

User Manual for Careel CNC Router

User's Operation Manual

Preface

Thank you for purchasing this CAREEL CNC router.

All the safety instructions contained in this manual must be read carefully and must be fully understood before you attempt to use your CNC router, in order to avoid potential hazards than could cause bodily injury, property damage, or damage the CNC router.

CNC routers belong to the high precision CNC machine. Improper installation or usage maybe damaged the accuracy, stability or the lifetime of the machine. Please read this manual before install the machine and keep this for long-term use or maintenance.

Safety Marks

1. DANGER (Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.)
2. FORBIDDEN (Indicates forbidden to do.)
3. (Must to do.)
4. CAUTION: (Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or moderate injury.)

Caution

In order to safely and properly use this CNC router, please read this manual before use it. Please remember the principle and safety information of this machine and keep this manual for long term use.

Request about the operator

The operator must know the request and procedures about the installation, adjustment and running. And he must know how to overcome the emergency situations and have the following terms: 1.) Have taken the training before. 2.) The operator can run the machine

commonly or run the machine safely according this manual. 3.) The operator can do turning on, turning off, clearing, grounding, connecting or other operations. 4.) The operator can use, repair and protect the machine.

The operator must do the following things.

1. Checking the safely appliance run properly or not.
2. Keep all operators alert before turn on the machine.
3. Keep clean worktable.
4. CNC routers may move unexpectedly, stay clear of machine at all times.
5. Wear safety glasses and hearing protection at all times when operating machine.
6. Use a grounded dust collection system to reduce hazard of explosion of airborne particles.

Clean machine surfaces and lead screws periodically to remove any foreign material.

7. Don't turn on the machine before preparation.
8. Press E-stop when meet hazard situation.

Warnings

1. This machine with hazard voltage, don't open the door of the control box or electronics to avoid potential hazard.
2. This machine has well grounding appliance, the input power just permitted to connect with the permanent power cables.
3. The machine adjusted to be the working situation, don't arbitrarily do any changes.

Please do the changes by the professional engineers.

4. Avoid the children and non-operator far away from the machine.
5. Please read safety cautions, warnings and safety marks on the machine before installation and adjustment. Ensure to put the warning marks at the eyesight position and change the damaged or fall off marks.
6. Please read the manual and instruction carefully to install, adjustment and maintain the machine. Proper movement, assemble and maintenance can ensure the reliability of the machine.

I. Abstract

- 1-1. Model explanation of CNC router-----3
- 1-2. Introduction of CNC router-----3
- 1-3. Introduction of the parts of the CNC router-----4
- 1-4. Parameters of CNC router-----5

II. Introduction of installation

- 2-1. Install environment-----5
- 2-2. Install procedure-----6
 - (1) Electronics installation and introduction of control panel-----6
 - (2) Installation of DSP system-----6
 - (3) Introduction of DSP system-----6
 - (4) Introduction and function of the inverter-----7
- 2-3. Install auxiliary parts-----13
 - (1) Install the vacuum pump (including the introduction about the vacuum pump and assemble procedure)
 - (2) Install the dust collector (including the introduction about the dust collector and assemble procedure)
 - (3) Install the air compressor (including the introduction about the air compressor and assemble procedure)
- 2-4. Install the software
 - (1) Install the control system software
 - (2) Install the application software

III. Testing the machine

- 3-1. The preparation before testing the machine
- 3-2. Testing the machine

IV. Maintenance

- 4-1. Maintenance
- 4-2. Lubrication
- 4-3. Maintenance of auxiliary parts

V. Common Problems

- 5-1. FAQ and solutions about inverter.
- 5-2. Other problems and solutions.
- 5-3. Common problems and solutions about DSP system.

VI. Electronic drawing

- 6-1. DSP drawing
- 6-2. Circuit drawing
- 6-3. Heavy power drawing
- 6-4. Control system drawing
- 6-5. DSP panel drawing

I. Abstract

1. Definition of the model

木工机 Wood working CNC router

广告机 Sign making CNC router

步进驱动 Stepper motor system

伺服驱动 Servo motor system

X 轴行程 X axis travel size

Y 轴行程 Y axis travel size

基本型 Basic model

真空吸附电木台面 Vacuum system made by bakelite

真空吸附金属台面 Vacuum system made by metal

排式刀库 + 真空吸附 ATC (rack style) and vacuum system

斗笠刀库 + 真空吸附 ATC (carousel style) and vacuum system

排式刀库 Rack ATC system

斗笠刀库 Carousel ATC system

吸尘器 Dust collector

喷雾冷却系统 Mist cooling system

手动加油系统 Manual lubricating system

Constitute of the CNC router

龙门 Gantry

机头 Machine head

HSD 主轴 HSD spindle

侧榜 Support

导轨 Linear

配电箱 Control box

齿条 Gear

DSP 手柄 DSP panel

床身 Table

Appendix:

Options: vacuum system, dust collector, air compressor

3. Parameters of CNC router

NO.	Description	Parameter
1	X, Y, Z Working Area	1300x2500x220mm
2	Table Size	1480×3050mm
3	X, Y, Z Traveling Positioning Accuracy	0.05/300mm
4	X, Y, Z Repositioning Positioning Accuracy	0.05mm
5	Table Surface	Vacuum system
6	X, Y Structure	Rack and Pinion Drive, Hiwin Rail Linear Bearings
7	Z Structure	Ball Screw, Hiwin Rail Linear Bearings
8	Max. Power Consumption (Without spindle)	2.0Kw
9	Max. Rapid Travel Rate	32000mm/min
10	Max. Working Speed	20000mm/min
11	Spindle Power Motor	1.5/2.2/3.0/4.5/6.0Kw
12	Spindle Speed	0-18000RPM
13	Drive Motors	Stepper Motor
14	Working Voltage	AC220V/50Hz, 3PH
15	Command Language	G Code
16	Operating System	DSP System/NCSTUDIO/SYNTEC
17	Interface	USB

18	Net Weight	1000KG
19	Gross Weight	1150KG

II. Setting up the CNC router

1. Work environment

- 1.) No dropping, no steam and no dust place.
- 2.) Ground is leveled, cleaned and no vibration.
- 3.) No interfere of electromagnetism
- 4.) Working environment temperature: -10°C — 50°C . If the temperature reach to 55°C , please keep good aeration.
- 5.) Input voltage is 380V/50Hz, capacity is 6KVA.

