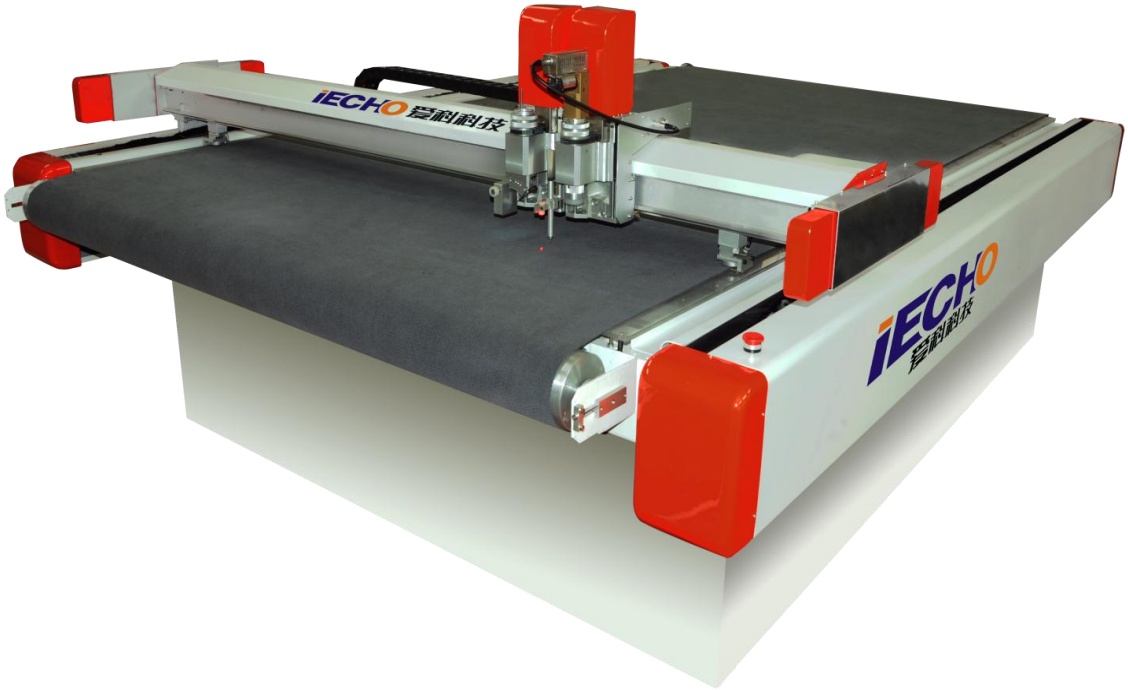
IECHO BK Digital Cutting System Manual



Hangzhou IECHO Science Technology Co., Ltd.

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1 Cutting System Introduction

1.1 System Components

BK cutting system includes electrical control box, cutting main body, pump, air compressor and other accessory parts.

Software includes data processing software and cutting system control software.

According to customer's requirements, we will configure the following one tool or several tools: tangential knife, oscillating knife, driven rotary knife, V-cut, creasing wheel, punching knife and CNC router.

1.2 Operating Principle

Deal with the patterns (dxf or plt formats) for outline analyzing, automatic marking, cutting tool and types definition with SmartCut software, the file after disposal can be conveyed to the machine automatically, the control center can finish the outline track, knife rotation, knife lifting off , according to the data, control system will operate fastly and generate motion control signal, then finish cutting path, rotating knife, lift off knife and other motion control actions with servo motor, to achieve fast and accurate cutting automatically.

1.3 Technical Parameters

Cutting Effective Area	2.5m×1.6m；1.7m×1.3m
Max. External Dimension	3.32m×2.46m；2.52m×2.16m
Max. Cutting Speed	1.8m/s
Cutting Accuracy	0.1mm
Max. Cutting Thickness	50mm(According to customer's materials)

Data Formats	DXF, HPGL
Memory	8M
Working Voltage	AC power 380V±10％, 220V±10％，50HZ
Fuse Specification	10A
Cutting System Power	1.5KW
Drive Motor	Servo Motor
Pump Vacuum	－25KPa
Pump Power	9.5KW；7.5KW
Environment	Temperature -0℃-40℃,Humidity20%-80%RH
Noise Level	60db

2 Security Considerations

1. Power supply must be connected to the earth.

2. Because of the big power of the cutter, the plug must be up to the diameter requirement,

3. Before turn on the power, check if there is anything on the strip or guide.

4. Please turn off the power if there are abnormal situation.

5. The installation site of cutting bed should be appropriate. The operator should keep a safe distance from the machine when the machine is running.

6. When inspect and maintain the equipment, please be sure to disconnect the power supply, prohibit to charge plug cable or connect operations.

7. If need to inspect, debug cutting head or replace tools when in an energized state

3 Serial Card and Software Installation

1. Normal Computer

CPU: intel Core i3 or AMD athlon ii x4

Memory: 2G

Disk: 160G

Expansion Slots: PCI slots(If with camera position system function will be 2 PCI slots)

2. Attached CD with the machine:

Cutting software (cuterserver and installation file of smartcutautoplan)

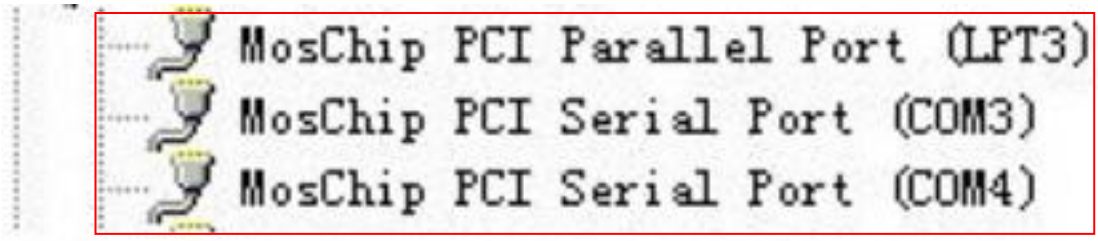
CodeMeter dongle driver

UT－713 serial port card driver

Hik video card driver

3. UT－713 serial port card installation

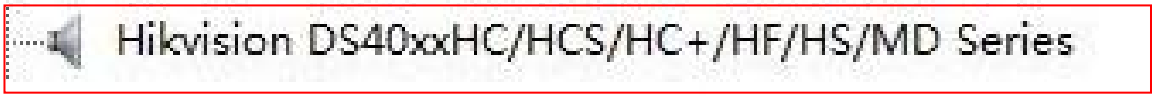
Open the computer case, install the serial port card inside the PCI slot in the computer, and install the driver program. Two new serial ports will be appeared in the device manager.



Connect the serial port card and cutting electrical box with 422 serial cable attached cutting system.

4. Video card installation (just only for CCD function)

Install the video card inside the PCI slot in the computer, and install the driver program. After installation successfully, as the figure below in the device manager list:



Connect the cutting system connector with any connector in the video card.

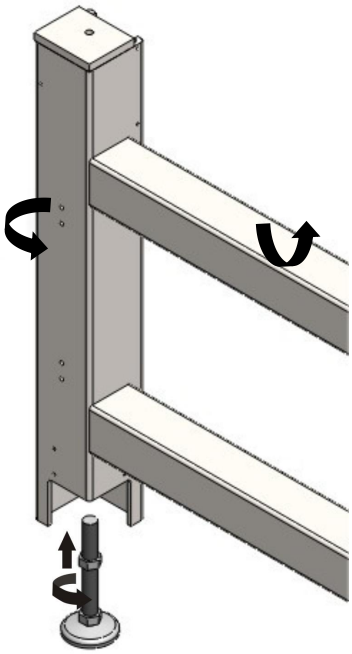
5. Install cutting system control software (cuter server) and editing software (smartcut auto plan)

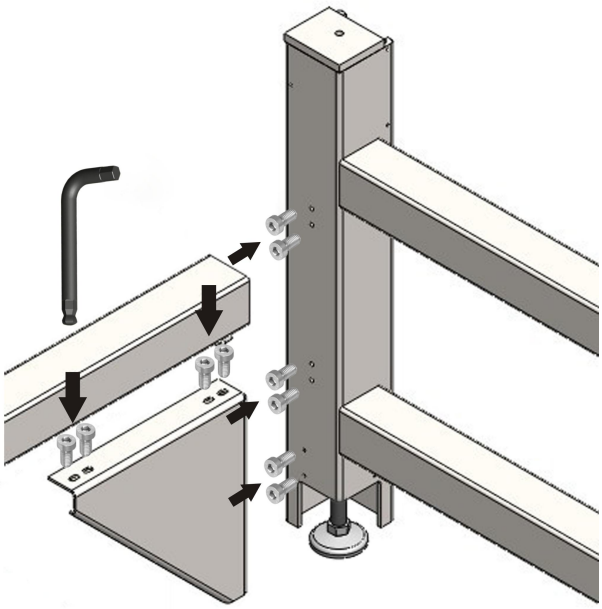
Double-click installation file, according to the prompt interface, click "next", with the default installation settings, until completing the program installation. It will popup the below icon after finishing installation.

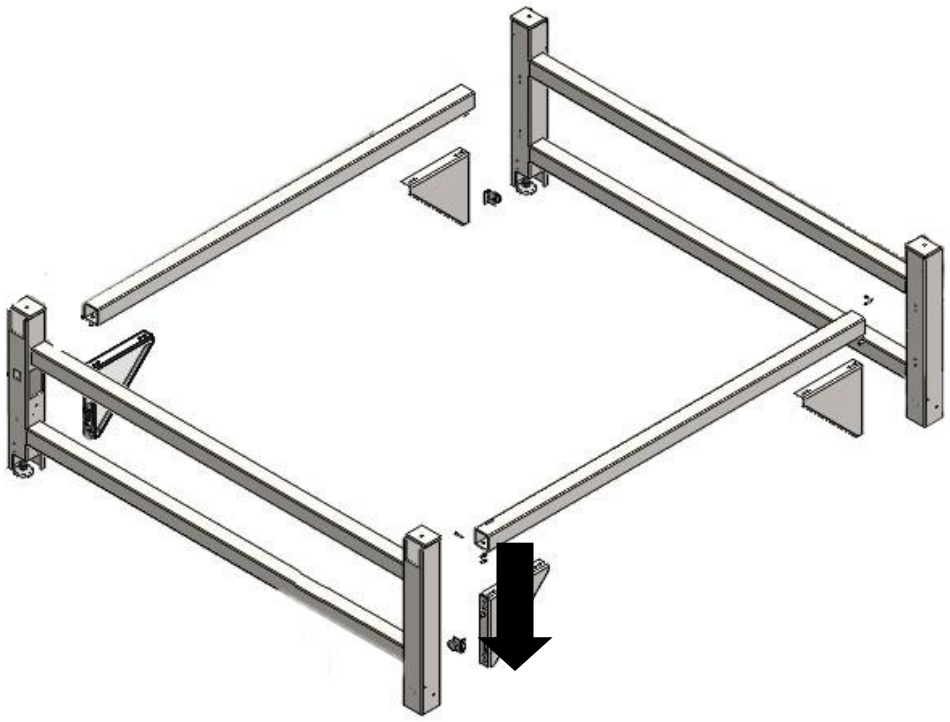
4 Cutting System Installation

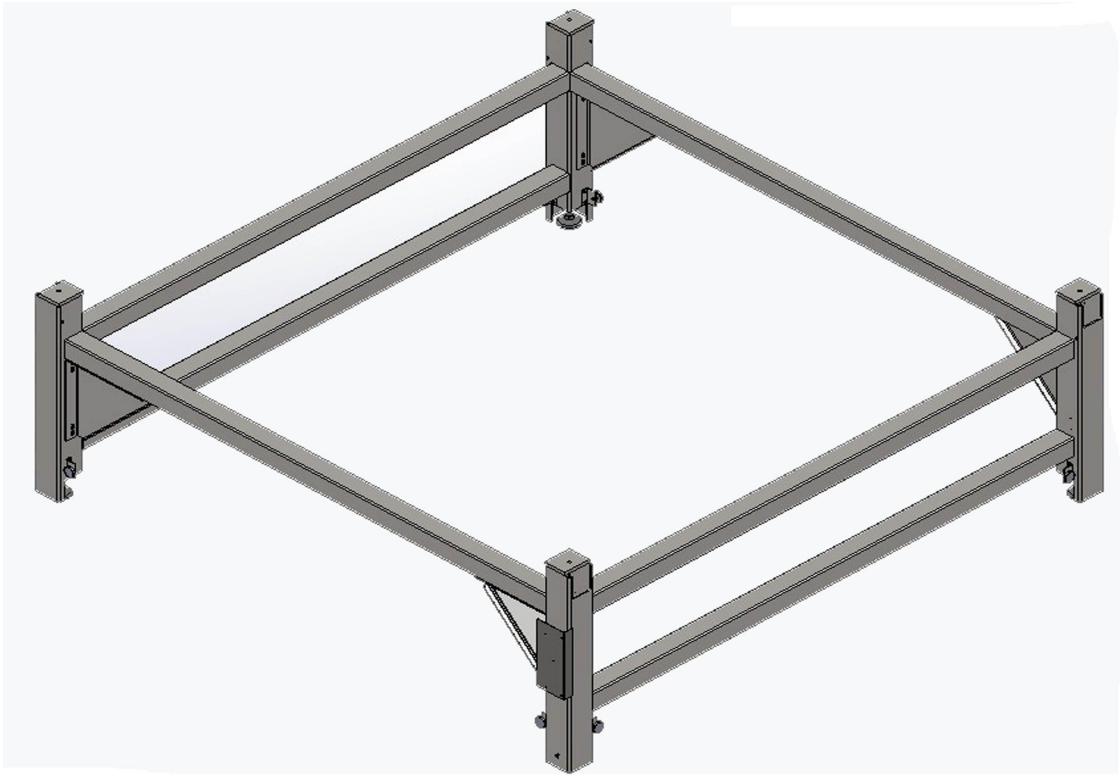
4.1 Main Part Installation

1. Install brace, please keep the same height with the bottom feet, then assemble each parts according to the drawings. In order to install the cutting table, please do not make the fixed screw too tighten firstly when install the fixed tripod, but ensure the brace is too loose.

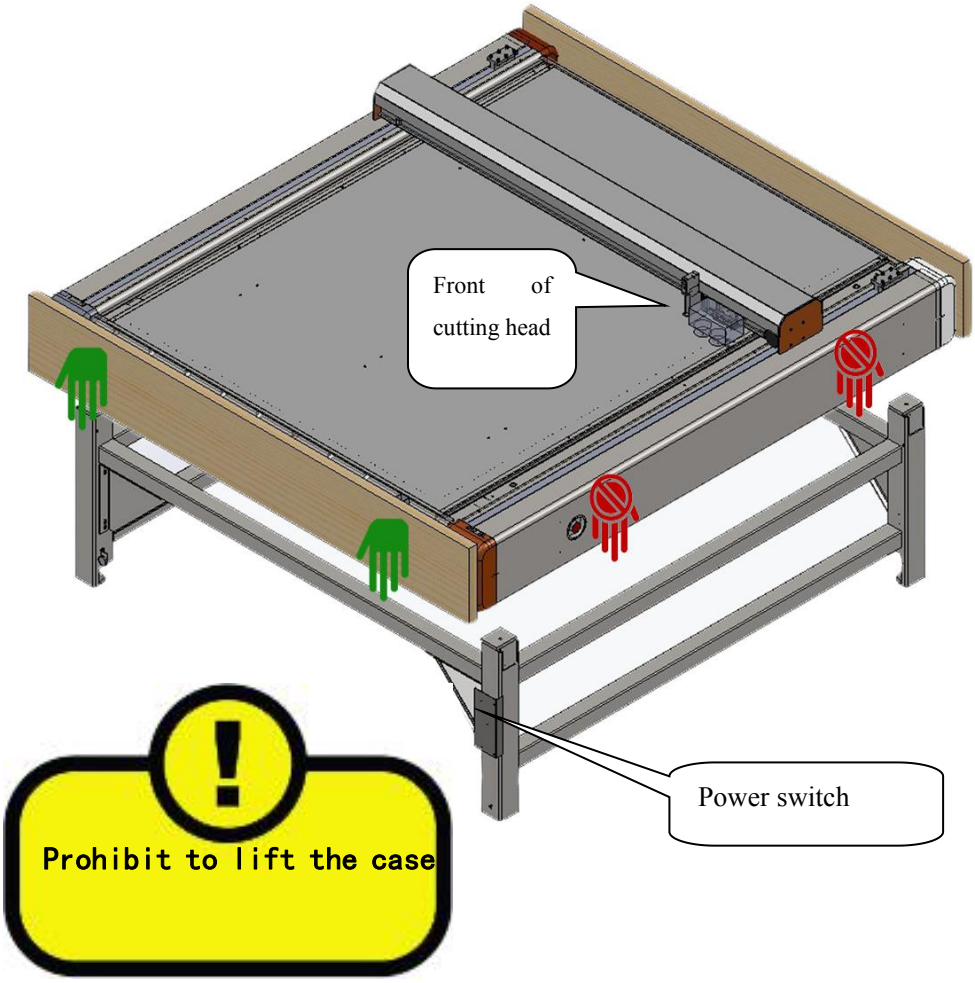




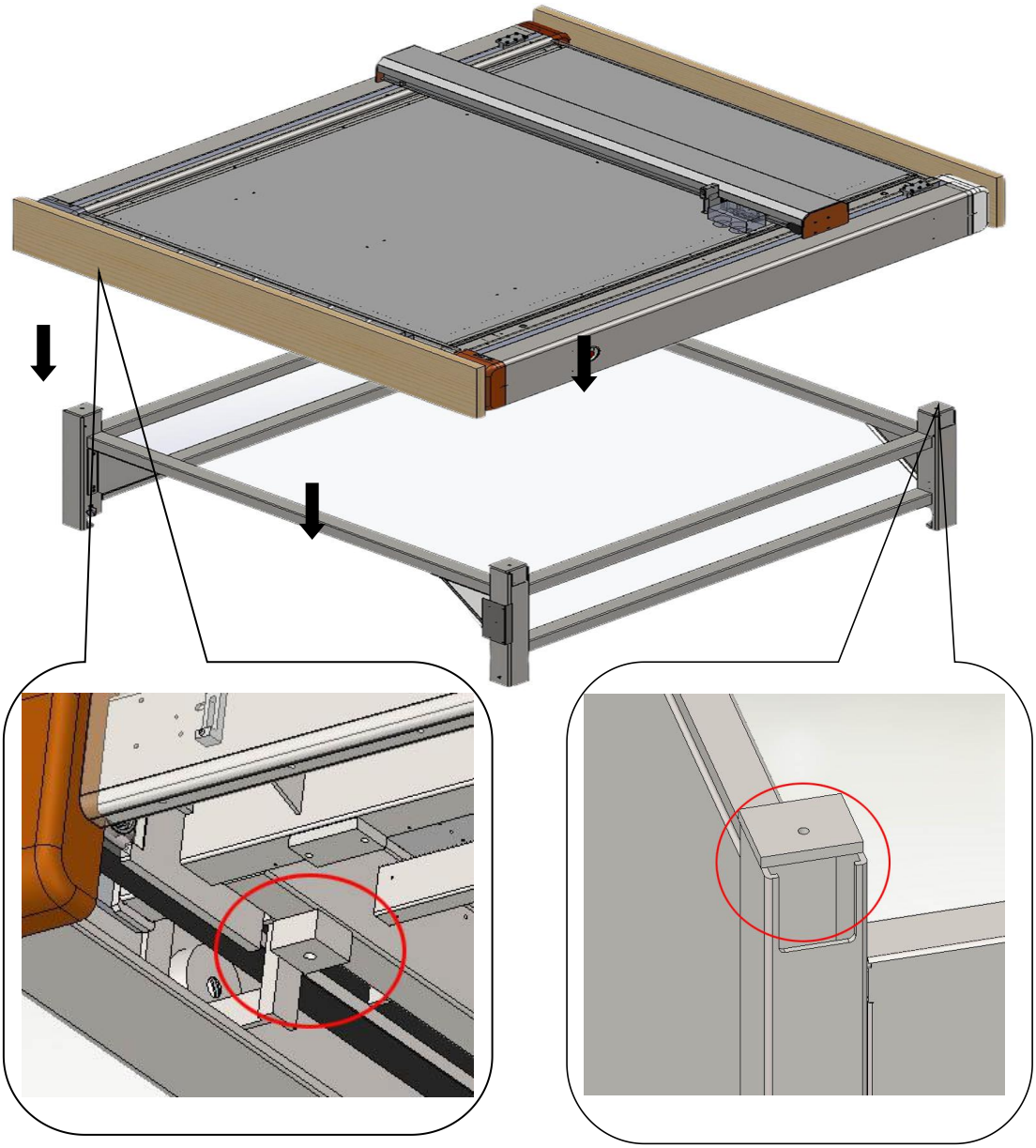




2. It should be many people to lift or hoisting with machine to fix the cutting table on the brace. When install, please keep the cutting table and brace corresponded, and the power switch of brace will be in the front of cutting head.

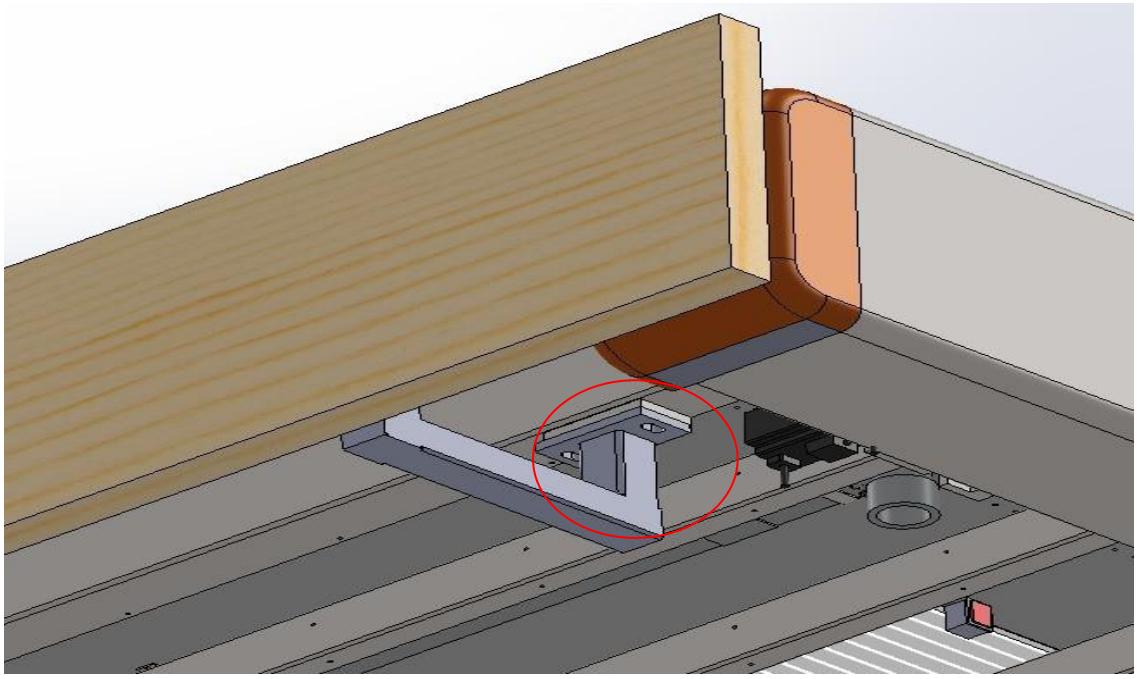


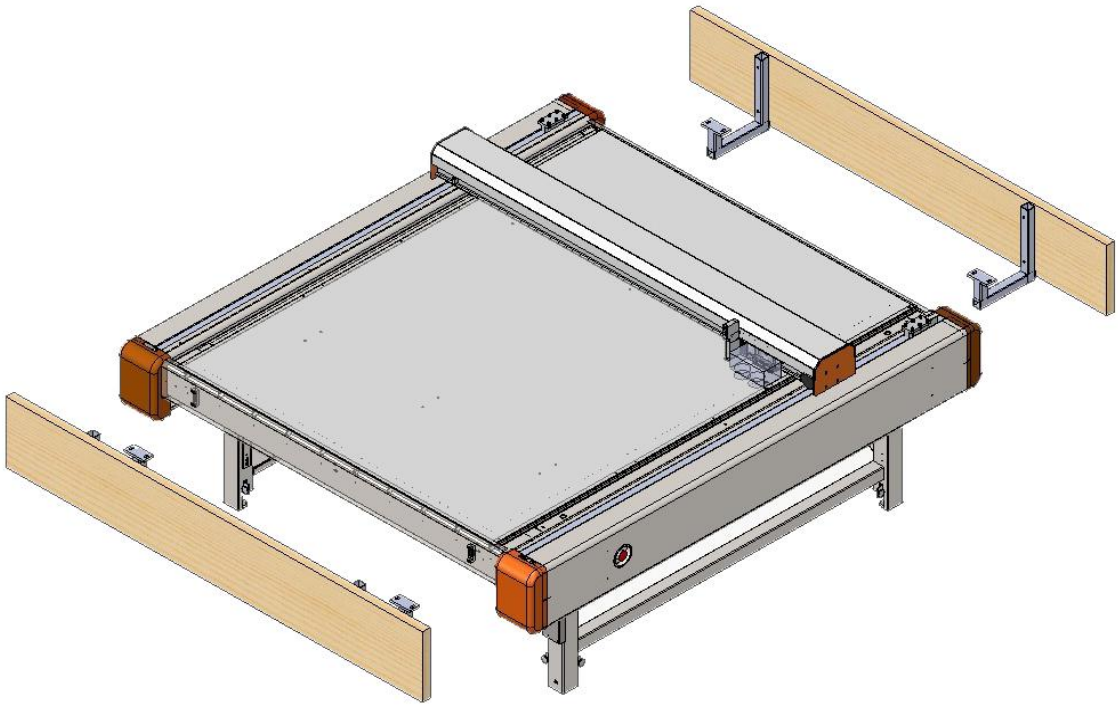
3. Check the right hole, fix the cutting table with M10 screw on the brace, then tighten the following 4 screws.



4. Tighten all the socket head screws of braces.

5. Unload the guard plate.





6. Check the horizontality with level meter; adjust the height of bottom feet to be level with the table if necessary.

4.2 Connection Line between Cutting System Wire and Electrical Box

Black motor cables plug into the corresponding sockets on the electrical box. (Motor power line plug and Motor encoder plug)

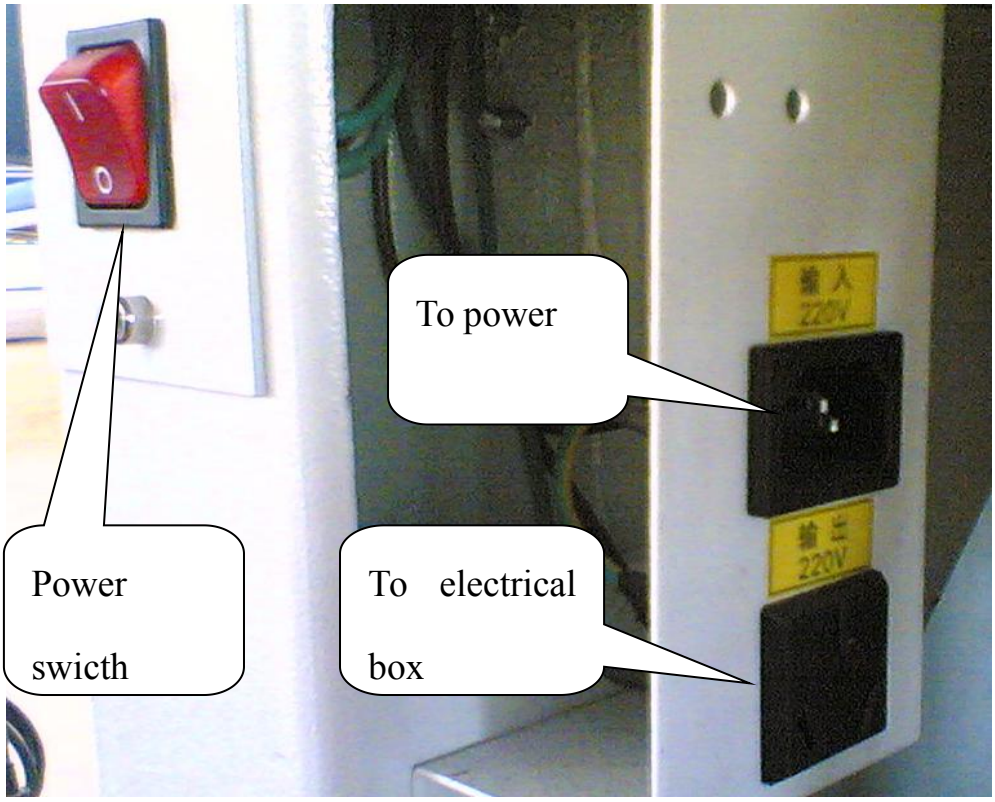
White flat cables plug into the corresponding sockets according to the marks. (S7_1、S7_2、S9_1、S9_2、J1）

Green plugs connect to the corresponding sockets according to the marks. (Including Pause, Pump Valve, Pump Contactor Control)

1. COM Port, connect to the computer with the serial port lines.
2. Operator Port, hand operator is optional. If the machine includes hand operator, the hand operator port is for connecting to the hand operator.

4.3 Connection Line between Cutting System Power Wire and Wires Outside

1. Two power cables with the cutting system, one is connected to the power slot from customer and "220V input", the other is connected to "220V output" and power slot on the electrical box.



Customer must supply earth line with good condition.

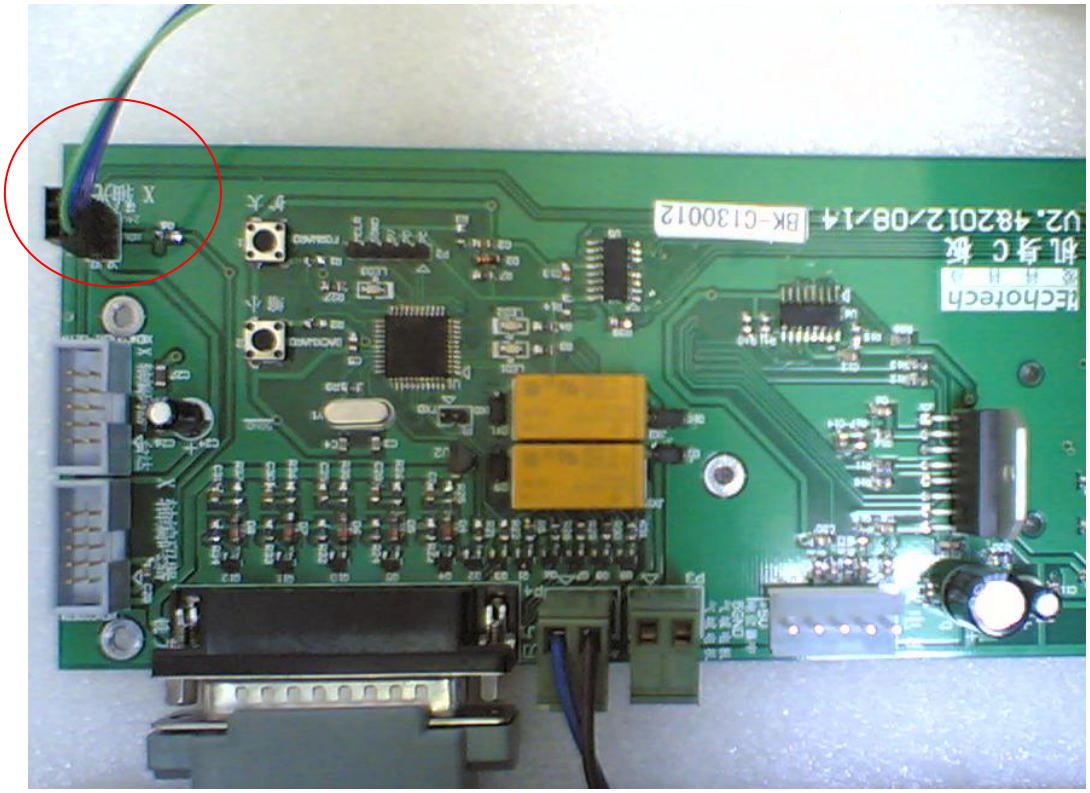
During machine working, please ensure the power switch on the electrical box and electrical leakage are in an open position. And please open or close the machine power with the power switch in figure.

2. Communication connector, connect the serial port line attached machine to the computer.

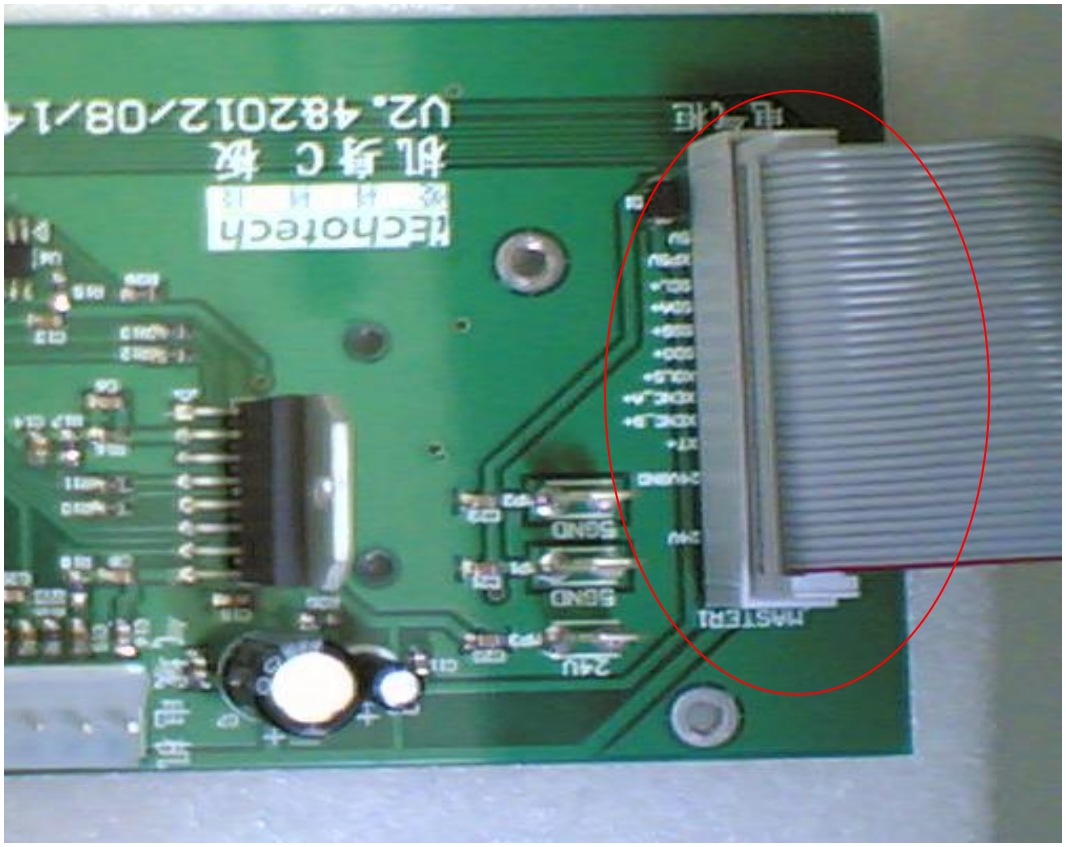
3. Handle connector, not for all machines. If configure, it is connected to the handle.

