Laser Tools & Technics Corp.

User Manual

Version 1.8 e

i.LASER Series

Introduction

Technical Support

Thank you for purchasing the i.LASER 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@lttcorp.com
Web: www.lttcorp.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.

Contents

Chapter 1 Safety

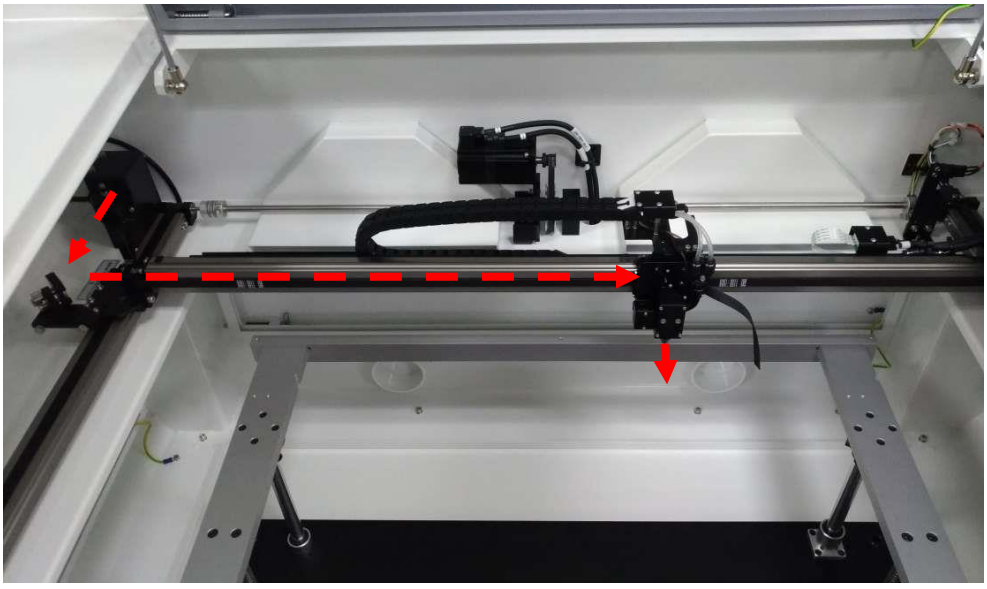
1.1 Safety Regulation

The i.LASER series uses a CO_2 Laser as a light source. It is classified as a class-IIIR product by **CDRH (the Center for Devices and Radiological Health)**.

Wavelength : 9.3、10.6μm
Maximum output power : 30 ~ 100W
Visibility : Invisible

When operating the i.LASER 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 top and front doors.
- Be careful about the path of the invisible laser beam shown in figure. Otherwise, eye or skin injury may result.



- Do not watch the laser beam directly during operation. Bright light caused by the lasing process can damage the eye.
- The side and rear doors are fixed by screws for safety. If you open these doors, the i.LASER will become a Class 4 laser device. For your safe, please wear protective goggles.
- The laser beam may cause fire. Never leave machine along without other operator watching during the laser cutting and engraving process. Keep a fire extinguisher near the machine at all times.
- Blowing materials with air flow from nozzle while cutting or engraving can avoid fire occurring and also obtain good quality.
- 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 i.LASER 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 i.LASER. These labels must never be removed. If they are damaged or tampered for any reason, please request for LTT immediately to replace them.


5

1


Laser Tools & Technics Corporation
Model No: i.LASER 4000-adv
Serial No: 20200142
Specification: Vi30, 220V
Manufacture Date: 2020 .02
www.lttcorp.com
MADE IN TAIWAN

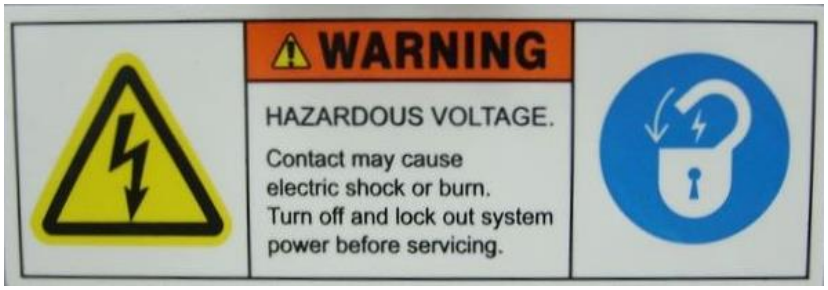
2


CAUTION
Laser Hazard
Visible and/or invisible laser radiation when opened.
Avoid eye and skin exposure to direct or scattered radiation.

3


WARNING
Moving Parts Present
Can result in serious injury
to hands or fingers.
Keep hands away from
moving parts.
Disconnect and lockout
power before servicing.

4


WARNING
HAZARDOUS VOLTAGE.
Contact may cause
electric shock or burn.
Turn off and lock out system
power before servicing.

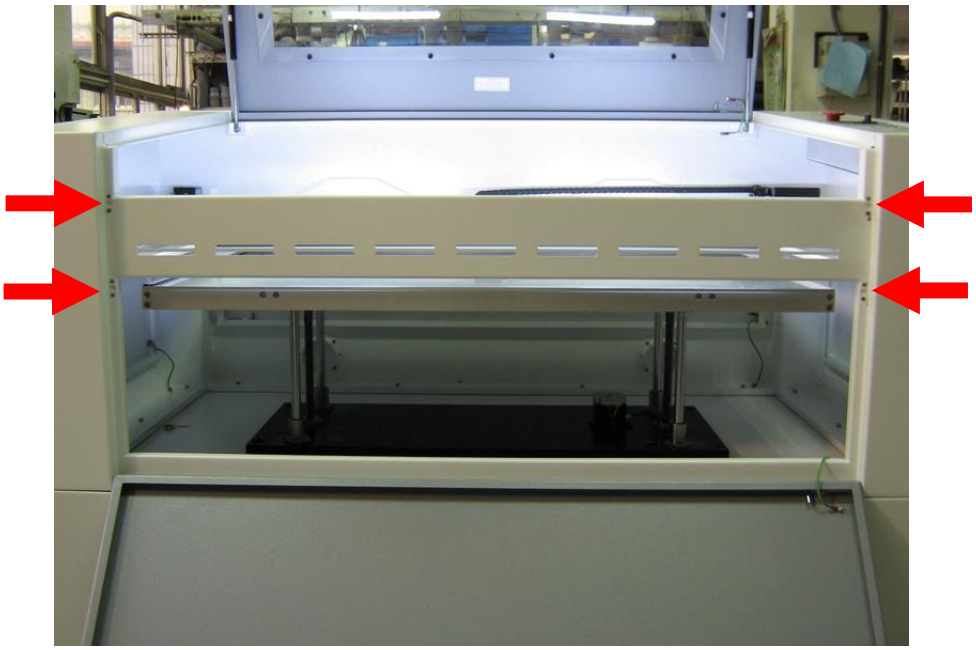
5


AVOID EXPOSURE
INVISIBLE LASER RADIATION
EMITTED FROM THIS APERTURE

1.3 Safety Protection Device

■ Interlock

The laser beam will not be emitted if you open the **top** or **front** doors. When any door is opened, the LED indicator of "**DOOR**" on control panel will be off.



Both doors close

Any door opens

■ Laser Switch

Laser switch on control panel can shut down the power of laser system 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).

■ **ON**

■ **OFF**

■ Emergency Stop Switch

Pressing the red pushbutton can shut down the main power of system immediately when emergency condition occurs. And turning right the red pushbutton can recover the power (Before recovering power, please clear the trouble in the machine first).

■ **ON**

■ **OFF**

Chapter 2 Installation

2.1 Unpack and Locate Machine

This section explains how to unpack and locate machine.

1. Remote the strings.

2. Remove the protective bag.

3. Remove the top cover.

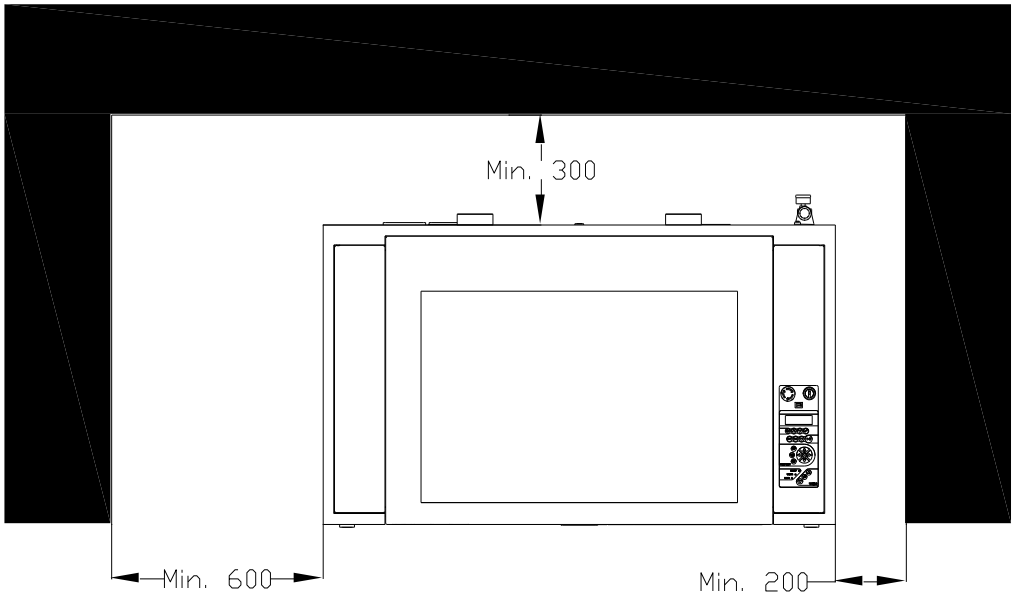
4. Remove the side cover and foam.

5. Remove the protective bag.

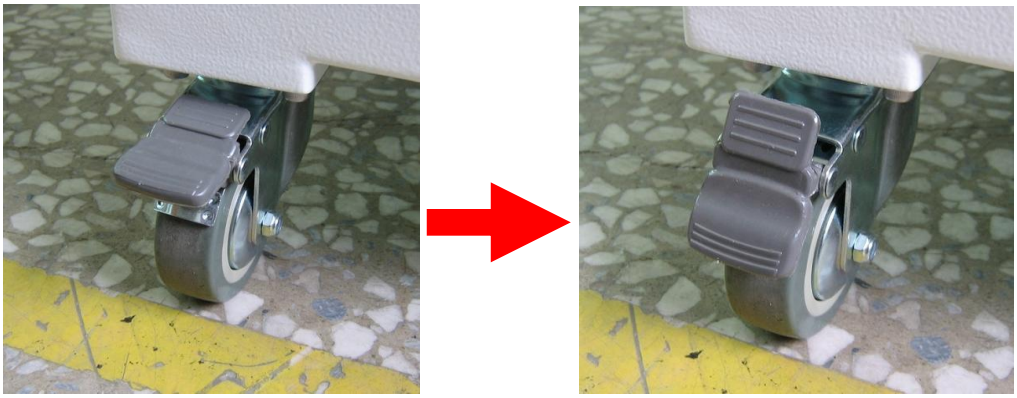
6. Remove the foam at bottom.

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

Unit: mm



8. Lock the wheels to locate the machine.



2.2 Package Contents List

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

1	**Box**	**5**	**LaserCAM Driver CD-Rom**
2	**Cotton Swab**	**6**	**USB Cable Driver CD-Rom**
3	**Alcohol Dropper**	**7**	**USB Cable**
4	**Allen Wrench**	**8**	**Power Cable**

2.3 Part Names and Functions

This section explains the main part names and functions of the i.LASER.

1. Lid

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

2. Front Door

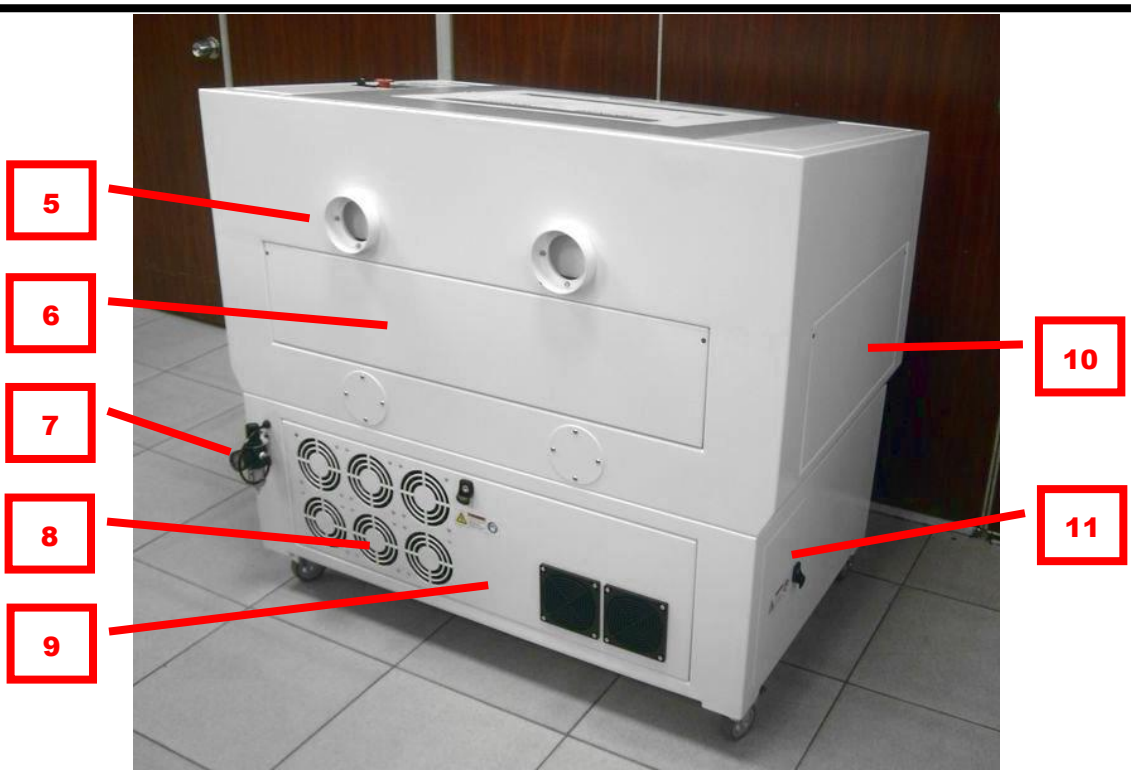
This door has interlock sensors for safety. If you open this door, the laser will be not emitted.

3. Side Door (Right)

You can work on long materials through two side doors. These doors have no interlock sensors, so they are locked by screws for safety. If you open these doors, the system becomes a Class 4 laser device.

4. Front Door of Chassis

Mostly opening this door is for maintaining. Do **NOT** open this door if it's not necessary, especially the machine power is on.



5. Exhaust Port

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

6. Rear Door

You can work on long materials through front door and this door. This door also has no interlock sensors, so it is locked by screws for safety. If you open this door, the system becomes a Class 4 laser device.

7. Air Filter

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

8. Fans

These parts can dissipate the heat in the chassis which is caused by laser generator.

9. Rear Door of Chassis

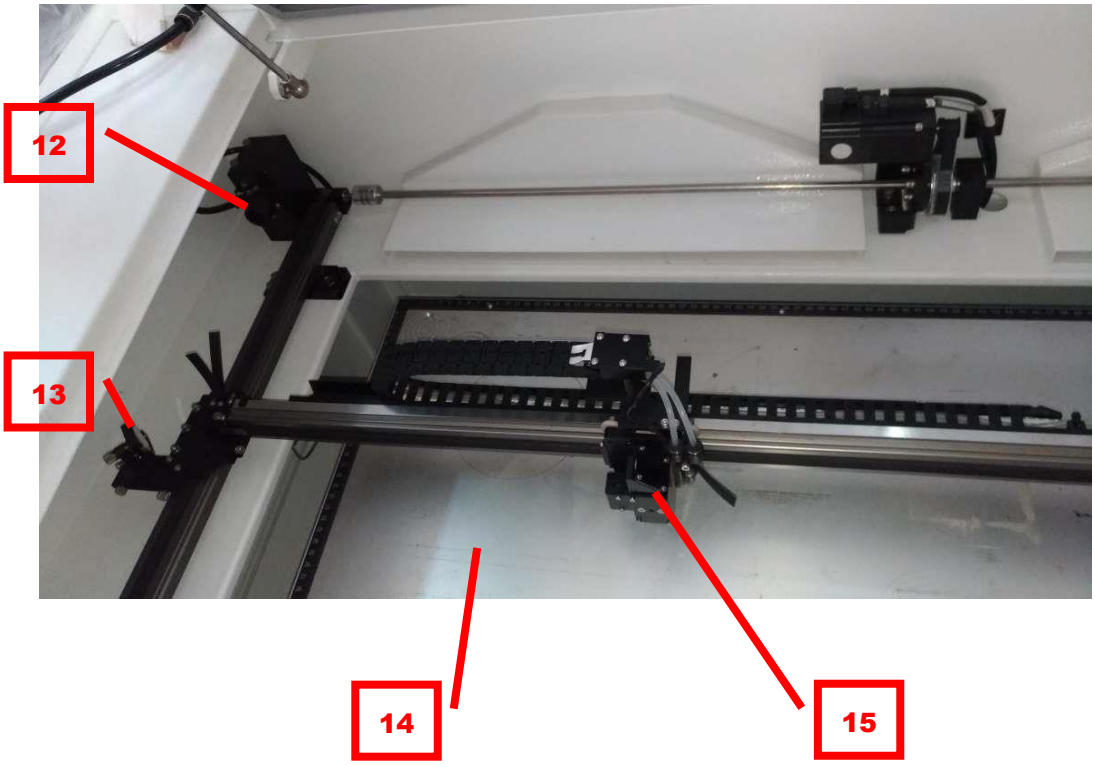
Mostly opening this door is for maintaining. Do **NOT** open this door if it's not necessary, especially the machine power is on.

10. Side Door (Left)

You can work on long materials through two side doors. These doors have no interlock sensors, so they are locked by screws for safety. If you open these doors, the system becomes a Class 4 laser device.

11. Side Door of Chassis

Mostly opening this door is for maintaining. Do **NOT** open this door if it's not necessary, especially the machine power is on.



