



Laser Tools & Technics Corp.

User Manual

Version 1.0 e

ILS-3V Series

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D022000100

Introduction

Technical Support

Thank you for purchasing the ILS-3V series. This product is warranted to be free of manufacturing defects for one year from the date of purchase. If you cannot find the solution to your particular application, or/if for any reason you need additional technical assistance. Our technical support group is glad to work with you in answering your questions, please use the ways as following:

Tel: +886-3-5727772 (Mon.-Fri., 8:30- 18:00, Taiwan)

Fax: +886-3-5728898

Email: service@littcorp.com

Web: www.littcorp.com

Address: No. 121, Lane 99, Pu-Ding Road, Hsin Chu City, Taiwan, R.O.C.

Disclaimer

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Special Symbols



Failure to follow instructions may lead to product damage, or error.



Failure to follow instructions may lead to injury by electric shock.



Failure to follow instructions may lead to injury by invisible radiation.

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Chapter 1 Safety

1.1 Safety Regulation



The ILS-3V series uses a CO₂ Laser as a light source. It is classified as a class-IIIR product by **CDRH (the Center for Devices and Radiological Health)**.



Wavelength: 10.6μm

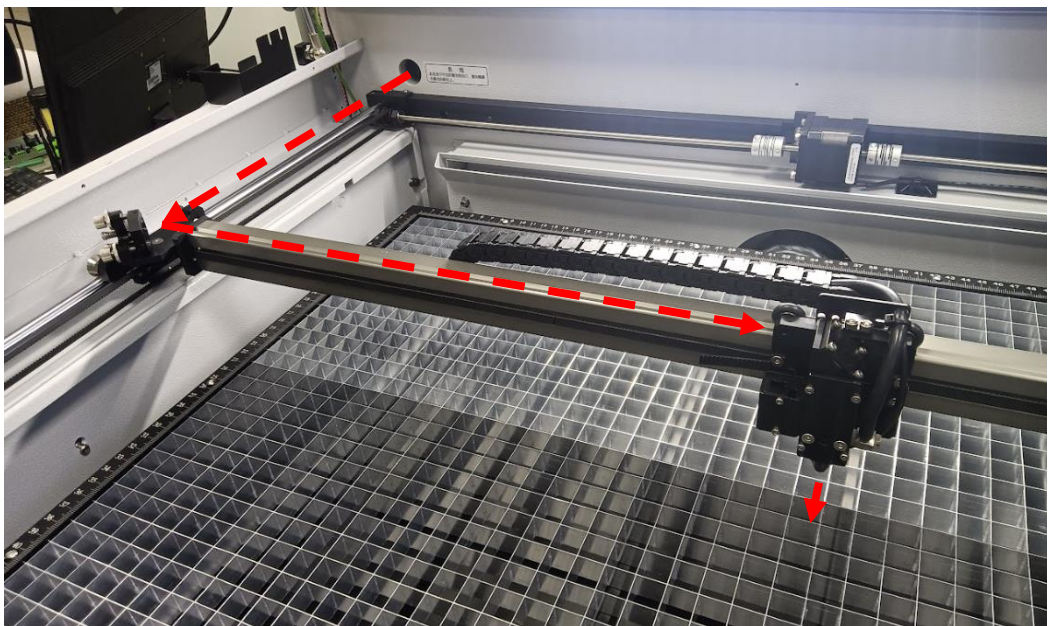
Maximum output power : 30 W~100W

Visibility: Invisible



When operating the ILS-3V series, be sure to always comply with the safety regulations as following:

- Do not attempt to modify or disassemble any component of the machine without LTT technical support.
- Do not open the doors of chassis and access the laser tube or electronic components, especially while the machine power is on.
- Connect the machine to a grounded outlet. Verify that the voltage of the outlet is correct for the machine.
- Do not disable the interlocks which are on the acrylic lid.
- Be careful about the path of the invisible laser beam shown in figure. Otherwise, eye or skin injury may result.

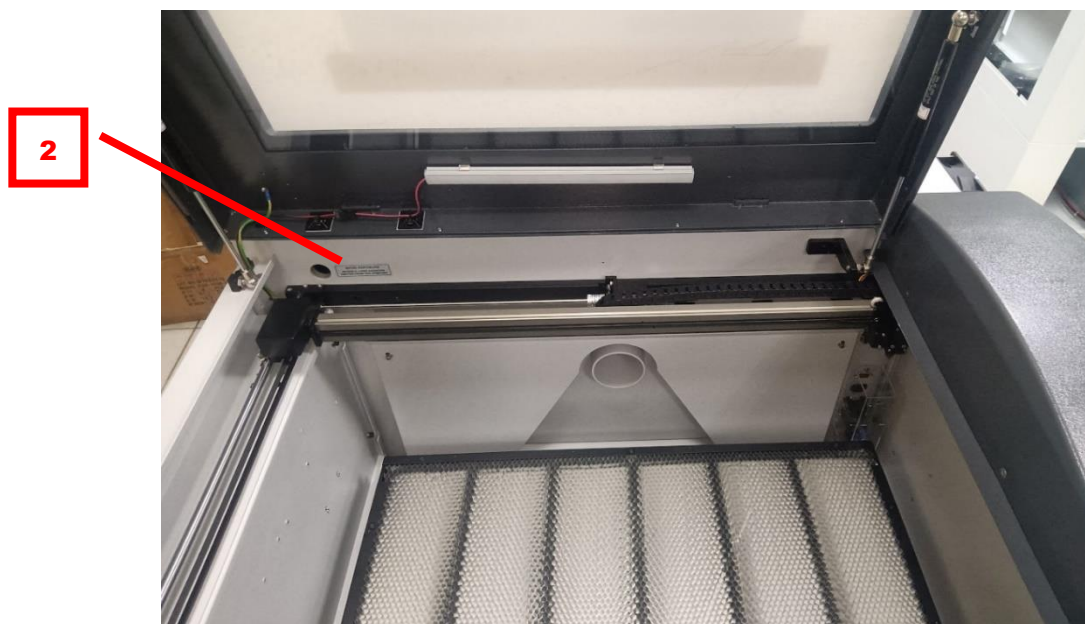


Chapter 1 Safety

- Do not watch the laser beam directly during operation. Bright light caused by the lasing process can damage the eyes.
- The sides and front doors are fixed by screws for safety. If you open these doors, the ILS-3V will become a Class 4 laser device. For your safety, please wear protective goggles.
- The laser beam may cause fire during processing. Never leave machine alone without operator watching during the laser cutting and engraving process. Always keep a fire extinguisher near the machine.
- Blowing materials with air flow from nozzle while cutting or engraving can avoid fire occurring and obtain good quality also.
- Verify that materials used in the engraver are proper for lasing. Never engrave or cut substrates that contain **PVC** or **Teflon**.
- Good efficiency of exhaust system makes you avoid breathing dust, debris or poison gas.
- Please comply with maintenance schedule as chapter 4 to keep ILS-3V working well.
- Before you execute auto focusing function, please make sure that there will be no crashing between motion system and other objects. For safety, it is **NOT** recommended to use auto focusing function on inequality materials.

1.2 Name Plate and Warning Labels

The labels as following are affixed to the ILS-3V. These labels must never be removed. If they are damaged or tampered for any reason, please request for LTT immediately to replace them.



1



2



1.3 Safety Protection Device

■ Interlock

The laser beam will not be emitted if you open the **acrylic lid**. When the acrylic lid is opened, the LED indicator of "**DOOR**" on control panel will be off.



Door close



Door open

■ Laser Switch

Laser switch can shut down the power of laser tube immediately, and it has no effect on motion system. Compared with interlock, turning off laser switch can save power. When you turn on laser switch, the LED indicator of "**LASER**" on control panel will be on (it needs to take more than 5 seconds to warm up laser tube while you turn it on).



Chapter 2 Installation

2.1 Unpack and Locate Machine

This section explains how to unpack and locate machine.

1. Remove the strings.



2. Remove the protective bag.



3. Remove the top cover.



4. Remove the side cover and foam.

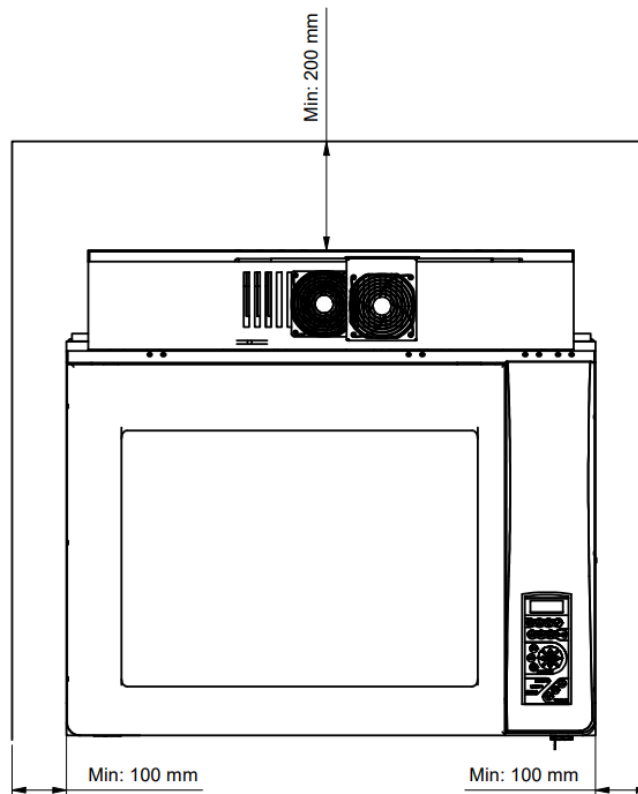


5. Remove the protective bag.



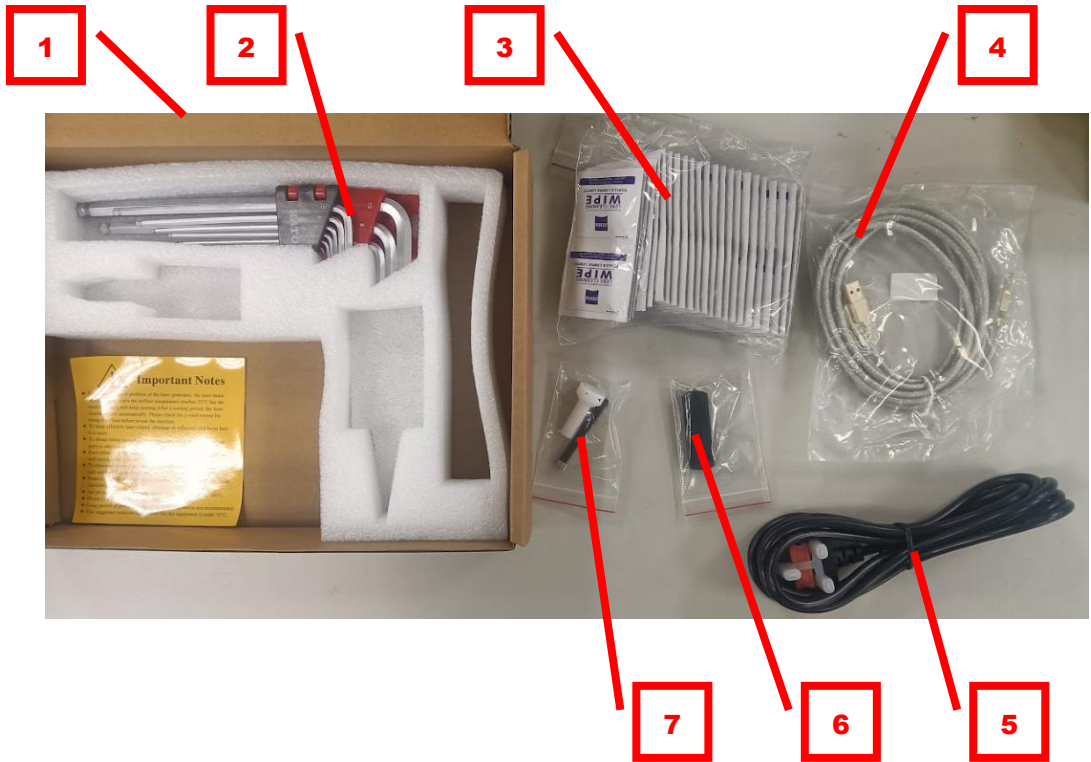
6. Locate the machine and keep the recommended space for maintenance.

Unit: mm



2.2 Package Contents List

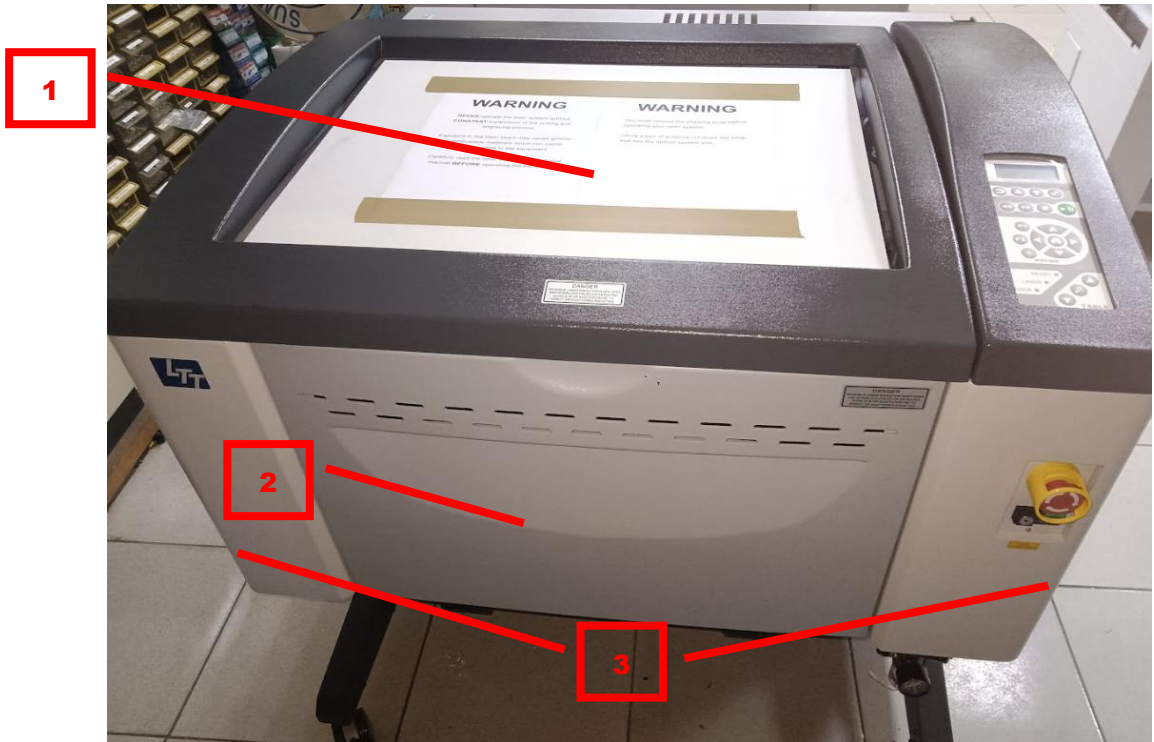
This section explains the package contents of the ILS-3V. The packages include the following components. Before using the unit, check that all components have been included in the packages.



- | | | | |
|----------|---------------------|----------|---|
| 1 | Box | 5 | Power Cable |
| 2 | Allen Wrench | 6 | USB Flash Drive |
| 3 | Alcohol swab | 7 | AutoFocus & Manual Focus tools |
| 4 | USB Cable | | |

2.3 Part Names and Functions

This section explains the main part names and functions of the ILS-3V.



1. Acrylic Lid

This lid has interlock sensors for safety. If you open this door, the laser will be not emitted.

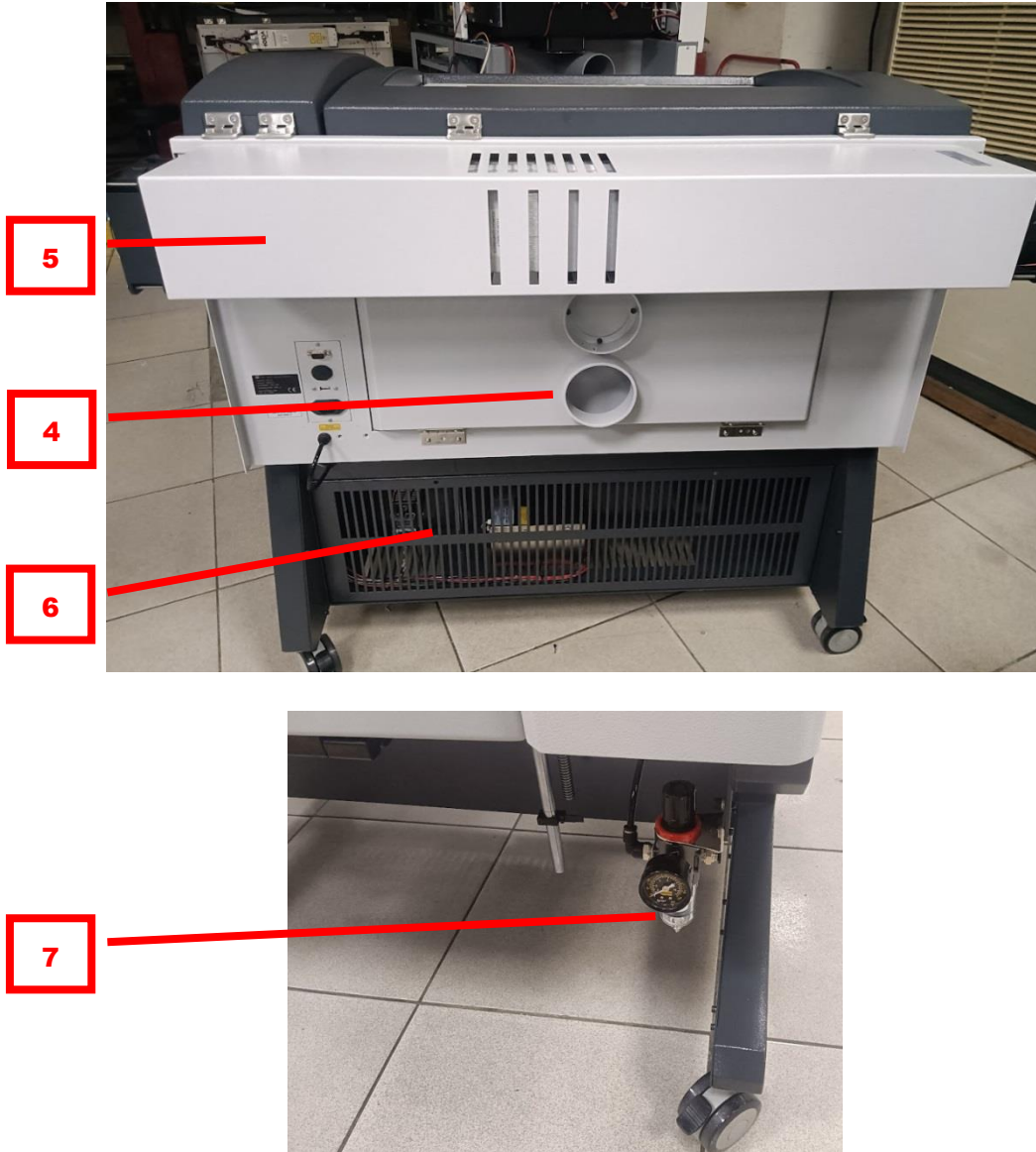
2. Front Door

This door is locked by screws for safety.



3. Side Door

Maintenance personnel can open the side doors to check the electric plates. If you open these doors, the system becomes a Class 4 laser device.



4. Exhaust Port

The port can exhaust the smoke which is caused by cutting or engraving. These ports have to be connected to blower through pipes

5. Laser protective cover and Fans

This part can dissipate the heat in the chassis which is caused by laser tube.

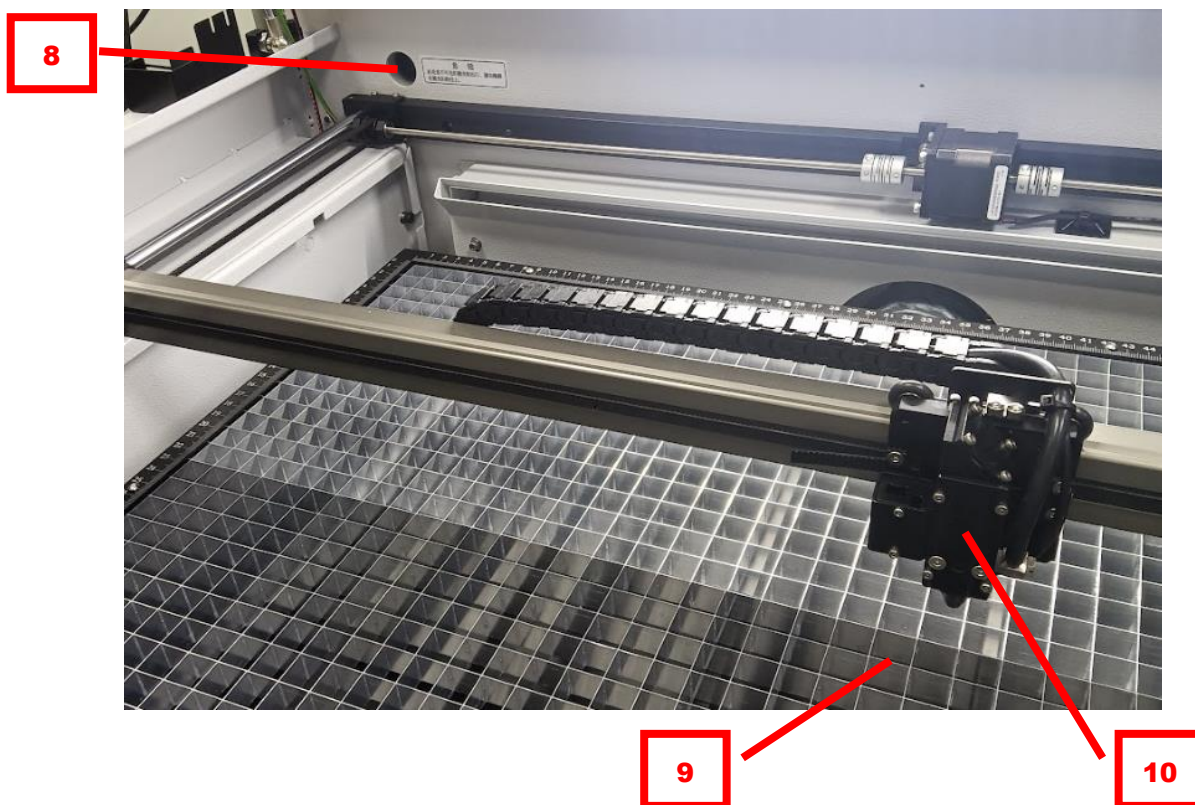
6. Rear Side Door (electrical box cover)

The power supplies and SSR for laser tube are mounted in this electrical box.



7. Air Filter

This part provides air assist through the hose which is connected to air compressor.



