PCBA Router machine

Manual

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Catalog

Chapter I   Equipment Introduction

1. Basic specifications and model description

(1) X, Y axis cutting speed: 0~100mm/s

(2) Machine repeatability: ± 0.01mm

(3) X, Y, Z axis control mode: use PLC and PC

(4) X, Y, Z axis drive mode: servo motor

(5) Man-machine operation and data storage: PC system

(6) Cutting accuracy: ± 0.02mm

(7) Spindle speed: MAX60000rpm

(8) Host voltage: 220V 1ψ 50 / 60HZ

(9) Air pressure supply: 5.5kg/cm2 or more

(10) Power consumption: 3KVA

(11) Dust collection method: lower dust collection/upper dust collection

(12) Dust collector voltage: 380V3ψ

2. Brief introduction of operation process

1. Turn on the main power of the machine and turn on the computer key switch.

2. Double-click the software icon of the splitter to open the software.

3. Enter the main interface of the program.

4. After entering the parameter setting, put the PCB board to be processed into the jig and press the corresponding control button to slide the jig into the machine.

5. Enter the processing programming interface, select the work area (left and right) according to the position of the PCB board in the left and right areas, and click New Work File.

6. Set the product information in the reference mode of machining programming and confirm the product settings.

7. Modify the visual point (that is, determine the MARK point) in the reference mode of machining programming, perform visual alignment, and determine the successful alignment.

8. Design the cutting path in the cutting mode of machining programming, and use the image to confirm whether the position of each cutting point is correct after the design is completed. Save the working document to the specified location and return to the main interface.

9. Enter automatic cutting and open the required working document. (Difference between the left and right work areas, both work areas need to open their own work documents). Click Auto Execute to process the job.

10. In automatic cutting mode, after the PCB board is cut, the jig will automatically slide out of the machine, manually replace the PCB board to be processed, and press the corresponding control button to slide the jig into the machine for cutting.

Note: The above is the operation flow. For detailed operation of each step, please refer to the function introduction of each interface.

3.Power on and off

1.Startup and shutdown sequence：

(1) Turn the power switch to turn on the machine.

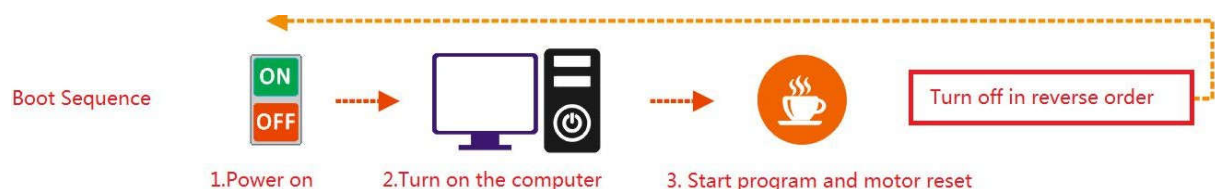(2) Turn on the computer. The state of the standby station is shown in Image 1.

Image 1 Machine sequence diagram1

（3）Find the YSVC-650 short cut on the desktop, double-click to start the software, and the main interface will appear as shown in Image 2.

Please a moment! The motor is being reset.

Image 2 software main interface

（4）After starting the program, press the flashing prompt "click the reset button to reset the motor" as shown in Image 2

Note: Before starting, please confirm whether the air pressure value is within the safe range, whether the front and rear doors are closed, whether there is a PCB board in the left and right jigs, whether the milling cutter is of normal length, and whether the emergency stop button is pressed. Turn on normally.

Chapter II Software interface and application introduction

1. Main interface introduction
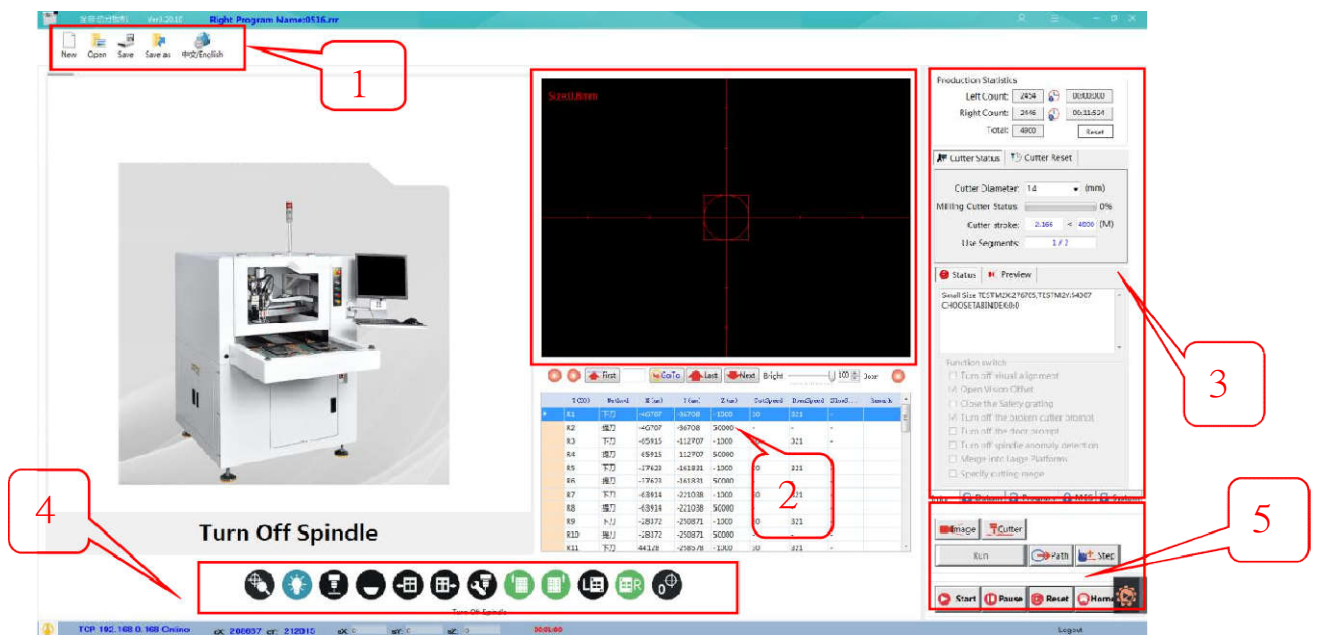
Image 3 software main interface

1. Function mode selection:

(1) Log in, create a new program, open the program menu, select the language of the software interface: select simplified Chinese and English

(2) CCD display area

(3) Edit display area

(4) Function switch menu

(5) Image, sub-board, single step, path display button.

2.User login

Users need to log in with a password when entering any functional mode. Please consult the original factory personnel for the password.
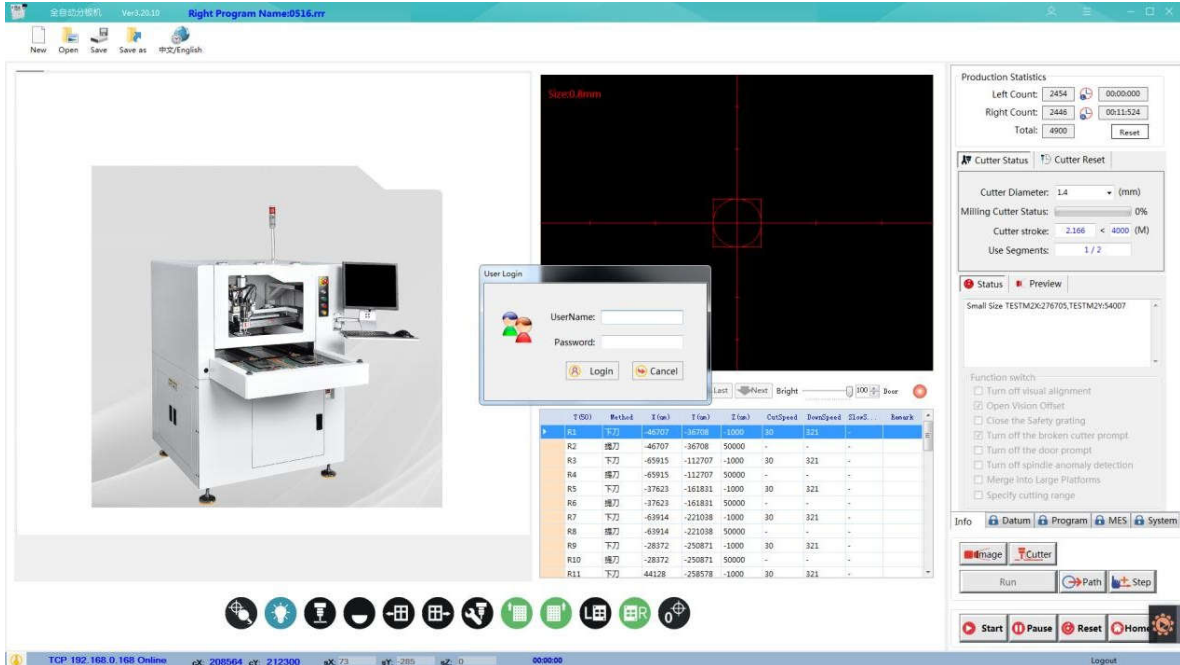
3. Parameter settings

-

1. Production parameter setting (Image 4) (After all settings are set, click to save data!)

Image 4 Generate statistics

(1) Number of cutting pieces in the left area: record the total number of PCB boards cut in the left area.

