深圳市睿达科技有限公司
ShenZhen Ruida Technology Co.,Ltd

每一步都是创造 · *Thinking in motion* ·

Read this manual before operation

➢ The content includes of electric connections and operating steps

➢ Read the manual to operate the systems

RDC6555G

Precision Laser cutting control system user manual

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CERTIFICATION STATEMENT

■ CE Certification statement

This product has passed the European Union CE (CONFORMITE EUROPEENNE) safety certification, has passed the corresponding conformity assessment procedures and the manufacturer's declaration of conformity, and complies with the relevant EU directives.

■ ROHS Certification statement

This product has passed the "Restriction of Hazardous Substances" safety certification established by EU legislation and complies with relevant EU environmental protection regulations.

■ FCC Certification statement

This product has passed the Federal Communications Commission safety certification and complies with relevant US electronic product safety regulations.

SAFETY INFORMATION

Please make sure that the operation is correct and the method is safe when using the system. Some signs or words will be used to remind you of dangerous matters and some important information.

Danger:

It indicates a serious danger. In the process of using, if improper operation or wrong usage method may cause serious injury or even death to the personnel, please do not use it easily until the operation method is correct and the usage method is correct.

Warning：

It indicates a serious danger. In the process of using, if improper operation or wrong usage method may cause injury to the personnel, please do not operate it until the operation method is correct and the usage method is correct.

Cautious：

It indicates potential product risk. In the process of using, if the use method is incorrect or the operation is improper, it may cause damage to the product or some parts. Please do not use it until it is ensured that the operation method is correct and the use method is correct.

Important:
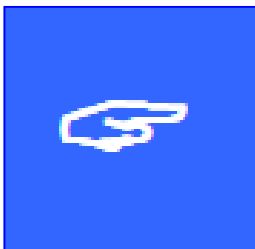
It indicates important information that needs attention during the use of the product. Please do not ignore this information, it will provide effective operation assistance.

This mark indicates laser radiation, which is generally attached to products that output laser. When using such equipment, please be careful with laser and pay

attention to safety.

Receiving, Unpacking, Inspection

The product has a plastic or metal casing to protect the exterior electrical component from damage. The product is wrapped in a foam bag and packed in an antistatic bag. If the package has any external damage, please check the goods and notify the carrier of the damage situation in writing.

Important:

After receiving the products, please check whether the outer packaging is in good condition, whether the product is complete after unpacking, and whether the parts are in good condition. If any   damage, please contact RUIDA.

Keep the packaging materials and wiring accessories when unpacking. Please be careful when disassembling the package. After unpacking the goods, please check if the parts are complete. If you find that the parts are missing or the parts are damaged, please contact Ruida immediately.

RDC6555G control system shipping list is shown in the following table: (due to the continuous updating of the product, the accessories received may be different from this manual)

Component	Quantity	Description
RDC6555G-(EC)-General Mainboard-Light gray cover	1	
RDPA6555G-General-Blue Sticker-Light gray case	1	
Five-core panel connecting cable 1.5m	1	
USB cable (2.0 dual magnetic ring A male to A male 3M) black	1	
Network cable (dual RJ 5M-blue)	1	
Ethernet port adapter cable 8PIN-1M	1	
USB adapter cable AM/AF (A male to A female with ear single magnetic ring 1M) beige	1	
USB adapter cable (B male to A female with ear single magnet ring 1M) black	1	
RDPA6555 Adapter	1	
Steel rail-350*35*7.5mm	1	

Contents

Chapter 1 Overview

This chapter includes:

■ **Introduction**

■ **Controller Model Description**

1.1 Introduction

RDC6555G is a new generation laser control system developed by Ruida Technology. The control system has better hardware stability, richer motion control solutions, and better anti-high voltage, anti-static features. The man-machine operating system based on 5-inch LCD has a more friendly operation interface and more powerful functions. The controller includes complete motion control function, supports encoder feedback input, supports dual-drive synchronous detection, has a better laser power control algorithm, and extends reserved multichannel general / special IO control interfaces, as well as multiple peripheral interconnection interfaces.

1.2 Controller Model Description

RDC6555G

General hardware version
Five-inch LCD
Five-axis card
The number of hardware subversion
The 6th generation hardware platform of this series
Laser cutting product
Ruida Technology Company
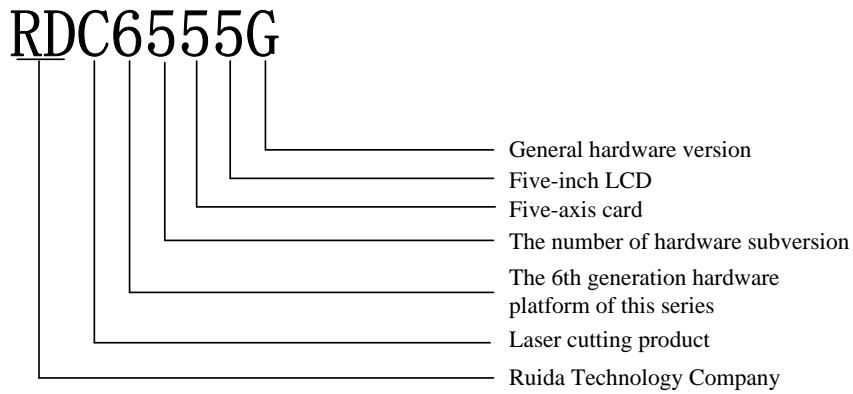
RD: Ruida Technology Company

C: Laser cutting product

6: The 6th generation hardware platform of this series

5: The number of hardware subversion

5: Five-axis card

5: Five-inch LCD

G: General hardware version

Chapter 2 Mounting Dimensions

This chapter includes:

■ **Mainboard Mounting Dimensions**

■ **Panel Mounting Dimensions**

2.1 Mainboard Mounting Dimensions

All dimensions are in mm.
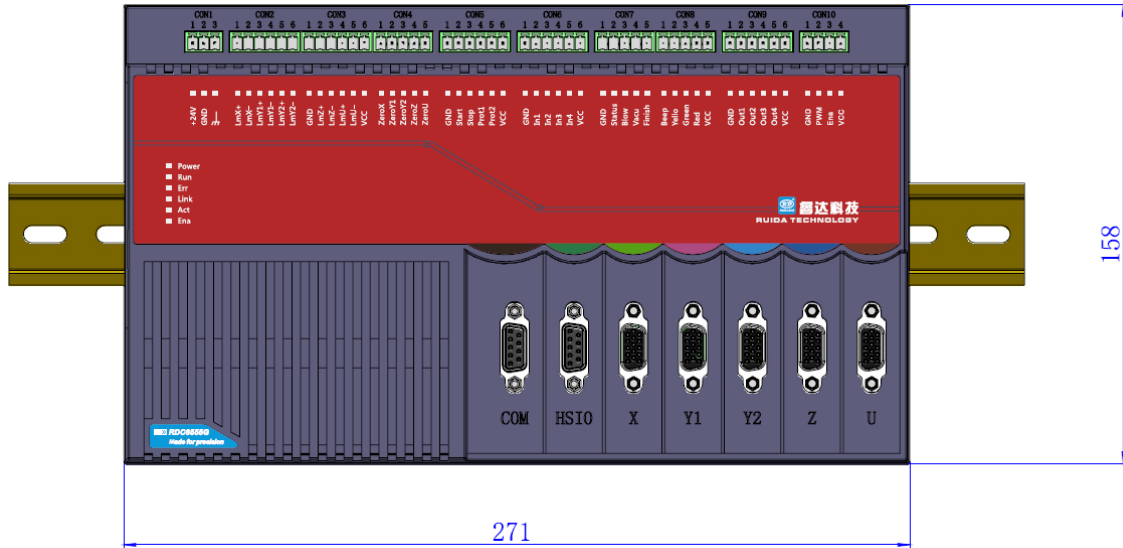
Figure 2.1.1 Vertical View

Figure 2.1.2 Front View
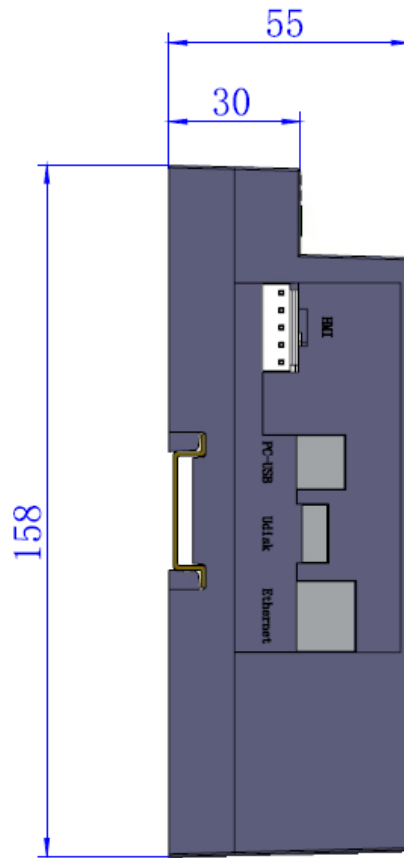
Figure 2.1.3 Left View
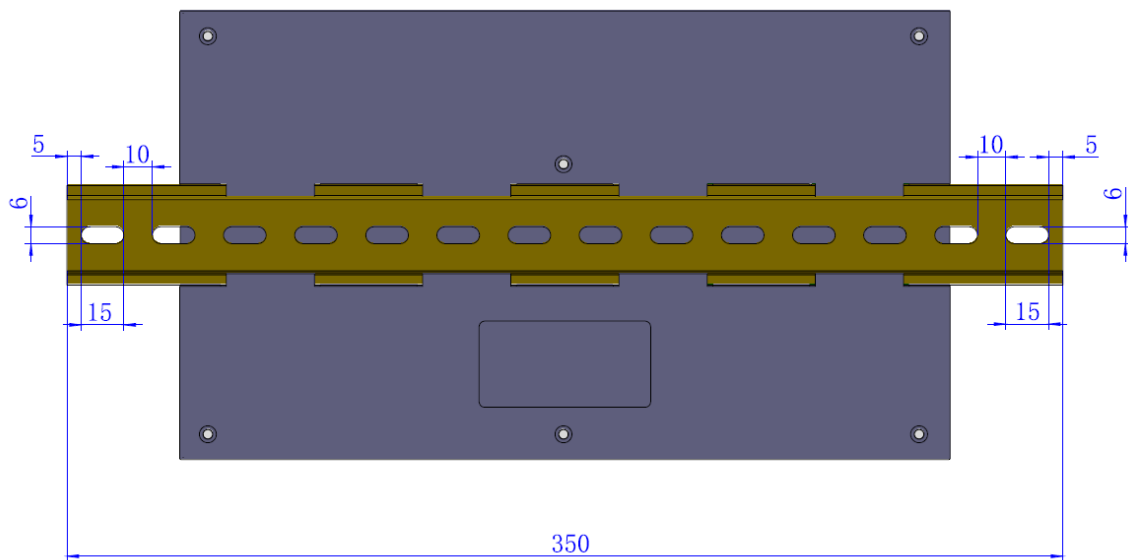
Figure 2.1.4 Back View

2.2　Panel Mounting Dimension

All dimensions are in mm.

Figure 2.2.1 Front View
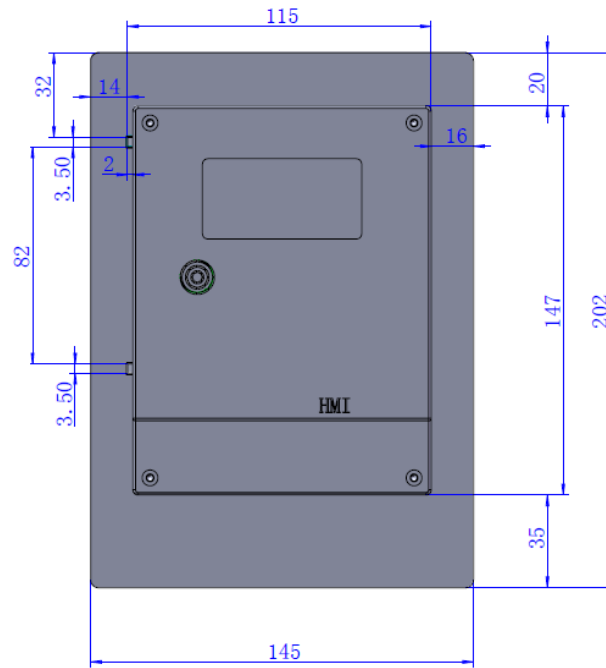
Figure 2.2.2 Back View
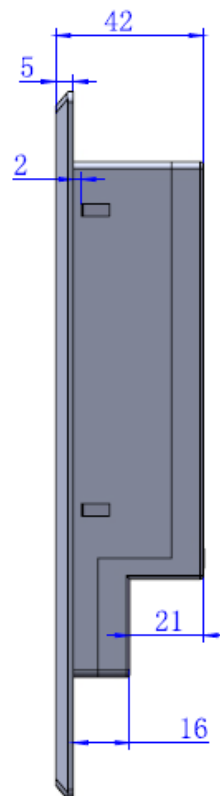
Figure 2.2.3 Side View

Chapter 3 Overview of Physical pictures and Interfaces

This chapter includes:

■ **System wiring diagram**

■ **Hardware interface instructions**

■ **Motor wiring instructions**

■ **Laser source wiring instructions**

3.1   Hardware interface diagram
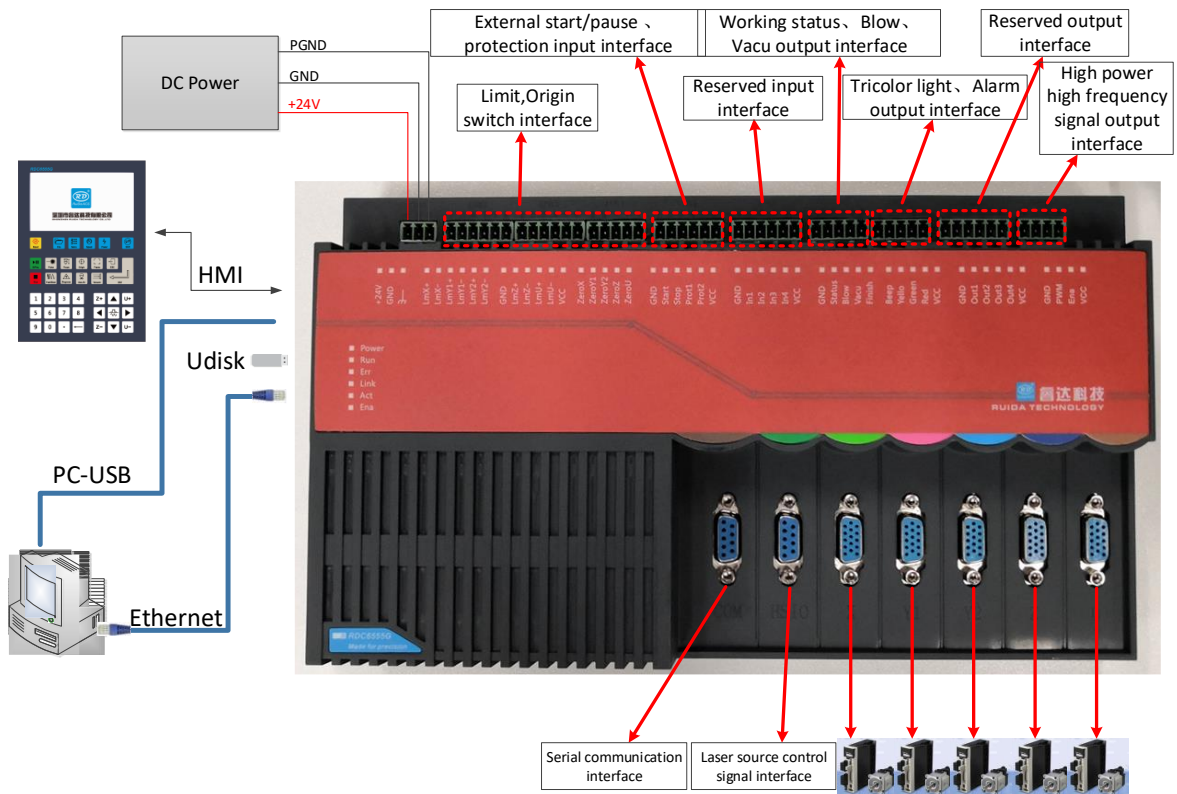
Figure 3.1 System Wiring Diagram

3.2   Main power interface CN1

PIN	Signal	Definitions
1	+24V	24V Switching power supply positive (input)
2	GND	GND
3	PGND	PGND
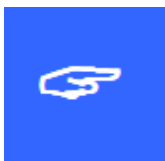
The control system uses a single 24V power supply. In order to leave a certain margin, it is suggested to use a power supply above 24V/2A.

3.3 Limit, Origin switch interface CN2, CN3, CN4

PIN	Signal	Definitions
CN2		
1	LmX+	X-axis positive limit
2	LmX-	X-axis negative limit
3	LmY1+	Y1-axis positive limit
4	LmY1-	Y1-aixs negative limit
5	LmY2+	Y2-axis positive limit
6	LmY2-	Y2-axis negative limit
CN3		
1	GND	GND
2	LmZ+	Z-axis positive limit
3	LmZ-	Z-axis negative limit
4	LmU+	U-axis positive limit
5	LmU-	U-axis negative limit
6	VCC	24V power supply output interface
CN4		
1	ZeroX	X-axis origin switch input interface
2	ZeroY1	Y1-axis origin switch input interface
3	ZeroY2	Y2-axis origin switch input interface
4	ZeroZ	Z-axis origin switch input interface
5	ZeroU	U-axis origin switch input interface
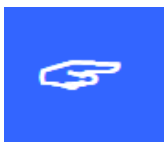
Limit switch must be the NPN, and limit polarity is optional. That is, if the motion axis reaches the limit position and triggers a low-voltage signal to make the LED corresponding to

each limit light up, the limit polarity is negative at this moment; on the contrary, if the motion axis is close to the limit position, the corresponding indicator light off, and the corresponding indicator lights up when leaving the limit, the limit polarity is positive.

1.The system can select the back-to-origin signal, negative limit back to zero or origin back to zero through setting parameters.

2.If the number of limit switches is insufficient, it is recommended that the limit switch be connected to a negative limit, and use the negative limit back to zero.

3.4 Input interface CN5, CN6

PIN	Signal	Definitions
CN5		
1	GND	GND
2	Start	System external start/pause input interface button
3	Stop	System external stop input interface button
4	Prot1	Raster protection input interface
5	Prot2	Cover-opening protection input interface
6	VCC	24V power supply output interface
CN6		
1	GND	GND
2	In1	Water protection input interface
3	In2	Reserved
4	In3	Reserved
5	In4	Reserved
6	VCC	24V power supply output interface

1.All input interfaces are low voltage triggered

2.When the system enables water protection, raster protection or cover-opening protection, it will detect the external protection signal in real time during processing. When the low voltage input signal is not given externally, the system will alarm.

3.5 Output interface CN7, CN8, CN9

PIN	Signal	Definitions
CN7		
1	GND	GND
2	Status	Working status output interface, OC output, maximum support 100mA current
3	Blow	Blow control output interface, OC output, maximum supports 100mA current
4	Vacu	Vacuum adsorption output control interface, OC output, maximum support 100mA current
5	Finish	Processing finished output interface, OC output, maximum supports 100mA current
CN8		
1	Beep	Alarm output interface, OC output, maximum supports 100mA current
2	Yellow	Tricolor light-yellow output interface, OC output, maximum supports 100mA current
3	Green	Tricolor light-green output interface, OC output, maximum supports 100mA current
4	Red	Tricolor light-red output interface, OC output, maximum supports 100mA current
5	VCC	24V power supply output interface
CN9		
1	GND	GND
2	Out1	Z axis cylinder control output interface, OC output, maximum supports 100mA current

3	Out2	Shutter control output interface, OC output, maximum supports 100mA current
4	Out3	Reserved output interface, OC output, maximum supports 100mA current
5	Out4	Reserved output interface, OC output, maximum supports 100mA current
6	VCC	24V power supply output interface

1.Here the output interfaces are low voltage effective, with a maximum current of 100mA, which can drive relays.

2.The status of tricolor light is as follows:

Yellow light on, green and red lights off	Pending
Green light on, yellow and red lights off	Running
Green and yellow lights on, red light off	Pause
Red light on, green and yellow lights off	Alarm

1.Status signal is valid when the system is in processing state. After the system finishes processing, the Finish interface will output a valid signal for 3 seconds.

Status:
Finish: Idle Start Work Work Finish Back Idle
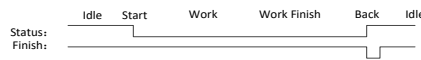
3.6 High power high frequency signal output interface CN10

PIN	Signal	Definitions
1	GND	GND
2	PWM	Reserved output interface, OC output, maximum supports 1A current
3	Ena	Reserved output interface, OC output, maximum supports 1A current
4	VCC	24V power supply output interface, maximum supports 1A current

The high-power high-frequency interface adopts OC output, which can support large-current drive and can drive solenoid valves for connection.

3.7 Five-axis drive interface

Five motion axis interfaces are the same. Take the X-axis interface as an example.

PIN	Signal	Definitions
1	GND	GND
2	B-	Encoder B negative phase
3	A+	Encoder A positive phase
4	Pul-	Pulse signal negative phase
5	Dir+	Direction signal positive phase
6	+5V	5V output power supply
7	B+	Encoder B positive phase
8	A-	Encoder A negative phase
9	Pul+	Pulse signal positive phase
10	Dir-	Direction signal negative phase
11	+24V	24V power supply output
12	ALM	Servo drive alarm input
13	SON	Servo enable
14	RST	Clear servo alarm
15	Reserve	Suspend

1.If connecting to a stepper motor, the differential connection, Yang connection, Yin connection and other connection methods can be adopted. The connection method can be determined by the specific case of stepper motor drive, and differential connection is recommended.

RDC6555G   Stepper Motor Driver

RDC6555G		Stepper Motor Driver
Pul+	Shielded	PULSE+
Pul−		PULSE−
Dir+		DIR+
Dir−		DIR−
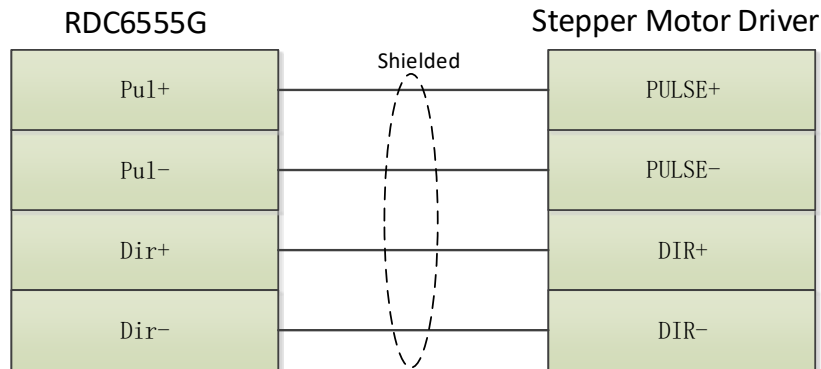
2.If connecting to a servo motor, please correctly set the servo drive parameters according to the servo drive model.

Panasonic AC Servo Driver Connection

RDC6555G		Shielded	MINAS A6 Series Servo Driver	
Pul+	9		3	PULSE1
Pul−	4		4	PULSE2
Dir+	5		5	SIGN1
Dir−	10		6	SIGN2
A+	3		21	OA+
A−	8		22	OA−
B+	7		48	OB+
B−	2		49	OB−
+24V	11		7	COM+
SON	13		29	SRV−ON
ALM	12		37	AML+
CLR	14		31	A−CLR
GND	1		41	COM−

ASDA AC Servo Driver Connection

RDC6555G		Shielded	A2 Series Servo Driver	
Pul+	9		43	PULSE
Pul−	4		41	/PULSE
Dir+	5		36	SIGN
Dir−	10		37	/SIGN
A+	3		21	OA
A−	8		22	/OA
B+	7		25	OB
B−	2		23	/OB
+24V	11		11	COM+
SON	13		9	DI1 SON
ALM	12		28	DO5+ ALRM
CLR	14		33	DI5 ARST
GND	1		45	COM−
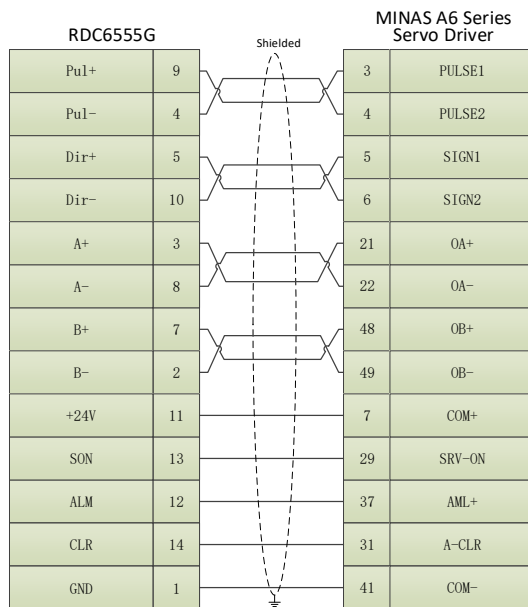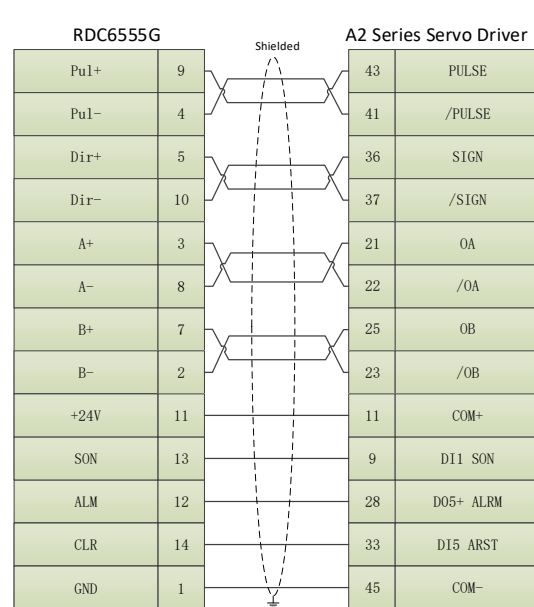
1.For servo drives, user have to set the relevant parameter configurations, otherwise the machine cannot run or the movement control will be abnormal.

2. The pulse direction signal and encoder feedback signal in the connection line between the control card and the servo drive are high-speed differential signals. It is recommended to use a high-quality twisted pair cable with a shield.

3.8 Laser source control signal interface HSIO

PIN	Signal	Definitions
1	5V	5V power supply output interface
2	Ena-	Laser enable negative interface, TTL level
3	L_ON+	Laser source control positive interface, TTL level
4	PWM+	Laser source modulation signal positive interface, TTL level
5	GND	GND
6	Ena+	Laser source enable positive interface, TTL level
7	L_ON-	Laser source control negative interface, TTL level
8	PWM-	Laser source modulation signal negative interface, TTL level
9	L-AN	Analog output interface, default 0-10V output

1.RF tube laser source wiring, take the coherent C-30 series laser source as an example:
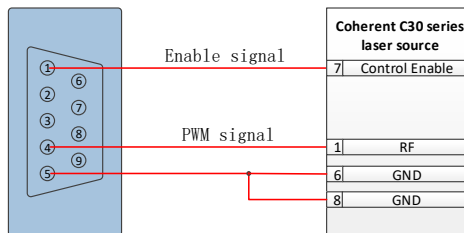
2.CO2 glass tube laser source wiring:
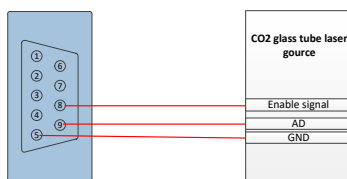
3.UV laser source wiring:
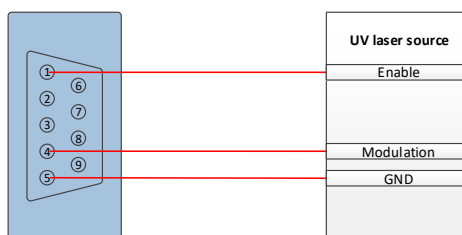
3.9 Serial communication interface COM

PIN	Signal	Definitions
1	TX1	First extended peripheral interconnection interface transmission
2	RX1	The first extended peripheral interconnection interface reception
3	GND	GND
4	TX2	The second extended peripheral interconnection interface transmission
5	RX2	The Second extended peripheral interconnection interface reception
6	+5V	+5V output interface

3.10 Ethernet interface

Ethernet is an ethernet interface, through which 10/100MHZ Ethernet communication between mainboard and PC.