4.4 Connection Line between Cutting System and C Board of Machine Body

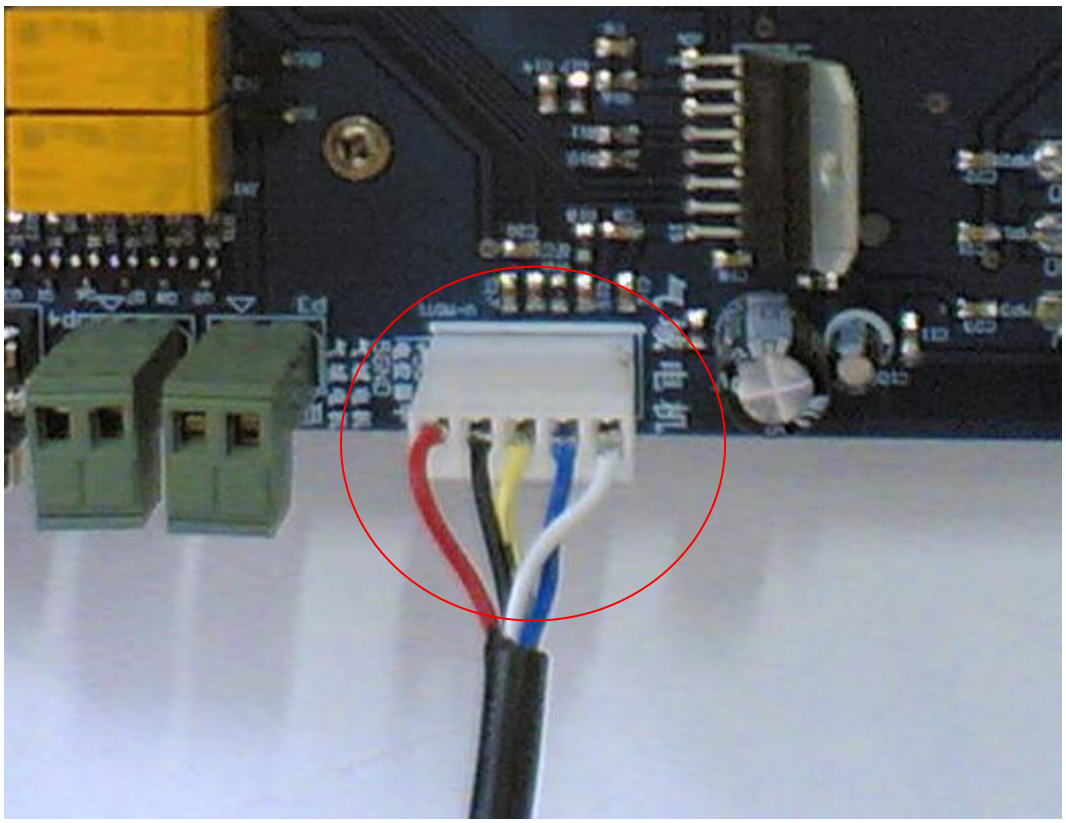
1. Photoelectric cable on X axis is connected to S1 slot on C board.



2. Wide flat cable is connected to MASTER1 slot.



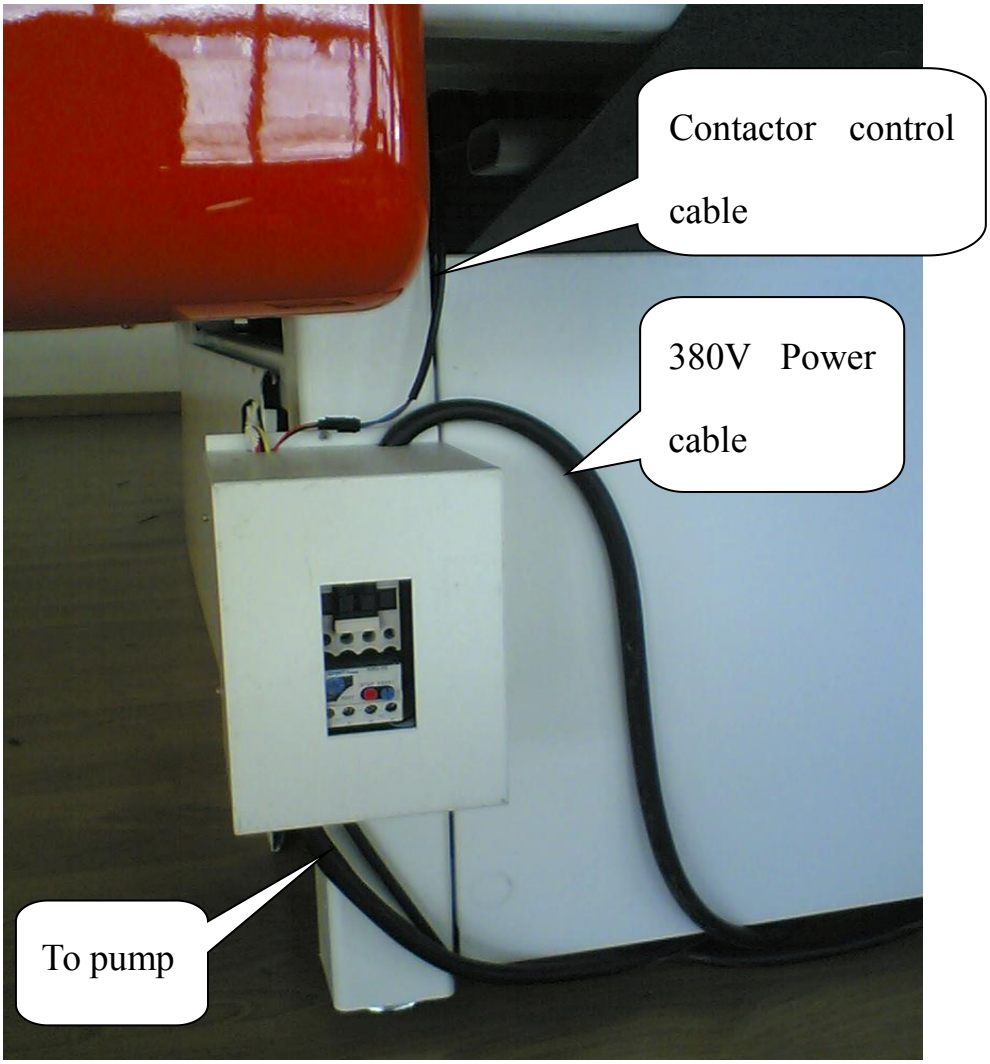
2. Airshed motor cable is connected to the white 5pin plug on the fuselage C board.



4.5 Pump installation and connection

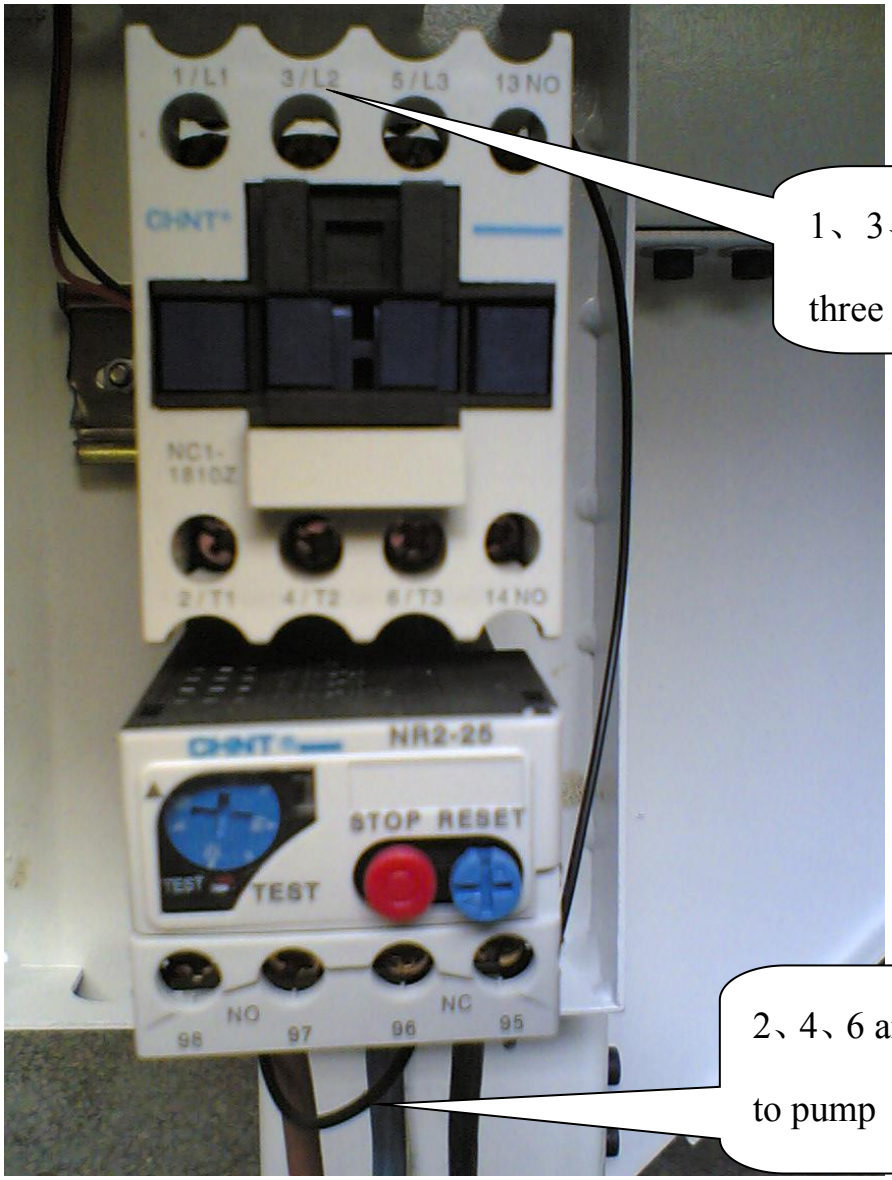
Pump needs three-phase 380V AC power, and earth wire is required.

Pump power control box is installed in front lower of cutting machine, customer need to prepare the cable from power to the machine.



Power is connected to the contactor of the top in pump power control box, connect to the pump and thermal overload relay with four core cable attached. In case of leakage, please connect the earth wire well.

Please connect the control wiring plug of 24V contactor well.



After checking the wires, please try to test the pump. If pump is reverse, please switch any two wires from three power wires.

Judgment methods of pump clockwise and counter-clockwise rotation:

Check the rotation direction if with direction.

If without rotation direction, please check the direction with inlet and outlet.

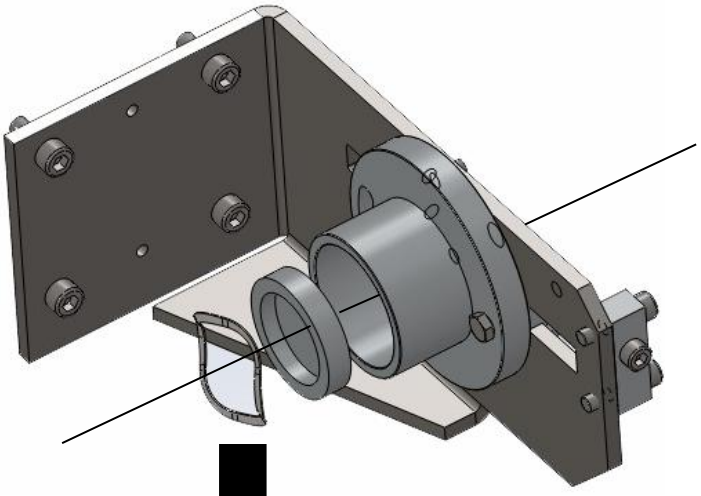
Pipe connection, there are 2 or 4 pipe connectors under the pump. Connect the 50mm flexible pipe, and lock it with steel hoop.

Connect the other end of flexible pipe to the tee, then connect to pump inlet with tee with a diameter of 75mm.

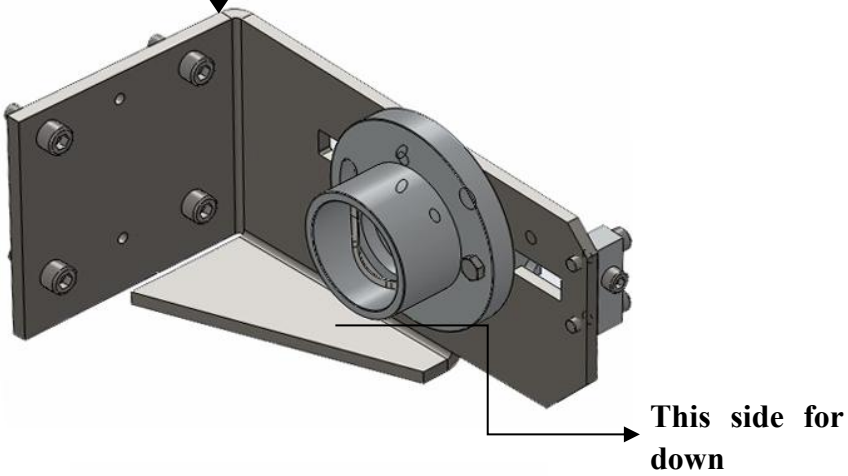
Connect the silencer to the pump outlet with a shorter diameter of 75mm.

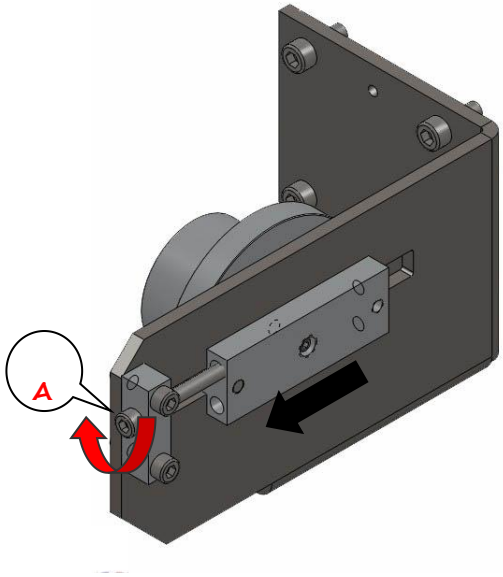
4.6 Feeding device installation

1. The installation of feeding roller mounting plate

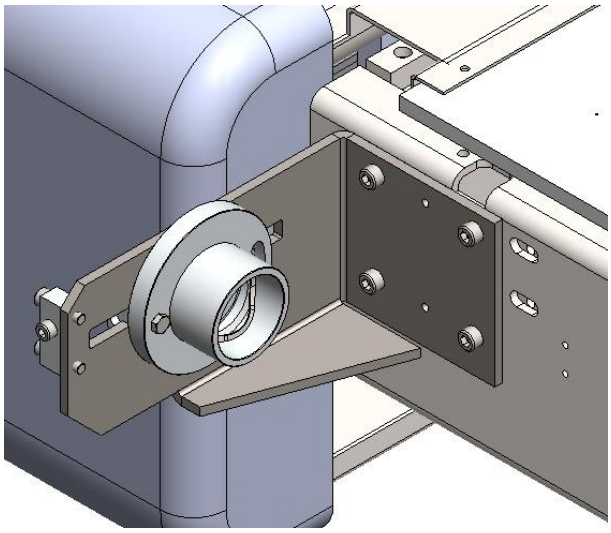


Note: Install the washer to the outermost.





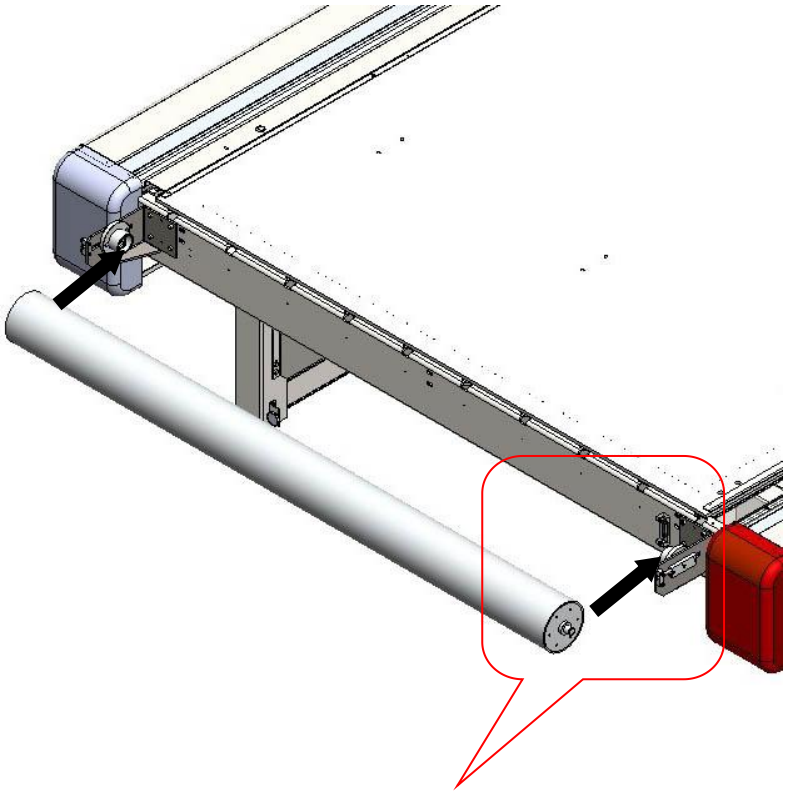
Pull the feeding roller cover to the outside with adjusting the inner hexagon screw A.

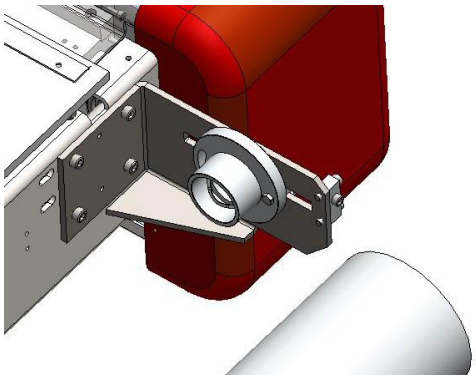


Note: When install the feeding roller mounting plate, please do not tighten the 4 inner hexagon screws.

2. Feeding roller installation

After installing the end of mounting base, please install the rollers in it firstly, then install the other end of mounting base.



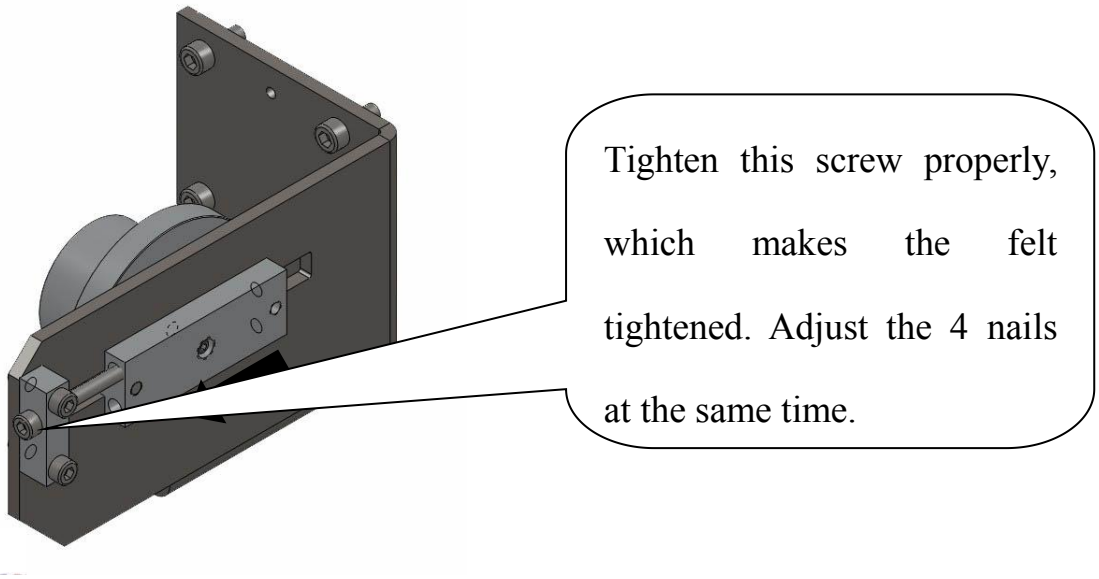


3.Felt installation

Joint of adhesive on felt, after bonding the felt connectors, please make it plat. With less 502 glue to fix some parts, then bond the seams with appropriate structural adhesive, and makes it level.

Before gluing, in case of leakage, put a layer of paper under the seams. And in order to increase its soundness, put a layer of cloth in the two sides of seams.

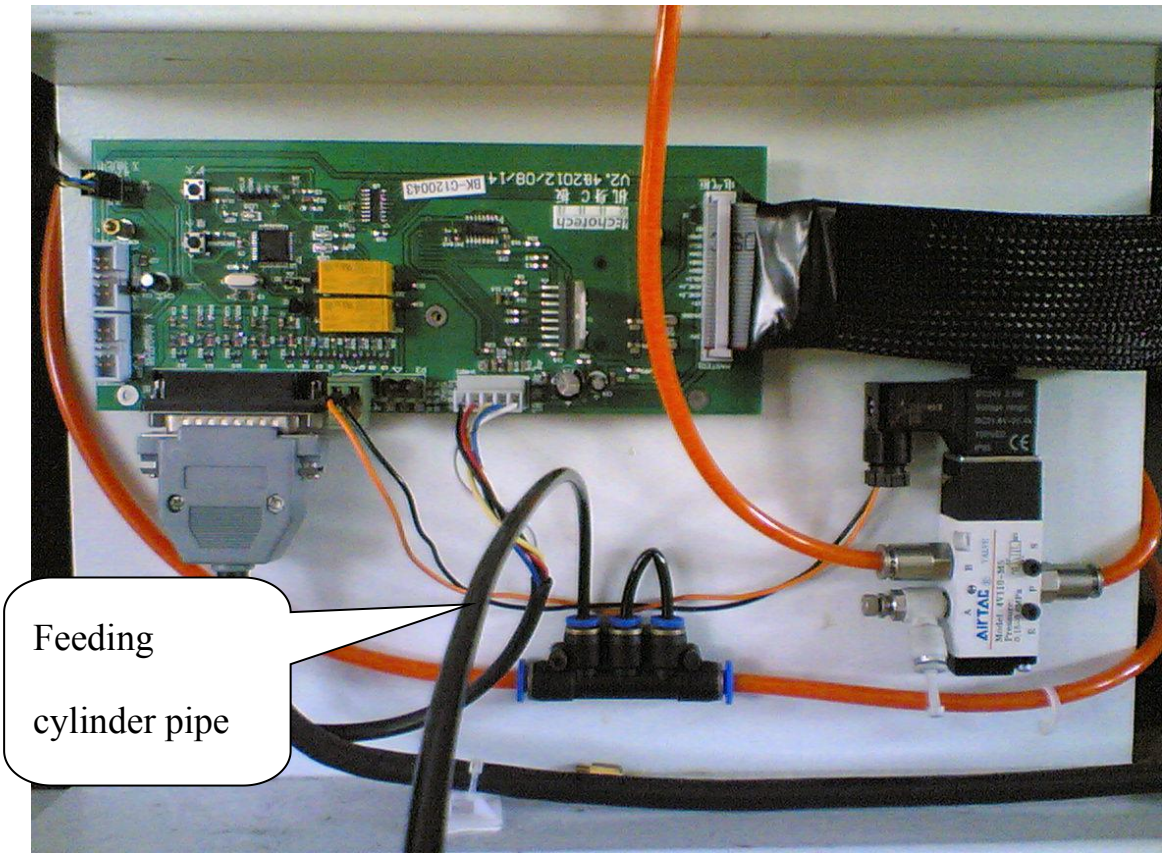
Please do not move the felt within 24 hours after gluing. Until the glue is dry, tighten elastic nails, roll the felt continually and adjust the 4 elastic nails at the same time, it makes the felt can not move to one side when rolling.



4.Feeding cylinder pipe connection

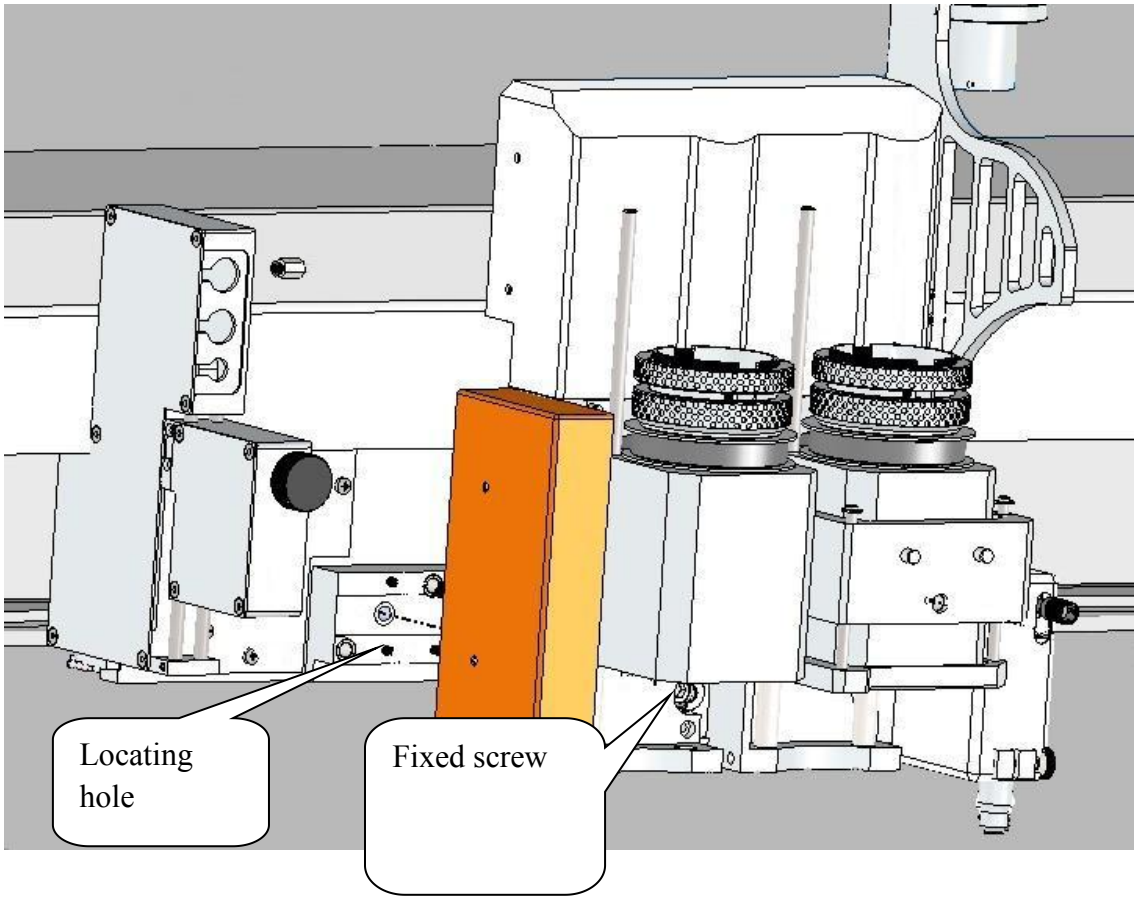
There is one black pipe of 4mm with the harness under the machine; it is the pipe which

connects to feeding cylinder. If without configure pneumatic knife, please connect this pipe to the air supply. If configure, please connect this pipe to the connector of tee near the pneumatic knife next to the fuselage side.



4.7 Cutting head installation

Hold the cutting head with hands, make the locating pin of cutting head aim at the locating hole of fixed plate. After aiming the electric plug to plug of fixed plate, hold the head in right place with minimal human exertion. Then tighten the fixed screws with tools.

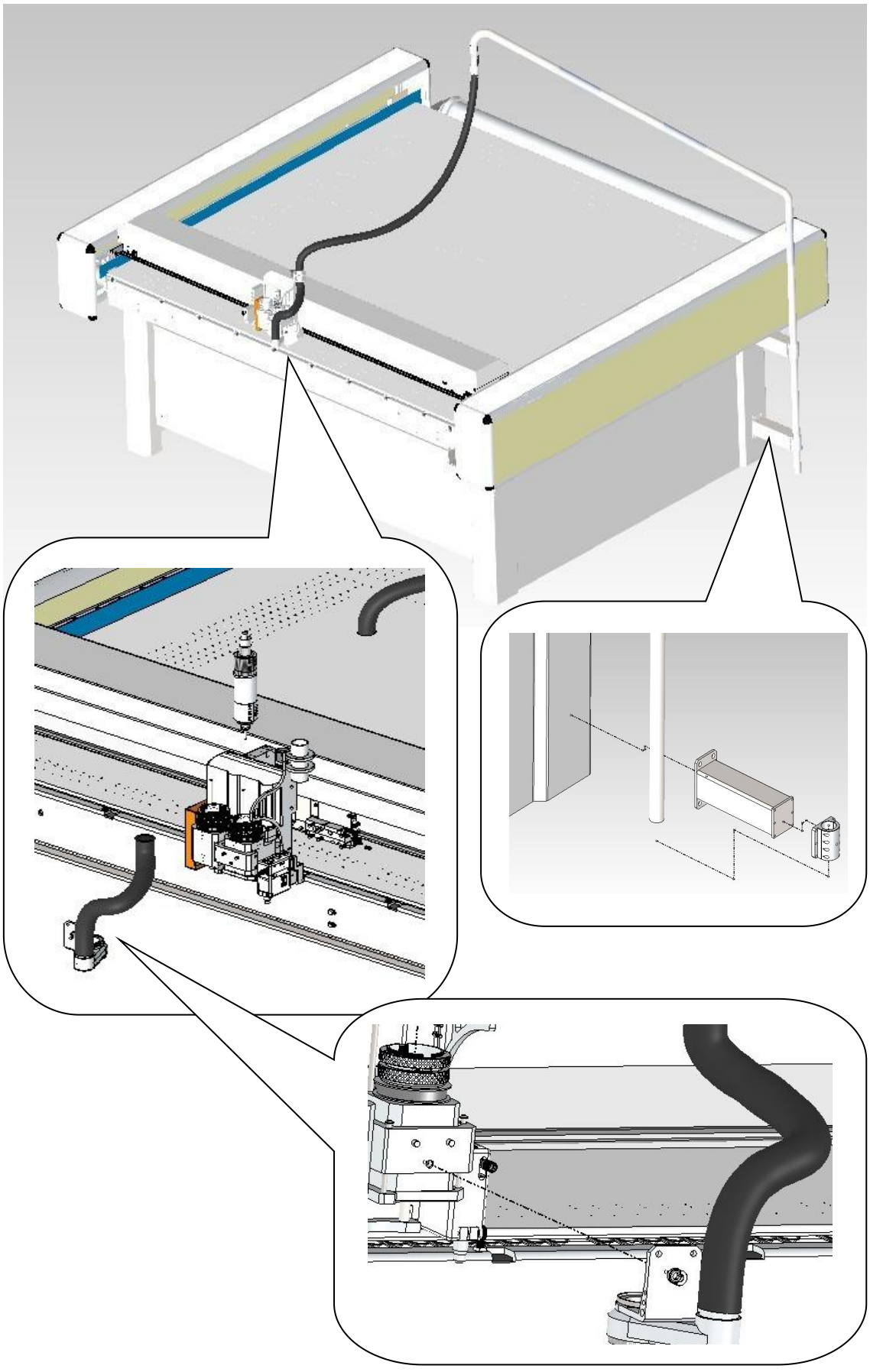


4.8 Electric milling tool installation

1. Installation of milling tool controller

According to the figure, assemble installing frame of milling tool controller and suction pipe.

