# EZCAD3.0



Beijing JCZ Technology C o. Ltd

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# 1 Software Overview

## 1.1 Software Installation

EzCad3 software requires the computer with dual-core CPU, 2G or more of memory, 10G or more hard disks, and more than 2 USB ports, and it is suitable for WIN7 64-bit, and WIN10 64-bit. (The software could run on win8-64-bit system also, but have to install many others program, so does not suggestion win8)

EzCad3 software is an installation-free version. Users only need to copy the file on the installation CD to computer directly. Then run the EzCad3.exe program to use it.

If you do not install the Licenses, you cannot open the software.

## 1.2 Software features

This software has the following main functions:



- Edit the graphic pattern
- Supports TrueType fonts, single line fonts (JSF), dot matrix fonts (DMF), one-dimensional barcodes, and two-dimensional barcodes such as DataMatrix.
- Dynamic text processing. EZCAD3 can change the text real-time during processing, can read and write text files and Excel files directly.



- Powerful node and graphic editing function for curve welding, clipping and intersection calculation.
- Support up to 256 layouts. Set different process parameters for different objects.
- Support general bitmap formats (bmp, jpg, gif, tga, png, tif, etc.)
- Support general vector file (Ai, Dxf, dst, plt, etc.)
- Support STL format 3D models file;
- Support general image processing (bitmap-grayscale conversion, black-white bitmap inversion, grid-dot processing, etc.), can perform 256 grayscale bitmap processing;
- Support different hatch type;
- A variety of control objects, users can freely control system interaction with external devices.
- Project the top view of a 3D model to mark. Support 3D model layer marking

## 1.3 Interface description

Start View：


Fig 1–1 Start View

Main View

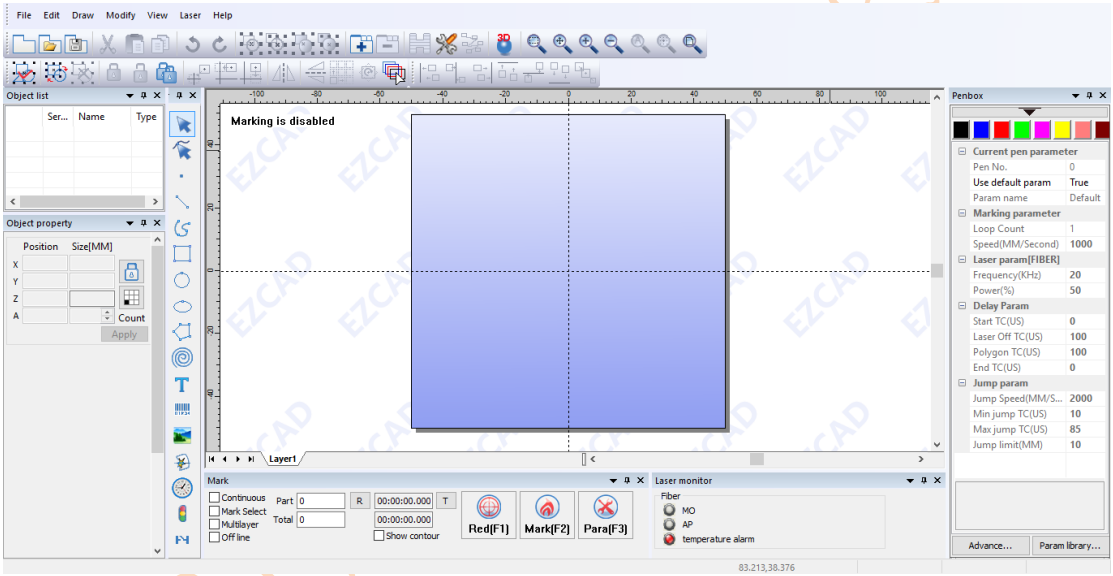



Fig 1–2 Main View

# 2 File Menu

File Menu: Achieve general file operations, such as new, open, save files and other functions.

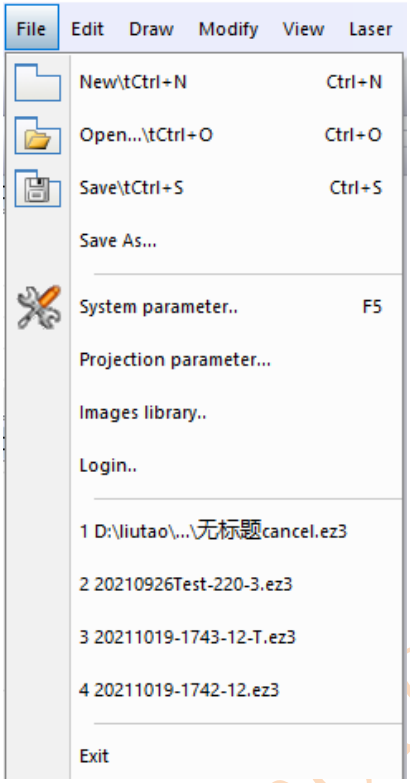



Fig 2–1 File Menu

## 2.1 NEW (N)

Create a new workspace view, the hot–key is ‘CTRL+N’, the Shortcut icon is.

## 2.2 OPEN (O)

Open an .ez3 file operator saved. The hot–key is ‘CTRL+O’, the shortcut is

## 2.3 SAVE(S)，SAVE AS(A)

SAVE file .the hot–key is ‘CTRL+S’, the shortcut is.

## 2.4 System Parameter

Set field size, auto save, language, unit, and password, Etc. Hot–key is ‘F5’ the shortcut is.

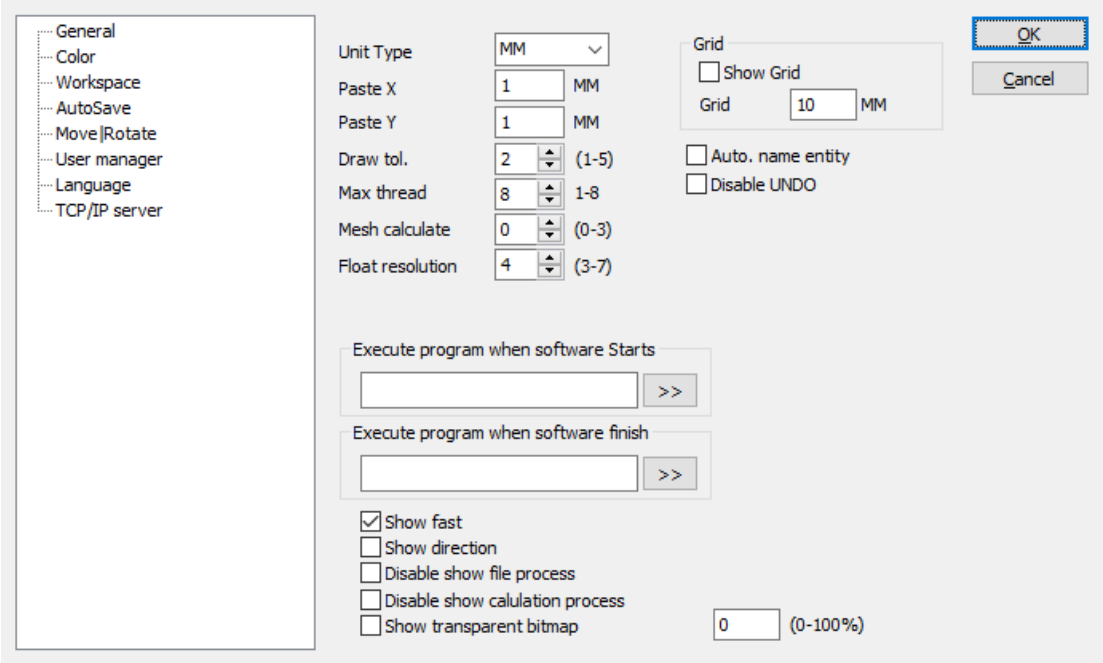



Fig 2–2 System Parameter

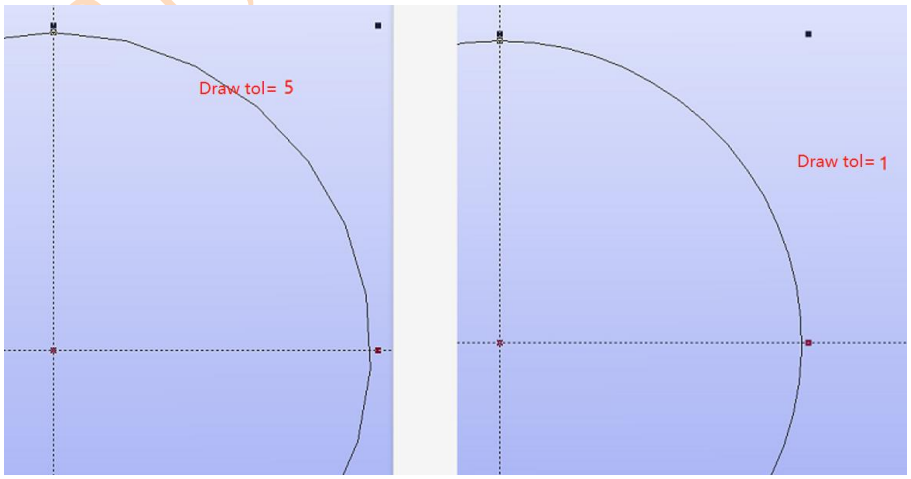
### 2.4.1 General

In the general parameters, some common parameters are set.

**Unit type：** Refers to the type of unit used by the software to display data such as coordinates and distances. Options are MM and INCH. Modification of the unit type requires restart of the software to take effect on the changes.

**Paste X /paste Y：** Specifies the offset of the newly generated object (the object being pasted) relative to its original position when you use the copy/paste function.

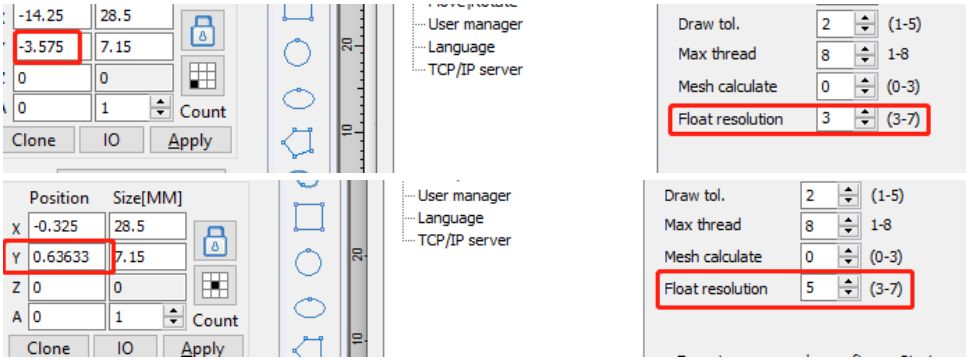
**Draw tol:** Visual optimization.




**Max thread**: Maximum threads supported by the computer

**Mesh calculates**: Visual optimization, same like draw tool, but this one for 3D curve.

**Float resolution:** Decimal places




**Grid：** Whether to display the view grid in the work area.

**Grid space：** The distance between grid lines.

**Auto name entity**: Auto named object after create

**Disable UNDO:** Do not use UNDO function.

**Execute program when EZCAD start/finish：** When Ezcad3 is started or closed, a set of executable programs provided by a third party is opened at the same time for realizing some related operations.

**Show fast：** In the software, zoom the display when marking content.

**Show direction：** Displays the curve laser marking path. As shown in Figure 2–5, the machining direction will be displayed on the object to be marked.

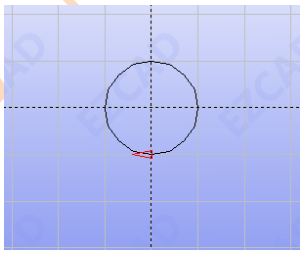


Fig 2–3 Show curve direction

**Disable show file process:** Show up the file progress bar or not.

**Disable show calculation process:** Show up the calculation progress bar or not.

**Show transparent bitmap:** setting bitmap transparency

### 2.4.2 Color

Background, workspaces, guides, grids display colors in software. As shown in Figure 2–6.

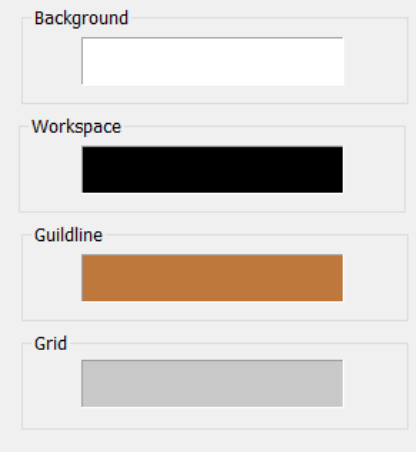
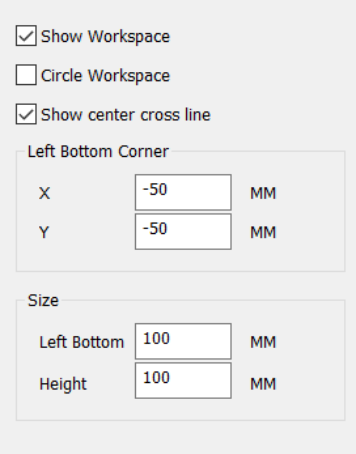



Fig 2–4 Color




2–5 Workspace setting

### 2.4.3 Workspace

Set the properties of the workspace, including the size and location of the workspace. As shown in Figure 2–5.

Workspace refers to the rectangular frame section in the main interface. The rectangular box corresponds to the effective working area of the actual equipment. All the graphics drawn in the rectangular box will be processed during actual processing. The figure outside the rectangular frame may not be processed due to the actual processing size of the galvanometer.

### 2.4.4 AutoSave

Set the time interval for AutoSaved of Ezcad software. Take 1 minute as the basic unit. Autosaved files are saved in the AutoSave.Ez3 file in main directory. As shown in Figure 2–6. And it could enable save file when software close.

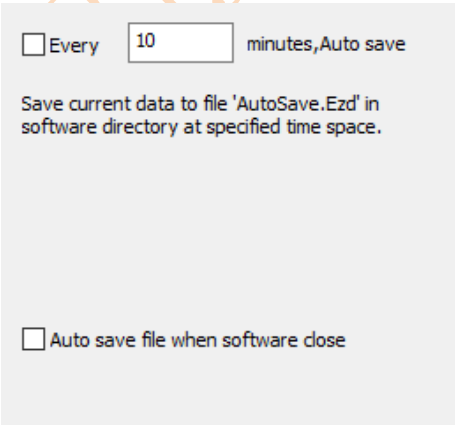



Fig 2–6 Autosave dialog

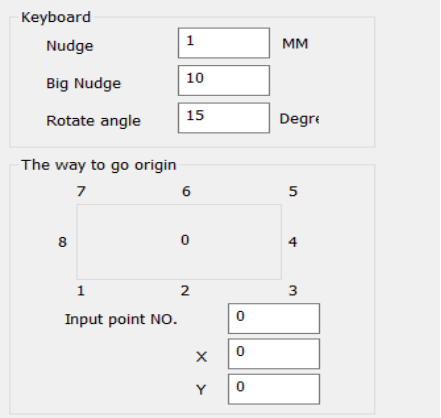



Fig2–7 move and rotate setting

### 2.4.5 Move and Rotate

As shown in Figure 2–7

**Nudge**：The distance that the object moved when pressing direction keys

each time.

**Big nudge**：indicates the number the user wants to time the Nudge distance so as to achieve further each time when synchronously press direction keys and “shift” key together

**Rotate angle**: the angle the object rotates each time when press direction keys and “ctrl” key together

**The way to go origin**：When use “Put to origin” function, which point of the object should be put on the origin.

**Input point NO**：Zero reference point. When the setting is as shown in Figure 2–10, the object is selected. Click go center in software, the object is centered on the zero coordinate (20, 0) at coordinate 1.

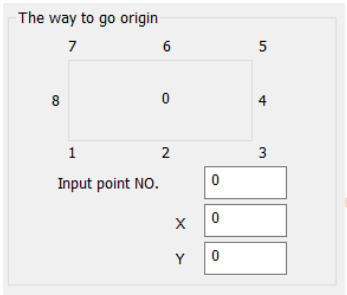
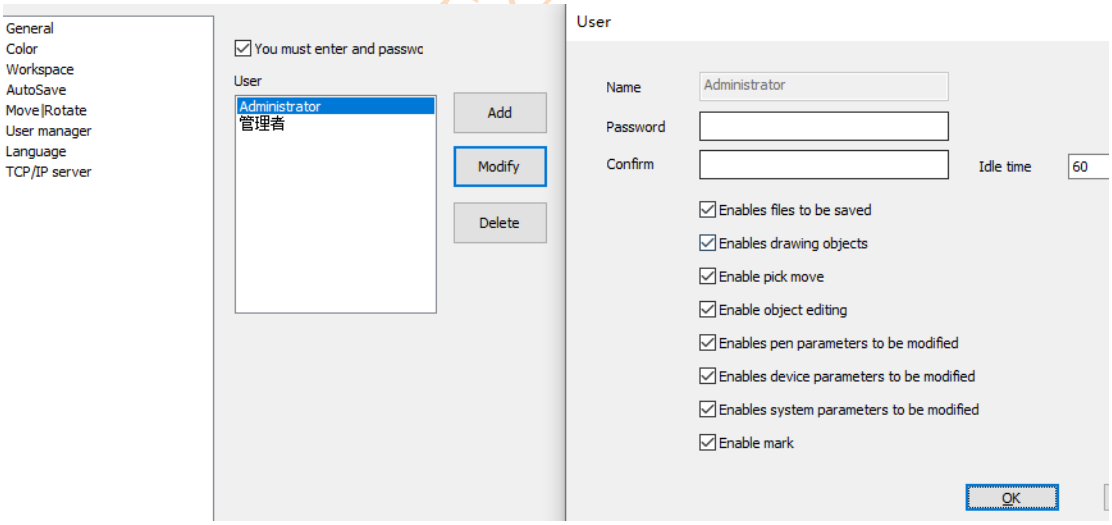



Fig 2–10 move and rotate setting

### 2.4.6 User Manager




Logon in as different identity, and could be setting different jurisdiction for every identity.

### 2.4.7 Language

Shows the language packs that are currently installed on LANG folder. You can modify the interface language in Ezcad software here. The choices made here do not take effect until the next time you start the software. As shown in Figure 2–11.

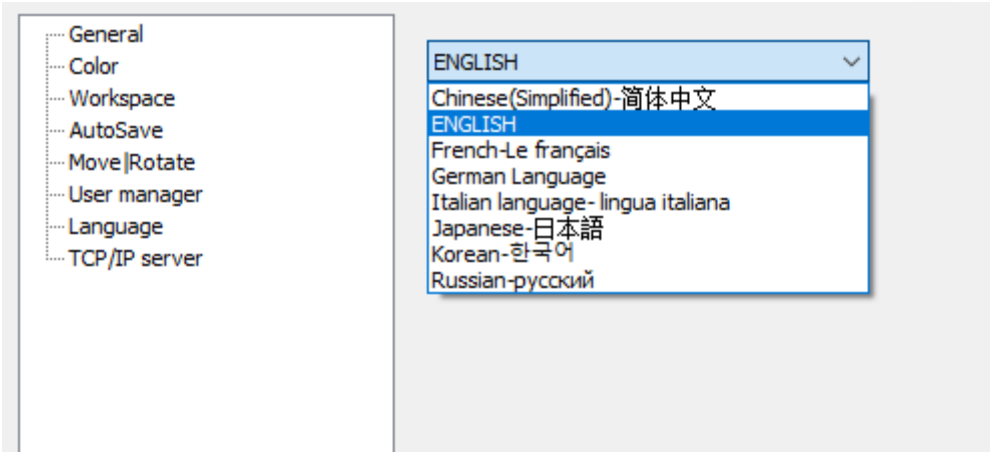



Fig 2–11 Language setting

## 2.5 Projection Parameter

Connect the external projection device. Keep the direction both scanner and projection same. Enable the project watch and click F4 to preview.

When using, the direction of projection of the projector needs to be the same as that of the galvanometer. After enabling projection observation, click F4 to preview the marked content with the projector.

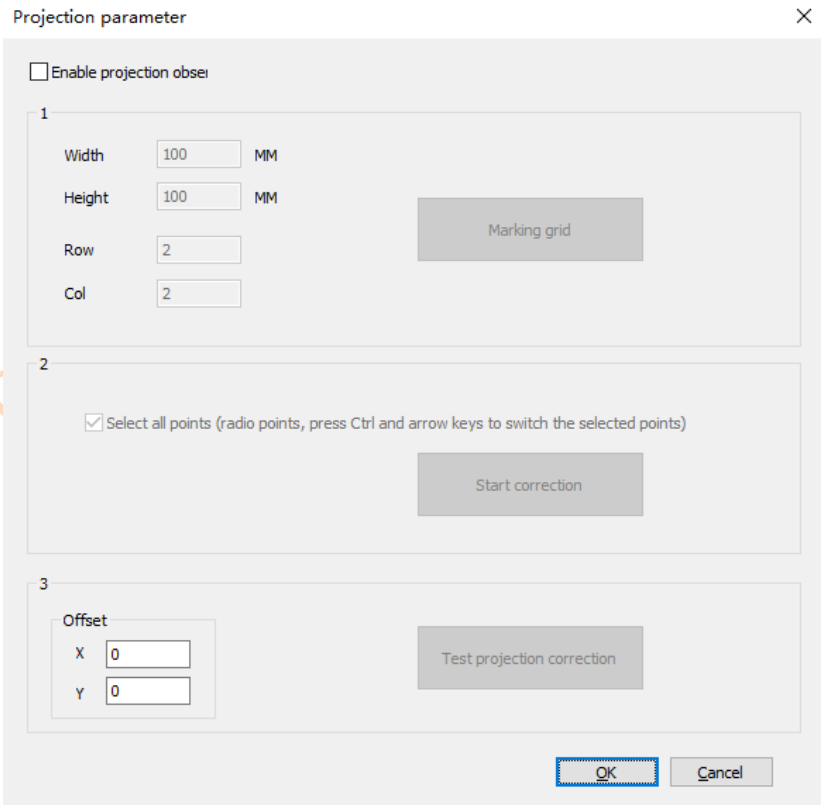



Fig 2–12 Projection

**Width：** Marks the width of the grid. Used for projector size and distortion correction.

**Height：** Mark the height of the grid. Used for projector size and distortion

correction.

**Row & Col：** Mark the number of correction grid rows and columns.

**Start correction：** Start to calibrate the position of each grid point.

**Test projection correction：** Project the actual effect of the calibration, if the projection of the calibrate grid and the actual marking of the grid coincide, the correction is valid, otherwise need to re-calibration.

**Offset：** Adjust the overall X and Y position of the projected content.

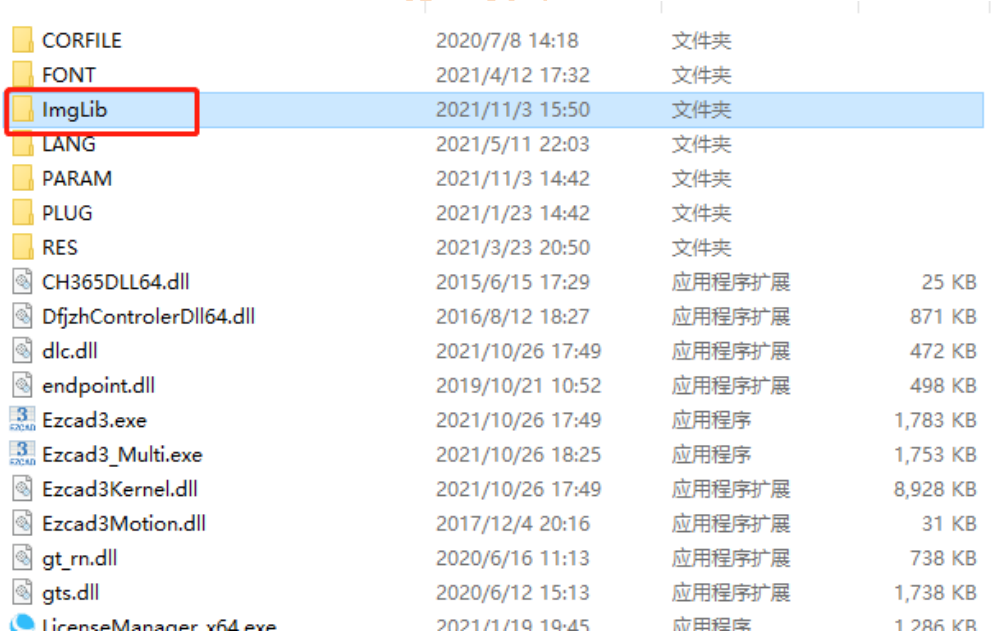
Projector calibration procedure

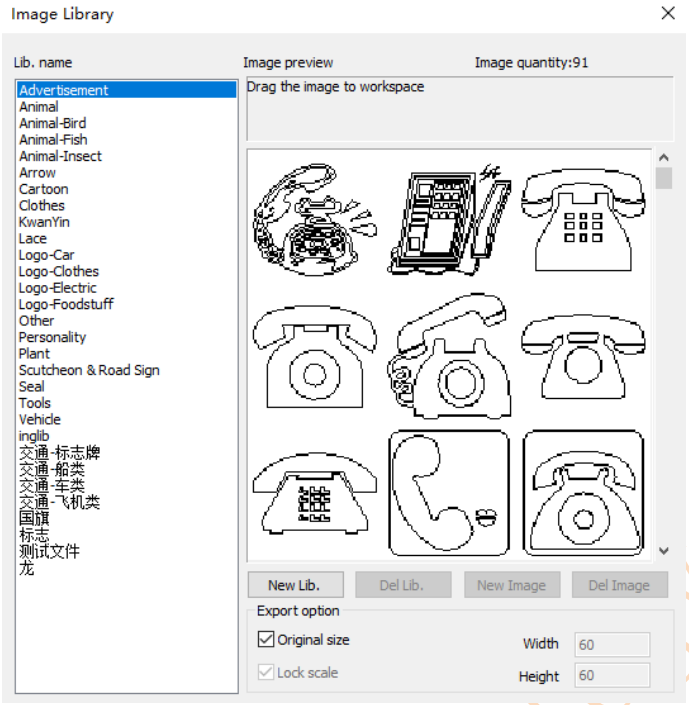
In Figure 2-12, fill in the calibration area size, the number of rows and columns, and click on the marking projector to calibrate the grid lines.

Click "start calibration", remove the "select all points" check, use Ctrl+ direction selection, adjust each point of the projected grid by up, down, left, right, and make the grid of the projection and the actual laser marking grid point completely Coincidence, click OK to save the projector calibration data.

## 2.6 Images Library

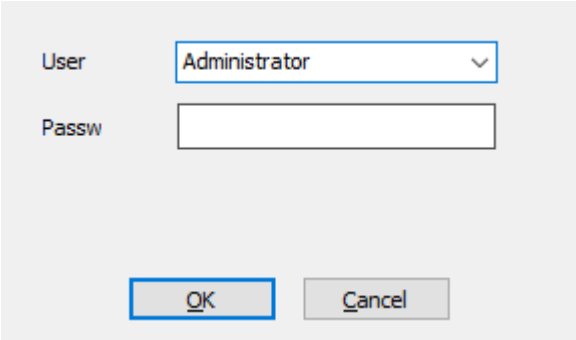
Pre stored drawing files, and could be user defined. The customer could load graph from library directly.






## 2.7 Login

Switch operation user, and logon in as another identity.




## 2.8 Recent documents

After the "System Parameters" menu, the files recently opened by the user are listed. The maximum number of listed files is 4. If the software has never opened/saved any ezd file, no file is listed and the menu item is not available.

## 2.9 Exit(X)

Exit Ezcad software. If you have unsaved files, you will be prompted to save them.

# 3 Edit Menu

The "Edit" menu implements the editing operation of the graphics. See Figure 3–1.

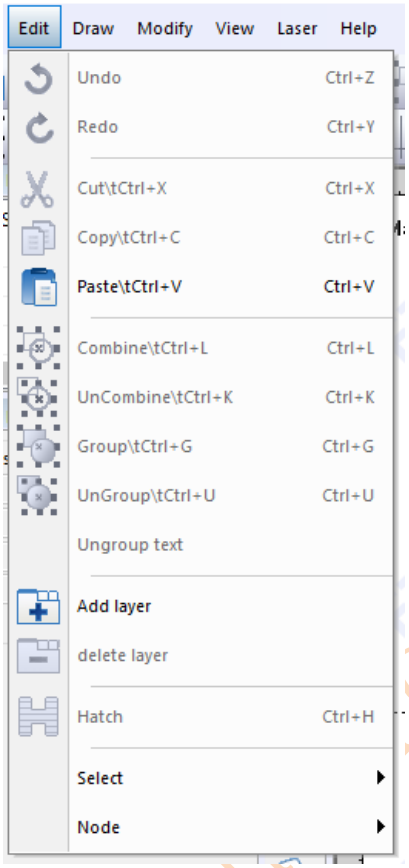



Fig 3–1 Edit

## 3.1 Undo Modify/Redo

In a graphical edit operation, if the current operation is not satisfied, the "undo" can be used to cancel the current operation and return to the state of the previous operation; after the current operation is revoked, the "redo" function can be used to restore the canceled operation. This is one of the most common functions of editing.

 corresponding to “undo”,  corresponding to “redo”.These two operations have shortcut keys ‘CTRL+Z’ and ‘CTRL+Y’.

## 3.2 Cut (T)/Copy(C)/Paste (P)

"Cut" deletes the selected graphic objects and copies them into the system clipboard, and then copies the graphic objects in the clipboard to the current figure with the "paste" function. “Copy" copies the selected graphic objects to the system clipboard while preserving the original graphics object.

The corresponding keys of "cut", "copy" and "paste" are respectively CTRL+X，CTRL+C，CTRL+V.

## 3.3 Combine/Uncombined

The "combine" removes all the curves of the selected objects and

combines them together as a new curve combination. This combined graphical object can be selected, copied, pasted, and set object properties as well as other graphic objects. For example, the original figure is round or rectangular, and the figure after "combine" is handled according to the curve, and it will be converted into a curve after being treated as "Uncombine".

The "Uncombine" reduces the combined object into a single curve object.

 corresponding to "combine",  corresponding to "Uncombine".

### 3.4 Group/ungroup

The "group" preserves the original attributes of the selected graphic objects and combines them as a new graphical object. This combined graphical object can be selected, copied, pasted, and set object properties as well as other graphic objects. The "unGroup" reverts the objects of the group to the state before the assembly.

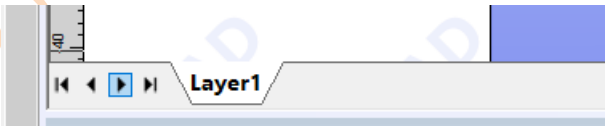
 corresponding to "group",  corresponding to ‘ungroup’.

### 3.5 Ungroup text

Text is separated into groups by character, and the object name of the group is the character name.

### 3.6 Add layer/delete layer

‘add layer’ adding multiple layers for the software, can edit and process the content and process in the new layer. Each layer can be controlled by double click of the left mouse button to change the IO port. Double click ‘Layer1’




Then can set IO in layer1 as fig 3–2.

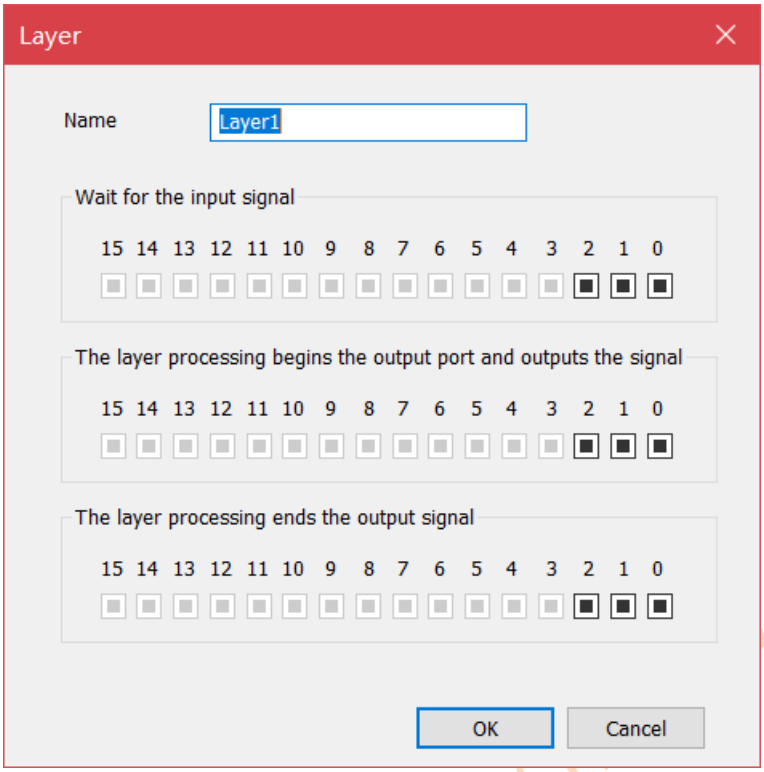



Fig 3–2

 corresponding to ‘add layer’,  corresponding to ‘delet layer’.

