EzCad3 Manual

Thunder Laser

www.thunderlaser.com

tech@thunderlaser.com

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DONGGUAN THUNDER LASER EQUIPMENT CO.,LTD

Dongguan City, Guangdong Province, China

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Chapter1 Introduction

1.1 Brief Introduction

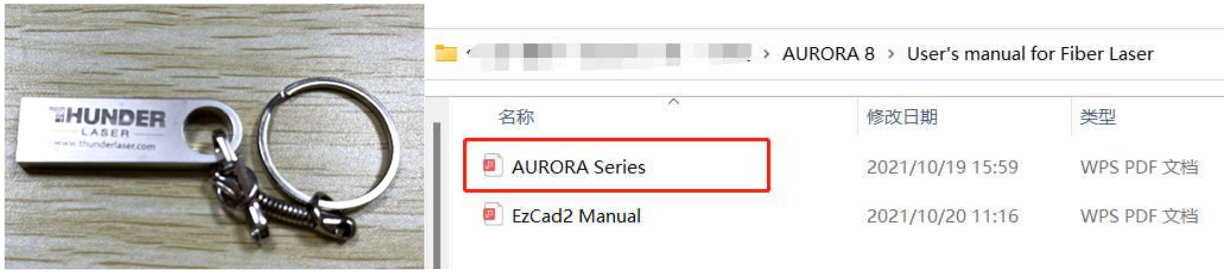
Compared with EzCad2, EzCad3, as the new version, is upgraded as follows: 3D projection, wrapping and layered deep carving; dynamic focusing large-format carving – solving small-format lens segmentation carving seam defects; by selecting different layers through external input ports, the layer is processed, and the multi-layer processing interface is more novel and friendly; the DLC2-M4 card comes with 4-way extension shaft to realize the expansion shaft splicing and feeding function; realize the function of dynamic carving and flight carving for the assembly line.

The standard computer hardware required for the operation of EzCad3 software: dual-core CPU, memory 2G, hard disk 10G, dual native USB interface. The computer system software is Microsoft Windows operating system WIN7 64-bit, WIN8 64-bit and WIN10 64-bit. The default operating system of this manual is Microsoft Windows. Note: It is recommended to choose Professional or Enterprise Edition as the operating system.

EzCad3 software installation is very simple, and users only need to copy the EzCad3.0 directory file on the installation CD directly to the hard disk. Then double-click the EzCad3.exe running software in the EzCad3.0 directory that has been installed. The computer must be authorized before the software runs, otherwise the software will not run normally.

1.2 Software Installation

The Software, Drive and Correction file are in the U-disk that came with the fiber machine. Please install the software driver according to **AURORA Series Manual. The manual is in the U-disk, too.**

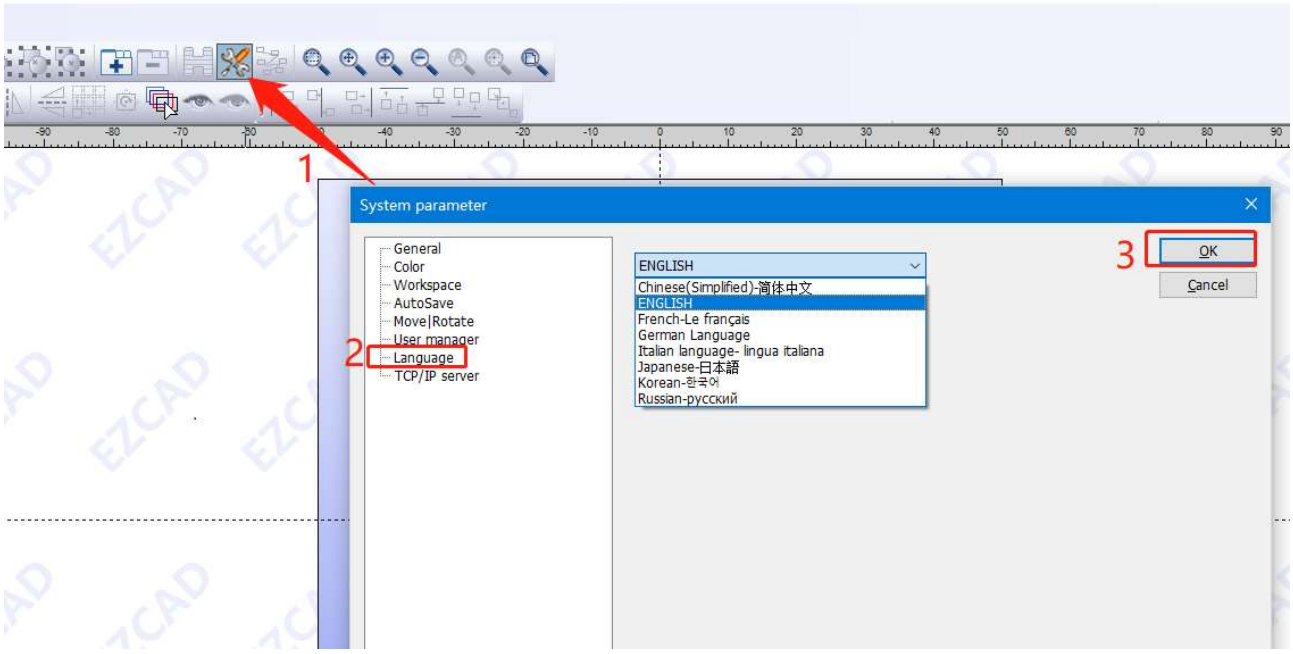


1.3 Language Settings

EzCad3 can be set in 5 languages. About how to change the language when it's needed:

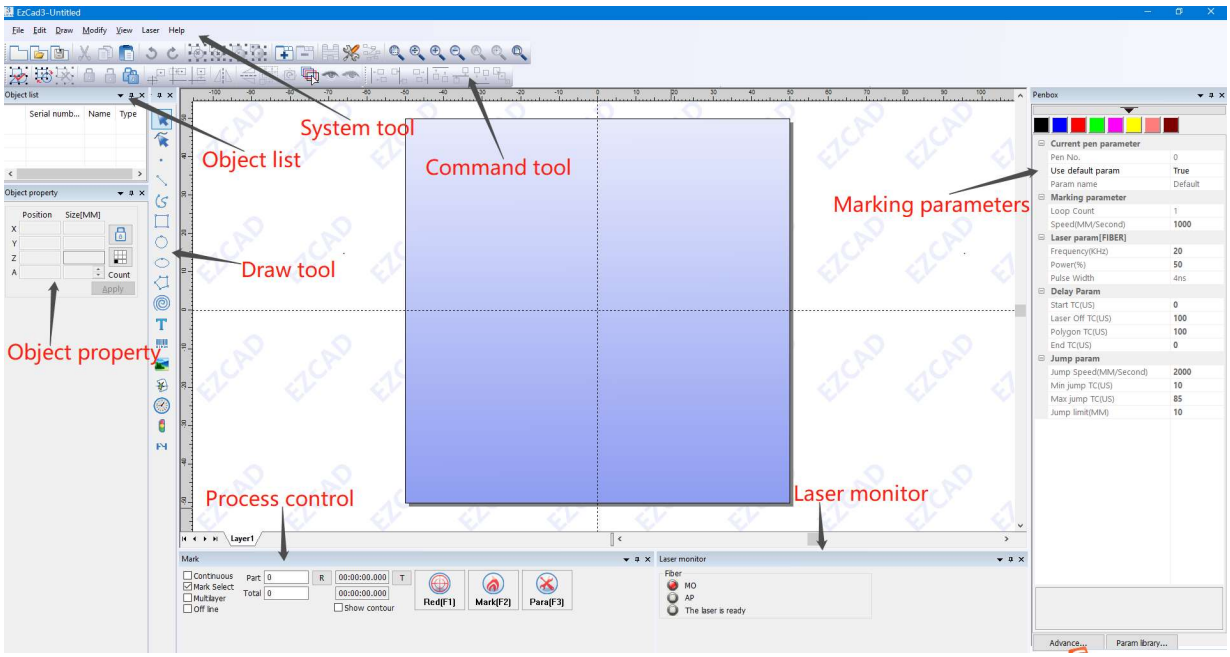
Open the software, File>>System Parameter>>Language, then change the language according to your need.

Note: Users need to restart the software after changing the language.



Chapter2 Main function

2.1 Main interface

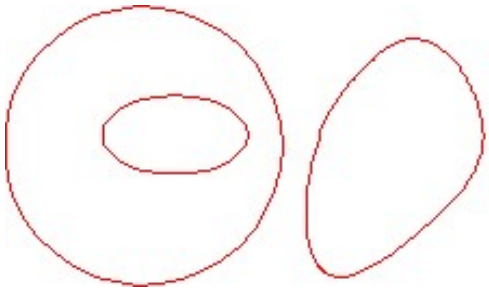


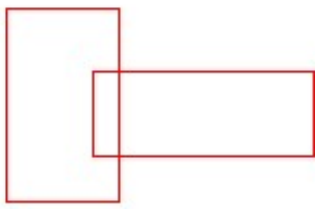
2.2 Main functions

1. Hatch function

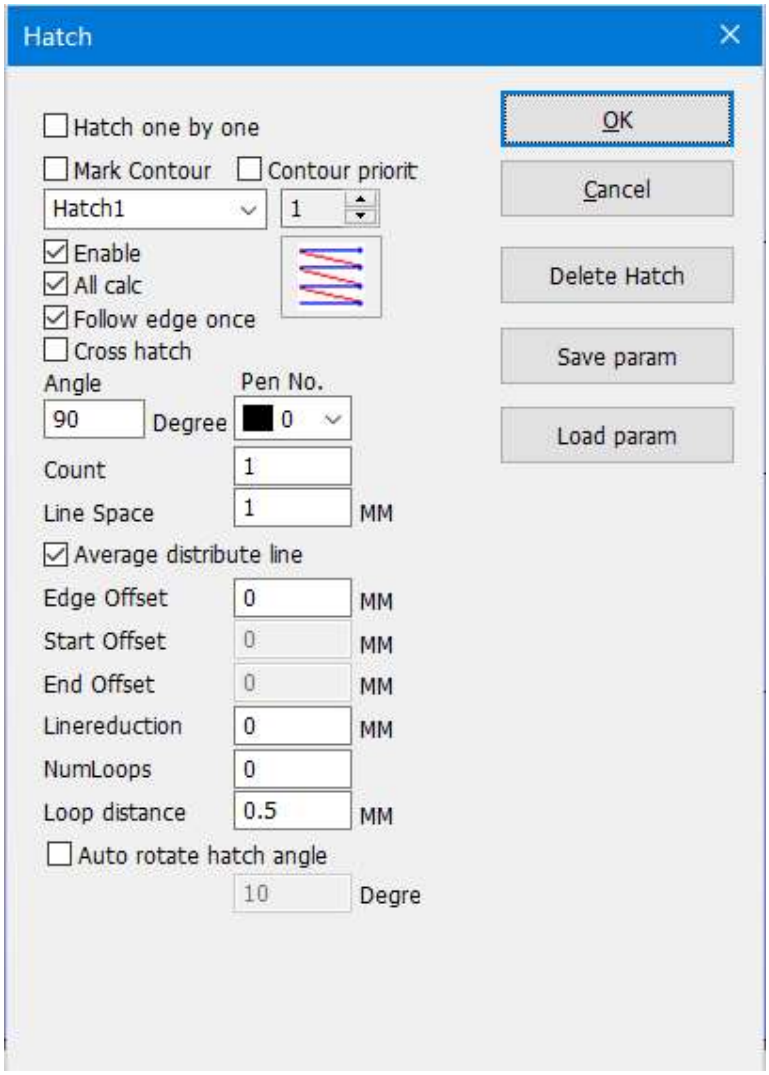
The  —Hatch is used to hatch the current objects. The object to be filled must be closed curve. And if you choose more than one object to fill, these figures can be objects nested mutually. Any two objects cannot have parts intersected.

(Objects on the left can be filled. The two rectangles on the right may cause unexpected result for they intersect each other.





The icon of Hatch in Toolbar is  and when it's clicked, a hatch dialog box like this will appear.



Mark Contour: whether to show and mark the contour of the current object or not, namely, whether to keep the original contour of the object.

Contour priority: whether to mark the contour of the current object first.

Hatch 1-8: Users can hatch one object with eight independent hatch parameters at the same time, each layer of one set of hatch parameter represented by different Pen No.s.

Change the number with the up and down buttons 

, the Hatch number will change

accordingly, then users can set different hatch parameters for objects.

Enable: whether to effectuate the current hatch parameter.

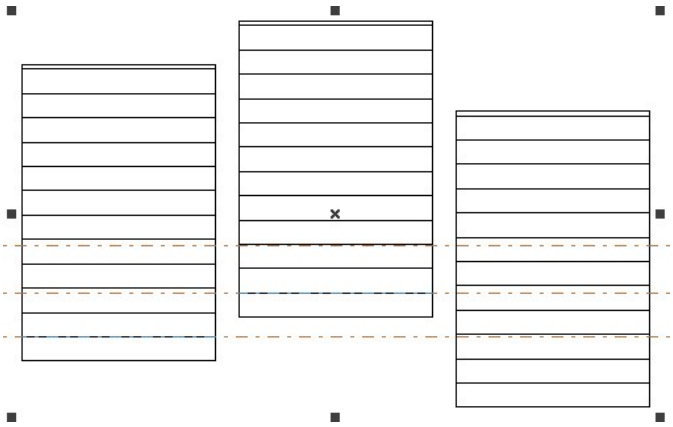
All Calc: Calculate all the selected objects as a whole. This is an optimizing option. In some cases, the speed of marking may be highly raised. It will take a long time to calculate large, complex objects. When not selected, the objects will be calculated separately.

For example: Draw three rectangles, line distance being 1mm and angle being 0.

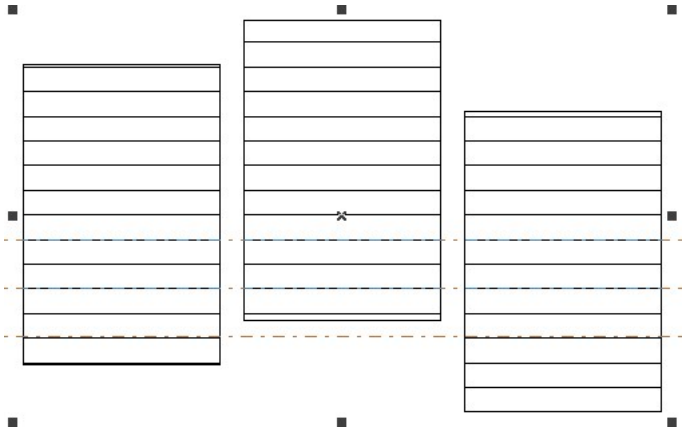
If All Calc isn't selected, the system will mark in the order in object list, namely, mark hatch line in the first rectangle and then mark hatch line in the second rectangle, and so on.

All Calc Selected, mark all the hatch line at one time, namely, mark all the hatch that on the same line.

Marking result is shown as following:



If All Calc isn't selected, the hatch lines will not be in the same line.



If All Calc is selected, the hatch lines will be in the same line

Follow edge on: Marking the edge of image.

Cross hatch: Change into a different angle every time when one hatch is finished.

Type of Hatch: (Figure Types of hatch)

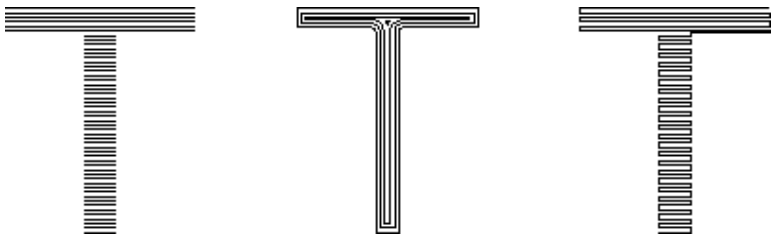
Unidirectional hatch: The hatch lines will be marked from left to right.

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

Ring-like hatch: The object will be hatched from the outside to the inside like a ring.

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

Click the button, and the mode will be switched among the unidirectional, bidirectional, and ring-like hatch.



Types of hatch

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

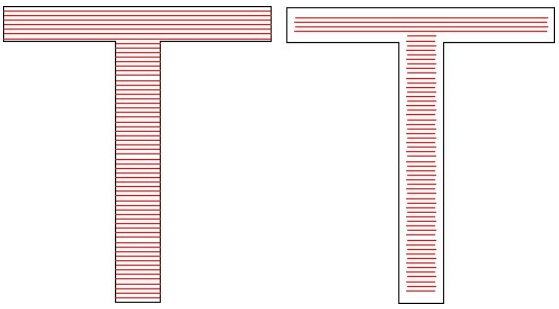
Dashed Hatch：Hatch fills the object with perforated hatch lines. The difference is that the system will skip in null place.

Optimization two-way hatch Dashed hatch

All of the five types above can be changed by clicking the button  , click it according to different situations.

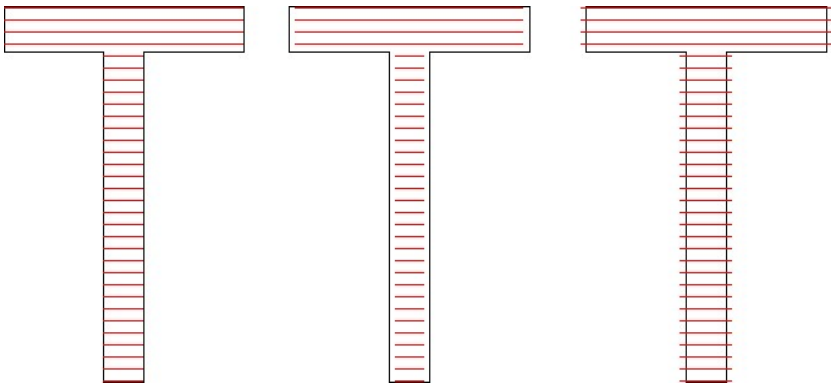
Delete Hatch: To delete what has been hatched.

Line Space: the space between two hatch lines



Edge offset: The distance between hatch lines and the outline of the object (see the figure below).