2. Setting up the machine

- 1.) Setting up CNC router
 - ① After receiving the CNC router, please check for the following:
 - a.) Check to make sure that the package includes the thing listed by the manual.
 - b.) Inspect the unit to assure it was not damaged during shipment.
 - c.) Make sure that the part number indicated on the nameplate corresponds with the part number of your order.

- ② Use the cotton yarn to clean the anti-rust oil on the machine and put some lube on the machine.

2.) Setup DSP panel.

- ① Install DSP system. (Pic.1 & Pic.2)

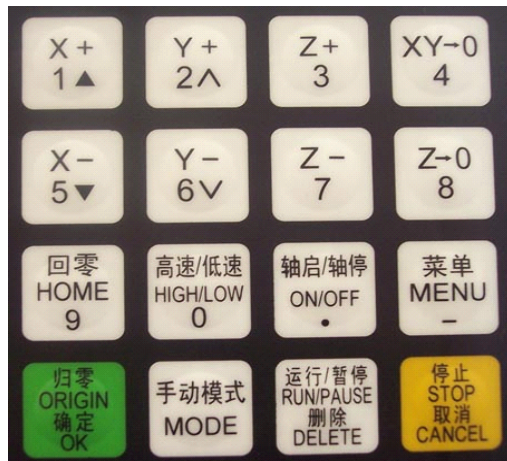
First step: Connect the digital cable with the inverter hub on the control box.

Second step: Connect the other end of the digital cable with the DSP panel.

Characteristics about DSP system

- ① Totally independent from PC platform;
- ② Directly read files from U Disk;
- ③ Easily process G code or PLT file with super size;
- ④ Strong system and process file examining function;
- ⑤ Easy to update system program;

- ⑥ It supports high micro step which makes precise and fast process possible;
- ⑦ Support to process part of the file;
- ⑧ Reliable data protection and recover function;
- ⑨ Friendly operating interface



Bottom functions on the DSP panel



Positive movement of Z axis, Menu upward, figure 1 inputting



Positive movement of Y axis, accelerate process speed, figure 2 inputting, different property selecting in Menu



Positive movement of Z axis, figure 3 inputting, rise spindle speed in process



Working origin of X axis and Y axis setting, figure 4 inputting



Negative movement of X axis; Menu downward, figure 5 inputting



Negative movement of Y axis; slowdown process speed; figure 6 inputting different property selecting in Menu



Negative movement of Z axis, figure 7 inputting, spindle speed adjusting in process









Z axis origin setting; figure 8 inputting











Axes home to machine tool origin, figure 9 inputting



Manual moving mode, high speed or low speed selection, figure 0 inputting

-  Spindle startup/stop, decimal point inputting
-  Menu setting entering, negative symbol inputting, multi process state checking,
-  All axes go working origin: confirm of motions /inputting/operating
-  Manual move, continue, step and distance modes selection
-  Cut process running/pause/inputted words delete
-  High/low speed parameter adjust, Cut process stop/selections, inputting and operating cancel

Compound buttons

1.  + digit button, switch working coordinate;
2.  +  button, C.A.D function;
3.  + digit button, stop point process;
4.  +  button, advanced process;
5.  + , help information;

There are some compound buttons for special applications. The operating mode is: press the first button and hold then press the second button, release the two buttons at same time.

Home Operating







Home is the machinery origin, Go to home operating refers to make all axes go back machinery origin. Home position depends on home sensor. Normally there are 3 sensors in an engraving machine. Go to home operating sets up the relationship between the machine and the working coordinates. And many system function applications rely on this operating, such as: stop point save, power off reboot and so on.

Warnings

1. Don't use this product in strong magnetic field or interfere environments;
2. Don't PnP U Disk while it is running a file;
3. Protect it from water, moist, dust and fire;
4. Protect it from metal materials getting into the cover;
5. Forbad to open the cover, there is no any user maintainable parts inside;

Plug U Disk and other lines gentle

1. Go to home parameter includes Home Speed and Home Direction; and those parameter should be adjusted in Menu. Home Speed refers to that 3 axes home speed, normally Z axis home speed should be lower than that of X and Y axes. Home Direction refers to which direction the axes go when it is under home process. It depends on the motor direction and Home sensor's location and sensor's property.

2. Entering Menu, cursor is on "Machine Setup" item, press  button, press  button, move the cursor to "Home Setup" item, repress  button to enter it, the cursor is on "Home Speed" item automatically, press  to enter and set 3 axes speed.
3. Speed limit Press  to confirm and save the new speed for X axis. The Cursor moves to the Y axis speed item automatically, if it is unnecessary to change the value, press  to move to the Z axis speed item. If it is necessary to change the speed, please do the same operating with X axis. When you finish all settings, it will go to former menu.

(5) Introduction about inverter

- ① When using a GFCI (Ground Fault Circuit Interrupter), select a current sensor with sensitivity of 200mA, and not less than 0.1-second detection time to avoid nuisance tripping.
- ② Connect these terminals (R/L1, S/L2, T/L3) via a non-fuse breaker or earth leakage breaker to 3-phase AC power (some models to 1-phase AC power) for circuit protection. It is unnecessary to consider phase-sequence.