8. Window Lens

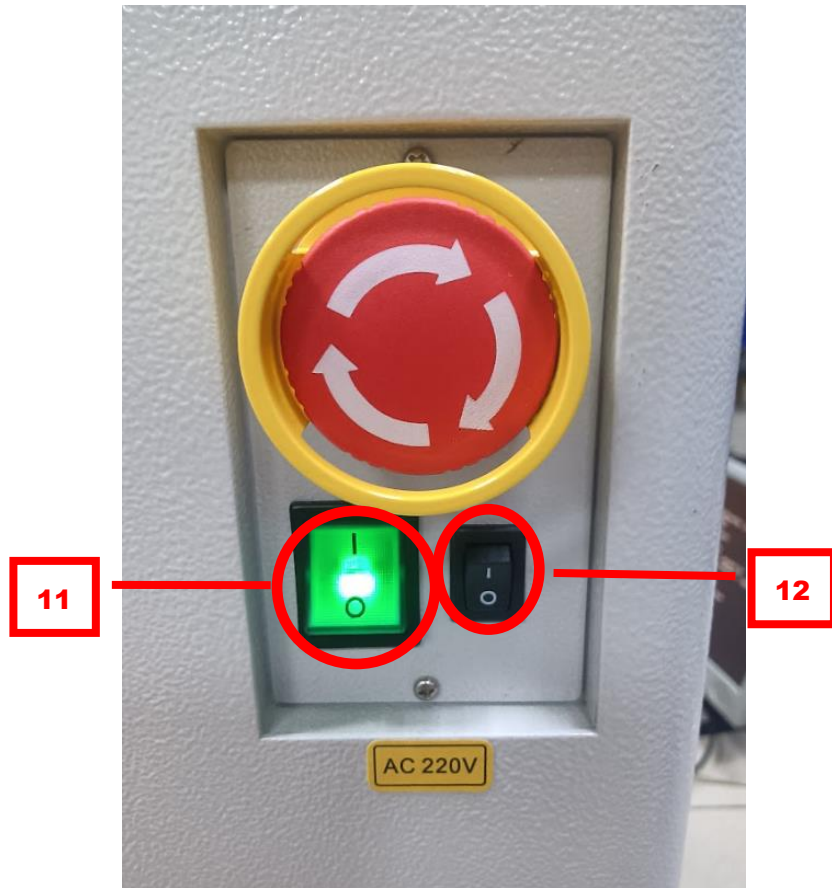
This part can protect 1st mirror against dusts or debris. It should be cleaned this lens daily. (See [chapter 4](#))

9. Table

This part can carry materials for cutting and engraving. You can move it up and down by the keys on control panel. (See section [3.2.1](#))

10. Carriage

This part includes 3rd mirror, focal lens, nozzle, and auto focus set. You can move it left, right, forth and back by the keys on control panel. (See section [3.2.1](#))

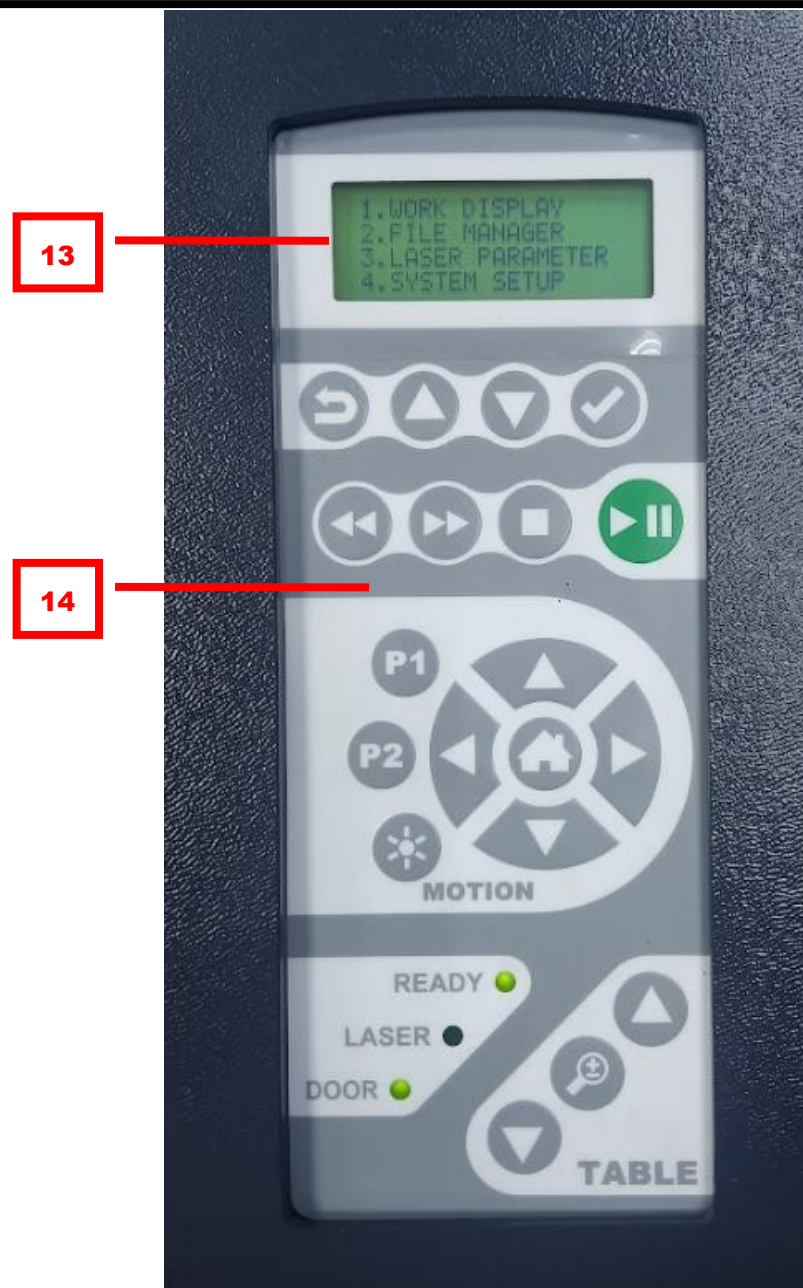


11. Power Switch

This switch can turn on/off the main power of machine.

12. Laser Switch

Please see section [1.3](#)

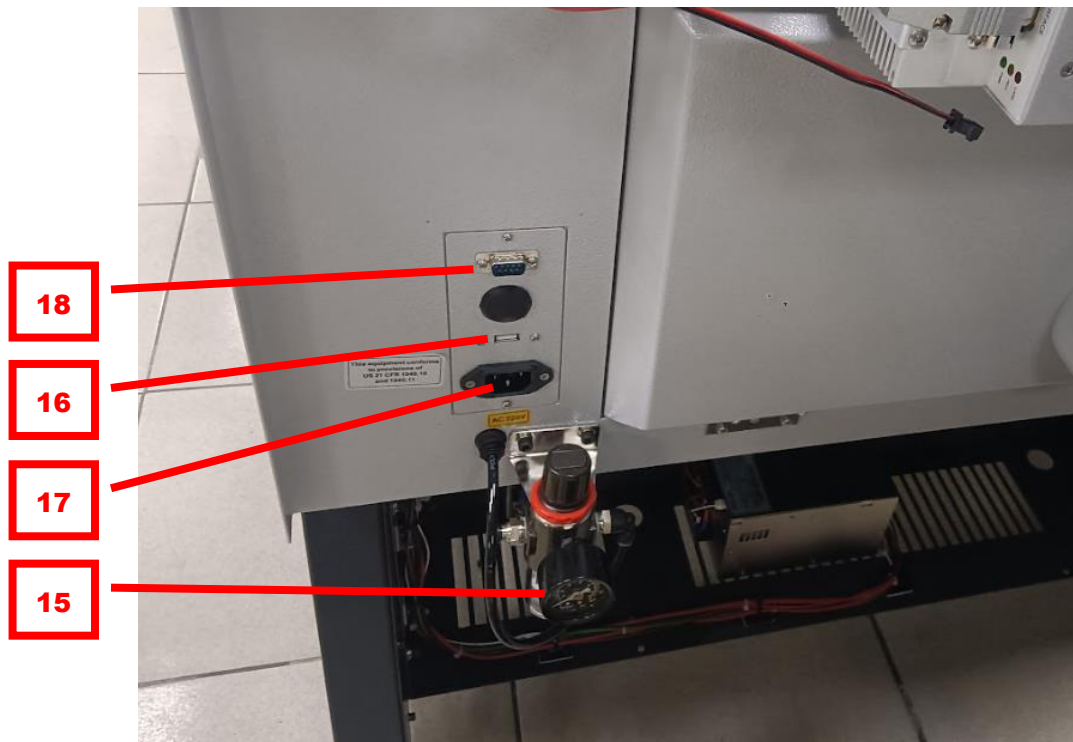


13. LCD Display

LCD display shows the operating menu and information from system. If you want to obtain more detail about operating menu, please see section [3.2.2](#).

14. Control Panel

Control panel provide the keys to operate machine. If you want to obtain more detail about operating menu, please see section [3.2.1](#).



15. Air Assist

Connect a diameter 6 mm hose from an air compressor. The air will go through an air filter and then to window lens and focal lens. It can provide a positive air pressure to protect window lens and focal lens.

16. USB Port

This part can send files from computer to machine through a USB cable.

17. Power Inlet

This part can provide main power through cable from wall outlet.

18. IO outlet

This part provides customer connect to an exhaust system to be controlled by ILS-3V during the working process. This is an option function.

2.4 Hardware Installation

This section explains the installation steps with other hardware.



1. Check environment

■ Power supply

Power supply: 220 VAC

■ Environment

Temperature: 0 ~ 30°C, No freezing

Relative humidity: 35 ~ 85 %

Other: Avoid to dust, dirt, oil, mist, strong vibration, or sudden temperature changes

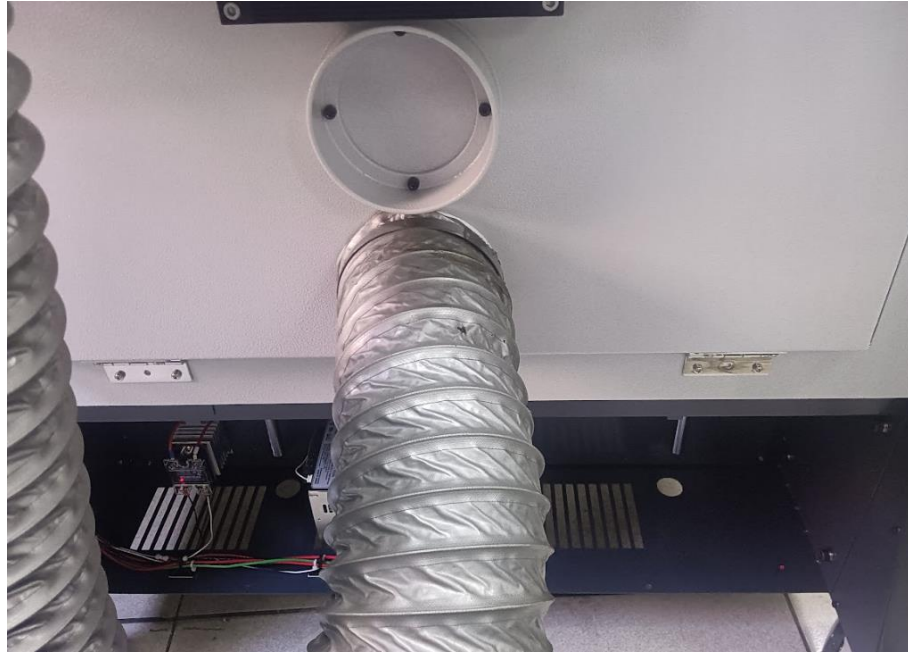
2. Connect AC power cable



3. Connect USB cable from computer to machine



4. Connect a pipe from exhaust port to blower



5. Connect a hose to an air compressor



or



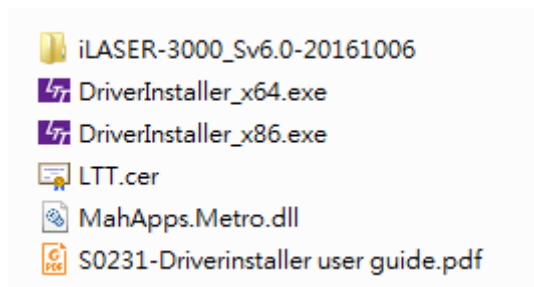
2.5 Driver Installation

This section explains how to install and uninstall the printer driver of the ILS-3V. It is a one click installation and un-installation program.

2.5.1 Install Driver

You should find a folder named as < Driver Installer> in the USB flash drive. Here is the file list in the folder.

Attention: Copy the folder to Desktop to use. It will fail if you execute the app in the USB flash drive.



Driverinstaller_x64.exe is for 64 bits Windows

Driverinstaller_x86.exe is for 32 bits Windows

LTT.cer is for installation reference.

MahApps.Metro.dll is for installation reference.

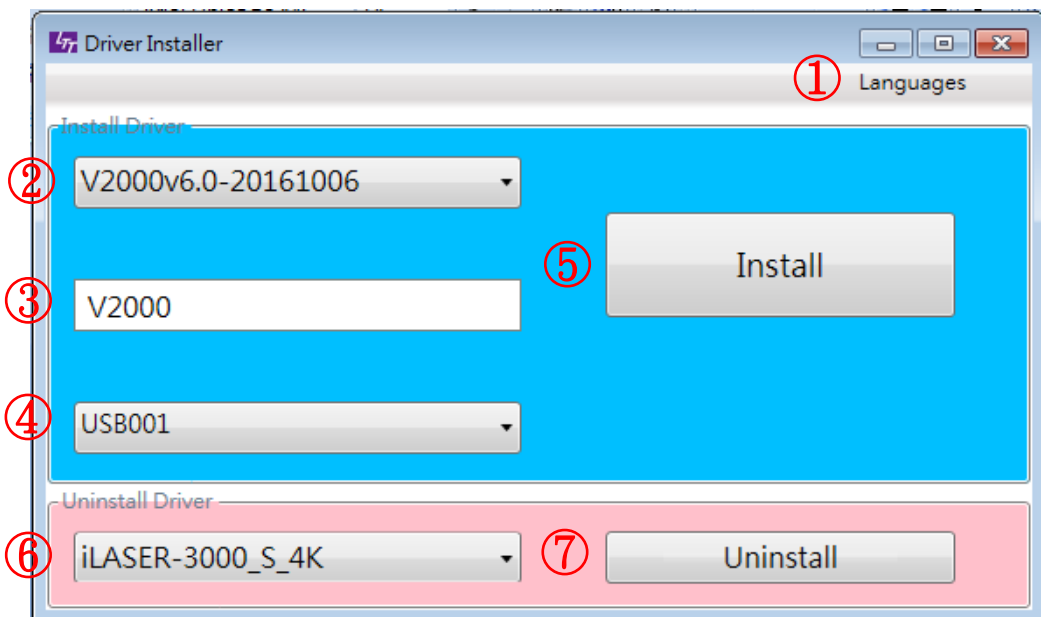
<iLaser-3000_Sv6.0-20161006> is the printer driver(Sample).

Run the Driver Installer program according to your Windows 64/32 bits.

You must have the Administrator authority of this computer.

The default language version is Chinese. Please change it to your language by the language options ① from the menu.

Program function description



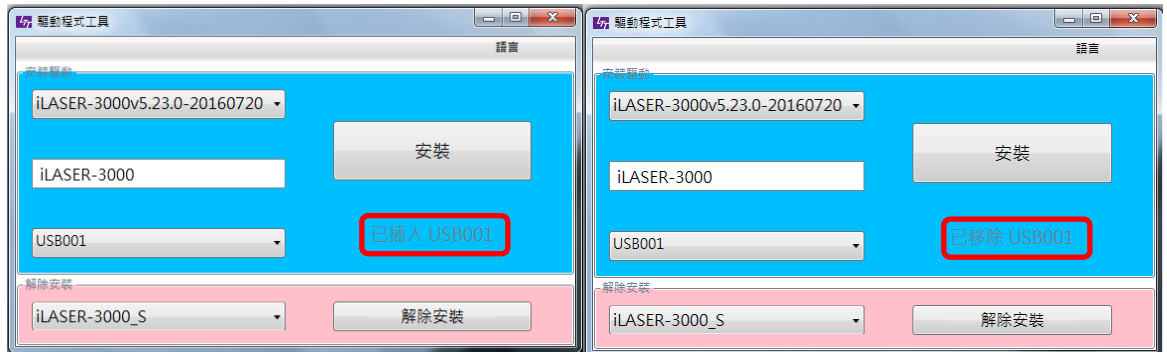
① : Choose language.

② : Driver folder list. When the driver folders are put in the same directory of Driverinstaller_ xxx.exe, it will list all these drivers.

Chapter 2 Installation

- ③ : Name of machine model (Printer Name).
- ④ : Printer port setting.
- ⑤ Click to install the driver showed in drop down list ②.
- ⑥ : Installed driver list in Windows.
- ⑦ : Click to uninstall the driver showed in drop down list ⑥.

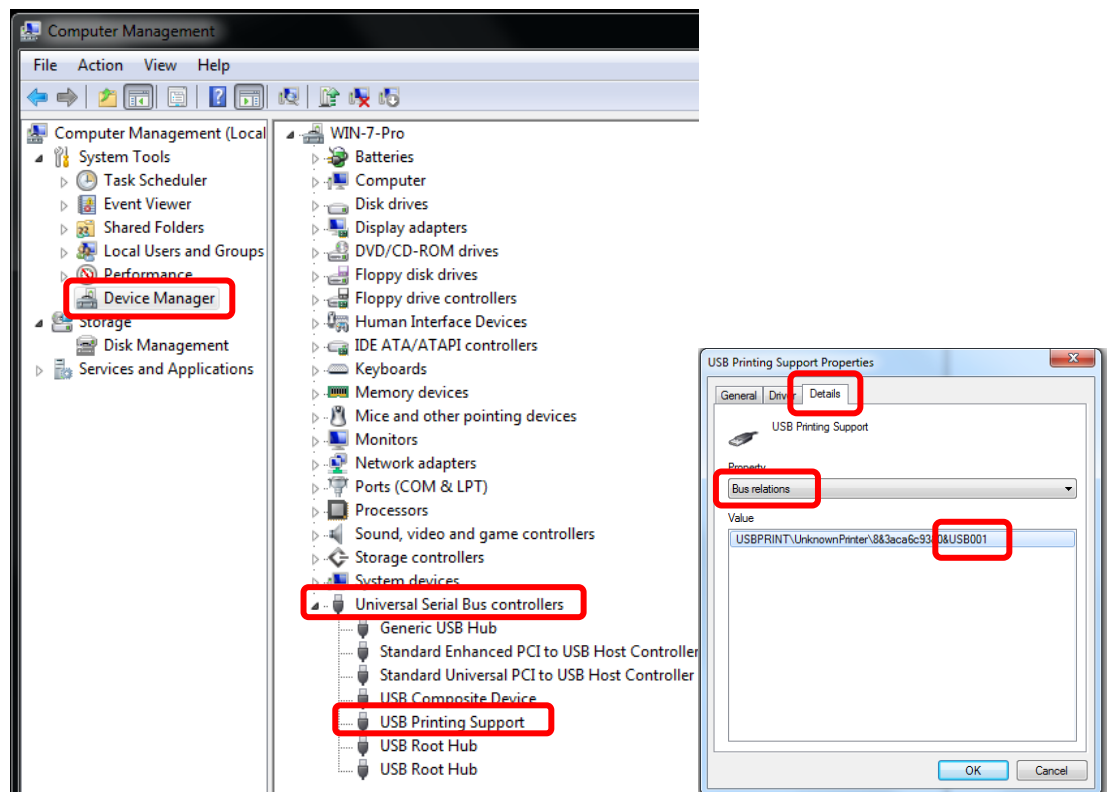
When the USB cable is connected with LTT laser machine, you plug or unplug the other end of USB cable from computer's USB port, Driver Installer will show the USB port number.



✂ You have to run DriverInstaller first, and then plug or unplug the USB cable; it will show the port number information.

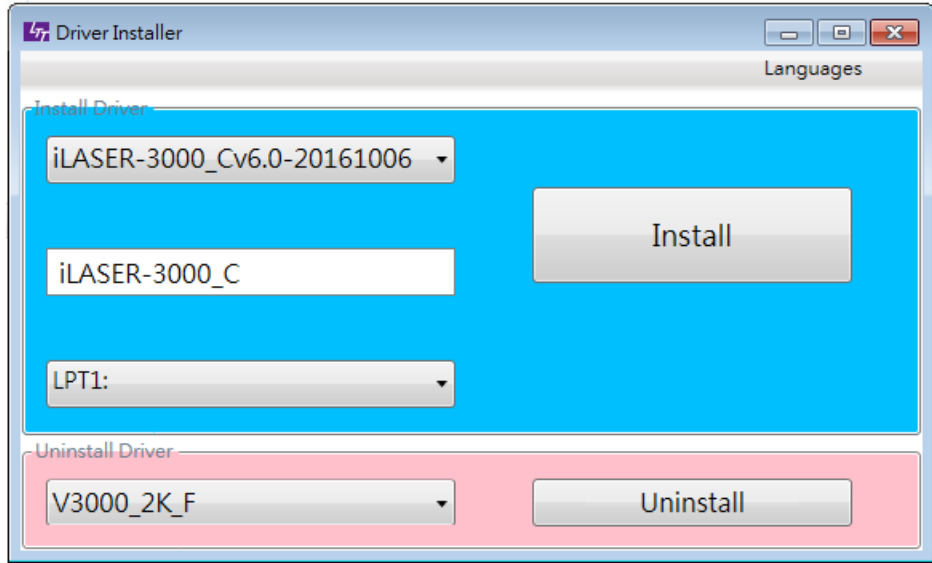
NOTE:

If you don't see the USB port number information, you can go to Device Manager to check Universal Serial Bus controllers. Right-click USB Printing Support, check the Properties/Details/Bus relations. The last three numbers is the USB port number you need.

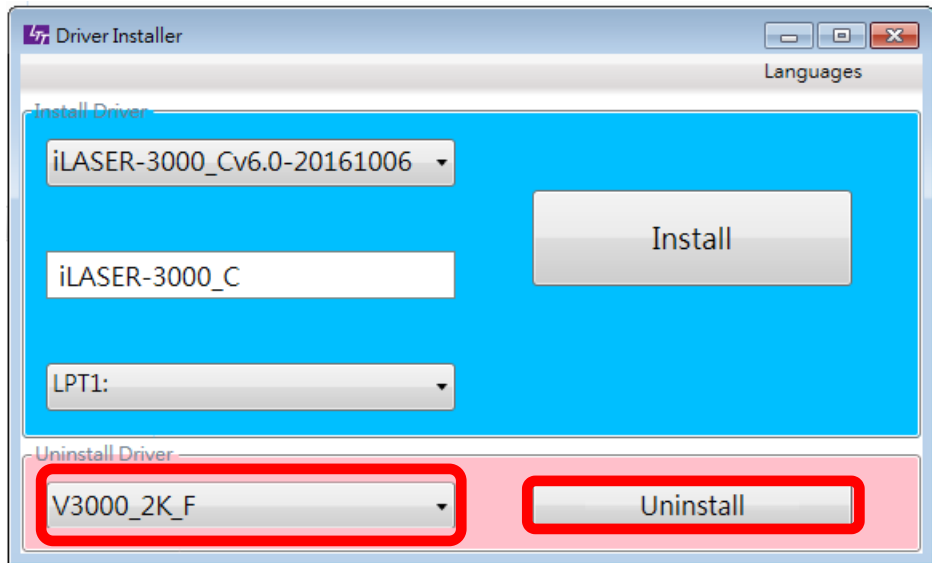


2.5.2 Uninstall Driver

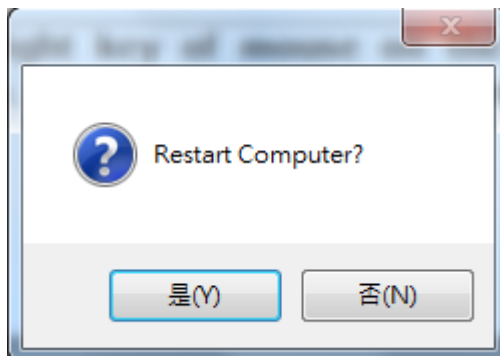
1 Open [Driver Installer]



2 Select the Printer you want to delete and then press [Uninstall] button.



3 Press the [Yes] button and reboot computer.



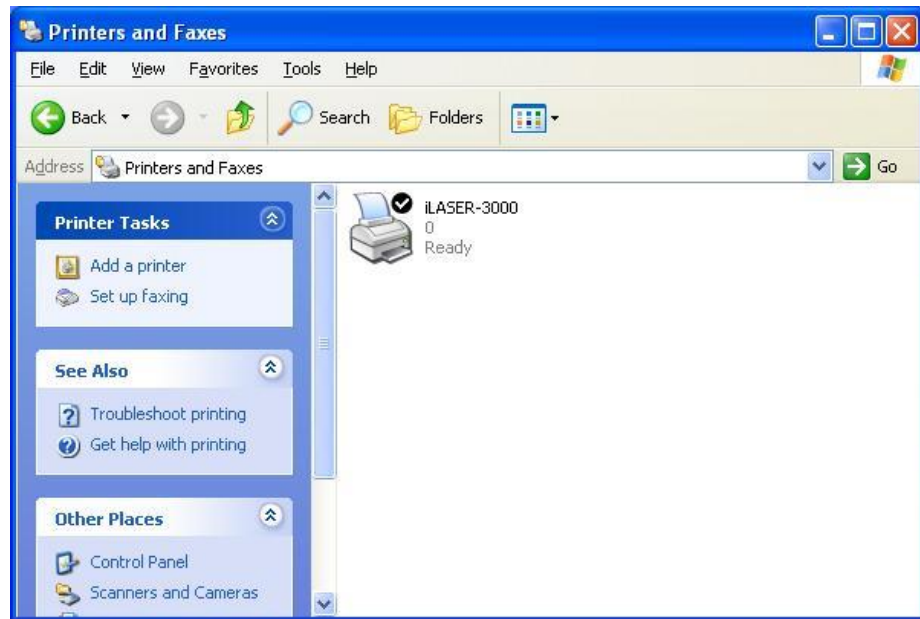
2.5.3 Change USB Cable to Another Port

This section explains that the steps when you change USB port.