3.11 U disk interface

U disk is USB-AM interface, which is the interface for motherboard to access Udisk. Do not directly connect to computer USB interface.

3.12 HMI interface

The connecting interface between the mainboard and the panel is the parallel line of PIN to PIN.

Chapter 4　HMI Function Introduction

This chapter includes:

■ HMI function introduction

■ HMI operation introduction

■ Parameter Description

4.1　Introduction

RDC6555G-HMI panel (hereinafter referred to as "Panel") is a human-machine operation interface based on 5.0" TFT LCD screen, with beautiful interface and friendly human-machine. The panel can describe the motion track of the controller in real time, support real-time position and real-time speed display. Users can clearly understand the current processing status. It also supports file management, file preview, user parameter and factory parameter modification, multi-language interface switching and other functions.
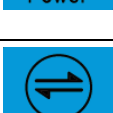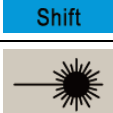
Figure 4.1
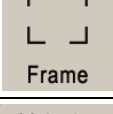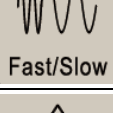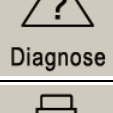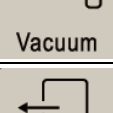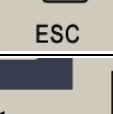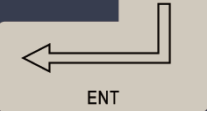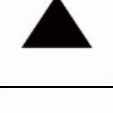
Panel features:
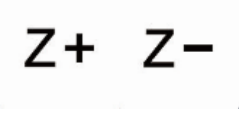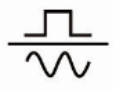
- 5.0 inches TFT

- 854*480 resolution ratio

- 64K color

- RS232 standard serial communication

- Buzzer

4.2 Button function introduction

No.	Button pics	Functions
1	Reset	System hardware reset
2	▶II St/Pau	Start working or pause
3	Stop	Stop processing or motor axis movement
4	File	Memory file and U disk file management
5	Menu	User parameters, factory parameters, language settings, etc.
6	Speed	1.Setting frame speed 2.If the system is in processing state, the current layer speed can be modified.
7	Power	1.Set the pulse control signal parameters 2.If the system is in processing state, the current layer process parameters can be modified.
8	Shift	1.Special function switch 2.Quick page flip
9	Pulse	laser on

10		Auto focus
11		Set positioning point
12		Frame operation on current processing file
13		Set the current button speed fast/slow
14		Quick access to system diagnostic interface
15		Blow interface control button
16		Vacuum interface control button
17		return to the upper menu, cancel parameter settings, etc.
18		Enter
19		For moving the X-axis or the left key of the movement option in the menu
20		For moving the X-axis or the right key of the movement option in the menu
21		For moving the Y-axis or the upper key of the movement option in the menu
22		For moving the Y-axis or the lower key of the movement option in the menu

23	Z+ Z−	For moving the Z-axis
24	U+ U−	For moving the U-axis
25	⊓/⌁	Switch between jog movement and continuous movement
26	•	Used to set parameters with decimals
27	←	Used to delete parameters
28	Number 0~9	Used to set parameters

4.3　Main interface functions

The main interface will be displayed when the system is powered on and reset. As shown below:

Graphic display area

Coordinate display area

Parameter display area

System status area

Layer parameter area

Network connection status

Processing progress bar

Number of workpieces　　Working status area　　Processing time　　Mode display　　Keyboard lock status

Work file :　　TempFile
X:　　12.3　　Y:　　45.6
Z:　　0.0　　U:　　0.0
SP:　0mm/s　　P:　　0%
Manual power　　2.0%/3.0K
Frame speed :　　100mm/s
Sys norma　　Conti

Count　　23　　dle　00:13:14　　General m

Figure 4.3

- Graphic display area: this area is used for file preview and for drawing the processed file image during processing.

- Coordinate display area: Display system coordinates, speed and power in real-time

- Parameter display area: Display the current pulse power parameter and frame speed.

- System status area: Display the system status and the current manual movement mode.

- Layer parameter area: Display the layer parameters of the current processing file or the layer parameters of the preview file. The parameters from left to right are: layer number, layer color, layer speed and layer process parameters.

- Working status area: Display the current working status of the system, which are idle, paused, completed, running. The processing time is displayed on the right side.

- Processing progress bar: Display the current processing progress

- Number of workpieces: Display the processed quantity of the current processing file.

- Mode display: General mode and visual processing display.

- Network connection status: Mainboard network connection status display. After the connected . otherwise will be displayed.

- Keyboard lock status: when the keyboard lock function is enabled, will be displayed. Pressing any key does not response and prompts to enter the unlock password. It will be unlocked after entering the correct unlock password.
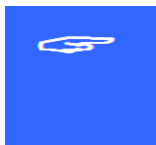
1.In the completed/idle state, the keys can all work, and the user can perform file processing, parameter setting, file preview, and other operations.
2.In the running/paused state, some keys do not work, such as the positioning key, frame key and file key, etc.

4.4　Files

4.4.1 Memory file

Press the [File] button on the panel to enter the file management interface

File:	Count:		Run	Work file:	TempFile
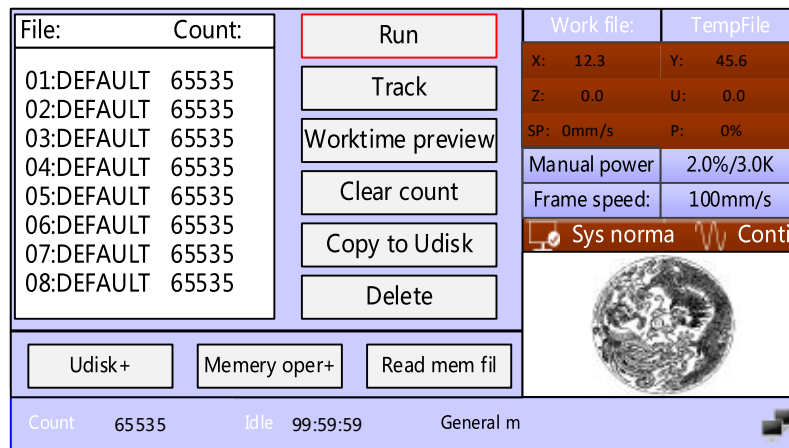
Figure 4.4.1

When entering this interface, the controller will read the memory file of the system automatically, the file name and number of processed pieces will be displayed on the list, and the selected file will be previewed in the preview area on the right. When there are multiple files, press the up/down keys to select a file, this file will be previewed, and the graph will be displayed on the upper right of the interface. The file will be previewed on the main interface when you press [ENT], and the current file dialog box will be closed. If you want to cancel the preview, press [ESC].

Press the left and right keys to switch back and forth with a red box between the file list on the left and the item on the right, indicating the list or item is activated, which is convenient for users to operate. When the "red selection frame" stops on the item, press the up and down keys to select the item, and press [ENT] to activate the item. Press [ESC] to return to the main interface. The content of the items on the right and bottom are as follows:

Item	Descriptions
Run	Process the selected file
frame	Walk the frame for the selected file
Working hour preview	Display the total processing time of the file

Clear the number of pieces	Clear the number of processed pieces of the selected file
Copy to U disk	Copy the file to U disk
Delete files	Delete the file
U disk files	U disk file menu
Memory operation	Enter the memory operation subordinate menu
Read memory file	Read memory file list

4.4.2 Layer parameters

After selecting the file to be processed in the file list, there is layer information in the main interface layer parameter area, as shown below:
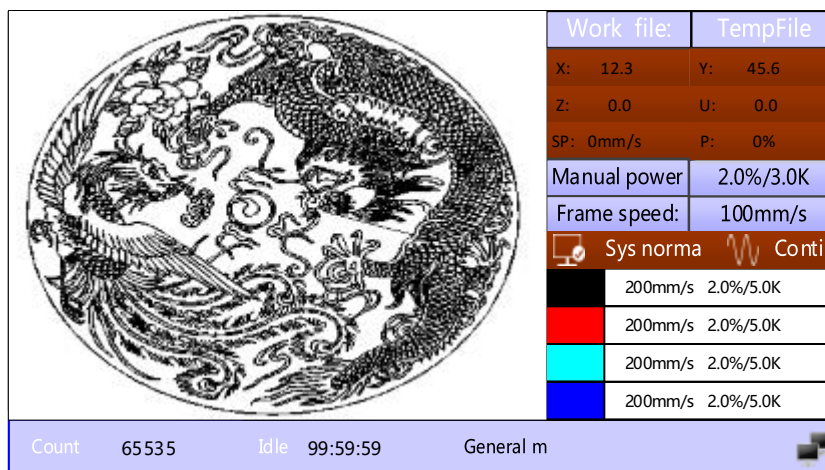
Figure 4.4.2-1

The [ENT] key to select the layer parameter area, then a "red selection box" appears in the first line of the layer list, as shown in the following figure:
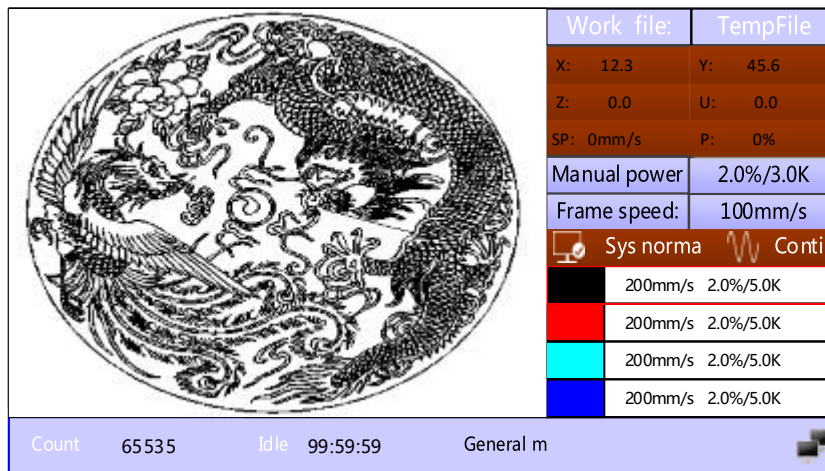
Figure 4.4.2-2

Then user can press the up and down keys to select the layer number, the "selection box" will move as well. After selecting the layer number to be modified, press the [ENT] key, the layer setting interface will pop up as shown below:
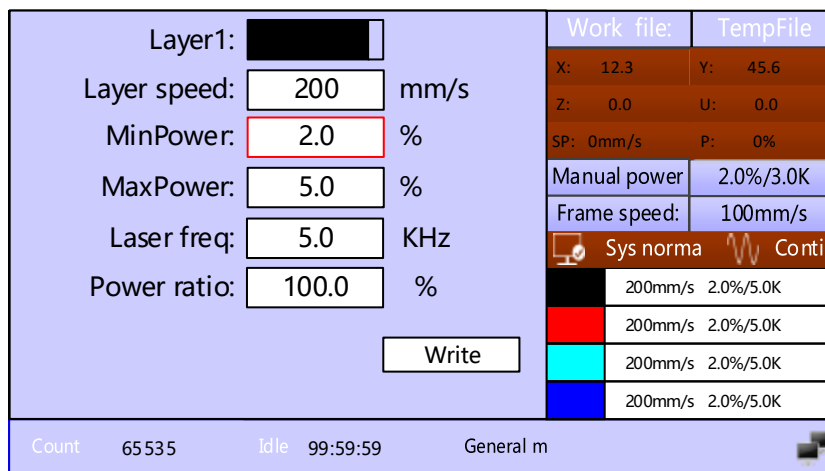
Figure 4.4.2-3

Here the "red selection box" stops on the layer number item, press [ENT] key to enter the layer selection mode, the "red selection box" becomes optional mode. Press "Up/Down" key to select other layers, and press [ENT] to exit the layer selection mode. Then press the "Up/Down" key to move the "Selection box" to the layer parameter item that needs to be modified. Press number key and delete key to set and modify the parameters. After setting the parameters, move the "Selection box" to the "Write parameters" item and press [ENT] key to

save the current layer parameters, the current parameters take active, otherwise the parameters are not saved. Press [ESC] key returns to the main interface.