### 3.7 Select

 **select all object**: select all the objects in the current workspace

 **select all the unselected**：select all the unselected objects in current workspace.

 **delete selected object**：Delete current selected objects.

 **lock picked object**：It means that you can't edit any of the current objects, and there will be some lock icons around the object. 。

 **Unlock picked object**：Release the locked object that is currently selected

 **unlock all object**：Remove all locked objects

 **put to origin**：Indicates that the selected object is placed at the original point

 **the x center is placed on the Y axis**：The center coordinates of the X direction representing the selected objects are placed on the Y axis.

 **the y center is placed on the X axis**：The center coordinates of the Y direction representing the selected objects are placed on the X axis.

 **Mirror X**：Represents the vertical centerline image of the currently selected object.

 **Mirror Y**：Represents the horizontal centerline image of the currently selected object.

 Rotate（as fig 3–3）

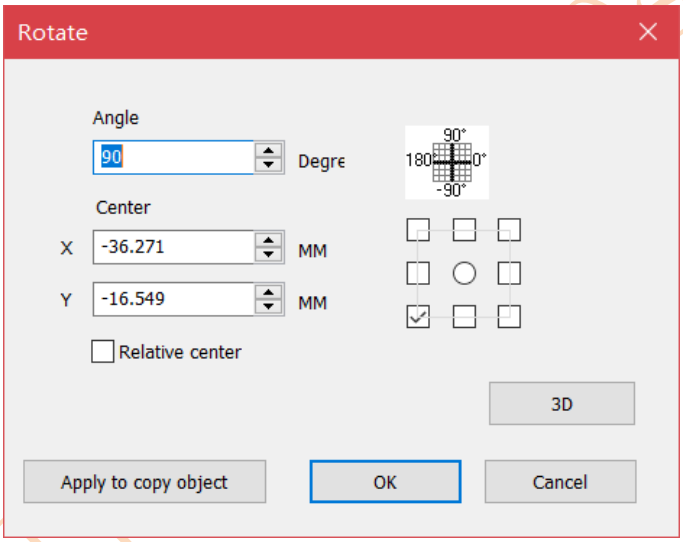



Fig 3–3

**Angle**：Indicates the angle at which the currently selected object is to be rotated.

**Center**：Indicates the center point of the currently selected object to be rotated.

**Relative center**：Click it, rotate center is object center.

**Apply to copy object**：Copy the current selection and rotate it to a new location.

**3D**：Current selected object rotates relative to axis x, y, z, click 3D pop up window in fig 3–3. As follow fig 3–4 show.

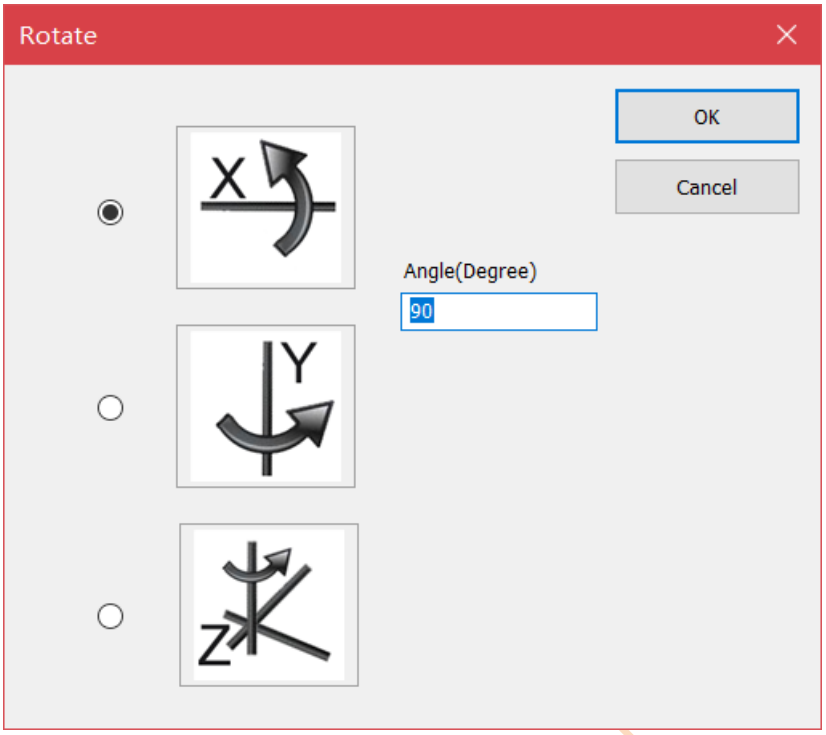



Fig 3–4

### 3.8 Node

The graphics drawn by EzCad3 software are all vector graphics. Therefore, you can modify the characteristics of the graphics to adjust the shape of the graphics.

If you want to use node editing fe atures, select the icon in the drawing toolbar. With a mouse click on an object in the workspace, the object shows all its nodes. The nodes are represented by boxes, with the larger one indicating the starting point of the curve. At the same time, the node editing toolbar will appear. As shown in Figure 3–5(A).

Fig 3–5 ( A )

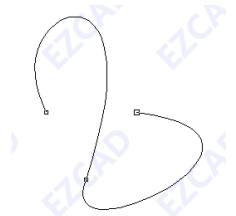


Fig 3–5 ( B )

: The mouse clicks on any non–node position on the curve where a

solid black circle dot appears. Select the "Add node" command to add a node at this point.

 : Click any node on the curve, the node is painted black, select "Delete node "command, the node is deleted

 : When two nodes are close, drag the two nodes and select the "unite node" command, the two nodes are merged into one node.

 : Clicks on any node on the curve. The node is painted black. Select the "separate node" command and the node is split into two separate nodes.

 : Click any point between two adjacent nodes on the curve and select the "convert to Line" command. The curve (which may be a straight line, arc or curve) between these two nodes is converted into a straight line.

 : Click any point between two adjacent nodes on the curve, and select the "convert to arc" command, then the curve between these two nodes turns into an arc.

 : The mouse clicks any point between two adjacent nodes on the curve and selects the "convert to curve" command. The curve between these two nodes is converted to a curve.

 : Click any node on the curve and select the "transition sharply" command, the node becomes a sharp point, and the curve turns more.

 : Click any node on the curve and select the "transition smoothly" command, the node will become a smooth curve and the curve will have a small turn.

 : Click a node with the mouse and select the "transition symmetrically" command, then the curve around the node is symmetrized.

 : Select the "change curve Direction" command, the start and end of the curve are exchanged and the direction of the curve is changed.

 : Select the command and the curve will close automatically.

 : Drag and drop more than two nodes and select the command. The Alignment dialog box appears. You can select the alignment of these nodes and align them with the top, bottom, left, or right sides.

**Note: Text objects and padding objects cannot edit nodes; but path text can edit the node of a path.**

### 3.9 Draw menu bar

Draw the normal objects.

(a)

(b)

Fig3–6 Draw

### 3.10 Hatch

Support fills the specified graphics. The filled figure must be a closed curve. If you select more than one object to fill in, then these objects can be nested within each other, or are not related to each other, but any two objects cannot have intersecting parts.

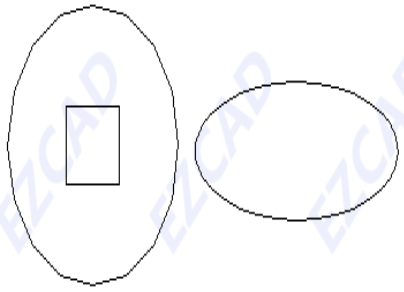


Fig 3–7 Hatch Item

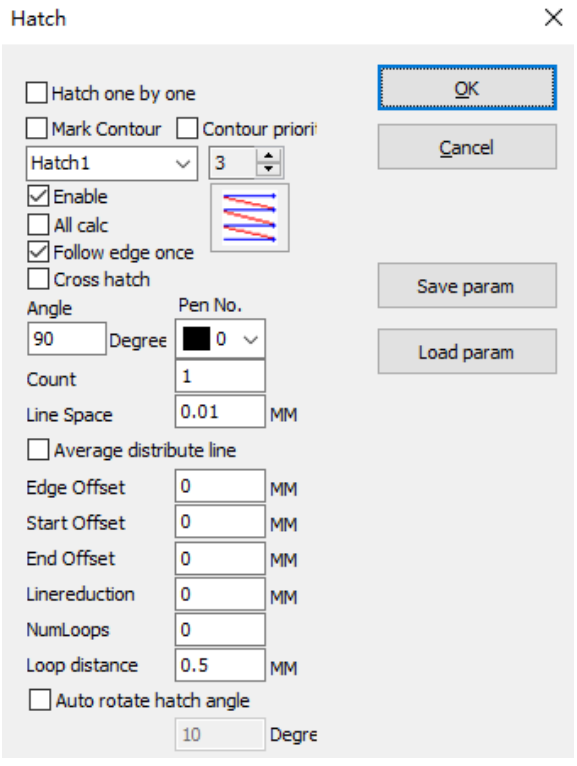



Fig 3–8 Hatch

**Hatch one by one**：After checking, when multiple objects are filled together, the number of objects does not change, which is the same as the effect of single independent filling for each object. Otherwise, multiple objects will be combined into a single padding object.。

**Mark contour**：Indicates whether to display and mark the outline of the original graphic. That is, whether the filled figure retains its original outline。

**Contour priority**：Mark contour first.

**Save param/load param:** Save hatch parameter to library, so next time could use it directly.

**Hatch1,2,3,4,5,6,7,8**：It means that there can be eight sets of padding parameters that are not related to each other for padding operations. Cross–filling can be done at any angle and each fill can support machining with six different fill types (four fill types include: one–way, two–way, circular, optimized bidirectional, and background fill. Below)

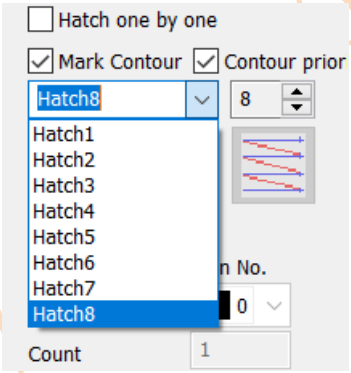



Fig 3–9

**Enable**：Whether to allow the current fill parameter is valid。

**All calc**：It is an option for multiple objects to be filled with one optimization at the same time. If this option is selected, all non–contained objects will be calculated as a whole when performing padding calculation. In some cases, the processing speed will be increased. (If you select this option, it may cause the computer to slow down.) Otherwise, each separate area will be calculated separately.

For example: draw three rectangles, line distance is 1mm, angle is 0.

Do not click ‘All Calc’, system will mark as the order in object list, mark hatch line in the first rectangle then mark hatch line in the second rectangle, and so on.

Click ‘All Calc’, mark all the hatch line at one time, mark all the hatch

that on the same line.

Marking result as follow fig 3–4:

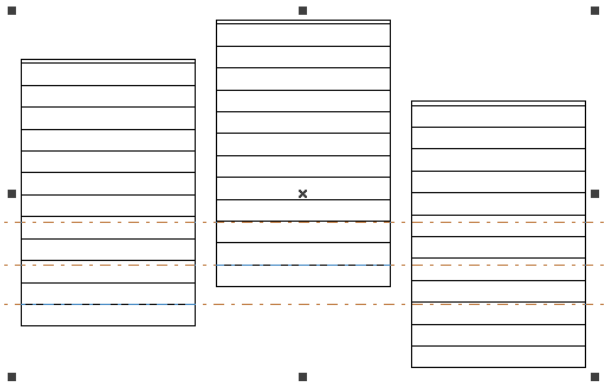


Fig 3–10(a) do not click ‘All Calc’, the hatch line are not in the same line

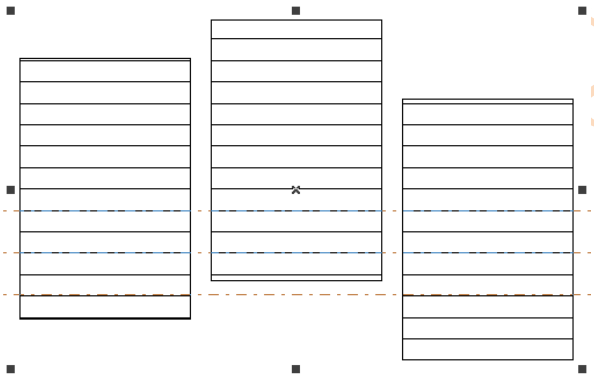
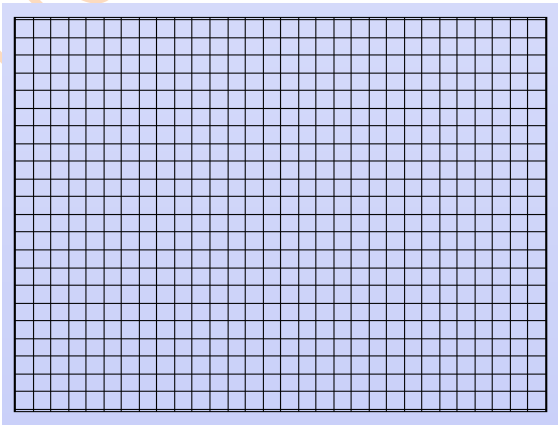


Fig 3–10(b) click ‘All Calc’, hatch line is in the same line

**Follow edge once**: After laser finished hatch line, it will mark contour once time.

**Cross hatch**: There will have two group hatch, 0 degree and 90 degree.



**Angle**: The angle of hatch line.

**Pen NO**: The pen parameter of hatch.

**Count**: Mark the number of times this hatch

**Line space**: The distance between two hatch line.

**Average distribute line**: Averages the distribution of fill lines within the drawing

**Edge offset / Start offset / End offset/ Linereduction / Numloops / Loop distance.**

1: Edge offset=0; Start offset=0; End offset=0; Linereduction=0; Numloops=0; Loop distance=0;

2: Edge offset=1; Start offset=0; End offset=0; Linereduction=0; Numloops=0; Loop distance=0;

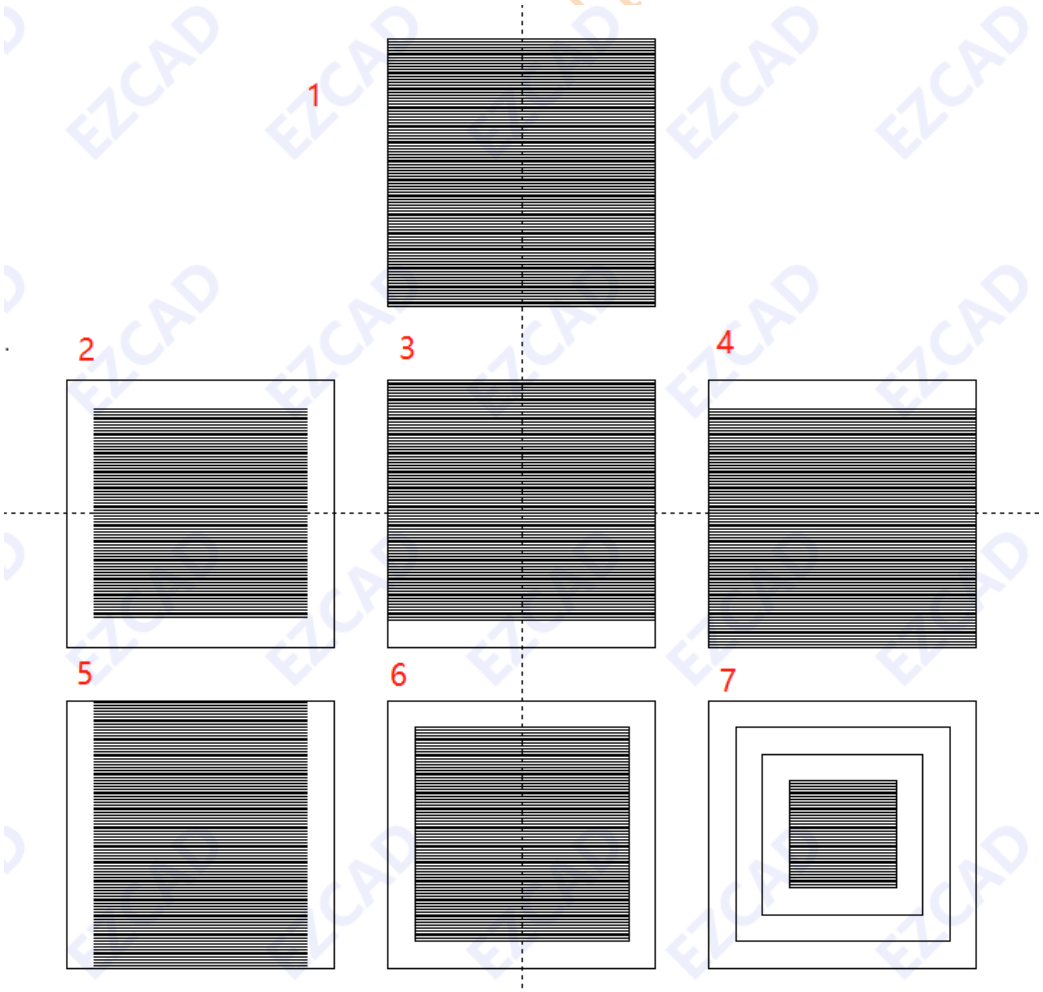
3: Edge offset=0; Start offset=1; End offset=0; Linereduction=0; Numloops=0; Loop distance=0;

4: Edge offset=0; Start offset=0; End offset=1; Linereduction=0; Numloops=0; Loop distance=0;

5: Edge offset=0; Start offset=0; End offset=0; Linereduction=1; Numloops=0; Loop distance=0;

6: Edge offset=0; Start offset=0; End offset=0; Linereduction=0; Numloops=1; Loop distance=1;

7: Edge offset=0; Start offset=0; End offset=0; Linereduction=0; Numloops=3; Loop distance=1;



**Auto rotate hatch angle**: Setting **Count**=3, **Angle**=0, **Auto rotate hatch angle**=30, click mark, the laser will start mark1 =0 degree, mark2=30 degree, mark3= 60 degree.

**Type of Hatch: 8 type.**

1)  **Unidirectional hatch:** The hatch lines will be marked from left to right.

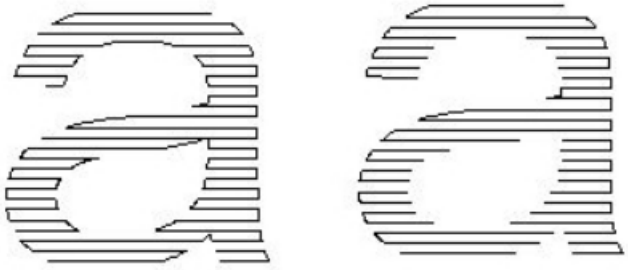
2)  **Bidirectional hatch:** The hatch lines will be marked from left to right first, and then from right to left.

3)  **Ring-like hatch:** Fills objects from the outside to the inside like a ring.

4)  **Optimization two-way hatch**: Similar with bidirectional hatch, but the end of each end connects.

5)  **Optimization Gong type hatch:** Similar with Gong, will jump in null place.

(The left object is being filled by Unidirectional Hatch or Bidirectional Hatch, the middle object by Ring-like hatch, and the right one is Optimization two-way Hatch)



Gong type hatch  Optimization Gong type hath

6)  **background：** Fill in the curve of the object that can be arbitrarily chosen, and convert the curve into the fill line of the filled object after the curve is taken as background. (Contact JCZ for this function) For example, the following steps are taken to place the spiral as the background of

"JCZ":

（1）Draw "JCZ" and helix, move "JCZ" to the helix, as shown in Figure 3-12.

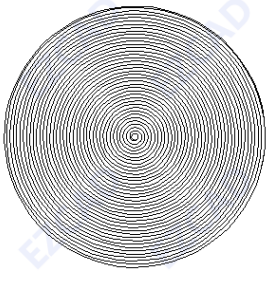


Fig 3–12（A）

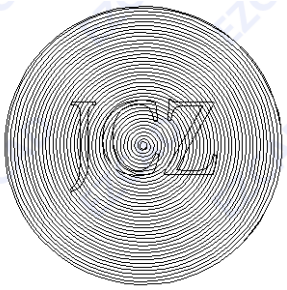


Fig 3–12（B）

（2）Select "JCZ", fill in the background filler, click ackgrour on the 3–12 (C) dialog box,

Select the helix, click OK.

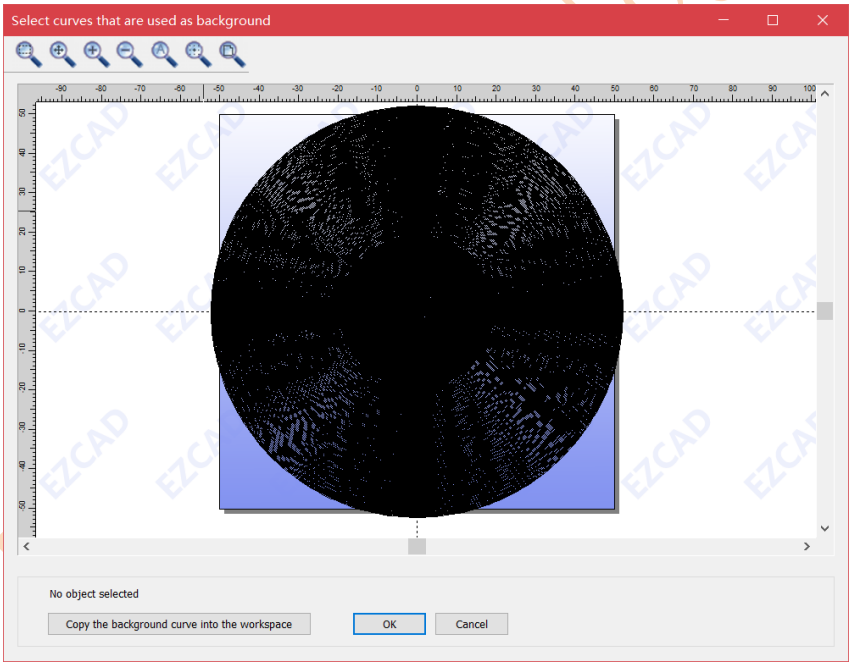



Fig 3–12（C）

（3）Actual background filling, as shown in 3–12 (D)

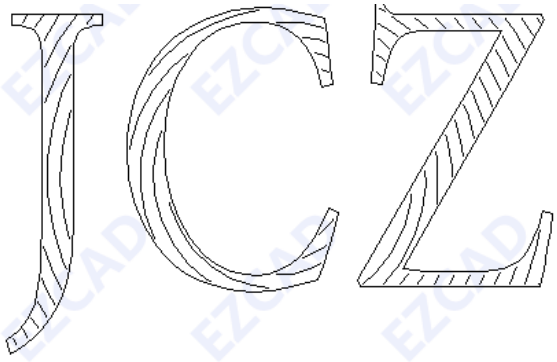
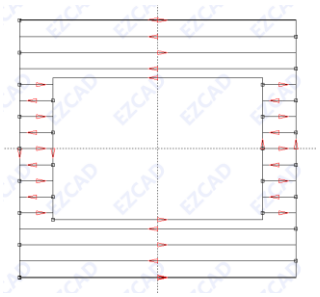
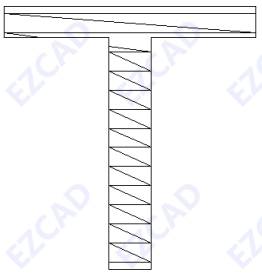


Fig 3–12 ( D )

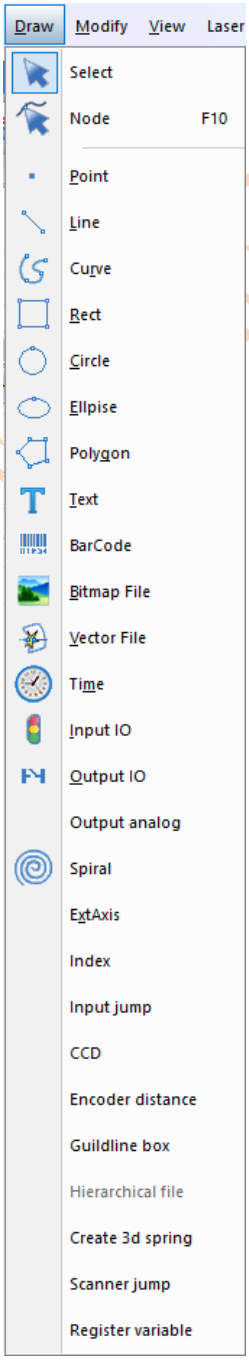
7) 



8) 



# 4 Draw Menu



### 4.1 Select

Select cursor is used to select and edit objects within your project and can move or re-size objects.

### 4.2 Node

Node cursor is used to select and edit curved objects. Clicking once places a temporary node on the object, which can change the shape of the object.

### 4.3 Point

Drawing a point in the workspace is the simplest drawing operation. Select the "Point" command and the mouse will change to a cross shape. Click the left mouse button in the appropriate place in the workspace to draw a point at that position. When drawing is complete, click the right mouse button, you can select to stop drawing, or click "input coordinates" to draw a point, after drawing; you need to right click to select "end".

### 4.4 Line ( L )

To draw a straight line, select the "Line" cursor in the drawing menu or click the  icon. The mouse changes to a cross shape. Click the left mouse button in the appropriate place in the workspace. This is the starting point of the line. Drag The mouse, you can see a straight line from the starting point, to the appropriate position and then a single mouse left button, here is the end of the line, and then a single right click, select this as the end, it will end the painting.

Under the draw curve command, click the right mouse button to select the coordinate position can directly input the coordinate value of the point.

There are three ways to represent the coordinates of a point:

Absolute coordinate position:

If "100,100" is entered, the actual absolute coordinate position of the target point is (100,100), and the input coordinate is to switch the input method to English.

### 4.5 Curve ( R )

To draw a curve, select the Curve command or click  icon.

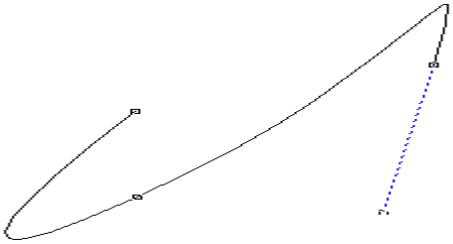


Figure 4–2 Draw Curve

Under the draw curve command, click the left mouse button to place the node. At the end, press the right mouse button to end the draw directly or select close end.

### 4.6 Rect

To draw a rectangle, select the Rectangle cursor on the drawing menu or click the  icon.

Under the drawing rectangle, hold down the left mouse button and drag to draw a rectangle.

Under the drawing rectangle, hold down the left mouse button while holding down the CTRL key on the keyboard and dragging can draw a square. After selecting the rectangle, the rectangle property shown in Figure 4–3 will be displayed in the property toolbar.

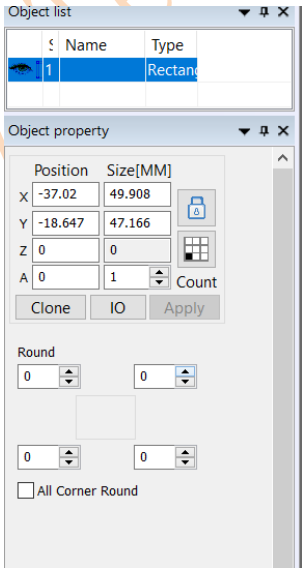



Figure 4–3 Rectangle property

**Roundness:** The degree of smoothness of each corner of the rectangle. If the degree of smoothness is 100%, the rectangle becomes a circle.

**All Corner Circles:** When this function is enabled, when the user changes the roundness of a certain corner, the remaining three corners will increase the corresponding roundness.

**Note: After modifying the parameters in the property, be sure to click the "Apply" button to make the modified parameters take effect. The same applies below will not be repeated.**

### 4.7 Circle ( C )

To draw a circle, select the circle command in the drawing menu or click the  icon. Under the draw circle command, press the left mouse button and drag to draw a circle.

After the circle is selected, the circle property shown in Figure 4–4 will be displayed in the property toolbar.

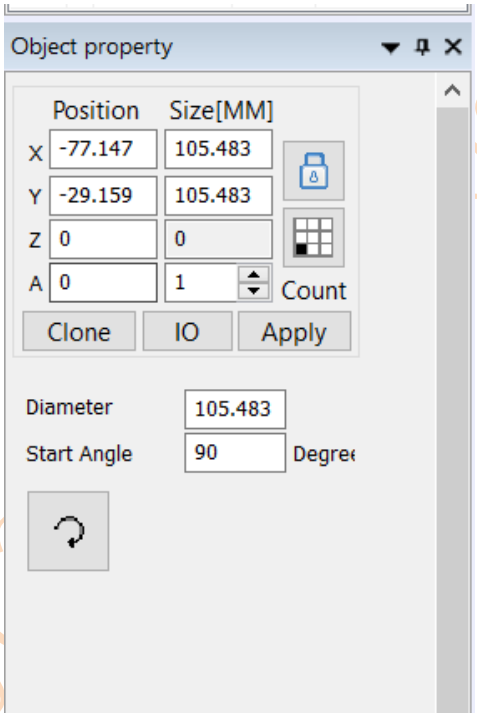



Figure 4–4 Circle property

**Diameter:** refers to the diameter of the circle.

**Starting angle:** refers to the angle of the starting point of the circle with respect to the center of the circle.

 Indicates that the current circle's machining direction is clockwise.

 Indicates that the machining direction of the current circle is counterclockwise

### 4.8 Ellipse

To draw an ellipse, select the Ellipse command from the Draw menu or

click the  icon.

Under the draw ellipse command, press the left mouse button and drag to draw the ellipse.

Under the draw ellipse command, press the left mouse button while holding down the CTRL key and drag to draw a circle.

After selecting the ellipse, the ellipse property shown in Figure 4–5 appears on the Properties toolbar.

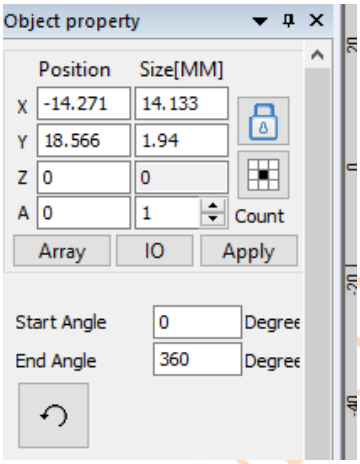



Figure 4–5 Ellipse property

**Starting angle:** refers to the angle of the starting point of the ellipse with respect to the center of the circle.

**End angle:** refers to the angle of the ending point of the ellipse with respect to the center of the circle

 Indicates that the direction of the current ellipse is clockwise.

 Indicates that the direction of the current ellipse is counterclockwise

## 4.9 Polygon

To draw a polygon, select the "Polygon" command in the drawing menu or click the  icon.

Under Draw Polygon, hold down the left mouse button and drag to draw the polygon.

After selecting the polygon, the property of the polygon shown in Figure 4–6 are

displayed in the Properties toolbar.

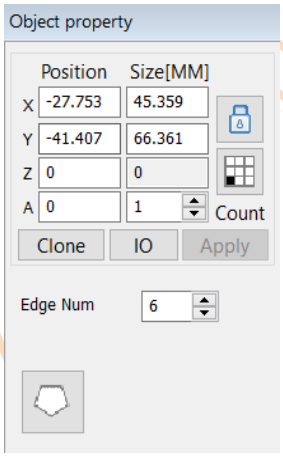
Figure 4–6 Polygon property

**Edge Num:** refers to the number of edges of the polygon, the minimum is 3. Generally, the number of edges selected is within 10, and the excess number of edges will make the drawn polygon more like a circle.

 :Indicates that the current polygon is an outer polygon.

## 4.10 Text

Ezcad software supports direct input of text in the workspace. The fonts




of the text include all fonts installed by the system, multiple fonts provided by Ezcad, and JSF fonts created by users themselves. If you want to enter text, select the "Text" command in the drawing menu or click the  icon.

Under the draw text command, press the left mouse button to create a text object.

### 4.10.1 Text font parameter

After the text is selected, the text attributes shown in Figure 4–7 appear on the Properties toolbar.

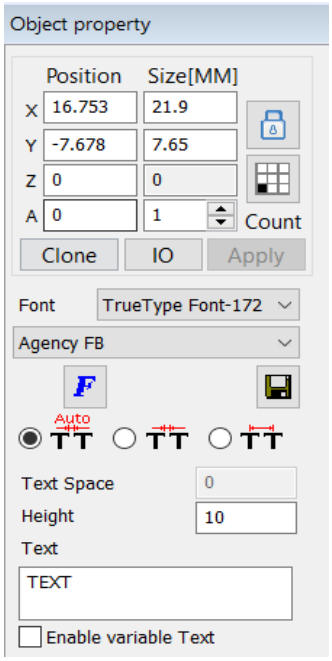



Figure 4–7 Text Property

If you need to modify the entered text, you can directly modify it in the text edit box.

