



Laser Tools & Technics Corp.

User Manual

Version 1.0

i.LASER Series with CCD Camera

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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@littcorp.com

Web: www.littcorp.com

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

Disclaimer

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LTT reserves the right to make changes without further notice to any products herein to improve reliability, function, or design. LTT does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights, nor the rights of others.

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 i.LASER 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 : 10.6 μ m

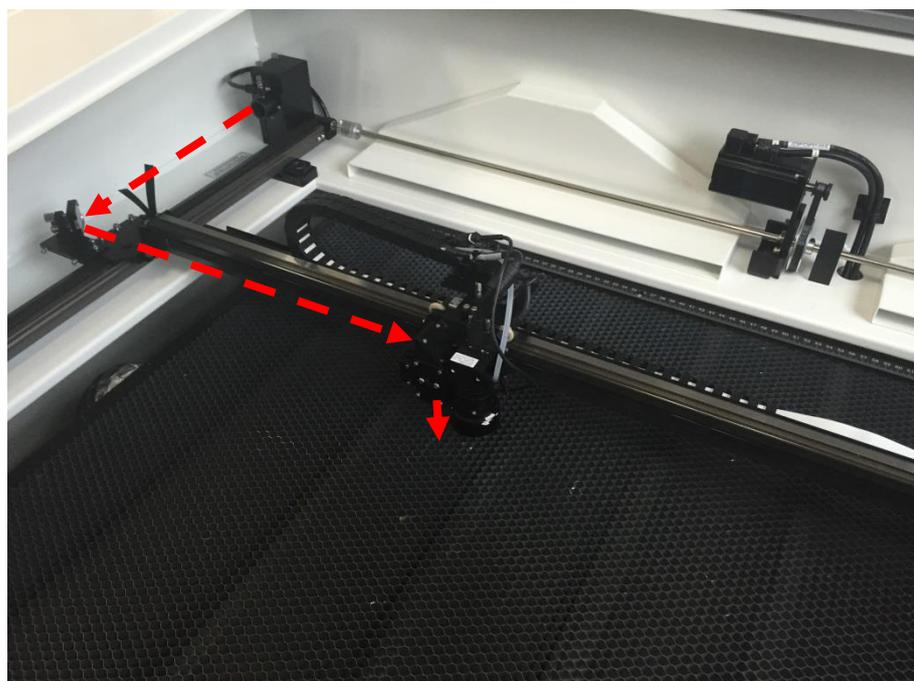
Maximum output power : 30 ~ 100W

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.



Chapter 1 Safety

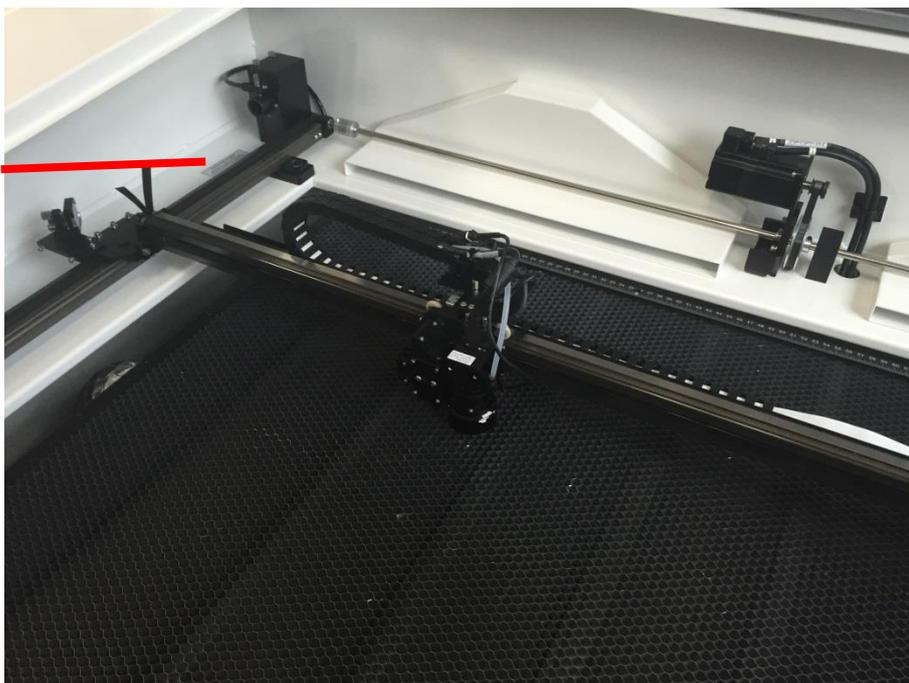
- Do not watch the laser beam directly during operation. Bright light caused by the lasing process can damage the eye.
- The side and rear doors are fixed by screws for safety. If you open these doors, the i.LASER will become a Class 4 laser device. For your safe, please wear protective goggles.
- The laser beam may cause fire. Never leave machine alone 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.LASER3000 Serial No: 9810000
Specification: V30, 110~220V, 10A
Manufacture Date: 2008 .12
No. 121, Lane 99, PU-DING ROAD,
HSIN CHU CITY, TAIWAN, R.O.C.
TEL : 886-3-5727772
FAX : 886-3-5728898



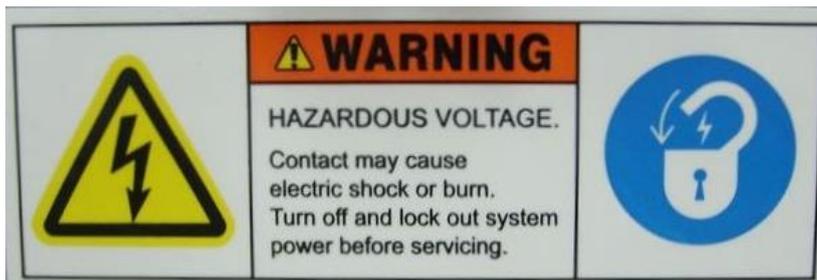
2

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

3



4



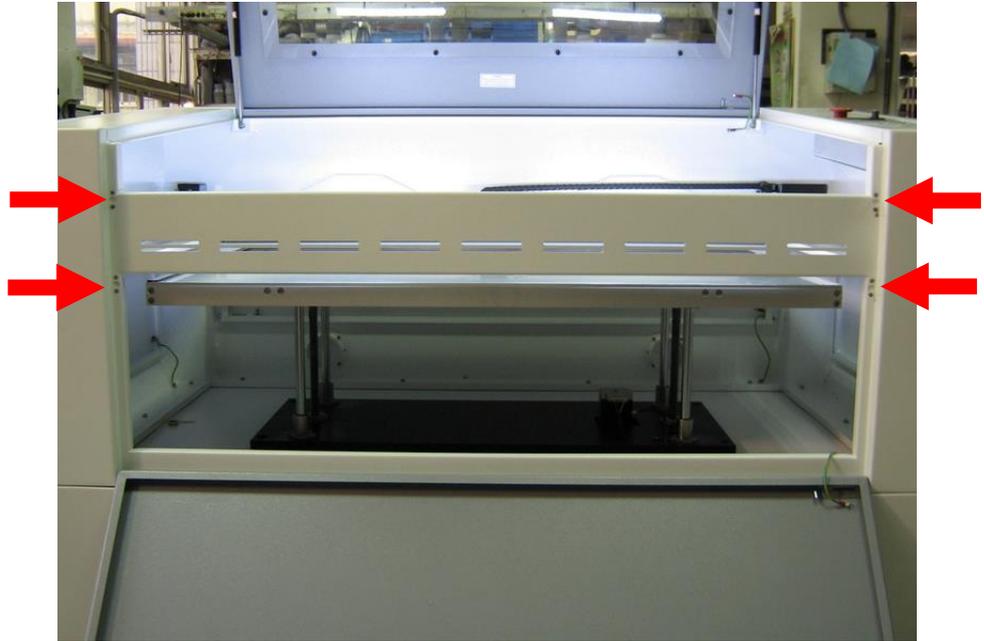
5



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 fist).

■ **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 upper box. (If you order slide board.)



4. Remove the top cover.



5. Remove the side cover and foam.



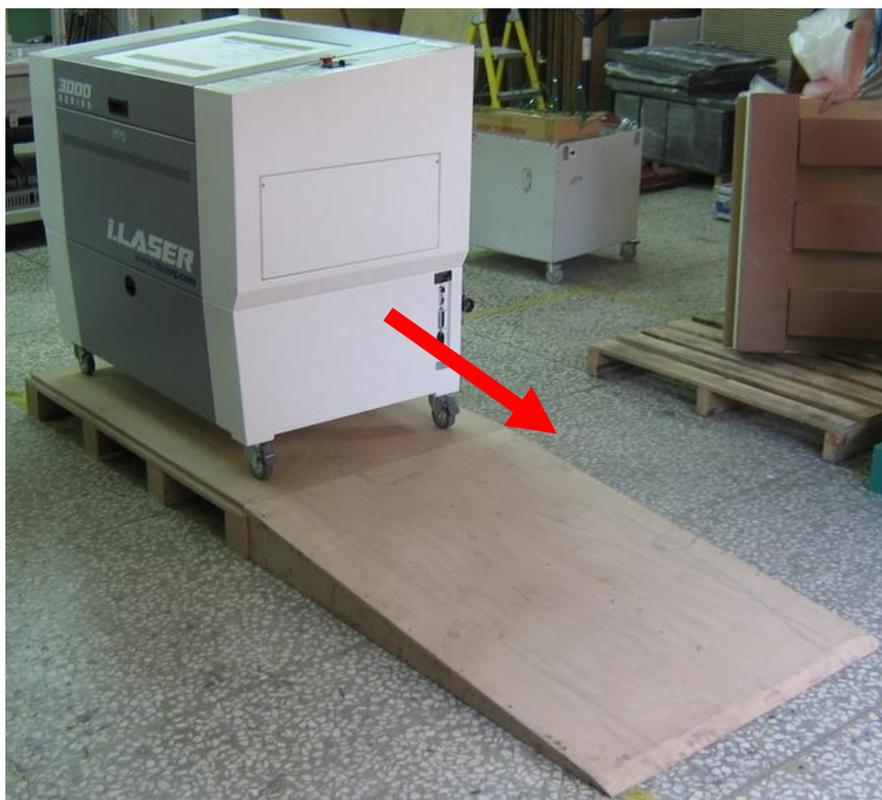
6. Remove the protective bag.



7. Remove the foam at bottom.

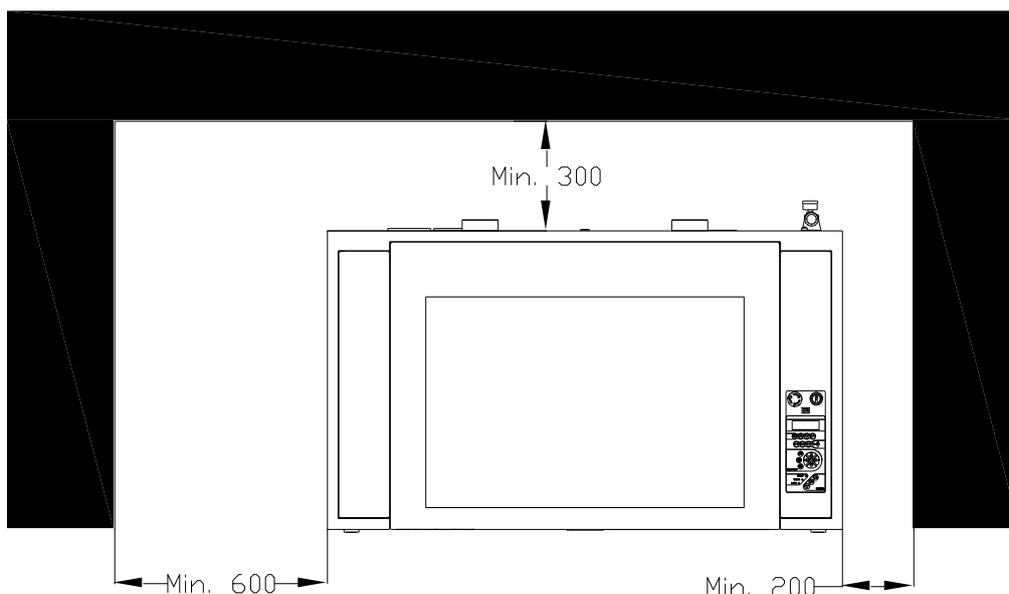


8. Place the slide board which is in the upper box and roll down the machine. (If you order slide board.)

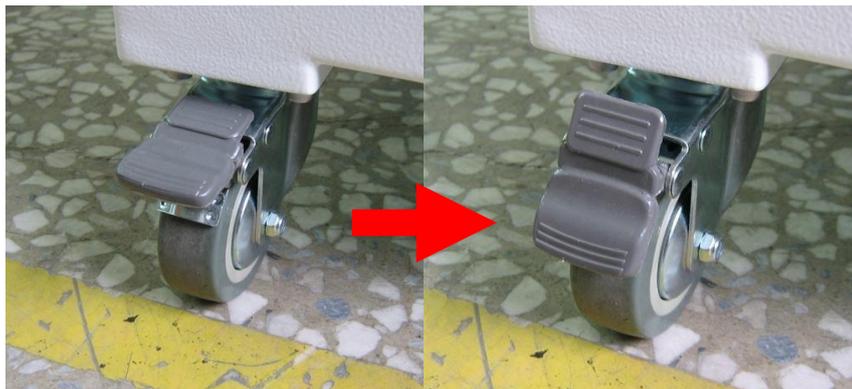


9. Locate the machine and keep the recommended space for maintenance.

Unit: mm



10. 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 Parts Name 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)

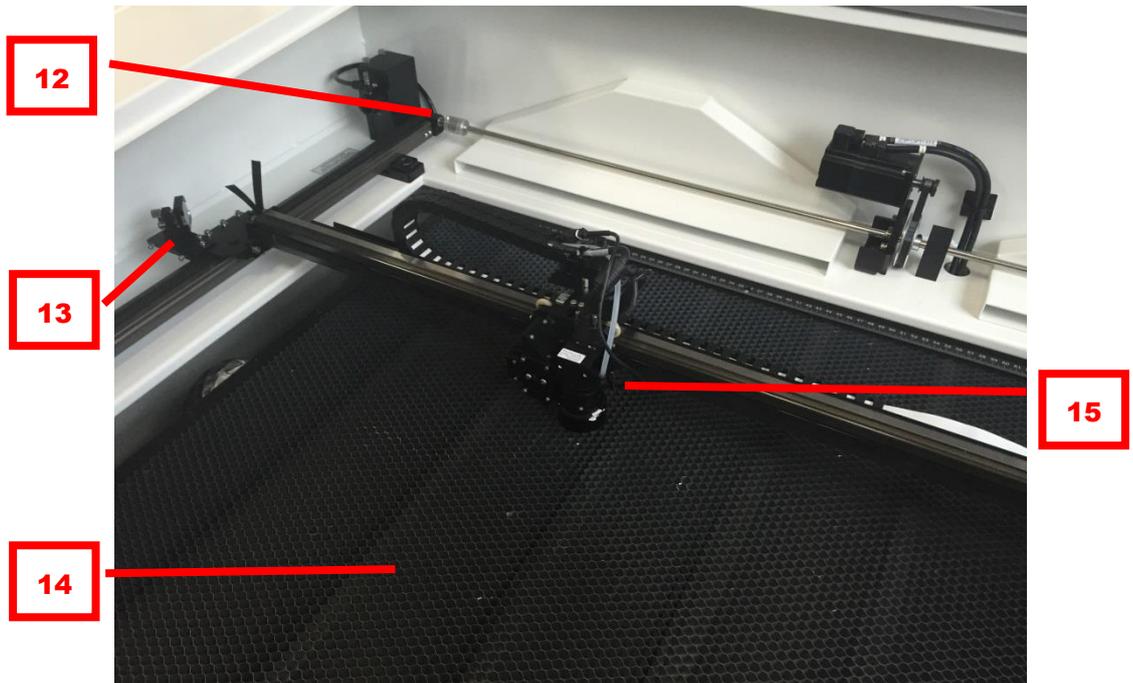
You can work on long materials through two side doors. These doors have no interlock sensors, so they are locked by screws for safety. If you open these doors, the system becomes a Class 4 laser device.



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 this lens daily. (See [chapter 4](#))

13. 4th Mirror

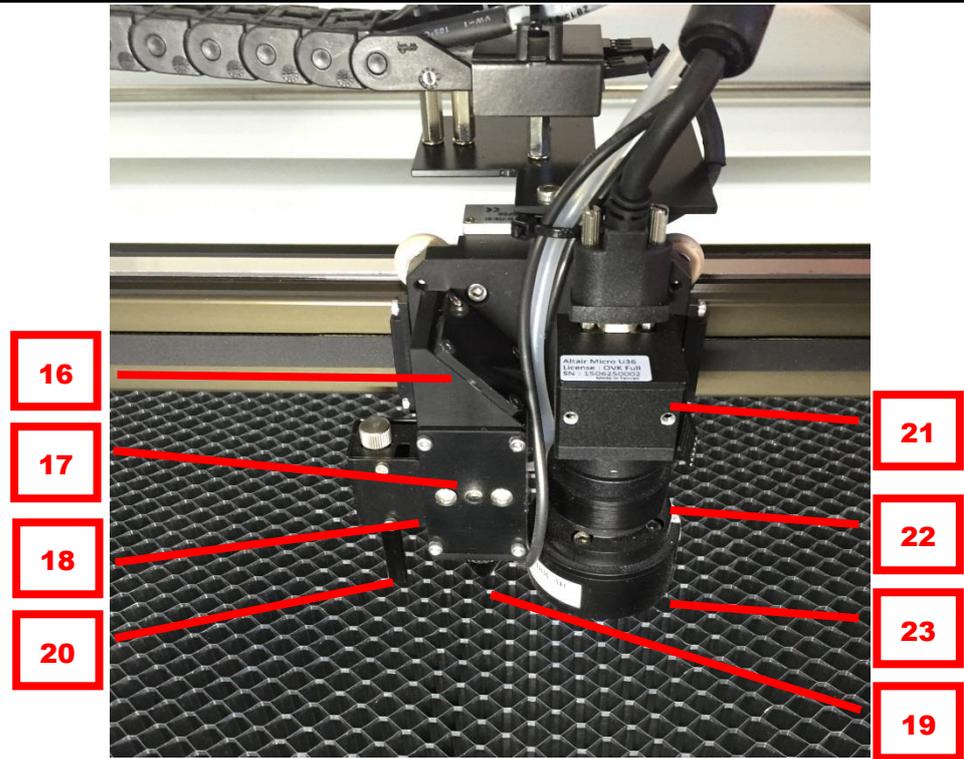
This part reflects laser beam to carriage. Also, it should be cleaned this lens daily. (See [chapter 4](#))

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 this lens 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 this lens daily. (See [chapter 4](#))

18. Air Assist Adjustment

This part can adjust air flow which is out the nozzle, it set at the back side.

19. Nozzle

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

20. Auto Focal Pin

This part can adjust focal height automatically by touching material.

21. AISYS CCD Camera

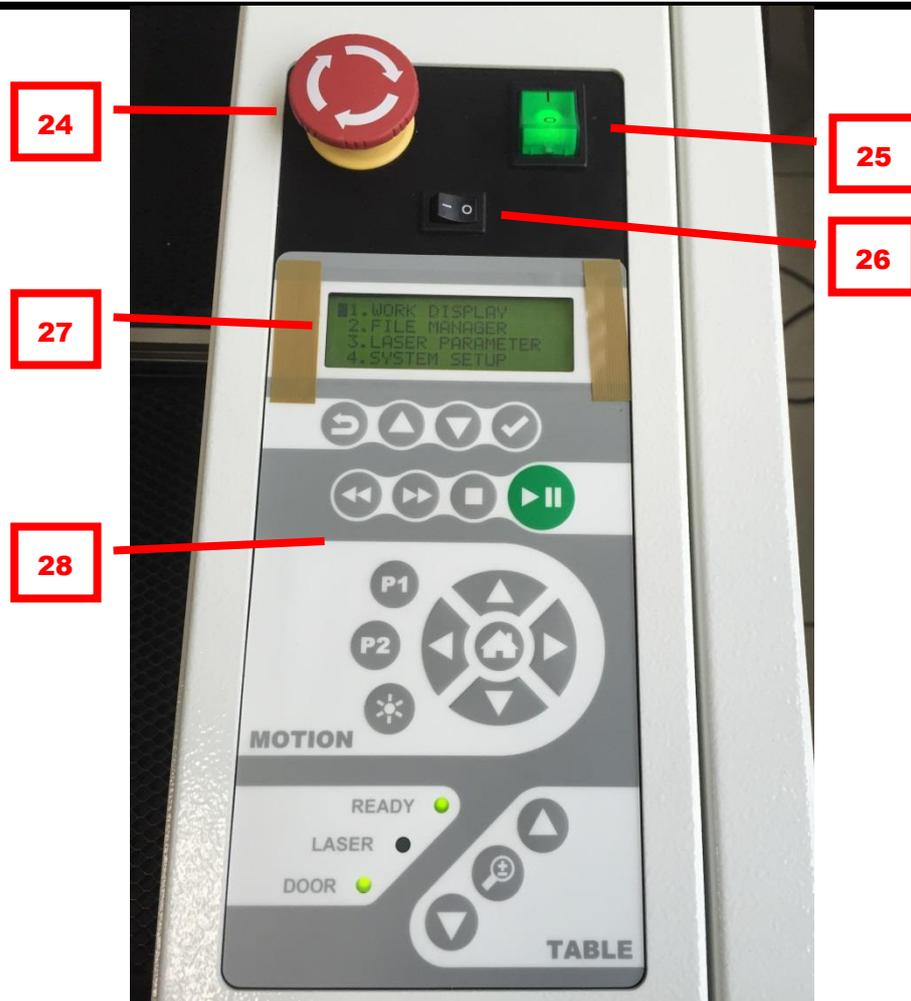
This part is setting [**ALTAIR U36 Camera**]

22. Camera Shot

This part provide the focus of CCD camera.