(2) Left area cutting time: record the time required to cut a PCB in the current left area.

(3) Number of cutting pieces in the right area: record the total number of PCB boards cut in the right area.

(4) Right area cutting time: record the time required to cut a PCB in the right area.

2. Parameter setting of spindle milling cutter (Image 5)

(1) Milling cutter diameter: the size of the milling cutter currently used. (Not clearable)

(2) Cutter stroke: record the length of the PCB board cut by the current segment of the cutter

(3) Milling cutter usage status: displays the milling cutter current usage percentage.

(4) Number of segments used by the cutter: record the maximum number of segments used by the cutter.

(5) The maximum life of each segment of the milling cutter:

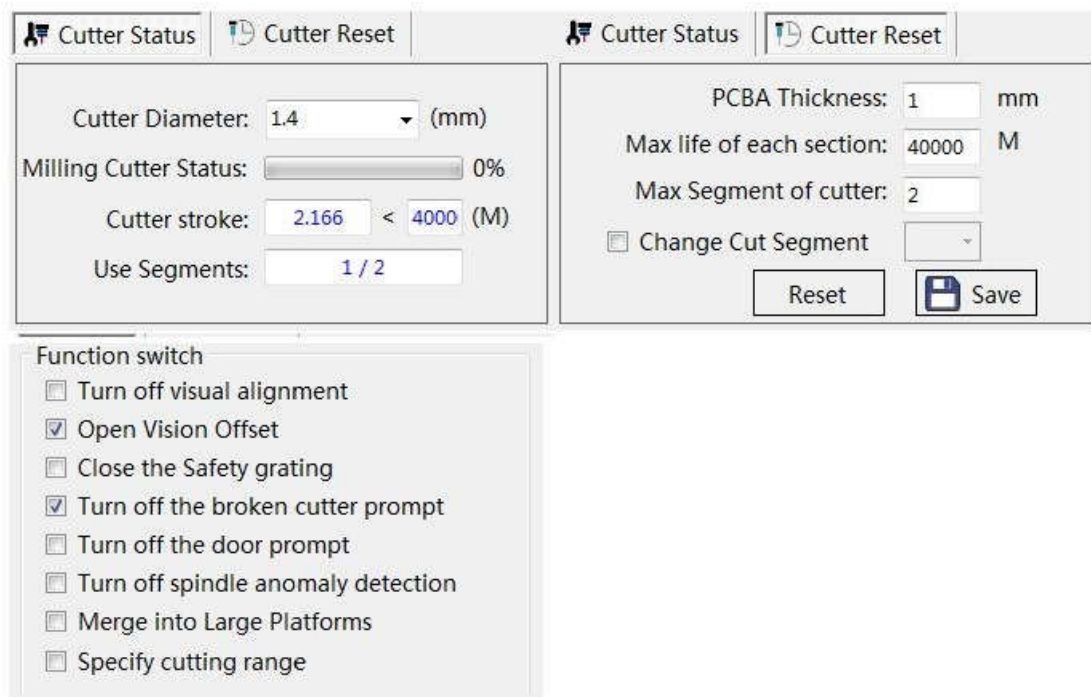
Image 5 Spindle milling cutter parameter settings

Note: When the set value is reached, the machine stops working and alarms. At this time, the milling cutter needs to be replaced and cleared. (The current data can be cleared by the clear button)

4. Machine system parameter operation (non-technical personnel please do not operate)

Machine maintenance interface Image 6):
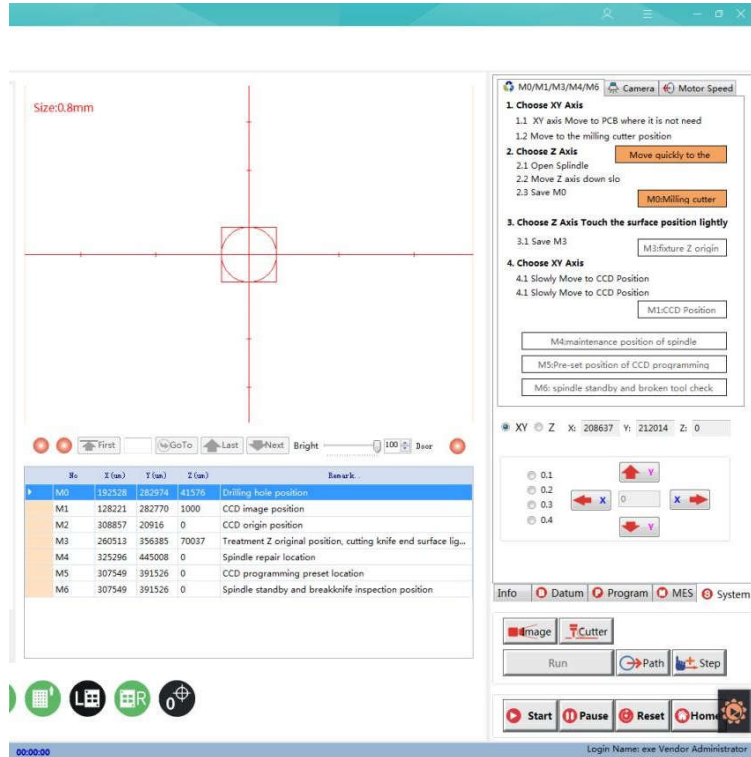
Image 6 Spindle milling cutter parameter settings

The machine maintenance interface consists of three parts: 1. CCD image area; 2. function area; 3. setting area

1. CCD image area

The CCD image area is the camera's shooting display part for auxiliary viewing. The center position displayed in the visual part is the cutting position of the milling cutter. Each time the machine camera or spindle position changes, the position of M0/M1 needs to be corrected again to ensure the camera The position compensation with the spindle is completely correct.
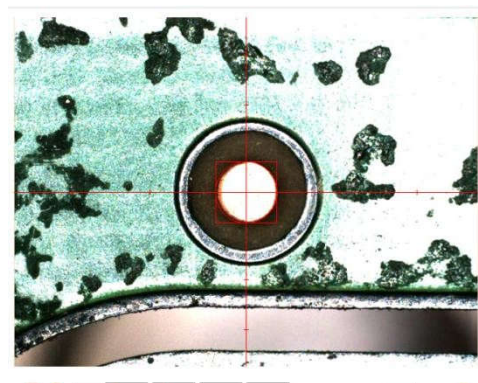
2. Setting area

The machine maintenance setting area includes five setting parts: M0/M1, M3,

M4/5/6, settings, camera and automatic tool change.

（1）M0-M6 operate in accordance with the interface sequence (image7)
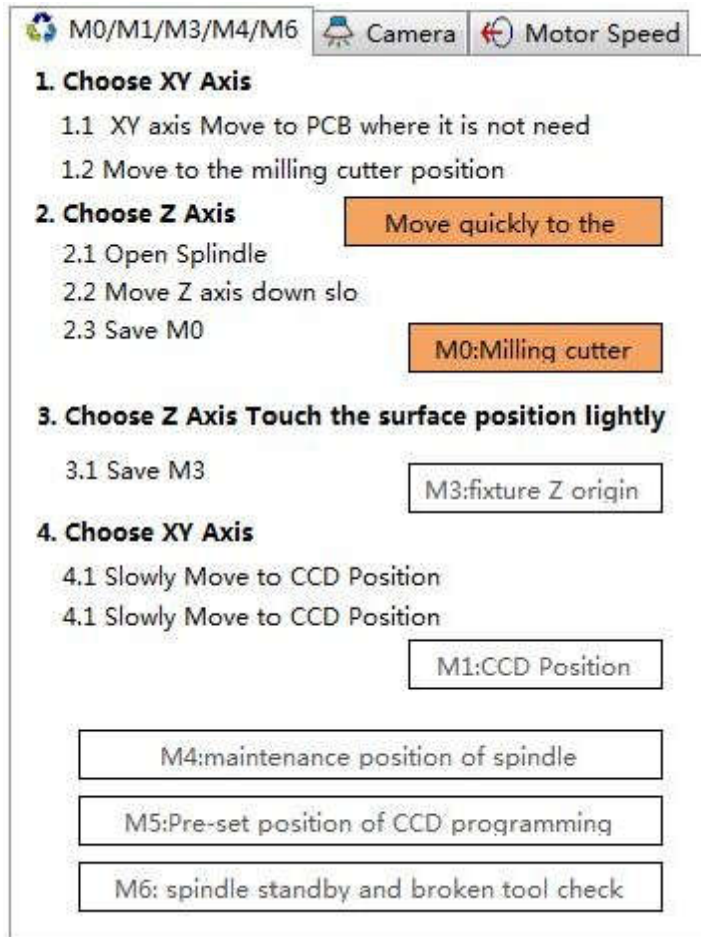
image 7 M0M1 settings

