

# **Full visual curve splitter**

## **Operation Manual**

## Preface

Thank you for choosing **Southern Machinery** intelligent full vision curve splitter equipment.

- Please read this Operation Manual carefully before using the equipment;
- This Operation manual is attached with an electronic file, please keep it for easy reference and use at any time;;
- This "Operation manual" detailed records how to operate, edit processing procedures related information, "QBR board machine software instruction manual" detailed records of all relevant information about the use of software introduction, designed for the use of trained technicians.

## — System Instruction

### 1.1 Product Features

1. Full vision curve splitter (hereinafter referred to as the machine) was after years of technical research and actual verification in the factory for many years launched on the market as a full-vision automatic production equipment for continuous plate cutting.
2. The whole series is equipped with CCD whole board visual programming system, technicians only need to draw straight lines and arcs on the picture, then can easily complete the program editing, completely subverted the traditional programming mode, greatly reducing the program editing and debugging time.
3. High speed spindle is used as cutting board for PCB board, with low cutting stress and high precision, and suitable for PCB board of any shape
4. The machine is equipped with automatic tool change function. When the tool reaches its service life, the machine can perform automatic tool change, greatly save the downtime of manual tool change, and also reduce the risk of operator

- tool change. (Note: This configuration model is machine Q380A).
5. The machine is equipped with broken tool detection function, which can find the use state of the tool in time.
  6. Double Y axis table work, can execute split board cutting and PCB board placement at the same time, can cut two different products on the left and right plates at the same time, to meet the needs of production line, improve operation efficiency.
  7. The machine is equipped with safety grating to ensure the safety of operation.
  8. High efficiency synthesizer, easy to maintain and clean.。
  9. Full vision curve board system software support WIN7, WIN10 system, safe and stable.

## 1.2 The specification

1. Machine repetition accuracy:  $\pm 0.01\text{mm}$
2. X、Y1、Z、Y2 Control mode: using moving arm and PC
3. X、Y1、Z、Y2 Drive mode: AC servo motor
4. Man-machine operation and data storage: PC system
5. Cutting accuracy:  $\pm 0.02\text{mm}$
6. Spindle speed: 20000-60000rpm
7. Power supply voltage: 220V, 50Hz
8. Power consumption: 5KW
9. Dust collection mode: lower dust collection
10. Dust collector voltage: 380V
11. Host size: L1230\*W1180\*H1350mm
12. Working size: L350\*W330mm
13. Double table (Y1 axis Y2 axis)

### 1.3 Installation Precautions

1. Site size (L2500\*W2500\*H2500mm)

2. The power distribution:

Host: voltage AC220V2v50HZ.

Power:: 2KW     Dust collector: voltageAC380V3v50HZ.

Power: 3KW

3. Gas supply: more than4.5kg/cm<sup>2</sup>.

4. Environment::

Ambient temperature: 10-30°C

Relative temperature: 35-80%

It is required to be clean and free from direct sunlight, water, oil and other chemical substances.

5. The installation shall be smooth without strong vibration or impact.

### 1.4 Operation precautions

To ensure the normal operation of the machine and prevent improper or incorrect operation, performance impact, or damage to the device, Please observe the following:

● When starting the equipment, please follow the following sequence::

(1) Turn on the main power switch of the equipment, and then press the power switch button of the machine;

(2) Start the computer;

(3) Access the Windows system;

(4) Enter the application.

● When cutting off the power supply of the equipment, please follow the following sequence:

(1) Exit the application;

(2) Exit Windows;

(3) Turn OFF the power of the equipment and switch the main power switch of the machine to OFF state.

If you do not perform this process and directly switch off or restart the power supply, the processing data will be damaged and the hard disk may be damaged. ◦

● For safety reasons, do not open the front door when the equipment is running.

● Switching power supply repeatedly may lead to equipment failure. After the power supply is OFF (OFF), please wait for more than 30 seconds before switching ON (ON).

● Before cleaning, the power should be turned off.

● Machine maintenance, should be carried out by qualified professional technician.

● Technical engineers for maintenance, must be turned off the main power of the machine, special circumstances to power on the test, must send professionals next to the alert, prevent unrelated personnel close to the machine mis-operation, prevent damage!!

**Please pay attention to the above matters!**

## 1.5 Product Appearance

The appearance of the full visual curve splitter is shown in FIG. 1.1:



FIG. 1.1 Product appearance

### 1.5.1 X,Y1,Y2, Z axis

(1) X-axis, as shown in FIG. 1.2:

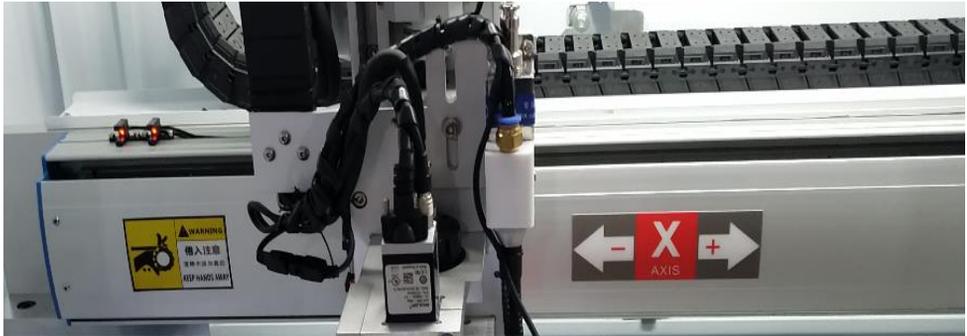


FIG.1.2

(2) Y1 axis, as shown in FIG.1.3:



FIG.1.3

(3) Y2 axis, as shown in FIG.1.4:



FIG.1.4

(4) Z axis, as shown in FIG.1.5:

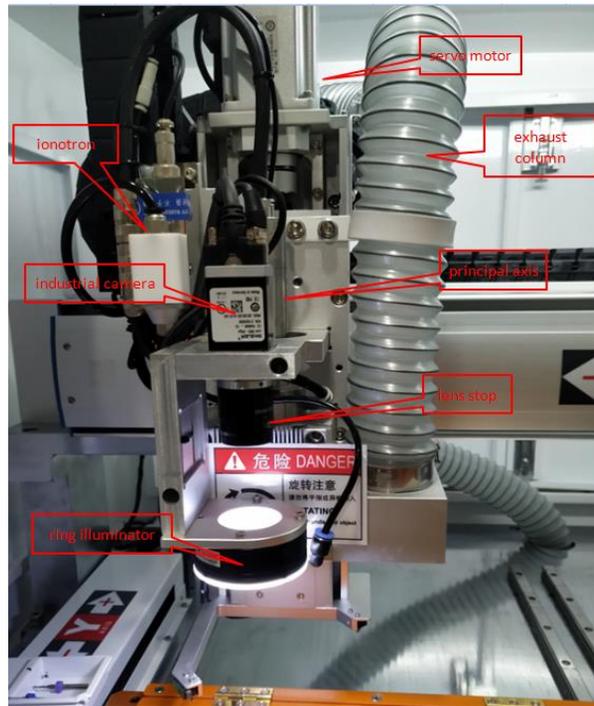
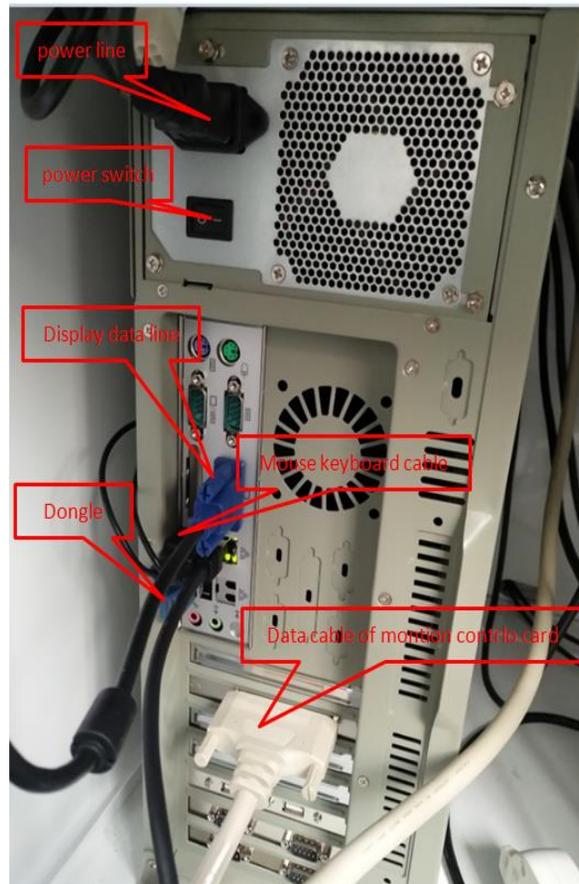


FIG.1.5

## 1.5.2 Control System Introduction

### (1) Industrial control host



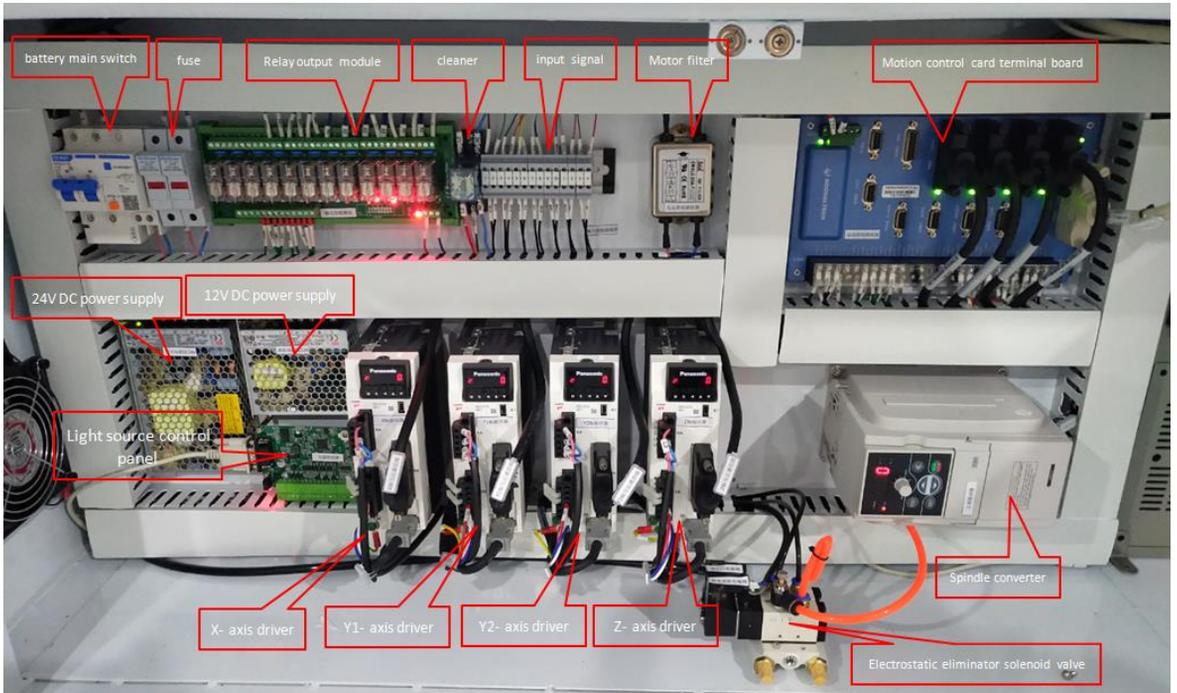
## (2) Spindle controller

750 As shown in the following picture, the basic parameters of the spindle controller have been set, so please do not move it.

Set operating frequency: 750



### (3) Internal mainline



## 1.6 Switch Button Description



1.6.1 Machine main power: ON: power ON; OFF: power OFF. (When this switch is ON, the industrial computer and the display are energized, but the machine has not been officially started)



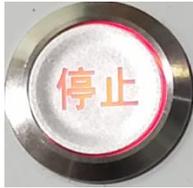
1.6.2 Machine start button , after this button is pressed, the machine equipment is officially powered on, the light in the machine is lit, and all electric control centers start working.



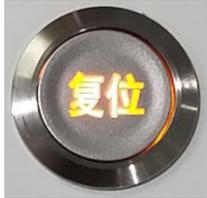
1.6.3 Emergency button , when the machine is abnormal, press this button can emergency stop the machine.



1.6.4 Start button , press this button, the machine can start, which is consistent with the function of the start icon in the software.



1.6.5 Stop button, press this button, the machine will stop working immediately, consistent with the function of the software stop icon.



1.6.6 Reset button, press this button, the machine will perform the reset action immediately, which is consistent with the reset icon function of the software.



1.6.7 Start the left tray, press this button, the left platform will quickly move to the machine, perform the cutting action.



1.6.8 Start the right tray, press this button, the right platform will quickly move to the machine, perform the cutting action.

# 1 Start operation flow

## 1.1 Start

(1) Plug in the power supply and turn on the main power switch of the equipment;



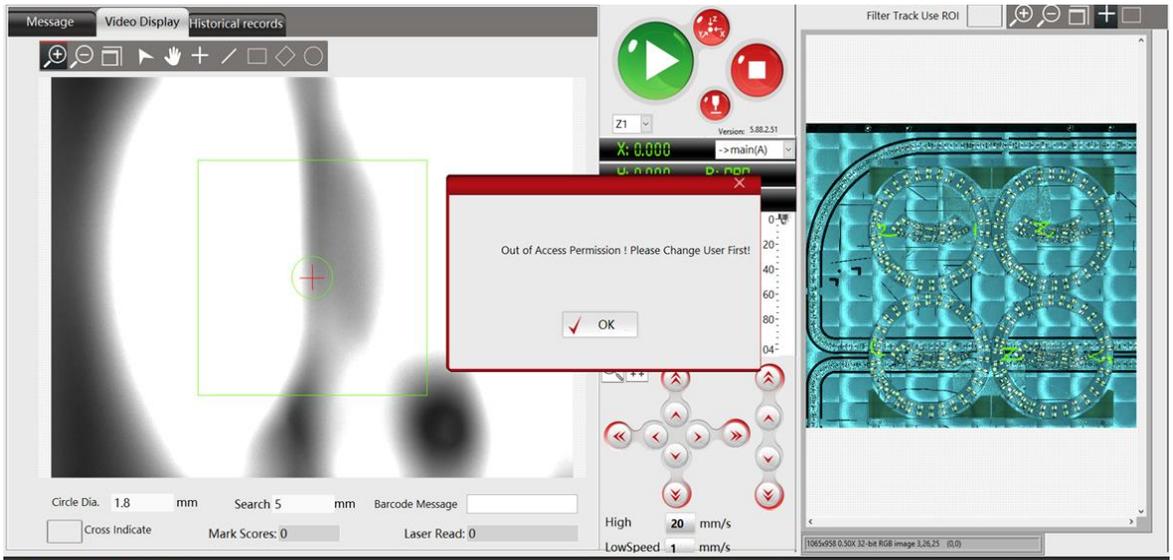
- (2) Press the machine power supply;
- (3) Start the computer and enter the Windows system;;
- (4) Open the software;



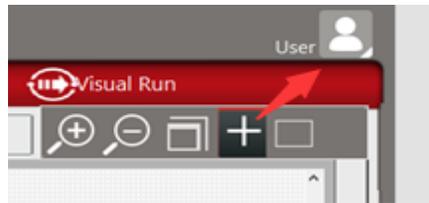
(5) It takes about ten seconds to open the software and then enter the software system, as shown in the picture below;

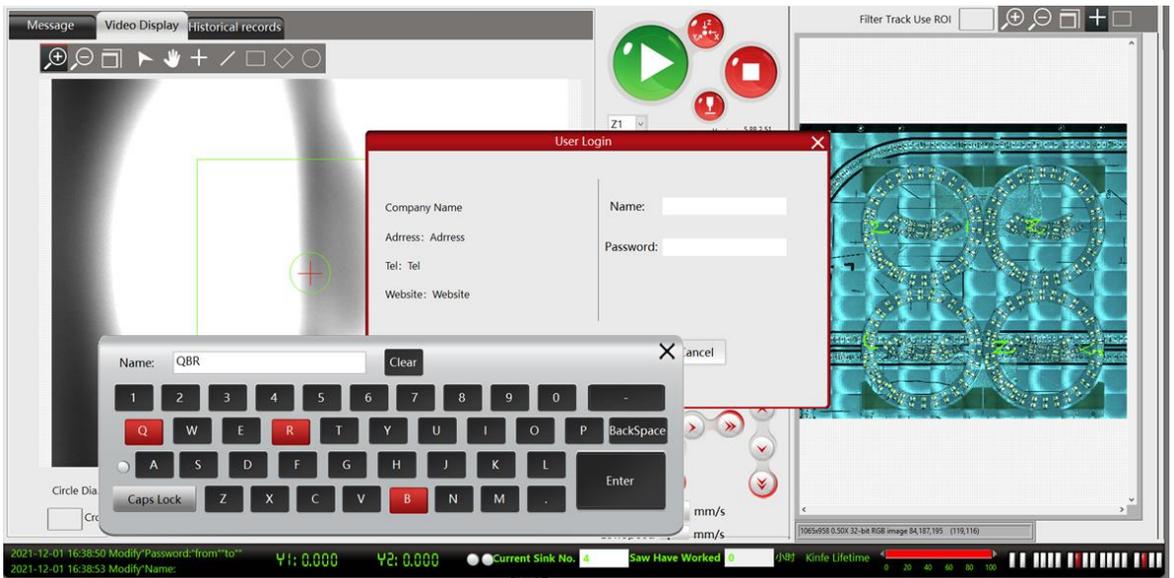


(6) Click OK. After the reset is successful, the operator can only perform simple operation functions. If you want to operate other interfaces, the software prompts the following operations, as shown in the picture below.