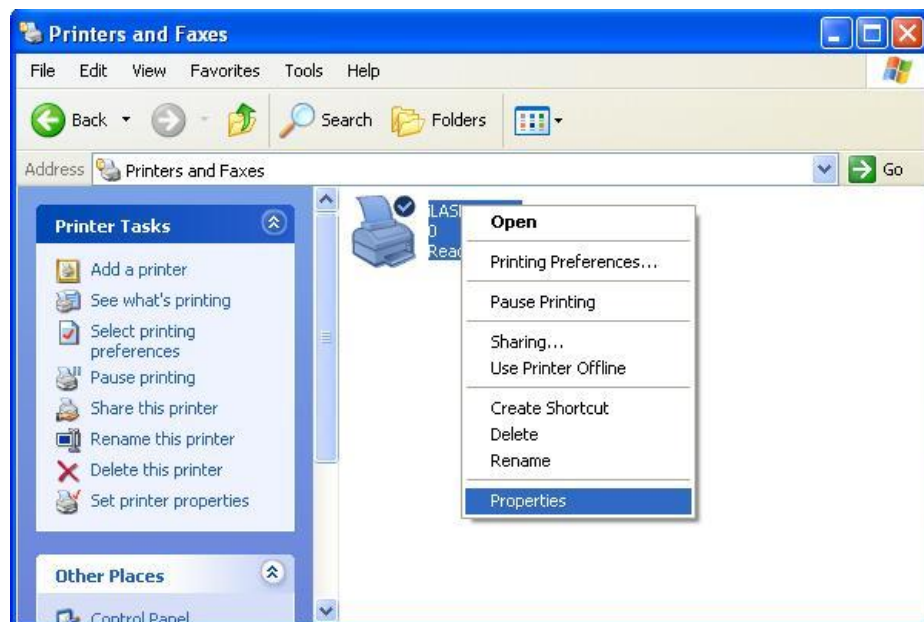


Once you connect the USB cable to computer, we strongly suggest that do not change it to another USB port. If you must change USB cable to another port, you have to also change the printer settings of ILS-3V. If this happens, please follow the next steps.

1. Connect the USB cable to another port well with ILS-3V.
2. Open **[Printer and Faxes]** window or **[Devices and Printer]** window

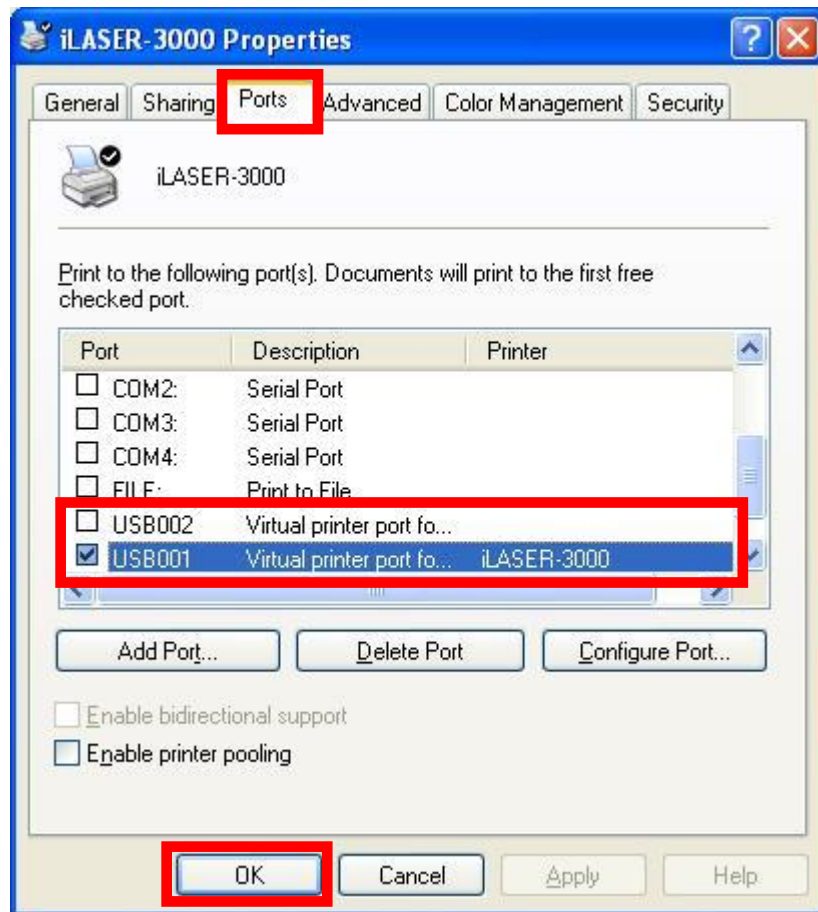


3. Right click ILS-3V printer and select **[Properties]** or **[Printer Properties]**



Chapter 2 Installation

4. Switch to **[Ports]** label. Switch the **[USB00*]** which is belong to the new port and click **[OK]**.



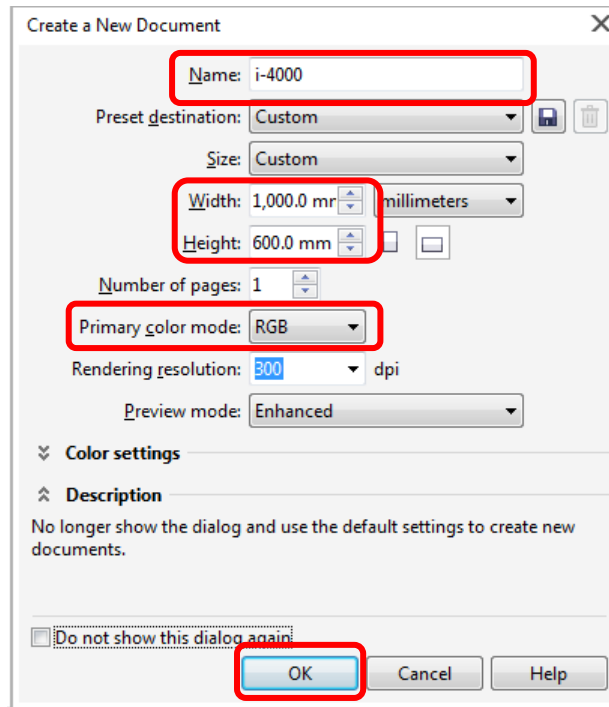
5. Done.

If you don't know the exact USB port number for your machine, please check 2.5.1 Note.

2.6 CorelDRAW Setup

1. File/New

Setup the page size to fit your machine working area.



2. Color setting

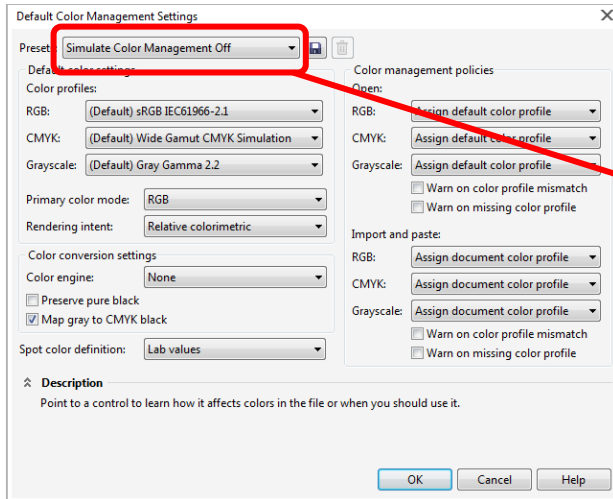
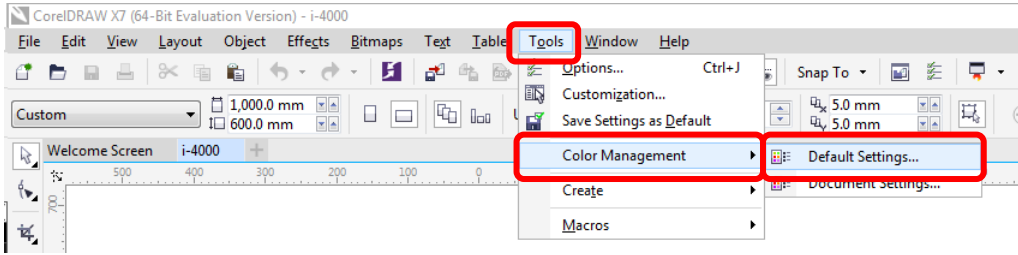
Laser printer driver defines eight colors as the following chart. You must use these same definitions in your graphics program. If your color definitions are different, the printed results may be unpredictable. It may happen wrong parameter mapping or wrong sequence cutting or engraving.

COLOR	RGB		
	RED	GREEN	BLUE
BLACK	0	0	0
RED	255	0	0
GREEN	0	255	0
YELLOW	255	255	0
BLUE	0	0	255
MAGENTA	255	0	255
CYAN	0	255	255
ORANGE	255	128	0

The following steps will show you how to change the default settings for CorelDRAW.

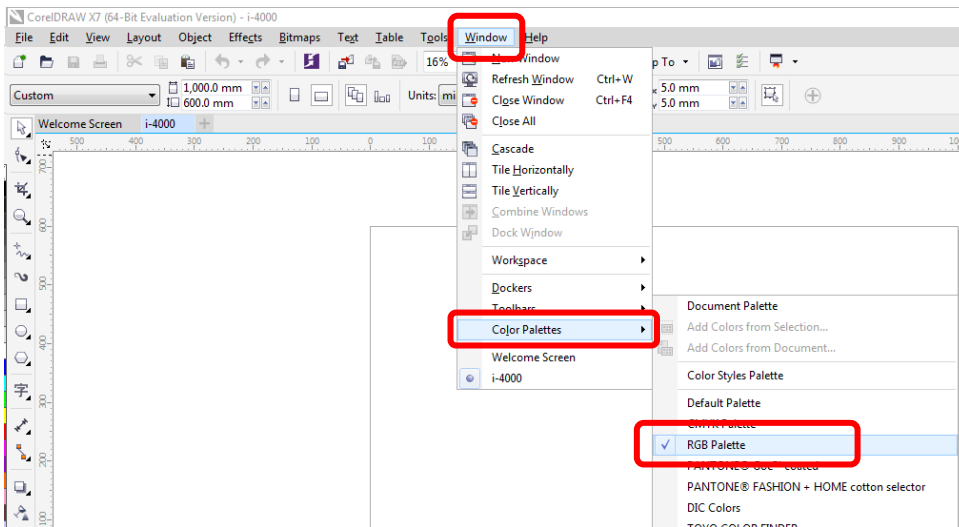
Chapter 2 Installation

Go to Tools/Color Management/Default Settings...



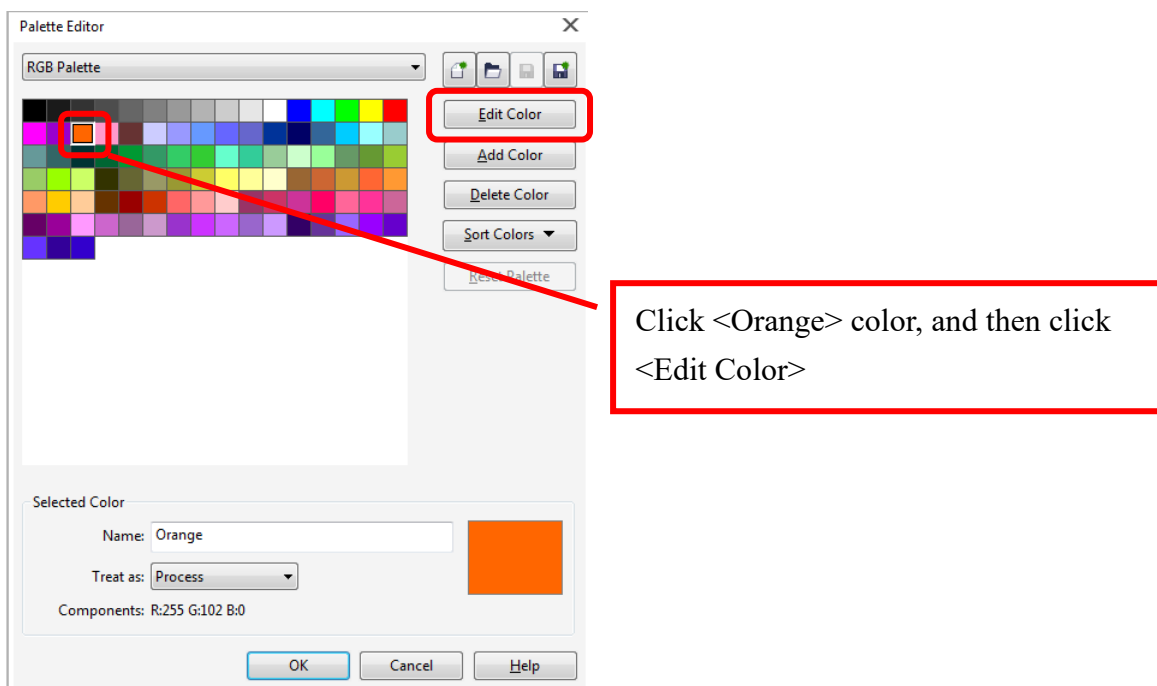
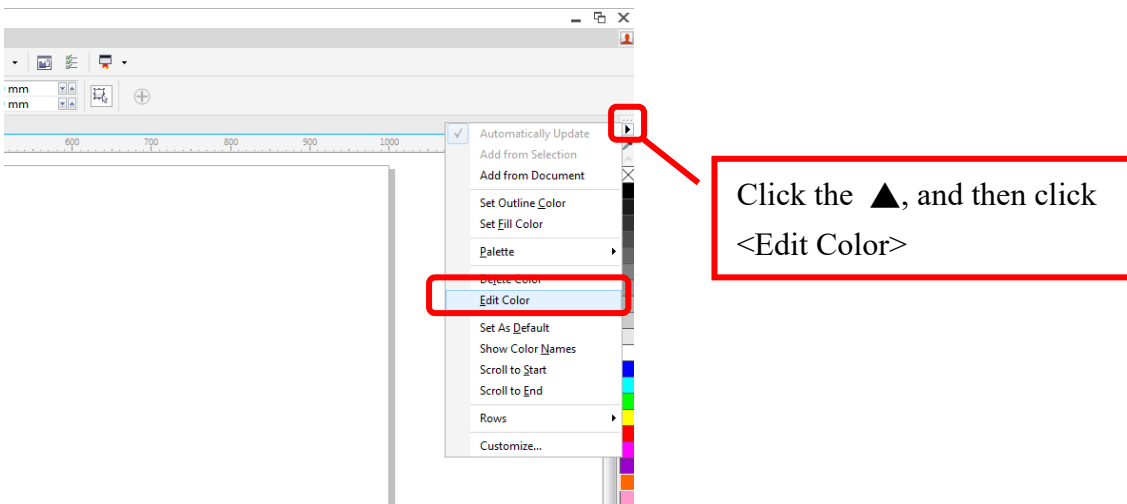
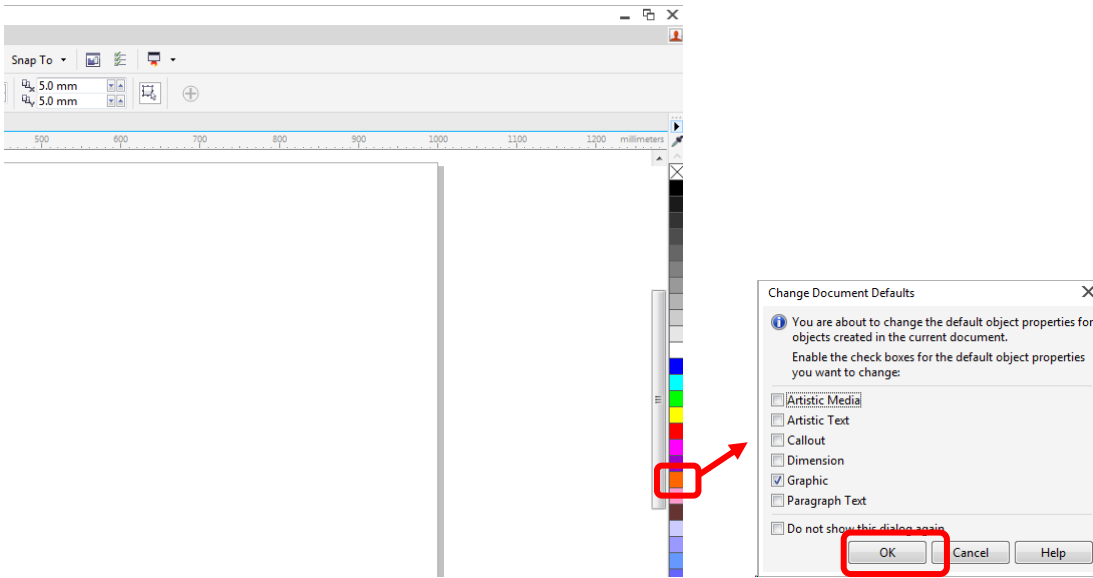
Change the settings to <Simulate Color Management Off>

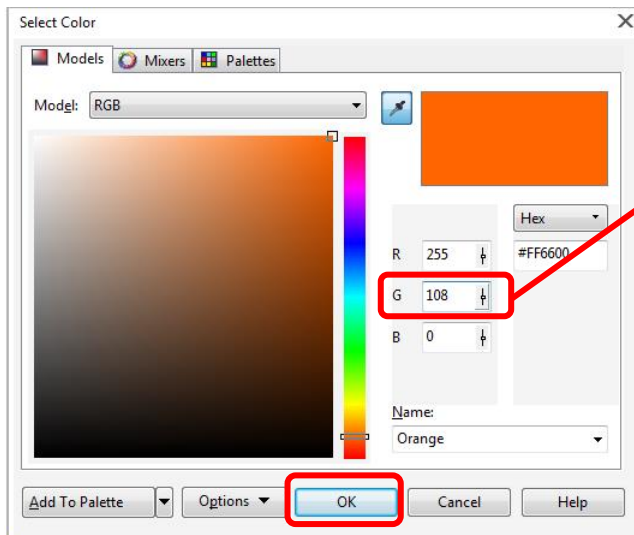
Go to Window/Color Palettes, check the <RGB Palette>, uncheck other palettes.



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Click <Orange> color in the palette. It will show a window, it depends on your needs to check the options, then you can close it.



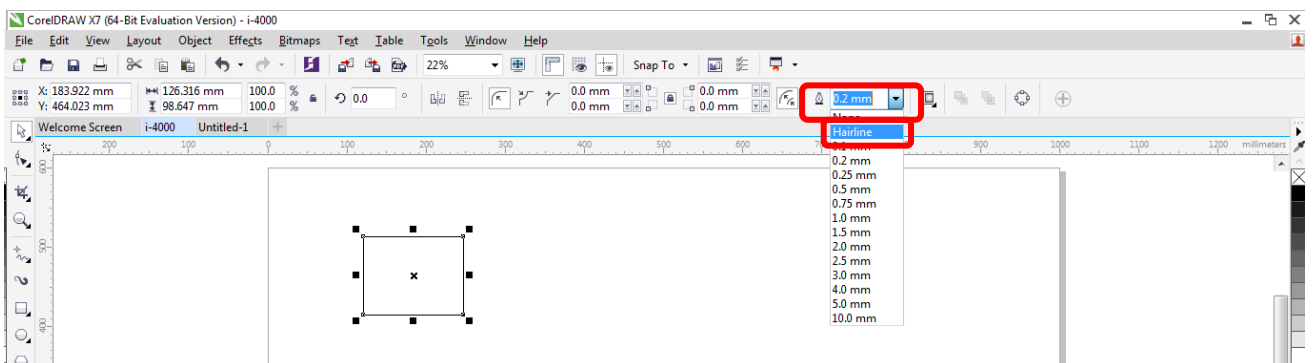


Change G value to 108.

3. Cutting setting

Generally, printer driver will recognize the finest line width as cutting path. For CorelDRAW, please set up as the following window.

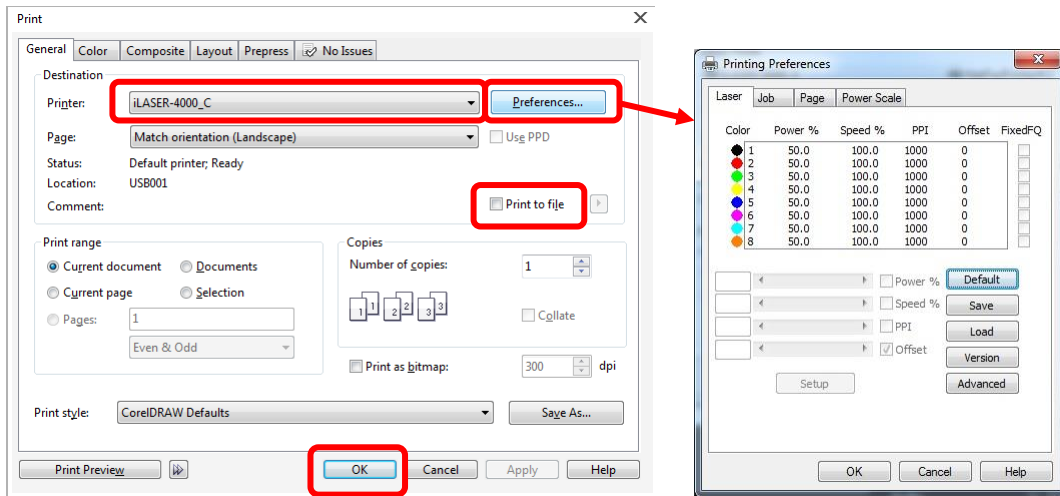
Select your cutting path, change the outline width to <Hairline>.



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4. Print out

Go to File / Print..., change the printer to laser printer driver.



Click <Preferences...>, it will show the <Printing Preferences>, you can setup more detail of the parameters for laser cutting or engraving.

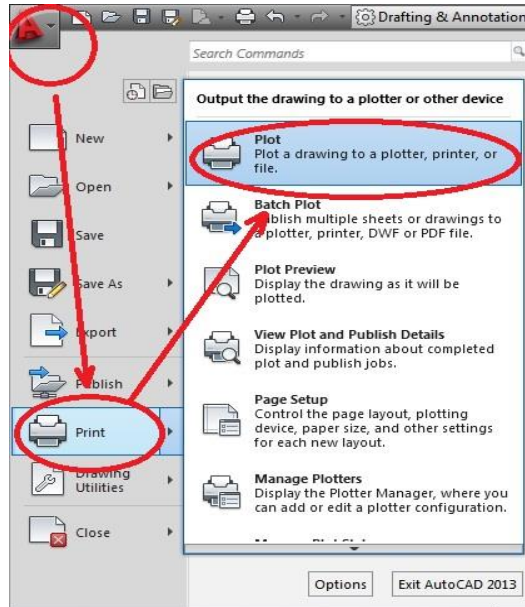
If you check <Print to file> box, you will print the result to a file, the extension file name is prn. If you don't check it, it will directly send file to the machine.

