Contents

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Chapter1   General Question

1.1 How to disassemble Nova

The Users Guide section will walk you through 6 steps for learning how to disassemble your Nova

PS: There's glass laser tube inside the laser machine, be careful and do not crash something when moving.
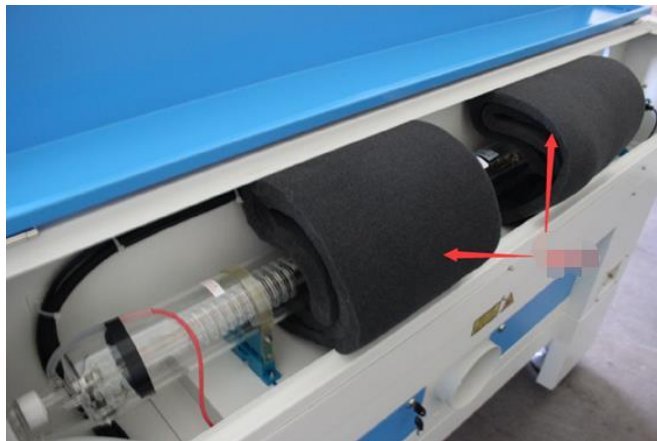
Please do as following:

1. Remove the front door, the honeycomb table and the blades. (To reduce the weight and make it easier to move)

2. Fix the top lid.

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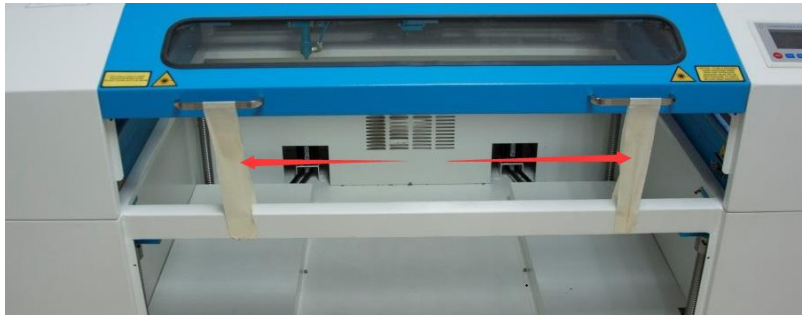
3. Unscrew all the screws at the foot stand. There are 8 screws on each side.

4. Move the machine upper part with a trolley
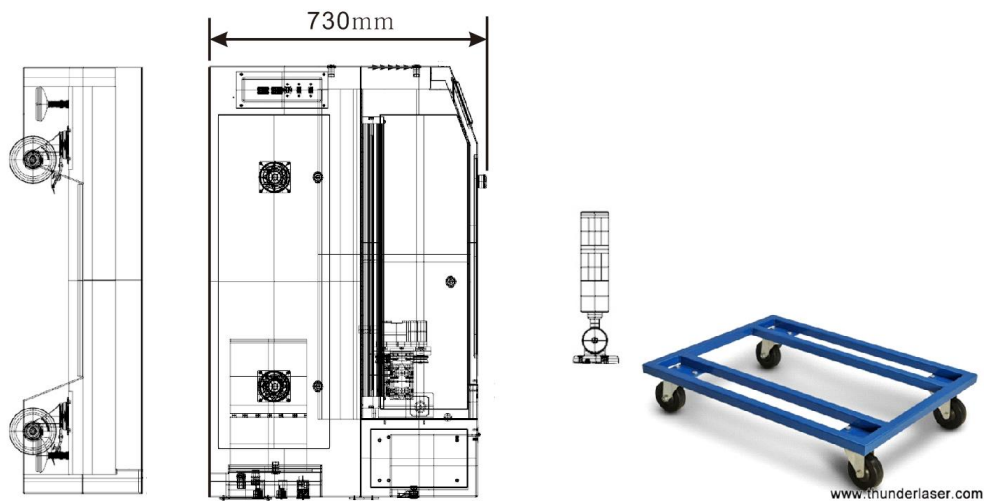
5. After moving all the parts to your room, please reassemble them by fix 8 screws on each side.

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1.2 Operation manual for Thunder laser machine

⚠️ To be safe, never ever run the laser system unattended.

👆 According to international standard，"O"means close；"I"means open for the rocker switch below

1. Turn on the water chiller

2. Startup sequence of machine: Main Switch→Laser switch；

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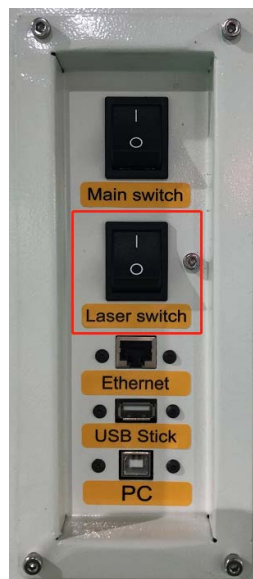
3. Connect computer and download file to machine；

4. Adjust the height of working table, place the material；
● The old panel

Z move	Language+
U move	IP setup+
Axis reset+	Diagnoses+
Manual Set+	Screen Origin+
Laser Set+	
Origin set+	
Set Fact Para	
Def Fact Para	
Auto Focus	
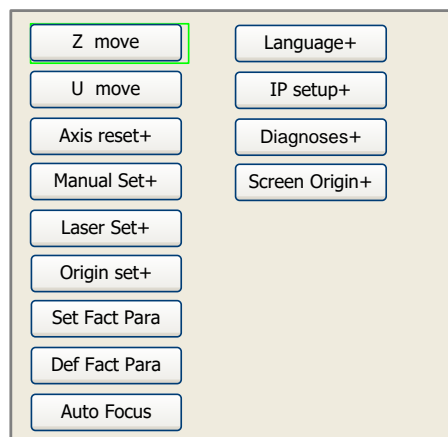
① Click Z/U button;
② Select "Z move";
③ Left arrow to move down;
④ Place the material;
⑤ Right arrow to move up;
● The new panel

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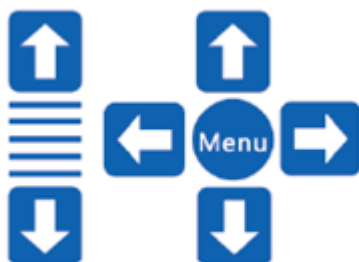
① The left top arrow to move up

② Place the material

③ The right down arrow to move down

5. Fix the material with magnet, adjust right focal distance with focus tool;
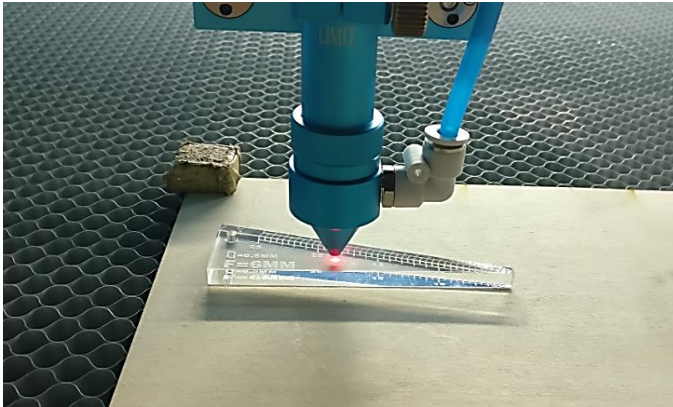
6. Close the top lid

7. Select the appropriate start point, start the program

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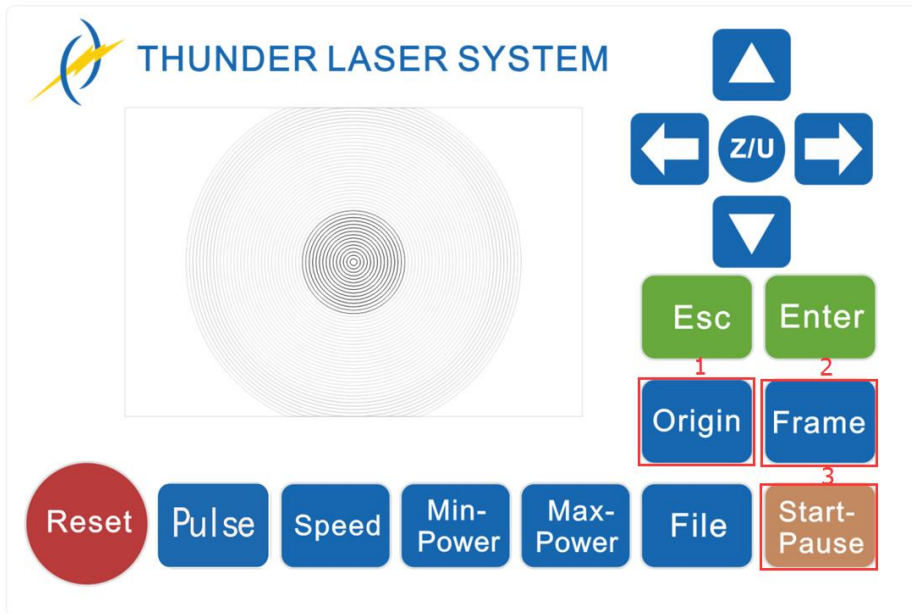
① Control arrow button to move the laser head;
② Click "Origin" button to select the start point;
③ Click "Frame" button to be sure the working area;
④ Click "Start-Pause" to run the program;

8. Shutdown sequence of machine：Laser switch→Main Switch→Turn off the water chiller

⚠ Any accident during working, please press emergency stop immediately

Standard feature
Water chiller:
http://www.thunderlaser.com/features/water-cooling-system.html
Air compressor:

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http://www.thunderlaser.com/features/air-assist.html

Exhaust fan:

http://www.thunderlaser.com/features/exhaust-system.html

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1.3 System Maintenance

Proper care and routine maintenance of the machine will ensure optimal performance over a long service life.

1.3.1   DAILY CHECK LIST

- **Focus lens**

1. Remove the laser head
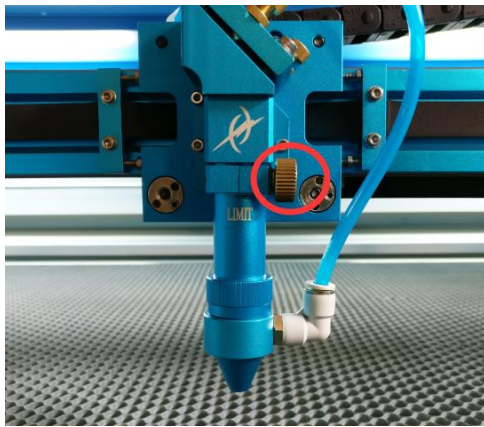
2. Divide the laser head

3. Remove the focus lens
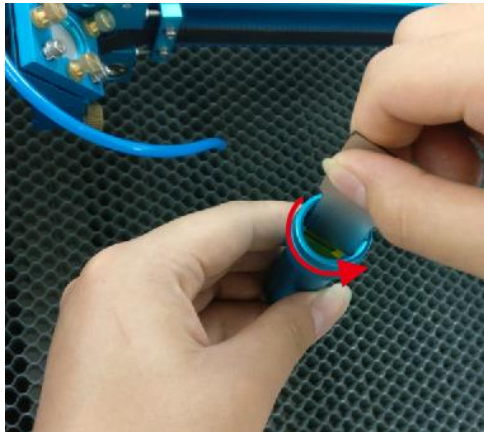
4. Clean the lens with cleaning cloth

Note: The direction of focus lens mounting please refer to below picture：

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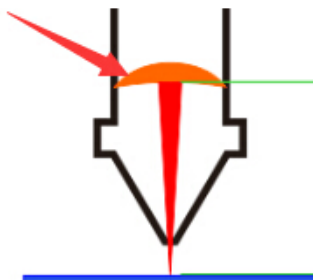
1.3.2 WEEKLY CHECK LIST

● **Reflector**

Use a lens cloth and lens cleaner to keep all mirrors clean

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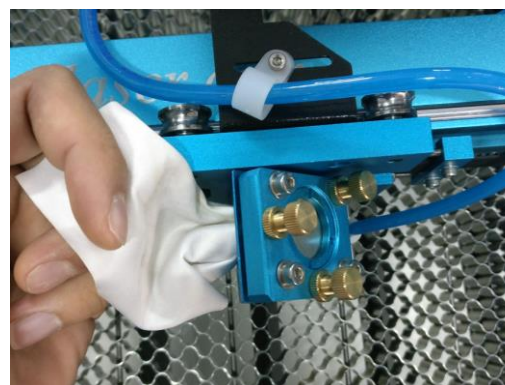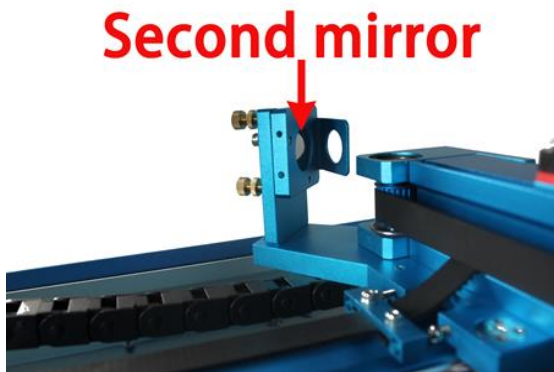
- **Laser beam combiner**

Use a lens cloth and lens cleaner to keep combiner lens clean
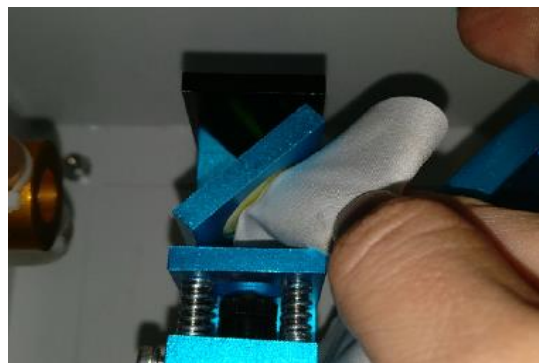
- Keep machine clean

Remove these small pieces that fall into the honeycomb table and collected in the machine using small brush or vacuum cleaner
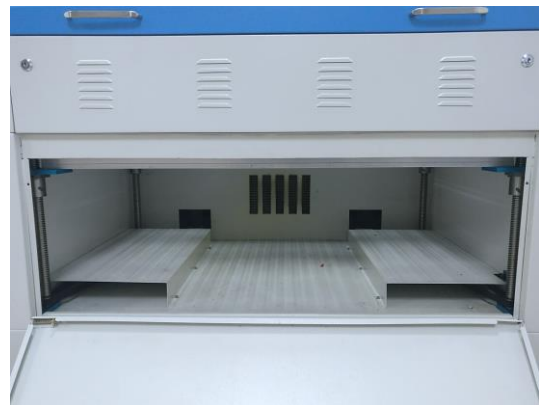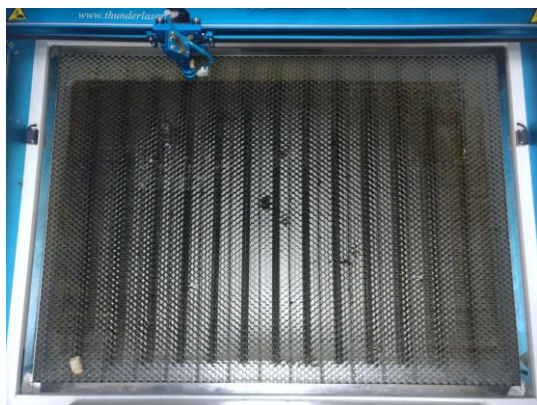
1.3.2   MONTHLY CHECK LIST

- **Rails and Screws**

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Add lubricant oil (or Rust Preventative Grease) to all rails on X&Y axis.

Add lubricant oil (or Rust Preventative Grease) to four Z axis screws

● **Laser path**

1. Mirror alignment;

When the laser head move to four corners of the working table, check if the laser beam lasers to the same position on the third reflective mirror.

2. Vertical alignment;

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When the laser head moves to four corners of the working table, check if the laser beam can vertically go through the 10mm acrylic.

Please check laser beam path according to the video below.

http://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-adjust-the-laser-beam-path.html
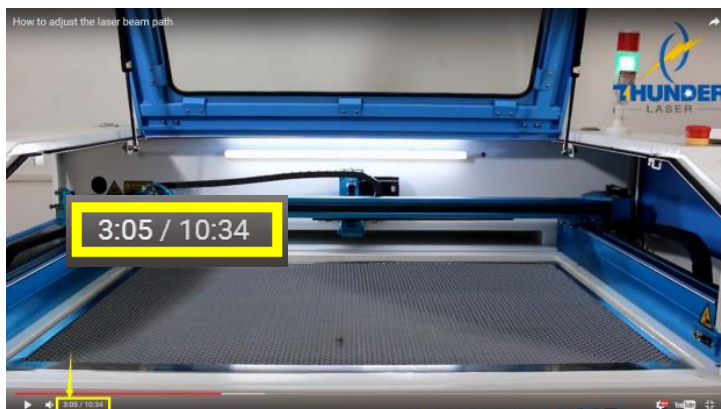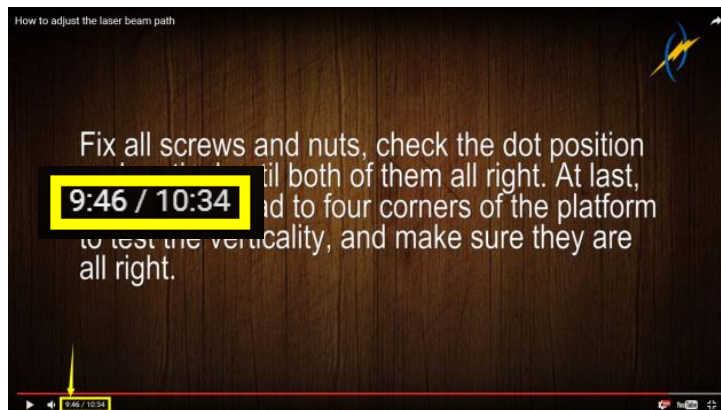
- **Exhaust fan**

Clean the air intake

- **Water chiller**

Change the pure (distilled) water and clean the filters

Note: if water drains slowly from drainage nozzle during water changing, please open the water supply inlet.

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注水口
WATER SUPPLY INLET

INLET OUTLET ALARM OUTLET

出风口
AIR OUTLET

水位计
WATER LEVEL METER

入风口
AIR INLET（FILTER）

排水口
DRAIN
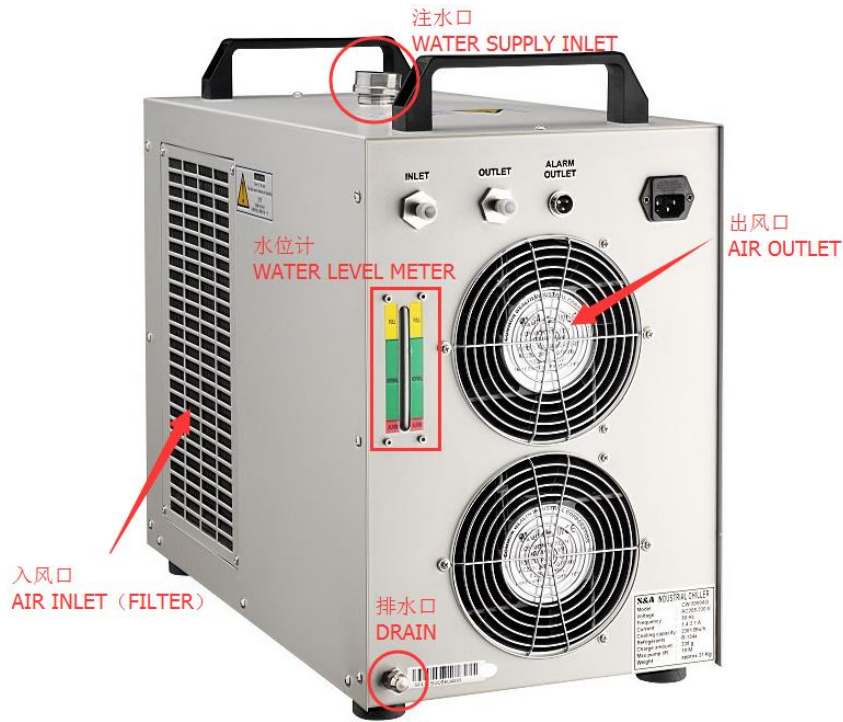
More detail please refer to the Chapter 5 Maintenance of User's Manual.
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1.4 How to judge if the laser power become weaker?

Please find a piece of 6mm acrylic (50*50mm),which used for testing the power of laser tube.
Like below.

Files: cut a 15*15mm circle ; blowing air; keep laser power to 90%,and then test how much is the fastest speed does the laser cut through the acrylic.

Please tell us your testing and we will judge for you.

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Chapter2　Laser cutter machine

2.1　Alarm of LCD panel—Frame/X/Y Slop over

LCD panel shows the following information:

Here are the reasons:

- **The size of the graphic is larger than the working area of the machine**

If your laser cutter's working area is 600×400mm, but you want to cut a graphic which larger than 600×400mm, this warn appears. Since the laser is not able to work beyond its working.

- **Incorrect starting point**

If you set an incorrect starting point, the graphic might be out of bounds. Please set a correct starting point to resolve this problem, like below.

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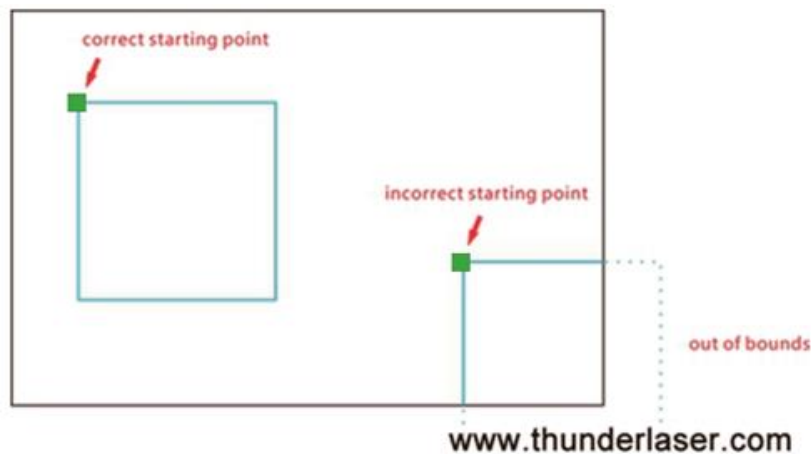
2.2 Alarm of LCD panel—No enough extend space

LCD panel shows the following information:
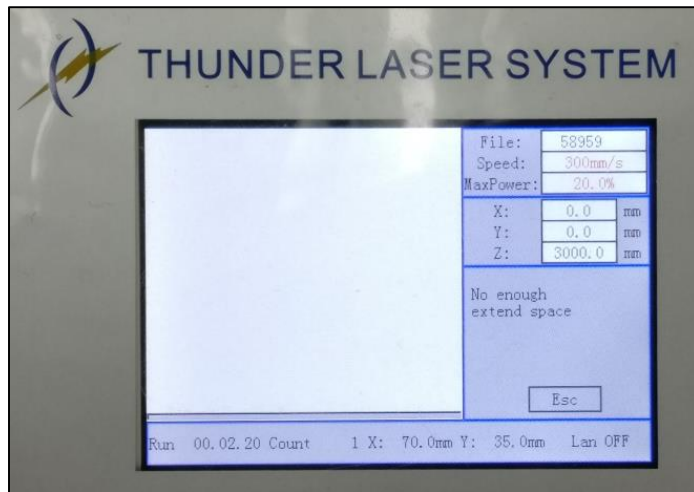
This problem only appears on engraving mode, it's caused by the buffer distance is out of bound.

For example, if you want to engrave a picture of 200×200mm, you move the laser head to the top left corner of the working table and press the "Origin" to set the starting point.

When you press the "Start" button to start engraving, the failure warning would appear.

How to fix this problem?

Press ESC at first, and then move laser head to right distance to leave enough buffer distance.

Now set a new starting point by pressing the "origin", you will find the problem was fixed when you run the job again.

Why this happen?

When the machine is engraving in high speed, the actual moving distance of the motor is usually large than the graphic.

Therefore, we need to keep enough buffer distance on the two sides of the graphic.

The buffer distance will be longer as long as you set faster speed, so we need to keep more buffer distance when the speed is higher.
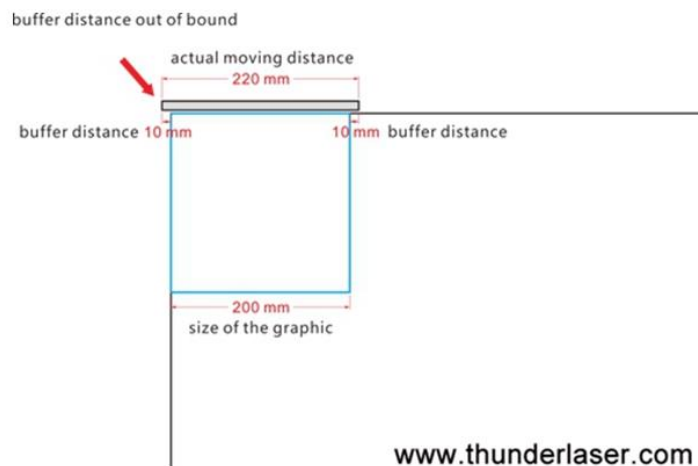
(Buffer distance out of working table)

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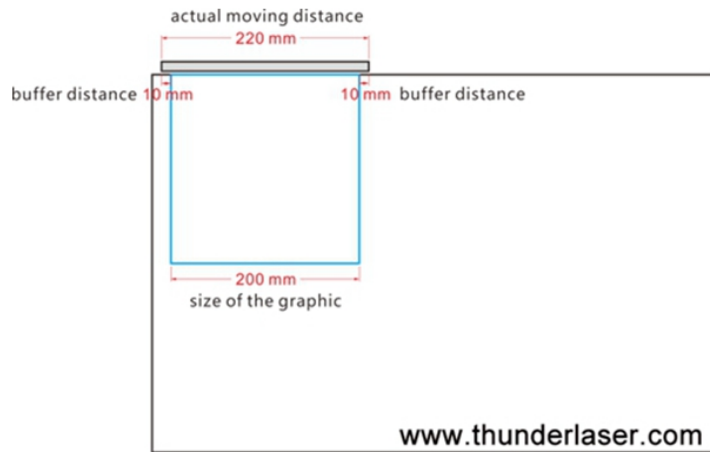
(Buffer distance within the working table)

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2.3 Alarm of LCD panel—Water error

LCD panel shows the following information:
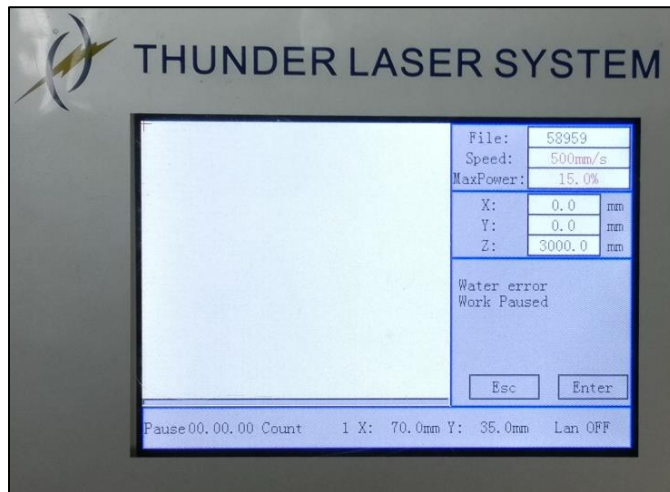
Here are the reasons:

● **Water chiller（water pump）is not turned on**

Please turn on the water chiller before power on the machine, like below.

● **Signal cable for water protection has no connection**

Please has signal cable connected, like below.

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● **Wiring problem**

Please check it according to the video below.

https://www.youtube.com/watch?v=zPV8moEZNh8

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2.4 Alarm of LCD panel—Machine protected

LCD panel shows the following information:
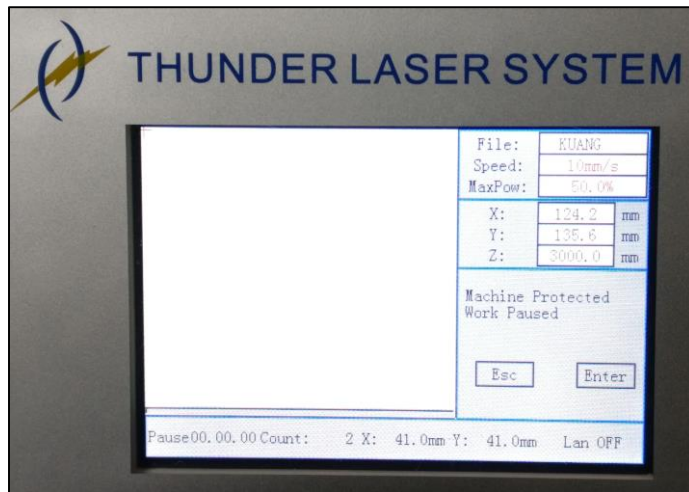
Our machine has sensors for door protection (front cover and laser tube cover), like below.
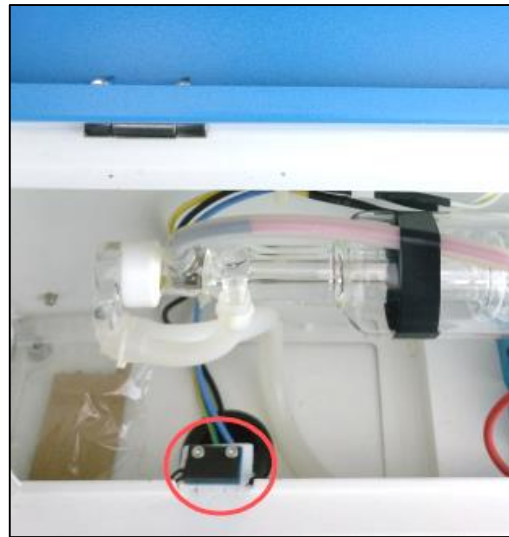
Please close both of them before start to work.

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2.5 The machine won't turn on

Here are the reasons:

● **Emergency Stop key is pressed**

If it's pressed, please reset it, like below.

