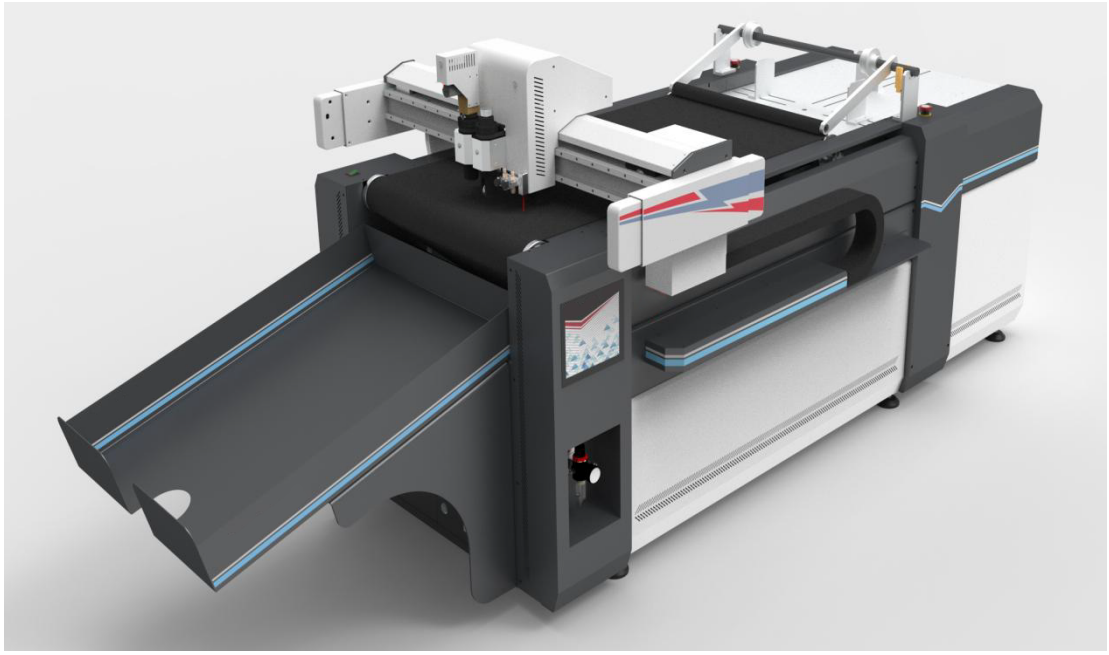
USER MANUAL OF SF DIGITAL FLATBED CUTTER

SF-4060/6090 Automatic Digital Cutting Solution User's Manual



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Thank you very much for selecting SF Digital Cutting Machine. Please read user manual before using.

Notice

1. Please set the machine in a place avoid direct sunlight, too wet, too much dust or corrosive gas. And stay away from violent vibration equipment, e.g. ironware punching machine, plasma cutting machine, laser machine, etc.
2. Use special line of power supply or add voltage stabilizer, and well grounded, to avoid the power fluctuation and possible moment disturbance signal, etc.
3. Operator should operate the machine according to operating steps; when the machine has errors, please record error message, and explain situation of the machine to our technicians. It will help to analyze, diagnose reasons of error and solveit.
4. Lubricate for screw rod, linear guide rail, bearing, and transmission parts as maintenance on a regular basis, brush anti-corrosive oil for metal plate of equipment, to ensure normal operation.
5. Change any parts under no electricity to avoid any accident.

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1. Machine Introduction

1.1. SF automatic intelligent cutting system introduction

The SF-4060/6090 model is an efficient automatic digital cutting equipment. The system processes the vector graphics and converts them into cutting lines, then the motion control system drives the cutter module to complete the cutting. The equipment is equipped with a variety of cutting tools, so that it can complete creasing and cutting on different materials. The automatic feeding, collecting device and CCD camera can realize the continuous cutting of printed materials.

SF-4060/6090 automatic intelligent cutting system is suitable for cutting the following materials: Self-adhesive materials, cardboard, KT board, PP plastic, corrugated board etc.

*** For more material choices, please contact after-sales support.**

1.2. Parameters

Model	SF-4060	SF-6090	SF-1310
Effective cutting area	400mm*600mm	600 mm*900mm	1000mm*1300mm
Applicable paper	A3/A4/A5/B3/B4/B5	A2/A3/A4/A5/B2/B3/B4/B5	A2/A3/A4/A5/B2/B3/B4/B5
Machine dimension (L*W*H)mm	2500*1000*1500	3200*1100*1600	4000*2000*1600
Package dimension (L*W*H)mm	1935*1135*2010	2550*1320*1665	2270*1860*1520 Main Body 1430*1165*495 Sheet stock
Weight	370Kg	460Kg	510Kg
Optional function	Roll loading device		
Loading system	Vacuum adsorption		
Cutting tools	Drag knife, Creasing wheels, Oscillating knife, Kiss cut		
Maximum cutting speed	1200mm/s		
Maximum cutting thickness	8mm	20mm	22mm
Cutting accuracy	±0.1 mm		
File format	DXF, PLT, PDF, DWG, TSK, SPL, HPG, EPS, AI, PS, BMP, TIF, PNG, JPG,		
Connect port	USB / PCIE slot / Ethernet		
Air pressure	0.7MPa		
Rated voltage	AC 220V/50HZ		
Power	3.1 KW	4 KW	5.5 KW
Working condition	Temperature 0°C-40°C , Humidity20%-80%RH		

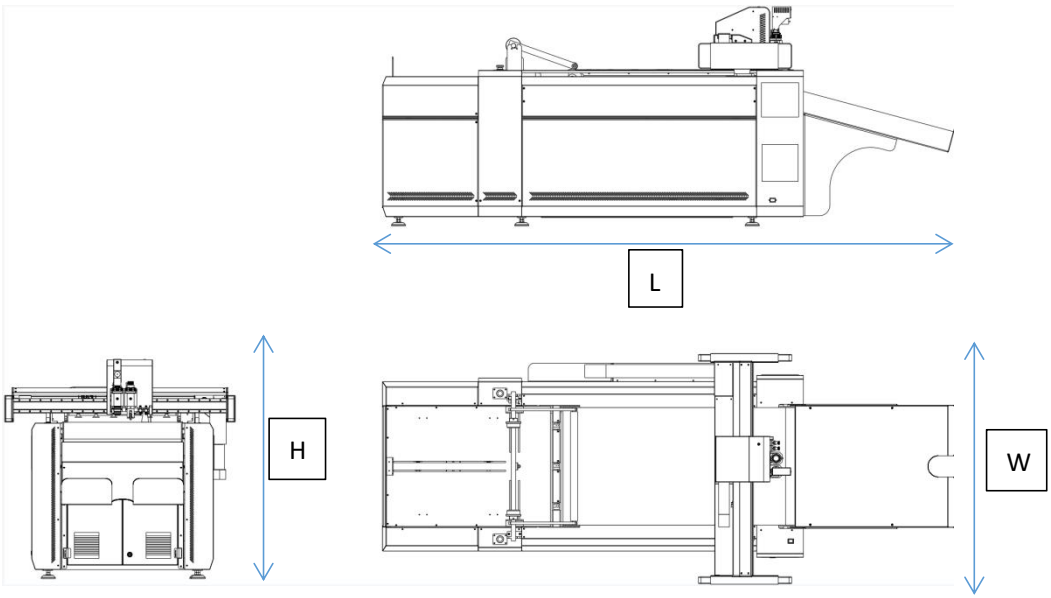
The following aspects are defined uniformly and used to communicate with technical personnel and after-sales support engineers.

2. Machine Installation

2.1. Preparation before installation

Customer installation site requirements, environmental requirements

Model	SF-4060	SF-6090	SF-1310
Required area(L*W*H)	2500*1400*1400	3200*1600*1500	4000*2500*1600
Indoor installation environment	Temperature 0°C-40°C , Humidity 20%-80%RH		
Power	AC 220V 50Hz, 16A		



2.1.1. Other preparations

PC: CPU:lntell5, with USB / PCIE slot / Ethernet

2.1.2 Engineers requirements

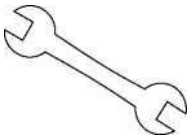
The installer must be guided by SF engineers

The installer is required to wear work gloves.

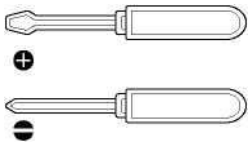
The installer must be familiar with the machine installation precautions, and have read and understood the installation instructions.