③ Do not connect 3-phase models to a 1-phase power source.

④ Make sure that the wiring is correct. In particular, check that the output terminals U, V, W, are not connected to power and that the drive is well grounded.

The introduction inverter panel.



Displays the AC drive Master Frequency.



Displays the actual output frequency present at terminals U/T1, U/T2, and W/T3.



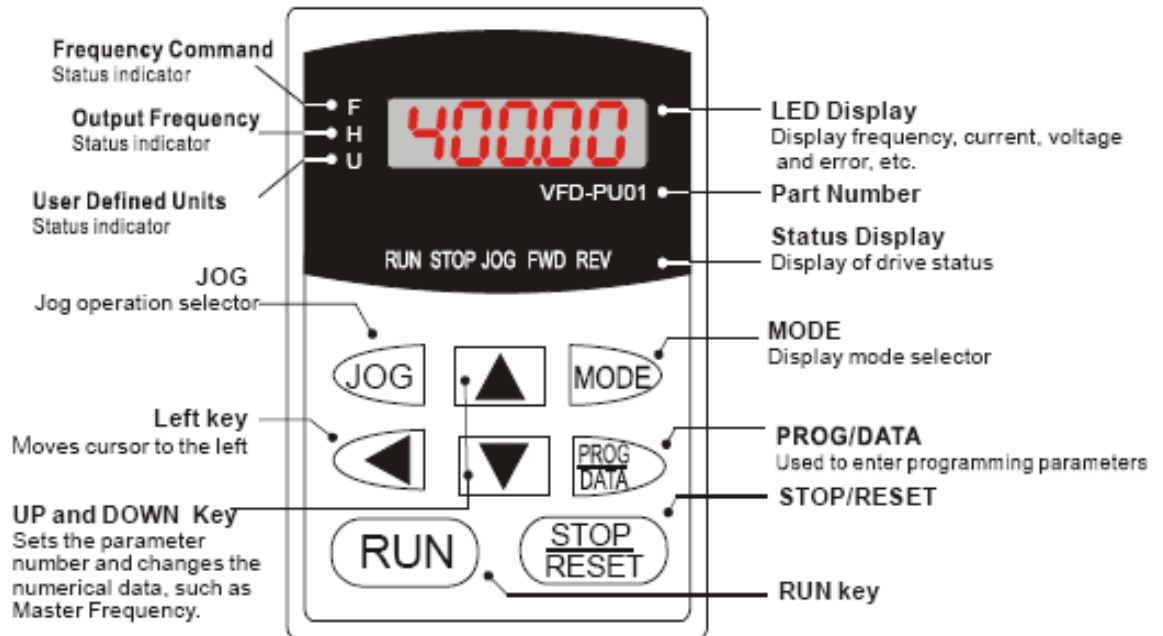
User defined unit (where $U = F \times Pr.00-05$)



Displays the output current present at terminals U/T1, U/T2, and W/T3.



Displays the AC motor drive forward run status.



3. Installation of auxiliary equipment.

(1) Installation of vacuum pump.

- ① Take out the vacuum pump from the package and take out the filter also. Please install the filter on the vacuum pump. (Pic.1)
- ② Please connect the tubes with vacuum pump and locked it.
- ③ Take off the cover of power on vacuum pump and connect with the 380V power supply.
- ④ Please check the rotating direction of the vacuum pump, clockwise rotating is correct.
- ⑤ Please clean the filter during the use per day.

(2) Installation of dust collector.

- ① Take out the dust collector from the package and install it according to the manual.

- ② Connect the power cable with dust collector.
- ③ Connect the power with dust collector.
- ④ Please connect the dust collector tube with the dust collector hood and the other end connected with dust collector.

(3) Installation of air compressor.

Connect the power cable with power supply and the other end with air compressor.

4. The installation of DSP software

(1) Hardware requirements: Main-board: PIII 450; 128M, Windows 2000 or XP;

(2) Host Program Setup

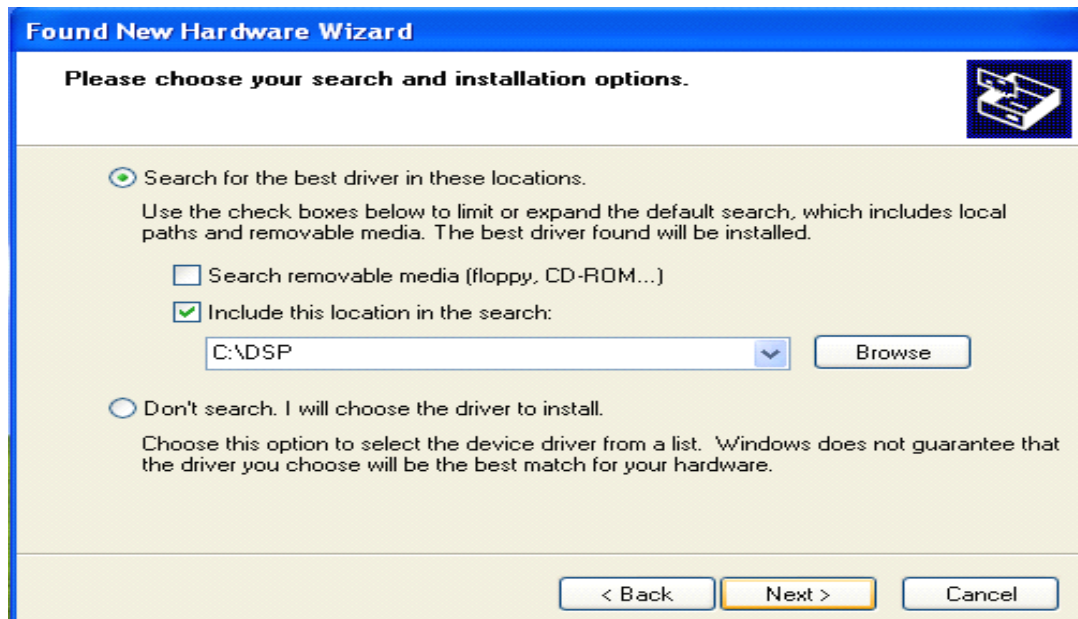
- ① Insert CD into computer driver, and copy all files in the CD and save them in a pointed folder in computer, such as: C:\RZNC-0501 Host Program;
- ② Connect the Controller to the computer with USB cable;
- ③ It shows: "Find new hardware" on the right bottom on the window as View 3-1, click on the clue;