23. LED Rim

This part provie the light for CCD camera catching image.



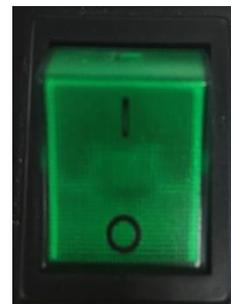
24. Emergency Stop

Please see section [1.3](#)

25. Power Switch

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

- ON
- OFF



26. Laser Switch

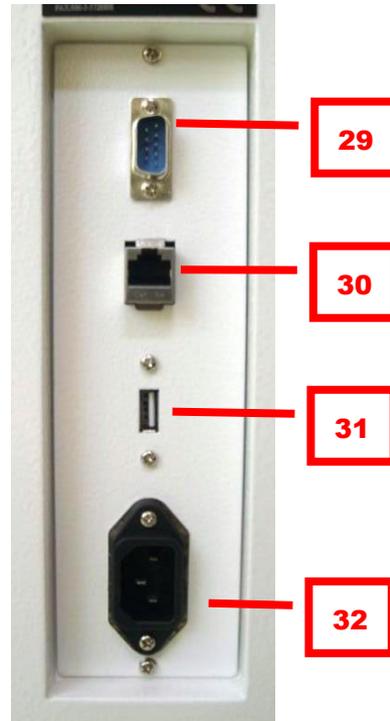
Please see section [1.3](#)

27. 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 [3.3.2](#).

28. 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](#).



29. Serials Port

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

30. Ethernet Port

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

31. USB Port

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

32. 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°C, No freezing

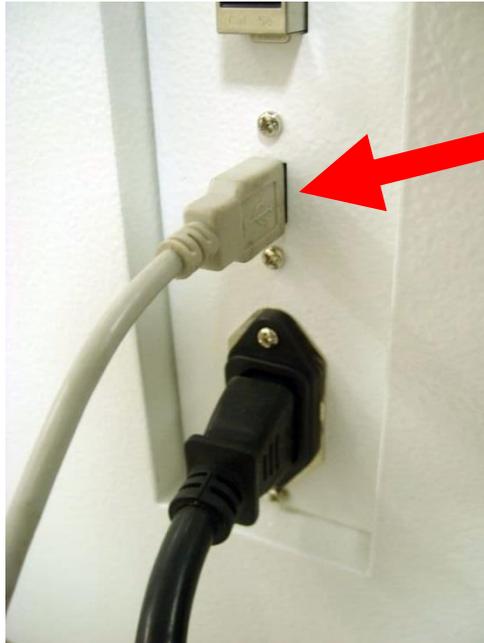
Relative humidity : 35 ~ 85 %

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 pipes from exhaust port to blower



5. Connect hose from air filter to compressor



2.5 Driver Installation

2.5.1 Install Driver

This section explains the installation steps for driver on computer.

1. Check computer equipment

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

- **Minimum**

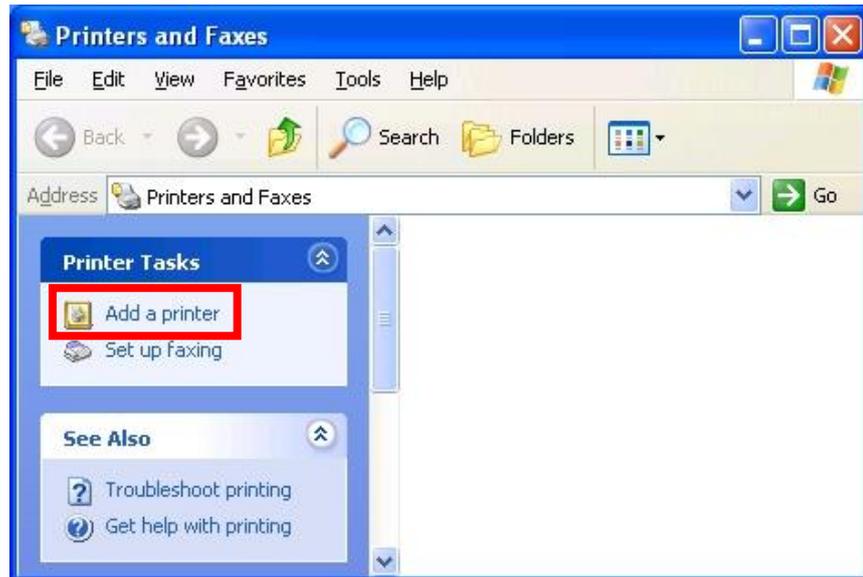
- Pentium 133MHz CPU
- 64 MB RAM
- 2 GB Hard Disk
- Microsoft Windows 2000
- 8MB Graphics Card
- CD-ROM Drive
- VGA monitor (800X600)
- CorelDraw 10
or AutoCAD R14

- **Recommended**

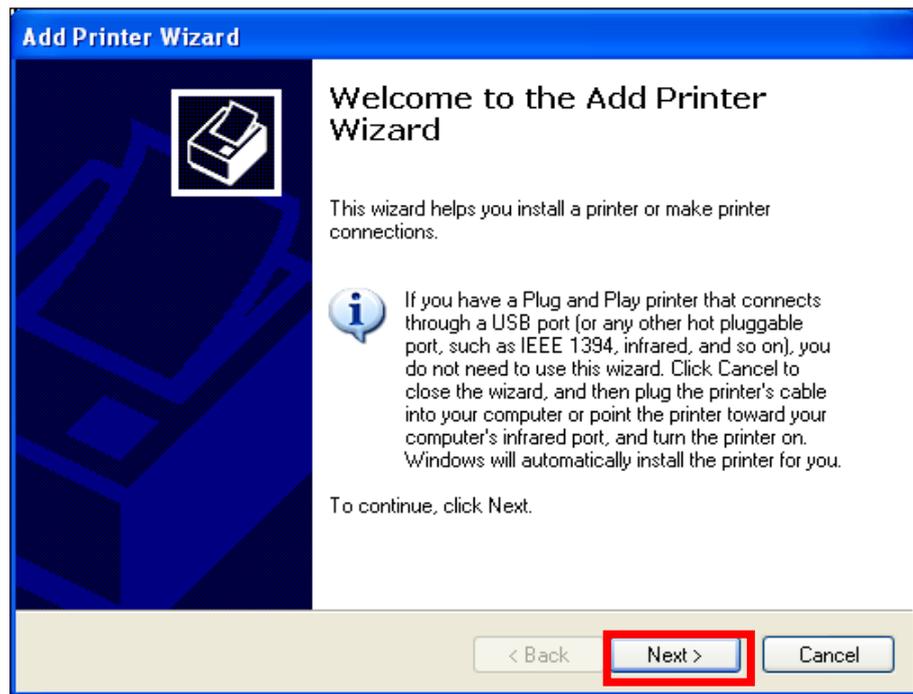
- Pentium-4 2.2GHz CPU
- 512 MB RAM
- 5 GB Hard Disk
- Microsoft Windows XP
- 64MB Graphics Card
- DVD-ROM Drive
- VGA monitor (1024X768)
- CorelDraw X3
or AutoCAD 2008

2. Put the CD-ROM of installation into CD/DVD drive

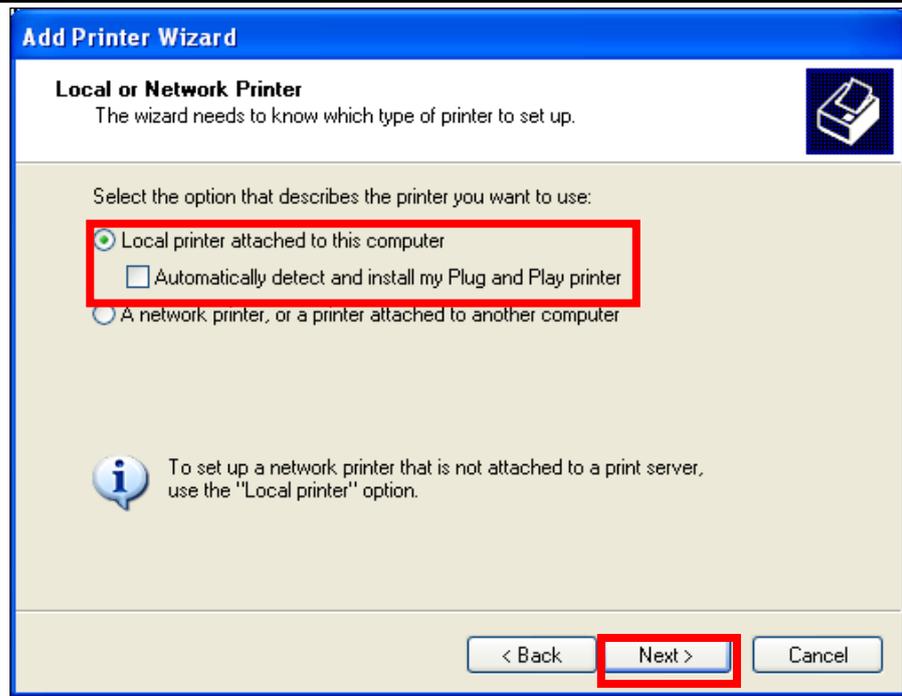
3. Go to the [Printers and Faxes] window and select the [Add a printer] option



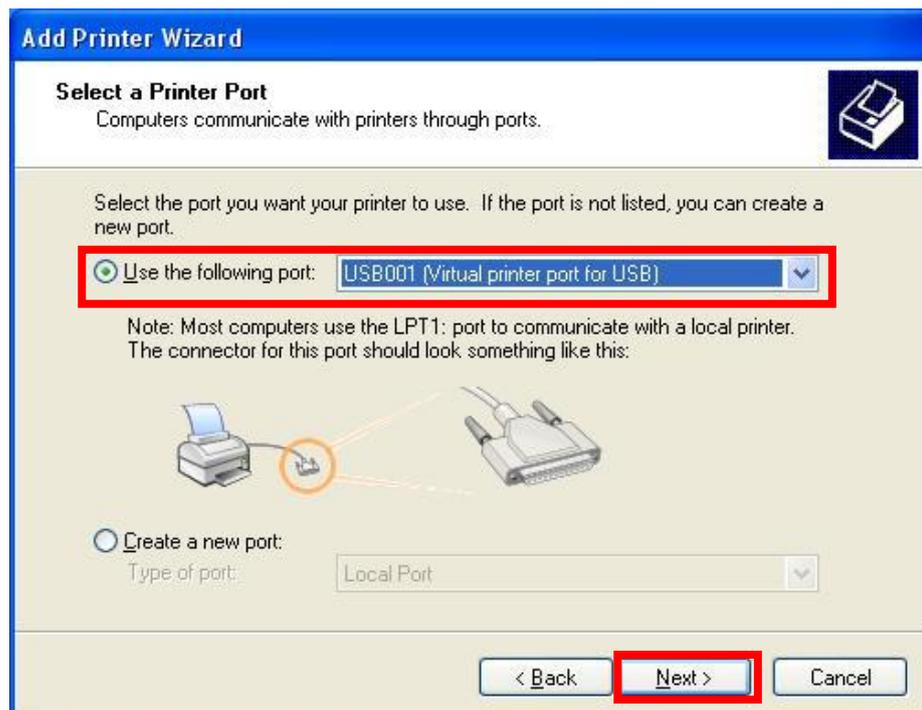
4. Click the [Next] button



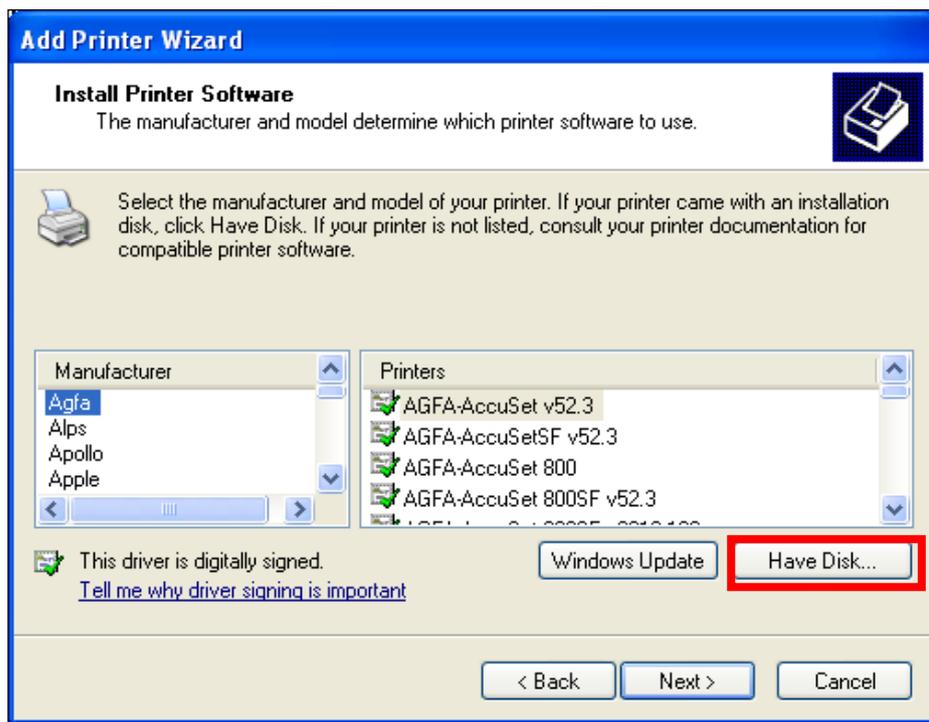
5. Select [Local printer attached to this computer], uncheck [Automatically detect and install my Plug and Play printer]



6. Select [Use the following port] and [USB00*]. (The * is depended on the USB port that is connected with i.LASER)



7. Click [Have Disk...]



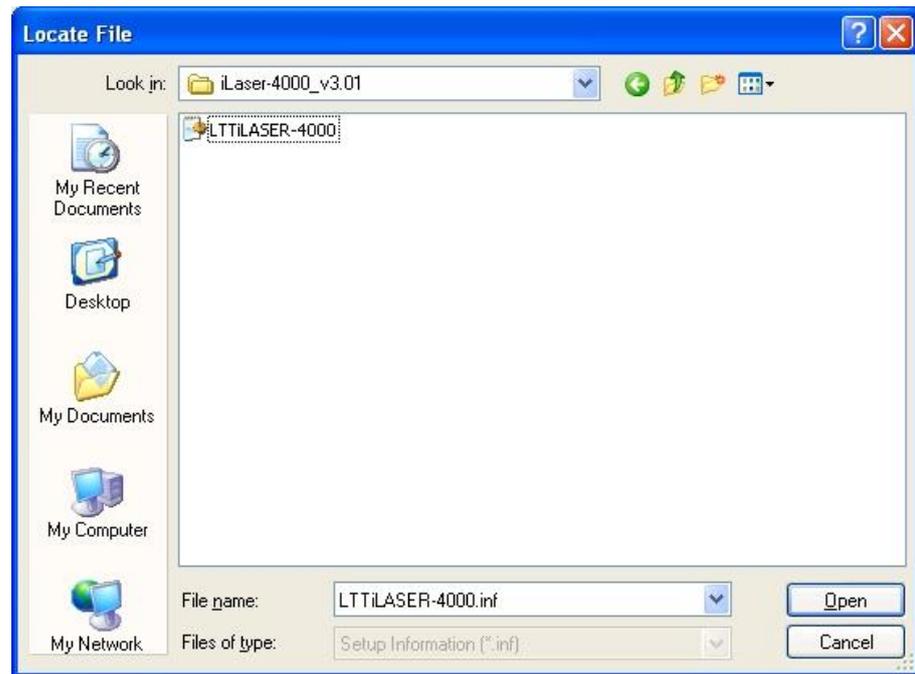
8. Click [Browse...] button



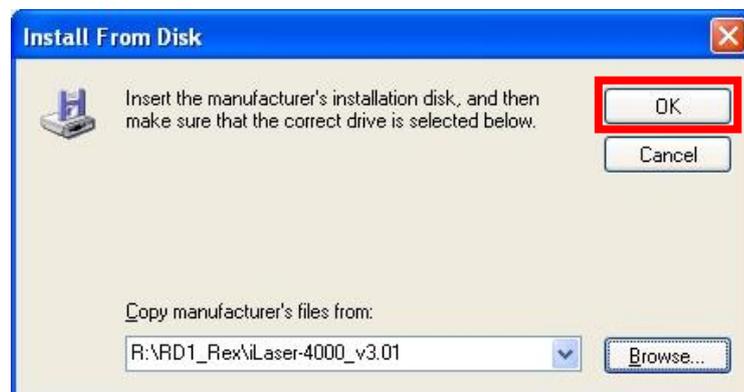
9. Select the inf file

Chapter 2 Installation

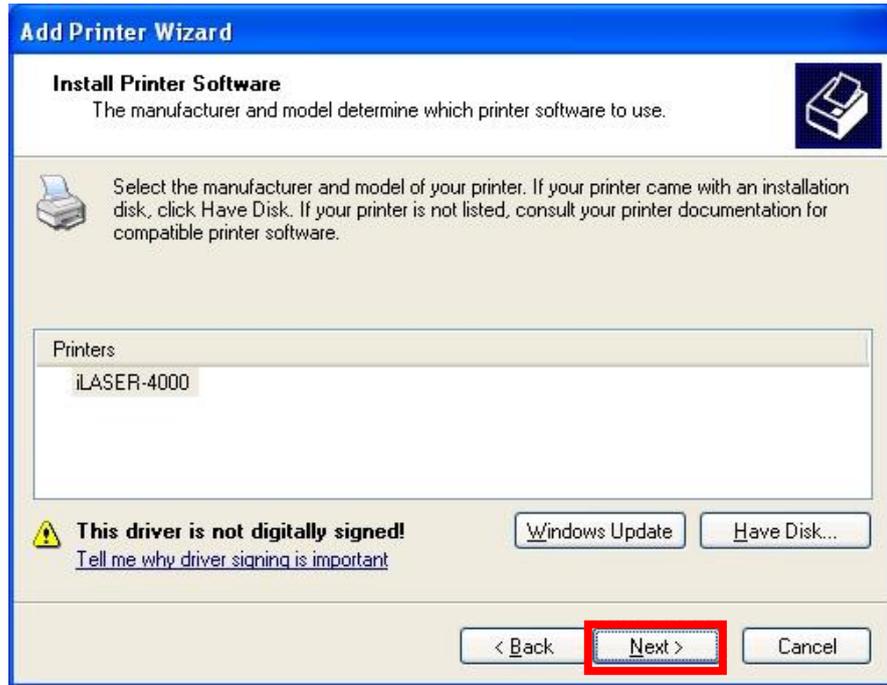
Browse to the location of inf file. If it is on a CD-ROM, please browse to the CD-ROM. Select the *.inf file which matches with your machine type.