2.7 AutoCAD Setup

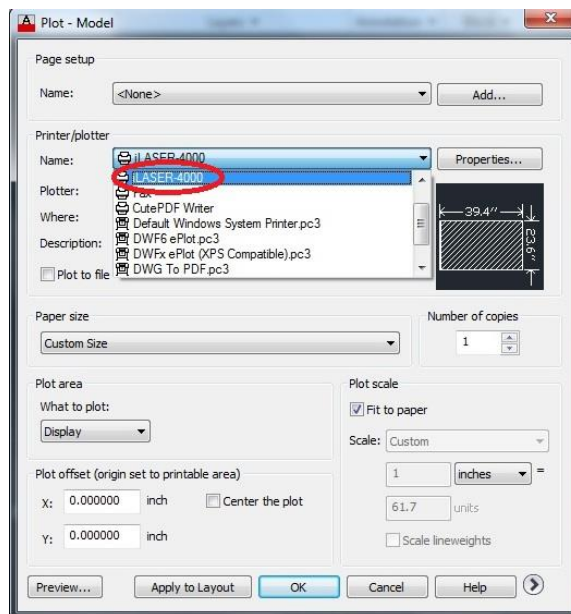
If you have a AutoCAD drawing, and you want to print it out laser machine from LTT. Here is an easy process for you to follow.

Print Setting

Select the **[A]** mark or **[File]** at left-up corner then select **[Print]**→**[Plot]**. (Or you can press **[Ctrl]+[P]**)

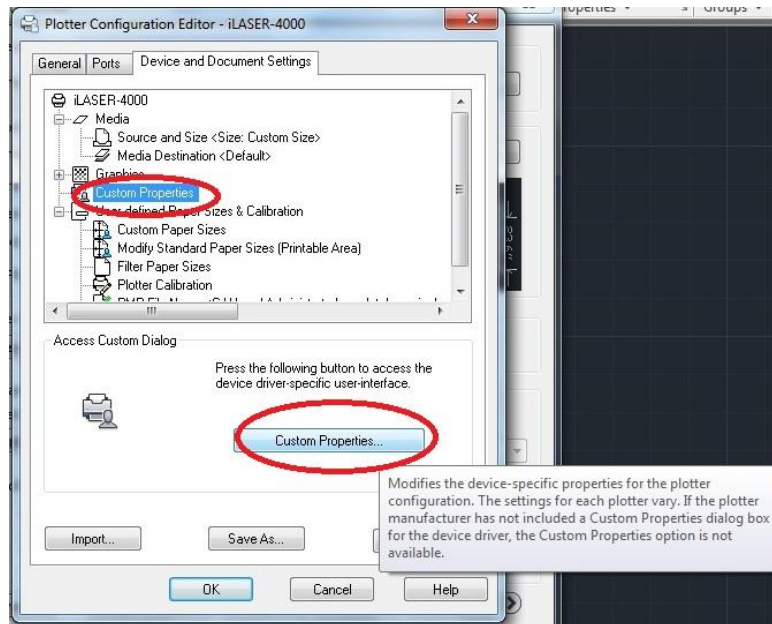


When the **[Plot]** window shows, select printer driver and click **[Properties]** button.

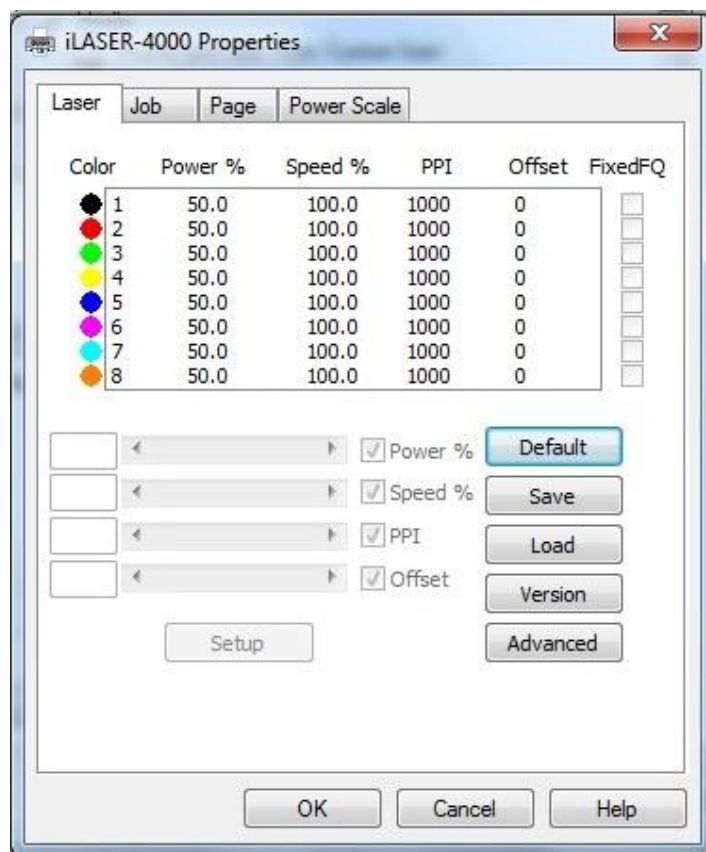


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Select [**Custom Properties**] and click [**Custom Properties**] button at middle.

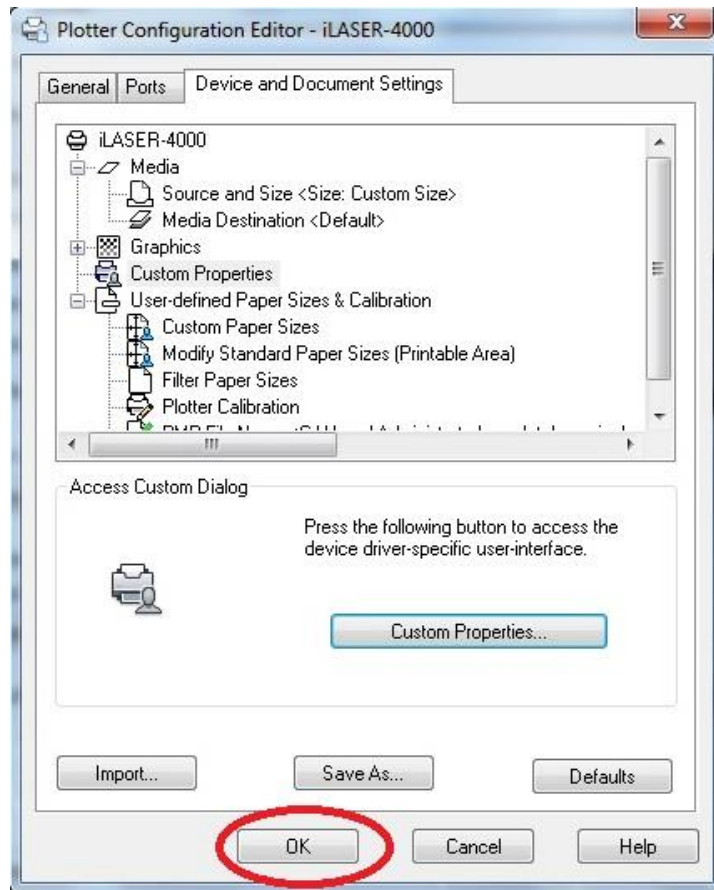


Modify Laser settings if need. Press [**OK**] to finish driver setting.

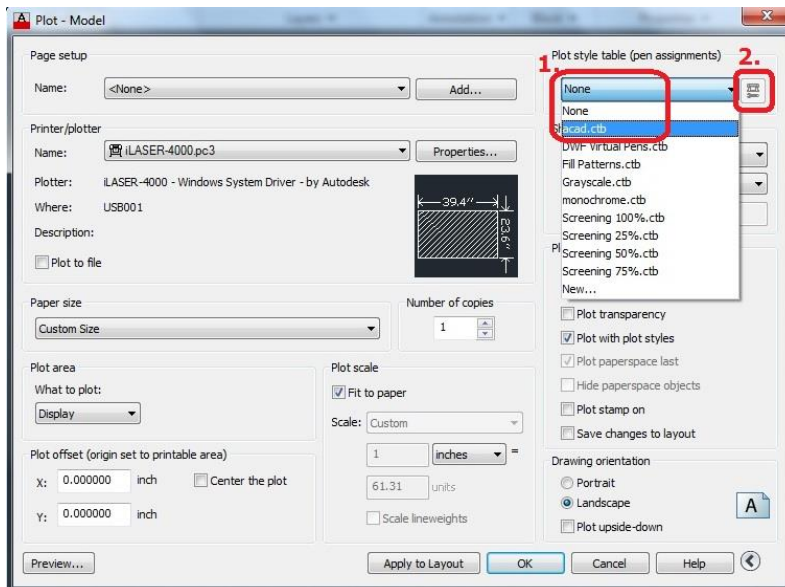


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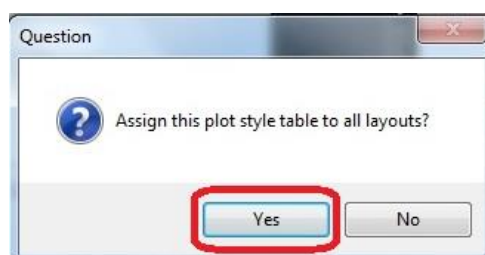
Press **[OK]** to back to print setting.



Select **[Plot style table]** to **acad.ctb**. Press **[Edit]** button.



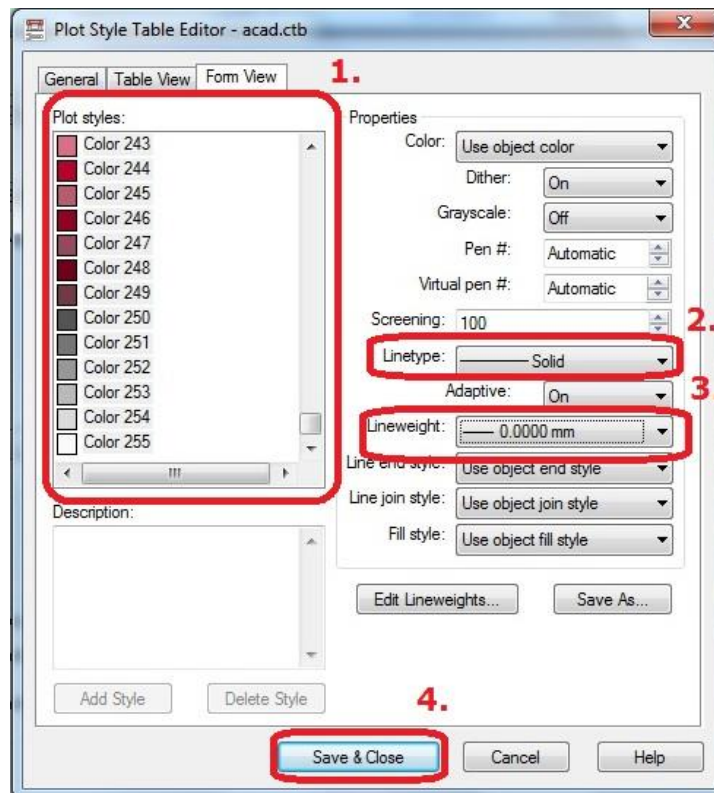
Press **[Yes]** button to continue.



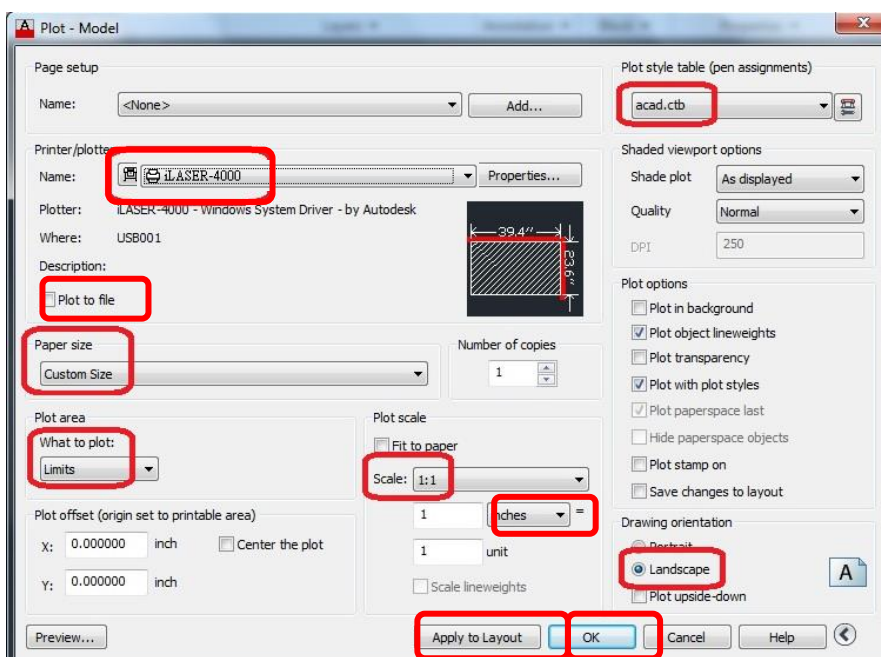
Chapter 2 Installation

Use **[Shift]** key to help selecting all colors in **[Plot styles]** list. Set the **[Linetype]** to **[solid]** and the **[Lineweight]** to **[0.0000 mm]** Then press **[Save& close]** button to continue.

(You only have to do this change once, next time you can just select **[Plot style table]** to **acad.ctb**.)



Switch to **[Plot Settings]** tab. Select the **[Plot scale]** to **[1:1]**. Select the **[Plot area]** to **[Limits]**. The **[Drawing orientation]** should be set to **[Landscape]**. Then Press **[OK]** to send file to machine.



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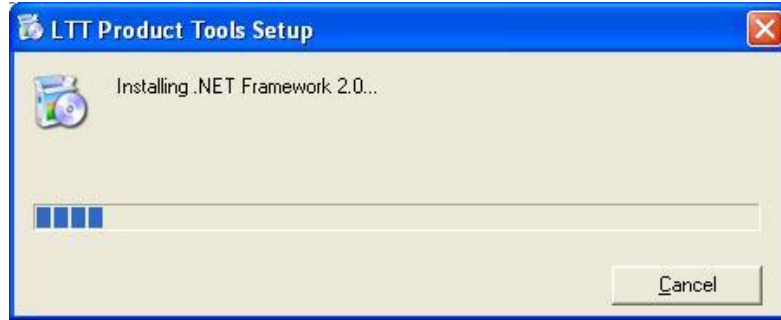
Print to file : If you check it, you can print the drawing to a *.plt file. All your cutting lines and power / speed parameters settings will be stored into this file. You can use LTT Products Tool to send this file to machine. If you will do the same job next time, you can just send *.plt file to machine, and you don't have to open the drawing again.

Plot area : You can choose Window and click two point of your drawing to setup the area that you want to print. Or You can draw a rectangle as the working area of your machine (For example, i.Laser 4000, you can draw a 1000x600 mm rectangle, then you can put the drawing contents in this rectangle. And you can print the rectangle as Window to print the contents.)

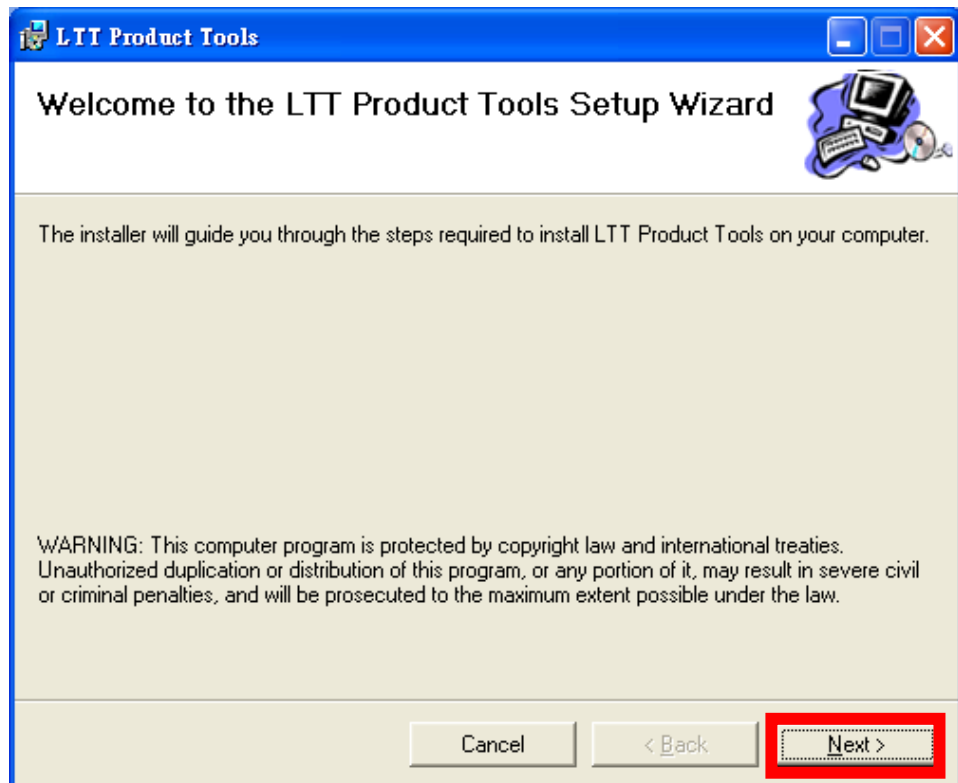
Apply to Layout : After you setup all the settings, you can click it. It will help you to save the layout setting into the drawing. When you open this drawing again, you can use the same layout again.

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3. When you see the diagram below, please wait for some minutes.

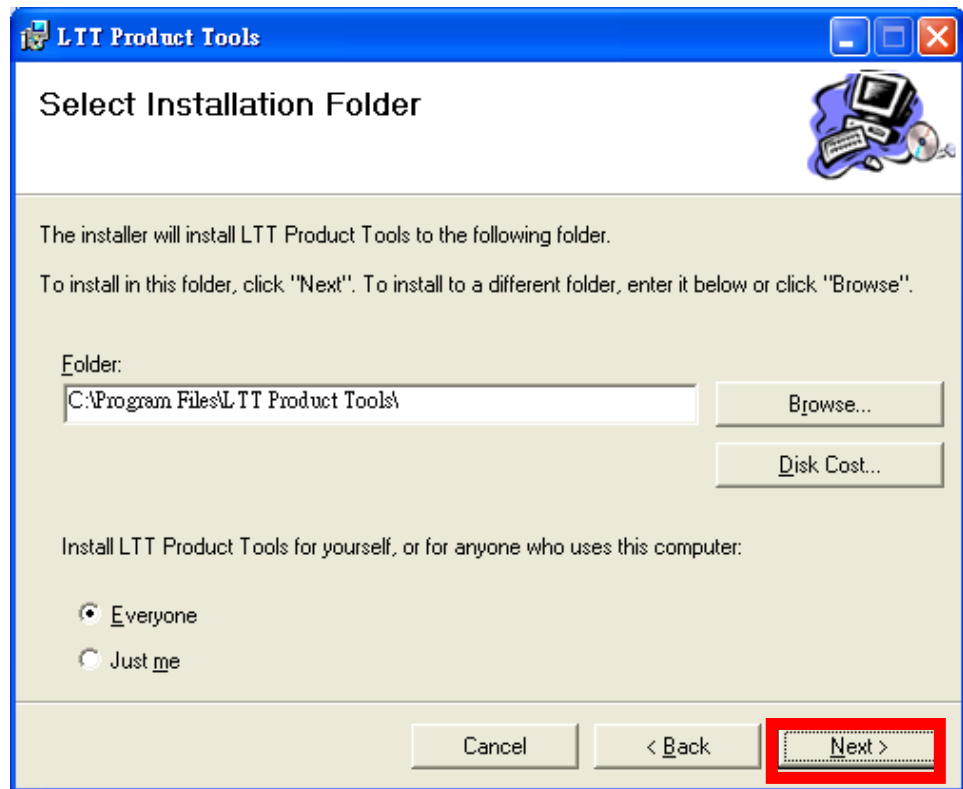


4. When you see the diagram below, please press the **[Next]** key to go on.

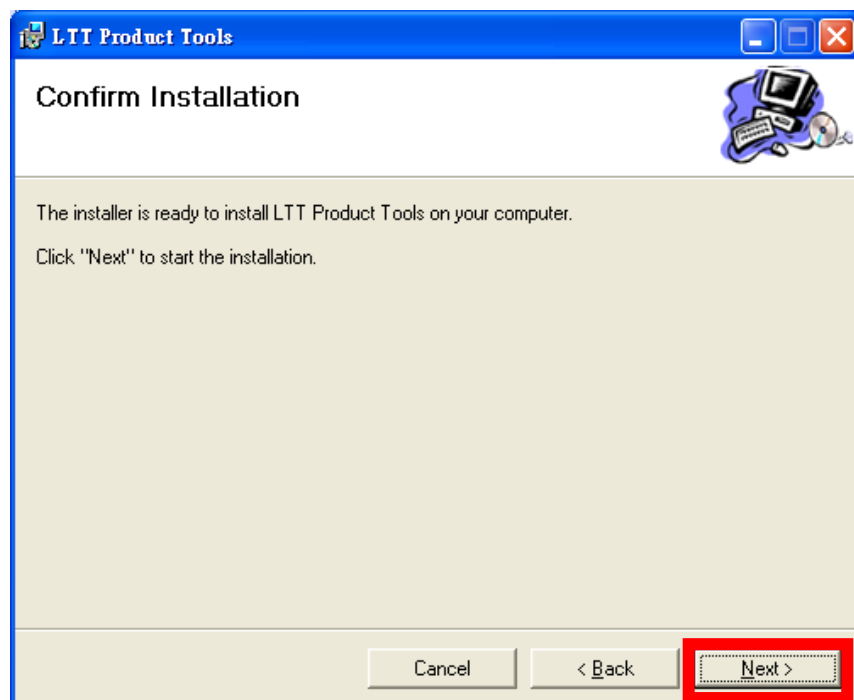


Chapter 2 Installation

5. When you see the diagram below, please choose a position to install the software and press **[Next]** key to go on.

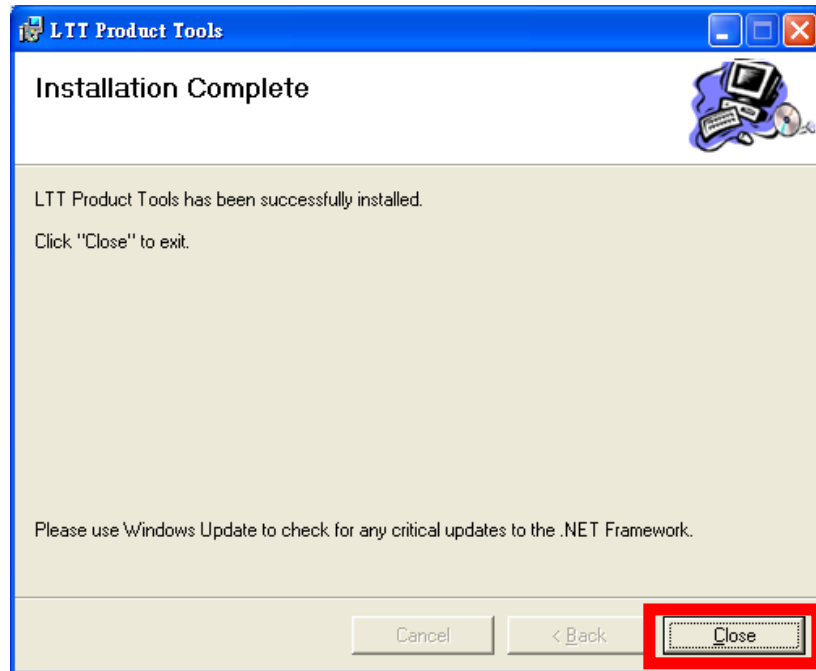


6. Press **[Next]** key to go on.

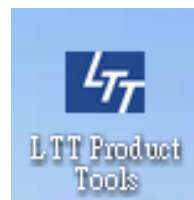


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7. Press **[Close]** key to finish the setup procedure.