12. Window Lens

This part can protect 1st ~3rd mirror against dusts or debris. It should be cleaned daily. (See chapter 4)

13. 4th Mirror

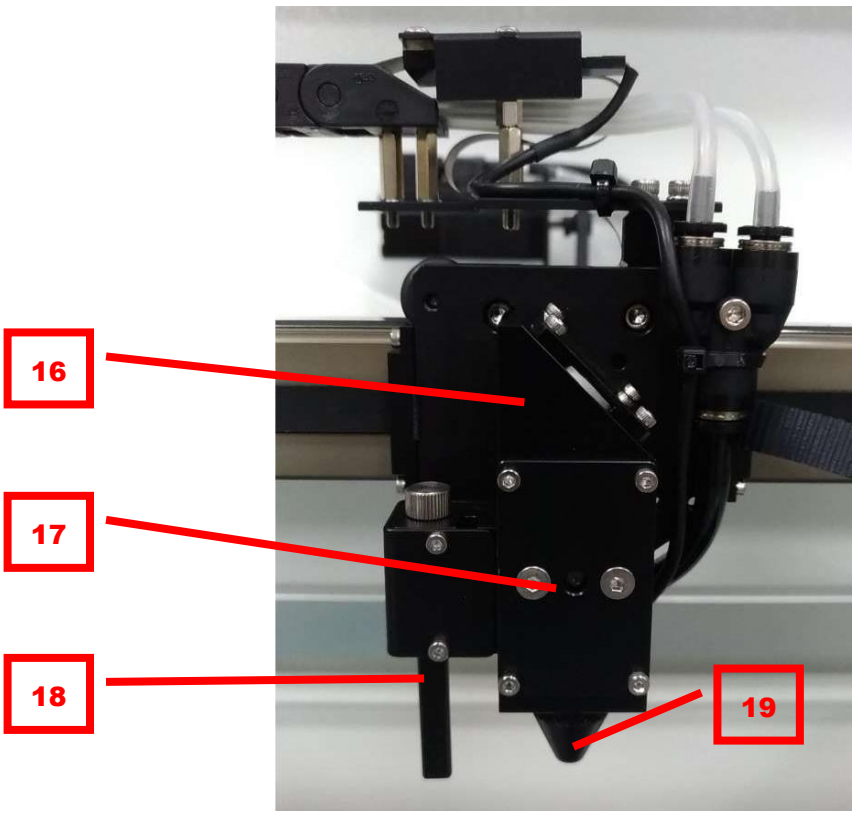
This part reflects laser beam to carriage. Also, it should be cleaned daily. (See chapter 4)

14. 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 3.3.1)

15. Carriage

This part includes 5th 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 3.3.1)



16. 5th Mirror

This part reflect laser beam to focal lens. Also, it should be cleaned daily. (See chapter 4)

17. Focal Lens

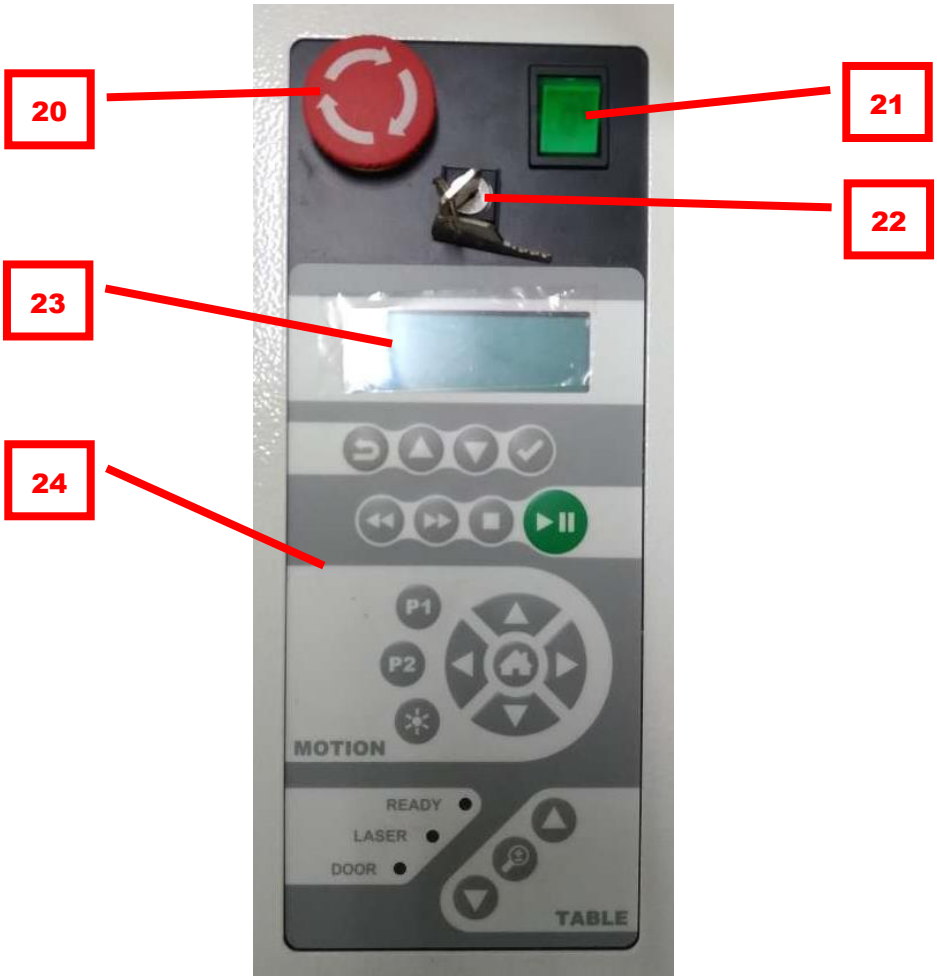
This part can focus the laser beam on materials for cutiing or engraving. Also, it should be cleaned daily. (See chapter 4)

18. Auto Focal Pin

This part can adjust focal height automatically by touching material. Keep it at other place once you finish autofocus.

19. Nozzle

This part can provide a air assist to protect focal lens against dusts or debris.



20. Emergency Stop

Please see section 1.3

21. Power Switch

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

22. Laser Switch

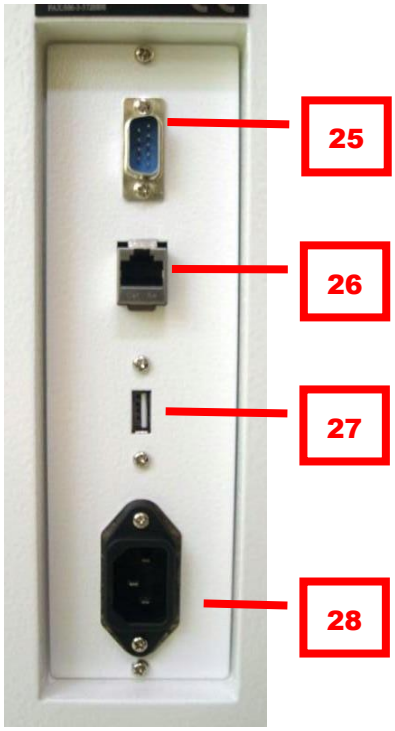
Please see section 1.3

23. 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.

24. Control Panel

Control panel provide the keys to operate machine. If you want to obtain more detail about operating menu, please see section 3.3.1.



25. Serials Port

This part provides extra I/O communication to expand functions of system.

26. Ethernet Port

This part can send files from computer to machine through RJ-45.

27. USB Port

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

28. Power Inlet

This part can provide main power through cable from power supply.

2.4 Hardware Installation

This section explains the installation steps with other hardware.

1. Check environment

■ **Power supply**

Power supply：110~220 VAC

■ **Environment**

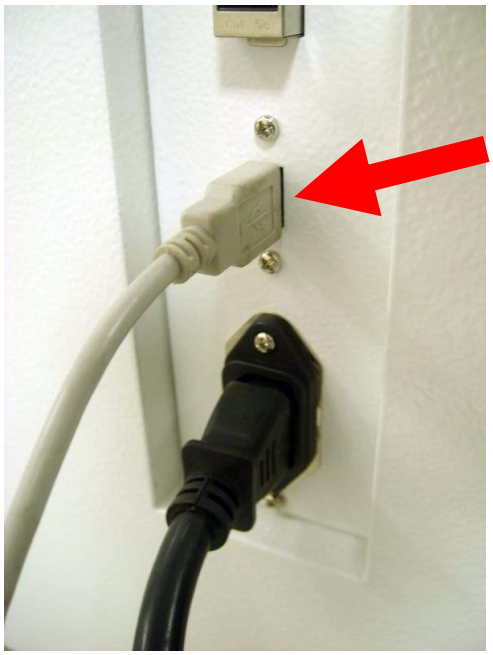
Temperature: 0 ~ 30 ℃, No freezing

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 pipes from exhaust port to blower

5. Connect hose from air filter to compressor

2.5 Driver Installation

2.5.1 DriverInstaller

This section explains how to use DriverInstaller to install the driver.

1. Check computer equipment

A High speed computer will calculate image file quicker and take less time to send files to machine.

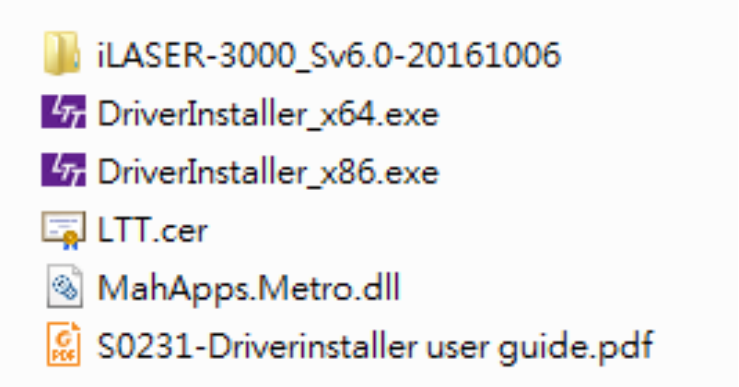
- **Minimum**
  - Pentium 133MHz CPU
  - 64 MB RAM
  - 2 GB Hard Disk
  - Microsoft Windows 2000
  - 8MB Graphics Card
  - CD-ROM Drive
  - VGA monitor (800X600)
  - CorelDraw 10
    or AutoCAD R14
- **Recommended**
  - Pentium-4 2.2GHz CPU
  - 512 MB RAM
  - 5 GB Hard Disk
  - Microsoft Windows XP
  - 64MB Graphics Card
  - DVD-ROM Drive
  - VGA monitor (1024X768)
  - CorelDraw X3
    or AutoCAD 2008

2. Open [DriverInstaller]

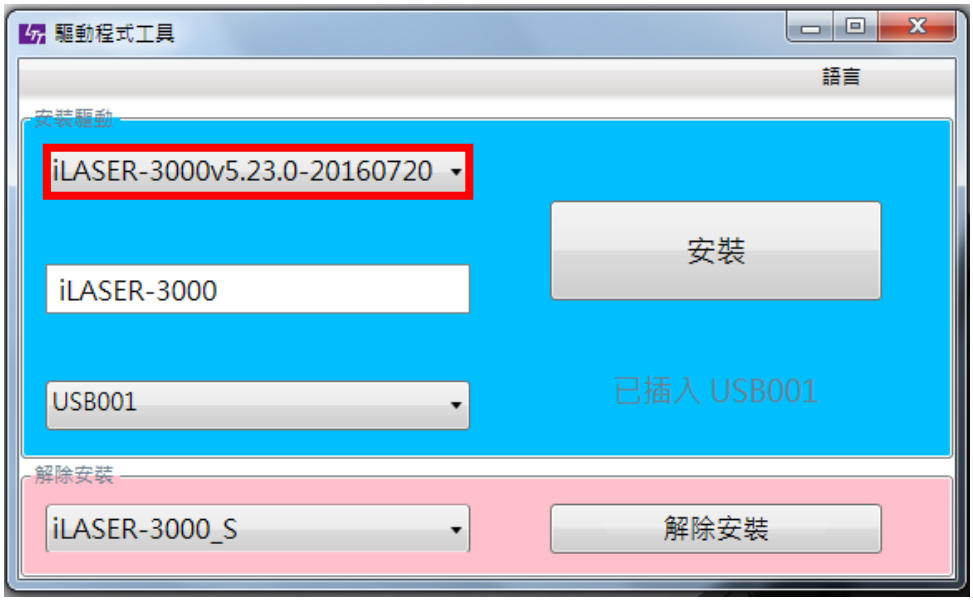
You should find a folder named as < DriverInstaller> in the CD-ROM. Here is the list what inside the folder.

Attention: Copy the folder to Desktop to use. It will fail if you execute the app in the CD-ROM.

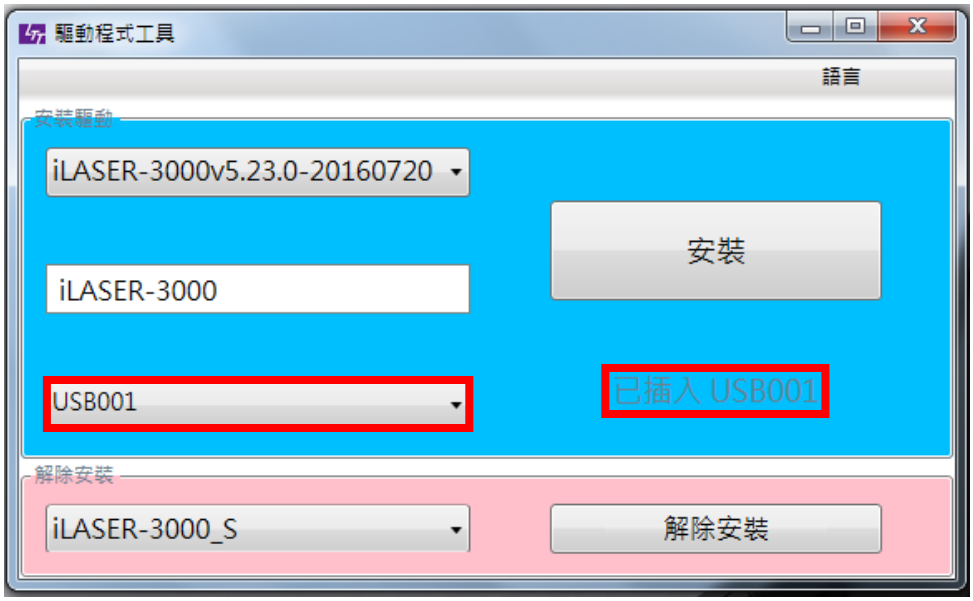
Attention: Open EXE version according to your OS.



3. Find the printer file you want to install.

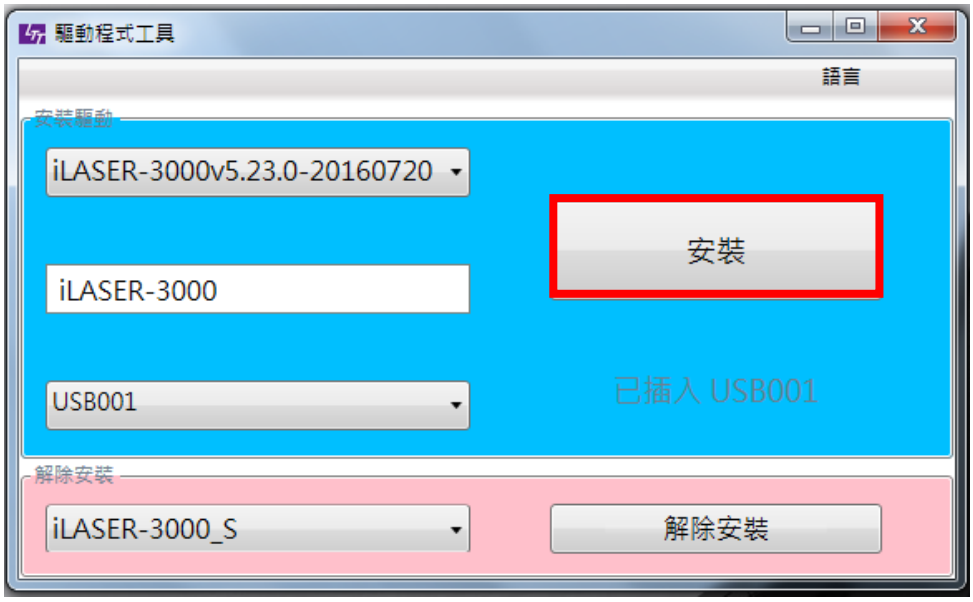


4. Select the connection port.



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

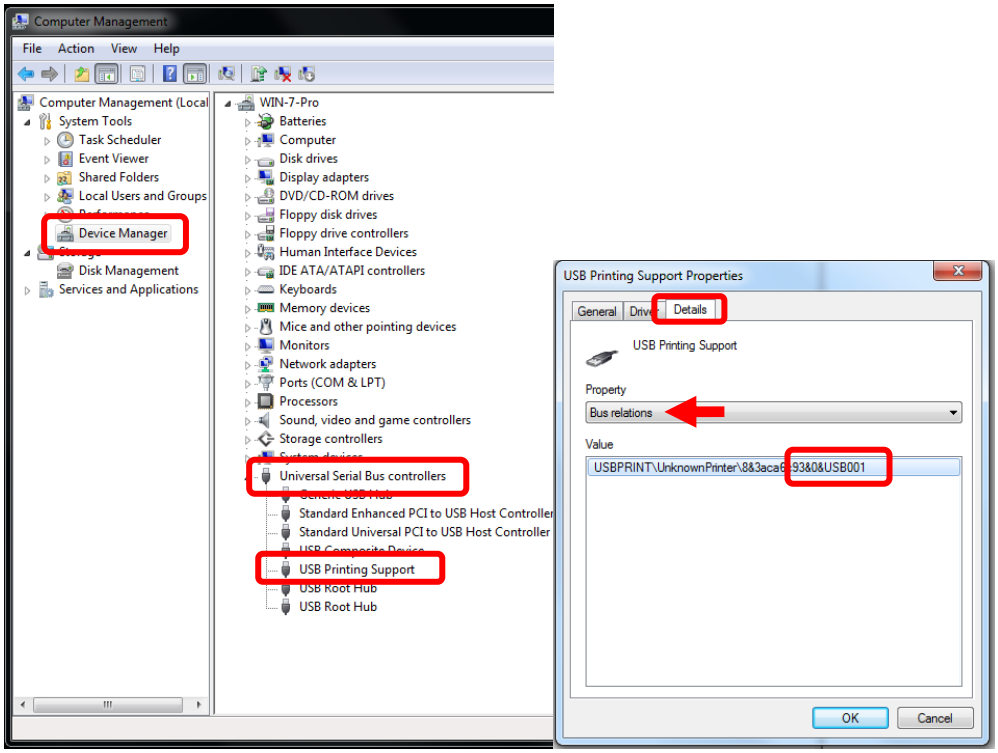
5. Press [Install]



6. Restart the PC and Done.

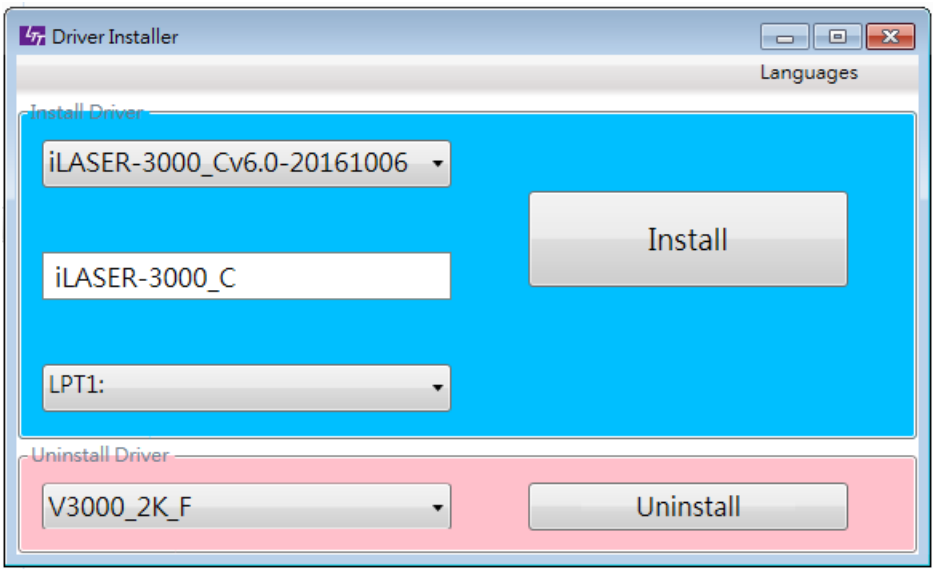
※NOTE:

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.

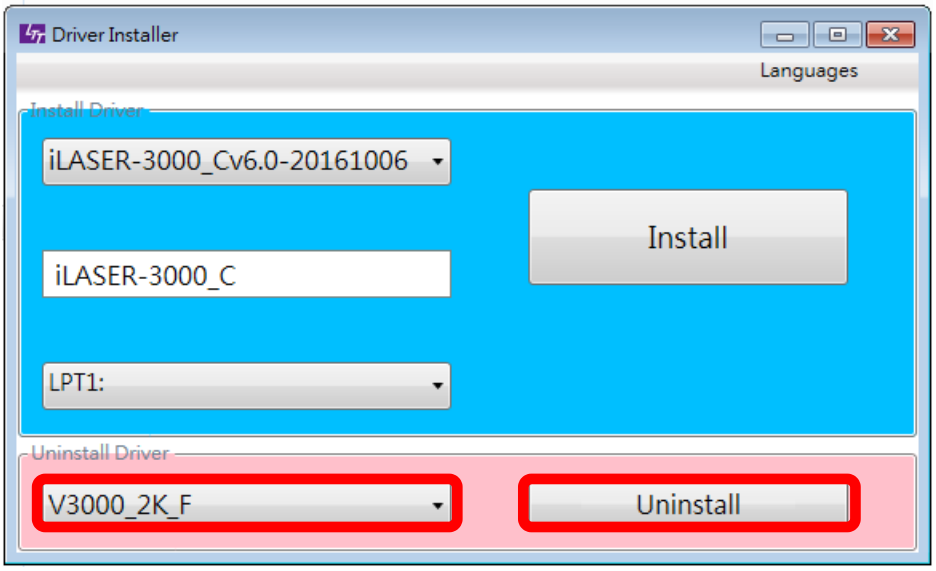


2.5.2 Uninstall Driver

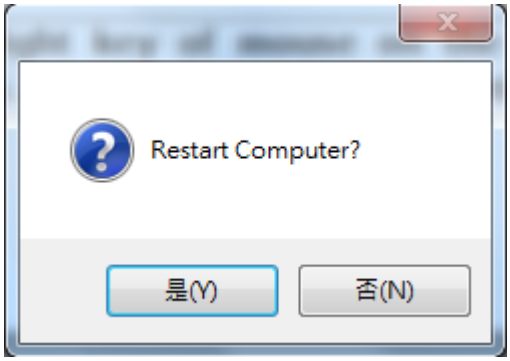
1 Open [Driver Installer]



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



3 Press the [Yes] button and reboot computer.



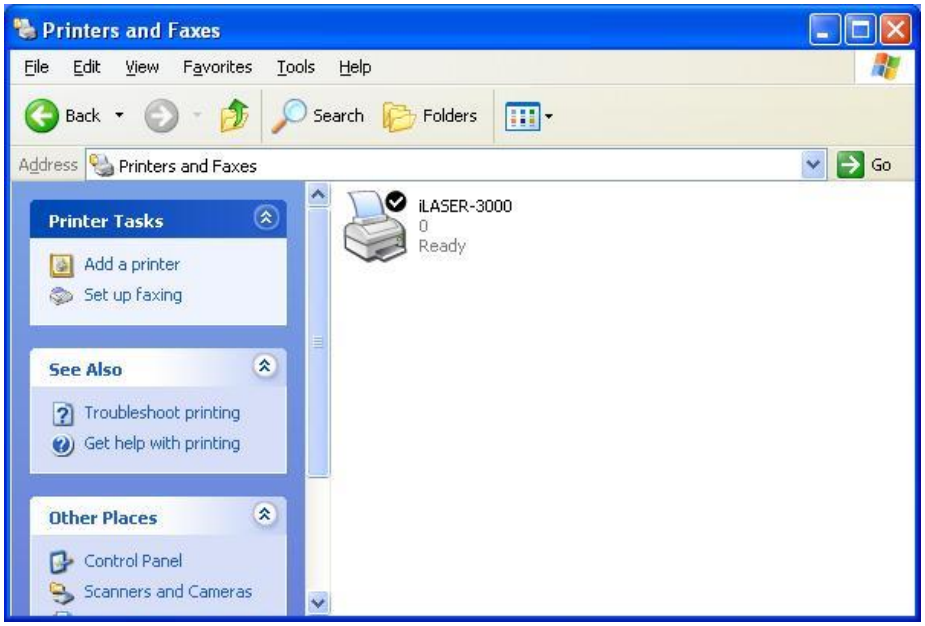
2.5.3 Change USB Cable to Another Port

This section explains that the steps when change USB port.