● **The circuit breaker has tripped**

Locate on the lower right hand door panel (or back side door panel), please check if it's in off position, and flip to on position, like below.
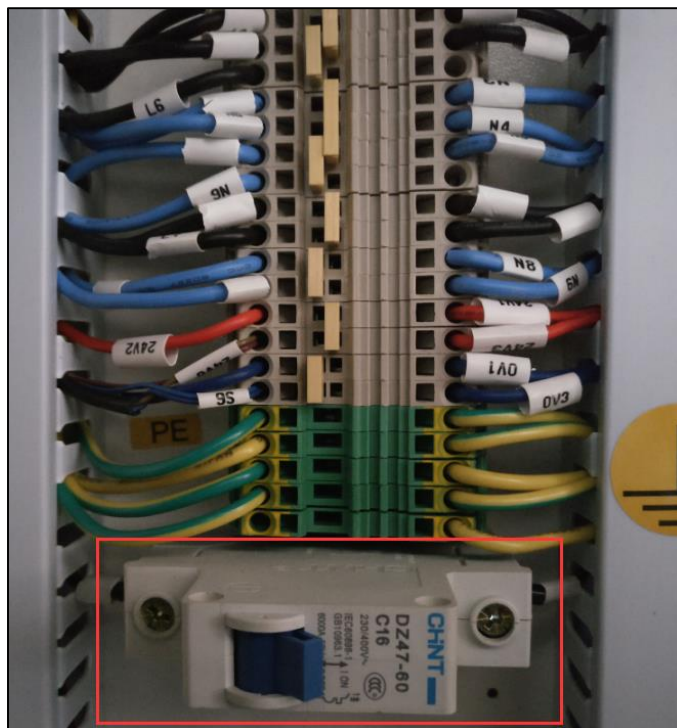
Note: The machine before Nov. 2016 had been installed the fuse without circuit breaker. Please check and replace the fuse, like below.

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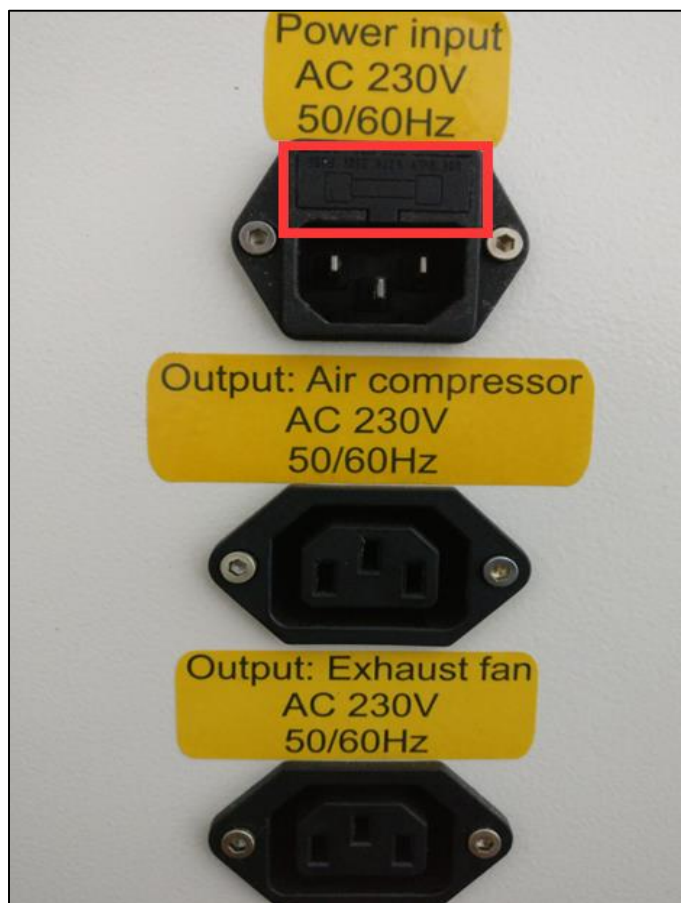
2.6 Y-axis not moving at all

Here are the reasons:

- **Rotary switch is turned on**

Note: The rotary-axis and y-axis can be switched, if the rotary switch is turned on, y-axis will not moving at all, and the rotary-axis will need to connect the rotary device.

If it is "-", please turn off to "O" and press the reset button on LCD panel, like below.
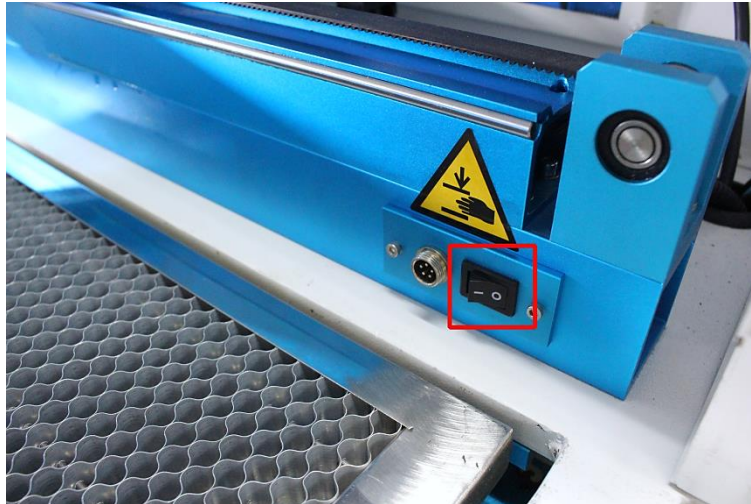
- **Y-axis limit switch problem**

Please open upper left hand door panel, check if the wiring and roller lever of switch are well or not, like below.
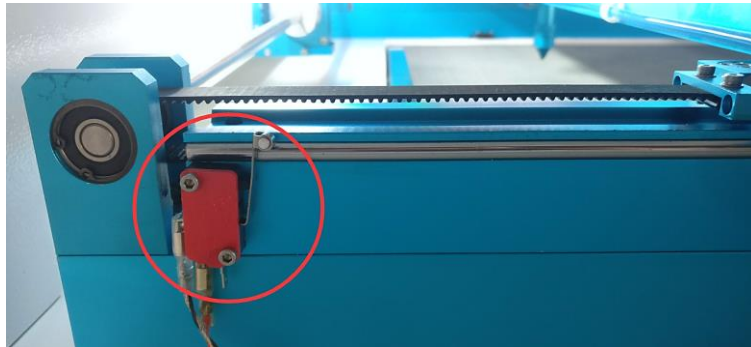
If they both seem to be well, please test is y-axis limit switch working properly according to the video below.

https://www.youtube.com/watch?v=oOy1HFAufu8

- **The interface of y-axis motor have bad connection**

If the y-axis limit switch is working properly, please open the laser tube cover, check if the interfaces of y-axis motor are connected well, like below.

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Please power off the machine, re-connect the interface then try again.

- **Motor or driver of y-axis is broken**

Please open lower right hand door panel, check the Y-axis driver (red LED should be up and flashing), like below:
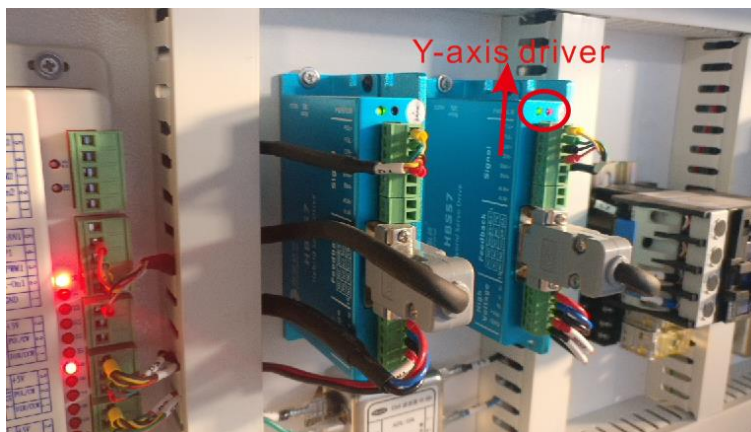
Please power off the machine, then swap two drivers according to the video below.
https://www.youtube.com/watch?v=LC6lW1YFLvM

After that, power on the machine, check if the machine is resetting normally.

If y-axis still not moving at all, so the y-axis motor is broken;

If the problem shifts to x-axis, the same driver is flashing red light, so this driver is broken.

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2.7 X-axis not moving at all

Here are the reasons:

● **X-axis limit switch problem**

Locate on the left side of x-axis, please check if the wiring and roller lever of switch are well or not, like below.
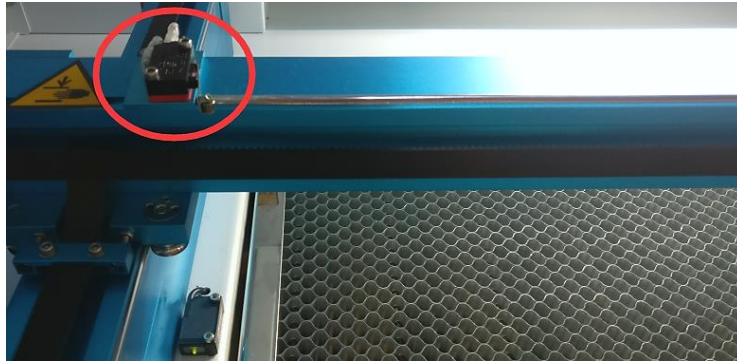
If they both seem to be well, please test is x-axis limit switch working properly according to the video below.

https://www.youtube.com/watch?v=yQZQWIWIotU

● **The interface of x-axis motor have bad connection**

If the x-axis limit switch is working properly, please open upper right hand door panel, check if the interfaces of x-axis motor are connected well, like below.
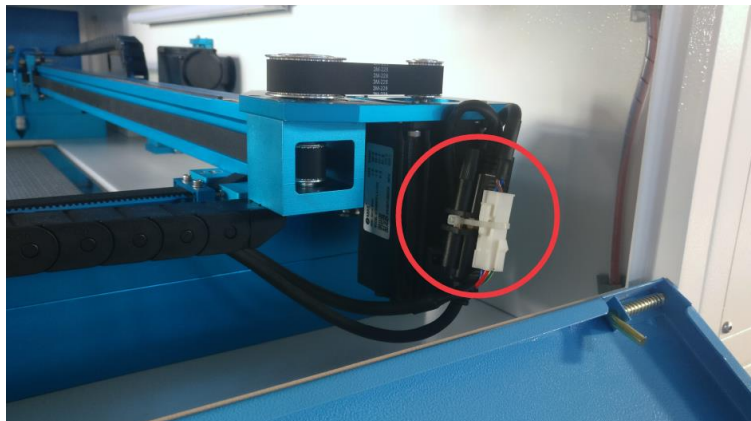
Please power off the machine, re-connect the interface then try again.

● **Motor or driver of x-axis is broken**

Please open lower right hand door panel, check the x-axis driver (red LED should be up and flashing), like below:
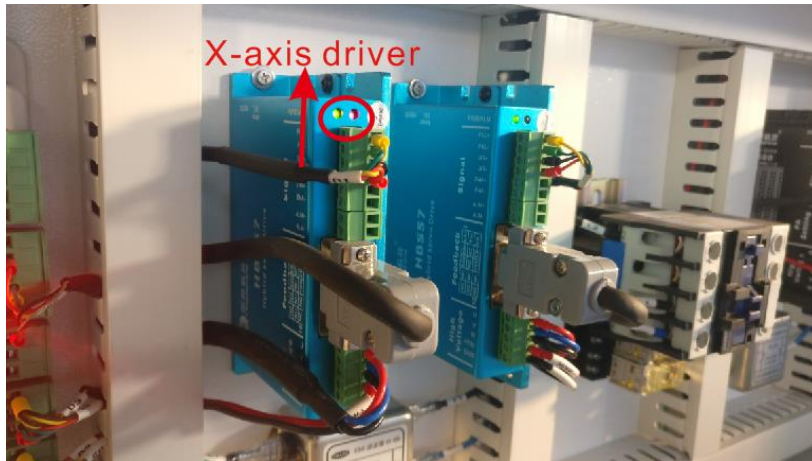
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Please power off the machine, then swap two drivers according to the video below.

https://www.youtube.com/watch?v=LC6lW1YFLvM

After that, power on the machine, check if the machine is resetting normally.

If x-axis still not moving at all, so the x-axis motor is broken;

If the problem shifts to y-axis, the same driver is flashing red light, so this driver is broken.

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2.8 The laser tube won't fire the beam

Here are the reasons:

● **The laser switch is off**

Please make sure laser switch is on, then open lower left hand door panel (or back side door panel), check if the laser power supply is showing sign of receiving power — fans is running and power light is up, like below.

Note: The machine before Apr. 2018 had been installed another type of laser power supply, like below.
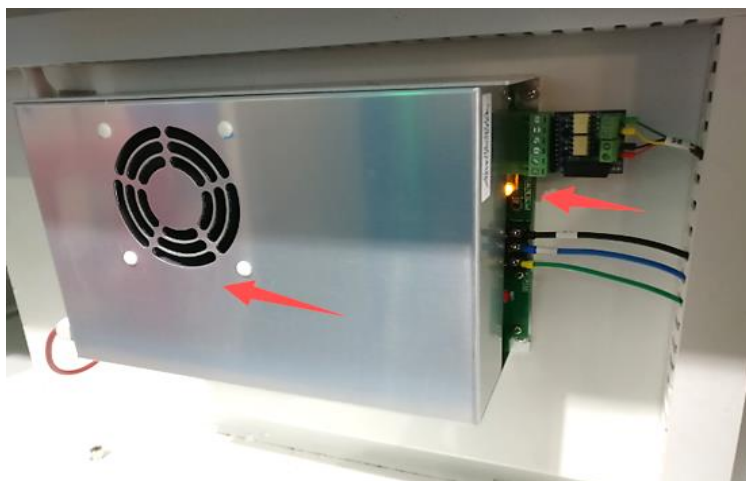
● **Laser power supply or laser tube is worn out**

Please test the laser power supply itself, first take off the plug of control signal, like below.

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Then press the red button to test, check if electric current (on screen or ammeter) changing and laser tube has laser beam comes out according to the video below.

https://www.youtube.com/watch?v=Iy9mJi1bXSg

If both electric current and laser tube are nothing, please check if the laser power supply is showing sign of energy output — making "zizi" sound.

If yes, the laser tube should be worn out, otherwise, laser power supply fails.

● **Laser path or machine parameters issue**

If both electric current and laser tube are working, please put back the plug of control signal.

Then restore your machine to factory setting, try that first to eliminate machine parameters issue, like below.

Operate the LCD panel;

Z/U button>>"set default para">> Password:HF8888.
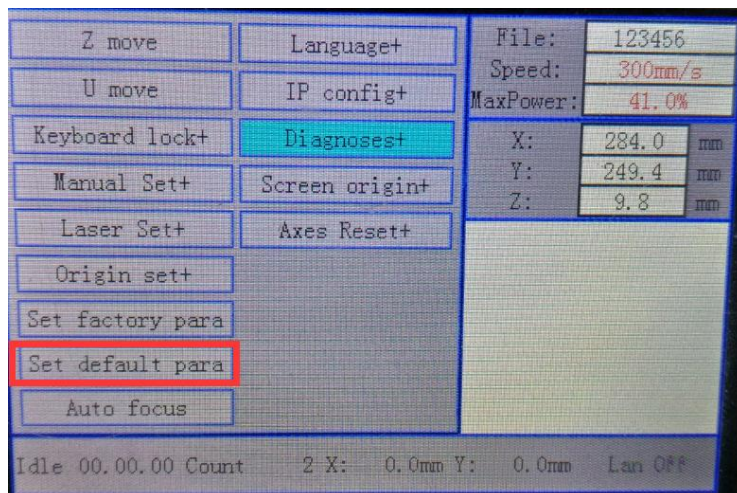
In the end, press reset button.

If the laser beam won't come out form the laser head, please align the mirror according to the video below.

http://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-adjust-the-laser-beam-path.html

End

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2.9 Why the red dot pointer not being able to come out from the laser head?

Here are the reasons:

● **The red dot pointer is off**

Locate on the Red Dot Pointer Mount in the rear of the machine, and check if the Red Dot Pointer is off, like below.

If yes, please open the lower left hand door panel, find the connector for the red dot and check if it's connected well, like below.

● **The red dot pointer is not aligned**

Procedure: Align the Red Dot pointer

1. Move the laser head on the middle of the working table.
2. Place a square of masking tape over the left side of the third mirror carriage, and mark a dot on the center, like below.

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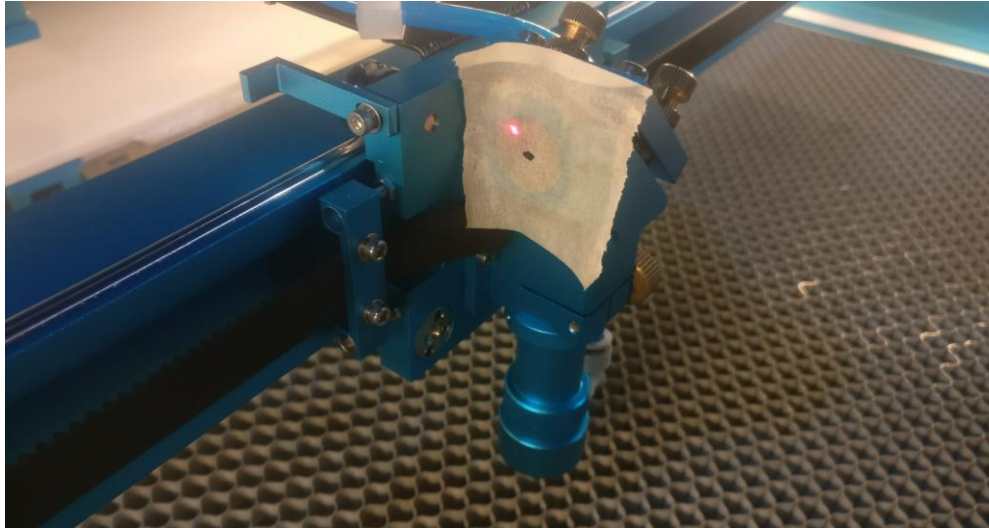
3. Use the three adjustment screws on the Red Dot Pointer Mount to move red dot to the mark dot on the tape, like below.

Red Dot Adjustment Diagram

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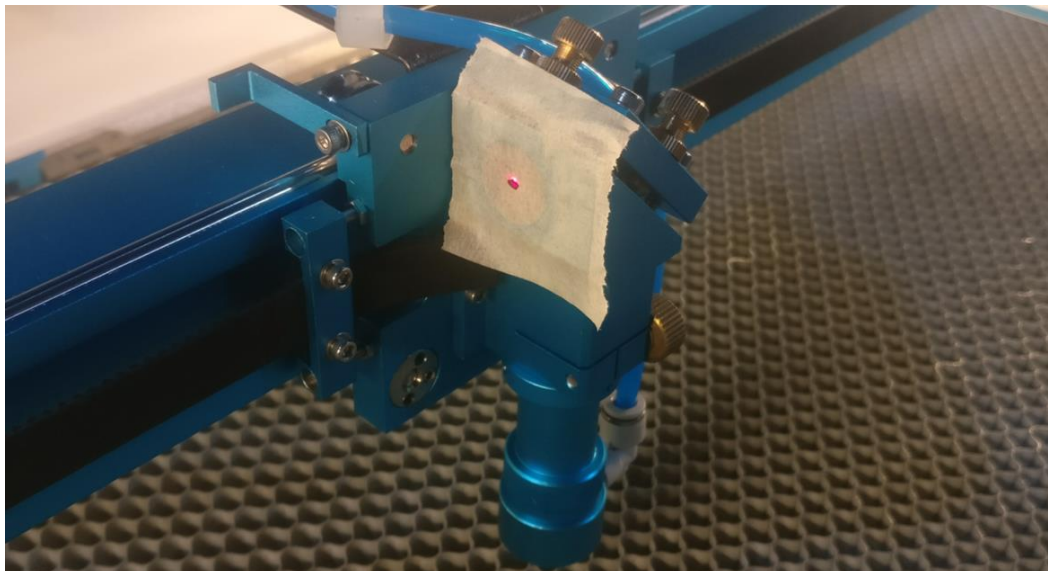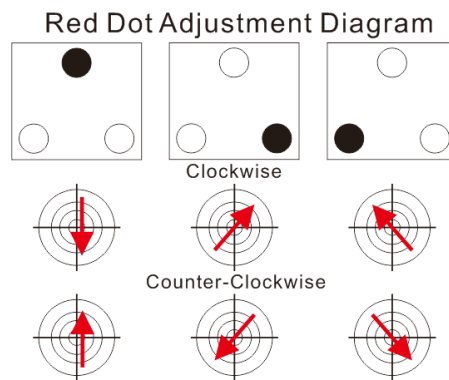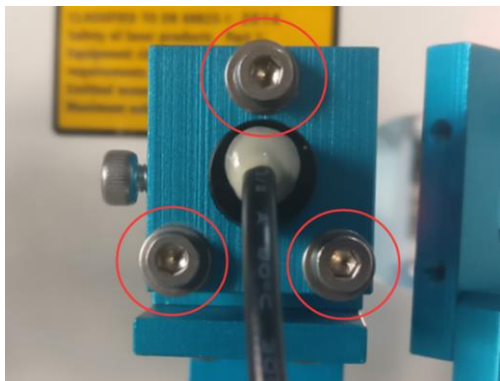
2.10 Why the "Origin" button of LCD panel not working?

Here are the reasons:

● **The starting point is set to absolute coordinate in software**.

Locate on the bottom left corner, the option of "Position" please select to Current position.
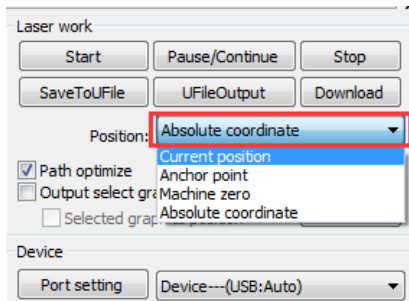
● **Origin setting is not proper on LCD panel**

Open origin setting windows: Z/U button>>origin set+.

Make sure the "Multiple Origins Enable" is not selected, like below.

End.

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2.11 Engraving problem—the engraving quality is very poor

Here are the reasons:
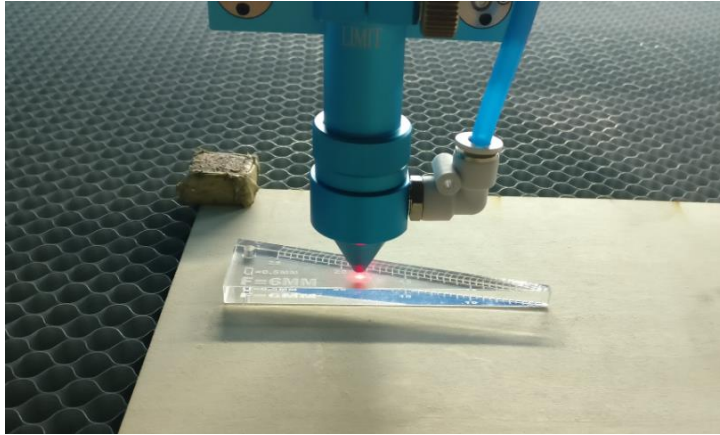
- **The needed focus is lost**

The bending of the material or the uneven working table can result in different focal lengths, especially for the large engraving graphic.

Please fix the material with magnet and check if the working table are the same height, then calibrate according to the link below.

http://www.thunderlaser.com/troubleshooting/how-to-calibrate-the-working-table-to-level.html

- **The focus lens and reflective mirror are dirty**

- **The laser beam path is not aligned**

1. Mirror alignment;

When the laser head move to four corners of the working table, check if the laser beam lasers to the same position on the third reflective mirror.

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2.Vertical alignment

When the laser head moves to four corners of working table, check if the laser beam can vertically go through the 10mm acrylic.

Please check the laser beam path according to the video below.

https://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-adjust-the-laser-beam-path.html

End.

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2.12 Cutting problem-- Some point of the same piece of materials cannot be cut through
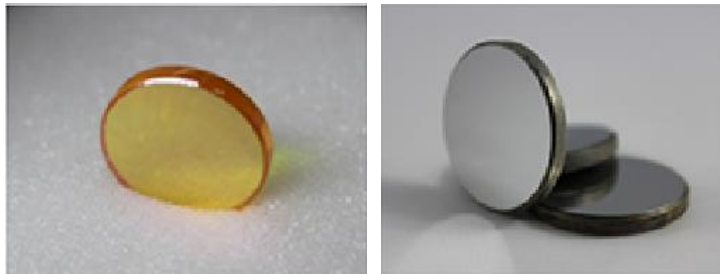
Here are the reasons:
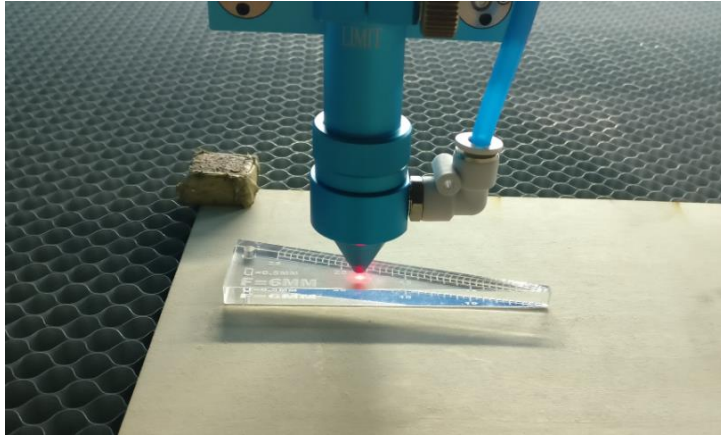
The needed focus is lost；

The bending of the material or the uneven working table can result in different focal lengths, especially for the large cutting graphic.

Please fix the material with magnet and check if the working table are the same height, then calibrate according to the link below.

http://www.thunderlaser.com/troubleshooting/how-to-calibrate-the-working-table-to-level.html

● **The focus lens and reflective mirror are dirty**
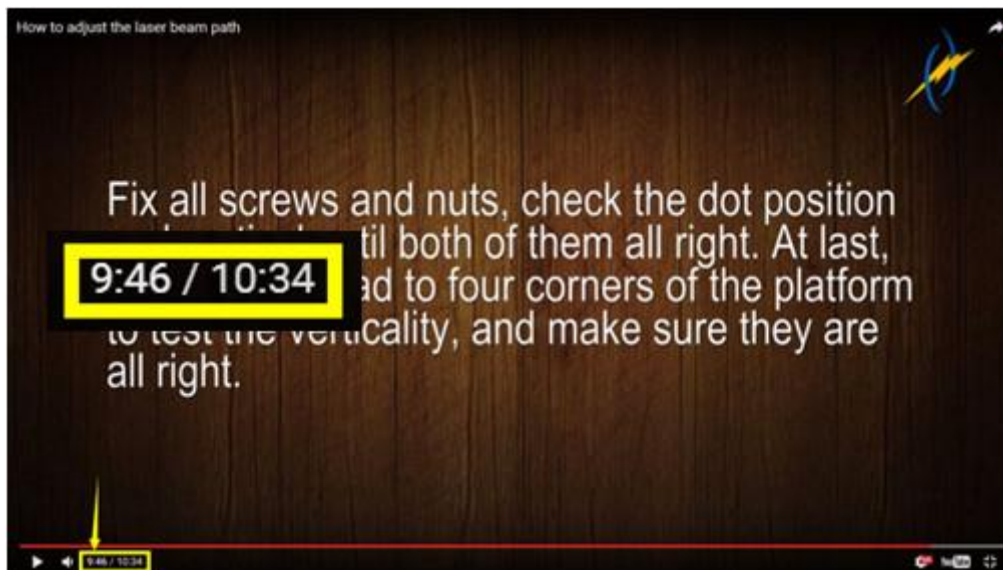

● **The laser beam path is not aligned**

1. Mirror alignment;

When the laser head move to four corners of the working table, check if the laser beam lasers to the same position on the third reflective mirror.

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2. Vertical alignment;

When the laser head moves to four corners of the working table, check if the laser beam can vertically go through the 10mm acrylic.

Please check laser beam path according to the video below.

http://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-adjust-the-laser-beam-path.html

End

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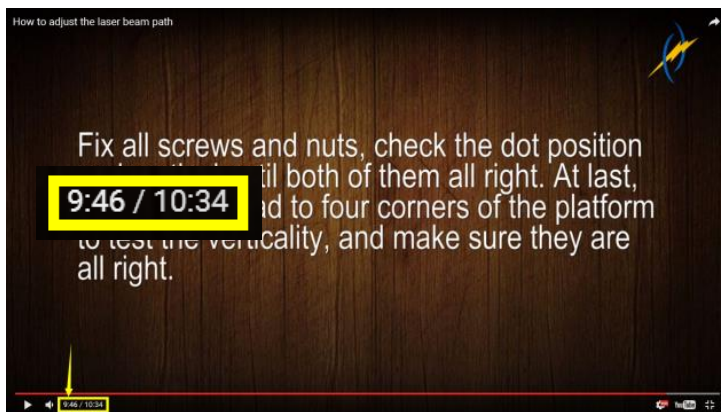
2.13 Cutting problem – Why the starting point of a cutting graphic can't meet with its end point

This problem is due to the different movement of the belt on both sides of the Y-axis, which lead the belt is not synchronized.

Here are the reasons:

● *The coupling loose;*

Please check if one of couplings is loose like below:
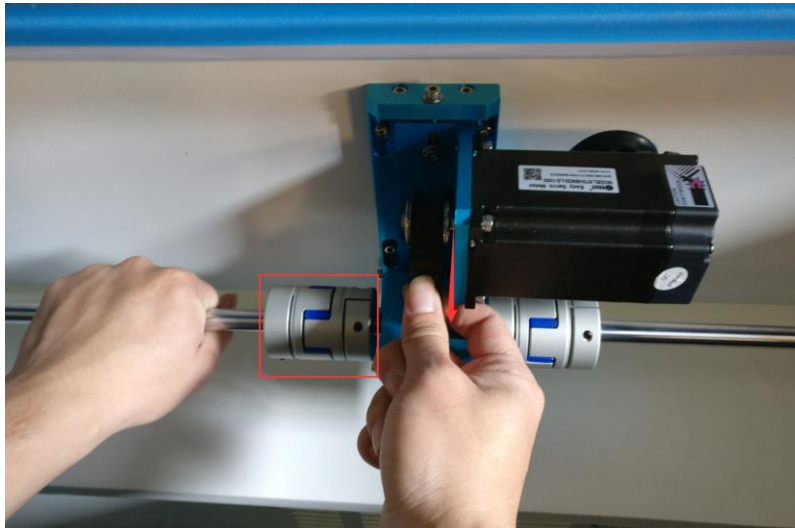
If yes, please tighten it in clockwise with M5 Allen wrench.