2.2. List of installation tools

Allen key
(provide)

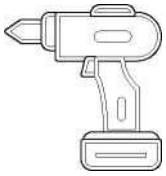


Wrench
(provide)

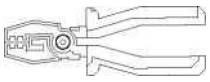


Screwdriver（cross, flat)
(provide)

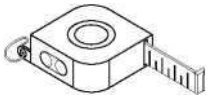
Laser Level



Electric drill



Pliers



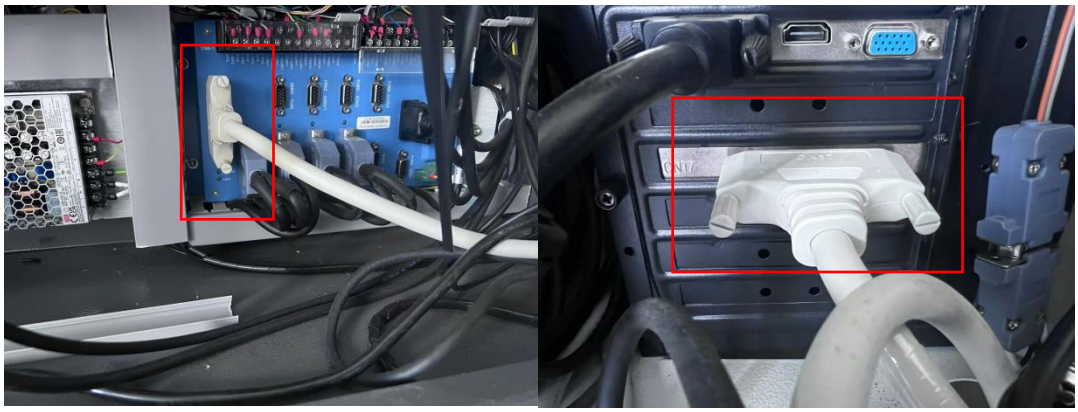
Roll ruler

2.3. Connection for machine

2.3.1. First connect the power cable to the power input socket of the machine, and then connect the power plug to the power supply socket.

2.3.2. Connection of communication board and cable

First install communication board inside computer, then connect communication cable.

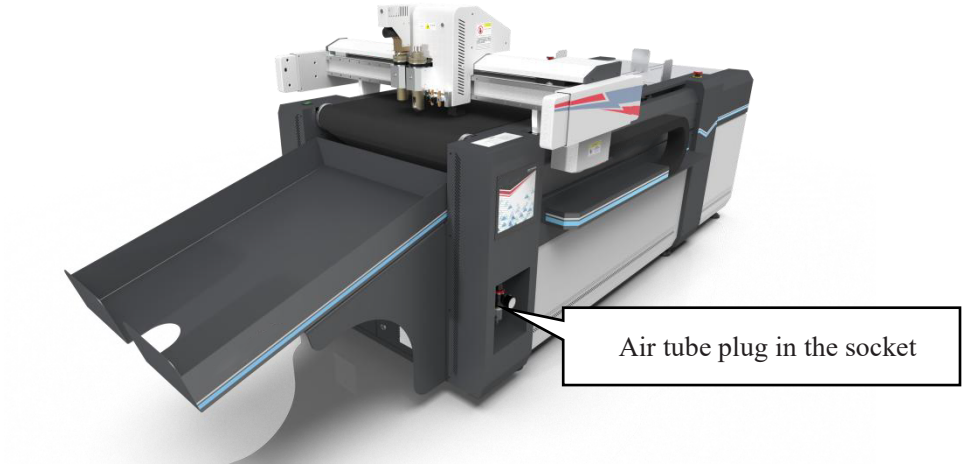


2.3.3. Connection of camera

Connect the power cable to the computer. (SF-4060 camera use USB slot, doesn’t use Ethernet)

2.3.4. Installation of air compressor

First connect the power to the air compressor, then connect air tube to the air tank, air tank connect to machine.



2.4. Software installation

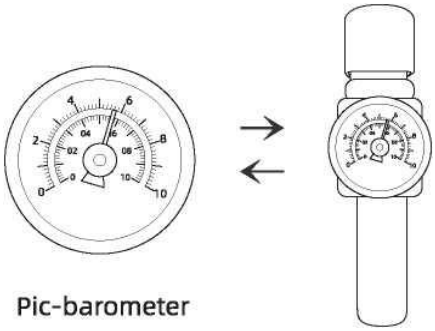
SF Cutting Studio software no installation required, just copy the software from the USB drive to the computer to use it.
(If a computer is included in the order, the software will be built-in to the computer
Install driver
First unzip the driver file, then open the computer device manager, install the driver.

GtPcie20190817.rar

Plug the dongle into the USB port of the computer. If there is no dongle, the following prompt will appear when the software starts.

2.5. Check before starting

2.5.1. Air pressure confirmation



Check the total barometer, the barometric pressure requirement is 0.7MPa

2.5.2. Power supply voltage confirmation

Use a multimeter to check whether the power supply voltage is 220V

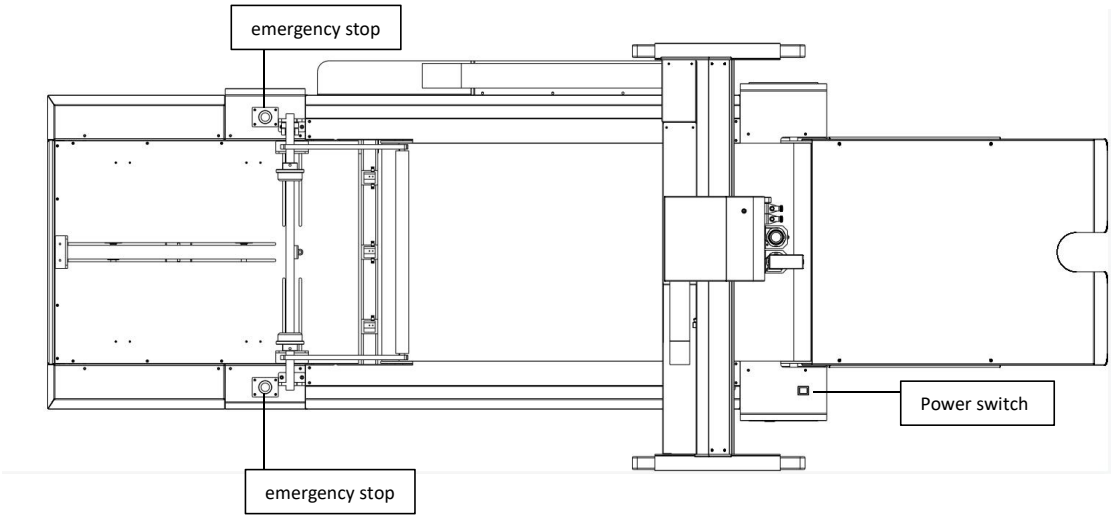
2.5.3. Hardware check

Manually push the beam and machine head to confirm whether there is abnormal noise.

2.6. Boot

Boot process and machine reset status:

Press the power switch and the indicator light is on to indicate that it is powered on. Open the software,click the reboot mechanical initialization icon,  the machine head and Loading table will reset. After the reset, the device is in the standby state.



2.7. Check after boot

2.7.1. camera communication detection

Click the icon to open the setting interface of camera positioning point.

2.7.2. Machine accuracy detection

2.7.2.1. Cutting size accuracy test

Cut a 300mm*300mm square on the test paper, measure the Length and width of the cut square, the error between the actual Length and the theoretical value on both sides of the machine X.

2.7.2.2. Vertical test

SF-4060 model requires cutting 380mm*580mnn rectangle; SF-6090 model requires 700mm*590mm rectangle cutting. Finally, measure the length of the diagonal of the cut rectangle, and the error between the actual length of the diagonal and the theoretical value is 0.2mm.

3. Installation of tools

The tools of SF-4060/6090 digital cutting machine mainly includes: electric oscillating knife, drag tool, creasing tool and kiss-cut tool.

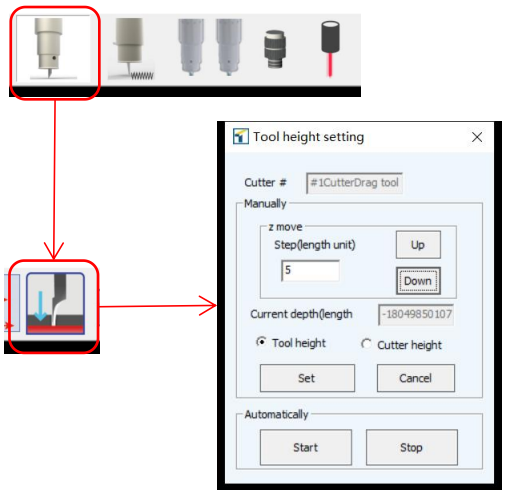
Universal Cutting Tool

Electric Oscillating Tool (EOT)

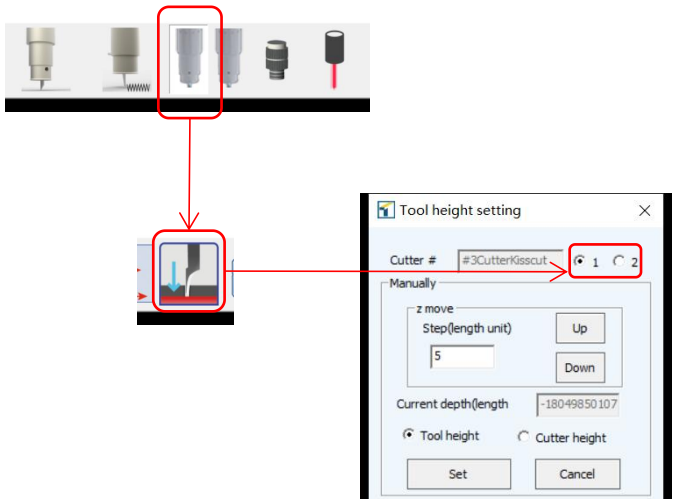
The steps of Cutting Depth Adjustion (Tool calibration of SF-4060/6090 cutter)

After install tool on the machine, please adjust cutting depth before cutting as following:

(1) Select the tool button above the software
(2) Enter the step distance of the drop. When the blade is not far from the felt, reduce the step (unit: mm)
(3) Click on the “down” to lower the head. Click once and drop once.
(4) When the blade reaches the surface of the felt, click “set”.