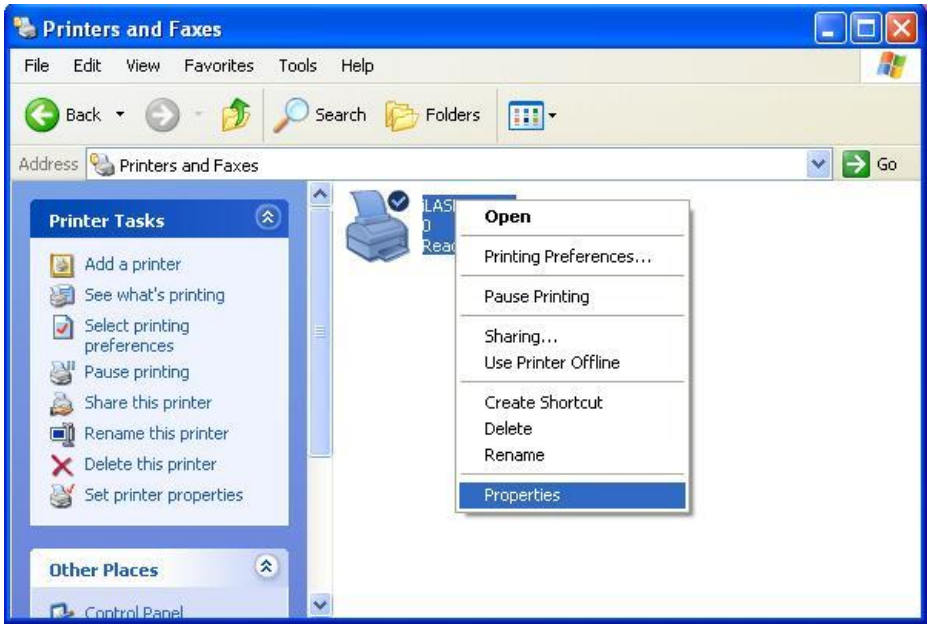
Once you contact the USB Cable to computer, we strongly suggest that do not change it to another USB port. If you must change USB cable to another port, you have to also change the printer settings of i.LASER. If this happens, please follow next steps.

1. Connect the USB cable to another port well with i.LASER.

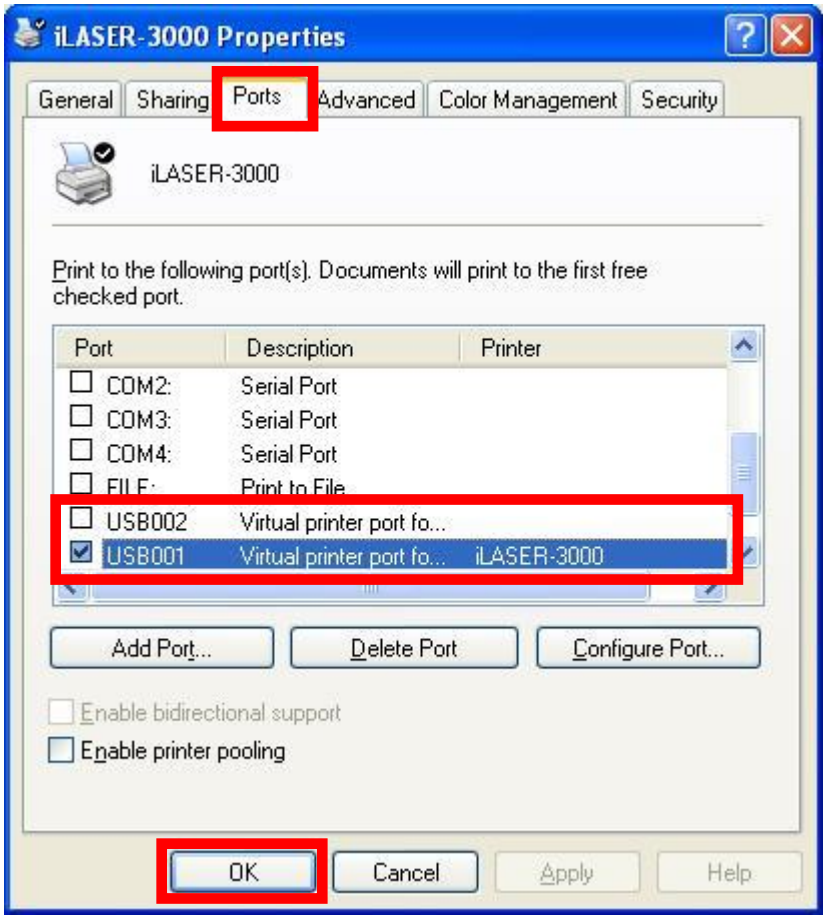
2. Open **[Printer and Faxes]** window



3. Right click i.LASER printer and select **[Properties]**



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

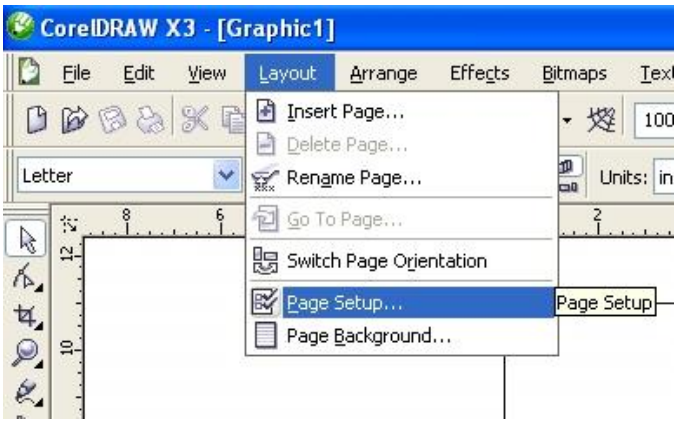


5. Done.

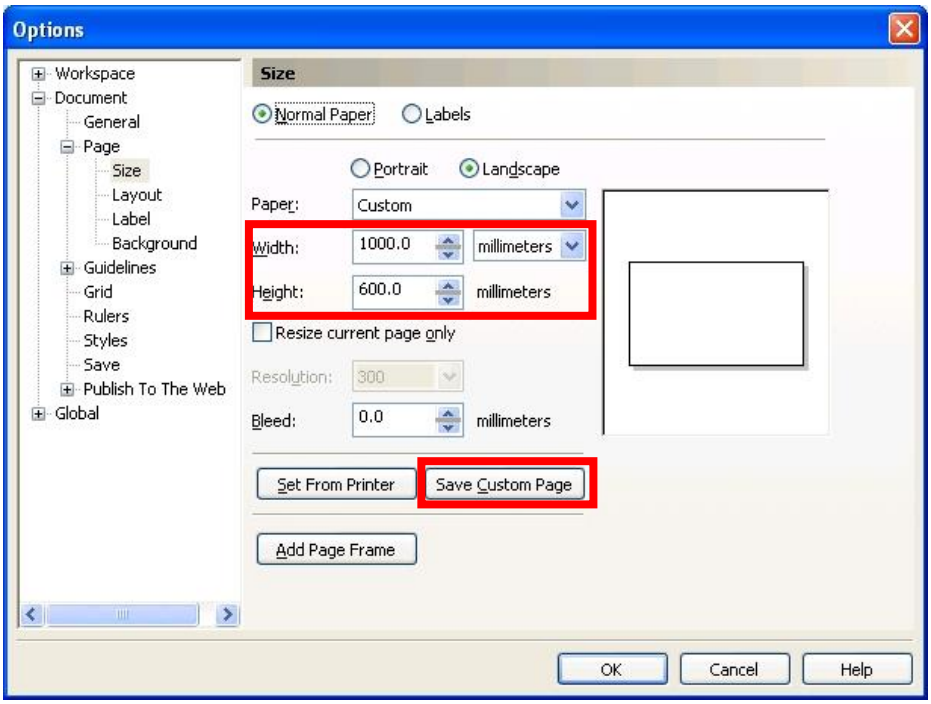
2.6 CorelDRAW Setup

It is strongly recommended to keep the graphic software's page size the same with driver's page size before you begin editing files. Here you will learn how to setup your page and learn how to keep those settings that you don't have to setup again next time. If you are an AutoCAD user, please check section 2.7.

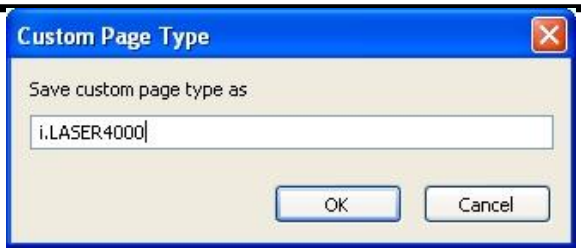
Go to **[Layout]** → **[Page Setup]**



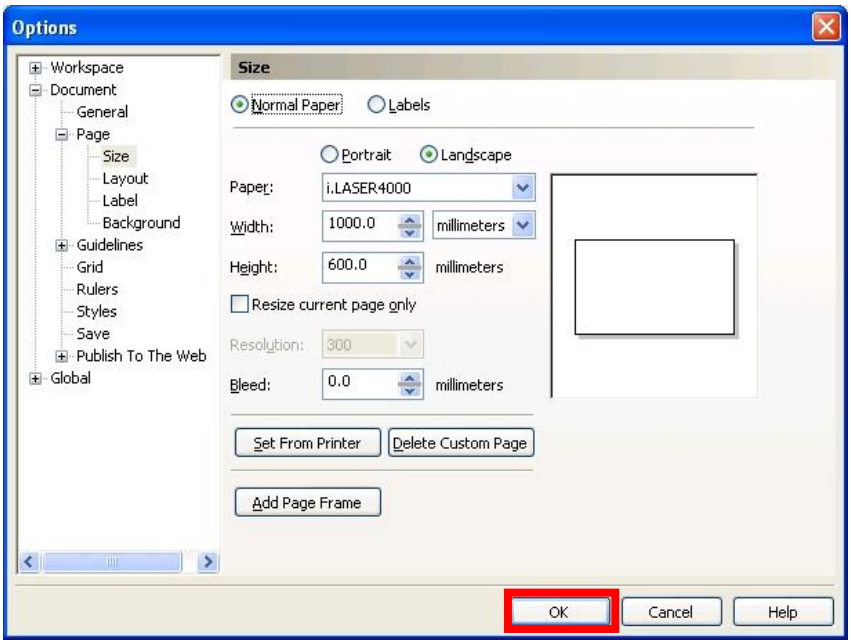
Modify **[Width]** and **[Height]** according to work area (See Appendix 1). Click **[Save Custom Page]** button.



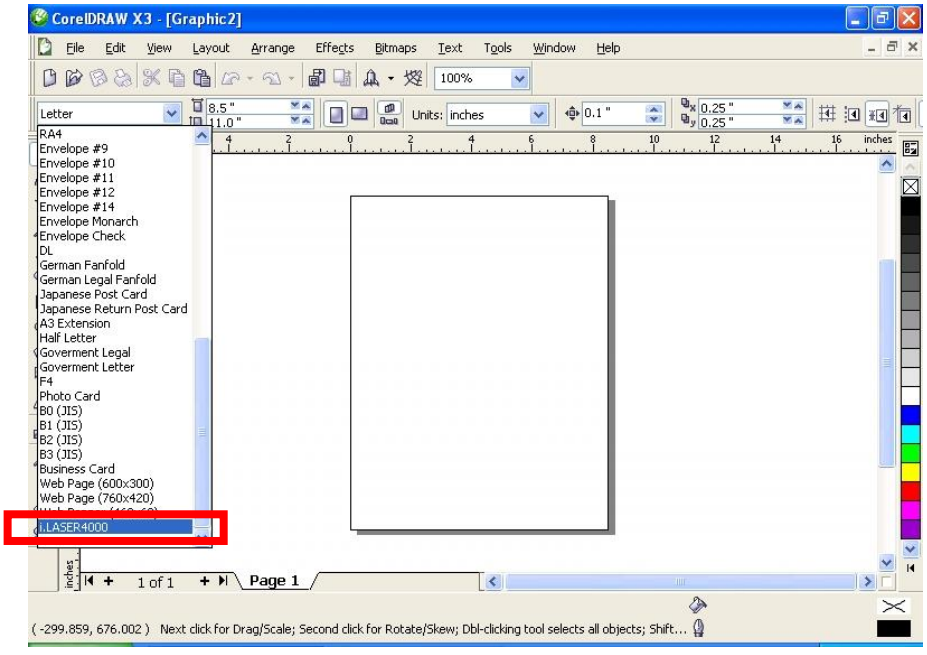
Name this paper type. It is recommended to name with the machine type. Then click **[OK]** to save.



Click **[OK]** to complete the paper size adjustment.



Next time you can select template style while you create new file.



2.7 AutoCad Setup

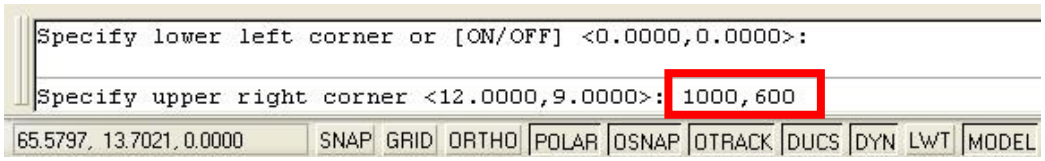
Here you will learn how to setup the page and print setting on AutoCAD.

1. Page And Layout Setup

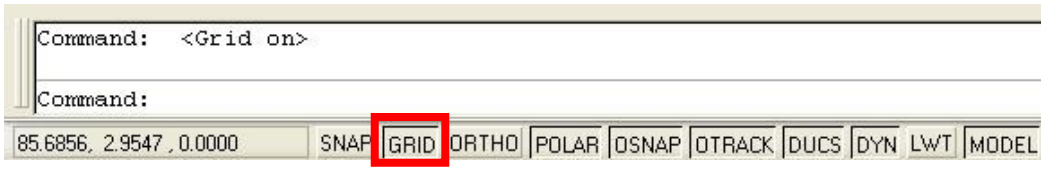
Open the AutoCAD. Type **[limits]** on the command line then press **[Enter]** key.

Then press **[Enter]** key to set the bottom left corner to **[0,0]**.

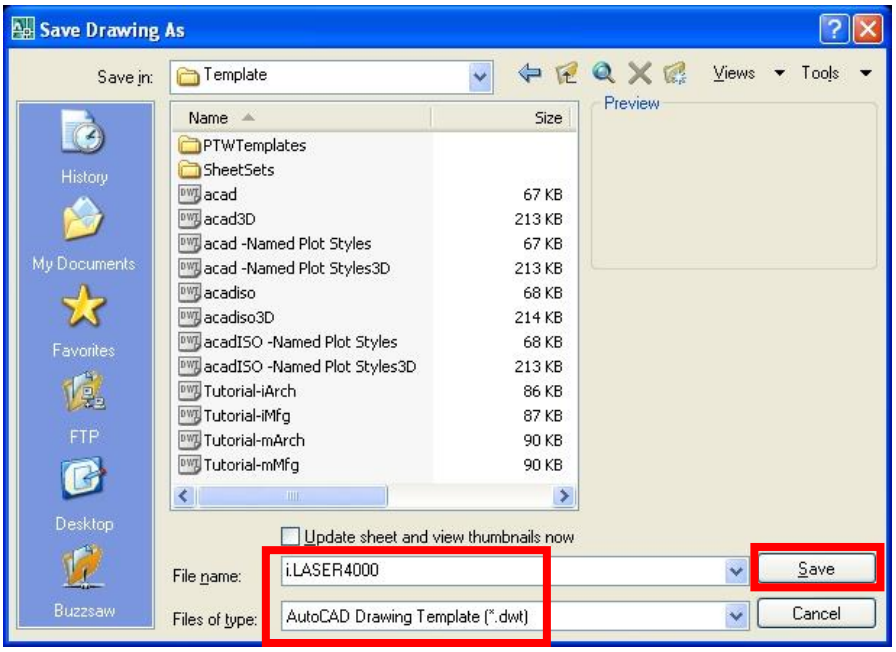
Setting the top right corner according to work area (See Appendix 1). Then press **[Enter]** key.



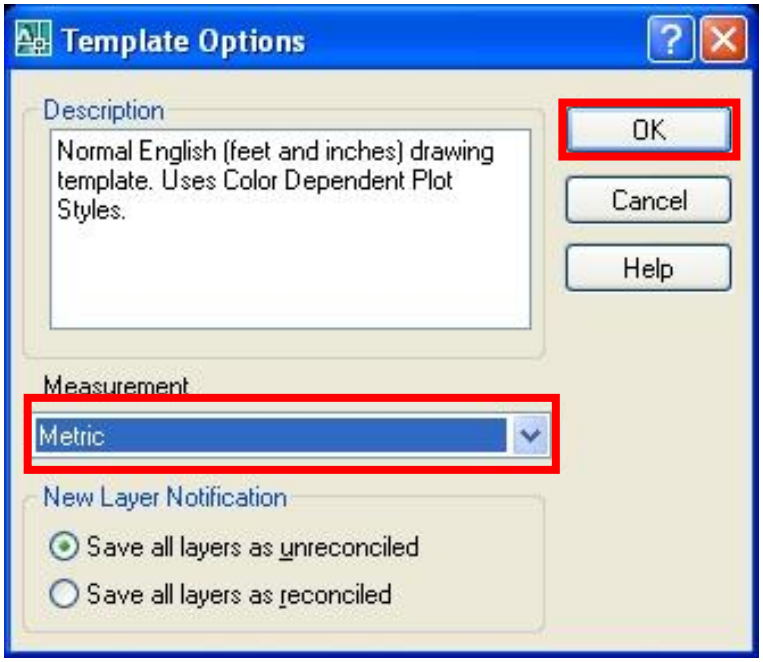
Turn on the grid by typing **[grid]** on the command line or turn on directly by pressing the **[GRID]** button which located under the command line. The grid shows the page area so that can help user to see boundary.



Choose **[File]** → **[Save as]**. Then select **[Files of type]** as **[*.dwt]**. Set file name as machine type and then press **[Save]** button to save the Template style.



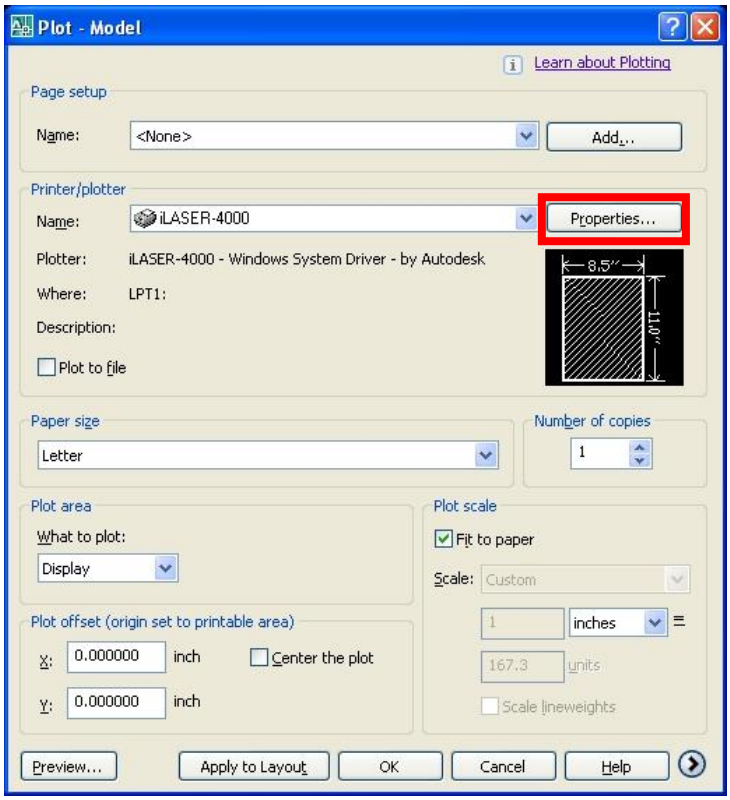
Write down some description for the template and set the measurement unit system you want.