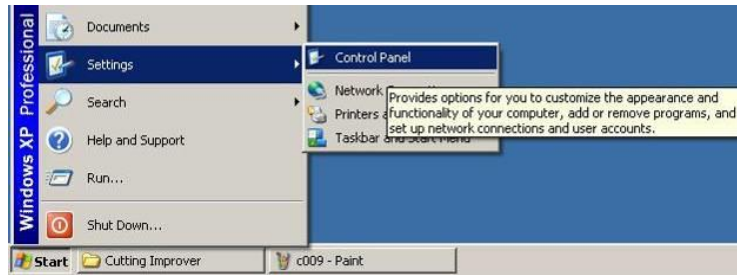


8. After the setup procedure, you can open the software from two shortcuts. The first one locates on the **[Desktop]**, and the second one is placed in the **[Start Menu]**.

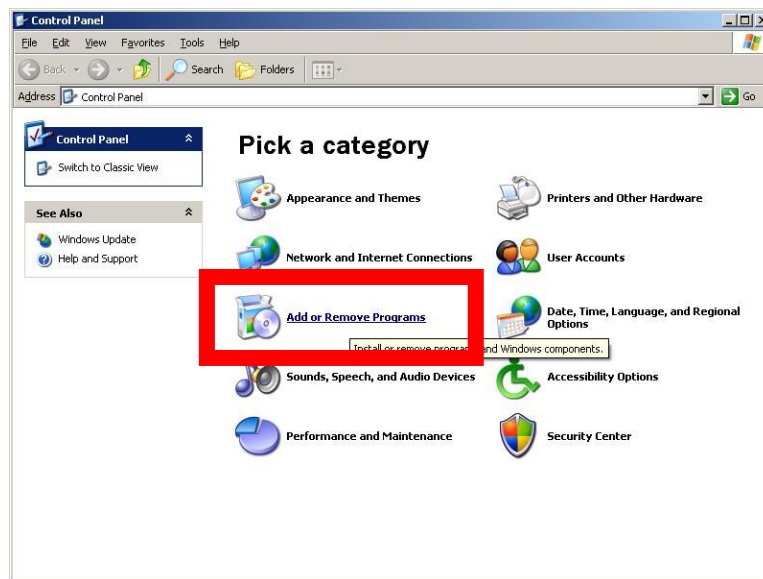


2.8.2 Uninstallation

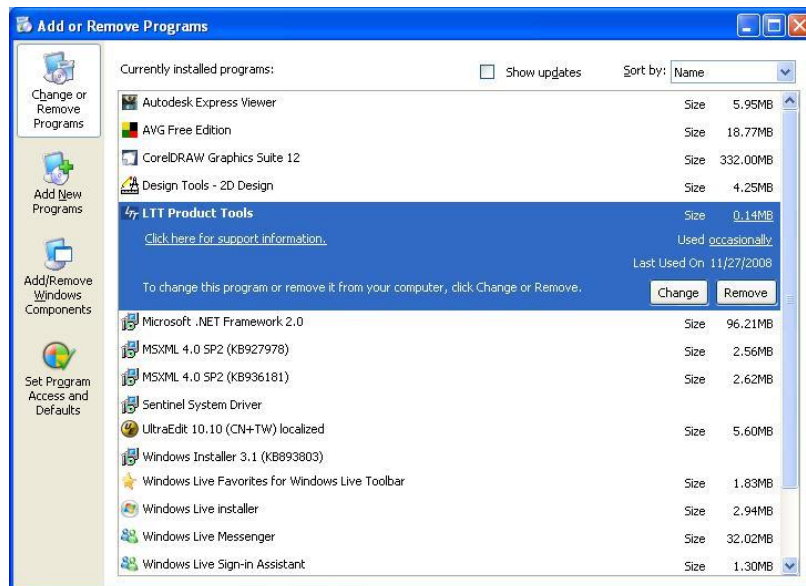
1. Click **[Start]**→**[Settings]**→**[Control Panel]**



2. Double click **[Add or Remove Programs]**

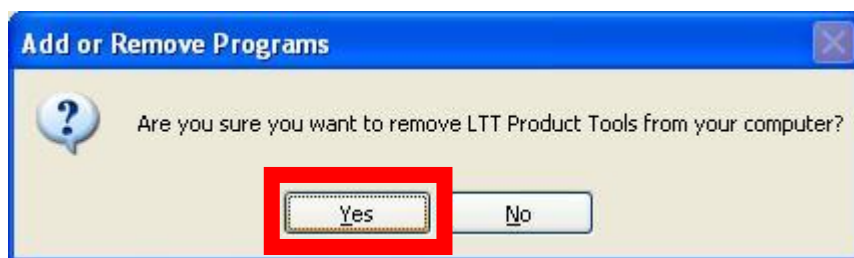


3. Click **[LTT Product Tools]**→ Press **[Remove]** key



Chapter 2 Installation

4. Please choose **[Yes]**

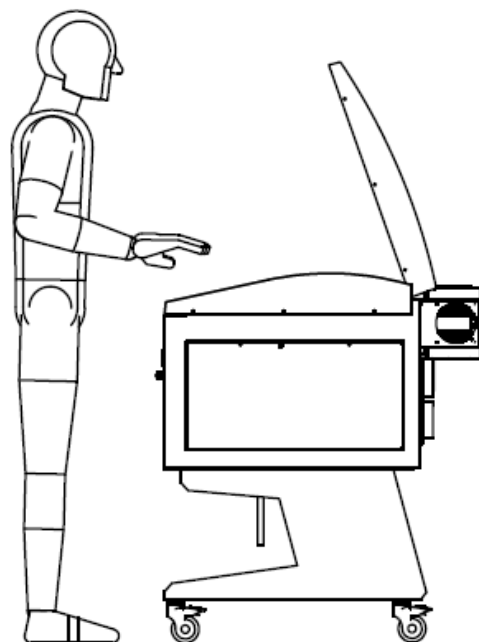
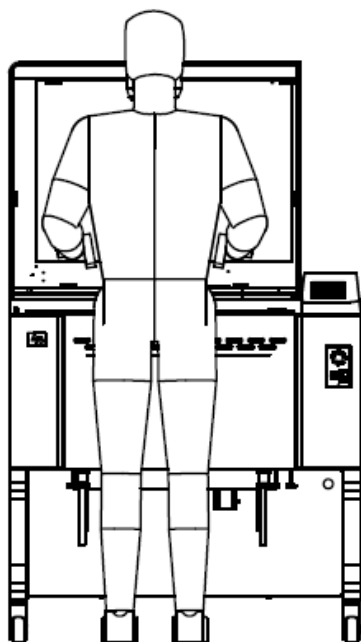
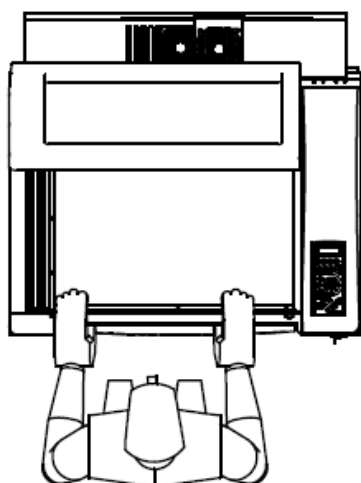


5. Done

Chapter 3 Operation

3.1 Operator Position

This section shows the position when you operate machine.



3.2 Basic Operation Flow

This section explains the basic and common steps to operate ILS-3V. If you want to obtain more detail about operation, please see section [3.3](#) and [3.4](#).

Before process the steps in this section, please make sure that you have already finished all steps in chapter 2.


1. Get machine ready.

- Turn on the power.
- Wait for homing process finishing.


2. Send file to machine.

- Open a drawing file or draw a new one on CorelDraw or AutoCAD.
- Execute the **[Print]** or **[Plot]** function.
- Modify the settings of driver. (See section [3.4](#))
- Click **[OK]** to send file.

3. Adjust focal height (if necessary).

- Put the material on the table.
- Move the carriage above the material.
- Press  and select **[Yes]**.

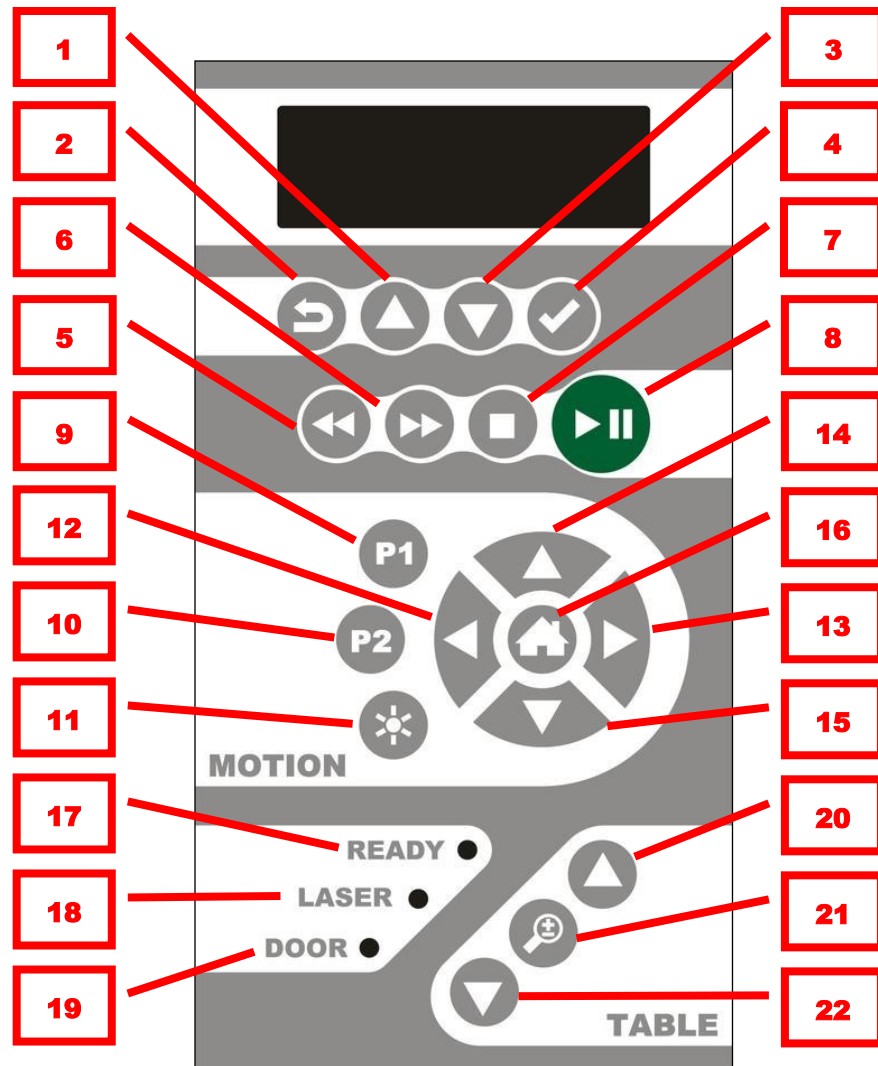
4. Execute file.

- Select the file on control panel.
- Make sure all LED indicators on control panel are on. (If not, see [chapter 5](#))
- Press  to start file.

3.3 Machine Operation

This section explains the detail about how to operate ILS-3V.

3.3.1 Control Panel



- | | |
|----------------------------------|--------------------------------|
| 1. Cursor Up / Increase Values | 12. Move Carriage Left (X-) |
| 2. Escape | 13. Move Carriage Right (X+) |
| 3. Cursor Down / Decrease Values | 14. Move Carriage Forward (Y-) |
| 4. Enter | 15. Move Carriage Back (Y+) |
| 5. Previous File | 16. Homing |
| 6. Next File | 17. Ready Indicator |
| 7. Stop | 18. Laser Indicator |
| 8. Run / Pause | 19. Door Indicator |
| 9. Move to P1 | 20. Table Up |
| 10. Move to P2 | 21. Auto Focusing |
| 11. Red Beam Switch/ Lase | 22. Table Down |

1. Cursor Up / Increase Values

Move the cursor up or increase values.

2. Escape

Escape from sub-menu or sub-selection

3. Cursor Down / Decrease Values

Move the cursor down or decrease values.

4. Enter

Enter into sub-menu or confirm the selection.

5. Previous

Select previous file in file list.

6. Next

Select next file in file list.

7. Stop

Give up the file that is in pause mode. Or you can stop the file directly which is still in processing mode. But the file will be terminated. You can not resume it.

8. Run / Pause

Run the file when system is ready or in pause mode. Pause the file when it is running.

9. Move Carriage to P1

Move the carriage to the location of P1. The way to set location of P1, please see section [3.3.2](#)

10. Move Carriage to P2

Move carriage to the location of P2. The way to set location of P2, please see section [3.3.2](#)

11. Red Beam Switch / Lase

Turn on/off the red beam normally.



If in the sub-menu of **[Alignment mode]**(See section [3.3.2](#)), this key will turn to emit the laser beam for alignment.

12. Move Carriage Left (X-)

Move the carriage left slowly when press this key shortly. If you want to move the carriage left faster, please press and hold this key.

13. Move Carriage Right (X+)

Move the carriage right slowly when press this key shortly. If you want to move the carriage right faster, please press and hold this key.

14. Move Carriage Forward (Y-)

Move the carriage forward slowly when press this key shortly. If you want to move the carriage forward faster, please press and hold this key.

15. Move Carriage Back (Y+)

Move the carriage back slowly when press this key shortly. If you want to move the carriage back faster, please press and hold this key.

16. Homing

Move the carriage to home and reset the position of home if the carriage loses position.



After the homing process, you have to press  so that you can leave the homing page.

17. Ready Indicator

This indicator will be on when system is ready to run file and no file is in pause mode.

18. Laser Indicator

This indicator will be on when laser tube is ready.

19. Door Indicator

This indicator will be on when all doors with interlocks are closed.

20. Table Up

Move the table up slowly when press this key shortly. If you want to move the table up faster, please press and hold this key.

21. Auto Focusing

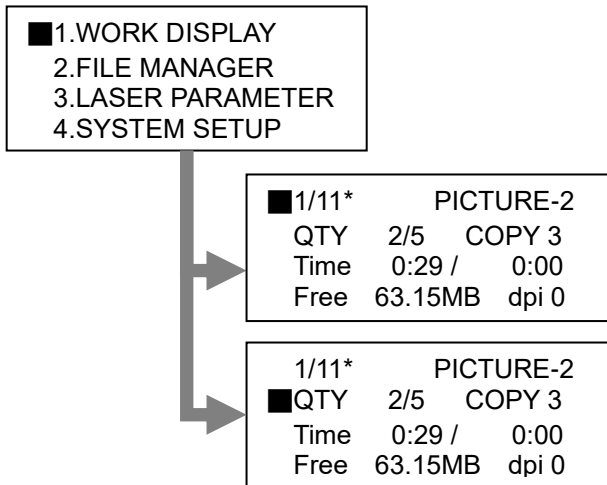
Automatically adjust the distance of the focal lens and material to the focal length.

22. Table Down

Move the table down slowly when press this key shortly. If you want to move the table down faster, please press and hold this key.

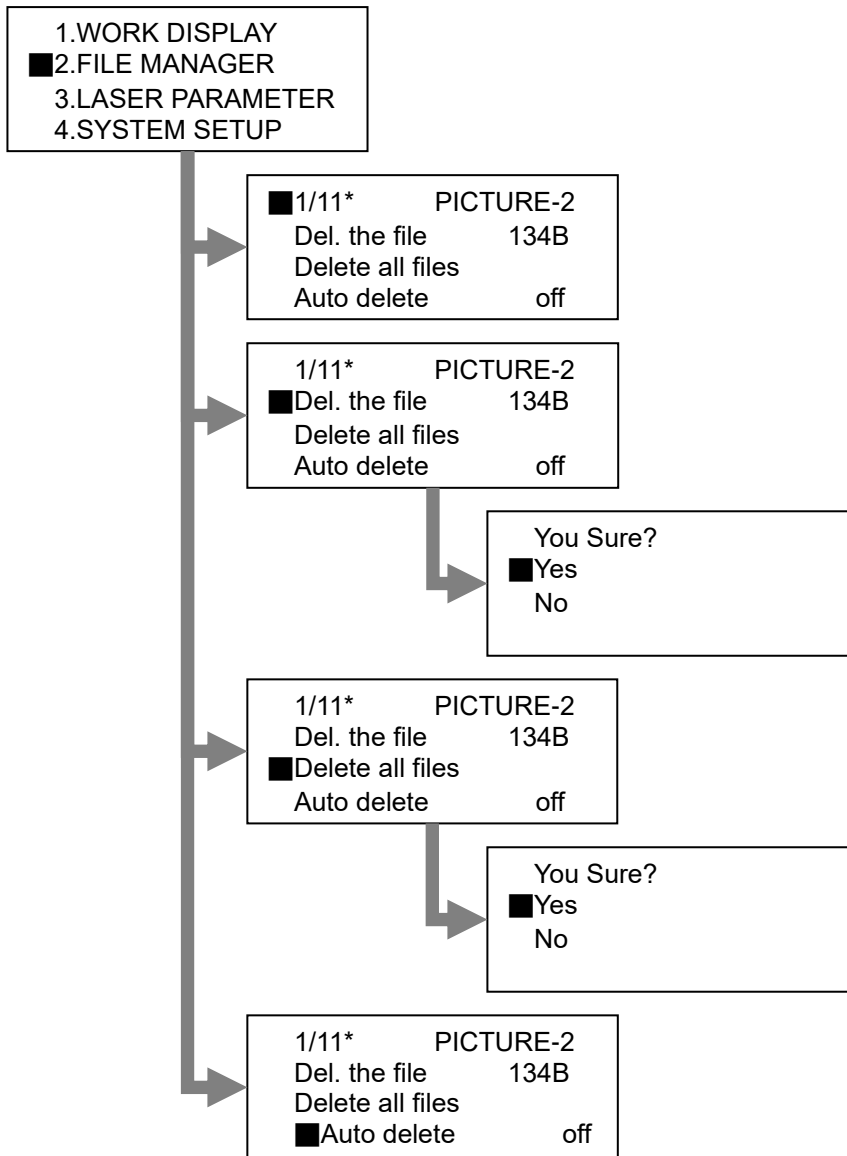
3.3.2 Operating Menu

1. Work Display



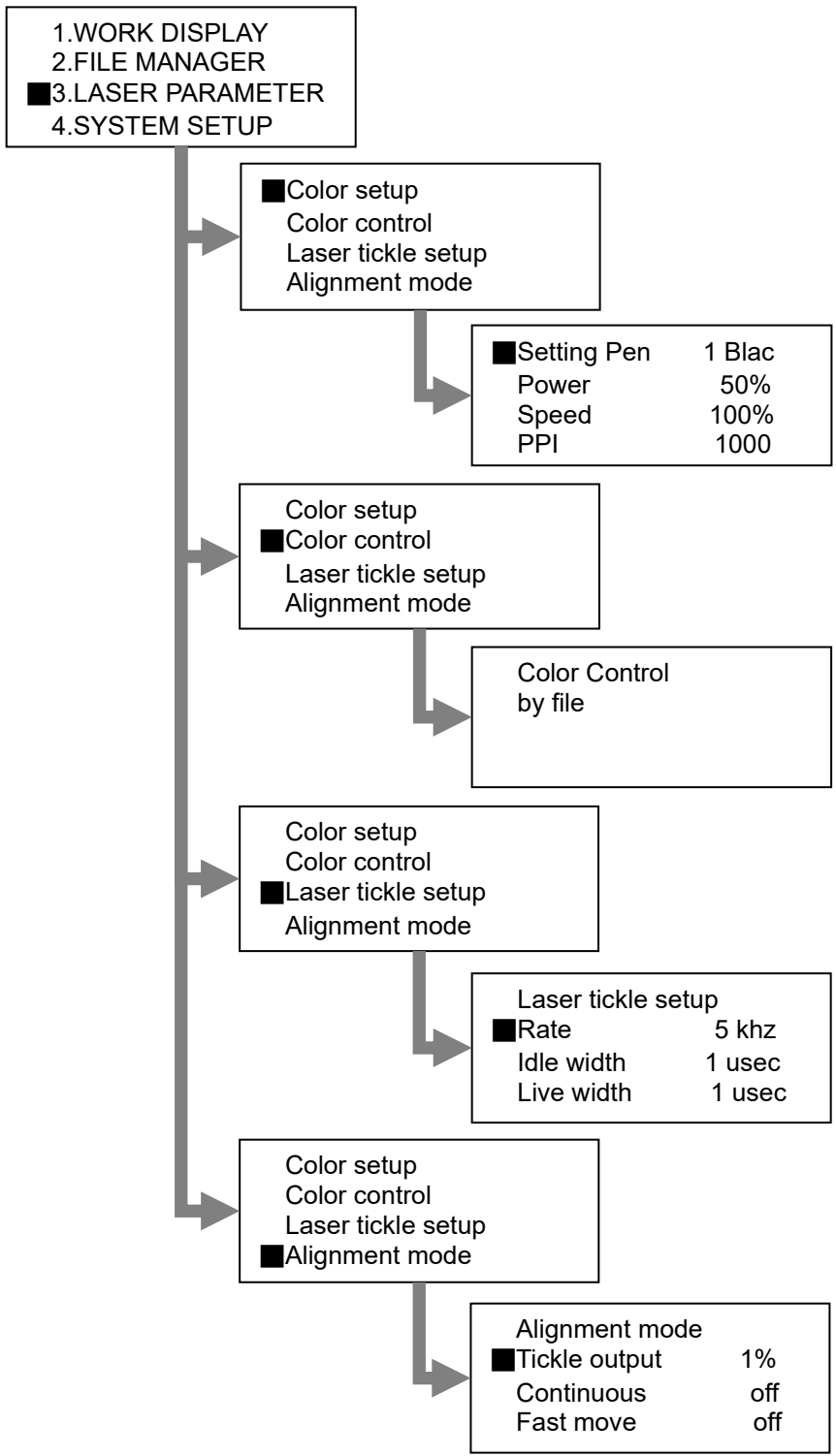
- **1 / 11***
Indicate that there are totally 11 files in memory, and the first file is selected at present. You can press and to select files.
- **PICTURE-2:**
Indicates that the first file is named "PICTURE-2".You can name file on the tab "Page" of driver. (See section [3.4.3](#))
- **QTY 2/5:**
Indicates that the file is limited to be executed 5 times at most, and system has finished 2 times. It will be invalid to press before system has finished 5 times. The way to modify this setting is described in section [3.4.3](#).
- **COPY 3:**
Indicates that the file will repeat 3 times automatically if you press one time. The way to modify this setting is described in section [3.4.3](#).
- **Time 0:29 / 0:00**
The first timer records the pass time at present when a file is executed. The second timer will record the total time if the file has ever finished at one time.
- **Free 63.15 MB dpi 0**
If no file is executed, this line will display available memory. If a file is being executed, it will display the current power and speed settings.

2. FILE MANAGER



- **1 / 11*PICTURE-2**
Like the definition in Work display, it indicates the number and name of files. You can press ◀ and ▶ to select files.
- **Del. the file:**
This selection can delete single file which is selected at present.
- **Delete all files:**
This selection can delete all files in memory.
- **Auto delete**
In on mode, after the file is executed, it will be deleted automatically. In off mode, file will be saved.

3. Laser Parameter



■ **Color Setup**

The settings of each color can be adjusted under this selection after the file has been sent. This is useful when testing parameters.

● **Setting Pen**

Indicates the color you want to modify.

● **Power**

Indicates the present power for setting pen. Its range is between 0~100%.

● **Speed**

Indicates the present speed for setting pen. Its range is between 0~100%.