● *The gear of transmission shaft loose*

Please check which side of gear of transmission shaft is unfixed like below:

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If the gear loose that mean the transmission shaft module is bad please contact with us.

Besides,there are another ways to improve the cutting problem by adjusting software.

1. An option of software for optimizing that problem.

Like below:
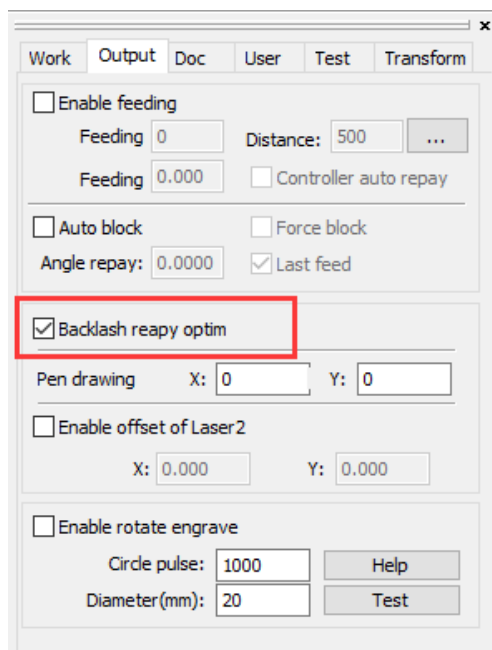
Then re-download the file to laser machine and test again.

If still not good,please go to next step.

2.Reduce the User setting of Go Acc factor and Speed factor to minimize the impact Like below:

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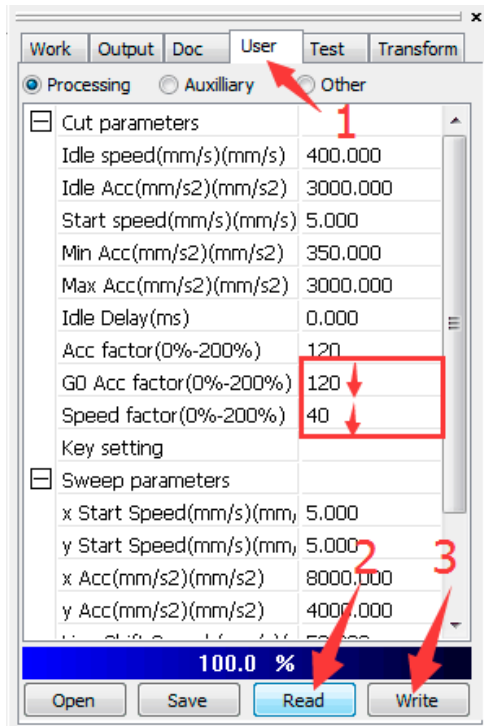
If the problem cannot be solved, please contact our tech team by email: tech@thunderlaser.com

End

2. Vertical alignment;

When the laser head moves to four corners of the working table, check if the laser beam can vertically go through the 10mm acrylic.

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Please check laser beam path according to the video below.

http://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-adjust-the-laser-beam-path.html

End

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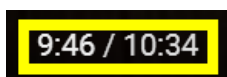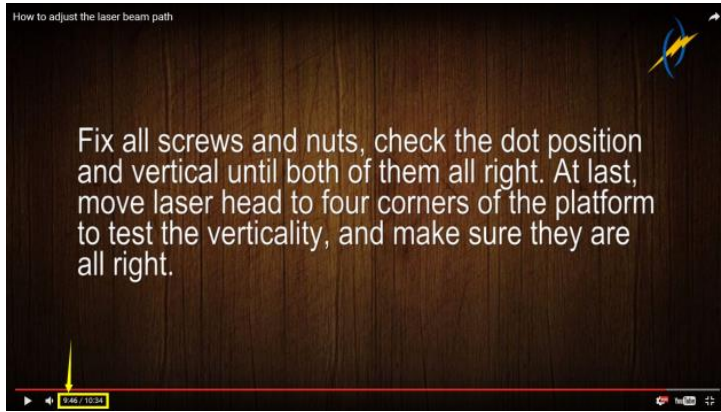
2.14 Why noisy while moving laser head front and back, how to adjust?

When you move laser head front and back, two couplings make a lot of noise.
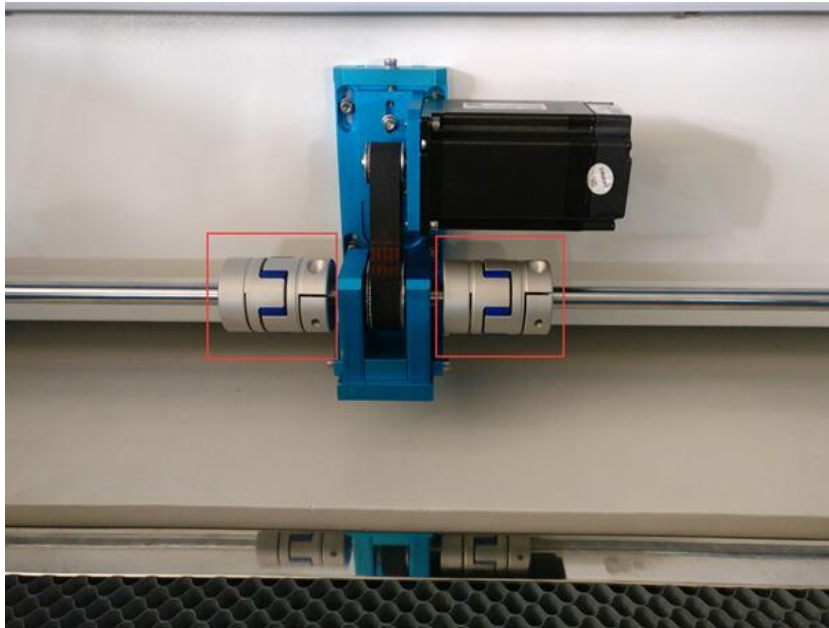
What is the cause of this?

Both sides of transmission shaft are not aligned

How to fix this problem?

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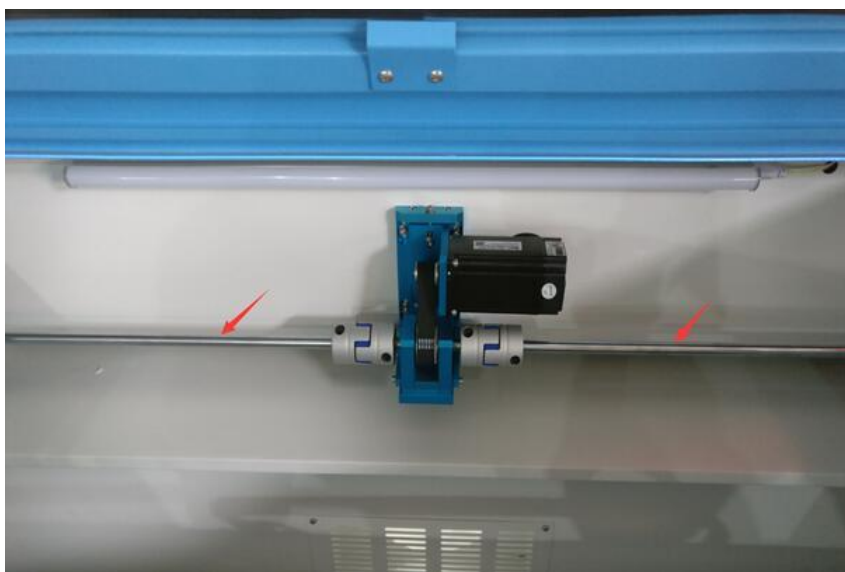
1.Turn off the whole machine power.

2.Take out the belt by taking down the motor.
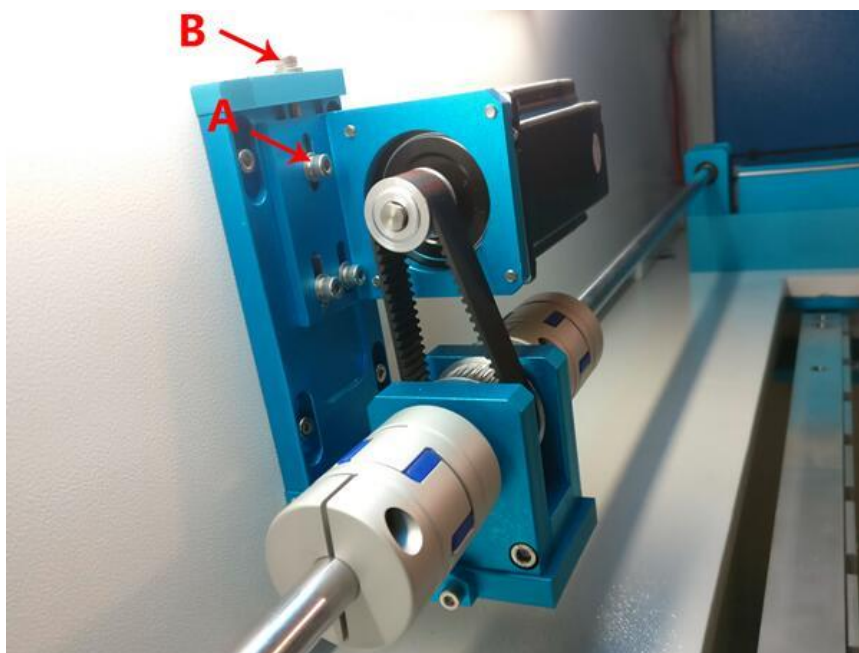
Loosen three screws A firstly.

Adjust screw B anticlockwise to loosen the belt by taking down the motor.

Then take out the belt from the motor.

3.Loosen the four screws in the bottom of this unit as below:
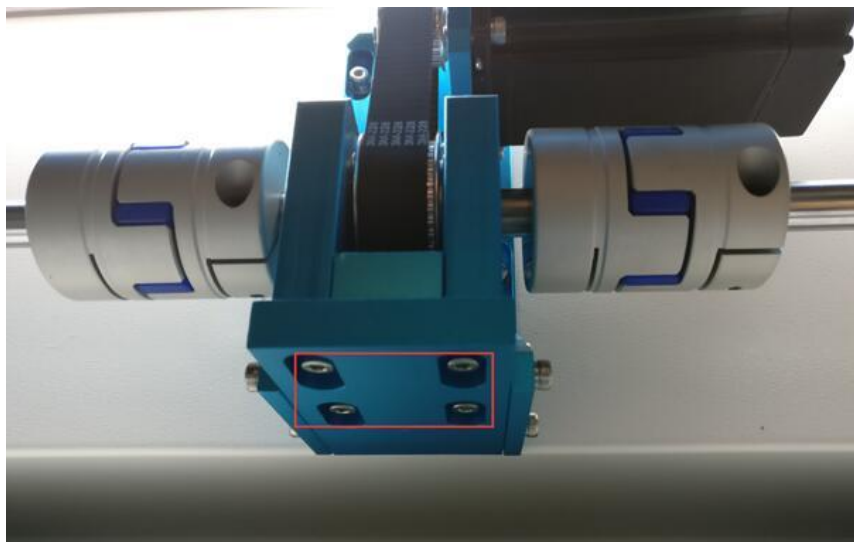
Push the X Axis front and back by hand, will find that the noise is disappear.

This is the most important step to screw them back, cause fix the screws not good ,it will make

noisy again.

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①Fasten the outward two screws first, please do it carefully, screw them a little then check the sounds by pushing the X Axis, screw them little by little until tighten them enough. Loosen them and repeat step ① again if the couplings make the large noise again.

② After it's ok of the sounds by fastening the outward two screws. Then fix the rest of screws in the bottom.

③Adjust back the belt.

How to adjust the belt of Motor:

Loosen three screws A firstly.

Adjust screw B clockwise to tighten the belt; Adjust screw B anticlockwise to loosen the belt.

The belt tension should be same with the belt X motor.

After that, fasten the three screws A.

PS：A small noise is ok no affect the process results, it's hard to make the noise disappear fully by non-professionals.

End

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2.15 Why does the machine beep continuously

How the heat alarm system works

The heat alarm system is an additional tool for laser machines.
Some materials such as acrylic, wood and so on, can easily catch fire, particularly during cutting.
The heat alarm system has a smart board with temperature sensor which will be reacted by an abnormal temperature (higher than 55°C/131°F) on working table. It will trigger at a certain temperature them signals to TL-Timer board to stop laser processing and give a warning sound, so operator can active fire control in time to reduce the potential losses and risks.
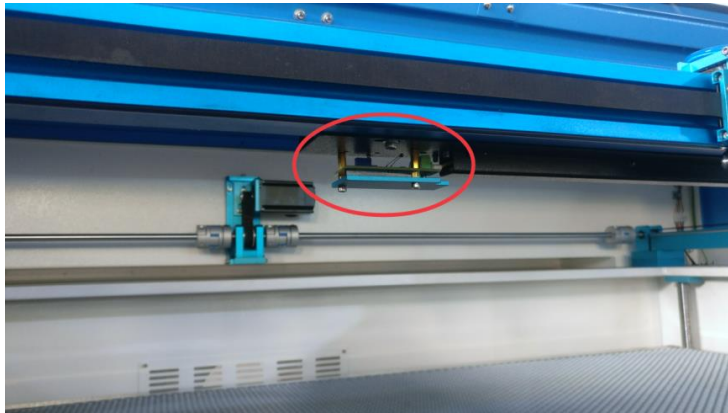
The warning sound comes from signal lamp (roughly 80dBA within 1m, 75dBA within 5m and 65dBA within 10m, the sound gets weaker as it travels).

Note: When heat alarm system is activated, the warning sound will beep all the time until user restart the machine.

How to check when the heat alarm system has needless alarm

● **The smart board has short circuit on temperature sensor**
The smart board is installed in the middle under the X-axis rail, see below pics.

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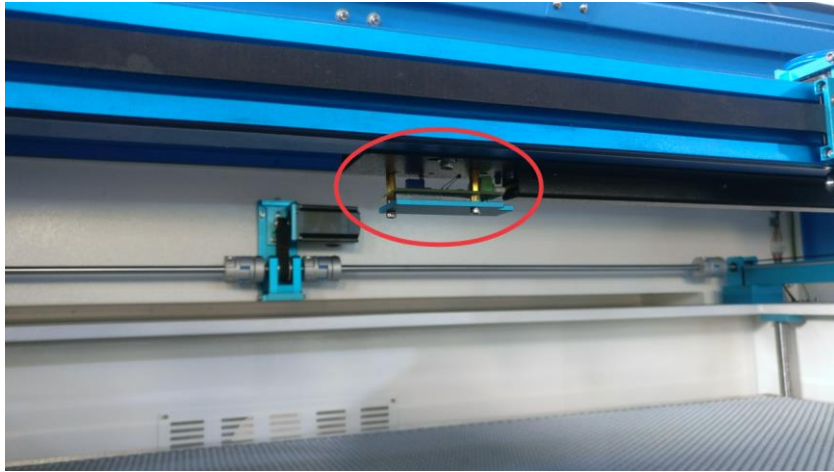
About smart board interface description：

1. 24V DC Voltage Power Input;

2. Signal Output;

3. Power light of D1, D1 is in red light while power is on.

4. Temperature sensor, monitor the temp on the working table

5. Alarm light of D2, D2 is in red light while the sensor is reacted by a certain temperature.

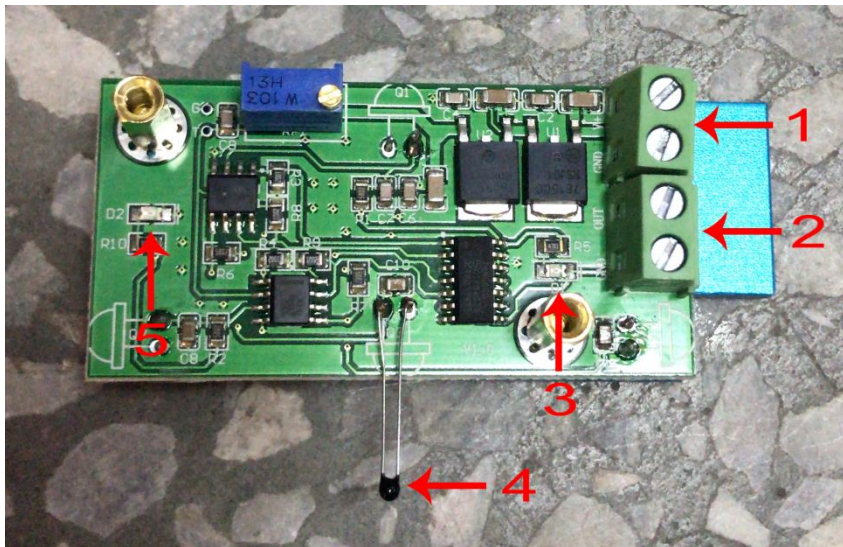If the red light of D2 is on and the needless alarm happens, please check first the pin of temperature sensor and make sure two pins are not twined to each other. After adjusting the sensor, restart the machine and see if the machine stops beeping. See below pics.

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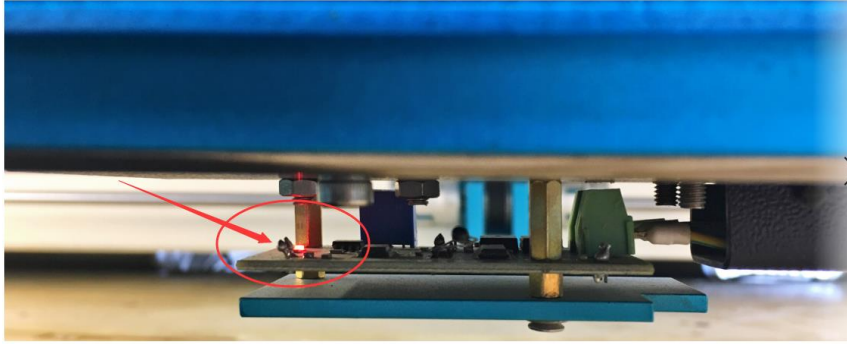
Tips: In order to avoid the needless alarms caused by the short circuit on sensor pin, we installed a heat-shrink tube on the pin (see below pic). If your smart board has installed it, there will be no short circuit. Maybe the smart board is broken. Please go into next step.
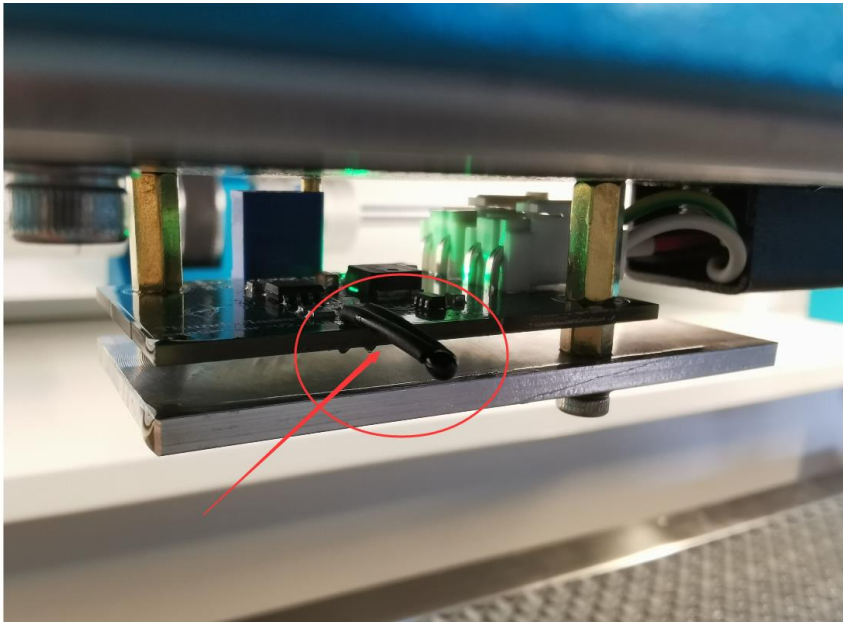
- **The smart board with temp sensor is broken**

If you checked the pin of the sensor is ok, the machine is still keep beeping. Maybe the smart board is broken. Please contact us:tech@thunderlaser.com.
Before you replace it, you can bypass it:
Please open the lower left door, and find the TL-Timer board and unplug the "IN6" connector. See below pic,

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Chapter3   Laser cutter software

3.1 How to prepare your files for feeding into the laser program to engrave

Note: the laser machine can only burn into or through material. Also, the beam can only be made to follow straight or curved paths or to burn a grid of dots (a bitmap image). There is no way for the laser to represent color.
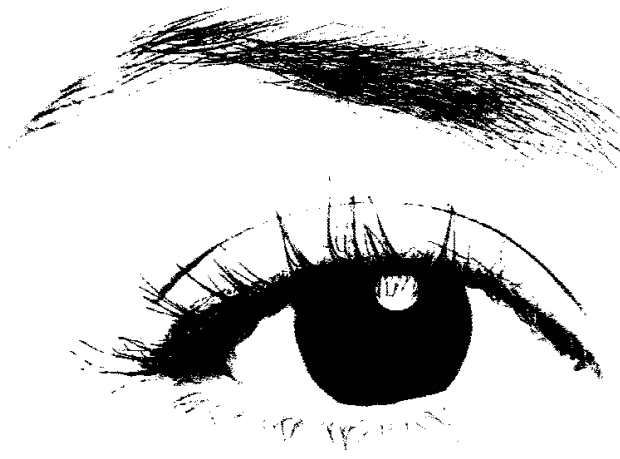
●   **Scanned Image Engraving**
The image is engraved by the laser machine line by line, point by point, similar to the way in which an inkjet printer applies ink, but instead of ink being applied, material is removed pixel by pixel by the laser.

Scenario 1:
If the picture is a color image, it will automatically turn into grayscale after importing into RDworks.


RDworks will recognize darker areas as engraving areas, and lighter areas will not engrave; if perform the picture directly, many details of the picture will disappear, like below.

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Solution：

Please convert the image into a 1-bit Windows bitmap (BMP) image where you will only have black and white pixels available to you. In RDworks, you can use "Bitmap handle" tool, like below.
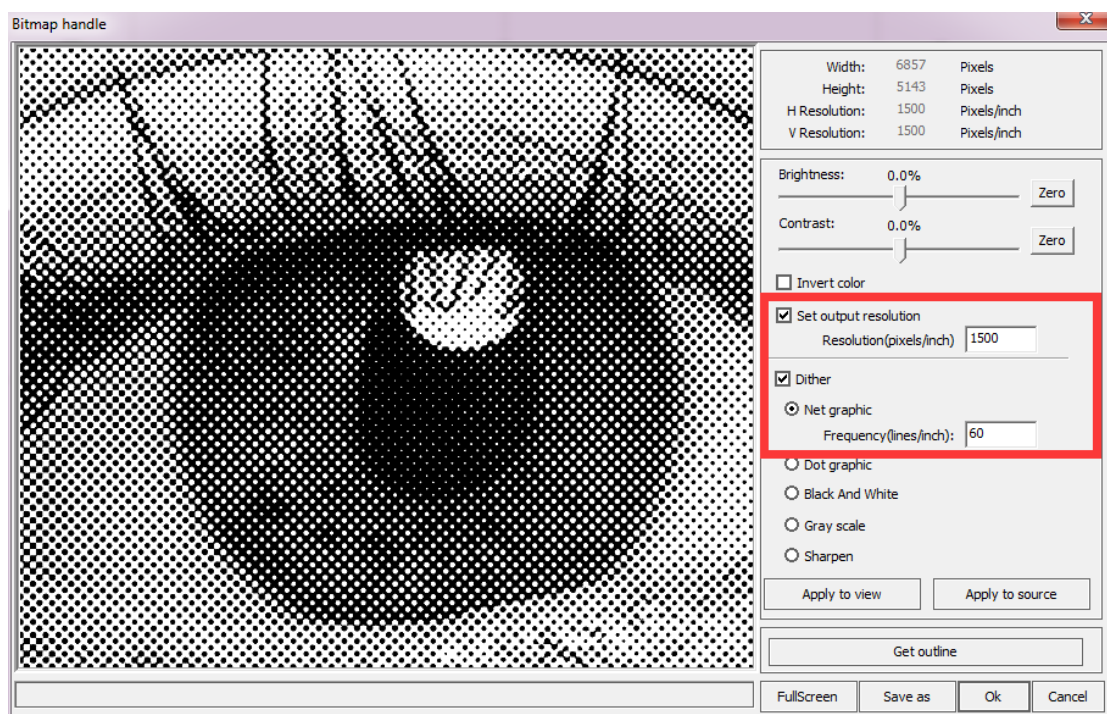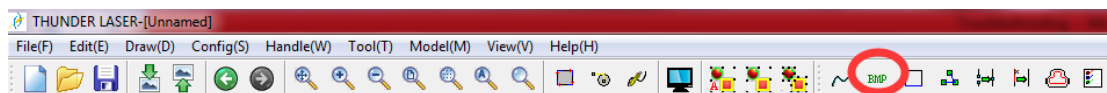
Resolution (pixels/inch): 1500;
Frequency: 60~80;

Note: Images for laser engraving should generally have a resolution of at least 300dpi as the output size. In RDwroks, you can check it from the BMP window, like below.

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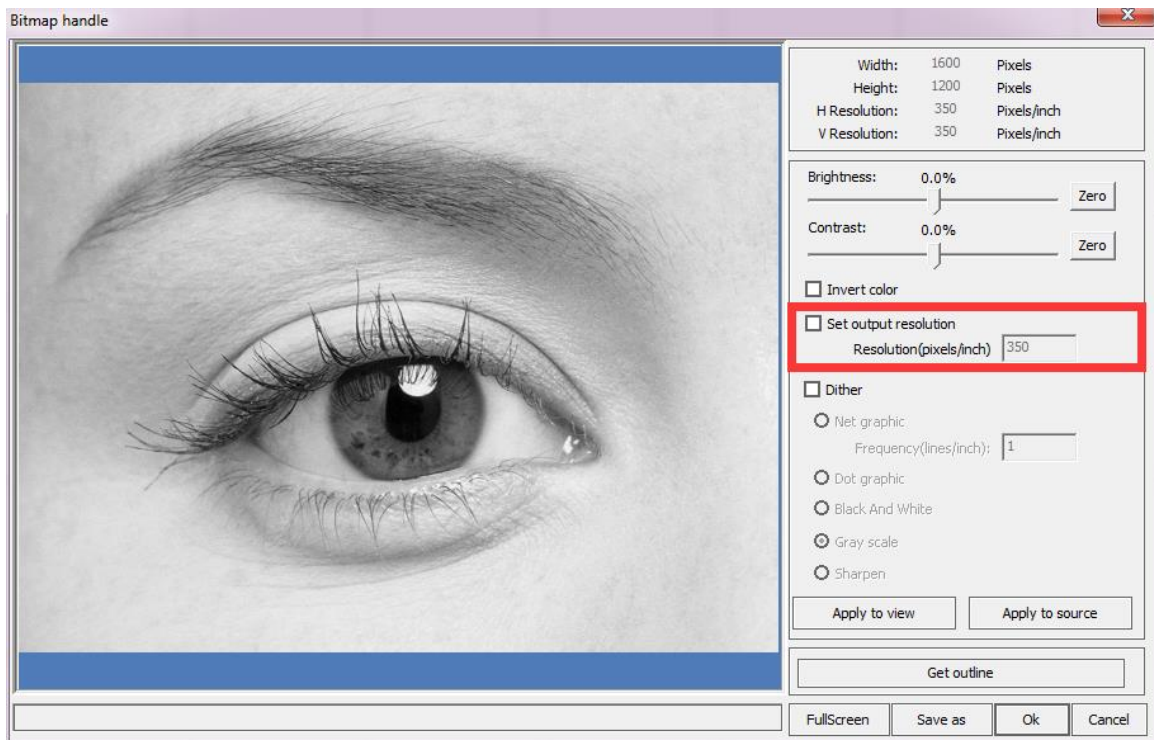
Scenario 2:

If the picture is a black and white image, it can be performed directly; if desired, you can make invert for the image, like below.

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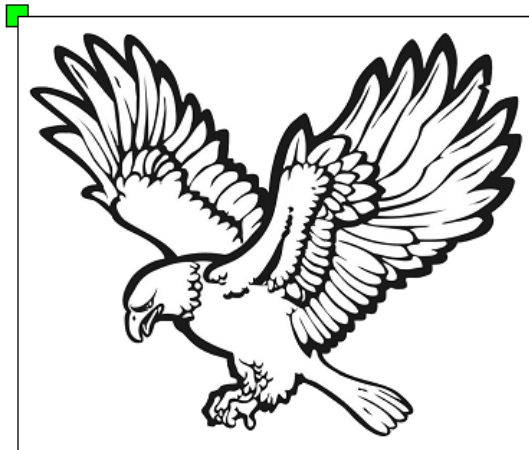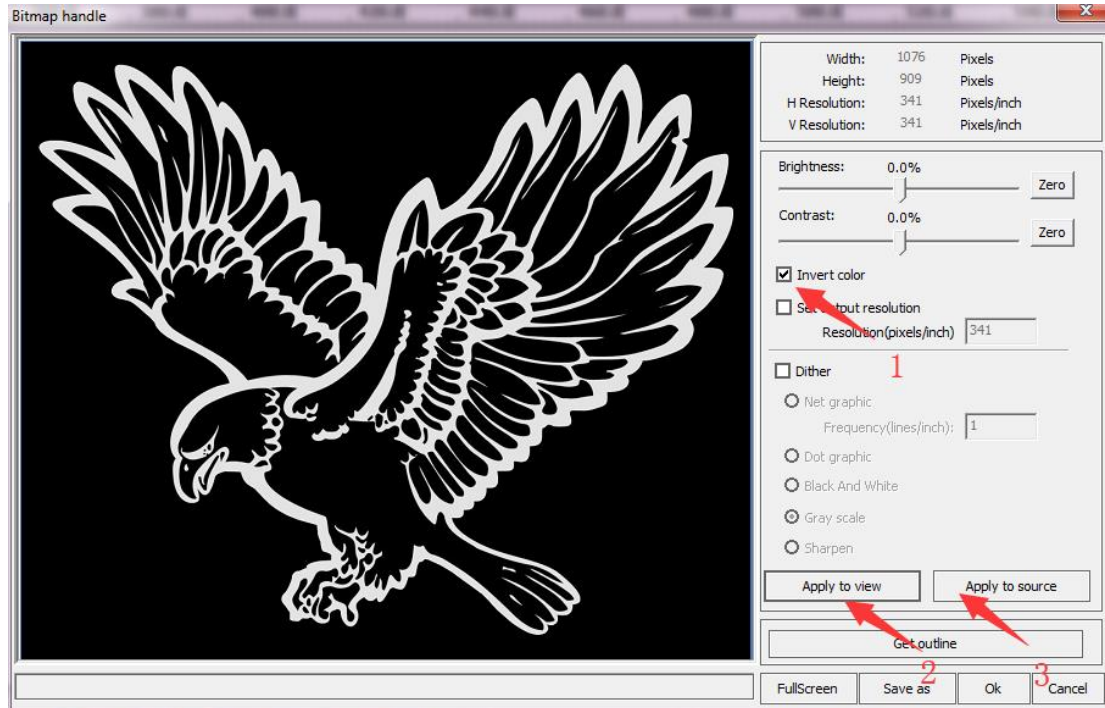
- **Vector-Based Engraving**

The closed vector object is engraved by the laser machine line by line in their filled area.

