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TL-3120 Motion Control
User Manual

Laser Motion Control

RV2.0

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Introduction

Thanks for Choosing Trocen Motion Control

In order to feedback customers, we will help you to complete the production of the equipment with first-class quality motion controller, perfect after-sales service and efficient technical support.

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User Manual

By reading this instruction, the users will know the basic composition, installation and how to use TL-3120.

For Who

This manual is applicable to engineers who have a certain understanding of laser mechanical automation and electrical circuits.

Main Content

The composition, installation and use of TL-3120 are introduced in detail

Relevant Document

《LaserCAD Introduction》

Content

1. Product Introduction

1.1 System Introduction

TL-3120 motion controller is a motion control system developed by Shenzhen Trocen Automation Tech co., LTD. This system is used by LaserCAD software and wiring board motion controller, which greatly improves the production efficiency and reduces the production cost.

Features of LaserCAD

- User-friendly and versatile
- Support CorelDraw and Auto CAD and other professional drawing software.
- Support the file format: AI, PLT, DXF, SVG, PDF, NC, DST, DSB, UD5, BMP, GIF, JPG, JPEG, PNG.
- With simple graphics drawing function.
- Support Z AutoFocus function.

Features of Wiring Board

- High DSP, quick calculating and optimal algorithm.
- 4.3'' color TFT LCD display with concise operation interface.
- Optical coupler, anti-electromagnetic interface and system stability.
- Faster reading files under USB or U Disk.
- 3 axis control, it can control servo motor /stepping motor and other motion machine.

1.2 Terms and Explanation

Table1-2-1 Terms and Explanation

Term	Explanation
LaserCAD Software	LaserCAD is a complementary software with auto typesetting for laser motion control.
TFT LCD Panel LCD Panel Control Panel Panel	4.3" color TFT LCD control panel. The panel is used for specific display and control operations.
Main board (Baseboard)	The main board and baseboard are the control board of the integrated signal input and output control and the motor drive connection, which is an important part of the system.
Hardware	Includes: panel (wiring board) and wire.

1.3 Unpack

After receiving the product, please confirm whether the product and accessories are complete. If there is a lack of accessories, please contact the after-sales service of Trocen company.

Table1-3-1 Wire Introduction

Name	Appearance	Introduction
Panel and mainboard		The panel (wiring board) of TL-3120.
USB Cable		Connect computer and panel by USB.
Extending Line		The extending line of USB.

1.4 Panel Preview

There are LCD display, soft keys and U disk slot on panel.

Figure1-4-1 Panel Preview
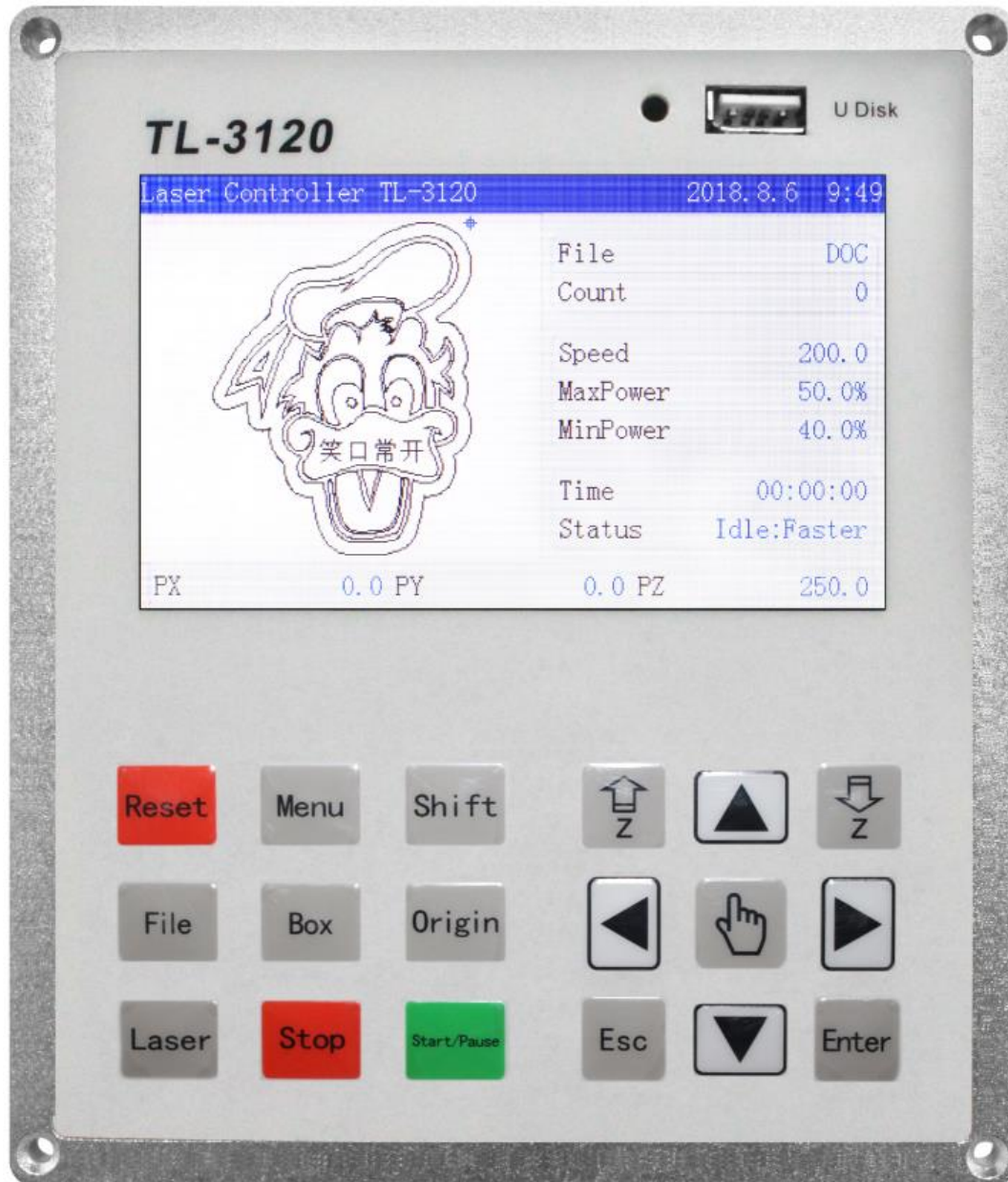
Figure1-4-2 Size of Main Board
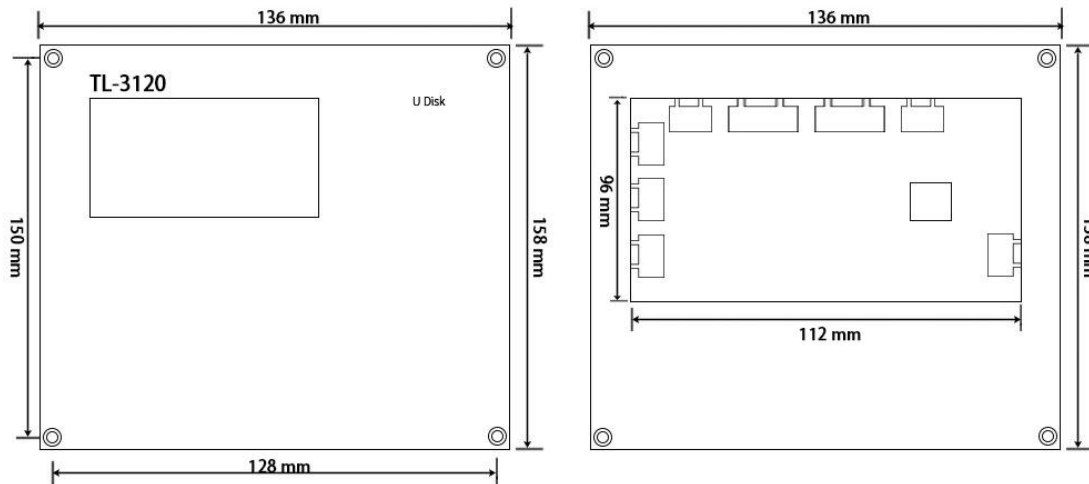
1.5 Buttons
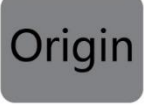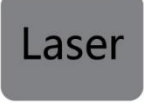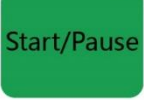
According to the different use of keys, all keys are roughly divided into three categories: function keys, direction keys and number keys.

1.5.1 Function Keys

Function key is designed to directly realize a specific operation function.

Table1-5-1 Function Keys Instruction

Name	Icon	Instruction
Reset	Reset	Return to standby state, no matter what state the machine is in.
Menu	Menu	Display function module, set and modify module subitem parameters.

Shift	Shift	Combine function key.
File	File	Browse the files stored in the control board.
Box	Box	Test the size of the processed object and the currently selected registration point.
Origin	Origin	Set the starting (origin) point of the controller.
Laser	Laser	Test usage. Press the key, the laser tube will give out light. It's used to adjust optical path.
Stop	Stop	Stop the running machine and return to the selected origin point.
Start/Pause	Start/Pause	Start/pause the controller and maintain the current state.
Esc	Esc	Cancel the settings of various parameter operations. It's also a port to exit a module or sub-option.
Enter	Enter	Save the settings of various parameter operations. It's also a port to enter a module or sub-option.

Hand		Manually switch fast speed and slow speed of motion axis.

On the main page, press 【File】 and you could see the memory files.

Figure1-5-1 File Interface

Move cursor to the file you need, press 【Enter】, you could set the parameters.

Figure1-5-2 File Parameters Setting Page
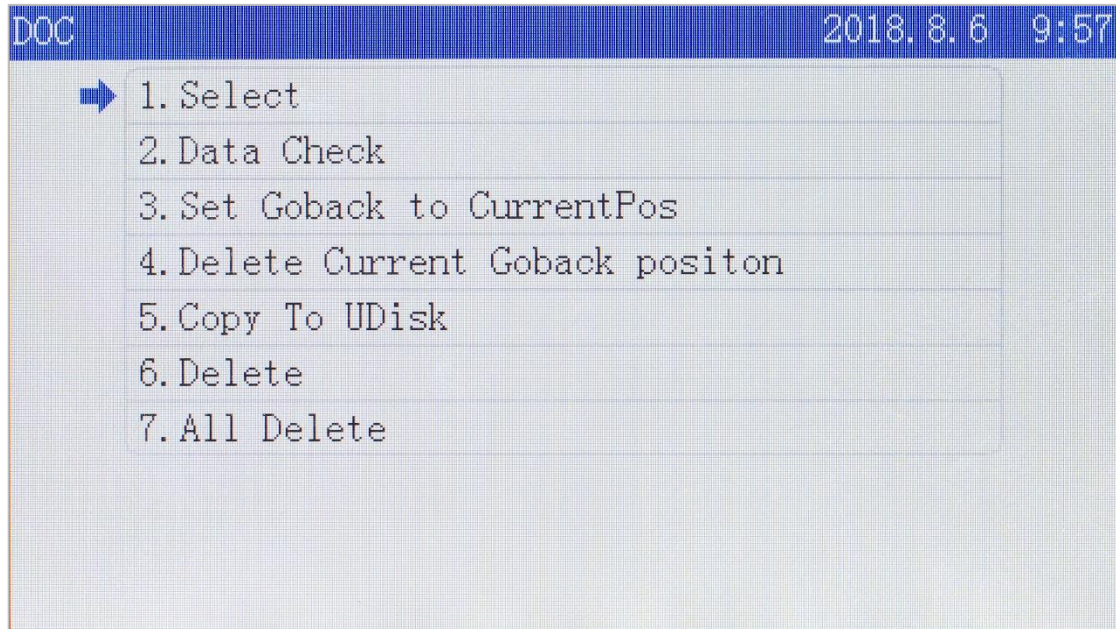
- Move cursor to 【Select】, press 【Enter】 and set current file as work file.

- Move cursor to 【Data Check】, press 【Enter】. If the graphics is the same as that in PC (File Data OK!), the graphics will be allowed to be processed. If not, the machine won't process this graphics.

Figure 1-5-3 File Format Test
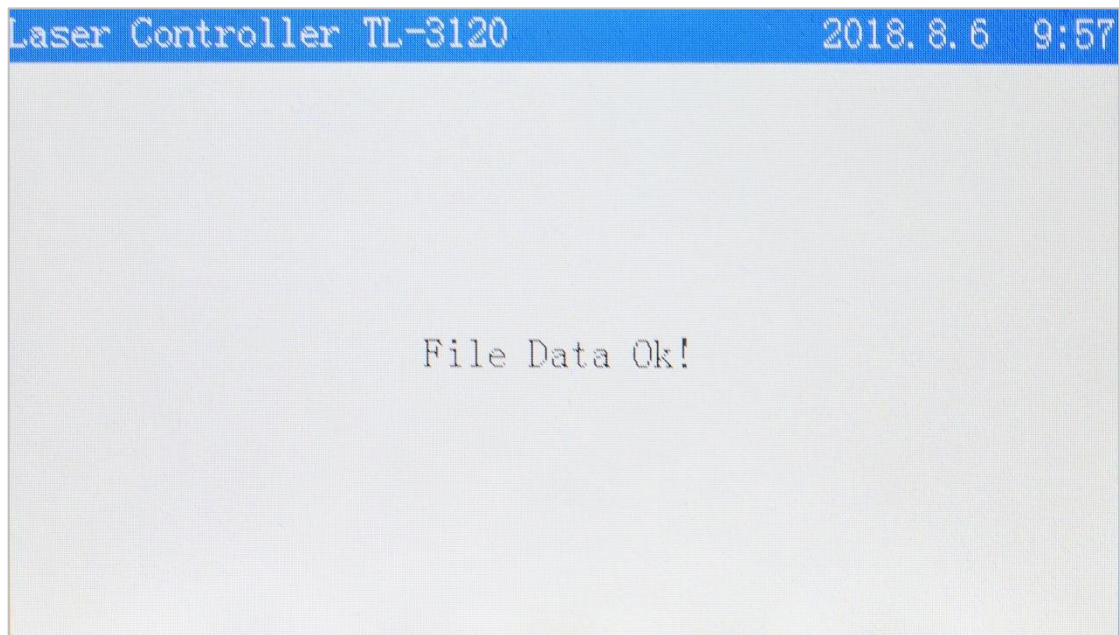
You could set other parameters as your need.

1.5.2 Direction Keys

- ### 【↑】【↓】【←】【→】

    They are used to move the X/Y axis and cursor, also used to modify options in the current view.

- ### 【z↑】【z↓】

    Directly move Z-axis up and down on the main interface. When the cursor is in reverse color, they are used to modify parameters. When 【↑】【↓】【←】【→】 are busy, they are used to move cursor.

1.6 Wiring Board

The panel and other parts of machine are connected by wiring board. The components as below:

- Connect motor driver

- Detection of motion axis limit signal

- Input signal detection

- Output IO control signal and corresponding power supply

1.6.1 Wiring Board Appearance

Figure1-6-1 Wiring Board Appearance
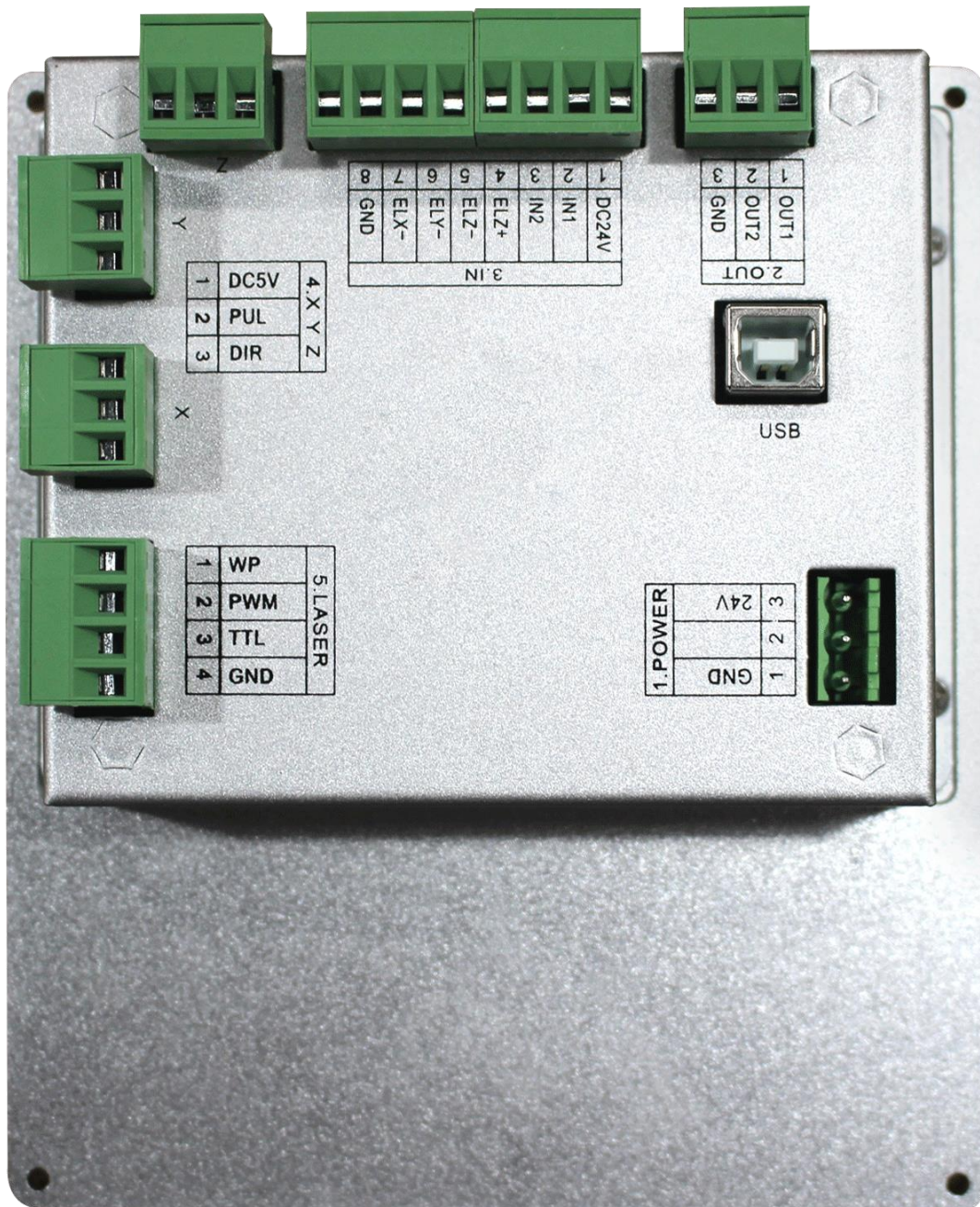
1.6.2 Port Instruction

1.6.2.1 Power Supply Port

The power supply ports provide power to wiring board and panel. Please pay more attention to polarity when connect them. Don't make the polarity reverse.

Table1-6-1 Instruction of Wiring Board Power Supply Port

Pin	Name	Introduction
1	GND	Negative pole
3	+24V	Positive pole

1.6.2.2 Signal Input

There are two groups of ports for signal input.

Table1-6-2 Wiring Board Signal Input Port Instruction

	PIN	Name	Instruction
IN	1	DC24V	Output DC voltage (24V)
	2	IN1	Door open protection signal (input).
	3	IN2	Foot pedal switch signal (input).
	4	ELZ+	The hard limit of Z-axis. When the Z-axis moves to the maximum coordinate position, the limit sensor inputs

		signal.
5	ELZ-	The origin limit of the Z-axis. When the Z-axis moves to the minimum coordinate position (zero position), the limit sensor inputs signal.
6	ELY-	The origin limit of the Y-axis. When the Y-axis moves to the minimum coordinate position (zero position), the limit sensor inputs signal.
7	ELX-	The origin limit of the X-axis. When the X-axis moves to the minimum coordinate position (zero position), the limit sensor inputs signal.
8	GND	Power ground (OUT).

Wiring diagram of signal input:

Figure1-6-2 Wiring Diagram for Signal Input
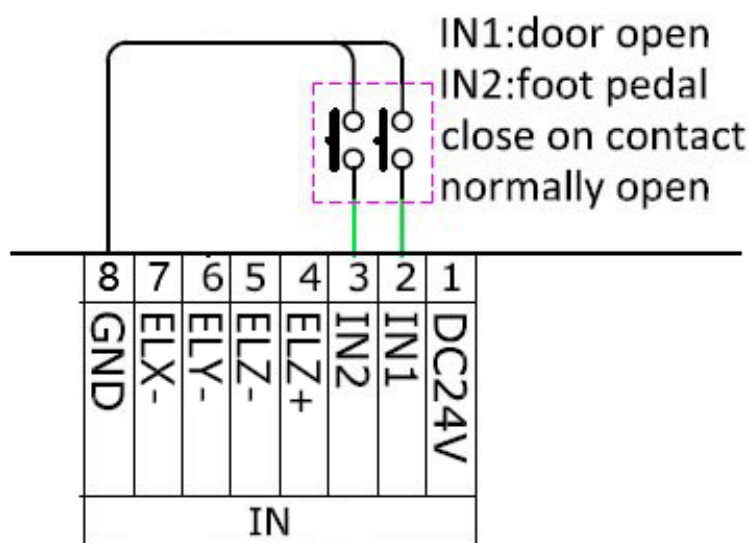
1.6.2.3 Signal Output

There are one group of output ports to supply power and control signals.

