

TL-B2 Laser Engraving and Cutting Control System User Manual V1.3

Shenzhen Topwisdom Technology Co., Ltd.

<http://www.topwisdom.com.cn>

All rights reserved

Shenzhen Topwisdom Technology Co., Ltd. (Topwisdom Technology hereinafter) reserves the rights of final interpretation and modification for this manual and declaration. Topwisdom Technology owns the patents, copyright and other intellectual property rights for its product and software. Without authorization, no one is allowed to copy, excerpt, reproduce, process, disseminate and use this product and its relative parts directly or indirectly.

Disclaimer

Topwisdom Technology reserves the right to modify the content described in this manual without advance notice. Topwisdom Technology is not responsible to any direct, indirect, or consequential damage or liability caused by improper use of this manual or the product. Machinery in motion can be dangerous! It is the responsibility of the user to design effective error handling and safety protection as part of the machinery. Topwisdom Technology shall not be liable or responsible for any incidental or consequential damages.

Technical Support

To get our technical support and after-sale service:

E-mail: service@topwisdom.com.cn

Website: <http://www.topwisdom.com.cn>

QQ Group:





Versions

Version No.	Revision Record
V1.0	Initial.
V1.1	<ol style="list-style-type: none">1. Modify the parameters of the rotary cutter.2. Update some particular parameter descriptions.3. Change picture.
V1.2	<ol style="list-style-type: none">1. Update some particular parameter descriptions.2. Picture correction.3. Increase test IO pin description table.4. The rotating knife parameters upon the fourth part.
V1.3	<ol style="list-style-type: none">1. New counting mode and display the total number of processing options

Content

Part I Overview	1
1.1 System Overview	1
1.2 Notes and Warning	2
1.3 Work Environment	2
1.4 Power Supply and Grounding	2
1.4.1 Power Supply Requirements	2
1.4.2 Grounding Requirements	3
1.5 Accessory List	3
Part II Wiring Installation Instruction	6
2.1 System Conventions	6
2.2 System Wiring Diagram	8
2.3 Installation Dimension	9
2.3.1 Panel	9
2.3.2 Main Board	10
2.4 Wiring Instruction	11
2.4.1 Interface Diagram	11
2.4.2 Wiring Diagram	12
2.5 Interface Instruction	16
2.5.1 Power Signal	16
2.5.2 PC Connection Port	16
2.5.3 U-DISK Port	16
2.5.4 NETWORK Port	16
2.5.5 HANDSET Port	16
2.5.6 Motor Axis Interface	17
2.5.7 Laser Power Interface	17
2.5.8 General Output Interface	18
2.5.9 Input Interface	19
Part III The Operation Panel	21
3.1 The Panel Operation and Buttons Function Introduction	21

3.1.1 The Panel.....	21
3.1.2 Buttons Function Introduction	21
3.2 The Main Interface Introduction	23
3.2.1 Power Interface	23
3.2.2 Standby Interface.....	24
3.2.3 Speed Settings	26
3.2.4 Laser Power Settings	27
3.2.5 Single Axis Movement Interface	28
3.2.6 Memory File	30
3.2.7 U Disk File	33
3.2.8 The Main Menu Setting.....	35
3.2.9 File Settings.....	36
3.2.10 User Settings	37
3.2.11 Axis Settings.....	41
3.2.12 IP Settings.....	45
3.2.13 Zero Point Return Settings	45
3.2.14 Range.....	48
3.2.15 Equipment Settings	49
3.2.16 Laser Settings	54
3.2.17 Language	57
3.2.18 Statistical Information	58
3.3 System Settings	59
3.3.1 Administrator.....	60
3.3.2 System Test.....	62
Part IV Operation Process	68
4.1 Double-head Asynchronous Machine	68
4.2 Rotary Cutting Machine	70
4.2.1 Function Introduction	70
4.2.2 Rotary Device Parameters	71
4.2.3 Head Presetting	73
4.2.4 Spindle and Pressure Feeding Roller Control	77
4.2.5 Tool Switch.....	78
4.2.6 Processing Flow	79

4.2.7 Notes and Warning	79
Part V The Frequently Asked Question	81
5.1 Power-on Reset Question	81
5.2 The Laser Light Question	82
5.3 The PC Connection Question	82
5.4 The Reading and Writing of U Disk Question	83

Part I Overview

1.1 System Overview

Thank you very much for using laser engraving control system of our company!

This system is a Double-head Asynchronous Cutting and Engraving Control System.

The main features of the Control System:

- Power supply of DC24V/2A;
- 32-bit high-performance floating point embedded ARM+FPGA architecture, 128M Flash, 32M RAM, 12 general outputs, 20 general inputs, TTL electrical level;
- Equipped with 4.3", 480×272 LCD;
- Support 7 axes motion control (X1, Y1 asynchronous cutting head 1 , X2, Y2 asynchronous cutting head 2, Z1, and Z2, used for rotary cutter lift or synchronous double-head movement (double-head mutual movement model) , U is feeding axis or lift axis; Motor shaft pulse frequency can be as high as 1MHZ;
- Support 4 lasers' control, TTL electrical level, adjustable output voltage of laser control: 0~5V, adjustable PWM output: 1K~100K, adjustable duty cycle: 0~100%;
- Support USB2.0 interface, support computer USB communication, support U disk to read and write files;
- Support 100Mbps network transmission rate;
- Support Y axis or X axis asynchronous cutting models; support double-head mutual movement + double beam asynchronous model (4 heads); support asynchronous cutting; support asynchronous double-head dislocation compensation;
- Support rotary cutter cutting function; with rotation height compensation;
- Support automatic blowing, automatic focusing, foot switch, cover protect, processing statistics, etc.; in the run of equipment, the power-off cutting restoration ensures the flexible settings of large file processing.
- Support the languages of Chinese (simplified), English, Traditional Chinese, Korean, Russian, Italian, Spanish, Portuguese, Vietnamese and etc.

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 bring 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: 5-40°C.

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

1.4 Power Supply and Grounding

1.4.1 Power Supply Requirements

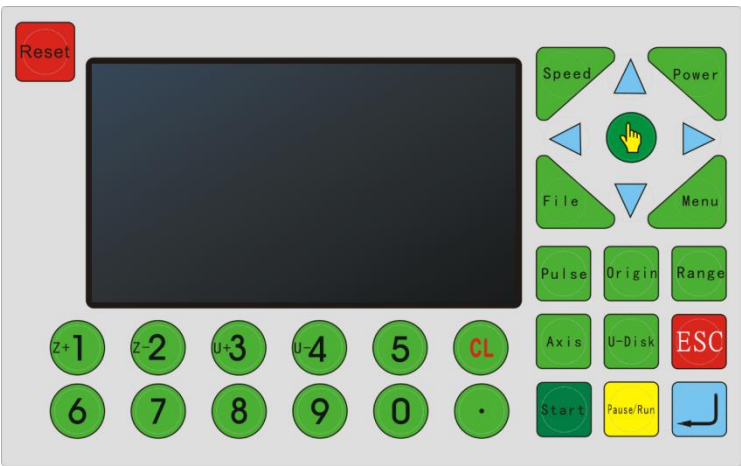
Power: DC24V/2A.

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 20meters, the cross-sectional area of the wire cable is larger than 1.0 mm².

1.5 Accessory List

The Laser Engraving Control System TL-B2 contained the accessories as below:

Name	Quantity	Introduction	Photo
Operation panel	1	For user operation	



Contr oller	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 communicati on cable for connecting controller and PC 3.USB communicati on extended cable	



Cross over Ether net cable/ Switch ing cable	2	For the direct communicati on between PCB and computer	 
--	---	--	--

Part II Wiring Installation Instruction

2.1 System Conventions

1. The laser head near to the origin location of the equipment is Laser 1, or Asynchronous laser head 1;
2. The laser head far from the origin location of the equipment is Laser 2, or Asynchronous laser head 2;
3. The laser head set on the same beam with Laser 1 is laser 3, constituting the double bidirectional motion
4. The laser head set on the same beam with Laser 2 is laser 4, constituting the double bidirectional motion

The following is with the origin location on the left upper corner:

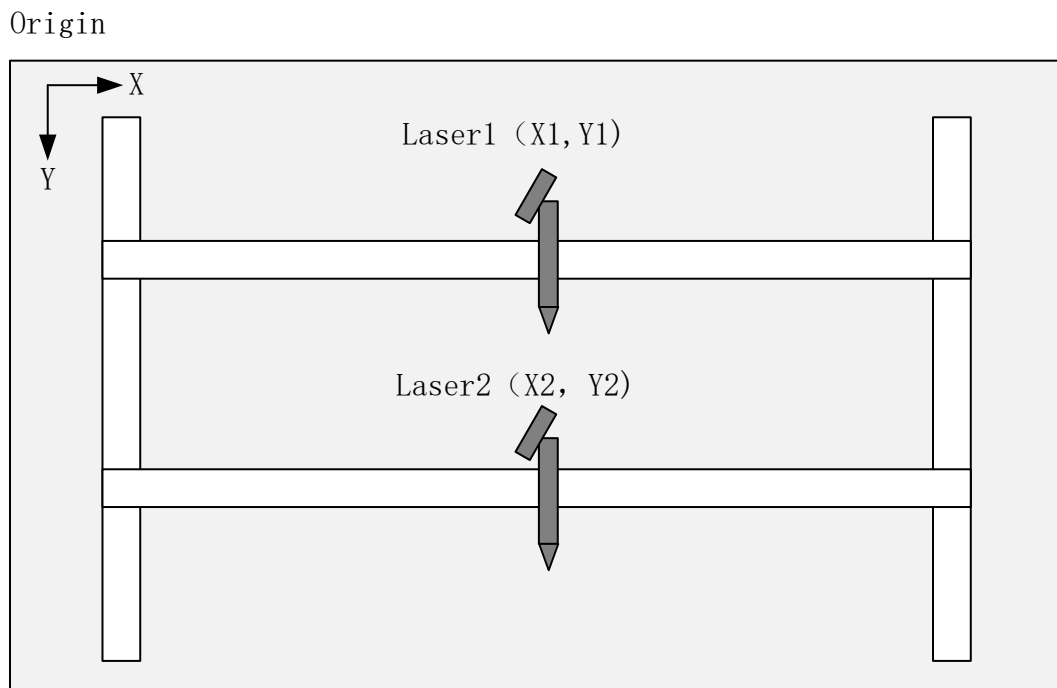


Fig. 2-1 Y axis asynchronous double cutting head

Origin

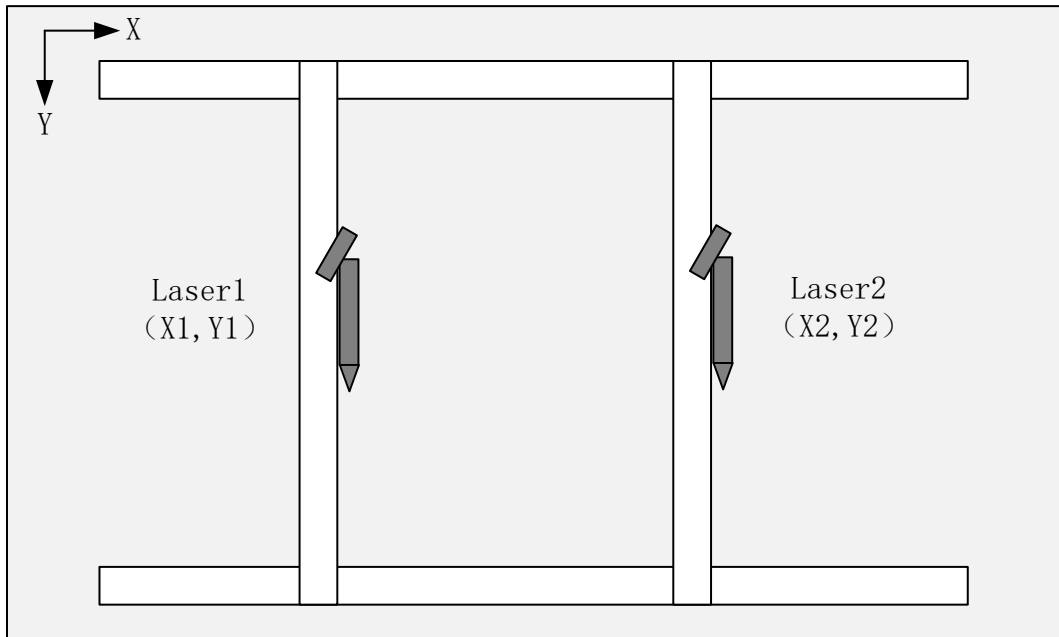


Fig. 2-2 X axis asynchronous double cutting head

Origin

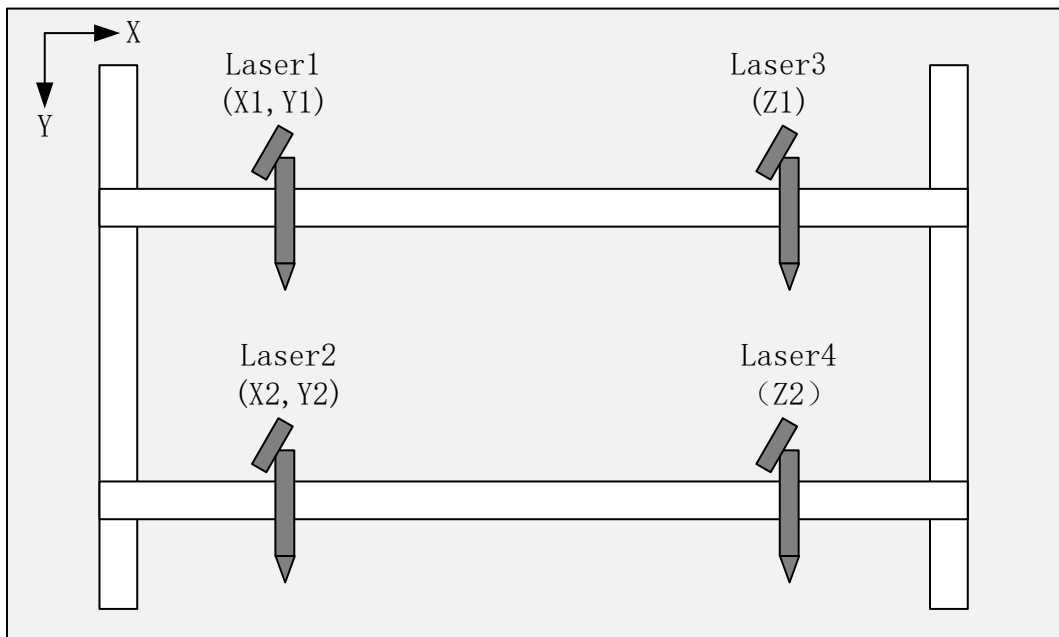


Fig. 2-3 Y axis asynchronous double cutting head + bidirectional

2.2 System Wiring Diagram

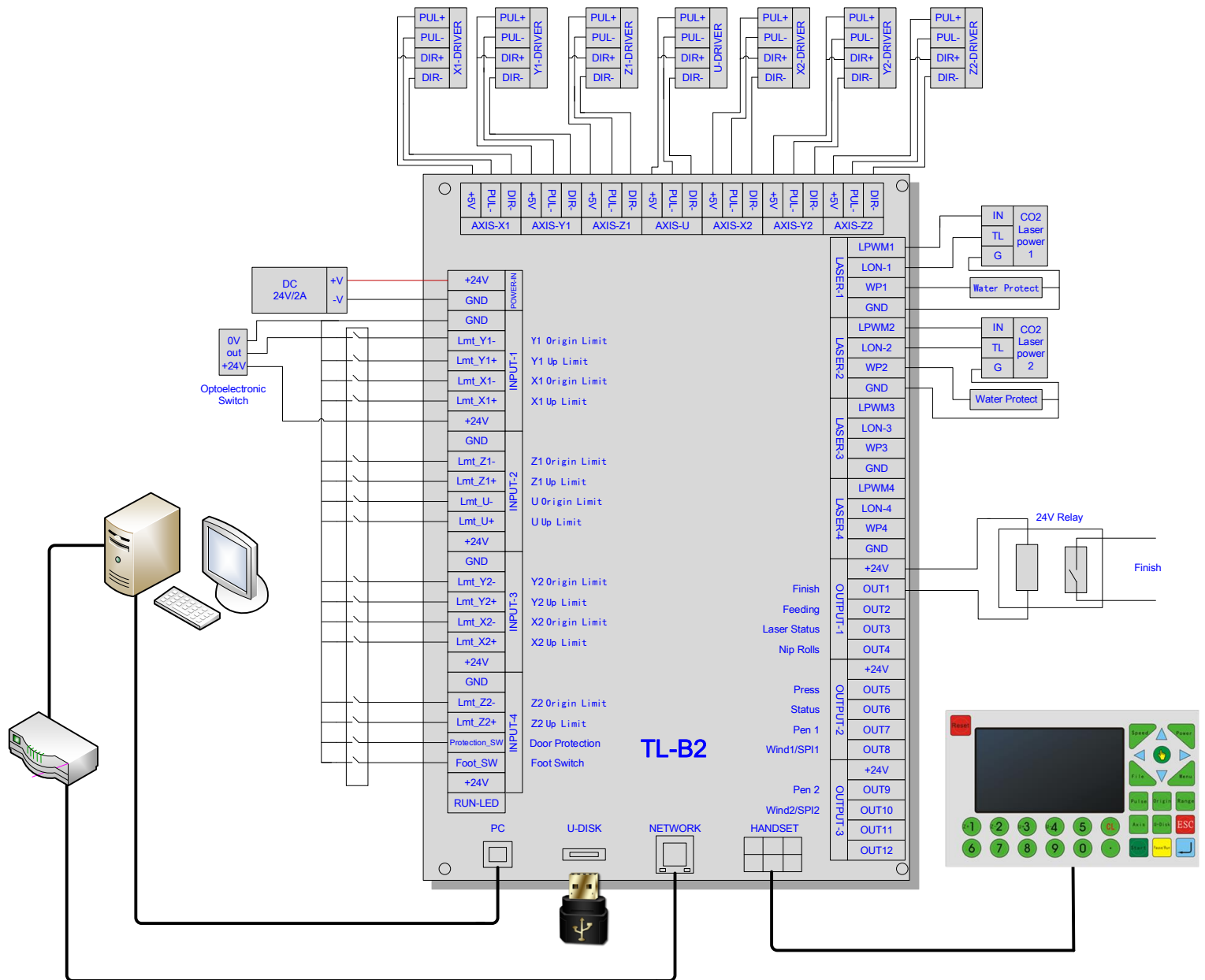


Fig. 2-4

2.3 Installation Dimension

2.3.1 Panel

Note: the unit is mm.

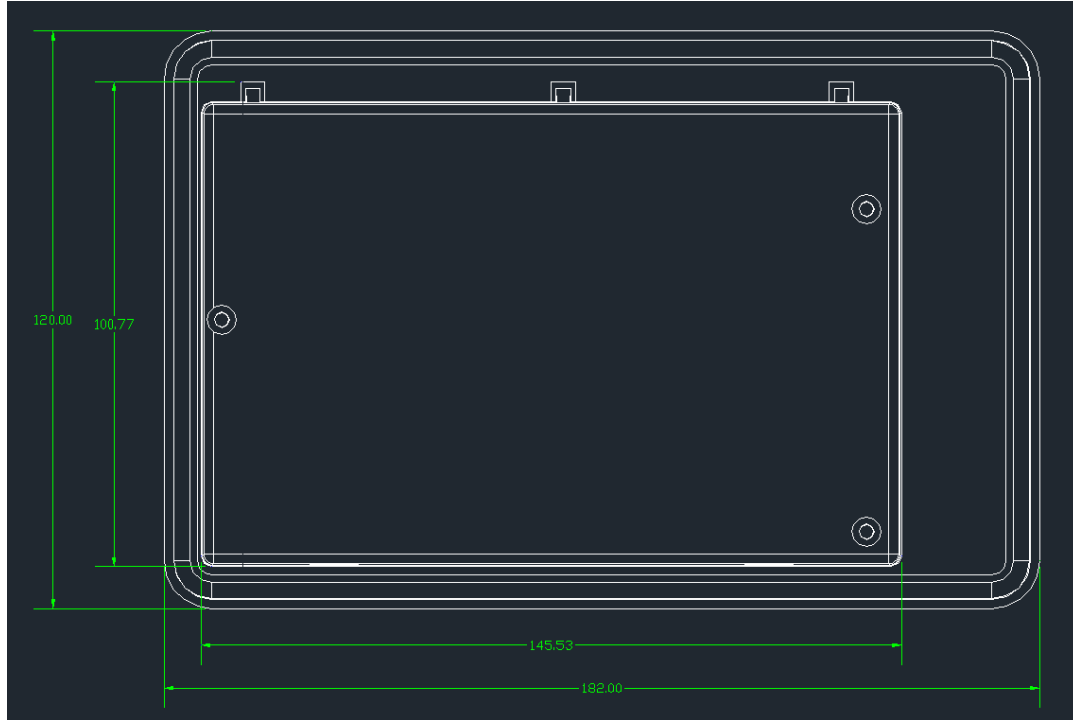


Fig. 2-5 Back

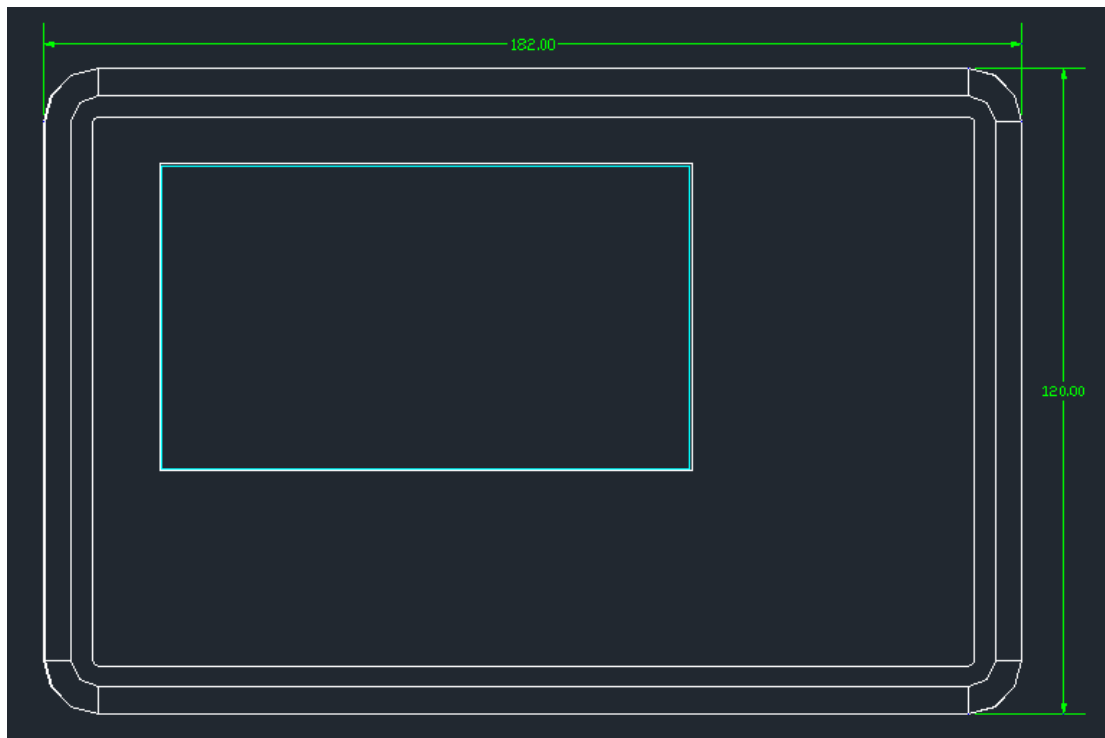


Fig. 2-6 Front

2.3.2 Main Board

Note: the unit is mm.



