SeaCAD5.0

User's Manual

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1. Introduction

1.1. SeaCAD5.0 Brief Introduction

1.1.1. Software Brief Introduction

The SeaCAD5.0 software supports Unicode and can run in several operating systems of the Microsoft Windows series, including Windows XP, Windows VISTA, Windows 2003 and Windows 7. All the following descriptions in this manual are applicable to the currently predominant Microsoft Windows 7 operating system by default.

SeaCAD 5.0 software is an upgraded version of SeaCAD 3.0, which expands the support for multi-document marking, and multi-type lasers; it also provides version compatibility support for the storage of graphic files, now Graphics files of 5.0 and above can be read and written by any version of the above 5.0 program.

SeaCAD5.0 is installed in a green way: extract the installation package into any directory in the hard disk, and then double click the SeaCAD.exe under the directory to run the software. .See the following figure.

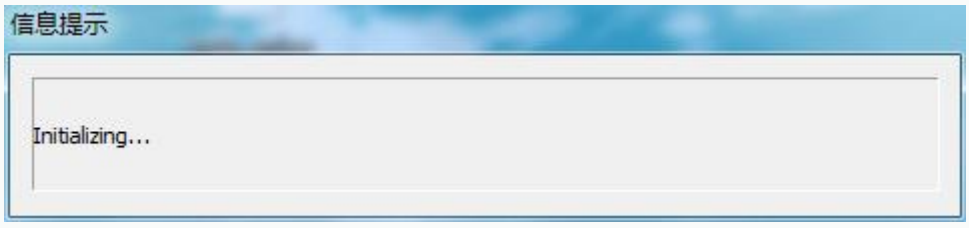


Fig.1-1 Software Initial

SeaCAD5.0 has no any special requirement on the computer hardware and the computer system able to run the operating system smoothly will provide the computer hardware environment required by this software.

1.1.2. Software Function

Main functions of this software:

- User can Design their graphics freely .
- Supports multiple document editing, multiple documents, multiple cards, and multiple laser types marking simultaneously.

- Supporting all the fiber lasers, CO^2 lasers and end-pumped lasers in the market. The parameters, such as the electric current, impulse frequency and duty ratio, can be set and adjusted through the software according to different laser types.
- Supporting the single red light marking pointer.
- Providing the software access control to prevent the parameters from being modified at random.
- Providing powerful IO control function: enabling your machine to easily realize automatic control through the port control.
- Provides manual correction, equal proportion correction, and fitting correction methods to obtain extremely accurate marking results.
- Providing the expansion axis function: supporting the expansion axis to rotate according to the angle, such as rotary marking and bi-axial figure marking.
- Supporting the mark on the fly: suitable for the continuous marking.
- Supporting the rotary marking: setting the rotation angle of the rotary axis between the marking operations, and suitable for the marking on the cylindrical work piece surface.
- Supporting the hatching operation: providing rectilinear hatch and round hatch at any angle and in a crossed manner, with the adjustable margin, border, space, etc.; supporting the hatching combination of three layers at most, with parameters of each layer set independently.
- Providing the variable text function: fixed text, serial number, data code, time, TCP/IP communication, serial communication, SQL database, etc.
- Supporting the image marking.
- Supporting 256-layer marking parameters: supporting the parameters of each layer to be set randomly to easily realize multi-parameter marking.
- Supporting image files such as PLT, DXF, BMP, JPG and JPEG.
- Supporting the common 1D/2D barcodes, such as Code39, EAN, PDF417 and DATAMATRIX.
- Providing the text input function and supporting various types of fonts, such as True Type, Jsf, barcode font and fonts added by the user (such as Dot Matrix Font).
- Supporting the dynamic file marking. When the text and graphs are marked, the filename is fixed, but the file content will be changed.
- Providing powerful editing function: supporting the arc arrangement of

characters, random graph drawing/editing, uncombining/combining, grouping/ungrouping, undoing/redoing, plastic, etc.

- Providing the simulation function: the graph marking tracks can be previewed before marking operation.

- Supporting secondary development: providing the SDK secondary development library, supporting the user to customize the development, expanding the functions of the existing marking system and meeting the user's requirements in special applications.

1.1.3. Interface Introduction

- Starting initial interface

The interface (Fig. 1-2) appears when the program runs, and meanwhile the initial operations take place in the background.

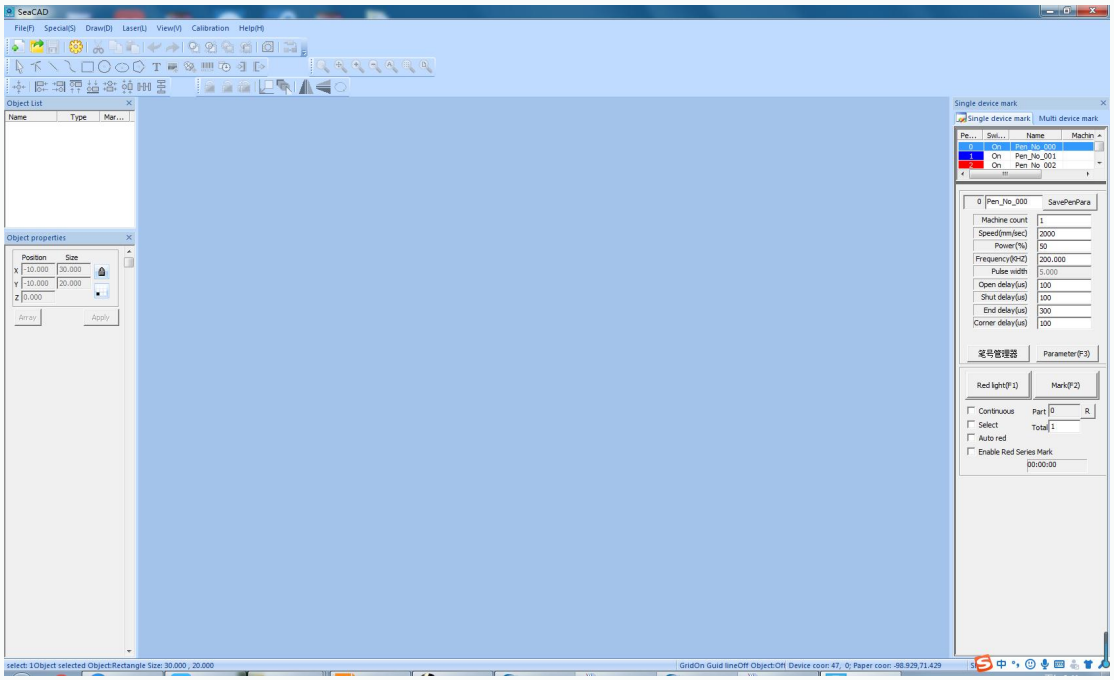


Fig.1-2 Program Starting Interface

- Main interface

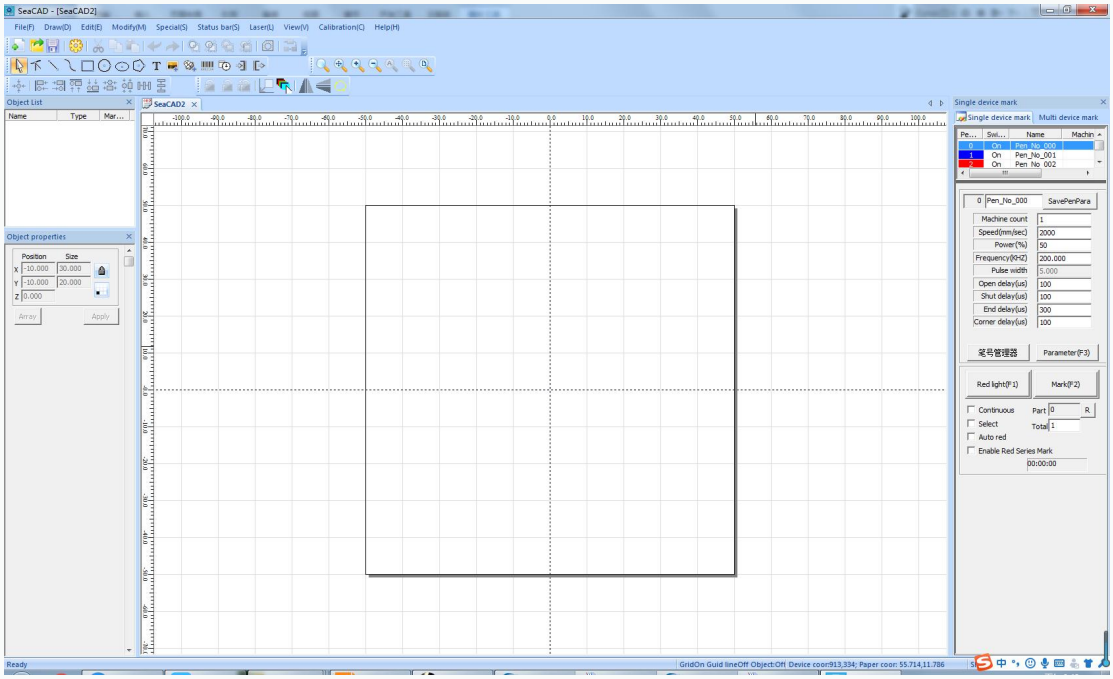


Fig.1-3 Main Program Interface

1.2. About SeaCAD3.0 User's Manual

1.2.1. Contents Arrangement

This manual will introduce the usage of SeaCAD5.0 according to the order of the menu bar in the main interface, including five main menus: File, Edit, Draw, Modify and View,Speical,Maeking,Laser,Scanhead Calibration,Help。

1.2.2. Announcement

● Other products and company names involved in this manual may be the trademark of the corresponding owner.

● Other product and company names mentioned herein may be the trademarks of their respective owners.

1.3. Instructions of Software Installation

This software is green software and can run immediately after extracted.

When the software starts and the reminder of "xxxx.dlll cannot be found" appears, carry out vcredist_x86_2010.exe to install the system patch.

2. File Menu

The File Menu is used for common file operations, such as "New", "Open" and "Save", as well as functions like system parameter setting and common graph library maintenance. See Fig. 2-1.

Fig. 2-1 "File" Menu

2.1.New(N)

"New" is used for creating a blank workspace to construct objects, and its shortcut key is "Ctrl+ N".

The icon of "New" in the Toolbar is . Clicking on this icon will achieve the same operation.

If you move the mouse cursor onto the icon mentioned above and keep it for a while, a piece of prompt information (Tool-tip) will appear, which briefly explains the function of this icon, and there will also be some detailed explanations appearing in the Status Bar in the bottom of the main window. And if you move the mouse cursor onto "New" in File Menu, only the detailed explanations will show in the Status Barr, but the prompt information will not.

[Reminder: in the SeaCAD3.0 software, each icon in the Toolbar has a function

of showing brief prompt information and the Status Bar has a function of displaying detailed explanations. Also, each icon has a corresponding menu item, and both the two ways carry out the same function. The User's Manual will not mention it again in the following chapters.]

2.2.Open(O)

"Open" is used for loading a saved "..orz" file, and its shortcut key is "Ctrl + O". When you click "Open", the software will pop an open-file dialog box (Fig. 2-2) to ask you select the file you want to open. See fig 2-2.

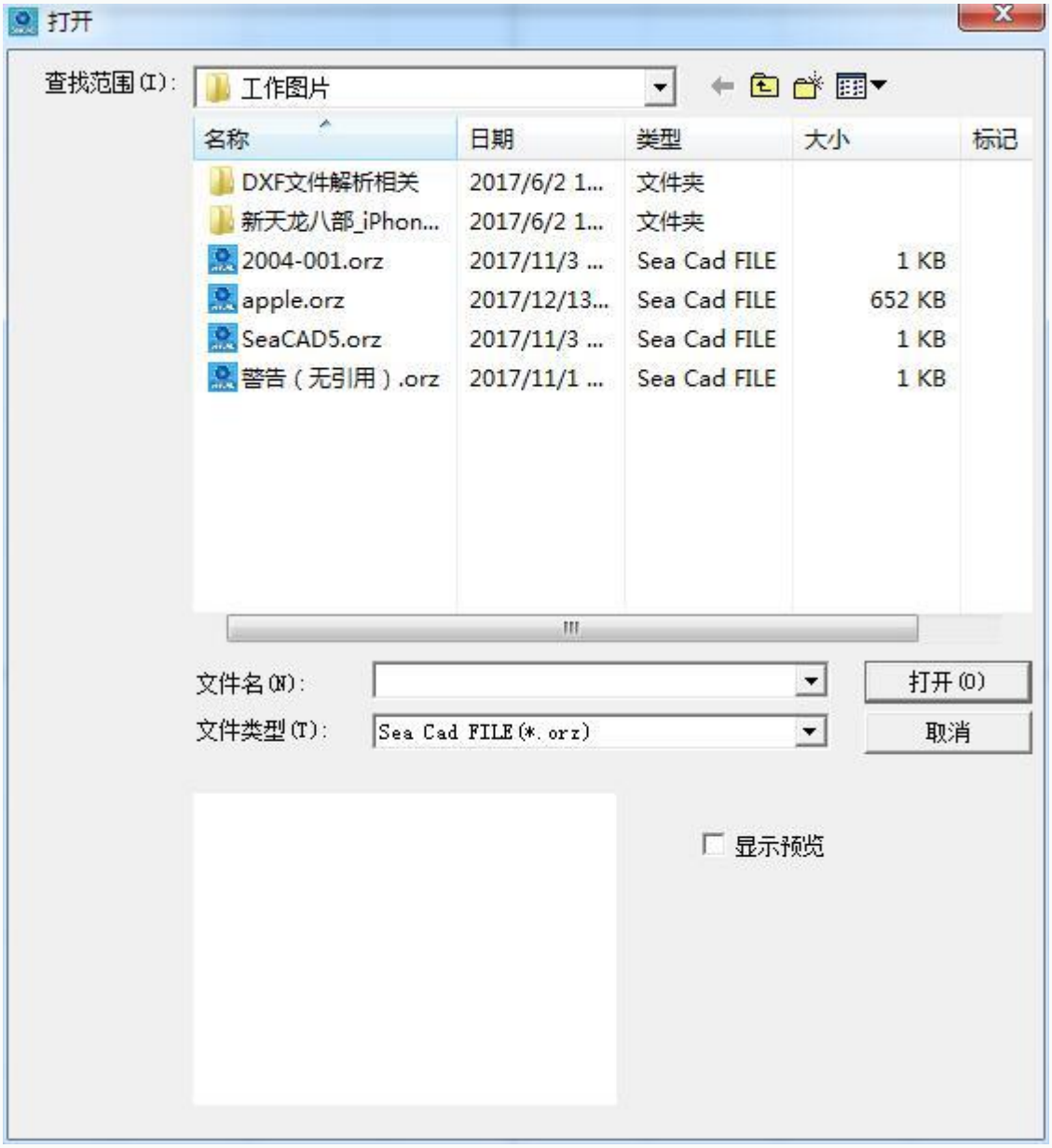


Fig. 2-2 "Open" Dialog Box

The icon of "Open" in the Toolbar is .

2.3.Save(S)Save As(A)

"Save" is used for saving the current state of a mark Document to disk. "Save As" is used for writing the current mark Document to disk by another name. The file can be saved in either of these two ways.

If the current Document has already been named, "Save" is selected to save it under the name that was used for opening the file, or the software will prompt the user to choose a destination path and type a name. Whether the current file is named or not, the "Save As" dialog box (Fig. 2-3) will appear to ask for a new name to save the file, and the previous file will not be overwritten.

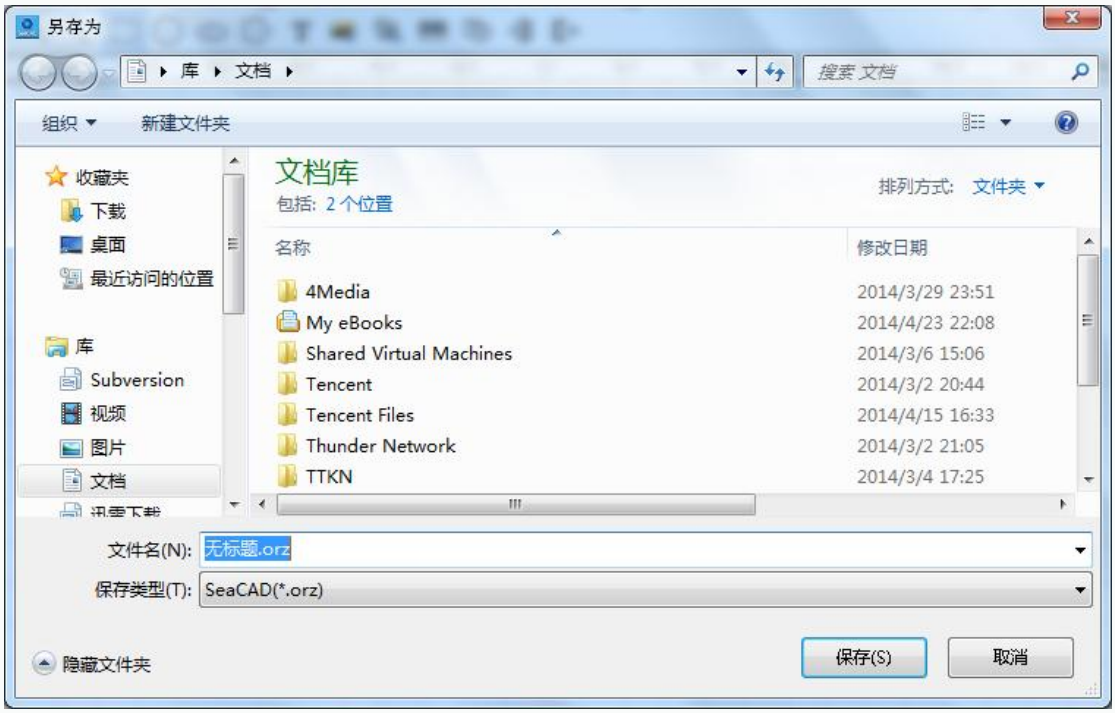


Fig. 2-3 "Save As" Dialog Box

The icon of "Save" in the Toolbar is 。

2.4.Print

Print is used to print current image and its shortcut key is "Ctrl+ N".

2.5.Scan Image(m)

'Obtain Scan Image' is used to get images from specific external devices.

Selecting this command will bring up the dialog box shown in Figure 2-4. Requires the selection of an external device (the listed devices are legitimate drivers already installed on your computer). When an external device is selected, the corresponding device image processing dialog box appears. You can select the corresponding image input. (The dialog box varies depending on the device. Please refer to the corresponding device operating instructions.)

Fig.2-4 Scan Image

2.6.System Parameter(P)

"System Parameter" configures the software. When it is selected, a dialog box as shown in Fig. 2-4 will appear, and you can set the unit the software uses, the color displayed, the work space's parameter, user manager and other parameters.

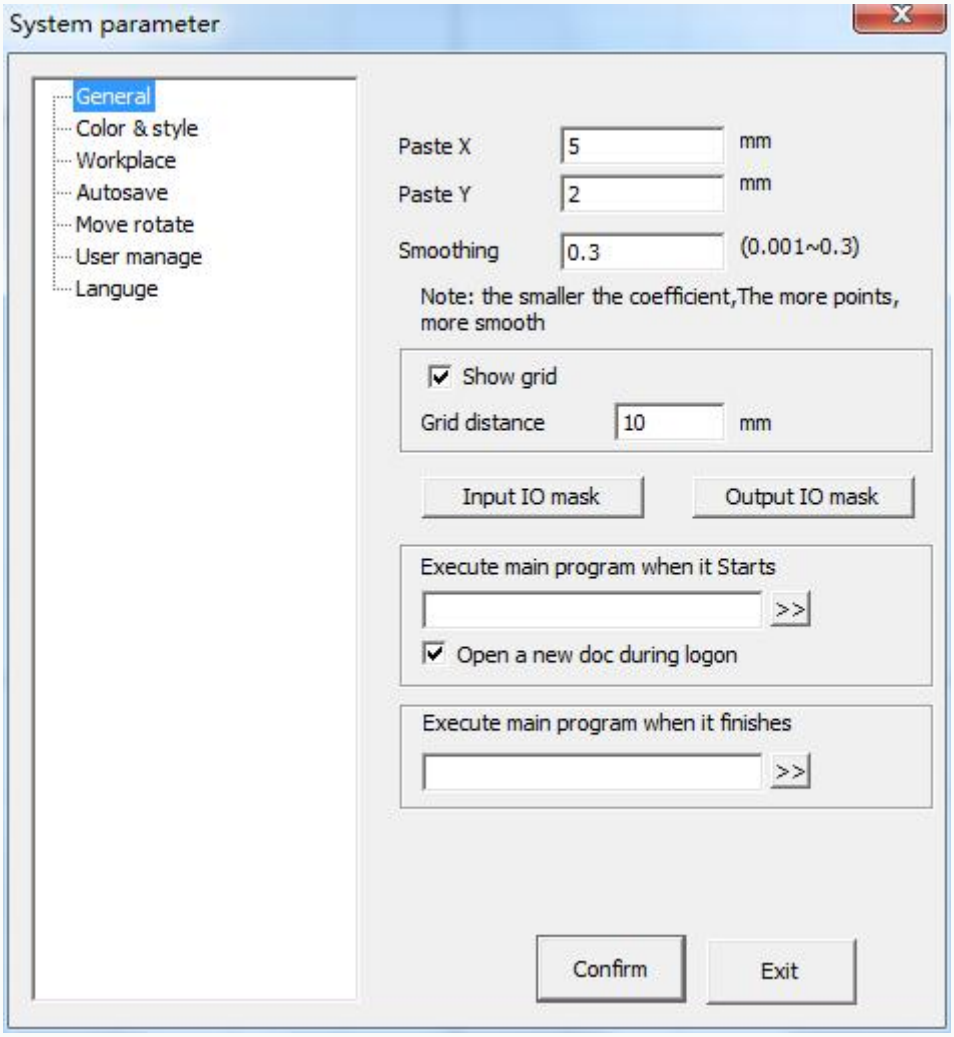


Fig. 2-5 "System Parameter" Window

The icon of "System Parameter" in the Toolbar is .

2.6.1.General

In "General", common parameters can be configured.

"Paste X" and "Paste Y": refer to the new object's offsets with respect to previous one (pasted object) when the Copy/Paste function is used, as shown in Fig. 2-6:

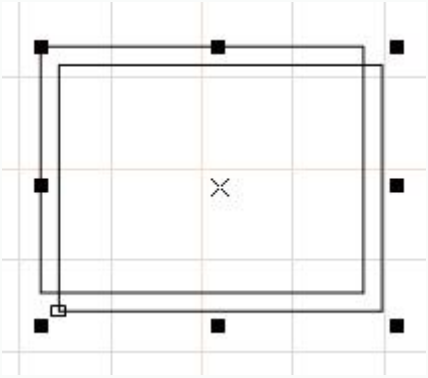


Fig. 2-6 Original Graph and Copied and Pasted Graph

"Smoothing Parameter": controls the smoothness of the vector diagram generated by the software.

"Grid": shows or hides the grid.

"Grid Space": adjusts the distance in grid.

"Execute when SeaCAD Starts"/"Execute when SeaCAD Finish": start the executable programs provided by the third party to realize some relevant operations.

Open a new file when SeaCAD Starts ：a new file named "SeaCAD1" is automatically created after the software is opened.

"Input IO Mask": sets the input port supported by the current software.

"Output IO Mask": sets the output port supported by the current software.

2.6.2.Color

"Color" is used for setting the color of background, workspace, guide line and grid, etc. Double clicking the color stripe could change the corresponding color. See Fig. 2-7.

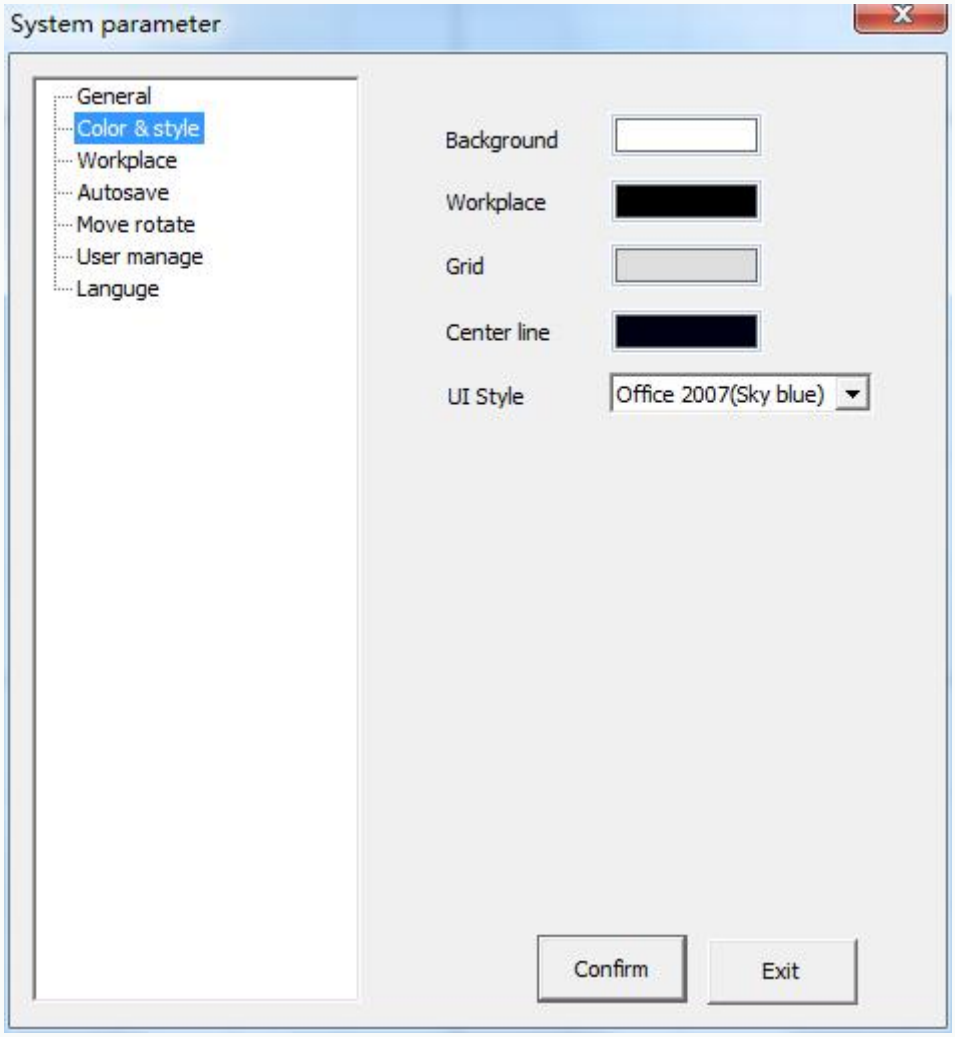


Fig. 2-7 Color Setting

2.6.3.Workspace

"Workspace" is used for setting various parameters in the operating area, enabling the user to customize them based on his habits. See Fig. 2-8.

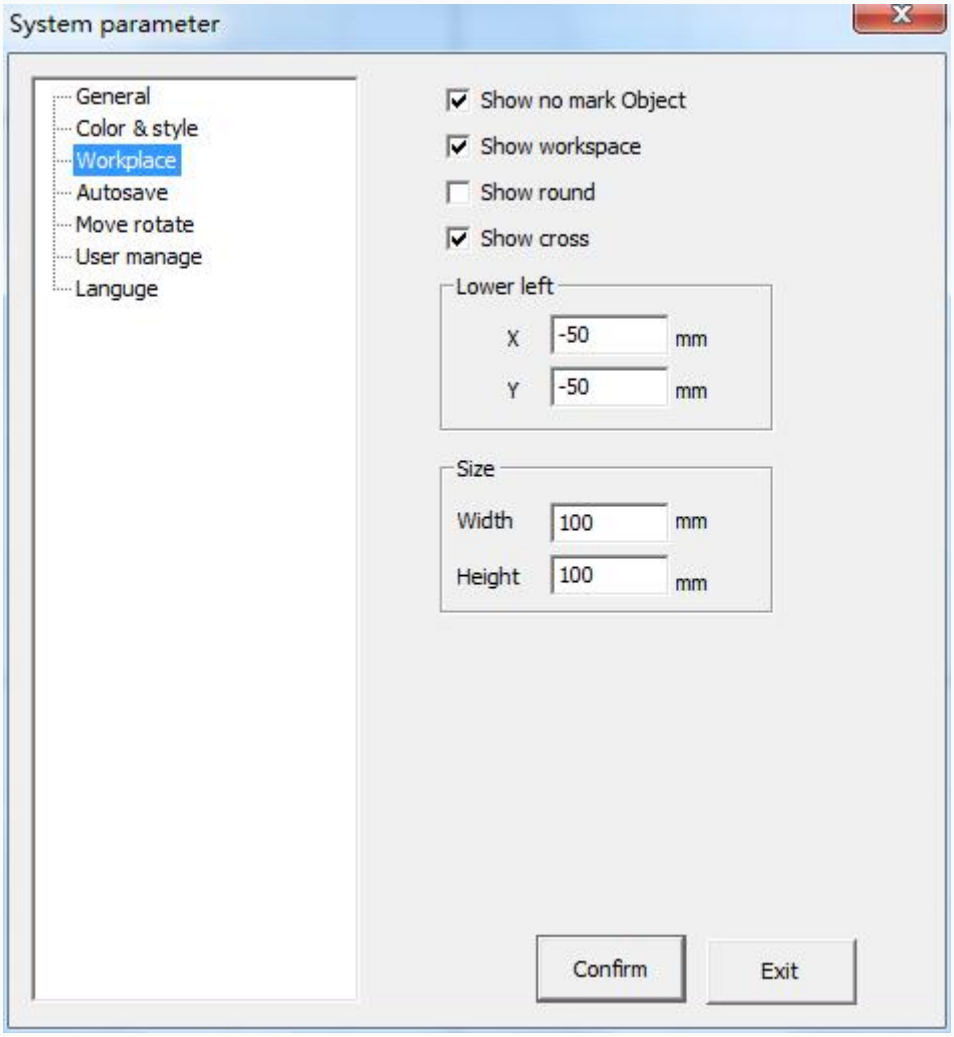


Fig. 2-8 Workspace Setting

2.6.4.Auto Save

"Auto Save" is used for setting the interval time between two automatic saves, so as to efficiently prevent missing file in case of any emergency (such as power failure or dead halt). According to the set interval time, the current data is saved in the file named "autosave.orz' in SeaCad's directory. See Fig. 2-9.

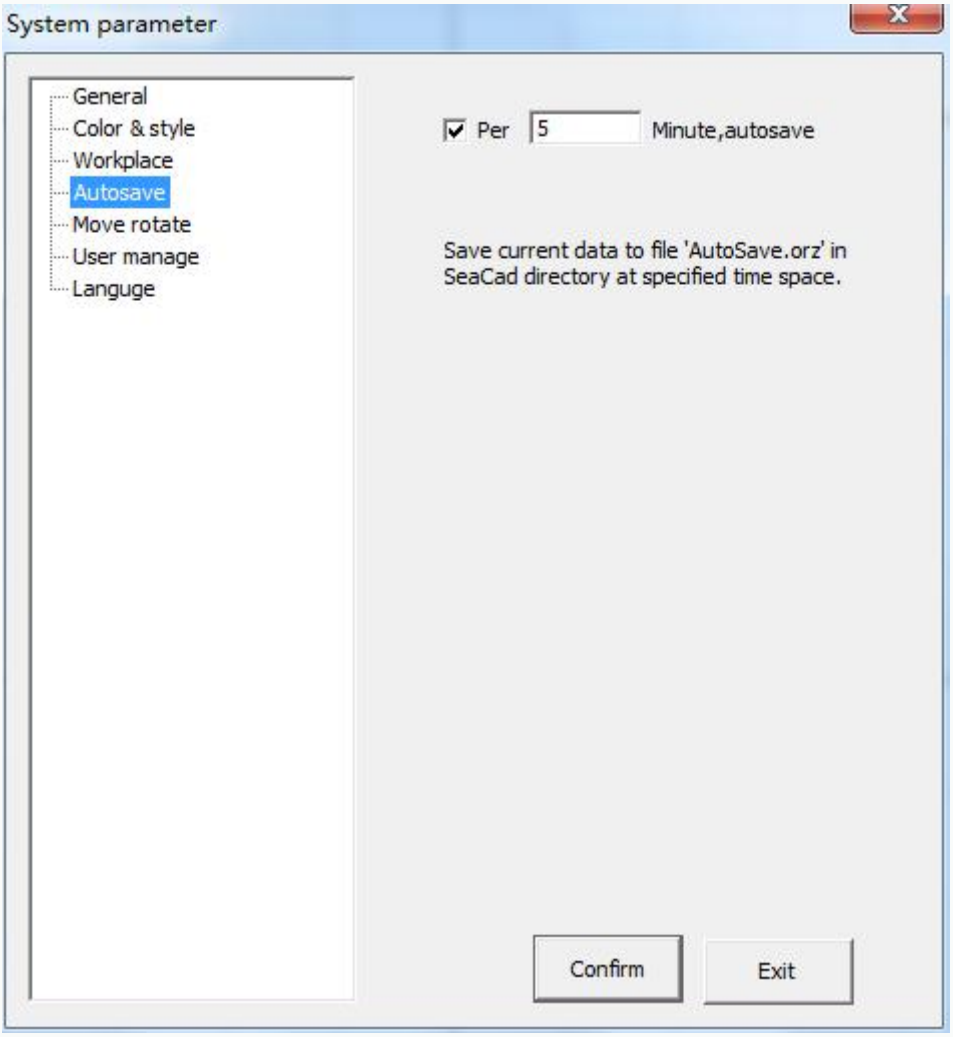


Fig. 2-8 Auto Save Setting

2.6.5.Move-Rotate

Nudge Distance： refers to the distance that the selected object moves each time when the direction key is pressed, if the direction keys of the keyboard are used for moving the graphs.

Big Nudge Scale: If the distance to be adjusted is long, synchronously pressing direction keys and "shift" key will enable the selected object to move for a distance of **Nudge Distance*Big Nudge Scale**.

Rotate Angle: refers to the angle the object rotates each time when direction keys and "ctrl" key are pressed together.

Object's Origin: determines which point of the object should be put on the origin when the "Put to Origin" function is used. SeaCAD 3.0 divides each graph into 9 position points (0-8). "Object's Origin" can be set by positioning the graph accurately at the user's will. Fig. 2-9 shows the origin setting based on Position 1. After the graph is drawn in the workspace of the software, click (Put to center) button:

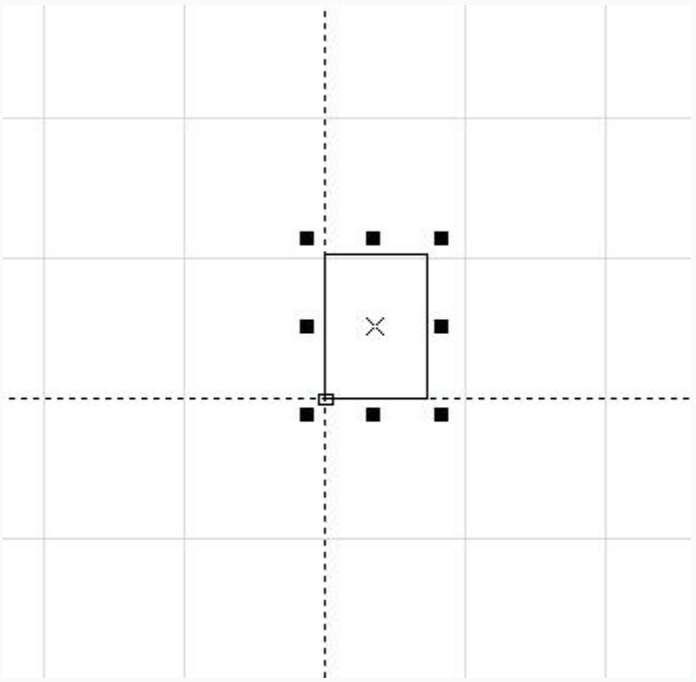


Fig. 2-9 Example of "Put to Origin"

2.6.6 User Manager

It is used for setting whether the user password shall be input to use the current software, as shown in Fig. 2-11.

When "Enter the Password before Using" is selected, the system is configured with only one administrator and one designer by default, but the user can add operators.

The administrator can use all functions of the software.

The designer can use all functions of the software, excluding modifying the user information and system parameters.

The Draftsman can draw files, set marking parameters, but cannot set the user information, system parameters and marking files.

The operator only can open the completed document to perform marking, but

cannot modify or save the document, or modify the system parameter, which can prevent the operator from changing the system parameters by mistake to cause abnormal work of the equipment.

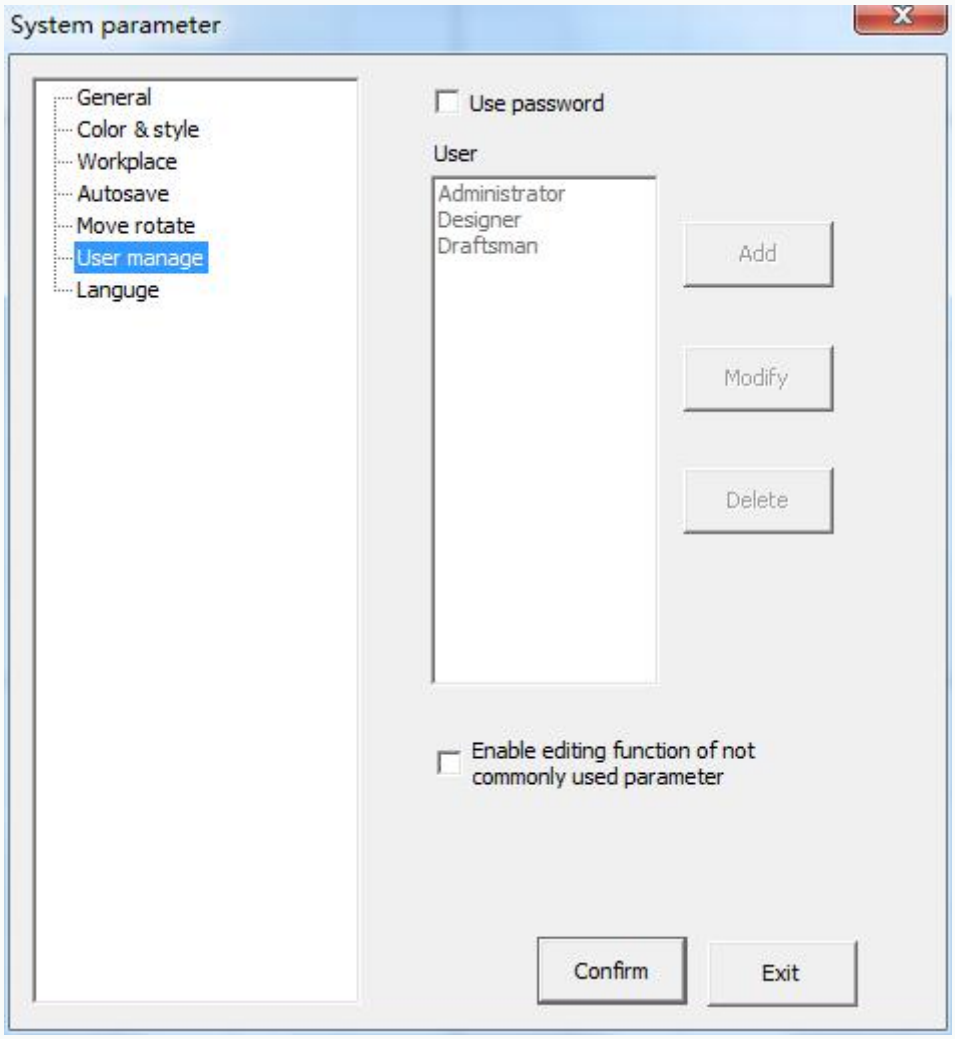


Fig. 2-10 User Manager

- Infrequent use parameter editing enable：When this item is not checked, the infrequently used parameter items in the main interface-Marking parameter -advanced options are grayed out and cannot be edited, as shown in Figure 2-12. Check this item r to enable editing.

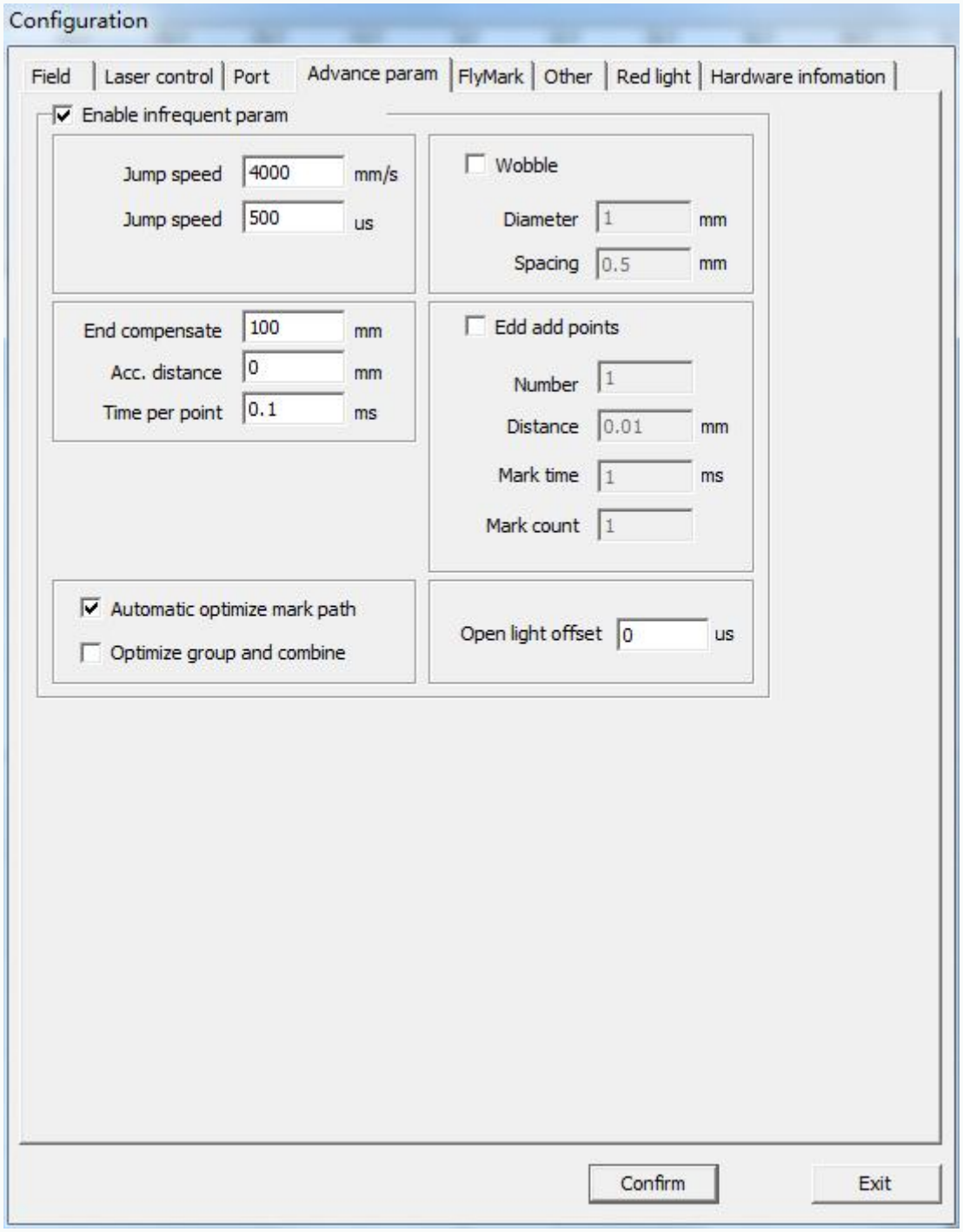


Fig.2-11 Advanced options

2.6.7. Language

It shows the language package installed in your computer. You can use it to change the language used in the interface of SeaCAD. The change will not take effect until the software is restarted next time.

2.7.Common Graph Library

This function can import the graphs frequently used to the common graph library for use at any moment. The specific procedures are as follows:

1. Save the graph library file

Draw or import the graph which you want to save in the common graph library in the workspace, select that graph, open the "File"/"Common Graph Library" dialog box, then click "New Graph Library" to enter the name of the new graph library in the "New Graph Library" dialog box, and click "OK".

