The user manual of the desktop-CNC

3040T triaxial engraving machine part parameters:

X,Y,Z Working Area： 275×385×55mm

Max. Feeding height： ≤ 70mm

Outside dimension： 610×480×400mm

Table size： 530×320mm

Lathe structure： 6061/6063 Aluminium alloy

Stepping motor：　two-phase 57/1.8A

Drive unit：　1204 Double thread Trapezoidal Screw

Sliding unit:：　Chromeplate shaft

Maximum speed：　0-3500mm/min

Engraving speed：　300-2500mm/min

Repeat positioning Accuracy：　0.05mm

Spindle motor：　spindle motor with direct current(200w)

Spindle speed：　1000～8000RPM/MIN

Cutting tool-holder：ER11/3.175mm

Interface：Parallel port

Software Compatability：Mach3/Emc2,(Type3,Wentai, ArtCAM)

Command code：　G code/.nc/.ncc/.tab/.txt

Machine weight：　28kg（including packaging）

Control box parameters:

Operating Voltage ：AC110V-AC220V

Control unit ：1.8A stepping motor driver plus adjustable spindle speed controller

Computer connection：on board palrallel port

Command code :G code

Acceptable software : Mach3,EMC2

Protection : Emergency stop button

Packaging

1× Engraving machine

1× Control box

1× Parallel cable

1× Power cable

1× Tool box and tools

3× Axis motors

Application :

This 3040 engraer is a user-friendly desktop engraving machine for those with limited space and /or a limited budget. The Computerized CNC Engraving and Cutting Machine is suitable for various materials, such as WOOD, PMMA or other plastic,MDF board,native wood,PVC,Acrylic, wood,composite board plywood,It can be used widely to process or make adverstising signs,PCB,nameplates,badges,seals,bronzing plate,aluminium alloy,acryplates,ABS resin double color plate,PVC foaming board,indentation plates,signs,construction models,instrument panels,wooden products,etc.

Notice:
   1. This machine should be used with the PC parallel port and controllde by Mach 3 or other software.

The PC parallel port should work in condition of the EPP mode, the setup of the EPP mode should be applied on the main board BIOS.

2. You'd better use the PC to control the machine, especially for this machine and do not install other software if conditions permit. And please do not use the Laptop to control the machine, the battery of some laptops will impact the pulse signal of the machine and the voltage of some parallel port is very low, it will cause the lost of the signal.

Warn:

You should setup the software correctly, it will make the machine works well. If you do not do it well and try to run the machine, it may damage the machine or cause the danger.

When you install or setup the machine, please do not turn on the control box, it may cause some damages.

Please do not plut the connctors on the control box, when it is power on. You should regulate the spindle as the low speed when you want to restart it. The interval of the open/close button time should be at least 30s, when you restart the spindle or turn on the control box again, othrwise it will cause the damages of the control box.
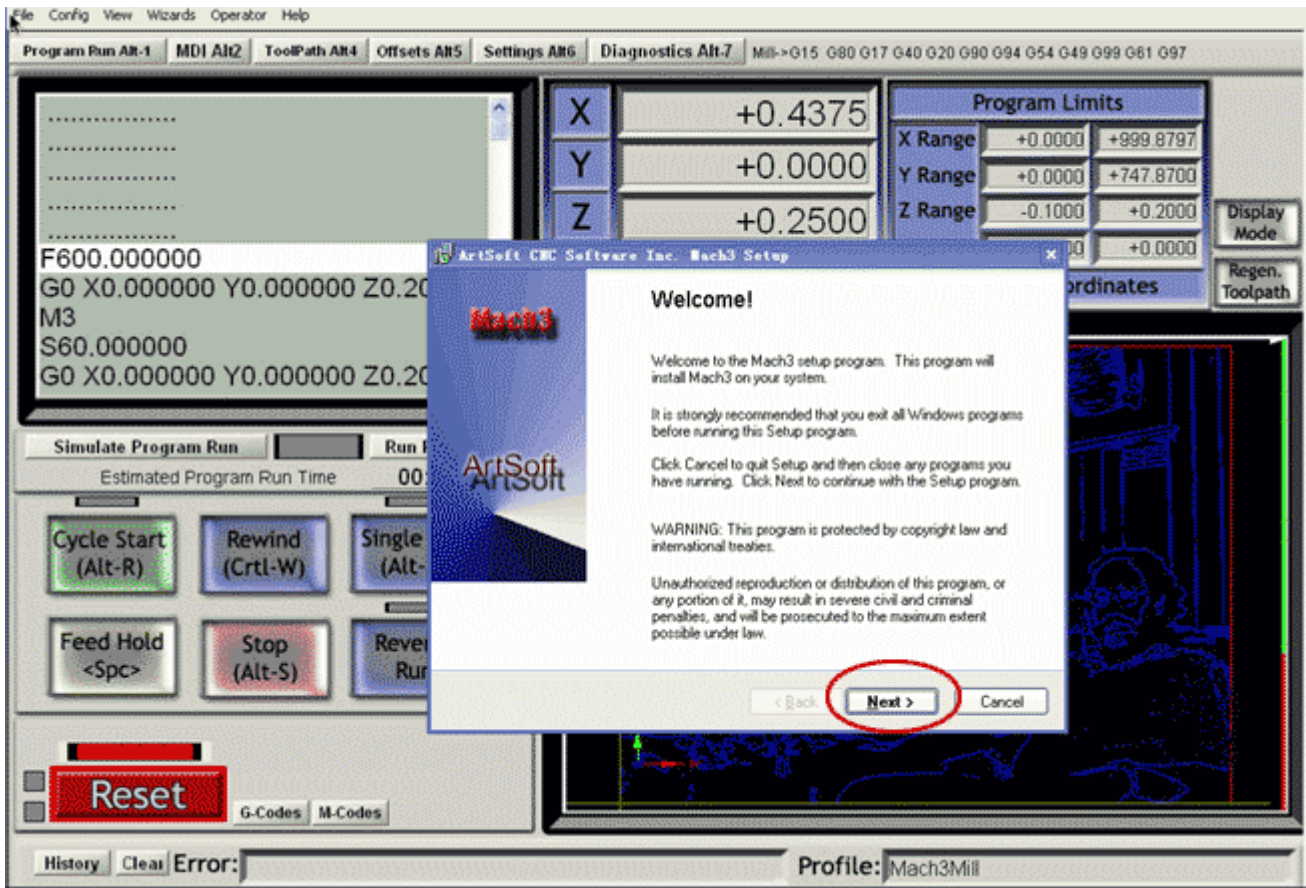
Our machin is 220V, when it is power on, please do not open the control box, do not touch the wiring connectors and not touch the running cutters, please wear the glasses or mask to protect yourself.
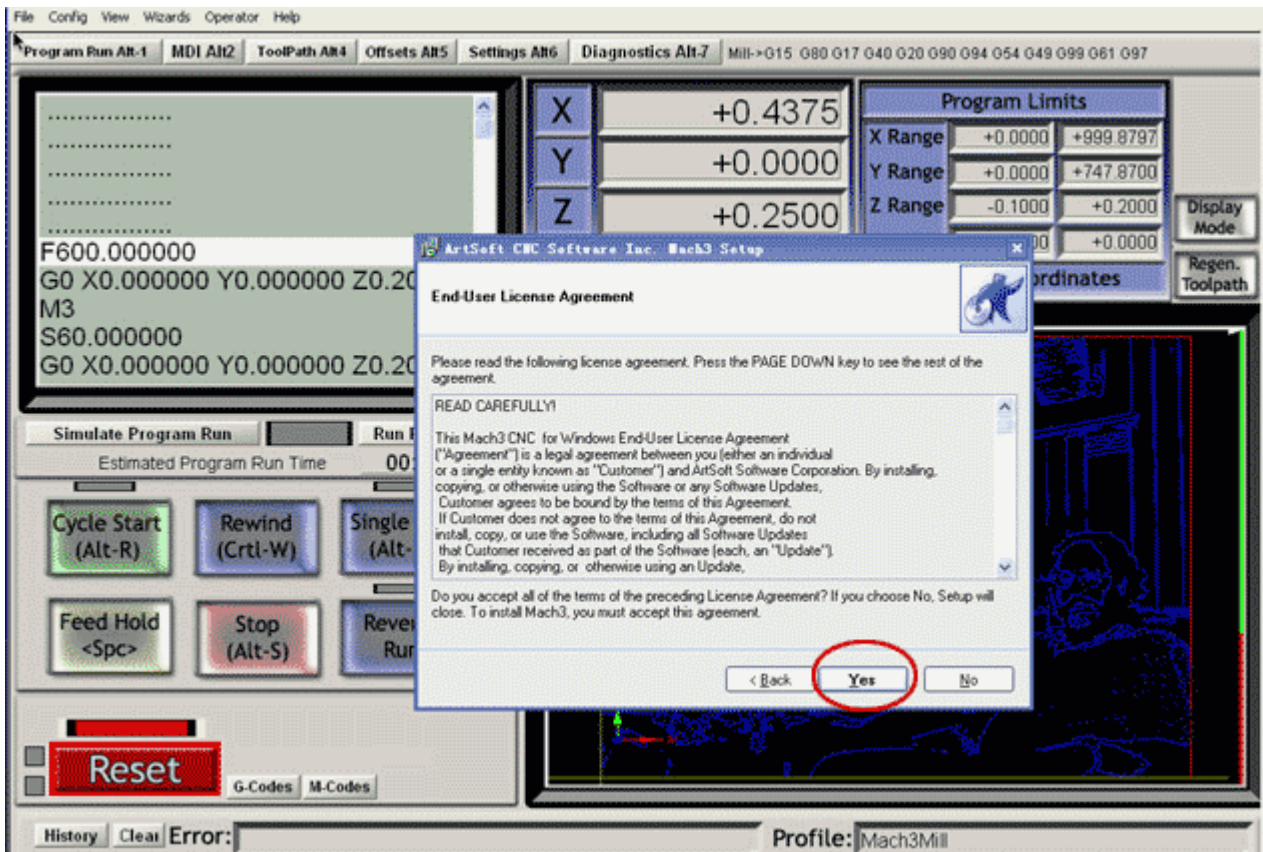
1.Software

