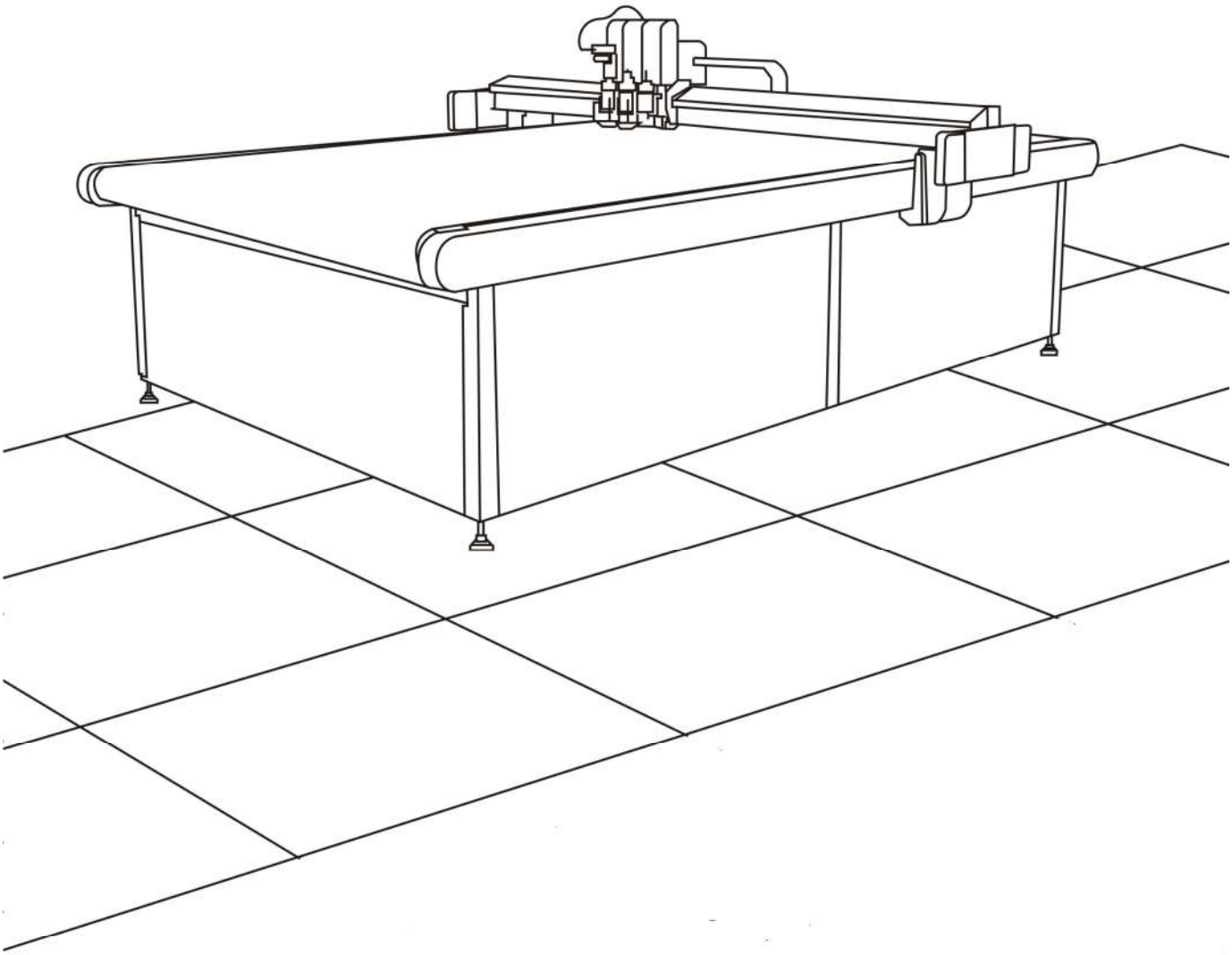
iECHO

User's Manual

BK3 Digital Flatbed Cutter



IECHO Science Technology Co., Ltd.

Directory

1. Instruction

1.1. Features

- Regional vacuum control
- Vortex vacuum control
- Automatic sheet feeding
- Conveyor system
- Camera registration system
- High-speed and high-precision cutting tools
- Collection table for cut out elements picking
- No artificial help needed

1.2. Composition

BK3 series digital cutting machine is composed of Electrical box, Main body, Vacuum and Auxiliary devices. Software includes file processing part and machine controlling part.

According to user's demand, one or more tools can be used: Tangent Tool, Oscillating Tool, Kiss-Cut Tool, Router, V-Cut Tool, Creasing Tool, Driven Rotary Tool, North & Drill Tool, Pen.

User can use bar code scanner to scan the bar codes that created by RIP software.

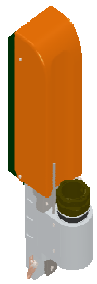
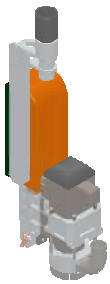
1.3. Working Principles

Import the files by SmartCut/iBrightCut, the user can process the files(editing and nesting) and send the processed cutting files to CutterServer. According to the cutting files, the controlling system will create motion control signals. With the signals, servo motors execute the tools lift/down and modules movement. Thereby, the machine achieves the high-speed and high-precision cutting.

1.4. Technical Parameters

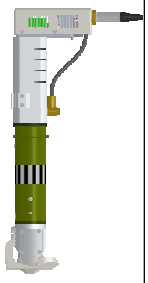
Model	BK3-1713	BK3-2513	BK3-2517	BK3-3017
Cutting Area	1700mm*1300mm	2500mm*1300mm	2500mm*1700mm	3000mm*1700mm
Machine Dimension	2500mm*2120mm	3300mm*2120mm	3300mm*2520mm	3800mm*2520mm
Max Speed	1500mm/s			
Accuracy	0.1mm			
Max Cutting Thickness	50mm			
Modules	1-3			
File formats	DXF, ISO, PLT			
Interface	Serial Port			
Adsorption	Vacuum			
Power	Single-phase 220V / 2kw Three-phase 380V / 5.5kw/7.5kw/9kw			
Power requirement	220V/50HZ, 380V/50HZ（Three-phase five-wire system）			
Air pressure requirement	0.6—0.8MPa，Dry compressed air			
Operating environment	Temperature：0℃-40℃ ； Humidity：20%-80%RH			

1.5. Cutting modules

Picture	Name	Feature	Cutting Material
	Universal Module	All tools can be installed in	Cutting thickness：50mm
	1.5kw Router Module	Power：1.5kw 24000rpm Air cooling cleaning device	Cutting thickness：2mm Di-bond 20mm Acrylic
	1kw Router Module	Power：1kw 60000rpm Air cooling cleaning device	Cutting thickness：2mm Di-bond 20mm Acrylic
	Marking Module	Two pens 3 times/s/pen	Material thickness：50mm
	North & Drill Module	Two heads 3 times/s/head	Material thickness：10mm

