

User's Manual for TC-C4 Vibrating Knife Cutting Control System User Manual V1.1

Shenzhen Topwisdom Technology Co., Ltd.

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Versions

Version No.	Revision Record
V1.0	Initial.
V1.1	Description based on firmware V.L026.003 version.

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Part I Overview

1.1 System Overview

Thank you very much for using our company's TC-C4 vibrating knife cutting motion control system!

This system supports 4-axis motion, supports vibrating knife, pen, punching and other processing methods, suitable for cutting car mats, sponge, EVA, hollow board, pearl cotton, self-adhesive, artificial leather, etc.

- Power supply of DC24V/2A;
- Use high-performance 32-Bit floating point ARM, 128M Flash, 512K RAM, 6 general outputs, 12 general inputs, TTL electrical level;
- Equipped with 4.3", 480×272 LCD;
- It can realize 4-axis motor control (X, Y for plane motion, Z for lifting, U for rotation; motor driver pulse frequency can be up to 166KHZ);
- Support USB2.0 interface, support computer USB communication, support U disk to read and write files;
- Support 100Mbps network communication;
- Using 7-segment S-shaped acceleration and deceleration curve and adaptive speed planning algorithm, speed gear, small circle speed limit, etc., different cutting parameters can be selected for different graphics;
- Support platform calibration function to avoid problems such as cutting through or hitting the knife due to uneven platform;
- Support red light positioning, frame preview, Y-axis feeding, etc.;
- Supports functions such as track preview, continuous cutting after power failure, foot switch, protection input alarm, servo alarm, machine authorization, firmware upgrade, processing information statistics, etc.;
- Support Chinese Simplified, English, Traditional Chinese, Korean, Russian, Italian, Spanish, Portuguese, Vietnamese and other languages;

Before using, please read our manual carefully, ensure to operate our system correctly.

Please keep the manual well, and it's convenient for your future references.

Because of different configuration, some devices have not some of the functions listed in the manual, the details subject to appropriate operation functions.

1.2 Notes and Warning

Prohibit the non-professionals to maintenance and debug the electrical system, if not, this will reduce device's safety performance, and expand failure, even cause accident and property loss.

Please do not piles up debris on the control box, and in the course of using, regularly remove the dust of the control box surface and filters, to keep good ventilation.

The company will not be responsible for any consequences due to any unauthorized change with the product!

Warnings

- ✓ **When users have to open the cover of the control box, must cut off the power after 5 minutes and under the professionals' guidance, only can be allowed to touch the components in the electrical control box!**

Prohibit

- ✓ **Prohibit touching any motion parts or opening the control equipment when the machine is working, or it may be bringing about the accident and machine can't work.**
- ✓ **Prohibit using the electrical equipment in the damp, dust, corrosive gas, flammable gas area, or it may be cause the electrical shock or fire!**

1.3 Work Environment

Good ventilation, sanitation, and less dust.

Storage temperature: 0-50°C.

Work temperature: 0-50°C.

Work relative humidity: 30%-90% (no condensation).

1.4 Power Supply and Grounding

1.4.1 Power Supply Requirements

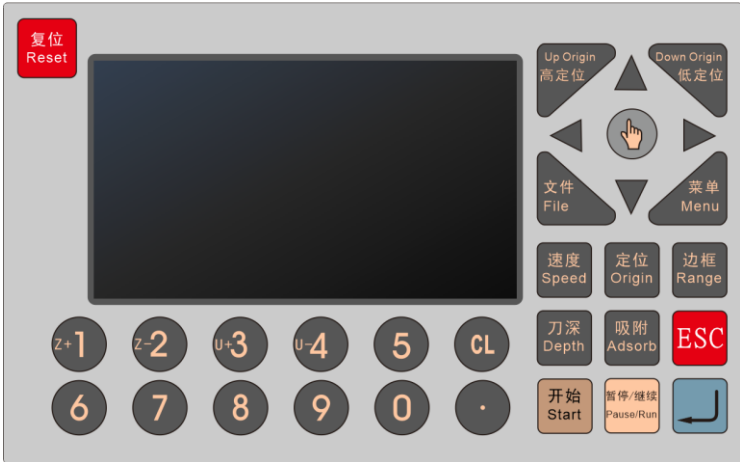
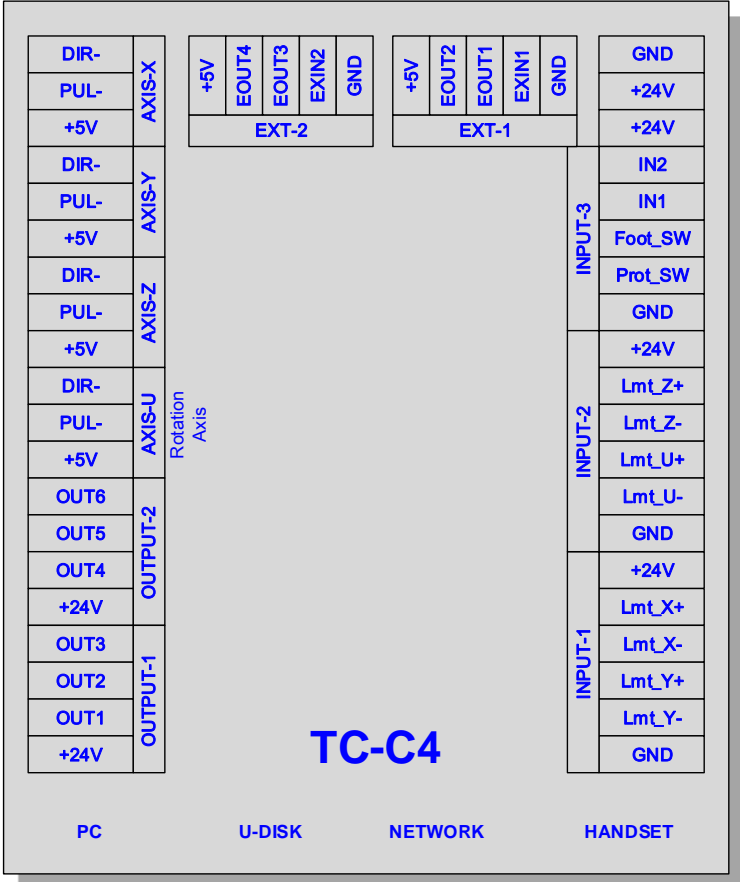
Power: DC24V/2A.

1.4.2 Grounding Requirements


In order to prevent electrical equipment from the electrical shock or fire due to leakage, over-voltage, insulation, etc., please make the reliable grounding for electrical control system. Grounding resistance is less than 100 ohms; the length of wire cable is within the 20 meters, the cross-sectional area of the wire cable is larger than 1.0 mm².

1.5 Accessory List

TC-C4 series laser engraving and cutting control system includes the following parts or accessories:

Name	The number of	Introduction	Photo profile
Operation panel	1	For user operation	
Controller	1	The Motion Control Card	



Conn ection cable/ USB comm unicat ion cable	3	1. Panel Connection cable for connecting controller and panel 2. USB communication cable for connecting controller and PC 3. USB communication extended cable	  
Cross over Ether net cable/ Switc hing cable	2	For the direct communication between controller and computer	 

Part II Wiring Installation Instruction

2.1 System Convention

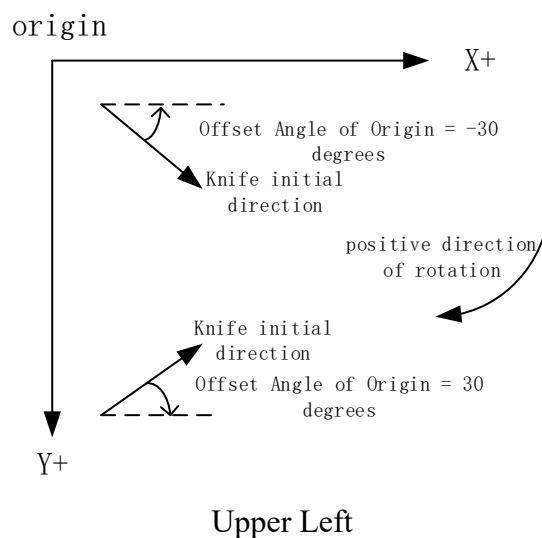
Convention 1: The horizontal direction is the X-axis, and the direction in which the coordinates move from zero to the largest is the positive direction of X.

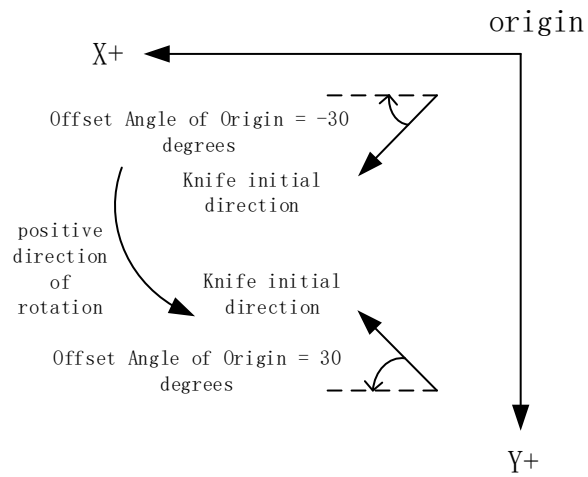
Convention 2: The vertical direction is the Y axis, and the coordinate moves from zero to the largest direction, which is Y forward and reverse.

Convention 3: Rotate from the positive direction of the X axis to the positive direction of the Y axis, which is the positive direction of rotation. Conversely, the rotation from the positive direction of the Y-axis to the positive direction of the X-axis is the negative direction of rotation.

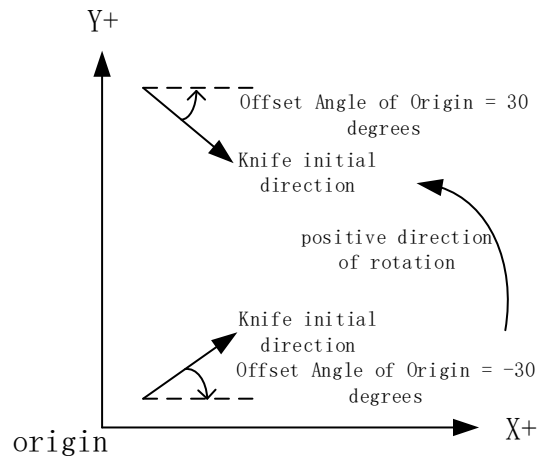
Convention 4: Due to the installation deviation of the limit of the rotating shaft, there is generally a deviation angle between the positive direction of X and the positive direction of X after the rotating reset of the blade reaches the limit, which is called the declination angle of the origin. If the tool needs to rotate the declination angle A in the positive direction, and the cutting edge coincides with the positive direction of X, the declination angle of the origin is a positive number. The opposite is negative.

As shown in the following four coordinate systems.