No	X (um)	Y (um)	Z (um)	Remark. .
M0	192528	282974	41576	Drilling hole position
M1	128221	282770	1000	CCD image position
M2	308857	20916	0	CCD origin position
M3	260513	356385	70037	Treatment Z original position, cutting knife end surface lig...
M4	325296	445008	0	Spindle repair location
M5	307549	391526	0	CCD programming preset location
M6	307549	391526	0	Spindle standby and breakknife inspection position

M0: The cutter position saved by the machine during calibration

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M1: CCD position saved by the machine during calibration. The machine uses the M0 and M1 values to compensate the coordinates of the milling cutter and the camera. If there is an error between the cutting position and the programmed position, it can be corrected by resetting M0/M1. The setting method follows the steps in the figure above.

M3 is the distance from the cutter saved by the machine to the surface of the PCB board during calibration. The setting method follows the steps in the figure above. (image8)）

3. Choose Z Axis Touch the surface position lightly

3.1 Save M3
M3:fixture Z origin

4. Choose XY Axis

4.1 Slowly Move to CCD Position
4.1 Slowly Move to CCD Position

M1:CCD Position
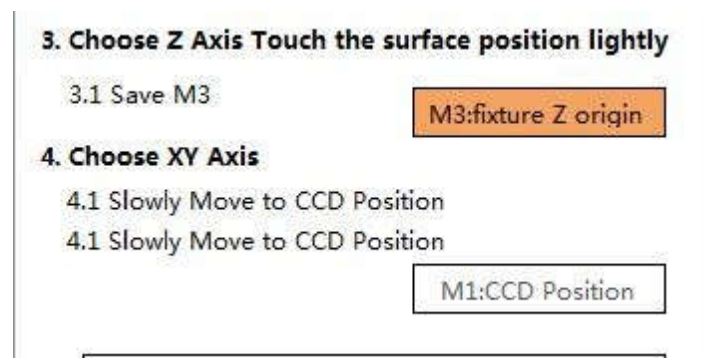
image 8 M3 parameter settings

M4: The spindle maintenance position coordinates saved by the machine during calibration.

M5: The default visual R&S position saved by the machine during calibration.

M6: The spindle standby position coordinates saved by the machine during calibration. When setting, move the spindle to the required position and click modify to complete the saving.

M4:maintenance position of spindle

M5:Pre-set position of CCD programming

M6: spindle standby and broken tool check
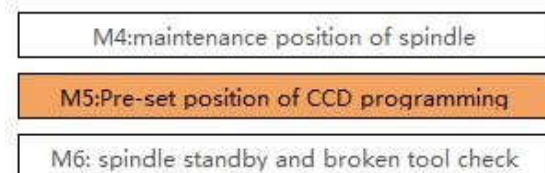
Customer employees cannot change parameters without permission.
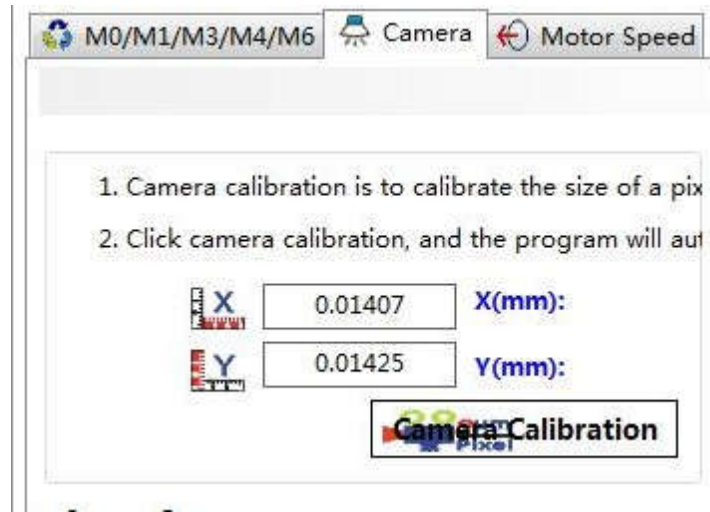
- (2) Camera (image 9)

image9 camera settings

When the camera is calibrated, the system automatically corrects the circle function. When the machine cannot find the circle quickly and accurately, it is adjusted by the camera. The setting method follows the steps in the figure above.

（6） Automatic tool change (the three-axis machine does not have this function temporarily, it can be expanded)

Use automatic tool change: After checking, the cutter life will be changed automatically after the life of the cutter during the automatic cutting process.

Automatic tool change function setting: CP1~CP5 are milling cutter positions.

Tool change height: the height of spindle gripping tool when changing tools.

Safety height: the setting of the spindle's rapid descent height when changing the tool.

Modify position: Move the camera target directly above the tool holder and click on the modify position to save the current tool change position.

Test automatic tool change: Click the test selected position to perform tool change

test.

Tool change switch: Blow tool button.

Set up visual detection: grab the milling cutter features, and automatically correct the tool change position when changing the tool.

5. Authority management

Permission management interface：
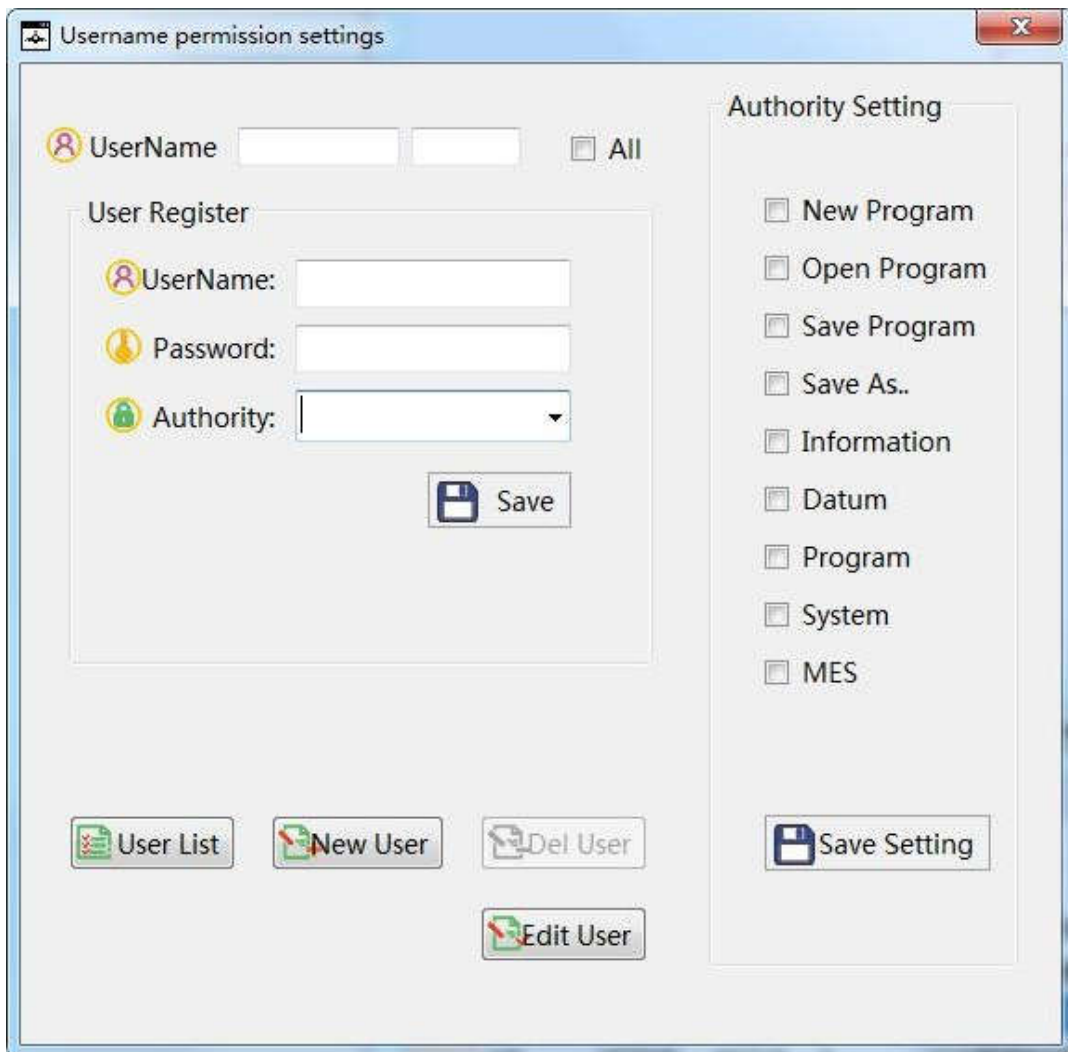
User management is a window used by upper-level managers to grant permissions to lower-level operators. Managers create new users and set access levels to control user rights. The permission level only needs to be selected in the login level.
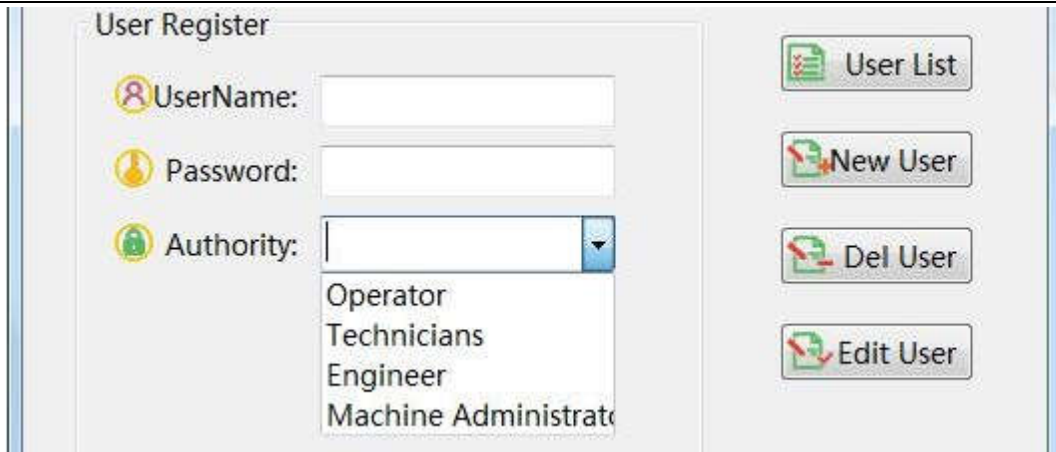
image 10

