the laser.

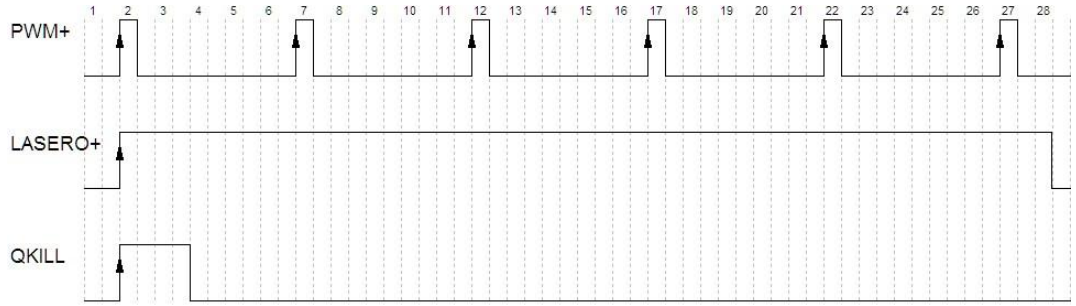
First pulse control: the duration of the first pulse suppression signal when the laser is turned on. It is used to avoid the occurrence of match heads or key points in the switch position.

Open Q switch when the first pulse finish: When the laser is turned on, wait for the first pulse suppression signal to end before turning on the Q switch, otherwise the Q switch will be turned on when the first pulse suppression signal is turned on.

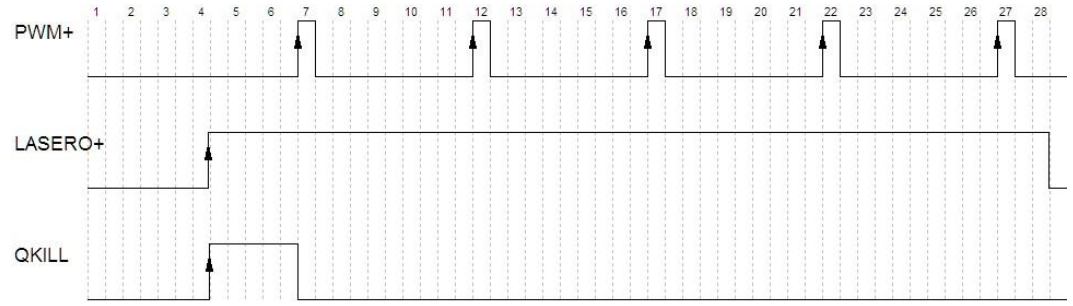
Pulse reversel: Change the high level of the PWM pulse to low level, and the corresponding low level to high level and shift it by the corresponding phase angle to meet the requirements of the PWM low-level effective Q driver.

The figure below shows that the first pulse suppression signal is generated at the same time

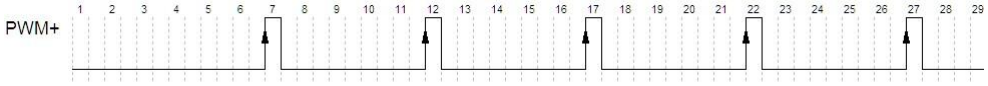
as the PWM signal.



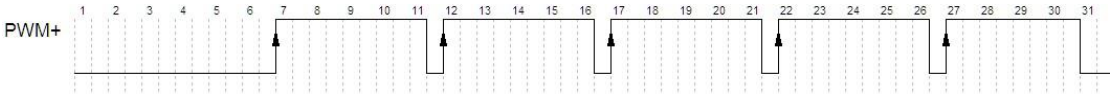
The figure below shows the PWM signal output after the first pulse suppression signal ends.



The following figure shows the PWM signal before the pulse width inversion.



The following figure shows the PWM signal after the pulse width is inverted.



YAG Laser DB25 pin description

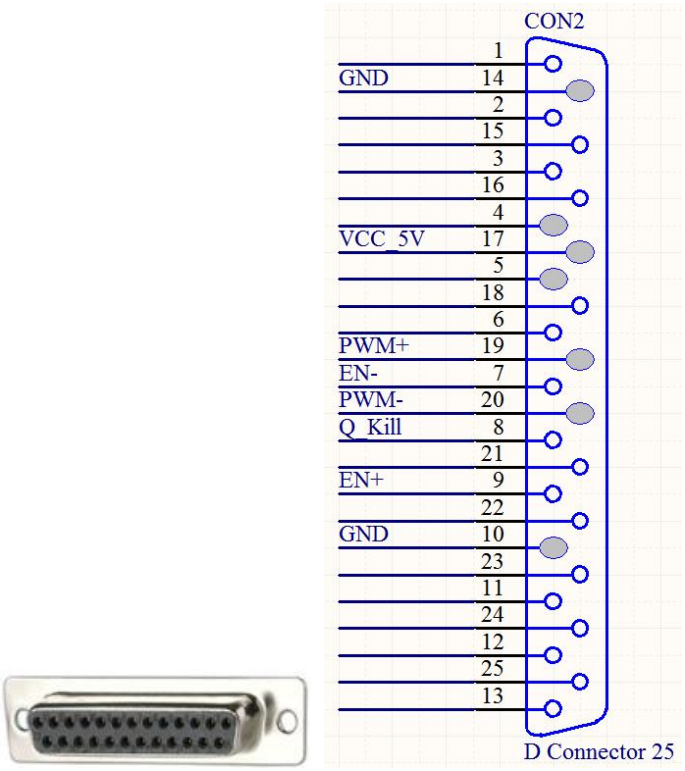
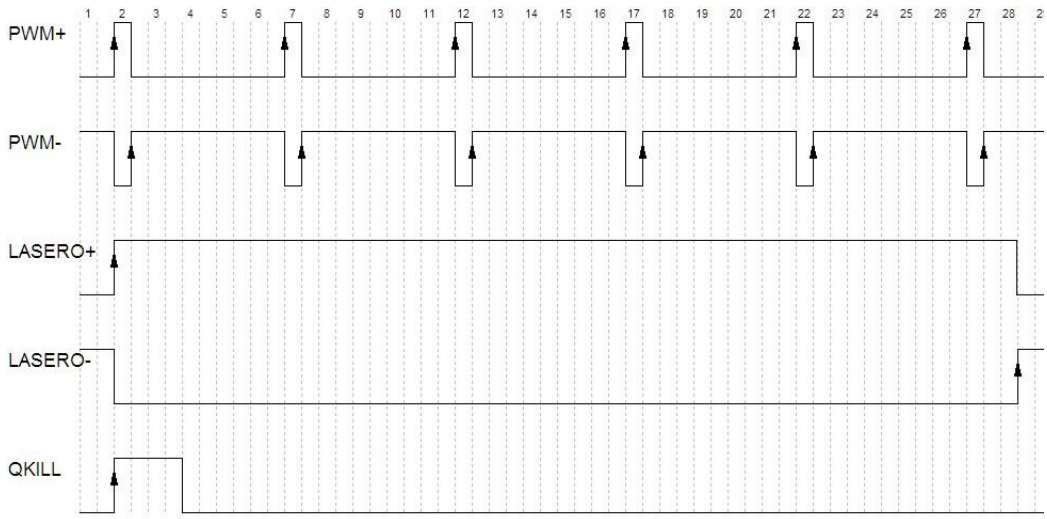


Figure 6-10 **Laser DB25 pin description**

Pin number	Signal name	Specific description
9	PLATCH (YAG_LASERO+)	YAG laser switch signal + (shutter signal). TTL output
7	P6(YAG_LASERO-)	YAG laser switch signal-(shutter signal). TTL output
8	P7(YAG_QKILL)	YAG laser first pulse suppression signal. TTL output
19	AP(YAG_PWM+)	YAG laser pwm+ output. TTL output
20	PRR(YAG_PWM-)	YAG laser pwm-output. TTL output
10,14	GND	Reference ground of control card
17	VCC	5V power output of control card

YAG Laser waveform



Illustrate ：

(1) Pin 19 is the YAG laser PWM+ signal. Corresponding to the PWM+ of the waveform diagram;

(2) Pin 20 is the YAG laser PWM- signal. Corresponding to the PWM- of the waveform diagram;

(3) Pin 9 is the YAG laser shutter signal +. LASERO+ corresponding to the waveform diagram;

(4) Pin 7 is the YAG laser shutter signal -. LASERO- corresponding to the waveform diagram;

(5) Pin 8 is the first pulse suppression signal of YAG laser. QKILL corresponding to the waveform diagram;

There is no typical connection method for YAG solid-state lasers, so you need to connect them according to the characteristics of the laser. Two typical examples are provided below:

(1) The PULSE pin of Ruifengheng laser is connected to pin 19 of the control board, the GATE pin is connected to pin 9 of the control board, the FPS pin is connected to pin 8 of the control board, and the Gate Input of Ruifengheng is set to ext, and the Trig mode is ext. , FPS Input is ext.

(2) The LASER+ pin of JPT DPSSLP-UV-3/5-AIO's purple solid-state laser is connected to the control board pin 7, and the PWM pin is connected to the control board pin 19.

UV switch: used to set the automatic switch laser (such as Innova and Huari's ultraviolet laser).

6.4.4 Analog

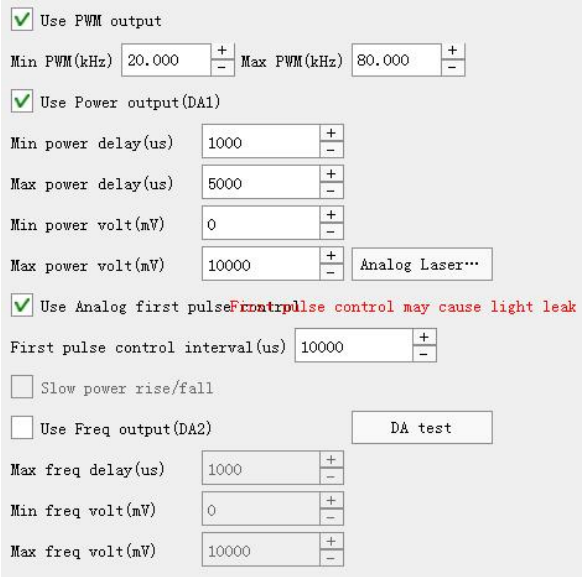


Figure 6-11 Simulated laser parameter interface

Use PWM output: simulate the laser to enable output PWM. The corresponding frequency is set by the frequency corresponding to the pen number parameter, and is limited by the minimum PWM signal and the maximum PWM signal. The pulse width (high level) of PMW is set by the pen number parameter pulse width. If the duty cycle exceeds 100%, it is automatically set to 99% duty cycle.

Min PWM: The minimum allowable frequency of the laser's PWM signal.

Max PWM: the maximum allowable frequency of the laser's PWM signal.

Use Power output: enable analog power output. The laser power is set by the analog voltage, and is limited by the minimum power delay, the maximum power delay, the minimum power voltage, and the maximum power voltage.

Minimum power voltage: the analog output voltage corresponding to the minimum power, generally 0mV.

Max power volt: the analog output voltage corresponding to the maximum power, generally 5000mV or 10000mV.

When the option of enabling analog first pulse suppression is not turned on, as shown in the figure

below:

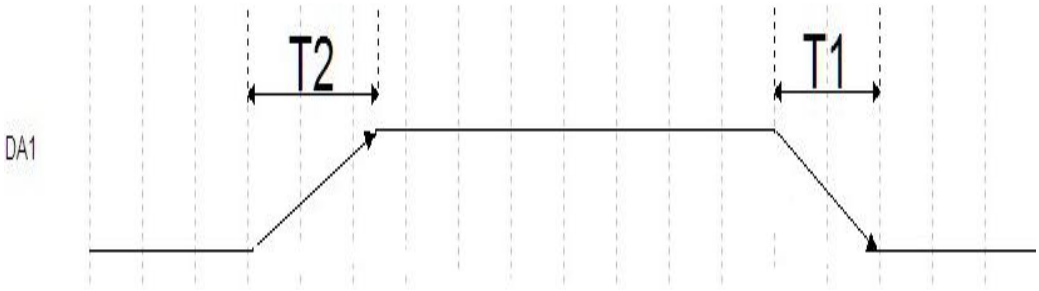


Figure 6-12

T2 Max power delay: the time required to rise from the minimum power voltage to the maximum power voltage. If the minimum voltage is 0V and the maximum voltage is 10000mV, the time to rise from 0V to 10000mV is 20000us.

T1 Min power delay: the time required when the voltage drops from the maximum power 1 to the minimum power voltage.

The power change process occurs when the laser is not turned on.

When the option of enabling analog first pulse suppression is turned on, as shown in the figure below:

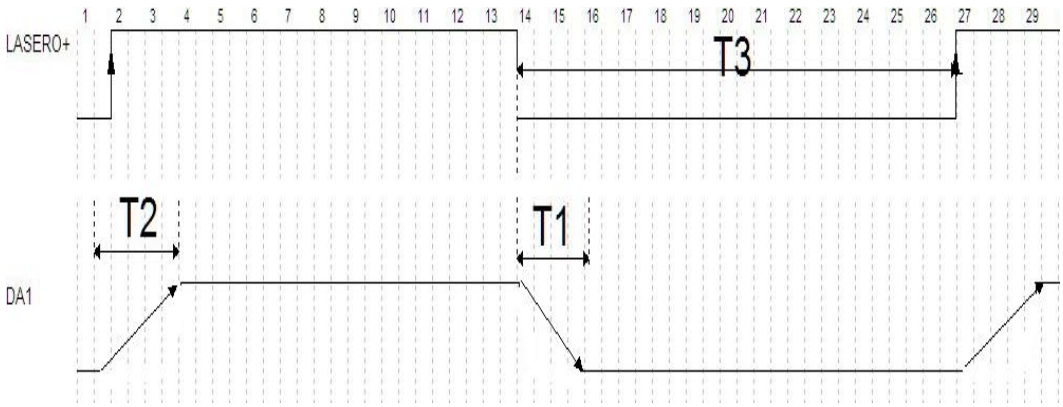


Figure 6-13

T2 Maximum power delay: the time required to rise from the minimum power voltage to the maximum power voltage. If the minimum voltage is 0V and the maximum voltage is 10000mV, the time to rise from 0V to 10000mV is 20000us.

T1 minimum power delay: the time required when the voltage drops from the maximum power 1 to the minimum power voltage.

The power change process occurs when the laser is not turned on.

When the option of **enabling analog first pulse suppressi**on is turned on, as shown in the figure below:

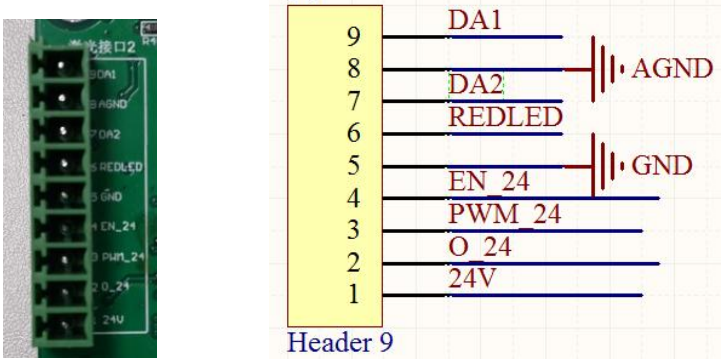


Figure 6-14

PIN No.	Signal Name	Specific Description
1、	DA1	Analog signal 1 output, generally used as power output
2	AGND	Analog ground, return ground for analog output
3	DA2	Analog signal 2 output
4	RUNLED	Red light output, TTL output
5	GND	land
6	RESV	Reserve
7	PWM_24	24V level, used as 24V modulation signal
8	EN_24	24V level, used as 24V shutter signal
9	24V	24V power output

Waveform diagram of modulation signal and shutter signal

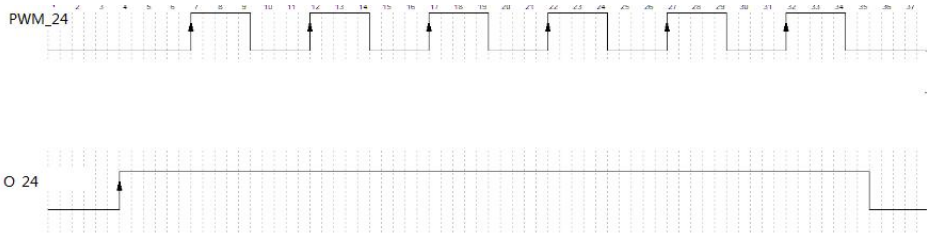
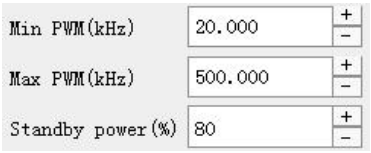


Figure 6-15

The high level outputs 24V, and the low level outputs 0V.

6.4.5 SPI Laser



6-16 SPI laser parameter interface

Min PWM: The minimum allowable frequency of the laser's PWM signal.

Max PWM: the maximum allowable frequency of the laser's PWM signal.

Standby power: The standby power of the laser.

6.4.6 Status message

After enabling, set the corresponding error message according to the status of the laser interface pin. When the pin is in an abnormal state, the laser ready signal is low (not ready state). For details, please refer to [Powermark laser preparation output port description (static)].

6.5 Laser test

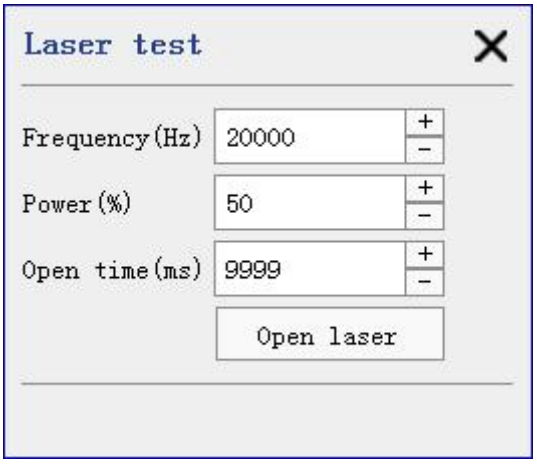


Figure 6-17 laser test interface

After turning on the laser, it will always be in the light-emitting state, which is generally used to verify whether the power is normal.

