CNCUSB Controller

User Manual

Introduction

1.1

CNC motion controller is a device connect computer with motor driver. It can

work with your laptop or desktop which have USB port connection.
This is a complete (hardware / software) project, no need any additional softwares. The control card is compatible with most motor drives, it is the replacement of the drive board of the prarallel port.

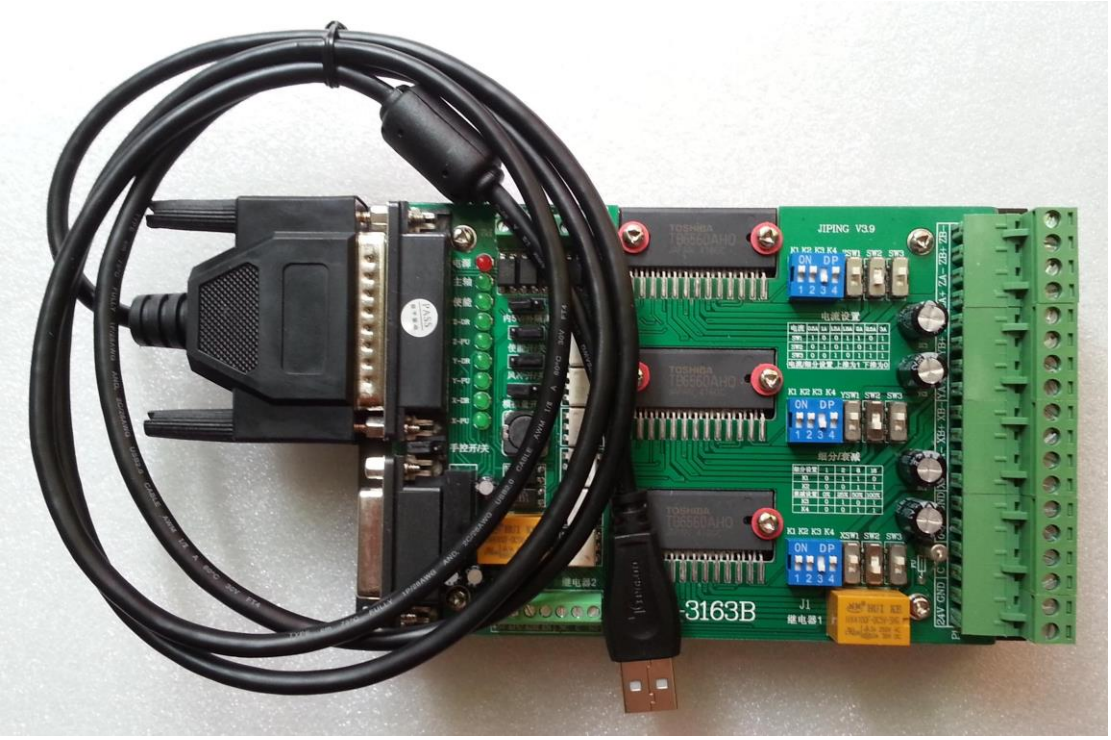
1.2 Computer System Requirements

Bottommost (lowest) configuration:
1 GHz or faster CPU processor
512MB of memory
500 MB of free disk space
DirectX 9 graphics device with WDDM 1.0 or higher driver
USB 2.0 port
. NET Framework 3.5 SP1

Recommend configuration:
2 GHz or faster CPU
2GB RAM
500 MB free disk space
DirectX 9 graphics device with WDDM 1.0 or higher driver
USB 2.0 port
.NET Framework 3.5 SP1

Hardware:

How to connect:



USB 25 pins functions：

Function	DB25pins	Remark
X axis (step pin)	2	
Xaxis (dir pin)	3	
Y axis (step pin)	4	
Y axis (dir pin)	5	
Z axis(step pin)	6	
Zaxis (dir pin)	7	
A axis (step pin)	8	
A axis(dir pin)	9	
External input interface (optoelectronic isolation)		
IN10	10	External emergency button
IN11	11	X axis limit switch
IN12	12	Y axis limit switch
IN13	13	Z axis limit switch
X、Y、Z、A axis Enabled	14	Enable
IN15	15	Tool setting*
No usage of other pins		

* this function is choosable, if there was, drive board will available

Spec&functions

2.1

Run Windows XP, Vista or Windows 7 (32 bit or 64bit) with USB2.0

Andvanced Interpolation algorithm

High-performance IO buffer

Provide, Start, Stop, Pause, Continue

Support standard RS274/NGC G-code (EMC2 compatible)

Support anvanced G-codes - G40, G41, G42 (tool radius compensation)

Support anvanced G-codes - G43, G49 (Tool length encoding)

Support anvanced G-codes - G54, G59.3 (coordinate system)

support SolidCAM, MasterCAM, ArtCAM, Vectric, ... creat G code

support 3-axis, 4-axis.

Load DXF file

Load directly PLT/HPGL file

Load directly picture file

Load directly drill file

Load directly GERBER file

Advanced tool change function

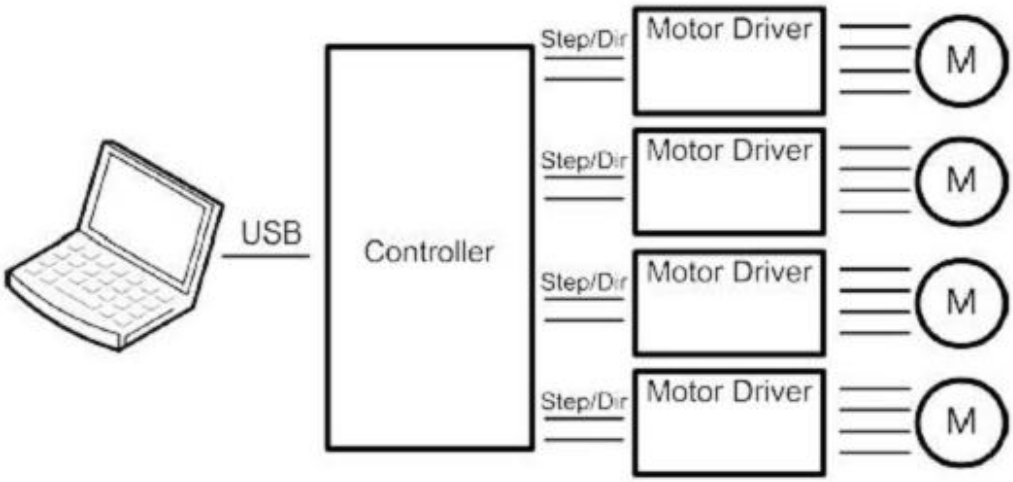
export G-code

export DXF

export CSV

export NC

安装



2.2

One point of USB card connect controller box by parallel port;

Another point connect computer USB port.

