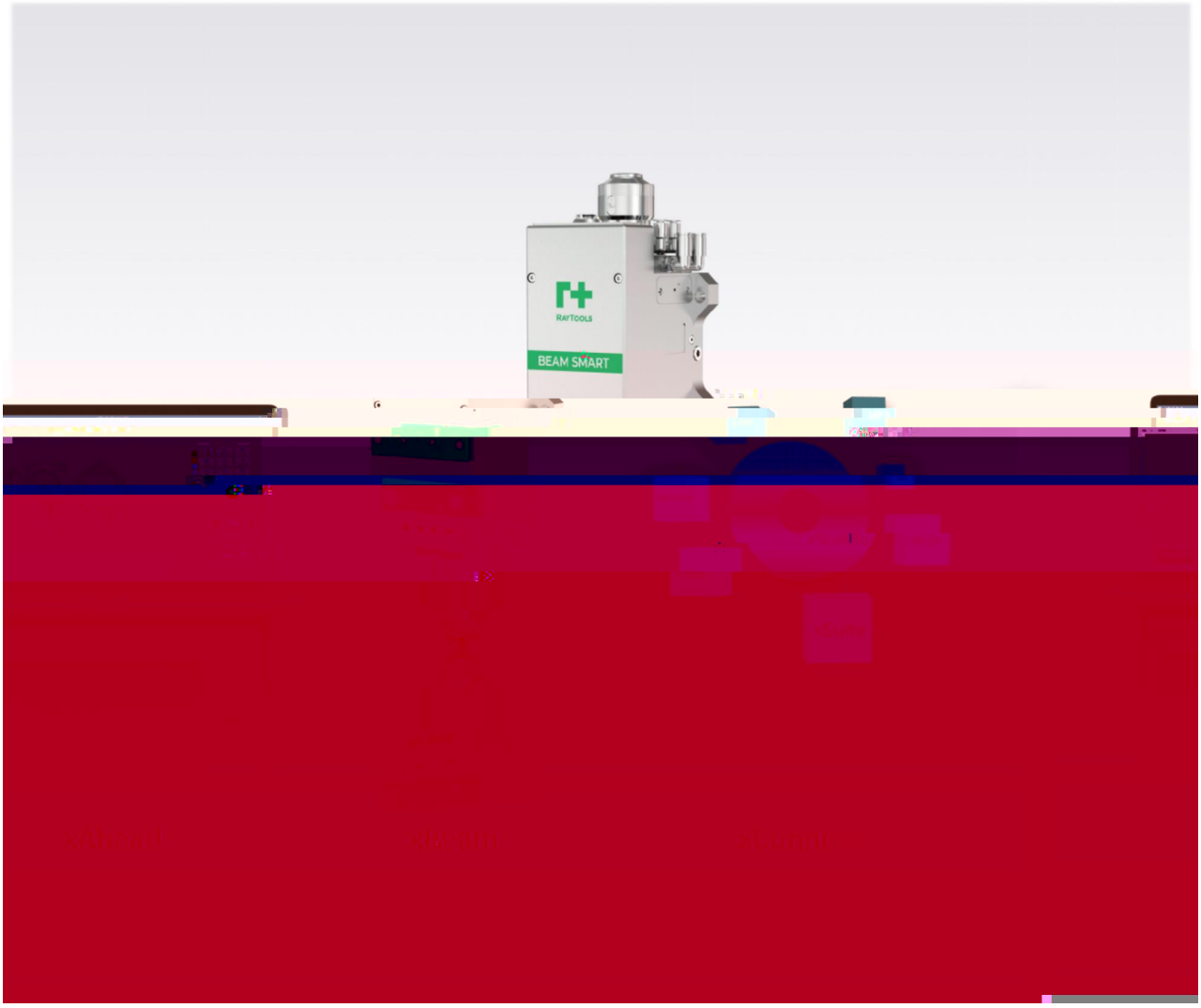
XC3000S Series

Laser Cutting System User Manual



Thank you for choosing this product from !

The manual provides a detailed introduction to the installation and use of the XC3000S Series professional laser cutting system, including a quick start, introductions to the function, notes and more. The software must be used with a dongle. If you do not have a dongle, you can use a simulator.

Please read the manual in detail before using the software and the associated equipment, as this will help you to use it better.

Due to the constant updating of functions, the product you receive may differ in some respects from instructions in the manual.

If there is any error in the document, please inform us as soon as possible.

The data contained in this manual is only used to describe the product and shall not be regarded as a statement of security interest.

For the benefit of our customers, we will constantly try to ensure that the products we develop comply with the latest technology.

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Email: sales@raytools.com

Website: www.raytools.ch

[redacted]

- Dismantling of [redacted] warranty, including the normal replacement of worn parts and components during maintenance or commissioning operations.
- Unauthorized modification of products or use of non-original spare parts will directly lead to the invalidation of warranty and liability exemption.
- It is recommended to only use the spare parts provided by us or submit them to our designated professional team for installation.

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- Ensure that the product is used in a dry environment.
- Ensure that the product is used in the environment required by EMC standards.
- The product is only allowed to run within the parameters specified in the technical data.

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- Be familiar with the basic provisions [redacted] and accident prevention, having received equipment operation guidance.
- Read and understand basic safety instructions and operations.
- Must have studied the relevant regulations and safety instructions and understand the possible hazards.
- Comply with relevant regulations and implement

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Once the software has been installed, the icon will appear on the desktop, as shown on the right.

Double-click left mouse button on it to run .

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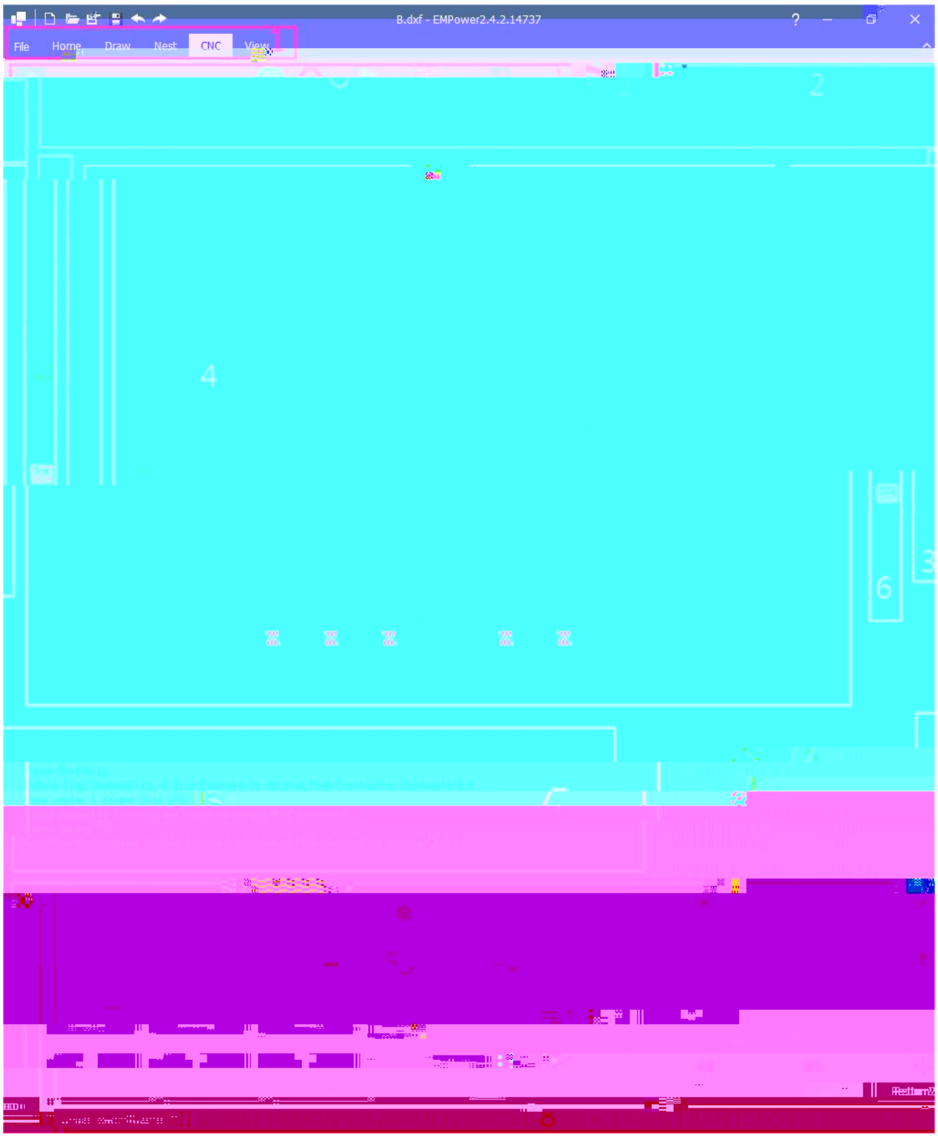
The mainform is one of the most common used user interfaces. There are many operating areas, as shown below:



1: Menu

2: Toolbar

3: Quick Drawing Toolbar

4: Drawing Area

5: Control Panel

6: Process Toolbar

7: Log

8: Status Bar

As shown below, the toolbar is divided into four sub-pages: "Home", "Draw", "Test" and "CNC ".

Select the sub-page to display its contents. When it is in processing, the "In Processing" page appears and cannot be switched to another page until the process stops.

The toolbar on each sub-page has several "columns" according to functions, such as "View", "Transform", "Process Setting", etc. And each column contains various function buttons.

In the top left co ar the a ile ', which c ns some file-related options.
Click on the ee n below

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Create a new drawing and not save the current one.

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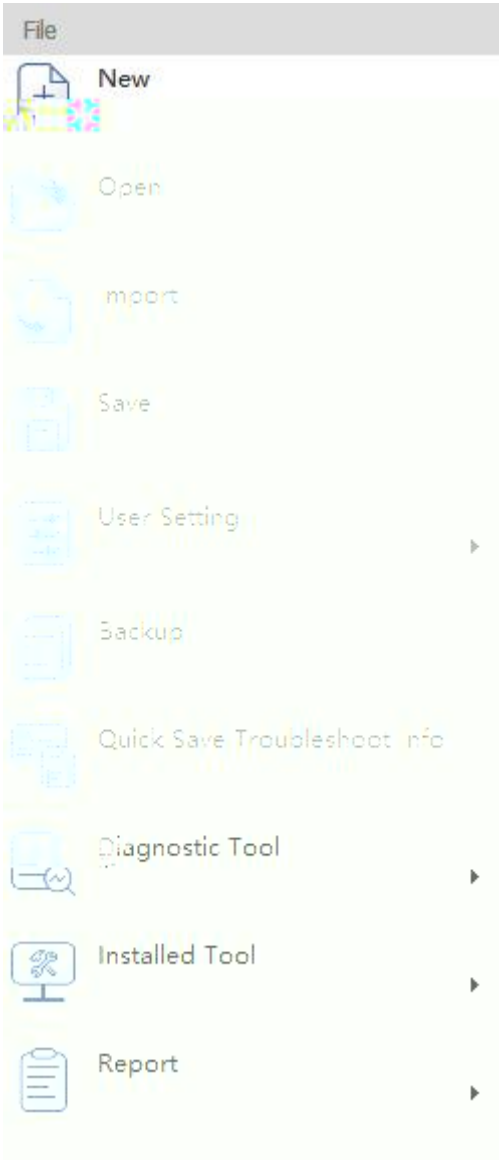
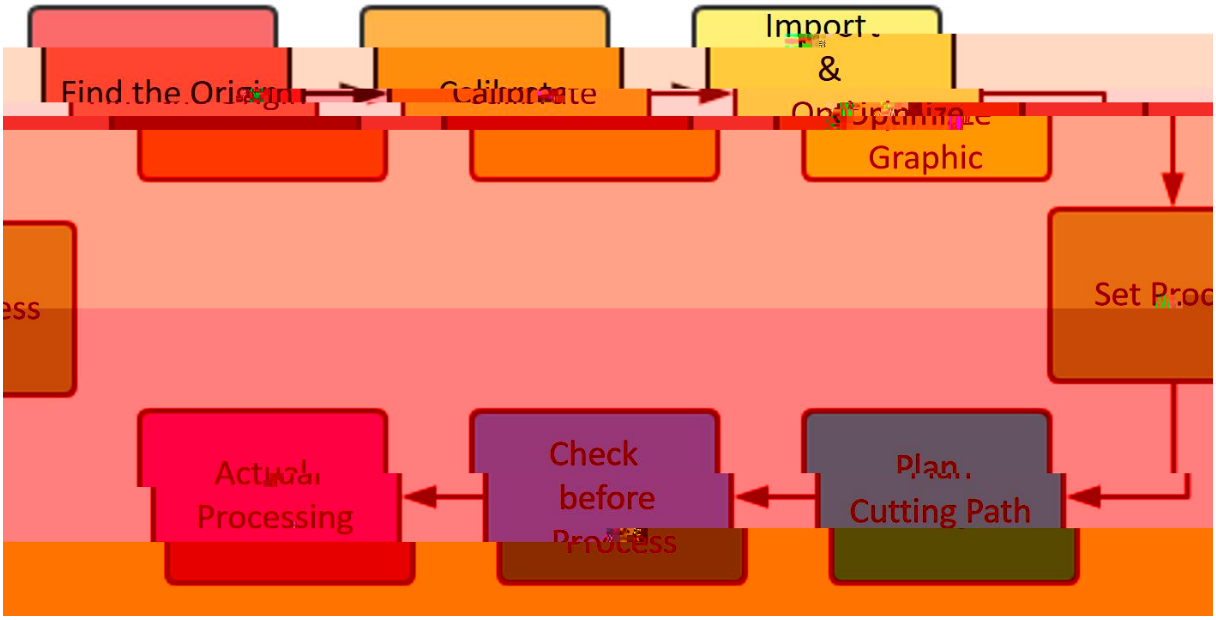
Import graphics to be processed. Supported file formats include dxf, emw, nc, nsp, etc.

Import another file to the drawing boar





After opening the software, click on Return

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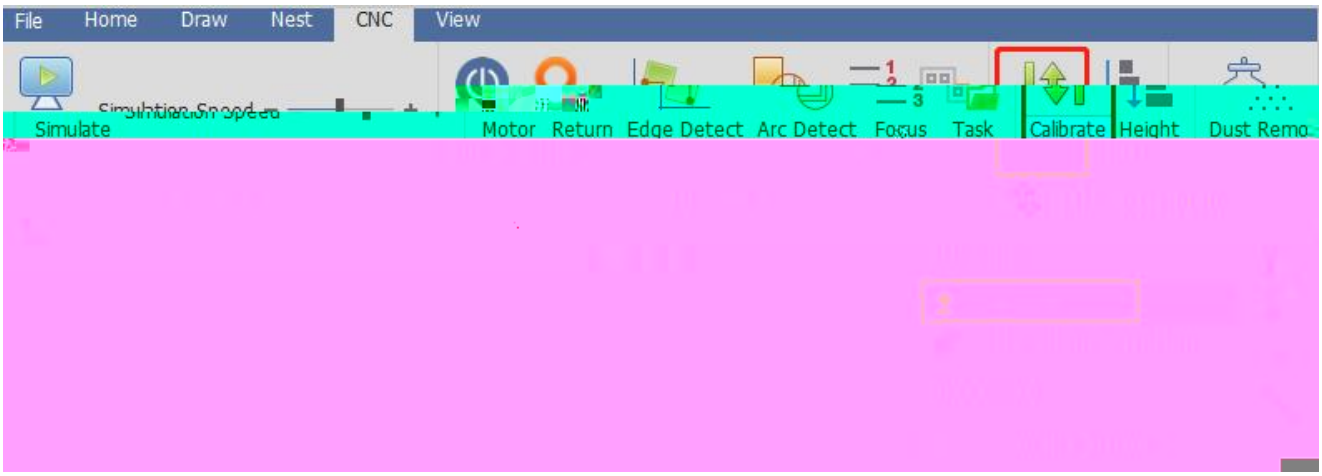
After the machine completed returning origin, place the cutting head above the clean flat sheet to be cut.