6.6 IO Configuration

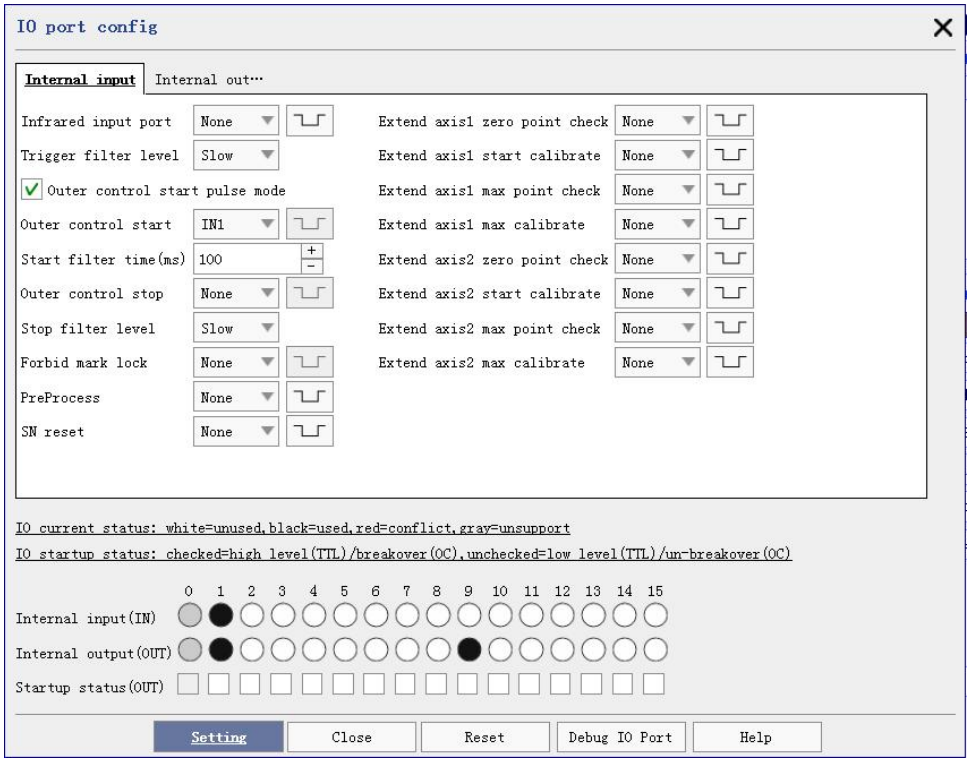


Figure 6-18-1 IO Configuration interface (general)

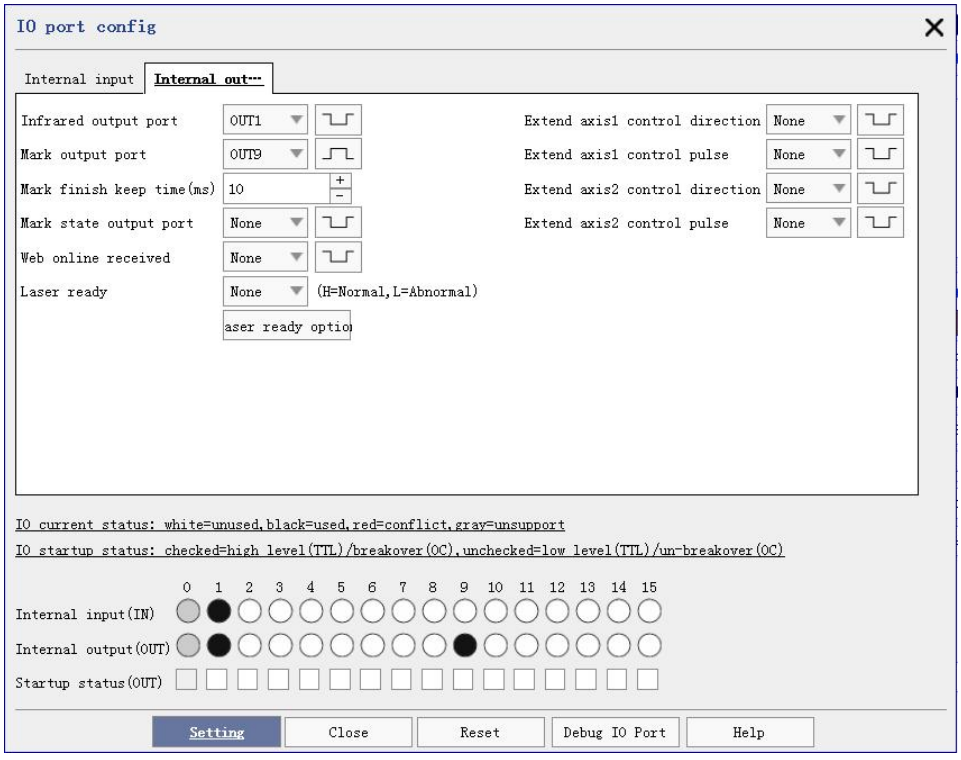


Figure 6-18-2 IO Configuration interface (expansion port)

6.6.1 Port explanation

 It is the polarity selection button, which means the low level is valid.

 It is the polarity selection button, which means high level is valid.

Both input port and output port can be configured manually. According to the silkscreen marks written on the control board, the input ports are generally IN1, IN2, etc., and the output ports are generally OUT1, OUT2, etc.

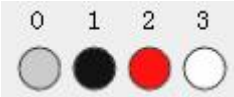
Example:

If the trigger input port is selected as 1, the polarity is  ， Indicates that when the control board port IN1 changes from high level to low level, it will send a trigger signal to the program.

If the red light indicator output port is selected as 1, the polarity is  ， Indicates that when the red light action is started by clicking or IO triggering, the control board port OUT1 changes from low level to high level.

IO port status

example:



Port 0 (gray) indicates that it is not supported, port 1 (black) indicates that it has been used, and port 2 (red) indicates that there is a conflict (that is, port 2 is selected for multiple ports. At this time, you need to check and re-modify the port number before setting. Success), port 3 (white) means it is not used.

6.6.2 Internall input

Infrared Intput port: control the start of the red light input port.

Trigger filter level: the filter level is fast, which means that the trigger signal needs to continue for more than 20us to be able to trigger successfully; the filter level is slow, which means the trigger signal lasts for more than 20ms to be able to trigger successfully.

Outer control start pulse mode: Checked means that the external input control port is pulse triggered (such as high level → low level or low level → high level); unchecked means that the external input control port is level triggered (such as input If the port is always in the set level state, it will always trigger to start marking).

Outer control start: equivalent to manually clicking the "marking" button on the screen (usually pedals, relay switches, buttons, etc.).

Start filter time: within this time after the external start marking is triggered, the external start marking signal is ignored, which is used to filter multiple start markings caused by false triggers or interference.

Outer control stop: It is equivalent to manually clicking the "Stop" button on the screen.

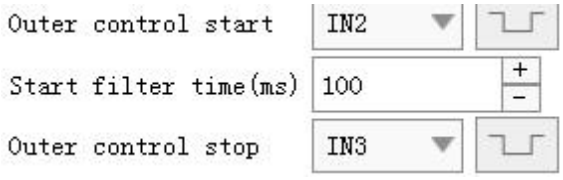
Stop filter level: the filter level is fast, which means that the signal needs to continue for more than 20us to stop marking; the filter level is slow, which means that the signal lasts for more than 20ms to stop marking.

Prohibit mark lock: prohibit all start marking operations, and enable the protection function.

PreProcess: equivalent to clicking the [marking pretreatment (F8)] button in the marking column;

SN reset: trigger to reset the serial number.

Example：



When the input port IN2 (pin 8) is connected to the ground, it will generate a start marking signal;

When the input port IN3 (pin 7) is connected to the ground, it will generate a stop marking signal;

Extend axis1 zero point check: the extended axis1 detects the zero switch signal.

Extend axis1 start calibrate: After triggering, the expansion axis 1 zero point correction is automatically executed.

Extend axis1 max point check: The expansion axis 1 detects the signal of the positive limit position.

Extend axis1 max check: After triggering, the expansion axis 1 max point correction is automatically executed.

Extend axis2 zero point check: the extended axis2 detects the zero switch signal.

Extend axis2 start calibrate: After triggering, the expansion axis2 zero point correction is automatically executed.

Extend axis2 max point check: The expansion axis2 detects the signal of the positive limit position.

Extend axis2 max check: After triggering, the expansion axis2 max point correction is automatically executed.

6.6.3 Internal output

Infrared output port: the signal that controls the red light preview.

Mark output port: every time a marking is completed, this port will output a valid pulse. The duration of the pulse is set by the parameter "**Marking completion duration**". When the duration is valid, a new round of marking starts at this time, and the new marking completion signal is automatically ignored.

Mark state output port: indicates the status of marking.

Web online received: Use with "Start Web Service" in "Setting-Network ".After the software receives the content of the web page, the output port will output a signal.

Laser ready: Only the fiber laser is effective. The output of this signal indicates that the laser is operating normally. For detailed instructions, please refer to "Powermark Laser Preparation Output Port Instructions".

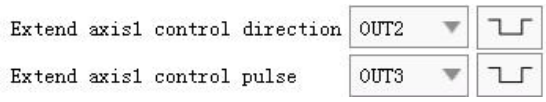
Extend axis1 control direction: The signal of the expansion axis1 that controls the direction of rotation of the stepper motor.

Extend axis1 control pluse: The pulse signal of the extended axis1 that controls the rotation of the stepper motor.

Extend axis2 control direction: The signal of the expansion axis2 that controls the direction of rotation of the stepper motor.

Extend axis2 control pluse: The pulse signal of the extended axis2 that controls the rotation of the stepper motor.

Example：



The output port OUT2 (pin 13) controls the rotation direction of the expansion axis 1.

The output port OUT3 (pin 10) controls the rotation of the expansion axis 1.

6.6.4 Debug IO port

Used to test whether the IO port is normal.

When the control panel has input status, the input port interface button lights up.

When the output port interface button is pressed, the system changes the state of the corresponding control board output port, and the external device can detect whether there is output.

6.6.5 DB15 Expansion IO port description

This interface can be used for the input and output of the IO port to control the marking of the system, as shown in the figure below：

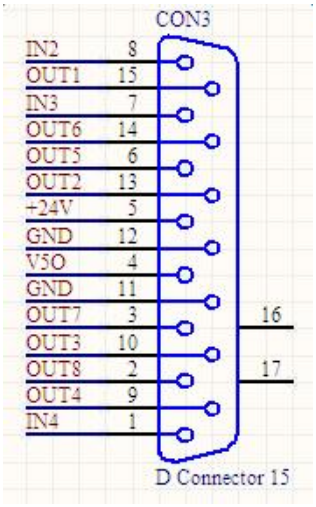


Figure 6-19-1 DB15Expansion IO Port

PIN No.	Signal Name	Specific Description
1	IN4	24V optocoupler input 4, forming a loop with GND
2	OUT8	Configurable OC door output port 8
3	OUT7	Configurable OC door output port 7
4	5V	5V output, forming a loop with GND
5	24V	24V output, forming a loop with GND, this output is the same voltage as the power input
6	OUT5	Configurable TTL output port 5
7	IN3	24V optocoupler input 3, forming a loop with GND
8	IN2	24V optocoupler input 2, forming a loop with GND
9	OUT4	Configurable TTL output port 4
10	OUT3	Configurable TTL output port 3
11, 12	GND	land
13	OUT2	Configurable TTL output port 2
14	OUT6	Configurable OC door output port 6
15	OUT1	Configurable TTL output port 1

6.6.6 DB25 Expansion IO port description

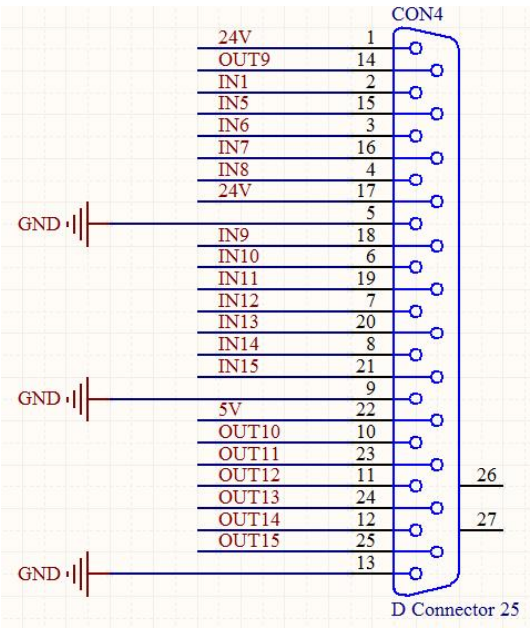
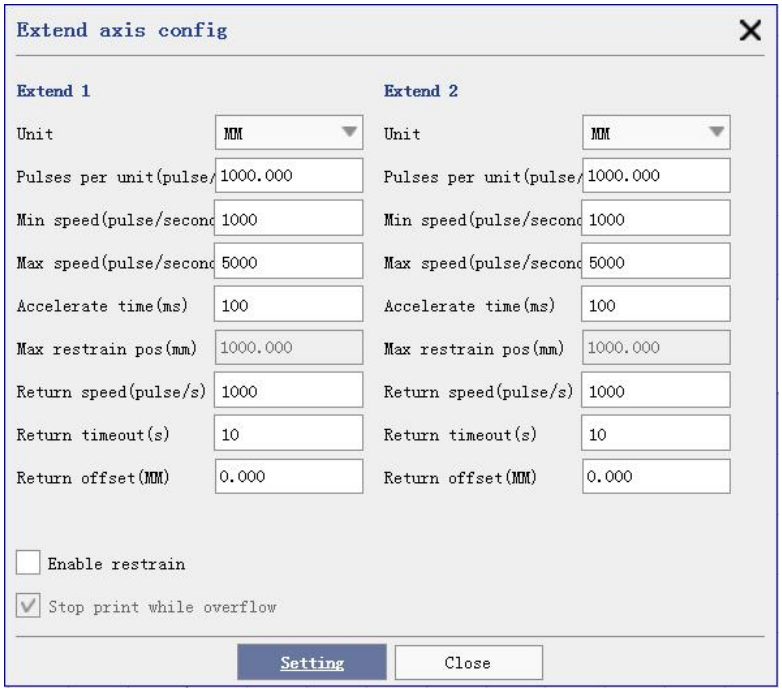


Figure 6-19-2 DB25 connection port

PIN No.	Signal Name	Specific Description
1, 17	24V	24V output
2	IN1	24V optocoupler input 1, forming a loop with GND
3	IN6	24V optocoupler input 6, forming a loop with GND
4	IN8	24V optocoupler input 8, forming a loop with GND
5, 9, 13	GND	GND ground
6	IN10	24V optocoupler input 10, forming a loop with GND
7	IN12	24V optocoupler input 12, forming a loop with GND
8	IN14	24V optocoupler input 14, forming a loop with GND
10	OUT10	Configurable TTL output port 10
11	OUT12	Configurable TTL output port 12
12	OUT14	Configurable TTL output port 14

14	OUT9	OC output port 9 can be configured to form a loop with 24V, and an external relay can be connected
15	IN5	24V optocoupler input 5, forming a loop with GND
16	IN7	24V optocoupler input 7, forming a loop with GND
18	IN9	24V optocoupler input 9, forming a loop with GND
19	IN11	24V optocoupler input 11, forming a loop with GND
20	IN13	24V optocoupler input 13, forming a loop with GND
21	IN15	24V optocoupler input 15, forming a loop with GND
22	5V	5V output
23	OUT11	Configurable TTL output port 11
24	OUT13	Configurable TTL output port 13
25	OUT15	Configurable TTL output port 15

6.7 Expend axis configuration



Unit:Optional MM(millimeters), Pulse and Angle.

Pulses per unit:The number of pulses output per millimeter or the number of pulses output

per angle.

Min speed:The minimum speed of the expansion axis movement(pulses per second).

Max speed:The maximum speed of the expansion axis movement(pulses per second).

Accelerate time:The time required for the expansion axis to accelerate from the minimum speed to the maximum speed.

Max restrain pos:It is only valid after checking "Enable restrain". During the movement of the expansion axis, when the positive limit input signal is detected, the laser system will set the current position to the value of this item.

Return speed:The speed when the expansion axis returns to the zero point.

Return timeout:The maximum time for the extended axis to return to the zero point.

Return offset:The position offset of the extended axis after returning to the zero point.

Enable restrain:Check to enable restrain.

Stop print while overflow:It is only available after checking "Enable Limit", and stops printing when the limit is exceeded.

6.8 System

Click the system menu and the system setting dialog box will pop up, as shown in the figure below.

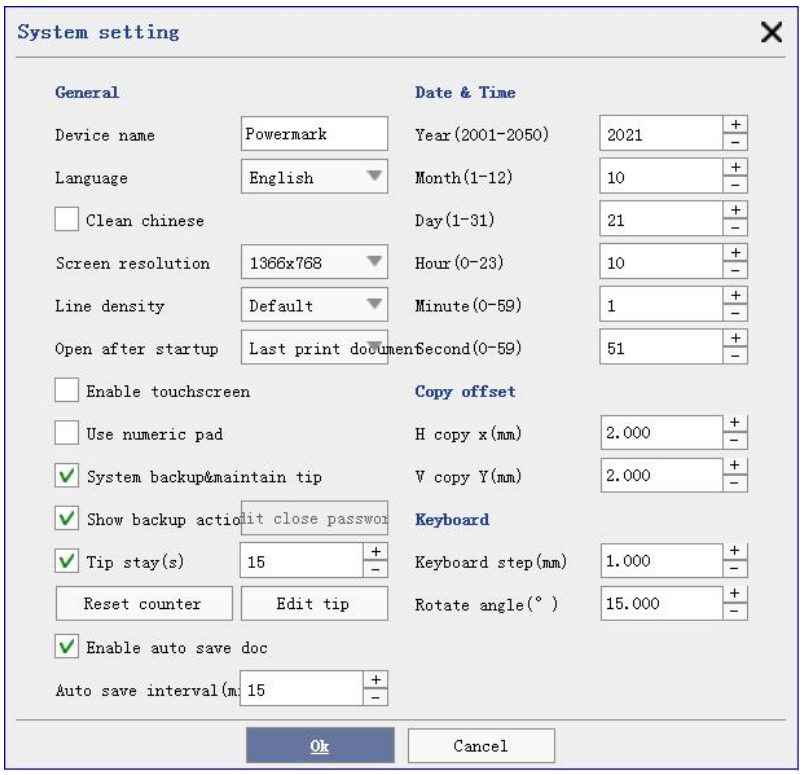


Figure 6-21 Systems setting

Language: The language of the laser marking machine system, currently supports Arabic, Simplified Chinese, Traditional Chinese and English, French, German, Italian, Japanese, Korean, Russian, Spanish, Turkish, and Vietnamese.

Screen resolution: When the resolution of the connected monitor is different, modify this parameter to get a better display effect.