Ezcad supports five types of fonts, after selecting the font type, the font list will list all fonts of the current type accordingly, as shown in Figure 4–9. After clicking  , the dialog box as shown in Figure 4–10 will pop up.

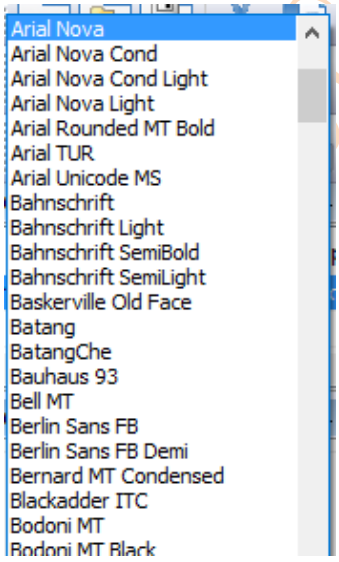



Figure 4–9 TrueType font list

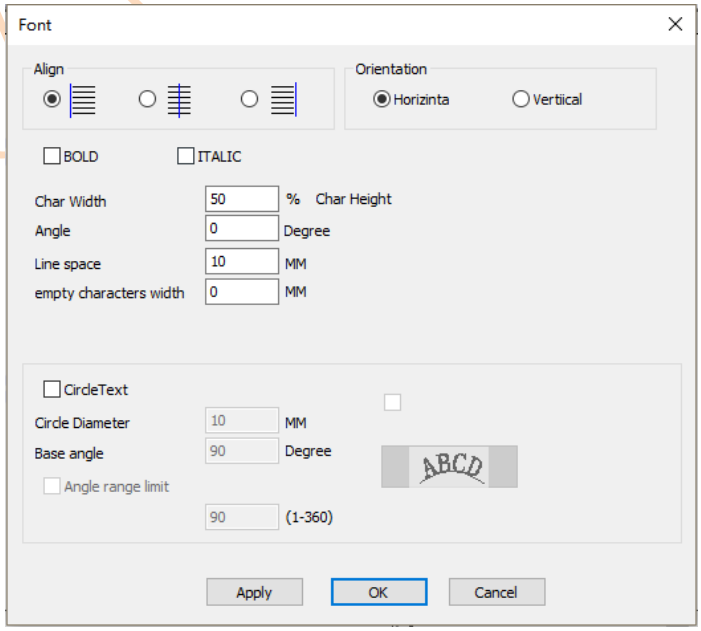



Figure 4–10 font parameter

 The arrangement of the current text is left–aligned;

 The arrangement of the current text is centered;

 The arrangement of the current text is right–aligned;

**Font width:** The average width of the font.

**Angle:** Refers to the angle of the font.

**Empty Characters width:** Refers to the distance between characters.

**Line space:** Refers to the distance between two lines of characters.

**Horizinta** / **Vertiical**: Character arrangement order.

**Arc text:** Ezcad supports circular text. The text is arranged along the arc track, as shown in Figure 4–11.

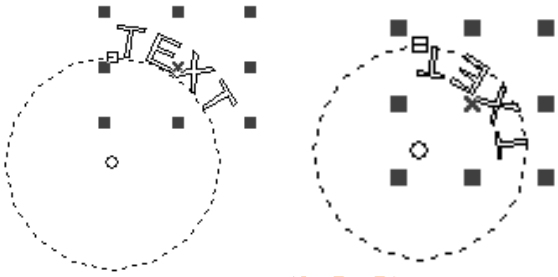



Figure 4–11 Arc text

 : Change the top or bottom of all text to coincide with the curve.

**Circle diameter:** refers to the circle diameter of the text alignment.

**Reference Angle:** The angle between the baseline of the text and the X axis.

**Angle Range Limit:** If this parameter is enabled, the system will shrink the text within the limited angle no matter how much text is input.

### 4.10.2 Bar Code Font Parameters

When the barcode font  is selected, the system will pop up a dialog box as shown in Figure 4–12.

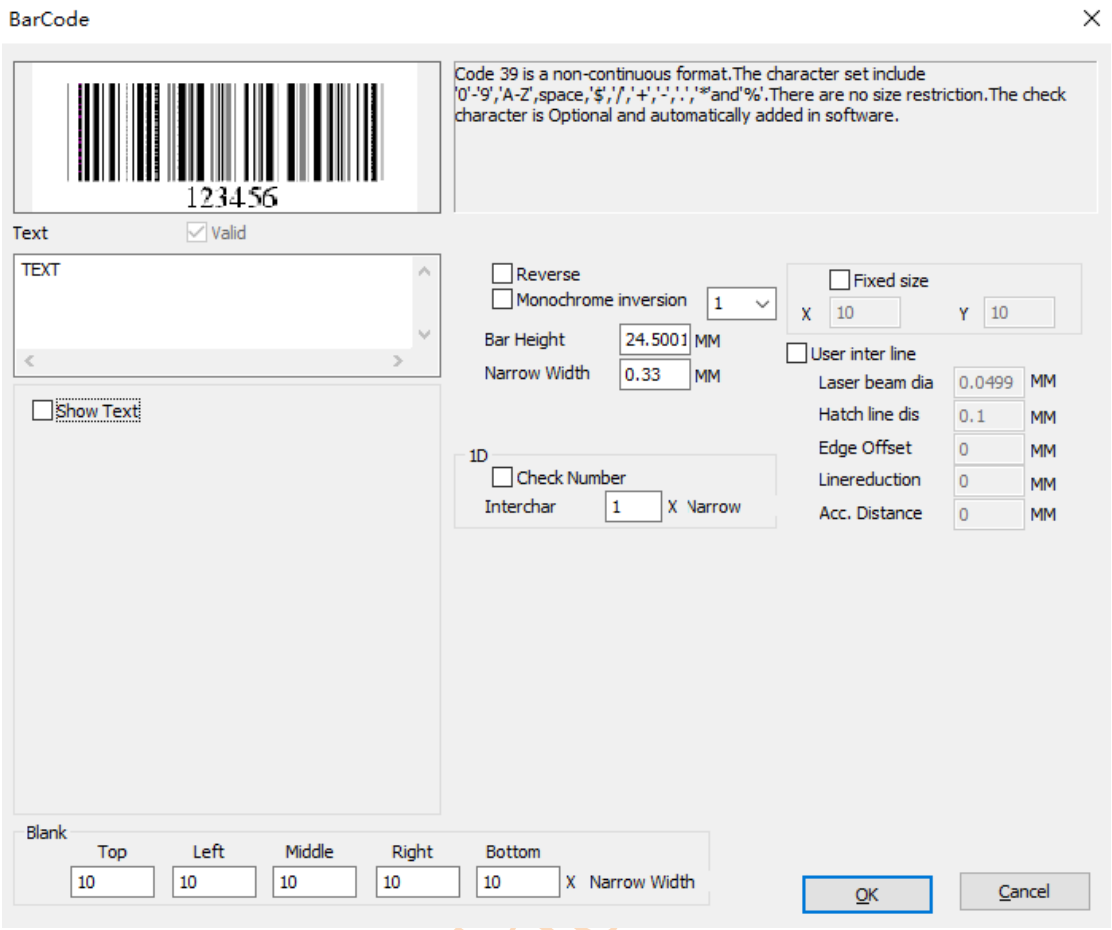



Figure 4–12 Barcode font parameter property

1) Barcode example

The bar code example picture shows the appearance picture of the bar code corresponding to the current bar code type.

2) Barcode description

The bar code description shows some format descriptions of the current bar code. If the format of the current bar code type is not clear to the user, please read the bar code description carefully to find out what type of text should be entered is legal.

3) Text

The current text to be displayed, if displayed, means that the current text can now generate a valid barcode.

4) Show text

Whether to display text that can be recognized by people under the bar code, check the attribute of the displayed text after checking.

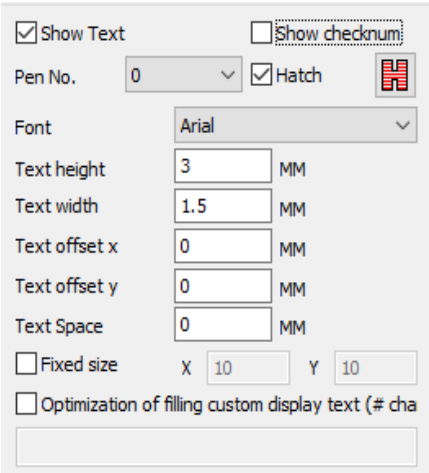



Figure 4–13

**Show checknum**: Display the check code.

**Font**: The font currently displaying the text.

**Text Height**: Character Frame Height.

**Text width**: character width.

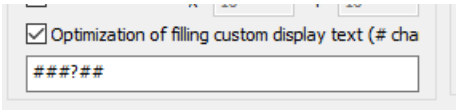
**Text X Offset**: The X offset of the text.

**Text Y Offset**: Y offset coordinates of the text.

**Text spacing**: spacing between text characters.

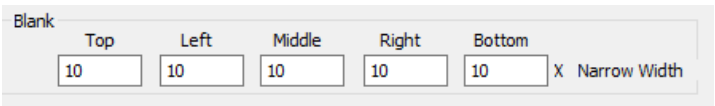
**Fixed size**: Check to set the text width and height. After the setting, when the text content changes, the text width X and text height Y values can remain unchanged.

**Custom display text**: After checking, the user can customize the font of the currently displayed text. '#' is the display character, "?" is Delete characters, add % check digits. For example, the content of the QR code is "JCZ123". If the content "JCZ23" needs to be displayed, the character "1" is deleted, the custom text is filled in as "###? ##".




5) Blank

When the bar code is reversed, the size of the blank area around the bar code can be specified.




**One–dimensional bar code:**

This bar code is composed of one by one "bar" and "empty" arrangement,

the bar code information is transmitted by different widths and positions of bars and spaces. The size of the information is determined by the width and accuracy of the bar code, wider bar code can tolerant more bars and spaces, more information. This bar code technology can only store information in one direction through the arrangement of "bars" and "empty", so it is called "one–dimensional bar code".

Figure 4–14 is the parameter setting in the interface when you select a 1D barcode.

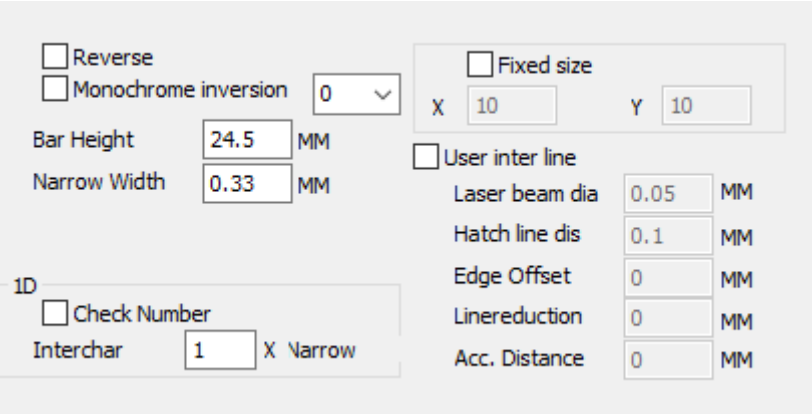



Figure 4–14 One–dimensional bar code parameter

**Check Number:** It indicates whether the current bar code needs the check code. Some bar codes can be selected by the user to check whether the check code is required. Therefore, the user can choose whether to use the check code.

**Inter–character spacing:** Individual barcodes specify a certain distance between characters and characters (for example, Code39). This parameter is used to set this value.

**Reverse:** Refers to whether inversion processing, after laser marking some material is light, so that when this switch must be chosen.

**Monochrome inversion**:

**Barcode height:** Refers to the height of the bar code.

**Narrow Width**: The code width of bar

**User Inter line**: Fill line inside of code.

1. **Two–dimensional bar code:** PDF417 barcode

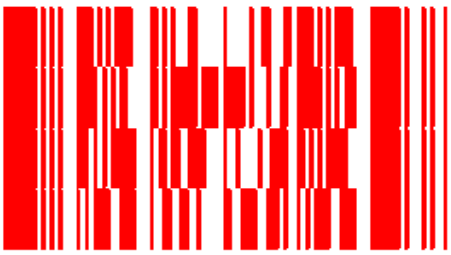


Figure 4–16 PDF417 barcode

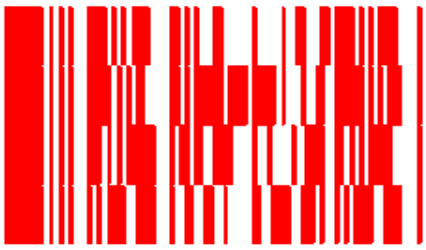


Figure 4–17 Compressing PDF417 barcode

PDF is the abbreviation of the first three letters of the English word Portable Data File, which means "portable data file. “Figure 4–16 is an example of a PDF417 code and Figure 4–17 is an example of a compressed PDF417 code.

Figure 4–18 shows the corresponding parameter settings for the PDF417 barcode.

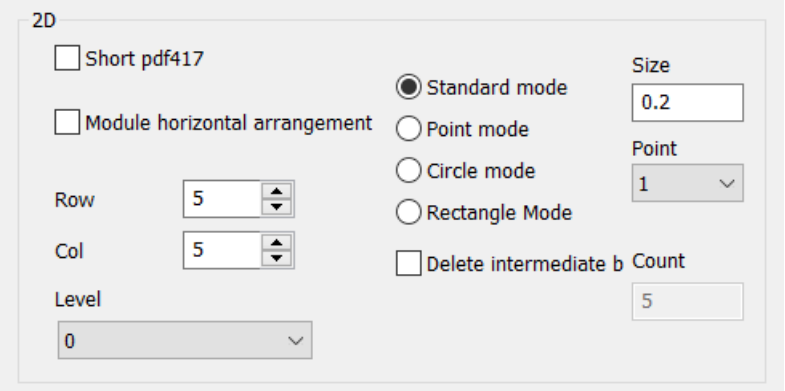



Fig 4–18

**Error correction level:** PDF417 error correction level, PDF417 error correction level is are 9 levels, from 0 to 8.

**ank:** Refers to the number of rows and columns of the PDF417 barcode. The bar code shown in Figure 4–17 is 4 rows and 4 columns.

**Delete the middle block:** delete the middle block, you can add some LOGO.

2. **DataMatrix code**

DataMatrix is a matrix type 2D barcode and currently has two types of Ecc000–140 and Ecc200. At present EzCad only supports Ecc200.

Figure 4–19 shows the corresponding parameter settings for the DataMatrix barcode.

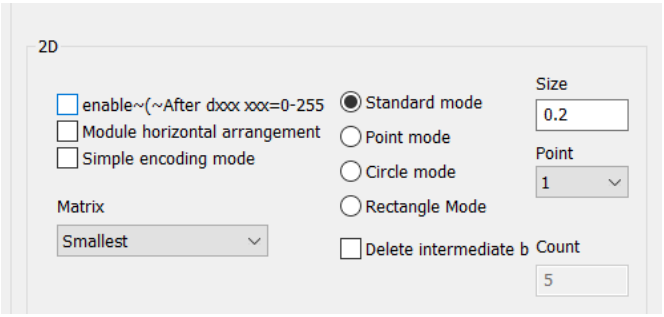



Figure 4–19 DataMatrix barcode parameters

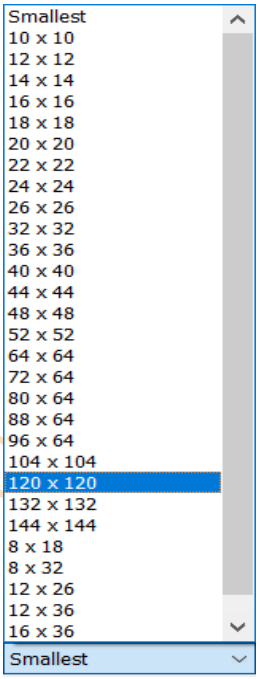



Figure 4–20 DataMatrix barcode size

Figure 4–21 DataMatrix Barcode Module Width

DataMatrix has many different fixed sizes that you can choose based on your needs. If the minimum size is selected, the system automatically selects the minimum size that can accommodate all the texts according to the text entered by the user.

### 4.10.3 Variable text

Click to enable the variable text. The variable text means that the text can be dynamically changed according to user–defined rules during processing.

Variable text type：Currently EzCad supports 9 types of variable text, as shown in Figure 4–22:

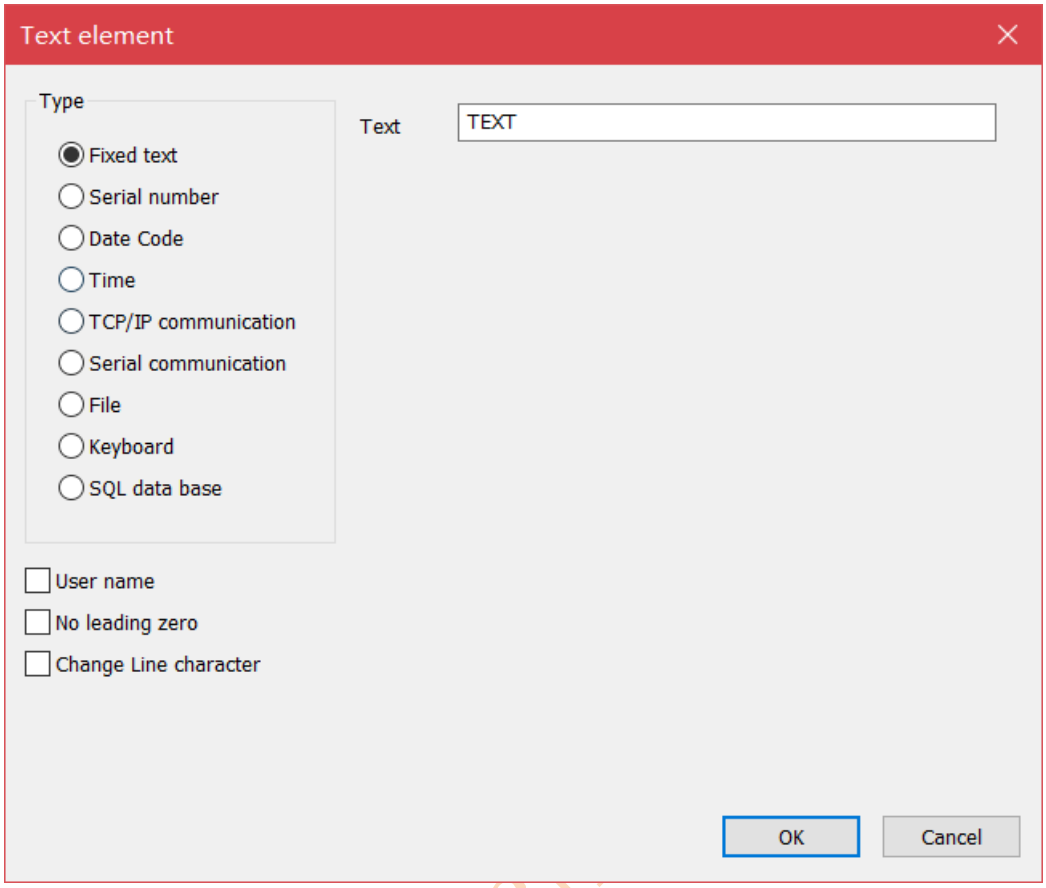



Figure 4–22 Variable text type

**Fixed text:** fixed characters set in advance.

**Serial number:** Change the text in fixed increments during machining.

**Date:** The system automatically retrieves date information from the computer to form new text during processing.

**Time:** The system automatically takes the time information from the computer to form a new text during processing.

**Network port communication:** The character transmitted by the network port during processing forms new text.

**Serial communication:** Characters transferred from the serial port form new text during processing.

**File:** Read the text to be processed line by line from the user–set TEXT text or EXCEL table during processing.

**Keyboard:** The user enters the text to be processed from the keyboard during processing.

**SQL database:** The characters extracted from the database during processing form new text.

**Keyboard: The keyboard text is the text input by the user from the keyboard.**

When the keyboard text system is selected, the system will display the content as shown in Figure 4–23 and ask the user to set the keyboard text parameters.

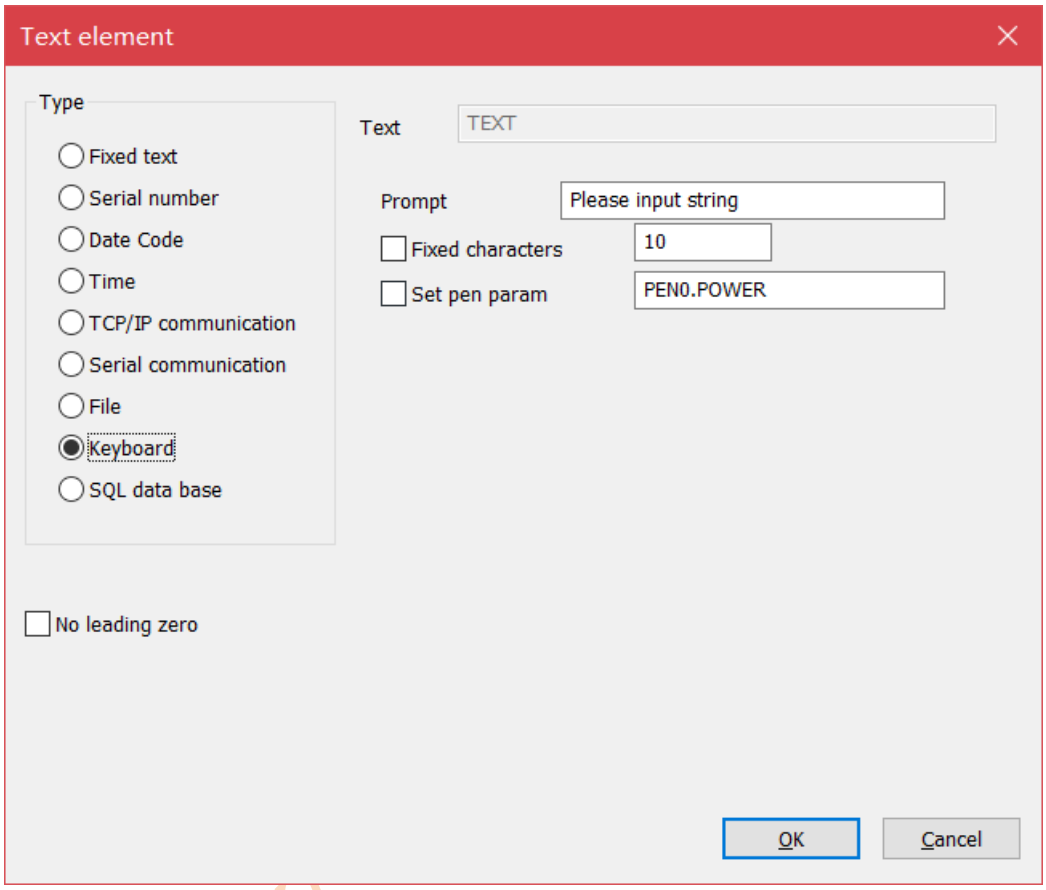



Fig4–23：keyboard parameter

**Tip:** It means the user is prompted to input the text to be processed during processing.

The user manually enters the text to be processed directly.

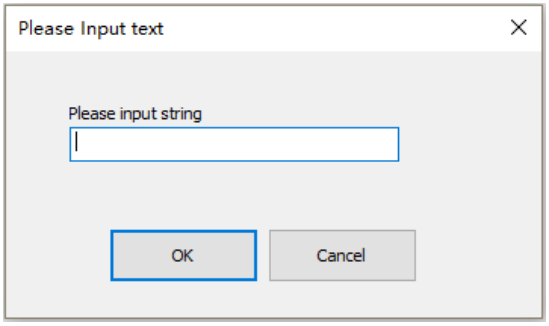



Fig4–24

**Number of fixed characters:** If the user selects, the number of characters input and the set number of characters are the same for marking. Otherwise, it must be re–entered.

**Date:** A date text object In the process of processing, the system will automatically take the date and time information from the computer to form a new text.

When the user selects the date text, a list of currently–predefined date formats is automatically displayed in the variable text dialog box, as shown in Figure 4–25. Users can select their desired date format directly from the date format list.

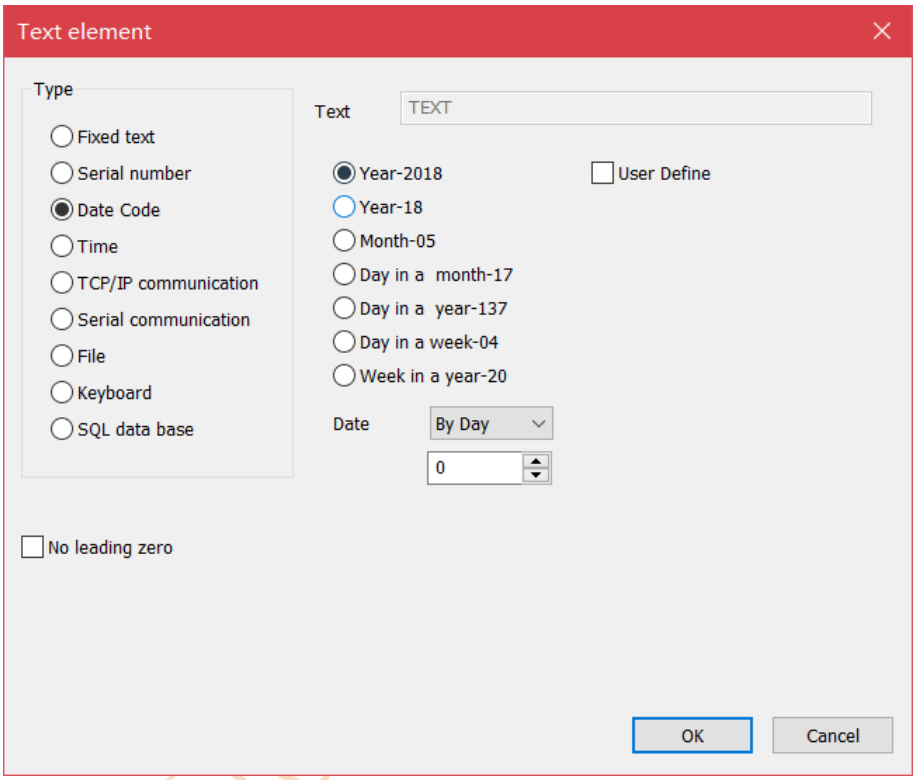



Figure 4–25: Date Format List

If you do not find the format you need in the date format list, you can also define your own special date format.

**serial number**

The serial number text is a fixed increment of text processing.

When the user selects the serial number text, the parameter definition of the serial number text is automatically displayed in the variable text dialog box, as shown in Figure 4–26.

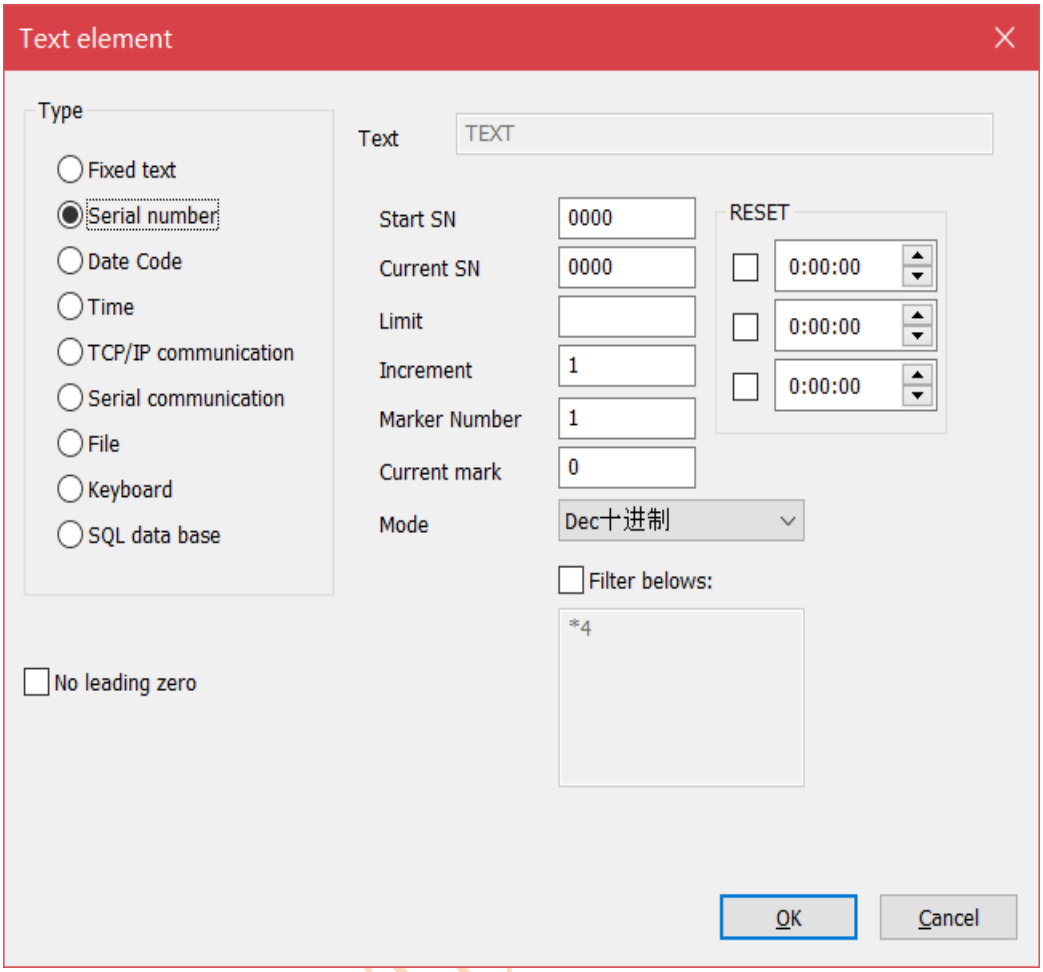



Figure 4–26 Parameter definition of serial number text

**Start Serial Number:** The first serial number currently being processed. It can be any ASCII character between "0–9" and "a–z" and "A–Z".

**Current serial number:** The serial number currently being processed.

**Serial number increment:** It refers to the increment of the current serial number. It can be a negative value. When it is set to a negative value, it means that the serial number is decremented.

If the current serial number increment is 1, if the start number is 0000, then each serial number will be added to the previous serial number, for example, 0000, 0001, 0002, 0003...9997, 9998, 9999, When the serial number reaches 9999, the system will automatically return to 0000. If a, b, c.....x, y, z, when the serial number reaches z, the system will automatically return to a. For example, A, B, C.....X, Y, Z, when the serial number reaches Z, the system will automatically return to A.

If the increment of the current serial number is 5, if the starting number is 0000, the serial number is listed as 0000, 0005, 0010, 0015, 0020, 0025.....

If the increment of the current sequence number is 2, if the start sequence number is aaaa, then the sequence number is aaaa, aaac, aaae, aaag, aaai, aaak.....

Others and so on.

**Each marking number:** refers to the number of each serial number to be processed and then changing the serial number.

After the user presses the extended key, the serial number expansion dialog box appears, as shown in Figure 4–27.

**Reset:** The specified time resets the serial number and restarts.

**Filter the following symbols:** You can set 20 filter conditions in the filter list and filter out some unwanted serial numbers.