Table1-6-3 Output Port Instruction

	PIN	Name	Instruction
OUT	1	OUT1	Blowing signal (blow air when the laser head is working) Working: output is high logic level; Free: output is low logic level.
	2	OUT2	Blowing signal (blow air when light comes out by laser) Working: output is high logic level; Free: output is low logic level. When the laser is turned off, the output is low logic level.
	3	GND	Power ground (OUT).

Output signals generally control laser blowing. The wiring diagram is shown below.

Figure1-6-3 Blowing Control Diagram
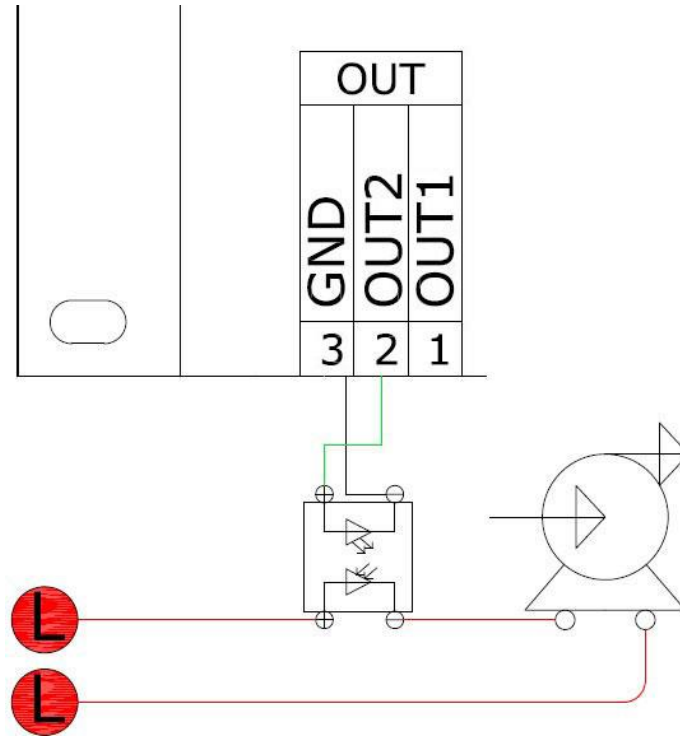
1.6.2.4 Laser Power Supply Port

There are two output ports on wiring board.

Table1-6-4 Laser Controller Output Instruction

	PIN	Name	Instruction
Laser	1	WP	Water Protection.
	2	PWM	Digital signal. The output voltage is 0~5V, and it will change according to the power.
	3	TTL	Laser switch signal.

	4	GND	Power ground.

Different lasers have different connection modes. Take ordinary glass tube laser as an example, the IN port of laser connects to PWM port on wiring board, L port connects to TTL port on wiring board.

Figure1-6-4 Ordinary Glass Tube Laser Diagram
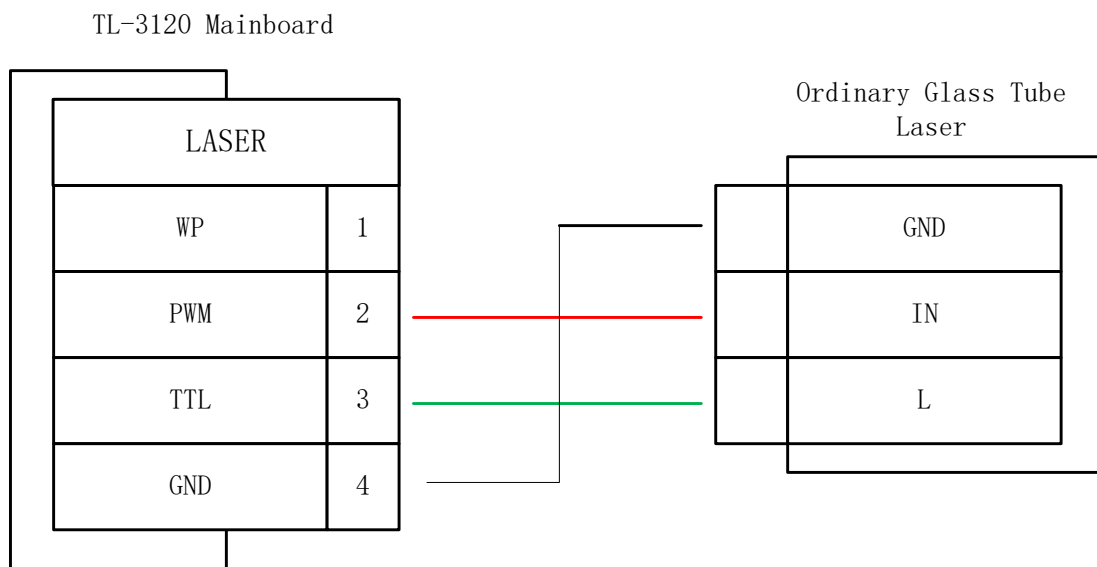
1.6.2.5 Motor Drive Control Port

There are 3 roads driver connection on wiring board at most.

Table1-6-5 Motor Driver Connection Instruction

	PIN	Name	Instruction
X	1	DC5V	Output DC voltage (5V)

	2	PUL	Pulse signal
	3	DIR	Direction signal
Y	1	DC5V	Output DC voltage (5V)
	2	PUL	Pulse signal
	3	DIR	Direction signal
Z (Lifting shaft)	1	DC5V	Output DC voltage (5V)
	2	PUL	Pulse signal
	3	DIR	Direction signal

Figure1-6-5 Diagram of Interface and Driver Connection
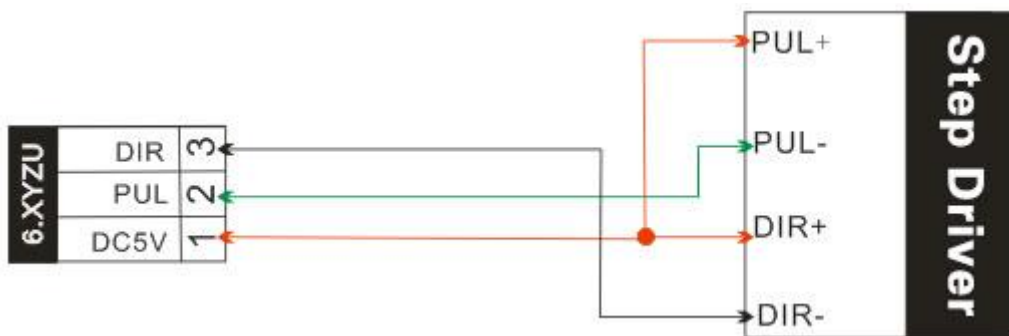
Refer to Chapter 8 for the diagram of control signals for different types of servo drives.

2. LaserCAD Installation

You can go through 《LaserCAD User Manual》 for more details about installation and how-to-use LaserCAD.

3. Simplified Installation

The content of this chapter is mainly about the hardware initial installation of the product and the setting of basic software parameters. Please refer to the following chapters of this article for the detail settings and descriptions of other parameters.

3.1 Hardware Connection

Figure3-1-1 Integral Wiring Diagram
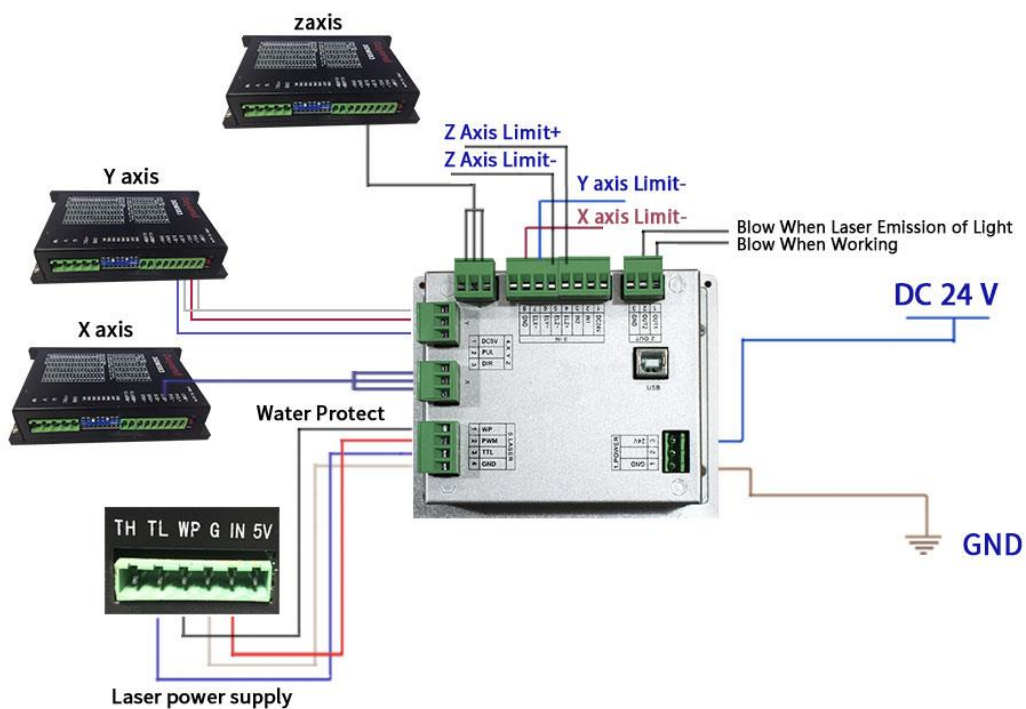
- Figure 3-1-1 shows the diagram of ordinary glass tube laser.

- Connect the axis limit ports to corresponding axis limiters.

- Please refer to the Chapter 1.6.2.5 to know the diagram of X/Y/Z motor driver.

3.2 Input Test

On the main page, press【Stop】and press 【Menu】two times at the same time, you will see the *Input Test* interface.

Figure3-2-1 Input Test Interface

According to different sensor types, you could choose metal products or other shielding objects to close to sensors in order to detect whether the signals changes, so as to confirm whether the wiring is accurate and effective.

3.3 Set the Origin Point of Machine

Connect machine and wiring board as Figure3-1-1. Power on and observe the motion direction of axis. If axis moves random, please press 【Stop】at once. Check your installation and wiring of limiters, if no mistake, then modify the direction of origin point and reset machine. Please refer to

Chapter 6.7.1 【Work Mode】to know more about reset settings of motion axis. Before start, please make sure to enable the XYZ axis auto reset. Detail settings refer to Chapter 7.4.

3.4 Key Direction

On the main page, press 【↑】【↓】【←】【→】【Z↑】【Z↓】to move XYZ axis, and check whether the motion direction is the same as key direction. If not, please modify the 【Key Direction】 on the axis parameters page.

3.5 Distance Per Pulse

Distance per pulse refers to the actual distance of motion axis for each pulse instruction sent by the controller. The calculation method is as follows (take the X-axis as an example):

1. Reset motion axis to registration point, and mark the current position with A.

2. On the main page, press 【Menu】and enter the *Jog Control* page. Set the 【Jog Distance】to 200mm as an example. Then press【Enter】 to save your modification. If you didn't set the 【Range】 on *Axis Parameters* page, please don't set the 【Jog Distance】 value too large.

3. On the *Jog Control* page, move cursor to 【X/Y/Z Jog】, then press direction key. The X axis will move a distance and stop. Mark the current position of X axis with B.

4. Measure the distance between A and B, and input the value into 【Actual Length】.

5. On the main page, press 【Stop】+【Shift】at the same time to open the *Manufacture Params Settings* page. Then move cursor to 【Axis Parameters】and press 【Enter】. Then open the *X Axis Parameters* page and move cursor to 【Distance Per Pulse】, press 【Enter】. Input 200mm into 【Expected Length】and input the distance between A and B into 【Actual Length】. Then press 【Enter】, the distance per pulse of X axis will be calculated.

	When the pulse distance value of any axis is close to or less than 1, the pulse distance can't be adjusted and is always 1. The recommended pulse distance value is 5 or more.

The calculation of distance per pulse of the other axis is the same as X axis.

3.6 Hard Limit and Range

On the main page, press 【Stop】+【Shift】at the same time to open the *Manufacture Params Settings* page. Then move cursor to 【HardLimit Settings】and press 【Enter】, then you can enable or disable the hard limit parameters. If you don't have hard limit sensors on your machine, we suggest you to set 【Range】parameters to avoid to damage machine when you do wrong operation.

Set the distance per pulse of X/Y/Z axis according to the content of the

Chapter 3.5. Then move motion axis to the maximum distance towards positive direction. You can set the coordinate value on the panel as 【Range】.

4. Main Interface Preview

Figure4-1 Main Interface
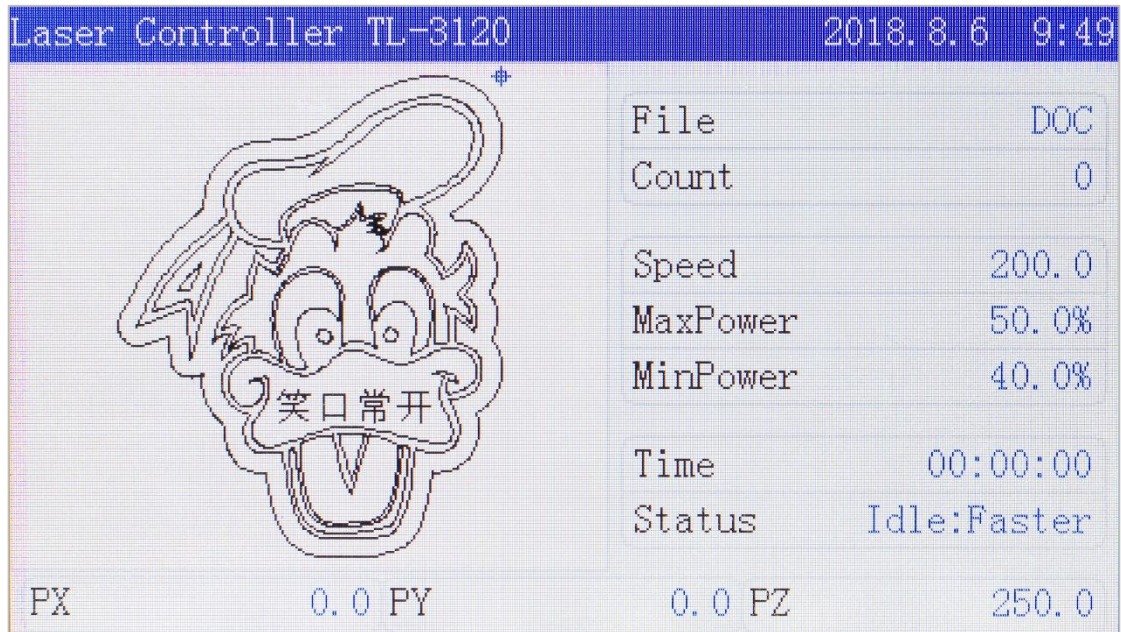
Table4-1 Main Interface Introduce

Name	Instruction
Top Bar	Display the type of control card, local date and time.
File	The file that processed currently. The file name consists of letters, numbers and Chinese (File name supports simplified Chinese characters, up to 4 characters).
Count	The number of graphics that has been processed.
Speed (mm/s)	Working speed when processing (Related to work state).
Max Power (%)	The power of cutting materials (Related to work state).

Min Power (%)	Turning power.
Time	Display how long the machine has been working.
Status	Display the work state of machine, Work, Idle or Pause. The processing progress of the graphics will be displayed as percentage at the state of working.
X/Y/Z	The X/Y/Z axis coordinate of working machine.

5. Main Page Function Introduction

5.1 File

5.1.1 Document Params Settings

On the main page, press【Enter】, then move cursor to File. Press【Enter】to open **Document Params Settings** interface.

Figure5-1-1 Select File Name

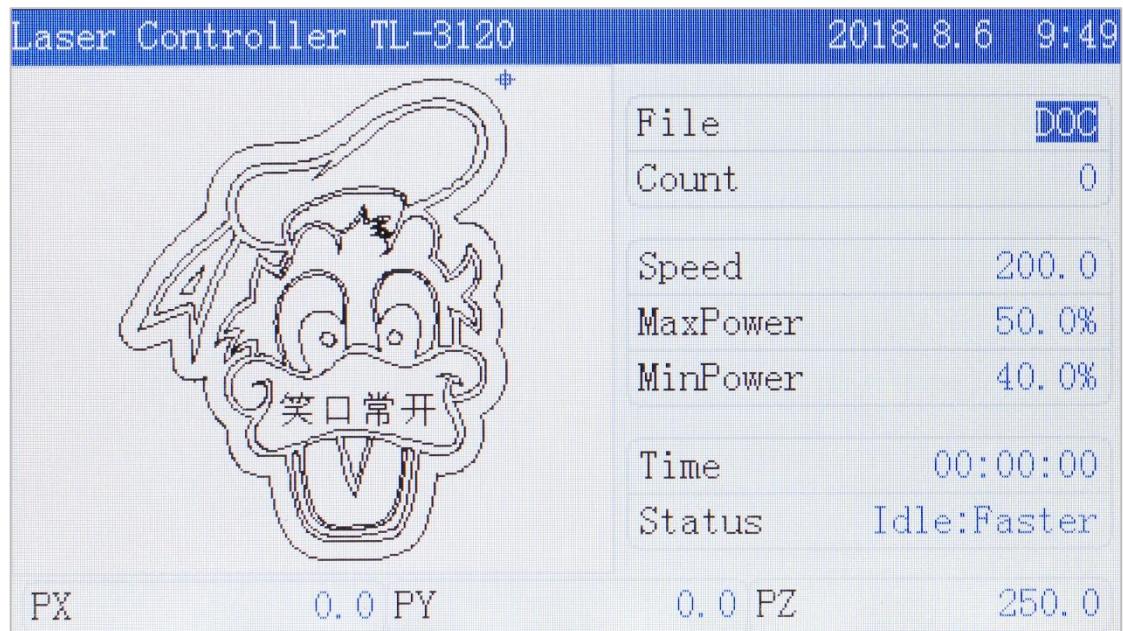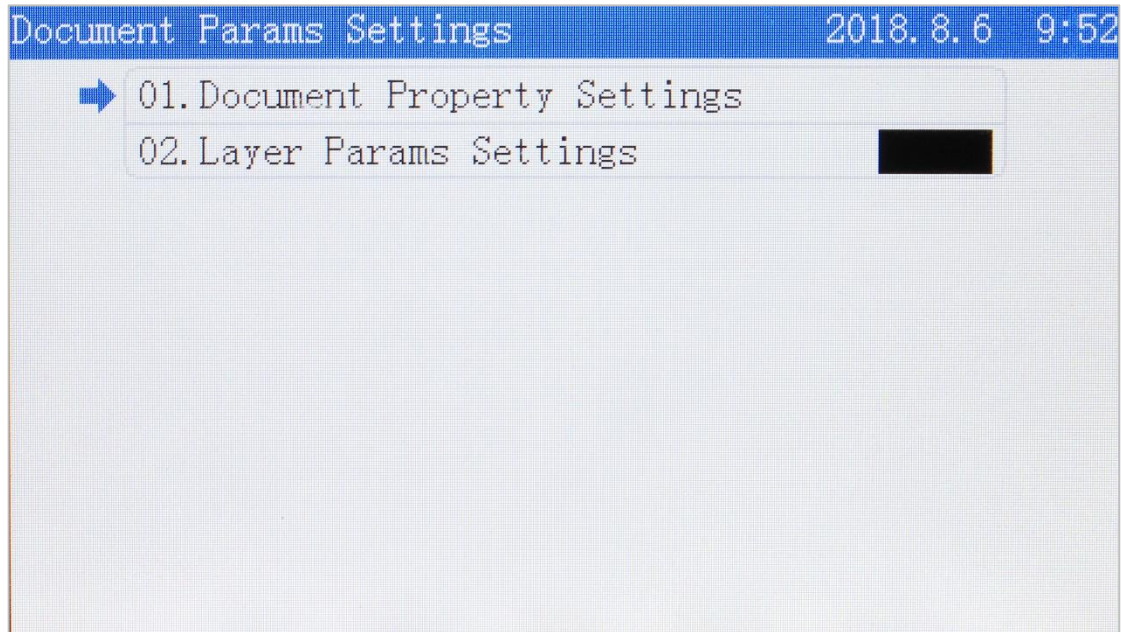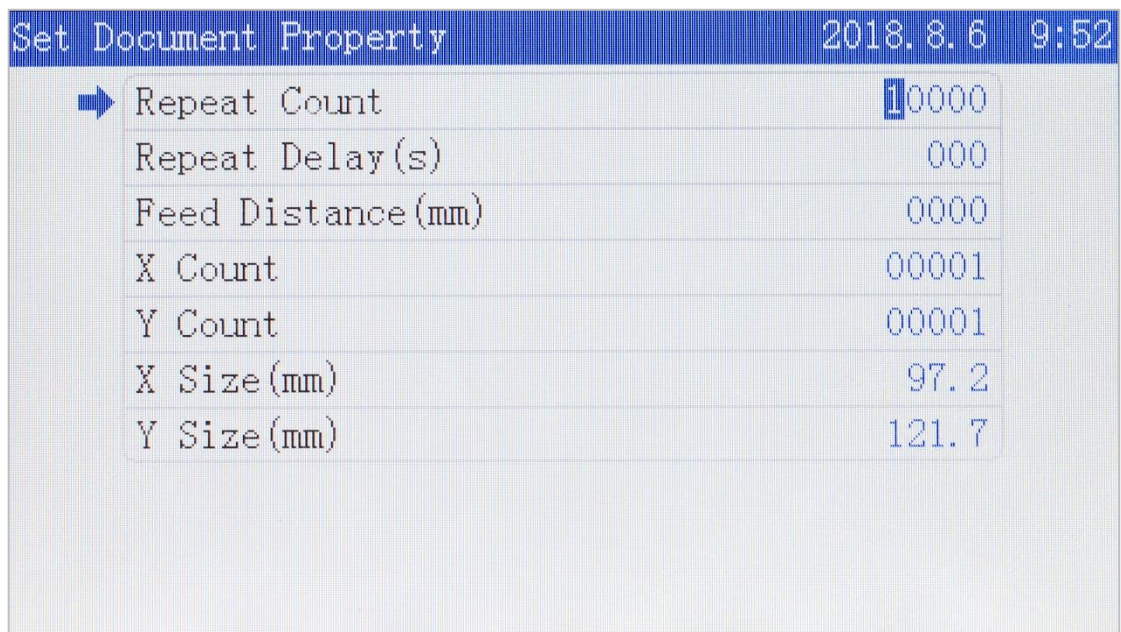**Figure5-1-2 Document Params Settings**

Move cursor to 【Document Property Settings】, press 【Enter】.