6. Processing programming

1. Benchmark operate

（1）Create a new file to save the processing data (image 11)
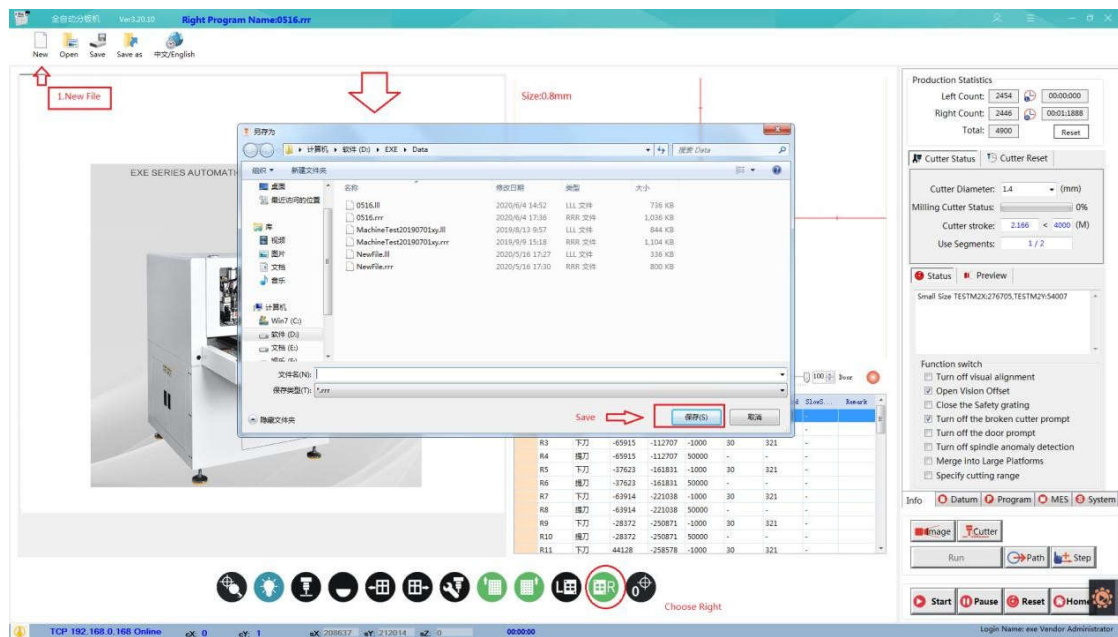
image 11 New file

(2) Enter the program name and click the save button. Don't enter the extension, according to the platform selected, the extension is automatically given, rrr is the program on the right, lll is the left.

(3) Automatically create two blank benchmarks, and the coordinate points are shown below.

No	X (um)	Y (um)	D (um)	Remark
▸ RB0	0	0	1000	Right plate Mark0 pairs and PCB origin
RB1	0	0	1000	Right plate Mark1 pair (diagonal)
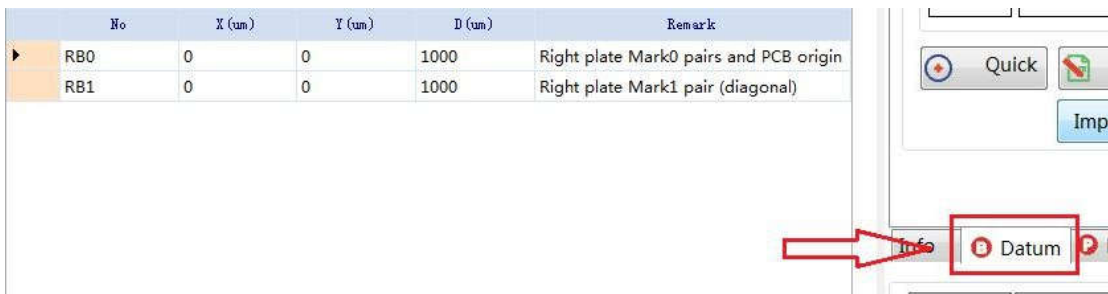
(4) Move the reference to the center position of the target in the photo display area, and follow the sequence shown in the following figure (Figure 12)
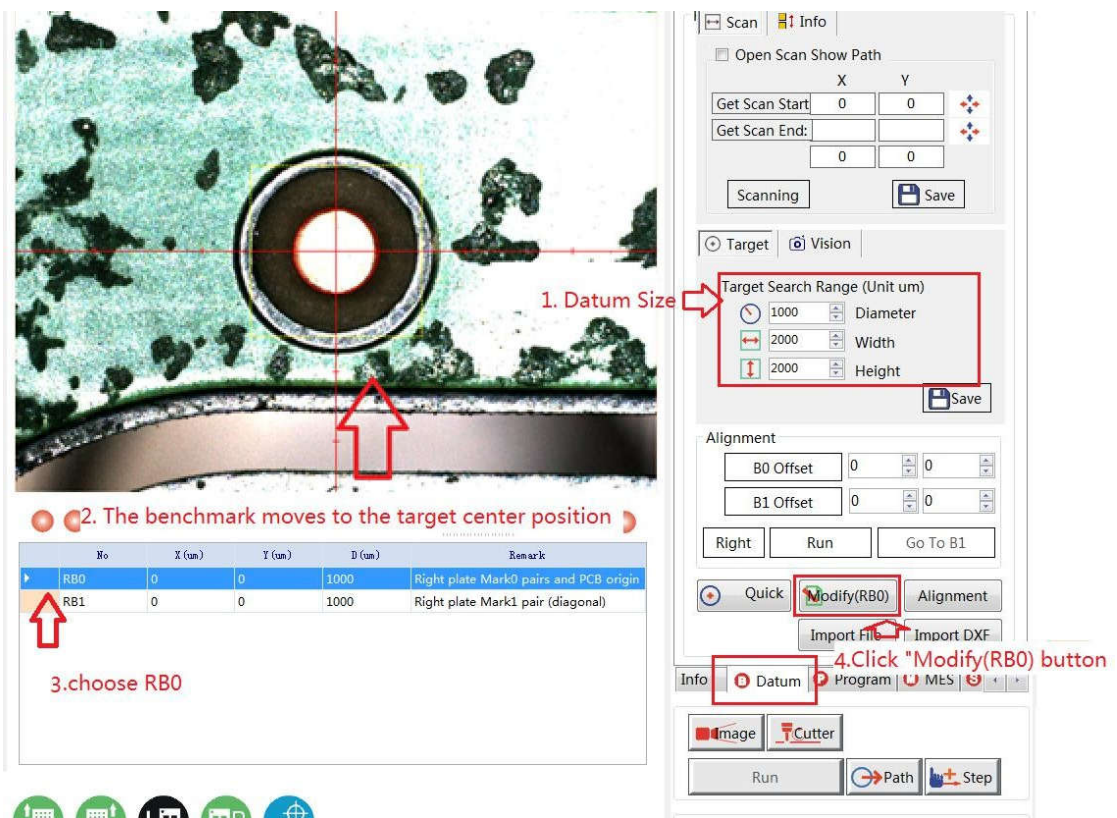
image 12 Benchmark

Target (MARK point recognition range):

①Screen red circle range setting

②Screen yellow rectangle width setting

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③Screen yellow rectangle length setting

(5) Repeat (4) Modify RB1

Image Matching

Image Matching

(6) The benchmark modification is completed, select "Image Comparison" to detect whether the benchmark is successfully repaired.