If the start number is 0000, the number group whose number increment is 1 :

0000，0001，0002，0003，0004，0005……，0012，0013，0014，0015，0016…

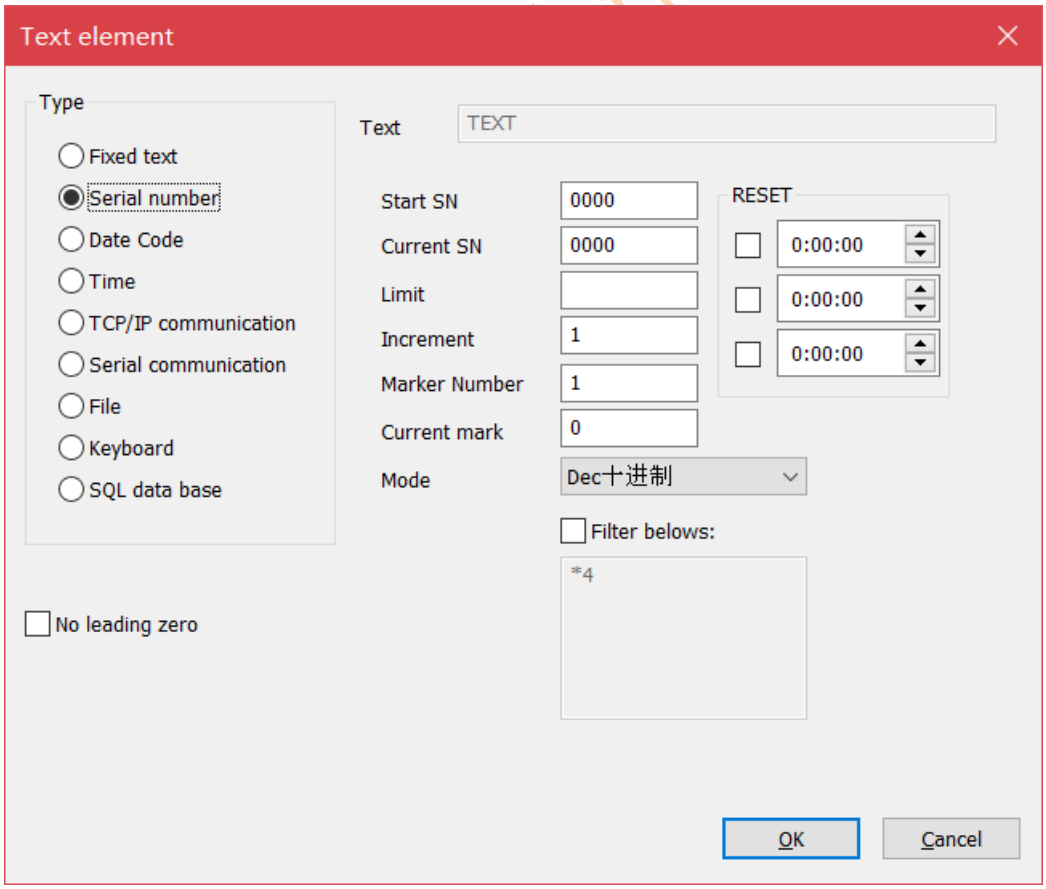



Figure 4–27 Serial Number Extended Parameters Dialog Box

If the filter condition is "*4", all serial numbers whose numbers at the end of the sequence number are "4" are filtered out, and "*" represents a wildcard

symbol.

Then the serial number group becomes:

0000，0001，0002，0003，0005，0006……，0012，0013，0015，0016，0017…

If the start sequence number is 1000, the sequence number increase number is 500.

1000，1500，2000，2500，3000，3500……

If the filter condition is "2*", all serial numbers with the first number "2" are filtered out.

Then the serial number group becomes:

1000，1500，3000，3500，4000……

**File**

Currently EzCad3 supports two kinds of list files

1. TXT text file

When the TXT file is selected, the system will display the content shown in Figure 4–28(a). The user is required to set the file name and the line number of the current text to be processed.

Automatic reset: When processing to the end of the text file, the line number is reset to 0, and processing is started again from the first line.

2. Excel text file

When the Excel file system is selected, the content shown in Figure 4–28(b) is displayed, requiring the user to set the file name, field name, and the line number of the current text to be processed. Currently, the form of *.xls is supported.

Field Name: Refers to the text of the currently set field name in Form 1 in the Excel file table. During processing, the system automatically extracts the text to be processed from the corresponding column.

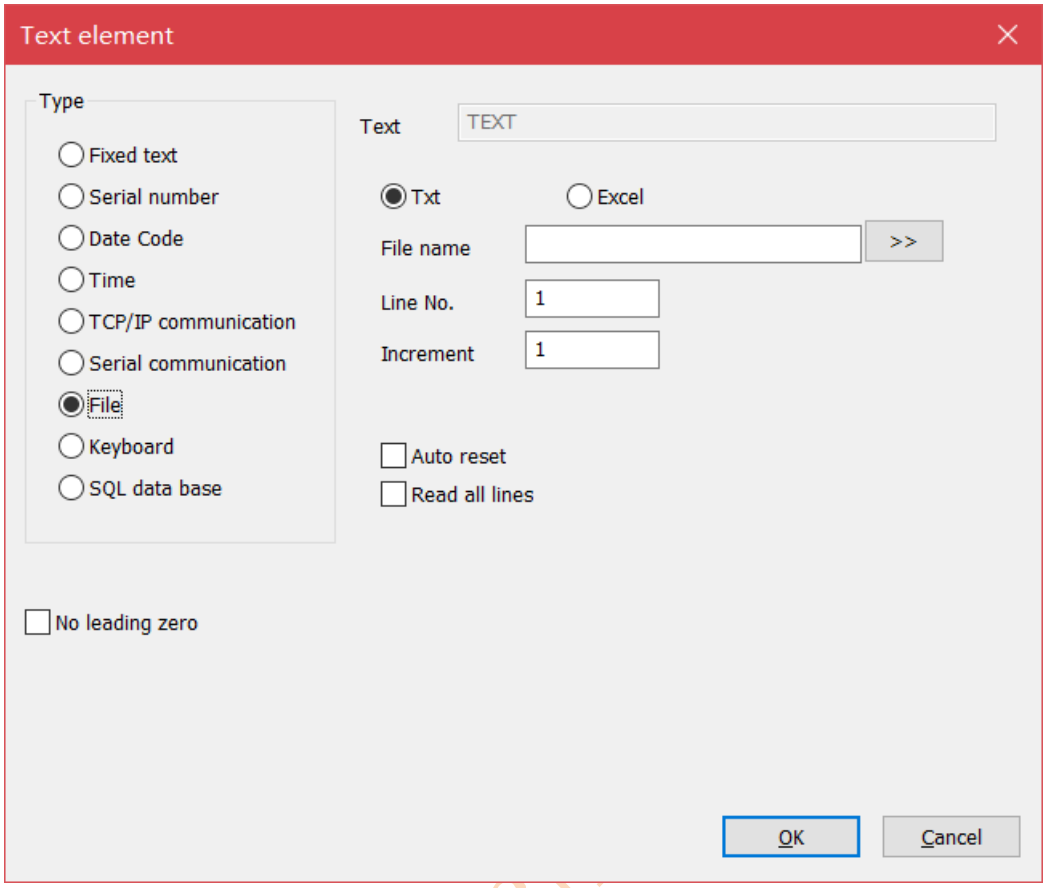



Fig4–28（a）file parameter

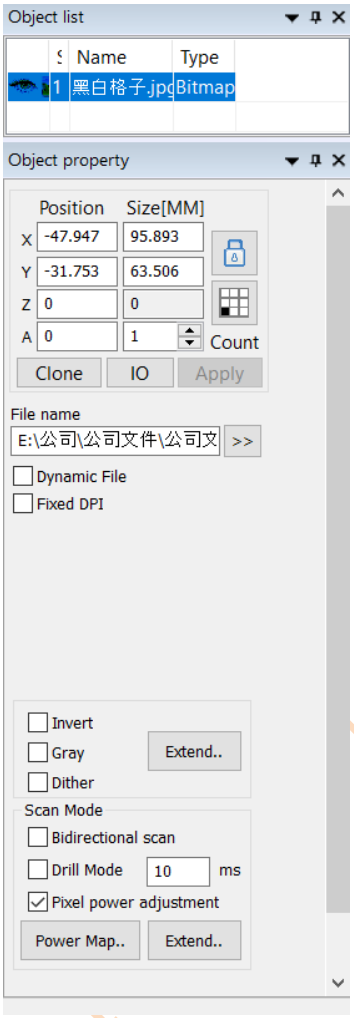
## 4.11 Bitmap

If you want to enter a bitmap, select the Bitmap command in the Draw menu or click the icon.

The system will pop up the input dialog as shown in Figure 4–29 and ask the user to select the bitmap to be input.

The current system supports bitmap formats: Bmp, Jpeg, jpg, gif, tga, png, tiff, Tif

After the user enters the bitmap, the property toolbar displays the bitmap parameters as shown in Figure 4–30.




Bitmap parameters shown in Figure 4–30

**Dynamic input file:** refers to whether or not to read the file again during processing.

**Fixed size X**: The width of the input bitmap is fixed to the specified size, if it is not automatically stretched to the specified size.

**Fixed size Y:** The height of the input bitmap is fixed to the specified size, if it is not automatically stretched to the specified size.

**Fixed position**: When dynamically inputting a file, if you change the size of the bitmap.

**Fixed DPI**: Because the DPI value of the original input bitmap file is not fixed, this function can be used to force a fixed DPI value. The larger the DPI value, the denser the point, the higher the image precision, the longer the processing time, and the value of DPI. 10–2000 When dynamically inputting a file, if you change the bitmap size, which position is used as a reference.

**DPI:** Refers to how many points per inch, 1 inch is equal to 25.4

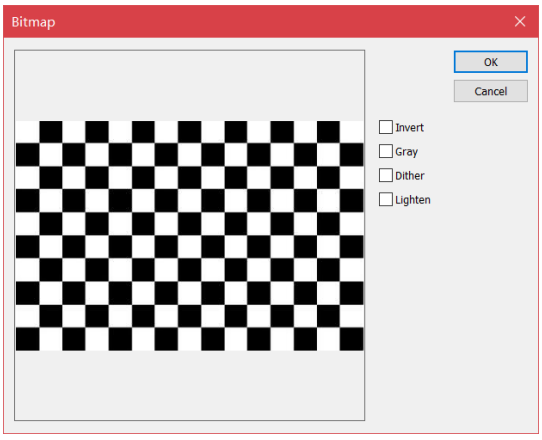
millimeters.

**Invert:** Inverts the color value of each point in the current image.

**Gray:** convert the colorful bitmap to gray bitmap.

Fig 4–32

**Dither:** Similar to the "halftone pattern" function in Adobe Photoshop, a black–and–white two–color image is used to simulate a grayscale image, and different grayscale effects are simulated by adjusting the degree of density of the dots with black and white, as shown in Figure 4–33. (The vertical bar in the picture shows the problem, it will not appear when processing).



**Lighten:** Change the brightness and contrast of the current image.

**Bidirection scan**: Bitmap scanning direction is two–way scanning back and forth,

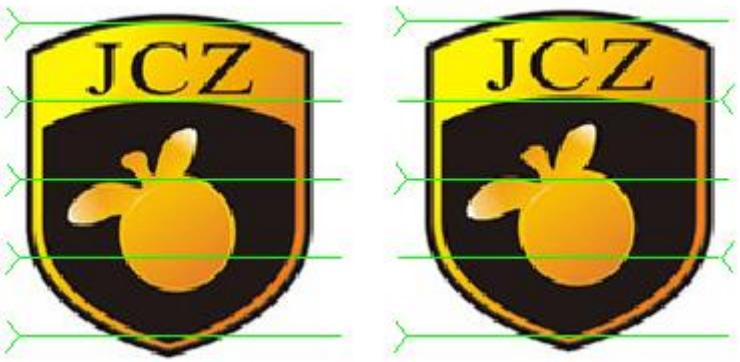
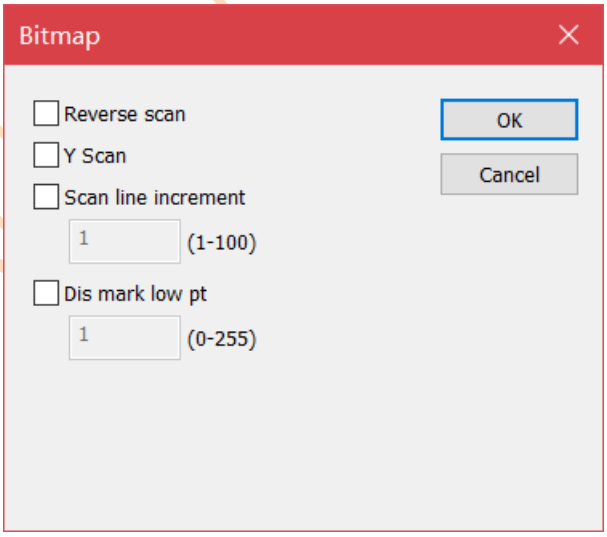


Fig 4–35 left is single scan, right is direction scan

**Drill mode**: the processing bitmap is converted to a point, and the light emission time of each point is the current setting time, which is not ticked as the threading mode.

**Pixel power adjustment**: Refers to whether or not the laser adjusts the power according to the gray level of the pixel when processing each pixel of the bitmap.

Scan mode extend:




**Reverse scan**：The processing bitmap scans in the X–direction scan direction from the bottom up, select the reverse direction and scan from top to bottom.

**Y scan**: When the bitmap is selected, the Y direction is scanned one by one in a row, and the X direction scans one line at a time.

**Scan line increment**: interlace scanning according to the set interval, proper setting can improve processing efficiency.

**Dis mark low pt**：Setting the grayscale points below will not mark.

### 4.12 Vector file

Install the vector file .this is the icon  .

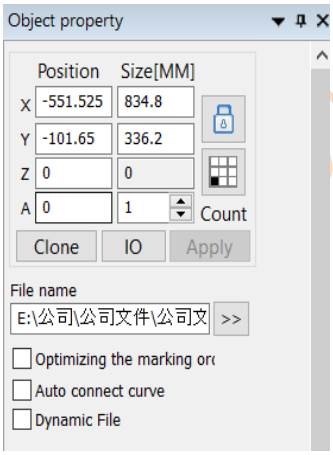
Pop up the file select dialog，select the file and click “ok”.

Support vector file format：.PLT, .DXF, .AI, .DST, .etc.

The unit in dxf is inch DXF：set the file size unit as inch

**Put to center**：The imported vector will be placed in the center of the work area.

Install the vector file the show the attribution view:



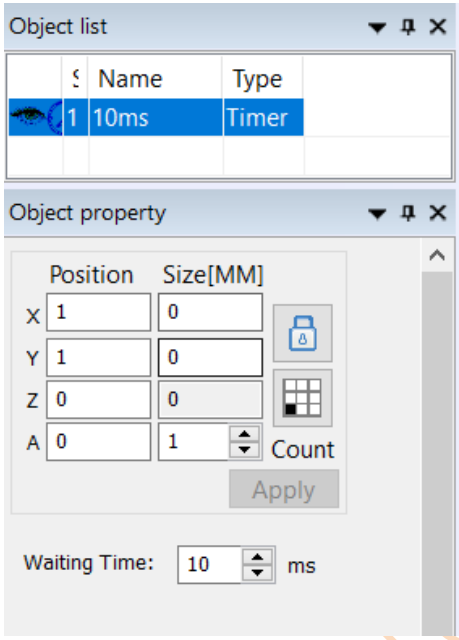

If the vector graphic contains several color information (the color of the stroke can be specified by drawing software such as Coredraw, AutoCAD, etc.), when inputting the vector graphic, HGLaserMark2.0 will automatically distinguish the color type, and the user can press the color or Pen number selection object, you can set the marking parameters (see section 8.1 "Color" check), the software will automatically calculate the marking order, so that the corresponding marking time is reduced

Optimizing the marking order：The software will automatically calculate the marking order and reduce the marking time.

Auto connect curve：The software automatically finds adjacent curve segments and connects.

Dynamic file：Same function with bitmap.

## 4.13 Time




Use it to set the delay time, this is the icon . The attribution is following:

Waiting Time：When the processing is executed to the current delayer, the system waits for the specified time before continuing to run.

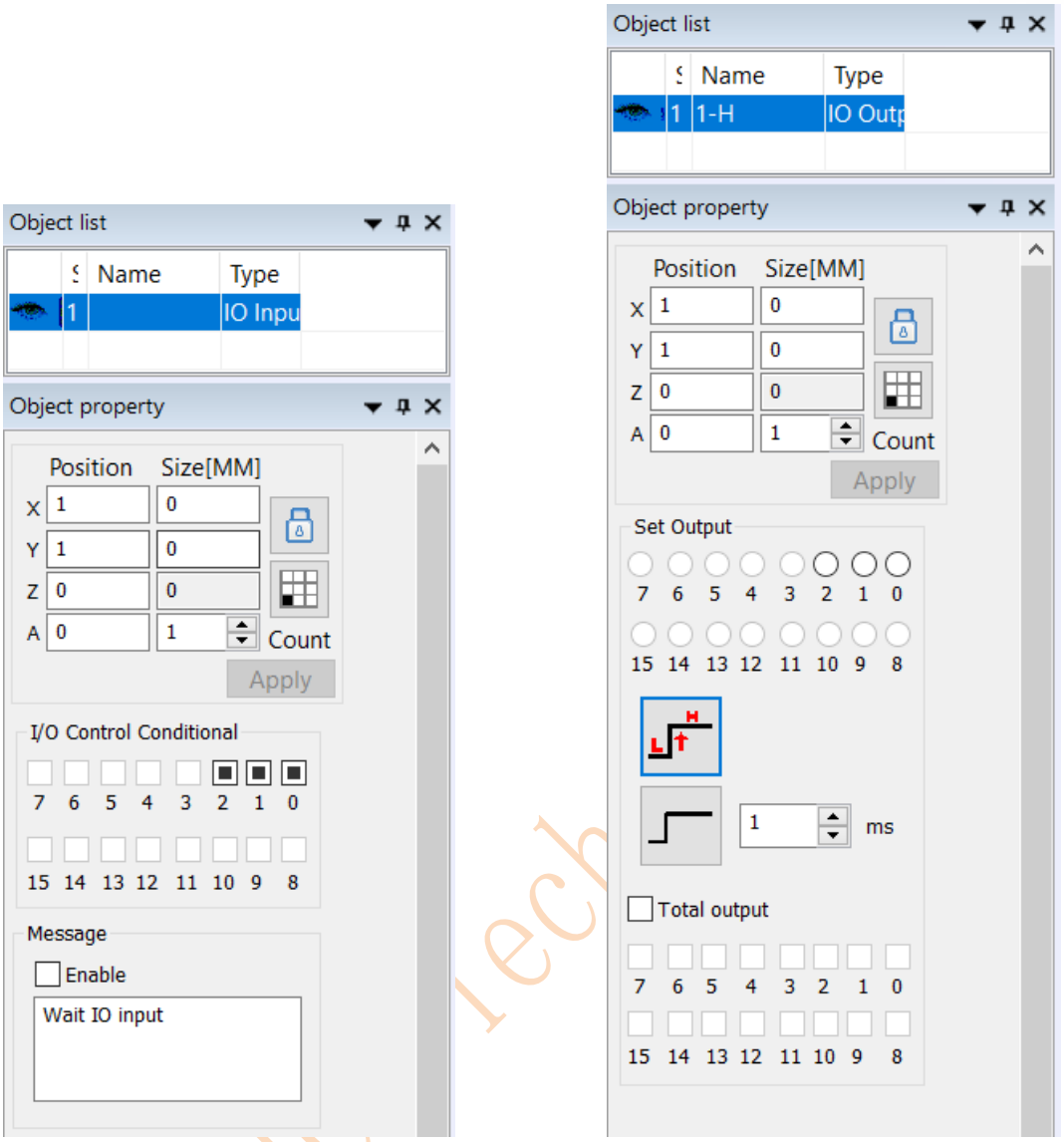
## 4.14 Input IO

Use the input port to control the mark object. This is the icon .

The attributions is following:

**I/O control Conditional IO**：When the process is executed to the current input port, the system reads the input port, and then compares the current value with the value of the control condition IO. If they are equal, the system continues to run downwards; otherwise, the system reads the port again.

**Message**：The prompt message when the system reads the port value equal to the control condition IO.




Input Output

## 4.15 Output IO

Use the output port to control the mark object. This is the icon .

The attributions are following:

Indicates that the system outputs a high level to the port when the process is executed to the current output port.

Indicates that the system outputs a low level to the port when the process is executed to the current output port.

Indicates that the system outputs a fixed level to the port and will

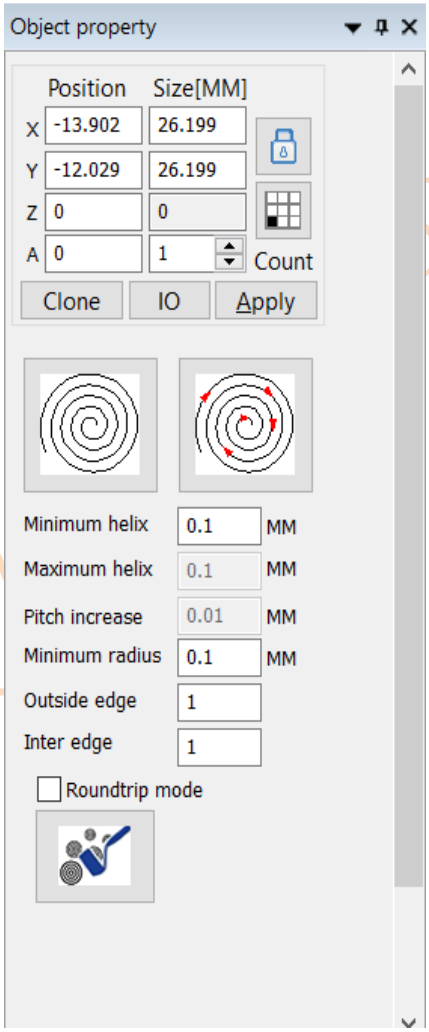
not be restored after the output.

 Indicates that the system outputs a pulse level to the port and returns to its original level after outputting the specified time.

**Total output：** After checking it, the output ports set at the bottom will all be output high or low. The “hook on” is a long height, and the “no check” is a long low.

### 4.16 Spiral

Draw a spiral.

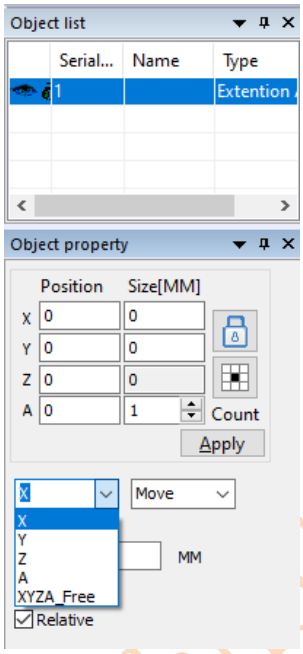



The icon in the upper left corner can change the type of spiral. There are three types of spiral: equidistant, increasing pitch, and decreasing pitch. Select the pitch increasing and decreasing to set the minimum and maximum spiral pitch, set Minimum spiral pitch value as the pitch of the equidistant spiral.

The icon in the upper right corner can set the marking direction

Roundtrip mode：After checking, the software view will have a spiral with the end of the end as the starting point and the starting point as the end point.

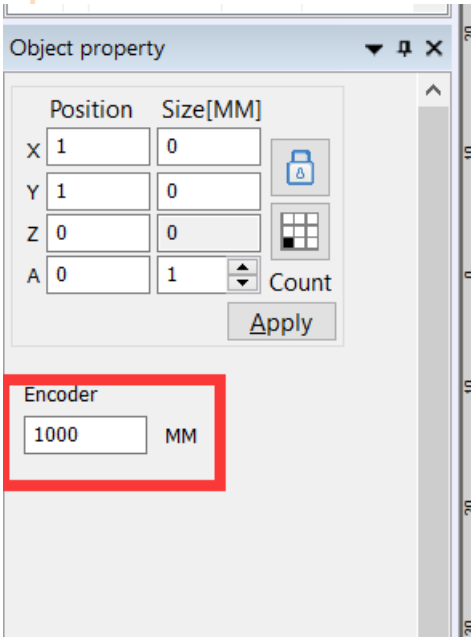
## 4.17 ExtAxis




Control axis move by draw an external axis object, click mark the axis will move.

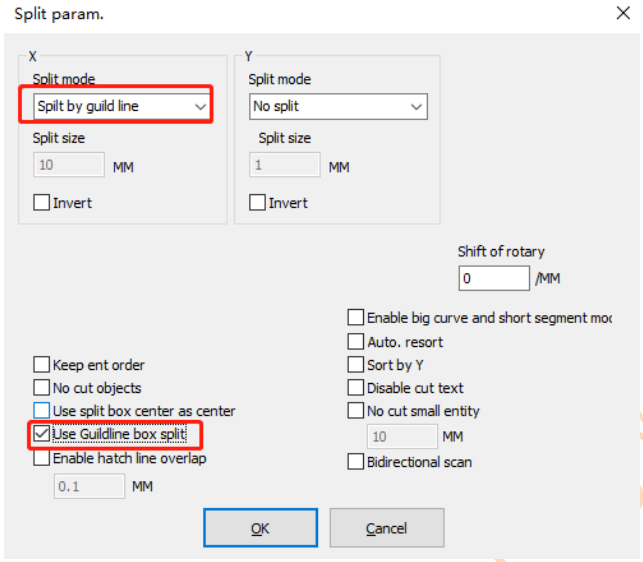
## 4.18 Encoder distance

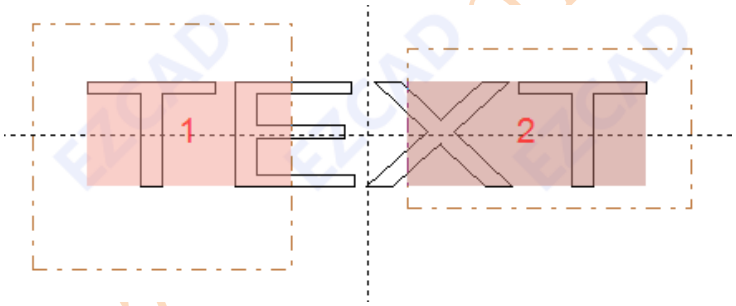
Set the encoder movement distance. The software will calculate the encoder movement position according to the set distance value, and then mark after reaching the designated position.



## 4.19 Guildline box

This function for split, enable guild line split, and use this draw a split box. (With axis enable)



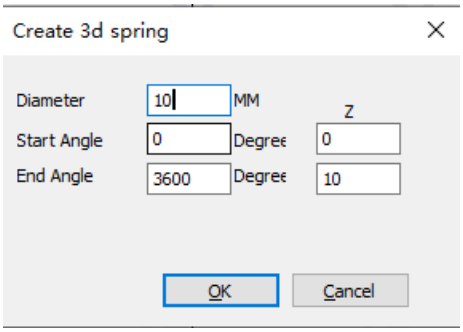



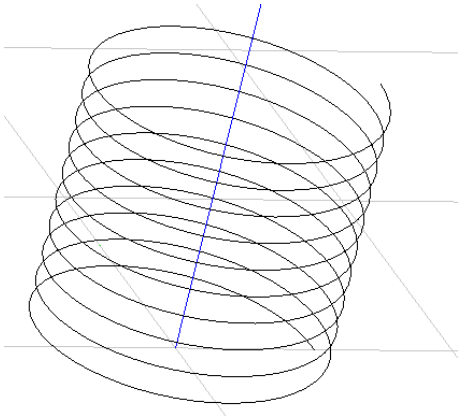

## 4.20 Hierarchical file

Ezcad3 support slicing file from others program, the format Ezcad3 support “.slc”, “.gcode”, “.cli”, “.job”

## 4.21 Create 3D spring

Create a 3D spring

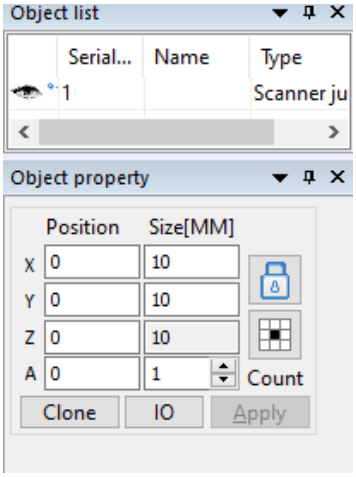


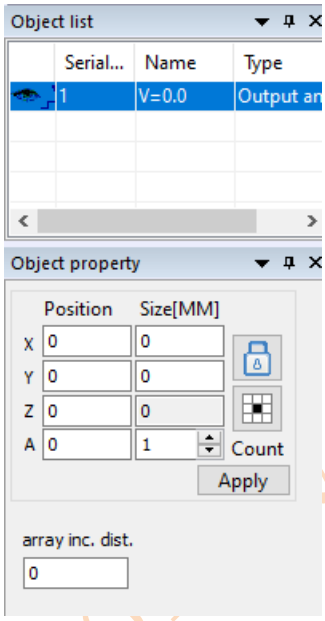
(click  button for check 3D preview, CTRL+mouse right click)

## 4.22 Scanner Jump

Control galvo mirror goes to setting position.




Scanner jumper




Output analog

## 4.23 Reserved Function

**Register variable/ Output analog/ CCD/ Input Jump/ Index**

The Output Analog for analog voltage output, it could be control by program.

| Output analog | |
|---|---|
| Min Value(V) | 0 |
| Max Value(V) | 10 |

# 5 Modify Menu

The Modify Menu contains advanced options in modifying Arrays, arrays text, offsets, turn into curves, trim, etc.

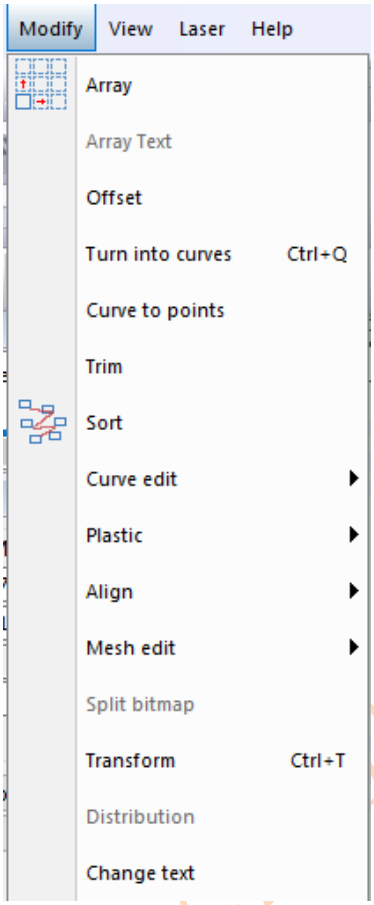



Fig 5–1 Modify

## 5.1 Array

Clicks the array command, the system will pop up a dialog box as following picture. There are two modes: "rectangular" and "circular".

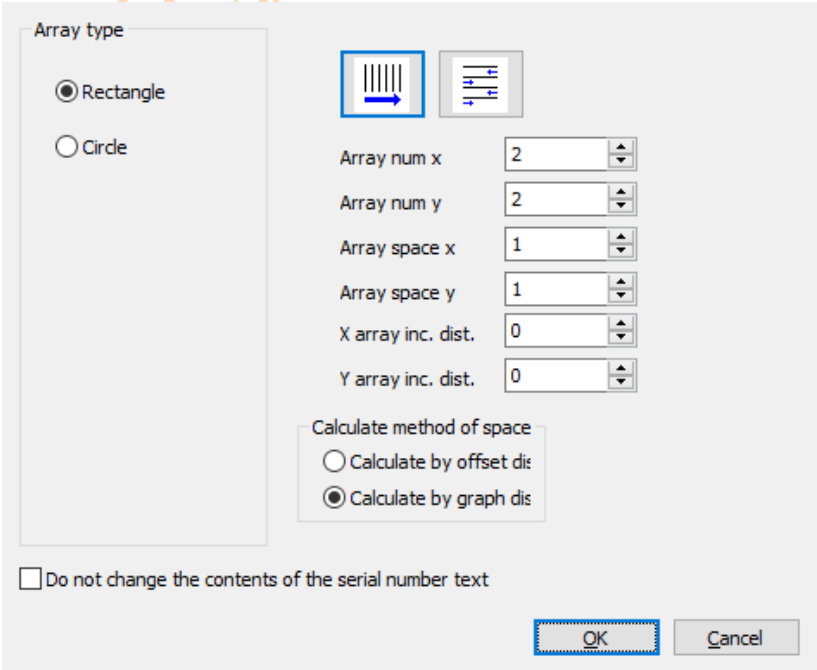



Fig 5–2 Array

"Rectangle "indicates arrays in X and Y directions.


Fig 5–3

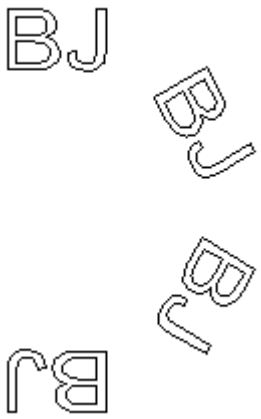
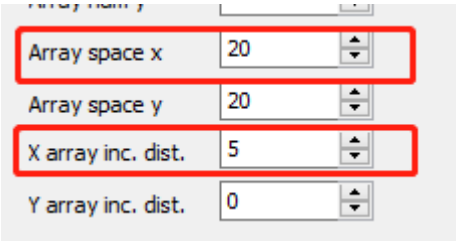
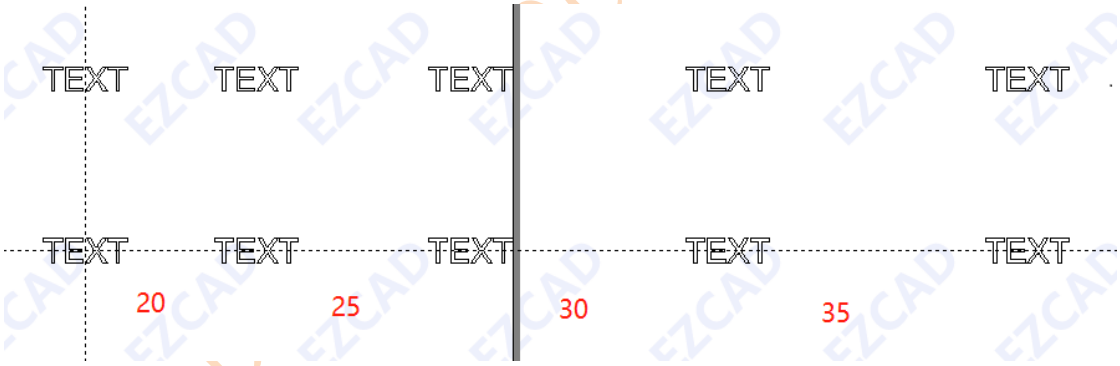



Fig 5–4

"Circle" indicates the array of angles.