Keyboard distance step: The unit is millimeter (mm), which means that the direction keys of the external keyboard are used to control the step length when the mark is moved.

Keyboard angle step: The unit is angle (°), which means using the Ctrl+direction keys of the external keyboard to control the rotation angle of the marker.

Line density: There are three options: default, high and low. Modifying this option will change the fineness of the laser marking machine system when drawing marks containing arcs. In the case of low line density, the arc will be displayed as fewer polyline segments, that is, the degree of smoothness will be reduced, thereby increasing the display speed; on the contrary, in the case of high line density, the arc will be more rounded and the display speed will be reduced. If there are a large number of arcs when using the array function, the running speed may be reduced. At this time, it is recommended that the user reduce the line density to increase the

running speed. Under normal circumstances, the default is sufficient. As shown in the figure below, the display effects of circles (with a size of 1mm) corresponding to different line densities:

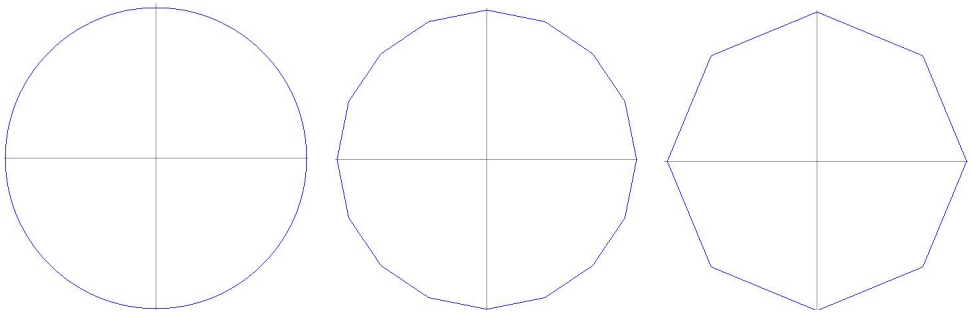


Figure 6-22 The line density from left to right is high, default, low

Open after start: Open the last marked document or edited document after the system is started.

Enable touchscreen: check this option when using an external touch screen.

Use numeric pad: After enabling and restarting the system, a numeric keypad will pop up in the numeric input box. As shown below:

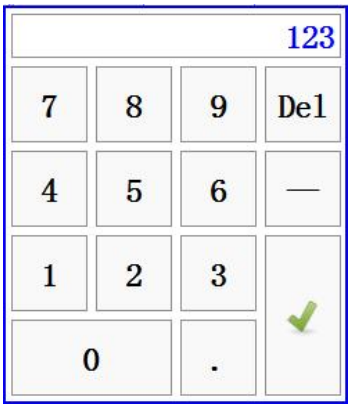


Figure 6-23 Numeric keypad

System backup&maintain tip: The system will pop up the reminder for backup and maintenance every month. You can click [Edit reminder] to modify the reminder content.

DateTime: Contains year, month, day, hour, minute, and second. When there is a difference between the system time and the actual time, you can modify the system time here.

Copy offset: After setting the copied marked object, the offset distance between the new object and the copied object.

6.9 Serial port

Clicking on the serial port menu will pop up the serial port setting dialog box, as shown in the figure below.

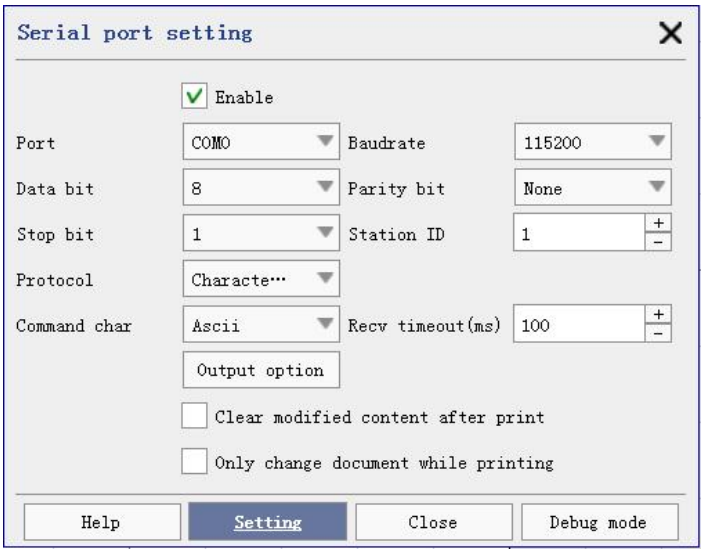


Figure 6-24-1 Serial port setting

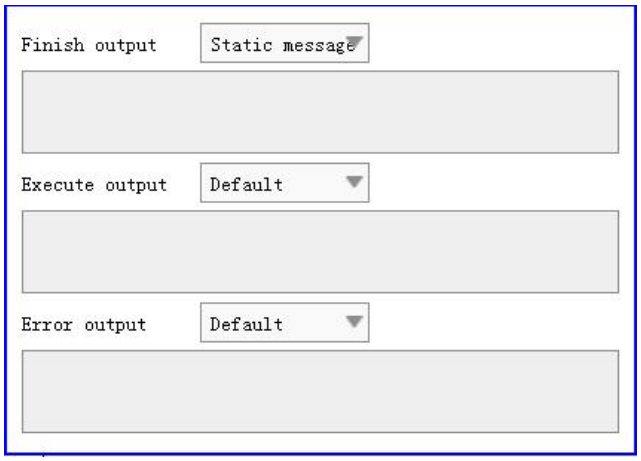


Figure 6-24-2 Output options

The serial port is used for the communication of the upper computer to remotely operate the laser marking machine. The attributes here should be consistent with the serial port parameters of the upper computer. See the communication protocol manual for details.

Output option: refers to whether to output the marking completion command through the serial port after the marking is completed. ①None means no output after marking is completed; ② Fixed information means sending serial data with fixed byte length; ③ Engraved content means sending the current marked content; ④ Custom means sending specified hexadecimal

data.

6.9.1 Default protocol

Please refer to [Communication Protocol V1.4 of Powermark Laser System].

6.9.2 Character stream protocol

Command char: Ascii or Unicode can be selected, Ascii is sent in single byte, and Unicode is sent in double bytes. If the control command does not contain Chinese, it is recommended to use Ascii, otherwise use Unicode.

Recv timeout: total the messages received within the timeout period into one complete message.

6.9.3 Debug mode

Generally used to test whether the serial port is available.

6.10 Network

Set the Ap hotspot mode and normal mode of Ethernet, wifi network. It is generally recommended to use one of these three networks. As shown below.

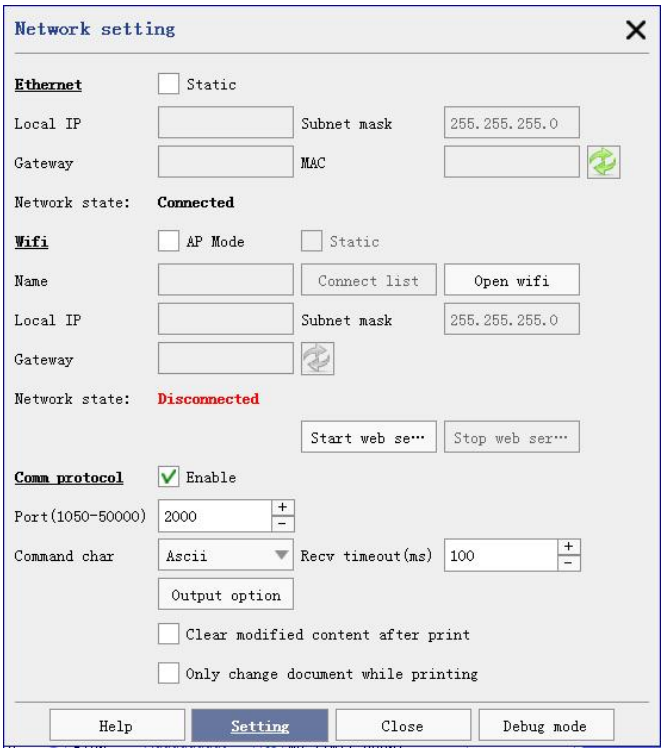


Figure 6-25-1 Network communication setting

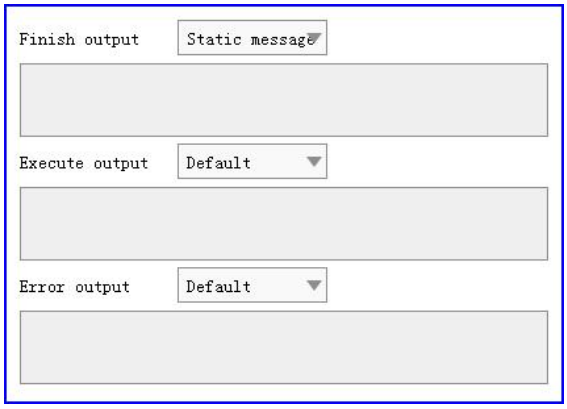


Figure 6-25-2 Output options

6.10.1 Ethernet

For wired network, the IP address is automatically obtained after connecting to the network by default, or you can check static to manually set a fixed IP address.

6.10.2 Wifi

Check [AP Hotspot Mode], you can set the name and password of the hotspot. At this time, it acts as a routing function. External devices can connect to this hotspot and communicate.

Uncheck [AP Hotspot Mode] (default), you can open the [Connection List], select and connect to an external Wifi hotspot. Tick static to manually set a fixed IP address.

6.10.3 Protocol

Only the character stream protocol is currently supported.

Port: define the communication port number of the laser control system.

Command char: Ascii or Unicode can be selected, Ascii is sent in single byte, and Unicode is sent in double bytes. If the control command does not contain Chinese, it is recommended to use Ascii, otherwise use Unicode.

Recv timeout: total the messages received within the timeout period into one complete message.

6.10.4 Debug mode

Generally used to test whether the network port/Wifi receiver is available.

6.10.5 Web service

After opening the Web service， open the laser system web terminal(Local IP:192.168.43.1) in the browser of mobile phone/tablet/computer to control the operations such as marking or uploading pictures.

6.11 Modbus

Set Modbus communication parameters, as shown in the figure below:：

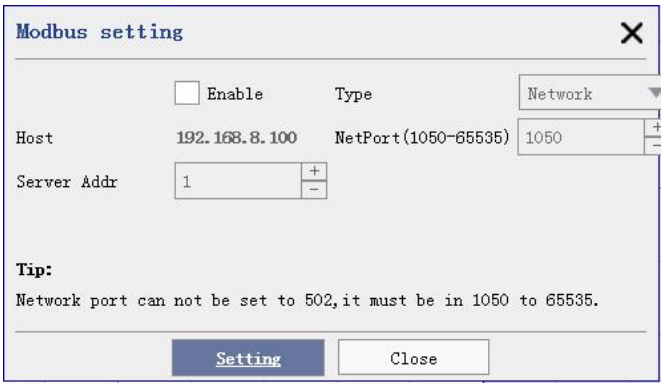


Figure 26 modbus parameters setting

Type: Support network and serial port.

6.11.1 Netwrok

Host: Cannot be set, get it from [Network Settings], and get the IP address according to the currently connected network (Ethernet or Wifi).

Port: The range is 1050-65535.

Server Addr: the station number of the laser board.

6.11.2 Serial port

The parameter configuration is the same as [Serial port setting].

6.12 Mark advance setting

The interface is shown in the figure below.

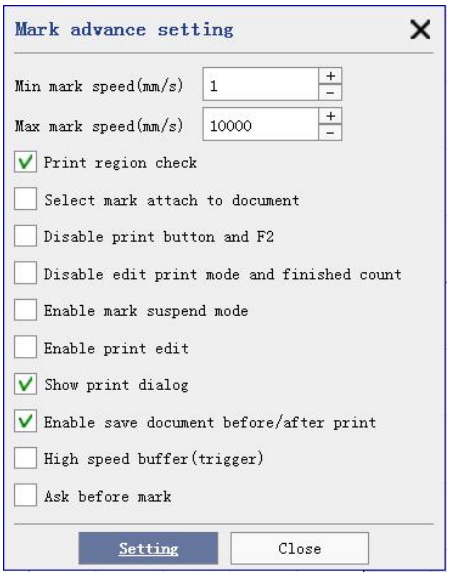


Figure 6-27 Advanced settings interface

Min mark speed/Max mark speed： Limit the laser marking, the detection speed before starting to mark, it will automatically prompt when it is less than/exceeding this limit.

Print region check： Used to limit the scope of marking content and prevent damage to the hardware.

Select mark attach to document： Indicates whether to select whether to save the marking parameters together with the document.

Disable print button and F2： Used to turn off and start marking control.

Disable edit print mode and finished count: Marking mode and completion number setting authority.

Enable mark suspend mode: After checking, during the marking process, press the ESC key on the keyboard to suspend marking.

Enable print edit: After checking, during the marking process, the content of the document can be modified through serial/network communication.

Show print dialog:If it is not checked, the "Working..." dialog box will not be displayed during printing.

Enable save document before/after print: After checking, each time before marking starts or after marking stops, the document will be saved; otherwise, it will not be saved.

High speed buffer(trigger):When printing in trigger mode, the software will cache the data in advance to achieve high-speed printing.

Ask before mark:Before marking, ask if you want to mark.

6.13 Resource manage/upgrade

When you click the upgrade management menu or insert the U disk, the upgrade management dialog box will pop up, as shown in the figure below.

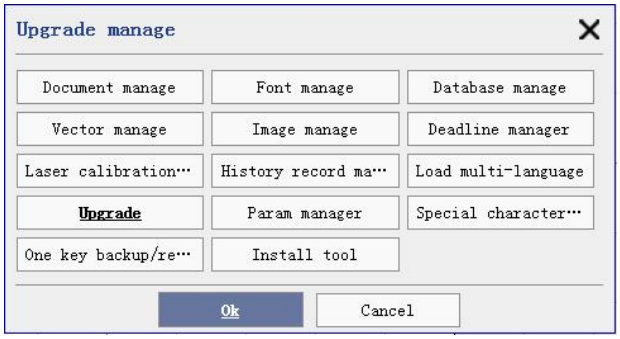


Figure 6-28 Upgrade manage

In the upgrade management, you can manage the documents or other resource files used in the laser marking machine, including documents, fonts, databases, vector , image, laser calibration, history records and parameter manager. The management interfaces of these major types of files are similar. The document management interface is described below, as shown in the figure below.

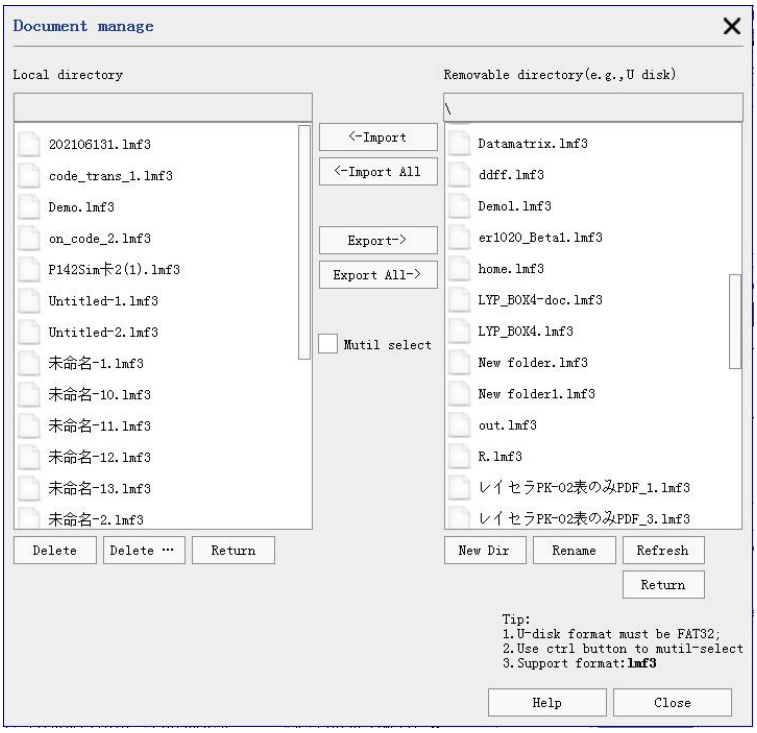


Figure 6-29 Document mange interface

In the document management interface, the list on the left is the list of files on this machine, and the list on the right is the list of corresponding files on the U disk. Since the document supports folder import and export, the folder will be displayed, while other resource files only support Import and export under the root directory of the USB flash drive.

Import/export supports select file operation or all file operations. When selecting a file, hold down the CTRL key and click the file list to perform multiple selection operations.

The delete operation can only be performed on the resource files of the machine, and some resources such as fonts can only delete the files imported by the user but cannot delete the internal resources of the system.

Document manage：Support lmf3 format.

Font manage：The supported font types are shx, .ttf and .lyf formats

Database manage： It supports the .txt, .csv and .xlsx formats that conform to the format (comma delimited, etc.) and the .db3 file generated by the laser marking machine.

Vector manage：The supported vector graphics are in .plt, .dxf and .ai formats.

Image manage：The supported pictures are in mainstream formats such as .jpg, jpeg, png, and .bmp.

Laser calibration：The saved laser calibration file.

History record manage：The historical marking information is saved and can be exported to a computer for viewing.

Load multi-language:Used to enable multilingual input methods.

Parameter manage： Including laser calibration, red light calibration, laser parameters, IO configuration, serial port parameters, etc.

Upgrade：Used for system software version update.

Deadline manager：The imported key is used to unlock advanced function modules (such as IC chip marking, etc.).

Special character： Used to import special characters (such as mathematical symbols, etc.) files.

Install tool：Can install other input methods besides the input method that comes with the system.

One key backup/restore：Refer to【6.14 Backup/Restore】

6.14 Backup/restore

6.14.1 Parameter

Laser calibration, red light calibration, laser parameters, IO configuration, serial port parameters, etc. are backed up to U disk/local or imported from U disk/local to restore the laser system.

6.14.2 One key backup/restore

System configuration parameters, calibration files (laser/red light), documents, pictures, vector diagrams, fonts, databases, special character file, record file, Plugin and so on are backed up to a USB flash drive or imported into a laser system to restore from the USB flash drive.