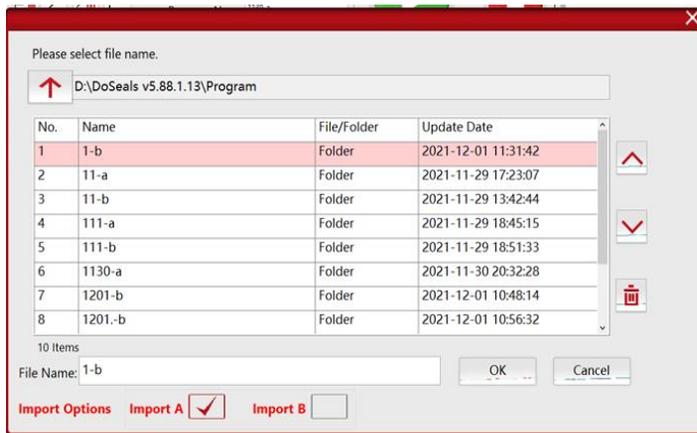
(7) At this point, you need to left-click the user's position on the status bar, and then a dialog box will pop up, as shown below;



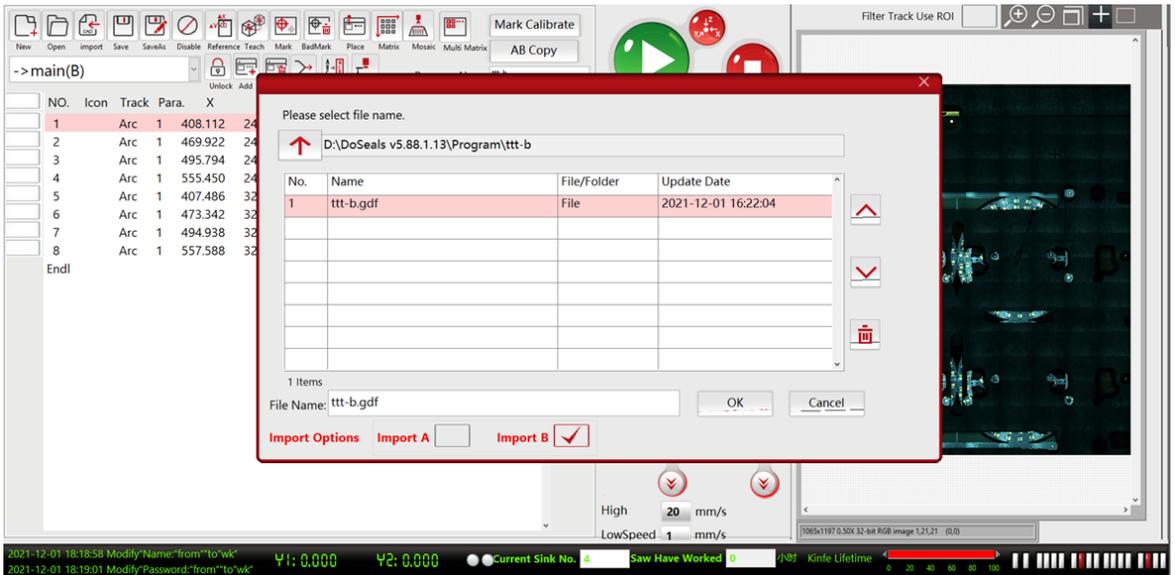


(8) Select user login, and tap user name and Password (user name: QBR Password: QBR). The super user name is wk, and the password is wk(only super user permission can be used to modify maintenance Settings).

(9) Click the open button to open or edit existing program files.



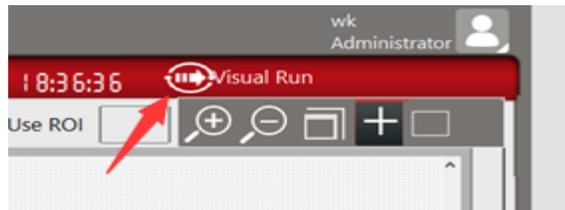
(10) Under normal circumstances, first select the left tray program (A), then select the right tray program (B), for example, B side program, first select the program name with B file name, click "import B only", click OK, then select the file, click OK to call out the corresponding program.



(11) Open the file, need to select the "main (B)", the system will bring up the corresponding information to program files, including panoramic images, if the panoramic image is blank, just click on

the "puzzles" column, and click on the "image", can save good pictures before loading, if is still blank, then need to puzzle again, and save.

(12) After the program is opened, the system will default to visual monitoring. The first procedure of the retrieval program is to use CCD to monitor it once to confirm whether the track is correct.



(13) After confirming that the visual monitoring is correct, click the visual monitoring to select, click the processing mode, and press OK to operate 123 items as shown in the picture below. 确认了视觉监控无误后，点击视觉监控栏进行选择，点击加工模式，并按确定，如下图的123项进行操作。



(14) Click the Start button



(15) The machine will start, and the tray to be processed is the A/B side shown in the corresponding panorama. Then, press the start button of the left tray and the right tray on the machine panel (**Note: Main (A) is the left platform tray, and Main (B) is the right platform tray**)



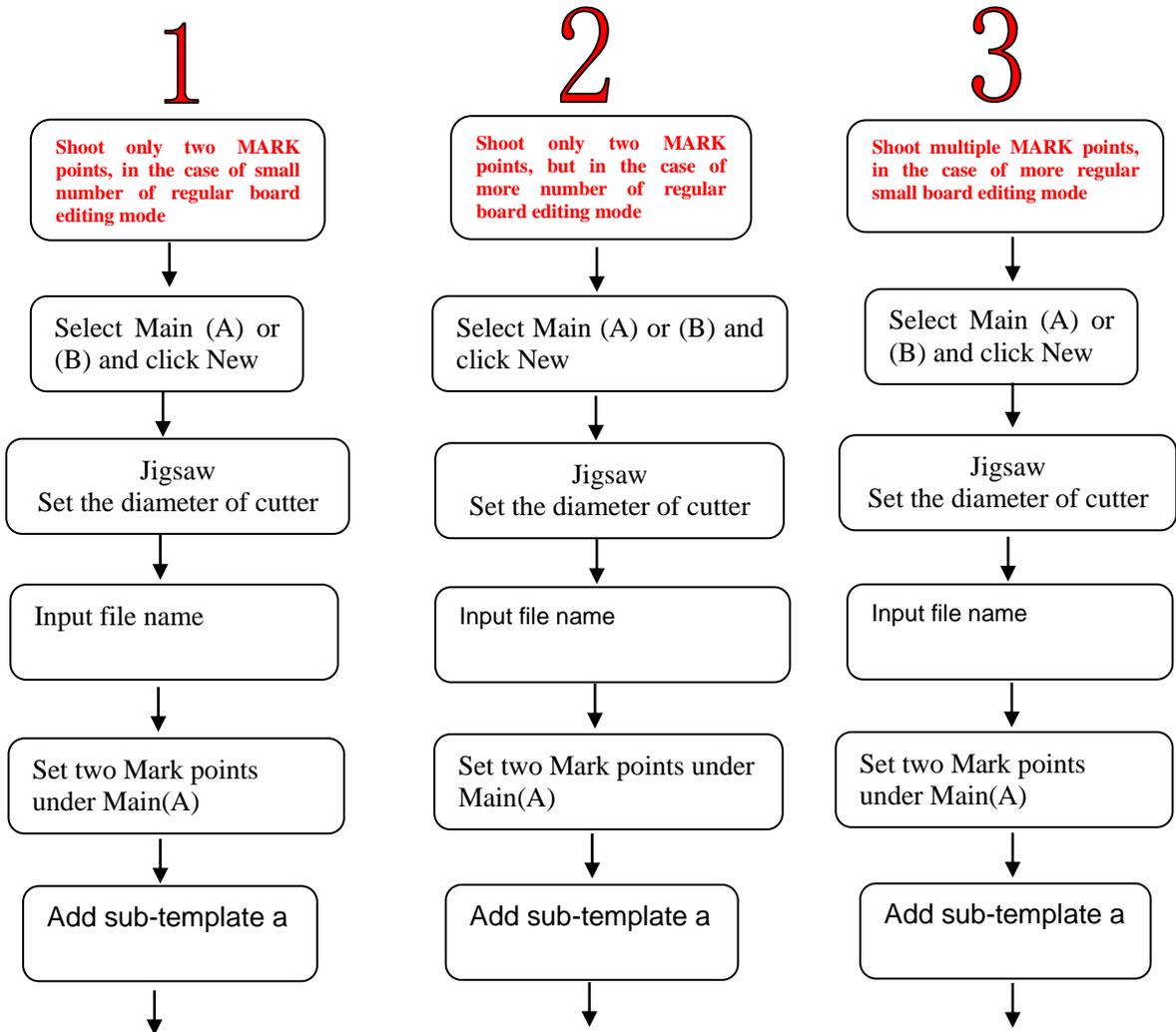
**note:**

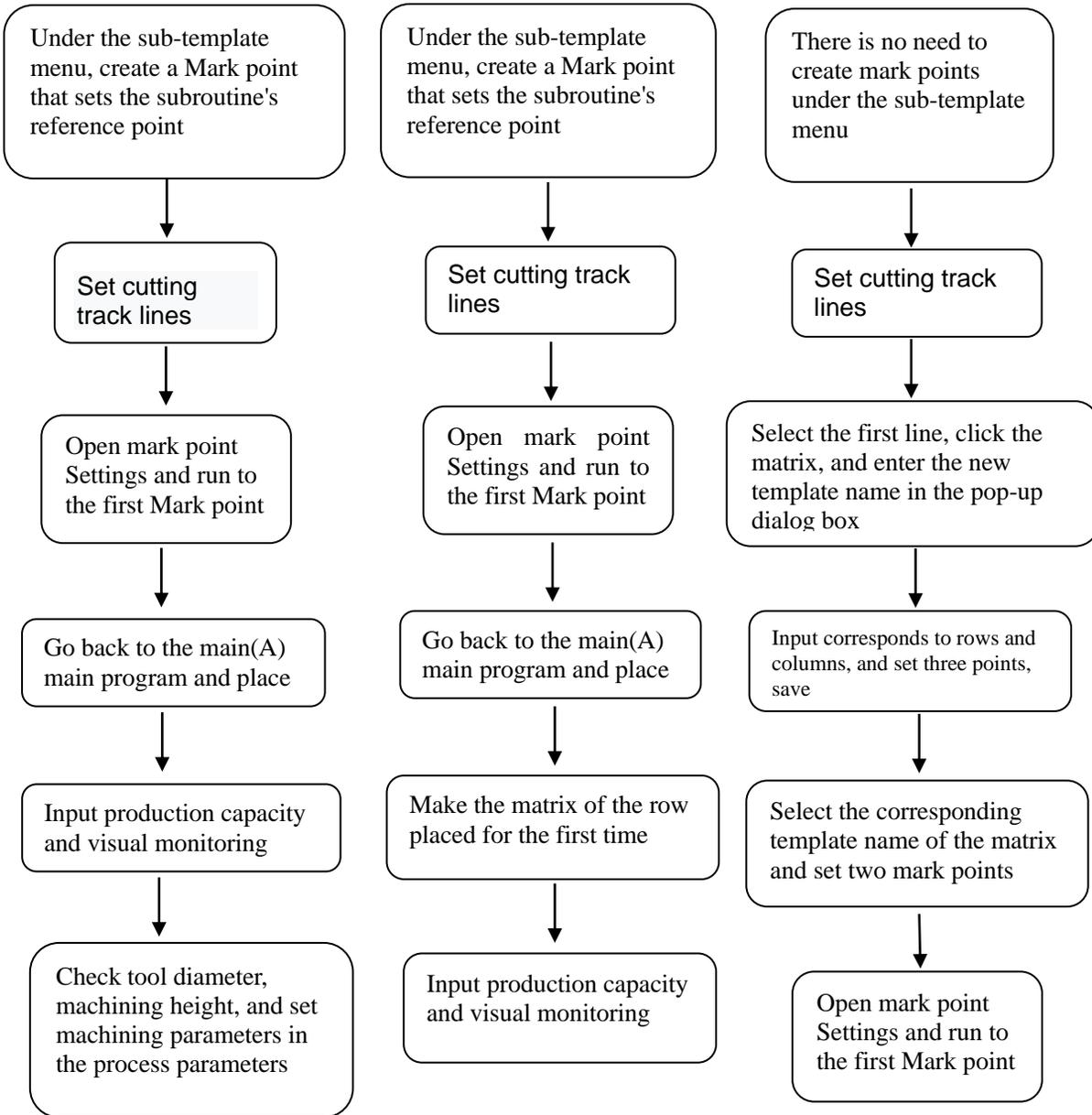
During normal continuous processing, it is necessary to switch the manual mode to the automatic mode, as shown in the following figure;