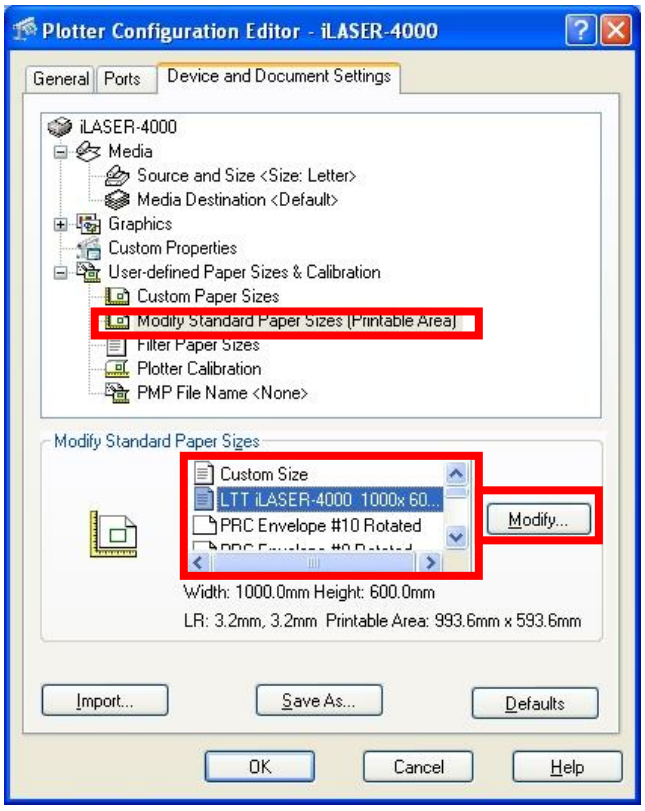
You can select the template file you created whenever open AutoCAD. Next time when you use the same page size, you can use the template file directly so that you don't have to setup the page anymore.

2. Print Setting

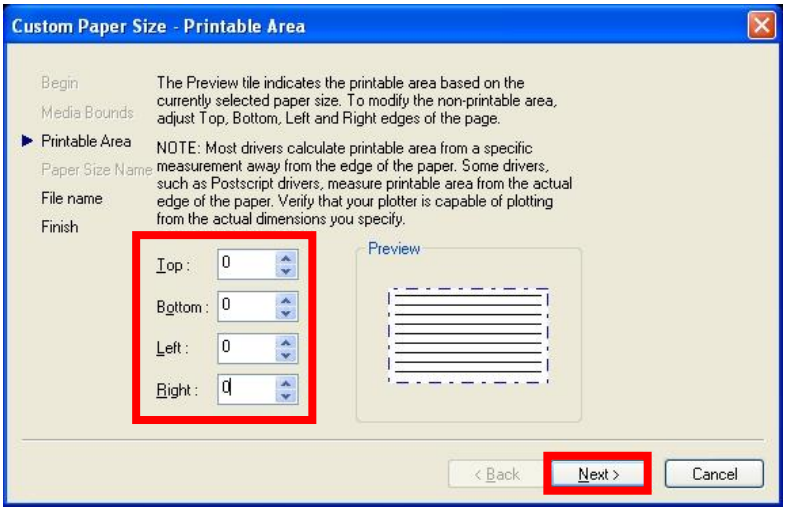
Go to **[File]** → **[Plot]**. When the **[Plot]** window shows, select printer driver and click **[Properties]** button.



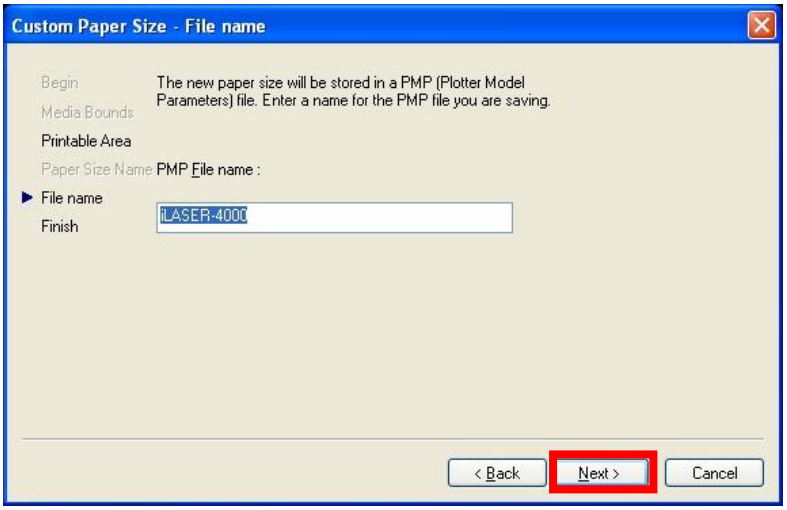
Select **[Modify Standard Paper Sizes]** on the tree-list box. Select the option which starts with **[LTT...]**. Press **[Modify]** button.



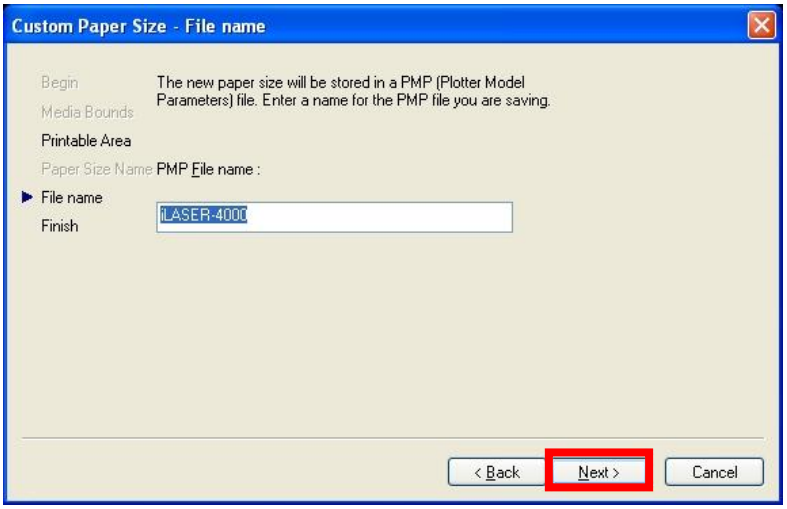
Modify **[Top]**, **[Down]**, **[Left]** and **[Right]** to zero, press **[Next]** button to continue.



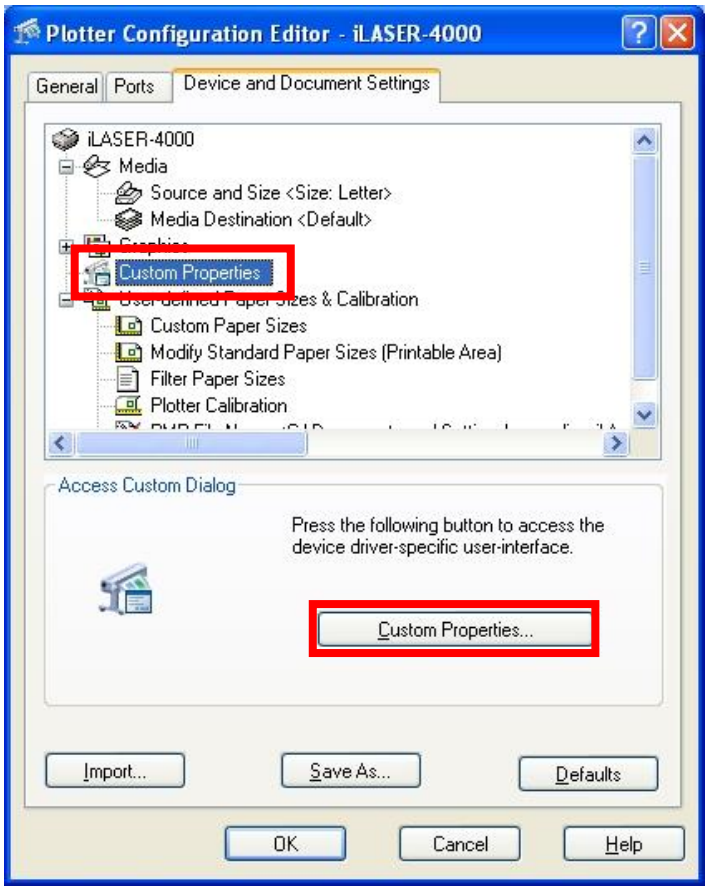
Press [**Next**] button to continue.



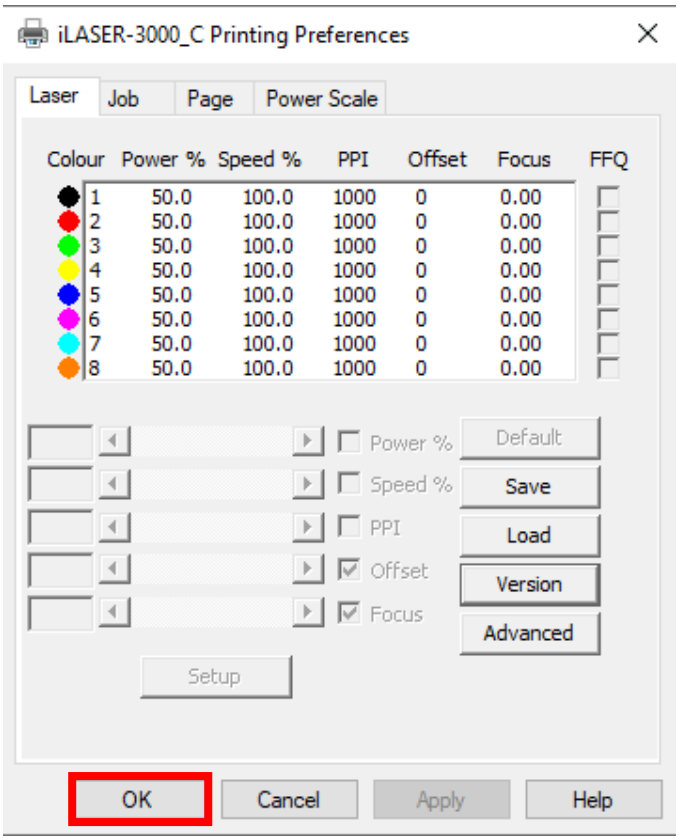
Press **[Finish]** button to continue.



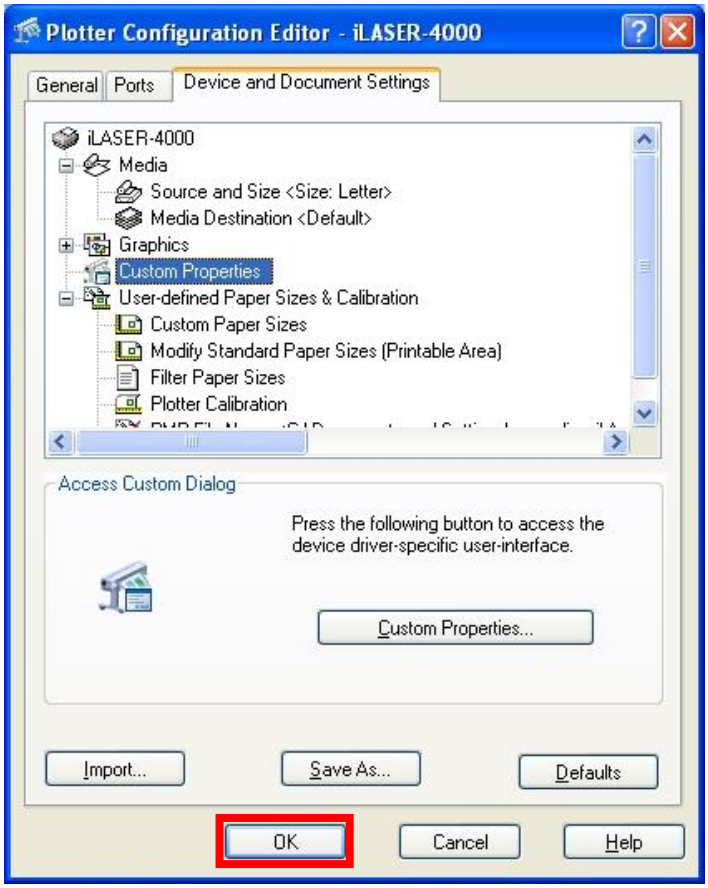
Select **[Custom Properties]** and click **[Custom Properties]** button at middle.



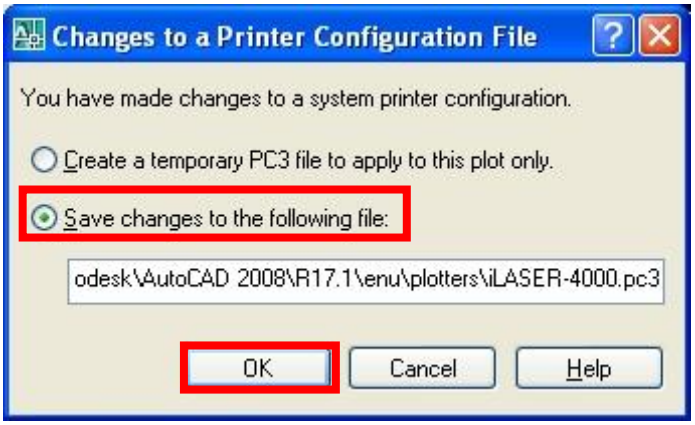
Modify Laser settings if need. Press **[OK]** to finish driver setting.



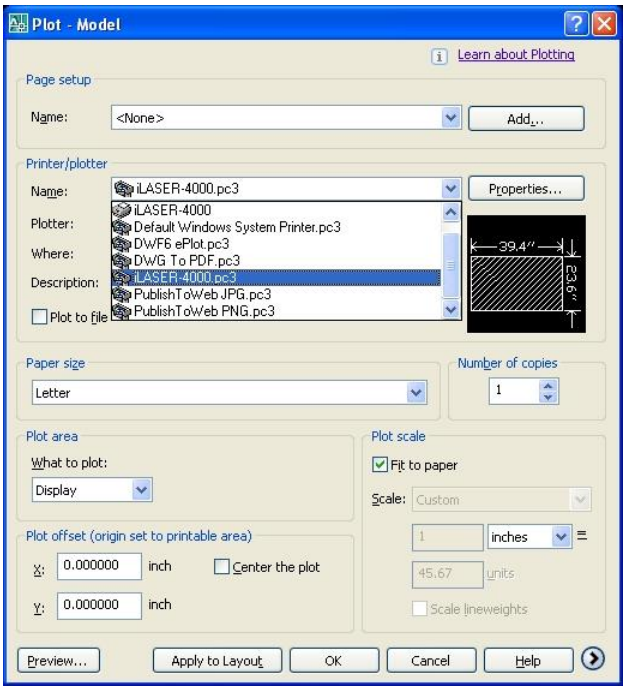
Press **[OK]** to back to print setting.



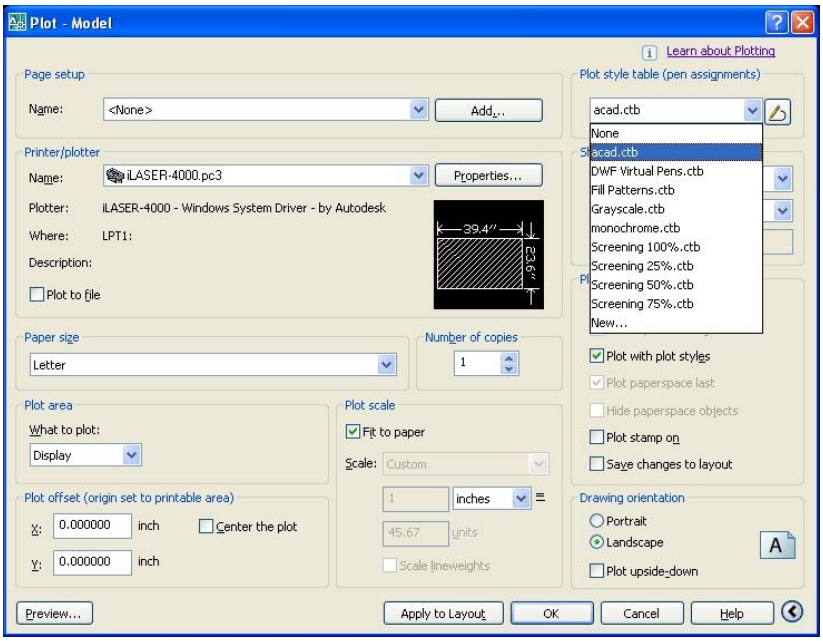
Select **[Save changes to the following file]** and press **[OK]** to continue.



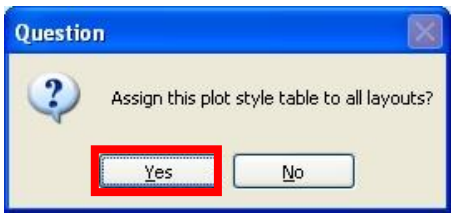
You will find the printer option that you just created (***.pc3**) on **[Name]** box. Please select the new printer instead of original in the future.



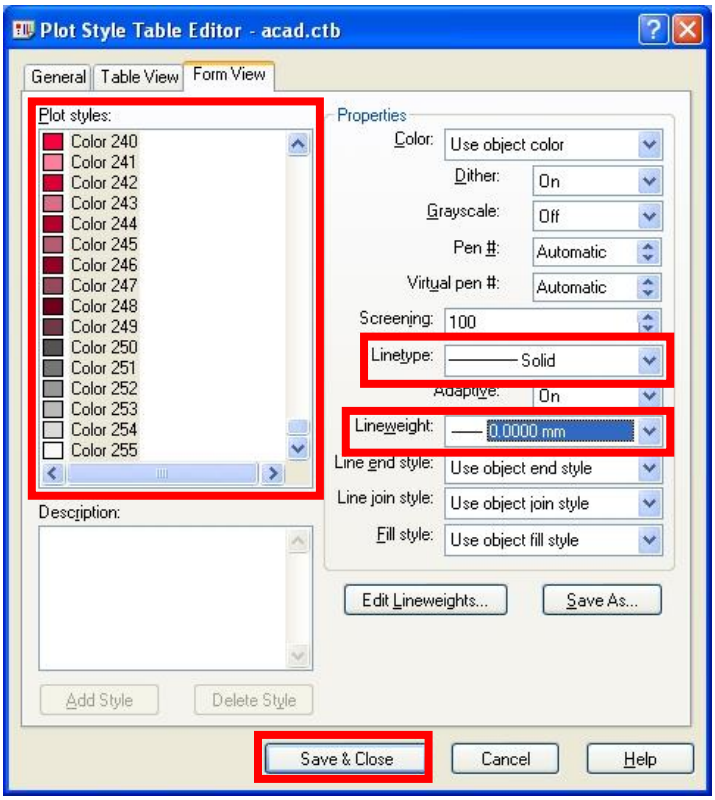
Select **[Plot style table]** to **acad.ctb**. Press **[Edit]** button.



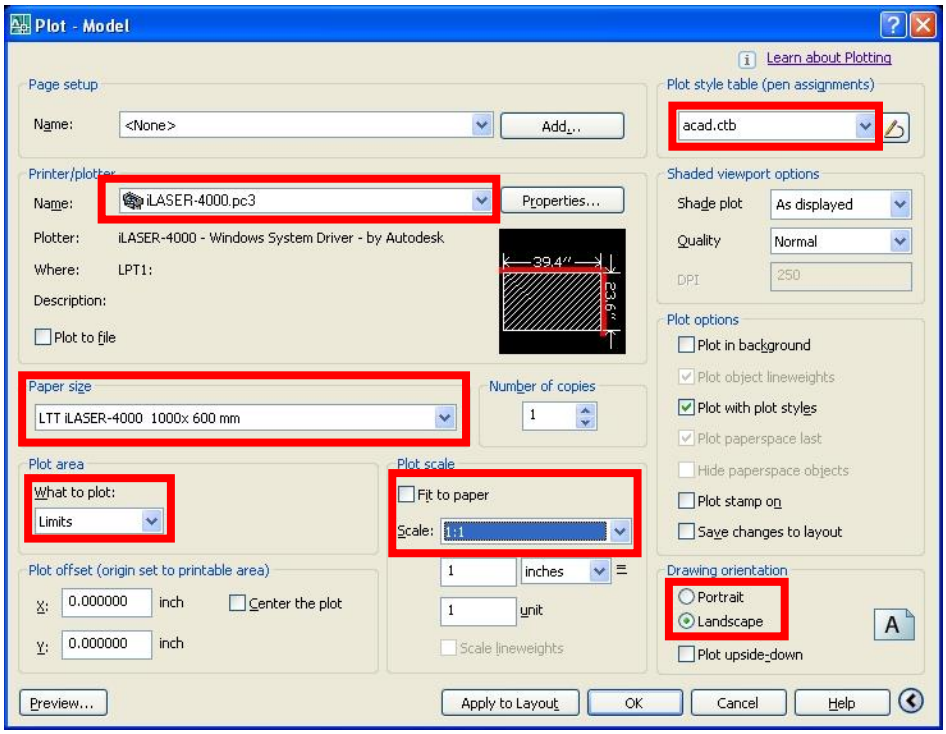
Press **[Yes]** button to continue.