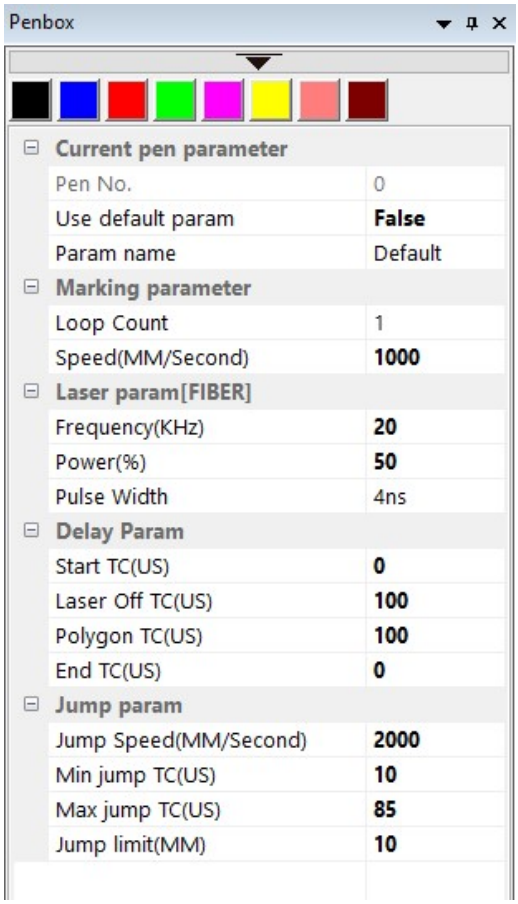
Linereduction: The indentation at both ends of the line. (see the figure below).



The left figure is the object when the Linereduction is 0, the middle figure is the object when the Linereduction is 0.5, and the right figure is the object when the Linereduction is -0.5.

2. Marking parameter

At the right side of the main interface, this parameter shows some settings about the marking project, you can change the parameter and color of the project, e.g. Speed, Current Frequency, Power, etc.



Color: The color of the current pen.

Use the default param: False means the user can set marking parameter for current file. True means the file will marking with default parameters.

Loop count: The loop times to mark an object.

Speed: The current marking speed (the adjustment range is 0-2000mm/s)

Power: The current power. (the adjustment range is 1-100%)

Frequency: The frequency of the laser machine in the current marking parameter.

Start TC: When the scan head has to execute a mark command, the scanner mirrors first have to be accelerated up to the defined marking speed. At the beginning of the movement, the laser focus moves very slowly, which may result in burn-in effect at the start point. To avoid this, we insert a delay (Start

TC) at the beginning of each mark command. When the laser eventually turns on, the mirrors have already reached a certain velocity. However, if this value is too large, the first part of the vector will be cut off. And negative value is supported.

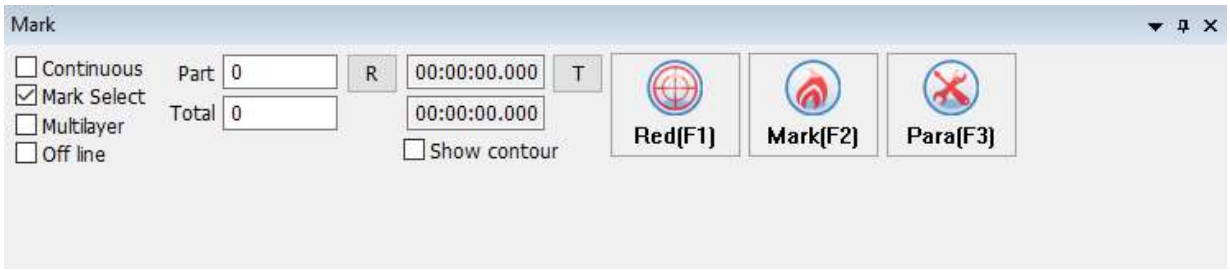
Laser Off TC: The delay time of the laser shutting down after finishing marking. Proper time can wipe off the burn-in effect at the end. This value cannot be negative.

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

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

3. Mark Control Bar

The Mark-Control Bar is located at the bottom of the main interface window, as Figure Mark-Control Bar shows.



Mark-Control Bar

Red: This item is used to mark the frame of the object without laser output so that it's convenient for users to orient the workpiece. This function is available in those laser machines which have guide light. Key –F1‖ is the shortcut key of this function for guide light to show.

Mark: Start marking. Key –F2‖ is the shortcut key of this function.

Para: Machine parameter. Key –F3‖ is the shortcut key of this function.

Continuous: Mark the current objects until the user stop marking.

Mark Selected: Only those selected objects would be marked.

Part: The total counts that the mark command has been executed.

Total: The total counts that the mark command should be executed. The value would decrease by 1 automatically after the mark command has been executed each time. It is unavailable under the mode of Continuous Marking. During the marking process, if the amount number is more than 1, the marking operation will not stop until the marking number is 0.

Chapter3 Calibration procedure

Note:

1. Before leaving the factory, we have done a correction test for each machine and import the calibration file to fiber software, so the customer does not need to calibrate again.

2. Different field lenses have different calibrate files and cannot be used generally.

3. If other field lens with the fiber machine is purchased, we will prepare the calibration file and put it in the U disk, too.

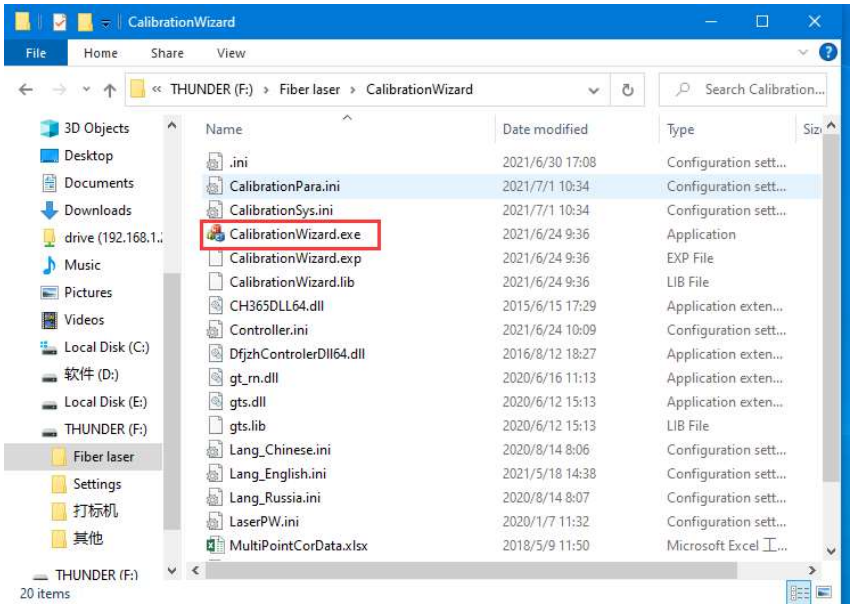
4. If you purchase other field lens after the machine has left the factory, contact us to get the calibration file.

5. The calibration order is 3*3, 5*5, 9*9.

If you think the actual size is incorrect, you can recalibrate again.

3.1 3*3 Point Calibration

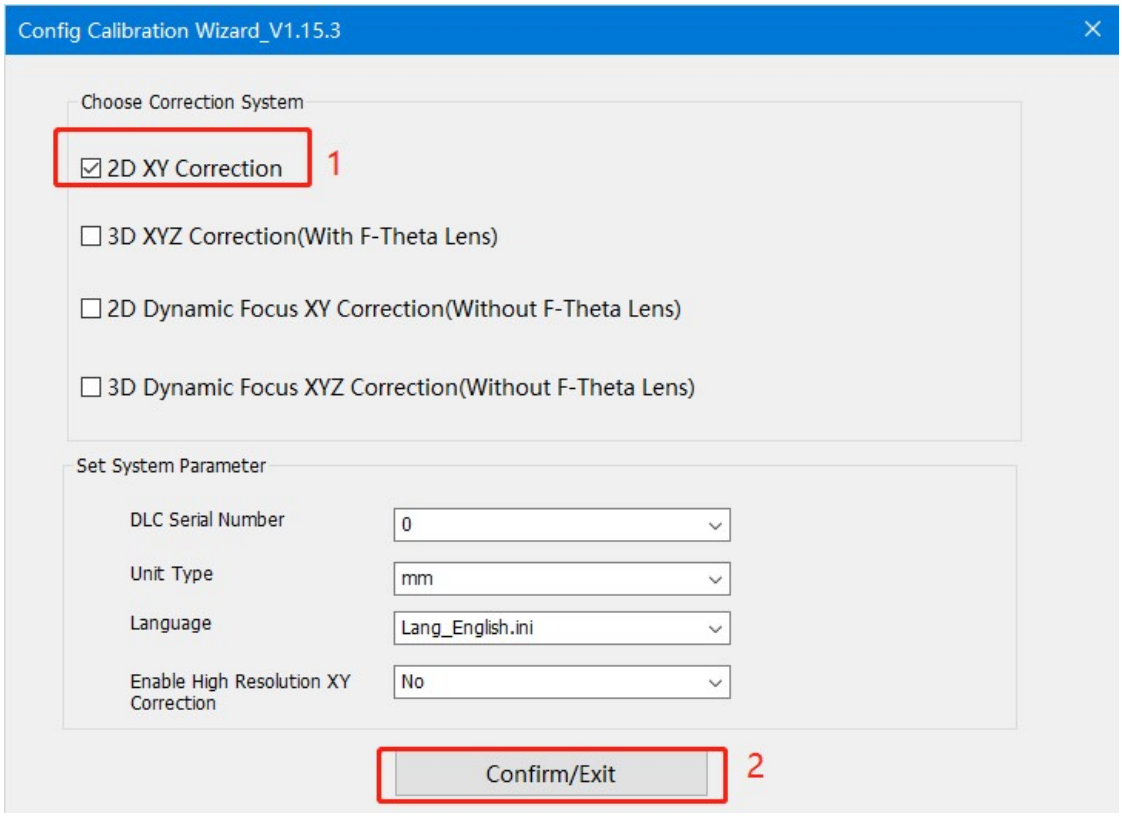
(1) Connect the fiber laser and computer, and find the correction software CalibrationWizard.exe. Users simply need to copy CalibrationWizard folder that is in the Install FOLDER to hard disk, and then double click the CalibrationWizard.exe under the CalibrationWizard's directory to run the software.



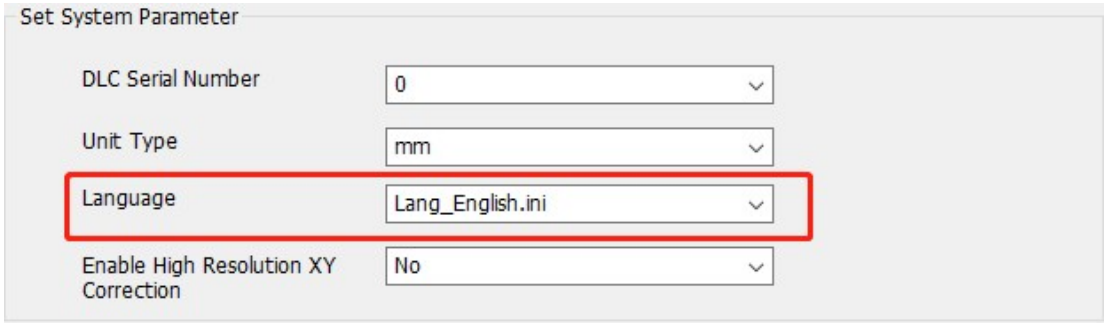
1. The calibrate software is in the software folder.

2. The paper used for calibration is special, it is recommended to buy some as a spare when purchasing the machine.

(2) Choose 2D XY Correction and click Confirm/Exit button.



You can change the language in this page.



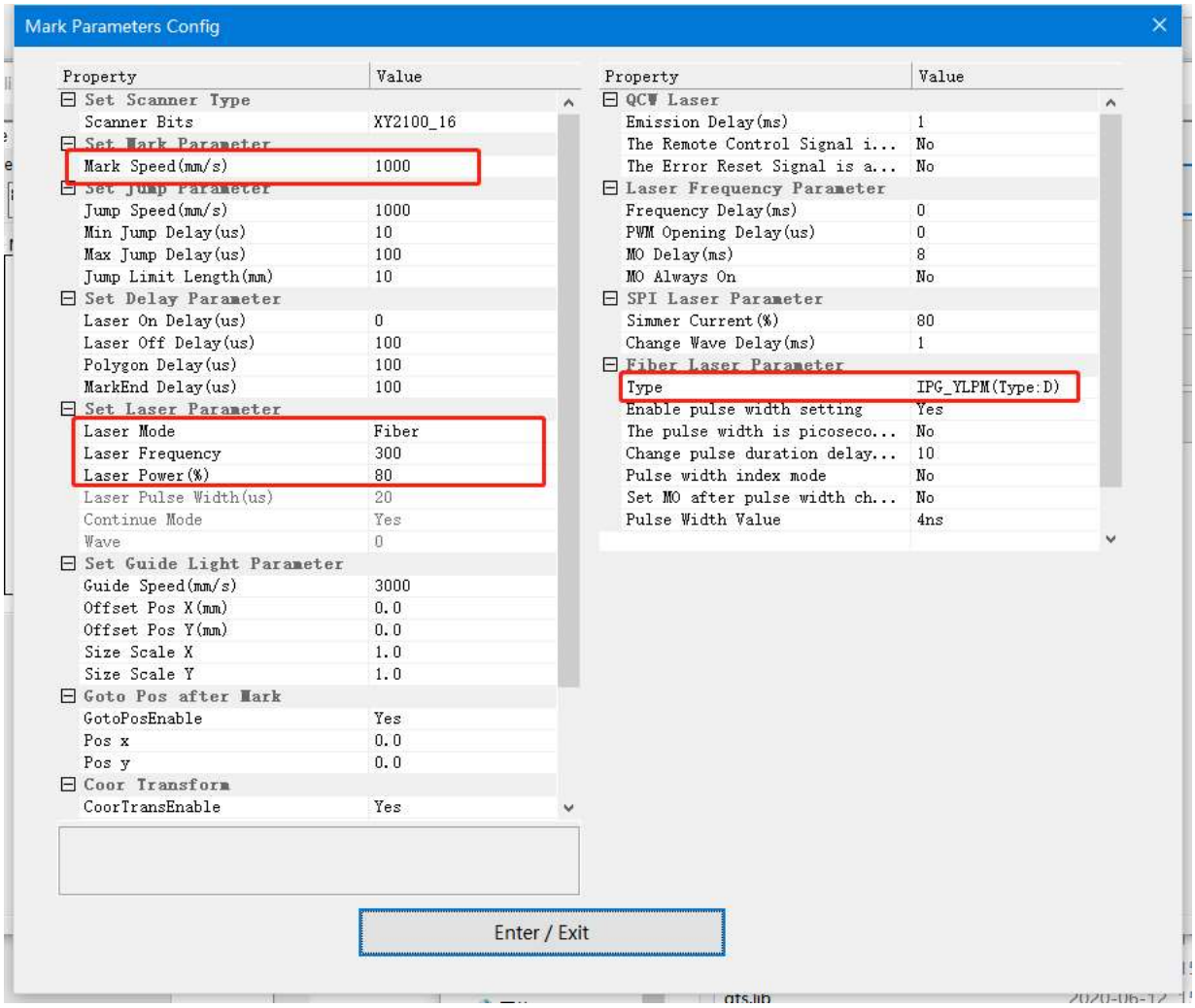
(3) Press "Common function" >> "Set Mark para", users only need set two parts: "Mark parameter and Laser parameter". See the picture below

Mark speed: 1000mm/s

Type: IPG_YLPM(Type:D)

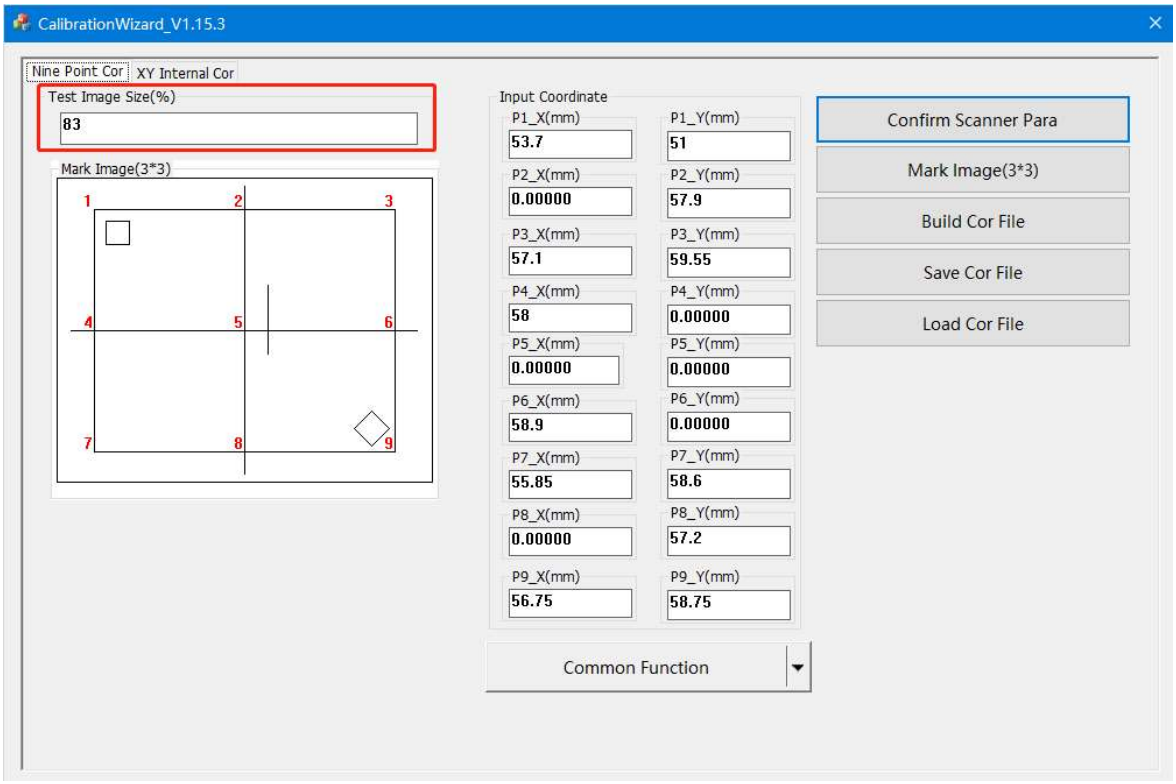
Laser Frequence:300

Laser power (%):80



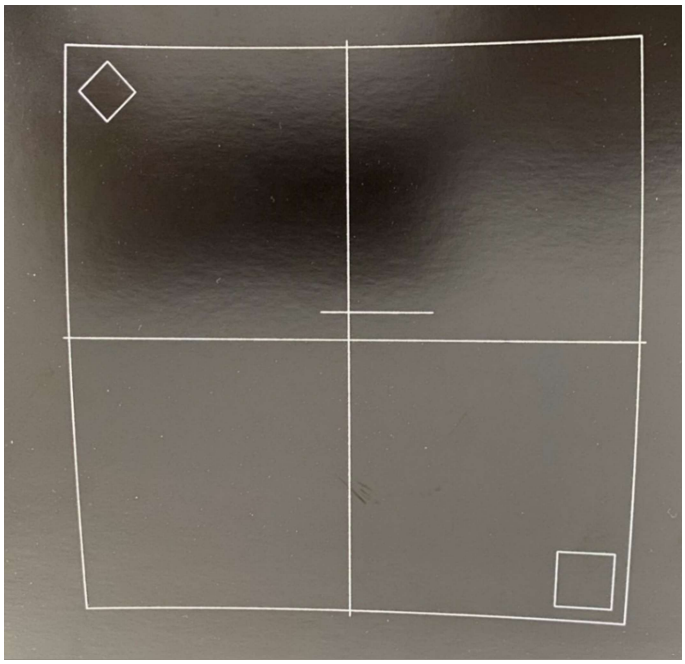
(4) Input the "Test image size (%)", enter a number. We have data for reference:

F-160	F-210	F-290
83%	85%	88%



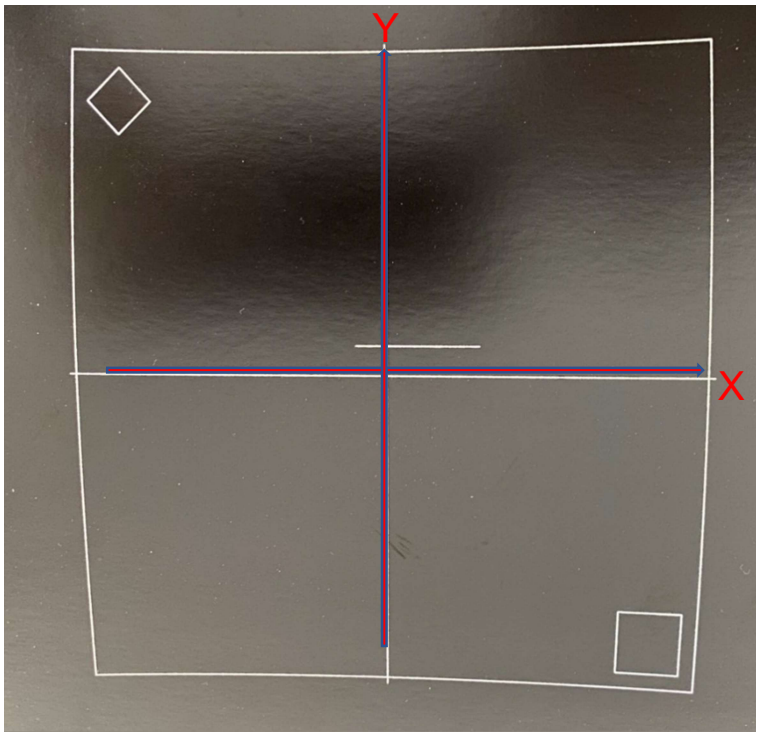
(5) Put the black-coated paper on working table, please make sure it's flat, and then press "Auto focus" button of the machine.

(6) Press Mark Image(3*3), then you can see a square is marked on the black coated paper. See the picture below.



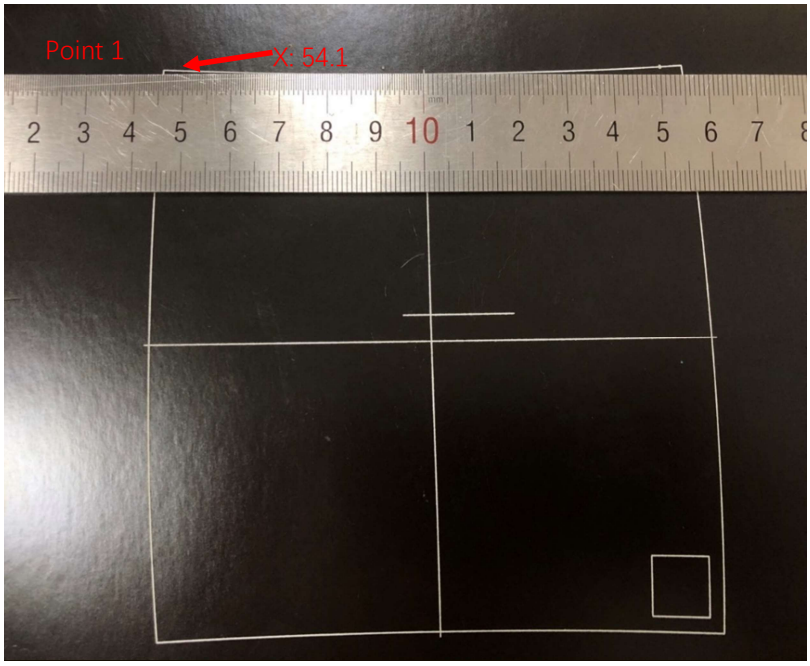
(7) Measure the size of the image, the sizes of different filed lens are different. F-160 should be 110*110 mm, F-210 should be 150*150 mm and F-290 should be 200*200mm. If the actual size is too small, increase the number. If it's too large, decrease the number.

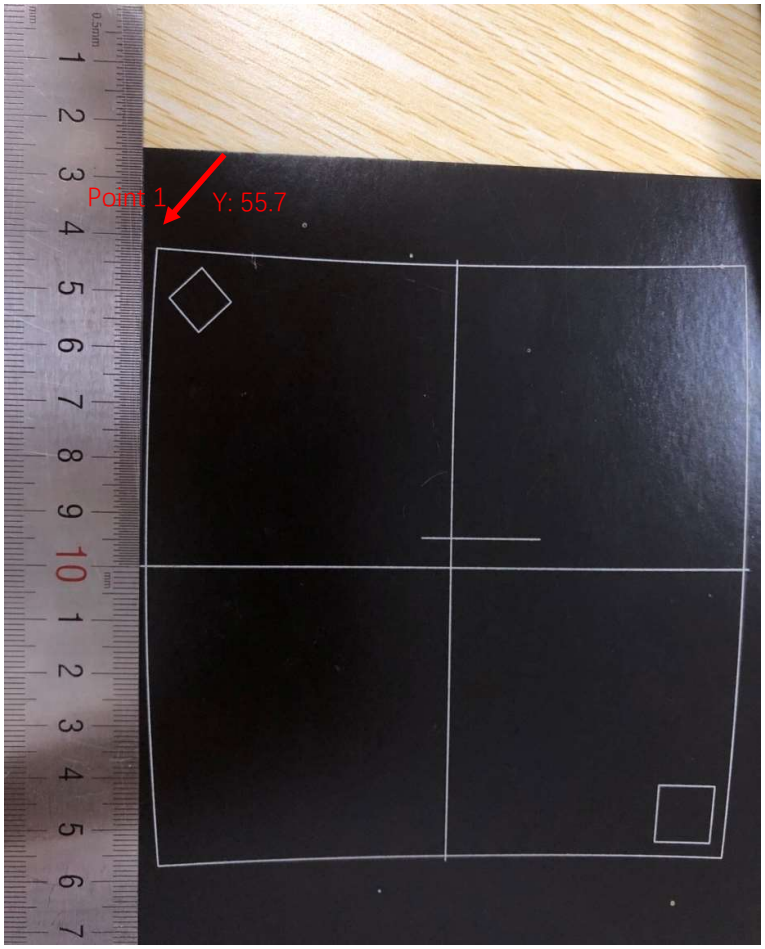
(8) If the actual size is very close to the maximum size, please measure the coordinates of all points. Take the two straight lines in the middle as X and Y coordinate axes. And measure the coordinates of point 1,2,3,4,6,7,8,9. Centered on point 5(0,0). Use a ruler to measure the coordinates of each point on the black photo paper, and take the absolute value (accurate to the decimal point)



For example:

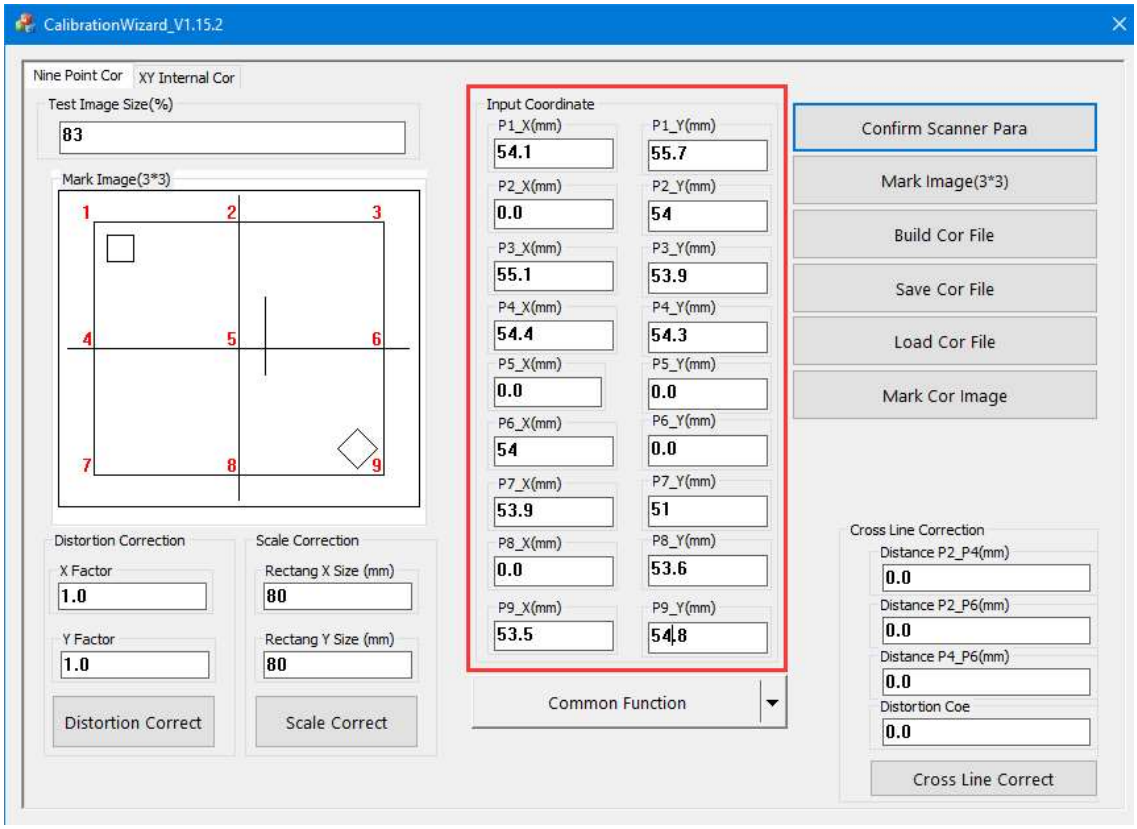
The coordinate of point 1 is(54.1,55.7). Measure other points in the same way.


Point 1
X: 54.1

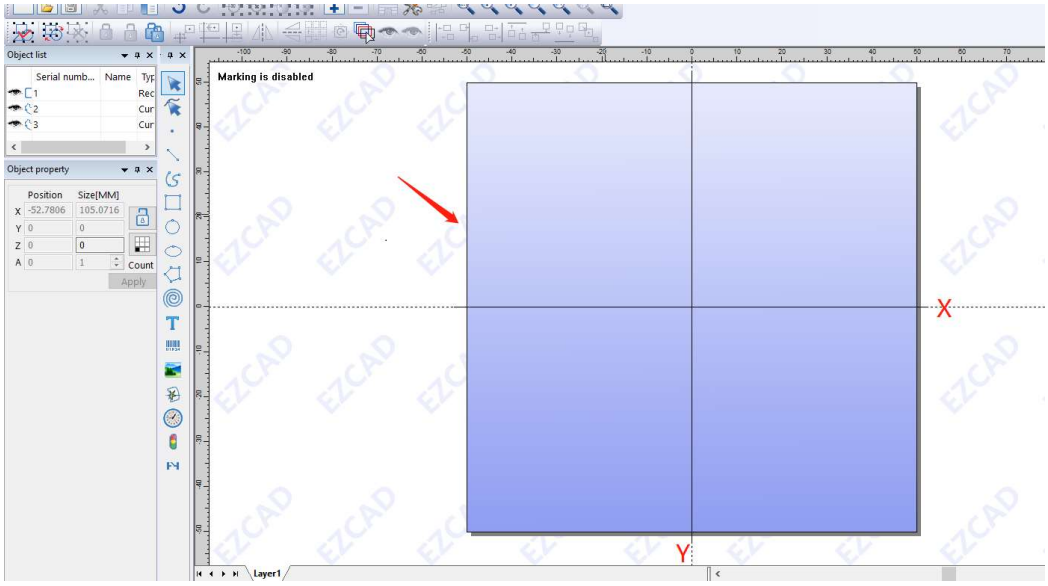

Point 1
Y: 55.7

Note: In order to avoid excessive error of Y-axis coordinate during the measurement, please rotate the photo paper and measure the Y-axis coordinate of point 1 in the horizontal direction.

(9) Fill in the corresponding coordinate column of the dialog box. After finishing, put a new black paper jam/coated printing paper on the work area.

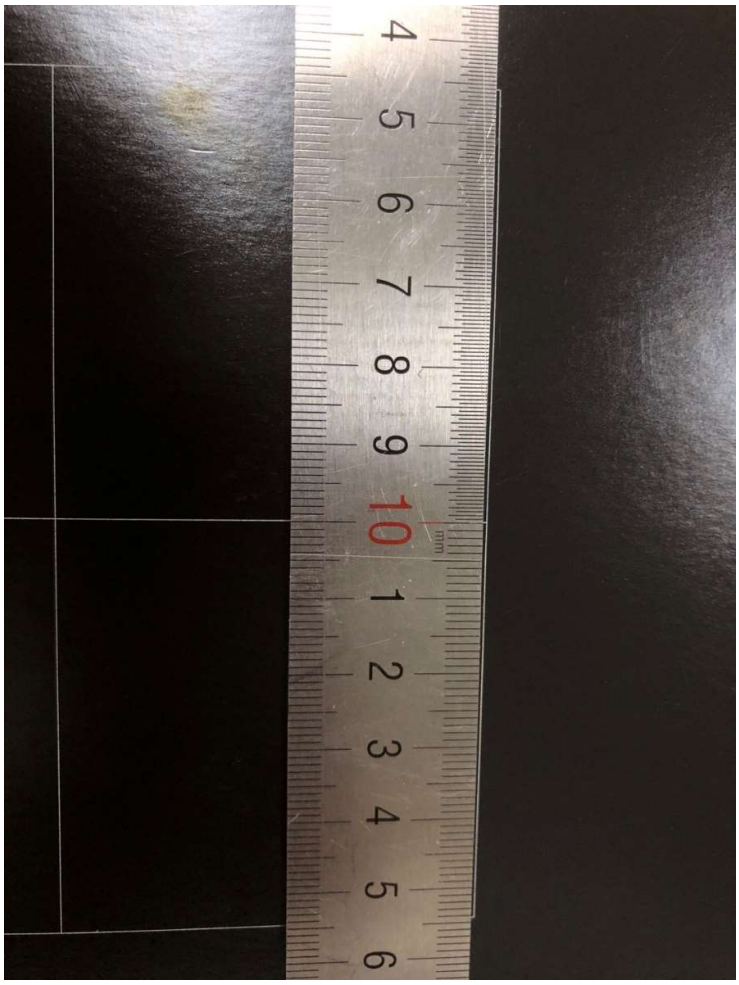


(10) Then start the fiber software EzCad3 and draw a square(F-160,110*110mm square, F-210, 150*150mm, F-290, 200*200mm square), see the picture below:



(11) Put a paper on working table, click "Red(F1)", the machine will show a red area, adjust the position of paper according to this area, then click "Mark(F2)".

(12) Then measure the size of square to see if it's correct.



（13）If the size is correct, no further calibration need to be done. If not, please see the details below about how to adjust further.

The distance on both sides of the square should be 55mm.

For this case, if the distance of the X axis of Point 1 is 55.05mm, it means the X coordinate value of Point 1 needs to be increased.

For this case, if the distance of the Y axis of Point 1 is 54.5mm, it means the Y coordinate value of Point 1 needs to be reduced.

Now we can modify the coordinates of Point 1, the coordinate of Point 1 is (54.1, 55.7),

Go back to the calibration software, we can reset the coordinate of Point 1 to (54.4, 54.7).

Note:

If the distance of X or Y axis of some point is equal to 55mm, it means the X or Y axis of this point needn't be adjusted.

The larger the error magnitude, the more the value you need to increase on the original basis.

The smaller the error magnitude, the less the original value needs to be increased.

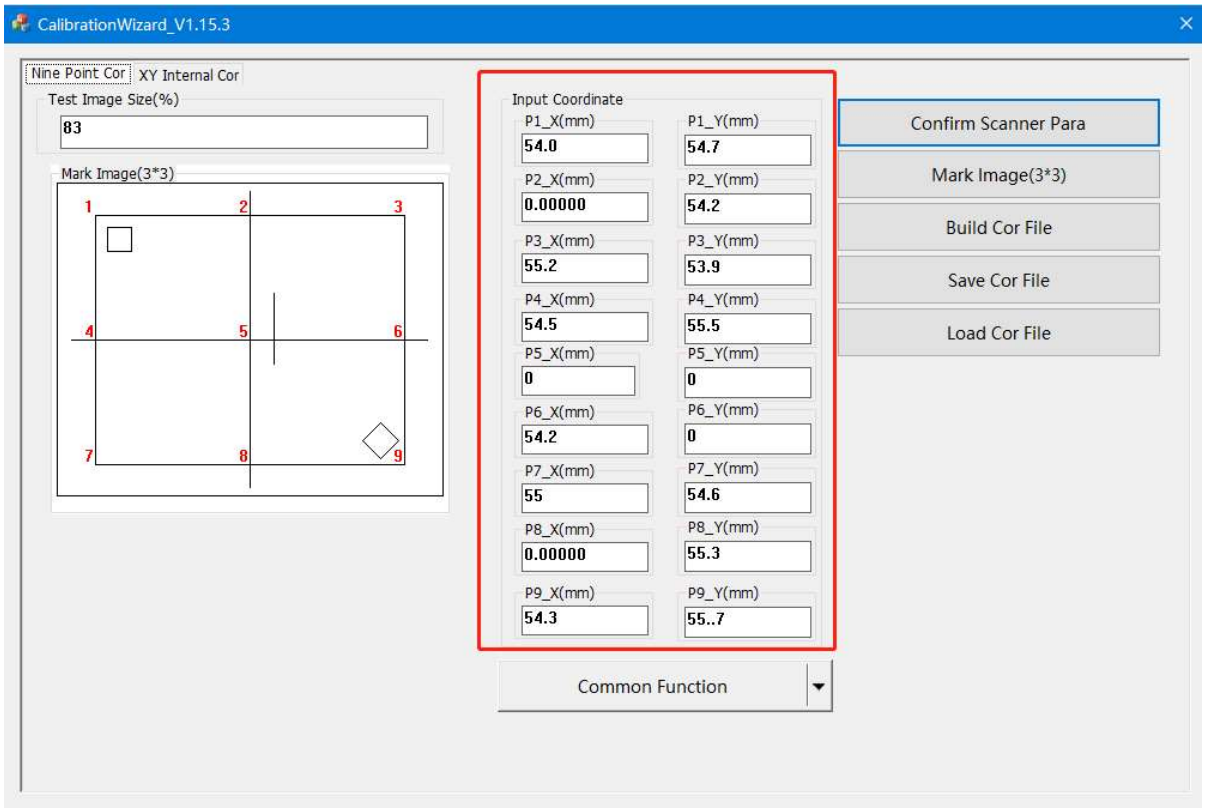
For example:

If the distance of Y axis of Point 1 is 57mm, it means the Y coordinate of Point 1 need to be adjusted, you can set it to 56.