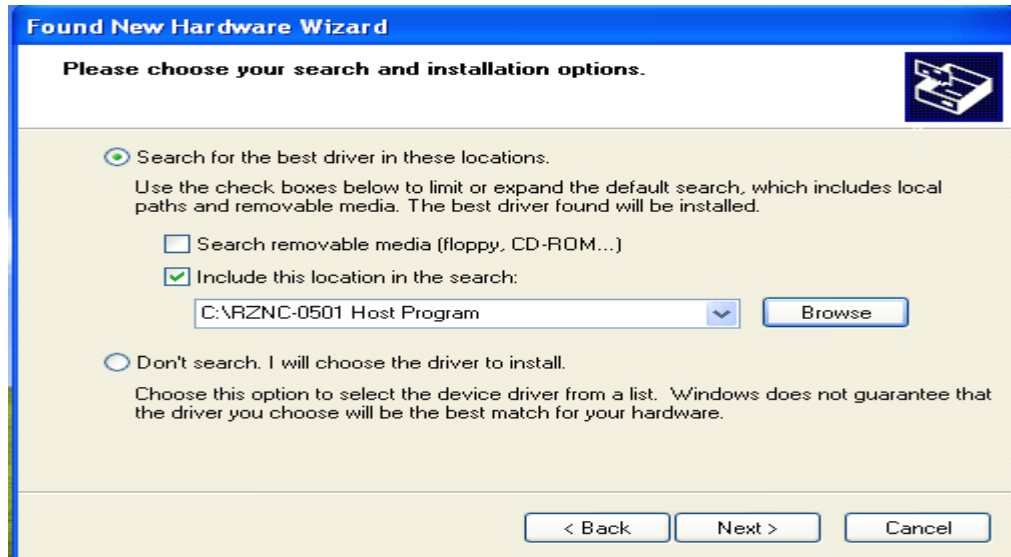
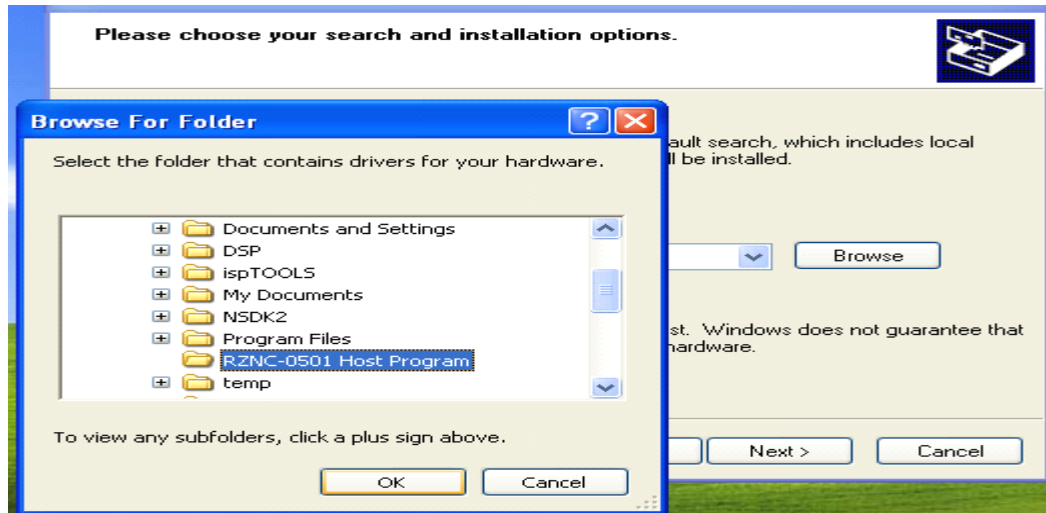


- 2) It appears setup information, select the second item, which is setup from list or special location, then click on "Next" button (as View 3-2);

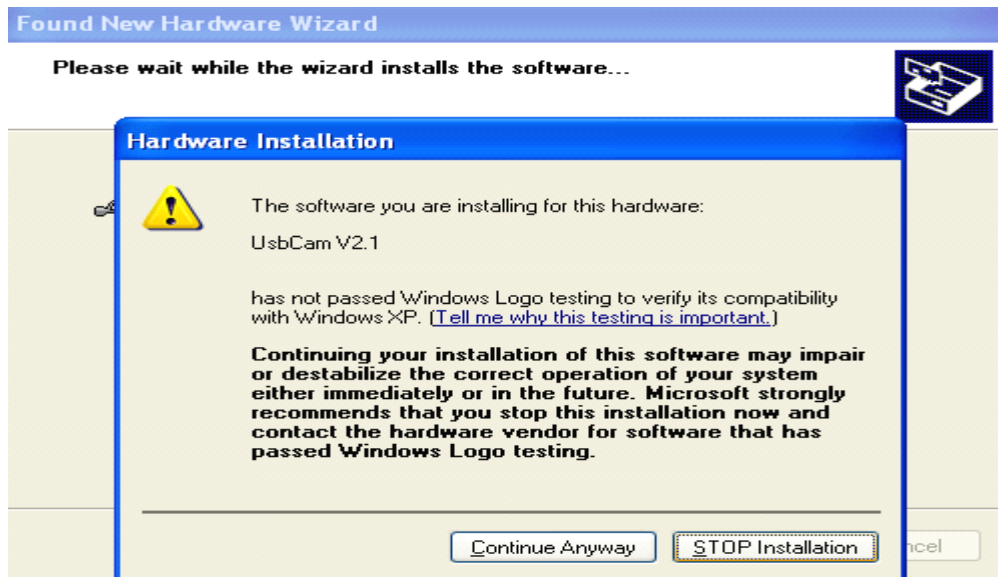


Choose "include this location in the search" then click on "Browse" icon, then find the location, such as: C:\RZNC-0501 Host Program, and click on "Next" button to begin to setup (as View 3-3);