Four-axis controller card instrudtion:

2.3

Support 4th axis machine

Can switch 3 modes: Normal XYZ, thermal cutting XYUV, rotating XYZA,

Provided for each axis 25 kHZ pulse signal

12 us minimum pulse width

All axis limit

Can be accessed by external port, such as hand remote controller;

3 digital outputs (spindle / cutting liquid / mist)

3. Software

3.1 Installation

System need to insall：

- DirectX 9c for .NET
- Microsoft .NET 3.5 SP1 Framework
- Controll software

3.1.1 Install driver

First install --- NET35

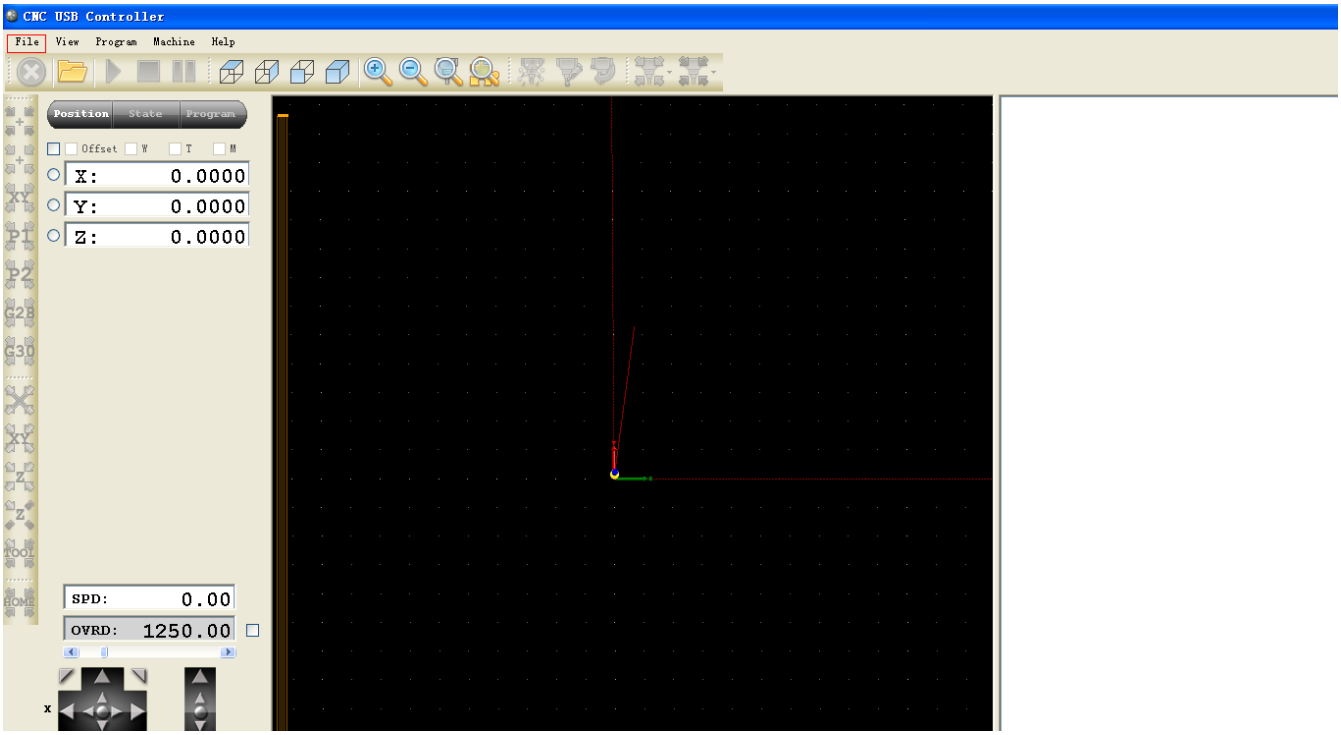
Please wait a second untill software installation complete...

Then install DX9:

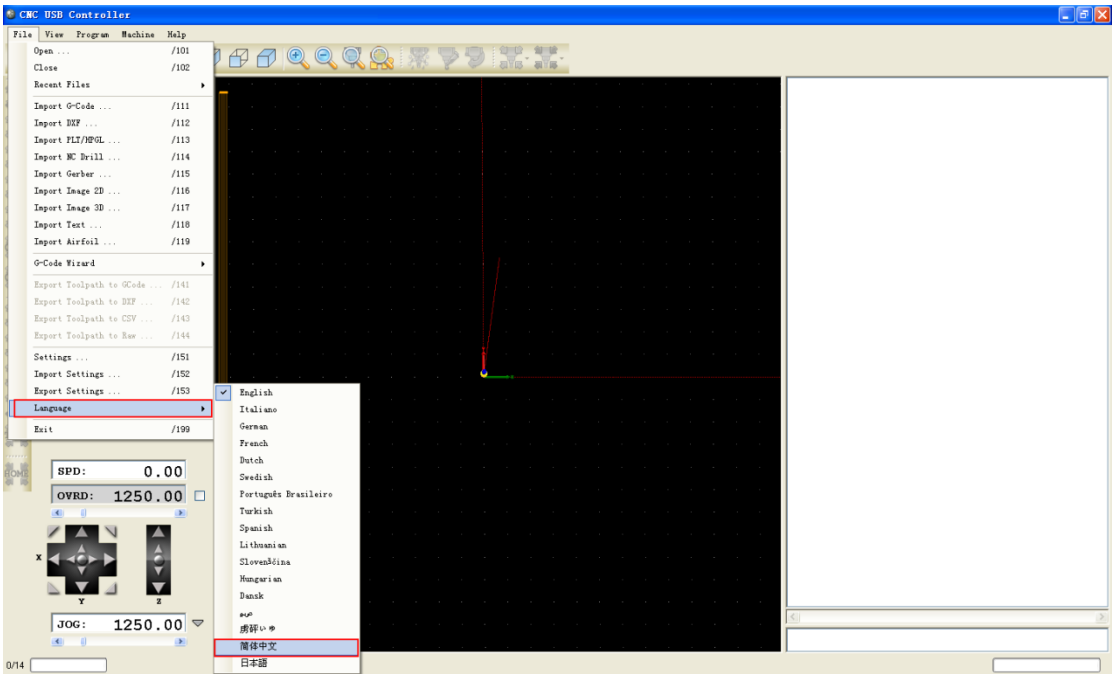
Then install the control software: CNCUSB_Setup

After installation, it needs Registration, otherwise can only run 25 rows Code.This software must work with controller card together.