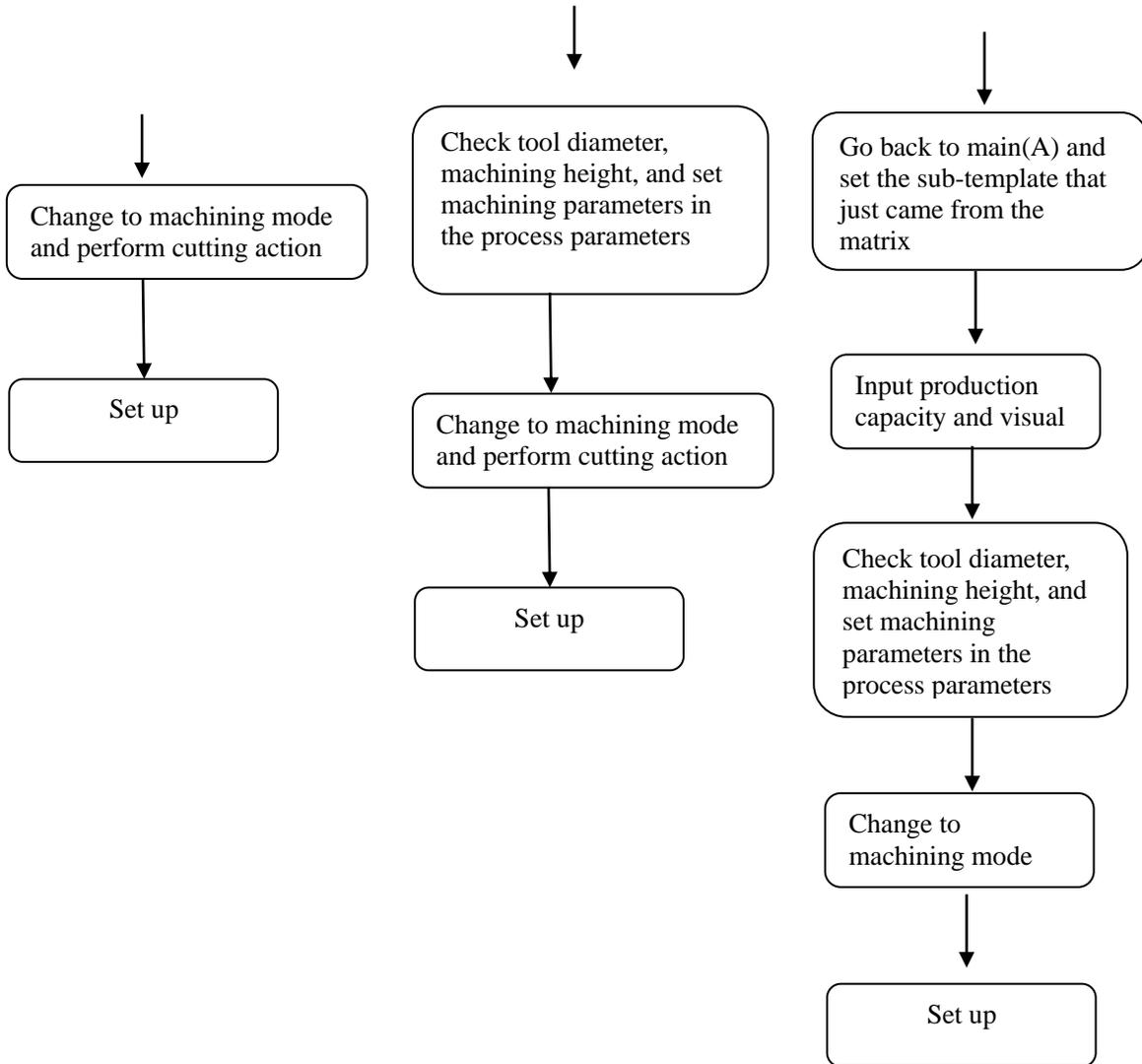


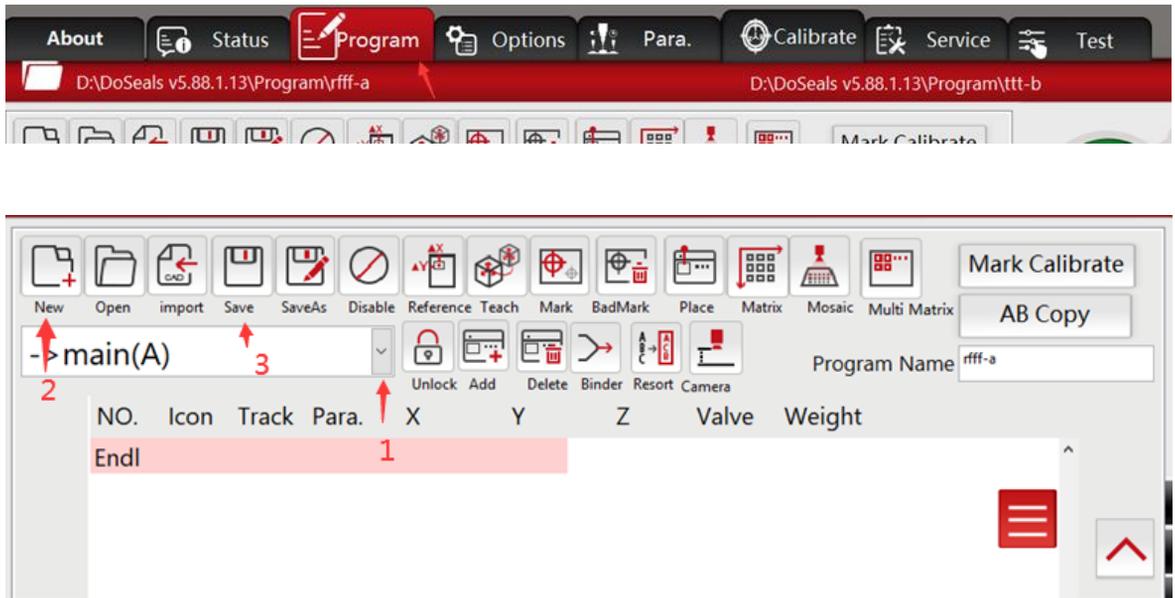
## 二 Program Edit

Generally, before creating a new program, observe the product to be cut first, and then refer to the following process for editing

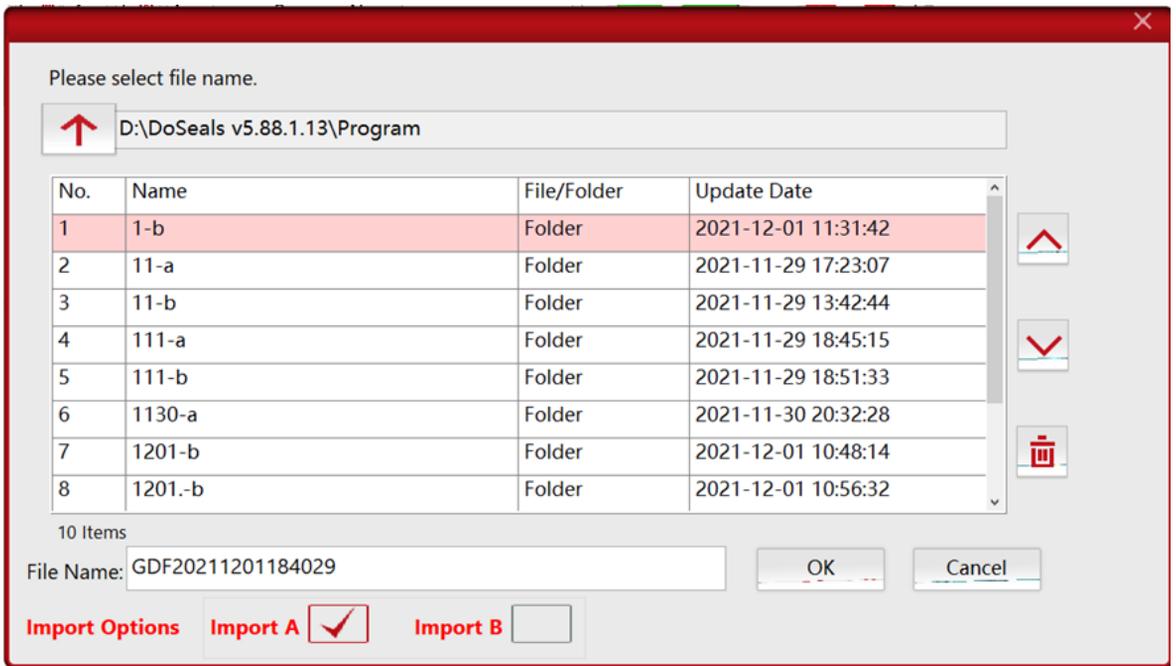




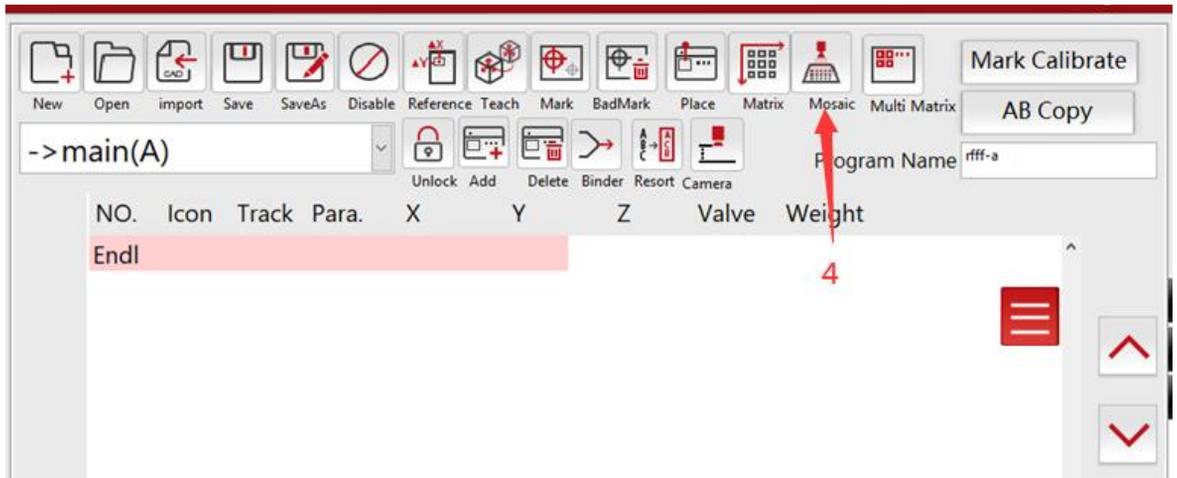




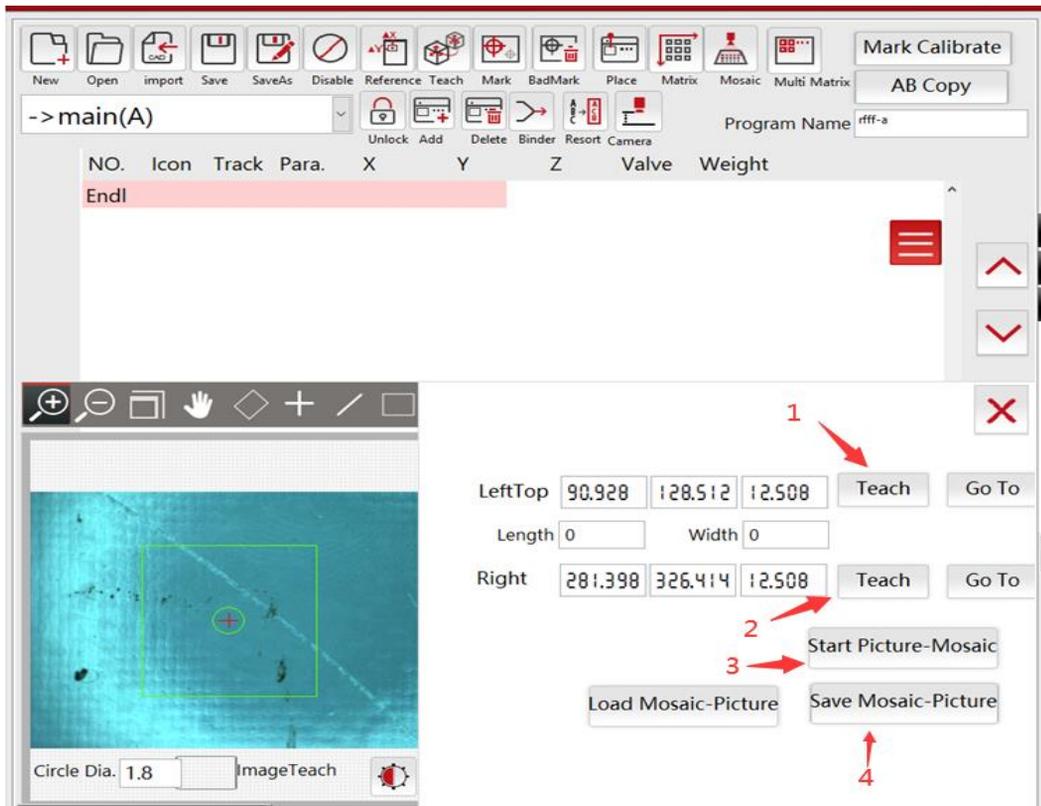
2.1 Select Main (A) left tray programming (step 1), click New (Step 2), click Save input file name (step 3), click Jigsaw (step 4), as shown below;



Click "import A only" , and enter A program name to return to the program editing in the left tray of Main (A). (Note: the file name must be saved before clicking the jigsaw, otherwise the new program cannot save the jigsaw)

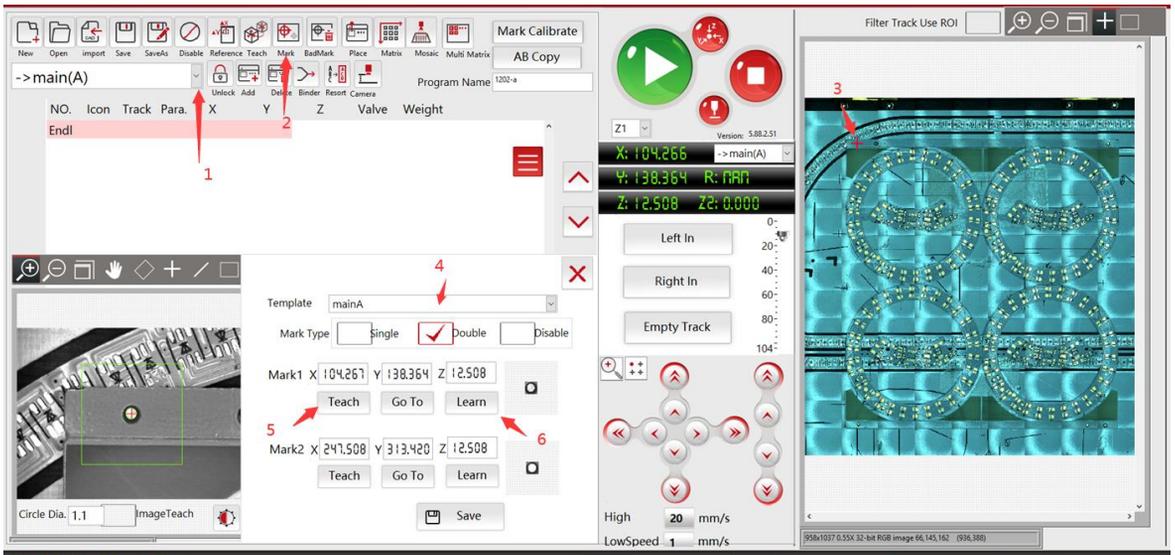


Set the position of the upper left corner and the lower right corner of the jigsaw range, or set the position of the upper left corner, directly input the length and width, also can automatically calculate the position of the lower right corner. After setting, click the jigsaw, and the machine will move the camera to jigsaw in the set area. After finishing the picture, click save jigsaw, and it will automatically save and exit the setting, as shown in the following steps.

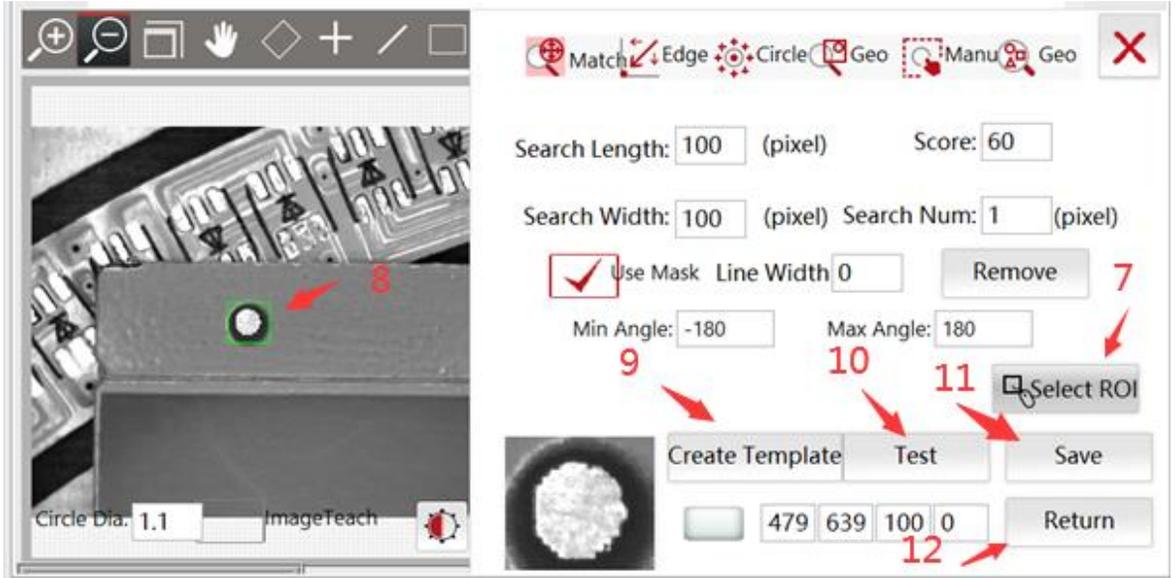


Once the picture is finished, you can start setting the Mark point on the Main (A) screen.