Click on the drop-down button of Calibrate in CNC sub-page, and then the drop-down bar will pop up. Click on Calibrate button in the bar, as shown below:



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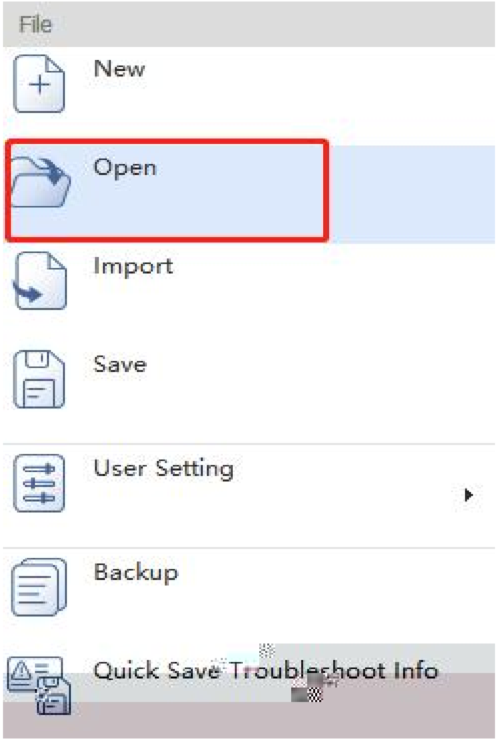
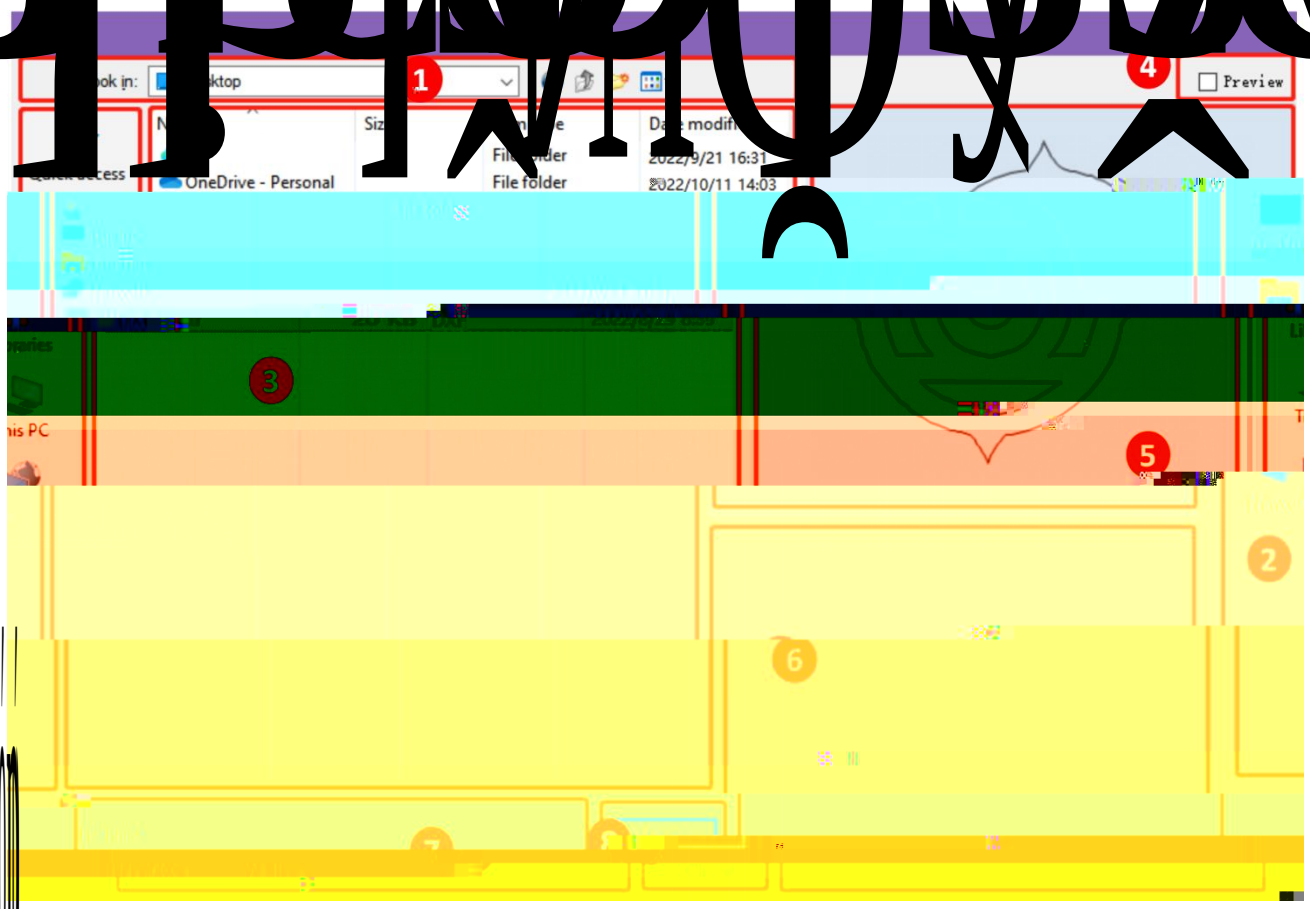
After the cutting head has been calibrated, import the graphic to be processed by clicking on Open button in File Menu, as shown below:



An interface of graphic import will pop up. Select the graphic in the disc and click on Open button. Currently supported file formats include DXF, EMW, NC, and NSP, as shown below



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Show the current file path.

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Select the disc of needed file.

óoú CλfŜă

Files and folders are shown as complying with the filter criteria by current disc path.

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Select to preview the graphic or not.

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Click on Preview ǧžž

[ŜŀŘťǚỳŜ: add to enable the workpiece to avoid being incomple

If you need to save process parameters of current layer, click on Export to save them as a file. Then, you only need to import the layer process parameters, select the material thickness, and click OK.

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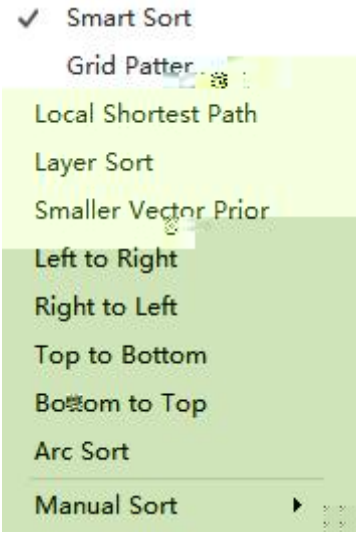
This step is to sort the graphics to be processed. Click on  button in Home or Draw sub-page to auto sort the graphics. Click the drop-down button, 

, of Sort to see there are several ways. Select one according to your need. It is shown below:



You can also group the graphics by selecting the graphics to be grouped and clicking on 

button in Home or Draw. Graphics in the selected group will be a whole and the processing sequence fixed. Later sorting will not affect the processing sequence in current group.

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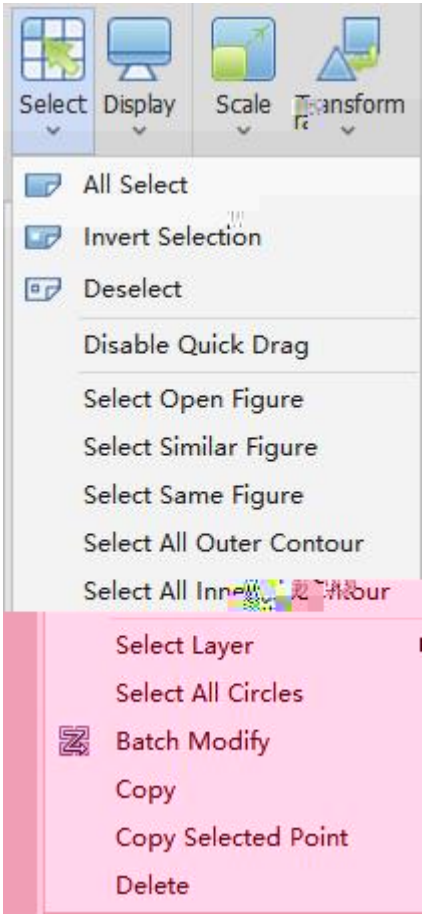
There are various ways to select graphics. Basic operation is to click on the graphic contour. Another way is box selection. Left click and hold the mouse. Then, drag it to create a translucent box to select the graphic.

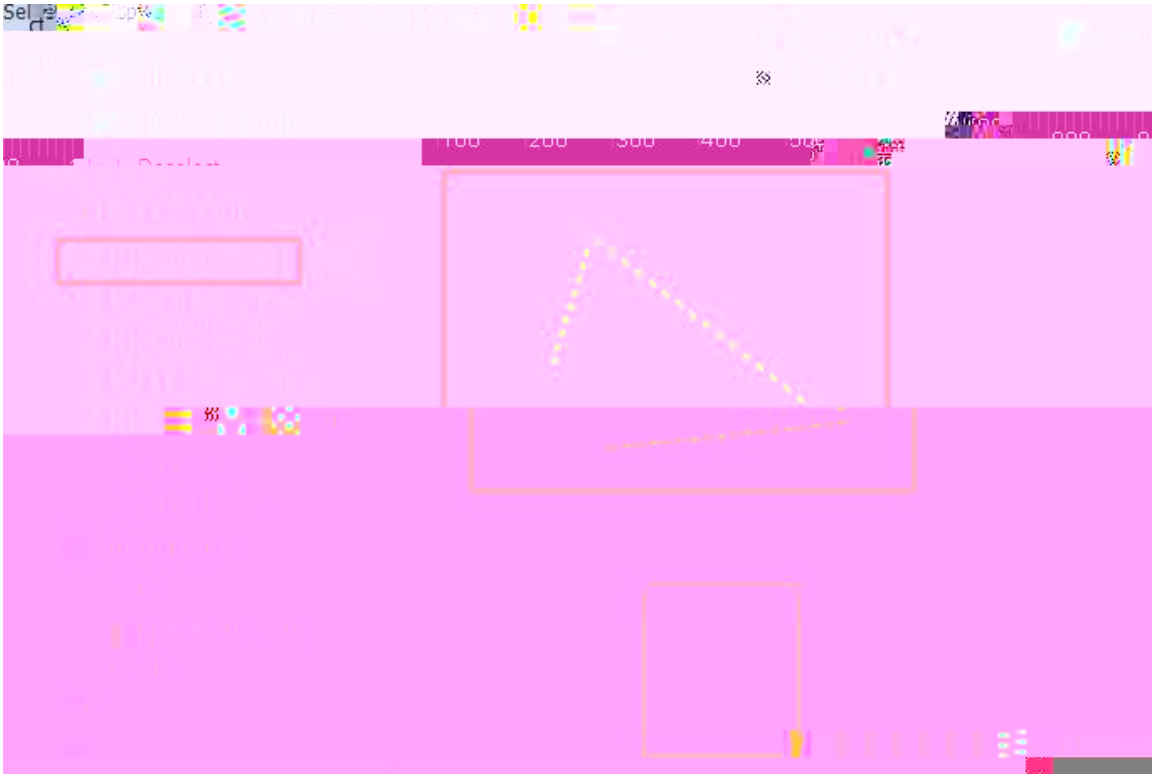
There are two types of box selection. When drag the mouse from left to right, only the graphic completely covered in the selection box will be selected. When drag the mouse from right to left, once part of the graphic is in the box, the graphic will be selected. You may use both types flexibly up to your need.

Click on Select in Home sub-page, and the drop-down bar will pop up. There are more advanced options, as shown below:



óMú !ff {ŜfŜŎű: select all the graphics in current drawing.
óHú LyØŜℕű {ŜfŜŎűλ2y: change current selected graphics into unselected.
óoú 5ŜăŜfŜŎű: deselect the selected graphics.
óпú 5λăŀōfŜ vʤλŎ] 5ℕŀƎ: make the graphics in current drawing area can not be dragged.

óрú {ŜfŜŎű hLJŜyϒCⱯƎdzℕŜ: select all the open graphics in the drawing area, as shown below:



ócú {ŜfŜŎű {ƛYϗfŀℕ CⱯƎdzℕŜ: select all similar graphics in the current drawing, as follows:

a. Select a target graphic (squares and circles are shown in below figure as an example),

b. Click on Select Similar Figure,

c. All squares and circles of the same size in the drawing are selected.

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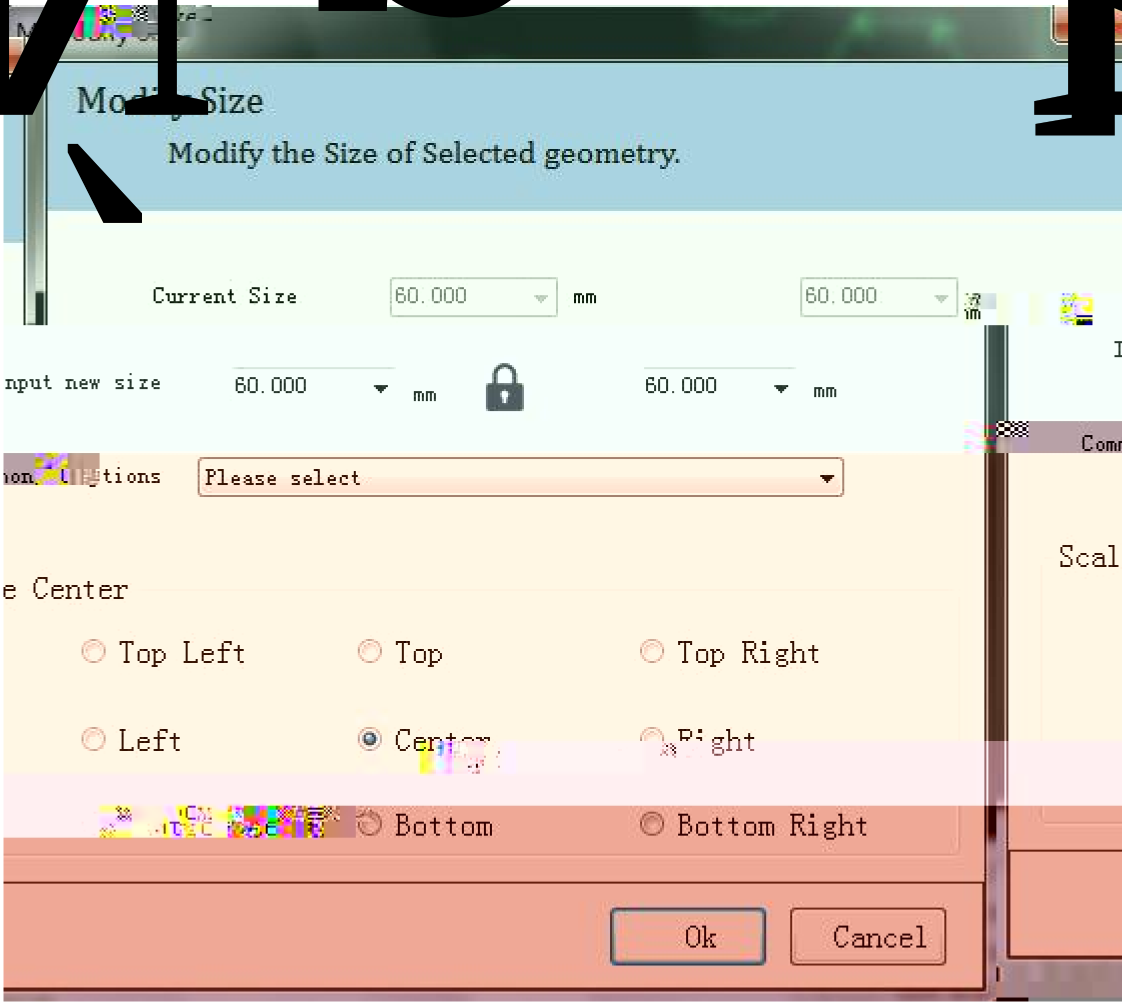
Click on Display button in t

To ... acc...es, ...se selec... ...aphic and... on Scale button. You can input a new size and complet... The ...face is shown as belo...



...hen the status of the lock in the interface is  , the length and width of the graphic scale according to its

ori...l size. To set length and width individually, click on the button as  to unlock it and enter the needed

...mmon Options: select the option according to needed

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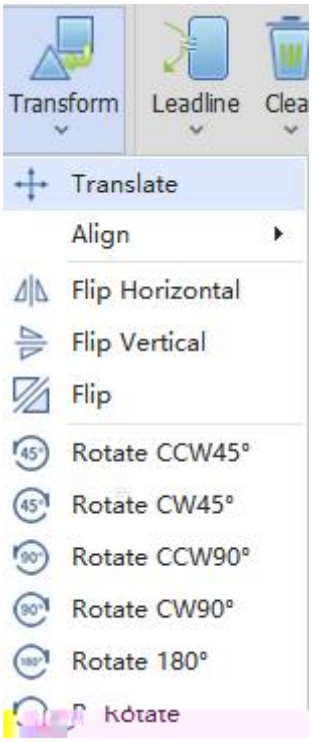
Click on Transform button in the Home sub-page, and the drop-down bar will pop up, as shown below:



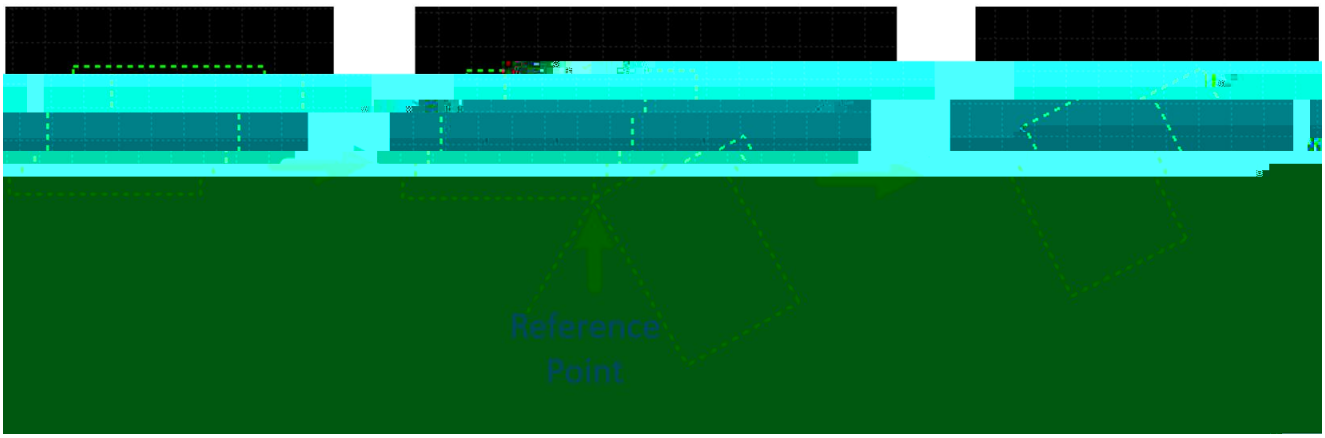
óмú ¢ℕŀyãfŀúŜ: select the graphic to be translated and click on Translate. In the drawing area, click on one reference point and move the mouse to drag the graphic to any position. Click on anywhere in the drawing area to complete.

óнú !ΦƎy: select the graphic to be aligned and click on Align to open the expansion bar. There are several types of alignment in the expansion bar. Click on the needed one to complete.

óoú CΦLJ I 2ℕÎ2yűŀf: select the graphic to be flipped and click on Flip Horizontal to complete.

óпú CΦLJ ±ŜℕúλÖŀf: select the graphic to be flipped and click on Flip Vertical to complete.

óрú CΦLJ: select the graphic to be flipped and click on Flip. Click on anywhere in the drawing area for a reference point. Move the mouse to drag the graphic to any position and click on anywhere to complete, as shown below:



óсú ... прс: select the graph... be rotated and click on Rotate CCW45° to complete.

отú w2ú / ² прс: select the graphic to be rotated and click on Rotate CW45° to complete.

óyú w2ú / / ² флс: select the graphic to be rotated and click on Rotate CCW90° to complete.

óфú ... /Uõ[illegible] ... to be rotated and click on Rotate CW90° to complete.