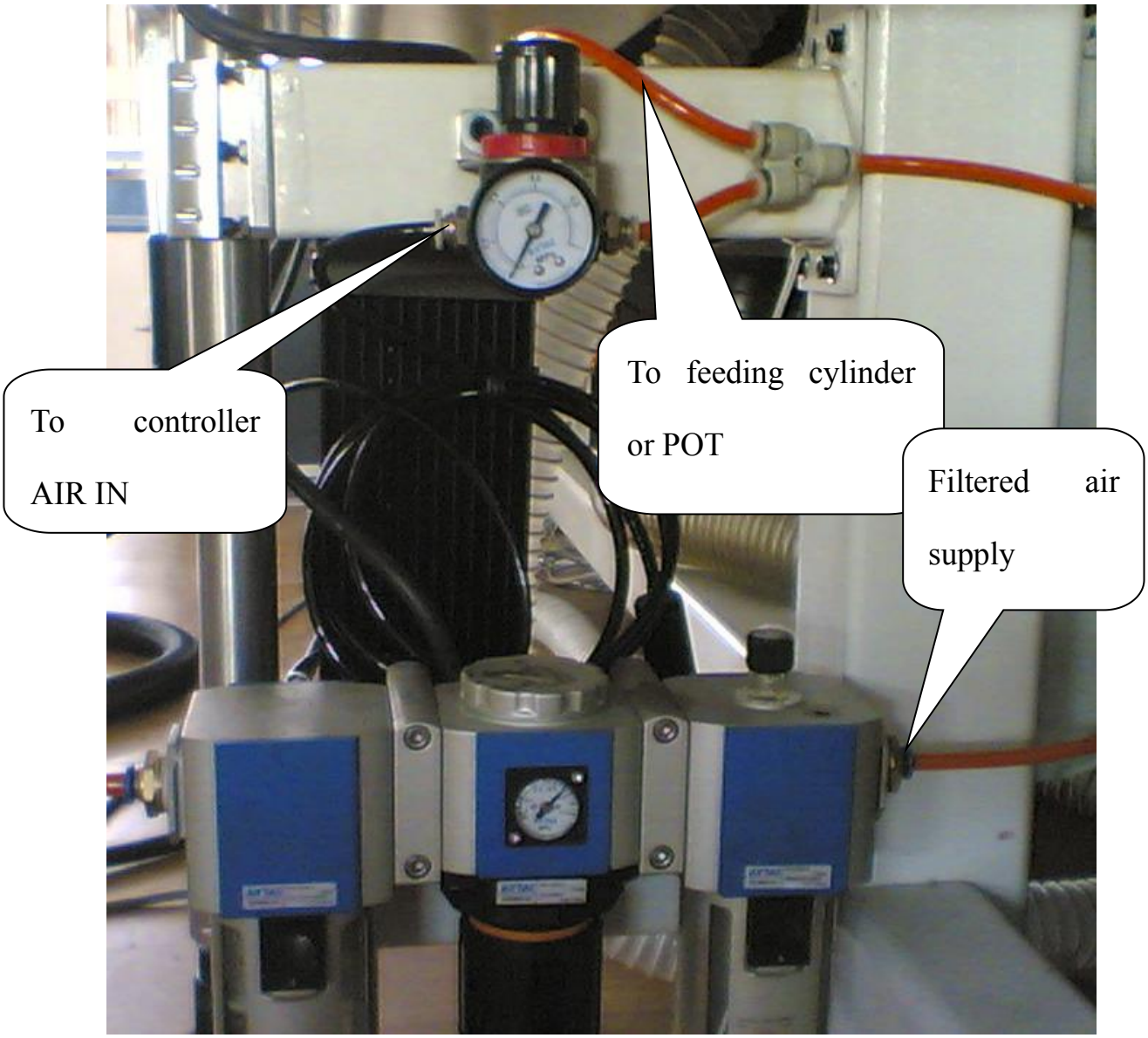
Fix the controller on the installing frame.



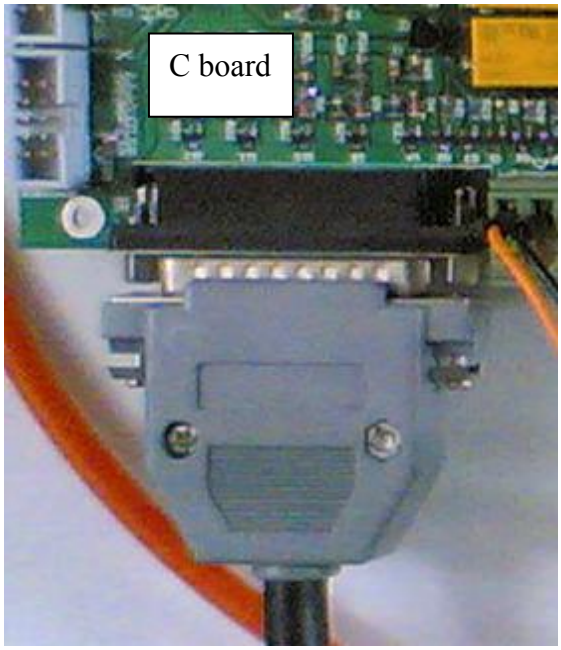
2. Connection of cable and air cooling pipe

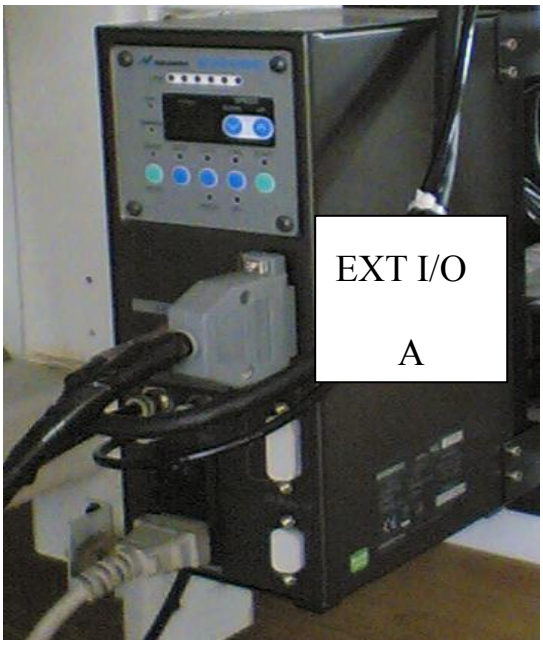
Cable of the cutting tool is connected to the MOTOR socket, air cooling pipe of cutting tool is connected to the pore of AIR OUT on controller. Tie up the cable of cutting too and air cooling pipe to the suction pipe with ribbon. In order to guarantee cutting tool's normal working, please remain enough cable on the cutting tool.

AIR IN hole pipe of controller is connected to pressure regulating value outlet of milling tool, and pressure regulating value inlet is connected to air supply.



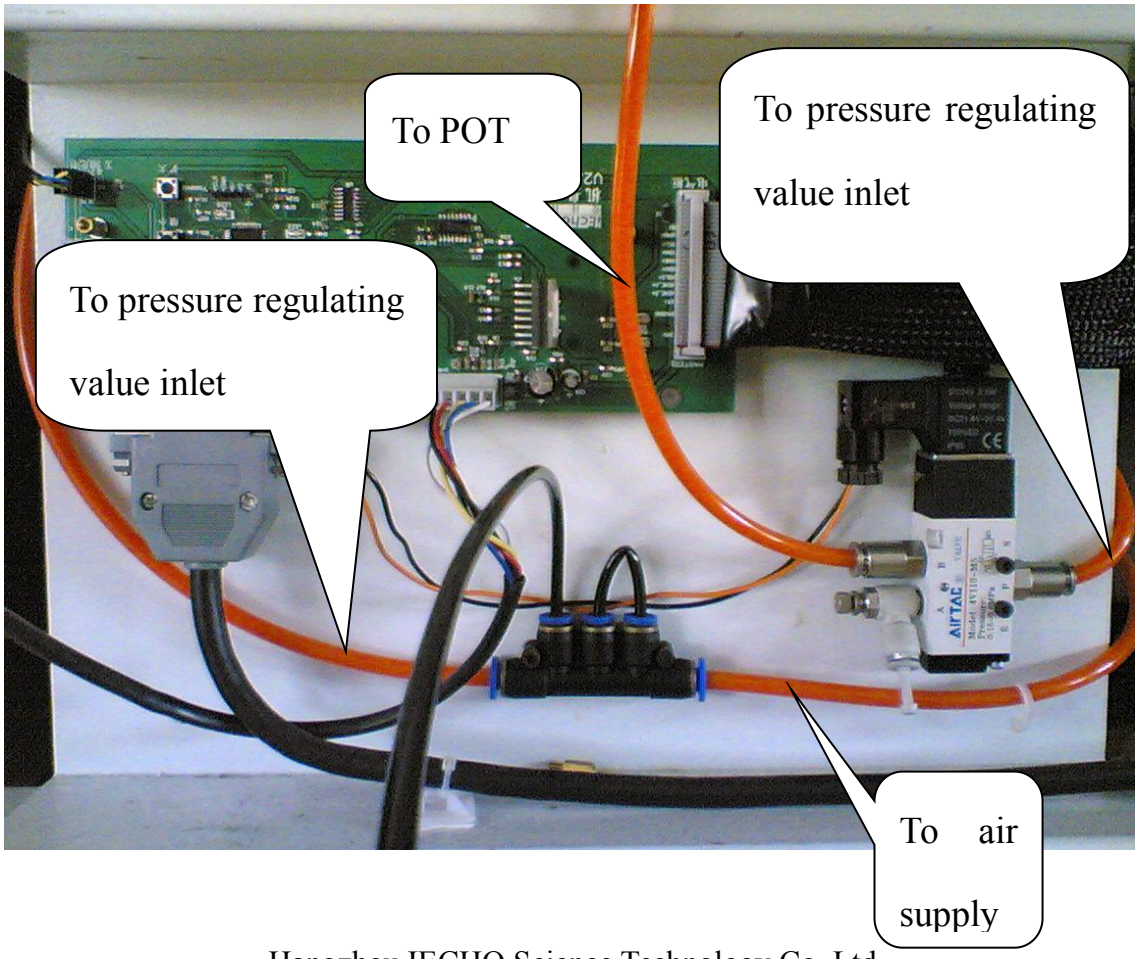
One end of signal line is connected to the fuselage of C board, and other other end of line is connected to EXT I/ O port of controller, then tighten the fixed screw.





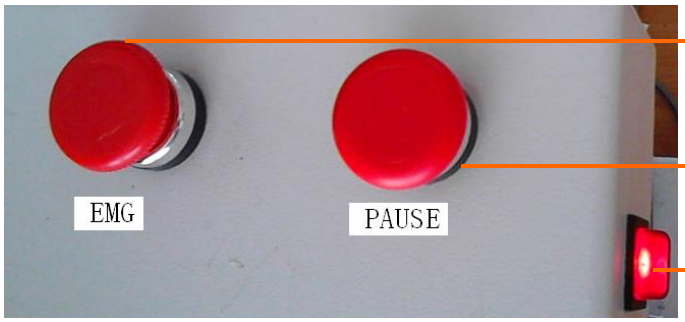
4.9 Connection of POT pipe

There is one orange pipe of 6mm with the harness under the machine, it is connected to the pipe of POT. Connect this pipe to B port of POT magnetic value near the machine side plate's port of magnetic value is connected to the pressure regulating value outlet of POT, the pressure regulating value inlet is connected to then tee ear the magnetic value. The pressure regulating value is fixed in front lower of the machine.


To POT
To pressure regulating value inlet
To pressure regulating value inlet
To air supply

5 Cutter Operation

5.1 Switches on the cutter



Emergency Stop

Pause

Power Switch

The leakage protection switch

Communication Serial Port

Power

5.2 Hand Operator

0 START

1 SWT switch key, press the key to select the knife tools, can select from pen, knife tool 1,knife tool 2,knife tool 3,knife tool 4 to make it to be current knife tool.

2 ENTER

3 knife lift/down, press the key to lift/down the current knife tools.

4 Multifunction key, press to select “SPEED:1”,“SPEED： 2”、“SPEED:3”、“SPEED：4”、“ZD ?”etc, at the same time ,there is the tips showed on the left top of the screen, “SPEED: x” means the speed level of manual movement.“ZD ?”means the selection of current knife cutting depth, under this status, up and down to adjust the depth of the knife, but cannot move the head in X or Y direction. Finished the knife depth setting, save to the software, then click the key again into the manual speed setting, make the head movement to be effect in X and Y direction.

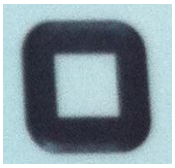
5. Relative Original, press the key, then press “2/ENTER” to make the head back to the start point.

6． Original, press the key, then press “2/ENTER”, the head back to original.

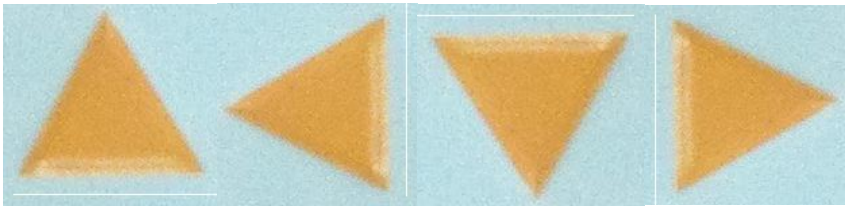
7 Preview, press the key, then press”2/ENTER”, the laser point open, move according to the size of the file, to check if it is over cut of the material.

8 Shift

9 Pause, press the key, pause the current cutting, press the key again, start the cutting again.



Stop/Cancel, press the key, cancel the current cutting, press again can not start again the, only start the cutting from the beginning.

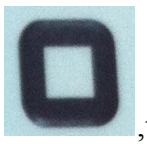


Direction Key: by using “4/SPEED” to select the speed level “SPEED：x”(x=1/2/3/4),move the head in 4 directions, at the same time to change the start cutting original point, If by using “4/speed” to select the adjustment of the knife tool depth “ZD？”,the UP and DOWN to adjust the knife tool depth.

Key combination descriptions

Modify the handle direction

Press the

3 times, then 2 times  ,then 1 time

,the left bottom will show “DIR:xx”（xx for 00/90/180/270), If failed, by press UP and DOWN key to be back to the interface. then can by using LEFT and Right key to set the rotation. Finished the setting, Press

to exit.

5.3 Cutter Operation

Turn on Cutter

Press the power on switch (normally the power switch on the control box is on),the cutter will be back to home, then the cutting head on the original point.

Attention:

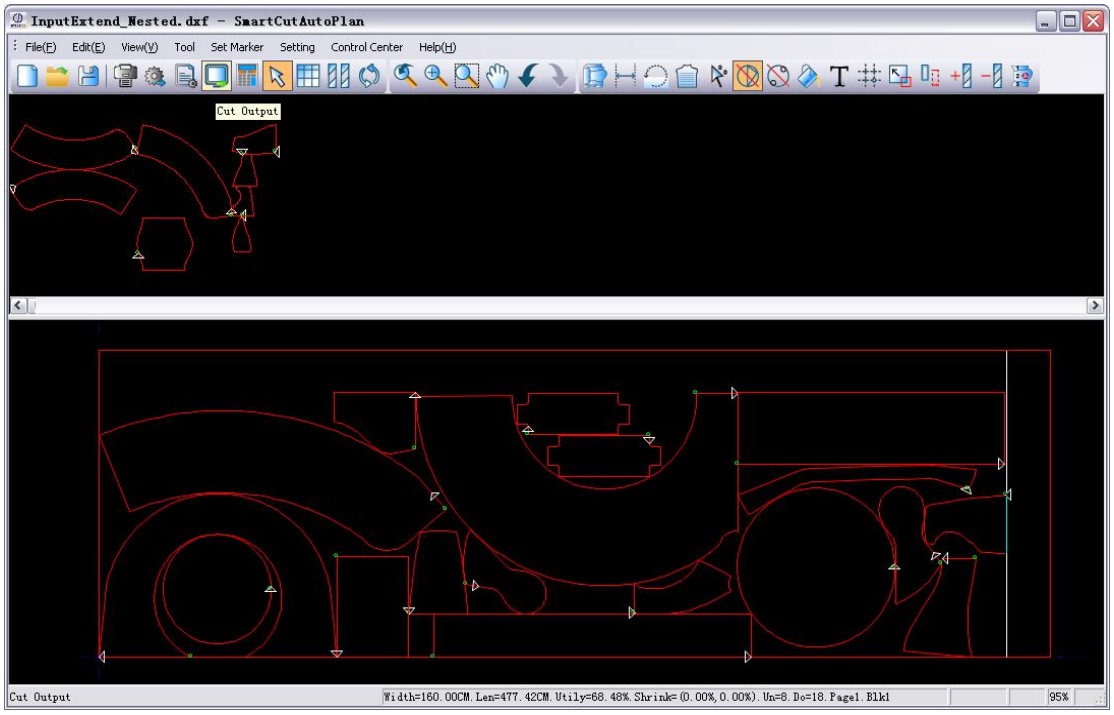
- Please make sure cutting table is clean before you turn on the cutter.
- If use POT, please open the air compressor first, then adjust the air pressure to be 0.7MPa.
- If use router, Please open the power of the driver and the compressed air supply ,and make the router cooling air pressure to be 0.3MPa.

Put the material on the table.

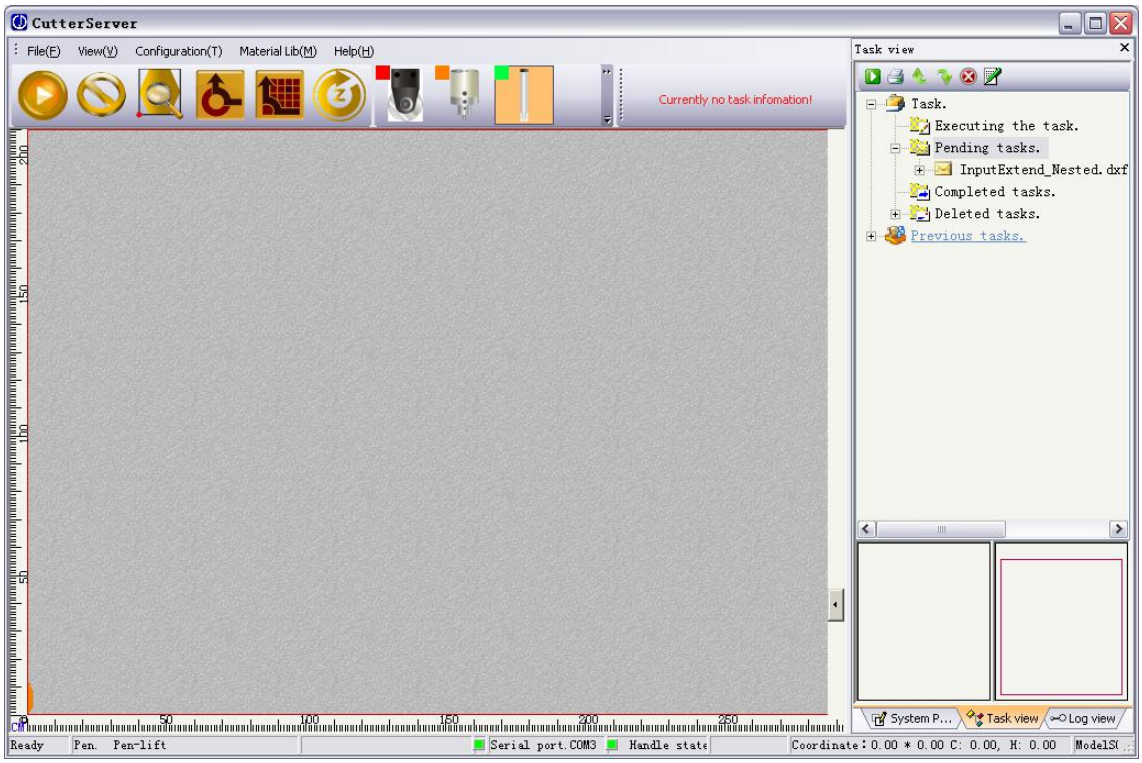
Put the material on the table, turn on the vacuum pump, make the material to be even sucked on the table. if it is breathable material, put the plastic on the surface. If the material is too small, the air leakage area should also be put the plastic. The table with the area adsorption will make good cutting quality.

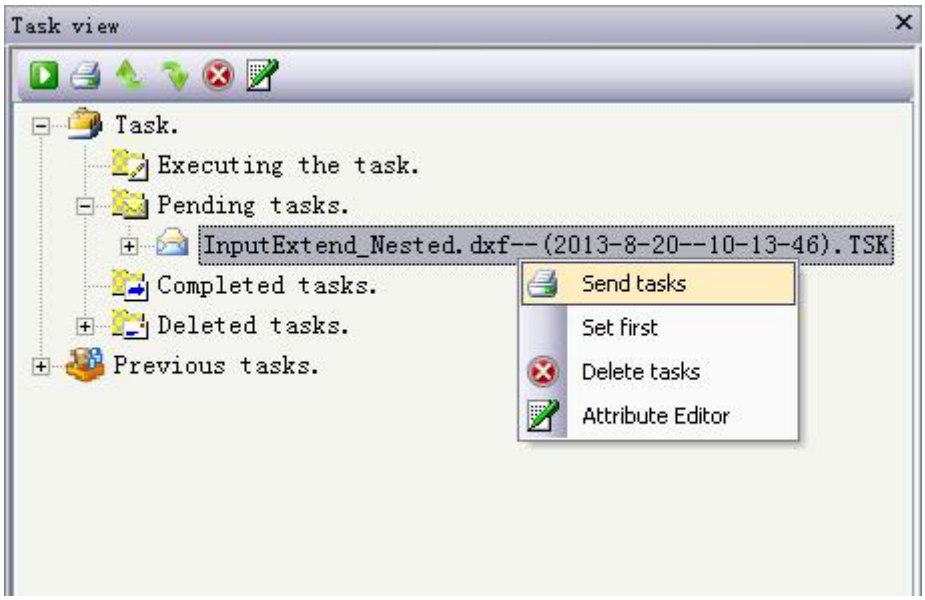
Add Tasks

Through the Smartcut software, to edit the blade/pen property, cutting order, nesting etc. Then output to the Cutterserver,

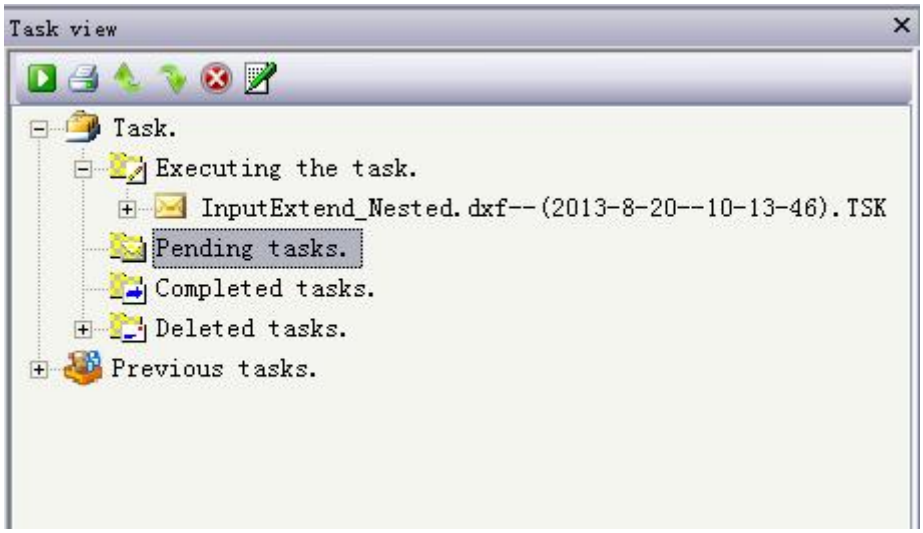


After the output sending, there will be an new task under the pending tasks.





Right click on the new task, then choose" send tasks", then send it to the executing the task.



Then use the hand operator or Cuttersever to operate as follows:

Choose the cutting original

Use the direction key or the direction key on the keyboard, move the cutting head to the proposed start cutting point. Or you can also use the cutter defaulted original.

Preview

Press the button "view" to check the cutting area, if it is out of the cutting area, you can choose another cutting original or back to the smartcut to edit the pattern, then send

it to the machine again.

Confirm cutting

After checking everything is ok, press the button “START” on the hand operator, then press “ENTER” to start the cutting.

Attention: before cutting should confirm as the follows:

- Select and install the suitable cutting tool
- Check the height of the knife tool
- Set the reasonable cutting parameters as speed, rotation speed, knife lift height etc.

Can do the following operations during the cutting:

Pause cutting

Press the “PAUSE”, the cutter pause cutting, press again, it will continuous the cutting.

Cancel cutting

Press the stop, the cutting will be canceled, the cutting will be stopped.

After finished the cutting, cutter stop, turn off the vacuum, pick the materials.

Next time when you do cutting, if same cutting original as last time, press Re-Original, then press “START”, then this time cutting will continue the cutting of last time.

After work, please turn off the power of the cutter and other relative devices as router, air compressor etc.

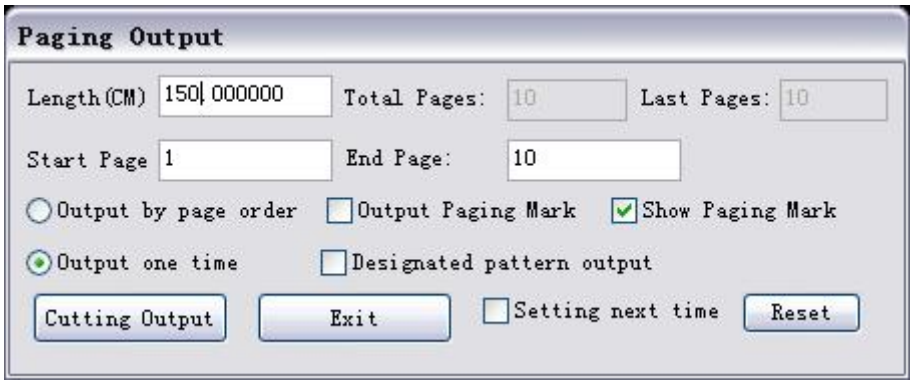
5.4 Auto feeding continuous cutting

Open the air compressor, check the air pressure should be more than 0.4MPa,If the material pressure controlled dependently, make the pressure to be around a.2MPa.Before the putting the material on the table, it’s better to try the conveyor

system first.

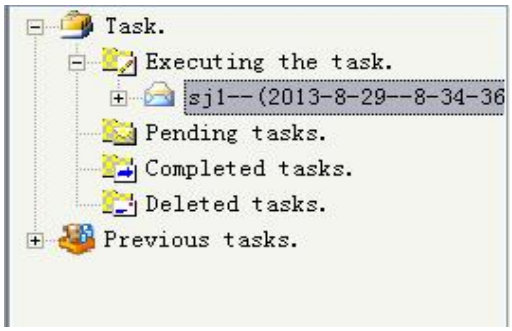
Paging Output

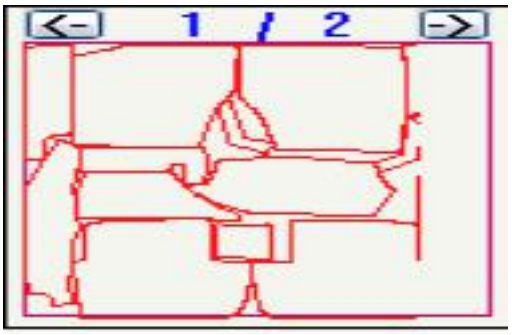
After the Smartcut nesting, press the control center paging output", open the dialog as follows:



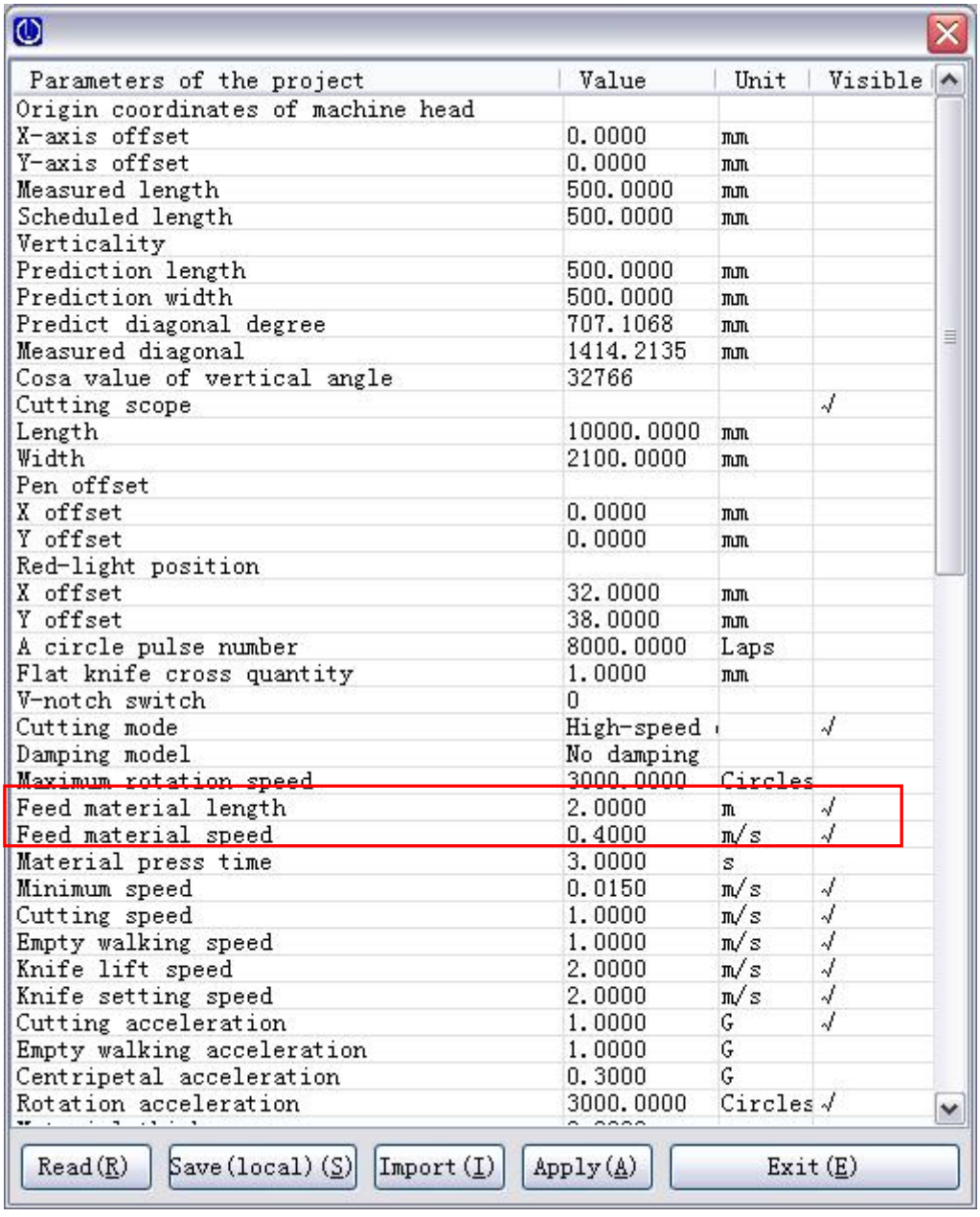
Set the length of the page, you can the divider lines as follows:

Select" output in one time", then press "output", you can send the task to Cuttersever. Select the task from paging output tasks, The first page will be showed in the preview, press the LEFT or RIGHT to check the following pages.





You can change the parameters with auto feeding, press the “configuration”-”modify parameter”, open the parameter dialog.



Parameters of the project	Value	Unit	Visible
Origin coordinates of machine head			
X-axis offset	0.0000	mm	
Y-axis offset	0.0000	mm	
Measured length	500.0000	mm	
Scheduled length	500.0000	mm	
Verticality			
Prediction length	500.0000	mm	
Prediction width	500.0000	mm	
Predict diagonal degree	707.1068	mm	
Measured diagonal	1414.2135	mm	
Cosa value of vertical angle	32766		
Cutting scope			√
Length	10000.0000	mm	
Width	2100.0000	mm	
Pen offset			
X offset	0.0000	mm	
Y offset	0.0000	mm	
Red-light position			
X offset	32.0000	mm	
Y offset	38.0000	mm	
A circle pulse number	8000.0000	Laps	
Flat knife cross quantity	1.0000	mm	
V-notch switch	0		
Cutting mode	High-speed		√
Damping model	No damping		
Maximum rotation speed	3000.0000	Circles	
Feed material length	2.0000	m	√
Feed material speed	0.4000	m/s	√
Material press time	3.0000	s	
Minimum speed	0.0150	m/s	√
Cutting speed	1.0000	m/s	√
Empty walking speed	1.0000	m/s	√
Knife lift speed	2.0000	m/s	√
Knife setting speed	2.0000	m/s	√
Cutting acceleration	1.0000	G	√
Empty walking acceleration	1.0000	G	
Centripetal acceleration	0.3000	G	
Rotation acceleration	3000.0000	Circles	√

Read(R) Save(local)(S) Import(I) Apply(A) Exit(E)

Feed material length--it's only with feeding length by manual, continuous cutting depends on the setting of the paging output.

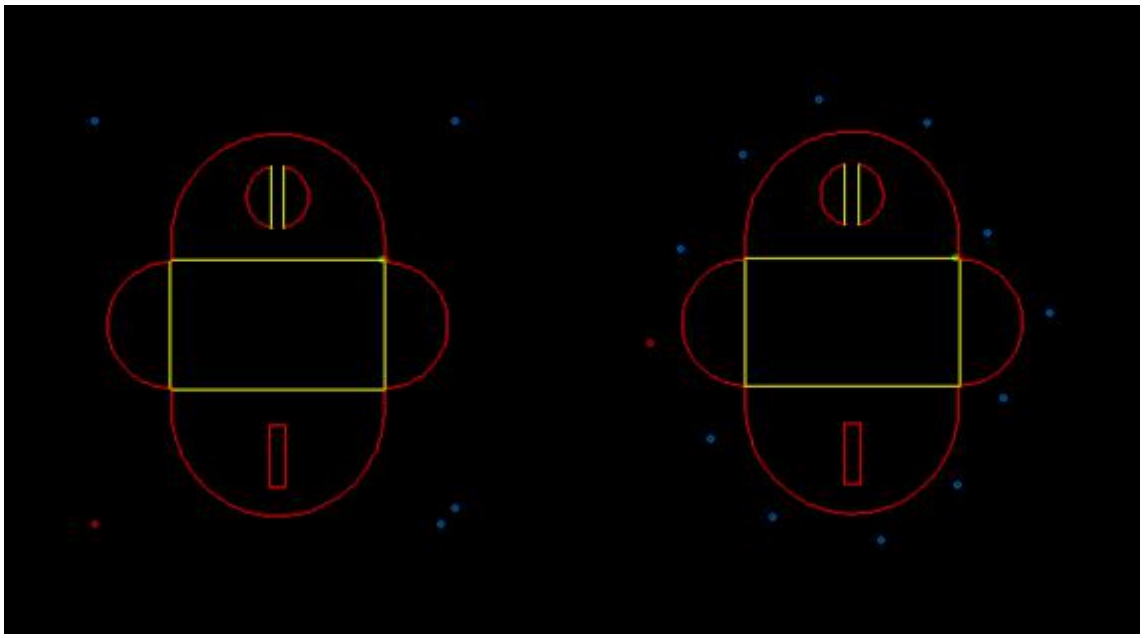
Feed material speed-- the speed of feeding, normally make the value to be small.