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



Please follow the settings below. 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.

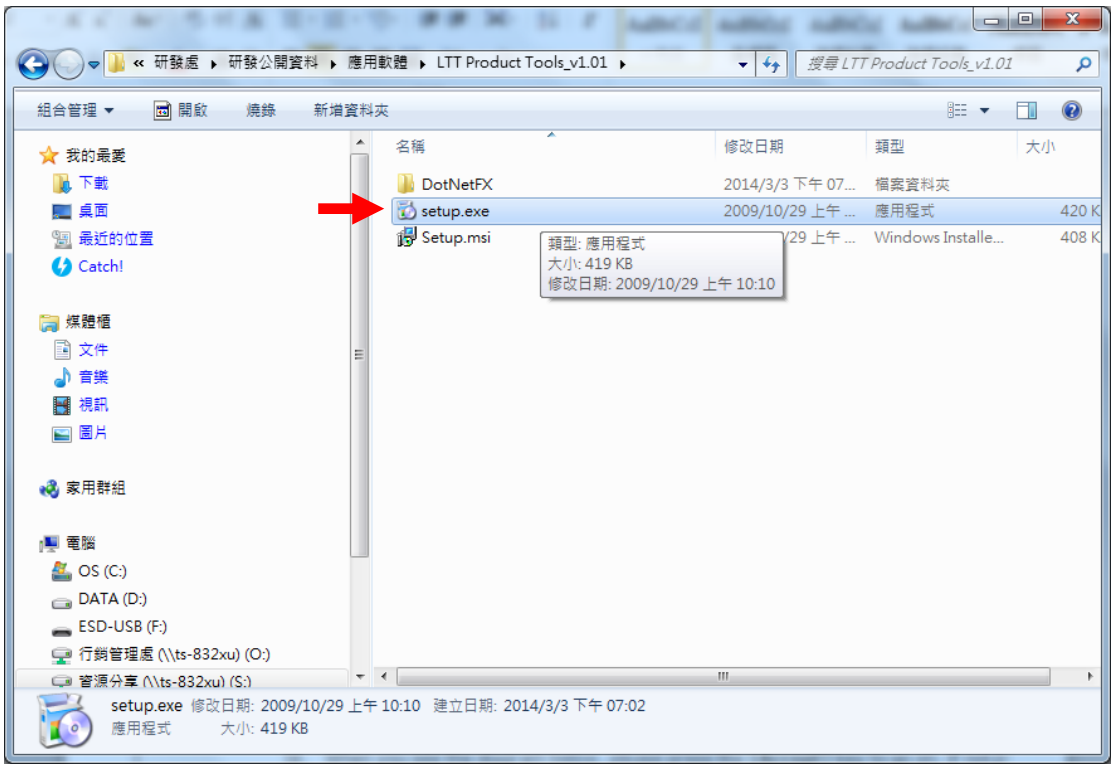


2.8 LTT Product Tools

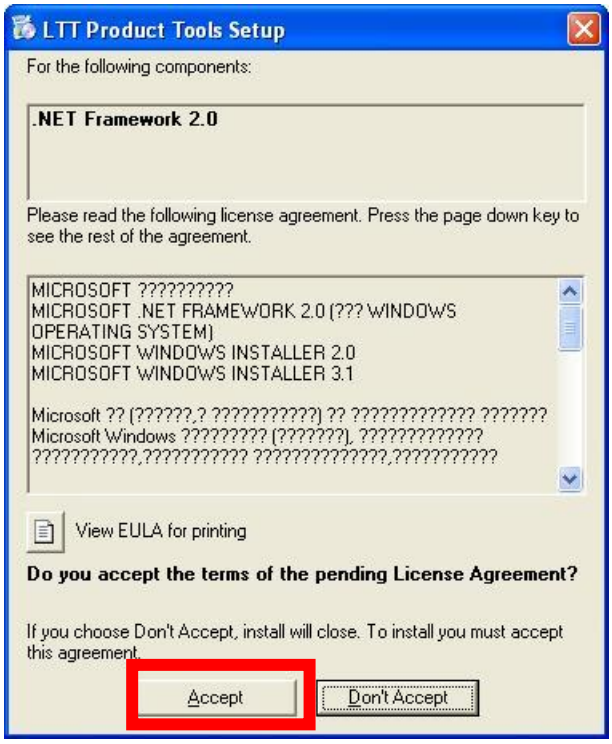
2.8.1 Install Procedure

LTT Product Tools is the software which can send prn or plt file, update firmware. This section explains the installation steps on your computer.

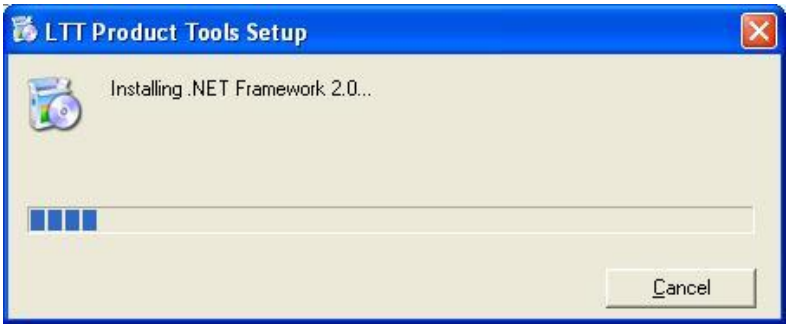
1. Double click **[setup.exe]**



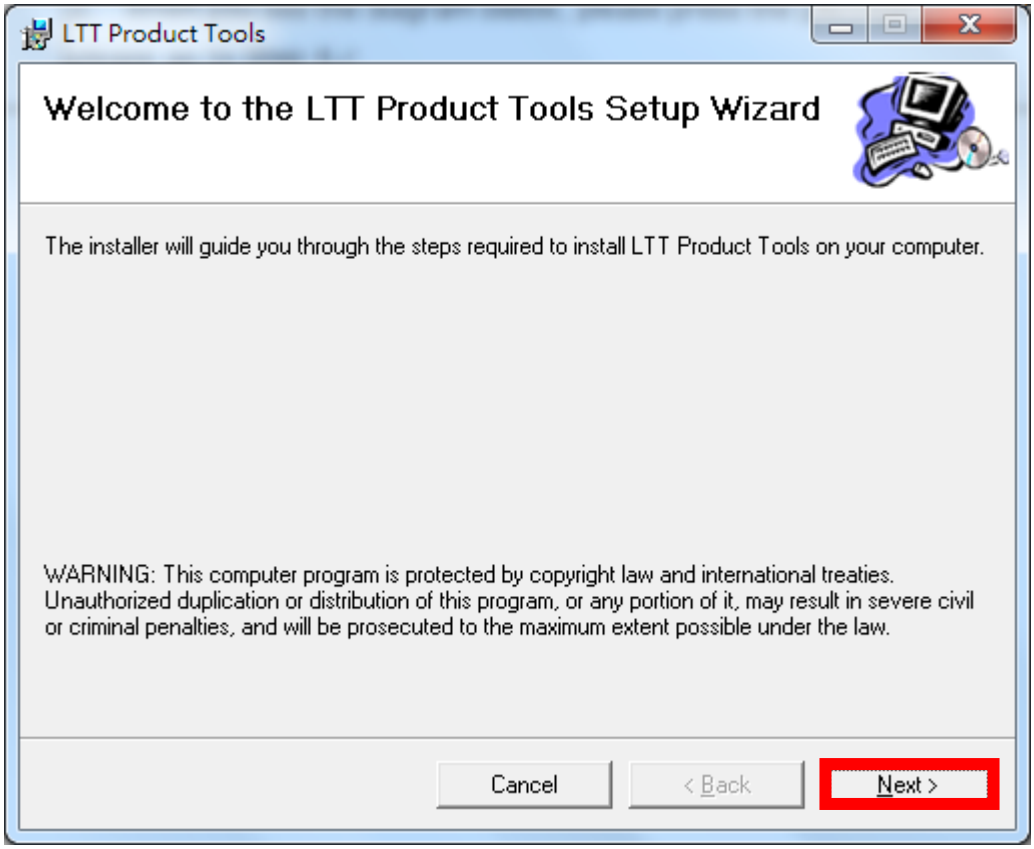
2. When you see the diagram below, please press the **[Accept]** key to go on. If not, please go to Step 4.



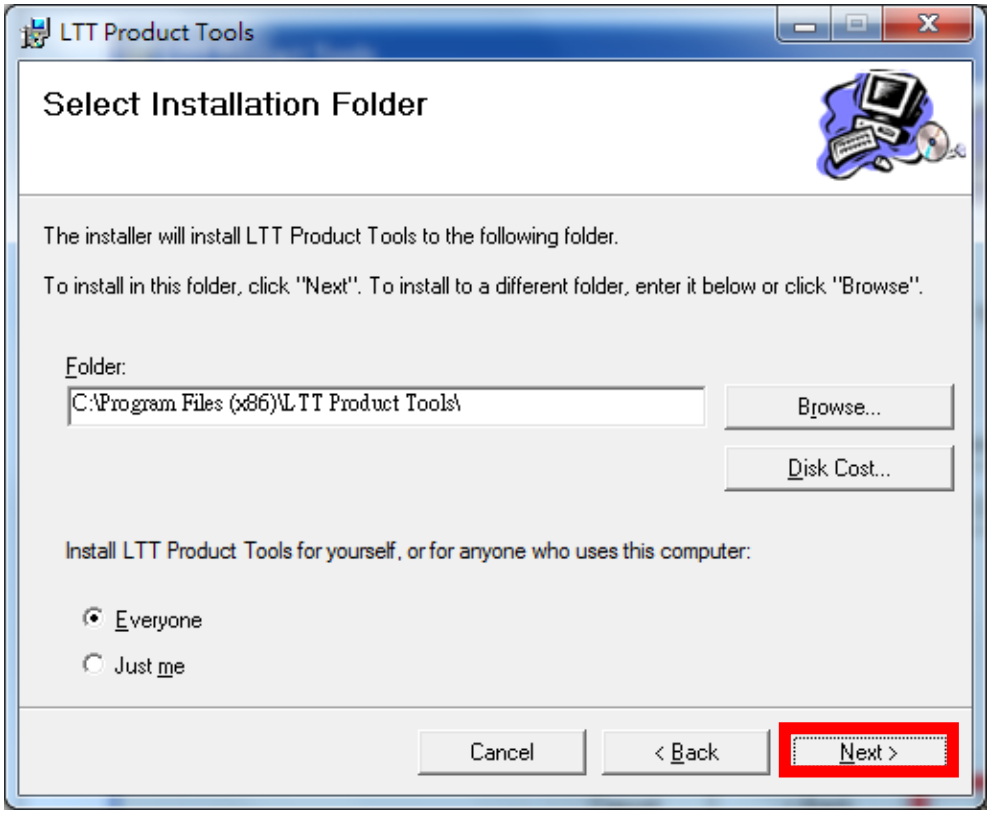
3. When you see the diagram below, please wait for some minutes.



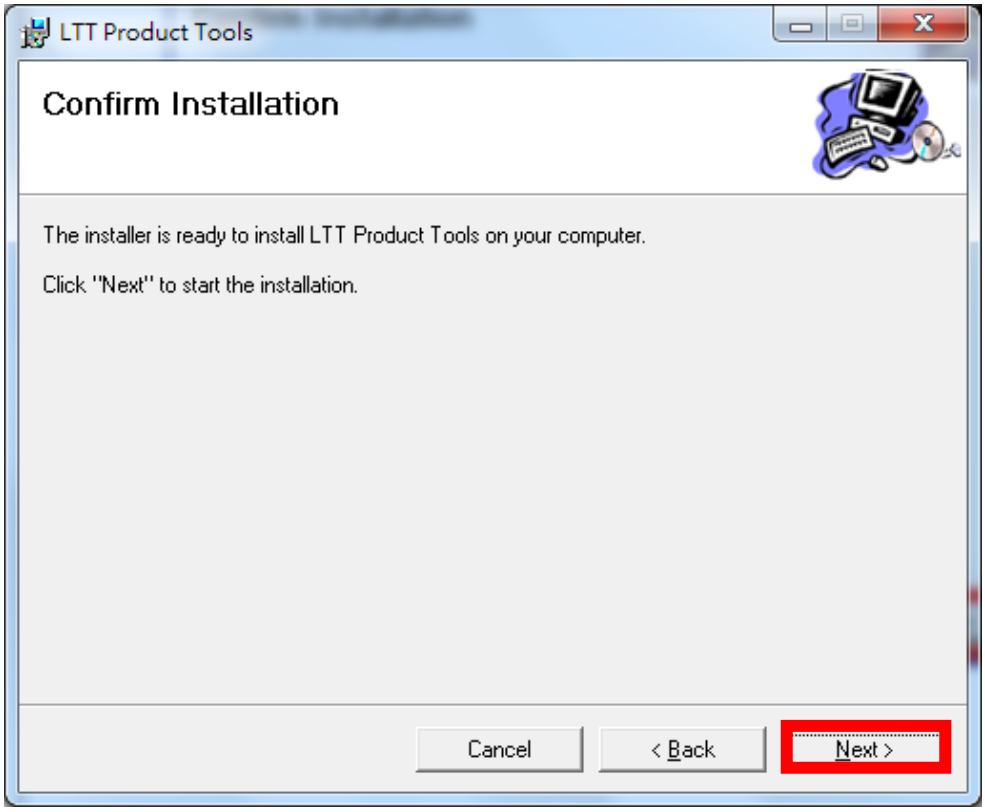
4. When you see the diagram below, please press **[Next]** .



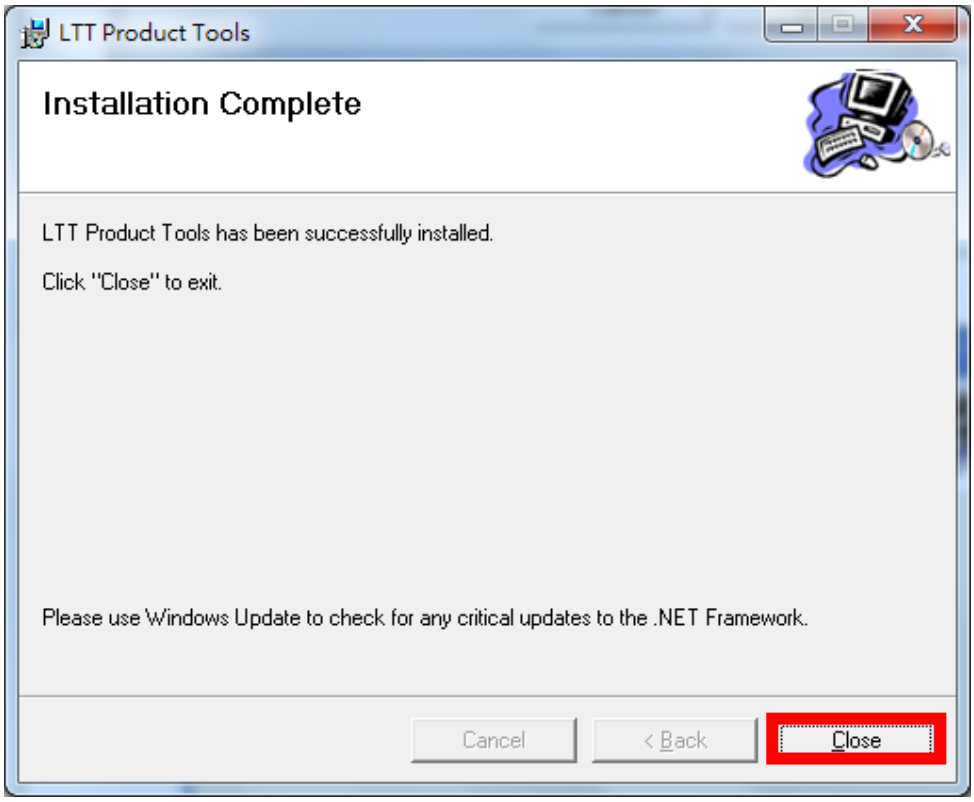
5. Please choose a position to install the software and press **[Next]** .



6. Press **[Next]** .



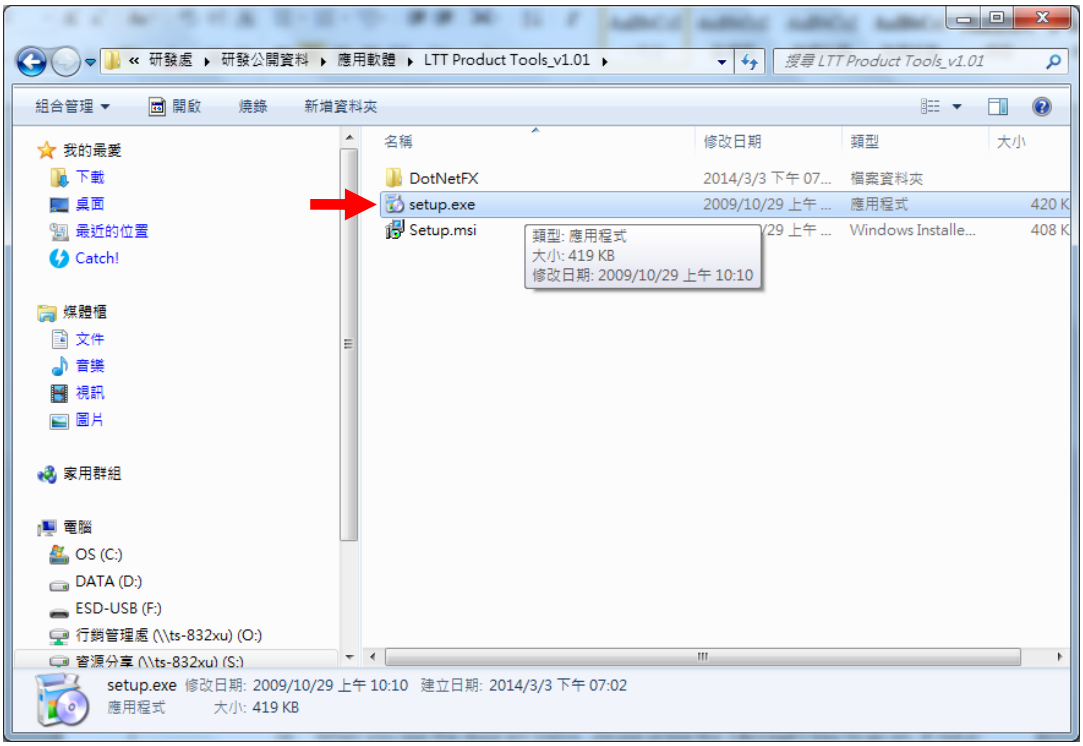
7. Press **[Close]** to finish.



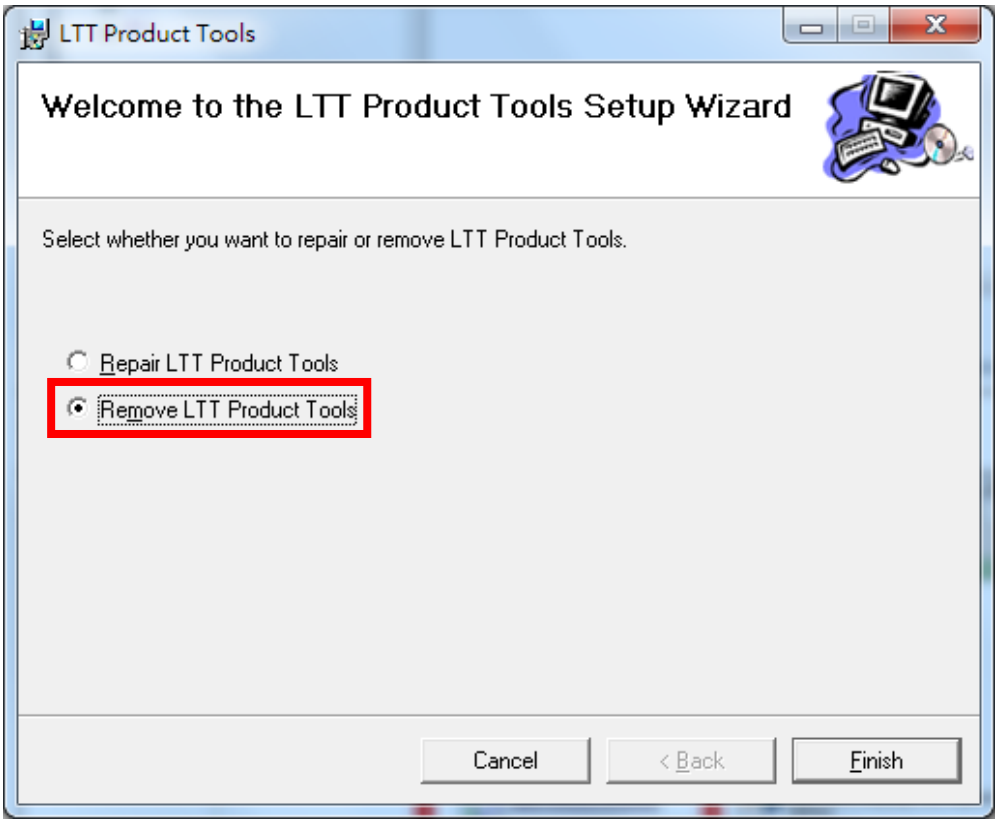
8. After the setup procedure, you can open the software from two shortcuts. The first one locates on the **[Desktop]**, and the second one is placed in the **[Start Manu]**.