Fig. 2-7

2.4 Wiring Instruction

2.4.1 Interface Diagram

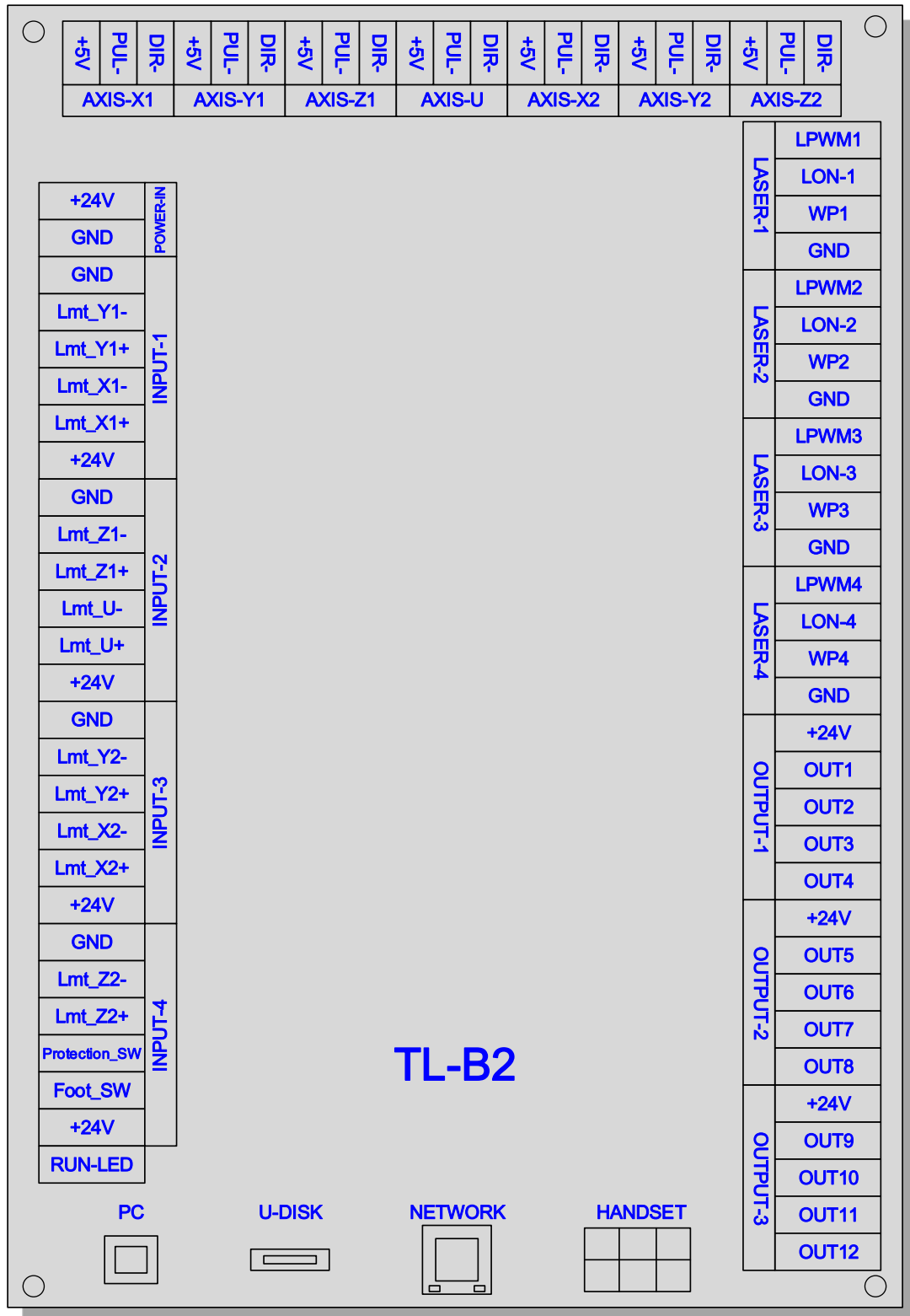


Fig. 2-8

2.4.2 Wiring Diagram

2.4.2.1 Motor Wiring

The following is X1 axis motor wiring, other axis are similar.

1. Step Motor Wiring

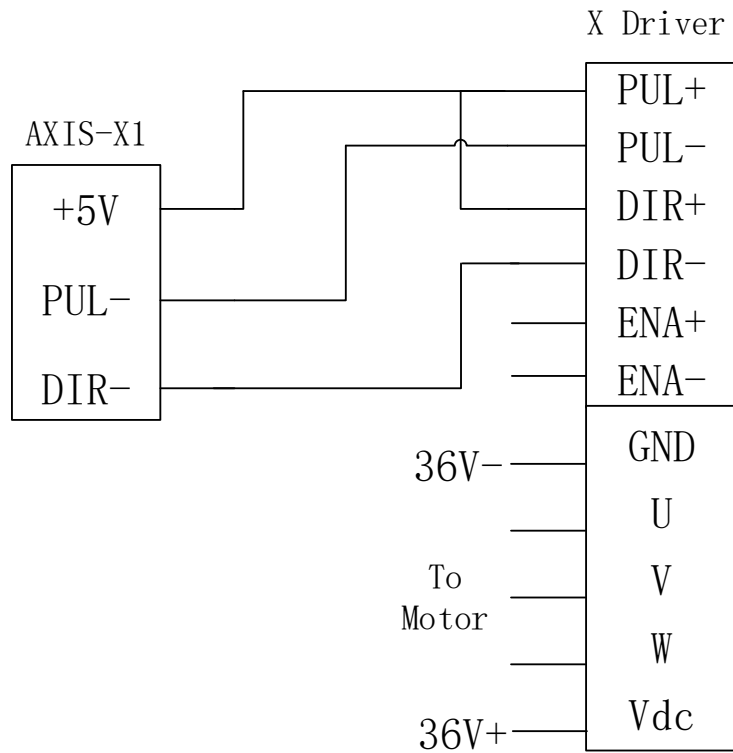


Fig. 2-9

2. Panasonic Servo Wiring

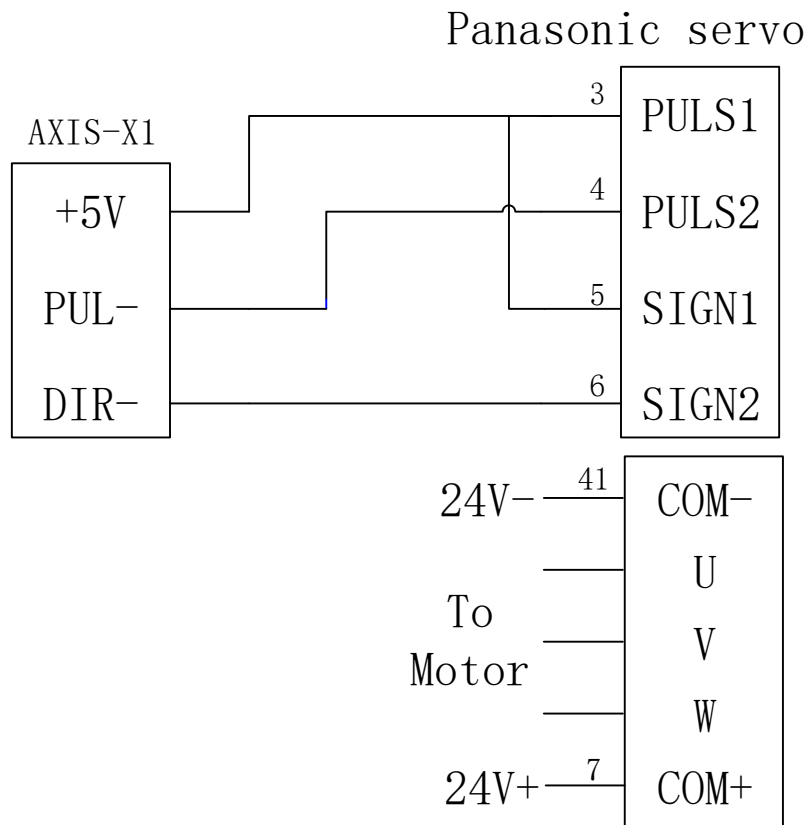


Fig. 2-10

2.4.2.2 Laser Power Supply Wiring

1. CO2 Laser Power Supply Wiring

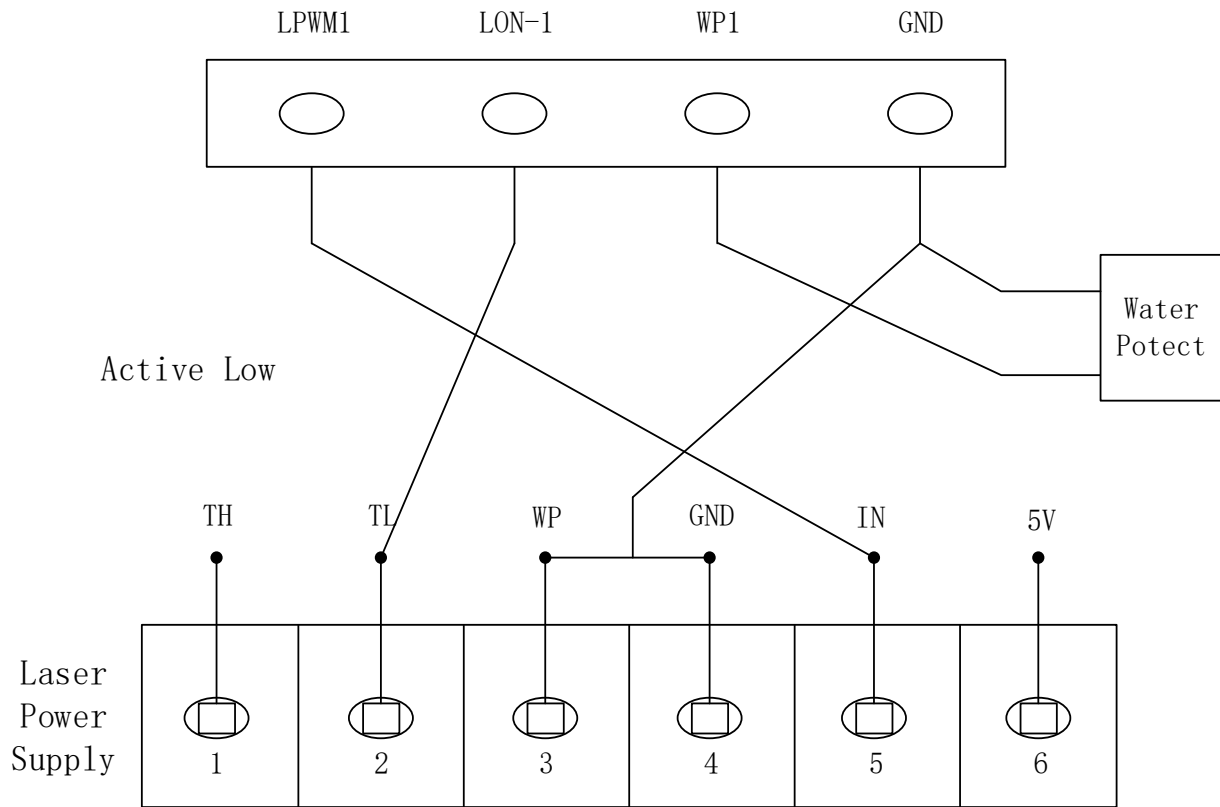


Fig. 2-11

2. RF Laser Wiring

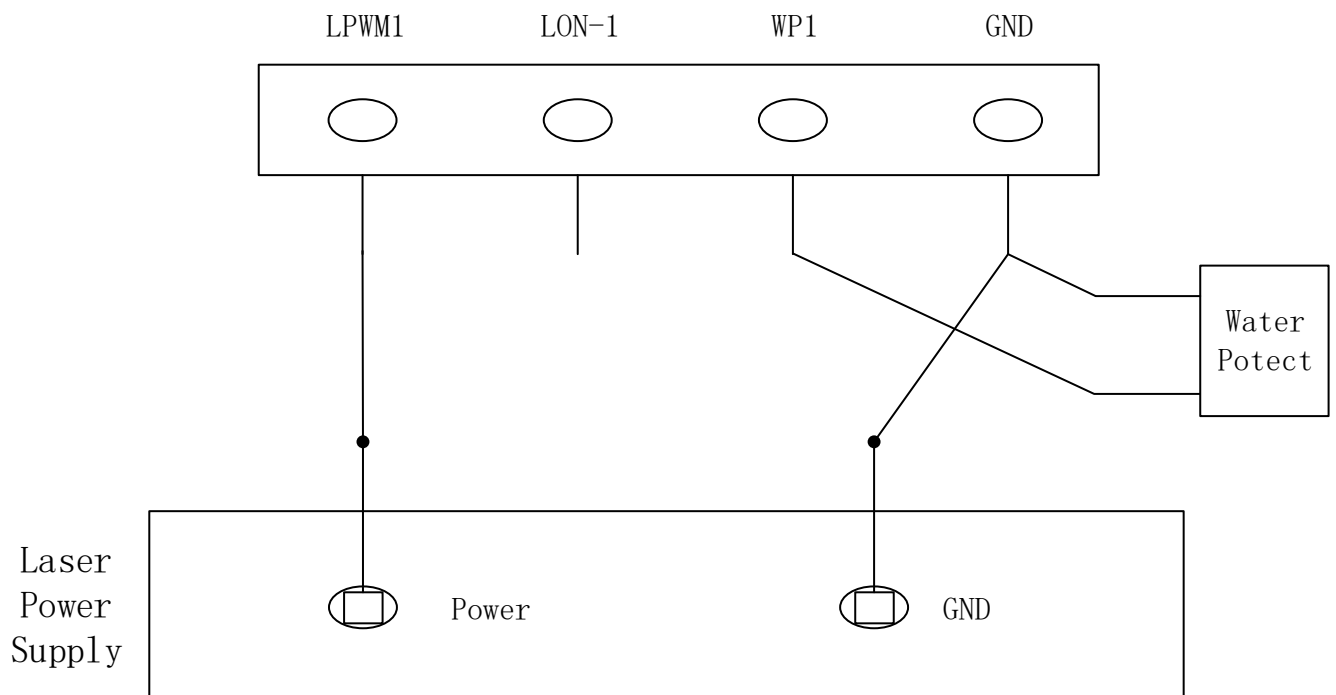


Fig. 2-12

The wiring of laser 2 is similar.

Note: When "RF or RF (Pre-ignition)" is selected, please set the PWM Frequency according to the data sheet of the laser. Generally, PWM Frequency is 5000Hz. And set the Laser Max parameter not larger than 95%, especially not to set as 100%, otherwise it works improperly.

2.4.2.3 General Output Signal Wiring Diagram

The following is OUT1 wiring, others are similar.

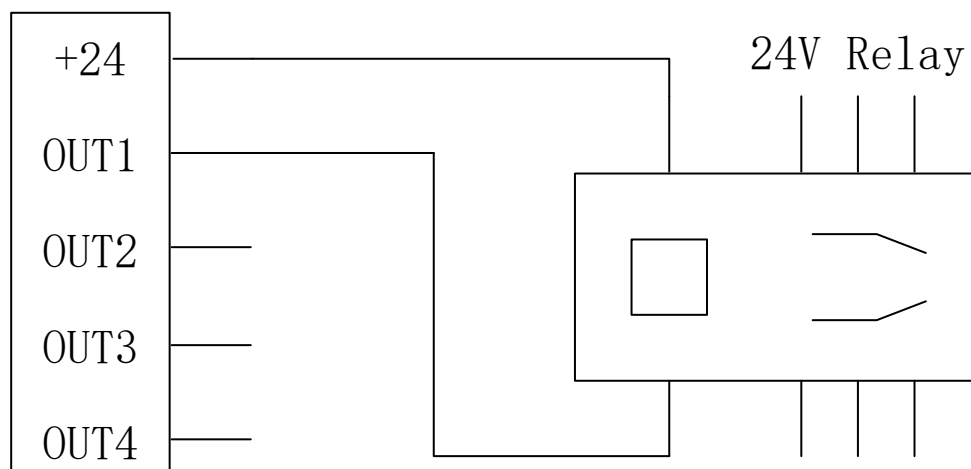
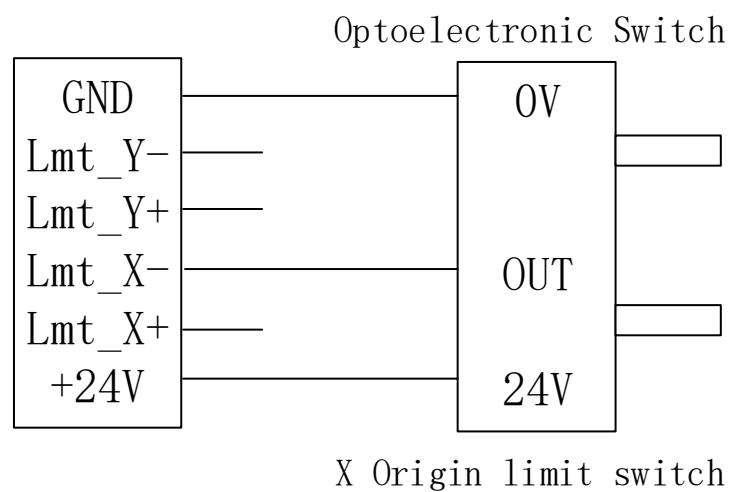


Fig. 2-13

2.4.2.4 Input Wiring



X Origin limit switch

Fig. 2-14 NPN Optoelectronic Switch

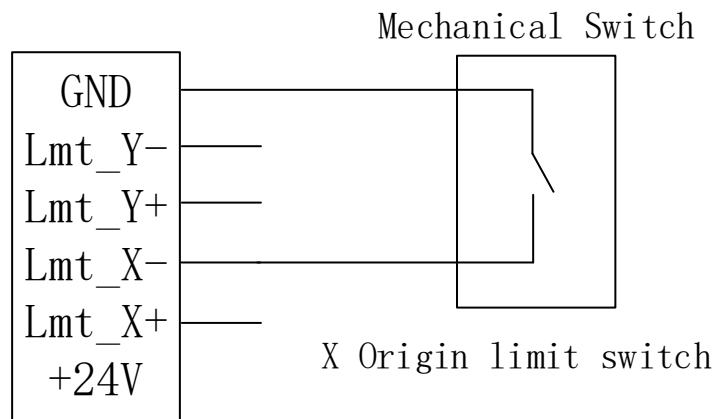


Fig. 2-15 Mechanical Switch

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	+24V 24V power source positive (Input)
2	GND 24V power source grounding (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 X1, Y1, Z1, U, X2, Y2 and Z2, only supportive of common anode connection. Among them:

- X1: X axis motor of asynchronous head 1
- Y1: Y axis motor of asynchronous head 1
- Z1: rotary cutter lifting motor of asynchronous head 1, or the bidirectional motion laser head of asynchronous head 1 in case of bidirectional motion mode
- U: feeding motor or lifting motor
- X2: X axis motor for asynchronous head 2
- Y2: Y axis motor of asynchronous head 2
- Z2: rotary cutter lifting motor of asynchronous head 2, or the bidirectional motion laser head of asynchronous head 2 in case of bidirectional motion mode

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 Laser Power Interface

The panel has 4 laser interfaces, among which

- Laser-1: laser Power Interface 1, laser interface for asynchronous head 1
- Laser-2: laser Power Interface 2, laser interface for asynchronous head 2
- Laser-3: laser Power Interface 3, the 2nd interface for bidirectional motion of asynchronous head 1
- Laser-4: laser Power Interface 4, the 2nd interface for bidirectional motion of asynchronous head 2

Pin	Definition
1	LPWM Be used to control the laser power When the laser is RF laser, used to control the power intensity and On/Off of the laser When the laser is CO2 laser, used to control the power intensity
2	LON Laser enable control. When the laser is CO2 laser, used to control laser On/Off
3	WP Water protection input, active at low level, the corresponding LED light will be on When the laser is RF laser, used to input of laser state When the laser is CO2 laser, used to input of water protection state (active at

	low level)
4	GND Power source grounding (Output)

2.5.8 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

OUTPUT1

Pin	Definition
1	+24V DC24V Output
2	OUT1 Work completion signal, output 1" low pulse width after the work is completed
3	OUT2 Feeding signal, output when feeding, active at low level
4	OUT3 Laser status signal, low output when the light is ON, and high output when the light is OFF.
5	OUT4 Press signal, for control of press roller of rotary cutter, active at low level

OUTPUT2

Pin	Definition
1	+24V DC24V Output
2	OUT5 Feeding/pressing signal, synchronous pressing signal at Y axis and U axis when feeding, active at low level
3	OUT6 Working status signal, output low level at work state, output high level at standby or pause state
4	OUT7 Pen signal 1, for the pen signal of the asynchronous head 1, low output when dropping the pen, high output when lifting the pen
5	OUT8 Blowing signal 1 or spindle 1 signal, the signal is multiplex, used for the blowing signal of the asynchronous head 1 in case of a normal model; used as start and stop signal for the spindle motor 1 in case of rotary cutting model, active at low level

OUTPUT3

Pin	Definition
1	+24V DC24V Output
2	OUT9 Pen signal 2, for the pen signal of the asynchronous head 2, low output when dropping the pen, high output when lifting the pen
3	OUT10 Blowing signal 2 or spindle 2 signal, the signal is multiplex, used for the blowing signal of the asynchronous head 2 in case of a normal model; used as start and stop signal for the spindle motor 2 in case of rotary cutting model, active at low level
4	OUT11 Reserved
5	OUT12 Reserved

2.5.9 Input Interface

INPUT1

Pin	Definition
1	GND Power source grounding
2	Lmt_Y1- Y1 origin limit, axis movement to the minimum coordinate (0) limit sensor input
3	Lmt_Y1+ Y1 upper limit, axis movement to the max coordinate limit sensor input
4	Lmt_X1- X1 origin limit, axis movement to the minimum coordinate (0) limit sensor input
5	Lmt_X1+ X1 upper limit, axis movement to the max coordinate limit sensor input
6	+24V DC24V Output

INPUT2

Pin	Definition
1	GND Power source grounding
2	Lmt_Z1- Z1 origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
3	Lmt_Z1+ Z1 upper limit, axis movement to the max coordinate limit sensor input
4	Lmt_U- U origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
5	Lmt_U+ U upper limit, axis movement to the max coordinate limit sensor input
6	+24V DC24V Output

INPUT3

Pin	Definition
1	GND Power source grounding
2	Lmt_Y2- Y2 origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
3	Lmt_Y2+ Y2 upper limit, axis movement to the max coordinate limit sensor input
4	Lmt_X2- X2 origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
5	Lmt_X2+ X2 upper limit, axis movement to the max coordinate limit sensor input
6	+24V DC24V Output

INPUT4

Pin	Definition
1	GND Power source grounding
2	Lmt_Z2- Z2 origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
3	Lmt_Z2+ Z2 upper limit, axis movement to the max coordinate limit sensor input
4	Protection_SW Protection signal input, connecting to cover protection and



	other signals
5	Foot_SW Foot switch signal input, active on the rising edge, with pulse width not less than 100ms
6	+24V DC24V Output

Part III The Operation Panel

3.1 The Panel Operation and Buttons Function Introduction

3.1.1 The Panel

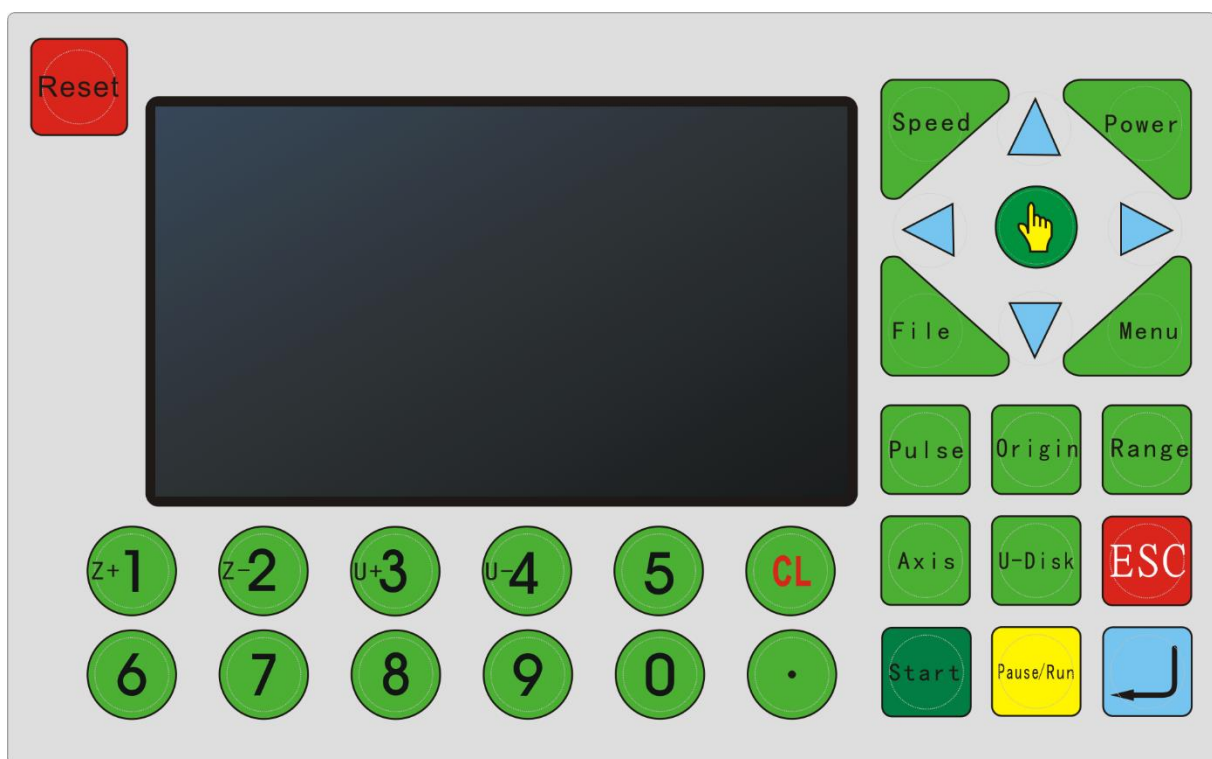


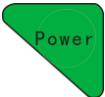


























Fig. 3-1

3.1.2 Buttons Function Introduction

1.  "Reset" key: no matter what state the machine, press this key, it'll go into reset state, and then return to the regression point.
2.  "Speed" Key: set the work speed and idle speed.