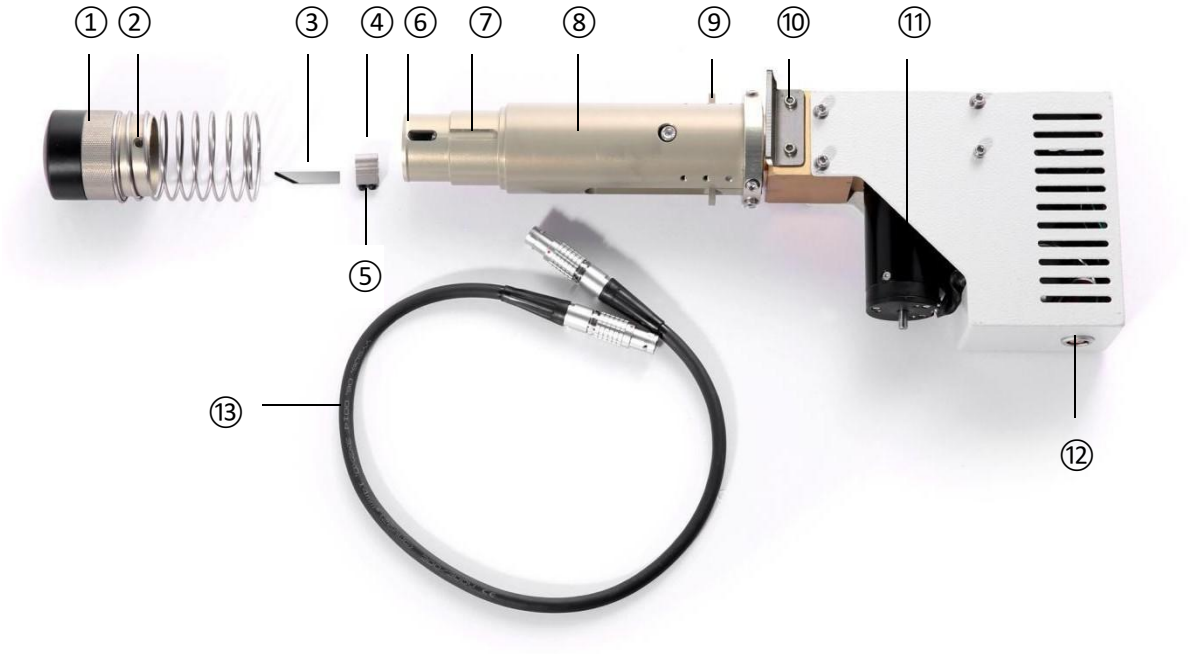


Passive need require clicking on “1” or “2” to switch and activate cylinders on different holders



3.1. Installation of Electric Oscillating Tool

3.1.1. Tool decomposition



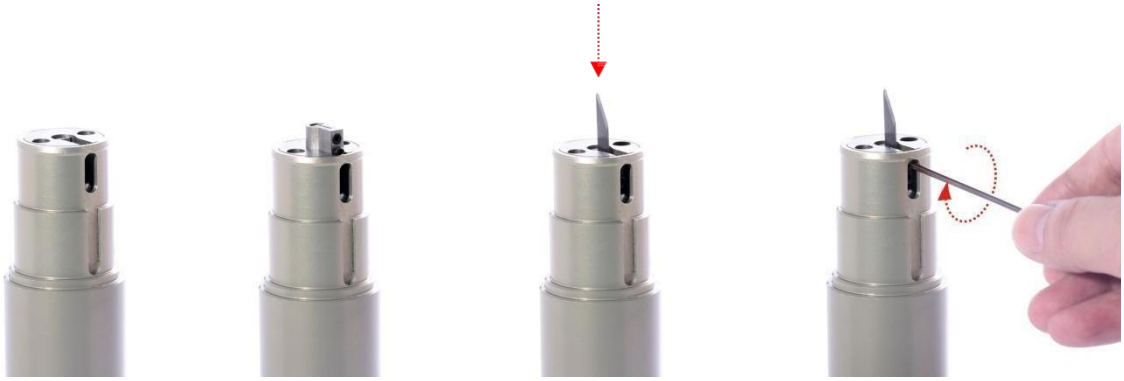
Label name:

(1) Protection cover of tool

(2) Positioning dowel of tool cover

(3) Blade
(4) Top wire for firming tool holder
(5) Stopper of tool cover
(6) Groove of tool cover for positioning and guiding
(7) Tool hilt
(8) Positioning block
(9) Rotating stopper
(10) Ultra-frequency motor
(11) Power input port 13 Power wire

3.1.2. Installation of blades



1. Loosen firm top wire, take out tool and tool holder.

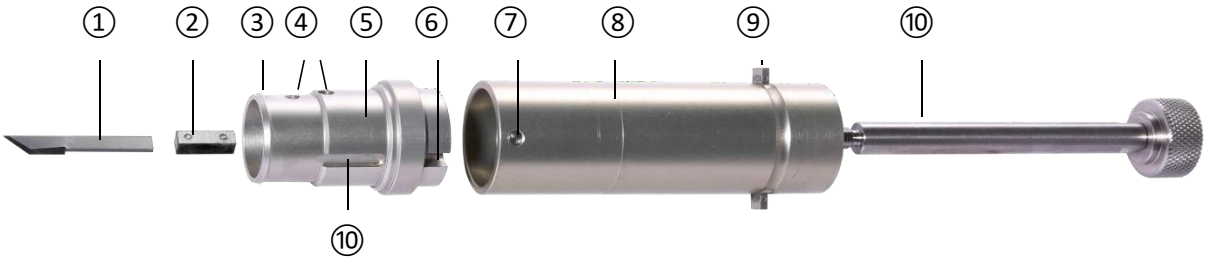
2. Put tool holder

3. Put the blade and make its tip in the centre of tool Rotation

4. Tighten the top wire of tool holder, screw it on clockwise from up and down.

3.2. Installation of Universal Cutting Tool

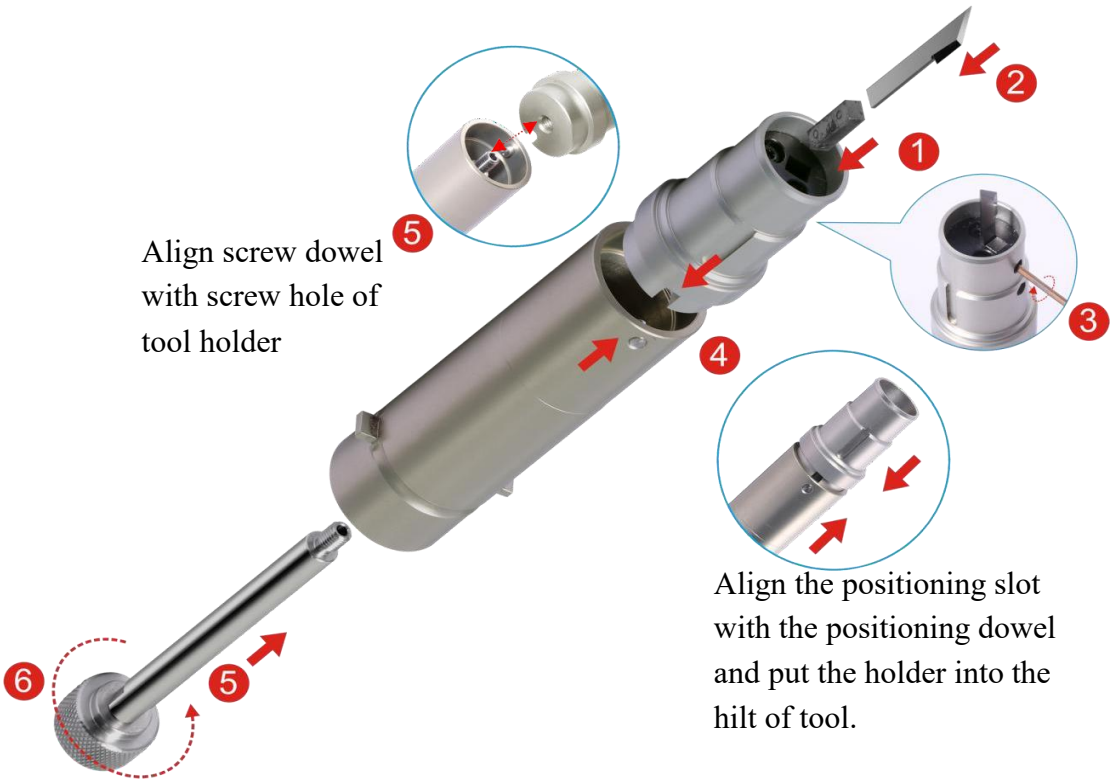
3.2.1. Decomposition of Universal Cutting Tool