2.8.2 Uninstall Procedure

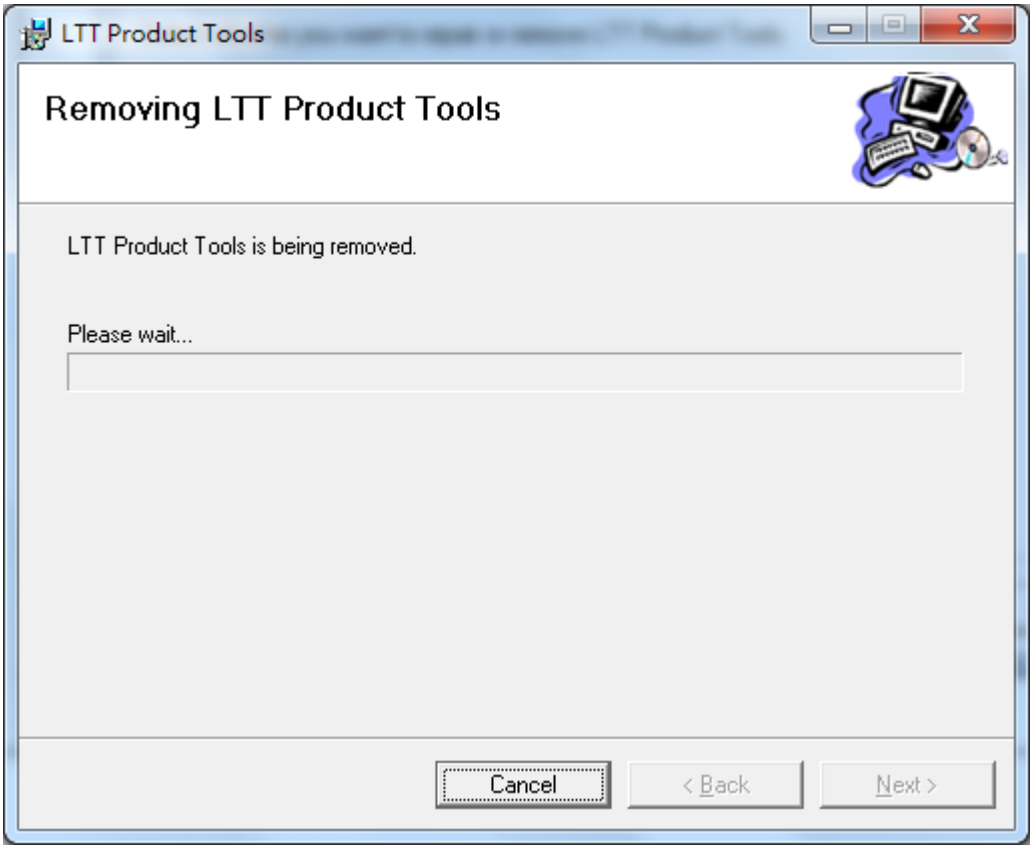
1. Double click **[setup.exe]**



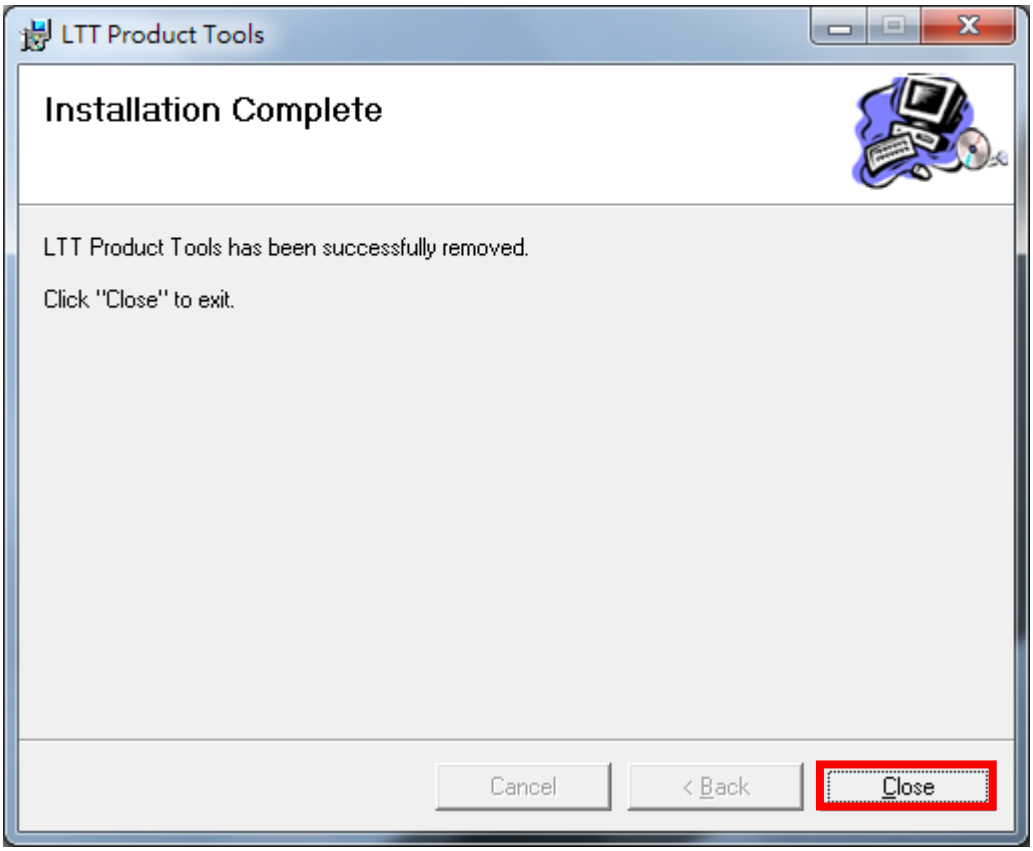
2. Choose **[Remove LTT Product Tools]** then press **[Finish]**.



3. Wait for a second.



4. Please press **[close]**.

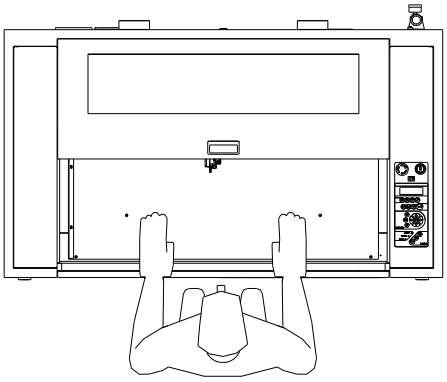


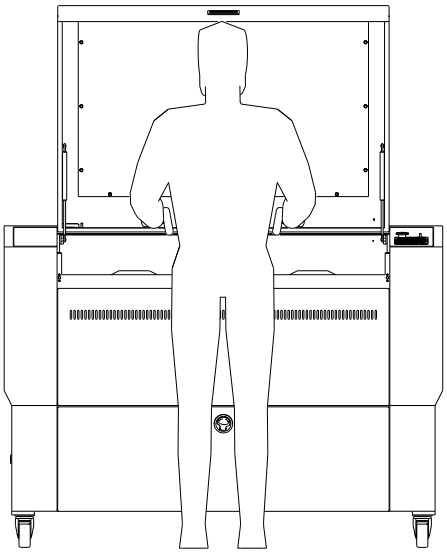
5. Done

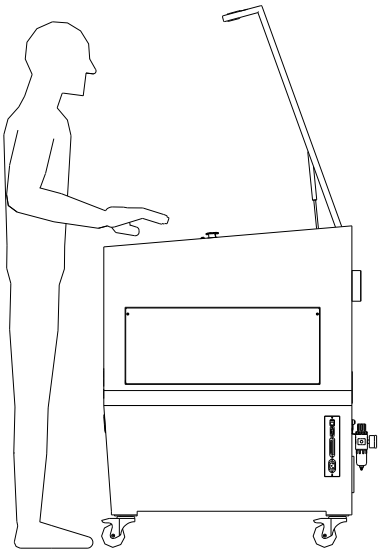
Chapter 3 Operation

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 i.LASER. 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]**.

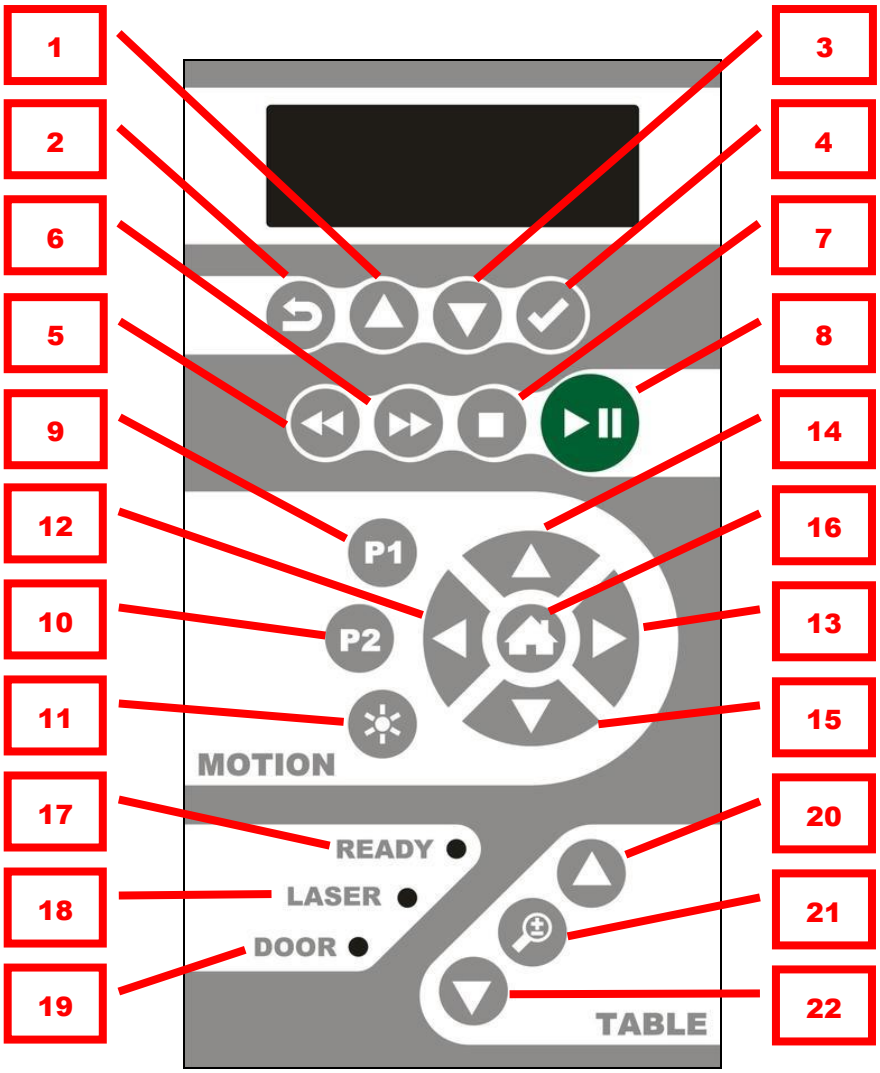
4. Execute file.

- 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 i.LASER.

3.3.1 Control Panel



1. **Cursor Up / Increase Values**
2. **Escape**
3. **Cursor Down / Decrease Values**
4. **Enter**
5. **Previous File**
6. **Next File**
7. **Stop**
8. **Run / Pause**
9. **Move to P1**
10. **Move to P2**
11. **Red Beam Switch/ Lase**
12. **Move Carriage Left (X-)**
13. **Move Carriage Right (X+)**
14. **Move Carriage Forward (Y-)**
15. **Move Carriage Backward (Y+)**
16. **Homing**
17. **Ready (Indicator)**
18. **Laser (Indicator)**
19. **Door (Indicator)**
20. **Table Up**
21. **Auto Focuse**
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. You can't stop file directly which is not in pause mode.

8. Run / Pause

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

9. Move 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 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.

But if in the sub-menu of **[Alignment mode]** (See section 3.3.2), this button 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 Backward (Y+)

Move the carriage back slowly when press this key shortly. If you want to move the carriage backward 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 Focuse

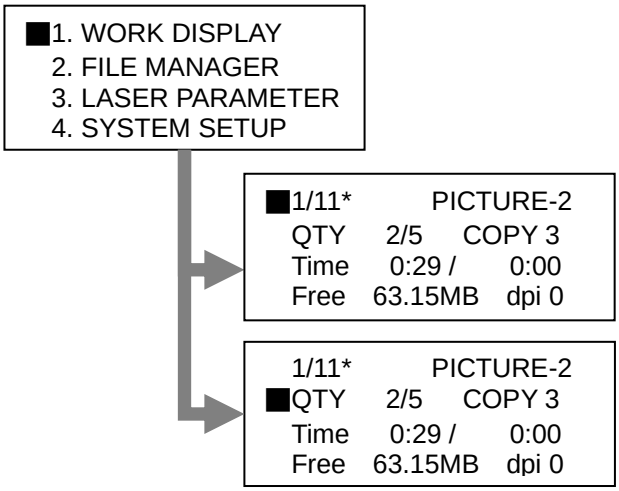
Automatically adjust the distance of lens and material to focus length.

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***

  Indicates 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 ▶II if 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 ▶II one time. The way to modify this setting is described in section 3.4.3.

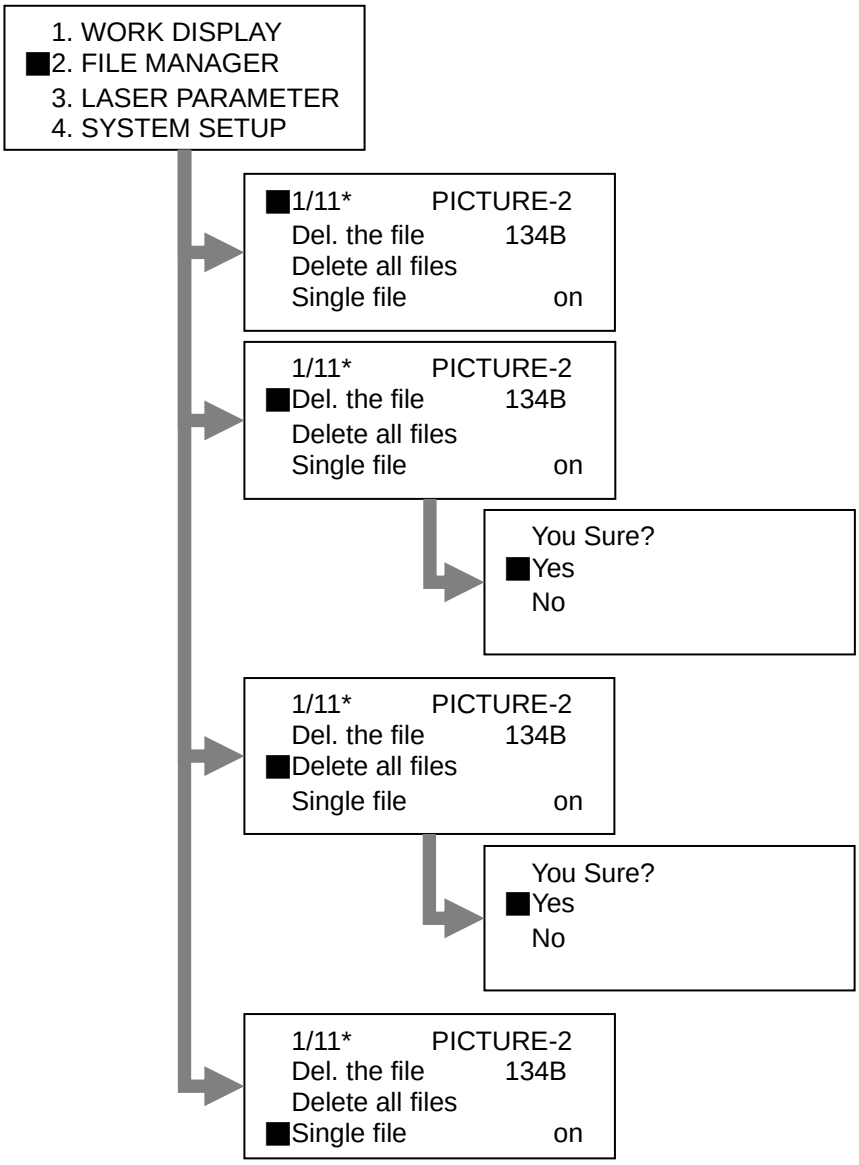
- **Time 0:29 / 0:00**

  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 :**

  The selection can delete single file which is selected at present.

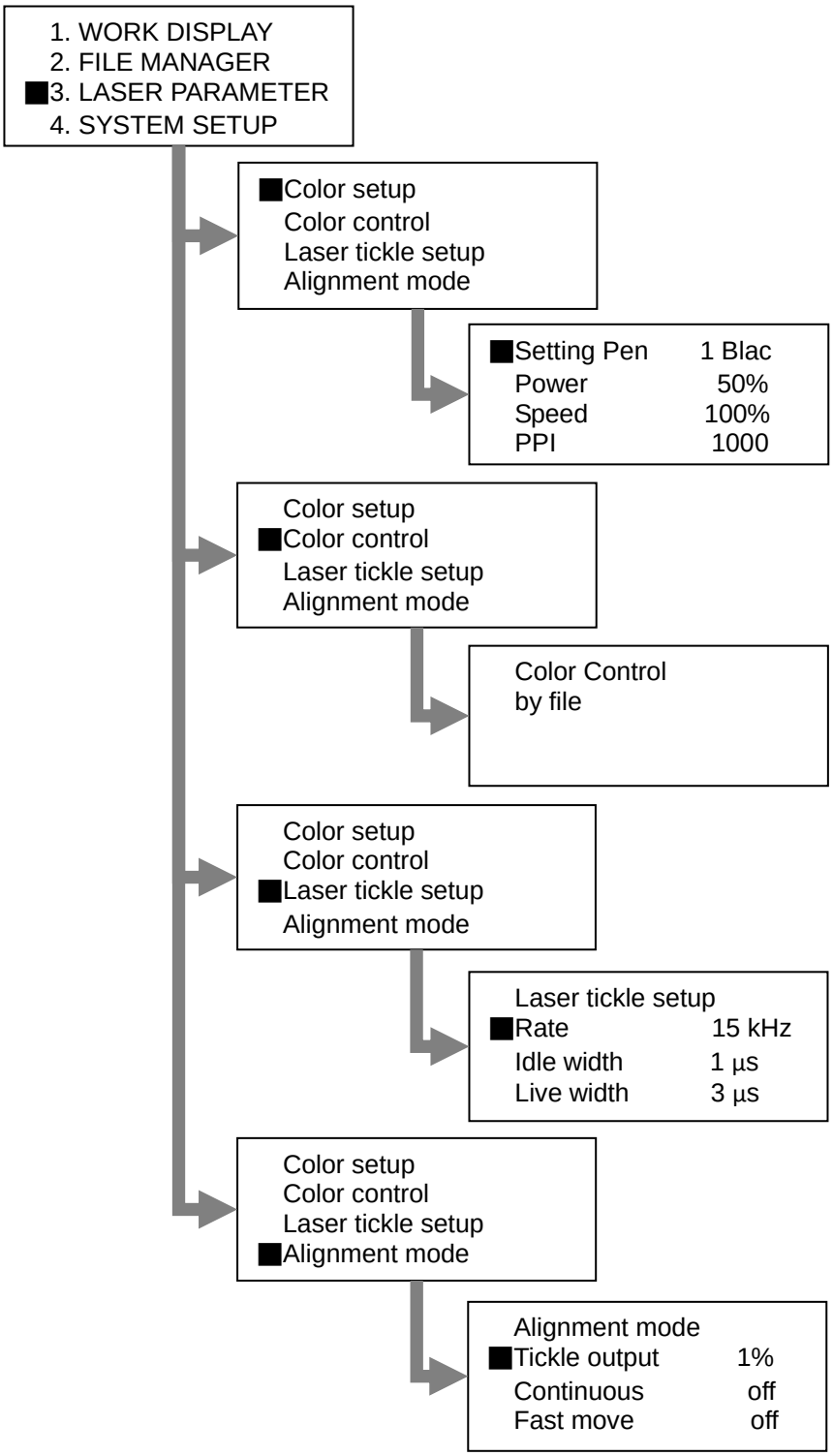
- **Delete all files :**

  The selection can delete all files in memory.