6.15 History record manager

As shown of the below picture:

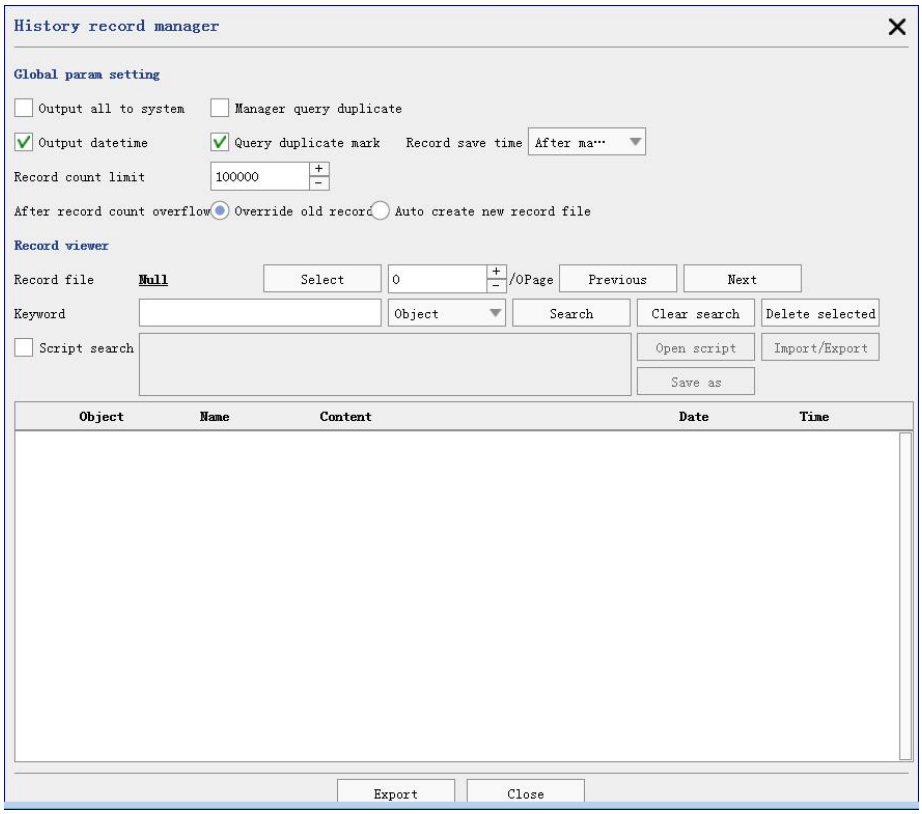


Figure 6-30 History record interface

Output datetime: Set whether to include the marking date and time in the marking record.

Record count limit: Set the size of a single historical record file. When it exceeds this size, it will automatically prompt to change the record file.

After the maximum number of records is exceeded, you can continue to override or re-auto create new record file and save.

Record viewer: support to open to view/search the marking record information. Enter keywords, you can search in object, name, content, date or time. Or check the script query and enter the query script. For details, please refer to [Marking Record Query Instructions].

Export: Export the historical marking record file to the U disk.

6.16 Authority

Click the permission menu under the administrator authority, and the permission setting dialog box will pop up, as shown in the figure below.

Figure 6-31 Authority setting

The password of the engineer or administrator can be modified in the authority.

6.17 Touch calibrate

Supports resistance touch screen with USB interface calibration.

6.18 Plugin manager

Set the startup plugin. Existing support welding system and cleaning system. As shown below:

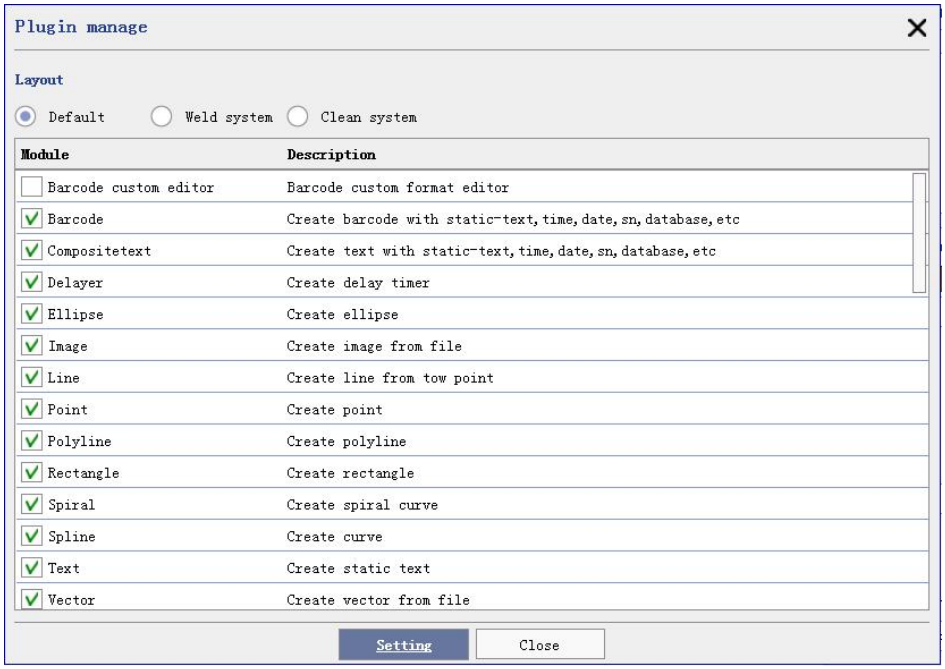


Figure 6-32 Plugin manager

6.19 About

You can view the version number, product unique ID, product type, and authorized modules.

7 Extend

Figure 7-1

7.1 Barcode Recorder

Used to scan and record the marked barcode.

7.2 Extend axis debug

It is used to test whether the extend axis can move normally.

7.3 Barcode output

Set the serial port parameters of the printer.

Template: Built-in four common barcode printer scripts: PPLA, PPLB, TSPL and ZPL.

The name of "@name@" in the script represents the name of the marking object(See in the **Entity list**), and the user can change it to the name of the object to be marked.

Take the **TSPL** script as an example:**BARCODE 50,50,"39",50,1,0,3,6,"@Text@"**.There is a object named "Text" in the currently opened document(Assuming its content is Tx).

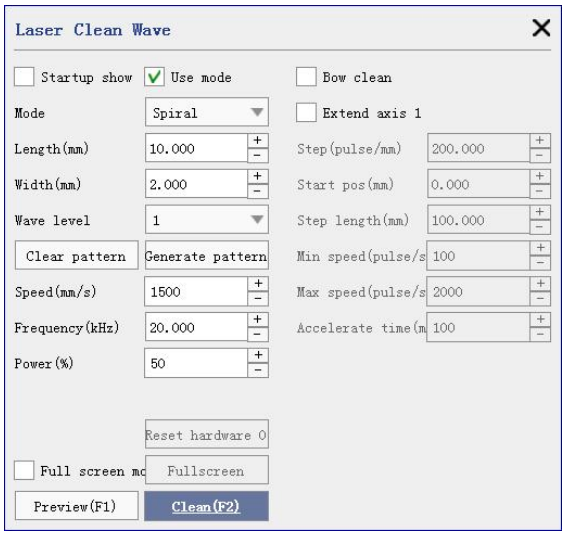
When the specified action is executed (Before marking or After marking), the software will automatically replace @name@ with Tx, and the final output to the barcode printer is:**BARCODE 50,50,”39”,50,1,0,3,6,”Tx”**

7.4 Barcode scan check

It is used to scan and print out the barcode, and then compare it to confirm whether the content is correct.

7.5 Laser clean wave

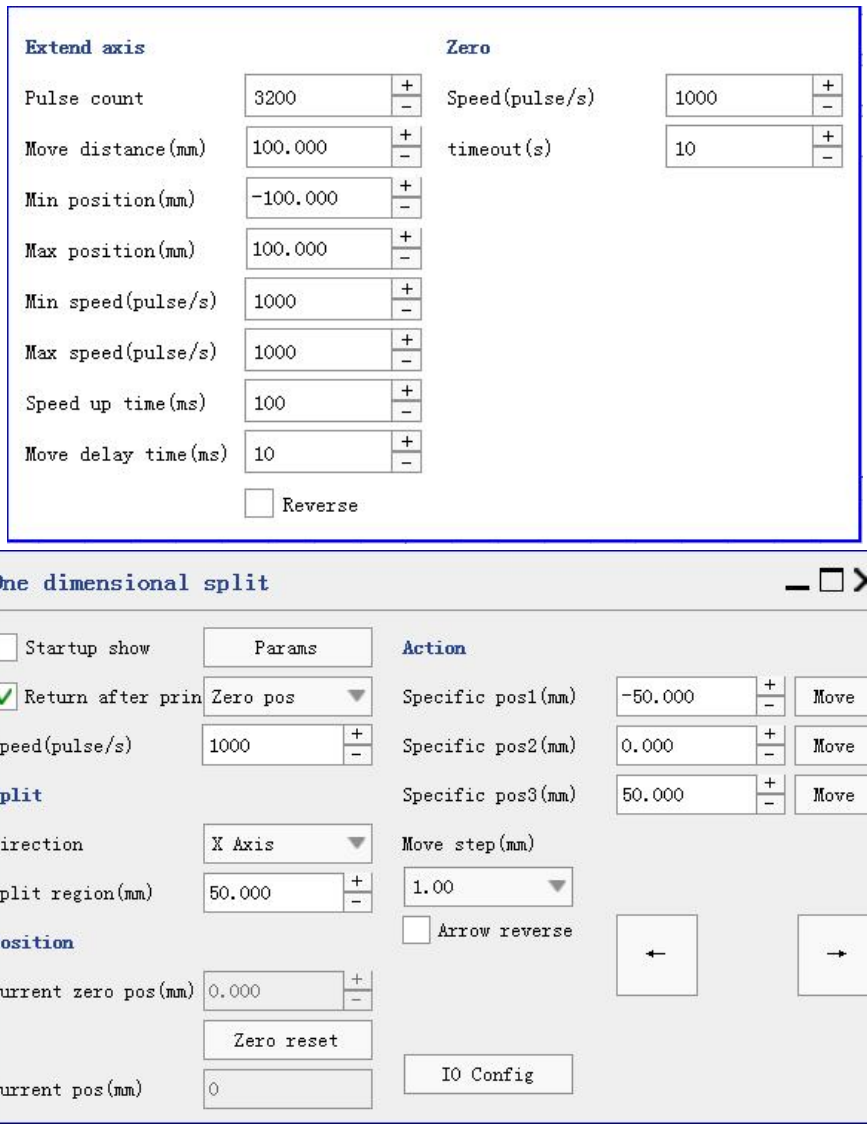
Optional spiral, parallel crosse, ellipse, Shape 8, rectangle, Sinusoid, polyline or custom patterns for cleaning. Support the expansion axis to move and clean. For more details, please refer to [Zero One Laser Cleaning Software Manual], the interface is as shown in the figure below:



7.6 CommServer config manage

Use with the event manager to support network and serial communication. For details, please refer to [Communication Configuration Practical Instructions].

7.7 One dimensional split



Pulse count:The number of pulses required for the extension axis motor to rotate one circle.

Move distance:The distance the workpiece moves after the expansion axis clicks and rotates once.

Max & Min position:The minimum and maximum coordinates of the extended axis movement. If they exceed the range, they will not be able to move and an error will be reported.

Max & Min speed:The minimum and maximum speed of the expansion axis movement.

Speed up time:The time required for the expansion axis to accelerate from the minimum speed to the maximum speed.

Move delay time:After moving to the corresponding position, how long will the delay take to mark again.

Direction:The direction of the split.

Split region:When the mark size is less than this value, it will not be divided; when it is greater than this value, it will be divided in units of this value.

7.8 Document list marking

Mark according to the order of the file list. Different files can be set for different marking times.

7.9 Event manager

Perform some actions based on events sent by the marking system. As shown below:

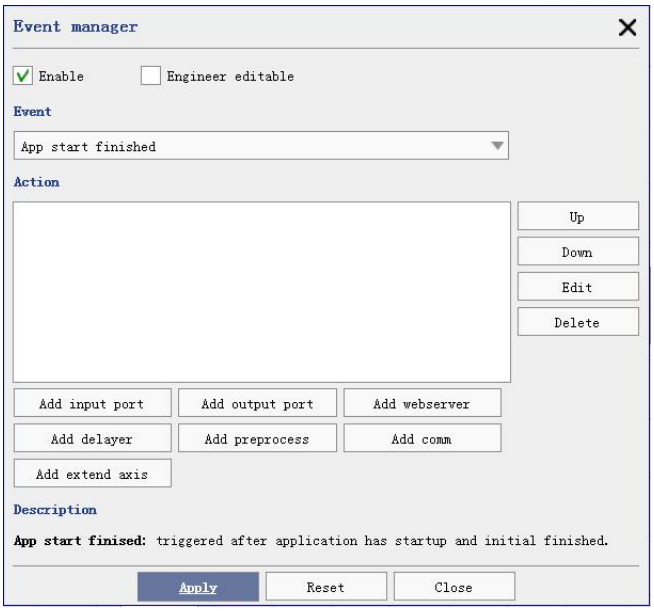


Figure 7-8 Event manager

The event categories are:

App start finished: This event is issued after program startup is completed and initialized.

Print start: This event is sent after pressing the marking button or F2 button.

Print finished: After marking the current content and preparing to update the next marking content (such as serial number or database, etc.) pre-event.

Prepare print next: Trigger after updating the marking content (such as serial number or database, etc.) and preparing to mark the next one.

Print stoped: This event is sent after the system stops marking. If it is a single marking, it is equivalent to the marking completion time. If it is a continuous post-trigger marking, this event will be emitted after pressing the ESC key or clicking the [Stop] button.

Print preprocess: press【marking preprocessing button】to send out this event.

After the event is triggered, the actions you can choose to perform are:

Add input port:Used to wait for input.

Add output port: output specified high/low level signal at the set output port;

Add webserver service: pull/push data from remote server;

Add delayer: delay fixed time;

Add preprocess: perform pre-processing work, such as scanning gun or serial port reading service;

Add comm: execute serial port/network port to read/send data.

Add extend axis: the movement of the expansion axis can be performed.

7.10 Font creator

Edit Powermark system custom fonts to facilitate customers to customize and modify fonts.

See the font creator manual for details.

7.11 Multi board marking

Through this function, you can use a Zero One device to control other Zero One devices connected to this device, and only need to connect a display.

7.12 IC chip mark

High-speed marking IC chip, supports three-station high-speed marking. See the IC chip

marking manual for details.

7.13 Multi document mark

External multi-channel IO controls multiple documents for marking. As shown in Figure 7-6 below.

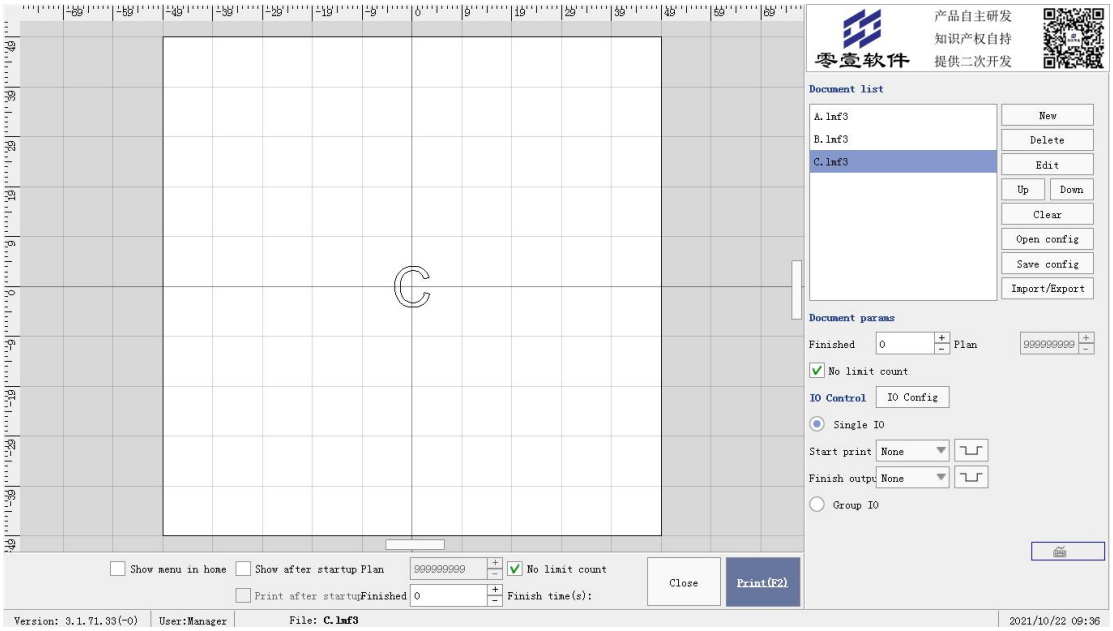


Figure 7-4Main interface for multi-document marking

Click the [Add] button in the right column to add the document to be marked, as shown in the figure below, add Document A, Document B and Document C to the list：

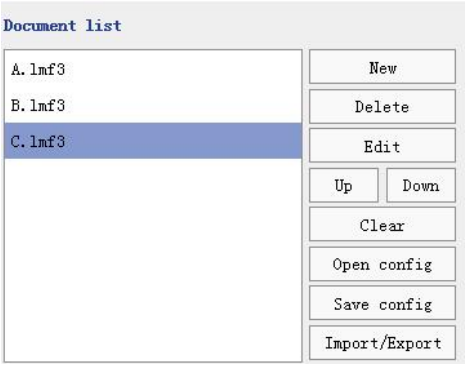


Figure 7-5Multiple document list

Select any document in the document list, and set the corresponding external input port under the document parameters (note: the input ports must not conflict), as shown in Figure 7-8, you can open [IO Configuration] to check whether the current settings are consistent with IO port conflicts configured in the system;

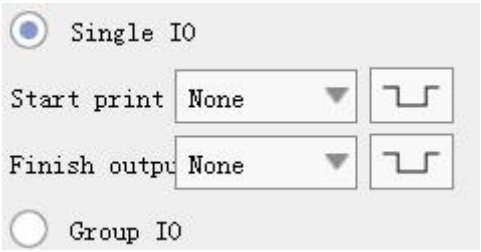


Figure 7-6 Document input port

Click the [Save Configuration] button in the right column to save the currently configured parameters to the configuration. Next time you enter the multi-document marking page, you can directly [Open Configuration].

Click the [Marking (F2)] button to enter the waiting state (marking is not actually started at this time, it only means that the state of the external input port has been monitored), and the associated document can be marked by triggering the document-associated input port .

Finished: the number of marked documents of the selected document.

Plan: The number of plans for the selected document.

No limit count: Whether the selected document is marked with an unlimited number.

For more detailed instructions, please refer to the "Static Multi-document Marking Manual".