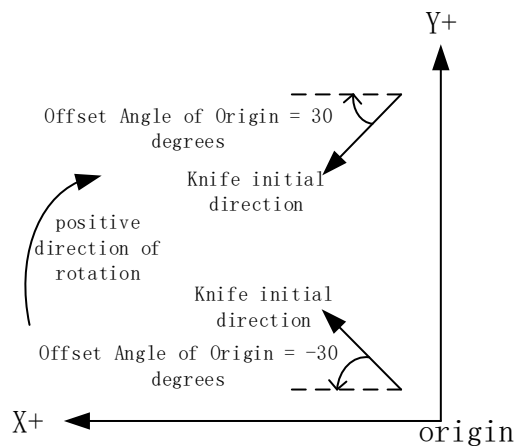




Top Right

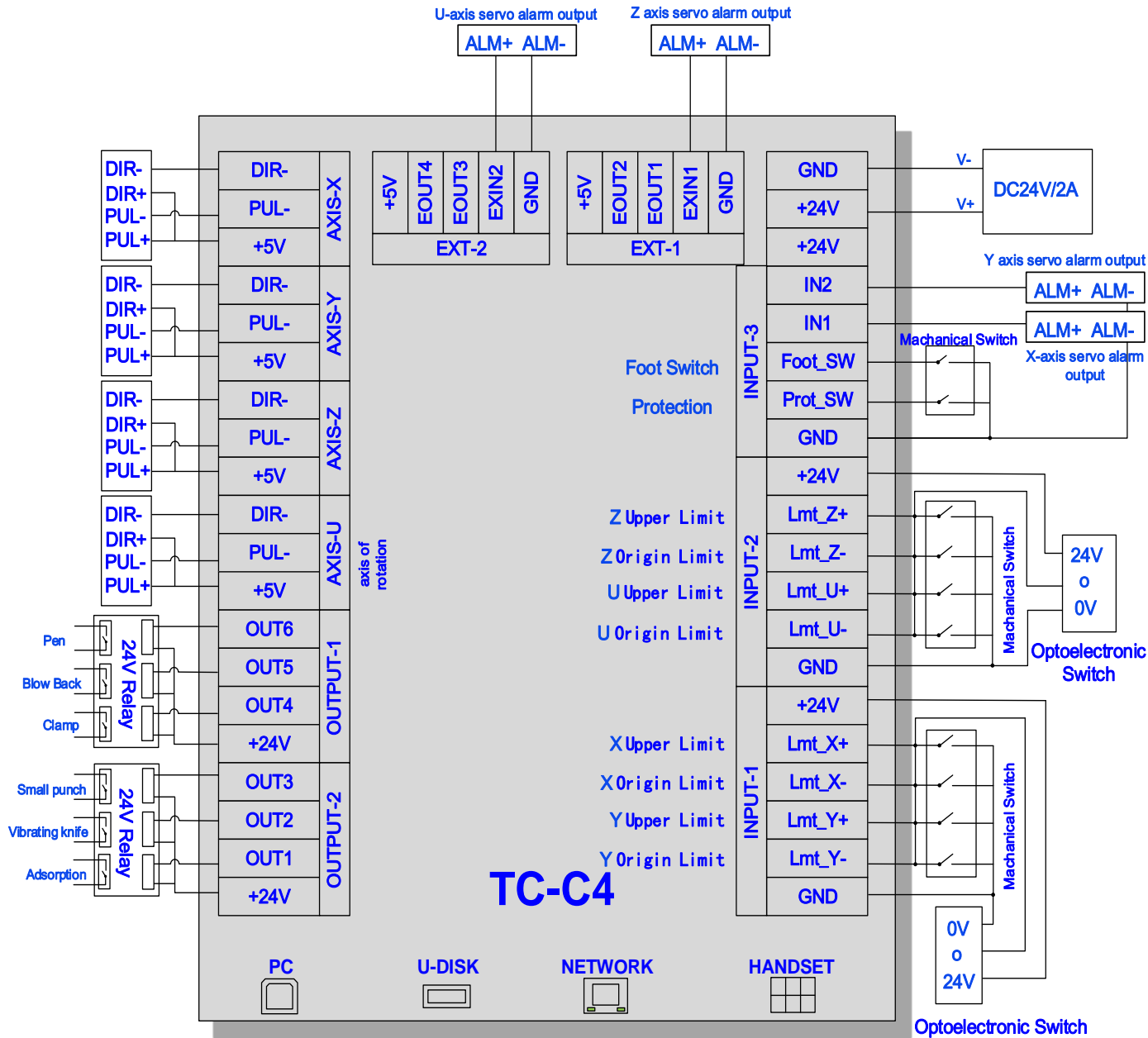


Lower Left



Lower Right

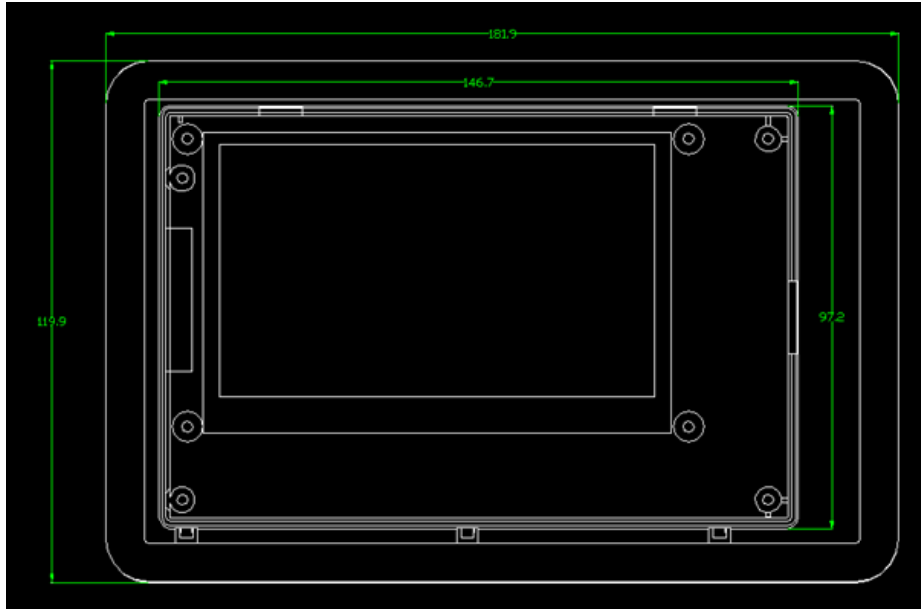
2.2 System Wiring Diagram



2.3 Installation Dimension

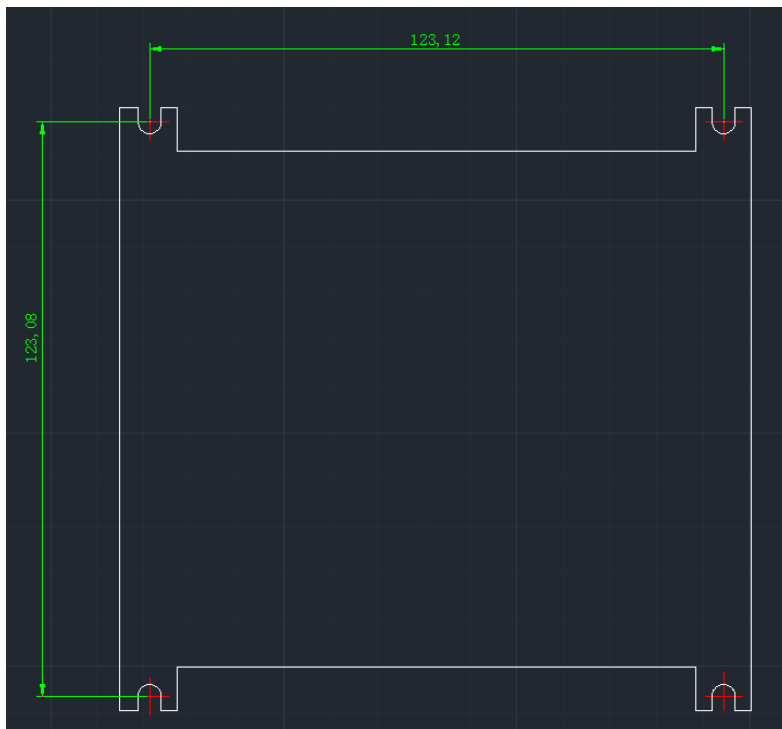
2.3.1 Panel

Note: the unit is mm.



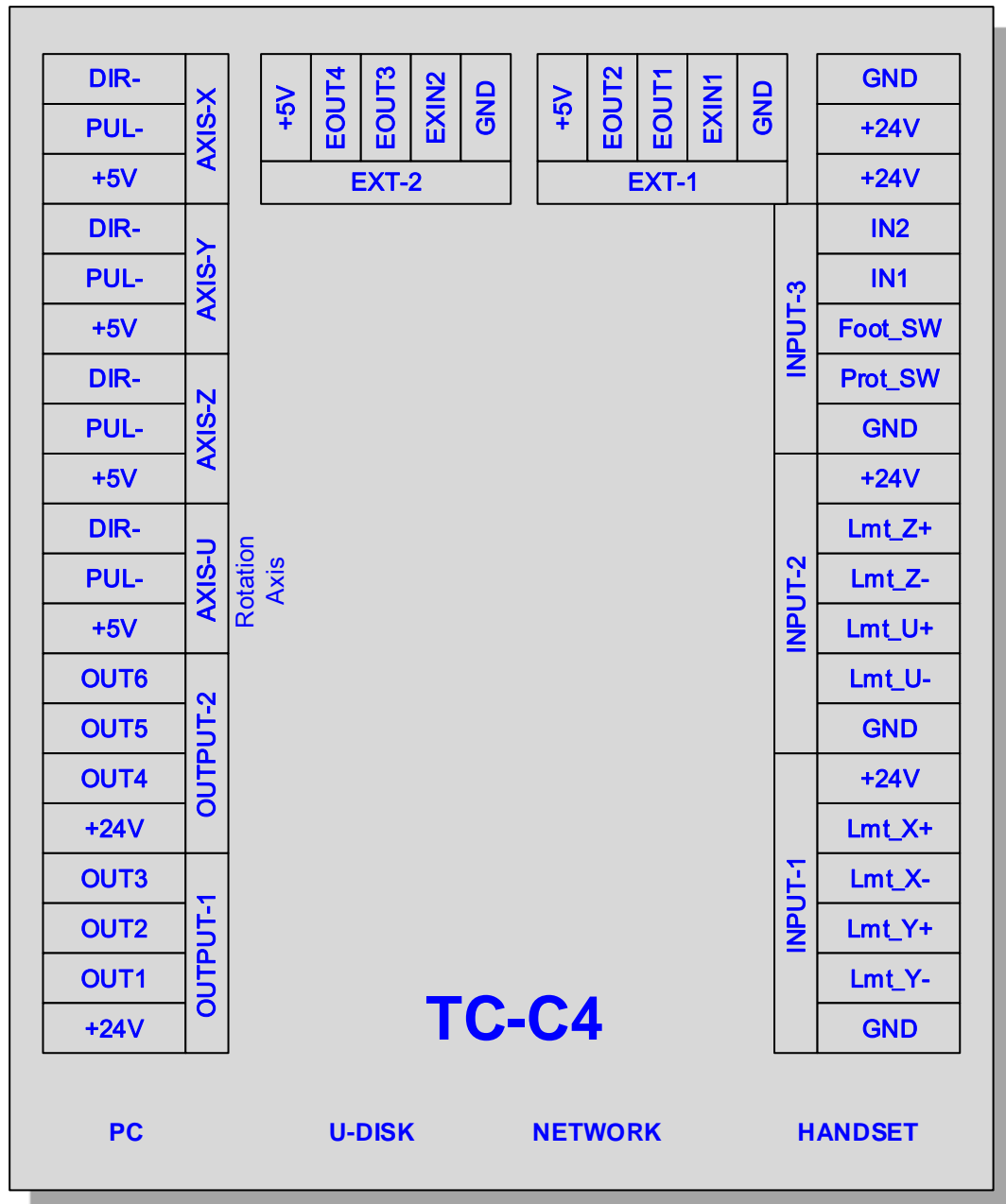
2.2.2 Main Board

Note: the unit is mm.



2.4 Wiring Instruction

2.4.1 Interface Diagram

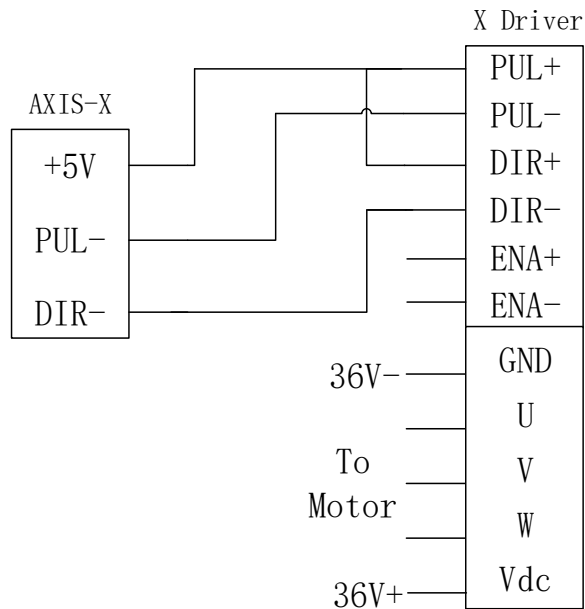


2.4.2 Wiring Diagram

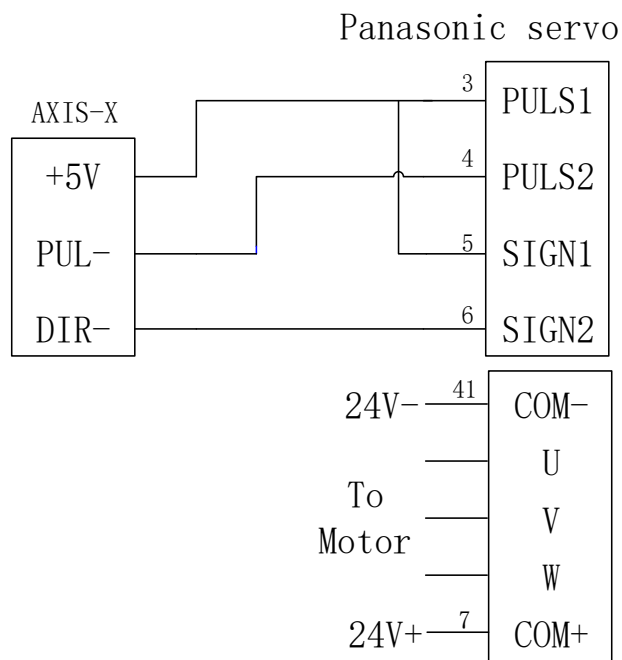
2.4.2.1 Motor Wiring

The following is X axis motor wiring; other axis is similar.

1. Step Motor Wiring

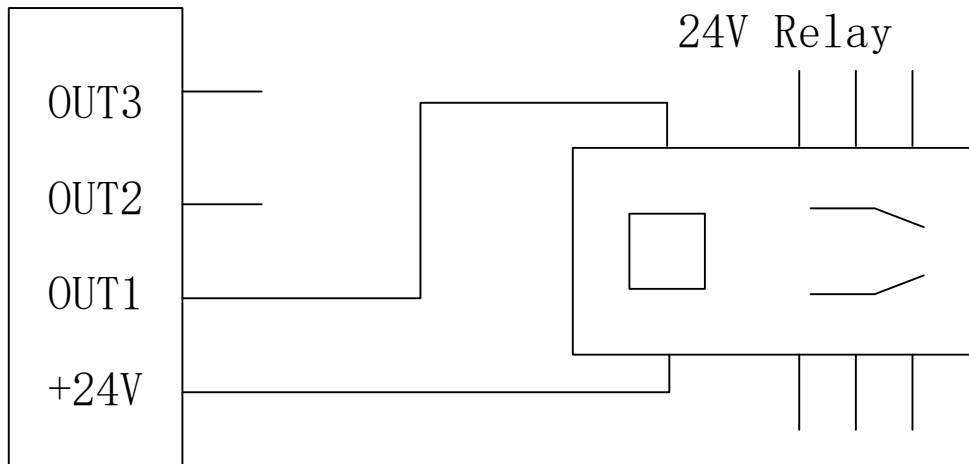


2. Panasonic Servo Wiring

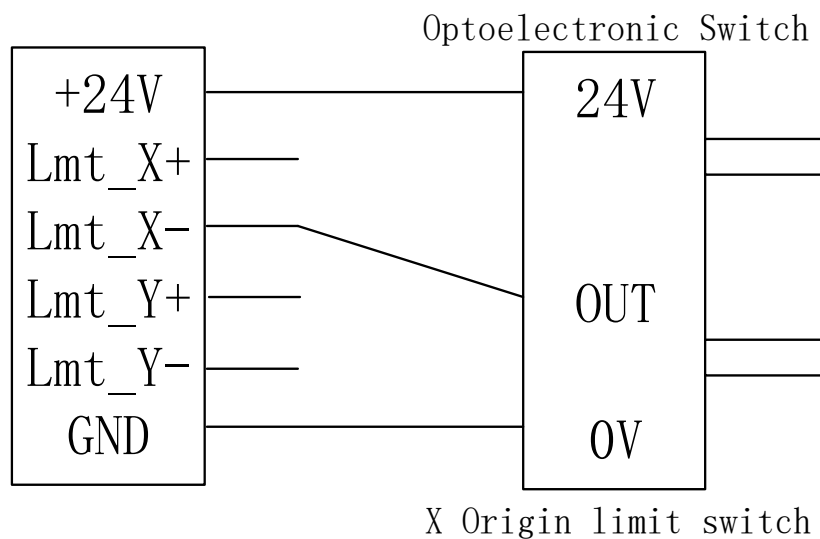


2.4.2.2 General output signal wiring diagram

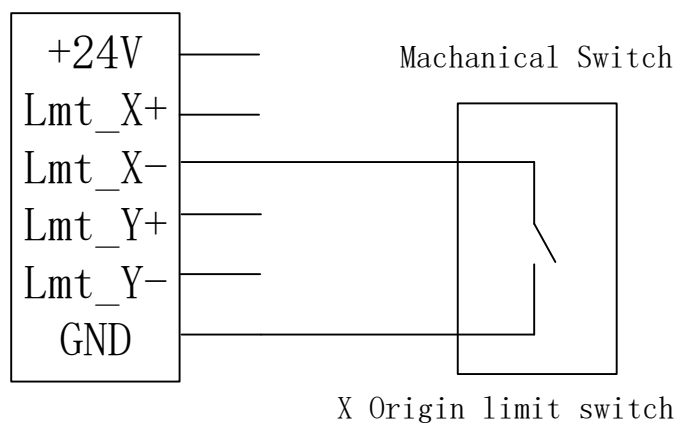
Taking the adsorption signal OUT1 as an example, the others are similar.