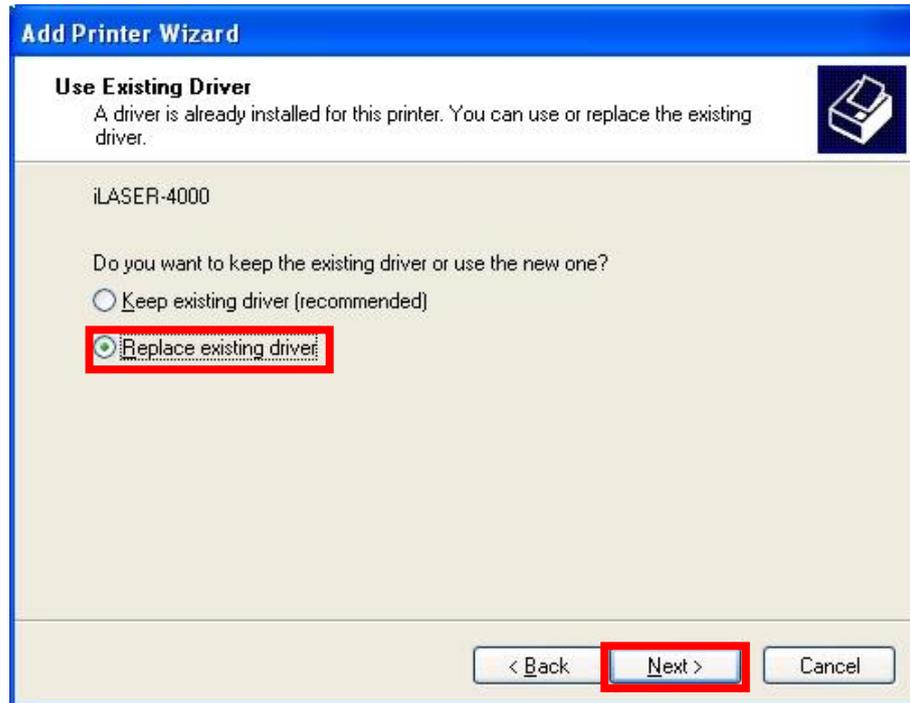
10. Click [OK] button



11. Click [Next] button



If the [Use Existing Driver] box shows, select [Replace existing driver] and click [Next] button.



12. Click [Next] button



If you want your engraver to be the default printer, then please select **[Yes]**, or please select **[No]**. If there are no other drivers installed on your computer, the i.LASER will automatically be set as your default printer.

Add Printer Wizard

Name Your Printer
You must assign a name to this printer.

Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.

Printer name:
iLASER-4000

Do you want to use this printer as the default printer?

Yes
 No

< Back **Next >** Cancel

13. Select [Do not share this printer]

Add Printer Wizard

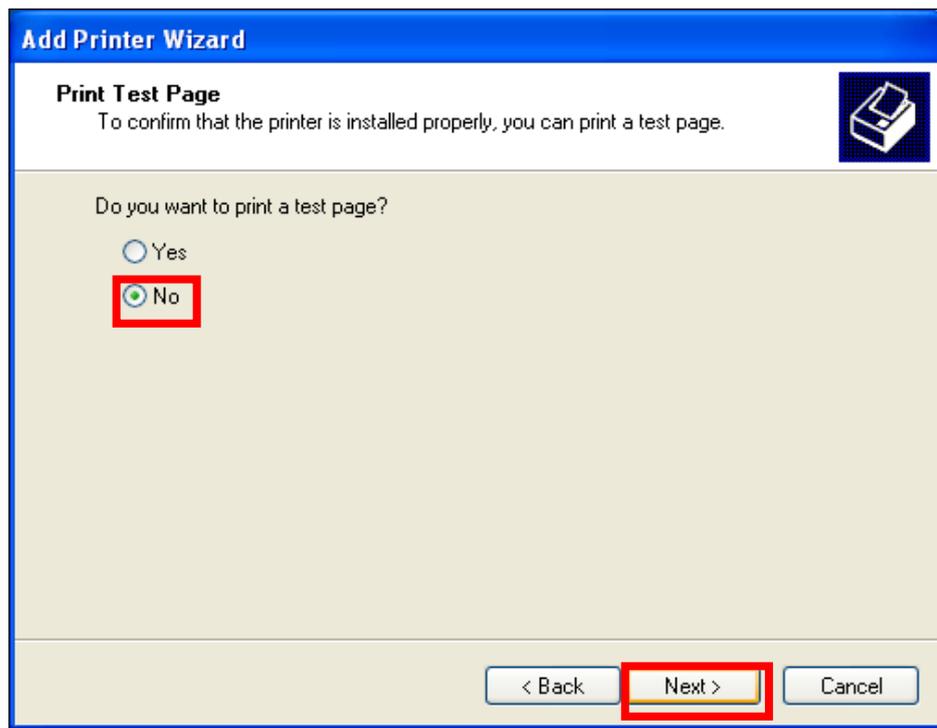
Printer Sharing
You can share this printer with other network users.

If you want to share this printer, you must provide a share name. You can use the suggested name or type a new one. The share name will be visible to other network users.

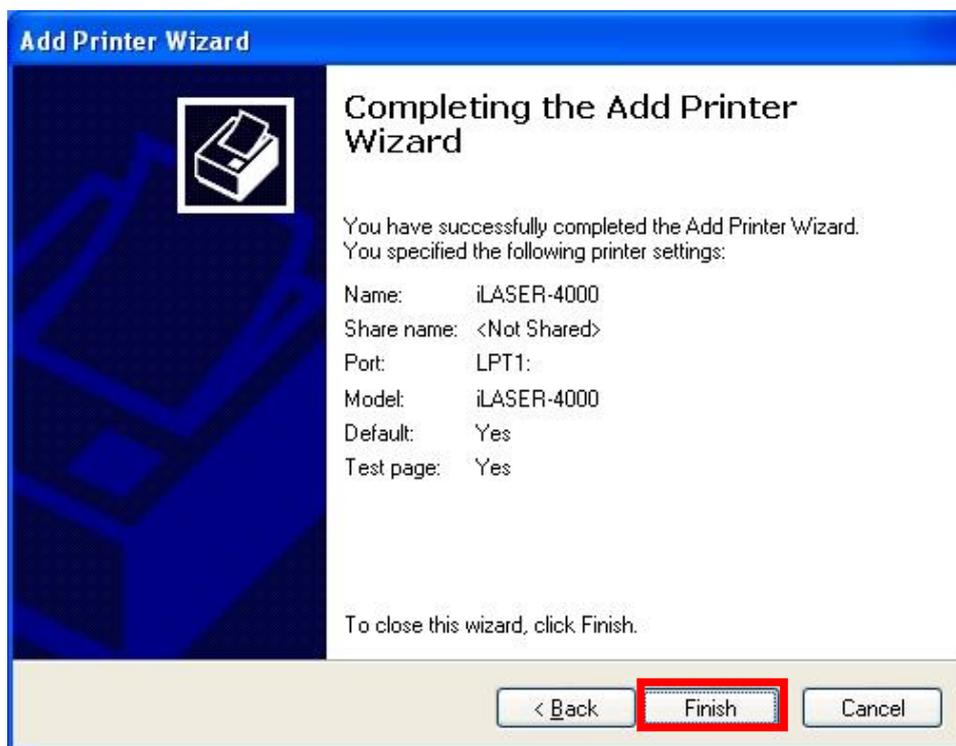
Do not share this printer
 Share name: _____

< Back **Next >** Cancel

14. Select [No]



15. Click [Finish] button



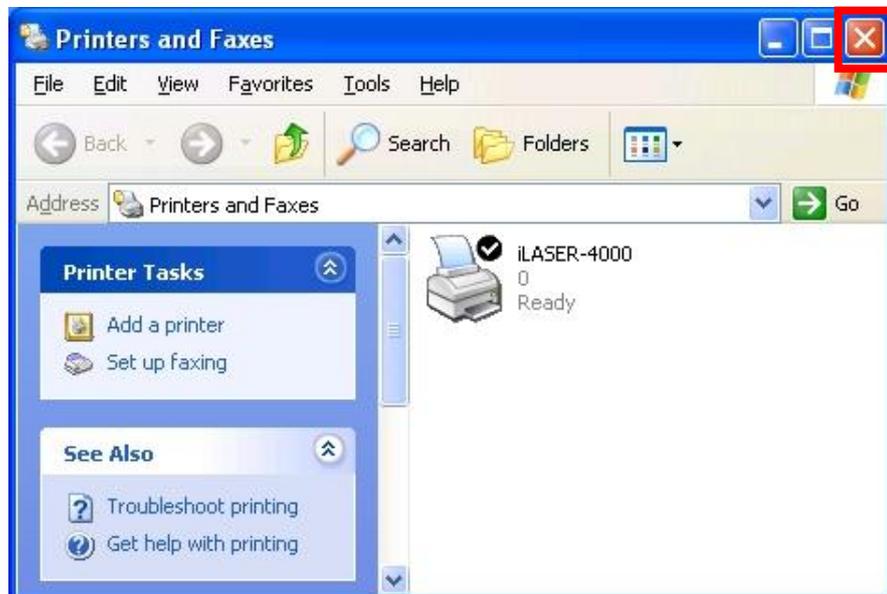


When the [**Hardware Installation**] box shows, please click [**Continue Anyway**]. Then your new driver installation is complete.



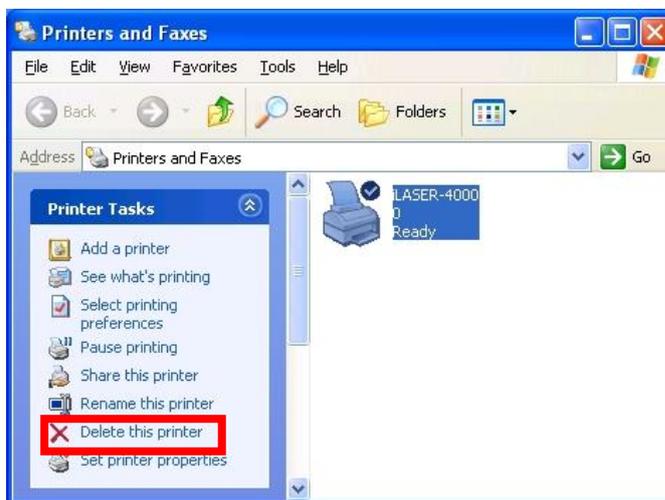
16. Close [Printers and Faxes] window

If your driver is now listed on the [**Printers and Faxes**] window, the installation was successful. Then you can close the window.

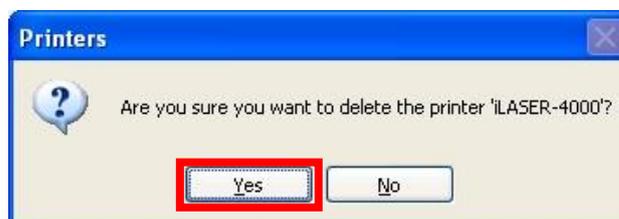


2.5.2 Uninstall Driver

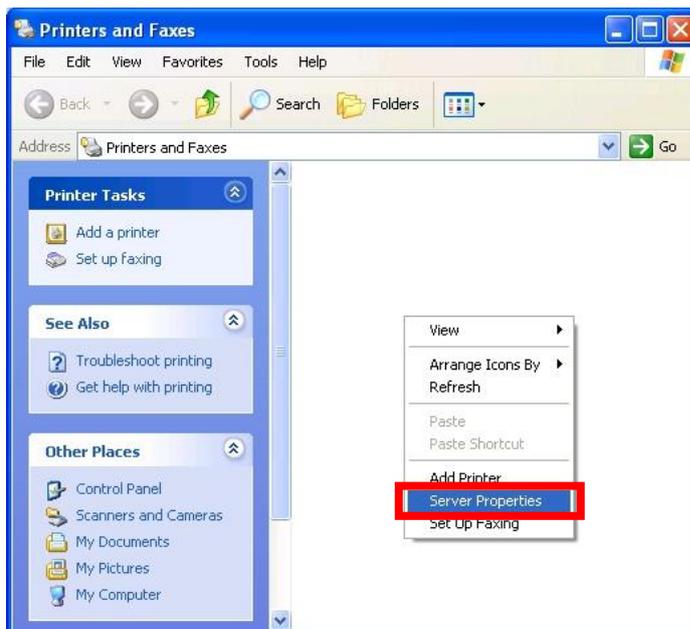
- 1 Go to the [Printers and Faxes] window
- 2 Select the Printer you want to delete and then press the [Delete this Printer] button.



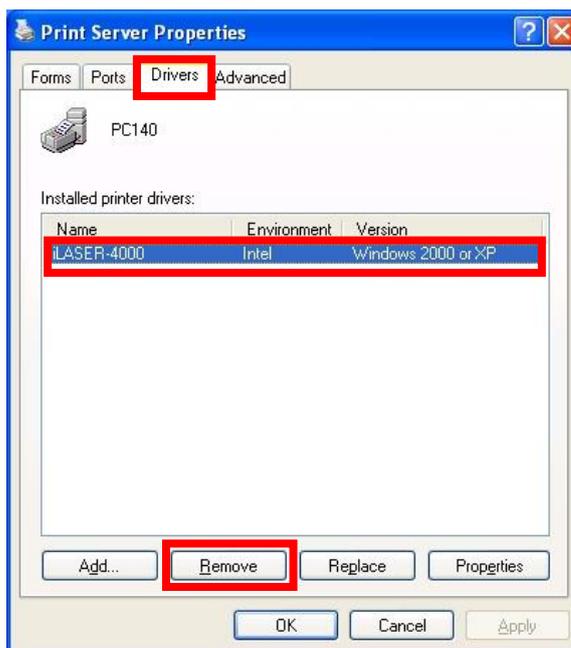
- 3 Press the [Yes] button and reboot computer.



- 4 Press right key of mouse on the [Printers and Faxes] window. Select the [Server Properties...] option.



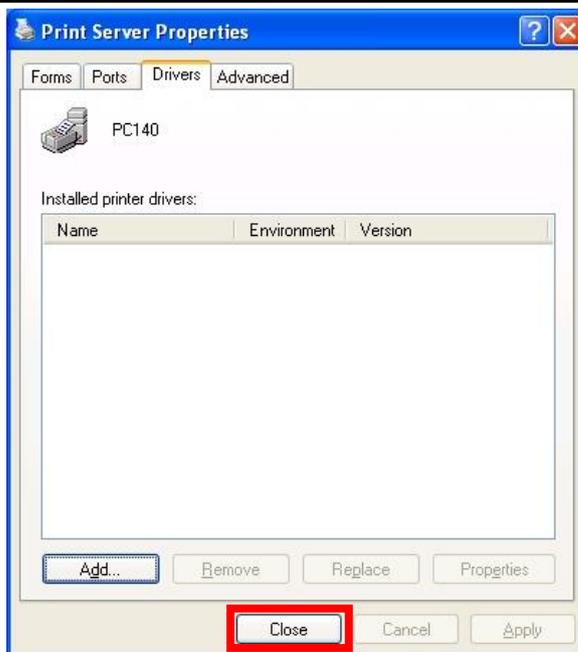
5 Switch to [Drivers] tab and choose the Printer you have just deleted. Press [Remove] button.



6 Press [Yes] button.



7 Press [Close] button.



8 Close the [Printers and Faxes] window.

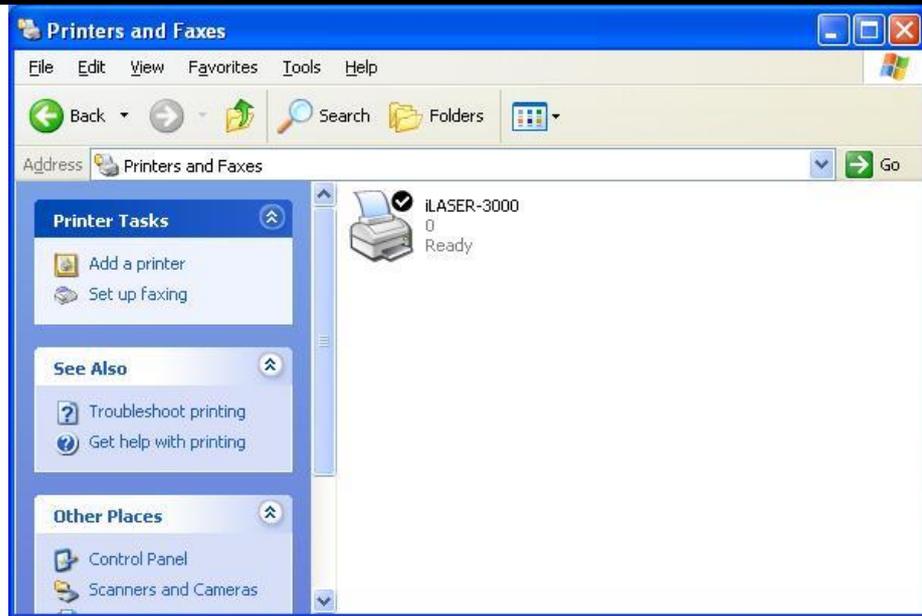
2.5.3 Change USB Cable to Another Port

This section explains that the steps when change USB port.

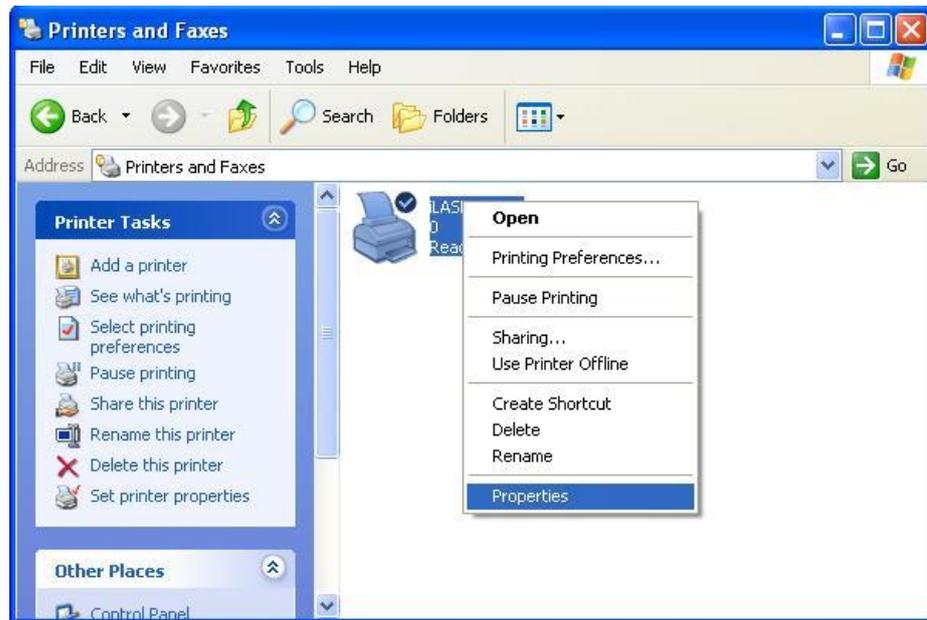


Once you connect the USB Cable to computer, we strongly suggest that do not change it to another USB port. If you must change USB cable to another port, you have to also change the printer settings of i.LASER. If this happens, please follow next steps.

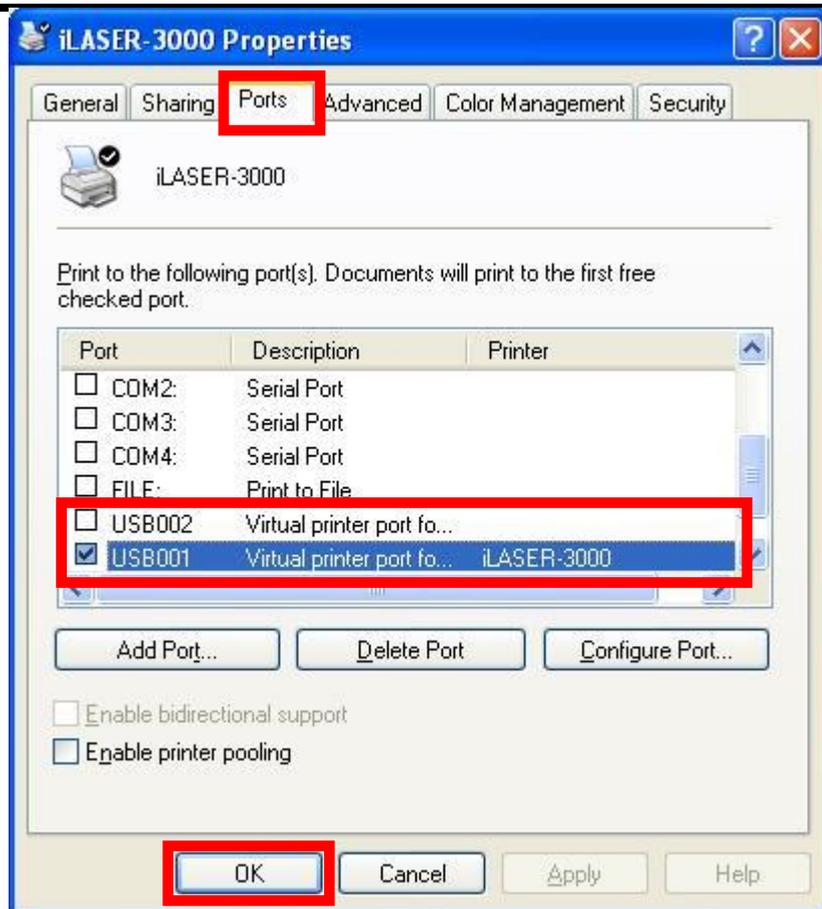
1. Connect the USB cable to another port well with i.LASER.
2. Open **[Printer and Faxes]** window



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]**.