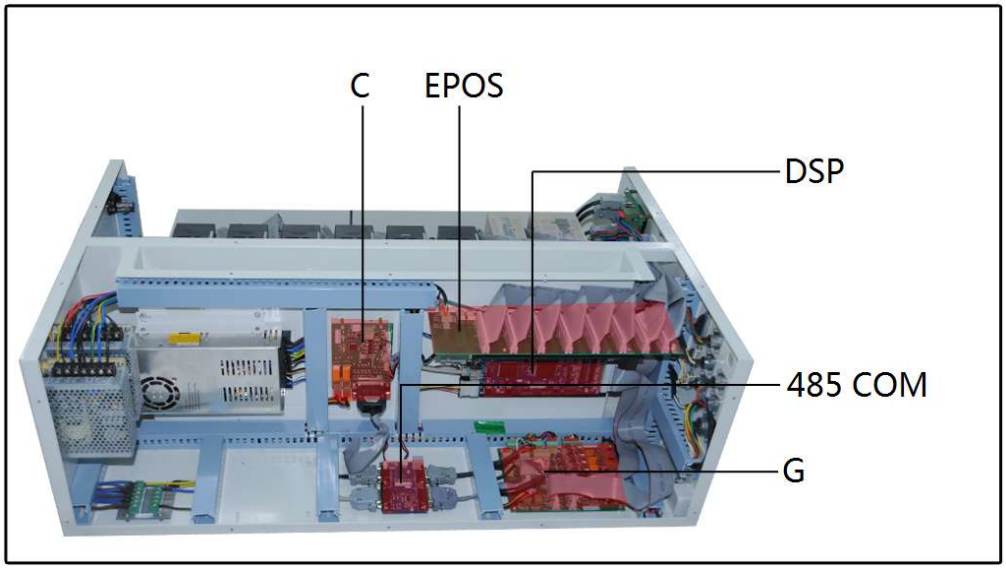
1.6. Tools

Picture	Name	Feature	Materials
	Tangent Tool	Universal Cutting Tool for materials up to 5mm thick. Fast speed and low cost.	Cardboard, Chevron board, ABS board, Gasket, Carbon fiber prepreg, PVC tarpaulin, PE, XPE, Label, etc.
	Electrical Oscillating Tool	High-frequency electric-driven tool with 80W and 250W power options. Max cutting speed 1m/s for soft and medium-density materials.	Chevron board, Corrugated board, Gasket, KT board, Gray cardboard, PE, XPE, EPE, PU leather, PU composite sponge, Coil car mat, etc.
	Pneumatic Oscillating Tool	Powerful air-driven tool with extended stroke for dense materials up to 50mm thick.	Composites, Honeycomb board, Asbestos gasket, Graphite gasket, Sponge, EPE, etc.
	Kiss-Cut Tool	Half-cut tool for vinyl materials.	Vinyl, sticker, reflective film, etc.
	Driven Rotary Tool	Cutting tool with driven rotary blade for fabrics and technical textiles with high processing speed.	Fabrics, carbon fiber, glass fiber, aramid, carpet, etc.

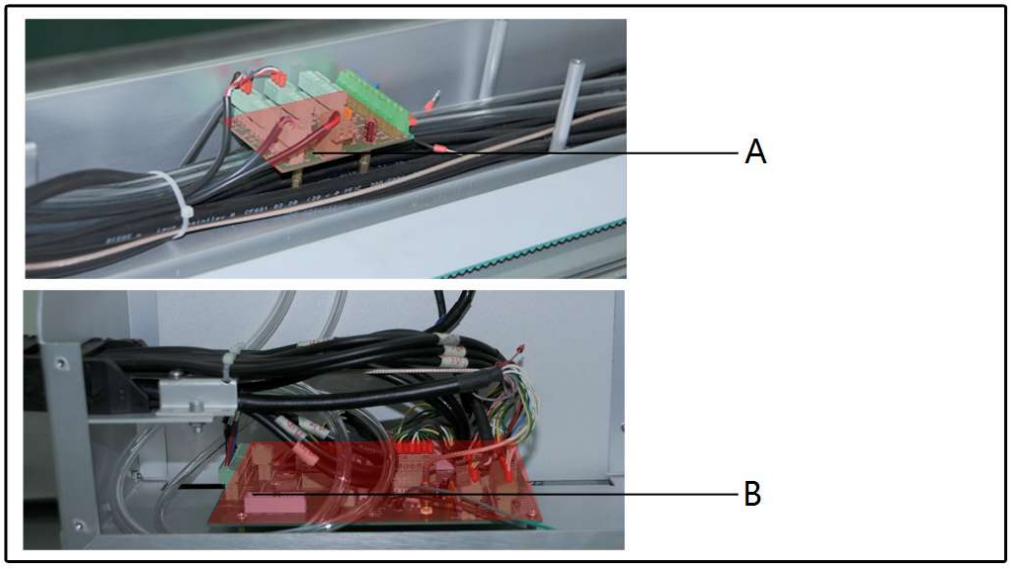
	V-Cut Tool	Tool with 5 cutting angles. Create 3D structural design.	Honeycomb board, sandwich board, KT board, Gray board, etc.
	Powerful Rotary Tool	Powerful tool with driven rotary blade.	Technical textiles, carbon fiber, glass fiber, carpet, fur, etc.
	Creasing Tool	Creasing wheels for carton box making.	Corrugated board, carton board, etc.
	Milling Router	Routing tool with high-performance routing on hard and tough materials up to 16mm thick.	Acrylic, Di-bond, aluminium composite, MDF, etc.