Scenario 1:
A closed vector can be engraved, like below.

An Open vector cannot be engraved, like below.

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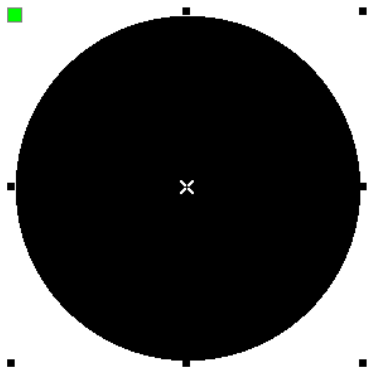Dongguan City, Guangdong Province, China
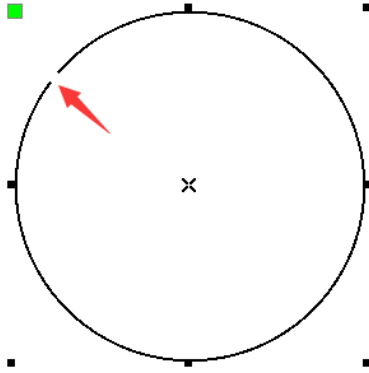
Solution：

In Rdworks, you can use "Curve auto close" tool to close the open vector, like below.
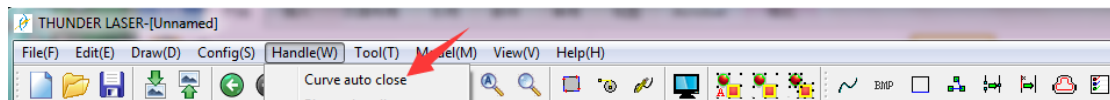
Scenario 2:

When the vectors nested each other, the overlapping area will have different results, like below:
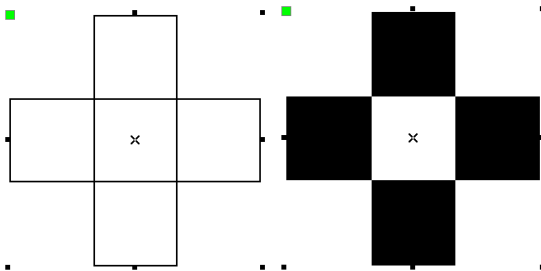
Solution：

In CorelDRAW, you can use "Weld" tool to merge objects into one, like below.

Scenario 3:

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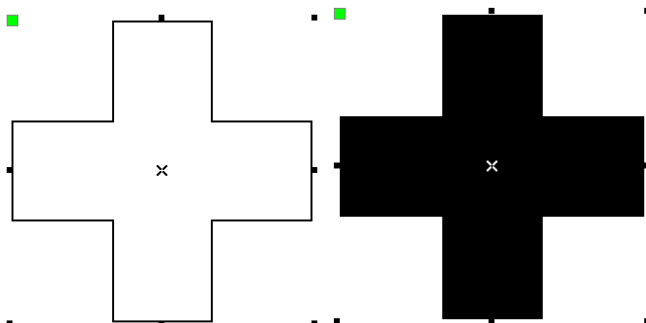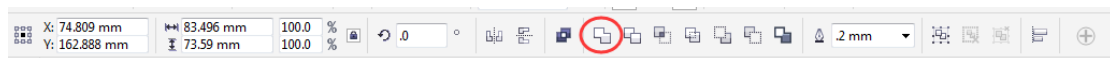
If two objects have overlapped path, they will disappear and not be able to engrave, like below.
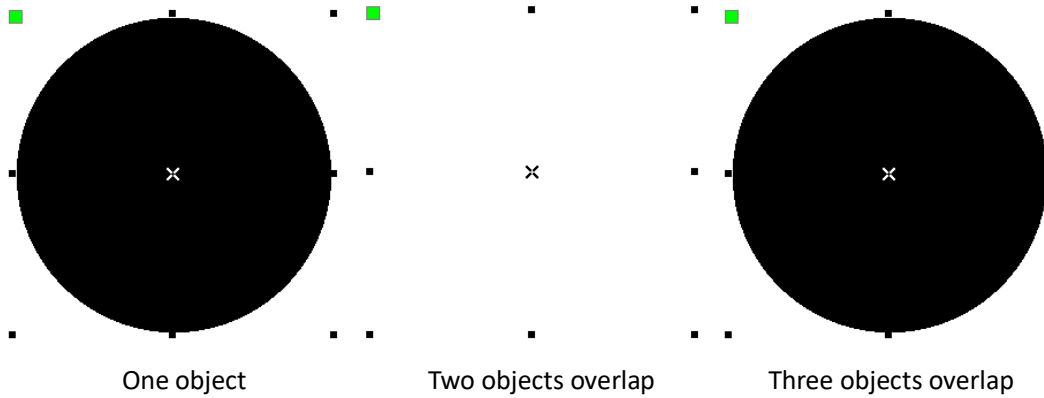
One object   Two objects overlap   Three objects overlap

Solution：

In Rdworks, you can use "Delete overlap" tool to delete all overlapped paths, like below.

End

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3.2 How to prepare your files for feeding into the laser

   program to cut

Scenario 1:

If the vector has overlapped paths and it will be cut repeatedly.

Solution：

In RDworks, you can use "Delete overlap" tool to delete all overlapped paths, like below.
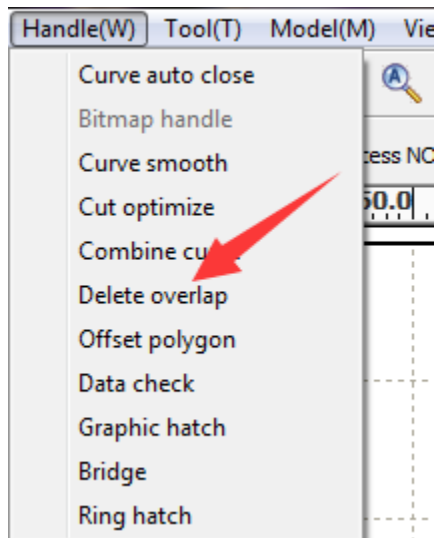
Scenario 2:

If you'd to make a rectangle at 30×30mm, however, it becomes 29.9×29.9mm when cut it through on material, because there's a little bit of gap appear on cutting edge, like below.

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Solution:

In RDworks, you can use "offset polygon" tool to correct the error.

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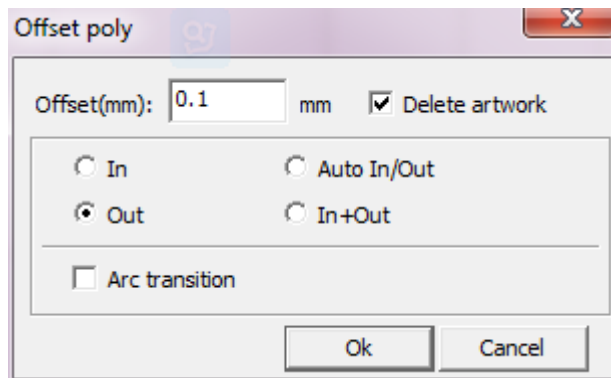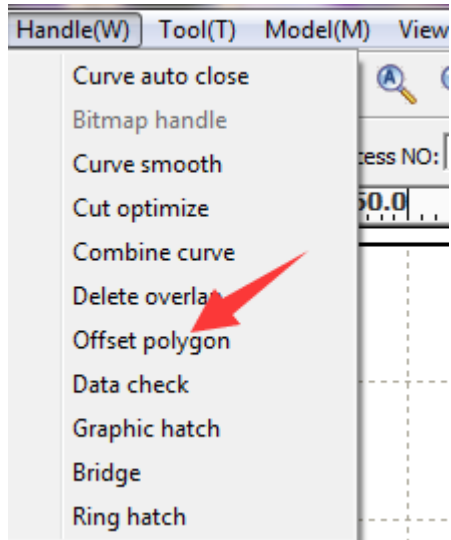
3.3 Communication Error

3.3.1 Ethernet cable connection

Connect the laser cutter system to desktop or laptop via an Ethernet cable.

1. Configure computer

Go to Start>>Control Panel>>Network and Sharing Center, configure the connection for local connection, like below.

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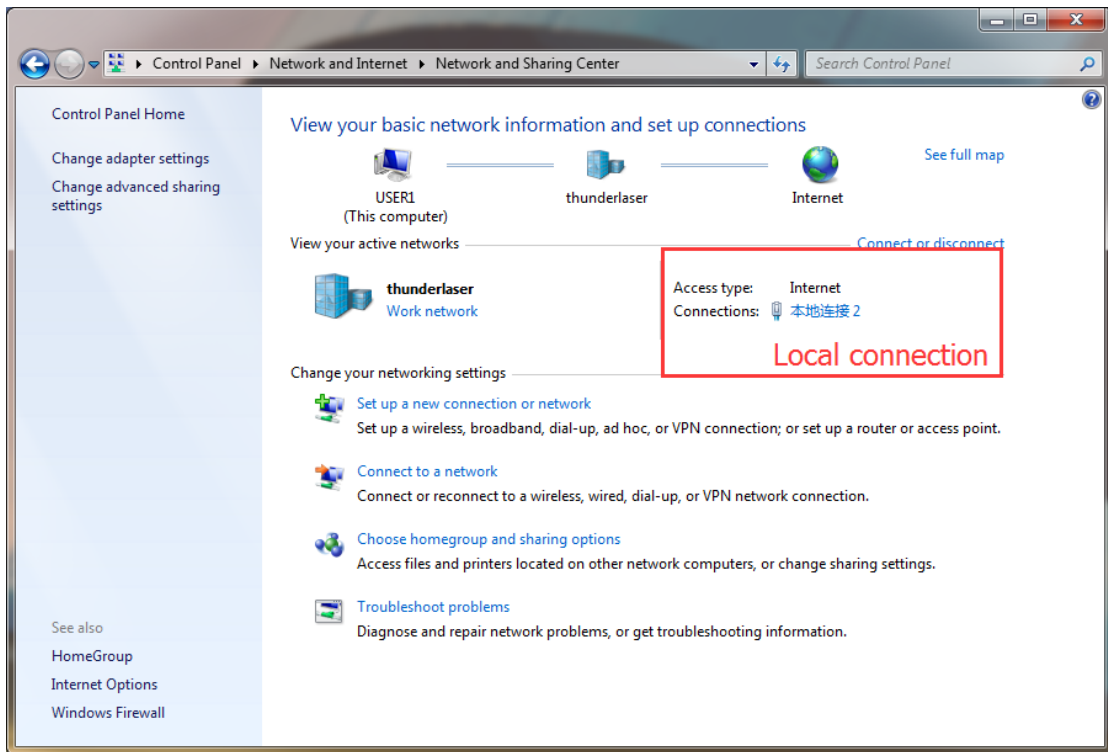
In the Properties window select Use the following IP Address: Set the address to 192.168.1.30 and the subnet Mask to 255.255.255.0, like below.

2. Configure laser cutter software

Add and select the Web port.

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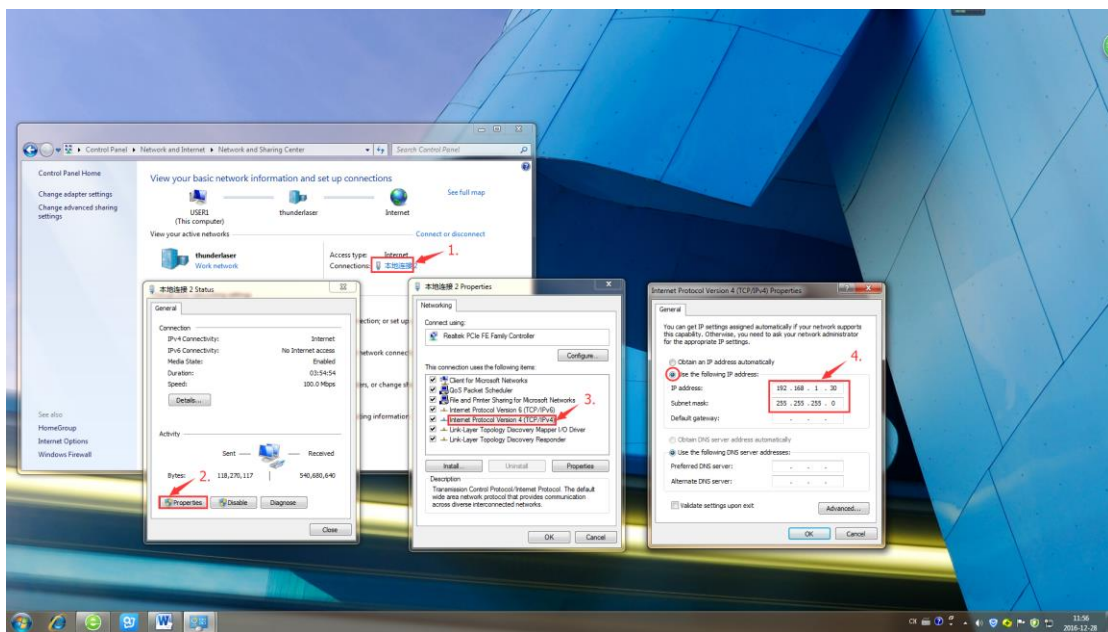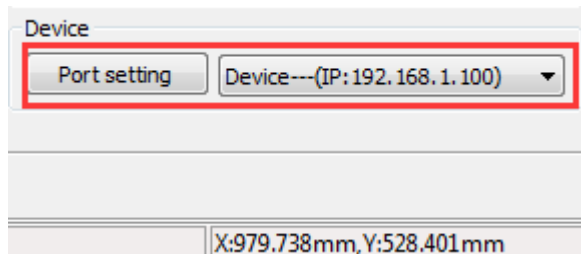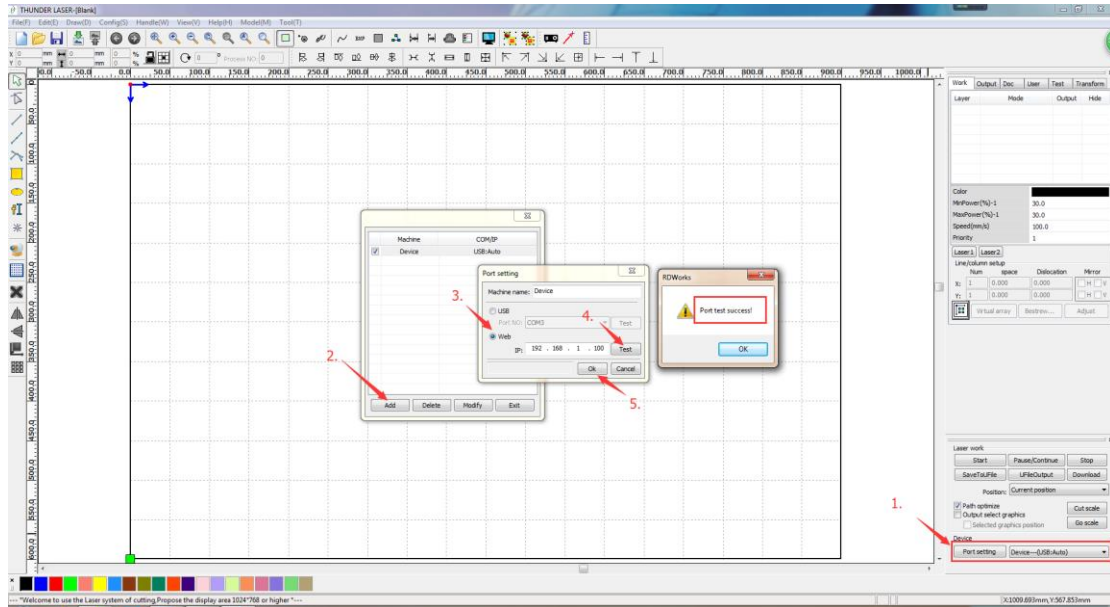
Click below link to see instruction video:

http://www.thunderlaser.com/how-to-use-your-laser-software/19-how-to-connect-the-laser-using-a-ethernet-cable.html

End

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3.3.2 USB cable connection

Test the connection as following:
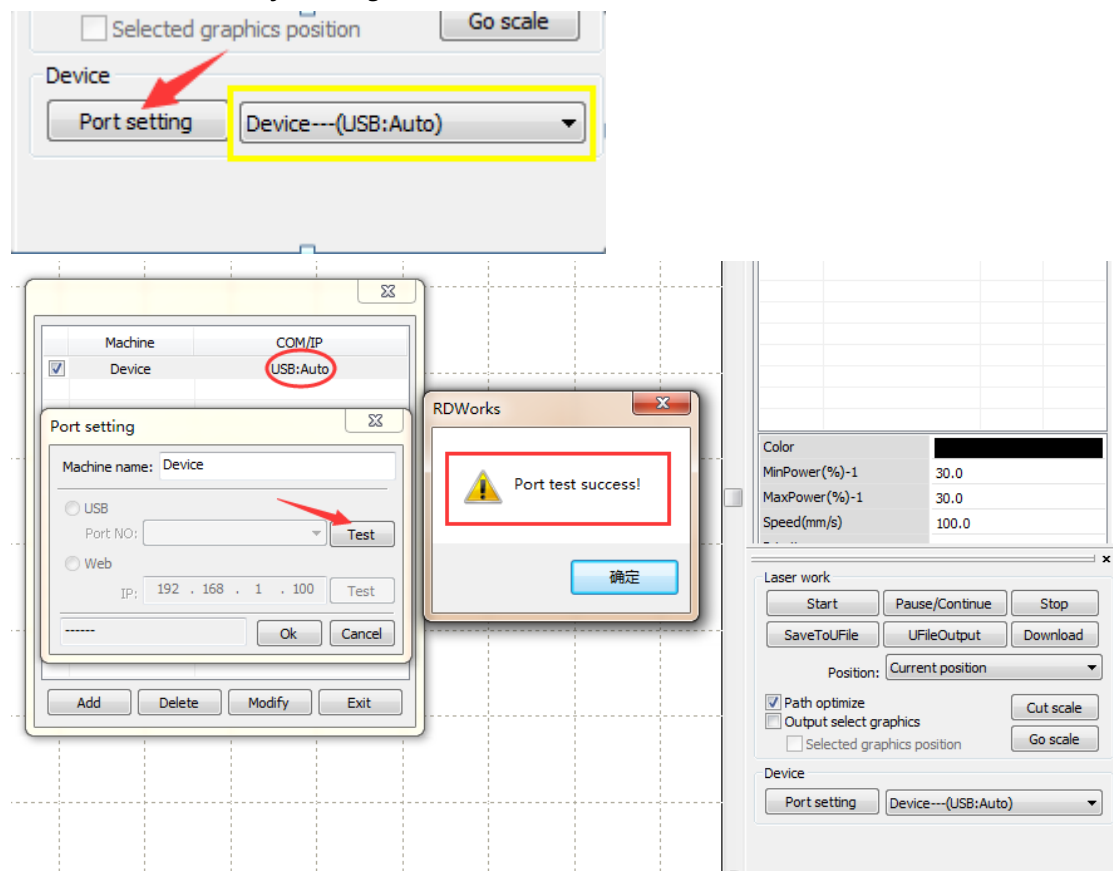
1. Don't forget to install the driver for USB.
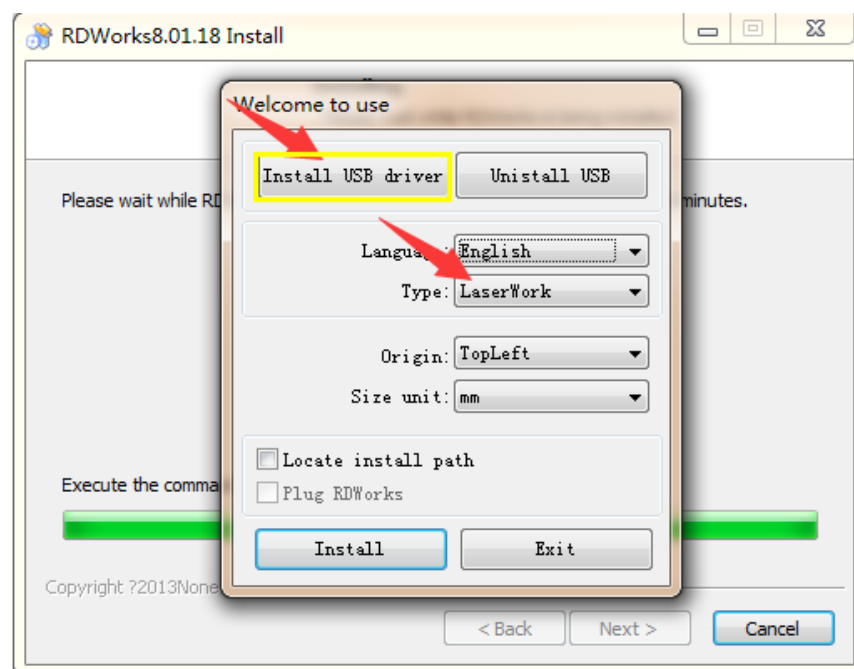
If you are not sure, just install USB driver again.

2. Laser cutter system connect to the PC.

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If still nothing, connect the USB cable to controller directly, like below.
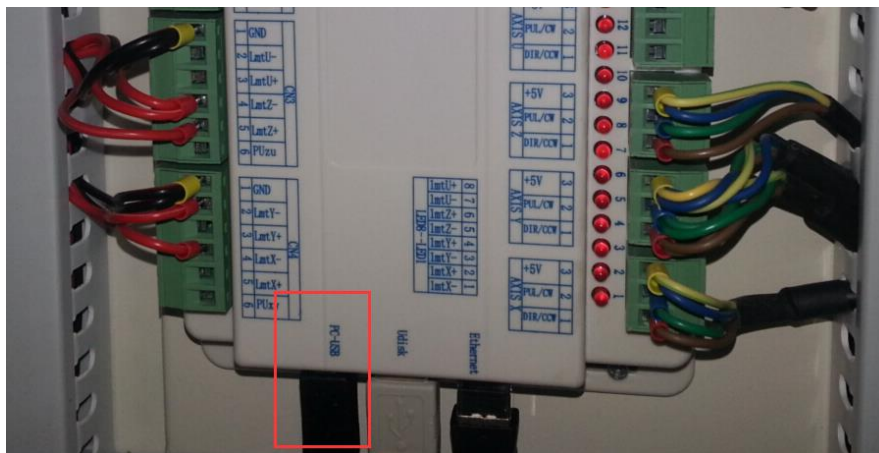
View Device Manager to make sure you have Rdworks connected to the machine. The port number of the COM appears in the following of the "USB Serial Port".
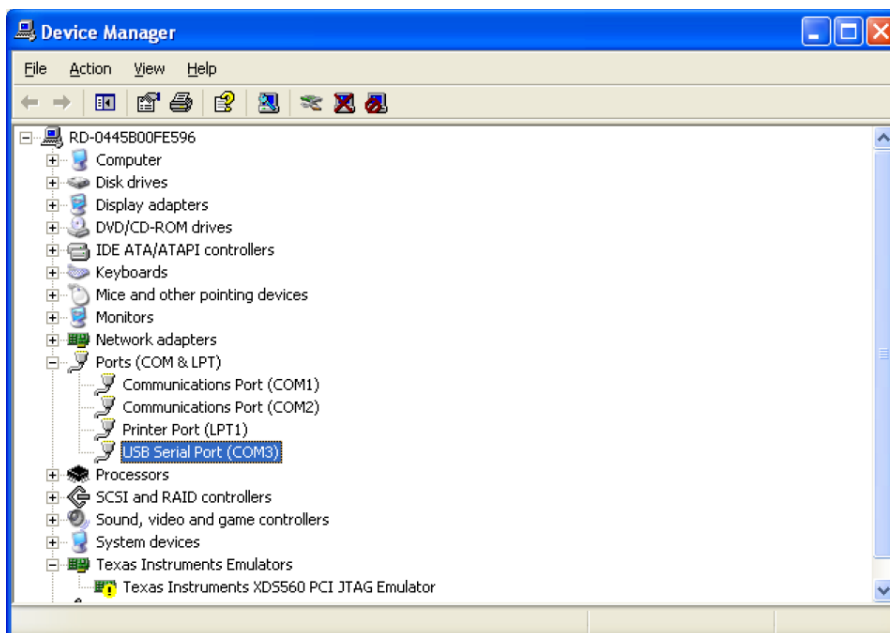
3. Install the USB driver manually

http://www.thunderlaser.com/download/down/USB_driver_diagram_for_windows.rar

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3.4 How to run several laser machines with one PC via Ethernet cable
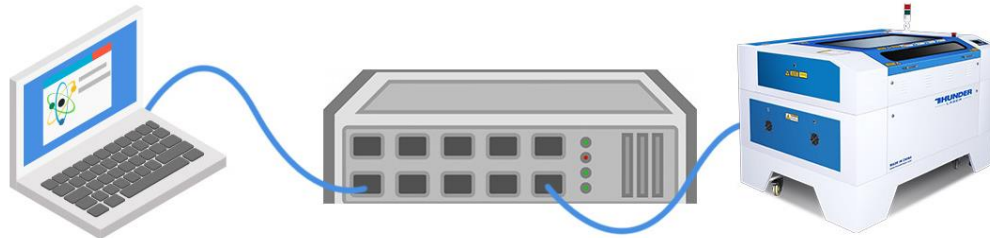
If there is an Ethernet hub in your network, it's able for one PC (laser software) to connect with several machines.

But pc will does only communicate with one machine and sending the file into the laser in the same time.

1. Ethernet hub setup;

PC to hub, one port of the hub goes to a laser machine.

2. Configure laser cutter machine;

Go to LCD Panel>>Z/U Button>>IP config+.

Default machine IP: 192.168.1.100, like below.
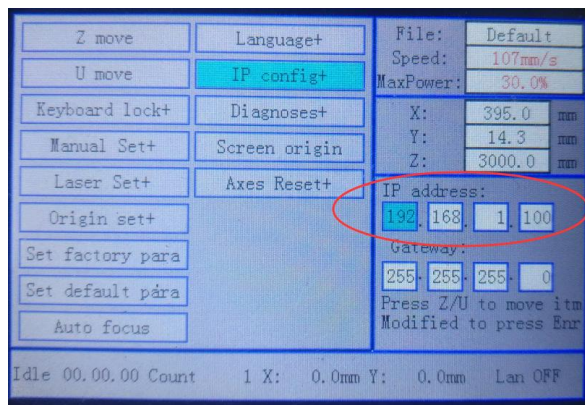
For other machine, you may have other IP address as 192.168.1.X.

3. Configure laser cutter software;

Add the Web port for each machine according to their IP address, like below.

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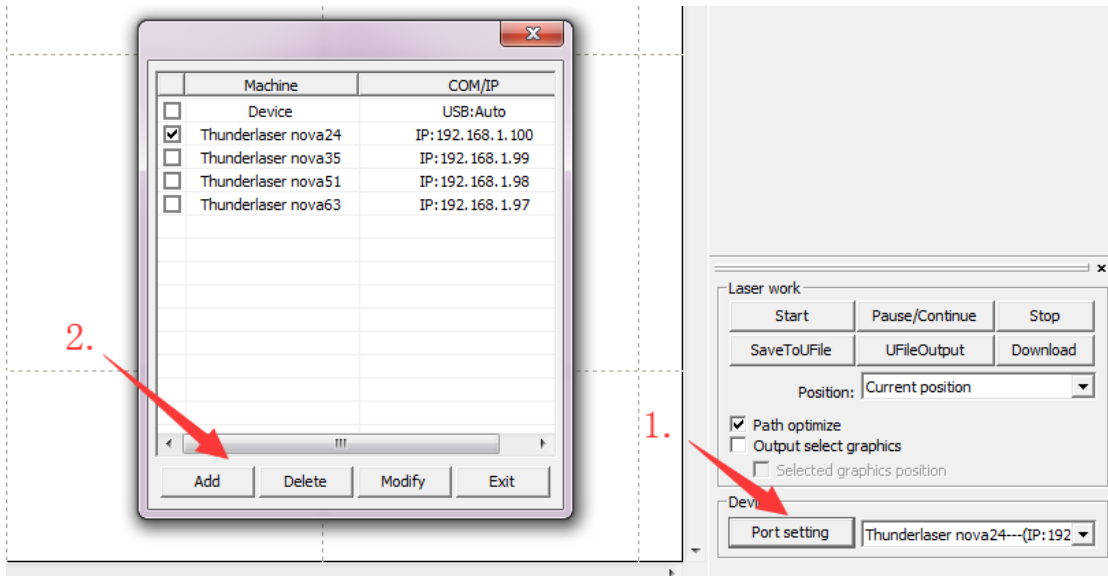
Note: please check the current IP for computer and avoid IP address conflicts from the laser machine and software.