7.14 Pen number group marking

IO trigger the pen number object bound to marking. For more information, please refer to [Pen Number Group Marking Manual]. The interface is shown in the figure below：

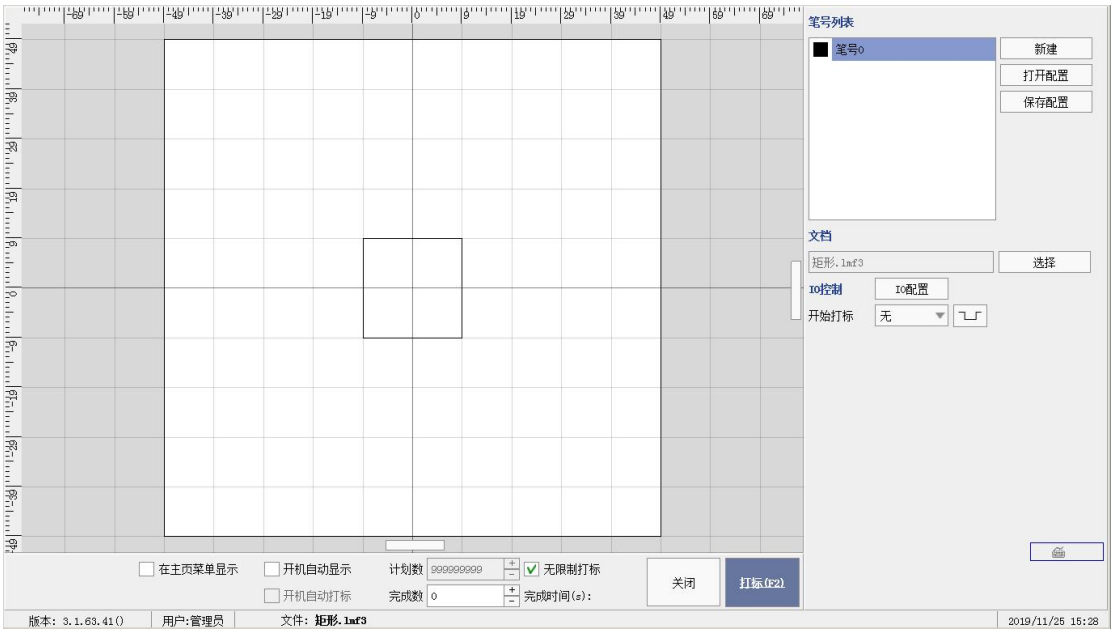


Figure 7-7 Pen number group marking

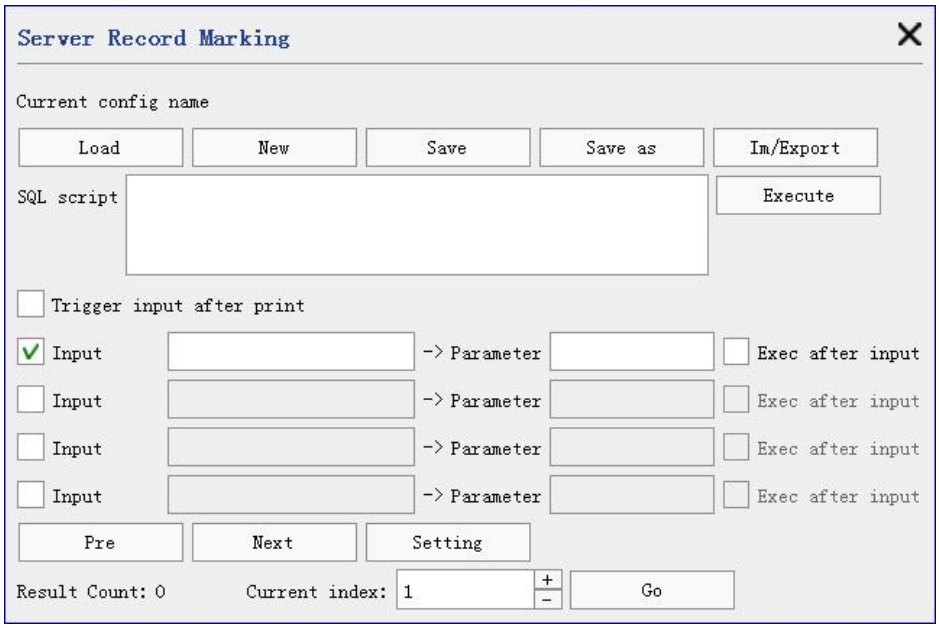
7.15 Online worker

Used for online updates and access to some online resources.

7.16 Server Record Marking

Support remote reading of database servers (such as SQLserver, Oracle, MySQL) or local data files (such as SQLite, JSON), and cache the read data. Support manual keyboard input or scan code input keyword, this keyword is automatically filled in the script, after the script is executed, the data will be obtained from the remote server.

The cache database can be used after checking the "**Memory database**" option in the **Database** of "**Composit-text**" or “**Barcode**”.



7.17 Two-dimensional spin-off marking

After marking the current mark on the two-dimensional plane, move and mark the next mark. It is generally used for marking large-area workpieces, but the content of a single mark is smaller than the marking range of the galvanometer. For details, please refer to [Two-dimensional Split Marking Manual].

7.18 Rotation axis

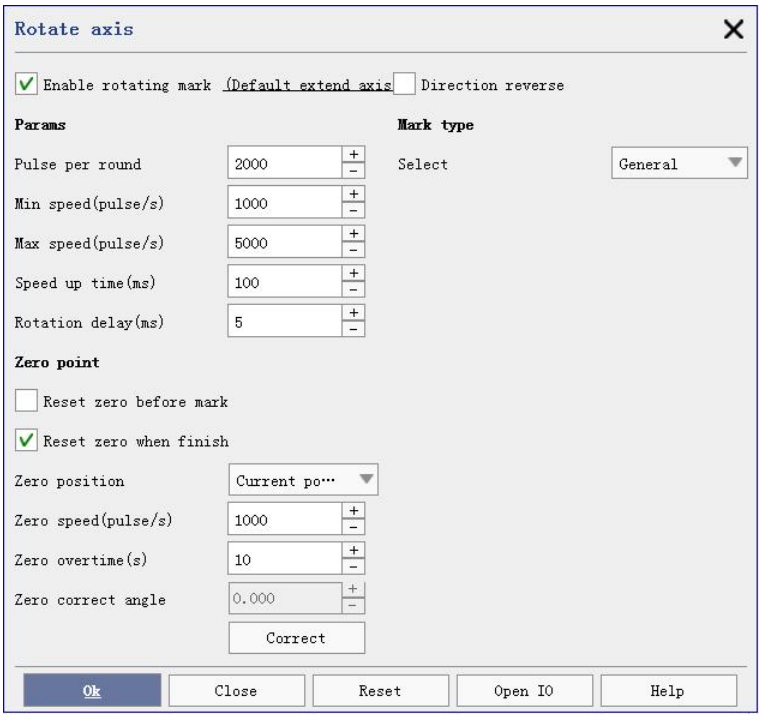


Figure 7-2 Rotation axis setting

Pluse per round: The number of pulses required for the extension axis motor to rotate one round. We can calculate the number of pulses per revolution X required by the software through the following formula: X=(360/N)* n, where X represents the number of pulses per revolution, N represents the step angle of the motor we use, and n represents Is the subdivision number set by the driver;

Min speed: the minimum speed at which the expansion axis can move.

Max speed: The maximum speed at which the extended axis can move.

Speed up time: The time required for the expansion axis to accelerate from the minimum speed to the maximum speed.

Rotation delay: the time to wait for the next operation after the rotation is completed.

Reset zero when finish: If it is not checked, the extended axis cannot establish an absolute coordinate system. When processing a batch of work pieces, it is necessary to manually adjust the position so that each processing is at the same position; if it is checked, then according to [Zero position] To establish an absolute coordinate system.

Zero position：

- **Current positio**n means that the system takes the current extended axis position as the default origin position before each processing;
- **Pre-processing position** means that after processing a workpiece, the system automatically moves the expansion axis back to the position before processing, so that each workpiece will be processed at the same position;
- **Zero point signal** means that after processing a workpiece, the expansion axis moves in the opposite direction until the system receives the zero point signal. After finding the zero point, the expansion axis establishes an absolute coordinate system. If the system does not receive the zero signal, it will start the extended axis function normally after the time set by "zero timeout" expires;

Zero speed： The movement speed of the extended axis when it returns to the zero point.

Zero overtime： Set the time used by the extended axis to find the zero point. If it exceeds this time, the extended axis will return to normal

.

Marking method:

- **Conventional**, refers to rotate the marking according to the Z angle value of the label, and the Z angle value is in the coordinate setting interface of the label, as shown in the figure below 

, Indicates that the label is marked at 90 degrees from the zero position (the Z angle value is an absolute angle);
- **Multiple marking** refers to marking the current document once by rotating the [step angle], and rotating and marking multiple times according to the set [number] value
- **Rotate axis text,** split the marked text characters, calculate the number of pulses per unit physical distance N=P/D according to [movement distance per revolution] D and [pulse number per revolution] P, if [splicing] The direction is the Y-axis direction, and the Y value of the center point coordinate of the character corresponds to the rotation angle R=N*Y; if the [splicing] direction is the X-axis direction, the center point coordinate X value of the character corresponds to the rotation angle R=N*X;
- **Rotate segmentation** to segment graphics (such as vector graphics dxf, plt or text) that exceed the [segment size]. If the splicing direction is the X axis, graphics with a length

less than [Split Size] will not be split, graphics with a length greater than [Segment Size] will be split according to [Split Size], and the marking will be performed around the axis in the X direction. For example, if the length of the graph is 40mm and the [Segment Size] is 7mm, the graph will be divided into 6 segments, and the length of each segment will be 7, 7, 7, 7, 7, 5 (7mm*5+5mm=40mm), height No change, as shown in Figure 6-3, first mark the first segment, then rotate, the second segment, rotate, until the sixth segment is finished. In the same way, if the splicing direction is the Y axis, the height will be divided according to the [Segment Size], and the length of the figure will not change after the division.

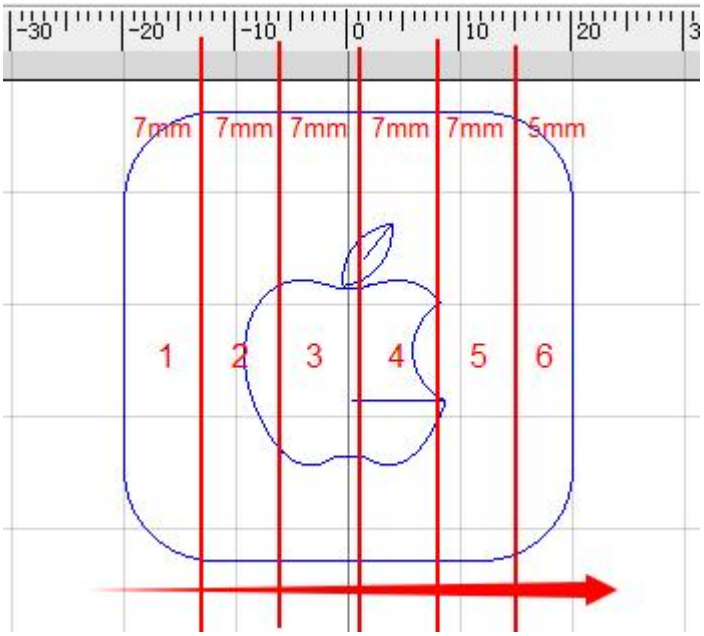


Figure 7-3 XDirection splicing, the marking direction is from left to right, the red vertical line is the dividing line

7.19 Data queue mark

Print the data received by the serial port in order.

7.20 Webserver

Connect to ERP and MES systems to obtain data, and cooperate with the **Event manager** to automatically update the content of the document for marking. For details, please refer to [Laser WebServer Documentation].

8 Drawing and object property bar

The drawing toolbar is located at the far left of the main interface.

The drawing toolbar is used to draw marks in the editing area, including line, rectangles, vector, text, image, etc.

8.1 Point

Click icon， a point mark is added in the center of the view by default. Figure 8-1 shows the property setting interface。

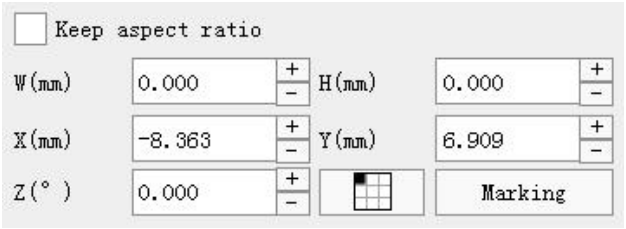


Figure 8-1

Attributes are divided into general attributes and point attributes.

The current point attribute is none.

Common attributes include width, height, X, Y, Z, coordinate datum and marking control.

W: The actual width of the current mark.

H: The actual height of the current marker.

X and Y: Indicates the position of the coordinate reference.

Z: Indicates the angle of the rotation axis.

Pos refer：Indicates the reference point corresponding to the mark of the X and Y values.

Close marking： Ignore marking the mark with this option checked.

Control port: For communication control marking, refer to the communication protocol help.

8.2 Line

Click  icon， you can insert a straight line mark into the editing area, as shown in Figure 8-2.

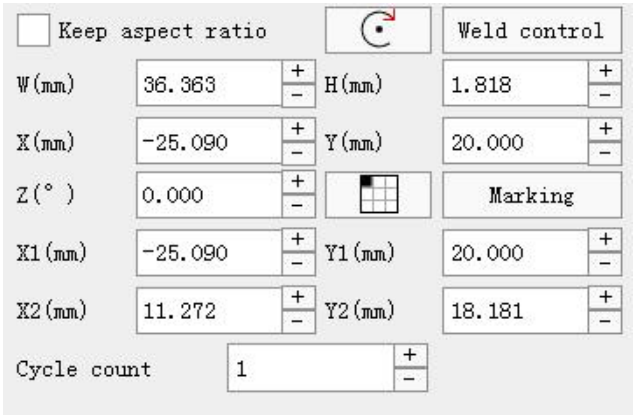


Figure 8-2 Line attributes

The general attributes are the same as [8.1 point].

X1 and Y1: represent the coordinates of the left end point of the straight line.

X2 and Y2: represent the coordinates of the right end point of the straight line.

Cycle count: marking times in a straight line (if set to 2, marking from left to right first, then from right to left).

Weld control:Used to achieve the effects of **Spiral**, **Sinusoid** and **Polyline**.

8.3 Rectangle

Click  icon，you can insert a rectangular mark into the editing area. Rectangle properties are shown in Figure 8-3。

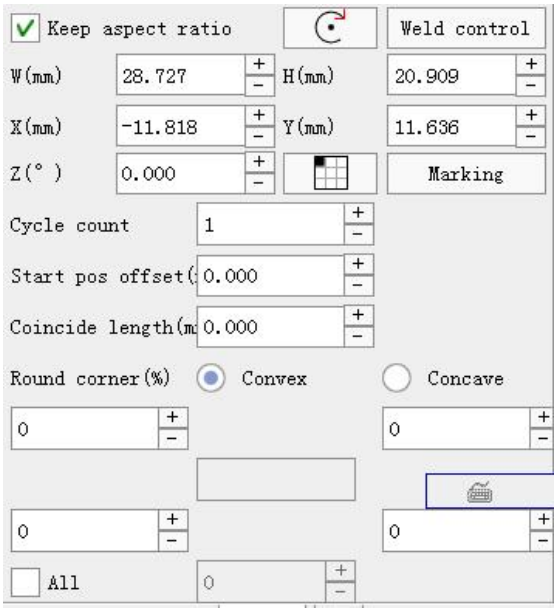
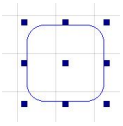
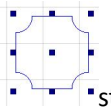


Figure 8-3 Rectangle attribute

The general attributes are the same as [8.1 point].

Weld control:Used to achieve the effects of **Spiral**, **Sinusoid** and **Polyline**.

The unique attribute of the rectangle is to modify the degree of convexity (percentage) of the four top corners, and you can draw a rounded rectangle.

For example, if all rounded corners are set to convex 45%, it will appear  style rounded rectangle, and concave shape will generate  style rectangle.

Cycle count: Mark the rectangle multiple times in a cycle.

Start pos offset: the offset length of the starting point of marking.

Coincide length: continue marking length after marking to the last point.

8.4 Ellipse

Click  icon， You can insert an ellipse mark into the editing area. The properties of the ellipse are shown in Figure 8-4.

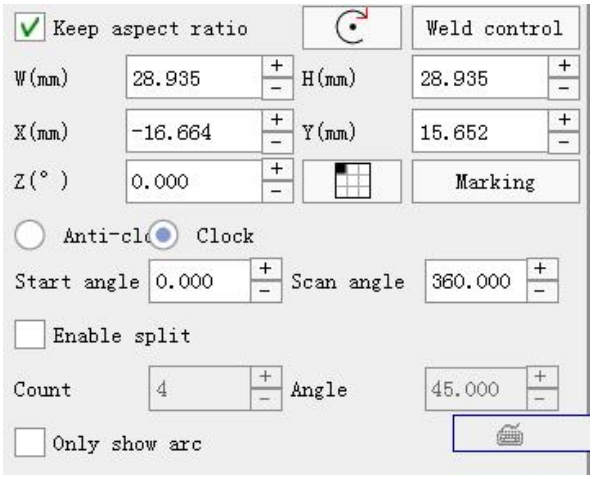
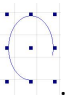


Figure 8-4 Ellipse properties

The general attributes are the same as [8.1 point].

Weld control:Used to achieve the effects of **Spiral**, **Sinusoid** and **Polyline**.

The unique properties of the ellipse are the drawing direction of the arc, the starting angle, the scanning angle and whether to display only the arc. The drawing direction indicates whether the ellipse draws an arc from the starting angle counterclockwise or clockwise. The starting angle is 0 degrees for the horizontal X axis positive direction, and clockwise is the positive direction, and the angle passed by the arc is the scanning angle. Show only the arc option does not work when the scanning angle is 360 degrees, and if the option is not checked when the scanning angle is less than 360 degrees,

Will draw an angle guide line from the center of the circle  , Otherwise, the auxiliary line is not displayed  .

Count: divide the arc into segments.

Angle: the scanning angle of each segment.

8.5 Curve

Click  icon， enter the curve editing state, as shown in Figure 8-5.