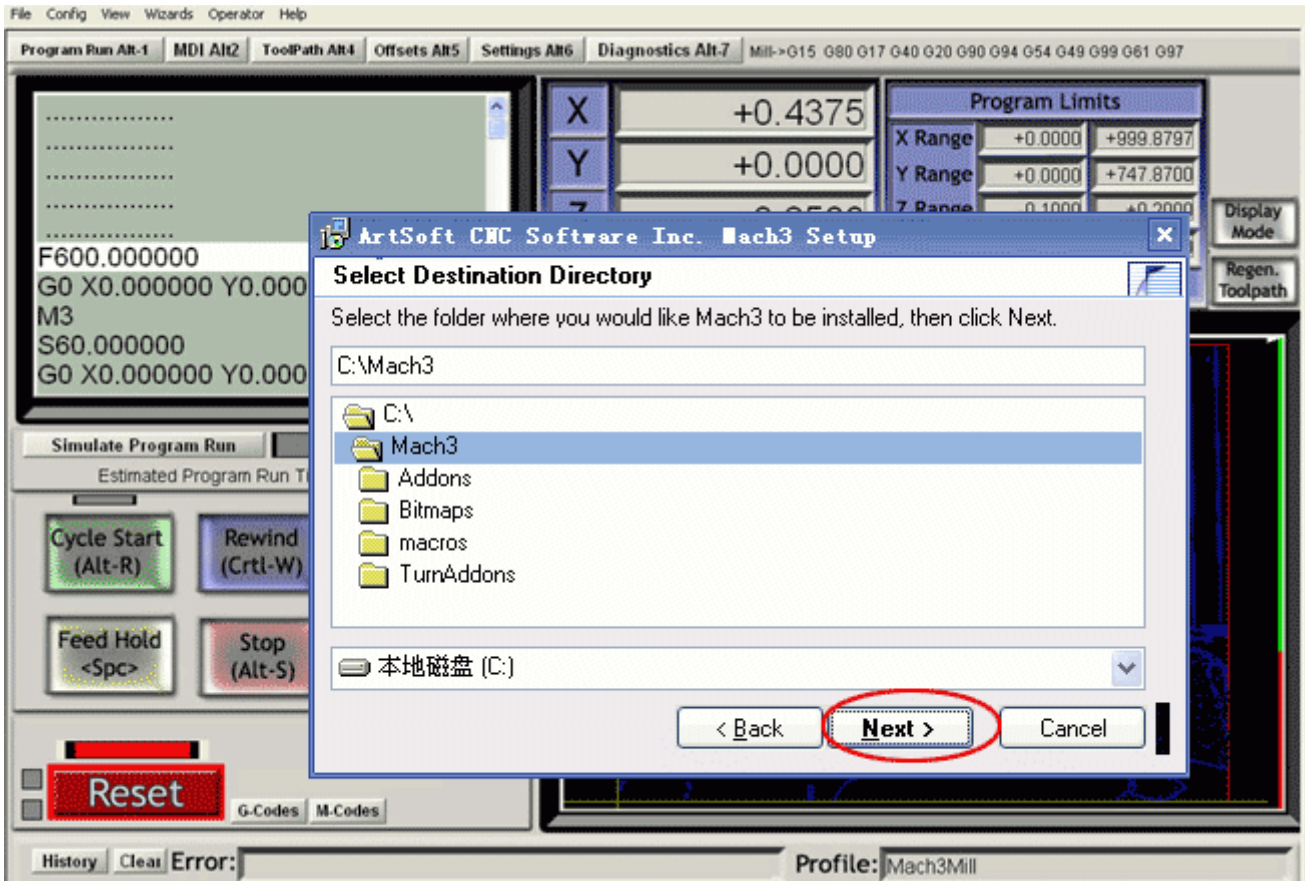1. Open the Mach 3 file, double click the "Mach3xxxxx.Exe"to start.
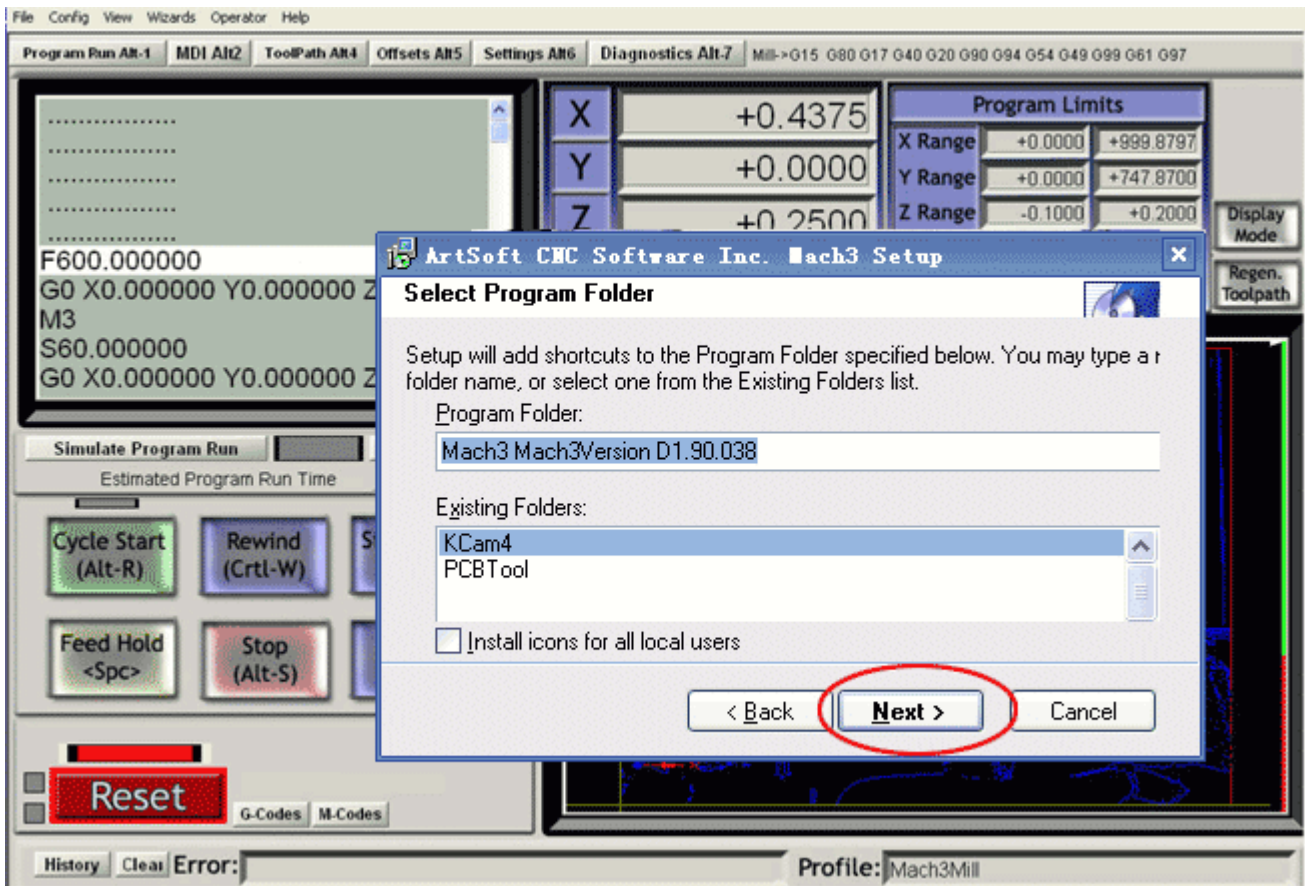