2.4.2.3 Input Wiring



NPN Optoelectronic Switch



Mechanical Switch

Other inputs are similar.

2.5 Interface Instruction

2.5.1 Power Signal

The system is 24V power supply interface (switching power interface)

Pin	Definition
1	GND 24V power source grounding (Input)
2	+24V 24V power source positive (Input)

2.5.2 PC Connection Port

Label PC connection port. Can connect PC to read and write with USB.

2.5.3 U-DISK Port

Label U-DISK. Can directly insert the U disk to read and write.

2.5.4 NETWORK Port

Label NETWORK. Can connect PC to read and write by network.

2.5.5 HANDSET Port

Label HANDSET. Connect Panel

2.5.6 Motor Axis Interface

The motor driver includes axis interface of X, Y, Z and U, only supportive of common anode connection. Among them:

- X: X-axis motor (tool head lateral movement)
- Y: Y-axis motor (vertical movement of the beam)
- Z: lift motor (tool head lift)

- U: Rotary motor (tool head rotates)

Pin	Definition
1	+5V DC5V output, connect PUL+ and DIR+ of step motor driver
2	PUL- Step pulse, connect to the PUL- of step motor driver
3	DIR- Direction signal, connect to the DIR- of step motor driver

2.5.7 General Output Interface

All the general output signals are only supportive of common anode connection. It is active when there is 24V power output between +24V and OUT

OUTPUT-1

Pin	Definition
1	+24V DC24V Output
2	OUT1 Adsorption signal, when the adsorption output, low effective
3	OUT2 Vibrating knife signal, when the vibrating knife is output, low effective
4	OUT3 Small punching signal, when punching output, active low

OUTPUT-2

Pin	Definition
1	+24V DC24V Output
2	OUT4 Clip signal, when the clip is output, active low
3	OUT5 Backflush signal, when backflush output, low effective
4	OUT6 Pen signal, the pen output is low level, and the pen up output high level

2.5.8 Input Interface

INPUT-1

Pin	Definition
1	+24V DC24V Output
2	Lmt_X+ X upper limit, axis movement to the max coordinate limit sensor input
3	Lmt_X- X origin limit, axis movement to the minimum coordinate (0) limit sensor input
4	Lmt_Y+ Y upper limit, axis movement to the max coordinate limit sensor input
5	Lmt_Y- Y origin limit, axis movement to the minimum coordinate (0) limit sensor input
6	GND Power source grounding



INPUT-2

Pin	Definition
1	+24V DC24V Output
2	Lmt_Z+ Z upper limit, axis movement to the max coordinate limit sensor input
3	Lmt_Z- Z origin limit, axis movement to the minimum coordinate (0) limit sensor input
4	Lmt_U+ U upper limit, axis movement to the max coordinate limit sensor input
5	Lmt_U- U origin limit, axis movement to the minimum coordinate (0) limit sensor input
6	GND Power source grounding

INPUT3

Pin	Definition
1	+24V DC24V Output
2	IN2 Y axis servo alarm signal input
3	IN1 X-axis servo alarm signal input
4	Foot_SW Foot switch signal input, active on the rising edge, with pulse width not less than 100ms
5	Prot_SW Protection signal input, can be connected to protection input and other signals
6	GND Power source grounding

2.5.9 Extension ports

EXT-1

Pin	Definition
1	+5V DC5V Output
2	EOUT2 Extended output 2
3	EOUT1 Extended output 1
4	EXIN1 Z axis servo alarm signal input
5	GND Power source grounding

EXT-2

Pin	Definition
1	+5V DC5V Output
2	EOUT4 Extended output 4
3	EOUT3 Extended output 3
4	EXIN2 U-axis servo alarm signal input
5	GND Power source grounding

2.5.10 Servo Alarm Interface

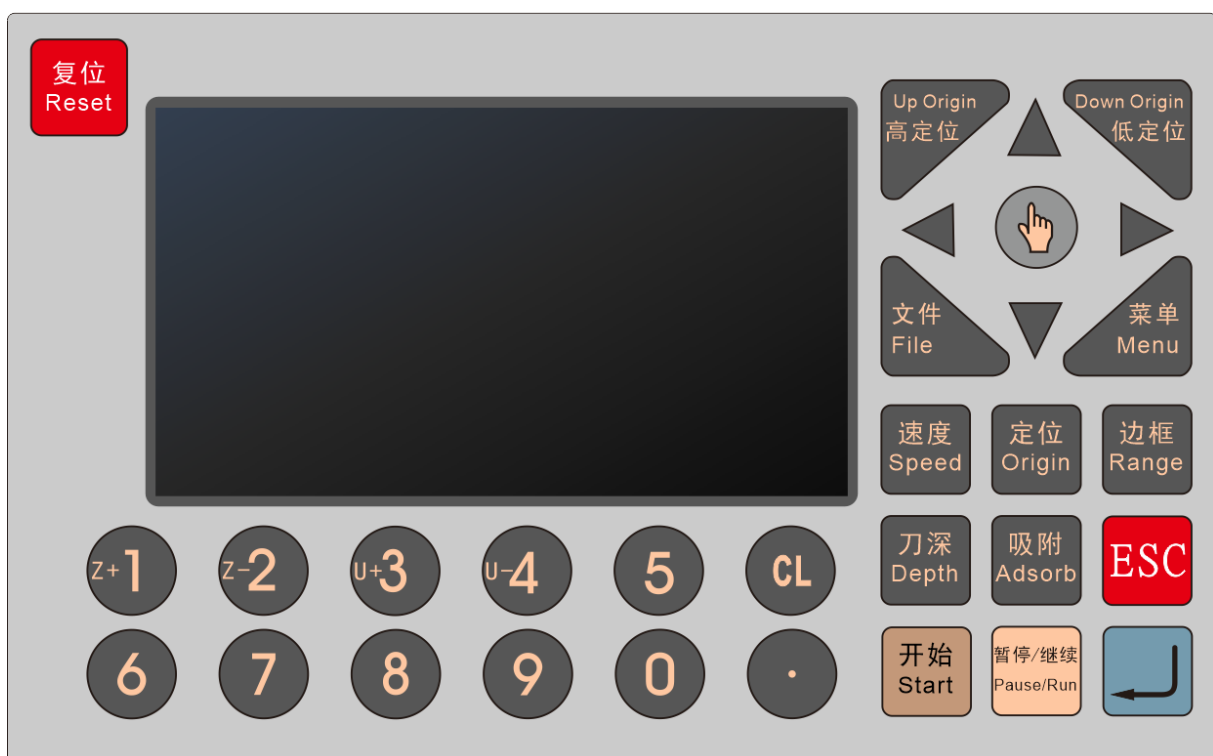
Interface Description

Pin	Definition	
1	IN1	X-axis servo alarm signal input
2	IN2	Y axis servo alarm signal input
3	EXIN1	Z axis servo alarm signal input
4	EXIN2	U-axis servo alarm signal input


Part III The Operation Panel


3.1 Function Introduction

3.1.1 The Panel



3.1.2 Buttons Function Introduction

- 










"Reset" key: no matter what state the machine, press this key, it'll go into reset state, and then return to the regression point.
- 

"Up Origin" key: Set the position of lift coordinate of the knife while working.



3.  "Down Origin" key: Set the falling position while working.
4.  "Menu" Key: press the key and go into the main menu interface.
5.  "File" Key: go into the memory file selection interface.
6.  "Adsorb" Key: Turn the adsorption device on or off.
7.  "Range" A: Perform a scope of work preview.
8.  "Speed" key: Set the working speed.
9.  "Origin" Key: Set the starting point position of processing.
10.  "Depth" key: Set the falling coordinates, lift coordinates, docking coordinates,
etc..
11.  "Enter" Key: agree to the current operation.
12.  "ESC" Key: used to cancel the operation and return to the previous interface.
13.  "Start" Key: start processing the current file.
14.  "Pause/Run" Key: In the working state, press this key to enter the pause state, and

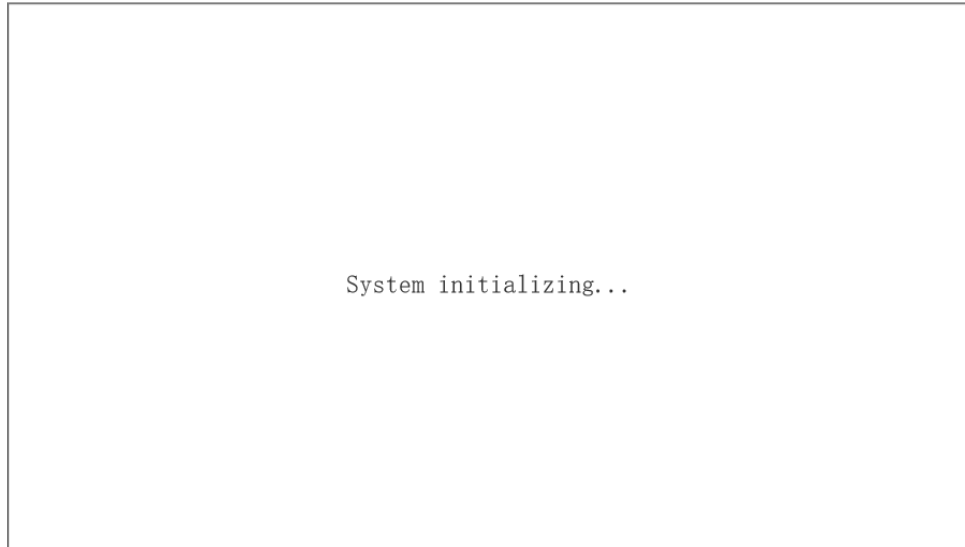
press it again to continue running. In stop state, press this key, the cutting head will automatically return to the positioning point. In the non-working state, during the movement, press the pause button to stop the movement.

15.  Decimal point key.
16.  Delete key.
17.   Z axis manual moving key, moving Z axis in main interface.
18.   U axis manual moving key, moving U axis in main interface.
19.  In the standby interface, press 5 to enter the output test interface.
20.  Direction key, used to move the X, Y axis, in the other interfaces, used to move the curse to choose menu.
21.  Select key, change the axis speed in the standby interface, in the other interface, used to change the parameters besides the numbers.

3.2 The Main Interfaces

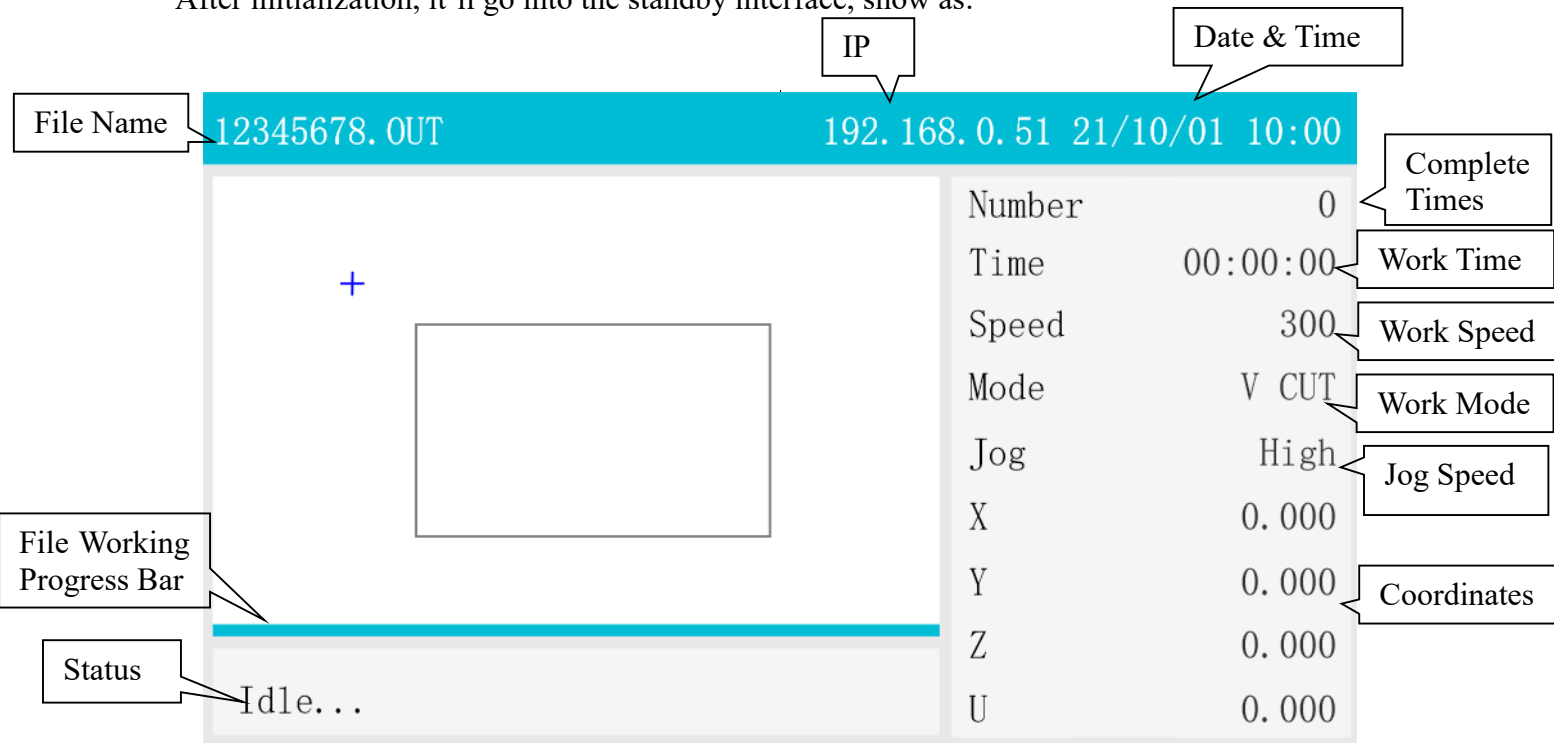
3.2.1 System Initialization Interface

The System Initialization Interface is as show:



3.2.2 Standby Interface

After initialization, it'll go into the standby interface, show as:



The top of the image above shows the selected file name, network connection status, and date and time (year/month/day hour: minute). If the network connection is successful, the IP address will be displayed. The white area of the main interface displays the preview of the processing graphics. The machine status is displayed below the preview image. The status displays "Idle..." when there is no processing, "Working..." when processing, and "Pause" when paused. The right side of the main interface displays the completion times, processing

time, processing speed, processing method, button speed, XYZU axis coordinates, etc. described as follows:


Number: The complete times of the selected file.