5.5 CCD Camera System Operation

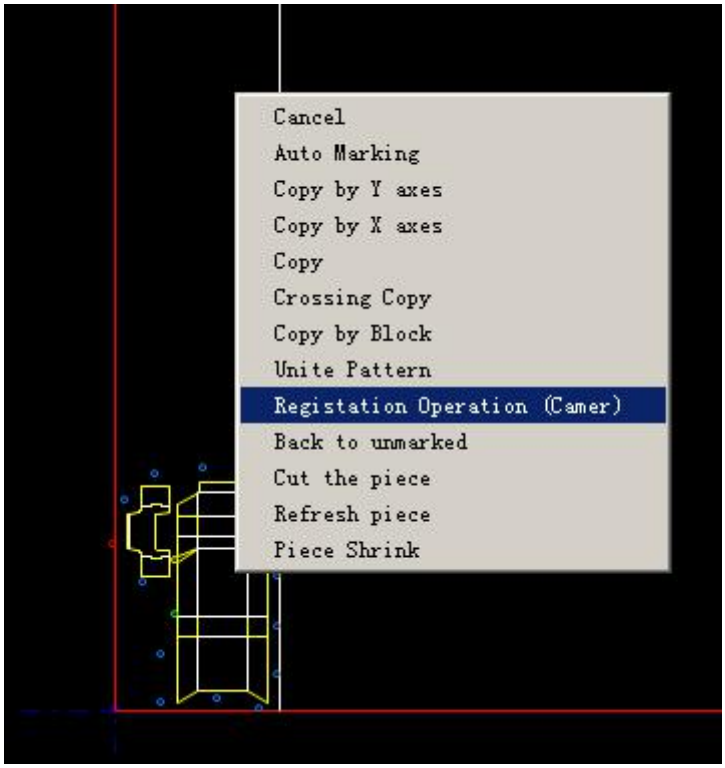
Unscrew the nut of the camera, adjust the height of the camera, use the height block to confirm the distance between the camera and the surface of the material.

1.Open the data file for the CCD camera cutting.

Input the DXF format CCD camera data file from the Smartcut, Please pay attention on the type of the marks, Corner marks are 5,Auto marks are some and the outline of the patterns. There is a red mark in both mark types. The red mark is the first mark, the other marks should be in yellow color.



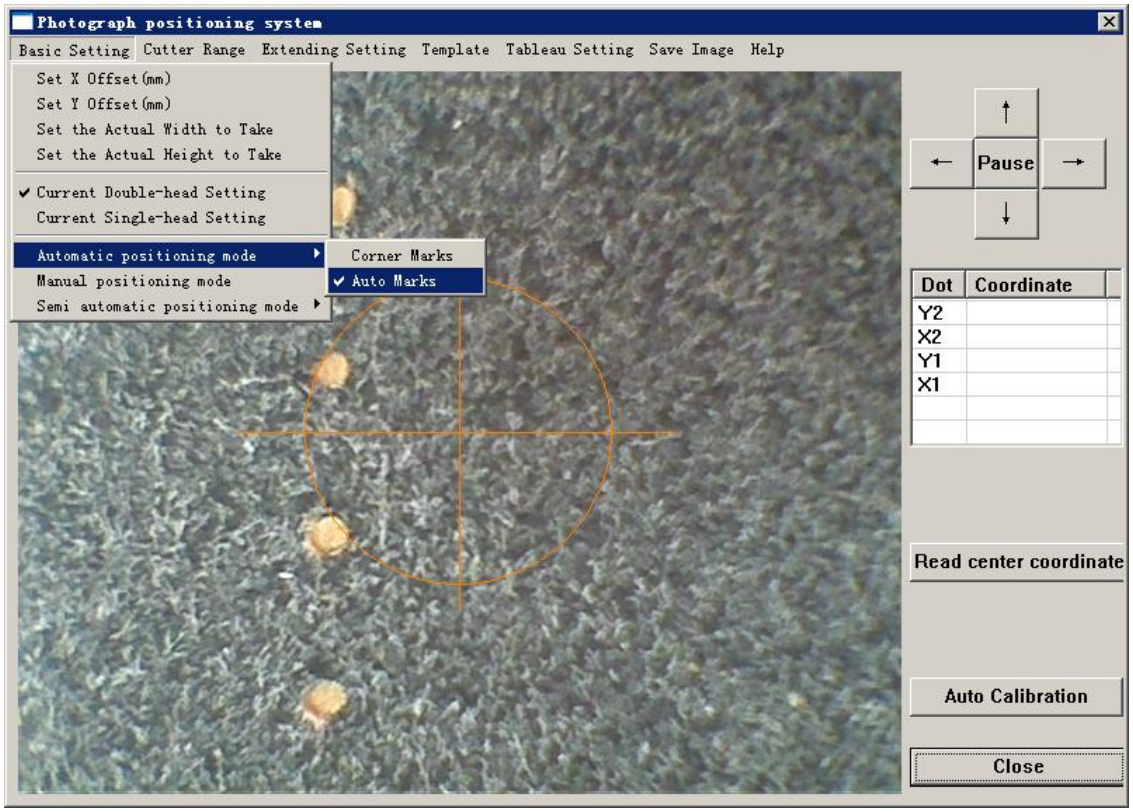
Move the pattern to the marking area(any place),press "Ctrl" at same time right click on the pattern, select the "CCD camera", then enter into the CCD camera cutting.



Move the camera on the first red mark, select the type of registration.

2.Choose positioning model and mark type.

Auto positioning model or Semi-Auto positioning model, choose the type according to the data file.



A. Auto positioning model

Find the first red mark by manual(make it the most accuracy),press “Automatic calibration”, then the system will find the first, the second, the third mark to the last automatically, If use template model, then no need the accurate manual positioning.

B. Semi- Auto positioning model

Find the first red mark by manual(make it the most accuracy),press “Semi-Automatic calibration”, the system will find the second mark automatically, but not accurate need adjust by manual, press “Semi-Automatic calibration”, then system will find the third mark, adjust by manual, press” Semi-Automatic calibration”, just follow to finish.

C. Manual position model

Move the camera to the original point of the printed material, move the camera through adjustment of video area, until the central of the video is on the central of the

original point. Then press “read the center coordinates” you can know the position value(X1,Y1),then move the camera to the printed material’s direction point, press “read the center coordinates” to get the position value(X2,Y2),Then press” camera cutting performance” to finish the process.

3. Cut after the positioning

After the positioning operation, there will be “Adjustment is complete,please proceed the cutting operations!”,Press”Enter”,Close the camera interface,the head will be back to the original point,then you can see the pattern position is changed automatically,this is the result after the positioning,send the data to the Cuttersever to start the cutting.

If “Adjustment is complete, please proceed the cutting operations!”,then press “Enter” but not close the camera interface, the system will not confirm this time positioning, you can do the positioning again, the system will adjust the pattern according to the last time operation.

If do the CCD camera cutting on the same pattern for the second time,

Need enter into the camera positioning interface again, but no need to input the pattern again.

5.6 Knife tools operation

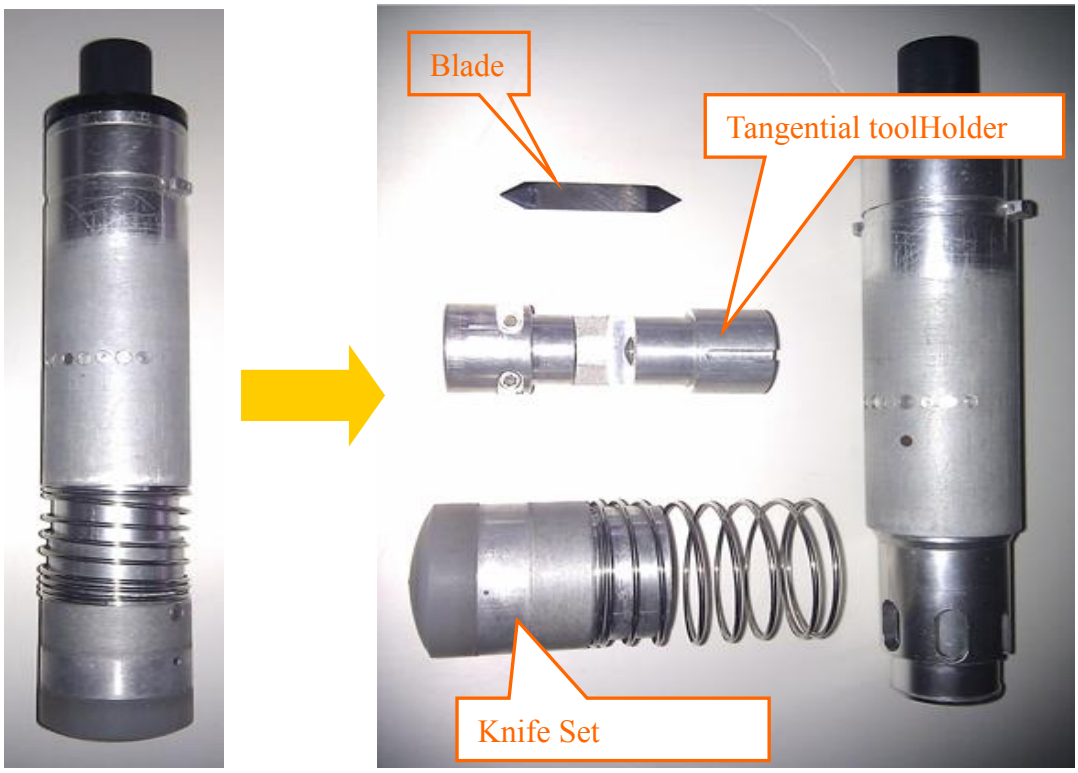
1. Pen

Take down the pen holder when change the pen, pay attention on the height of the

pen holder after changing the pen.

Attention: cutting high thickness, pay attention on the height of the pen to avoid the damage on the pen, or take the pen..

2. Change the tangent knife: the tangent knife is used frequently among the cutting tools. A complete set of cutting tools include: tangent knives, holder, tool fixer and knife set.



Tangent knife installation: unscrew the 2 inside hex screws on the holder, put the knife into the socket, and then screw up the inside hex screw.

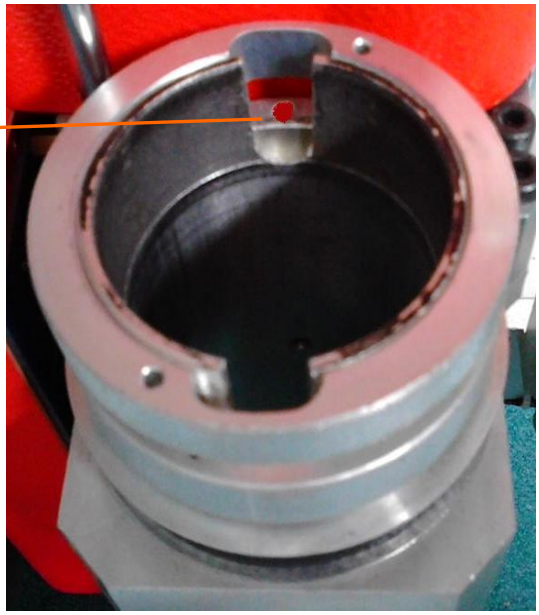
Attention:

Tangent knife holder installation: insert the holder into the tool fixer. (Attention: the socket on the top of tangent knife holder should correspond to the inside sign of tool fixer, or also can correspond to the tool fixer.)

Knife set holder installation: the purpose to install knife pouch is to make the material which is easy turn-up well fixed on the table during high speed cutting, make the sign on the knife pouch and socket of the tool fixer to align, then insert knife set.

Install the tangential tool in the head: unlock the retaining ring on the top of the head, unlock to make the retaining ring to be even with knife holder, and make the

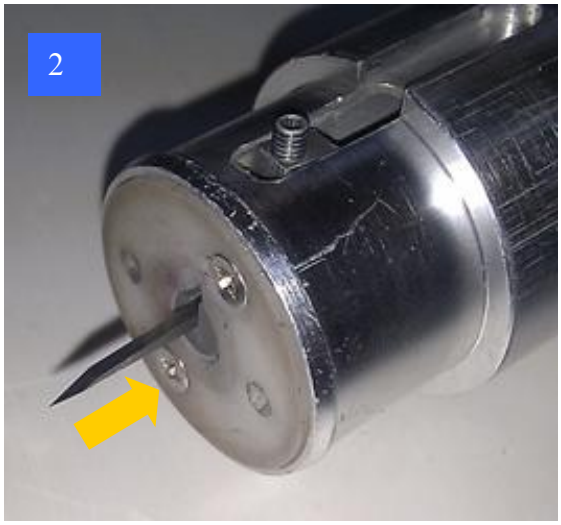
retaining ring groove corresponding to the knife holder groove. Make the below two red marks in the same direction, the insert the tool into the holder, rotate the retaining ring to lock it.

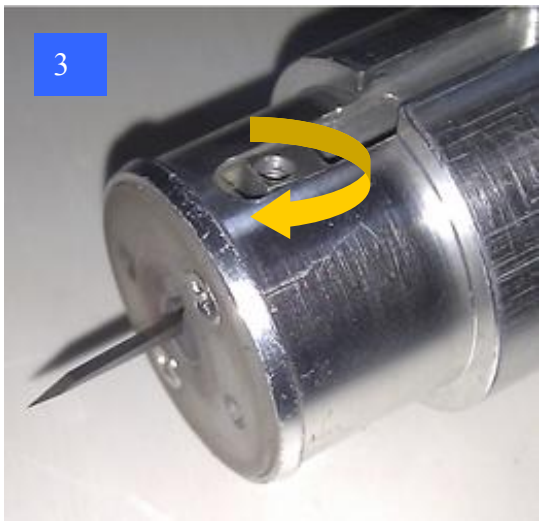


3. EOT installation

Change oscillating knife: oscillating knife is used mostly among cutting tools, a complete set of oscillating tools including: oscillating knife, oscillating holder and knife set.

Oscillating knife installation: unscrew the inside hex screw in the direction of oscillating knife head, insert the oscillating knife into the bottom of the holder and then screw up the hex screw.



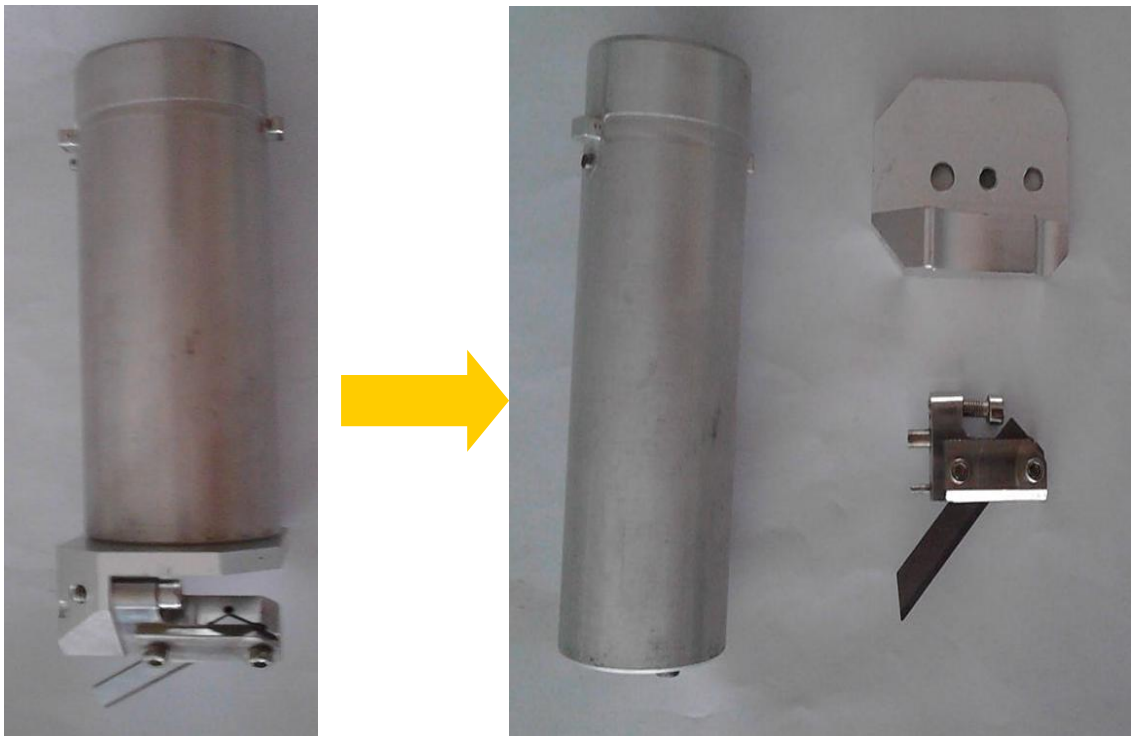


·Oscillating knife holder installation: make the sign on the knife pouch corresponded to the socket of the knife holder, then insert the knife pouch.

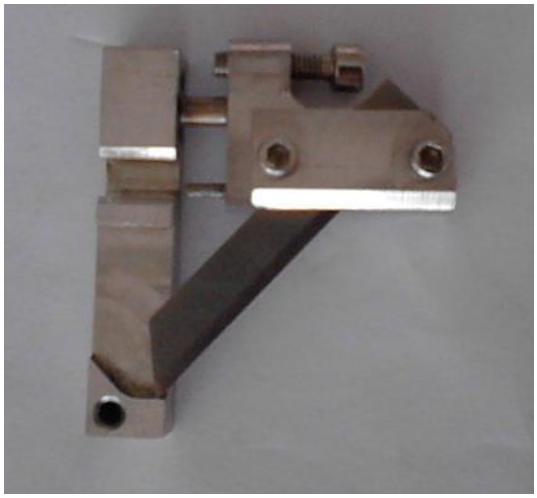
Insert the oscillating knife into the head: unlock the retaining ring of the head, unlock to make the retaining ring to be even with knife holder, and make the retaining ring groove corresponding to the knife holder groove. Make the below two red marks in the same direction, the insert the tool into the holder, rotate the retaining ring to lock it. Check the top of the oscillating knife, lock the top of the oscillating and insert the oscillating knife power cable to the plug on the left of the head.

4. V-Cut Tool

V-Cut Tool including: knife tool-Cut blade holder, knife holder.



Blade installation: use the V-Cut blade installation tool to install the blade, first install the V-Cut blade holder on the blade installation device, unscrew the two screws of the blade installation device, insert the blades, make the blade point to be limited position, lock the screws, divide the blade holder and the blade installation device, then put it into the head.



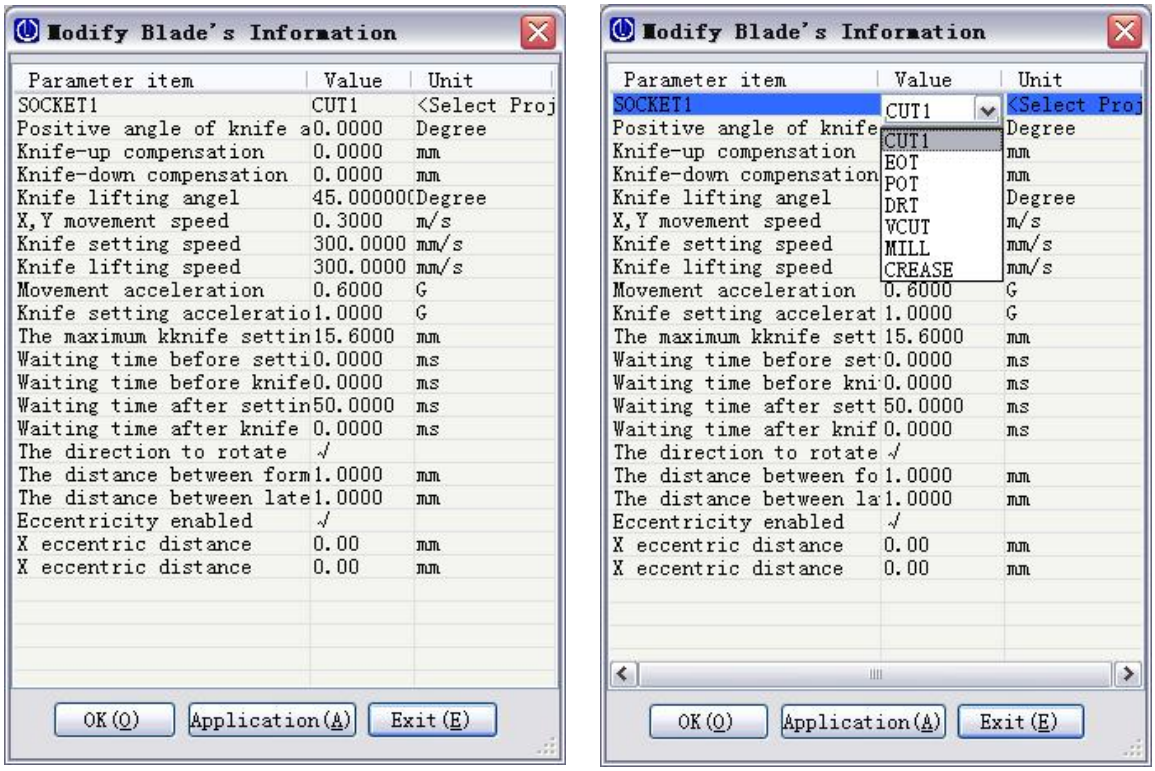
Insert the V-Cut tool into the head: the V-Cut tool installation is different from other tools, please insert the V-Cut tool into the head, then install the blade holder from the bottom.

5.7 Knife tool configuration

BK plotter with knife tools as Tangential tool,. EOT, POT, DRT, V-Cut, Milling tool, crease wheels etc.

One-head, you can insert any type of the above tool in the head in the same time. Two-Head, you can insert any two tools of the above tools in the head in the same time.

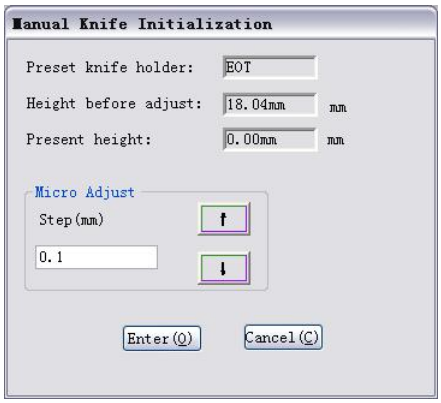
After Changing the tool type in the head, then need change the parameters accordingly. Enter into Cuttersever, In the tool bar right click the socket1,there will be dialog as fellows:

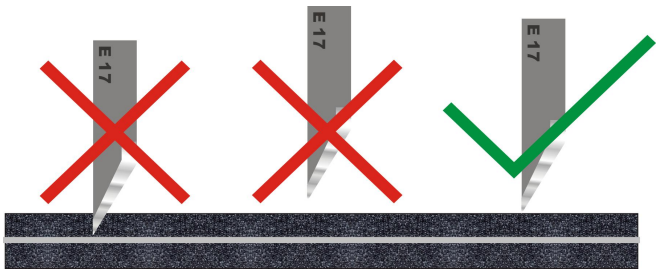


Click the tool name on the Socket 1,there will be tool types, select the tool type, then click “application” to finish the setting.

5.8 Adjust the knife height by manual

Install the tool and fix the tool in the head, set the socket to the present one, click the manual adjustment, there will be manual knife initialization as follows:





Clicking the up/down to control the lift & fall of knife. When the knife point touch the felt surface, click OK key to finish manual knife adjustment.

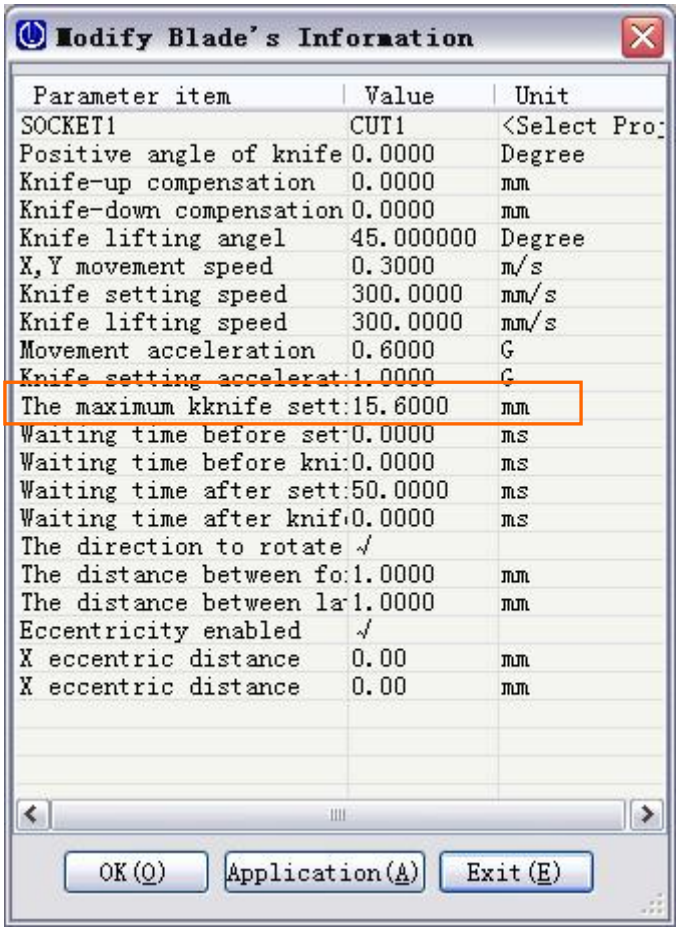
Attention：

1.BY changing the step value to set the lift/down value every time.

2.Under the status the manual, can use the up/down on the keyboard to control the lift/down of the knife, at the same time press “Ctrl”, it will lift/down quickly.

3.After insert the tool into the head, if you do not know how deep it will go, please do not click the tool bar continuously, otherwise it will cause damage on the blade and the cutting under layer.

1.After the manual knife height adjustment, please right click the tool bar ,there will be dialog as follows:

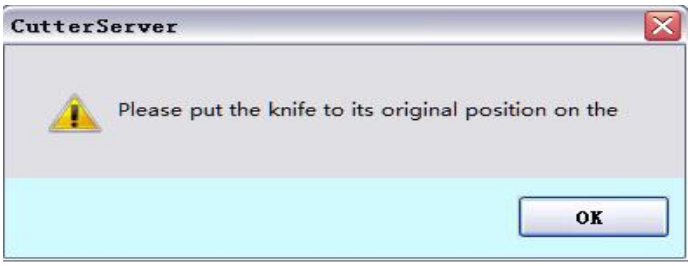


As you can see the maximum knife height is 15.6mm,it is result by the manual adjustment. If need more adjustment on the knife height, you can change the value by your experience but not need enter into the manual adjustment again. That will be easier.

5.9 Auto Adjustment

Insert the tool and fix the tool in the head, take down the auto adjustment device and put it to the groove, set the head to be the present one, click the “Auto Adjustment”, there will be dialog as follows:

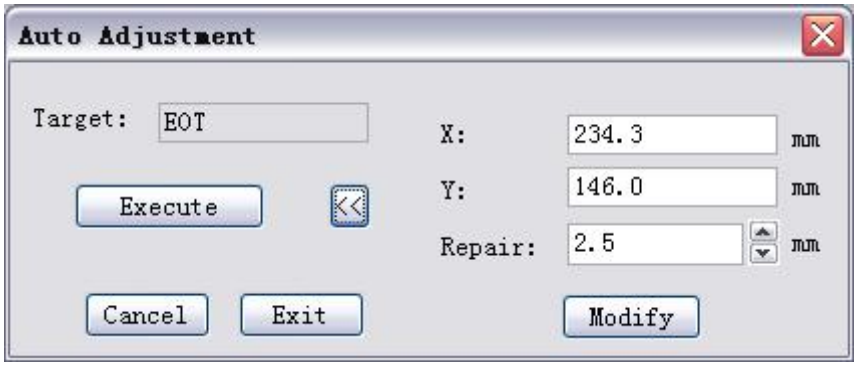
After confirm the tool, then click “Execute” to start the auto adjustment, after there will be success adjustment dialog.



Pick up the auto adjustment device, then operation finish.

Attention：

1.Click the auto adjustment ,please do not change the value X and Y which is set in the factory.



1.After Auto Adjustment, there may be difference, for same machine the value is same, please confirm the difference, then put fill the value by manual, press modify, there will be adjustment.

2.The Auto Adjustment can be used to tool: CUT, EOT, DRT, MILL, The tool can not

use the Auto Adjustment: V-Cut, Crease.

The possible errors as follows:

Common problems in automatic knife function

Enter into the auto adjustment, if do not take out the auto adjustment device, there will be this dialog, please take down the device, then enter into it again

Cutting machine can not open automatic knife function.

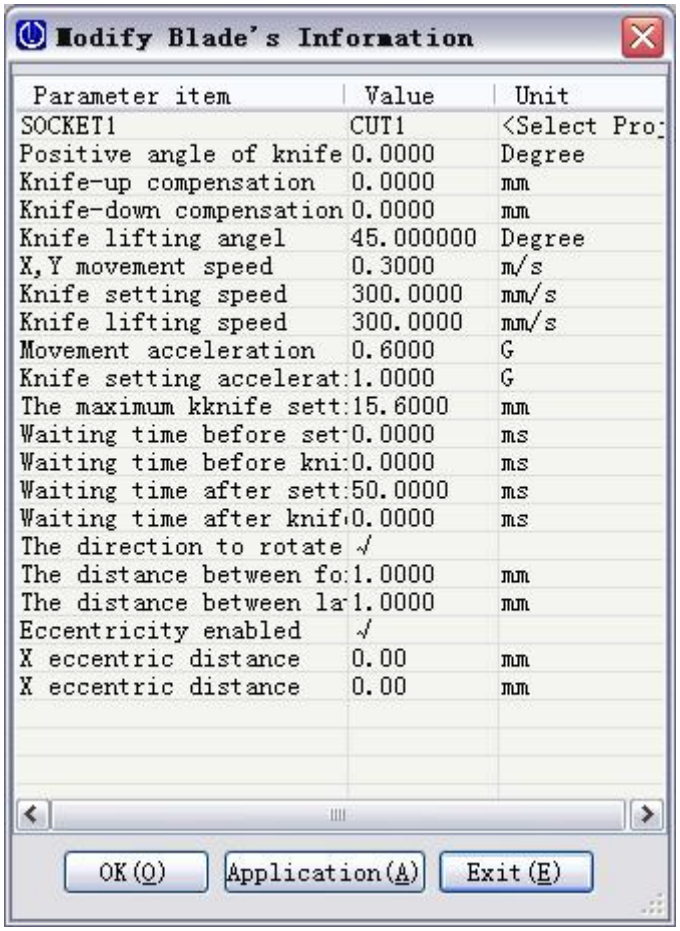
The current configuration without auto adjustment.

The present tool is red light or pen. Please change it to the tool.

5.10Cutting Parameter Setting

1. Cutting tool parameter

Right click the tool, there will be the dialog as follows:



The parameters must be checked or adjusted before cutting:

Cutting Speed: According to the tool type and cutting materials. Please use low speed when you do not have much experience.

Movement Acceleration: when cut one small patterns, it's very important.

Knife-down speed: According to the tool type and the materials, the speed for the milling should be very slow.

The maximum knife-down depth: it will have influence on whether it can cut through the material or not, normally it is adjusted by manual or auto adjustment, or you can modify the value directly.

Parameters relative with the cutting accuracy and cutting quality(different tool has different parameters):

Knife-up or knife-down compensation: adjustment on the overcut of the materials.

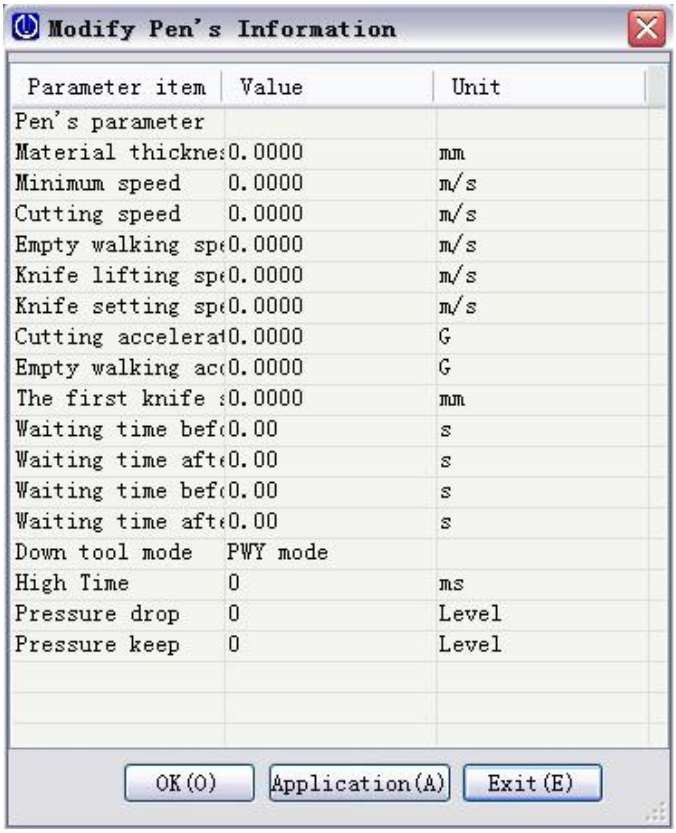
Knife lifting angel :whether need the lift rotation direction when cutting on curve lines.