Label name:

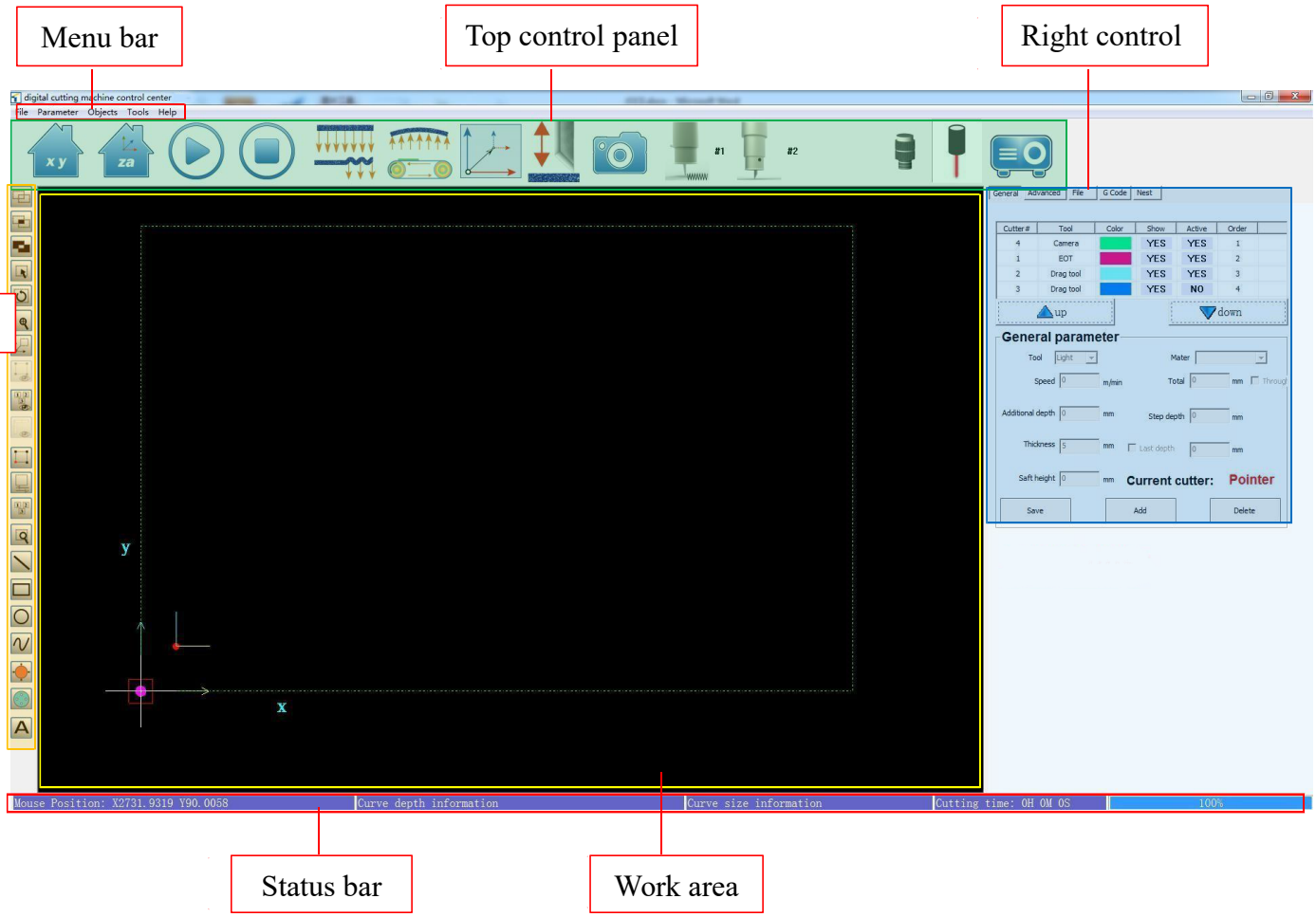
(1) Blade
(2) Tool dowel
(3) Stopper of tool shell
(4) Top pressing wire of blade
(5) Positioning and guiding slot
(6) non-oscillating tool holder
(7) Positioning notch
(8) Positioning dowel
(9) Universal tool hilt
(10) Positioning block on hilt
(11) Pulling stick of tool holder

3.2.2. Installation of Universal Cutting Tool



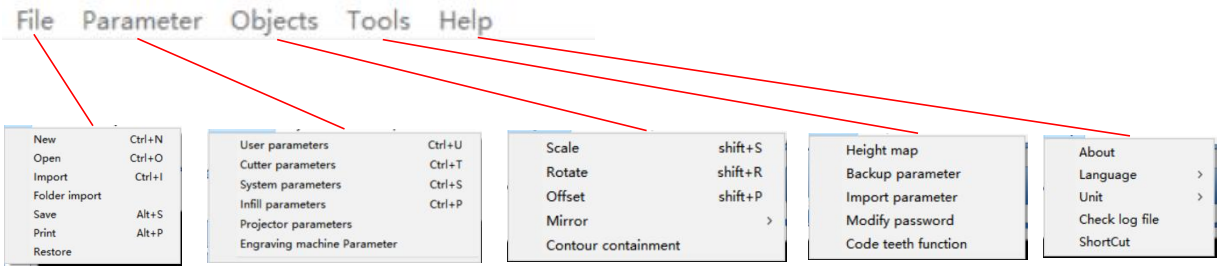
4. Software description

SF Cutting Studio system interface consists of menu bar, top control panel, left toolbar, right control panel, bottom status bar and work area.



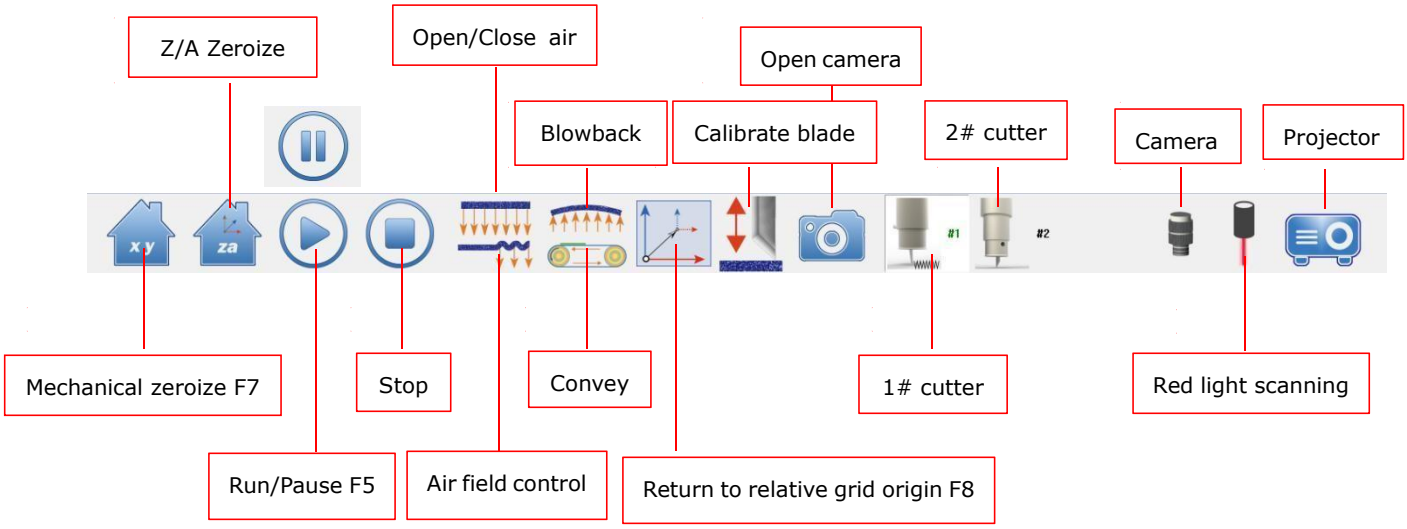
4.1. Menu bar

Menu bar is divided into five options by function: File, Parameter, Objects, Tools and Help. These options include all the functions of system.



