3D LASER ENGRAVING MACHINE

MANUAL

激光内雕机 操作手册

SMART

V2021

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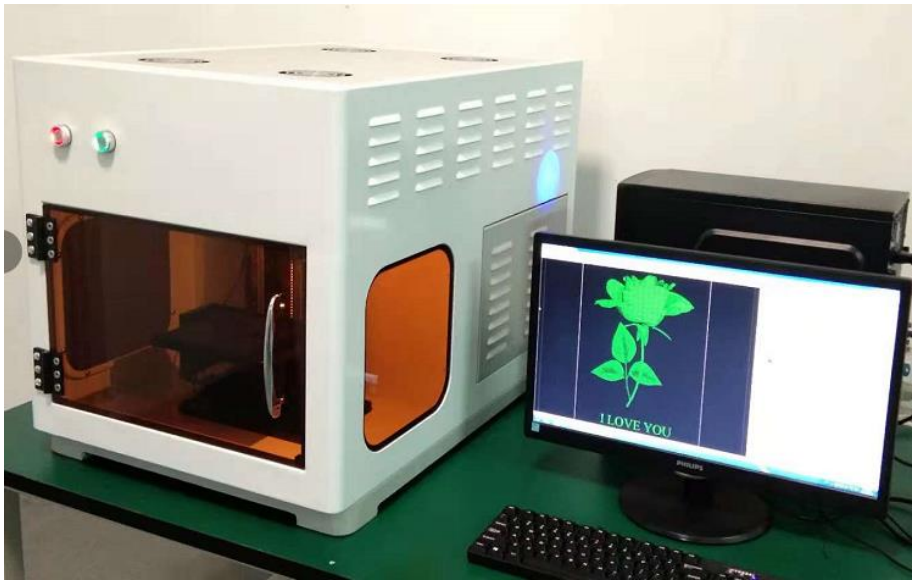
Connect the Signal Cables

INTRODUCTION FOR SMART



This is a laser engraving device that is easy to use and easy to learn, the engraving range of the device can reach a diameter of 100 mm and a height of 80 mm

The user does not need any foundation to read this manual carefully and can quickly grasp the use of the machine. We also provide a 3D model library for customers to use the exercises.

This equipment uses high-quality laser and motion platform to ensure long-term stable working equipment. We have been working for more than 24 hours before leaving the factory.

The device is mainly composed of three core components

1. The laser is the core component of the device and has a service life. Therefore, please turn off the device when the machine is not working.
2. Scanning mirrors and f-theta lens allow the laser to move quickly on the platform so that beautiful patterns can be recalled
3. The motion platform can be moved up and down so that a three-dimensional point cloud can be created.

Machine Test

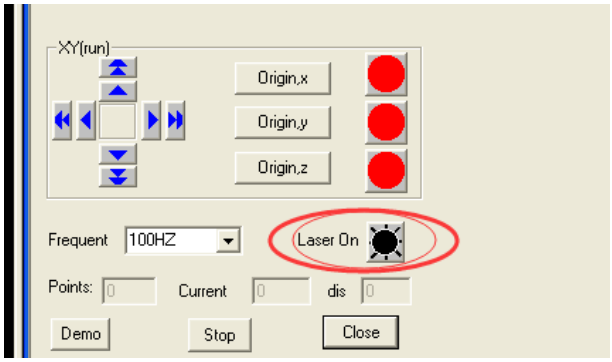
Turn on the power buttons

The red button is for the platform and the green one is for the laser. In case of emergency, you can press the red button. The laser will work after several minutes because the laser needs to warm up.

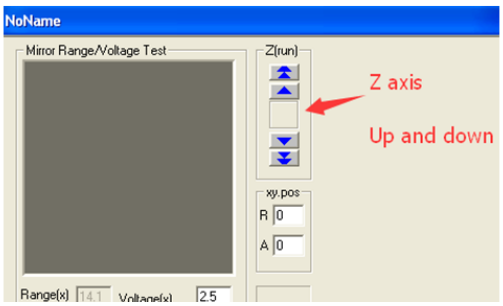
Open the LaserControl software to test the machine.

Press the test button

Click the Laser On button to test if the laser is working, and please turn it off when you start to engrave the crystal.



Click the arrow to test whether Z axis can move.



There is Origin Z buttons which can move the platform to the origin。

The Software Introduction

Points Cloud Generation

- 3D Crystal：Convert the 2D/3D model to Points Cloud with .cad format.

Points Cloud Engraving

- Laser Control：Control the machine to engrave the image .cad into the crystal.

Get the 3d model

To make a 3d crystal, you must have the 3d model first, which we can get them by using the 3d design software, such as 3ds max. This requires that you have the skill of design or 3d model.

Of course, you can also download them from the internet, such as **http://archive3d.net/**. I really like this website indeed, because of more than 45,000 free and excellent models there.

Which format we should use?

We will use the “OBJ” format and it will be better to use the 3d object file with texture, the texture file always be “BMP” or “JPG”. You will also find the “MTL” file, which includes the details of the texture.

For example, “D:\3d model\map\c221 heart rose” you will find the files.

2.jpg

rose.mtl

rose.obj

OBJ: 3d model file

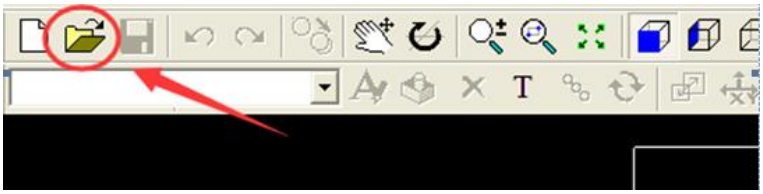
JPG: texture color file
MTL: includes the details of the texture.

Points Generation with 3D Crystal

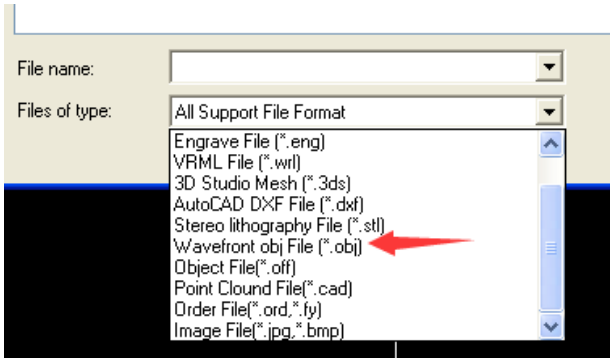
The 3D Crystal program is very easy to use, but it has many powerful features. For more details about how to use the 3D Crystal software, please watch the short training video. We will use it to general the 3d points cloud.

Open the 3D Model File

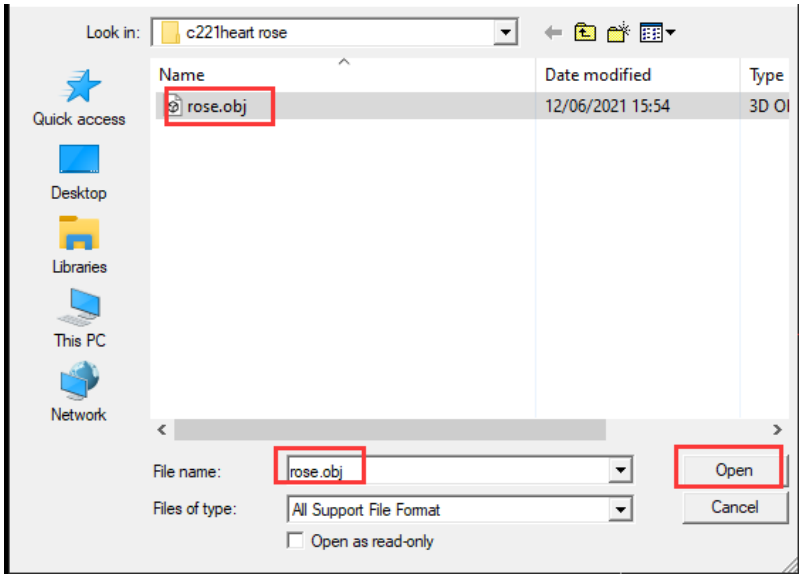
Click the open button

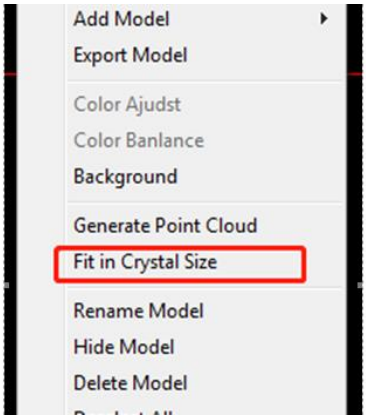


You will note the formats the software support and “OBJ” file is in the list.