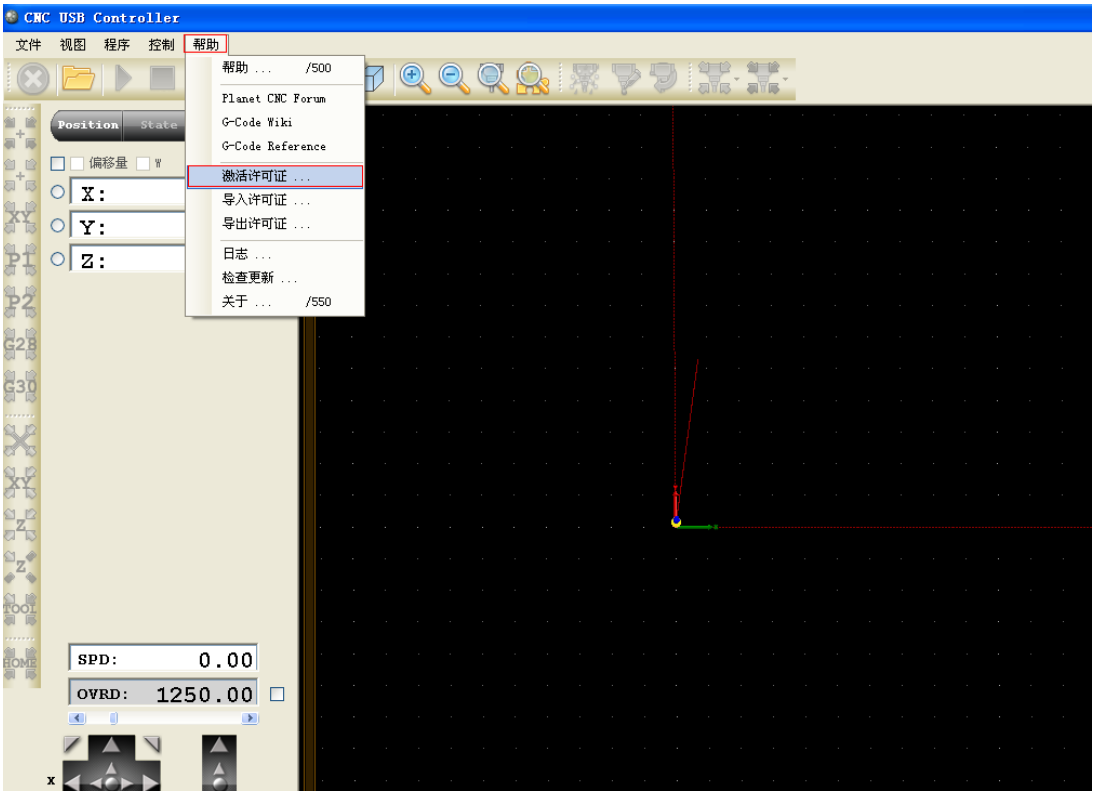
1，Open CNC USB Controller, choose your language.



Click the red frame”File---language---English,” picture as belows:

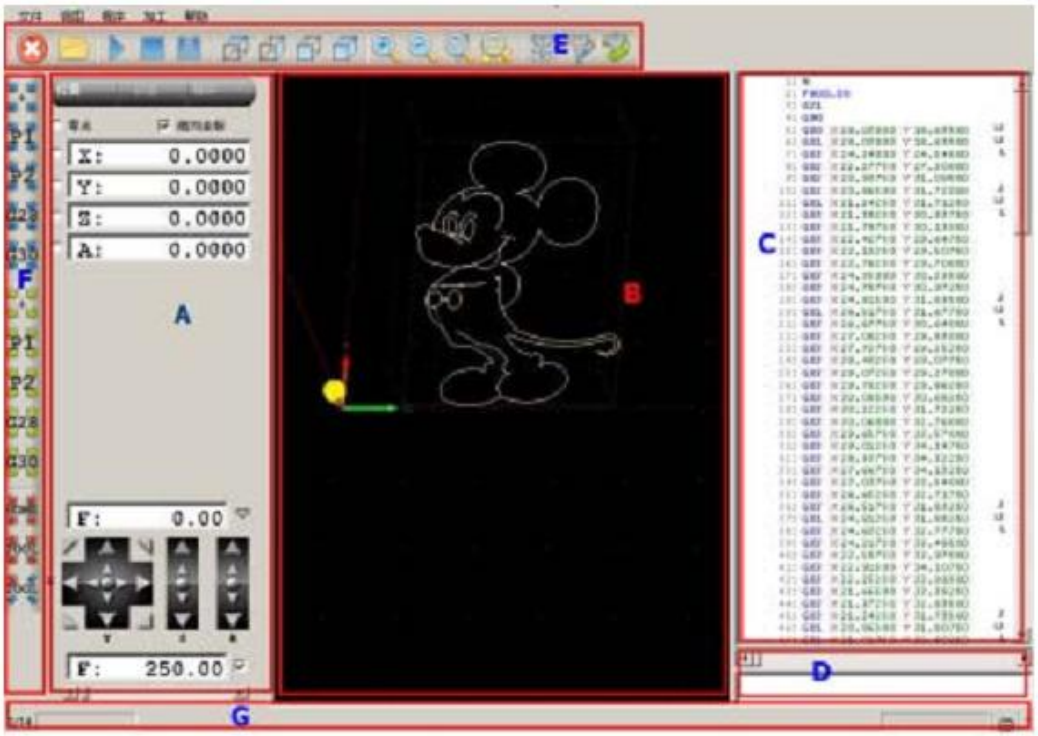


Insert the USB card, click”help”---“activate” , enter the register code, picture as belows:



For more convenient, you can save the setting steps, just need to click"File"—Load file (file name usually: XXXX.Setting.)