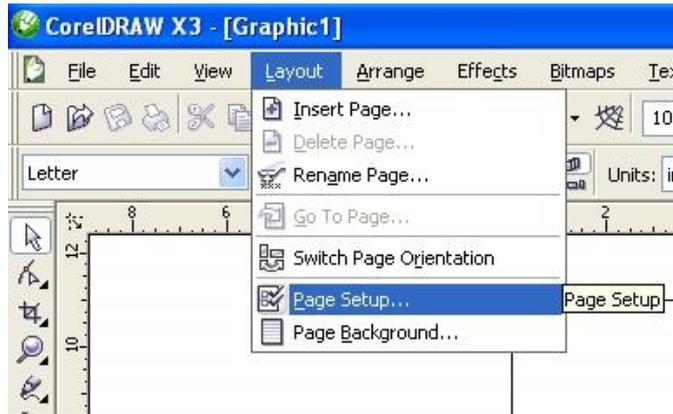


5. Done.

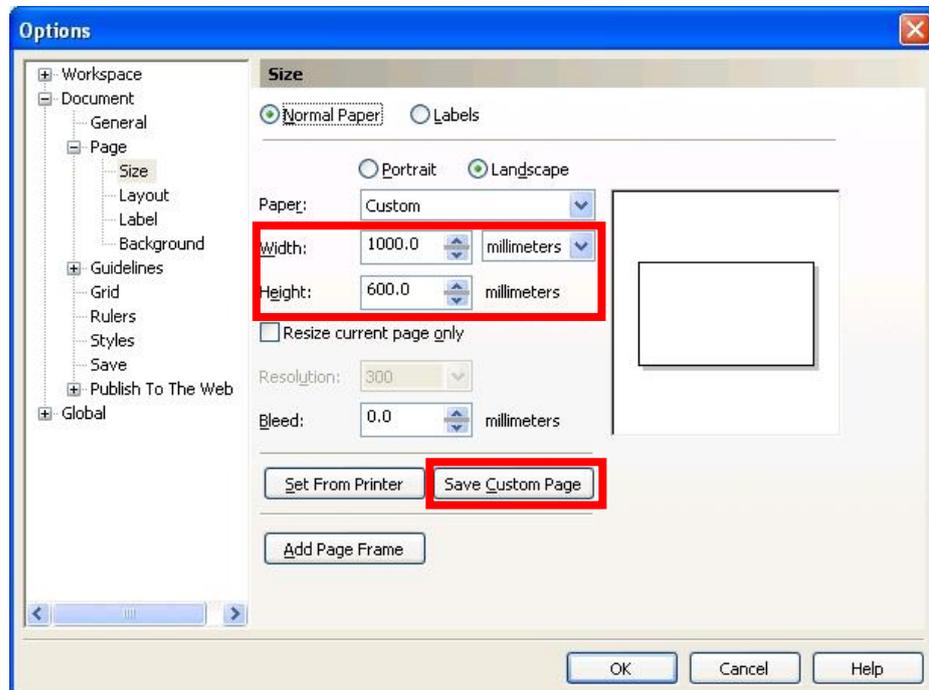
2.6 CorelDRAW Setup

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 section [2.7](#).

Go to **[Layout]** → **[Page Setup]**



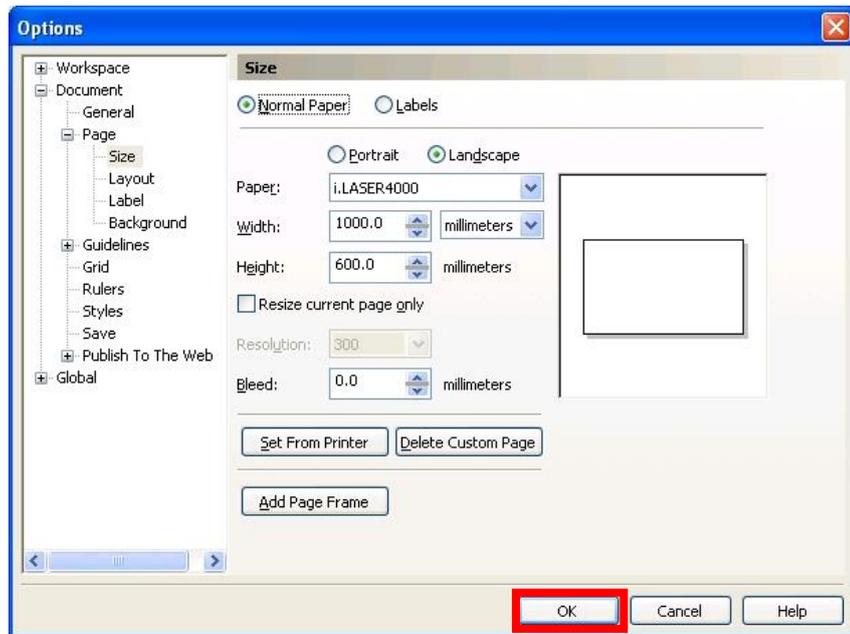
Modify **[Width]** and **[Height]** according to work area (See [Appendix 1](#)). Click **[Save Custom Page]** button.



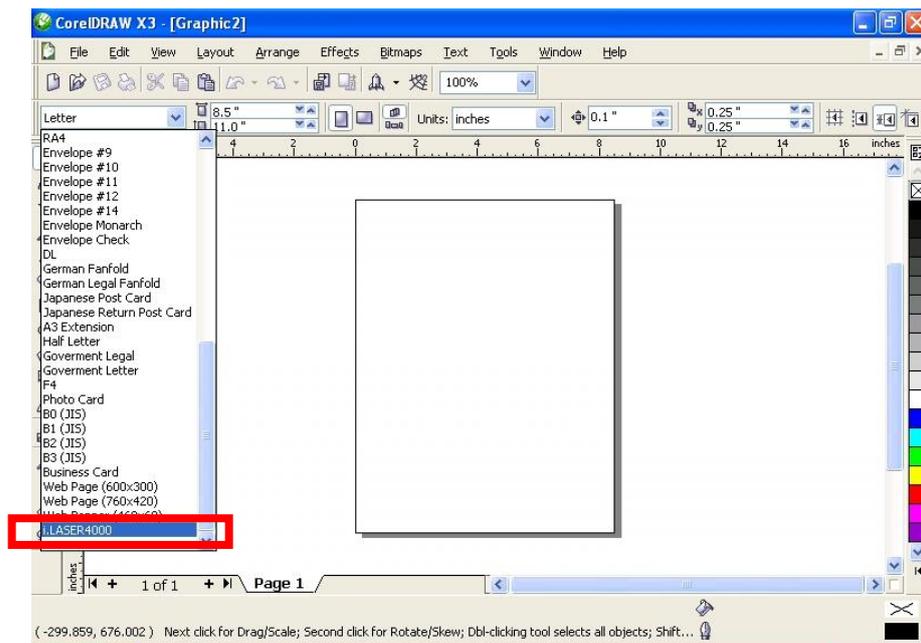
Name this paper type. It is recommended to name with the machine type. Then click **[OK]** to save.



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

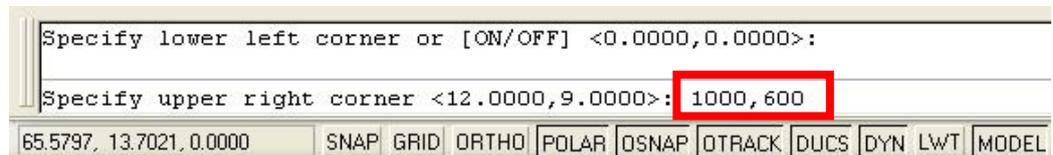
Open the AutoCAD. Type **[limits]** on the command line then press **[Enter]** key.



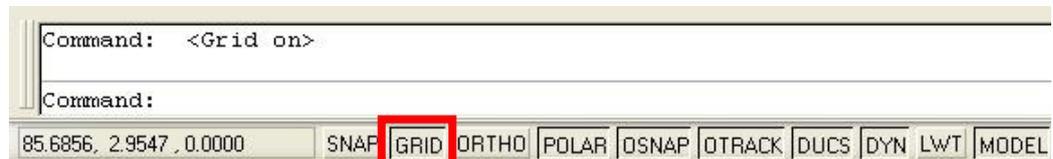
Then press **[Enter]** key to set the bottom left corner to **[0,0]**.



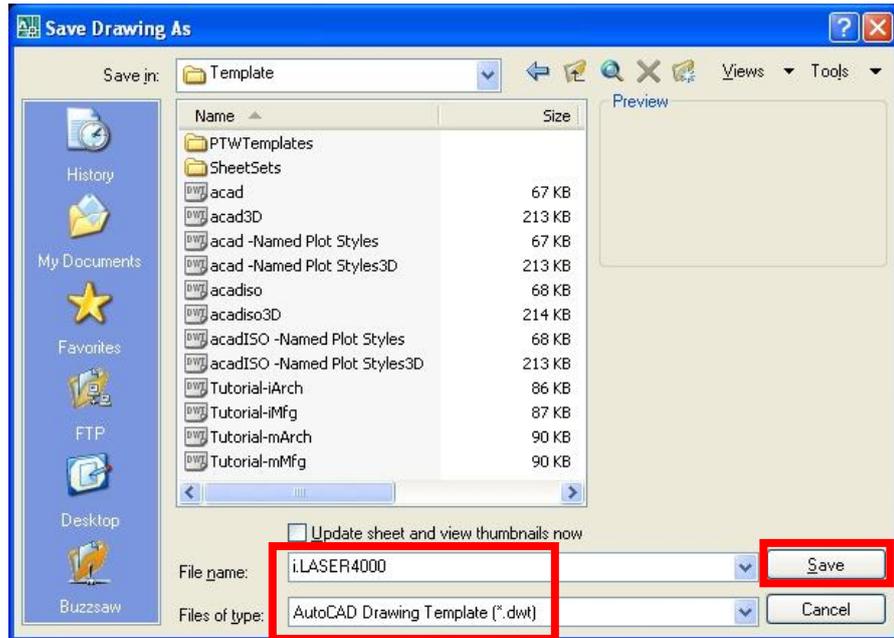
Setting the top right corner according to work area (See [Appendix 1](#)). Then press **[Enter]** key.



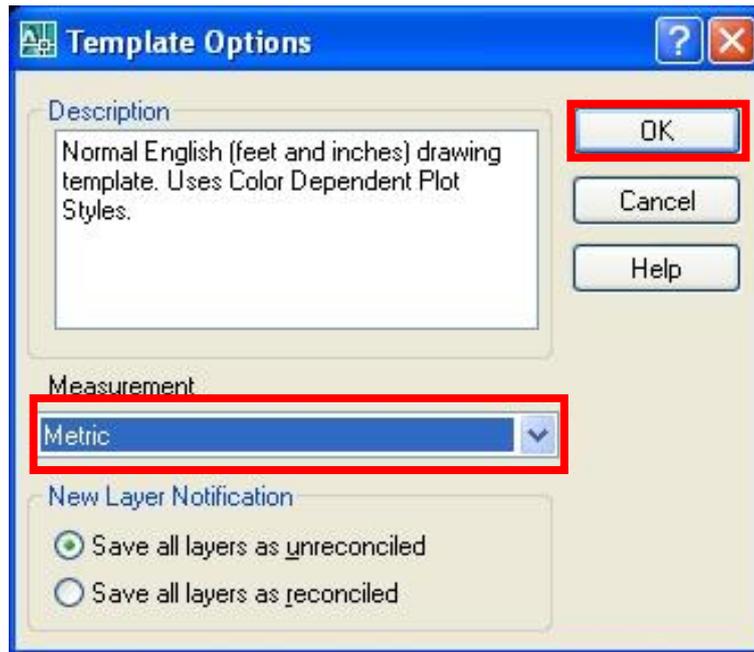
Turn on the grid by typing **[grid]** on the command line or turn on directly by pressing the **[GRID]** button which located under the command line. The grid shows the page area so that can help user to see boundary.



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.

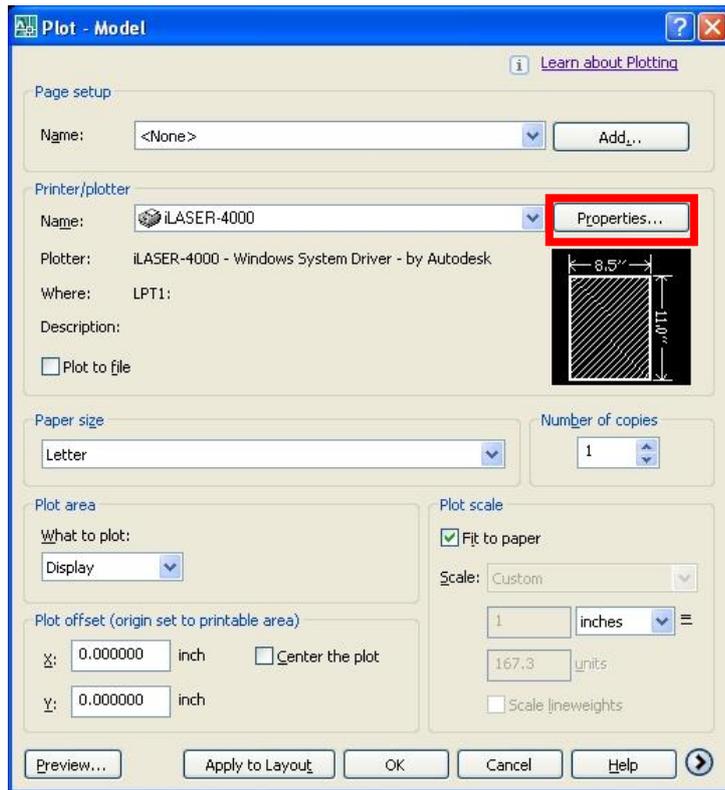


You can select the template file you created whenever open AutoCAD. Next time when you use the same page size, you can use the template file directly so that you don't have to setup the page anymore.

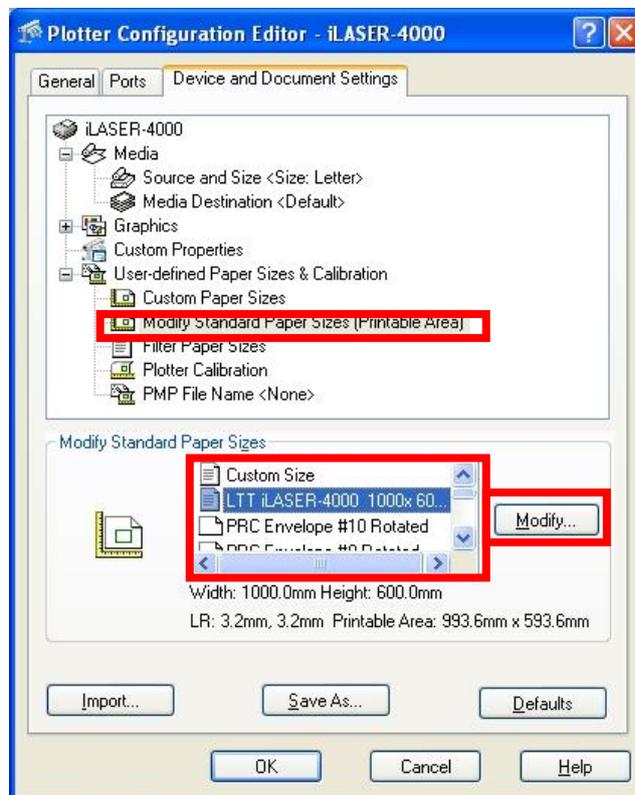
2. Print Setting

Chapter 2 Installation

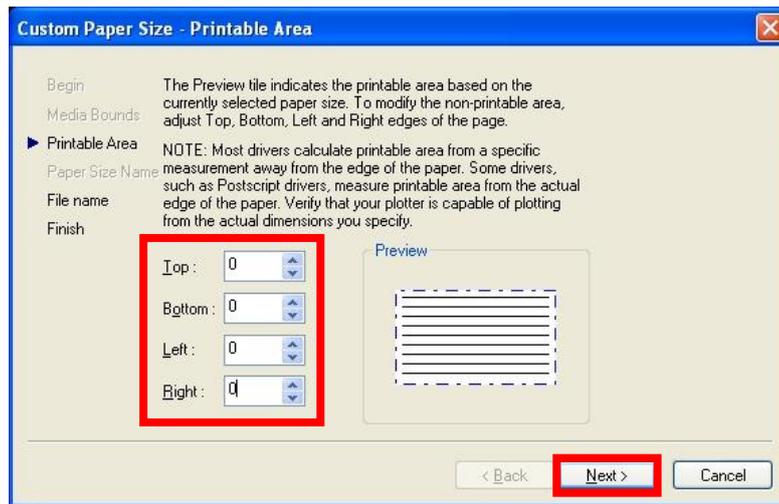
Go to **[File]** → **[Plot]**. When the **[Plot]** window shows, select printer driver and click **[Properties]** button.



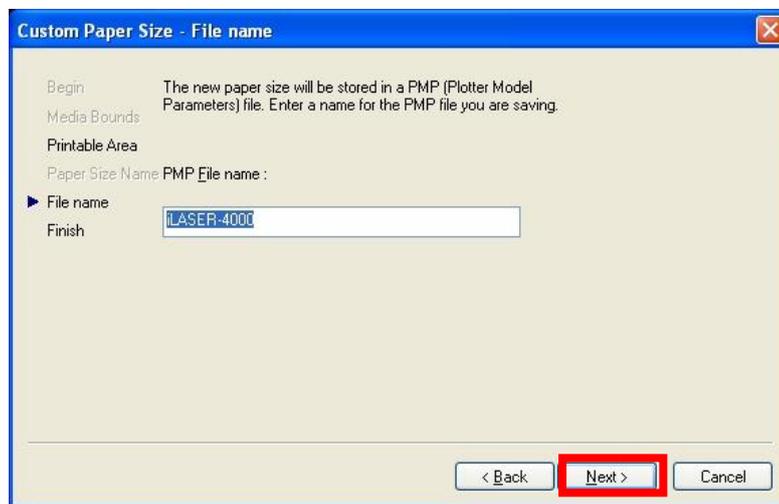
Select **[Modify Standard Paper Sizes]** on the tree-list box. Select the option which starts with **[LTT...]**. Press **[Modify]** button.



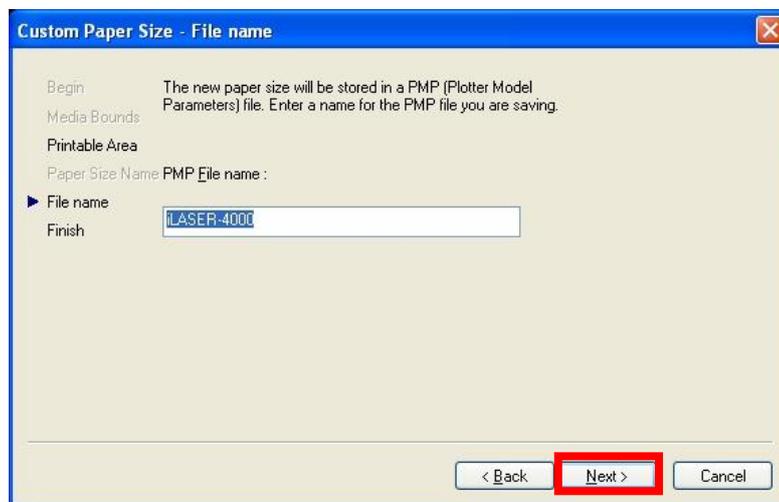
Modify **[Top]**, **[Down]**, **[Left]** and **[Right]** to zero, press **[Next]** button to continue.



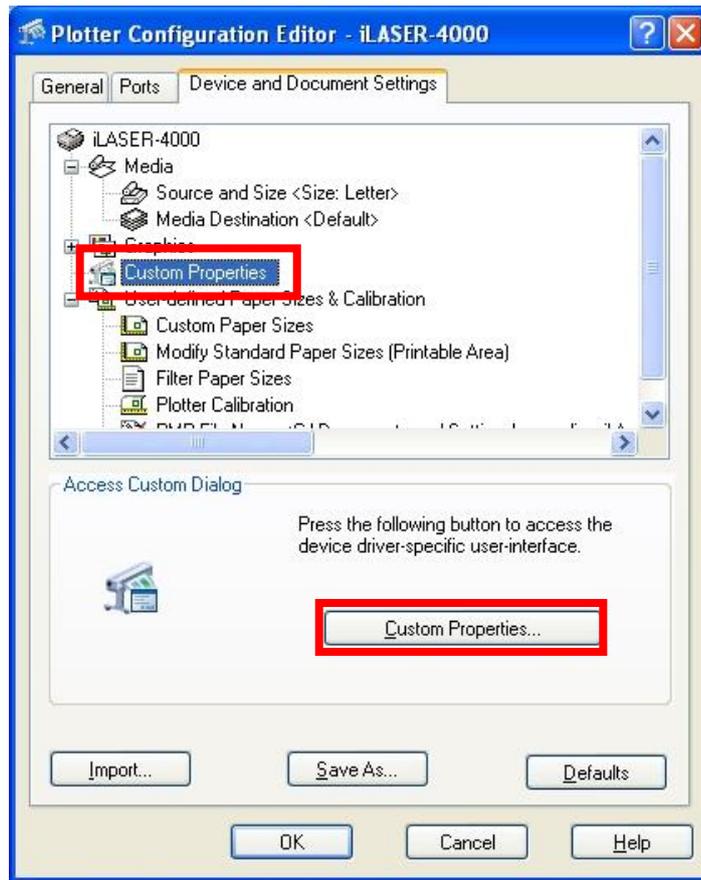
Press [**Next**] button to continue.