Figure5-1-3 Set Document Property

Press 【↑】【↓】【←】【→】 to move cursor, press 【Z↑】【Z↓】 to

modify parameters, and press【Enter】to save settings.

Table5-1-1 Set Document Property Instruction

Name	Instruction
Repeat Count	The number of times that machine processes graphics repeatedly.
Repeat Delay (s)	After machine processed current graphics, it will take some time to process the same graphics again.
Feed Distance (mm)	The moving distance of feed axis feeding one time.
X Count	The number of graphics processed by machine in the X direction.
Y Count	The number of graphics processed by machine in the Y direction
X Size (mm)	The size of graphics in X direction.
Y Size (mm)	The size of graphics in Y direction.

5.1.2 Layer Params Settings

On the ***Document Params Settings*** page, move cursor to 【Layer Params Settings】 and press 【Enter】. On the ***Layer Params Settings*** page, press 【↑】【↓】【←】【→】 to move cursor, press 【Z↑】【Z↓】 to modify parameters, press 【Enter】 to save settings.

Figure5-1-4 Layer Params Setting
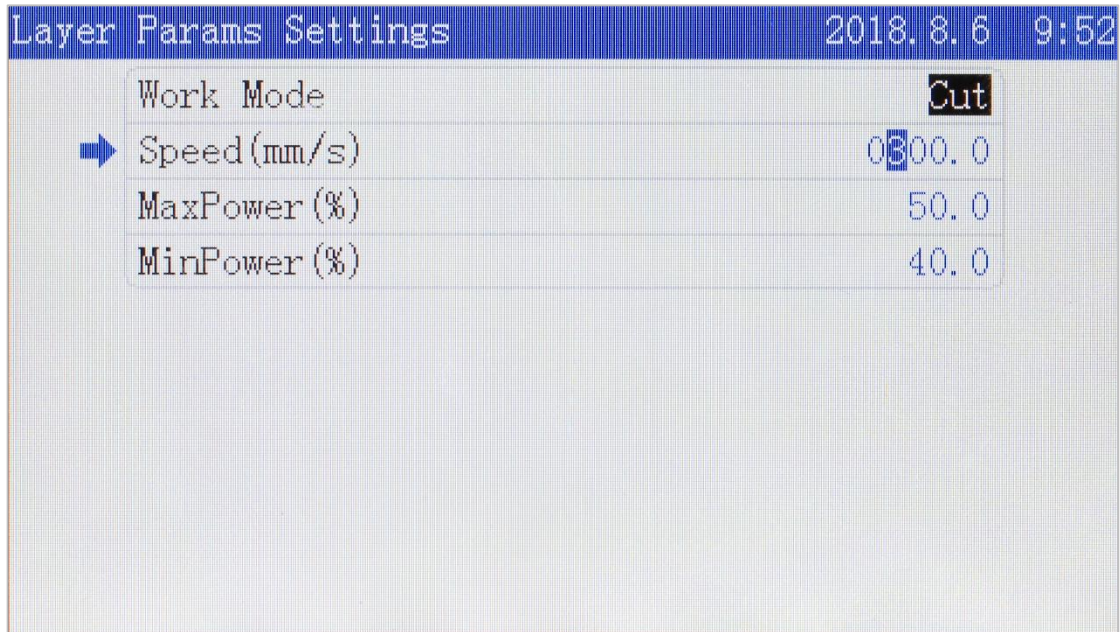
Table5-1-2 Layer Params Setting Instruction

Name	Instruction
Work Mode	The mode of processing graphics.
Speed (mm/s)	The speed of processing graphics.
Max Power (%)	The max power of laser head (working power).
Min Power (%)	The min power of laser head (turning power).

5.2 Count

On the main page, press 【Enter】, then move cursor to 【Count】. Press

【Enter】 to clear total count. Move cursor to 【To Clear Total Count】

and press 【Enter】. The total count will change to zero.

Figure5-2-1 Clear Total Count
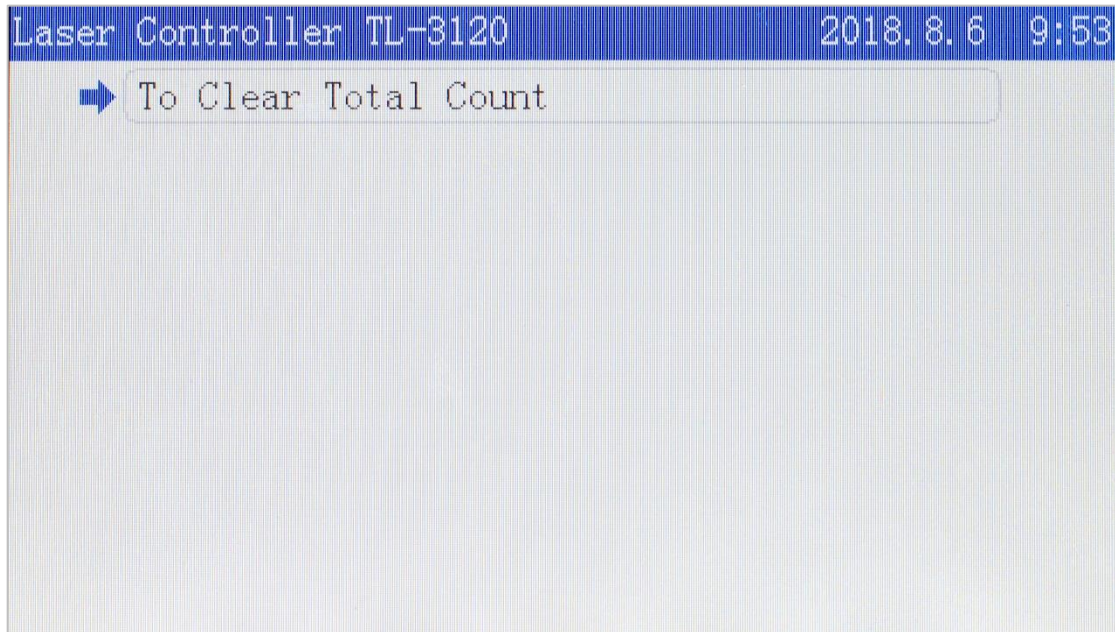
5.3 Working Property

On the main page, press 【Enter】 and move cursor to 【Speed】. Press

【Enter】 to open *Set Laser Power While Idle* page.

Figure5-3-1 Select Speed Option
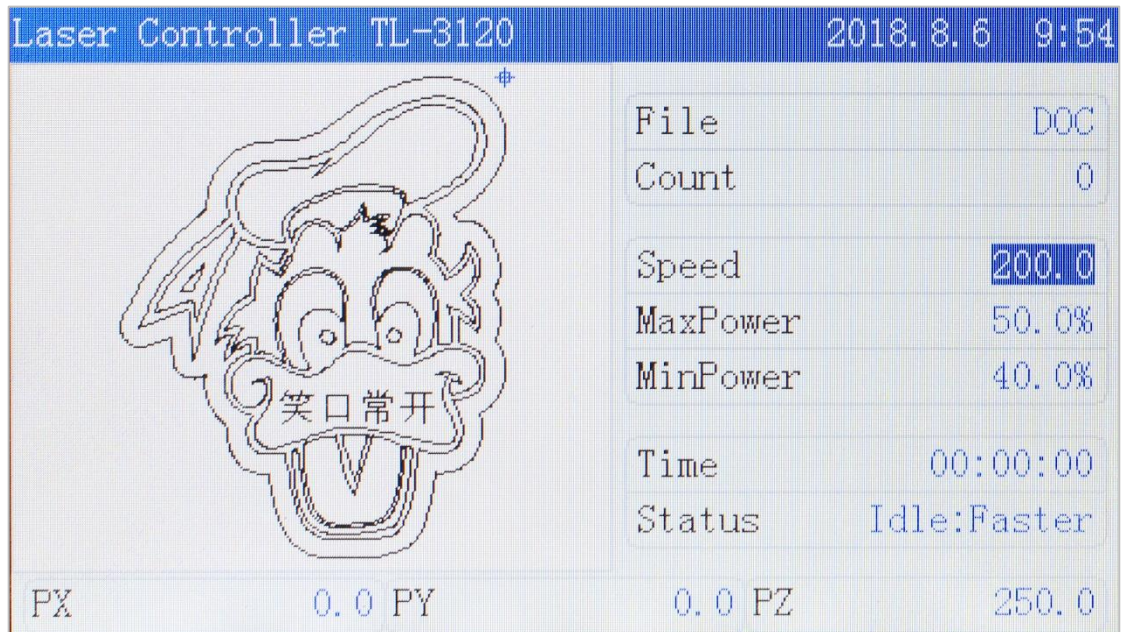
Press 【↑】【↓】【←】【→】 to move cursor, press 【Z↑】【Z↓】 to

modify parameters, and press【Enter】 to save settings.

Fiugre5-3-2 Idle Laser Power Setting Page
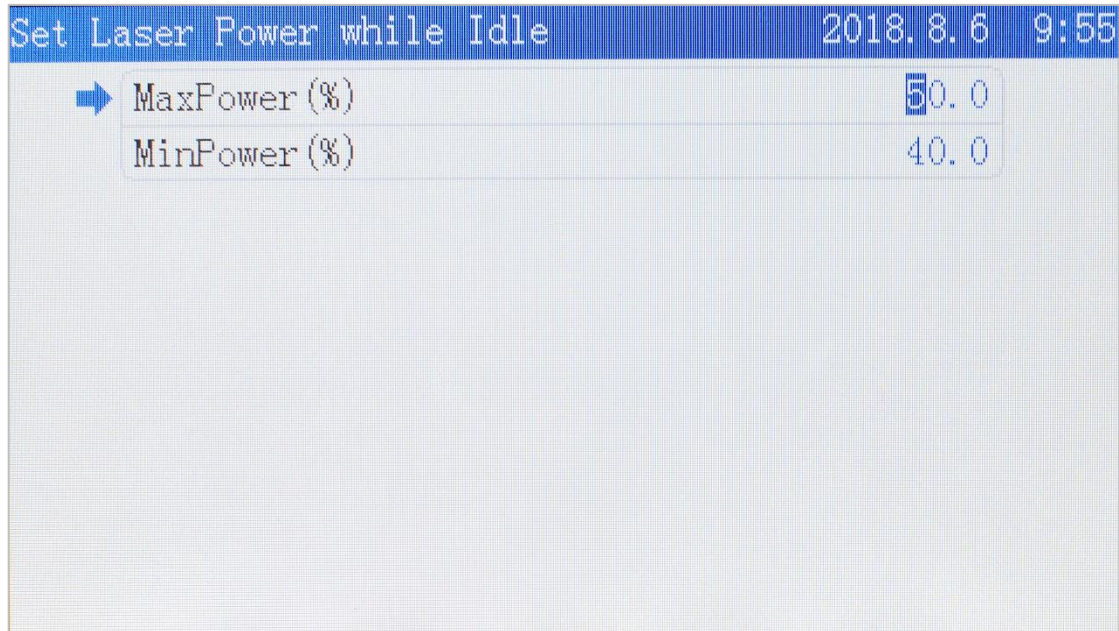
Table5-2-1 Idle Laser Power Instruction

Name	Instruction
Max Power (%)	Laser power.
Min Power (%)	The minimum power of laser head (turning power).

6. System Menu

6.1 U Disk Files

Insert a U disk into the U disk slot on the panel. After the U disk indicator

lighting up, press 【Menu】 and move cursor to 【U Disk Files】, press

【Enter】.

Figure6-1-1 Main Menu Interface
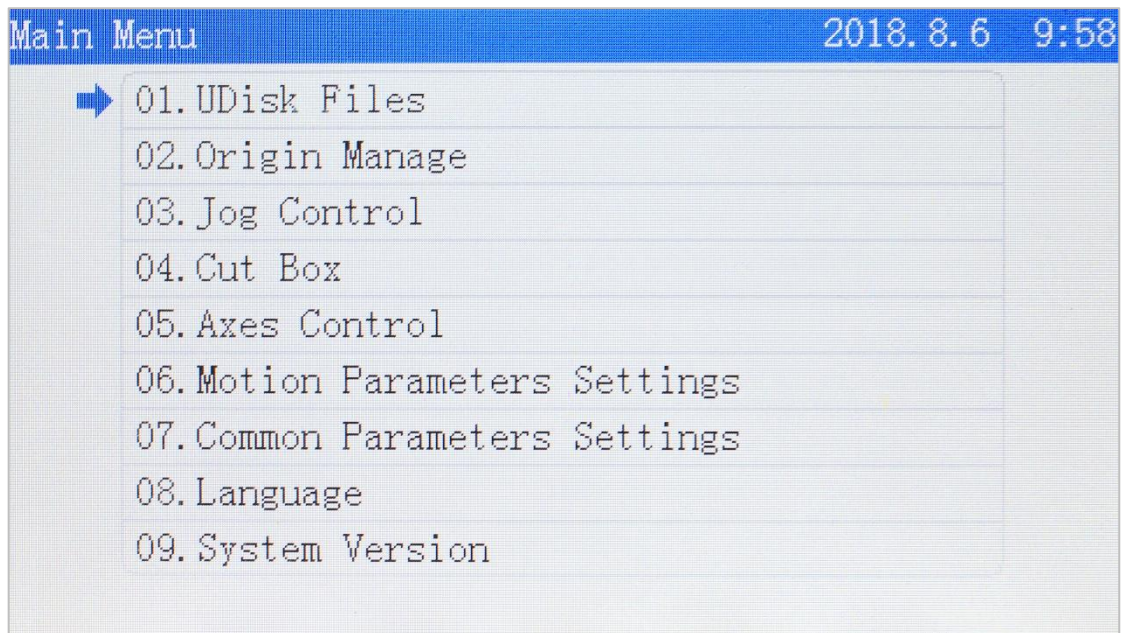
Figure6-1-2 U Disk Files
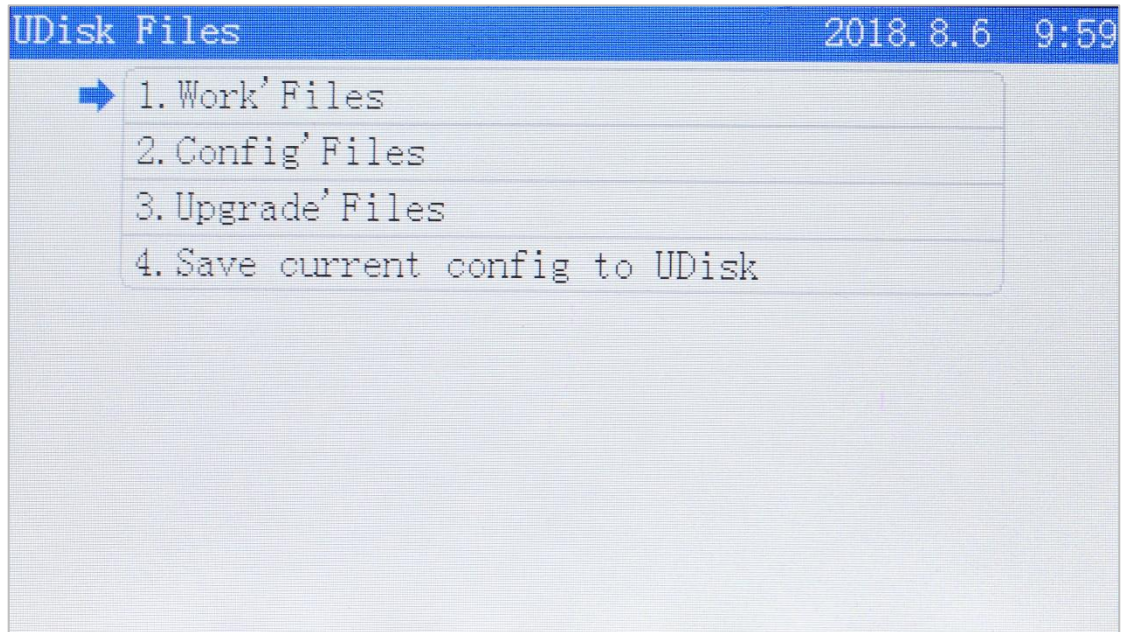
	● The U disk must be formatted into FAT32 in advance. Don't choose quick formatting. Other formats can't be read.
	● It's the best to select the U disk with indicator to confirm whether the U disk has connected to the card.
	● Due to the different main control of the U disk, some U disk may be enabled to read. Please try to use the regular U disk. If the U disk never reads, please change another U disk to try.
	● The U disk can't be used to install system.

If the U disk can't be read, you will see the interface below.

Figure6-1-3 No U Disk Interface
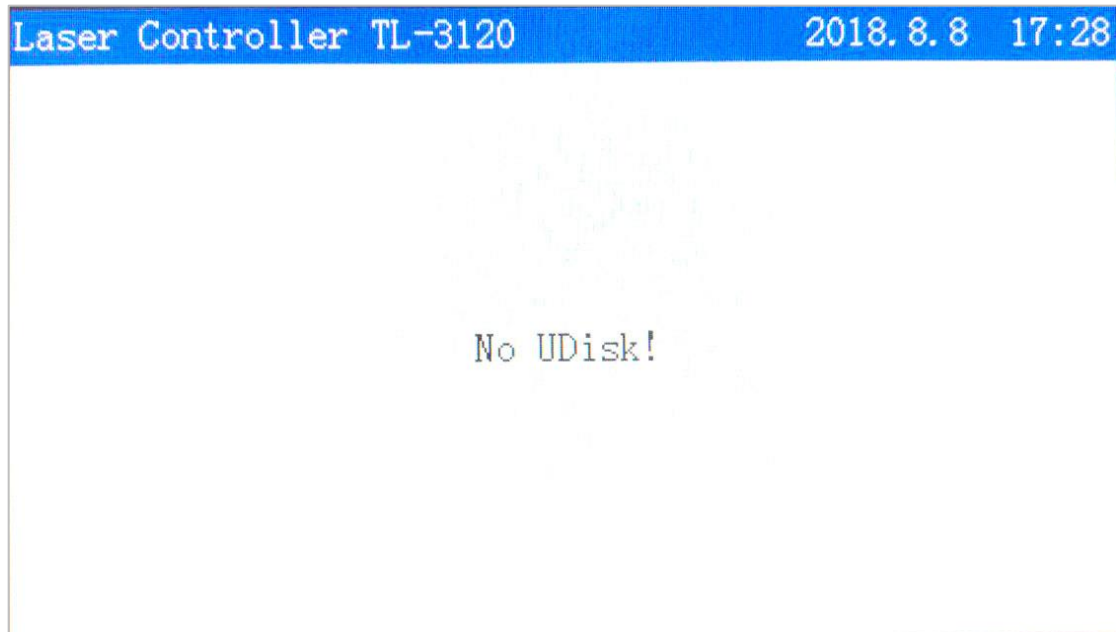
6.1.1 Work Files

Move the cursor to 【Work Files】 and press 【Enter】. You will see all the work files in the U disk, and file names are listed on the left, the relevant graphics previews are on the right. Press 【↑】【↓】to move cursor and press 【Enter】to save the U disk file to mainboard.