3.  "Power" Key: set the laser powers.
4.  "Menu" Key: press the key and go into the main menu interface.
5.  "File" Key: go into the memory file selection interface.
6.  "U-Disk" Key: go into the U disk file selection interface.
7.  "Range" A: the range previewed interface.
8.  "Pulse" Key: use to test. Press one time, light one time. It is used to test the optical path and light power intensity
9.  "Set Point" Key: can set the start point from which the machine runs.
10.  "Axis" key: go into the single axis movement interface.
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: press the key to pause at the working state, or press again, it'll go on running. In the pause state, move the X or Y axis, then press this button, it'll automatically return to the break point to continue working. On the Stop state, press the key, the laser head will automatically return the anchor point.
15.  —  Number Keys, change the data in the selected area. Also it can directly press the key to choose the item.
16.  Decimal Key. Or for Auto Focus function.

17.  Delete key.
18.   Z axis manual moving key, moving Z axis in main interface.
19.   U axis manual moving key, moving U axis in main 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 Interface Introduction

3.2.1 Power Interface

The power interface is as show:

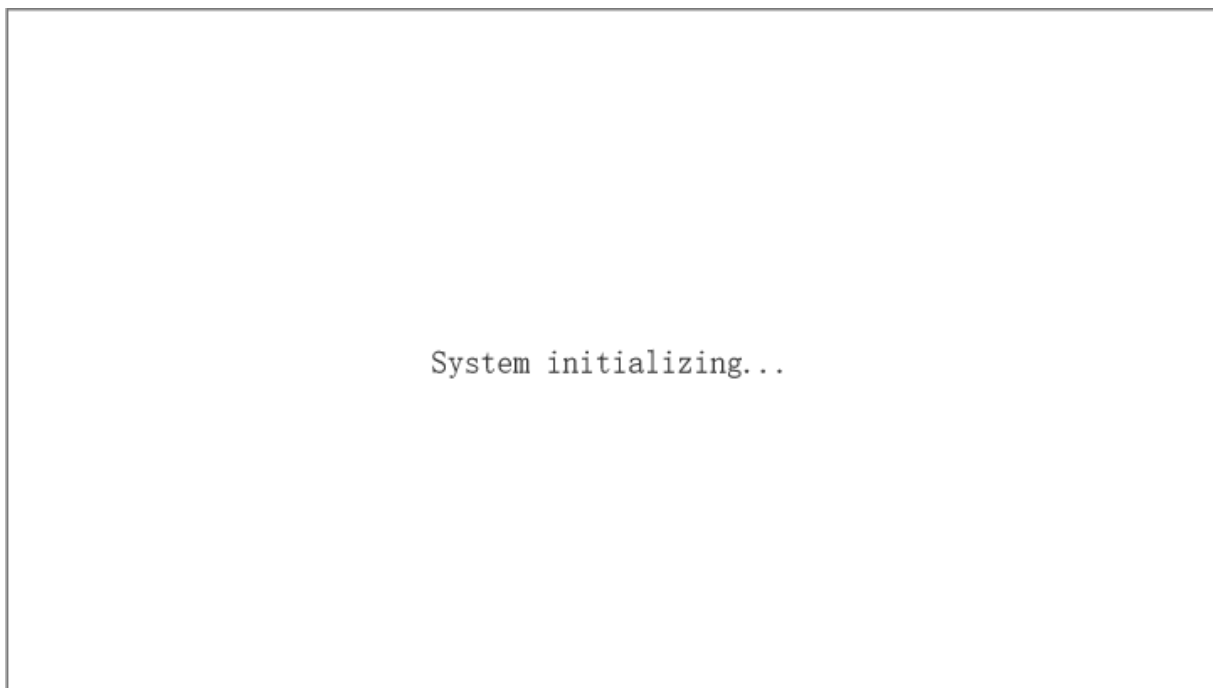


Fig. 3-2

3.2.2 Standby Interface

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

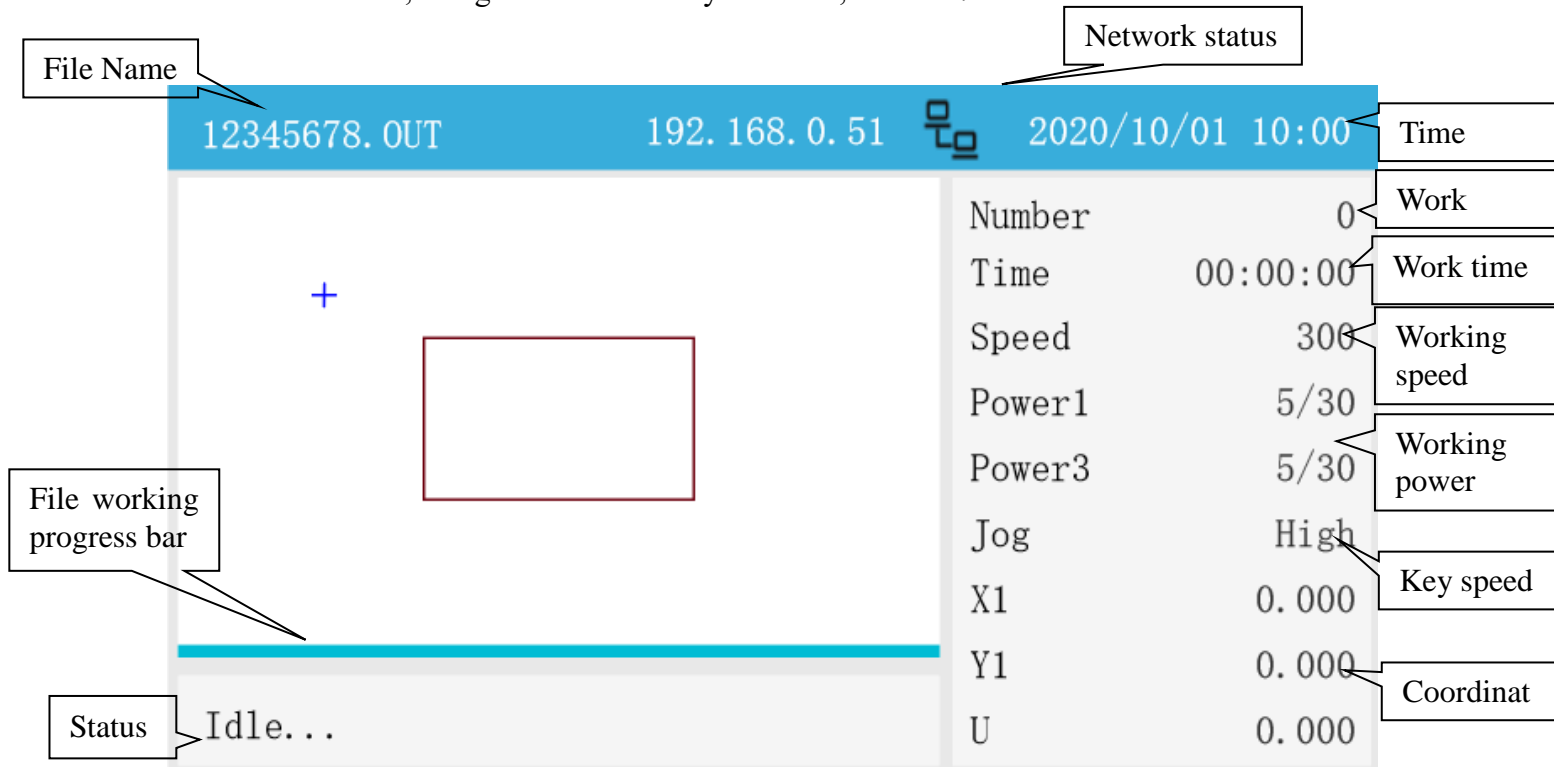


Fig. 3-3

The top of the interface shows the file name, network status, the date and time. When the network connection is successful, the IP address will be displayed. The white area shows the preview of the selected file, the water protection status. And at the bottom left of the interface, it shows the machine status and the last working time. When there is no work, the status displays "Standby...", while "Processing..." when it is at work, and "Pause" when being paused. And the right side of the main interface shows the complete times, default power, speed of the machine, the speed of key moving, and the position of axis x, axis y, axis z and axis u, etc. The parameters are described below:

Number: the complete times of the selected file.

Power 1: the power of Laser 1. The left value is min power value. The right value is the max power value.

Power 2: the power of Laser 2. The left value is min power value. The right value is the max power value.

Power 3: the power of Laser 3. The left value is min power value. The right value is the max power value.

Power 4: the power of Laser 4. The above value is min power value. The following value is the max power value.


Speed: the working speed.

Jog Speed: manually move axis speed, can press the "Select" key to change the speed, there are "High" or "Slow". The "High" is default Jog Speed set by user, and the "Slow" is half of the Jog Speed.


Notes:

- **X, Y, Z, U:** the coordinate in the current place in X axis, Y axis, Z axis and U axis. For double-head bidirectional model or a rotary cutting model, displays the coordinates of Z axis. When it is a normal model and the U axis is set for lifting, displays the coordinates of U axis.
- When there is no file Selected, it displays the default power and speed. When selecting the file, it shows the power and speed in the first layer of the file. When processing, it shows the power and speed of the current processed layer.
- When the machine is processing, if you want to modify the speed of the current layer, press the pause button, then press speed button, you can modify the speed of the current layer. In the same way, press power button to modify the min/max power. If machine is processing, press "Left/Right" button, can immediately reduce or increase the laser power. Press once, plus or minus 1%. Left for reduce, Right for increase. When changed the speed of power during working operation, after the completion of processing, it prompts whether to save the changes of the speed and power value.




- In the standby interface, press  to switch between Asynchronous Head 1 or Head 2. When X2Y2Z2 is displayed, it indicates the current control state of the asynchronous head 2, press Z+/Z- can control the movement of the Z2 axis.



- In the standby status, when the processing file is selected, press  to clear the number of completions of the current file.
- When the machine has autofocus function, it can be set through the lifting the U-axis control platform (cutting head), and the focal length is set in the laser parameters,



press  to perform autofocus.

- Press number key "6" to start the positioned cutting with the camera software.

- For the rotary cutting model press the key "5" to enter the interface of tool setting test, press key "7" to display the control interface of the rotary cutter, press key "9" to record the docking position (completion /stop position) on Z axis, press key "0" to

automatically set the tool and press  to manually set the tool.

3.2.3 Speed Settings

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

Cancel	Parameter			Save
	Layer Parameter		1	
	Work Speed (mm/s)		300	
	Idle Speed (mm/s)		300	
	Speed Factor		2	
	Speed Mode		Fast	

Fig. 3-4

1. **Layer Parameter:** when one file is selected, press button, to choose the layer number.
2. **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.
3. **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.
4. **Speed Factor:** it is applied to improve the smoothness of movement. The range is 0.00-5.00. 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 or above.

5. **Speed Mode:** In the normal mode, the machine jitter and shock are reduced, and the processing effect is good when turning smoothly, but the processing time is increased. In the fast mode, the machine turns quickly, and the jitter and shock increase, but the processing time is short and the efficiency is high.

3.2.4 Laser Power Settings

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

Cancel	Parameter			Save
	Layer Parameter	<	1	>
	Power Min1 (%)	<	5	>
	Power Max1 (%)	<	30	>
	Power Min2 (%)	<	5	>
	Power Max2 (%)	<	30	>
	Power Min3 (%)	<	5	>

Fig. 3-5

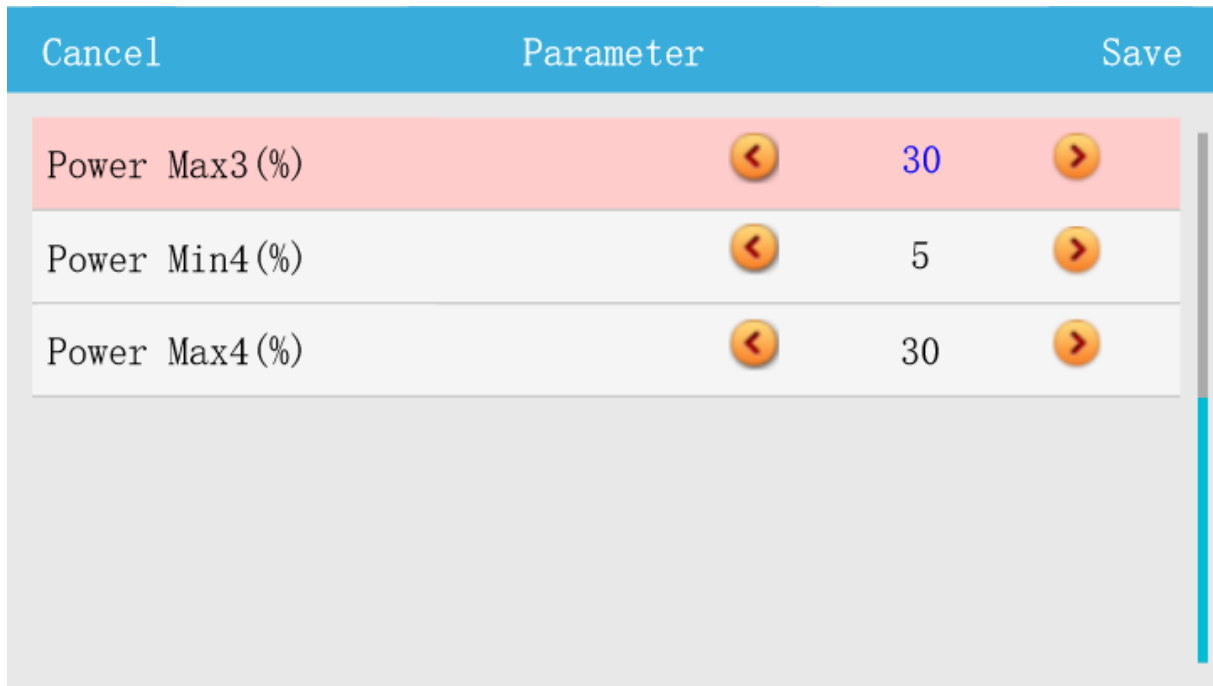


Fig. 3-6

1. **Layer Parameter:** when one file is selected, press "Select" button, to choose the layer number.
2. **Power Min:** when stroking curves, this power intensity applied for line start and the corner of the curve. Or it applied for the top depth when gradient carving. The range is 0.00~100.00%.
3. **Power Max:** when stroking curves, this power intensity is applied as the work speed was reached. Or it applied for the bottom depth when gradient carving. The range is 0.00~100.00%.

Power Min1 the min light power of LASER-1. Power Max1 is the max light power of LASER-1. It is the same as Power Min2 and Power Max2 of LASER-2, Power Min3 and Power Max3 of LASER-3, Power Min4 and Power Max4 of LASER-4. When there is no file selected, it displays the default power. The pulse power is the max light power currently displayed on the standby interface.

3.2.5 Single Axis Movement Interface

After initialization, press "Axis" key, show as:



Fig. 3-9

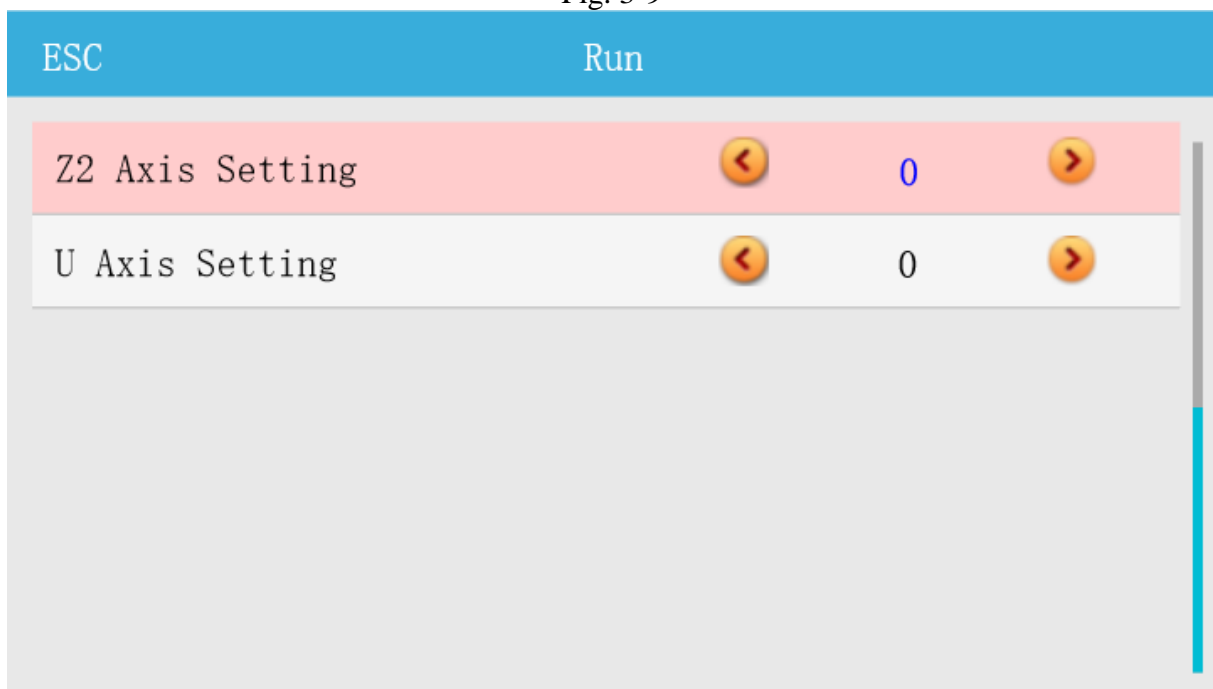


Fig. 3-10

Press the "Up/Down" key to choose the needed operation:

1. **Laser On:** select "Yes" or "No". When selecting "Yes", the light is on along the single axis movement, otherwise, the light is off.
2. **X1 Axis Setting:** press "Right/Left" key to move X1 axis, when it stops, it'll show the current coordinate. The other axis operation is similar. Input the coordinate value, and press enter key can move to setting position. It is able to input the X/Y coordinates together.

When Laser On parameter is set as Yes, it uses the system default power to cut. No file is selected and press Power button to modify the system default power.

3.2.6 Memory File

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

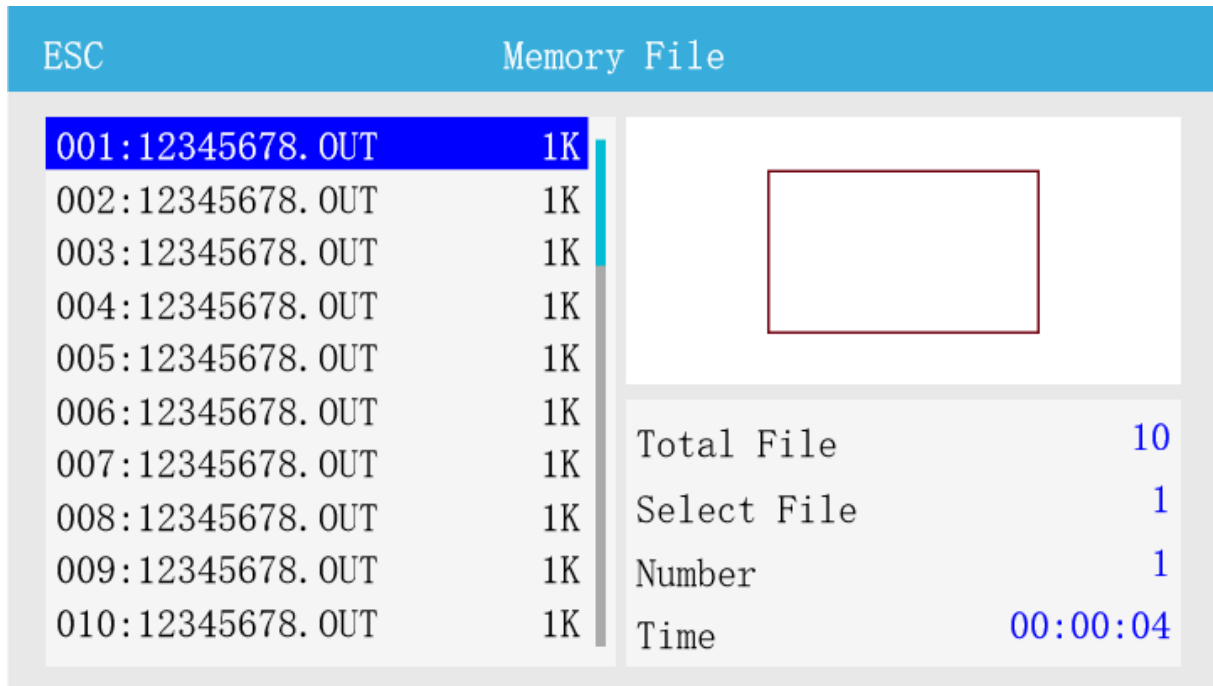


Fig. 3-11

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 "Select" key to find the current file, press "ESC" to quit. Press "Enter" to operate, show as:

1. **Read 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.

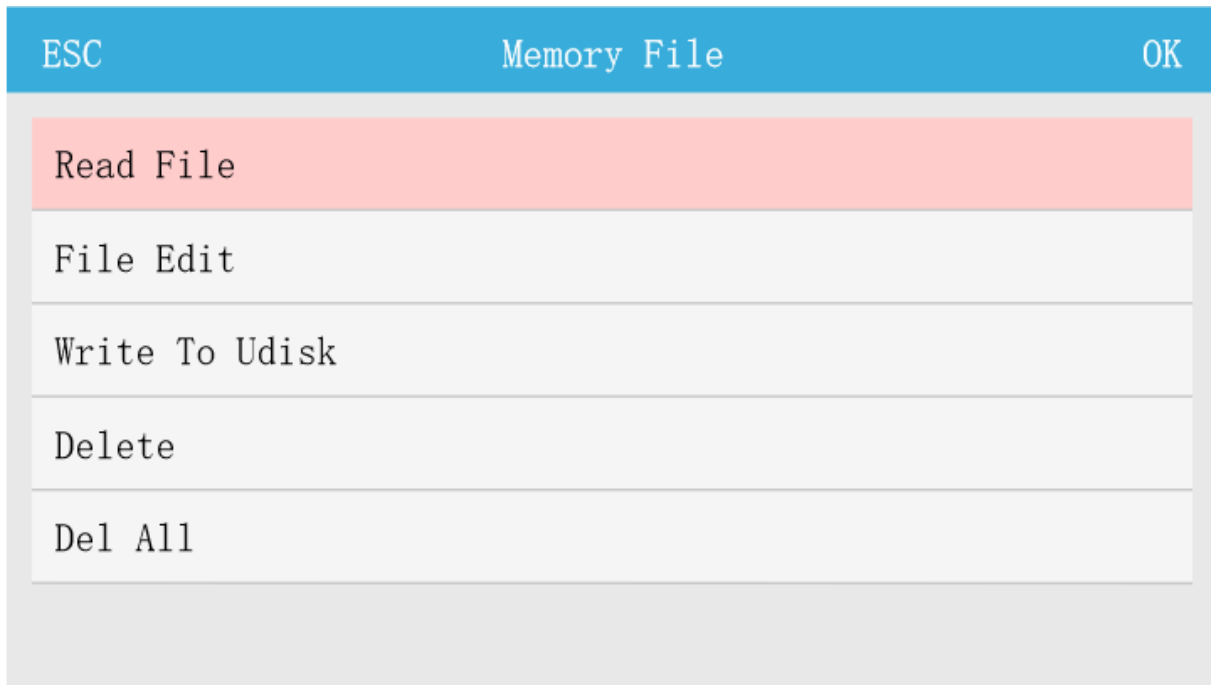


Fig. 3-12

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.