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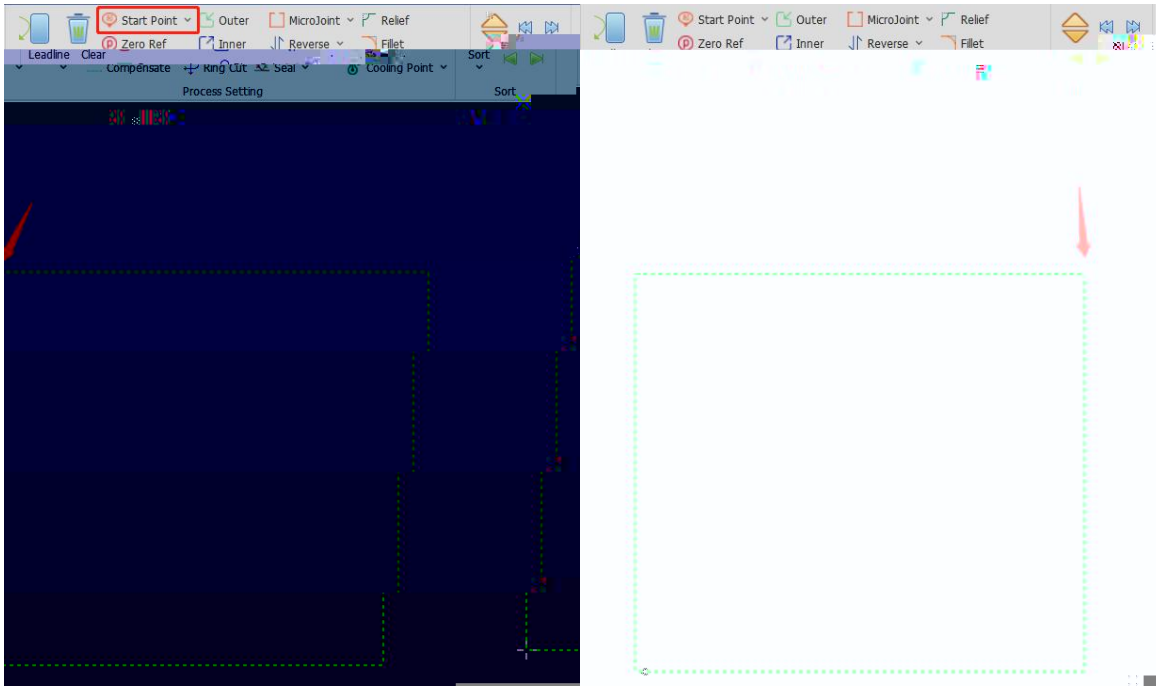
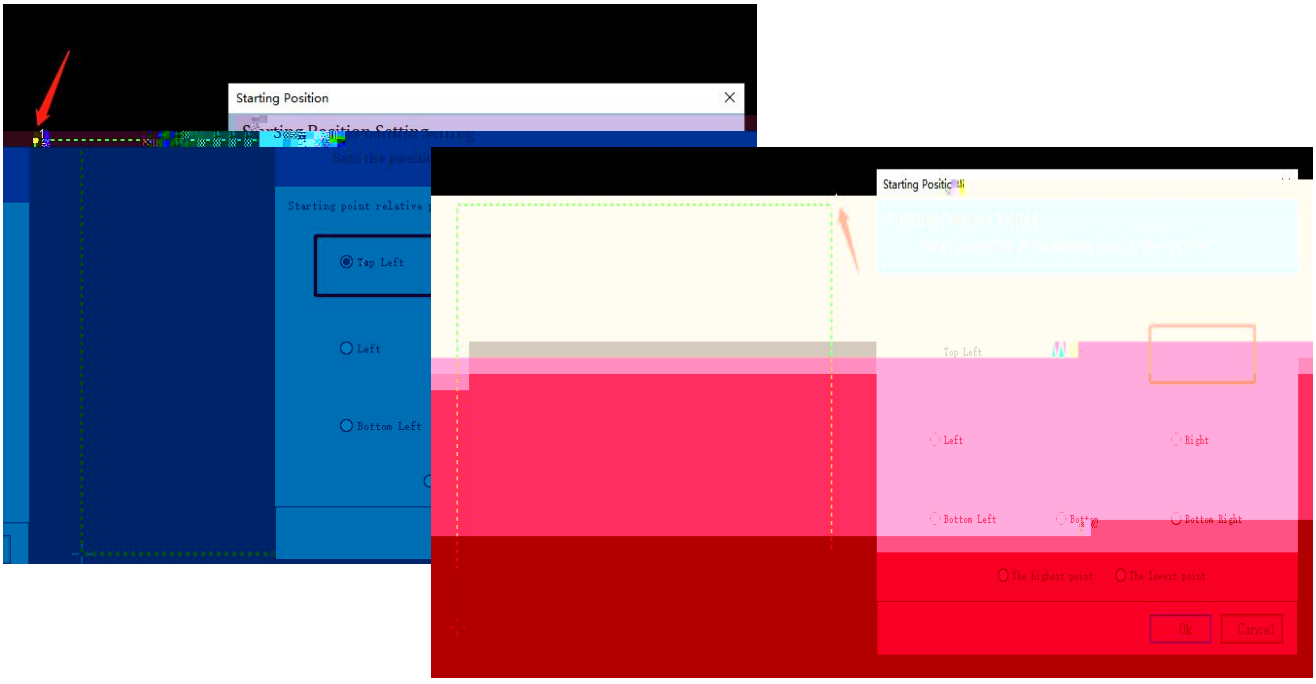
Set the start point of processing.

Click on Start Point button in the Home sub-page. The drop-down bar contains Manual Start Point and Auto Start Point.

ómú a ŀyʤŀf {ű‡ℕú t2λyű: click on it and select the contour of the graphic to complete setting the start point, as shown below:



óнú !ʤű2 {ű‡ℕú t2λyű: select the graphic to be processed and click on Auto Start Point. Set the start point in the new interface and click on OK to complete, as shown below:



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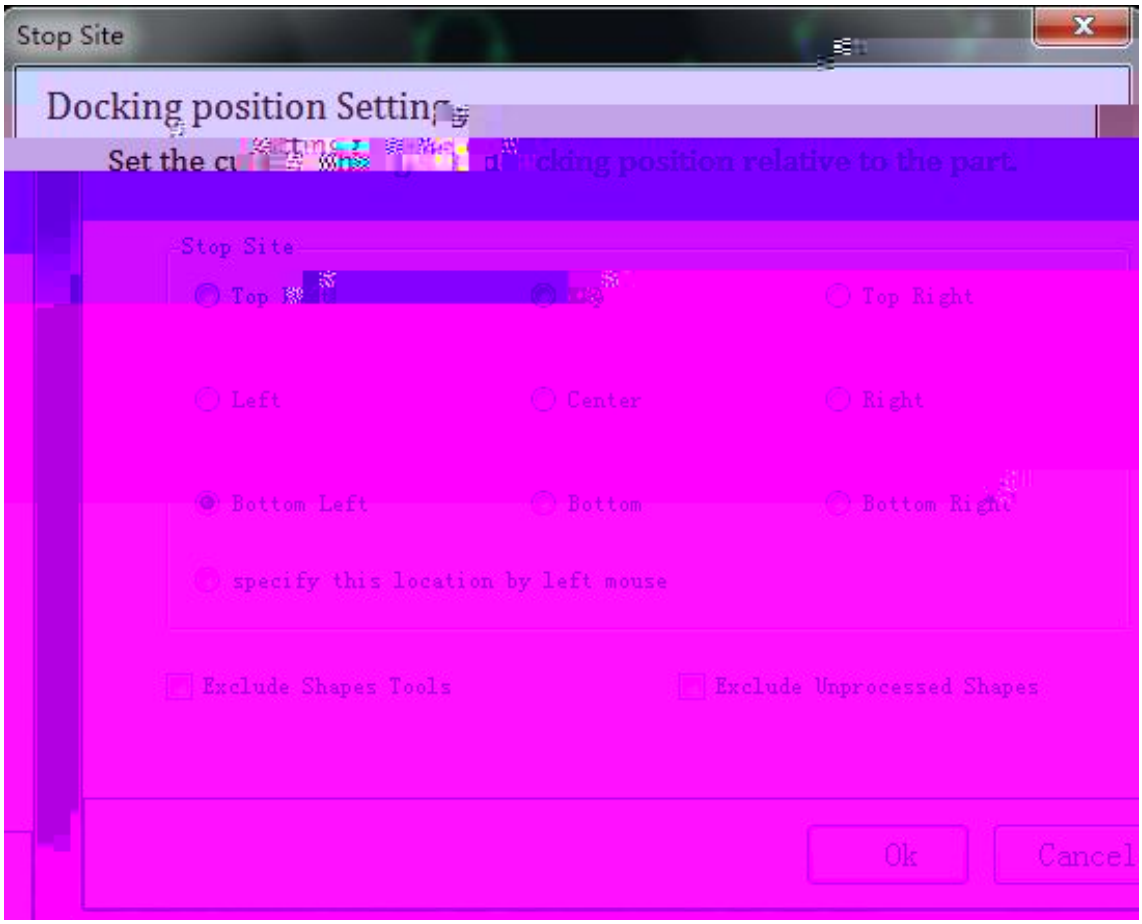
Set the cutting head to a relative position to the graphic as the zero reference (docking position).
The bottom left is recommended.

Click on Zero Ref button in THE Home sub-page and set the parameters. After setting, click on OK to complete, as shown below:



Note: “Select the zero reference by following the graphic” can be selected in the “Advanced Selection” in the Configuration Tool.

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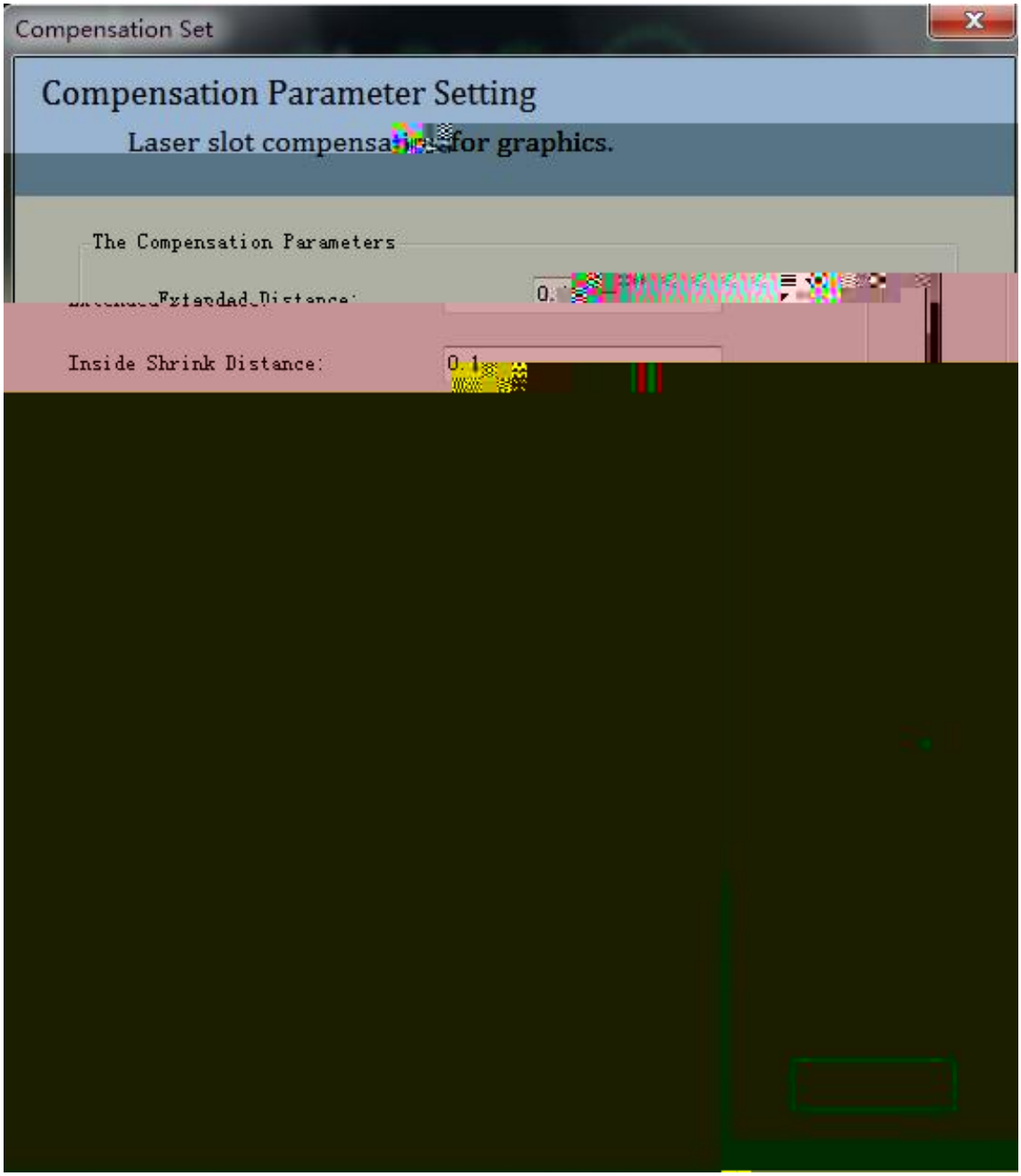
By scaling the graphic, compensate the impact of the cutting slots to the parts. Sharp and round corner can be chosen in sharp point processing. Way of compensation includes Expand and contract, All expand, and All contract.

Select the graphic to be compensated and click on Compensate in Home sub-page. Set the parameters and click on OK to compensate the selected graphic, as shown below:



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Extended Distance: the value that increases in equal intervals outwards.

Inside Shrink Distance: the value that decreases in equal intervals inwards.

Sharp Point Processing: to use sharp or filleted corner.

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Read the configuration in the compensation library by selecting materials and thickness to quickly apply.

Modify default parameters in the compensation library by selecting materials and thickness.

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Way of compensation includes Out Expand and In Shrink, All Out Expand, and All In Shrink.

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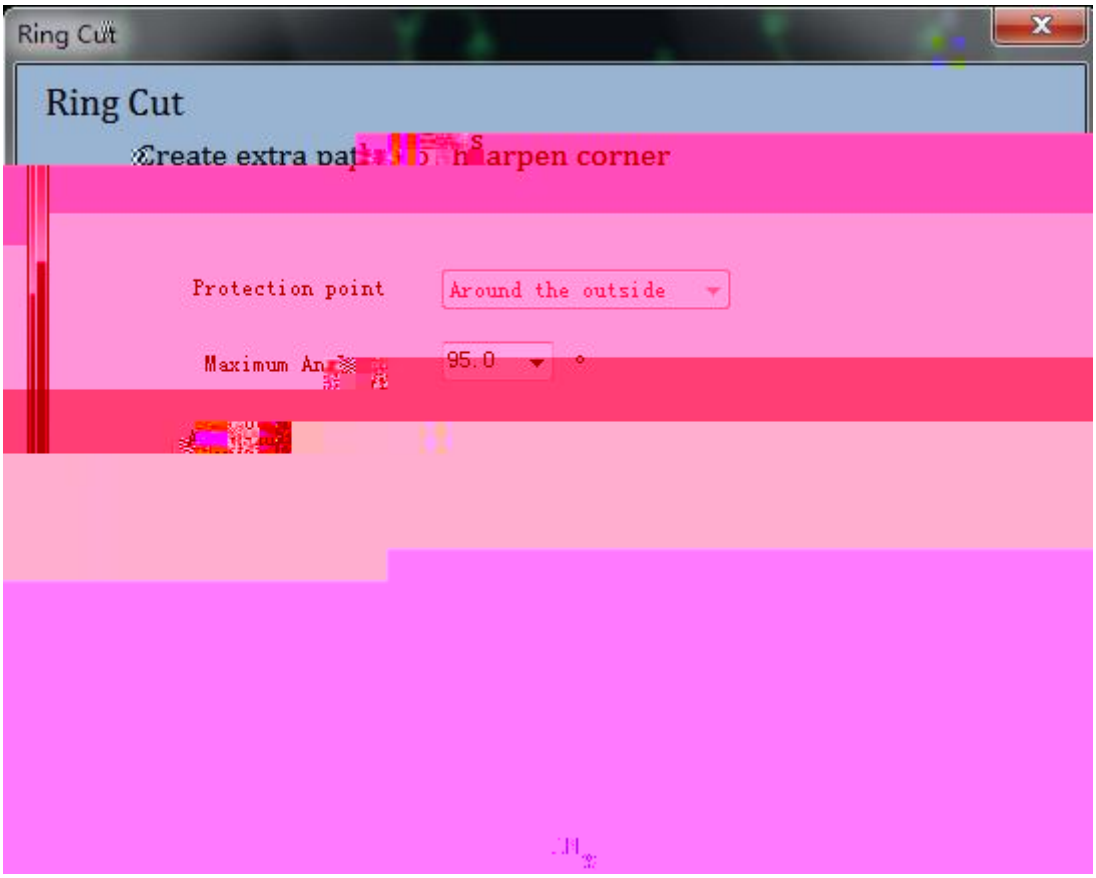
Add Ring Cut or cooling point to the graphic.

Select the graphic to be ring cut and click on Ring Cut in Home sub-page. Set the parameter for ring cut and click on OK to complete, as shown below:



Protection Point: select the type of ring cut., with the option of around the outside.

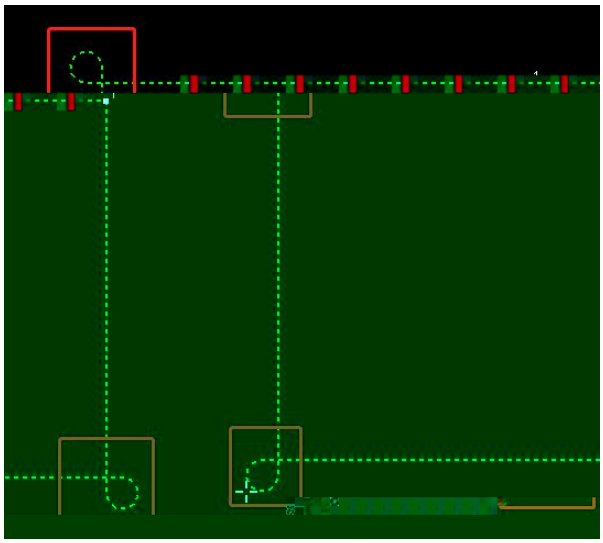
Maximum Angle: corner bigger than this angle will not use the outside cutting.

OutsideCut Type: select the arc or triangle as the contour of outside cutting.

OutsideCut Length: set the perimeter of the contour of outside cutting.

ShortestSide Length: set the shortest edge length.

The graphic added with ring cut is shown on the left.



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The workpiece with micro connections can avoid falling off. Micro Joint includes manual and auto ones.