Time: The work time.


Speed: The working speed.

Mode: V CUT, Pen, Small Punching.



Jog Speed: It refers to the speed of moving the frame manually. Press the "  " button to change the speed of moving the frame. There are fast and slow speed options. The button speed in user Settings is adopted for fast speed, and the speed is halved for slow speed.

Notes:


- X, Y, Z, U: The coordinates of the XYZU axis are displayed. The XY axis is plane motion, the Z axis is up and down, and the U axis is rotation. The XYZ axis coordinate unit is mm, and the U axis coordinate unit is degrees.
 - When there is no file, the default speed is displayed. When the file is selected, the processing speed and processing mode of the first layer are displayed respectively. When processing, the speed and processing mode of the current layer are displayed.
 - During the processing, if you want to modify the speed of the current layer, you can press the pause key, then press the speed key, you can modify the speed of the current layer.
-
- In the standby status, when the processing file is selected, press  to clear the number of completions of the current file.
 - Press the "5" key to enter the output test interface.

3.2.3 Speed Settings

After initialization, press the "Speed" key, show as:

Cancel	Parameter	Save
Layer Parameter	◀ 1 ▶	
Mode	◀ V CUT ▶	
Work Speed (mm/s)	◀ 200 ▶	
Idle Speed (mm/s)	◀ 200 ▶	
Speed Factor	◀ 2 ▶	
Speed Mode	◀ Fast ▶	



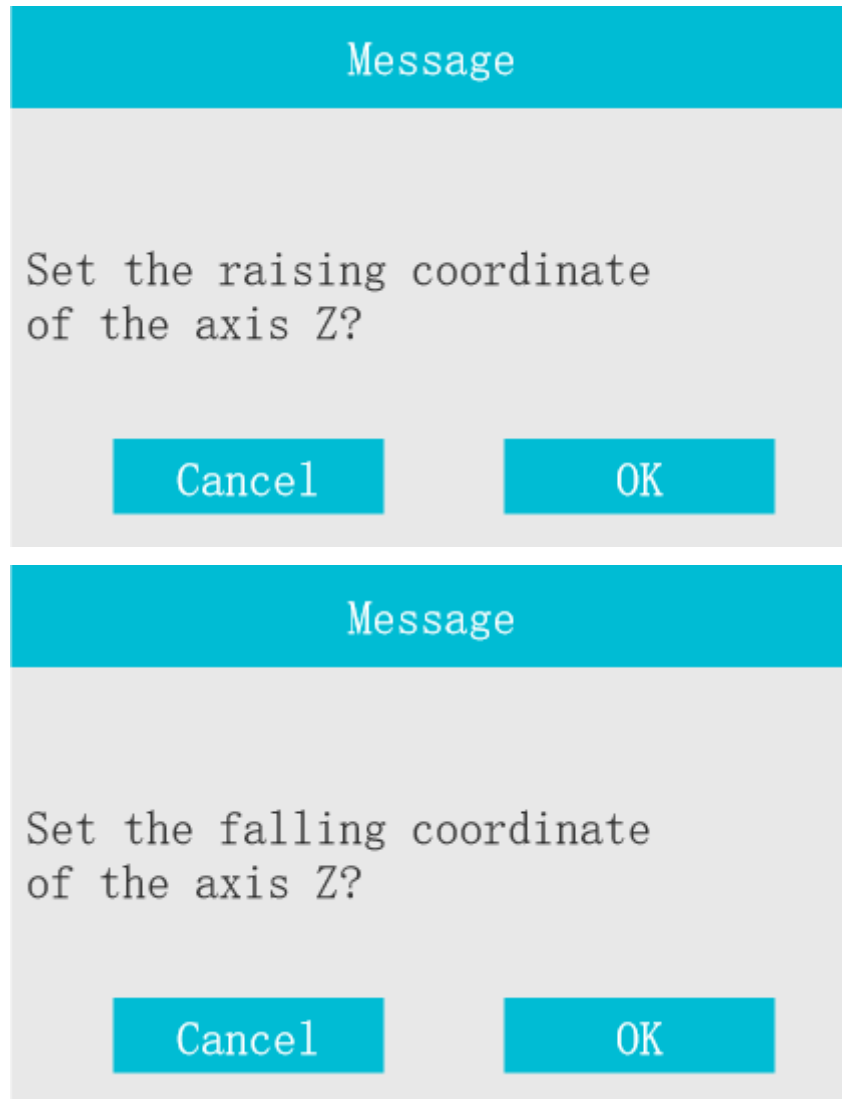
1. **Layer Parameter:** when one file is selected, press "  " button, to choose the layer number.
2. **Mode:** V CUT, Pen, Small Punching
3. **Work Speed:** when one file is selected, it shows the work speed in current layer. Otherwise, it shows the system default speed value. The unit is mm/s.
4. **Idle Speed:** the default move speed when laser is off. When one file is selected, it shows the idle speed in current layer. Otherwise, it shows the system default speed value. The unit is mm/s.
5. **Speed Factor:** it is applied to improve the smoothness of movement. The range is 0.00-3.00. The bigger the factor, the faster of planned speed of lines in work file, and the stronger jitter of motion. The smaller the factor, the slower of planned speed of lines in work file, and then longer the work time and the jitter of motion. Normally it is set to 2. If the smoothness is high demanded (i.e. above 2500mm/s), set the factor to less than 1. The jitter reduces obviously. In a need for acceleration, set the speed factor to 3.
6. **Speed Mode:** in the normal mode, the shaking and impact of the machine are reduced, the processing effect is good with gentle turning, but the processing time is increased. In the fast mode, the machine turns quickly and the shaking and impact increase, but the processing time is short and the efficiency is high.

3.2.4 Up Origin and Down Origin

On the standby interface, press the " Up Origin " and " Down Origin " buttons.

Up Origin: set the coordinate position of lifting when working.

Down Origin: set the falling coordinate position when working.



3.2.5 Depth Interface

On the standby interface, press the " Depth" button to fine-tune the setting of the drop and lift heights.

Tool Falling Coordinates: the machining position coordinate, corresponding to the position set by "Down Origin".

Tool Raising Coordinates: during the process, without cutting, the coordinate of the lift,

corresponding to the position set by "Up Origin".

Tool Docking Coordinates: the coordinates of the completion of the lift.

Cancel	V CUT	Save
Tool Falling Coordinates (mm) ◀ 30 ▶		
Tool Raising Coordinates (mm) ◀ 15 ▶		
Tool Docking Coordinates (mm) ◀ 10 ▶		

3.2.6 Output Test Interface

ESC	Test...
Z	0.000 mm
CL	Z axis lift test
1	Adsorpyion
2	Vibrating knife
3	Small Punching
4	Clamp
5	Blow Back
6	Pen

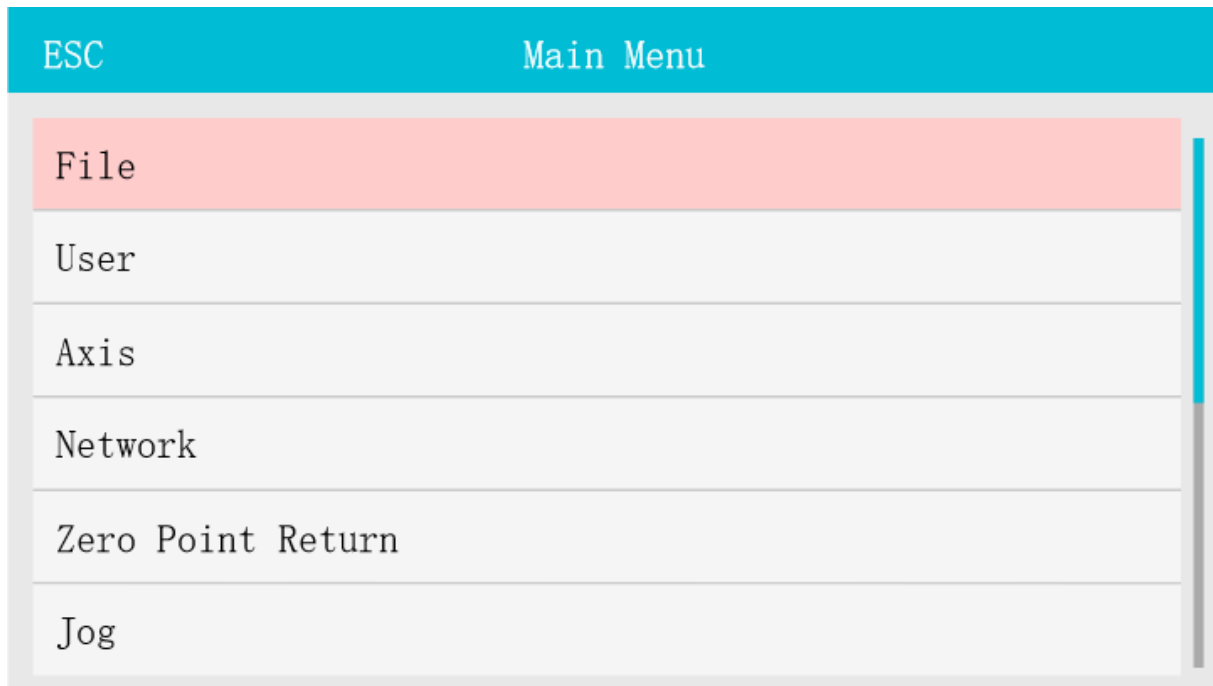
Press the "5" key to enter the output test interface.

Press the CL key repeatedly to test the Z-axis lift.

1 key: button to turn on and off adsorption switch.

- 2 key: turn on/off the vibrating knife.
- 3 key: open/close the small punch switch.
- 4 key: open/close the clip switch.
- 5 key: open / close the backflush switch.
- 6 key: open/close the pen switch.

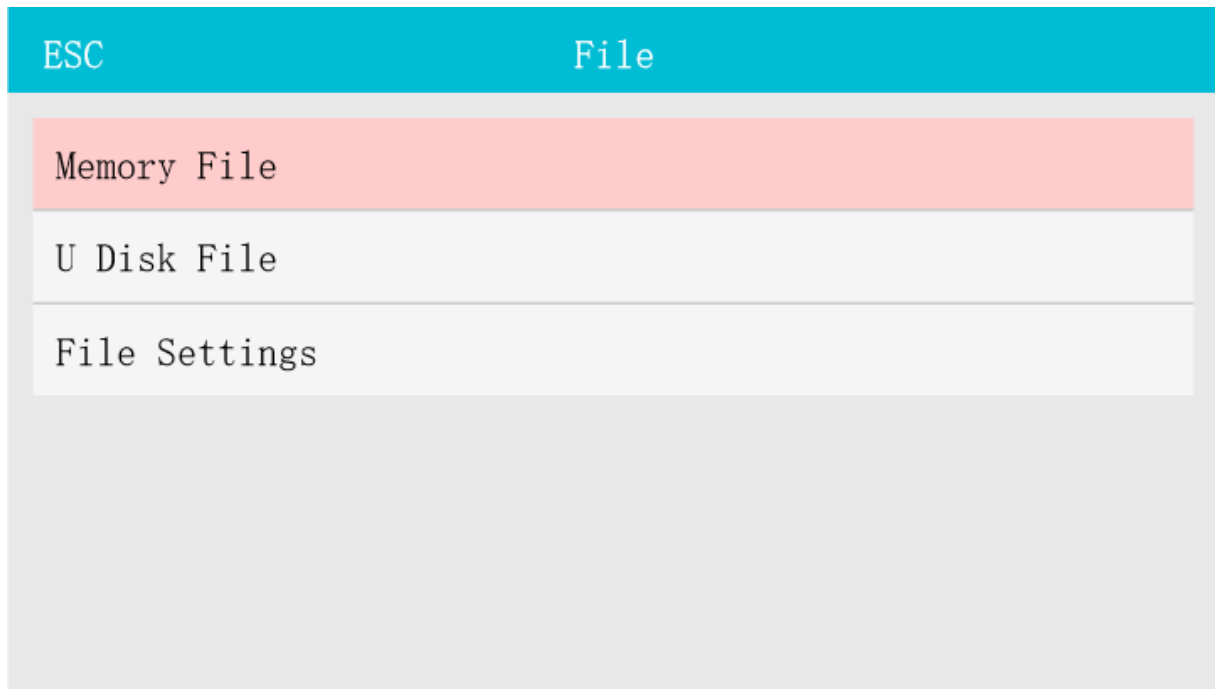
3.2.7 The Main Menu Settings



Press the "Up/Down/Left/Right" key to choose the needed setting, Press "Enter" to go in to the current operation interface.

3.2.8 File Settings

After starting, press "Menu/File" into the "Memory File", "U Disk File", "File Settings" interfaces:



The file setting is as shown:


Cancel	File Settings	Save
Save Type	◀ General ▶	
Save as Current Select	◀ Yes ▶	
Save and Execute	◀ NO ▶	
File Work Mode	◀ General ▶	

Press "Up/Down" to choose the required operation, click "Select" key to change setting. Press "Enter" to save the setting, and click "ESC" to quit.