3.3 Main window:

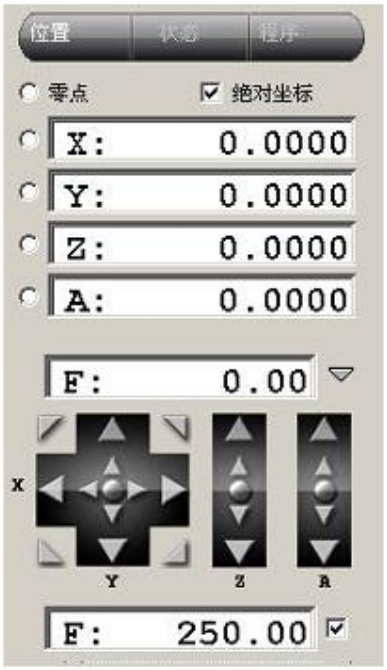


A – Position, status, code information board

B – process code
C – G-code
D – manually G-code
E – Tool
F – common positioning tool
G– status

Position operate”

3.3.1 Main functions:



Position

Clear button

Current speed

Move

Speed adjust

Purple background: + Direction limit trigger

Red background: - Direction Limit Trigger

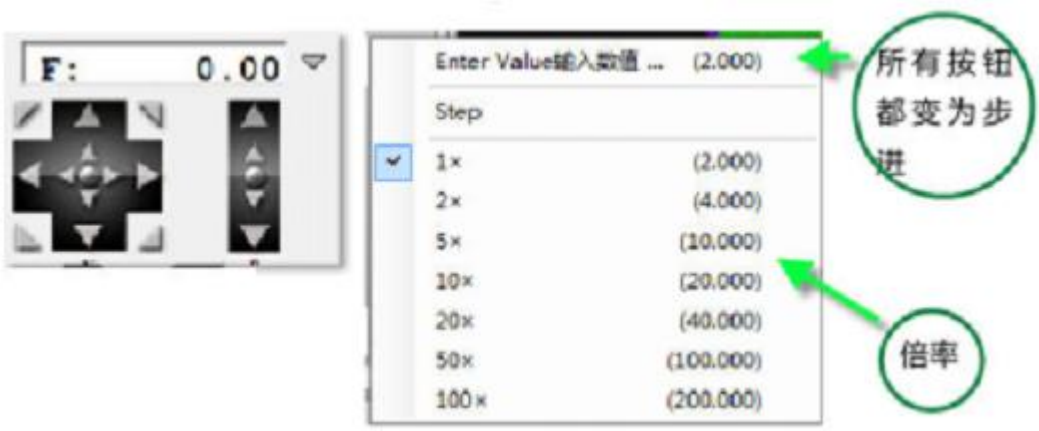
Above the window position coordinate system shows the current position information.

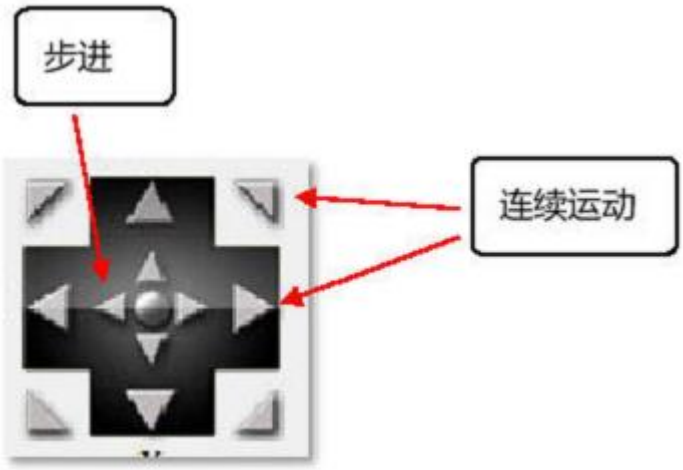
Absolute coordinates marked "absolute coordinates" option. You can also enter the figure directly then press Enter,
Of course, that means the position is the new figure. If you enter 0, the current axis position is cleared.
"Zero" button will clear all axis positions.

Speed F shows the 'unit / per minute.' Unit setting in the system parameters.

Jog key is moving the equipment to the desired position, the speed limited by the following slider as belows.

F value on the right drop-down button, when clicked, pop Stepping Options box, specify the stepping movement distance.

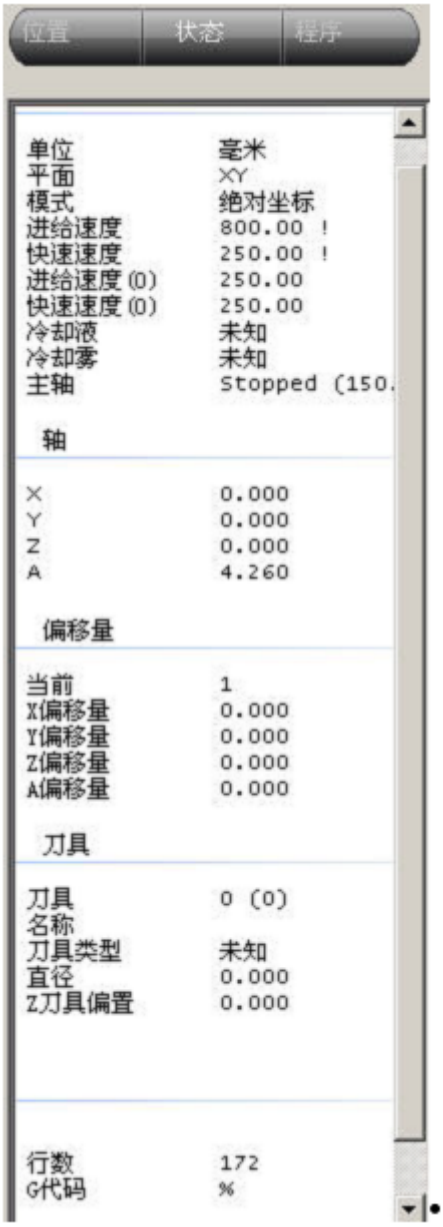




F speed value adjust by the sliding block:

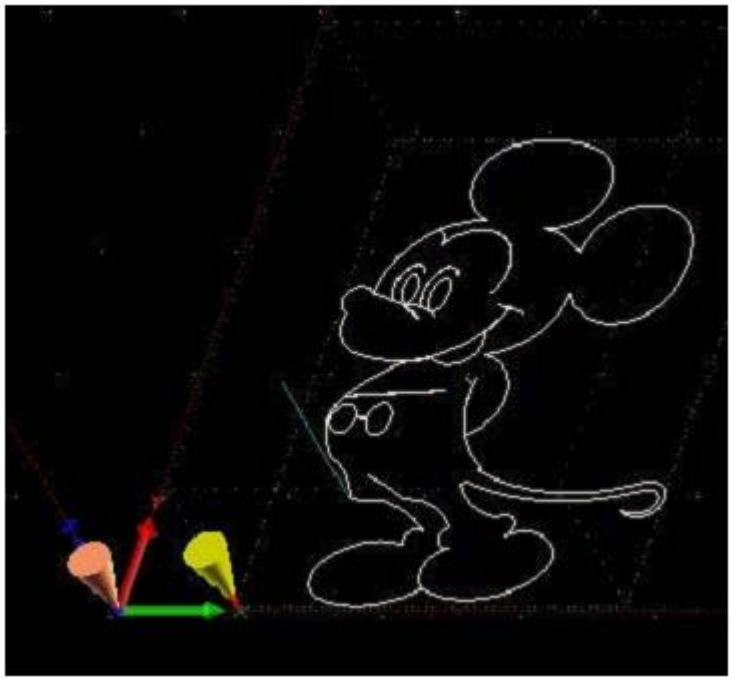
Specify or entered manually.
Right hook - specified speed, ignoring F order of G code (generally on hook),
After hook, the processing speed can be changed.
Do not hook – use accelerated speed of "General Settings" in speed of G code or system parameters.
The Select Default from the "General Settings" and "specified speed" item definition.
Speed Settings: System parameters "basic settings" default rate, "Axis Set 1" The maximum speed of each axis.

3.3.2 Status of board



Show: Current device status

3.3.4 Processing code window



This window displays the device, tools, machining path 3D map.

Orange Box - device processing capacity range
Gray grid - machine worktable
Axis arrow - display coordinate system origin
Red axis - the origin of the coordinate system selected
White Lines - machining feed path
Green Line – blank path
Red lines - selected path (on the right Select G-code line number)
Yellow Cone - the current tool position
Orange cones - analog display position •
Dark green / gray cone - G28 and G30 Location •
Dark green / gray - project scope and procedures for cutting range

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Shortcuts:

Zoom / shrink: mouse wheel
Shift: Press the left mouse button and move
3D perspective changes: Press the right mouse button and move

3.3.6 Manually G code input window

G code text can be entered:

Devices such as input “G1 X123 F234” F-way speed of X axis will be moving

forward 123 units.
Toolbar

3.3.7
Toolbar functions from left to right:

Emergency Stop
Open the code file
Begin
Stop
Pause
Top View
Lateral view
Front View
3D perspective
Zoom
Shrink
Centered at the origin
Show all

If software shows status below, it says the controller card comminication faile, or you pressed the emergnecy button.

Usuall positioning tool as belows:

- 将当前位置设为零点
- 将当前位置设为 PACK 1
- 将当前位置设为 PACK 2
- 将当前位置设为 G28
- 将当前位置设为 G30
- 设备移动至 零点
- 设备移动至 PACK 1
- 设备移动至 PACK 2
- 设备移动至 G28
- 设备移动至 G30
- 回原点
- 回对刀位 自动对刀
- 在当前位置 对刀

Status bar

3.3.9

Left side display control card cache information

Right side picture shows in controlling status 

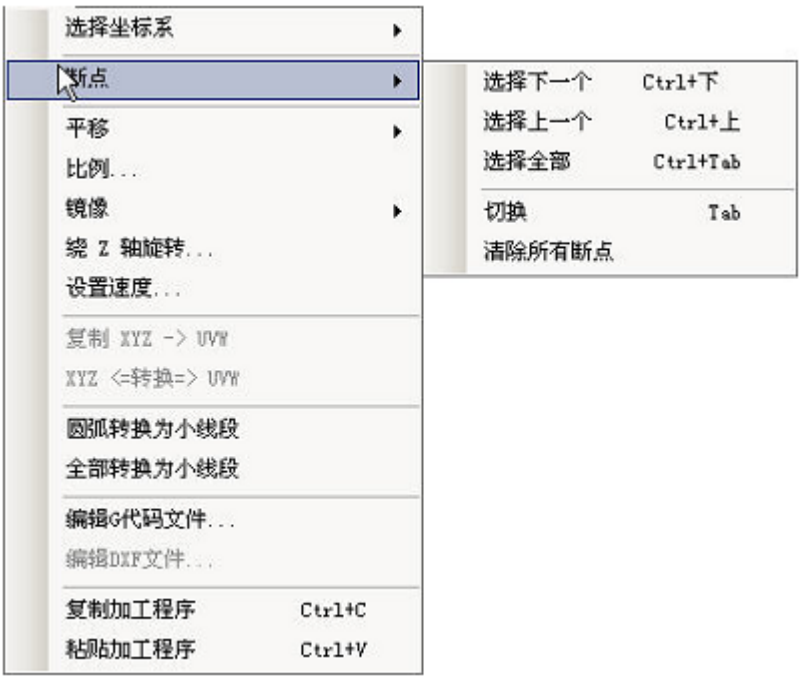
When processing, it will shows the working condition

3.3.10 File menu

3.3.11 display menu

Code menu

3.3.12



Device menu

3.3.13

Firmware

upgrade – control card upgrade

Control card must first enter the upgrade mode, after power on shorted external interface pin 7 and 10 . Release, the red status light flash.

Authentication - Compare card firmware and software version are the same

3.3.14 MenuHelp

4．system parameter setting

4.1 Baisc settings

Size unit: Metric or inch

Axis: check your machine 3 or 4 axis (this card the max 4 axis)

Axis definition: X, Y, Z, A axis(rotary axis); but for cutting usually use: X Y U V.

Axis name:

X, Y, Z – common aixs

A, B, C – rotary axis

U, V, W – parallel axis (hot cutting machine)

The default rate

The default setting when the code runs (G-CODE F is not specified when) the feed and air speed, the unit is size

Units / per minute.

Feed - under the knife processing speed (G-CODE in general as G01)

Fast speed ----- Non under the knife movement speed (G0 0).

Speed limit: hook on the right side of the main interface F value is also selected (meaning software default)

After processing by hook on the main interface to set the F processing, ignoring F G code commands.