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Select the graphic

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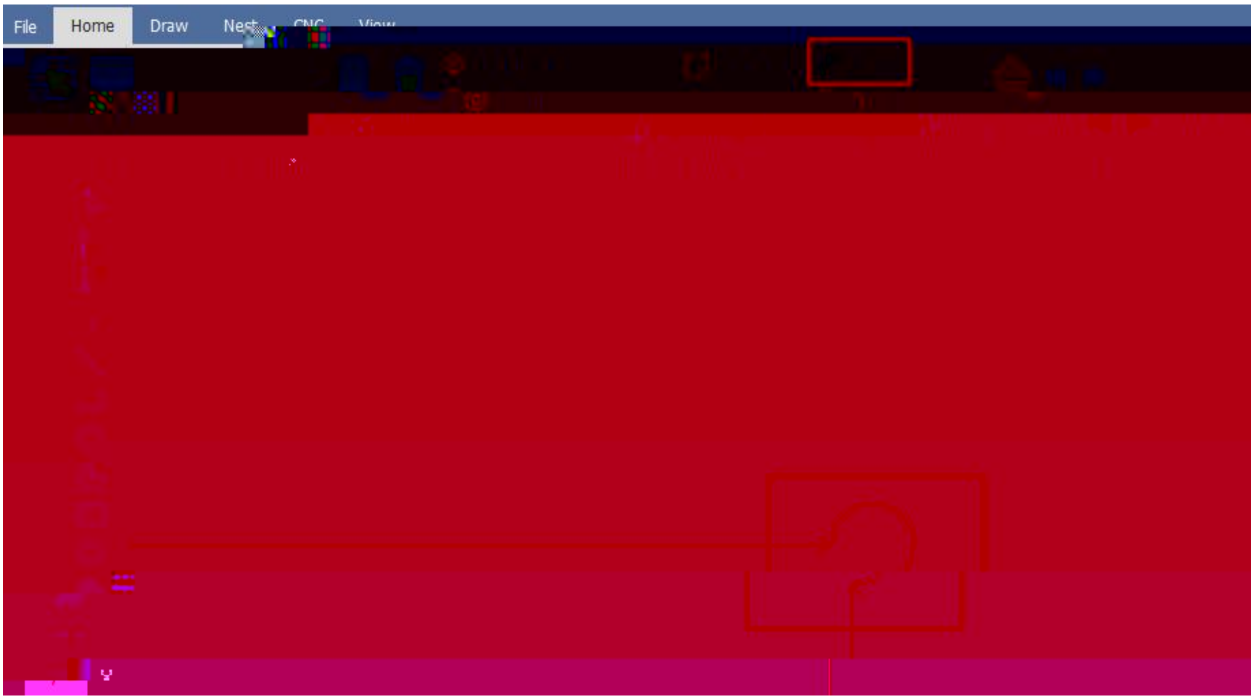
Click on  button to generate release corners for the following bending process.



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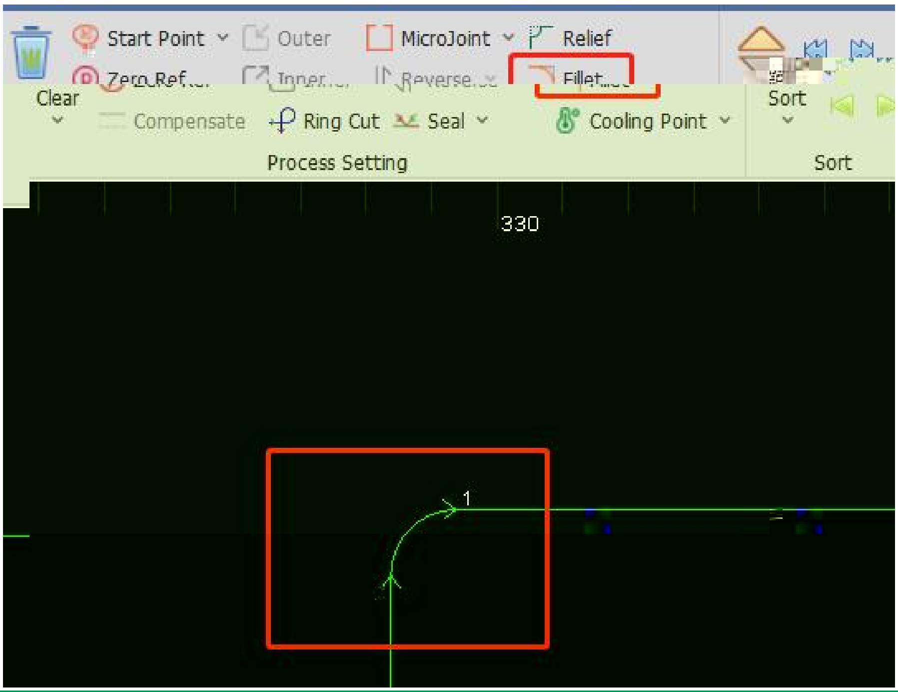
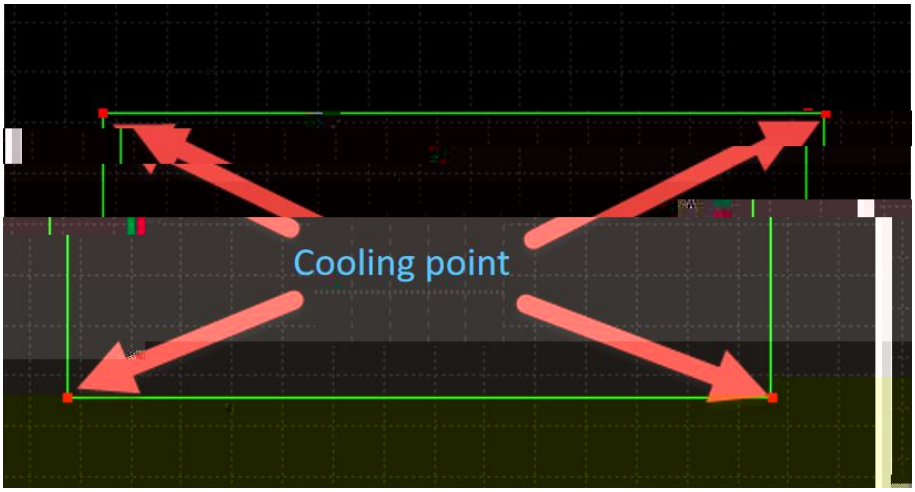
Switch the sharp corners into the filleted corner.

Select the graphic needs fillet and click on Fillet button in the Home sub-page. Set the fillet radius and click on OK. Then, click on the corner of the graphic to complete. The setting of fillet is shown as below:



The co... p... used to avoid the workp... are manual and auto cooling.

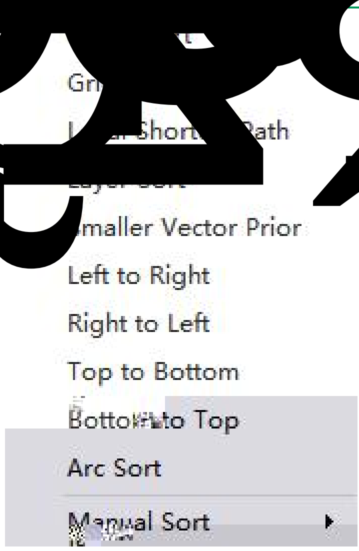
Click on Cooling Point in the Home sub-pa...



a ŀÊλYʤY ŀyƎfe: corners bigger than this angle will not use the cooling point.

[Ŝŀŕ LJ2λyű LJℕ2úŜŏűλ2y: select to add the cooling point at the start point of the graphic.

{ĸŀℕLJ ŀyƎfŜ LJℕ2úŜŏűλ2y: deselect the function and not to aŁes t



In the Sort column, four manual sorting bu

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Quickly copy the graphics. There are two kinds of an array: rectangular and circular.

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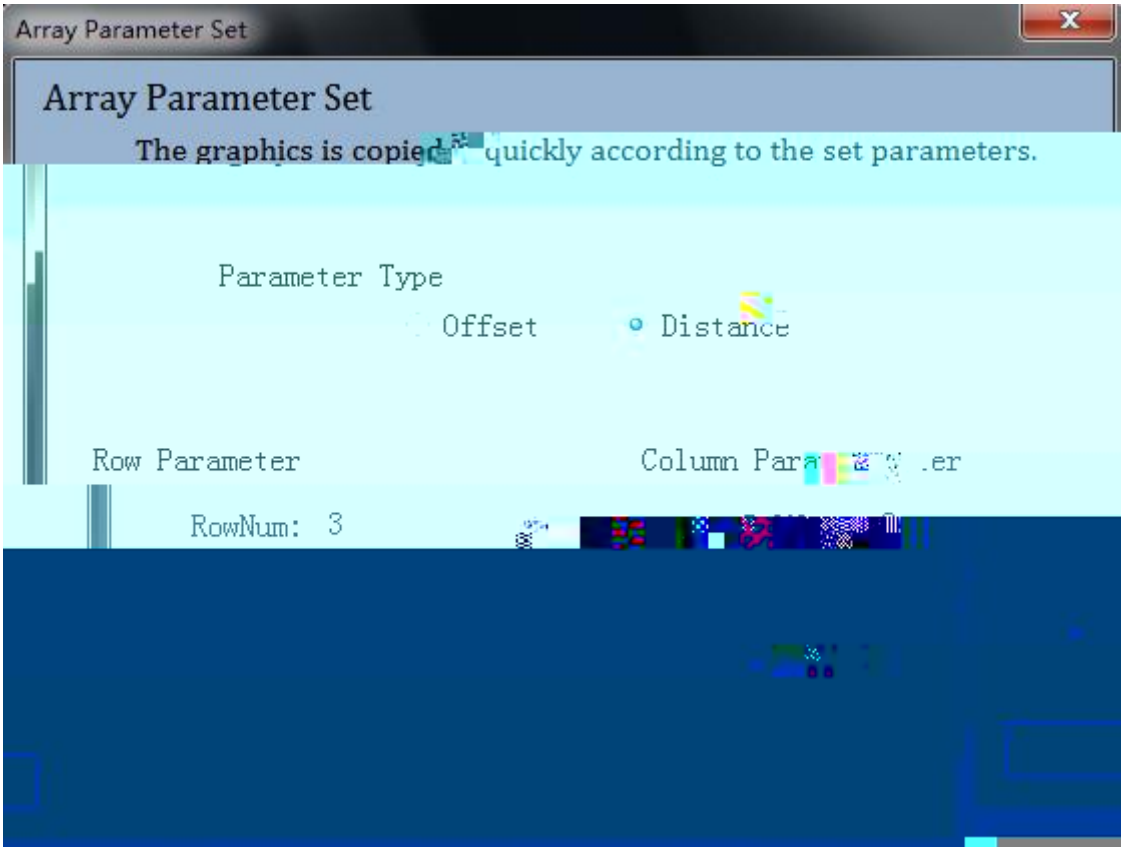


Select the graphic to be copied in an array and click on Array button in the Home sub-page.

Set parameters of the array and click on OK to complete. The parameter setting is shown as below:

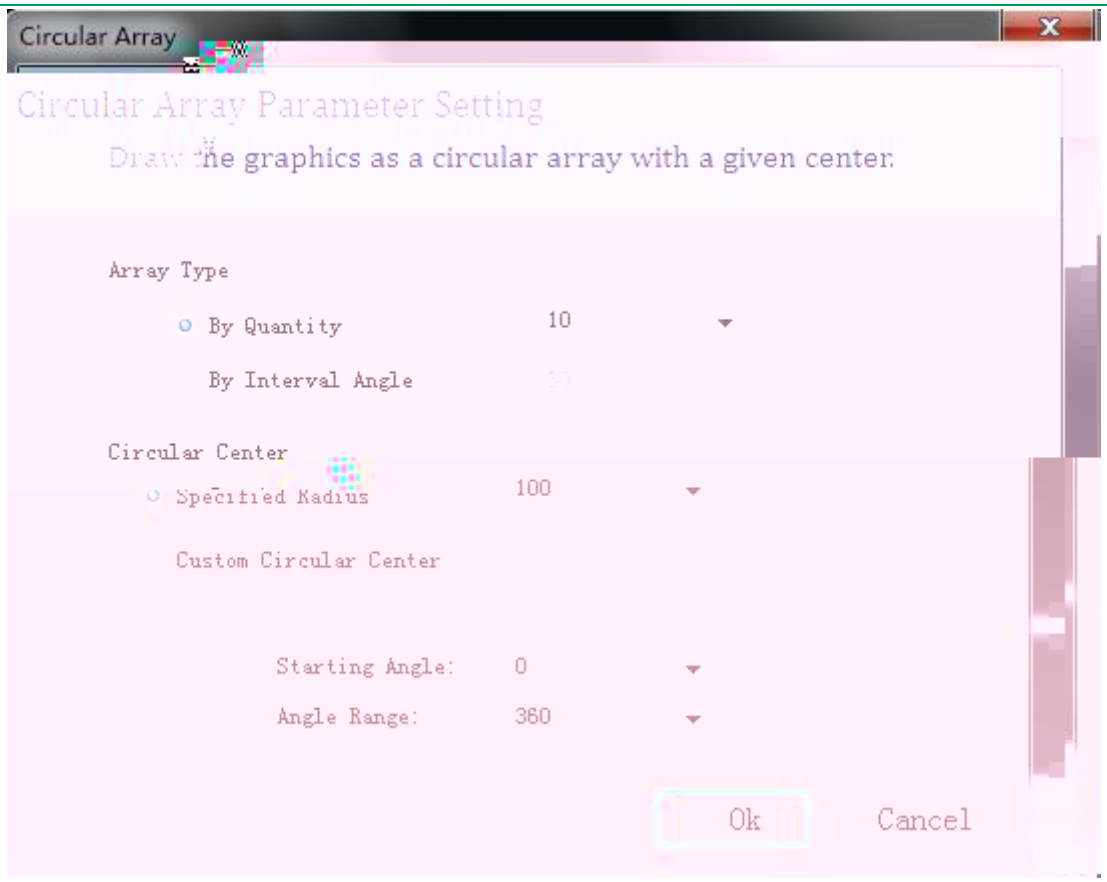
t ŀℕŀYŜúŜℕ űëLJŜ: select to array according to offset or distance.

w2ǿ κ /2fʤYyʃbʤY: the number of row and column in the array

ów2ǿ κ /2fʤYyŷ 5ƛăűŀyŎŜ κ hŦŦăŜű: the distance and offset value

¦LJ κ 52ǿyʃκ [ŜŦű κ wƛƎKű: directions of the array

óнú /ƛℕŎʤfŀℕ



Select the graphic to be arrayed and click on the drop-down button under Array. Click on Polar in the drop-down bar. Set parameters of the array and click on OK to complete. The parameter setting is shown as below:

! ℕℕŀè ¢ëLJŜ: array by quantity or interval angle.

/ λℕŎʤfŀℕ /ŜyűŜℕ: set by specified radius or custom stretching in the drawing area.

{úŀℕúλyƎ ŀyƎfŜ: starting angle of the array.

! yƎfŜ ℕŀyƎŜ: array within the angle range.

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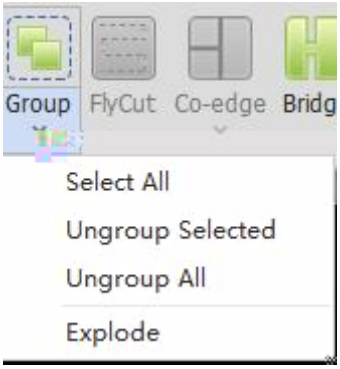
Grouping multiple graphics into a whole to avoid shifts in the position of dragging graphics.

Select multiple graphics and click on Group button in Home sub-page. The selected graphics will be a whole. The sorting and position of graphics and the layers will be fixed after being grouped. Then, the graphics will not change if sort or drag them. Click on the drop-down button of Group to see the drop-down bar, as shown below:



{ŜťŜǑű !ff: selec... groups i... current... wing.

¦ƴƎℕƧǳǇ {ŜťŜǑű... select the group of graphics and click on Ungroup ...lected button. The select... group will be canceled.

¦ƴƎℕƧǳǇ !ff: cli... on Ungroup All button and all groups in the curre... rawing will be canceled.

9ȄǇťƧŘŜ: select the graphic and click on Explode. The selected graphic will be broken up into the smallest segments of a line (arcs or lines).

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Set the selected graphics as the path and layer. The parameter setting

[illegible]

Circle: select to [illegible] circular path.

Linear: select to [illegible] rectangular and polygon-shaped [illegible]h.

Radar: linear cut[illegible] path [illegible]hout smooth[illegible]s. Other [illegible]ng modes inclu[illegible] [illegible]broun[illegible]d Leadline.

: select different sort modes to use different fly cutting paths.

: select the start position of the graphic to be processed.

: if the horizontal and vertical length of the graphic is smaller than the tolerance, the graphic will be in a line or an array; if larger, the graphic will be in multiple lines or arrays.

: if the distance between two graphics is less than the max smooth joint length, an arc tangent will be auto-added to the cutting path to speed up processing and improve efficiency.

: radius of the arc mentioned in Max Smooth Joint.

: select to lift the Z-axis in the travel between two groups in fly cutting.

: laser on in advance for better cutting off the workpiece.

: as over-cutting distance, laser off delay is for better cutting off the workpiece.

Combine workpieces with common edges to use one edge for cost efficiency and improve processing efficiency.

Select graphics to be co-edged and click on Co-edge button in the Home sub-[illegible]

fter **set** he maximum d
ours.
Select the graphic to be bridged and cl
double-click the drawing area to see the b

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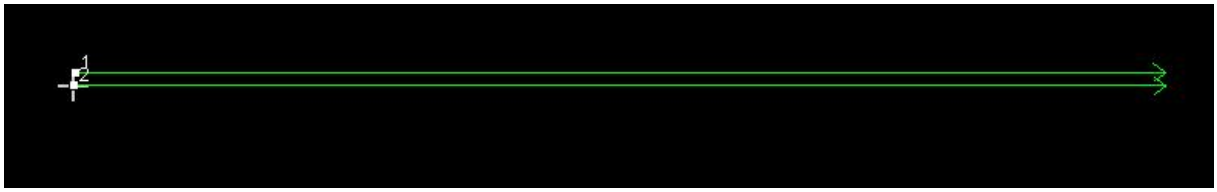
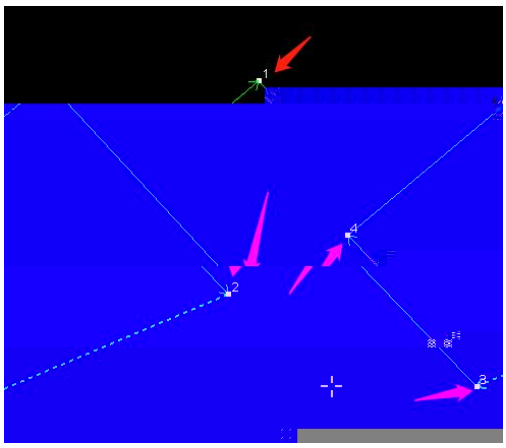
Optimi

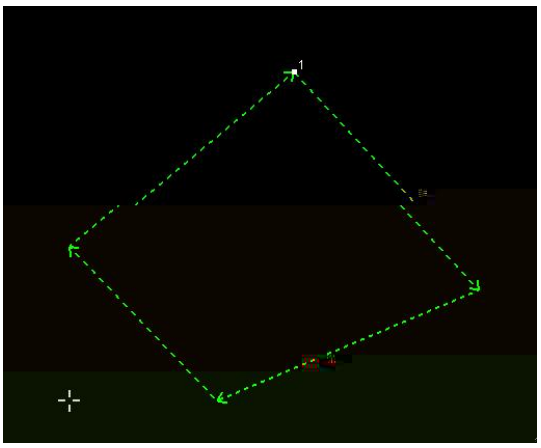
óoú 5ŜfŜűŜ 5ძLJfℳŎŀűŜ: some lines are duplicates though visually not. Select the graphic, click on Delete Duplicate, and set the deletion tolerance. If the max distance of two contours are less than the tolerance, they are duplicate. After parameter setting, click on OK to complete, as shown below:



óпú 5ŜfŜűŜ lyØλăλōfŜ: In the imported graphics, there may be some graphics whose size is too tiny to recognize and the position may move in processing. You can click on Delete Invisible button to set the minimum contour size and click on OK to delete the tiny graphics whose size is smaller than the minimum one.