1. **Save Type:** General or Temp Save. Temp Save means the received file is temporary file. It will be replaced by the new received file. General means the received files will be saved one by one, not be replaced, like copying from the U disk.
2. **Save as Current Select:** once a file is finish downloading, it will be select as current file. That is, once received, press "Start" to start engraving the current file. Select "No" to save the received files directly in the system.
3. **Save and Execute:** once a file is finish downloading it will be executed.
4. **File Work Mode:** General or Cyc. Cyc means All the Files will be executed one by one in cycle. Otherwise, select "General".

3.2.9 Memory File

Press "File" key in the standby interface, directly select "File/ Memory File" to enter, show as:

ESC		Memory File	
001:12345678. OUT	1K		
002:12345678. OUT	1K		
003:12345678. OUT	1K		
004:12345678. OUT	1K		
005:12345678. OUT	1K		
006:12345678. OUT	1K		
007:12345678. OUT	1K		
008:12345678. OUT	1K		
009:12345678. OUT	1K		
010:12345678. OUT	1K		
		Total File	10
		Select File	1
		Number	1
		Time	00:00:00

The list of files is displayed on the left side of the interface, the preview image in the upper right area, and the file information in the lower right area.

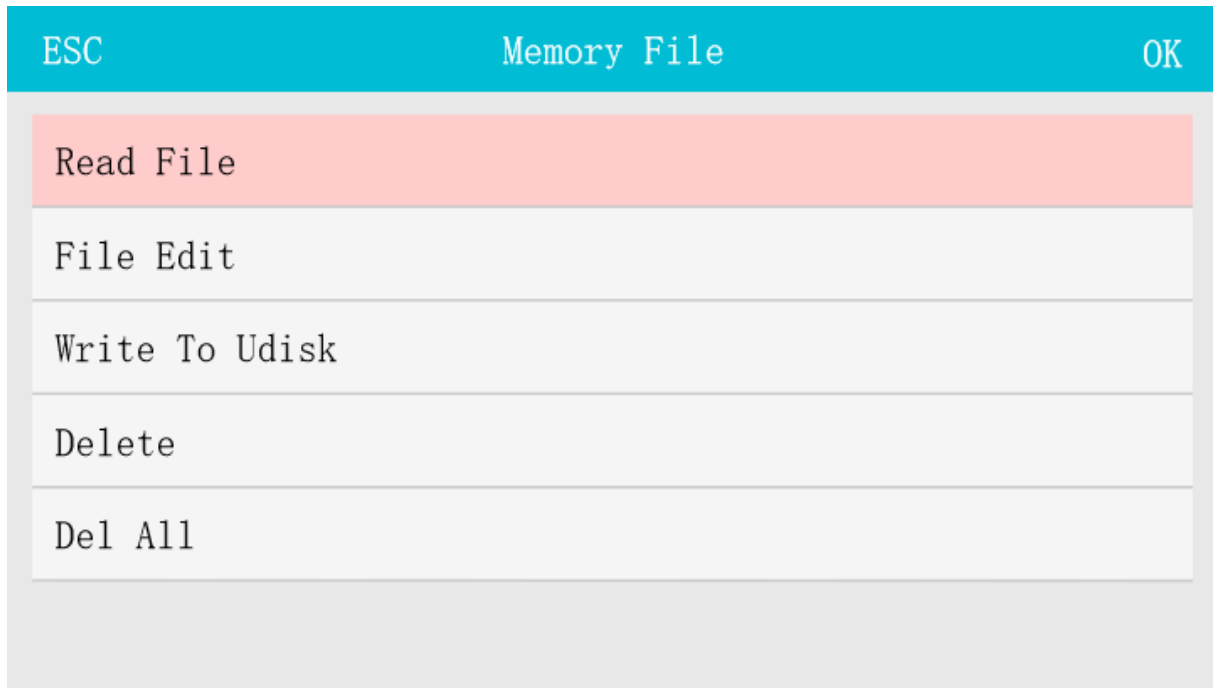
1. **Total File:** the total number of files, up to 500 files.
2. **Selected File:** the currently selected file.
3. **Number:** the completion times of the selected file.
4. **Time:** the previous processing time of the selected file.



Press "Down/Up" to view the file, press " " key to find the current file, press "ESC" to quit. Press "Enter" to operate, show as:

1. **Reading File:** select this file to work.
2. **File Edit:** edit the file parameters like speed and power.
3. **Write to U Disk:** copy the file into U disk.
4. **Delete:** delete the current file.
5. **Delete All:** delete all memory files.

Press "Enter" to confirm the operation, press "ESC" to quit and return to the original interface.



Under File Edit, the layer parameter and file parameter can be set, as shown in the Fig. Press "Enter" to enter into the next interface.



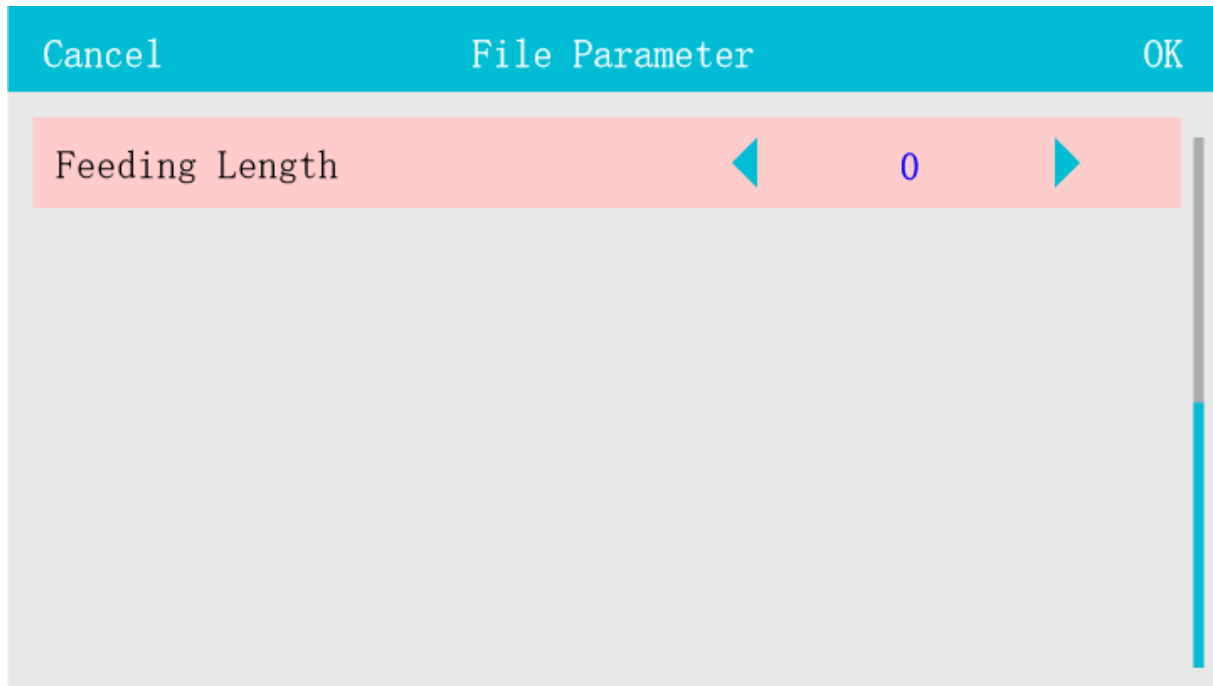
In the layer parameter interface, you can set the speed of each layer, etc.



Cancel	Layer Parameter		OK
Layer parameter	◀	1	▶
Mode	◀	None	▶
Work Speed (mm/s)	◀	200	▶
Idle Speed (mm/s)	◀	200	▶

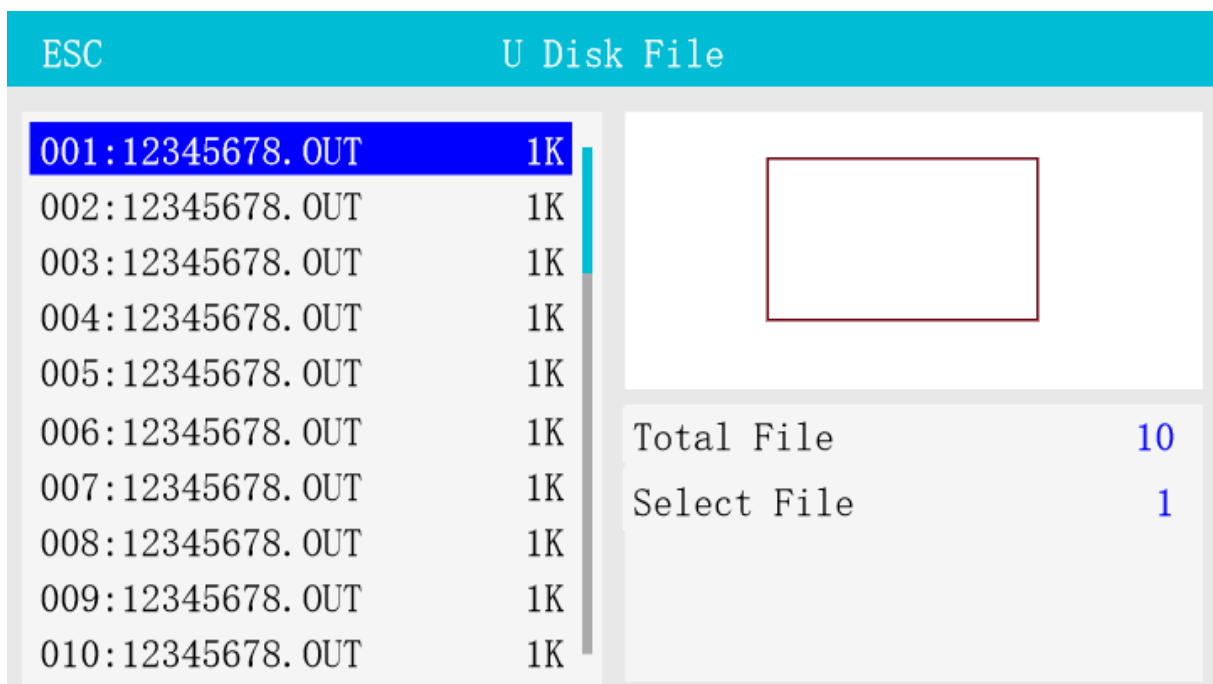
Set the feeding times and length in the File Parameter, the length unit is mm.

Cancel	File Parameter		OK
Work Start Position	◀	Setpoint	▶
Rows	◀	1	▶
Columns	◀	1	▶
Rows Space	◀	100	▶
Columns Space	◀	100	▶
Feeding Times	◀	0	▶



3.2.10 U Disk File

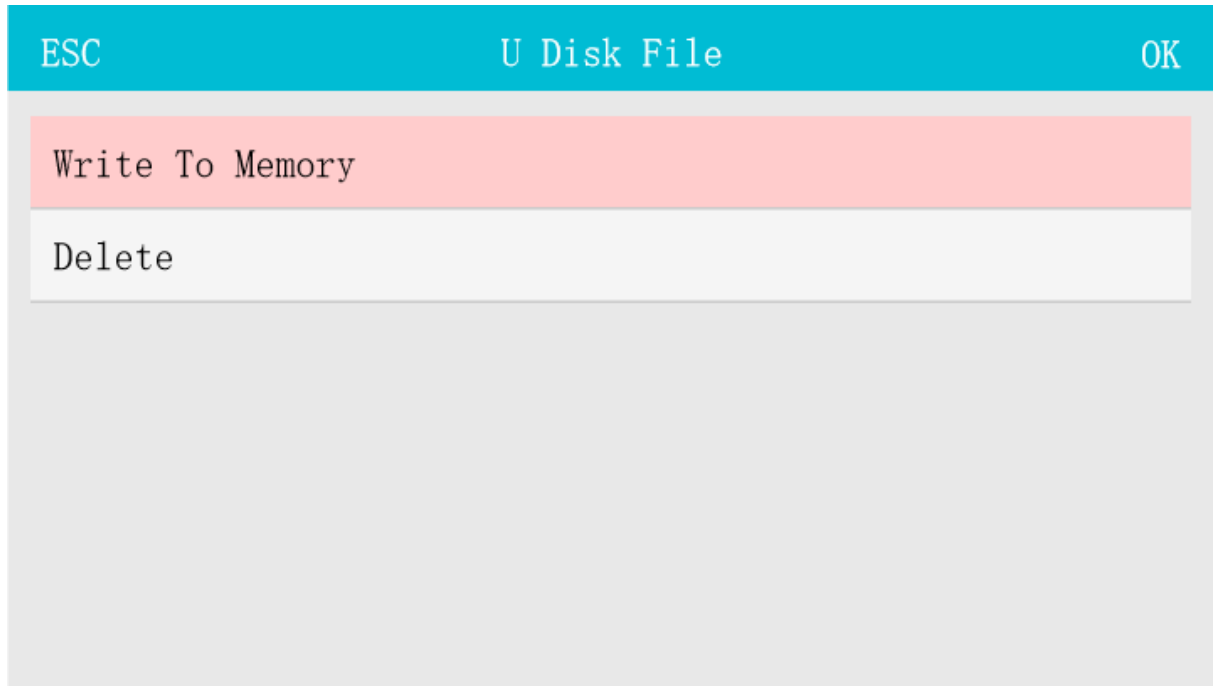
Insert U disk and press "Menu" key into the main menu, and select File / U Disk File, show as:



The left area of the interface displays the file list, and the low right area displays the file information.

1. **Total File:** the number of files processed in U disk.
2. **Selected File:** the currently selected file.

Press "Down/Up" to choose the file, and press "ESC" to quit the interface. Click "Enter" key to quit the operation of the file, show as:



1. **Write to Memory:** copy file from U Disk to control card.
2. **Delete:** delete the current file.

Press "Enter" to confirm the operation, press "ESC" to quit and return to the original interface.