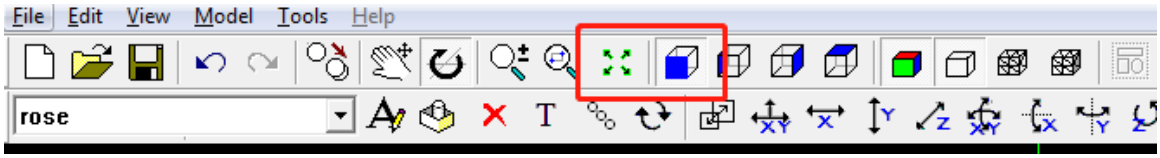
We can find the .OBJ file D:\3d model\map\c221 heart rose\ rose.obj





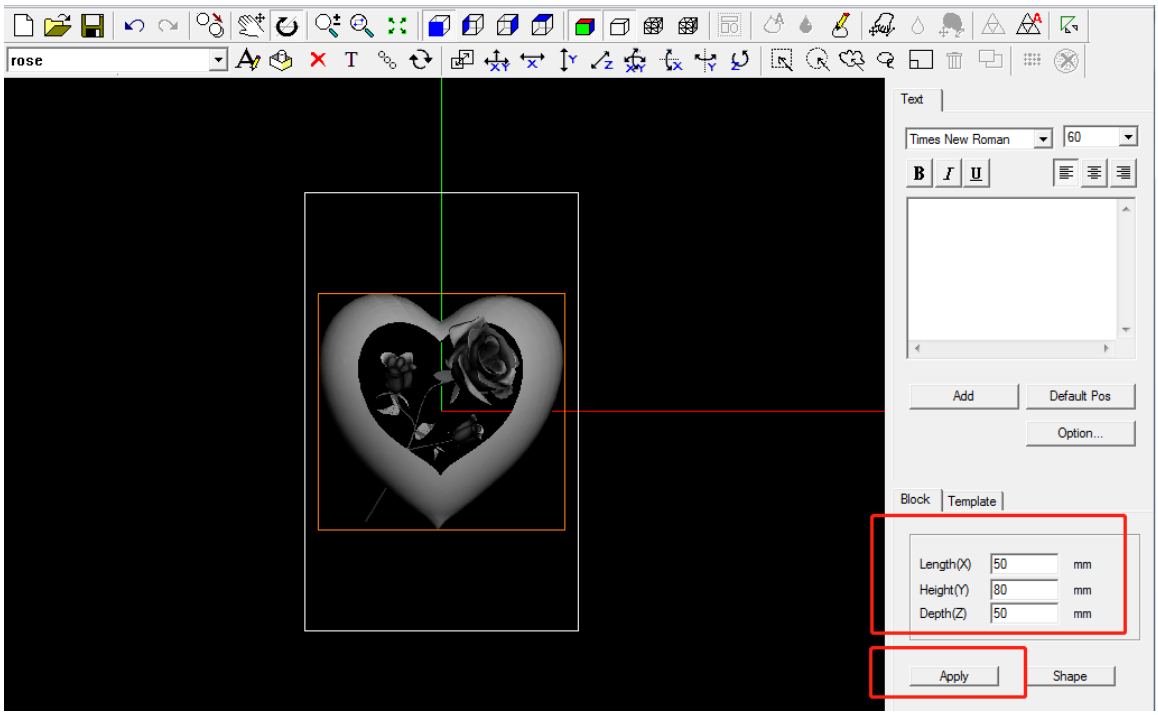
If you can't see the model after you have opened it, you can right-click the mouse in the working area and then click "Fit in Crystal Size"

The Maximize View and Front View will be also clicked to fit the window.

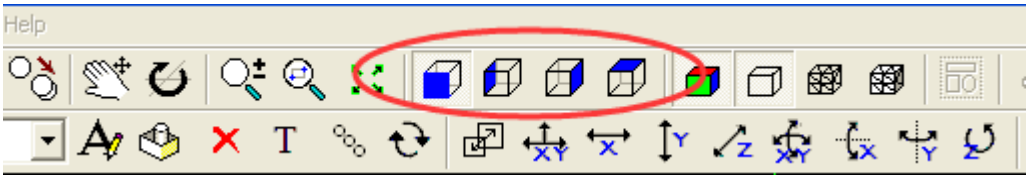


The orange color box is the size of the 3d model.

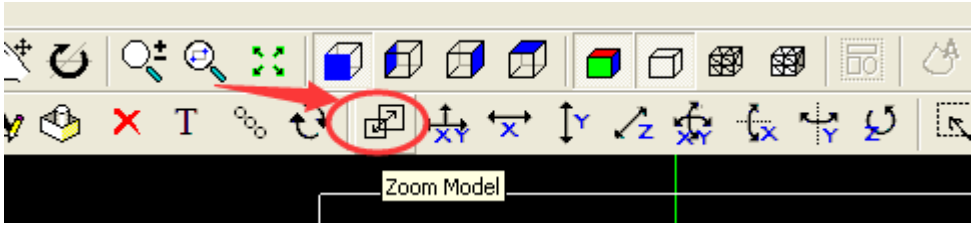
The white box shows the size of the crystal, we can change the crystal size by editing the block size. For example, we use the "558" size crystal just like in the picture below.



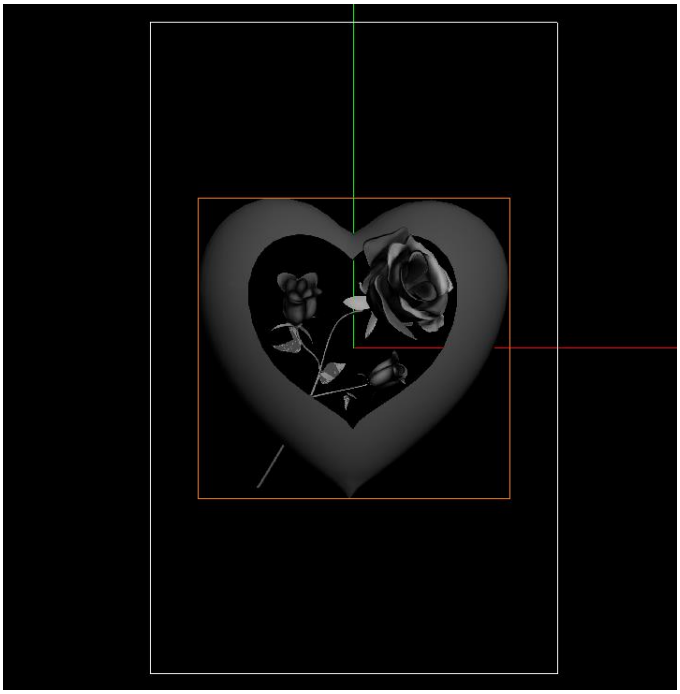
We can change the direction of the view by clicking the buttons in the picture



We can also resize the model to adjust the whole size of the model.

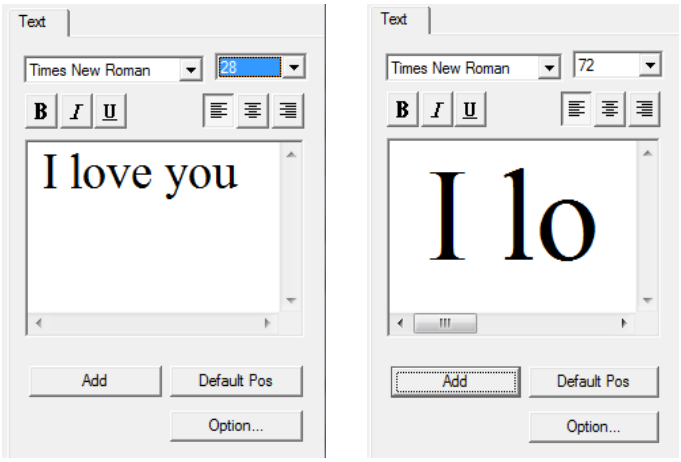


It is better to resize the model to 90% size of the crystal, so the model will be “inside”.