End

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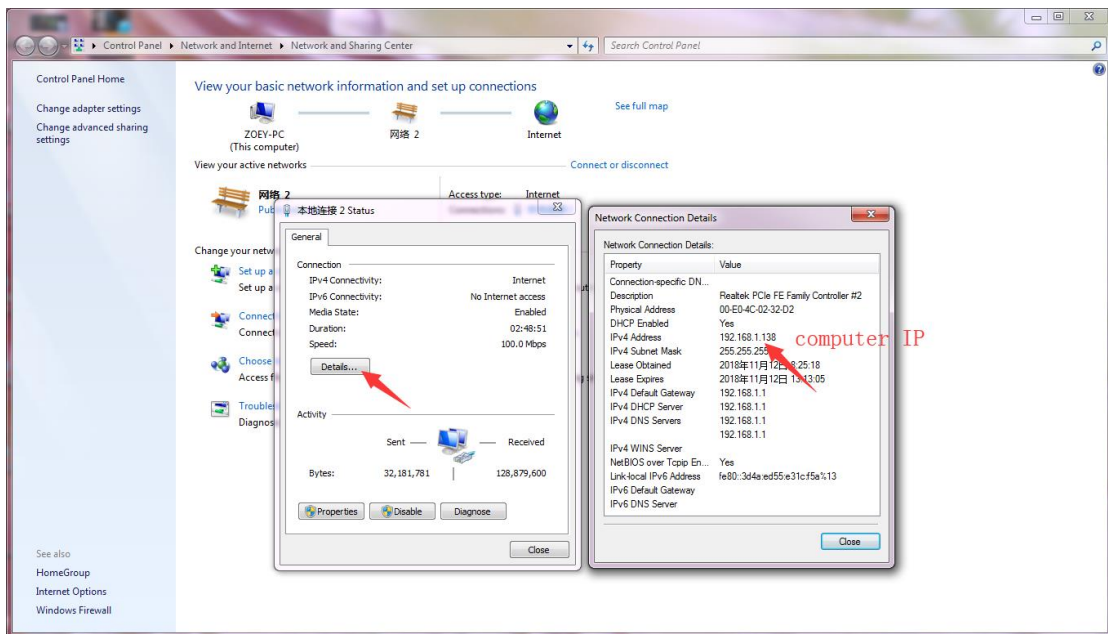
3.5   How to run several laser machines with one PC via USB cable connection
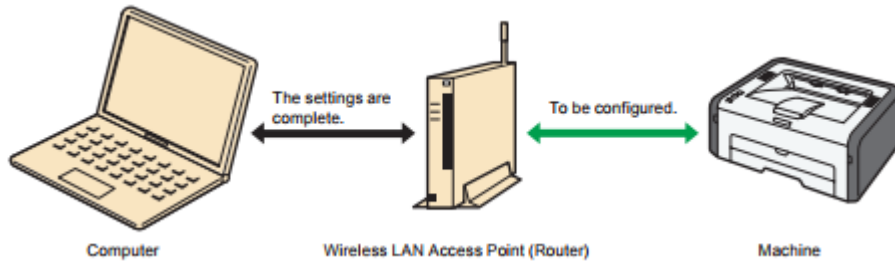
If there are several USB interfaces with your PC, it's able for one PC (laser software) to connect with several machines.

pc to hub , one port of the hub goes to laser

But pc will does only communicate with one machine and sending the file into the laser in the same time

For USB connection as below


1. When connecting with the first machine, it's connected automatically as default.

2. When connecting with the second machine, please click the "Add" below, then click "USB" and choose COM3 (or other ports).

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3. When connecting with more machines, it's the same as 2. (Just choose different COM ports)

If you use Ethernet interfaces, please refer to the following video teaching you how to set network. And the way of adding more Ethernet port is the same as above.
http://www.thunderlaser.com/how-to-use-your-laser-software/19-how-to-connect-the-laser-using-a-ethernet-cable.html

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3.6 How to setup wireless network connection for Thunder laser machine

Here's what you'll need:
- A computer with wireless capability;

Almost all laptops have wireless capability built-in, but most desktop computers do not have wireless built-in.
- A wireless router;
- An Ethernet cable;
- A Thunder laser system

1. router setup

Use the Ethernet cable to connect the wireless router to the Ethernet port on your laser system.
Connect the power to the router.

2. Configure computer

Go to Start>>Control Panel>>Network and Sharing Center.
Right click on your Wireless Network Connection and then select Properties.
In internet protocol version 4(TCP/IPv4) Properties window select Obtain an IP address automatically, like below.

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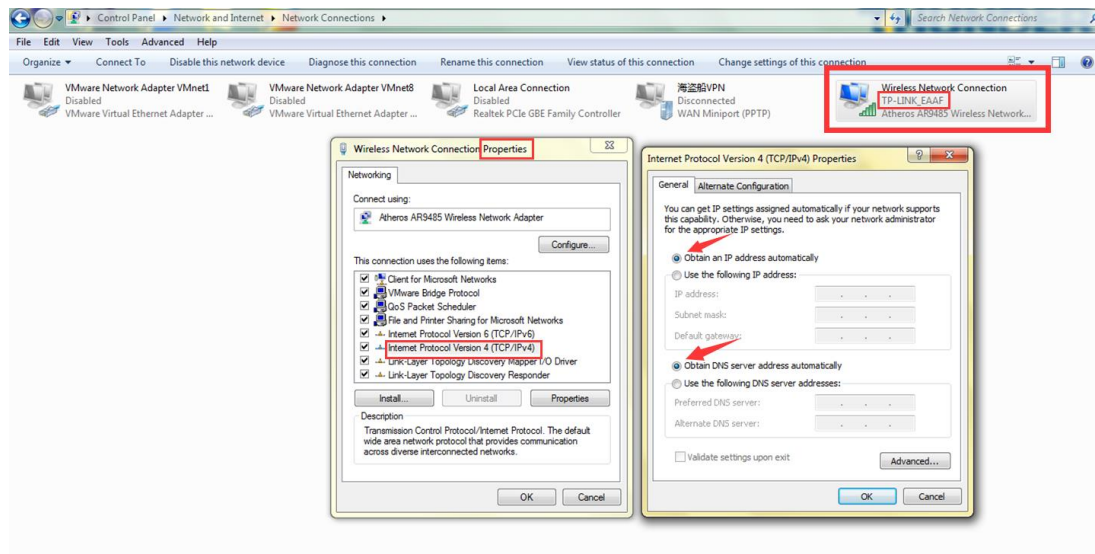
After that, click OK to exit all windows.

3. Configure laser cutter machine

Go to LCD Panel>>Z/U Button>>IP config+.

Default machine IP: 192.168.1.100, and you should set the Gateway same with router IP.

Our router IP is 192.168.1.1, so set gateway as 192.168.1.1, like below:
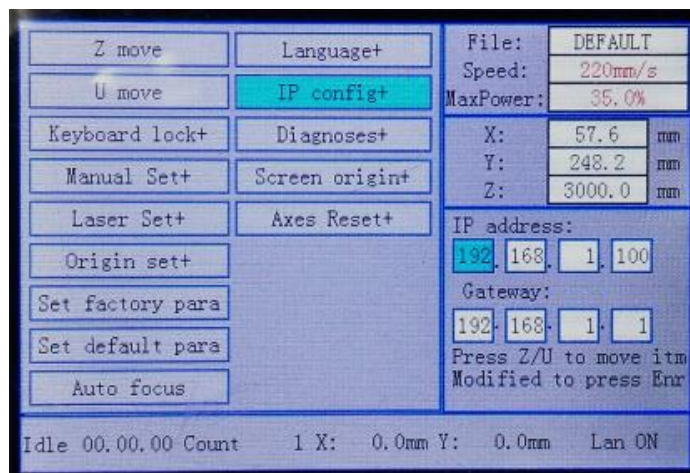
4. Configure laser cutter software

Add and select the Web port on rdworks, like below.

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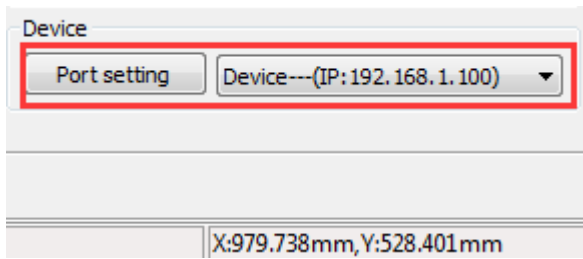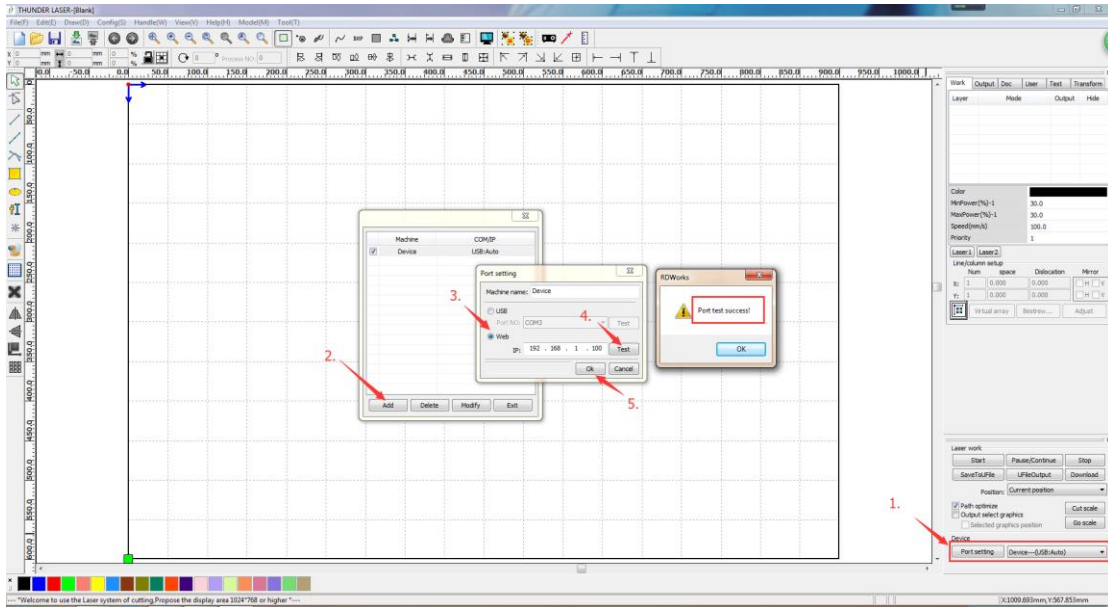
Note: please check the current IP for computer and router and avoid IP address conflicts from the laser machine and software.

End

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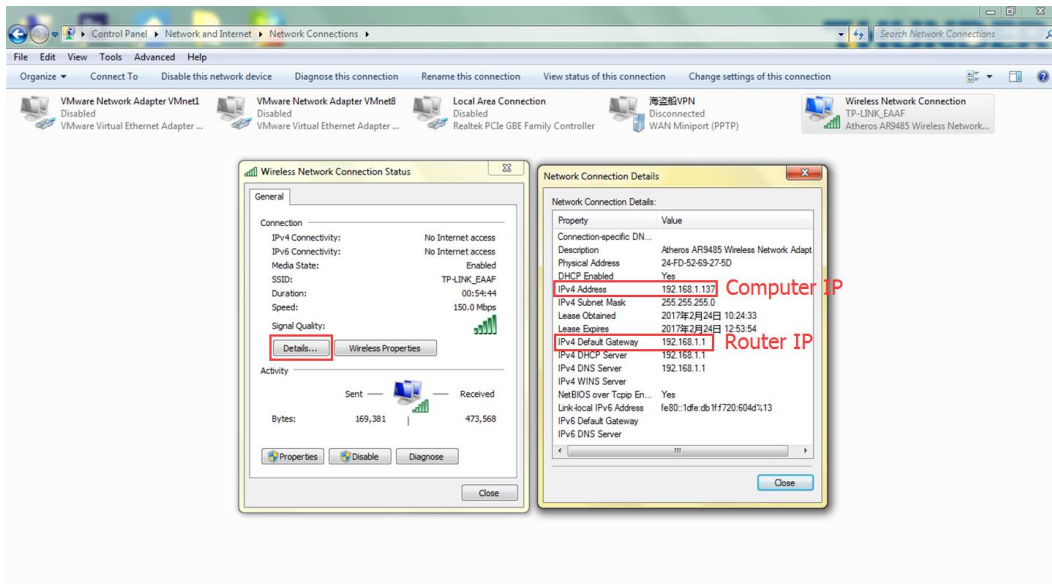
3.7 How to run several laser machines with one PC via USB cable

If there are several USB interfaces with your PC, it's able for one PC (laser software) to connect with several machines

But pc will does only communicate with one machine and sending the file into the laser in the same time

For USB connection as below
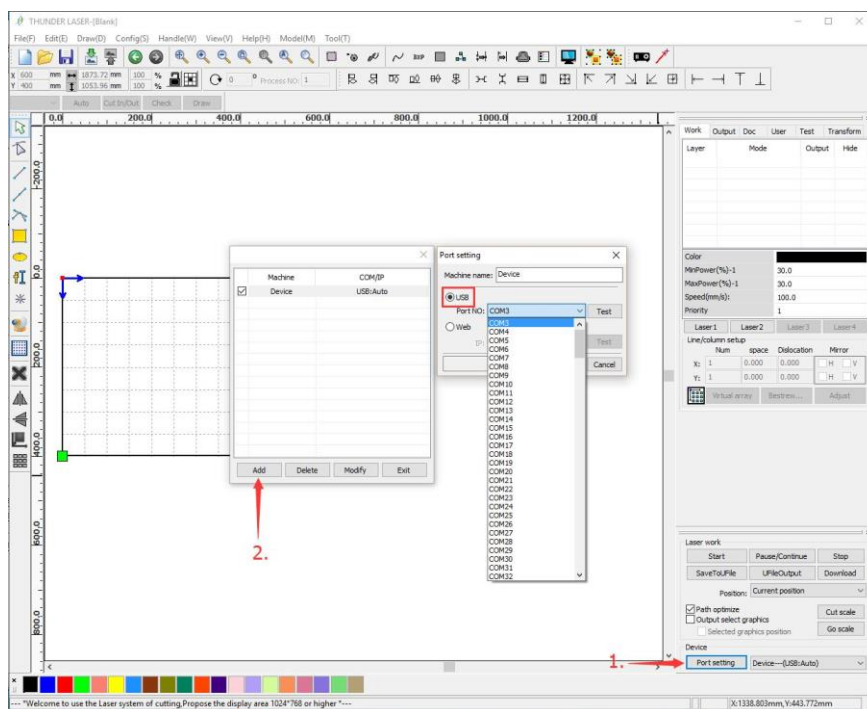
1. When connecting with the first machine, it's connected automatically as default.

2. When connecting with the second machine, please click the "Add" below, then click "USB" and choose COM3 (or other ports).

3. When connecting with more machines, it's the same as 2. (Just choose different COM ports)

If you use Ethernet interfaces,please refer to the following video teaching you how to set network. And the way of adding more Ethernet port is the same as above.
https://www.thunderlaser.com/how-to-use-your-laser-software/19-how-to-connect-the-laser-using-a-ethernet-cable.html

End

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3.8 How to import PDF files into RDWorks

1. RDWorks cannot read PDF and open it directly.

2. Use CorelDraw to open/import PDF file firstly. Then save the graphic as DXF file.
Like below:
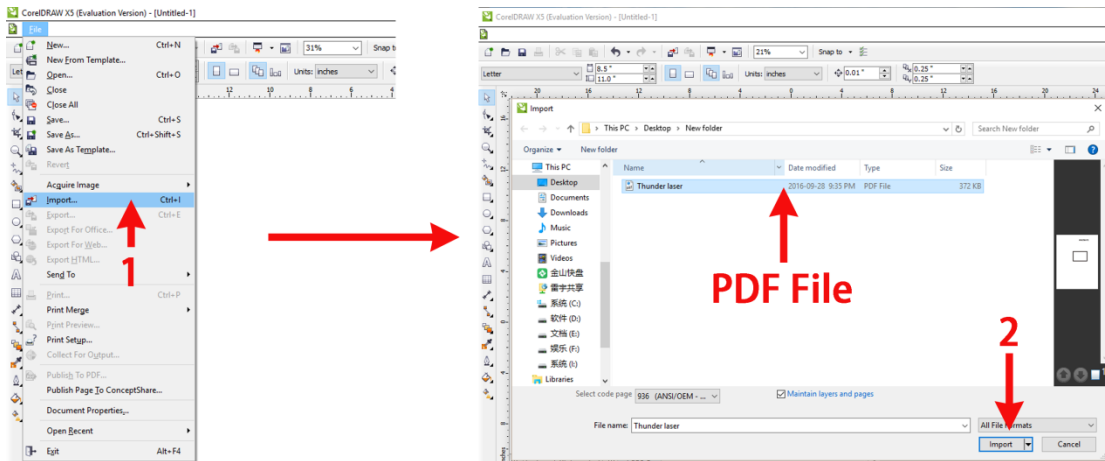
3. Then RDWorks can read the DXF file, Just import the DXF file into RDWorks directly.

4. The other way is open/import PDF file with CorelDraw，use the plugin button "Laser Running " to import the graphic into RDWorks

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3.9 How to install the CorelDraw plugin for RDWorks

1. Firstly run CorelDraw and set the parameter following below instructions:
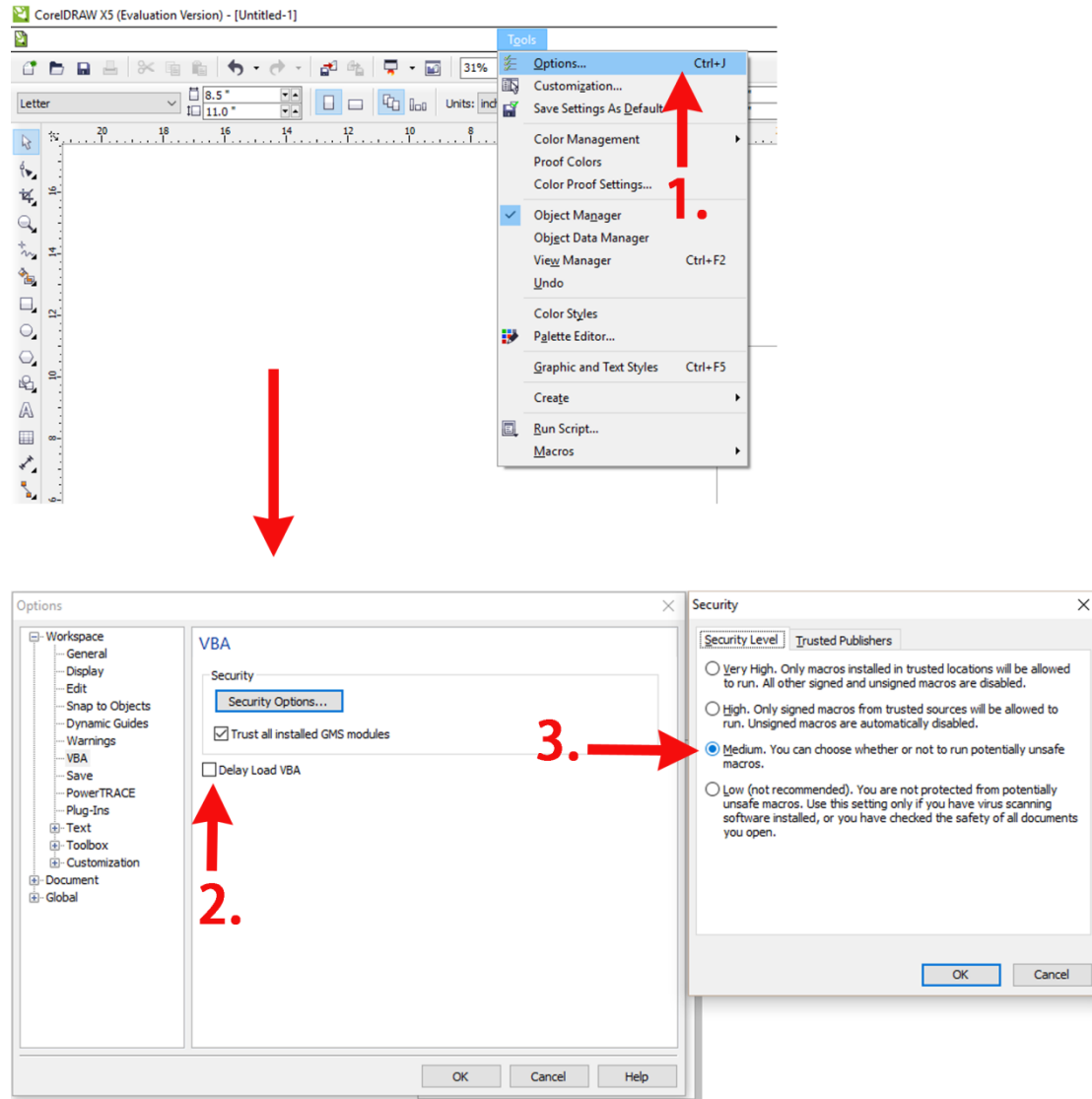
2. After that, close CorelDraw. Double click to open RDWorks installation program. Choose the type of CorelDraw_Laser (be sure the RDWorks main program has been already installed), and then tick the item RDworks, as shown below:

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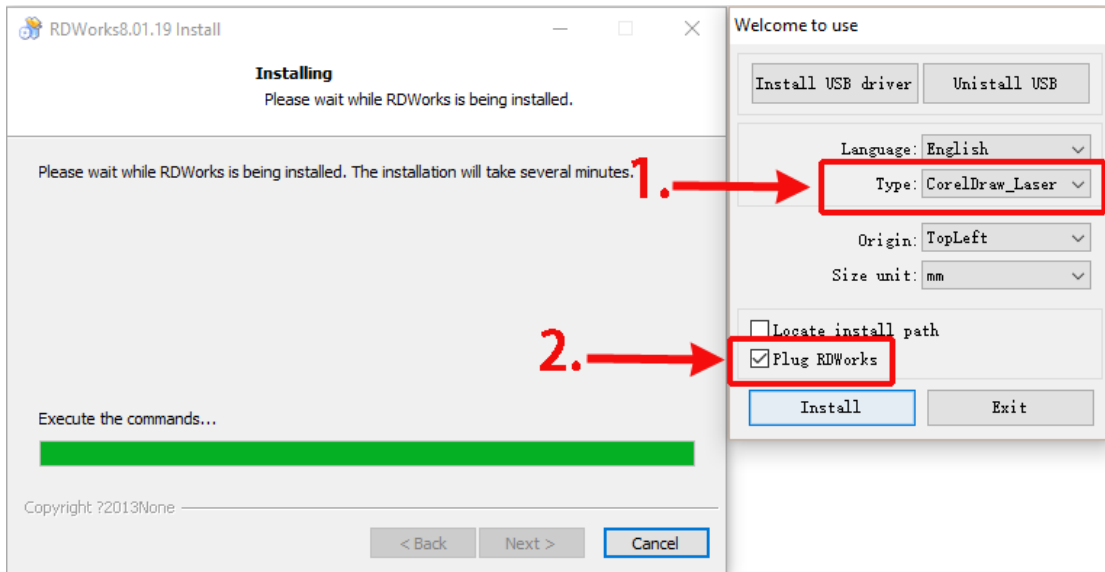
Click "install" and wait to compete the installation.

3. Again run CorelDraw. Choose and enter "Run Macro"(Tools > Marcos>Run Macro). Choose Marcos in: [Globalmacros (RDWorks15/16/17V8.gms)] > [RDWorksV8.UserInit]. Click run.
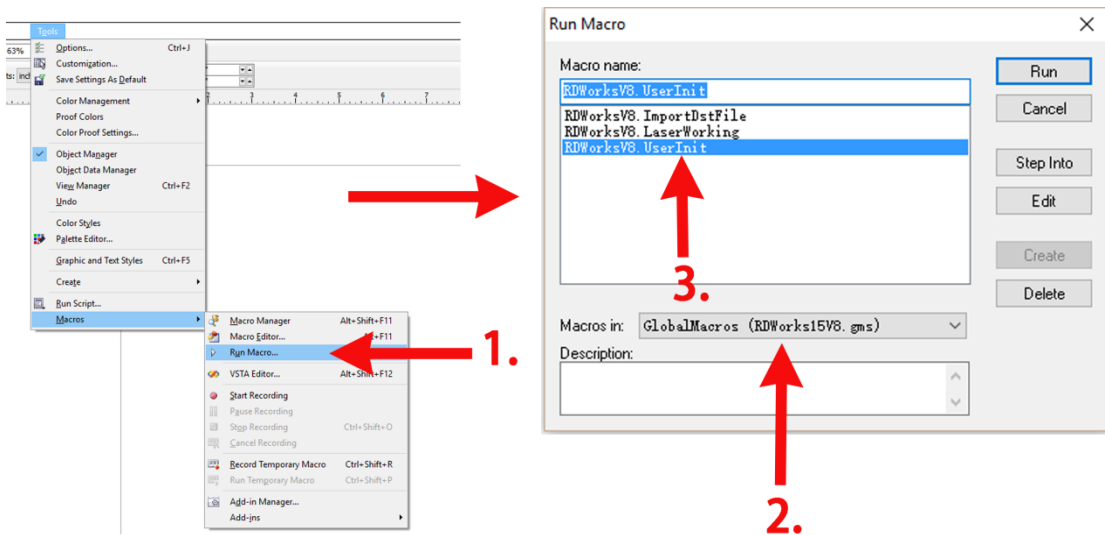
4. There will appear two extra buttons . Move them to anywhere you want them to be. After finish drawing the graphics, click "Laser running" to directly import the graphics into RDworks.

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3.10 Wrong proportions from RDWorks

I'd like to cut a Rectangle at 30x30mm,

however, it become 30×60.2 in simulation and in laser,
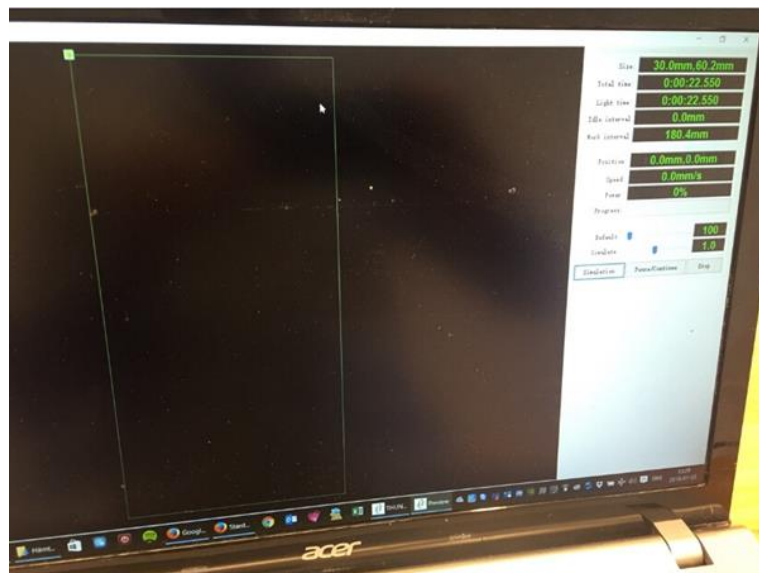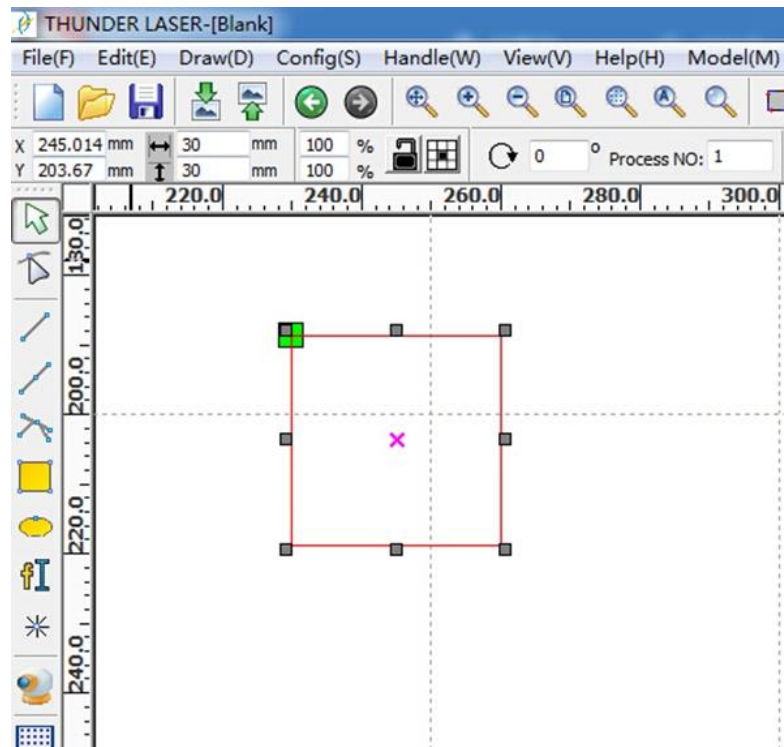
Please make sure "Enable rotate engrave" is not ticked.

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End

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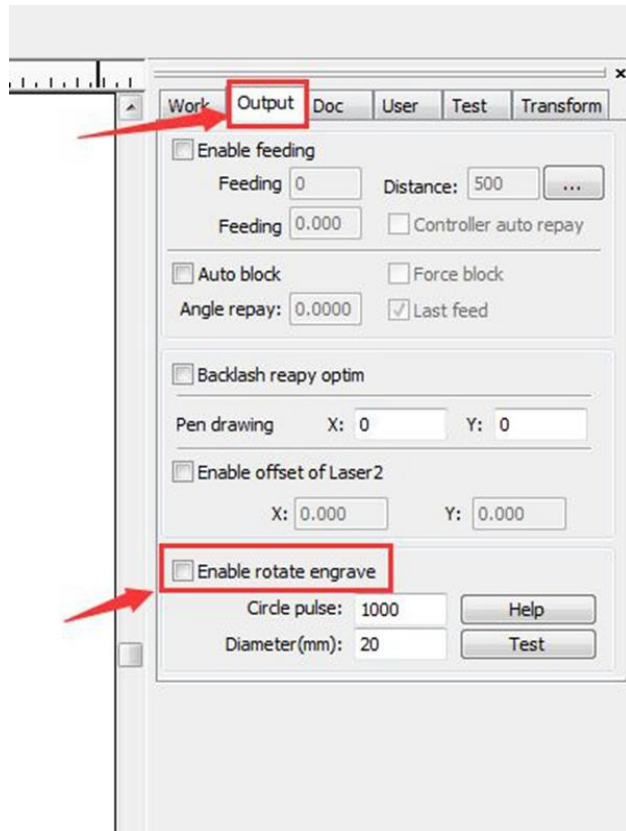
3.11 Why does the graphic size that imported to RDWorks different from its original size

If the file being imported is DXF format, the problem may be caused by improper software setting.