4.4.3 Memory operation

Select "memory operation" item in the above interface, press [ENT] key and the pop-up menu is as shown below:
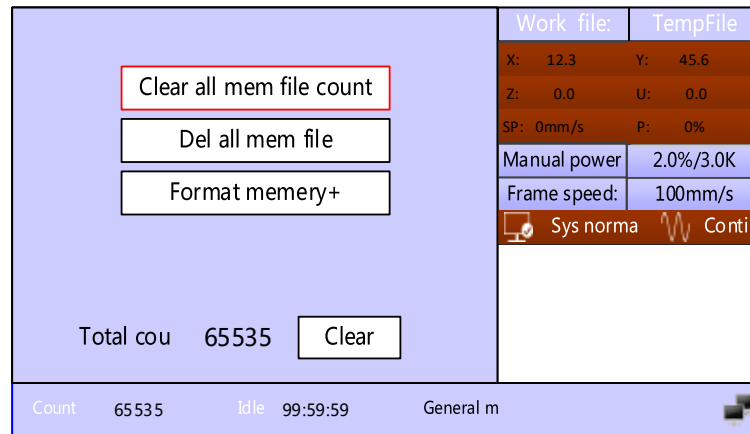
Figure 4.4.3-1

Item	Descriptions
Clear all memory files	Clear the number of processed pieces of all memory files
Delete all memory files	Clear all memory files
Format memory	Enter the subordinate menu of formatting memory
Total number	Display the sum of processed pieces of all memory files, which can be cleared by the "Clear" item on the right

Select [Format memory] item in the above interface, press [ENT] to clear the memory file, and the pop-up menu is as shown in the figure:

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ShenZhen Ruida Technology Co.,Ltd
每一步都是创造·Thinking in motion·
RDC6555G Precision Laser cutting control system user manual

Work file:	TempFile
X: 12.3	Y: 45.6
Z: 0.0	U: 0.0
SP: 0mm/s	P: 0%

Format speedly

Format in grain

| Manual power | 2.0%/3.0K |
| Frame speed: | 100mm/s |

Sys norma   Conti

Count   65535   Idle   99:59:59   General m
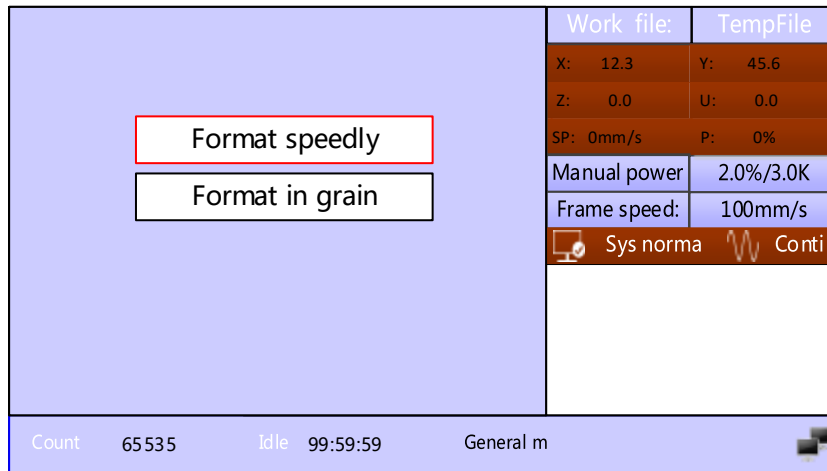
Figure 4.4.3-2

4.4.4 U disk file

Select [U disk+] item from [File] interface, press [ENT] to pop up U disk file list. The operation method is the same as the memory file. Press [ESC] to return to the "File" interface. As the figure shows:

File:		Work file:	TempFile
01:DEFAULT		X: 12.3	Y: 45.6
02:DEFAULT	**Read Udisk file**	Z: 0.0	U: 0.0
03:DEFAULT		SP: 0mm/s	P: 0%
04:DEFAULT	Copy to mem	Manual power	2.0%/3.0K
05:DEFAULT		Frame speed:	100mm/s
06:DEFAULT	Delete	Sys norma Conti	
07:DEFAULT			
08:DEFAULT			

Count   65535   Idle   99:59:59   General m
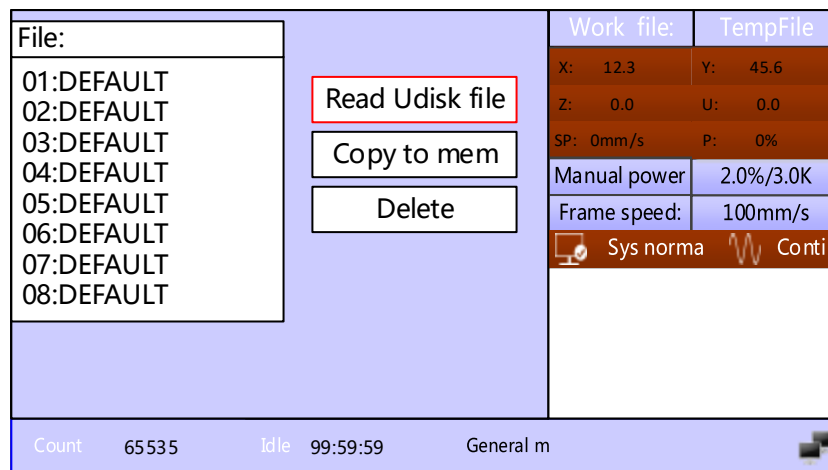
Figure 4.4.4

Item	Descriptions
Read U disk files	Read U disk file
Copy to memory	Copy files to memory
Delete files	Delete files from U disk
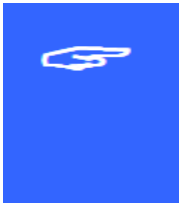
☞ This system supports FAT32 and FAT16 file formats of the U disk. Files must be placed in the root directory of the U disk to be recognized by the system. File names exceeding 8 characters will be automatically cut off by the system. Files name only can read English and numbers. The files copied from the mainboard to the U disk are placed in the U disk root directory.

4.5　Menu

Press [Menu]　・on the panel to enter the menu interface, and select the items ,as shown in the figure:

Work file:	TempFile
User setting	Function+
Manufactory setti	Set factory para
Controller settin	Set default para

X: 12.3	Y: 45.6
Z: 0.0	U: 0.0
SP: 0mm/s	P: 0%
Manual power	2.0%/3.0K
Frame speed:	100mm/s

Sys norma　Conti

Count 65535　Idle 99:59:59　General m
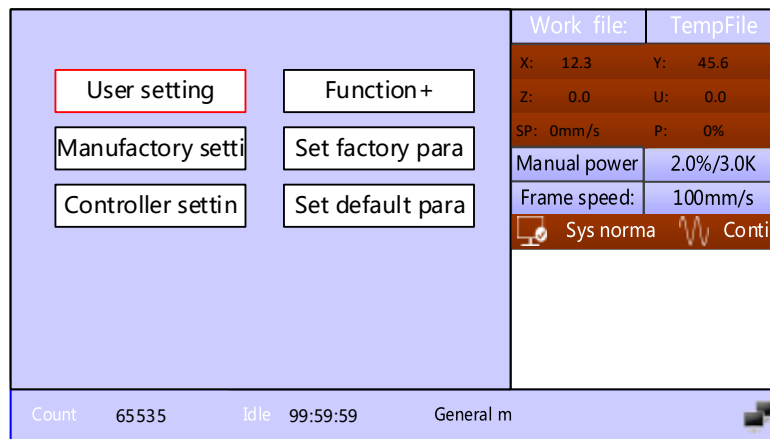
Figure 4.5

4.5.1 User setting

Select [User setting] through the [Menu]on the panel, user setting includes: cut para, key para, , return para, working speed ,reset para, , focusing para, frame para ,feeding para, and other para.
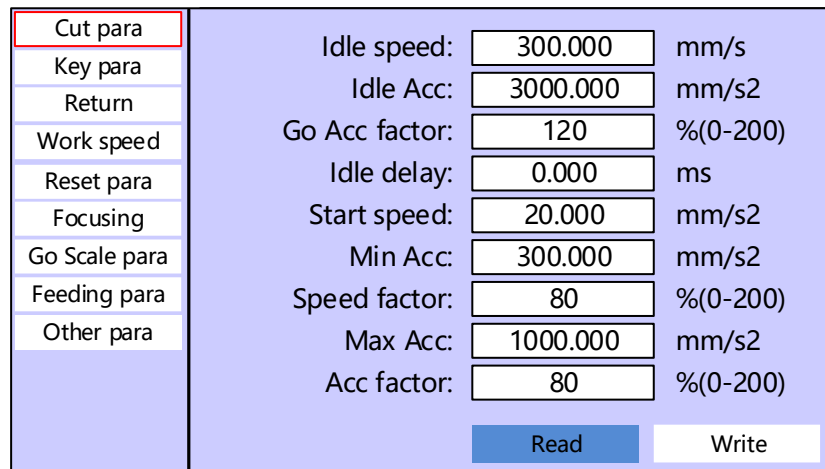
Figure 4.5.1-1

When entering the user setting, the panel will automatically read and display the mainboard parameters. After all the parameters are read, user can select the parameters by pressing the [Up/Down] key to move the red cursor, such as [Key para], [Frame para], etc. The parameter area on the right displays the corresponding parameters. If the user does not need to modify the parameters, press the [Esc] to return.

If the user needs to modify the parameters, press the Right key, and the red cursor will switch to the first parameter in the parameter area on the right, as shown in the figure below:
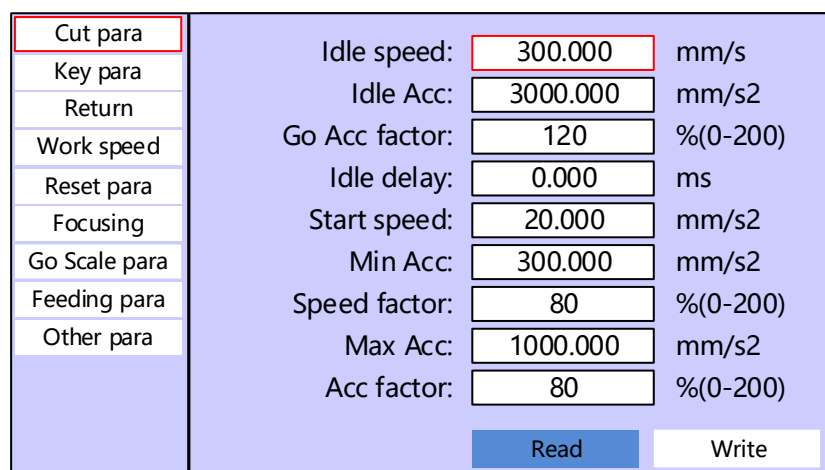
Figure 4.5.1-2

User can press the [Up/Down] key to select the parameters to be modified, and press numeric keys to modify the numerical parameters (such as [Idle speed]). After completing the modification, move the red cursor to the

[Write] option with the arrow keys, and then press the [ENT] from the panel.

Other interface operations are similar, the interface display is as below:

Cut para	
Key para	X key fast : 100.000 mm/s
Return	X key slow: 20.000 mm/s
Work speed	Y key fast : 100.000 mm/s
Reset para	Y key slow: 20.000 mm/s
Focusing	Z key fast : 100.000 mm/s
Go Scale para	Z key slow: 20.000 mm/s
Feeding para	U key fast : 100.000 mm/s
Other para	U key slow: 20.000 mm/s
	Read Write

Cut para	
Key para	
Return	
Work speed	
Reset para	Go scale mode: Close laser
Focusing	Go scale blank: 0.000 mm
Go Scale para	
Feeding para	
Other para	
	Read Write

Cut para	
Key para	
Return	
Work speed	Return positin: Not return
Reset para	Docking point x: 100.000 mm
Focusing	Docking point y: 100.000 mm
Go Scale para	
Feeding para	
Other para	
	Read Write

Cut para	
Key para	X Reset speed: 50.000 mm/s
Return	Y Reset speed: 50.000 mm/s
Work speed	Z Reset speed: 50.000 mm/s
Reset para	U Reset speed: 50.000 mm/s
Focusing	X on reset: Yes
Go Scale para	Y on reset: Yes
Feeding para	Z on reset: No
Other para	U on reset: No
	Read Write

Cut para	
Key para	
Return	
Work speed	Z work speed: 10.000 mm/s
Reset para	U work speed: 50.000 mm/s
Focusing	
Go Scale para	
Feeding para	
Other para	
	Read Write

Cut para	
Key para	Enable single lift and No
Return	Focus coordinate posit 10.000 mm
Work speed	Offset height of singl 1.000 mm
Reset para	Z axis stop point: 5 mm
Focusing	Lifting in place delay 10 ms
Go Scale para	Fall in position delay 10 ms
Feeding para	
Other para	
	Read Write

Cut para	
Key para	
Return	Delay before feed: 5.000 s
Work speed	Delay after feed: 5.000 ms
Reset para	Progressive feeding: No
Focusing	Progressive feeding re 0.000 mm
Go Scale para	Last feeding: No
Feeding para	
Other para	
	Read Write

Cut para	
Key para	X Backlash: 0.000 mm
Return	Y Backlash: 0.000 mm
Work speed	Blow type: Manual blow
Reset para	Adsorb type: Manual
Focusing	Adsorb on type: 5.000 ms
Go Scale para	Adsorb off type: 5.000 ms
Feeding para	First pulse supp strat 10.0 %
Other para	First pulse supp durat 10.0 ms
	Read Write

Figure 4.5.1-3

The detailed description of user parameters is as follows:

Cut paras	**Idle speed**	After the machine starts processing to the end of processing, all motion without laser on is idle motion. This parameter determines the maximum speed of the idle motion.
	Idle acc	The acceleration of idle motion. Setting the idle motion and idle acceleration too large may cause the trajectory to jitter.
	G0 ACC factor	Acceleration of idle motion
	Idle delay	If the value is 0, there is no delay after idling. Otherwise, it decelerates to 0 and delays after each idle movement, and then starts processing with laser on.
	Start speed	The speed when turning during processing movement.
	Min ACC	The acceleration during turning. Setting the turning speed and turning acceleration too large may cause the turning jitter.
	Speed factor	Acceleration during turning
	Max Acc	The maximum acceleration value of cutting during the whole processing
	Acc factor	The acceleration during processing
Key para	**X key fast**	Refers to the speed of manually moving the X-axis when in [Fast speed]
	X key slow	Refers to the speed of manually moving the X-axis when in [Slow speed]
	Y key fast	Refers to the speed of manually moving the Y-axis when in [Fast speed]
	Y key slow	Refers to the speed of manually moving the Y-axis when in [Slow speed]
	Z key fast	Refers to the speed of manually moving the Z-axis when in [Fast speed]
	Z key slow	Refers to the speed of manually moving the Z-axis when in [Slow

		speed]
	U Key fast	Refers to the speed of manually moving the U-axis when in [Fast speed]
	U key slow	Refers to the speed of manually moving the U-axis when in [Slow speed]
Return	**Return position**	The position where laser head stops after processing. There are four options for origin, absolute origin, no-return and docking point.
	Docking point X	Used to set the X-axis coordinate position of the docking point.
	Docking point X	Used to set the X-axis coordinate position of the docking point.
Work speed	**Z work speed**	Z-axis working speed
	U work speed	U-axis working speed
Reset para	**X reset speed**	Speed when X-axis resets
	Y reset speed	Speed when Y-axis resets
	Z reset speed	Speed when Z-axis resets
	U reset speed	Speed when U-axis resets
	X on reset	If the X-axis boot reset is enabled, the X-axis will be reset automatically when the machine is turned on, otherwise it will not be reset automatically.
	Y on reset	If the Y-axis boot reset is enabled, the Y-axis will be reset automatically when the machine is turned on, otherwise it will not be reset automatically.
	Z on reset	If the Z-axis boot reset is enabled, the Z-axis will be reset automatically when the machine is turned on, otherwise it will not be reset automatically.
	U on reset	。 If the U-axis boot reset is enabled, the U-axis will be reset

		automatically when the machine is turned on, otherwise it will not be reset automatically.
Focusing	**Enable Z-axis single lifting**	After enabling Z-axis single lifting, it will only be lifted once in the whole processing, and the lifting setting in the layer parameters is invalid.
	Focus coordinate position	Z-axis works in the motor mode and is controlled up and down so that the laser focus is on the Z-axis coordinate of the cutting table.
	Single lifting offset height	When the Z-axis lifting is controlled by a motor, after enabling the Z-axis single lifting, the distance between the laser focus and the table by the Z-axis focusing.
	Z-axis docking point	After enabling the Z-axis lifting, it is Z-axis docking position when each processing completed.
	Lift in position delay	The lifting action refers to the separation of the cutting head from the table. After the Z-axis is automatically lifted, it will delay a period of time before proceeding to the next step, to ensure that the Z-axis moves in place.
	Follow down delay	The following action refers to the cutting head getting close to the table. After the Z-axis is automatically lifted, it will delay a period of time before proceeding to the next step, to ensure that the Z-axis moves in place.
Frame parameters	**Frame mode**	The movement mode when the panel starts the frame movement, which can be laser on frame and laser off frame.
	Expansion distance	The expansion distance of frame movement against to the actual graphic frame.
Feeding parameters	**Feeding times**	The system automatic feeding times
	Feeding length	The moving distance of feeding axis in every feeds