- **Single file**

  The selection can define how many files the machine can keep, single or several files.

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.

■ **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 μs 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%.

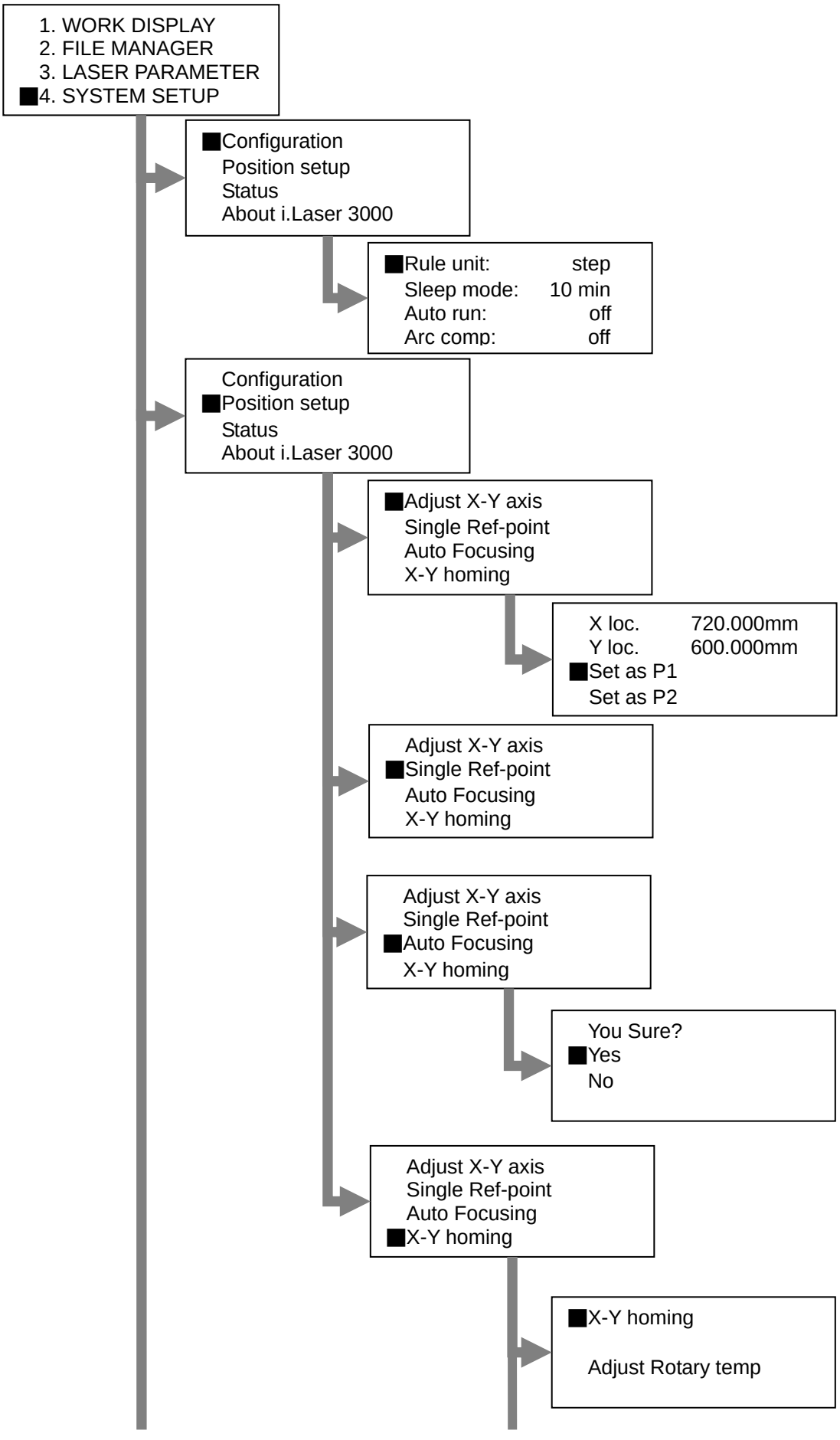
- **Continuous**

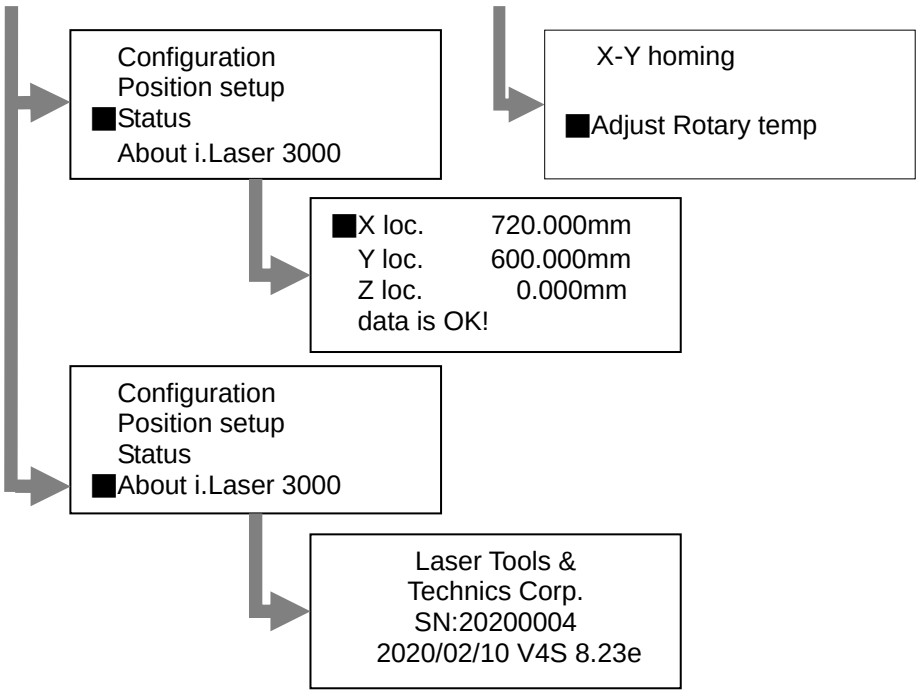
  If this function is on and press  , the laser tickle will emit continuously until pressing  again. If this function is off, the laser tickle emits only when you keep pressing  .

- **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 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]**.
  - **Single Ref-point**

    There are 2 mode.

    [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.
  - **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**

  It for rotary mode, you can set the ref-point under this selection.

- **Status**

  The function can show the position of carriage and table.

- **About i.LASER ####**

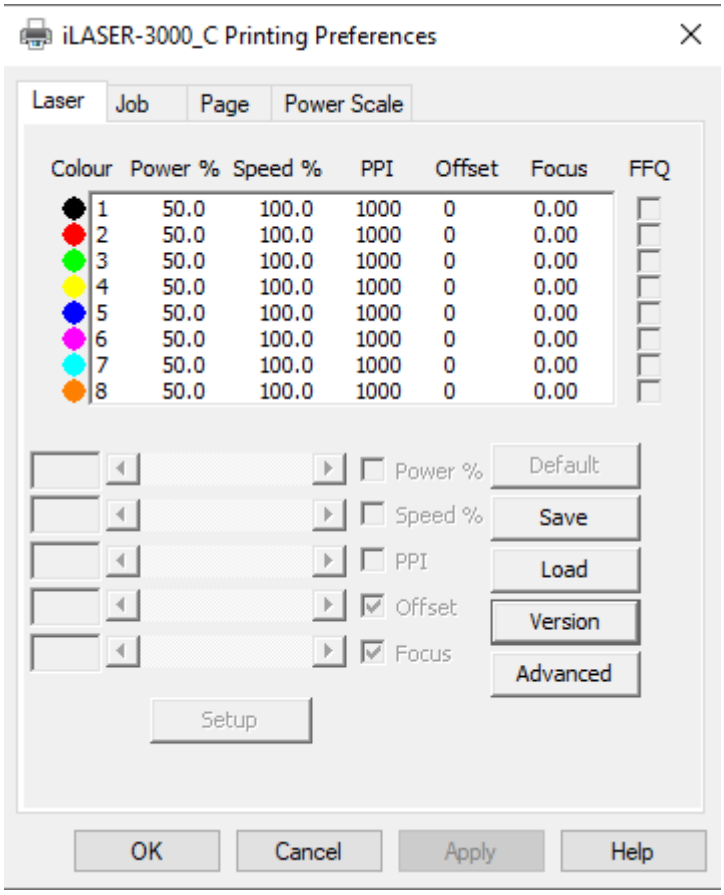
  The function can show the firmware version and the machine serial number.

3.4 Print Driver Operation

Because i.LASER 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 i.LASER, you can easily modify the driver settings just like using a desktop printer. There are four tabs in i.LASER's 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, and turn machine.



1. Color

i.LASER 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 60 ips, then setting 50% speed will produce about 30 ips 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. Focus

After autofocus, user can set different focal height through driver by different color. The range of value is -4~100. If number is bigger, the lens is far to material; if number is smaller, the lens is closer to material. System will keep at the latest processing Z height after finish work. (unless re-autofocus or reboot)

7. Setup

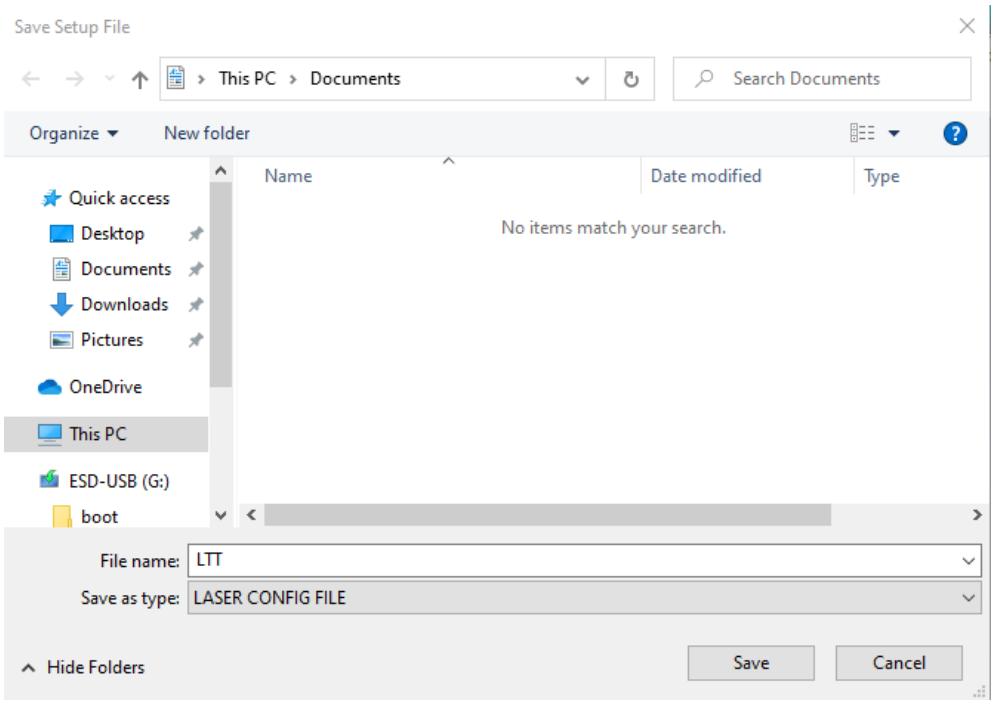
The settings of power, speed, and PPI can be modified by editing the text boxes and dragging the sliders. Then please click the setup button to save the new values for each setting.

8. Default

Clicking on this button will reset all settings of driver to their default values.

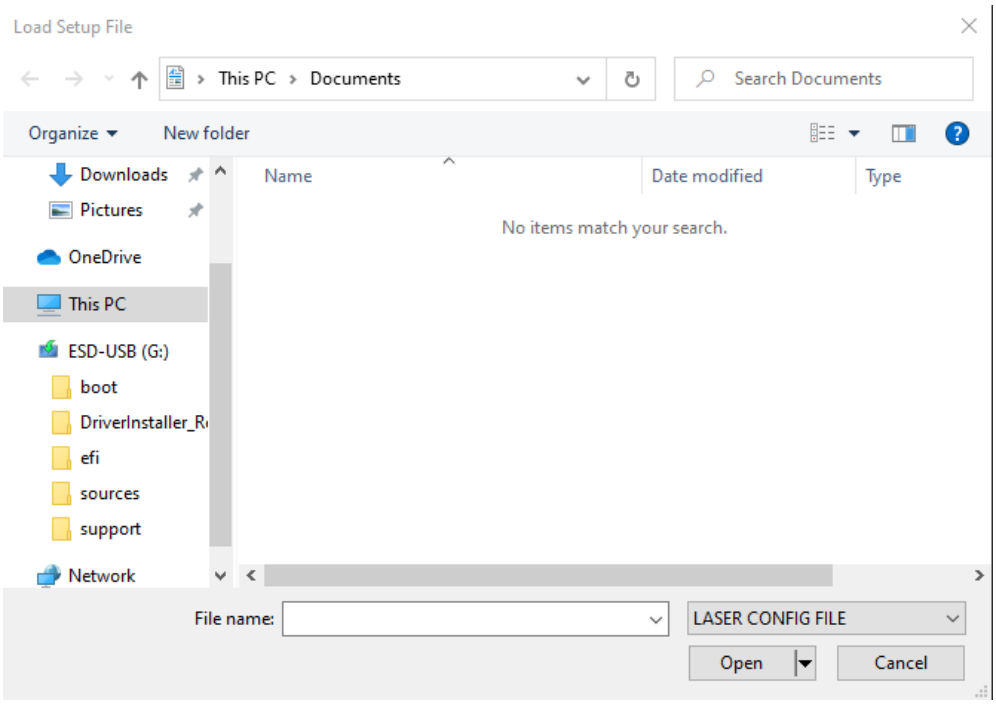
9. Save

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



10. Load

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

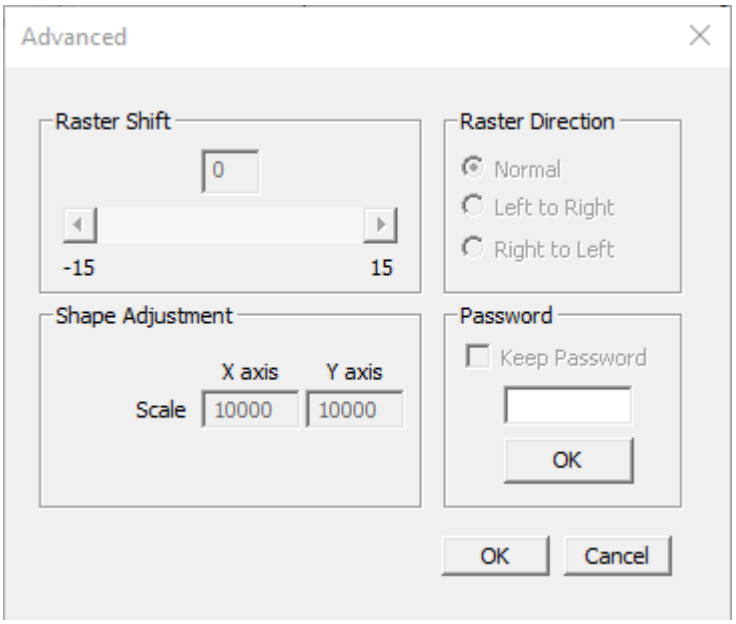


11. Version

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.**

Sharpe 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

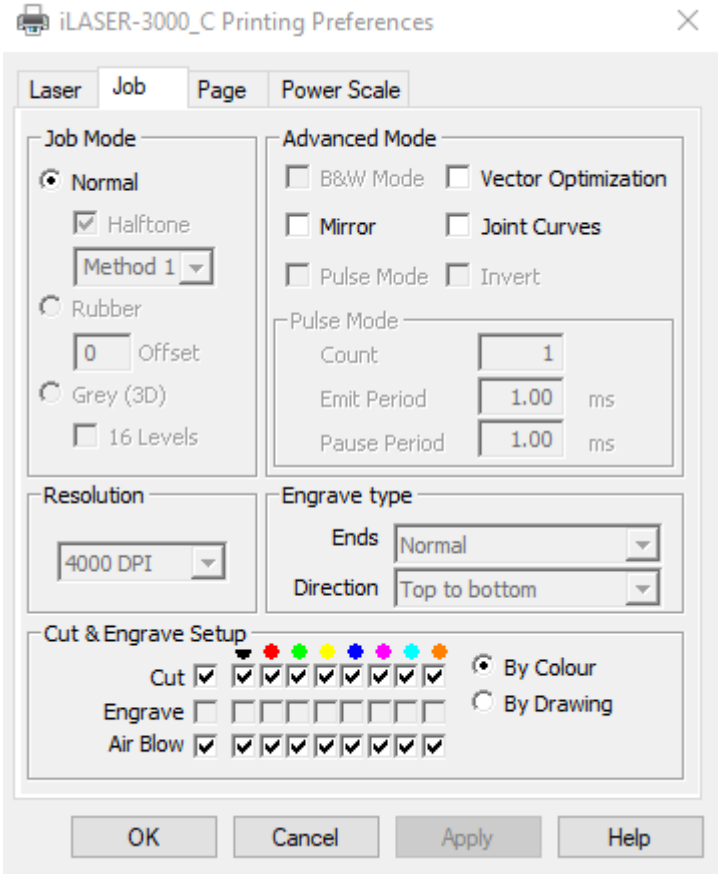
You can choose a raster quality by changing the Raster Direction. If you choose Normal, the laser opens both on direction of left to right and right to left. Otherwise, if you choose Left to Right or Right to Left, the laser opens only on the single direction you choose. All of those three options will produce correct engraving result as you set, but the quality of single direction will be better then the Normal option.

Password

Check the **[Keep Password]** box, than 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 5 sections: **Job Mode**, **Resolution**, **Advanced Mode**, **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 through the use of 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 higher 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 many 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 power from the laser generator. 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.

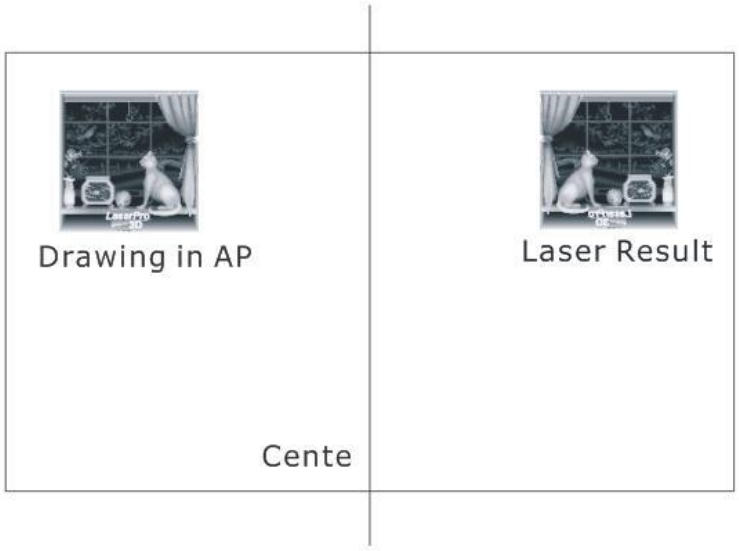
2. Advanced Mode

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 engraver.



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 potions 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

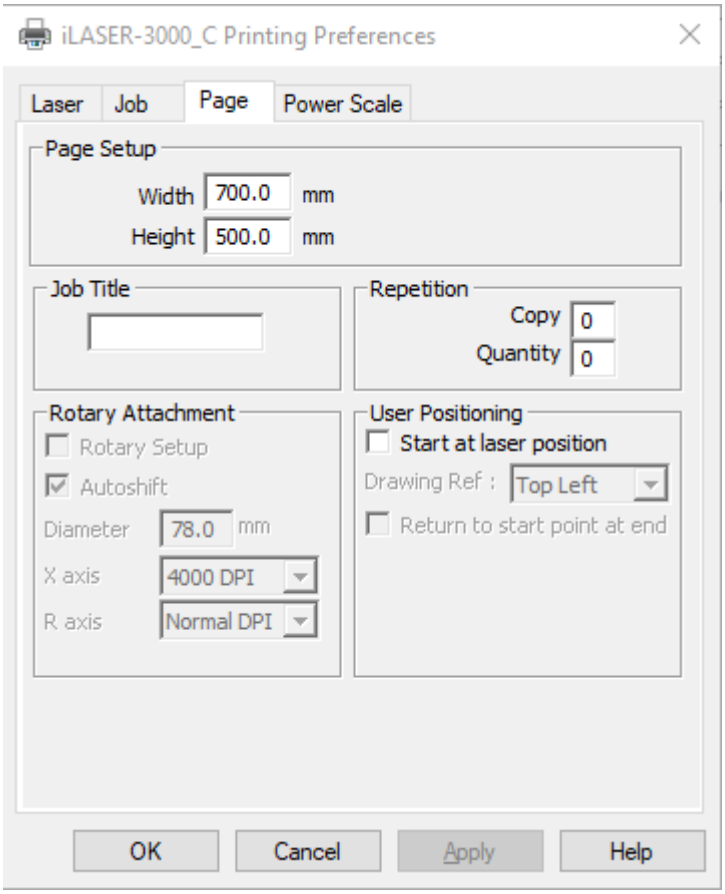
When **[By Color]** is selected vector are cut according to the predefined color order. And vectors of the same color are cut in the sequence they have been drawn. Engraving objects' orders are according to color only. Raster lines of the same color are engraving by **[Direction]** setting

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 5 sections: **Page Setup**, **Job Title**, **Repetition**, **Rotary Attachment** and **User Positioning.**.