Figure6-1-4 U Disk Work Files List
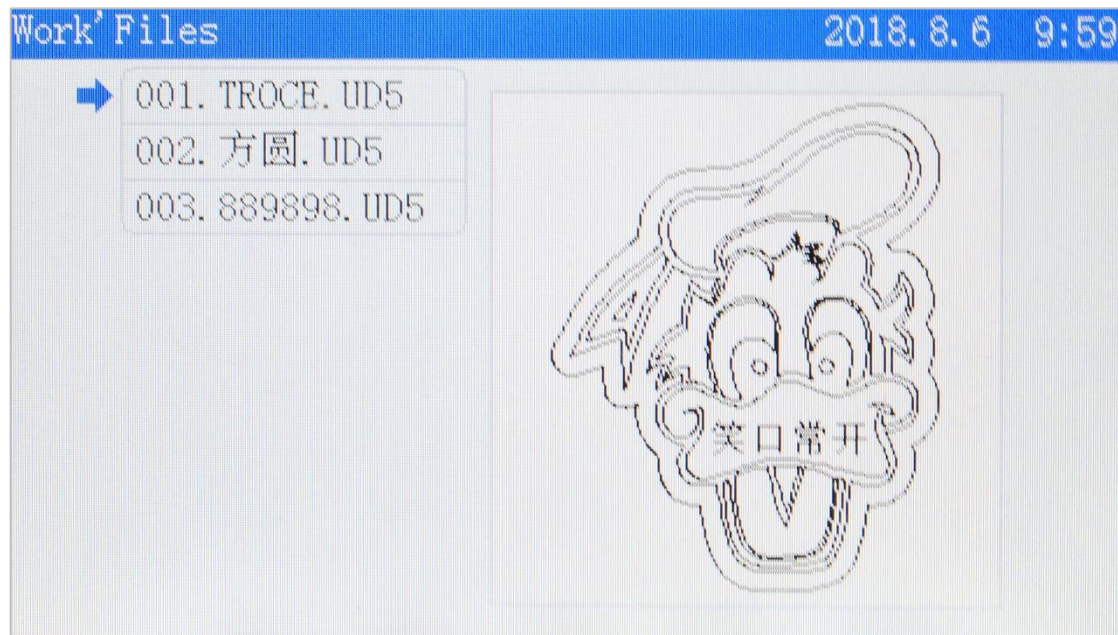
	The work files stored in the U disk are offline files and the suffix is .ud5. The files must be stored in the U disk root directory. The other formats directly stored in the U disk can't read.

6.1.2 Config Files

Move cursor to 【Config File】 and press 【Enter】. Press 【↑】【↓】 to move cursor, then Press【Enter】to save current config file to mainboard.

Figure6-1-5 Config Files List
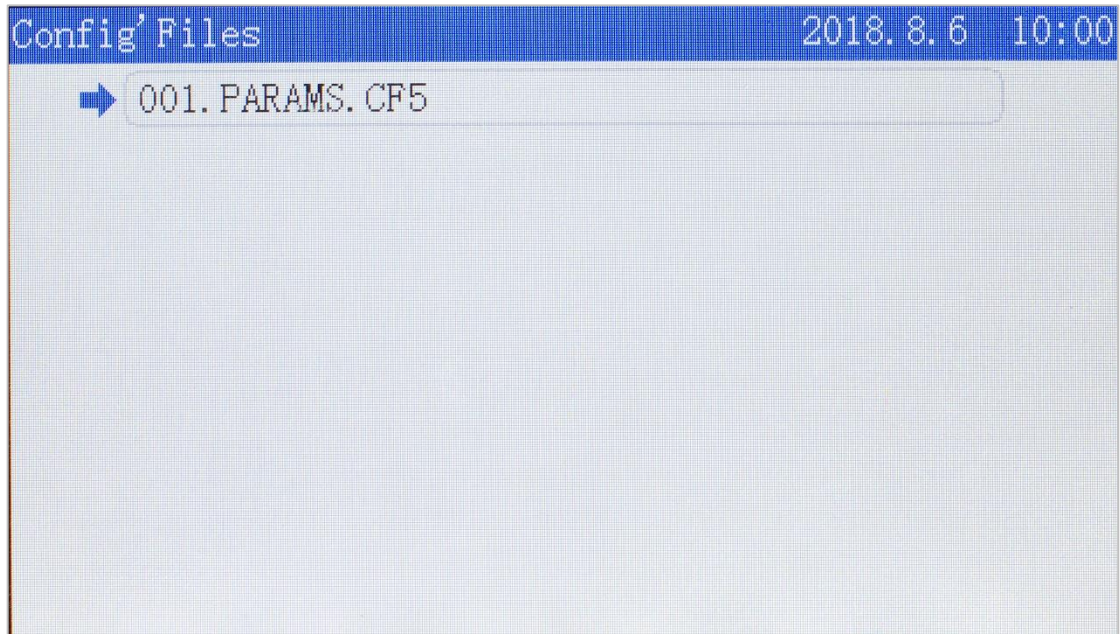
6.1.3 Upgrade Files

Move cursor to 【Upgrade Files】 and press 【Enter】. Press 【↑】 【↓】to move cursor, then Press 【Enter】 to upgrade your mainboard.

Figure6-1-6 Upgrade Files
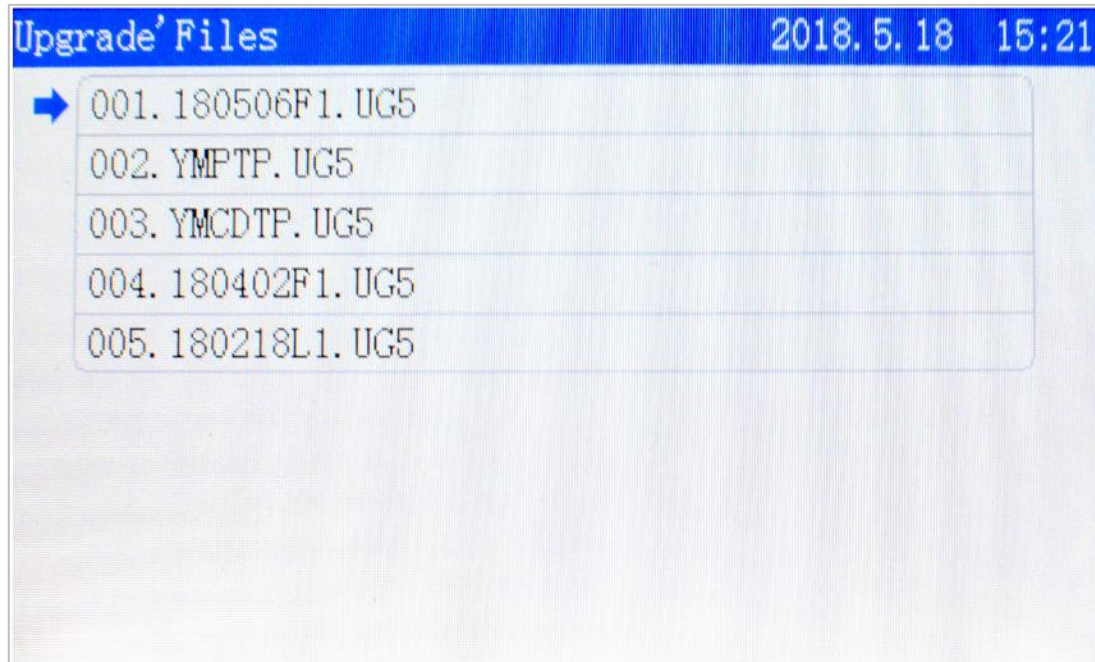
⚠	Don't turn off the power during upgrade, otherwise it will cause damage to the mainboard. The upgrade will take about 30s. After finishing upgrade, the mainboard will reset automatically.

6.1.4 Save Current Config to U Disk

Move cursor to 【Save Current Config to U Disk】 and press 【Enter】 to save current mainboard config file to U disk. And the file is named params.cf5 in the U disk.

Figure6-1-7 Save Current Config to U Disk
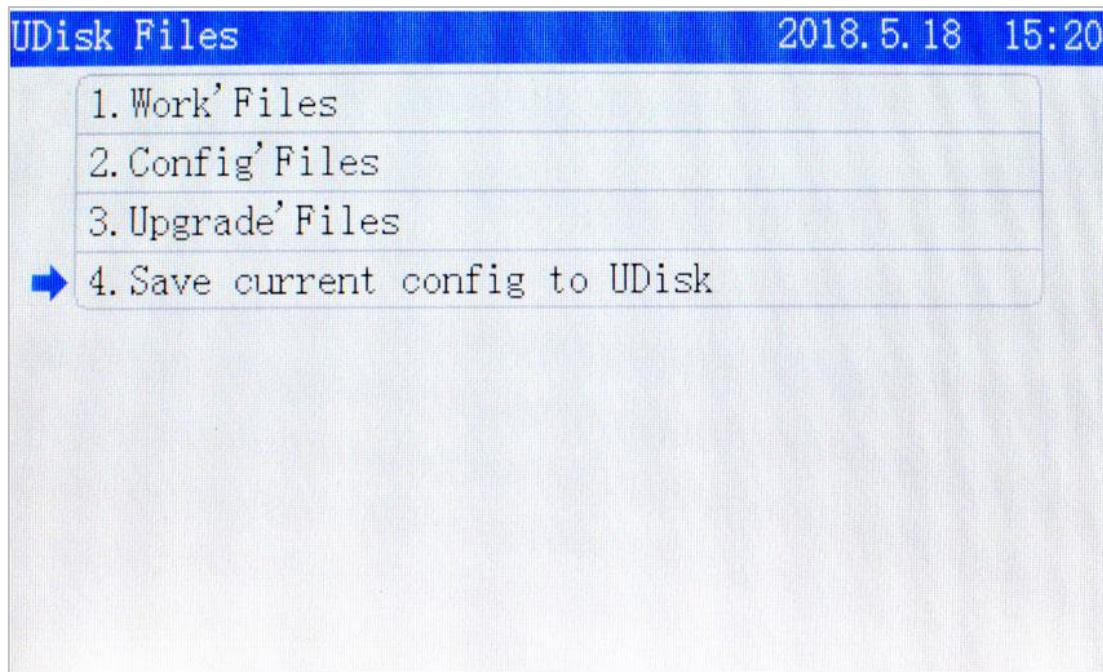
6.2 Origin Manage

There are 4 origin points at most on TL-3120. You could accurately set origin point by the coordinate of XY axis. For convenience, you could set 4 different origins to use, and when you need, you could choose any one directly.

On the main page, press 【Menu】, and move cursor to 【Origin Manage】, press 【Enter】. You will see 【Origin Manage】 page.

Figure6-2-1 Origin Manage Interface
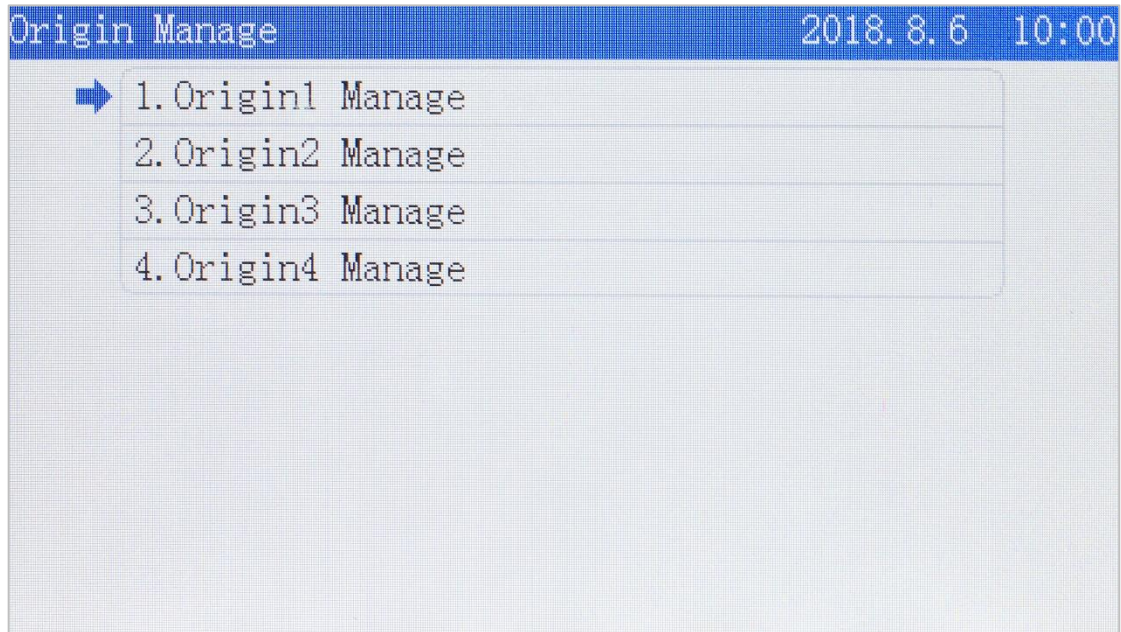
Take 【Origin1 Manage】as an example.

Figure6-2-2 Origin Mange Instruction
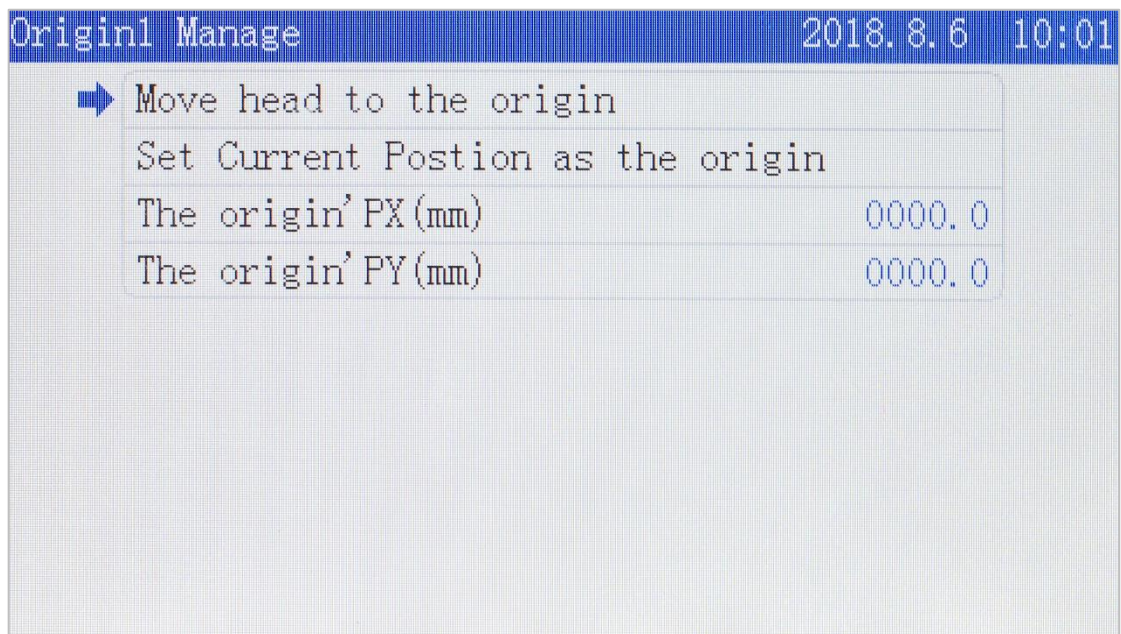
Press 【↑】【↓】to move cursor and you could set the X/Y coordinate value of the origin accurately, press 【Enter】to save settings.

6.3 Jog Control

On the main page, press 【Menu】, move cursor to 【Jog Control】 and press 【Enter】. Then press 【Z↑】【Z↓】 to modify the distance.

On the *Jog Control* page, move cursor to X/Y/Z jog and control the relevant axis to move by direction keys.

The jog control can move axis accurately and adjust the distance per pulse of axis. Please check the Chapter 3.5 to know more about distance per pulse.

Fiugre6-3-1 Jog Control Interface
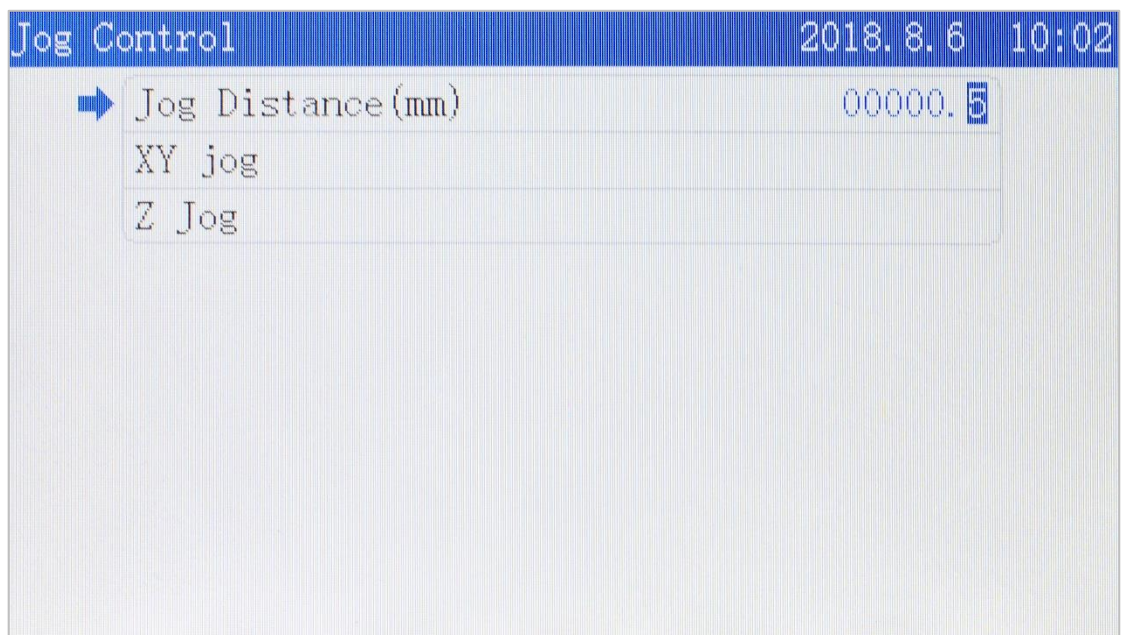
6.4 Cut Box

On the main page, press 【Menu】 and move cursor to 【Cut Box】, press 【Enter】. Move cursor to 【Blank Distance】, and press 【Z↑】【Z↓】 to modify parameters, then move cursor to 【Start cutting box】and press 【Enter】.

Fiugre6-4-1 Cut Box Interface
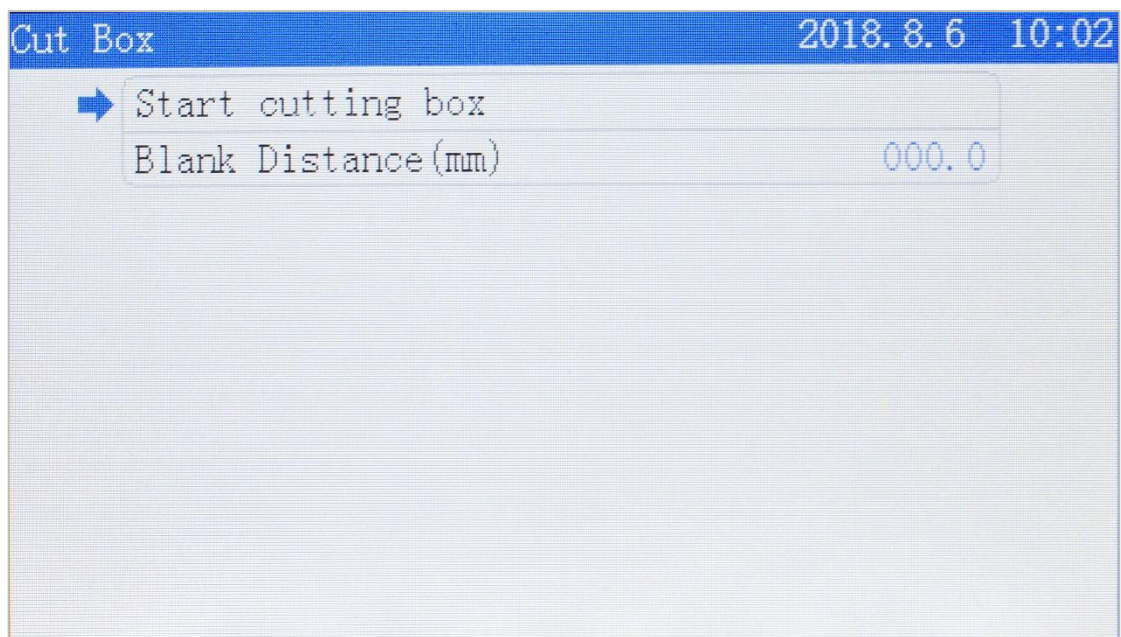
Table6-4-1 Cut Box Instruction

Name	Instruction
Blank Distance (mm)	The distance between the border of graphics and the border of cutting.