ópú W2λyű {ŜƎYŜyű: in drawing area, there may be some graphics are connected visually but actually not. Click on Joint Segment button and set the MerTolerance, merging tolerance which refers to if the interval of the nearest breakpoints of two contours is within the tolerance, the contours will be jointed together. After tolerance setting, click on OK to complete, as shown below:





н͞н 5ℕŀ ǿ

When drawing a graphic in the drawing area, there will be a prompt of next step in the log area.

User can complete the drawing with the prompt.

н͞н͞м [λỿŜ

Click on Line button in the Draw sub-page and click on the star

t2tuy3ick on ine button and click the drawing area to set the start point. Drag the mouse and click again, and then repeat to dra graphics with multiple lines.

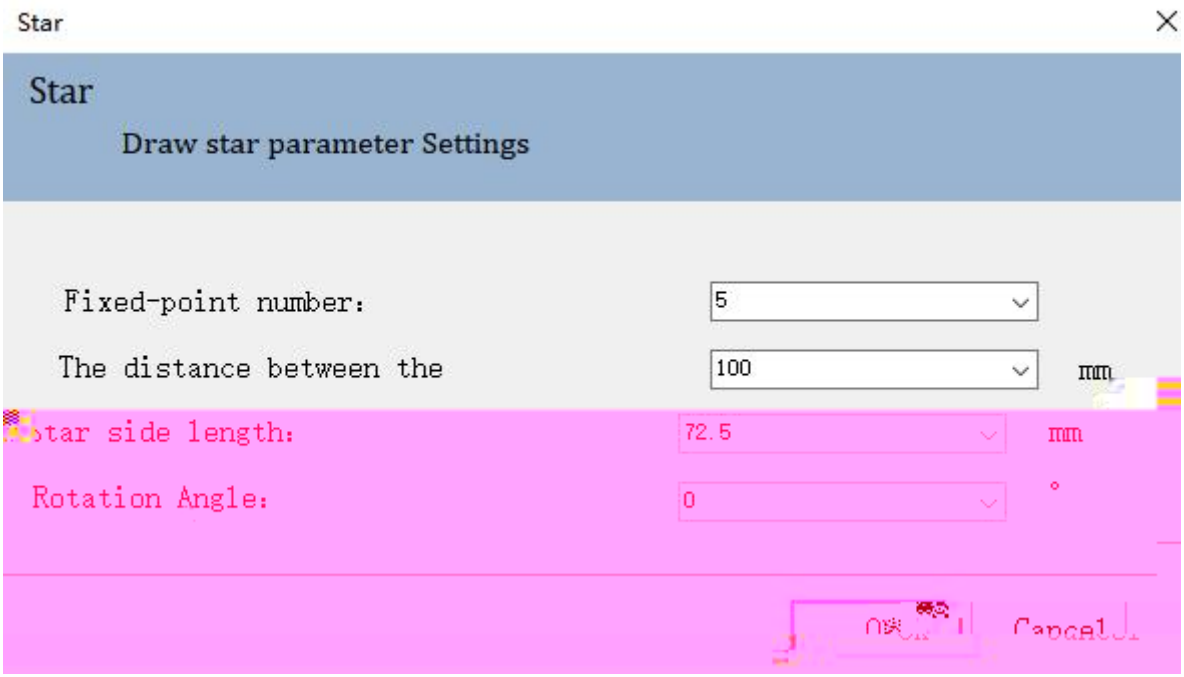
The default is to dr straight line. You can switch it to an arc by pressing A on the keyboard, switch back to a straight line by L, and make the our closed according to the selected line type by pressing C. Press Enter to complete the drawing.

t2fèƎ2y: click on Polygon button to set the number of edges and c e to inner or outer tangent to the circle. Click on OK in the setting interface. Click on one point in the drawing a to set the cen and drag the mouse to click on another point for setting the radius of the polygon.

{úŀℕ: there are two ways to draw a star-shaped graphic.

(1) Input the number of fixed points, the distance between the vert nd cen the side gth, and the rotation angle. The star-shaped graphic will be auto-drawn by clicking on a point in e drawing a to se star cent

(2) Input the number of vertices (fixed-point) and no other informa . Set th nter, inne tex, an ut vertex in the drawing area. Draw the star-shaped graphic by the three points. Its angle can be rotated randomly, as shown below:



нΦнΦp t2ỉyű

Click on Point button in the Draw sub-page and click in the drawing area to complete drawing a point.

нΦнΦc ¢ŜÈű

Click on Text

нΦo bŜăű

XC3000S has equipped the function of auto-nesting. This section will describe the function in detail, so users can better use the software and improve processing efficiency.

Select the Nest suþ ʁo B

нψ t l·ℕű

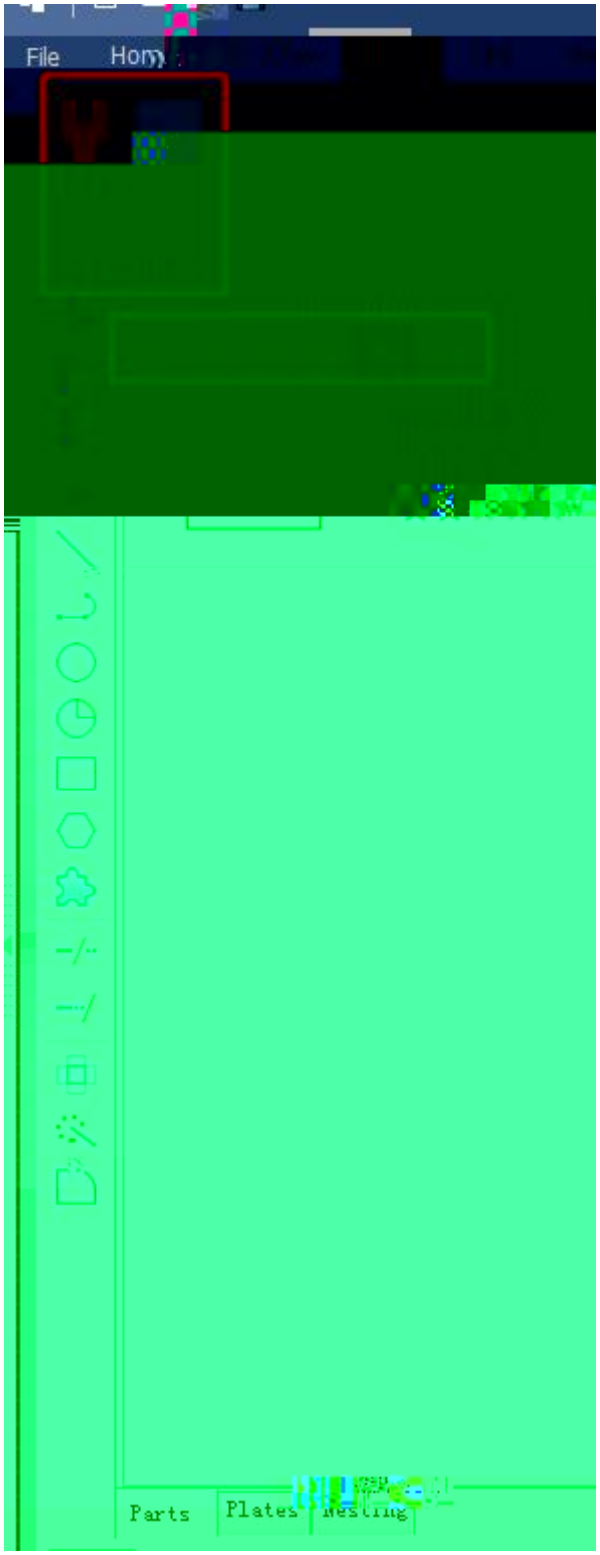
Before nesting, turn the graphics into parts for cutting. A part consists of its inner and outer contours, and the outer contour is not a must. Add parts by selecting the graphics and right-clicking to add

нΦoΦн bŜăúλyƎ

With parts in the drawing area, there will be a left sidebar for nesting. You can set parts and plates in the sidebar.

óмú vʤλŎ‰ !ŎŎŜää ¢22fōŀℕ: quickly select, delete and nest parts and plates.

óнú tŀℕú . ŀr: display all the added parts.



нΦoΦo bŜăúλyƎ tŀℕŀYŜúŜℕ

Set the nesting parameters.

óмú .2ŀℕŘ {Ŝű: set the size and count of plates

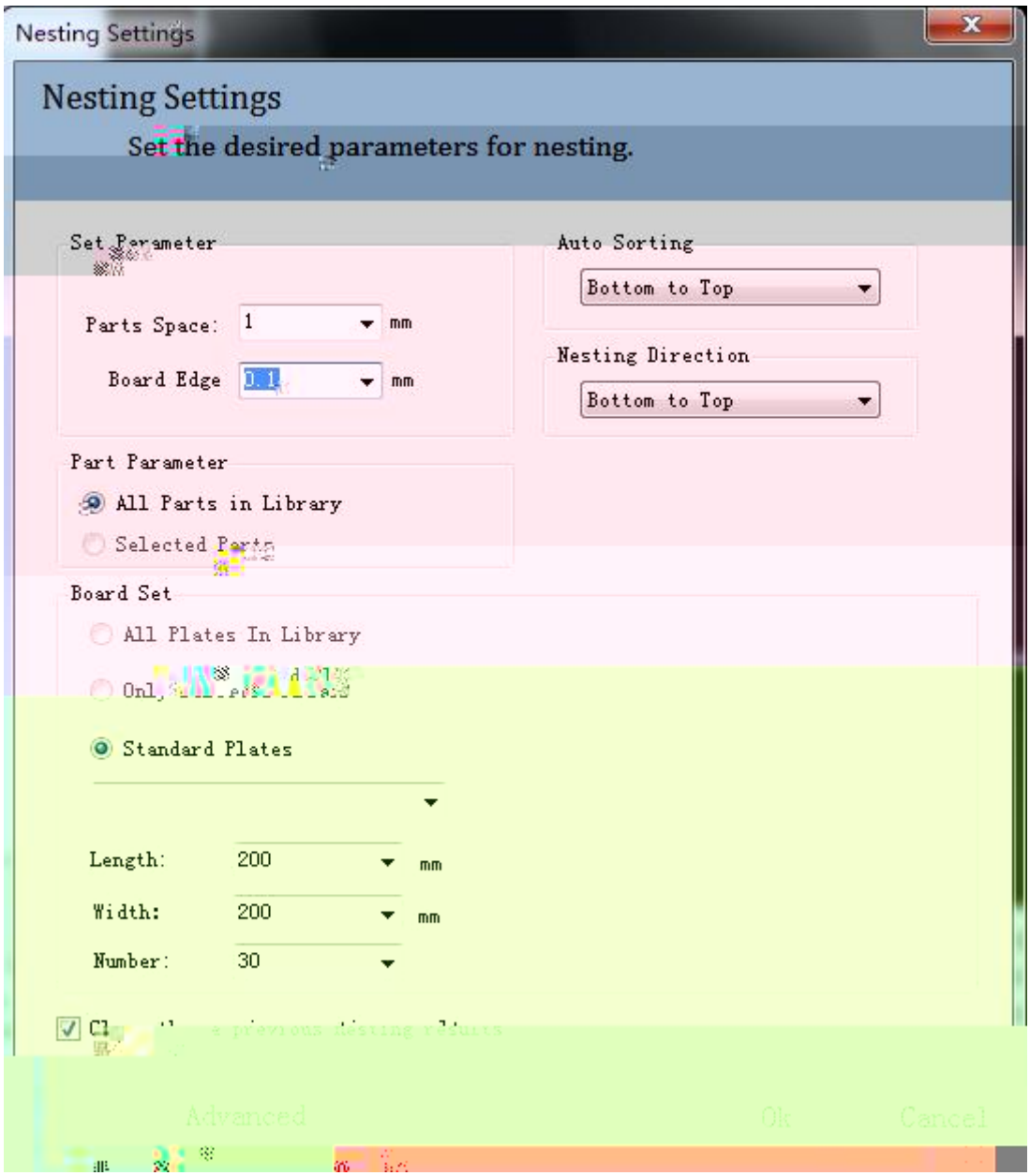
óнú {Ŝű tŀℕŀYŜúŜℕ: set the space between parts and interval between the part and the sheet margin (board edge).

óoú !ʤű2 {2ℕúλyƎ: set the sorting way and the nesting direction of the parts.

óпú tŀℕú tŀℕŀYŜúŜℕ: select the parts to nest.

ópú /fŜŀℕ úKŜ LJℕŜØ%2ʤž yŜăúλyƎ ℕŠăʤfűă: whether to continue the nesting on the former results.

ócú !ŘØŀyŐŜŘ: click to set the advanced parameters.



нΦoΦп ! ŘØŀyǒŜŘ t ŀℕŀYŜűŜℕ

ŀΦ {űŀℕúλyƎ: set the start point of nesting.

ōΦ bŜăúλyƎ 5λℕ: set the priority of nesting direction.

ǑΦ w2úŀûλ2y ! yƎfŜ: refers to the angle of each placement when placing the part (the smaller the angle, the better the result and the slower the nesting speed).

ŘΦ bŜăúλyƎ: refers to the precision of nesting. The smaller the the value, the better the effect and the slower the speed.

ŜΦ LyãλŘŜ úĸŜ Ƙ2fŜ: decide whether to place the part in the hole of the waste area of another part. Select to improve the utilization of the plate with slower nesting speed.

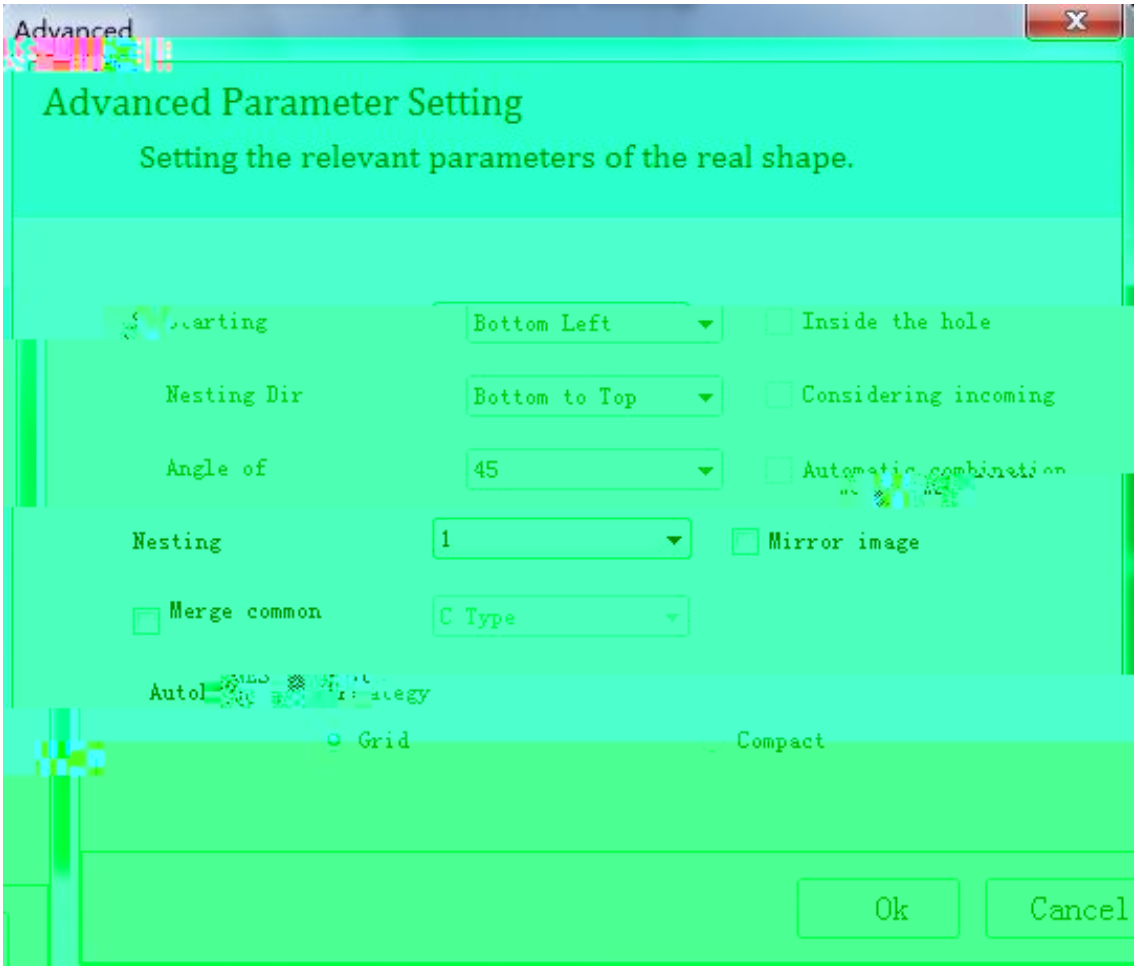
ŦΦ /2yãλŘŜℕλyƎ λyǑ2Yλ yƎ: decide whether the edges of the part have leadlines.

ƎΦ !ʤú2Yŀûλǒ Ǒ2Yōλyŀûλ2y: combine the placed nesting parts and copy the resulting nesting to speed up nesting.

ĸΦ a λℕℕ2ℕ λYŀƎŜ: allow the mirroring of the graphic to improve the utilization of the plate.