(7) Manual alignment: when the whole program is offset or copied from left to right

①Move XY to the position of the first point MARK on the PCB, click B0 offset.

②Move XY to the position of the second point MARK on the PCB, click B1 to move.

③ Perform manual positioning of continuous piece or manual positioning of wholeboard and confirm.

Alignment		
B0 Offset	0	0
B1 Offset	0	0
Right	Run	Go To B1

image 13 Manual alignment

2. Program editing, after successful image comparison, start program editing.

(1) Default value setting

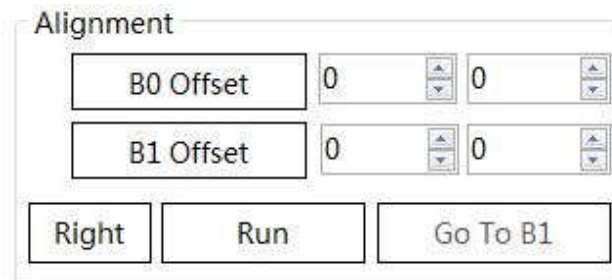(1) Milling cutter size: milling cutter size

(2) Cutting speed: speed setting of the cutter during cutting

(3) Cutting speed: milling speed setting

(4) Slow wear speed: the speed when the milling cutter slowly wears the PCB

(5) Height of lifting knife: the lifting height of the cutter during the cutting process
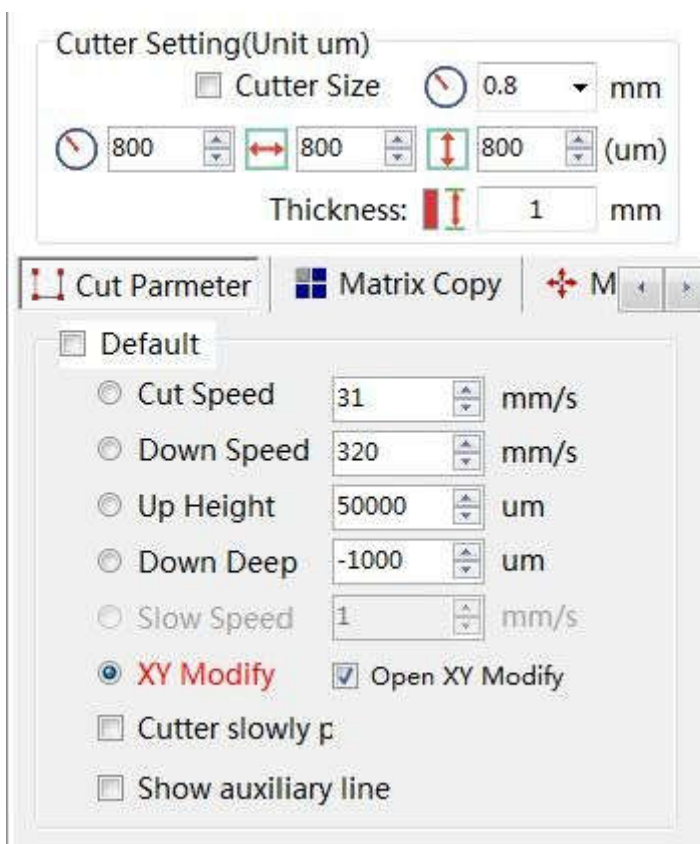
After completing all the settings, click Set to save the data!

（2） Cutting programming steps (image 14)

1. Set the size of milling cutter according to the actual situation.

2. Set the cutting speed, cutting speed and lifting height of the cutting point. (if the milling cutter needs to penetrate the PCB, check the milling cutter to slowly penetrate the PCB and set the slow threading speed at the same time.)Manually move the CCD to the center of the first cutting point and select the shape to be

cut. Click "add" cutting point.

3. After determining the first cutting point, manually move the CCD to the second cutting point. If the cutting shape is linear, the second point is automatically the tool lifting point, and then click "add" cutting point.
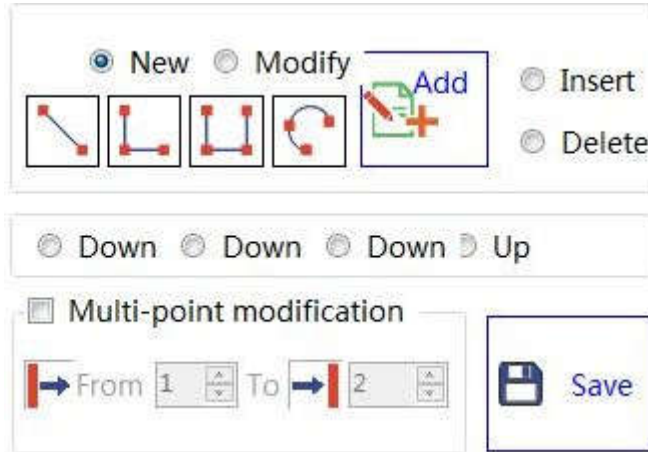
image 14 shape of cutting point

4. Edit and save. If the cutting point is L-shaped, U-shaped or rectangular, the last point is the tool lifting point, and the middle point is the turning point.

5. For the arc, the first point is the lower tool point, the second point is the upper point in the middle of the arc, and the third point is the tool lifting point.

6. When editing the cutting point, you need to insert the cutting point and delete the cutting point, click Insert cutting point and delete cutting point. Check multi-point modification when batch multi-point modification of cutting points is needed, input the starting serial number of the point to be modified, and end the serial number of the modified point (including cutting speed, cutting speed, lifting height, remarks, editing) and click Modify.
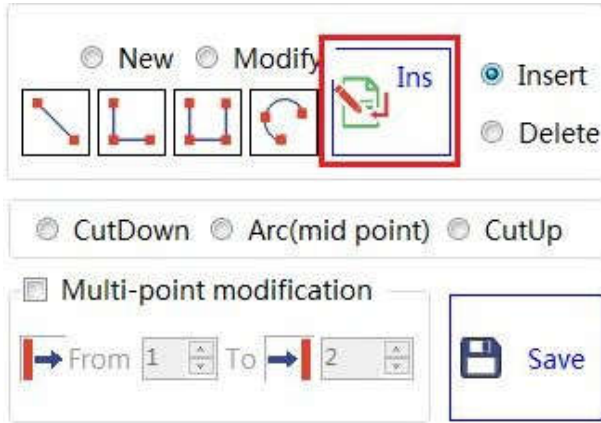
image 15 inserting and deleting

3. Edit optimization

（1）**Matrix copy:** when there are multiple boards with the same direction.
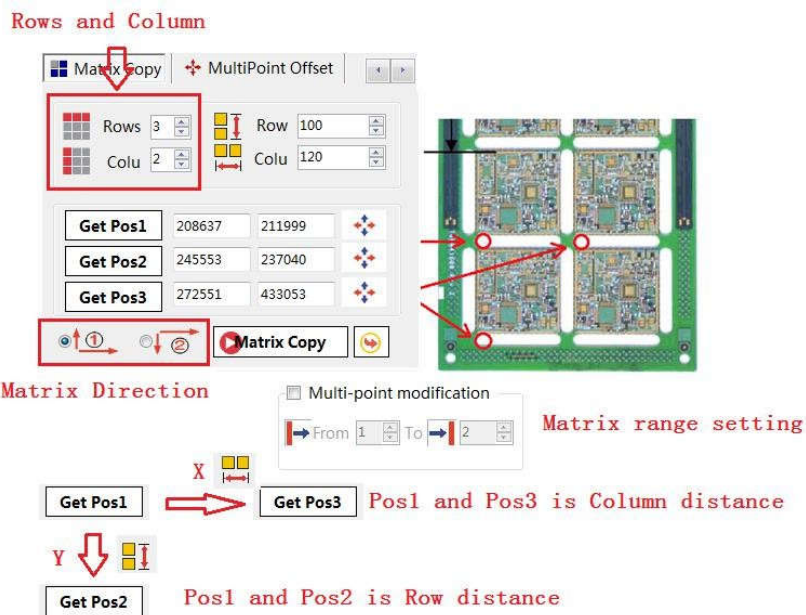
（2））**Multi point offset:** when several consecutive points are offset and the offset value is the same.