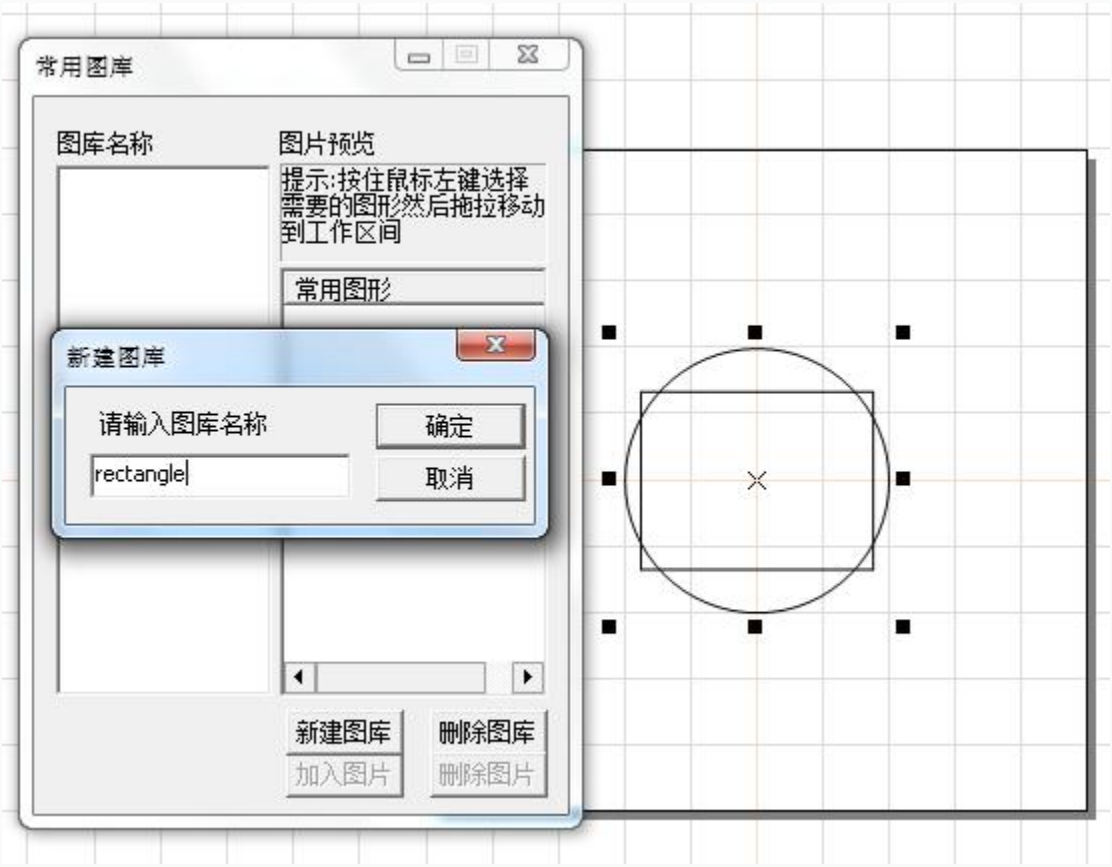


Fig.2-12 Images Library

When the graph library is created, add the graph to be saved. Select the graph in the workspace, click "Add Graph" to enter the graph name, and click "OK" to save the graph selected in the work pace in the "Common Graph Library".

2. Copy the graph from the graph library

If the graph in the graph library is to be copied, open the common graph library and drag the graph to be used to the workspace by pressing the left mouse button.

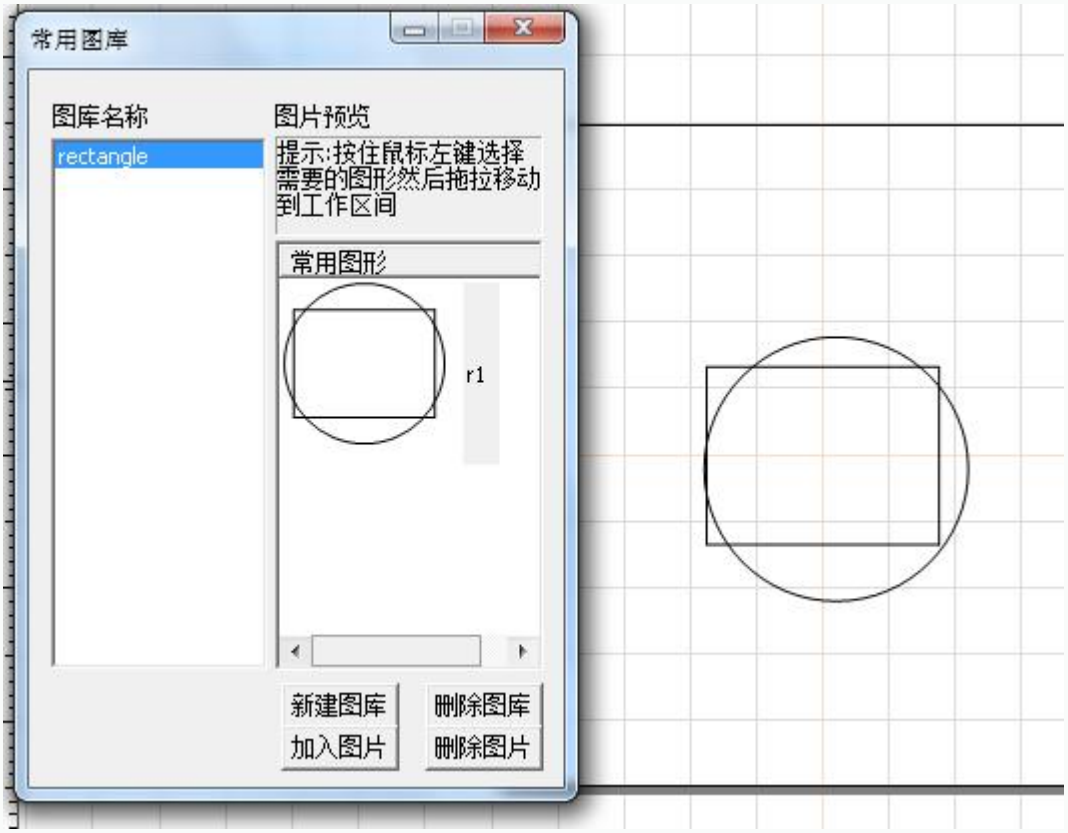


Fig.2-13 Copy the graph from the graph library

2.8.Recent File List

Below "System Parameter", a list is displayed to show the files recently opened by the user. If the user has never opened/saved any ".orz" file, such a list will not appear.

2.9.Exit (X)

It is used for exiting the SeaCAD software. If any file is not saved, the system will ask you whether to save it.

2.10.Object List

Object List is in the left side of the main interface of SeaCAD, as shown in Fig. 2-15.

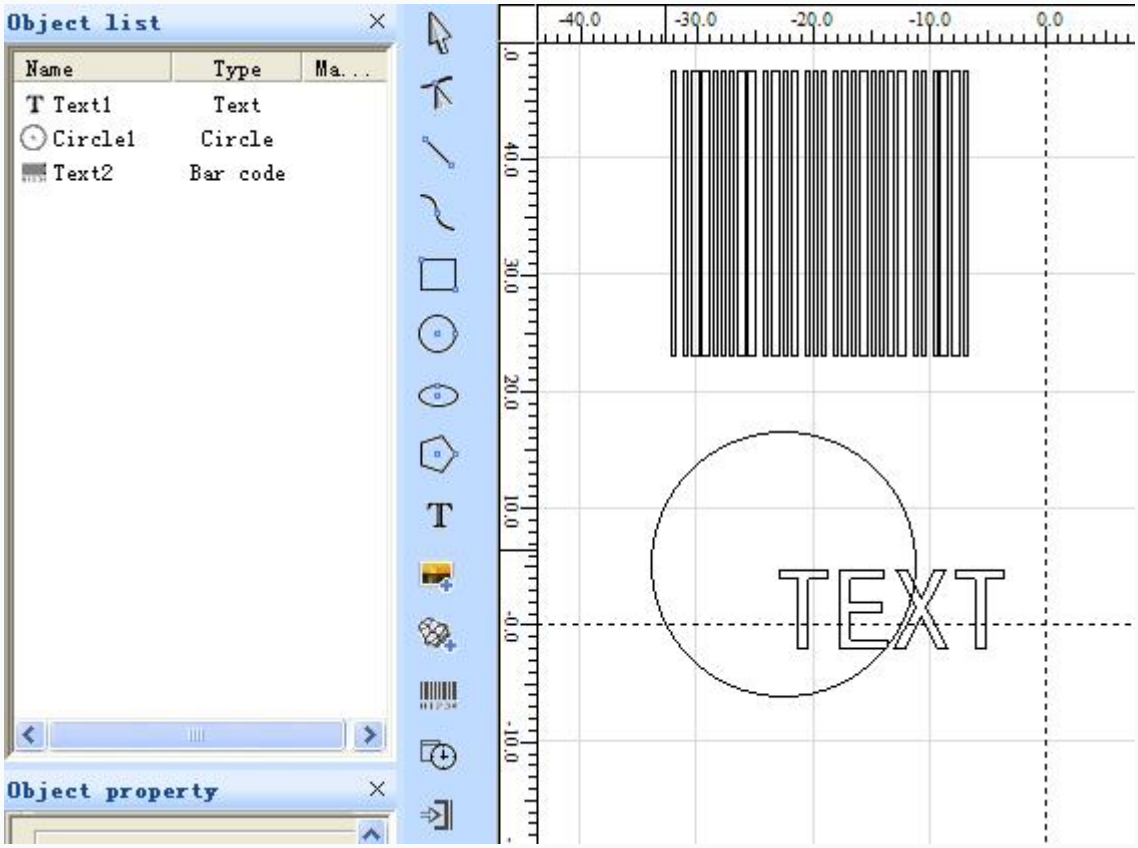


Fig. 2-15 Object List

Note: during marking, the system will follow the order in the object list (from top to bottom) to mark the listed objects.

The user can rearrange the list by directly dragging the object or through the right key.

The user can double click the object name to rename it.

2.11.Object Properties Toolbar

Object Properties Toolbar is displayed in the left side of the main interface of the software, as shown in Fig. 2-16.

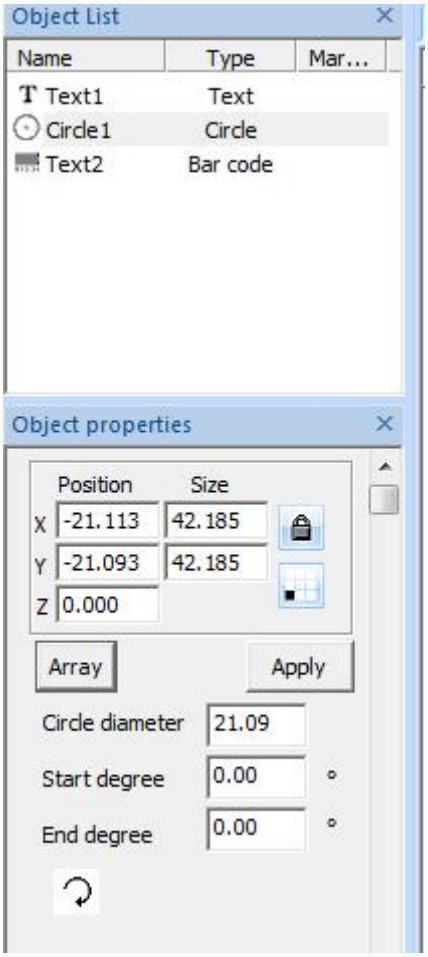


Fig. 2-16 Object Properties Toolbar

X Position: the X coordinate of the selected object. It can indicate the coordinate of the object's left bottom corner or its center. The coordinate data button is used for setting the specific content of the coordinate.

Y Position: the Y coordinate of the selected object. It can indicate the coordinate of the object's left bottom corner or its center. The coordinate data button is used for setting the specific data of the coordinate.

Z Position: the Z coordinate of the selected object.

X Size: the width of the selected object.

Y Size: the height of the selected object.

: locks the current length/width ratio of the selected object. If the user changes X and Y Sizes, the system will keep the length/width ratio of the new

size unchanged.

Coordinate Data Button: determines whether **X position and Y position** correspond to the coordinates of the left bottom corner or center of the object or other given positions. When the user clicks this button, a dialog box will appear to ask the user to select the position corresponding to the coordinate. The coordinate data displayed currently indicate that **X Position and Y Position** correspond to the coordinates of the object's left bottom corner.

Array 阵列: copies the current object and arrange them to the destination by dealing with the dialog box as shown in Fig. 2-17:

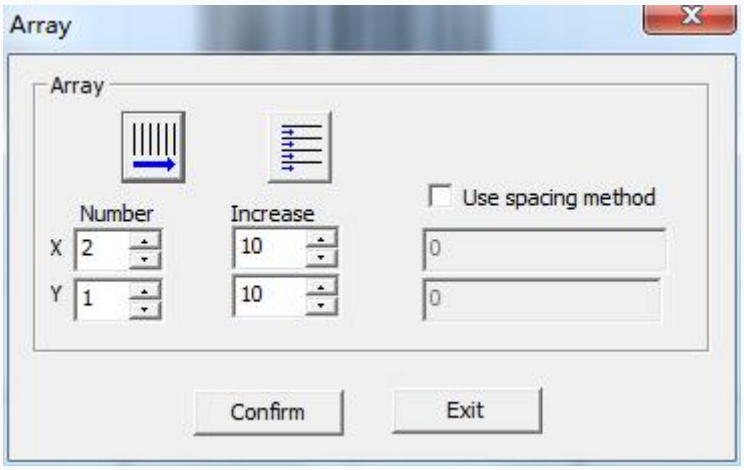


Fig. 2-17 Array Operation Dialog Box

Increment: the space between rows/columns, given by the user.

Fig. 2-16 shows the object's situation when X=2 and Y=3.

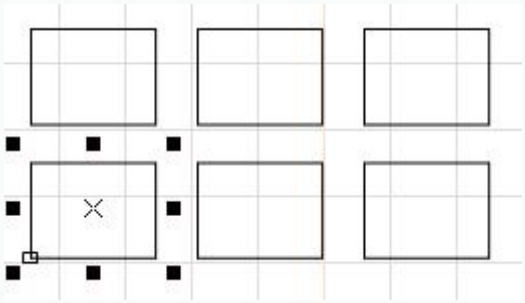


Fig. 2-18 Array Operation Result

: sets the array's row as marking precedence.

: sets the array's column as marking precedence.

: refers to the unidirectional marking.

3. Edit Menu

The "Edit" menu carries out the editing operation of a graph, as shown in Fig. 3-1.

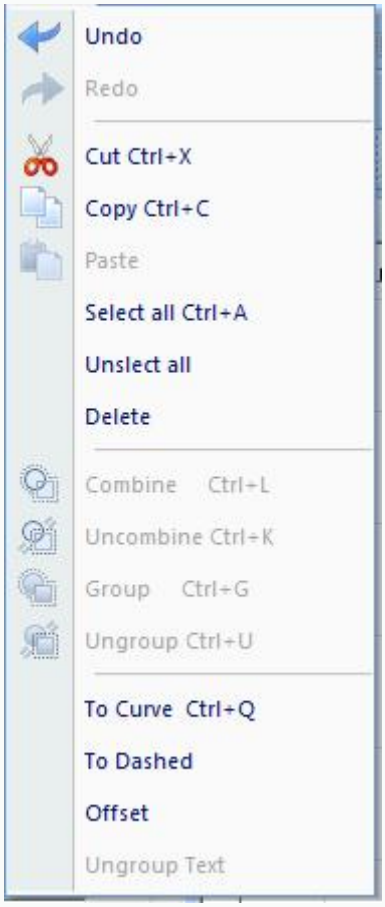


Fig. 3-1 "Edit" Menu

3.1.Undo (U)/Redo (R)

During graph editing, if the current operation is not satisfying, "Undo" can be used for undoing current operation and bring the previous operation back; after the current operation is undone, "Redo" can be used for redoing the undone operation. This is one of functions most frequently used in editing.

The icon of the "Undo" menu in the Toolbar is , while the icon of the "Redo" menu in the Toolbar is . Similar to most software, those two operations have their corresponding shortcut keys, i.e. Ctrl+Z and Ctrl+Y

respectively.

3.2.Cut (T), Copy (C) and Paste (P)

"Cut" will delete the selected graph and copy it to the clipboard of the system. Then "Paste" will copy the graph in the clipboard to the current graph. "Copy" will copy the selected graph to the system clipboard and keep the original graph.

The shortcut keys of "Cut", "Copy" and "Paste" are Ctrl+X, Ctrl+C and Ctrl+V respectively.

The offset of the pasted graph position with respect to the original graph position is determined by "Paste X" and "Paste Y" in "General" of "System Parameter".

3.3.Combine/Uncombine

"Combine" will ignore all the selected objects' original properties and combine those objects into a new curve object. This combined graph, like other graphs, can be selected, copied, pasted and its properties can be set. For example, when the original graph is a circular or a rectangular, but the graph after "Combine" operation is dealt with as a curve and will be transformed into a curve after "Uncombine" operation.

"Uncombine" will get the combined object back to separate curves.

The icon of "Combine" in the Toolbar is , while that of "Uncombine" is . Their shortcut keys are Ctrl+L and Ctrl+K respectively.

3.4.Group/Ungroup

"Group" will keep the selected objects' original properties and make them into a new object, and this new graph, like other graphs, can be selected, copied and pasted, and its properties can be set.

For example, the original graph is circular or rectangular, but the graph after "Group" operation will be dealt with according to the original properties and it will be restored to the original graph, with properties unchanged, after

"Ungroup" operation.

"Ungroup" will turn the object which has just been grouped into previous situation.

The icon of "Group" in the Toolbar is , while that of "Ungroup" is . Their shortcut keys are Ctrl+G and Ctrl+U respectively.

3.5.To Curve/Multi-line Segment

This function is to remove the properties of the selected graph and transform it to a curve or multi-line segment.

3.6.To Dashed Line

This function is to transform the vector graph to a dashed graph for marking, as shown in Fig. 3-2:

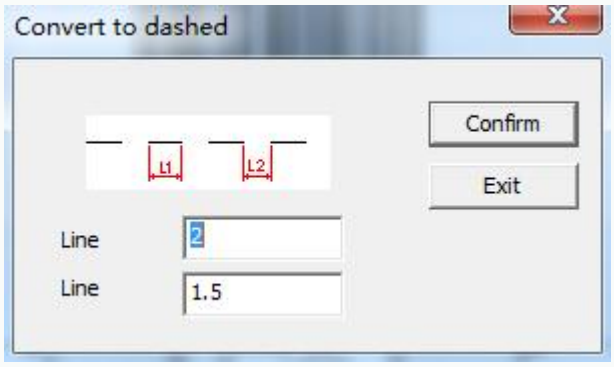
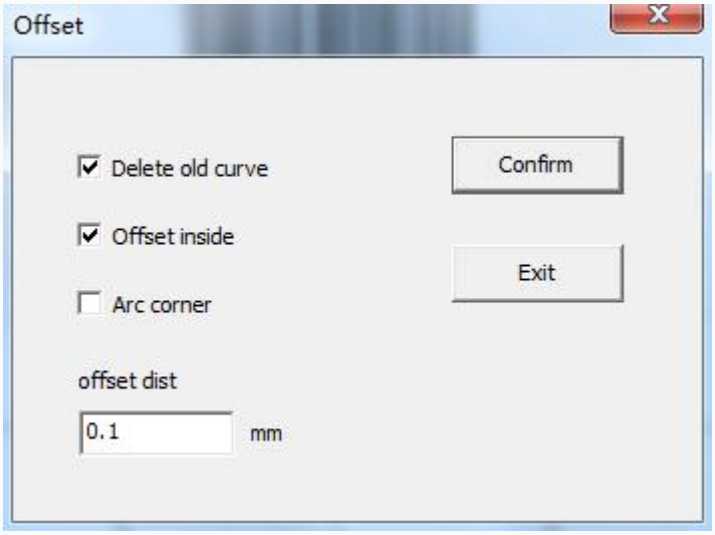


Fig. 3-2 "To Dashed Line"

The user has to set the length of the short line and the space between lines, and then click "OK" to transform the vector graph into a dashed one.

3.7.Offset

Offset the drawn vector graphic according to the offset distance. as shown in Figure



3-3 on the left:：

Offset dist： The distance between the old curve and original curve.

Del Old curve： Whether to keep the original graphics. Unchecked means to keep the original graphics. Check to remove the original graphics and keep only the offset.

Offset inwards: Select this option to offset the graphic internally.

Arc Angle Transition: Check this item to make the corners rounded.

3.8.Ungroup Text

Ungroup the character text string into several texts, each of which contains only one character.

3.9Hatch

"Hatch" is used for hatching a given graph. The graph to be hatched must be a closed curve.

The icon of "Hatch" in the Toolbar is . When it is clicked, a dialog box will appear, as shown in Fig. 3-4.

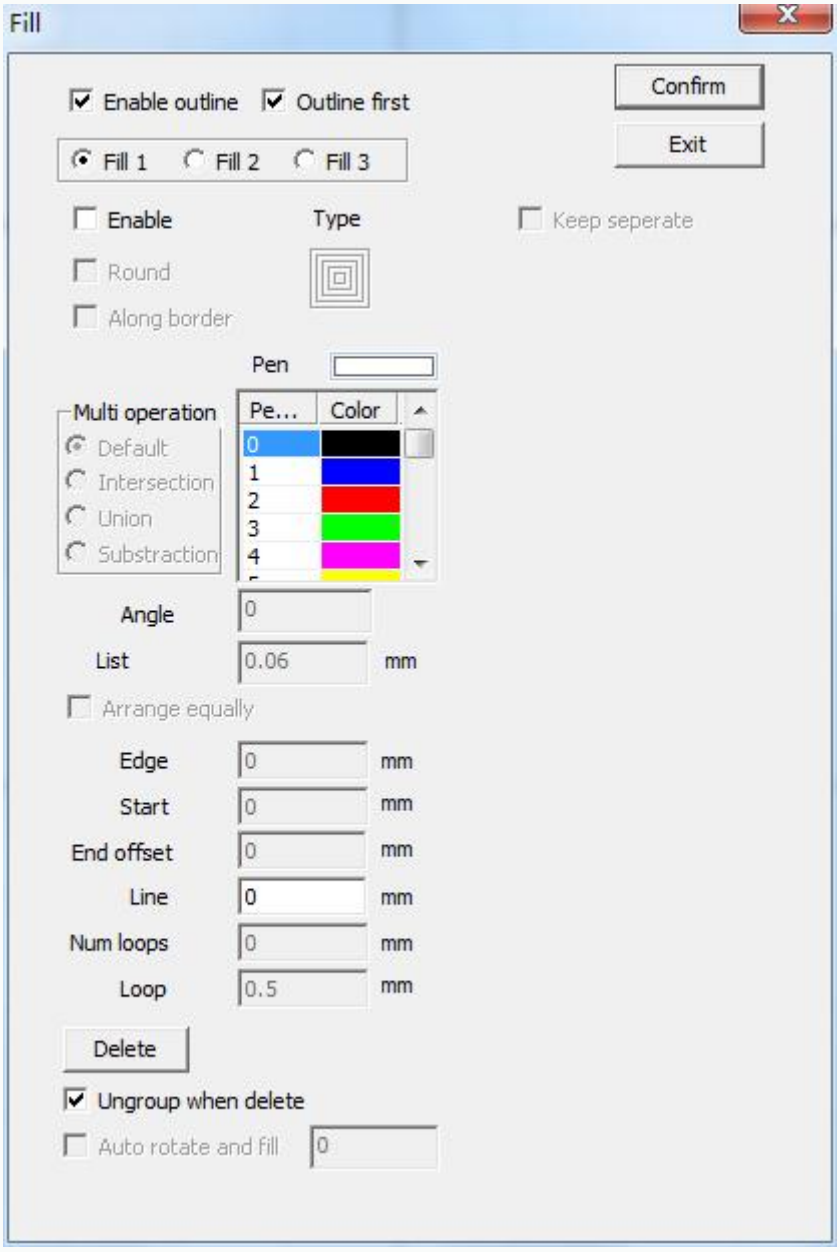


Fig. 3-4 "Hatch" Dialog Box

Mark Contour: determines whether to show and mark the contour of the original graph, namely, whether the hatched graph keeps the original contour.

Contour Precedence: indicates that the contour is marked first and then the hatch line is marked when "Mark Contour" is clicked.

Hatch 1 / Hatch 2 / Hatch 3: indicates that there can be three sets of independent hatch parameters for hatch calculation. The crossed hatch at any angle can be realized and each kind of hatch can support four types of hatch to perform marking (four types of hatching are:

unidirectional/bidirectional/ring/optimized bidirectional hatch, as shown in the following).

Enable: determines whether to permit the validity of the current hatch parameter.

All Cal: serves as an optimized option. If it is selected, all the mutually exclusive objects will be calculated as a whole during hatch calculation, which will speed marking up on certain occasions. (If it is selected, the computer's calculation may slow down), If it is not selected, each independent area will be calculated separately.

For ease of description, we now give a special example to illustrate this feature.

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

1、 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

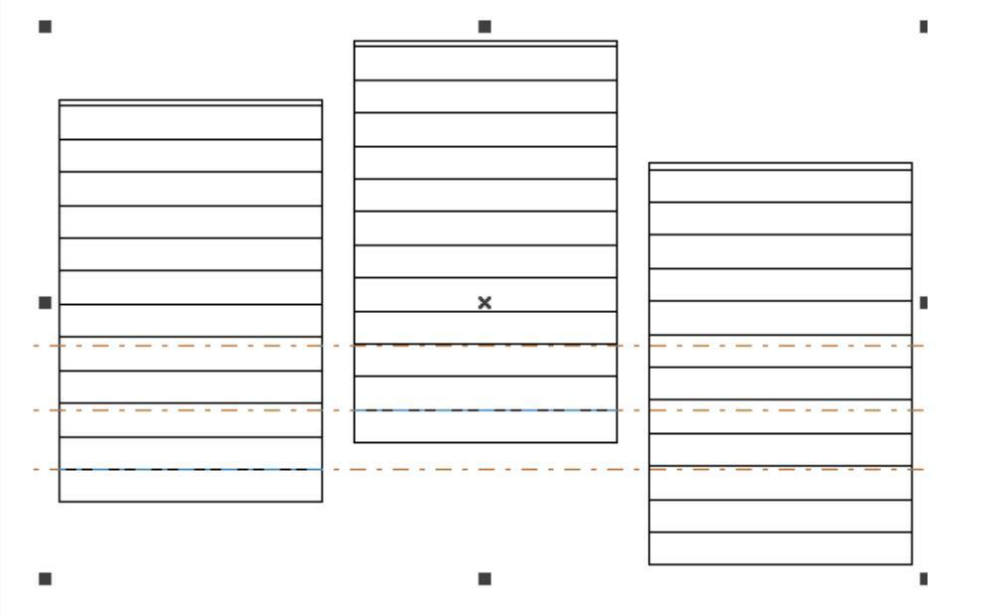


Fig.3-5 Do not click 'All Calc'

2、 Click 'All Calc', mark all the hatch line at one time, mark all the hatch that on the same line.

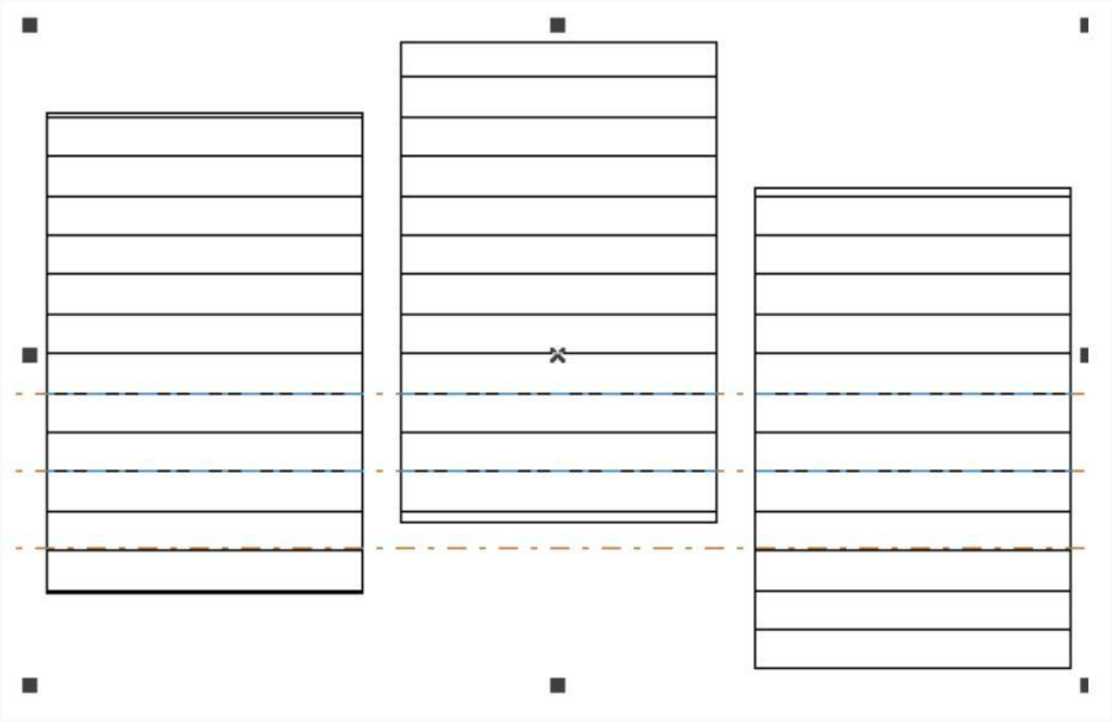


Fig.3-6 Click 'All Calc'

Type of Hatch：

Unidirectional Hatch: the hatch lines will be marked from left to right.

Bidirectional Hatch: the hatch lines will be marked from left to right first and then from right to left, and the others are circular hatch.

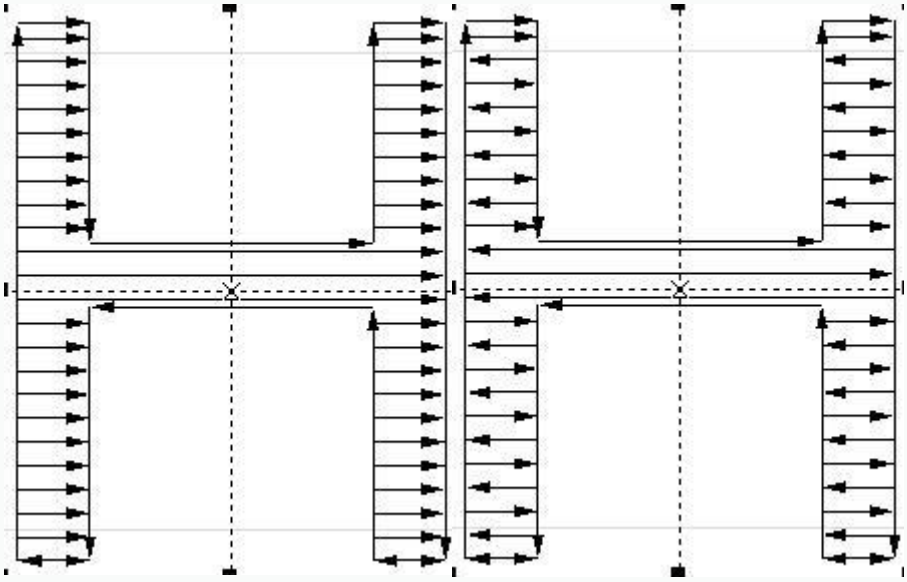


Fig.3-7 Left is Unidirectional Hatch，Right is Bidirectional Hatch

Ring Hatch: the hatch lines will be marked from outside to inside of the object contour in a circular and skewing manner.

Optimized bidirectional hatch: It is similar to bidirectional hatch, but the ends of hatch lines will connect.

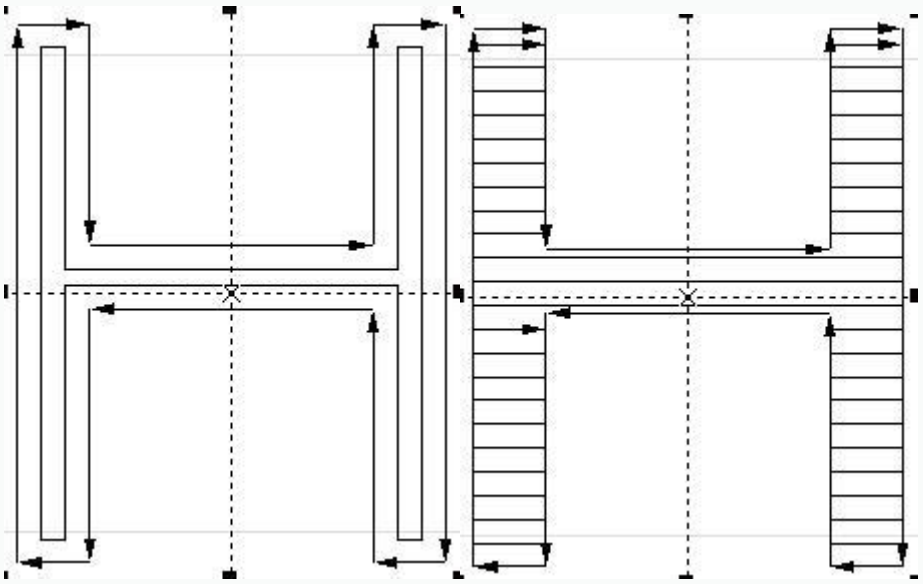


Fig.3-8 Left is Ring Hatch,Right is Optimized bidirectional hatch

Optimization Gong type hatch: similar with Gong, will jump in null place

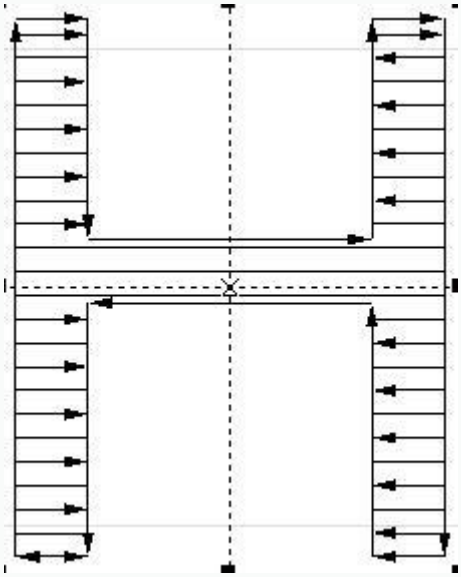


Fig.3-9 Optimization Gong type hatch

Those five types of hatch can be switched over by clicking the button with the mouse and can be set or modified conveniently and rapidly according to the required effects.

Angle: the angle between the hatch line and the X axis

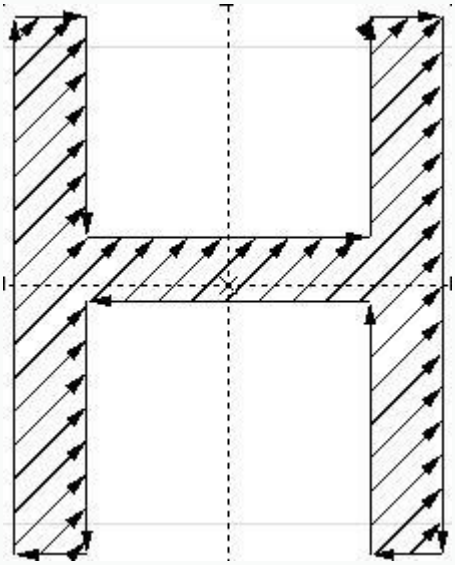


Fig. 3-10 Angle is 45

Line Space:the space between two adjacent hatch lines.

Edge Offset: the distance between hatch lines and the contour when "All Cal" is selected.

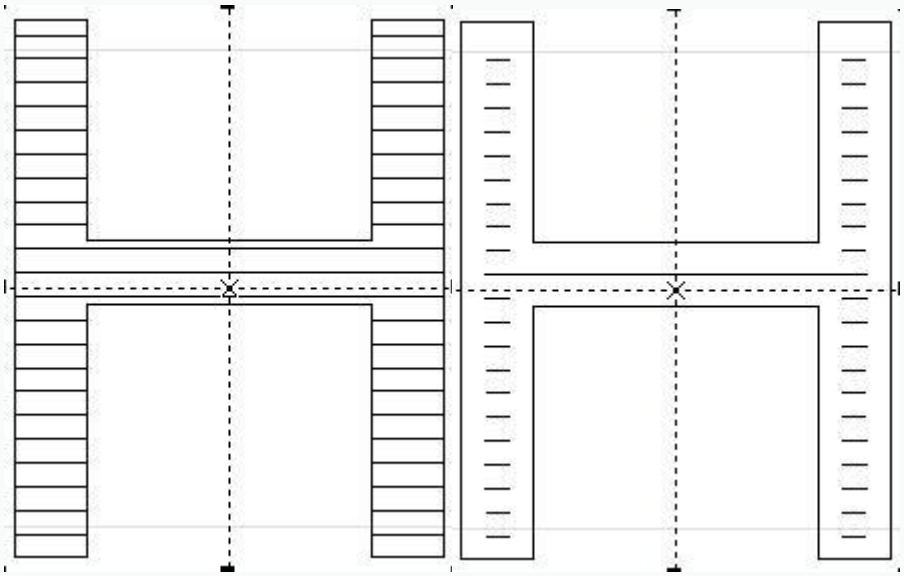


Fig 3-11 Line Space

(Left one line space is 0，Right one line space is 1)

Follow Edge One Time: adds a contour around the hatch lines after hatch calculation.

Evenly Distribute Hatch Lines: deals with uneven distribution of hatch lines at the beginning and end of the hatched object. Due to the size of the hatched object, line space, etc., the hatch lines at the beginning and end of the hatched object may be distributed unevenly. To simplify the operation, this function is added so that the hatch lines can be distributed evenly without any resetting of the line space by the user. After it is selected, the software, based on the line space set by the user, will nudge the line space to ensure the even distribution of hatch lines.

Start Offset: the distance between the first hatch line and the border of the object**.**

End Offset: the distance between the last hatch line and the border of the object.

Linereduction: the reduction of both ends of the hatch line. A positive value indicates reduction and a negative value indicates extension. This function is

used when the distances between both ends of the hatch line and the contour line are expected to be large during marking.

NumLoops: the times of ring hatch before the aclinicing hatch. The last ring cannot be hatched evenly if only the ring hatch is used, so this function can solve such a problem.

[Note: the line space shall not be too large during text hatching, because a too large line space will cause the hatch effect to be invisible.]

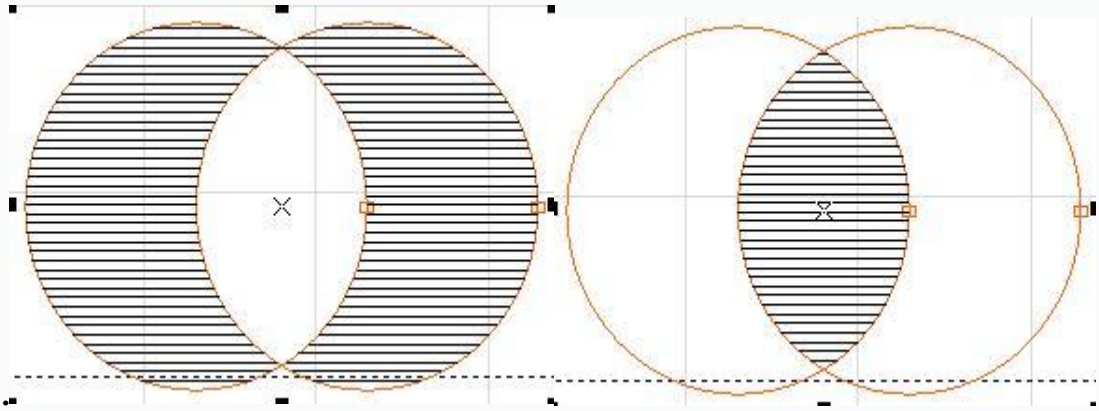
Hatch one by one: choose multi object and hatch together, after hatch, still independent

object.Undo Hatch： delet hatching

Dissolve Group on Delete: Ungroup when you perform a delete operation.

Auto rotate hatch: Refers to after every marking, the hatch line will fill the revolving angle which we setted automatically to marking again. For example, angle is 0, auto rotate angle is 30, the first mark angle is 0, the second is 30, the third is 60, and so on

Multi-figure Operation: Default, Intersection, Union, Difference Set As shown in Figure 3-12, the figure combination can be filled with different patterns.



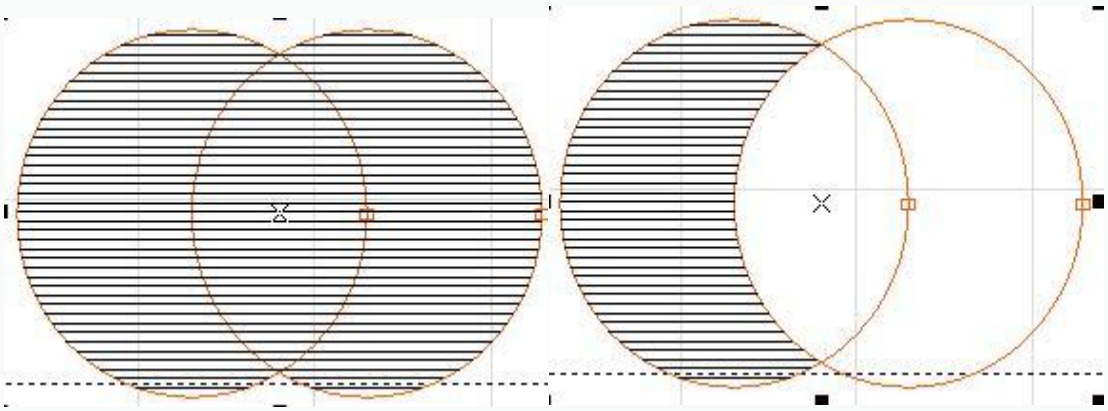


Fig 3-12 The upper left is the default, the upper right is the intersection, the lower left is the union, and the lower right is the difference

4. Draw Menu

The "Draw Menu" is used for drawing various common shapes, including Point, Line, Curve, Polygon, etc. This menu has a corresponding Toolbar, and all related operations can be achieved through the icons in this Toolbar, as shown in Fig. 4-1. When you select a drawing command or the icon in the Toolbar, the Present Command Toolbar on the top of the workspace will be changed to show some options of the current command.

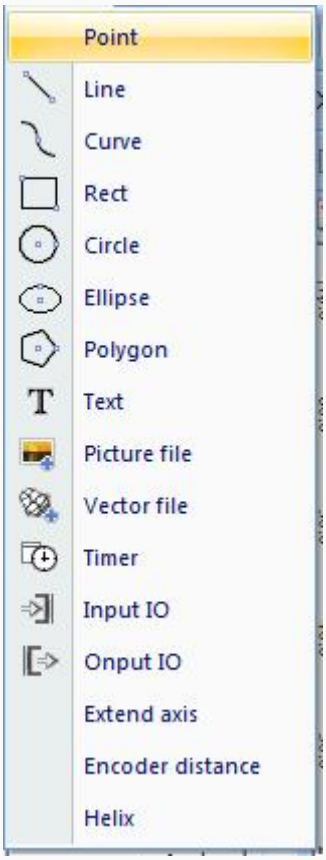


Fig a) "Draw"Menu

Fig b) "Draw" Toolbar

Fig c) Select command toolbar

Fig4-1 "Draw" Operation

4.1. Point (P)

Drawing a point in the workspace is the simplest drawing operation. By selecting the "Point" command in the menu and clicking the left mouse button at an appropriate position in the workspace, you can draw a point at the position. Also you can draw more points by clicking the left mouse button continuously. After drawing, you can click the right mouse button to stop the point drawing command, and then the last point is displayed as the selected object.

4.2. Line (L)

To draw a line, the user can select the command "Line" in the Draw Menu or click the icon , or click and move the left mouse button when the "Line" command is selected.

When the "Line" command is selected, input the coordinates of points directly by clicking the right mouse button, as shown in the following figure:

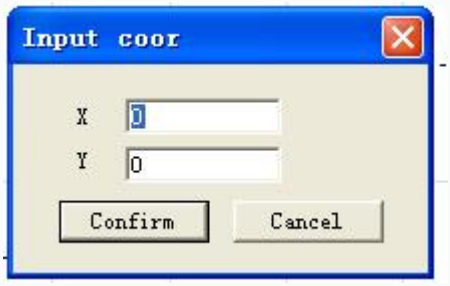


Fig. 4-2 "Input Coordinates"

4.3. Curve (S)

To draw a curve, the user can select the "Curve" command in the Draw Menu or click the icon .

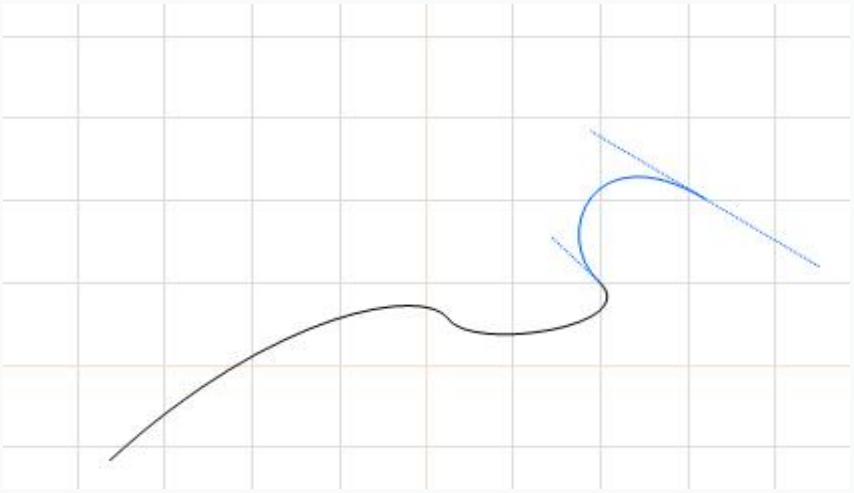


Fig. 4-3 Curve Drawing

When the "Curve" command is selected, the user can draw curves freely by pressing the left mouse button and moving the mouse.