**Array inc. dist**: the increase distance of every TEXT.




**Do not change the contents of the serial number text**: This is for serial number setting, enable this function, the serial number do not increase while use Array.

## 5.2 Array text

Variable Text get multiple texts but they are a whole object, so the position and size of each variable text in the array cannot be changed. Select the array object and click on "dynamic text array" to modify the size and position of each text.

## 5.3 Offset

Delete old curve：Whether to keep the original graphics. Unchecked to

retain the original graphics, check to remove the original graphics, leaving only offset graphics.

Offset dist: the offset distance between Refers to the distance between the offset graphics and the original graphics.

count：Number of offset graphics

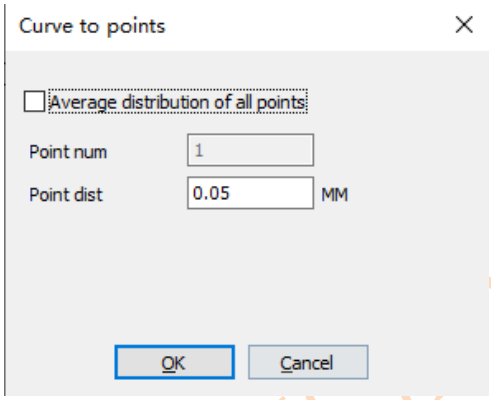
When you use this function, you only need to set the offset distance, and th2en use the mouse to click the offset direction of the graphics to make the offset graphics.

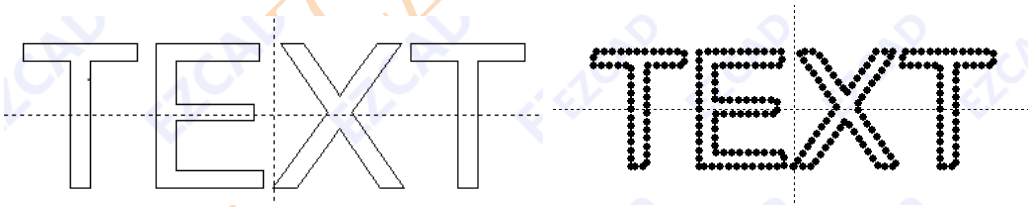
### 5.4 Turn into curves

Remove the selected graphic object's attributes and turn it into a curve object.

### 5.5 Curve to points

Turn curve object into points object.



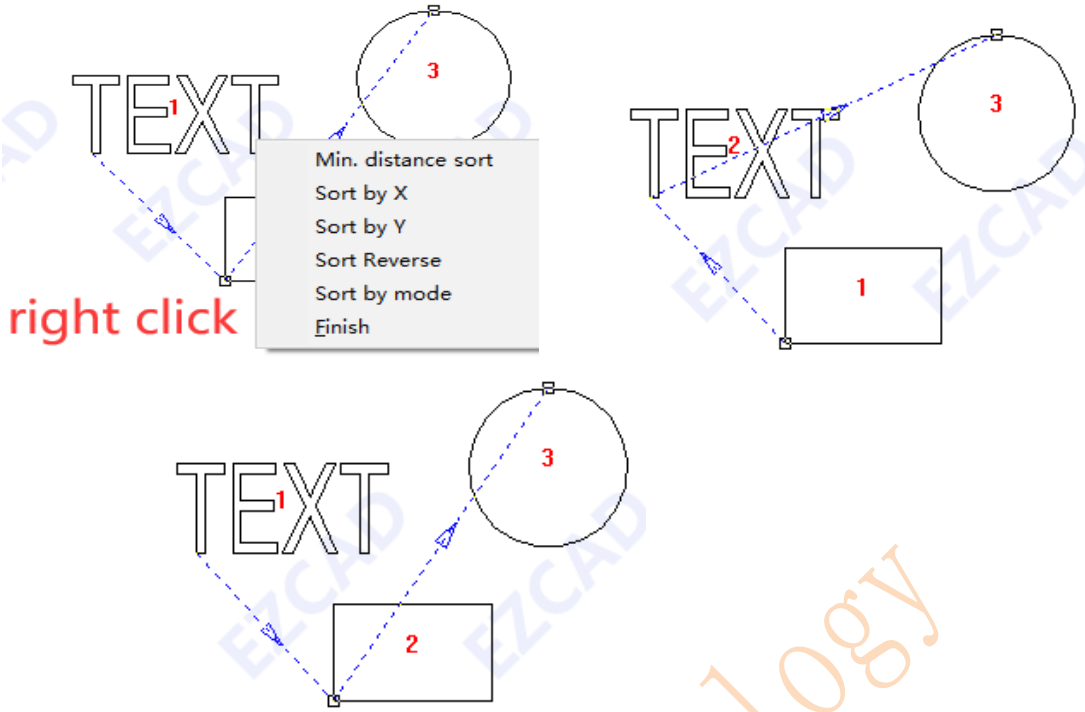




### 5.6 Trim

When there is a curve in the object, click on the trim and the mouse will become the shape of the scissors. Curves will turn blue when the mouse moves over the curve. Click the left mouse button and the curve will be deleted.

### 5.7 Sort

If there have few objects on mark list, use this function for setting marking order.




## 5.8 Curve edit

Auto connect：When the user clicks the command, user can set the connect error value.

### 5.6.1 Auto connect error

When the distance between the first and last point of the two selected figures is smaller than this parameter, the two curves are connected into a curve.

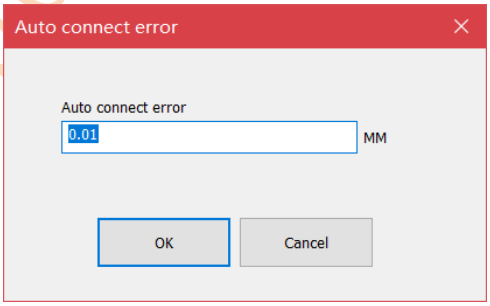
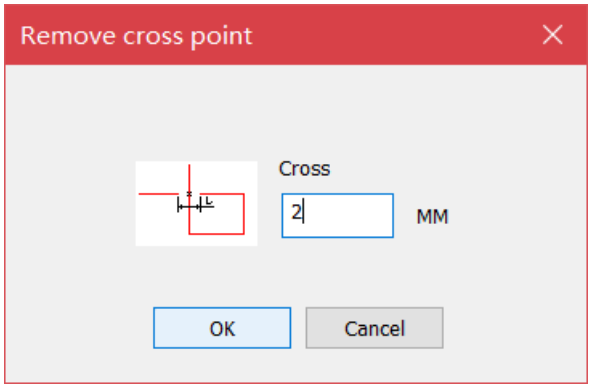
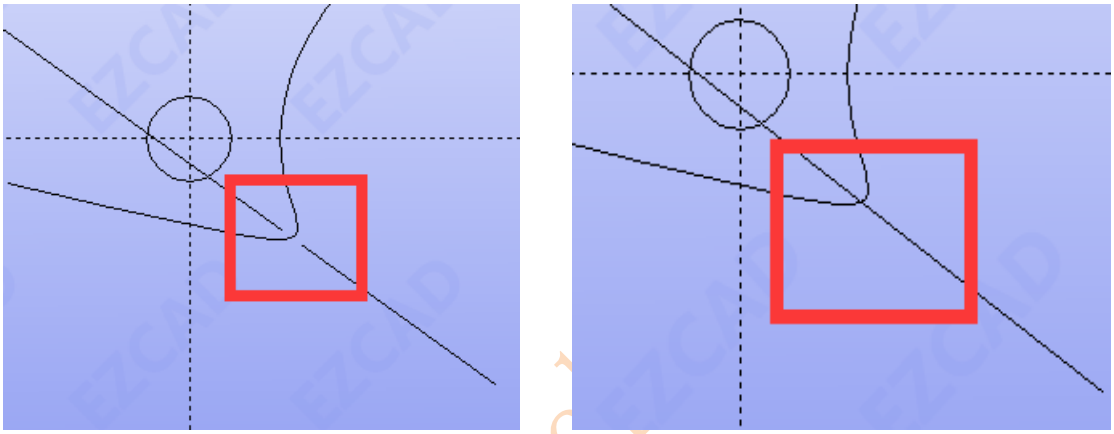



Fig 5–5

### 5.6.2 Remove crosses point

The command will remove the cross line that we can set the length.



## 5.9 Plastic

**Weld：** It is possible to merge two intersecting closed areas into one closed area.

**Trim：** You can trim a closed area out of the graphics contained in another area.

**Intersect：** It is possible to merge two intersecting closed areas into one closed area, leaving only the intersecting parts.

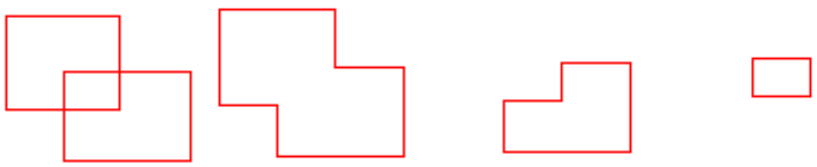


Fig 5–8 transform

## 5.10 Align

 **Left：** Aligns objects according left of the last object in the list of objects.

 **Hor center：** Aligns objects according the horizontal centerline of the last object in the object list.

 **Right：** Aligns objects according to the right of the last object in the list of objects.

 **Top：** Align objects according the top of the last object in the list of objects.

 **Ver center：** Align objects according the vertical center of the last object in the object list.

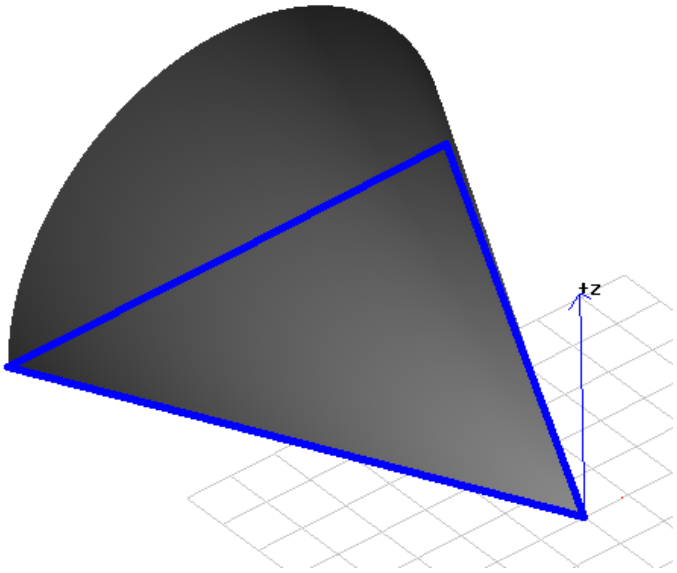
 **Bottom：** Align objects according the bottom of the last object in the list of objects.

 **Center：** Align objects according the center point of the last object in the list of objects.

## 5.11 Mesh edit


Merge close vertices:

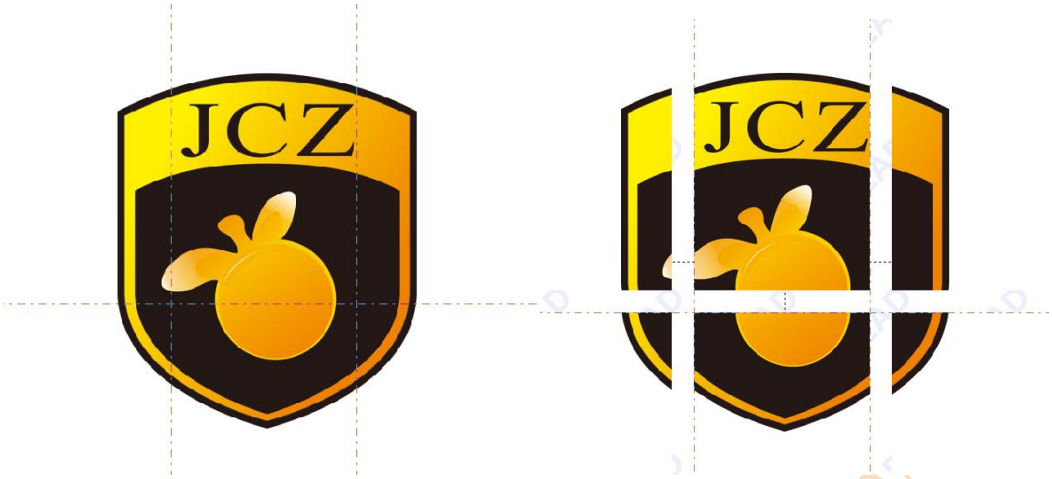
**Refine plane contour:** Extract the plane contour from the 3D model.



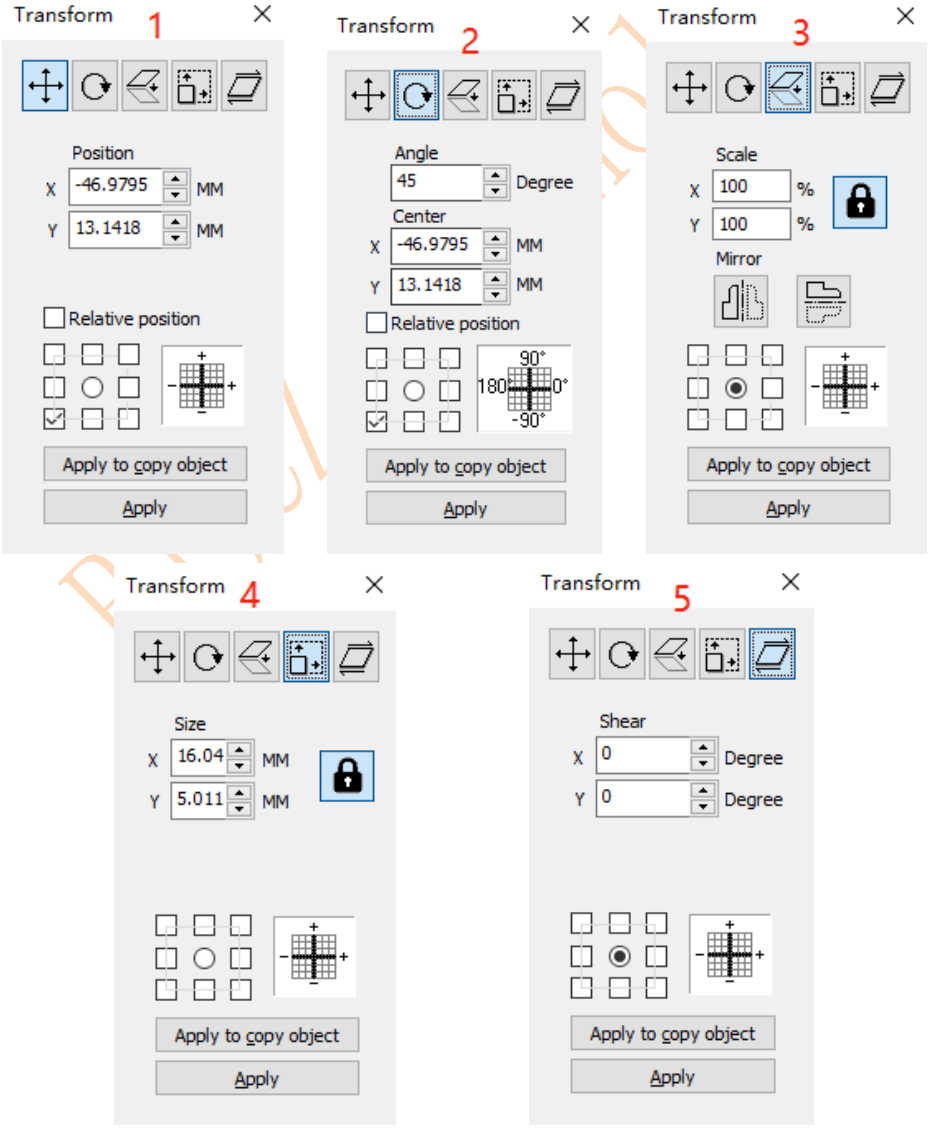

## 5.12 Split Bitmap

Use this function for split bitmap to small part. Put guide line on picture,

and then use this function split it. Use this function, Ezcad3 could split big BMP to small parts and then mark it.




## 5.13 Transform




Transform mode1: Move object position.

Transform mode2: Rotate object.

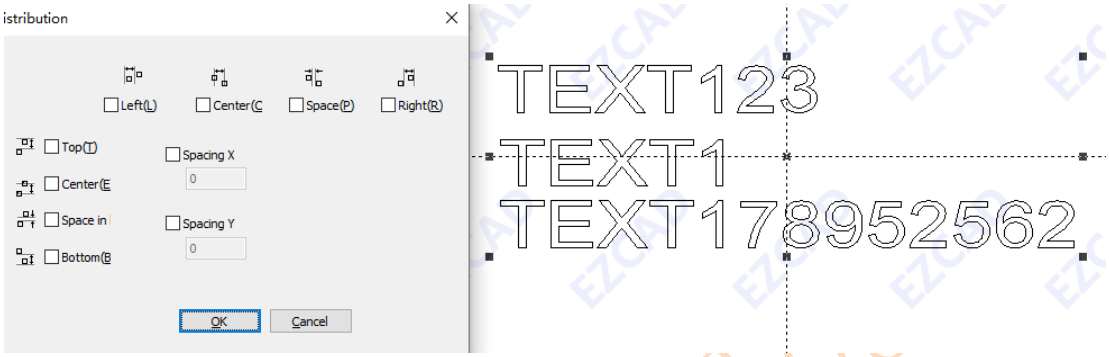
Transform mode3: Mirror object.

Transform mode4: Object size scale transformation.

Transform mode5: Object's tilt angle transformation.

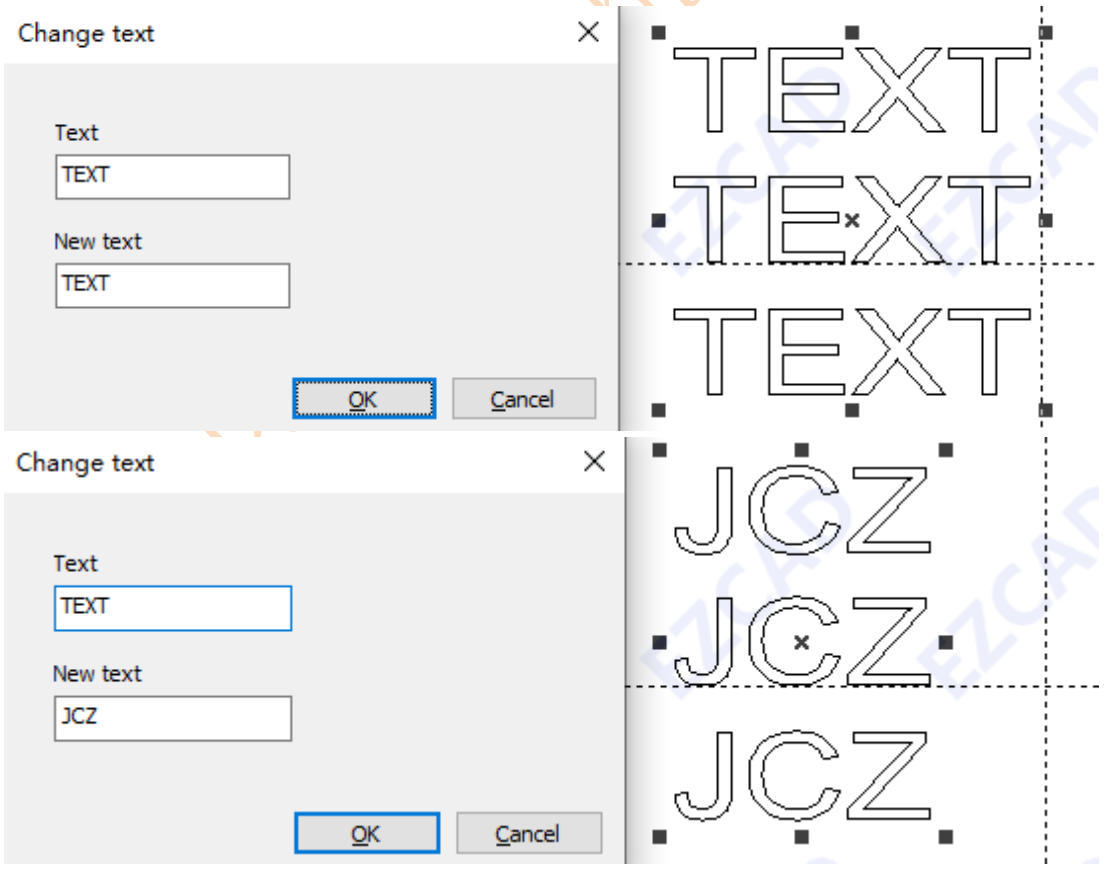
## 5.14 Distribution

This is the function for distribute the objects.

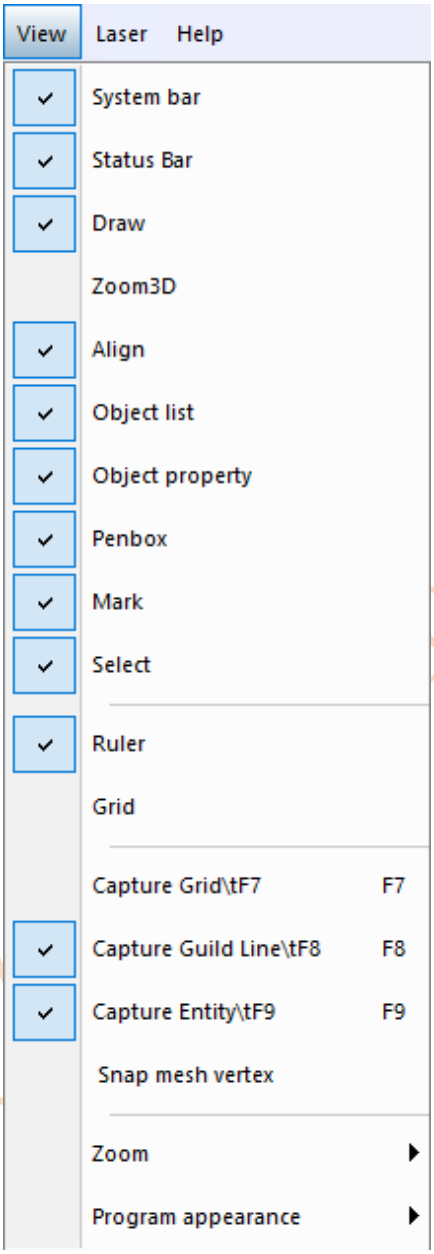



## 5.15 Change Text

If there have many TEXT have same content, use this function for update all of them



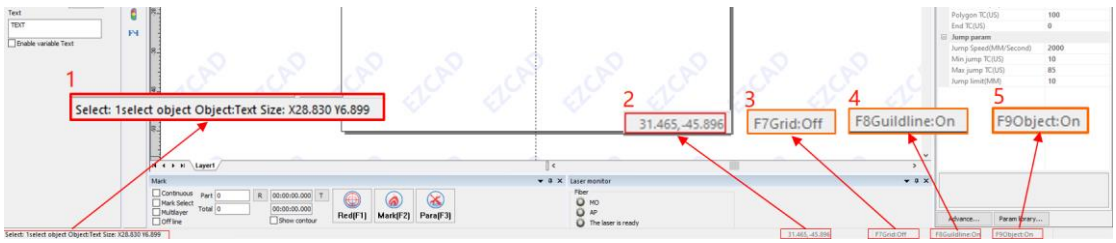
# 6 View Menu




The View function is for check function bar show up on program or not.

## 6.1 System bar

## 6.2 Status bar



**Bar1**: Show how many objects be select, and show size of all object together.

**Bar2**: Show the coordination of mouse cursor.

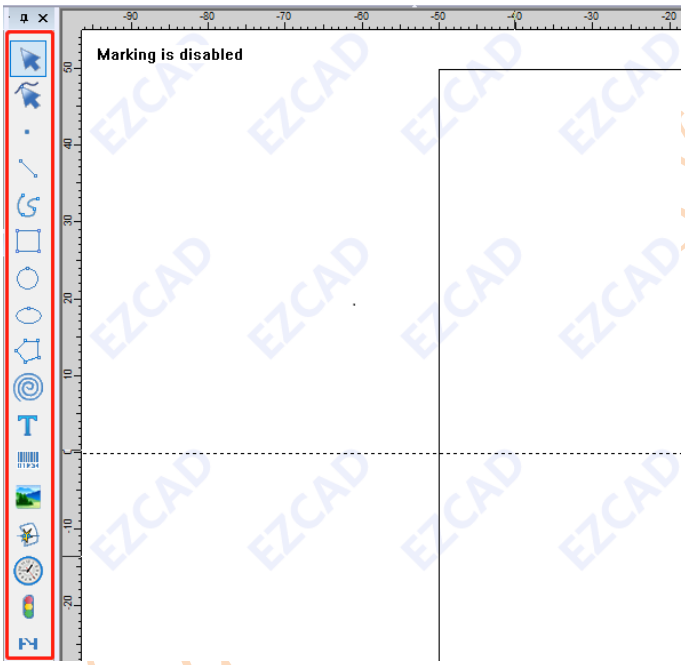
**Bar3**: Show **Capture Grid** function ON/OFF. (Hot key F7)

**Bar4**: Show **Capture Guild line** function ON/OFF. (Hot key F8)

**Bar5**: Show **Capture Entity** function ON/OFF. (Hot key F9)

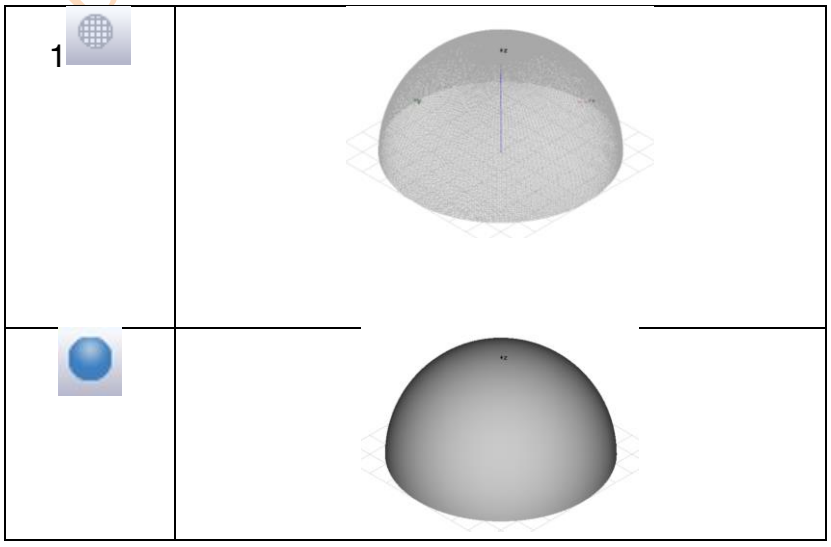
## 6.3 Draw bar

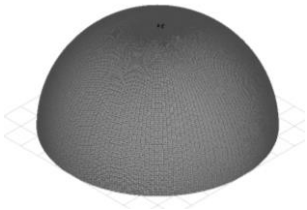
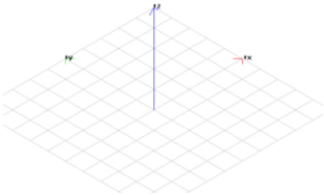
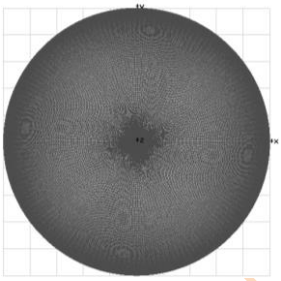
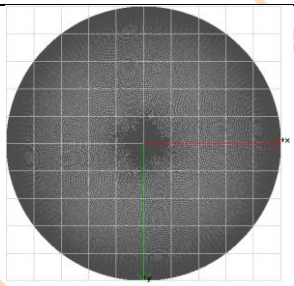
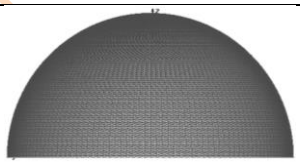
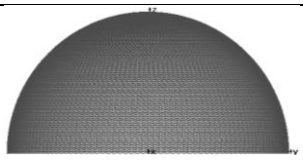
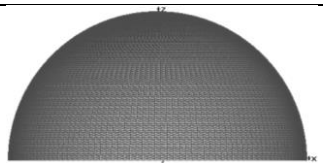
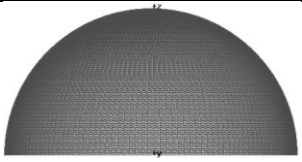
This bar for quickly create new project.




## 6.4 Zoom 3D

This bar for quickly view of 3D model file.

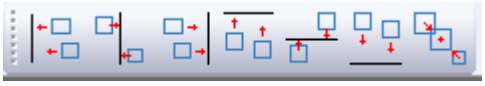


| | |
|---|---|
| |  |
| (Hide) |  |
| (Top) |  |
| (Bottom) |  |
| (Left) |  |
| (Right) |  |
| (Front) |  |
| (Back) |  |

| | |
|---|---|
| (Oblique) |  |

## 6.5 Align

Function description please check **5.10 Align page**



## 6.6 Object list

On the left side of Ezcad is object list, as shown in Figure 2–13. When processing, the system executes the objects in the list in order. User can select the object to directly drag the arrangement order in the list. User can also rename the object by double–clicking the object name in the object list.

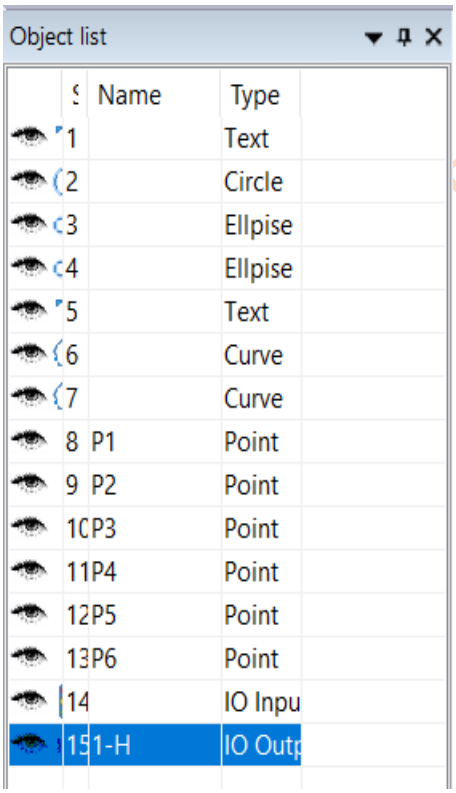



Fig 2–13 Object list

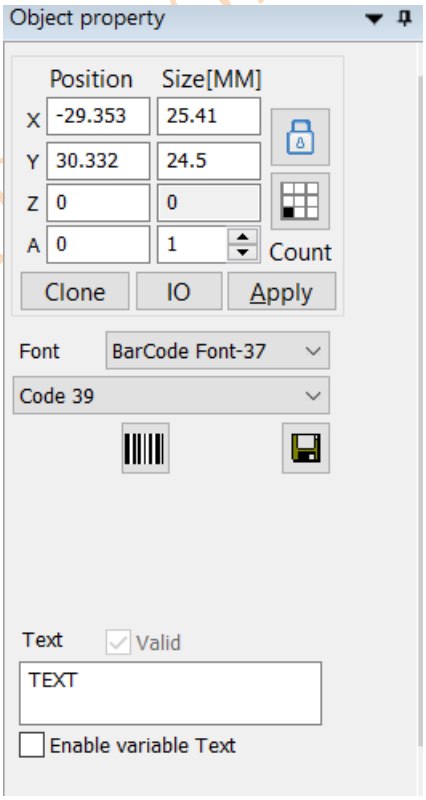



Fig 2–14 Object property

## 6.7 Object property

On the left of Ezcad is the object parameter, as shown in Figure 2–14.

**Position X：** Indicates the X coordinate of the currently selected object. The coordinates can be specified as the coordinates of the lower left corner of the

object, or as the coordinates of the center of the object. Use the coordinate information button to set the specific meaning of the position coordinates. Figure 2–14 shows the X coordinate of the lower left corner of the selected object.

**Position Y：** Indicates the Y coordinate of the currently selected object. The coordinates can be specified as the coordinates of the lower left corner of the object, or as the coordinates of the center of the object. Use the coordinate information button to set the specific meaning of the position coordinates. Figure 2–14 shows the X coordinate of the lower left corner of the selected object.