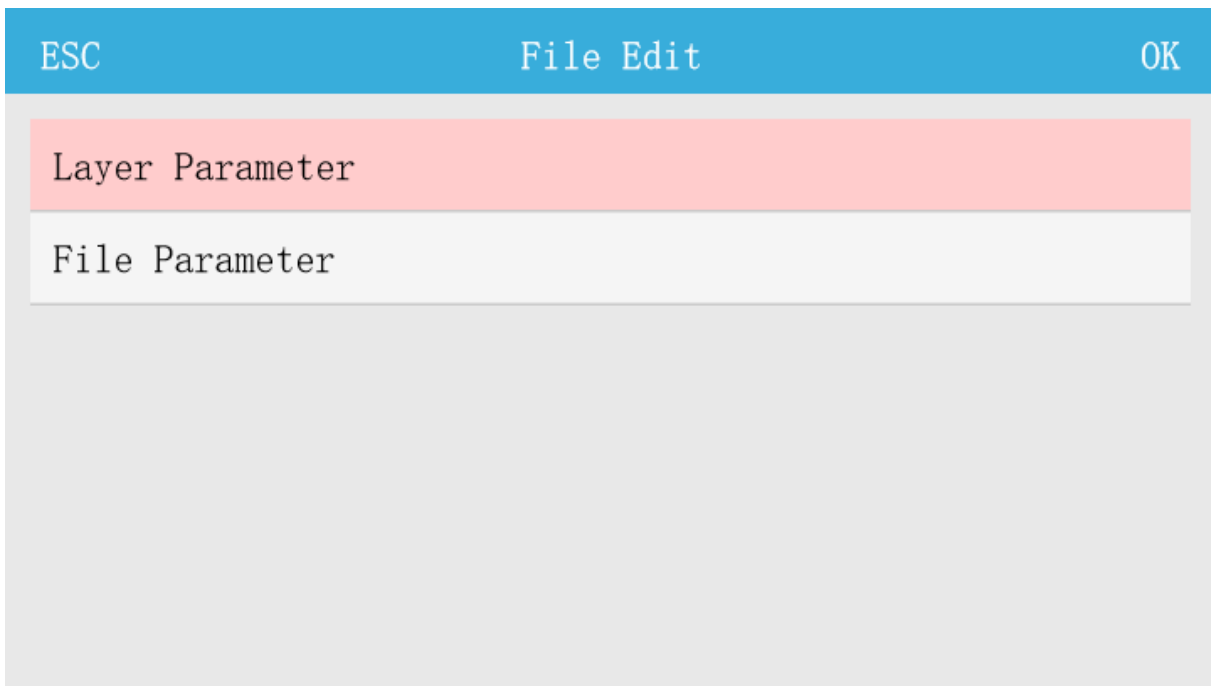


Fig. 3-13

In Layer Parameter interface, set the parameters of each layer such as Blowing, Light Power, Speed, Laser On/Off Delay, etc. In particular before the processing, first smooth the equipment to reduce jitter, set the Open Delay to 0.05, and Drill Power to 0. Laser Open/Close Delay: the unit is second.

Cancel	Layer Parameter		OK
	Layer Parameter	1	
	If Open Air	Yes	
	Power Min1 (%)	5	
	Power Max1 (%)	30	
	Power Min2 (%)	5	
	Power Max2 (%)	30	

Fig. 3-14

Cancel	Layer Parameter		OK
	Power Min3 (%)	5	
	Power Max3 (%)	30	
	Power Min4 (%)	5	
	Power Max4 (%)	30	
	Work Speed (mm/s)	300	
	Idle Speed (mm/s)	300	

Fig. 3-15

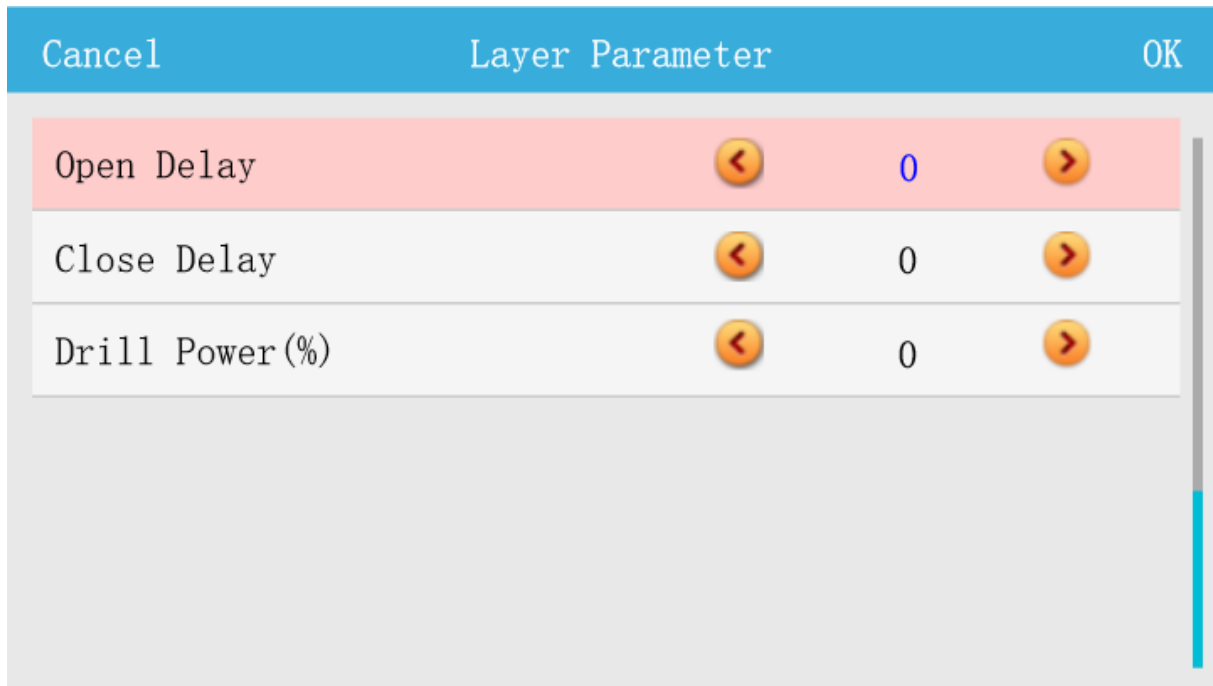


Fig. 3-16

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

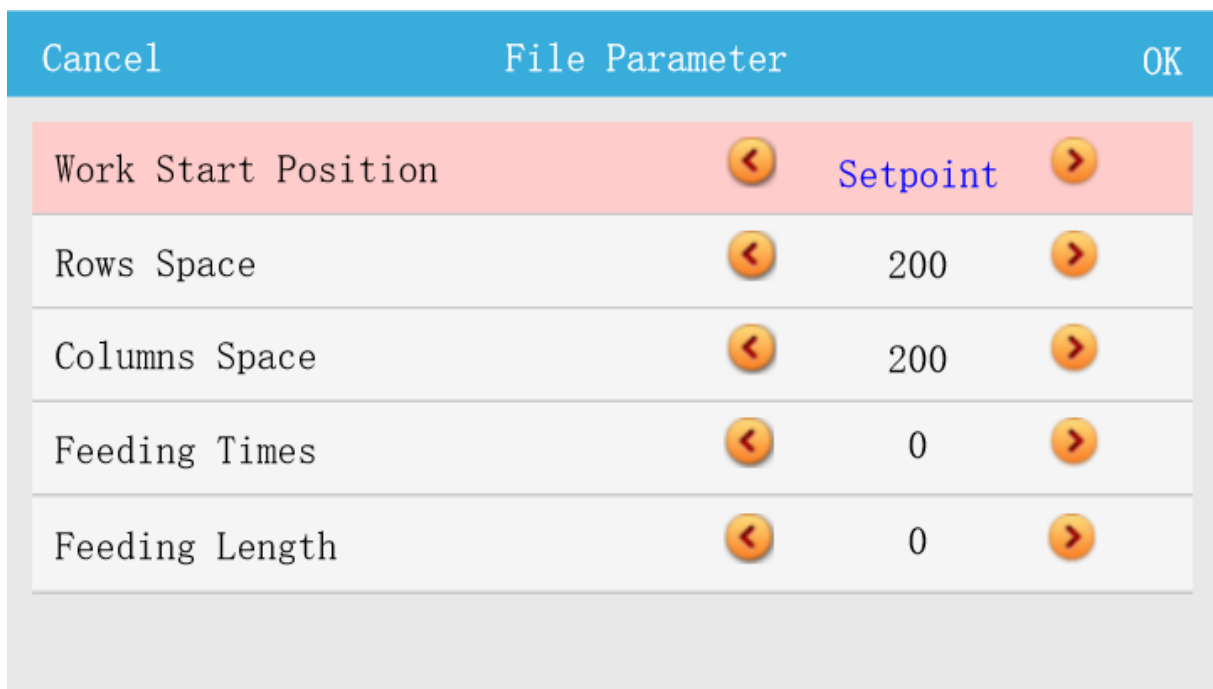


Fig. 3-17

3.2.7 U Disk File

Press "Menu" key into the main menu, and select the U Disk File. Also can directly press "U Disk" to enter, show as:

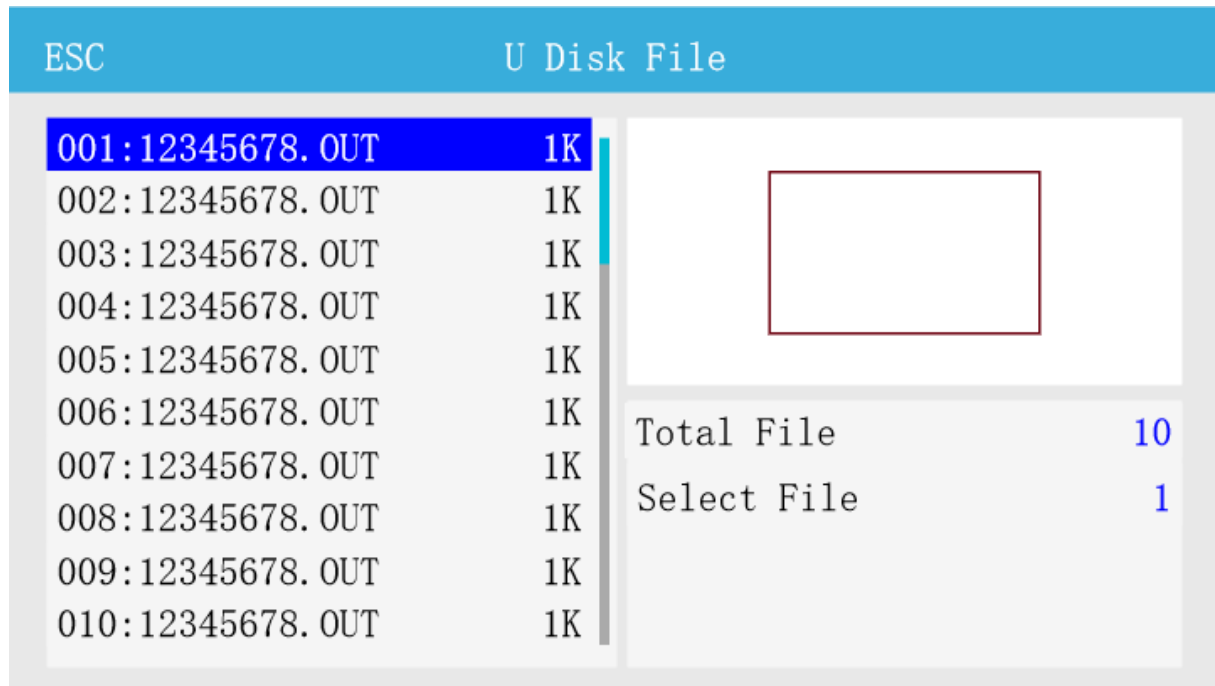


Fig. 3-18

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:

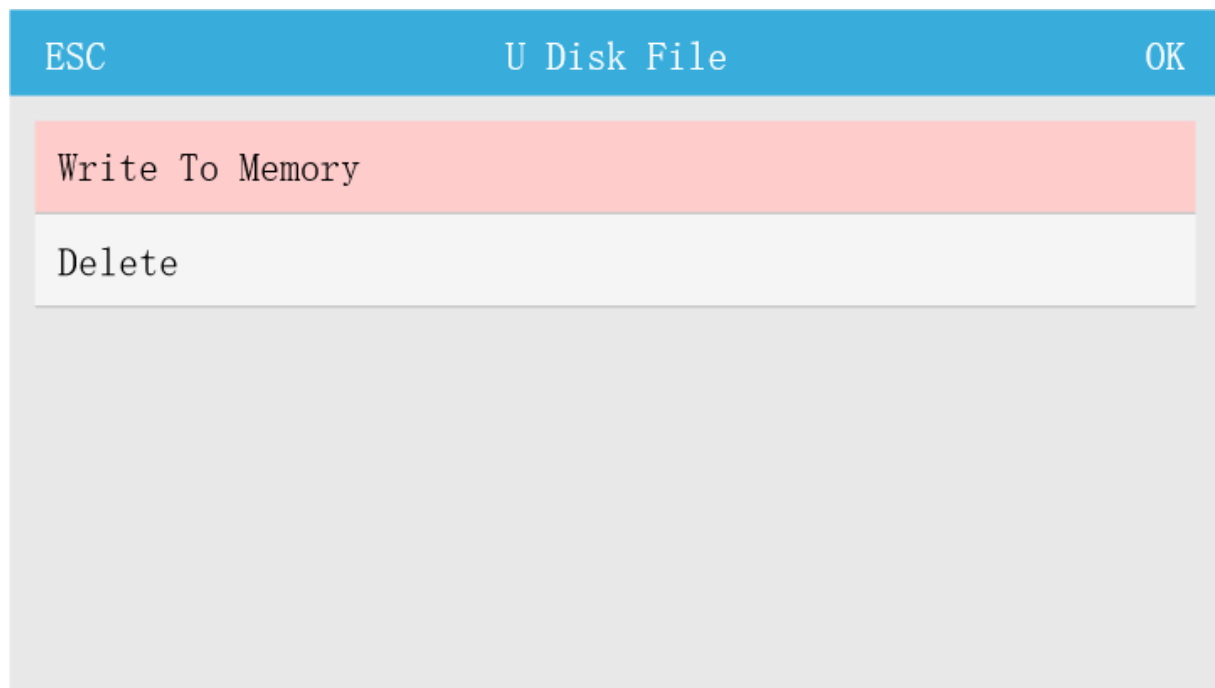


Fig. 3-19

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.

3.2.8 The Main Menu Setting

Press "Menu" into the main menu, show as:

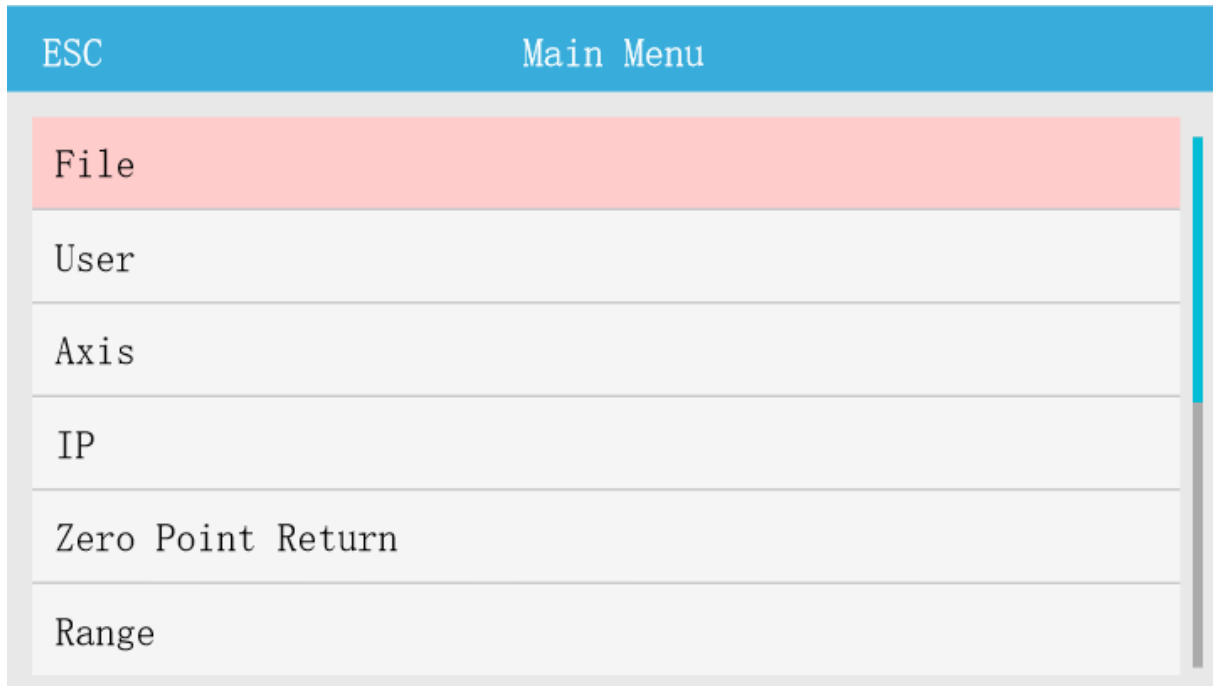


Fig. 3-20

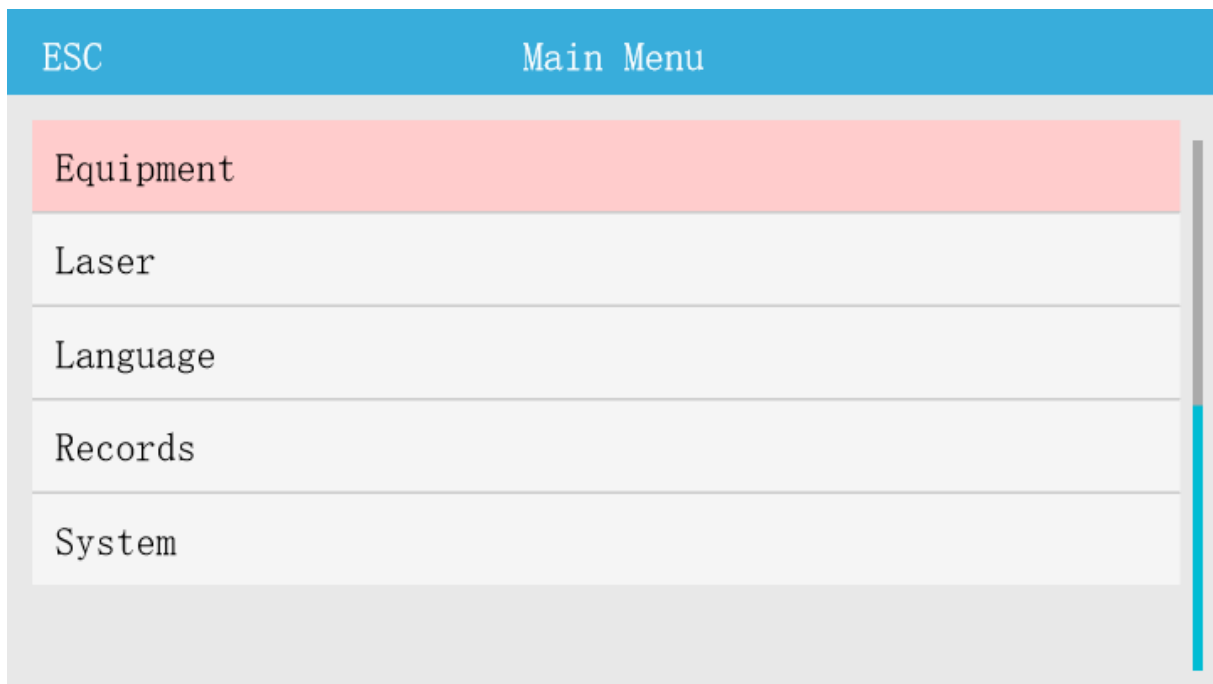


Fig. 3-21

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

3.2.9 File Settings

In the Main Menu interface, choose "File" to go to the "Memory File", "U Disk File", "File Settings" interfaces:



Fig. 3-22

The file setting is as shown:

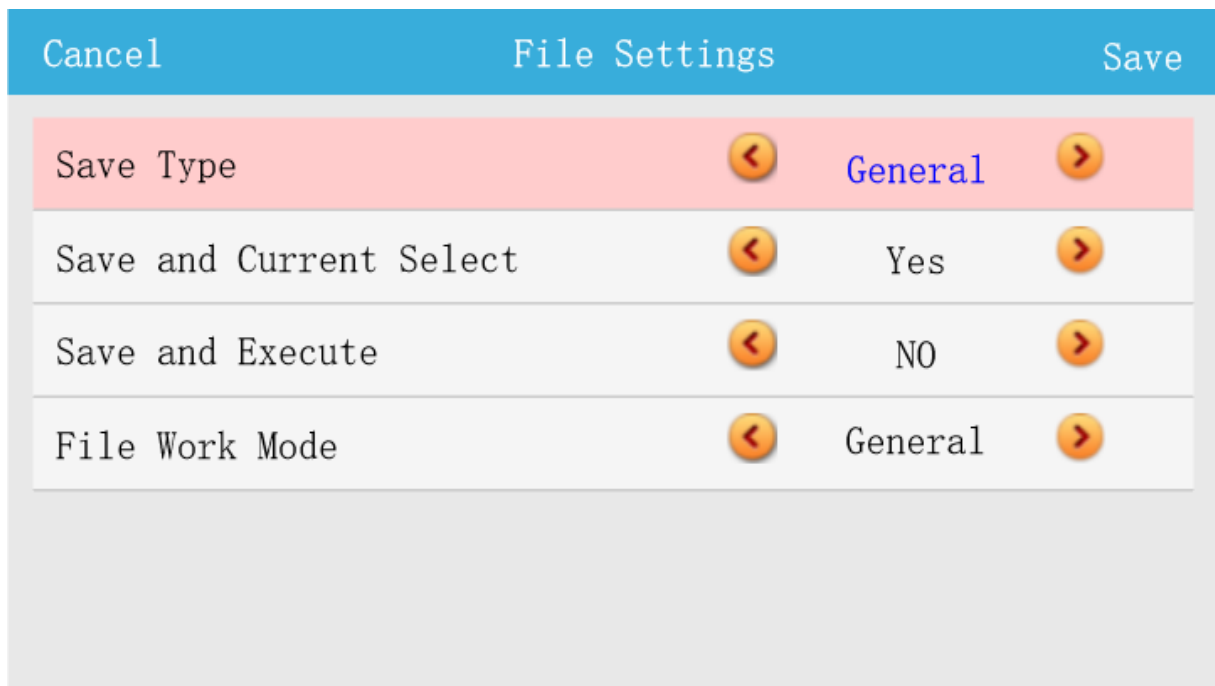


Fig. 3-23

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 orderly in the system.
3. **Save and Execute:** once a file is finish downloading it will be executed.
4. **File Work Mode:** General or Cycle. Cycle means all the files will be executed one by one in cycle. Otherwise, select "General".

3.2.10 User Settings

In the Menu interface, select the "User", press "Enter" key to go into User Set Interface as show below.