	Delay before feed	The time can be set from 0 to 300s, the feeding axis starts to move after the previous work is completed and the value is delayed. During the delay period, it is convenient for users to load and pick the materials on the feeding device.
	Delay after feed	The time can be set from 0 to 9.9s, which is convenient for the feeding device to move in place, delay to jitter, and wait for the feeding shaft completely standing still before performing the second working.
	Finish feeding	Set whether to continue feeding after the last feeding process is completed
	Feeding compensation	Due to the inaccuracy of feeding shaft movement, the feeding length can be compensated by setting this item.
Other parameters	**X Backlash**	X Backlash. Set this value according to whether the machine actually has a backlash, accurate to 1um, if the value is not zero, the mainboard will compensate for the Backlash.
	Y Backlash	Y backlash. Set this value according to whether the machine actually has a backlash, accurate to 1um, if the value is not zero, the motherboard will compensate for the backlash.
	Blowing type	Set the blowing interface control method, manual blowing, processing blowing, and laser-on blowing are supported.
	Adsorb type	Adsorption control method, manual and automatic controls are supported.
	Adsorb on delay	For automatic adsorption, the system opens the adsorption for a period of time before starting processing
	Adsorb off delay	For automatic adsorption, the system delays a period of time and then closes the adsorption after processing.

	First pulse suppression starting power	Taking RF tube as an example, if the same signal is used to control the laser source output, the first few pulse actual laser on by the laser source have a larger energy, so it needs to suppressed.
	First pulse suppression duration	The duration of the first pulse suppression function, after which the normal laser control signal is output.

4.5.2 Manufactory setting

Select [Manufactory parameters] through the [Menu] on the panel, the manufactory setting interface requires to input the password before entering, the password is rd8888,the interface is as follows. The factory parameter interface operation and setting are the same as user parameter interface, which will not be repeated here. The parameters of each axis are the same, and the other interfaces are as follows.
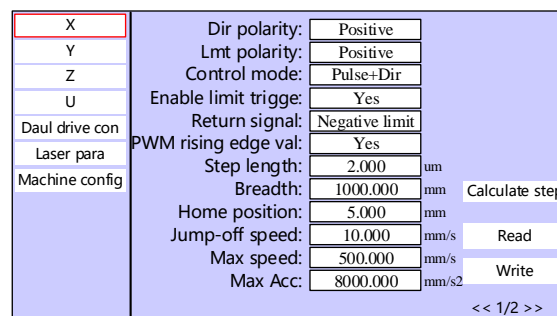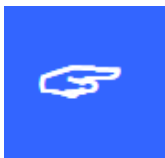

Figure 4.5.2

1.Axis parameters are divided into two pages.

2.The parameters of Y1 axis and Y2 axis are the same.

The factory parameters are detailed in the following table:

X, Y, Z, U	Direction polarity	Modify the direction polarity to make the motor move in the

Axis		
		opposite direction. The purpose of modification is to make the axis move to the origin when reset. If the axis moves away from the origin when reset, it means that the axis direction polarity setting is wrong and should be modified.
	Limit polarity	Used to set the high and low voltage mode of the limit signal. If a low voltage signal is output to the mainboard when the moving axis reaches the limit position, at this time the limit polarity should be set to negative.
	Control mode	The type of controller output pulse includes positive and negative pulse and pulse + direction two modes. Generally, it is set to pulse + direction mode.
	Hard limit protection	If hard limit is enabled, limit protection will be generated when the hard limit is triggered; if hard limit is forbidden, protection will not be generated when the hard limit is triggered.
	Back to origin signal	When the system is reset to find the origin, the negative limit or zero point can be selected as the position of 0 coordinate. After setting the parameters, the corresponding CN2, CN3, CN4 hardware interfaces of the card require to be wired correctly.
	PWM rising edge effective	Used to set whether the pulse signal of motor drive is valid on rising edge or falling edge. When this item is not enabled, the controller uses the falling edge to be valid; when this item is enabled, the controller uses the rising edge to be valid. If the processing position is offset after a long time processing, this item requires to be modified.
	Motor step	It is the pulse equivalent of the motor. When a pulse is sent to the motor, the absolute distance value traveled by the corresponding moving axis. Before this value is set correctly,

		the machine can cut a larger rectangle (larger graphics can make the error smaller), and automatically calculate the motor step through the graphic length and the measured length.
	Stroke	The maximum distance that the motion axis running.depends on the actual situation of the machine
	Origin offset	If the shaft enables hard limit protection, the value should usually be set to 2-5mm. If set to 0, when the motion shaft runs to the minimum coordinate 0, it may make the limit valid, which will trigger the hard limit protection function by mistake and protect the machine.
	Jump-off speed	The speed at the beginning of motion. Typical values are 5 to 30 mm/s.
	Maximum speed	The maximum limit motion speed that the axis can withstand. This parameter is related to the driving ability of the motor, the inertia of the motion shaft and transmission ratio.
	Maximum acceleration	The maximum acceleration value allowed by the motion axis during acceleration and deceleration.
	Emergency stop acceleration	If the axis enables hard limit protection, when the axis moves to the limit position, the axis will be performed an emergency deceleration shutdown with an emergency stop acceleration. The value can be 1.5 to 3 times the maximum acceleration of the shaft.
	Servo enable	Used to configure whether the servo enable interface is a valid level signal.
	Servo alarm enable	If the servo alarm is enabled, the protection will be generated when the servo driver alarms; if the servo alarm is forbidden, the protection will not be generated when the servo driver

|		
		alarms.
	Encoder enable	If the encoder enables, the system hardware connection is considered to be connected the encoder.
	Encoder polarity	Used to set the polarity of the encoder.
	Encoder resolution	Set the number of encoder feedback pulses per motor revolution, which is related to the driver parameter setting.
	Lead	The distance that the motor moves in one revolution.
	Follow deviation alarm enable	When connecting to the encoder, the system will detect the sent command signal and feedback signal of the servo driver. If the difference is too large, it will prompt an alarm.
	Maximum follow deviation	The maximum allowable value of motor motion delay.
	Key reverse	Control the motion direction when the manual key moves the motion axis. When the direction polarity parameter is correctly set, if you press the arrow key on the operation panel and the shaft moves in the opposite direction, then enable the key to reverse.
	Key jump-off speed	The starting speed of moving the axis by the pressing key on the keyboard, which cannot be higher than the take-off speed of the axis.
	Key acceleration	the acceleration value of moving the axis by the pressing key, which cannot be higher than the maximum acceleration of the shaft.
Dual-drive configuration	**Y-axis dual-drive enable**	When Y-axis is a dual-drive structure, this parameter is required to be enabled.
	Dual-drive synchronization alarm enable	If the dual-drive synchronous alarm is enabled, protection will be generated when Y-axis dual-drive misaligned; if the

		dual-drive synchronous alarm is forbidden, protection will not be generated when the Y-axis misaligned.
	Dual-drive synchronization error	If the dual-drive synchronous alarm is enabled, protection will be generated when the Y-axis dual-drive misalignment deviation is greater than the dual-drive synchronization error.
Laser source	**Laser source enable**	Whether to enable the laser source to emit light.
	Type of laser tube	Set the laser source type, supporting glass tube, RF tube and UV types. The default is RF tube.
	Control mode	Support PSS, PSV, PSP, FSP mode optional. PSS is a fixed power mode, PSV is a power following mode, PSP is a position synchronization mode, FSP is a fixed pulse width mode, and the default is FSP mode.
	Laser frequency	Laser source working frequency.
	Maximum power	The maximum allowable power.
	Enable precombustion	Some RF tubes need to have precombustion signal, and the parameters are used to whether to output a precombustion signal.
	Precombustion frequency	Some RF tubes need to have precombustion signal, and the parameters are used to set the precombustion signal frequency.
	Precombustion duty cycle	Some RF tubes need to have precombustion signal, the parameters are used to set the precombustion signal duty cycle.
	Laser on signal active	Set the active voltage of laser on signal.
	Corner power ratio	Relative to the normal power, adjust the corner power.
	Corner speed ratio	Relative to the processing speed, the corner power regulates the speed range.
Machine configuration	**Grating protection enable**	When enabling this signal, a low voltage signal is required to

		be input continuously from the outside to the corresponding hardware interface, otherwise it cannot be processed and an alarm will be prompted.
	Cover-opening protection enable	When enabling this signal, a low voltage signal is required to be input continuously from the outside to the corresponding hardware interface, otherwise it cannot be processed and an alarm will be prompted.
	Water protection enable	When enabling this signal, a low voltage signal is required to be input continuously from the outside to the corresponding hardware interface, otherwise it cannot be processed and an alarm will be prompted.
	Feeding mode	One-way/two-way are optional. When it is a one-way feeding, it can always feed in one direction without checking the coordinates; when two-way feeding is selected, the system will check the maximum and minimum coordinates, feeding in one direction at odd times, and feeding in the other direction at even times. The initial direction of the first time can be changed by setting the direction polarity or modifying the positive and negative values of the feeding length.
	Power off delay	0 to 3000ms can be set. After the power grid is cut off, the power supply of the system will not immediately drop to 0V, during which there is a delay. The delay value set here should be basically consistent to the actual power outage delay value. If the deviation of the setting value is large, the graphics processed for the second time and the graphics before the power cut may not be closed or overlapped too much when performing power cut continued carving.

	Material-pressing control enable	Whether to enable the Y-axis pressing rod control, check if it is enabled. When the Y-axis pressing rod control is checked, you can select whether the absolute origin of the machine is above or below the machine table.	
	Y-axis origin position	Applied for the Y-axis pressing material, select whether the pressing material is above or below.	
Z-axis configuration	**Enable Z-axis automatic lifting**	After checking to enable it, the system will carry out the Z-axis automatic lifting control. If the Z-axis automatic lifting function is not enabled, all Z-axis lifting actions are invalid, and the Z-axis movement is controlled manual movement only.	
	Control mode	Used to describe the actual configuration of the equipment Z-axis, supporting motor control and air cylinder control. Use card Z-axis control interface when selecting motor mode, and use card OUT1 interface when selecting air cylinder mode.	
	Controlled objects	Used to describe the actual configuration of the equipment Z-axis, control whether the cutting head moves or platform moves.	
	Z-axis origin position	Used to describe the actual configuration of the equipment Z-axis. When the Z-axis is reset, whether the controlled object resets by moving upward or moving downward.	
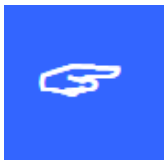
1.After modifying the factory parameters, it must be reset before performing other operations.

4.5.3 Language settings

Select [Controller settings] item and press [ENT], select [Language+] item and press [ENT] to set the panel operation language.
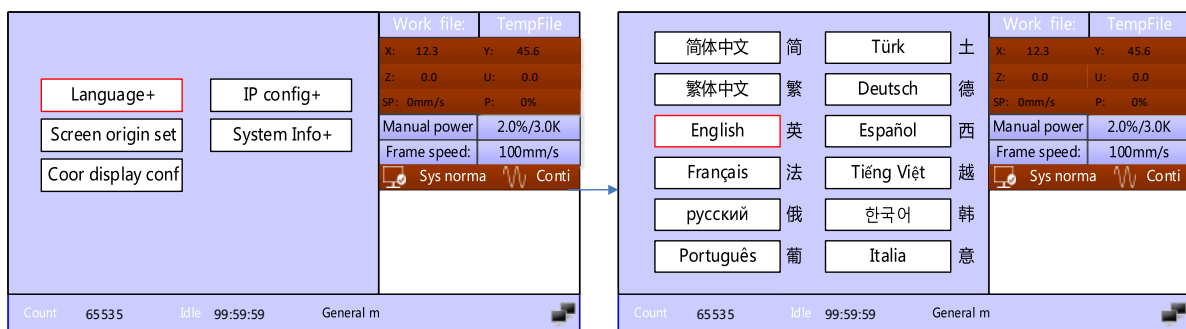

Figure 4.5.3

4.5.4 Screen origin settings

Select [Controller settings] item and press [ENT], select [Screen origin settings] item and press [ENT] to set the origin position of the display screen. Different screen origin positions can be selected to mirror the displayed graphics in different X/Y directions. Please match the screen origin position with the actual machine origin position, otherwise it will cause the screen graphics display be mirrored, which is inconsistent with the actual cutting direction of the graphics. Press the [Up/Down] key to select an origin and press [ENT] to make the setting effective.
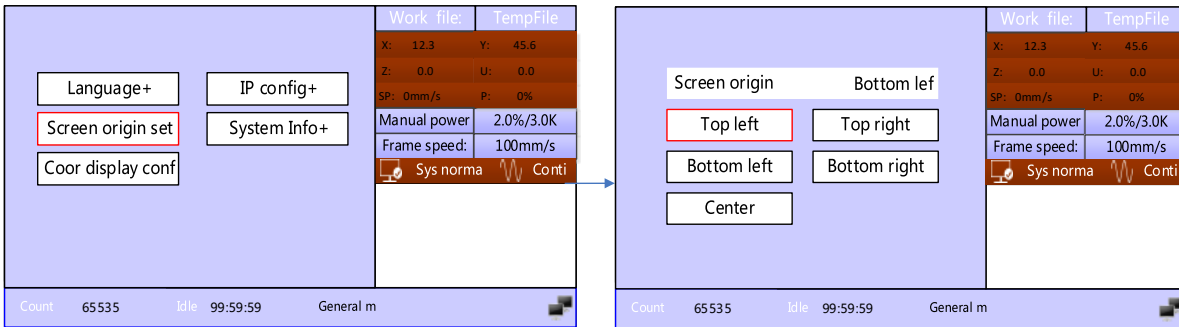
			Work file:	TempFile
			X: 12.3	Y: 45.6

Figure 4.5.4

4.5.5 Coordinate display configuration

Press [Controller settings] item and then [ENT], select [Coor display conf] item and press [ENT] to set the system coordinate display source. When selecting [Planning position], the coordinates displayed on the XY axis are the system default coordinates. when selecting [Actual position], the coordinates displayed on the XY axis are the actual position coordinates calculated by the system detecting external feedback signal.