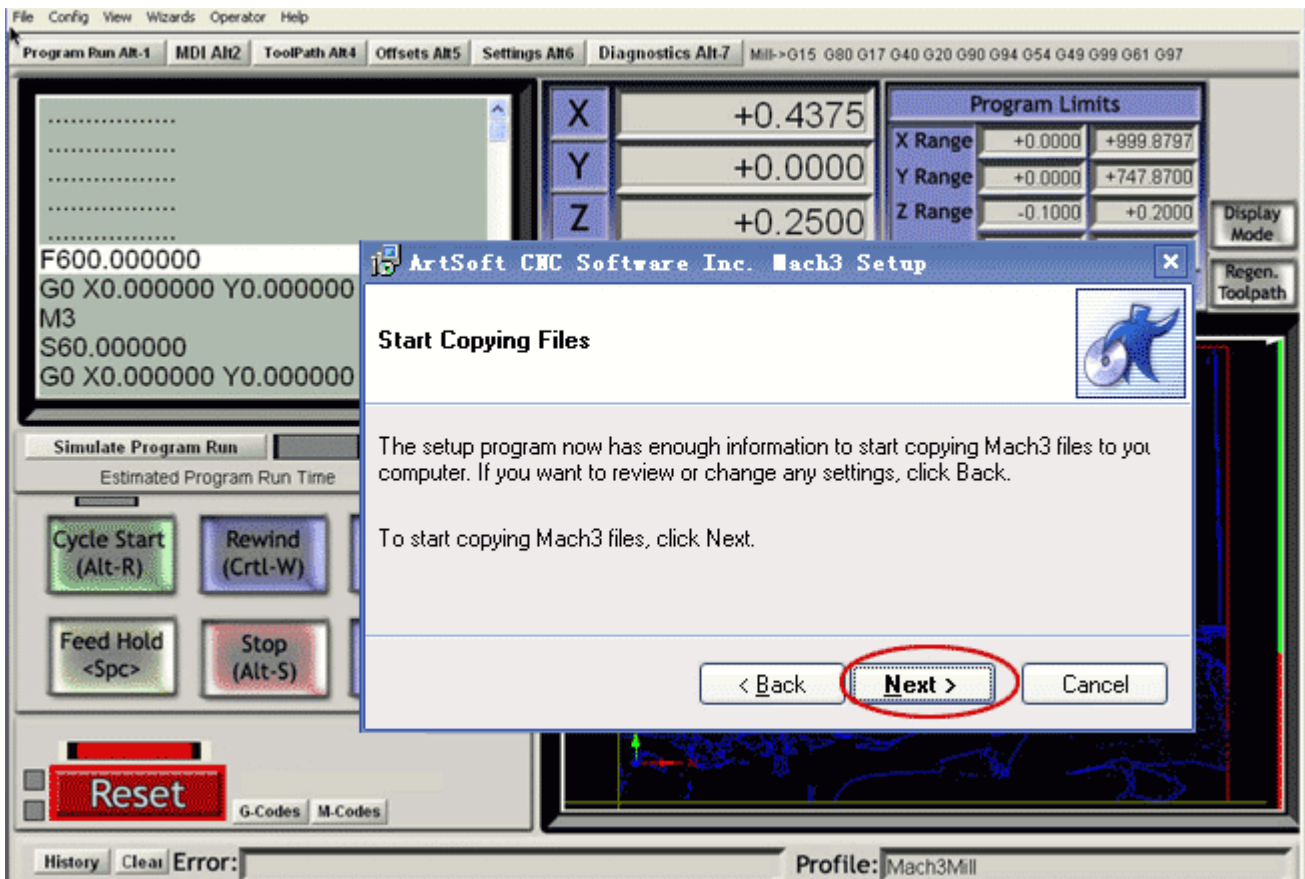
2. Click the "Next"
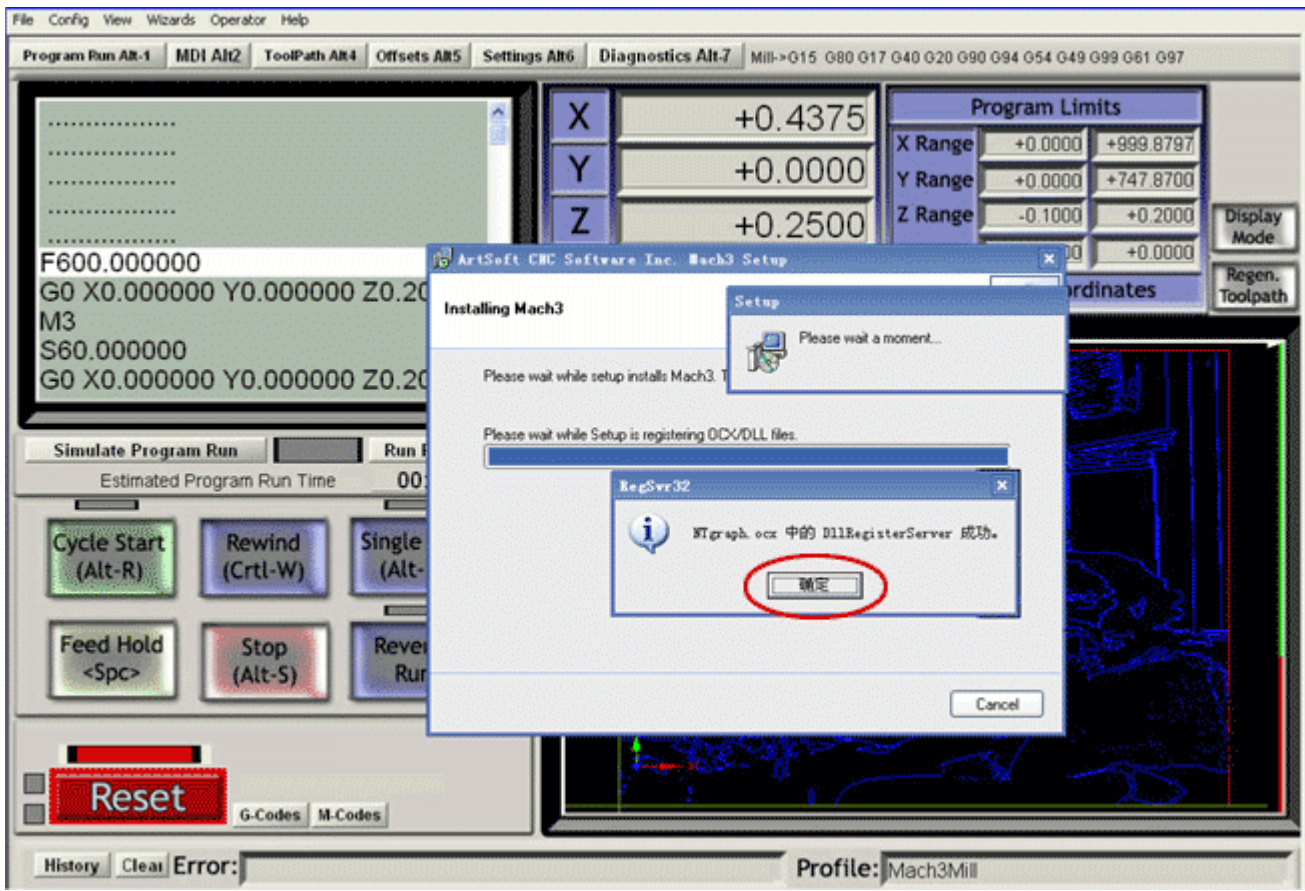
3. Click the "Yes"
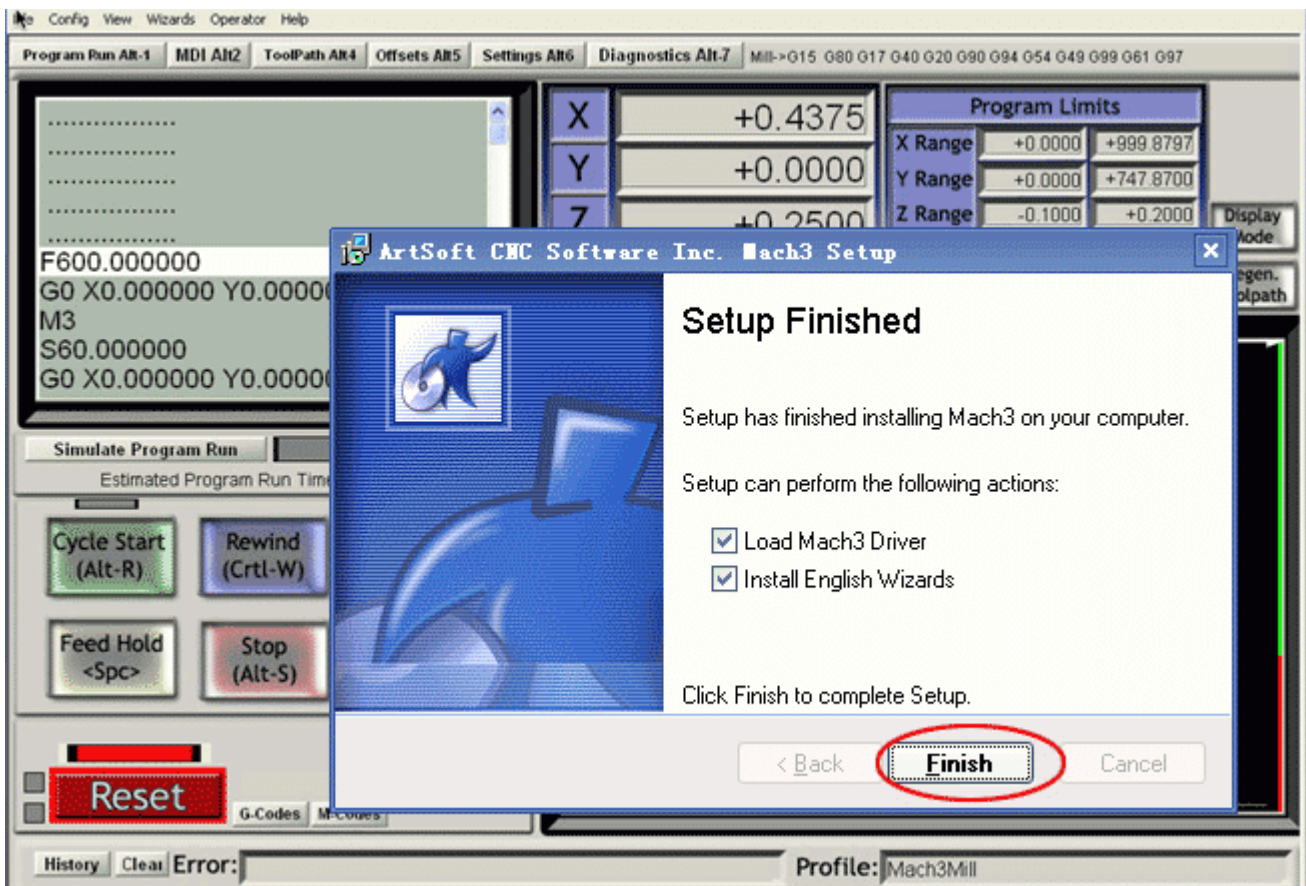
4. Click the "Next"
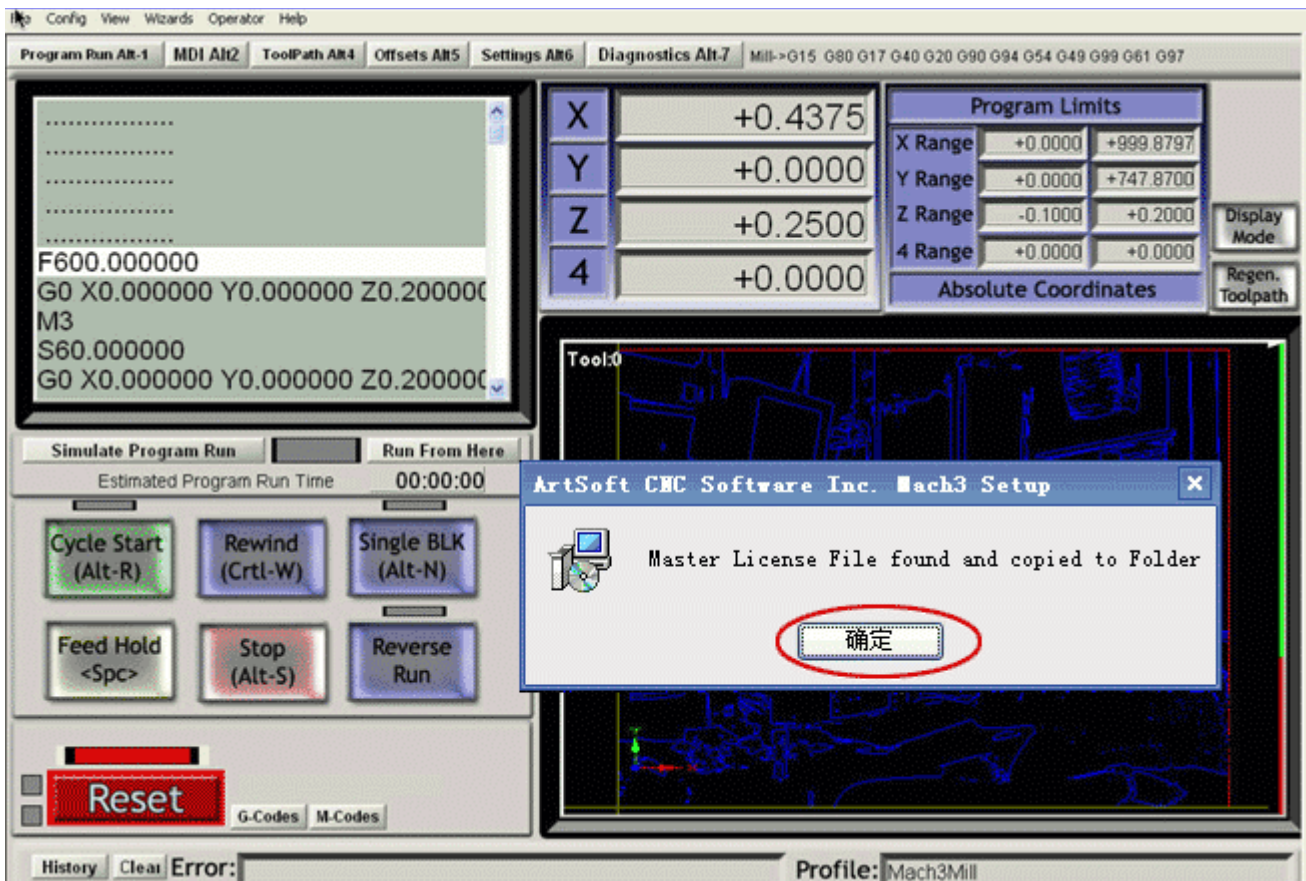

5. Click the "Next"

6. Click the "Next"

7. Click the "Ok"

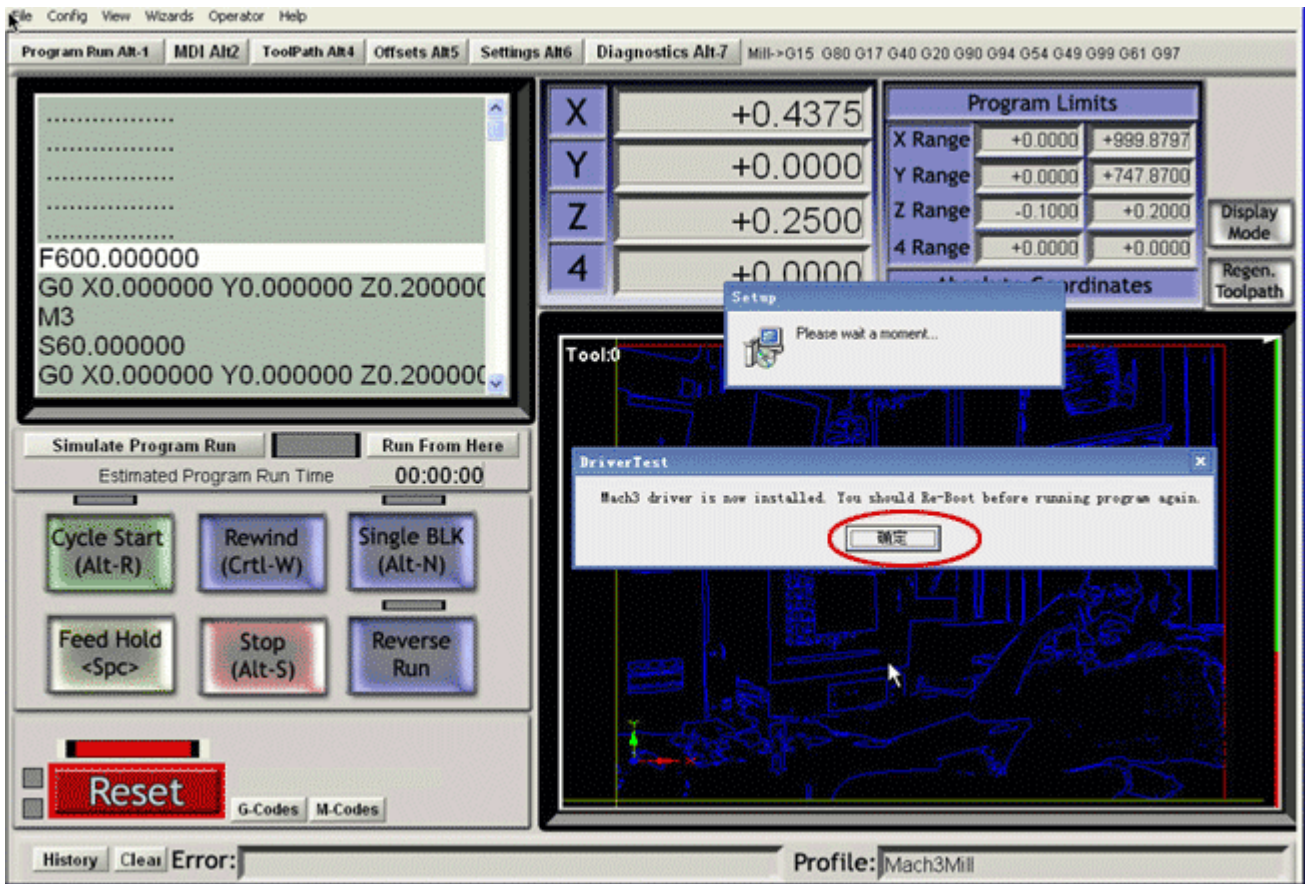8. Click the"Finish"

