

Thank you for buying our CNC Router.
(Mach3 USB port)

This technical instruction goes with machines, it is also the instructional document which makes sure you're correct using. Please read it carefully and keep it well. Please operate the machine according to this instruction, if any problems or questions, please contact us freely. In order to bring the superior function of our machine into play, and ensure the safety of the user, please read this instruction carefully before installation and operating. Then you can have acknowledge in details about what should be paid attention to, and the parameters of installation and operation, inspection of the abnormality and daily maintenance rules etc. It is our target to make the customers satisfactory. Thank you for your cooperation.



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I Unpacking Inspection

Before sending, all the parts of CNC router are inspected strictly and packaged carefully. However, damages may occur during transportation process due to various factors. Please check the following items before unpacking. Inform the distributor or us if any abnormality:

1. Make sure that the machine is not be damaged or distorted during the transportation process.
2. After open the package, check whether the spare parts are the same with the packing list.
3. Check whether the specification you ordered fits the machine's nameplate (voltage and KVA)
4. Check whether there is any abnormality or foreign material in the machine.



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II Safety Notice

This chapter mainly introduces the machine usage notice; the user must read this carefully to avoid the suddenness.

- 2.1 The machine should put on the balanced table, adjust the fundus to make sure the machine can't shake and keep it horizontal.
- 2.2 Please use the appointed voltage according to the instruction, connect power and put through the grounding wire.
- 2.3 Please do not connect many electronic products on one outlet to avoid overburden.
- 2.4 The engraving machine is high speed working machine; the main spindle speed can reach to 24000RPM. So the operator should wear work clothes and hat, **forbidden to wear gloves**.
- 2.5 When the machine is working, the operator should keep distance with it. **Forbidden to touch the cutter and other motorial parts**.
- 2.6 Make sure the electric power is off when clean the machine. Do not clean it with the liquid or the spray, but the dry dust cloth and meanwhile with slushing oil.
- 2.7 when checking the machine faults Please make sure the power is off.
- 2.8 Do not use this machine near water, for example: near the bathtub, the bison, and the launder of the kitchen, wet floor, or swimming pool and so on.
- 2.9 Do not put this machine on the unstable truck, shelf or tables. Otherwise it may fall down and cause the machine damage or the hurt of people.
- 2.10 Only the electric variety on the nameplate can be used in this machine. If you are not familiar with the electric variety in your place, please ask the vender or the local bureau of supplying electricity.
- 2.11 Triangle plug (ground wire) is available for this machine. This just for ground wire type plug use and this is the safety device. If you cannot use this kind of plug, please ask the electrician for help. But do not discard the safety device.
- 2.12 Do not put anything on the electrical power cable, and do not put the cable in the place that someone else can touch.
- 2.13 Do not make the receptacle or the branch wires afford over-voltage, or there may fire hazard and electric shock.
- 2.14 Please don't put anything into the aperture or put thing in the machine, or else may get an electronic shock, on fire or other danger caused by dangerous pressure or short circuit.,
- 2.15 In order to avoid getting an electric shock, please do not disassemble this machine. If it needs repairing, please take it to the qualified repairing center. Disassembly of this machine may bring the electric or some other dangers. The incorrect reassembly may cause electric shock in the future using (unless operation under the instruction of professional engineers).
- 2.16 Under the following conditions, you need to pull the plug out from the receptacle, and consign the repairing work to the qualified repairing center:
 - A. when the cable and the plug are broken.
 - B. if some liquid inflow the machine.
 - C. if this machine is rained or watered.
 - D. if operation is done as what the instruction says, but this machine cannot work, you can only adjust the controlling part of this machine. Otherwise if you adjust other parts incorrectly, you may cause damage of this machine. As to the complex work, you had better ask the qualified worker for help, which can make the machine work orderly.
 - E. if this machine falls down to the floor from the high position or the body of the machine are broken.
 - F. if obvious changes of the machine's function occur.
2. 17 Avoid using the machine when it thunders. Or it can cause faraway electric shock.
The transportation, installation and maintenance make the machine operate well.

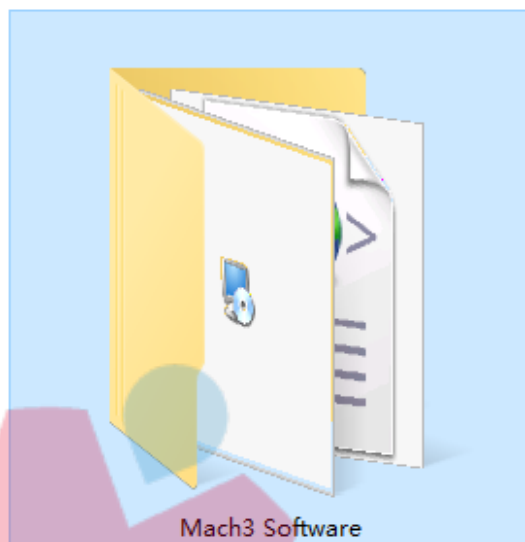
III Introducción al sistema de control

Instalación Mach3

Por favor conecte la tarjeta de control Mach 3 al PC con cable USB.

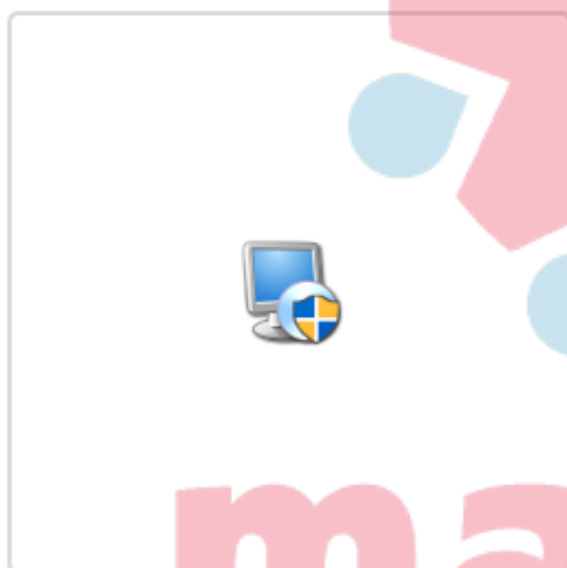


Entonces



Encuentre en la USB del equipo la siguiente carpeta

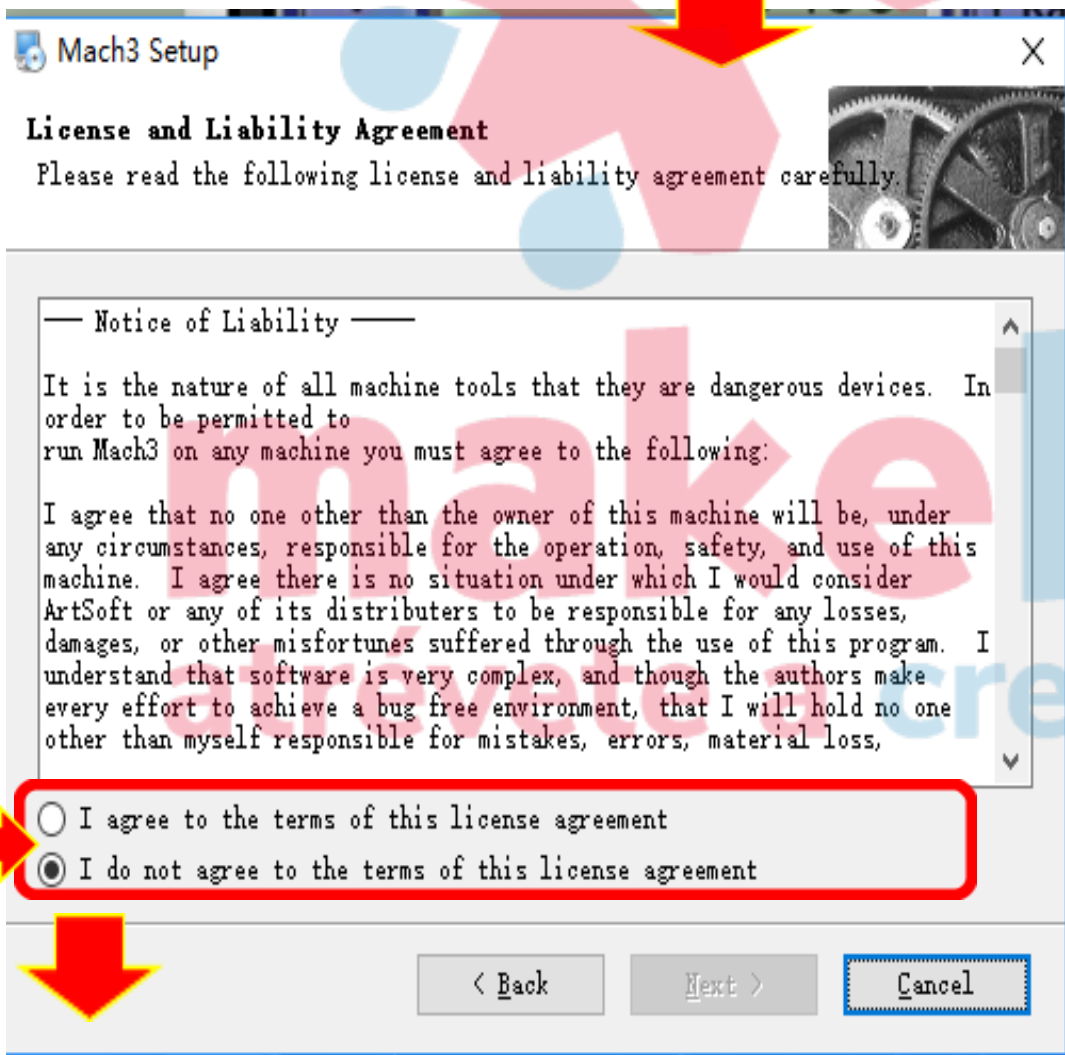
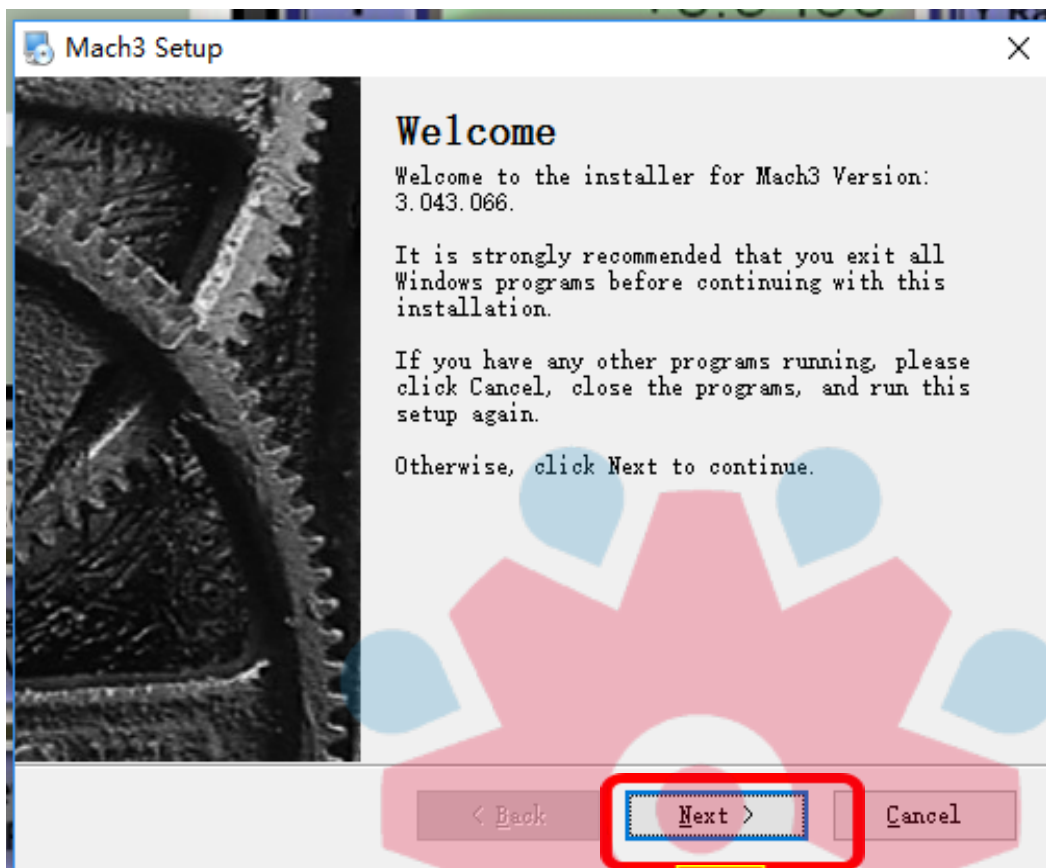
Entonces instale mach3 (USB port) software. Al dar doble-click en el ícono con el botón izquierdo del mouse.

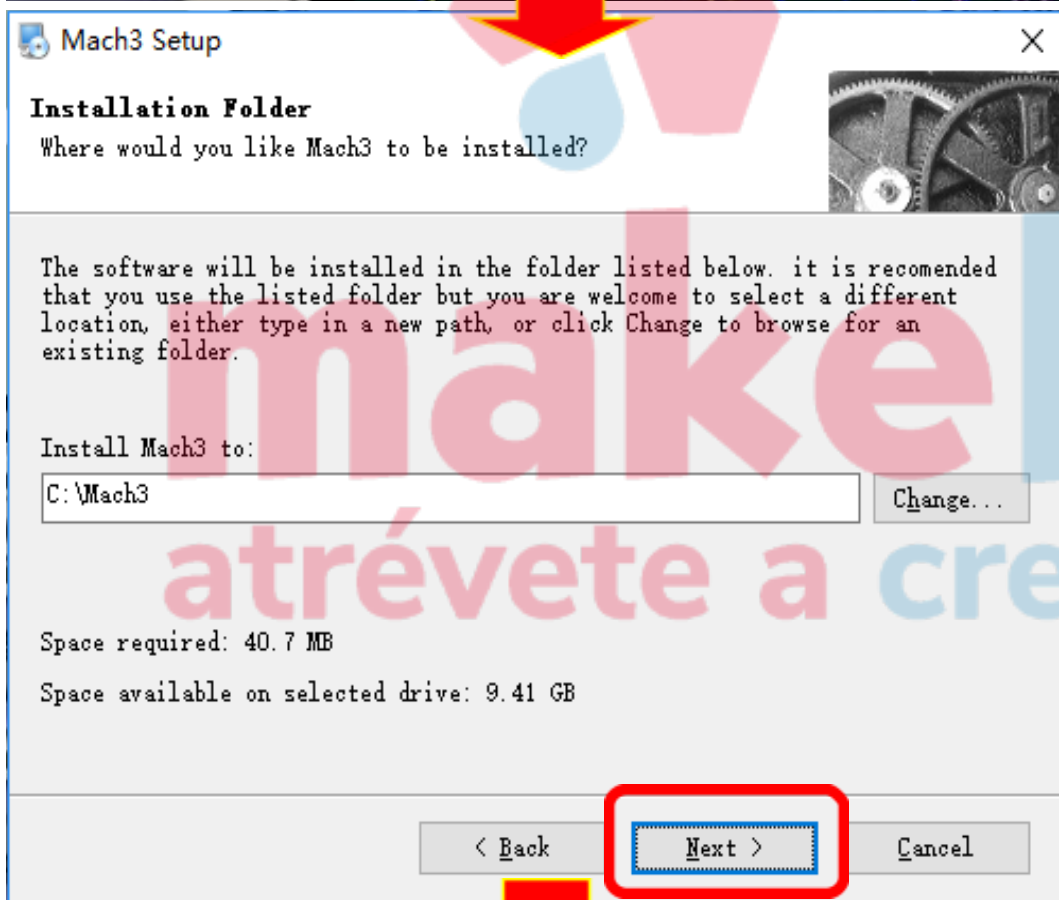
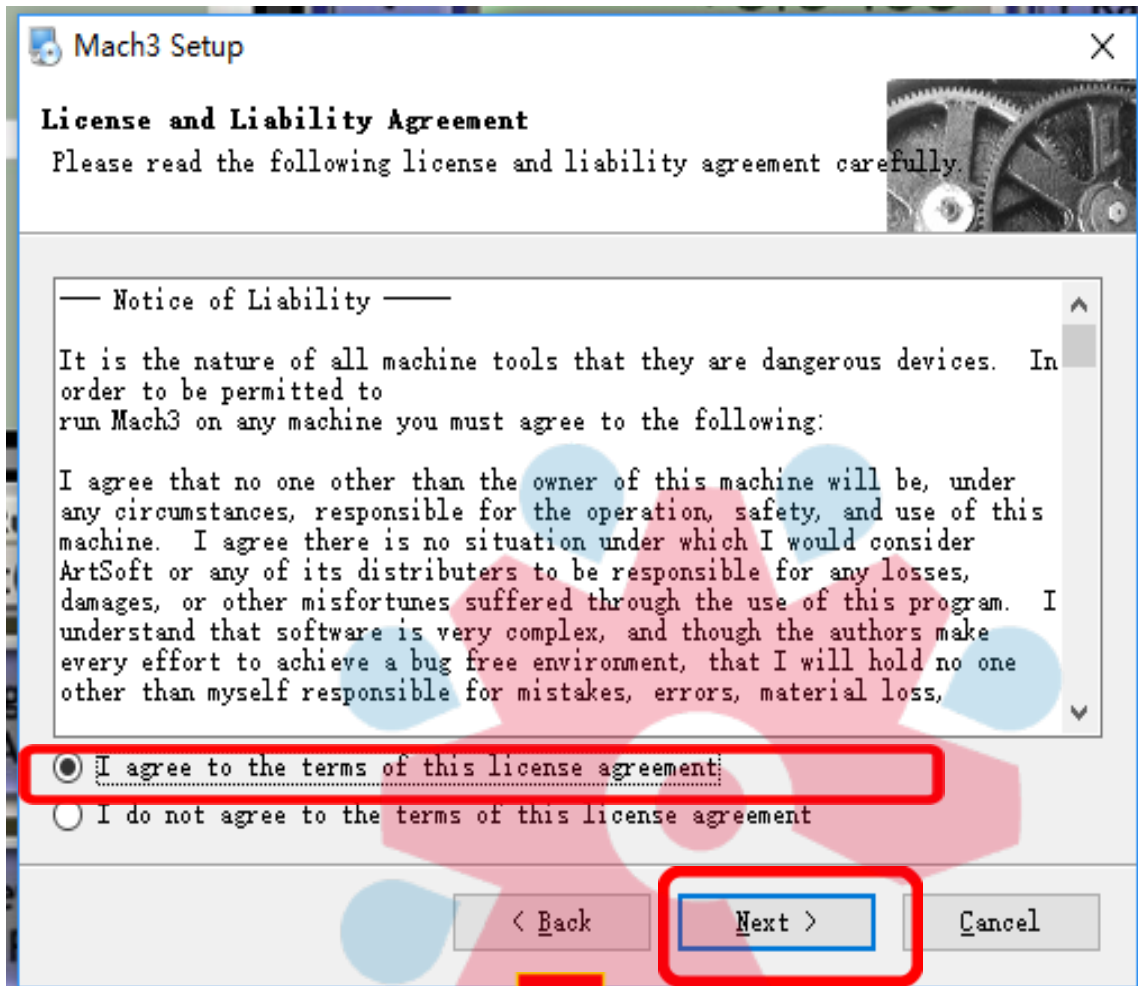


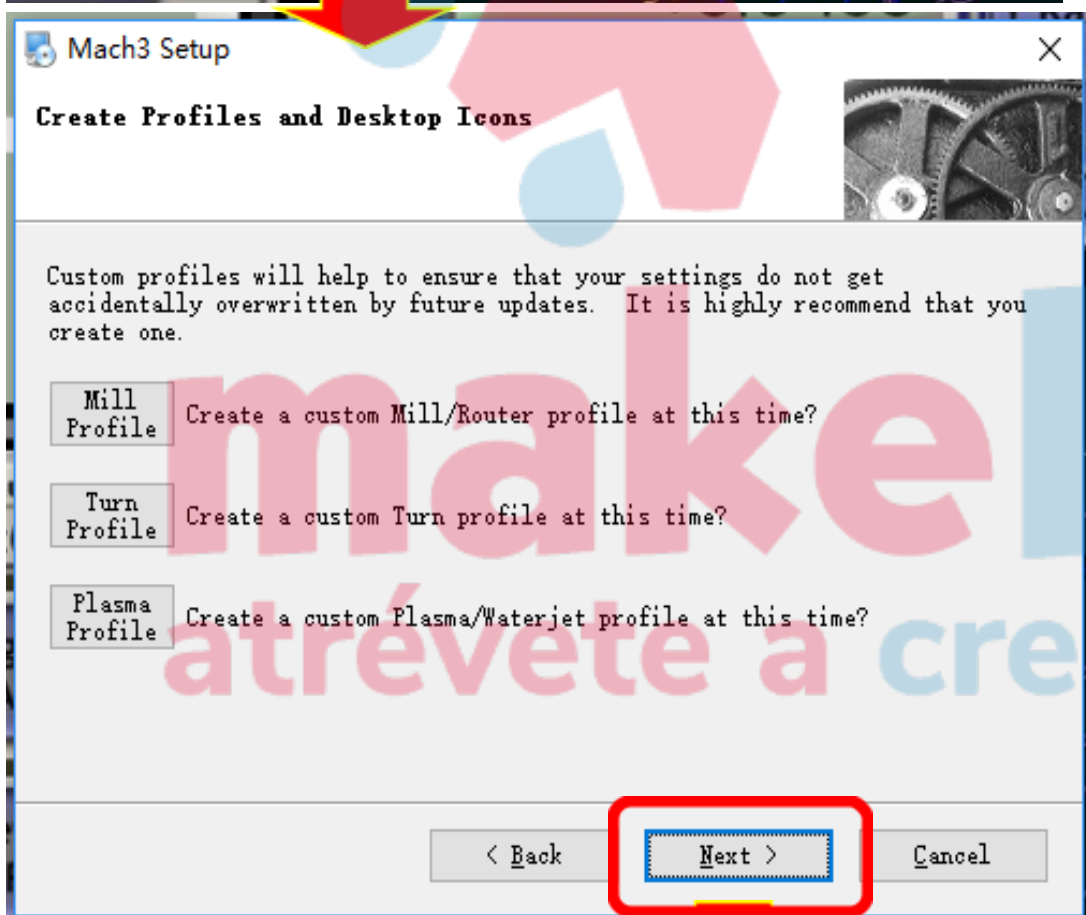
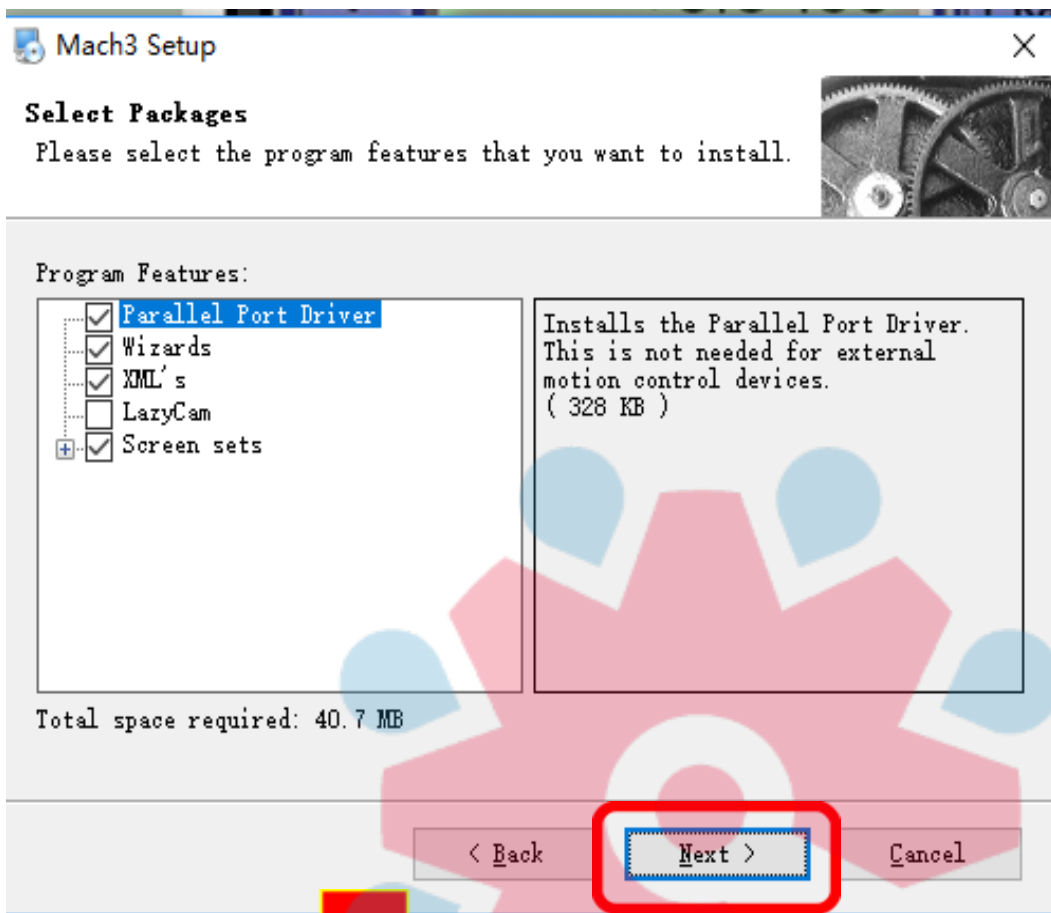
Mach3Version3.043.066.exe