1.7. Circuit boards

- Boards positions in electrical box

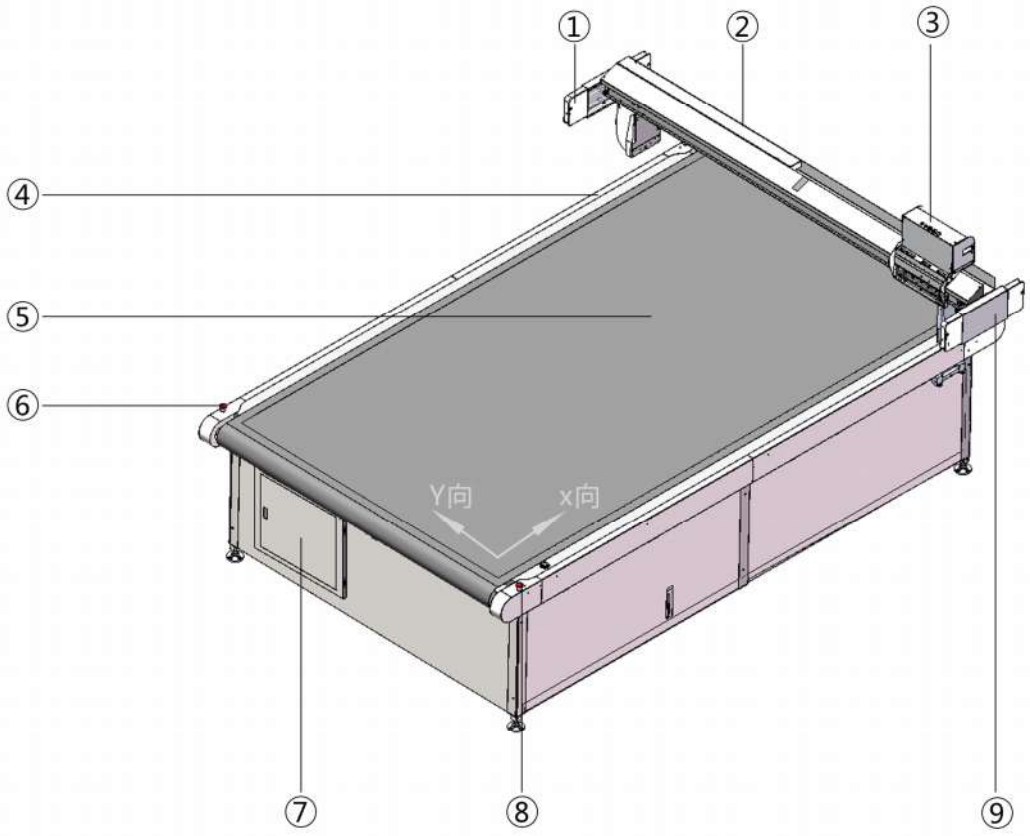


- Boards positions on machine



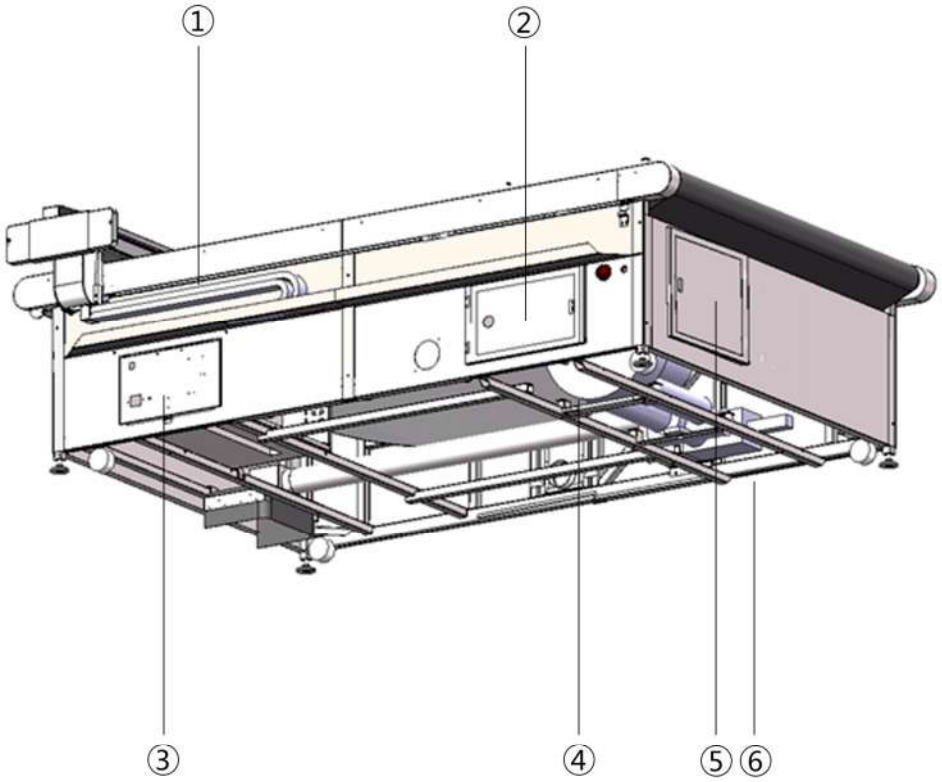
2. Installation

2.1. Base machine installation



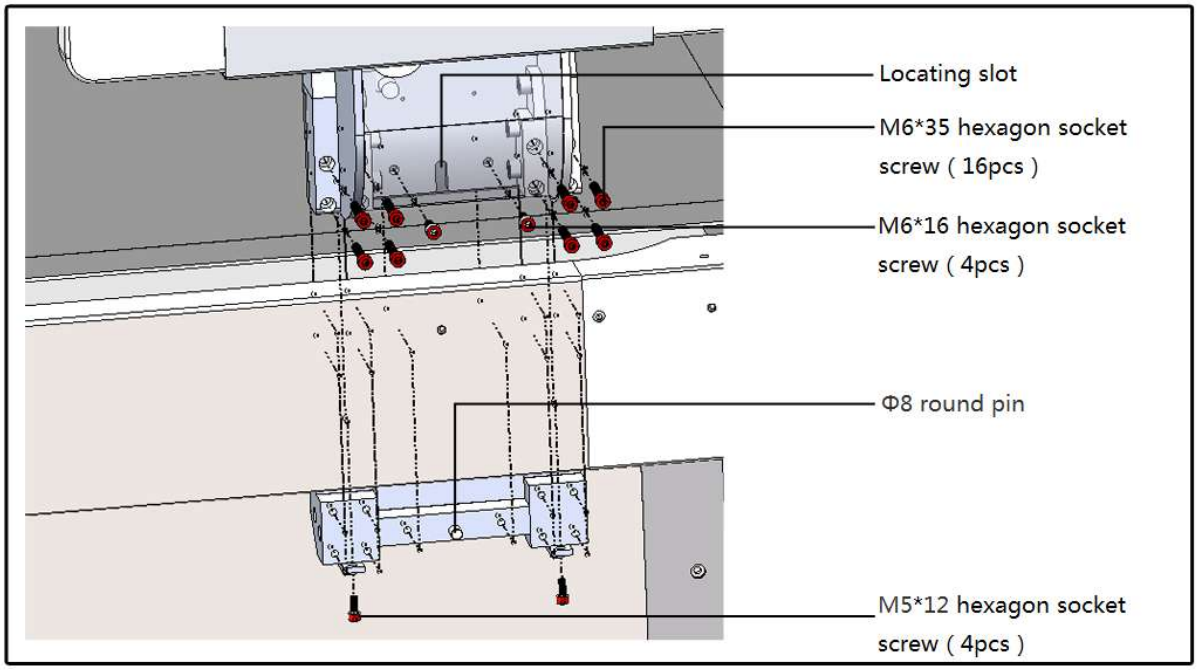
No.	Name	No.	Name
1	Safety Device	2	Beam
3	Carriage	4	Table
5	Felt Mat	6	Pause button
7	Control box of Vacuum	8	Pause button
9	Safety Device		

Picture 1

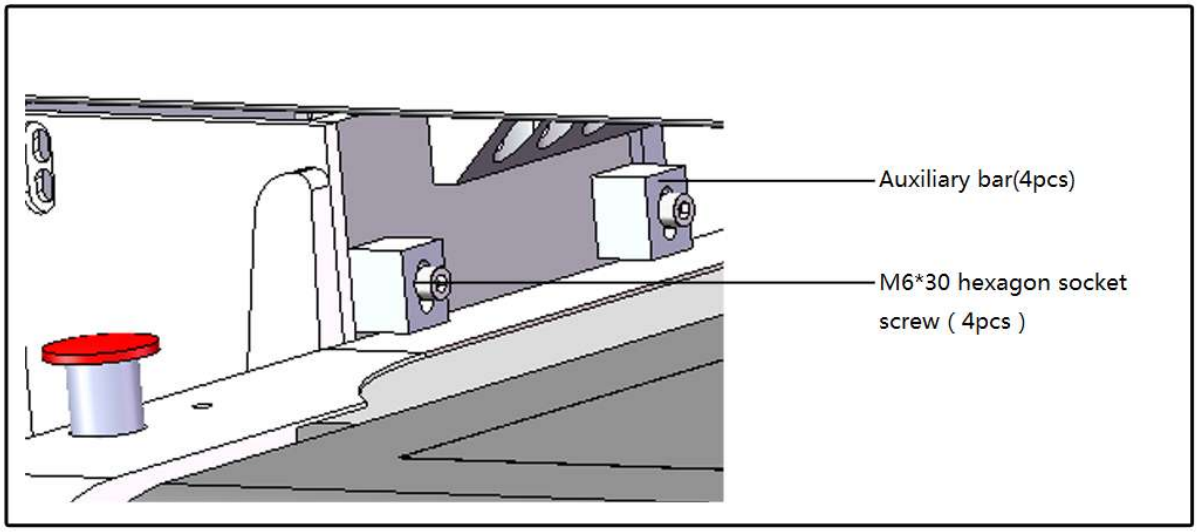


No.	Name	No.	Name
1	X Chain	2	Power supplier box
3	Electrical Box	4	Vacuum pump
5	Control box of Vacuum	6	Valve