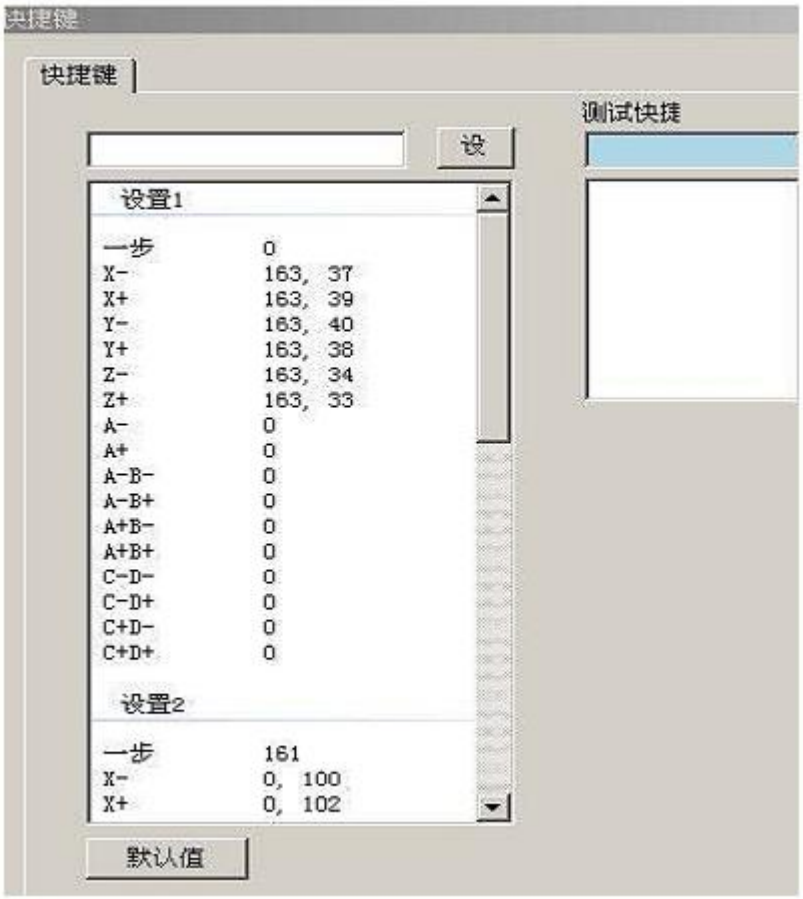
Limited to only feed rate: the hook under the knife only after the specified speed

Hook is not empty full speed under the knife away and the main interface F value at.

color Definition icon widget color

shortcust Define keyboard shortcuts

adjust Calibration platform, designated units are consistent with the actual movement distance



4.2 Miscellaneous

Select the device type:

XYZ - ordinary 3-axis engraving machine

Hot wire - 4-axis thermal cutting

Rotary - device has the rotation A axis

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XY-UV distance: distance of both ends of thermal cutting

Display Resolution: setting in the middle of the main interface window, processing code icon window, plus small figure will increase the value of the computer Computation.

Hardware graphics acceleration: after on the hook, use graphics graphics acceleration. .

Skin: Select the software interface skin (restart to take effect)

Expansion ports:

Start: Not take effect until the hook is enabled

Opposite: need to take the hook

For the emergency stop button

For Pause

Jog: without self-locking switch must hook

Other:

Advance angle

Advance angle used to calculate the speed, if the angle between the two movements is bigger than this value will not reduce speed. If the angle between the two movements is less than this value will reduce the walking speed. In G-code, use “ ㄴ“ and “ㅣ “ to display.

Optimization thresholds

Optimize the degree of optimization of the threshold setting. Program will attempt to delete the lines shorter than the specified length. Set this too low will cause the machine to shake, if set too big, the detail will be lost too.

Pause dialog Pause pop-up dialog

Pause deceleration Pause is enabled when decelerating, the proposed hook, avoid high-speed movement will be suspended inertial motion.

4.3 Axis setting 1

Pulses / step

Set the number of pulses per unit, this value is very important, please use the basic settings after setting the calibration function tests.
Trapezoidal screw pitch is generally 4MM, axis number of steps to be set to 400.
Ball screw pitch is generally 5MM, axes should be set to 320 the number of steps
Reverse
Set against the direction of movement

Level inverter
Some motor drives with a total of yin yang connection of different correlation.

Acceleration
Movement started from the initial velocity (units / min) and speed (units / second squared) to the maximum speed.
Acceleration value is smaller, the maximum speed from the initial speed to the longer time-consuming, the more stable the motor.

Maximum Speed
Please set up the machine movement is not lost step value.
Be careful to set these parameters, serious adjustment.

Backlash
Can be set for each axis hysteresis

Stops
Set PACK1, PACK2 information.
In manual homing useful tool.

4.4 Axis setting 2

Limit

Limits for each axis hardware limit switch, hook hired

Limit -

Usually set to 0

Limit +

Effective working distance, the settings icon in the main interface window will work area

Homing

This function is implemented with hardware limit switch. After execution, the one axial direction, that come into contact with the contact limit switch is a certain position, and then move a distance.

Y axis is homed when the - direction moves at a speed of 200, met - limit switch, the point defined as -10

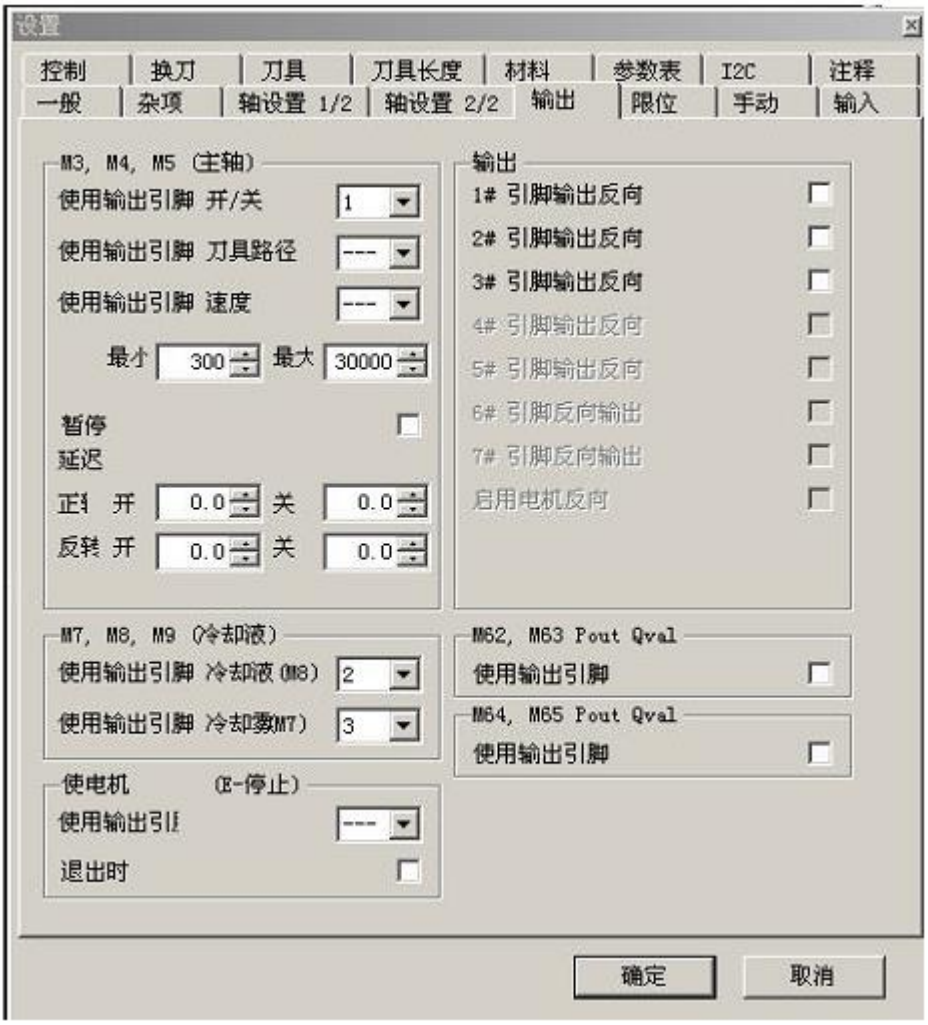
Point, Y and then moved to 0:00.