For example, the unit of the original DXF file is "inch", but in RDWorks, the DXF unit is set as "mm". When you import the DXF graphic to RDWorks, the graphic will be read as "mm" unit. Therefore the size turn out in RDWorks is different from the original size.
Please refer to below photo to set DXF unit in RDWorks:
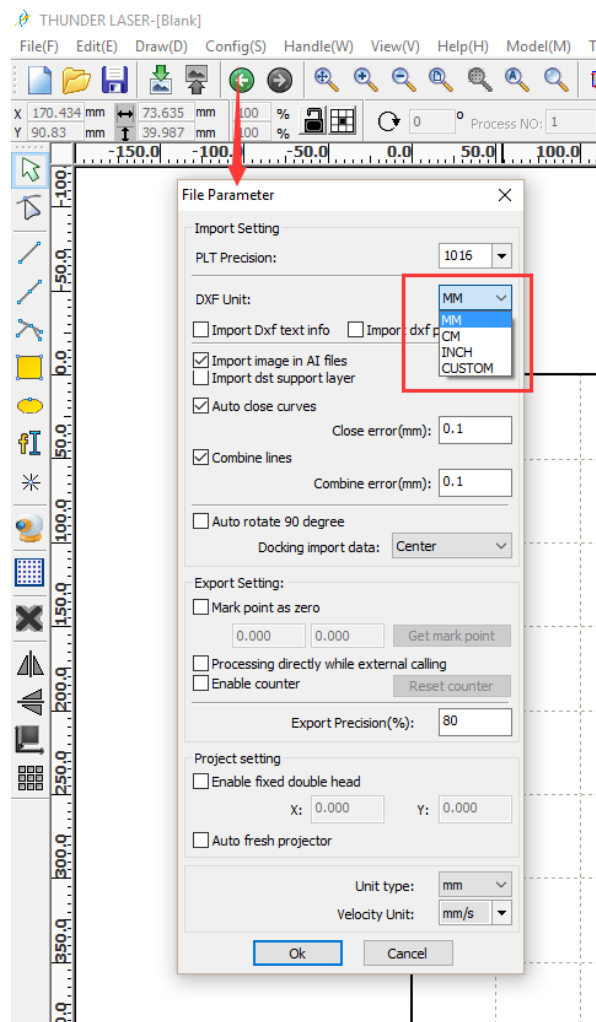
Please make sure DXF file unit from your drawing software is the same as RDWorks' s DXF unit.

End

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3.12 Engraving problem—how to Improve Engraving Quality in the scan mode of X-swing
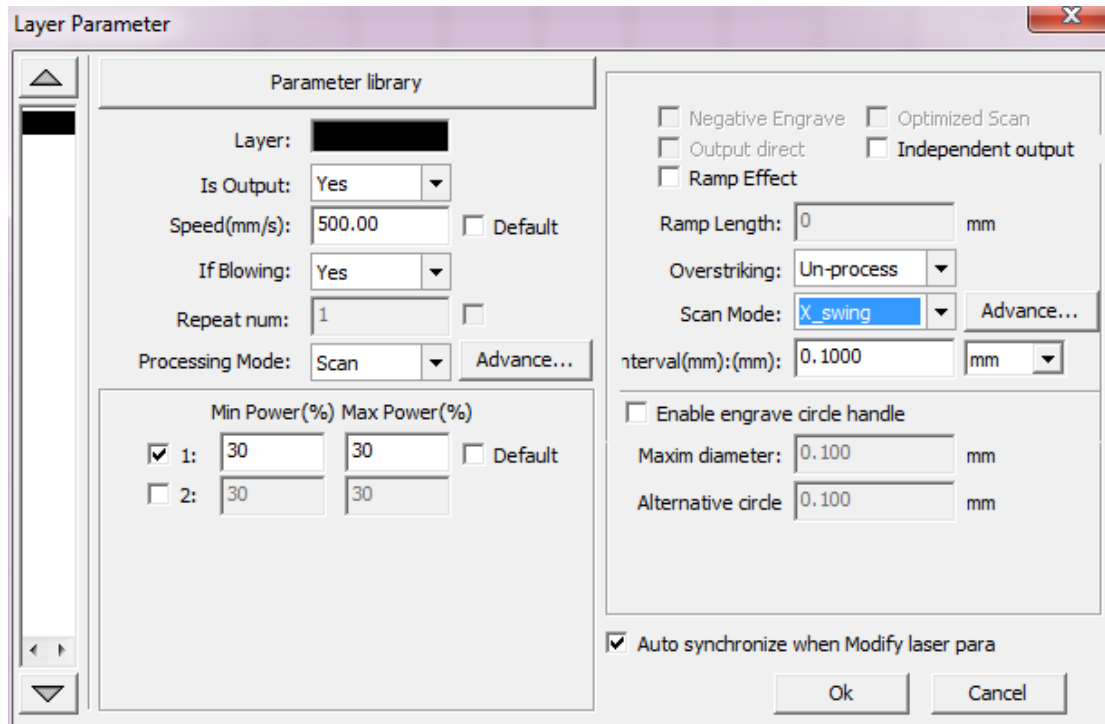
The engraving quality working on x-swing is generally worse than x-unilateralism, it usually results in ghosting effect or image offset or bi-directional engraving offset, like below.

In RDworks, you can adjust the **Reverse Interval** to improve this issue.

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1. Open the test file;

Click the link below for the test file:

http://www.thunderlaser.com/download/down/Reverse%20interval-%20test.rld
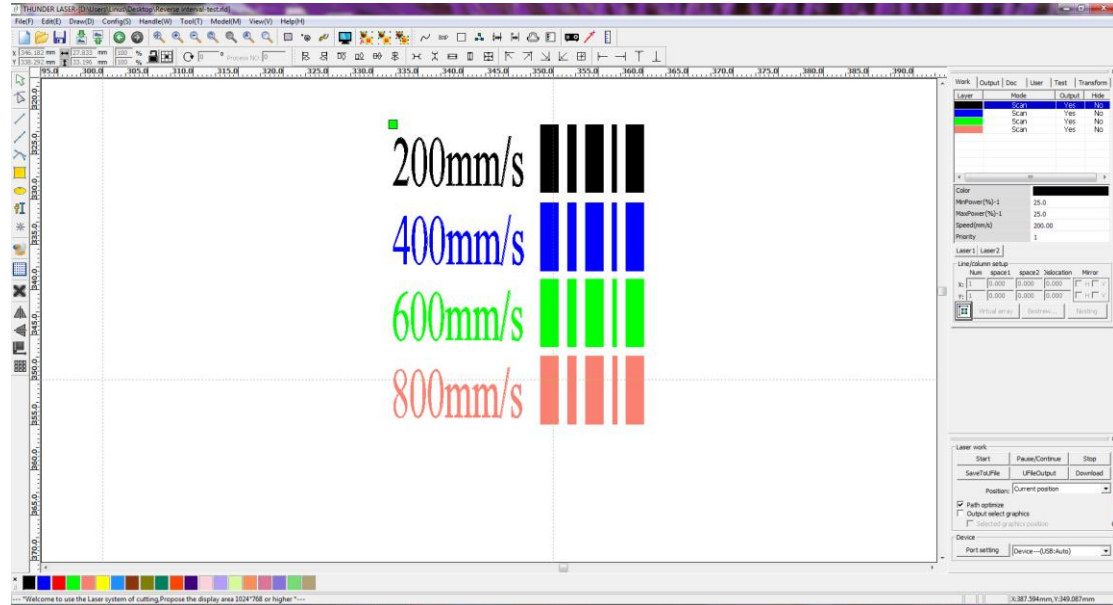
You only need to test and adjust for above four speeds then other speed from 1mm/s to 1000mm/s will be calibrate automatically.

2. Test and calibrate the Reverse Interval;

Open System Setting window: Config >> System Setting >> General Settings, like below.

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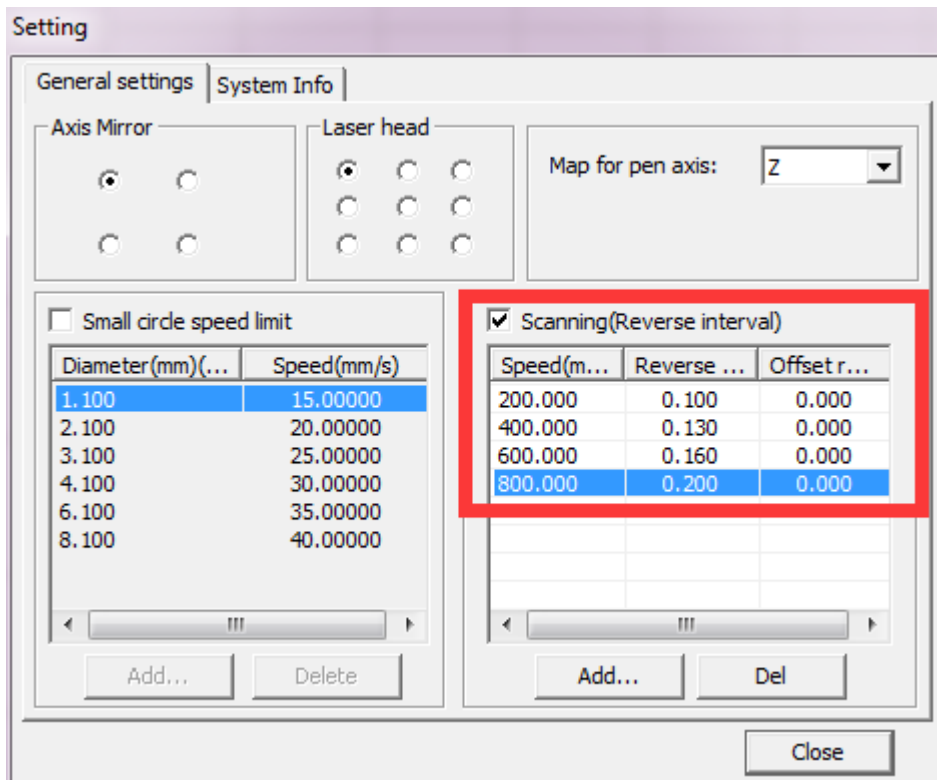
These are default values for reverse interval, you may need to calibrate them for your machine.

Let's test and calibrate.

Send the file to your laser machine and test, then adjust the values of reverse interval according to the results for each speed, like below.
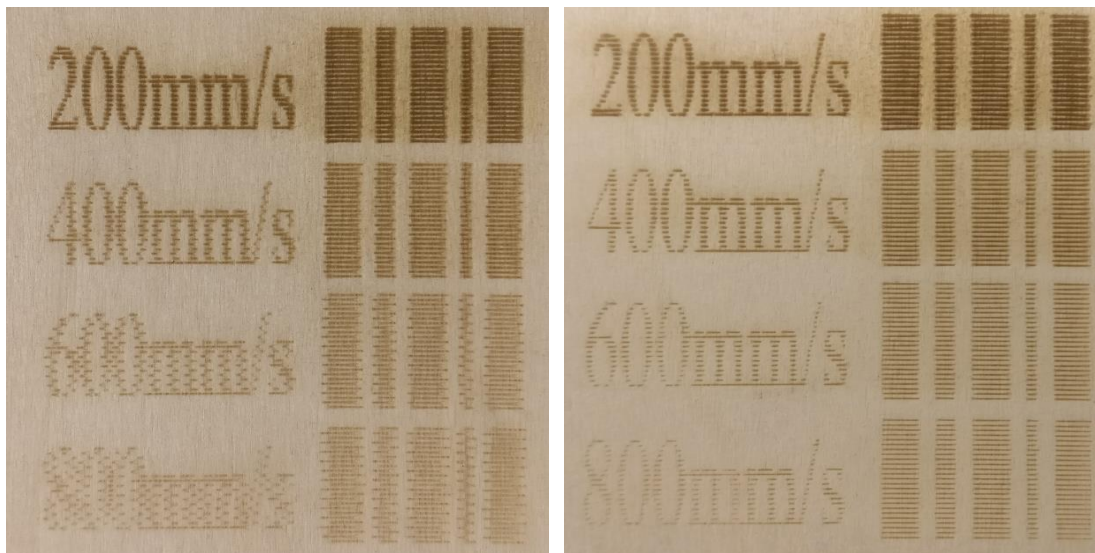
Look at the results with a magnifying glass and calibrate reverse interval until the lines will align horizontally, like below.

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The value is not enough

The value is too large
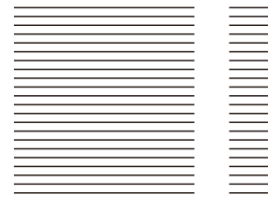
The value is perfect

Note: Each time you change the value of reverse interval, please send again the test file to your machine and test.

End

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3.13 Why does the cutting and engraving graphics reverse (mirror)?

This problem may cause from improper setting of the software.

Please start up the laser software RDWorksV8. And then click "Config" – "system setting" on the menu bar. This dialog box appears.
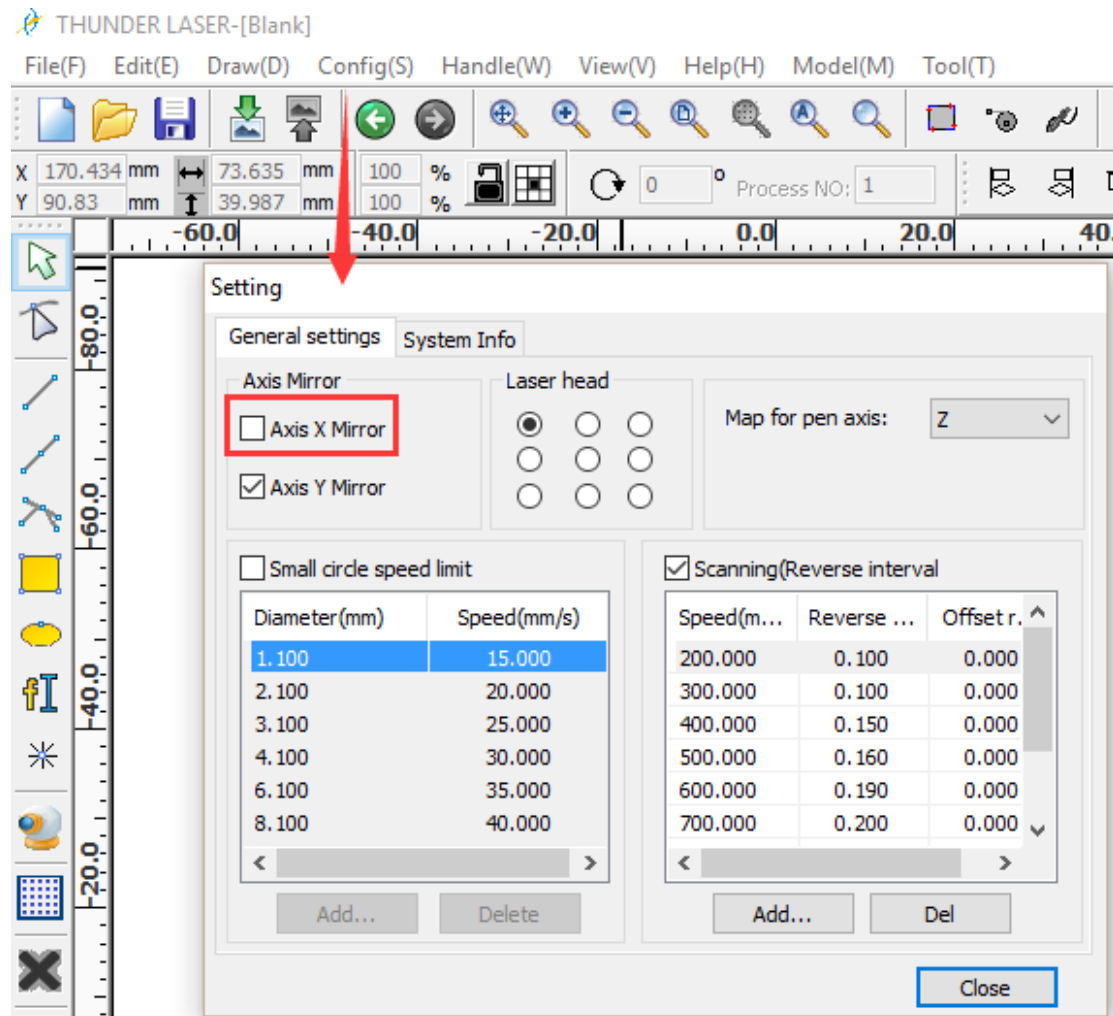
Make sure "Axis X mirror" is unticked, and "Axis Y Mirror" is must ticked.

If your setting is different from this, this is the problem why your cutting/engraving reverse. Just reset the config as above.

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3.14 Laser cutter has a wrong cutting/engraving size

If this problem occurs, generally the pulse setting of the X/Y axis motors is wrong.

Please follow the below steps to solve the problem

Please draw a 100x100mm square using the cut mode and send to your laser cutter and cut the square.
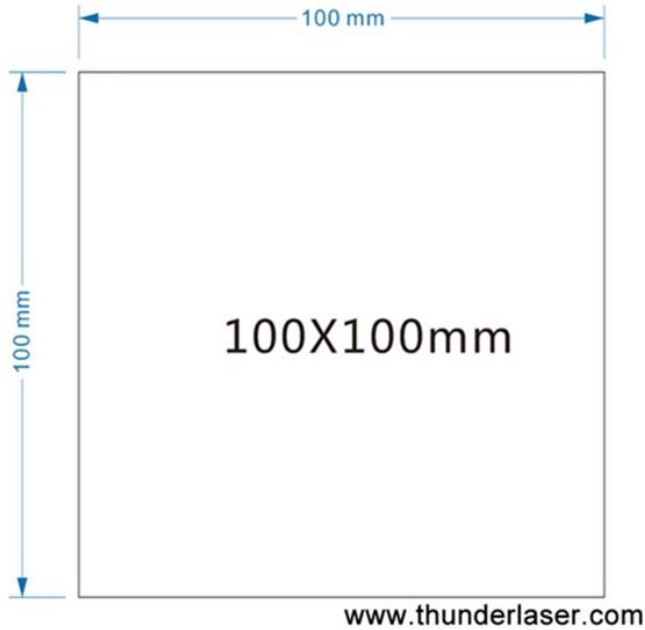
Let's say the actual size of the square measured is 98x95mm

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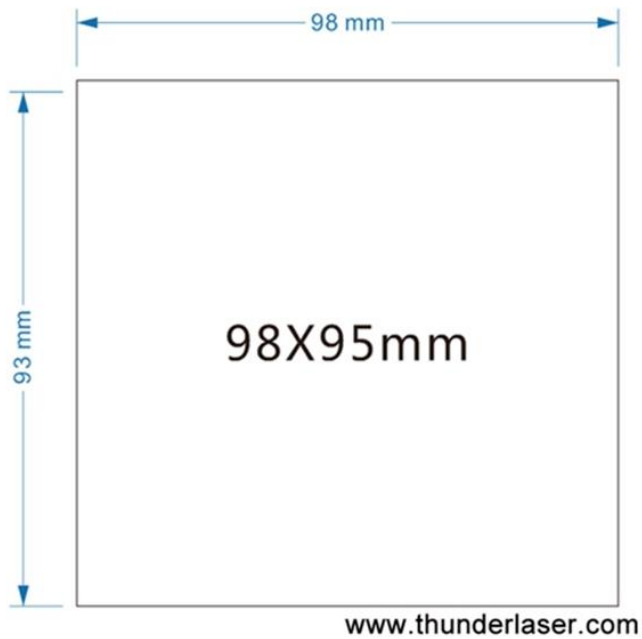
How to fix this problem?

Please follow the pictures below to find the "Vender settings "and then input the password.

Click "Read" first.Now select the X/Y axis and revise the step length,input the numbers as the

below, and the software will count the correct number automatically,then please click "Write "and

then exit.

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After "Reset" on display and draw a new 100×100mm square, if the size is correct, the problem is fixed. If not, please repeat the step 1-3.

If you have any other questions, please contact with us directly by sending email to us tech @thunderlaser.com

End.

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3.15 Laser cutter's LCD panel in Chinese

If your laser cutter's LCD panel is in Chinese, it might cost you lots of time to set to English. Now Thunder laser will show you how to change Chinese to English just in a few seconds.

Step 1. click "Z/U" button

Step 2. select "语言设置" and then press "Enter" to confirm

Step 3. select "英文" and press "Enter" to confirm

Now it's in English

End.

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Chapter4   Component Maintenance

4.1 How do i replace the controller board

Firstly, turn off the whole machine power.

Remove Old Part:

1.   Open the lower right hand door panel, find the main controller board, like below.

2.   Unplug all connectors on the controller board, then remove 4 screws located on each corner of the board.

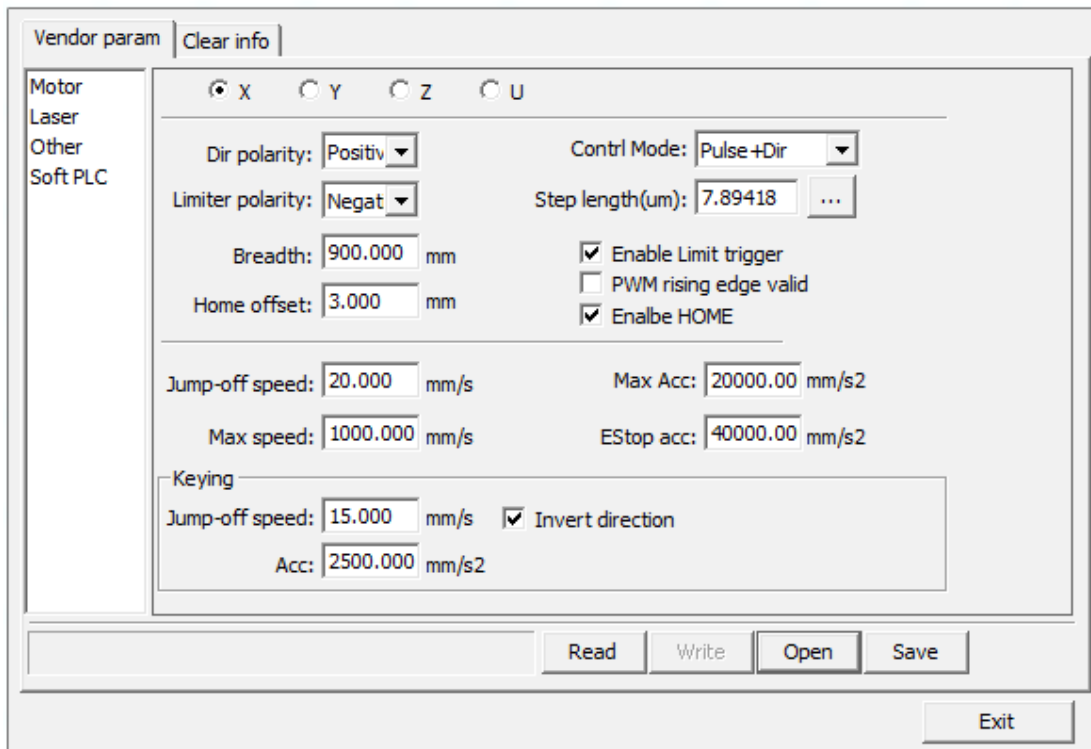## Install New Part:

1.   Screw 4 screws to fix the controller board and plug the connectors back to the board except AXIS Y and AXIS X, like below.

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Note: the laser head will find home(top left corner) during boot up, if the controller board have not been set as factory setting, the laser head will homing to other corner then cause the accident. So check the setting of the board before putting back the connector of Axis x and y.

2. Turn on the machine to provide power to the board, click ECS button to stop the resetting, then connect the computer and machine.

3. In software, please check the setting in vendor settings windows.
Open the vendor setting windows: menu bar(top left corner)>>File(F)>>vendor setting>>password:rd8888.

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Read the setting of the board by the "Read" button, the progress bar will become blue once read successfully, like below.
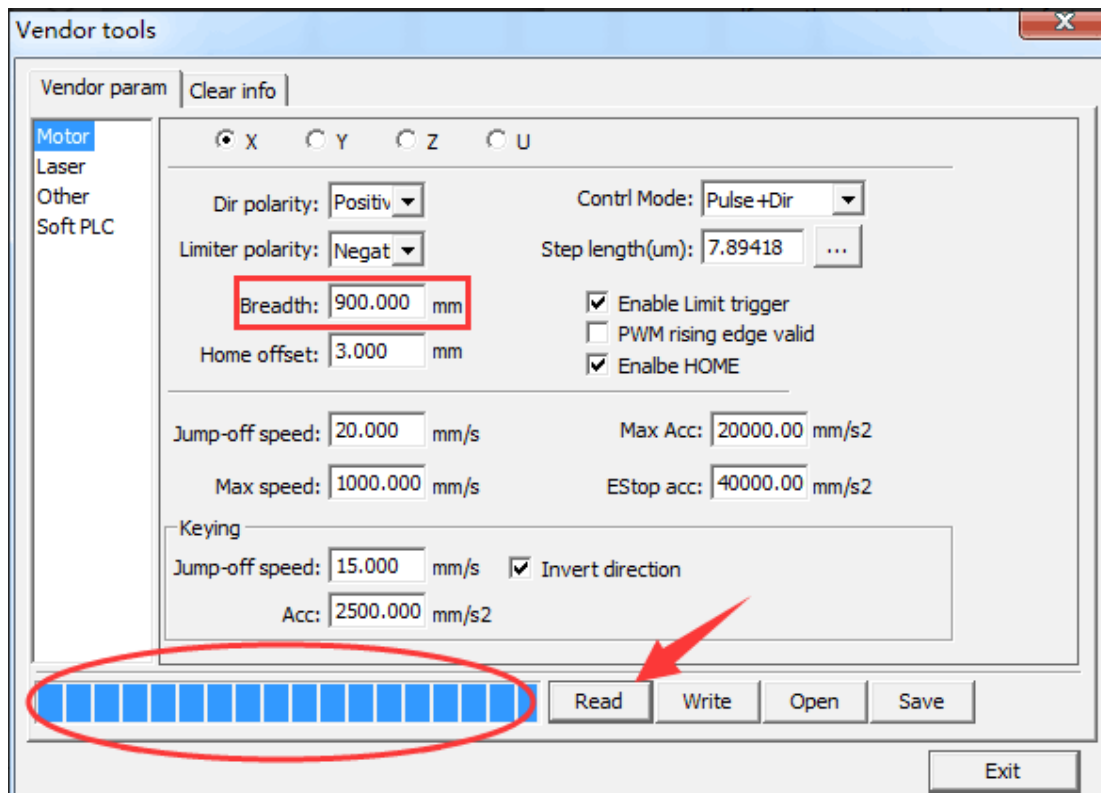
Check the breath of X, it should be 900mm for nova35 for instance.

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MARS60/NOVA24	X and Y:600*400mm
MARS90/NOVA35	X and Y:900*600mm
MARS130/NOVA51	X and Y:1300*900mm
MARS160/NOVA63	X and Y:1600*1000mm

If yes, the controller board is in factory setting, reboot the machine and done after putting back the connector of Axis x and y.

Note: if the breath is not correct, please contact with our tech team: tech@thunderlaser.com.

End.

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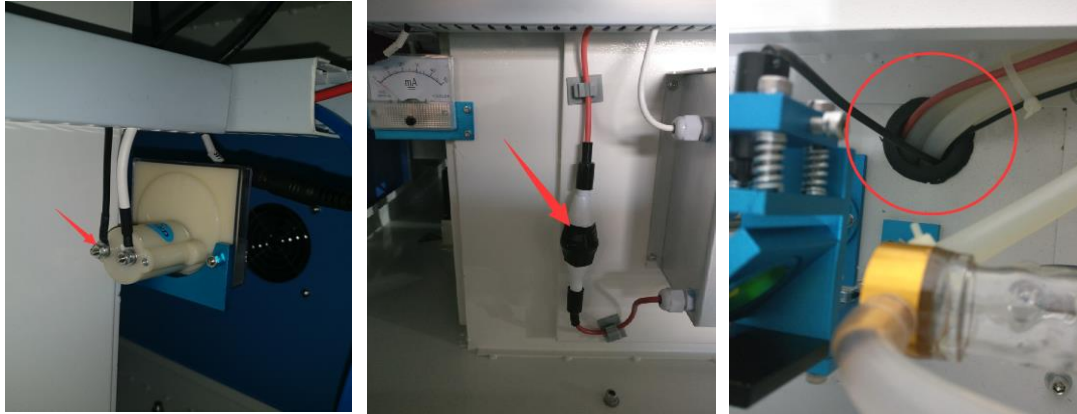Dongguan City, Guangdong Province, China

4.2 How to replace laser tube?

Firstly, turn off the whole machine power.

Disassembly procedure:

1. Unplug the wire between laser tube and laser power supply and take out from the hole, like below.

2.unfix the tube.

① Cut the white cable tie
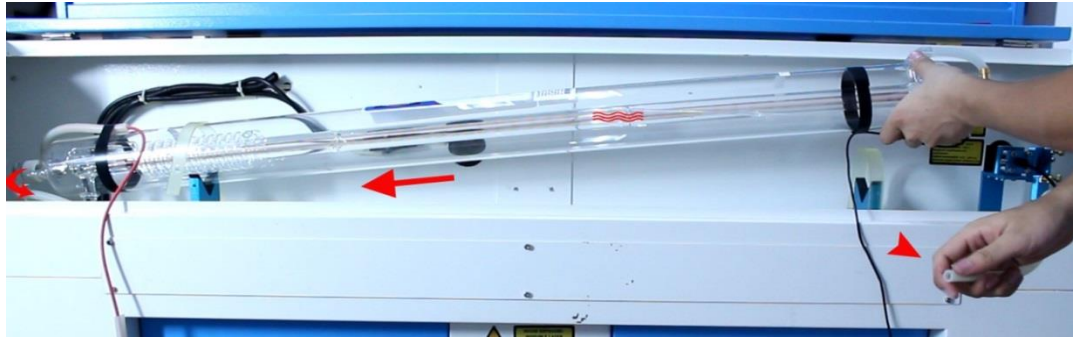
② Remove the screws
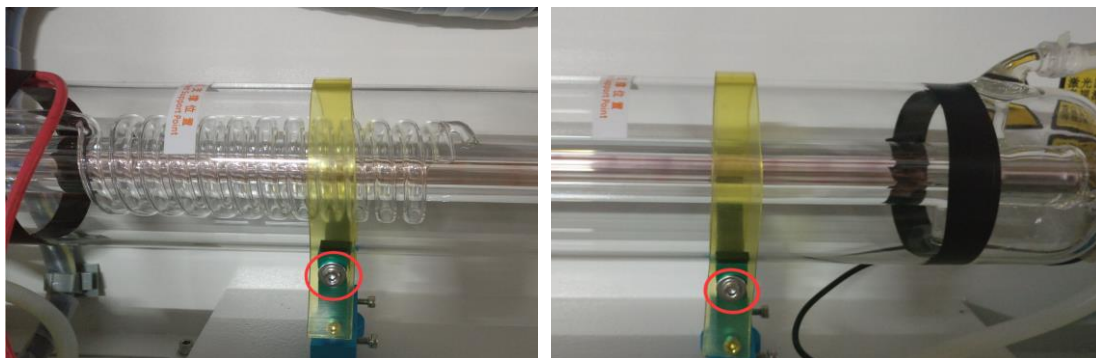
3.drain the water away from the tube.