Cancel	Uesr		Save
Protection	<	Close	>
Protection Input Polarity	<	Negative	>
Return Point	<	Setpoint	>
Jog Continue Mode	<	Open	>
Jog Step Distance (mm)	<	1.5	>
Jog Speed (mm/s)	<	250	>

Fig. 3-24

Cancel	Uesr		Save
Zero Point Return Speed(mm/s)	<	80	>
Pulse Time(ms)	<	200	>
Feeding Delay(ms)	<	500	>
Min Acc(mm/s ²)	<	400	>
Default Idle Speed(mm/s)	<	330	>
Idle Acc(mm/s ²)	<	1200	>

Fig. 3-25

Cancel	Uesr		Save
Idle Jerk(mm/s ³)	<	60000	>
Idle Delay(ms)	<	0	>
Laser Protection	<	Close	>
Pulse Blowing	<	Close	>
Homing Protection	<	Close	>
Speed Limit Mode	<	Work Speed	>

Fig. 3-26

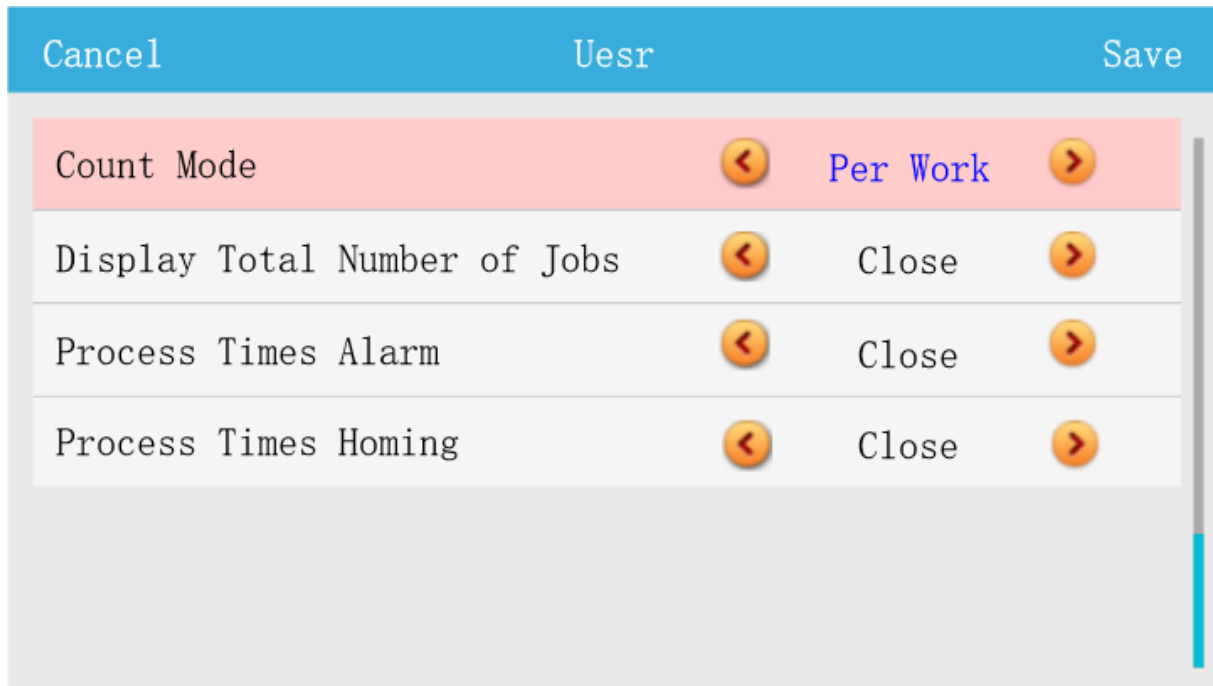


Fig. 3-27

Press "Up/Down" key to select the items, press "Select" key to change the Combo Box, press the "Number" key to edit the value. Press "Enter" to save the setting, press "ESC" to back.

1. **Protection:** when it is ON, system will detect the cover protect switch signal. While the signal is valid it would stop the working.
2. **Protection Input Polarity:** change the parameter while the protection switch working in wrong way. ("Negative" is "active at low level", "Positive" is active at high level).
3. **Return Point:** the position which the system back to while work is finishing. Origin, None, Set Point, Seperation. Select "None" to stop at the work completion position. When selecting "Separation" the asynchronous double head is separated after the system is powered on, LASER-1 to the Origin, and the LASER-2 is at the maximum position.
4. **Jog Continue Mode:** when it is Open, Press the "UP/Down/Left/Right" arrow key or "Z+/Z-/U+/U-" to move the axis, Release these key to stop moving. When it is Close, and if Jog Step Distance is set, press the key to move the axis with the distance set.
5. **Jog Step Distance:** when the "Jog Continue Mode" is Close, the "UP/Down/Left/Right" arrow key to move the axis with the distance set. Note: the unit is mm.
6. **Jog Speed:** the single axis move speed.
7. **Zero Point Return Speed:** the homing speed, the unit is mm.
8. **Pulse Time:** the time of laser is on when "Pulse" is press, the unit is ms.
9. **Feeding Delay:** the delay time after feeding, the unit is ms.

10. **Min Acc:** the min acceleration for start moving or stop moving. The less this value, the smoother the movement, the longer the working time, vice versa. Normally, it is set to 400mm/s², if a shorter work time is demanded, set the value no less than 850 mm/s² (Set this value according to the actual situations of the machine). The unit is mm/s².
11. **Default Idle Speed:** if processing the file at the default speed, it is the idle speed of X, Y axis when the Light OFF. The unit is mm/s².
12. **Idle Acc.:** the acceleration speed of X, Y Axis when when the Light OFF. The unit is mm/s². The bigger the value is, the faster the acceleration, and the stronger jitter of motion. Otherwise, the smoother the working is.
13. **Idle Jerk:** the acceleration speed of X, Y Axis when the Light OFF. The unit is mm/s³. The bigger the jerk, the stronger the jitter of motion. Otherwise, the smoother the acceleration and deceleration is.
14. **Idle Delay:** time interval of XY idle movement when no light is emitted, The unit is ms.
15. **Laser Protection:** enable or disable detecting the status of laser water cooling valve. "Open" means detect, "Close" means NOT detect.
16. **Pulse Blowing:** whether there is blowing when pulsing.
17. **Homing Protection:** when it is open and the Protection parameter is set to open, during the return to the machine origin, if the protection input is valid, the regression stops. If the signal is invalid, and the regression continues.
18. **Speed Limit Mode:** machining speed, limit the working speed of the small graphics; End speed, limit the end speed of the small graphics, if you need to limit the speed when cutting a large arc, set it as the end speed
19. **Count Mode:** Per work count, Per light count and Per array count. Per work count, when processing a file or feed repeat, count once. Per light count means that each light figure is counted once. Per array count is, when a virtual array or a group array is used, an array element is processed and counted once. Note: The reset and alarm of machining times are only effective when counting the whole plate (Per work count mode).
20. **Display Total Number of Jobs:** Once opened, in the number of completions in the main interface, "|" The left side shows the current number of file processing, and the right side shows the total number of processing. In this case, press CL key, the current number of file processing times and the total number of times will be deleted.
21. **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.

22. **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.

3.2.11 Axis Settings

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

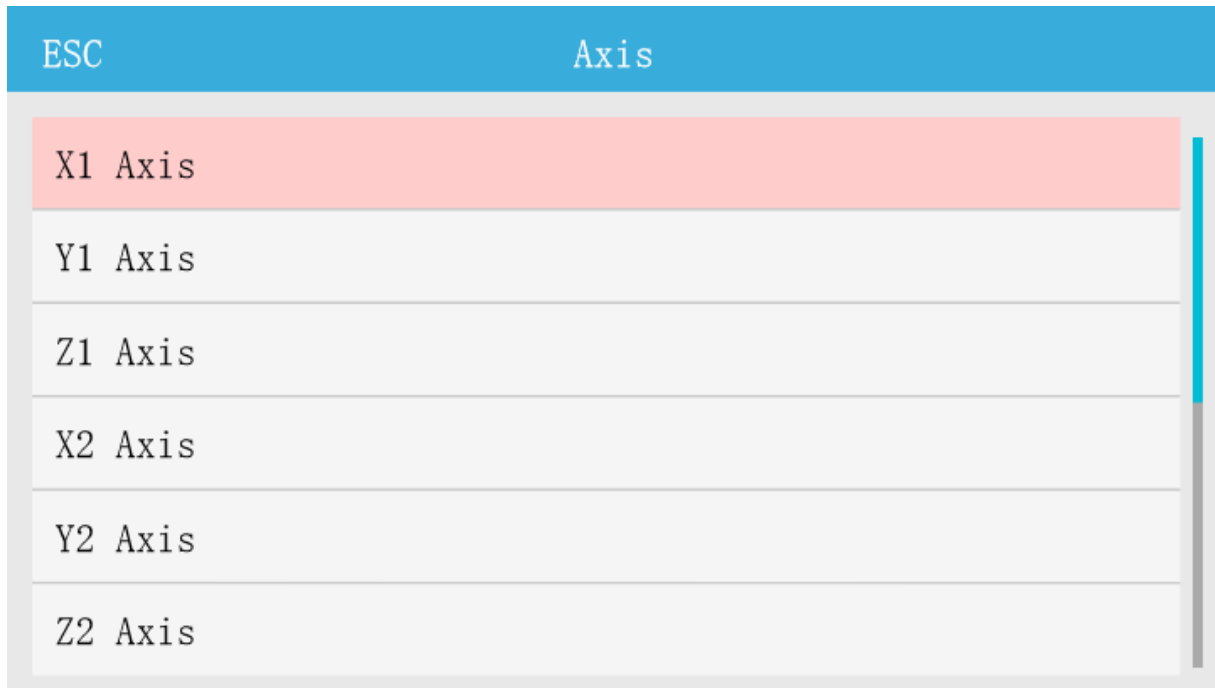


Fig. 3-39

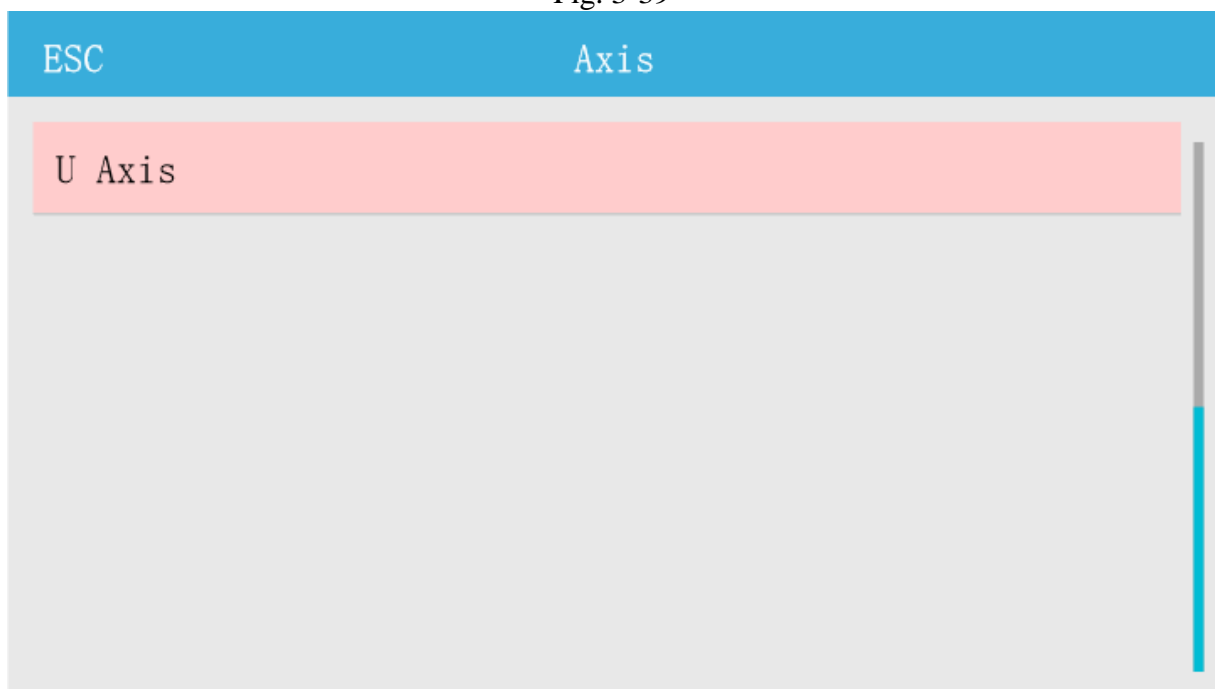


Fig. 3-40

Press the "Up/Down/Left/Right" key to select the needed operation. Press "Enter" to enter the

operation interface, and click "ESC" to quit.

Cancel	X1 Axis Setting			Save
	Resolution(um)	<	3.145	>
	Max Speed(mm/s)	<	500	>
	Corner Speed(mm/s)	<	20	>
	Acceleration(mm/s ²)	<	12000	>
	Jerk(mm/s ³)	<	480000	>
	Max Range(mm)	<	1200	>

Fig. 3-40

Cancel	X1 Axis Setting			Save
	Backlash(mm)	<	0	>
	Origin Offset(mm)	<	0	>
	Direction Polarity	<	Negative	>
	Limit Polarity	<	Negative	>
	Jog Polarity	<	Negative	>
	Limit Protection	<	Close	>

Fig. 3-41

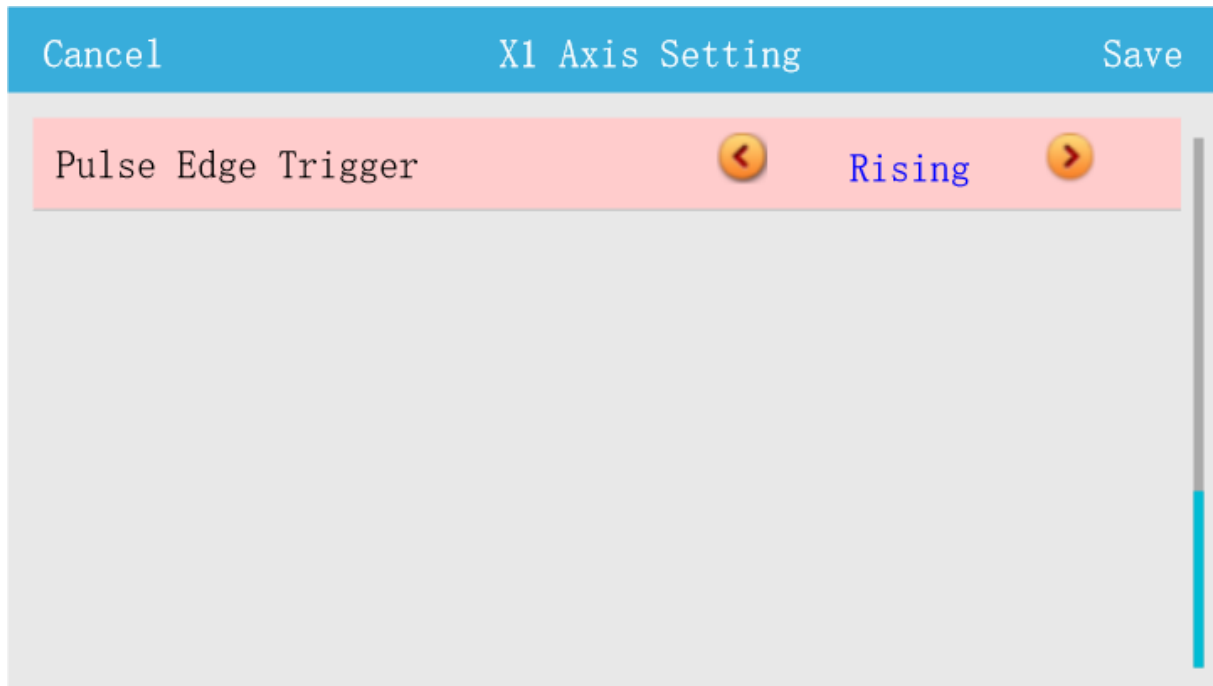


Fig. 3-42

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

About measurement:

Draw a 30*30 rectangle to calculate the resolution. When measuring, the width of the laser beam needs to be considered. The processed rectangle is as shown in figure below. Take the measured value of the X axis 34mm, and input 34 into the Actual Value edit box and 30 into the Set Value edit box. Click ok the program will calculate out the right resolution. Other Axis is similar.

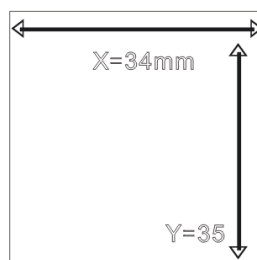


Fig. 3-43

When calculate the resolution of Y, the Real Size is the length of trace the beam moved.

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 change 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(mm):** set the offset value. when the X axis returns to the origin, it will stop at the origin after moving a certain distance, so as to avoid accidentally hitting the limit switch during work or movement.
9. **Direction Polarity:** when the motor cannot return to the original position, change the polarity to make it normal.
10. **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.
11. **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.
12. **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.
13. **Pulse Edge Trigger (Reverse the polarity of the pulse):** Rising or falling edge. Depending on the drive settings, it is usually set the Rising edge. If the axis repeatedly moves, and there is always dislocation in one direction, and reverse the polarity of the pulse.

3.2.12 IP Settings

In the Menu interface, select the "IP", press "Enter" key to set the network IP address, but it requires to be on the same network segment as the computer. As shown below:

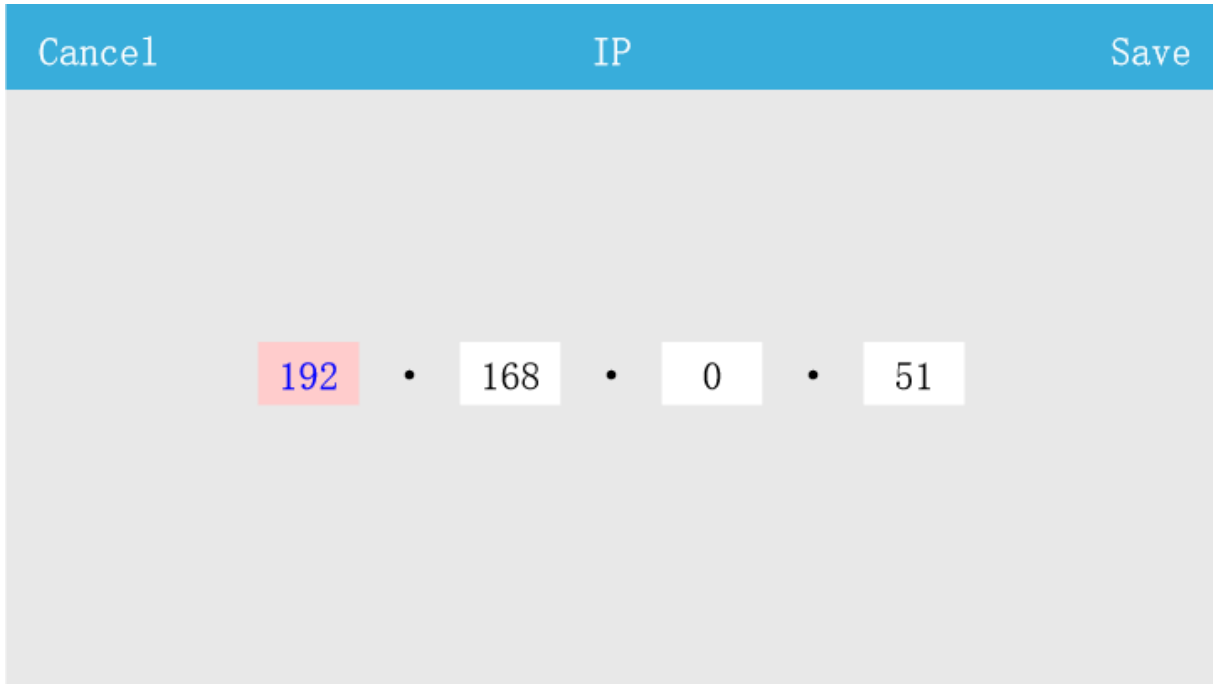
The image shows a user interface for setting an IP address. At the top, there is a blue header bar with three buttons: "Cancel" on the left, "IP" in the center, and "Save" on the right. Below the header, the main area has a light gray background. In the center of this area, the IP address "192.168.0.51" is displayed. Each number is contained within its own white rectangular box, and the boxes are separated by black dots. The first box containing "192" has a light red background, while the other boxes are white.

Fig. 3-28

3.2.13 Zero Point Return Settings

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

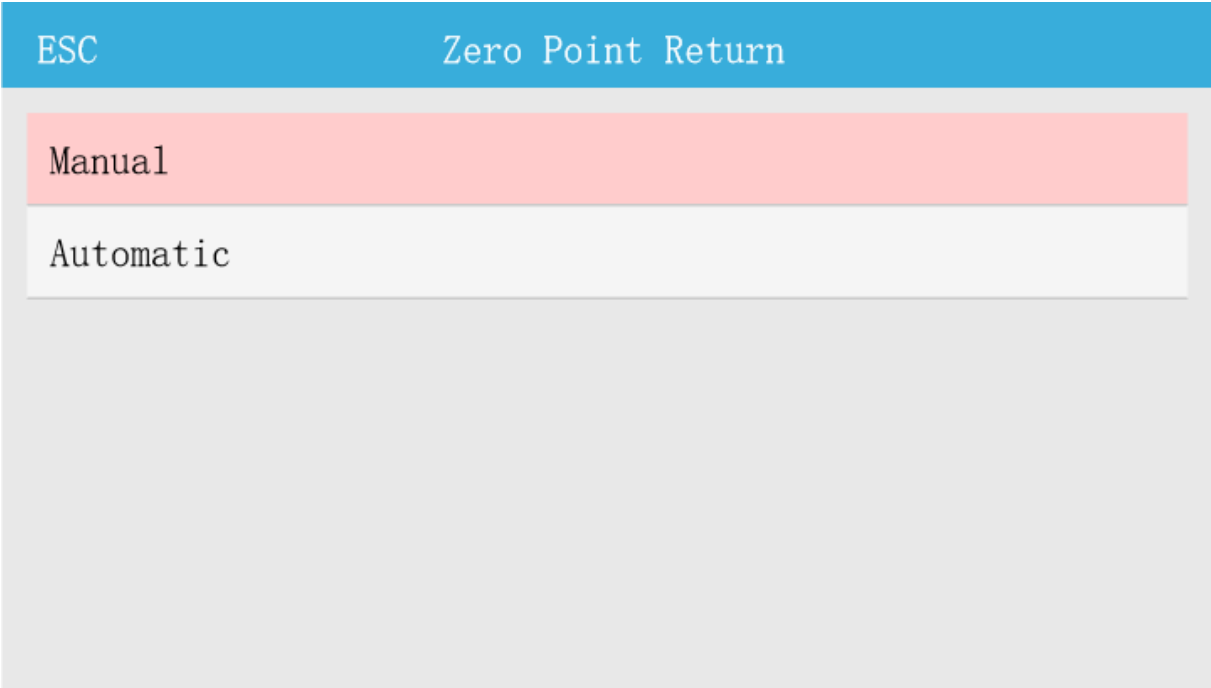


Fig. 3-29

1. **Automatic:** set which axis goes back to origin after power up.
2. **Manual:** manually set single axis back to origin.