**Position Z:** Indicates the Z coordinate of the currently selected object.

**Size X:** Indicates the width of the currently selected object.

**Size Y:** Indicates the height of the currently selected object.

 : Indicates that the current aspect ratio is locked. If the user changes the XY size, the system ensures that the aspect ratio of the new size does not change.

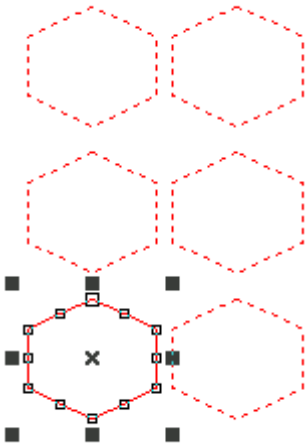


fig 2–15 X=3 Y=2 clone

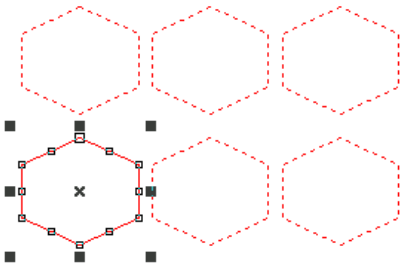


fig 2–16 X=2 Y=3 clone

 : coordinates information, position X and the position Y correspond to the coordinates of the points of the object. After clicking the button, the user can select the object reference position coordinates.

**Clone：** Copy the current object to the specified position.

Figure 2–15 shows the object of clone number X=3, Y=2.

Figure 2–16 shows the object of clone number X=3, Y=2.

**Increment：** Refers to the row spacing and column spacing specified by

the user.

 Array direction as a horizontal row priority

 Array direction is vertical priority

 Array in single directional array

 Arrays are dual directional arrays

### 6.8 Ruler grid/ Capture grid/ Capture guild line/ Capture entity

**Ruler:** Display horizontal and vertical rulers, grid points and auxiliary lines.

**Capture Grid:** The command automatically places the points you draw on grid points in the workspace

**Capture Grid line:** The command automatically captures to the guides as you move the objects. The auxiliary line can be dragged by the left mouse button anywhere in the ruler

**Capture entity:** When performing certain operations, the software will automatically find the feature points such as vertices, midpoints, nodes, center points, intersections, etc. on the object

### 6.9 Snap mesh vertex

The snap to grid feature enables the drawn points to automatically be on the grid points in the workspace.

### 6.10 Zoom

There are seven models.

 View the whole area. You need to use the mouse to select the magnified rectangular area. If you right–click directly, the current view will be reduced to half of the current view. If you press the left mouse button directly, the current view will be Zoom in on the current position with the mouse position centered.

 Use the mouse to move the current view in parallel.

 Zoom in on the current view.

 Zoom out the current view.

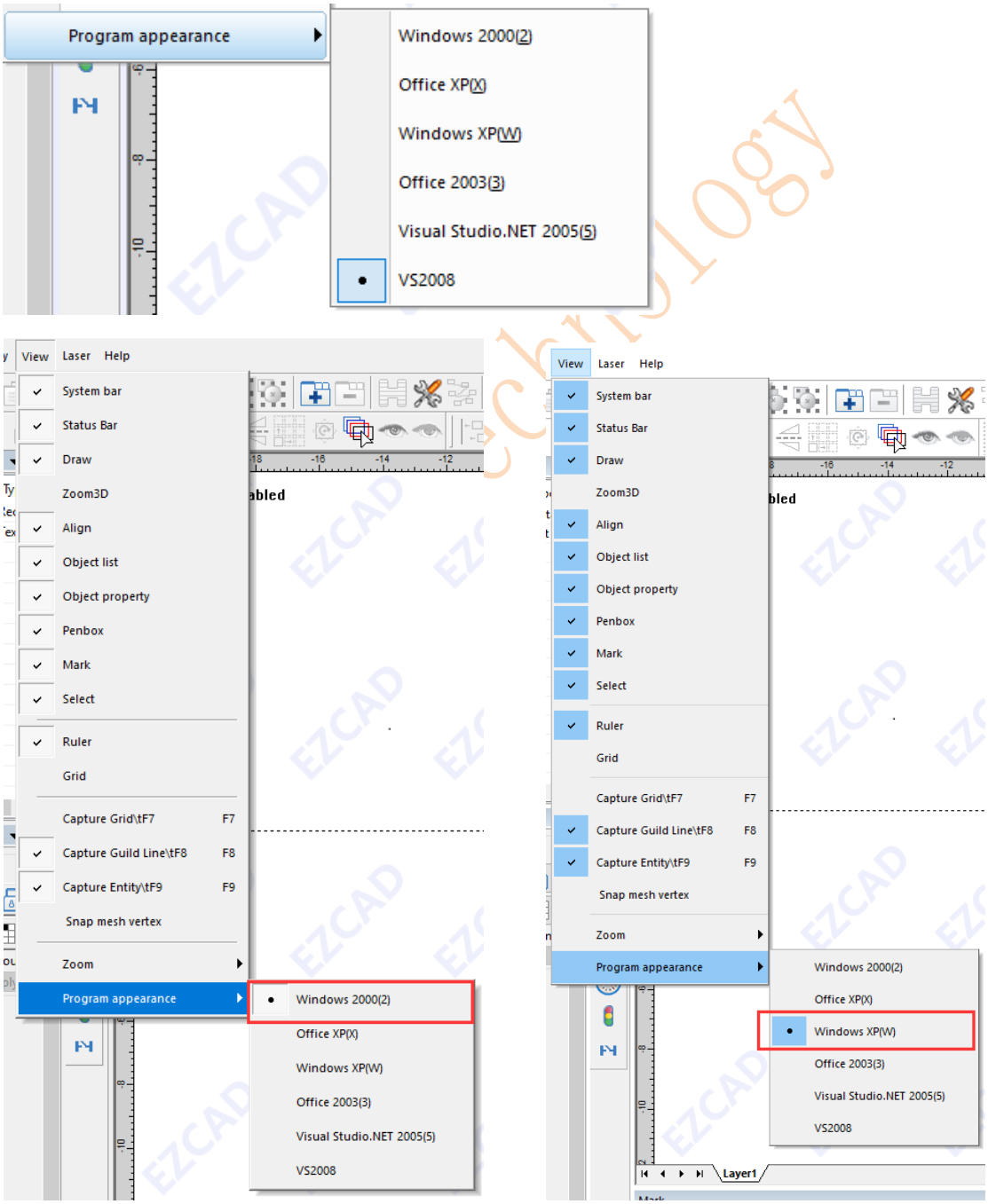
 View the whole objects.

 The currently selected object fills the entire viewing area for observation.

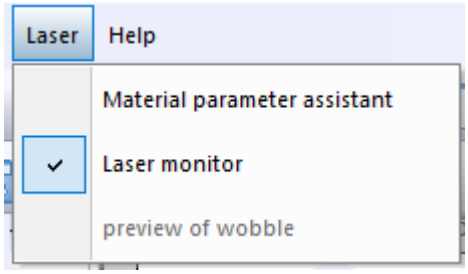
 The current workspace fills the entire viewing area for observation.

## 6.11 Program appearance

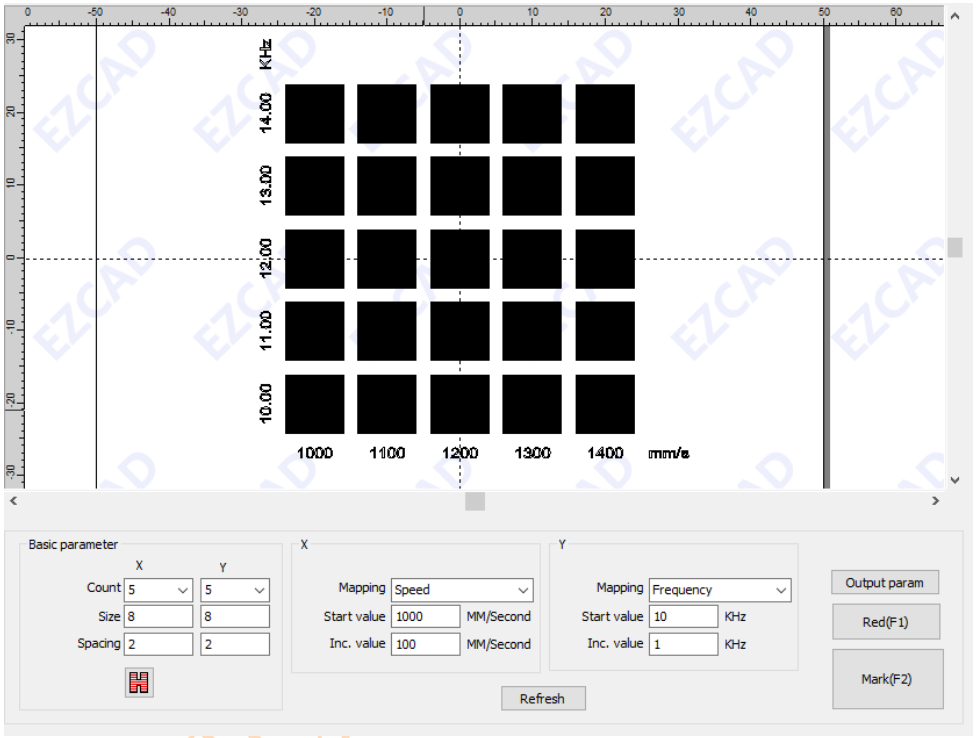
Setting different UI view for program



# 7 Laser menu




## 7.1 Material parameter assistant




Basic parameter:

**Count**: the numbers of array.

**Size**: the size of rectangle

**Spacing**: the distance between two rectangles

**Mapping**: Include Speed/Frequency/Power/Loop count/pulse width.

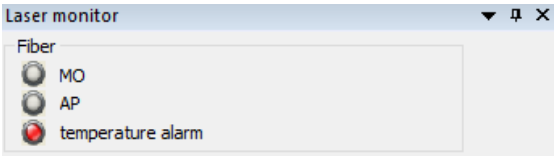
**Start value**: the start value of coordination

**Inc. value**: the increasement of coordination

**Output param**: the select one will be import to main workspace

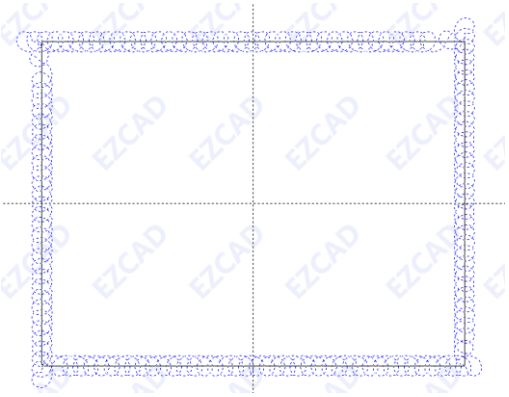
## 7.2 Laser monitor

The monitor of laser state, for fiber, QCW SPI etc.



### 7.3 Preview of wobble

The program will preview laser wobble line according to parameter.(The blue line is laser wobble)

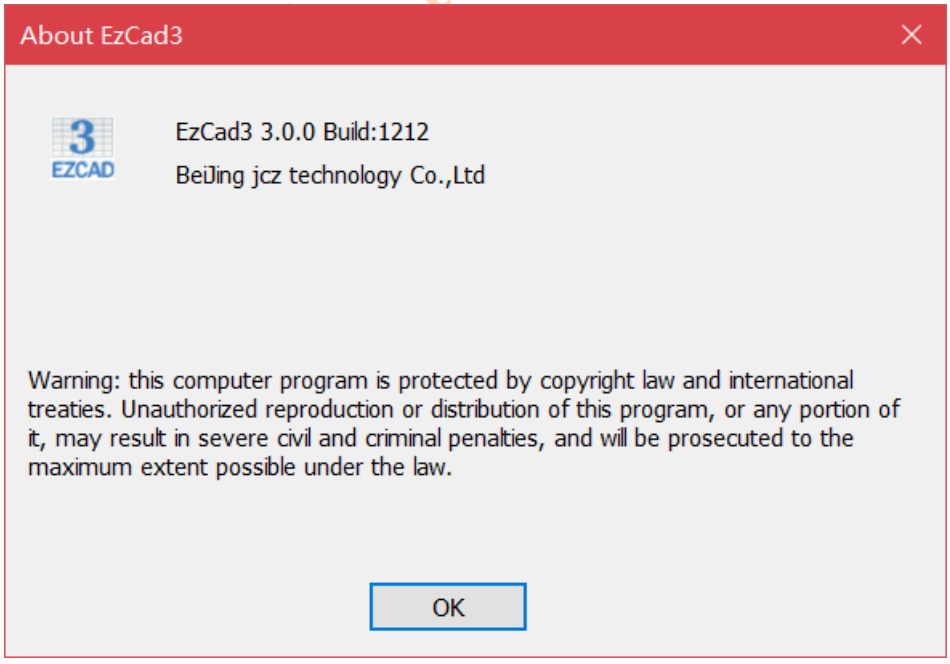


## 8 3D View

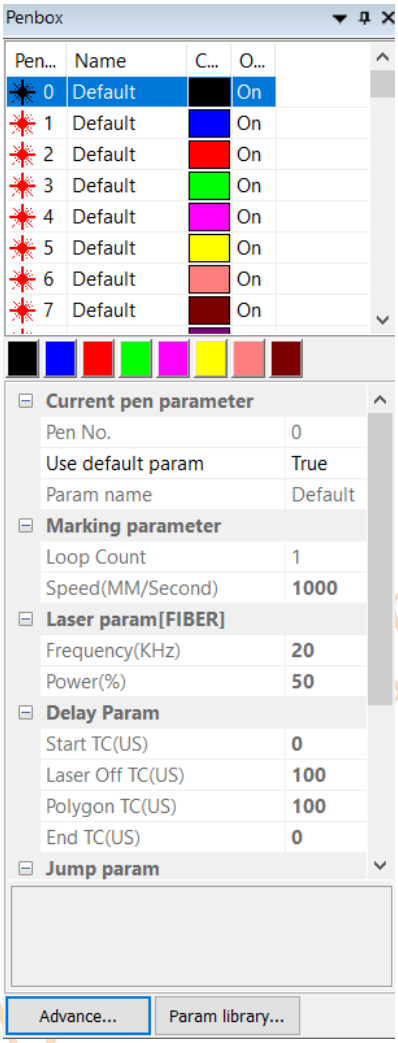
EZCAD 3 software support 3D marking, this feature needs special license, and we edit another option manual to introduce it.

## 9 Help

Show EZCAD3 information, contain version, user and software copyright.etc.



# 10 Pen parameter




## 10.1 Pen list

There are 256 “pen” in each file, from 0 to 255.

Indicates that the current pen is to be machined, that is, when the processed object corresponds to the current pen number, it is processed, and double-clicking this icon can be changed.

Indicates that the current pen is not processed, that is, when the processed object corresponds to the current pen number, it is not processed.

**Color**: Indicates the current pen color. This color is displayed when the object corresponds to the current pen number. Double-click the color bar to change the color.

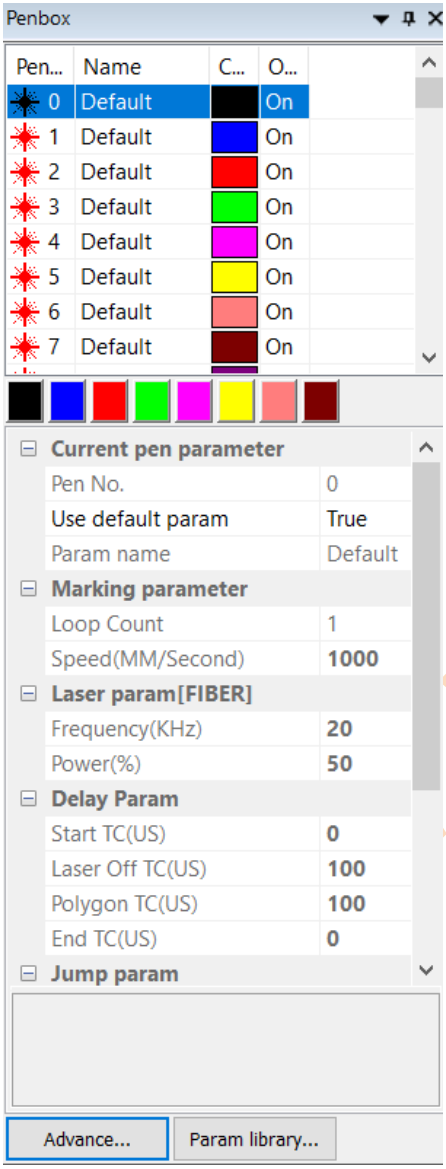
**parameter application button**: When the user presses the parameter application button, the pen number of the currently selected object will be changed to the corresponding button pen number.

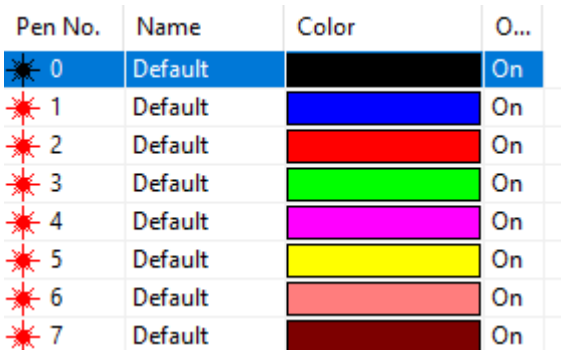
When the user right-clicks on the current list.

Fig 9–2parameter application button

## 10.2 Pen Box

The pen box parameters for laser marking, the operator could edit laser marking parameter from here.



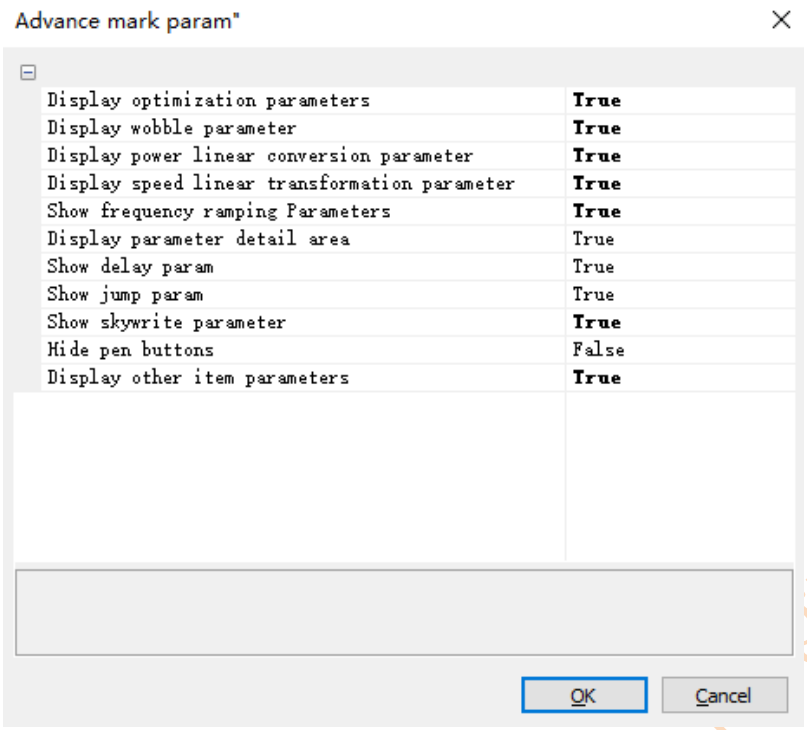




### 10.2.1 Pen No

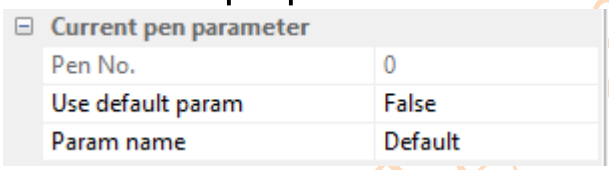
There are 256 pen numbers, which means that users can save 256 parameters to the pen library, and download pen parameter from library directly while user want to use it.

### 10.2.2 Advance mark param

The program not show all parameters, on advance window, user could decide which parameter show on pen box.




### 10.2.3 Current pen parameter

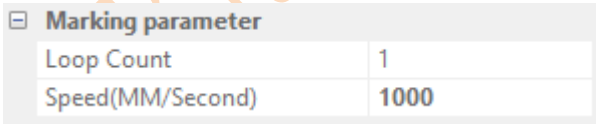



**Pen No**: The current Pen No.

**Use default param**: True (use default marking parameter from program); False (user define)

**Param name**: Use named this pen, this name will be saved to pen library.

### 10.2.4 Marking parameter




**Loop Count:** The number of times this pen number is marked

**Speed:** The galvo mirror speed while mark. (mm/s)

### 10.2.5 Laser parameter

This will be different while select different laser type, the details please check F3–laser description.page


**Frequency**: The setting frequency of laser while marking process.

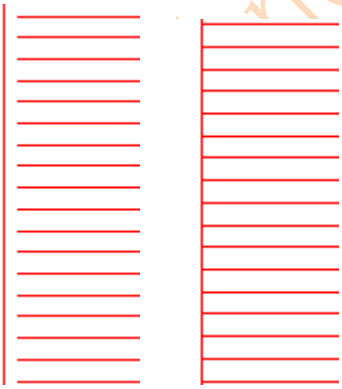
**Power**: The setting power of laser while marking process.

**Pulse width**: The setting pulse width of laser marking.

### 10.2.6 Delay Parameter

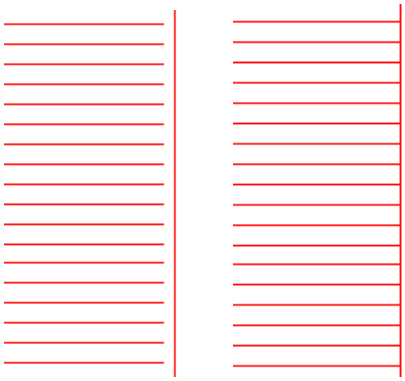
| Delay Param | |
|---|---|
| Start TC(US) | 0 |
| Laser Off TC(US) | 100 |
| Polygon TC(US) | 100 |
| End TC(US) | 0 |

**Start TC**: When the galvo has to execute a mark command, the scanner mirrors first have to be accelerated up to the defined marking speed. In the beginning of the movement, the laser focus moves very slowly which may result to burn–in effect at the start point. To avoid this, we insert a delay (Start TC) at the beginning of each mark command. When the laser eventually turns on, the mirrors have already reached a certain velocity. However, if this value is too large, the first part of the vector will be cut off. Also, negative value is supported.

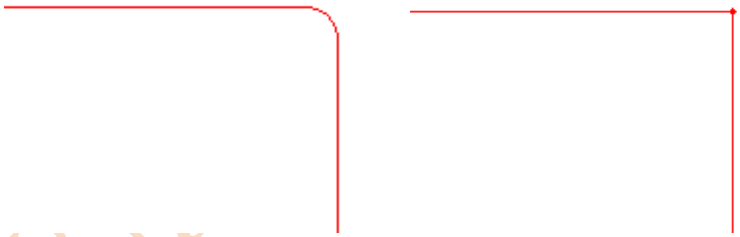


**Laser Off TC**: The delay time of the laser shutting down after marking finished. Proper time can wipe off the burn–in effect at the end. This value cannot be negative.

**End TC**: The End TC parameter is used to control how long the software will wait at the end of a series of vectors. The wait is required because the software is always "ahead" of the hardware and must wait for the hardware to catch up. This delay applies to the end of all vectors in which the laser is to be turned off after execution.



**Polygon TC**: The Polygon TC parameter is used to control how long the software will wait at vector connection points. The wait is required due to the lag time between the software/DAC position and the actual hardware/mirror position. This timer applies to all vectors whose endpoint is also the start point of the next vector (polygon connection points). In other words, this timer applies to end of all vectors in a series of connected vectors, except for the last one (the end of last one is controlled by the End TC parameter). The three connected points in a square or the intermediate connection points in a polyline circle are examples of points the Polygon TC parameter can effect. The starting point of the square is controlled by Start TC parameter. The last corner of the square is controlled with the End TC timer.



### 10.2.7 Jump parameter

| Jump param | |
|---|---|
| Jump Speed(MM/Second) | 2000 |
| Min jump TC(US) | 10 |
| Max jump TC(US) | 85 |
| Jump limit(MM) | 10 |

**Jump speed:** Set a jump speed of the scanner for the current parameter

**Min jump delay/Max jump delay**: Set jump delay, every time jump finished, system will wait for a little time and then jump next time. This little time is the jump delay. Max or min delay time depend on the Max limit length.

**Jump limit**: Set longest length that makes sure good jump result.

### 10.2.8 SKY optimization

| SKY optimization | |
|---|---|
| Enable | False |
| Limit angle(Degree) | 45 |
| Lead-in cycle(10us) | 10 |
| Export cycle(10us) | 10 |
| Lag time(us) | 0 |

Whether the uniform marking function is enabled, which is effective after enabling. It mainly solves the problem of inconsistent speed of galvanometer when starting and stopping. Properly setting the import cycle and export cycle parameters can eliminate the uneven dot at the beginning and end of marking. This function is applicable to all machining objects

**Limit angle:** Set the break angle, and curves less than the limit angle will automatically use polygon delay

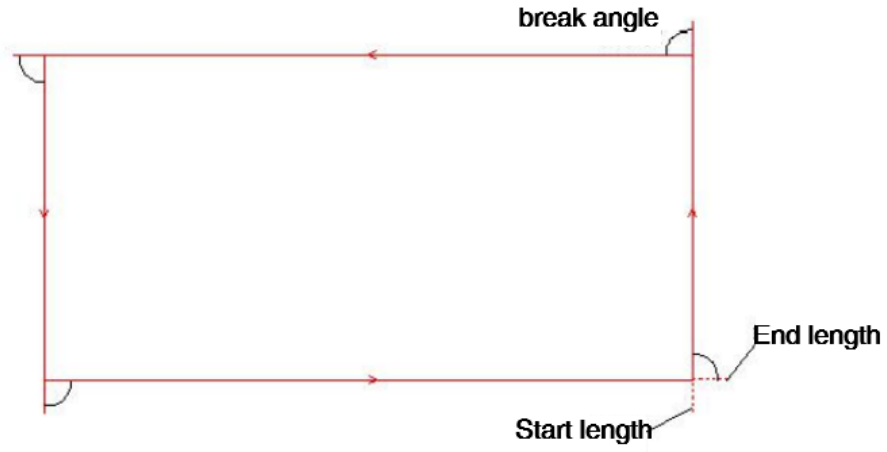
**Lead–in cycle:** Acceleration time to start marking, time to guide into curve cycle

**Export cycle:** Deceleration time for ending marking and time for guiding to exit curve cycle

**Lag time:** Laser off delay.

**Example：**

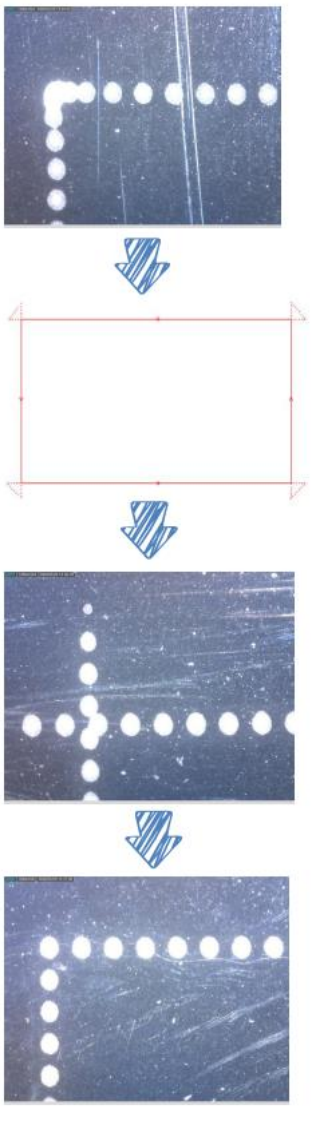
Take the actual marking of a 40 x 20 rectangle as an example. During the actual marking, the galvanometer motor has an acceleration process when starting and a deceleration process when it stops. Uneven dots will appear during acceleration and deceleration. Phenomenon, as shown in the figure.




Note: The arrow indicates the marking direction, and the arc indicates the angle.

Set the interruption angle to 89 degrees. When the marking angle is greater than or equal to 89 degrees, the actual marking effect is as shown in the figure.

Note: The dotted line is the trajectory of the light spot when the galvanometer is swinging.



In actual marking, the galvanometer motor has an acceleration process when starting, and a deceleration process when it stops. There will be uneven dots during the process of acceleration and deceleration.

The original polyline is divided into line segments for marking. The dotted line in the figure is the distance of acceleration or deceleration. In this way, the processing optimizes the phenomenon of key points or arc corners at the turning point.

In actual use, mark the rendering

After setting the laser on/off and delay, the effect picture at our corner

### 10.2.9 Power/Velocity/Frequency linear transformation

| Power linear transformation | |
|---|---|
| Enable Start | False |
| Start proportion(%) | 50 |
| Start length(MM) | 1 |
| Enable end | False |
| End proportion(%) | 50 |
| End length(MM) | 1 |

| Velocity linear transformation | |
|---|---|
| Enable Start | False |
| Start proportion(%) | 50 |
| Start length(MM) | 1 |
| Enable end | False |
| End proportion(%) | 50 |
| End length(MM) | 1 |

| Frequency ramping | |
|---|---|
| Enable Start | False |
| Start proportion(%) | 50 |
| Start length(MM) | 1 |
| Enable end | False |
| End proportion(%) | 50 |
| End length(MM) | 1 |

**Start/End proportion:** The power percentage of the starting/ending light output. The actual starting/ending light output power is the power percentage of the current processing parameter multiplied by this percentage. Pen parameter power is total power, starting power = total power X starting ratio

**Start/End length:** Length of start/end power gradient

### 10.2.10 Optimized parameter

| Optimized parameter | |
|---|---|
| Enable | False |
| Acc. Distance(MM) | 0 |
| End compensate(MM) | 0 |
| Bidirectional migration(MM) | 0 |
| BiDirection compensate len... | 0 |

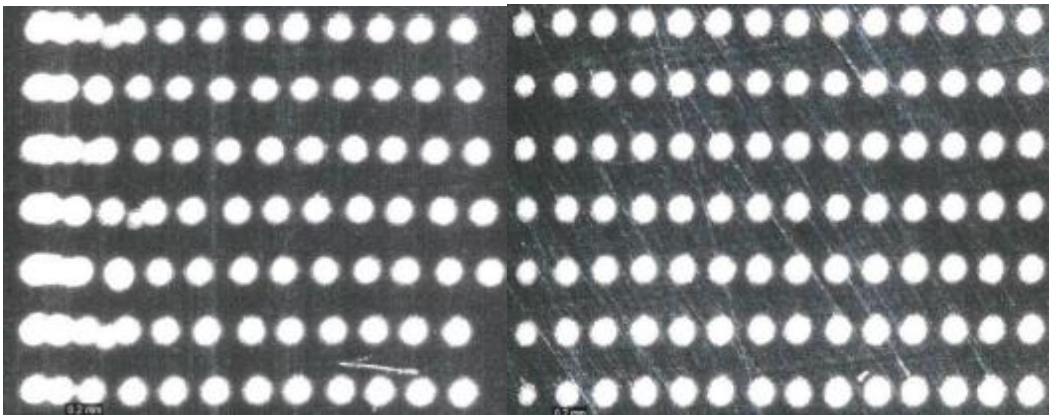
**Acc.Distance:** If the galvanometer accelerates in advance and this parameter is properly set, the uneven dot at the beginning of marking can be eliminated

**End compensate:** End curve extension

**Bidirectional migration:** The non-synchronization of galvanometer and laser causes bidirectional dislocation. Properly setting this parameter can effectively solve the problem of bidirectional filling offset

BiDirection compensate length:

Set an appropriate acceleration distance. This parameter is adjusted according to the actual effect to make the spacing of all light spots on a straight line consistent, and then set an appropriate light on delay and light off delay to adjust the size of the marking pattern to the actual size. If two-way filling is used, the filling line will be misaligned. Use the two-way offset parameter to adjust.