4.2. Top control panel

Top control panel has functions of controlling the equipment directly, whose functions include zeroing operation, start cutting, pause cutting, stop cutting, control of vacuum pump adsorption area and tool configuration. It uses simple and vivid icon buttons to facilitate operation of the equipment for users.



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Function description of every top control panel icon.

Icon	Icon name	Function description
	Mechanical initialization icon	Click the icon to initialize the equipment after starting the device or restart the software. (If the device is restarted with the software not turned off, you need to click icon in the software and then zeroize it.)
	Z/A axis zeroing icon	Zeroize Z-axis and A-axis of the currently selected cutter.
	Icon of starting processing	Click "Start" and the button icon turns a "Pause" button and then click it to pause processing.
	Icon of pausing processing	Click "Pause" and the button icon turns a "Start" button and then click it to continue processing.
	Stop/Reset icon	Click the icon so that the device will stop processing or prompt whether there is a need to be completely reset.
	Air pump icon	Click the icon alternately to start or turn off the vacuum pump.
	Icon of air field control	Click the icon to access to the partition setting panel of the vacuum adsorption work platform.
	Blowback icon	Click the icon to start blowback felt function, eliminate negative pressure of aluminum platform and felt so as to remove work pieces easily.
	Conveying icon	Click the icon and then belt will convey work pieces or materials to be cut.
	Icon of return to relative grid origin	Click the icon to remove red light tool to the position of relative grid origin.
	Icon of calibrating blade	Click the icon to access to the interface of blade calibration.
	Camera icon	Click the icon to open the setting interface of camera positioning point.
	1# cutter icon	Click the icon to set 1# cutter and cutter parameters.
	2# cutter icon	Click the icon to set 2# cutter and cutter parameters.

	Camera icon	Click the icon to access to the setting interface of top camera.
	Red light icon	Click the icon when red light is moved to cutting position. It can do regional red light scanning and positioning for graphics to be cut.
	Projector icon	Click the icon alternately to turn on/turn off projector.

4.3. Function description of toolbar icon

The toolbar consists of graphic editing, graphics plotting, operating tools, etc., mainly including functions of grouping, moving, rotating, zooming, editing processing order, plotting simple graphics and so on.

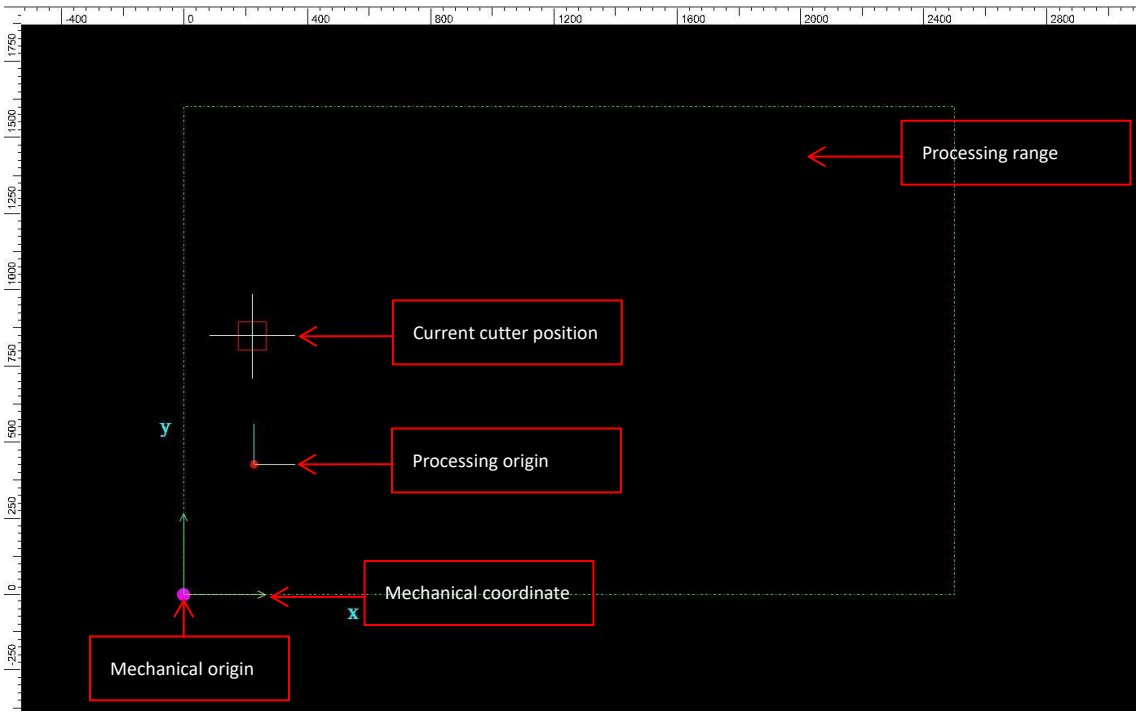
Icon	Icon description	Icon	Icon description
	All graphics selection		Change cutting direction
	Group graphics		Edit cutting order
	Ungroup graphics		Scale to the specified area
	Move		Draw straight line
	Rotate		Draw rectangle
	Zoom in or zoom out/ Scale		Draw ellipse
	Move to processing origin		Simplify curve
	Display cutting point		Cruise edge surveying and mapping of regular workplace
	Display cutting order		Quick plotting module of gaskets
	Display scaleplate		Text input
	Edit cutting point		

4.4. Status bar

Status bar below software provides users with real-time information and real-time prompts during running of the equipment. It includes current mouse position coordinate, curve depth, curve size, cutting time and cutting progress and other information

Includes current mouse position coordinate, curve depth, curve size, cutting time and cutting progress and other information.

4.5. Work area

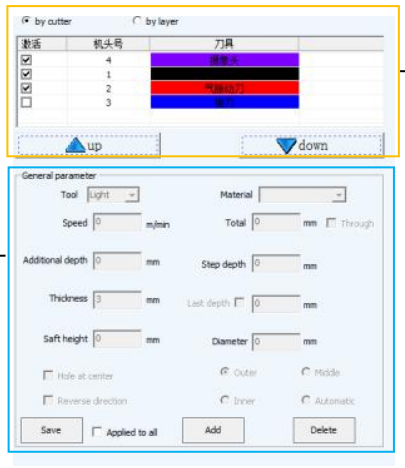


4.6. Right control panel

Right control panel includes: basic settings, advanced functions, file management, G code, nest and other floating setting panels.

4.6.1. Setting panel of basic parameters

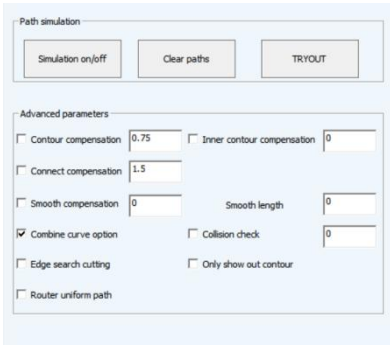
General parameter is a window for setting parameters of materials to be cut, which includes contents of Tool, Speed, Thickness, Additional depth, Safe height, Step depth and so on. Users can name and save these parameters so that it will be convenient to use and modify them quickly when cutting the same material.



Display the cutter and graphic color corresponding to cutter number. Whether to display graphic color, cutter activation, cutting order, etc or not is as users set.

4.6.2. Setting panel of advanced functions.

Advanced functions include Path simulation, Visio cutting, Repeat cutting, Page setting and Advanced parameters setting.



Display cutting path in work area.

Use top camera to do positioning cutting.

Set cutting times and spacing time.

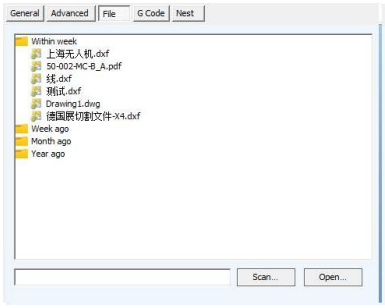
Set page cutting for long width workpiece beyond the length of the worktable.

Define cutting method.