● **PPI**

Indicates the number of pulses per inch for setting pen. It has six options, and they are 166, 200, 250, 333, 500, and 1000.

■ **Color Control**

There are two options: **[by file]** and **[by panel]**. **[by file]** means that the color settings are defined based on print driver for single file. **[by panel]** means that the color settings are defined based on **[Color Setup]** for all files.



When you check the join curve function in your files, the [by panel] will become only the power modification works. Even you can adjust the speed, it will use the original settings in the file. (The total working time will be the same.)



■ **Laser Tickle Setup**

The laser tickle pre-ionizes the gas into a plasma state so that it is just below the lase threshold. Increasing tickle width beyond $1\ \mu\text{s}$ will add enough energy to the plasma to cause laser emission. By applying a laser tickle, the laser will respond predictably to laser signal even when there is considerable "off" time between applied pulses. It is recommended **NOT** to change the settings unless instructed to by a LTT technician.






■ **Alignment Mode**

This function is used for alignment of laser. It is recommended **NOT** to use this function unless instructed to by a LTT technician.

● **Tickle output**

Indicates the power for laser tickle. Its range is between 0~100%.

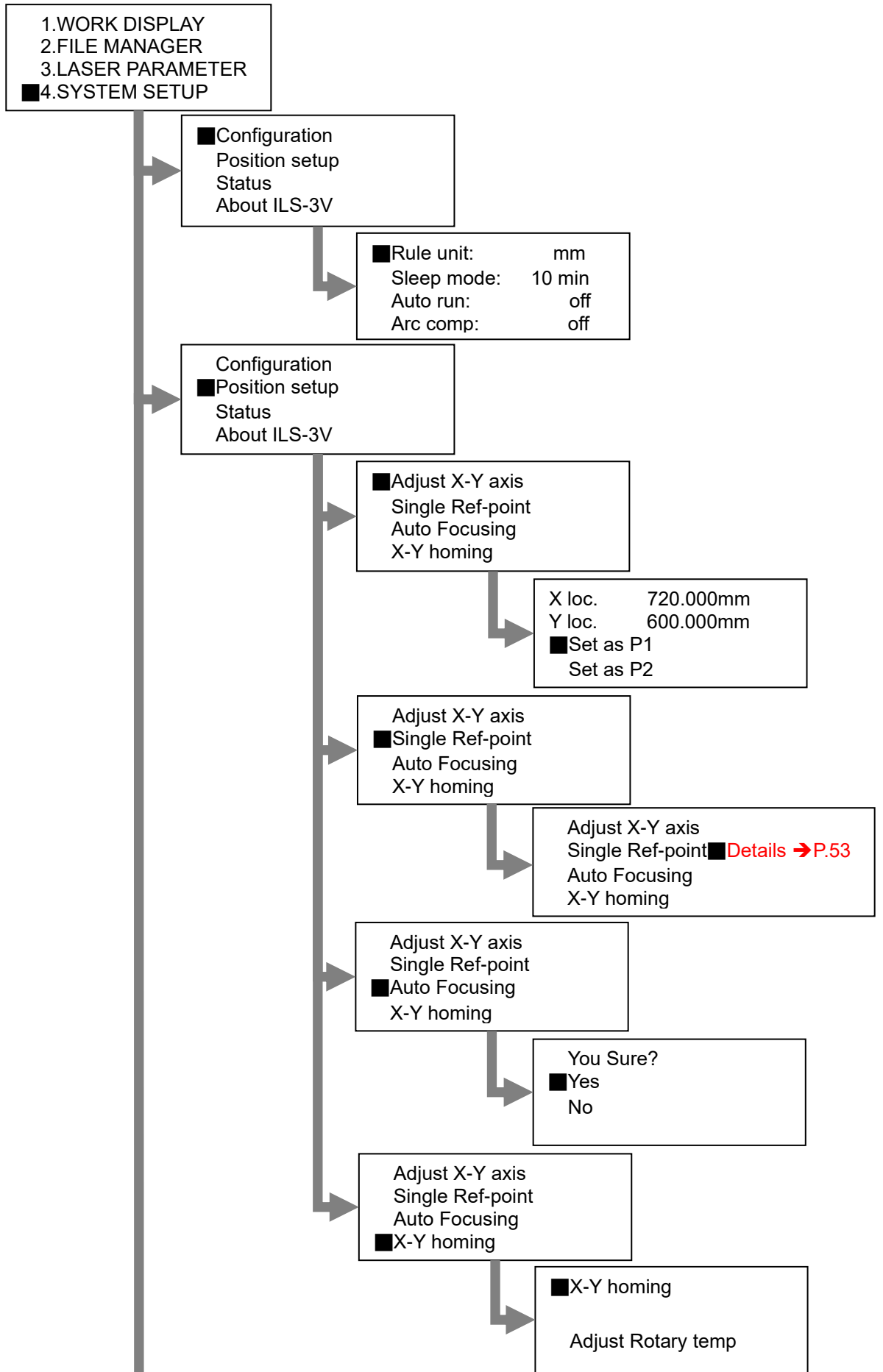
● **Continuous**

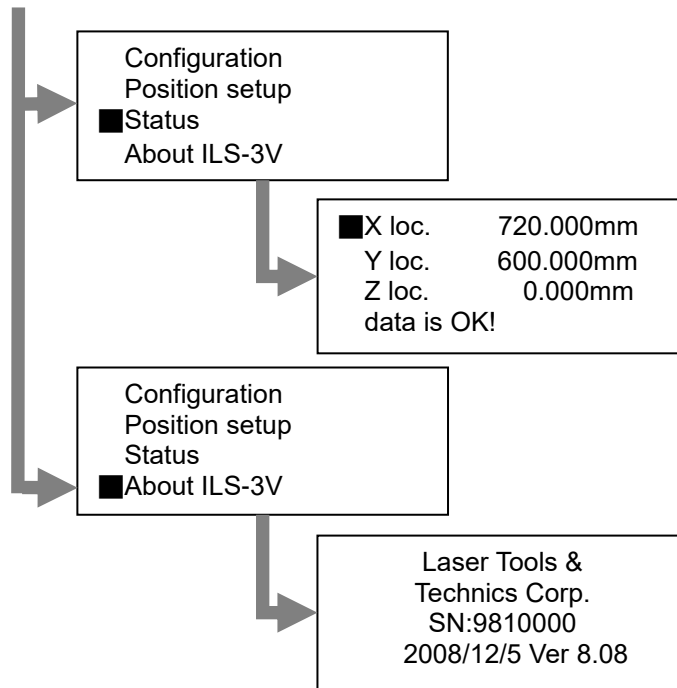
If this function is on and press  the laser tickle will emit continuously until pressing  again. If this function is off, the laser tickle emits only when you keep pressing .

● **Fast move**

If this function is on, you can move the carriage faster to nine position of working table by using motion control keys.

4. System Setup





■ **Configuration**

● **Rule unit**

This function can allow user to select the unit of length for system. There are three options: **step**, **millimeter**, and **inch**.

● **Sleep mode**

After the setting the time, system will turn off the power of laser tube if there is still no file being executed.

● **Auto run**

This item has been deactivated.

● **Arc comp**

Compensates laser output power while cutting an arc.

■ **Position setup**

● **Adjust X-Y axis**

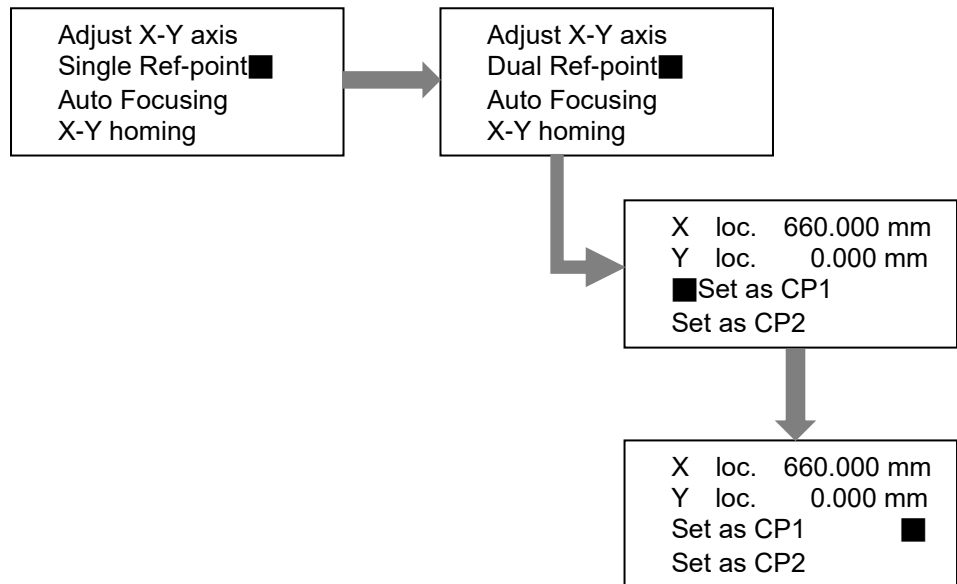
This function can allow user to set the position of **[P1]** and **[P2]**. Please move the carriage to the position that you want set for **[P1]** or **[P2]**. Then press **[Enter]** when the cursor is on the right side of **[Set as P1]** or **[Set as P2]**.


● **Ref-point**

There are 2 modes.

[Single Ref-point]: The start position is where the laser head is.

[Dual Ref-point]: User can set 2 ref-points by machine; then the start position is at the center of these 2 points. If the user needs to engrave graphics in the center of the material, we recommend that the user select this function.




You can press  to switch between [single ref-point] and [dual ref-point], then you can select the opposite corners of the material. Please select [Set as CP1], move the X-axis and Y-axis, until the red light spot stops at the position of the material you expect, then press escape to exit selection mode, now you are done setting up CP1. Then follow the same steps to set up CP2, after completing the above steps, you will be able to engrave with the center point of the material as the reference.

- **Auto Focusing**

Focusing the laser automatically. This function is the same with .

- **X-Y homing**

Move the carriage to home, and reset the position of home if the carriage loses position. This function is the same with .

- **Adjust Rotary temp**

The Ref-point for rotary axis device. [Details → Ch. 3.6](#)

- **Status**

This function can show the position of carriage and table.

- **About ILS-3V**

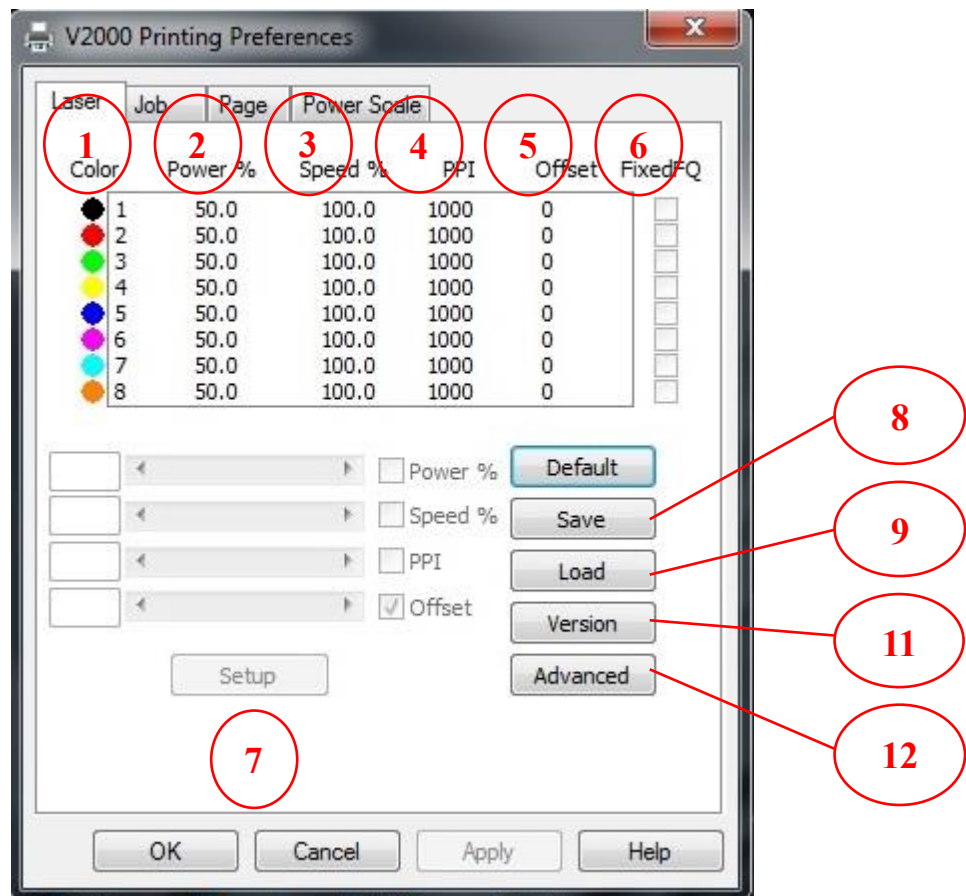
This function can show the firmware version and the machine serial number. If you have any problem with your machine, please provide us this serial number for your agent or LTT for further help.

3.4 Print Driver Operation

Because ILS-3V is controlled by a standard Windows printer driver, you can create the drawing on your favorite graphics software based on Windows system. When you want to send files to machine, you can easily modify the driver settings just like using a desktop printer. There are four tabs in printer driver programming: **Laser**, **Job**, **Page**, and **Power scale**.

3.4.1 Laser Tab

The [**Laser**] tab contains Power, Speed, and PPI for eight colors. Other functions enable user to save and load configuration files of driver settings, check driver information.



1. Color

ILS-3V system can cut or engrave with eight groups of power, speed and PPI according to the color in drawing. If the color in drawing does not belong any one of these eight colors, then driver will choose a similar one according to its RGB values.

2. Power

This item can control the output power by setting the percentage of maximum power. For example, if the maximum power of Laser generator is 30 Watts, then setting 50% power will generate about 15 Watts of output power.

3. Speed

This item can control the output speed by setting the percentage of maximum speed. For example, if the maximum speed of engraving is 60ips, then setting 50% speed will produce about 30ips of engraving speed.

4. PPI

PPI means "Pulses Per Inch". This item controls the numbers of laser pulses in one inch. This item only affects vector cutting. It is recommended to decrease PPI for dull materials like wood and increased for polished materials like acrylic.

5. Offset

The function is only for a closed vector path like circles and polygons. It can output an offset value to the original drawing.

The positive value will make the drawing bigger, and the negative will make it smaller. The unit is 1um.

6. Fix FQ

Normally, to balance the laser output between high speed and slow speed area, the controller will automatically adjust the laser power according to motion speed. Check this option will disable the adjustment and fix the laser output frequency to maintain the laser power ratio.

*This function is only available on some model.

7. Setup

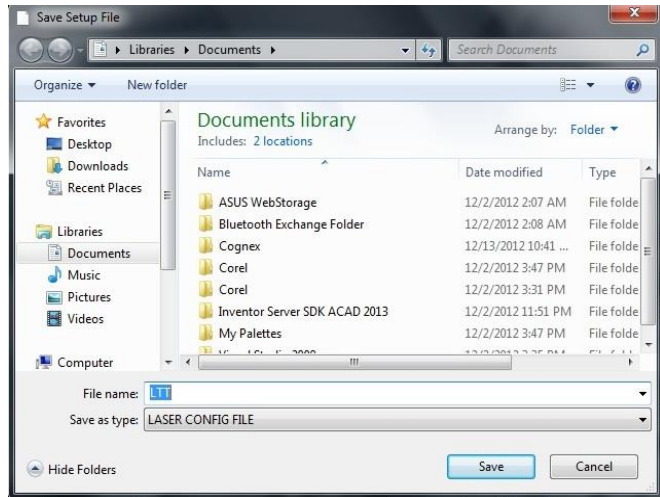
The settings of power, speed, and PPI can be modified by editing the text boxes and dragging the sliders. Then please click the setup button to save the new values for each setting.

Default

Load the default settings for printer driver.

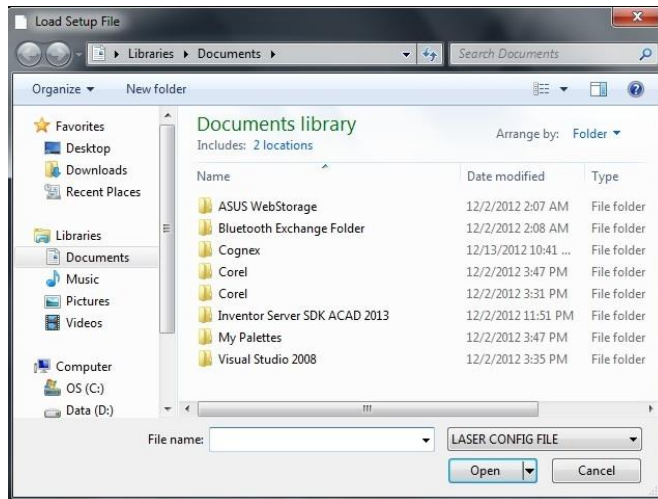
8. Save

Clicking this button will pop up a **[Save Setup File]** window. User can save all settings into a configuration file (*.lcf).



9. Load

Clicking this button will pop up a **[Load Setup File]** window. User can load all settings from a configuration file (*.lcf).



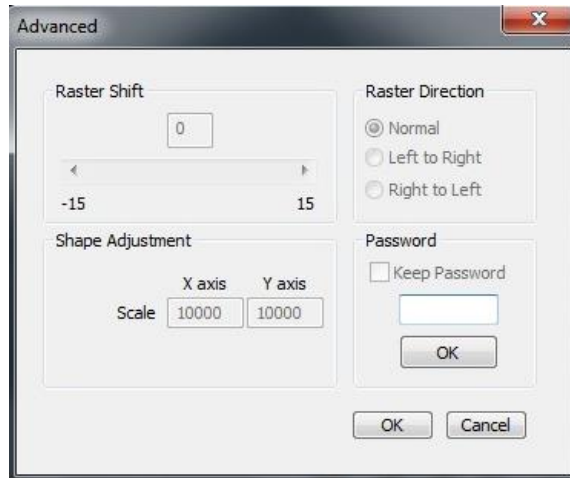
10. Version

Clicking this button will show the version of driver.



12. Advanced

Clicking this button will pop up a **[Advanced]** window that is protected by password. If you need password to modify these settings, please contact LTT. It is recommended **NOT** to change the settings unless instructed to by a LTT technician.



Raster Shift

***This function only works for servo motor machine model.**

Shape Adjustment

The range of is from 9500 to 10500. The default setting 10000 means the vector scales remain the original size without any scaling. When X axis's scale sets 10500, it means output will be multiplied by 1.05 times in x axis's direction. If the value is out of the setting range, it will turn into the originally setting value: X axis=10000, Y axis=10000 automatically. The Shape Adjustment is only works with vector (cutting) drawings.

Raster Direction

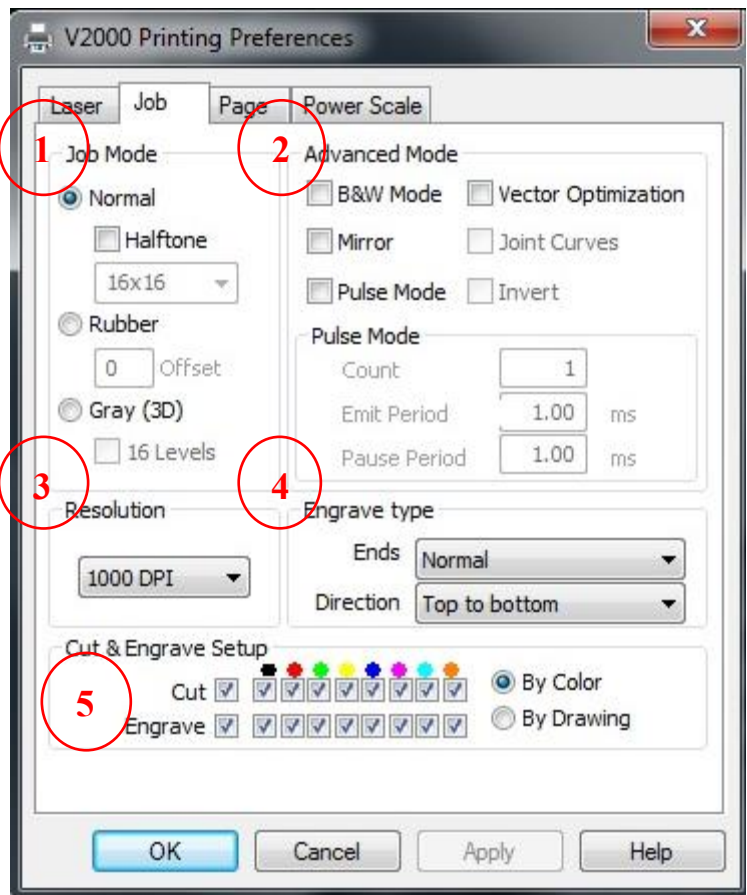
You can choose a raster quality by changing the Raster Direction. If you choose Normal, the laser engraves on both directions of left to right and right to left. Otherwise, if you choose Left to Right or Right to Left, the laser engraves only on the single direction you choose. All of those three options will produce correct engraving result as you set, but the quality of single direction will be better than the Normal option. It also takes more time to do the engravings.

Password

Check the **[Keep Password]** box, then click the **[OK]** button to allow for keeping the password. Next time you can modify the settings without password.

3.4.2 Job Tab

The Job tab is divided into four sections: **Job Mode**, **Resolution**, **Engrave Type**, and **Cut & Engrave Setup**.



1. Job Mode

Normal

This mode uses the eight color settings to raster engrave and vector cut graphics drawn in the graphic software. You can use the **Halftone** function if you want to simulate the Bitmap image with equally spaced dots of different size. The bitmap image will be filled with different dot/grid density from 16x16 dots to 4x4 dots. 16x16 dithering type would present the image high resolution than the 4x4 dithering.

Rubber

This mode is used for making rubber stamps. This mode causes the laser to create a tapered profile on the edge of the engraving. This gives small graphics more strength, preventing them from folding over when used. The profile of the edge depends on the power settings on the Power Scale tab. You can create custom profiles, but the default generally works well. You may notice that the Offset input box becomes available when the Rubber mode is selected. The Offset function will automatically increase the boldness of the engraving. The primary benefit of the offset feature is the improved quality of small text.

Gray(3D)

This mode is used for engraving three dimensional images. The driver uses 256 shades of gray to vary the amount of laser power. Darker colors of gray engrave at higher powers and lighter shades engrave at lower powers. If the 16 Levels option is enabled, the driver converts the image into 16 shades of gray and the Power Scale tab is used to control the power used for each shade of gray.

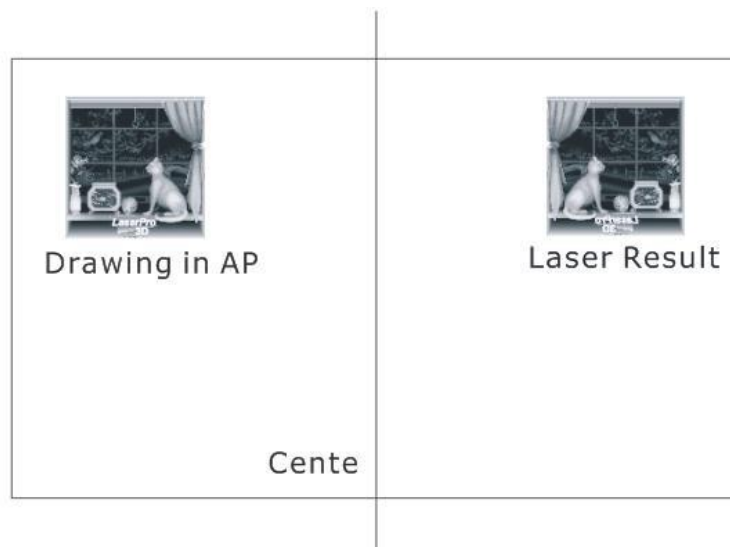
2. Advanced Mode

B&W mode

This option converts all raster objects' colors to black and white and uses the black laser setting for engraving. This mode still uses eight color settings to cut vector objects.