λΦ a ŜℕƎŜ Ǒ2YY2y: turn on the function and complete the nesting on co-edged parts.

2Φ !ʤú2b9{¢ ăúℕŀûŜƎè: select grid to sort the parts in rows and select compact to sort into any space.



· /оллл{ {ŜℕŜă [ŀăŜℕ /ʤúűλyƎ {ěăűŜϒ π ¦ ăŜℕ a ŀyʤŀf

Th[illegible] a tree-[illegible]structure to sa[illegible] the proc[illegible] All the cutting parameters can be added to the structure on the left for users to view and use.

Right-click on any material in the process structure to add a new material or thickness type. Users can add a new type of material or the thickness of material in the interface popped up.

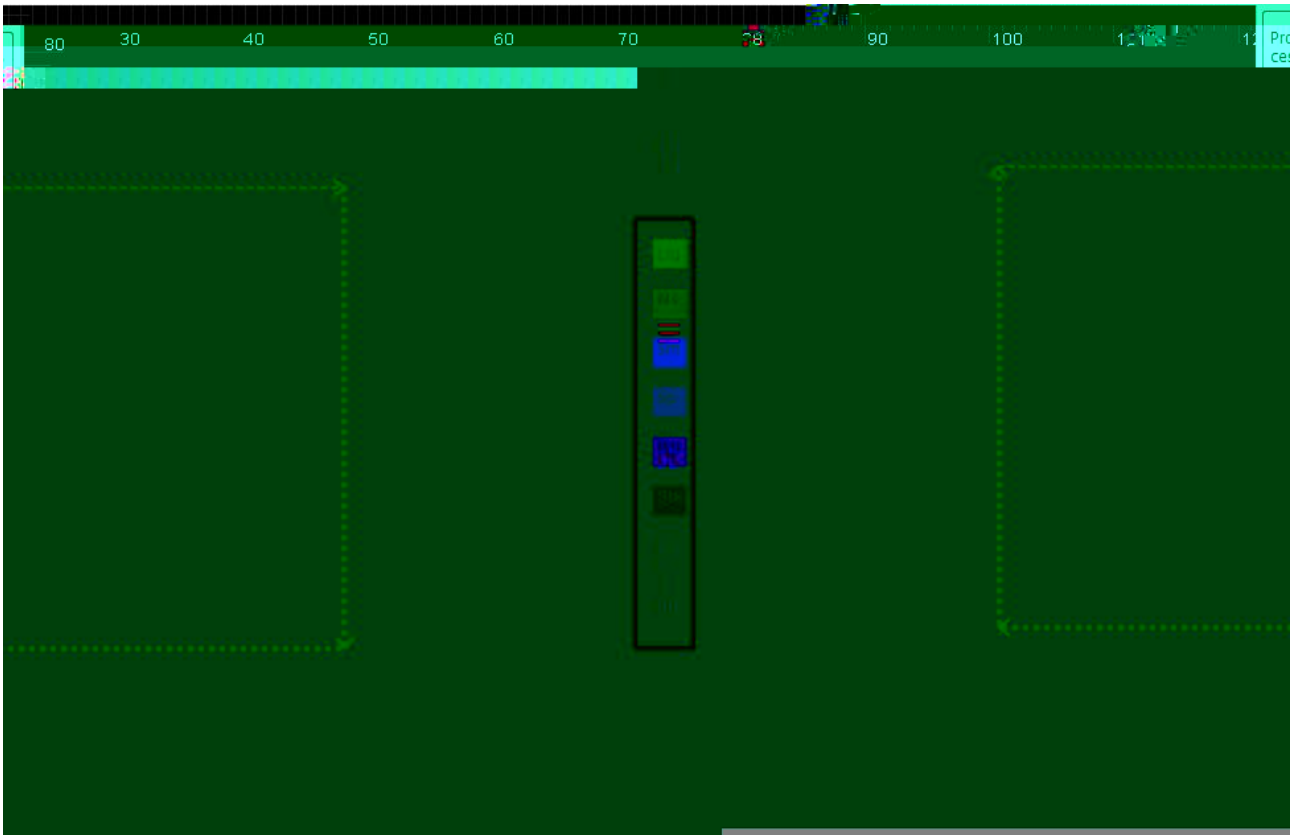
Take adding BR in the fol

oΦн ₵ℕŜŜπfλ⌊Ŝ tℕ2ŎŜăă {úℕdzŐűdzℕŜ

oΦo [ŀèŜℕ

There are 7 process layers and every one of them can be set separately.

Select the graphic in the drawing area and click on the corresponding layer button on the right. And the graphic will be processed using the selected layer process, as shown below:



oΦп tℕ2ŎŜăăλyƎ a 2ŘŜ

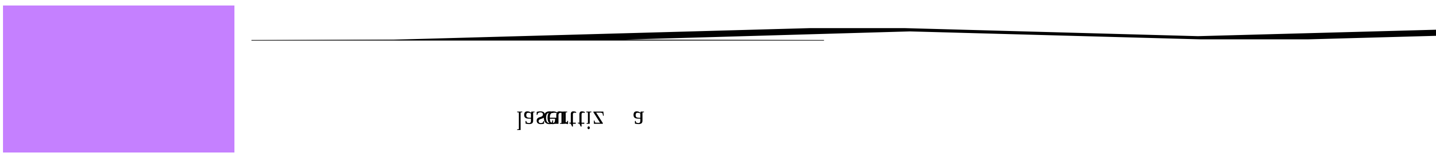
tℕ2ŎŜăăλyƎ a 2ŘŜ	
5ŜŦ₼ſY	After selecting the function, the process is first carried out along the cutting path using the film parameters to defilm, and then carried out the normal process according to the layer parameters. Select the function and you can set the defilm parameter in the FilmCut interface.
tℕŜLJŜℕŎŜ	Selecting the function, prepierce at the start of the graphic or the start point of the leadline, before actual cutting. There is also a function of auto-group prepiercing which can be selected in the global parameter.
tℕ2ŎŜăăλyƎ Y2ŘŜ	Select standard or fixed height cutting. Fixed height cutting refers to cutting at a fixed height.

oфp /ǳűűλƴƎ tŀŊŀƳŜűŜŊ

/ǳűűλƴƎ tŀŊŀƳŜűŜŊ

bƻĨĨfŜ ĸŜλƎĸű	Set the cutting height from the nozzle to the plate.
{ǀŜŜŘ	Set the command speed of cutting.
tƻǝŜŊ	Set the peak power of the laser in cutting.
/ǳű ŦŊŜlj	Set the frequency of the laser in cutting. It refers to the time of beam out in 1 second. The higher the value, the more continuous the laser beam is. 5000Hz is a successive beam.
5ǳűè ǑèǑfŜ	Set the duty cycle of the laser in cutting. It refers to the ratio of beam-out duration in one beam-out cycle and the total time. The higher the ratio value, the higher the average power is when beam out. When it is 100%, it means the average power equals the peak power.

D Ķ s



oΦт t2ǿŜℕ /ʤℕØŜ

Select the corresponding options to display the laser output in curvÀ

There are tšà o power -ŕspeƷķso

The laser cus[illegible]ed as a spline cur[illegible] the horizontal coordi[illegible] being the speed and the vertical coordinate being the laser output, which has good smoothness. The interfaces for editing can be chosen as shown above.

Take the figure above as an example: the duty cycle is 60%-70% when the speed is about 30%, and nearly 100% when the speed is 100%. As in the processing, the duty cycle is nearly 100% for a cutting speed of 10m/min, the duty cycle is 60%-70% for a cutting speed of about 3m/min.

The default parameter [illegible] The

¢	lect to sta sing tra s mic nt and the thic late ut o t the joint in processing
w22ű wŀűΛ2	Set the percentage of the retention left i tting
ŘűyŜ tℕ2ŎŜăă	elect to use the leadline.
tŀℕŀYŜűŜℕ	Speed: set the cutting speed of graphic with leadlines. Duty: set the beam-out duty cycle when laser cutting with leadlines. Frequency: set the beam-out frequency when laser cutting with leadlines.
{f2ø 5ŜăŎŜyű	select to descent slowly when cutting with leadlines.
{f2ø 5ŜăŎŜyű	Lead height: set the nozzle height when cutting with leadlines. Stable dist: slowly descent the leadline height to the stable height of the plate in cutting. Set the stable distance of the leadline from the plate.
C2ŎdžăŘ?Yű	Focus Adjmt: select to use the focus adjustment of leadlines. Focus point: set the focus position when cutting with leadlines. Initial leadline: set the initial length of leadline of focus-adjust cutting.
[ŜŀŘŎΛℕŎfŜ	Lead circle: select to use the lead circle. Speed: set the processing speed of the lead circle. Radius: set the radius of the lead circle.
{flƎ wŜY2Øŀftℕ2ŎŜăă	Select to use the process to remove slags.

oΦмм lYLJƨNű ł·yŘ 9ÈLJƨNű

To import or export the process parameters of the layer, users should note that the button will only use to import or export the process of the current layer. For example, if using both layers of large and medium contours, clicking on Export button in the layer of large contour will only export the process parameters of it. Them same applies to the import. Select the needed layer and then import or export.

oΦмн Dfƨōł·f t ł·Nł·YŜűŜN

Global parameter mainly includes Motion Control Parameter, Default Parameter, Unit Selection, Prepiercing and Defilm. Adjustment of these parameters will affect the stability of machine operation, processing effect and efficiency.

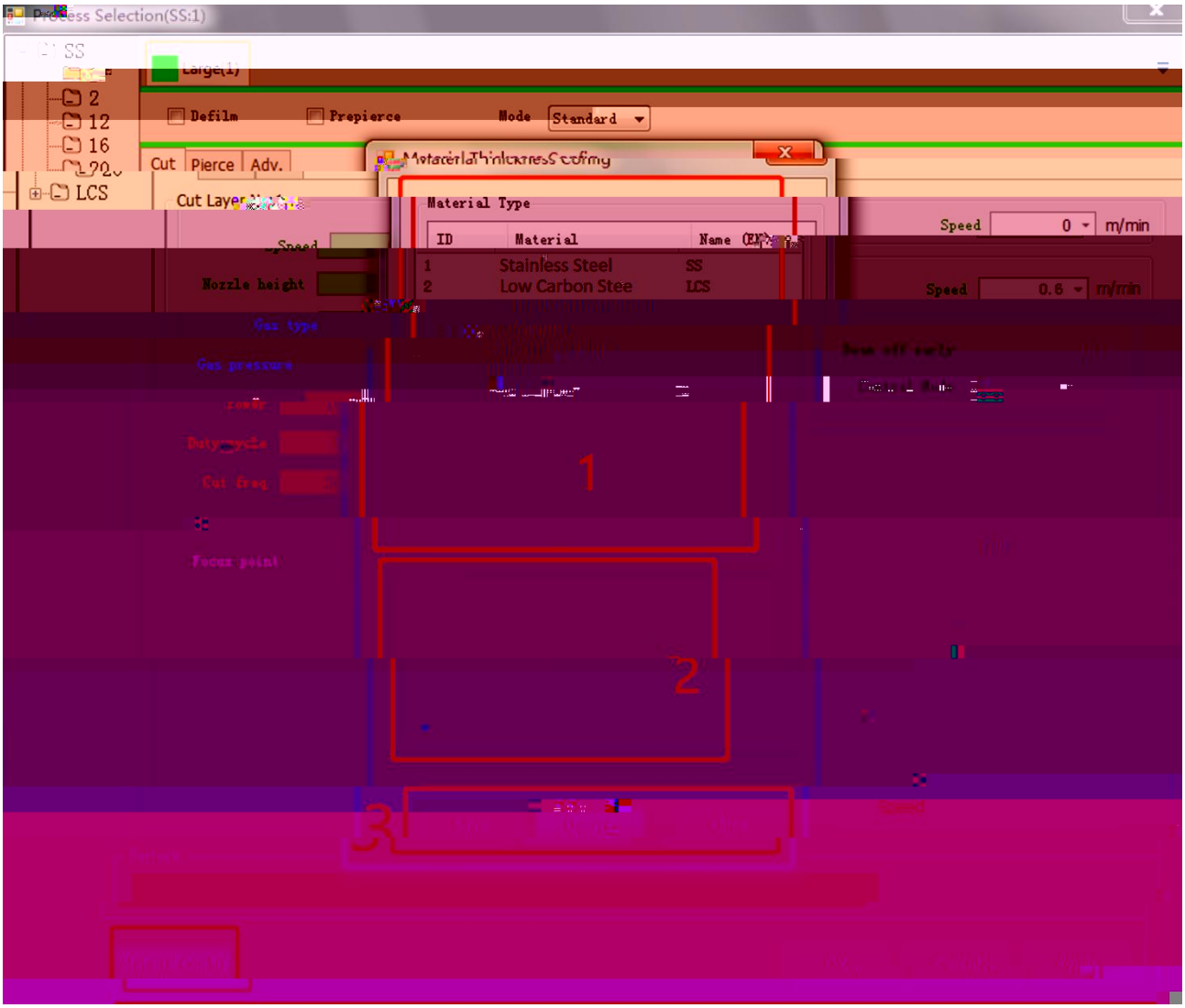
a ƨűλ2y / 2yűN2f t ł·Nł·YŜűŜN		
t ł·Nł·YŜűŜN	5ŜŦł·dzfű	wŜYł·Nٯ
¢Nł·ØŜf ăLJŜŠŘ	30	The travel speed of the X/Y axis from one contour to another in cutting. (Set the X and Y axis to be the same or separate with different parameters at the bottom of Motion Control Parameter.)
¢Nł·ØŜf ł·ŏŏ	6000	The travel acceleration of the X/Y axis from one contour to another in cutting. (Set the X and Y axis to be the same or separate with different parameters at the bottom of Motion Control Parameter.)
¢Nł·ØŜf ł·ŏŏ űλYŜ	100	The travel acceleration time of the X/Y axis from one contour to another in cutting. The more the time, the slower the acceleration, which brings less impact to the machine. The less the lhe ϰp

5ŜŦļdzfű tļŊļƳŜűŜŊ		
tļŊļƳŜűŜŊ	5ŜŦļdzfű	wŜƳļŊʅ
Dļă ƻyŘŜflè	200	Gas on and delay till the set time before laser on.
CʎŊăű ƎļăƻyŘŜflè	400	Before cutting, there are air in the gas hose. S

oΦмп a ŀúŜℕλŀf /2yŦλƎdzℕŀûλ2y

Click on Material Config button in the process interface.

The interface of material configuration will pop up as shown below:

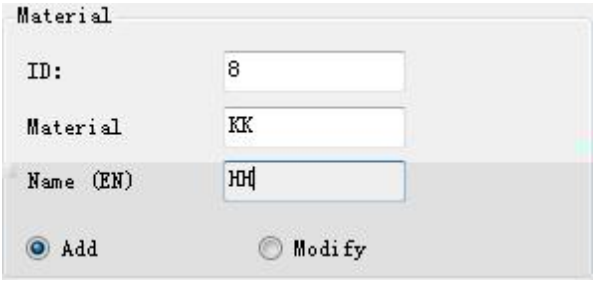


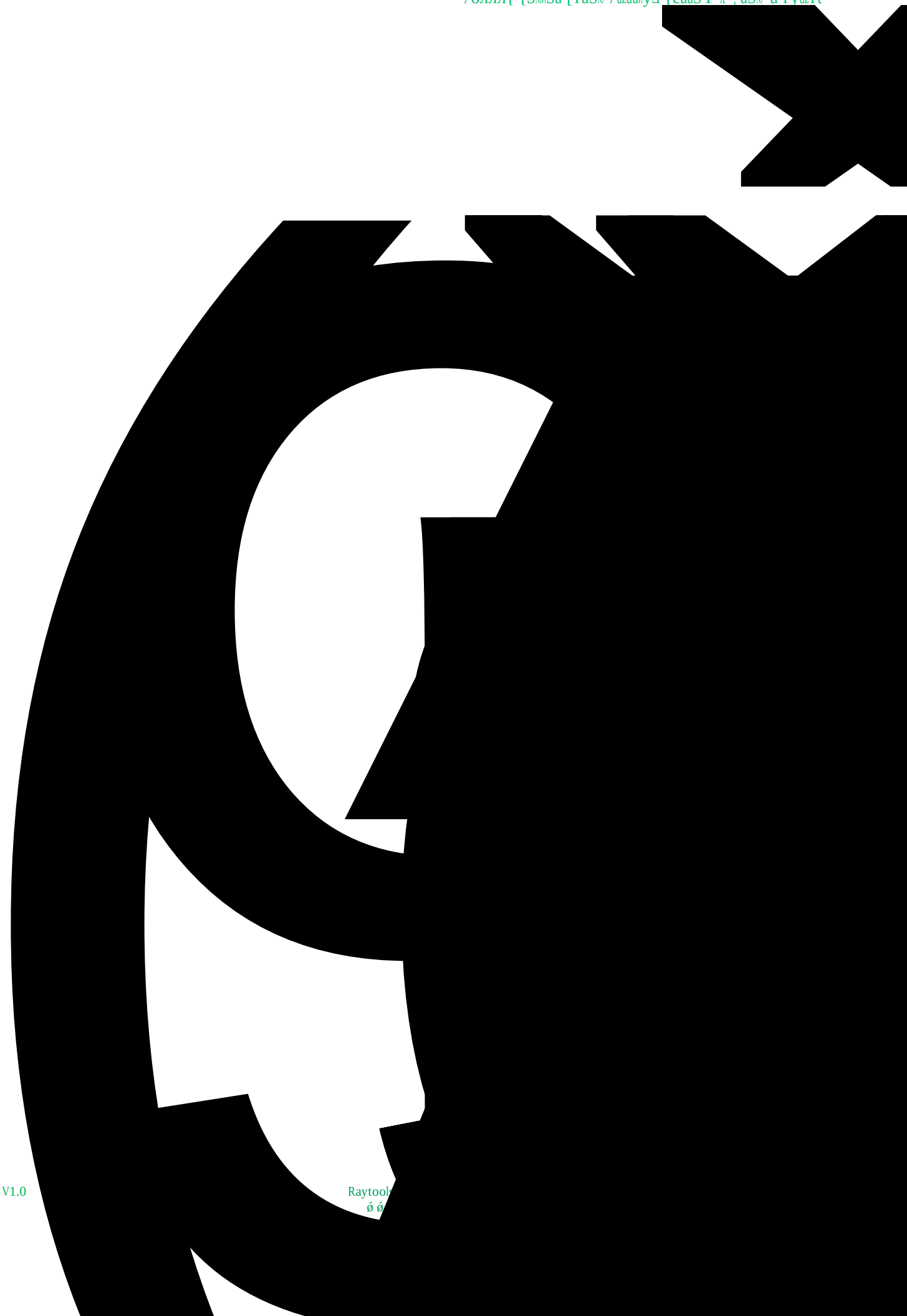
óмú There is a list of current materials. Users can add new materials.