1. Set the start and end serial numbers of successive offset points

2. Move CCD to the first point on PCB and click to obtain position 1

3. Move the CCD to the second point on the PCB and click to obtain position 2

4. Click to get XY offset value and calculate XY offset automatically

5. Click X-axis offset or y-axis offset
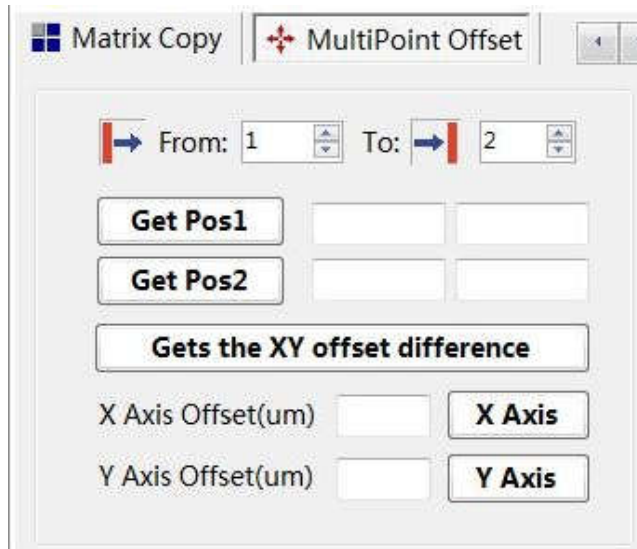
image 16 multipoint offset

1. Operation Function Button
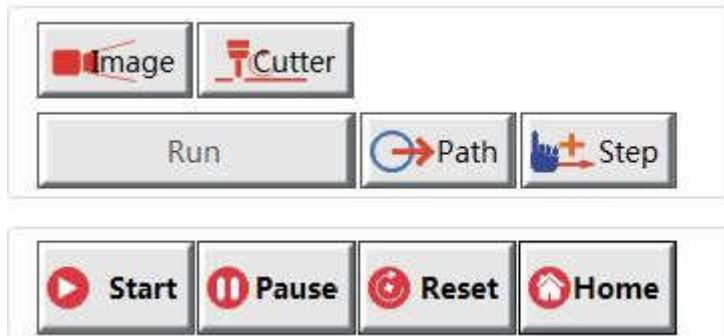
（1） Image: when the machine runs the image mode, the image simulation is performed according to the program position to see whether the cutting position is correct.

（2） Board splitting: when the machine runs board splitting mode, it will cut according to the program position.

（3） Path: sketch of cutting path.

（4） Single step: step to execute the switch key.

（7） Start: machine start key.

（8） Pause: machine pause key.

（9） Reset: machine reset key. (same function as panel button).

（10） Execute: execute the open cutting program.

Chapter III alarm treatment and main tenance

1. The cause of the alarm and how to deal with it

Alarm prompt information	Cause and treatment
Insufficient air pressure	1. Confirm whether the pressure gauge behind the machine is above 5.5kg/cm² and whether the air pressure is supplied.
The air pressure of	2. The SENSOR in the pressure gauge is damaged or the detection line is broken. Under normal circumstances, the status of the air pressure detection column in the IO gauge is

the machine is lower than the set pressure. Normal use pressure value 5.5-6.0kg//cm2	0.
	3. DC24V short circuit, confirm that the LED on the I/O board of the electrical control cabinet under the machine is blinking, and exclude whether the short circuit component and DC24V power supply are normal.
Controller communication error	1. The machine is not turned on, confirm whether the machine wer supply 220V power supply.
	2. The controller and the PC host network communication line are loose, and then re-plug the network port computer host and controller interface.
	3. The controller is abnormal, replace the controller or return to the original factory for repair.
	4. The computer motherboard is abnormal. Replace the computer motherboard.
X/Y/Z axis reaches the limit	1. Confirm whether the X/Y/Z axis servo drive trips. If it trips, ease turn off the power of the machine, manually move the responding axis back to a safe position, and then turn on the ain power of the machine.
	2. Confirm whether the X/Y/Z axis servo driver has AC-220V wer supply.
	3. If you just reach the limit position, just move it back in the posite direction manually.
The front/rear door is not closed	1. Confirm whether the front and rear doors are closed. If not, please close them immediately.
	2. If the front and rear doors are closed, please confirm whether the front and rear door detectors are damaged. Under normal circumstances, the status of the front/rear door closing detection column in the IO table is 0.
	3. Confirm whether the detector is far away from the door, so that the detector cannot sense the signal, and the position of the detector can be adjusted.
Left/right raster alarm, The machine enters the pause state	1. Confirm whether there is an object in the grating detection area, please remove it, make sure there is no obstruction, click Yes in the popup window to continue the operation, click No to reset.
	2. Confirm whether the grating is damaged.
There is no program for the left/right file	1. The left and right area cutting files are not added, and the ved files can be opened after resetting. If there is no file, a new tting program needs to be created. Refer to the instructions for aking cutting programs.
Cutter break	1. The cutter is broken, please replace the cutter.
	2. The broken knife SENSOR is blocked by the blocking object, and no signal is detected.
	3. The broken knife SENSOR is faulty, replace the broken knife

	SENSOR. Under normal circumstances, the status of the broken knife detection column in the IO table is 0.
	4. System machine maintenance interface, it is detected that Z1/Z2 parameter setting is not correct during automatic tool change, please set two parameters again. For details, please refer to the introduction of machine maintenance interface.
Emergency stop button was pressed	1. The emergency stop button is pressed, please release the emergency stop button after the processing is completed, reset and ensure that the platform returns to zero. If it does not return to zero, please reopen the software to reset it to zero. If you do not perform zeroing, please restart the device. (Generally reopen the software)
Left/right damper is not open	1. Confirm that the left/right damper is open. 2. Confirm whether the sensors controlling the left and right damper cylinders are damaged or loose.

2. Machine operation safety specification

2.1 Please confirm whether the machine is normal before operation, test in manual mode, whether all the detectors and buttons are valid, whether the cutter and spindle are normal, whether each axis can move, whether to press the function key to execute the corresponding action, and whether the coordinates of the cutting program There is an offset.

2.2. Please ensure that one person, one machine and two hands work, when the machine is normally cutting, be sure to operate the slide table entry and exit buttons with both hands.

2.3. Before turning on the machine, make sure that the front and rear doors are closed, and there are no objects in the left and right working areas.

2.4. When the grating detection function is not turned on, do not place objects in the left and right working areas.

2.5. When any abnormal phenomenon or sound occurs during the use of the machine, it should be stopped immediately and the power should be cut off.

2.6. After work, cleaning and maintenance should be carried out, and the power supply should be cut off to arrange the machine.