X eccentric distance: if there is eccentric on the knife, please fill the value, normally it is set in the factory.

Y eccentric distance :if there is eccentric on the knife, please fill the value, normally it is set in the factory.

2. Global parameters:

Right click on the pen tool bar, there will be the interface as follows:



They are the parameters relative to the whole machine working, there are cutting speed, empty walking speed, cutting acceleration, empty walking acceleration.

The relationship between the global parameters and knife tool speed:

If the global speed is lower than the knife tool speed, then the cutting speed depends on the global speed, if the global speed is higher than the knife tool speed ,then cutting speed depends on the knife tool speed. The pen speed same as the global speed and the preview speed is same as the empty walking speed.

Material thickness: Fill the real material thickness, the first time knife-down depth depends on this value and the first time knife-down depth. If the value is smaller than

the real material thickness, then when cutting, the blade will touch the material.

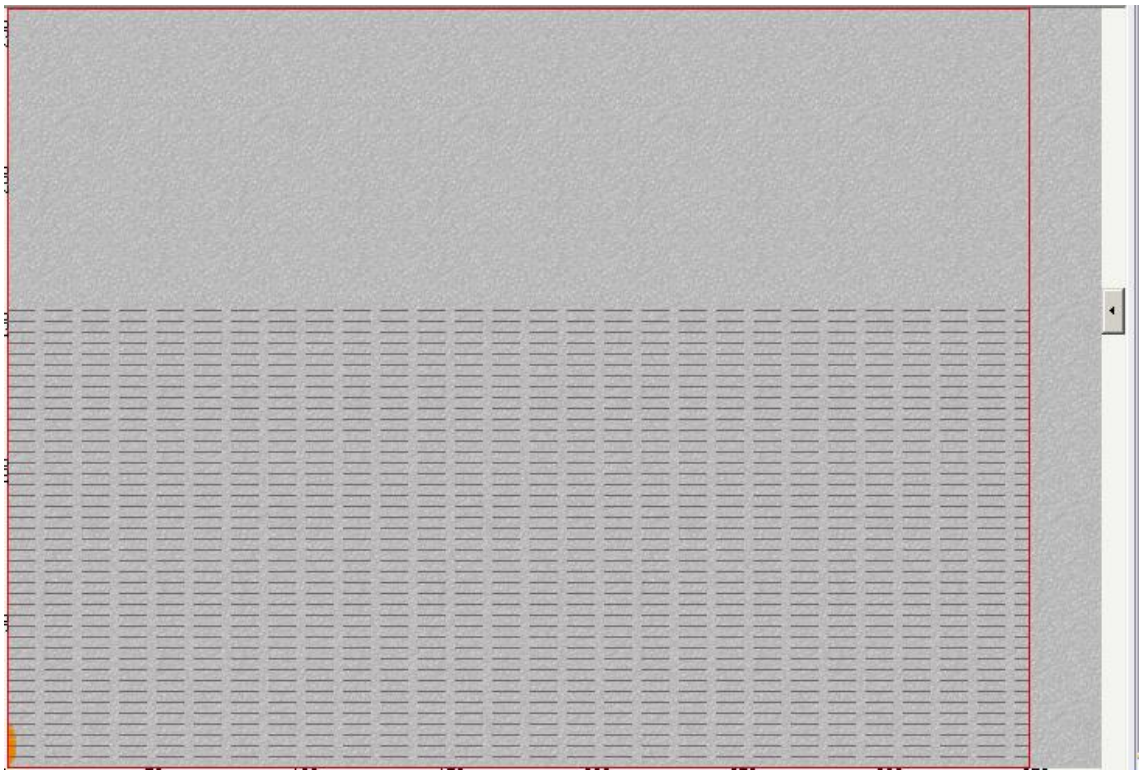
The first knife setting depth: the distance between the blade and the surface of the material depends on the fist knife setting depth.

The knife tool is in the second knife depth when cutting, empty walking is in the first knife setting depth, the relationship as follows:

Other parameters, please keep it as set in the factory.

5.11 Area adsorption

When cutting on small materials, please adjust the area adsorption to get the best adsorption. The adjustment only can be proceeded after the vacuum turned off. Through move the area to the change it, it will be as follows when you do the adjustment.



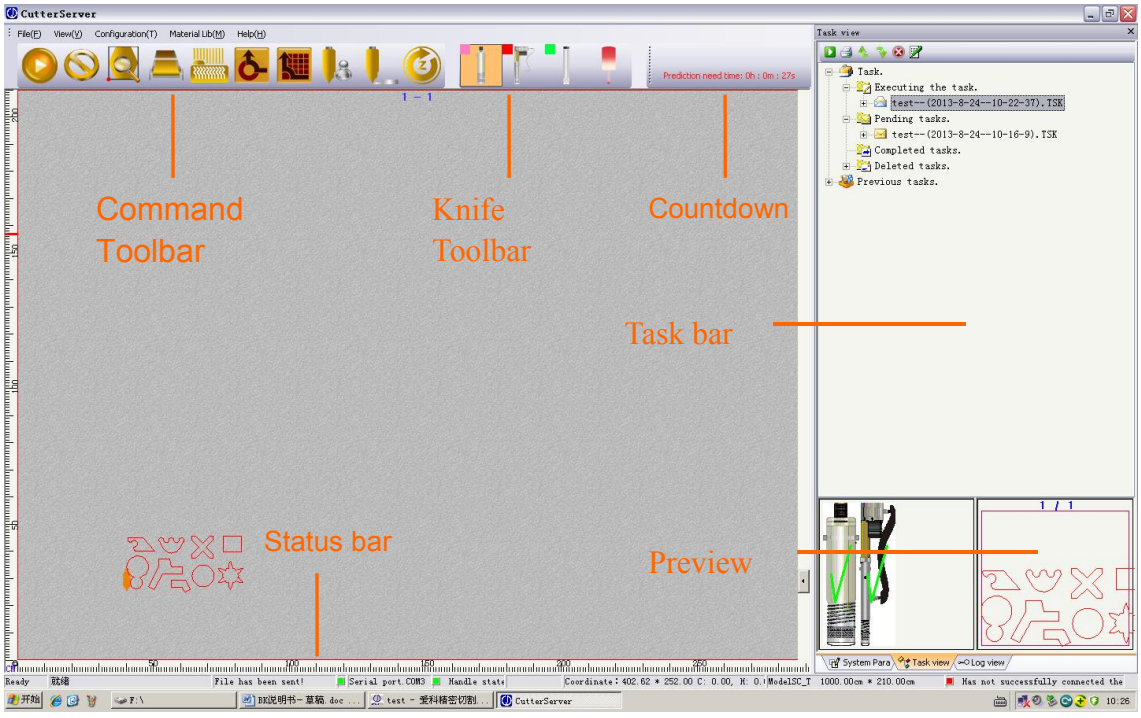
5.12 Maintenance

When do meintenance, please check and turn off the power of the machine.

- When machine is working, there will be dusty or waste materials, please use the clean the table after work
- X and Y straight guide should be clean, add some oil.
- The up/down linear should be clean, specially, must clean after using the milling tool.
- The air compressor should be changed on a regular basis or add some oil. Please refer to the air compressor manual.
- Add more oil for the vacuum on a regular basis, clean the muffler on a regular basis, please refer to the manual.

6 Cutterserver

Function: Cutting Task Managing; Cutting Parameter Editing; Cutting Route Tracking; Cutting Feedback.



6.1 Command Toolbar

Start cutting icon

Click this icon to start cutting after confirming the cutting task, if need to pause, still click this icon, then click it again to continue cutting.

Cancel cutting icon

If need to cancel the present cutting task, click this icon to cancel cutting.

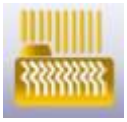
Preview icon

After clicking preview, the cutting machine will indicate the cutting area, preview with laser point.

Automatic material

feeding icon

After clicking automatic material feeding icon, cutting machine will feed the materials automatically.



Pump switch icon

Click this icon to run pump, click it again to turn off.

Original point icon.

Get the cutting head back to the original point after clicking this icon.

Relative original point	Get the cutting head back to the starting point of the last setting.
Automatic knife	adjustment icon After selecting the knife tool which needs to automatic set, click this icon, it will prompts
Manual knife	initialization icon Click the manual knife adjustment icon after selecting the knife needed to set the knife manually.
Z axis reset function icon	By clicking this icon, the system will reset the knife position in Z axis automatically.

6.2 Knife bar

Tool bar icon introduction

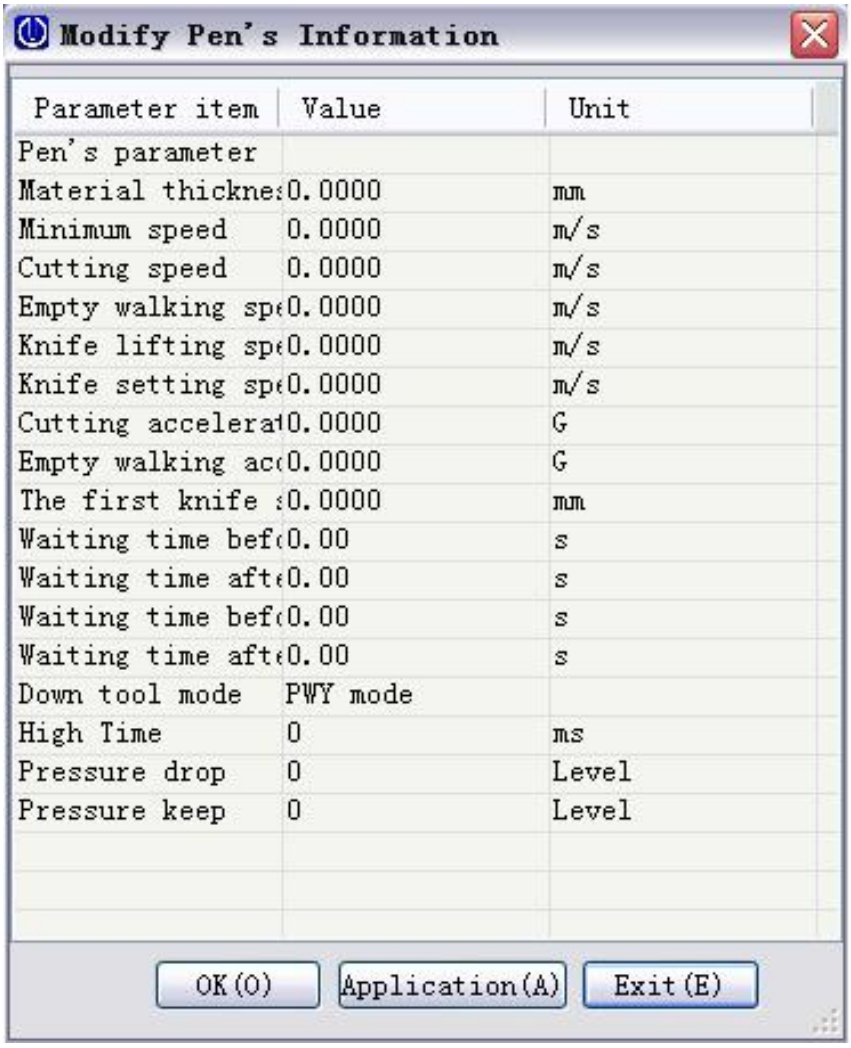
Tools display here. The background of the chosen tool will be orange.

As shown in the figure, the machine has EOT, CUT and Pen, the pen has been chosen right now.

The chosen tools should be of the same colors with the cutting data.

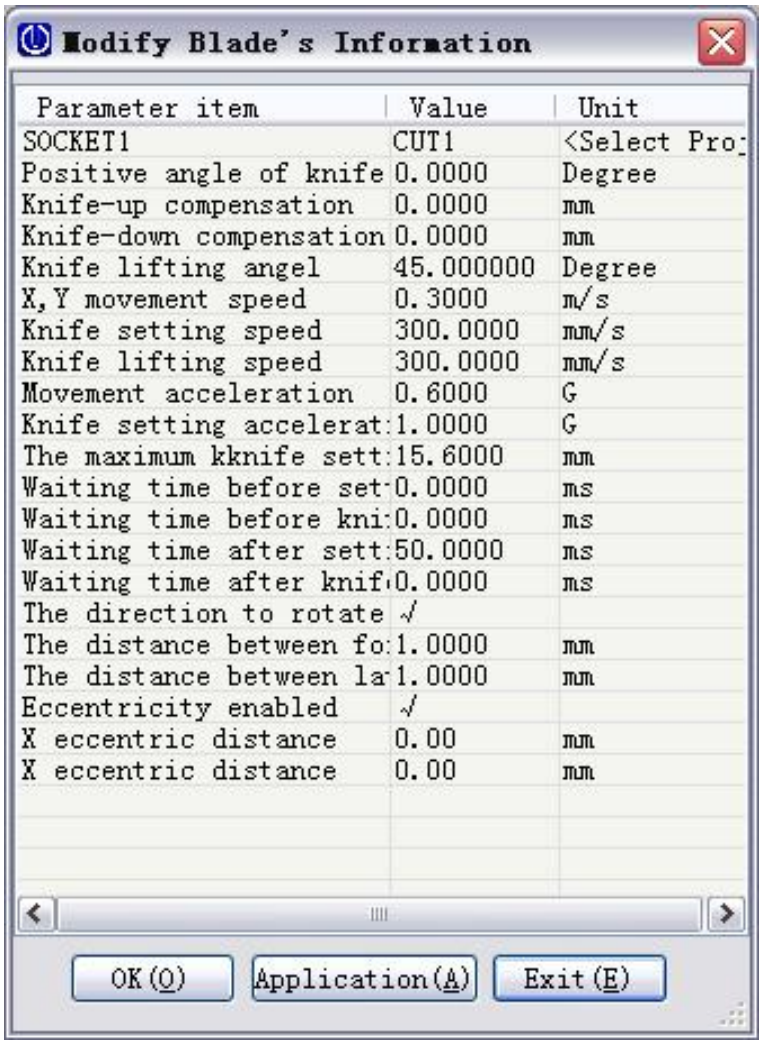
After choosing a tool, click one time to move it down; click it again to move it down to the bottom; the third time click to lift it up.

Right click on the Pen Icon to modify the pen parameters.

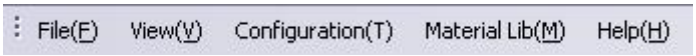


Select the needed knife tool, right click to modify the knife parameters.

If need to set other parameters, please contact IECHO engineer. Please do not modify!

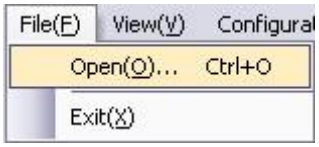


6.3 Menu Introduction

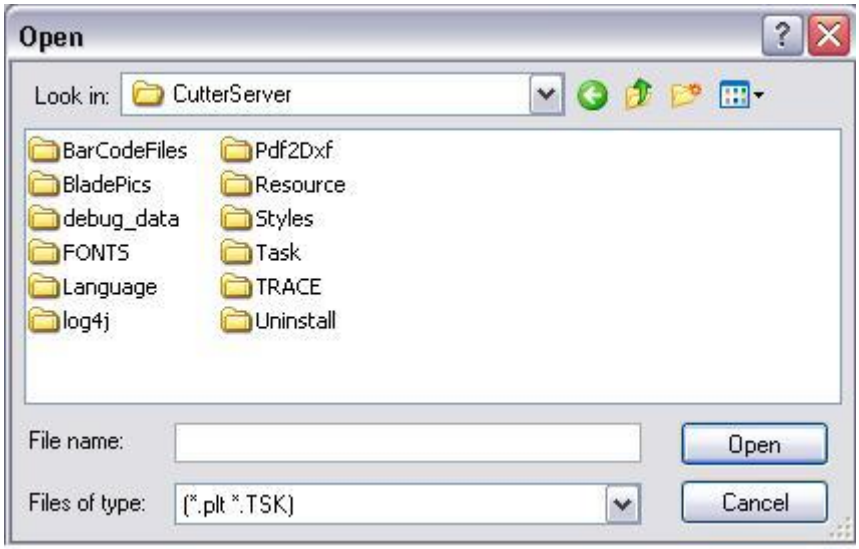


There are five tools in the menu bar, file, view, configuration, material storage and help.

1. File



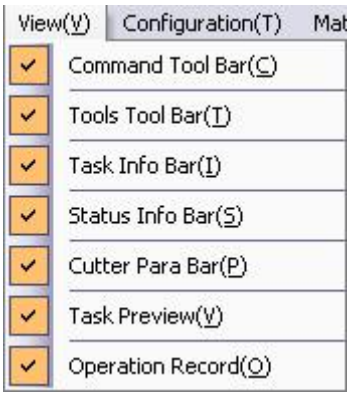
Click Open(O)...Ctrl+O item, the following window pops up, select the needed file and click OK.



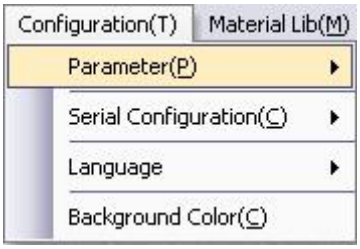
Click Exit(X) to exit from the CutterServer Module

2. View

Open the view tool to adjust the displaying area on the surface according to your needs.

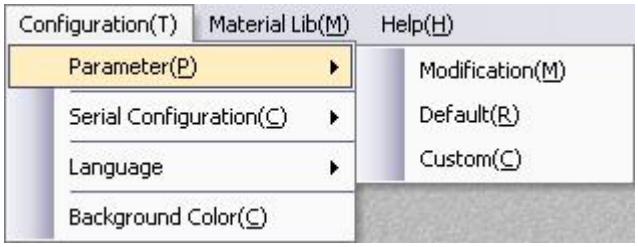


3. Tools Configuration

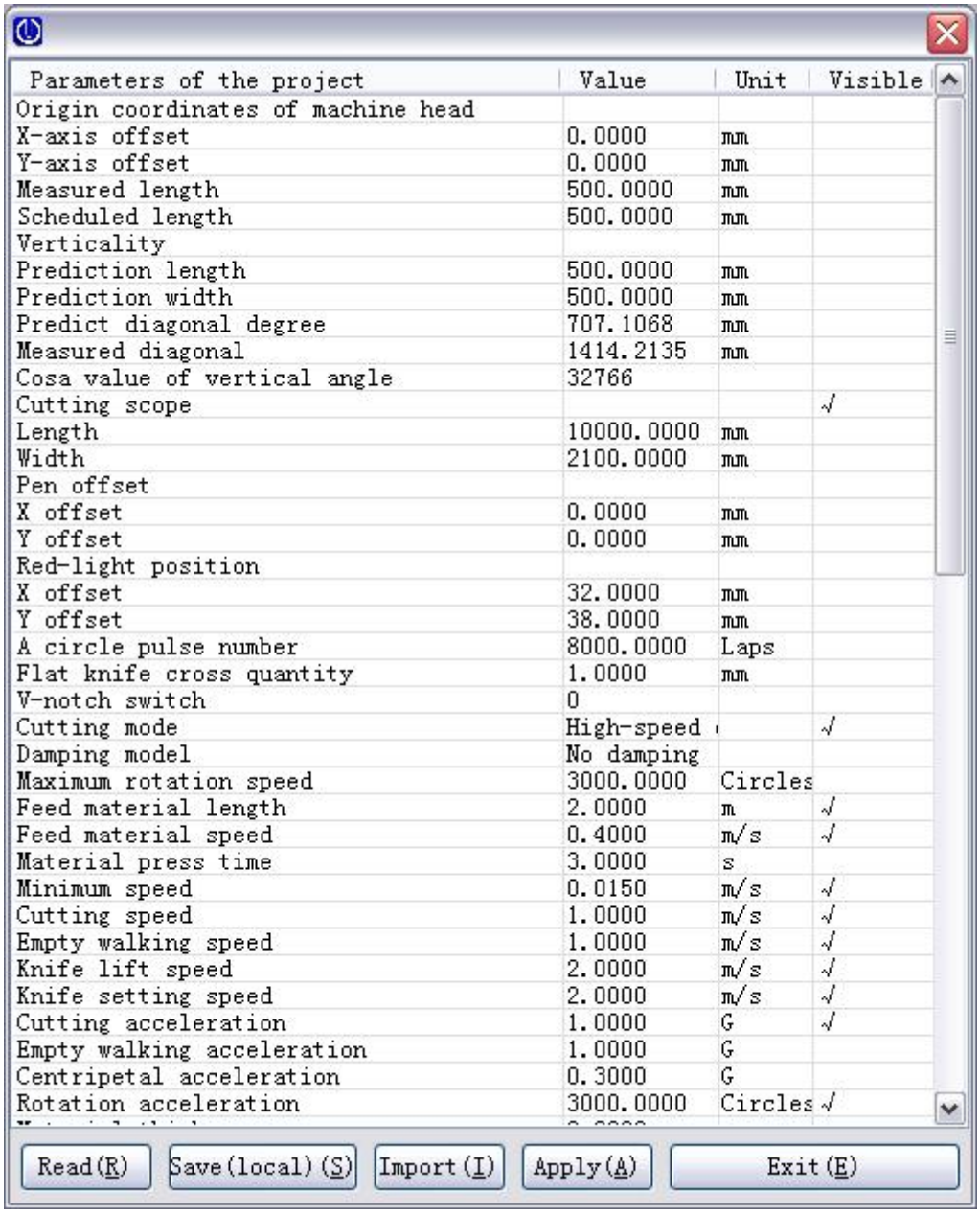


Tools Configuration: parameters configuration, serial configuration, language configuration and background color configuration

Parameter configuration: modification, default and custom.



Click modification , the following window pops up.



Parameters of the project	Value	Unit	Visible
Origin coordinates of machine head			
X-axis offset	0.0000	mm	
Y-axis offset	0.0000	mm	
Measured length	500.0000	mm	
Scheduled length	500.0000	mm	
Verticality			
Prediction length	500.0000	mm	
Prediction width	500.0000	mm	
Predict diagonal degree	707.1068	mm	
Measured diagonal	1414.2135	mm	
Cosa value of vertical angle	32766		
Cutting scope			√
Length	10000.0000	mm	
Width	2100.0000	mm	
Pen offset			
X offset	0.0000	mm	
Y offset	0.0000	mm	
Red-light position			
X offset	32.0000	mm	
Y offset	38.0000	mm	
A circle pulse number	8000.0000	Laps	
Flat knife cross quantity	1.0000	mm	
V-notch switch	0		
Cutting mode	High-speed		√
Damping model	No damping		
Maximum rotation speed	3000.0000	Circles	
Feed material length	2.0000	m	√
Feed material speed	0.4000	m/s	√
Material press time	3.0000	s	
Minimum speed	0.0150	m/s	√
Cutting speed	1.0000	m/s	√
Empty walking speed	1.0000	m/s	√
Knife lift speed	2.0000	m/s	√
Knife setting speed	2.0000	m/s	√
Cutting acceleration	1.0000	G	√
Empty walking acceleration	1.0000	G	
Centripetal acceleration	0.3000	G	
Rotation acceleration	3000.0000	Circles	√

Reading parameters: read the cutting machine parameters automatically.

Save(local): Save the cutting parameters to the local computer.

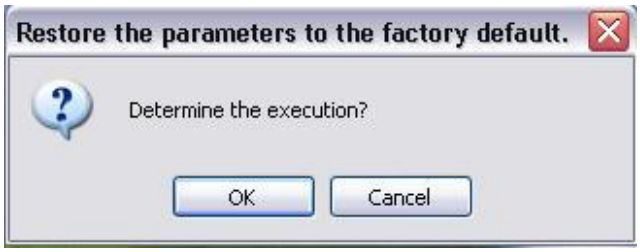
Import: import the parameter configuration sheet.

Application: apply the modified parameters, and save to the cutting system.

Exit: Exit cutting overall parameters dialog box.

Please do not modify the parameter values in cutting overall parameter dialog box, if need, contact IECHO engineer.

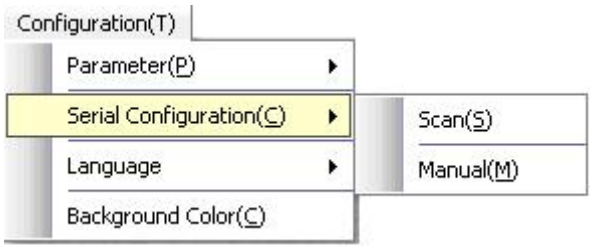
Default parameter: click default item to restore to the factory settings.



Please do not restore to factory settings unless in a have to situation.

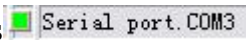
Custom parameters: This function is only for IECHO engineer.

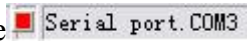
Serial port configuration



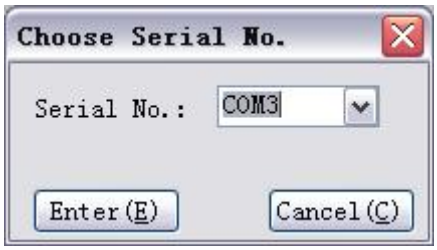
Scan function: scan the serial numbers automatically, if success, the serial lamp will

turn green.

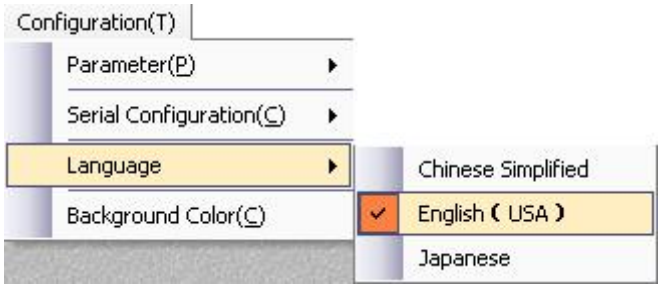
Success 

Failure 

Manual function: click manual function to select the corresponding serial number manually.

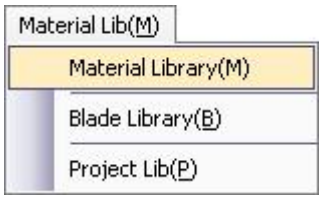


Language configuration



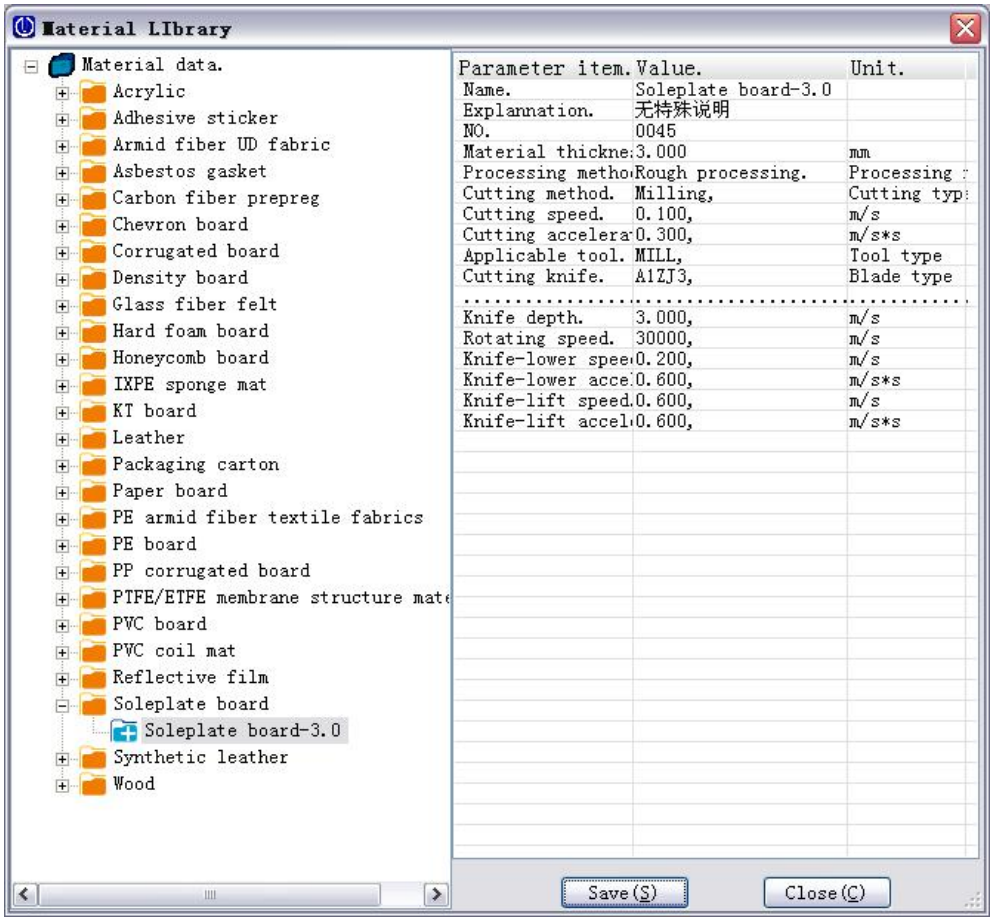
Switch languages

4. Material Library tool

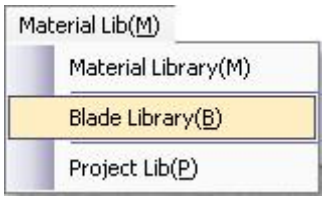


Material Library

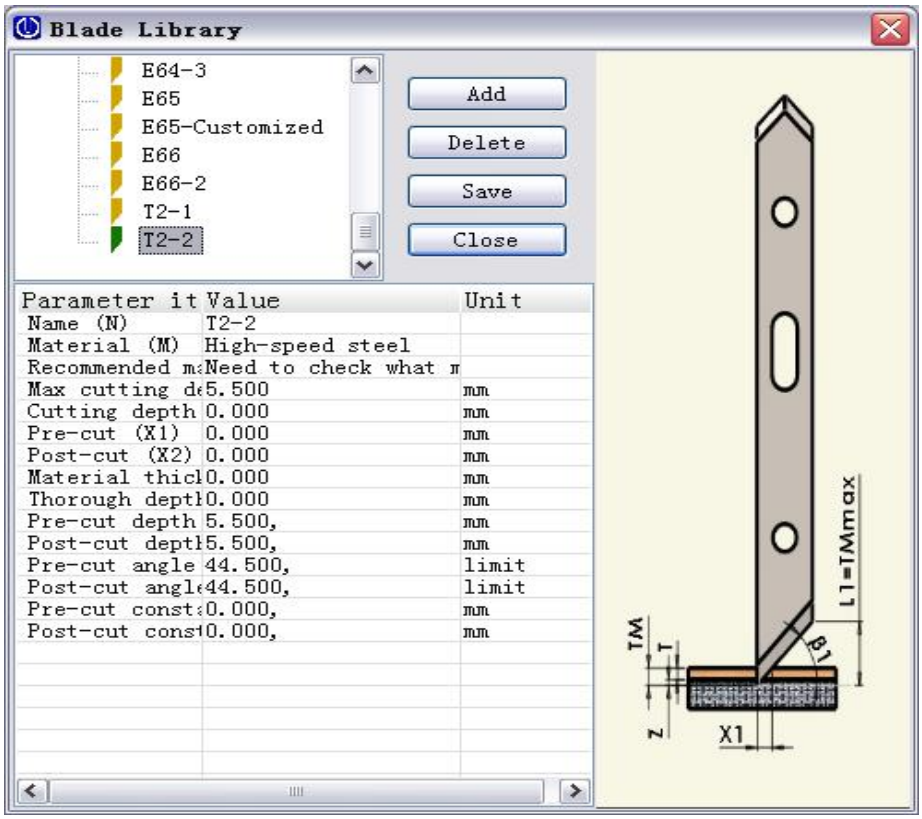
Click Material Library, getting to the material data base. Choose the material to be cut, you will find the corresponding cutting information.



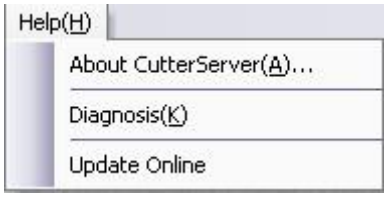
Blade library



Click Blade library, getting to the blade storage, you will find the descriptions of the collected blades.