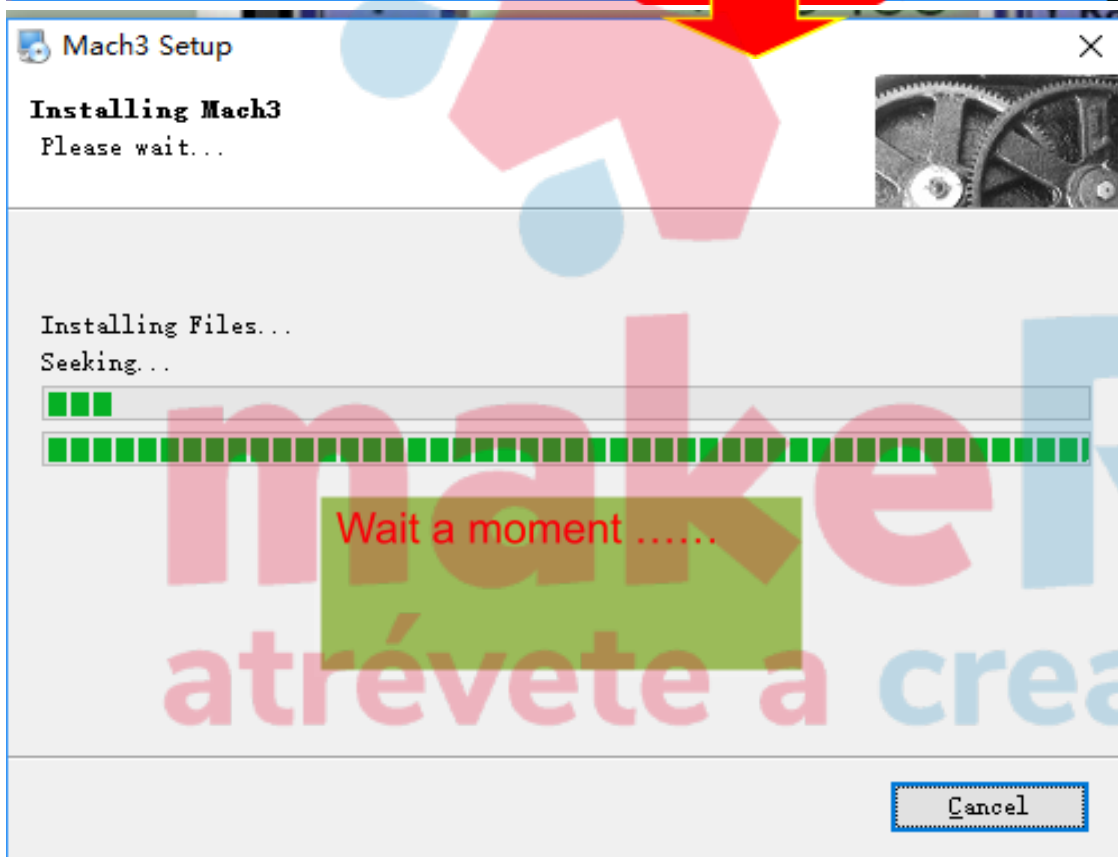
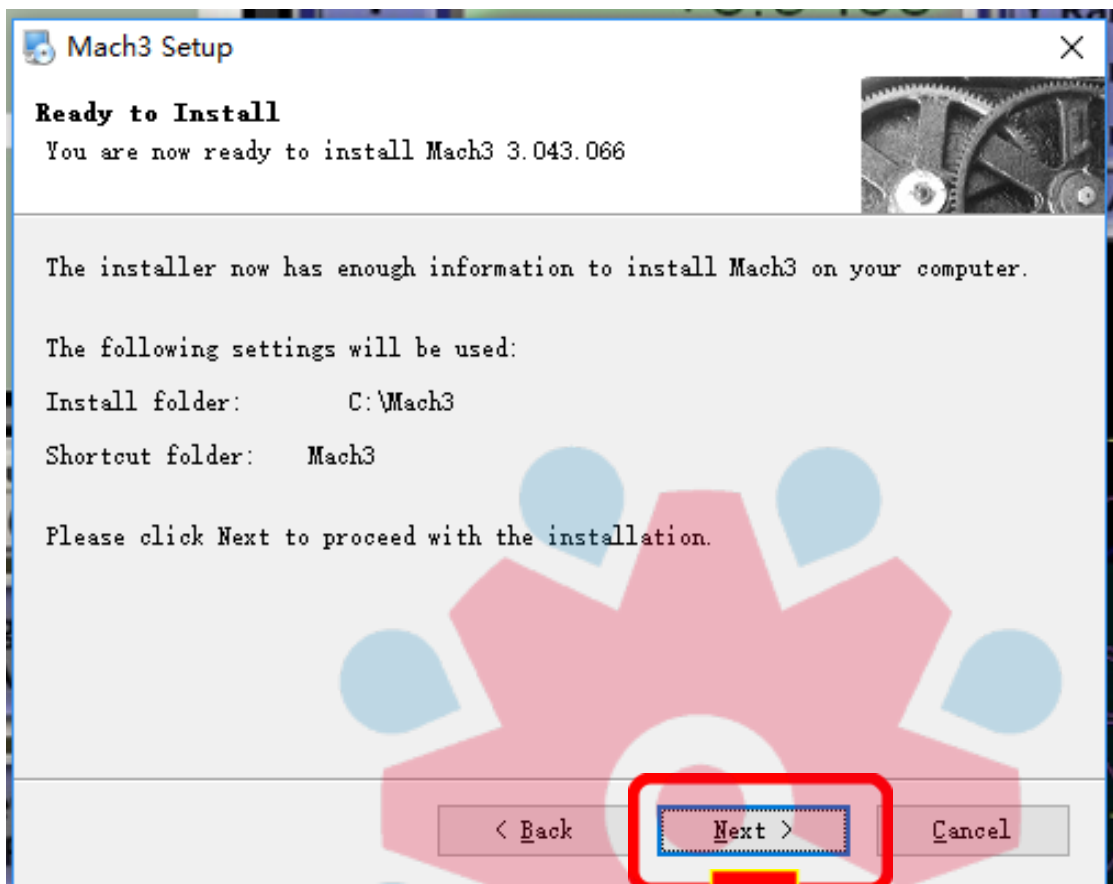
Verá algo como esto:

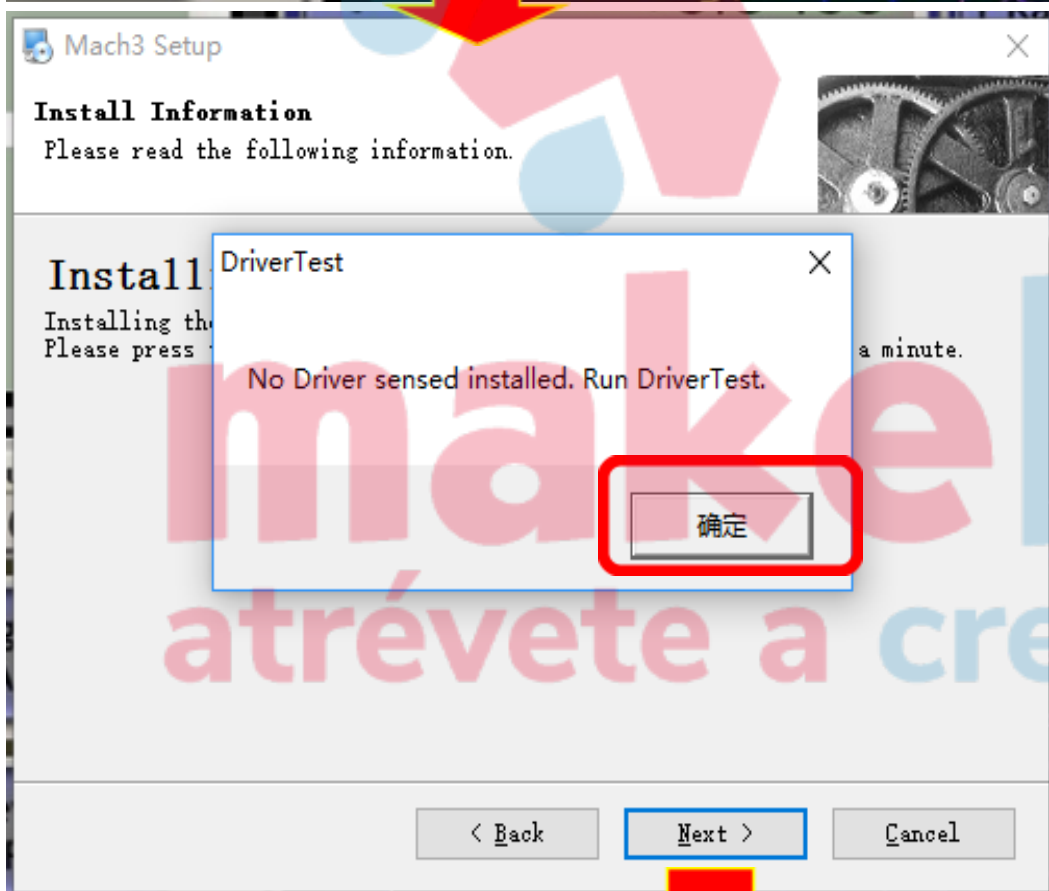
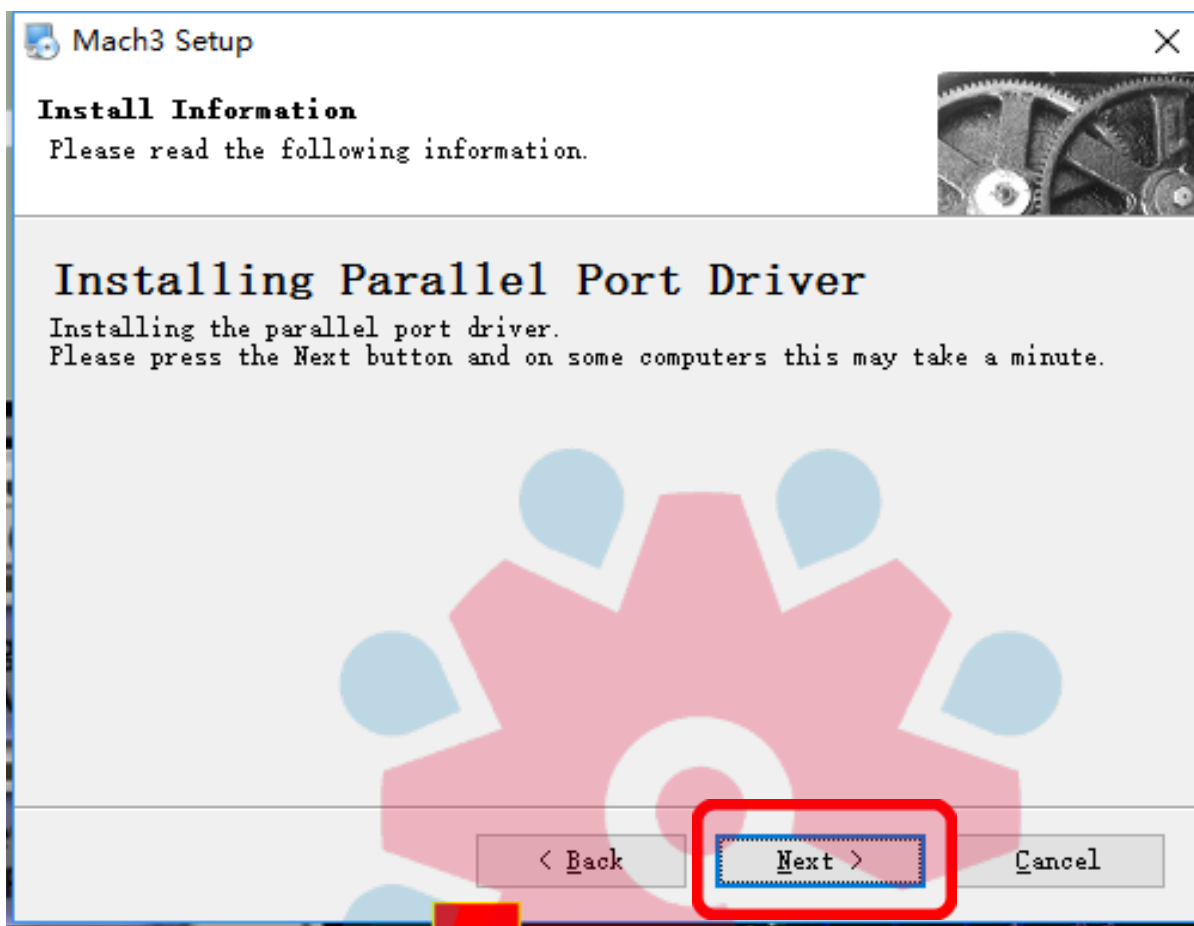
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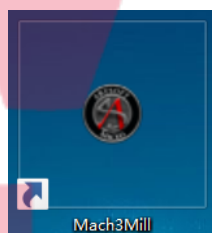
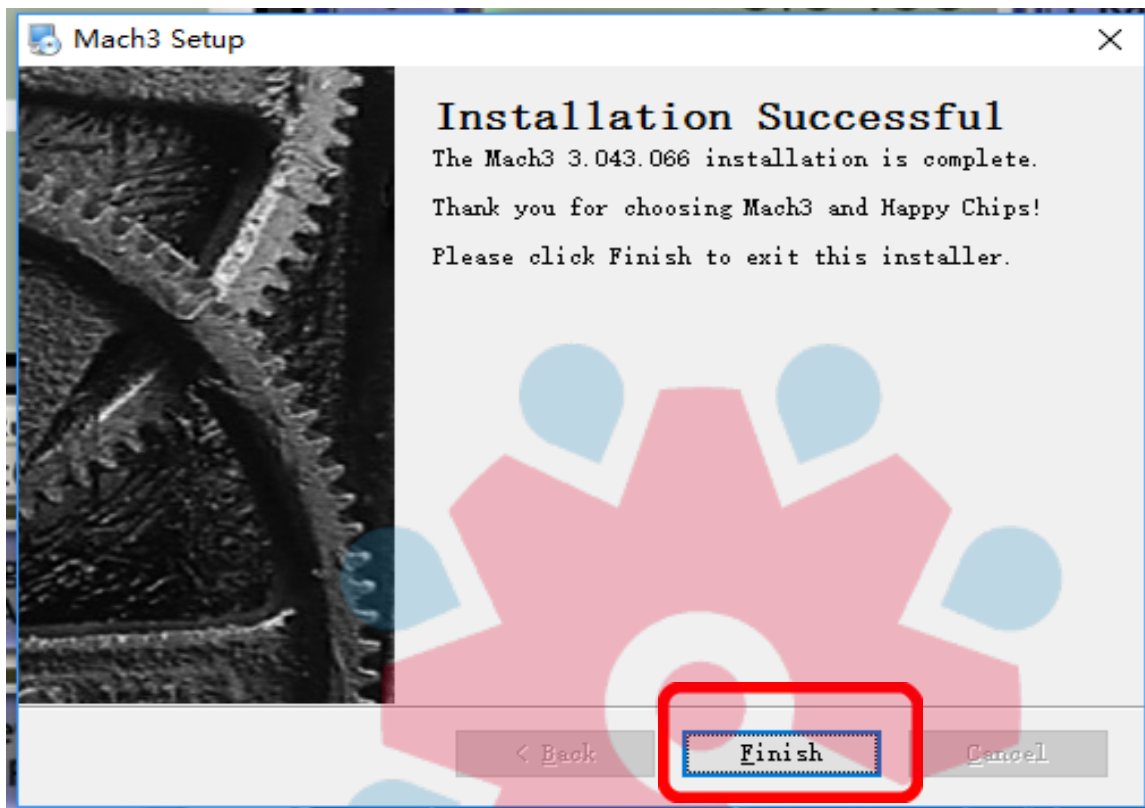













after installation, mach3 will appear on your PC screen.


Insert USB card driver :  NcUsbPod.dll ,we need it to copy and Paste it into your **C:\Mach3\PlugIns** folder

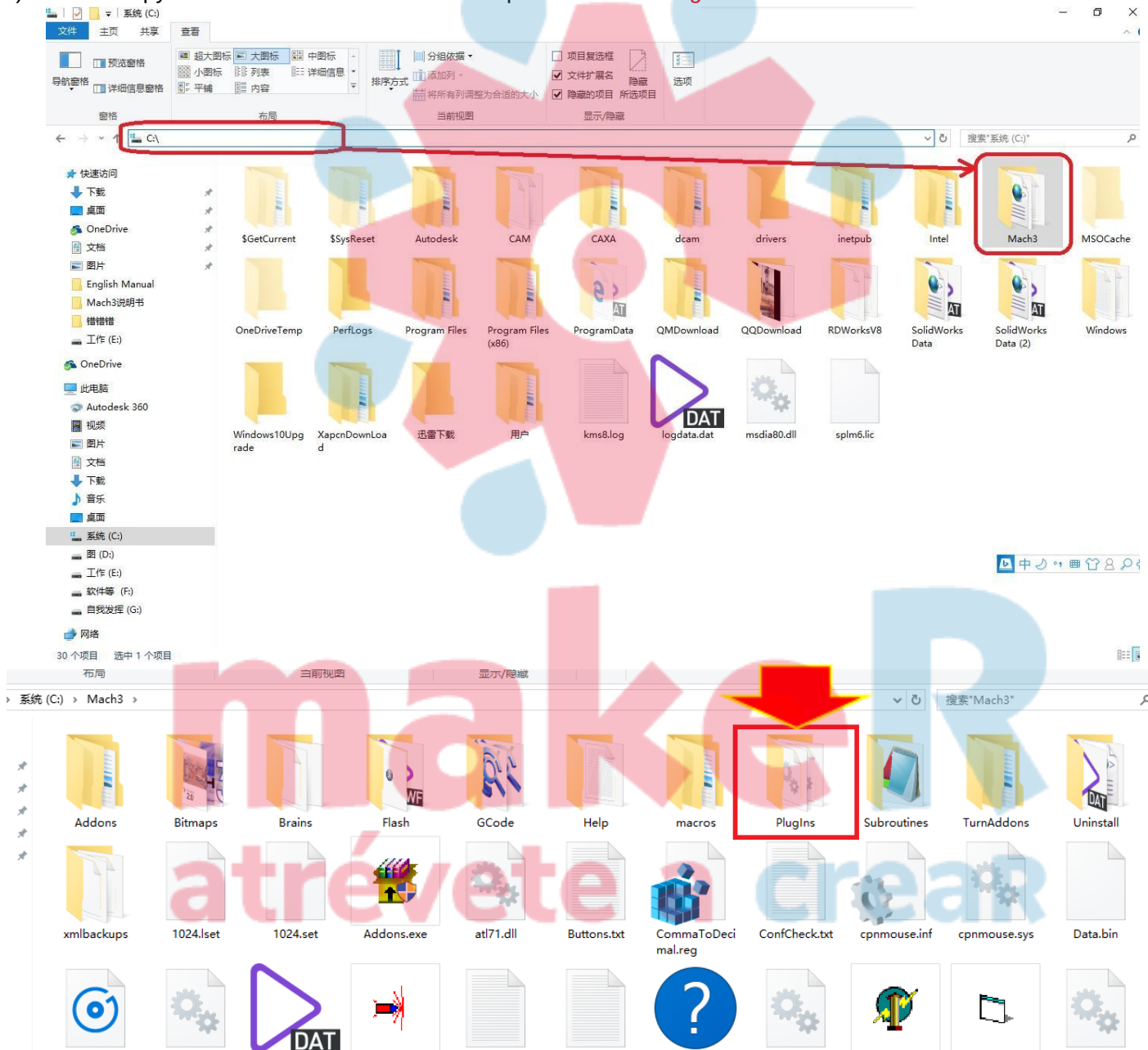


1) find the folder ,then open it .you will see the usb file .

English Manualand software > usb card driver-v2.38.5



2) Please copy the file  NcUsbPod.dll . Then open C:\Mach3\PlugIns



Paste to here.

名称	修改日期	类型	大小
Flash.dll	2008/7/16 3:01	应用程序扩展	1,070 KB
JoyStick.dll	2007/9/5 4:33	应用程序扩展	180 KB
PrinterScope.dll	2008/10/26 22:58	应用程序扩展	256 KB
ShuttlePro.dll	2016/9/9 11:44	应用程序扩展	644 KB
TurnDiags.dll	2008/10/26 23:31	应用程序扩展	256 KB
Video.dll	2007/9/20 11:57	应用程序扩展	304 KB

Start the Mach3 software, a dialogue of "Motion Control Hardware PlugIn sensed!!"

Please select the "Mach3-USB-Motion-Card", you can also check "Don't ask me this again".

When the Mach3 is connecting with the card, the Status indicator (LED on the card) is flashing.



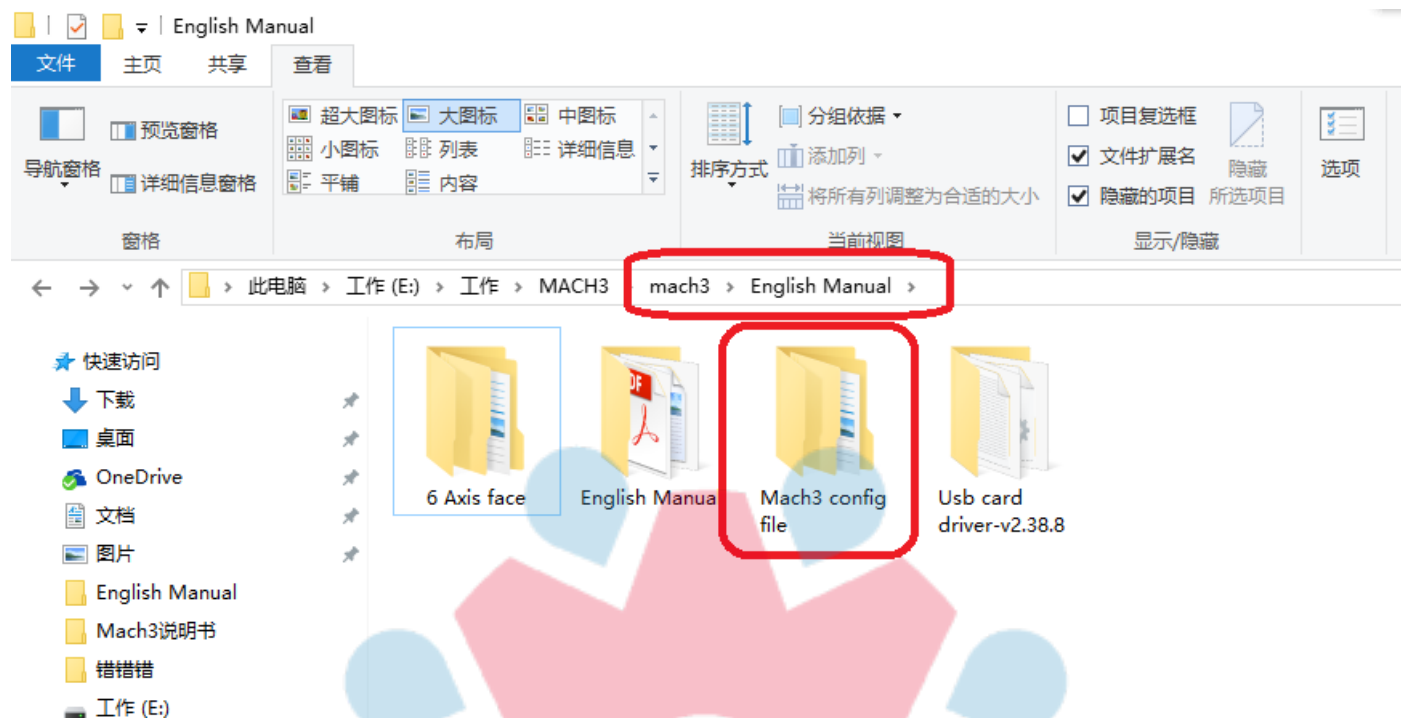
Then we can control machine by mach3, but before that, we have other one thing to do.