3. Replacement method of milling cutter

3.1. The milling cutter needs to be replaced when:

(1) The service life of the milling cutter has reached

(2) The cutter breaks

3.2 Operation steps of replacing milling cutter:

(1) Click the "Clear cutter reset" button to reset the service life of the cutter;

(2) Click "Maintenance Position" to move the spindle to the maintenance position;

(3) Open the front door, at this time, click the reset button to clear the alarm;

(4) Prepare a new milling cutter and one each of No. 12 and No. 14 open-end wrenches (see Picture 1);

(5) The wrench is inserted under the spindle (see Picture 2);

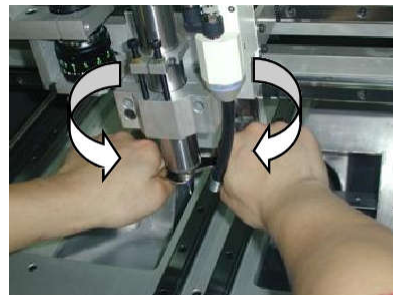Image 1   image 2

(6) Use the wrench to turn both hands inwards to loosen the milling cutter (see Picture 3);

(7) There are two stages to loosen the milling cutter, the first stage to loosen the nut, and the second stage to loosen the clamping system. After releasing the clamping system, the whole group can be rotated down

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image 3   image 4
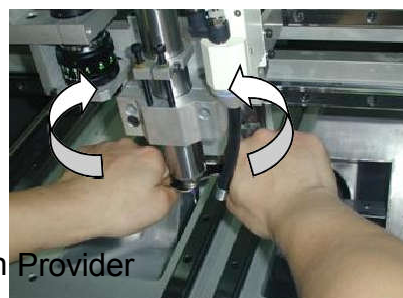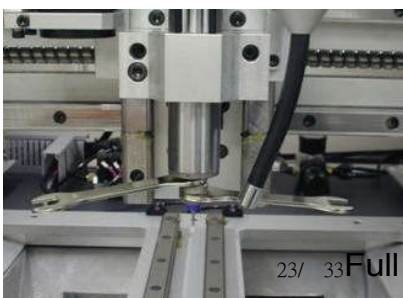
(8) Put on a new milling cutter, and use both hands of the wrench to turn the milling cutter outward. At this time, pay attention to that it is not necessary to force the lock when locking, but the milling cutter cannot be too long and too short, and the sensor has a signal to be suitable. (Picture 4);

(9) After the door is closed and the tool is changed, the machine can be used normally.

4. Machine maintenance instructions

The board splitter is a computer-controlled precision production equipment. Its motion processing is completed by a precision mechanical movement mechanism. In order to ensure the normal use of the board splitter, the board splitter must be regularly maintained. The specific requirements are as follows:

4.1. Routine maintenance

The following work should be performed daily:

(1) Clean the dust inside the electric control box, clean the dust on the bed and fixture, and remove the waste.

(2) The air pressure of the fuselage is maintained at 5.5-6.0kg//cm2, and the voltage is 220V.

(3) Check X, Y, Z axis motor wiring, origin and each limit detector is valid.

(4) Keep the PCB fixture free of deformation and damage.

(5) Remove the debris on the cutter and the cutter cannot be deformed.

(6) Clean the dust inside the dust collector.

4.2. Regular maintenance

The following work should be done weekly:

(1) Check and clean the jig of the milling cutter device.

(2) Clean the swarf and dirt on the screw rods of the X, Y, Z axes and the guide rail, and check whether the wiring of the stroke limit switch is loose, whether the connection is reliable, and the screws are loose.

(3) Clean the surface of Camera and Sensors.

(4) Clean the dust and filter inside the dust collector.

(5) Apply thin oil on the surface of the X, Y and Z axis slide rails.

(6) Clean the dust inside the electric control box and check each joint.

(7) Check whether the internal connector of the operation button on the front of the host is loose, and re-lock it.

(8) Check the leakage voltage of the equipment and ground wire to avoid leakage.

The following work should be done monthly:

(1) Clean the X, Y, Z axis screws and guide rails, and add an appropriate amount of lubricating oil.

(2) Check and clean the solenoid valve and cylinder.

(3) Confirm the cutting accuracy of CCD camera and machine cutter.

(4) Thoroughly disassemble and clean the dust collector.

(5) Re-lock if the internal connector of the electric control box is loose.

(6) Check the connection of the connecting cable.

(7) Check whether the anti-loosening screws of the machine's fixed supporting feet are loose and re-tighten.

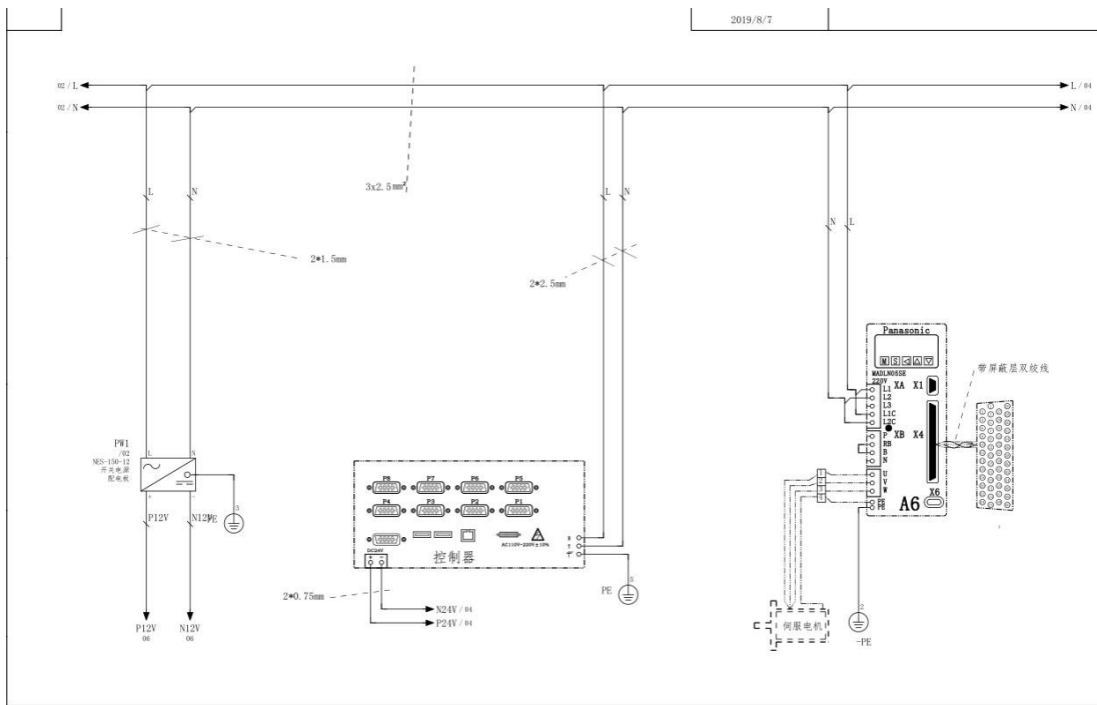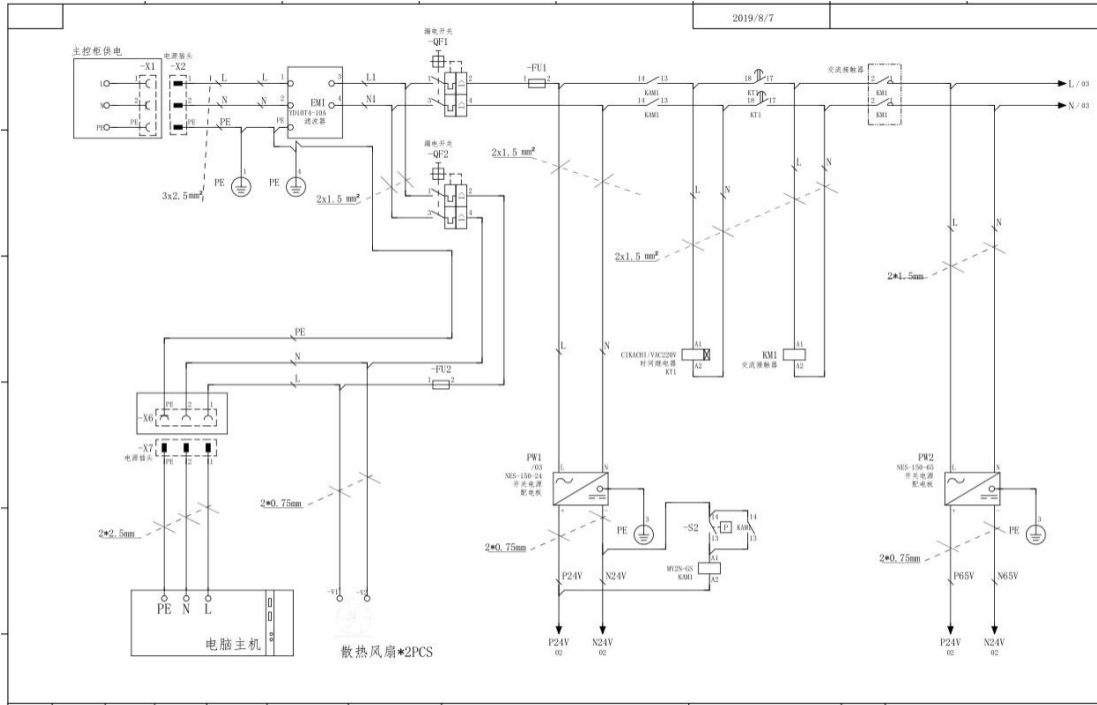(8) X, Y, Z axis slide rail oil injection holes are filled with oil.

The following work should be carried out every year:

(1) Check and adjust the overall level of the equipment.

(2) Clean and lubricate the X, Y and Z axes in the equipment.