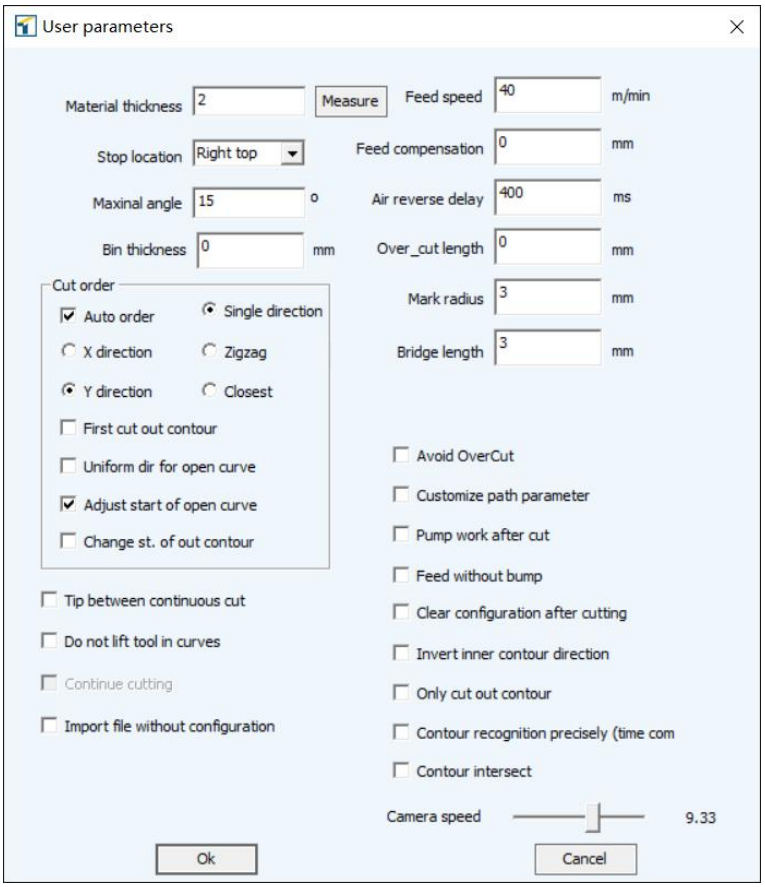
4.6.3. Function panel of file management.

With file management function, it can automatically save processed files of users to system specified folder and sort them by time, which greatly saves time of searching files a lot.

Having configured with the code scanning function, users can use code scanning gun to get files by scanning the barcode on the retained workpiece quickly.



4.7. Description of each parameter and function option in User Parameters panel

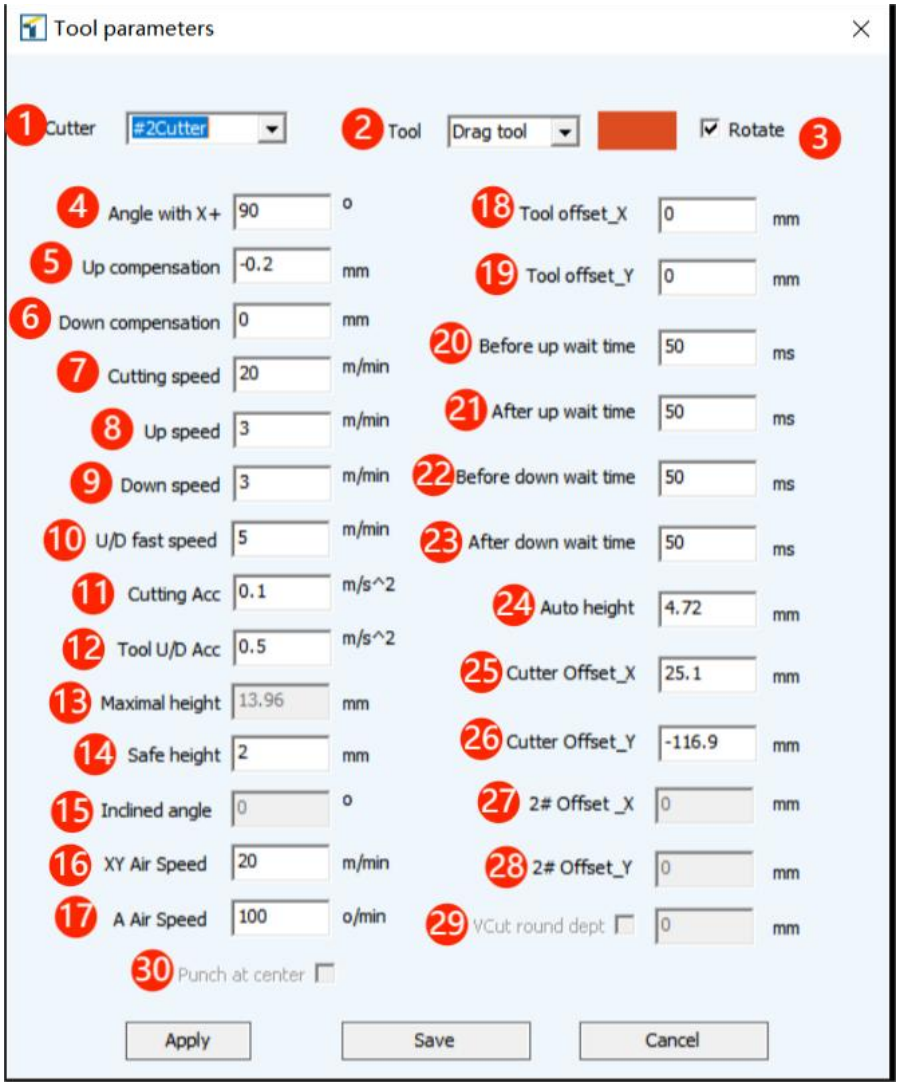


No.	Parameter name	Description	No.	Function option	Description
1	Material thickness	Thickness of current material to be cut	12	Auto order	With this function started, graphics to be cut will be Sequenced automatically by software and manually defining cutting order and cutting direction will fail.
2	Measure	Measure material thickness with smart sensor (Need moving red light to material edge)	13	Adjust start of open curve	
3	Stop location	Location selection to stop cutter after cutting graphics	14	Avoid over-cut	Open function of avoiding Ov er-cut or not

4	Maximal angle	Angle maximum to lift blade or not during cutting graphics	15	Tool follow between curves	With this function started, tool will rotate to the same cutting angle after finishing one graphic so as to improve cutting efficiency.
5	Bin thickness	Bin thickness placed under material to be cut	16	Tip between continuous cut	Need tip between continuous cut or not
6	Feed speed	Speed of feeding material	17	Wait after lifting blade	
7	Feed compensation	Due to slipping in the feeding process, feeding length maybe influenced. The parameter which needs to be tested is to modify the feeding distance.	18	Invert inner contour direction	Cutting direction of inner and outer contour is opposite by default. Inverting inner contour direction will be allowed with this option.
8	Over-cut length	The length value used after the prevent Over-cut function is turned on, is related to the shape of tool used and thickness of material.	19	Customize path parameter	Universal tool except milling tool does not support layered cutting by default. All tools will support layered cutting with this option.
9	Mark radius	Radius of mark point	20	Pump work after cut	Air pump function will close automatically by software default after finishing cutting. If the option is selected, it will not be closed after cutting so as to prevent moving of material to be cut.
10	Contour compensation	Bleeding value of print contour when cutting by mark point positioning.	21	Clear configuration after cutting	Cutter configuration information of graphics will not be cleared after cutting by fault. With the option on, cutter configuration information of graphics will be cleared automatically.