If the distance of Y axis of Point 1 is 53mm, you can try to set the Y coordinate of Point 1 to 54.7.

（14）Measure the nine points of this square, and record all the distances (including Y and X axes).

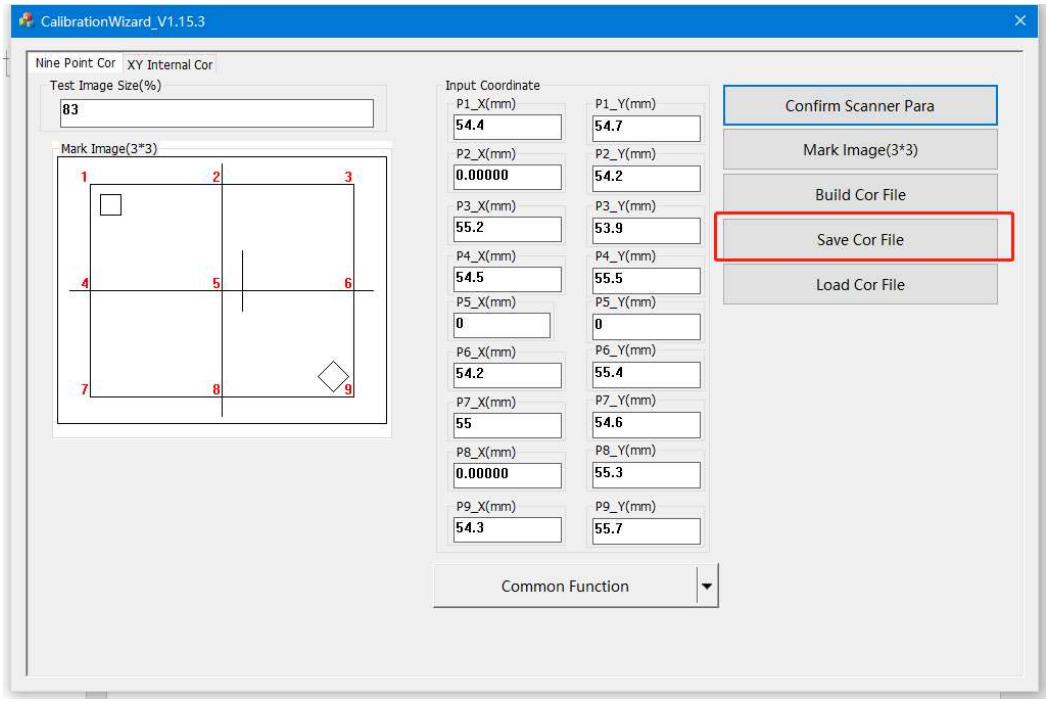
（15）Then modify the coordinates according to the distances that you have recorded in steps above.

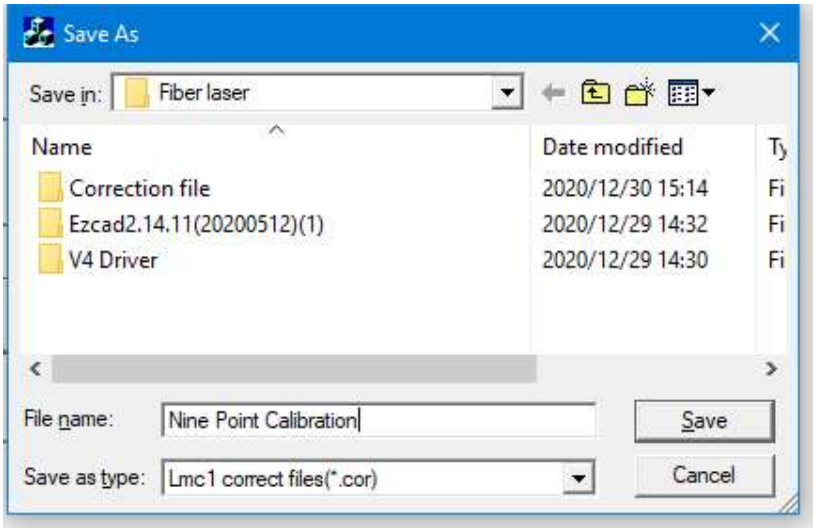


（16） After that, please put a black paper on the work table.

（17）Then press "Mark Image(3*3)" , the fiber laser will mark the calibrated square again. And repeat step (5) to step (15). If the size of square and distance between the squares are correct, you can move to the next step.

(18) When the size is correct, you need to save the calibration file. Click "Save Cor file", and the following dialog box will appear. Please specify a file for the file name, otherwise it will fail to be saved, such as "Nine point Calibration". Be sure to remember the file directory location.





（19）Then start the EzCad3 software and import the calibration file you saved.

3.2 5*5 Point Correction

Note:

1. If you think the 3*3 point calibration is not accurate, you can choose the 5*5 point calibration.

But you should have done 3*3 point calibration, then you can do 5*5 point calibration.

2. Or you can import the 3*3 cor file in the U-disk that came with the machine. After that, you can do 5*5 point calibration directly.

3. For F-160, 210&290, 9*9 point calibration is used. We have saved three calibration file in the U-disk that came with the machine. You can use them directly.

Steps:

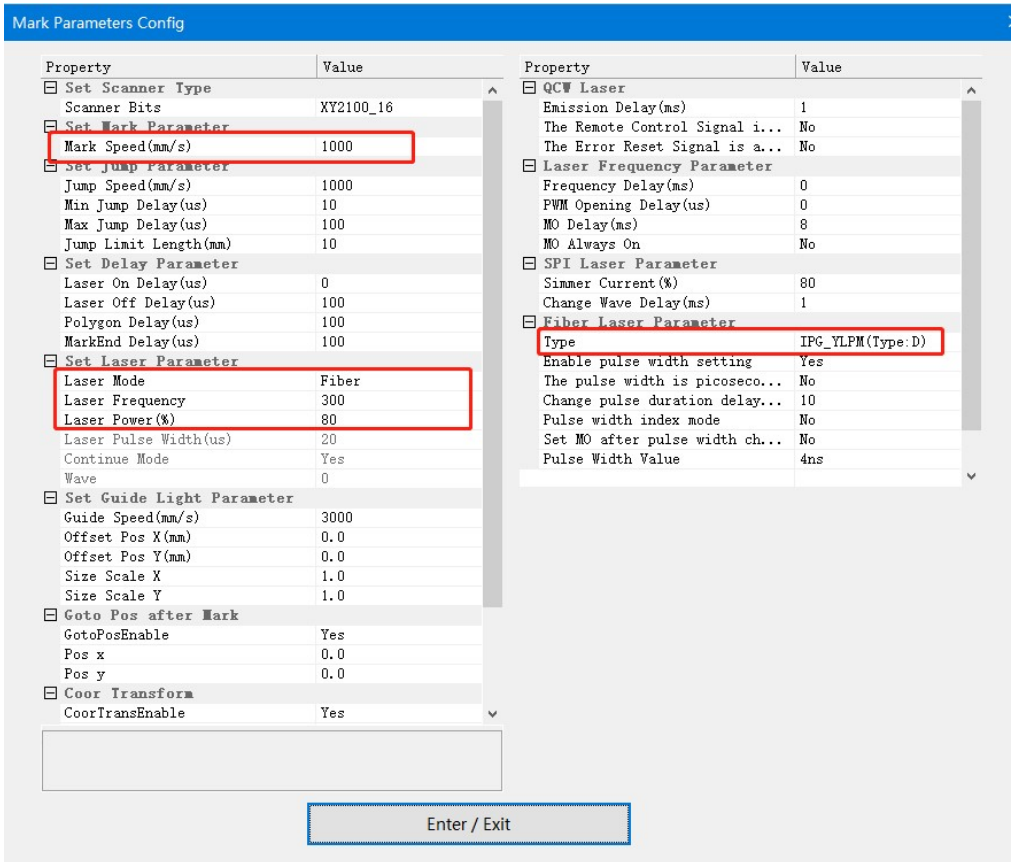
(1) Set Mark Parameter

Mark speed: 1000mm/s

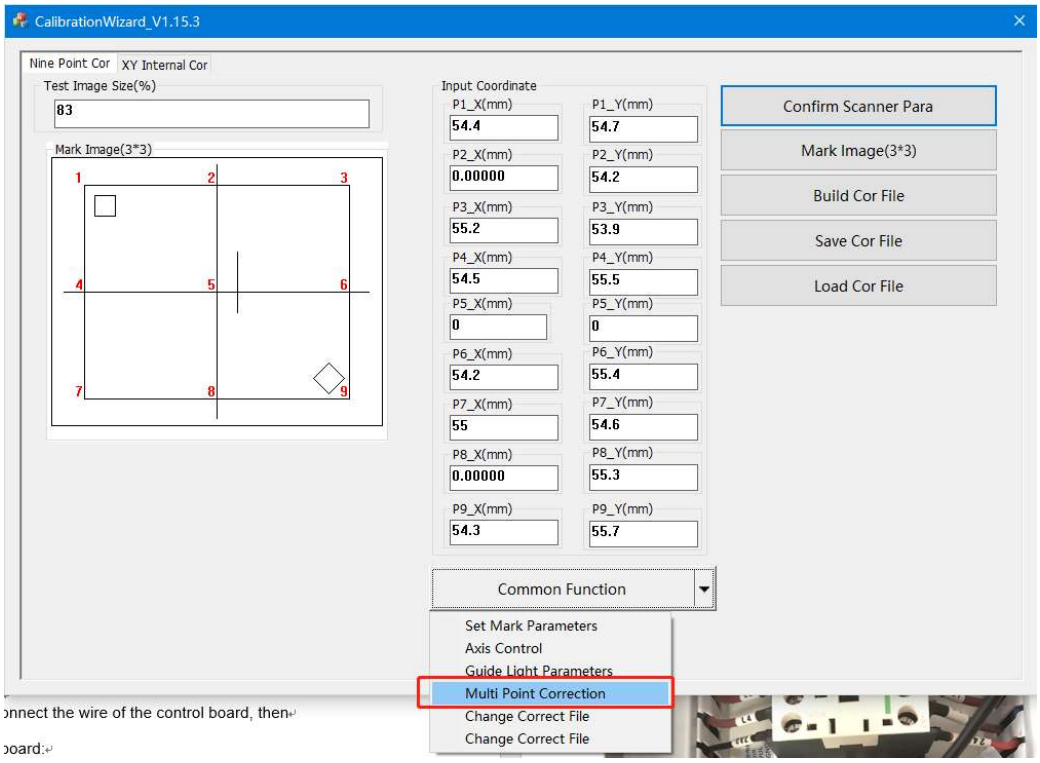
Type: IPG_YLPM (Type: D)

Laser Frequence:300kHz

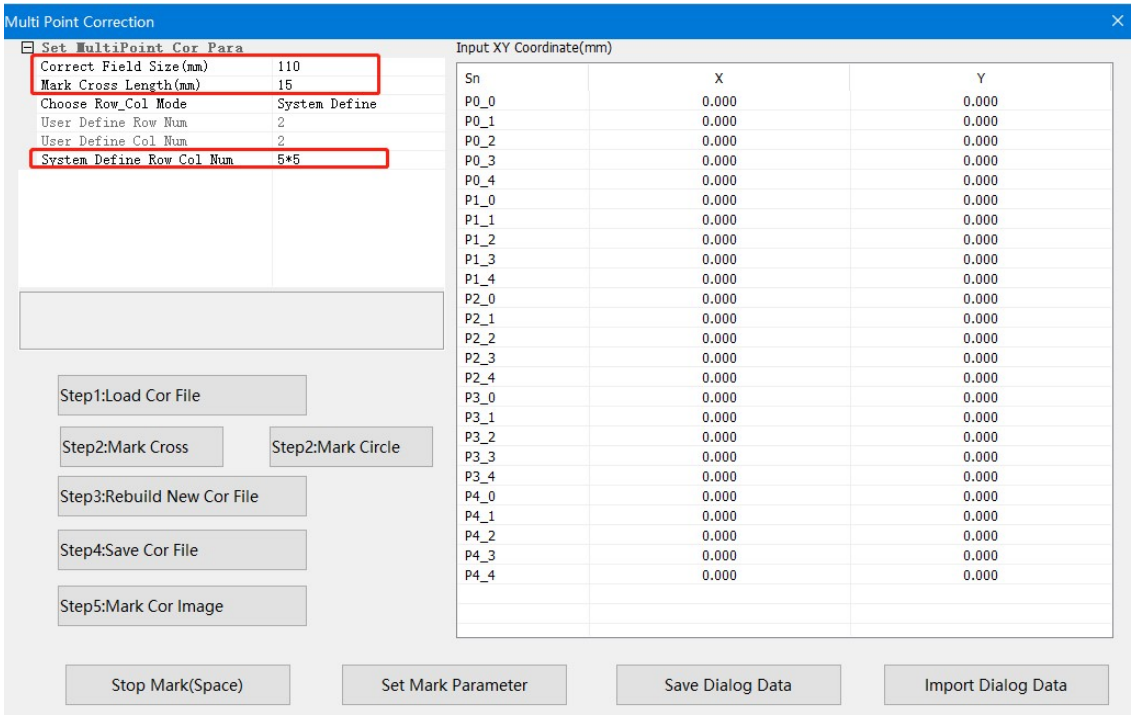
Laser power (%):80



（2）Start the calibration wizard software>>Common Function>>Multi Point Correction.



(3) Set the "Correct Field Size(mm)". Take F-160 as an example, set it as 110. And set "Mark Cross Length(mm) as 15, set "System Define Rov Col Num" as 5*5, other settings needn't to be changed.

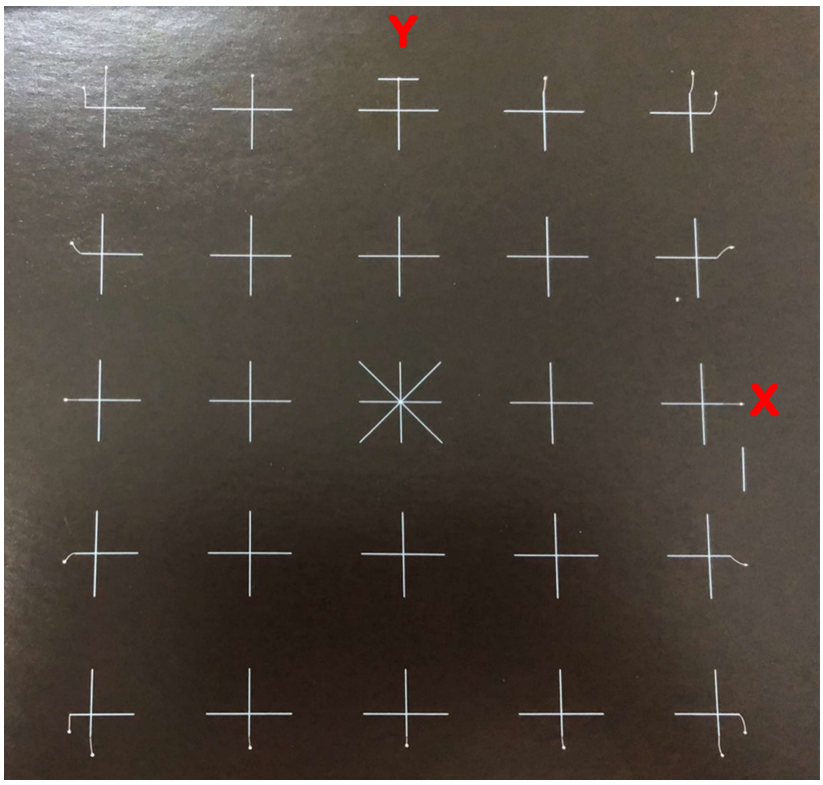


(4) Then click Step1: Load Cor File, load the 3*3 point calibration file you saved before.

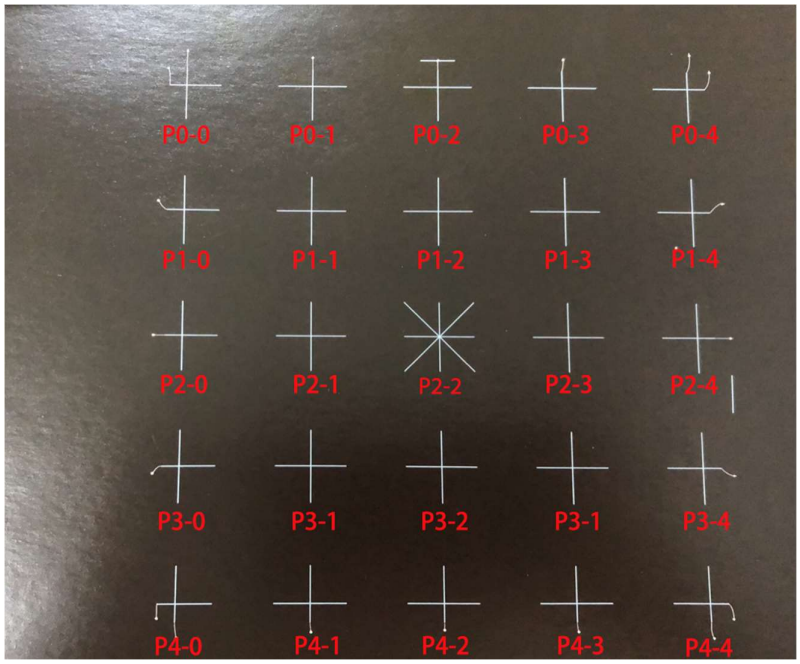
(5) Put a black-coated paper on the working table and make sure it's flat.

(6) Click Step 2 Mark Cross, then the fiber laser will mark an image (25 points), see the picture below.