When the "Curve" command is selected, the user can move the mouse cursor to the beginning node of the curve and press the left mouse button to close the current curve automatically.

4.4. Rectangle(R)

To draw a rectangle, the user can select the "Rectangle" command in the Draw Menu or click the icon.

When the "Rectangle" command is selected, the user can press the left mouse button and move it to draw a rectangle.

When the "Rectangle" command is selected, the user can draw a square by pressing the left mouse button and the "Ctrl" key simultaneously and moving the mouse.

When a rectangle is selected, the rectangle properties as shown in Fig. 4-4 will be displayed in the Properties Toolbar.

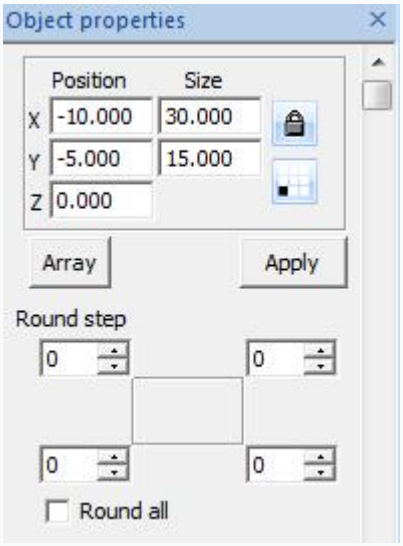


Fig. 4-4 Rectangle Properties Toolbar

Corner Roundness: It refers to the roundness of the rectangle's four corners. If the roundness is 100%, the corner turns into an arc.

All Corners Round: When it is activated, the user can modify the roundness of the four corners by just modifying one of them.

NOTE: Whenever the parameters in the Properties Toolbar are modified, it is a must to click the "Apply" button to effect the modification, which applies to the following operations.

4.5. Circle (C)

To draw a circle, the user can select the "Circle" command in the Draw Menu or click the icon .

When the "Circle" command is selected, the user can press the left mouse button and move the mouse to draw a circle.

When a circle is selected, the circle properties as shown in Fig. 4-5 will be displayed in the Properties Toolbar.

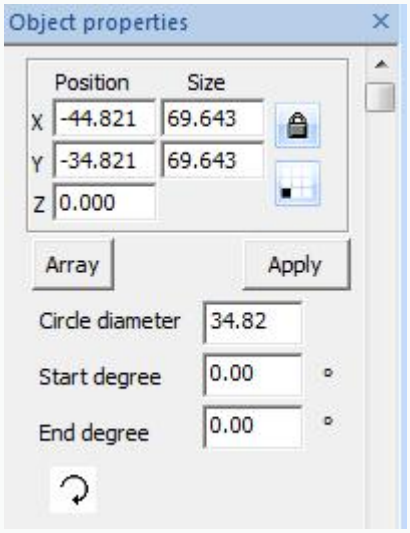


Fig. 4-5 Circle Properties Toolbar

Diameter: the diameter of a circle.

Start Angle: the angle of the starting point of a circle relative to its center.

: It means the current circle is marked clockwise.

: It means the current circle is marked anticlockwise.

4.6. Ellipse (E)

To draw an ellipse, the user can select the "Ellipse" command in the Draw Menu or click the icon .

When the "Ellipse" command is selected, the user can press the left mouse button and move the mouse to draw an ellipse.

When the "Ellipse" command is selected, the users can draw a circle by pressing the left mouse button and the "Ctrl" key simultaneously and moving the mouse.

When an ellipse is selected, the ellipse properties as shown in Fig. 4-6 will be displayed in the Properties Toolbar.

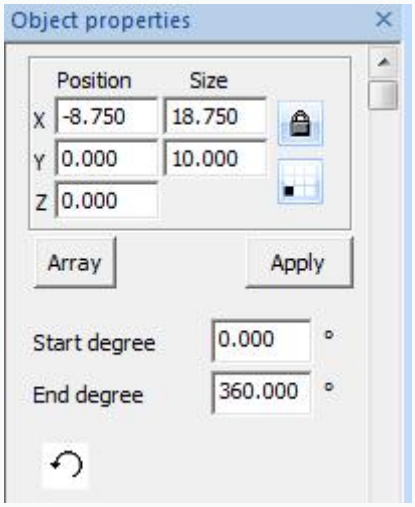


Fig. 4-6 Ellipse Properties Toolbar

Start Angle: the angle of the starting point of an ellipse relative to its center.

End Angle: the angle of the ending point of an ellipse relative to its center.

: It means the current ellipse is marked clockwise.

: It means the current ellipse is marked anticlockwise

4.7. Polygon (M)

To draw a polygon, the user can select the "Polygon" command in the Draw Menu or click the icon .

When the "Polygon" command is selected, the user can press the left mouse button and move the mouse to draw a polygon.

When a polygon is selected, the polygon properties as shown in Fig. 4-7 will be displayed in the Properties Toolbar.

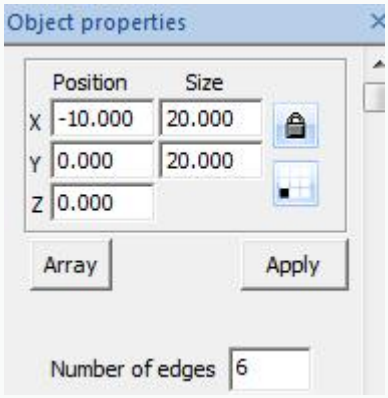


Fig. 4-7 Polygon Properties Toolbar

Edge Num.: It refers to the number of a polygon's edges with the minimum number of three.

4.8. Text (F)

Inputting characters directly in the workspace is supported in SeaCAD, and the fonts include all those supported by the system and many others set in the SeaCAD. To input characters, the user can select the "Text" command in the Draw Menu or click the icon T .

When the "Text" command is selected, the user can create text objects by clicking the left mouse button.

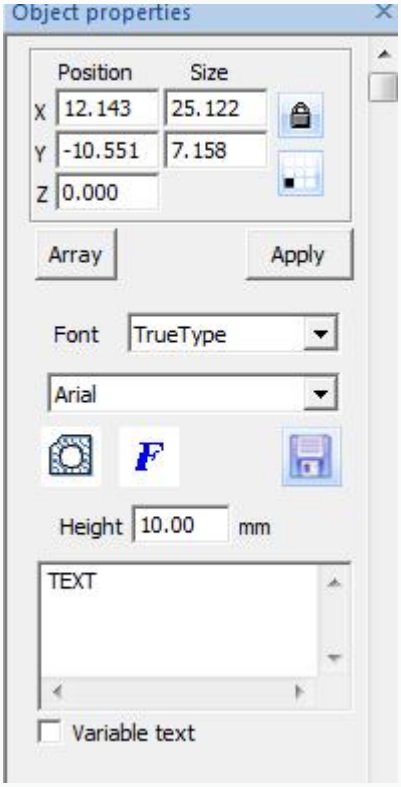


Fig. 4-8 Text Properties Toolbar

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

SeaCAD supports four types of fonts (TrueType fonts, single line fonts, barcode fonts, bitmap fonts) and other fonts that are installed independently.

After selecting the font type, the font list will list all fonts of the current type accordingly, as shown in Figure 4-9 is a TrueType font list.

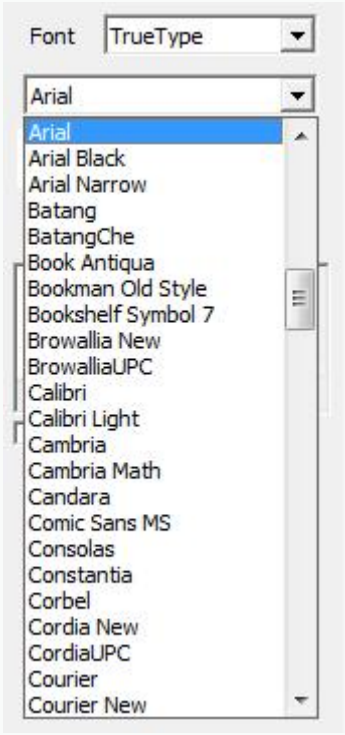


Fig. 4-9 TrueType List

Height: The average height of the font.

4.8.1. Font Parameters

When a text is selected, the text properties as shown in Fig. 4-10 will be displayed in the Properties Toolbar.

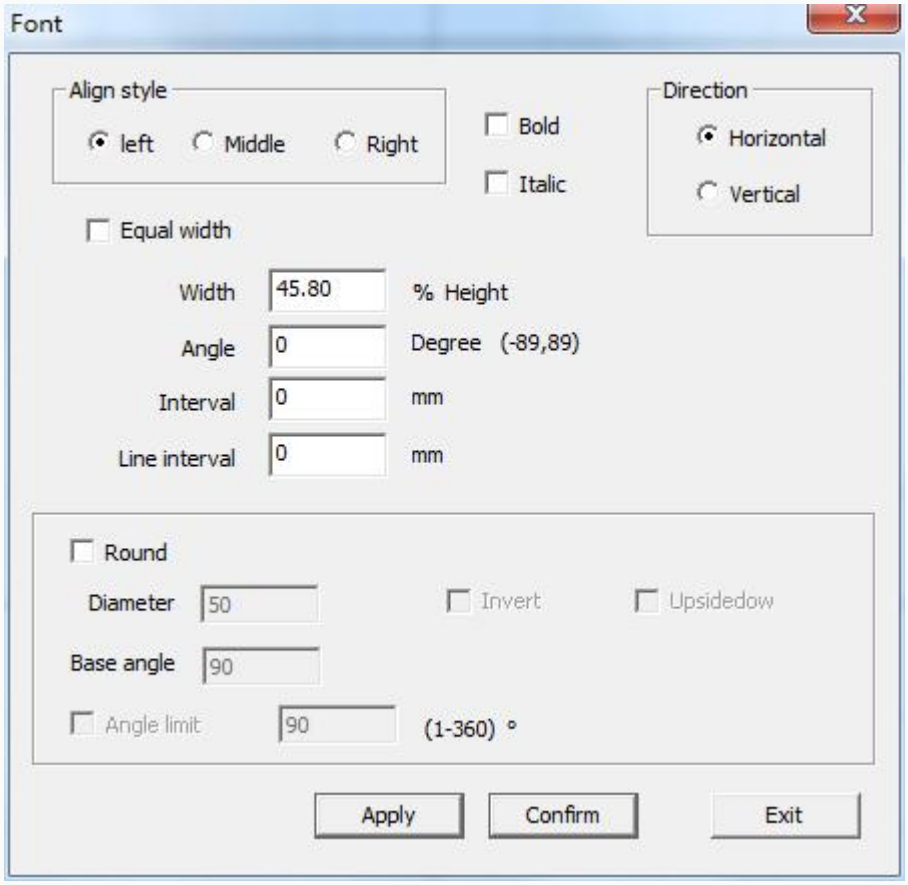


Fig. 4-10 Font Properties

Alignment: "Left", "Center" and "Right" mean that the current text is aligned to the left/center/right respectively.

Bold: When selected, the current text become bold.
Italic: When selected, the current text become italic

Sorting direction: Horizontal means Horizontal arrangement, Vertical means vertical arrangement.

Enable the Same Width Character: make all characters keep the same width.

Char Width: the average width of characters.

Char Angle: the angle of inclination of characters**.**

Char Space: the distance between characters.

Line Space: the distance between two rows of characters.

Circle Text: SeaCAD supports circular text, the text will align according to the user

definition circle diameter.As show in figure 4-11.

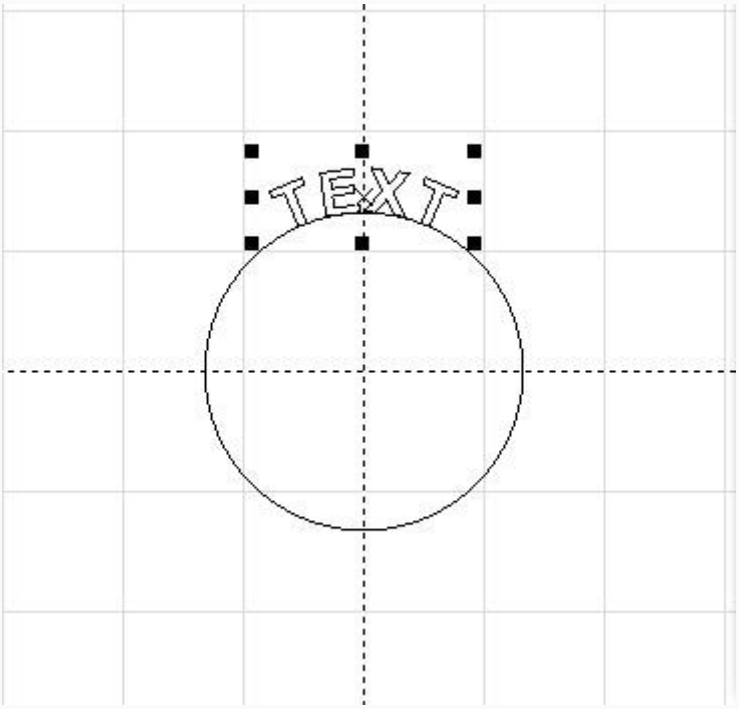
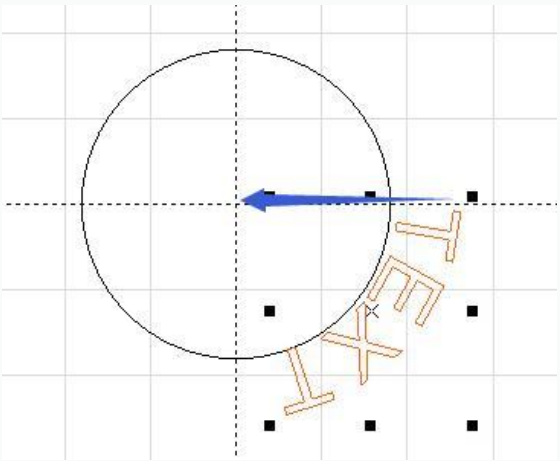


Fig. 4-12 Path Circle Text

Circle Diameter：diameter of circle text。

Base Angle: the angle benchmark for text alignment.



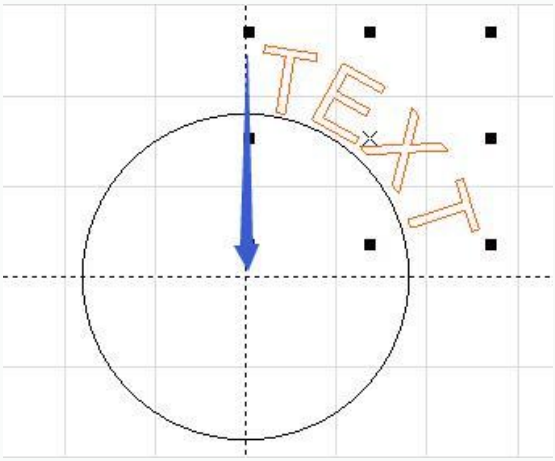


Fig. 4-12 First one base angle is 0，Second one base angle is 90.

Angle Range Limit: When it is selected, the text will be limited in the angle range limit no matter how many characters are input.as shown in Fig. 4-13

。As show in Fig 4-13：

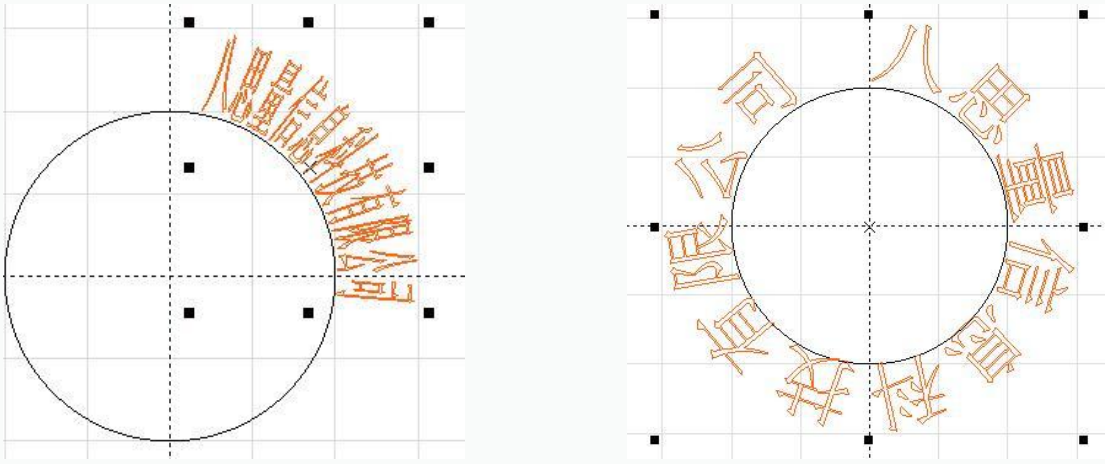
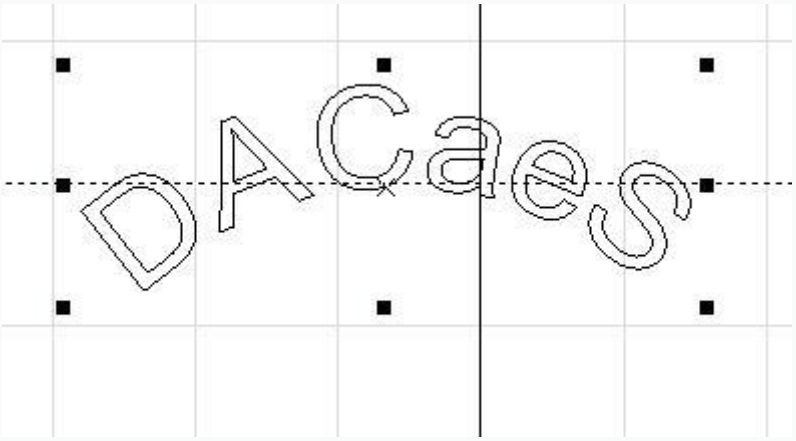
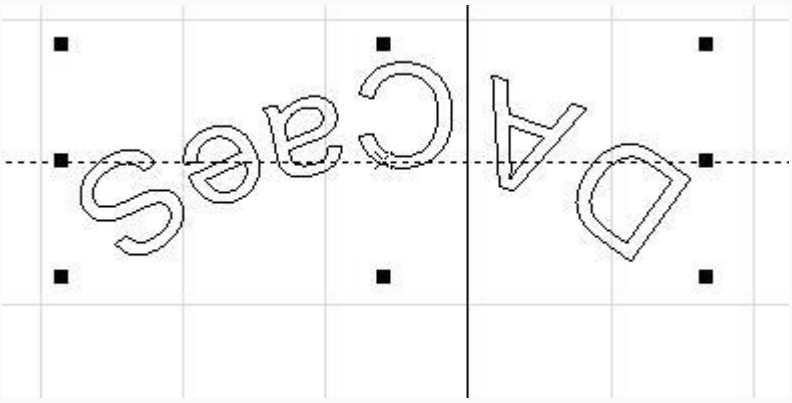


Fig. 4-13 Left is click Angle Range limit，Right one is not。

Reverse：Reverse the text。



Invert： Invert the text。



4.8.2. Path

Draw a circle, select the "Text" command and click the circle edge to get the text. The pattern is as shown in Fig. 4-14.

：

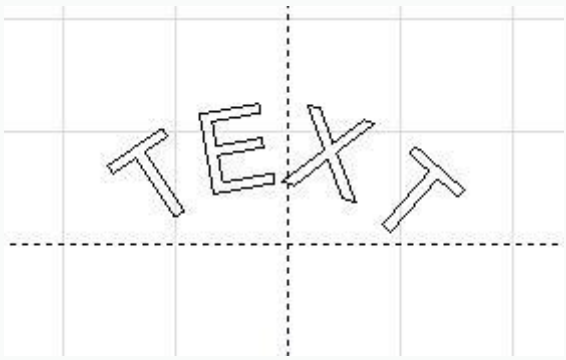


Fig. 4-14 Path Circle Text

After the icons, , are clicked, a dialog box will pop out as shown in Fig.4-15.

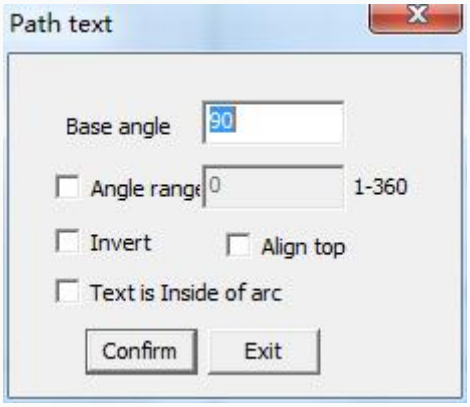


Fig. 4-15 Path Text

Base Angle: the angle benchmark for text alignment.

Angle Range Limit: When it is selected, the text will be limited in the angle range limit no matter how many characters are input.

Text inside the arc：Put the text inside the arc as show in flowing fig.

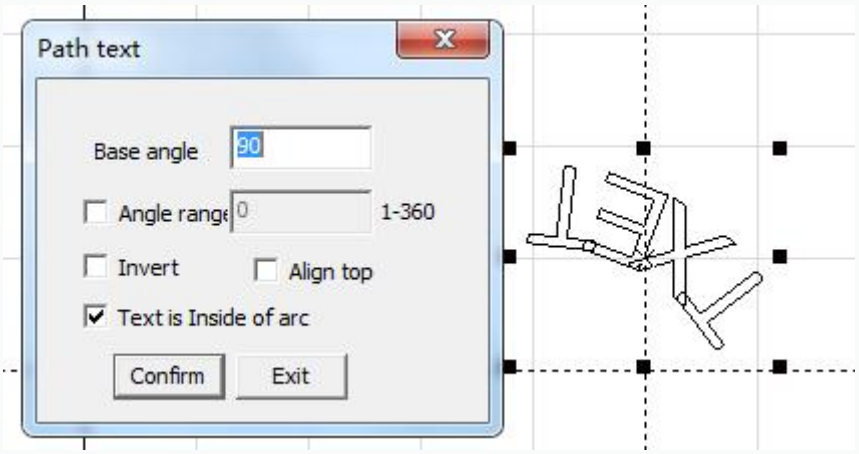


Fig. 4-16 Text inside the arc

Align the top of the text：means the top of the text is superposition with the curve, as show in flowing fig.

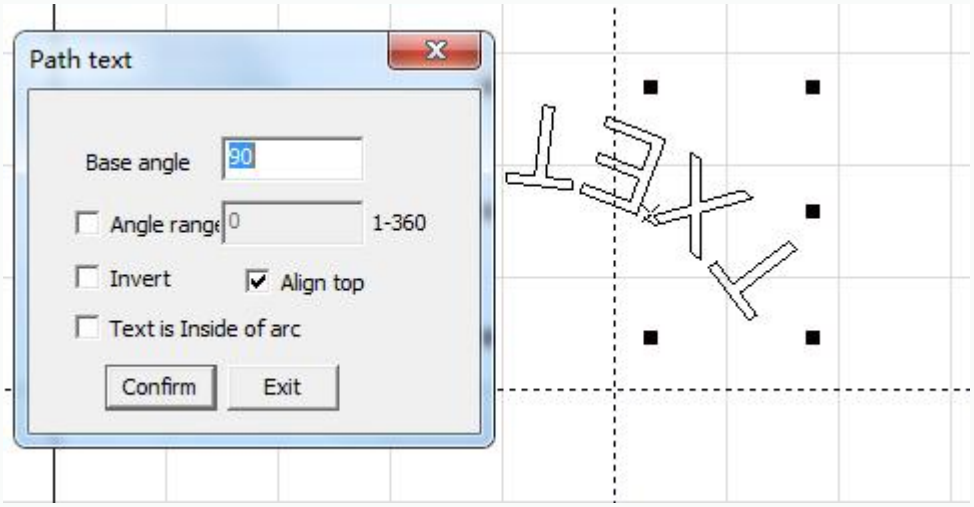


Fig.4-17 Align the top of the text

4.8.3. Barcode Text

When the Barcode Font is selected, a dialog box will pop out as shown in Fig. 4-19 after the icon

is clicked.

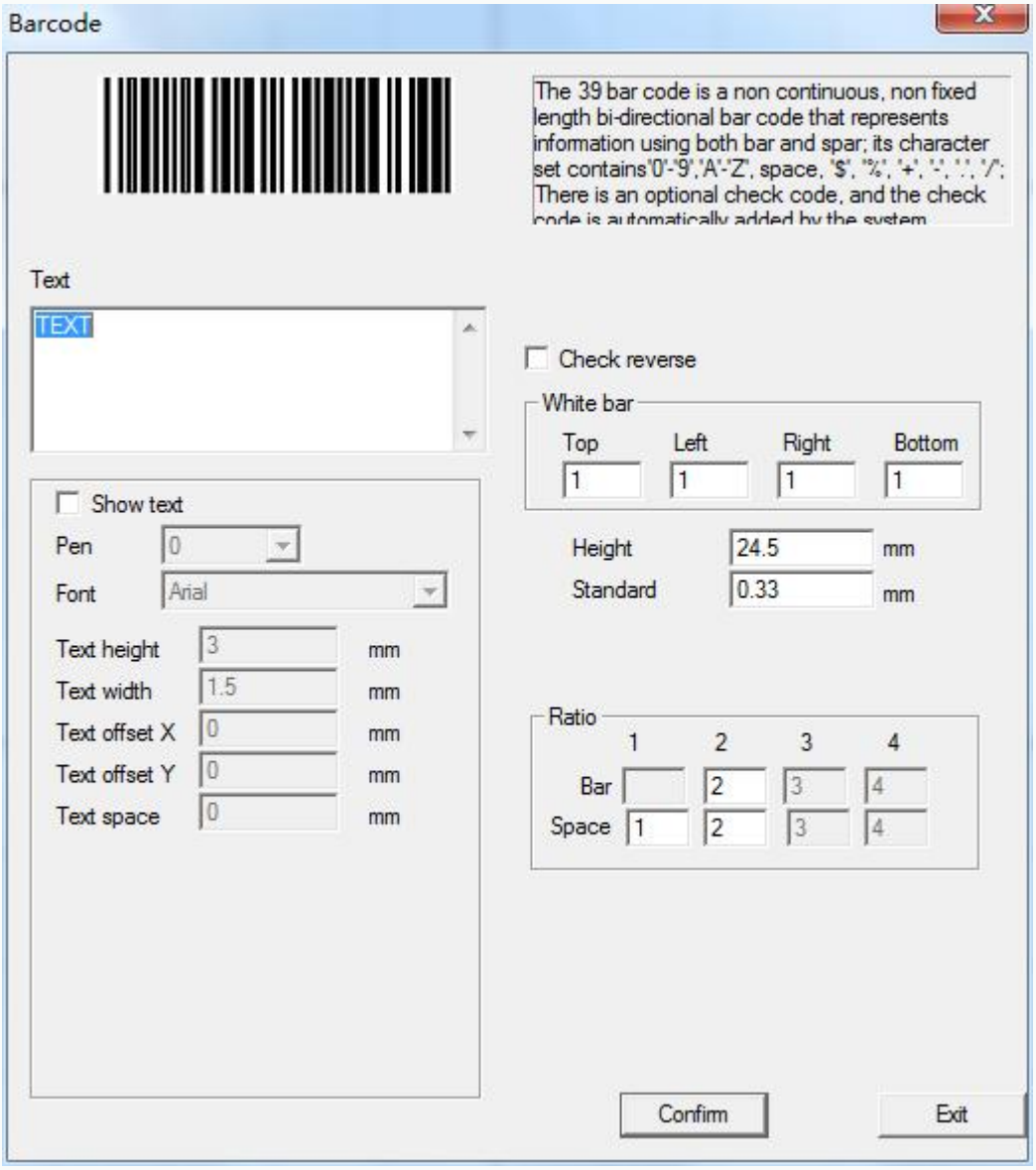


Fig. 4-19 Dialog Box of Barcode Font Parameters

Show Text: determines whether to show a corresponding text for identification under the barcode.

Pen No： Select the pen number for the text, the default is the same as the barcode.

Font: the font of the current text to be displayed.

Height: the average height of the text.

Width: the average width of the text.

Text X Offset: the coordinates of text offset in the direction of X axis.

Text Y Offset: the coordinates of text offset in the direction of Y axis.

Text Space: the space between characters.

4.8.3.1. One-dimensional Barcode

It consists of "bar" and "space" arranged one by one. The barcode information is carried by different widths and positions of bar and space, and the information volume is decided by the width and the precision of barcode. The wider the barcode is, the more bars and spaces are included, and the more information is carried. This kind of barcode technology can store information in only one direction through permutation and combination of bars and the spaces, so it is called one-dimensional barcode.

Fig. 4-20 shows the parameter setting in the window when a one-dimensional barcode is selected.

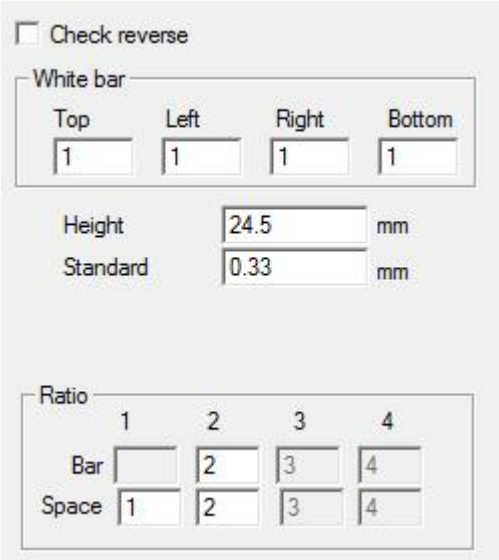


Fig. 4-20 One-dimensional Barcode Parameters

Black and White Invert: determines whether to invert the marking. This function is used for some materials which are light-colored after marking**.**

Bar Height: the height of the barcode.

Standard Width: It refers to the width of the narrowest bar, i.e. the width of the unit bar. Commonly a one-dimensional barcode consists of bars and spaces with four types of width respectively, and 1, 2, 3 and 4 refer to 1, 2, 3 and 4 times the width of the unit bar as per the width size of bars and spaces. The

width of the narrow bar means the width of one unit bar.

The actual width of Bar 2 is a scale of the narrow bar width multiplied by the width of Bar 2, and the method applies for Bar 3 and 4.

The actual width of Space 1 is a scale of the narrow bar width multiplied by the width of Space 1, and the method applies for Space 2, 3 and 4.

Quiet: It refers to the limited area where the reflectivity at the outer ends or middle of the barcode is the same as that of the space. The actual width of the Quiet area is a scale of the narrow bar width multiplied by the Quiet area.

4.8.3.2. Two-Dimensional Barcode

4.8.3.2.1. PDF417Barcode

PDF is the abbreviation of the Portable Data File. Figure 4-21 is the demonstration of PDF417 Barcode.

Bar Height: the height of the barcode
Narrow Width: This refers to the width of the unit bar.
Level: the Error-Checking Level of PDF417 barcode, from 0 to 8
Lines and Columns: the lines and Columns of PDF417 barcode

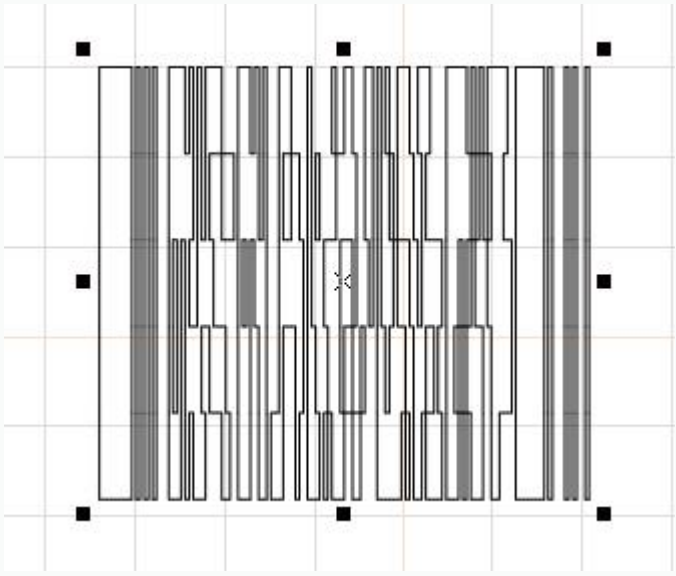


Fig. 4-21 PDF417 Barcode

4.8.3.2.2. DataMatrix Barcode

DataMatrix is a kind of two-dimensional barcode based on Matrix, as shown in Fig. 4-22:

Data Matrix has various fixed size, and users can choose what they want.have, If the smallest size is chosen, the system will automatically select the smallest frame to fit the all text users

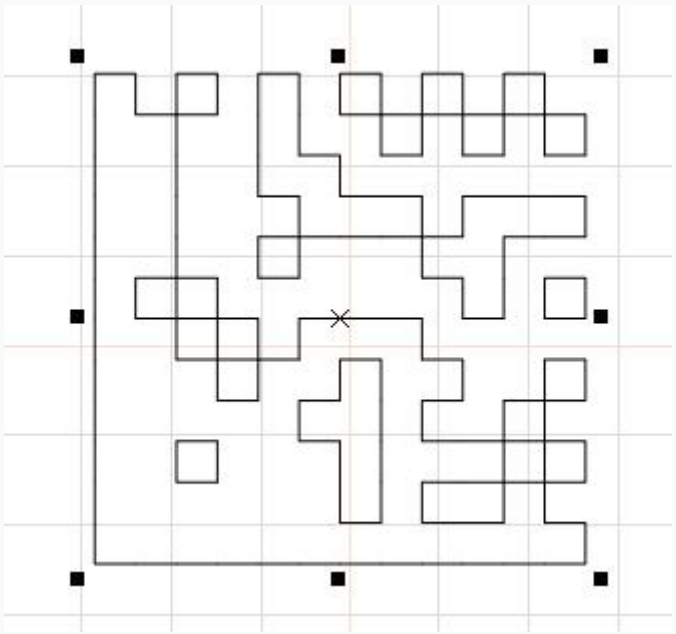
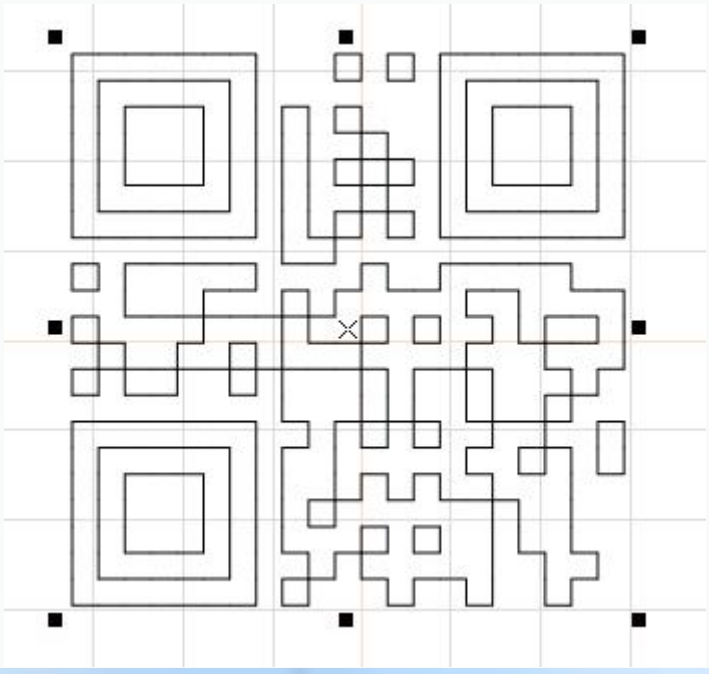


Fig. 4-22 DataMatrix Barcode

4.8.3.2.3. QR-Code

QR-Code Barcode is a kind of two-dimensional barcode and its character set includes all ASCII values, as shown in Fig. 4-23:



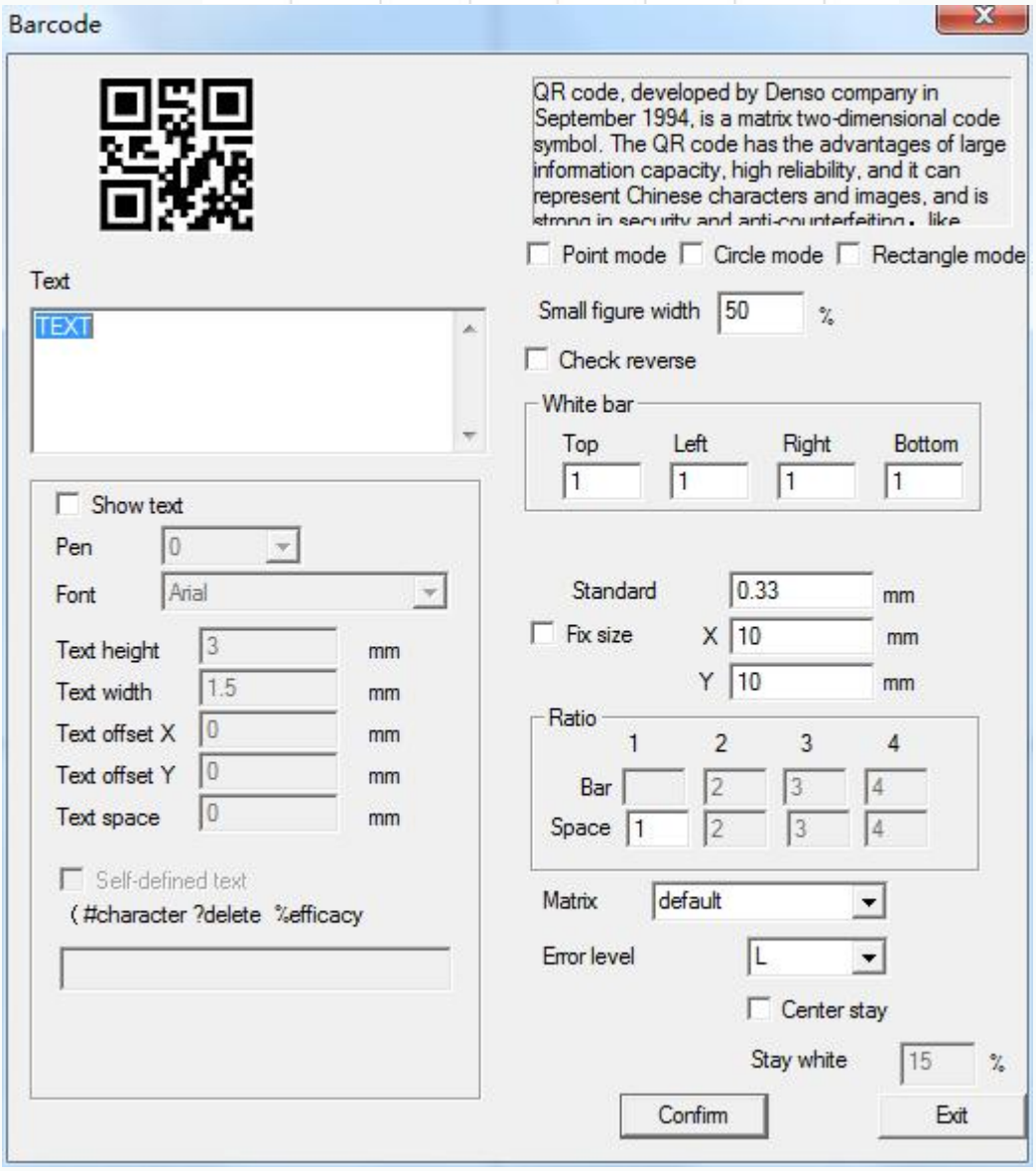
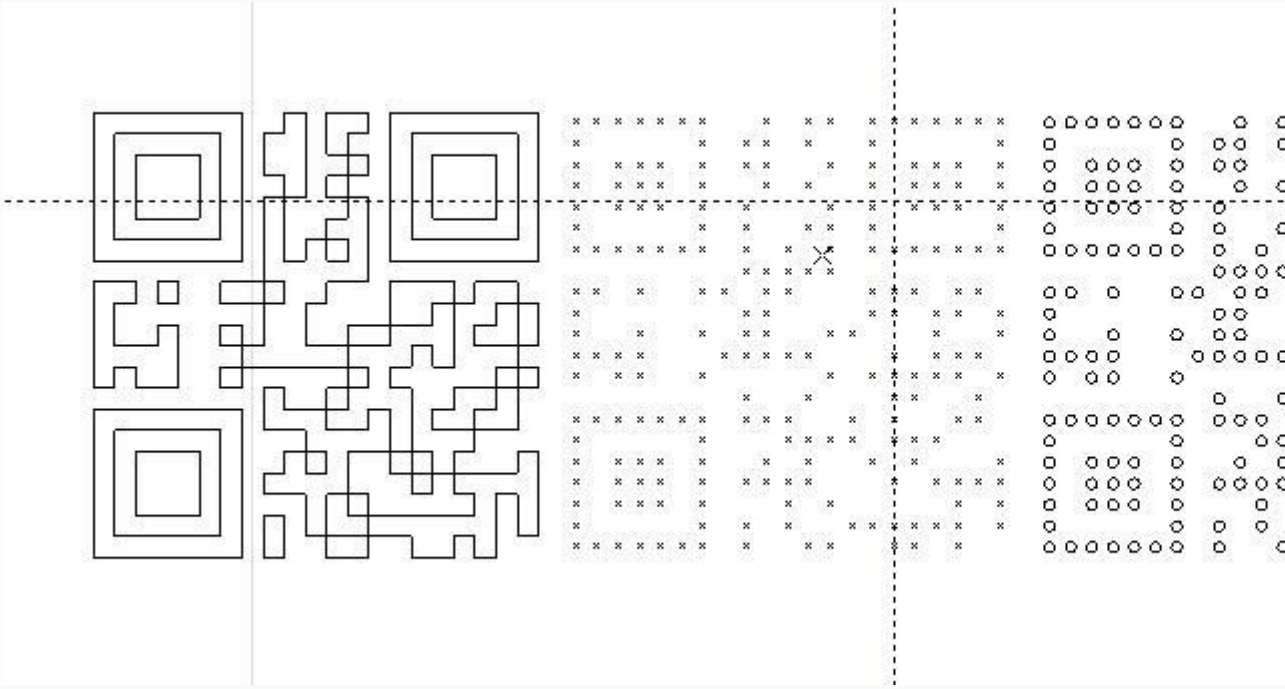

Barcode
QR code, developed by Denso company in September 1994, is a matrix two-dimensional code symbol. The QR code has the advantages of large information capacity, high reliability, and it can represent Chinese characters and images, and is
Point mode
Circle mode
Rectangle mode
Text
TEXT
Small figure width
50
%
Check reverse
White bar
Top
Left
Right
Bottom
1
1
1
1
Show text
Pen
0
Font
Arial
Text height
3
mm
Text width
1.5
mm
Text offset X
0
mm
Text offset Y
0
mm
Text space
0
mm
Standard
0.33
mm
Fix size
X
10
mm
Y
10
mm
Ratio
1
2
3
4
Bar
2
3
4
Space
1
2
3
4
Self-defined text
(#character ?delete %efficacy
Matrix
default
Error level
L
Center stay
Stay white
15
%
Confirm
Exit

Fig. 4-23 QR-Code Barcode

Custom display text： User can use commands to display the text you want to display. #- represents the character that shows the current position,? - represents the character that deletes the current position, %- represents the position number of the character that displays the current position, and -/ is a line-up display character string. For example:

Dot Mode, Circle Mode, and Rectangle Mode: Select the mode that makes up the two-dimensional code. The examples are as follows (from left to right, dot mode, circle mode, rectangle mode):



The proportion of graphics width： Set the size of the element which formed two-dimensional code. The adjustment range is from 1 to 100. It is valid only for the circle mode and rectangle mode.

Fixed size： Set the size of the two-dimensional code.

Center blank： An area will be vacated in the center area of the QR code , which will be used to place company LOGO, pictures, etc.

4.8.4. Variable Text

The Enable Variable Text will be available after ☑ 使能变量文本 is selected, and the variable text properties as shown in Fig. 4-21 will be displayed by the system. The "Variable Text" means that a text can be modified dynamically based on the rules given by the user during marking.

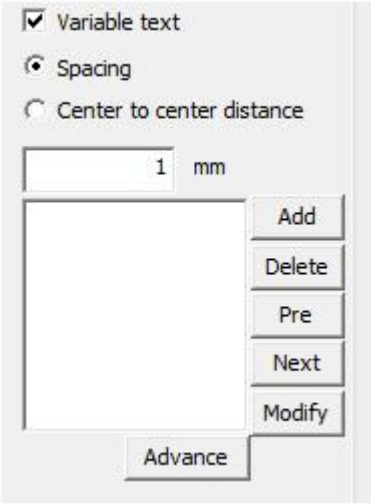


Fig. 4-24 Variable Text Properties

Distance Control: the distance between characters as per the current character arrangement pattern.