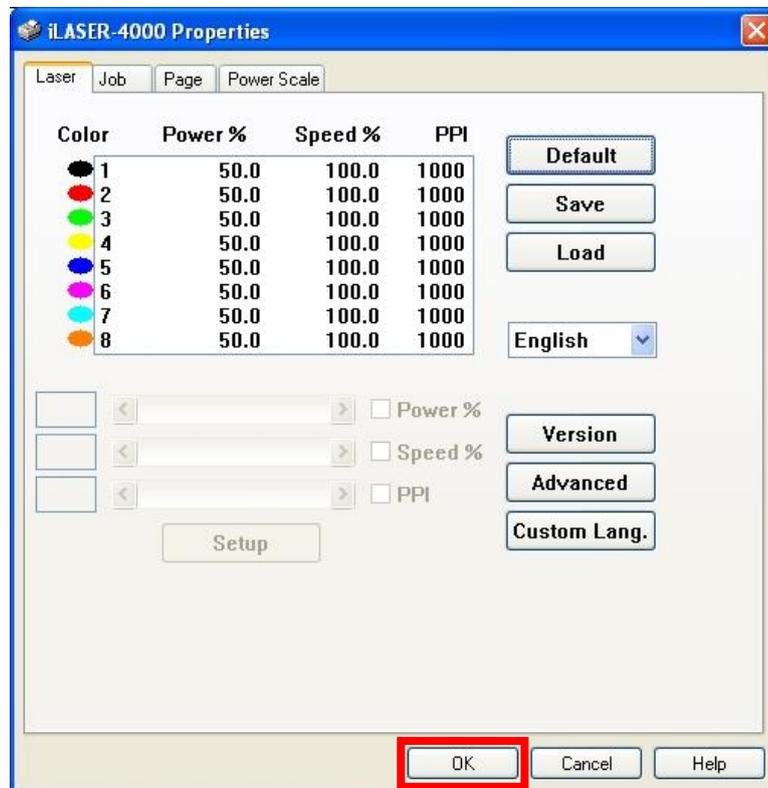
Press [**Finish**] button to continue.



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



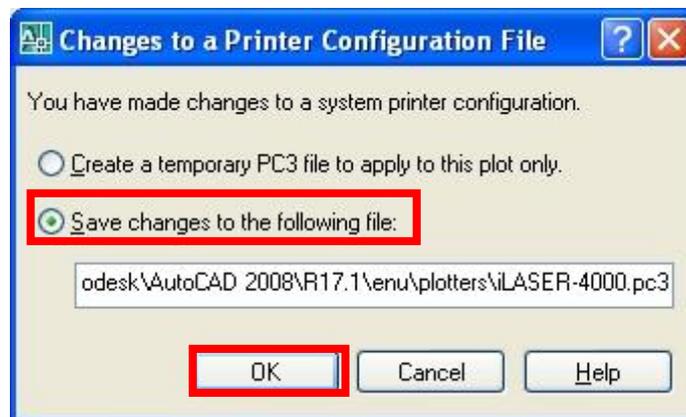
Modify Laser settings if need. Press **[OK]** to finish driver setting.



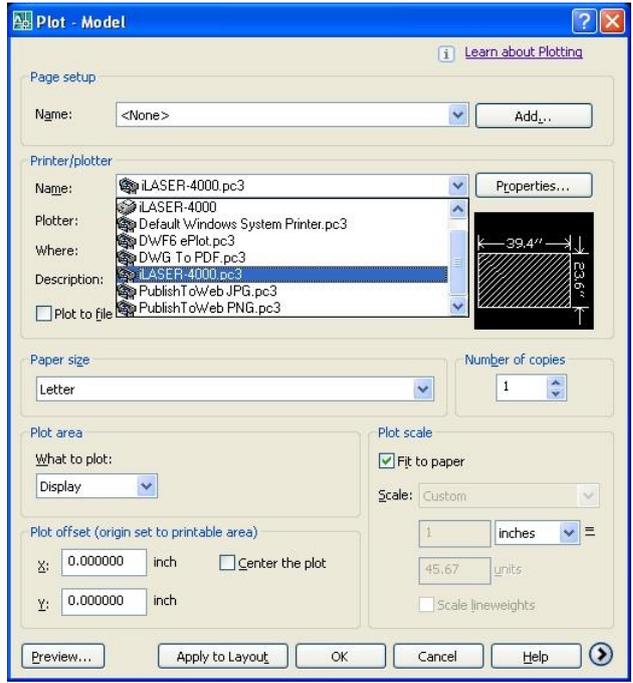
Press **[OK]** to back to print setting.



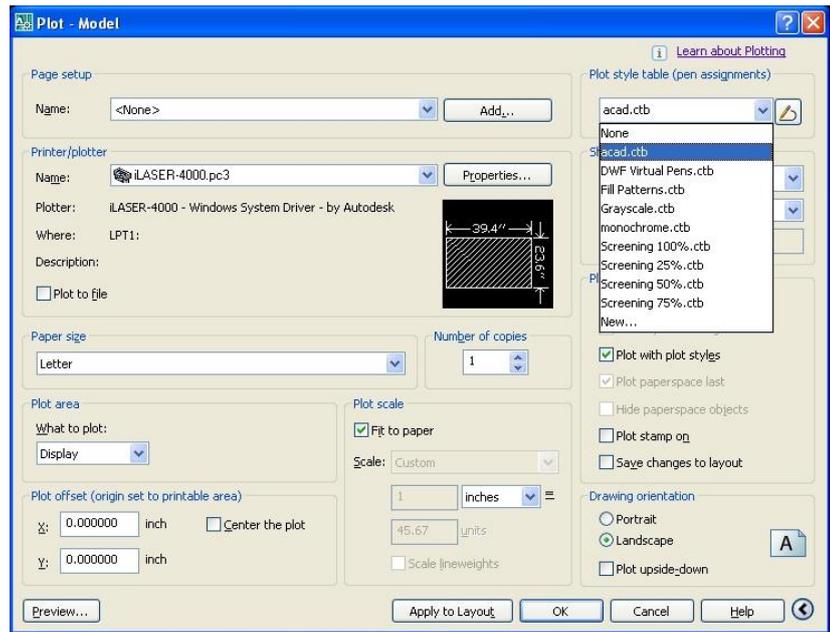
Select [**Save changes to the following file**] and press [**OK**] to continue.



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.



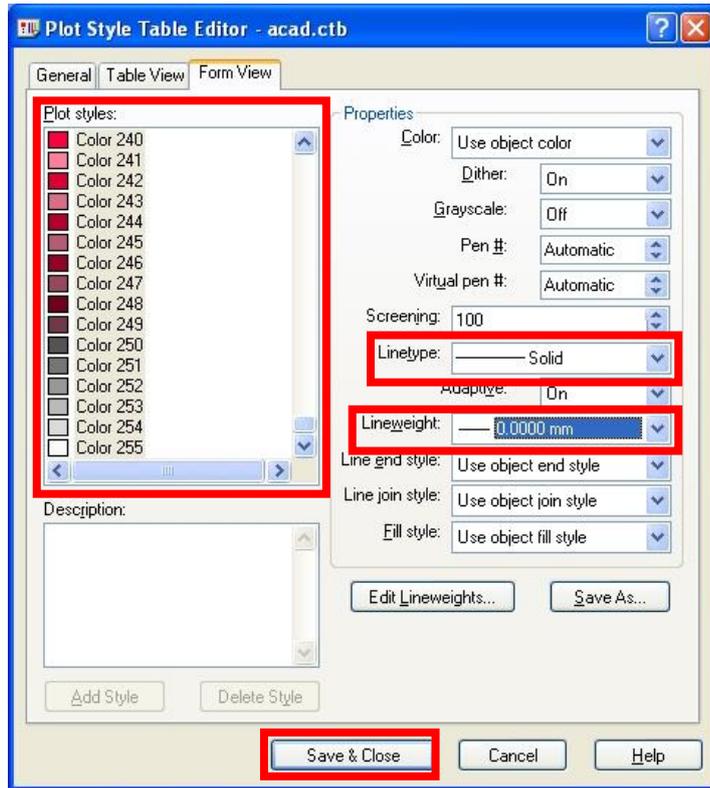
Select **[Plot style table]** to **acad.ctb**. Press **[Edit]** button.



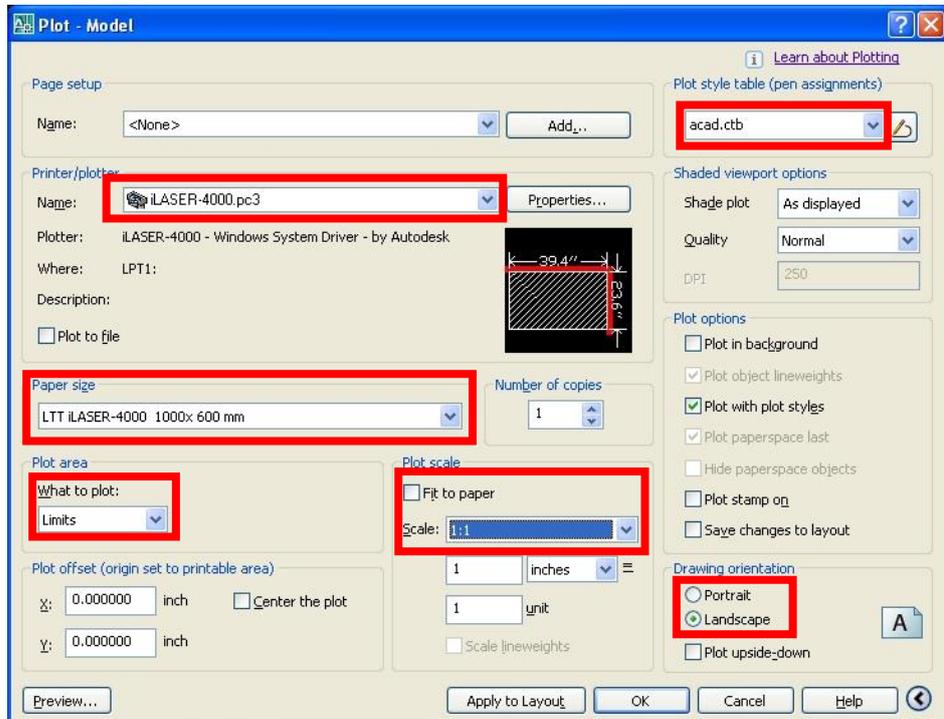
Press **[Yes]** button to continue.



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.

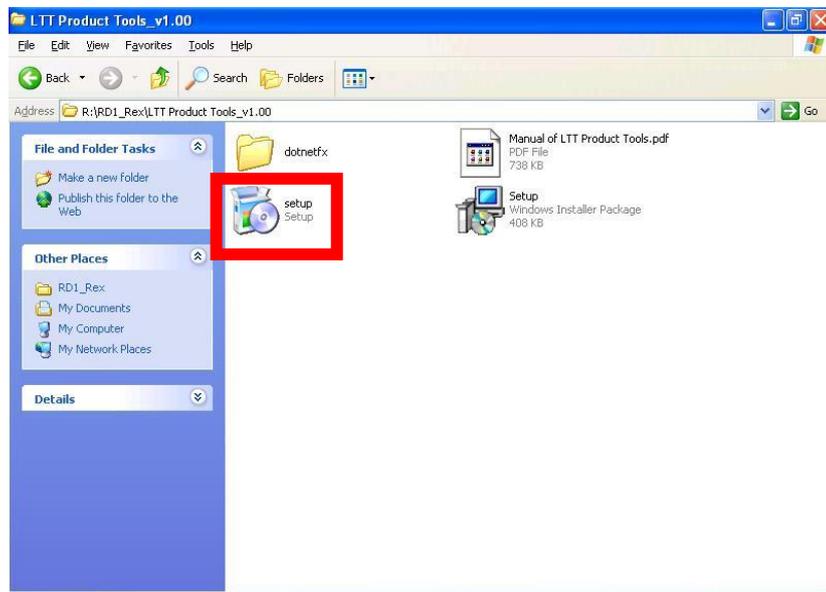


2.8 LTT Product Tools

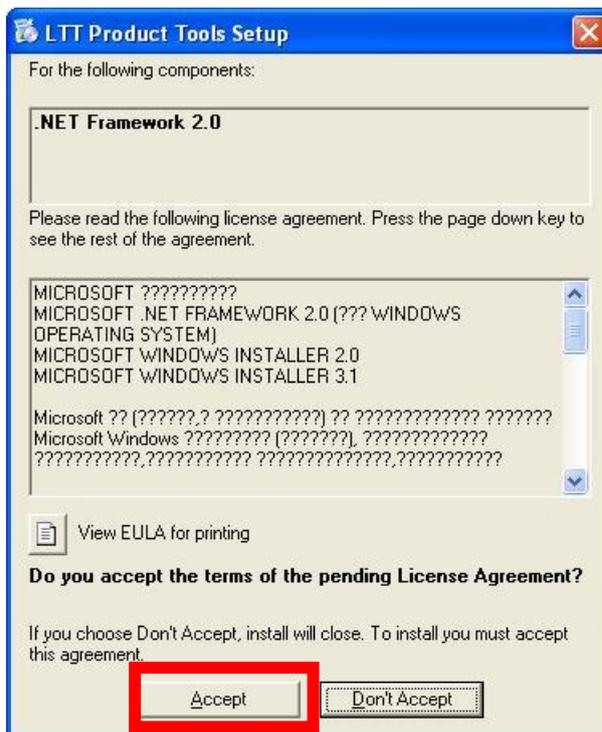
2.8.1 Install Procedure

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

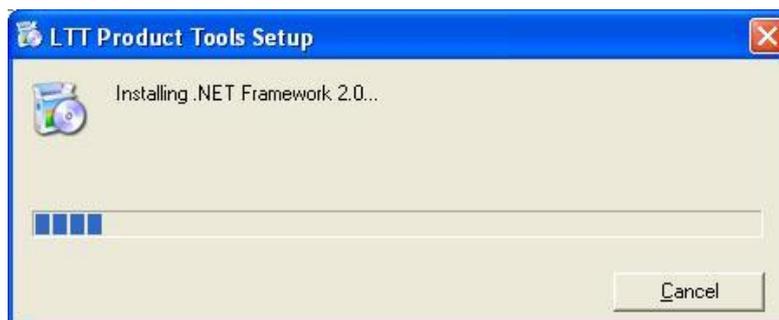
1. Double click **[setup.exe]**



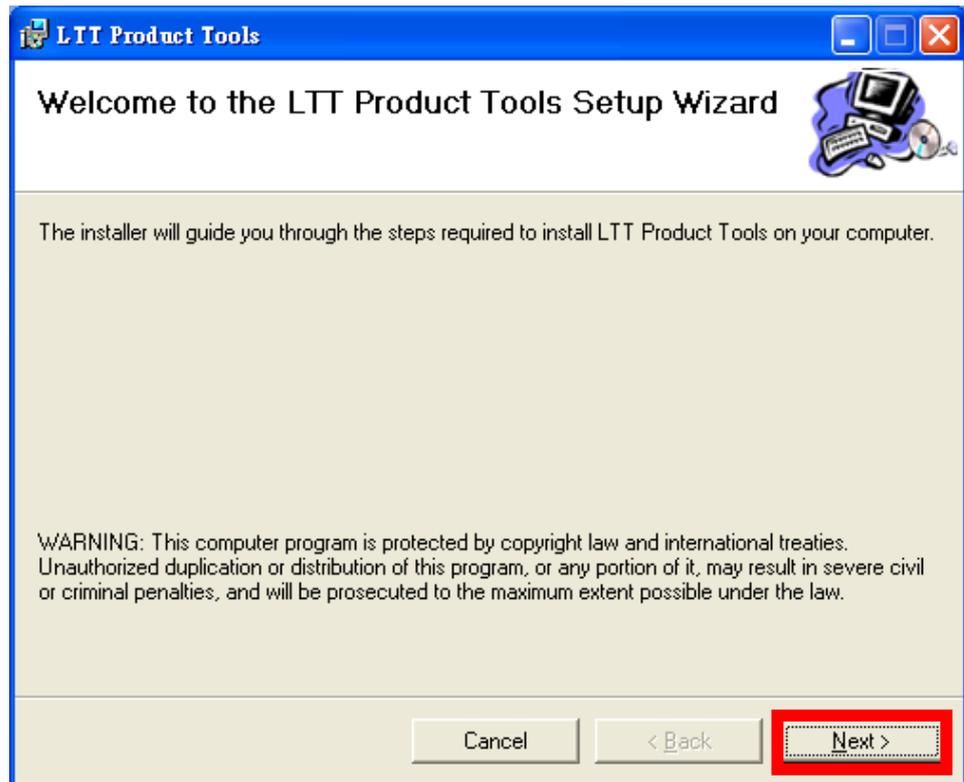
2. When you see the diagram below, please press the **[Accept]** key to go on. If not, please go to Step 4.



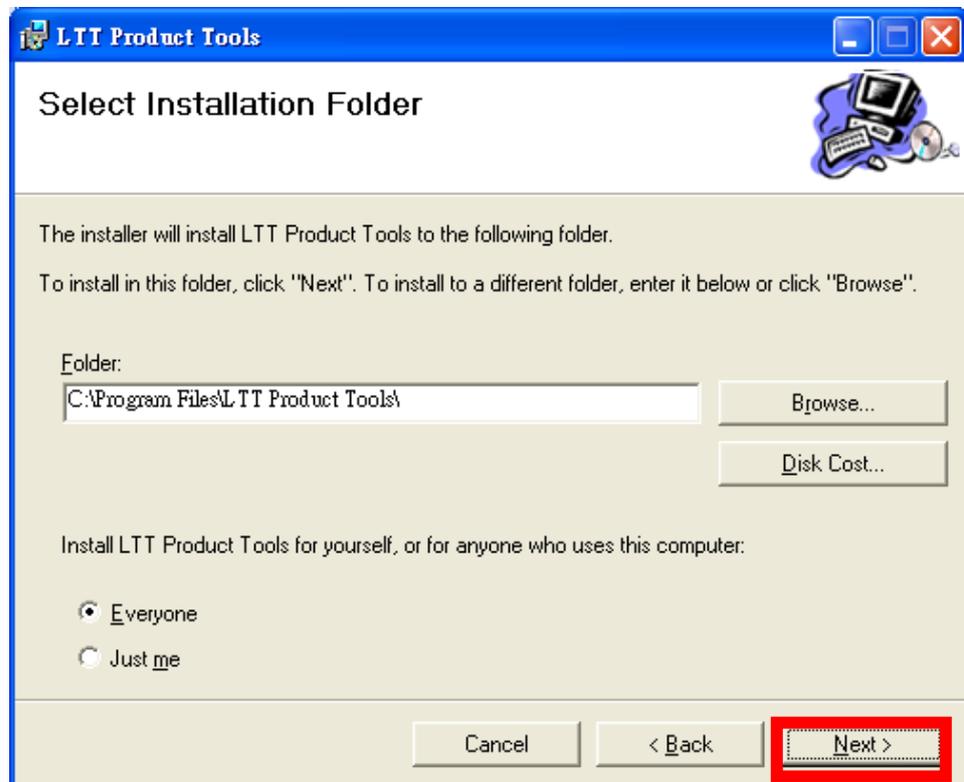
3. When you see the diagram below, please wait for some minutes.



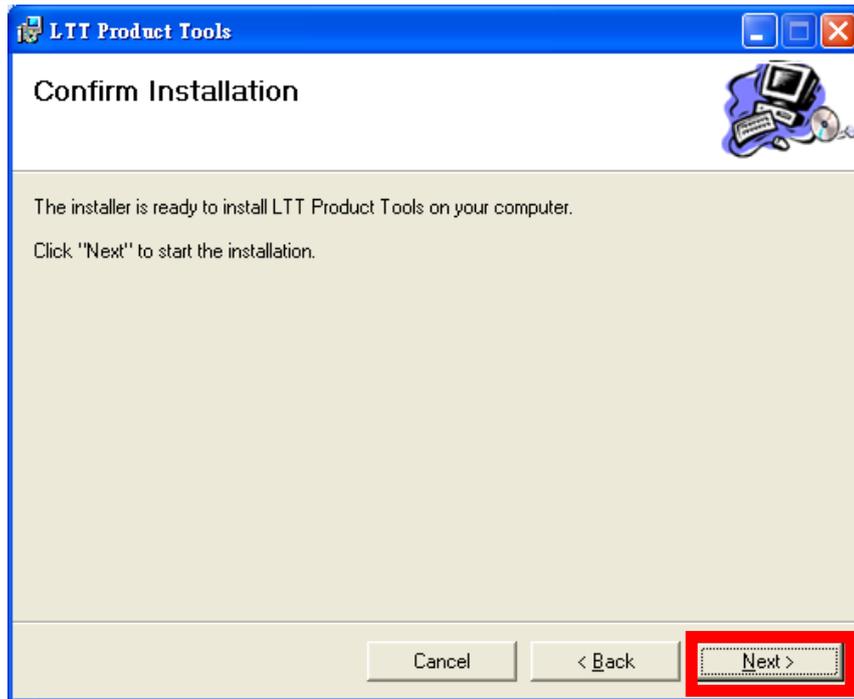
4. When you see the diagram below, please press the **[Next]** key to go on.