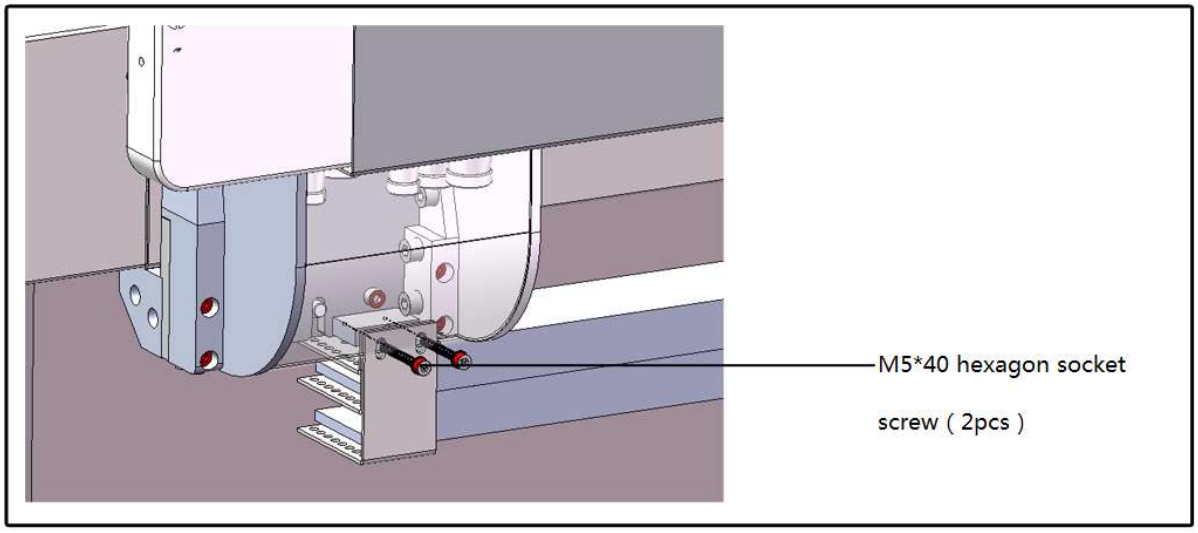
Picture 2



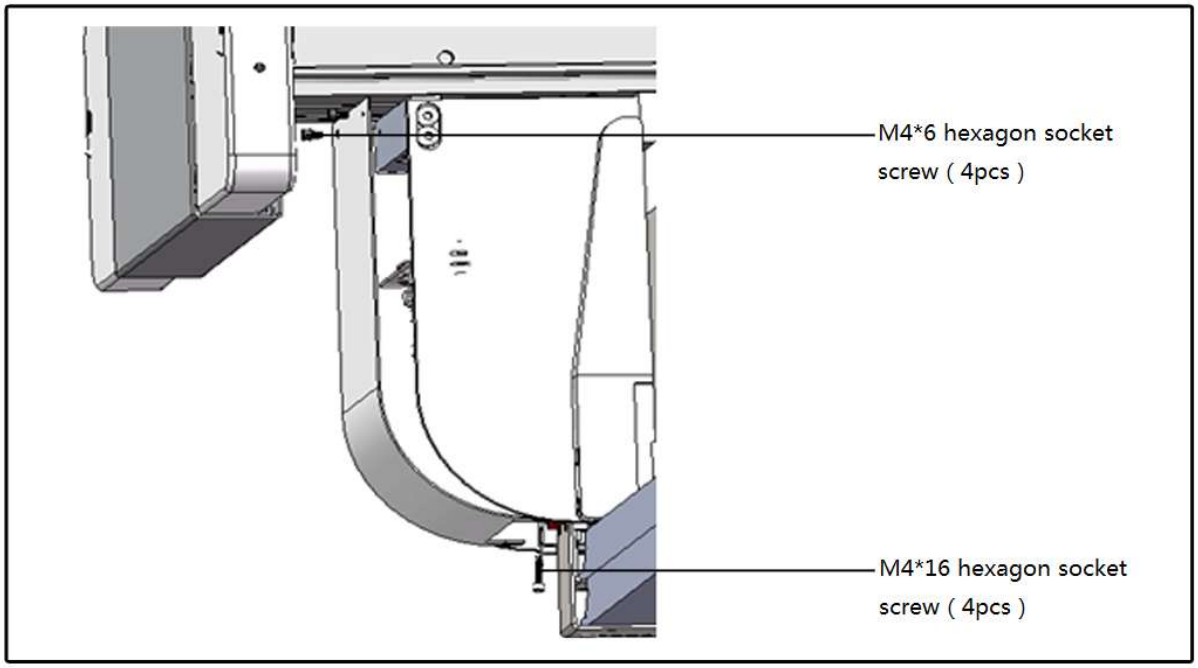
Picture 3



Picture 4



Picture 5



Picture 6

- Put the beam on the table (two ends of the beam correspond the round pins. The side with carriage is the front side of the machine (Picture 1)
- Tighten M6X16（4pcs）（Picture 3）
- Loose M6X30, move the auxiliary bar to upper side, tighten M6X30（Picture 4）

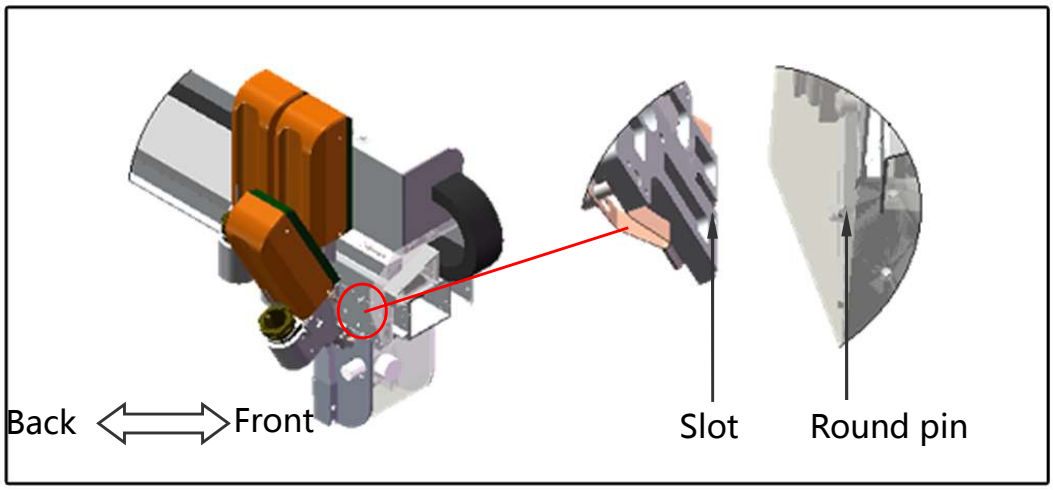
- Tighten M5X12（4pcs）(Picture 3)
- Use Loctite 272 glue on M6X35 and tighten them(16 pcs).
- Install the aviation plugs and tighten M5X40 (2pcs) Picture 5
- Tighten M4X6 and M4X16 to install the side cover. Picture 6

2.2. Power installation

3 phase / 5 wire power supply, use 5-core cable to connect the power.