(3) Clean and inspect the industrial computer in the equipment.

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Chapter IV Circuit diagram
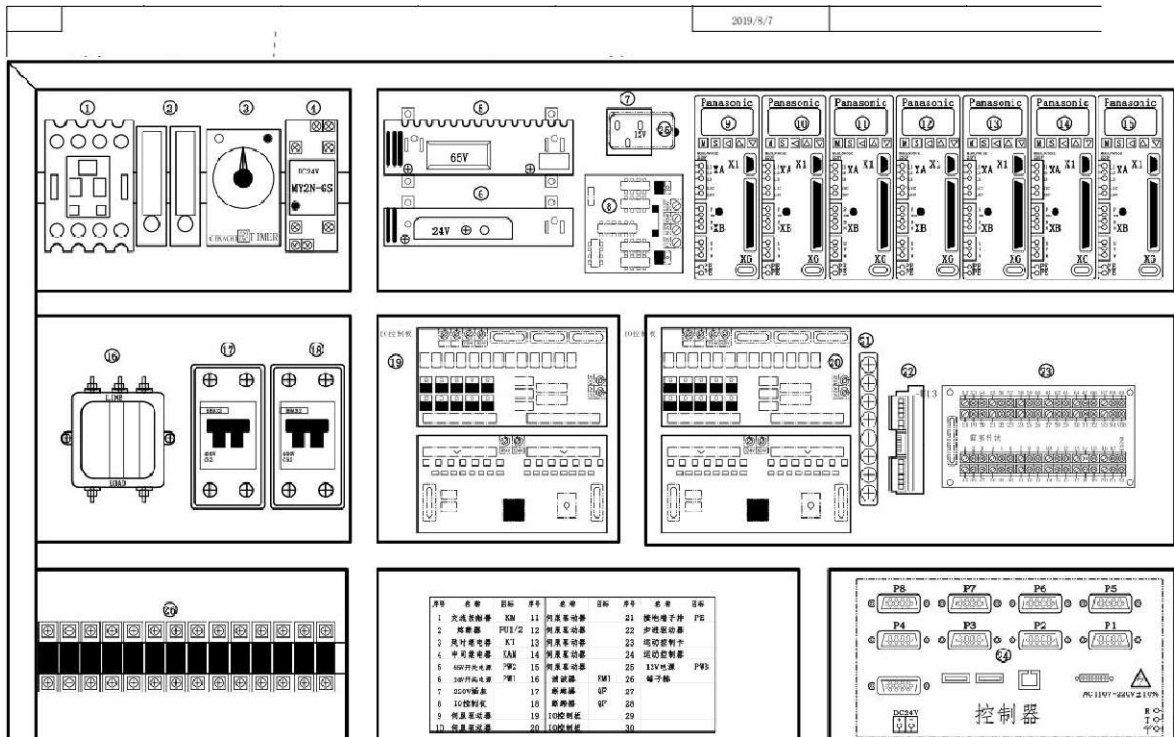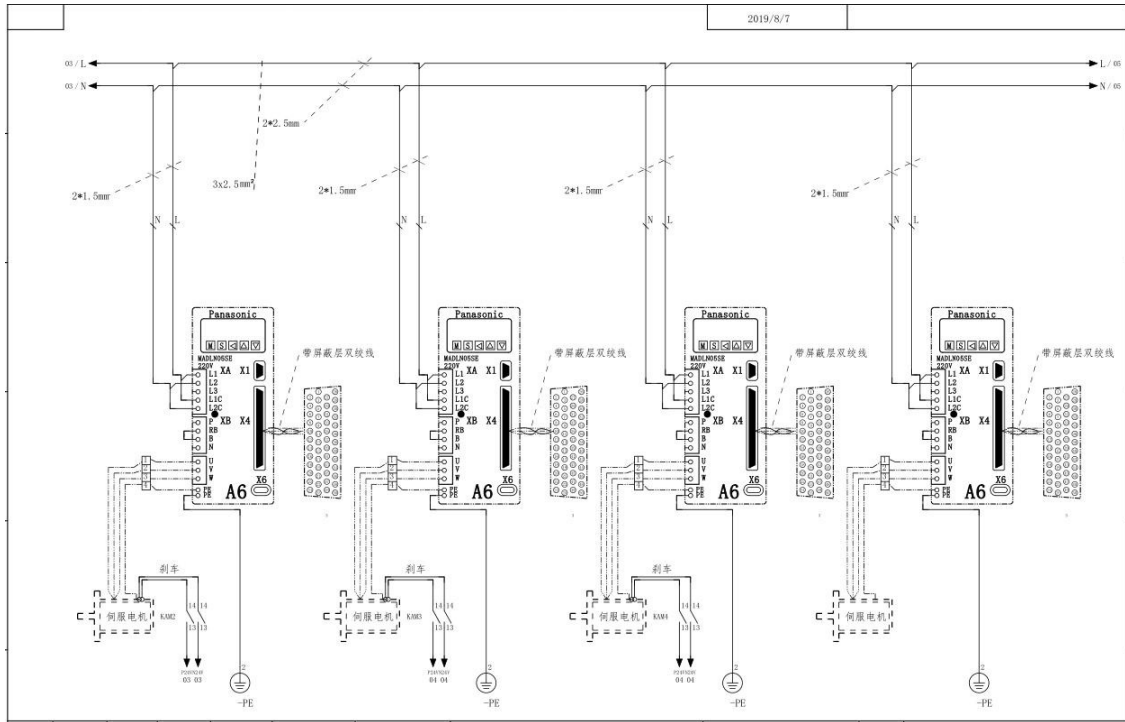
Chapter V Cutting condition parameter table

PCB thickness(mm)	Milling cutter diameter (mm)	Cutting speed (mm)/sec(MAX)	Spindle speed RPM (MAX)
0.8	ϕ 1.2	30	30,000
	ϕ 1.5	40	30,000
	ϕ 2.0	50	30,000

1.0	ϕ 1.2	30	30,000
	ϕ 1.5	40	30,000
	ϕ 2.0	50	30,000
1.2	ϕ 1.2	30	30,000
	ϕ 1.5	40	30,000
	ϕ 2.0	50	30,000
1.6	ϕ 1.5	30	30,000
	ϕ 2.0	40	30,000
2.0	ϕ 1.5	20	30,000
	ϕ 2.0	30	30,000

The above parameters are for reference only, the cutting speed and spindle speed can be adjusted according to the material of the workpiece

PCB thickness(mm)	Milling cutter diameter (mm)	Cutting speed (mm)/sec(MAX)	Spindle speed RPM (MAX)
0.8	ϕ 1.2	55	42,000
	ϕ 1.5	65	42,000
	ϕ 2.0	70	42,000

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1.0	$\phi\,1.2$	50	42,000
	$\phi\,1.5$	60	42,000
	$\phi\,2.0$	65	42,000
1.2	$\phi\,1.2$	45	42,000
	$\phi\,1.5$	55	42,000
	$\phi\,2.0$	60	42,000
1.6	$\phi\,1.5$	45	42,000
	$\phi\,2.0$	50	42,000
2.0	$\phi\,1.5$	35	42,000
	$\phi\,2.0$	40	42,000

The above parameters are for reference only, the cutting speed and spindle speed can be adjusted according to the material of the workpiece

Company Profile

YUSH, a long-standing electronic equipment industry platform, has been continuously contributing to the global customer base in the field of electronics manufacturing since 1999. YUSH company has excellent technical team and service team in surface mount technology (SMT), plug-in assembly (DIP), functional test (TEST), etc. in home appliances (Such as TV, refrigerator, air conditioner, washing machine), new energy (LED, Solar, new energy vehicles, automotive electronics, medical equipment, semiconductors, power electronics and other fields have many successful experiences. Our products cover SMT equipment (smt line, stencil printer, SPI, pick and place machine, AOI, reflow oven, handling equipment), DIP equipment (plug-in line, wave soldering machine, assembly line, belt line), test equipment, packaging equipment, etc. .
Through the deepening of YUSH's globalization strategy, we have helped more than

200 customers around the world to complete the entire industry chain from program design, production and construction, service training, etc. Our team and products have covered more than 150 countries all around the world and area.

While exporting YUSH's nearly 30 years of technical experience to global customers, we continue to improve our R&D capabilities and production capabilities. Through investment and equity acquisitions, YUSH has more than 15 member companies in China, forming a supply chain for the entire industry chain system.

In 2018, We helped clients plan to build more than 35 production workshops and train more than 100 technicians. In the next five years, our goal is to continue to focus on the electronics manufacturing industry, to provide more than 200 customers worldwide, and to provide more professional and active technical support for customers' manufacturing.

Full SMT Solution Provider