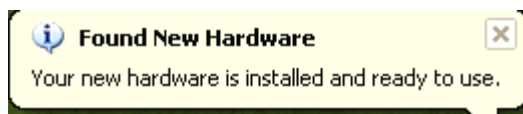




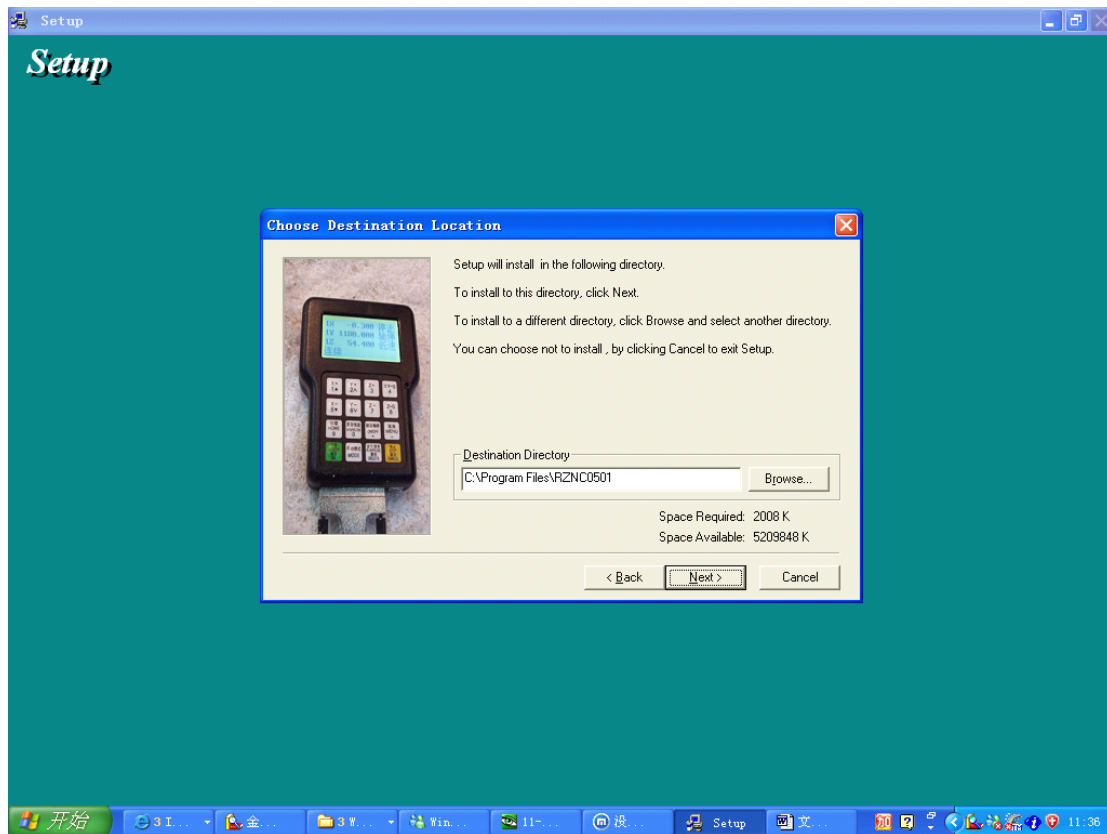
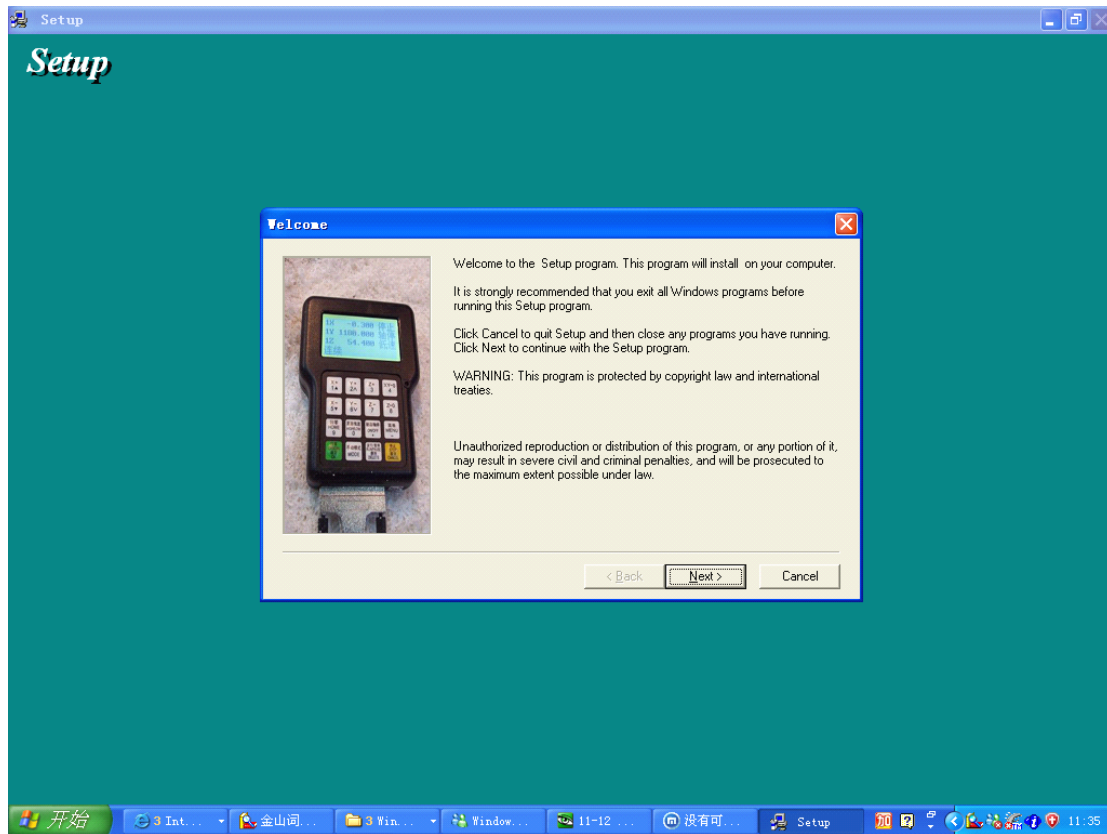
It begins to setup driver program, click on "Continue Anyway" when it clews "The program does not pass Microsoft Logo testing to verify its capability with Windows XP.",(as View 3-4);