Figure 4.5.5

4.5.6 IP settings

Select [Controller settings] item and press [ENT], select [IP config+] item and press [ENT] to set the system IP address.
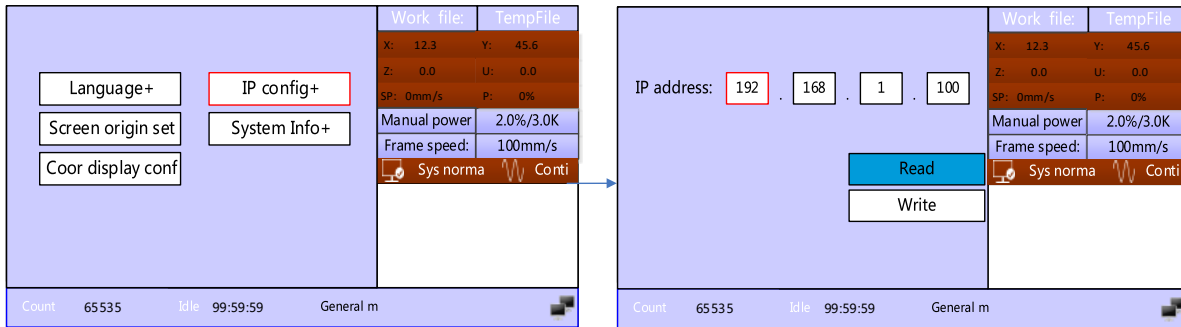
Figure 4.5.7

4.5.7 System information

Select [controller settings] item and press [ENT], select [System info+] item and press [ENT] to view the system information.
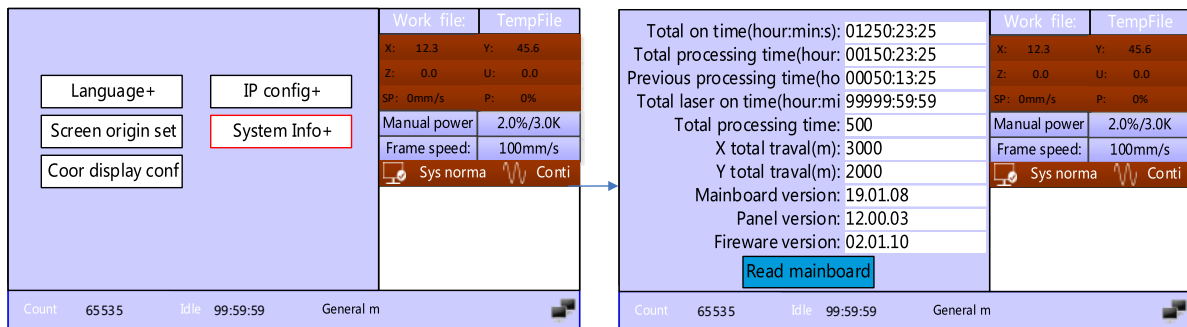

Figure 4.5.8

4.6　Functions

4.6.1 Axis reset

Reset of each axis includes: XY axis reset, X axis reset, Y axis reset, Z axis reset, U axis reset and so on. When the XY axis is reset, only the XY axis will be reset at the same time.others are individual axis reset, only the corresponding axis will be reset.
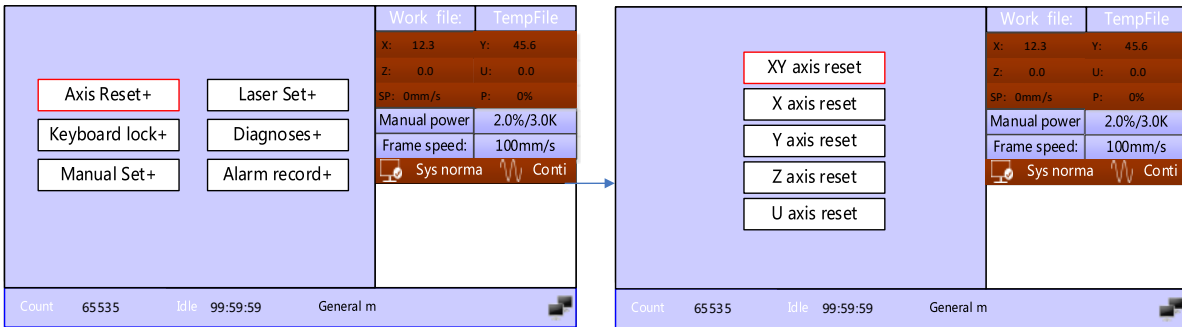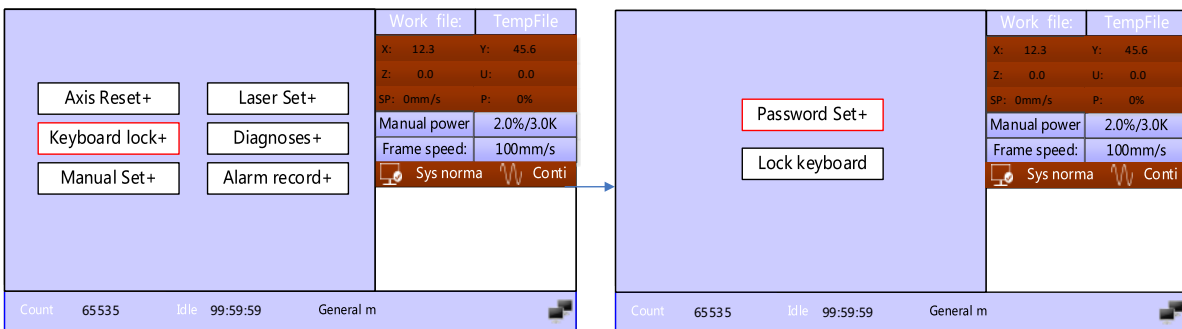
Figure 4.6.1

4.6.2 Keyboard lock+

Figure 4.6.2

Item	Instructions
Password set+	○ This option can set the default password for keyboard lock, and use the new password to lock the keys after setting it successfully.
Keyboard lock	This option can lock the panel keys, after entering the correct password, the keys are automatically locked and return to the main interface. When pressing any key, the interface prompts to enter the password to unlock the keys.

4.6.3 Manual set+

Press [Menu] on the panel and select [Function+], press the [ENT] and select [Manual set+] to enter the parameter configuration page, as shown in the figure:
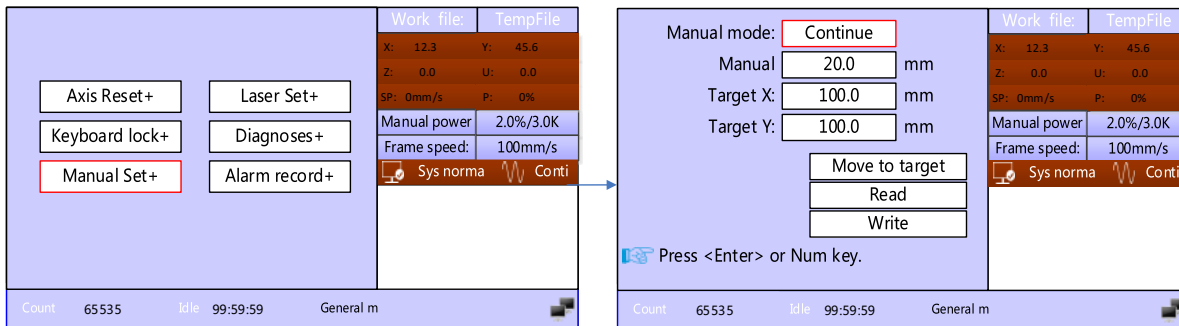

Figure 4.6.3

Item	Instructions
Manual mode	When the manual mode is [Continue], the manual distance does not work. At this time, when pressing the arrow key, the axis moves, when releasing the arrow key, the axis stops moving; when the manual mode is [Manual], the corresponding motion axis runs once for each time the arrow key is pressed, and the running distance is equal to the manual distance set by the user (in the case of not exceeding the machine breadth).
Manual distance	When the manual mode is [manual], the corresponding motion axis runs once for each time the arrow key is pressed, and the running distance is equal to the manual distance value set by the user.

Target coordinate X	Set the target X to be moved to
Target coordinate Y	Set the target Y to be moved to
Move to target position	Move to the target coordinate position set by the parameter

4.6.4 Laser set+

Press the [Menu] key on the panel and select [Function+], press the [ENT] key and select [Laser set+] to access the parameter configuration page, as shown in the figure:
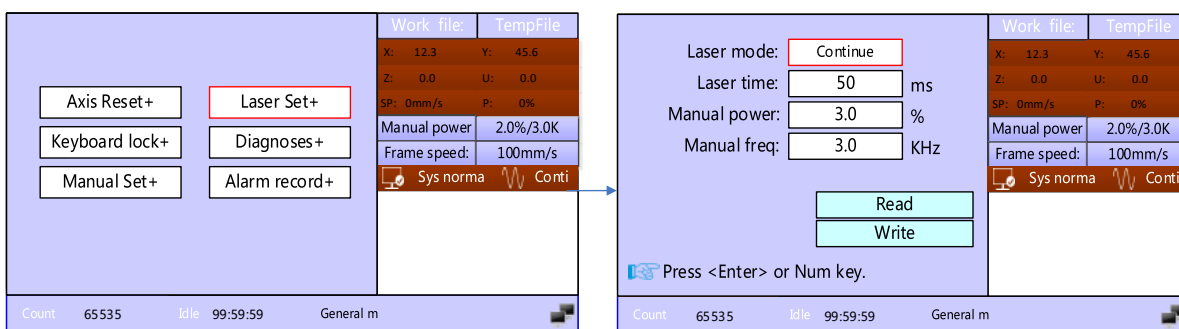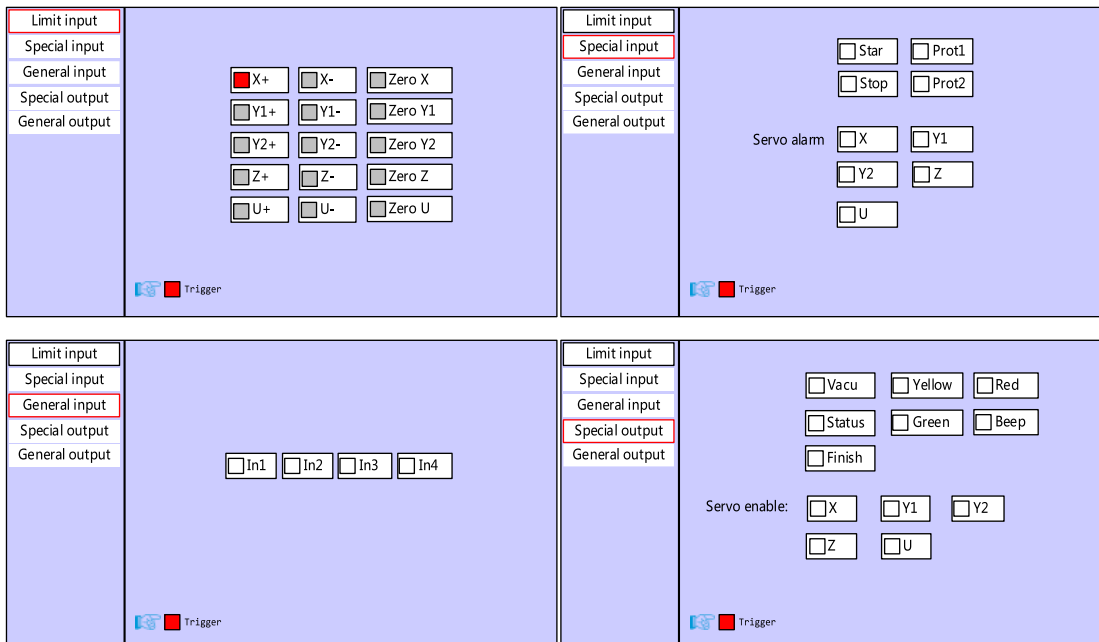

Figure 4.6.4

Item	Instructions
Laser mode	When the laser mode is [Continue], the laser parameter does not work. At this time, when pressing the [pulse] key from panel, it will keep laser on until release. when the manual mode is [laser], it will be laser on for a period of time and automatically stops each time the [pulse] key is pressed, the duration is equal to the laser time value set by the user.
Laser time	When the laser mode is [laser], it will be laser on for a period of

	time and automatically stops each time the [pulse] key is pressed, the duration is equal to the laser time value set by the user.
Manual power	Duty cycle of laser on signal
Laser freq	Frequency of laser on signal

4.6.5 Diagnoses+

Press the [Menu] key on the panel and select [Function+], press the [ENT] key and select [Diagnoses+] to access the diagnosis page, which can detect the input and output IO status in real-time, as shown in the figure:
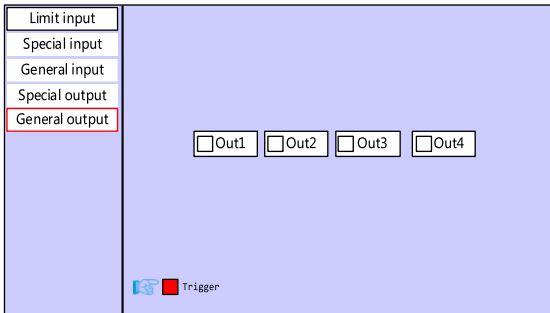
Figure 4.6.5

4.6.6 Alarm record+

Press the [Menu] key on the panel and then select [Function+], press the [ENT] key and then select [Alarm record+] to access alarm record page, in which you can check the abnormal conditions of the alarm. Use the arrow keys to turn the page, if you press the [ENT] key again, some alarms will be processed, as shown in the figure:
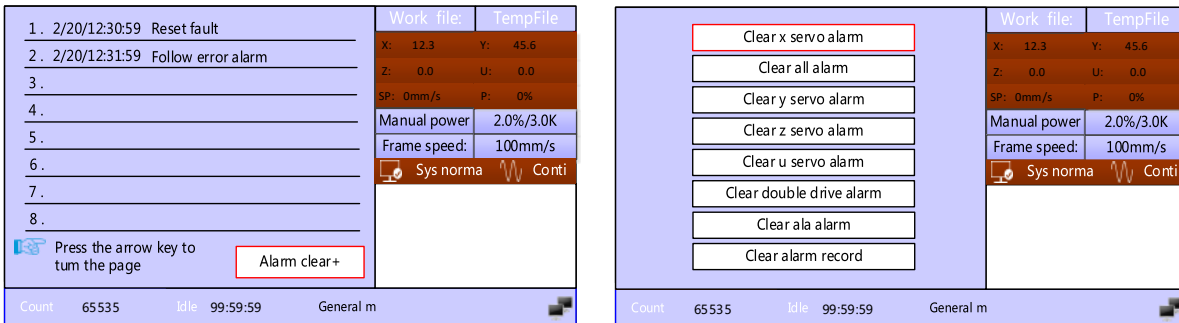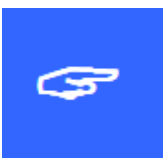

Figure 4.6.6

4.7   Set factory para

Select the [Set factory para] option in the menu interface, and press the [ENT] key to pop up the password input interface. The password is CC8888, If the password is correct, the current manufacturer parameters and user parameters will be backed up as factory parameters, the interface prompts [Backup parameter setting succeed].