After finishing install. We have backup the machine system setting, you just to copy the backup date to the

C:\Mach3

Here is the step .

First find the folder "Mach3 config file".



Open it you will see .



Open yours ,and you will see .copy the file ,then paste it into the folder "C:\Mach3"



Mach3Mill.xml

You will see .please select “Replace the file in the destination”



Ok the Mach 3 software install have finish.

After that . We have finished the setting of mach3. Run mach3 and try to control each axis move to see if every axis direction is right and move smoothly.

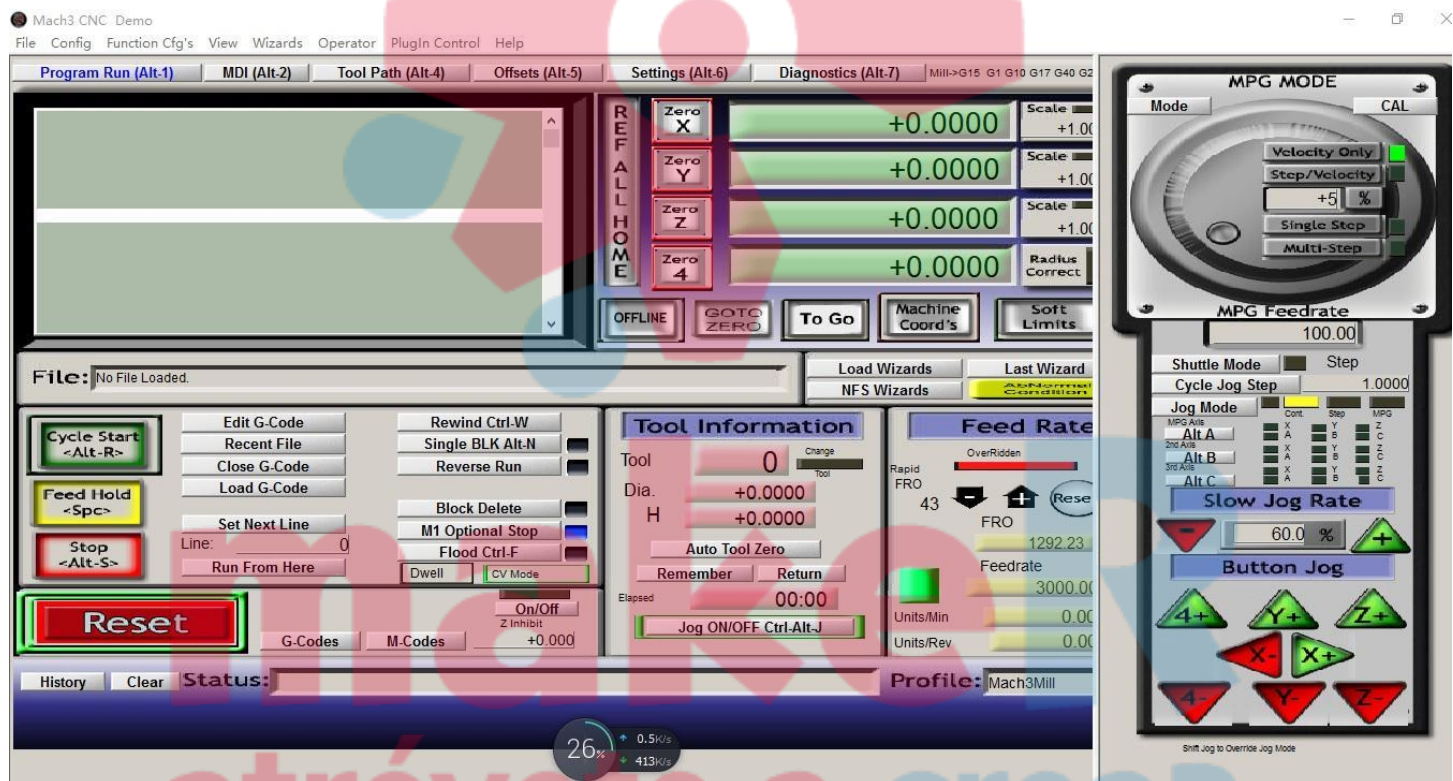
Here my advice . For Mach 3.



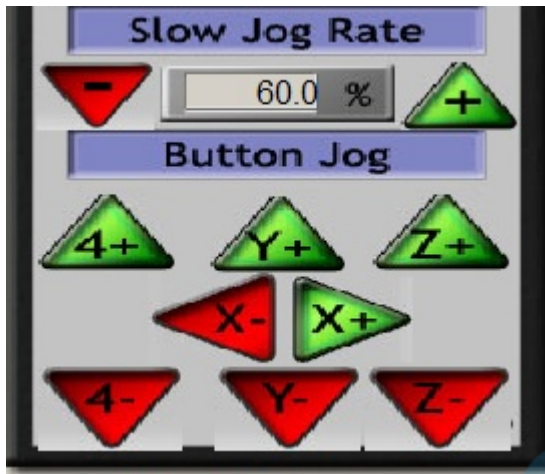
Press the key "Tab"



Then you will see like this .



You can use mouse to press the key to move axis.



And you can also move the axis by keyboard.



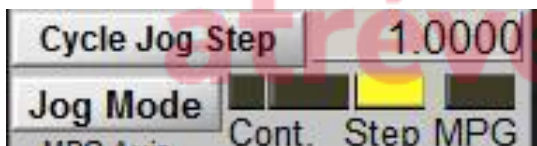
← → : X AXIS

↑ ↓ : Y AXIS

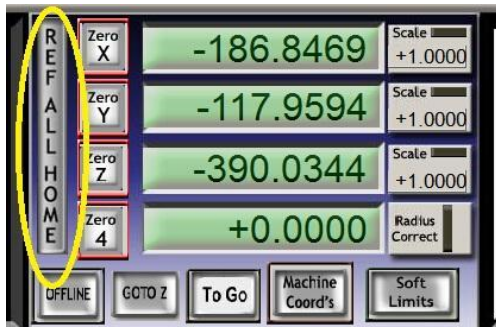
Page Up Page Down : Z AXIS down and up .

Some times, we will use certain distance jog, like we want to move spindle down 1mm by 1mm, now we will use step function. There are three Jog mode.: Cont -- step -- MPG.

So we can click Jog Mode button to change the mode. And when we use step mode, we can input “1” into Cycle Jog Step and enter . And then press Z- to see what will happen ;)



Test go home function. Each axis has its limited switch. when machine move to each axis switch, that place is the mechanical original point. For mach3, please press this button (if it not go home, please contact us.)

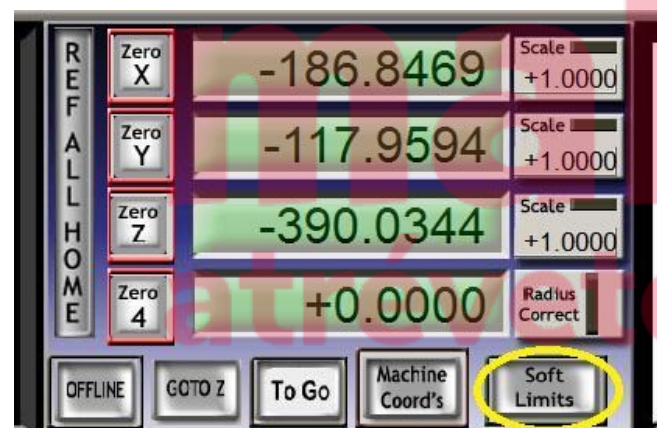


After Ref all home, X Y Z will become zero, if not , please press the right button to make them to be zero. Then we will test soft limits, before that, we need to check if our each travel setting is right.

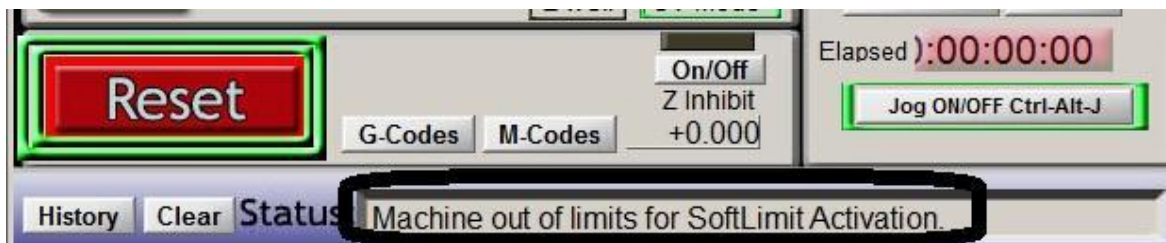


Like the picture showing, if your machine (1212 model) X can go +1200mm travel. So we should set soft Max 1200mm, Y can go +1200mm travel. So we should set soft Max 1200mm, Z can go -150mm travel. So we should set soft Min -150mm,

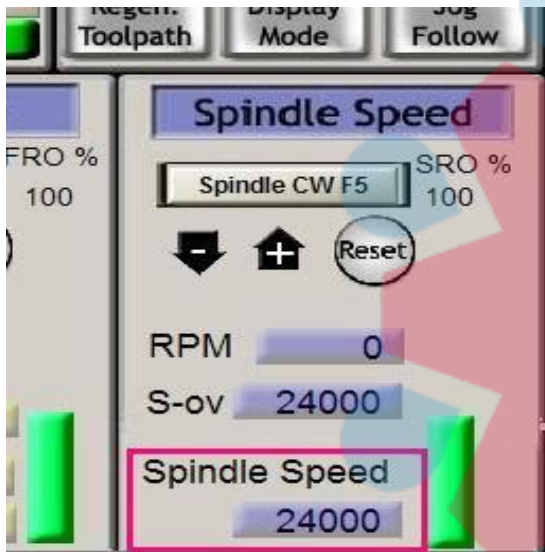
Then we need to press this soft limits button first before (avoid each axis movement to be over the travel zone) when test this function. Then try to move x to right, it will stop when x axis number is 1000, so soft limits works. Other axis is same way to test.



After click soft limits button, the status will show message of activation.



Then we will test spindle. Check if spindle speed shows 24000, and then switch spindle button on control box (in fact, it is power on inverter) . And wait some seconds until inverter display show 400HZ. Then we can press spindle CW F5 to let spindle run. We can speed up and down y click up arrow and down arrow, also green column. If spindle doesn't work, please see if inverter is power on and show 400hz first, and refer to **--VII The Judgment of Machine Fault and Resolvent**



Set Mach3 by yourself (ADVANCED).

Of course. You can make your own setting if you know mach3 very well.

Then there will be some major setting introduction here :

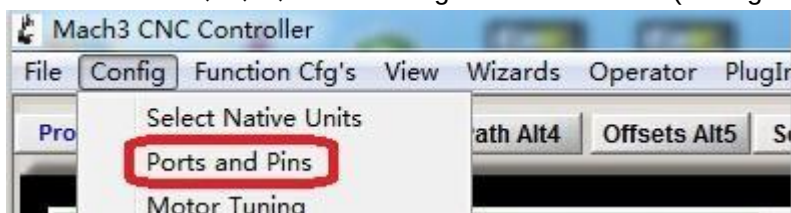
1. Motor output setting:

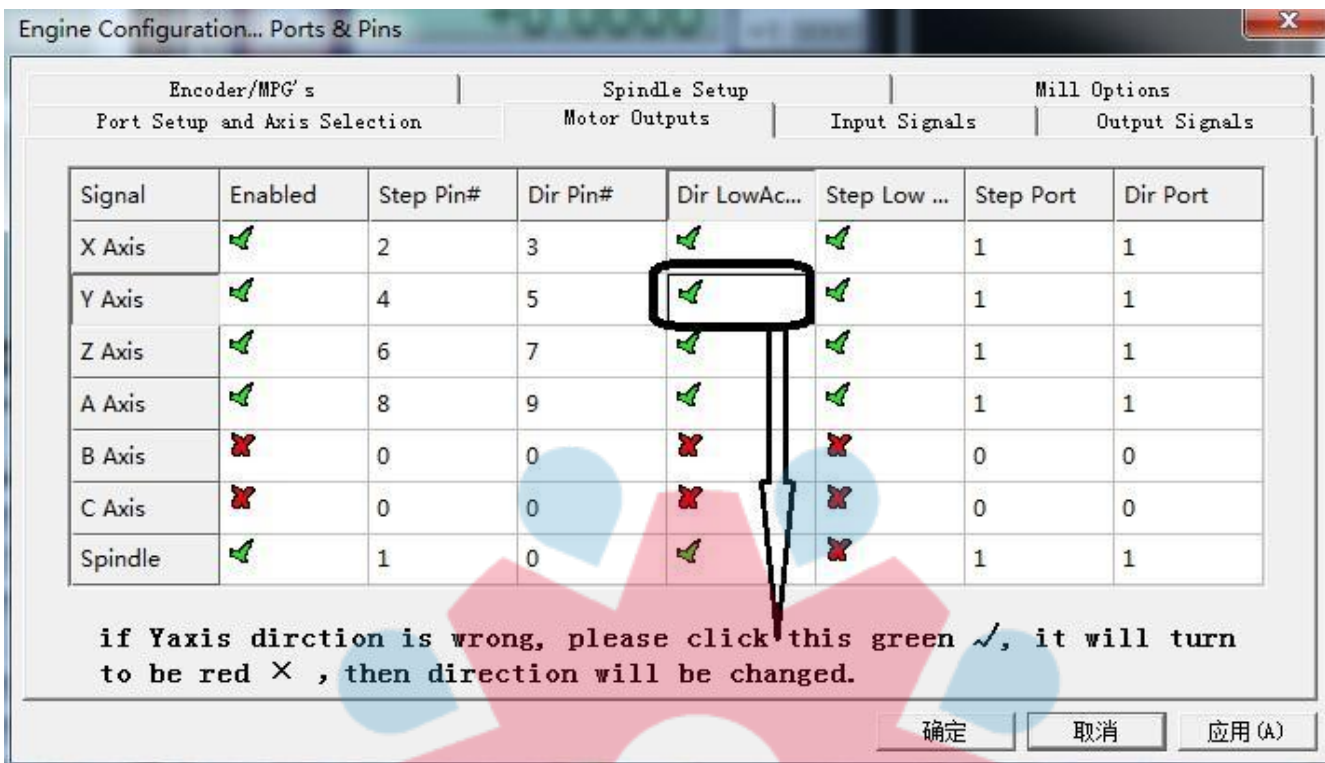
There are 4 important signal need to set. X Y Z A axis. You will see as follows . If you want X Y Z work . You should enable it . Notice only for A , If you choose A axis (here should be 4 driver. Not 3 , it is the the real A axis .) please enable it.

Another important point is **dir low** part. If you find your x axis move at wrong direction. (like if you press X + , it should move to left direction.) you can change \sqrt to be \times . Then the direction will be reversed.

Note : you can find more details in the USB board manual

1.1 1. Mach3 X、Y、Z、A Axis config as shown below: (Config => Ports and Pins)





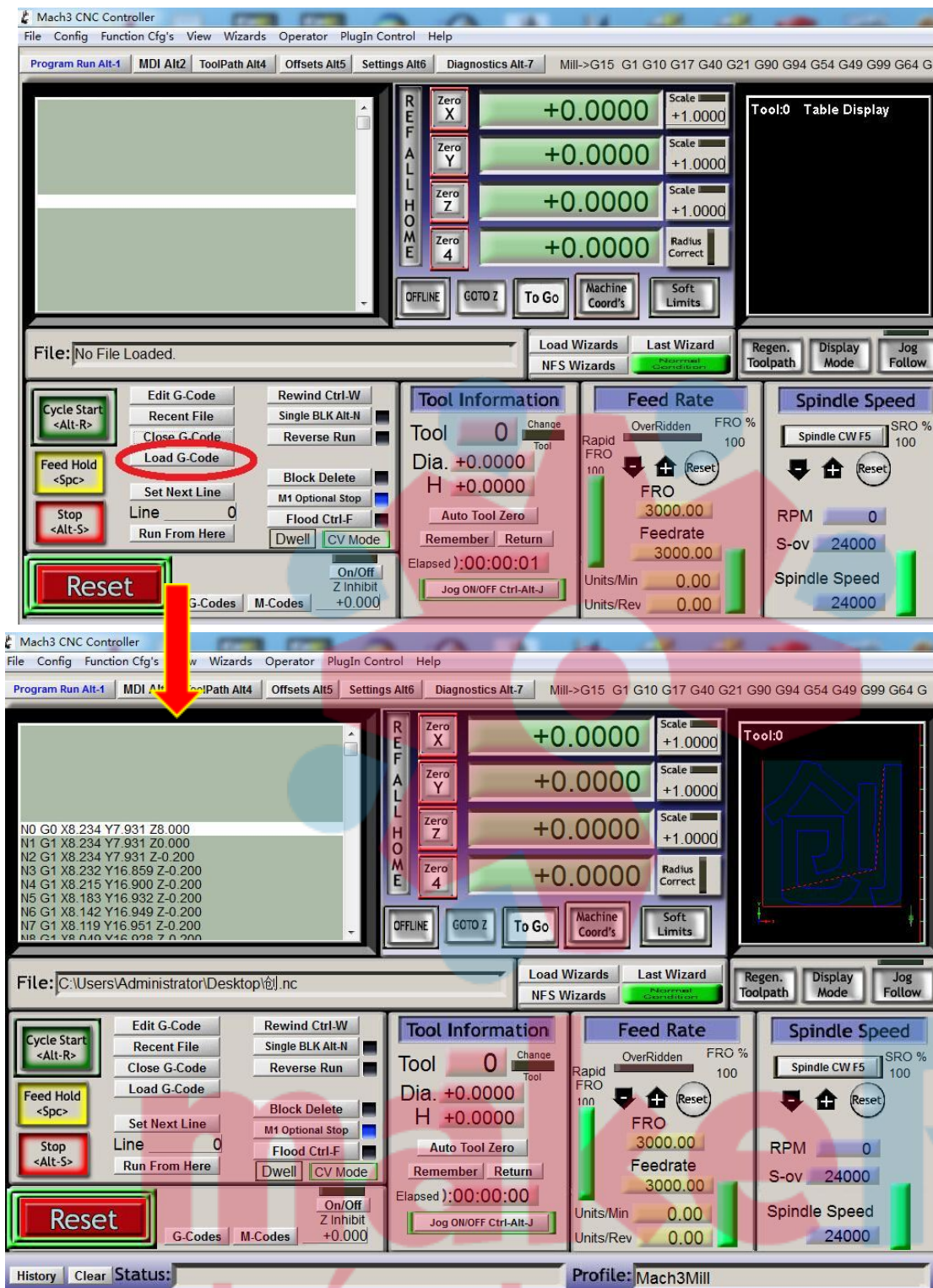
2. Motor tuning setup as shown below: (Config => Motor Tuning)



① if you click x . It will show x axis status. ②. If it is 1605 ballscrew, it should be 640, if it is 2510 ballscrew, it should be 320 . ③ It will be different from every machine. Usually, you can set only 6000 or so at first using period, and you can try higher speed afterwards. ④. We usually set 400-800 ⑤. Please click it after you change any setting .

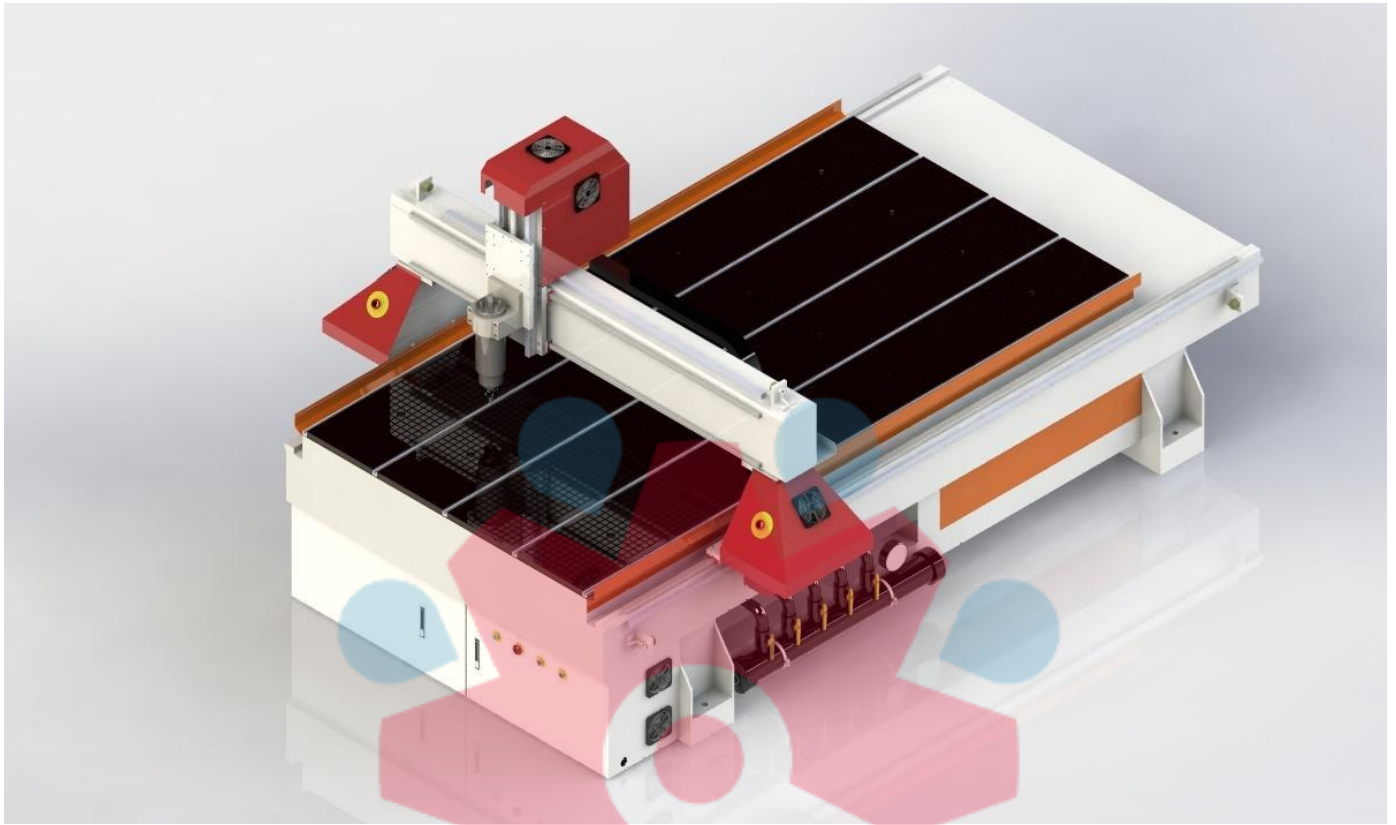
4) mach3 using

First. We will load G code file of tool path , which we make by ucamcam or artcam or typ3 and so on. Mach3 can accept G code file (for example : tap , nc format)



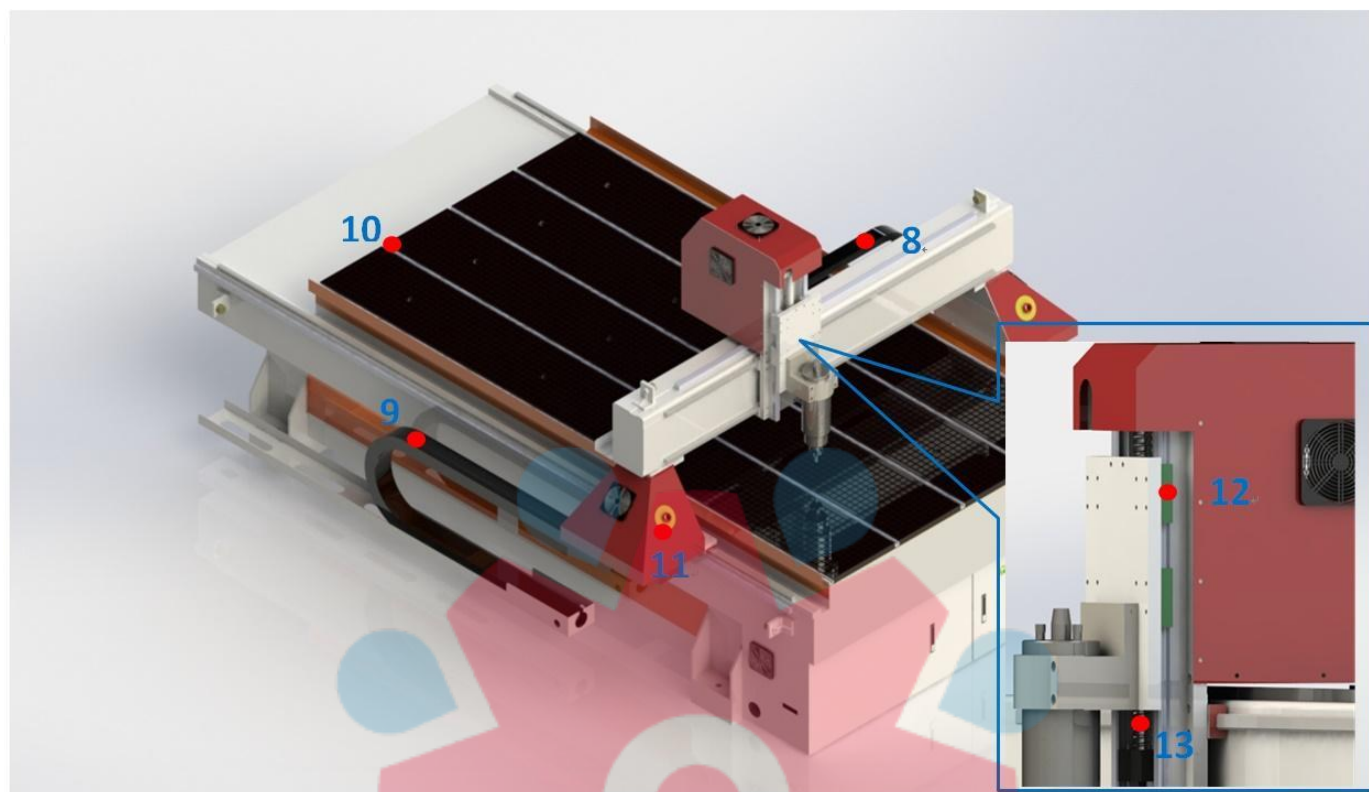
Secondly. We will put the material we want to engraving on, and hold it tightly with clamping. Thirdly, we will install tool bits and set the working original point. Then, we can let machine work.