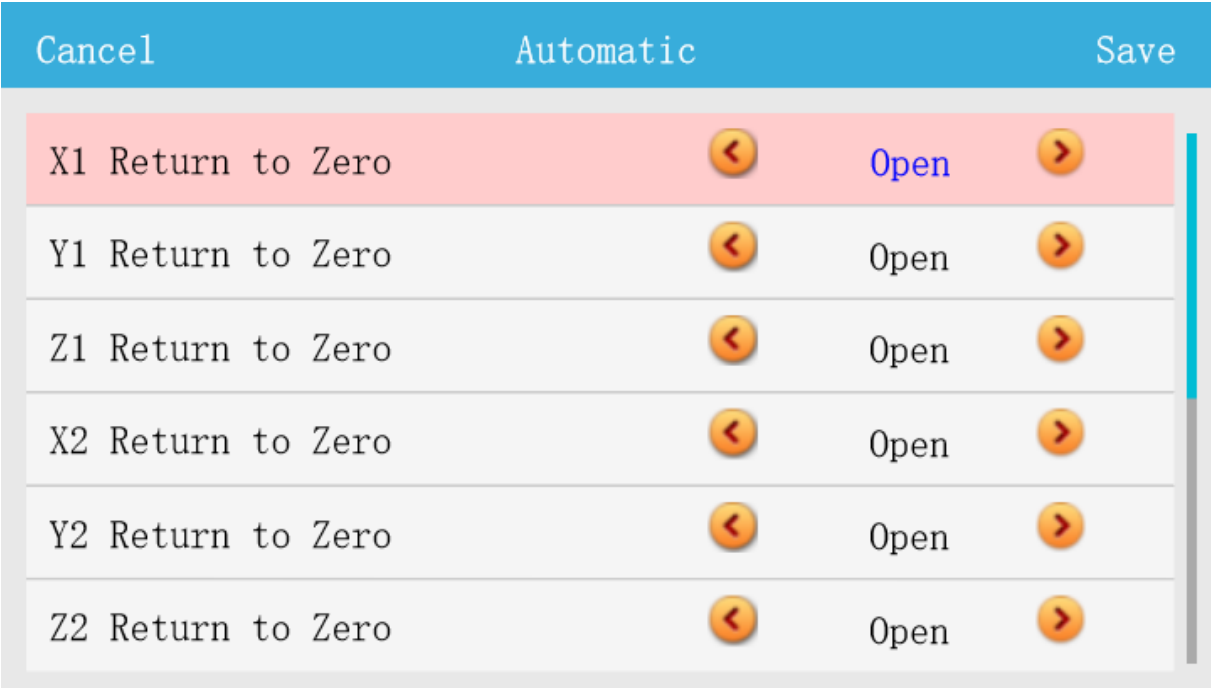


Fig. 3-30

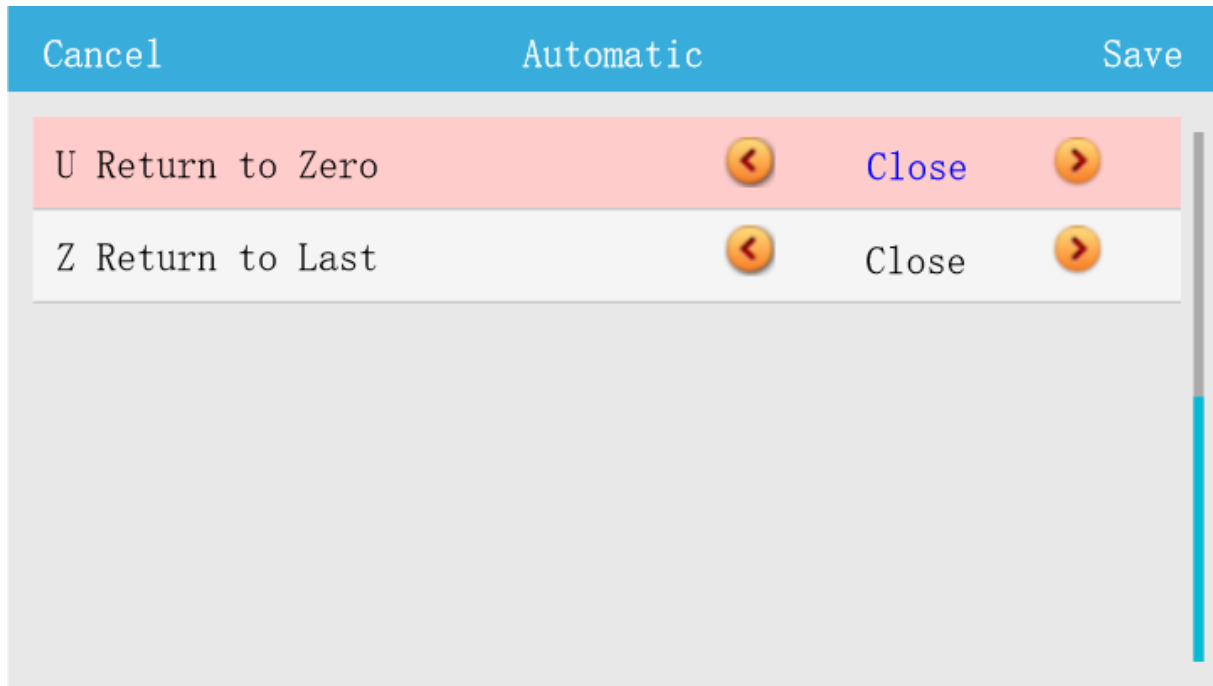


Fig. 3-31

When the parameters are set to Open, the axis automatically moves back to origin after machine powers up, and the coordinates will get back to zero. When close, the axis moves none, and the stop position will be the origin of axis. **Z Return at Last:** When the parameters are set to "Open", the Z axis starts resetting after the X, Y axis, which is generally used for the synchronous double model. Press "Enter" to save the setting, and click "ESC" to quit.

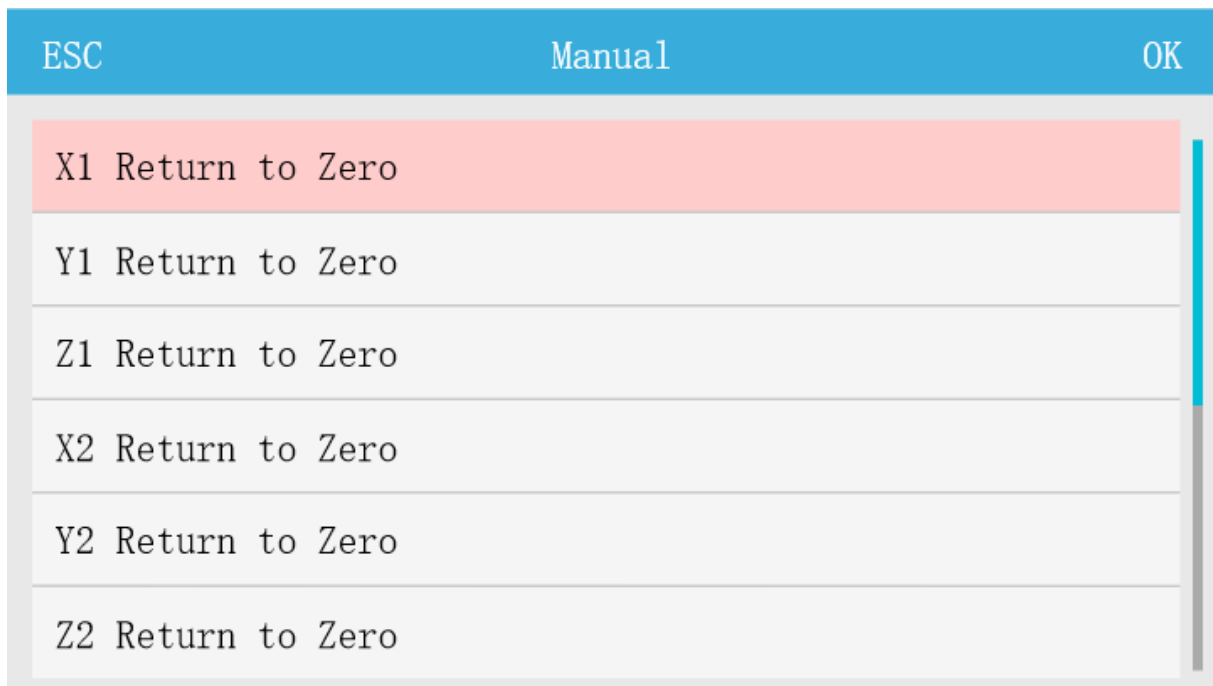


Fig. 3-32



Fig. 3-33

Press "Up/Down" key to select the needed operation, click on the "Enter" to set one axis back to origin, and "ESC" to quit.

3.2.14 Range

After initialization, press "Range" key, show as:


ESC	Range			OK
Laser On		NO		
Run Speed (mm/s)		200		
Power Min1 (%)		5		
Power Max1 (%)		30		
Power Min2 (%)		5		
Power Max2 (%)		30		

Fig. 3-7









ESC	Range		OK
Power Min3 (%)		5	
Power Max3 (%)		30	
Power Min4 (%)		5	
Power Max4 (%)		30	

Fig. 3-8

1. **Laser On:** two range preview modes, one is for cutting range; the other for the running scale. Change the two preview modes by pressing the "Select" key, select "Yes" to cutting range, and select "No" to running scale to view the working range. Press Enter to perform the operation after selection.
2. **Run Speed (mm/s):** the speed of running scale, unit is mm/s.
3. **Power:** when cutting the scale, it uses the system default power which is shown here. The min power intensity applied for line start and the corner of the curve. The max power intensity is applied as the run speed was reached.

3.2.15 Equipment Settings

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

Cancel	Equipment Parameter		Save
Table Mode	<	General	>
Laser Config	<	Single	>
Equipment Type	<	Common	>
U Axis Option	<	Lifting	>
Feeding First	<	NO	>
Asynchronous Mode	<	Double Bridges	>

Fig. 3-34

Cancel	Equipment Parameter		Save
Asynchronous Direction	<	Axis Y	>
Asynchronous Head Distance X(mm)	<	0	>
Asynchronous Head Distance Y(mm)	<	100	>
Buzzer Setting	<	0	>
Power Off Delay(ms)	<	700	>
Lubricating Stroke(m)	<	0	>

Fig. 3-35

Cancel	Equipment Parameter		Save
	Lubrication Time (s)	0	
	Lubricating Stroke 2 (m)	0	
	Lubrication Time 2 (s)	0	

Fig. 3-36

1. **Table mode:** General or Double. After choosing double table model, and set the Table Size parameter—the distance of double table model, the distance subjects to the two upper left corner of table model. The machine on double table has two tables: to go back and forth by U axis, keep a table on the working position; and another one turn in there on the both sides of machine, so as to carry out the work without delay and further increase the work efficiency (The function is only available in those models with such part). After choosing double table model, and every time after the work is completed, the U axis will move for the set double platform distance once.
2. **Laser config:** Single, Double 1, Double 2 and Fix Double. Single means it just has one laser head. Double 1 and Double 2 are subject to bidirectional modes only. Double 1 means the bidirectional mode with one belt and two motors. Double 2 means the bidirectional mode with two belts and two motors. Fixed Double has one belt, the two heads are fixed and unable to move. After choosing Double 1 or Double 2, you need to set the Double Heads Distance parameter—which is the origin points between the two laser heads. The "**Double Heads Distance (mm)**" is to set the interval parameter between LASER-1 and LASER-3, and "**Double Heads Distance 2 (mm)**" is to set the interval parameter between LASER-2 and LASER-4. The X axis and Z axis are used in the Synchronous (Bidirectional) Double-head Model to control the two laser heads' movement. The X axis control the laser head near the origin of the machine, Z axis

control the laser head away from the origin of the machine. X axis maximum range is the maximum width that a Double-Head mode can work on. Z axis range is set to X axis range minus the distance between two laser head.

3. **Equipment Type:** Common, Round (machine with wheel) and Rotary Cutting.
4. **U Axis Option:** Feed, for the feeding motor; Lift, for platform lifting or auto focus.
5. **Feeding First:** Indicates whether feeding action is needed before the laser machine starts cutting.
6. **Asynchronous Mode:** Bridge 1/Double Bridges.
7. **Asynchronous Direction:** Y axis direction / X axis direction.
8. **Asynchronous Head Distance X (mm):** in the X axis direction, the interval between asynchronous double heads. Press the "Select" button to enter a negative sign.
9. **Asynchronous Head Distance Y (mm):** in the Y axis direction, the interval between asynchronous double heads. Press the "Select" button to enter a negative sign.
10. **Buzzer Setting:** press "Number" keys to set the times.
11. **Power Off Delay:** when the laser head is used for cutting after power off, the backstopping is insufficient, which results in the graphics interface is not closed. This parameter can be used to make appropriate compensation adjustment. The units are ms
12. **Lubricating Stroke:** The distance traveled during lubrication. The units are m.
13. **Lubrication Time:** The continuous time of oil pump during lubrication. The units are s.

About Equipment Type:

- 1) When choose the **Round (machine with wheel)**, two parameters need to set: **Reference Diameter and Reference Resolution**. After the reference diameter and reference resolution set correctly, each time replace material, it just needs to set the "Diameter" parameter in main menu interface. The current diameter of the wheel and the exact resolution corresponding to the current wheel can be entered as the Reference Diameter and Reference Resolution.

Reference Resolution instructions:

- a. Menu/Equipment: set the Equipment to Round. The "Reference Diameter" and "Reference Resolution" are used as a pair of Reference Parameters.

Cancel	Equipment Parameter		Save
	Lubrication Time(s)	0	
	Lubricating Stroke 2(m)	0	
	Lubrication Time 2(s)	0	
	Reference Diameter(mm)	100	
	Reference Resolution	10	

Fig. 3-37

b. Reference Parameters

- ✓ Because cylindrical materials with different diameter, the range and the resolution of Y axis are different, the control card provides a Reference Diameter and Reference Resolution for convenience to calculate.
- ✓ After the reference diameter and reference resolution are set correctly, each time replace material, it just needs to set the Diameter parameter in main menu interface. Then the resolution and the max range of Y axis will be recalculated according to the Reference Diameter and Reference Resolution. It means you just need to set the new material diameter.

c. The Modification of Reference Parameters

- ✓ Set the Equipment to Round. You will see the Reference Diameter and Reference Resolution have a default value. Measure the diameter of a material for processing. Input this diameter into the "Reference Diameter" parameter. The Reference Diameter can remain as default value or input the estimate value to it.
- ✓ Set the laser max power low, to draw out one 50mm length line on the surface of material. Measure the real length of the line, 55mm etc. Go into the Menu/Axis set/Y Axis interface, set the resolution of Y Axis to reference resolution value. Press "Select" key and a window to calculate the resolution. Set the "Set Value" to 50, "Actual Value" to 55 in the resolution window. Press "Enter" key to



calculate the right resolution. Then set the actually calculated resolution reference as Reference Resolution.

- ✓ Next time you replace the new material with different diameter, just set the “Diameter” parameter in Menu/Diameter interface. At this time, the Y axis resolution automatically calculates the resolution and maximum range of the current object based on the reference diameter and reference resolution.

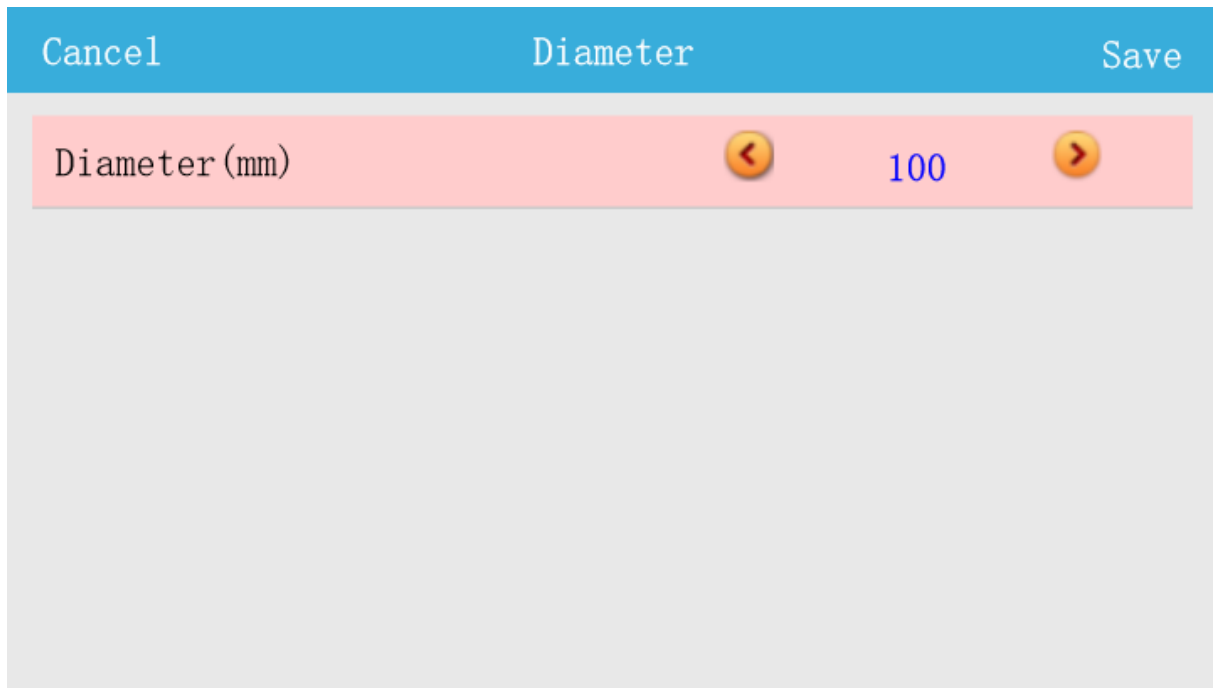


Fig. 3-38

Calculation Formula:

Real resolution of Y axis = Wheel Diameter / Reference Diameter * Reference Resolution

Real range of Y axis = Wheel Diameter * π

3.2.16 Laser Settings

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

Cancel	Laser Parameter			Save
	Laser Type	<	C02	>
	PWM Frequency (HZ)	<	20000	>
	Laser Min (%)	<	3	>
	Laser Max (%)	<	100	>
	PWM DIR	<	Negative	>
	X Compensation Mode 1	<	Positive	>

Fig. 3-44

Cancel	Laser Parameter			Save
	X Direction Compensation 1 (%)	<	0	>
	X Compensation Mode 2	<	Positive	>
	X Direction Compensation 2 (%)	<	0	>
	X Compensation Mode 3	<	Positive	>
	X Direction Compensation 3 (%)	<	0	>
	X Compensation Mode 4	<	0	>

Fig. 3-45

Cancel	Laser Parameter		Save
X Direction Compensation 4(%)	<	0	>
Y Compensation Mode 1	<	Positive	>
Y Direction Compensation 1(%)	<	0	>
Y Compensation Mode 2	<	Positive	>
Y Direction Compensation 2(%)	<	0	>

Fig. 3-46

1. **Laser Type:** the common laser (CO2 glass tube), RF, and the RF (Pre-ignition). when the laser is one without pre-ignition, choose the laser type; when the laser is one with pre-ignition, choose the type of RF (pre-ignition) (Under such circumstance, as the control card is be in the standby state, it outputs a 1us pulse signal to the laser to make it pre-ignite.)
2. **PWM Frequency (HZ):** according to the laser Manual, set the laser tube PWM waveform frequency. Generally, 20000 for the CO2 tube and 5000 for the RF tube.
3. **Laser Min Duty Ratio:** the minimum duty ratio of the PWM waveform. It is the minimum power when the laser light is OFF.
4. **Laser Max Duty Ratio:** the maximum duty ratio of the PWM waveform. It is the rated maximum power of the laser. The range set: $0 \leq \text{the min duty ratio} \leq \text{the max duty ratio} \leq 100$. f the maximum duty ratio is equal to the minimum duty ratio, the light intensity is not adjustable.
5. **PWM DIR:** press "Select" to change the PWM DIR. If you found when you set power bigger, the intensity of laser beam is stronger. Then you should press "Select" to change the PWM DIR.
6. **X Compensation mode:** X-direction laser head power compensation, when the origin is in the upper left corner, the compensation method is positive, and the laser light intensity will gradually increase as the X-axis moves away from the origin. When the

compensation is negative, the laser light intensity will gradually decrease as the X-axis moves away from the origin.

7. **X Direction Compensation (%)**: Set the light intensity that needs to be compensated for the laser head to move from the origin position to the X-direction maximum size.
8. **Y Compensation mode**: Y-direction laser power compensation, when the compensation mode is positive, the laser light intensity will gradually increase as the Y-axis moves away from the origin. When the compensation is negative, the laser light intensity will gradually decrease as the Y-axis moves away from the origin.
9. **Y Direction Compensation (%)**: Set the light intensity that needs to be compensated for the laser head to move from the origin position to the Y-direction maximum size.
10. **Focus Length (mm)**: press the "Number" keys to change the focus length. When this parameter is set, press decimal point "." in standby interface, a message box will pop up showing that focus length is reset. If press "Enter", the laser head will go down and be controlled by U Axis. When sensors are close to the material surface and reach the designated position, a signal is output to controller, then it controls the laser head move up to the focus position.

Attention: if laser type is RF or RF (Pre-ignition), set the PWM Frequency to 5000, Laser Max Duty Ratio to 95%, not to 100%, otherwise the laser would always be on or off.

3.2.17 Language

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

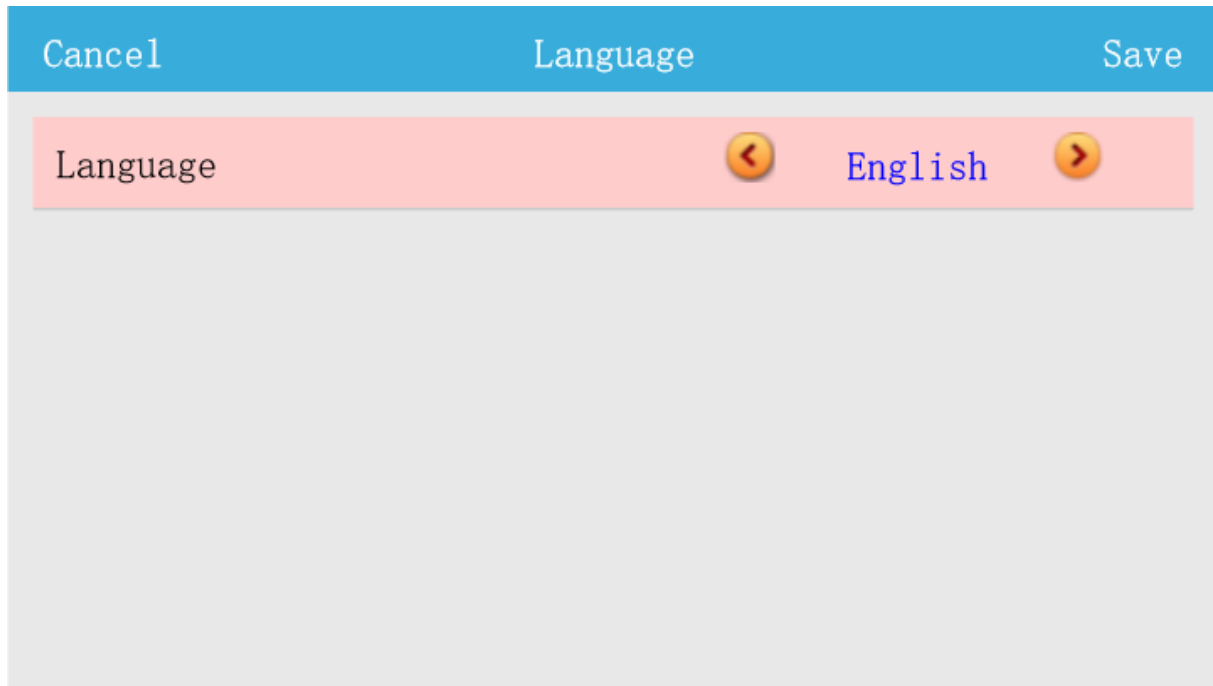


Fig. 3-47

3.2.18 Statistical Information

In Main Menu interface, select "Records" to view the statistical Information. Statistical Information includes: Time of Power On, Laser On Time, Total Work Time, Total Process Times, X Travel and Y Travel. On the statistics page, press the "CL" button on the panel and enter the password "12344321" to enter the delete statistics page. Press the up and down keys to select the option you want to delete. Then press the enter key to delete. Press the number "0" key to enter the same password and delete all the information with one click.

ESC	Records
1. Time of Power On:	0:00:00
2. Laser On Time:	0:00:00
3. Total Work Time:	0:00:00
4. Total Process Times:	0
5. X1 Total Travel:	0
6. Y1 Total Travel:	0
7. X2 Total Travel:	0
8. Y2 Total Travel:	0

Fig. 3-48

Cancel	Records	OK
1. Clear Time of power On		
2. Clear Laser On Time		
3. Clear Total Work Time		
4. Clear Process Times		
5. Clear X1 Travel		
6. Clear Y1 Travel		
7. Clear X2 Travel		
8. Clear Y2 Travel		

Fig. 3-49

3.3 System Settings

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

ESC	System
Version	V. L023. 029
System Upgrade	
Administrator	
System Test	
Factory Data Reset	

Fig. 3-50

1. **Version:** the version of control system.
2. **System Upgrade:** we support an update file for user to update their system. Before update, copy the update file TZD_L018.TFL into the U Disk, and insert the U Disk to Card. Select the "System Upgrade" item then press "Enter" key to upgrade your system. During the update, it is forbidden to cutting off the power.
3. **Administrator:** enter the administrator settings interface.
4. **System Test:** enter the system test interface.
5. **Factory Data Reset:** enter the password 12344321, can restore the factory parameter Settings.

3.3.1 Administrator

When entering the administrator interface, you need to enter the Admin password first. The default password is 00000000 (8 zeros). In the administrator interface, you can set lock of the system.

Steps for lock setting:

- Set the date and time of the system.
- Set the ID of the machine.
- Change the Admin password.
- Turn the Password Status "Open".

- In Password Times, set the times of periodic lock.
- In the Lock Date, set the date to start the lock. For example, if set January 1st, 2018, when it reaches January 1st, 2018, it prompts to enter the 1st periodic password. Repeat same operation for other passwords.
- In the Password Preview, checks whether the settings are correct.
- At the end, insert the USB flash drive and export the lock password.