Spacing: It refers to the distance from the right boundary of left character to the left boundary of right character.

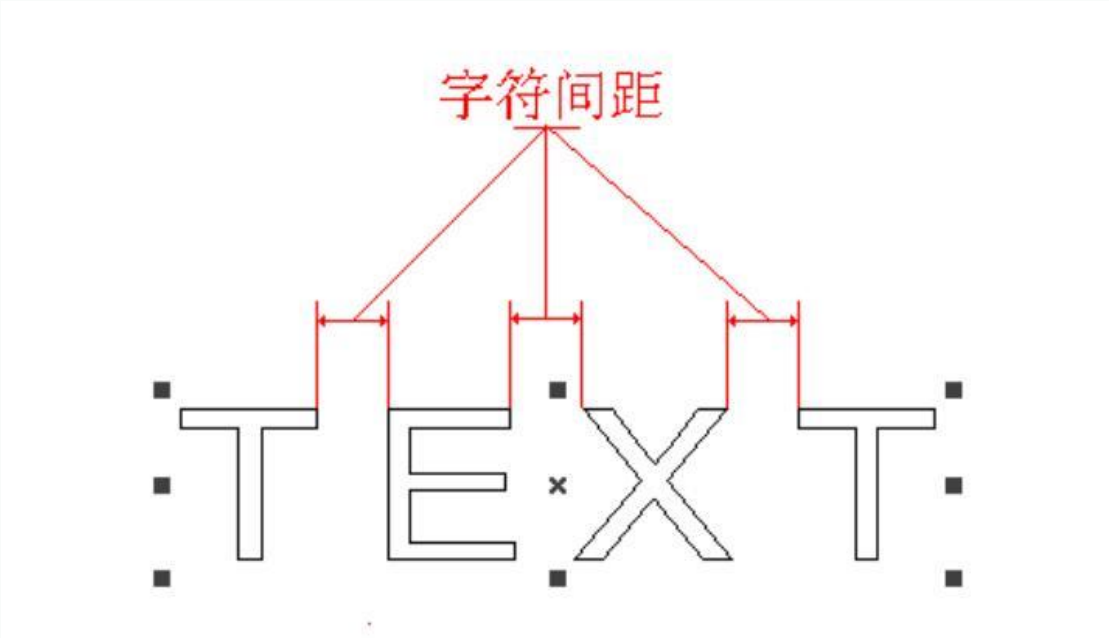


Fig.4-25 Spacing

Center Distance: It refers to the distance from the center of left character to the center of right character.as shown in Fig. 4-26

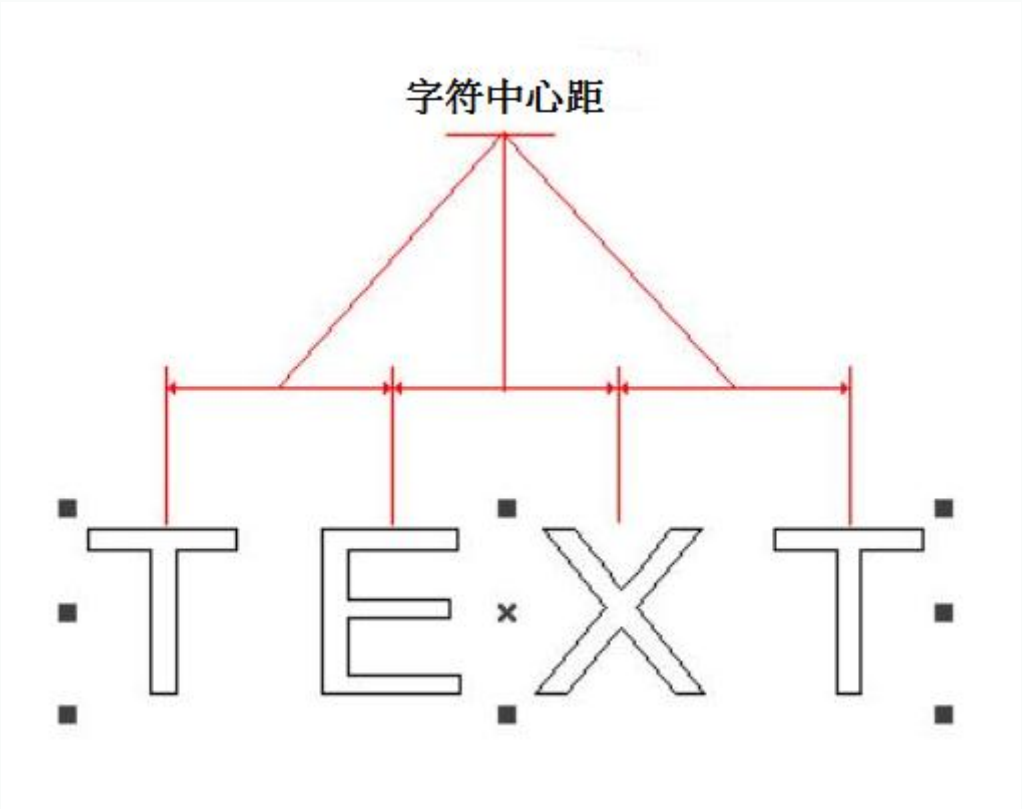


Fig.4-26 Center Distance

The user may add various variable text elements as required and sequence the text elements. After the "Add Text Element" is selected, the dialog box as shown in Fig. 4-27 will pop out.

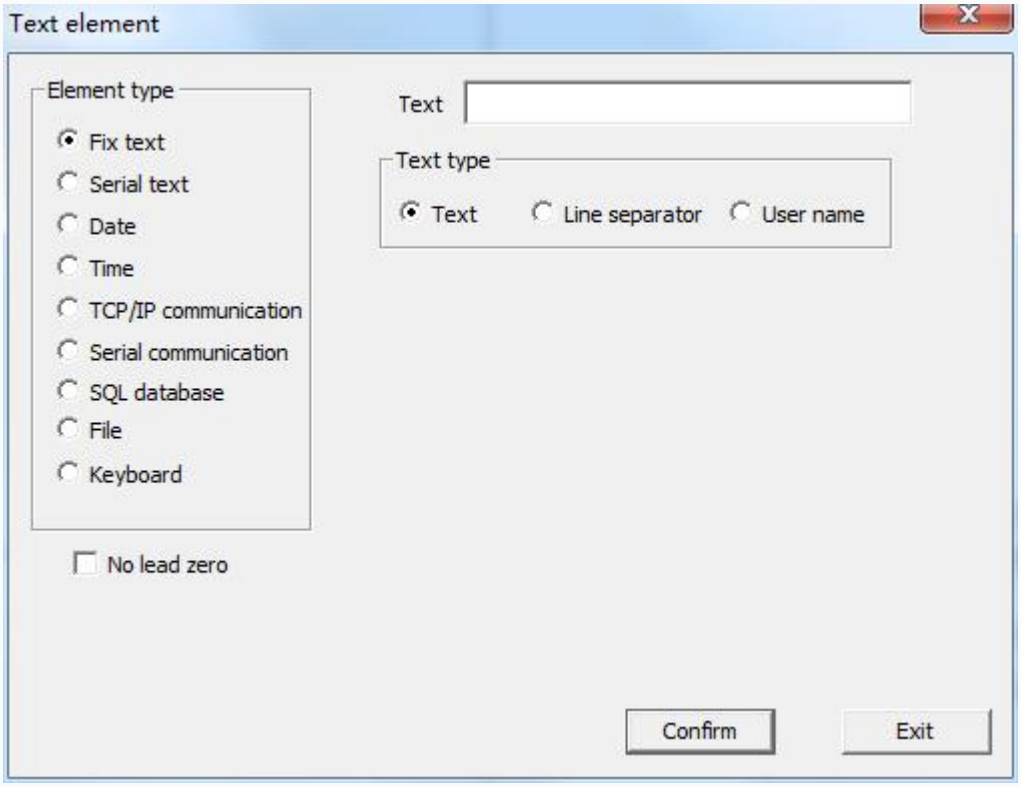


Fig. 4-27 Text Element Dialog Box

Fixed Text: It refers to the invariable element in the text during marking.

Serial Number: It refers to the element changing with the fixed increment during marking.

Date Code: The system will automatically read date information from the computer during marking.

Time: The system will automatically read time information from the computer during marking.

TCP/IP Communication: The system will read the text to be marked through the network during marking.

Serial Communication: The system will read the text to be marked through the serial port during marking.

SQL Database: The system will automatically read the text to be marked from the connected database during marking.

Text: Text to be processed are read directly from the "TXT" "EXCEL" file .

Keyboard: The elements of the text to be processed are entered by the user from the

keyboard during processing.

4.8.4.1. Fixed Text Element

It refers to the invariable element during marking.

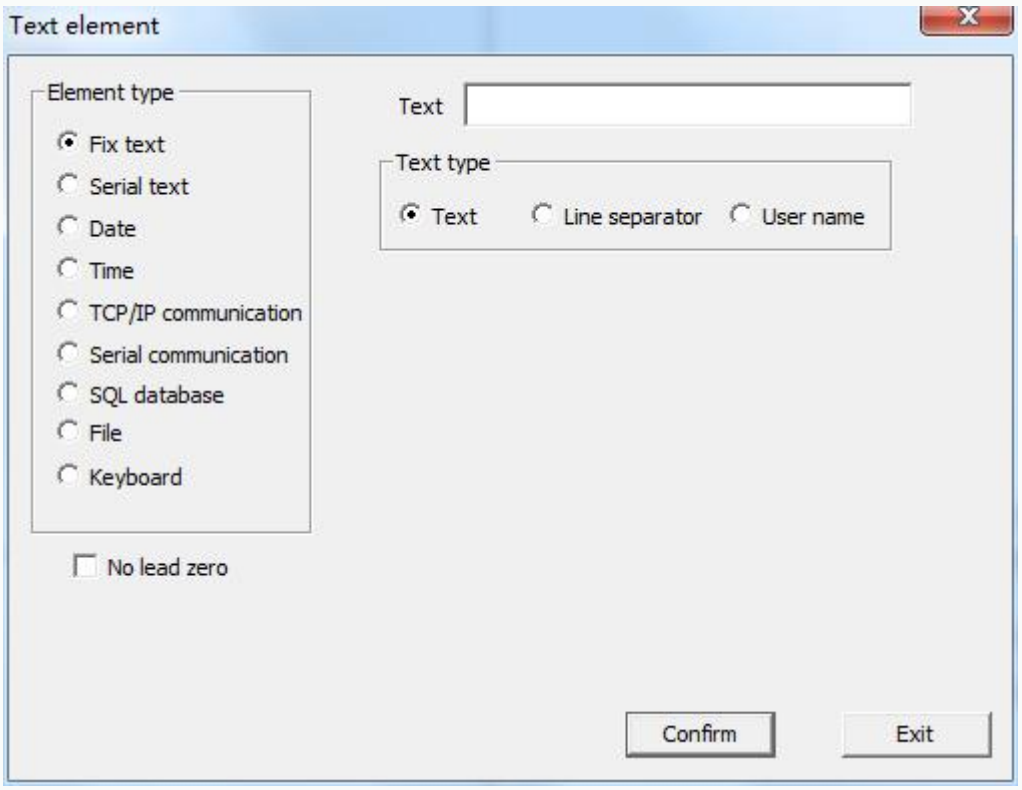


Fig.4-28 Fixed Text Element

Newline character: Applied to the variable text function to solve the problem of multiple lines that require branch marking. When applied, a new line character is added between the two texts, and the software automatically branches the text according to the position of the newline character. If multiple texts need to be split into multiple lines, simply add a line break after the text to be split

Username: When this option is selected, the system automatically replaces the current user name using SeaCAD with a fixed text.

4.8.4.2. Serial Number Element

The serial number element is a text element which changes with the fixed increment during marking.

When the Serial Number is selected, the serial number parameter definition will automatically be displayed in the text element dialog box, as shown in Fig. 4-29.

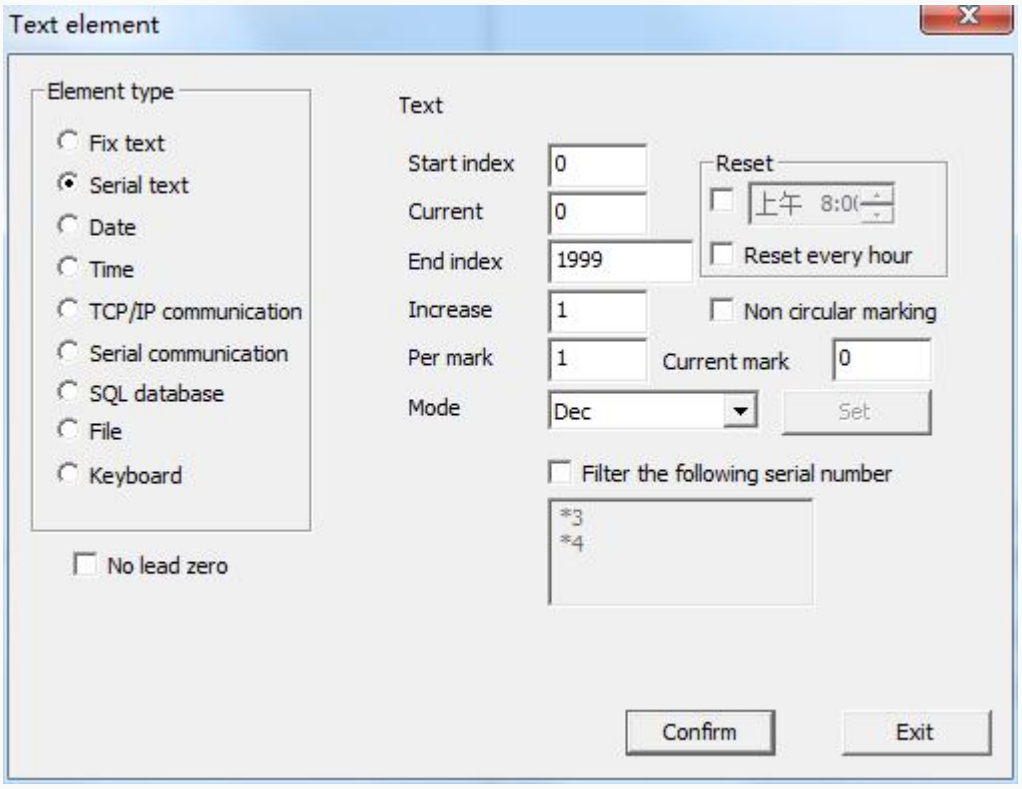


Fig.4-29 Serial Number Element

Start SN: the first serial number to be marked at the moment.

Current SN: the serial number to be marked at present.

Limit SN: When it comes to the marking of limit serial number, the system will return to the start serial number automatically.

Increment: It refers to the increment of the current serial number. When set as a negative value, the serial number will decrease progressively.

When the increment of the current serial number is 1, and the start serial number is 0000, each number will be added with 1 based on its previous number, for example, 0000, 0001, 0002, 0003 … 9997, 9998, 9999. When it comes to 9999, the system will return to 0000 automatically.

When the increment of the current serial number is 5, and the start serial

number is 0000, the serial numbers are: 0000, 0005, 0010, 0015, 0020, 0025…..and so forth.

Marks Per: the number of serial numbers to be marked required for the change of serial number per time.

Current Marks.: The marking times of the current serial number. When it equals to Marks Per, it will turn to 0 automatically.

Mode: the carry mode of the current serial number.

☐ Filter the following serial number : The system will filter out serial numbers whose certain digit is a particular value after it is selected. The *4 means that the serial numbers with 4 as the tail number will be filtered out, and the * can be numbers with any digits.

Reset: You can customize the reset time or reset every point. Every day this time, the serial number of the mark changes to the start sequence number.

☐ Non circular marking：Stop the marking task after you finish the Specified sequence number。

4.8.4.3. Date Code

Date Code: The system will automatically read date information from the computer during marking.

When the Date Code is selected, the date parameter definition will be displayed in the text element dialog box automatically, as shown in Fig. 4-22.

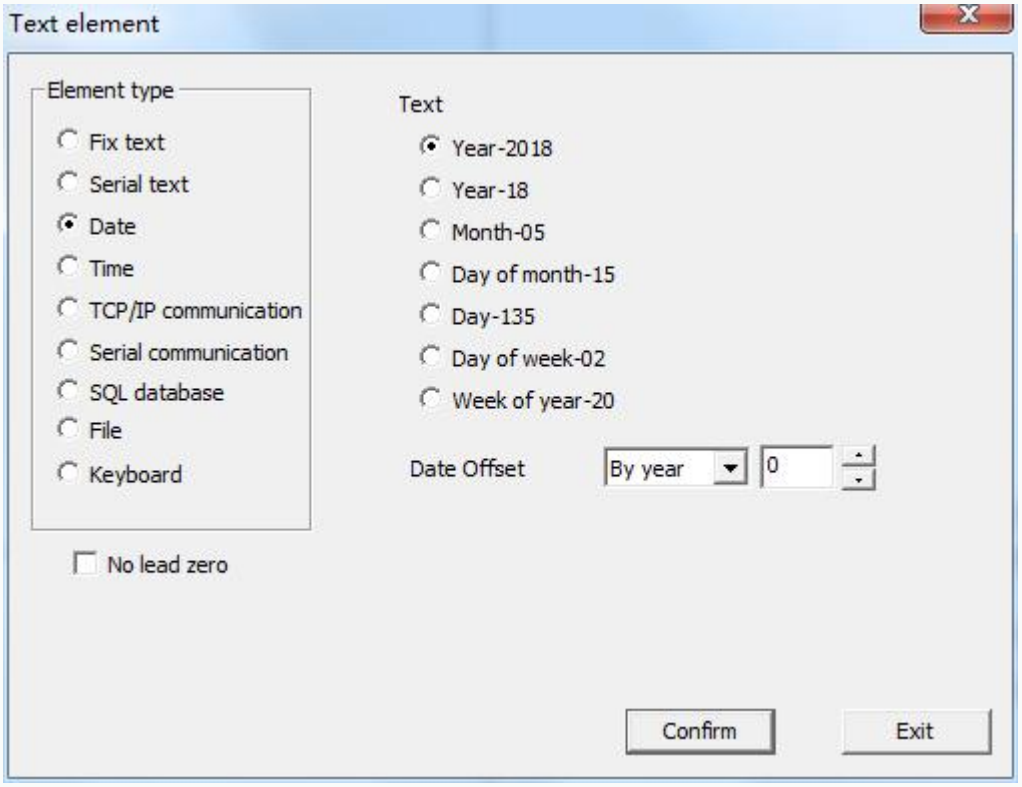


Fig. 4-30 Data Code Parameter Definition

Year-2017: takes the year indicated by the current computer clock as the corresponding text with four characters.

Year-17: takes the year indicated by the current computer clock as the corresponding text with two characters: only the latter two digits are taken.

Month-06: takes the month indicated by the current computer clock as the corresponding text with two characters.

Day-05: takes the date of each month indicated by the current computer clock as the corresponding text with two characters.

Day-156: takes the number of days from January 1 to the date indicated by the current computer clock as the corresponding text with three characters. (001 represents January 1, 002 represents January 2, and so on).

Day of Week-01: takes the day of week indicated by the current computer clock as the corresponding text with two characters.

Week of Year-18: takes the week of year of the date indicated by the current computer clock as the corresponding text with two characters (take the period

from January 1 to the first Saturday as the first week).

Date Offset: When the system reads the date indicated by the computer clock, it is necessary to add the set offset-date to obtain the marking date. This function is mainly used for the marking of workpieces with production date and shelf life in food industry and the like.

4.8.4.4. Time Element

The system will automatically read time information from the computer during marking.

When the Time Element is selected, the time parameter definition will automatically be displayed in the text element dialog box, as shown in Fig. 4-23.

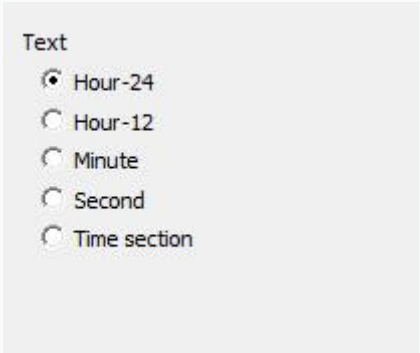


Fig. 4-31 Time Parameter Definition

Hour-24: takes the time in hour indicated by the current computer clock as the corresponding text in the 24-hour time system.

Hour-12: takes the time in hour indicated by the current computer clock as the corresponding text in the 12-hour time system.

Minute: takes the time in minute indicated by the current computer clock as the corresponding text.

Second: takes the time in second indicated by the current computer clock as the corresponding text.

Time section: 24 hours of one day are divided into 24 time sections, and the user can define a text for each time section. This function is mainly used for the

marking of workpieces requiring the shift information.

。

4.8.4.5. TCP/IP communication

When the operation is taking place, the system will pick up the text from the network.

Notice: The network interface in here is the network interface uses in TCP/IP agreement.When the user selected the "TCP/IP communication", the parameter defines will display automatically in the dialog box, see the figure 4-24:

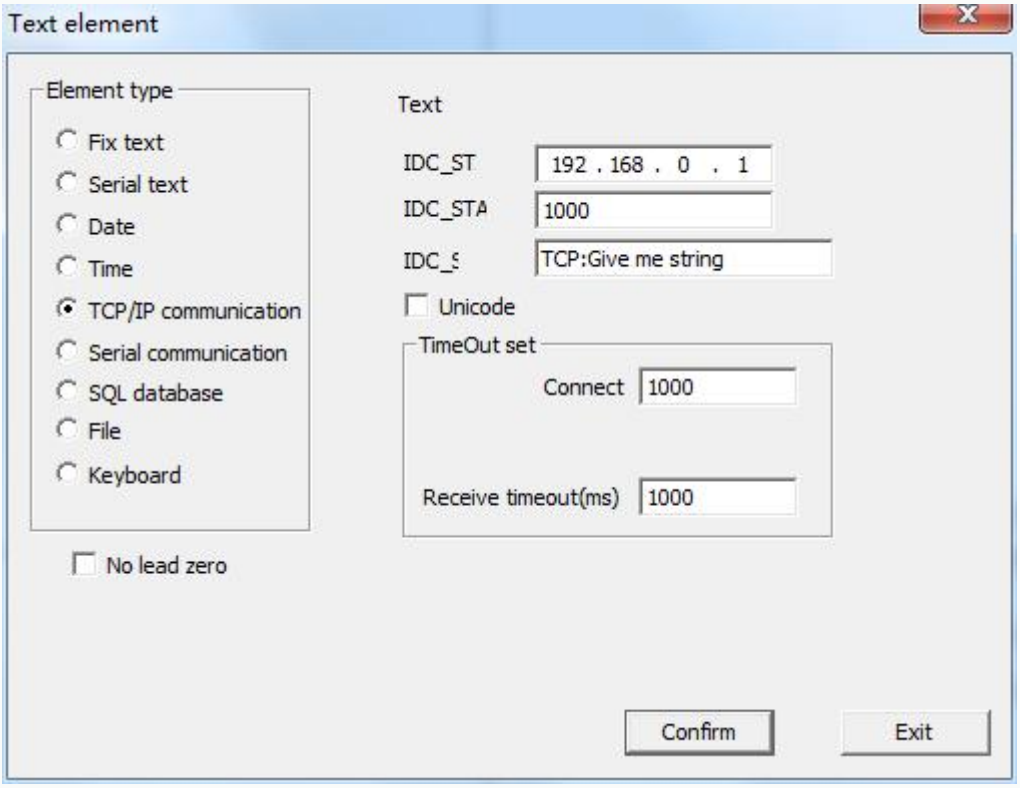


Fig.4-24 TCP/IP communication

IPAddress: select the IP address which from reads the data

Port: select the port the TCP/IP communication used

Command: When the system processes to this text object, the system through the network interface to transmit this order character string to a computer assigned the IP address,request the computer sends the

character string needs to process at present, the system will not return until the computer replied, after the response of the computer, the system will process the returns text automatically.

Unicode: After choosing this option, the system to the computer transmission which and the read character is the Unicode form, otherwise is the ASCII form.

Timeout setting: You can set the timeout period for connecting the specified IP address and receiving data.

4.8.4.6. Serial communication

When the operation is taking place, the system will pick up the text from the serial port. When the user selected the "Serial communication", the parameter defines will display automatically in the dialog box, see the figure 4-25.

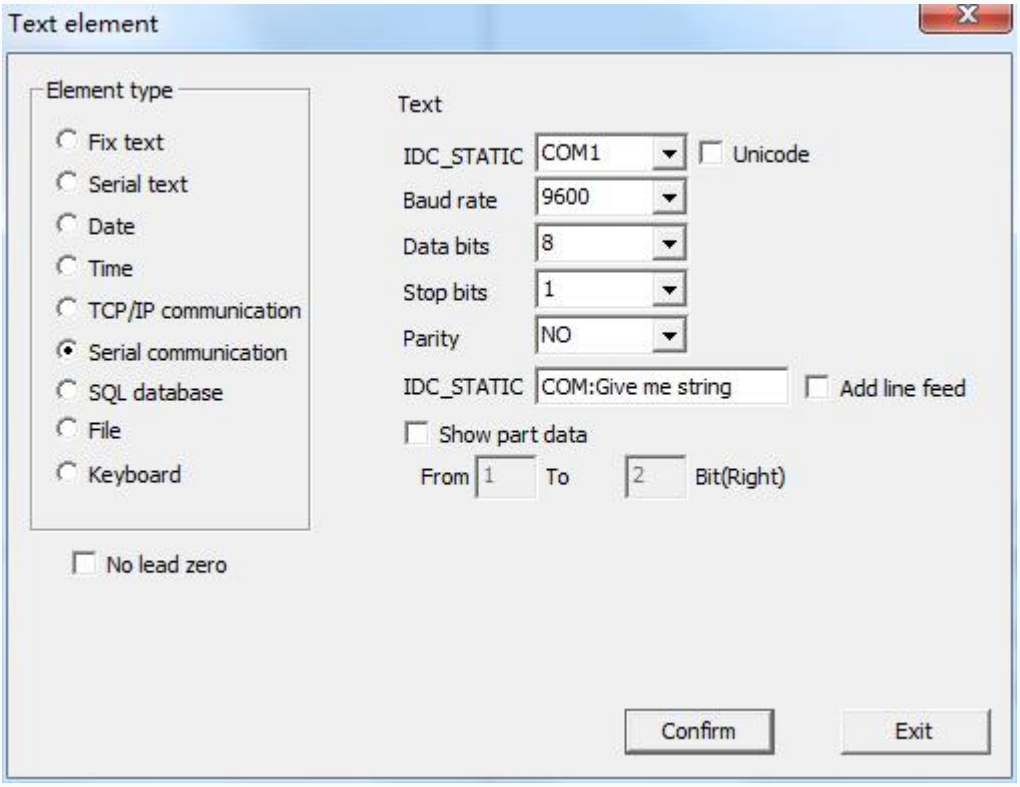


Fig.4-25 Serial communication

Port: the port which computer and peripheral equipment connection used

BaudRate: the BaudRate which the serial communication used

DataBits: the DataBits which the serial communication used

StopBits: the digits of StopBits of which the serial communication used

Parity: select the digits of Parity which the serial communication used

Command: When the system processes to this text object, the system through

the serial port to transmit this order character string to a peripheral equipment, request the peripheral equipment sends the character string needs to process at present, the system will not return until the peripheral equipment replied, after the response of the peripheral equipment, the system will process the returns text automatically

Display part of data: check to show characters between specified bits

4.8.4.7. File

TXT ： When select TXT file, a dialog box as Figure 4-26 shows will be displayed to ask for the file's name and the current text's line number.

Auto reset: If checked, the line number will change to 0 automatically when reach the last line. The next mark will start from the first line again

Read all lines: When processes to the text document direct read entire Document.

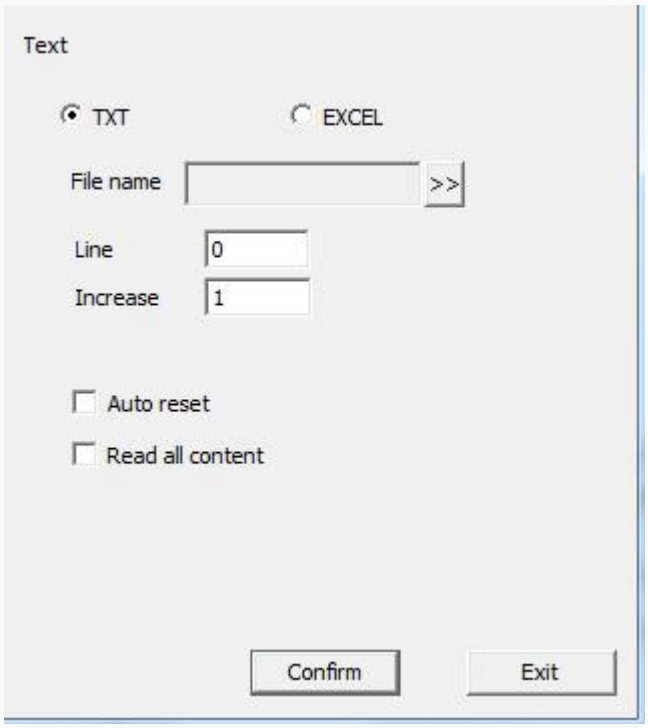


Fig.4-26 TXT

EXCEL： We have to appoint the file name, Field name, Line number to tell the software which cell in the excel table will be mark

File name: The text string of the first row in the datasheet1. This parameter

indicates which
column will be marked

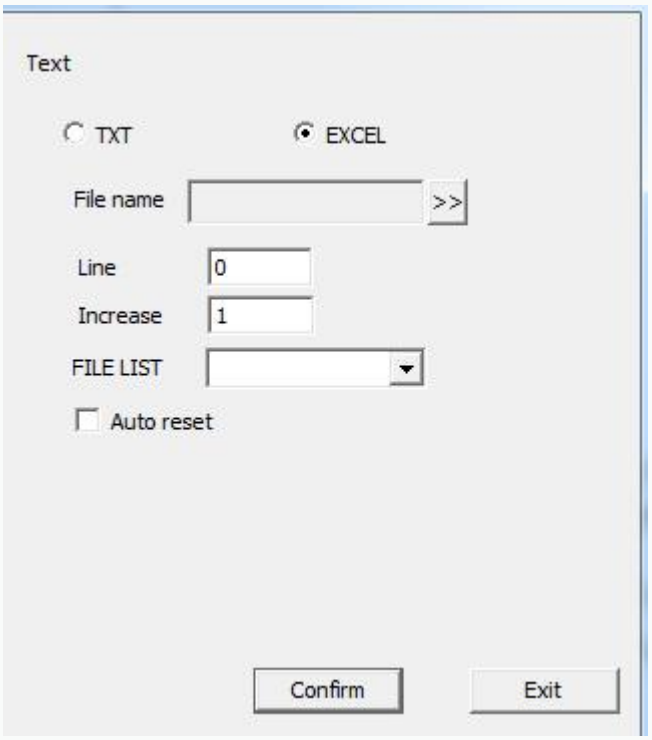


Fig. 4-27 EXCEL

4.8.4.8. Keyboard

The keyboard element is the text which must process from the keyboard entry by the user,when select the keyboard element, a dialog box as Figure 4-47-a shows will be displayed to ask for the user set the keyboard element parameter

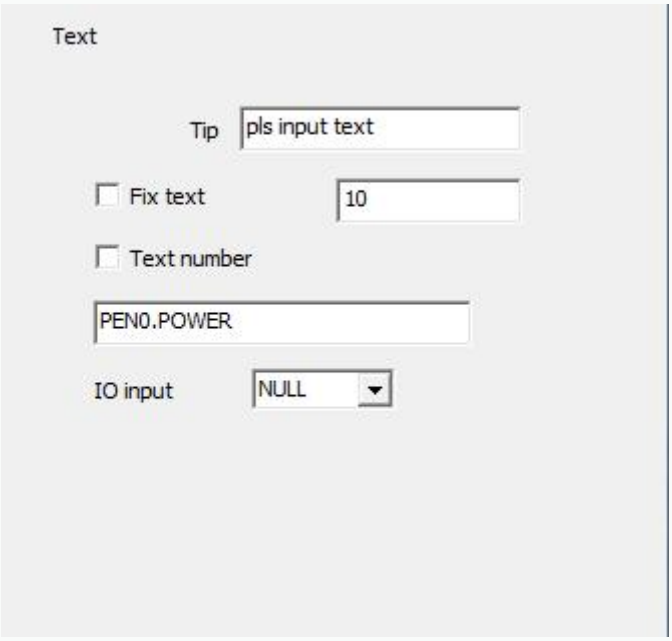


Fig.4-28 Keyboard

Fixed char count: user must input string with digit equals to this count

.

Set Pen Param: When selected, we can get power, speed, frequency from the keyboard entry,only through setting pen*.power, pen*.speed or pen*.freq. The "*" is number of pen.

The keyboard element function uses frequently in this kind of situation when the processing needs the real-time input to the processing content. If the customer present need processes one batch of work pieces, on each work piece is printed with a bar code, when processing needs the user with the bar code scanning gun real-time scans the work piece to read the content on the bar code, then with laser to mark to the work piece assigns in the position, at this time can use the keyboard element function. At the processing time system springs like the figure 4-30 shows the dialog box, the operator with the bar code scanning gun scanning bar code work piece on, the bar code scanning gun inputs the read content to the dialog box inside and closes it automatically, then the system will start to process the content read a moment ago automatically .

4.8.4.9. Advance Function

After the "Advance" function is selected, the dialog box as shown in Fig. 4-29 will pop out.

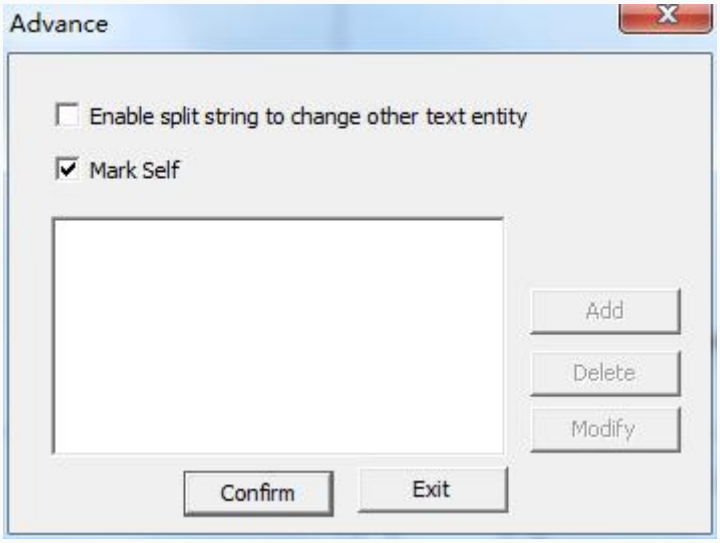


Fig.4-29 Advance Function

- **Mark Self:** In certain situations, when the user needs to split the variable text and then mark them in different positions, and also needs to mark the variable text, this function is applicable. It is conducted by setting the parameters for character splitting and selecting "Mark Self". During marking, besides the split character, all input variable texts will be marked in corresponding positions.

- Select **"Enable Split String to Change Other Text Entity"**, and click "Add" button to get the dialog box as shown in Fig. 4-30.

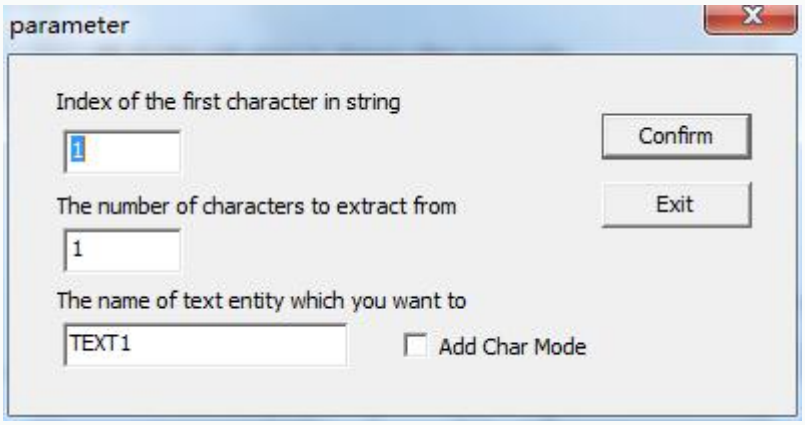


Fig.4-30 Advance Function

Index of the First Character in String: the order of the first character in the character string of variable TEXT1 text.

The Number of Characters to Extract from String: extracts a certain number of characters starting from the first character in the character string of variable text.

The Name of Text Entity Which You Want to Change: When it is selected, it is necessary to input the name of a fixed text for the character to be split and read.

Add Char Mode: when it is selected, the split and read character will be added to the position following the fixed text.

For example:

1. Create a new variable text (take a variable serial number text as an example)

2. Click "Advance" in the Variable Text Properties Toolbar, and select "Enable Split String to Change Other Text Entity", as shown in the following figure:

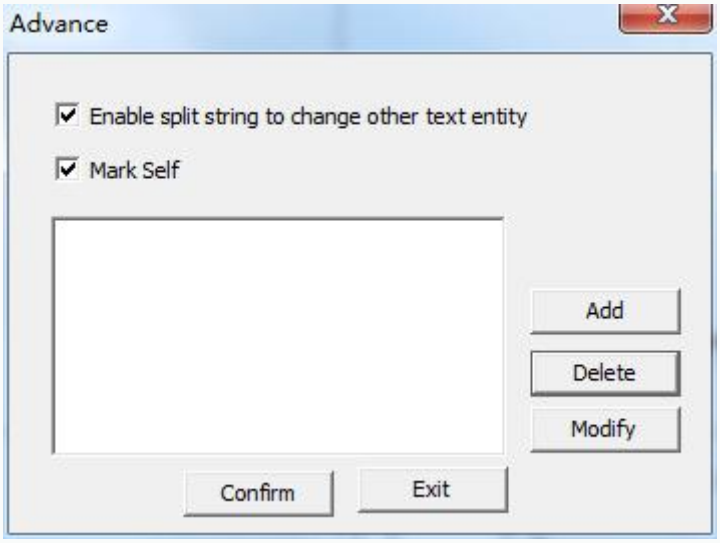


Fig.4-31

3. When "Add" is clicked, the following dialog box will pop out (it means that two characters starting from the first character in the variable text are extracted to replace the content in the fixed text entity with an indicated name)

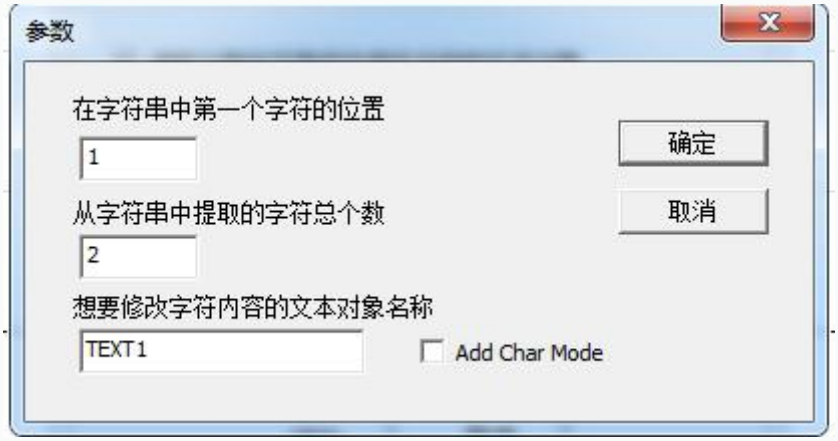


Fig.4-32

4. After clicking OK, draw another fixed text entity, and modify its name as per the name set as above.

4.9. Bitmap

4.9.1. Input Bitmap

To add a bitmap, the user can select the "Bitmap" command in the Draw Menu or click the icon .

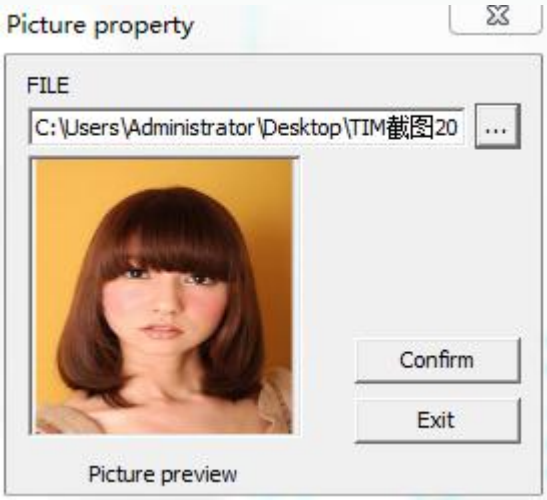


Fig. 4-33 Bitmap Inputting Window

The system will pop up the input dialog box as shown in Figure 4-33 and ask the user to select the bitmap to be input. The currently supported bitmap formats are: Bmp; Jpeg,;jpg; Gif; Png; Tiff; Tif; Emf. The system will automatically display the picture of the current file in the preview box, and

will also put the center of the current picture on the origin of the coordinates.

After entering the bitmap, the property toolbar displays the bitmap parameters as shown in Figure 4-34.

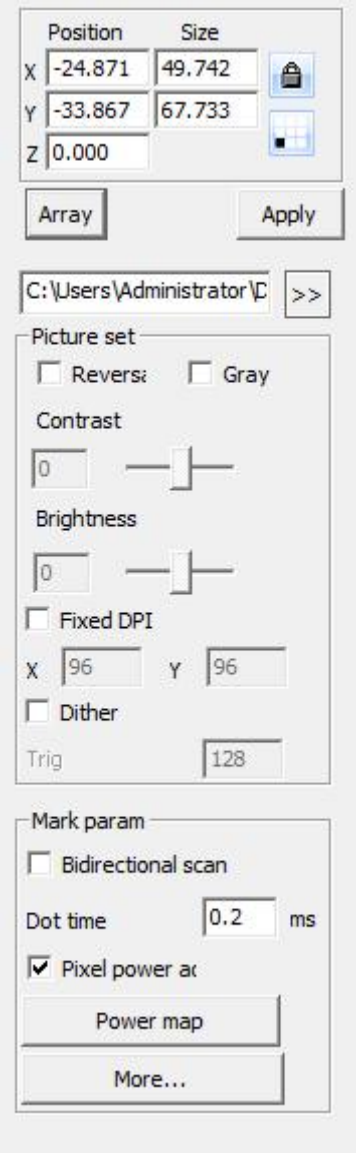


Fig.4-34 Bitmap parameters

4.9.2. Invert

Invert: takes the opposite color value for each point of the current image, as shown in Fig. 4-35.

Fig. 4-35 Inverted Image

4.9.3. Grey Scale

changes a color image into a 256-level grey scale image, as shown in Fig. 4-36.

Fig. 4-36 Grey Scale Marking

4.9.4. Fixed DPI

It is similar to the resolution of images. When the DPI value of the original bitmap is not fixed or unclear, the fixed DPI value can be set by means of "Fixed DPI". The higher the DPI level is, the closer the dots gather, the higher the photo precision is and the longer the marking time is.。

4.9.5. Dither

Dither: This effect is similar to the "Halftone Pattern" function in Adobe PhotoShop. It uses a black-and-white image to simulate a grey scale image

and achieves different grey scale effects by adjusting the density of points based on black and white colors, as shown in Fig. 4-37.

Fig.4-37 Dither

4.9.6. Bidirectional Scan

The scanning is bidirectional during the marking of bitmaps.

4.9.7. Drill Mode

Determines whether the laser is kept on or for a scheduled period for each pixel during the marking of bitmaps.

4.9.8. Adjust Power

Determines whether the laser's power is adjusted according to the grey scale of each pixel during the marking of bitmaps.