2.2 Click on the Mark setting bar and set the coordinates of Mark1 in the following sequence;

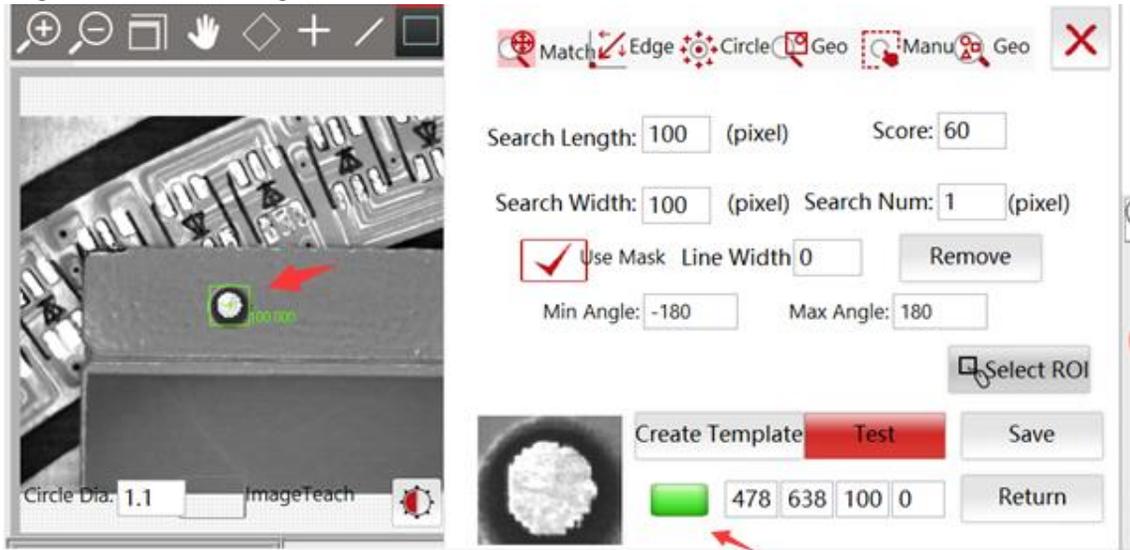


2.3 After clicking the template learning, learn Mark1 template in the following sequence;

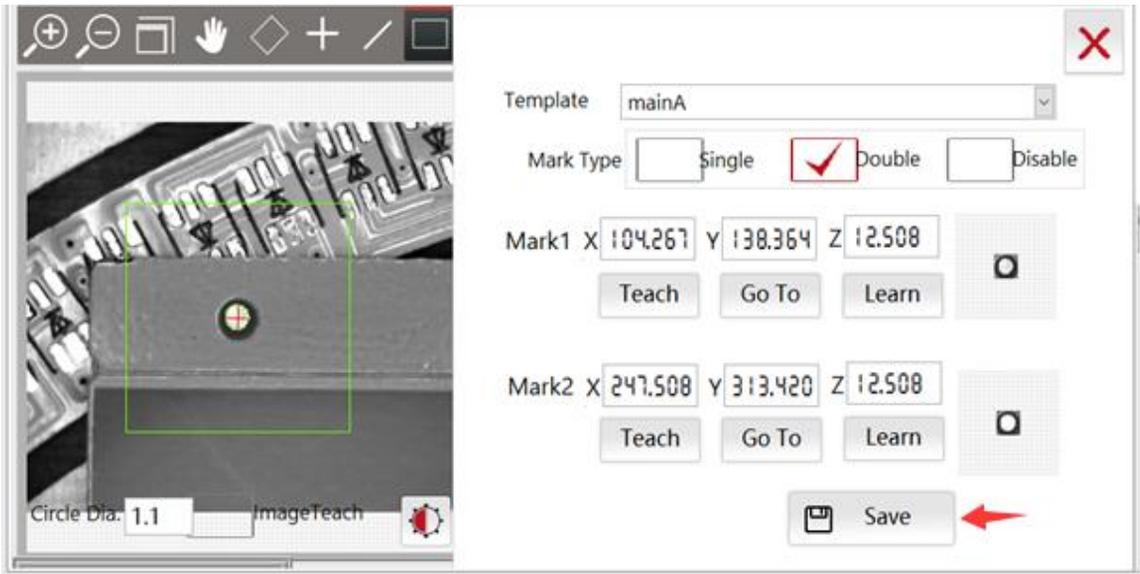


2.4 When you click test, if the test value is displayed as green, then the learning is successful within the

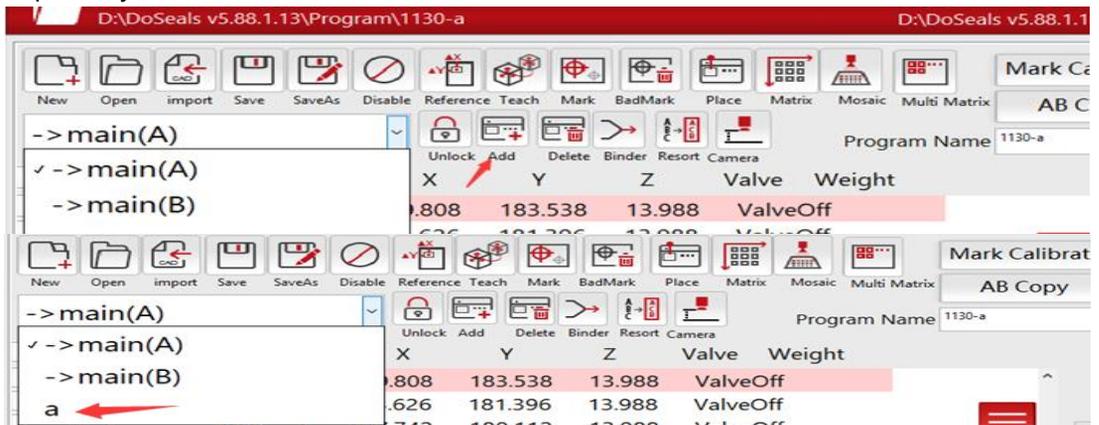
range, as shown in the figure below;



2.5 Repeat steps 2.2 to 2.4 for coordinate setting and template learning of Mark2. After setting, Click save to return to the setting interface automatically;



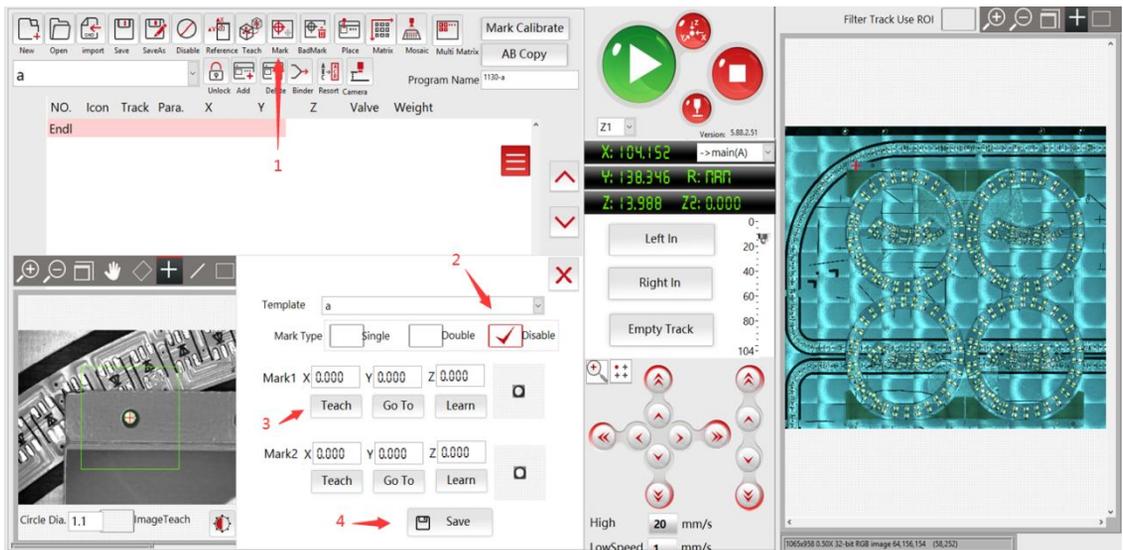
2.6 Click "Add" in the left tray mode of Main (A) to add A subroutine, and enter "A" for the program name (optionally named);



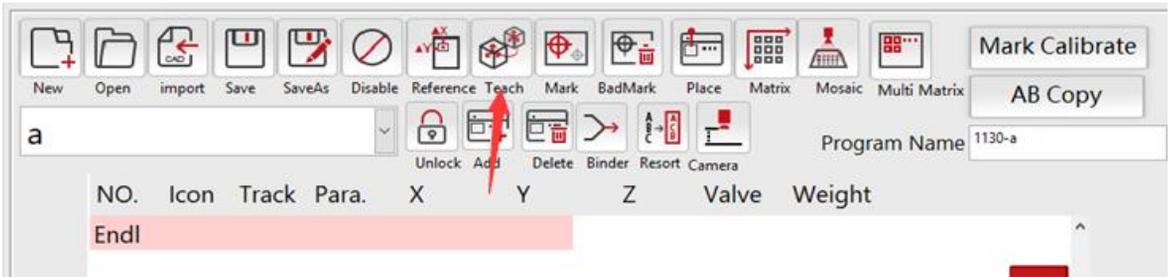
(Note) Main (A) is the left tray of the Main program interface, if you need to cut the PCB do not have the same characteristics, does not require array and

copy, can be directly set the cutting line in the Main program interface, but if PCB products have the same characteristics, need array and copy, must build a subroutine (A), to facilitate subsequent array and the setting function.

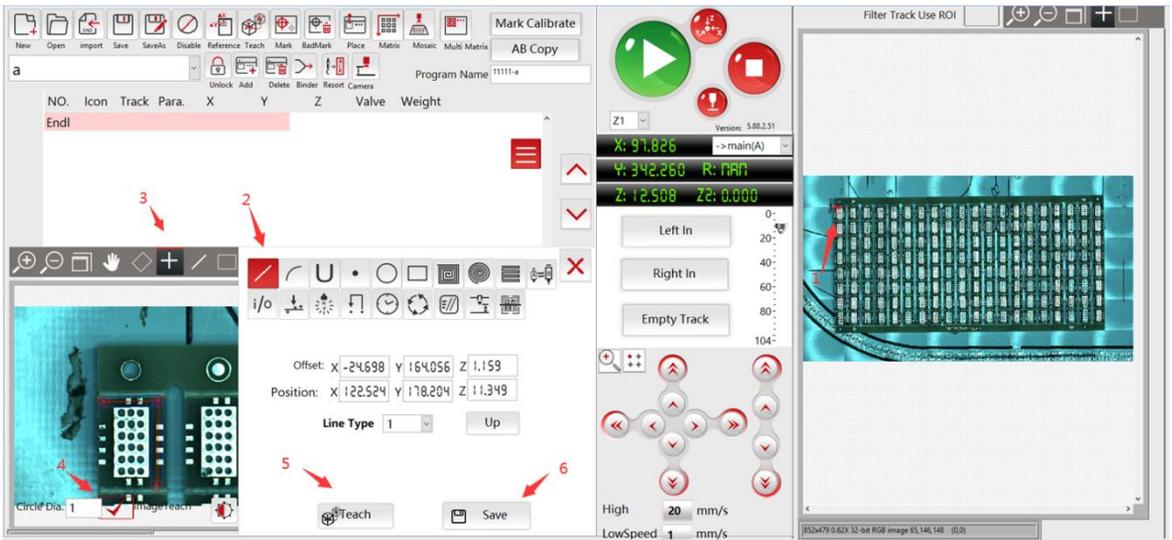
2.7 After creating a new subroutine (for example, "a"), also need set the Mark point,, should choose to disable (refers to the need for program execution Mar point scanning correction action), moving to each small plate have a common feature point (can be a little each dot, or reticle), and click Settings, and finally save and exit (note: Here only the coordinate position of Mark1 needs to be set without template learning), as shown in the following;



2.8 Once Mark1 of the subroutine is set, you can start clicking the Teach icon button as shown below;



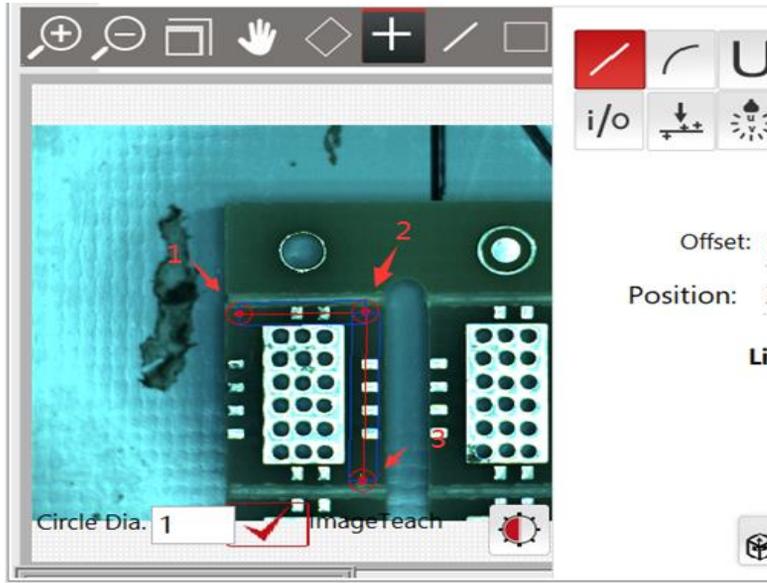
2.9 After entering the teaching interface, first click the coordinate position to be cut in the panorama for rough positioning, and then select a straight line or arc for line drawing (please confirm the circle size before line drawing, it must be consistent with the milling cutter diameter, otherwise PCB board will be damaged), as shown below.



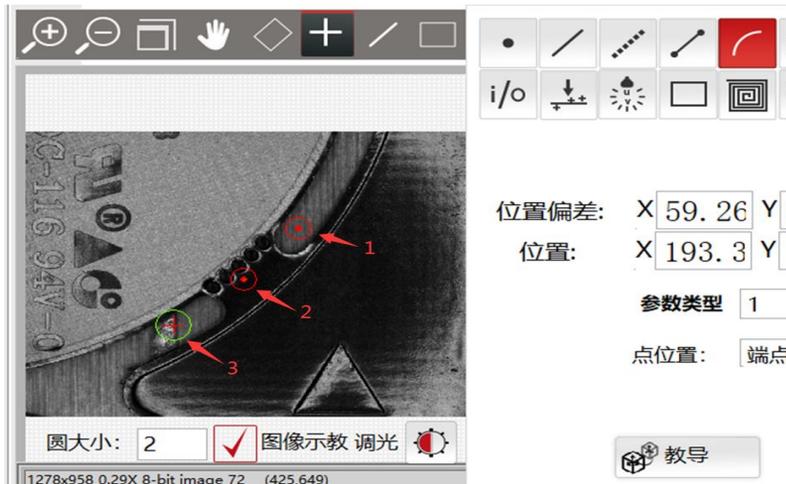
Note: check the operation method of image Teaching function

1. 1. When drawing a straight line, just click the first cutting point

on the picture with the left mouse button, then click the end point with the left mouse button, and the track line to be cut will appear in the picture. Then click teach and Save to generate a cutting track line data and present a green track line in the panorama, as shown below;

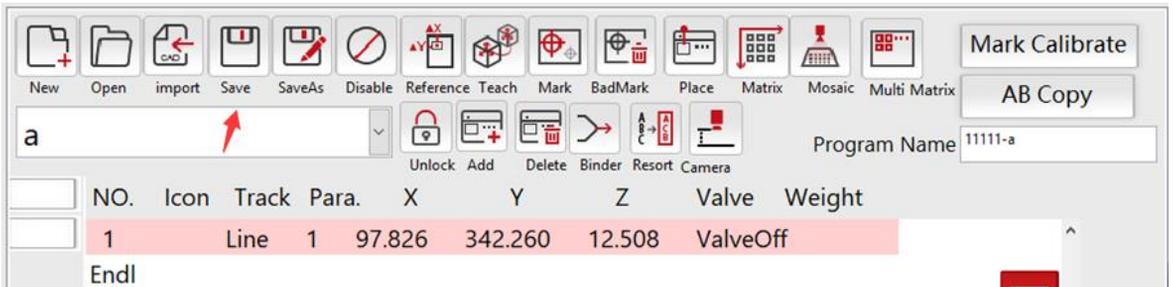


2. When drawing an arc, you need to determine the starting point, midpoint, and end point, three points into an arc trajectory line, click teach, save, as shown below;



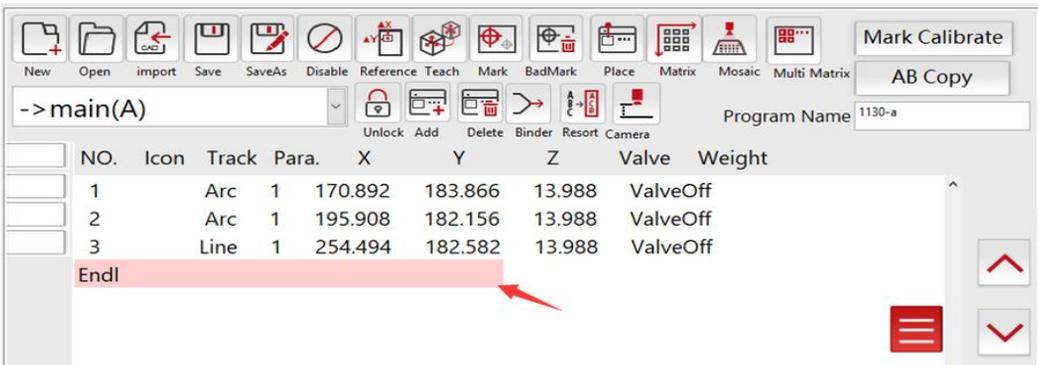
If you do not choose the image teaching function, you need to manually move the CENTER of THE CCD to the first starting point of the line, click teach, choose not to lift the knife, click save, generate the first point coordinate value of the line, then move the center of the CCD to the tail point, click teach, choose to lift the knife, click save, complete the editing of a line; Edit arc is the same operation mode, but need to confirm three points, need to pay special attention to save the last point must choose "lift", otherwise the machine will not lift the knife to cut the PCB board, remember!!