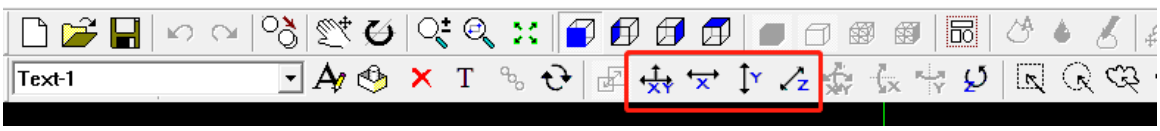


How to Add the Text

Type in ”I LOVE YOU” and then choose the size。

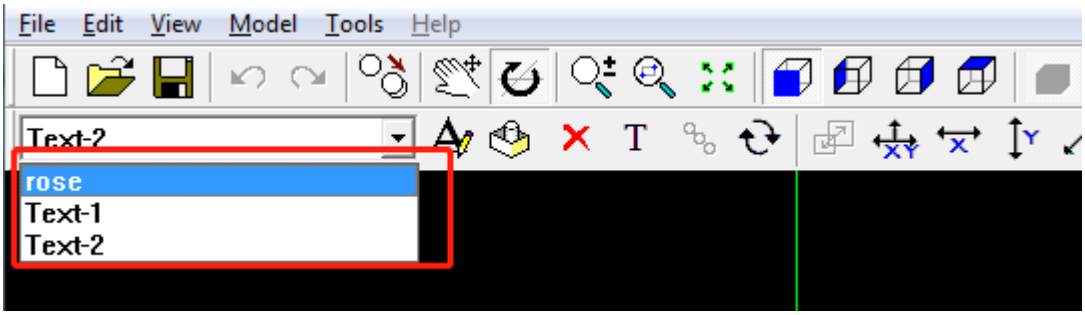


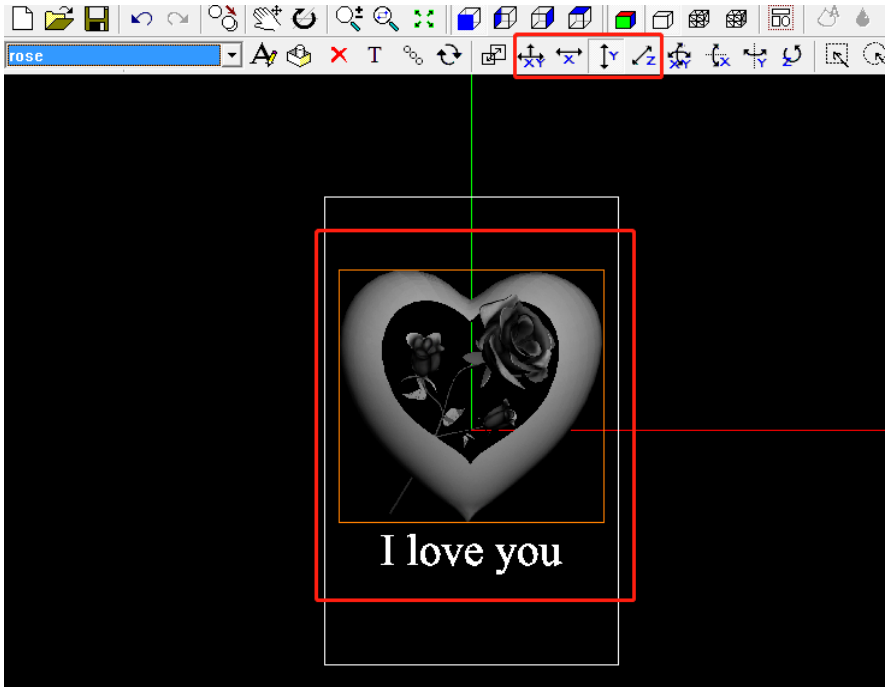
Move buttons:



If you want to delete the text, just select it from the model list and then click the delete button.

You can select any model from the list





General the Points

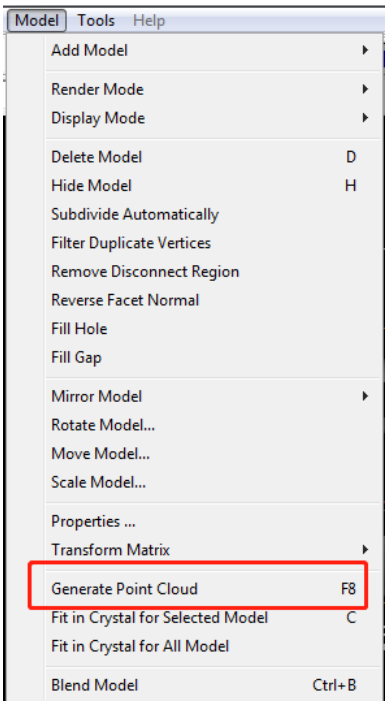
Note： We have two methods to general the points.

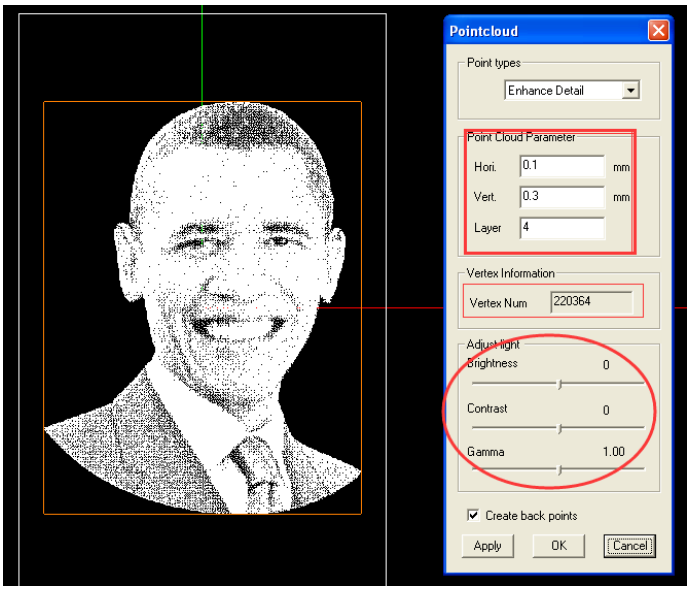
- Cut back points
- “360 degrees” whole points.

Which one we should choose? That depends on the user.

➢ For human face

We will use the “cut back” which will be more clear to see the detail of the face. If you watch the face from the back, you will find the model moving alive in the crystal. This is very interesting.
To general the “cut back” points, shortcut F8 or Menu： Model – Generate Point Cloud.

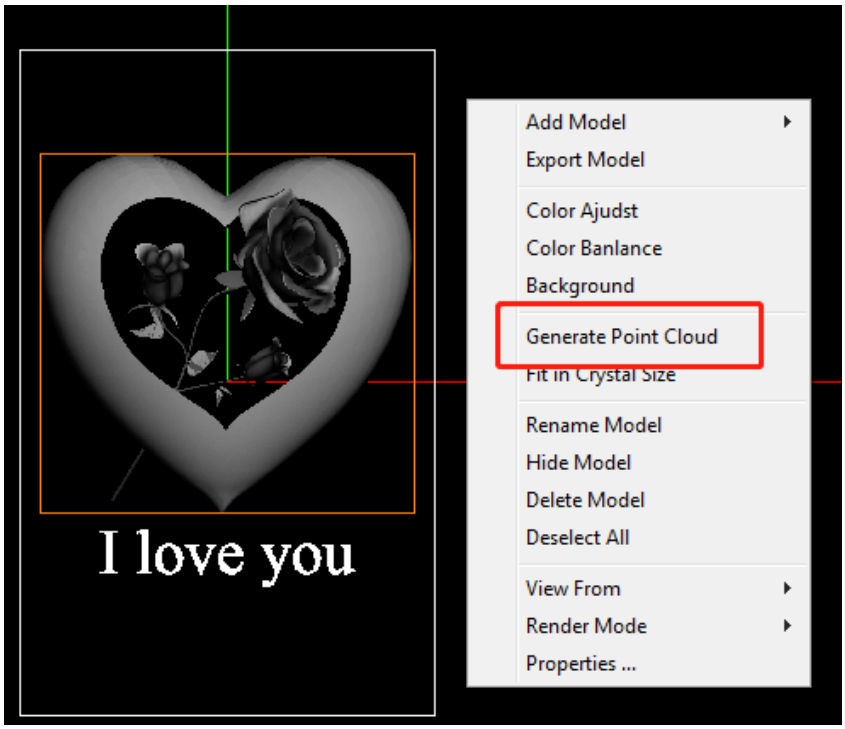




You can change the Brightness, Bontrast and Gamma to adjust the quality or points number for the model.