Before After

### 10.2.11 Wobble

| Wobble | |
|---|---|
| Enable | False |
| Type | Spiral |
| Diameter(MM) | 1 |
| distance(MM) | 0.5 |
| Diameter2(MM) | 0.5 |
| Relative speed(MM/Second) | 1000 |

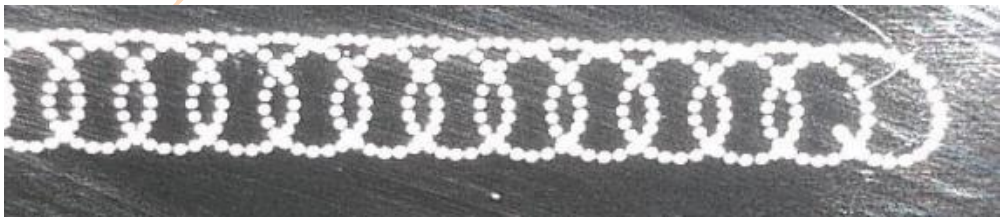
**Type**: Jitter types include helix, sine curve, ellipse, vertical 8-character and horizontal 8-character

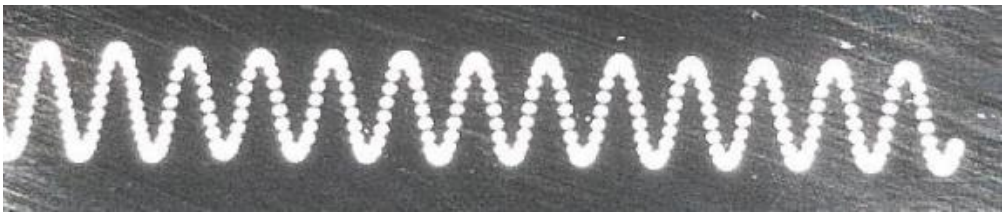
**Diameter**: The diameter of spiral circle during jitter marking, that is, the line width marked with spiral mode

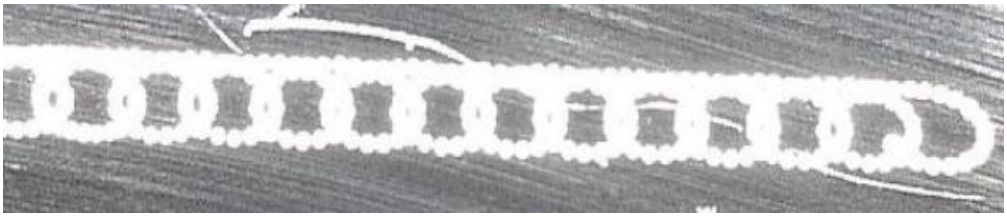
**Distance**: Center distance of two adjacent circles during jitter marking. Set an appropriate value according to the size of the point on the object surface acted by the laser. If the pitch is set too large, the marked line will have shading, and if it is set too small, the marking time will be increased

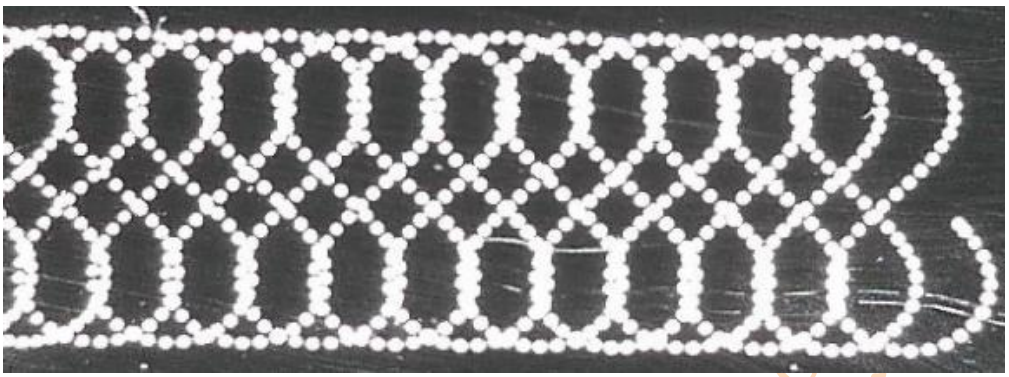
**Diameter2**: Diameter of ellipse

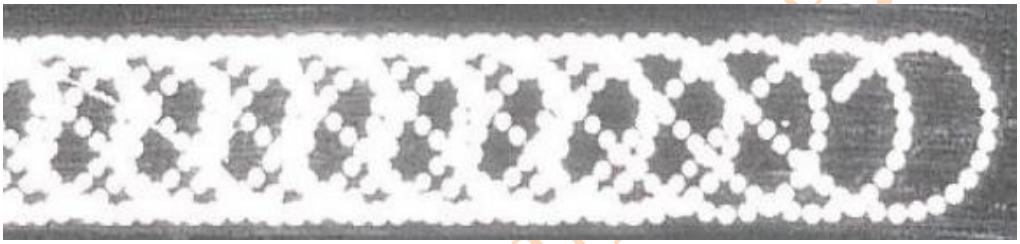
Relative speed:











### 10.2.12 Other

| Other | |
|---|---|
| Time per point(ms) | **0.1** |
| Enable curve scatter error | False |
| Curve scatter tolerance(MM) | **0.01** |
| Laser on lag time | False |
| Laser on lag time(us) | **0** |

**Time per points:** When there are points in the object, the light emission time of each point

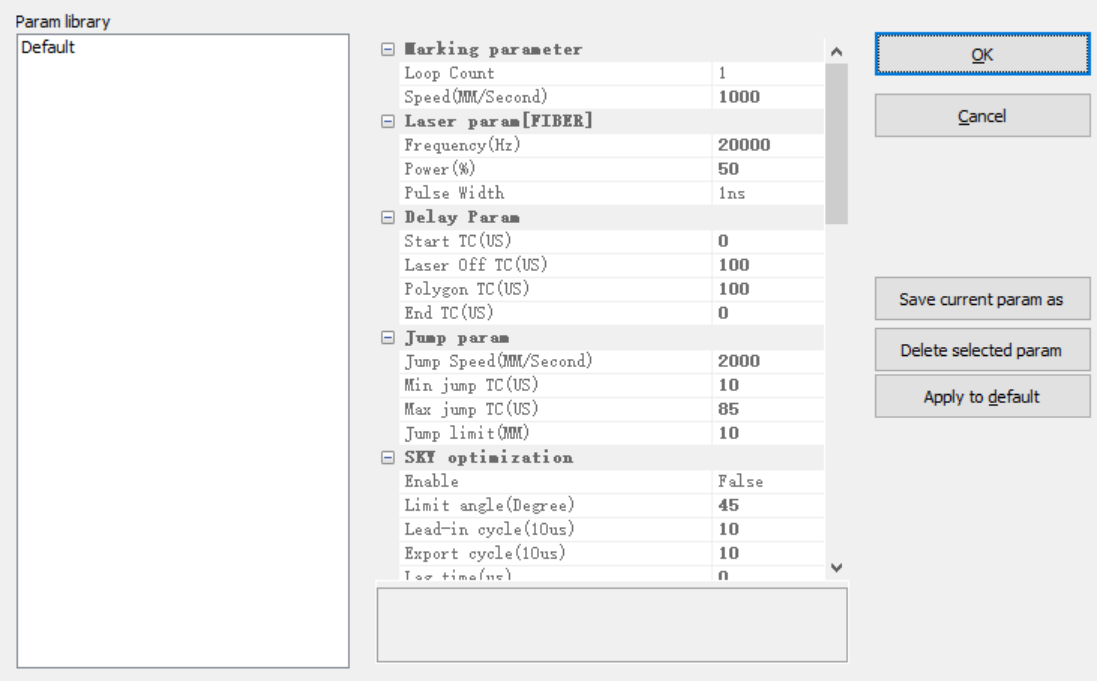
**Enable curve scatter error:** Enable curve dispersion error

**Curve scatter tolerance:** Maximum chord height error of curve discretization into a straight line

Laser on lag time: Reserved.

## 10.3 Param library

Save the parameters user set.



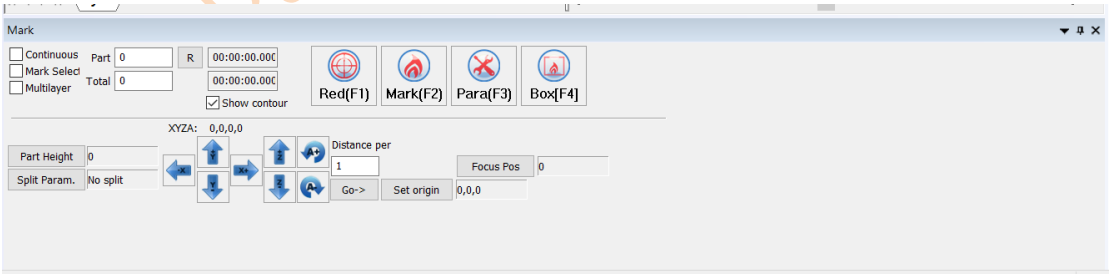

**Apply to default**: Save all parameters of the current parameter to the parameter named "default".

**Param library**: Save parameters currently set by all users for processing various materials.

**Save current param as**: Indicates that the parameters in the pen are saved to the parameter library.

**Delete select param as**: Indicates to remove the current parameter from the parameter library.

## 10.4 Mark control




**Red**: The outer frame of the figure to be marked is marked, but no laser is used to indicate the processing area so that the user can position the workpiece. This function is used for marking machines with red indicating light.

**Mark:** start mark.

Press F2 directly to execute this command.

**Continuous**: Indicates that the current file has been repeatedly processed and the current file is being processed cyclically.

**Mark select**: Only the selected object is machined.

**Multilayer**： The number of offline processing layers enabled, used together with offline processing, to achieve offline processing.

**Part**: Indicates the total number of parts currently processed.

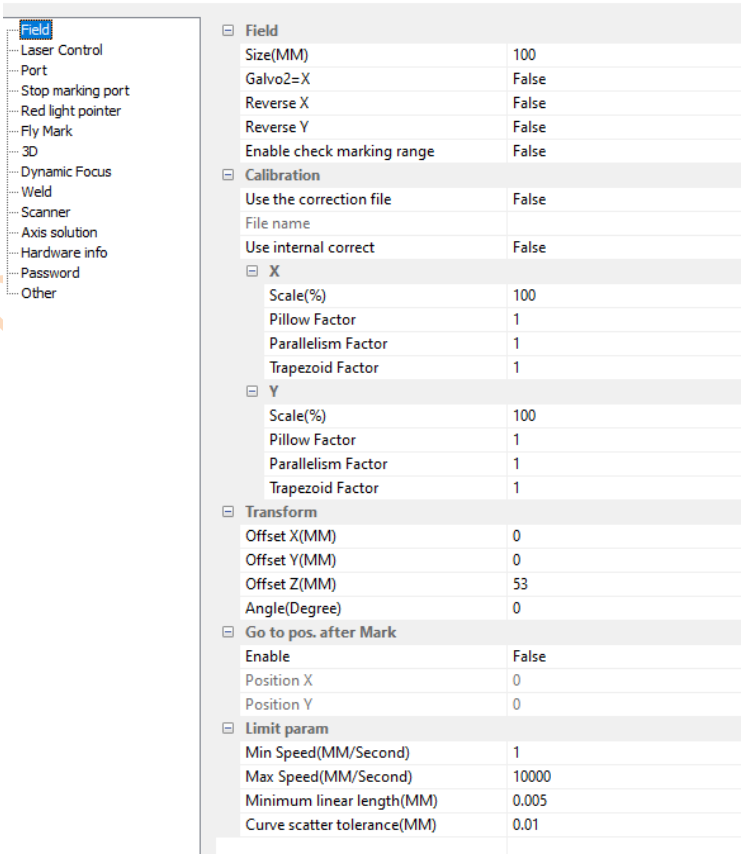
**Total**: Indicates that the total number of parts currently being machined is invalid in continuous machining mode. When not in the continuous machining mode, if the total number of parts is greater than 1, the machining will be repeated until the number of parts processed is equal to the total number of parts.

**Para:** Current device parameters. Press F3 directly to execute this command.

**Box**： Click this button to mark the top view boundary of the model in the current software.

## 10.5 Machine parameter

### 10.5.1 Field




**——Field:**

1) Size： The actual maximum marking range corresponding to galvanometer.

2) galvo2=x: Represents the galvo mirror output signal 2 of the control card as the x axis of the user coordinate system.

3) Reverse X: Indicates that the output of the current galvo x is reversed.

4) Reverse y：Indicates that the output of the current galvanometer y is reversed

**--Calibration**：Is external calibration file enabled?

**--Use internal correct:** Enable and then use Internal correction directly.

Scale: Size scale (Target size / actual marking size)

Pillow Factor: Pincushion effect. 

Parallelism: Tilt distortion. 

Trapezoid: Trapezoidal distortion. 

**--Transform**：

1) Offset X：When processing, the X coordinate offset of each point of the workspace, such as the original point coordinate X is 20, the offset X is –20, the actual processing is X is 0.

2) Offset Y：The Y coordinate offset of each point in the workspace during table processing.

3) Offset Z：Z coordinate offset of each point in workspace when table is processed.

4) Angle：A coordinate offset of each point in the workspace when the table is being processed.

**--Goto pos after mark**：Set the oscillating mirror to the specified position after the current machining is set.

**--Limit parameter**：

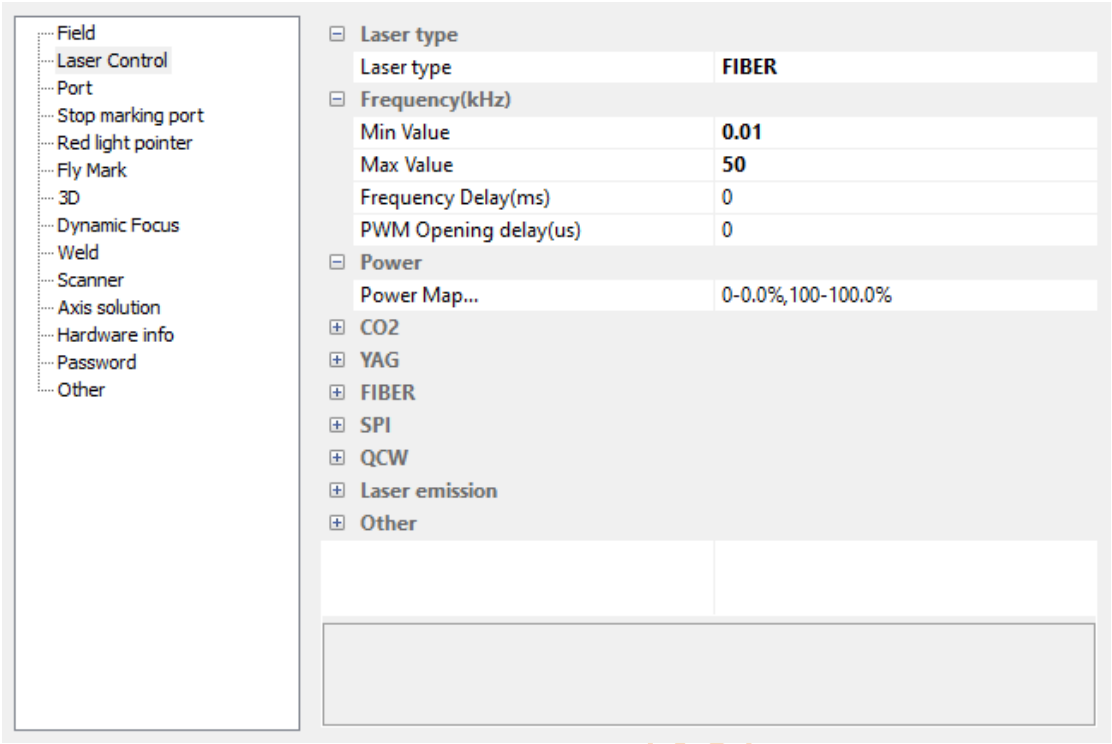
1) Min speed：The galvanometer movement allows to set the minimum speed.

2) Max speed：The galvanometer movement allows the set maximum speed.

3) Minimum linear length：The minimum linear length of the composition curve.

4) Curve scatter tolerance：The maximum chord–level error of a curve discretized into a straight line.

### 10.5.2 Laser control




**Laser type：Set different laser type**

1)Fiber：Indicates current laser type is fiber laser

2)CO2：Indicates the current laser type is CO2 laser.

3)YAG：Indicates the current laser type is YAG laser.

4)SPI：Indicates the current laser type is SPI laser.

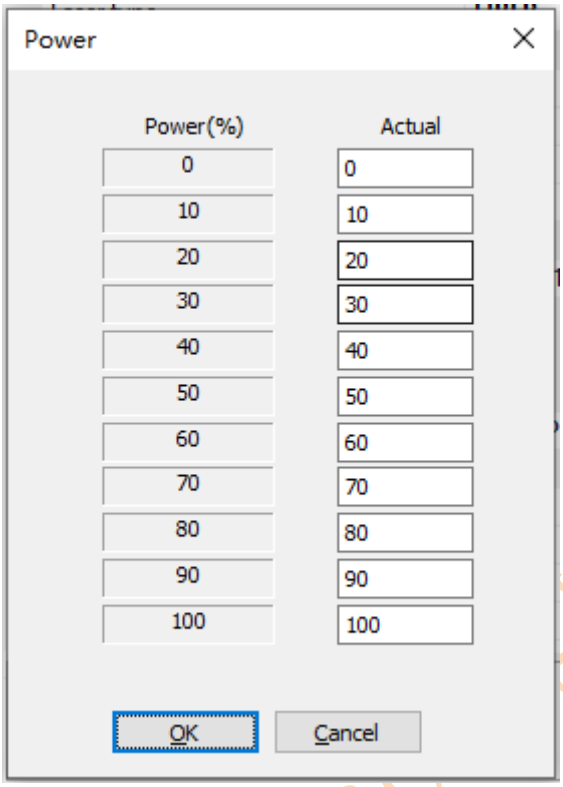
5)QCW：Indicates the current laser type is QCW laser.

**Frequency**

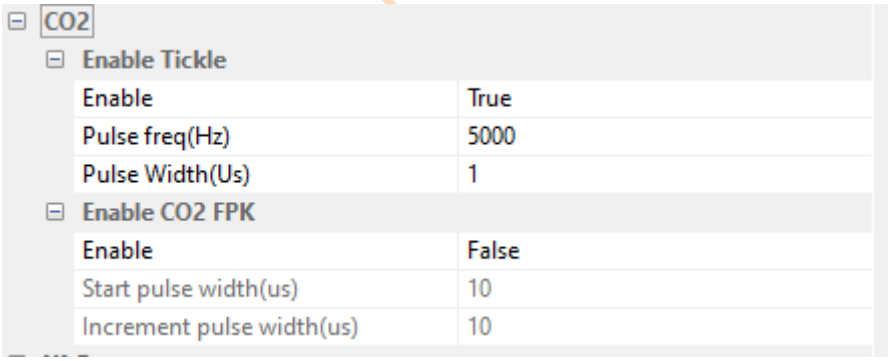
1) Min value：The laser can set the minimum frequency.
2) Max value：Laser can set the maximum frequency.
3) Frequency delay：Delay time required when the laser changes frequency.
4) PWM opening delay：Time delay of rising edge and rising edge of Gate when PWM is on.

**Power**

Power map：Set the user–defined power ratio and the actual power ratio. If the power ratio set by the user is not in the dialog box, the linear interpolation is used.




CO2：



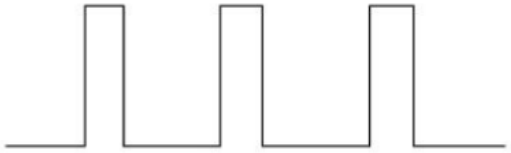

1) Enable tickle：Enables the preionization signal. Some manufacturers CO2 lasers need this signal to work properly, such as the United States SYNRAD's laser.
2) Pulse freq：Pulse frequency of preionization signal.
3) Pulse width：Pulse width of preionization signal.
4) Enable CO2 FPK: The purpose of enabling CO2 laser is to solve the phenomenon of "heavy first point" at the beginning of marking due to too strong laser power or long interval and large accumulation of laser energy.

5) Start pulse width: The duration for which the laser power is maintained at a certain value
6) Increment pulse width: Increase with a certain pulse width

**YAG：**

| YAG | |
|---|---|
| Type | PI |
| FirstPulseKiller | |
| FirstPulseKiller(US) | 40 |
| Enable Threshold 2 in FPK(US) | 1000 |
| QSwitch Open When FPK end | False |
| Enable Analog FirstPulseKiller | False |
| FPK Voltage 1(v) | 0 |
| FPK Voltage 2(v) | 5 |
| pulse width reverse | False |
| Enable current output | False |
| Current Map... | |
| Output analog | |
| Min Value(V) | 0 |
| Max Value(V) | 10 |

1) Firstpulsekiller：The duration of the first pulse suppression signal when the laser is on.
2) Enable threshold 2 in FPK: Minimum time interval of analog first pulse suppression signal output
3) Q switch open when FPK end：The Q switch is turned on when the laser is turned on and so on after the first pulse suppression signal is completed. Otherwise, the first pulse suppression signal is turned on and the Q switch is turned on.
4) Enable Analog FirstPulseKiller:
5) FPK Voltage1: Minimum voltage of analog first pulse suppression signal
6) FPK Voltage2: Maximum voltage of analog first pulse suppression signal
7) Pulse width reverse: The PWM pulse high level is changed to low level, the corresponding low level is changed to high level, and it is offset by the corresponding phase angle to meet the requirements of PWM low-level effective Q driver.



a

b

8) Enable current output：Enables the analog power signal output of the control card.
9) Current map：Set the user–defined current ratio and the actual current ratio. If the current ratio set by the user is not in the dialog box, the linear interpolation value is used.

**FIBER：**

| FIBER | |
|---|---|
| Type | IPG_YLPN_1X120(Type:E) |
| Pulse Width | |
| Enable pulse width setting | True |
| Enable the first time to open the ... | False |
| Changing pulse duration delay(... | 10 |
| Pulse width index mode | True |
| Set MO after pulse width change | False |
| Preionization | |
| Enable | True |
| Frequency(kHz) | 80 |

1) Type: Fiber laser class.
2) Enable pulse width setting：Whether the pulse width is enabled.
3) Enable the first time to open the laser delay
4) Change pulse duration delay：Delay time for the laser to change pulse width.
5) Pulse width index mode：Pulse width is represented by an index.

6) Set MO after pulse width change: Adjust MO once time after pulse width for enable laser.

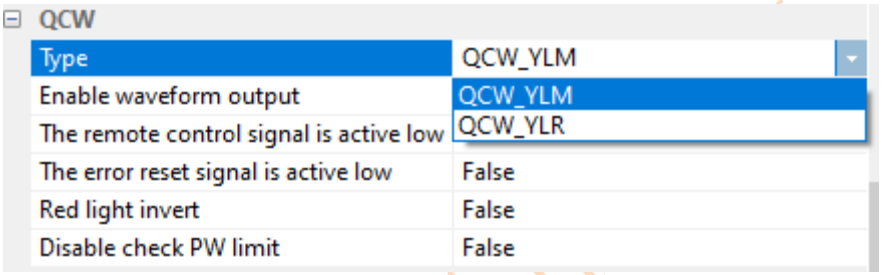
7) Preionization: Enables the preionization signal.

**SPI**


1) Simmer cur：SPI laser standby power.

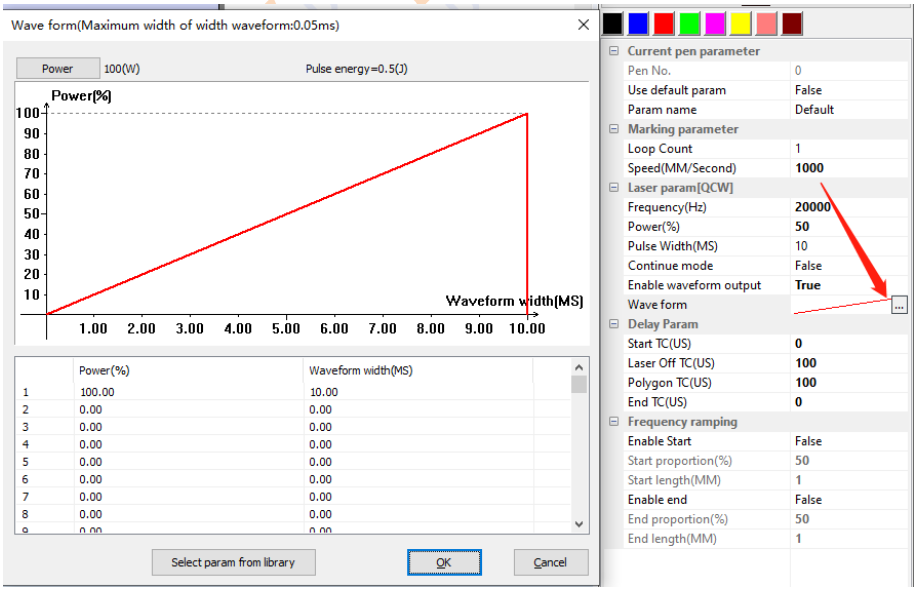
2) Change wave delay：The time from changing the waveform to the light output takes time due to the laser changing the mode.

**QCW–Enable waveform output：**

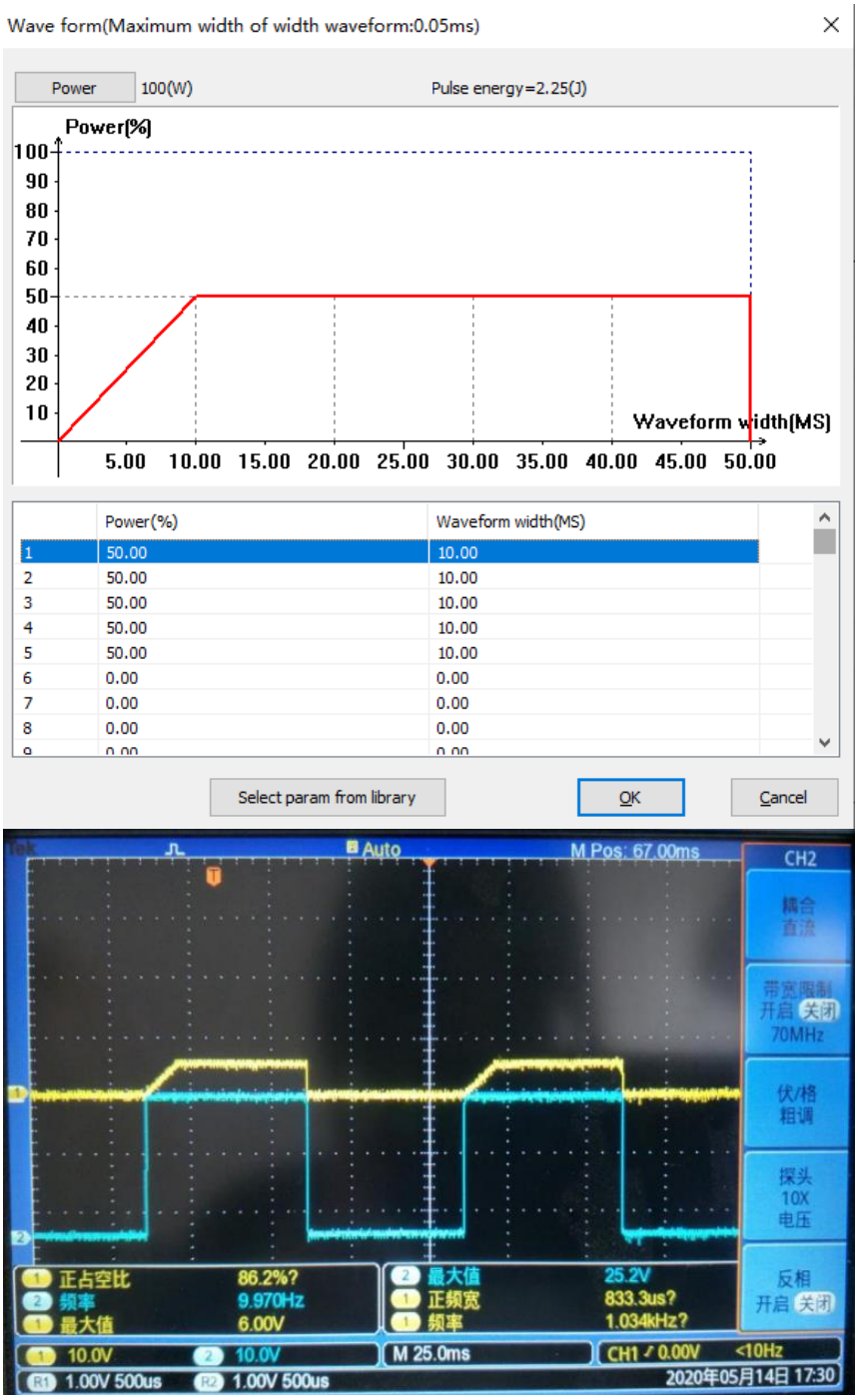



QCW_YLM/QCW_TLR: Different type of QCW laser.

1) Enable waveform output: On welding mode, could setting special wave output for welding.

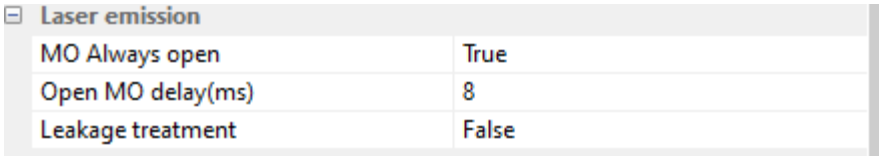



The operator could adjust own wave according welding samples,




2) The remote control signal is low level：Control signal high and low effective setting.
3) The error reset signal is active low：Yes, reset signal is low, no, reset signal is high.
4) Red light invert: Enable this option to reverse the level state of the red–light signal
5) Disable check PW limit: The limit value of pulse width is not detected on the enable

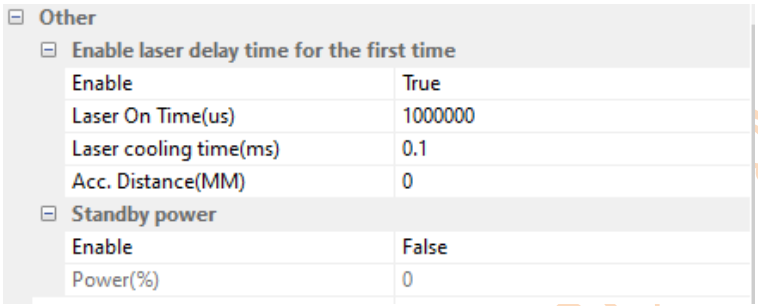
Laser emission



| Laser emission | |
|---|---|
| MO Always open | True |
| Open MO delay(ms) | 8 |
| Leakage treatment | False |

1) MO always open：After enabling, the MO signal is always on.
2) Leakage treatment：After each marking a line segment, the MO signal will be turned off and turned on the next time.
3) Open MO delay：The MO signal gives the AP signal after the delay. If the setting is too small, it may damage the laser.

Other



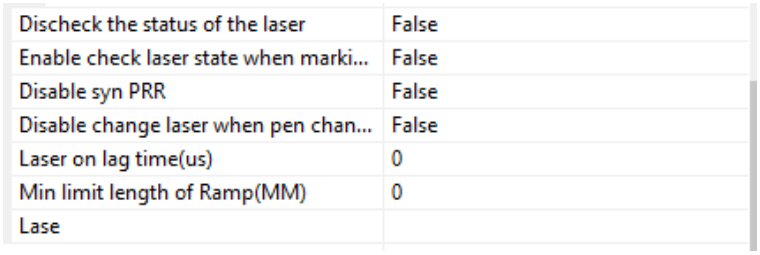
| Other | |
|---|---|
| Enable laser delay time for the first time | |
| Enable | True |
| Laser On Time(us) | 1000000 |
| Laser cooling time(ms) | 0.1 |
| Acc. Distance(MM) | 0 |
| Standby power | |
| Enable | False |
| Power(%) | 0 |

1) Enable laser delay time for the first time：Whether to enable the first time to open the laser delay time.

   Laser on time：Set the laser on delay time. When marking for the first time, the light on time = light on delay + laser on time. This delay only works for the first marking.

   Laser cooling time: Set the laser cooling time; When the light off interval of the laser is greater than the laser cooling time, the laser on time will be started, and when it is less than, the laser on time will not be started.