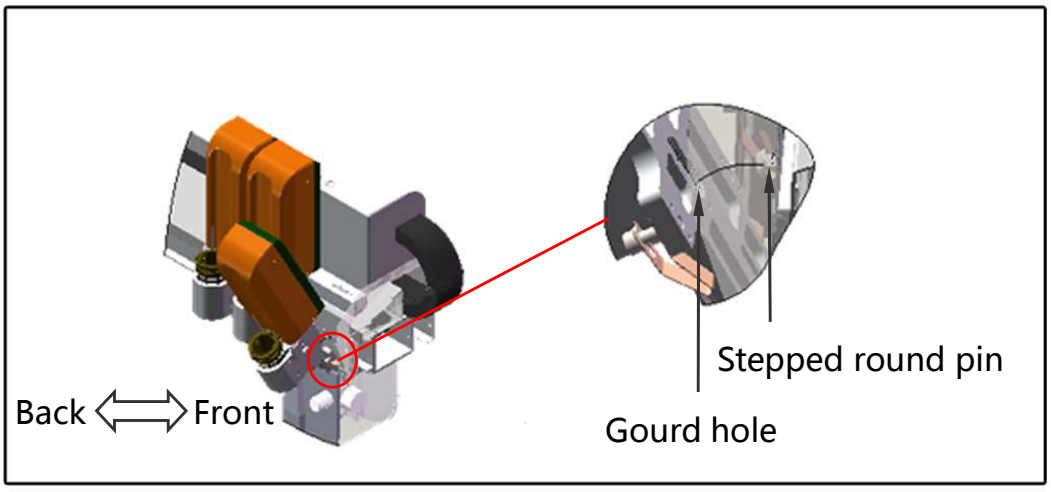
380V\220V Circuit diagram（See P18 in attachment 2）。

2.3. Modules installation



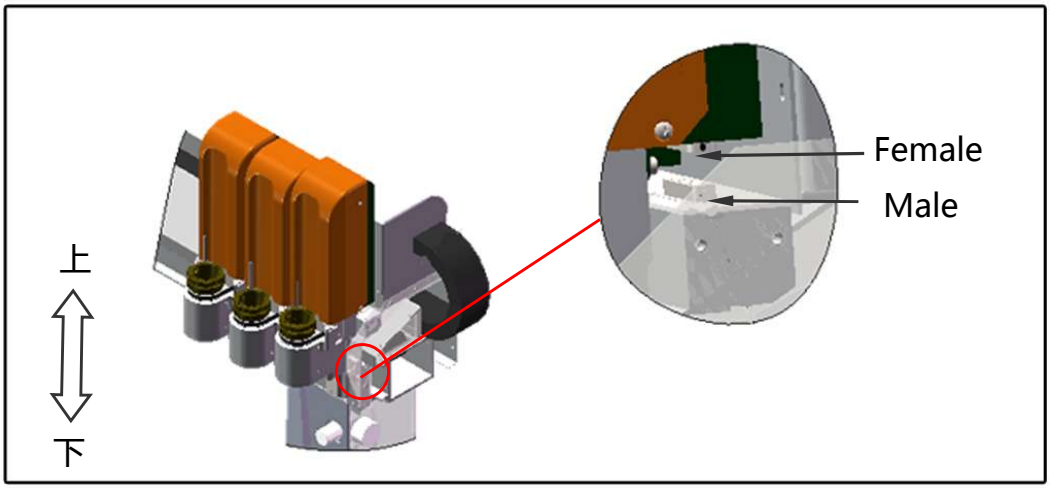
Picture 7

- Install the module in the way shown in Picture 7. Make sure the locating slot matches the round pin



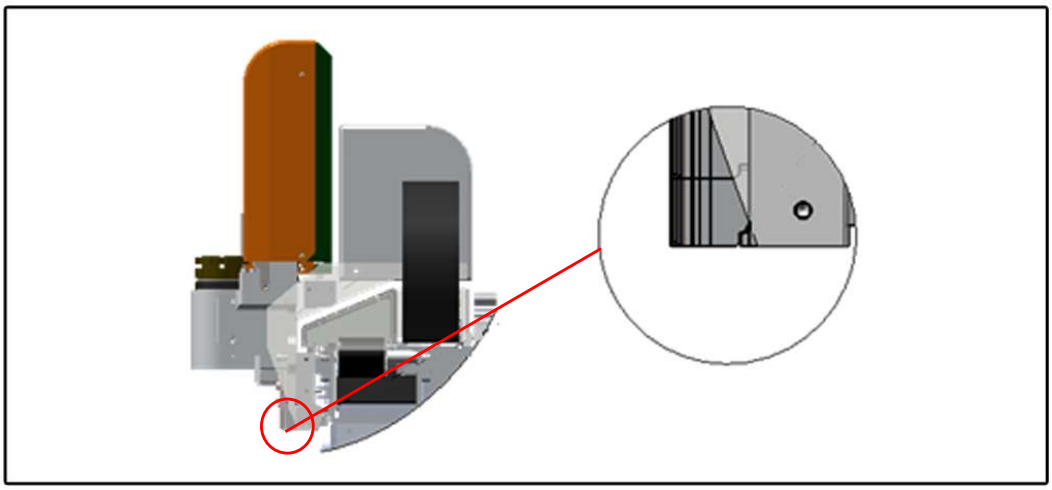
Picture 8

- Take the bottom of the module as shaft, rotate the module upward. Picture 8



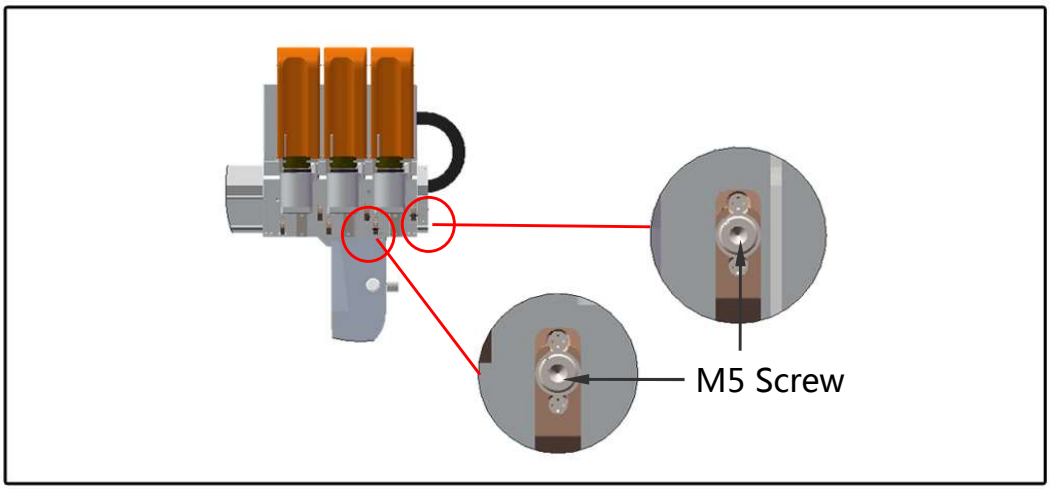
Picture 9

- Tilt the module backwards onto the module carriage, lower the module until it stops (approximately 15mm), make sure the electrical connection of tool holder and support aligned. (Picture 9)



Picture 10

- Important: Position the module on the mounting ledge as shown in picture 10.