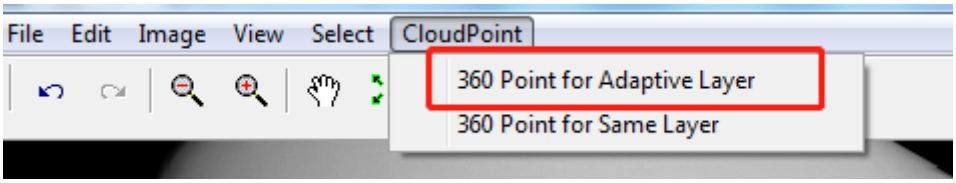
- For the 3D model

We will use 360-degree points for the 3d model, right click mouse and click “Generate Point Cloud”

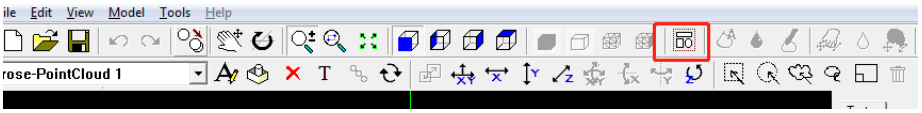


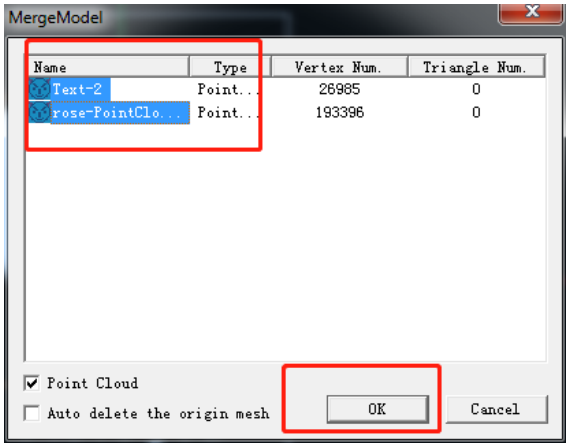
Config the parameters：

Hori： 0.08 ~ 0.12 we use 0.1
Layer Num： 3 ~ 5, we use 5
Distance： 0.15 ~ 0.45 we use 0.2

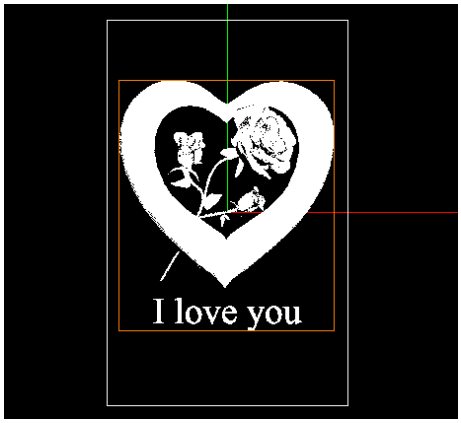


Combine the Model Points and Text Points

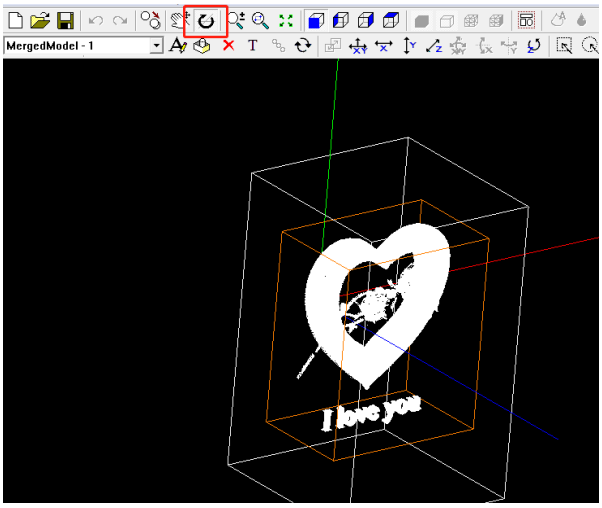




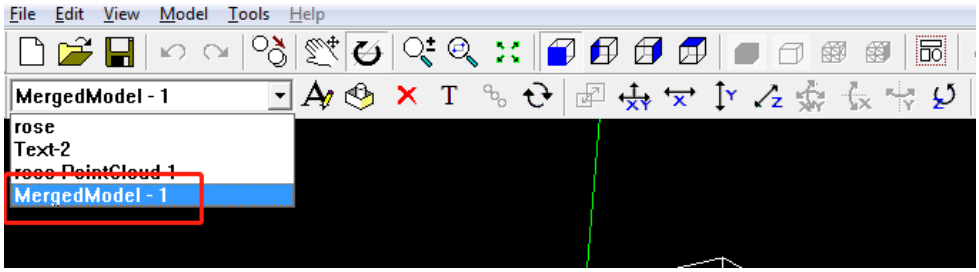
Orange color box shows the result of the combination.



You can rotate the points of the model.



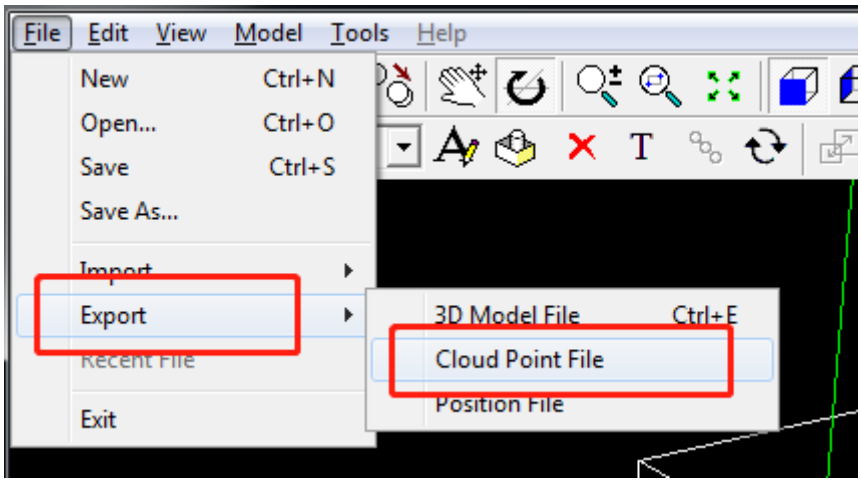
You can see the combined points from the model list.



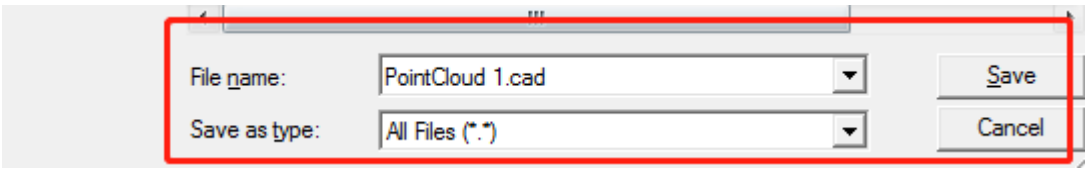
CAD Points Export

Export the points cloud with “cad” format.

Click the Menu: File – Export – Cloud Point File



Note: Change the file type to “All Files”, and rename the File name to add the “cad” extended part. Then Save.