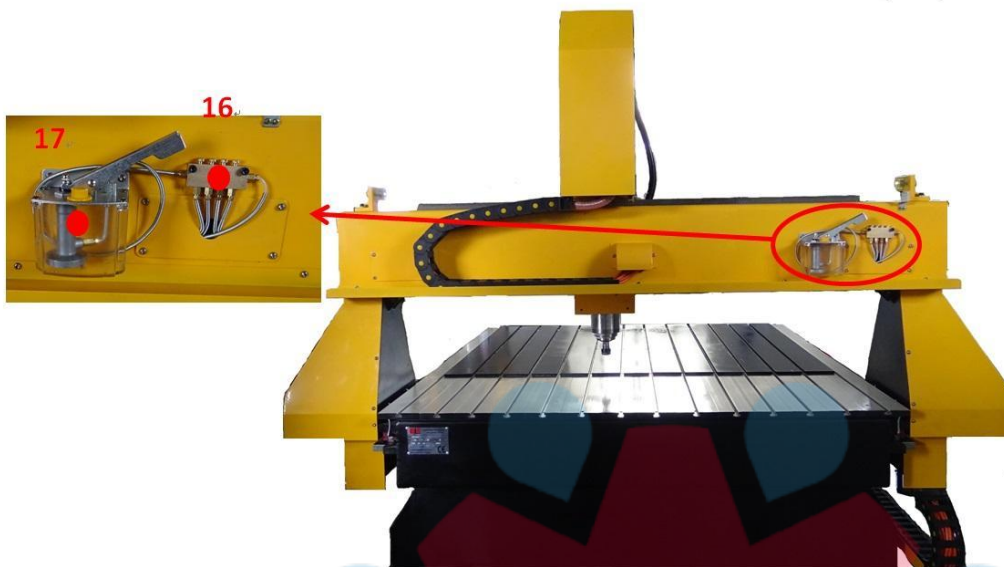
iv. Machine introduction and installation



.Machine parts introduction







- | | | |
|----------------------------|-----------------------|-----------------------------|
| 1) Spindle | 7) Hard limit . | 13) Ball screw |
| 2) Table | 8) X axis towline | 14) Guide |
| 3) Electrical cabinet | 9) Y axis towline | 15) Bevel gear |
| 4) Crossbeam | 10) T –shot | 16) Manual lubrication pump |
| 5) Gantry | 11) Emergency button* | 17) Main Oil separator |
| 6) Vacuum adsorption valve | 12) Slider | |

Electrical cabinet introduction

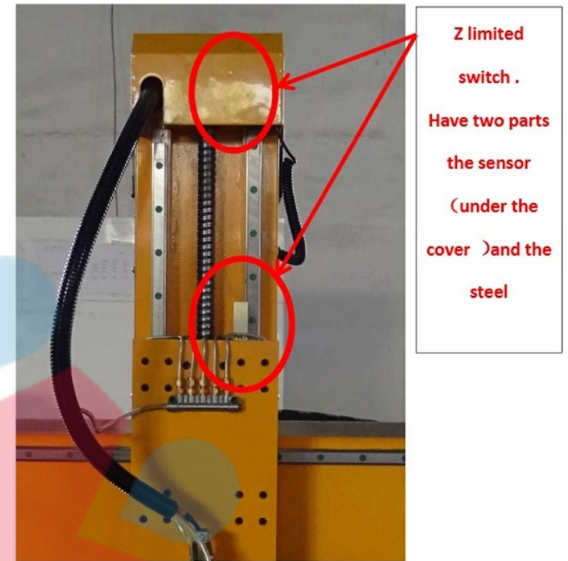
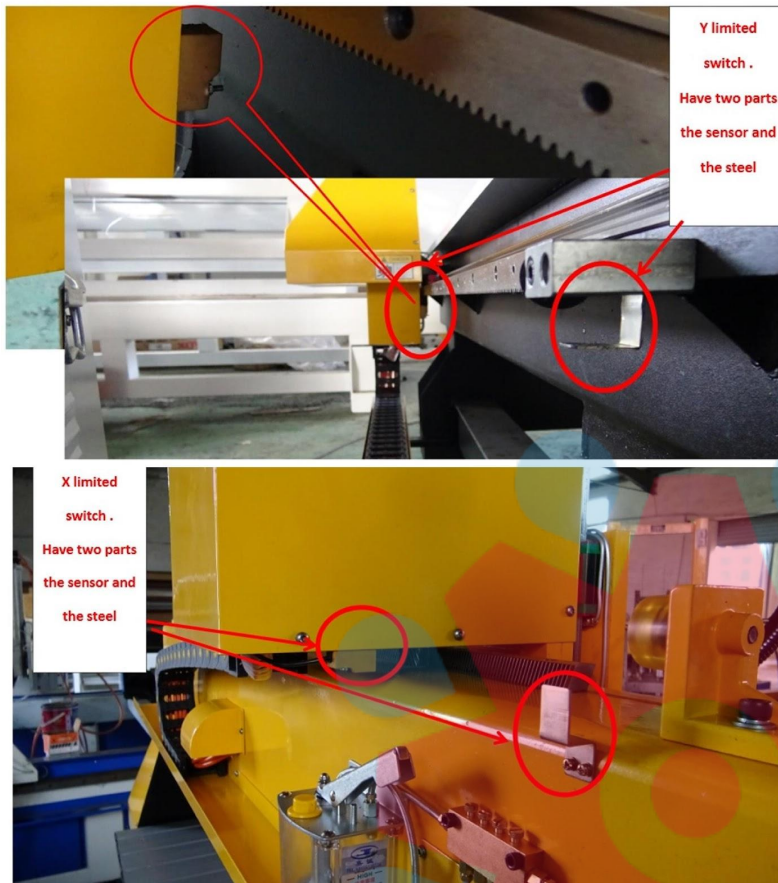


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- 1) Lock
- 2) Power on
- 3) Emergency button
- 4) *
- 5) *
- 6) Fan
- 7) Inverter
- 8) Driver

- 9) 24v Power for driver
- 10) 24v Power for system
- 11) Relays
- 12) Fuse
- 13) Filter (For driver)
- 14) Mach3 card
- 15) Main power input (1ph)
- 16) PE



Attention : * button spare.

Attachment introduction

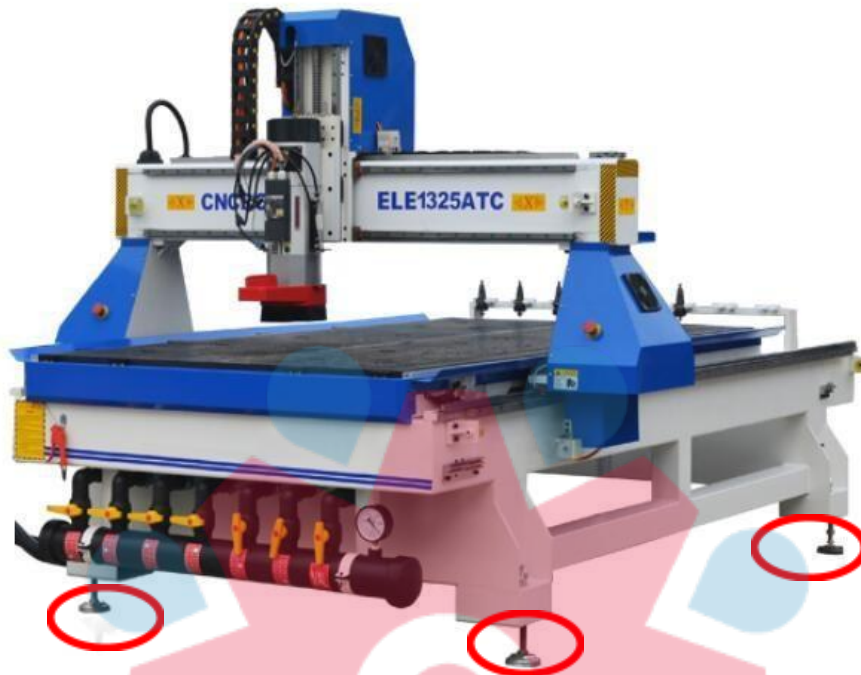
- | | |
|--|-----------------------|
| 1. Power cable | 5. Tool box |
| 2. CD | 6. Tool bits |
| 3. Parallel port cable (or USB cable or DSP handheld with cable) | 7. Spare switches |
| 4. Water pump 1 set (or 2 sets for tool bits cooling if you choose this function) | 8. Bending kit |
| | 9. Wrench for spindle |

Files in the CD you can refer to;

- A. mach3 install: (Software Installation and Usage)
- B. mach3 setting: (you can choose the setting file according to your control box option)
- C: machine teaching video We take some video about how to use mach3 to control machine to work. And hope it help some CNC router beginners to know how to use machine quickly.
- D: mach3 teaching video: you can learn more about mach3 in this part
- E: manual: you can find inverter manual, breakout board manual machine using manual in this file.
- F: auto tool zero setting: please read the introduction careful.

Machine installation

- 1) . Put the CNC Router on a plane surface, then adjust the feet of the machine.

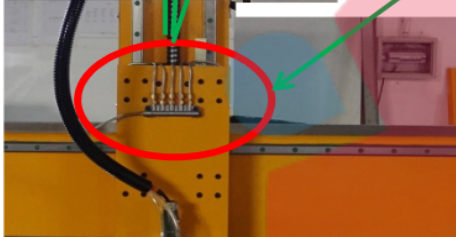
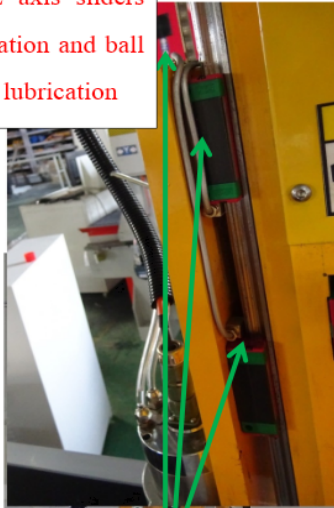


- 2) Fix the dust pipe bracket to the Z spindle and the side of lathe bracket. There are screws in the point of connection, taking off the screw and fixed the bracket on. (if choose dust collector)

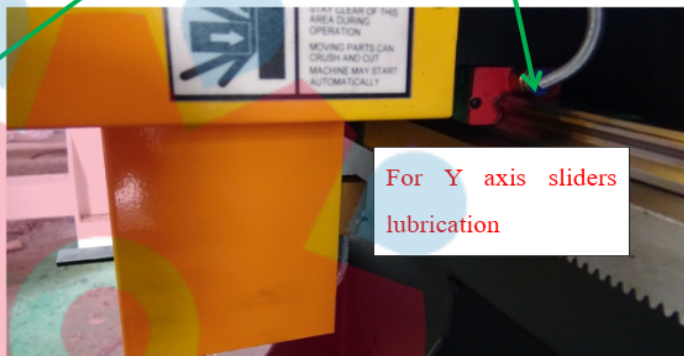
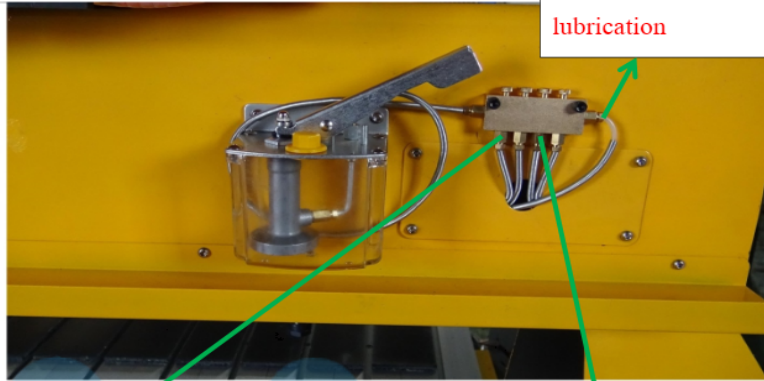
Lubrication system for moving parts



For Z axis sliders
lubrication and ball
screw lubrication



For X axis sliders
lubrication



For Y axis sliders
lubrication

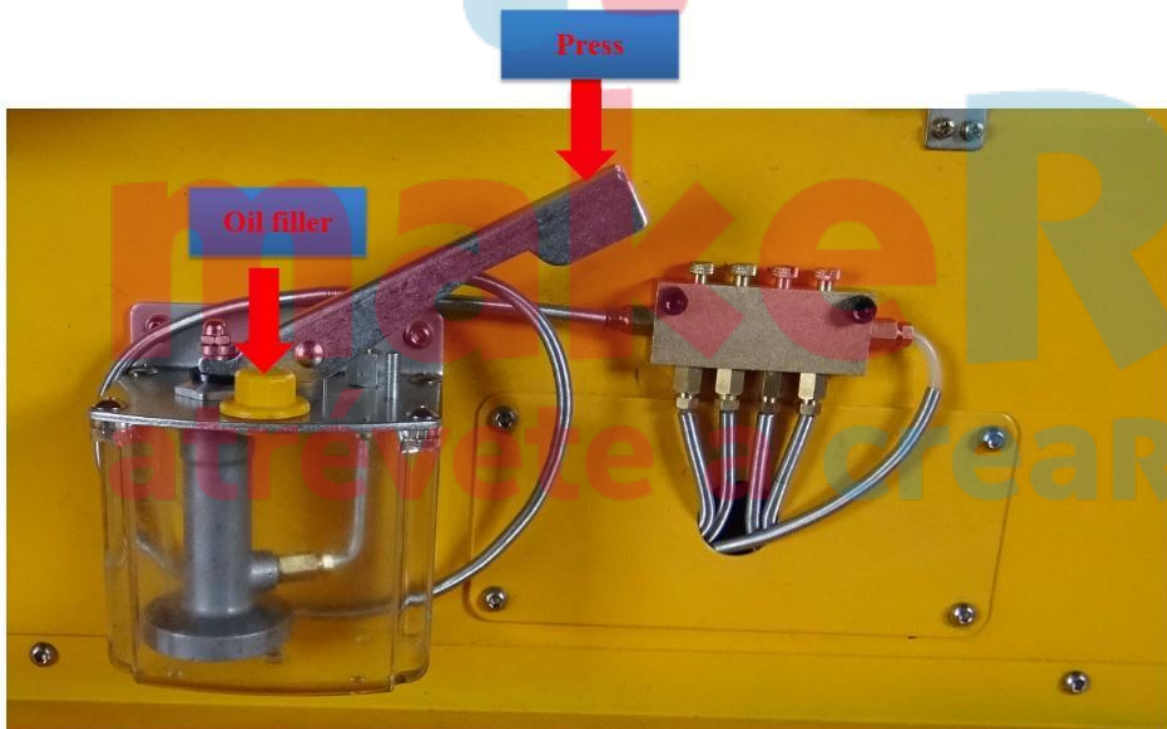
Oli: Normal Engine oil

Before first use the machine ,we need let the slider and the ball screw get oil .

After first use ,we need every day press the Manual lubrication pump once before start work .

Press

Oil filler

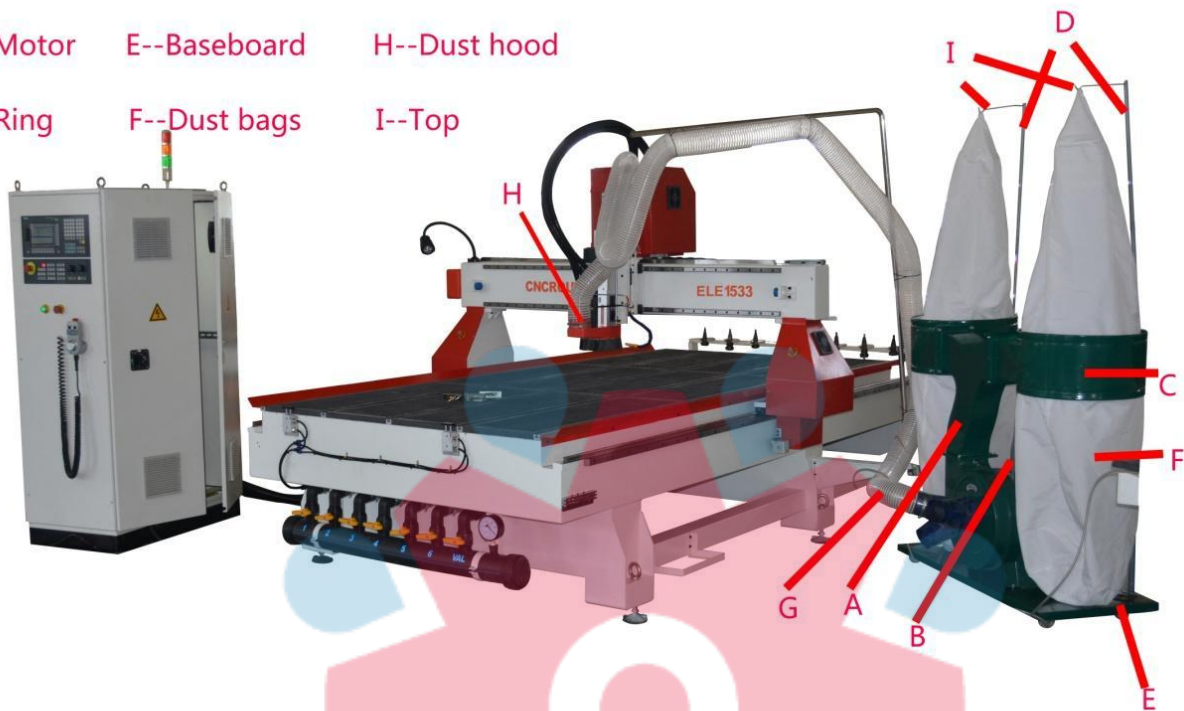


How to connect dust collector .

A--Tee tube D--Dust bracket G--Dust pipe

B--Motor E--Baseboard H--Dust hood

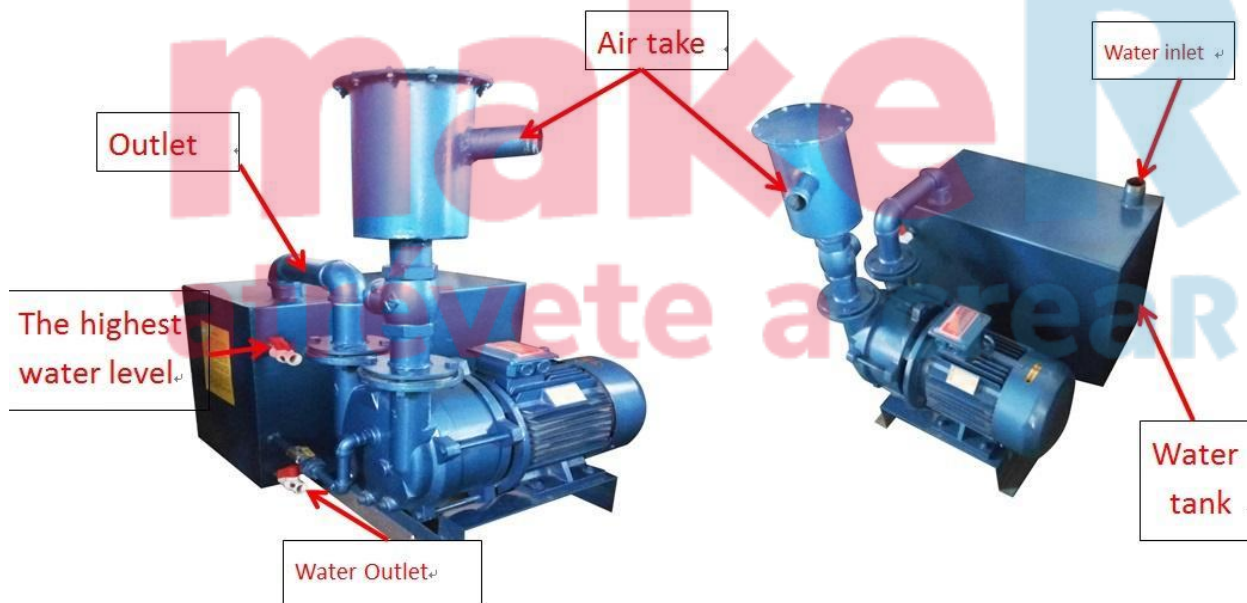
C--Ring F--Dust bags I--Top

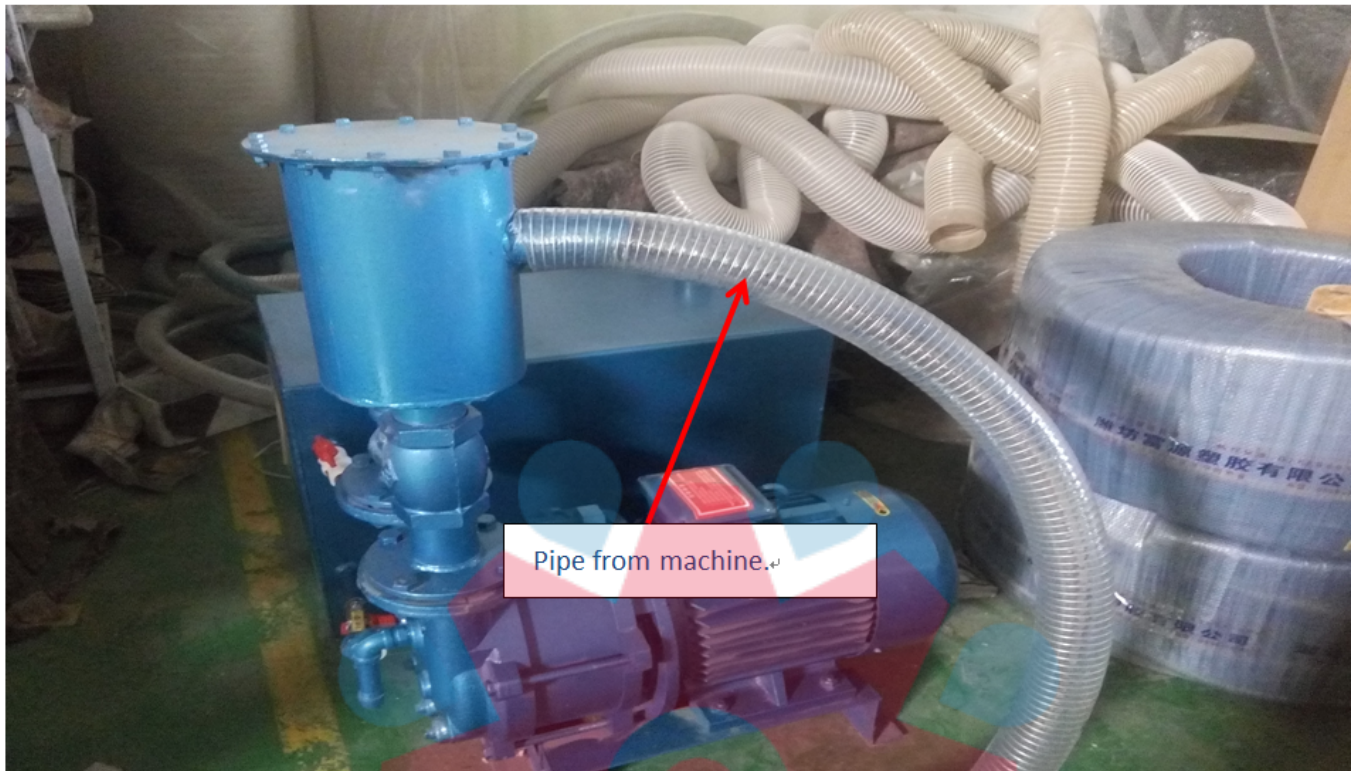


How to connect and use the dust collector system

1. A connects with B
2. A connects with C
3. D connects with E, C,I
4. F connects with E, C,I
5. G connects with H
6. The motor connects with lines, energizing and begin to use.