9.Click the"Ok"

10.Click the"Ok"

After installing the Mach 3, on the desktop, there will occur 3 icon as follows:

Notice: do not open them, please restart your PC at first(if you open the software not restart PC,it need uninstall fully and reinstall it)

After restarting the PC, please double click the "MACH 3 MILL" icon,then you can enter the setup of the software(you can delete the other two icons)

Open the G code---all the axis should be"0"---then start to engrave,You can choose the "Feed hold" to pause the working when it has someting, if something emergency happens, you can use the" E-stop"or you can adjust the "Feed rate".
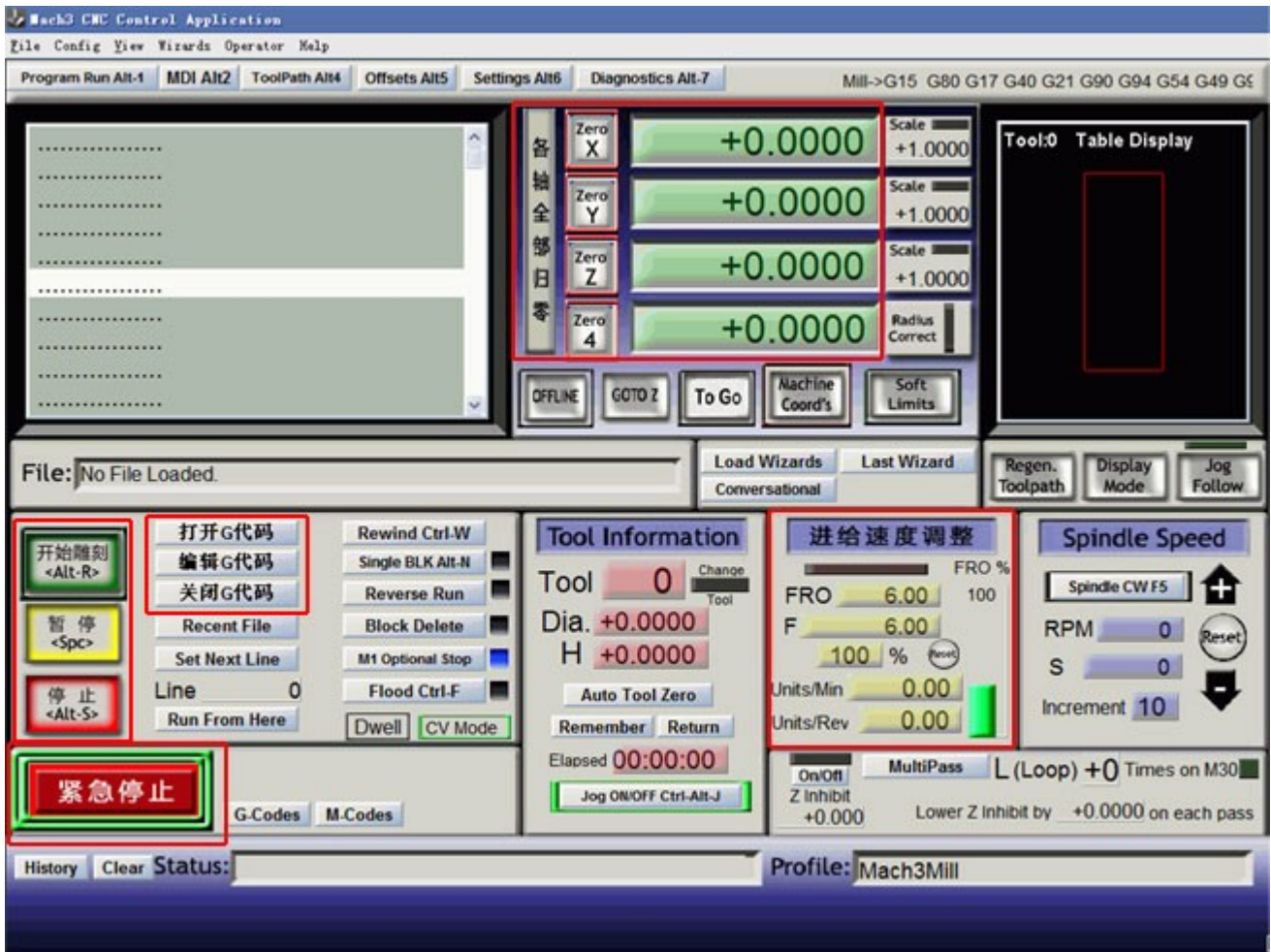
2. How to control the software:

1. After restarting the PC, choose the MACH 3 MILL icon on the desktop to start the Mach 3.

2. Open the "Config-- select Native Units" menu, then choose the "MM's"
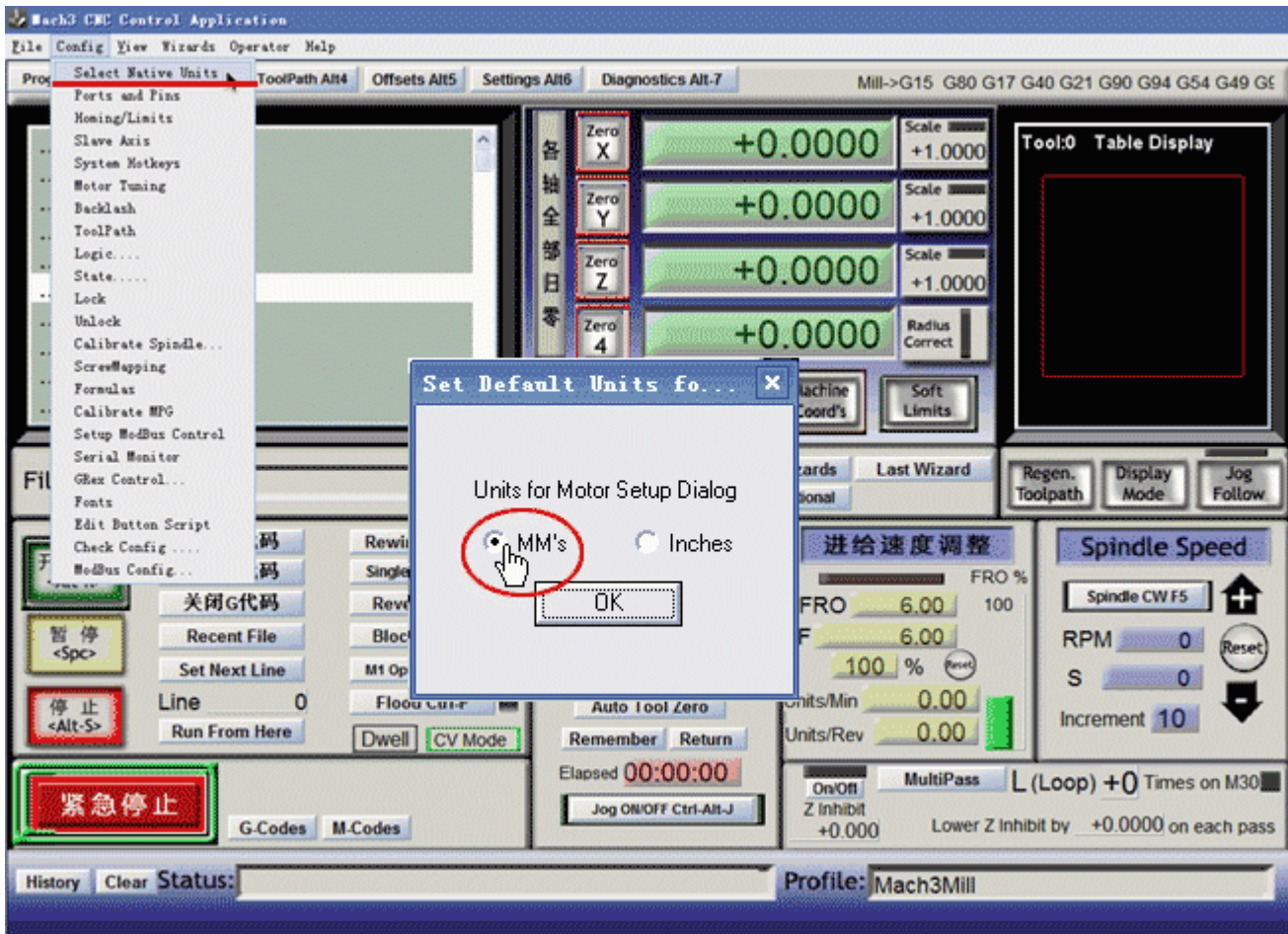
3. See as below,open"Config--Ports and Pins" to enter the setup.
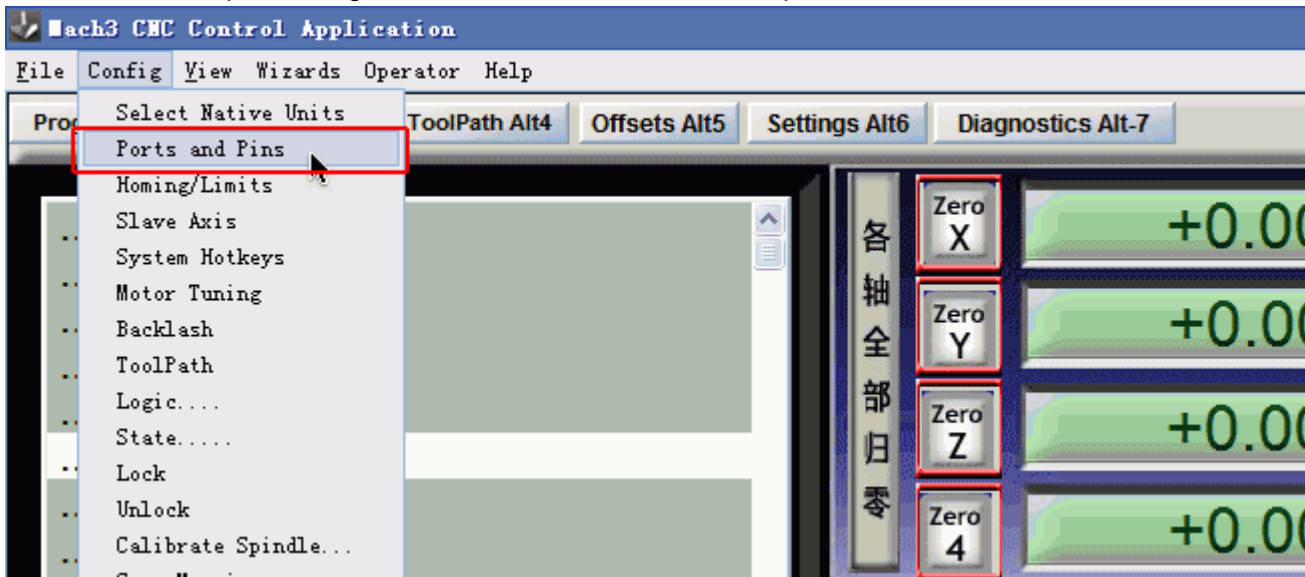
4. To check whether all the data is same as the follows in the big red circle and then choose OK to continue.
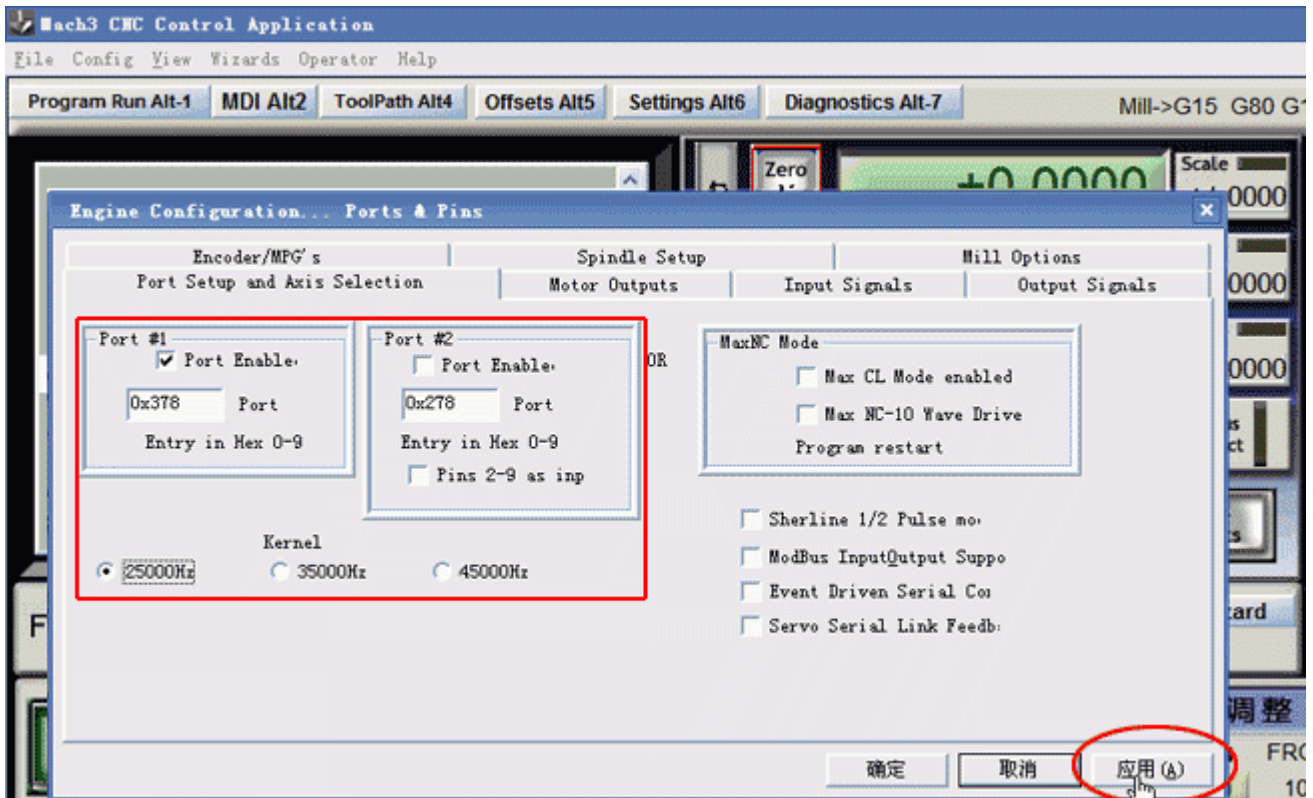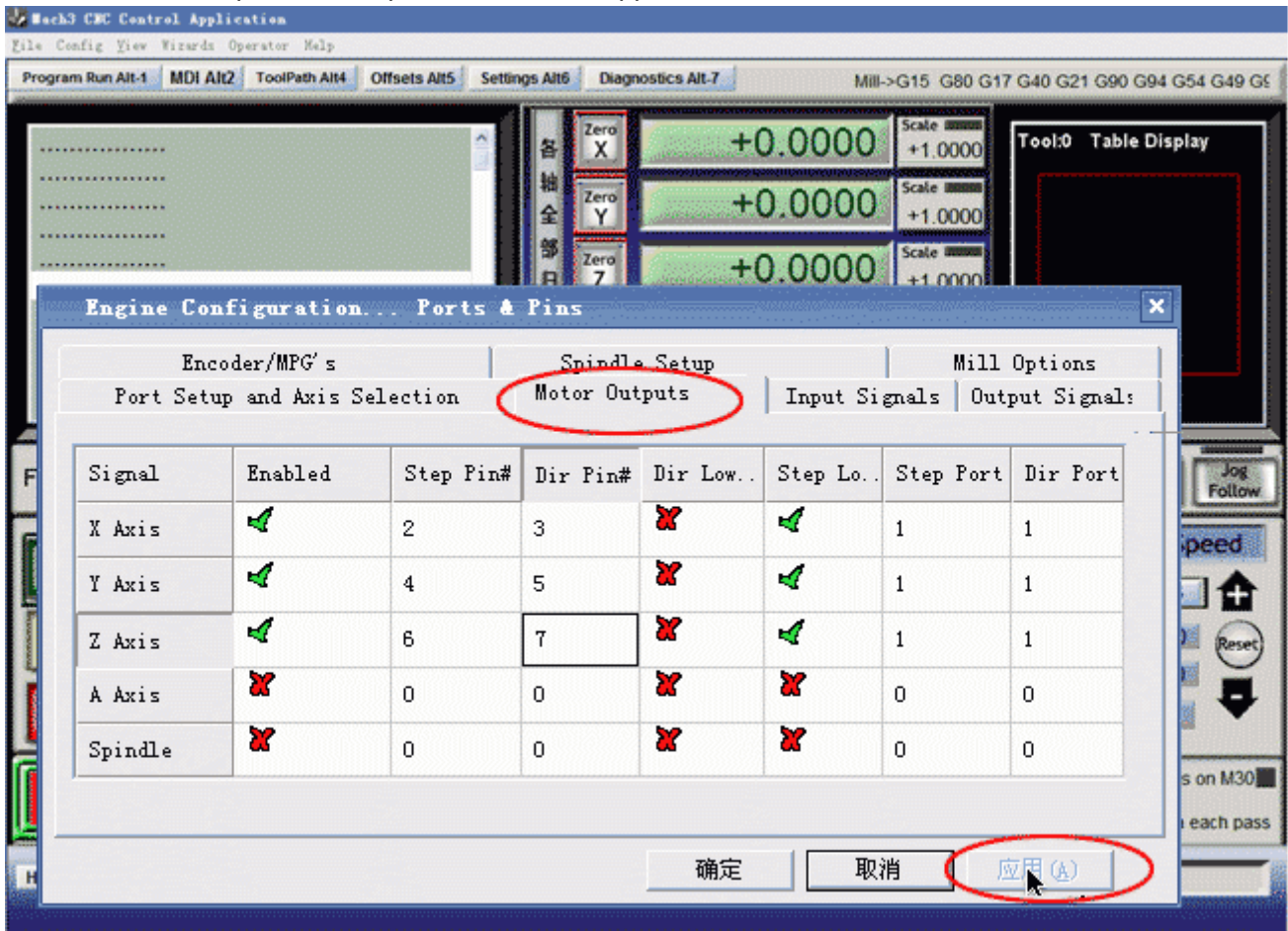
5. Click "Motor Outputs" to setup the Pin of the stepper motor as follow

This part is very important, please check your setup is as same as the data above. Even a small error will cause the machine working incorrectly. Do not forget to save the setup.
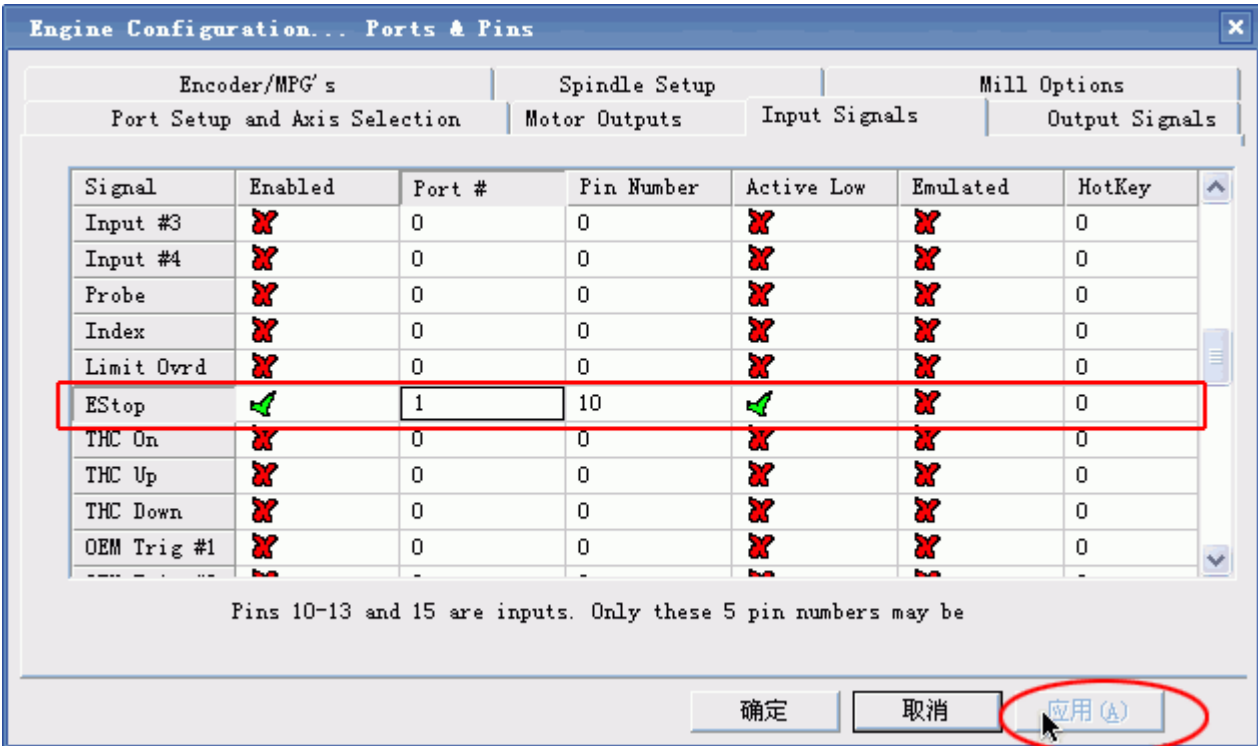
Remark:

(1). If you want to use the 4th axis(A axis), you can setup the A axis data as follows:

A Axis	✔	8	9	✘	✘	1	1

(2).”Dir Low Active” This choice is to set up the Direction of the motor, if you find the running direction of the axis is inverse, you can choose the "Dir Low Active" to change the direction and then save the setup.

6. The clients who bought the Control box from us, need to setup the E-stop signal,still in "Ports and Pins" menu to click "Input Signals" to find the "Estop",then setup as follow,final apply and then save.