That is the Y axis 0:00 from a real hard limit has 10 safe distance.

Note that with the relationship between different coordinate systems.

Lower left corner of the main interface hired origin is in effect.

4.5 Output



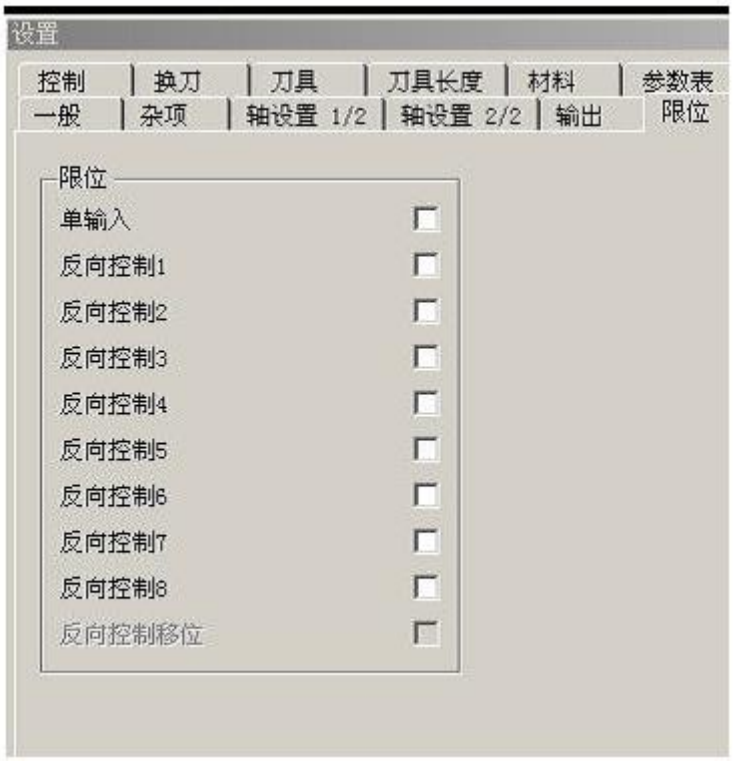
M3,M4,M5 Spindle control command (control spindle function temporarily use)

Switch port

Direction for the port

Speed port

4.6 Limit



Single Limit: hook after: each axis - + direction limit sharing a port that is restricted to the axis 2 position switch in parallel. Limit one point to the X with, limit 2 to Y, limit 3 to Z, limit 4 to A.
Not hook: Limit 1 to X-, limit 2 to X +
Anti level: normally closed limit switch hook.

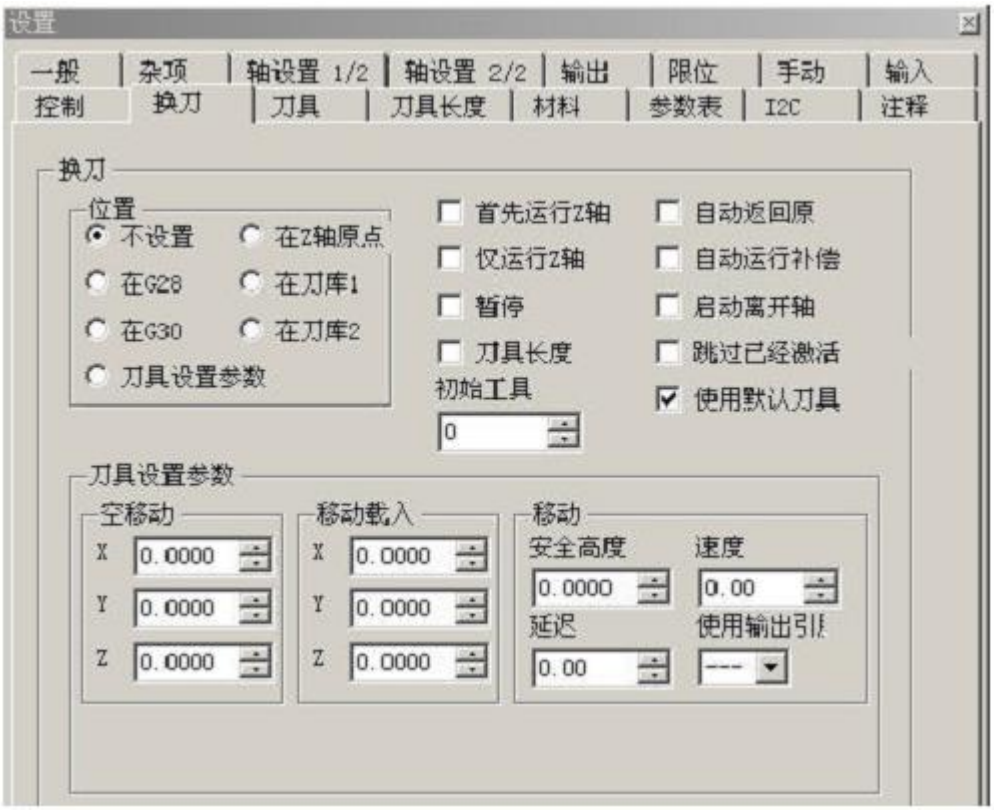
4.7 Jog key

External point switch
Enable
Hook This feature takes effect after
Inverting
No hook

Acceleration and deceleration
After the acceleration and deceleration function hook effect
Stepping
Minimum step size, how many units to move once more

Max speed
Move the fastest speed
Movement speed by the control card external speed potentiometer control, if not then press the top speed.