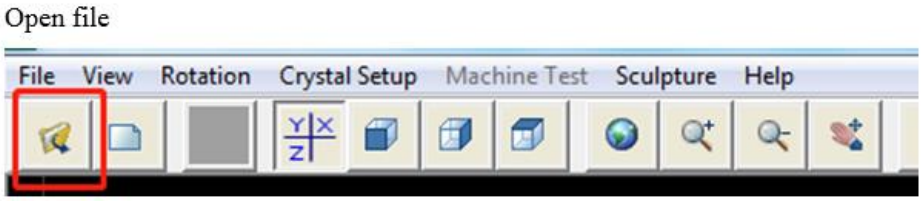


Engraving to Crystal: Laser Control

Know the direction

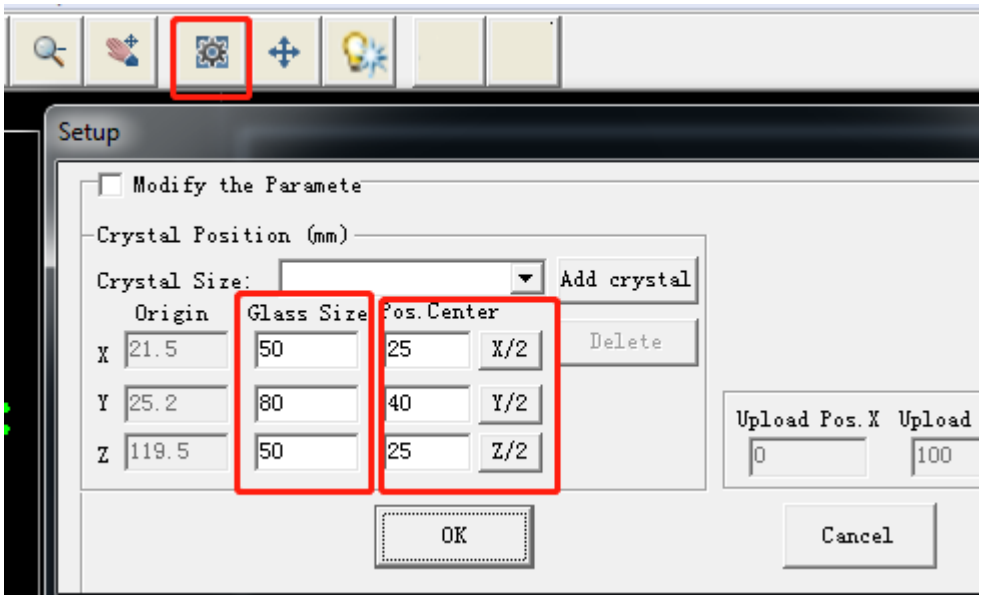
- X：LEFT TO RIGHT
- Y：FRONT TO REAR
- Z：DOWN TO UP

Open file

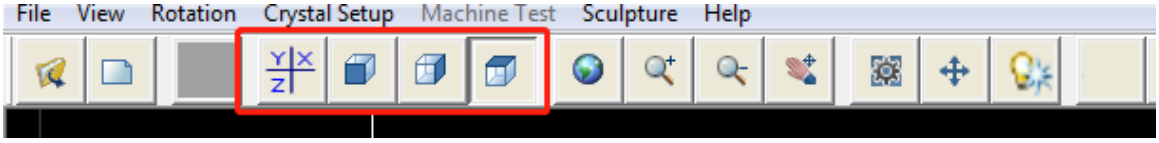


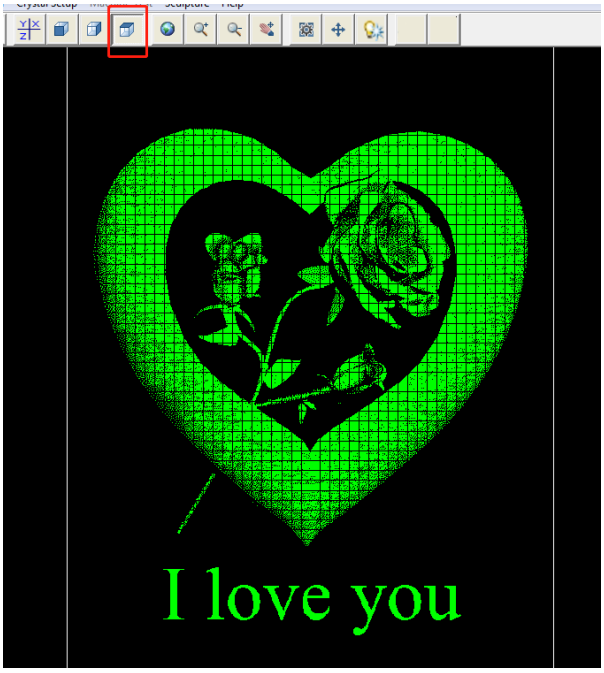
Change the file format to .cad

We use “558” size crystal，press X/2 Y/2 Z/2 to set the center position.