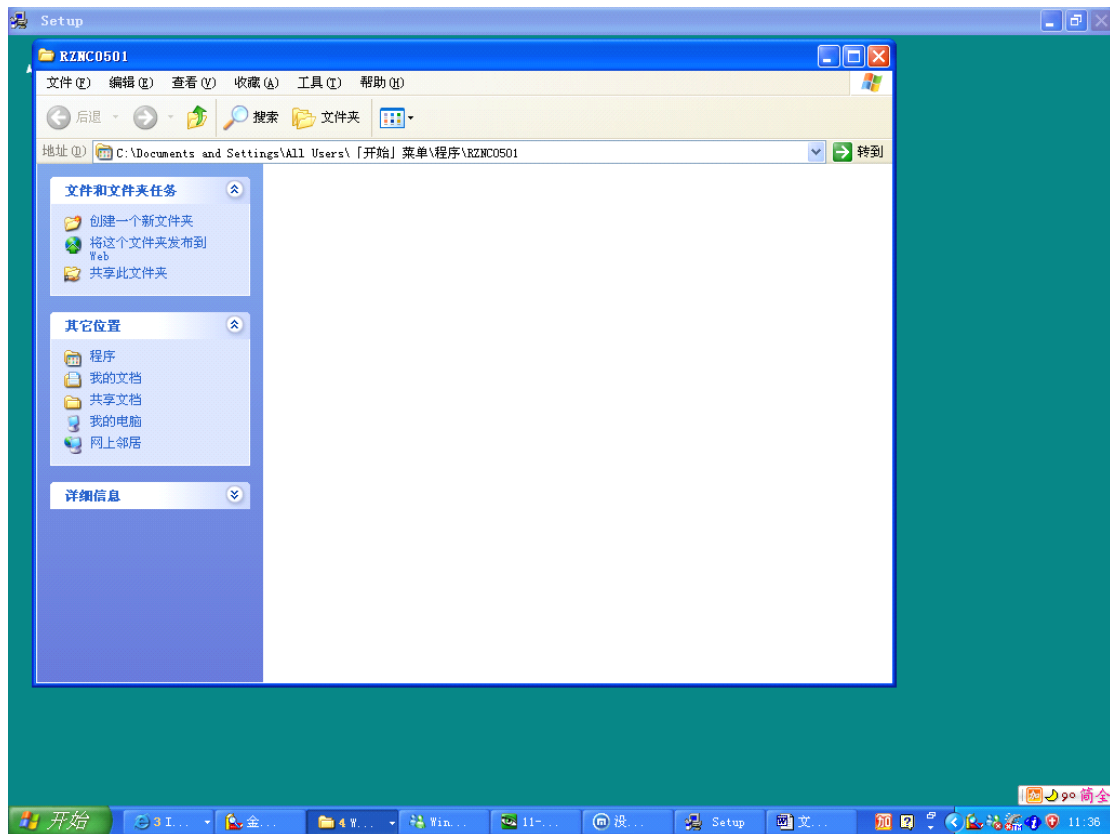
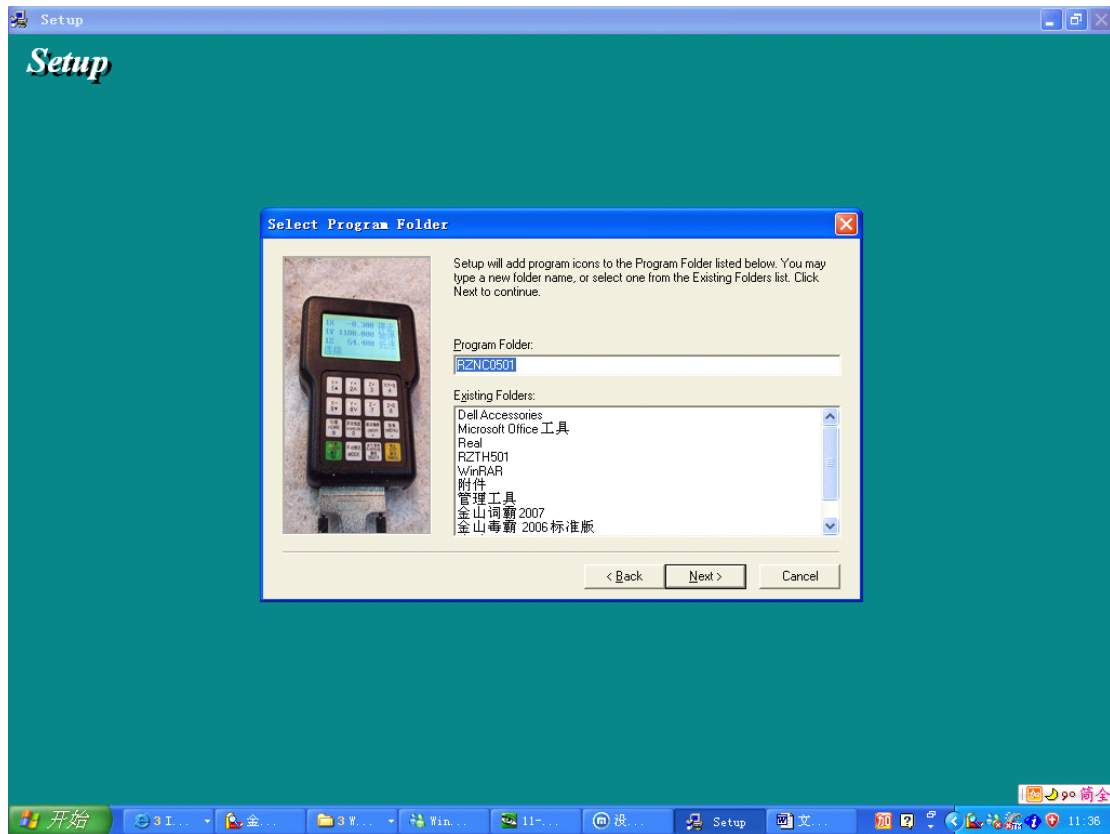