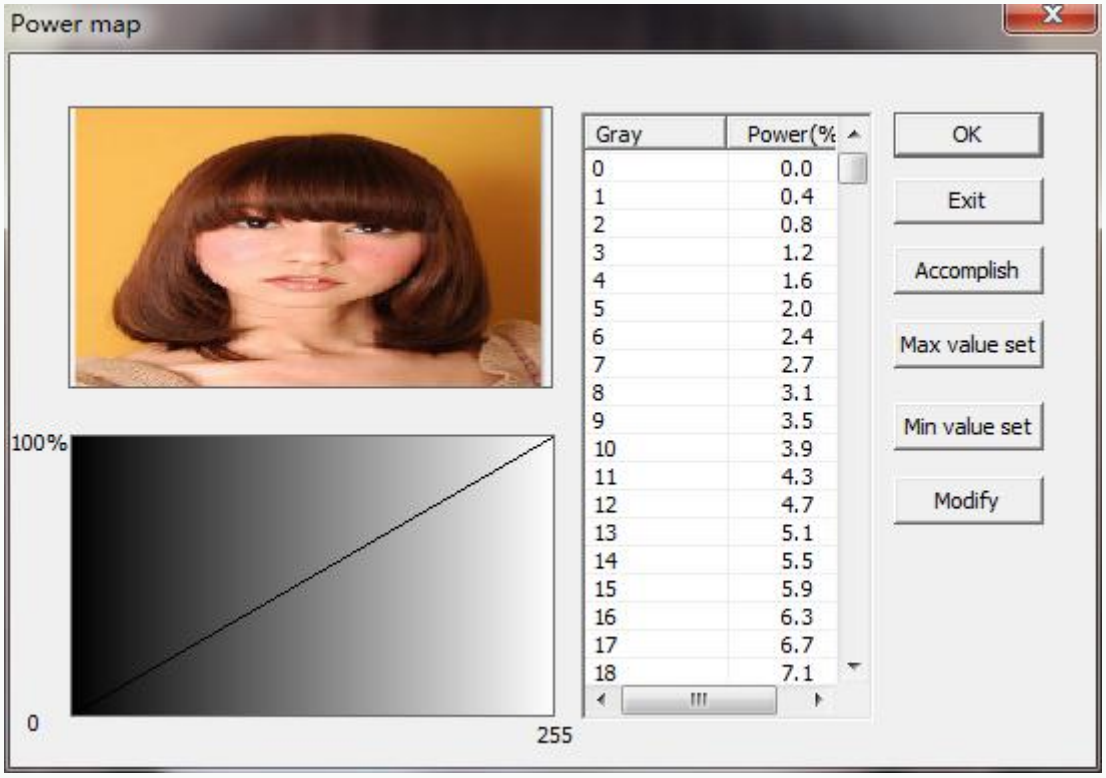


Fig.4-38 Power Map

4.9.9. Expand Parameter

Expand Parameter: Figure 4-39 。

Y Scan: The scan will run along Y axis line by line

Scan line Increment: This item indicates whether to scan line by line or skip some lines. This function may quicken the marking speed when in low precision marking requirement

Disable Mark Low Gray Point: This item indicates that every point is marked or only marking bigger gray points. This function may quicken the marking speed when in low precision marking requirement

Line feed malposition: The point isn't aligned between two adjacent rows, but the point is aligned with the position which is the middle of two points in the previous line, to avoid the trace of marking 。

Optimize Mode: calculate the marking speed according to the DPI and frequency to optimize marking speed and result 。

ACC.Distance:this parameter is used for remove the offset of BiDir scan

model

BiDir Offset: improve the edge not alignment marking problem

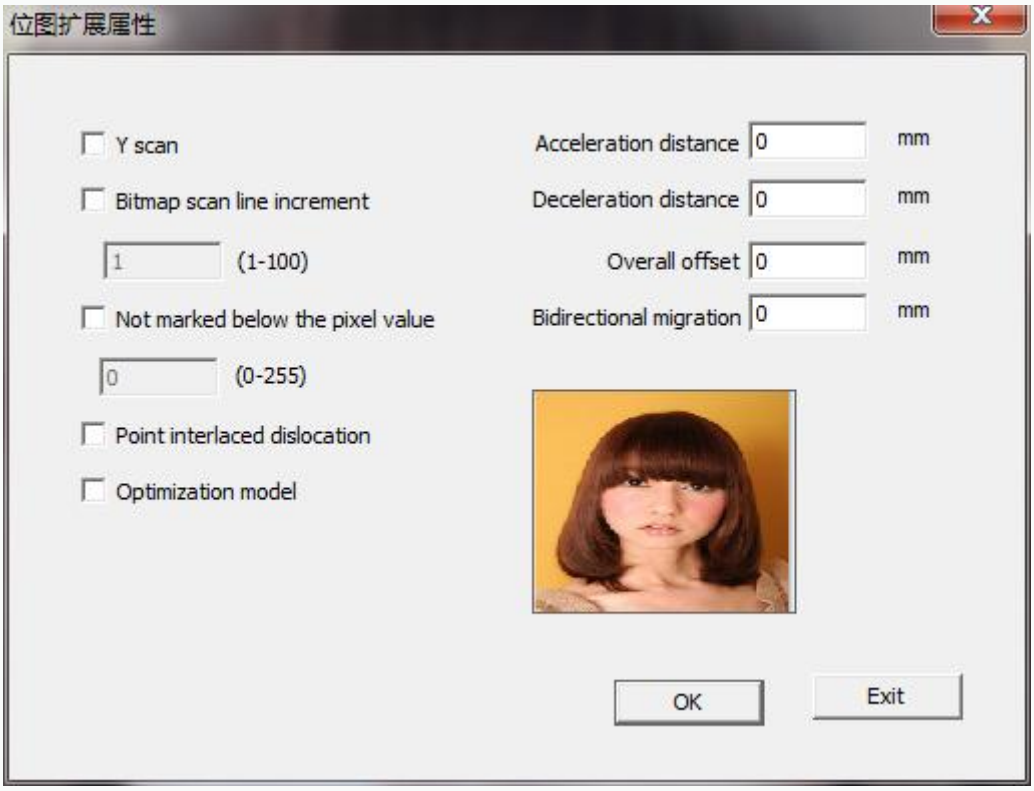


Fig.4-39 Expand Parameter

4.10. Vector File

To input a vector file, the user can select the "Vector File" command in the Draw Menu or click the icon .

The bitmap formats supported by the current system include PLT and DXF. The Fig. 4-40 shows the result of vector image import.

Fig. 4-40 Vector Image Import

4.11. Time-lapser

To input the control object of delayer, the user can select the "Delayer" command in the Draw Menu or click the icon.

When the "Delayer" is selected, the delayer property as shown in Fig. 4-41 will be displayed in the Properties Toolbar.

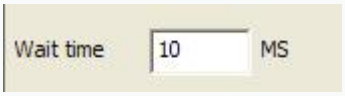


Fig. 4-41 Delayer Property

Waiting time: When the marking comes to the current delayer, the system will wait for a scheduled period and then continue to operate.

4.12. Input Port

To input the control object of input port, the user can select the "Input Port"

command in the Draw Menu or click the icon .

After the "Input Port" is selected, the input port properties as shown in Fig. 4-31 will be displayed in the Properties Toolbar.

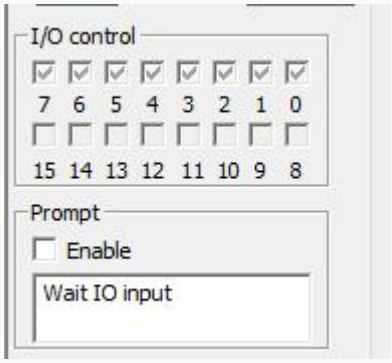


Fig. 4-42 Input Port Parameters

I/O Control Condition: When the marking comes to the current input port, the system will read the input port and compare the read value with the I/O Control Condition; if the two equal, the system will proceed to the following ports, and otherwise it will read the port again.

Message: It is given by the system when it reads the port repeatedly and waits for the matching between the port value and the I/O Control Condition.

4.13. Output Port

To draw the control object of output port, the user can select the "Output Port" command in the Draw Menu or click the icon .

After the "Output Port" is selected, the output port property as shown in Fig. 4-43 will be displayed in the Properties Toolbar.

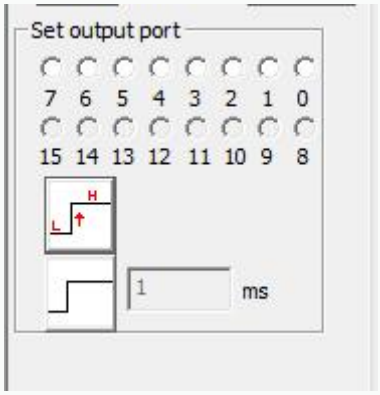


Fig. 4-43 Output Port Parameters

The system will provide the port with high-level voltage when the marking comes to the current output port.

The system will provide the port with low-level voltage when the marking comes to the current output port.

The system will provide the port with a level signal and keep it.

The system will provide the port with a pulse signal and it can set the pulse width.

4.14. External Axis

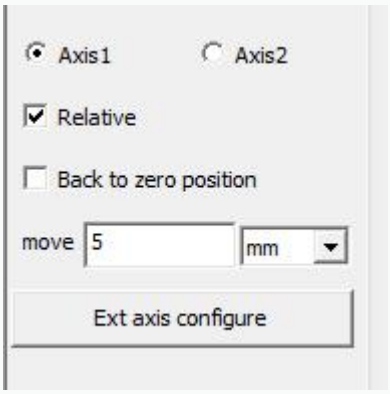


Fig.4-49 External Axis

External Axis 1、 External Axis 2： Select which external axis to use for operation.

Correct axis origin: The current expansion axis go zero and reset coordinates.The following example explains how to use this module.

Relative position: It means the origin is used as the reference when the motor moves

Number of moving pulses: how many pulses are sent to the motor, and the number of pulses indicates the motor movement distance.

Unit： unit of motor movement distance

4.15. Encoder Movement Distance

When the "Encoder Movement Distance" command in the Draw Menu is selected, the "Encoder Movement Distance" will be displayed in the Object List as shown in Fig. 4-50

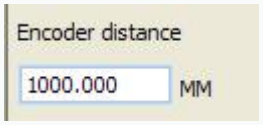


Fig. 4-50 Dialog Box of Encoder Movement Distance

"Encoder Movement Distance" is mainly used for detecting the movement distance of flying objects during the process of mark on the fly.

4.16. Helical Line

The helical line can be added to objects outside the frame and the following parameters can be set: equal pitch, unequal pitch and helical line setting from inward to outward or from outward to inward, as well as the minimum radius, the minimum and maximum pitches of helical line, variation of pitch, number of rings of outer and inner boundaries, etc., as shown in Fig. 4-51:

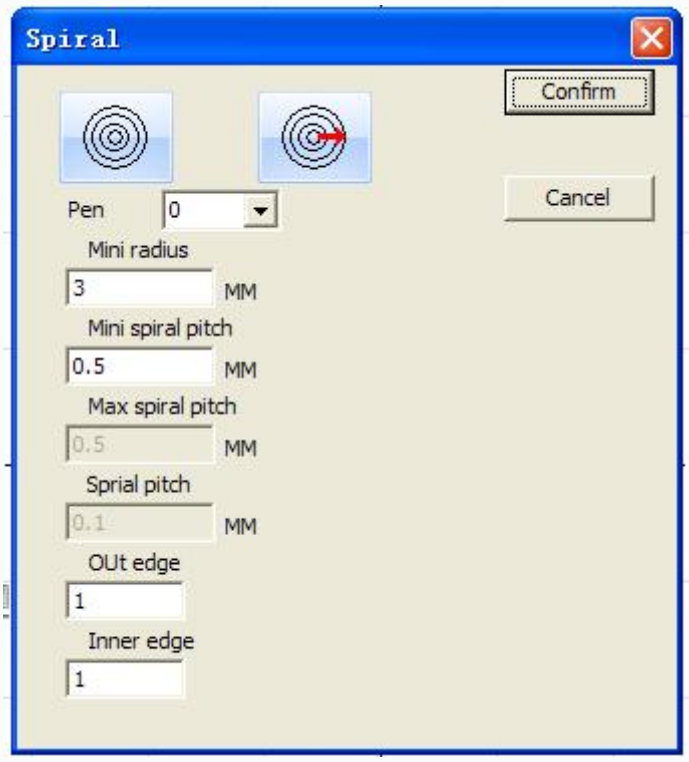


Fig. 4-51 Helical Line Setting Dialog Box

4.17. Graph Selection

The icon on the top of the Draw Toolbar is used for graph selection. The depressed state of the icon indicates that the command is selected at that time if no other command is selected, and you can select an object by clicking objects in the workspace with the mouse. The software has the "Auto-snap" function, and you can select an object by clicking the left mouse button if the mouse cursor is near a curve in the workspace.

You can also press the left mouse button and move the mouse to select an object, and there will be a dashed frame in the area where the mouse moves through. Objects wholly included in the dashed frame will be selected.

When the "Select" command is selected, the Select Toolbar will be displayed, and you can realize some particular operations, as shown in Fig. 4-44:

Fig. 4-44 Select Toolbar

It means that the current object is locked and you can't conduct any editing operations on it. Some lock-like icons will appear around the object at that time.

It means unlocking locked object selected currently.

It means unlocking all the locked objects.

It means placing the selected object to the origin.

It means selecting objects by the pen number. The dialog box as shown in Fig. 4-45 will be displayed after the command is selected.

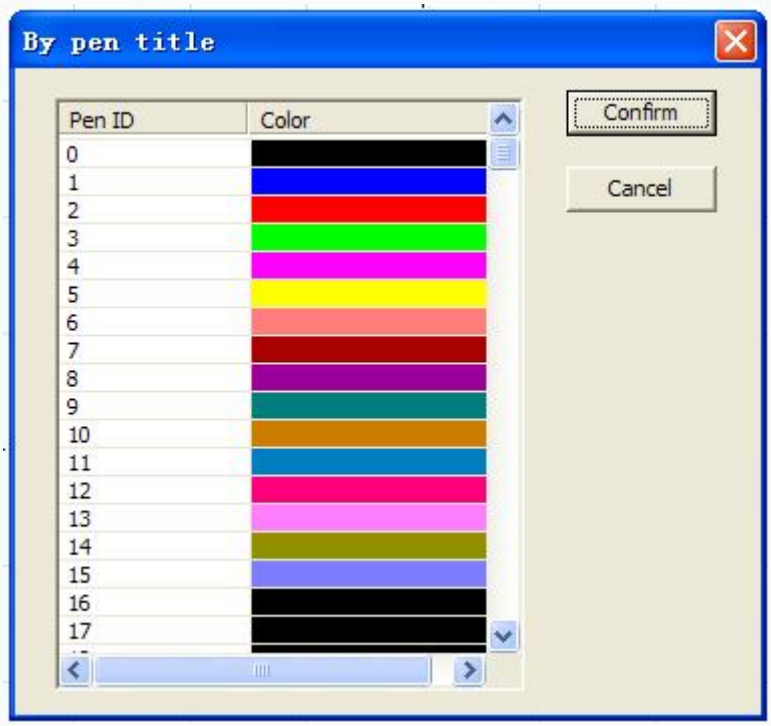


Fig. 4-45 Dialog Box of Selection by Pen Number

Indicates that the current selection object will be mirrored horizontally。

Fig.4-46 Mirrored horizontally

Indicates that the current selection is vertically mirrored：

Fig.4-47 Vertically mirrored

Show or hide the current figure's marking path ：

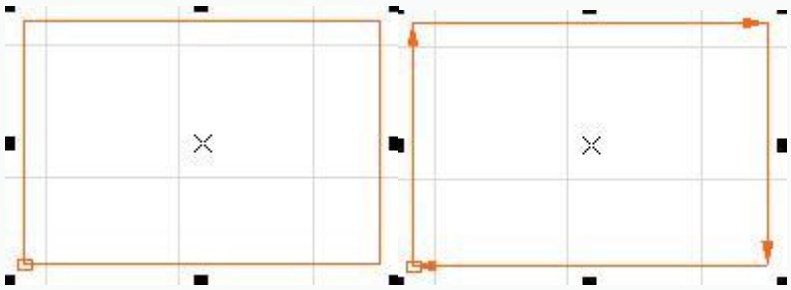


FIg.4-48 Figure's marking path

5. Modify Menu

Commands in Modify Menu will take easy operations on selected objects, such as transformation, Plastic, Curve Editing, Aligning, etc. (Fig. 5-1)

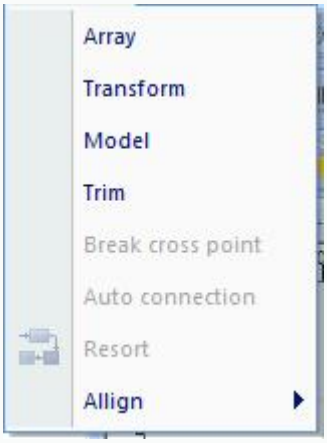


Fig. 5-1 Modify Menu

5.1. Array

Click "Array", we can see the dialog box as shown in Fig. 5-2:

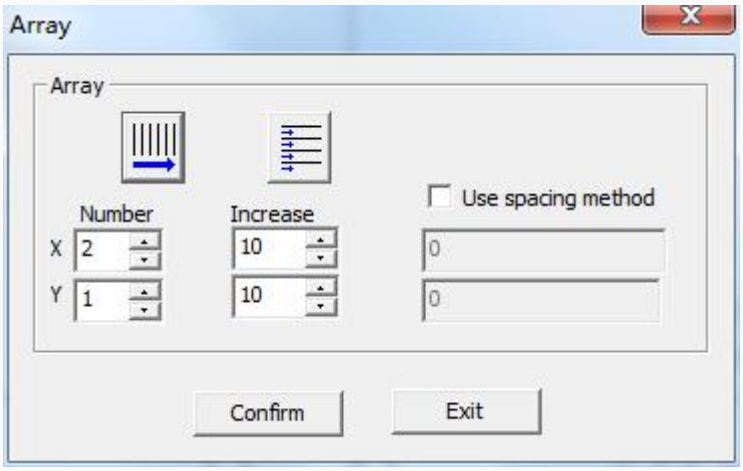


Fig. 5-2 Array Dialog Box

Rectangle: The graph according to rectangle array.

Circle: The graph according to circle array.

: Present the graph in undirectional array as per marking sequence.

: Present the graph in bidirectional array as per making sequence.

Array Num: The row number.

Array Num: The column number.

Array: The space between two objects on X direction.

Array: The space between two objects on Y direction.

Calculate by Offset Distance: The space of the graphs is calculated by offset distance. (Fig. 5-3 (a))

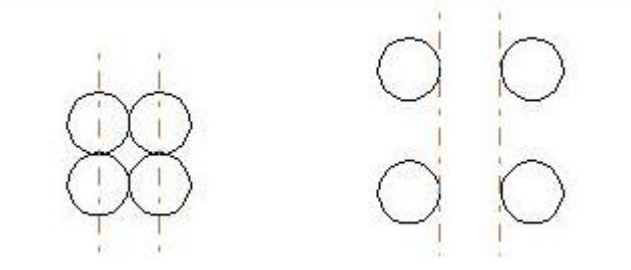


Fig. 5-3 (a) Calculate by Offset Distance (b)

Calculate by Graph Distance: The space of the graphs is calculated by graph distance. (Fig. 5-3 (b))

If we select the array type of "Circle", we can see the dialog box as shown in Fig. 5-4:

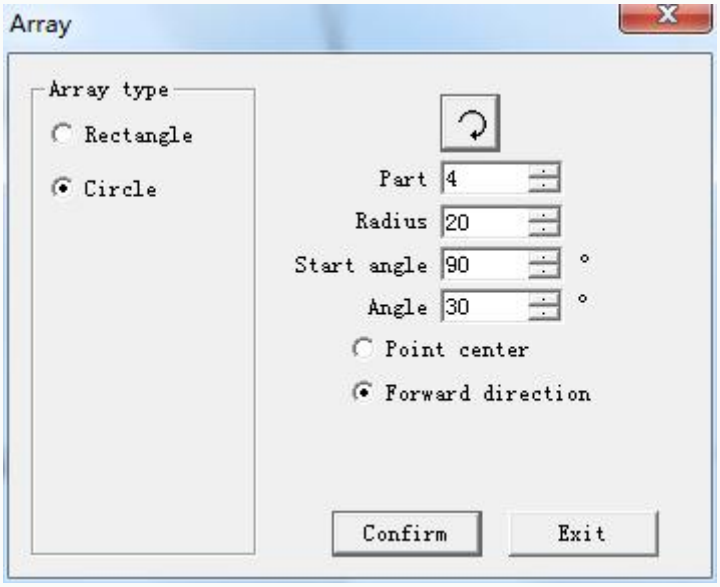


Fig. 5-4 Array Dialog Box (Circle)

: The graph's array is clockwise or anticlockwise, which sets the marking

sequence.

Array Number: The graph number.

Radius: The radius of the circle.

Start Angle: The angle between the starting graphs of the circle.

Angle: The angle between two graphs.

5.2. Transformation

When selected, a parameter setting box will appear as shown in Fig. 5-5.

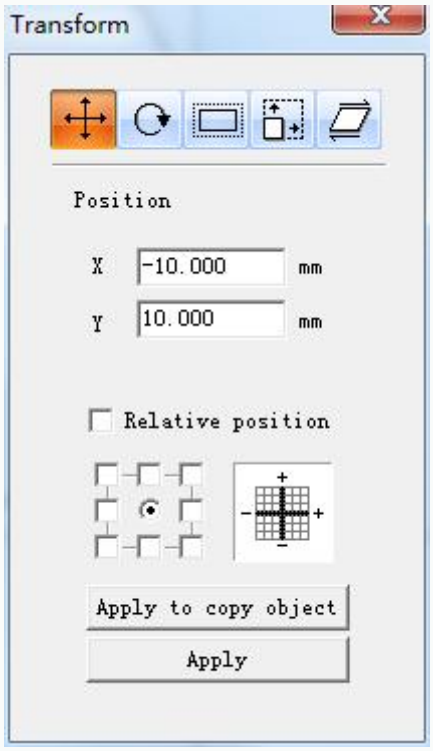


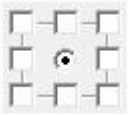
Fig. 5-5 Transformation Setting Box

5.2.1. Move

: Stroll tool for moving objects

Position: The coordinates of the currently selected object datum mark.

This function is the same as the Position which is introduced in object label of properties toolbar in Chapter 2.

 Select a datum mark of an object.

Relative Position: use relative coordinates

Apply: Activate the modification.

Apply to copy object: This item is used to copy the currently selected object and move it into a new place.

5.2.2. Rotate

: Rotate your object.

When selected, a parameter setting will appear in the Rotation Setting Dialog Box as shown in Fig. 5-6.

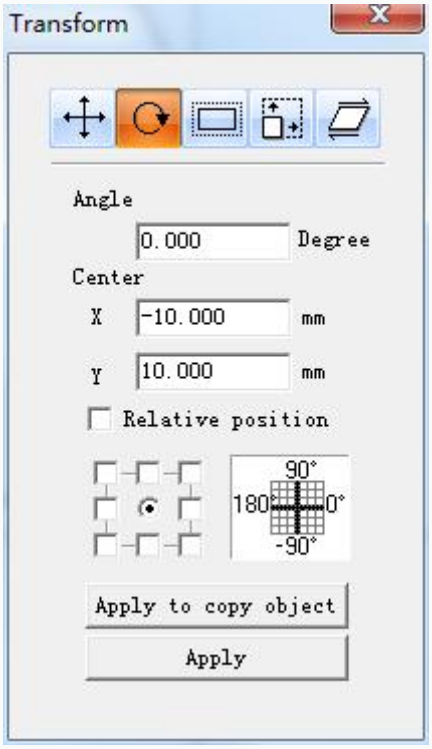


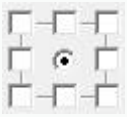
Fig. 5-6 Rotation Setting Box

Angle: Angle to rotate.

Center: The coordinates of the currently selected object's datum mark.

This function is the same as the Center which is introduced in object label of

properties toolbar in Chapter 2.

 : Select a datum mark of an object.

Relative Center: Change the current coordinates into relative coordinates.

Apply: Apply. Let the modification of the current object active.

Apply to copy object: This item is used to copy the currently selected object and rotate it into a new place.

5.2.3. Mirror

: Mirror the currently selected object.

When selecting mirror command, a parameter setting box will appear as shown in Fig. 5-7.

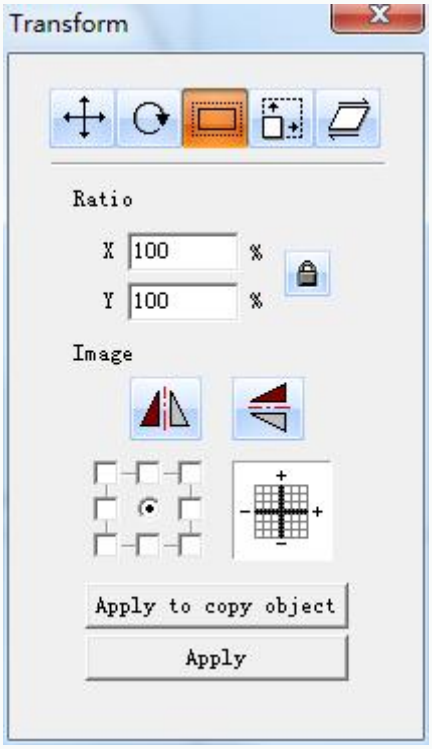


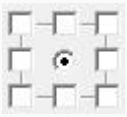
Fig. 5-7 Mirror Setting Box

Scale: The zoom ratio of the X/Y size after being mirrored.

: The current object's horizontal mirror.

: The current object's vertical mirror.

The vertical mirror and horizontal mirror can be activated at the same time, activate the corresponding mirror functions as per requirements in actual use, and make sure not to press the function that is not required.

 : Select a datum mark of an object.

Apply: Let the modification of the current object active.

Apply to copy object: This item is used to copy the currently selected object and mirror it into a new place.

5.2.4. Zoom

: Zoom your objects.

When selected, a dialog box will appear as Fig. 5-8.

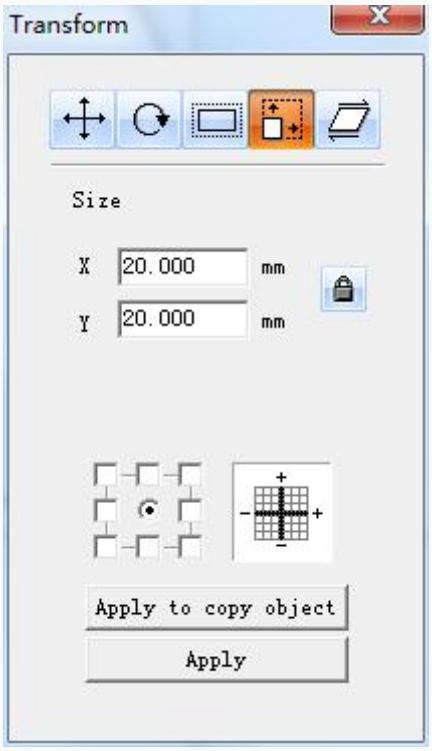
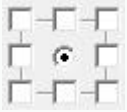
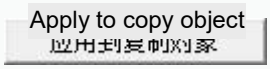


Fig. 5-8 Zoom Setting Box

Size: The size after zooming. This function is the same as the Size which is introduced in object label of properties toolbar in Chapter 2.

 : Select a datum mark of an object.

: Let the modification of the current object active.



: This item is used to copy the object and zoom it into a new place.

5.2.5. Lean

: Lean the currently selected object

When selected, a parameter setting box will appear as shown in Fig. 5-9.

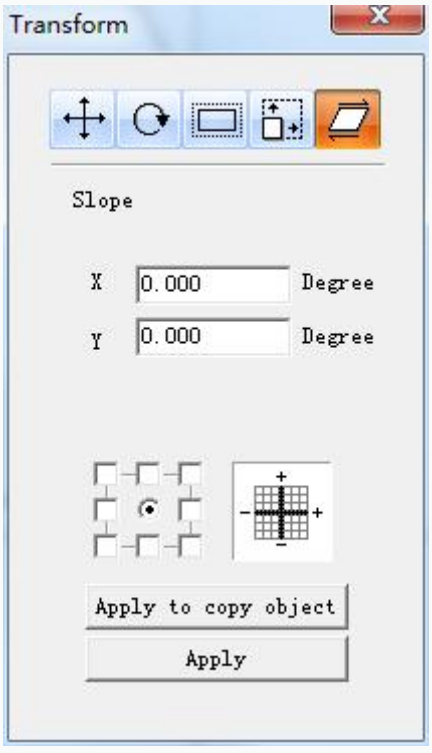
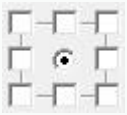


Fig. 5-9 Lean Setting Box

Angle: The angle the object leans.

 : Select a datum mark of an object.

Apply: Let the modification of the current object active.

Apply to copy object: This item is used to copy the currently selected object and lean it into a new place.

5.3. Plastic

When selected, a parameter setting box will appear as show in Fig. 5-10.

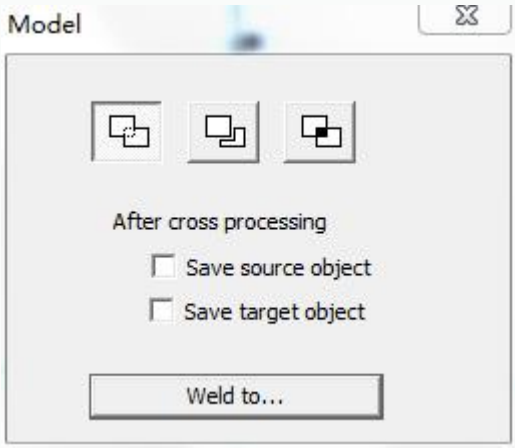


Fig. 5-10 Plastic

: Joint two close intersect areas into one.

: Shear a close intersect area contained in another.

: Pick up the intersect part of two close intersect areas.

5.4. Trim

Trim is used for shearing curve in graph. After users select it and when the mouse is moved to the curve to be sheared, the mouse will be of a scissor shape and the the curve to be sheared will become light blue, as shown in Fig. 5-11. By clicking the left mouse button at this time, the curve will be sheared.

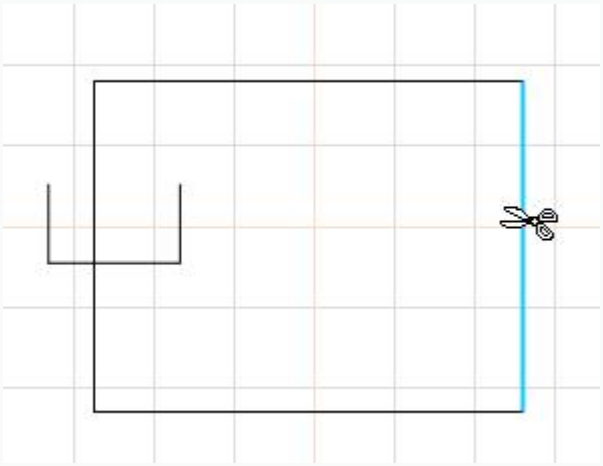


Fig. 5-11 Example of Trim Operation

5.5. Break Cross Point

When users click "Break Cross Point", the following dialog box as shown in Fig. 5-14 will pop-up:

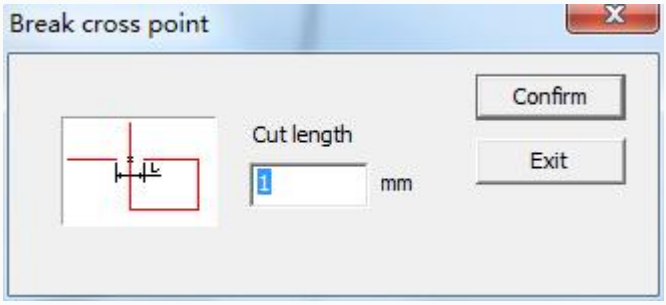
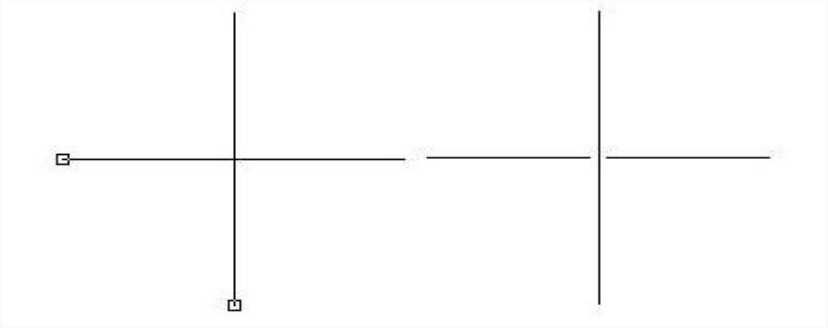


Fig. 5-12 Dialog Box of Breaking of Cross Point

Length of Cross Point: It means the length of the cross line part that we designed, as shown in Fig. 5-12. Take the following Fig. 5-13 for example:



(a) Before Breaking Cross Point (b) After Breaking Cross Point

Fig. 5-13 Example of Breaking Cross Point

5.6. Auto-Connect:

When selected, a dialog box will appear as shown in Fig. 5-11.

Auto-Connect Error: If the distance between two curves' starting and ending points is less than the parameter set, the two curves will be jointed into one.

Fig. 5-14 Auto-Connect Dialog Box

5.7. Resort

Select this command in the modify menu or select from the main interface。The software will mark through your chosen direction

Figure.5-14 Resort

5.8. Align

Command "Align" will be available only when more than one object is selected in the workspace. "Align" is used to align the objects users select on the two-dimensional plane. There are several ways to align:

Left: All objects align left.

Right: All objects align right.

Vertical: All objects align vertical.

These three ways above only support to move objects on horizontal direction.

Top: All objects align top.

Bottom: All objects align bottom.

Horizontal: All objects align horizontal.

These three ways above only support to move objects on vertical direction.

Center: All objects align center. This way may cause moves on both horizontal and vertical directions.

Note: The benchmark to align is according to the last object users select, and other objects align behind it. If you select several objects by "Frame Select", then the system will hardly identify which is the last one, and this may cause unexpected alignment. It is strongly recommended that you select the object which is to be the benchmark at the end when you want to align several objects.

6. View Menu

The View Menu is used for setting every option for view in the SeaCAD, as shown in Fig. 6-1.

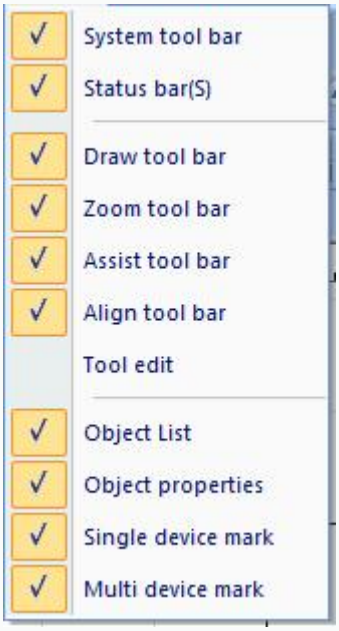


Figure.6-1 View Menu

6.1. Zoom

The Toolbar of the zoom Menu is , and there are seven types for different requirements.

: This item is used for filling the whole view area with the appointed area. Users may use mouse to select rectangle area to zoom in. If pressing the right button of the mouse, the current view will zoom out for one time with the mouse pointer's position as the center; and if pressing the left button of the mouse, the current view will zoom in for one time with the mouse pointer's position as the center.

: To move the current view.

: Zoom in.

: Zoom out.

: Fill the whole view area with all the objects.

: Fill the whole view area with only the selected objects.

: Fill the whole view area with the whole workspace.

6.2. Ruler/Gridding/Guide Line

There are Horizontal Gauge, Vertical Gauge, Gridding and Guide Line for selection.

6.3. Snap Grid

This item is used for automatically putting the dots you draw on the grid.

6.4. Snap Guide Line

This item is used for making objects approach to guide lines automatically when moving the object.

6.5. Snap Objects

During performing some operations, this item is used for automatically snapping an object's top, center, nodes, circle center, intersect points, etc.

6.6. System Menu Bar/Toolbar/Status Bar/Interface Window Bar

SeaCAD supports many toolbars to achieve different functions. Toolbars can be either displayed or hidden by selecting corresponding options in View Menu; and also the Status Bar can be displayed or hidden, either. When there is a "√" selected in front of the submenu, the corresponding toolbars on Status Bar is visible, and if not, they are hidden.

6.7. IO State

Check current input and output state, follow fig 6-3

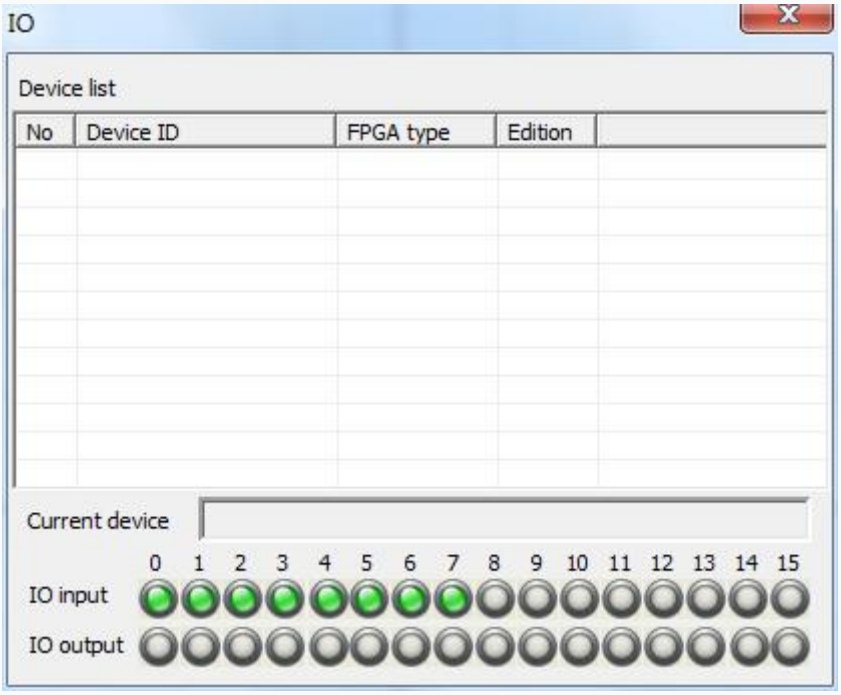


Figure.6-2 IO Status

6.8. Path preview

Select this function to see the path of the drawing.

7. Special

特殊菜单在 SeaCad 软件中的各种选项，如图 7-1 所示。

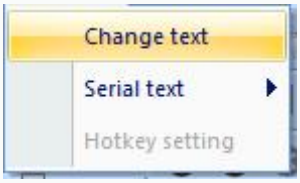


Figure.7-1 Special

7.1. Change Text

Click change text, follow dialog window will pop-up, as fig 7-1

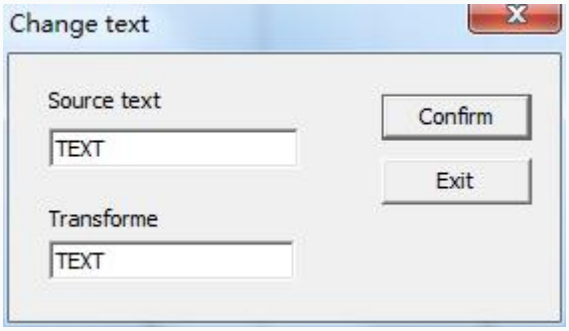


Figure 7-2 Change Text

The content under 'text' is to be replaced, the content under 'change to' is that after replace.

7.2. Serial number text

All serial numbers under the current file are directly increased or decreased according to their respective increments.

Or reset to the starting serial number without marking.

8. Laser

"Laser" menu mainly aims at expansion axis control, as shown in Fig. 7-1 below:

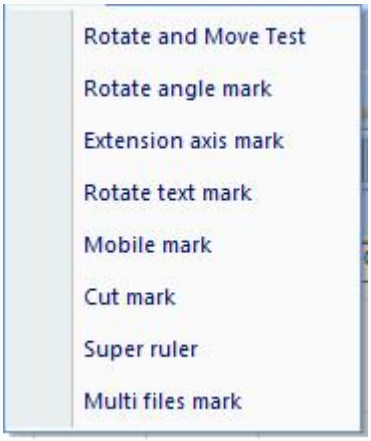


Figure.8-1 Laser

8.1. Rotate and Move test

"Rotary Marking" is performed according to the angle of rotation axis.

Click "Rotary Marking" under "Laser" menu, and the following dialog box will display:

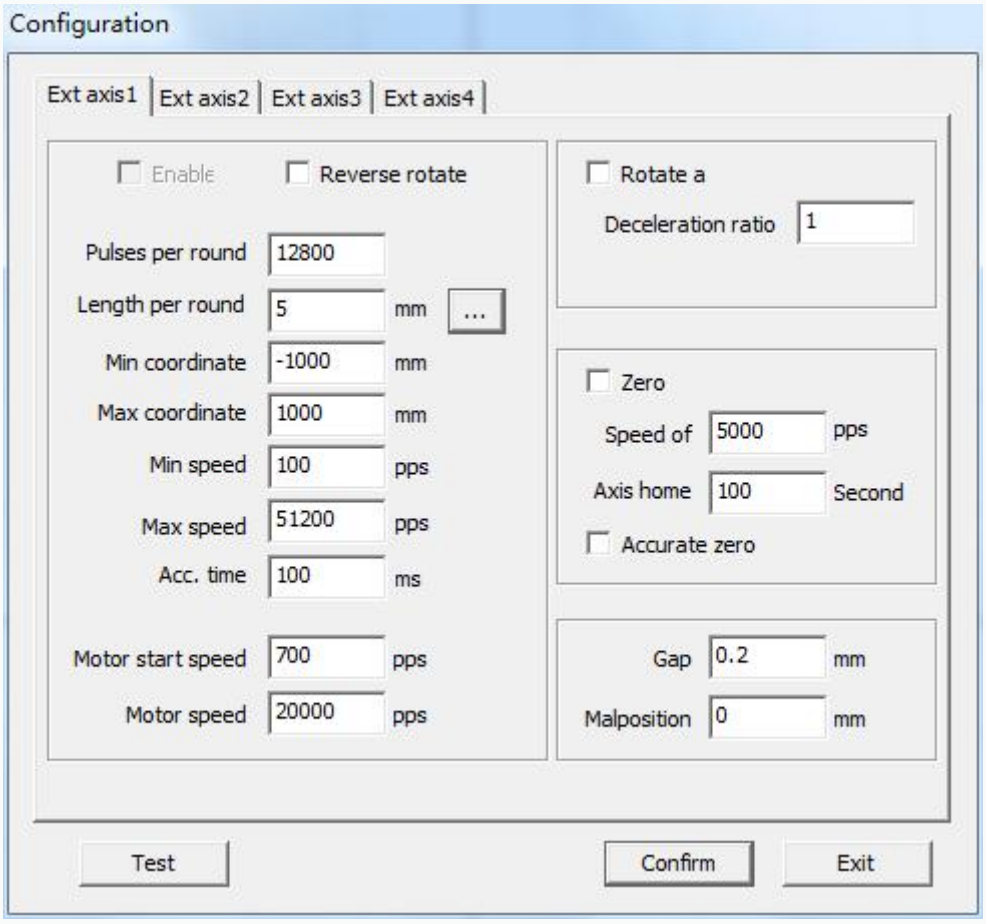


Figure.8-2 Rotate and Move test

Axis ID： Choose Axis X ,Y, Z, U。

Invert: It refers that the expansion axis rotates in the opposite direction. When it is checked, it means the expansion axis will invert;

Pulses per Round: The pulse (subdivision of driving motor) numbers each round that the expansion axis rotating. It can be set according to the motor parameter.

Distance per Round： The distance each round that the expansion axis rotating，Click the setting button "..." to calculate a more accurate distance per round.

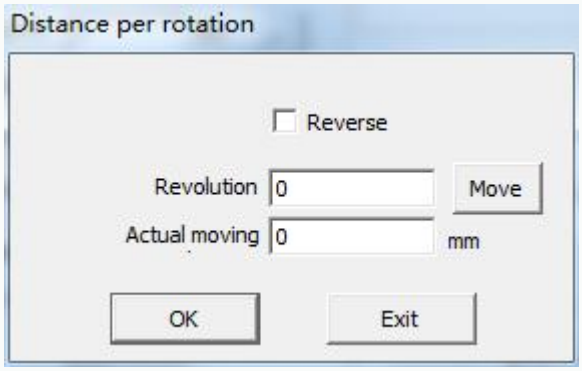


Figure.8-3 Extended axis accuracy setting

Min Coordinate: The smallest coordinate in which the extended axis can move, in millimeters.

Maximum Coordinate: The maximum coordinate of the extended axis that can be moved, in millimeters.

Min. Speed: The minimum rotary speed of expansion axis.

Max. Speed: The maximum rotary speed of expansion axis.

Acc. Time: Acceleration time needed when expansion axis moves from minimum speed (starting speed of motor) to maximum speed.

Offset Compensation: It refers to the correction to position offset. Perform either positive correction or negative correction.

Go to Start Position After Finished: When it is checked, the expansion axis will go back to the initial position after finishing marking.

Start Speed： Set motor start speed, unit is pulse/s。

Motor Speed: The rotating speed of motor.

Rotation axis: Select it, it's indicates that current expansion axis is rotation axis. Moving manner is rotation; otherwise, it indicates flat content processing or Z axis locating process.

Reduction ratio： If the motor is directly connected to the shaft, the reduction ratio is 1; if there is a reduction mechanism in the middle, it is the reduction ratio of the reduction mechanism.

Part Diameter: It is used for setting the external wall diameter of round parts and converting graphs in workspace into the accurate rotation angle.

Zero: Whether current expansion axis has zero signal. When expansion axis has not activated zero signal, it cannot set up an absolute coordinate system. Then, it is required to manually adjust the site to make every processing stay in the same site. The system takes the current expansion axis point as default

original point before processing.

If the zero is selected, the system will automatically look for zero point when employing the expansion axis function. After finding the zero point, an absolute coordinate system will be built for the expansion axis. If the system fails to find the zero point, the expansion function will not be activated properly until the time set for "Zero Time Out" is over.