1. Page Setup

The Page Setup section includes the Width and Height information of machine.

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. Rotary Attachment

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 **[Autoshift]** 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.

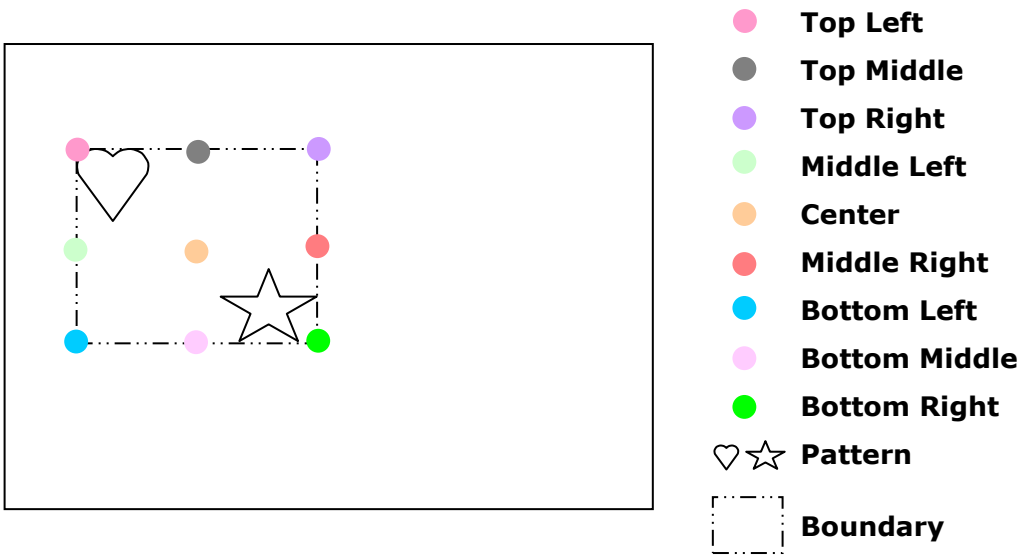
5. User Positioning

Start at laser position

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.

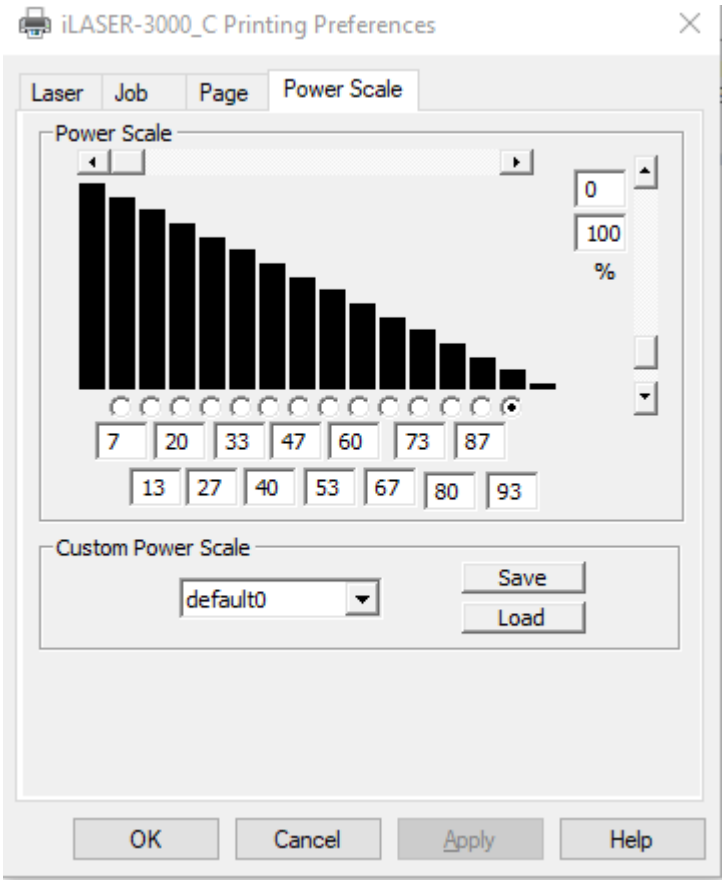


Return to start point at end

If you want to stay on reference point after job finished, you can check this option. The option can save your time.

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.

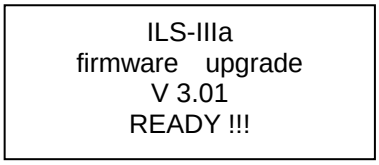
3.5 LTT Product Tools

3.5.1 System Upgrade

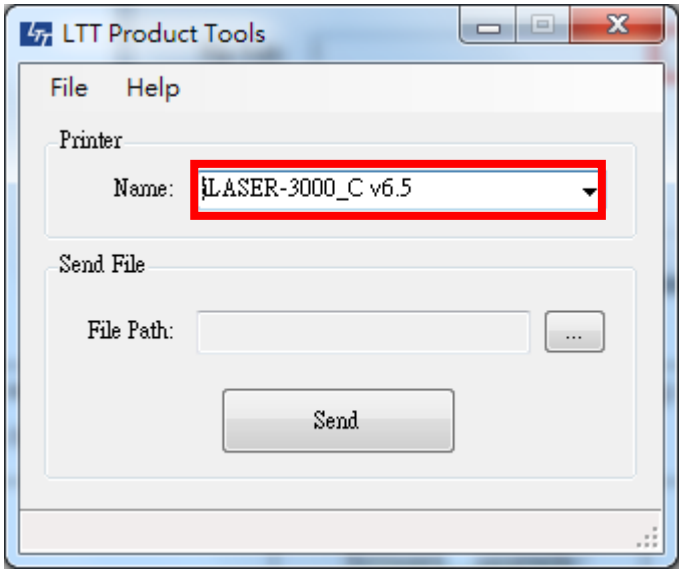
Generally, the file for upgrade will be provided from LTT. The file type is **[*.ice]**. While upgrade is processing and the power is turned off or the cable is disconnected, the i.LASER may not be upgraded for the moment. If this situation happens, please contact LTT.

1. Turn off the i.LASER, and check that the i.LASER is connected with PC through USB cable.

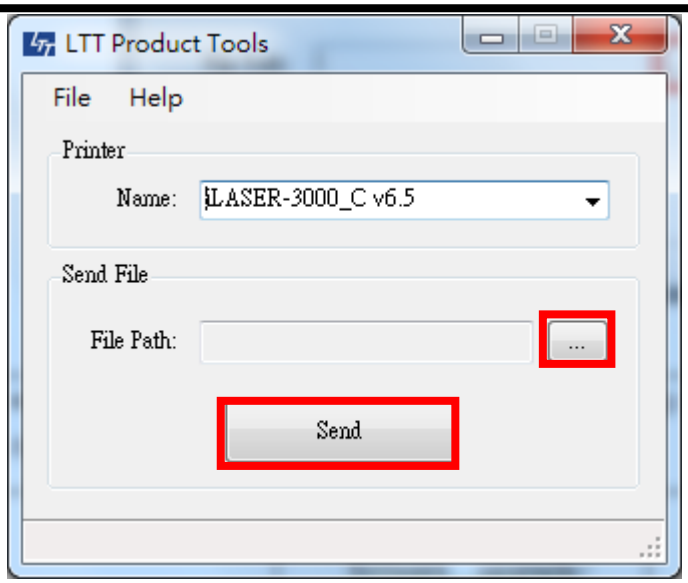
2. Turn on the i.LASER and computer. Press and hold on the control panel right after turning on i.LASER until the following screen appears.



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



4. Then select the **[*.ice]** file with **[...]** key, then press **[Send]** key to upgrade the firmware of i.LASER.



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 i.LASER returns to main menu.

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

Chapter 4 Maintenance

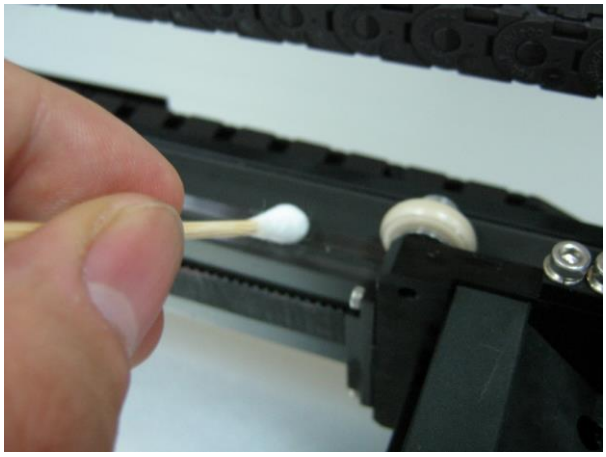
4.1 Daily Cleaning

1. Preparation

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

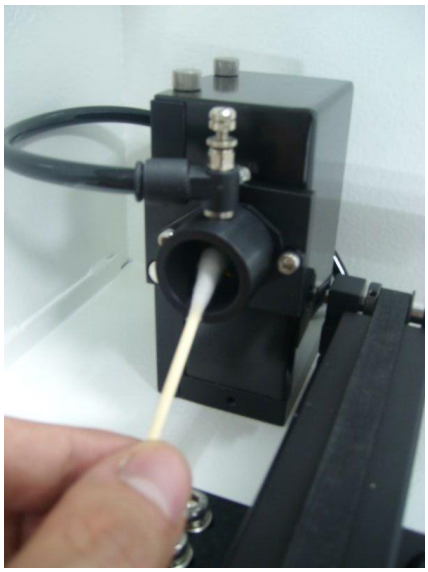
2. Clean machine

- **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.**

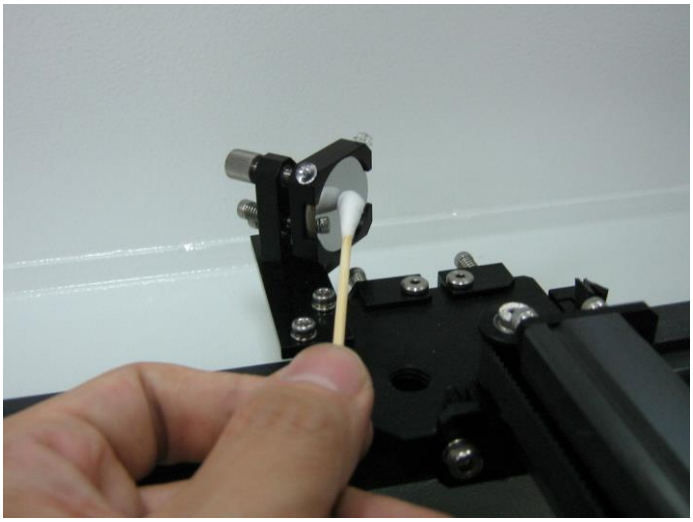


3. Clean lens and mirror

- **Clean the window lens with cotton swab and alcohol.**

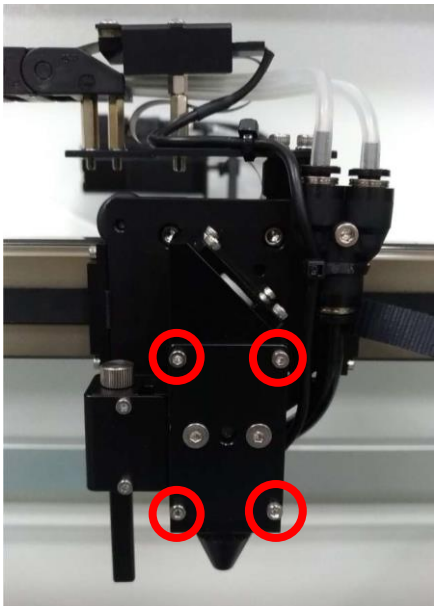


- **Clean 4th mirror with cotton swab and alcohol.**



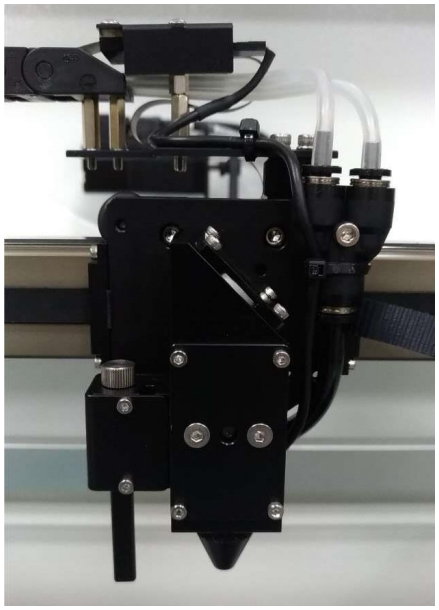
- **Clean 5th mirror and focal lens with cotton swab and alcohol.**

  Loosen the 4 screws by tool, and take off the cover.



Clean the 5th mirror and focal lens clean it, and put it back.

Assemble the cover and screws back.



4.2 Weekly Cleaning

1. Preparation

- **Ensure that the system is turned off and the AC power cable is unplugged.**
- **Prepare for compressive air which is waterless and oil free, dry brush, cotton swab and alcohol.**

2. Clean machine

- **Clean all electric components with compressive air and dry brush.**
- **Clean exhaust port with brush.**
- **Clean all cooling fans with compressive air.**
- **Clean all filter cottons.**

3. Clean lens and mirror

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

  Loosen the two screws by hand, and take off the cover.

Clean the mirror.

Assemble the cover and screws back.

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 1.3.)
Laser beam is not emitted.	Laser on/off switch may be turned off.	Turn on the switch. (See section 1.3.)
	Doors with interlocks are not closed. (If "Door" indicator is dark.)	Close all doors with interlocks. (See section 1.3.)
	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 3.4.1.)
	Laser generator has breakdown.	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 i.LASER series.

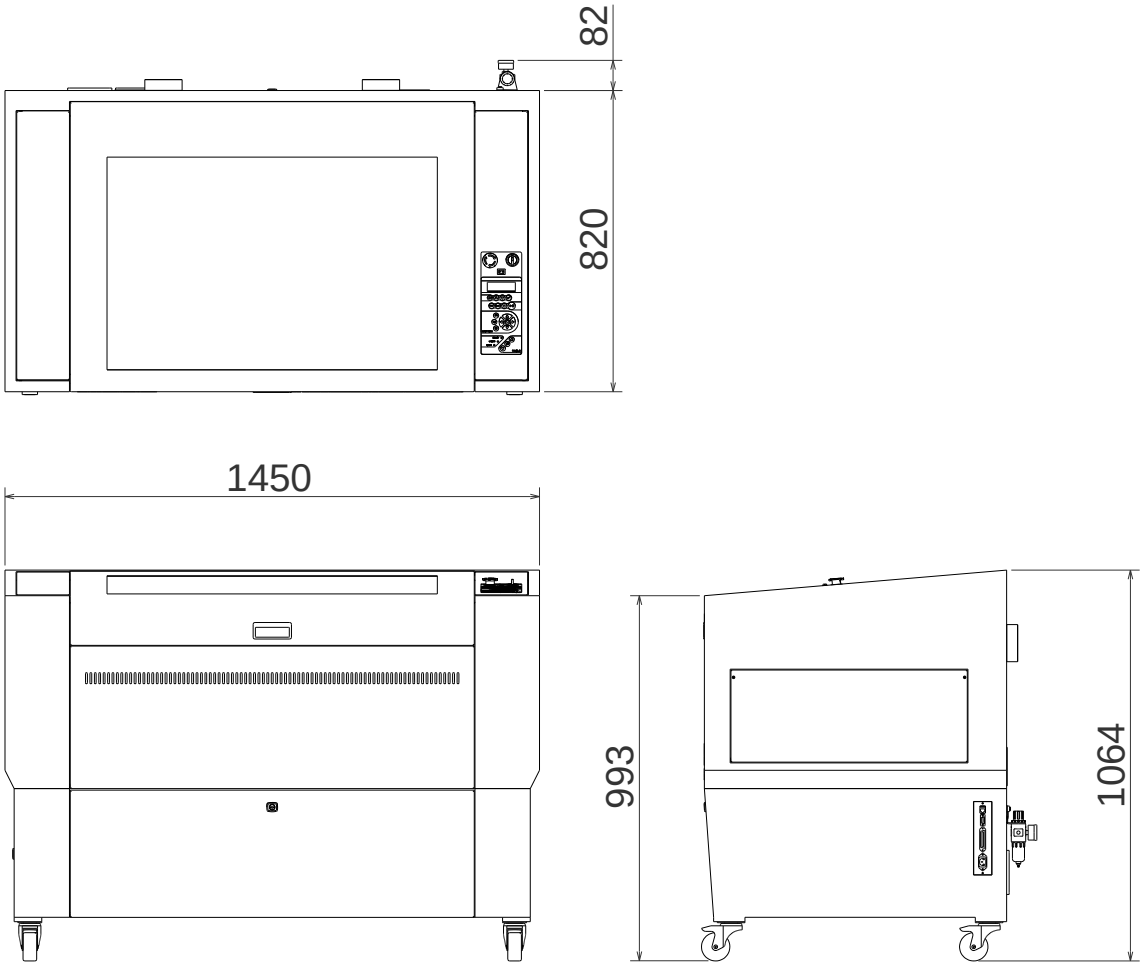
Model	**3000 series**	**4000 series**
Work area	700 (L) × 500 (W) mm	1000 (L) × 600 (W) mm
Table Movement	230 (H) mm	
Max. speed	1524mm/sec (60"/sec)	
Resolution(DPI)	1000, 500, 333, 250, 200, 160	
Memory Buffer	64MB	
Interface	USB port	
Laser generator	30W / 60W /100W (air-cooled CO2 laser)	30W / 60W /100W (air-cooled CO2 laser)
		50W (water-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 Beam Expender (4000 series)	
Options	Blower Air compressor Rotary attachment Honeycomb cutting table Rubber stamp fixture Ethernet Port Beam Expender (3000 series)	

Appendix 2 Dimensions

This section describes the dimensions of i.LASER series.

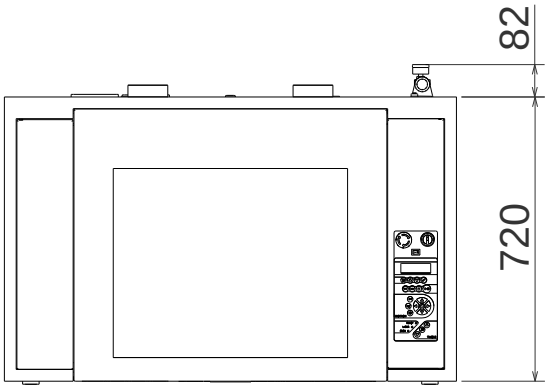
■ i.LASER 4000 series

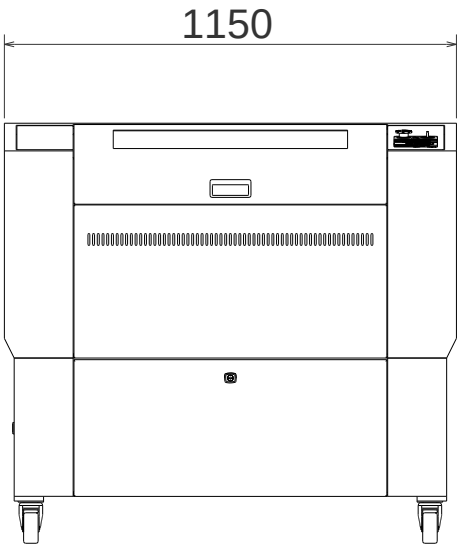
Unit:mm

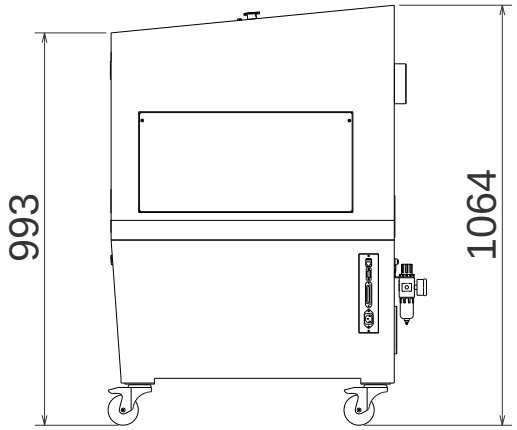


■ i.LASER 3000 series

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	
		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
Laserable 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	