Parameters Instruction:

1. **Time Set:** set the date and time.
2. **ID:** press "Number" key to set the equipment number for convenient management. When a USB is used for communication, the equipment number will be display on the software port. **The machine number is displayed when the password expires.**
3. **Administrator Password:** enter the Admin Password, and then you can modify it. If you need to set the lock, you need to change the Admin password. Otherwise, after locking the machine, you could also enter the system after entering the Admin password.
4. **Password Status:** when the time limit is set to "Open", the periodic passwords start working.
5. **Password Preview:** set the times of periodic passwords, one period for one month.
6. **Export Password:** insert a USB flash drive into the system and click Password Export. You can export the Periodic Passwords to a text file on the USB flash drive. The file name is the device ID.
7. **Factory Data Backup:** Backup the factory machine parameters.

The time base is subject to the time set by the system.

Note: 3 days before the system is locked, the system will prompt the remaining days of the lock to remind the user to unlock in time.

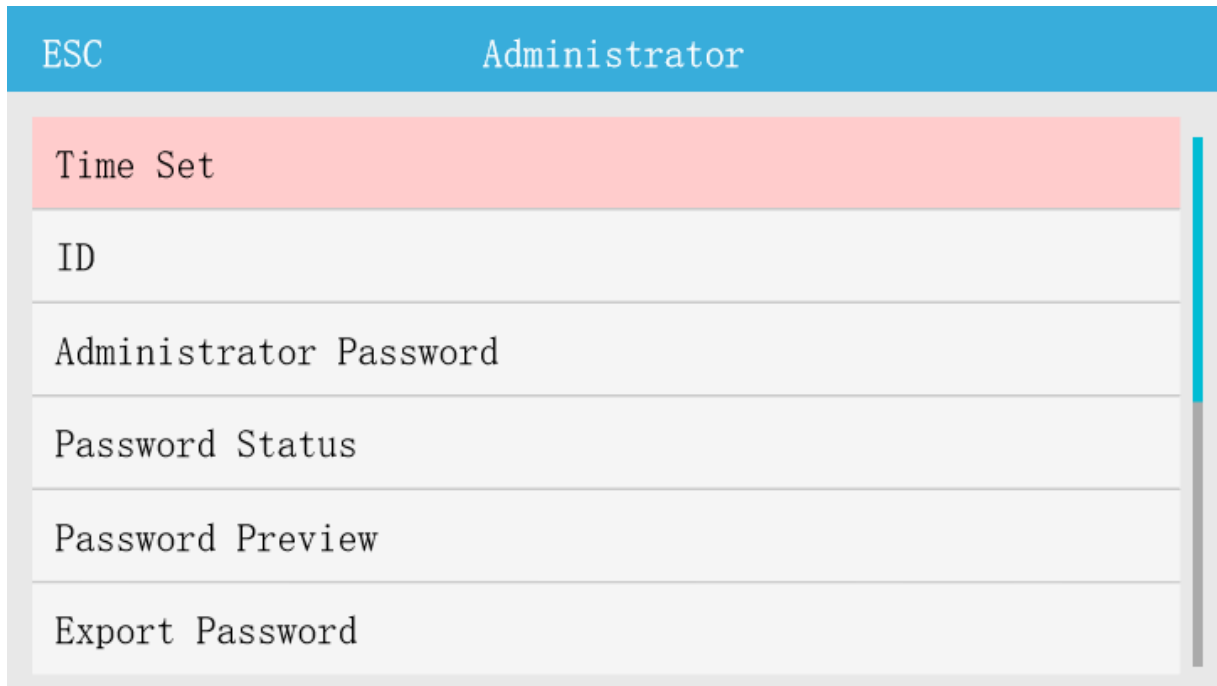


Fig. 3-51

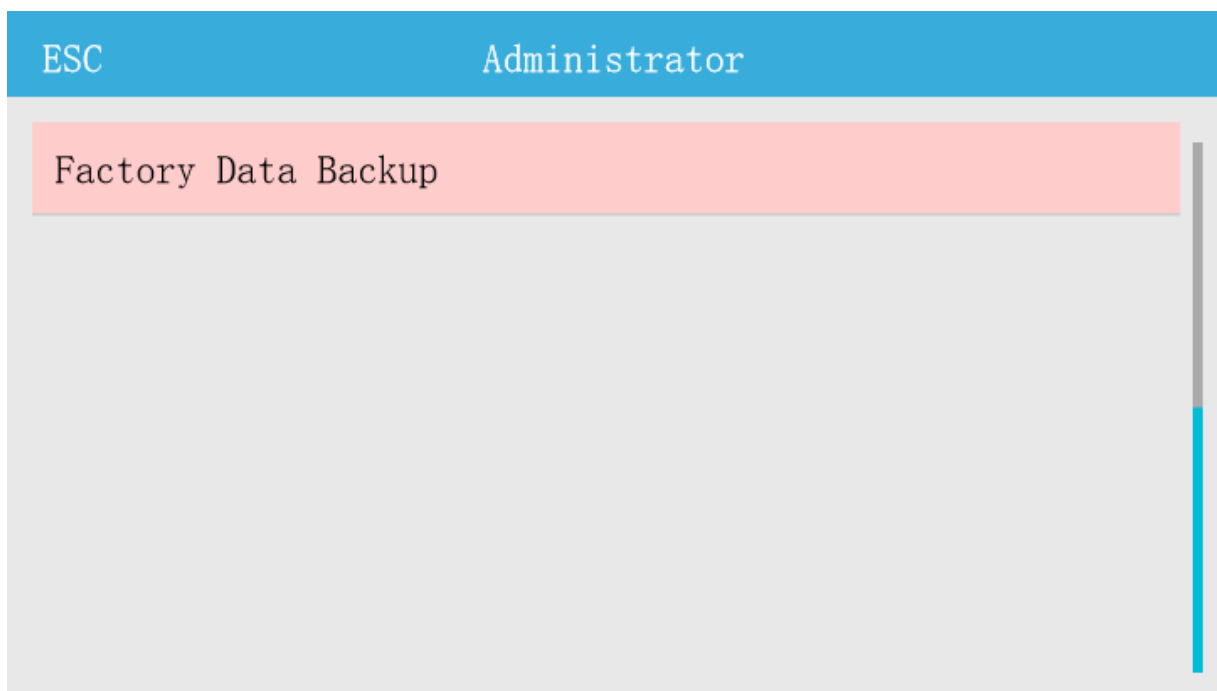


Fig. 3-52

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
	TFRAM
	Clock
	SDRAM
	Flash

Fig. 3-53

返回	I0 Input								
1.	<input type="checkbox"/>	2.	<input type="checkbox"/>	3.	<input type="checkbox"/>	4.	<input type="checkbox"/>	5.	<input type="checkbox"/>
6.	<input type="checkbox"/>	7.	<input type="checkbox"/>	8.	<input type="checkbox"/>	9.	<input type="checkbox"/>	10.	<input type="checkbox"/>
11.	<input type="checkbox"/>	12.	<input type="checkbox"/>	13.	<input type="checkbox"/>	14.	<input type="checkbox"/>	15.	<input type="checkbox"/>
16.	<input type="checkbox"/>	17.	<input type="checkbox"/>	18.	<input type="checkbox"/>	19.	<input type="checkbox"/>	20.	<input type="checkbox"/>

Fig. 3-54

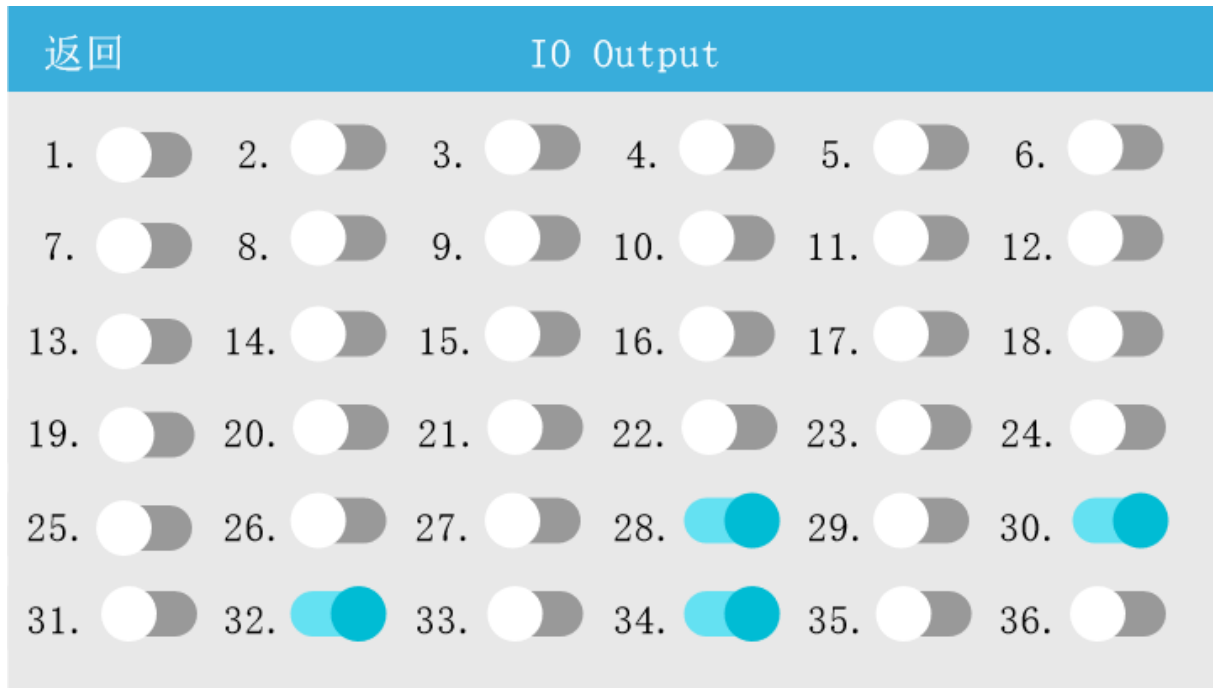


Fig. 3-55

1. **IO Input/Output Test:** corresponding to IO input/output test, when the pin is active at low level, it'll display from off to on. As shown in IN-1 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 "Select" 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. After finishing the testing **TFRAM**, **Clock**, **SDRAM** and **Flash**, a dialog box will pop up to will show the result.
3. Pin Description

INPUT

Pin number	Description
INPUT1 = Lmt_Y1-	Lmt_Y1- Y1 origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT2 = Lmt_Y1+	Lmt_Y1+ Y1 upper limit, axis movement to the max coordinate limit sensor input
INPUT3 = Lmt_X1-	Lmt_X1- X1 origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT4 = Lmt_X1+	Lmt_X1+ X1 upper limit, axis movement to the max coordinate limit sensor input
INPUT5 = Lmt_Z1-	Lmt_Z1- Z1 origin limit, axis movement to the minimum coordinate (0) limit sensor input sensor input
INPUT6 = Lmt_Z1+	Lmt_Z1+ Z1 upper limit, axis movement to the max coordinate limit sensor input

INPUT7 = Lmt_U-	Lmt_U- U origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT8 = Lmt_U+	Lmt_U+ U upper limit, axis movement to the max coordinate limit sensor input
INPUT9= Lmt_Y2-	Lmt_Y2- Y2 origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT10 = Lmt_Y2+	Lmt_Y2+ Y2 upper limit, axis movement to the max coordinate limit sensor input
INPUT11 = Lmt_X2-	Lmt_X2- X2 origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT12 = Lmt_X2+	Lmt_X2+ X2 upper limit, axis movement to the max coordinate limit sensor input
INPUT13 = Lmt_Z2-	Lmt_Z2- Z2 origin limit, axis movement to the minimum coordinate (0) limit sensor input
INPUT14 = Lmt_Z2+	Lmt_Z2+ Z2 upper limit, axis movement to the max coordinate limit sensor input
INPUT15 = Protection_SW	Protection_SW Protection signal input, connecting to cover protection and other signals
INPUT16 = Foot_SW	Foot_SW Foot switch signal input, active on the rising edge, with pulse width not less than 100ms
INPUT17 = WP1	WP1 Water protection 1 input, active at low level
INPUT18 = WP2	WP2 Water protection 2 input, active at low level
INPUT19 = WP2	WP3 Water protection 3 input, active at low level
INPUT20 = WP2	WP4 Water protection 4 input, active at low level

OUTPUT

Pin number	Description
OUT1 = Finish	Work completion signal, output 1" low pulse width after the work is completed
OUT2 = Feeding	Feeding signal, output when feeding, active at low level
OUT3 = Laser Status	Laser status signal, low output when the light is ON, and high output when the light is OFF
OUT4 = Nip Rolls	Press signal, for control of press roller of rotary cutter, active at low level
OUT5 = Press	Feeding/pressing signal, synchronous pressing signal at Y axis and U axis when feeding, active at low level
OUT6 = Status	Working status signal, output low level at work state, output high level at standby or pause state
OUT7 = Pen 1	Pen signal 1, for the pen signal of the asynchronous head 1,

	low output when dropping the pen, high output when lifting the pen
OUT8 = Wind 1/SPI 1	Blowing signal 1 or spindle 1 signal, the signal is multiplex, used for the blowing signal of the asynchronous head 1 in case of a normal model; used as start and stop signal for the spindle motor 1 in case of rotary cutting model, active at low level
OUT9 = Pen 2	Pen signal 2, for the pen signal of the asynchronous head 2, low output when dropping the pen, high output when lifting the pen
OUT10 = Wind 2/SPI 2	Blowing signal 2 or spindle 2 signal, the signal is multiplex, used for the blowing signal of the asynchronous head 2 in case of a normal model; used as start and stop signal for the spindle motor 2 in case of rotary cutting model, active at low level
OUT11	Reserved
OUT12	Reserved
OUT13 = X1-PUL	PUL- X1 Step pulse, connect to the PUL- of step motor driver
OUT14 = X1-DIR	DIR- X1 Direction signal, connect to the DIR- of step motor driver
OUT15 = Y1-PUL	PUL- Y1 Step pulse, connect to the PUL- of step motor driver
OUT16 = Y1-DIR	DIR- Y1 Direction signal, connect to the DIR- of step motor driver
OUT17 = Z1-PUL	PUL- Z1 Step pulse, connect to the PUL- of step motor driver
OUT18 = Z1-DIR	DIR- Z1 Direction signal, connect to the DIR- of step motor driver
OUT19 = U-PUL	PUL- U Step pulse, connect to the PUL- of step motor driver
OUT20 = U-DIR	DIR- U Direction signal, connect to the DIR- of step motor driver
OUT21 = X2-PUL	PUL- X2 Step pulse, connect to the PUL- of step motor driver
OUT22 = X2-DIR	DIR- X2 Direction signal, connect to the DIR- of step motor driver
OUT23 = Y2-PUL	PUL- Y2 Step pulse, connect to the PUL- of step motor driver
OUT24 = Y2-DIR	DIR- Y2 Direction signal, connect to the DIR- of step motor driver
OUT25 = Z2-PUL	PUL- Z2 Step pulse, connect to the PUL- of step motor driver



OUT26 = Z2-DIR	DIR- driver	Z2 Direction signal, connect to the DIR- of step motor
OUT27 = LPWM1	LPWM1	Be used to control the laser 1 power
OUT28 = L-ON1	LON1	Laser 1 enable control
OUT29 = LPWM2	LPWM2	Be used to control the laser 2 power
OUT30 = L-ON2	LON2	Laser 2 enable control
OUT31 = LPWM3	LPWM3	Be used to control the laser 3 power
OUT32 = L-ON3	LON3	Laser 3 enable control
OUT33 = LPWM4	LPWM4	Be used to control the laser 4 power
OUT34 = L-ON4	LON4	Laser 4 enable control

Part IV Operation Process

4.1 Double-head Asynchronous Machine

1. Set related parameters of the asynchronous double heads in the Machine Parameters:

- **Asynchronous Direction:** Y axis direction, or X axis direction.
- **Asynchronous Head Distance X (mm):** in the X axis direction, the interval between asynchronous double heads. Press the "Select" button to enter a negative sign.
- **Asynchronous Head Distance Y (mm):** in the Y axis direction, the interval between asynchronous double heads. Press the "Select" button to enter a negative sign.
- **Supplement:** assume that the asynchronous direction is the along Y Axis direction, set the interval between asynchronous heads on Y Axis direction. Also, the interval on X Axis direction can also be set, generally within ± 10 mm, to compensate for the error of the mounting position of the two cutting heads. When the X axis direction is asynchronous, it is all the same.

2. Connect the Control Card to the computer and open the AutoLaser to enable independent control of double heads. Click to get the interval between double-head to obtain the interval.

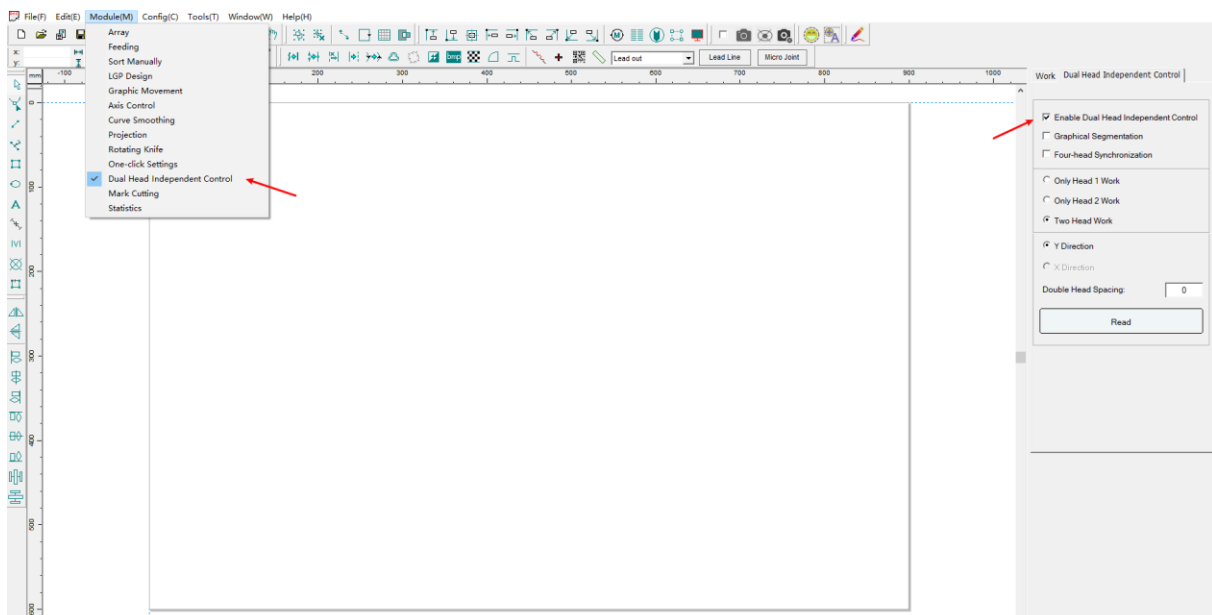


Fig. 4-1

Parameters Instruction:

- **Enable Double-head Independent Control:** when checked, it enables the asynchronous processing of double-head. Otherwise, LASER-1 processing is defaulted.
 - **Graphic Segmentation(Split):** if checked, the graph is forced to be split into several processing areas according to interval of the asynchronous heads and assign them to asynchronous heads for processing. Otherwise, it won't be split to ensure that each head completely cuts each graphic.
 - **Single Graphic Segmentation(Split):** when there is only one graphic, there is no free move segment, and double head cutting is needed, such as a circle, you can check this option and the special path will be used when splitting to improve the processing efficiency. Generally, it is not recommended to choose this option for array graphics.
 - **Upper & Lower Double Head Cutting / Right & Left Double Head Cutting / Double Head Interval:** after clicking "Obtain", the software will read the asynchronous parameters set by the machine and divide the graphics. The upper & lower double-headed cuttings are set asynchronous on the Y axis direction, and the left & right double-headed cutting is set asynchronous on the X axis direction. The double-head interval is the intervals in the respective directions.
 - **Processing Method:** if only the 1st head is chosen for processing, LASER-1 is used; if only the 2nd head is chosen for processing, LASER-2 is used; if both, two heads together start their own processing.
3. Import the graph to be processed, set processing parameters and files. If the machine has only two heads, just set the light power intensity of LASER-1 and LASER-2; if the machine is asynchronous + double head bidirectional, need to set power of LASER-4. Please refer to Section 2.1 the System Convention for the defined positions of 4 lasers.
 4. After the graphic is output to the Control Card, move the laser head to the processing position, press the "Set Point" key and then "Start" to start. The asynchronous double heads process the respective graphics at their own Set Point. When the LASER-1 finishes processing, it returns to the minimum coordinate of the Y axis and waits for the other head to finish processing. After the LASER-2 finishes processing, it returns to the maximum coordinate of the Y axis. When both heads have been machined, they will go back to regression point.
 5. Regarding the Set Point, the X1 and Y1 coordinates shown on the standby interface

indicates the current position of the LASER-1 as a reference point. Press Set Point key, the coordinates of LASER-1 becomes the Set Point. Similarly, press the "OK" to switch to display the X2, Y2 coordinates. Press the Set Point, the current position of the LASER-2 become the Set Point. While in standby, press the "Pause", LASER-1 or LASER-2 will move to the Set Point, whichever head is displayed on the current panel. When the running scale, it is also the currently displayed laser head that runs scale.

6. Regarding the feeding and pressing, when the pressure feeding is required, U axis and the Y1 axis respectively carry out the feeding and the pressing.

4.2 Rotary Cutting Machine

4.2.1 Function Introduction

If rotary cutting machine is selected, the coordinates of Z Axis are shown on the bottom right. Press Number 5 key, open the interface of testing head presetting position; press Number 7 key, open the interface for control of rotary cutting, the start/stop of spindle, ascending/descending of pressure feeding roller, the switch between the cutting heads and height compensation for head presetting. Press the number 9 key to record the stop position. Press the number 0 key to execute the automatic tool setting. Press the decimal point "." to manually preset the heads and record the presetting position.

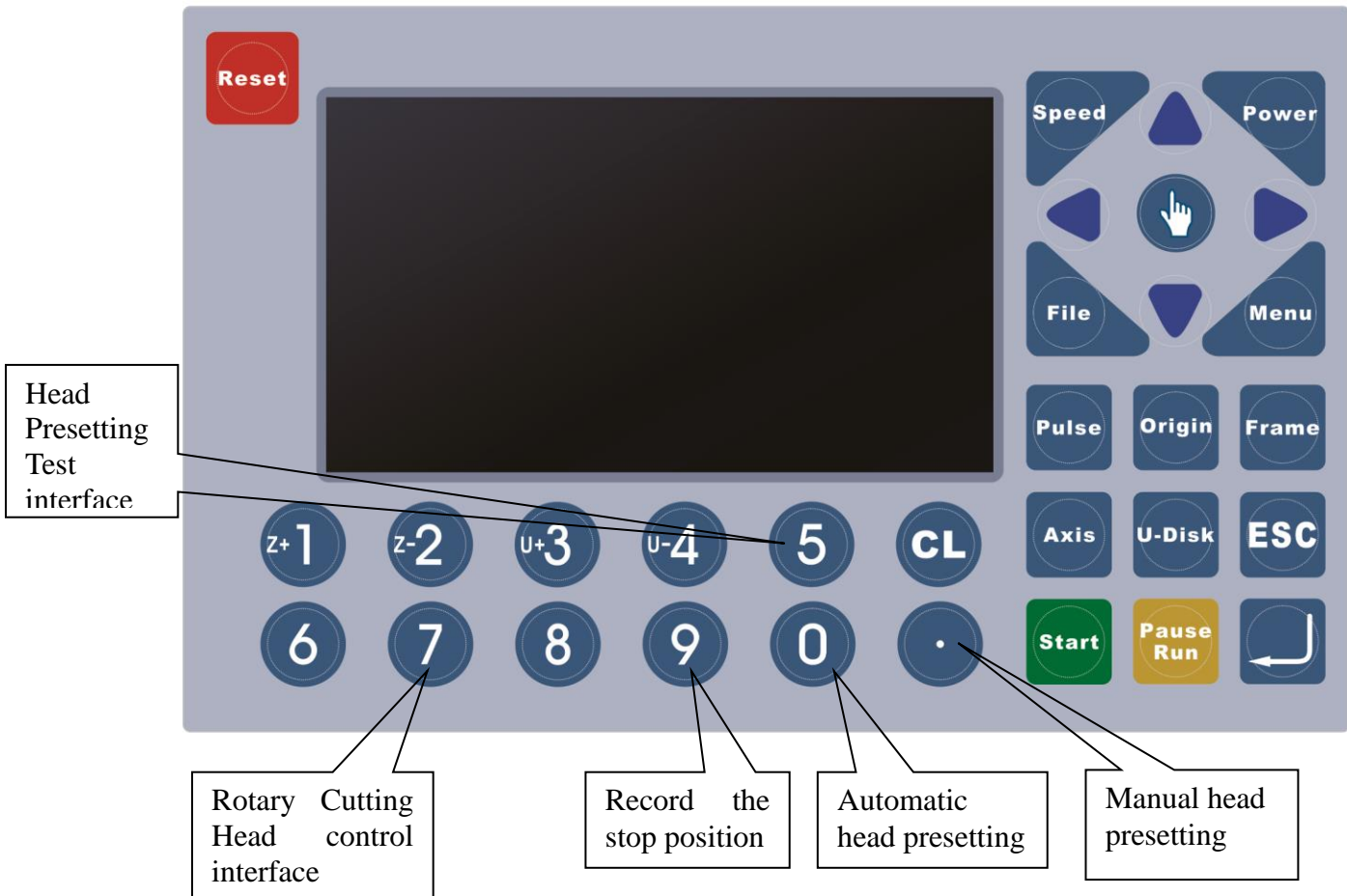


Fig. 4-2

4.2.2 Rotary Device Parameters

In the Equipment Parameter interface, set the equipment type to Knife. Then set the following parameters.