Speed of Go Zero: The moving speed of expansion axis looking for zero signal.

Zero Time Out: Set the time of expansion axis finding zero point. If it overruns, the system will present "overtime".

Accurate Zero: When it is selected, it is required to receive three signals before going back to zero; if not selected, only one signal is required for going zero.

Gap compensation: Used to set the interval compensation between each independent figure. For example, the interval between two figures is set to 10mm. If the mark is 10.1, then the gap compensation bit - (10.1-10) =- 0.1.

Offset compensation： When the graphics are stitched, it may cause mismatch phenomenon. This parameter is used to eliminate the misalignment.

Test： Test Rotary Axis.

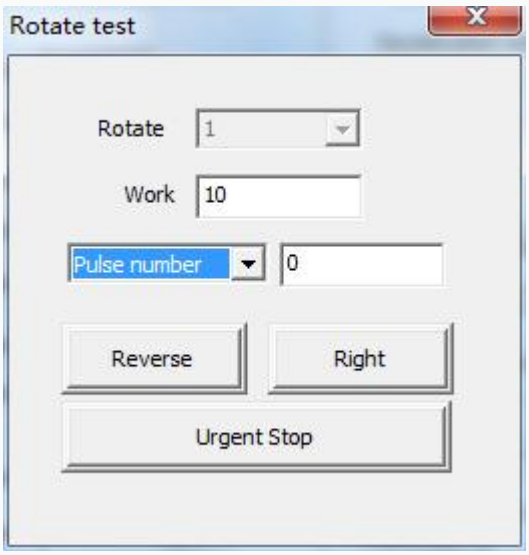


Figure.8-4 Rotate test

8.2. Rotary Marking2

8.2.1 Interface description

"Rotary Marking" is to perform rotation marking according to the angle of the

rotation axis to process the entire figure.

Click on the "Rotation Angle Marking" menu item under "Laser" to display the following dialog box:

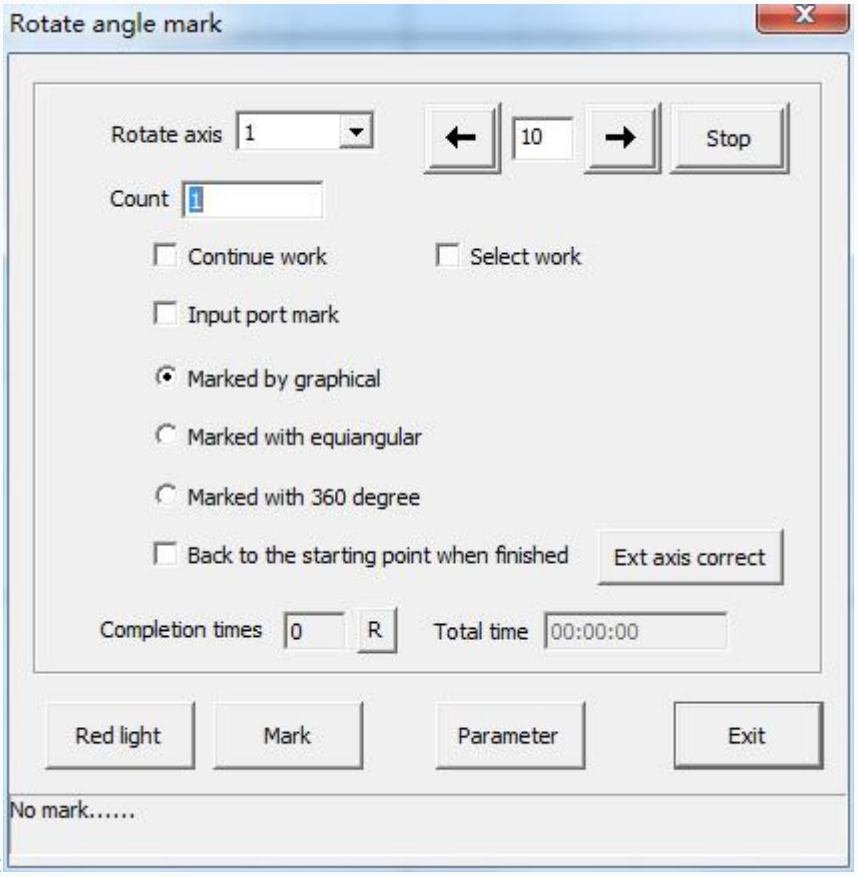


Figure.8-5 Rotate angle mark

Total Number: The total counts that the marking command should be executed. If checking the "Continuous", the marking number will not be limited by the total number;

Axis：Choose which axis to use；

Continuous: If it is checked, it will not be controlled by the total number, and it will perform continuous marking for graphs or text contents displayed in the workspace.

Mark Selected: If it is checked, only those selected graphs will be marked; otherwise, all the graphs will be marked;

Input trig marking： Specify an input port and the marking can be triggered through the IO port.

Overall Marking of Graph: Mark the individual graph or text as a whole at a time, and after marking an individual graph, rotate for an angle.

Increment: The angle that the column should rotate after mark each figure. It is the angle interval between two adjacent figures

360 degree mark: Selected to mark the figure on the column evenly

Go to Start Position After Finished: When it is checked, the expansion axis will go back to the initial position after finishing marking.

Part: The total counts that the marking command has been executed;

R：Reset the marking status and clear marking count；

Total Time： Total time of marking.

8.2.2 Functional operation

8.2.2.1 Redlight

Click on the "red light " button, you can see the red indicator of the current graphics.

8.2.2.2 Mark

Click "Mark", and the software marks according to the set parameters.

8.2.2.3 Parameters

Click "Parameters" to configure specific parameters for the rotary marking, and the following parameter configuration dialog box is displayed. The expansion axes 1, 2, 3, and 4 correspond to the expansion axes 1-4 (Refer to section 8.1 for related parameters.) .

8.2.2.4 ESC

Click "ESE", the system will save the configured parameters for the next use.

Note: If you click the "X" button in the upper right corner of the dialog, the modified parameters are not saved.

8.3. Expansion Axis Marking

The expansion axis marking function divides the picture into a specified size and then mark while rotating. The interface is as follows:

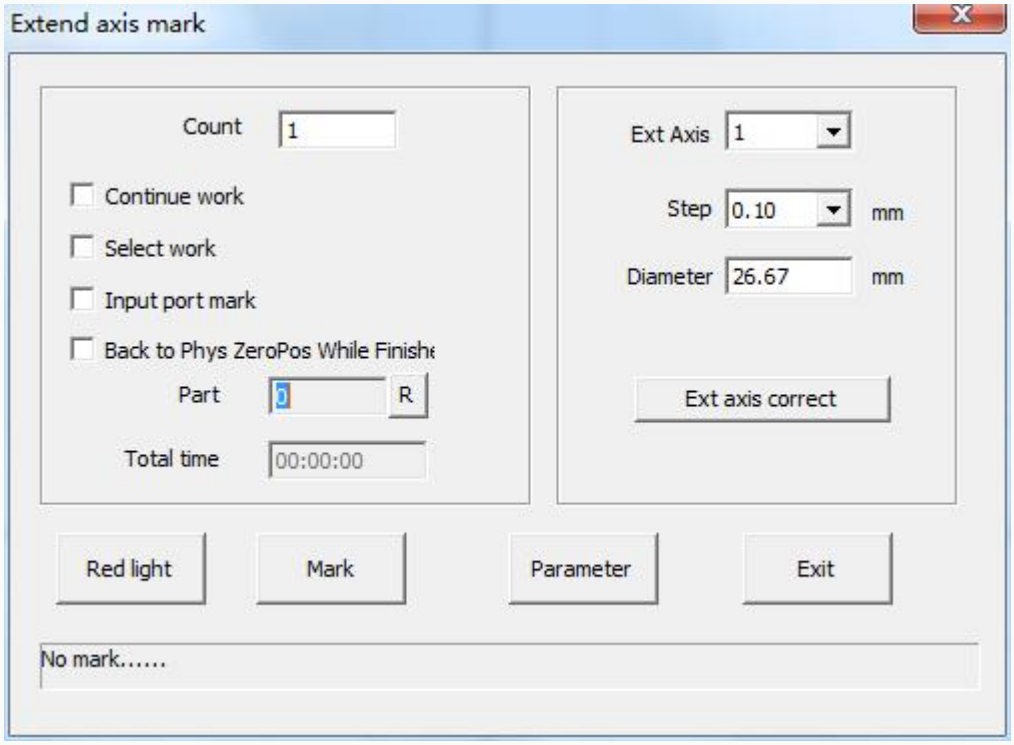


Figure.8-6 Extend axis mark

Axis ID： Choose Axis 1,2,3,4

Axis Diameter： Diameter of Axis.

Rotating step： The angle or distances each round that the expansion axis rotating.

8.4. Power Ruler

The function of is Power Ruler mainly uses for to design each kind of scale, as is shown in Figure 8-7:

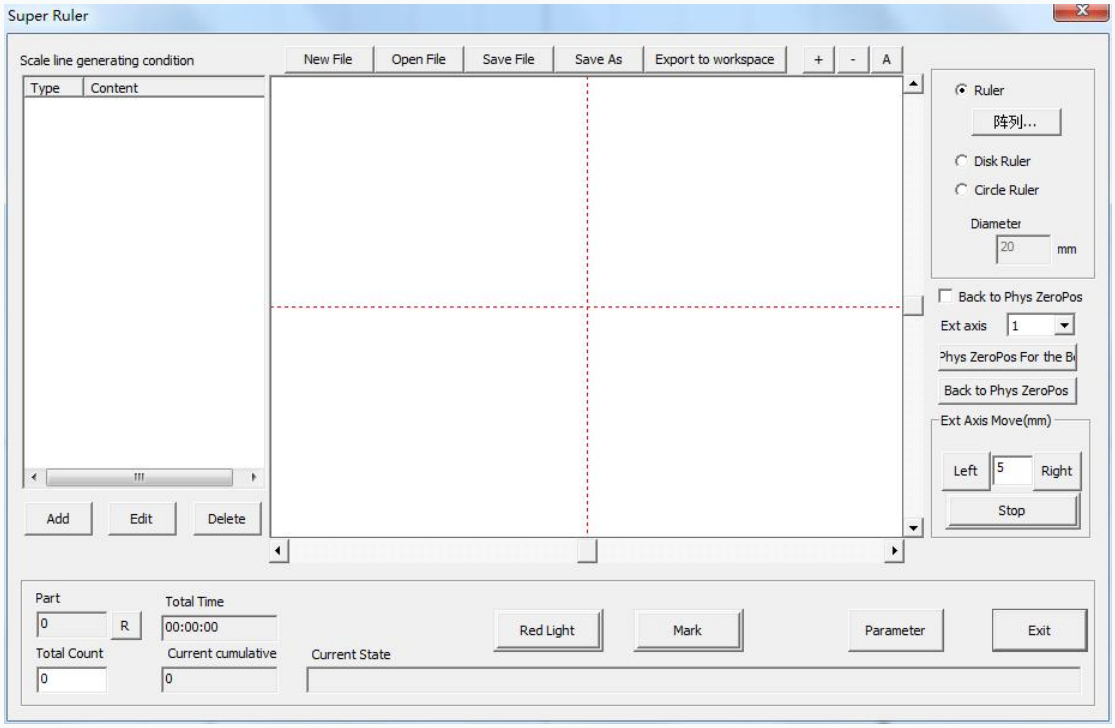


Figure.8-7 Power Ruler

File：

New File ： The software will close the documents which you are editing and meanwhile create a new file

Open File：When click "Open", the software will pop an open-file dialog to ask you select the file you want to open

Save File: save the current file to disk.

Save as: save the current file to disk by another name.

Export to WS: export the file to the software workspace.

Marking File：

New ： Create a file that need to mark. Under normal circumstances, a ruler needs to mark a few figures .

Edit: Revision the content.

Delete：Delete the content.

Click "Add" presenting to edit the ruler, following dialog box shown in Figure 8-8

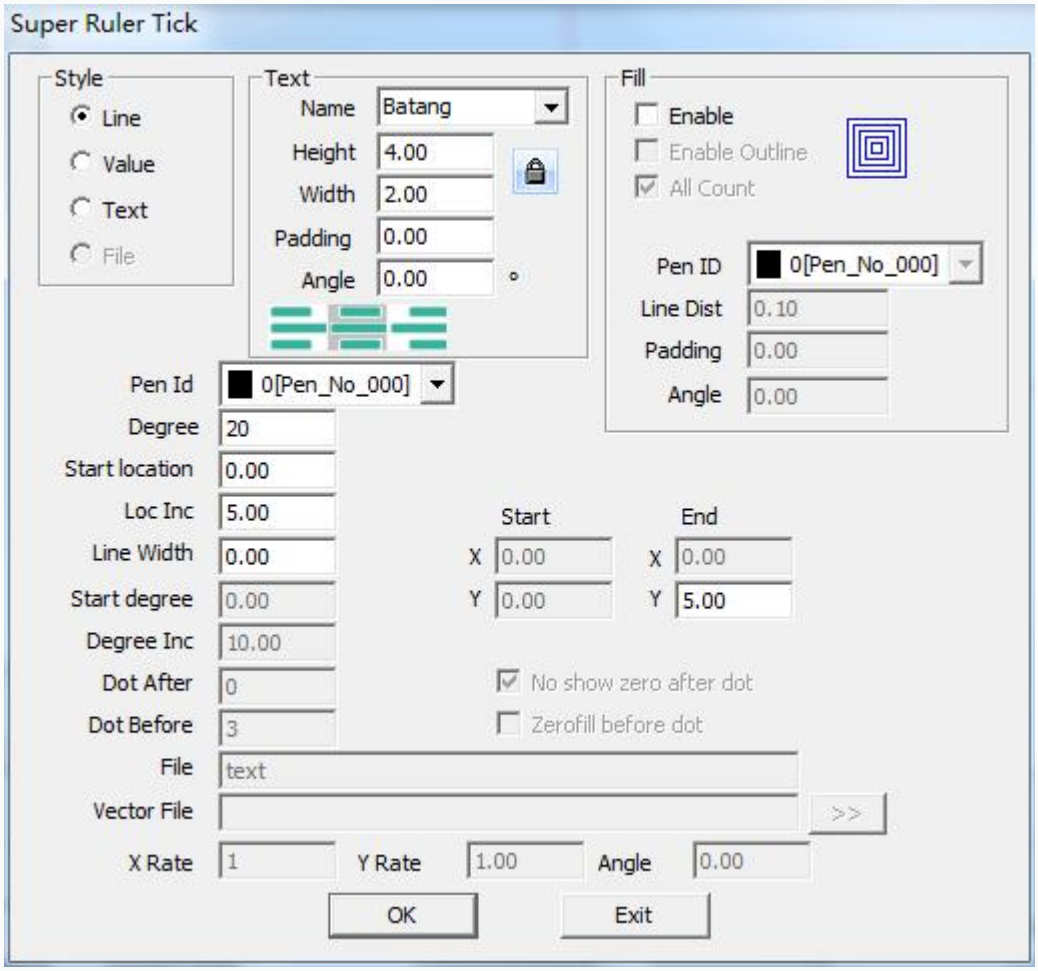


Figure.8-8 Power Ruler Tick

Type：

Line： The current parameter is the line parameter value

Value： The current parameter is the value parameter value

Text： The current parameter is the text parameter value

VectorFile： The current parameter is the vectorfile parameter value

Text：

Rotate: the angle of the text revolving

Hatch:

Pen No.： This item indicates that objects with selected pen's number will be marked.

Graduation Num: The total graduation numbers need to be marked

Start Graduation: Set the position of start marking graduation

Increment pos: the space between two neighboring lines

Line width: Set the width of the line

Start point: Set start point of the line

End point: Set end point of the line

Start value: Set start value of line

Inc. value: Set Inc. value of the line

Dot bit count：Set dot bit count of the line,

Straight ruler/Ring ruler/Disk ruler: The ruler's type need to mark currently choose is enable

Part diameter: The workpiece accurately diameter of the "Ring ruler" or "Disk ruler".

8.5. Rotate Text Mark

Rotate Text Mark is a marking method in which the text is divided by each character and then the individual characters are marked while being rotated.

As show in figure 8-9：

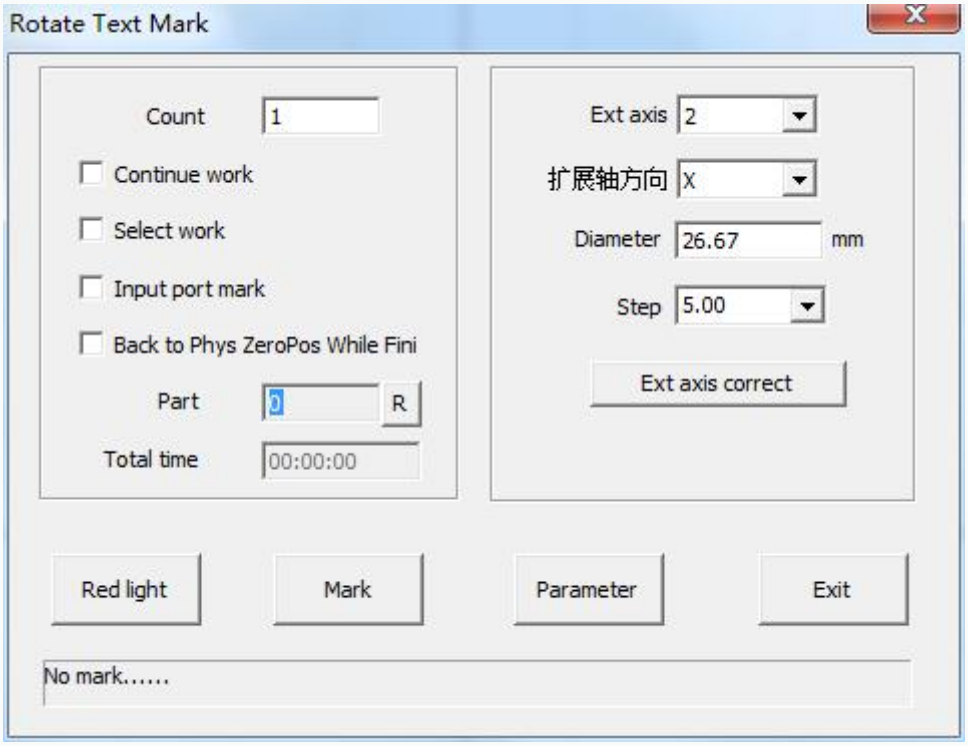


Figure.8-9 Rotate Text Mark

The configuration parameters are the same as those for the Rotary marking.

8.6. MultiFile Mark

"MultiFileMark" module is able to mark repeatedly different *.orz files, avoiding changingthe files. That function menu is shown in figure 8-10:

The left text box shows the file name, and the right border shows a preview image of the selected file after checking the preview.

Double-click on the file name and open the marking file on the main screen to edit it.

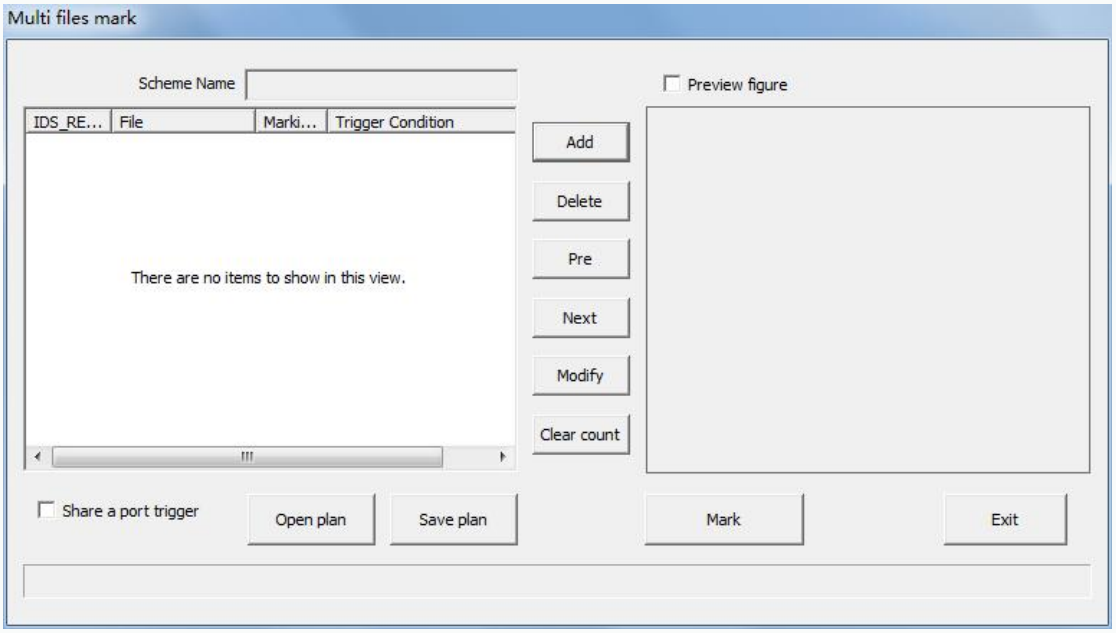


Figure.8-10 Multifile Mark

8.6.1. File Manage

Add: Add .orz files. The dialog box pops up as Figure 8-38 after click "add" button. Setting I/O control conditional for files, and automatically mark files when board accept the IO signal in mark status.

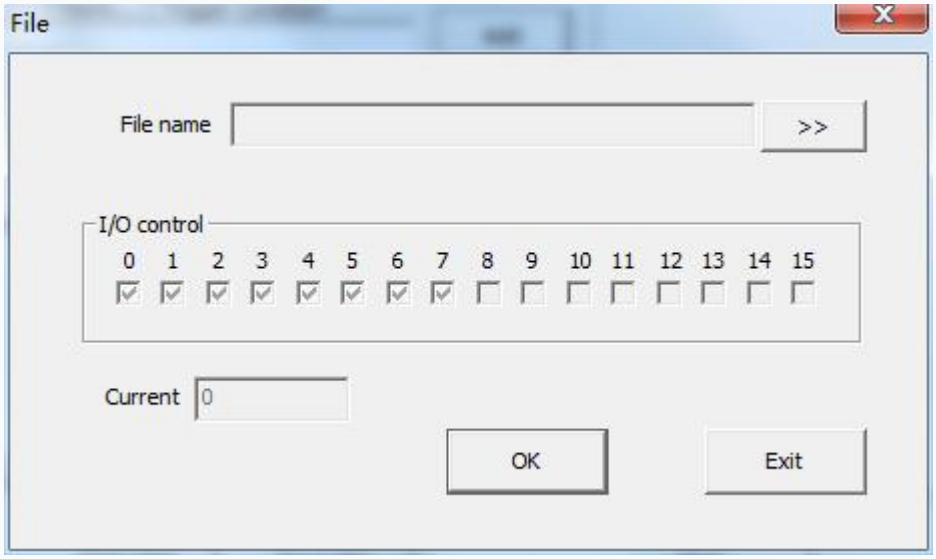


Figure.8-11 File Menu

Gray：Gray means not used

Blank：Blamk means low level

Black Hook：means high level。

Delete: delete files.

Prev, Next: change the order of files.

Modify: change file selected and IO control conditional

8.6.2. Option

One port trigger：Use a port to mark the preset files in order.

Open：Open saved multi-file marking scheme。

Save：Save the currently designed multi-document marking content as a scheme。

Mark：After clicking , software will enter the state of waiting for the IO signal to trigger. At this time, the IO signal can be triggered to mark the corresponding document.

Figure.8-12 Marking Interface

8.7. Mobile Mark

"Mobile mark" module is able to split joint big content. We can either choose an expansion axis to be X direction split joint, or choose two expansion axes to be XY direction split joint respectively.

That function menu is shown in figure 8-13-1:

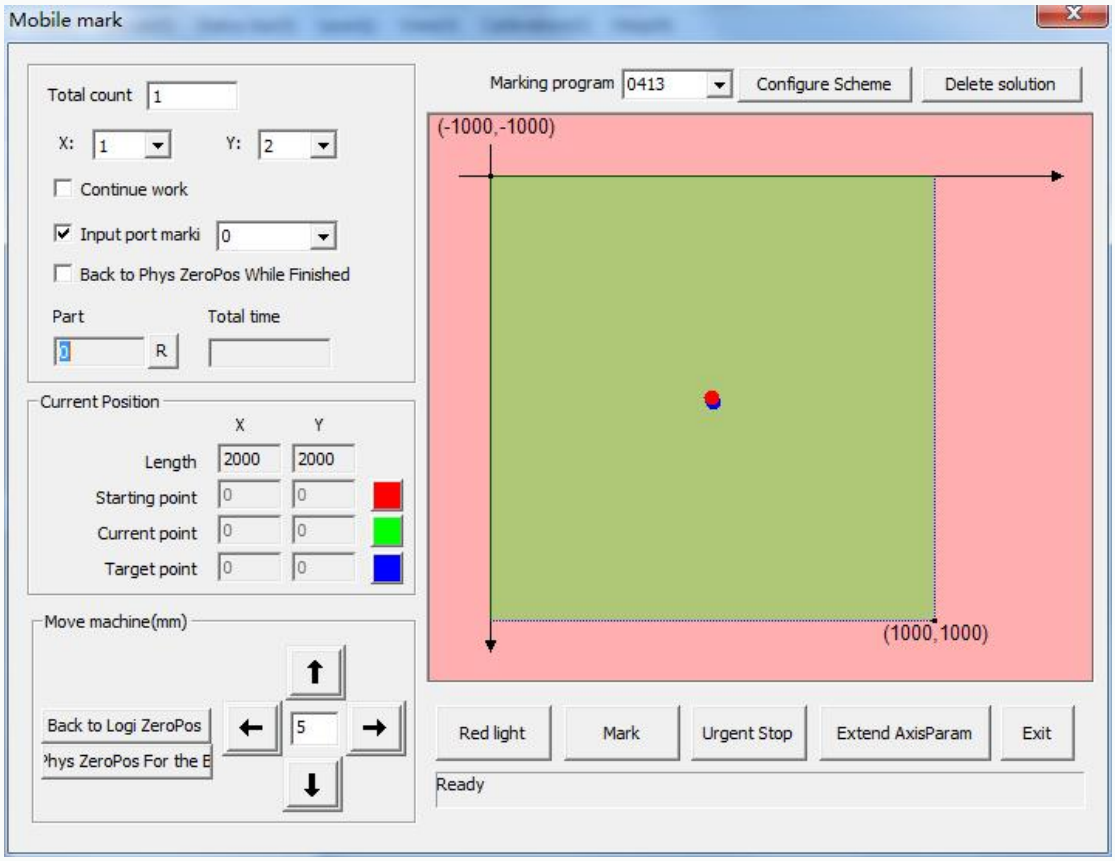


Figure.8-13-1"Mobile mark"Interface

8.7.1.Mark Parameter

Part: The part count that has been marked. Press the button R on the rightwards will reset the part count

Total Time： Total time of marking。

Total Number: It means the total number to be marked. When the processing number meets the requirement, the system will stop marking automatically.

Continues: Repeatedly mark the figure until stop it manually.

Input Trig Marking： Select whether to mark through the input port.

X:/Y: Set which axis X and Y correspond to。

Current Posion：

Length: Displays the maximum movable distance of the platform in the x and y directions (set by axis parameters);

Starting point: shows the coordinate position when starting marking;

Current point: Displays the current position (distance from the starting point);

Target point: The coordinate position of the target point.

8.7.2.Platform move

Used to manually adjust the position of the platform.

Absolute distance: After checking, the moving distance is the distance from the starting point; otherwise it is the relative distance from the previous position;

Return to zero：Moving the platform from its current position to zero (starting point) can be used on platforms with no physical zeros and physical zeros.

Target location : Move the platform from its current location to the target location.

Adjust：After the parameters of the extended axis are configured, click the up, down, left, and right buttons to move the platform up, down, left, and right by the set distance. The unit is mm.

8.7.3.Marking configuration

8.7.3.1.Configuration

Marking configuration: In the Marking configuration list, select or enter a marking Configuration name. Click "Configure Plan" to enter the following picture:

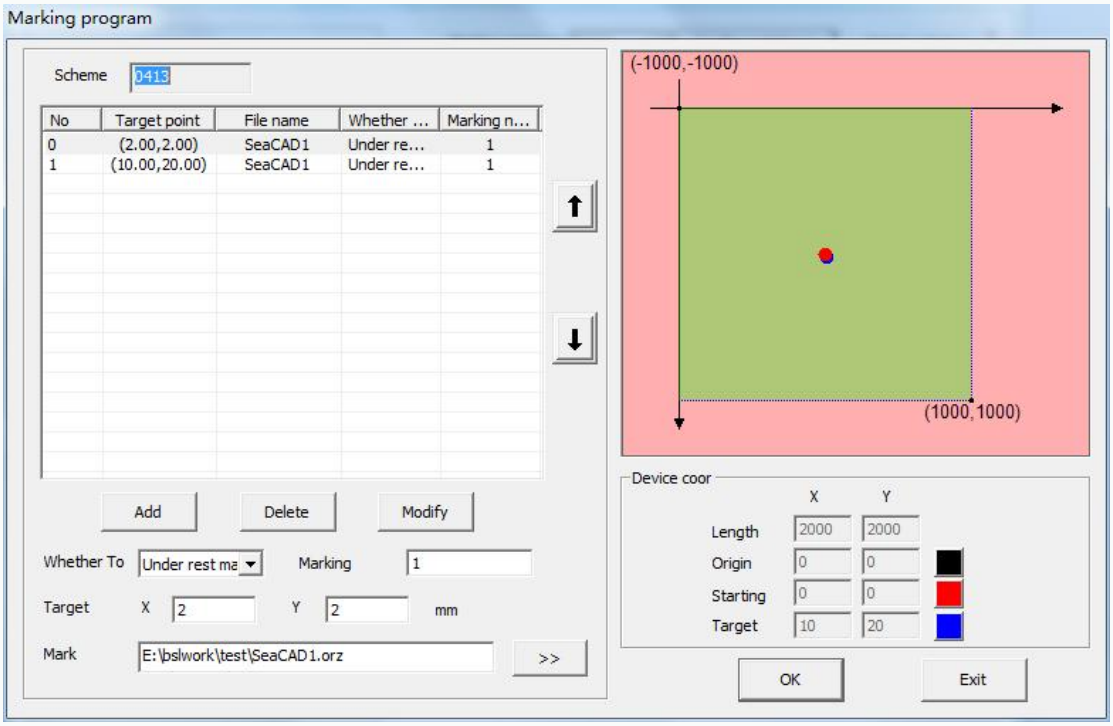


Figure.8-13-2 Configure Scheme

Marking method (marking): It is divided into non-marking and static marking. When you select static marking, you can set the number of markings. When the number of markings is greater than 1, marking points are evenly distributed between the previous point to the target point';

Marking times: Set the number of markings for this document.。

Target point: The coordinates of the center point of the current marking diagram (unit: mm);

File name: Click the to select the file, which is the company's software format (suffix is .orz).

After setting the project entry, click "OK" to make it effective, and "Cancel" to abandon the modification.

8.7.4.Marking

8.7.4.1. Red Light

Click on the "red light" button to show the outline of the current marked image.

8.7.4.2. Mark

Click on the "Mark" button, then software will mark according to the selected image.

During the marking process,the starting point is the starting point set by the system, and the target point is the coordinates of the last marking point of the marking program.

8.7.4.3. Extended axis parameters

Refer to the 8.1.1 configuration。

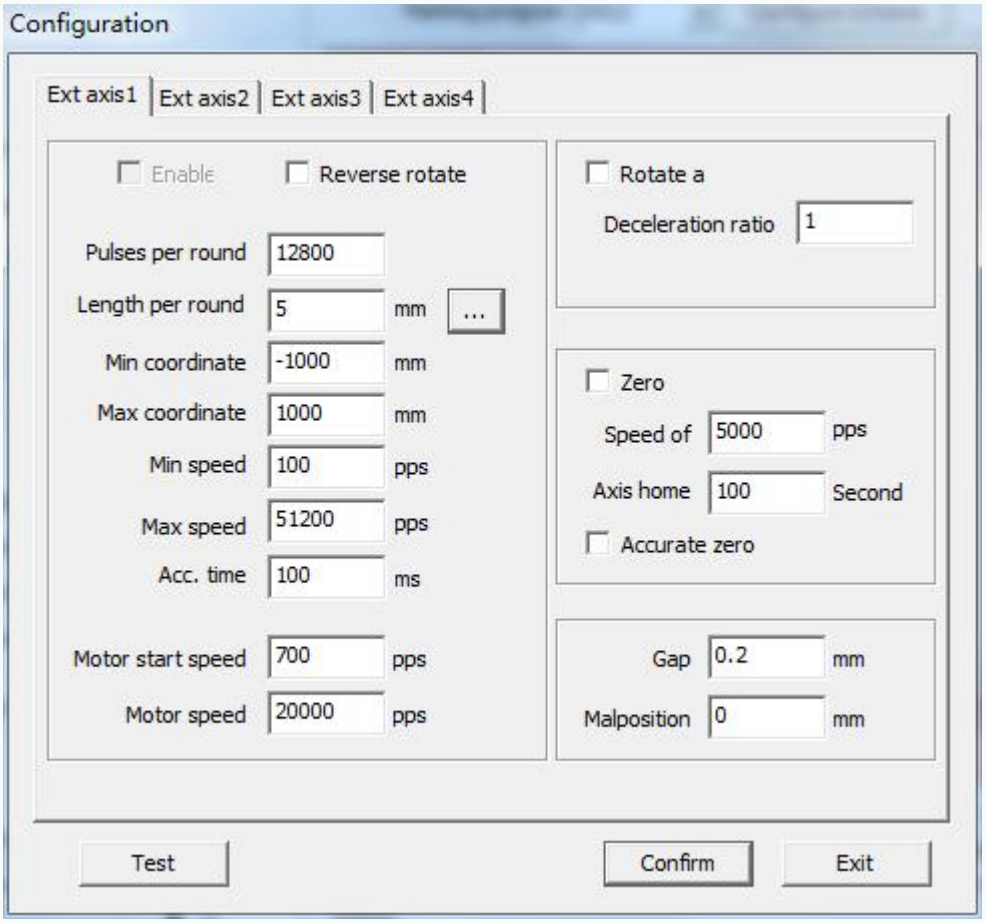


FIgure.8-13-3 Extended axis parameters

8.8. Split Mark

Due to the limited range of laser marking (usually no more than 15cm), when the customer needs to carry out a large-scale pattern marking, a large pattern needs to be divided and marked with a moving platform or a moving laser head.

The menu for the "Split Mark" function is in the "Laser" category.

Before using this function, you must first import or edit the file on the main screen to be divided. The file can be a picture, a vector, a text, or a self-compilation graphic. It can be a single figure or a combination figure.

Main interface as following fig：

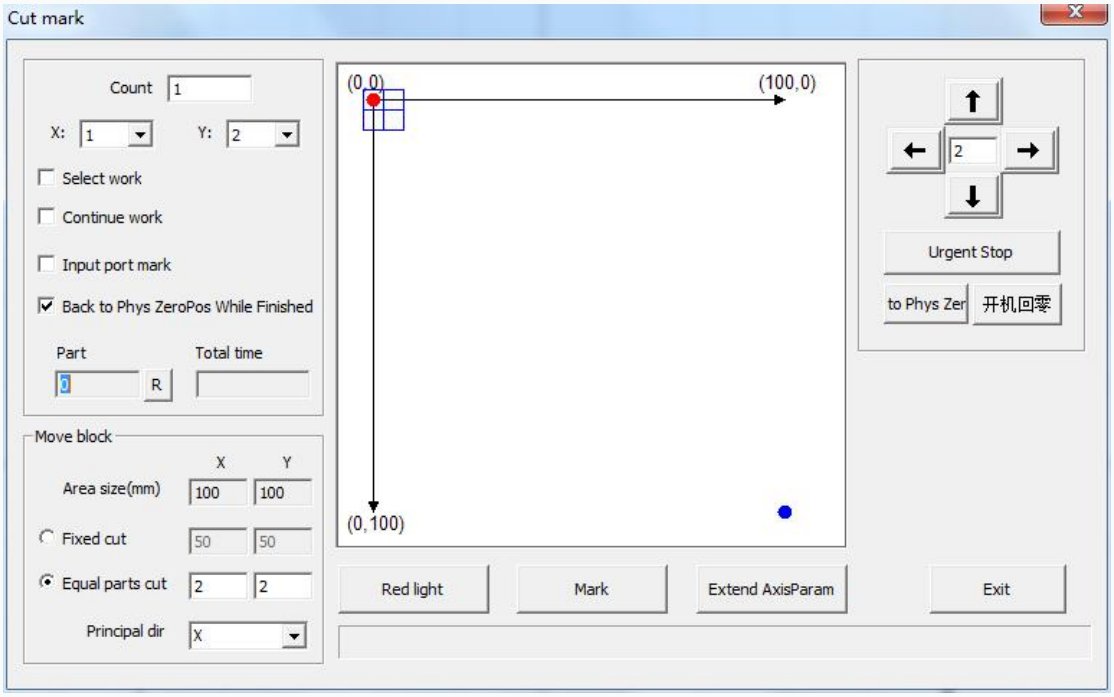


Figure. 8-14-1 Split Mark main Interface

"Split Mark" function, object can be divided into multiple pieces designated for marking.

8.8.1. Marking Parameters

.

Part: The part count that has been marked. Press the button R on the rightwards will reset the part count.

Total Time： Record the total time for marking。

Total num: The total count need to mark. When the parts have been marked reach the **Total num**,software will stop it automatically

Mark Selected: Only those figures selected will be marked.

Continues: Repeatedly mark the figure until stop it manually

ID: The current expansion axis will be used as axis X/Y

Input port trig: Select whether to mark through the input port, select the specific port on the right.

Zero: After processing a workpiece, the system will move expansion axis back. 。

Motion Split：

Area size: The size of the area where the largest frame of the graphic needs to be marked;

Fixed Split: When this option is selected, the pattern is divided into specified size; if not, the average size is divided according to the size of the pattern.

Equal-Split: Indicates the number of pieces to be divided. Filling "1" indicates that the direction is not divided.

The setting of the extension axis movement error (gap compensation and offset compensation) in split marking:

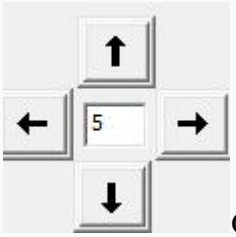
Offset compensation: Platform integrity compensation, which can be a negative value. When the movement actual value is greater than the target value, it is set as a negative number, otherwise it is a positive number.

Gap compensation: Displacement between patterns is adjusted using this parameter, and the value is measured by the actual size (this size is the error size between the second and first patch images in the same direction);

8.8.2 Pattern display area

This area shows the size of the mobile platform (displayed by the black coordinates), and the size of the pattern (shown by the blue rectangle). Blocks of the pattern indicate the mode of split marking. The red dot indicates the initial marking point, the blue dot indicates the target marking point, and the green dot indicates the path point.

8.8.3 Movement



Control to move up, down, left, and right.

Emergency stop: Stop the movement of the mobile platform immediately

8.8.4 Marking Function

Red light: Preview the current marked image outline.

Marking: Dividing mark according to the selected marking scheme.

Axis parameters: Same as 8.1.1.

9. Marking

Including single-card marking and multi-card marking。

9.1. Single-card marking

The Marking Properties Toolbar is as shown in Fig. 9-1.

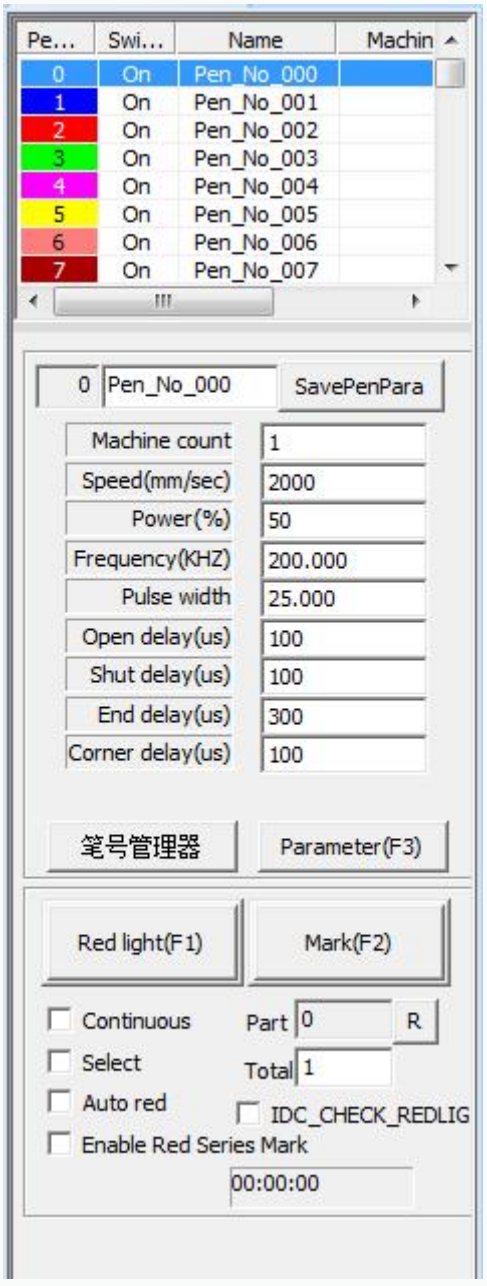
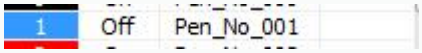


Figure.9-1 Marking tool bar

9.1.1 Pen List

Each file in SeaCAD has 256 pens which correspond to the uppermost 256 pens in Marking Properties Toolbar with pen numbers ranging from 0 to 255.

indicates that the current object to be marked corresponding to the current pen number requires marking. Users may change it by double-clicking this icon.



indicates that the current object to be marked corresponding to the current pen number requires no marking.

Color: The current pen's color, which will be displayed when the object is corresponding to the current pen number. Users may customize the color by double-clicking the color sticker.

Apply Parameter Button: When users press this button, the pen number of the current object will be changed to the one that the color stands for, as shown in Fig. 9-2.

Figure.9-2 Apply Parameter Button

When the user right-clicks on the current list, the right-click menu as shown in Figure 10-3 will pop up.

图9-3 右键菜单

Here we will introduce the specific meaning of each parameter in Fig. 9-1 in details.

Current Pen Number: The set of marking parameters currently used. In SeaCAD, the concept of "pen" is equivalent to a set of given marking parameters.

Marking Quantity: The marking times for each object during one marking are equivalent to the marking quantity in its marking parameters.

Speed: The marking speed of current marking parameters.

Power: This item indicates the power percentage of the current marking parameter, and 100% refers to the maximum power of current laser.

Frequency: The laser's frequency in the current marking parameter.

Duty Ratio: The ratio of laser pulse duration to pulse period.

Start TC: Delay time for laser ON at the beginning of marking. The proper Start TC parameters set can eliminate the "match head" appears at the beginning of marking, while the too large ones may cause miss at the initial segment. This value may be negative, which indicates that the laser emits light in advance.

Laser Off TC: Delay time for laser OFF at the end of marking. The proper Laser Off TC parameters set can eliminate the misclosure phenomenon appears at the end of marking, while the too large ones may cause "watch head" appears at the termination segment. This value cannot be negative.

End TC: Generally, there is a period of response time from sending laser OFF command to completely laser OFF, proper End TC is set to provide the laser with sufficient response time for laser OFF, so as to make the laser perform next marking in case of totally OFF to prevent light leakage and point dragging.

Polygon TC: Delay time between each segment during the marking. The proper Polygon TC parameters set can eliminate the circular angle appears during right angle marking, while the too large ones may cause marking time increase and double points at the corner.

Clicking "Advanced…" will prompt an advanced parameter dialog box as shown in Figure 8-4.