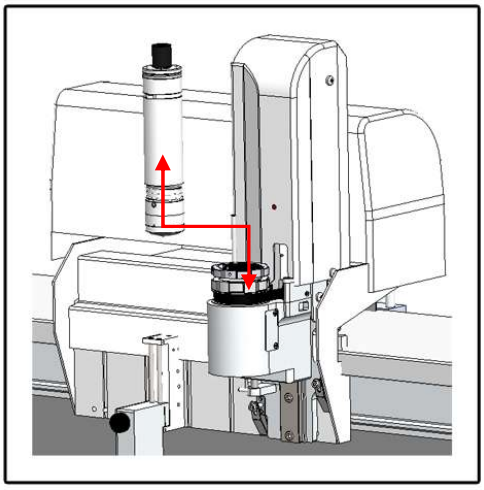


Picture 11

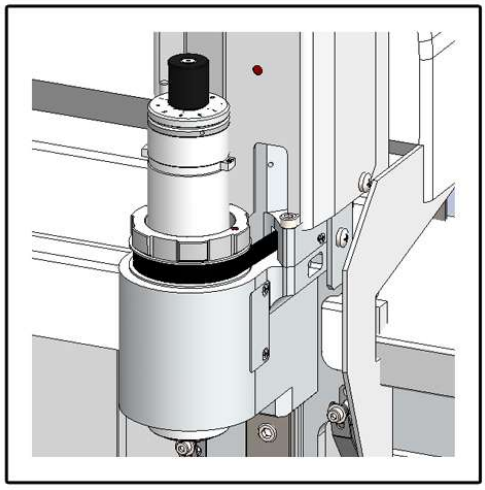
Use the 4 mm Allen key to fix the module in place (Picture 11).

2.4. Tools installation

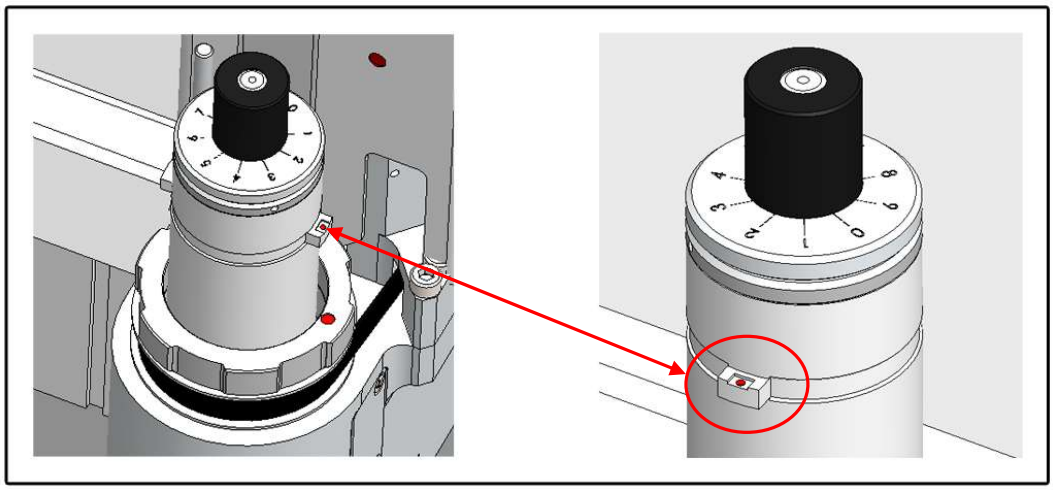
2.4.1. Tangent tool



Picture 12

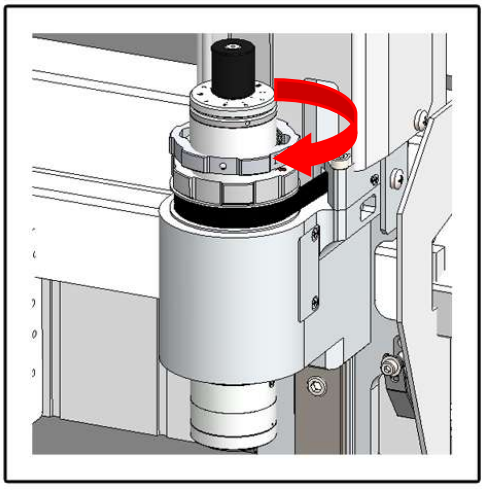


Picture 13



Picture 14

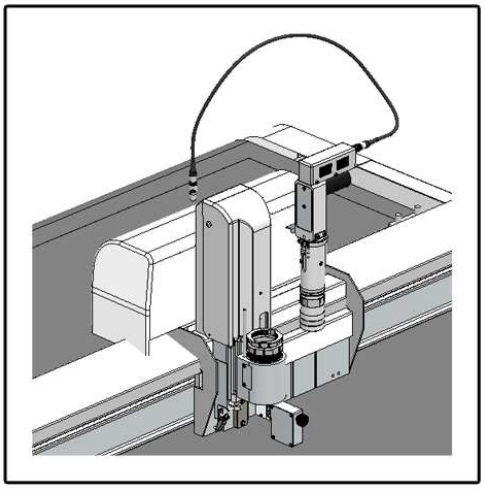
Insert tangent tool(as shown picture12,picture13), The tool holder and a UCT are each marked with a red dot. The tool is in the correct position when the dots are aligned.



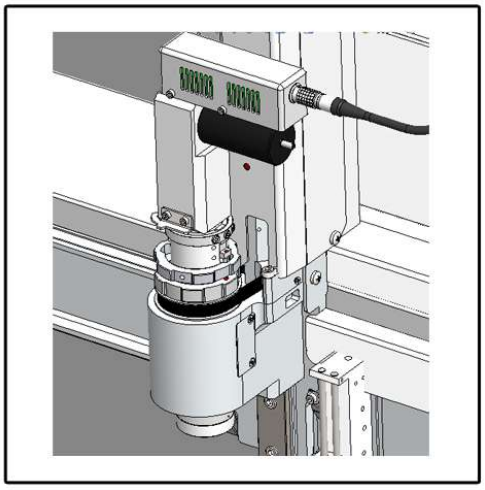
Picture 15

- Fasten in clockwise direction.(Picture 15)

2.4.2. Electrical Oscillating Tool

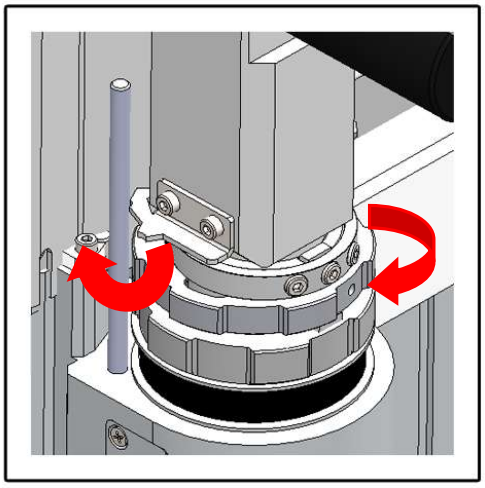


Picture 16



Picture 17

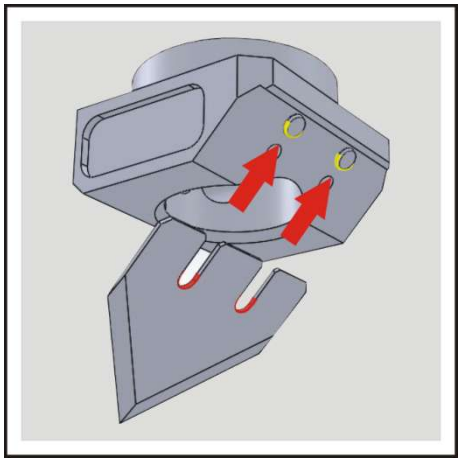
- Insert the EOT into the module, red point on the EOT corresponds the red point on the module. Picture 16 and 17