11	Edge detection velocity	Detect edge velocity by red light sensor.	22	Camera speed	

4.8. Interface of tool parameters

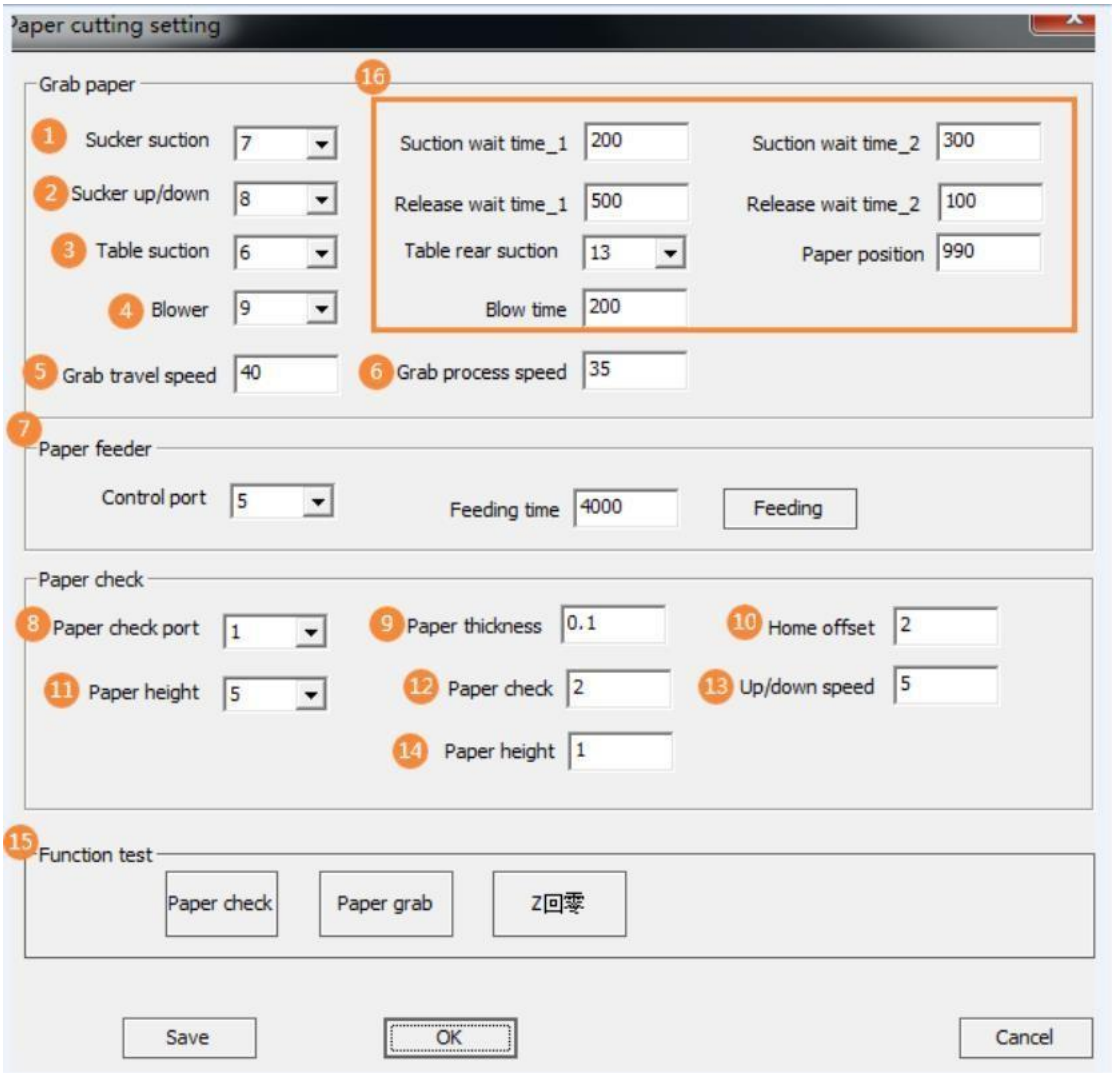


Each parameter description in tool parameter panel

No	Parameter name	Description
1	Cutter	Current configured cutter (can be selected)
2	Tool	Current corresponding tool (can be configured)
3	Rotate	Current tool with or without rotation function
4	Angle with X+	Angle with current blade and positive direction of X axis.
5	Up compensation	Position compensation before tool lifted up during cutting. The positive is to extend and the negative is to shorten.
6	Down compensation	Position compensation before tool lifted down during cutting. The positive is to extend and the negative is to shorten.
7	Cutting speed	Cutting speed of processing
8	Up speed	Speed of lifting up tool
9	Down speed	Speed of lifting down tool
10	U/D fast speed	Free speed of lifting tool up or down
11	Cutting ACC	
12	Tool U/D ACC	
13	Maximal height	Distance between blade tip and bottom (Can not be edited directly)
14	Safe height	Height distance between lifted blade tip and material surface during cutting.
15	Inclined angle	Inclined angle of V-cut tool
16	XY Air speed	Moving speed when not cutting
17	A Air speed	Zeroing speed of A axis
18	Tool offset_X	Relative distance in X direction between blade tip center and tool rotation center at the initial state of A axis.
19	Tool offset_Y	Relative distance in Y direction between blade tip center and tool rotation center at the initial state of A axis.

20	Before up wait time	Wait time before tool lifted up during cutting.
21	After up wait time	Wait time after tool lifted up during cutting.
22	Before down wait time	Wait time before tool lifted down during cutting.
23	After down wait time	Wait time after tool lifted down during cutting.
24	Auto height	Height distance between calibration point of automatic tool calibrator and platform.
25	Cutter Offset_X	Relative distance in X direction between blade tip center and tool rotation center at the initial state of A axis.
26	Cutter Offset_Y	Relative distance between tool centre and Y direction referenced to red light point.
27	Router Offset_X	Relative distance between milling tool centre and X direction referenced to red light point.
28	Router Offset_Y	Relative distance between milling tool centre and Y direction referenced to red light point.
29	V-cut round depth	Round parameter of V-cut tool
30	Round angle	

4.9. paper cutting setting



1 Port No. of sucker suction.

2 Port No. for sucker up or down.

3 Port No. of tabletop suction.

4 Port No. of blowing.

5 Travel speed of grabbing papers from tabletop to Automatic lifting material device.

6 Travel speed of grabbing papers from Automatic lifting material device to tabletop.

7 Feeding speed and feeding time mean the speed and time of conveying the finished products to collection by the felt.

8 Port No. of checking paper presence

9 It's used for setting paper thickness.

10 and 13. Generally, no need to set the two parameters.

11 Port No. of paper height.

12 Speed of checking paper. Please click the speed of paper reset when there is no signal in "Paper height" port, which corresponds to 11.

14 Generally set 3-6 as parameter. If the figure is too large, the sucker can' t suck papers. On the Contrary, too small figure will make gear rack eliminate the lifting height, which leads to no feeling of Automatic lifting material device rising or falling.

15 The function is unnecessary.

16:
① Open the Sucker suction, close Table suction and move the sucker to the Automatic lifting material device. Suction wait time_1 includes these three steps.
② Open the port "Sucker up/down" to fall the sucker above the paper (material.
③ Close the port "Sucker up/down"to rise the sucker and open the port "Blower". Suction wait time_2 includes these steps.
④ Close the port "Blower". It is "Blow time".
⑤ Convey the paper to the destination and open "Table suction". "Release wait time_1" includes these two steps.
⑥ Close port "Sucker suction".
Open the port "Sucker up/down" to press the paper, then rise again. "Release wait time_2" includes these steps.

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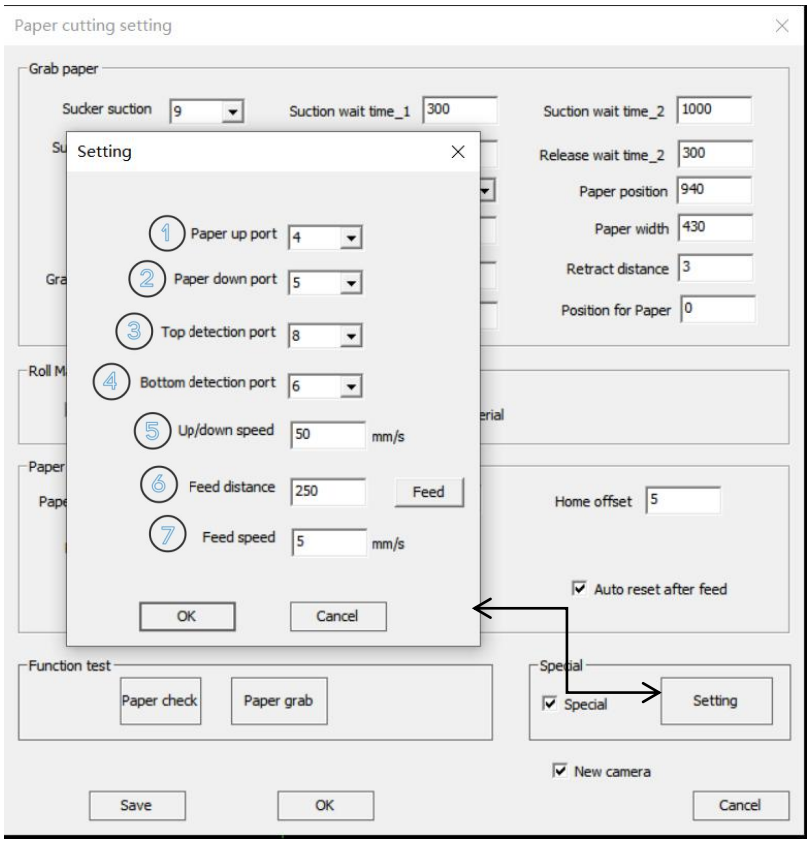
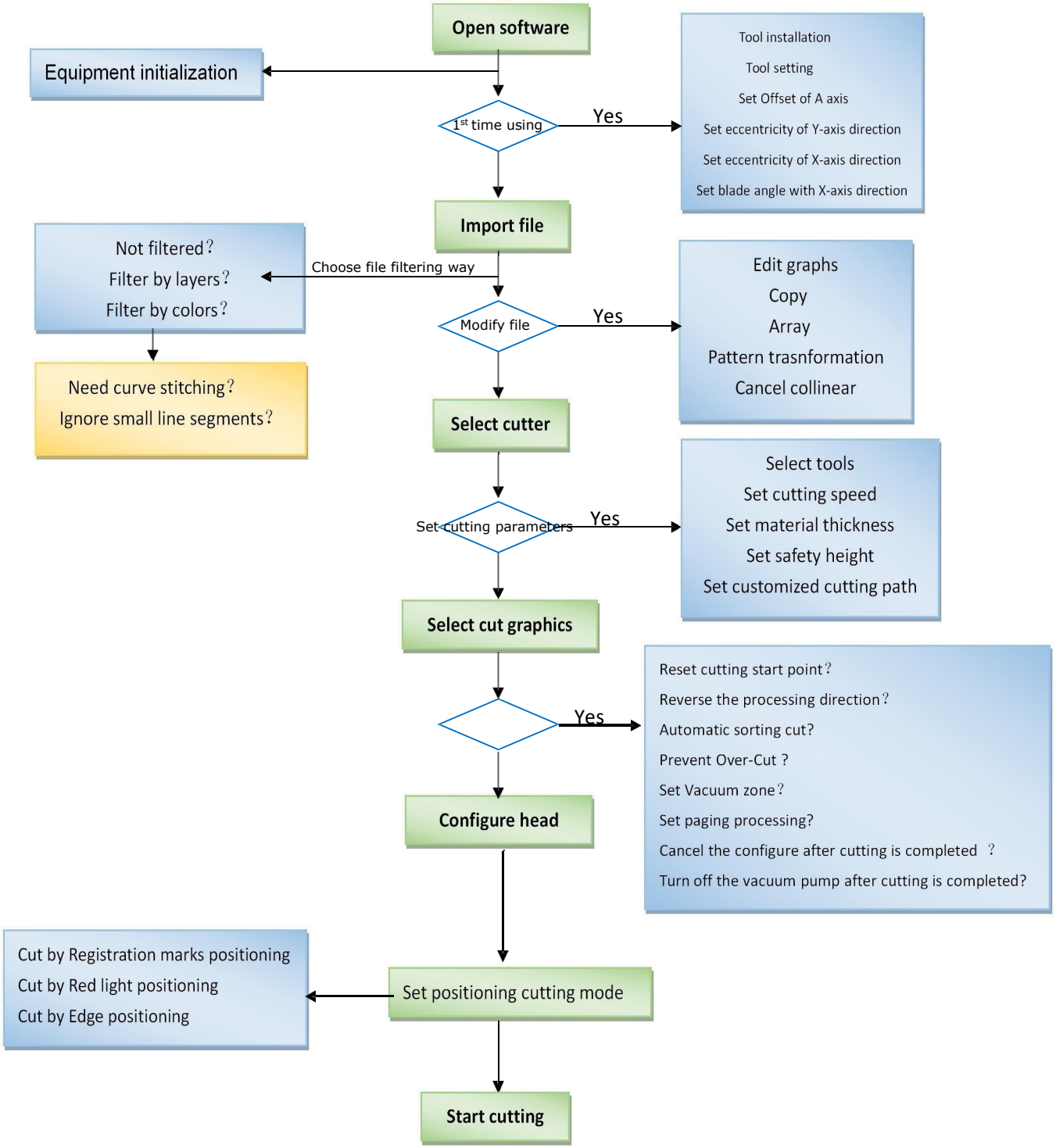