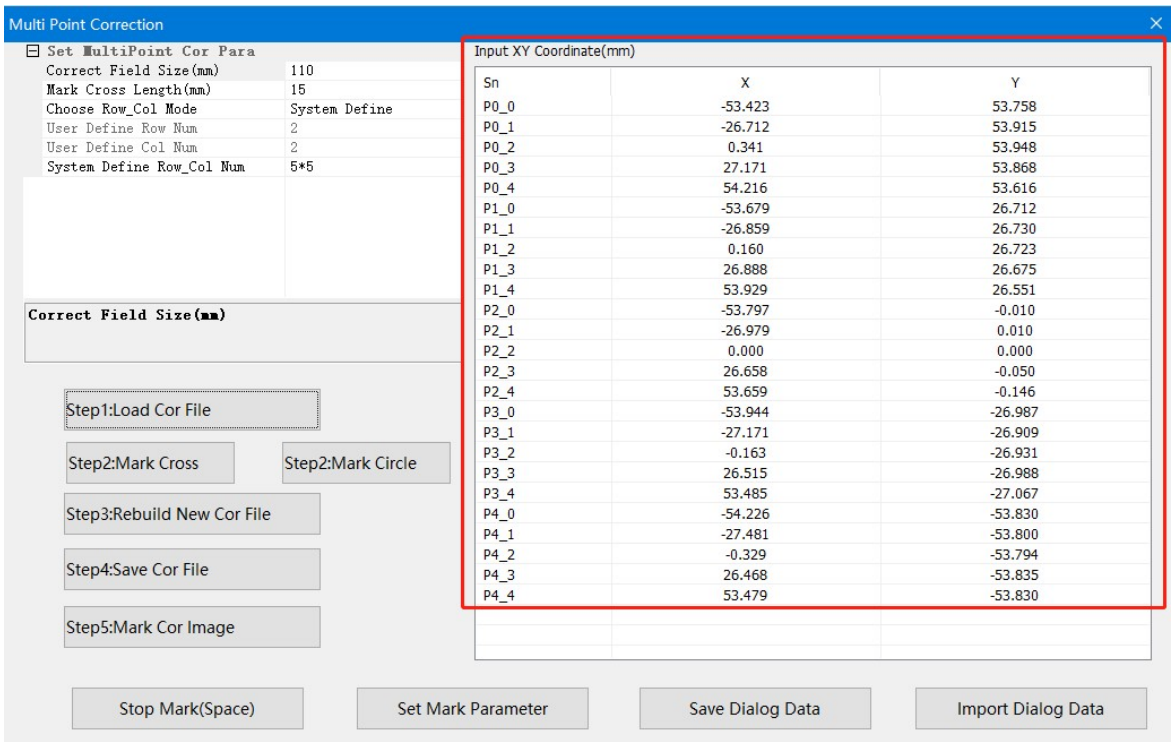
Please remember the direction of X axis or Y axis.



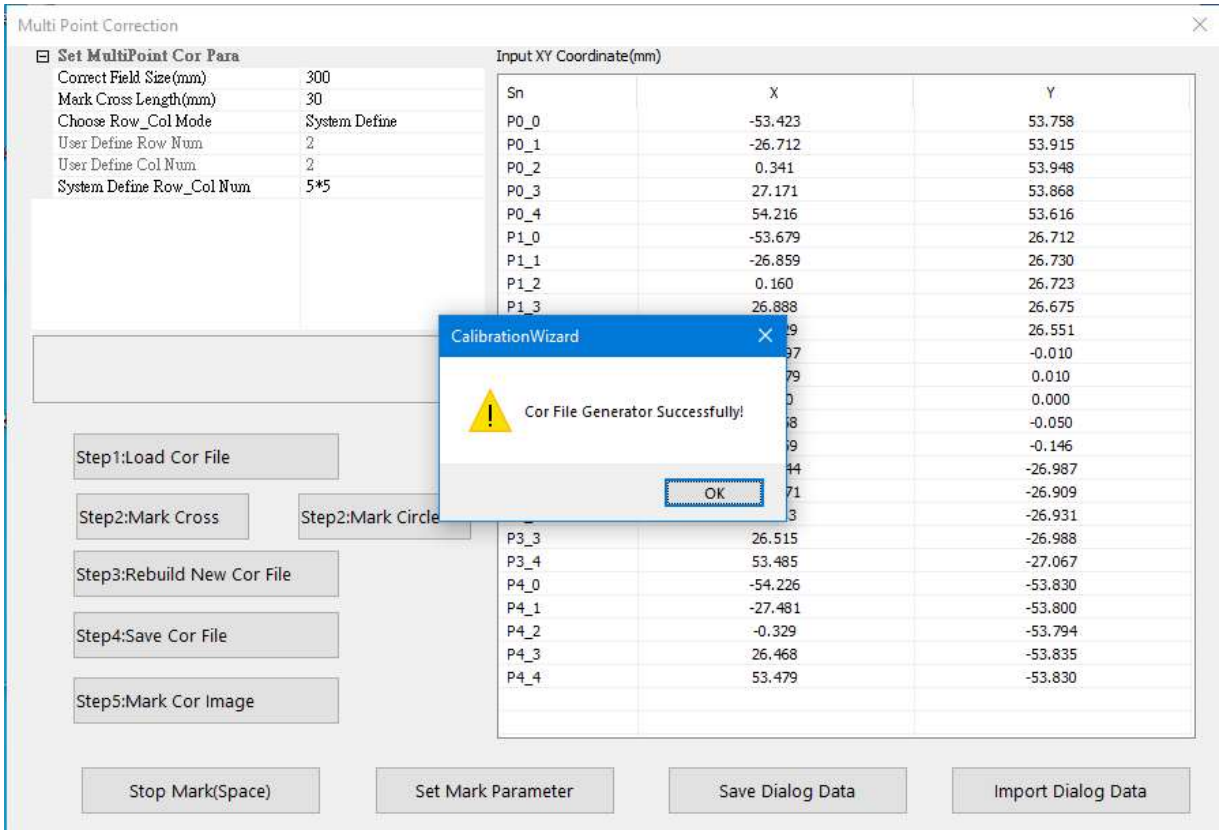
（7）Then measure the coordinates of all points. The P2-2 is the origin, coordinate being (0.0). Then name of 25 points is marked, see the picture below.



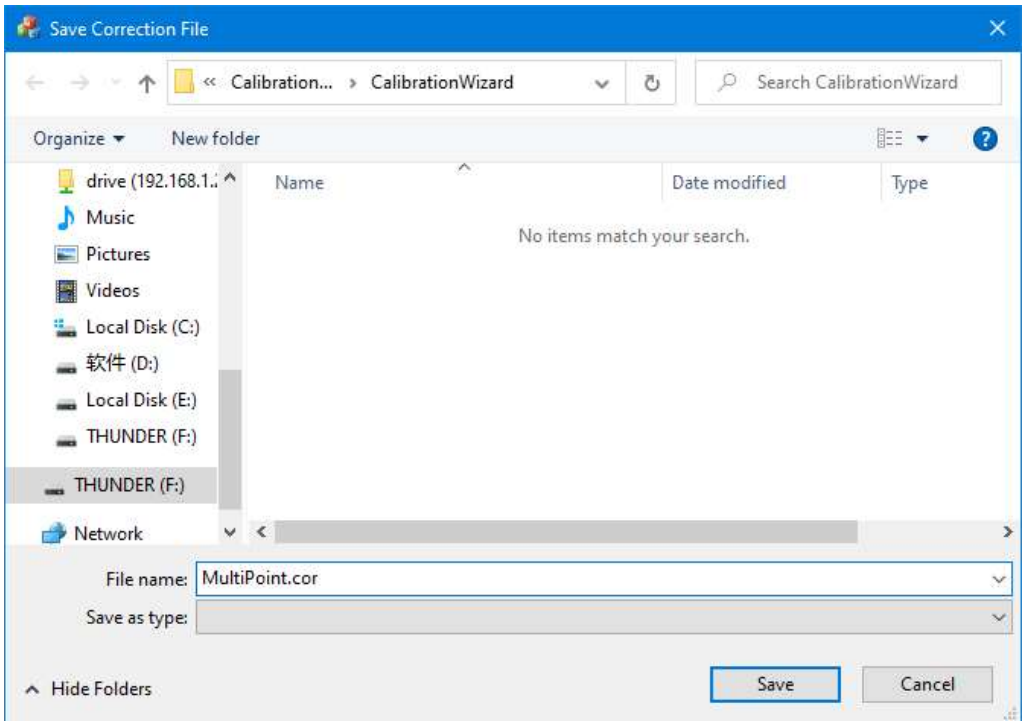
(8) Input all coordinates in the software. Do not forget to enter the minus sign of coordinates.



(9) Click Step 3: Rebuild New Cor File, the software will show the page below, please click ok.



(10) Click Step4: Save Cor File



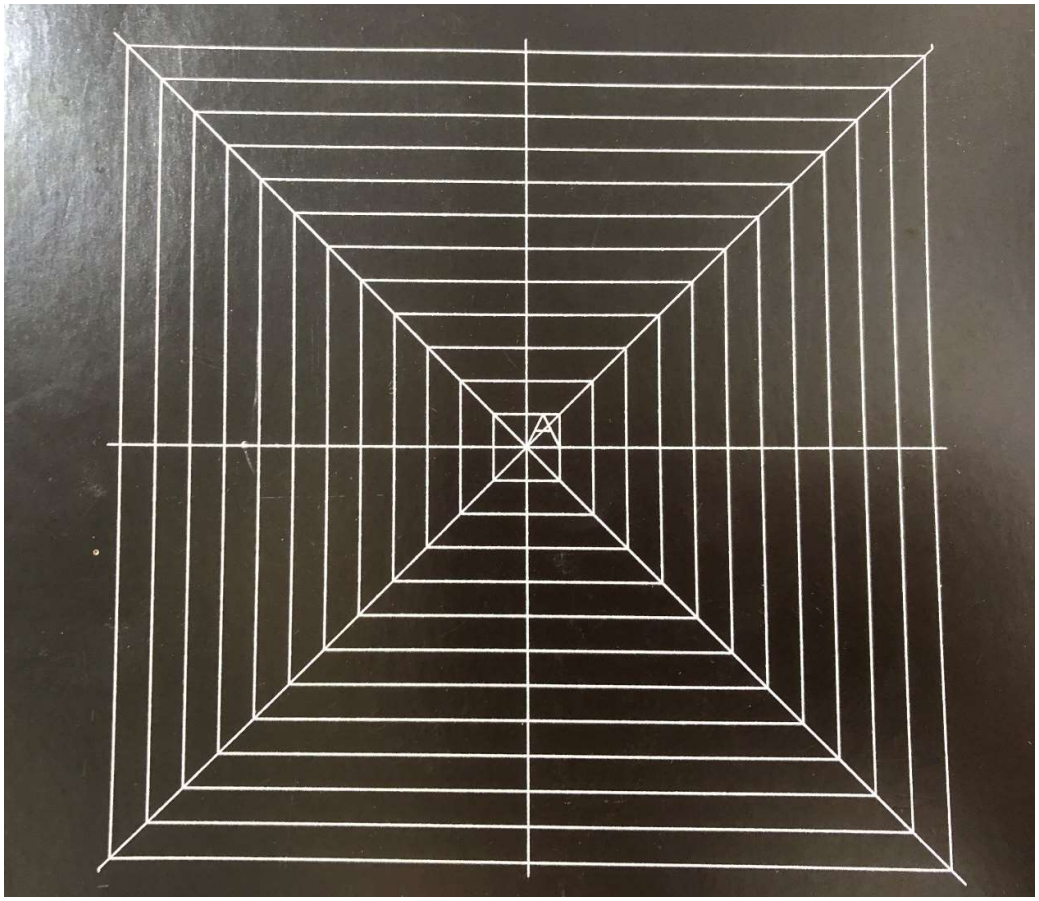
(11) Put a coated paper on working table, and click Step 5: Mark Cor Image. Then fiber laser will mark the image below. Then measure and adjust until the size of square is correct.

Note:

F-160, measure the third square outside (from outside to inside), the size should be 110*110mm.

F-210, measure the second square outside (from outside to inside), the size should be 150*150mm.

F-290, measure the fourth square outside (form outside to inside), the size should be 200*200mm



(12) If the size is incorrect, please repeat Step2-5.

(13) If the size is correct, please load the Cor file to fiber software (EzCad3).

3.3 9*9 Point Calibration

Note:

1. If you think 5*5point calibration is not accurate, you can choose 9*9point calibration.

But before doing 9*9 point calibration, you have to do 5*5 point calibration first.

2. Or you can import the 5*5 cor file in the U-disk that came with the machine. After that, you can do 9*9 point calibration directly.

3. For F-160, 210&290, 9*9 point calibration is used. We have saved three calibration files in the U-disk that came with the machine. You can use them directly.

Steps:

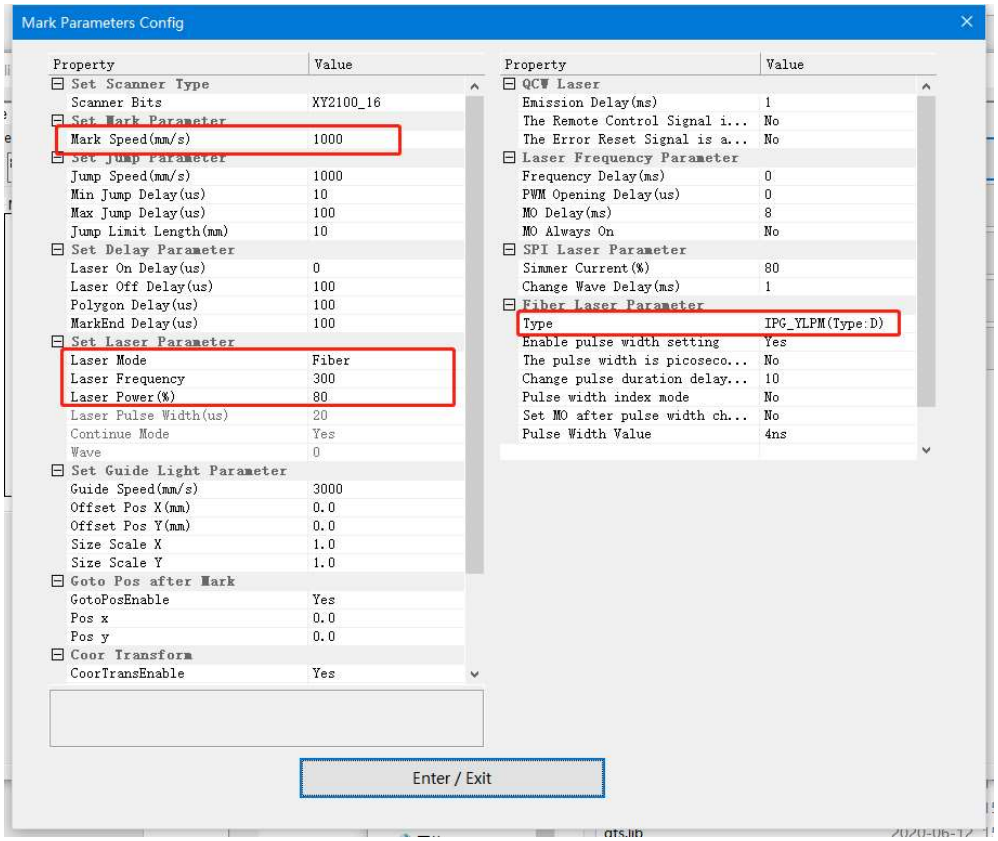
(1) Set Mark Parameter

Mark speed: 1000mm/s

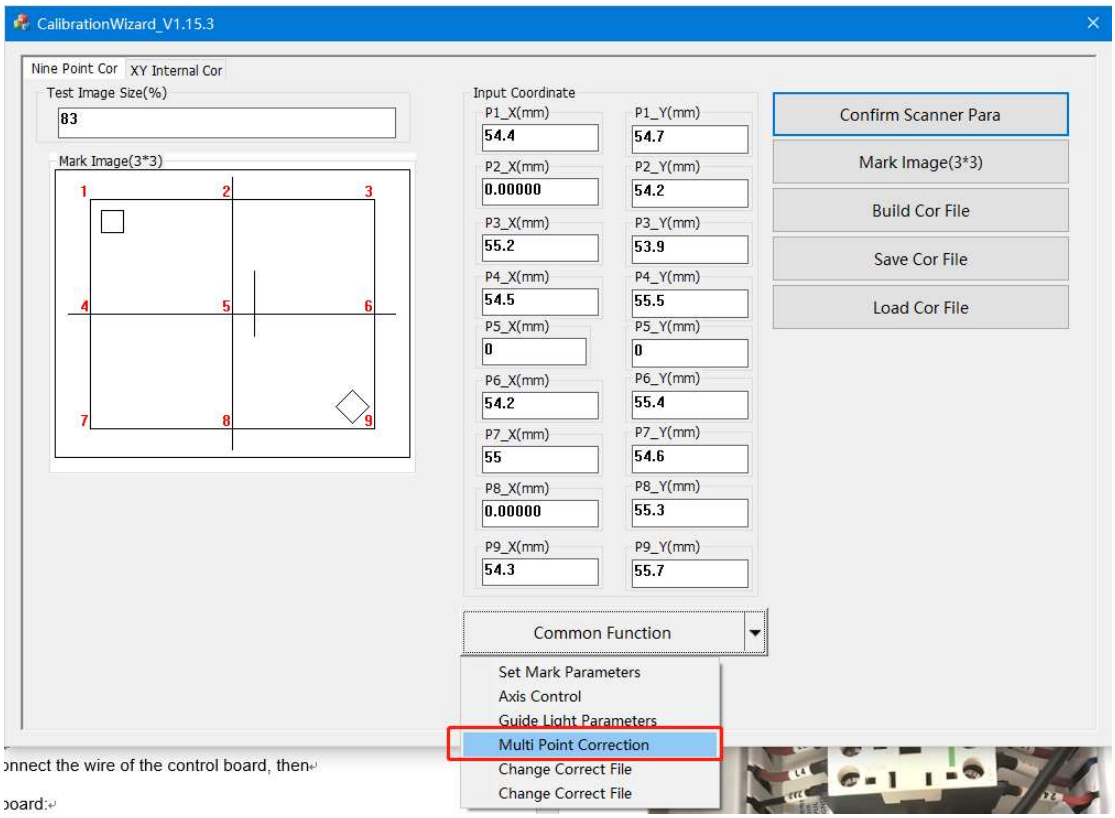
Type: IPG_YLPM (Type: D)

Laser Frequence:300kHz

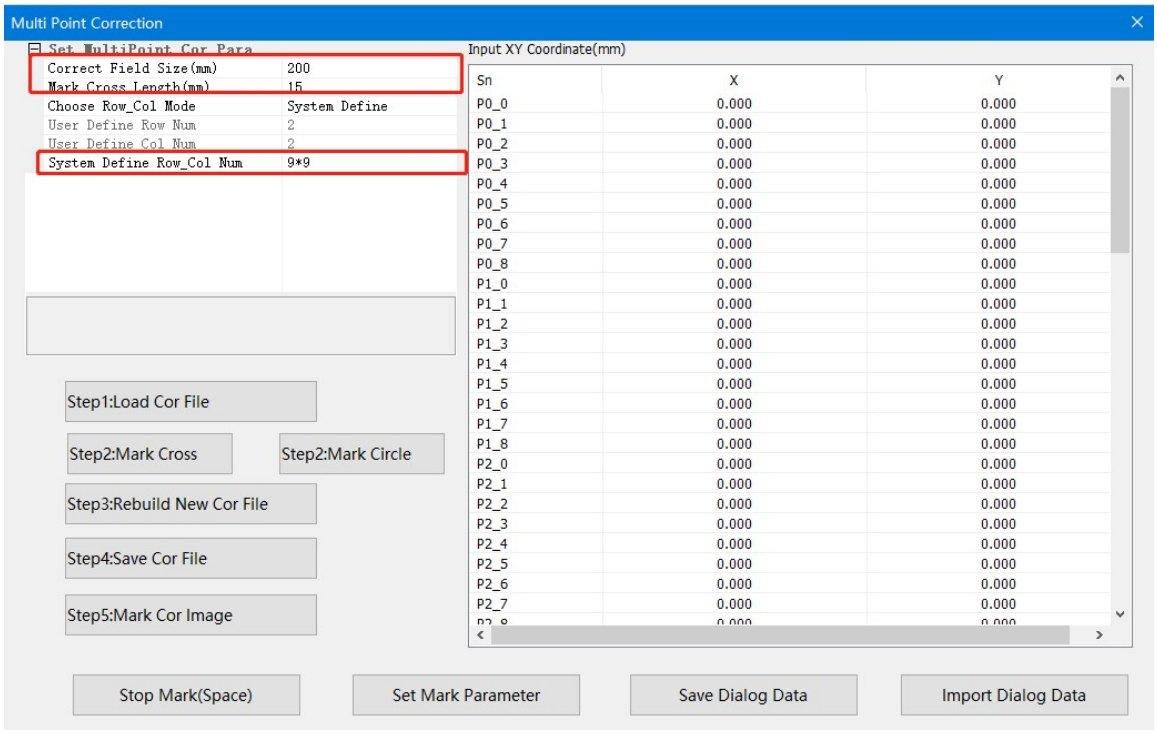
Laser power (%):80



(2) Start the calibration wizard software>>Common Function>>Multi Point Correction.