9.1.2. Equipment Parameter

9.1.2.1.Field Parameter

See Fig. 9-4 for the field parameter of equipment:

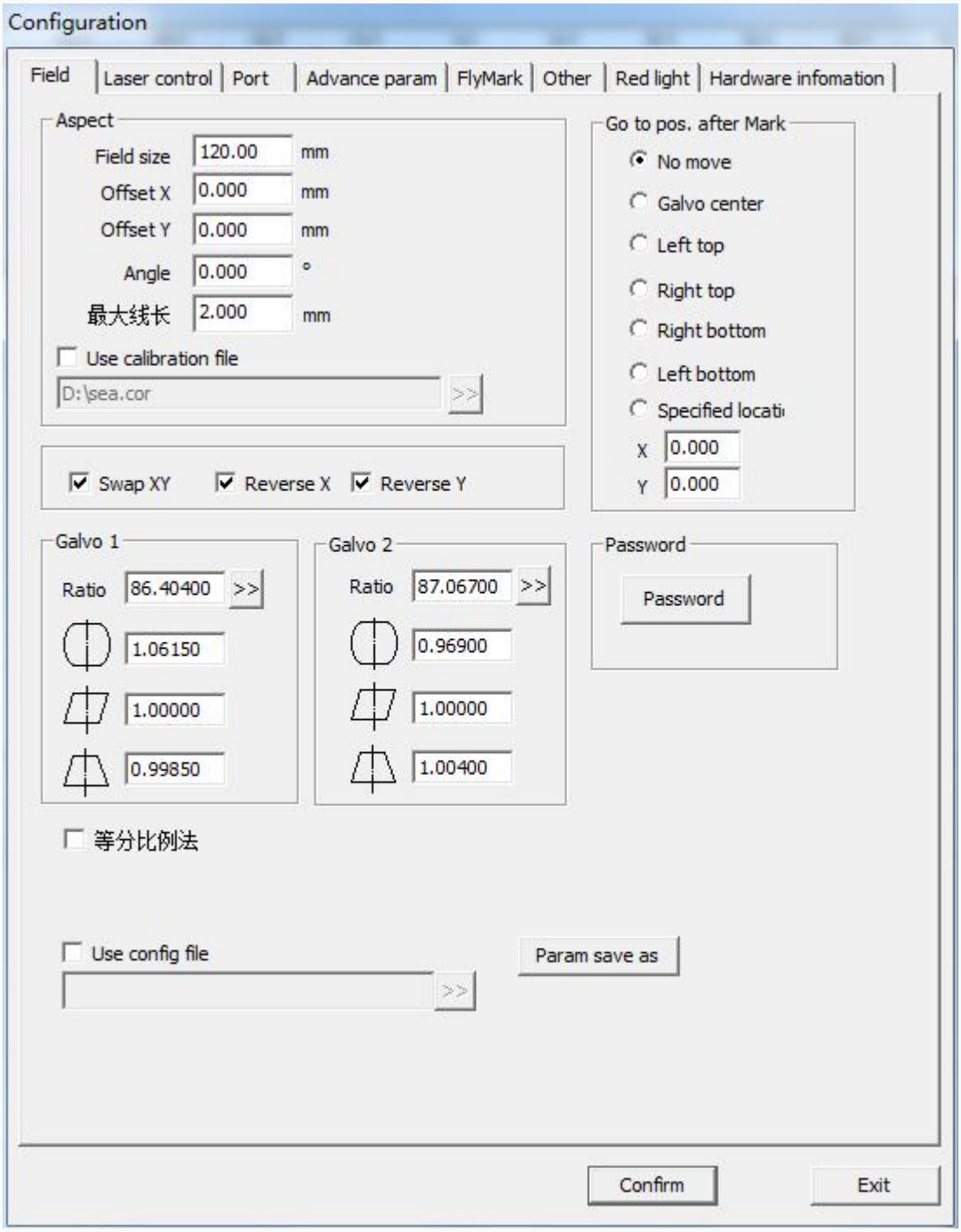


Figure.9-4 Field Parameter

Field Size: The actual widest range for marking corresponded by the scanhead.。

Offset X: The offset distance of scanhead center in X direction from field lens center.

Offset Y: The offset distance of scanhead center in Y direction from field lens center.

Angle: Adjust the angle of the galvanometer.

Maximum line length: The maximum length of the line segment that is divided by the figure. It is used to split the line segment beforehand to deliver the data, so as to improve the marking accuracy.

Use the Calibration File: Use the calibration file generated by external calibration program to calibrate the scanhead.

XY Change: Change the axes corresponding to the original galvanometer signal 1 and signal 2.

Negate: The opposite direction of the current scanhead.

indicates the barrel distortion or pincushion distortion calibration coefficient with default of 1.0 (parameter range: 0.875-1.125).

indicates the parallelogram calibration coefficient with default of 1.0 (parameter range: 0.875-1.125).

indicates the trapezium calibration，with default of 1.0 (parameter range: 0.875-1.125).

Scale: It refers to the flex percentage, and the default is 100%. This parameter will be adjusted when the trim size marked is different from the setting size. If the trim size is smaller than the designed one, users can raise this parameter; if the trim size is bigger than the designed one, users can lower this parameter.

Note: If there are some distortions with the laser scanhead, users must firstly adjust the distortions and then the flex percentage.

During scale setting, we may press the button directly, and a dialog box like Fig. 9-5 will be popped up. After we input the set size in software and the actual marking size measured, the software will automatically calculate the flex percentage.

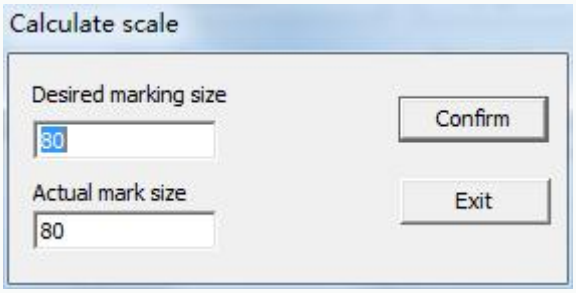


FIgure.9-5 Calculate scale

Go to Specified Position after Marking: After the completion of current marking, move the scanhead to its specified position.

Password: Set the current parameters can only be changed by entering the password。

9.1.2.2.Laser Parameter

See Fig. 9-6 for the laser parameter of equipment:

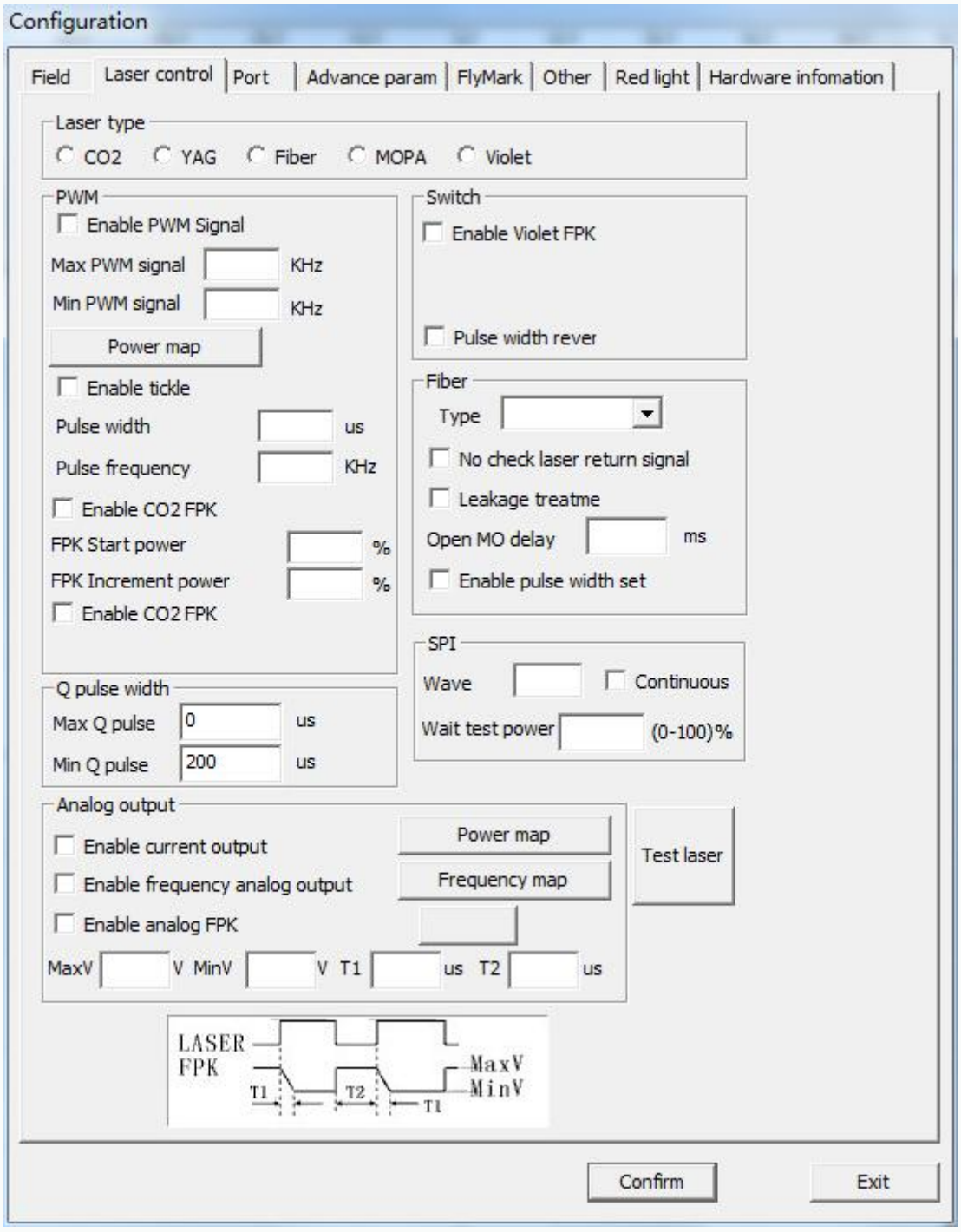


Figure.9-6 Laser Control

Please carry out the adjustment as per the actual parameters of laser machine.

9.1.2.3.Port Parameter

See Fig. 9-7 for the equipment port parameter.

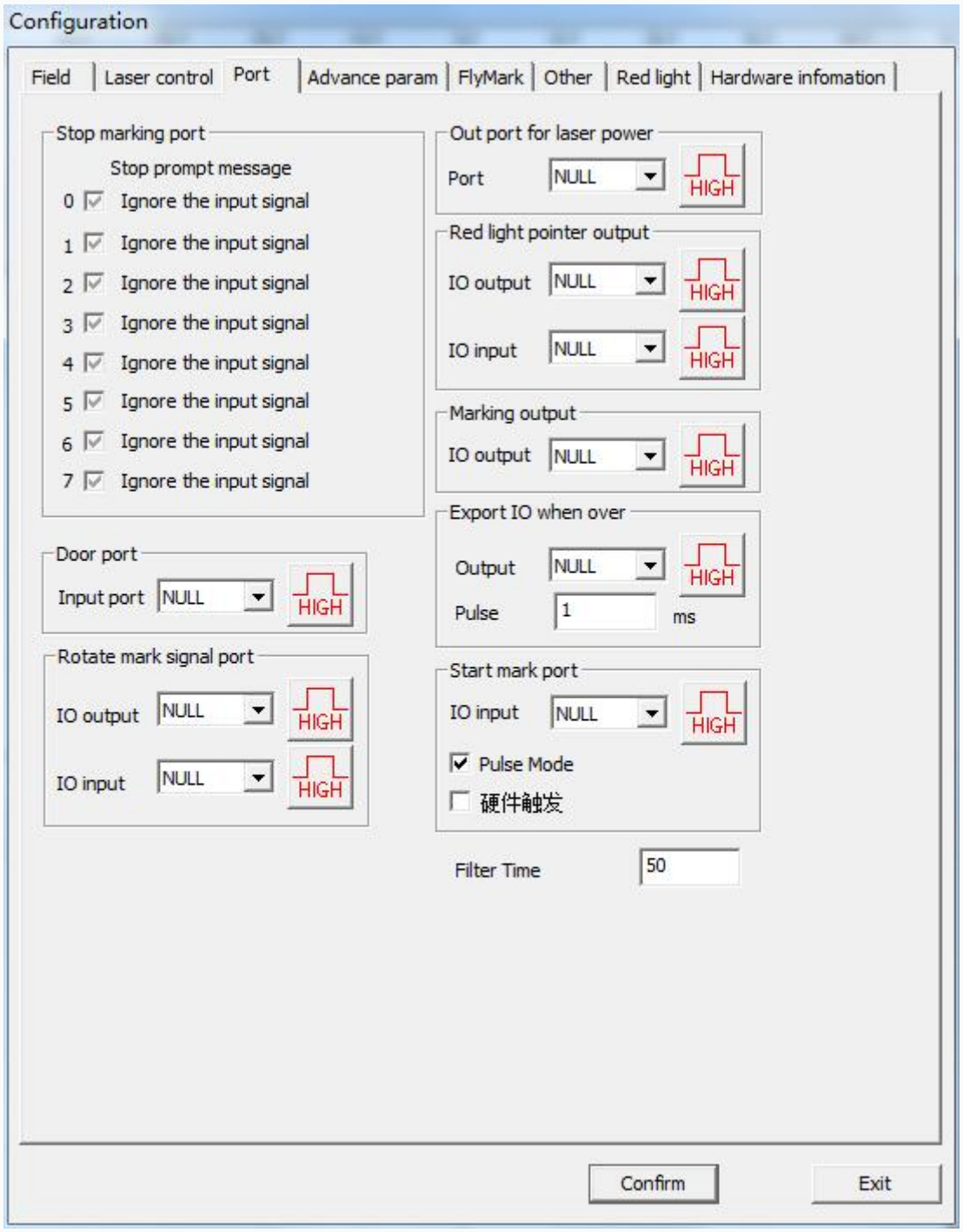


Figure.9-7 Port

Input Port of Stopping Marking: Certain input port is specified as marking stopping port. During marking process, if the system detects there is a corresponding input signal, the current marking operation will be ended, and prompt the users with error information.

Gate Port: Check the port signals for safety gate opening and closing and

make sure the marking will automatically stop in case of safety gate opening (red light indication may continue being used) so as to protect the operators from being burnt.

Laser Power Supply Output Port: This port may be used to control the on-off of laser power supply.

Red Light Pointer Output Port: The system will output high level to the appointed output port during red light pointer.

Mark Output Port: The system will output high level to the appointed output port during marking.

Mark Starting Port: In idle state, the system will start marking automatically if high level is output by the appointed input port.

Start Signal Pulse Mode: Checking this option means the start signal is marked by software in pulse mode, even for continuous level input, the software only reads one pulse. Otherwise the input port marked is of continuous level.

9.1.2.4. Advance Parameter

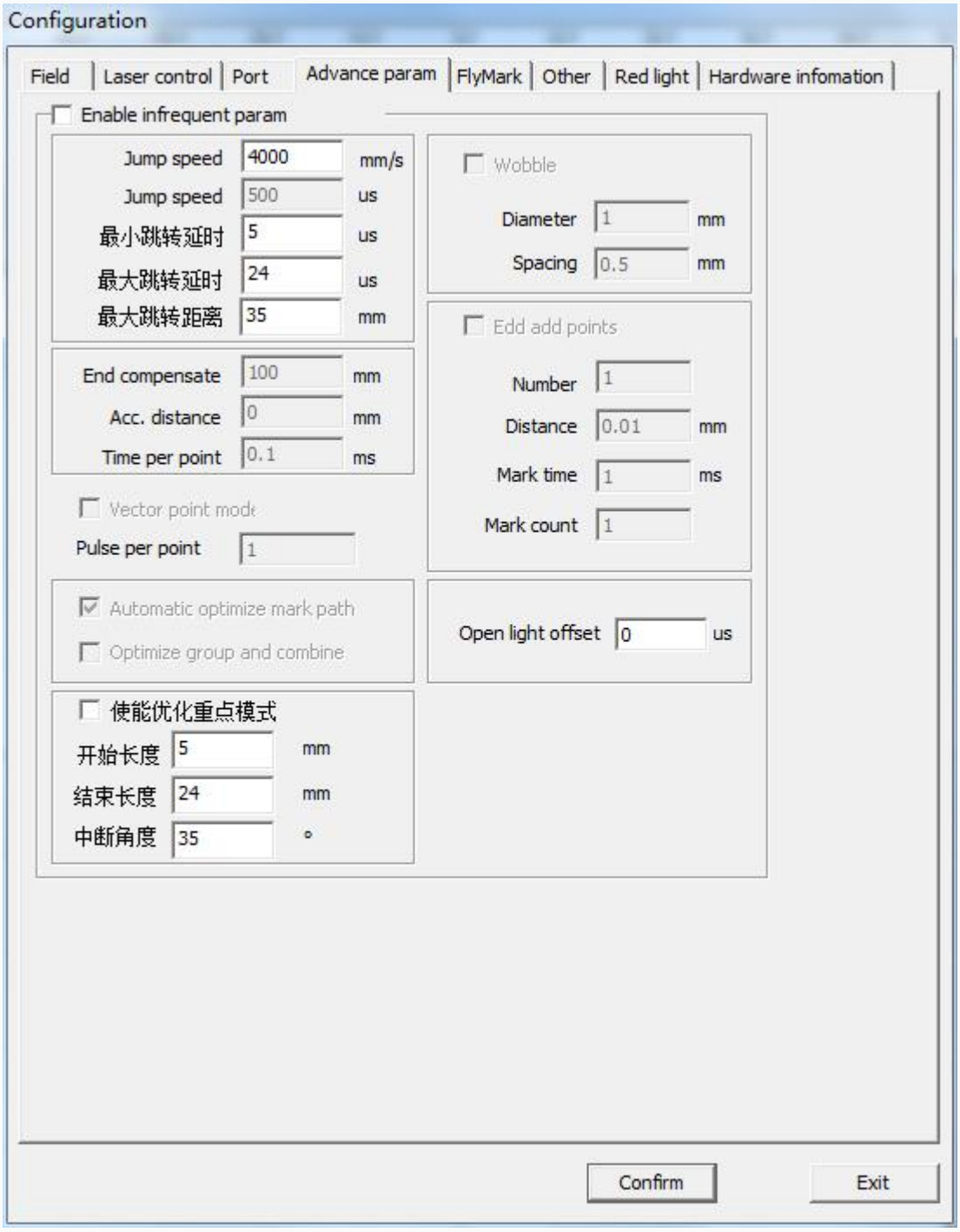


Figure.9-8 Advance Parameter

Jump Speed: Set a jump speed corresponded by the current parameter.

Jump Position TC: Value of Jump Position TC.

Jump Distance TC: Value of Jump Distance TC.

After each jump movement, the system will delay some time, and then execute the next command. The actual delay time is calculated by the following formula:

Jump TC = Jump Position TC + Jump Distance × Jump Distance TC

End Point Compensation: This parameter requires being set only when the end point fails to be put in place by TC parameter adjustment during high-speed marking, by means of proceeding to marking a straight line with length of end point compensation distance at the end of marking compulsively. Negative value is supported.

Acceleration Distance: This parameter may be set properly to eliminate the uneven dotting at initial marking segment.

Dotting Time: It indicates light emitting time of each point in case that point objects exist.

Vector Dotting Mode: It indicates to compulsively specify the fixed pulse number given out by the laser during each point marking.

Add Point at the End: It is used to solve the problem of laser end shining. The software will automatically add points at the end of each pen, but will not display it as an object.

Quantity: Quantity of points added at the end.

Distance: Distance between the points added at the end.

Dotting Time: Marking time for each point added at the end.

Dotting Times: Marking times for each point added at the end.

9.1.2.5. Fly Mark

Mark it synchronously with the production line. Click the button "Mark on the Fly", a dialog box as shown in Fig. 9-9 will be popped up.

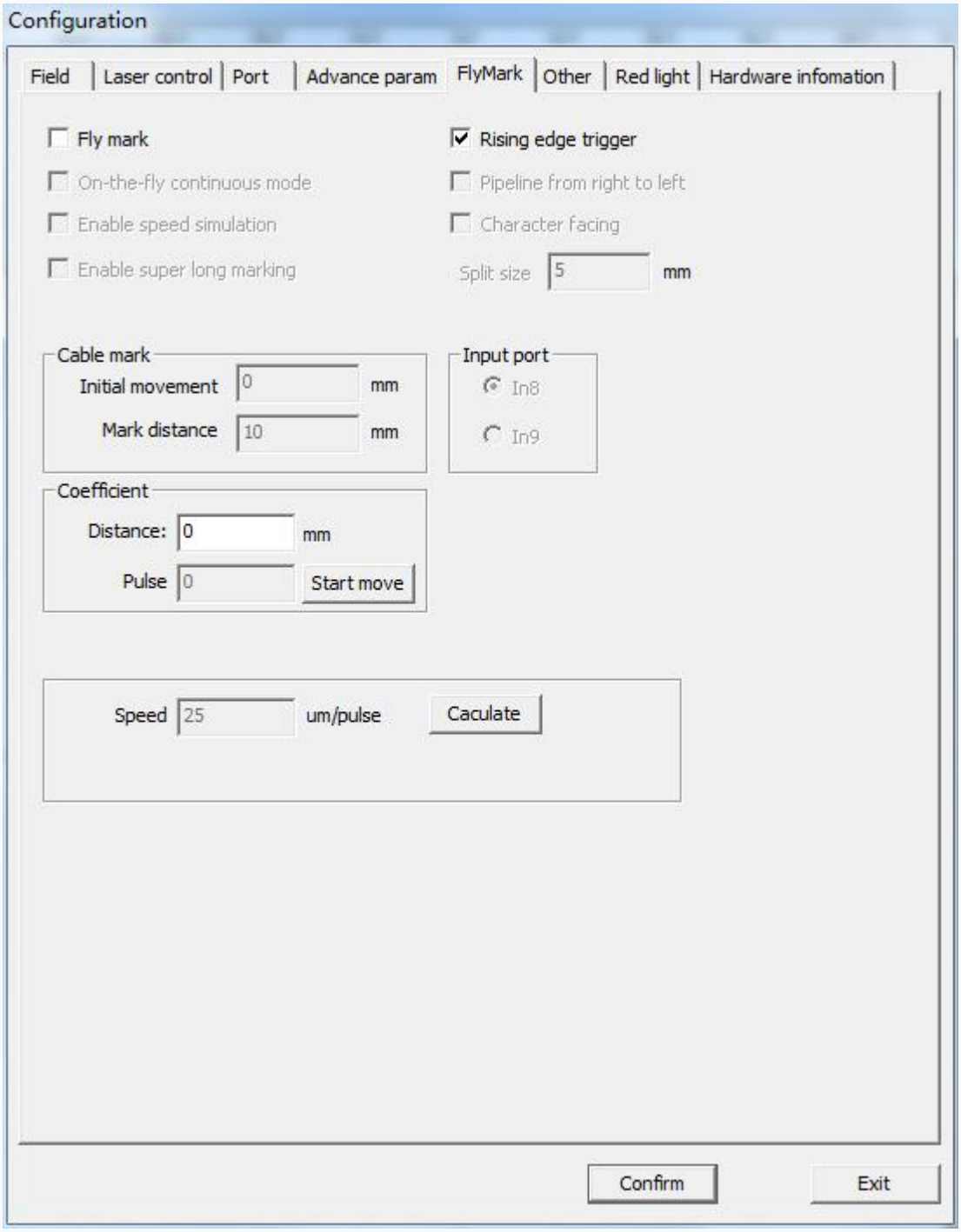


Figure.9-9 Fly Mark

Fly Mark: If it's checked, the function "Mark on the Fly" can be used.

Right-to-left Line Direction: If it's checked, the software will consider the line direction being right-to-left. By default, the line direction is left-to-right.

Rising Edge (High Level) Trigger: It indicates that marking will be executed when a rising edge signal is received from the input port (In8 or In9).

Continuous Line Mode: If it's checked, cable marking mode will be started and "Initial Movement Distance" and "Marking Spacing" parameters may be set.

Enable Hardware Simulation Fly: In case that the photoelectric encoder is not connected to detect fly speed, the hardware simulation fly shall be checked and its speed coefficient shall be set.

Enabling long marking: For marking the object beyond the size range of the galvanometer, you need to check and enable the long marking, and fill in the size according to your needs. The system will divide the marking object according to the fill size.

Marking through characters ： When marking, the pipeline moves from left to right. The characters of the marked file are marked from right to left.

Fly Speed System: It is used to set the line operation speed.

Mark on the Fly: If it's checked, the function "Mark on the Fly" can be used.

Right-to-left Line Direction: If it's checked, the software will consider the line direction being right-to-left. By default, the line direction is left-to-right.

Rising Edge (High Level) Trigger: It indicates that marking will be executed when a rising edge signal is received from the input port (In8 or In9).

Continuous Line Mode: If it's checked, cable marking mode will be started and "Initial Movement Distance" and "Marking Spacing" parameters may be set.

Enable Hardware Simulation Fly: In case that the photoelectric encoder is not connected to detect fly speed, the hardware simulation fly shall be checked and its speed coefficient shall be set.

Fly Speed System: It is used to set the line operation speed.

Operation steps:

1. Start line movement and label the current position;
2. Stop the movement after a period of line movement;

3. Measure the distance and input it in the edit box "Operation Distance", click "Calculation" and obtain the corresponding operation speed.

4. Save and exit.

9.1.2.6. Red Light

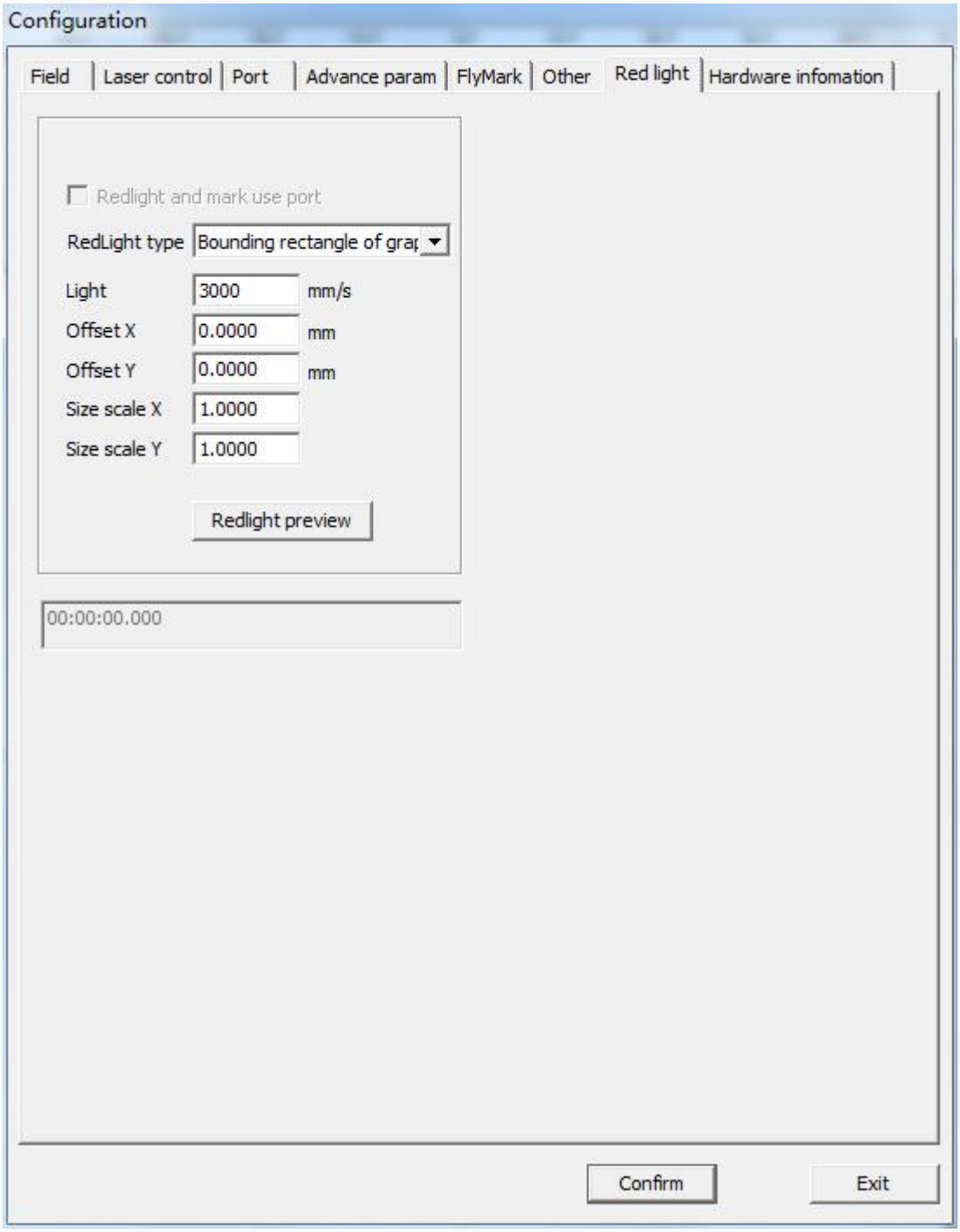


Figure.9-10 Red Light

Red light style: Used to select the red light to display the bounding rectangle of the figure or the outline of the figure.

Red Light Speed: It indicates the system movement speed in case of red light pointer.

Offset Position: It indicates the system movement offset position in case of red light pointer and may be used to compensate the position error between red light and actual laser.

Size Scale: It refers to the size deviation between red light and laser, by adjusting which the two can completely coincide.

9.1.2.7. Others

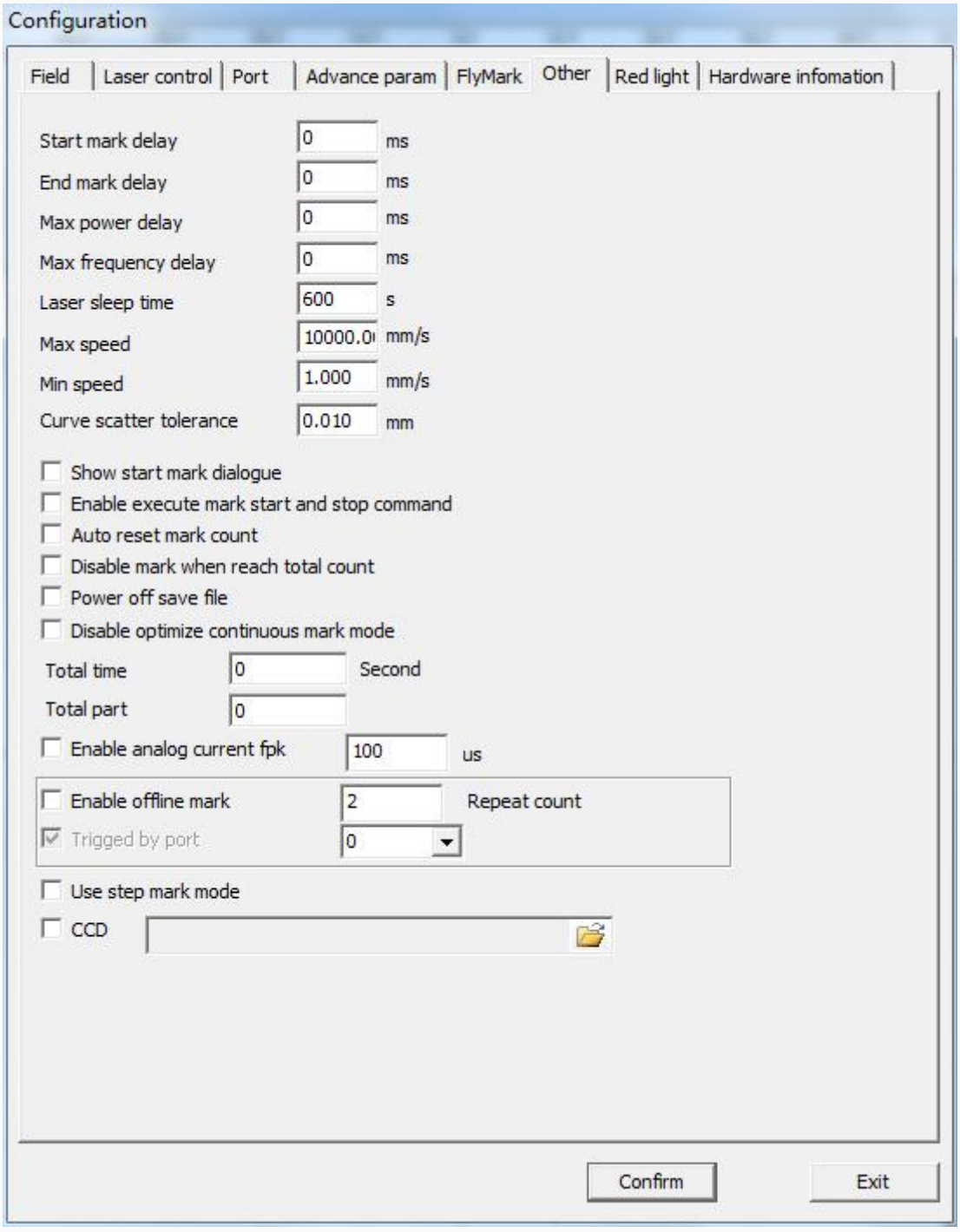


Figure.9-11 Others

Delay for Starting Marking: Start the marking after delay of appointed time at the beginning of each marking.

Delay for Finishing Marking: Finish the marking after delay of appointed time at the end of each marking.

Max. Power Delay: After the marking power changes from 0% to 100% during the system operation process, the system will delay this value and perform the next marking action. If the power's range changes by less than 100%, the system will automatically decrease the delay value in proportion. Similar to the "Delay for Starting Marking", both these two parameters are used to adapt the response speed of laser power supply. If the laser supply has quick enough response time, this value may be 0.

Max. Frequency Delay: Similar to the "Max. Power Delay", it is used to adapt the response speed of the laser's Q actuator. If the Q driving power supply has quick enough response time, this value may be 0.

Automatic Reset Marking Quantity: When the parts number reaches the total marking number designated, the parts number will be reset automatically.

Forbid Marking after Designated Marking Number is Achieved: When the parts number reaches the total marking number designated, the system will pop up a dialog box to prompt that "the current number has exceeded the total marking number, please reset it, and then start marking".

Display the Dialog Box for Starting Marking: After checking, it will prompt a dialog box of "whether to start marking" for each time selecting marking, as shown in Fig. 9-11.

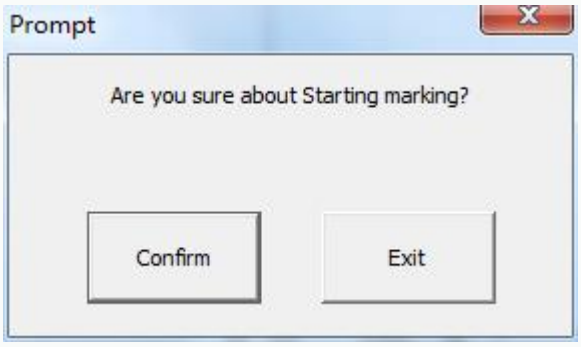


Figure.9-12 Start Marking Dialog

Enable to Execute Mark Start and Stop Command File: A command file needs to be executed first at the beginning and end of marking.

After enabling this function, when the marking starts, the system will seek for the start.bat file under the current software of contents automatically and

execute it; after the marking has ended, the system will seek for the stop.bat file under the current software of contents automatically and execute it.

The bat file, with simple format, may be compiled with text editing software (such as notepad and tablet) directly. Bat is the pure ascii code text file, altogether has 3 commands.

1. Input port detection. For example, IN2 = 1 indicates the input port 2 is detected. If IN2 is high, continue detection to the smaller number; otherwise wait for IN2 to turn high.

2. Output port setting. For example, OUT4 = 1 indicates the output port 4 is set as high level.

3. Delay. For example, DELAY = 1000 indicates the system is 1000 ms delayed.

Enable Offline Marking: The same data once marked may be marked off-line.

Enable Step Mark Mode: It refers to move as per the min. scanhead movement step during the marking and delay the fixed time after one step is completed. This function is mainly used for high-power laser marking. The longer delay between steps indicates a deep marking at the position where laser stays.

Enable to Restrain Simulation Current: Restrain the simulation current at the beginning of marking and make the time be 0.

9.1.3.Mark

The Marking dialog box is at the bottom right of the SeaCAD interface, as shown in Figure 9-13.

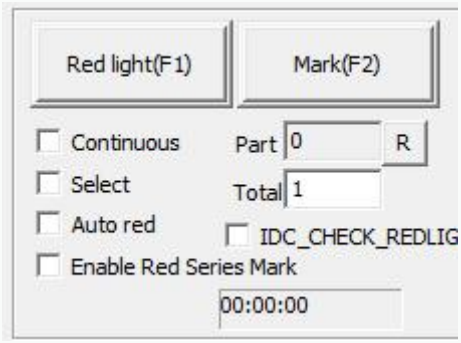


Figure.9-13 Marking Dialog

Red Light: This item is used to mark the frame of the object without laser output and indicate the marking area so that users are convenient to orient the workpiece. This function is available in those laser machines which have red guide light. Key "F1" is the shortcut key of this function.

Mark: To execute marking. Key "F2" is the shortcut key of this function.

Continuous: Mark the current object repeatedly without stop.

Mark Selected: Only those selected objects would be marked.

Part: It indicates the total quantity of parts which have been marked.

Enable display outline: Check this function to display the outline of the figure when displaying red light.

Total Number: It indicates the total parts to be marked, which is ineffective under the mode of Continuous Marking. If the total part number is more than 1, the marking operation will not stop until the number of parts marked is equal to the total part number.

R: Marking parts reset.

Parameter: It is used for equipment setting.

Enable Continuous Red Light Marking Mode: After selecting this function, returning to the software interface and clicking "Marking", a dialog box as shown in Fig. 9-14 will appear. It will appear after each marking and red light preview will always exist.

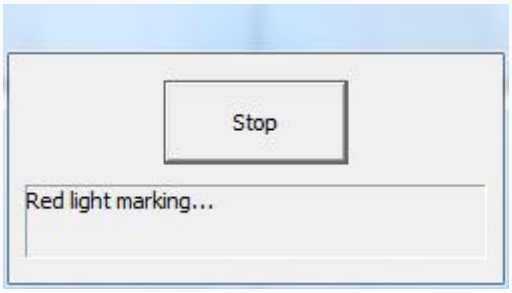


Figure.9-14 Continuous Red Light Marking Mode

9.2. Multi-Card Mark

Open multiple documents and mark different document content on multiple different/same type lasers.

The following figure shows the Multi-Card Marking Control Bar.

Figure.9-14 Multi-Card Marking Control Bar

9.2.1 Multi-parameter management

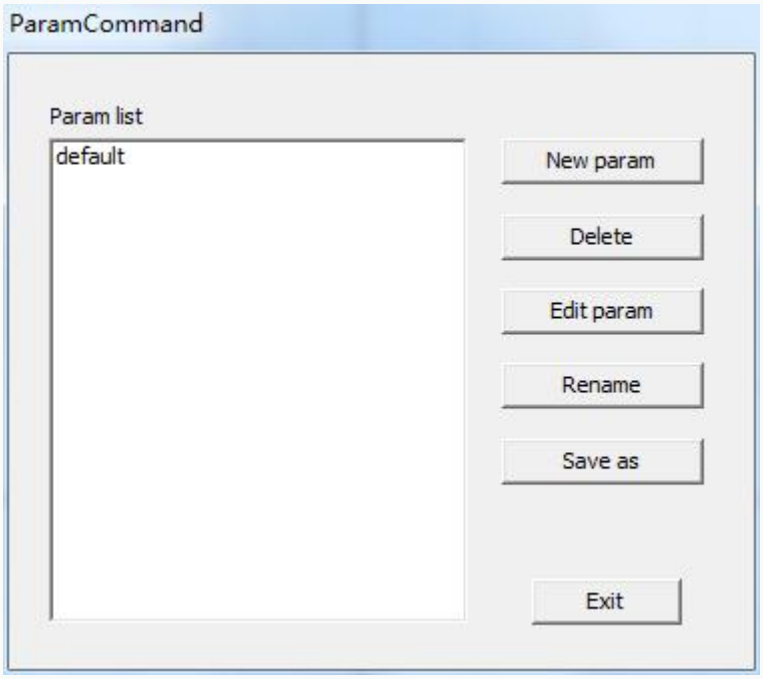


Figure.9-15 Multi-parameter management

Under normal circumstances, edit the default parameters and set them according to the current corresponding laser. Then you can create new parameters or edit the default parameters.

9.2.2 Device Association Management

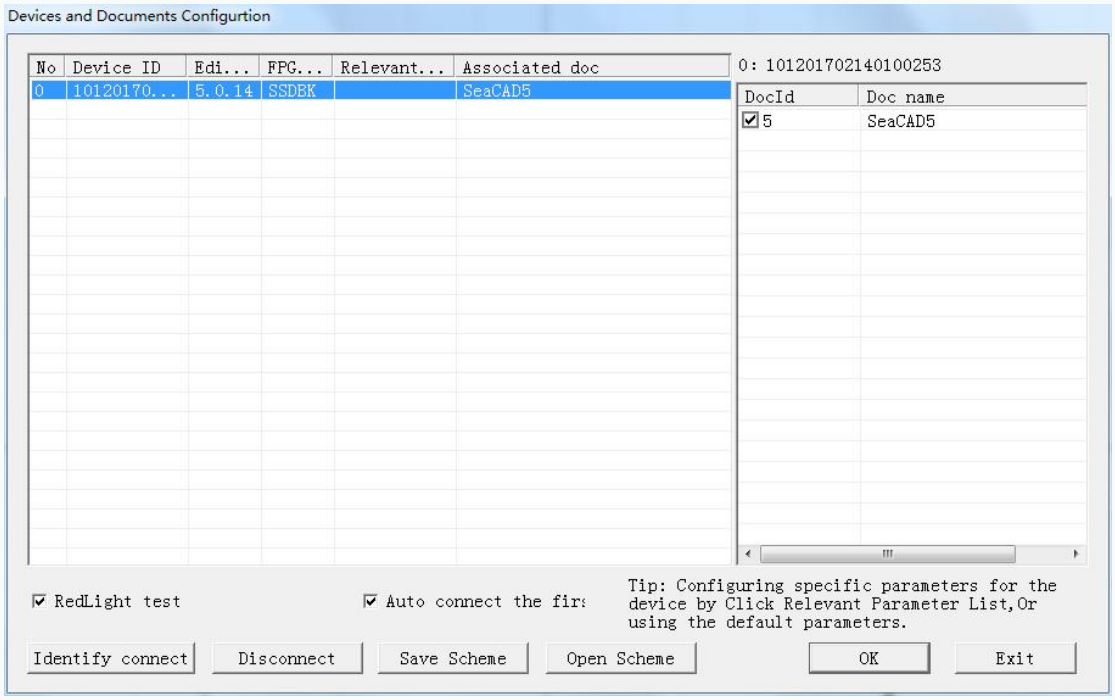


Figure.9-16 Device Association Management

Configure Parameters for Device;Associate document with devices.

After all devices are associated, you can choose to save the associated configuration. In this way, the next time you need to do the same processing, you can directly open the associated plan without having to re-set it.

9.2.3 Mark

Click Marking, the following interface appears, showing the marking status.