óнú Add or modify the material.

óoú There are buttons of Save, Delete, and Close the interface.

The following is an example of adding a new type of material: ŀΦ Input the ID, Material, and its Name (EN as abbreviation). Then select Add button. Note that the ID and name of Material must not be the same as the existing materials, as follows:



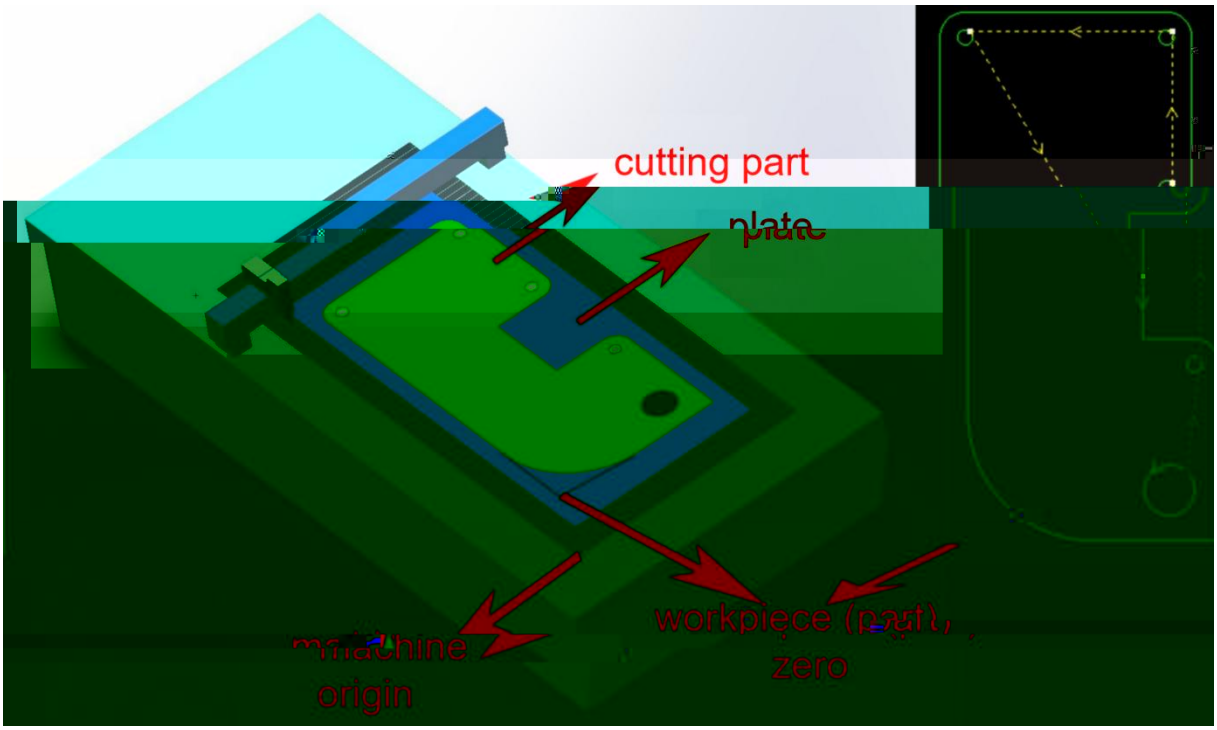


π /ƨyűℕƨf t ŀ·yŜf

The processing control module mainly introduced in this chapter locates on the right of the drawing area. Functions are selectable in the control panel, such as the coordinate system, manual and auto control, etc.

п℗м /ƨƨℕŘλyƛŀúŜ {ěăűŜϒ

All the motions in processing are the cutting head relative to the workpiece. The workpiece zero, as part zero, is marked as  in the drawing area. The correspondence between the machine coordinate systems and the workpiece coordinate system is shown below:



Click on Preview button in the control panel to display the positional relationship between the machine and graphicN ѽ ѽ ѽ a

The coordinate system is the right-handed Cartesian coordinate system. As shown in the figure, the thumb is pointing in the positive direction of the X axis, the forefinger is pointing in the positive direction of the Y axis, and the middle finger is pointing in the positive direction of the Z axis. With the X, Y, and Z coordinates determined, it is easy to determine the direction of the A, B, and C rotational coordinates according to the right-hand spiral rule.

пΦмΦм a ŀǑŘλyŜ /22ℕŘλyƖúŜ {ëăűŜY

The machine coordinate system is only determined by the machine structure and its parameters. It can be established by clicking on Return Origin button, or by clicking on Return Origin button in the CNC sub-page to re-establish the machine coordinate system while initial installation or when there is any derivation for abnormal reasons.

пΦмΦм tℕ2ƎℕŀY /22ℕŘλyƖúŜ {ëăűŜY

As the position of the workpiece may vary,

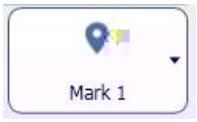
When selecting workpiece coordinate 1 to 9, the workpiece zero point is set manually by the user by clicking on Mark, and once set saved for a long time until the next setting. The workpiece coordinate system is suitable for batch production for the workpiece position is generally determined by a fixed fixture. Keep the processing in the same position each time by using workpiece coordinate 1 to 9 .

Click on the status

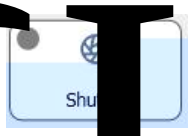
пΦн yʤŀf /2yűℕ2f

click on Mark to mark the current point as the cutting head position.

click on Go Marker and the cutting head will move to the marked point.



11 positions can be marked. Select the needed marked point in the drop-down bar.



on he pin o e laser shutter connects to the system, click on Shutter to control the shutter switch.

once the pin of the red laser light connects to the system, click on Aiming to control the red light.

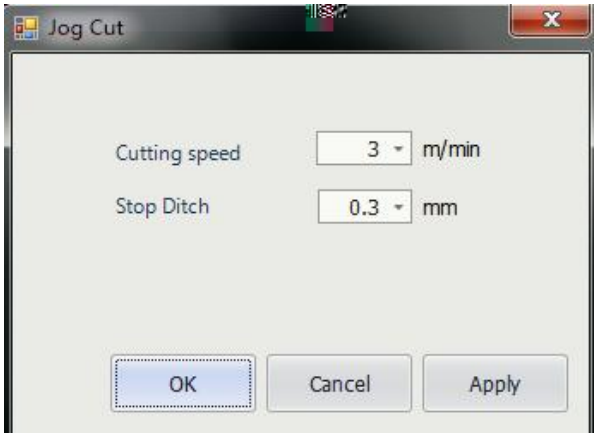
click on Laser to make the beam out to confirm the status of the laser beam. Set the laser parameters by clicking on the drop-down bar on its right.

click on Follow to bring the cutting head to a diĬrs

click on Blow to manually open or close the protective gas.

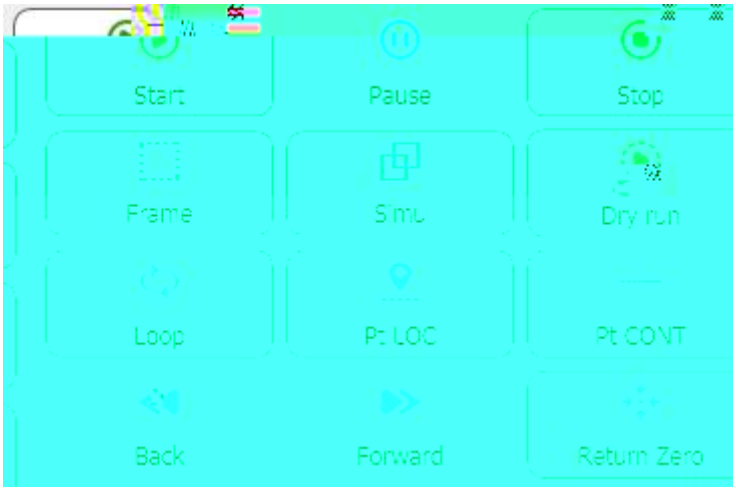
Click on Nitrogen. Air, nitrogen, and oxygen are all selectable for blowing.

Clăű: after selecting and setting the speed, the axis m



Cutting speed: when the set processing speed is faster than it, it will be the maximum speed limit for jog cutting.
Stop ditch (Step height): the larger the value, the less sensitive the detection to the plate margin is, and the greater the Z-axis over move distance. The smaller the value, the more sensitive it is and the greater the probability of mistakenly detecting a plate undulation as its margin.

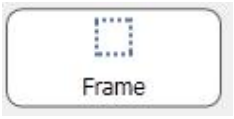
пΦo tℕ2ŏŜăăλyƎ /2yűℕ2f



click on Start to start the processing or resume if paused. After clicking on it, the mode interface will display auto-operating status.

click on Pause when the program is running, and the auto processing will pause. The mode interface will display auto-paused status.

click on Stop, and the processing will reset to the initial status and to be ready again.



click on Frame, and the cutting head will move along the outer contour of the graphic in a rectangle shape for users to observe the graphic position in the plate.

simulate before processing. Click on Simu, and confirm the cutting path by simulation.

dry run is different from the actual processing, with no laser, no gas, and no following-up, with other steps the same as the actual ones. If user clicks on pause while dry running and wants to continue to dry run, click on Dry run to resume the simulation. In paused status, clicking on Start leads to the actual processing from the position.

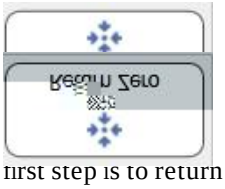
set the processing in loops at the position and click on Loop to see the following interface:

only [illegible] the breakpoint mode in paused state. In breakpoint mode, most functions in the control panel will be locked. User can mov[illegible]he cutting head by button for manual operating or wireless remote, or using the fixed-height.

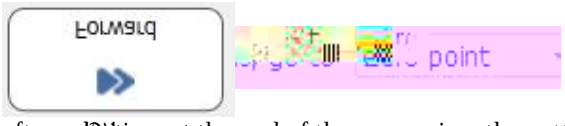
click on Pt CONT button, and the cutting head will move back to the located position and resume processing.

click on the button in paused state, and the cutting head will move backward along the cutting path. Click on Pause to stop the motion.

click on the button in paused state, and the cutting head will move forward.



click on the button to return to the machine origin. Note that right after opening the software, the first step is to return zero and then the functions in control panel will be acitivated.

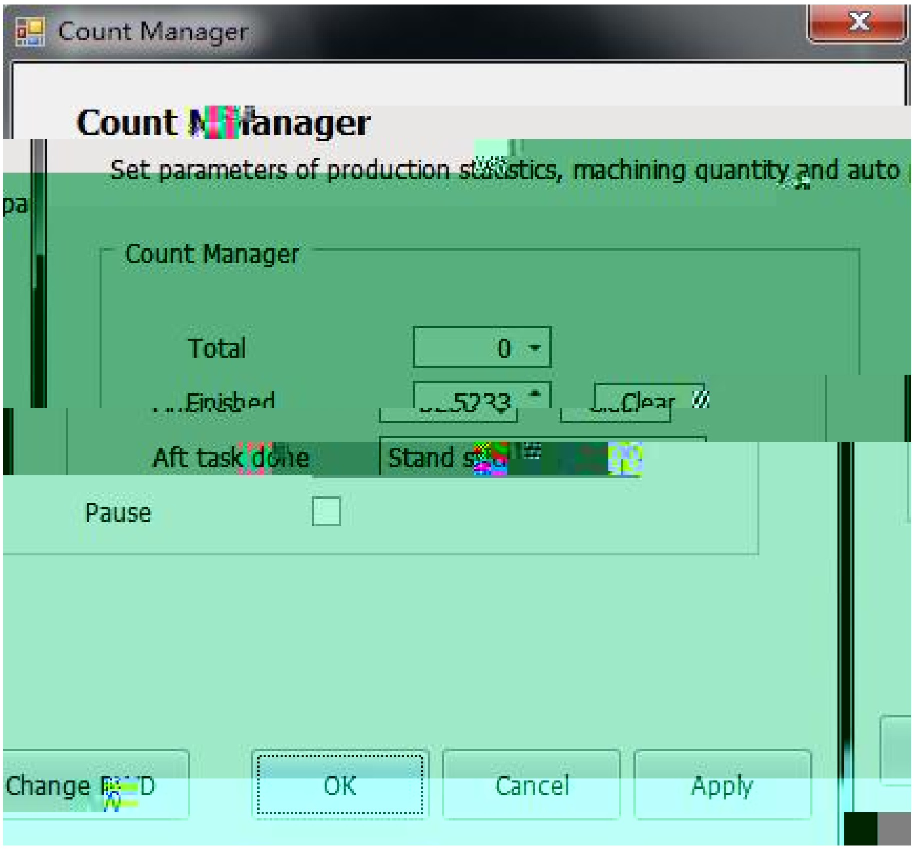


after selecting, at the end of the processing, the cutting head will auto-move back to the selected marked point.

Count: count for each time of actual processing.

Plan: the actual count planned to be processed.

Click on Mange button in the processing control and there pops up an interface as shown below:



¢2ůŀf: set the expected count of the workpiece to be processed.

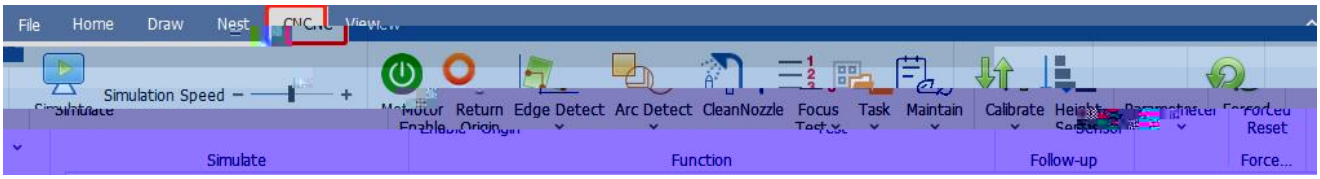
CǚyʎăKŜŘ: display the completed count.

/ƖŜŀǸ: clear current completed count.

! Ŧů ůŀăʅ Ř2yŜ: there are corresponding prompts after the processing plan has been completed.

t ŀǳăŜ: select to pause the count of processing.

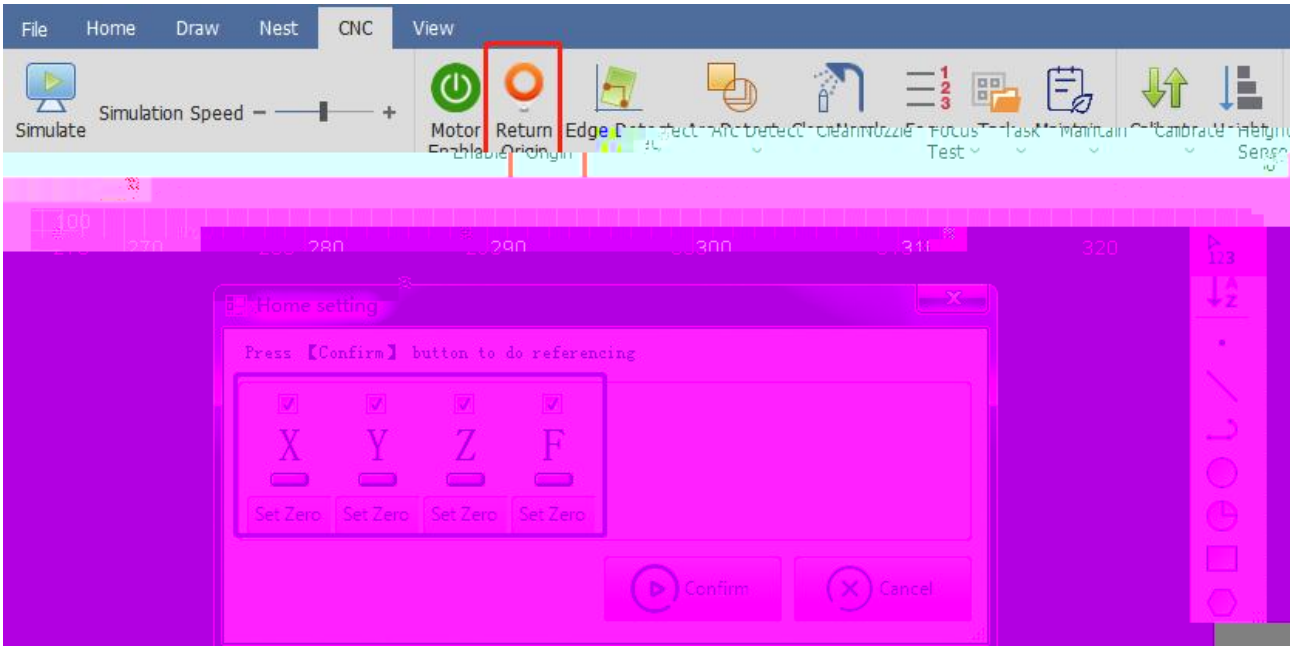
Click [redacted] shown below:



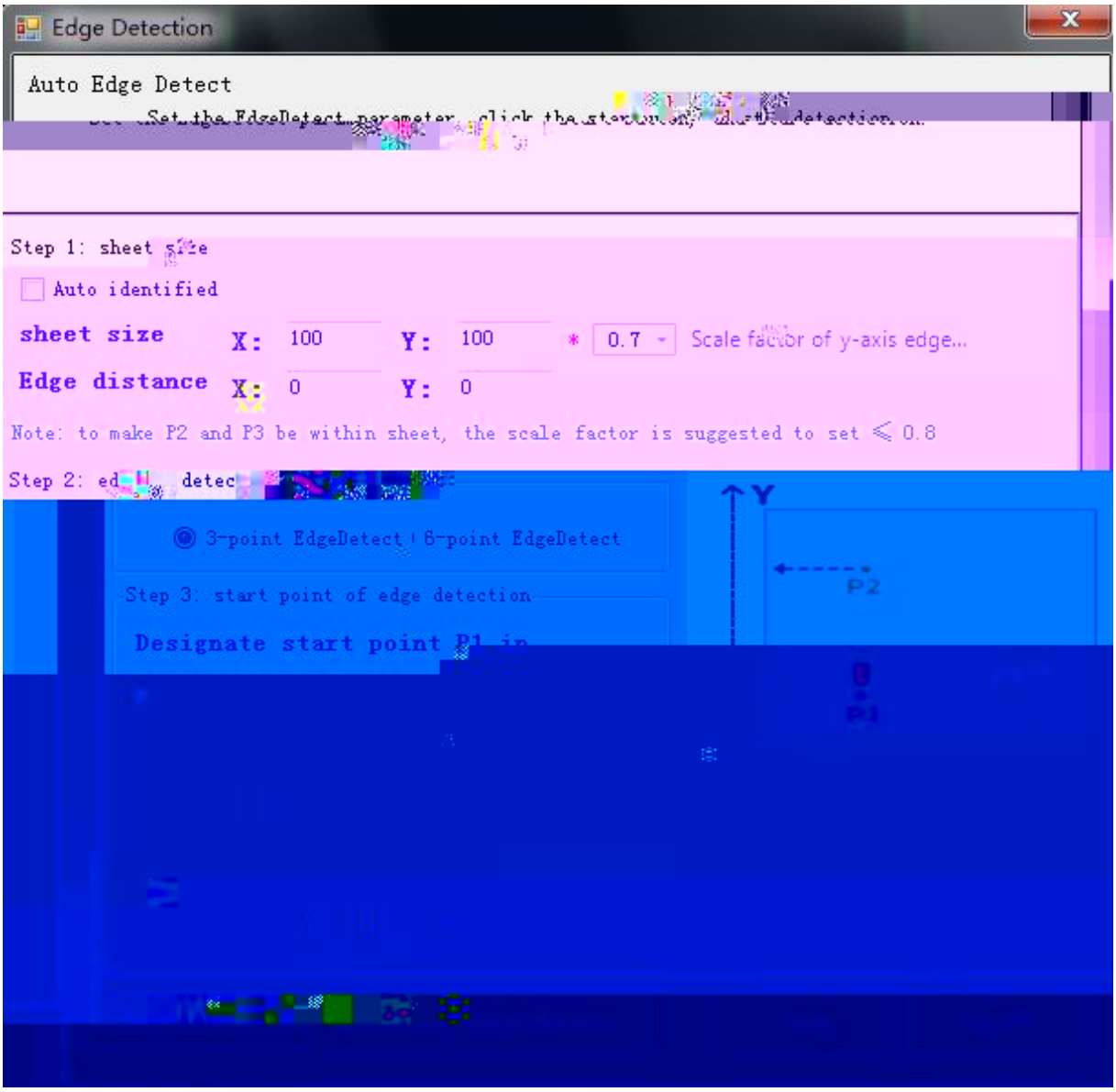
pΦм {ỉYʻdzfŀúŜ

Before processing, confirm the cutting [redacted] Digital twin. •

to After ening software, it is needed to **return** origin first. Click on Return Origin button. The setting interface of will p as s below:



Select



After completing the parameter setting, click on Save and start edge detection button, and the machine will start working. The result will be shown below the drawing area.