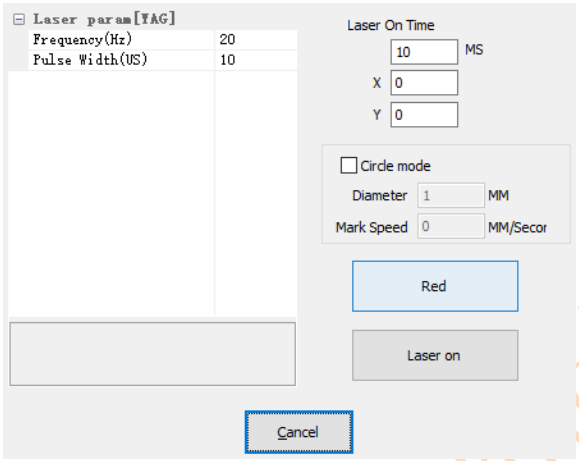
   Acc. Distance: If the galvanometer accelerates in advance and this parameter is properly set, the uneven dot at the beginning of marking can be eliminated, but it only works for the first time.
2) Standby power:



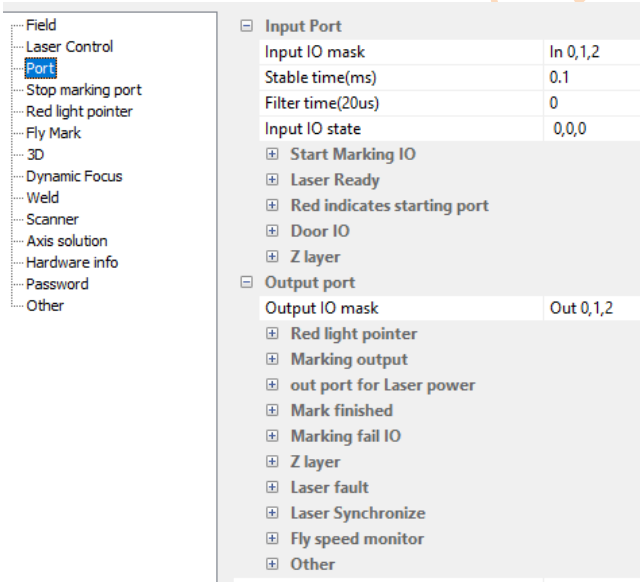
| | |
|---|---|
| Discheck the status of the laser | False |
| Enable check laser state when marki... | False |
| Disable syn PRR | False |
| Disable change laser when pen chan... | False |
| Laser on lag time(us) | 0 |
| Min limit length of Ramp(MM) | 0 |
| Lase | |

3) Discheck the status of the laser：It is forbidden to check the laser status before processing.
4) Enable check laser state when marking: The program continues check laser state on marking process.

5) Disable syn PRR: Disable PRR signal synchronization
6) Disable change laser when pen changing:
7) Laser on lag time: Delay the laser light output and wait for the synchronous response of the galvo. This parameter is used to compensate the time difference between the galvo and the laser. Generally, the galvo is about 100US slower than the laser.
8) Min limit length of Ramp:
9) Lase: Test laser, this is for check laser work state.




## 10.5.3 Port




### Input port

1) Input IO mask：Set the input port that the current software allows, and increase or change the input port that can be used.
2) Stable time：Due to interference from signals that may be received by external factors, proper settings can eliminate such as relay jitter.
3) Filter time: Filter out the interference pulse wave whose pulse width is narrower than it, and return the original appearance of the input signal. If the filter delay

setting time is too long, the useful narrow pulse input signal will be filtered out

4) Input IO state：Currently enabled input status.

**Start marking IO**

1) Port：When the system is not in the marking state, the trigger signal is given to the designated input port. When it is valid, the system will automatically start marking.
2) Active low level：Start marking port active low
3) Pulse mode：This item indicates that the software processing start signal is pulsed. Even if the input is continuous level, the software reads only one pulse. Otherwise, the processing input is a continuous level.
4) Disable lock signal: Whether the trigger signal in the marking process needs to be processed. If latch is selected, after the trigger signal appears in the marking process, after the processing of the current object is completed, then execute the waitio command to immediately start processing the next object; If no latch is selected, insert a command to clear the latch before the waitio command. After the current object processing is completed, clear the previous IO latch status and start processing after waiting for the next trigger; For example, if the customer selects the pedal input, if the pedal is triggered during processing, this option can be used to avoid this problem.

**Laser ready**：This port is output according to the laser system status. After setting this port, a "power" switch button will be displayed above the "parameters" in the software interface.

**Red indicate starting port**：When the system is not in the red indication state, if the specified input signal is valid, the output port designated by the red cursor will output a high level, turning on the red light.

**Door IO**：The safe door signal is connected to this port. When the user opens the safety door, it stops processing automatically. Only when the safety door is closed, it can be processed to protect the operator from laser burn.

**Z layer**: In deep carving or 3D printing, the port set when marking the contents of the current layer is marked with a layer when the trigger signal is received, and the extension axis Z axis needs to be enabled for use.

**Port**：Set the trigger input port.

**Output port**

1) Red light pointer：When the system gives a red indication, it will output a high level to the specified output port.

2) Marking output：When the system performs marking process, it will output high level to the specified output port.

3) Out port for laser power：This port can be used to control the laser power on and off.

4) Mark finished：When the system finishes processing, it will output signal to the specified output port.

**Z layer**

1) Port：In deep carving or 3D printing, when the current layer content is marked, the currently set port outputs the set level signal.

2) Active low level：Yes, the output signal is low; no, the output is high.

3) Pulse width：Output signal time.

4) Stop marking port：Specify an input port as the stop machining port. When the port receives a signal during machining, the current machining will be terminated and the user will be prompted with an error message.

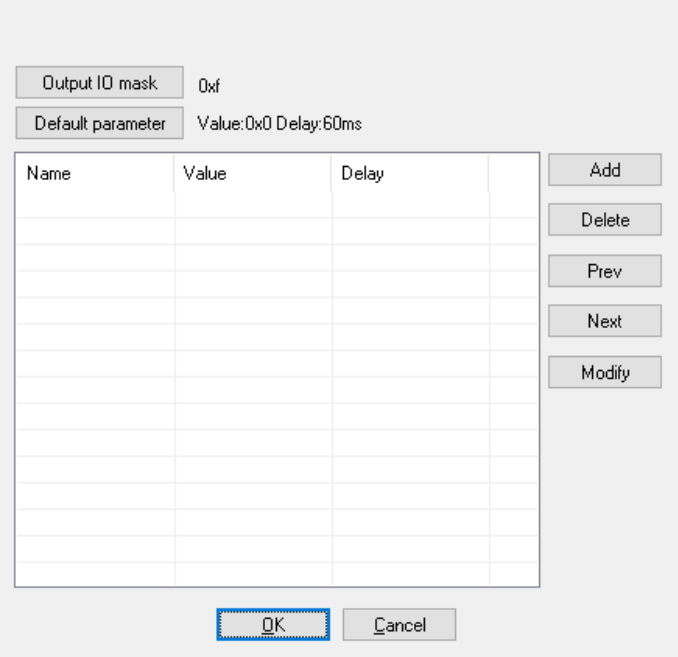
**Laser fault:** The setting port will output signal if laser not on correct state.

**Laser Synchronize:**

**Fly speed monitor:**

**Other**

1) Enable laser extend output:




2) Save output when power off:

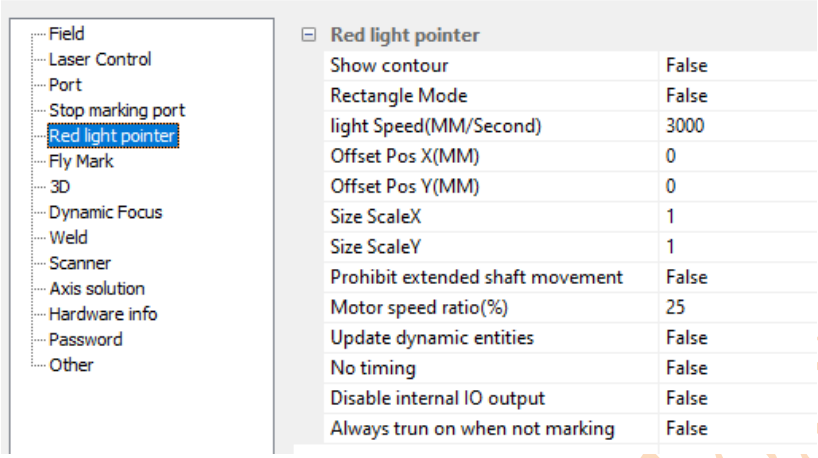
3) Not check start Inport when marking: In continuous machining mode, the function of the start input port is not checked

### 10.5.4 Stop marking port

Specify an input port as the stop machining port. When a corresponding

input is detected at the set port during machining, the current machining will be terminated and the user will be prompted with an error message.

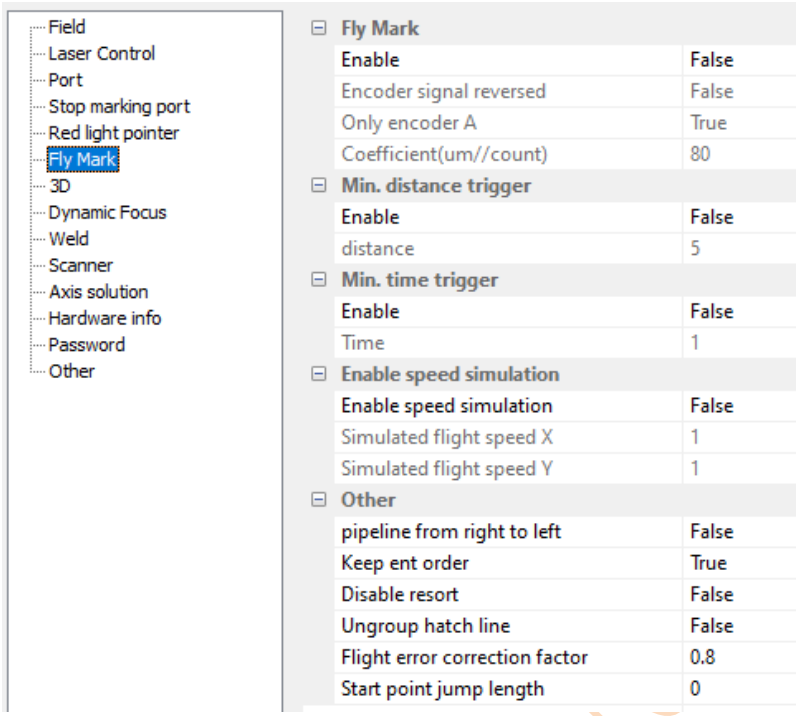
### 10.5.5 Red light pointer




1) Show contour：Show all outlines.
2) Rectangle Mode: show a rectangle of marking object.
3) Light speed: Indicates the speed of the system when indicated by red light.
4) Offset PosX: When the red light deviates from the position of the actual marking graphic in the x direction, this correction can be used.
5) Offset PosY：When the red light deviates from the position of the actual marking graphic in the y direction, this correction can be used.
6) Size scaleX：When the red light and the actual marking pattern have a dimensional deviation in the x direction, this correction can be used.
7) Size scaleY：When the red light and the actual mark line y direction size deviation can be corrected by this.
8) Prohibit extended shaft movement：The red light indicates whether the axis is moved.
9) Motor speed ratio: adjust the motor axis movement speed while use guide preview.
10) Update dynamic entities: Refresh the dynamic file while use guide preview.
11) No timing: do not refresh working time.
12) Disable internal output:
13) Always turn on when not marking: The guide beam will always on if laser not shooting.

### 10.5.6 Fly mark

**(Ezcad3 fly function for some normally fly mark, if request more powerful fly function, please contact JCZ and there have fly product)**

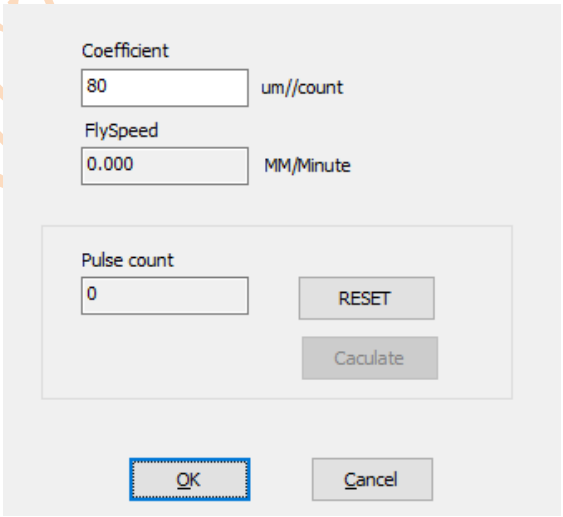



1) Enable：Enable the fly marking function.

**Encoder signal reversed:** Checked to invert the encoder output signal that the software will accept.

**Only encoder A:** The board only reads the phase A signal of the encoder and shields the phase B signal.

**Coefficient:** The value can be calculated by software. Click the "Calculate" button, the following interface appears




The pipeline moves for a certain distance, the software will automatically record the number of pulses of the encoder during this period, input the precisely measured movement of the pipeline into the input length, click OK, and the speed will be automatically calculated into the flight speed coefficient. If the measured value is not accurate, it will cause deformation of the marked object.

Flight speed coefficient = the moving distance of the encoder tachometer

wheel (that is, the moving distance of the production line) / the number of pulses of the distance encoder (automatically read by the software).

2) **Min distance trigger:** Enable this option to trigger invalid within the set unit distance
3) **Min time trigger:** Enable this option to trigger invalid within the set unit time
4) **Enable speed simulation：** It is assumed that the assembly line is always moving at a constant speed. Then, without using an encoder to monitor the assembly line in real time, an analog encoder is used to compensate for the speed of the production line to achieve dynamic marking. The characteristic of this method is that it can only work at a constant speed. Marking on the assembly line.
5) **Other**

**Pipeline from right to left：** Check to indicate that the software thinks the flow direction is from right to left.

**Keep ent order：** Check this box to indicate that the software will mark the contents of the workspace one by one in the order of the object list. The position of the marking position is the same as the drawing position, and the relative position between multiple objects can be guaranteed to be the same as the drawing position.

**Ungroup hatch line:** Before this option is enabled, only one object will be filled. After enabling to break up, each filled line is an object.

**Flight error correction factor：** The proportion of the current acquisition period and the previous period of the acquisition encoder coefficient

**Start point jump length:**

### 10.5.7 3D

Enable：Whether to enable 3D mode.

### 10.5.8 Dynamic focus

| Dynamic Focus | |
|---|---|
| Enable | False |
| Speed field | |
| Enable | False |
| Ratio | 1 |
| Power field | |
| Enable | False |
| Ratio | 1 |
| Distribution mode | Primary |
| Resolution ratio | 0.1 |

Enable：Whether to enable dynamic focus mode

Dynamic focusing can achieve large-format marking, and energy loss may occur at the edge of the format. In order to avoid energy loss and improve the

marking effect, the functions of enabling energy field and enabling speed field are added.

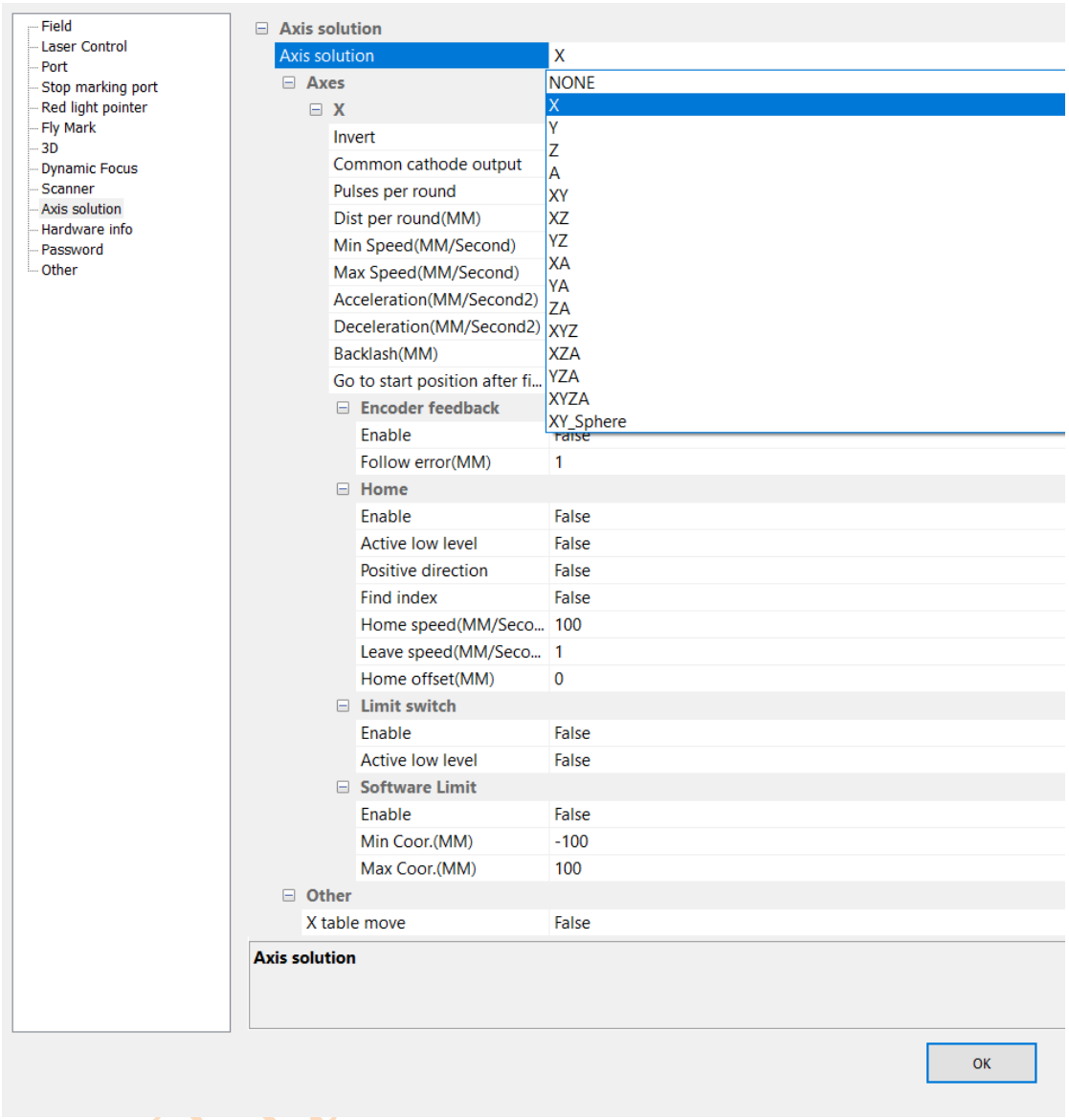
**Speed field:** Change the ratio of the marking speed between the edge of the graphic and the center of the graphic when marking. That is, the ratio = the marking speed at the edge of the graphic/the marking speed at the center of the graphic. The ratio adjustment range of the enable speed field is between 0.01–5.

**Power field:** Change the ratio of the energy between the edge of the graphic and the center of the graphic when marking. That is, the ratio = the marking energy at the edge of the graphic/the marking energy at the center of the graphic. The adjustment range of the ratio of the enable energy field is between 0.01–5.

**Distribution mode:** In the 'CalibrationWizard' calibration software, after selecting the dynamic focus XY calibration, the XY zone Z value calibration will appear in a curve mode. The curve mode will automatically generate a calibration curve based on the 9–point calibration value entered by the user in the 9–point Z–axis calibration. Changing the curve distribution mode can select the automatically generated curve to generate the curve in the mode of primary distribution, secondary distribution, and cubic distribution.

**Resolution ratio:** That is, the accuracy ratio of the distribution curve generated by the curve mode. Adjust the accuracy of the distribution curve by adjusting the subdivision accuracy ratio. Subdivision accuracy ratio 0–1.

### 10.5.9 Axis solution

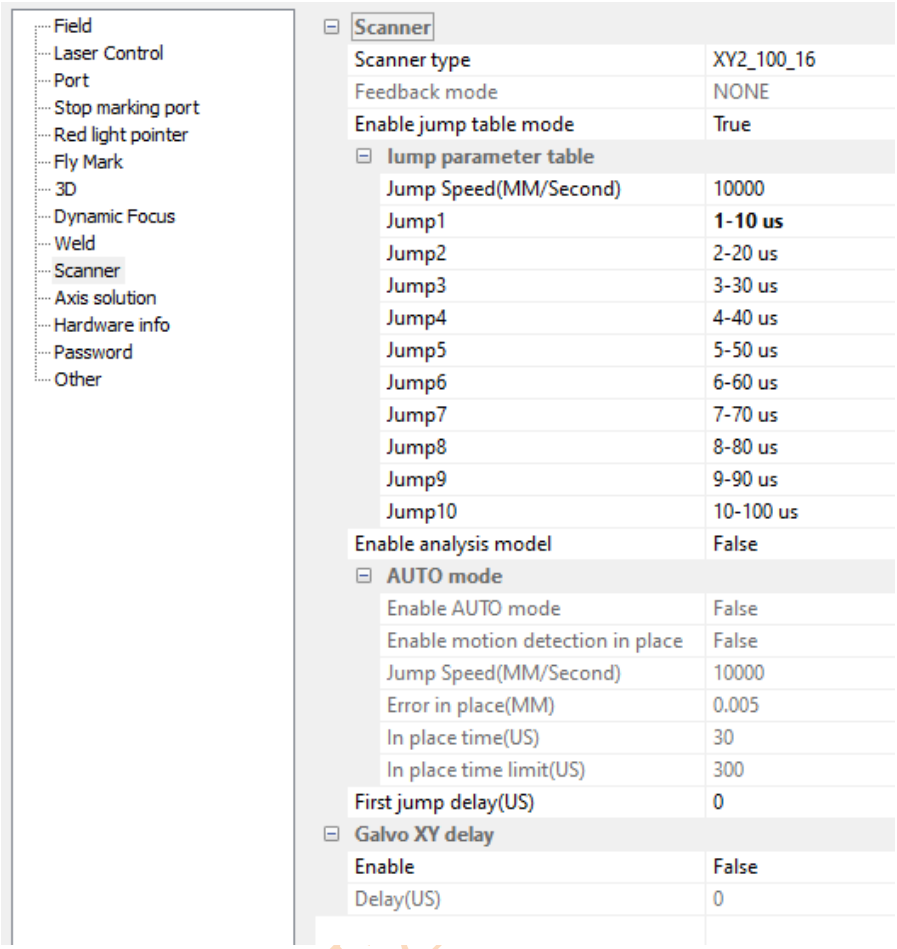



The diagram shows the selection of the expansion axis program. The corresponding axis control is selected. The axis control can be parameterized, such as the number of pulses per revolution and distance, speed and acceleration, zero point, limit switches, etc.

The more details for axis control, please check axis operation manual.

### 10.5.10 Scanner

Scanner type：Currently supports 16–bit, 18–bit XY2–100, and NEWSON 18–bit and NEWSON 20–bit.

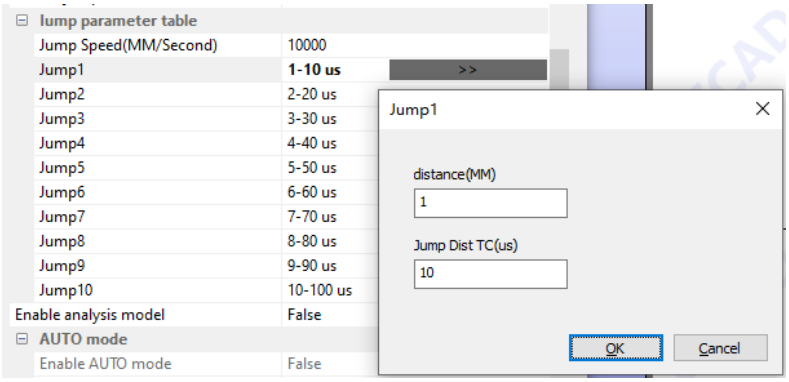



Enable jump table mode:

Enable jump parameter table mode: whether the jump parameter table mode can be used. After enabling the jump parameter table mode, the jump parameters in the pen parameters will no longer work, and the jump parameters in the pen box will be hidden automatically. Jump speed: set the empty pen moving speed of the galvanometer in the same way as the jump speed setting in the pen parameters. There are 10 groups of jump parameters in the jump parameter table, and the jump delay corresponding to 10 different jump lengths can be set.

**Distance**: refers to the jump length. In actual marking, the jump delay corresponding to this distance will be used if the jump length is less than or equal to this value.

**Jump distance delay**: set the jump distance delay.




AUTO mode: Reserved.

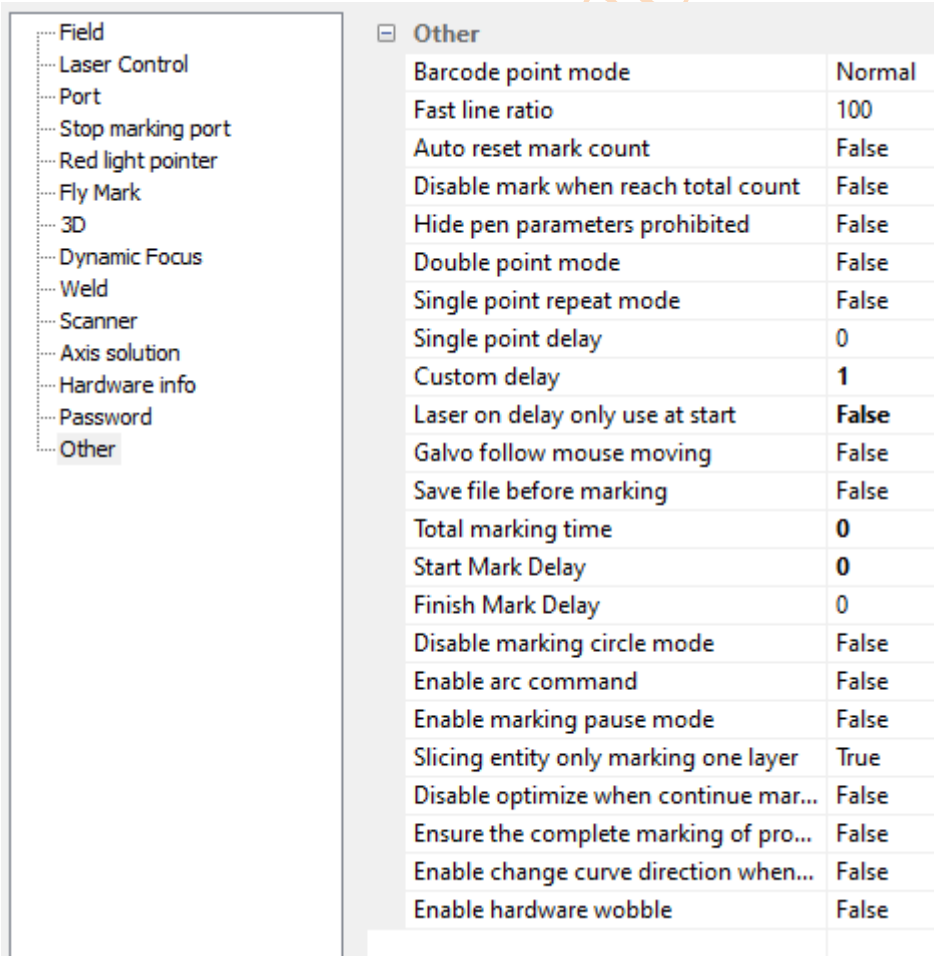
### 10.5.11 Hardware info

Hardware information includes board type, version number, function code and other information.

### 10.5.12 Password

F3 parameter password

### 10.5.13 Other




1) Barcode point mode:

Fast mode: The dot matrix QR code drawn can enable fast dot mode,

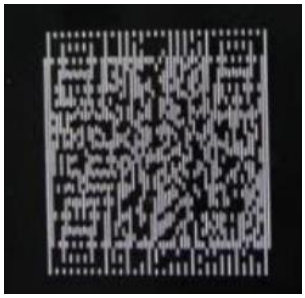
improve processing efficiency, and can be used in conjunction with flight.

The fast point mode controls the marking time by adjusting the frequency and jump speed, which can be adjusted according to the demand and effect. Adjust the laser lag command time: (left figure) when the single sequence (from left to right) and double sequence in the figure are misaligned greatly, the effect of (middle figure) can be achieved by adjusting this parameter. In F3 parameter – laser control – adjust the laser lag command time. Adjust acceleration distance: if the dimension of QR code in Y direction is incorrect, it can be adjusted by adjusting this parameter. Adjust bi–directional offset: (middle figure) the double number sequence in the figure exceeds the single number sequence and is higher than the single number sequence. At this time, the bi–directional offset distance should be increased. After adjusting the bi–directional offset distance for many times, the finally adjusted two–dimensional code is shown in (right figure).

Fast line: The dot matrix two–dimensional code drawn can enable rapid line drawing mode, improve processing efficiency, and can be used in conjunction with flight.

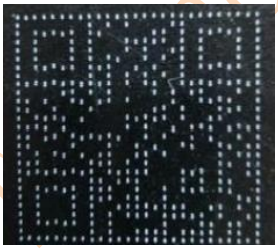
Fast line mode controls the marking time by adjusting the speed and jump speed, which can be adjusted according to the demand and effect. Adjust the laser lag command time: (left figure) when the single sequence (from left to right) and double sequence in the figure are misaligned greatly, the effect (right figure) can be achieved by adjusting this parameter. In F3 parameter – laser control – adjust the laser lag command time. Adjust acceleration distance: if the dimension of QR code in Y direction is incorrect, it can be adjusted by adjusting this parameter. Adjust bi–directional offset: (left figure) in the figure, the double number sequence exceeds the single number sequence and is higher than the single number

sequence. At this time, the bi–directional offset distance should be increased. After adjusting the bi–directional offset distance for many times, the finally adjusted two–dimensional code is shown in (right figure).



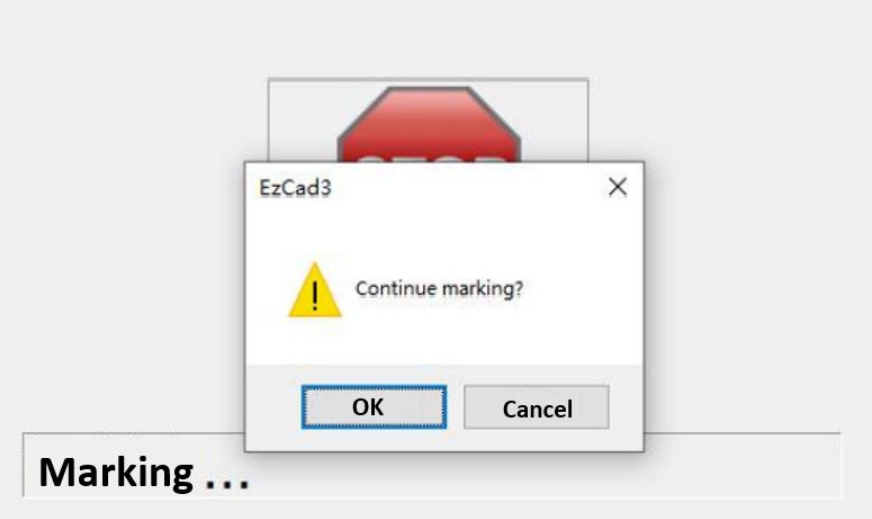
Step mode: For small character fast marking.

Step mode controls the marking effect by adjusting the frequency and dot time. These two parameters need to be matched to make. The adjustment parameters of this mode are the same as above, which are the effect of aligning the QR code by adjusting the laser lag command time, acceleration distance and bidirectional offset



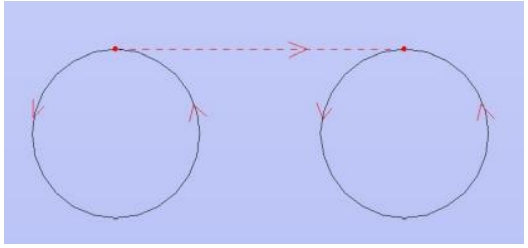
2) Fast line ratio: Used in conjunction with fast wire bonding, the effect of changing the ratio is different, and it is used to control the length of the line.
3) Auto reset mark count: Reset after processing to a specified number of times.
4) Disable mark when reach total count: After processing to the specified number, stop processing.
5) Hide pen parameters prohibited: The hidden pen parameters do not take effect.
6) Double point mode: Because the laser power is not large, the energy of a single point is relatively small, in the fast dotting mode, enable this mode can mark twice.
7) Single point repeat mode:
8) Single point delay:
9) Custom delay: Reserve.
10) Laser on delay only use at start: Delay only works at the beginning
11) Galvo follow mouse moving: When the drawn processing object is a point, the galvanometer position will follow the mouse movement in real time
12) Save file before marking: Automatically save files after power failure.
13) Total marking time: Total time required for processing.

14) Start mark delay: Waiting time before starting marking.
15) Finish mark delay: Waiting time before ending marking
16) Disable marking circle mode: The software will mark the circle with countless small line segments, and it will prohibit marking the circle with the selected center and radius
17) Enable arc command: If this function is enabled, the arc will not be converted to linear processing.
18) Enable marking pause mode: After ticking, click ESC during processing, the marking will stop emitting light and prompt whether to continue, click OK to continue processing from where it stopped, and click Cancel to exit processing.

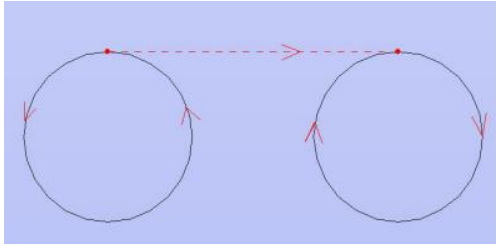



19) Slicing entity only marking one layer: Only one layer of sliced object is processed each time.
20) Disable optimize when continue mark mode:
21) Ensure the complete marking of products: This option guarantees that the entire product must be marked to stop. Pressing esc should stop when the current product is marked.
22) Enable change curve direction when marking: Path optimization for closed curves.

a, False



b, True



23) Enable hardware wobble: The galvanometer is jittered on the board hardware.