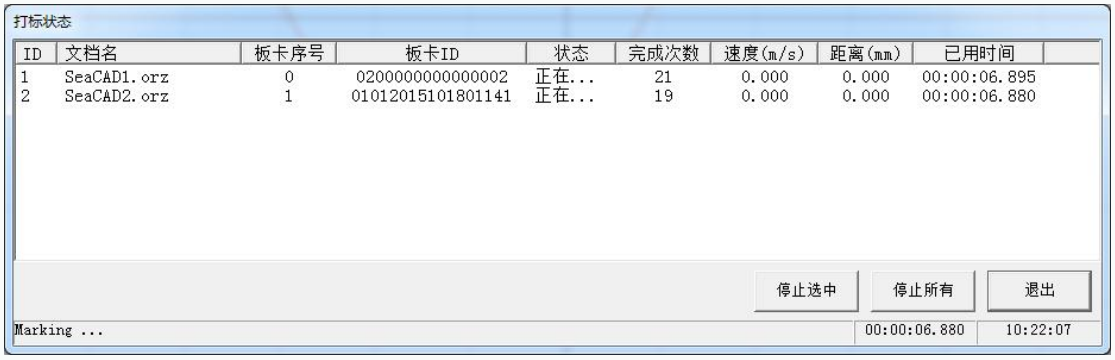


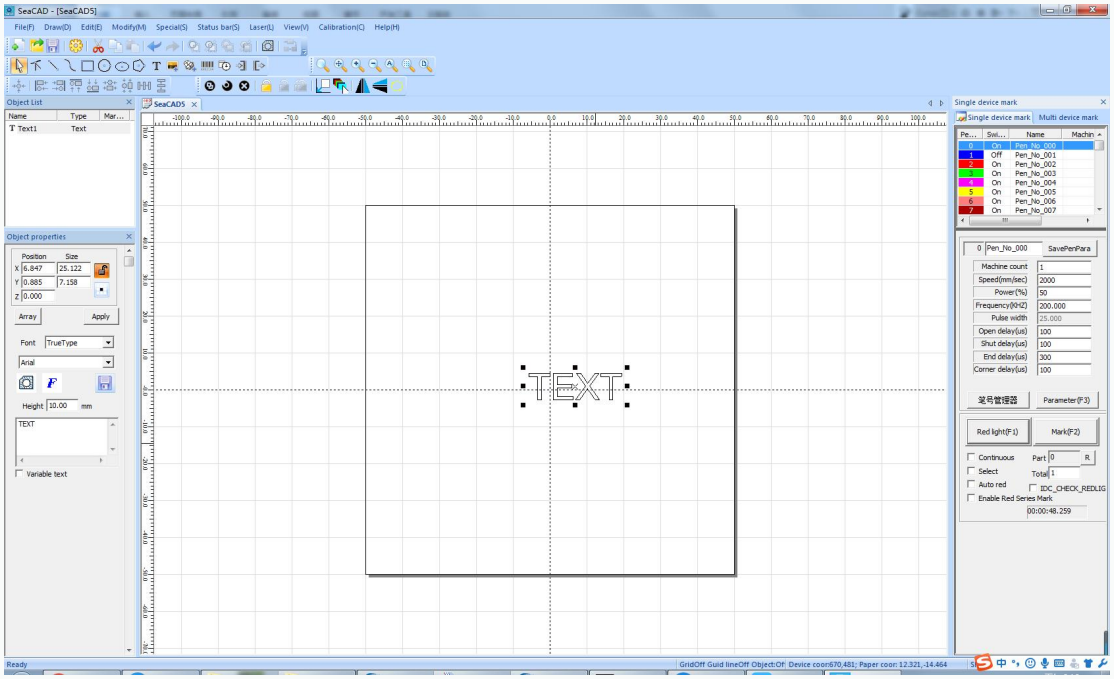
Figure.9-17 Multi-Device Mark

10.Scanhead Calibration

10.1.Direction adjustment

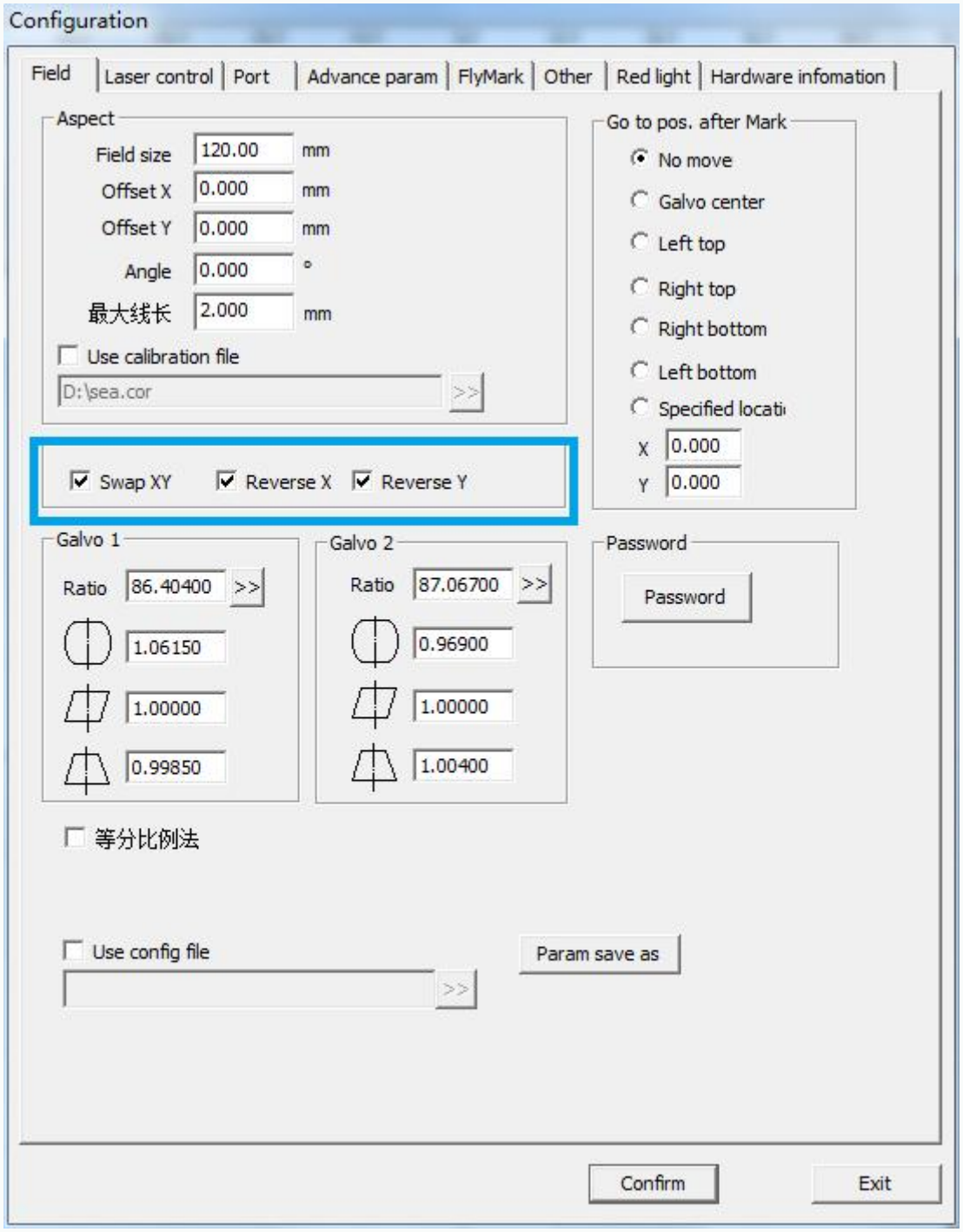
The direction needs to be adjusted to the same direction as the drawing area before the calibration.

For example, draw a text in the drawing area, as shown below:



Try to change the three checkmarks in the blue box below and mark until the marked figure matches the drawing area

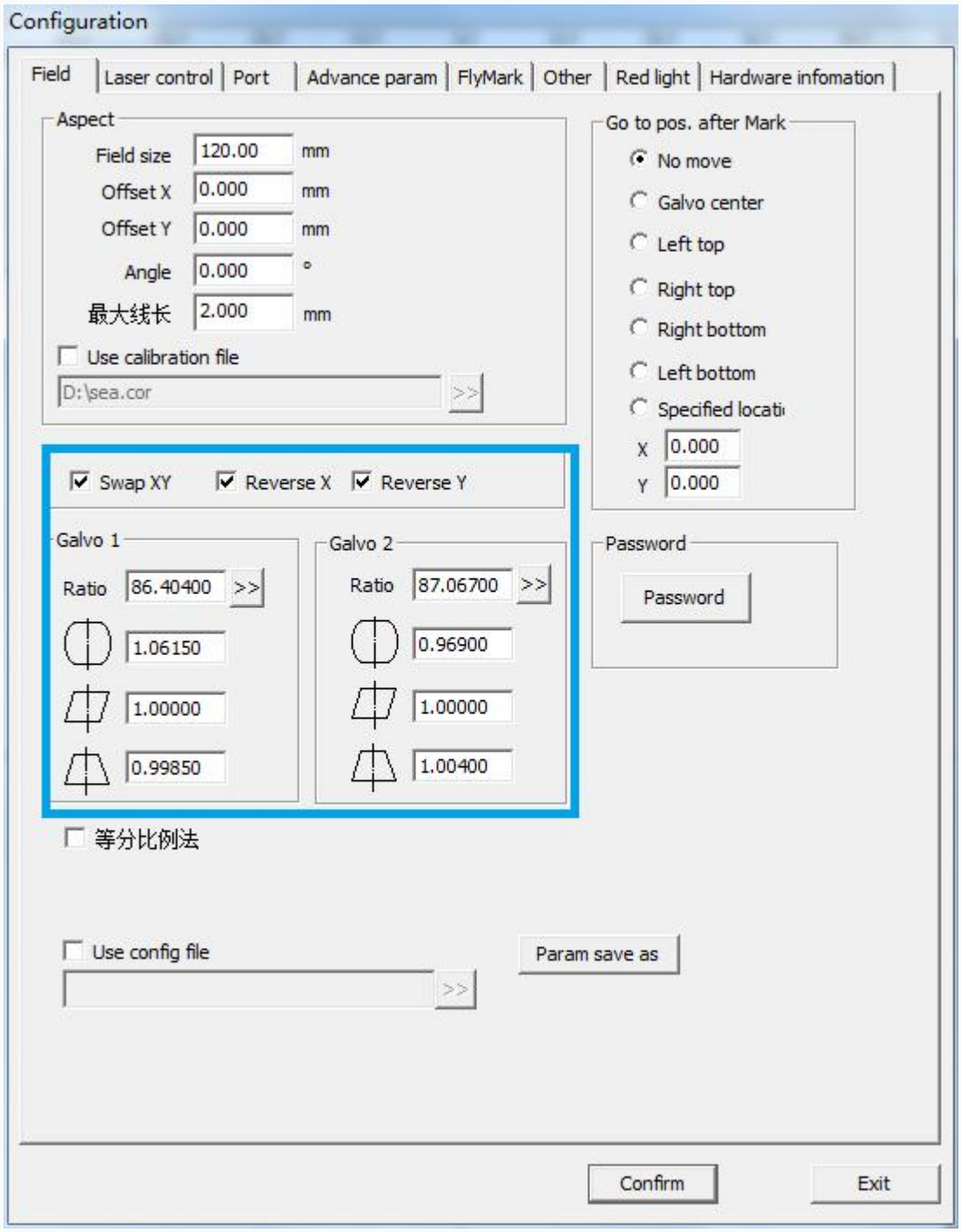
.



10.2. Manual correction

Manual correction, enter from the right parameter (F3), as shown in the blue box in the figure below. By default, the galvanometer 1 corresponds to x and the galvo mirror 2 corresponds to y. If the xy swap is checked, the galvanometer 1 corresponds to y. Galvo 2 corresponds to

X:



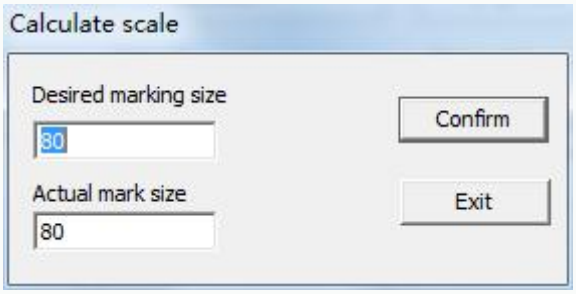
10.2.1.Shape adjustment

Adjust the curvature, trapezoidal deformation, parallelogram deformation.

Each time you change the curvature, trapezoid, and parallelogram parameters, click "Mark test rectangle" until it is square.

10.2.2.Zoom

According to the marked figure, measure the actual size,Zoom in/out, as shown below:



In the first step, click on the "marking X scale line" and the software mark a line in X direction.

10.2.3.Save

Click "Save" to save the parameters using the current file name (or default file name); click "Save Data As" to save the file using another file name.

The saved file can be used for data correction of the marking software.

10.3. Fitting correction

For applications where the accuracy requirements are high.

Correction related parameter settings

1. On the right side of the main interface, select in the marking parameter field to open the parameter setting. The shortcut key is F3.

2.Determine the scope of the field lens. Take 120mm as an example, change the area size parameter to 120.

3. Set the galvanometer direction, as shown below;

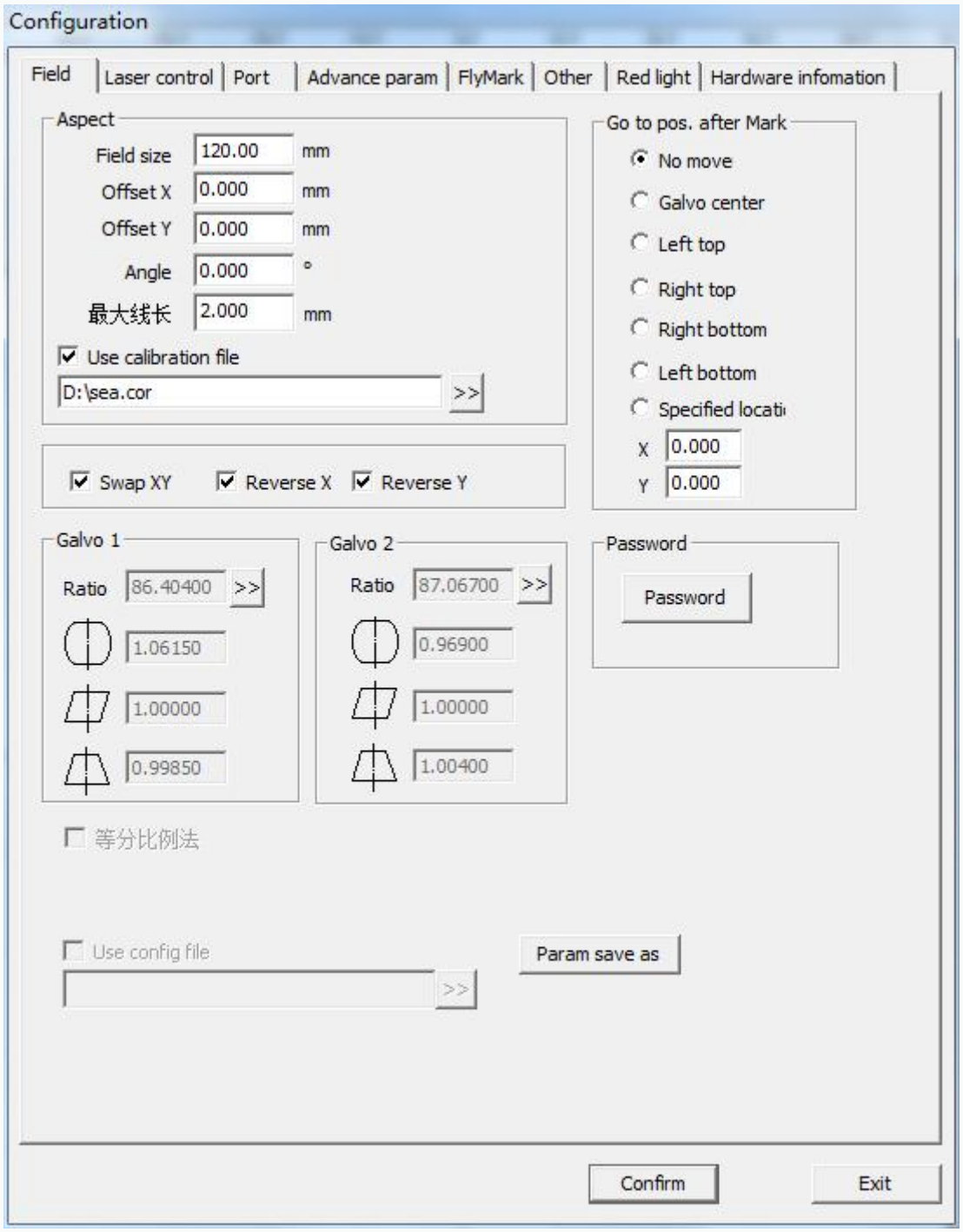
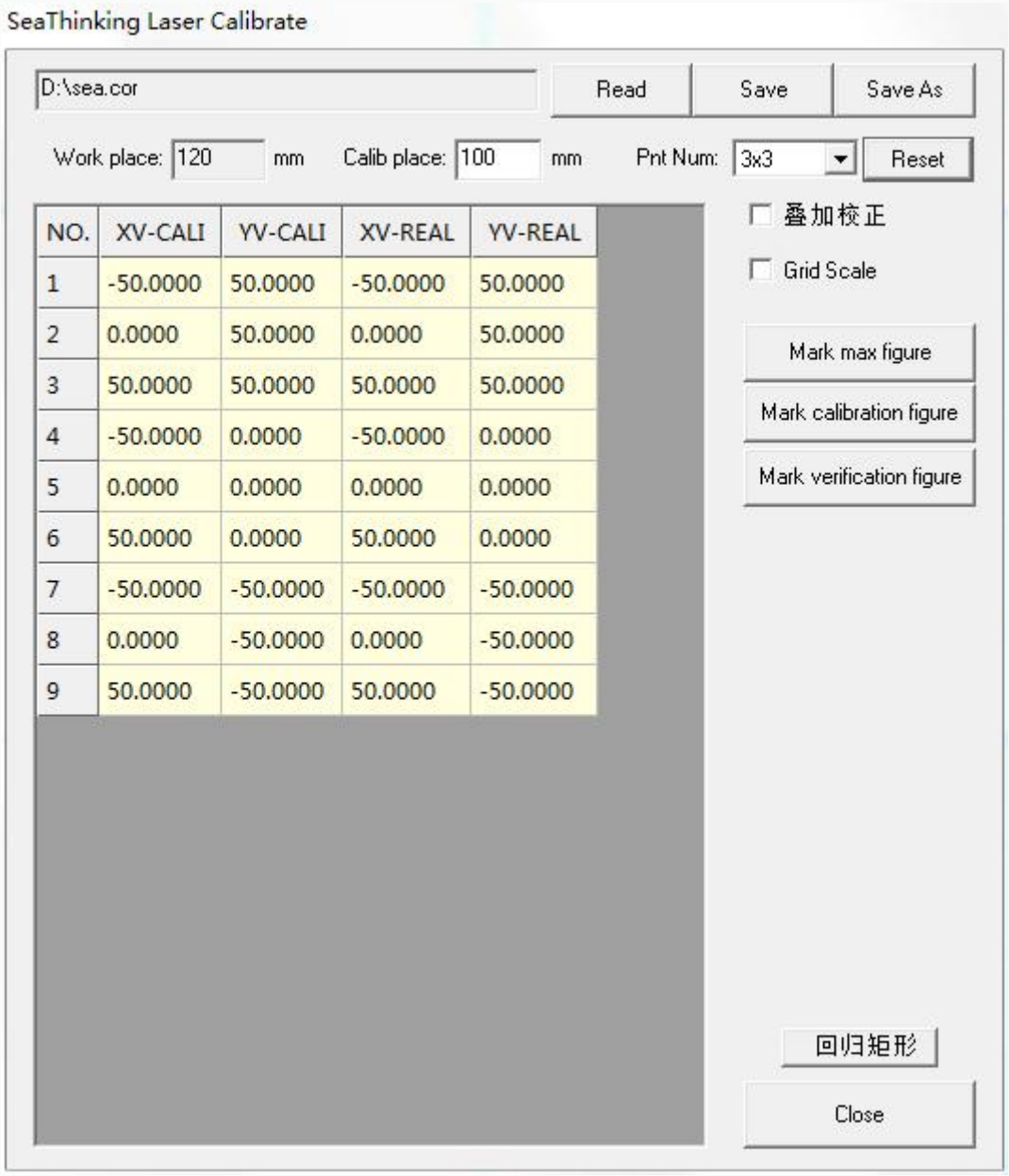


Figure9-1 Field Parameter

10.3.1 Start correction

From the menu, enter Fit Correction to enter the Fit Correction operation interface.

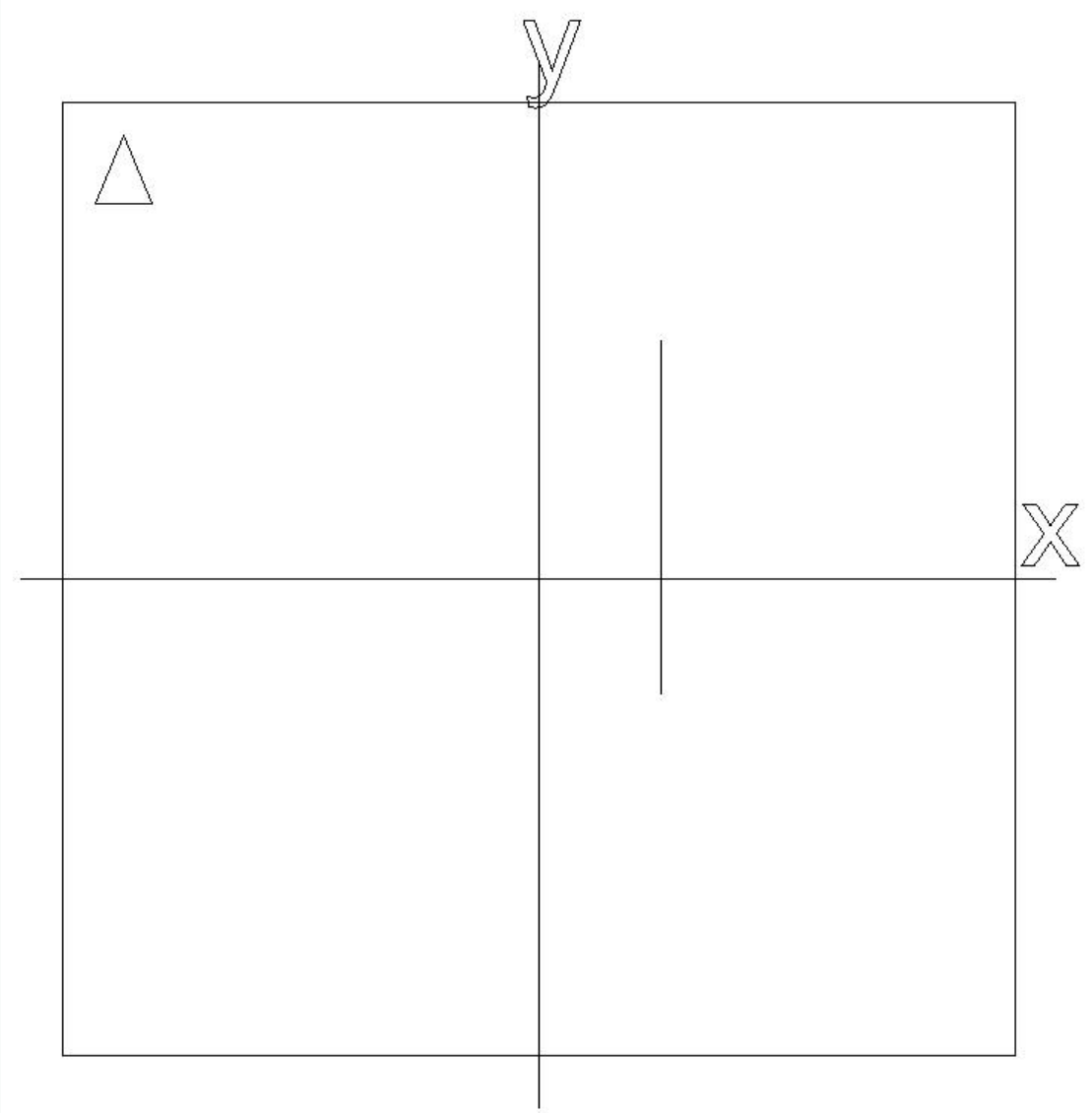


10.3.2Marking correction graphics

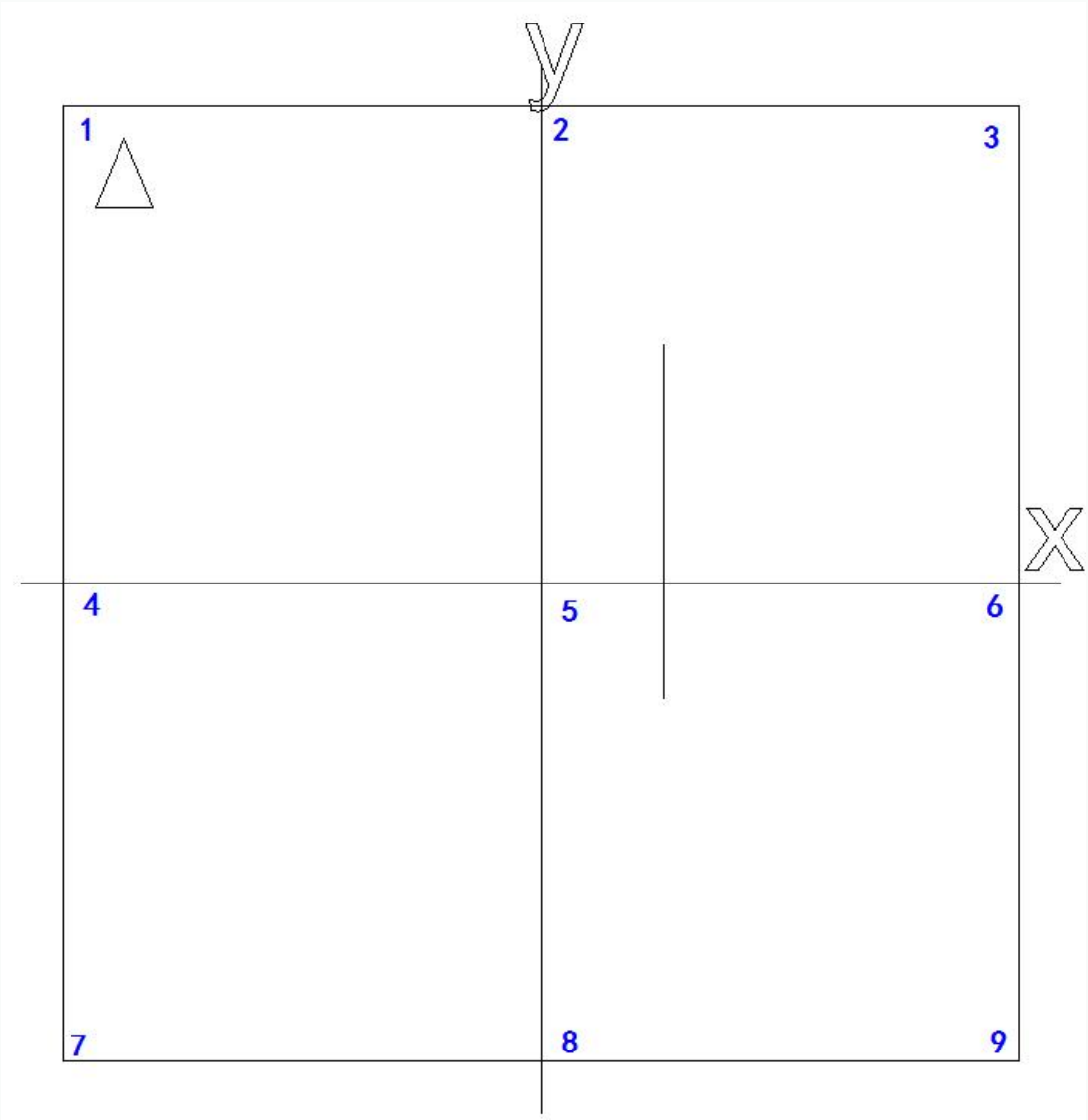
Set the verification area to 100mm, set the verification points, and reset.

Click on the "Marking Verification Graph" to mark the following graph (x and y are used to illustrate the orientation of the graph and will not be actually marked). Note that the direction and position of the short segment and the upper left triangle must follow the figure below.If not, adjust the XY swap, X

reverse, and Y reverse parameters of the main interface until the marked figure is in the same direction as the figure above.



When measuring the coordinates of a point, minimize the measurement error. Measure the coordinate values of the 9 points in the above figure in sequence, based on the center point (point 5). The sequence number is as shown in the following figure:



- Measure the coordinate values of 9 points in sequence using the center line of the cross (the line of the straight line passing through the No. 5 point) as a reference and record it. The measuring method is that the vernier caliper coincides with the X-axis or Y-axis of the cross centerline, and the other side coincides with the point to be measured, and the reading is the correction value at this time. Or use a quadratic element measurement. Take the first point correction value as shown in Figure 9-5 as an example: (It can be considered that the method of measuring the average value of 3 times will be more accurate)

- Fill the measured values in columns 4 and 5 of the data sheet. Among them, the 2nd and 3rd columns are the set distances, and the 4th and 5th columns

correspond to the actual marking distances. Note that the measured values are positive and negative.

- Click "Save" to save the file (here saved as 9dot.cor) as shown in Figure 9-9；

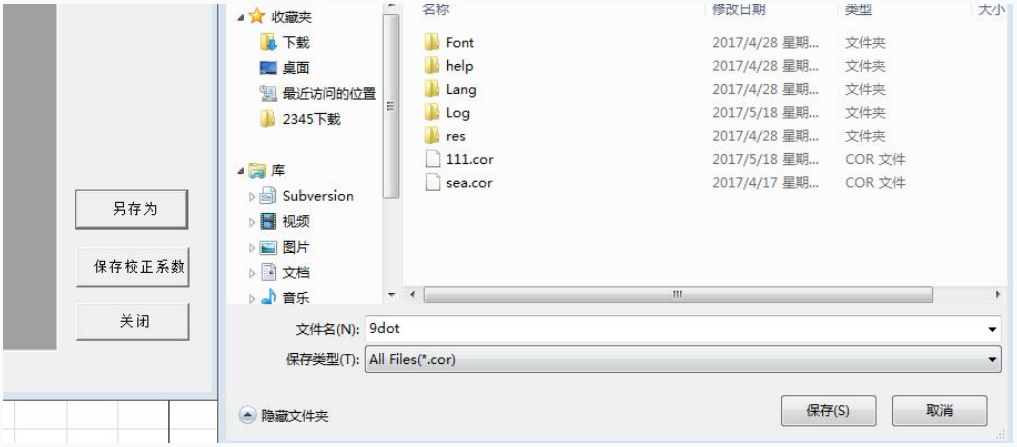
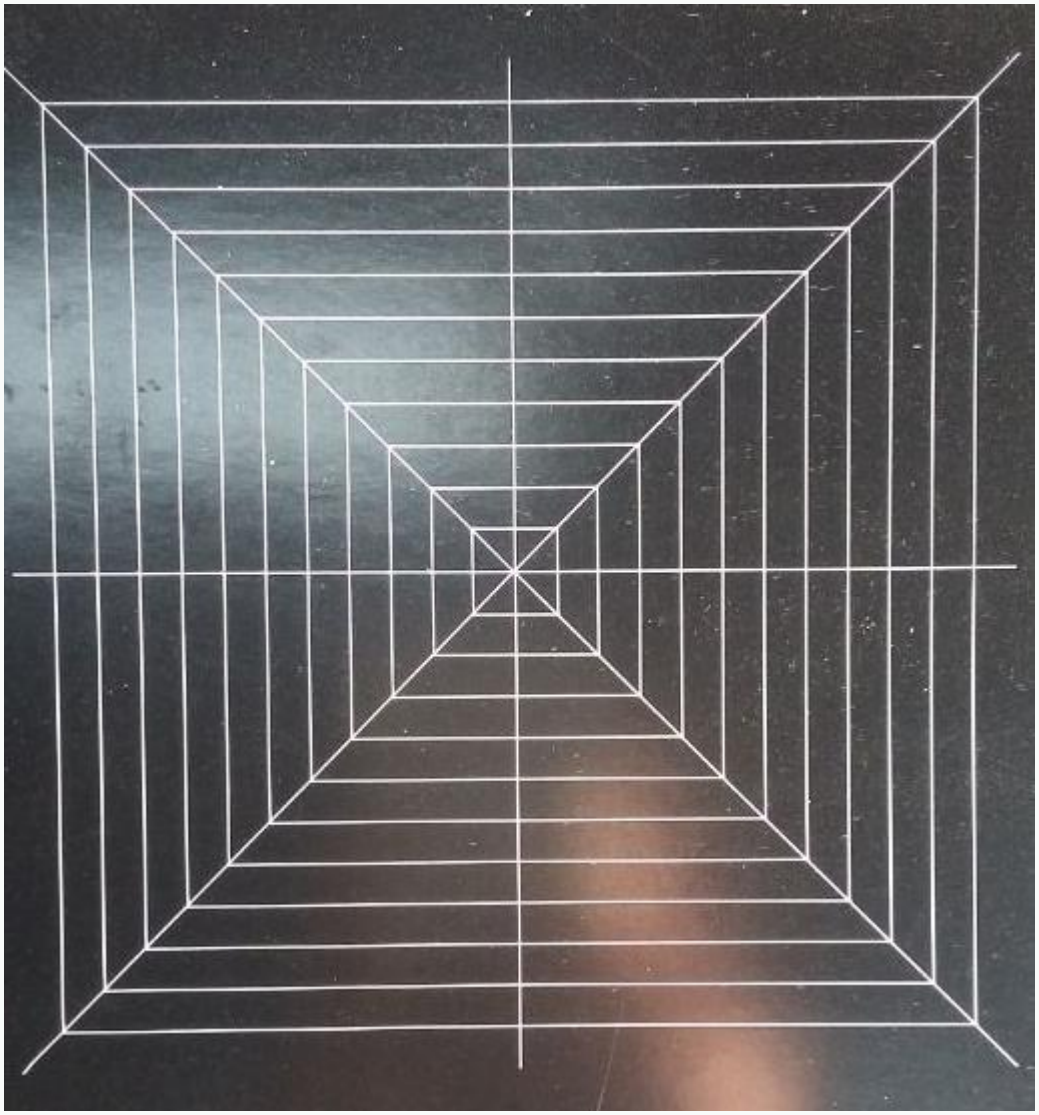


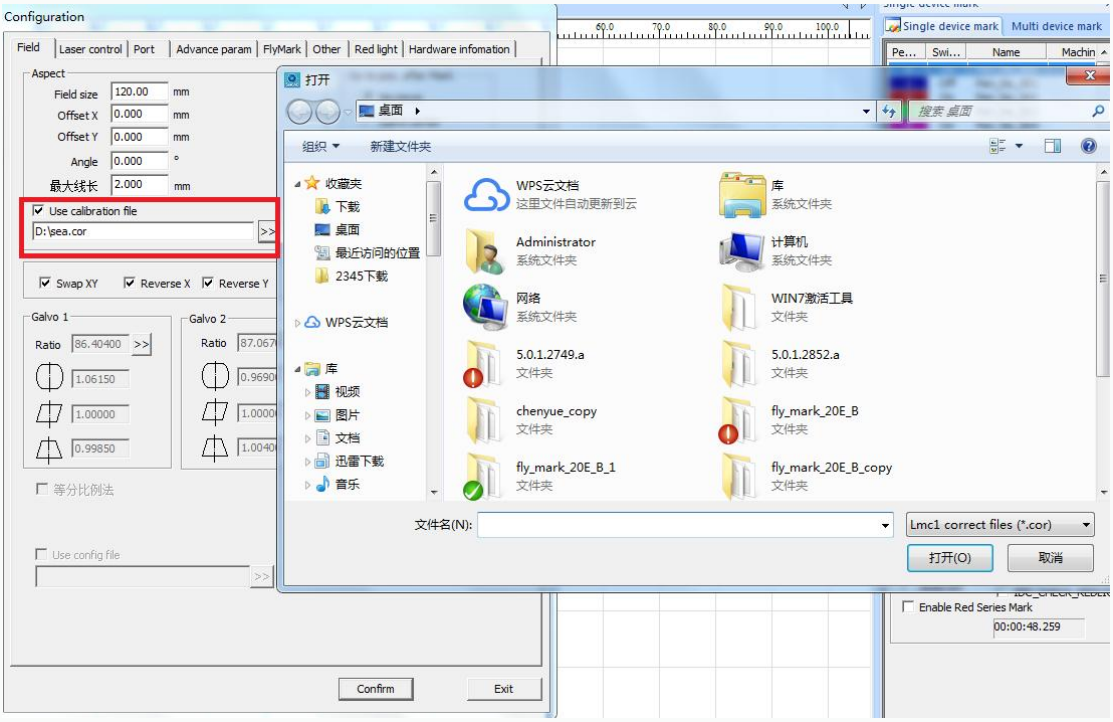
Figure.9-9 Save calibration file

After saving, you can click "Marking Verification Pattern" to mark, as shown below:



10.3.3Use calibration files

The coefficient file saved may be used for marking calibration in the setting interface below.

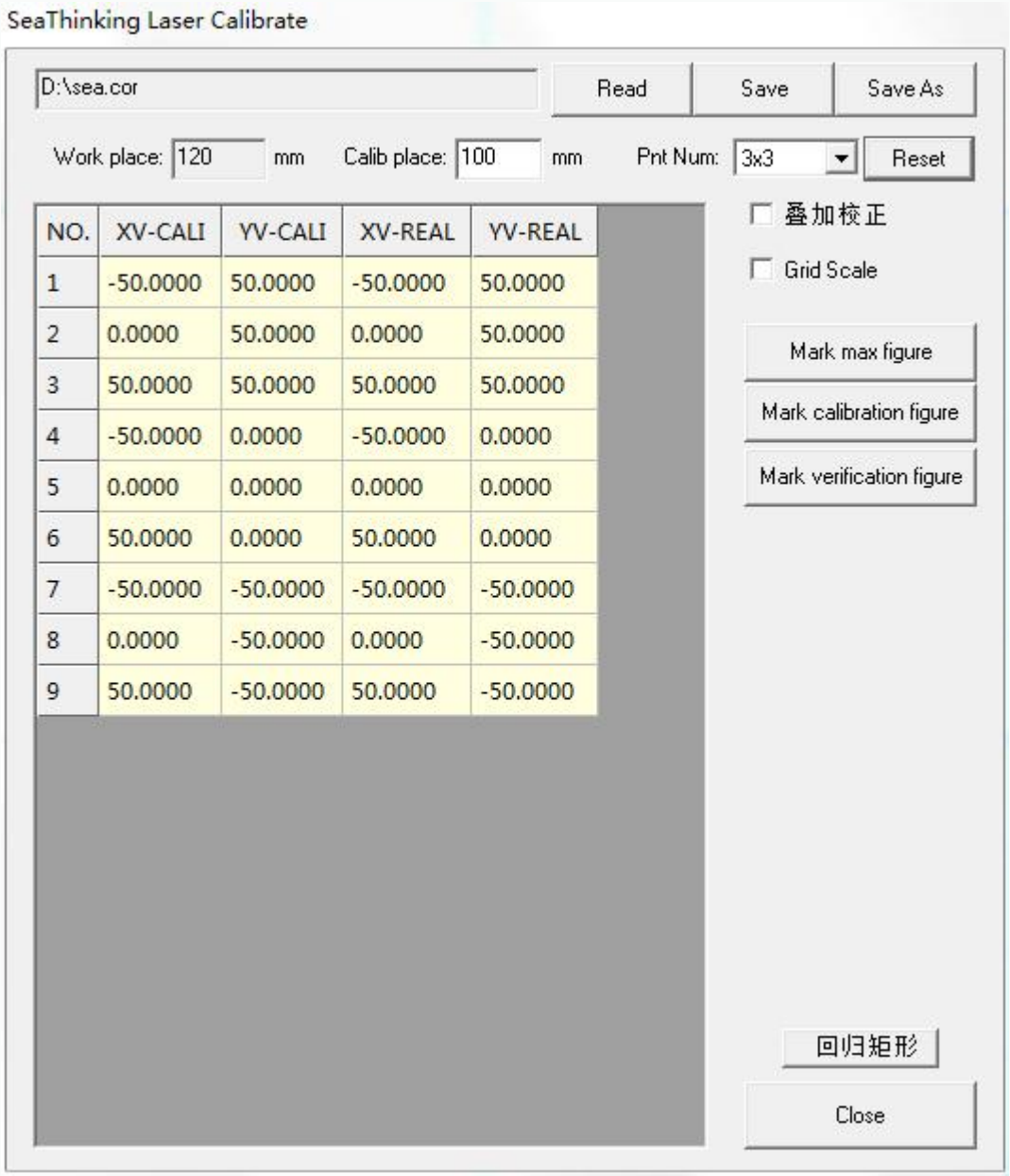


Use Calibration File

10.3.4 High-precision correction

After the above-mentioned fitting and correction, generally speaking, the accuracy can meet the requirements. If the uniformity can not meet the requirements, the equal division correction can be added in the x and y directions.

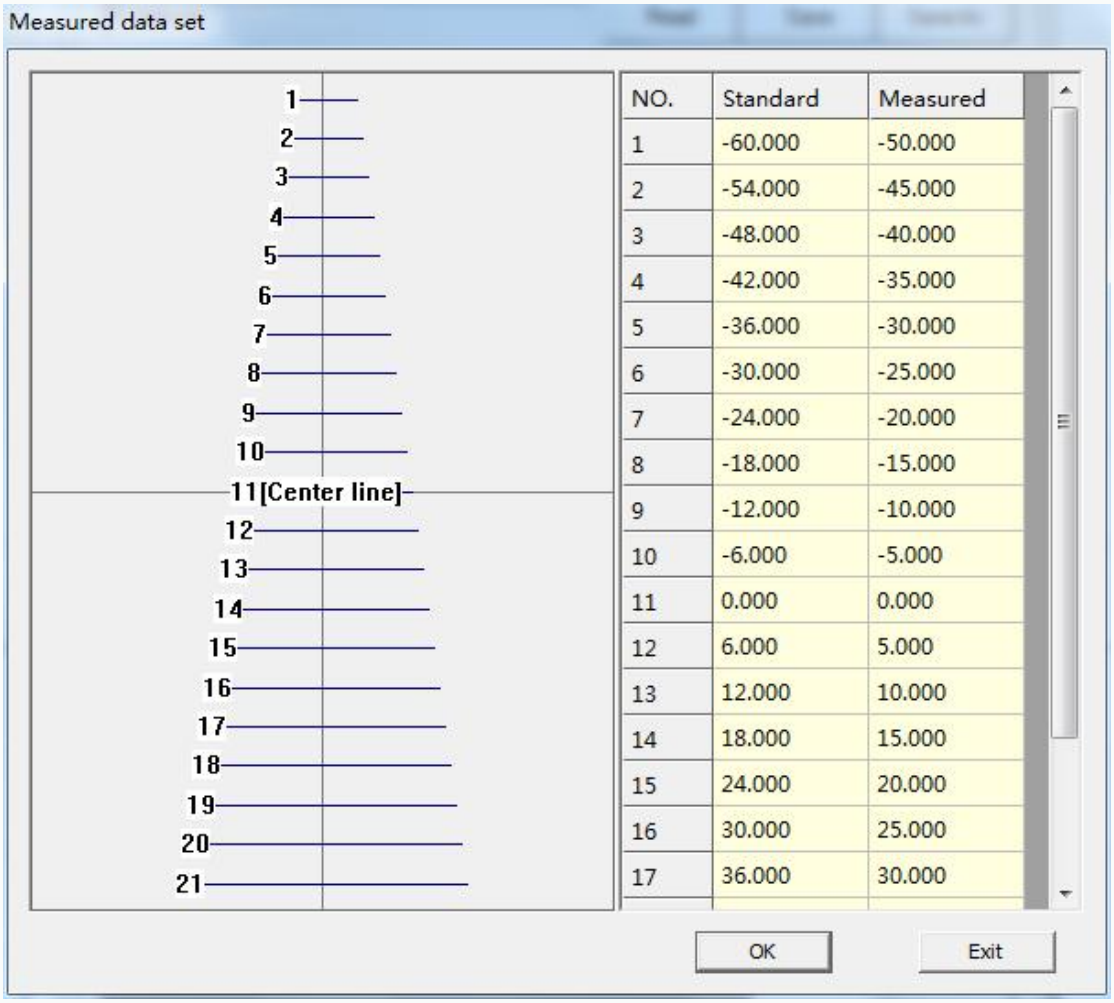
Check the "Dividing ratio method" and the following interface appears:



10.3.4.1 Set X Proportional Parameters

In the first step, click on "Mark X Proportion Lines" and the program marks many lines that change from shorter to longer along the x-axis.The

second step, click "Set X Proportional Parameters" to enter the proportional value setting interface。



Measure the distance (mm) between the short line and the center line in the order described in the figure, fill in the right table, and click OK to return to the main screen.

In the third step, click "Marking x Test Line" and the software marks a series of short and long lengths along the x-axis. (The size of the verification area is divided into 20 equal parts. For example, the verification area is 100 mm. The standard distance between adjacent bisectors is 5mm), measuring the distance between each short-line and the centerline. If an interval is greater than the standard equidistance, you need to increase the distance of the proportional parameter. If it is less than the standard equidistance, you need to reduce the proportional parameter.

For example, if the distance between line 5 and line 6 in the graph is 4.9, assuming that 6, 7, 8, 9, and 10 are correct, then the distance between line 5 and the centerline is 29.9. According to the data entered in Figure 2-13, this

value is between "6" and "7". According to the above rules, we need to adjust the data in point "6". Since 4.9 is less than 5, we need to reduce the original value of 30.8.

10.3.4.2 Set Y Proportional Parameters

The operation steps are the same as those in 10.3.4.1。

10.3.4.3 High precision correction

For high-precision requirements, you can use the equal-division ratio adjustment in the X and Y directions to achieve high accuracy.

The following example illustrates the adjustment operation. Assuming that the scanning scope of the galvanometer is 120X120mm, the verification area is 100X100mm, and the required accuracy is 0.05mm.

Firstly, use nine-point correction to correct the deformation; select the equal-division ratio method to mark the X- and Y-axis bisectors, respectively, and divide them by 5mm into equal parts. In the full-width X- and Y-axis directions, they are 25 lines. measure the distance between each line to its centerline, the left/lower end is negative and right/top is positive, and the measured values are entered in the scale parameter table. These measurements are mostly the basis for adjustment. On this basis, start the adjustment.

1.Mark a 100*100mm rectangle and measure the length of the top, bottom, left, and right sides;

2.If the difference between the actual measured length and the 100mm is greater than 0.05mm, adjust the 50mm or/and -50mm corresponding value in the X or / and Y proportional parameter table according to the actual measured value, and increase or decrease the value and save it. Mark the rectangular

frame again, measure the lengths of the four sides of the rectangle, see the influence on the size of the rectangle, and record the values before and after the adjustment and the corresponding measurement values of the rectangular frame; it can be inferred that the influence of X/Y on the size. If it is satisfied, it ends; otherwise, steps 1 and 2 are repeated until the accuracy is satisfied.

3.If you also need to adjust the accuracy of the 90*90mm rectangular box, you can mark the 90*90MM rectangular box, adjust the corresponding measurement value of 45/-45mm, do the same operation in steps 1 and 2.

10.4. Grid correction

To be perfect

11. Help

11.1. About SEACAD

Click "About SEACAD" to display the software version information.

11.2. Software registration

Please ask the control card supplier for the registration code and fill in the "enter registration code" column to complete the software registration.

11.3. Help documentation

Click "Help Documentation" to open the software manual directly.

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