Connect vacuum pump





1, Pour water into the vacuum pump. But you should avoid too much water in the pump.
 (remember: after you have poured the water, 15 minutes later, then you turn on the power)

Attention

1), before use the vacuum pump, please add water to the tank.

Here are steps, please open the high water level valve, then add water until the water outflow from it. Close high water level valve. Please power on of the motor about 15 minutes later, wait for the pump is full of water. The pump must be full of water.

2), every day, please check the water of the tank before work.

3), regular cleaning of the water tank. Every 2 months to clean up the water tank. Open low level water valve let water outflow. Rinse several times.

4), regular cleaning the filter .every week.

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Pump for spindle water cooling

If your spindle is water cooling,you should do like this.

1,Find the box of the pump .



Open,then you will see.



We will do like this.

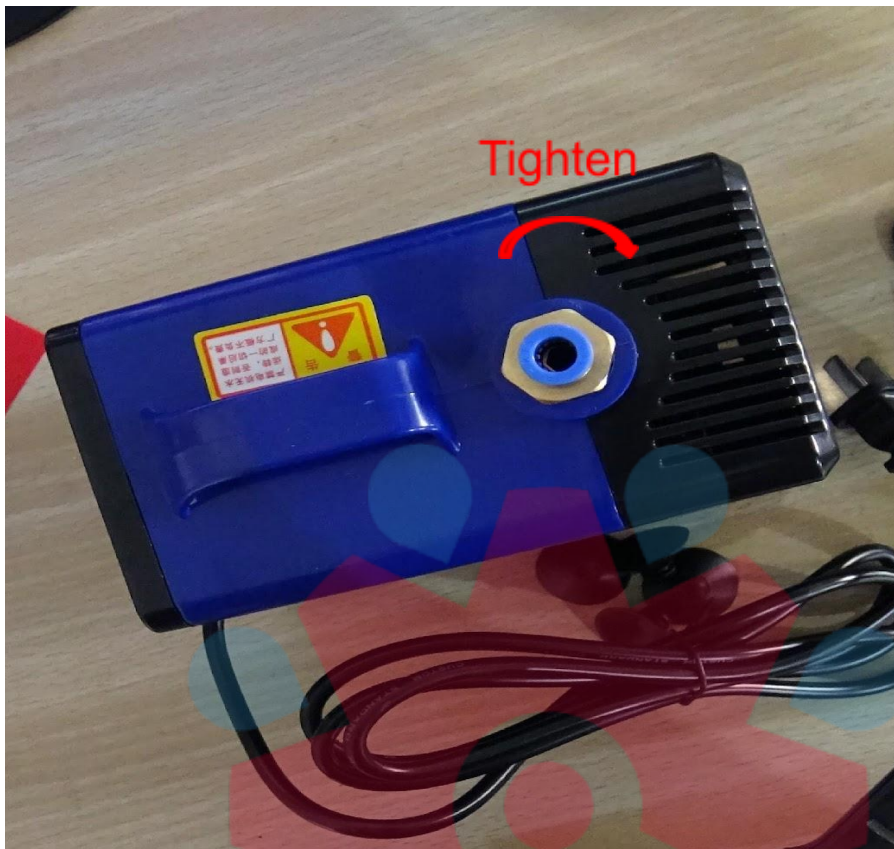


Front

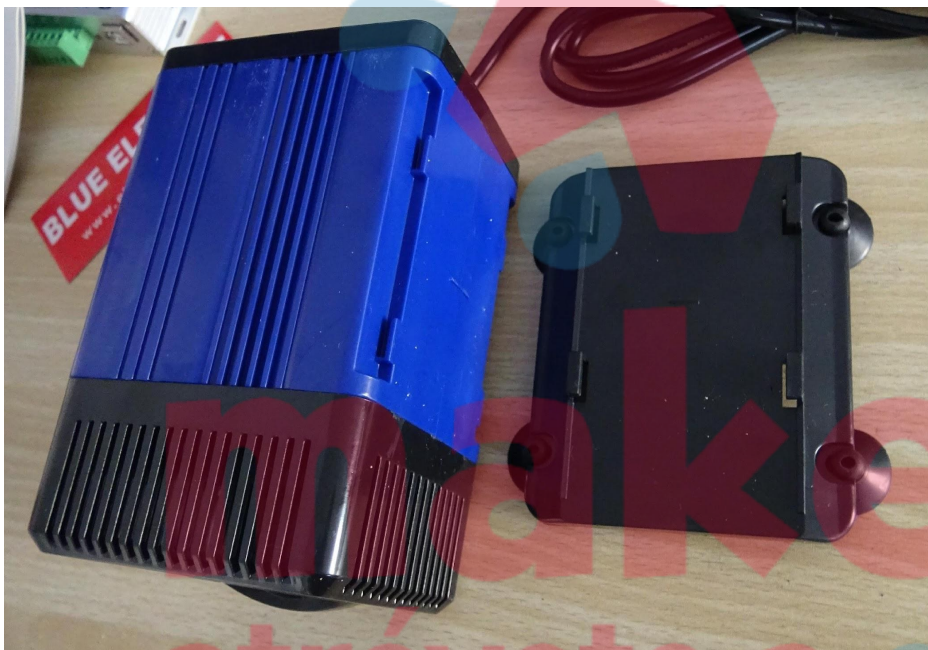


Then.





Next.





Ok, finish.



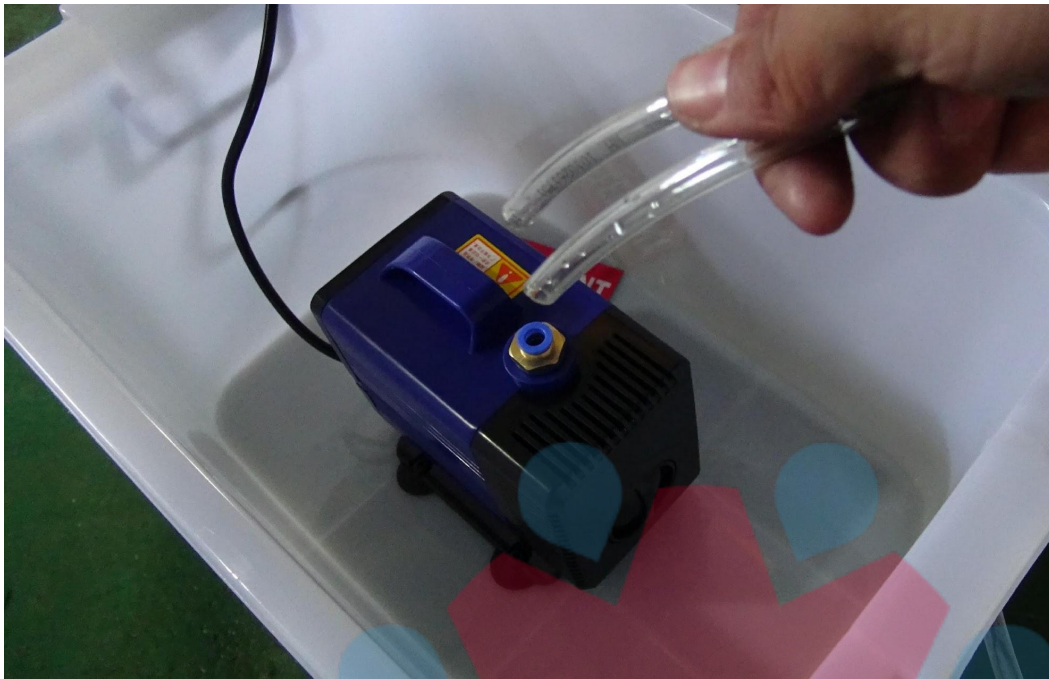


Now ,we go to the machine .



Then connect the pump.

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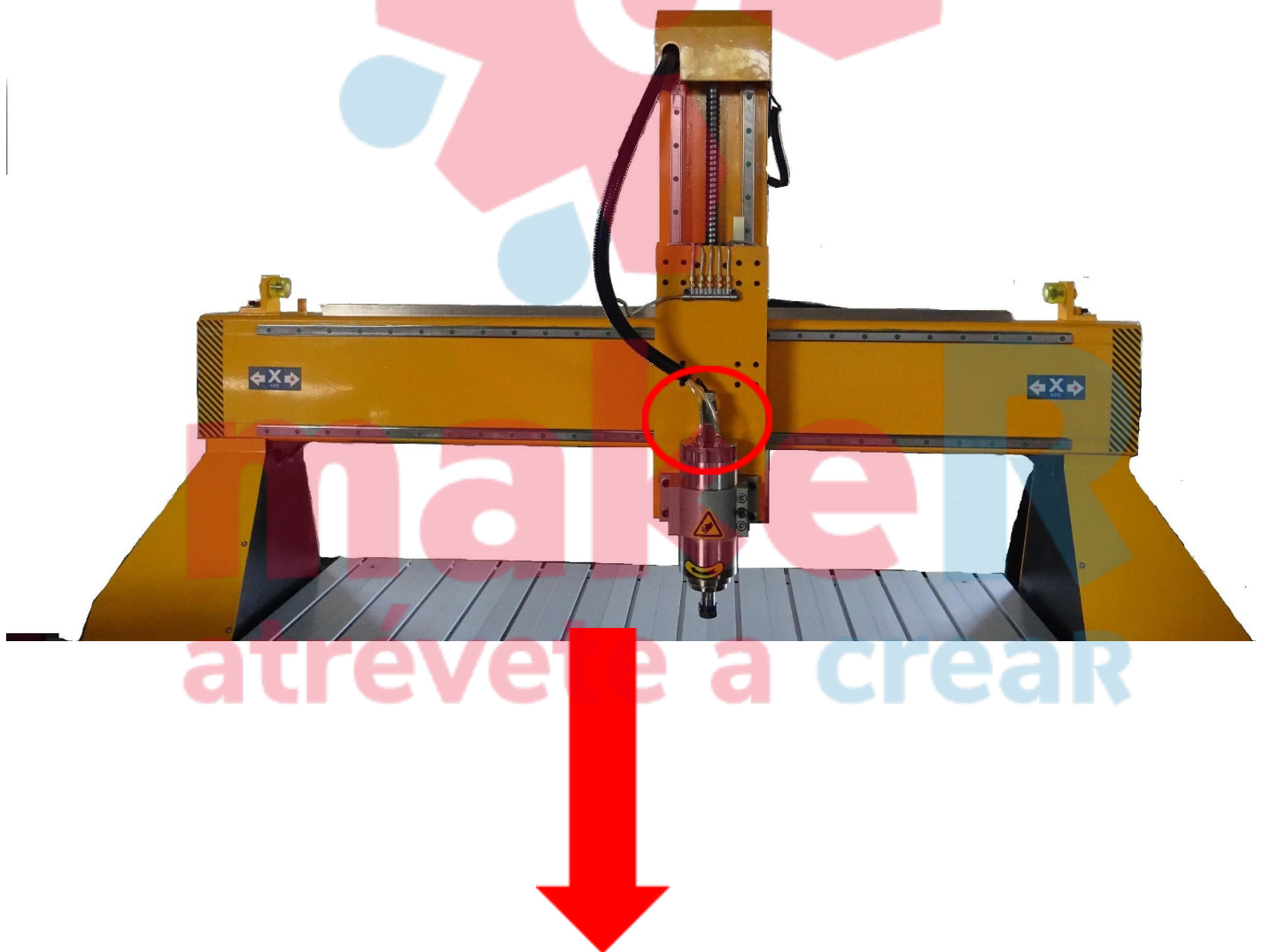
Ok, finish.

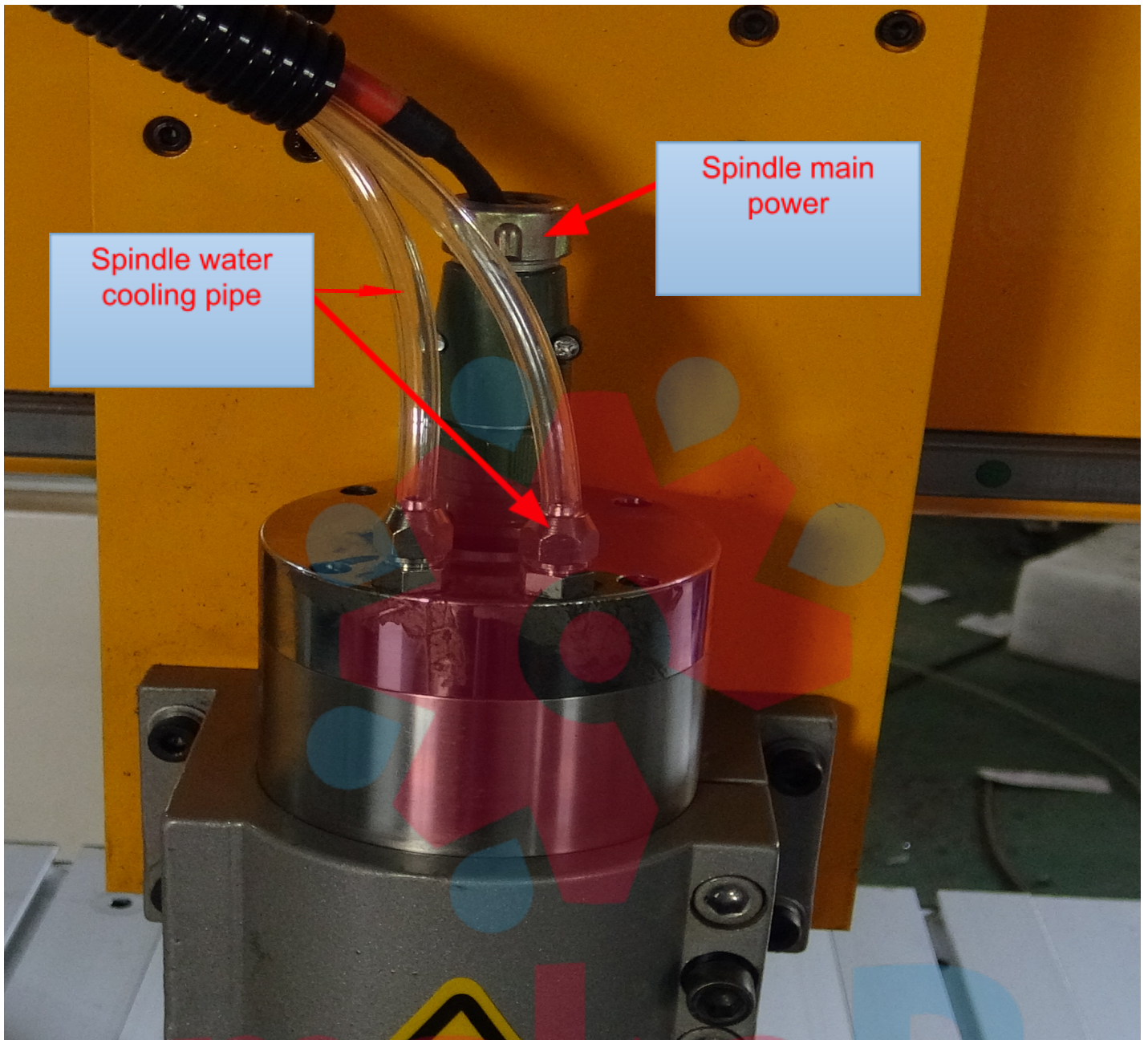
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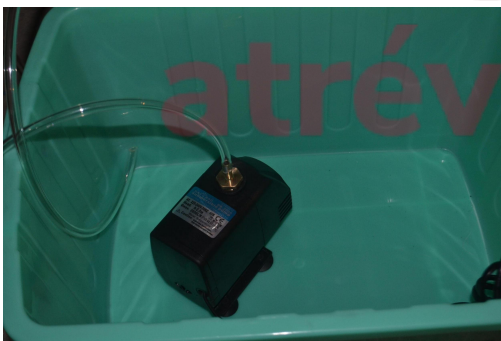
We need Pour the water into the box

After the machine power on,the pump must be working .

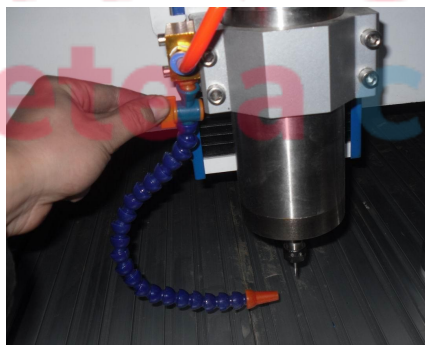




Watering the water tank more and better. The spindle is cooled by water, so there is one water pump to offer running water through the spindle. Then there are two tubes is outside of the machine, one tube is installed on water pump, pump will get water into the tube and go through the spindle, then out from another tube. They are transparent pipe.



a



b

- a) If you choose metal engraving type. There will be second water pump(also need another water tank , please don't use same one with a) to cool the bits , we use orange color pipe .
- b) there is a water jet beside spindle. You can see

Note :

- 1) for water pump cooling spindle. The water is cyclic , so please add enough water and be careful about the temperature of water in the tank. If it become hot, please change cool water.
- 2) For water pump cooling bits. The water is not cyclic, so it will need more water. Please be careful about the water in the tank to avoid the empty of water.

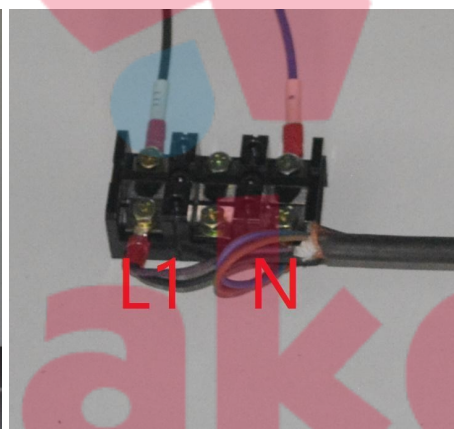
Here we offer a quick fitting connector with pump. So you can plug in or off the tube very easily when you want. This is the way you can refer to:



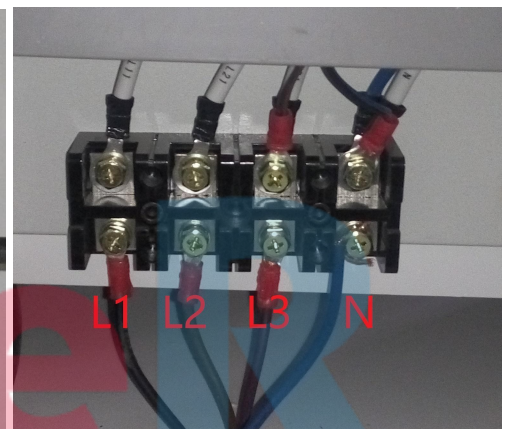
Connect to main power.



3PH 220V



1PH

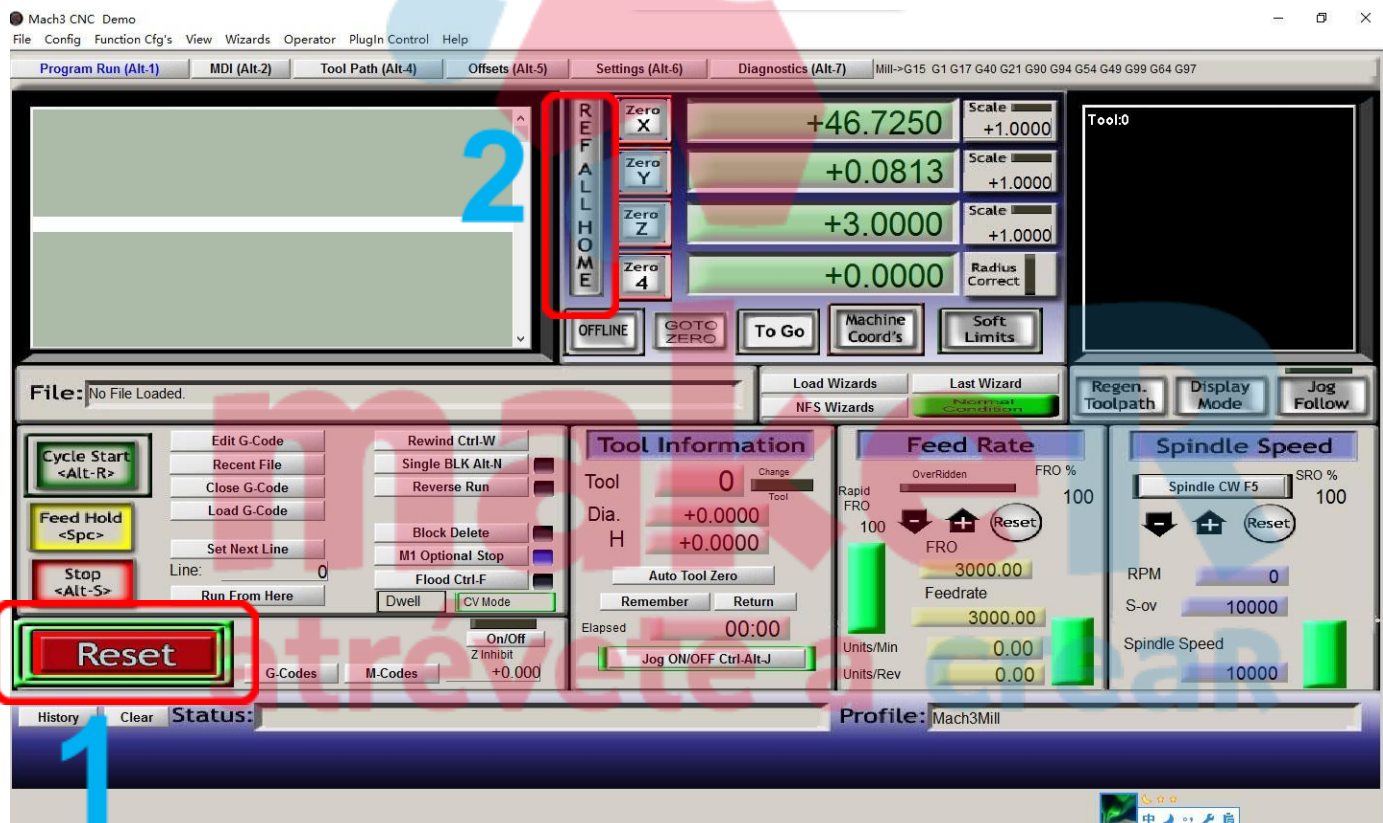


3PH 380V

Power on the machine .