(3) Set the "Correct Field Size(mm)". Take F-290 as an example, set it as 200. And set "Mark Cross Length(mm) as 15, set "System Define Row Col Num" as 9*9, other settings needn't to be changed.

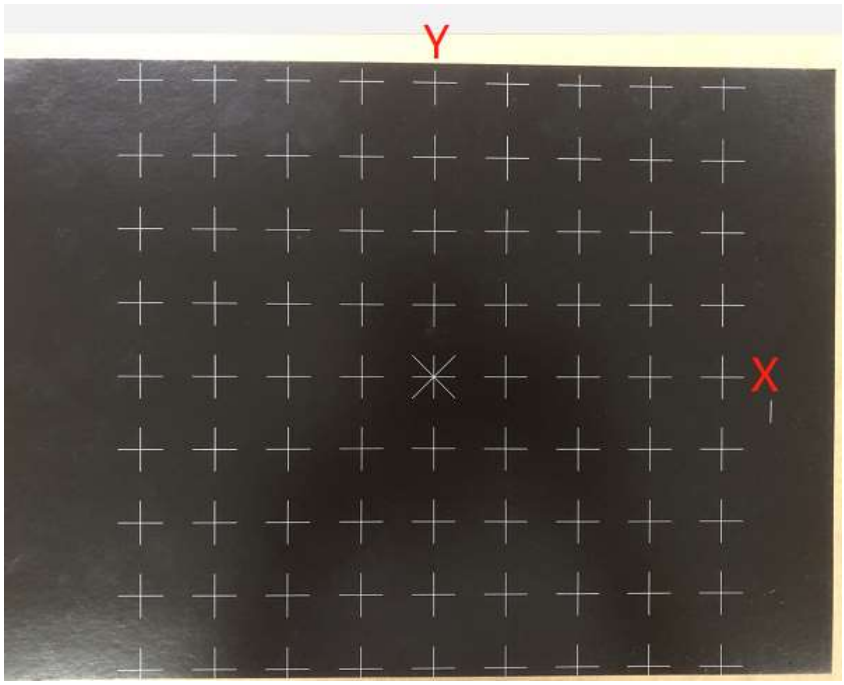


(4) Then click Step1: Load Cor File, load the 5*5 point Cor file you saved before.

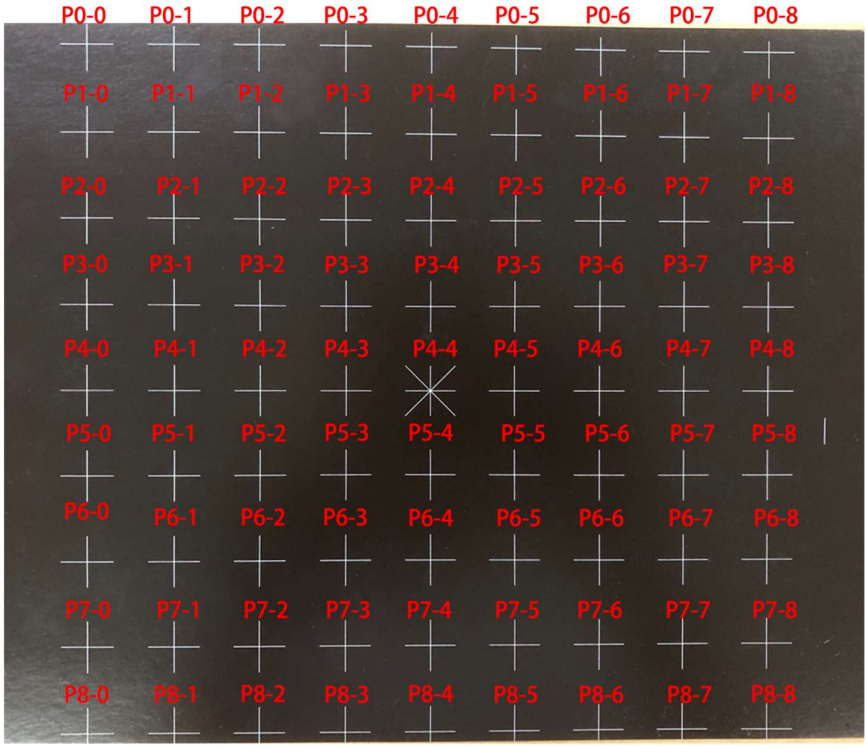
(5) Put a black-coated paper on the working table and make sure it's flat.

(6) Click Step 2 Mark Cross, then the fiber laser will mark an image (81 points), see the picture below.

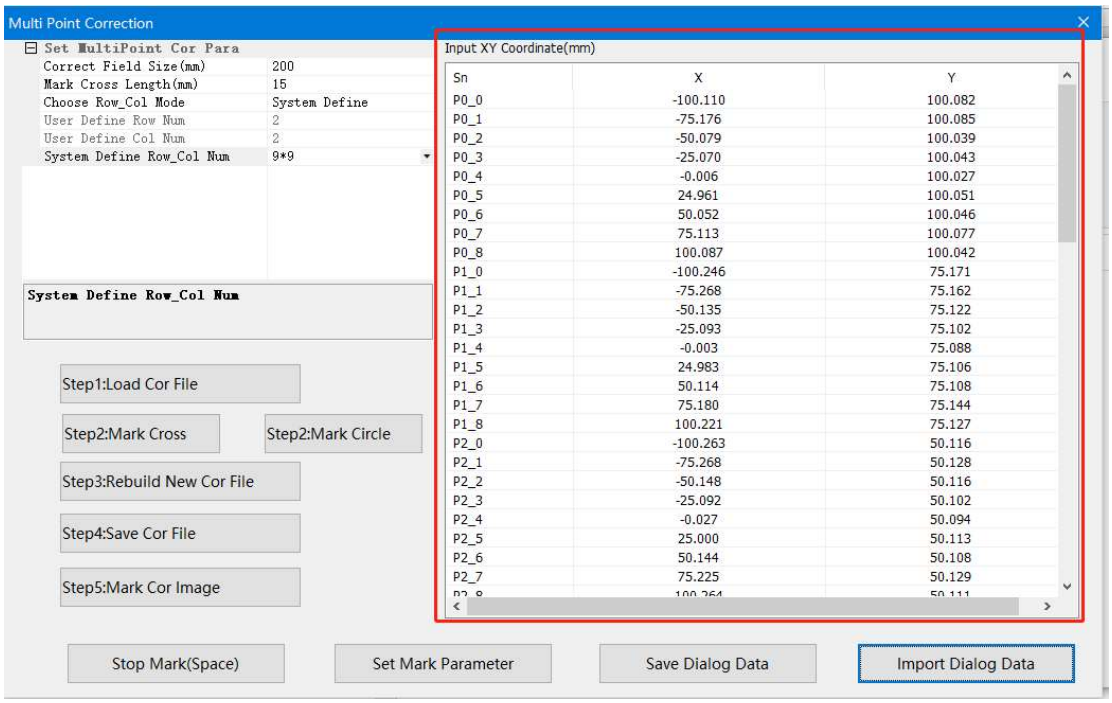
Please remember the direction of X axis or Y axis.



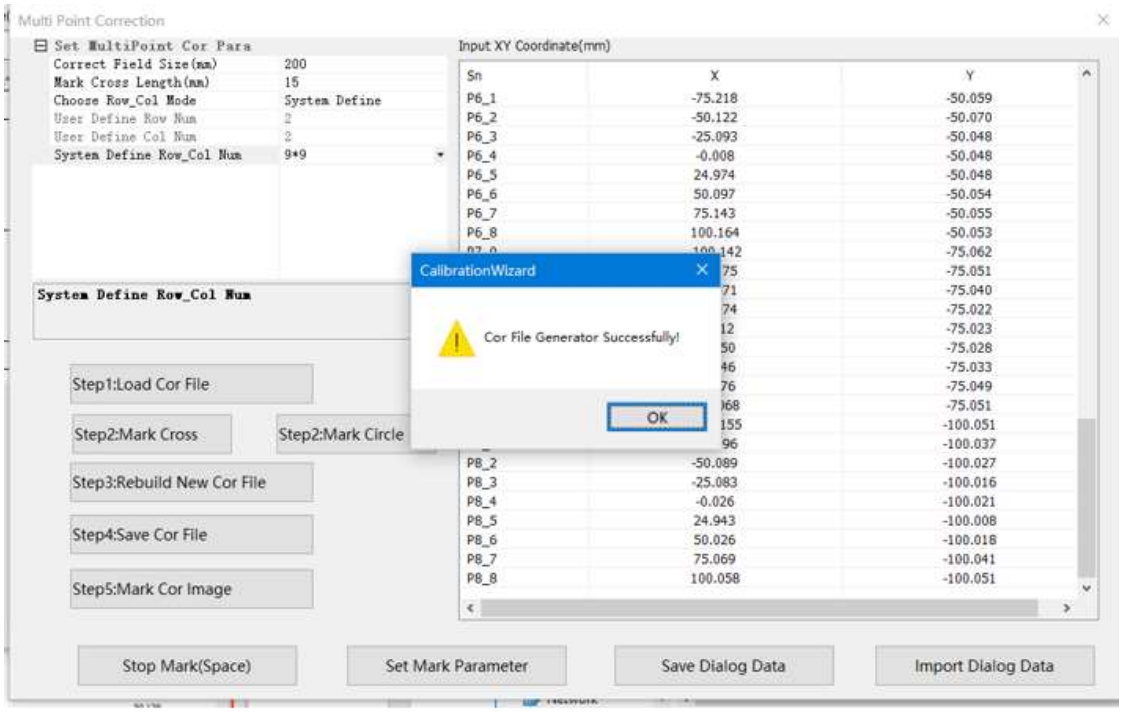
（7）Then measure the coordinates of all points. The P4-4 is the origin, coordinate being (0.0). Then name of 81 points is marked, see the picture below.



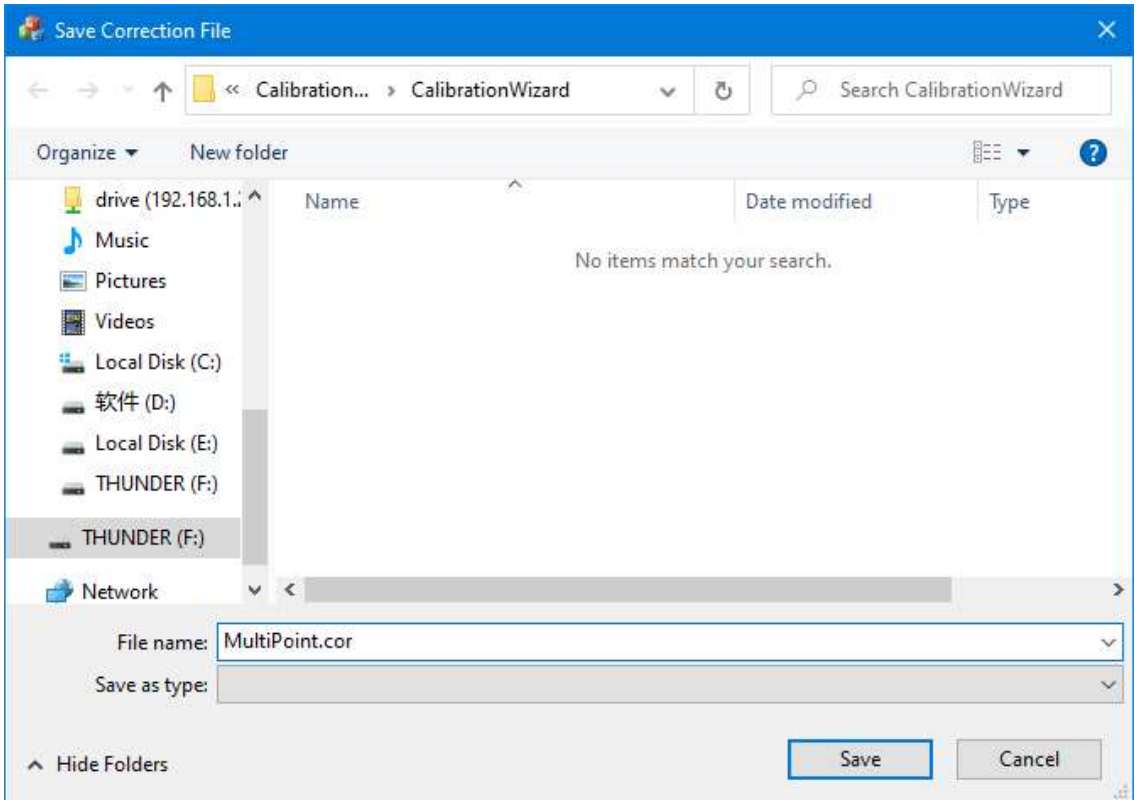
(8) Input all coordinates in the software. Do not forget to enter the minus sign of coordinates.



(9) Click Step 3: Rebuild New Cor File, the software will show the page below, please click ok.



(10) Click Step4: Save Cor File



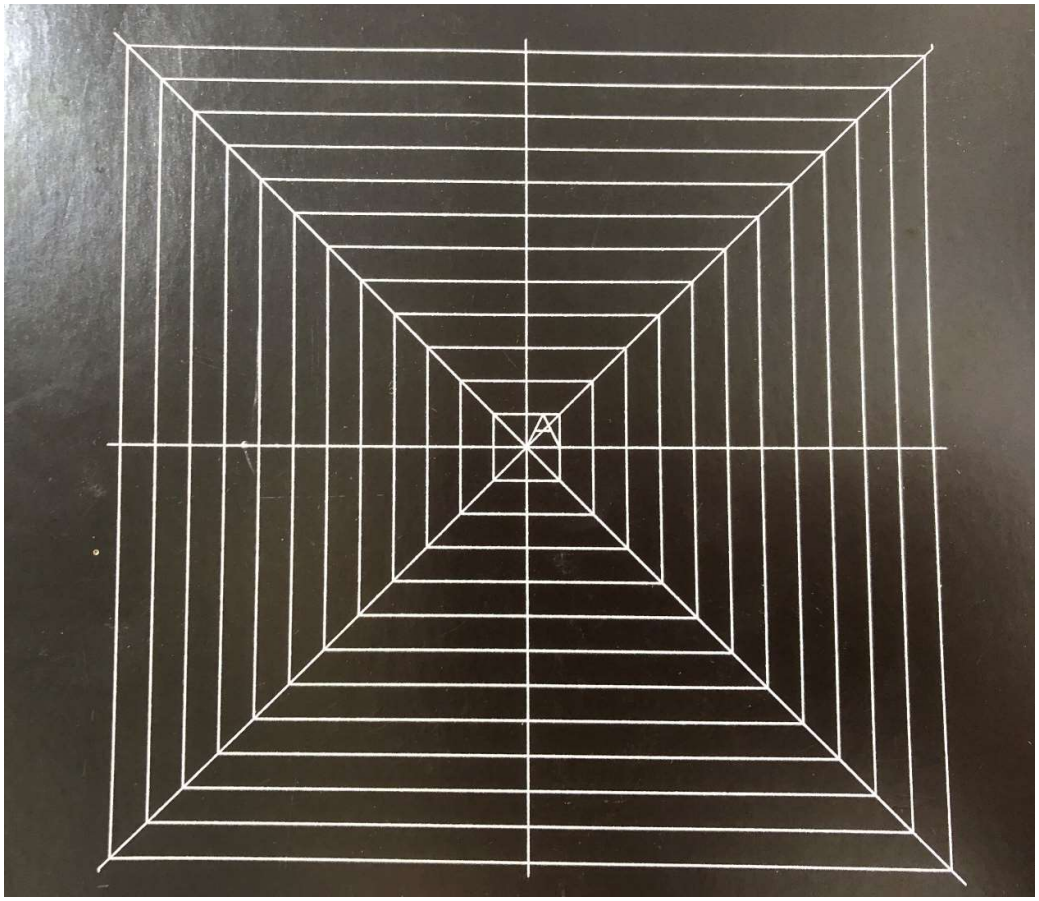
(11) Put a coated paper on working table, and click Step 5: Mark Cor Image. Then fiber laser will mark the image below. Then measure and adjust until the size of square is correct

Note:

F-160, measure the third square outside (from outside to inside), the size should be 110*110mm.