6.5 Axes Control

On the main page, press 【Menu】 and move cursor to 【Axes Control】, press 【Enter】. You could choose【Z AutoFocus】function or reset Z axis on this page. Move cursor to the option you need, and press 【Enter】.

Fiugre6-5-1 Axes Control Interface
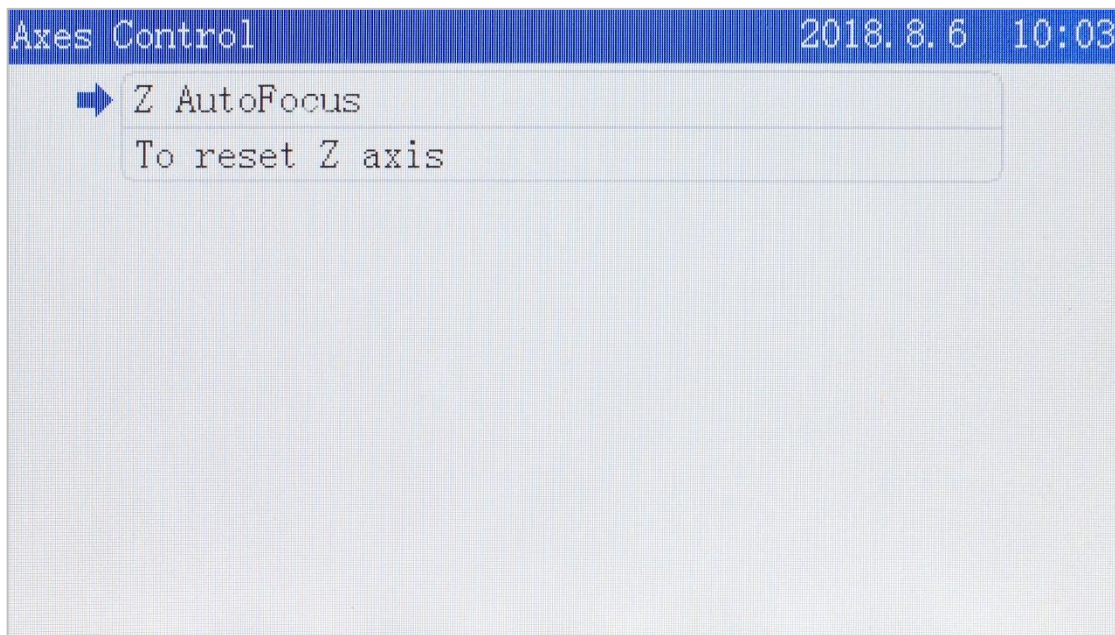
6.6 Motion Parameters Settings

On the main page, press 【Menu】 and move cursor to 【Motion Parameters Settings】, press 【Enter】. Press 【↑】【↓】 to move cursor and press 【Z↑】【Z↓】 to modify parameters, press 【Enter】 to save settings.

| ⚠ | The settings of motion parameters interface are valid for X/Y axis and have no influence on Z axis. |

Fiugre6-6-1 Motion Parameters Settings Interface

```
Motion Parameters Settings        2018.8.6   10:03
  ➡ Space Speed(mm/s)                      0300.0
    Cut Jerk(mm/s3)                        060000
    Space Jerk(mm/s3)                      100000
    Min Acc(mm/s2)                          00300
    Cut Acc(mm/s2)                          03000
    Space Acc(mm/s2)                        03000
    Engrave Acc(mm/s2)                      10000
    Start Speed(mm/s)                        10.0
    Speed Factor                             3.0
```

The settings of these parameter items will affect the cutting effect, please note to adjust according to your requirements.

Table6-6-1 Motion Parameters Instruction

	Name	Instruction
⚠️	Space Speed (mm/s)	The speed of laser head moving without laser powering on and should be filled in the number with an increase or decrease of 50 each time.
	Cut Jerk (mm/s3)	The variation of cutting acc and should be filled in with the number of an increase or decrease of 10 thousand each time.
	Space Jerk (mm/s3)	The variation of laser head's moving speed acc without laser powering on and should be filled in the number with an increase or decrease of 10 thousand each time.
	Min Acc (mm/s2)	Should be filled in number with an increase or decrease of 50 or 100 at a time at least.
	Cut Acc (mm/s2)	The variation of cutting speed and should be filled in with an increase or decrease of 500 each time.
	Space Acc (mm/s2)	The variation of laser head's moving speed without laser powering on and should be filled in the number with an increase or decrease of 500 each

		time.
	Engrave Acc (mm/s2)	The variation of engraving speed and is only effective to engraving.
	Start Speed (mm/s)	The initial speed of laser head from static condition to movement.
	Speed Factor	It has an impact on smoothness when turning the corner. We suggest that lower speed is going to be filled in with 0.5 or 1 while regular speed with 2 and high speed with 3 or 4. This option should be filled in with 0.05 when cutting acrylic or wood.

6.7 Common Parameters Settings

On the main page, press 【Menu】 and move cursor to 【Common Parameters Settings】, press 【Enter】.

Fiugre6-7 Common Parameters Settings Interface

```
Common Params Settings          2018.8.6  10:04
  ➡ 01. Work Mode
    02. Common Parameters
    03. Axis Speed parameters
    04. Rotate Engraving&Cutting
```
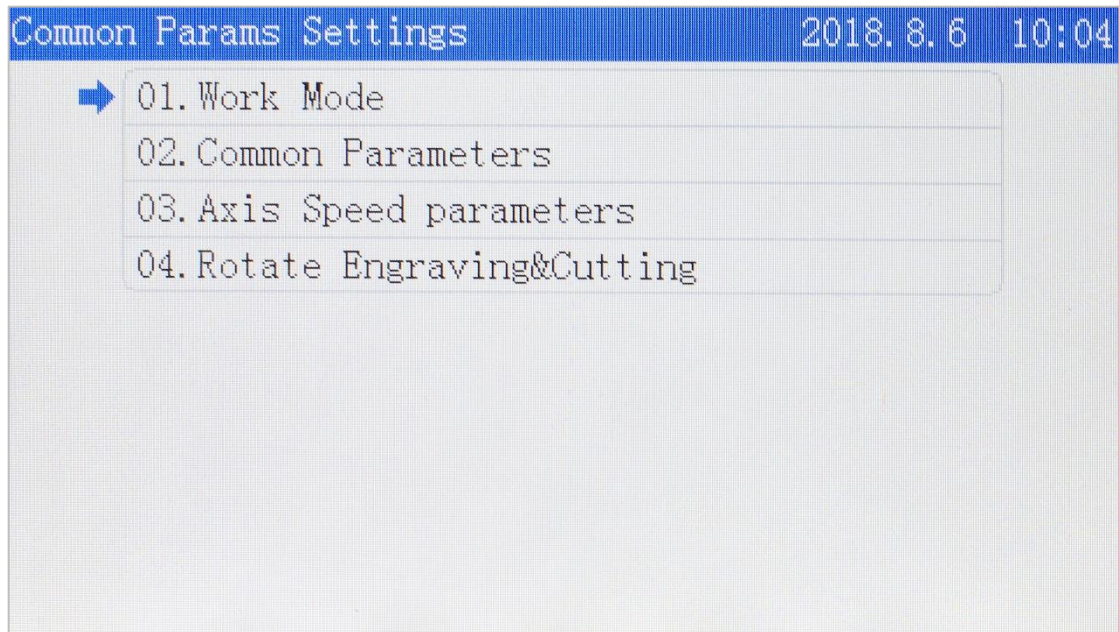
6.7.1 Work Mode

On the **Common Params Settings** page, move cursor to 【Work Mode】 and press 【Enter】. Press 【↑】【↓】to move cursor, press 【←】【→】 to modify options and press 【Enter】 to save settings.

Fiugre6-7-1 Common Parameters Settings Interface
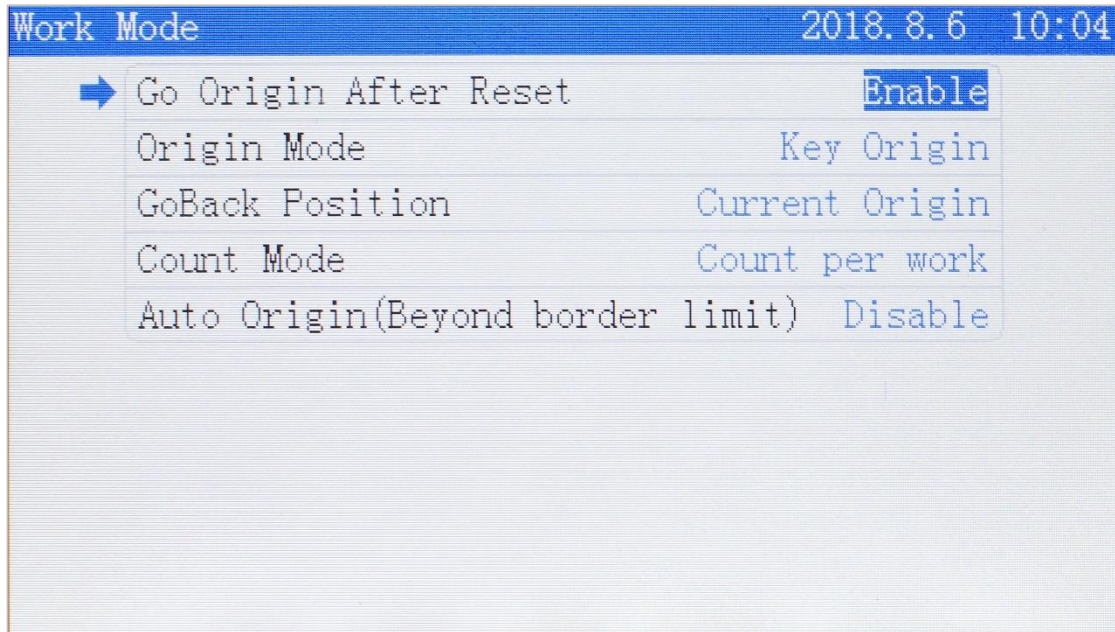
Table6-7-1 Work Mode Instruction

Name	Instruction
Go Origin After Reset	Enable: the laser head will move to the registration point after reset. Disable: the laser head will move to the machine origin point (zero point) after reset.
Origin Mode	Current Position: the laser head stops at the current position and set this position as registration point to start cutting. Key Origin：moving the laser head to the required point, press the 【Origin】 key on the panel to locate. Soft Origin: imported to software (LaserCAD), locate by the coordinates of the graphics in the software.

	Machine Zero As Origin：The registration point is the machine origin point.
Go Back Position	Current Position: the laser head stops at the current point after finishing work. Current Origin: the laser head goes back to registration point after finishing work. Zero Coord: the laser head goes back to the zero point directly after finishing work.
Count Mode	Count per work: the value adds one after cutting all the graphics on the range. Count per Light: the laser head lights one time, and the value adds one. Single of Array: the value adds one after cutting a complete graphics.
Auto Origin (Beyond border limit)	Enable: when the graphics beyond the border limit, the machine will locate to zero point automatically. Disable: Disable the function.

6.7.2 Common Parameters

On the **Common Params Settings** page, move cursor to 【Common Parameters】and press 【Enter】. Press 【↑】【↓】to move cursor and

press【Z↑】【Z↓】to modify parameters, press【Enter】to save settings.

Fiugre6-7-2 Common Parameters Interface
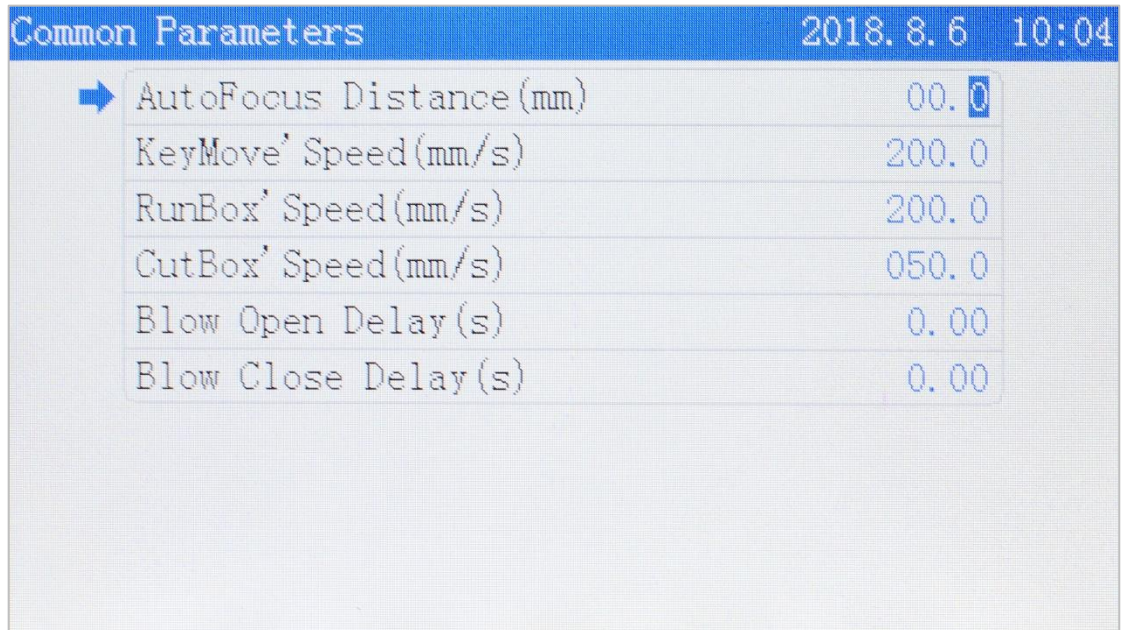
Table6-7-2 Common Parameters Instruction

Name	Instruction
Auto Focus Distance (mm)	The distance between the focal point of laser head lens and the origin of Z axis.
Key Move Speed (mm/s)	The speed at which the axis moves when press direction keys on the panel.
Run Box Speed (mm/s)	The speed at which the laser head runs box without light.
Cut Box Speed (mm/s)	The speed at which the laser head cuts box with light.

Blow Open Delay(s)	The time from the laser giving out light to the beginning of the blow.
Blow Close Delay(s)	The time from the laser stopping giving out light to the ending of the blow.

6.7.3 Axis Speed Parameters

On the **Common Params Settings** page, move cursor to 【Axis Speed Parameters】and press 【Enter】. Press 【↑】【↓】to move cursor and press【Z↑】【Z↓】 to modify parameters, press 【Enter】to save settings.

Fiugre6-7-3 Axis Speed Parameters Interface
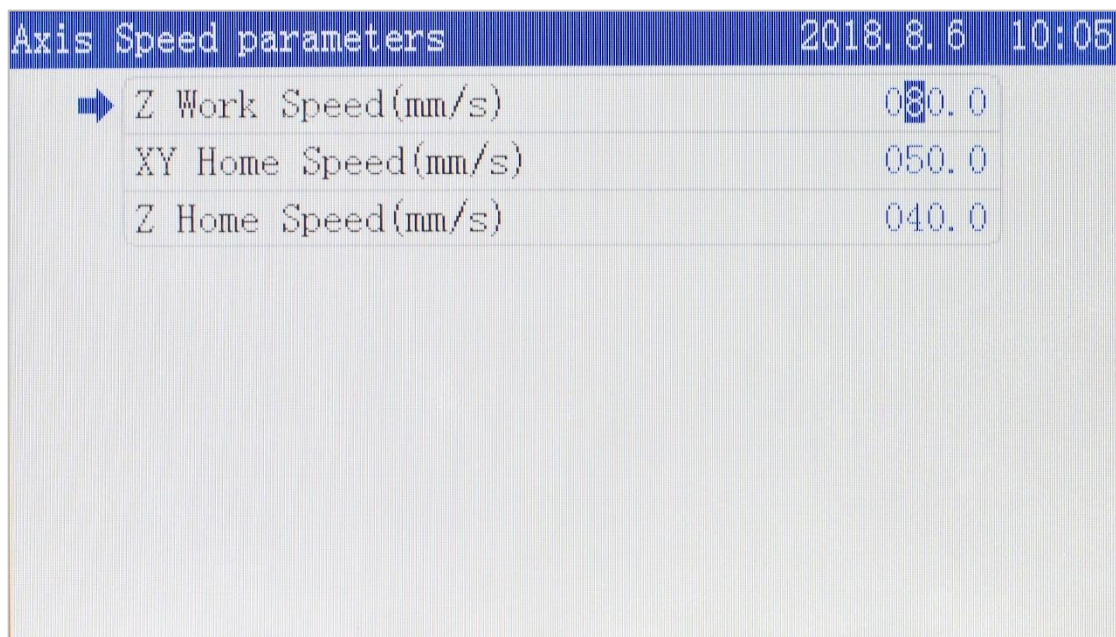
Table6-7-3 Axis Speed Parameters Instruction

Name	Instruction
Z Work Speed (mm/s)	The work speed of Z axis.
XY Home Speed (mm/s)	The reset speed of XY axis.
Z Home Speed (mm/s)	The reset speed of Z axis.

6.7.4 Rotate Engraving & Cutting

On the **Common Params Settings** page, move cursor to 【Rotate Engraving & Cutting】and press 【Enter】. Press 【↑】【↓】to move cursor, press 【←】【→】to modify options and press【Z↑】【Z↓】to modify parameters, press 【Enter】to save settings.

Fiugre6-7-4 Rotate Engraving & Cutting Interface
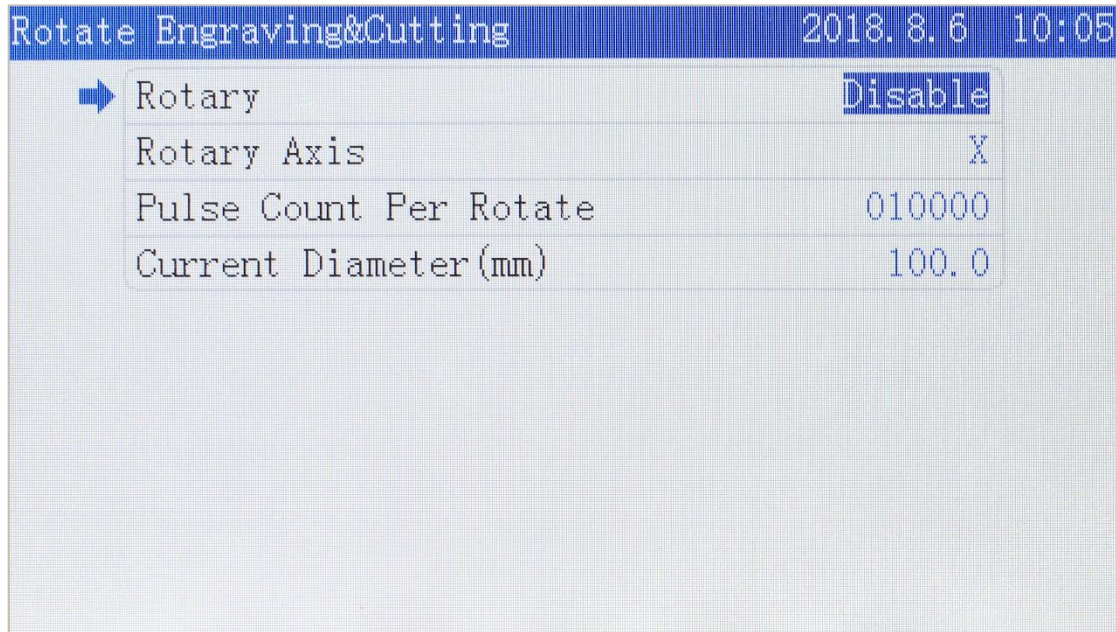
Table6-7-4 Rotate Engraving & Cutting Instruction

Name	Instruction
Rotary	Enable or Disable rotary engraving function.
Rotary Axis	The axis which rotary engraving uses.
Pulse Count Per Rotate	The number of pulses required by motor driver when the rotary axis rotates one circle.
Current Diameter (mm)	The diameter of current work piece.