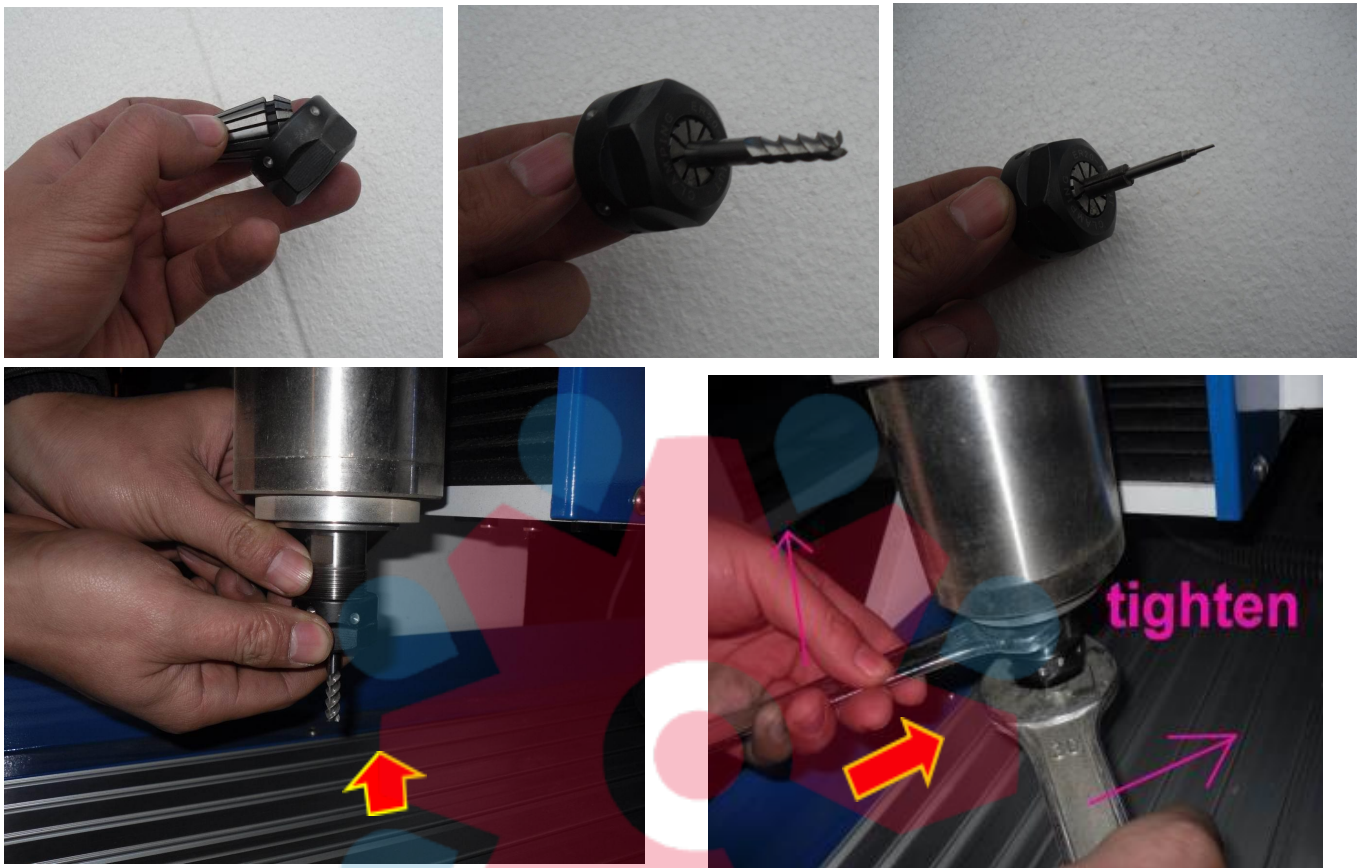


Step 1 release the Emergency button (1)
 Step 2 press the green button .
 Then the power .
 Connect the computer to the machine with the usb cable .
 Ok



Step 1 Click the button “Reset(1)” (Please use the the lift button of the mouse)
 Step 2 Click the button “REF ALL HOME (2)” (Please pay attention to the machine ,all of the axis will move to the Bottom left corner of the machine.)

Here is the way of setting tool bits on spindle.




How to use the table .

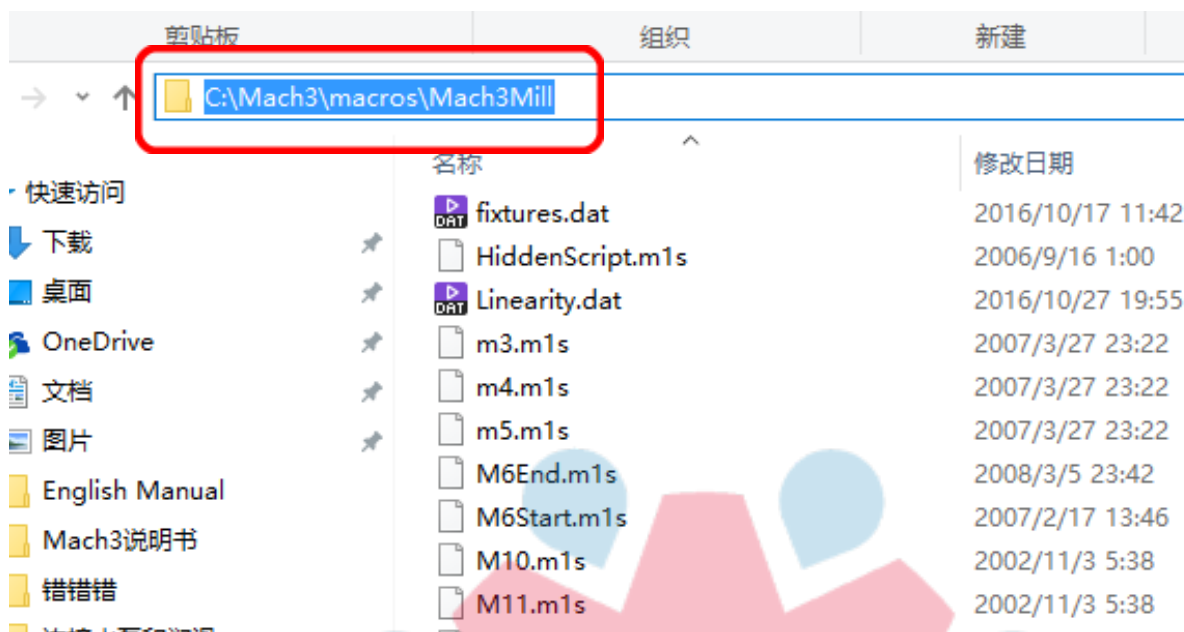
If you want to **cut** something, please do like this.



Calibrator using.

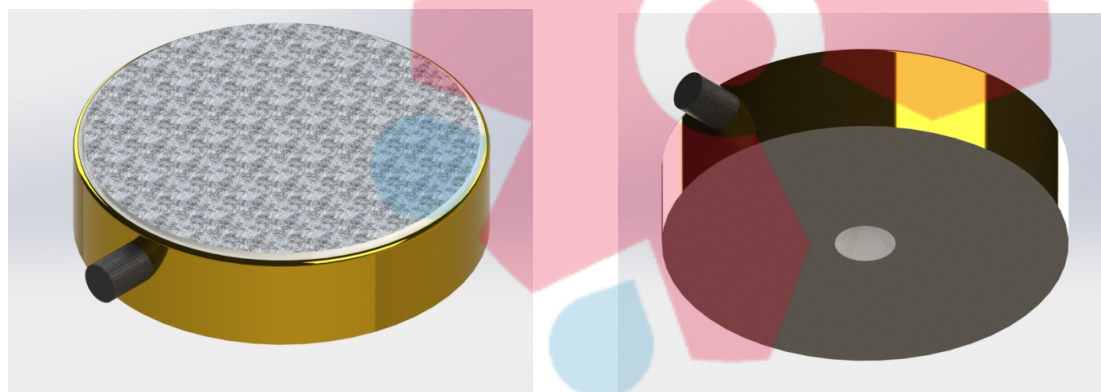


You can find the instruction file in CD if it is mach3 file.  M930.m1s
The M930.m1s is probez surface file, please copy it to the [mach3/macros/mach3mill](#) directory;
Copy the file then paste to the folder .



Please check the front , left side of your machine to find the connector of calibrator.

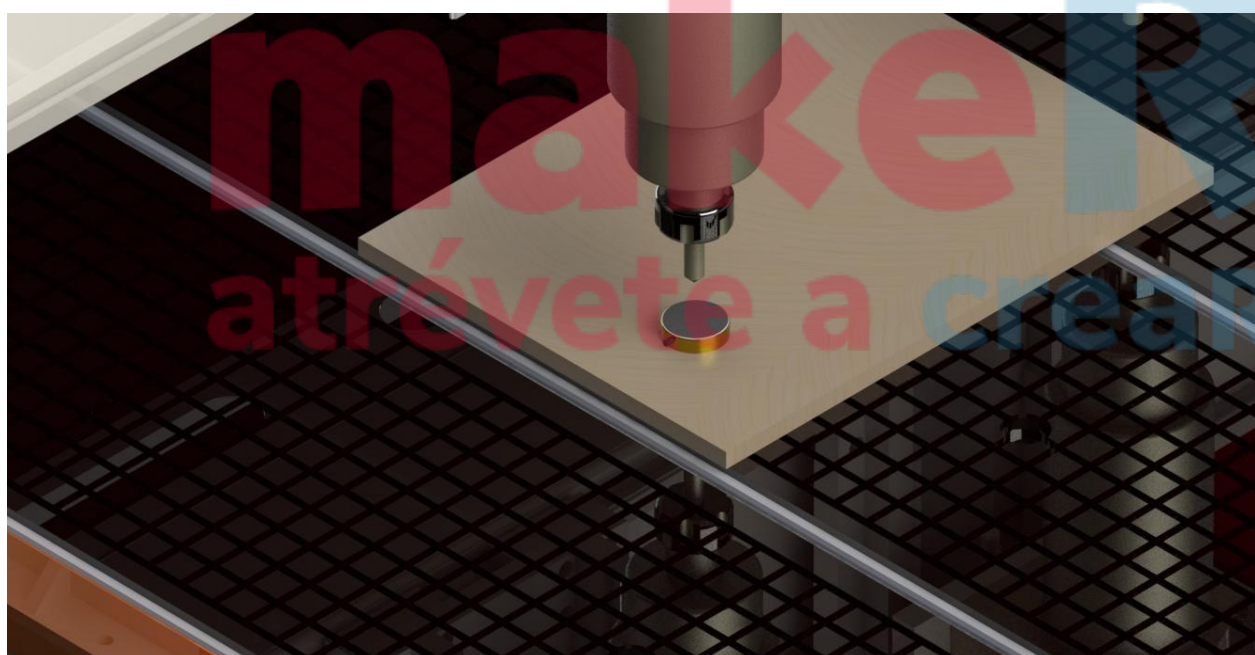
How to use it ?



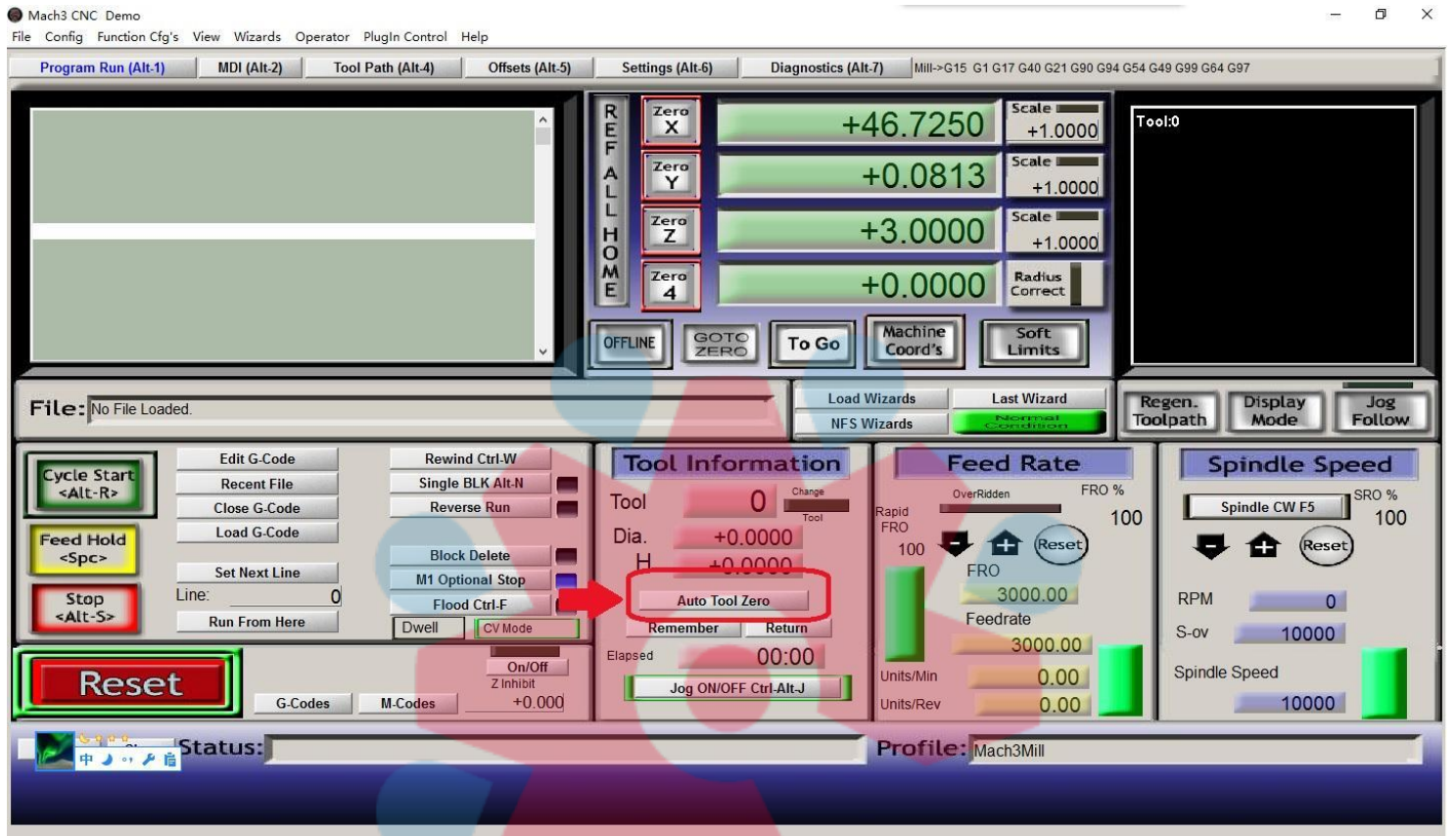
Front

Back

Put calibrator on the surface of the workpiece . Tool just below



Open the Mach 3 software . press “Auto Tool Zero” the spindle will down with slow speed .when the tool touch the calibrator,the spindle will move up,the set zero for Z axis is finish .



Attention: the calibrator just set Z axis zero point .x and y workpiece zero point please set manual .
the calibrator just set Z axis zero point.
the calibrator just set Z axis zero point.

How to set workpiece zero point .

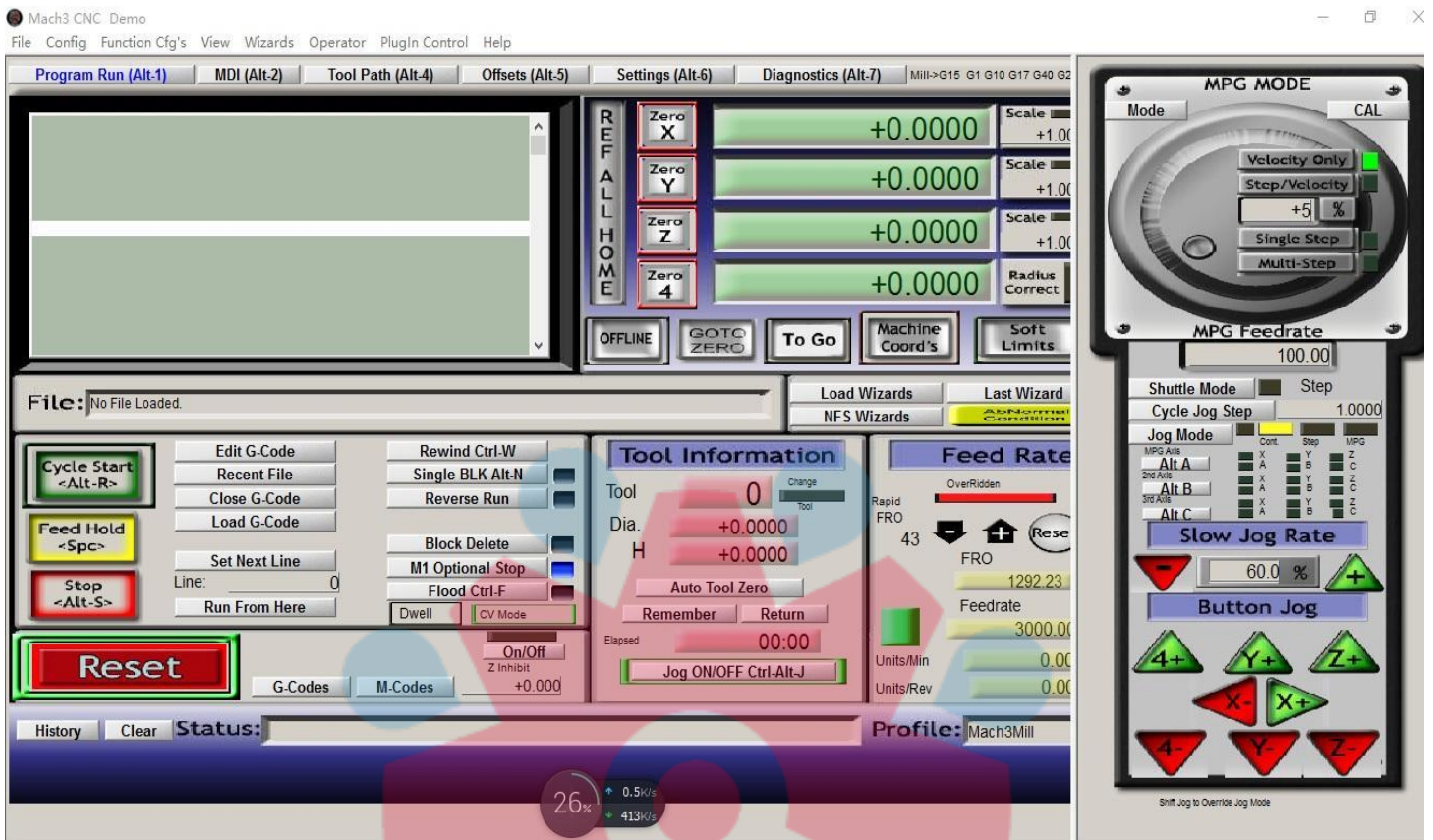
For Mach 3.



Press the key “Tab”



Then you will see like this .



You can use the key to move axis.



And you can also move the axis by keyboard.





: X AXIS



: Y AXIS

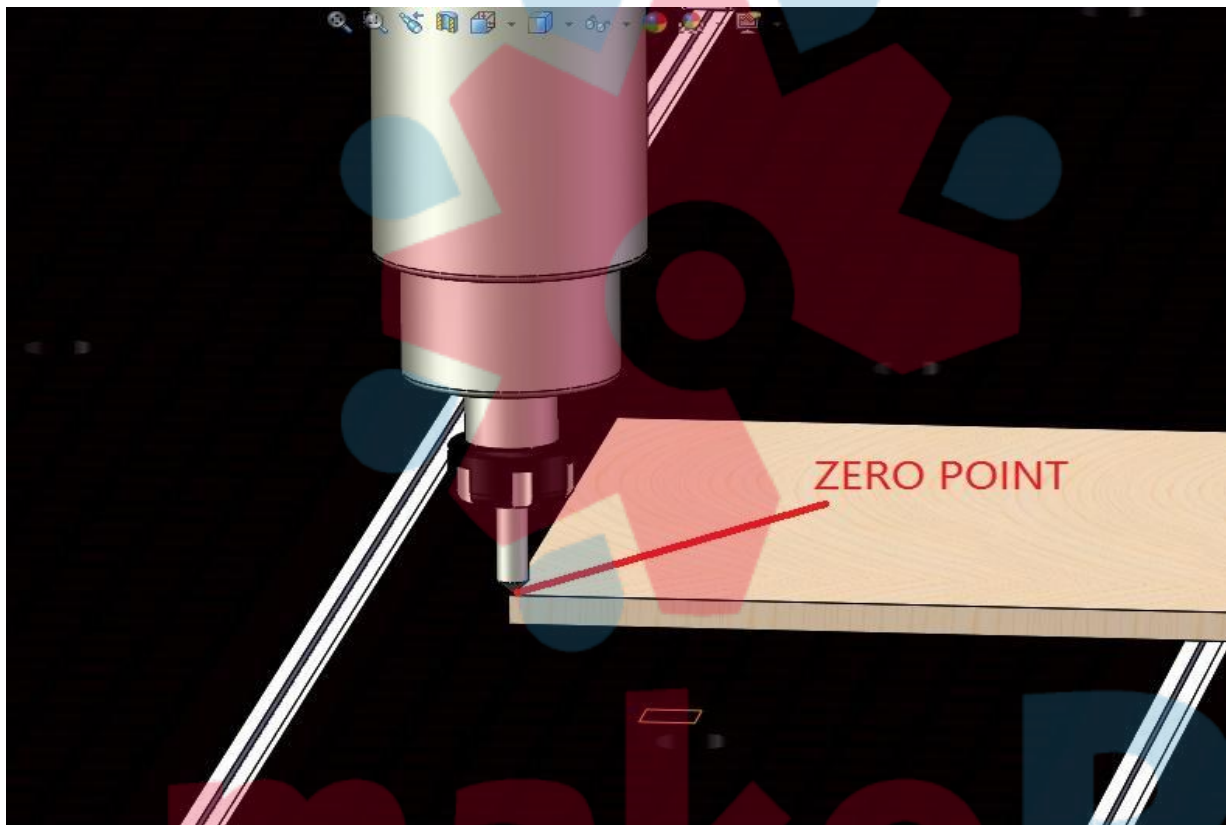


: Z AXIS down and up .