F-210, measure the second square outside (from outside to inside), the size should be 150*150mm.

F-290, measure the fourth square outside (form outside to inside), the size should be 200*200mm



(12) If the size is incorrect, please repeat Step2-5.

(13) If the size is correct, please load the Cor file to fiber software (EzCad3).

Chapter 4 How to use the chuck rotary axis attachment

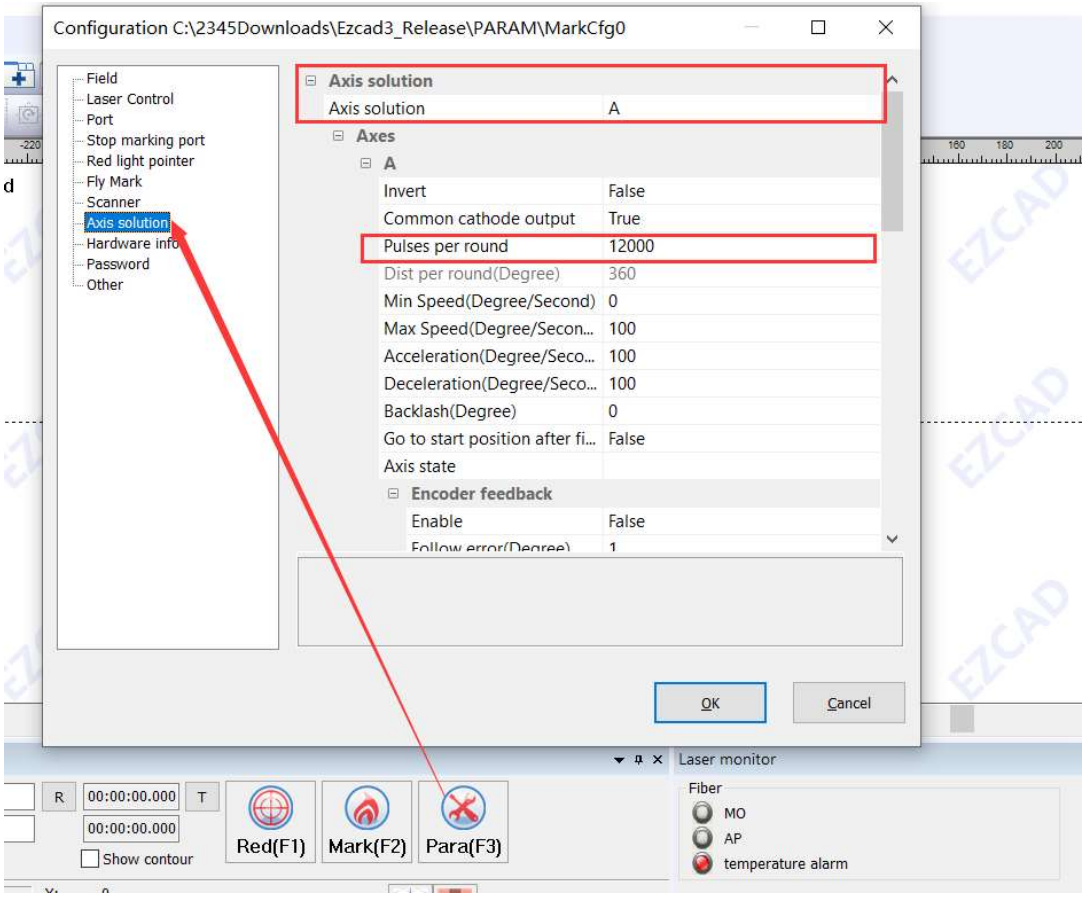
4.1 Rotary Mark Introduction

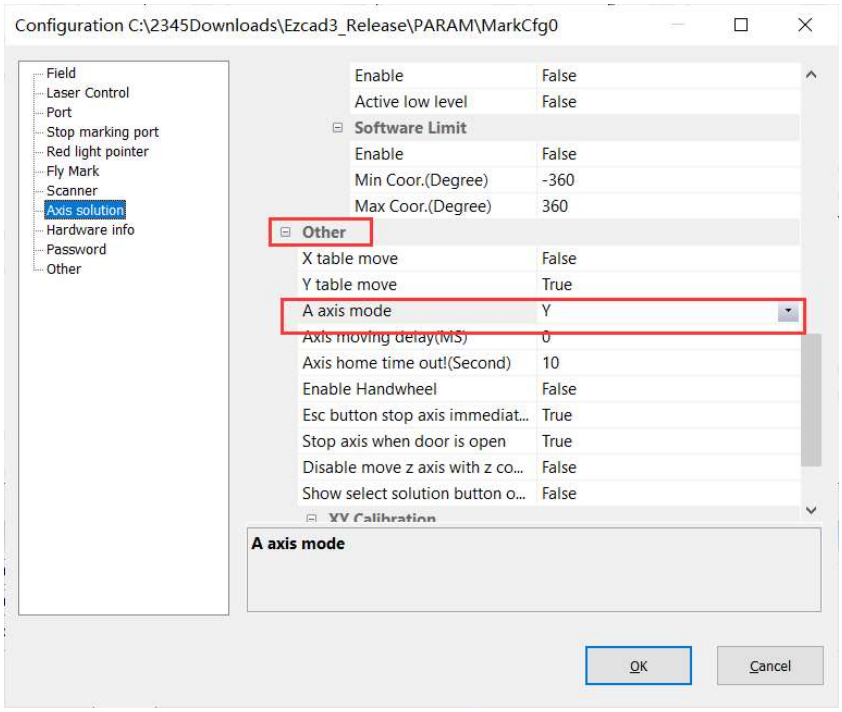
RotaryMark is in the Parameter(F3) column, click Para(F3) >>Axis solution>>Choose "A", then set the parameters:

Common cathode output: Ture

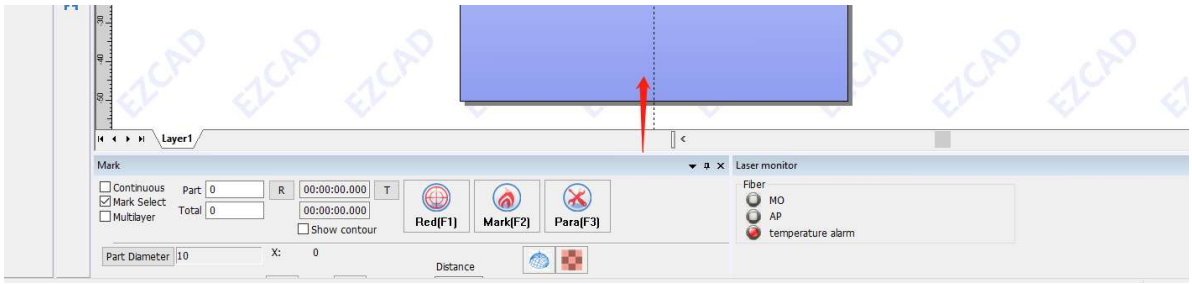
Pulses per round: 12000

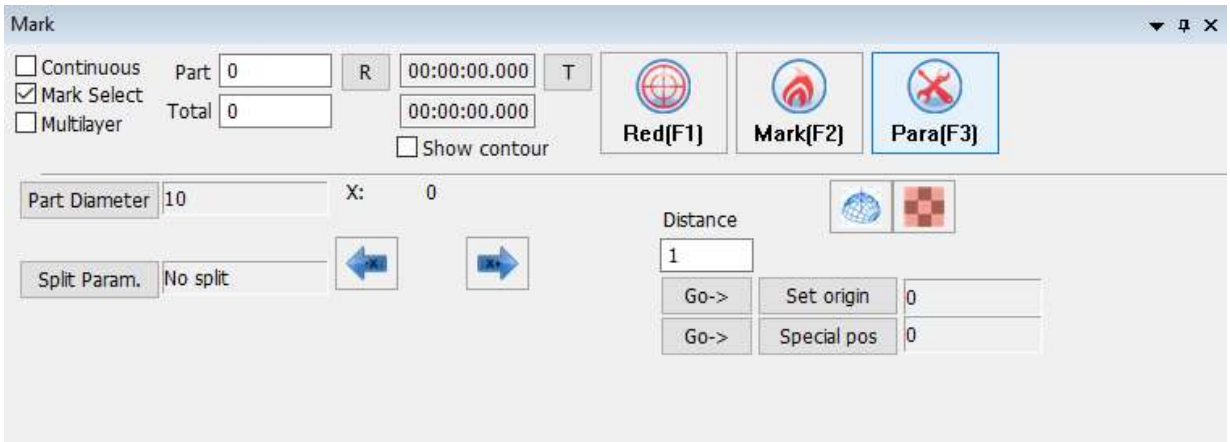
A axis mode: Y





Then click "OK", back to the main page. You can see a rotary page at the bottom, if you cannot see the whole content, please pull the page on as follows:





Please choose Y axis as default settings.

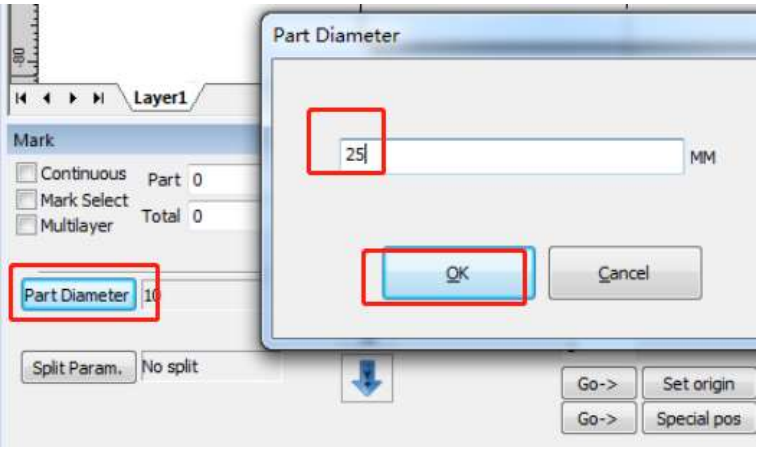
Continues: Repeatedly mark the figure until it's stopped manually.

Mark Selected: Only those figures selected will be marked.

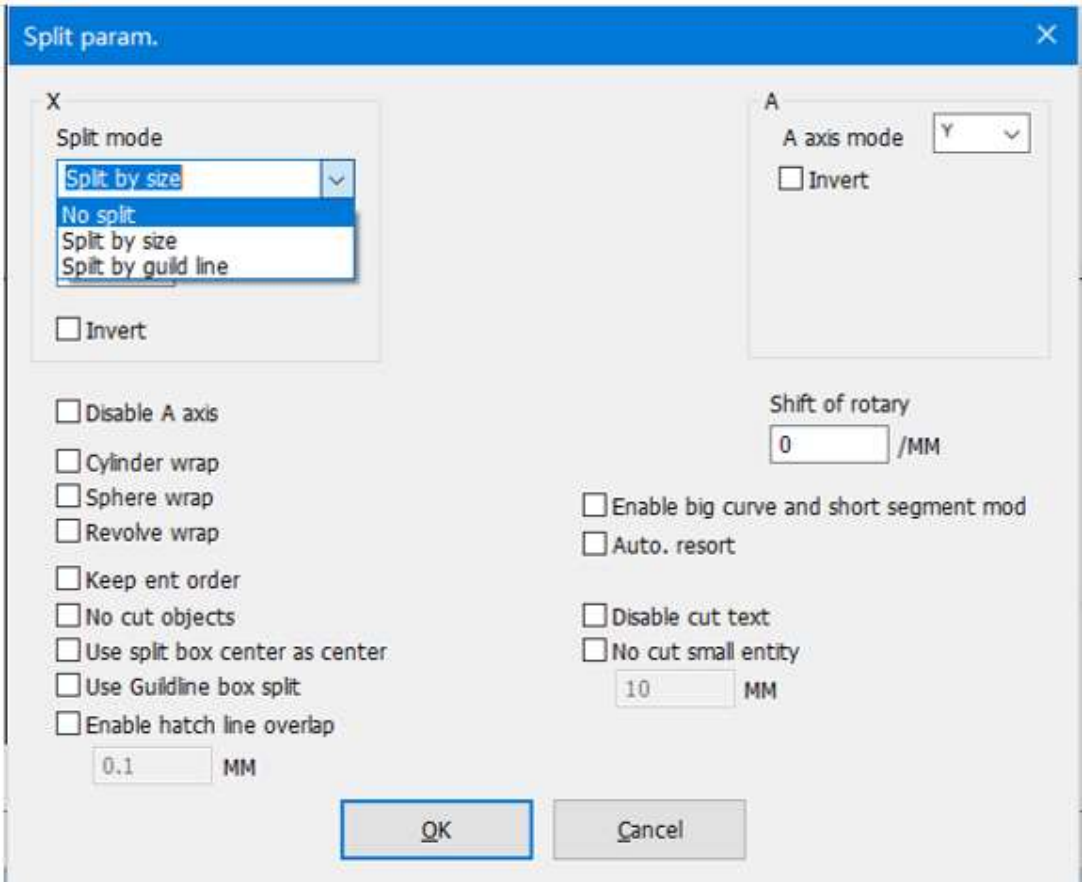
Part: The part count that has been marked. Press the button R rightwards, and the part count will be reset.

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

Part diameter: Click it, and fill in part diameter.



Split Param: Click it to check more settings.

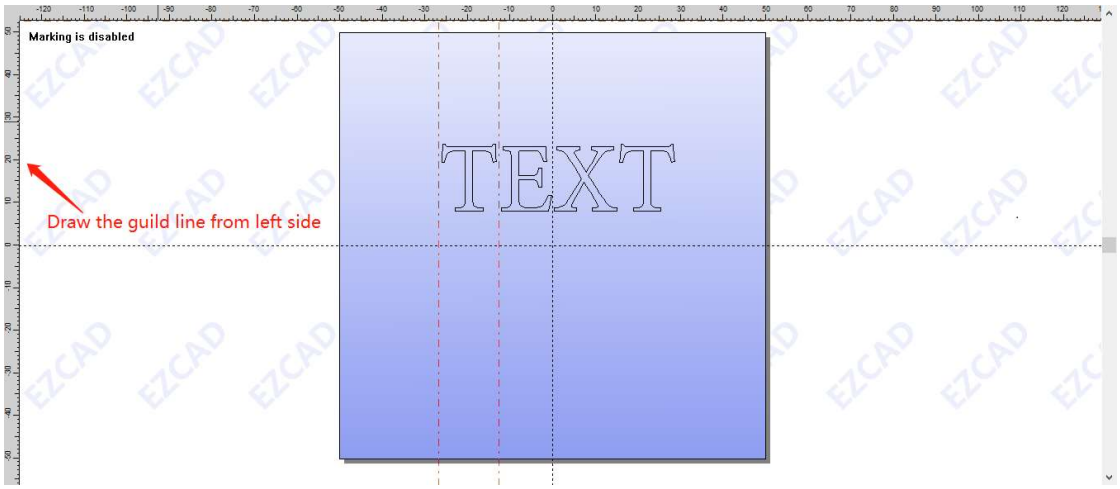


1) Split mode

①No split: Mark the whole file without split line.

②Split by size: Split the file according split size you set.

③Split by guild line: Click it, software will mark by split line, click the left mouse button twice to draw split line, click the right mouse button near the split line to cancel the split line. The direction of the split line is the same with that of the rotary axis.



2) Do not change any other settings in **Split param**!

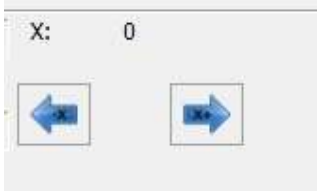
Distance: The distance of each rotation of the rotary.

Set origin: Set current position as origin.

Set special pos: Set current position as a special position.

Go-: Click "Go-", the rotary will move to origin &special position.

The two buttons are used to move the rotary.

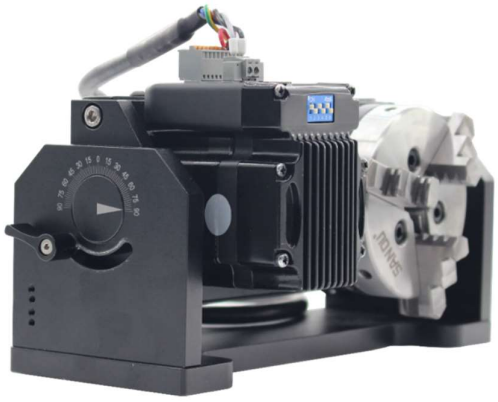



Preview function: Preview your file.


Divide function: Divide you file according to the split mode.

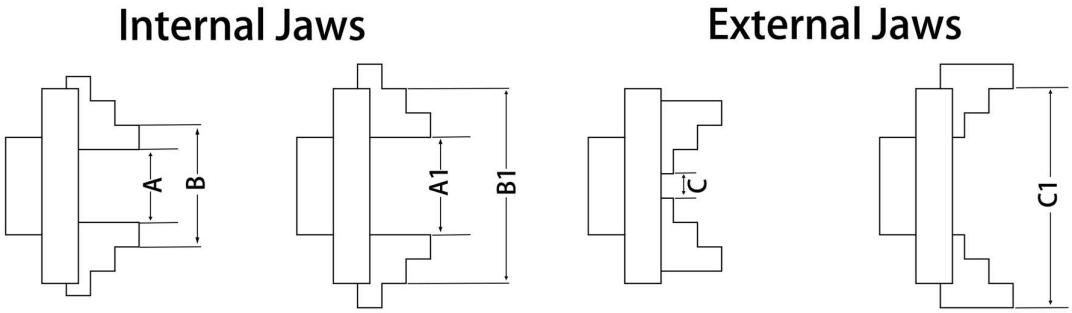
4.2 The first time to use the chuck rotary axis attachment

The chuck rotary axis attachment is the optional item.



Specification	
W×D×H	150mm×130mm×120mm/9.45"×5.12"×4.72"
Diameter of chuck	80mm/3.15"

4.2.1 The specification of chuck rotary axis attachment



Internal Jaws		External Jaws
Clamping Range	Jamming Range	Clamping Range
A---A1	B---B1	C---C1
2---90mm	23-120mm	2-100mm

All of the data above are for reference only!