1.Control the upward port of the paper loading table
2.Control the downward port of the paper loading table
3.Control the upper limit port of the paper loading table
4.Control the lower limit port of the paper loading table
5.Control the up and down speed of the paper feeding table
6.Control the receiving distance
7.Control the receiving speed

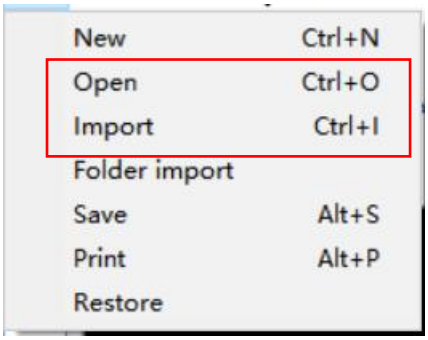
5. Equipment operation flow

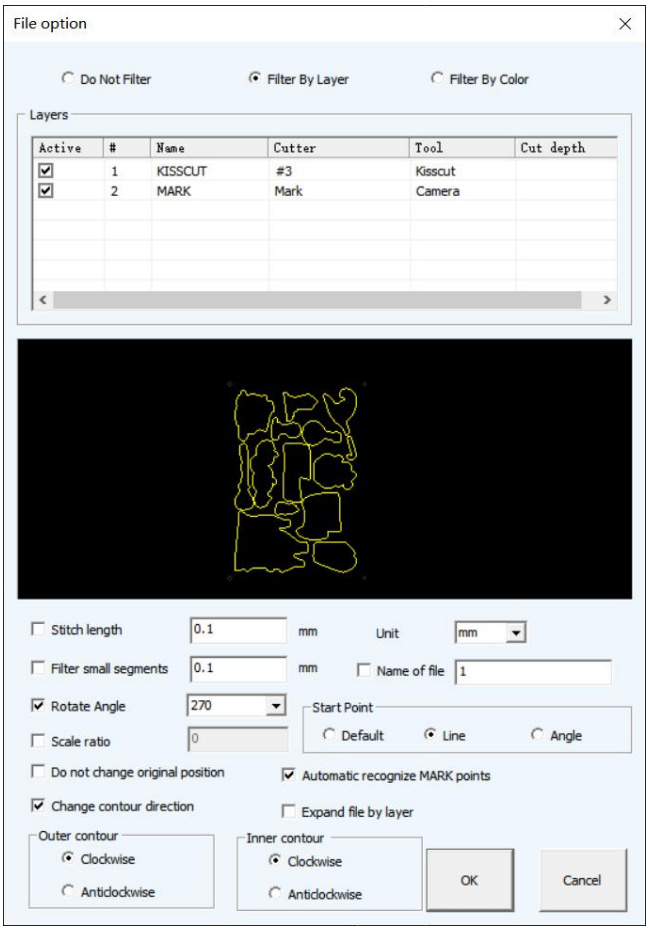


6. STEPS OF OPERATING

6.1.Open file & Import file

SF cutting studio can interpret PLT, DXF, PDF, DWG, TSK, SPL, and so on, HPG, EPS, AI, PS, BMP, TIF, PNG and JPG formats, and designed with three ways to open files (open directly, import, folder import) for the user to choose.



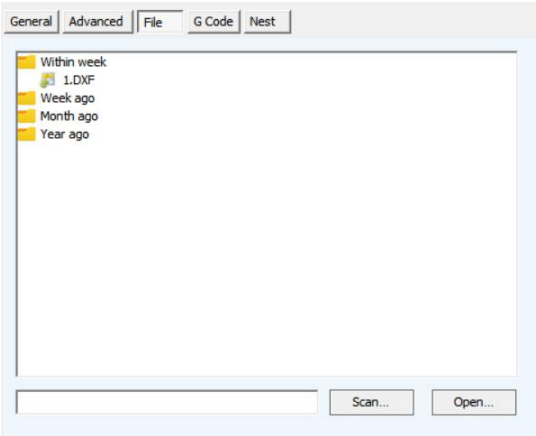


6.2. Match the tool

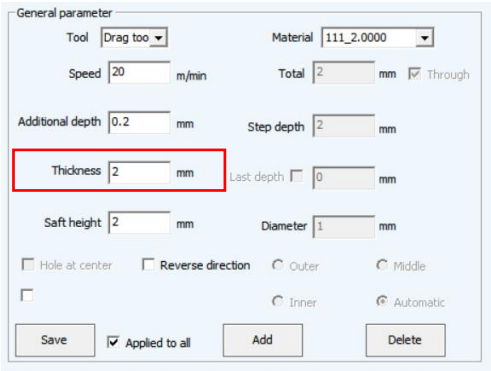
Match the have two ways, by color or by layer name.

6.3. Open file by QR code

If material print with QR code, named the file name as QR code information, put file inside software folder path, in “Machined Files” folder.
Open right panel <File>, click scan, move camera to the QR code, software will identify the QR code and find the file with the same name as the QR code information in the folder



6.4. Material thickness



Material thickness is make sure the blade can lift out material during the rotation.

6.5. Camera cutting process

(1)Import cutting data
Open the file which have mark circle
(2)Match the tool
Set the mark circle in mark tool
(3)Place the cutting material and turn on the air pump to fix it. Manually move the camera to the first positioning point, and click the start icon the SF software interface, the camera interface will automatically open and start to identify the positioning points one by one. After finding the point, the software will adjust the data position and start to cut.

7. Maintenance

Maintenance Item	Method	Period
Graphic blade holder clean	Check and clean debris inside blade holder	Every time before use
Check pressure valve and water Level	Make sure pressure valve in normal condition, open tank to release water	Every day
Water separator	Make sure pressure is in accepted range, and check for water Level	Every day
Felt cleaning	Use air gun or vacuum cleaner	Every day
Lubricating oil in Linear rail guide	Add lubricating oil for X,Y rail guide	Every six months
Lubricating oil in creasing tool axis	Add right amount of Lubricant manually	Every six months
Lubricating oil in oscillating tool axis	Add right amount of Lubricant manually, and inject grease in oil hole with	Every six months

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