3.0 After set the cutting track line, must timely click the save button;

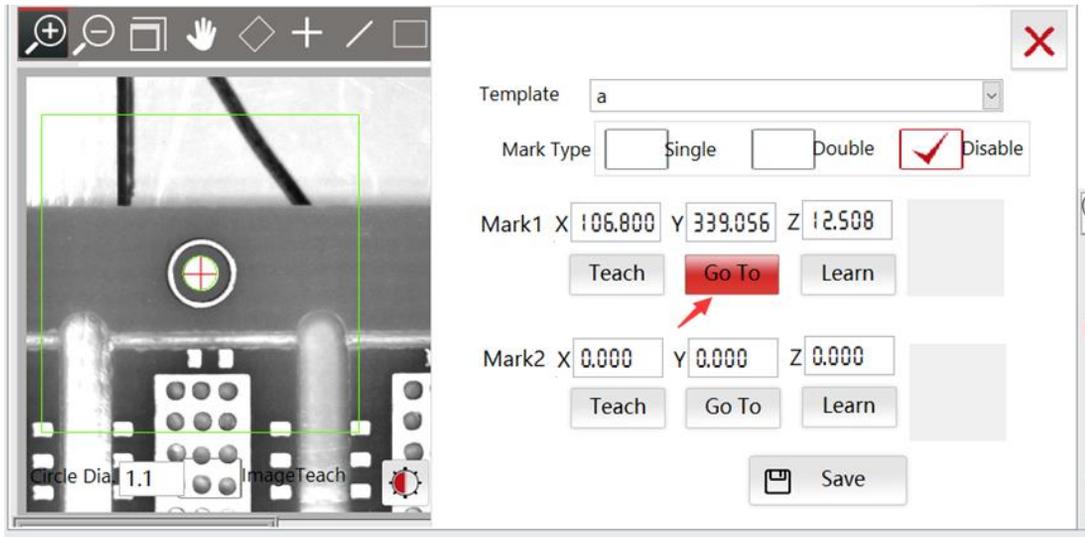


Note: To add a cut track line, the red highlight must be on "Endl".

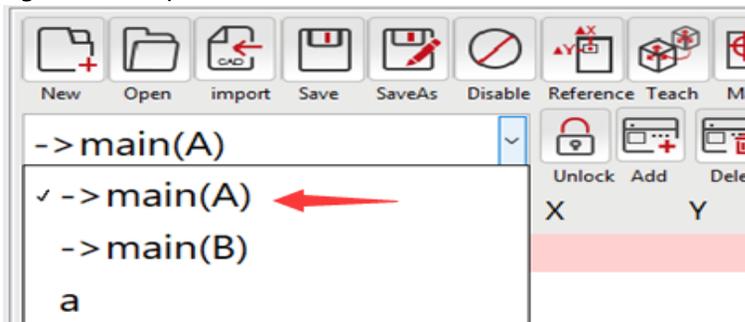
If the cursor is over another coordinate value, the value you just saved will replace the original one. Remember! See below;



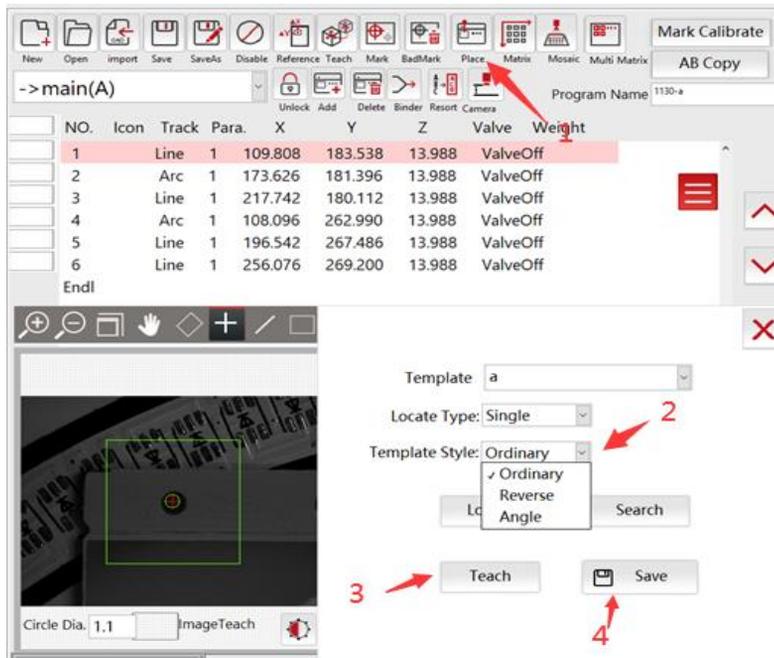
3.1 After the subroutine is saved, click Mark to set and see where the coordinates of Mark1 of the subroutine are. Click "Run to" and the center of CCD will quickly reach this position, as shown in the arrow operation below.



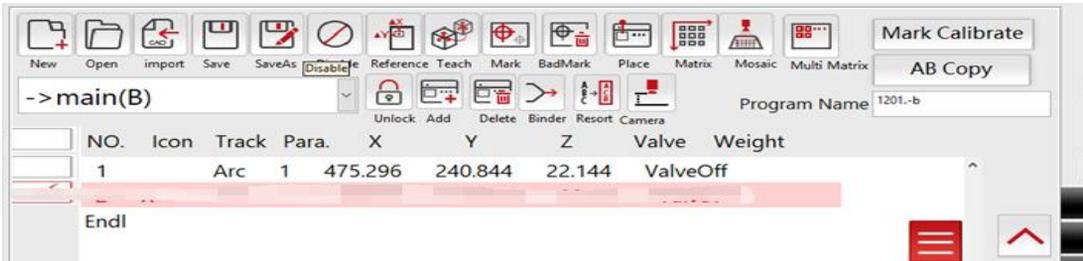
3.2 After reaching the Mark1 position, close this interface and select "Main (A)" from the program



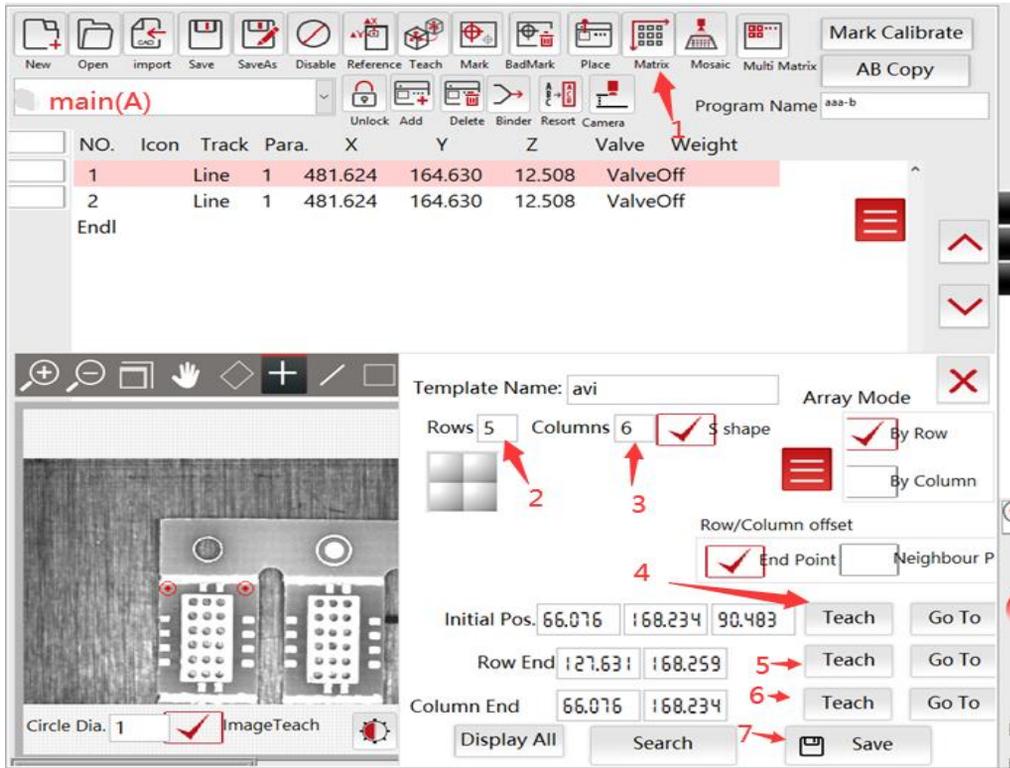
3.3 After returning to the main program interface, click the "Place" menu. This action is to put the newly edited subroutine into the main program, and finally make the machine perform the cutting action according to the track setting requirements in the main program. **(Note: The software does not execute the trace line in the subroutine, but only the programs of the main program (main(A) and main(B)). Therefore, the subroutine must be placed or array in the main program. See below**



3.4 After successful placement, the status will display a line of data. If there are multiple sub-boards with the same characteristics, please use the same method to "Place" and "Teach", as shown in the following;



3.5 If there are many small boards with the same characteristics in a piece of board, the function of "matrix" can be used. Before using this function, a subroutine must be placed in the main program, select the placed data row, click the matrix, and operate according to the steps marked in the following picture.;



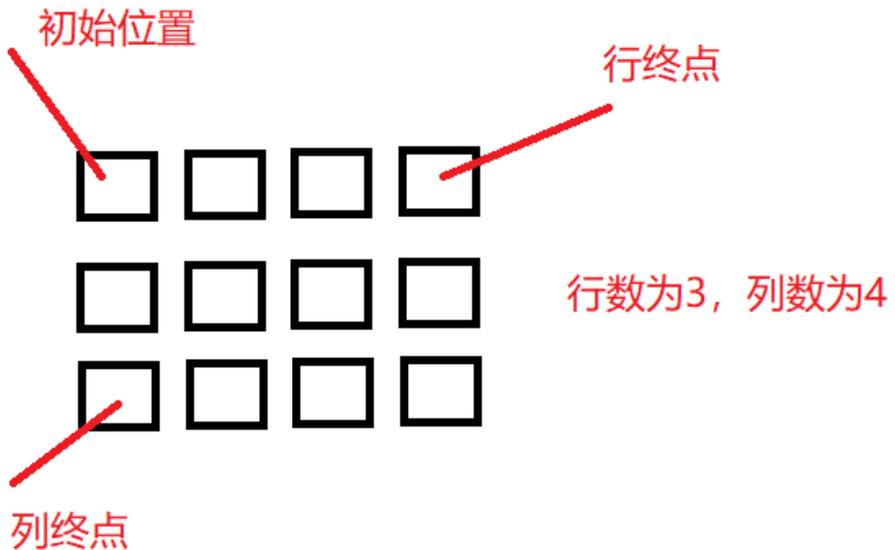
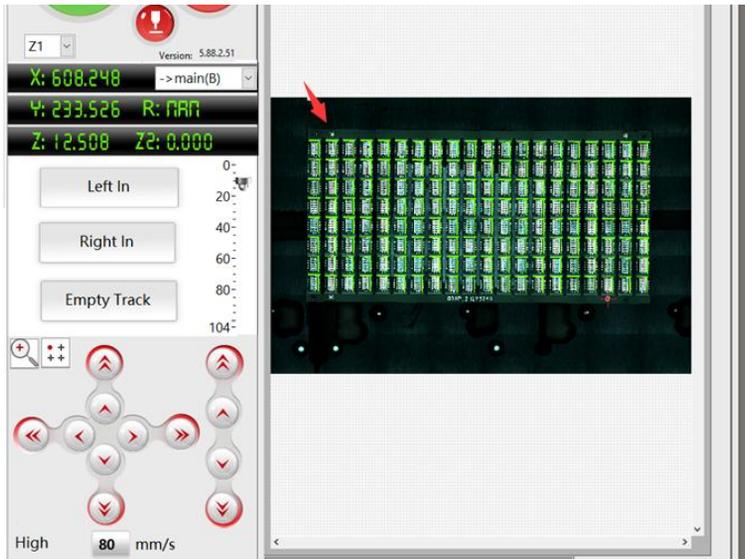
The screenshot displays the software interface with a table of cutting tracks and a configuration dialog box. The table has the following data:

NO.	Icon	Track	Para.	X	Y	Z	Valve	Weight
1		Line	1	481.624	164.630	12.508	ValveOff	
2		Line	1	481.624	164.630	12.508	ValveOff	

The configuration dialog box shows the following settings:

- Template Name: avi
- Array Mode:  By Row
- Rows: 5 (indicated by red arrow 2)
- Columns: 6 (indicated by red arrow 3)
- Row/Column offset:  End Point (indicated by red arrow 4)
- Initial Pos. 66.076 168.234 90.483
- Row End 127.631 168.259 (indicated by red arrow 5)
- Column End 66.076 168.234 (indicated by red arrow 6)
- Buttons: Display All, Search (indicated by red arrow 7), Save

3.6 After clicking save, all cutting track lines will appear in the panorama, as shown below

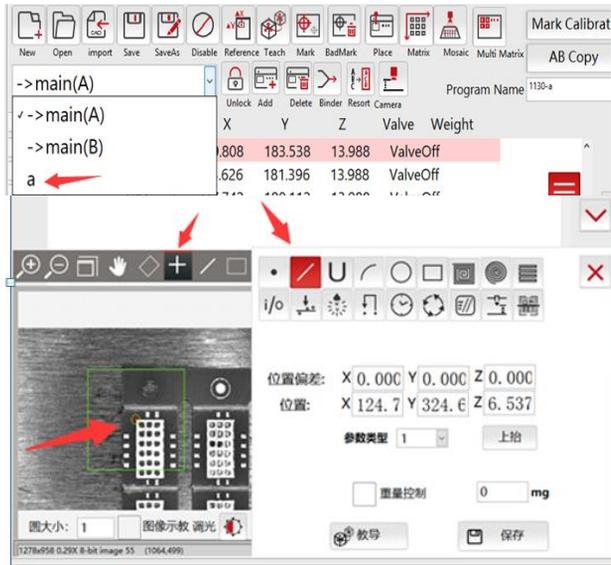


3.7 After all the data is arrayed, disable the data row placed for the first time (the first small board will be repeatedly cut twice), and proceed with the following steps (note: if the matrix function is not carried out, only the placement function does not need to operate this step);

1	Matrix	1024a	118.590	244.692	6.447	普通
2	X	DO	1024a	118.590	244.692	普通
Endl						

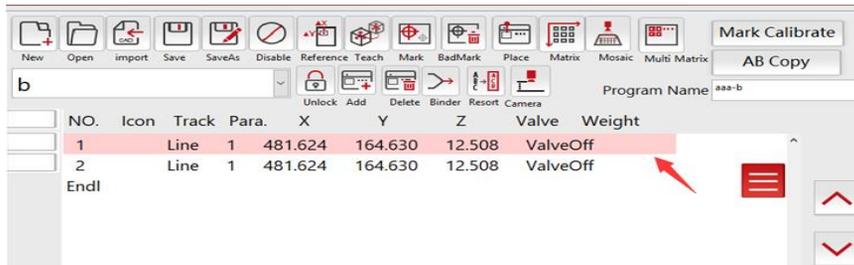
3.8 If you need to expand the data from the "matrix", do as follows;

3.8.1 If you need to expand the data from the "matrix", do as follows;



Note: when the first line is drawn in the figure above, when "Teach image" is not checked, It is better to set the cross line of the circle at the right Angle of the board or mark point, mainly for the convenience of making reference point position for the following board. After setting, check "Image teaching", do not move the XY axis, and then directly draw lines in the screen.