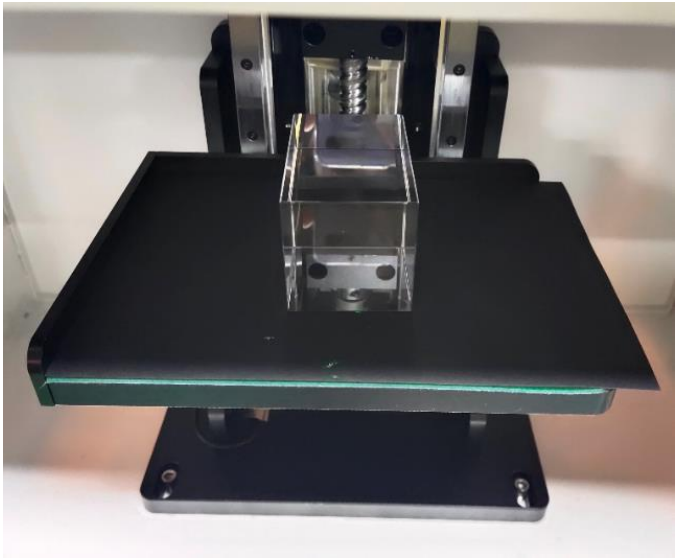


View Direction

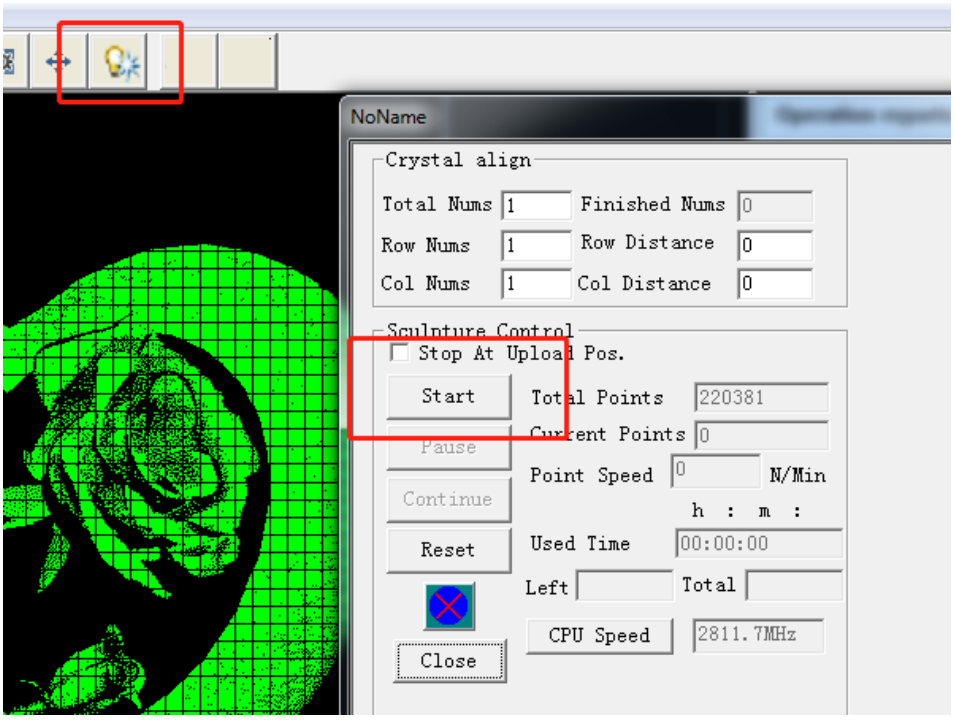




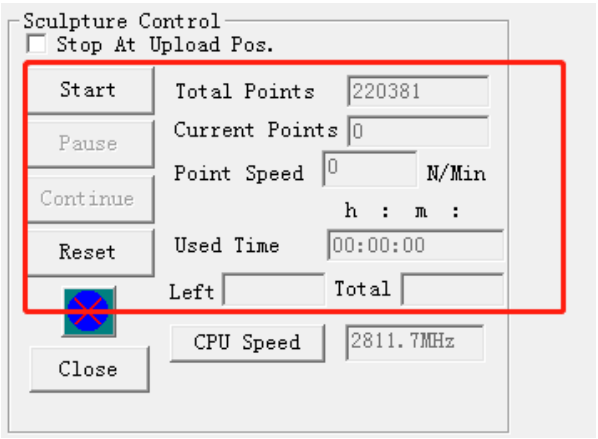
Put the crystal on the platform. (Page23 Q:Where should we put the crystal on the platform?)



Press the Start button



You can see the speed when the machine working.



The total engraving time is about two minutes.

2D Photo Picture

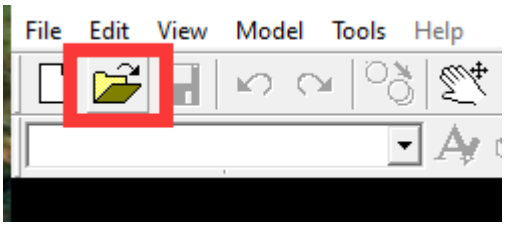
3D Crystal -> Laser Control

NOTE：The quality of the picture is very important which will determine the final engraved result.

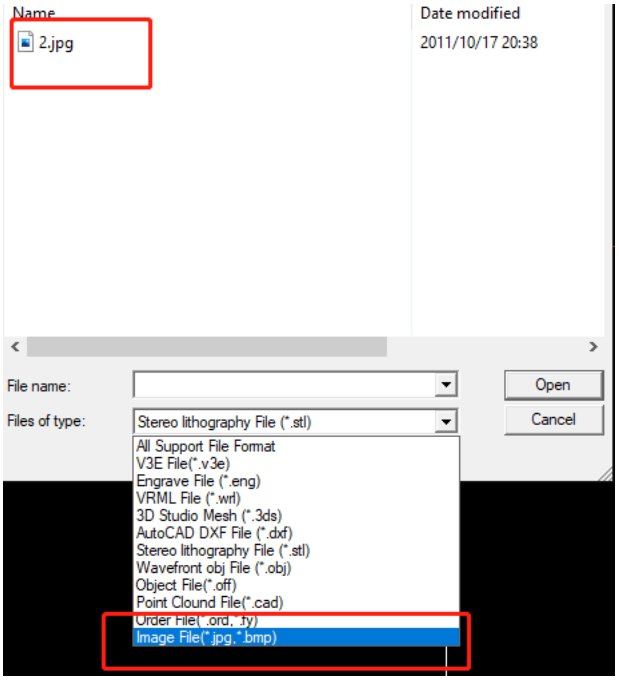
2D Points Generation

Open 3DCrystal

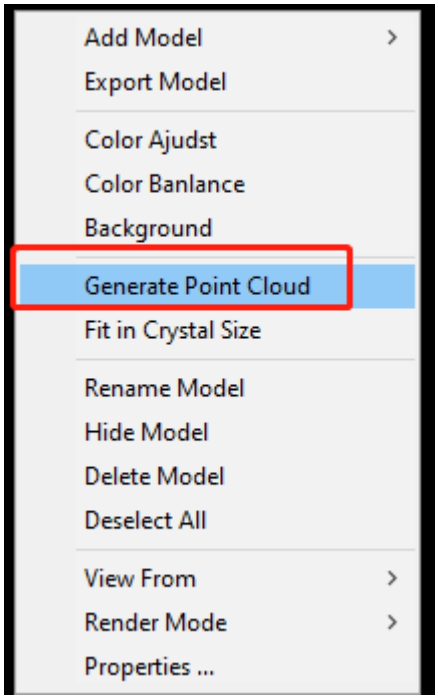
Open files



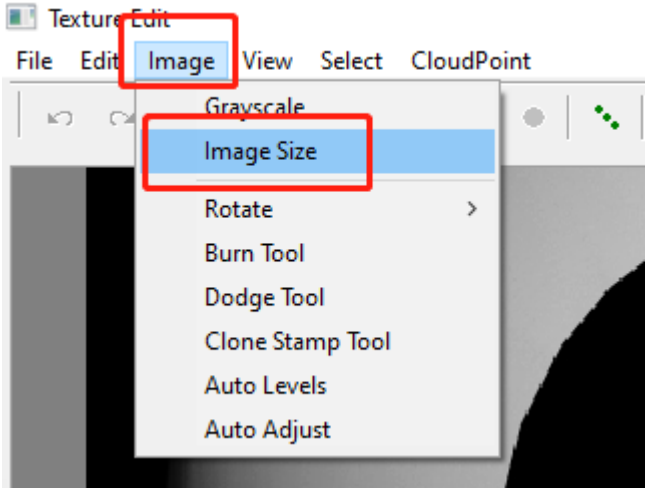
Choose Files Type：Image files -----Open “2.jpg”



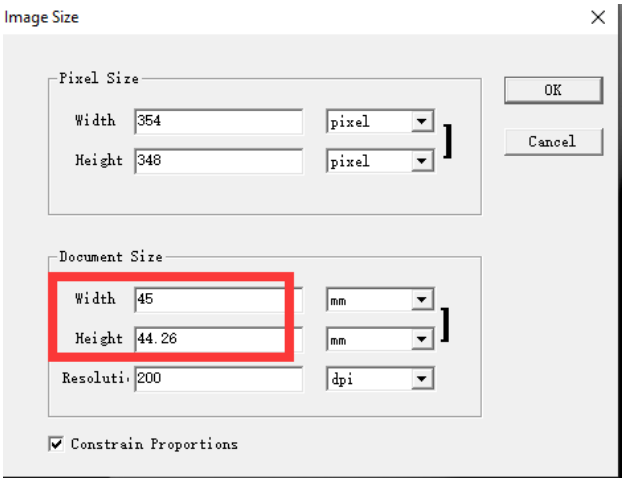
Fit in Crystal Size--------Generate Point Cloud

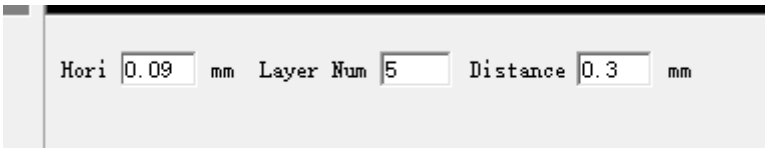


Menu Bar: Image---Image Size



Change the size of the picture then click OK.