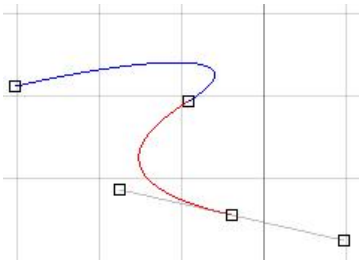


Figure 8-5 Curve editing mode

Create curve

New point: click on the blank space with the left mouse button. If the mouse is pressed and released immediately, a straight line is created; if the mouse is pressed and moved, a curve is created, and the gray line is the arc control line;

Exit the editing mode: click the right mouse button;

Modify curve

Double-click the curve mark to be modified to enter the curve editing mode, as shown in Figure 7-5.

Support for new nodes  、 **Delete node**  、 **Merge node**  、 **Split node**  、 **Convert to a straight line**  、**Turn to arc**  、**Convert to curve**  、**Sharp transition**  、 **Sharp transition**  、 **Symmetrical transition**  、 **Change the direction of the curve**  、 **Automatically close the curve**  .

8.6 Polyline

Click  icon， enter the polygon editing state.

Figure 8-6 polygon editing state

8.7 Vector

Click  icon， you can insert a blank vector map mark into the editing area. The vector graphics attributes are shown in Figure 8-7.

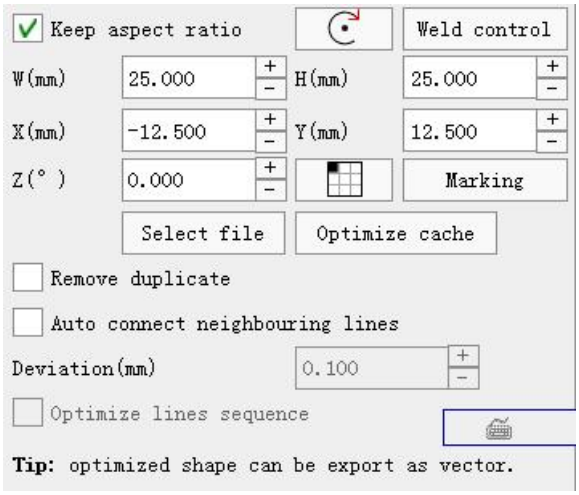


Figure 8-7 Vector graphics attributes

The general attributes are the same as【8.1Point】。

The vector file dialog box will list all vector files that have been imported into the laser marking machine， including PLT format and DXF format. Double-click the file name or single click the file name and click the select button to display the currently selected vector file on the mark.

Removal duplicate, **Auto connect neighbouring lines**, **Deviation** and **Optimize line sequence**: refer to [4.15 Line Optimization].

Optimize cache: After the vector diagram is imported into the system, the system automatically generates the corresponding cache file. Click this button, the system will remove the old cache file and read the vector file again. It is used to solve the problem of re-importing the system after the vector diagram is changed, but the display and marking are still the old data.

8.8 Text

Click  icon， you can insert a common text mark into the editing area. Common text attributes are shown in Figure 8-8.

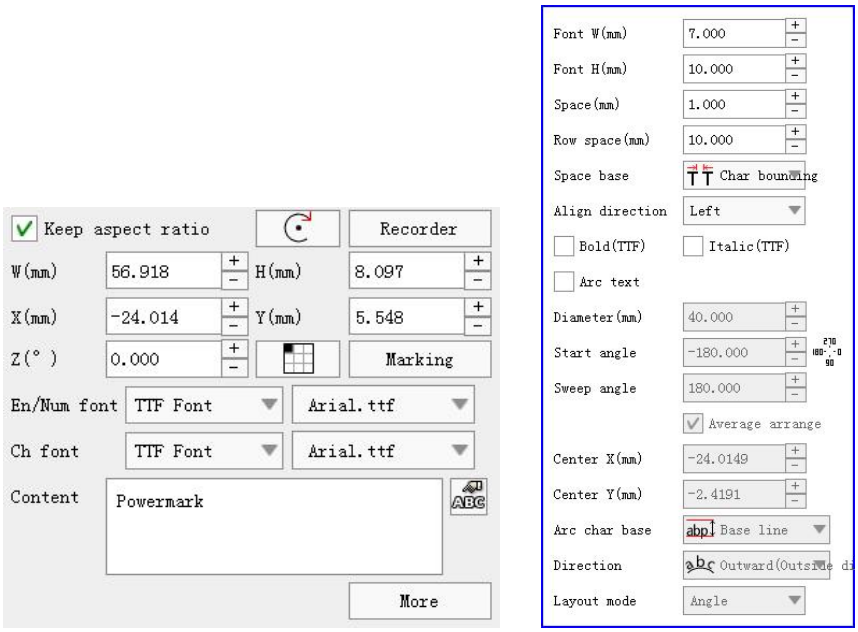


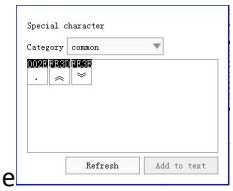
Figure 8-8 Common text attributes

The general attributes are the same as【8.1 Point】.

The unique attributes of common text include **Font**, **Content**,**W** and **H**, etc.

The fonts are divided into English/digital fonts and Chinese fonts. The supported formats are SHX (single-line characters), TTF (double-line characters), DMF (dot matrix characters) and LYF (custom fonts).

The content is the displayed text content, which can be input through the soft keyboard or an external keyboard. When using the soft keyboard

If you need to enter a special symbol, you can click  pop up special symbol table  , double-click the special character to enter it. Supports wrapping in the content (press the keyboard Enter key to wrap input after editing the content of the current line) to display.

Space needs to be used together with the **space base** in the more property pages. By default, the space base is **Char bounding**, which represents the distance between the rightmost of the previous character and the leftmost of the next character. If the datum is auto, the spacing setting is invalid, and the text arrangement uses the internal font width property of the font (usually used in TTF fonts); if the datum is char center, it is arranged based on the vertical center

of each character with equal center distance. Ensure that the position of each character does not change with content changes.

For TTF fonts, **Bold** and **Italic** characters can be set. It is invalid for other fonts.

Check the "**Arc text**" option to convert the current mark into arc text. You can set the **Diameter**, **Start angle**, **Sweep angle**, **CenterX&Y**,**Direction** and **Layout mode** of the arc text. When the arrangement mode is character spacing, the distribution angle is invalid. Figure 8-9 illustrates the difference between the two different text directions.

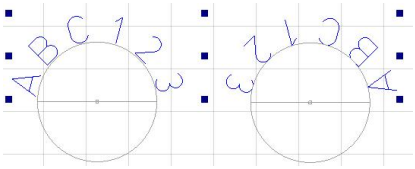


Figure 8-9 The left side is the text direction outward, the right side is inward

If the **Direction** is **Outward**, the arc characters are arranged clockwise, as shown in ABC123 on the left of Figure 8-9; if the **Direction** is inward, the arc characters are arranged in a counterclockwise direction, as shown in Figure 8-9. ABC123 on the right.

When the alignment direction is **Left**, the first character of the arc text is at the **Start angle** position;

When the alignment direction is the horizontal center, the center of the arc text is at the **Start angle** position;

When the alignment direction is the **Right**, the end character of the arc text is at the **Start angle** position;

Click Marking, Check the fixed width to limit the text width.

Only provide data (not marked), generally used as a data source in the linked text.

Click Recorder, As shown in Figure 8-10 below.

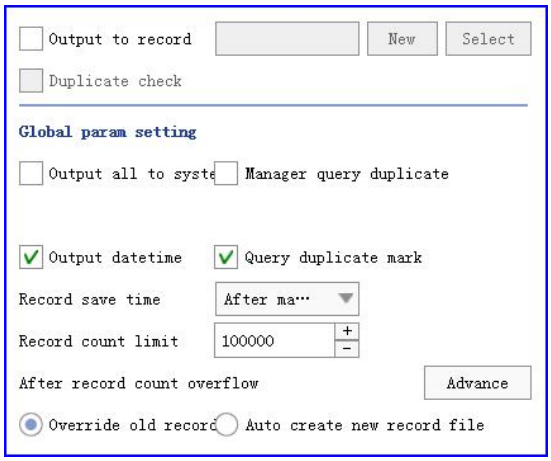


Figure 8-10 Marking record settings

Check the **Output to record** and select the record file. After each marking is completed, the marking content will be written into the record file. Record count limit sets the maximum number of records in a single record file. Check whether it has been marked, you can verify whether the code is repeated before marking.

Click Advanced Settings to open the [6.15 Marking Record Management] interface.

8.9 Composite text

Click icon， you can insert a combined text mark into the editing area. The combined text attributes are shown in the figure8-11.

Figure 8-11 Composite text attributes

The general properties are the same as [8.1 point].

The text, marking control and marking record parts are the same as [8.8 ordinary text].

The unique properties of combined text include alignment and a list of combined text content. Alignment is the alignment method when the content of the combined text is larger than one line; the combined text content list has operations such as adding, deleting, editing, moving up, and moving down. Click the Add button or select an item in the combined text list and click Edit After the button, the type editing dialog box pops up, as shown in Figure 8-12.

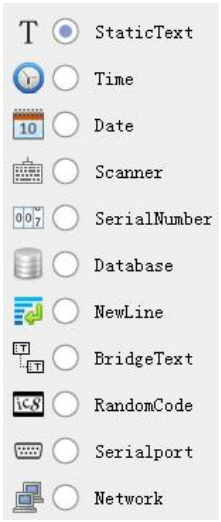


Figure 8-12 Type edit dialog box

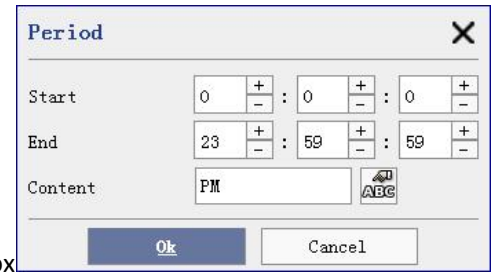
Composite text types include **StaticText**, **Time**, **Date**, **Scanner, SerialNumber, Database, NewLine, BridgeText, RandomCode, Serialport** and **Network.**

8.9.1 Static Text

You can enter fixed text content.

8.9.2 Time

The time type can be set as hour (24 hour system), hour (12 hour system), minute, second, hour: minute: second, hour: minute, time period (shift), the content will be determined according to the current system time, leading zero is used To fill in zero.

When you select a time period, the time period editing area on the right becomes available. You can specify the content displayed by the mark in different time periods by modifying the number of time periods. Double-click the item in the time period list to pop up the time period edit box 

, you can modify the start time, end time and content.

8.9.3 Date

The date type can be set to long year, short year, month, day, day of the year, week, week of the year, year/month/day, year.month.day, year-month-day , Day/month/year and custom. And you can set the offset days, months, and years according to the current date.

The date display content can also be customized, by double-clicking the content list on the right to pop up the content edit box

, just enter the content corresponding to the selected time.

8.9.4 Scanner

Scanner means that the mark needs to be scanned to input content when engraving, and it supports keyboard and press Enter key to input. You can choose to display the text directly or convert it to hexadecimal display (the entered content is treated as a decimal number). If the input timeout is enabled, when a timeout occurs, you can choose to interrupt the marking, keep the original content and continue, or clear the content and continue.

8.9.5 Serial number

The serial number editing interface is shown in Figure 8-13.

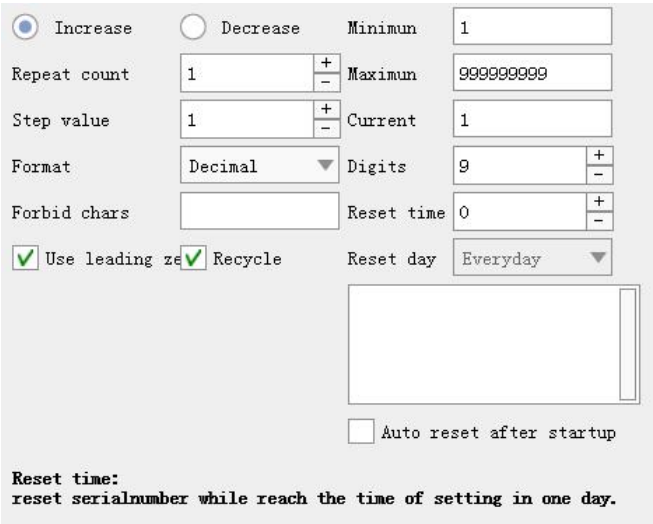


Figure 8-13 Serial number

The serial number indicates the text that changes according to a fixed rule during the engraving process.

Increase/Decrease: Indicates whether the current serial number is an incremental change or a decrement change.

Repeat count: indicates the number of markings before each serial number is changed.

Step value: indicates the incremental value of a change of the serial number.

Format: Including decimal, hexadecimal case and triple hexadecimal case, valid decimal characters are "0-9", valid hexadecimal uppercase characters are "0-9, AF", hexadecimal The valid lowercase character is "0-9,af", the valid three-hexadecimal uppercase character is "0-9,AZ", and the valid three-hexadecimal lowercase character is "0-9,az".

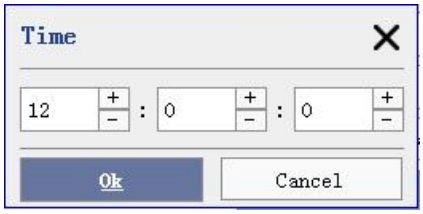
Recycle: When the cycle is started, the serial number increases to the maximum value or decreases to the minimum value, the marking does not stop, and it starts to change from the minimum or maximum value again.

Maximum/Minimum: Mark the range of change.

Current: Mark the current serial number value.

Digits: The number of digits of the serial number.

Reset time: the default is 0, which means no reset, if it is greater than 0, it will be in the reset time list.

You can edit the reset time 

, when the system time reaches the reset time, the serial number is reset, returning to the minimum value and starting to change again.

8.9.6 Data base

The editing interface of the database is shown in Figure 8-14.

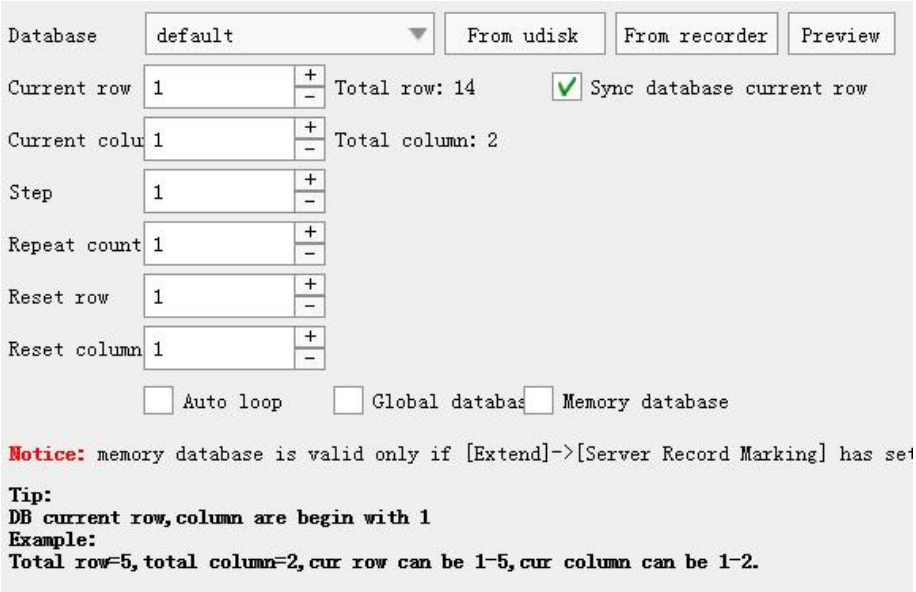


Figure 8-14 Data base

The database function can select the database file imported in advance in the laser marking machine for engraving. The database drop-down box will display all supported database files. After selecting, modify the current number of rows and columns, and the content will be changed according to the parameters during engraving. If the automatic cycle is checked, after the last line of content is printed, it will return to the first line of content and then mark.

If other documents use the same database, you can check the **Global database** to achieve synchronous marking without duplication.

If [7.19 Server Cache Record Marking] is enabled, you can check Use **Memory database**.

When you click the reset database in the marking bar, all databases will be reset according to their respective **Reset row** and **Reset column** parameters.

8.9.7 New line

The line break is used between two combined texts to display the effect of a new line.

8.9.8 Bridge text

Used to get data from other tags, as shown in Figure 8-15.

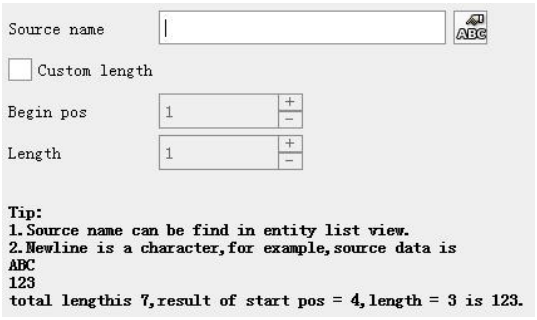


Figure 8-15**Bridge text**

Source data object name: refers to the tag from which the data is obtained. The tag name can be viewed and changed in [9 Object List].

8.9.9 Random code

Dynamic random content, support custom format.

8.9.10 Serial port

The marking system acts as a client, requesting data from the serial port server.

8.9.11 Network

The marking system acts as a client, requesting data from the web server.

8.10 Image

Click  icon, you can insert a blank picture tag into the editing area. Picture attributes are shown in Figure 8-16.

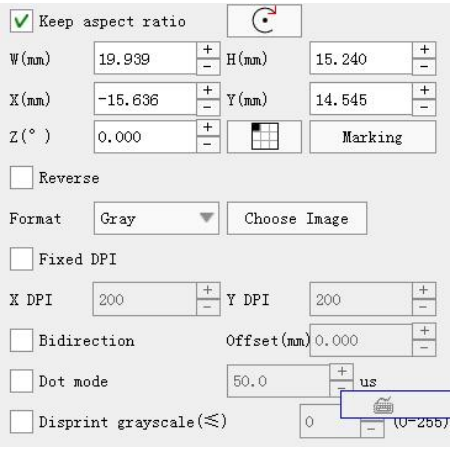


Figure 8-16

The general attributes are the same as [8.1 point].

Reverse: Set the picture display effect to reverse color after reversal.

Format: There are three types of grayscale images, dots, and monochrome images. The gray image is a 256-level gray image; the dots are black and white analog gray images; the monochrome image has only black and white colors and only large patterns are retained.

Fixed DPI: similar to the resolution of the picture. After selecting the fixed DPI, the DPI of the picture is modified to the specified value for marking, otherwise it is marked according to the DPI of the picture itself. The larger the DPI value, the higher the fineness of the image and the longer the marking time.