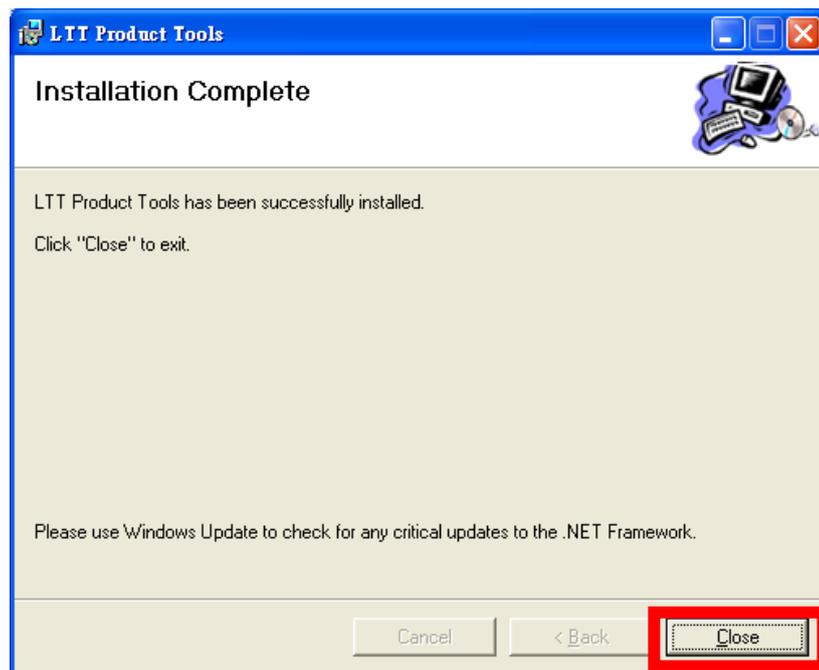
5. When you see the diagram below, please choose a position to install the software and press **[Next]** key to go on.



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



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

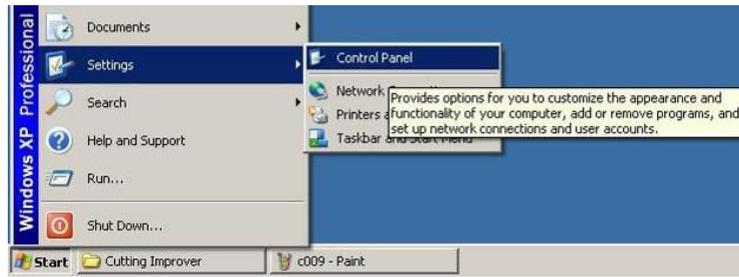


8. After the setup procedure, you can open the software from two shortcuts. The first one locates on the **[Desktop]**, and the second one is placed in the **[Start Menu]**.

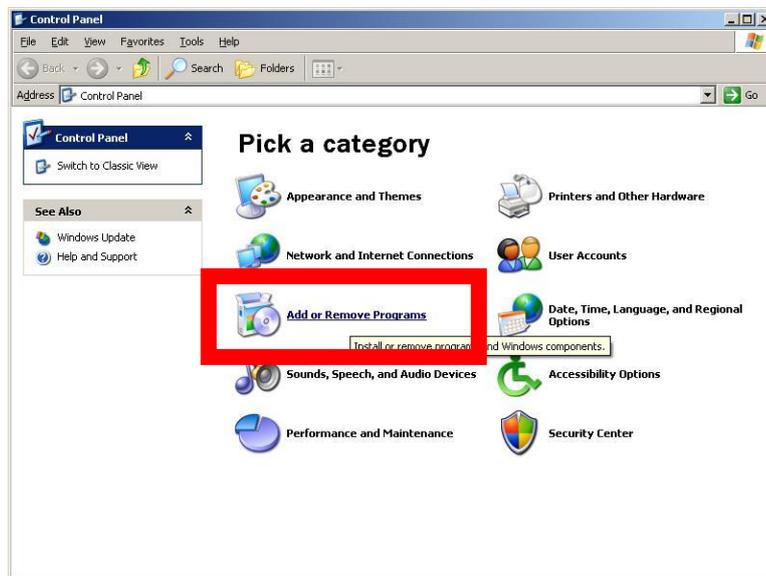


2.8.2 Uninstall Procedure

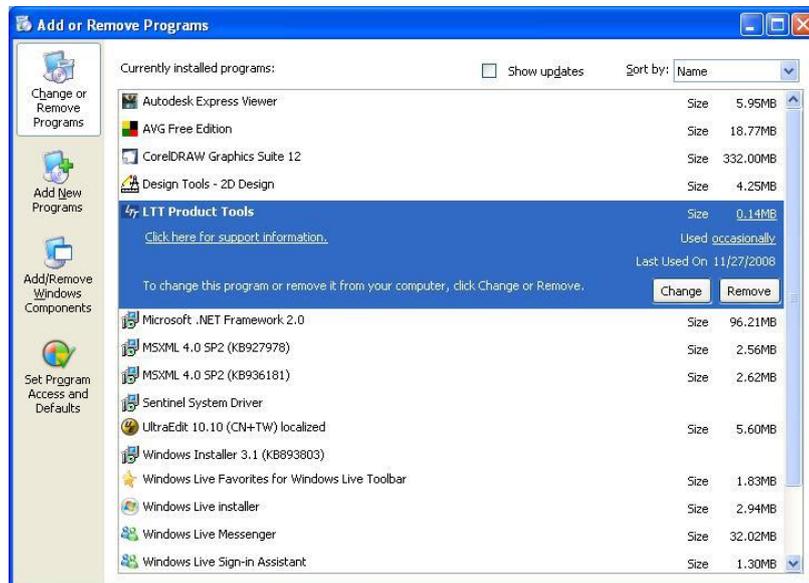
1. Click **[Start]** → **[Settings]** → **[Control Panel]**



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

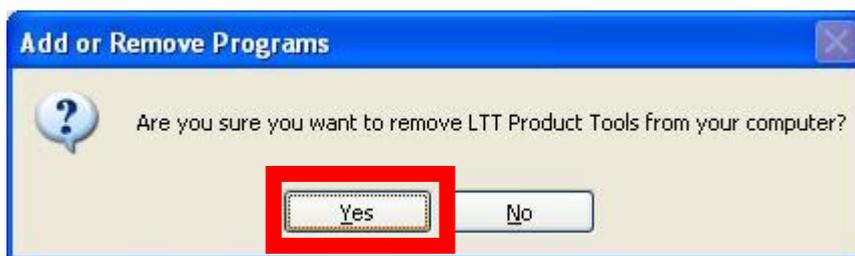


3. Click **[LTT Product Tools]** → Press **[Remove]** key



Chapter 2 Installation

4. Please choose **[Yes]**

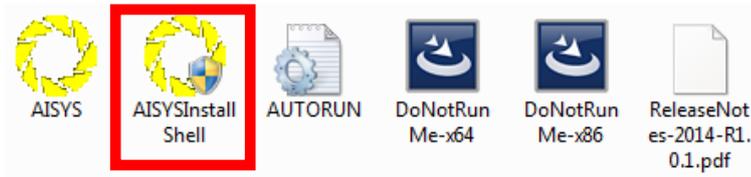


5. Done

2.9 AISYS Installation

2.9.1 Install Procedure

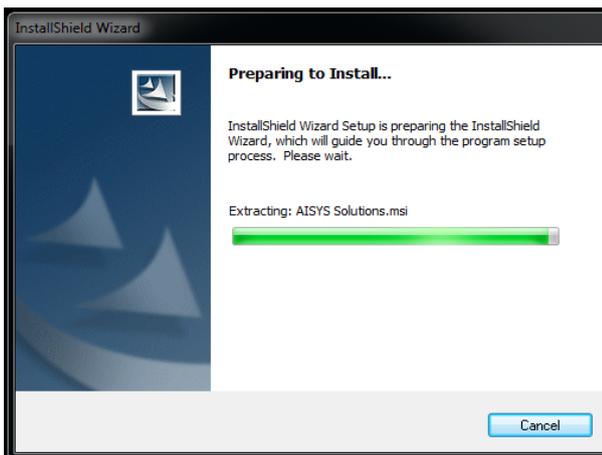
1. Please find the AISYS folder from installation CD, then double click **[AISYSInstall Shell]**.



2. When you see the diagram below, please press the **[Install]** to go on.

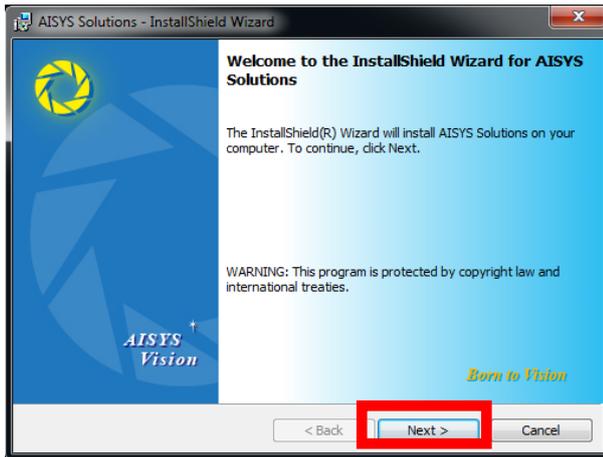


3. When you see the diagram below, please wait for few minutes.

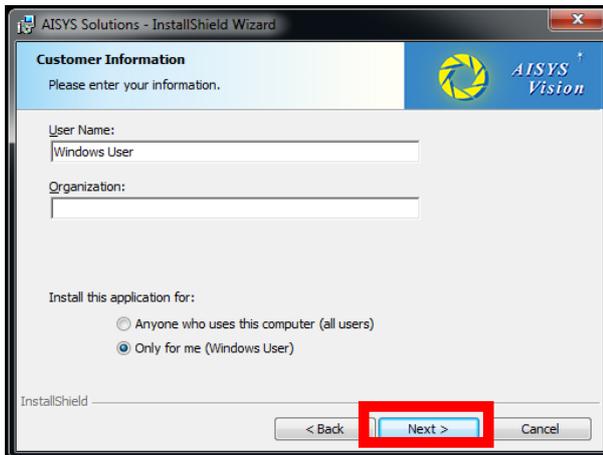


4. When you see the diagram below, please press the **[Next]** key to go on.

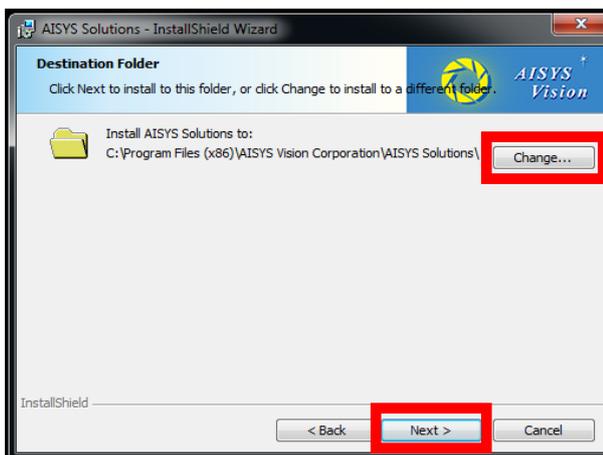
Chapter 2 Installation



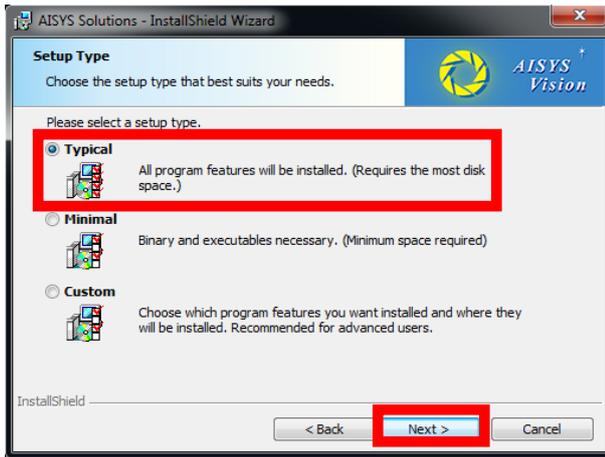
5. When you see the diagram below, please press the **[Next]** key to go on.



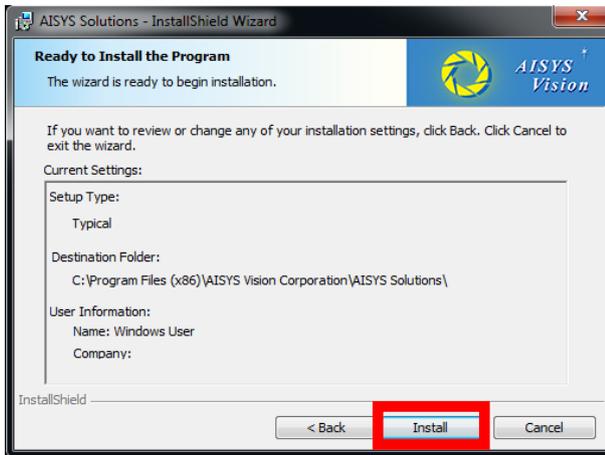
6. When you see the diagram below, please choose a position to install the software, and press **[Next]** key to go on.



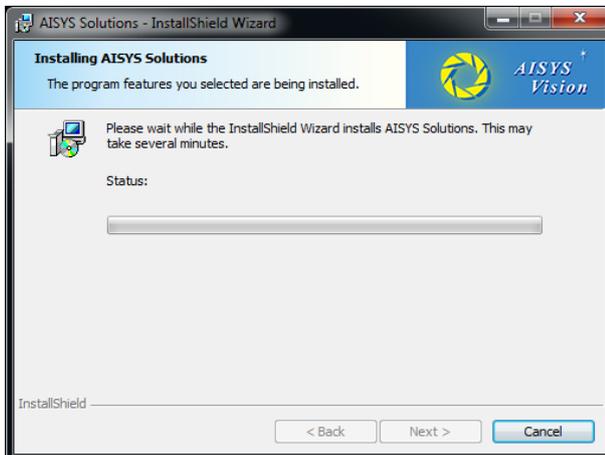
7. When you see the diagram below, please select a type **[Typical]** to install the software, and press **[Next]** key to go on.



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

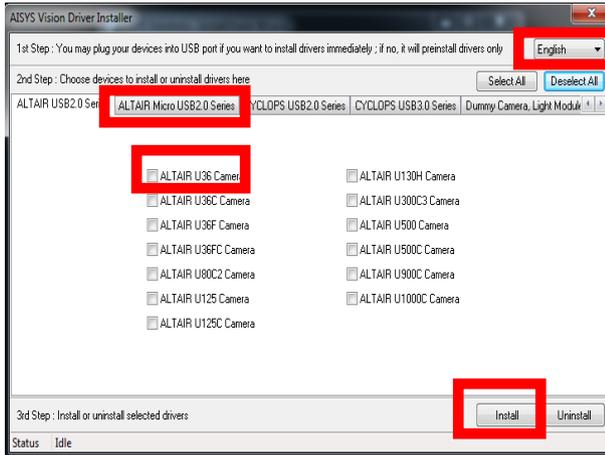


9. When you see the diagram below, please wait for few minutes.

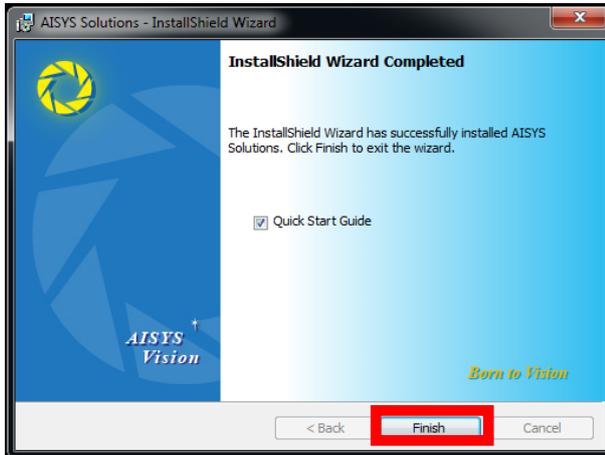


10. When you see the diagram below, you have to set **[Language]**, select **[ALTAIR Micro USB2.0 Series]**, and **[ALTAIR U36 Camera]**, then press **[Install]** to go on.

Chapter 2 Installation

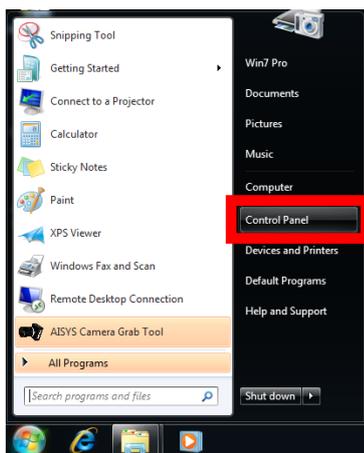


11. When you see the diagram below, please press the **[Finish]** key.



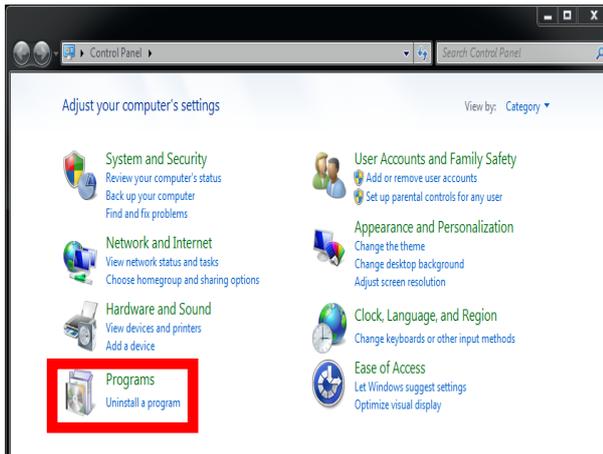
2.9.2 Uninstall Procedure

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

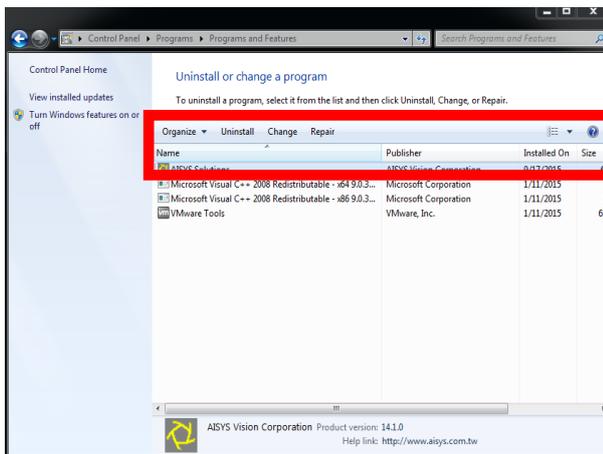


2. Double click **[Uninstall a program]**.

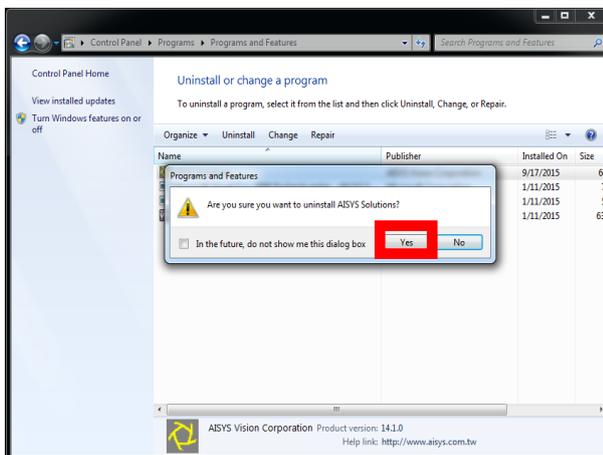
Chapter 2 Installation



3. When you see the diagram below, you have to double click **[AISYS Solution]**

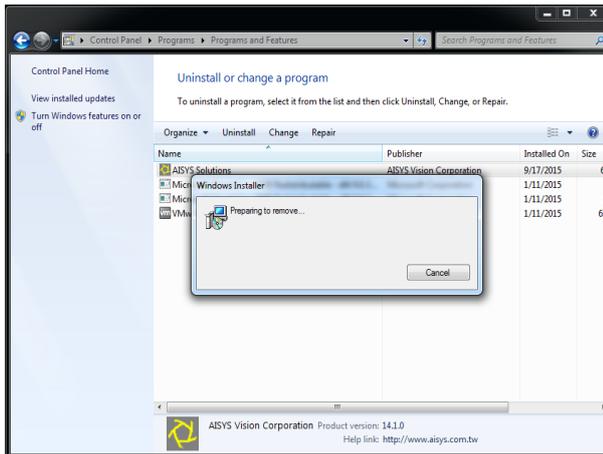


4. When you see the diagram below, please press **[YES]** to go on.



5. When you see the diagram below, please wait for few minutes.

Chapter 2 Installation

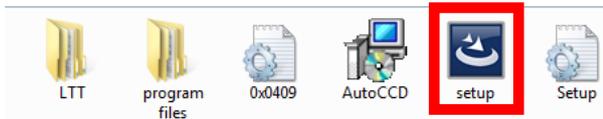


2.10 AutoCCD Installation

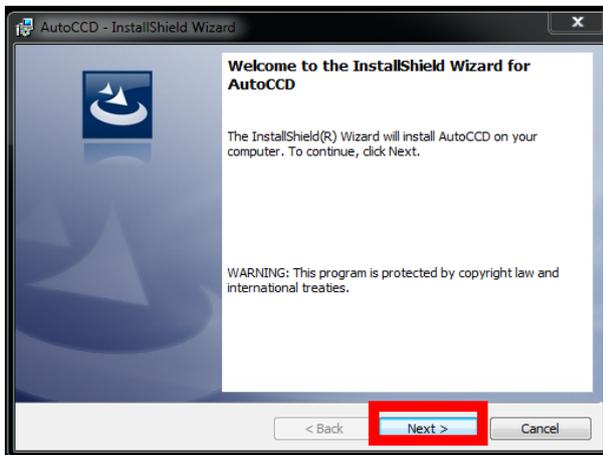
2.10.1 Install Procedure

AutoCCD is the main control program for cutting with CCD camera. This section explains the installation steps to your PC. Before install AutoCCD, please check the computer has to install **[.Net Framework 4.0]** already.