Engine Configuration... Ports & Pins

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

Signal	Enabled	Port #	Pin Number	Active Low	Emulated	HotKey
Input #3	✘	0	0	✘	✘	0
Input #4	✘	0	0	✘	✘	0
Probe	✘	0	0	✘	✘	0
Index	✘	0	0	✘	✘	0
Limit Ovrd	✘	0	0	✘	✘	0
EStop	✔	1	10	✔	✘	0
THC On	✘	0	0	✘	✘	0
THC Up	✘	0	0	✘	✘	0
THC Down	✘	0	0	✘	✘	0
OEM Trig #1	✘	0	0	✘	✘	0

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

| 确定 | 取消 | 应用(A) |

7. The setup of the Stepper motor: Config-- Motor Tuning--- X Axis---setup the X axis as follows---then"SAVEAXIS SETTINS", then setup the Y axis and Z axis,final click "OK".
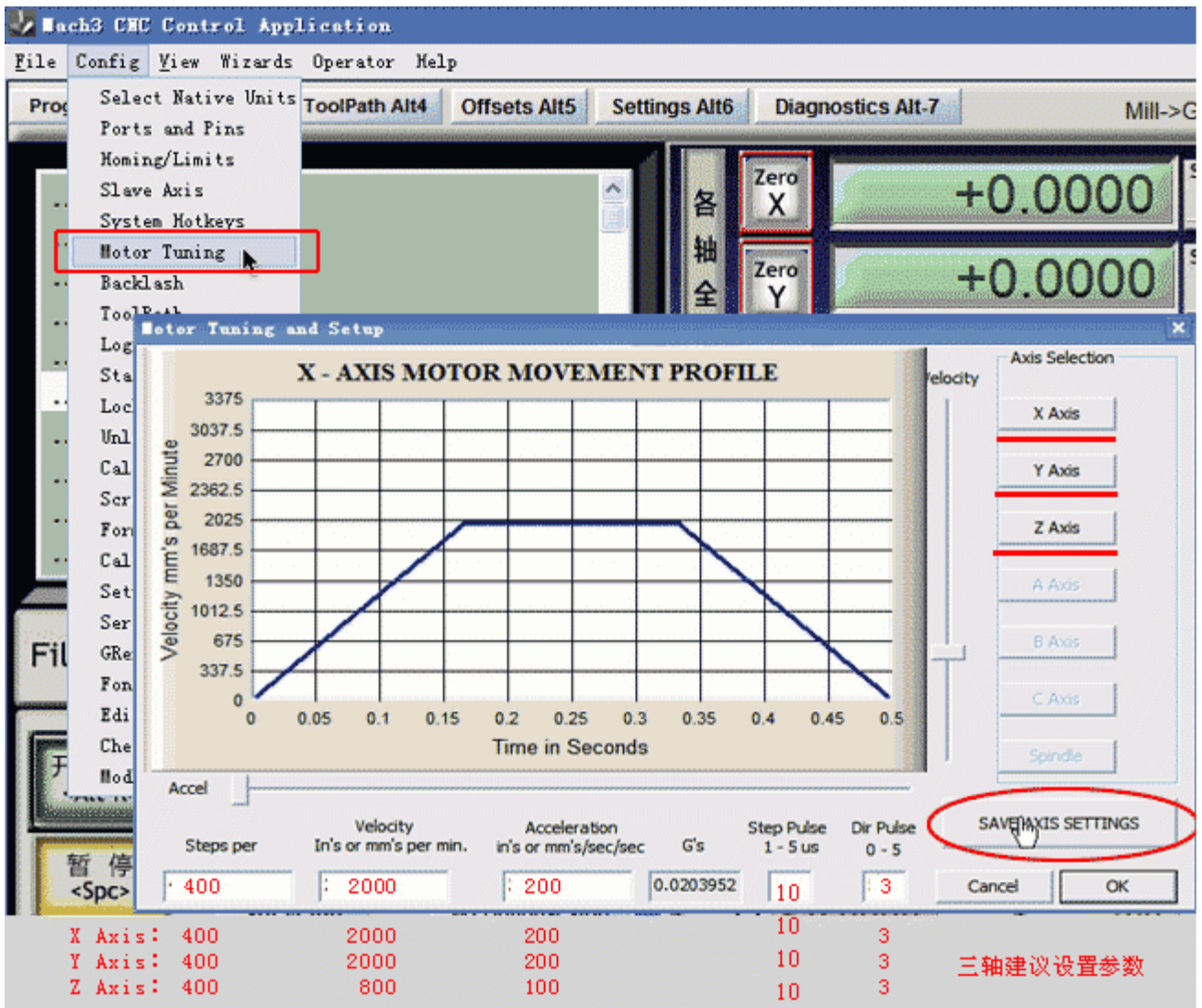
The setup is over, Please close the Mach software that all data setup can be available. And then open it again to check whether all the data is correct otherwise can't run your machine well.

3. Try to use your CNC

1. First let us to learn this machine,below take 3020 for example,The full kit has the machine(the Frame), the electrical control box, X,Y,Z stepper motors, the spindle and the spare parts box(it contains the 4 pcs presser feet, 5 pcs test bits, 1 pair of spare carbon brush, 1 pcs fuse pipe,ancethe spanner of the spindle, the 6 hexagonal spanner and the nuts and screws).
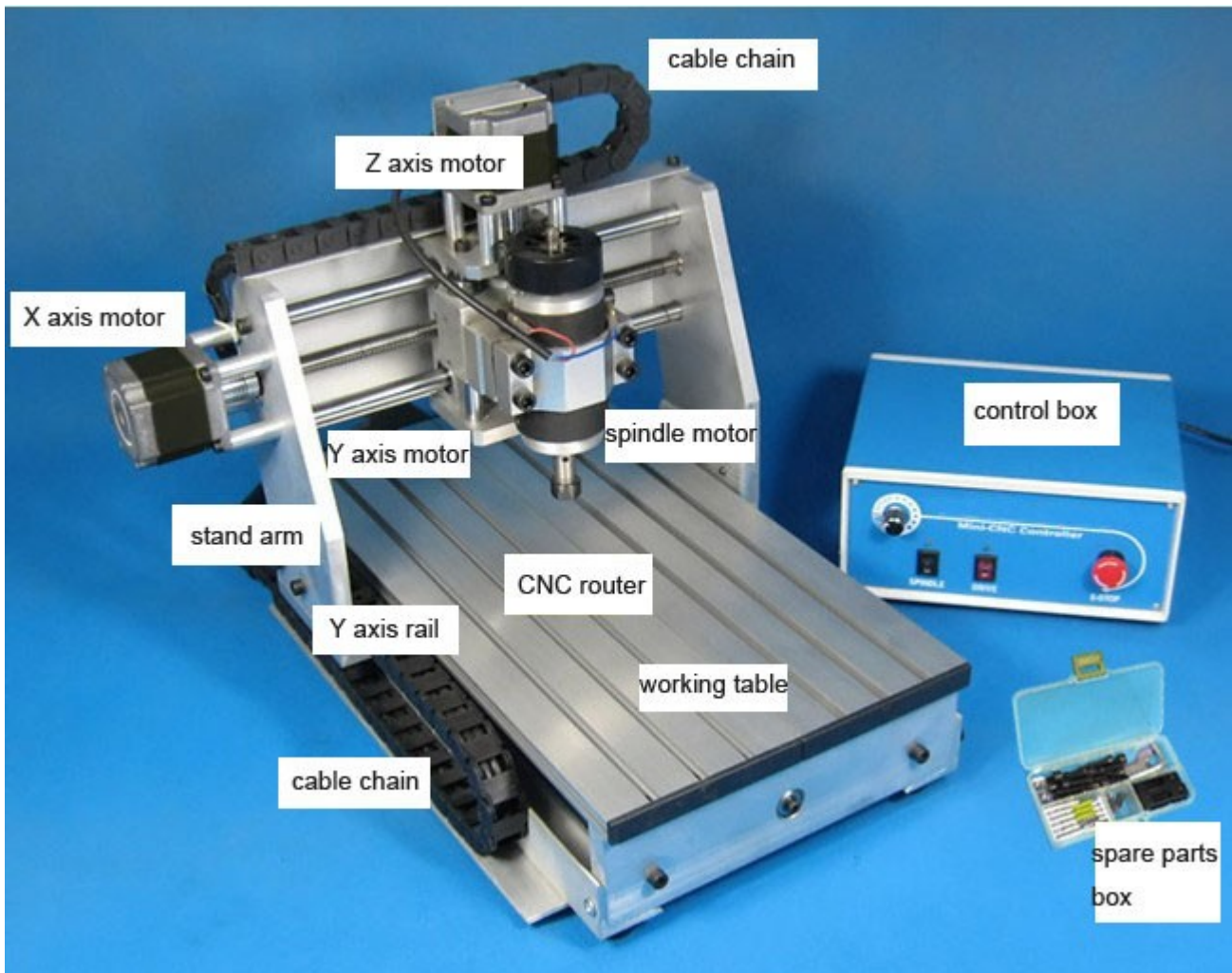
(1) Our machine is made of the aluminum alloy, if you drop it from the top on the floor or hard hit, it will damage the machine. Please put this machine on the stable desk, the thin desk may cause more resonance when it is running.

(2) In the electrical control box, there are the switching power supply, stepper driver board, the spindle speed regulator, please put it in a ventilating condition and around it, there should not have the electromagnetic interference within 10 meters.

(3) Pls sort out the power cables and connecting cables, do not put it in a mess, maybe it will obstruct the working of the machine. Please remain some excess of the cable for the gantry and the X axis.

(4) Pls try to study yourself and test it, If you have some questions, you can ask us or discuss it on the CNC Forum

2.The wiring and yourself-checking

(1) Wiring:

Put the cables into the corresponding port, on the connectors there print the X, Y, Z, the cable of the spindle has no mark, but it is a two-wires plug. On the electrical control box, it print the marks of the ports. The LIMIT-IN is the spare port for the 4th axis or external limit switch or E-stop etc.

Now just connect the X, Y, Z stepper motor cables and the spindle cable, but the parallel cable do not connect it at first.

Please make sure that all the connectors are tight to avoid the loose contact.

2. Yourself-checking

The aim of the checking is to make sure that the electrical control box and the machine are well wired and all axis can be controlled.

At first, power off the spindle and the driver power, "o" is off, "I" is on, and regulate the spindle in this safe position(see the photo below). The E-stop switch is off.

Then wrest the X axis screw by hand to feel it (at this time you can move it easily), and then connect the power of electrical control box and open the driver switch, at the time, you can hear a small voice of the moving of the X, Y, Z stepper motors. Now try to move the X axis screw to check whether you can move it easily by hand,if it does not move, it means this axis have been controlled by the control box, after this, please try to move the Y, Z axis screw(move the coupling is ok), if they can not be moved, it means all axis are self-locked and fine.


If anyone screw can be moved, please check the wiring of this axis to see whether it is well connected, if the 3 axis all can be moved, please contact us.if 3 axis are ok please continue.

Then please power off the driver and make sure the spindle is in the safe position. Power on the spindle and adjust clockwise slowly of the spindle speed regulator to the first dot, the spindle motor will start to

move,continue to adjust clockwise,spindle will run more and more quickly.

Remark: If you face the spindle, the clockwise direction is the right direction. If you find the direction is anticlockwise, please power off the spindle and exchange the two connectors will be fine.

clockwise rotate is right
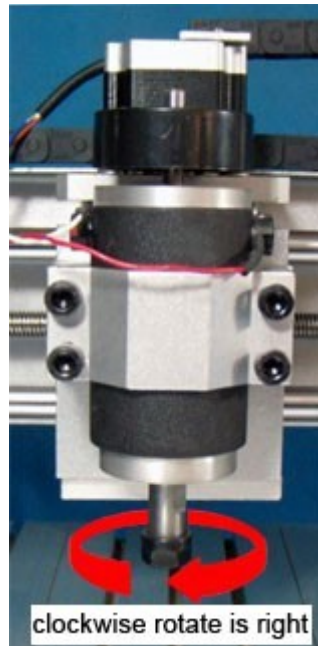
Notice:

(1).Whn the spindle is power-on, the voltage between the two connectors of the spindle is 90VDC, when the spindle is running, please do not touch the cutters and wear the glasses and mask. please keep the children away from the machine.

(2) Before powering on the spindle, please make sure the spindle speed regulator is in the safe position and then power on the spindle and speed up slowly. When power off the spindle, you can turn off the spindle power supply switch directly and regulate the speed regulator to the safe position. If the speed regulator is in the high-speed position, it will cause the burnt of the fuse and over current, this will do damage to the speed regulating board in the control box.

3.Test by PC

(1)In the power off, use the parallel cable to connect the control box and the PC parallel port.