4.8 tool change



Tool change command (M6) execution triggered.
Location
ATC prior to move the location of the first definition, pay attention to the adequacy of the Z-axis height tool.
Z-axis first move
Just move the Z axis
Pause
Length of the knife
After execution of the knife tool change operation, see below see "the knife"
Back before the tool change position
Automatic compensation
Maintaining spindle status

Status with the hook on the back spindle M3, M5 command and control, do not hook tool will automatically close when the spindle, but only after manual opening tool.
Initial knife
The default knife.

Tool library settings

4.9 Tool bit

Need to cooperate with tool library

4.10 Tool setting

Enable
Enable the feature on the hook
Position the knife speed
Equipment before moving to the XY position, then the Z-axis direction at a speed of a movement in that direction until the limit switch is hit.
Let position is usually the thickness of the knife block, increase the number of actual use to avoid carving does not penetrate.
Tool sensor
Tool usage.

4.11 Material

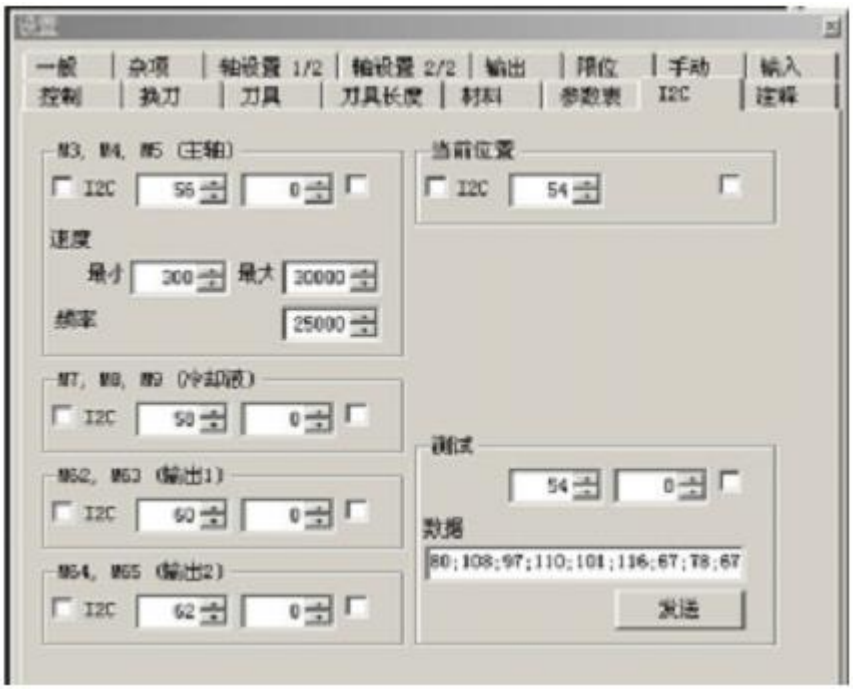
4.12 parameter

Set coordinates with several common position.

Modified point update.

Reset to the default values.

4.13 I2C extention



I2C control card provides external communication function, the external hardware support can achieve:

External coordinate display

Spindle control

Other controls.

Ask and answer

5.1 Firmware Upgrade

Each software update, you must also upgrade the firmware. The software will automatically detect.

You can also manually upgrade method for the control card, short external interface 7 feet and 10 feet, and then click the menu upgrade.

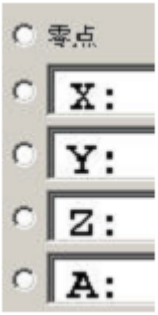
Upgrade mode with the usual mode of operation

Status lights flashing at different frequencies.

5.2 Axis zero and cleared

Zero refers to the axis to the current coordinate system 0. Can click the main window on the left toolbar icon.

Clear refers to the current position as 0, according to the location information at the top of the main window button clears all the axes, an axis can also be cleared individually.



5.3 Home position

The main window right side 

icon, perform automatic back hardware origin, to be used in conjunction with limit switches.

5.4 Tool setting operation

Clik 

（tool setting）or 

(Current position tool setting) to operate.

Note:

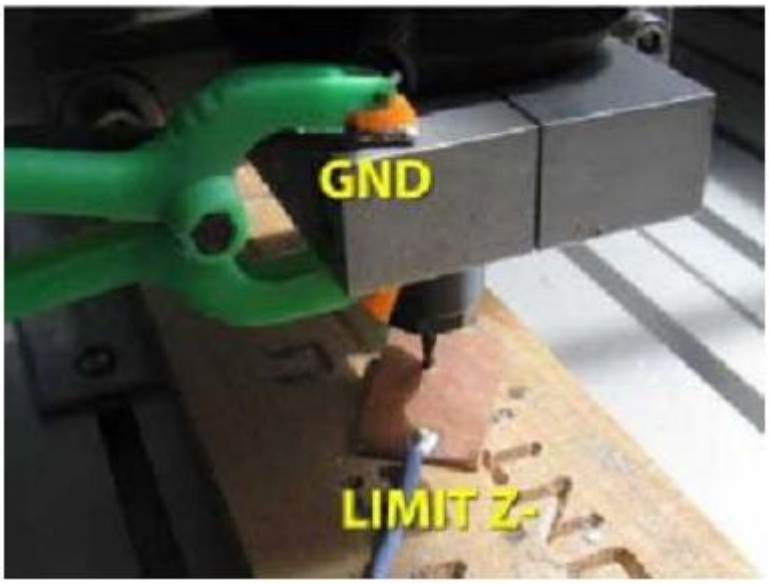
Insulated with a bottom of the PCB board or other flat conductor as a knife block, connected to the Z-axis - or + limit;

Spindle tool is connected to the ground terminal of the control card (GND).

Z axis slowly move down when touched when both, Z axis sensing trigger limit, then the location is right

Knife block thickness.

Z axis will move up four units of exhumation to a safe altitude.



5.5 Speed-related options and Precautions

Speed-related Key Points:

Maximum velocity for each axis

In the "axis setting 1";

G code specified velocity;

Basic settings in the "default rate" (G code does not specify movement speed);

Specifies the F value (the main window bottom left);

Empty process and feed rate;

The maximum pulse frequency control card 25kHZ.

Working speed:

Specified speed (the right side of the main window hook on the bottom left of the F value)

"Feed" or "Feed + empty away" by their own set of F-value work, processing time can be changed.

When not specified, "Feed + empty away" by G-code file F-value work; G F value is not set by the system based on the "default rate" work.

END.

Software updating...