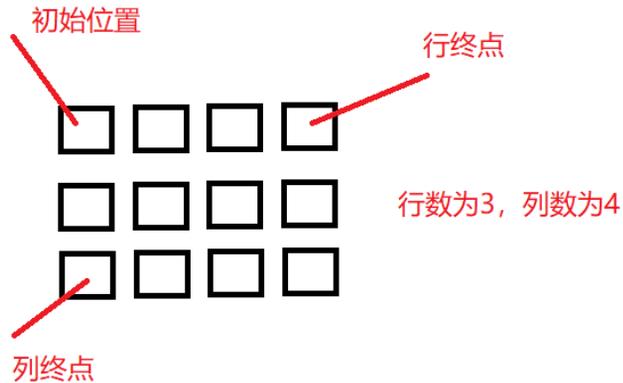
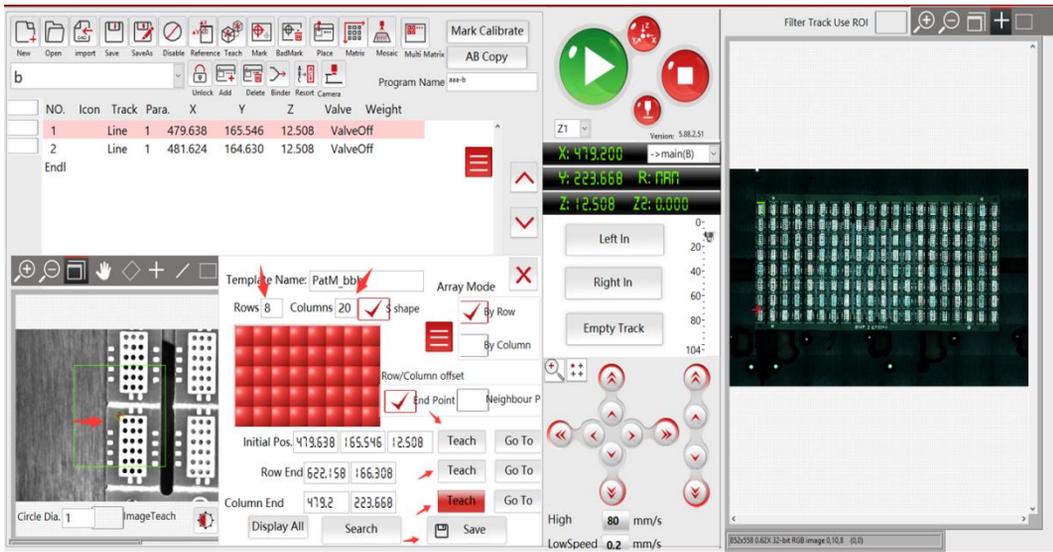
3.8.2 After drawing the cutting track line in the sub-template, select the first line of data and click the matrix, as shown below.



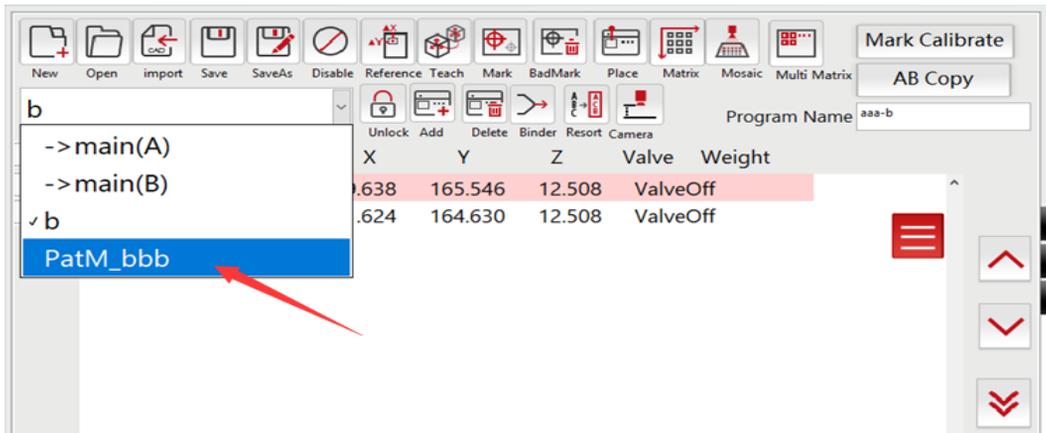
3.8.3 After clicking matrix in the sub-template, a dialog box will pop up, and you need to enter the new template name (note: clicking matrix in the main program will not pop up this dialog box), as shown below.



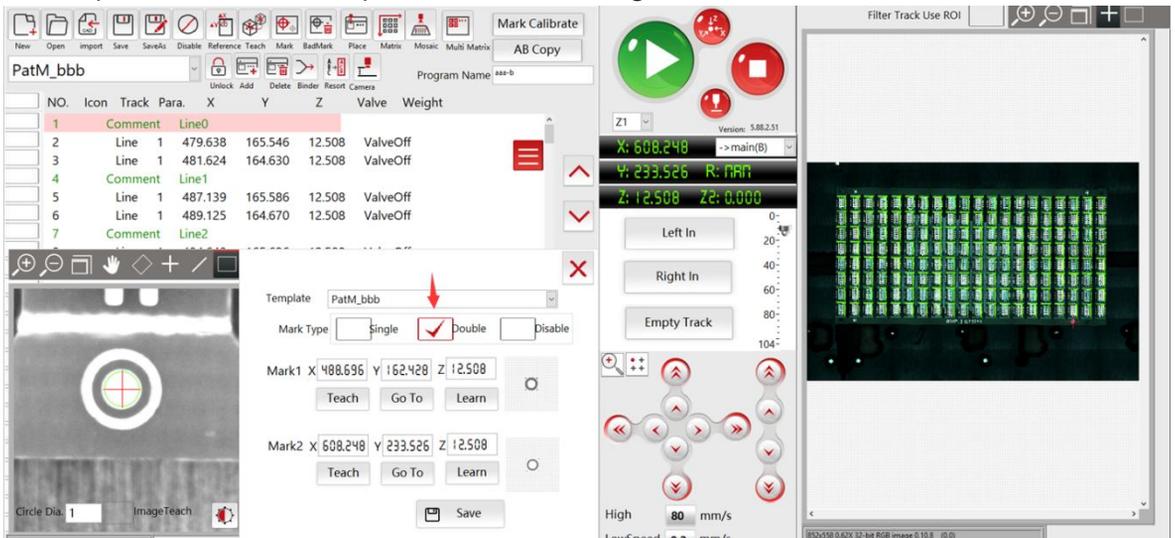
3.8.4 Input the corresponding row and column in the matrix column, and then Teach the corresponding row and column end points. The following end points of row end points are the same as the starting point set by the first board (note: to remove the check of "image teaching", you can see the cross line of the circle, that is, the center of CCD).



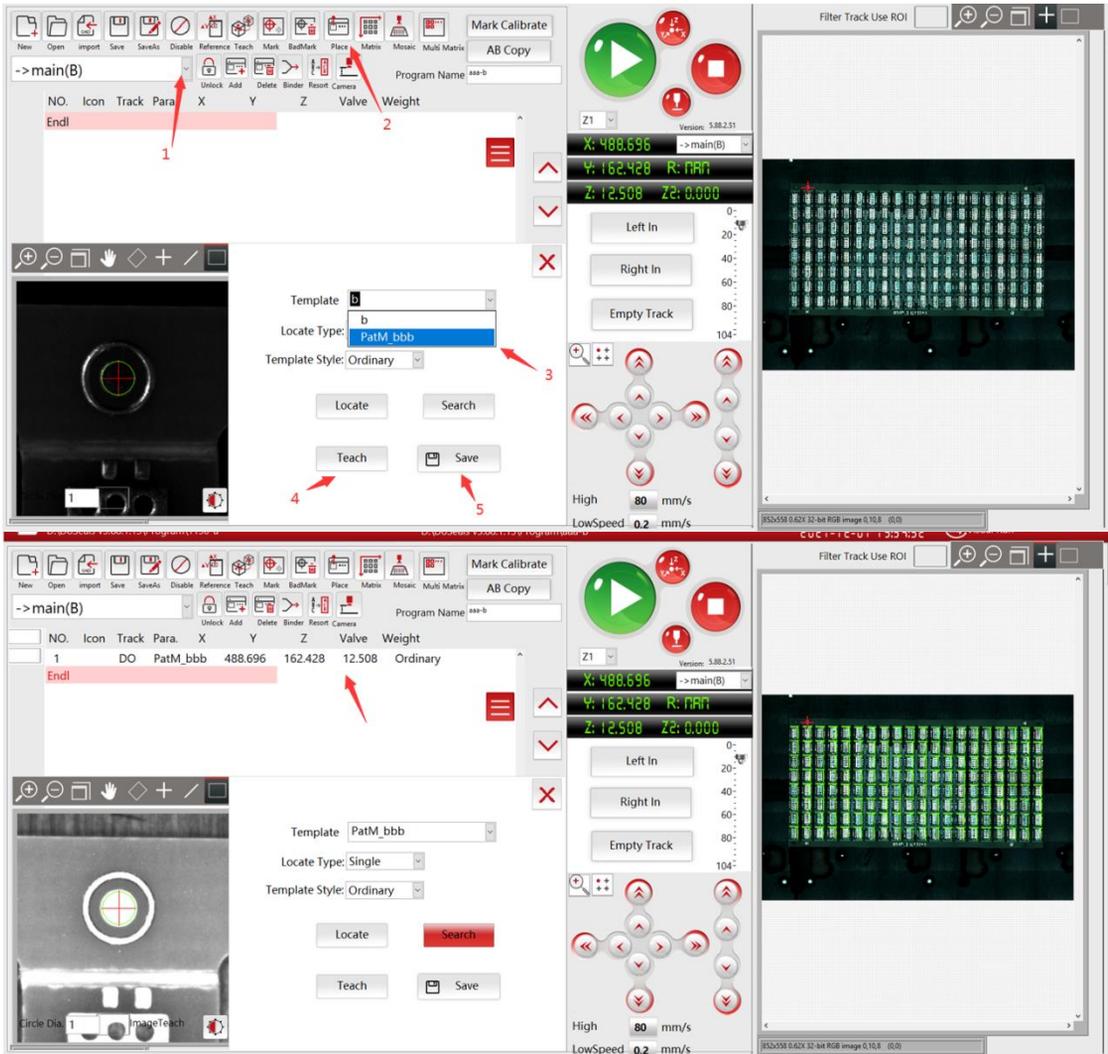
3.8.5 After the matrix is finished, the matrix data cannot be seen in the current sub-template, so you need to select the sub-template produced by the matrix from main(A) as shown below.



3.8.6 After selecting the sub-template from the matrix, you can see all the extended board data and make individual changes. At this point, it is necessary to set two mark points on the matrix sub-template and learn the template, as shown in the figure below.



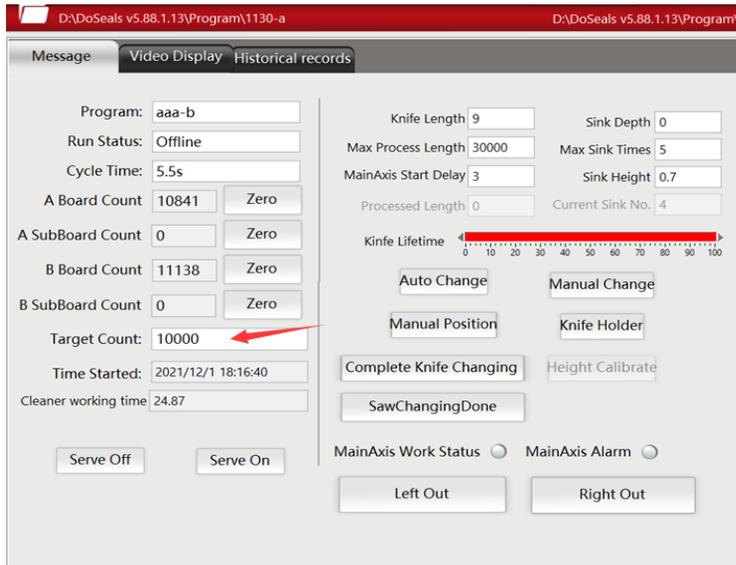
3.8.7 Move to the position of the first mark point, select main(A) main program, and place the sub-template out of the matrix in the main program, as shown below;



If multiple boards need to be placed, find the mark1 position of the next board again to place, and then the data of multiple boards can be added.

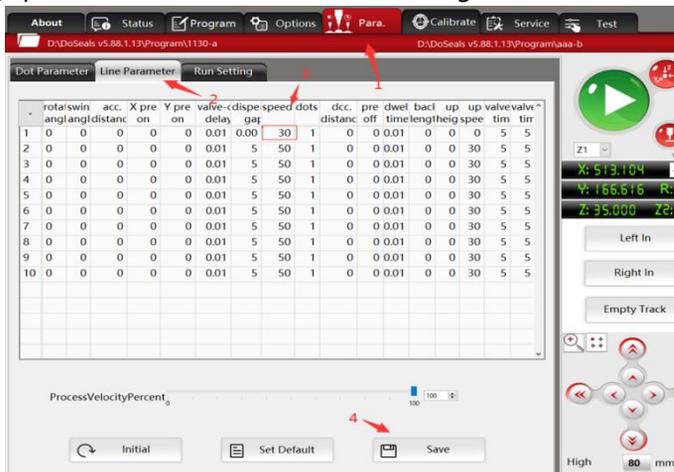
3.9 When all programs are set up, you can click the start button and observe the track line in visual monitoring mode to see if there is cutting deviation (when starting for the first time, a target capacity

number should be entered into the equipment information), as shown in the following operation steps;

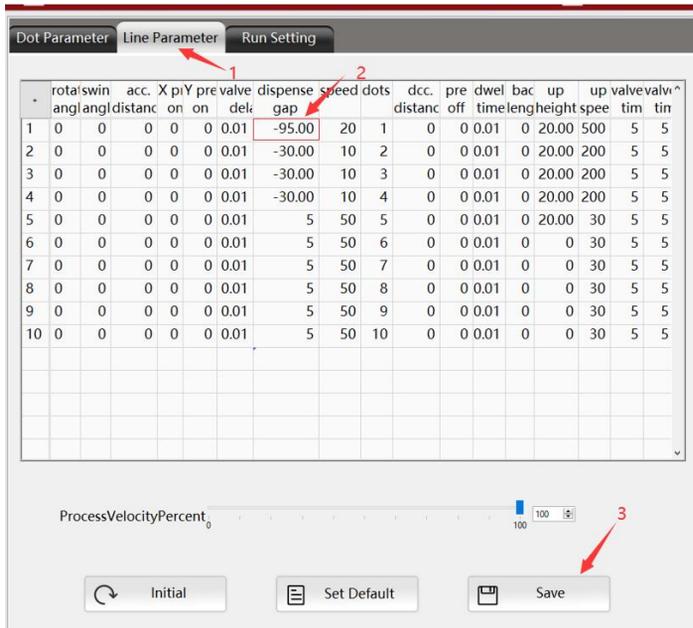


4.0 After observing no problem through visual monitoring, click the process parameter to modify the

speed of cutting track line. (Under normal circumstances, the first debugging speed should not be adjusted too fast, the smaller the diameter of the milling cutter, the speed should be relatively set small, to prevent cutting speed too fast to lead to cutter breaking), see the following operation steps;



4.1 After setting the cutting speed, check the column of "dispense gap(work Reference Height)" in the system setting and follow the operation steps as below;()



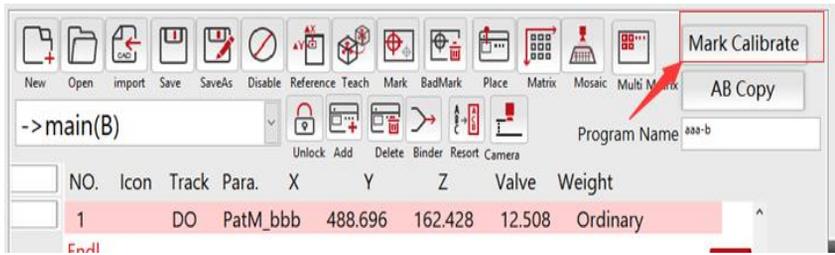
The third step is to slowly lower the z-axis cutter head to the PCB board (the drop position should be outside the jig), press the "teach" button, then the z-axis coordinate value will be set as the cutting height.