(2) Start the PC, open the "MACH 3 mill"and the drive power, and make sure the 3 axis are self-locked automatically. Check the Mach 3 interface, the E-stop button is twinkling, if so, click it to stop it (if you click it, and the E-stop button on the interface is still twinling, please check the E-stop button on the control box is pressed, if it is pressed, please move it clockwise to make it unpressed,if the driver is power off the E-stop button is twinkling and can't stop).

（3）After stopping twinkling E-stop on MACH 3 interface, you can type the direction key of the PC keyboard, to check whether the X, Y, Z axis can move.

If it can not move:A-check the X, Y, Z data on the Mach 3 is changed or not when typing the direction key on the keyboard, if the data changes but the X, Y, Z axis do not move, please follow the step as below:

B-check the setup of the pin.

C-check the connection of parallel cable

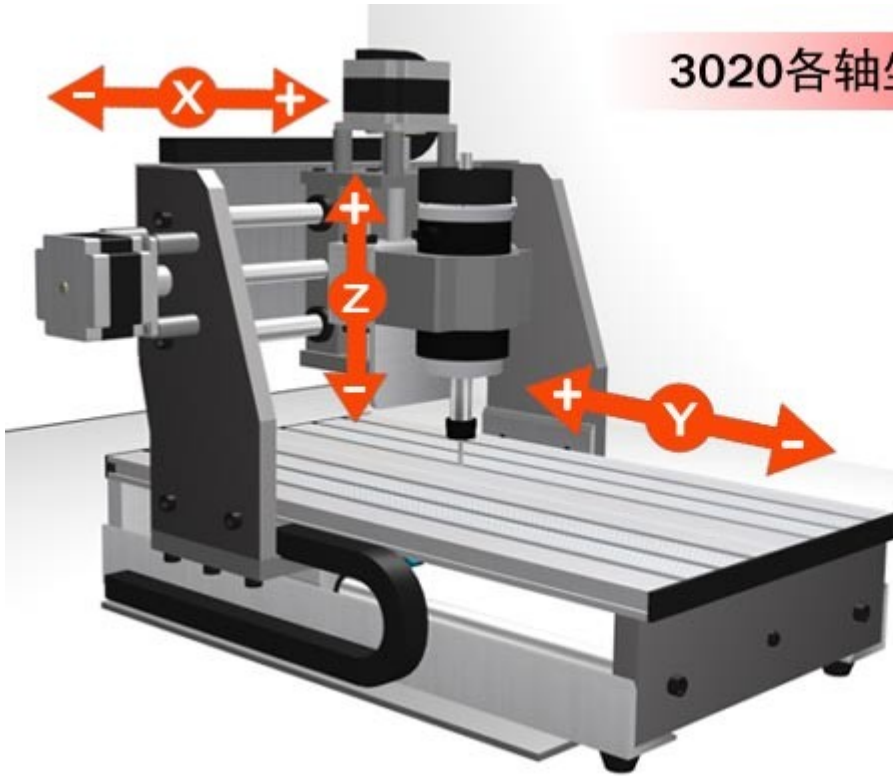D-check the manual control button "JOG ON/OFF"whether is green. Refer the image below

If all the axis can move, please check the direction of the axis coordinate is right(see below).
If you find the axis which move wrong direction please change the setup as Page10 green letters.

3020各轴坐标方向示意图

MACH中键盘控制
对应各轴方向
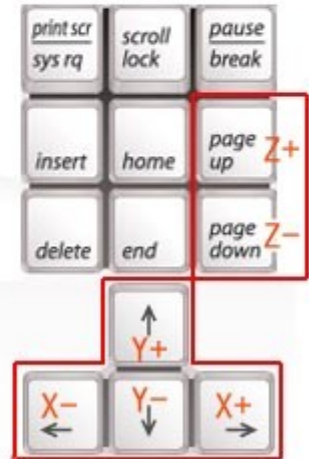
PS: you can use the keyboard to control the direction of the axis, and also you can use the manual control keyboard of Mach 3 by using the mouse to control the movement of the X, Y, Z axis.

Press the"TAB"key on the keyboard then it will pop-up the MACH manual control interface as the figure below.

Press Tab key to enter the manual control and press again to exit it

continue motion and Jog mode

Jog mode unit distance/mm

The direction control of X,Y,Z axis

Now the test of the Mach 3 communication with the machine is over. If it still can not realized the manual control, please do as follows:
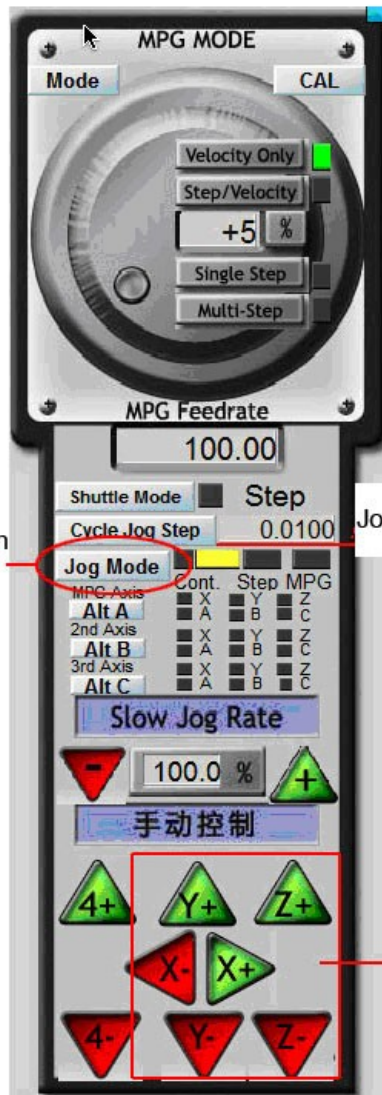
(1)Uninstall the Mach3 and use other versions of the Mach 3 to test(because some parallel port is not compatible with MACH software)

(2)Check the PC parallel port is fine or change another PC to test it.

(3)If the machine' X, Y, Z axis can be self-locked, you should think about the compatibility of the PC and the Software.

（4）You must restart the PC when finish installing of the MACH 3.

4.Engraving test

We use a Chinese character"雕" to test the machine.

First:Assembly the materials

(1)Find a soft material about 12CM*12CM, like PVC. WOOD,PMMA or other plstic material

(2)Fix the board on the working table as below, notice the screw and nuts should be tight but do not make the T slotted board out of shape.

if the material board is more thick you can clamp it like this.
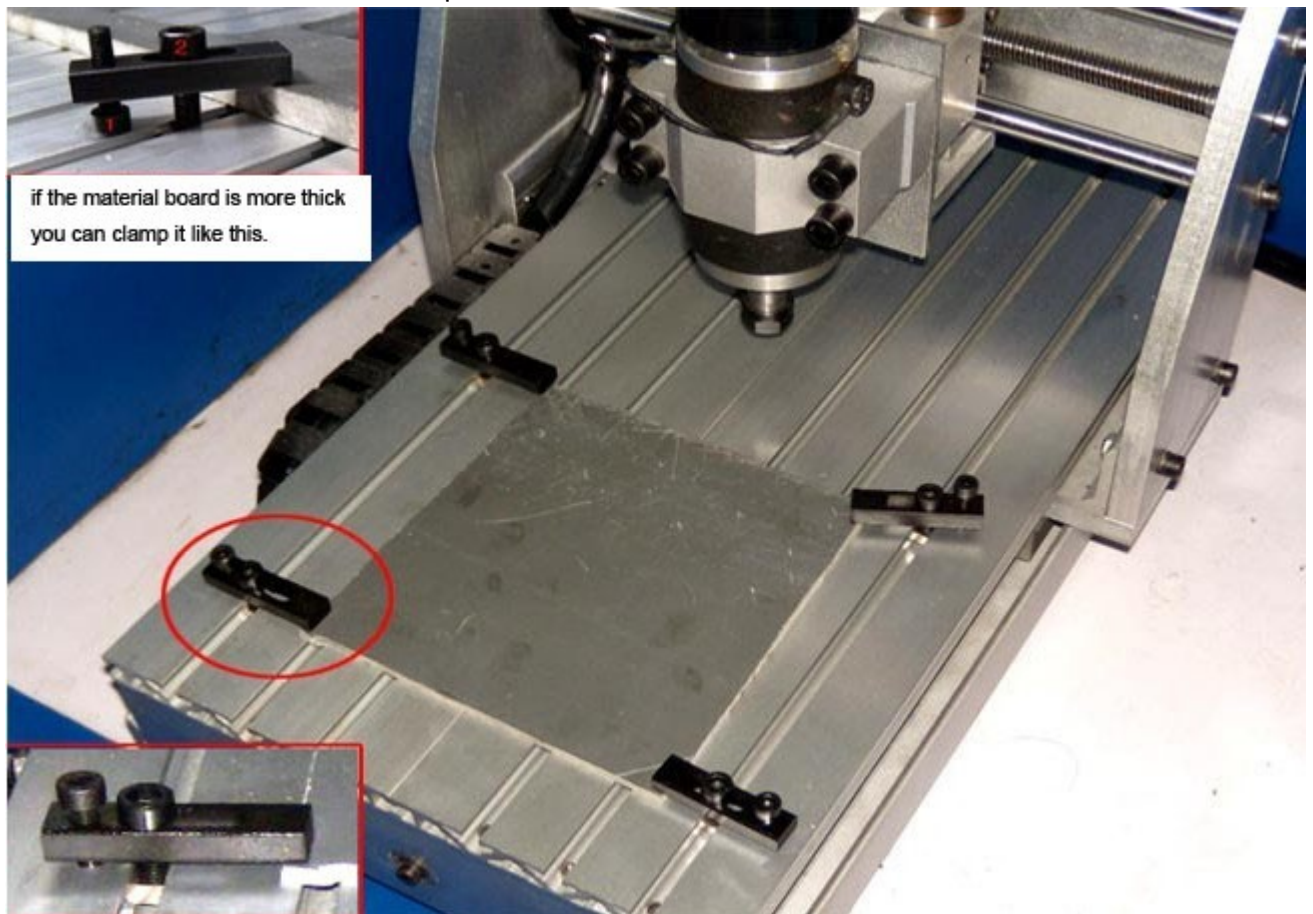
Second:Cutter trace unload running test without the cutter

(1)Copy the document you want to engrave to the desktop of your PC, and then open the Mach 3 Mill---start the G code and import the document you want to engrave, also you can use the Mach menu---file---load G code to import it.

(2)Import the G code of"雕", then it will display on the PC as below

(3)Power on the control box driver, move the spindle tool bit to the left-bottom of the material board by manual control the three axis, the area in the red circle(the image below)is the safe area. The left bottom red-green WCS arrowhead above is the original point, move the spindle bit (without cutter) to this point.
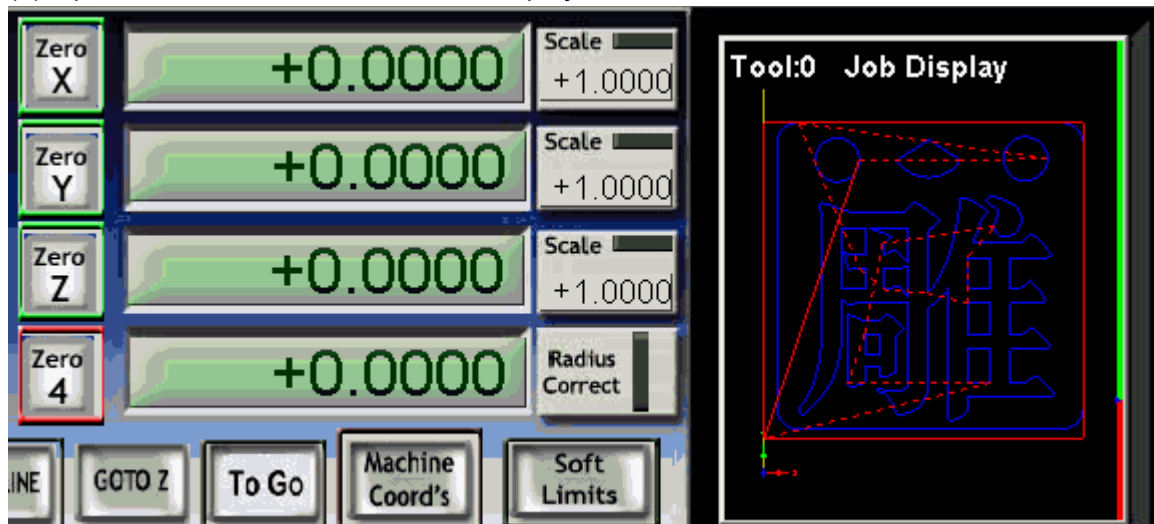
(4)Put the Z axis a little higher to avoid to touching the clamping nuts. Clear all the axis to zero and click the Green (ALT-R) button to start.At the same time, please pay attention to the windows of the software, the moving dashed is the trace of the machine. If you find the trace is incorrect, please power off the drive and check the unit of the Mach 3 whether is "MM" and axis WCS.