Mirror

This mode will mirror the images horizontally for reverse engraving. This is useful when engraving on the backs of transparent materials such as acrylic. However, we suggest mirroring your images in the graphics program which will allow you to accurately preview the engraving before the job is sent to the machine.



Pulse Mode

This mode can be enabled for drilling holes. For details on holes drilling, contact technical support.

Vector Optimization

This mode can modify the working path base on positions of vector in the drawing, it can decrease working time.

Joint Curves

Checking this box will make cutting circle or arc faster and smoother.

3. Resolution

The only variable in the resolution section is DPI otherwise known as dots per inch. The DPI setting controls the dot density of the engraver when raster engraving. This setting affects the resolution along the X and Y axis. Higher DPI settings result in smoother edges but also require more time to engrave

4. Engrave type

Ends

The Ends dropdown box allows for two selections. The Normal setting provides the fastest engraving, but the edges of detailed graphics may not align properly. The Fine setting results in slower engraving but detailed images are engraved flawlessly.

Direction

The Direction options are Top to Bottom and Bottom to Top. These options determine if the engraver begins raster engraving at the top or the bottom of the graphic. When using the bottom to top setting engraving results are slightly cleaner due to the direction of airflow inside the engraver.

5. Cut & Engrave Setup

The Cut & Engrave Setup section allows the user to enable and disable certain functions of the engraver. If the box next to Cut is unchecked the engraver will disregard any portions of the graphics that instruct the laser to vector cut. Likewise, if the box next to Engrave is unchecked the engraver will disregard the portions of the graphic that would normally be raster engraved. For more precise control the boxes below each color allow the user to disable the cut or engrave options independently for each color.

By Color

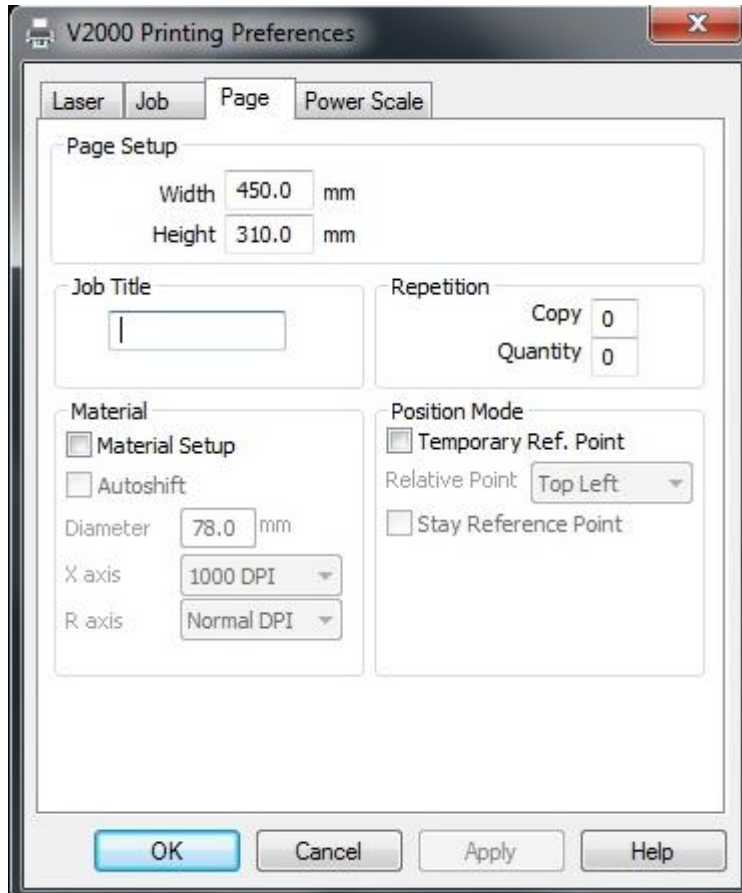
When **[By Color]** is selected vector are cut according to the predefined color order. And vectors of the same color are cut in the sequence they have been drawn. Engraving objects' orders are according to color only. Raster lines of the same color are engraving by **[Direction]** setting

By Drawing

When **[By Drawing]** is selected all vectors are cut in the sequence in which they have been drawn, regardless of color. Engraving objects won't follow this.

3.4.3 Page Tab

The Page Tab is divided into four sections: **Page Setup**, **Job Title**, **Repetition**, and **Material**.



1. Page Setup

The Page Setup section includes the Width and Height information of machine. There are three functions in this section. They are **Imperial**, **Joint Curves**, and **Time Estimate**.

2. Job Title

The Job Title input box allows the user to input a title for the job being sent to the engraver. The title entered will be the top line of the job file on the display of the engraver.

3. Repetition

The Repetition section allows the user to modify the setting of **[Copy]** and **[Quantity]** which will be shown on panel. (See section [3.2.2](#))

4. Material

The Material section is used for setting up the driver for the rotary attachment. When the Material setup checkbox is checked the Material section is enabled. The Diameter input box allows you to enter the diameter of the object in the rotary attachment. When checked, the **[Auto shift]** check box causes the driver to ignore the vertical position of the graphic on the page. This causes the engraver to begin engraving without initially rotating the object. This feature allows for easier alignment of graphics on items with handles. The X axis dropdown box is used for setting the DPI when the rotary attachment is in use. The R axis dropdown box options no longer affect the functions of the engraver.

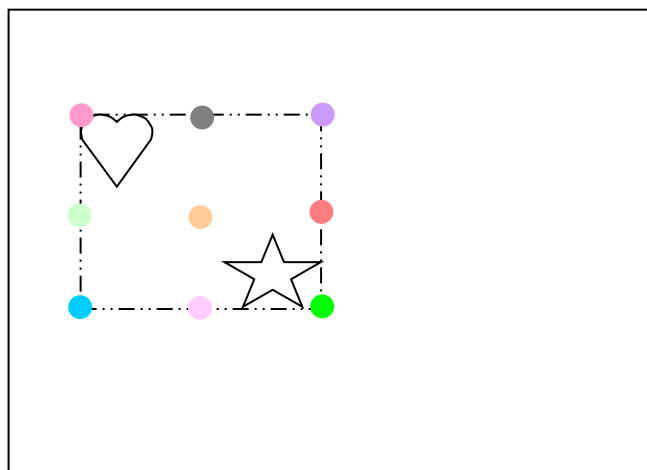
5. Position Mode

Temp Ref. Point

If this box is checked, the file will not execute in the position as application software. Otherwise, it will execute in the position where user determine on machine.

Relative Point

There are nine relative points. They are **Top Left, Top Middle, Top Right, Middle Left, Center, Middle Right, Bottom Left, Bottom Middle** and **Bottom Right**. Those points mean different positions on the boundary of drawing in application software.



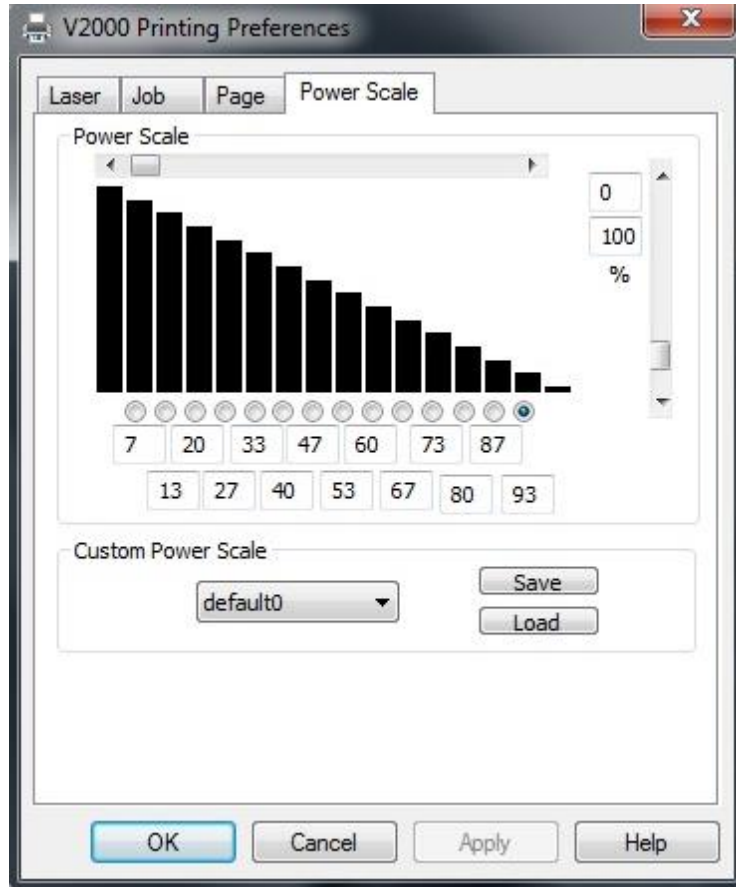
- **Top Left**
- **Top Middle**
- **Top Right**
- **Middle Left**
- **Center**
- **Middle Right**
- **Bottom Left**
- **Bottom Middle**
- **Bottom Right**
- ♡☆ **Pattern**
- **Boundary**

Stay Reference Point

If you want to stay on reference point after job finished, you can choose this option. This option can save your time when you want to use.

3.4.4 Power Scale

The Power Scale tab is divided into two sections, **Power Scale** and **Custom Power Scale**.



1. Power Scale

The Power Scale section is used to adjust the strength of the laser power. While in Rubber mode, the Power Scale function will control the curve of the tapered profile. While in Gray (3D) mode, with 16 Levels option selected, the Power Scale function will control the amount of laser power for each gray level. The horizontal scrollbar is used to adjust the default power scale setting. The vertical scrollbar and the input boxes below the bar graph are used to independently adjust each power scale depending on which scale is selected.

2. Custom Power Scale

The Custom Power Scale section allows the user to Save and Load up to five Power Scale parameters for later use.

3.4.5 Color Definition

The LTT printer driver defines the eight colors mentioned above according to the following chart. You must use these same definitions in your graphics program. If your color definitions are different, the printed results may be unpredictable. If your graphics software allows you to save color palette, start by creating a palette with the first eight colors as defined above, in the order given, you will save yourself lots of frustration later.

COLOR	RGB		
	RED	GREEN	BLUE
BLACK	0	0	0
RED	255	0	0
GREEN	0	255	0
YELLOW	255	255	0
BLUE	0	0	255
MAGENTA	255	0	255
CYAN	0	255	255
ORANGE	255	128	0

Note that the color assignments have nothing to do with color imaging or color bitmaps. Colors are used simply as a means to indicate different laser parameters for different areas of a graphic.


If you use a color other than above eight colors, the driver will choose one of those, which is close to that you chose and apply a halftone pattern to represent the original color's shade. For example, a rectangle filled with pink, the driver will analyze the value of RGB in the color of pink and choose one of the pre-defined colors to represent it. You may expect the driver to choose red, but the real color the driver chose is magenta.

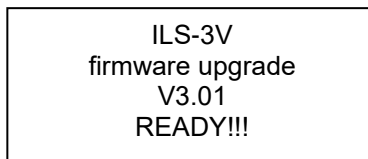
If your graphic software has color correction function, you must disable it. Color correction will modify the RGB value of colors before print.

3.5 LTT Product Tools

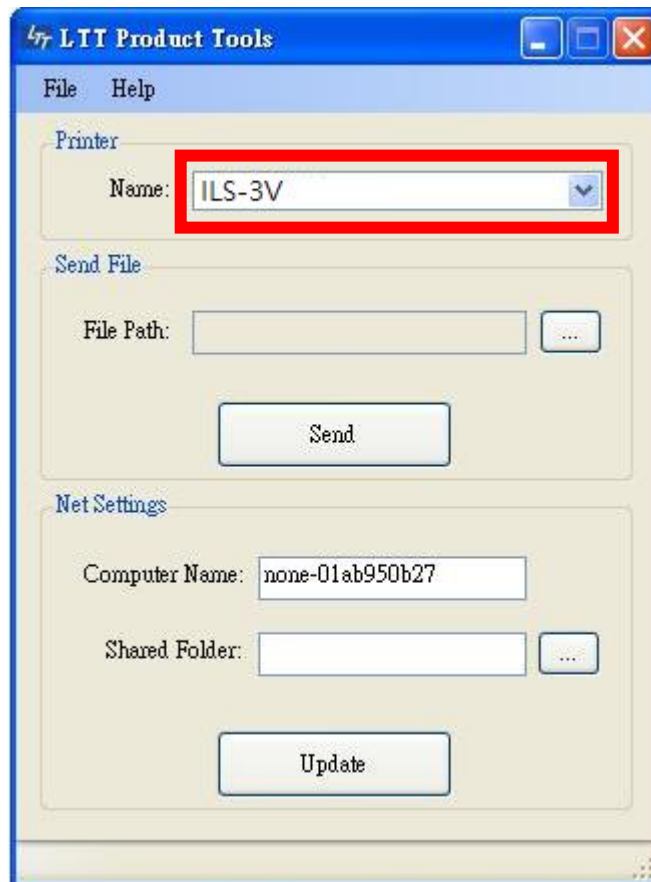
3.5.1 System Upgrade

Generally, the file for upgrade will be provided from LTT. The file type is **[*.ice]**. While upgrade is processing and the power is turned off or the cable is disconnected, the ILS-3V may not be upgraded for the moment. If this situation happens, please contact LTT.

1. Turn off the ILS-3V, and check that the ILS-3V is connected with PC through USB cable.
2. Turn on the ILS-3V and computer. Press and hold  on the control panel right after turning on ILS-3V until the following screen appears.

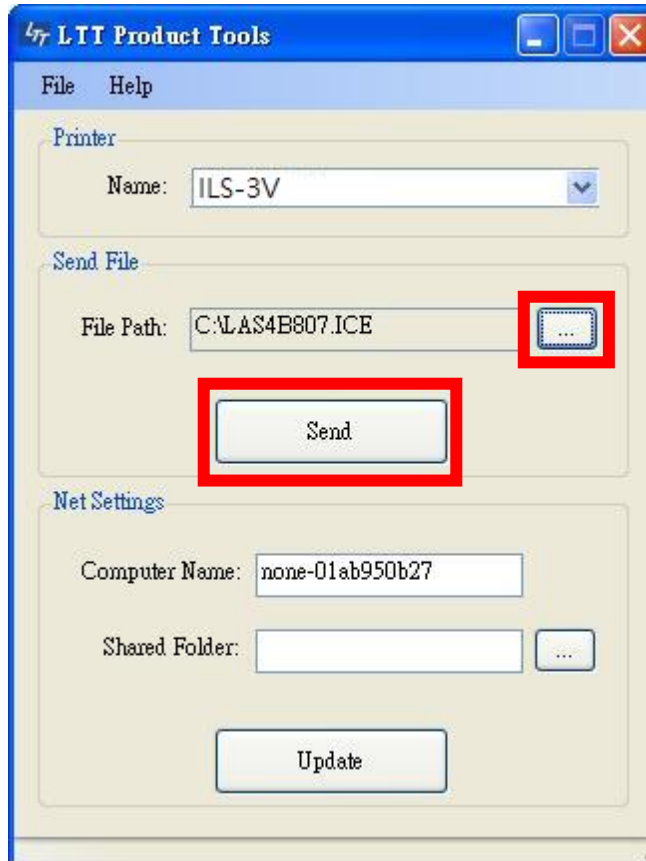


3. Run **[LTT Product Tools]**, and select the printer. ILS-3V

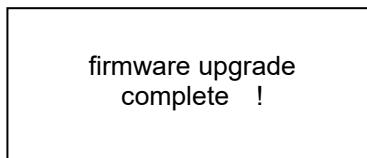



Chapter 3 Operation

4. Then select the [***.ice**] file with [...] key, then press [**Send**] key to upgrade the firmware of ILS-3V.



5. You will hear two short beeps along with the following display, showing that the upgrade has completed successfully.



6. Press  on the Control Panel and you will hear a beep after which ILS-3V returns to main menu.

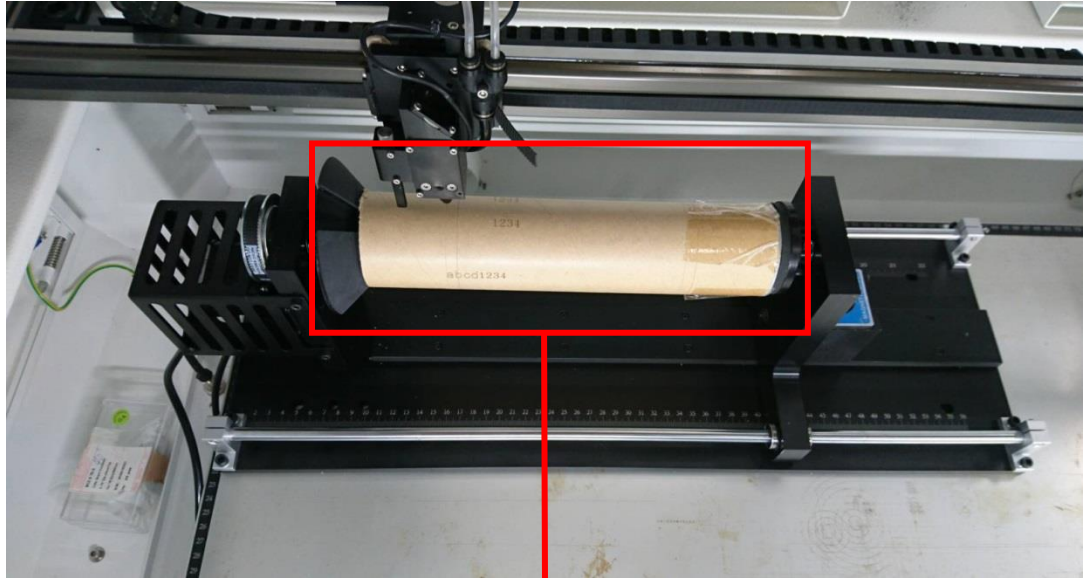
7. Check the firmware version in the 4th line of the [**ABOUT**] submenu (See section [3.3.2](#)).

3.6 Rotary Ref-point introduction

3.6.1 What is Rotary Ref-point

You can use this function to work on cylinder surface.

It is similar to the **Single Ref-point** function.



You can put the material on rotary attachment.

3.6.2 How to set up Rotary Ref-point

At first, turn on the power of machine.

01. Go to **4.SYSTEM SETUP\Position setup\X-Y homing**



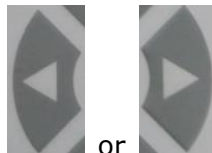
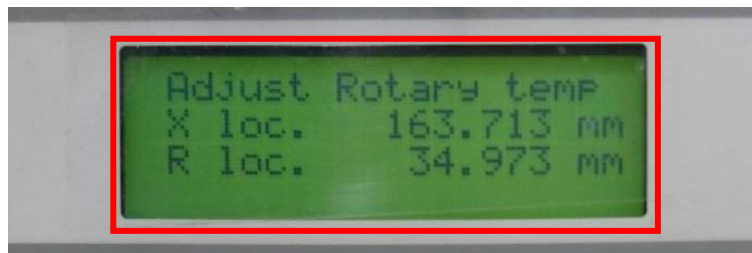
P.S. You also can press  to this page.

02. Select **Adjust Rotary temp** on the LCD.

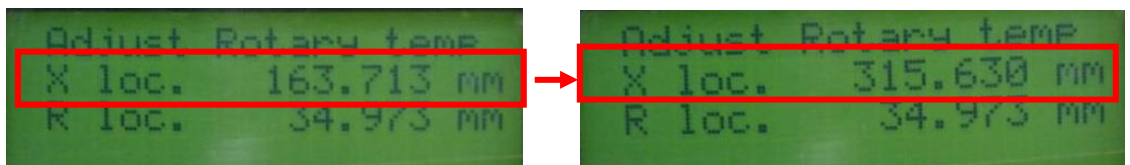
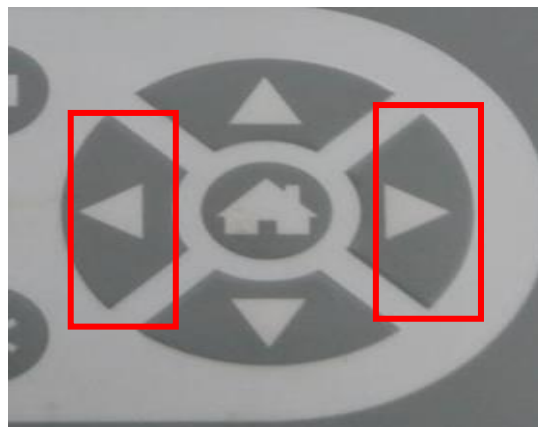


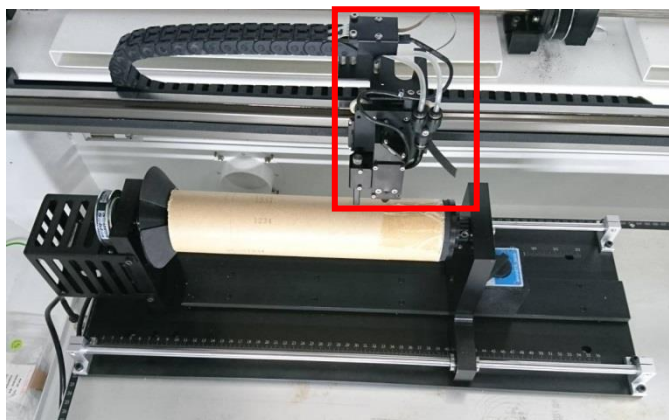
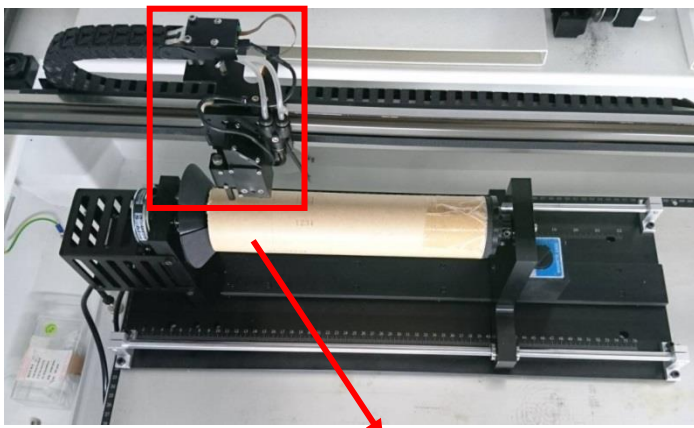
03. Press  to enter next menu.



04. You can see the coordinate of X and R on the LCD.

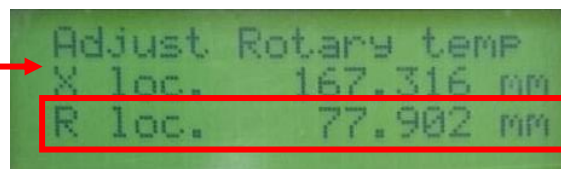
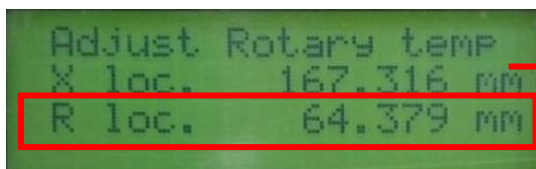
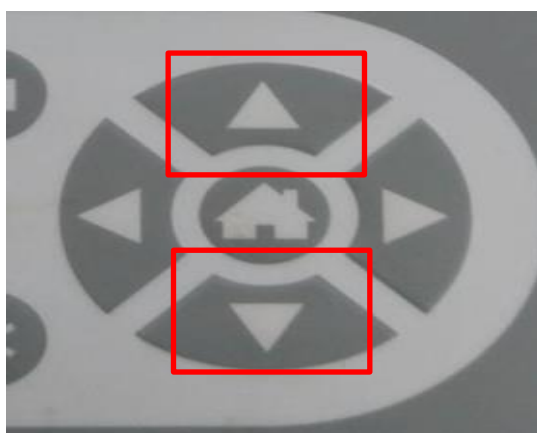


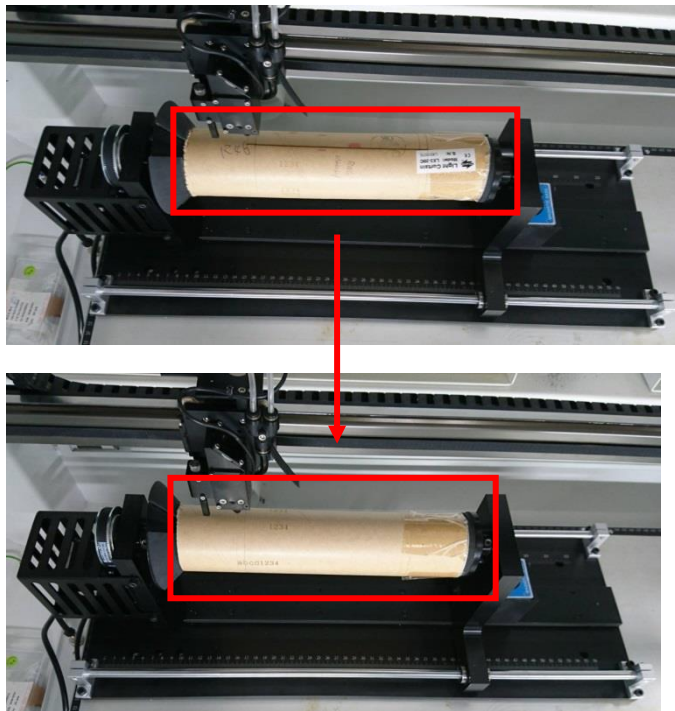
05. Press  or  to change X-axis position.