Cancel	Equipment Parameter			Save
	Lubrication Time(s)		0	
	Lubricating Stroke 2(m)		0	
	Lubrication Time 2(s)		0	
	Cutting Tool		Knife	
	Spindle Delay(ms)		5000	
	Work Lift Height(mm)		15	

Fig. 4-3









Cancel	Equipment Parameter			Save
	Docking Position 2(mm)		0	
	Z Axis Speed (mm/s)		50	
	Feeler Block(mm)		0	
	Feeler Block Polarity		Negative	

Fig. 4-4

- Cutting Tool:** Knife or Laser. When the knife is selected, the rotary cutter mode is used to activate the spindle rotation, and the cutting head automatically moves down for cutting and lifts when finishing. When the laser is selected, the cutting head does not lift or fall.
- Spindle Delay:** the time required for the spindle to run from standstill to the rated speed. It requires to be consistent with the settings of the inverter. If the spindle is not

started but the control Card is On, turn on the spindle running signal first, then wait for the spindle start delay before cutting. Unit: ms.

- c. **Work Lift Height:** when working, the lifting height of the cutting head before the starting of idle motion, in unit of mm.
- d. **Docking Position:** the position where the cutting head stops after completion of the work, in unit of mm.
- e. **Z Axis Speed:** the speed at which the cutting head descends or ascends during operation. In standby mode, when the key speed is "High", it means the same speed at which Z axis moves after pressing Z+/Z-. "Slow" is half of this speed. The head moving speed is no greater than the limit speed of the Z axis. Unit: mm/s.
- f. **Feeler Block(mm)(Height of Presetting Block):** when the machine is equipped with the blocks for presetting the cutting heads, its height needs to be entered in unit of mm.
- g. **Polarity of Feeler Block (Presetting Block):** the negative indicates that the presetting block input is active at low level; the positive indicates active at high level.

4.2.3 Head Presetting

4.2.3.1 Manual Head Presetting

1. In the standby interface, press Z+, Z- to move the rotary cutting heads to the material cutting position, as shown.

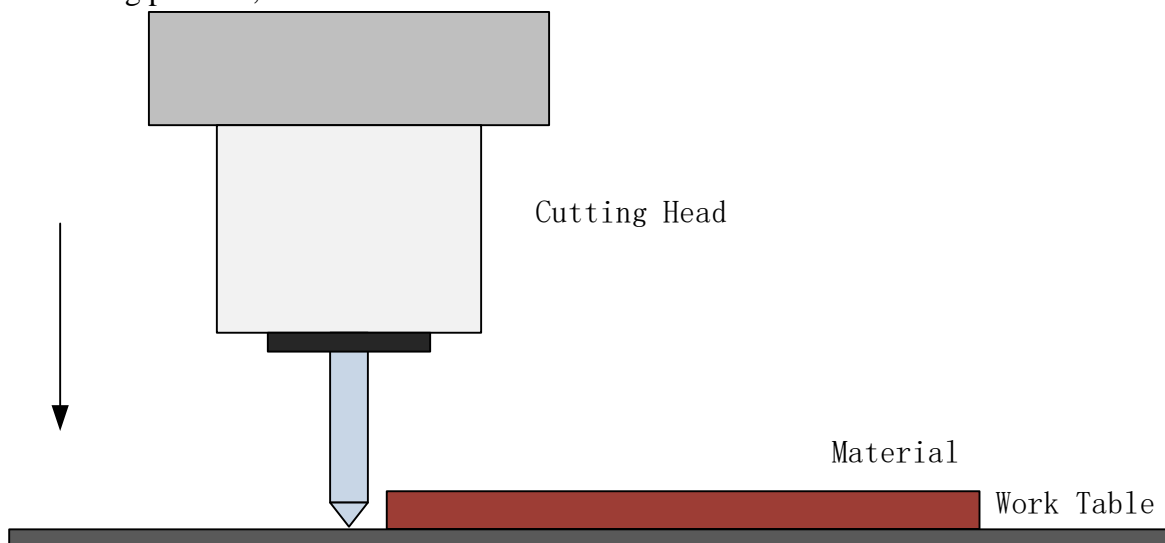


Fig. 4-4

2. Press the decimal point key "." to pop up the position recording interface and press "OK" to record the position of the current rotary cutting head. This position is the position where the rotary cutting head is lowered during the processing.

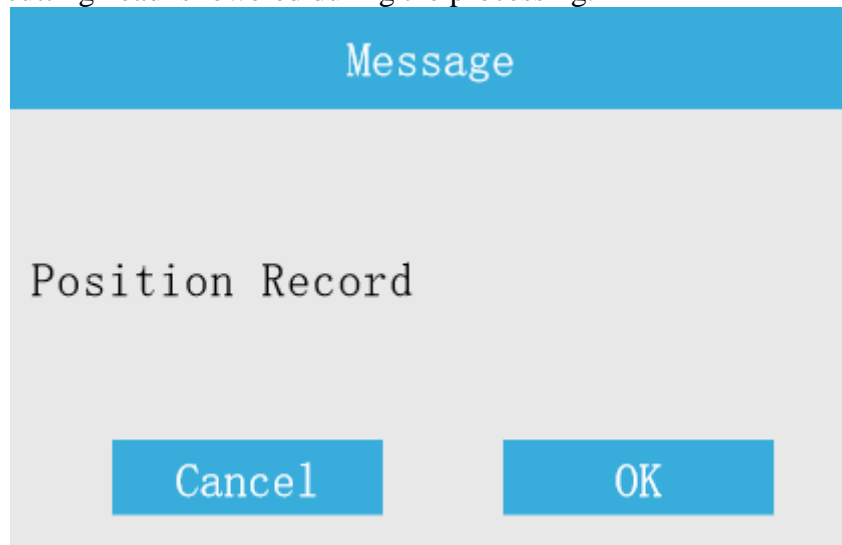


Fig. 4-5

1. Press Z- to move the rotary cutting head to the position where it stops after completion, then press the number "9" key and then OK to record the current stop position.

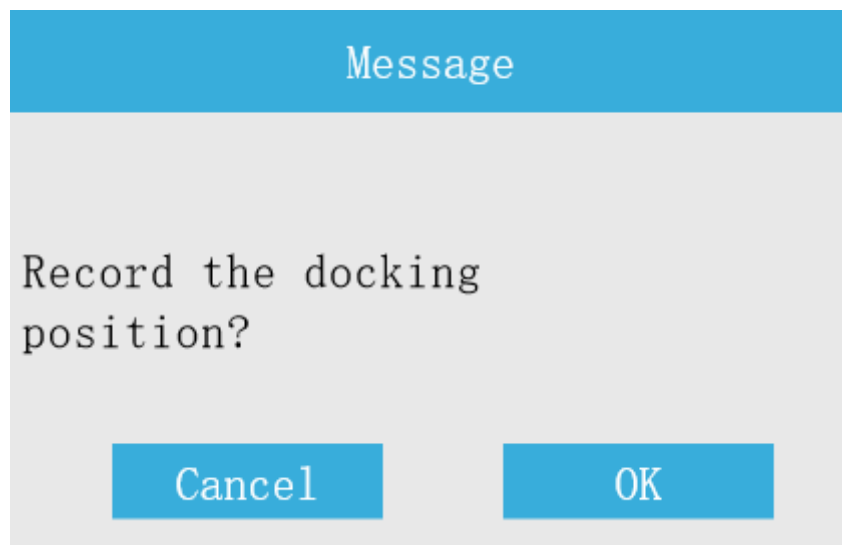


Fig. 4-6

2. Press the number 5 key to test the head presetting. At this time, the interface pops up as shown in the figure. At this point, the cutting head will automatically drop to the preset position recorded, and the coordinates of the current Z axis will be displayed in the interface. In this interface, press the number 5 key again, the cutting head can be lifted up to the position specified by the Docking Position. For example, if the head presetting position is 30mm and the docking position is 10mm, when lifting up, it is 10mm. If an emergency stop is required during the test, press the Pause button to stop the motion.

Repeat pressing the key 5 button to finish the descending and ascending test, and press the ESC to exit the test.



Fig. 4-7

4.2.3.2 Automatic Head Presetting

- Before the work, the head presetting blocks have been equipped, and the wiring is as follows (**the following wiring is active at low level**). If the head presetting block is active at high level, please refer to the wiring diagram of the specific presetting block. The presetting signal interface of the control card is the Protection_SW terminal. Note that when it is active at high level, need to change the polarity of the presetting block in the Machine Parameters to "positive".

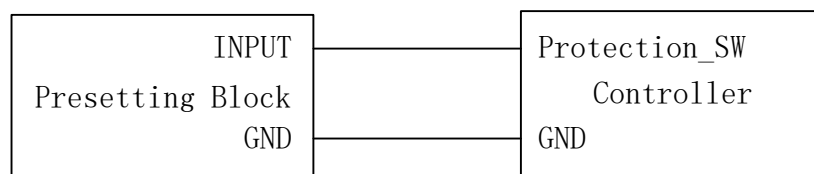


Fig. 4-8

- Set the "Presetting Block Height (mm)" H in the Machine Parameters as shown in the figure below as H = 10mm.
- Move the rotary cutting head to the top of the presetting block.
- In the standby interface, press the number "0" key to start the automatic head presetting and press the OK to execute. At this time, the rotary cutting head moves downward, and the moving speed is the Z-axis stop speed. As shown in below figures.

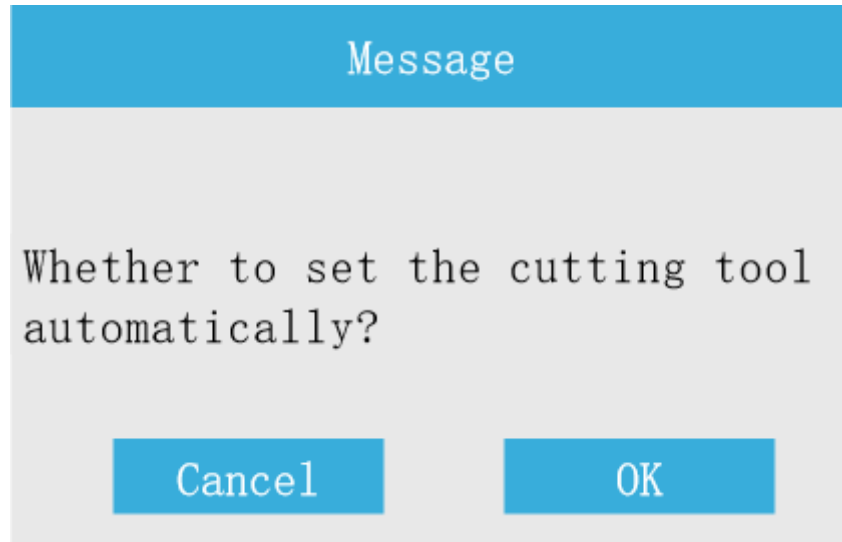


Fig. 4-9

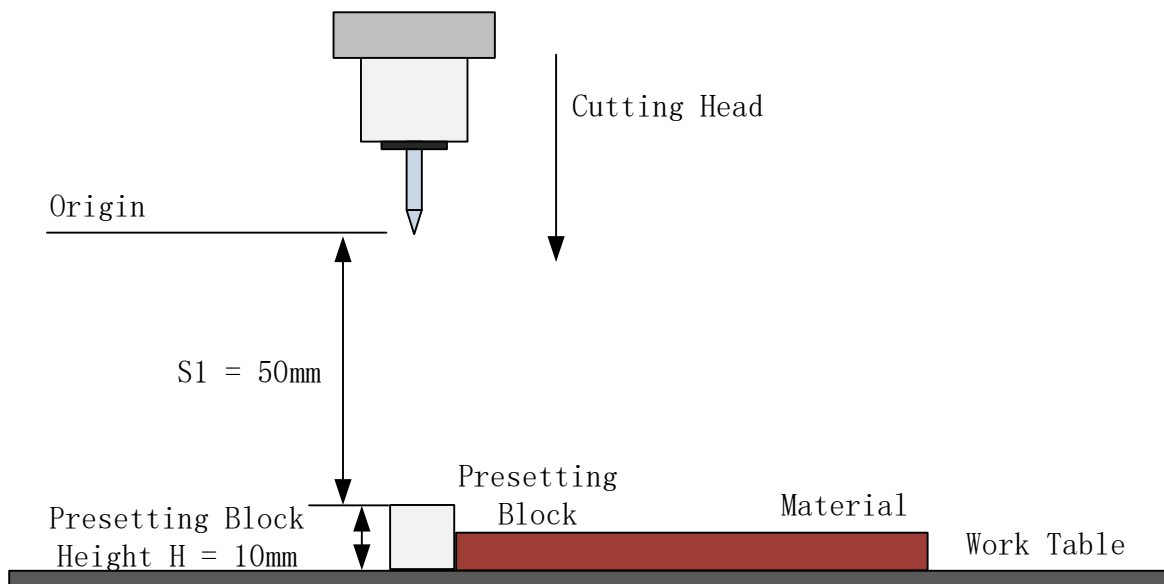


Fig. 4-10

5. When the cutting head touches the presetting block, it stops and records the current coordinate of Z axis, as shown in the figure, $S1 = 50\text{mm}$. At this time, the actual head presetting position $SZ = S1 + H$ (the position where hitting the presetting block + the height of the presetting block). Record and save. In the end, the rotary cutting heads return to the Origin Point. So, the automatic head presetting is completed.

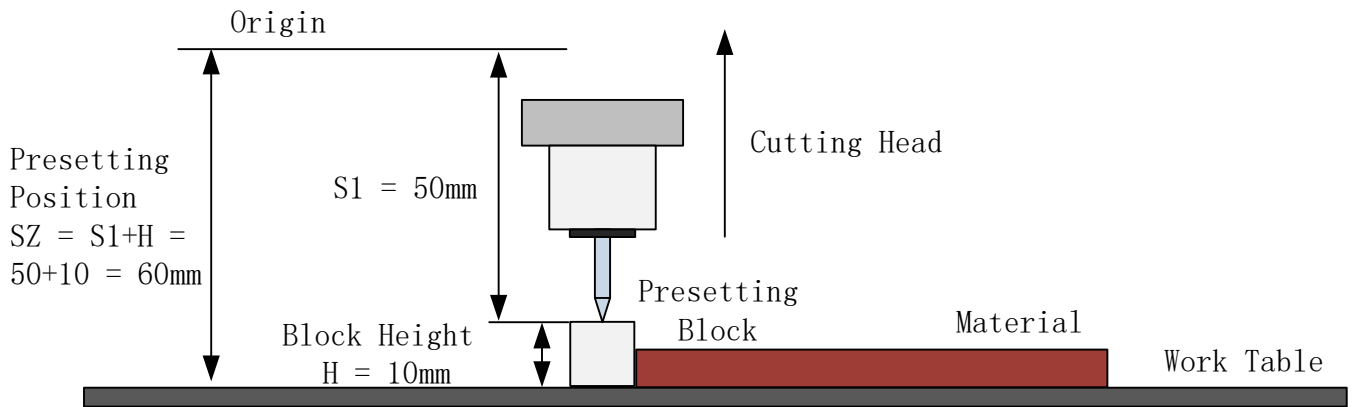


Fig. 4-11

6. Assume that the height of the presetting block is $H = 10\text{ mm}$, then the head presetting position is $SZ = S1 + H = 50 + 10 = 60\text{ mm}$. The presetting position is range from the **bottom** of the material to the Origin Point. When working, the rotary cutting heads automatically drop to a position of 60mm to perform the cutting. As shown:

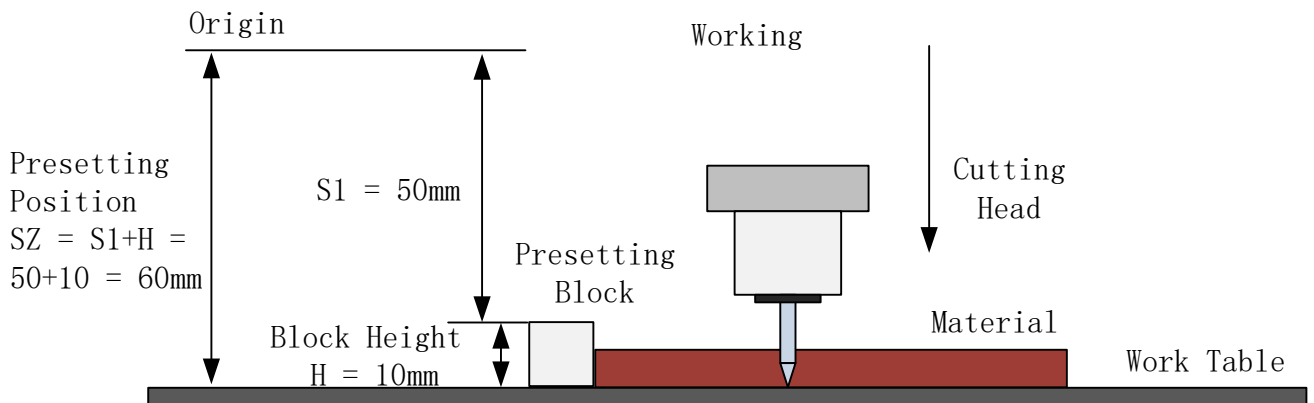


Fig. 4-12

7. After the head presetting is completed, press the number key "5" to test whether it is correct (same as step 4 of Manual Head Presetting). **Note that when testing, remove the cutting heads away from the presetting blocks, otherwise they will hit onto the blocks.**

4.2.4 Spindle and Pressure Feeding Roller Control

In the standby interface, press the number key 7 to enter the control interface.

1. **Spindle:** if "Open" is selected, the spindle is started, and if "Close" is selected, the spindle is stopped;
2. **Nip Rolls (Pressure Feeding Roller):** if "Open" is selected, the feeding roller is lowered, and if "Close" is selected, the feeding roller is lifted;
3. **Tool:** if "Knife" is selected, it is on rotary cutting mode, if require laser cutting, select Laser;
4. **Tool Height Compensation (Compensation Mode):** if positive is selected, it indicates the head presetting position plus the compensation value, is the real head presetting position, otherwise, minus the compensation value.
5. **Compensation Value:** the compensation value of the tool height in mm. If the tool is re-aligned, the compensation value is cleared.
6. **Docking Position:** the position where the cutting head stops after completion of the work, in unit of mm.












ESC	Knife		
Spindle		Close	
Nip Rolls		Close	
Cutting Tool		Knife	
Compensation Mode		Positive	
Compensation		0	
Docking Position (mm)		20	

Fig. 4-13

4.2.5 Tool Switch

In the standby interface, press the number key 7 to enter the control interface, select the rotary cutting head or laser. When the Knife is selected, the Control Card adopts cutting with the rotary cutting head. When working, turn on the spindle first, then after a delay, wait for cutting head of the spindle to run the rated speed, then precede cutting, and when in idle

motion, lift it to the specified height. After completion, return to the specified position of the lift height, then close the spindle. When laser is selected, cutting proceeds with the laser head. The spindle is not activated during operation, and no start delay of the cutting head.

4.2.6 Processing Flow

1. When rotary cutting is required, select the rotary cutting head.
2. Place the material to be cut, then press the number key 7 to open the feeding roller to press. (If there is a press device.)
3. Perform the head presetting and press the Z+/- key to move the cutting head to the cutting position of the material. Press the decimal point "." to record the head presetting position.
4. If there is any head presetting block, perform the automatic presetting with reference to Section 4.2.3.2.
5. Press the number key 5 to test if the tool position is normal.
6. Move the X, Y axis, move the cutting heads to the Set Point, and press the Set Point key.
7. Press Start to begin cutting. When processing, first open the spindle, wait for the spindle to run to the rated speed, lower the cutting tool, and when it is idle, lift it to the specified height. After completion, return to the specified position of the lift height, then close the spindle and exit the processing.
8. If you want to switch to the laser cutting, press the number key 7 in the standby interface to select the laser cutting. At this time, move the laser head to the place where it needs to be cut, press the Set Point key, and then press the start key to cut.

4.2.7 Notes and Warning

1. X axis direction range: When the machine is equipped with the rotary cutting and laser cutting at the same time, since the two cutting heads are arranged side by side in the X axis and the two heads are spaced apart with certain interval, each head can be cut in a smaller range than the machine. As shown in the figure, the actual range of each head is $L2 = L1$ (X axis direction machine range) - $L3$ (interval of double heads). In this case, you need to set the maximum coordinate of the X axis to $L2$. If there is only rotary cutting, the maximum coordinate of the X axis can be $L1$.

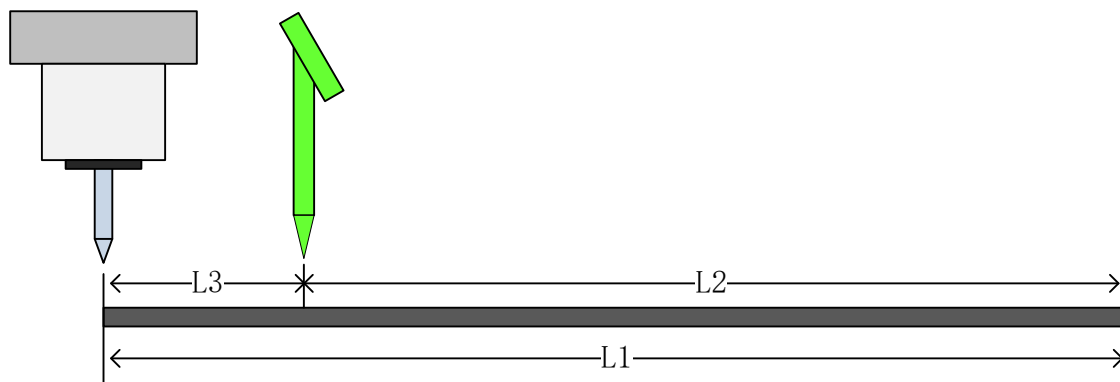


Fig. 4-14

Part V The Frequently Asked Question

5.1 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, the Main Board is short-circuited, causing abnormal power supply and 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 Set " interface, set the X, Y axis as Opening. Or the Limit Polarity goes wrong, or the limit switch is damaged.

3. Q: After powering on, the X, Y axis returns the origin, the LCD still shows “system initialization”.

A: The power back to origin error. Go into the "Zero Point Return Set" interface, set the Z, U axis as Close.

4. 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 "Limit Polarity" interface, and change the X, Y polarity.

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

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

6. 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 "Key Polarity" interface, and change the X, Y

polarity.

7. Q: after the completion of reset, X, Y starts automatically moving fast.

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

5.2 The Laser Light Question

1. Q: The light lasts on for a long time after powering on.

A: View how the enable signal of laser power is wired

2. Q: When the light power intensity is big, the light turns out to be few; when the light power intensity is small, the light turns out to be more.

A: The PWM polarity setting error. Go into the laser parameter setting interface, changes the PWM polarity.

3. Q: PWM frequency is correct, light power intensity can be changed by line within 10% - 60%.

A: Check the laser power supply model, whether it's controlled by 5V rather 3.3V.

4. Q: Water protection is invalid.

A: Please check whether the water protection directly shorted. If not, please send it back to us for hardware testing.

5.3 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 driver is installed correctly, reload the driver.
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 TL_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.

5.4 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, replace a U disk.

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

A: Replace the U disk cable.