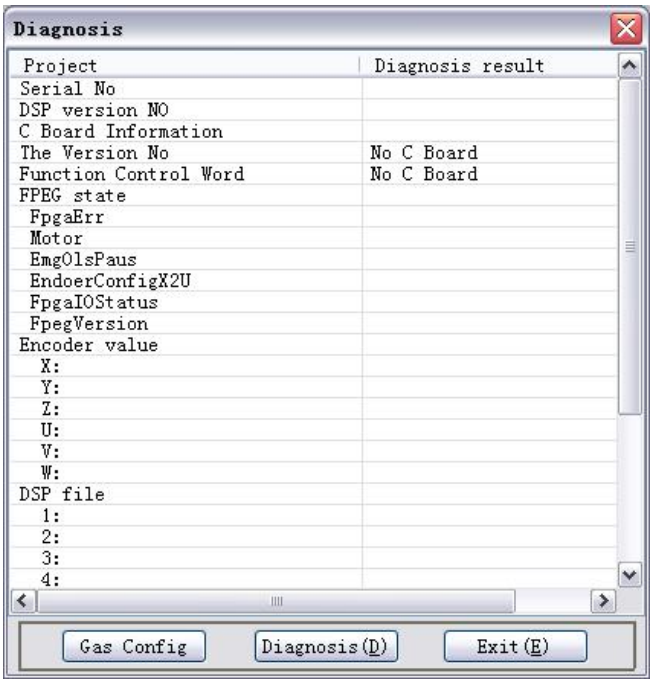
5. Help tool



About cutting control center

Display software version number

Diagnostic function



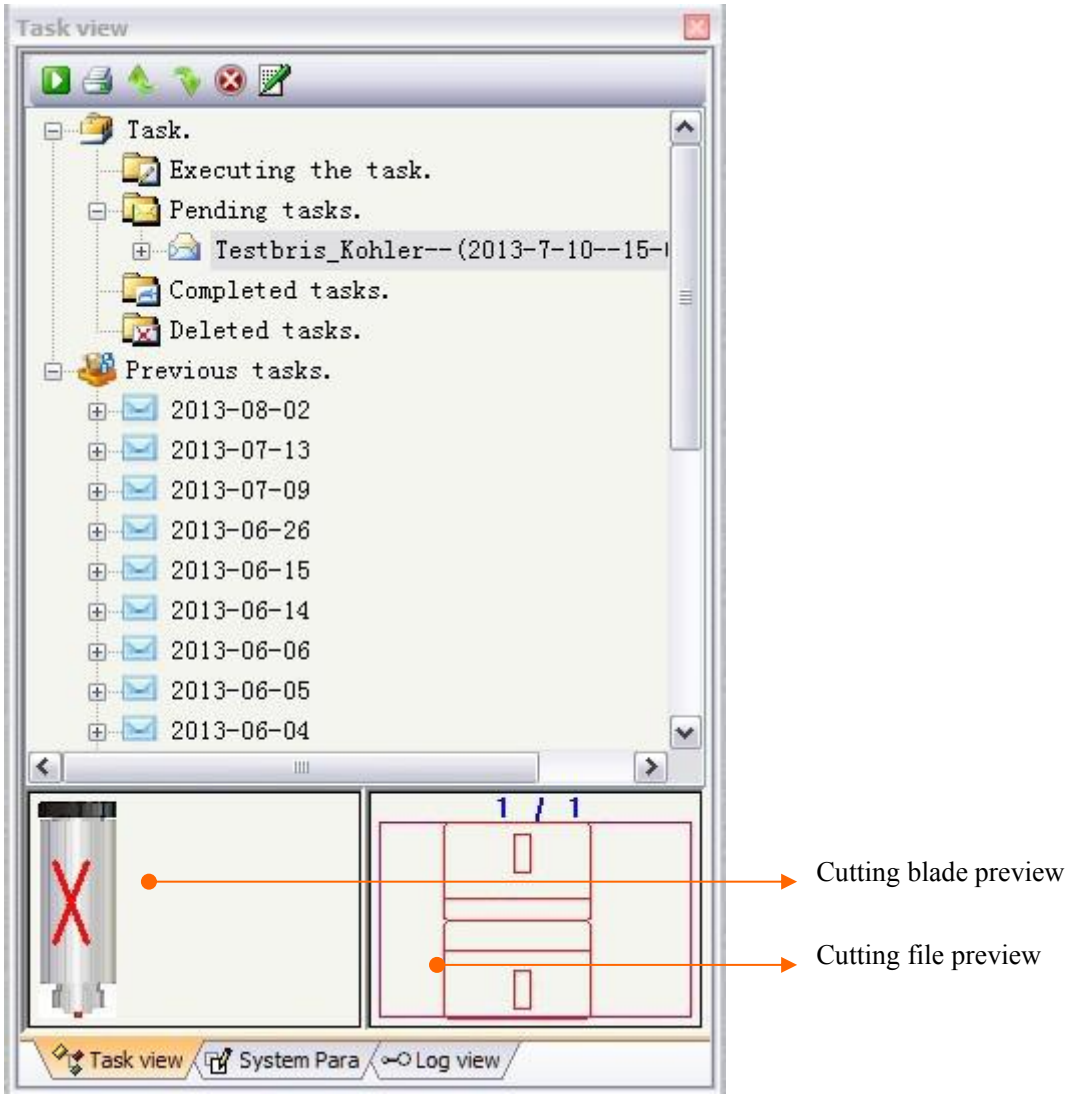
Diagnostic function is for IECHO engineers

This diagnostic function is mainly used for furthering diagnosis or parameter adjustment of cutting by IECHO engineer.

6.4 Side bar

There are mainly three modules in the side bar: task view, log view and machine parameter.

1. Task view



Show the knife used in the cutting tasks, to check the actual tool being used.
Preview the cutting file
Show the data of the cutting tasks.

Being performed tasks

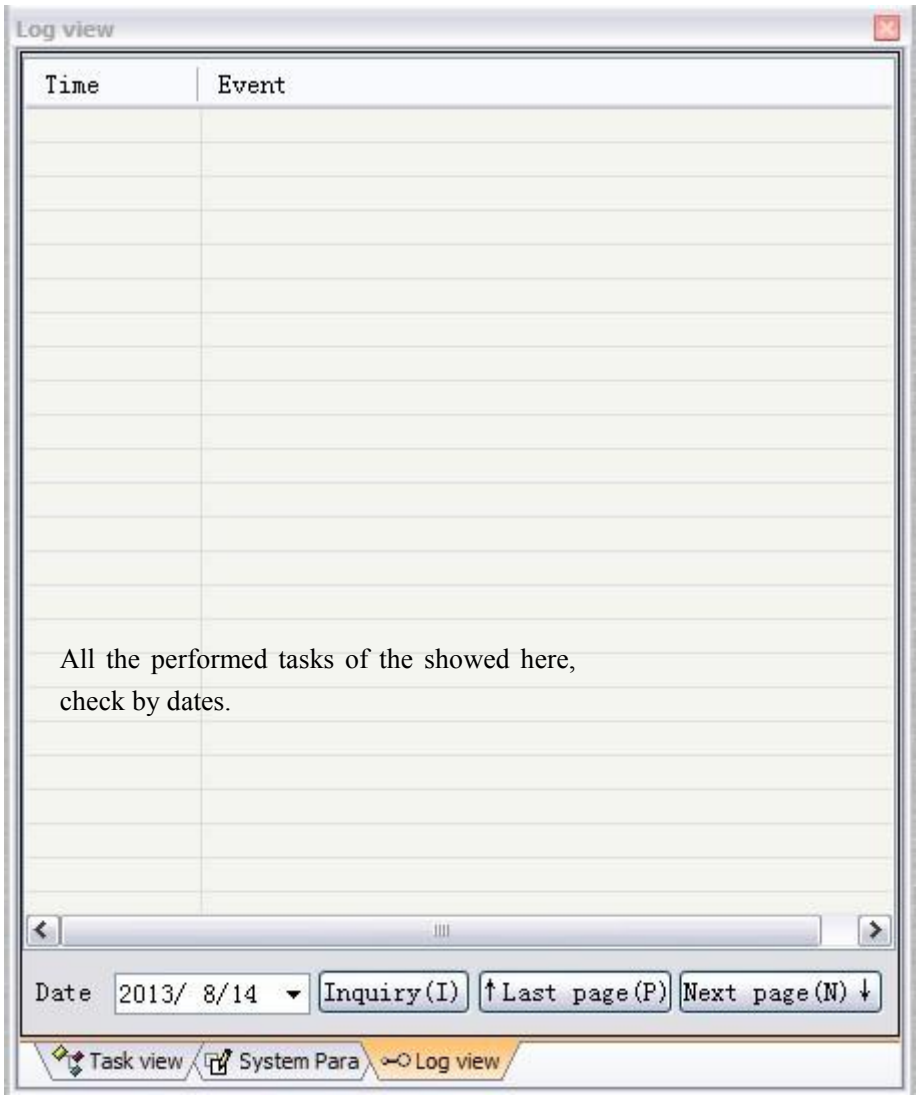
Pending tasks: All the tasks sent buy the Smartcut will be showing here. Right clicking to send the task, set priorities, delete tasks.

Finished tasks: All the finished tasks showed here, right clicking to resend the finished tasks or delete the tasks.

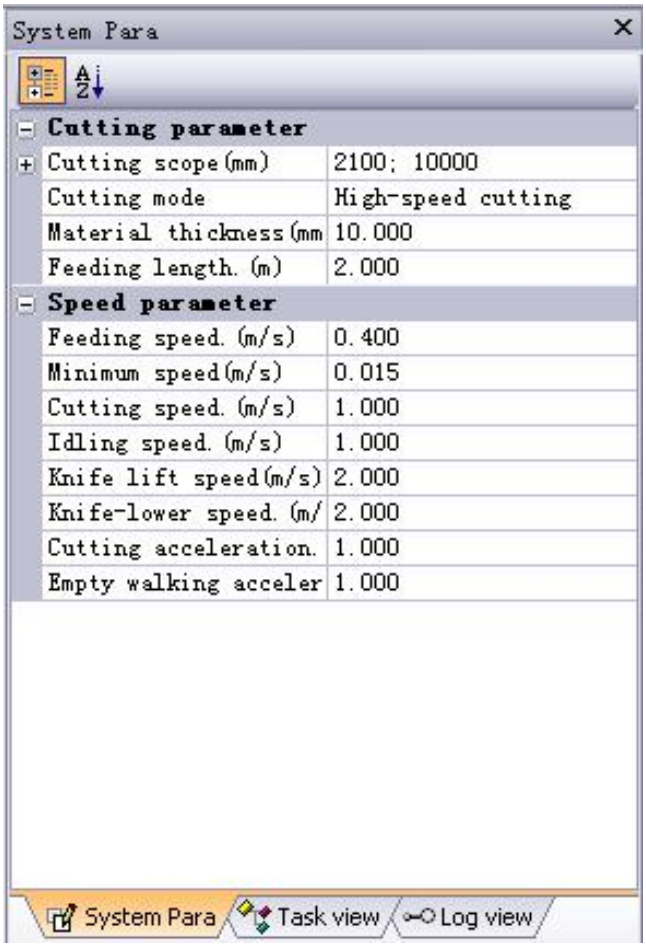
Delete tasks: All the manually deleted tasks will be showing here. Right clicking to edit (recover and delete), the recovered tasks will be showing at : Pending tasks.

Historical Task: Right click to edit the historical tasks(Redo or Delete).The Redo tasks will be showing at Pending Tasks.

2. Log View



3. Cutter parameter



Show the current operating parameter.

6.5 Status Bar

Serial port lights; Handle Status lights; Coordinate Status; Model Status; Cloud Services lights are showing here.

Finished sending

Communication port

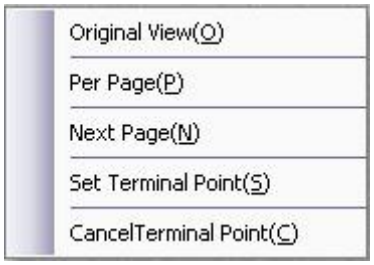
Handle Status

6.6 Cutting Information, Air Suction area modifying, Context Menu

Time remaining shows at Cutting Information bar.

Drag the slider to modify the scope of vacuum adsorption.

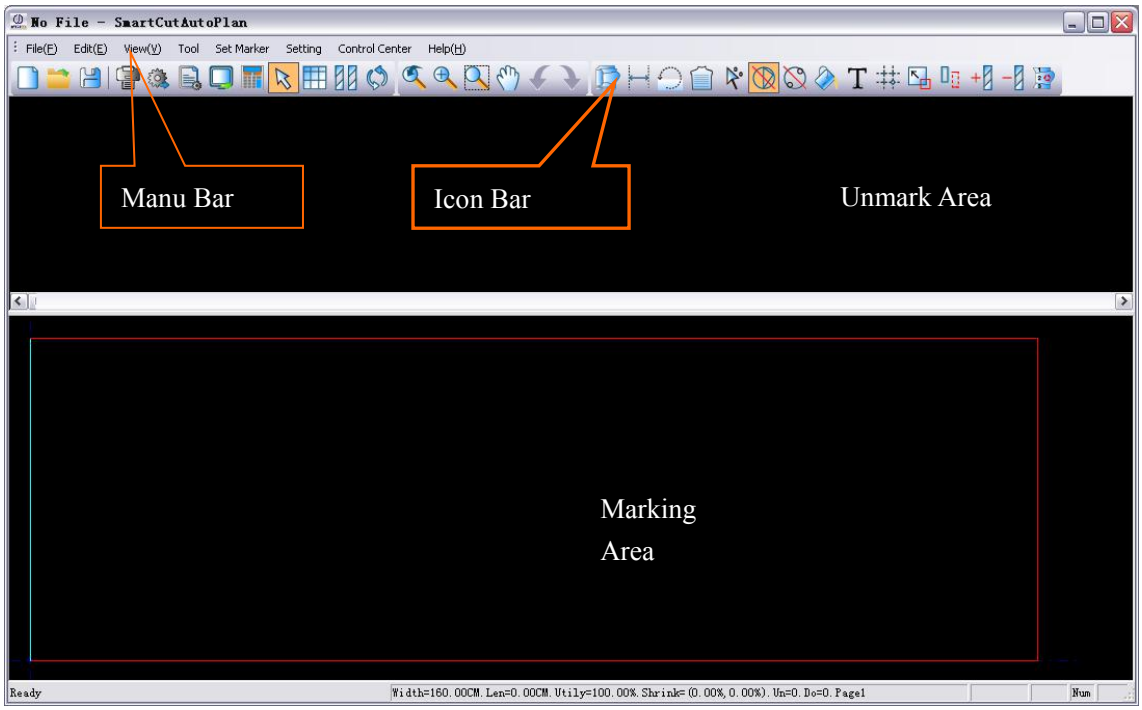
Right click on the cutting area, the terminal-point setting window pops up. Click the “Set Terminal Point”, a red square shows on the screen and the Cutting Head will stop here when the task finished. You can cancel the terminal point by click the “CancelTerminal Point”.



7 Smartcut

Instructions of Smartcut module

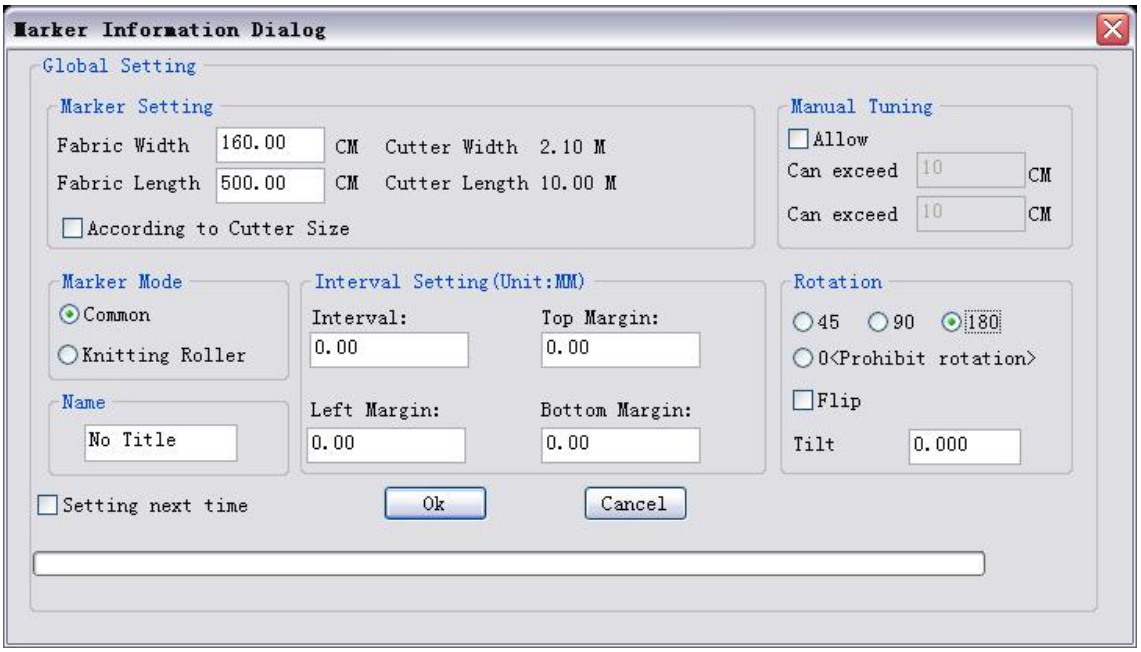
7.1 Interface introduction of Smartcut



The above picture is the interface of Smartcut, included Tool bar, menu bar, unmarking area, marking area. And the following is the diagram.

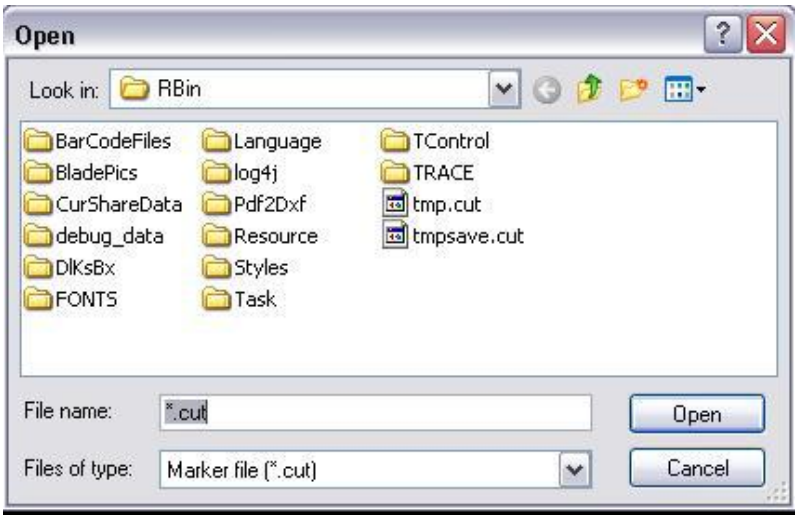
7.2 Function Key

1. Create （ ）



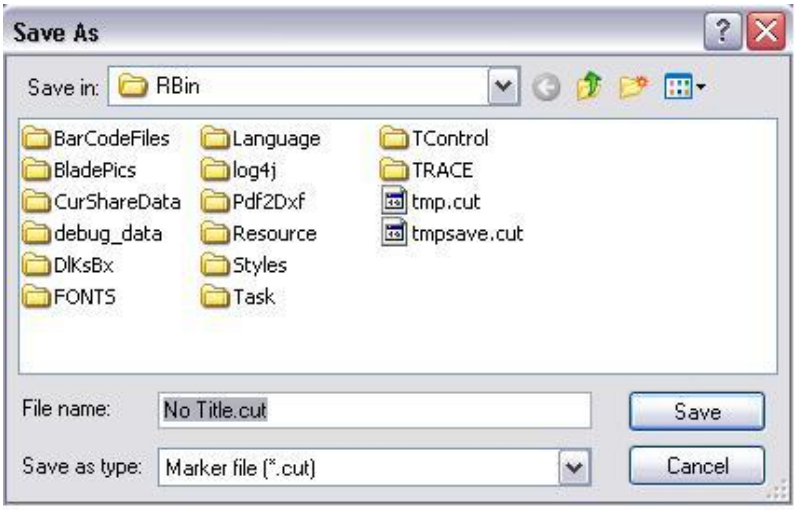
The fabric width, length, interval, rotation angle and other parameters can be set in the dialog box.

2. Open（ ）



Select 【open】in 【File】menu to find all the .cut files.

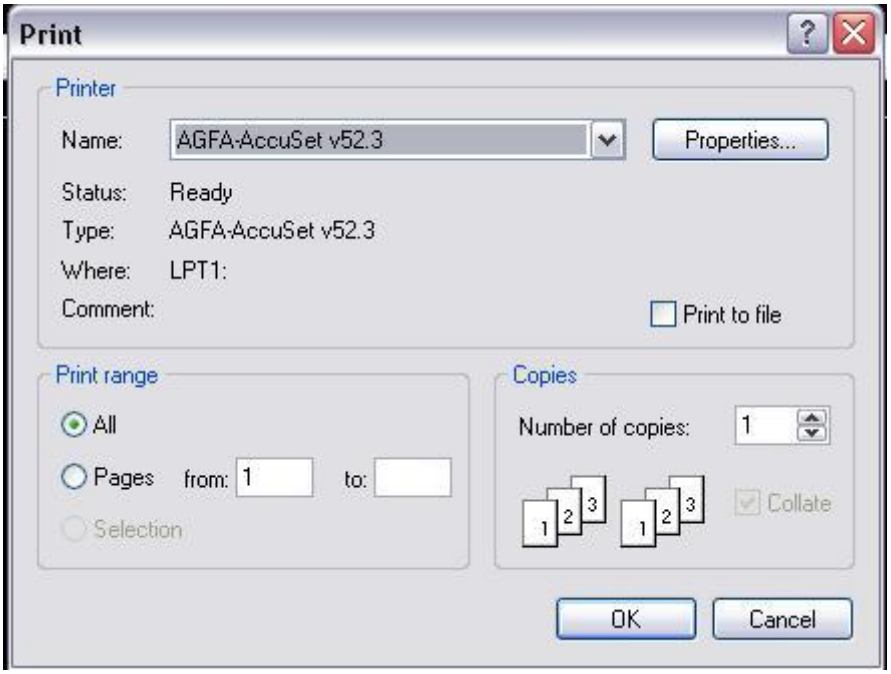
3. Save（ ）



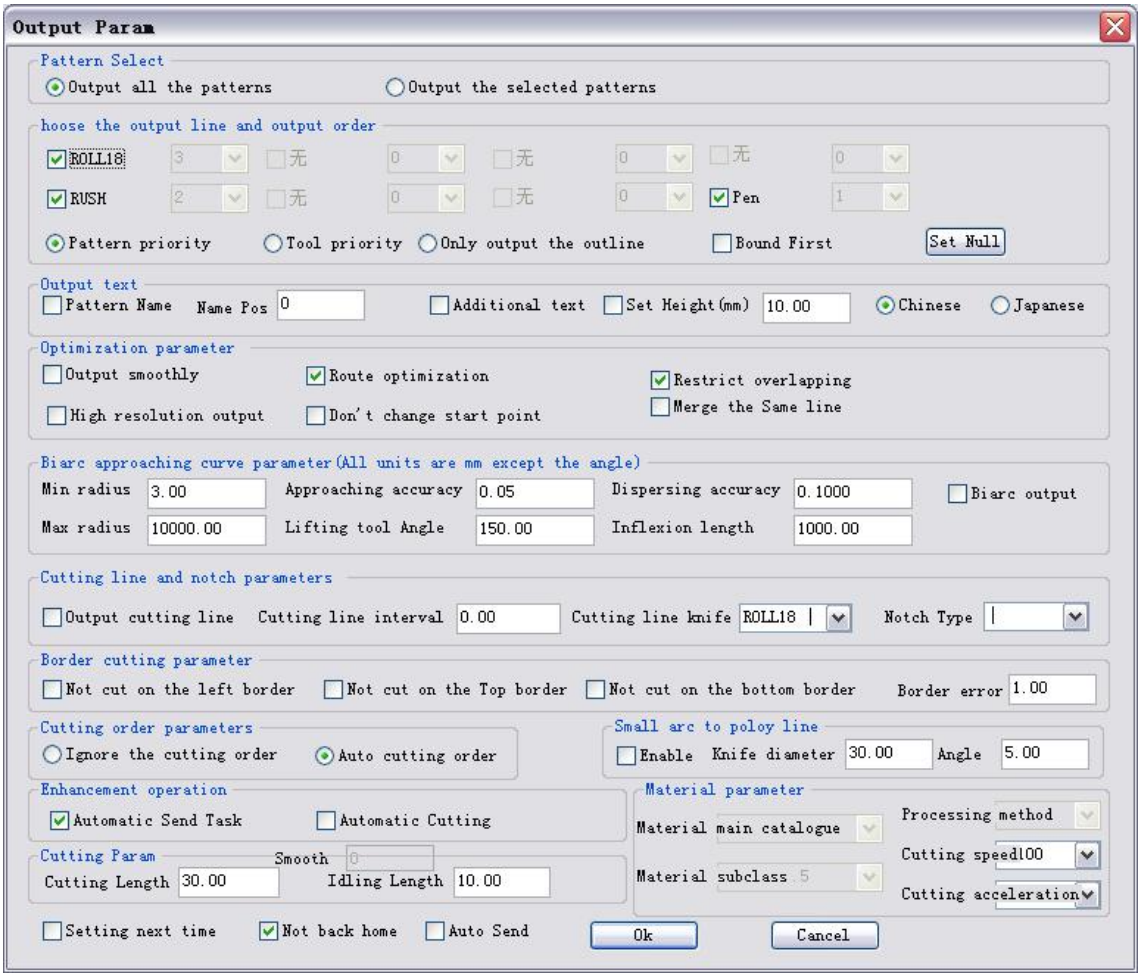
This dialogue is to save the cutting file to be .cut format.

4. Print（ ）

Printing the file



5. Output Settings（ ）



6. Cutting Parameters（ ）

   Click this key, there are the basic parameters of the cutting machine

7. Output of the cutting machine】（ ）

   Click this key, send the cutting data to the Cutter server

8. Cutting machine control center（ ）

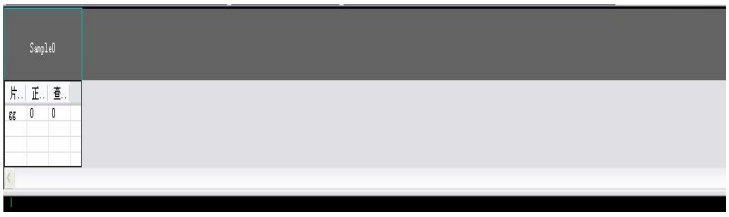
   This key button is for the controlling center

9. Collecting the pattern （ ）

   Click this key to collect the pattern.

10. Switch View（ ）

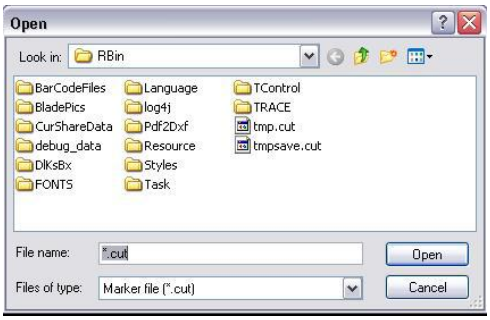
    Click this key, the following dialog appears.



In this dialog, switch the unmarking area and the source of patterns.

11. View other marking list（ ）

Click this key, the following dialog appears.



This dialog is to open other cut files.

12. Refresh（ ）

Click this key to refresh the software interface.

13. E-ZOOM （ ）

Click this key to zoom the specified parts.

14. Image Zooming（ ）

Click this key to enlarge the pattern data.

15. Full Screen（ ）

Click this key to display all the patterns in the marking area by the full screen

16. Remove Image（ ）

Click this key button to remove the pattern in the un-marking area and marking area

17. Undo（ ）

Click this key to return to last action.

18. Re-execute （ ）

Click this key to redo the last action.

19. Auto Marking（ ）

Click this key, the following dialog appears

In this dialog, you can set the marking time and start the auto-marking operation.

20. Relay Marking（ ）

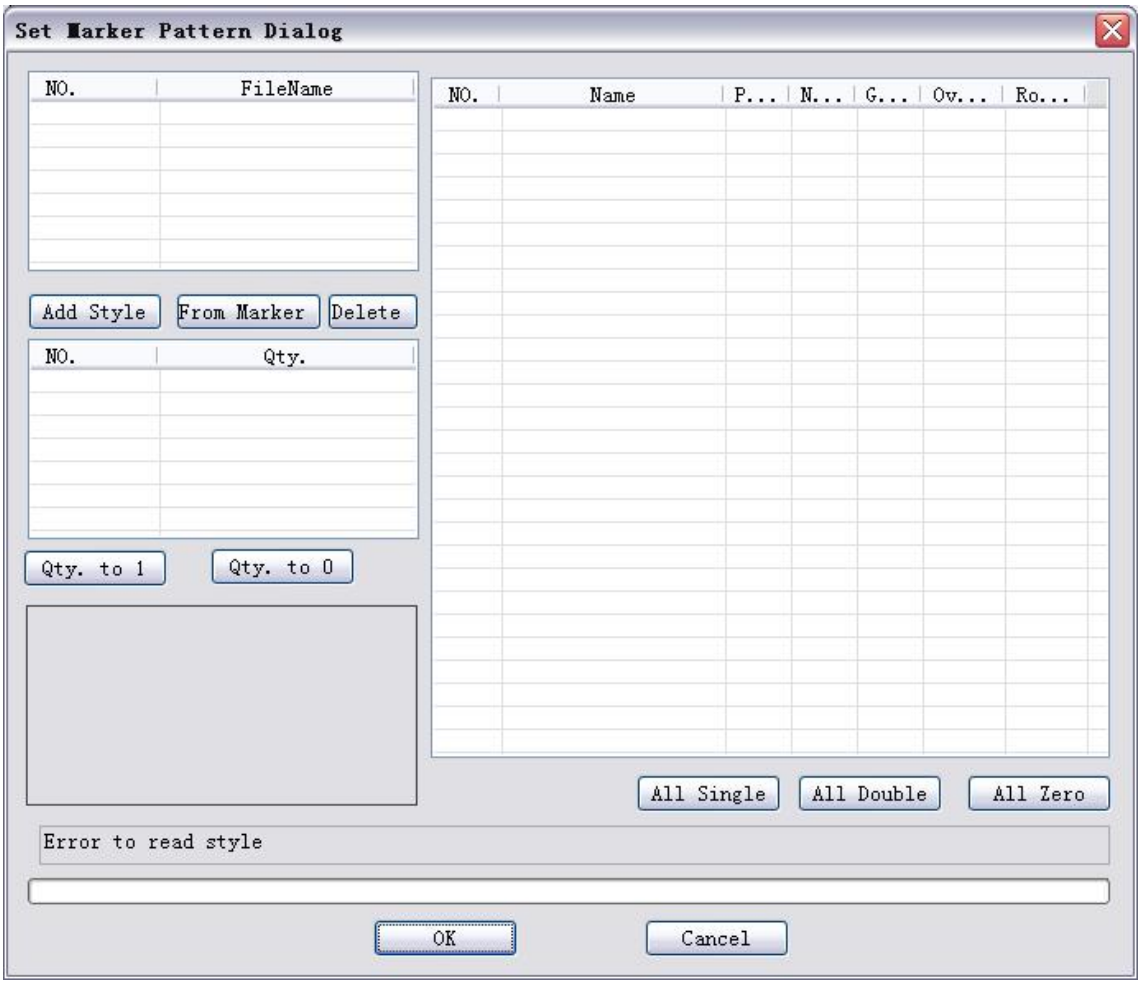
Click this key to remove the pattern from the unmarking area to the marking area quickly.

21. Restore to the un-marking area（ ）

Click this key, it can restore the pattern data from the marking area to the unmarking area.

22. Set the pattern list（ ）

Click this key button it will show the following dialog



This dialog can choose the pattern data to cut.

23. Adjustment Priority （ ）

Adjust the priority of the pattern

24. Limit overturn （ ）

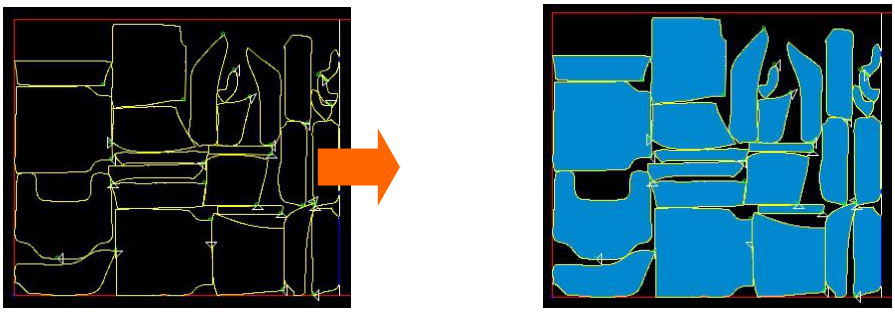
Click this key, it will stop the overturn request for all the patterns

25. Limit rotation （ ）

Click this key, it will stop rotation request for all the patterns

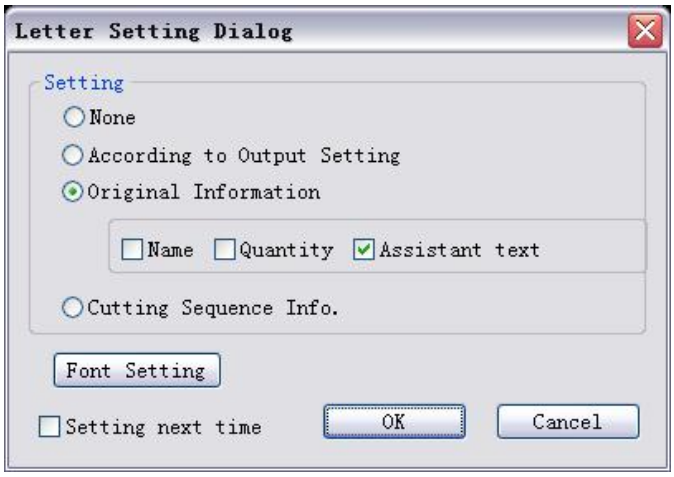
26. Color Switch（ ）

Click this key, it will fill the color to the marking area pattern



27. Text display options（ ）

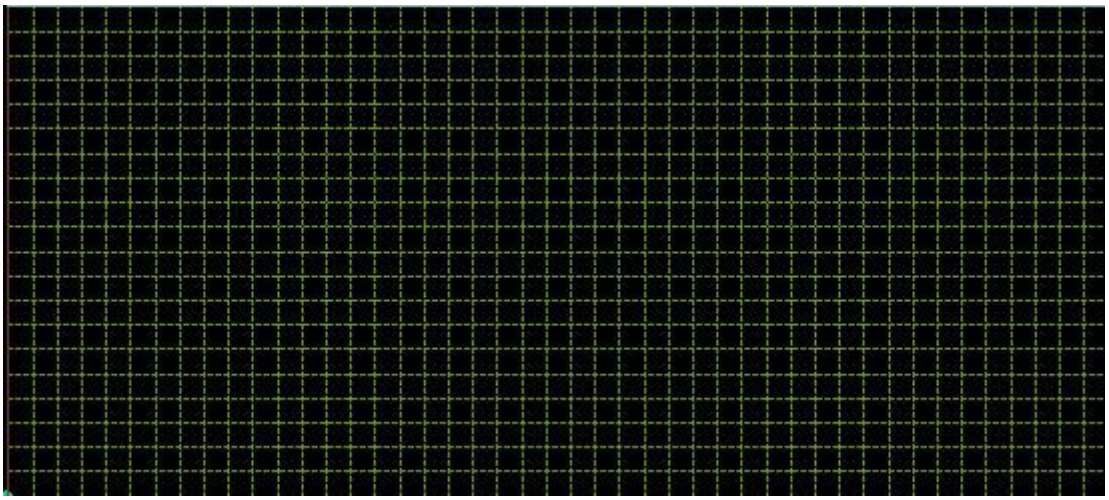
Click this key, it will show the following dialog



This dialog is for setting the text display on the pattern.