4.2 After setting the cutting depth, you can start the cutting action.

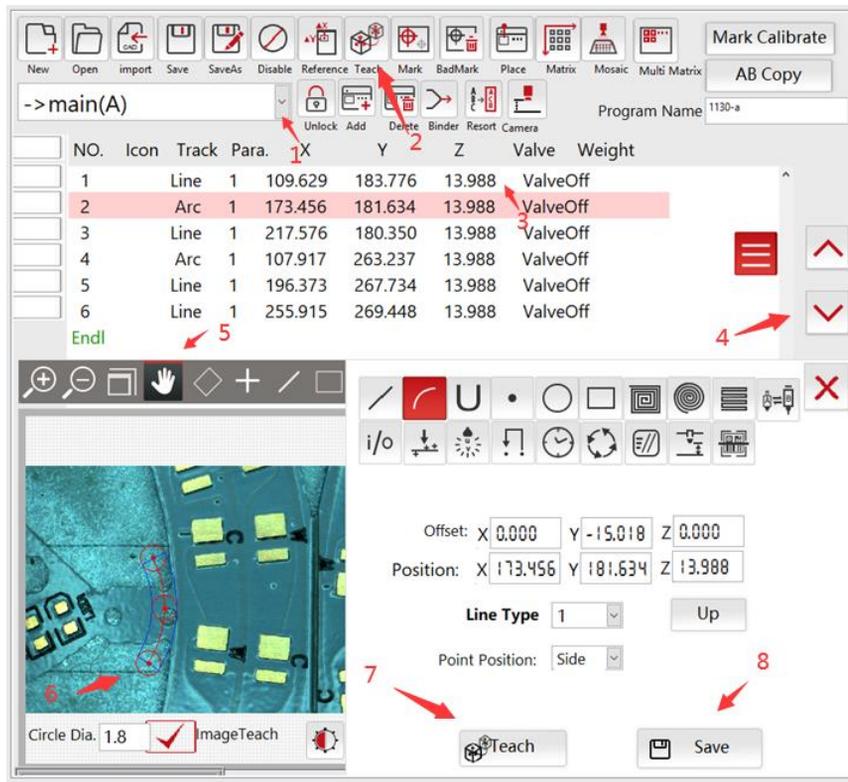
## 4 Program Correction

When it is found that some trace line cutting deviation occurs in the program, it must be corrected. Please follow the following steps to operate;

If two mark points are made in the main program, click the "Mark matching" button; if not, click the "Mark matching" button in the subroutine, whose main function is to first make mark points on the PCB board for correction, as shown below



After Mark point alignment, then modify a cutting line separately, as shown below;

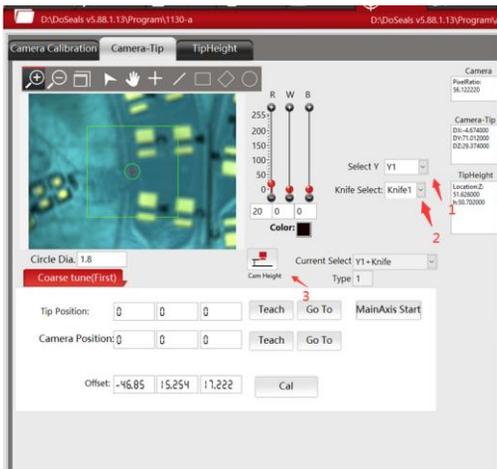


Note: After clicking the gripper, when the cursor moves to

the middle of the line, you can directly drag the previous track line to realize the overall offset function. If the cursor moves to either end, it can be stretched or shortened and the coordinates can be moved. Arc line is the same operation method. After modification must click teach, and save (can only click once), the data will be updated, return to modify teach interface, also need to click save to the current program.

## 五 Camera and cutter head calibration

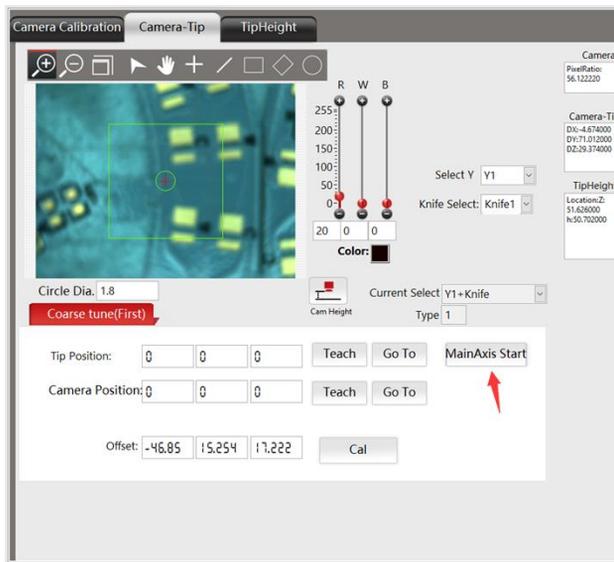
Calibrate XYZ deviation between camera and spindle cutter. (Calibration of "camera and tool head" is required only after deviation between camera simulation and actual cutting or removal of camera or spindle)



**Operation Instruction:**

To correct the offset between left trays, select Y1 from "Y-axis Selection Type" (to correct the offset between right trays, select Y2 from "Y-axis Selection Type")

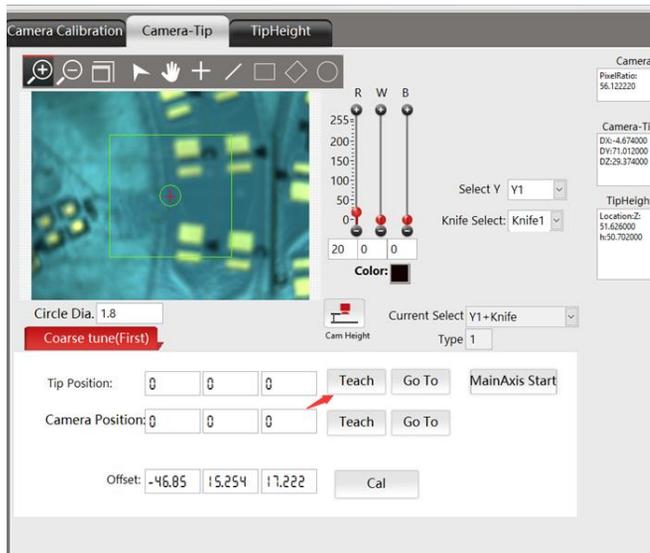
1. Click the height of the camera, select the Y-axis type, move the spindle to a point on the surface of the fixture or PCB board (not in use), click "Spindle start", then the spindle starts, as shown below;



2. Click Z axis down, when the spindle milling cutter contacts the surface, you will hear a little sound, confirm that a hole was drilled, and then raise the Z axis to a safe height, and then click the "spindle start" button, this way you can close the spindle, as shown below;



2. After lifting to a safe height, click "Teach" in the position of the cutter head, as shown below;



3. Then move the camera to the center of the position of the round hole. Enter the diameter of the milling cutter for the radius of the circle, and click "Teach" in the position of the camera, as shown in steps 1 and 2 below;

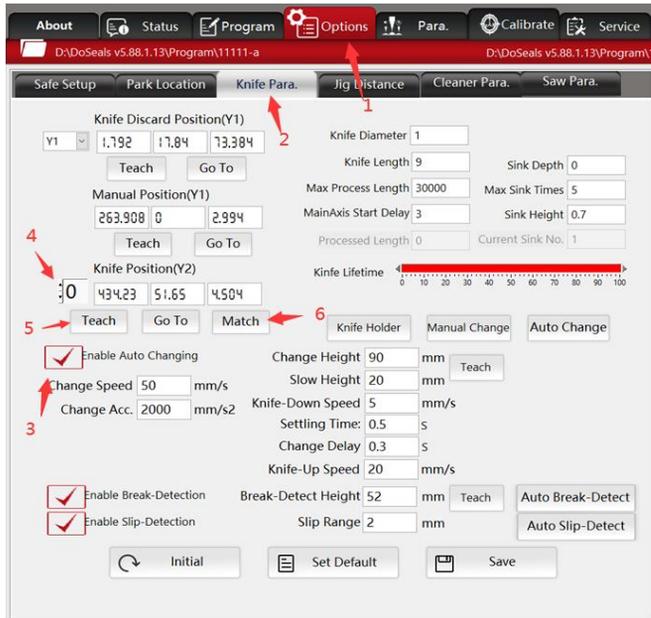


4. Finally click the "calculate" button to complete the calibration of camera and cutter head.



## 六 Automatic knife change Settings (Q380A configuration function)

1. Click on the "system setting", and then select "Knife parameters", check the "enable auto changing", click on the up and down arrows to select the number to set up the knife location, and then moving the CCD to knife center position, and click the "teach", coordinates to teach after go in, and click "match" do template Settings, as shown in the below step;



2. Enter the template matching interface, move the CCD center to the center of the knife, learn the knife template according to the following steps, and finally click "Save template", and it will automatically return to the menu of the upper level.

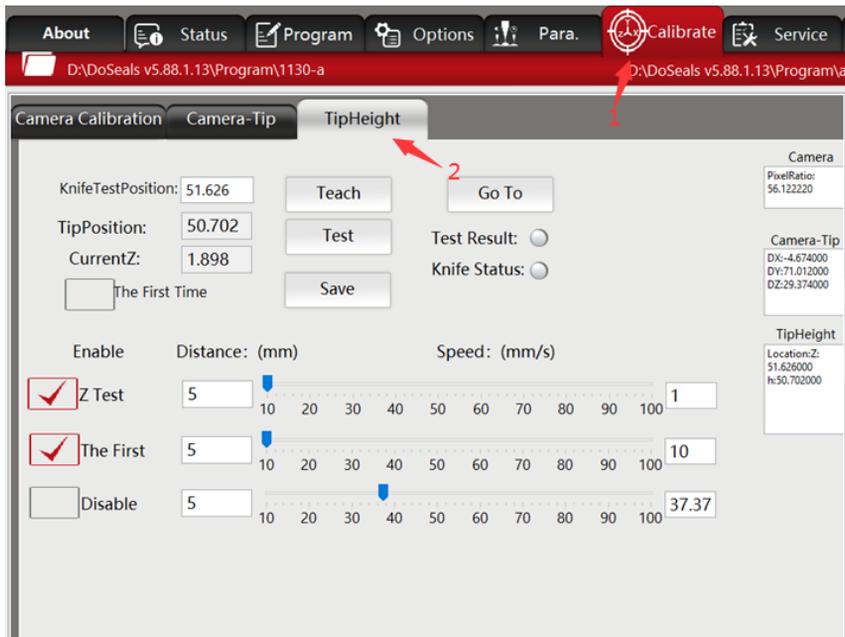
### 七 Automatic tool height correction function

- 一、 This equipment has the tool automatic correction function (in replacing tool, because the height of each of the cutting tool positioning ring will exist a certain differences, and some of the milling cutter is not installed the locating ring, so can't ensure the height of the cutting tool consistency every time, therefore, this equipment independently developed tool height automatic correction function, its working principle is: When after manually or automatically change the knife, click tool height adjustment button, Z axis slowly fell to a red laser cutting knife with high detection sensors point location, by automatically decline to determine the height of the new cutter coordinates, the software automatically record the coordinate values of the Z axis, with the height of a detection of the cutting tool and set the base board height when editing program, The software can

realize the z-axis automatic compensation function, to ensure that after each tool change, the z-axis tool drop position is consistent, to prevent cutting PCB board and the bottom of the product components.

## 二、 Operation steps:

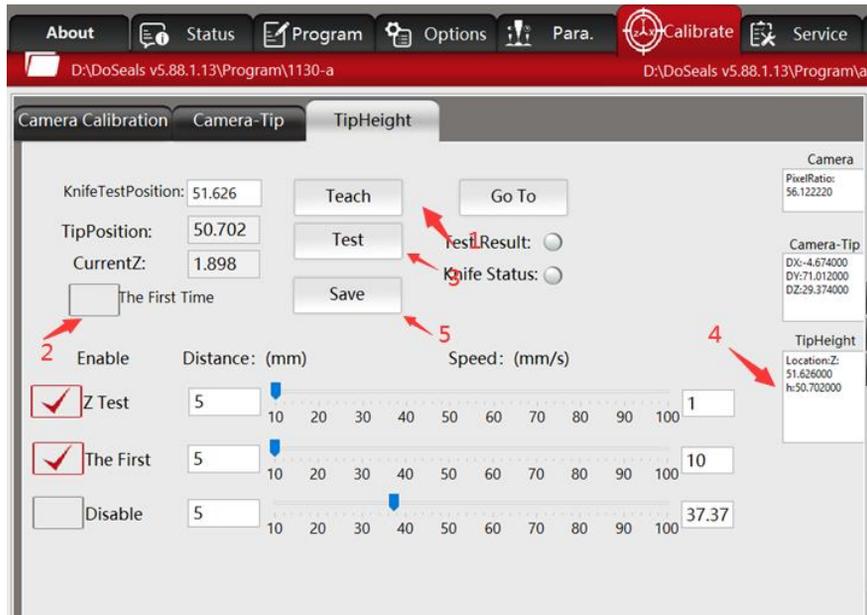
1. Click "Position Calibrate" and select "Tip Height", see the operation steps in the picture below



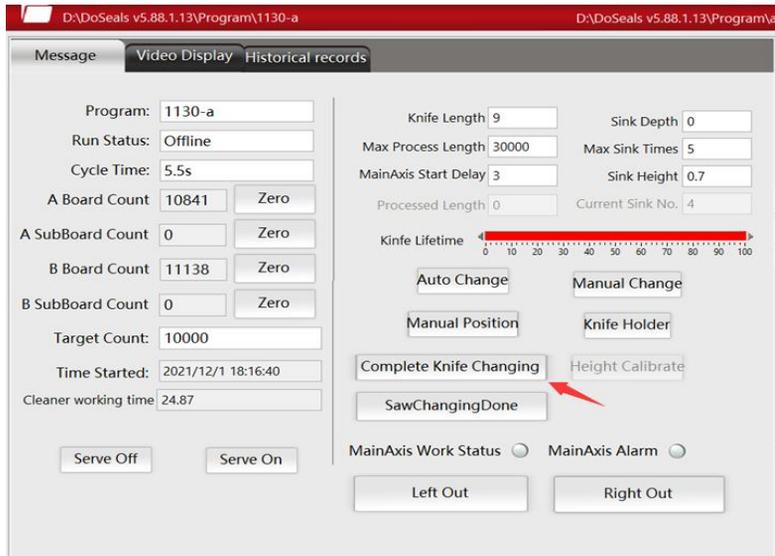
2. Check the box in the "Enable" column to directly select "Z test " and "The First ", which can be separately set at the distance and speed of the test, in order to improve the accuracy of the Z-axis test value; The following figure;