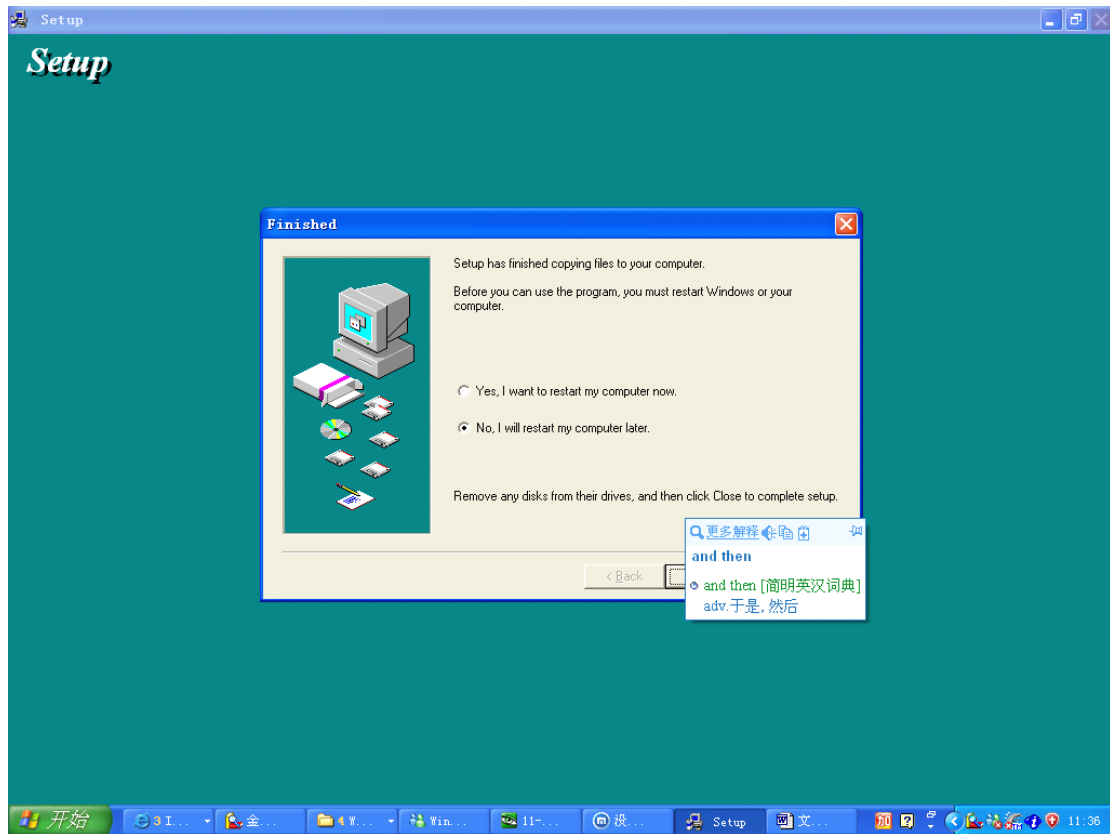
It clews setup finished, click on "Finished", (as View 3-5);



⑧ Enter into C:\RZNC-0501 and click "setup.exe"








3. Introduction of software


We use UcanCam software (Chinese software), Type3 software (France software) and Artcam software (England software) for our CNC router.

III. Test the machine

- (1) Turn on the power of the inverter and check whether it has abnormality. If it has some problems, please power off the machine and check the problems.
- (2) When it has been supplied power, it appears on the screen: "Goto Home?", actually it is

a question which needs your answer, press  means "Yes", then Z axis moves first,

When Z axis arrives its home, then X and Y move. Press , means "No", 3 axes do not move to their homes. Press any other buttons, only Z axis goes to home, X and Y don't go home;

- (3) When it is in Manual state, press  and 3 axes will go home; If the machine doesn't stop when back to home, please check the wire connection of the limit sensor

and the damage of the limit sensor.