Figure6-7-5 Rotary—Clamped
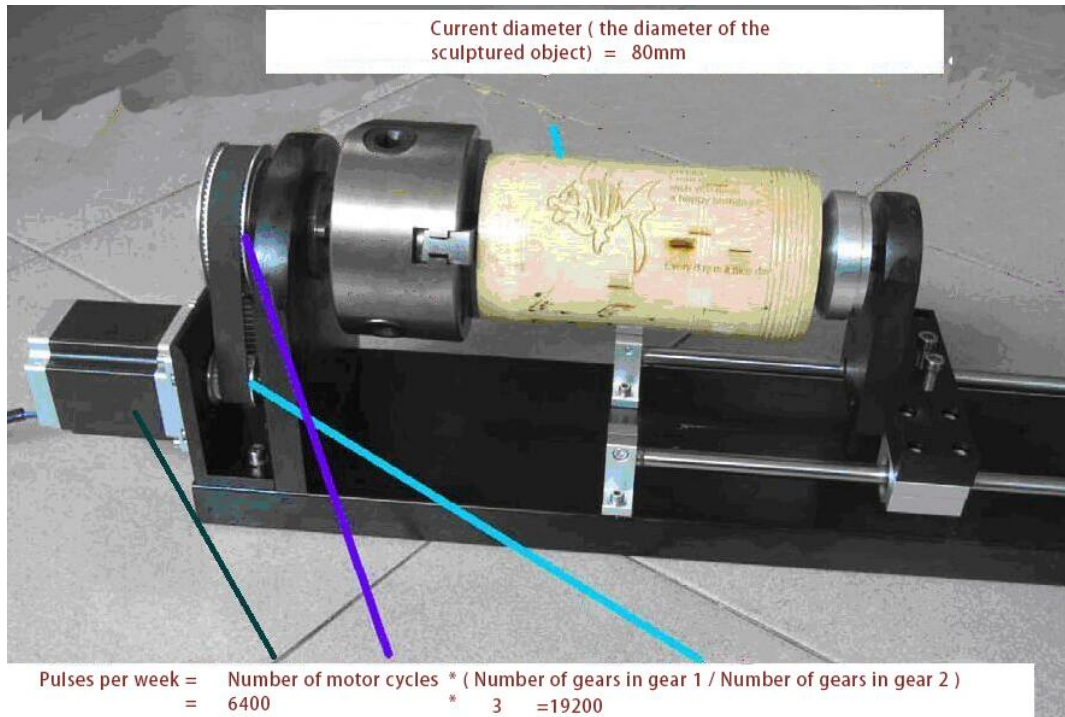
Figure6-7-6 Rotary—Roller

6.8 Language

On the main page, press 【Menu】and move cursor to 【Language】, press 【Enter】. Press 【←】【→】 to modify options and press 【Enter】 to save settings.

Fiugre6-8 Language Interface
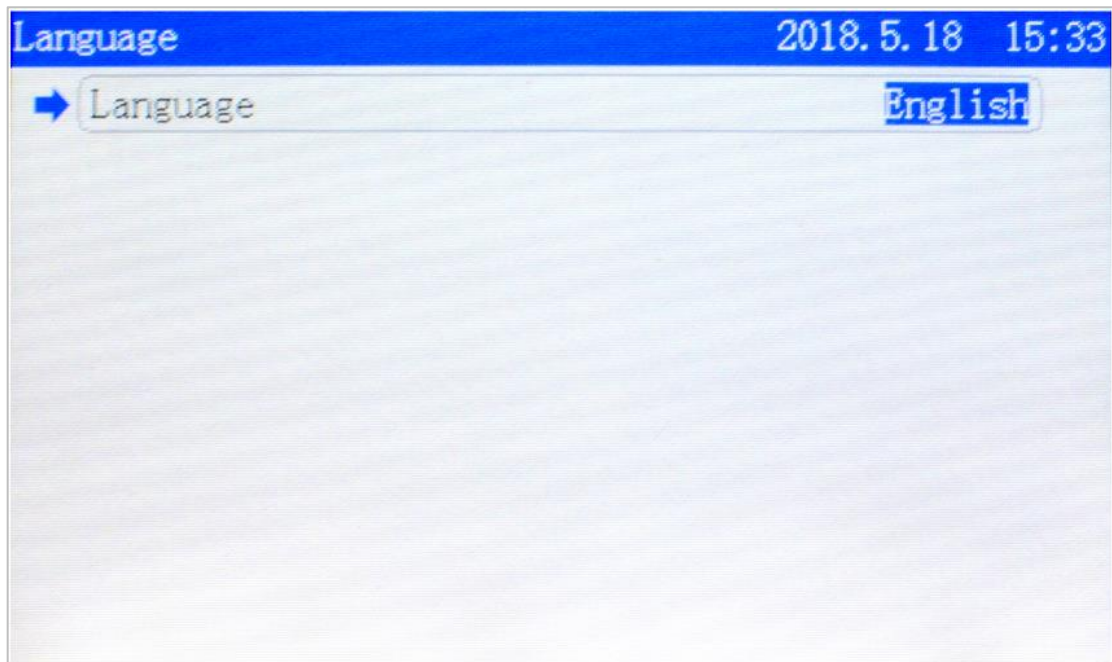
6.9 System Version

On the main page, press 【Menu】and move cursor to 【System Version】, press 【Enter】 to see the system information. Move cursor to 【User authorization code】and press 【Enter】. Press 【↑】【↓】to move cursor, press 【Z↑】【Z↓】 to modify parameters and press 【Enter】 to save settings.

If the encryption or decryption of the mainboard is successful, the product

ID will change.

Fiugre6-9 User Authorization Code Interface
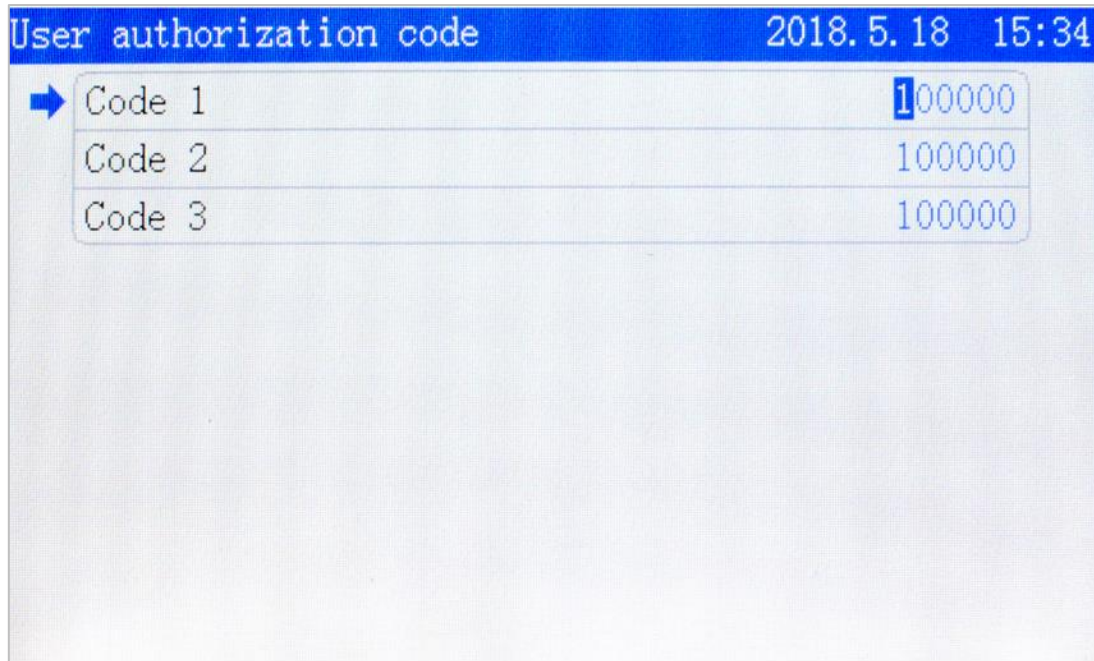
The user authorization code is used for encryption or decryption. If you don't need encryption, there is no need to modify it. Otherwise see the encryption manual.

7. Manufacture Params Settings

On the main page, press 【Stop】+【Shift】together, you will see *Manufacture Params Settings* page.

Figure7-1 Manufacture Params Interface
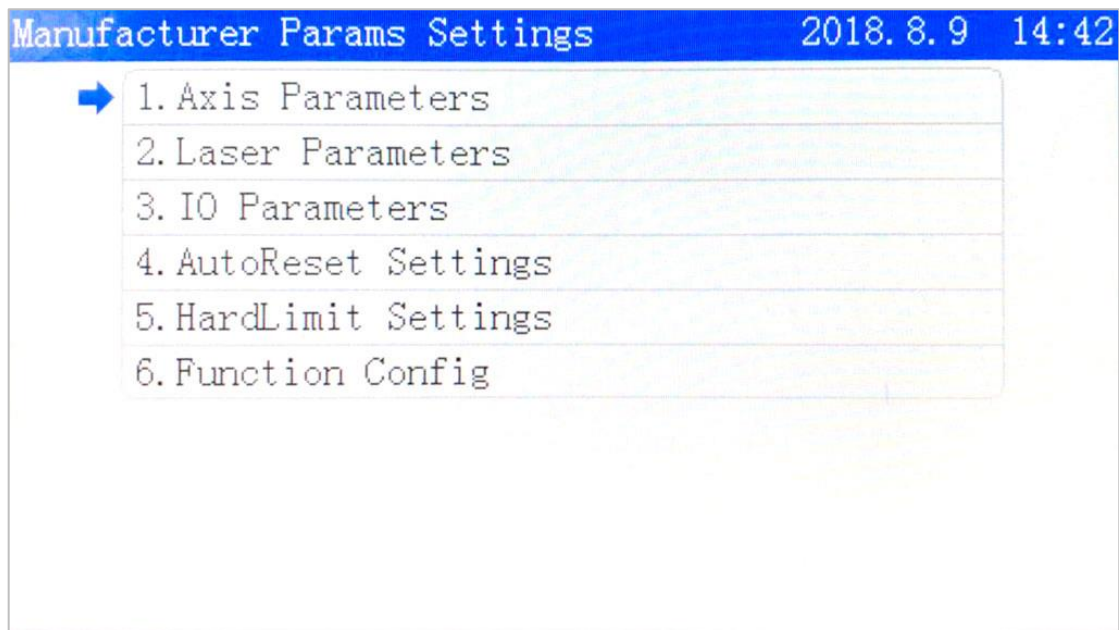
7.1 Axis Parameters

Move cursor to 【Axis Parameters】 and press 【Enter】. Take the X axis parameter setting as an example, other axis parameter settings are the same.

Figure7-1-1 Axis Parameters Interface
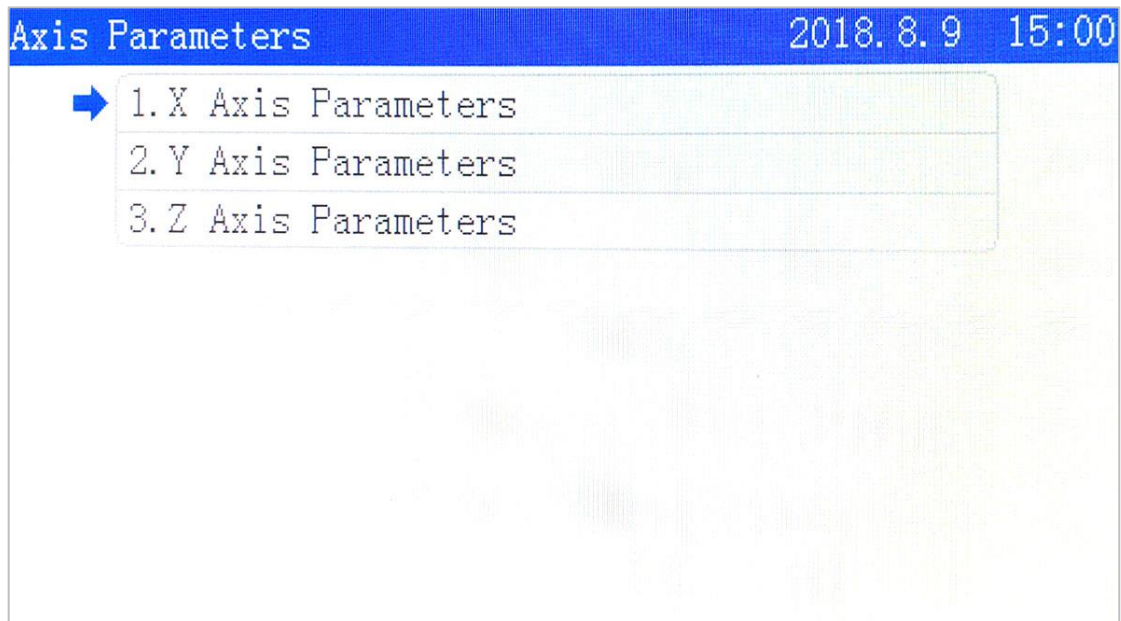
On the *Axis Parameters* page, move cursor to 【X Axis Parameters】 and press 【Enter】. Press 【↑】【↓】 to move cursor, press 【←】【→】 to modify options, press 【Z↑】【Z↓】 to modify parameters and press 【Enter】 to save settings.

Figure7-1-2 X Axis Parameters Interface

Table7-1-1 X Axis Parameters Instruction

Name	Instruction
Distance Per Pulse (um)	When the controller sends a pulse signal, the motor moves a distance or rotates fixed angle. If set incorrectly, the graphics will change.
Valid Pulse Edge	Effective values for driver level to change.
Datum Direction	The direction in which the machine moves when reset. If set incorrectly, the axis moves against origin direction.
Key Direction	The direction in which the axis moves when press keys on the panel. When set incorrectly, the axis moves opposite direction.
Limit Polarity	The control level that limit switch passes to control panel. When set incorrectly, the limit will fail. If the limit sensor is NPN, the limit polarity is negative.

	If the limit sensor is PNP, the limit polarity is positive.
Range(mm)	The working range of machine.
Start Speed (mm/s)	The speed at which the axis moves from rest to motion.
Max ACC (mm/s2)	The maximum acceleration value of the motion axis when increases or decreases speed.
Max Speed (mm/s)	The maximum speed which the motion axis supports.

Move cursor to 【Distance Per Pulse】, press 【Enter】. Input 【Expected Length】 and 【Actual Length】 by 【Z↑】【Z↓】 to calculate the pulse distance automatically. More detail about the calculation of distance per pulse, please refer to the Chapter 3.5 of this manual.

Figure7-1-3 Pulse Distance Calculation
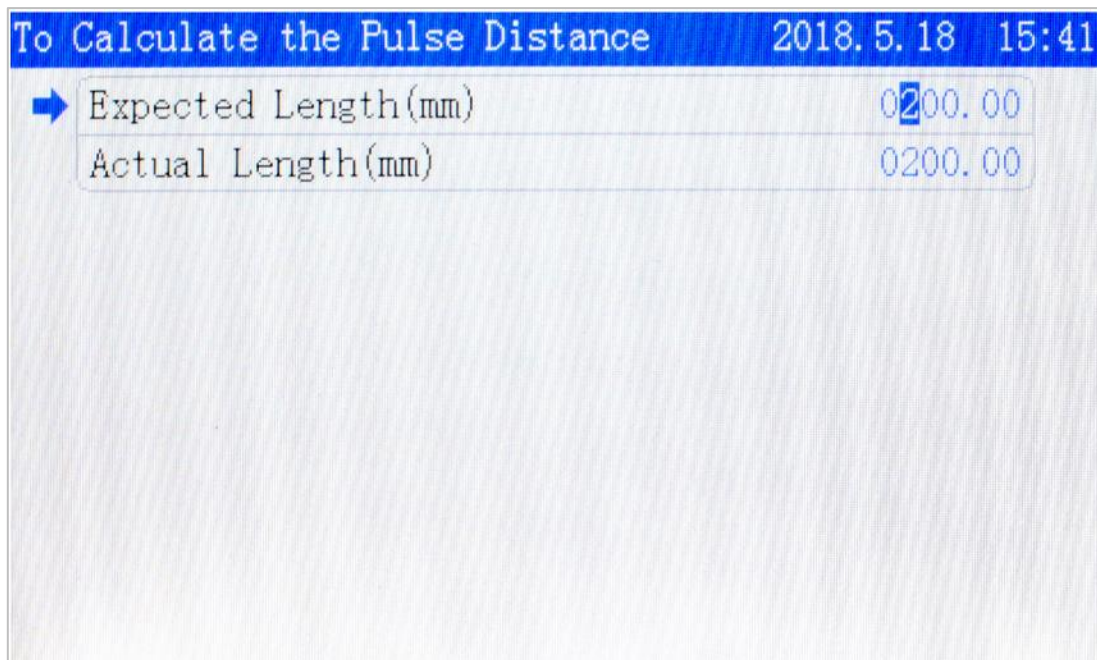
7.2 Laser Parameters

On the **Manufacture Params Settings** page, move cursor to 【Laser Parameters】 and press 【Enter】. Press 【↑】【↓】 to move cursor, press 【←】【→】 to modify options, press 【Z↑】【Z↓】 to modify parameters and press 【Enter】 to save settings.

Figure7-2-1 Laser Parameters Interface
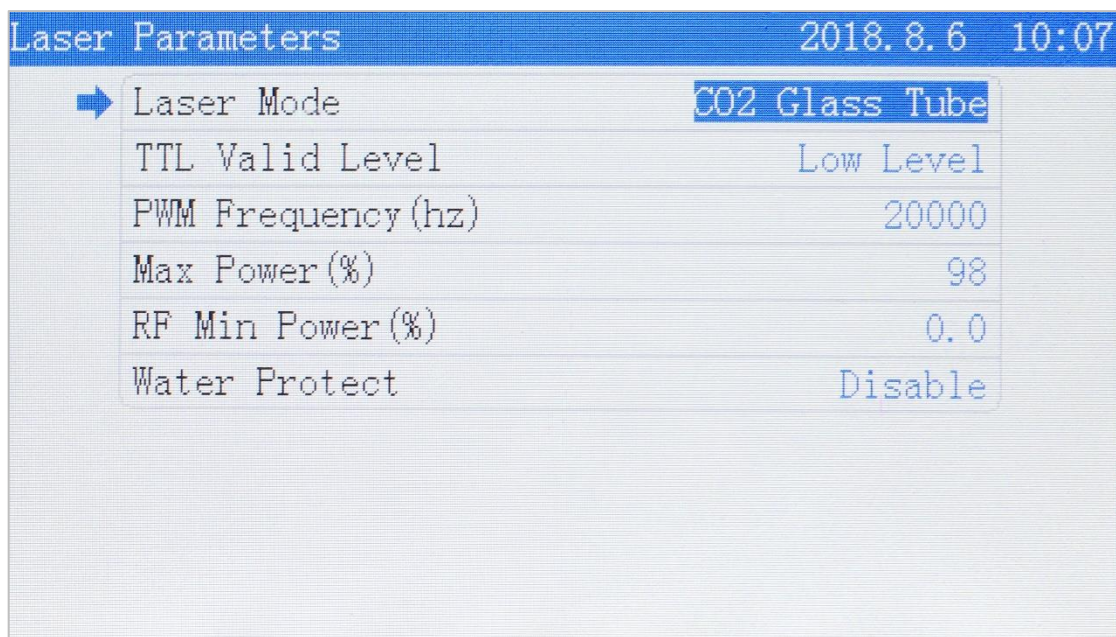
Table7-2-1 Laser Parameters Instruction

Name	Instruction
Laser Mode	Laser tube type: CO2 Glass Tube, RF tube.
TTL Valid Level	The control level of laser tube.
PWM Frequency (Hz)	Set the pulse frequency of control signal used by laser.

Max Power (%)	The maximum power of laser tube. The maximum power value set by user can't be higher than this value and the laser power is displayed as a percentage.
RF Min Power (%)	Turning power.
Water Protect	Water protection switch. Enable: Turn on water protection. Disable: Turn off water protection. If turn on this function, the machine will stop working when the machine detects the signal of water stopping.

7.3 I/O Parameters

On the ***Manufacture Params Settings*** page, move cursor to 【IO Parameters】 and press 【Enter】. Press 【↑】【↓】 to move cursor, press 【←】【→】 to modify options and press【Enter】to save settings.