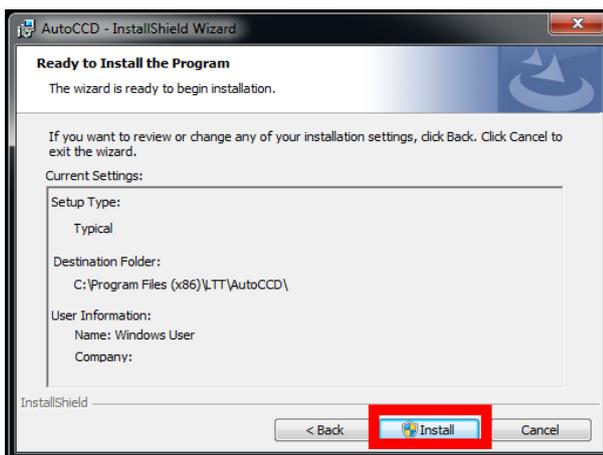
1. Please find the AutoCCD folder from installation CD. Double click **[setup.exe]**



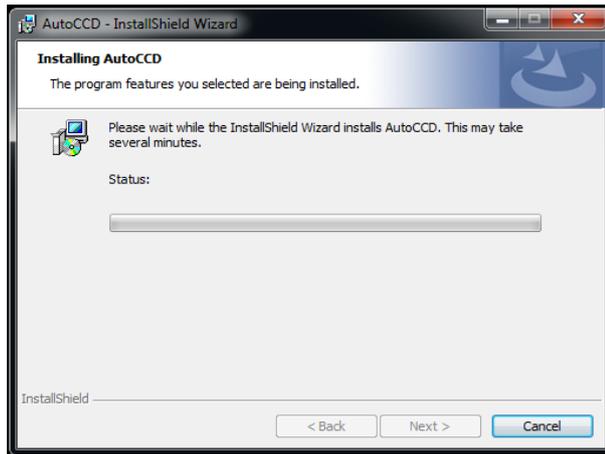
2. When you see the diagram below, please press the **[Next]** key to go on.



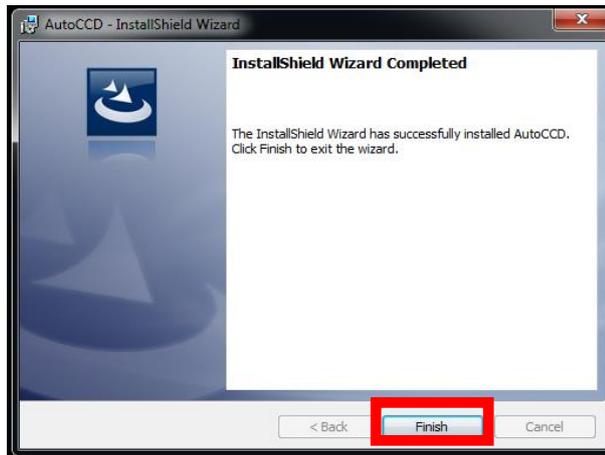
3. When you see the diagram below, please press the **[Install]** key to go on.



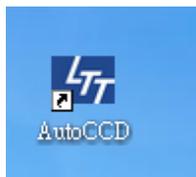
4. When you see the diagram below, please wait for few minutes.



5. When you see the diagram below, please press the **[Finish]** key.

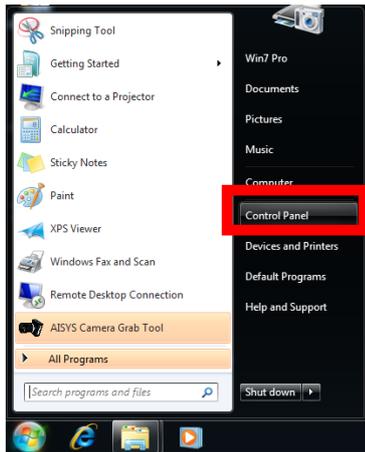


6. After the setup procedure, you can open the software from two shortcuts. The first one locates on the **[Desktop]**, and the second one is placed in the **[Start Manu]**.

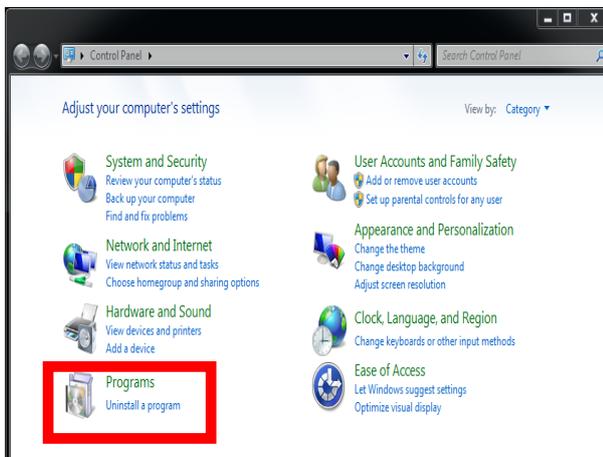


2.10.2 Uninstall Procedure

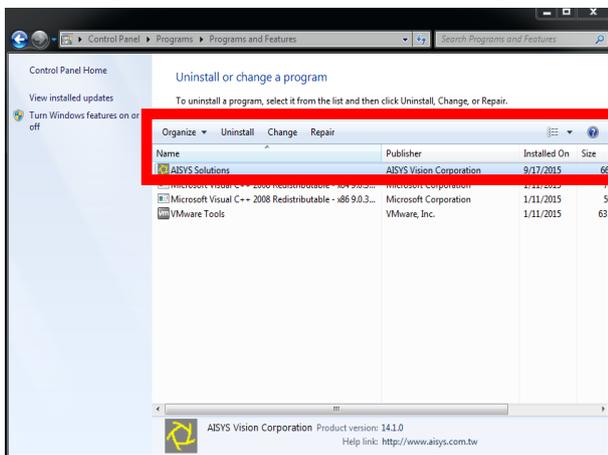
1. Click **[Start]** → **[Control Panel]**



2. Double click **[Uninstall a program]**.

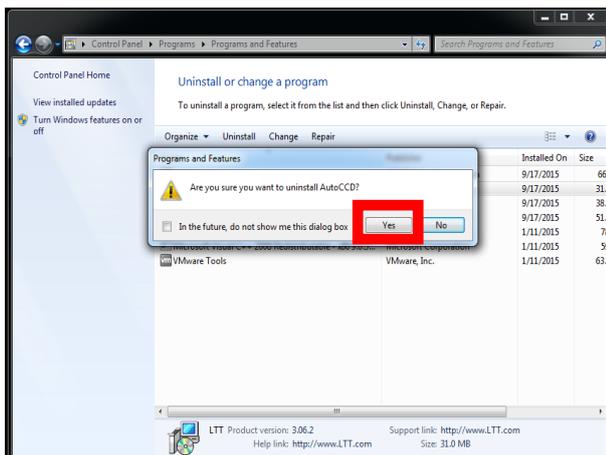


3. When you see the diagram below, you have to double click **[AutoCCD]**.

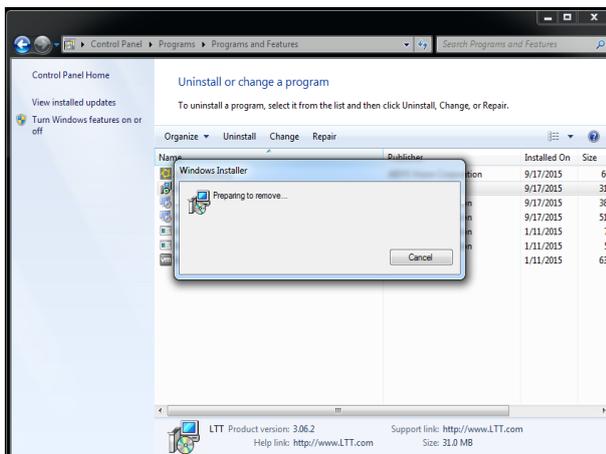


4. When you see the diagram below, please press **[YES]** to go on.

Chapter 2 Installation



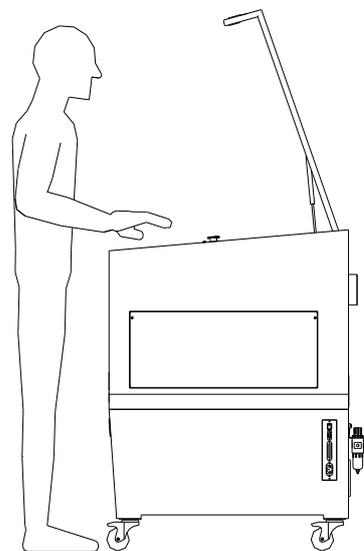
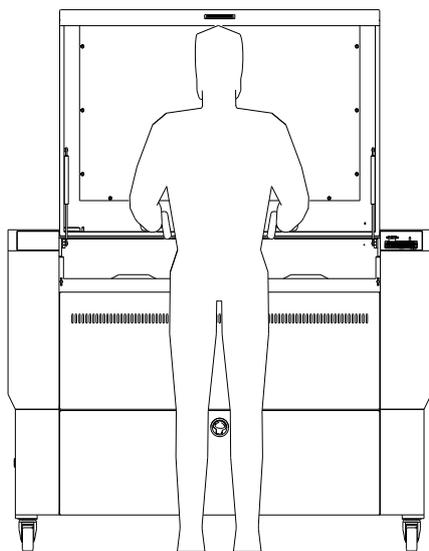
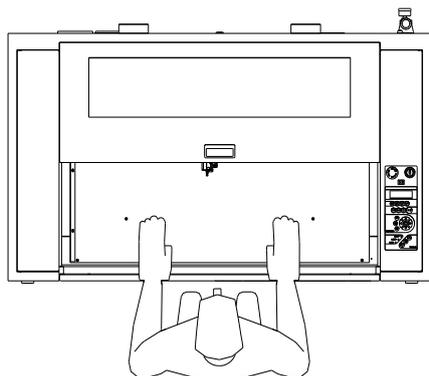
5. When you see the diagram below, please wait for few minutes.



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]**.

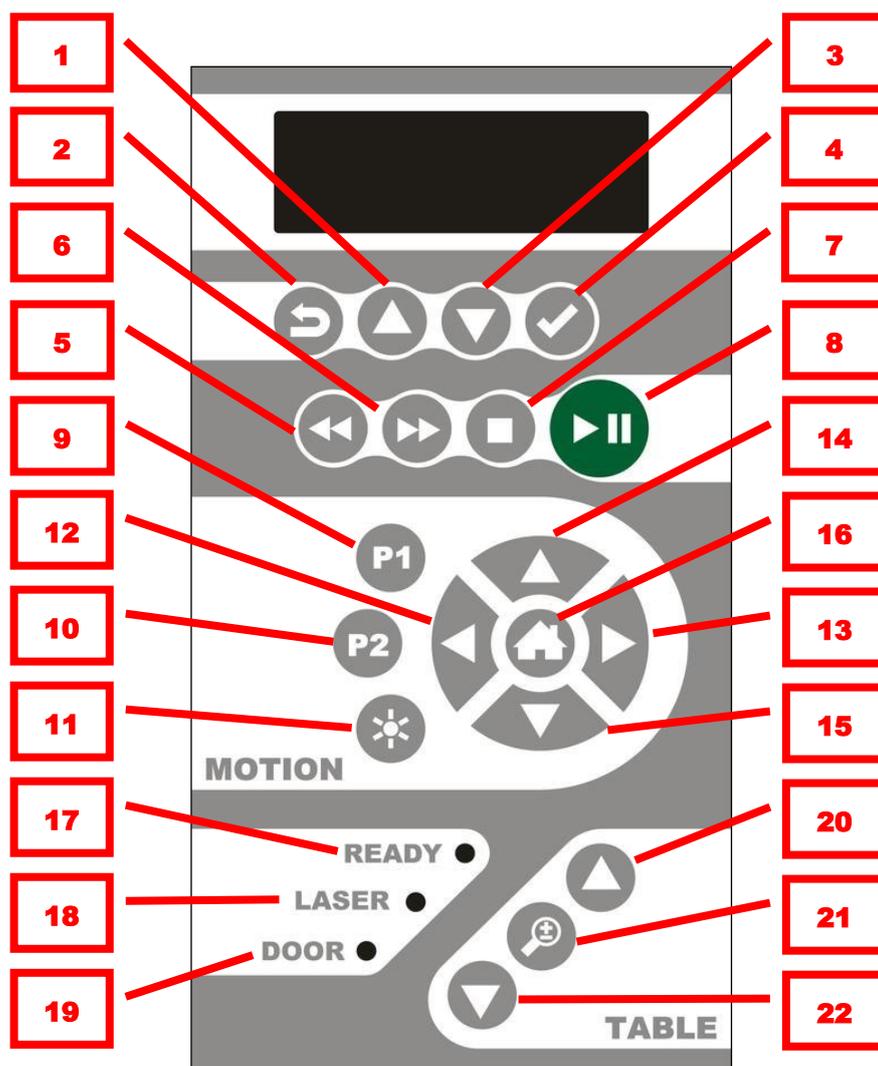
4. Execute file.

- 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 | 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. 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 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.



But 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

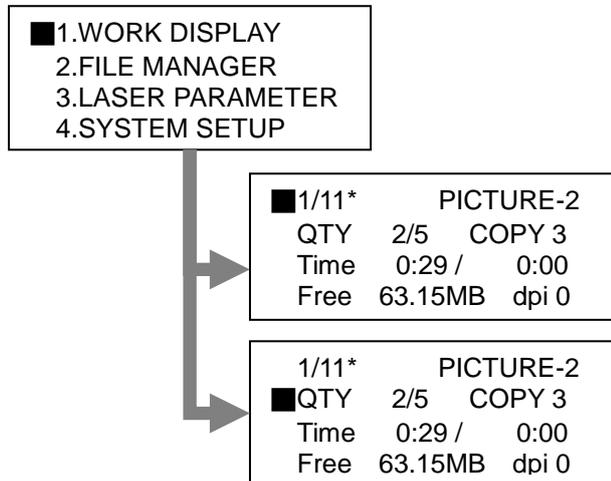
Automatically adjust the distance of lens and material to focus length.

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.