- (4) Turn on the switch of inverter to check whether it has any alarm. If it has alarm, please turn off the power and solve the problem. And then move to next step.
- (5) Press "start" on inverter, the spindle start to rotating. Please check the running sound, direction right or not and whether the inverter has alarm. If it has abnormality, please turn off the power of inverter and check it. Then move to next step.
- (6) Check the air compressor, dust collector and vacuum pump working well.
- (7) You can use the DSP system to power on/off the spindle.
- (8) Turn on the computer and install the driver and software.
- (9) Down load a simples G code file to test the accuracy of the machine and then you can use it.

IV. Maintenance

1. Maintenance

- (1) Don't operate, dissemble and repair the machine without authorization or training.
- (2) Turn off the power of the machine before the maintenance. Please ask the professional electrician do the inspection when the machine power on.
- (3) Please check the E-stop works well or not.
- (4) Please use the same model parts for the replacement.
- (5) Please do a regular inspection on the thermo emission system.
- (6) Please check the power voltage of the control system.
- (7) Protect the dust fall into the control device.
- (8) The maintenance of the control system if no use for long time. First, it is not good to the CNC machine for long time stock. Please use the machine after getting it. If long time no use, the technical function will be declined. Please do regular inspection on the control system.

2. Lubrication

- 1.) Please use proper engine oil 10#.
- 2.) Please add the lubricate oil for vacuum pump per three months.

3.) Please lubricate the linear and ball screw per week.

4.) Please lubricate the spindle per week.

3. Other maintenance

1.) Please clean the inlet filter of vacuum pump per day to avoid the dust goes into vacuum pump.

2.) Please clean the outlet filter of the vacuum pump per week.

3.) Please check the neatness of the vacuum pump oil per two months. If the oil becomes black and sticky, please change it.

4.) Please use the air gun to clean the control box per week to protect the component from the dust.

5.) Please ensure the linear and ball without any block from the dust.

6.) Please clean the filter of the cooling machine per week.

7.) Please clean the filter of the cooling fans to ensure the function of the components.

8.) Please clean the dust from the carousel.

Common problems and solutions

1. DSP controller dies

Change a new DSP controller power supply (+5v) in the control box.

Use the manostat (UPS)

2. The machine doesn't go home.

Restart the DSP controller

Use a new DSP controller

Recover the data in DSP controller: MENU=>SYSTEM MAINTENACE=>DATA

SETUP=>RECOVER DATA

Reinstall the DSP program ZHBUSB: copy from the CD we sent with the machine.

3. Machine moves to the opposite direction

The cable maybe loose and you can check the cable.

Change the wire port A+ and A- on motor driver: you can find A+ and A-on the driver in the control box.

Change a new red limit sensor.

Change the cable connected with the limit switch.

4. Computer dies when downloading file

Data is inordinate and format the data in DSP controller: MENU=>SYSTEM

MAINTENANCE=>DATA SETUP=>FORMAT DATA

Enlarge the EMS memory and CPU.

Change a better computer

5. Main spindle doesn't rotate?

Voltage is too low and use the manostat (UPS)

Check the cable connected with the main spindle

Change a new transducer

Change a new main spindle

Date out of order after being copied and recover the data: MENU=>SYSTEM

MAINTENACE=>DATA SETUP=>RECOVER DATA

6. Machine doesn't work accurately

Change the motor of every axis or change the motor driver.

Use ground wire

Fasten the linker of the screw ball

7. Engraving size is not right

Change the pulse equivalent according to the type of the machine (screw machine: 320 160

320; gear machine: 127.3 127.3 200: 320,320,320 for XYZ6090): MENU=>SYSTEM

MAINTENACE=>SYSTEM PARAMATERS=>PULSE EQUIVALENT

9. Machine doesn't work after opened (including the machine don't go home)

The switch is broken, change a new switch

There is something wrong with the power, check or change the power

Check the cable connected with the switch and pin in one side of the cable

10. Machine strikes sideward peg when it is working

The sensor switch is broken or the sheet copper of the sensor switch is distort, change a new sensor switch or fix the sheet copper

The dimension of the machine in controller is not right, reset the dimension according to the working size (the soft limited in the DSP): MANU=>MANUAL SETUP=>MOTION LIMIT.

11. Blade is broken when engraving

Lower the engraving speed: MANU=>MANUAL SETUP=>MOTION PARAMATERS LOW SPEED/HGIH SPEED.

If the material is too thick, engraves by steps

Change a better quality blade

Collet is in a wrong position and corrects it.

12. There are some leftover of the material when the machine is working.

Rectify the interspace of the screw of every axis in DSP: MENU=>SYSTEM

MAINTENACE=>SCREW INTERSPACE

Change the bearing on the screw ball

Fasten the linker of Y axis (for ball screw machine)

13. Red sensor switch is ok but can't stop the machine

Sensor switch is dirty and clean it

Sheet copper is too far away from the red sensor switch, the best distance is 1-2mm

When we operate machine manually, the sensor switch doesn't work

14. Add machine in soft ware TYPE3

Open the TYPE3, and find the machining=> set up machines =>choose the FAUNC OMD in

CNC machines=>ok

15. X-axis or y-axis doesn't move.

Usually it is the problem of the stepper motor, driver and cable connected with the x-axis or y-axis, check them and correct

16. How to protect the vacuum hold down table

Don't hollow out the material when engraving

17. How to change Chinese version to English (DSP)

Open English version ZHBUSB, Download Controller Menu and Download Label.

18. How to solve the problem of message over Z + limited in Type3

When we use software TYPE3, we need to set up machine. When we set up machines, the initial position and end position of Z-axis are the same and higher than the Z between contours.

19. How to change the language of TYPE3 from Chinese to English

Open the soft ware type3 and press the button F10. It will appear option windows. You can choose English

20. Oil of the vacuum pump used for vacuum system CNC router.

Use engine oil #68