When the machine leaves the factory, use the function of [Set factory para] to back up all the manufacturer parameters and user parameters that have been debugged, and then at any time, user can use [Set default para] to restore all manufacturer and user parameters with one key.

4.8   Restore factory parameters

Select the [Set default para] option in the menu interface, and press the [ENT] key to pop up the password input interface. The password is HF8888, If the password is correct, the current manufacturer parameters and user parameters will be backed up as factory parameters, the interface prompts [recover success].

4.9   Speed

Before it is processed, press the [Speed] from the panel, and the following interface will pop up. At this time, user can press the numeric key and the delete key to set and modify the frame speed. Press the [ENT] key to save the parameters after modification, and press the [ESC] key to cancel parameters modification. The interface disappears and returns to the main interface.

Work file:	TempFile
X: 12.3	Y: 45.6
Z: 0.0	U: 0.0
SP: 0mm/s	P: 0%
Manual power	2.0%/3.0K
Frame speed:	100mm/s

Frame speed: [100] mm/s

Modified to press Enter

Sys norma Conti

	200mm/s	2.0%/5.0K
	200mm/s	2.0%/5.0K
	200mm/s	2.0%/5.0K
	200mm/s	2.0%/5.0K

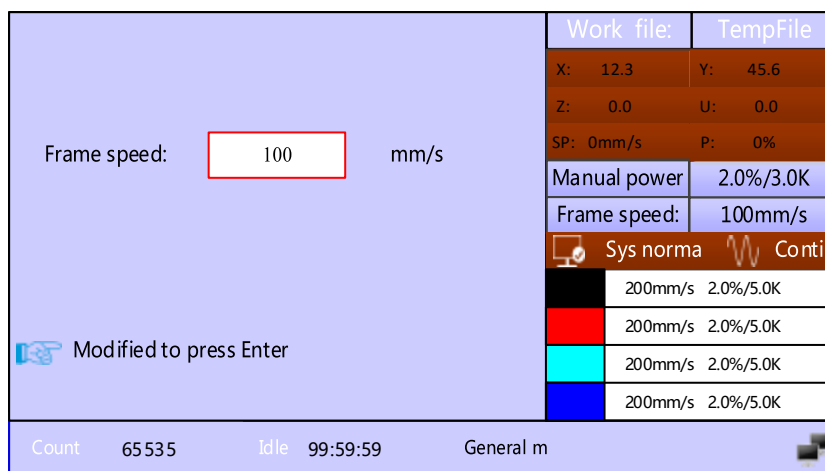Count   65535   Idle   99:59:59   General m

Figure 4.10.1

During processing or pause processing, press the [Speed] key from panel, the following interface will pop up.

At this time, you can press the numeric key and the delete key to set and modify the parameters. Press the [ENT] key to save the parameters after modification, and press the [ESC] key to cancel parameters modification. The interface disappears and returns to the main interface.
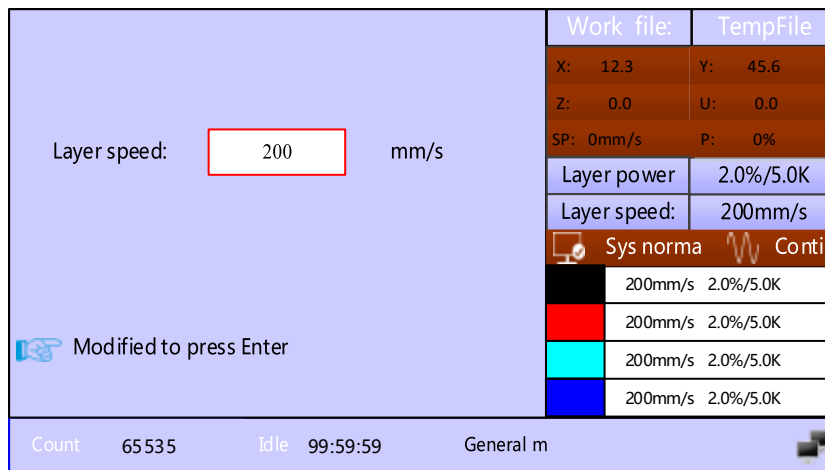

Figure 4.10.2

4.10 Power

The system supports processing cutting laser on, to facilitate dimming test, it will be laser on by pressing the [pulse] key on the panel. Press the [Power] key in the unprocessed state to quickly access to the parameter setting page. The meaning of the parameters will not be repeated here. In the processing pause state, press the [Power] key to pop up the following interface:
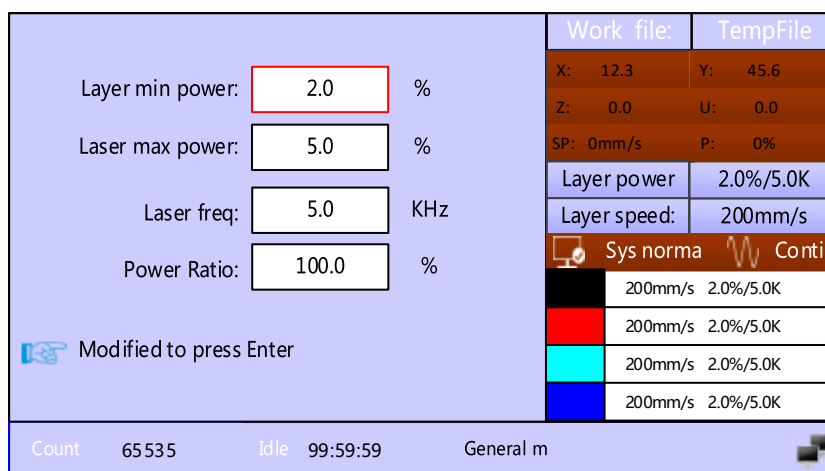

Figure 4.11

The "red selection box" stays on the first parameter to indicate that the parameter is selected. Press the numerical keys and delete key to set and modify the parameters. Press the arrow keys to move the "selection block" to select other parameters to modify. After the parameter modification is completed, press the [ENT] key to save the parameter, press the [ESC] key to cancel the modified parameter, the interface disappears and returns to the main interface.

4.11 Focus

When the control mode of Z-axis is cylinder, the cylinder lift and fall is controlled. When the control mode of Z-axis is motor, the Z-axis moving to the focus coordinate position set in the user parameters is controlled. Note that if the Z-axis automatic lift must be enabled in the manufacturer parameters, otherwise the Z-axis will not automatically move. For more automatic lifting methods, please refer to the <LSWorks Instructions>.

4.12 Origin, Frame

The [Origin] key on the panel is used to set the location point, especially when applying to the floating coordinate system, the current location can be taken as the location point, which is used as the reference point in the floating coordinate system processing. The [Frame] key is used for the frame operation of the current processing file, and know the processing position of the graphics.

4.13 Fast/Slow

The [Fast/Slow] key on the panel is used to select the target speed during manual movement. The user can set the fast and slow movement speed of each shaft in the [Key parameters] of [User parameters]. The movement of the normal arrow keys use the slow speed to move. When fast movement is required, you need to press the

[Fast/Slow] key first, and then press the arrow key to move. Only one speed can be selected to each movement. Pressing the [Fast/Slow] key after the slow movement has started cannot change the movement speed to fast. In the same way, when the fast movement has begun, releasing the fast key cannot change the movement speed to slow.

4.14 Diagnose

The [Diagnose] key on the panel can quickly access to the diagnosis and debugging interface, and the parameters in the interface will not be repeated.

4.15 Aux.Air, Vacuum

The [Aux.Air] key and [Vacuum] key on the panel manually control the state of corresponding IO interface.

4.16 Manual/Continue

The [Manual/Continue] key in the middle of the arrow keys can quickly switch manual mode, and the current manual mode can be viewed in the main interface. User can use the mouse click button on the software for single shaft movement.

Chapter 5 System Debug

This chapter includes:

■ XY axis Motion Test Instructions

■ Laser Test Instructions

■ Processing Tests

5.1   X,Y axis motion debug

Be careful when it running for the first time, please follow the steps below to debug:

1. Before connecting the motor driver, please set the manufacturer parameters, user parameters of the mainboard correctly, especially the parameters such as motion speed, motor step, motion distance and so on, to avoid unsafe motion caused by unreasonable parameter settings.

2.In the diagnoses interface, first correctly judge the logic voltage of the limit switch and the origin switch, manually trigger the limit switch to check whether it is valid, and then set the limit switch polarity correctly in the manufacturer parameters.

3.Please connect the motor cable and set the driver parameters correctly according to the motor driver model.

4.When the parameters are correctly set, connect the motor and driver, power on the system, manually move the XY shafts, and observe whether the XY can move normally, if not, please check whether the connection is correct, the mainboard parameters are correct and the driver parameters are correct.

5.Select [Menu]-[Function+]-[Reset of all shaft]-[Axes Reset+] on the panel to manually reset the XY axis. At this time, observe whether the XY shaft moves toward the direction of negative limit of the XY axis. If not, press the [Esc] immediately to cancel the motion to avoid the zero signal being undetected, and then modify the direction polarity in the manufacturer parameters, until the XY axis reset direction is correct.

6.Manually move the XY shaft to check if the XY axis motion is consistent with direction keys on the panel. For example, when pressing the X-axis direction key to move, observe whether the actual motion of the X-axis is consistent. If the motion is inconsistent, you need to set the key reverse in the manufacturer parameters until the XY axis motion direction is correct.

7.Test whether the X,Y axis steps are set correctly. For details, please refer to the manufacturer parameter instructions.

8.When the system uses a servo driver, the encoder polarity, encoder resolution and lead are required to be tested. Select [Menu]-[Controller setting]-[Coor display conf] , user can choose the coordinates displayed on the main interface as the actual position or the planned position. After moving forward and backward repeatedly over a long distance, the planned coordinates should be consistent with the actual coordinates. If the actual coordinates do not change along with the button movement, the encoder polarity setting is wrong; if the actual coordinates change with the button movement but the distance is not correct, the encoder resolution and lead setting are wrong. If the actual coordinates deviate from the planned coordinates after multiple forward and backward movements, the PWM rising edge setting is wrong.

9.If the above operation process is normal, other tests can be performed.

5.2　Laser test

1.Connect the laser source wiring correctly.

2.Set the laser parameter according to the laser source instructions, and press the [pulse] button on the panel to observe whether the laser source on normally. Modify the laser power and laser frequency and observe whether they are effective. The user can adjust the laser path during the test. If the laser source keeps emitting, the effective level of the laser source may be set incorrectly. Select [Menu]-[Manufactory setting]-[Machine config]-[Processing signal effective level] to modify.

3.If the above operation   process is normal, other tests can be performed.

5.3　Cutting test

Before the cutting test, please make sure the wiring is correct and the controller parameters are set correctly. X, Y shafts motion and laser source light emitting test are normal, and have been successfully reset. The use of related software is only briefly introduced here. For detailed introduction, please refer to the LSWorks software user manual.

Please follow the below steps to test:

1.Double-click the icon LSWorks on the computer desktop, LSWorks software, click the device option in the lower right corner of the software, connect the card normally via USB or network cable. For detailed operations, please refer to Chapter 7 Device Connection Instructions.
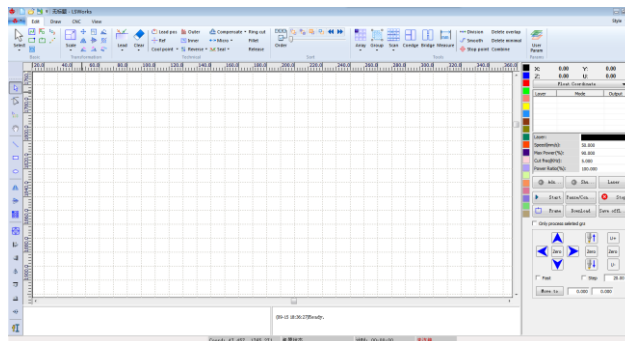
2.On the left side of the software, use common drawing tool to draw a simple figure, take the rectangle as an example:
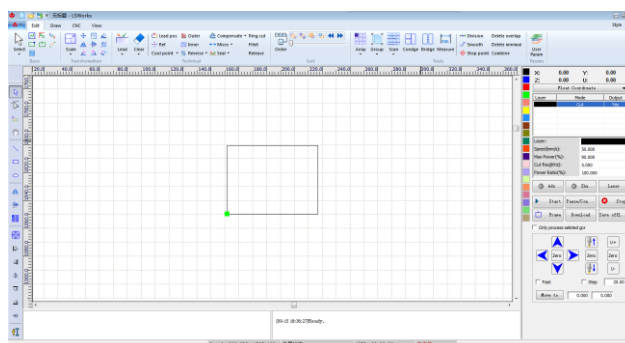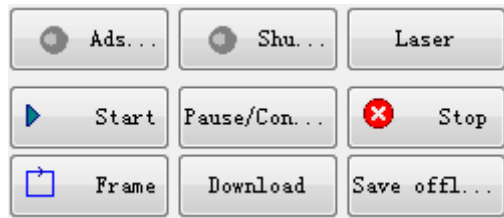
3.Set layer parameters correctly:
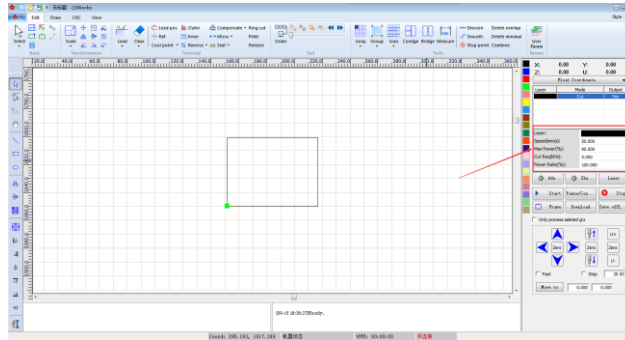
4.Laser test

First set the laser parameters correctly, then use the [Vacuum] button to observe whether the fan is normal, and then use the [pulse] button to test whether the laser is emitted normally.