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Reassembly:

In order to ensure laser path correct, location of new tube should be the same with the old one.

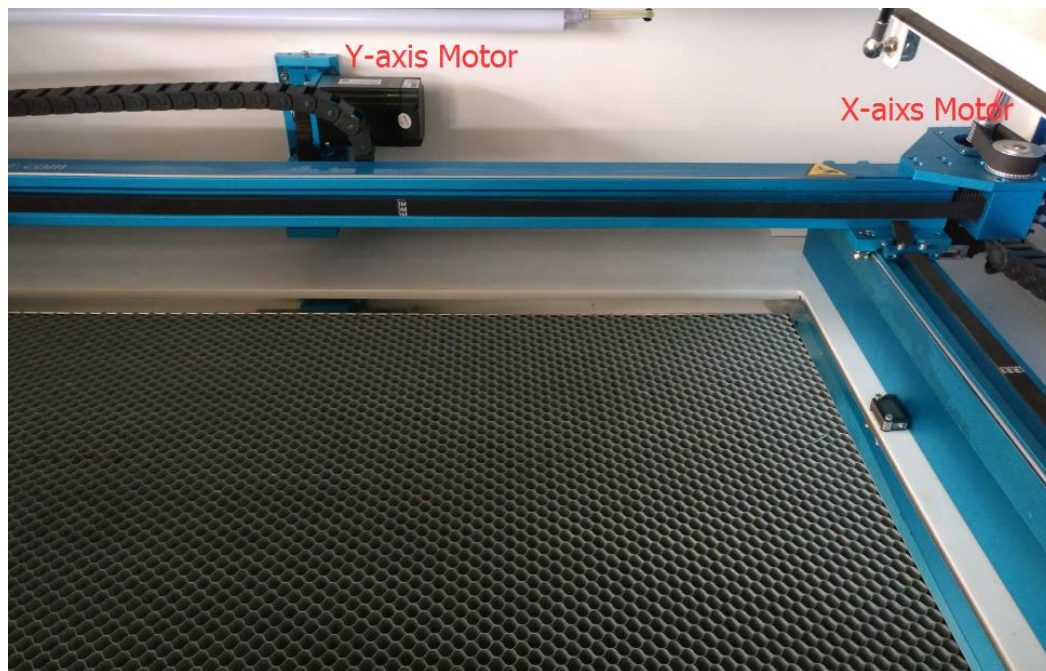Then fix the tube and wire.

More details, please following below instruction video:

http://www.thunderlaser.com/how-to-use-your-laser-machine/install-new-laser-tube.html

End

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4.3 How to adjust and replace the motor?

Firstly, disconnect the machine from its power source.
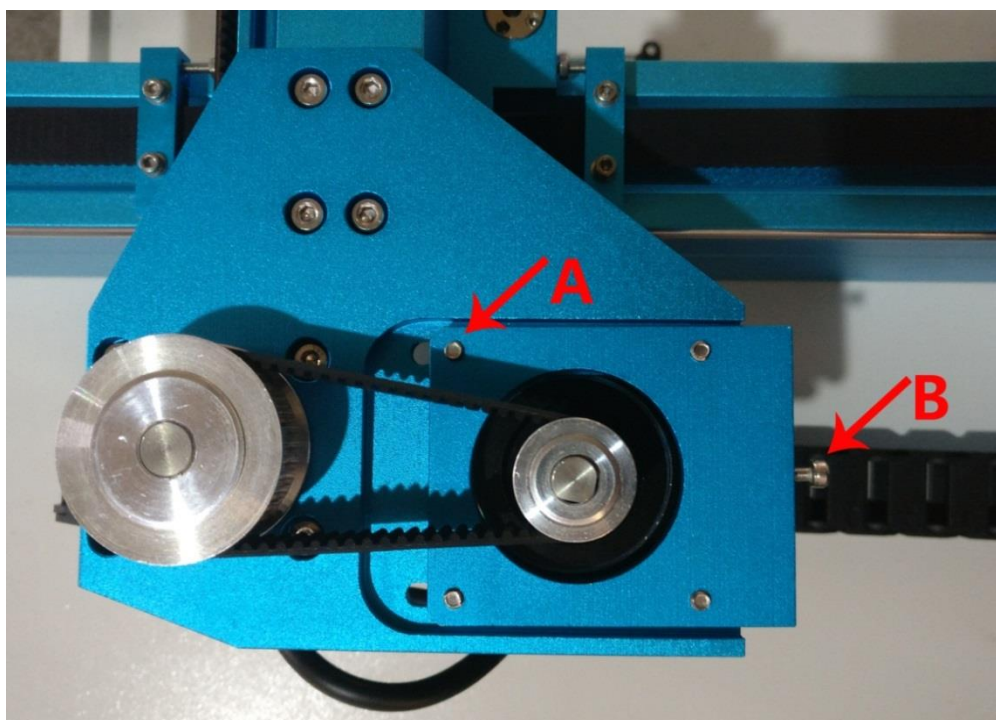
① X-axis Motor

Screw A: There are four screws A, for fixing the X motor;
Screw B: It's for adjusting the belt tension, please loosen the four screws A before adjust belt.

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Click the link below for instructions video:
- X motor disassembly

https://youtu.be/drrXKYfg4ro

- X motor reassembly

https://www.youtube.com/watch?v=9UWcSd79UJk

② Y-axis Motor
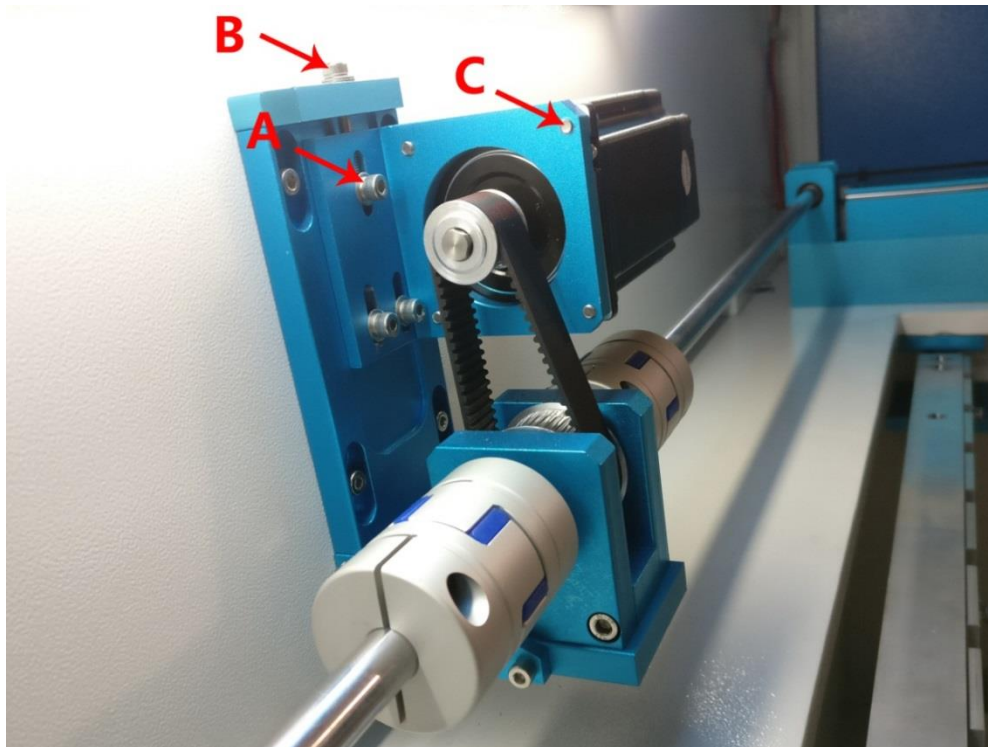
Screw A: There are three screws A.

Screw B: It's for adjusting the belt tension, please loosen the three screws A before adjust belt.

Screw C: There are four screws C, for fixing the Y Motor.

Click the link below for instruction video:
- Y motor disassembly

https://www.youtube.com/watch?v=JlKVgI0A5vY

- Y motor reassembly
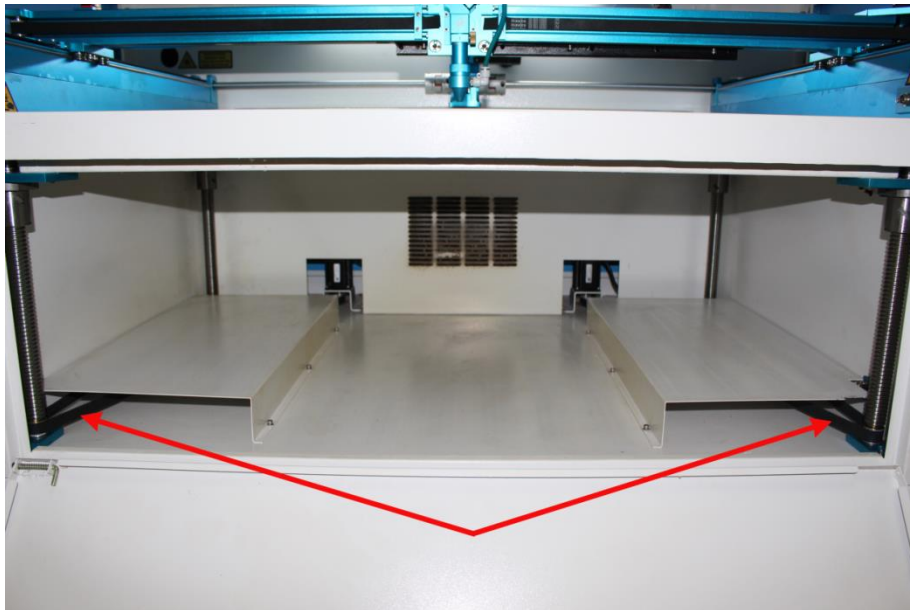
https://www.youtube.com/watch?v=_sYk1SYU5xI

End

## 4.4 How to calibrate the working table to level.

There are three cases.

1. Two sides of the working table are not of the same height.
Turn off the whole machine power, manually pull one of the belts of Z axis so as to adjust the up and down of the working table height of this side and calibrate the level in this way. Shown as below:

2.   If it's one of the four corners that is of different height from the other three corners, use method 2.
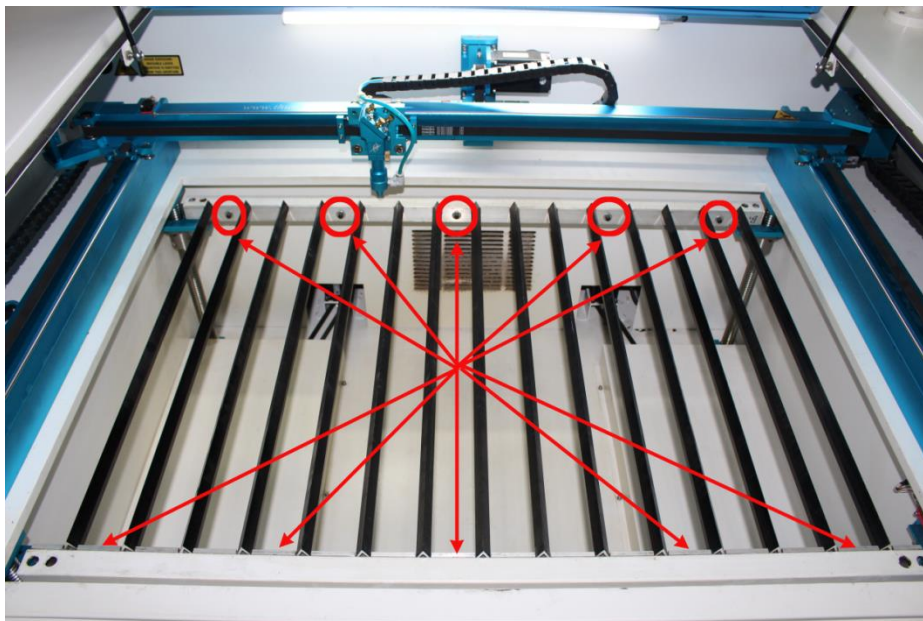
As shown above, by adjusting these screws you can fine adjusting the support frame of the knife table so as to calibrate height of one corner.

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3. If neither of above two methods can solve the problem, please use method 3. But it's much more difficult. Please handle it carefully.
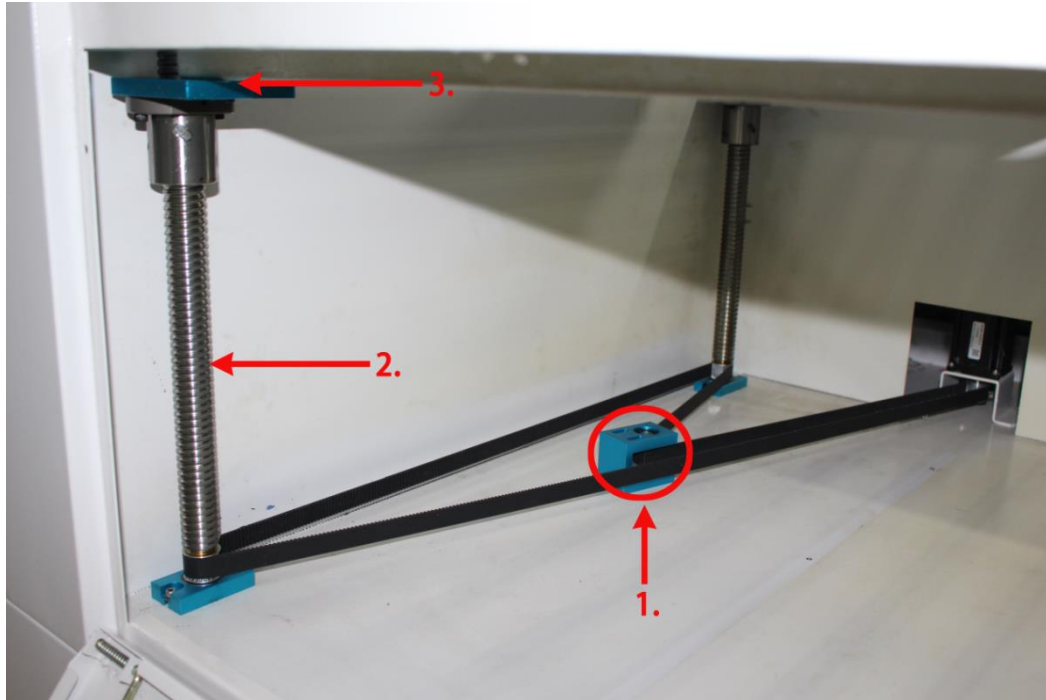
1. Loosen the screws of the fixed module. The belt will be loose accordingly.

2. Rotate the lead screws to calibrate the table height of this corner. (PS: rotate it clockwise, table in this corner will go up; turn it anticlockwise, table will go down)

3. Working table of this corner will go up or down when you rotate the lead screw in different directions.

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4.5　How to Replace the rollers and adjust the X Axis Shaft?

1.Please check before adjustment

①Hold and shake it to check if it becomes loose.(Can't be wobble obviously)
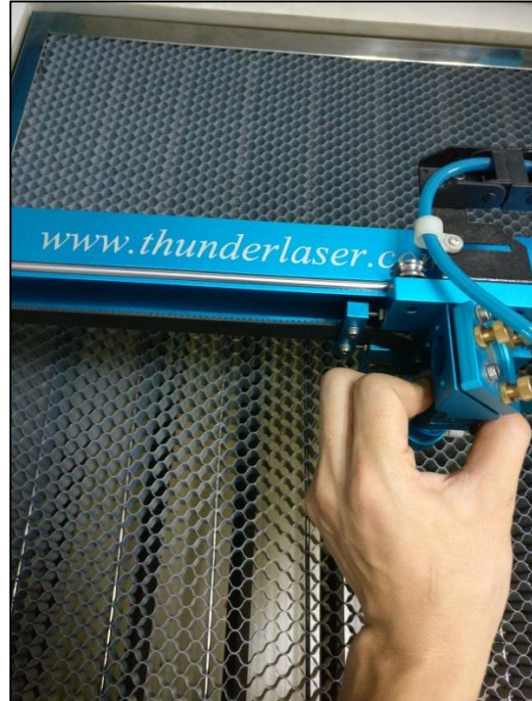
②In the back of X Axis Shaft have four rollers,both of them should locate on the rail.(can move smoothly)

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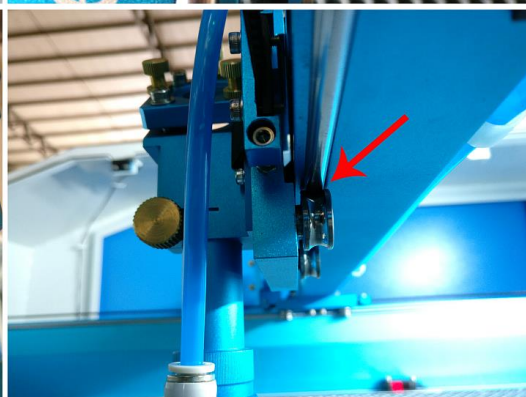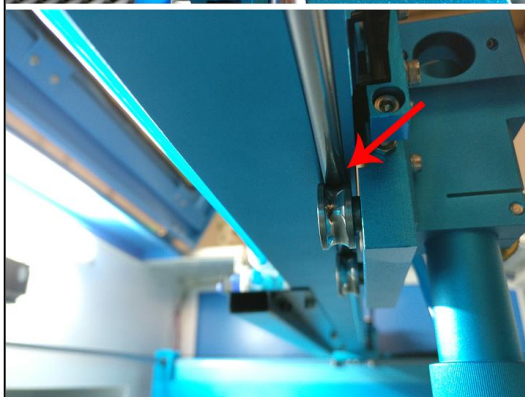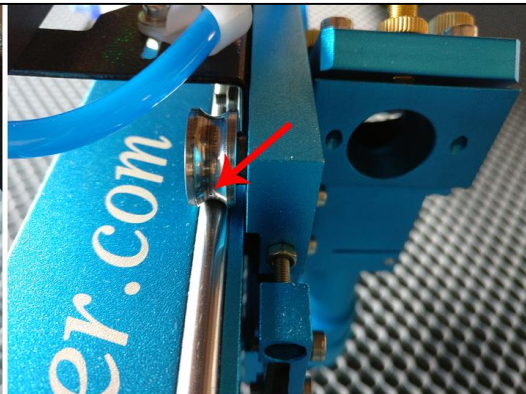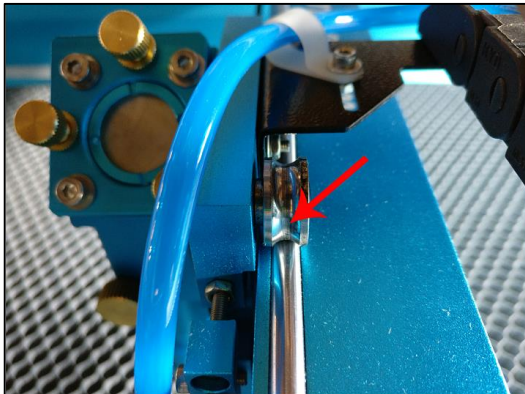
2. Introduction of the X Axis Shaft

① The X Axis Shaft

② Eccentric gears, which was for adjusting the tension of X Axis Shaft

③ Rollers

The tools you needed as follow：（M2/M3 Allen Wrench and Crimp Tool inside the tool box）
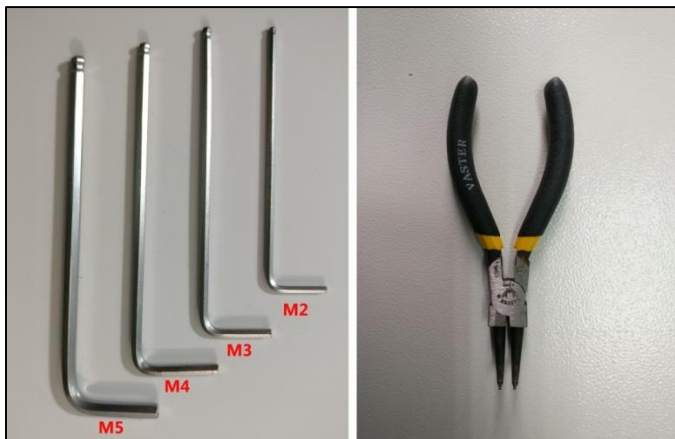
3. Adjustment of the X Axis Shaft

①Make sure the all screws of the four Rollers are tight enough.

However, the X Axis shaft is loosen.

②Adjust the two Eccentric gears as follow：

First , Hold the screws back of the Eccentric gears;
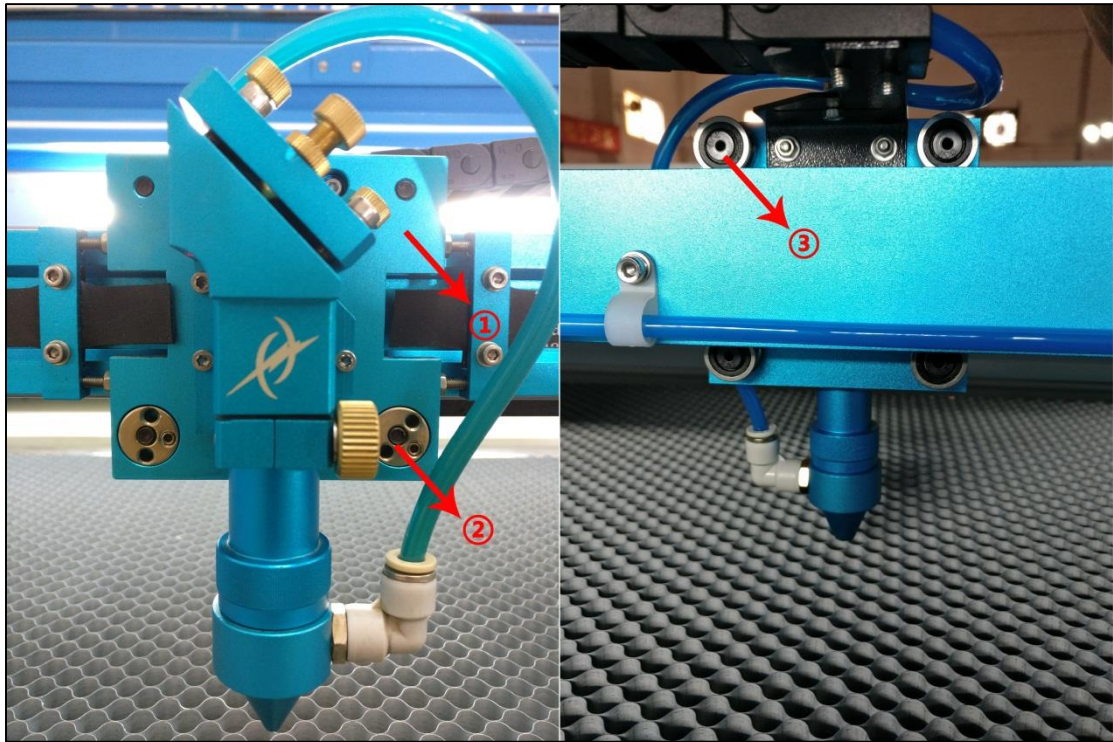
Next, loose the A screws ;

Then, Rotate B by Crimp Tool to tighten the X Axis Shaft.

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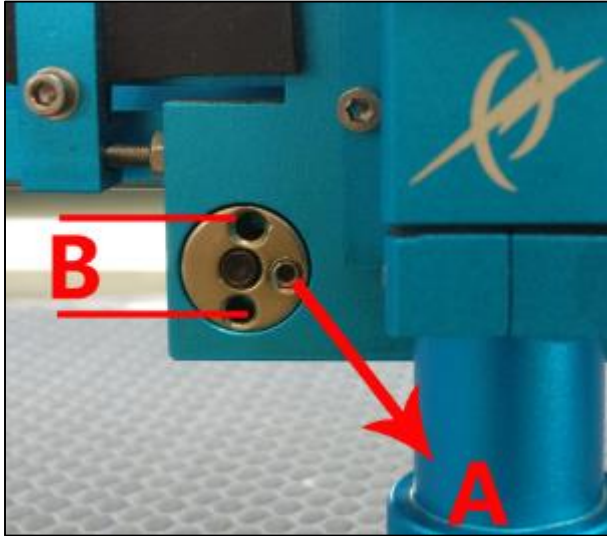
Make sure all the Rollers are at the same tension

③repeat step 1 to check again.

End

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4.6 How to adjust the verticality between the X and Y Axis？

There are two solutions：
1. **Unfix the X Axis.**

Turn off the whole machine power. There are four screws for each side，loosen them then you can fine tuning the angle of the X Axis. Shown as bellow.
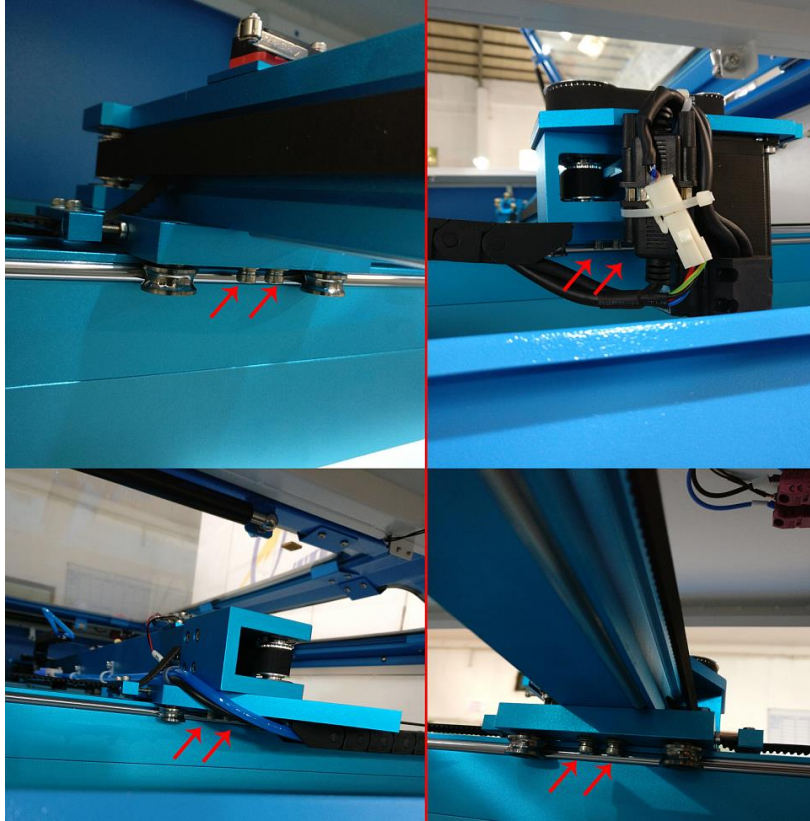
Diagonal line 1 = Diagonal line 2.

Error value must be less than 0.5mm like below:

① If the Diagonal line 1 > Diagonal line 2.

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Please adjust as follow:
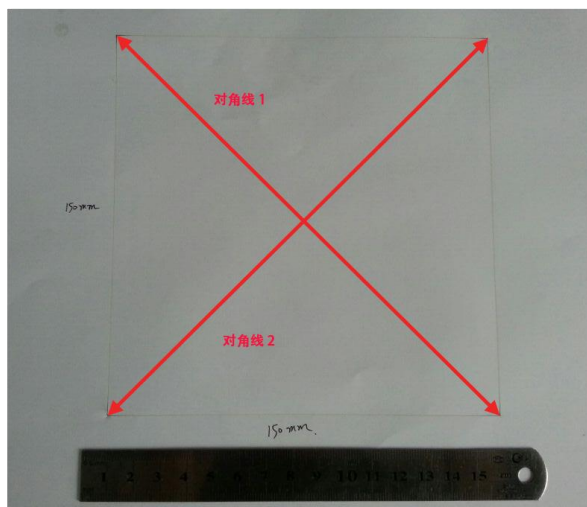
② If the Diagonal line 1 < Diagonal line 2.

Please adjust as follow:
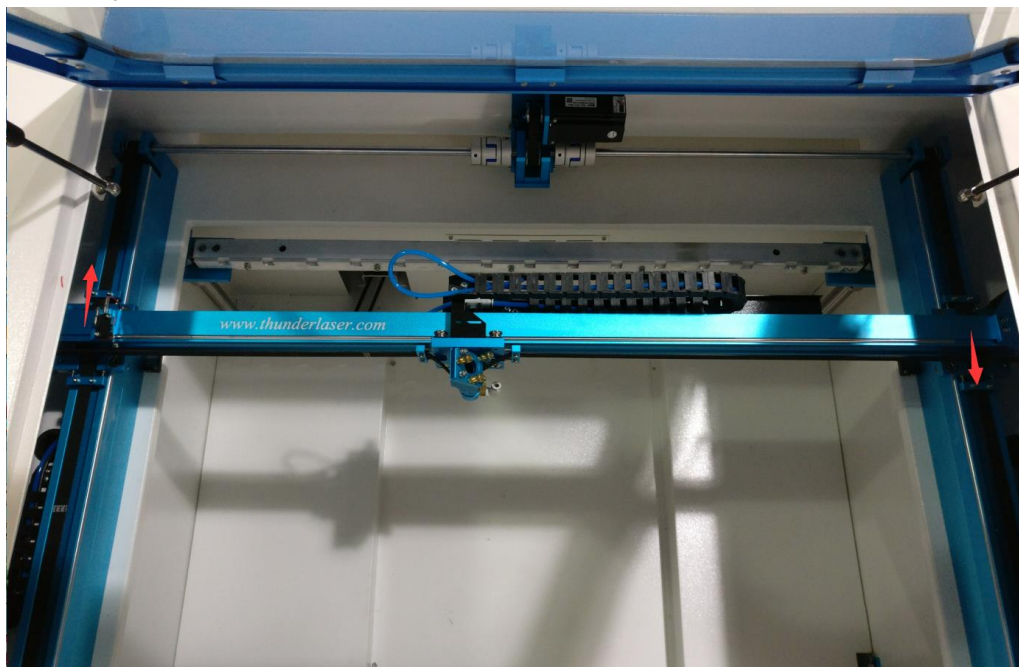
Above are just fine tuning the angle of the X Axis, if the error still more than 0.5mm, please further to the solution 2.