3.2.11 User Settings

In the menu interface, select "User " to enter the "Process Parameters", "Axis Working Speed", "Jog Speed" and "Other Parameters" interface:



ESC	User
Process Parameters	
Axis Working Speed	
Jog Speed	
Other Parameters	

3.2.11.1 Process Parameters

Cancel	Process Parameters			Save
Min Acc (mm/s2)	◀	400	▶	
Default Idle Speed (mm/s)	◀	330	▶	
Idle Acc (mm/s2)	◀	1200	▶	
Idle Jerk (mm/s3)	◀	60000	▶	
Idle Delay (ms)	◀	0	▶	
Lifting Angle	◀	25	▶	

Cancel	Process Parameters	Save
<div> Max Turns <div>◀ 0 ▶</div> </div>		

1. **Min Acc:** the corresponding minimum acceleration when starting and stopping. The smaller the value, the smaller the jitter when starting and stopping, and the corresponding acceleration and deceleration time increases; the larger the value, the greater the jitter when starting and stopping, and the faster the acceleration and deceleration. Generally, it is 400mm/s². If faster processing speed is required, set the minimum acceleration to above 700mm/s². If precise processing is required, set it to 200mm/s² (according to the actual machine, here is the recommended value). The unit is mm/s².
2. **Default Idle Speed:** When the default speed is selected for the processing file, during the working process, the moving speed of the XY axis after the tool is lifted. The unit is mm/s.
3. **Idle Acc:** XY axis idle acceleration. The unit is mm/s². The greater the acceleration, the faster the acceleration and the greater the relative jitter. On the contrary, the acceleration and deceleration are smoother.
4. **Idle Jerk:** the jerk of the XY axis idle movement. The unit is mm/s³. The faster the acceleration, the greater the relative jitter. On the contrary, the acceleration and deceleration are smoother.
5. **Idle Delay:** After the XY non-cutting moves in place, the delay waiting time is used for jitter optimization before cutting starts, in ms (milliseconds).
6. **Lifting Angle:** when the track turning angle is greater than this angle, lift the knife first.
7. **Max Turns:** When the controller finds that the number of turns of the rotating shaft exceeds a certain value, it will re-reverse the movement of the rotating shaft, which can avoid the cumulative error caused by the inaccurate setting of the rotating shaft's rotation pulses (numbers of pulse per round).



3.2.11.2 Axis Working Speed

Cancel	Axis Working Speed	Save
	Z Working Speed (mm/s) ◀ 50 ▶	
	U Working Speed (r/s) ◀ 2 ▶	
	Feeding Speed (mm/s) ◀ 50 ▶	

1. **Z Working Speed:** Z-axis lifting working speed, unit mm/s.
2. **U Working Speed:** U-axis rotation working speed, unit r/s (revolutions per second).
3. **Feeding Speed:** feeding moving speed, unit mm/s. When feeding, it is the Y-axis clip feeding, and a clip needs to be installed. Set the clip delay and backflush delay.

3.2.11.3 Jog Speed

Cancel	Jog Speed			Save
	XY Jog Fast (mm/s)	◀	200	▶
	XY Jog Slow (mm/s)	◀	10	▶
	Z Jog Fast (mm/s)	◀	200	▶
	Z Jog Slow (mm/s)	◀	20	▶
	U Jog Fast (r/s)	◀	2	▶
	U Jog Slow (r/s)	◀	0.5	▶

1. **XY Jog Fast:** the speed of the XY axis button movement in the fast gear, the unit is mm/s.
2. **XY Jog Slow:** the speed of the XY axis button moving in the slow gear, the unit is mm/s.
3. **Z Jog Fast:** the speed of the Z axis button to move the fast gear, the unit is mm/s.
4. **Z Jog Slow:** the speed of the Z axis button to move the slow speed, the unit is mm/s.
5. **U Jog Fast:** the speed of the U axis button to move the fast gear, the unit is r/s.
6. **U Jog Slow:** the speed of the U axis button to move the slow speed, the unit is r/s.

3.2.11.4 Other Parameters

Cancel	Other Parameters		Save
	Protection Input Alarm	◀ Close ▶	
	Protection Input Polarity	◀ Negative ▶	
	Return Point	◀ Sptpoint ▶	
	Jog Continue Mode	◀ Open ▶	
	Jog Step Distance (mm)	◀ 1.5 ▶	
	Run Speed (mm/s)	◀ 200 ▶	

Cancel	Other Parameters		Save
	Speed Limit Mode	◀ Work Speed ▶	
	Process Times Alarm	◀ Close ▶	
	Process Times Homing	◀ Close ▶	

1. **Protection Input Alarm:** in the open state, the system will detect the protection input signal, when the protection input is valid, it will stop working.
2. **Protect Input Polarity:** protect the wiring mode of the input switch (“negative pole” is active at low level, and “positive pole” is active at high level).
3. **Return Point:** The position which the system back to while the system is reset or the work is finishing. Origin, None, Set Point. Select "None" to stop at the work completion

position.

4. **Jog Continue Mode:** Open, continuous mode, press and hold the arrow key, axis motion, release the button, stop motion; If closed, inching mode. Press the key and the axis will move the specified length of inching distance.
5. **Jog Step Distance:** When turning off the continuous key mode, set the direction key, inching distance of each axis, unit mm.
6. **Run Speed:** The speed at which the range key performs a preview of the working range. The unit is mm/s.
7. **Speed Limit Mode:** The processing speed limits the working speed of small graphics; End speed: limit the end speed of small graphics. If it is necessary to cut a large arc, speed limit should be set as the end speed.
8. **Process Times Alarm:** When it is open, set the work times. Then when the finish times reaches to the setting number. It will beep 5 times for alarm.
9. **Process Times Homing:** When it is open, set the work times. Then when the finish times reaches to the setting number. It will home to the machine origin automatically.

3.2.12 Axis Settings

In the Main Menu interface, choose "Axis" to enter, show as:

ESC	Axis
X Axis	
Y Axis	
Z Axis	
U Axis	



Cancel	X Axis Setting	Save
Resolution(um)	◀ 10 ▶	
Max Speed(mm/s)	◀ 500 ▶	
Corner Speed(mm/s)	◀ 20 ▶	
Acceleration(mm/s2)	◀ 12000 ▶	
Jerk(mm/s3)	◀ 480000 ▶	
Max Range(mm)	◀ 1100 ▶	

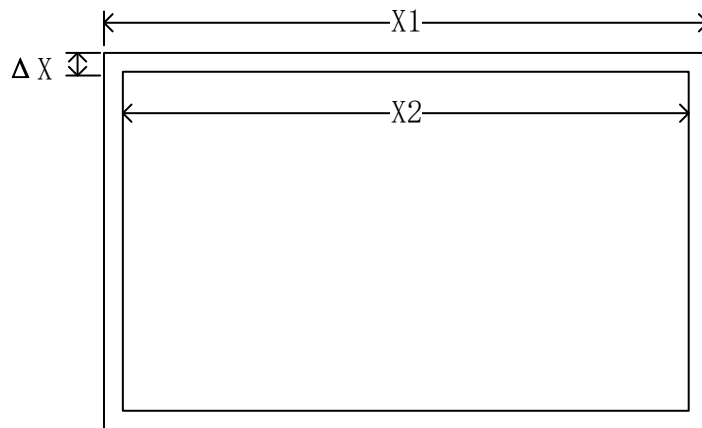
Cancel	X Axis Setting	Save
Backlash(mm)	◀ 0 ▶	
Origin Offset (mm)	◀ 0 ▶	
X- Magin (mm)	◀ 0 ▶	
X+ Margin (mm)	◀ 0 ▶	
Direction Polarity	◀ Negative ▶	
Limit Polarity	◀ Negative ▶	

Cancel	X Axis Setting		Save
Jog Polarity	◀	Negative	▶
Limit Protection	◀	Close	▶
Servo Alarm Protection	◀	Close	▶
Pulse Edge Trigger	◀	Falling	▶

- Resolution:** $\text{Resolution} = \text{Length that the cutting head moves when the motor rotates for one cycle} \times 1000 / \text{Pulses that the driver output when the motor rotates for one cycle}$. Press the "Select" button here to leave the input box for Set Value and Actual Value. The Set Value is displayed on the machine. The Actual Value needs to be measured by the ruler. Press the key to move the cutting head, input the corresponding lengths into the options. Press "Enter", the system automatically calculates the correct resolution.

About measurement:

The user can draw a rectangle, so that the side length of the rectangle can be measured to calculate the resolution, and the diagonal of the rectangle can also be measured to check whether the beam is perpendicular to the trolley. When measuring, the width of the laser beam should be considered, that is, the machine actually draws two rectangles when drawing rectangles, and the user measures the lengths of the two rectangles respectively when measuring, and the average value of the two lengths is the actual length. The length of diagonals only needs to compare whether the diagonals of the same rectangle are equal. For example, measure the length of a rectangle, where X represents the width of the laser beam, measure the lengths of X1 and X2 in the figure respectively, and take the average value. The longer the line length, the more accurate the measurement is.



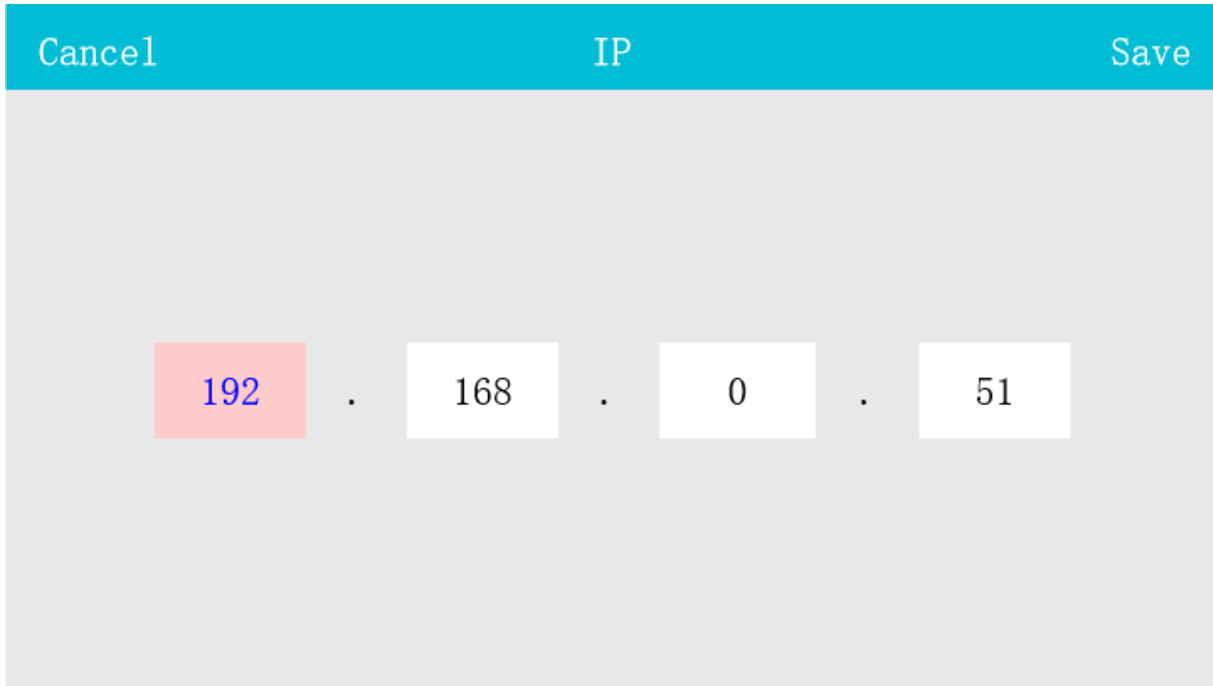
2. **Max Speed (mm/s):** the maximum speed allowed for single-axis movement. This value decides the max. Engraving speed and cutting speed.
3. **Corner Speed (Stop Speed) (mm/s):** the speed of start or stop during single-axis motion, i.e., the motion stops speed.
4. **Acceleration (mm/s²):** the max acceleration of this axis, the bigger the acceleration, the shorter the work time, and the stronger jitter of motion.
5. **Jerk (mm/s³):** the acceleration of the acceleration changes from the minimum acceleration to upgrade to the maximum acceleration—Or the changed from the maximum acceleration reduce to minimum acceleration during slowdown. The smaller the jerk, the weaker the jitter of motion, the slower of acceleration and deceleration. Otherwise, the jitter is stronger, the accelerating and decelerating is the faster.
6. **Max Range (mm):** maximum distance for axis can move.
7. **Backlash:** the allowance for machine to move in the reverse direction. It is used to compensate the cutting dislocation.
8. **Origin Offset (Offset Angle of Origin):** set the offset value. When the X-axis returns to the origin, it will move a certain distance at the origin to stop, so as to avoid accidentally hitting the limit switch during work or moving and triggering the limit alarm. For the U axis of the rotation axis, the **Offset Angle of Origin** is, after the U axis hits the origin limit, then rotate the moving angle and align the positive direction of X, which is the zero position of the U axis. Refer to the offset angle calibration instructions.
9. **X- Margin:** When the X-axis is reset, the reset is completed after it touches the origin limit (if the origin offset is set, it will offset the limit for a certain distance and then stop). The position at this time is the zero position of X, but it may be near this position, in the direction of the X axis, there is a long distance, the machine table is a steel plate, and it is not allowed to cut in this area, then this distance is called X- Margin.

10. **X+ Margin:** move the X-axis to the maximum coordinate. Similarly, at this time, the machine table below the vibrating cutter head may also be a steel plate, and this area cannot be used for cutting, so this distance is called X+ Margin. The concept of Y-/+ Margin is similar.
 11. **Direction Polarity:** When the motor cannot return to the original position, change the polarity to make it normal.
 12. **Limit Polarity:** classified into positive and negative. When it is positive, the limit signal is active at high level; when it is negative, the limit signal is active at low level.
 13. **Jog Polarity:** when the motion direction of the axis motor disaccords with the direction control buttons on the keyboard, you can change the polarity to make them consistent with each other.
 14. **Limit Protection:** enable or disable detecting the axis limit switch. When it is opened and the limit switch is on, it will stop the motion.
 15. **Servo Alarm Protection:** After it is turned on, the servo alarm protection signal will be detected. When the signal is valid, movement is prohibited.
 16. **Pulse Edge Trigger:** Rising or Falling. Depending on the drive settings, it is usually set the Rising. If the axis repeatedly moves, and there is always dislocation in one direction, and reverse the polarity of the pulse.
- Direction Polarity, Limit Polarity, Jog polarity setting sequence. Generally, the limit polarity is negative, which is set according to the output level of the limit switch. Then observe the direction of XYZU returning to zero, whether it is in the direction of the origin limit switch, if not, change the direction polarity. Finally, press the arrow keys to move XYZU, if the direction is reversed, change the polarity of the keys.
 - For the axis of rotation (U-axis):
 - **Rotation Pulses:** on the rotary axis, when the tool rotates 360 degrees, the total number of pulses that the controller needs to send to the driver is the rotation pulses. Assuming that the current subdivision of the rotating shaft motor is 5000, and the transmission ratio is 1:1, that is, the motor rotates for 1 turn and the tool also rotates for 1 turn, then the weekly pulse at this time is 5000. If the transmission ratio is 3:1, if When the motor rotates for 1 cycle, the tool actually runs only one third of a cycle, that is to say, the tool can only run for one cycle after the motor rotates for 3 cycles, so the number of pulses per cycle at this time is $5000 \times 3 = 15000$. It is recommended to control

the weekly pulse to 5000~30000.