06. Press  or  to change R-axis position.

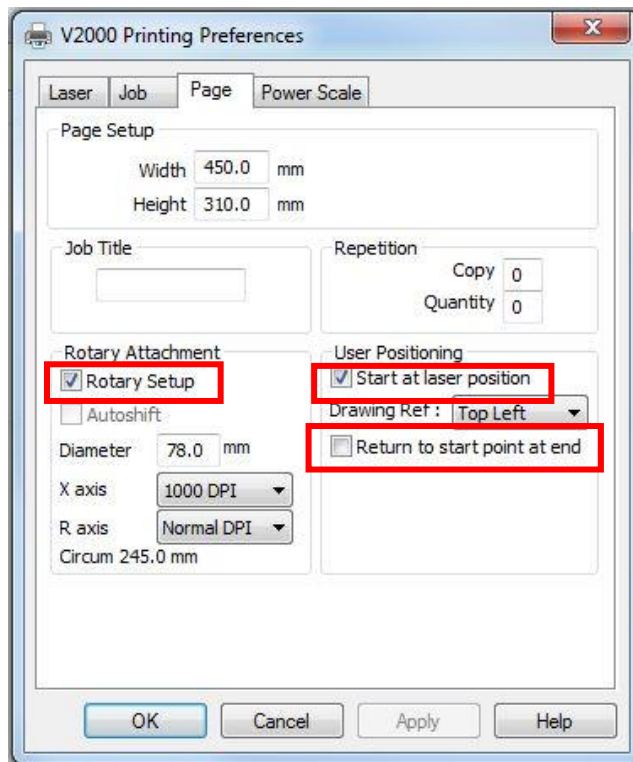




07. Press  to return to main menu on the LCD, and focus module (laser head) will go back to X-Y home position. Now the **Rotary Ref-point** is ready.

3.6.3 Notice for Rotary Ref-point

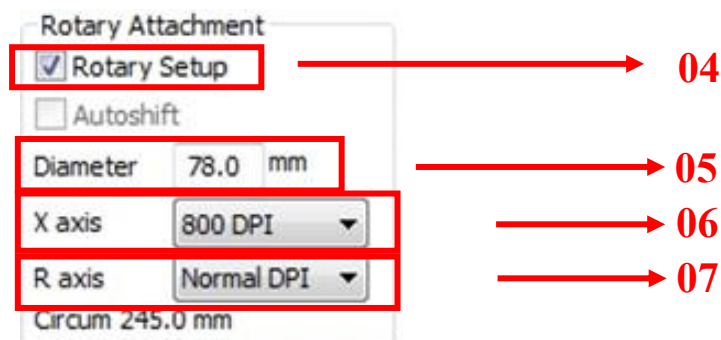
01. When you reboot the machine, your rotary ref-point will be restored to the initial value.
02. If you have finished rotary ref-point settings, please return to the main menu. Else you press run button, the machine will not run.
03. We strongly recommend user setup as the followings. Please check **Rotary Setup** and **Start at laser position**.



→ You can check or uncheck it. It will not cause any impact.

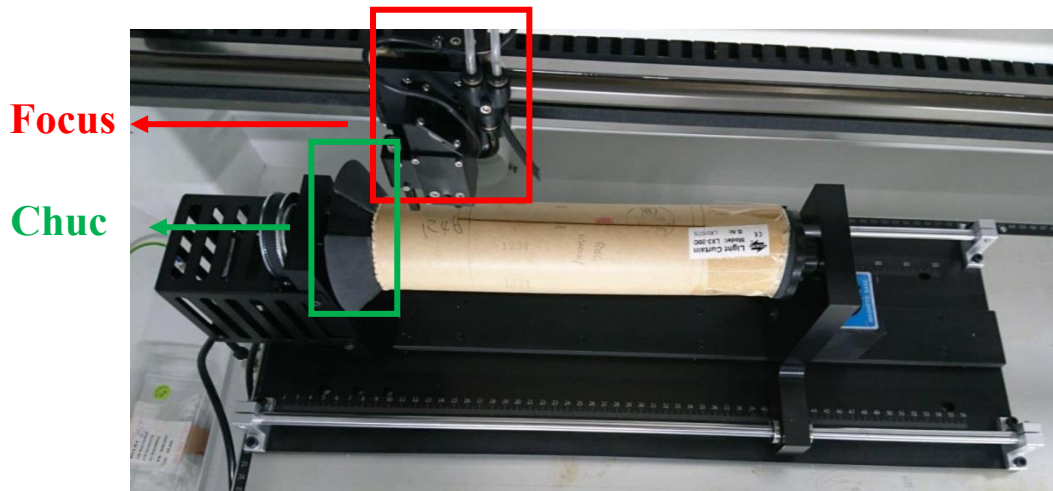
After it finishes the first running, you still can press run again before you take off the material. It will engrave on the same position.

04. Please check **Rotary Setup**, or you can't use the function of rotary attachment.
05. Please set the diameter of your material
06. Please set the DPI of the X-axis.
07. Please set the resolution of the Rotary-axis.



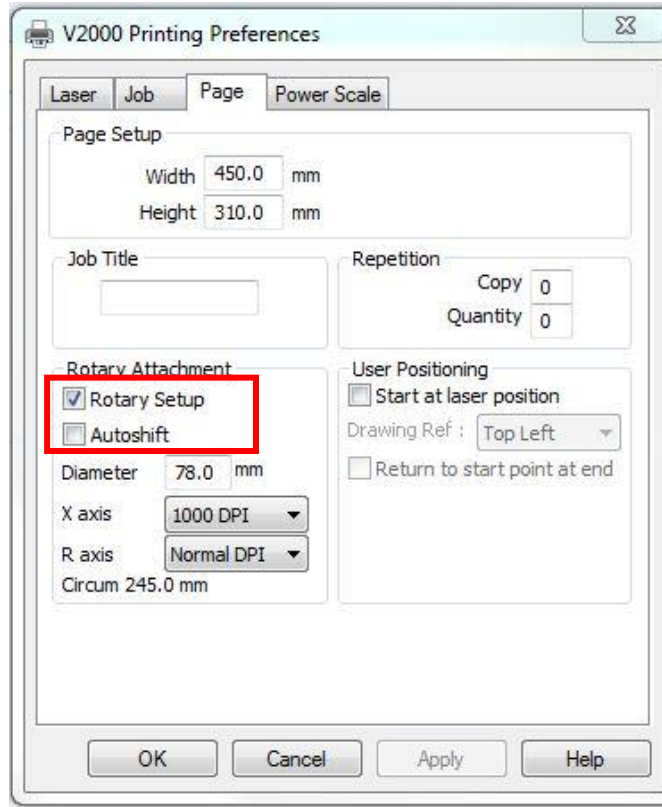
Chapter 3 Operation

08. When you adjust the rotary ref-point, please be careful about the position of your focus module (laser head). If the focus module (laser head) is too close to the left, the focus module (laser head) may hit with chuck.

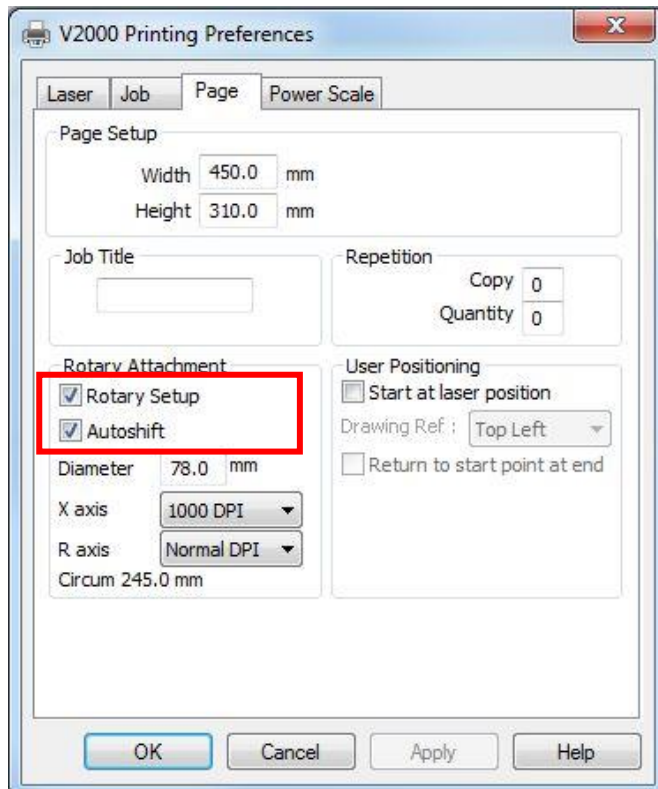


3.6.4 How to avoid trouble in Rotary Ref-point

01. If you only check **Rotary Setup** on the driver and without **Autoshift**.
It will be run on rotary attachment, but we can't predict where the engraving is.
When you want to engrave again, it will not engrave on the same position.



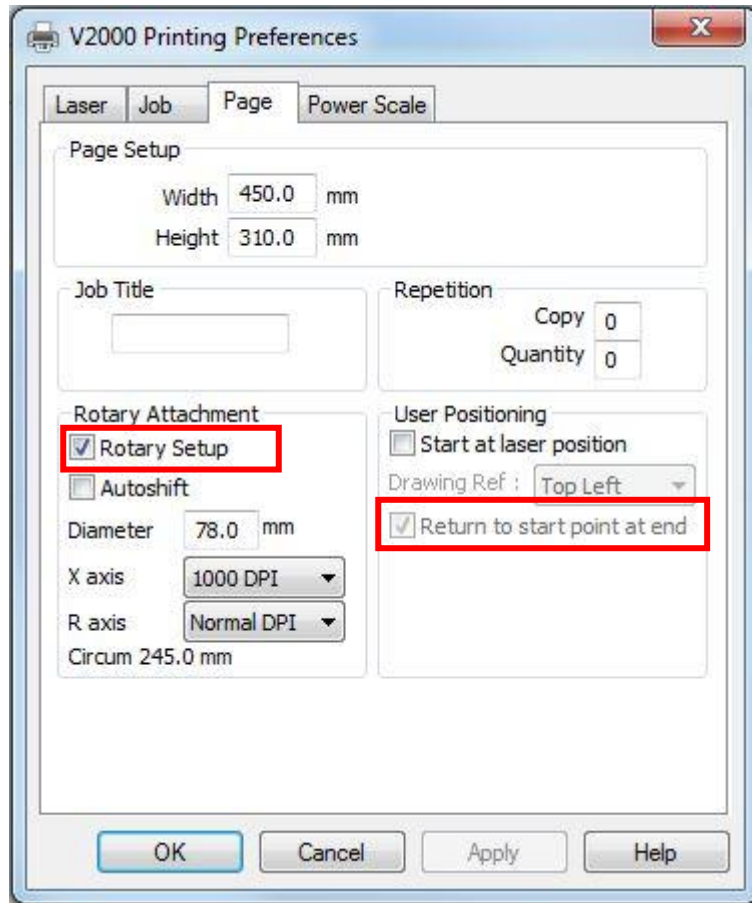
02. If you check **Rotary Setup** and **Autoshift** on the driver.



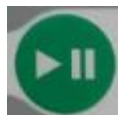
It will be run directly on rotary attachment and without any moving on the Rotary-axis.

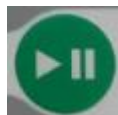
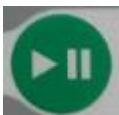
When you want to engrave again, it will start below the original image file.

03. If you check **Rotary Setup** and **Return to start point at end** on the driver.

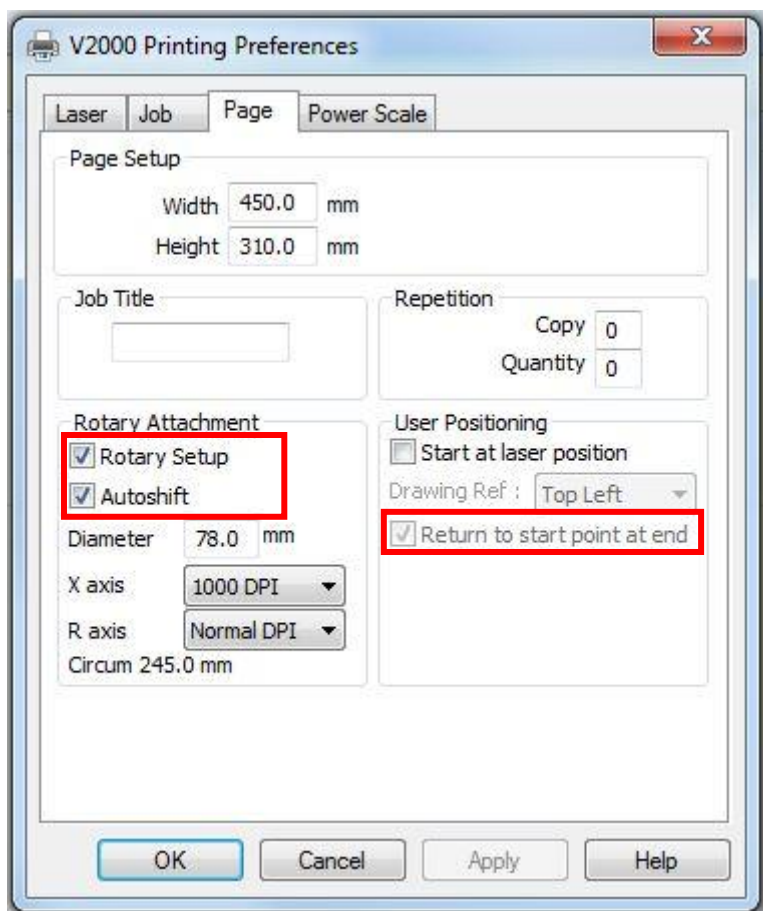


This bug is like item 01.



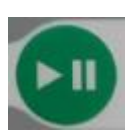
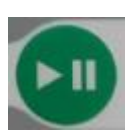
But when you press  to pause and then press  again to start, the Rotary-axis will rotate back and forth three times, and when engraving is end, the focus module (laser head) will not go back to X-Y home position.

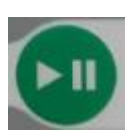
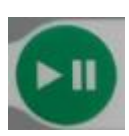
04. If you check **Rotary Setup** and **Autoshift** and **Return to start point at**



end on the driver.

Its bug is like item 02.



But when you press  to pause and then press  again to start, the Rotary-axis will rotate back and forth two times, and when engraving is end, the focus module (laser head) will not go back to X-Y home position.

Chapter 4 Maintenance

4.1 Cleaning



1. Preparation

- Ensure that the system is turned off and the AC power cable is unplugged.
- Prepare for cotton swab, cotton cloth, and alcohol.

2. Clean machine

- Remove all loose dirt and debris from inside of the machine.
- Clean the top window with cotton cloth and alcohol.
- Clean the working table surface with cotton cloth and alcohol.
- Clean all of the rails of the motion system with cotton swab and alcohol.



3. Clean lens and mirror

- Clean the window lens with cotton swab and alcohol.



- **Clean 2nd mirror with cotton swab and alcohol.**

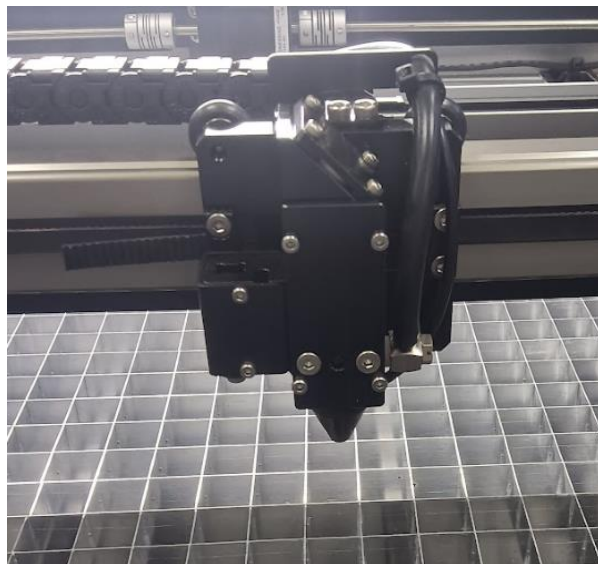


- **Clean 3rd mirror and focal lens with cotton swab and alcohol.**



Clean focus lens with cotton swab and alcohol.

Pull out the focus lens.



Assembly the focus lens back after the clean process.

Chapter 5 Trouble Shooting

This chapter provides suggestions to check and solve some common problem. If you can't find any answer in this chapter, please see introduction to call technical support!!

Problem	Cause	Remedy and reference
Power is not turned on.	AC power cable is not connected properly.	Check Hardware Installation. (See section 2.4.)
	Emergency stop is pressed down.	Turn right the pushbutton. (See section 2.3.)
Laser beam is not emitted.	Laser on/off switch may be turned off.	Turn on the switch. (See section 2.3.)
	Doors with interlocks are not closed. (If "Door" indicator is dark.)	Close all doors with interlocks. (See section 2.3.)
	The temperature of laser generator is too high.	Stop job for a certain time to cool laser generator.
	Laser beam is misalignment.	Realign by adjusting mirrors.
	The setting of laser power is too low.	Increase the setting. (See section 3.4.2.)
	Laser tube is break down.	Please contact LTT. (See Introduction)
Cutting or engraving quality is bad.	Focal length is not suitable.	Adjust focal length. (See section 3.3.1)
	Lens and mirrors are dirty.	Clean the lens and mirrors. (See section 4.1 and 4.2)
	Setting of focal length on panel does not match with lens.	Modify the setting. (See section 3.3.2)
	Lens and mirrors are broken.	Please contact LTT. (See Introduction)
	The settings of laser power are not suitable.	Modify the setting. (See section 3.4)

Appendices

Appendix 1 Specifications

This section describes the specification of the ILS-3V series.

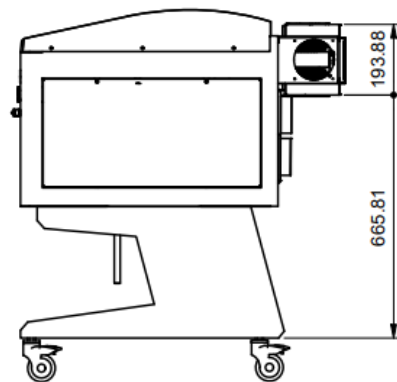
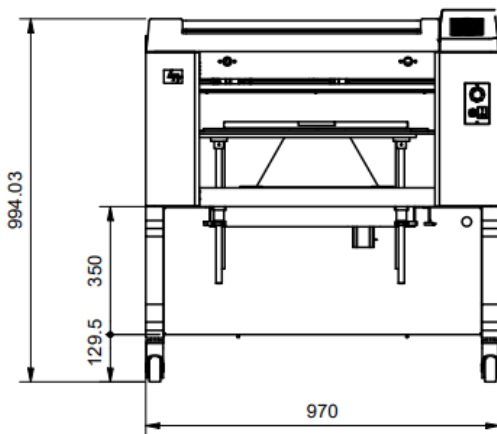
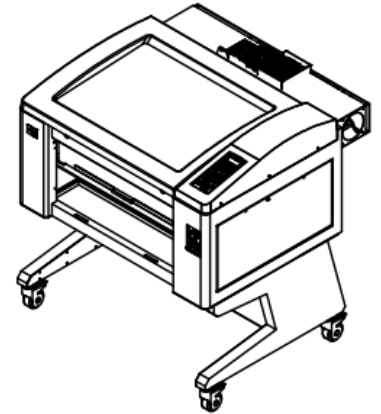
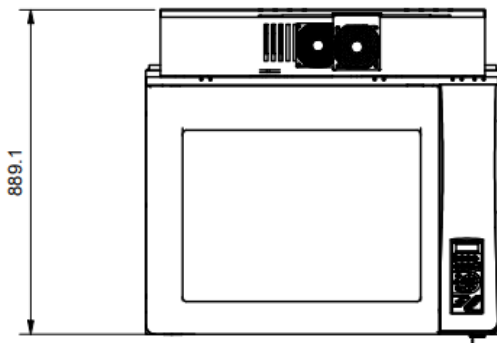
Model	ILS-3V series
Working area	680 (L) × 500 (W) mm
Table Movement	92 (H) mm
Max. speed	1524mm/sec (60"/sec)
Resolution(DPI)	1000, 500, 333, 250, 200, 160
Memory Buffer	64MB
Interface	USB port
Laser generator	30W / 60W /100W (air-cooled CO2 laser)
Power supply	30W : 100~240V AC, 10 Amp, 50/60 Hz 50~60W : 220~240V AC, 10 Amp, 50/60 Hz 80~100W : 220~240V AC, 15 Amp, 50/60 Hz
Exhaust	requiring at least 6.0 m ³ /min air flow for two 4" connection
Regulatory Compliance	CE certification RoHS directive
Standard	Auto Focus Red-beam Pointer
Options	Blower Air compressor Rotary attachment Honeycomb cutting table Rubber stamp fixture Ethernet Port

Appendix 2 Dimensions

This section describes the dimensions of ILS-3V series.

■ ILS-3V series

Unit: mm



Appendix 3 Suggested Power and Speed Settings

The below settings are only intended to be starting points. Many variables can affect actual settings. Different manufacturers have different formulations, laser tubes differ in actual power output, natural materials vary greatly, and the user desired results will drastically affect actual settings.

Laser Source : 30 Watt						
Material	Type	Thickness	Speed	Power	PPI	DPI
Acrylic	Engraving		100%	20%		500/1000
	Cutting	3 mm	3%	100%	1000	
		5 mm	2%	100%	1000	
	Cutting	10 mm	0.5%	100%	1000	
Anodized Aluminum	Engraving		100%	40%		500/1000
Card Stock	Cutting		40%	100%	250	
Cermark	Engraving		25%	100%		500
Ceramic Tile	Engraving		60%	100%		500
Coated Brass	Engraving		100%	50%		1000
Crystal	Engraving		100%	30%		500
Denim	Engraving		100%	30%		500
	Cutting		20%	100%	500	
Glass	Engraving		100%	50%		500
Granite	Engraving		60%	40%		333
Laser Foil	Cutting		50%	100%		1000
Laser able Plastic	Engraving		100%	20%		1000
	Cutting	1.5 mm	8%	100%	500	
Leather	Engraving		100%	70%		500
	Cutting		2%	100%		
Marble	Engraving		60%	23%		333
Rubber Stamp	Engraving		15%	100%		1000
	Cutting		4%	100%	500	
Wood	Engraving		100%	100%		500/1000
	Cutting	3 mm	7%	100%	500	
		6 mm	2.5%	100%	500	