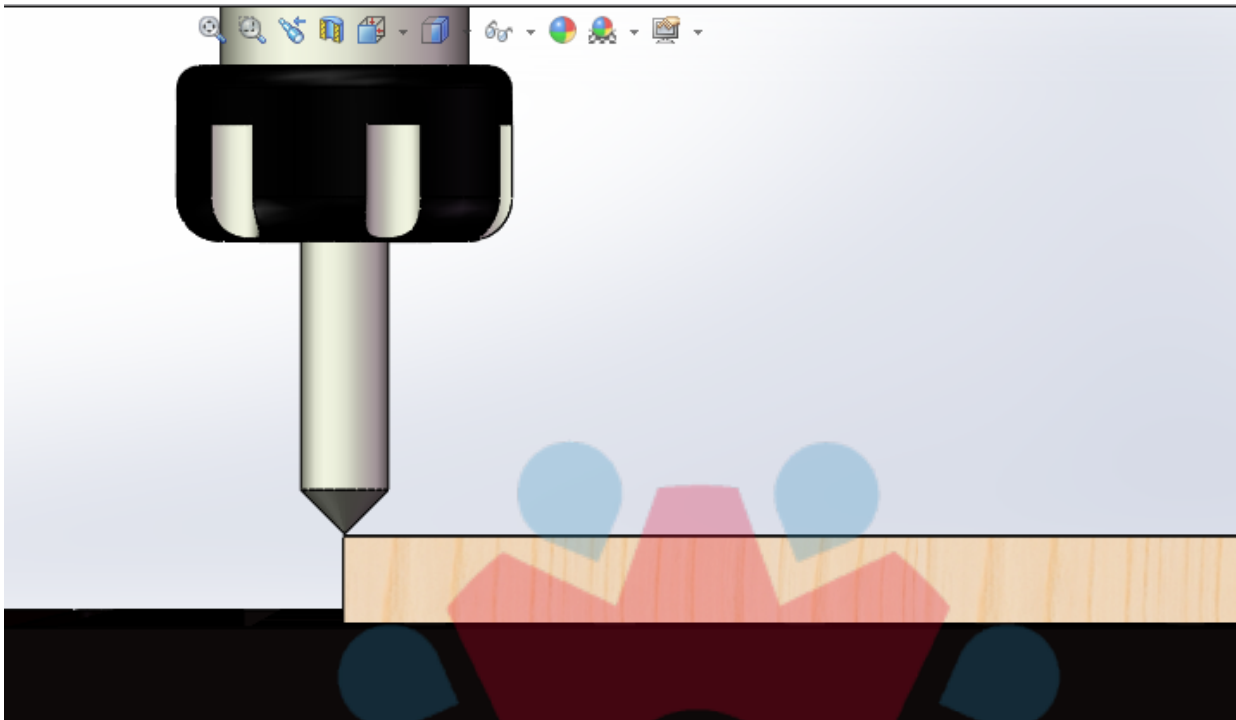
Method one

1, Move the axis to the workpiece zero point (where you have to set .) .

Like this:



maker
atrévete a crear



THEN



atrévete a crear

V Notice and Maintenance

NOTICE:

As the machine is shipped by sea. it took long time. so when you run the spindle at first time. please let it run at low speed for a while. for example: 5000rpm for 5 minutes, and then 10000rpm for 5 minutes, then 15000rpm for 5 mins. 20000rpm for 5 mins. then 24000rpm at last.

note: if you run the spindle at 24000rpm at first time. there will be a little noisy made by ball bearing , it will shorten the working life of spindle .

V Maintenance

5.1 CNC router maintenance

CNC router is a machine tool equipment, it has a certain running in period, it is better to use in the low speed in the first three months, Please use it intermittently and keep the motor not too hot, frequently clear the dust of the bearing of the ballscrew and lubricate it.

5.2 The maintenance rules of CNC router machine:

It is necessary to clean impurity and apply oil during the daily use of engraving machine, or else the machine will work slowly and in disorder because of the long time working without cleaning the impurity and dust of the ballscrew, sliding block and inner of bearing.

Maintenance methods:

- 1). **Choose the lubricate oil:** the mixture of the engine oil and cup grease, not too thick.
- 2). **Lubricating parts:** master screw, guide screw, sliding block and axletree of the spindles of X, Y, Z.
- 3). **The process of lubricating:** wipe of the impurity of the rack, axletree, master screw, guide rail, nut and the sliding block of axletree before lubricating. If some are difficult to wipe off, you can use petrol to clean then fill the lubricating oil and makes speed gradually to test without material.
- 4). **Lubricating period:** it should depends on the working surroundings and the working time, generally wipe of the disintegrating slag everyday after work. And fill the oil of each parts per month then move fast to lubricate without processing any materials.
- 5). **Lubricating methods:** use cup grease to fill sliding block, other parts can use oil pot to drip oil or use cloth to rub oil on.

5.3 The maintenance of vacuum. (Vacuum is optional)

5.31 In order to avoid the abrasion of the the impeller and pump body or locking of the impeller, make sure that the dust which go into the pump with the air and the water should be washed out through the washing pot which is in the bottom of pump cap.

5.32 If use hard water act as working fluid, the hard water should be intenerated, or wash the vacuum pump periodically.

5.33 Lubricate

In the average working circumstances, using 50HZ motor: after 20,000 hours working or after 3 years working, the disused grease and dirt between the axletrees and their accessories should be cleaned and the new lubricating oil should be added into. The newly added lubricating oil should take 50% space of the axletrees and 65% space of the axletrees cap.

If the working conditions is very wretched, the exchange period of oil should be shorten.

5.34 Exhaust

After drain away the air, open the water outlet of water tank to make the water outflow.

And rotate the vacuum pump by manual drive, until there is no water to outflow. Incline the vacuum pump at 45 degree angle to drain away completely. In this case, the pump won't get breakage even if it is

long-time no use or under the cold weather.

- 5.35 The methods of dealing with long—time pump off: if the pump has been discontinued using for more than 4 weeks, it should be drained according to method 3, after that, it should be taken anticorrosion treatment, that is to say, pure 1/2 L anticorrosive oil to the pump from the suction port or the vent, and then run the vacuum pump for a short time. If the impeller is locked after long-time discontinue use because of have using hard water, the vacuum pump should be inpoured with 10% oxalic acid for about 30 minutes.

5.4 The maintenance of dust collector (Dust collector is optional)

Frequently clean dust and pay more attention to oiling maintenance for the rotation part.

VI. The rules of cutters operation

6.1 Cutters operation :

- 6.11 All cutters of our series are designed in clockwise way .
- 6.12 Must choose the collets in appropriate size . The collets that are uneven , damaged , not smooth enough or with taper inside , can not hold cutters tightly enough .To avoid the shank shaking , flying off or being twisted off , must change the bad collets immediately .
- 6.13 The shank must be inserted in the collet with good osculation and be tightened tightly . After tighten the shank in collet , the surface of shank is uneven or there are dents in it , which indicates the shank slipped inside or there is deformation inside of collet. In this case , change the collet immediately .
- 6.14 Stop working with blunt cutters . Keep working with blunt cutters will increase twisting strength of the cutter , which will cause the cutter broken or even industrial accident when the strength exceeds the endurance of the cutter .
- 6.15 The working material even or curve can affect the useful life of cutters . Especially when the cutting depth is deeper than the edge cutting depth, the part upper the edge will be touching the working ware. In this case , the temperature of the part upper the edge will increase heavily , which will cause the cutter deformed and broken or even facilities accident .
- 6.16 Put on proper eye protecting device when operating .
- 6.17 Keep body , clothes , hair , or other sundries away from the working material .

6.2 Choose the proper cutting speed

- 6.21 It is very important for cutters useful life and quality of cutting works to choose proper cutting speed according to different working materials . Work more quickly , better , and more safely with proper cutting speed .
- 6.22 Big cutters move slowly and continuously , in uniform and steady speed . Note : No pause during cutting .
- 6.23 Impel the cutters with large diameter for several times to finish cutting , which will prolong the useful life of cutters and make operation more safely .

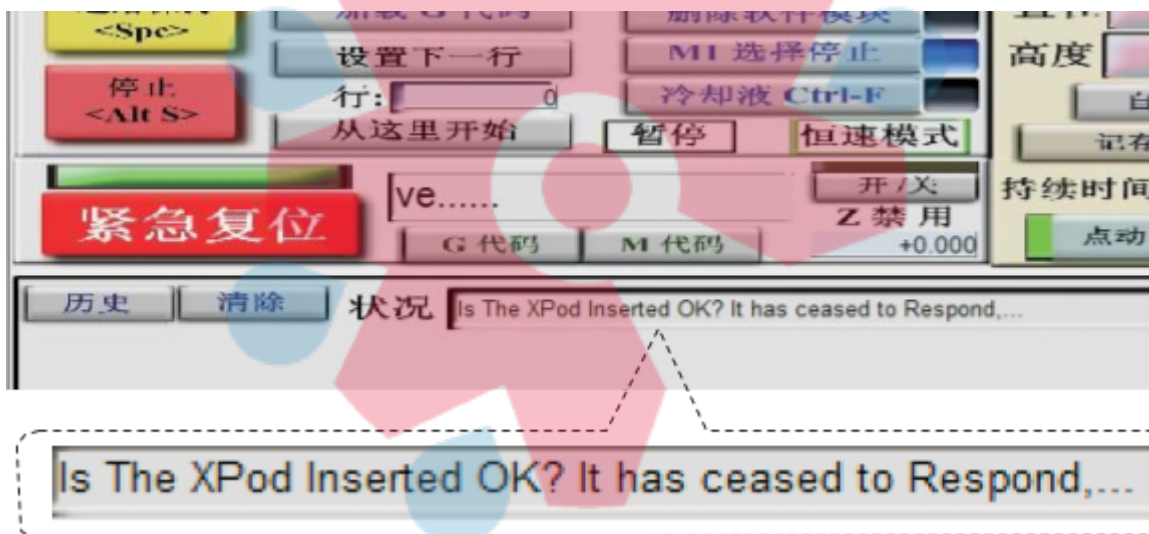
6.3 Cutters maintenance

- 6.31 Maintain the cutters clean. Use standard cleanser that is special for cutters to clean the filth and impurity .
- 6.32 Smear an amount of machine oil on cutters surface to avoid rusting and damage.
- 6.33 In order to meet the demand of operation , milling process needs the particular equipments and skills . Forbid milling cutters or changing the shapes of cutters at random, or that will cause the cutter edge broken even facilities accident .
- 6.34 Blow to clean the ash and other dirt off the bearing . Forbid cleaning it with diesel oil or coal oil , or that will damage the special lipid .

PS 1MACH3-USB FAQ solutions

1. Because of the interference, MACH3 cannot find the USB card

Problem Description: control cards, when suddenly turn on the spindle, or for spindle speed adjustment.
The problem: MACH3 software is stopping, status bar:
please insert USB card.

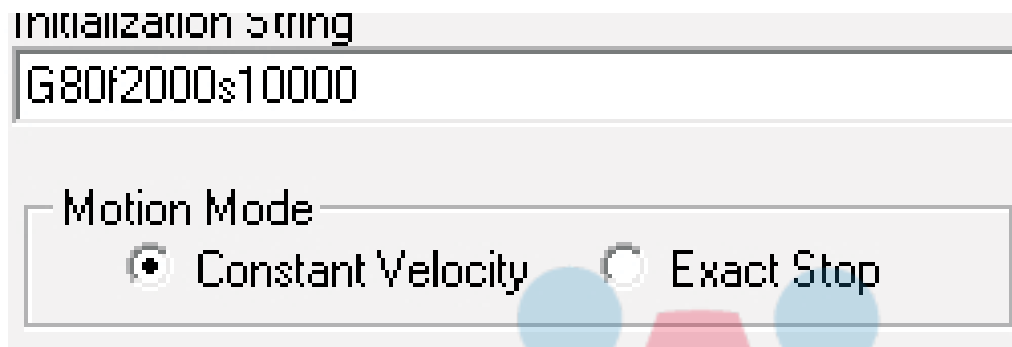


Solution: the problem is caused by interference
Please connect the ground wire (PE) of the inverter and the ground wire of the shaft to the earth

Connect the VFD PE Pin and spindle shell to the ground



2. In Constant velocity mode, In a straight line corner, walked out of mach3 is rounded.



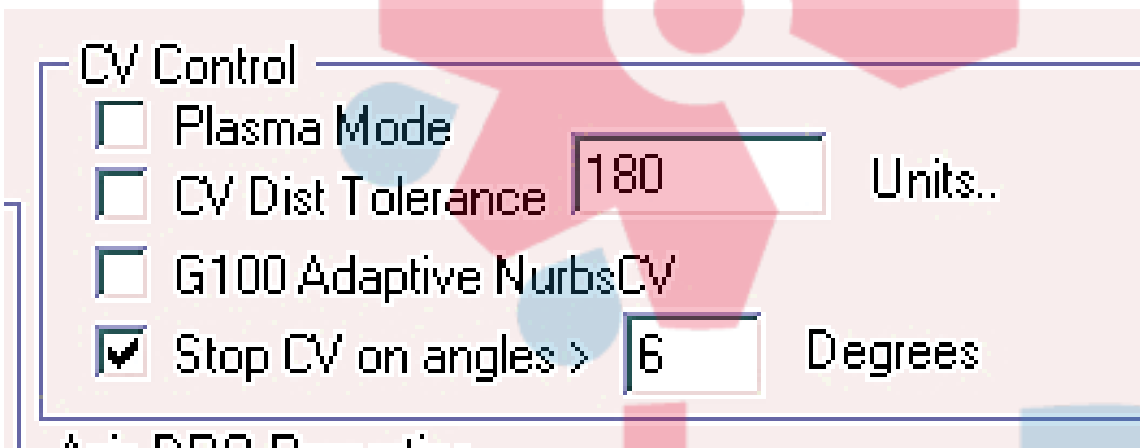
Initialization String
G80f2000s10000

Motion Mode
☒ Constant Velocity ☐ Exact Stop

2.1.1 In general setting, please choose constant velocity mode

2.1.2 In general setting, choose “stop cv on angle>6 degree”

When drawing small circles, if the machine dithers, you can modify 6 degree into 12 degree. With this number become bigger, it moving faster when drawing. But straight line corner will be round.



CV Control
☐ Plasma Mode
☐ CV Dist Tolerance 180 Units..
☐ G100 Adaptive NurbsCV
☒ Stop CV on angles > 6 Degrees

2.1.3 It is not smooth when drawing little circle, you can see many line segments. at the same time, machine dithering.

Now please modify the output code of drawing little circle into I, J Code. Then you can do it.

3. Mach3 back to origin point setting:

3.1 Under Mach3 configure menu, open IO port/pin, then /input menu xhome,yhome ,zhome. set it Port# 1, Pin number :0,1,2 , Active low: Ticked.

Engine Configuration... Ports & Pins

Port Setup and Axis Selection | Motor Outputs | Input Signals | Output Signals | Encoder/MPG's | Spindle Setup | Mill Options

Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey
X ++		1	0			0
X --		1	0			0
X Home		1	0			0
Y ++		1	1			0
Y --		1	1			0
Y Home		1	1			0
Z ++		1	2			0
Z --		1	2			0
Z Home		1	2			0
A ++		1	0			0
A --		1	0			0

Pins 10-13 and 15 are inputs. Only these 5 pin numbers may be used on this

Automated Setup of Inputs

3.2 Open our driver: note mach3 /configure menu, open config plugins. Choose Ncpod. At homing menu please choose Single Stage/Dual stage.

Optional Configs.

Homing

☐ No Homing

☒ Single Stage

☐ Dual Stage

3.3 Connect the origin switch wire; make sure switch signal is right.

3.4 Mach3 main interface choose ref home.

3.5 Executive command, start to back origin point

If after back to origin point, direction and Switch is opposite, please Enter Mach3 configure, Open home/Limit, Tick the Home neg of the corresponding axis

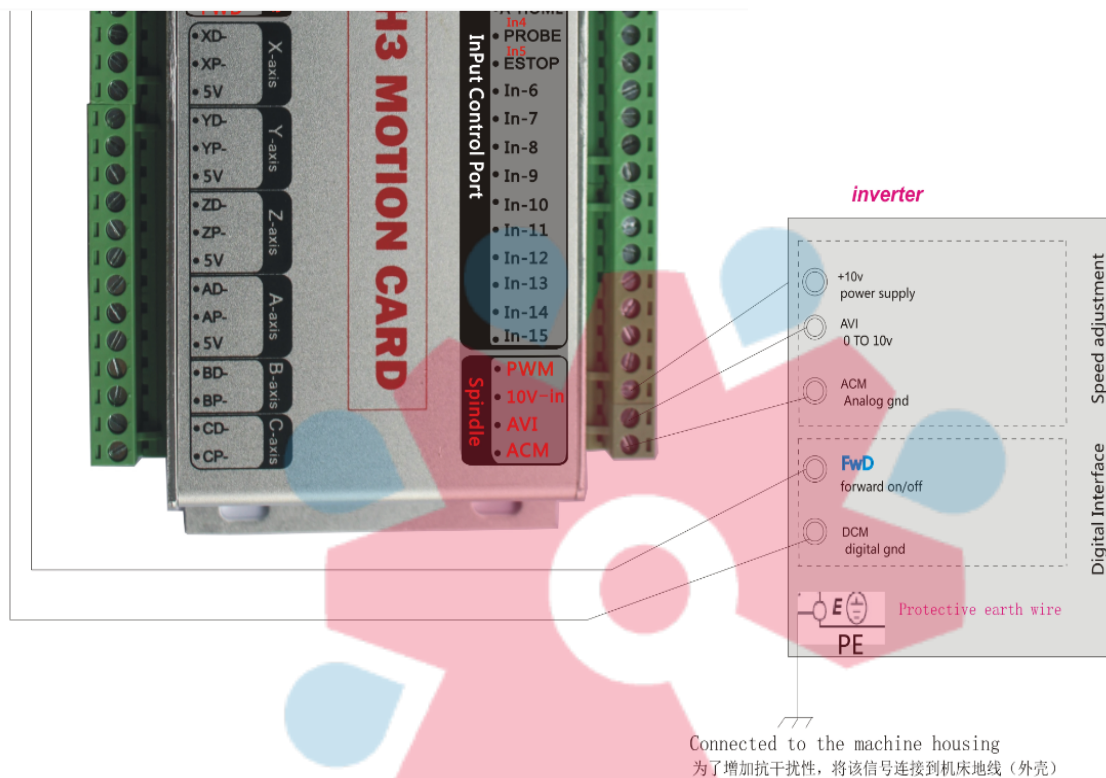
Motor Home/SoftLimits

Entries are in setup units.

Axis	Revers...	Soft Max	Soft Min	Slow Z...	Home ...	Home ...	Auto Z...	Speed %
X		100	0	1	0.0000			20
Y		100	0	1	0.0000			20

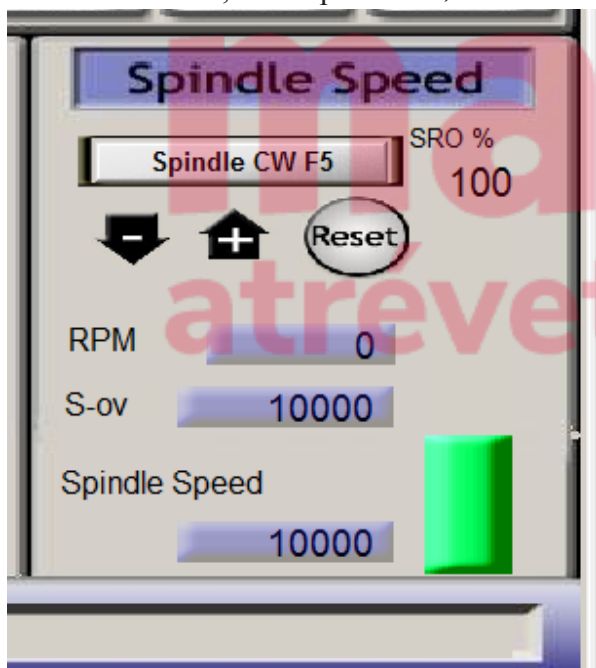
4. How to adjust the spindle speed?

4.1 Connect the spindle control line like the picture showed.



DCM, FWD belongs to Starting signal. Short circuit will start VFD. AVI, ACM are Analog voltage adjustment signal for spindle speed adjustment, 10V is VFD output Voltage

4.2. Mach3 work, click spindle F5, move slider for speed adjustment.

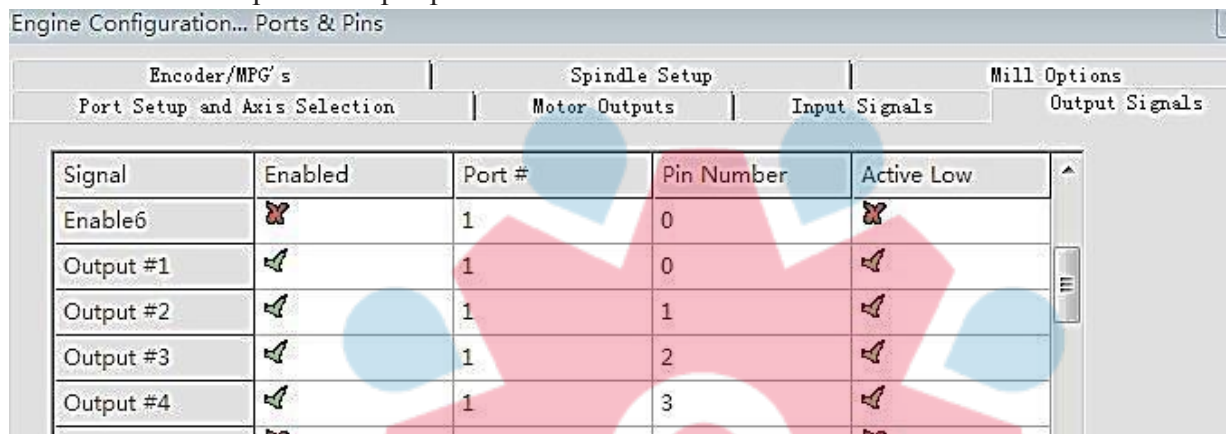


4.3. Make sure that the speed not 0 now, if it is 0, Please input 10000 of spindle speed, and Enter. Check if the mach3 start signal is right

4.4. If the spindle is not started, please make sure that connection is right
And VFD belong to analog voltage control

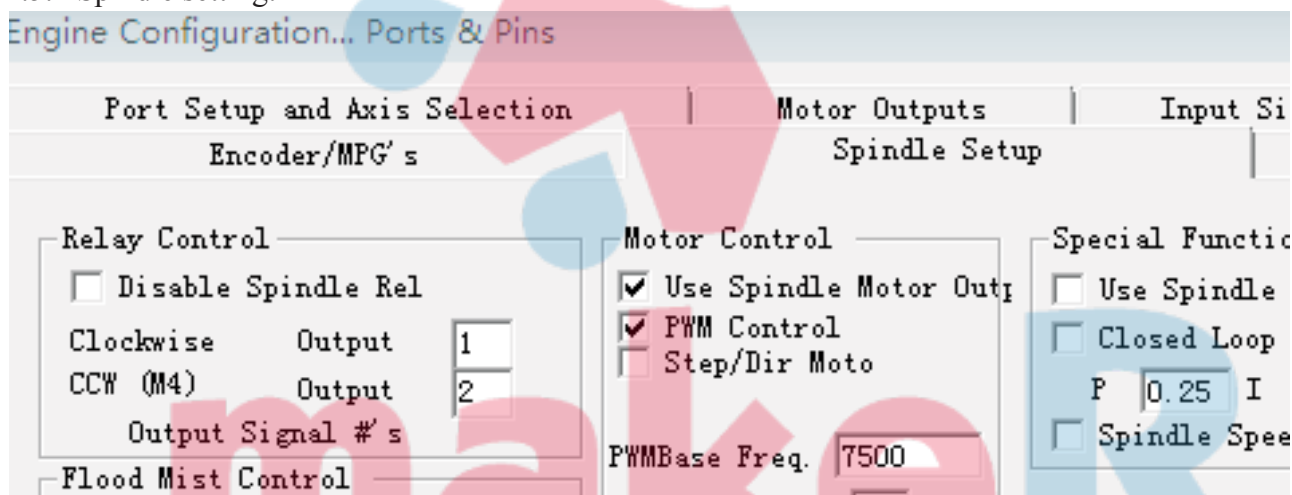
4.5 mach3 spindle start need to set 2 places

4.5.1 Set hardware port->Output port:



Please make sure that Output #1- Output #8 are ticked, other not.

4.5.2 Spindle setting:



4.5.3 Tick Use spindle motor Output and PWM Control, and Clockwise Output set 1, CCW output set 2

4.5.4 Set Spindle Max Speed.

Config menu ->Pulley selection Please set the Max Spindle speed into 24000

Pulley Selection

Current Pulley: Pulley Number 4

Min Speed: 0

Max Speed: 24000

Ratio: 1

☐ Reversed

OK

5. How to do tools setting?

5.1 Setting hardware port->input port, please tick Probe input signals.

Pin Number should be corresponding with Inx of hardware card as follow output pin should be In4.