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2. Unfix the X Axis and coupler

Unfix the X Axis then loose one of the coupler ensure each sides can move separately.
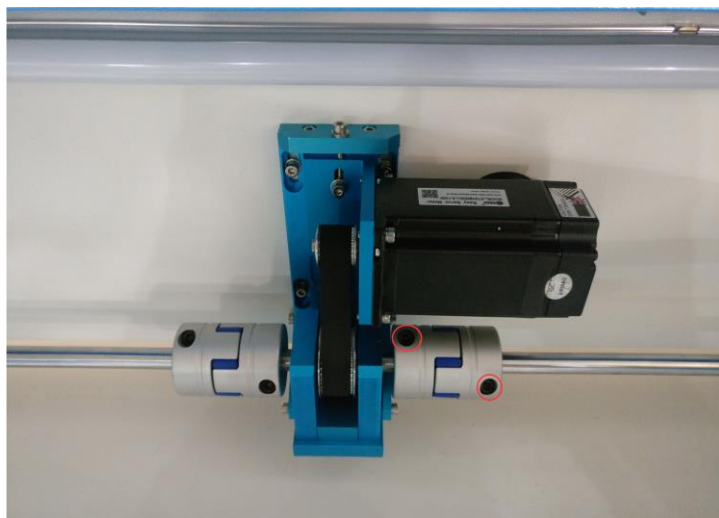
Measure by ruler, make sure they are the same distance as follow:
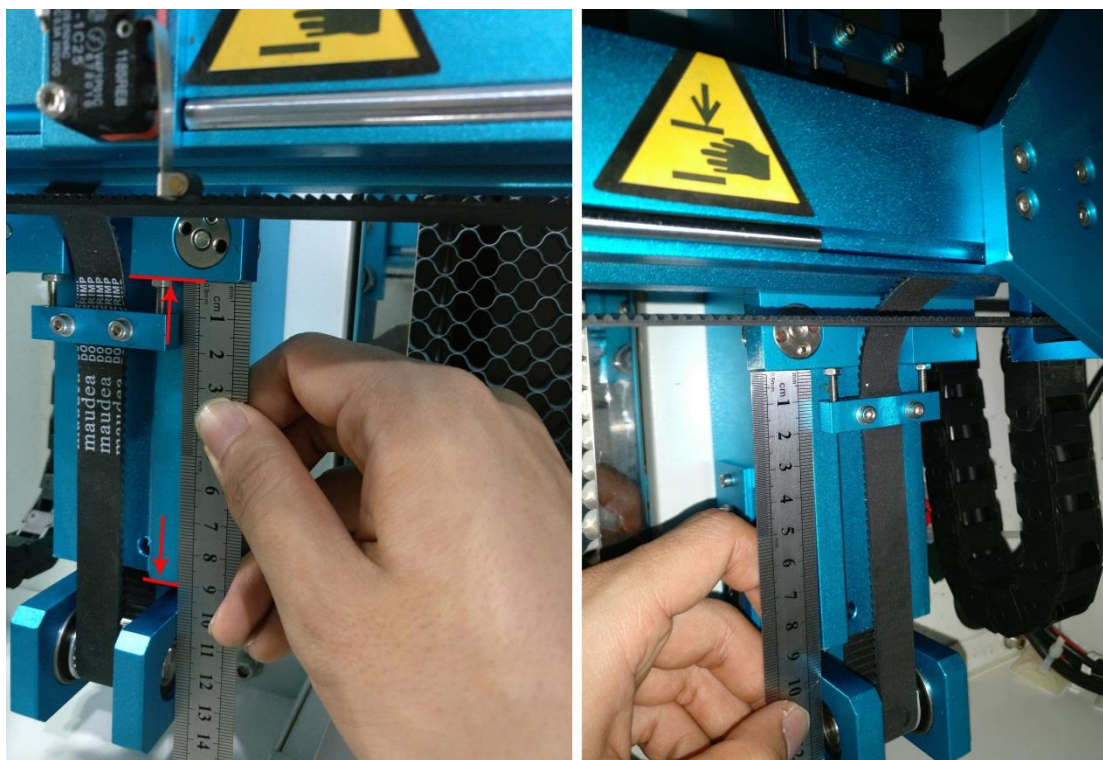
Then tighten the screws for each side of X Axis firstly, please do it carefully by tighten slowly to ensure the angle of X Axis doesn't change. After fix them then measure the distance again, ok, then fix the rest of the screws. It's ok if the error within 0.5mm. finally, fasten the screws of the coupler.

End

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4.7 How do I replace the drive shaft module?

Firstly, disconnect the machine from its power source

Disassembly procedure:
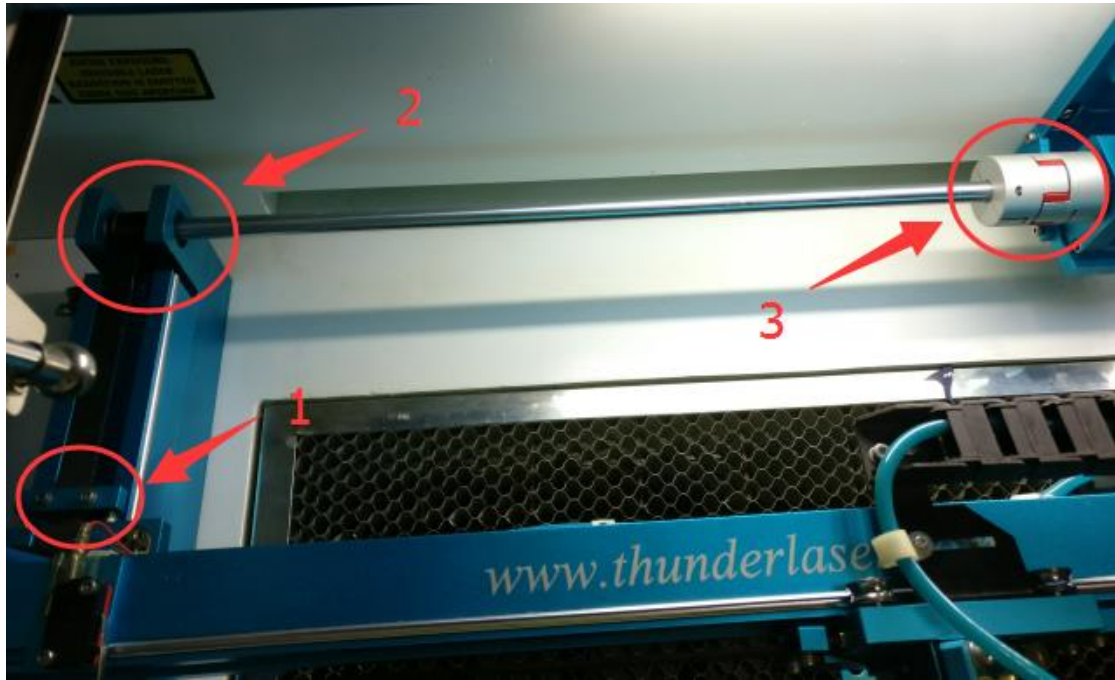
Prepare M3/M4/M5 Allen Wrench

Tips：Loosen in anticlockwise, tighten in clockwise.

1. Loosen two upper screws on the buckle then take out the belt;

2. Unscrew and remove four screws from the blue base;

3. Unfix two screws on coupling

After that, please remove this drive shaft, like below.

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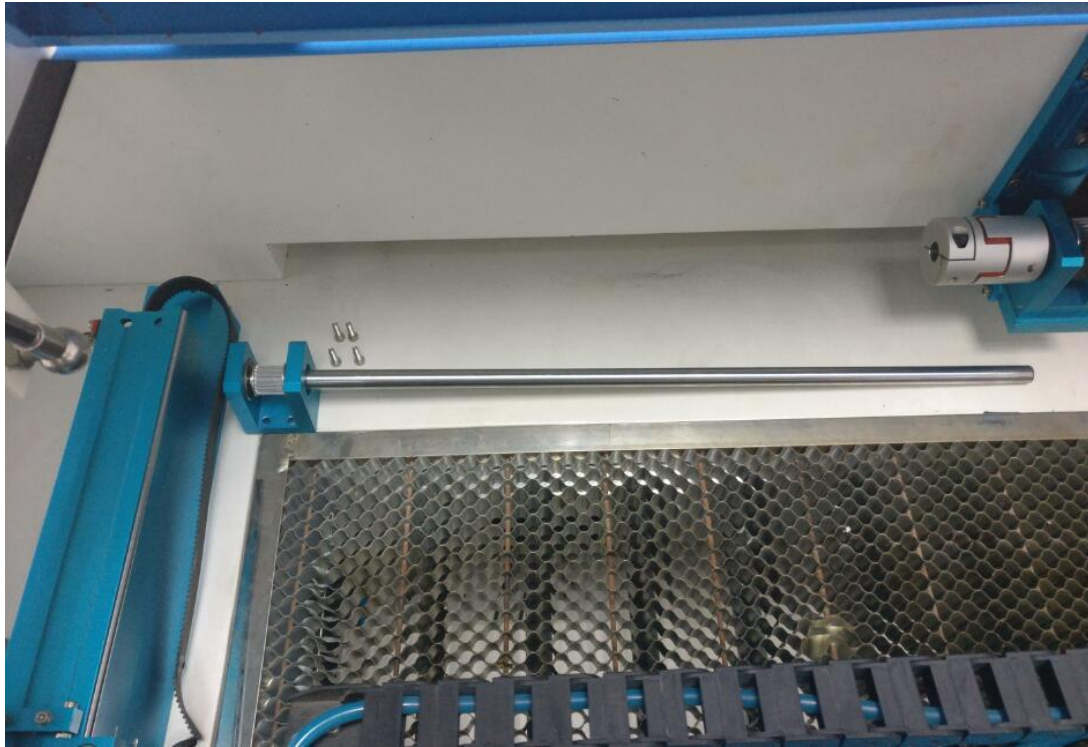
Reassembly procedure:

Tips: put four screws and the belt into the blue base firstly, like below.

1. Insert the shaft into coupling then fix the blue base with four screws;

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2. Slide the coupling to proper position as the right sides shown, then fix it.
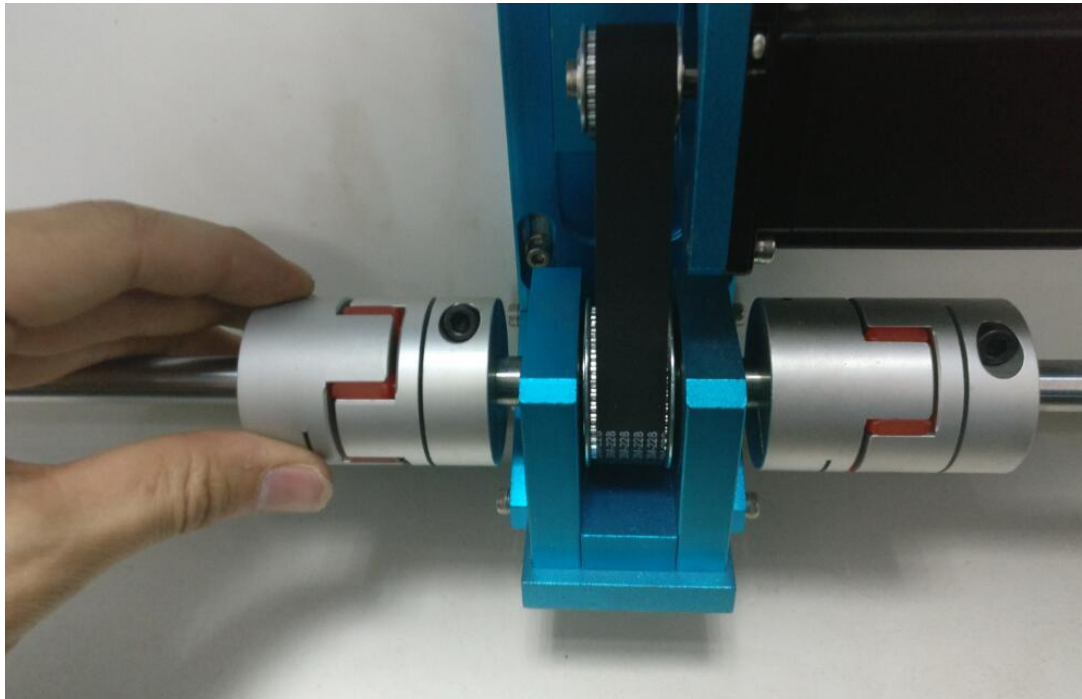
3. fix the belt, like below.
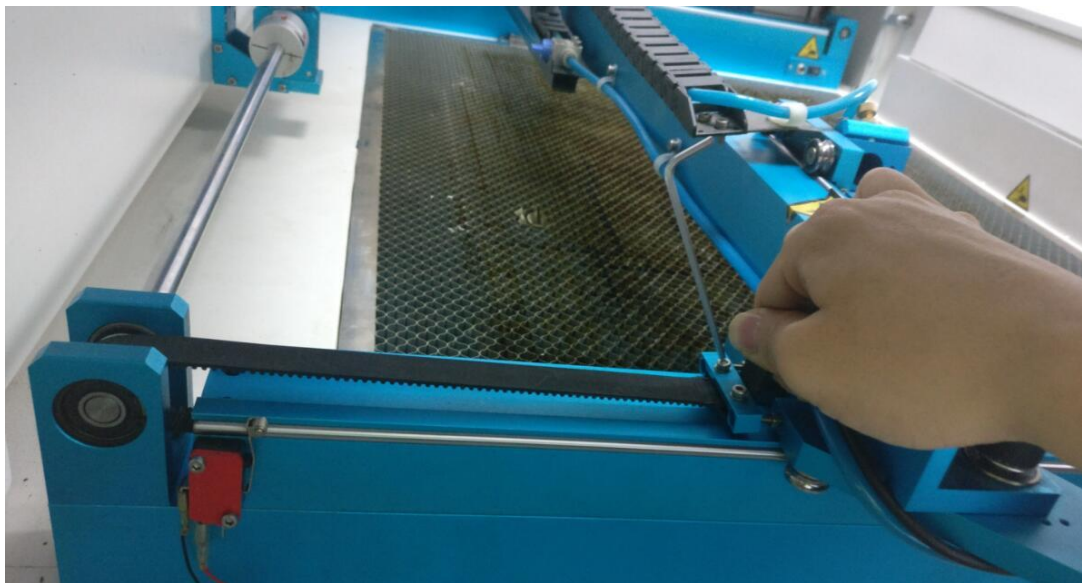
After that, check and adjust the tension of belt, just refer to the belt of right sides.

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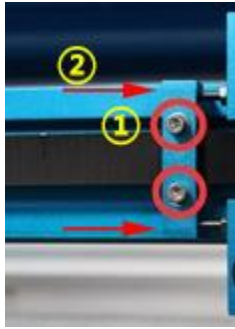
①Fix the belt

②Adjust the tension of belt

Please note: please don't forget to fix the nuts after adjusting belt.

End.

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4.8 External accessory problem

4.8.1   Exhaust fan cannot extract smoke or dust；

Here are the reasons:

● **Exhaust fan break down**

How to check if exhaust fan break down, there's a common way to connect it to the power directly using the power cable of chiller, then check if exhaust fan can be turn on normally.
See below.

● **Connect the fan inlet and outlet in opposite directions**

● **Exhaust channel are blocked**

End

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### 4.8.2 Air pump won't work or no air assist when job starts

Here are the reasons:

● **Air compressor break down;**

How to check if air compressor break down, there's a common way to connect it to the power directly using the power cable of chiller, then check if air compressor can be turn on normally. See below.

● **Wrong setting**

The air assist can be controlled by the layer parameter of software, please make sure you have "If Blowing" selected to YES, like below
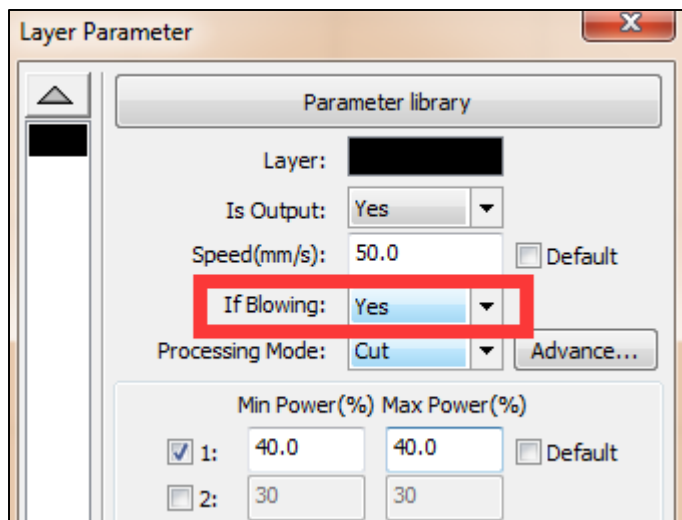
Note: If the Processing Mode is Cut, "If Blowing: Yes" must not be changed.

● **The air valve is close**

Make sure have the manual air valve opened（horizontal means open）, like below.

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http://www.thunderlaser.com/how-to-use-your-laser-machine/how-to-use-the-air-valve.html

End

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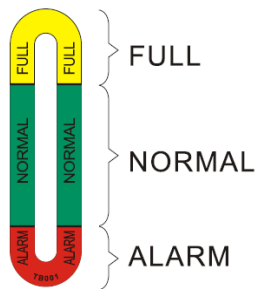
4.8.3   Chiller alarms unusually；

Chiller lcd panel is showing normal, but the red light on and buzzer beeping.
Here are the reasons:

● **Water is not enough**
Please check the water level of chiller, like below:

Keep the water level in the green area

● **Water circulation pipes are blocked or water pump break down**
Please connect a water hose between water inlet and outlet on chiller to check the water circulation, like below.

Does alarm stop？
If alarm stops, so maybe the water hose in the laser machine was blocked somewhere, please

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check like below.

If alarm continues, check if the water circulation is normal from the water hose between water inlet and outlet on chiller (Abnormal condition—intermittent water circulation or without water circulation).

● **Water flow switch break down**
Water circulation is normal, but chiller still alarms.
Please open the cover of the chiller to check the water flow switch.

Cut off the four wires, then connect red and red wire, connect black and yellow wire without water flow switch, then check if the alarm will stop after restart the chiller.
If stop, the switch broke down.

End

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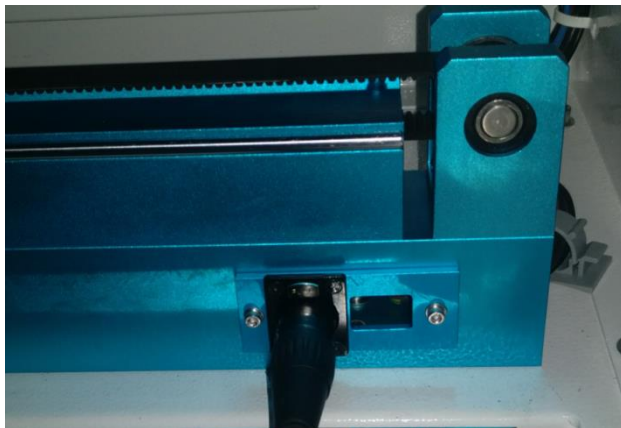Dongguan City, Guangdong Province, China

4.8.4 Rotary axis attachment has a wrong cylindrical engraving/cutting size

Here are the reason:

● **Different type of Rotary connector on the machine;**

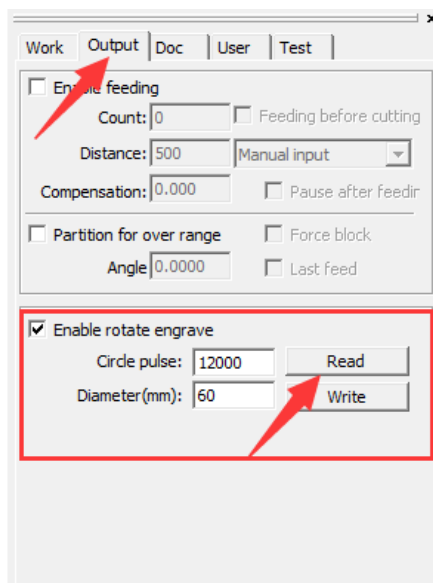Check the Rotary connector on your machine,the connector is located inside the right front of the machine.
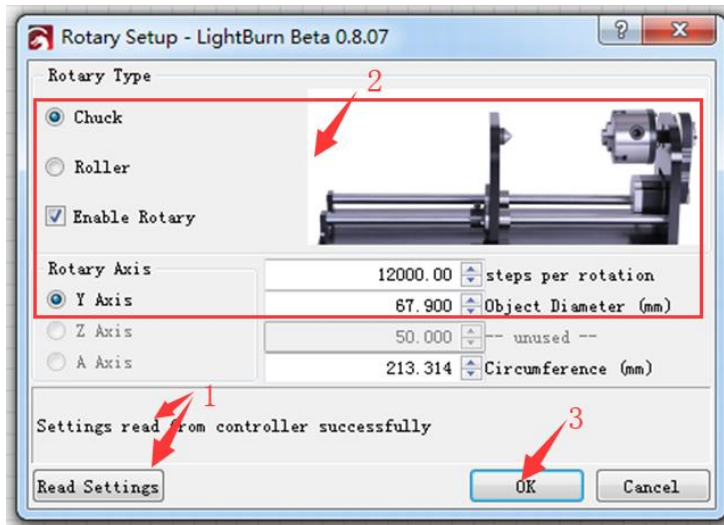
1. 7-pin connector on the machine, like below.

For this type connector, rotary axis is controlled by U axis.

In RDworks, the setting of "Enable rotate engrave" need read and write button that can save the setting into U axis, like below.

Read>>tick "Enable rotate engrave">>set "Circle pulse" and "Diameter">>Write

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In Lightburn, Read settings(successfully)>>tick "Chunk","Enable Rotary" and "Y Axis">>set "steps per rotation" and "Object Diameter">>OK, like below.

PS: The setting need to be saved into controller, so please connect your pc and laser machine.
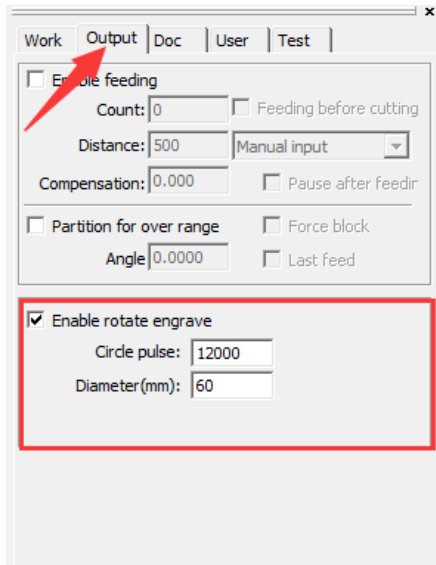
2. 5-pin connector on the machine,like below.

For this type connector,rotary axis is controlled by Y axis after turn on the rotary switch.

In RDworks, there must be no read and write button on the setting of "Enable rotate engrave".

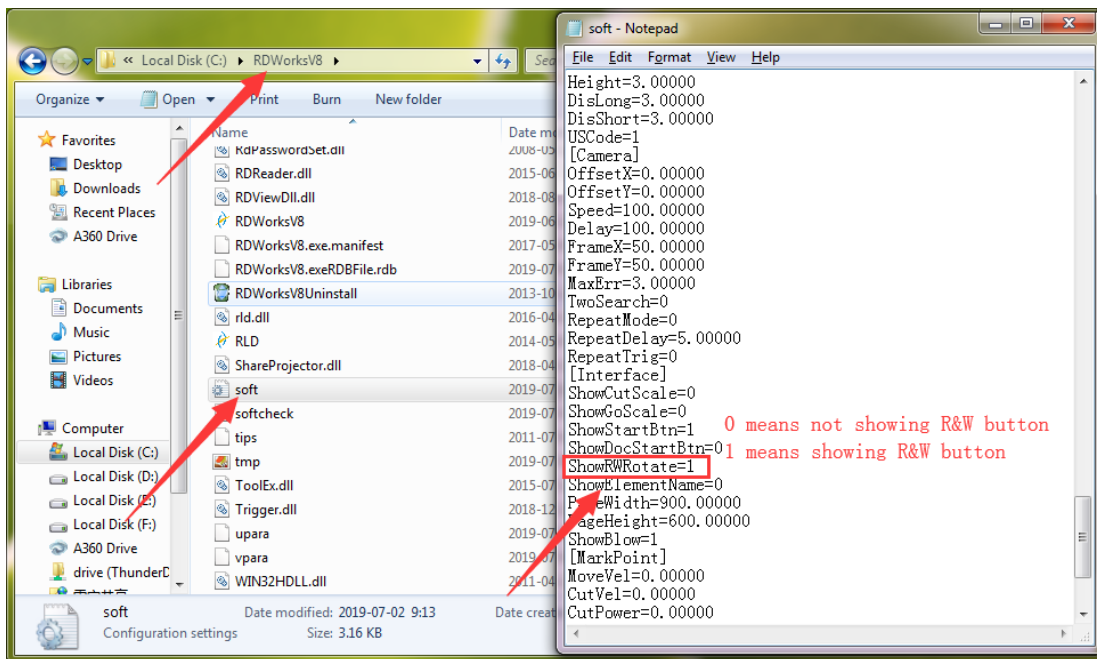Tick "Enable rotate engrave">>set "Circle pulse" and "Diameter"

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PS:The machine with 5 pin type rotary connector is not work with the software Lightburn.

Tip: how to enable and disable the Read and write button on "Enable rotate engrave" of RDworks?
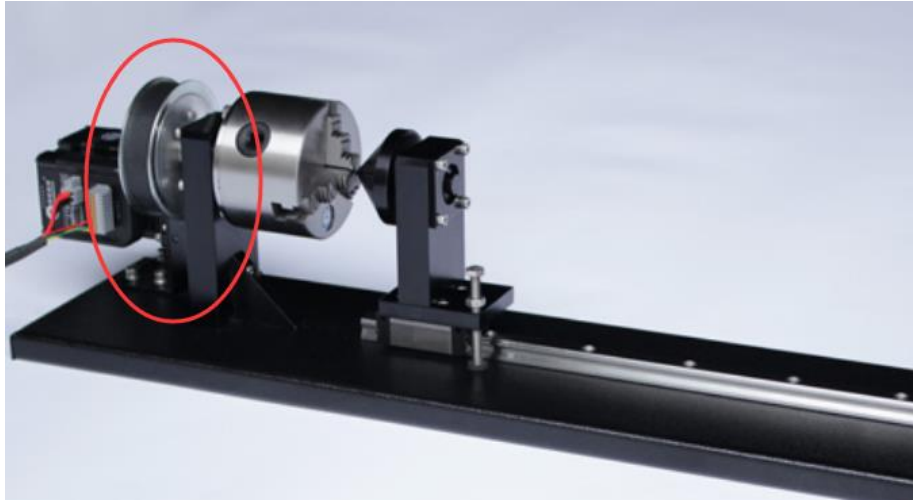
Go into the RDworks's root directory>>open the text file of "soft">>change the setting of "ShowRWRotate" >> save the text file, like below.

● **The value for Circle pulse or steps per rotation**

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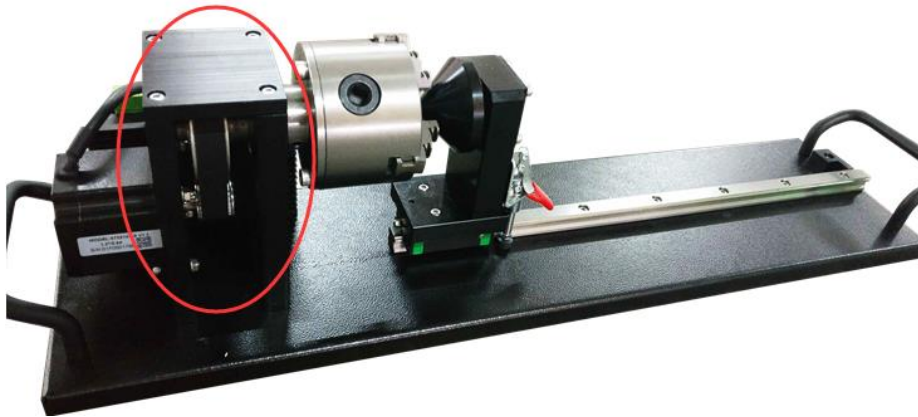Dongguan City, Guangdong Province, China

Check the gear ratio on your rotary attachment.

1. Gear ratio 4:1 structure, like below.

The Circle pulse or steps per rotation should be set as 16000.
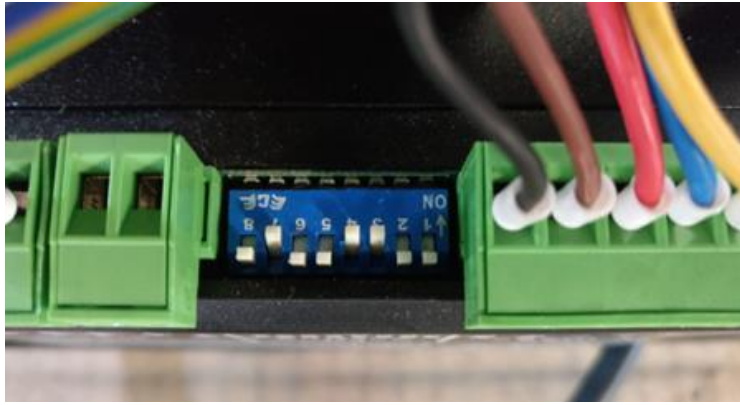
2. Gear ratio 3:1 structure, like below.

The Circle pulse or steps per rotation should be set as 12000.

● **Wrong setting on Rotary attachment**

Please check Your Rotary attachment

1. The setting for separated motor and driver, like below.

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2.   The setting for Integrated motor, like below.

End.

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