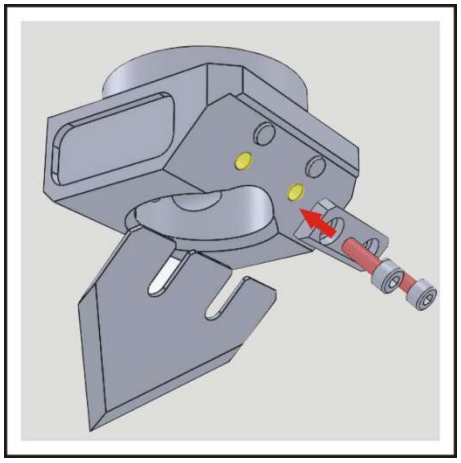
Picture 18

- Rotate the clamp clockwise to tight, rotate the EOT clockwise to match the pin. Picture 18

2.4.3. V-Cut tool

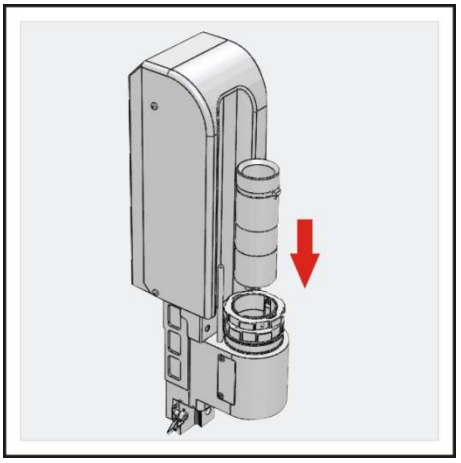


Picture 19

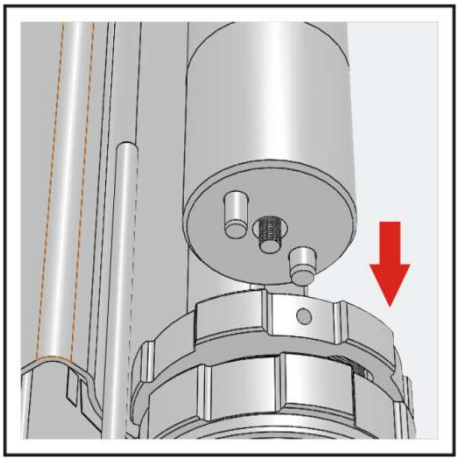


Picture 20

- First blade fitting ramps of the V-cut holder, then put the kidney-shaped slot into the round positioning pins.(picture 19)
- V-cut tableting squeeze blade,screw two M4*8 bolt(picture 20),blade installation is complete.(note:If the cylindrical pin don't get stuck blade, it will lead to blade breakage and scarp)

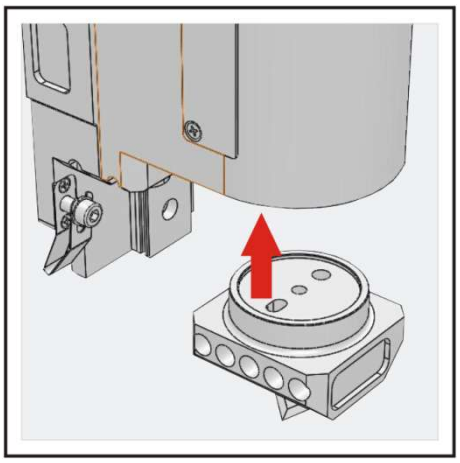


Picture 21

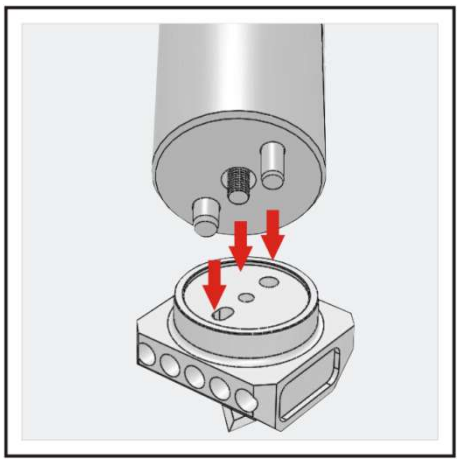


Picture 22

Put the V-CUT into the cutting holder(picture 21&22).(note: the v-cut red point corresponds to the cutting holder's red dot,otherwise it will cause installation error.

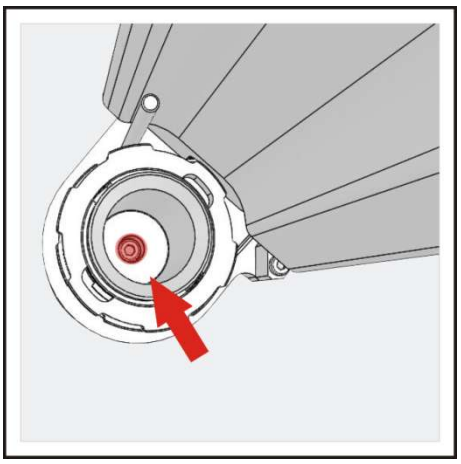


Picture 23

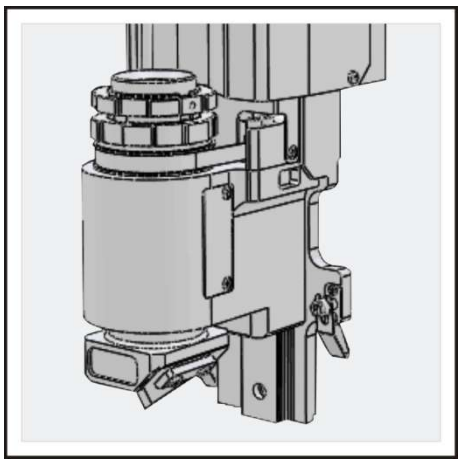


Picture 24

- Put the finished oblique turret on the bottom of oblique knife mount, make them fit(picture 23).
- There are two different cylindrical pin on the oblique knife mounts,with corresponding cylindrical pin hole, insert easily,otherwise it will cause no installed or damage parts and other issue.oblique knife mount and oblique turret should completely butt（picture 24）.