3.2.13 Network

In the menu interface, select "Network Connection/IP Settings", press "Enter" to enter, set the network IP address, the IP address needs to be in the same network segment as the computer. Such as 192.168.0.xxx, as shown in the figure:



Cancel	IP				Save
192 . 168 . 0 . 51					

3.2.14 Zero Point Return Settings

In the Menu interface, choose "Zero Point Return" to enter, show as:

ESC	Zero Point Return
	Manual
	Automatic
	Homing Speed

1. **Manual:** manually set single axis back to origin.
2. **Automatic:** set which axis goes back to origin after power up.
3. **Homing Speed:** set the home speed.

ESC	Manual	OK
	X Return to Zero	
	Y Return to Zero	
	Z Return to Zero	
	U Return to Zero	

1. Press "Up/Down" key to select the needed operation, click on the "Enter" to set one axis back to origin, press "Pause" to stop.

Cancel	Automatic	Save
X Return to Zero	◀ Open ▶	
Y Return to Zero	◀ Open ▶	
Z Return to Zero	◀ Open ▶	
U Return to Zero	◀ Open ▶	

If you choose ON, when the system is powered on, the axis will automatically move to find the origin signal; if you choose OFF, after the system is powered on, the axis will not return to the origin, and the coordinates are half of the maximum travel.

Cancel	Homing Speed	Save
Homing Speed XY (mm/s)	◀ 80 ▶	
Homing Speed Z (mm/s)	◀ 20 ▶	
Homing Speed U (r/s)	◀ 0.1 ▶	

XYZ homing speed in mm/s. The unit of speed of U axis homing is r/s (revolutions per second).

3.2.15 Jog Interface

In the Main Menu interface, choose "Jog" to enter, show as:

ESC	Move		
X Axis Setting	◀	0	▶
Y Axis Setting	◀	0	▶
Z Axis Setting	◀	0	▶
U Axis Setting	◀	0	▶

Press the "Up" and "Down" keys to select the desired operation item.

1. **X Axis Setting:** Press the "Left" and "Right" keys to move the X axis, and the current coordinates will be displayed when the movement stops. Other axes operate similarly. You can input the currently set axis coordinate value, and press the "Enter" key to move to the specified coordinate. You can input X, Y coordinates at one time and move to the specified position.

3.2.16 Equipment Settings

In the Menu interface, choose "Equipment" to enter, show as:

ESC	Equipment Parameter
V CUT	
Pen	
Punching	
Red Light	
Other Parameters	

3.2.16.1 V CUT parameters

Cancel	V CUT	Save
Vibrator On Delay(ms)	◀ 0 ▶	
Vibrator Off Delay(ms)	◀ 0 ▶	
Tool Falling Coordinates (mm)	◀ 30 ▶	
Tool Raising Coordinates (mm)	◀ 10 ▶	
Tool Docking Coordinates (mm)	◀ 15 ▶	

1. **Vibrator On Delay:** the delay time of opening the vibrating knife, the unit is ms.
2. **Vibrator Off Delay:** the delay time for turning off the vibrating knife, the unit is ms.
3. **Tool Falling Coordinates:** the machining position coordinate, corresponding to the position set by "Down Origin".
4. **Tool Raising Coordinates:** during the process, without cutting, the coordinate of the lift,

corresponding to the position set by "Up Origin".

5. **Tool Docking Coordinates:** the coordinates of the completion of the lift.

3.2.16.2 Pen Parameters

Cancel	Pen	Save
Pen Offset X (mm)	◀ 0 ▶	
Pen Offset Y (mm)	◀ 0 ▶	
Pen Falling Delays (ms)	◀ 0 ▶	
Pen Rising Delays (ms)	◀ 0 ▶	

First cut a cross with a vibrating knife, then draw a cross with a pen, and measure the offset value set by the distance between the two crosses. Re-download a vibrating knife and pen, and observe whether the center points of the two crosses are completely coincident. If they are completely coincident, it means that the set offset value is correct. The pen offset calibration can be set in the calibration interface.

1. **Pen Offset X:** the horizontal offset value between the pen and the vibrating knife, the unit is mm.
2. **Pen Offset Y:** the vertical offset value between the pen and the vibrating knife, the unit is mm, and it can be negative. After entering the number, press the select key to enter the minus sign
3. **Pen Falling Delay:** the delay time of pen drive down, the unit is ms.
4. **Pen Rising Delay:** the delay time of pen driving rising, the unit is ms.

Note: We agree to install the vibrating knife near the origin of the machine, and then install the pen or punch. As in the upper left coordinate system, the vibrating knife is installed on the far left.

3.2.16.3 Punching Parameters

Cancel	Punching	Save
Small Punching Offset X(mm)	◀ 0 ▶	
Small Punching Offset Y(mm)	◀ 0 ▶	
Small Punching Falling Delays (ms)	◀ 0 ▶	
Small Punching Rising Delays (ms)	◀ 0 ▶	

1. **Small Punching Offset X:** the lateral offset value between the small punching and the vibrating knife, the unit is mm.
2. **Small Punching Offset Y:** the vertical offset value between the small punching and the vibrating knife, the unit is mm, and it can be negative.
3. **Small Punching Falling Delays:** the delay time for the down of the small punch device, the unit is ms.
4. **Small Punching Rising Delays:** the delay time of the small punching device rising, the unit is ms.

3.2.16.4 Red Light Parameters

Cancel	Red Light		Save
Offset X (mm)		◀ 0 ▶	
Offset Y (mm)		◀ 0 ▶	

Red Light Offset X/Y: the horizontal and vertical offset value between the center of the red light cross and the vibrating knife, the unit is mm, and it can be negative.

3.2.16.5 Other Parameters

Cancel	Other Parameters		Save
Adsorption On Delsy (ms)		◀ 0 ▶	
Adsorption Off Delay (ms)		◀ 0 ▶	
Clamp On Delay (ms)		◀ 0 ▶	
Clamp Off Delay (ms)		◀ 0 ▶	
Blow Back Off Delay (ms)		◀ 0 ▶	
Blow Back Off Delay (ms)		◀ 0 ▶	

Cancel	Other Parameters	Save
Power Off Delay (ms) ◀ 700 ▶		
Buzzer Setting ◀ 1 ▶		

1. **Adsorption On/Off Delay:** the delay of starting and closing the vacuum adsorption equipment, generally connected to the vacuum adsorption equipment through a relay, the adsorption equipment is used to adsorb the cutting material to the platform to ensure that the material does not move during cutting. the unit is ms.
2. **Clamp On/Off Delay:** the clip is used to clamp the material when feeding, and the feeding action is completed by dragging the Y-axis. the unit is ms.
3. **Blow Back On/Off Delay:** during the feeding process, it is necessary to turn on the back blow switch first to blow and separate the material from the platform to ensure the correct execution of the feeding.
4. **Power Off Delay:** it is used for continuous cutting when the power is cut off, and the cutting head does not retreat enough, resulting in the graphic interface not being closed. This parameter can be used to make appropriate compensation adjustments. the unit is ms.
5. **Buzzer Setting:** Set the number of times the buzzer beeps when the work is completed.

Remark:

Feeding action process: The feeding Y-axis moves to the back end, then the clamp is opened, the material is clamped, the adsorption function is turned off, the blow back switch is turned on, the Y-axis drags the feeding, the blow back switch is turned off, if it needs to work again, the adsorption is turned on, and finally the clamp is closed.

3.2.17 Calibration

In the Menu interface, choose "Calibration" to enter, show as:

ESC	Calibration
	Offset Angle Calibration
	Pen
	Small Punching
	Red Light
	Platform Calibration

3.2.17.1 Offset Angle Calibration

ESC	Offset Angle Calibration
OA	0.000 X 0.000 Y 0.00 U 0.00
High	Continue Distance 1.000
	1.Press Depth key homing
	2.Press U+, U- to align
	3.Press the Enter key to save
	4.Press the Start key to test
	CL key:change key mode
	Select key: change the key speed
	Decimal point key:change step distance

1. Press Depth key, zero the rotary axis.
2. Observe whether the direction of the tool after reset coincides with the positive direction of the X axis. If it does, it means that the current offset angle is correct.
3. If they do not coincide, press U+, U- key to rotate the tool so that the tool direction coincides with the positive direction of the X axis.
4. Press the enter key to set the declination angle after moving.

Press the arrow keys to move XY to the appropriate position.

Press the start button to cut a 100*100 cross. Observe whether the cutting direction of the cross cut by the vibrating knife is correct, so as to decide whether to readjust the declination of the origin. If there is an error, repeat from step 3.

CL key: Change the key mode. In continuous mode, press and hold the direction key, the axis moves, release the key, and stop the movement; when it is turned off, it is in jog mode. Press the key, and the axis will move the length specified by the "step".

Select key: Change move fast, or slow mode.

Decimal point: Change the step distance. The jog distance of the axis, enter the distance, and press the enter key to save.

PS: OA (Offset Angle of Origin) shows the rotation axis offset angle of origin, the unit is degree.

3.2.17.2 Pen Offset Calibration

ESC				Pen			
OX	0.000	OY	0.000	X	0.000	Y	0.000
High		Continue		Distance		1.000	
1.Press XY to move							
2.Press the Start key to test							
3.Move XY to align the center of the cross							
4.Press the Enter key to save							
CL key: change key mode							
Select key: change the key speed							
Decimal point key: change step distance							

1. Move the XY axis to the appropriate cutting position.
2. Press the start key, the knife to cut the cross, and then draw the cross with the pen. If the cut cross and the cross drawn by the pen are coincident, it means that the current offset is correct.
3. If they do not coincide, move the pen to align the center of the cross cut by the knife.
4. Press the enter key to set the new offset.

PS: OX, OY shows the Offset X/Y of Pen.

3.2.17.3 Punch Offset Calibration

ESC		Small Punching					
OX	0.000	OY	0.000	X	0.000	Y	0.000
High		Continue		Distance		1.000	
1. Press XY to move							
2. Press the Start key to test							
3. Move XY to align the center of the cross							
4. Press the Enter key to save							
CL key: change key mode							
Select key: change the key speed							
Decimal point key: change step distance							

1. Move the XY axis to the appropriate cutting position.
2. Press the start key, cut the cross with a knife, a punching. If the center of the cross and the punching position are coincident, the current offset is correct.
3. If they do not coincide, move the punch to align the center of the cross.
4. Press the enter key to set the new offset.

PS: OX, OY shows the Offset X/Y of punching device.

3.2.17.4 Red light Offset Calibration

ESC		Red Light			
OX	0.000	OY	0.000	X	0.000
High		Continue		Distance	1.000
1. Press XY to move					
2. Press the Start key to test					
3. Move XY to align the center of the cross					
4. Press the Enter key to save					
CL key: change key mode					
Select key: changethe key speed					
Decimal point key: change step distance					

1. Move the XY axis to the appropriate cutting position.
2. Press the start button, the knife will cut the cross, and then the XY axis will be moved, so that the red cross and the cutting cross are aligned. If the center of the cross and the punching position coincide, the current offset is correct.
3. If they do not coincide, move the red cross to align the cutting cross.
4. Press the enter key to set the new offset.

Remarks: Red light, small punching, and pen testing methods are similar. Just find a suitable position for testing, align the center of the cross, and press the Enter button, the system will automatically calculate the offset value. If you want to check whether the new offset value at this time is Reasonable, you can click the "Start" key again to test.

PS: OX, OY shows the Offset X/Y of red light.

3.2.17.5 Platform Calibration

Cancel	Platform Calibration		Save
Platform Height Compensation		◀ Open ▶	
Sampling Interval (mm)		◀ 50 ▶	
Work Lift Height (mm)		◀ 30 ▶	
Press the start key to collect			

When the machine is installed with a height acquisition device, the platform calibration can be entered. Before acquisition, the height collector must be connected to the positive limit signal of the Z axis (Lmt_Z+) and GND.

Set the "Platform Height Compensation" to Open, set the sampling interval, lifting height when collecting, press the "Start " key to start the acquisition, and enter the acquisition interface.