Figure7-3-1 I/O Parameters Interface
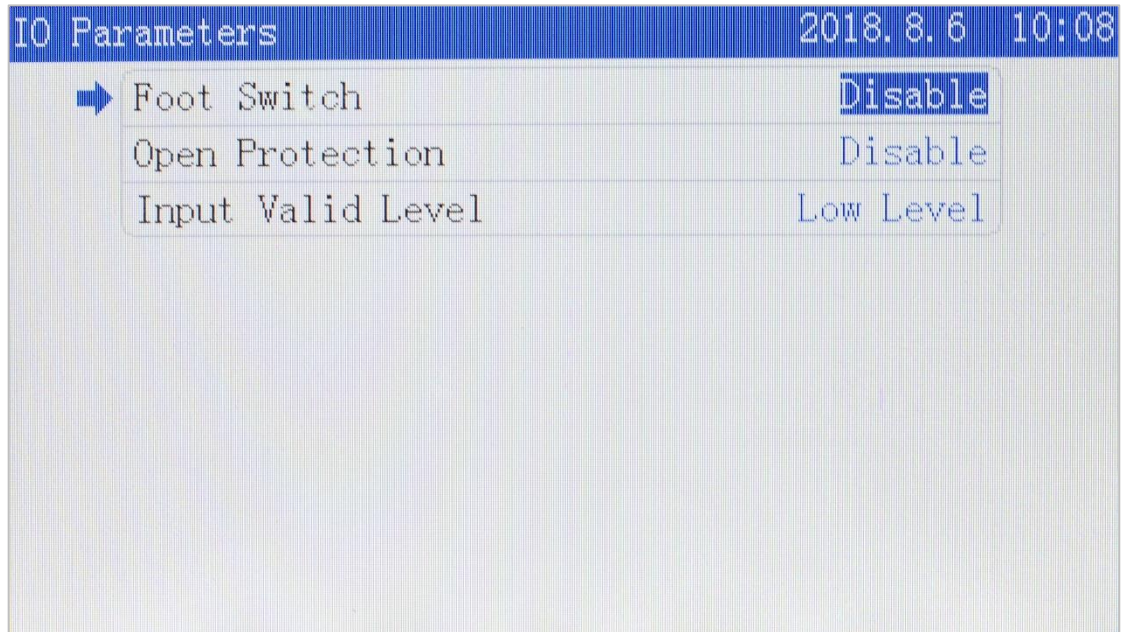
Table7-3-1 I/O Parameters Instruction

Name	Instruction
Foot Switch	Enable: Turn on foot switch. Disable: Turn off foot switch.
Open Protection	Enable: Turn on open protection. Disable: Turn off open protection.
Input Valid Level	According to need, set input IO to low level or high level.

7.4 Auto Reset Settings

On the ***Manufacture Params Settings*** page, move cursor to 【Auto Reset Settings】 and press 【Enter】. Press 【↑】【↓】 to move cursor, press 【←】【→】 to modify options and press 【Enter】to save settings.

Figure7-4-1 Auto Reset Setting Interface
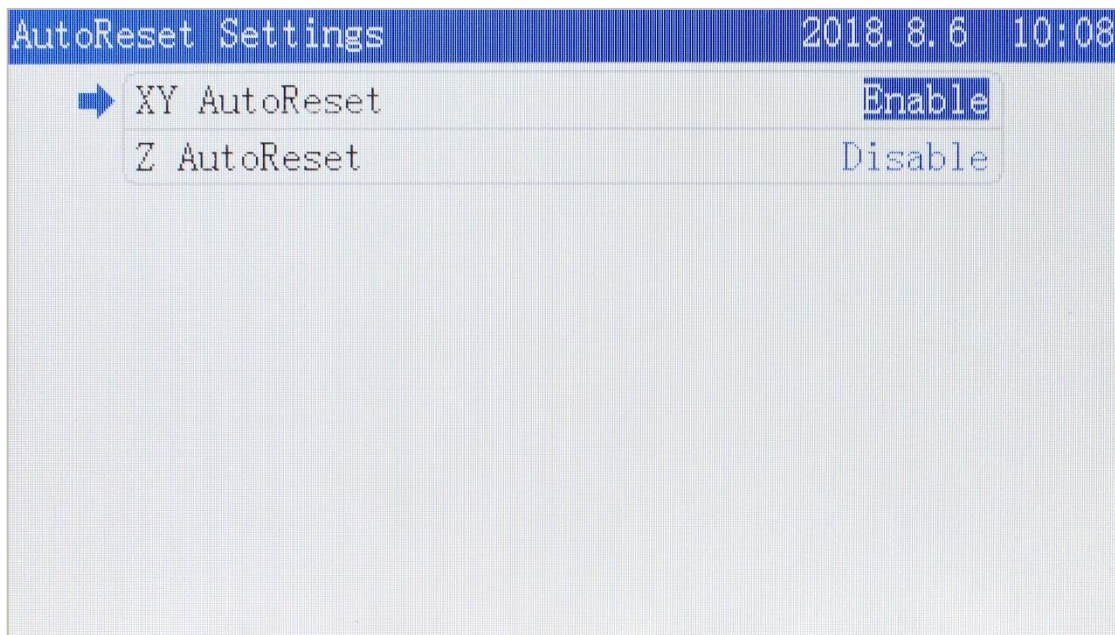
Table7-4-1 Auto Reset Settings Instruction

Name	Instruction
XY Auto Reset	Enable: when the machine resets, X/Y axis will reset automatically. Disable: when the machine resets, X/Y axis won't reset.
Z Auto Reset	Enable: when the machine resets, Z axis will reset automatically.

	Disable: when the machine resets, Z axis won't reset.

7.5 HardLimit Settings

On the **Manufacture Params Settings** page, move cursor to 【HardLimit Settings】 and press 【Enter】. Press 【↑】【↓】 to move cursor, press 【←】【→】 to modify options and press【Enter】to save settings.

Figure7-5-1 HardLimit Setting Interface
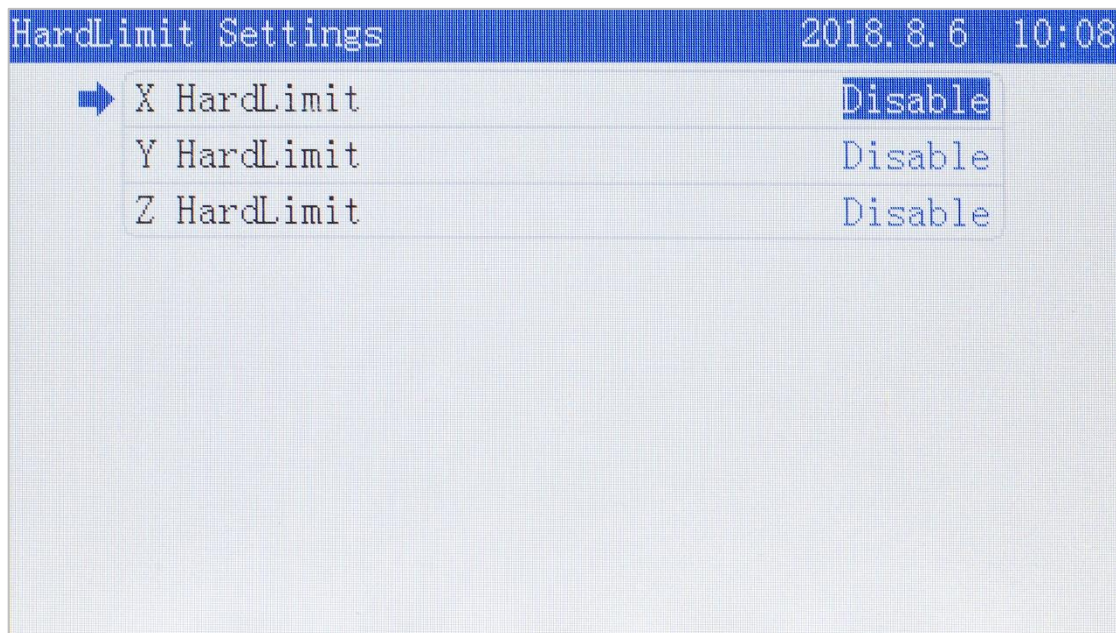
Table7-5-1 Auto Reset Settings Instruction

Name	Instruction
X HardLimit	Hardware limit switch of X axis. If use hardware limit, you should enable this function.

Y HardLimit	Hardware limit switch of Y axis. If use hardware limit, you should enable this function.
Z HardLimit	Hardware limit switch of Z axis. If use hardware limit, you should enable this function.

7.6 Function Config

On the *Manufacture Params Settings* page, move cursor to 【Function Config】 and press 【Enter】. Press 【←】【→】 to modify options and press【Enter】to save settings.

Figure7-6-1 Function Config Interface
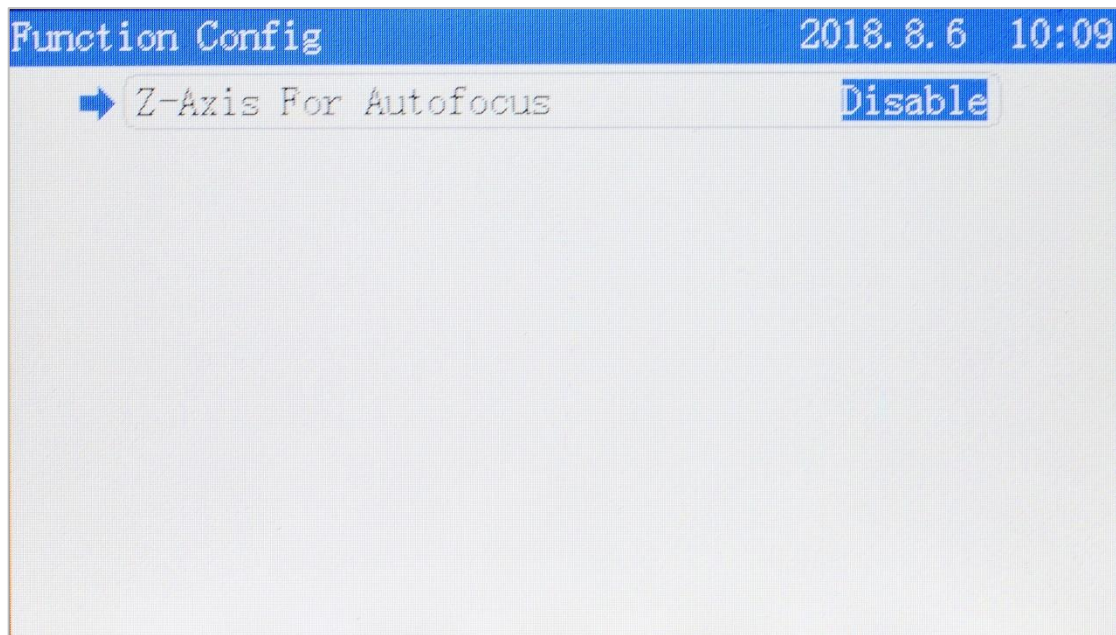
Table7-6-1 Function Config Instruction

Name	Instruction
Z-Axis for Autofocus	The switch of Z-axis autofocus. If you need Z AutoFocus function, you need to enable this option.

8. Wiring Diagram of Servo Driver

8.1 Panasonic A5 High Speed Pulse Wiring Diagram

Figure 8-1-1 Panasonic A5 High Speed Pulse Wiring Diagram

TL-3120 Servo Control Interface   Panasonic MINAS-A 50P Interface

Signal	PIN
DIR	3
PUL	2
DC 5V	1

PIN	Signal
44	PULSH1
45	PULSH2
46	SIGNH1
47	SIGNH2
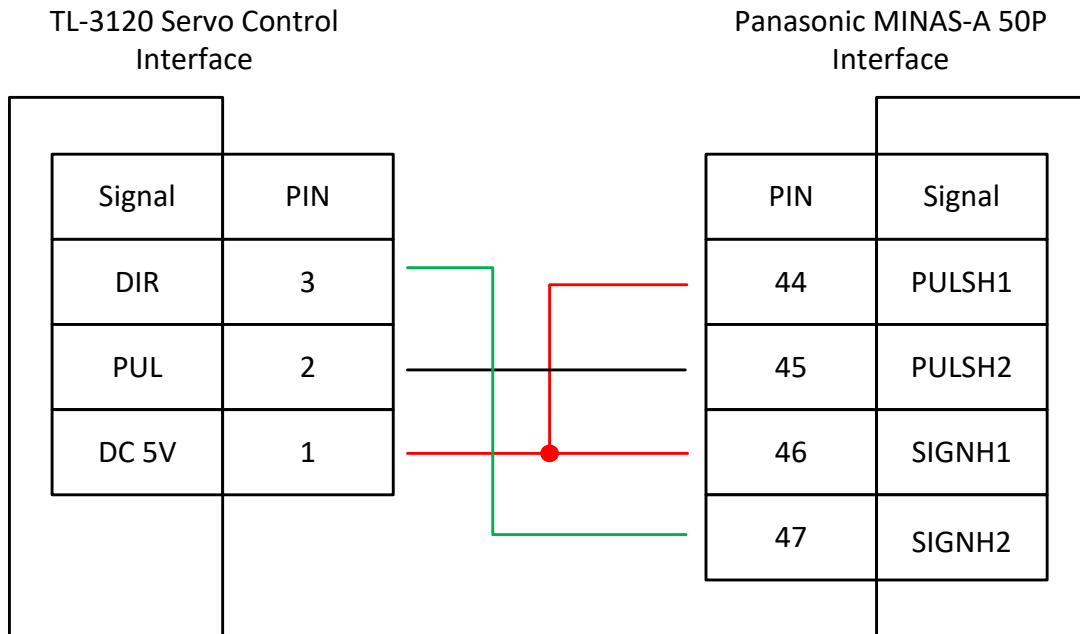
Figure 8-1-2 Panasonic A5 Low Speed Pulse Wiring Diagram
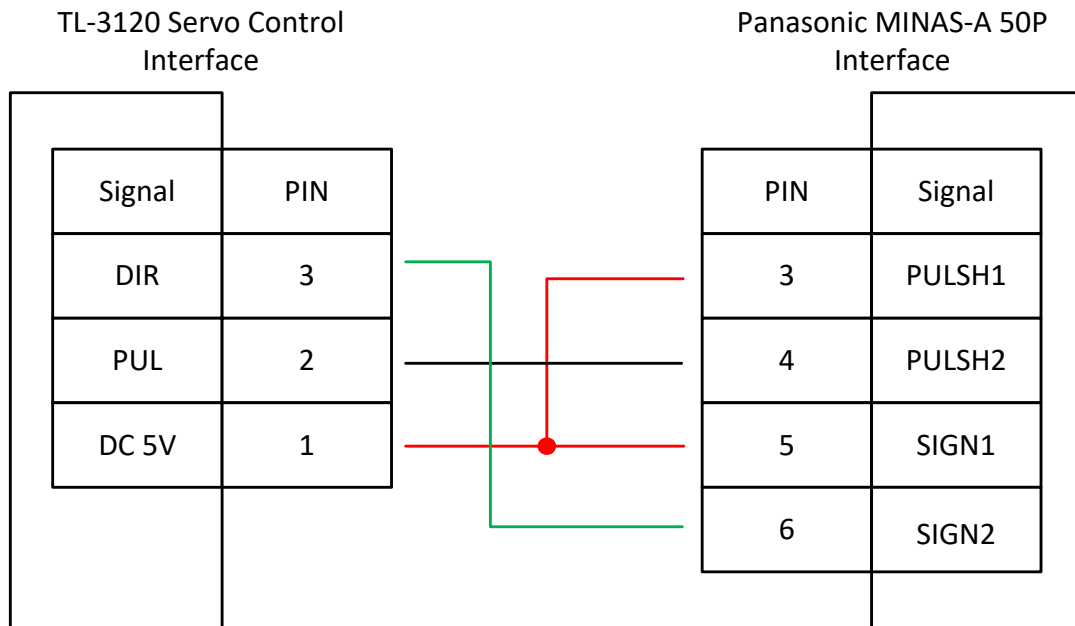
Table8-1-1 Panasonic A5 Series Basic Setting Parameters

Mode	Value	Instruction
Pr001	0	Control mode, must be set to position mode.
Pr007	3	Must be "Pulse + Direction" mode.
Pr005	1	High-speed pulse connection mode, the parameter is set to "1", and the maximum pulse frequency is 3Mpps. Low speed pulse connection mode, the parameter is set to "0", and the maximum pulse frequency is 500Kpps.

8.2 Yaskawa Wiring Diagram

Figure 8-2-1 Yaskawa Wiring Diagram
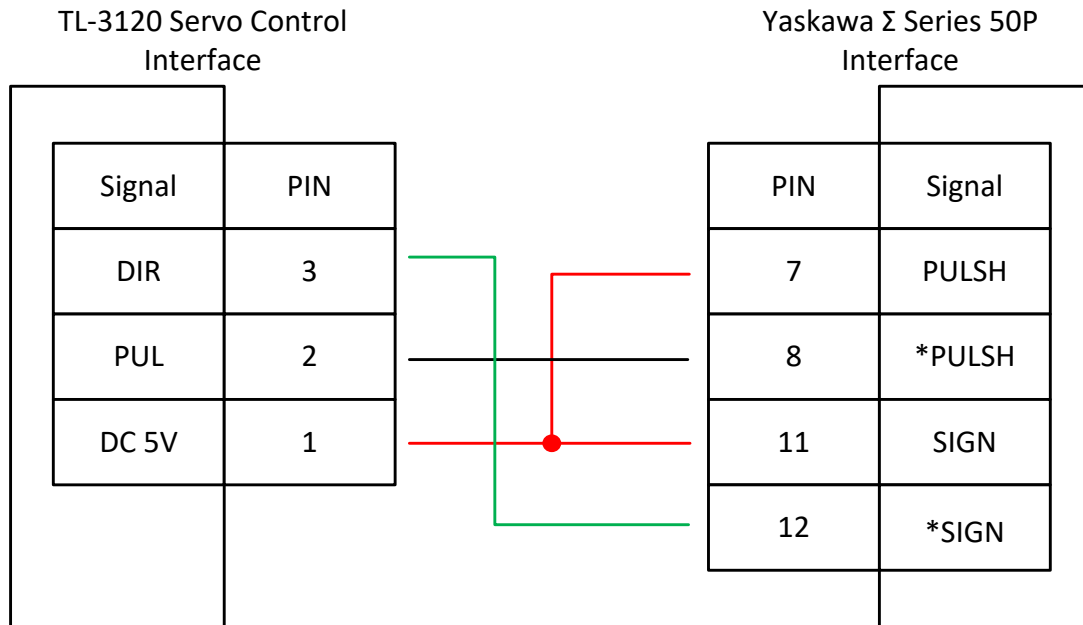
Table8-2-1 Yaskawa Σ Series Basic Setting Parameters

Mode	Value	Instruction
Pn000	001X	Position mode.
Pn00B	None	When single-phase power input, the parameter is set to "0100".
Pn200	2000H	Positive logic: Pulse + Direction; 0005H negative logic: Pulse + Direction; When the pulse frequency is less than 1Mpps, please select "0000H". When the pulse frequency reaches 1Mpps~4Mpps,

		please select "2000H".
Pn50A	8100	Positive rolling side can be driven.
Pn50B	6548	Negative rolling side can be driven.