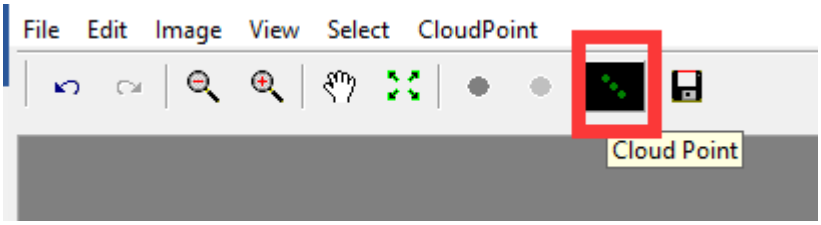




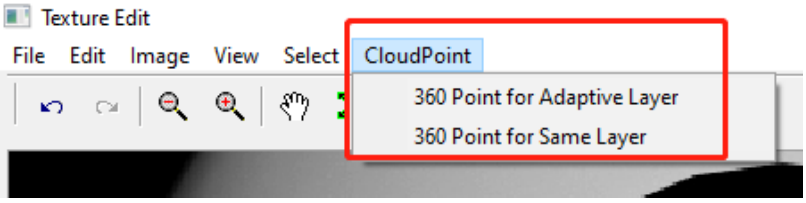
Hori: 0.08-0.12 Layer Num: 3~7, Layer Distance 0.2-0.45

Generate CloudPoint:

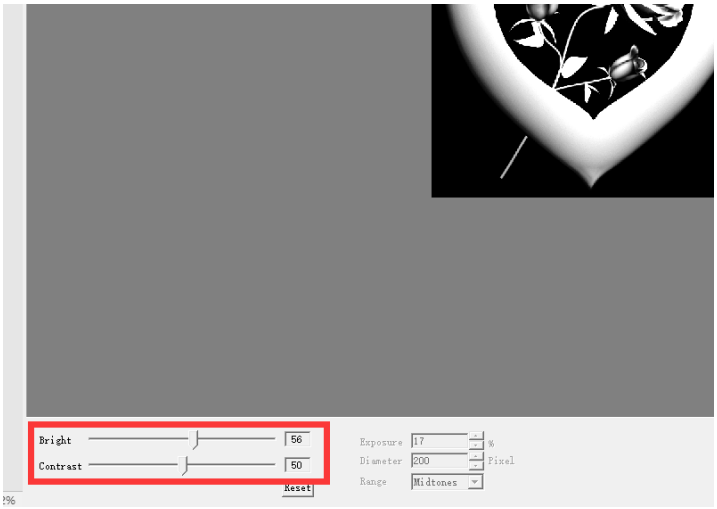
Method 1: Click



Method 2:

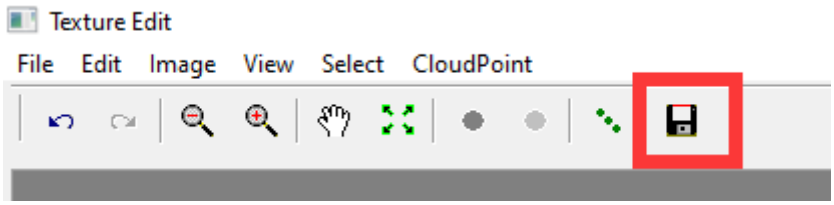


You can adjust the brightness and the contrast to decrease or increase the point number.

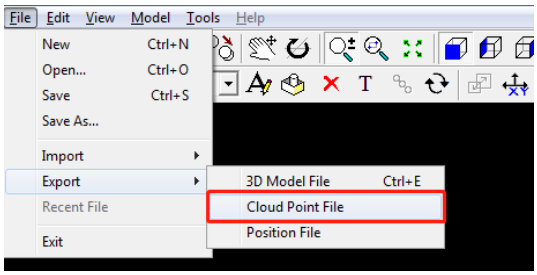


Note : The max size of the image is about 90%~95% size of the crystal.

Click to save CloudPoint.



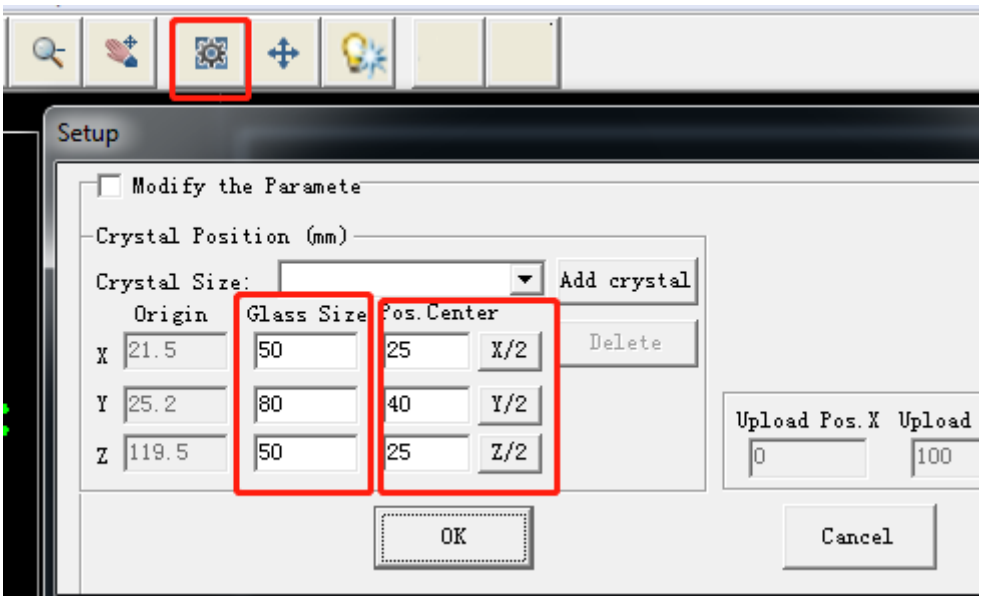
Export the points.



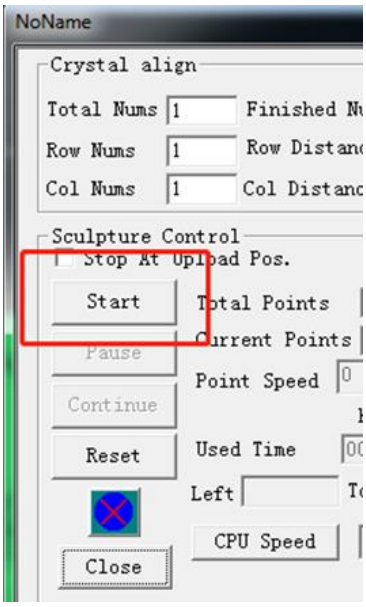
Engraving to Crystal: Laser Control

Open cad file in LaserControl

Type the size of the crystal，press X/2 Y/2 Z/2 to set the center position.



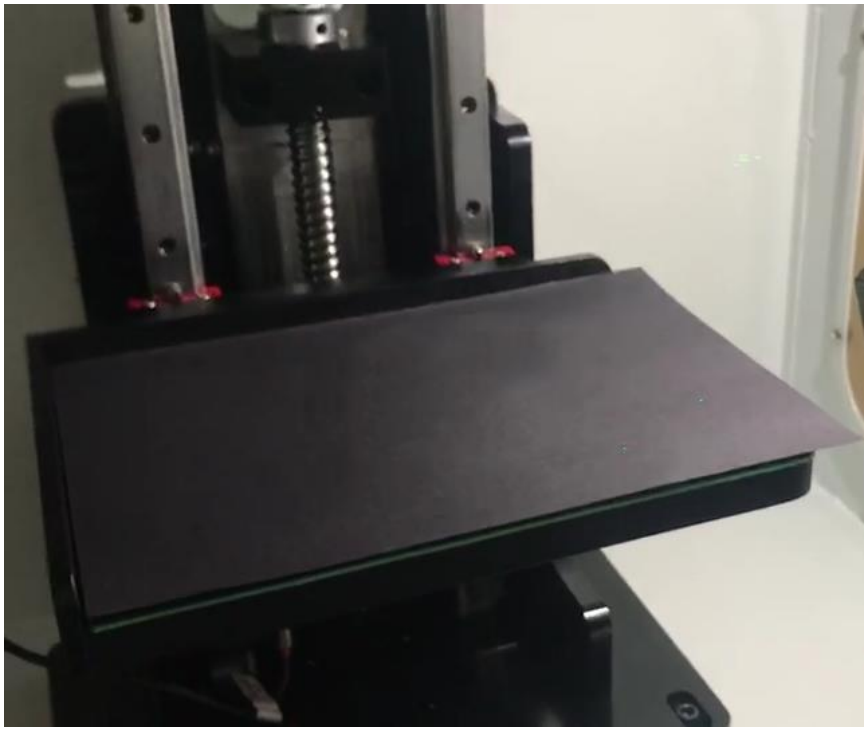
Click the light button and press the Start



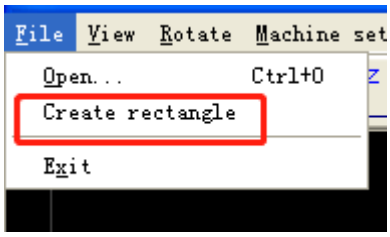
Q:Where should we put the crystal on the platform?