Engine Configuration... Ports & Pins

Encoder/MPG's			Spindle Setup		Mill Opt	
Port Setup and Axis Selection			Motor Outputs		Input Signals	
Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey
Input #2	<input checked="" type="checkbox"/>	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
Input #3	<input checked="" type="checkbox"/>	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
Input #4	<input checked="" type="checkbox"/>	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
Probe	<input checked="" type="checkbox"/>	1	4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0
Index	<input checked="" type="checkbox"/>	1	0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0

5.2 Menu->Edit button script

Click auto tool zero clearing

Tool Information

Tool: 0 Change Tool

Dia. +0.0000

H +0.0000

Auto Tool Zero

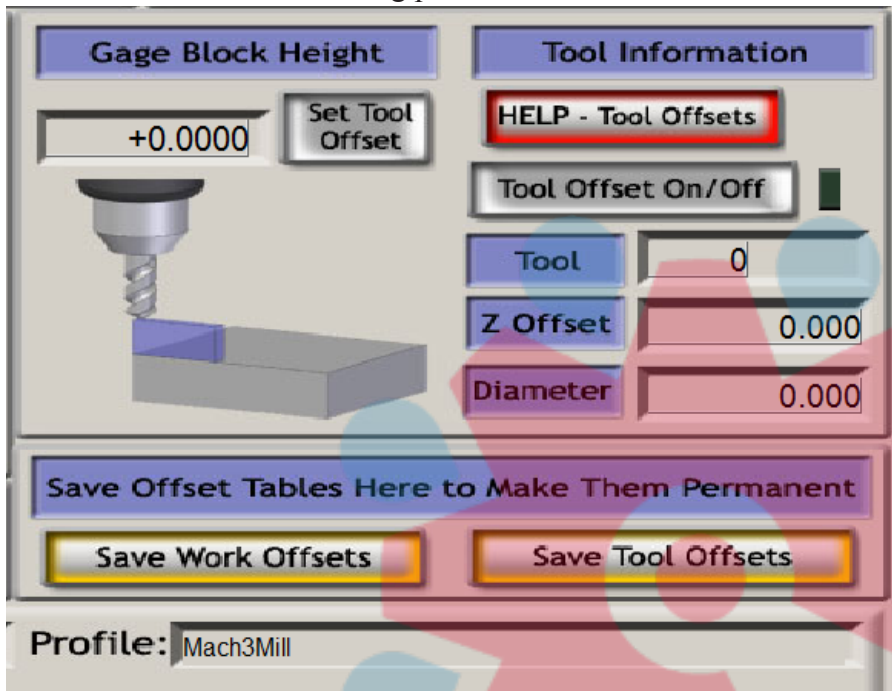
Remember Return

Elapsed 00:03

Jog ON/OFF Ctrl-Alt-J

5.3 Copy the file m930.m1s in the USB we offered, save it and quit documents edit window. Then click auto tool zero clearing button, it starts to do auto tool guide.

5.4 For thickness of tool setting please set it in mach3 offset window.



6. How to manually move lathe and adjust moving speed

6.1 Press TAB key will show manual move window, enter Jog mode, you can switch it between Step and Continuous



6.2 Press X+, Y- then you can move the lathe

6.3 press +/- to adjust the moving speed percent, when it up to 100%, moving speed will be Max.

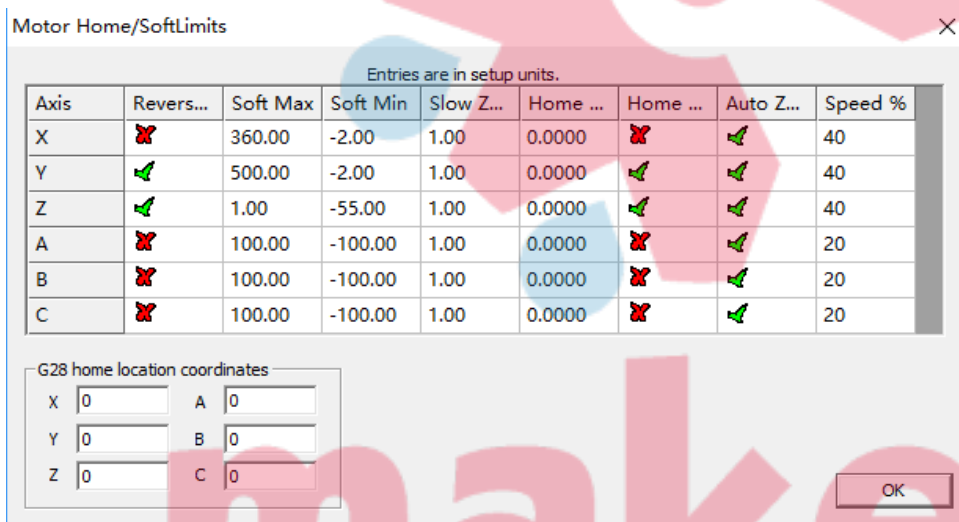
This is the motor speed of your motor adjustment

7. How to set software limit according to the size of lathe.

7.1 Back lathe origin, zero clearing Machine coordinate.



Open Origin/Limit window in Config setting



7.3 Set soft ax as max positive, soft min as min negative, unit is mm/inch. This data can be set according to your size of machine. But This data is machine coordinate, not working coordinate

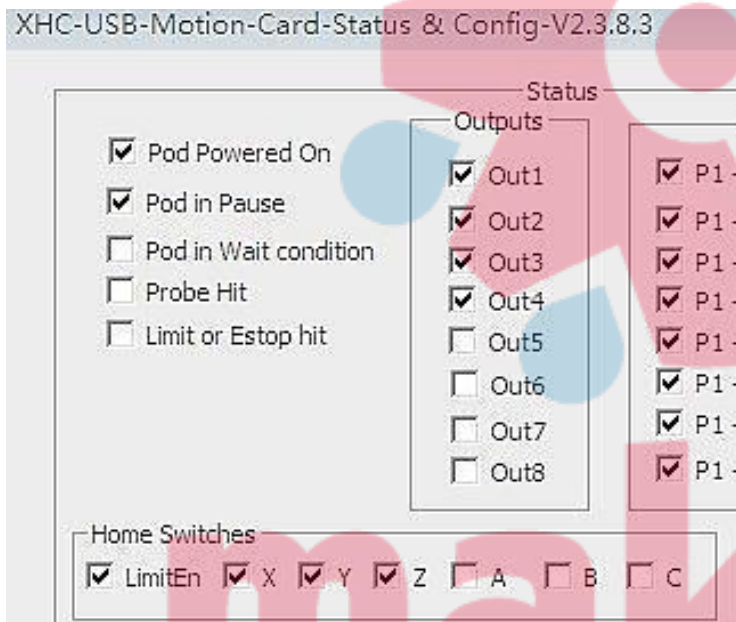
7.4. Press Software limit button, Open it. It will turn green

If it is working normally



8. How to set limit switch?

8.1 if you use origin switch as limit switch, then you only need to open our driver plugin, tick LimitEn and corresponding origin, no need other setting.



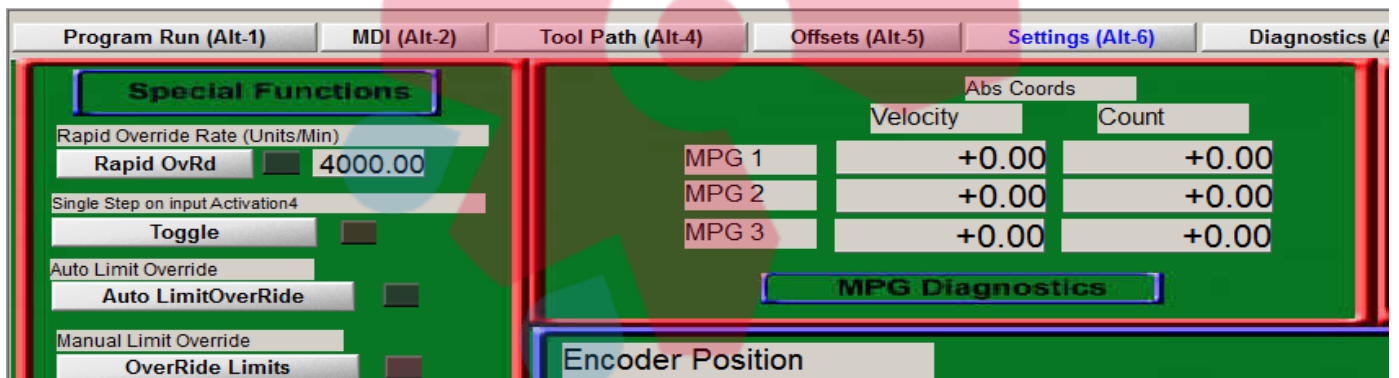
Generally speaking, A, B, C are rotation axis, no need limit.

8.2. If you got a special limit switch, and connect X++ and positive limit to the In8, you need to set it like below... Config -> hardware port: Input port please tick x++, set P1.8, and active low like the form below.

Engine Configuration... Ports & Pins					
Encoder/MPG's			Spindle Setup		
Port Setup and Axis Selection			Motor Outputs		Input Signals
Signal	Enabled	Port #	Pin Number	Active Low	Emulated
X ++		1	8		
X --		1	0		

9. How to control feed speed when run G-code?

Setting page, change feed adjustment into 3000, open rapid control button, now the speed of go will be F3000



10. How to calculate Steps per?

Steps per is the number value that the machine move 1mm, unit is: pulse/mm

Computational Formula: Screw drive:

Steps per =

$$(360 \text{ degree}) / \text{step angle} * \text{micro-stepping level} / \text{Screw lead}$$

Rack Gear: Steps per =

$$(360 \text{ degree}) / \text{step angle} * \text{micro-stepping levels} / \text{transmission ratio} / \text{modulus} * \text{number of teeth} * 3.1415$$

Unknown parameter

if steps per is 200 pulse/mm, ----Input, enter

manual processing mode then input g0x300 (it means when you input pulse X value the distance it will move

300mm) moving actual distance we call it a. Here is the

Formula: $X/300 = 200/a$.

right steps per $X = 200 * (300/a)$

11. How to set velocity and acceleration velocity correctly

MACH3, Motor adjustment, please set velocity and like the form showed

Generally, for stepper motor, value should be 100-500.

For servo motor system, can be 400-1200

Acceleration velocity should be set right,

It maybe cause problems, like machine dither, lose step.

Speed	acceleration velocity(Step motor)	acceleration velocity (Servo Motor)
3000 and below	200	300
4000-6000	300	500
7000-8000	400	600
9000 and above	500	800

12. Mach3 Control Output IO-M code

Activate Signal (OUTPUT5) Open Output port5

Deactivate Signal (OUTPUT5) Close Output 5

Please copy m200, m201 to c: mach3\macro\mach3mill

In programming, input m200 open output 5, M201 close output 5

User can change OUTPUT5 into OUTPUT6, And then you can control other Output Port.

In Mach3 diagnosis, If Output 5 is flashing, it shows that Output port opened

makeR
atrévete a creaR

PS2 Electrical diagram

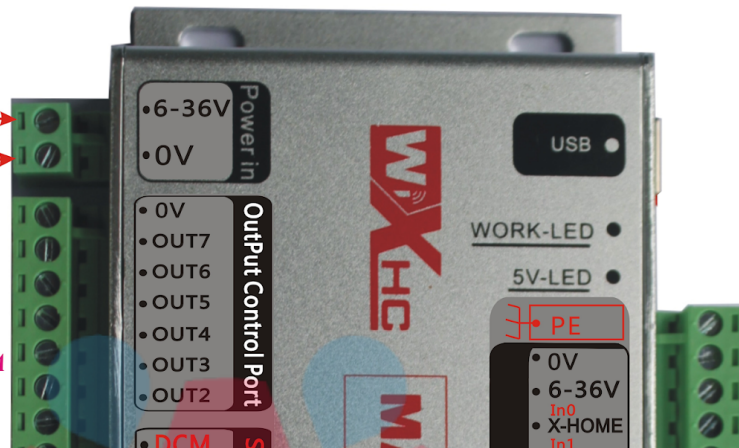
1 power input



DC 6-24V-INPUT
DC 0V_GND

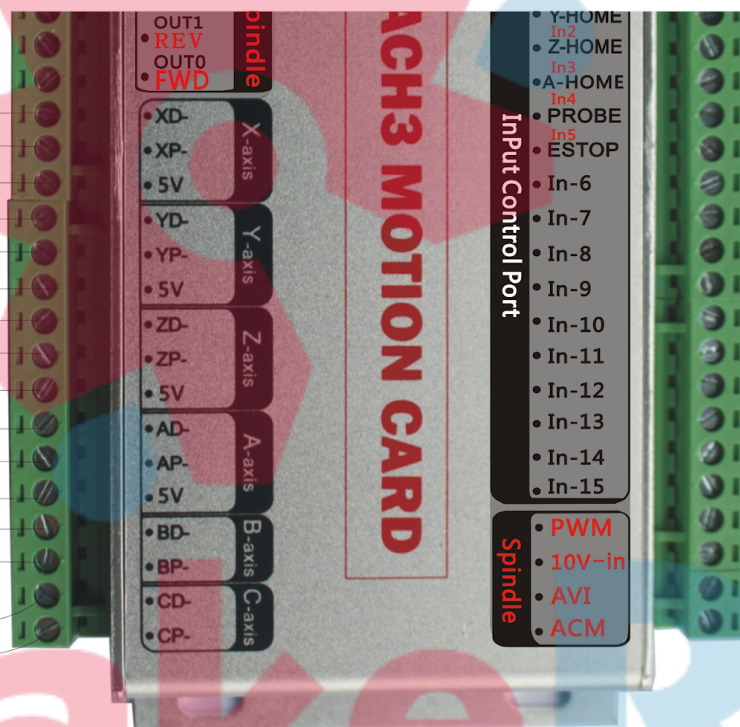
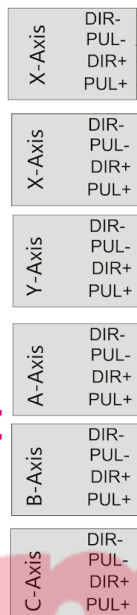
Use notes:

Before using the control card,
you need to provide the control card
with DC (6 to 24 volts), working current 0.5A

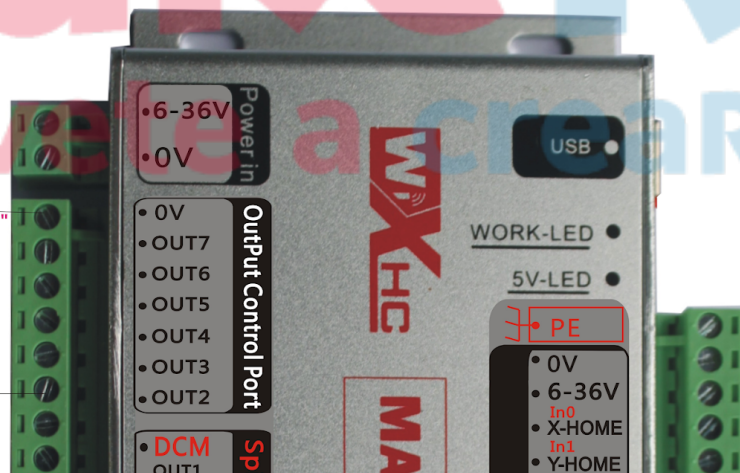
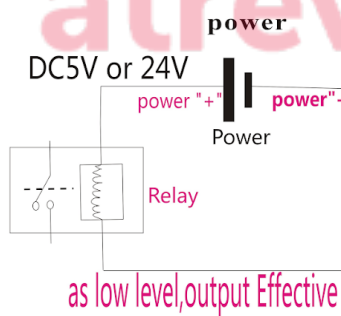


2 Drive Interface

Stepper or servo drives



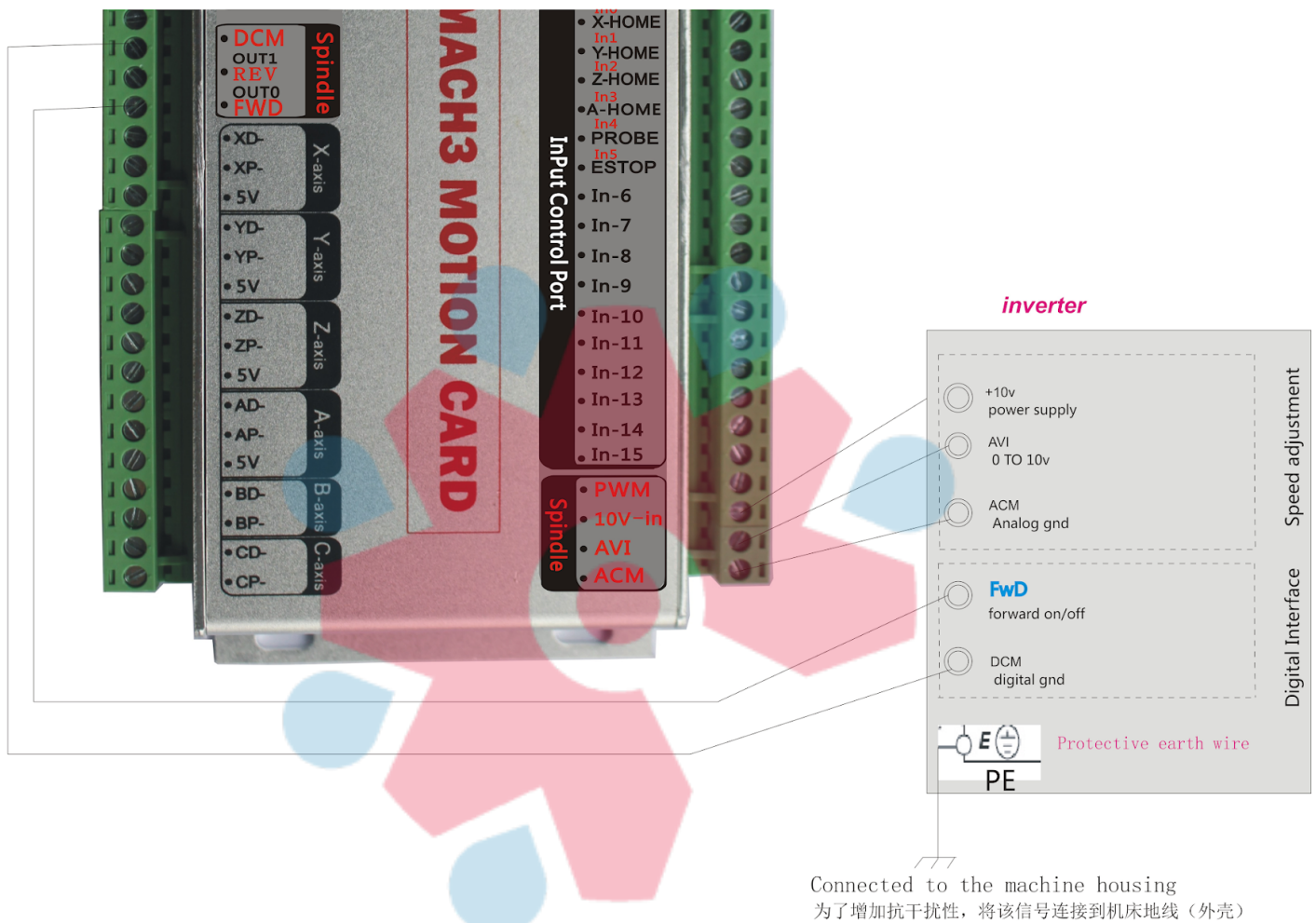
3 Relay Interface



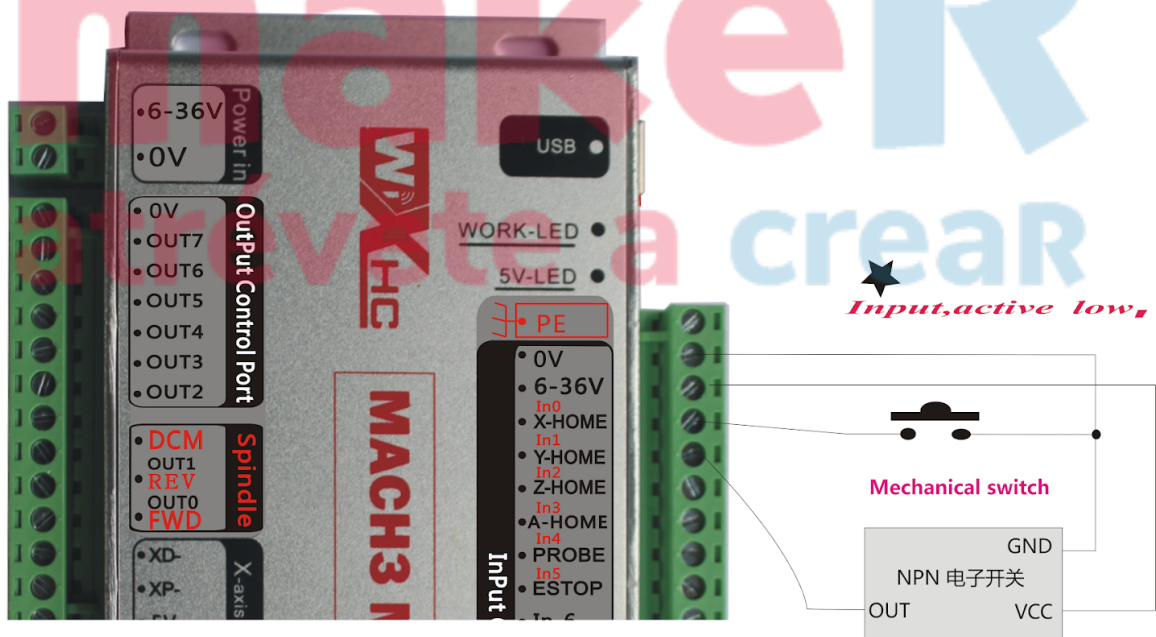
4

OUTPUT: spindle control-Inverter connection

inverter Interface



4. INPUT: Limitswitch 'level power output Effective input Interface



Supports only NPN type electronic switch

PS3 There are some other common problem reason and solution.

COMMON FAULT	REASON	JUDGEMENT	RESOLVENT
Main spindle running down	1.short circuit or circuit obstruction 2.transducer shows exceptional, transducer output exceptionally 3.main spindle fault	1.using multimeter to measure the on off of circuit. 2. see whether transducer shows exceptionally; measure whether there is voltage of fan-out 3.whether transducer idling normally, load exceptionally	1.change three core wire of main spindle 2.adjust transducer diameter; Change the transducer 3.change or maintain main spindle
One spindle doesn't rotate or more spindles do not rotate.	1.input and output circuit exceptionally 2 driver fault 3.screw of connecting shaft is loose	1. using multimeter to measure the onoff of circuit. 2.whether the indicator twinkle or not; exchange the two drivers to test 3. the motor rotates but the machine doesn't work	1.change connecting signal line 2.change the driver 3.fix screw tightly
In disorder (motor fall out of synchronism) or engraving disorderly.	1.drive is hot 2.screw of connecting shaft is loose 3. without ground wire or poor electric conduction.	1. there is problem with driver because of long time working. 2. the motor rotates but the machine doesn't work 3. there is static of machine metal parts.	1. change the driver 2. fix screw tightly 3. fix ground wire hard
engraved size is different from designed size	Machine diameter is not correct.	1. Ncstudio user 2. DSP handhold user	1.consult manufacturer 2.consult manufacturer
Material suction strength is weak	1. the material is turnup or uneven 2. vacuum suction is weak 3. Uneven table-board lead to air leak	1. to see whether the material are turnup 2. to feel the suction by touching sucker mouth 3. there are air leak sound around brims	1. change the board 2. to check whether there are little water in the vacuum pump or the water is too hot 3. use milling cutter to suck the table-board Note: little cutters will be ok
Do not work momentarily	Fluctuant voltage	There are mainly four conditions caused by fluctuant voltage. During Automatically working: 1. the screen shows normal, but the data stop to change, it is no use to press anywhere 2. screen shows that "entering the power down protecting status, may because of unmatched voltage" During manual operation: 3. screen shows that "entering the power down protecting status, may because of unmatched voltage" 4. the screen shows normal, but the data stop to change, it is no use to press anywhere The above conditions all may occur when fluctuant voltage, be similiar with power down protection(power cut abruptly). There will be a cue when small fluctuant voltage, and no cue when big fluctuant voltage. The above conditions all can be solved by adjusting the voltage of control card at 5.3V.	
Transfinite work	This condition usually caused by: The numerical value of zero point "physics coordinate" + "unprocessed files dimension" exceed the max. or minimum value of limit position	After zero point user definition, X axis or Y axis exceed the limit position in some direction.	Remake the right zero point can solve this problem
Intermit abruptly	The limit position is smaller than the actual	The system can start to work normally, but intermit	Make the limit position bigger than the actual working area



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