Bidirection: refers to the scanning direction of the picture when engraving is scanning back and forth in both directions, otherwise it is fixed to scan from left to right.

Offset: How much offset data is skipped after a line of data is printed at the time of bidirectional scanning.

Dot mode: refers to whether the laser is always on when processing each pixel of the picture, or whether each pixel is on for a specified time. The specified time can be set in the numerical box on the right.

Disprint grayscale(≤): Ignore marking the area less than or equal to the set gray value. If the current selection is a gray image, the set range is 0-255; if it is a dot or monochrome image, the set range Is 0-1. Here, 0 grayscale means white, and 255 (grayscale image) or 1 (monochrome image) indicates black.

8.11 Barcode

Click  icon， you can insert a barcode mark into the editing area.

Bar codes are divided into two categories: one-dimensional codes and two-dimensional codes.

One-dimensional codes include: Code128 (A/B/C), Code39, Code93, Code11, CodaBar, C25Matrix, C25Inter, ExtendCode39, EAN128, EAN8, EAN13, UPCA, UPCE, ISBN.

Two-dimensional codes include: QRCode, PDF417, DataMatrix, DataMatrix_GS1.

The general attributes are the same as [8.1 point].

The attributes of combined data are the same as [8.9 Combined Text].

The text, marking control and marking record parts are the same as [8.8 ordinary text].

The general attributes of one-dimensional code/two-dimensional code are shown in Figure 8-17.

Figure 8-17

Fixed size: The size of the limited one-dimensional code/two-dimensional code remains unchanged.

Reverse: Type in a barcode with reversed content (usually marked on dark materials), and support customizing the width of the blank margin after inversion.

Encode: Different barcode formats can be selected.

Text: After selecting the display text, the text content in the combined text can be displayed below the bar code. The meaning of the parameters is described in [8.8 Normal Text]. Here you can modify the marking parameters of the text as needed.

The one-dimensional code attributes are shown in Figure 8-18.

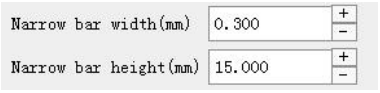


Figure 8-18

Narrow bar width: the width of each vertical line.

Narrow bar height: the height of each vertical line.

The QRCode property page is shown in Figure 8-19.

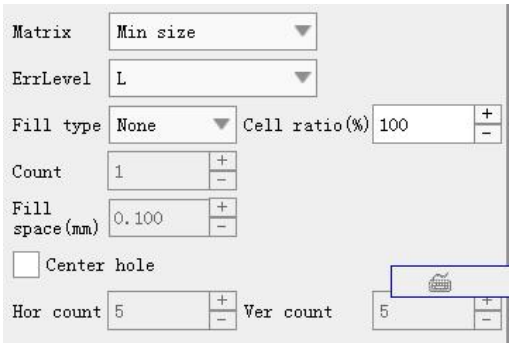


Figure 8-19 QRCode

ErrLevel: There are four types of errors: L, M, H, and Q, which increase in order. Increasing the error level will increase the complexity of the two-dimensional code, and can also increase the fault tolerance of the two-dimensional code.

Fill type: eight types: no filling, dot, rectangle, circle, loop rectangle, spiral rectangle, triangle, and arc connecting line. The display effect is shown in Figure 8-20 and Figure 8-21.

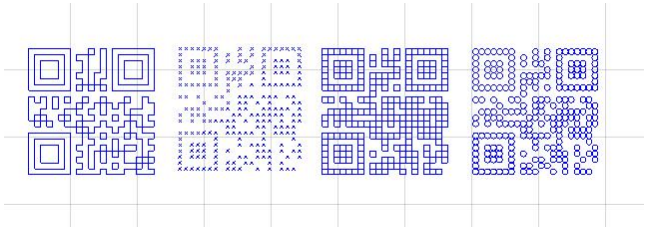


Figure 8-20 From left to right are none, dots, rectangles, and circles.

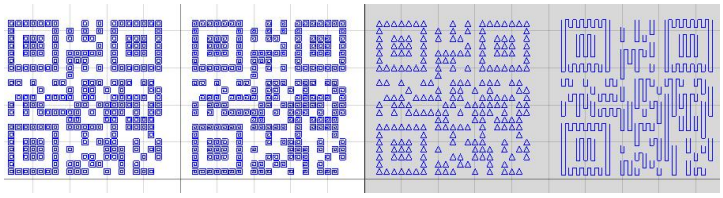


Figure 8-21 From left to right are loop rectangles, spiral rectangles, triangles, and arcuate connecting lines.

Count: When the point filling is enabled, the number can be set. The more the number, the denser the marking will be.

Cell ratio: Adjust the effective size of the module, ranging from 1-110%.

Fill space: fill the spacing between lines.

Center hole: You can set the number of blank width modules and blank height modules, which can be used to place logo images.

The property pages of PDF417 and DataMatrix are similar to QRCode, so I won’t repeat them here.

DataMatrix requires a special text format, which requires the prefix [] in front of the content to be correctly identified, such as "[01]12345678901234", as shown in Figure 8-22.

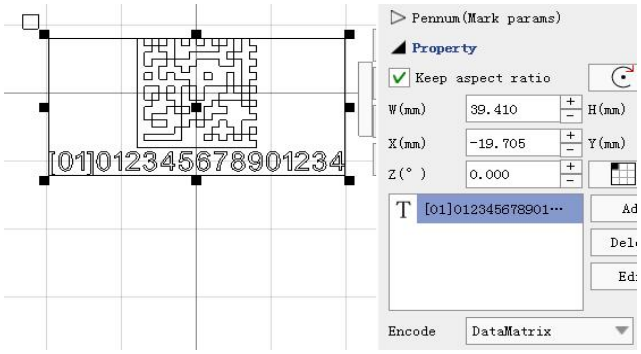


Figure 8-22 Datamatrix example

8.12 Delayer

Click  icon， You can insert a delayer. The delayer does not have actual graphics, and when the marking sequence reaches the delayer, the laser marking machine waits for the timeout time set by the delayer before proceeding to the next instruction.

8.13 VIN code

Click VIN icon，inserting VIN mark.

VIN is the abbreviation of English Vehicle Identification Number (Vehicle Identification Number). Have a fixed format. In the pneumatic marking machine software, the simple disassembly is divided into a fixed text part (11 digits) and a serial number part (6 digits).

The general attributes are the same as [8.1 point].

The text, marking control and marking record parts are the same as [8.8 ordinary text].

The serial number part is the same as [8.9.5 serial number].

Enter the corresponding VIN code information in the fixed text, the check digit can be filled

in at will, and the correct check digit will be automatically generated after the setting is completed; the length of the serial number part is fixed at 6, and the range can be controlled by modifying the serial number parameter. If the cycle is not turned on, a prompt will pop up after marking all the serial numbers and stop marking.

Click to manually enter the complete VIN code, and the fixed text and serial number values can be automatically intercepted.

8.14 Spiral

Click  icon， Insert the spiral mark, the attributes are shown in Figure 8-23.

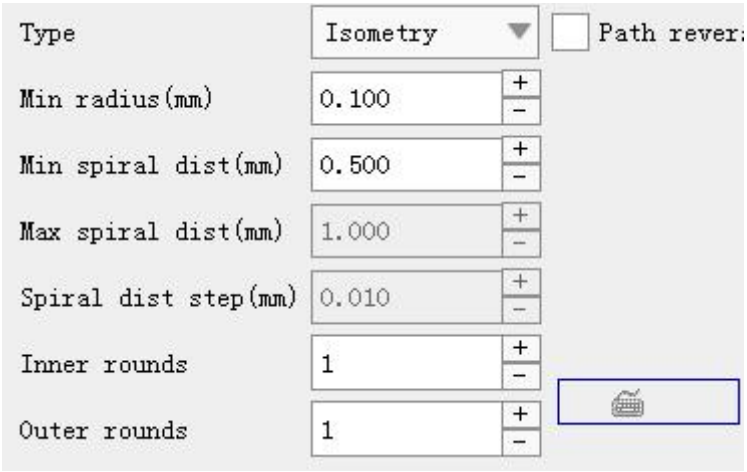


Figure 8-23 Spiral

Isometry: the inner and outer spirals are equally spaced.

Inner tight: the spiral spacing from the inside to the outside is getting larger and larger.

Outer tight: the spiral spacing from the inside to the outside is getting smaller and smaller.

The effect is shown in Figure 8-24.

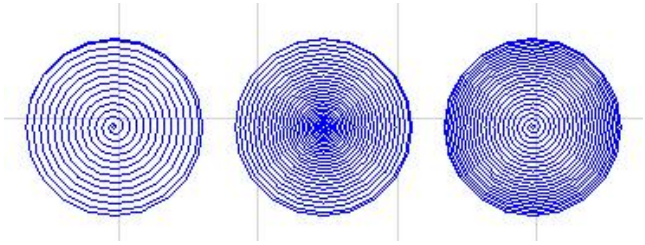


Figure 8-24 From left to right are equal pitch, inner tightness and outer looseness, and inner looseness and outer tightness.

Min spiral dist: the minimum radius of the center circle.

The **Min spiral dist**, **Max spiral dist** and **Spiral dist step** determine the tightness of the spiral.

Path reversal: the spiral marking order can be switched from inside to outside or from outside to inside.

Inner rounds & Outer rounds:Set the number of inner circle and outer circle.

8.15 Weld line

Click  icon， Insert the welding line mark, the properties are shown in Figure 8-25:

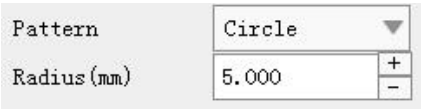


Figure 8-25

Patterns include: circle, ellipse, straight line, figure eight, square and rectangle.

8.16 Control point

click  icon, Insert control point markers.

Input : When marking to this mark, a prompt will pop up and wait until the state of the corresponding input port is successfully queried before continuing the subsequent marking.

Wait outer start: Wait for the external control start marking input signal of [6.6 IO configuration].

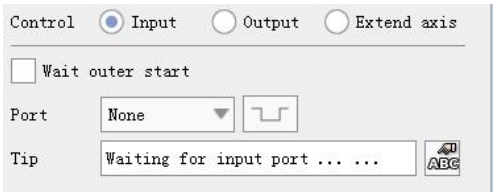


Figure 8-26

Output: when marking to this mark, output the corresponding pulse signal.

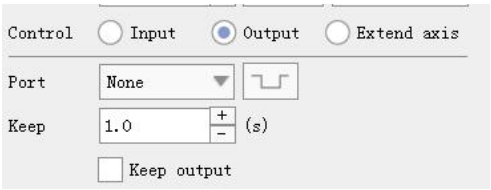


Figure 8-27

Extended axis control: support 1, 2, 1&2 axis control.

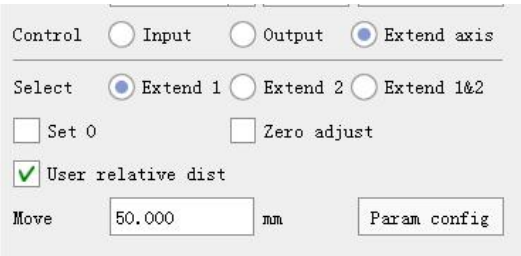


Figure 8-28

Zero adjust: it means that when the marking is executed to this point, the zero point is reset. For the setting of the zero point detection signal input port, please refer to [6.6.4 Input port (extension axis) description].

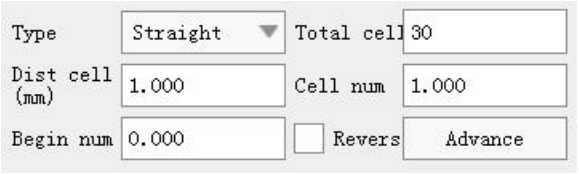
Set 0: it means that when the marking is executed to this point, the current mechanical position will be saved as the zero point position.

Use relative dist: Check this option, it means to continue to move 50.00 mm from the previous position (take the figure as an example); if it is not checked, it means to move 50.00 mm from the zero position.

Param config: refer to【6.7 Parameter Configuration of Expansion Axis】.

8.17 Ruler

Click  icon, Insert ruler object.



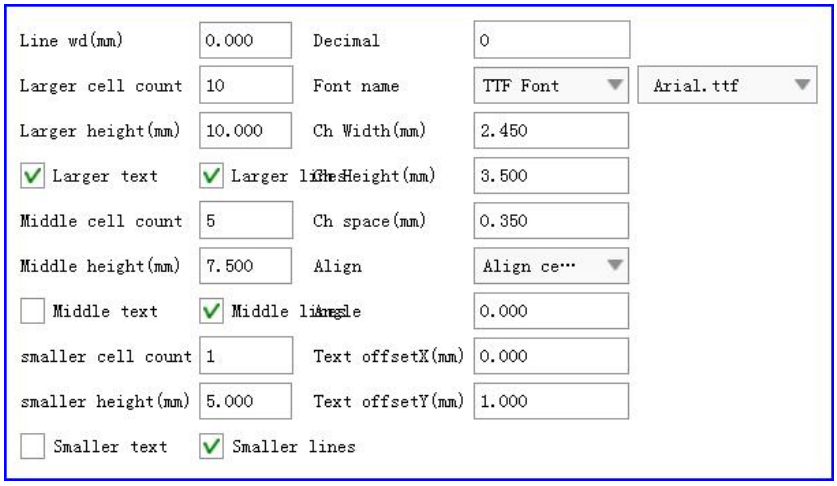


Figure 8-29 ruler

Support straight edge and round ruler.

If it is a **Straight**, then the total length = **Total cell** * **Dist cell**, count from **Begin num**, accumulate according to the **Cell num**.

If it is a **Round**, then the total radian = **Total cell** * **Angle cell**, count from **Begin num**, accumulate according to the **Cell num**.

There are three types of scales: large grid, medium grid and small grid.

9 Entity List

The entity list refers to the label list in the upper right part of the main interface, as shown in Figure 10-1.

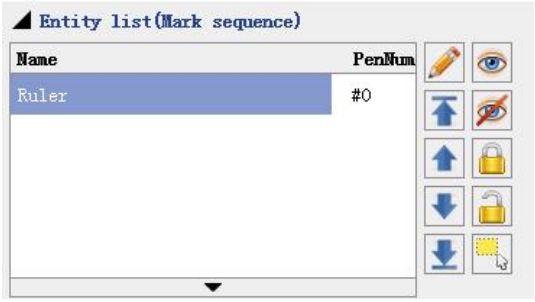


Figure 9-1 entity list

In the object list, all the marks displayed in the editing area will be arranged in the order of engraving. Single-selection and multi-selection operations performed in the editing area will also be displayed in the object list at the same time.

In the single selection state, the mark can be moved up   or move down   To change the marking order.

click  and  you can hide and show selected objects.

Click  and  you can lock and unlock the selected object.

Hidden or locked objects cannot be selected with the mouse in the view area. You need to click to select them in the object list.

Double-click the label name in the list or click  ， The tag name modification box will pop up, and you can customize the input tag name.

10 PenNumber Property

The pen number attribute bar is located in the middle right part of the main interface, as shown in Figure 11-1 and Figure 11-2.

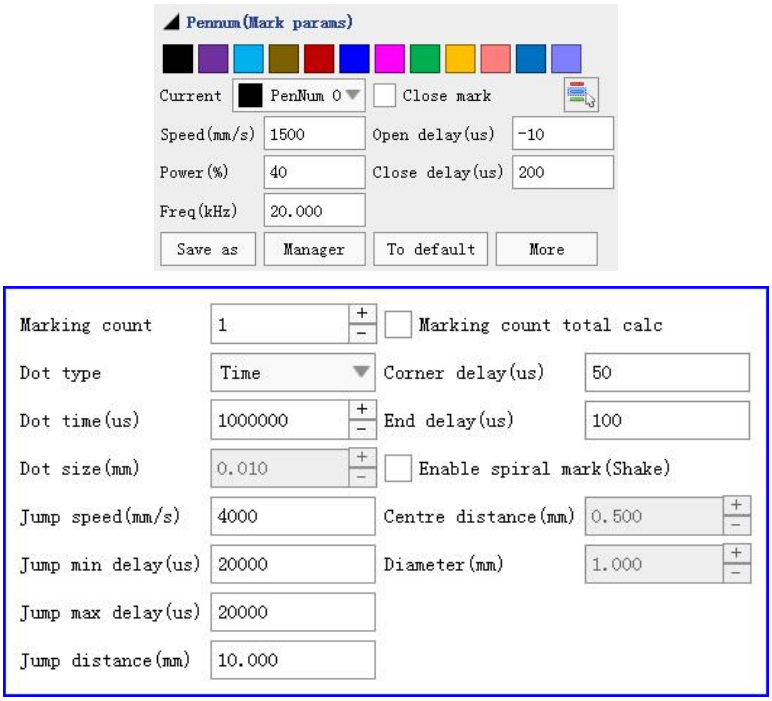


Figure 10-1 Pennumber property

Figure 10-2 Quick pen number switching bar

Quick pen number switching bar: The color square represents pen number. Select a mark, click one of the color blocks, and the pen number of the selected mark will be changed to the pen number of the clicked color block.

10.1 PenNumber property

When creating a new blank document, the laser marking machine will automatically create 21 pen numbers.

Current: The pen number of the currently selected object.

Speed: The unit is millimeters per second (mm/s), which is the swing speed of the X.Y

two-way galvanometer inside the scanning head when the light is emitted for marking. The range is (1---20000mm/s). When adjusting the speed, pay attention to the corresponding relationship with the power and frequency. The faster the speed, the higher the frequency should be. The speed value directly affects work efficiency. The larger the value, the shorter the time required for marking; the smaller the value, the longer the time required for marking.

Power: The unit is percentage (%), the relative power of the laser (the actual power depends on the energy of the laser), and the range is (1%-100%). When the other parameters remain unchanged, the greater the value, the greater the output energy, and the marked effect will have a heavy color and deep traces.

Freq: The unit is kilohertz (kHz), the number of pulses per unit time, that is, the number of light points emitted per second. The larger the value, the more and more compact the light spots are arranged in a unit length. Proper spot spacing is conducive to the adjustment of the effect. With other parameters unchanged, the lower the frequency, the higher the peak power, which has a better direct vaporization effect on the material; the light energy effect exhibited by high frequency is closer to the average power, that is, the reaction is more thermal effect.