(5)This test engraving dimension is 7*7*CM,1MM thickness, engrave it twice, each time the depth is

0.5MM, so it will work twice the same trace, when it idle running, please check whether it will touch the clamping board, if so, please recheck the original point of the engraving, Otherwise it will damage the cutter, the material even the machine.

clamping board

In this red circle it is a safy area

the cutter bits point ----the safy area should consider the external diameter of nut cap except the the cutter bit diameter
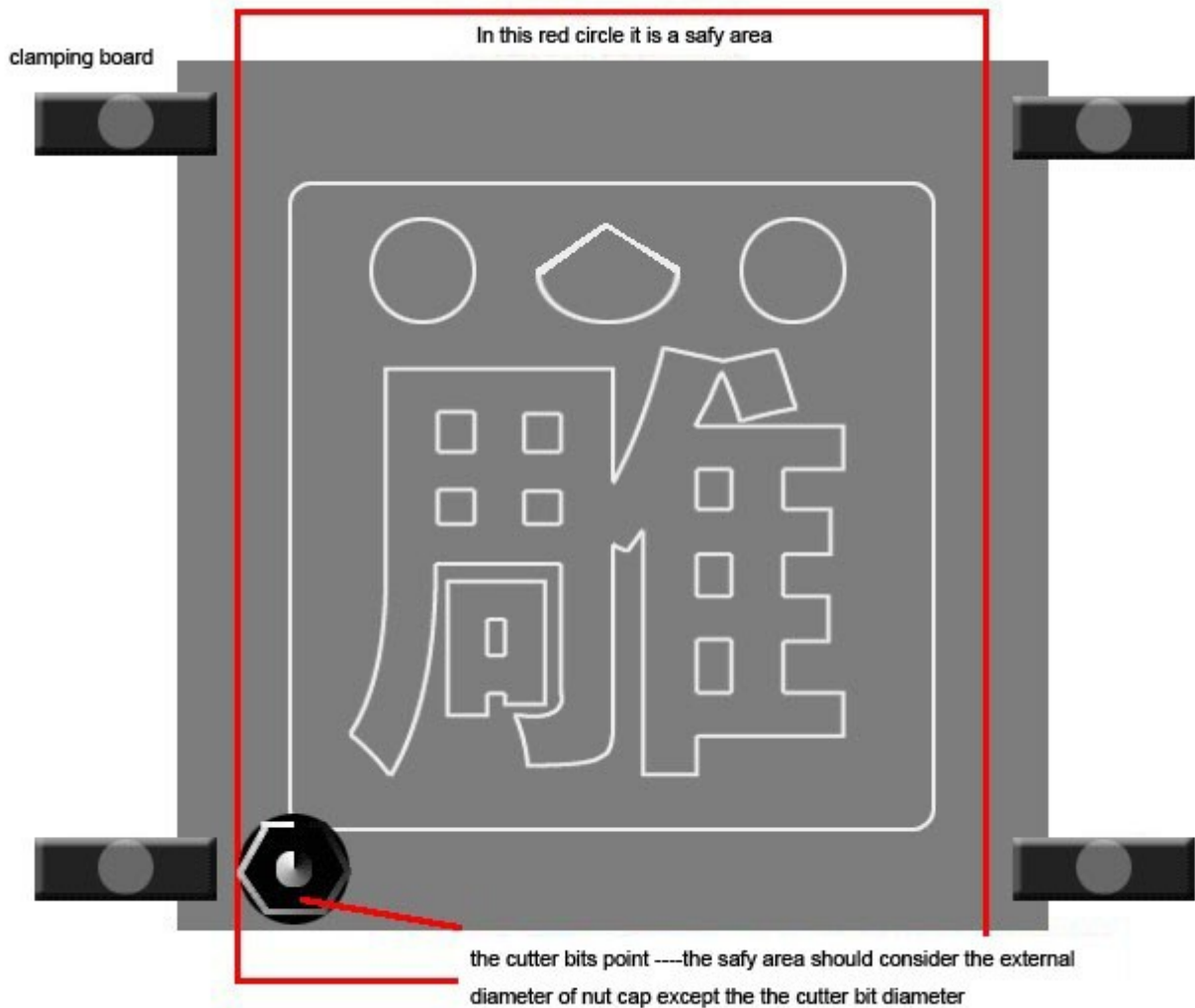
Notice:when doing holed-out work, please put a no-use flat board below the material to avoid the damage of the working station

3.Engraving test with the cutter bits

  (1)Install the cutter bits:after the idle running test without the cutter bit is fine, we can put the cutter bit on the spindle, the cutter bit is SHK---3.175mm---30 degree---0.3mm---flat bottom rngraving bits. The shank should be put into the collet more than 1 CM and fix it tightly by wrench.

  （2）Tool setting:it is very import to fix the cutter bits point to the original point of the material. Where is he original point?it is according to your G code file setting,our example is in the position of the left-bottom of the material board. You can power on the drive on the control box and move the cutter bits to that point by hand axis as below.

Move the cutter bit to the original point(the point which you setup in the file),then put a paper on the material board,power off the driver,move the Z axis by hand when the cutter bit point is closed to the paper that you feel the paper is touched by the bit point(you can use the MACH self-with manual control to opearte it)
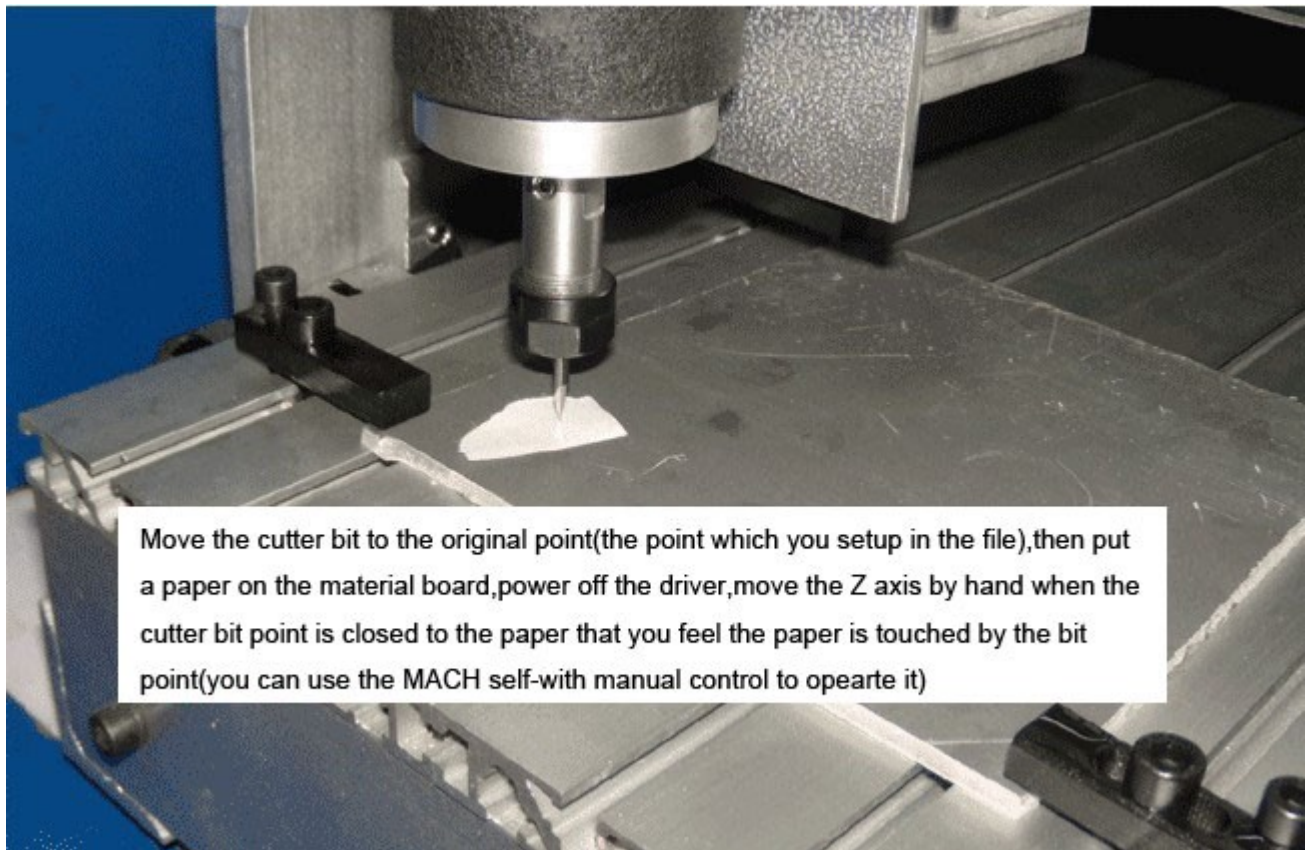
The engraving steps:

(1) Power on the drive and move the X, Y, axis to the original point by hand put the Z axis down to the material board, distance is about 1 CM with material board

(2)Power off the drive on the control box, and put a small piece of paper on the original point and move the Z axis by hand, and put the Z axis down, when the bit point is closed to the paper, you can feel the paper is touched by the bit point but the bit point is not touch the material, this tool setting tolerance is about 0.05MM(if you need more precise, you can buy a professional tool presenter)

(3)After it, power the drive on the control box and all the axis will be self-locked.

(4)Make sure the spindle speed regulator is in the safe position and power on the spindle and move the speed regulator slowly, for the first time you can move it to highest speed(the biggest point around the speed regulator)to check whether the full speed running of the spindle is fine.

(5)Make sure you wear the face mask(at least cover for the eye protection),then click the "Alt-R" to engrave in MACH3.

Remark:During the machine is working, if something emergency happens, please press the E-stop button on the control box or Click the E-stop button in the Mach 3.

4.To know the engraving bits in common use

(1)ACRYLIC cutting process,we suggest use one spiral flute bits,its advantage is no smoke no smell,high speed,high efficiency,non-stick powder,thin lay of cutting,smooth surface material board,if the material is thin ACRYLIC like as 2-3mm thickness,two spiral flute bits or straight bits are suitable too

(2)Aluminum board cutting process,we suggest use one spiral flute bits for aluminium,non-stick,high

speed,high efficiency.if low cutting required or hard aluminium(non-stick bits aluminium),also can choose two spiral flute bits for metal

(3)Small precision 3D engraving in the non-metal material,we suggest use radiused bottom engraving bits

(4)Large 3D engraving in soft wood,MDF board,native wood,PVC,Acrylic we suggest use one or two spiral flute ball bits

(5)Engraving metal,it need use one or two spiral flute bits for metal,flat bottom engraving bits for steel

(6)Engraving for MDF board,solid wood, composite board, plywood we suggest use straight flute bits or two large flute spiral bits

(7)Engraving for metal mould it need use flute end mills

(8)Engraving for stone it need use diamond router bits

If you has some more questions for router bits please consult professional router bits supplier.