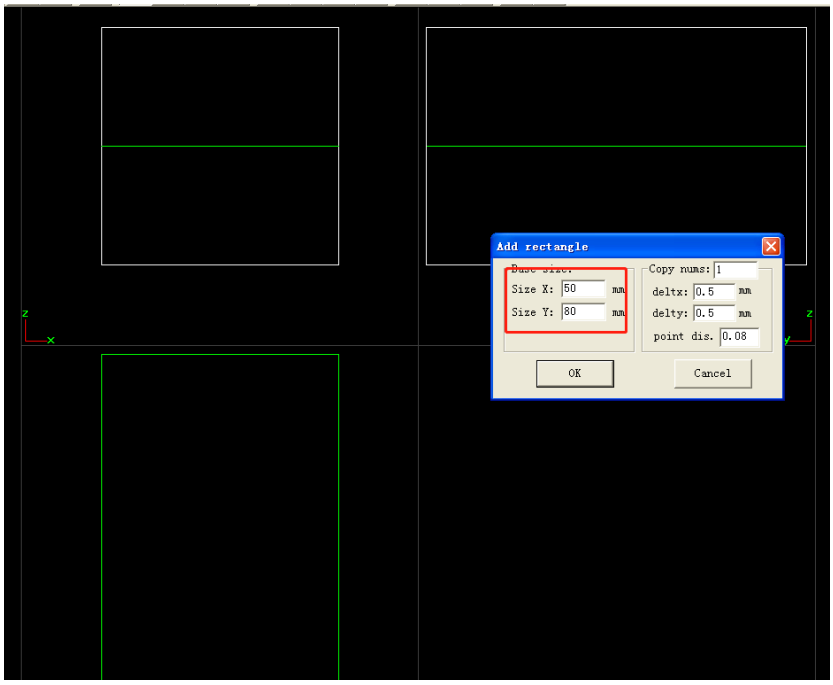
A: Confirm the crystal position by carving a rectangle on a black paper.

1. Put black paper on the platform

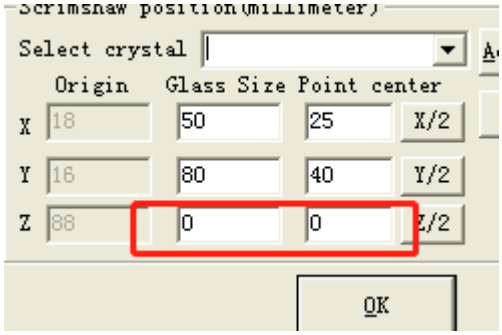


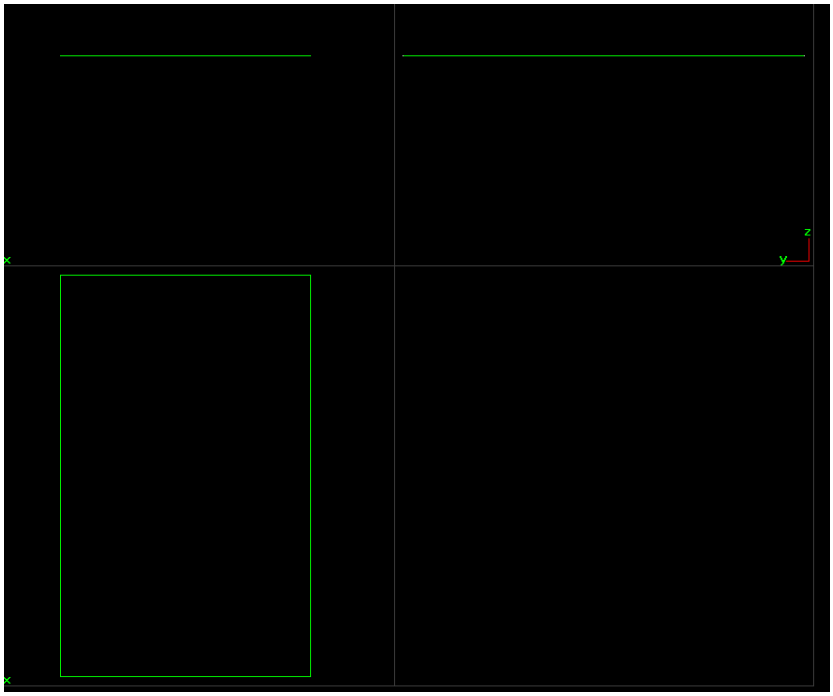
2. Create a rectangle of the same size as the crystal in LaserControl.



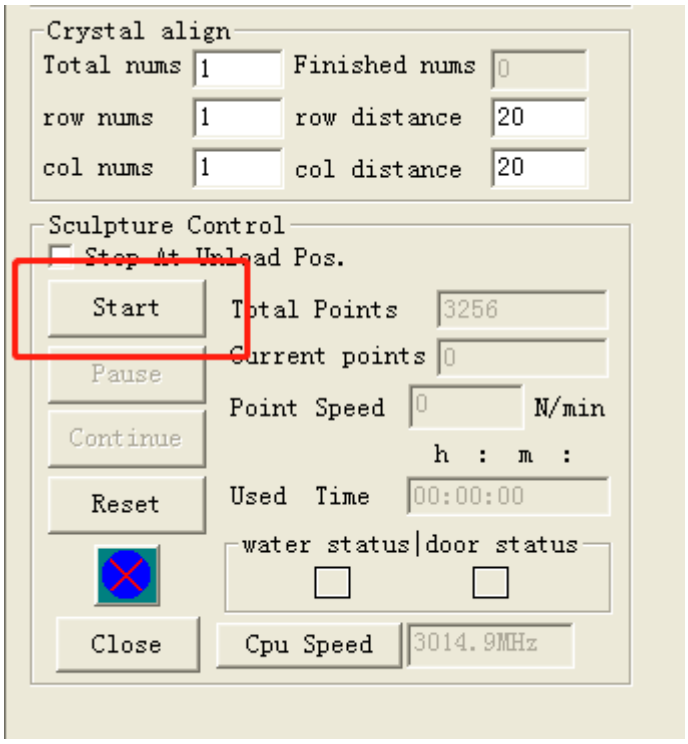
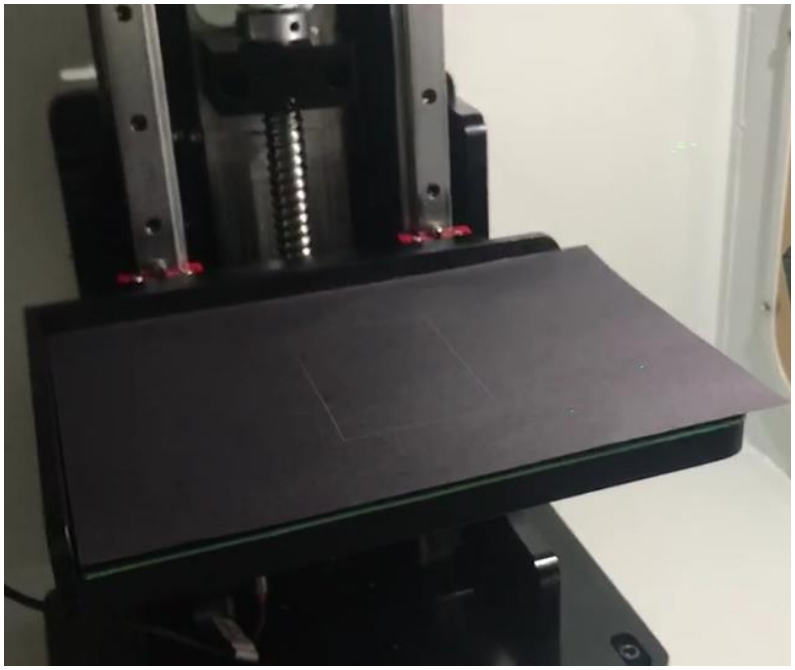


3. Set crystal size Z to 0.





4. Click “Start”



There will be a rectangle on the black paper, which is where the crystal is.