5.Frame

On the right side of the software interface, press the [Frame] button, and the laser head will move along the maximum rectangle boundary of the processed graphics. You can use this function to know the actual processing position. If the panel prompts that the frame is out of bounds, it means that the cutting head motion will exceed the rectangle range, so no motion will be executed to ensure the safety of the machine.

6.Start cutting

When each function test is normal, press the [Start] button on the software interface to start cutting, press the [Stop] button to stop processing.
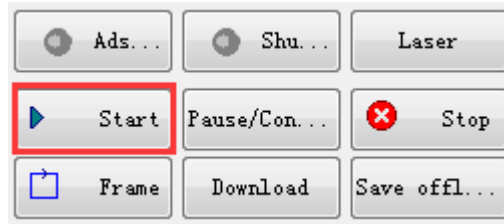
Chapter 6　　Alarm Information Instructions

This chapter includes:

■ **Alarm Information Instructions**

■ **Alarm Processing Method**

6.1   Alarm information instructions

During the operation of the mainboard, an alarm may be generated when an abnormal situation is encountered, and corresponding protection actions will be generated to protect the machine. Alarm information includes system error, limit trigger, reset error, follow deviation alarm, servo alarm, cover-opening protection, grating protection, etc. When an error occurs, the corresponding error will be prompted on the panel. If an error occurs, please follow the error prompt to eliminate it before running the system, otherwise it may affect the normal operation of the system.

6.2   System error

When the system occurs error and cannot run normally, a system error will be displayed, and the system will stop moving. At this time, the mainboard needs to be re-powered. If the system error is still displayed after repeatedly power-on, the mainboard cannot be used normally.

6.3   Limit trigger

When the limit is enabled, after triggering the limit switch, a limit trigger will be displayed. If the limit switch is not actually triggered while the limit trigger is still displayed, it may be the following situations:

- Limit polarity setting error, please modify the limit switch polarity;
- Limit switch wiring is incorrect, please connect it correctly;
- Limit switch is damaged, or output voltage of the limit switch is incorrect, please replace the limit switch;

6.4 Reset error

When the reset motion is executed, the motor does not move or the motion speed is too slow, resulting in timeout exit. Please set the parameters correctly to ensure that the shaft motion can run normally.

6.5 Excessive Following error

During the machine running, when the deviation between the command pulse position and feedback pulse position is greater than the set value, an alarm of excessive follow deviation will be generated. During processing, if the alarm of "Excessive Following error" is frequently triggered, you need to adjust the driver parameters or increase the maximum follow deviation parameter. After the follow deviation alarm is generated, the machine needs to be powered again.

6.6 Dual-driver synchronous alarm

The system supports Y-axis dual-drive function and Y-axis dual-driver synchronous alarm function. If the Y-axis dual-drive synchronization error greater than the maximum synchronization error, a dual-drive synchronization alarm will be generated to stop the motion to protect the machine. When the dual-drive synchronization alarm is generated, the machine needs to be shut down for maintenance.

6.7 Axis servo alarm

When the card detects that the servo alarm signal input is high, it will generate a servo alarm; when the servo motor may appear unsafe motion, a servo alarm will also be generated. Servo alarm may occur in the following situations:

● Servo driver has generated an alarm.

- Servo alarm signal level logic of the servo driver is incorrect. The high level must be output when the servo driver alarms. If it is low level, please convert the level to high level by a relay or other means.

- Wiring error, please check whether the wiring is correct.

- Poor grounding will cause greater system interference and false alarms. Please ensure that the machine is well grounded.

6.8   Grating protection, Cover-opening protection

After enabling the grating protection or cover-opening protection in the manufacturer parameters, when the corresponding interface of the motherboard detects high level or suspension, the motherboard will generate an alarm. If it is processing, the processing will be suspended. If the processing needs to be continued, please eliminate the alarm fault first, and then continue processing, otherwise it will not be able to be continued.

6.9   Frame out of bounds

When starting the processing, the prompt of frame out of bounds pops up. Frame out of bounds may occur in the following situations:

- The processed graphics exceed the maximum breadth of the machine. Please ensure that the cutting graphics are smaller than the maximum breadth of the machine.

- Manufacturer parameters are set incorrectly, and the XY shafts breadth does not match the actual breadth of the machine. Please set the XY breadth correctly.

6.10 Mainboard communication failure

Mainboard communication failure may occur during the use of the panel. The mainboard communication failure may occur in the following situations:

- The connection cable between the panel and the mainboard is connected incorrectly.

- The connection cable terminal between the panel and the mainboard is not in firm contact. Please check whether the connection cable is stable.

- The connection cable between the panel and the mainboard is damaged. Please replace with a new connection cable.

- The mainboard does not run normally. Please check if the Run indicator light on the mainboard flashes normally. If the indicator light does not flash, please power on the mainboard again.

- The mainboard or panel hardware interface is faulty.

Chapter 7   Device Connection

This chapter includes:

■ **USB driver installation**

■ **USB device connection**

■ **Ethernet device connection**

7.1 USB driver installation

USB is divided into 5 different drivers, including XP, WIN7 32-bit, WIN7 64-bit, WIN8, WIN10, etc. according to the different systems installed by the computer. Drivers can be installed automatically or manually.

7.1.1 USB automatic installation

The steps of USB driver automatic installation are as follows:

Install software LSWorks . The specific installation steps are as follows:

1.Download the LSWorks software installation package from the website of Ruida Technology http://www.rd-acs.com/, and unzip the installation package file.

2.Double-click "LSWorks V1.01.01Setup.exe" file in the installation package file to start the installation of LSWorks software. Keep clicking Next or Install in the pop-up interface, and the LSWorks software will be automatically installed.
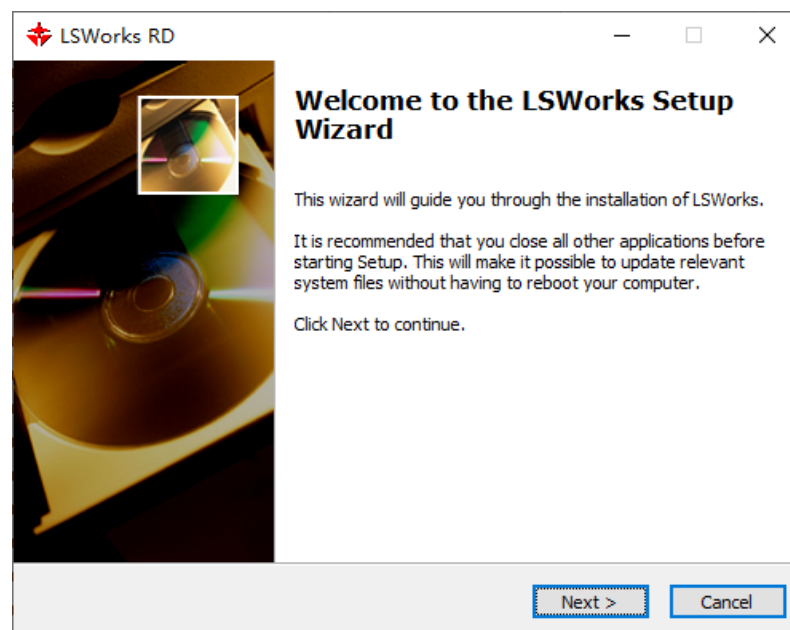
3.After installing the LSWorks software, click the [Start] icon on the computer desktop, find the LSWorks software in all programs, and click the LSUsbDriver software in the directory to start installing the USB driver automaticall

7.2 Ethernet device connection

The steps to connect the mainboard by Ethernet are as follows:

1.Double-click the icon on the computer desktop to open the LSWorks software, and click the [Device Connection] button in the software.
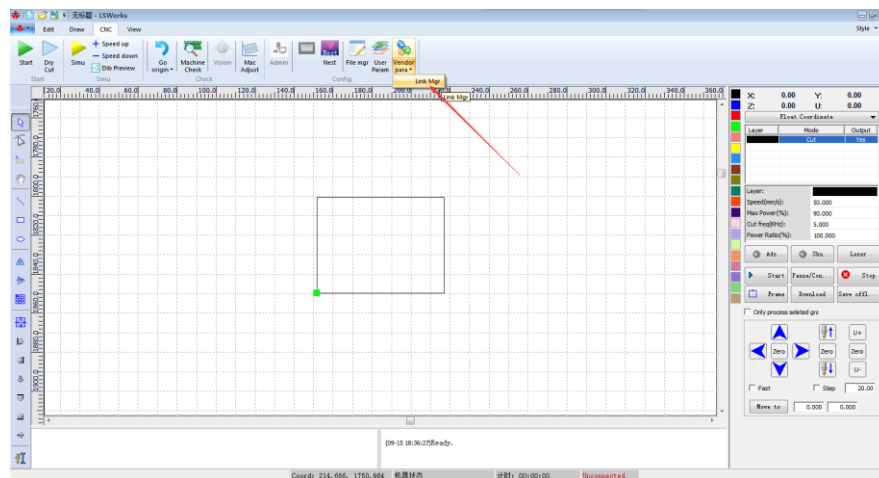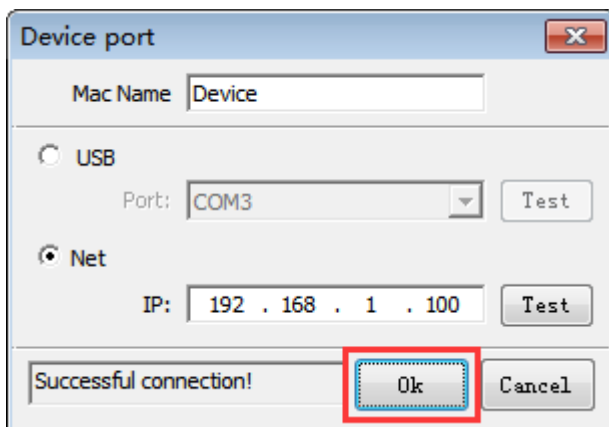

2.Click the [Add] button, add the network device, and set the network IP address correctly. The IP address is 192.168.1.XXX, where XXX represents any number in the range of 2 to 254. if there are multiple devices connected to the same LAN, please note that the IP address of the different mainboards cannot be the same, otherwise, IP address conflict will result in connection failure.
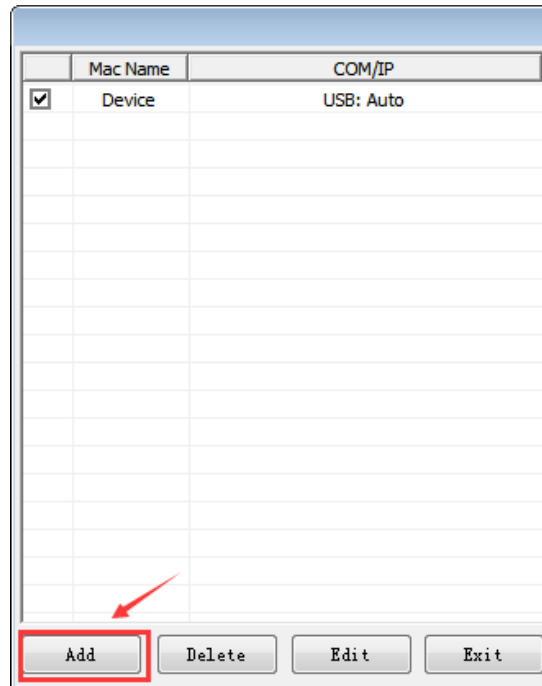
3.After setting the IP address correctly, click the [Test] button to show the connection is successful. If the connection failure, please check the network cable. If the network cable is connected correctly while the connection still failure, please modify different IP addresses and connect again.
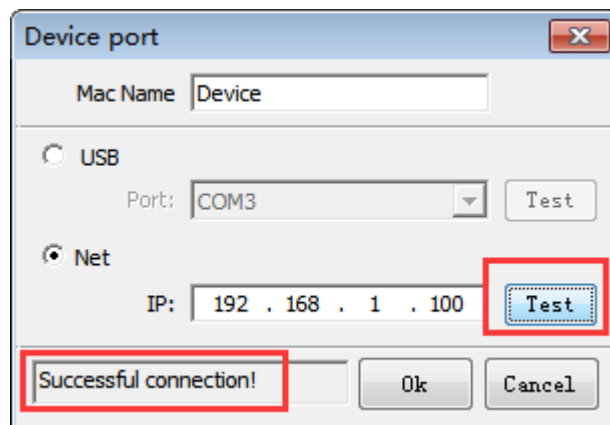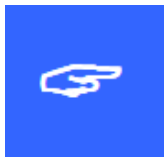

4.After the setting is successful, click the [OK] button to complete the device connection.

7.3   Panel settings

When using the network connection, user can modify the network IP address and gateway on the panel. The IP address is 192.168.1.XXX, where XXX represents any number in the range of 2 to 254. Generally, the gateway does not need to be set.

The IP is default as 192.168.1.100. If in a same LAN, you should ensure that the first three fields of the IP address are consistent with the first three fields of the gateway address of the network. Otherwise it may result in network errors and fail to connect to the controller.

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