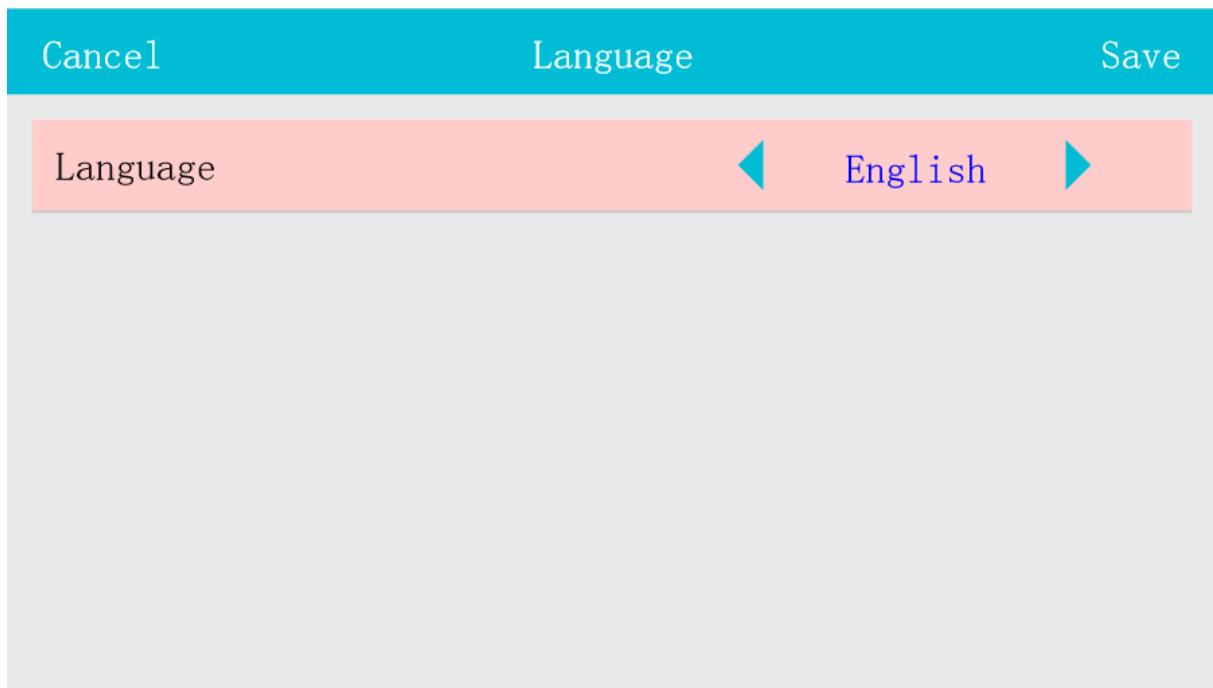
ESC	Platform Calibration		Save
X 0.000	Y 0.000	Z 0.00	
Highest Position(mm):		0.000	
Lowest Positiin(mm):		0.000	
Platform Error(mm):		0.000	
OK			
Press the start key to collect			
Press the Enter key to save			
Press 1 to move to the highest position			
Press 2 to move to the lowest position			

In the acquisition interface, the current acquisition position and the height of the Z-axis will be displayed, and the highest and lowest positions of the platform during the acquisition process will be displayed, and the platform error will be the difference between the highest and lowest positions.

If the acquisition is successful, press the enter key to save. If you need to pause, press the pause key. To exit, press ESC. If the platform is not flat and the error is too large, press 1 key to move to the highest position, or press 2 key to move to the lowest position to correct the flatness of the platform. If re-acquisition is required, press the start key.

3.2.18 Language

In the Main Menu interface, select "Language", switch between the displayed languages: Chinese, English, Traditional Chinese, Korean, Russian, Italian, Spanish, Portuguese, Vietnamese and etc.



3.2.19 Statistical Information

On the menu interface, select "Records" to view statistics. The statistical information includes startup time, accumulated processing time, accumulated processing times, X-axis

accumulated travel, and Y-axis accumulated travel. Press the "CL" key on the panel, enter the password "12344321", you can enter the delete statistics page, press the up and down keys to select the option to be deleted. Then press enter key to delete. Press the number "0" key, enter the same password, and delete all information with one key.

ESC	Records
1. Time of Power On:	0:00:00
2. Total Work Time:	0:00:00
3. Total Process Times:	0
4. X Total Travel:	0
5. Y Total Travel:	0

Cancel	Records	OK
1. Clear Time of Power On		
2. Clear Total Work Time		
3. Clear Process Times		
4. Clear X Travel		
5. Clear Y Travel		

3.3 System Information

In Main Menu interface, select "System", and press "Enter" key to enter the system set

interface.

ESC	System
Version	V. L026. 003
System Upgrade	
Administrator	
System Test	
License Key	
Factory Data Reset	

1. **Version:** Display the current control card firmware version.
2. **System Upgrade:** Use U disk to upgrade the firmware program. Before upgrading, please copy the upgrade file TZD_L026.TFL to the U disk, then insert the U disk into the motherboard, select the system upgrade, and execute the upgrade. Power off during the upgrade process is prohibited.
3. **Administrator:** Enter the administrator setting interface.
4. **System Test:** Enter the system test interface.
5. **License Key:** Display authorization code information.
6. **Factory Data Reset:** Enter password 12344321 to restore factory parameter settings. Note that the premise is that the machine manufacturer needs to set the factory settings in the Administrator / Factory Data Backup first.

3.3.1 Administrator

ESC	Administrator
Time Set	
Administrator Password	
Factory Data Backup	





















When entering the administrator page, you will be prompted to enter an administrative password first, which is 00000000 (8 zeros) by default.

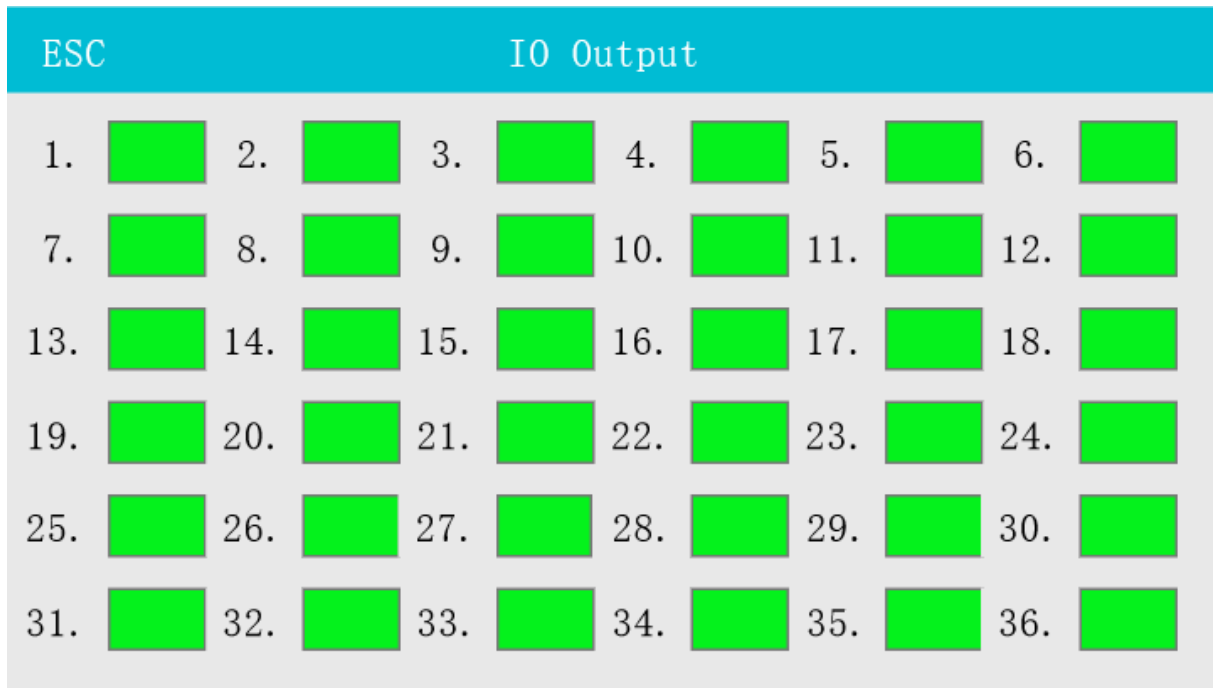
1. **Time Setting:** Set the date and time.
2. **Administrator Password:** Modify the administrative password.
3. **Factory Data Backup:** Backup factory machine parameters.

3.3.2 System Test

Select "System Test", press "Enter" key to go into the interface, show as:

ESC	System Test
I0 Input	
I0 Output	
Clock	
SRAM	
Flash	

ESC	I0 Input				
1.		2.		3.	
4.		5.			
6.		7.		8.	
9.		10.			
11.		12.		13.	
14.		15.			
16.		17.		18.	
19.		20.			



1. **IO Input / Output Test:** corresponding to IO input/output test, when the pin is active at low level, it'll display from off (green) to on (red). As shown in IN-13,14 above, press the number key on the output test interface to manually output the signal. For example, 1-9



corresponds to OUT1-9, 0 corresponds to OUT10. Press the " " key to switch between the 4 groups of output, which are 1-10, 11-20, 21-30, 31-40. After pressing the Select button, press the number button to output. Press the Enter key to test all outputs with one click.

2. **Clock, SRAM and Flash:** After finishing the testing, a dialog box will pop up to will show the result.
3. **IO Input / Output Test Interface Description:**

Input Test:

Pin No.	Description
INPUT1 = Lmt_Y-	Lmt_Y- Y origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT2 = Lmt_Y+	Lmt_Y+ Y upper limit, axis movement to the max coordinate limit sensor input
INPUT3 = Lmt_X-	Lmt_X- X origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT4 = Lmt_X+	Lmt_X+ X upper limit, axis movement to the max coordinate limit sensor input

INPUT5 = Lmt_U-	Lmt_U- U origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT6 = Lmt_U+	Lmt_U+ U upper limit, axis movement to the max coordinate limit sensor input
INPUT7 = Lmt_Z-	Lmt_Z- Z origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT8 = Lmt_Z+	Lmt_Z+ Z upper limit, axis movement to the max coordinate limit sensor input
INPUT9 = Prot_SW	Prot_SW Protection signal input, can be connected to protection input and other signals
INPUT10 = Foot_SW	Foot_SW Foot switch signal input, active on the rising edge, with pulse width not less than 100ms
INPUT11 = EXIN1	EXIN1 Z axis servo alarm signal input
INPUT12 = EXIN2	EXIN2 U-axis servo alarm signal input
INPUT13 = IN1	IN1 X-axis servo alarm signal input
INPUT14 = IN2	IN2 Y axis servo alarm signal input

Output Test:

Pin No.	Description
OUT1 = adsorption	OUT1 adsorption signal, when the adsorption output, low effective
OUT2= Vibrating knife	OUT2 Vibrating knife signal, when the vibrating knife is output, low effective
OUT3=Small punching	OUT3 Small punching signal, when punching output, active low
OUT4=Clip	OUT4 Clip signal, when the clip is output, active low
OUT5 = Backflush	OUT5 Backflush signal, when backflush output, low effective
OUT6 = Pen	OUT6 Pen signal, the pen output is low level, and the pen up output high level
OUT7 = Keep	Keep
OUT8 = Keep	Keep
OUT9 = X-PUL	X-axis PUL- pulse signal, connected to the PUL- of the stepper driver
OUT10 = X-DIR	X-axis DIR- direction signal, connected to DIR- of the stepper driver
OUT11 = Y-PUL	Y-axis PUL- pulse signal, connected to the PUL- of the stepper driver

OUT12 = Y-DIR	Y-axis DIR- direction signal, connected to DIR- of the stepper driver
OUT13 = Z-PUL	Z-axis PUL- pulse signal, connected to the PUL- of the stepper driver
OUT14 = Z-DIR	Z-axis DIR- direction signal, connected to DIR- of the stepper driver
OUT15 = U-PUL	U-axis PUL- pulse signal, connected to the PUL- of the stepper driver
OUT16 = U-DIR	U-axis DIR- direction signal, connected to DIR- of the stepper driver
OUT17 = EOUT2	EOUT2 Extended output 2
OUT18 = EOUT1	EOUT1 Extended output 1
OUT19 = EOUT4	EOUT4 Extended output 4
OUT20 = EOUT3	EOUT3 Extended output 3

3.3.3 License Key

Cancel
License Key
Save

License Key
◀ 878095988065 ▶

ID: L3TU0009
Expiry Date: 2021-11-5
Remaining Days: 2

The authorization code function is that the user can set the valid use date of the control card, and when the authorization expires, the authorization period or permanent authorization can be extended. This function is applicable to scenarios such as trial and installment payment of

the supporting machine. If you need the authorization code setting function, please contact our company to obtain the setting tool and operation instructions.

License Key: 12-digit authorization code.

ID: Each control card has a unique number, which is the identity of the control card.

If a license date is set, the license expiration date and the number of days remaining will be displayed. If permanent authorization is displayed, it means that the machine can be used without restriction. If prompted that the authorization has expired, please enter a new authorization code to use the device.

When the authorization date is set. The system will remind 7 days before expiration, and users can extend or permanently authorize in advance.

Part V the Frequently Asked Question

4.1 Power-on Reset Question

1. Q: The system does not reset, buttons have no response, and LCD doesn't display.

A: The system reset error.

- Check whether the 24V power supply is normal;
- Remove all the wiring of the Main Board, except the power supply. Power on and check whether it can enter the homing interface;
- If it can enter homing interface, test wiring.
- If it cannot enter the homing interface, the main board is damaged.

2. Q: After powering on, the X axis and Y axis don't move, the LCD displays the main interface, but the axis can be manually moved.

A: The power back to origin error. Go into the "Zero Point Return / Automatic" interface, set the X, Y axis as Opening. Or the Limit Switch Polarity goes wrong, or the limit switch is damaged.

3. Q: After powering on, X, Y axis slow-move a short distance, but cannot reach to the limit point or complete the reset.

A: The Limit Polarity error. Go into the "Axis / Limit" interface, and change the X, Y polarity.

4. Q: After powering on, X, Y move to the opposite direction of limit switch,

A: The direction polarity error. Go into the "Axis / Direction" interface; change the X, Y polarity.

5. Q: Press directional button for moving, but X, Y moving to the opposite direction against the button.

A: The button polarity error. Go into the "Axis / Jog" interface, and change the X, Y polarity.

6. Q: After the completion of reset, X, Y starts automatically moving fast.

A: The regression point setting error. Go into the "User / Return Point" interface, set the regression point as mechanism origin point (Origin).

4.2 The PC Connection Question

The Questions:

1. When reading the parameters, cannot open the port.
2. Cannot read the parameters.
3. Transfer the file invalid.

The Solutions:

1. Check whether the USB line is connected correctly. Check whether the USB port is connected the PC.
2. Check whether the USB line is connected correctly. Unload the driver and reload it.
3. Whether output port shown in the software is the current device number. If the device number is 00000000 while the port displayed in the software is TC_00000000.
4. If there are multiple machines connected to one computer, various machines are respectively numbered for easy distinction.
5. Change to another USB port on your computer for connection.
6. Restart the computer, to ground the equipment and the computer.
7. Replace a computer.
8. Replace a controller.

4.3 The Reading and Writing of U Disk Question

- 1. Q: Click the U disk file, showing "U disk is empty or error".**

A: U disk error.

First, check whether the U disk port is correct.

Second, format the USB flash drive as FAT32 type.

Third, change to another type of USB flash drive.

- 2. Q: Click the U disk file, showing "U disk reading...please wait", and the indicator is off.**

A: Replace the U disk extension line.