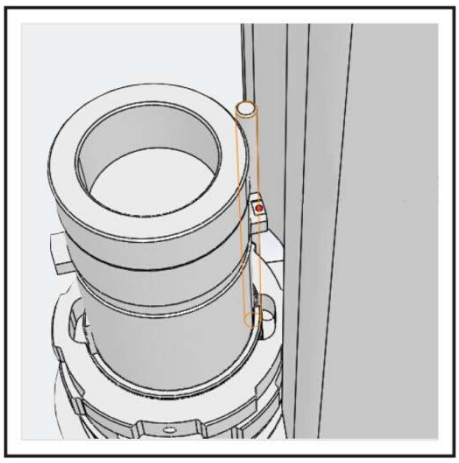
Picture 25



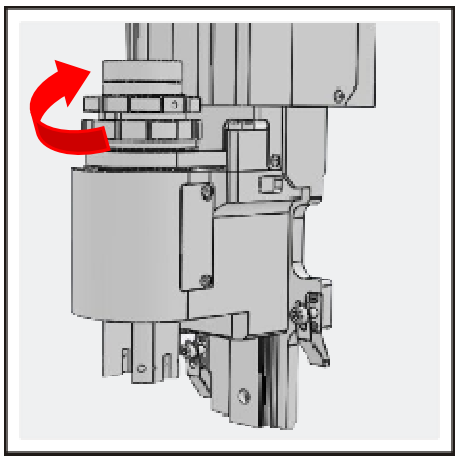
Picture 26

- Use inner hexagon 4th wrench tighten oblique knife mount hex bolts(picture 25), oblique knife mount and oblique turret will gradually fit securely.
- Tool installation is complete(picture26).Shaking oblique turret by hands,If there is no gap and shake phenomenon, the installation is correct. Special attention that the blade is quite sharp, prevent the blade cut hands at any time.

2.4.4. Big creasing tool

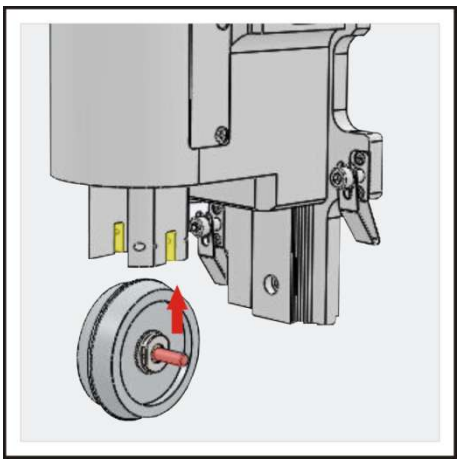


Picture 27

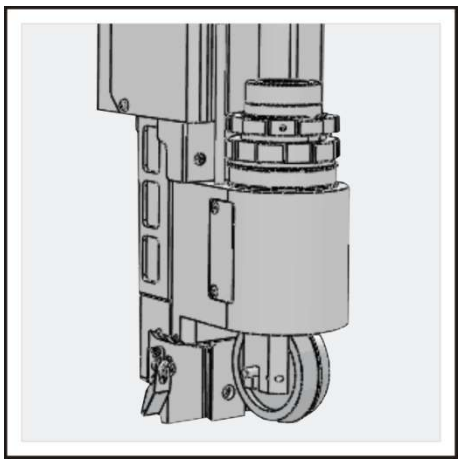


Picture 28

- Insert the big creasing wheel holder into the cutting head(Pic 27),make the red dot of creasing wheel holder aligned with the red dot on cutting head, then insert it into the hole on the head.
- Confirm the big creasing wheel holder into the cutting head in place, then tighten the screw on the head with clockwise(pic 28).



Picture 29



Picture 30

- Put the wheel in the rectangular slots of holder (pic 29)
- Push the wheel with hand, if no fall, it indicates installation is finished(pic 30)

3. Operating

3.1. Preparation

- Before starting, ensure there is nobody on the working area.
- Be sure to finish the platform before starting, ensure no sundry in the X/Y chain during the process.
- Check whether there is lubricating oil in Y guide.
- Check whether the air pressure reaches 0.6Mpa.
- Check whether it is correct with tools and installation.

3.2. Operating

- Power on.
- The machine starts re-set. Re-setting procedures: Cutting head height re-setting, X/Y direction re-setting, cutting head rotation re-setting, cutting head move to the original place.
- In order to avoid cutting the felt, please adjust the depth of tools.
- Put the materials on the table, start the vacuum pump, which make the materials adsorping on the table. If with the breathable materials, need to put the plastic on it.
- Open “IECHO Digital cutting system”, import the files (DXF or PLT). The system will process the analysis of outline, definition the cutting tool and definition the cutting type.
- Start the vacuum pump, move the cutting head, select laser point in CutterServer, review the cutting area. If the material is not in the reviewing area or exceed, please adjust the material.
- Click cutting icon after confirming, the machine will start to cut.
- After finishing cutting, please power off and other relevant switch

4. Maintenance

4.1. Daily Maintenance

- Check all the sockets of power, as well as the connector of serial cable.
- Before cutting, make X/Y running with slower, then check whether has abnormal sound.
  Without cutting,start the tools which can rotate automatically(electric oscillating tool, pneumatic oscillating tool, driven rotary tool and milling), check whether the tools are OK.
- Clean everything after finishing the jobs.
- Do the dust work, clean up the dust and oil in Y guide daily.
- Clean up the water in the regulating valve of air compressors and equipment.
- Do not put the machine in the wet conditions.

4.2. Weekly Maintenance

In order to absorbing the chips during long working, which makes small suction, should clean up the pump inlet weekly.

4.3. Monthly Maintenance

Repair the connections of felt monthly.

4.4. Quarterly Maintenance

Do the maintenance for the whole machine quarterly, including the cleaning, spare parts with normal, rotation parts with lubricating oil and all the screws are loose.

- ❖ Lubrication method: clean the rotating parts with cloth, wipe the dirty oil;then lubricant in the surface of the part. Better with “Mobil 1 5W-30”

4.5. Annual Maintenance

Do the maintenance for the whole equipment yearly, including whether the wire is aging , the spare part are rust and the screws are loose.

5. Circuit diagram

5.1. Circuit diagram of Electrical box (Attachment 1)

5.2. Circuit diagram of Machine (Attachment 2)

6. Troubleshooting

No.	Malfunctions	Solutions
1	Cutter cannot start	1、Check whether the circuit breaker tripped. 2、Check whether the fuse is burned out. 3、Check whether the red switch is broke. 4、Check the plug connected to electrical box interface with a multimeter. 5、Check whether the circuit of the 220V power
2	Cutter suction force weakened, failed to fix the materials well	1、Put one film on the surface of the materials if they are breathable. 2、Clean the vacuum entrance filter net if it is blocked. 3、Check whether there`s leakage on the vacuum plate and pipes.
3	Materials could not cut though	1、Knife height not enough; Increase cutting knife depth. 2、Change new blades. 3、Check the flatness of the cutting table; Contact services if need. 4、Materials cannot totally cut off; Put a piece of perforated paper on the table surface.
4	Could not cut off patterns at the corners	Open the dialogue box of Cutter Parameter Setting, Reset the Knife Up Compensation and Knife Down Compensation
5	Files sent failed warning in CutterServer	Use Diagnose function in CutterServer, to check the DSP version.

7. Safety attentions

- GND electrical wire connected to the ground.
- Use the required specification wires for electric power connection, as per the big cutter power.
- Check the synchronous belt before switch on the machine, in case it`s blocked by materials fragments.
- Press the Emergency stop button or switch off the power in case emergency.
- Operators and staffs shall not reach into the danger area when the cutter works.
- In principle, any troubleshooting work or inspection on the cutter is to be carried out only when it is switched off.
- Cutting heads adjustment and tools changes shall be carried out only when it is stopped.

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