Open delay: The unit is microseconds (us). For the delay of the laser, the laser is turned on to wait for the galvanometer to complete the command (range -2000---2000us). Because the galvanometer jumps from the current stop point to the next character or pattern starting position, the response of the galvanometer to the position signal will lag behind the time when the system sends the signal, so the laser must be delayed to wait for the galvanometer Jump to the corresponding position and then emit the laser. This setting is related to the response time of the laser. Normally, this value should be adjusted to a positive value, but when the response time of the laser is greater than the response time of the galvanometer, the value should be adjusted to a negative value. Both CO2 lasers and fiber lasers should usually be set to negative values.

Close delay: The unit is microseconds (us). For the delay of the laser, the laser is turned off with a delay to wait for the galvanometer to respond to the final position command. The range is (-2000 to 2000us). Because the response time of the laser to the "turn off" command is much shorter than the response time of the galvanometer to the "end position" command, the laser must be turned off with a delay to wait for the galvanometer to reach the response position. This setting is related to the marking speed and needs to match the marking speed set by the user.

Setting proper light-off delay parameters can remove the non-closing phenomenon at the end of marking, but if the light-off delay is set too large, it will cause excessive dots in the end section.

Close mark: After checking it, all markings under this pen number will be turned off.

Marking count: set the number of times all marks under this pen number are engraved in one marking operation.

Dot type: time, pulse and diamond mode.

Dot time: The unit is microsecond (us), which represents the light emitting time when the laser is dotted. When doing dot matrix marking, the marking speed has no effect on the overall marking time. The longer the time spent, the deeper the trace.

Dot pulse: It is valid when the dotting mode is pulse, which means that the light emission time is controlled by the number of pulses.

Dot size: the unit is millimeter (mm). It is valid when the dot mode is diamond. The larger the value, the thicker the dot, and vice versa.

Pulse width: The unit is nanoseconds (ns), which is the duration of time when the laser power is maintained at a certain value. At the same frequency, the larger the pulse width, the smaller the peak power. This parameter is only valid (visible) after enabling MOPA in the [6.4.1 Fiber Laser] parameter.

End delay: The unit is microseconds (us). The laser machine makes a stroke. After the stroke is completed, it is necessary to wait for the light-off delay and turn off the light. Since the laser needs response time to turn off the light, the end delay is this waiting time. After waiting for the end delay, it will go to the next marking coordinate. If this delay is set too small, the laser has not been completely turned off, causing tailing; if it is set too large, it will affect the marking time.

Corner delay: the unit is microsecond (us), the delay time of the galvanometer signal at the corner of the character (range 30-200ns). The delay time required for the laser marking of character corners or arc lines. If this setting is not set properly, burnt black will occur at the corners or arc lines of the characters, and the required delay time will vary depending on the marking. The marking material and marking speed are different.

Jump speed: The unit is millimeters per second (mm/s), the speed at which the X.Y two galvanometers inside the scan head swing when jumping, and the range is (1-20000mm/s). This parameter is mainly used to control the jump speed between strokes when marking characters or

patterns. That is to say, after marking the last point of a character or stroke, the galvanometer will turn to the moving speed of the next character or the starting point of the stroke. There is no laser in the middle.

Jump min delay: The unit is microseconds (us). The minimum time required for the laser to jump between strokes.

Jump max delay: The unit is microseconds (us). The maximum time required for the laser to jump between strokes.

Jump distance: The unit is millimeter (mm). The maximum distance required for the laser to jump between strokes.

When the actual jump distance <the maximum jump length, the actual jump delay = minimum jump delay + (actual jump distance / maximum jump length) * (maximum jump delay-minimum jump delay).

When the actual jump distance >= the maximum jump length, the actual jump delay = the maximum jump delay.

Save as: Save the currently set parameters to the laser marking machine, you need to enter a unique name.

Parameter manager: It will be introduced in [10.2 Parameter Manager].

The following is an example to illustrate the effect of each parameter:

Create a new marking file, add a fixed text, the text content is "TEXT" font is GENISO.shx font, and the size is set to 31.78X11 mm.

Use arrows to simulate the direction of laser marking.

Adjust the Open delay:

Mark this text and observe the line at the beginning of each line segment of the marked letter. There may be the following situations：

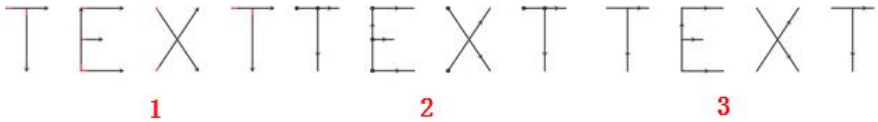


Figure 10-3 Marking effect under three different light-on delays

The first case**:** there is no light at the beginning of a line (the red line is the light without light). This is caused by the excessively large turn-on delay, and it is necessary to adjust the turn-on delay to a small value or even a negative value.

The second situation: the “focus” phenomenon as shown in the figure appears in a line at the beginning, that is, the laser is heavy at the beginning. This is caused by too small turn-on delay, and it is necessary to increase the turn-on delay.

The third case: the length of the line is appropriate, and there is no "key point" phenomenon of the second case. This is the situation we need, and the light-on delay at this time is more appropriate.

Adjust Close delay: Mark the text made above, and observe the line at the end of each line segment of the marked letter. The following three situations may occur, similar to the beginning segment.

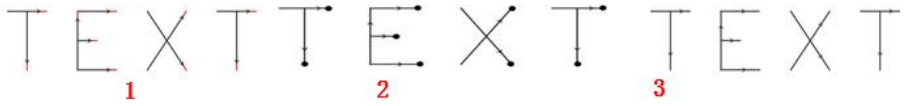


Figure 11-4 Marking effect under three different light-off delays

The first case: a section of the line at the end does not emit light (the red line is the section without light). This is caused by too small light-off delay, and it is necessary to increase the light-off delay.

The second case: a line at the end of the line has a "key point" phenomenon as shown in the figure, that is, the laser at the end is heavy. This is caused by the excessively large turn-off delay, and the turn-off delay needs to be adjusted down.

The third case: the length of the line is appropriate. This is what we need. At this time, the light-off delay is more appropriate.

Because different manufacturers use different lasers and galvanometers, their performances are also very different, and the marking material is different, sometimes no matter how to modify the light-on delay and the light-off delay, the length of the line segment cannot be made suitable, and the line is not a straight line. . At this time there will be several other situations：

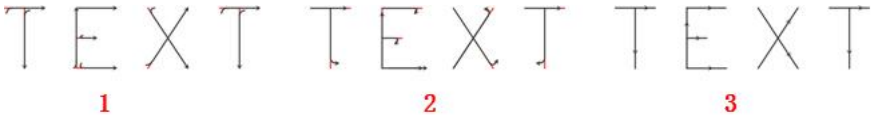


Figure 10-5 Three possible abnormal images

The first case: the line in the beginning segment is deformed, and the jump delay can be increased at this time.

The second case: the line of the end segment is deformed, and the end delay can be

increased at this time.

The third case: there is no deformation of the lines at the beginning and the end, and the two delay parameter values are just right at this time.

As long as the end delay and jump delay are as small as possible when the line is not deformed, the two delay parameters are too large. Although the line is normal, it will affect the efficiency of marking.

Adjust Conner delay:

Create a new marking file, add a fixed text, the text content is "A4" font is GENISO.shx font, and the size is set to 15.89x11mm.

Mark this text, observe the corners of the font, the following three situations may appear：

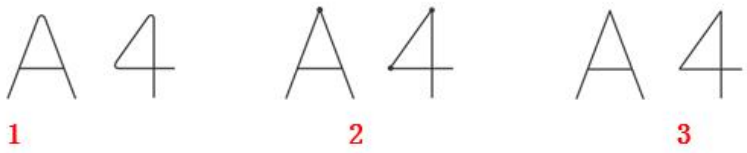


Figure 10-6 Three kinds of corner delay

The first case: the figure that should have been sharp corners becomes a circular arc, which is caused by the corner delay parameter value being too small, at this time the corner delay parameter value should be increased.

The second case: Although the graphics that should have been sharp corners are sharp corners, the vertices of the right angles are heavy by the laser. This is caused by the corner delay parameter value being too large. At this time, the corner delay value should be reduced.

The third situation: the shape that should be sharp corners is sharp corners, and there is no phenomenon that the vertices are the focus. This is the situation where the corner delay parameter value is more appropriate.

After the above parameters have been set, this group of parameters can be used for marking. It is best not to modify the set parameters, because after modification, the marking effect may change. In a similar way, other marking parameters can be established and saved. In the future, it is no longer necessary to modify the parameters every time, just select the required marking parameter name directly, which reduces a lot of repetitive work and improves work efficiency.

Marking count total calc: After checking, the pen number corresponding to all the markings

will be marked once, and then the marking will be performed again until all times have been marked. If it is not checked, the next mark will be marked after the mark has been marked independently.

Enable spiral mark (Shake): Mark the marked line segment in spiral mode. The diameter determines the size of the spiral, and the pitch determines the tightness of the spiral. The marked line effect will be noticeably thicker.

10.2 Parameter manager

After the marking parameters have been modified, they can be saved through the parameter manager. Click the parameter manager button under the More menu to pop up the marking parameter manager interface, as shown in Figure 11-7.

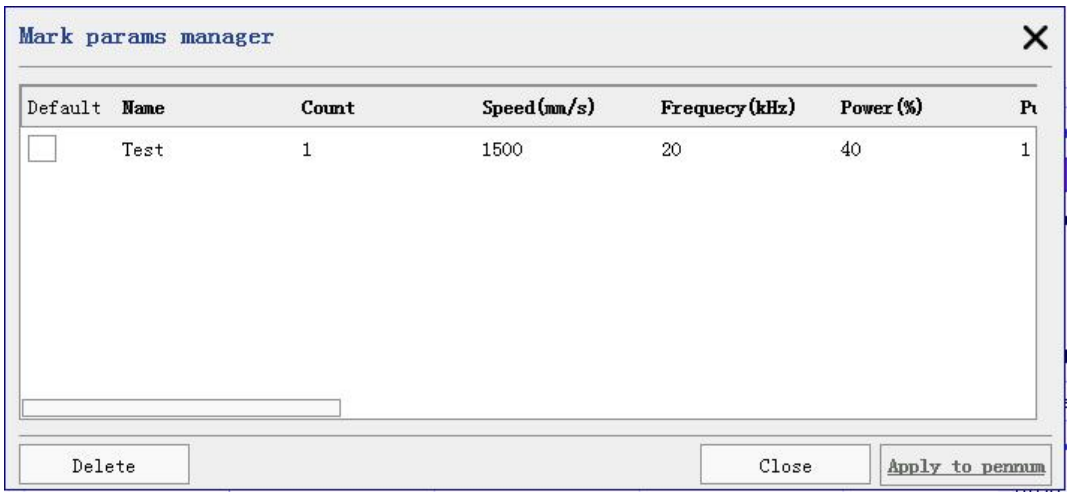


Figure 11-7 Marking parameter manager interface

In this interface, a list of marking parameters saved in the current laser marking machine can be displayed. Click an item in the list to delete or apply to the current pen number. If you want to set the selected marking parameter as the default parameter, you can click the default box before the marking parameter, so that when you create a new document in the future, the default is the selected marking parameter.

The parameter manager also supports quick modification of the saved parameters. Double-click the item you want to modify, and the modification interface shown in Figure 11-8 will pop up.

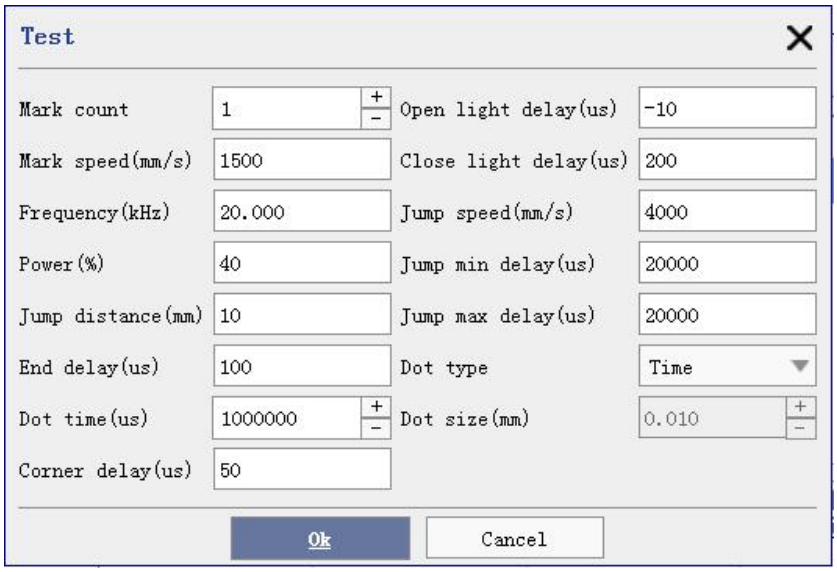


Figure 11-8 Parameter modification interface

Here you can quickly modify the saved parameters, click OK to save again.

11 Marking control bar

The marking control bar refers to the control area below the editing area of the main interface, as shown in Figure 13-1.

Figure 11-1 Marking control bar

Select mark: After selecting the mark in the editing area, and then checking the option mark, only the selected mark will be engraved during marking, otherwise, all marks that have not been turned off will be engraved. If the mark has been set to turn off marking, it cannot be engraved, that is, turning off marking has the highest priority.

Preview path: Checked means red light shows the marking path; unchecked means red light shows the marking frame rectangle.

Set 0 after opened: Checking means that the number of markings will be automatically cleared every time the document is opened.

Mode: There are three modes: single, trigger and continuous. With the advanced setting parameters, the advanced setting parameters are shown in Figure 13-2.

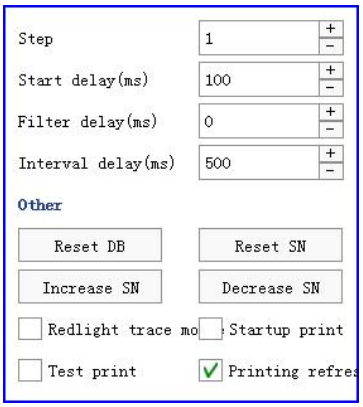


Figure 13-2 Advanced setting parameters

Single: Press the marking button or "External control to start marking" to start marking once. Start delay: In this mode, the start delay is not accurate. It consists of start delay plus software delay; filter delay: invalid; interval delay: invalid.

Trigger: Press the marking button or "External control to start marking" to enter the trigger mode. The IO port of "Start Marking Input Port" performs trigger marking. Start delay: the delay

time from IO port valid to the start of printing; filter delay: only one trigger is processed within the set range, and then the trigger in this time interval is ignored; interval delay: invalid.

Continuous: Press the marking button or "External control to start marking" to enter the continuous mode. Start delay: In this mode, the start delay is not accurate. It is composed of start delay plus software delay; filter delay: invalid; interval delay: the interval time from the completion of one marking to the beginning of the next marking**.**

Step: Refers to the number of times of marking in one marking operation. For example, if the number of single steps is set to 2, and in single mode, you click once to mark, and two marks are engraved in the document record.

Marking preprocessing: used to process preprocessing actions in the scanner or event manager.

Plan: Plan the total number of times to be engraved, and automatically stop engraving when this number is reached.

Finished: The number of times that the marking has been completed.

Finish time(s): The total time to complete the marking of the mark in the entire document. The unit is seconds (s).

No limit count: does not limit the number of times the document is marked.

Infrared Preview (F1): Red light preview, red light will appear after clicking to confirm the marking position, and the shortcut key is F1. A red light preview box will appear on the interface, as shown in Figure 13-3.

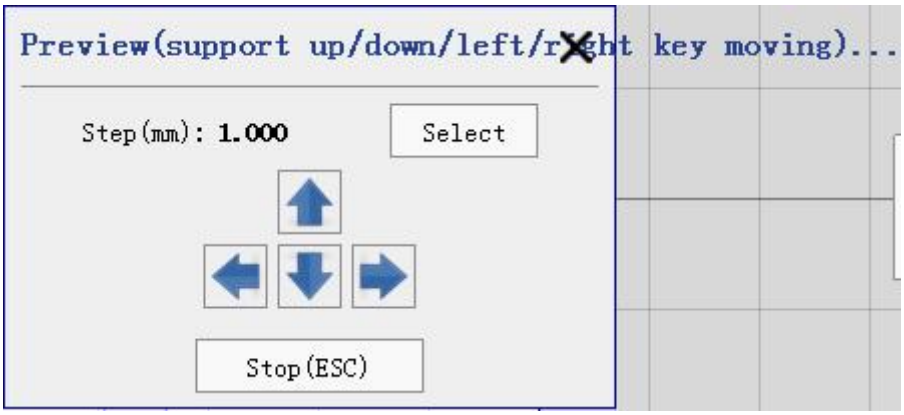


Figure 11-3 Red light preview interface

Support the keyboard to move the document mark up, down, left, and right, and refresh the red light preview in real time.

Print(F2): Start marking, click to enter the marking process, the shortcut key is F2. The marking interface will appear on the interface, as shown in Figure 13-4.

Figure 13-4 Marking interface

The red light interface will not automatically close, and the user needs to click the stop button or press the ESC key on the keyboard to exit the red light preview after the red light preview is over.

The marking interface will automatically close after the marking is finished. If you need to stop marking in the middle, click the stop button or press the ESC key.

12 Status Bar

The status bar is the long strip displayed at the bottom of the main interface, as shown in Figure 14-1.

Figure 12-1 Status bar

The status bar from top to bottom is: version number, current user, currently edited document, selected mark size, network connection status, and system time.

13 Input

 **The input method status bar is displayed as a floating frame on the main interface, and supports mouse movement. After the next startup, the position of the floating frame is the position after the last move. Click the keyboard icon to pop up a menu. As shown in Figure 15-1.**

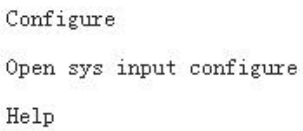


Figure 15-1

Currently supports Sogou input method and Android automatic English input method. Check the corresponding input method to complete the switch.

Configure: Used to set the current input method. Sogou input method supports English, Chinese (simplified, traditional, and Wubi). After configuration, you need to restart the system to take effect.

Help: Display the help of the current input method. If the current Sogou input method is used, click the keyboard Shift+Spacebar to switch between Chinese and English. If the current Android keyboard (AOSP), only supports English input.

13 Tool

13.1 Notepad

It is used to save the temporarily edited content, and it will be cleared after power off and restart. If you can continue to use it next time you turn it on, you need to save it to the local or USB flash drive.

13.2 Transcode

Convert characters to hexadecimal to facilitate communication debugging.

13.3 Calculator

Simple calculator tool.

13.4 Port occupy viewer

Used to view the occupancy of the serial port.