About how to change the internal jaws to external jaws, here's a video for reference.

https://youtu.be/vt6nJmr5jII

4.2.2 How to use the rotary

1. Due to the limitation of the maximum working height, F-290 cannot use rotary axis attachment.

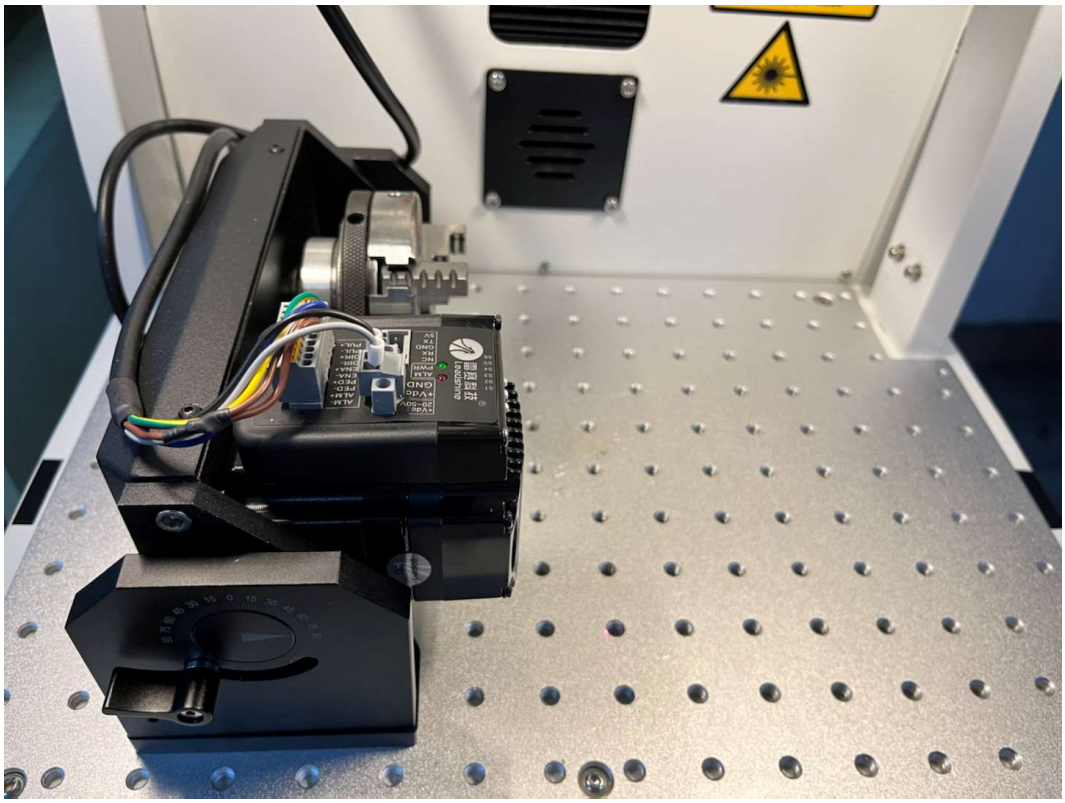
2. Please put the rotary in Y axis direction.

3. Please close the door when marking.

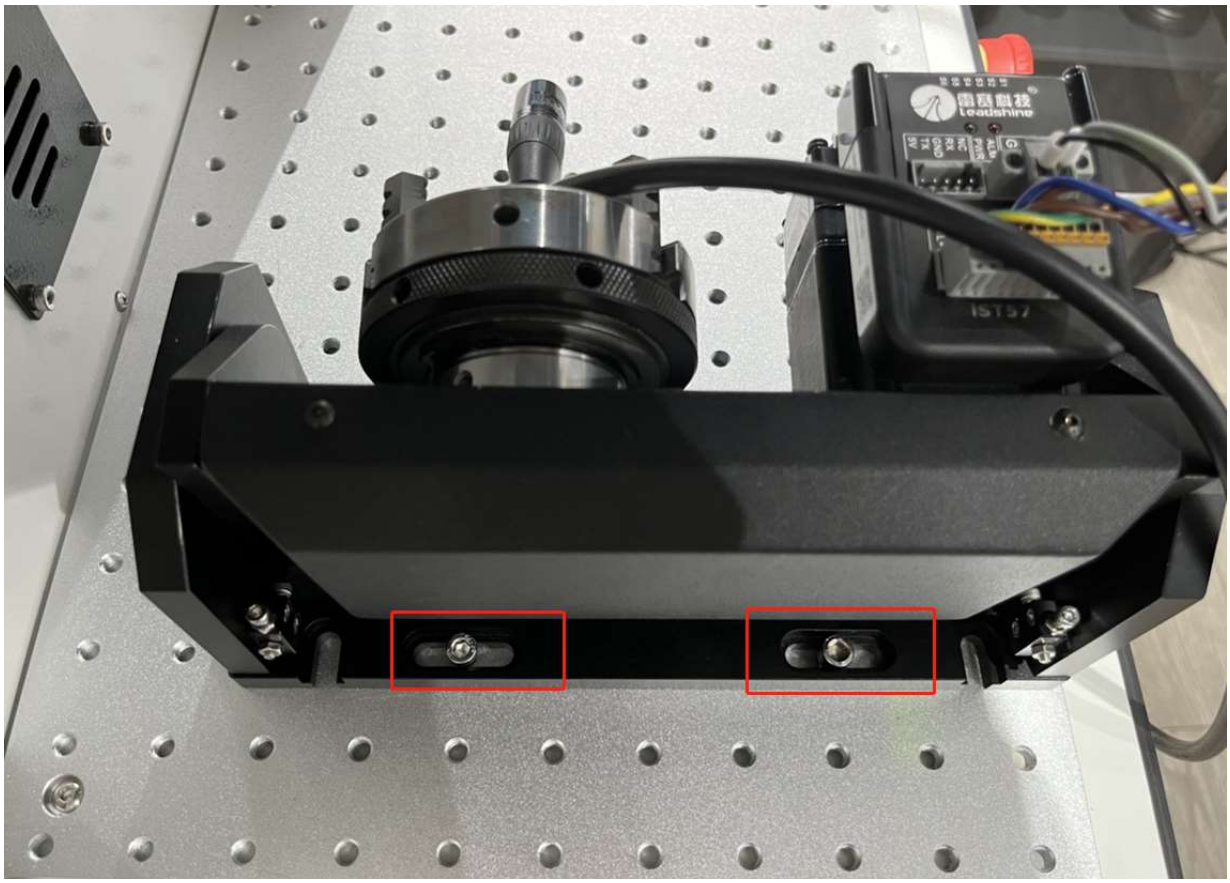
A video is for reference:
https://www.youtube.com/watch?v=mhsJjs3SxKc

(Take AURORA 8 PRO, 20W(MOPA), lens F-210 as an example):

1. Turn the fiber machine on.
2. Move the field lens to the highest position and open the lid.
3. Put the rotary axis attachment onto the working table and align the rotary attachment with the Y-axis till they're parallel, with the jaw chuck closest to where the rotary attachment plugs in.



4. If it's needed, you can fix the rotary with two screws which is came with AURORA, but please make sure the object at the center of the work area.



5. Connect the rotary, with the connector inside the working area. Connect it to this interface.

6. Measure the diameter of object that you want to etch and record it.

7. Fix the object on rotary.

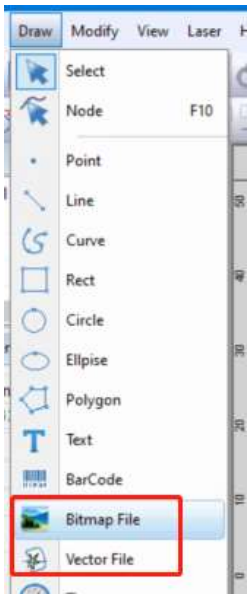
8. There is a red dot beam in the working area. Adjust the position of rotary to make sure that the object is under the red dot beam.

9. Press Auto focus button on the fiber machine.

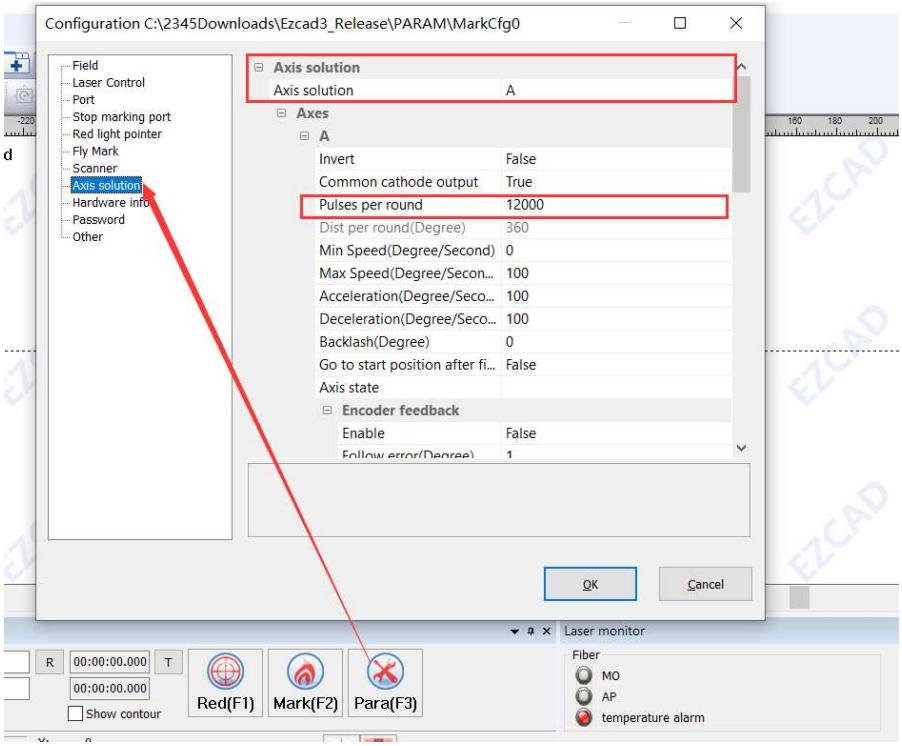
10. The Galvanometer will adjust the focus distance automatically. And wait 2-3 seconds, when hearing a beep (from the indicates light), it means the focus distance adjustment is complete.

11. Generate a graphic with the help of the graphics software. The size of the graphics must be adjusted until it's less than the dimensions of the work piece.

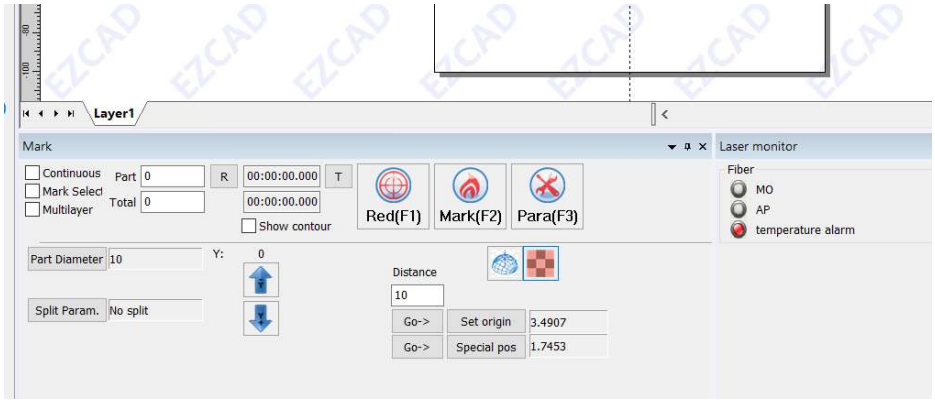
12. Start EzCad3 and import your file.



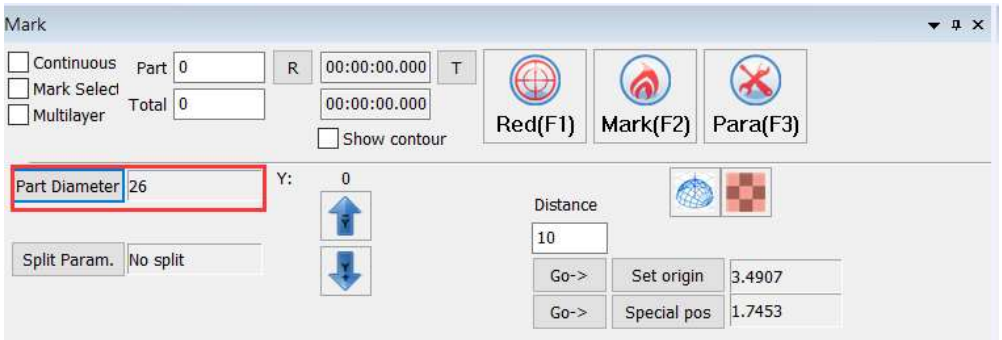
13. Click Para(F3) >>Axis solution, and change the settings like below, then click "OK".



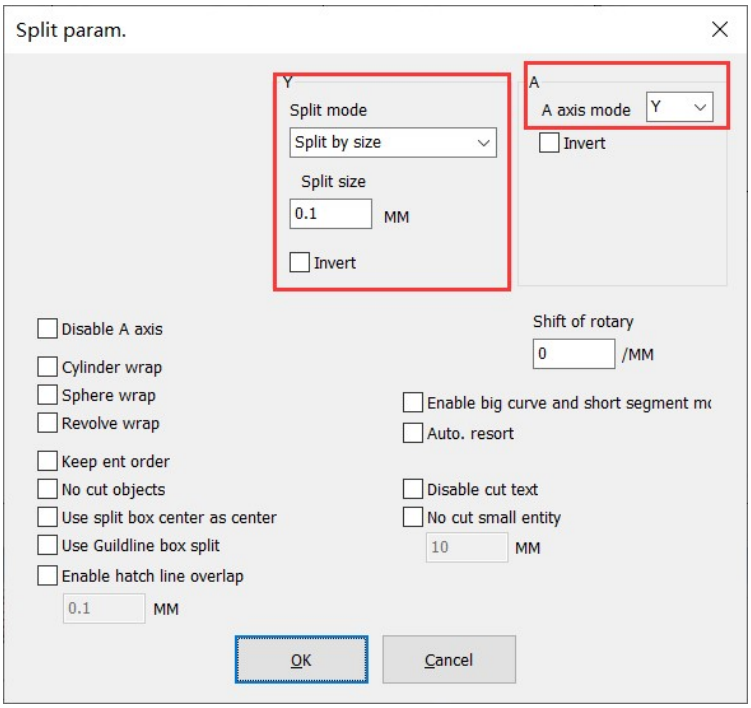
14. A column would pop up.



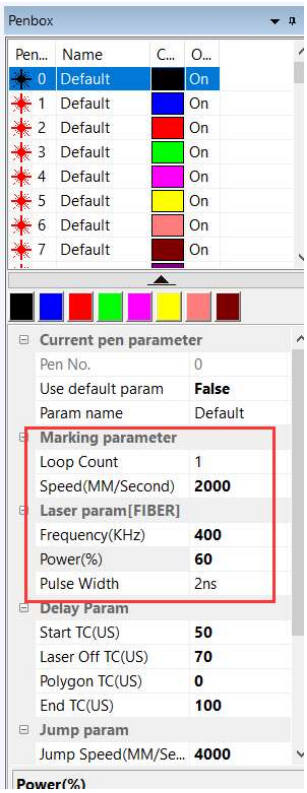
15. Click Part Diameter to enter the diameter.



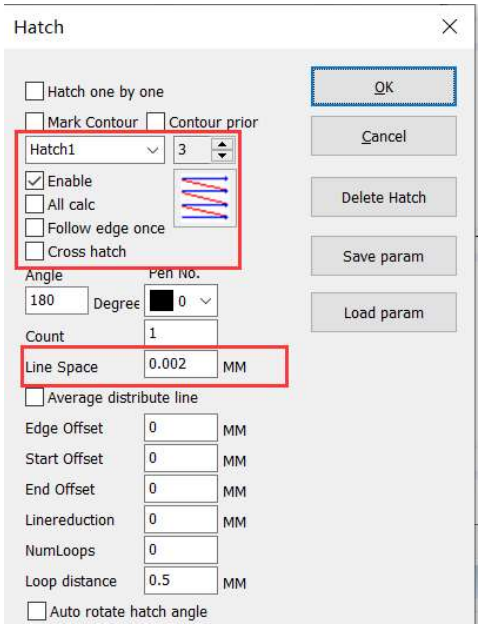
16. Click "Split Param" and change the settings like below. Do not change the other settings.



17. Set the marking parameters (Loop Count:1, Speed 2000mm/s, Power 60%, Frequency:400KHz, Pulse Width: 2ns).

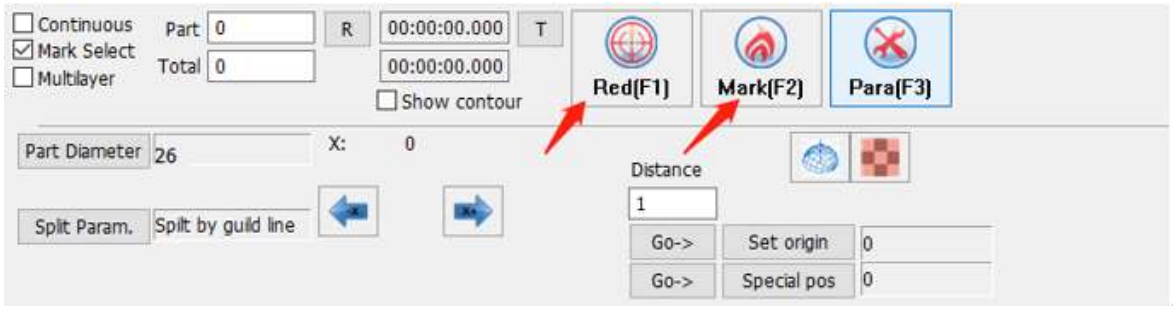


18. Set the Hatch parameters.

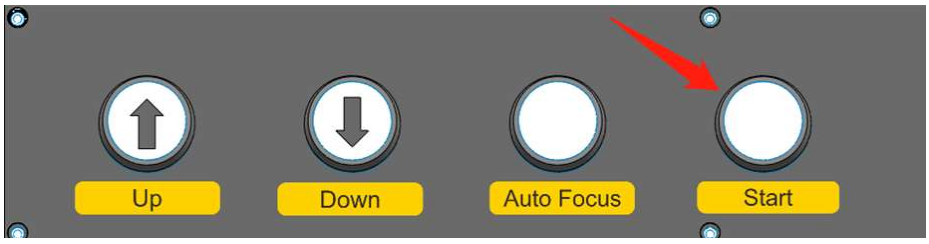


19. Press Red(F1), you can see a red vertical line (the red light comes from the fiber laser) on your material. The machine will mark from the vertical line to the right side. If it's needed, you can move the rotary manually.

20. Press Mark(F2), the fiber laser will mark your image.



After that, if you need to mark the same file many times, you can press Start button directly.



20. Unplug the rotary connector after all is done.

End.