8.3 Delta A Series High Speed Pulse Wiring Diagram

Figure 8-3-1 Delta A Series High Speed Pulse Wiring Diagram
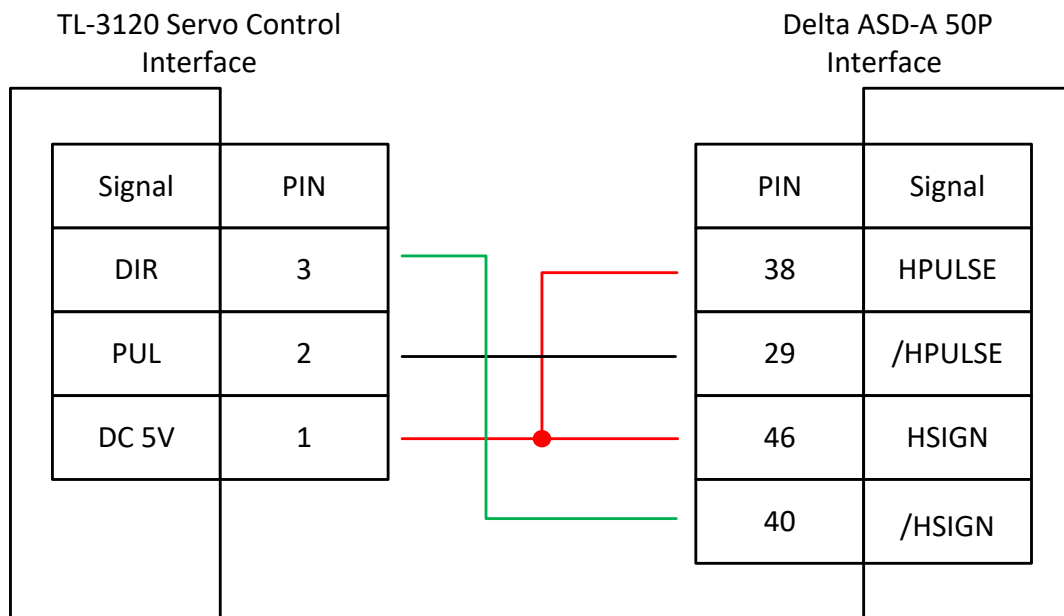
Figure 8-3-2 Delta A Series Low Speed Pulse Wiring Diagram
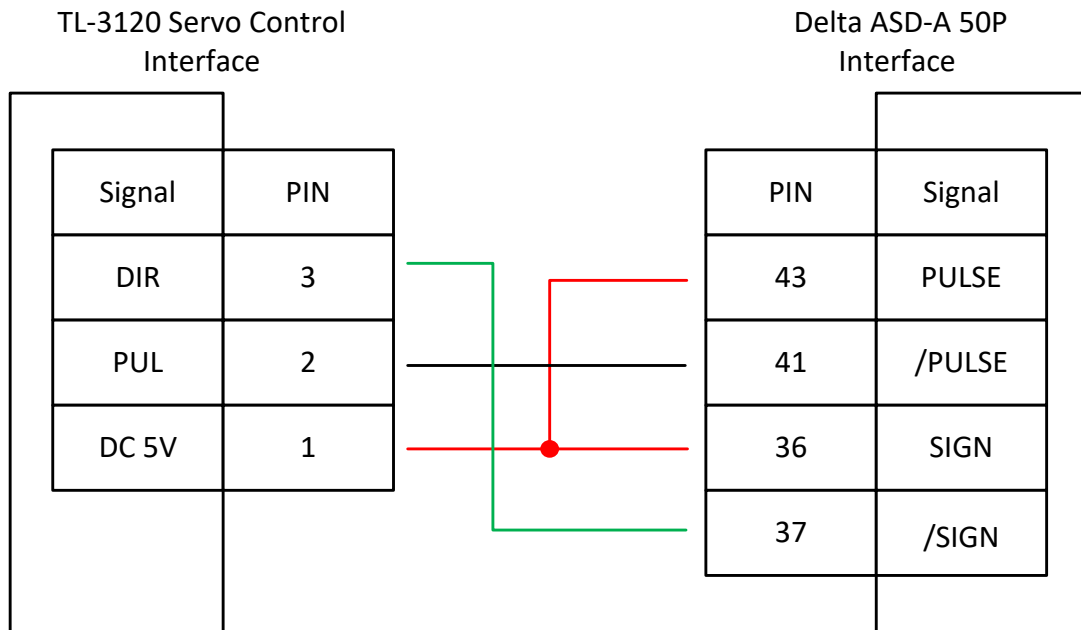
Table8-3-1 Delta ASD-A Series Basic Setting Parameters

Mode	Value	Instruction
P1-00	1102H	Position control mode, negative logic: "Pulse + Direction". Set the parameter to "1102H" to open the high-speed differential signal, and the maximum pulse frequency is 4Mpps; Set the parameter to "0102H" low-speed pulse signal, and the maximum pulse frequency is 500K.
P1-01	00	Select the location mode controlled by the external instruction.

P2-10	101	DI1 is set to SON servo enablement, and the logic is normally open.
P2-14	102	DI5 is set as ARST clear alarm function, the logic is normally open.
P2-12	007	DO5 is set as ALRM servo alarm function, the logic is normally closed.

8.4 Sanyo R Series Wiring Diagram

Figure 8-4-1 Sanyo R Series Wiring Diagram

TL-3120 Servo Control Interface

Sanyo R Series 50P Interface

Signal	PIN
DIR	3
PUL	2
DC 5V	1

Signal	PIN
28	R-PC
29	R-PC
26	F-PC
27	F-PC
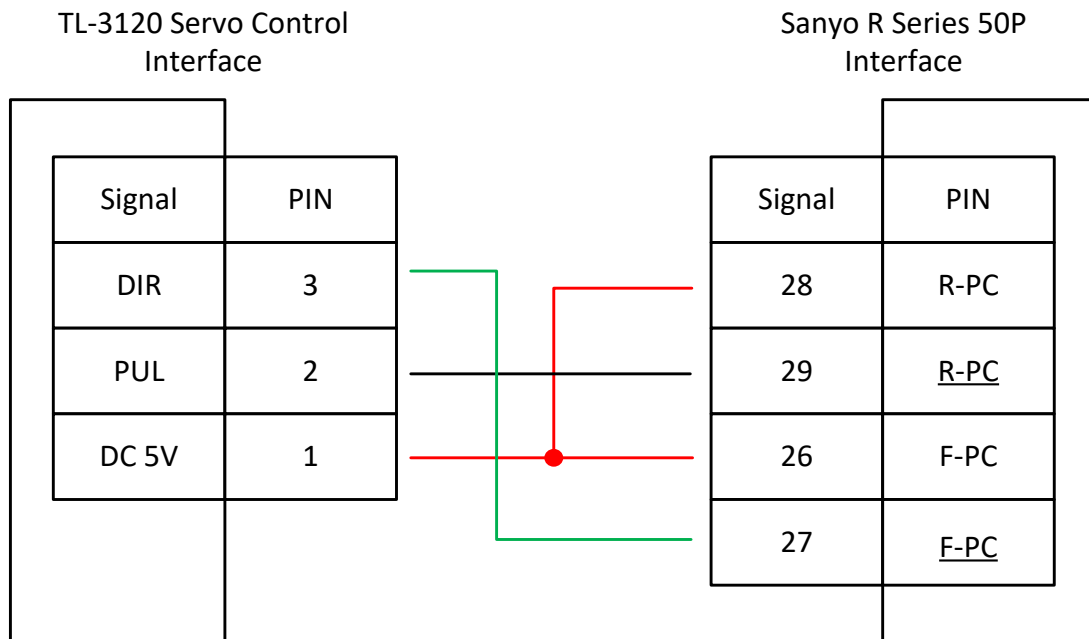
Table8-4-1 Sanyo R Series Basic Settings Parameters

Mode	Value	Instruction
SY08	00	Position mode.
Gr8.11	02	Pulse signal mode: Pulse + Direction.
Gr9.00	00	Positive rolling side can be driven.
Gr9.01	00	Negative rolling side can be driven.

8.5 Schneider 23A High Speed Pulse Wiring Diagram

Figure 8-5-1 Schneider 23A High Speed Pulse Wiring Diagram

Figure 8-5-2 Schneider 23A Low Speed Pulse Wiring Diagram

TL-3120 Servo Control
Interface

Schneider 23A-50P
Interface

Signal	PIN
DIR	3
PUL	2
DC 5V	1

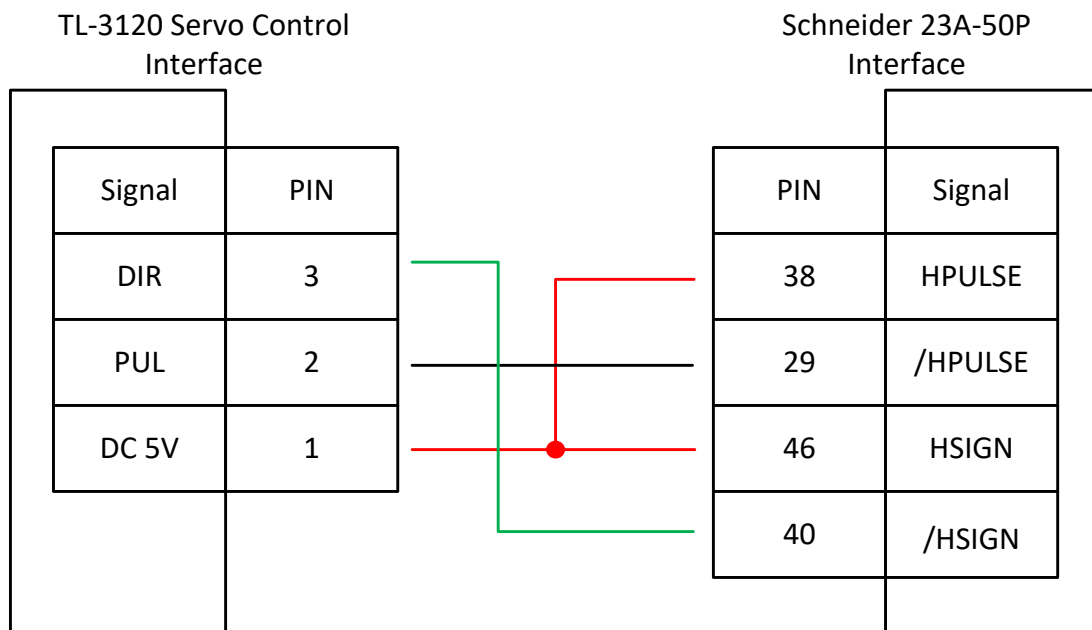| PIN	Signal
41	HPULSE
43	/HPULSE
37	HSIGN
36	/HSIGN
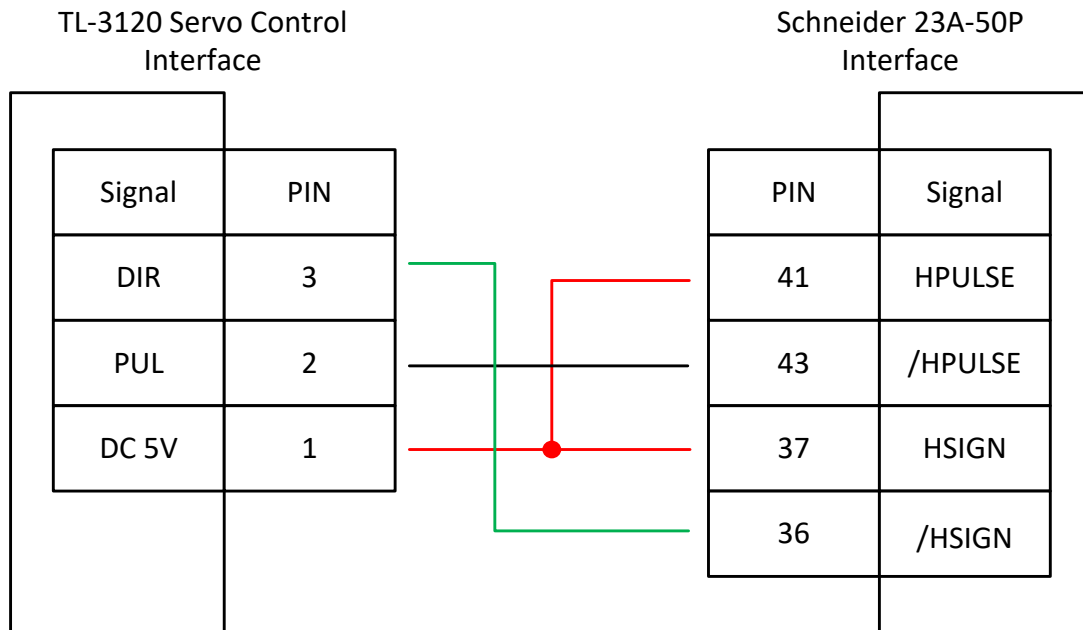
Table8-5-1 Schneider Lexium 23D Series Basic Settings Parameters

Mode	Value	Instruction
P1-00	1102H	Position control mode, negative logic: "Pulse + Direction". Set the parameter to "1102H" to open the high-speed differential signal, and the maximum pulse frequency is 4Mpps; Set the parameter to "0102H" low-speed pulse signal, and the maximum pulse frequency is 500K.
P1-01	X00	Select the location mode controlled by the external instruction.

P2-10	101	Change the servo IN1 to SON function.
P2-11	0	We don't use IN2。
P2-13~P2-17	0	We don't use IN4~IN8。

8.6 Fuji A5 Series Wiring Diagram

Figure 8-6-1 Fuji A5 Series Wiring Diagram

TL-3120 Servo Control Interface

Fuji A5-26P Interface

Signal	PIN
DIR	3
PUL	2
DC 5V	1

PIN	Signal
7	CA
8	*CA
20	CB
21	*CB
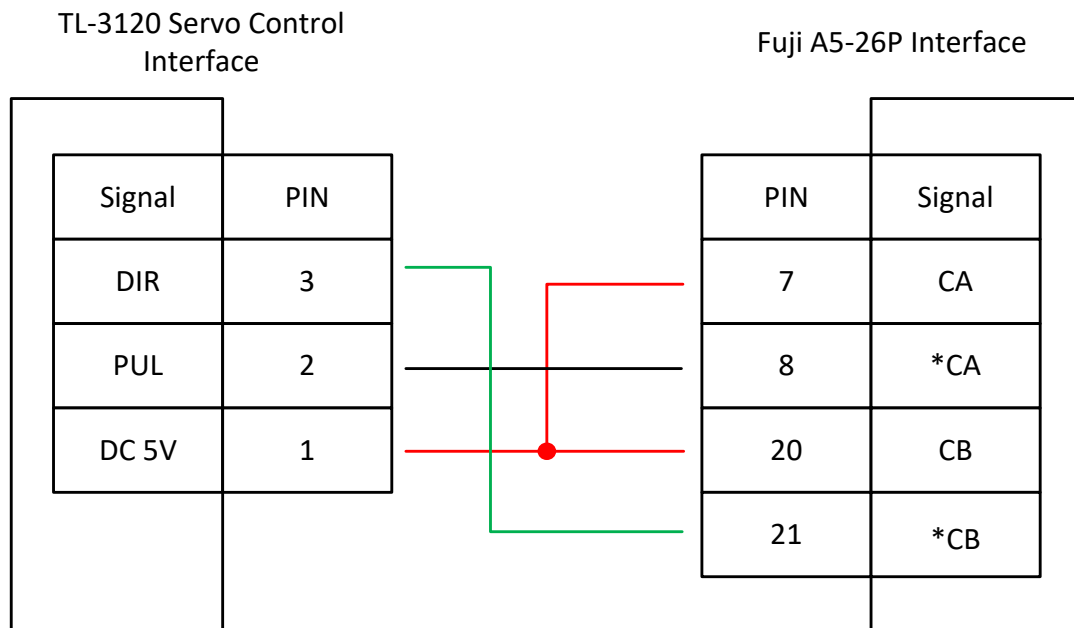
Table8-6-1 Fuji ALPHA 5 Series Basic Setting Parameters

Mode	Value	Instruction
PA-101	0	Position control mode.
PA-103	0	Pulse + Direction, the maximum pulse frequency is

		1Mpps.

8.7 Mitsu Series Wiring Diagram

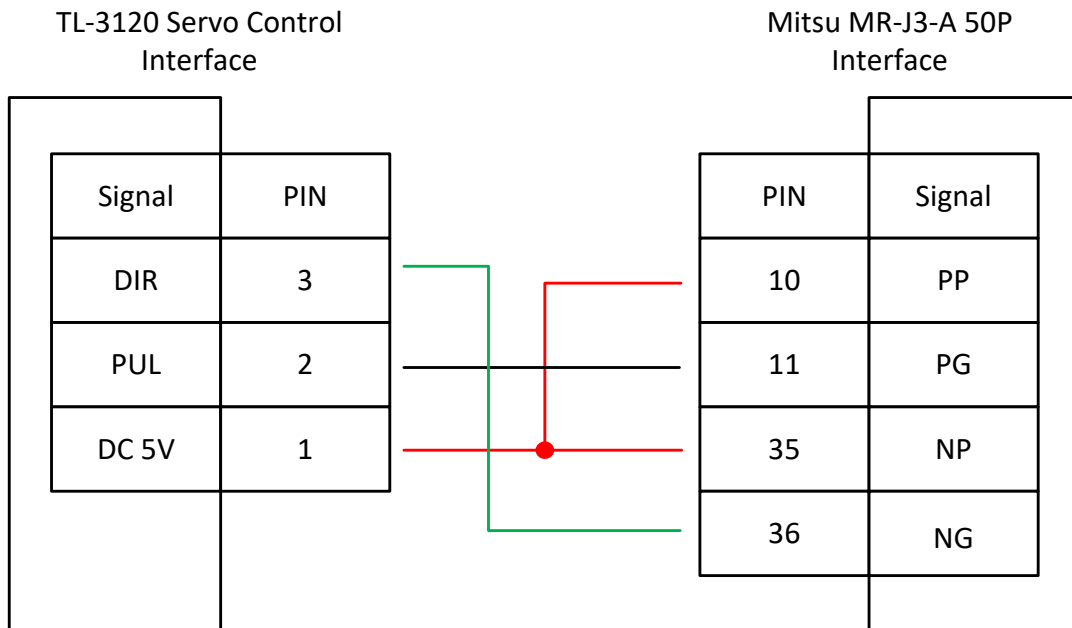**Figure 8-7-1 Mitsu J3 Series Wiring Diagram**

TL-3120 Servo Control Interface　　　　　Mitsu MR-J3-A 50P Interface

Signal	PIN
DIR	3
PUL	2
DC 5V	1

PIN	Signal
10	PP
11	PG
35	NP
36	NG

Figure 8-7-2 Mitsu E Series Wiring Diagram
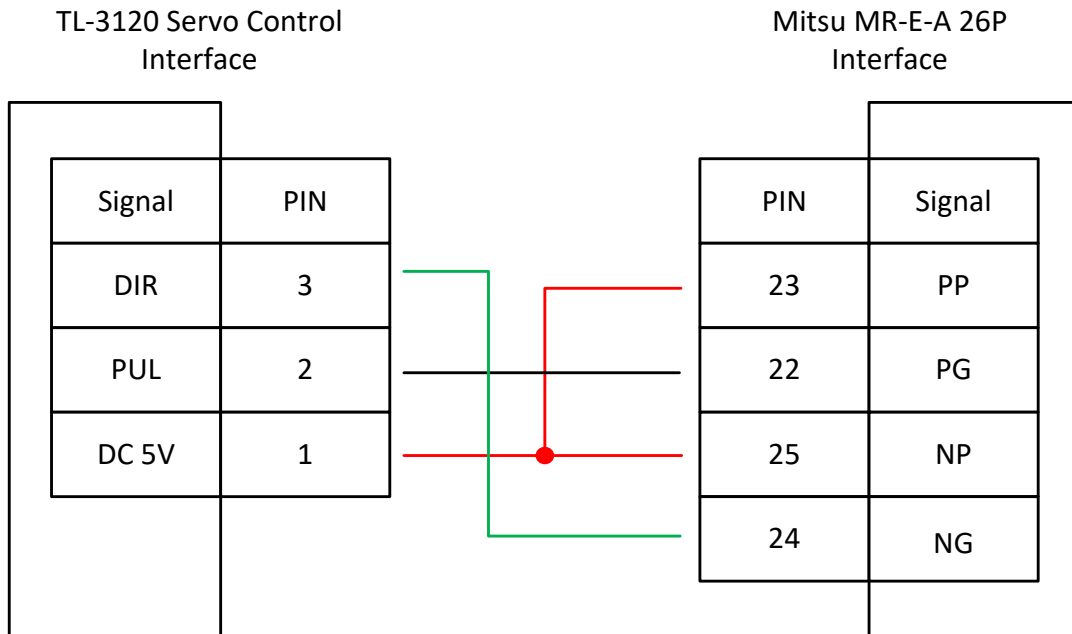
Table8-7-1 Mitsu MR-J3—A Series Basic Setting Parameters

Mode	Value	Instruction
PA01	0	Control mode: Position mode.
PA13	0011	Negative logic: Pulse + Direction.

Notice: The maximum pulse frequency of Mitsu J3 Series is 1Mpps.

9. FQA

1. Judge whether the amplifier is well wired according to the signal strength shown on the panel：

   ● There is no change at all. The 10-meter signal line is broken or not well connected.

   ● Small change. There is problem with short copper wire connected to the amplifier.

   ● A linear change in the magnitude of the signal strength indicates that the wire is connected well.

2. The top bar displays local date and time. The date and time can be modified, which requires the cooperation of encryption software. If the time changes to 0.0.0, it means the battery in the panel has run out of power and can't set password for control card. The clock doesn't support power off relay function.

3. Pulse distance can't be modified.

   When the pulse distance value of any axis is close to or less than 1, the pulse distance can't be adjusted and is always 1. The recommended pulse distance value is 5 or more.

4. Wrong laser mode.

   When the power of loading graphics is larger and the power of cutting is smaller, it indicates the laser mode is wrong. Please reset the correct laser mode.