28. Display grid line（ ）

Click this button, the marking area will show as the following picture.



29. Size Classification（ ）

Click this key button to put all the un-marking pattern data to the left.

30. Specification Classification（ ）

Click this key button to put all the un-marking pattern data to the left of position

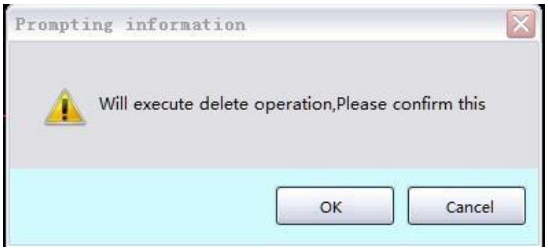
31. Add the cutting pattern（ ）

Click this key button and select the one which need to add, will show the following dialog

Click the OK key to copy the pattern which needs to be added.

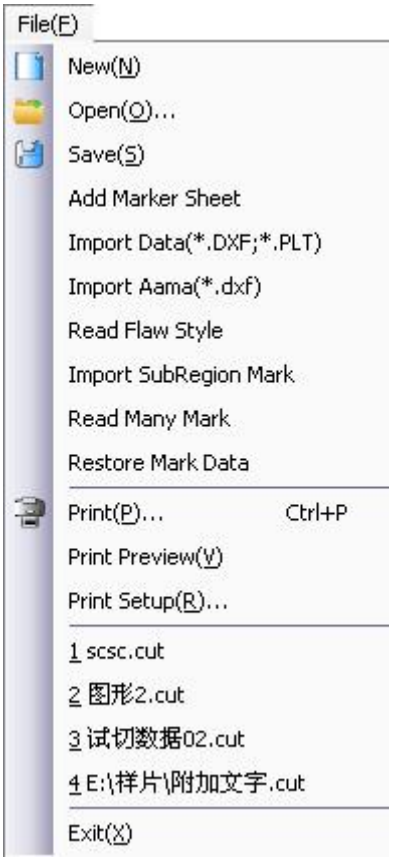
32. Minus the cutting pattern（ ）

Click this key, and select the one which need to deduct, will show the following dialog. Click the OK button will copy the pattern which need to add???



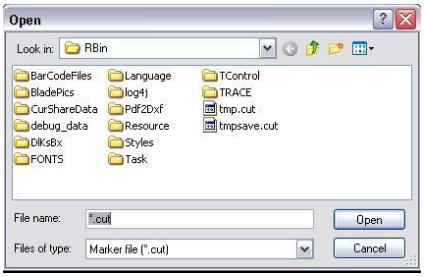
7.3 Menu Key

1. 【File】: Click this key button will show the following dialog



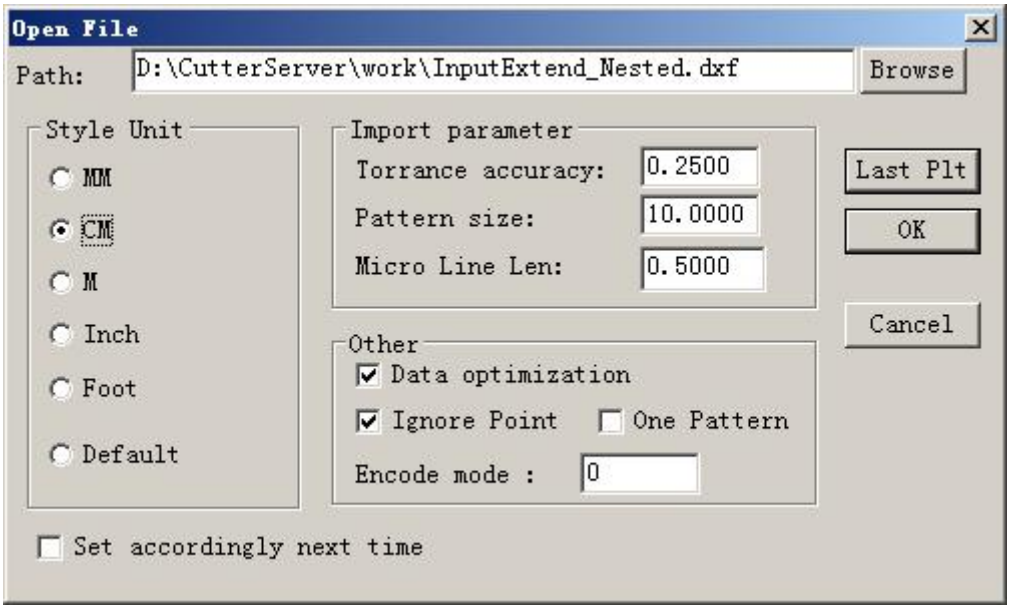
"New""Open""Save" function button in the dialog box has been introduced.

Select "Online Marker" will show the following dialog box



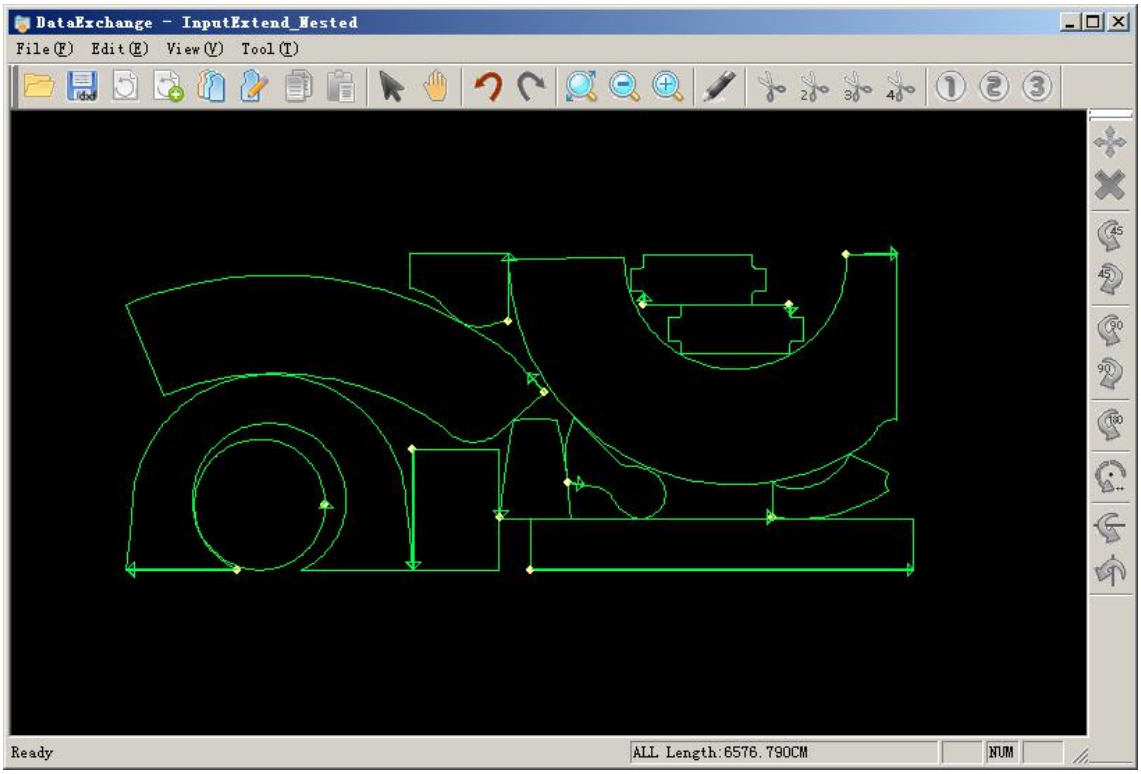
It import the.mkm file.

Click the “Import external data（*.DXF;*.PLT;）will show the following dialog box



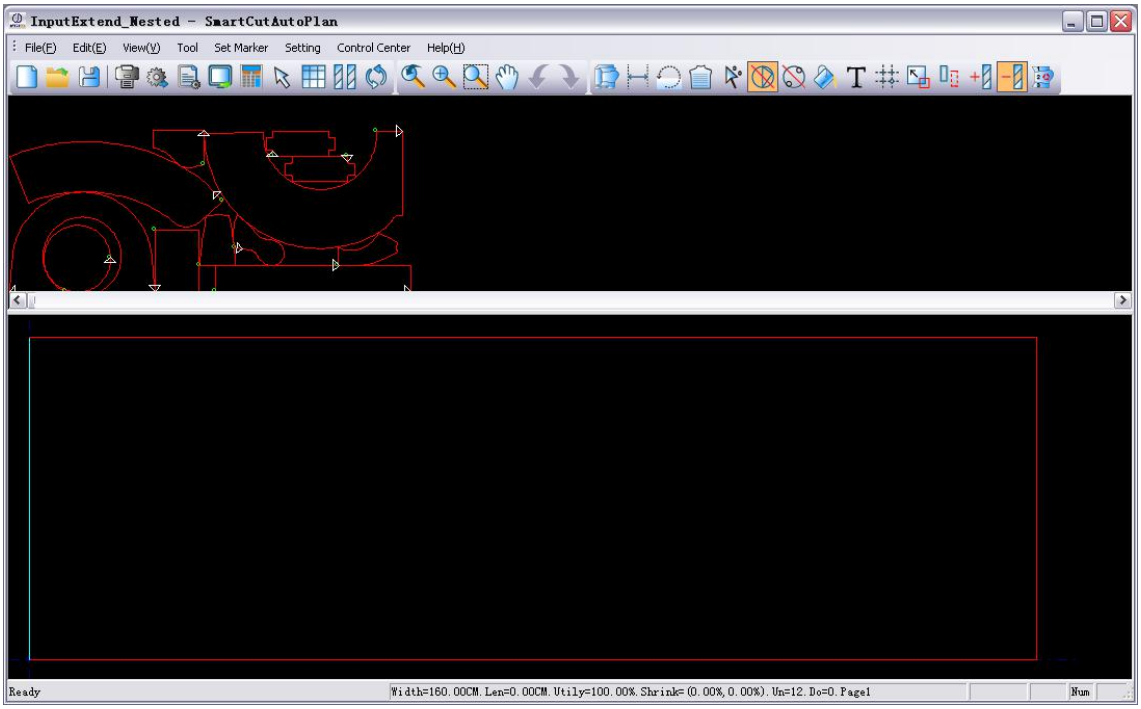
In this dialog, import the .dxf and plt files and set parameters.

Click OK button to enter pattern edit module after confirming the imported data is right.



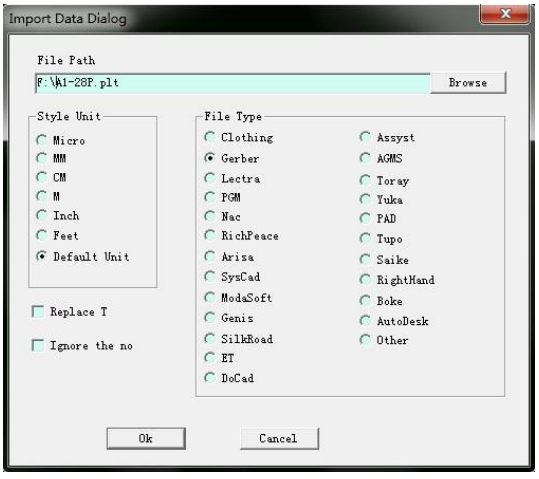
If need to adjust the pattern, please double click the pattern or select the pattern and click right mouse, choose “pattern editing ”function to edit the data.

If do not need adjust the pattern, please click in tool bar, move the patterns to unmarking area as below:



If need import other files, please do the above step again, please click

Import the Amma(*.dxf) , it will popup the following dialog box



Import the auto-marking data from this dialog box

2. 【Edit】: Click this key, it will show the following dialog box

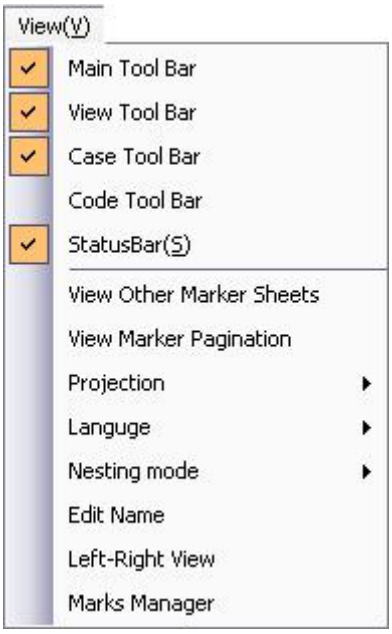
Undo the last action

Forward the action

Clear history

Import the un-marking area to marking area

3. 【View】: Click this key, it will popup the following dialog box

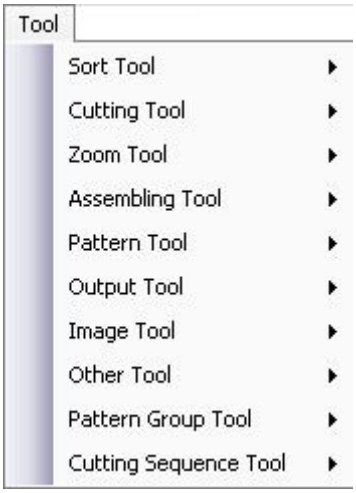


Click "Main Tool Bar ", it will hide the following function key:

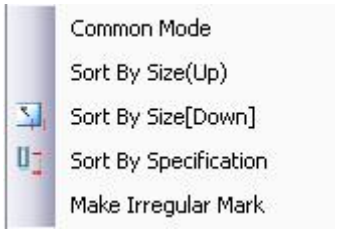
Click"View Tool Bar ", it will hide the following function key:

Click"Case Tool Bar ", it will hide the following function key:

4. 【Tool】: Click this key button, it will popup the following dialog box

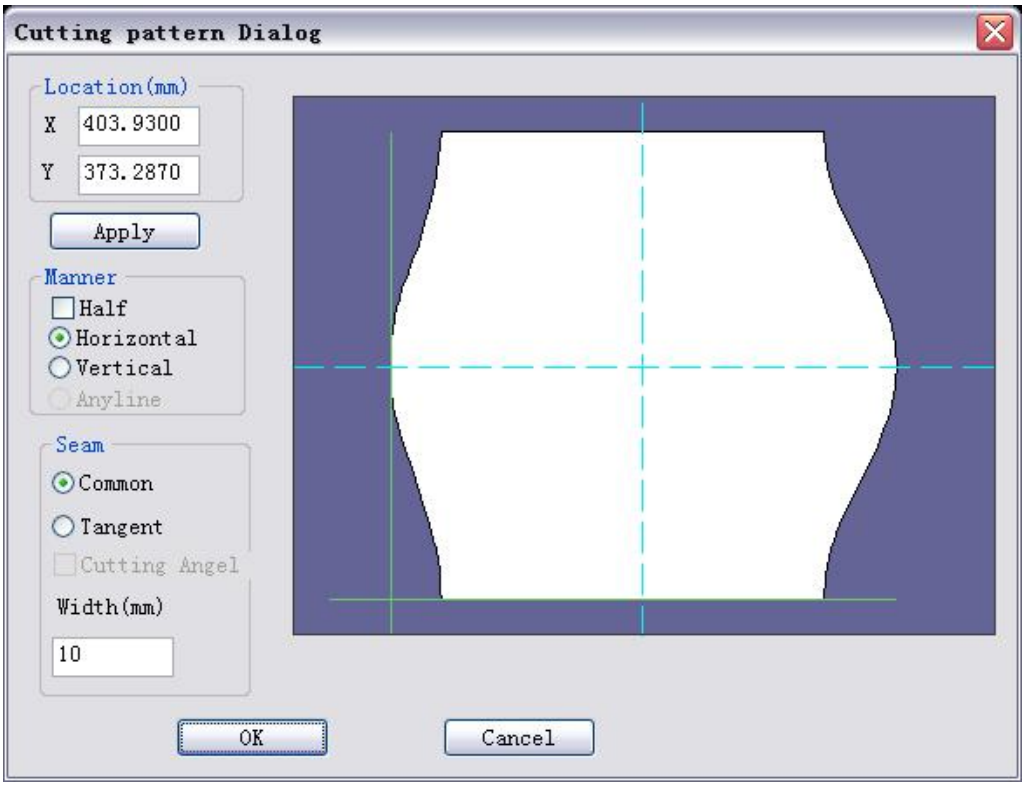


Click“Sort tool”, it will show the following dialog box



Click “Cutting Tool”, it will popup the following dialog box

Click”Cut Pattern”and select the pattern which need to edit, will popup the following dialog box



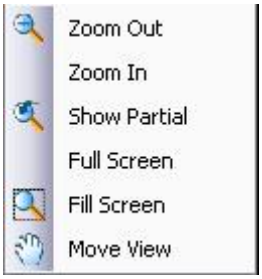
Cutting position: Unit (mm), The cutting position shows that cutting point deviate from the original place of the pattern, input the number by manual, accurately adjust cutting position with button “Apply”

Cutting way: There are two ways to cut at present, level cutting and vertical cutting, if selecting “half and half cut", no matter where is the cutting position, it will be half-and -half setting according to outside rectangle of the pattern

Seam: there are two ways of seam, common way is that seam from vertical cutting line in the cutting position ,tangent way is that going down the primary outline from cutting position to seam

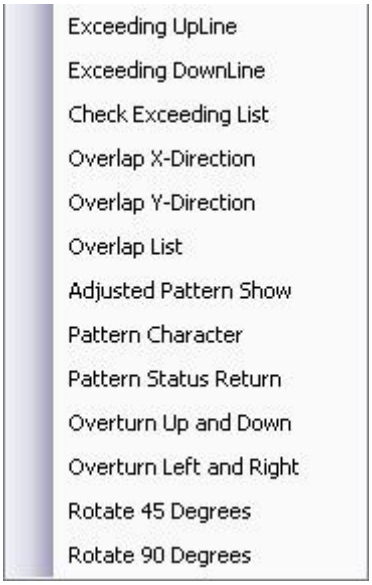
Slit width: The width of slit when seam.

Zooming Tool



The above function has been introduced in the key button tool.

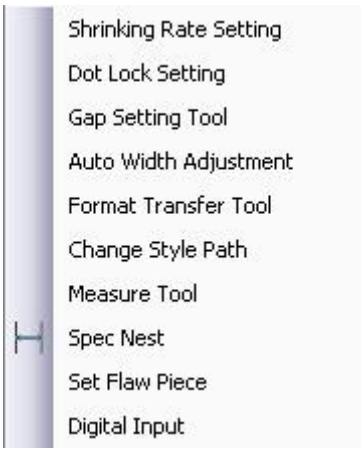
Click ”Pattern tool” will show the following dialog box

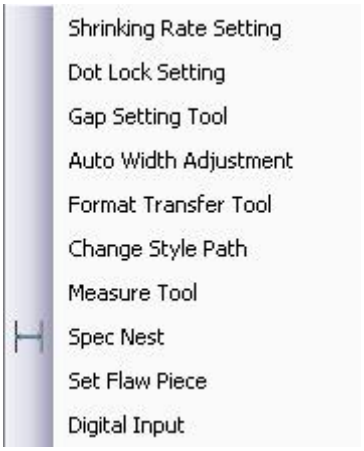


Click“Congregate tool”will show the following dialog box

Click”Image tool”will appear the following dialog box

Click“Other tool”, it will popup the following dialog box





Click“Group tool”it will appear the following dialog box

The function is to group many selected patterns as a whole, whatever moving or

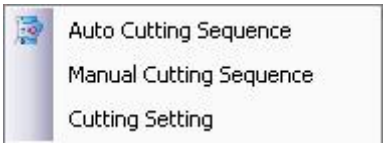
dragging, they are as a whole, moreover it always exist if not canceling the function. There is one way to activate it:

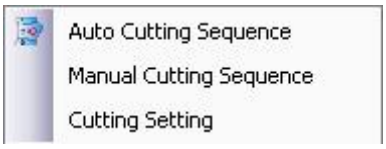
<1> After selecting many patterns, click pull-down menu "group" tool to activate the function.

<2> Separate the patterns function is after selecting group patterns, click pull-down menu "tool" for "separating" under "grouping tool", then activate the function.

Notice: F7 is to group, F8 is to separate

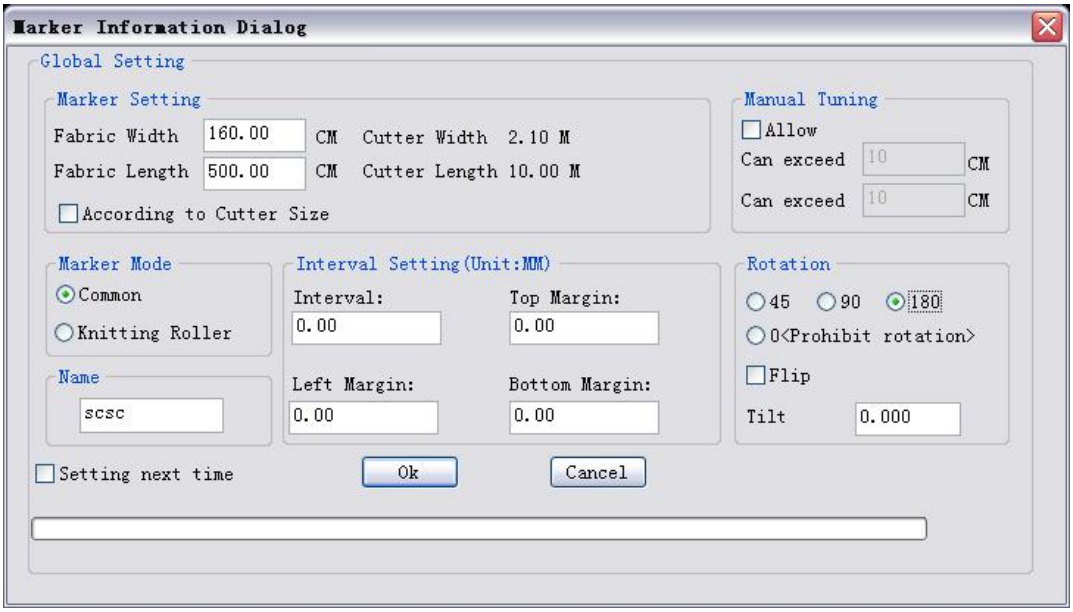
Click "Cutting Sequence", it will popup the following dialog box





5. 【Set marker】: Click this key, it will popup the following dialog box

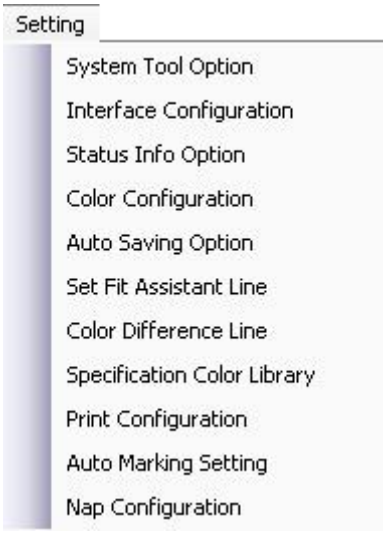
Click"Marker information", it will popup the following dialog box



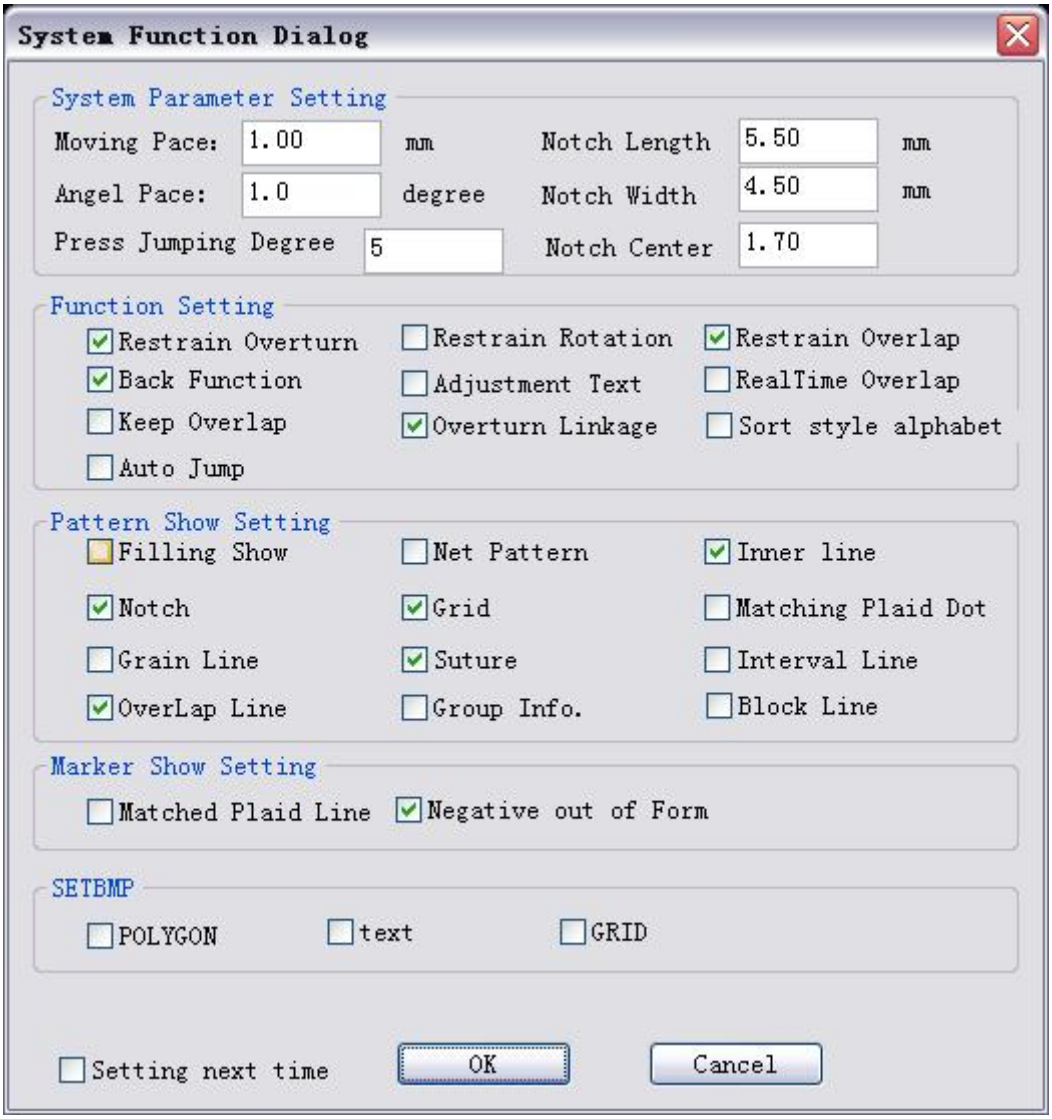
The parameter in this dialog box can be revised by customers' material.

Click "Marker ", this function has been introduced.

6. 【Setting】: it will popup the following dialog box



Click "System tool option", it will popup the following dialog box



Parameter setting description:

Movement length:(unit)mm, the parameter will work when press direction key on the keyboard ,press for one time, the distance for moving up, down, left and right, the minimum distance is 0.5mm

Notch length:(unit)mm, after finishing setting the parameter, the notch of the pattern will get length according to the parameter, but this parameter has no effect in generated pattern, no effect also for saved marking list.

Rotation angle amplitude: （unit)degree, the parameter is used for pressing the

rotation button each time, the range for pattern rotation. The angle for rotation is at least 0.1 degree.

Rotation angle amplitude: (unit)degree, set the parameter of the rotation amplitude of the pattern. The min. rotation amplitude can be 0.1 degree.

Find bound limit: When the pattern impact on detection, to search for the accuracy of position, 1-100,1for accuracy finding, but the speed will be slow, default precision is 5

Limit overturn: select the parameter, system will stop overturn request for all the patterns

Limit rotation: select the parameter, system will stop rotation request for all the patterns

Limit overlap: select the parameter, in common way, pattern can't be overlapped, if the pattern position overlapped with other pattern, the pattern will be bound automatically, find no position of overlap

Open back function: select the parameter, the operation for marking list, such as moving, copying, deleting, mirror will be recorded, in order to operate the previous actions.

Notes: use this function will cause empty processing of all the record of current marking list

Adjustment priority: select the parameter; it will adjust the function of right button for dragging the pattern in order to only drag the pattern character.

Show overlap number anytime: select the parameter, in the process of moving pattern, if overlap happens, the overlap station for present pattern group will reflect in

the overlap dialog box

Notes: little move for direction key cause pattern overlap that will not bring overlap dialog box popup at any time, even if selected the parameter.

Data-base lookup priority: the parameter will cause the function of exchange model such as open and from the open function, save and save as. Selected the parameter, increase marked list, lookup marked list will take the way of open data-base, otherwise adopt any way to open

Overturn linkage: when chose style, if pattern appear pairs is that chose both positive and negative side, selected the parameter, if one of the pattern cause overturn, well then another pattern will be also overturn, otherwise only overturn present selected pattern.

Fill in color display: indicate all the patterns in marked area and unmarked area, whether display the pattern of fill in color.

Display net pattern: whether all the patterns display net pattern.

Display internal line: whether all the patterns display their own internal line

Display notch: whether all the patterns display their own notche for gross and net pattern

Display gridding: whether all the patterns show their gridding

Display Matching plaid: whether all the patterns show their own Matching pattern and plaid.

Display grain: whether all the patterns display grain line

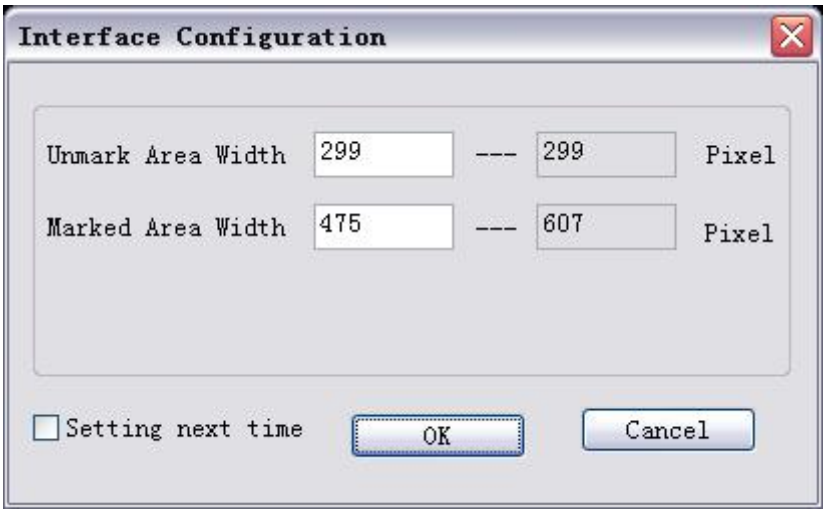
Display stitches: whether all the patterns display stitches for putting seam after cutting

Display sepal line: whether all the patterns display virtual sepal line between patterns after setting marking gap

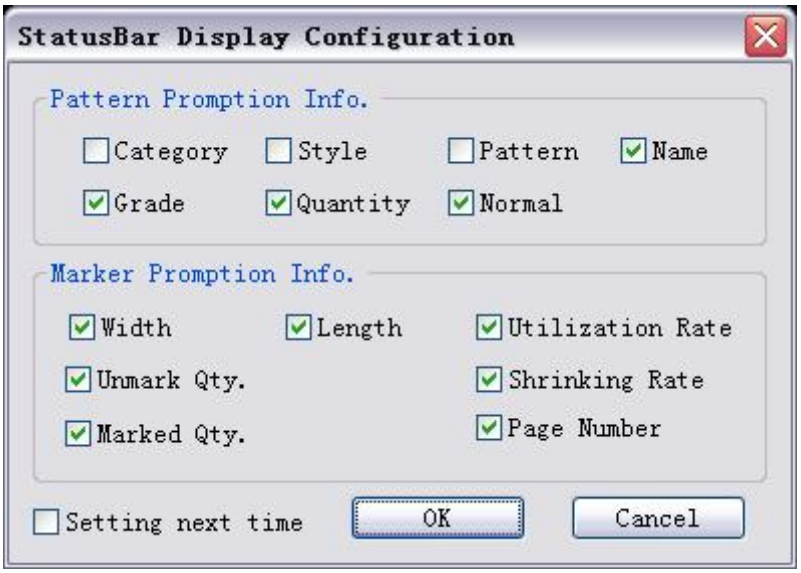
Display matching plaid line: whether matching plaid line display in marking list area

Open anti-aliasing: when marking list shows, whether open anti-aliasing, anti-aliasing will improved in softness of curves, but there will be some effect in refresh speed of system.