The following are the parameters for auto-detection:

(Sheet size) !ȡú2 ƛŘŜyűƛƬŜŘ: select to auto calculate the sheet size after edge detection.

{ĸŜŜú ăƛÎŜ: X is the length of the sheet in X-axis direction of the machine. Y is the length of the sheet in Y-axis direction of the machine. Please note that inputting the wrong sheet size will risk sticking the cutting head. Please input the actual sheet size!

9ŘƎŜ Řƛăúŀ-yŐŜ: set the positional deviation of Point P for edge detection. A positive value shifts the zero point of the sheet inwards, a negative value outwards.

9ŘƎŜ ŘŜúŜŐűƛ2y˄YŜúĸ2Ř: 3-point and 6-point. It is suggested to use the 6-point edge detection on the thin sheet. Detect the edge by a single point 6 times to avoid interference from the tooth tip to the edge detection on a thin sheet.

5ŜűŜŎű ₮ℕ2Ƴ űĶŜ ŎǆℕℕŜyű [illegible] 2₮ űĶŜ ŎǆűűⱦyƎ ĶŜl·Ř: select, and the edge detection will start from the current position of the cutting head. [illegible] electing, please move the cutting head into the range of the sheet to make sure there is a sheet under cutting head.

5ŜűŜŎű ŜŘƎŜ ₮ℕ2Ƴ űĶŜ ăűl·[illegible] select, and the edge detection will start from a fixed position. Move the cutting head into the range of the sheet a[illegible] on Save start point button. The current position of the cutting head will be recorded as a fixed position for detect[illegible]e.

/ l·ſŎǆſl·űŜ ℕ2űl·űⱦ2ƴ l·yƎſŜ[illegible]tation angle obtained by edge detection.

5Ŝűl·ⱦſŜŘ ǈl·ℕl·ƳŜűŜℕă 2₮[illegible]űŜŎűⱦ2ƴ: Set the basic parameters for capacitive edge detection.

I ŜⱦƎĶű: the height from [illegible]ting head to the plate in the process of edge detection.

{űŜǈ ĶŜⱦƎĶű: the sensiti[illegible]e in edge detection. The higher the value, the less sensitive

⊥ ∘/.

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· /оллл{ {ŜℕÂŝă [ŀăŜℕ /ʤúűůyƎ {ėăűŜϒ π ¦ ăŜℕ a

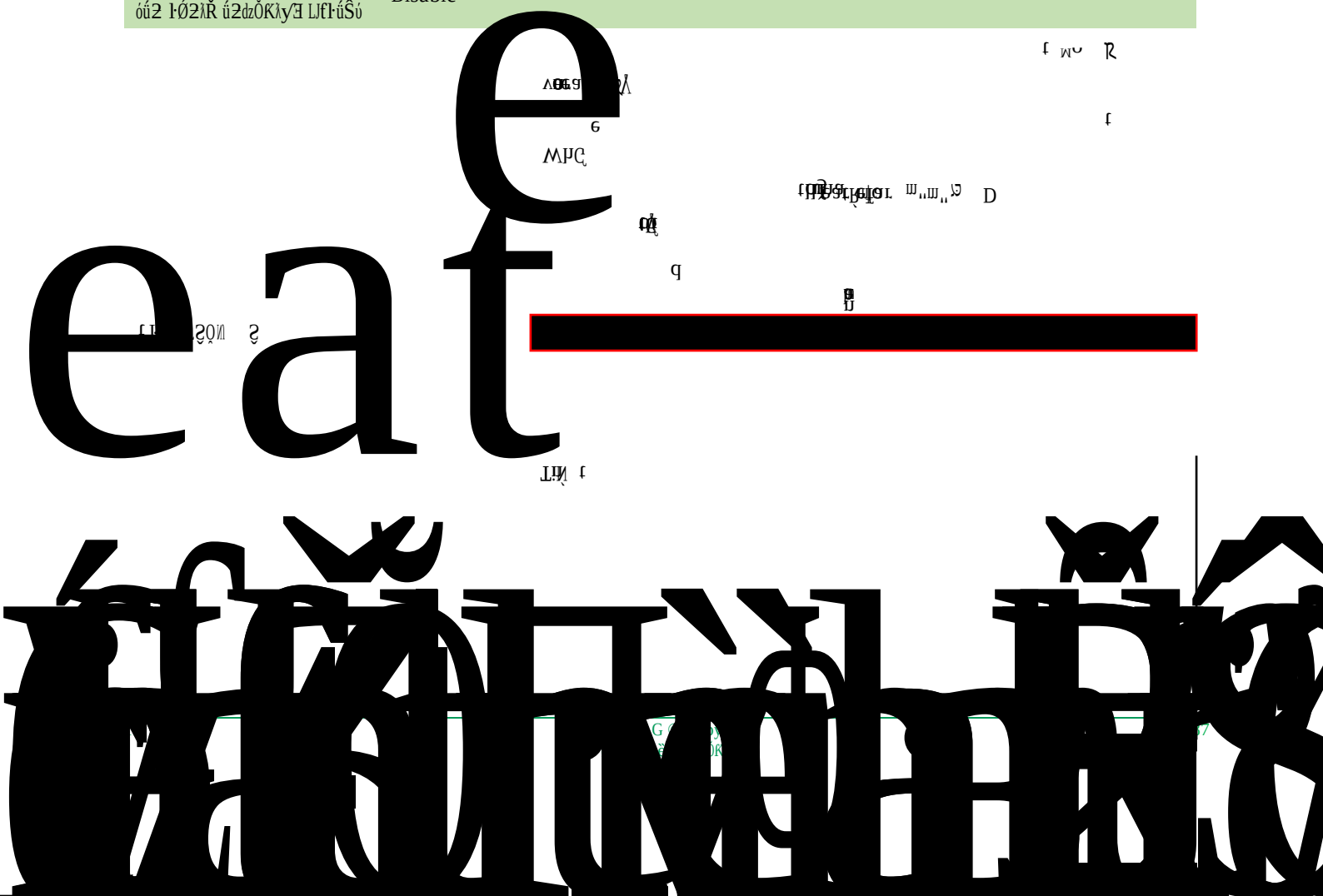
pΦмм I ŜΛƎƘű {

Click on Height Sensor in CNC sub-pag d the setting interface w contai the following parameters will pop up:

[ƛŦűλyƎ		
t ł·ℕł·YŜúŜℕ	5ŜŦł·ʤfű	wŜYł·ℕ৲
a ł·È ΘŦűλyƎ ƘŜΛƎƘű ół·Y2yƎ Ǒ2yű2ʤzℕăύ	30	After Z-Axis follow-up completes, the max lifting height is the lifting height of the cutting head bases on its current position. It is recommended not to set the value too large. The value can be set as half of the Z-axis travrring

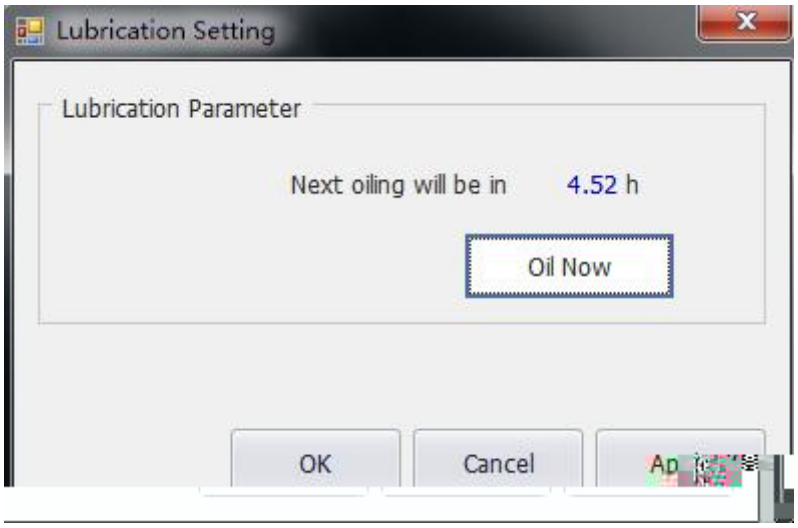
		previous cycle (1ms ago) is greater than this value, the cutting head is considered to have touched plate, and at this time the cutting head moves upwards and starts the calibration to record the capacitance value in relation to the height.
Ly˝LJfŀŎŜ ǿλŘűK	0.2	It refers to the range of height used to decide if the cutting head follow-up is in place.
{ŜℕØ2 CŜŜŘōŀŎ] ŘŜfŀè	5	The delay can be auto-measured or adjusted by auto-tuning.
I ŜλƎKú ăŜyã2ℕ ŘŜfŀè	10	The delay can be auto-measured or adjusted by auto-tuning.

¢2ʤŎKπtfŀúŜ tŀℕŀYŜűŜℕ		
tŀℕŀYŜŜŜℕ	5ŜŦŀűʤzű	wŜYŀℕ]
tλŜℕŎλyƎ ŘŜfŀè	200	In piercing, the system will alarm and stop cutting if the duration of the touch-plate signal is greater than the value.
/ʤúûλyƎ ŘŜfŀè	100	In cutting, the system will alarm and stop cutting if the duration of the touch-plate signal is greater than the value.
5ℕè ℕʤzy˝ŘŜfŀè	50	When the cutting head is in a dry run, the system will alarm and stop cutting if the duration of the touch-plate signal is greater than the value.
tℕŜπú2ʤŎKπLJfŀúŜ KŜλƎKú	0.1	If the current height is smaller then the value, it means the touch-plate signal is triggered. The function is used to protect the value, so it is fine to use the default value.
9ŘƎŜ Ŧ2ff2 ǿ óú2 ŀØ2λŘ ú2ʤŎKλyƎ LJfŀúŜú	Disable	Enabled, once the cutting head is



pΦмн [ʤōℕŎŀűℵ2y

Click on Lubrication button in the CNC sub-page, and the setting interface will pop up. Users can check the time to do the next lubrication, or click on Oil Now to lubricate the machine at once, as shown below:

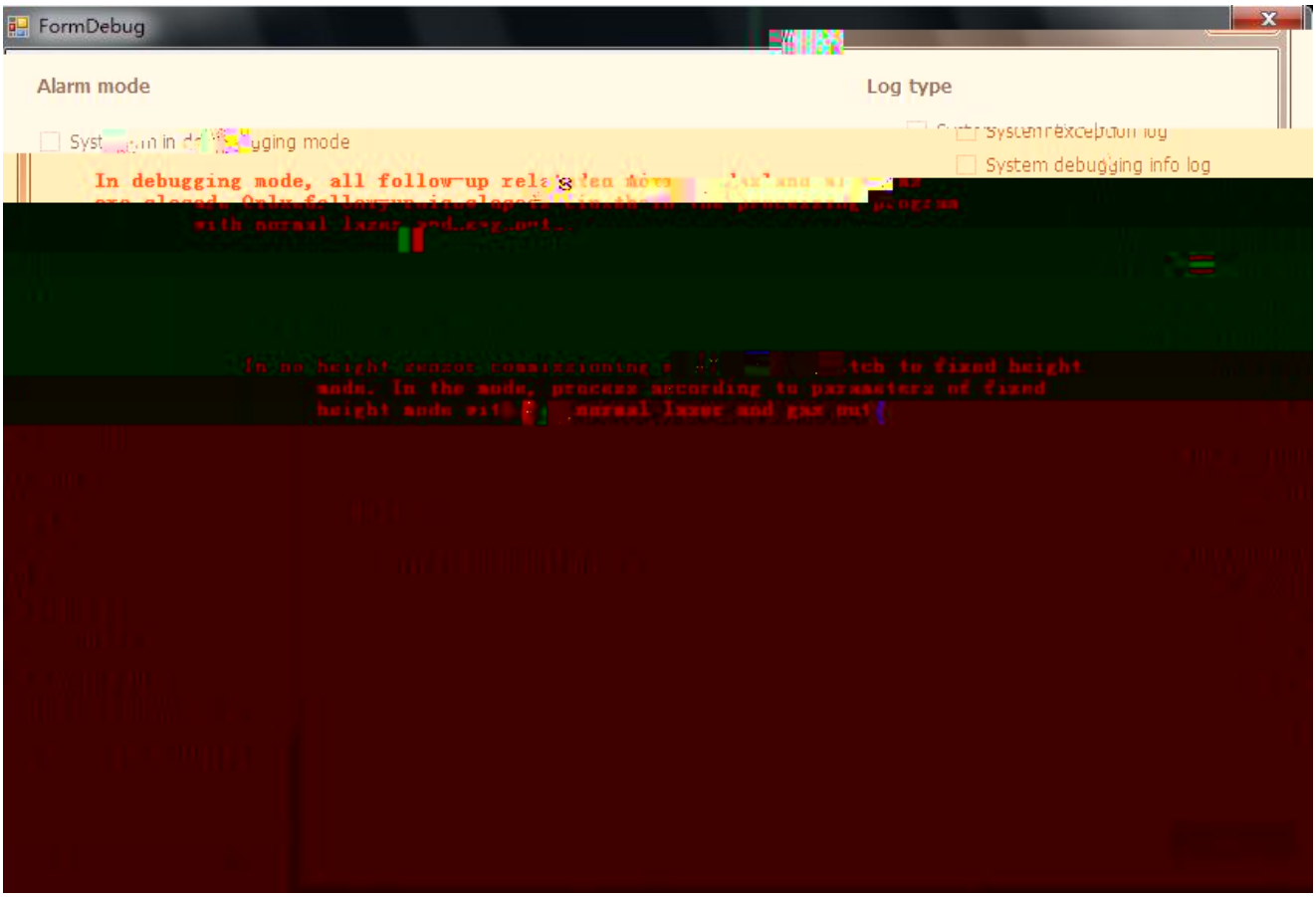


5ʤăű ŜϒƠŀ

Click on Dust Removal button in the CNC sub-page, and the setting interface will pop up. Users can set the function open or closed, and timed output. There are also selections for all on or all off.

pΦмп {Ŝúűλy∃

Click on Setting button in the CNC sub-page and its interface will pop up, as shown below:



!fŀℕϒ Ϋ2ŘŜ: select or deselect according to the users' needs while debugging. The default is to deselect.

[2∃ úèLJŜ: types of the log can be selected according to the users' needs and viewed in the log area.

Cfè /ʤú Ŏ2Υϒλăăλ2yλy∃: click on Parameter Setting to turn on the EDS2000 hardware for fly cutting. It's also able to set the fine and coarse tuning of the pulse.

/2yűℕ2f LJŀySf:

{ ǿλúŎK ű2 ØŜℕúλŎŀf ŘλăLJfŀè: select to place the control panel at the bottom of the mainform. It is suitable for vertical display. The setting takes effect after re-open the software.

9yŀōfŜ LJℕ2ŎŜăăλy∃ f2Ŏ]: select to lock the control panel and make it ineffective.

!ʤű2 Ŝyŀōf Ŝ ǿKŜyϒăúŀℕú ă2₮ǿŀℕŜ: select to make the software auto-enable once opened. The software will not auto-enable if deselect the function.

a ŀyʤŀffè Ϋ2ØŜ Îπ ŀÈλă Ř2ǿyϒǿŀℕŘă ú2 ŀØ2ŘŘ ú2ʤŎK LJfŀúŜ: turn on the touch-plate detection when Z axis moving.

!ʤű2 ₮ŦúλyƎ ǿKŜyϒ½πŀÈλă ú2ʤŎKŜă LJfŀúŜ: turn on the function of Z-axis lifting when touching plate.

· /oɾ [{ŜℕŜă [ŀăŜℕ /ʤúűƴyƎ {èăűŜϒ π ¦ăŜℕ a ŀyʤŀf

The status bar at the bottom of the mainform mainly includes Draw (drawing log), Log (system log), and A

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The system alarm is mainly used to display the current alarm or prompt, as shown below:

b2űŜ: when a red alarm displays in the status bar, it is needed to clear the alarm before processing. If it is a grey or white prompt, it does not matter to the processing.