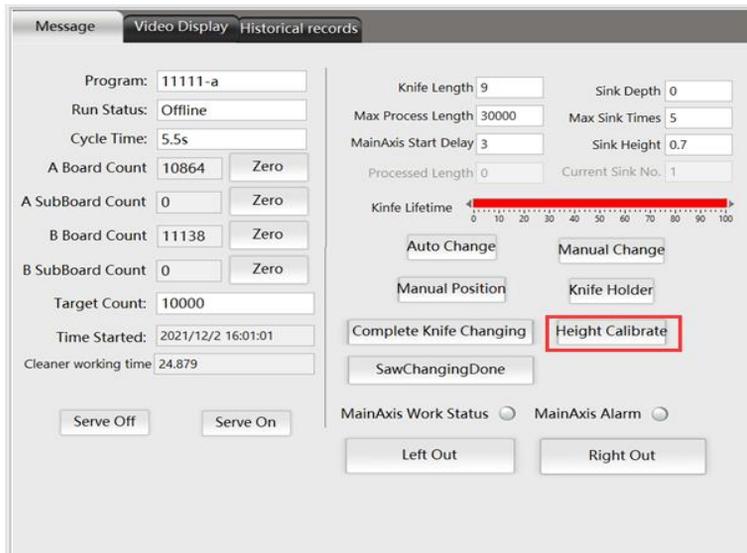
- Click the slow descending Z-axis until the valve state lights up, indicating that the height sensor has sensed the knife tool. At this time, click the instruction of "Tip height test position", then check the box of "The first time", click the test, the tool height is tested and displayed in the column of "Tip height", as shown below:



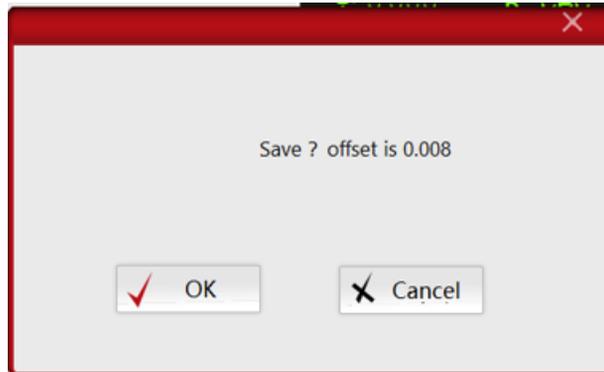
- After the test, click Save.
- After replacing a new knife, first click the button of "Complete knife changing" as shown below;



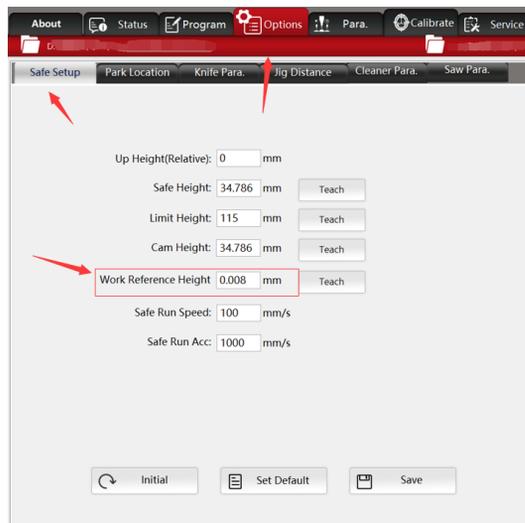
6. Click "Height Calibrate" , as shown in the picture below;



7. Z axis automatically drops to detect the height, and then click save. The system can automatically calculate the Z axis and recalculate the processing height of Z axis to ensure that it is consistent with the height of the previous tool sinking processing.

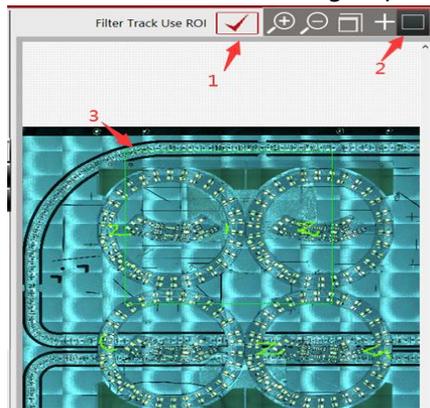


8. After saving, you can go to the "Options" column to check the safety Settings, and it will be found that the value of "work reference height" will change, because it is reset according to the value automatically tested by the machine. See below



## 八 How to shield excess cut lines (Filter Track Use ROI filtering)

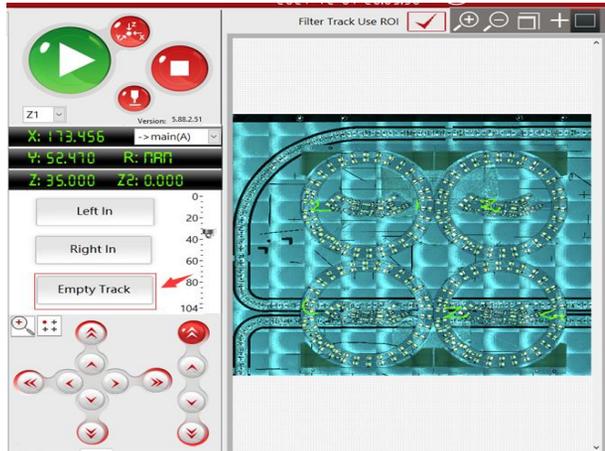
8.1 If there are extra cut lines coming from the arra, then need to shield the extra cut lines. The operator can check "Filter Track Use ROI" in the panorama area, and then select the frame to select the cutting line to be filtered, as shown in the following steps;



8.2 After selecting the area, a dialog box will pop up on the interface, select OK (step 4) to complete the setting of this function, and then carry out visual monitoring mode, it will find that the cutting line track just selected has turned gray, indicating that the selected area will not be cut during the processing operation.

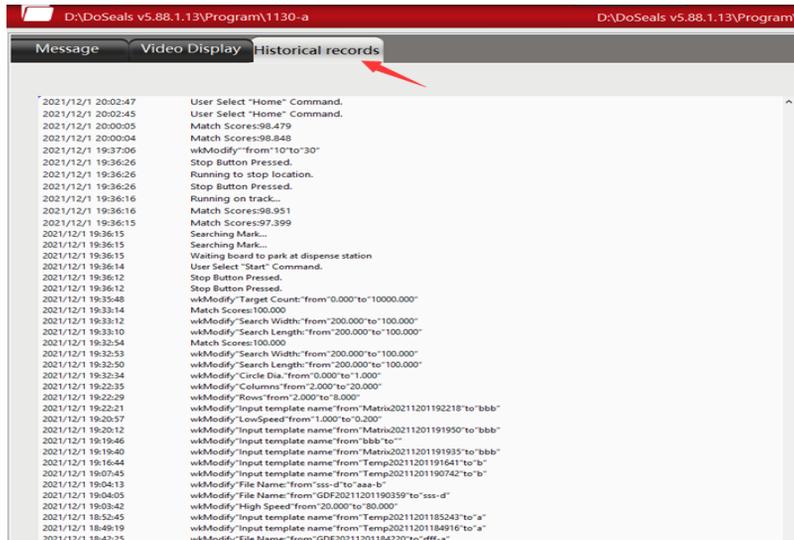


8.3 If the previous cutting track line needs to be restored, just click "Empty Track" and click "OK" to restore it, as shown in the picture below



## 九 How to query machine history and fault information

When the machine is running, if there is a sudden failure, the machine will record some artificial settings and failure codes, which are recorded in the "History" in the menu of "Device Information", as shown below.



## + Simple Maintenance Instructions

10.1. Before cleaning and maintenance, turn off the main power supply of the machine, unplug the power plug, and ensure that the power is completely cut off.

10.2. Use cotton cloth to wipe the surface, with non-corrosive detergent to wipe, do not use chemical solvents, such as industrial alcohol, washing board water, avoid abrading paint and machine accessories.

10.3 Machine work table, double Y axis cover plate around the keyboard and mouse should be kept clean.

10.4 All switches should be kept clean at all times to avoid foreign matter and dust falling into them, affecting the operation of the machine and causing damage to it.

## Maintenance Periodic Table.

Maintenance Table								
No.	Items	Maintenance mode	Time					Remark
			Day	Week	Month	Quarter	Year	
1	Appearance	Wipe		1				
2	Display	Wipe			1			
3	Industrial control host	Wipe			1			
		Dust removal				1		
4	The mouse	Wipe		1				
5	The keyboard	Wipe		1				
6	Operation table	Wipe	1					
7	Plate fixture	Wipe	1					
8	Industrial camera	Wipe				1		Wipe with mirror paper
9	Ball screw	lubrication			1			High speed bearing grease
10	Guide sliding	lubrication			1			High speed bearing grease
11	Electric box filter	Dust removal			1			
12	Dust collecting	Dust removal		1				
13	Dust bag	Dust removal	1					Shake the lever to remove the dust
		Cleaning				1		
14	Dust collection box	Dust removal	1					

## +- Simple Trouble Removal

### 11.1 Error message

Message	Cause	Elimination method
Software interface reports X/Y1/Y2/Z axis driver alarm	<ol style="list-style-type: none"> <li>1. The power line of the specified shaft or the plug wire of the encoder is loose;</li> <li>2. The driver connector is loose.</li> <li>3. There are foreign bodies stuck in the moving position of the specified shaft, which can not move, and overload phenomenon occurs;</li> <li>4. The driver is damaged.</li> <li>5. Motor failure and damage.</li> </ol>	<ol style="list-style-type: none"> <li>1. Reinsert the power cable or the plug cable of the encoder;</li> <li>2. Pull out the plug of the driver end and plug it in again. When inserting and removing the cable, you must turn off the power supply of the machine before performing this operation;</li> <li>3. Find out the stuck foreign body, in the case of power off, manually push the movable shaft, no longer stuck feeling, and then power on the test machine again;</li> <li>4. Replace the driver and debug related parameters.</li> <li>5. Replace motor</li> </ol>
Machine pressure is low, please check air supply system	<ol style="list-style-type: none"> <li>1. Insufficient air intake of air pressure source;</li> <li>2. Improper adjustment of pressure switch;</li> <li>3. Air pressure sensor is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the pressure source should be maintained at 5-6kg;</li> <li>2. The pressure value of the pressure switch shall not be higher than the pressure of the pressure source;</li> <li>3. Replace the air pressure sensor.</li> </ol>
The spindle cannot be started, the machine cannot be used normally, please check the spindle driver alarm	<ol style="list-style-type: none"> <li>1. The main shaft intake pipe (auxiliary heat dissipation function) is not unobstructed;</li> <li>2. The air pressure of the main shaft intake pipe (auxiliary cooling function) is too high;</li> <li>3. The spindle rotation is stuck;</li> <li>4. Spindle frequency converter alarm;</li> <li>5. The main shaft inverter is faulty and damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the main shaft intake pipe is bent and ensure that the main shaft air supply is normal;</li> <li>2. Check whether the air pressure value of the main shaft intake pipe is set to 3kg. Do not set it too high.</li> <li>3. Turn the spindle gently with your hand. If there is obvious resistance, the spindle is faulty and needs to be replaced.</li> <li>4. After solving the above problems, turn off the power of the frequency</li> </ol>

		converter, and then turn on the power of the frequency converter two minutes later to see whether the "ER" prompt is reported. If no message is displayed, the error is cleared.
Exceed set range	<ol style="list-style-type: none"> <li>1. Click on panorama directly without jigsaw;</li> <li>2. When setting MARK point, the setting is wrong, resulting in the cutting track path beyond the scope of machine activity.</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-jigsaw and then click the position in the picture.</li> <li>2. Check the value of MARK point coordinates and re-teach MARK point coordinates.</li> </ol>
After the software is started, a message is displayed indicating that the software has expired		Please contact customer service

## 11.2 Fault causes and solutions

The fault phenomenon	Cause	Solutions
After the software is started, the software process is always stopped and the software interface cannot be accessed normally	<ol style="list-style-type: none"> <li>1. The power switch of the machine is not turned on;</li> <li>2. The SOFTWARE I/O configuration is incorrect.</li> </ol>	<ol style="list-style-type: none"> <li>1. Before opening the software, you must turn on the power supply of the machine;</li> <li>2. Reconfigure the I/O configuration file in the software file and then start the software.</li> </ol>
Cutting accuracy reduced	<ol style="list-style-type: none"> <li>1. There is a large error between the cutter and the CCD camera cross line;</li> <li>2. The picture definition of the image area is different from before;</li> <li>3. The splitter fixture is loose or the positioning pin is loose.</li> <li>4. Spindle or CCD camera fixing screw, loose;</li> <li>5. X, Y1 or Y2 shaft coupling screw is loose.</li> </ol>	<ol style="list-style-type: none"> <li>1. Recalibrate the center coordinates of the camera and the tool head (pay attention to distinguish left tray type 1 and right tray type).</li> <li>2. Check whether there are foreign bodies under the detachable fixture, whether the product is placed smoothly, and whether the height distance between the camera and the product is changed;</li> <li>3. Check the firm condition of fixture fixing position and positioning pin to ensure that there is no loosening phenomenon when the product is placed in fixture;</li> <li>4. Check the fixing screws of the spindle and CCD camera and tighten the screws;</li> <li>5. Check the screws of the coupling</li> </ol>

		between the screw rod of each moving shaft and the motor, and tighten the screws to ensure that they are not loose.
CCD camera display window does not show the actual picture	<ol style="list-style-type: none"> <li>1. The CCD network port is disconnected.</li> <li>2. CCD power supply is not supplied;</li> <li>3. The CCD camera cable or power supply cable is open.</li> </ol>	<ol style="list-style-type: none"> <li>1. Open the network connection and check the connection status to see if any network data is lost. If so, restart the software and plug and unplug the network cable socket between the industrial computer and the camera.</li> <li>2. Observe whether the 12V switching power supply in the electrical box is green on (if not, replace the 12V power supply). In addition, check whether the network port of the CCD camera blinks green.</li> <li>3. Use a multimeter to check whether the CCD power cable is supplied. If 12V power is supplied, check whether the network connection is normal.</li> </ol>
Each motion axis has abnormal sound and vibration when moving at high speed	<ol style="list-style-type: none"> <li>Some assembly screws of moving shaft mechanism are loose;</li> <li>2. The servo motor is faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Carefully check whether the assembly screws of each moving shaft mechanism are moved, and tighten them for reinforcement;</li> <li>2. Test with no load on the motor. Replace the servo motor if there is still a fault.</li> </ol>
Industrial dust collectors do not work	<ol style="list-style-type: none"> <li>1. The starting relay of the splitter is faulty;</li> <li>2. The connecting signal between the board separator and the dust collector falls off;</li> <li>3. There is no power supply for the dust collector;</li> <li>4. The contactor or thermal protector is faulty;</li> <li>5. Fan motor may malfunction.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the relay in the electrical box of the splitter;</li> <li>2. Check the connecting signal between the two machines and insert it firmly;</li> <li>3. Check whether the power supply of the dust collector is AC380V;</li> <li>4. If the coil voltage 380V is normal, the thermal protector is not protected, and the input voltage is normal, the contactor or thermal protector is faulty,</li> <li>5. Check whether the fan motor has power supply. If the fan still does not run, replace the fan motor.</li> </ol>
Vacuumping effect reduced	<ol style="list-style-type: none"> <li>1. There is leakage vacuum in the pipeline from PCB cutting port to inlet outlet;</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether there is vacuum leakage in the cutting port and pipeline;</li> <li>2. Beat the filter bag by rocker arm</li> </ol>

	<ol style="list-style-type: none"> <li>2. Too much dust on the surface of the filter bag causes blockage;</li> <li>3. Excessive dust accumulation in dust collecting drawer is not cleaned;</li> <li>4. Dust collecting drawer is not lifted to the top, resulting in vacuum leakage.</li> </ol>	<p>and clean the dust on the filter bag;</p> <ol style="list-style-type: none"> <li>3. Regularly clean the dust in the drawer;</li> <li>4. Every time after dumping the dust in the dust collecting drawer, it is necessary to pull up the rocker arm of the drawer to lift the dust collecting drawer to the top and keep it sealed to prevent vacuum leakage.</li> </ol>
<p>The machine cannot be turned on properly</p>	<ol style="list-style-type: none"> <li>1. Whether the power plug is supplied with normal voltage;</li> <li>2. The blue button on the leakage circuit breaker springs up;</li> <li>3. The fuse may be blown out.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check whether the 220V voltage is supplied to the air switch of the equipment, and ensure that the total power switch is turned on (check the status of the switch and check the line in detail to rule out whether the switch is damaged);</li> <li>2. Press the popped blue leakage button;</li> <li>3. Power off the fuse and measure and check whether it is OK. If the fuse is broken, remove the short circuit and replace the fuse with the same model.</li> </ol>