Click “Interface Configuration” will show the following dialog box

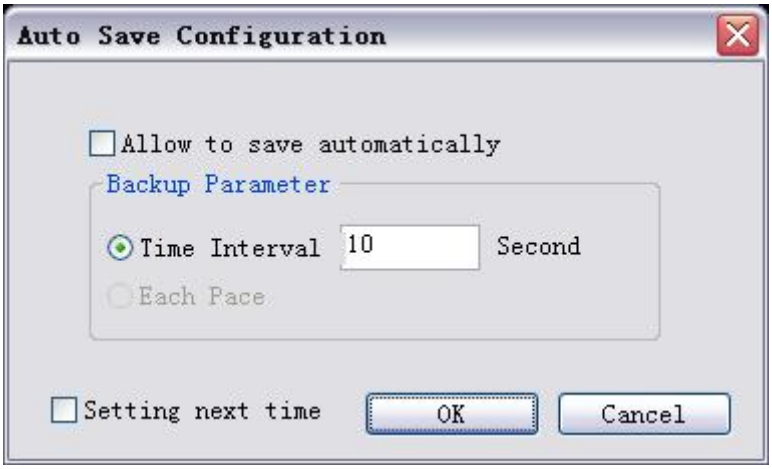


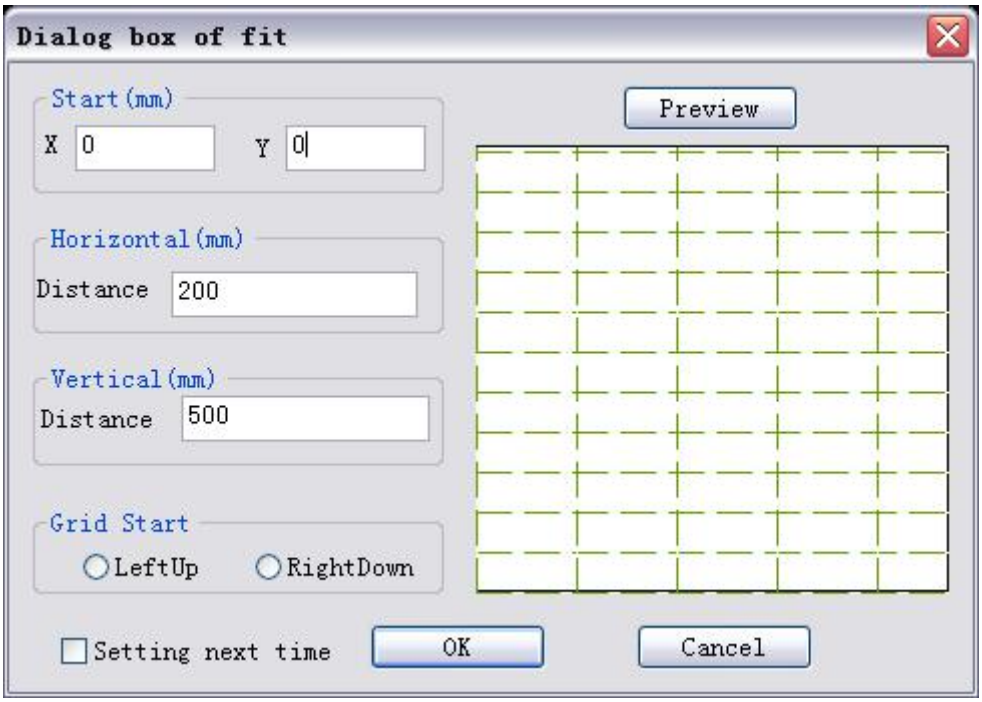
Click“ Status Info Option” will popup the following dialog box



This dialog box can set the pattern info and marker info.

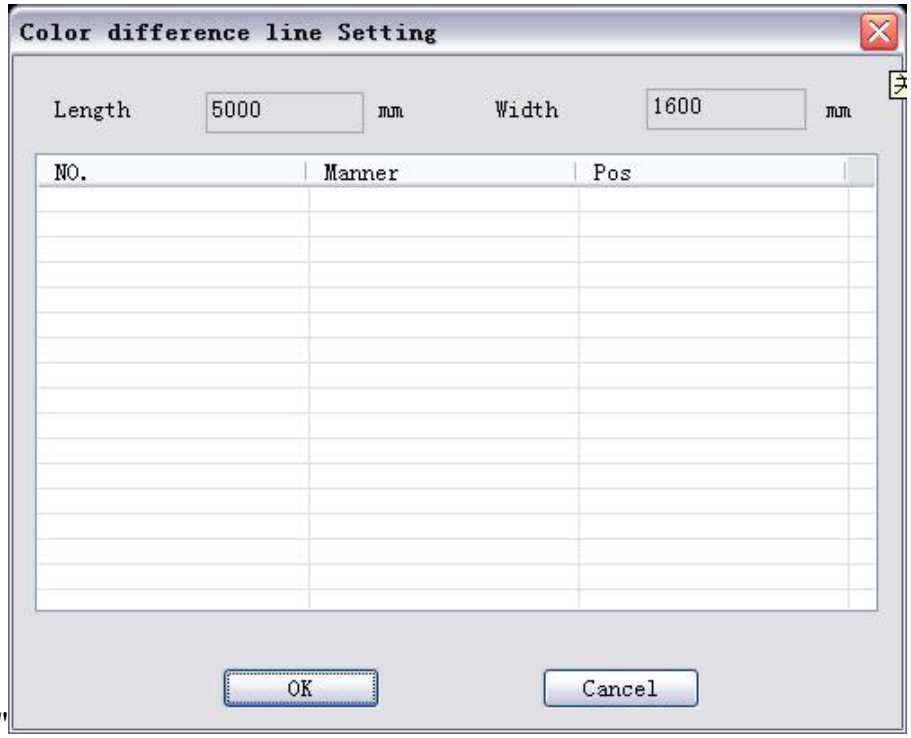
Click “Color configuration” will popup the following dialog box





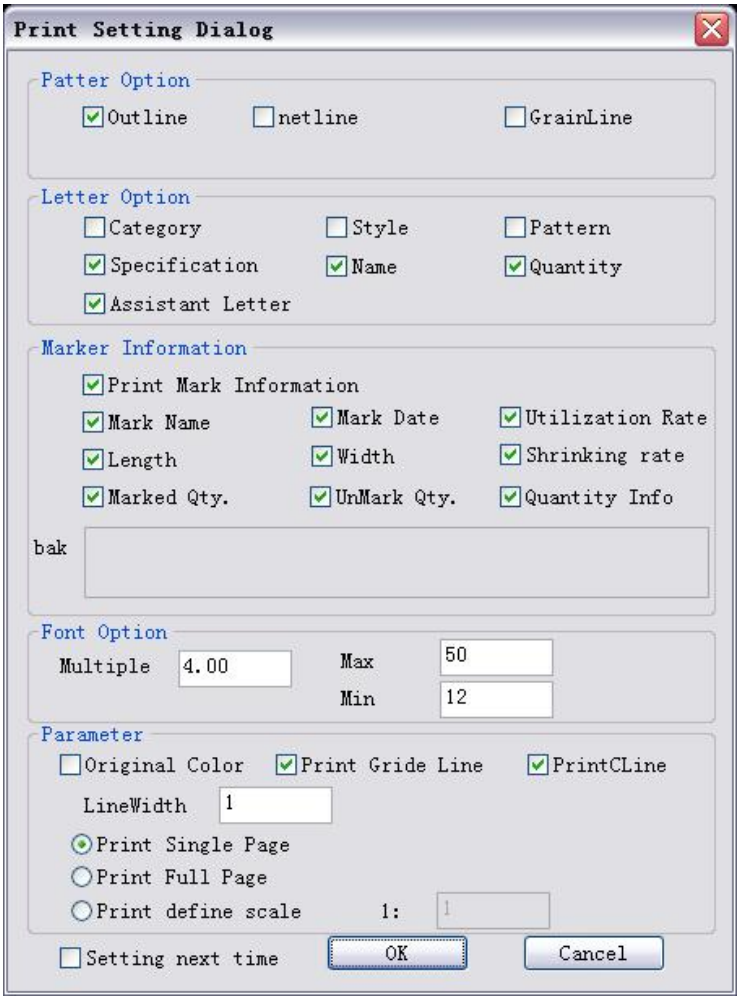
This dialog box can set the grid space of displaying.

It will popup the below dialog box after clicking "Setting color line



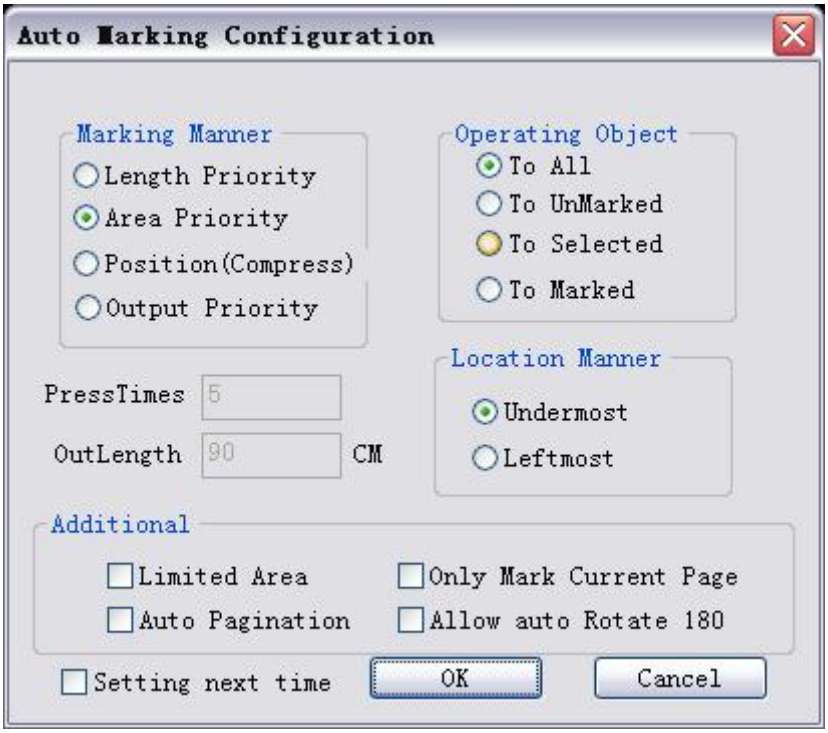
"

It will popup the below dialog box after clicking "Printing setting"



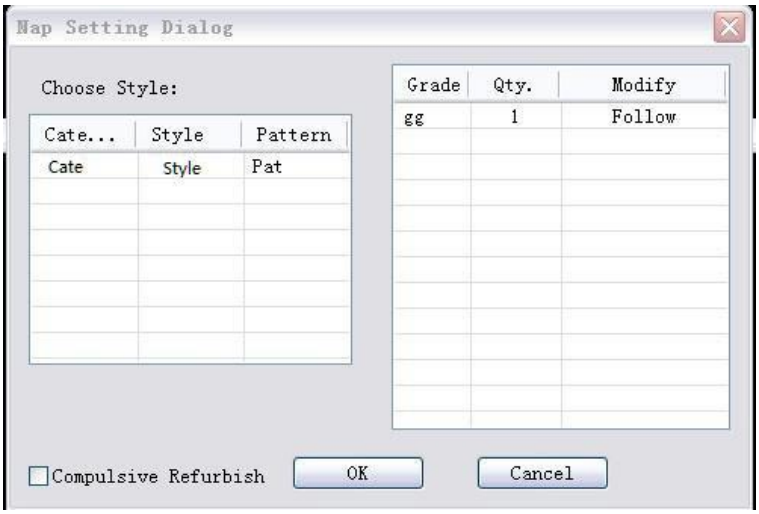
This dialog can set print parameters.

It will popup the below dialog after clicking" Auto marking setting"

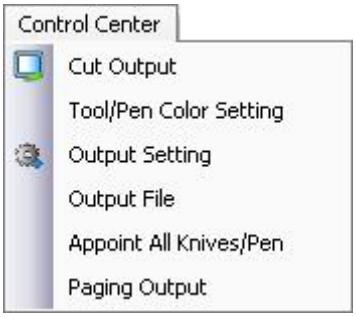


This dialog is selecting" length priority" "area priority" " position (compress)" "output priority" for the samples in mark area.

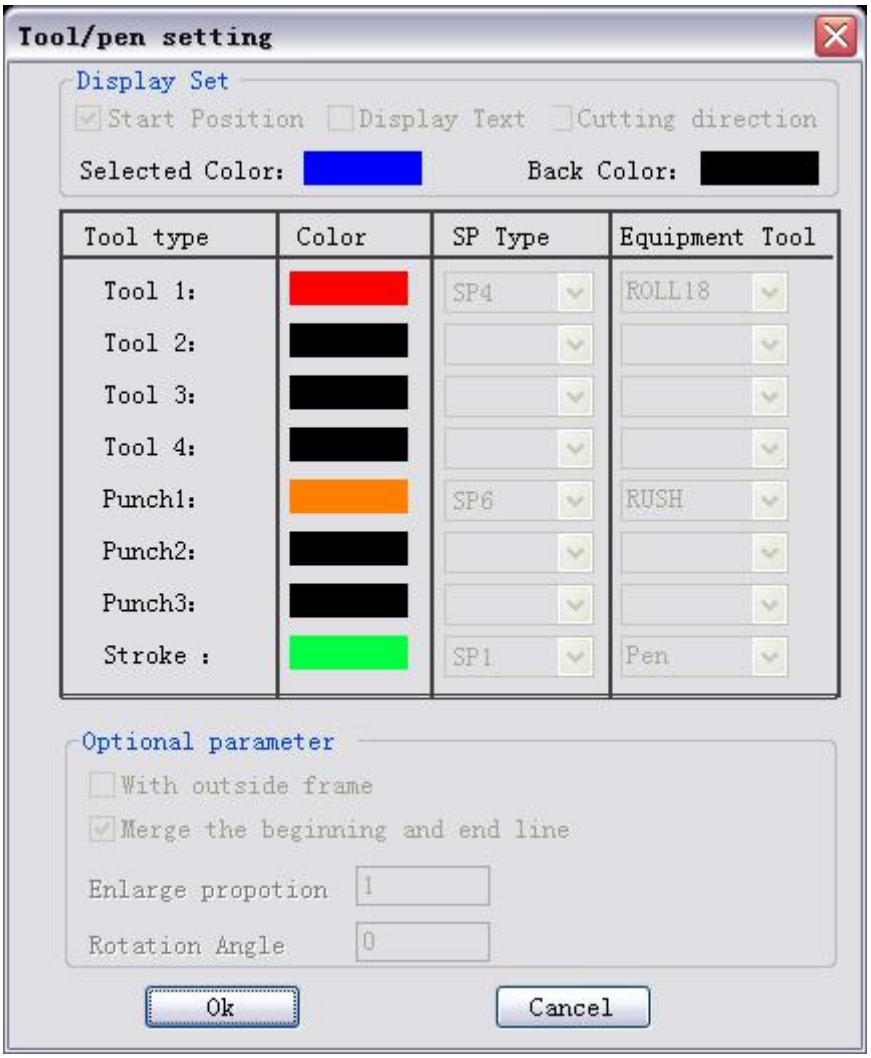
It will popup the below dialog box after clicking "reversing hair setting"



7. 【Control center】: It will popup the below dialog after clicking this key.

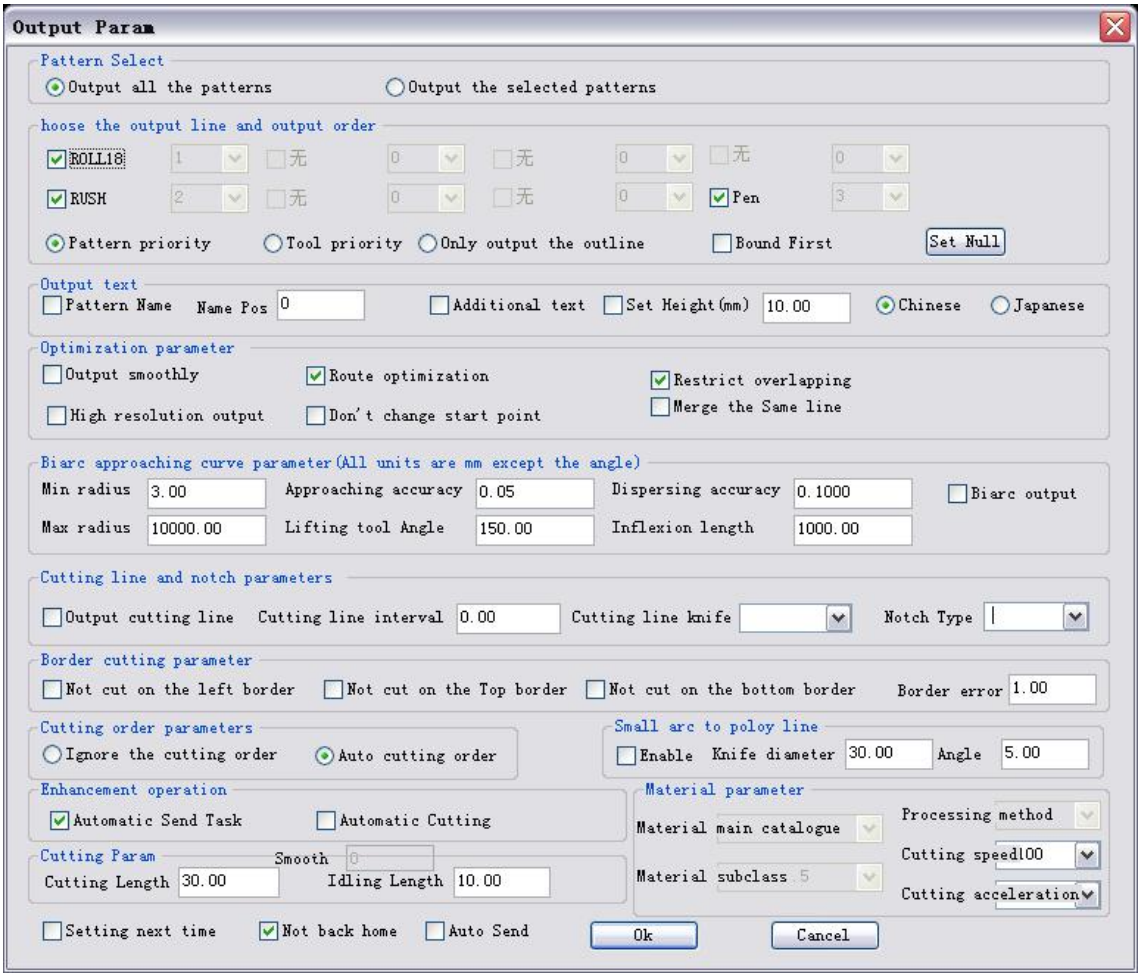


It will popup the below dialog box after clicking "Knife and Pen Setting"



This dialog box can set the colors for all the knives and pens.

It will popup the below dialog box after clicking "Output Settings".



"Select Output Line and the Output Order" is selecting the cutting knife & pen of patterns. Selection of knife & pen cutting order(Put the knife on the place which click, then cutting)

"Pattern Priority" refers to finish cutting all of knife and pen of single pattern.

"Knife Priority" refers to finish cutting all the patterns with one knife & pen.

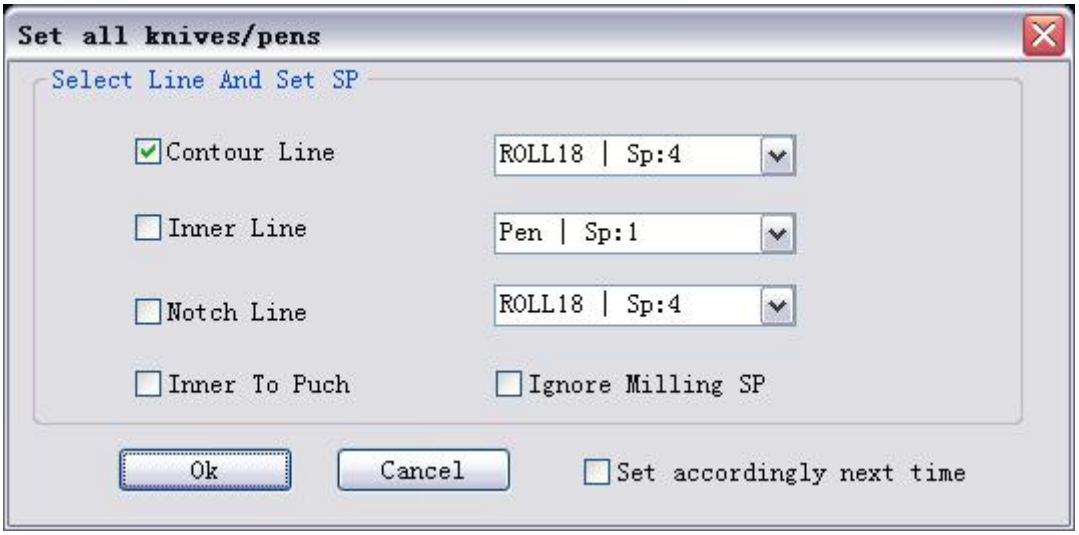
"Not back to original point" ✓ refers to the cutting head will stop at the finishing point. Without tick, the cutting head will come back to the original point after finishing cutting.

"Auto conveyor system" ✓ refers to the finished patterns will be conveyored to the material picking table automatically after finishing cutting.

If need to modify or set other parameters in the dialog box, please contact IECHO

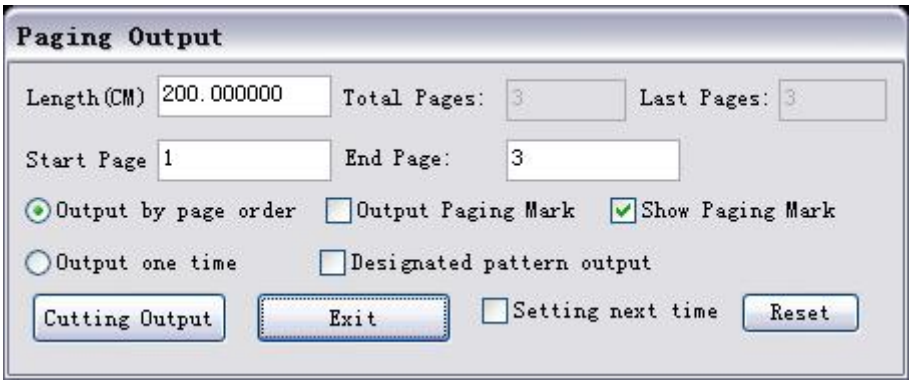
engineer.

It will popup the below dialog after clicking "All the samples of Knife & Pen Settings"



This dialog box is for setting knife & pen of contour line, inner line and notch line.

It will popup the below dialog after clicking" Paging Cutting Output"



This dialog box is for setting the length of each page when continuous cutting. The length of each page can't be exceed the maximum length of the cutting table.

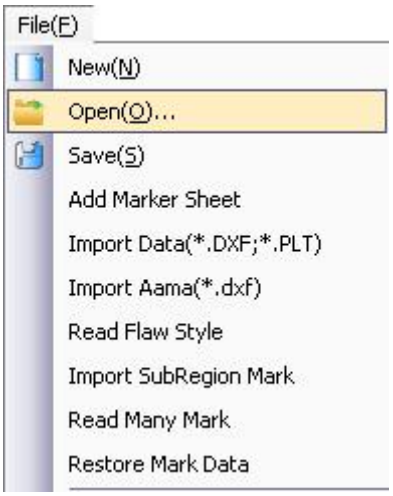
8. 【Help（H）】: It will popup the below dialog box after clicking this menu.

7.4 Operational Process of Smart cut Module

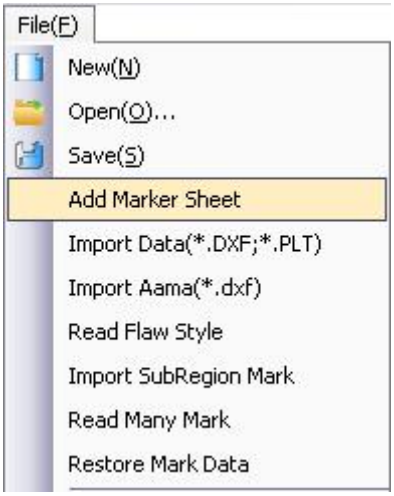
Open the file you need to cut:

There are 4 methods:

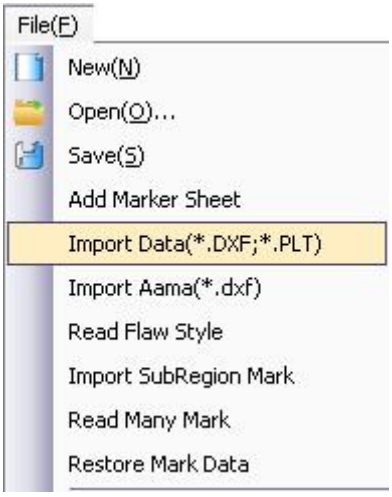
No.1: Open Cut file, This format is processed by the Smart Cut module.



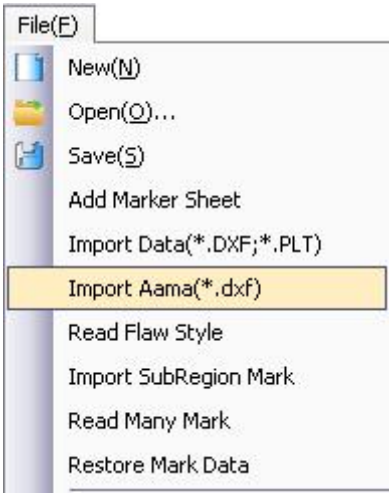
No.2: Open Online Marker(mkm):This format file is the file format which saved by auto network marking.



No.3: Import External Data(DXF,PLT):This format is a general CAD format.

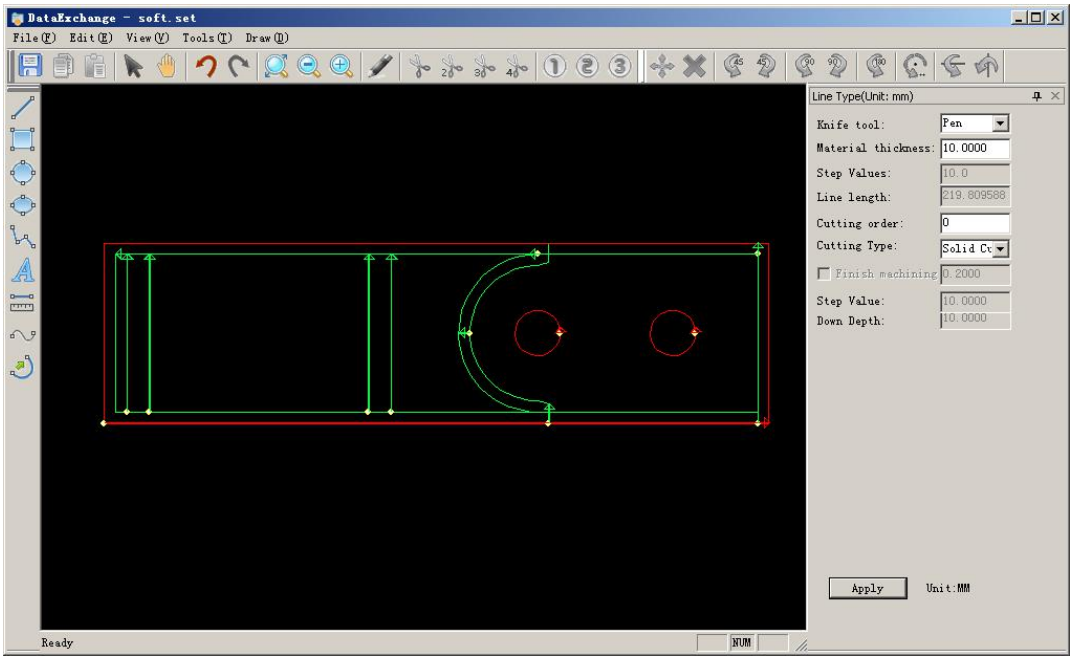


No.4: Import(AAMA): With this import method, it will open the interpretation format in the auto network marking module.



Data Editing Module

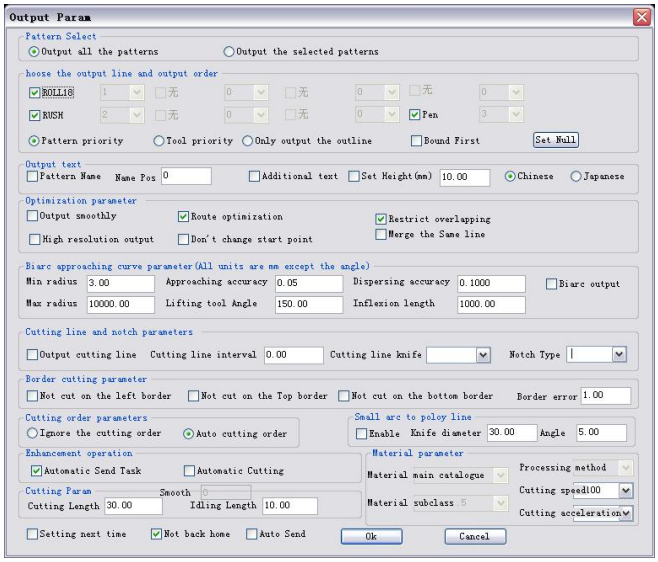
Import the pattern into the Marking Module. Then double-click the pattern to edit it.



Select the line you need to edit, choose the corresponding knife tool on the right knife tool module, then click application for finishing setting.

Output Setting

Click Control Center menu ---output setting, get to the output setting dialog box.



Send data

Send data to Cutterserver module after finishing the above operations, then click Control Center ---cutting output.

8. Common fault and eliminating methods

1. Unable to start the machine and Electrical Cabinet lights are off

- Check whether the 220V power plug is inserted well.
- Check the compressed air source. Low pressure protection switch may cut the power. Power will be connected when the air pressure reaches to a certain value.

2. Unable to start the machine while the Electrical Cabinet lights are on.

- Check the fuse tube in the Electrical Cabinet, replace it with a same and fine one.
- Check the leakage protector, it should be opened.

3. Unable to start the Vacuum Pump

- Check the 380v power
- Check the 24v contactor power
- After trip-out of the thermal protector, it will take a while to power recover.

4. The pump stops when starting for a little while

- The thermal protector tripped out. Adjust the electric current to increase the short current.

5. CutterServer is unable to communicate with the cutting machine

- Check the software setting.
- Check the serial port lines and ground lead.

6. The COM status light is on(green or yellow), but the computer still can not connect with the cutting machine

- Switch the serial ports, connect again.
- Maybe one of the serial port broken. Change to another serial port.
- The ground wire on the serial port is not connected.
- DSP system version and the CutterServer version are incompatible. Update the version or change to another version.

7. X axis motor or Y axis motor noise

- Set the P2-47 parameter to be 1, move X and Y axis, then set it to be 0

8. Cutting length error

- In the new system, X and Y are adjusted synchronously. If the deviations of the X and Y are different, adjust the Motor electronic gear ratio firstly. P1-44 is Numerator and P2-45 is Denominator. When the deviations are adjusted to the same, adjust the length factors. When the deviations are adjusted to a ideal condition, no need to adjust the length factors.

9. DELTA motor alarms

- AL006 is overload, this case usually happened when the old motor was replaced buy a new one. Adjust the resonance parameters: set the P2-47 to be 1, run the motor, then set it to be 0

10. AL011 Encoder, check the encoder connector and cable; or replace the cable; check the encoder ground wire.

- AL013 suddenly stop, check the sudden stop switch and lines, check the 24V power, examine the 24V plug on the DSP board.
- AL030 overload, the resistance is too large because of mechanical problems. After eliminating the mechanical problems, check P1-57 and P1-58, normally, they are respectively 200 and 100.

11. Alarms when machine starting

- 4A suddenly stop, check the sudden-stop switch.
- Motor 46 or 47 alarms, check whether the cutting head is too close to the edge. Move the cutting head a little further from the edge, then start the machine.

12. Knife position error

- Reboot the machine, the knife will turn for twice, then stop at a normal direction; if the knife only turn to one direction or stop at a wrong direction, check the installation site of the Rotating knife sensors

13. Cutting Head cannot move down to the designated position

- Check the cutting head fixing screws.

14. For high-beam cutting machine, the knife cannot reach the felt even when the socket is at the bottom.

- The tangent knife and creasing knife should not be inserted too deep to the knife holder. Avoid moving the socket to the bottom.

15. Putting the knife into the socket, the retainer ring is slack

- Take down the retainer ring, overturn and put it on again.

16. The Oscillating knife cannot reach the felt

- Reset the position of the retainer ring, bring down the knife. But make sure the knife is able to lift up.

17. The oscillating knife still touches the material when the knife has been at the top.

- Reset the position of the retainer ring, bring up the knife.
- Use a short knife
- The material thickness beyond the affordable range.

18. Knife broken

- Cutting speed is too fast
- Knife direction wrong
- Knife does not oscillate

19. Knife does not oscillate or weak oscillate

- The oscillating knife is worn out, need to be maintained

20. Intermittently oscillate

- Check the oscillating power
- Mechanical problem leads to strong resistance

21. Oscillating knife will pick up material

- Lengthen the waiting time after the knife lift up
- Check the spring

22. Milling tool error when moving down

- Reboot the power, remove the alarm record
- Check the cooling air pressure, it should be 0.3 MPa

23. Milling tool getting deeper and deeper

- The milling tool was slackly fixed

24. Milling tool broken

- Cutting speed is too fast
- Cutting too deep, try multiplicity cutting
- Material adsorption weak

25. Adsorption weak

- Check the air pipe connection
- Adjust the air suction function setting
- Vacuum chamber leaks if the max pressure is quite different with -0.02MPa
- Replace the pump if it's max pressure cannot reach -0.025 MPa
- Generally it is caused by the reversing valve. Check it and replace it if necessary.

26. The beam does not feeding the material

- Check the air compressor power. The puller cylinder pressure should be more than 0.4MPa

27. The beam does not move when feeding, X axis overloaded

- Check the cylinder pressure, it should be 0.2MPa
- Check the pump switch

- Check the material putting position, which can cause strong resistance.
- Slow the feeding speed

28. Feeding stopped when it just started, X axis alarms

- Check the reverse function of the vacuum pump

29. Material feeding direction incorrect

- Check whether the material and the beam are parallel
- Check the pressure of the presser cylinders, make the pressures are all the same
- Check the feeding direction of the felt

30. Material moves when air direction reversing

- Check the pressure time, it should be long enough

31. The X axis of the front page and the X axis of the behind page are different when perform paging cutting

- Check the pressure of the presser cylinder
- Check the material putting position and the feeding resistance.
- Check whether the pressing rod is slidable
- Elastic material maybe out of shape

32. The Y axis of the front page and the Y axis of the behind page are different when perform paging cutting

- Adjust the felt feeding direction