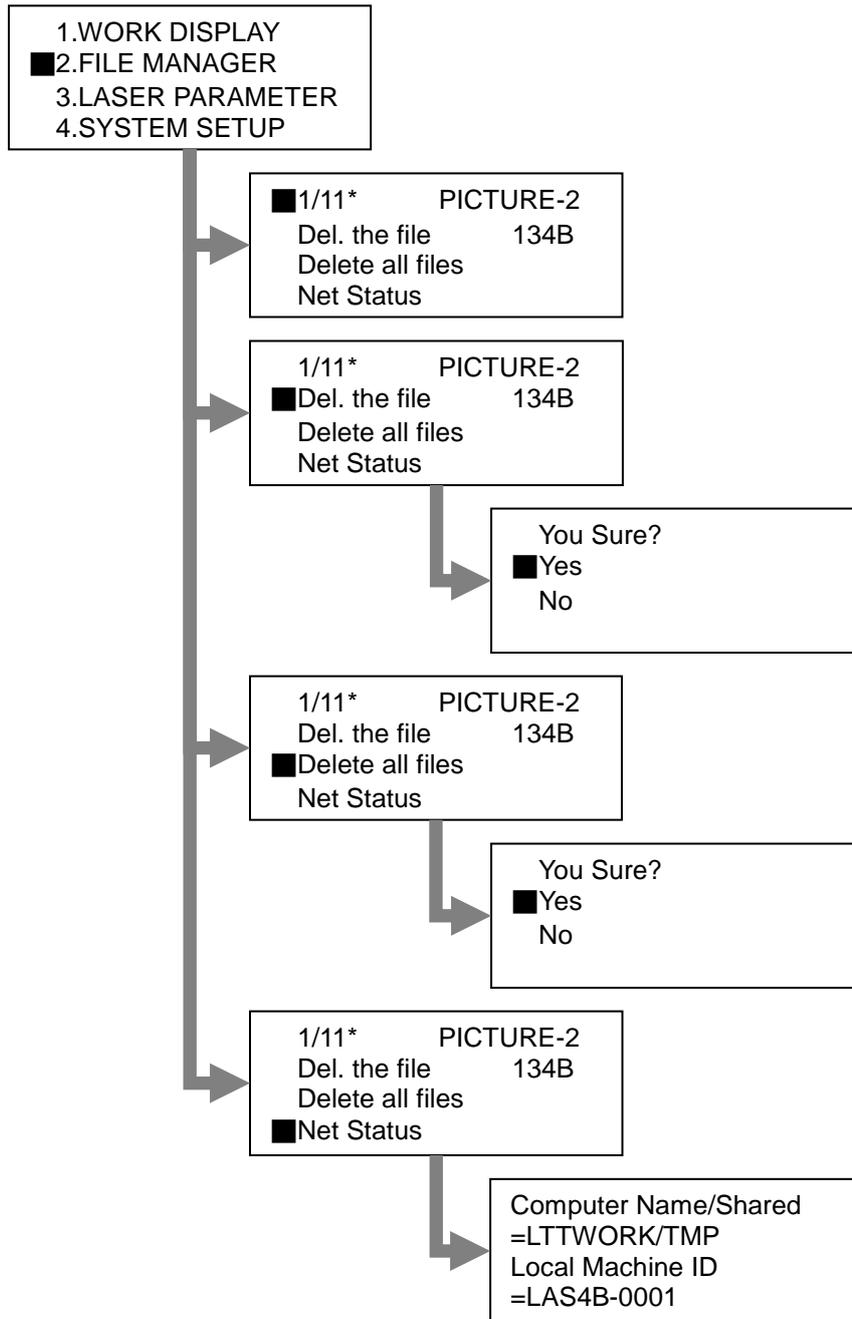
3.3.2 Operating Menu

1. Work Display



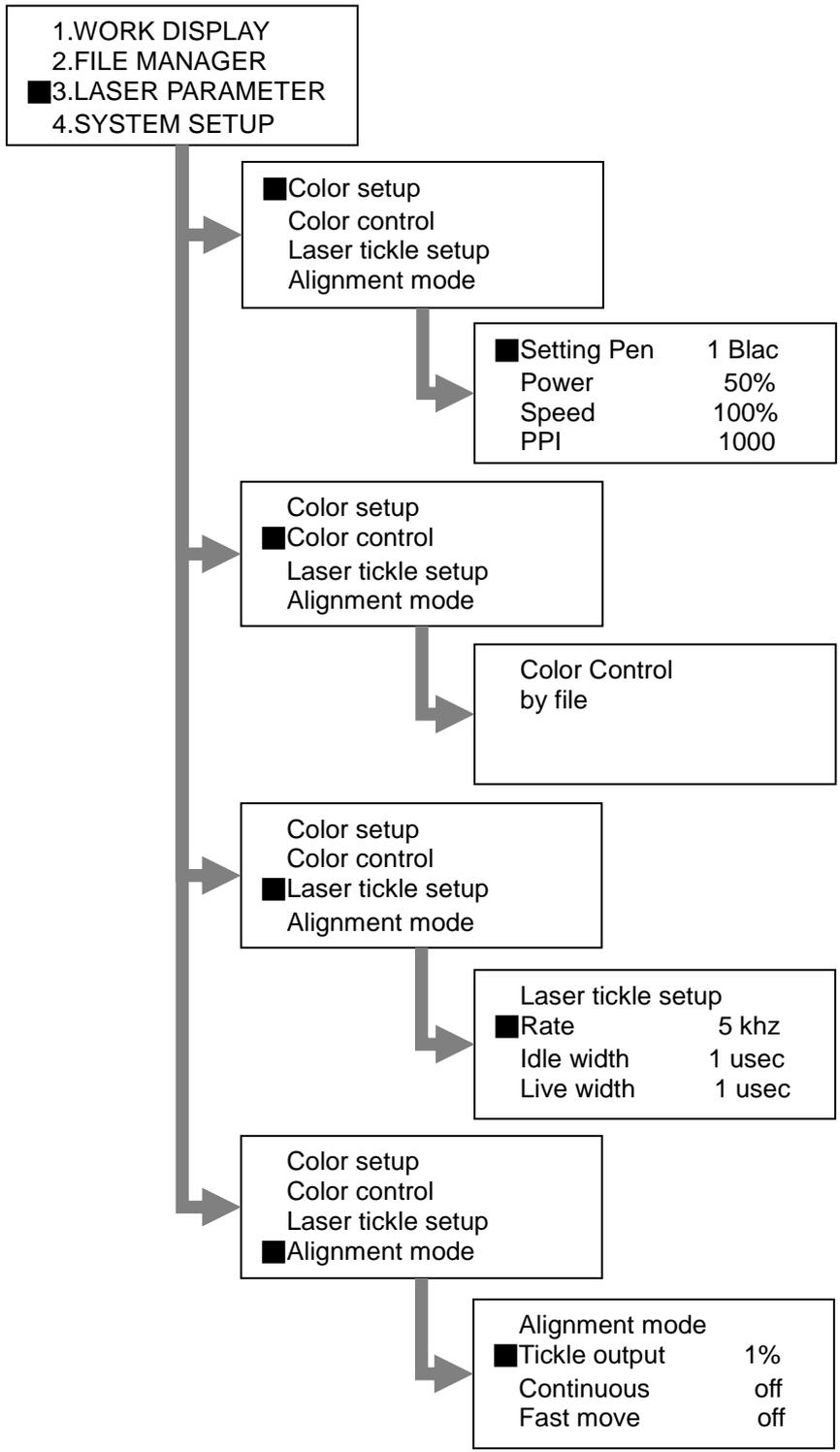
- **1 / 11***
Indicates that there are totally 11 files in memory, and the first file is selected at present. You can press and to select files.
- **PICTURE-2 :**
Indicates that the first file is named "PICTURE-2". You can name file on the tab "Page" of driver. (See section [3.4.3](#))
- **QTY 2/5 :**
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 stem 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 me. 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.
- **Net Status**
This selection can show the settings of Ethernet.

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 μ 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%.

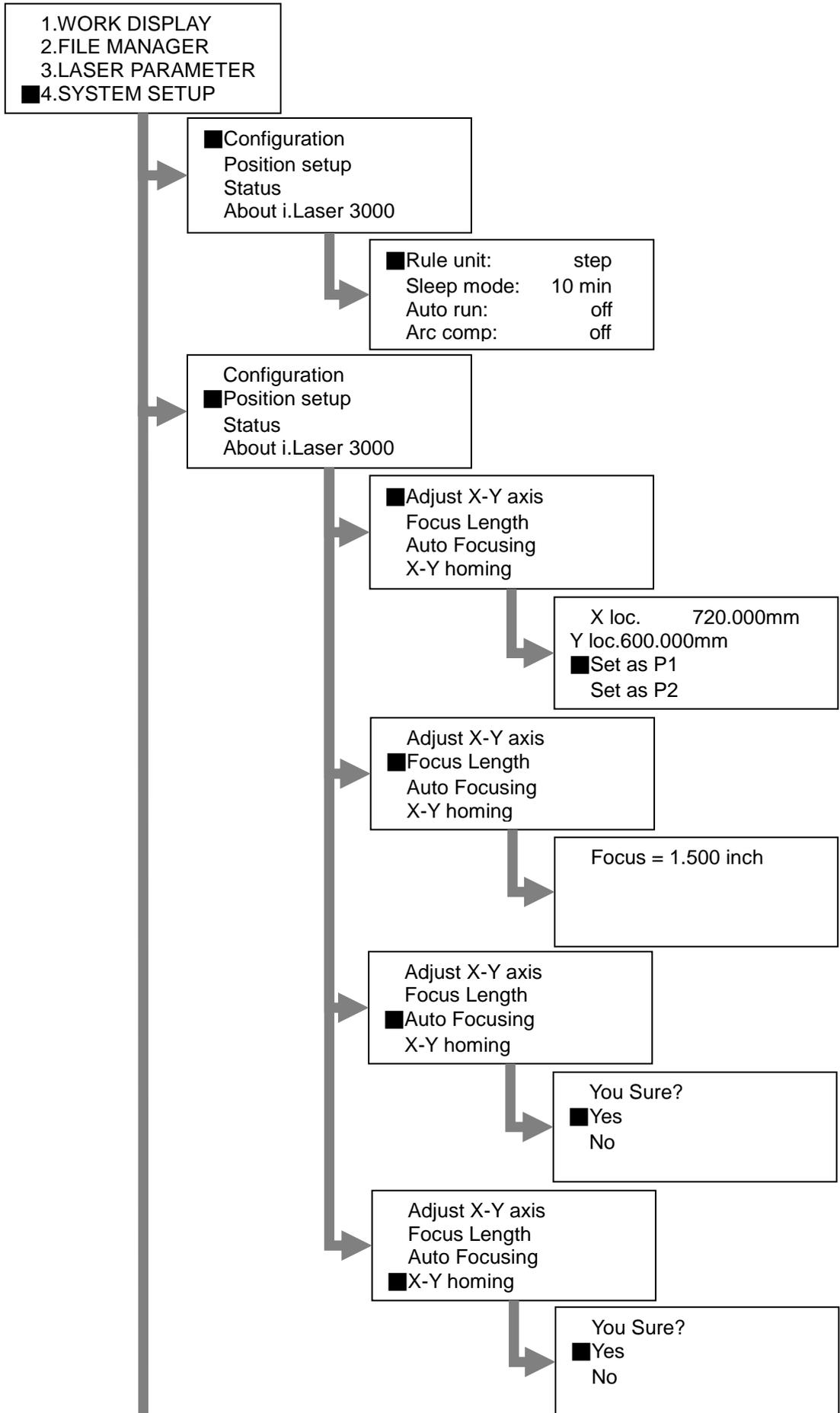
● **Continuous**

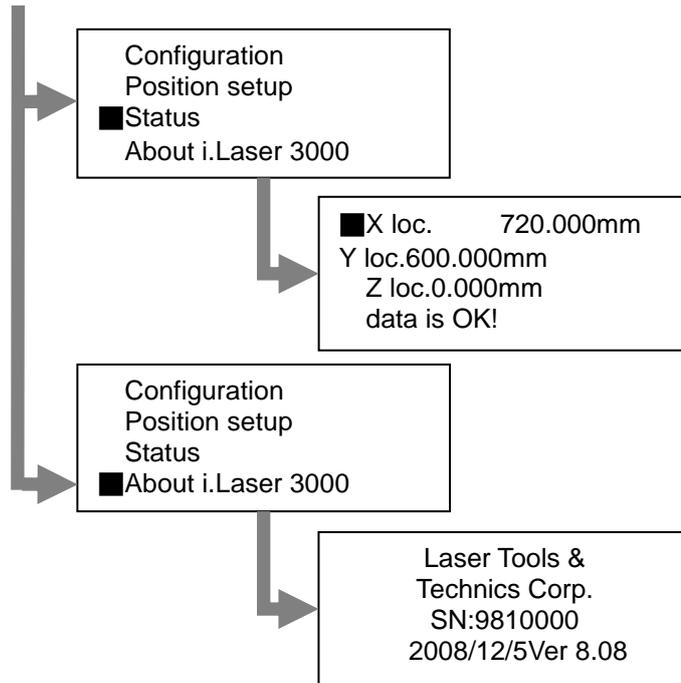
If this function is on and press,  laser tickle will emit continuously until pressing  again. If this function is off, the laser tickle emits only when you keep pressing. 

● **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]**.

● **Focus Length**

This function can change focal length for auto focusing if you change the size of focus lens.

● **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 .

- **Status**

This function can show the position of carriage and table.

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

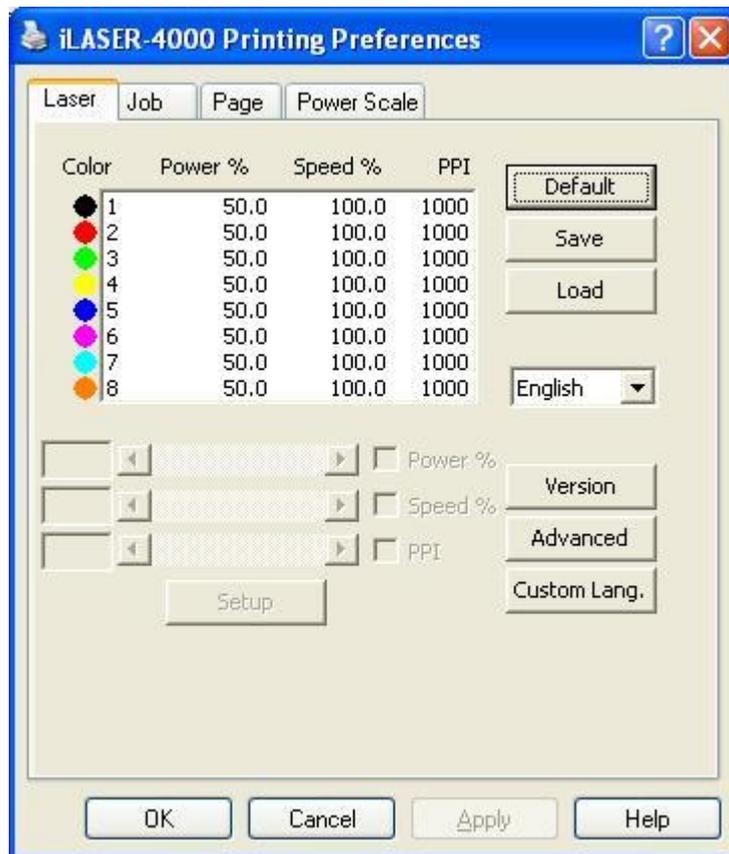
This function can show the firmware version and the machine serial number.

3.4 Print Driver Operation

Because i.LASER is controlled by a standard Windows printer driver, you can create the drawing your favorite graphics software based on Windows system. When you want to send files to i.LASER, you can easy modify the driver settings just like using a desk to 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 setting, check driver information, turn machine, and customize the language of driver.



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 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. Setup

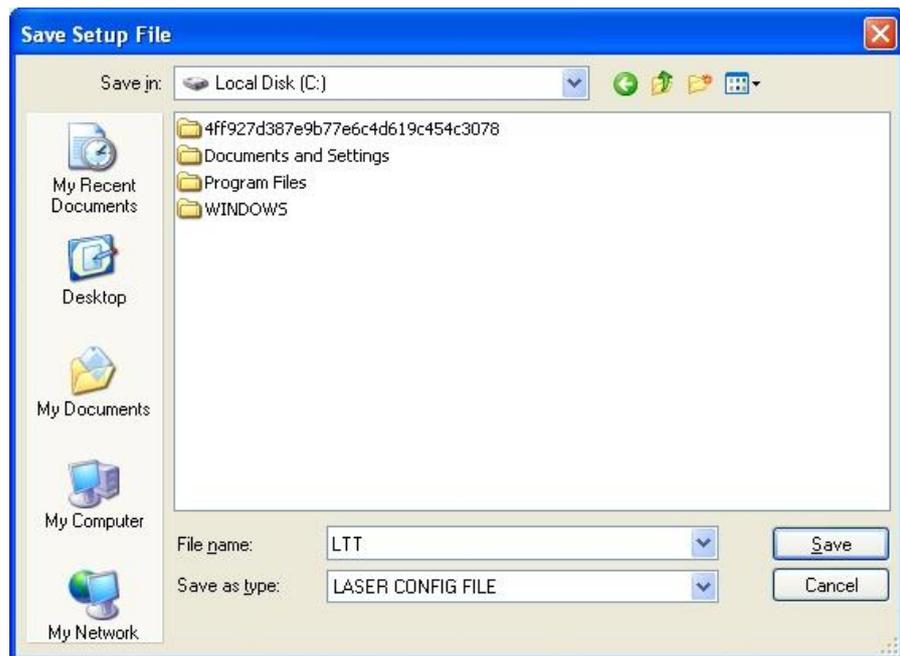
The settings of power, speed, and PPI can be modified by editing the text boxes and dragging the sliders. Then please click the setup button to save the new values for each setting.

6. Default

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

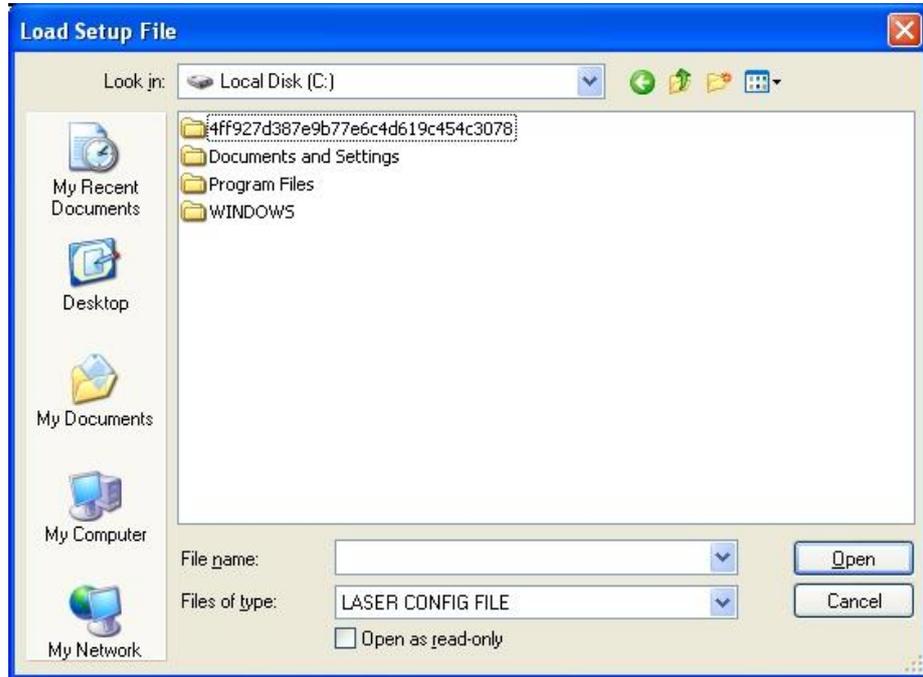
7. Save

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



8. Load

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



9. Language

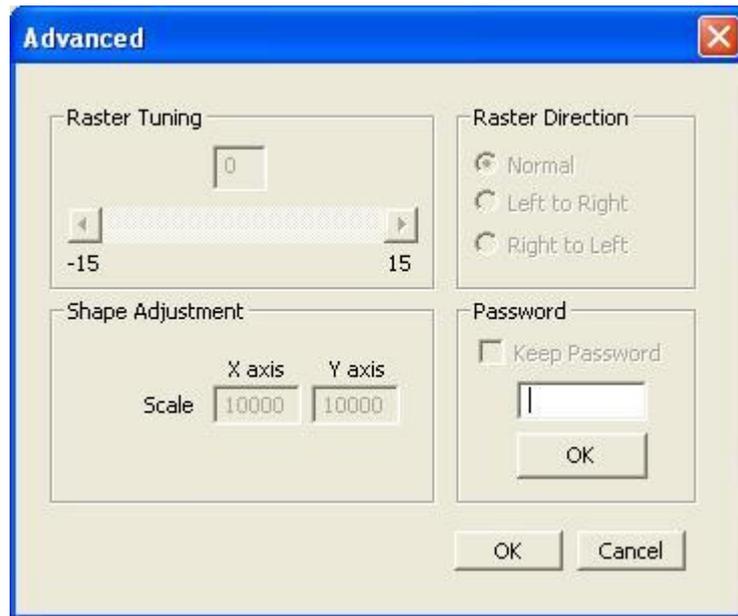
This drop-down box allows user to select different languages.

10. Version

Clicking this button will show the version of driver.

11. Advanced

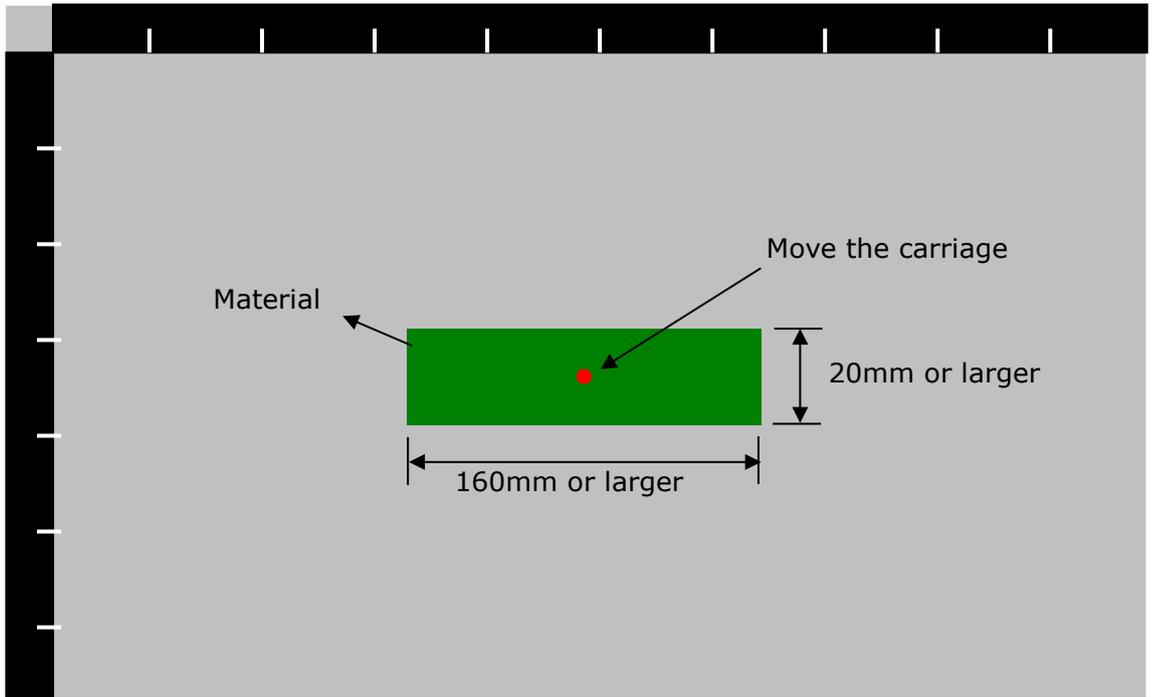
Clicking this button will pop up a **[Advanced]** window that is protected by password. If you need password to modify these settings, please connect LTT. It is recommended **NOT** to change the settings unless instructed to by a LTT technician.



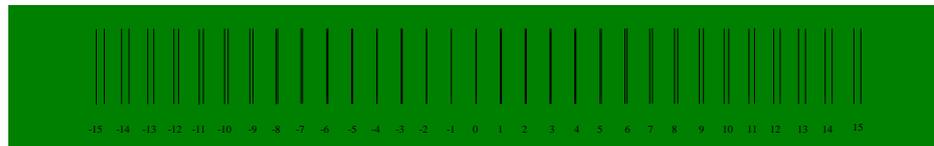
Raster Tuning

This tuning procedure will align the left-to-right and the right-to-left raster lines. To keep the laser system running at its best, be sure to periodically run the tuning process every 3~6 months of operation or as necessary. A sign that the system needs tuning would be that text characters may appear “fuzzy” or “double imaged” when engraving at high speeds. Here are the Tuning test procedure, please follow the steps below:

1. Please send the iLaserTuning.prn to machine.
2. Prepare a material that doesn't require high power to engrave and that you can run at 100% Speed such as anodized aluminum, coated brass, or micro-surfaced engravers plastic. The material size should be at least 160mm x 20mm.
3. Place the material on middle of working area, as shown below.
4. Using the AutoFocus tool to focus the lens to material.

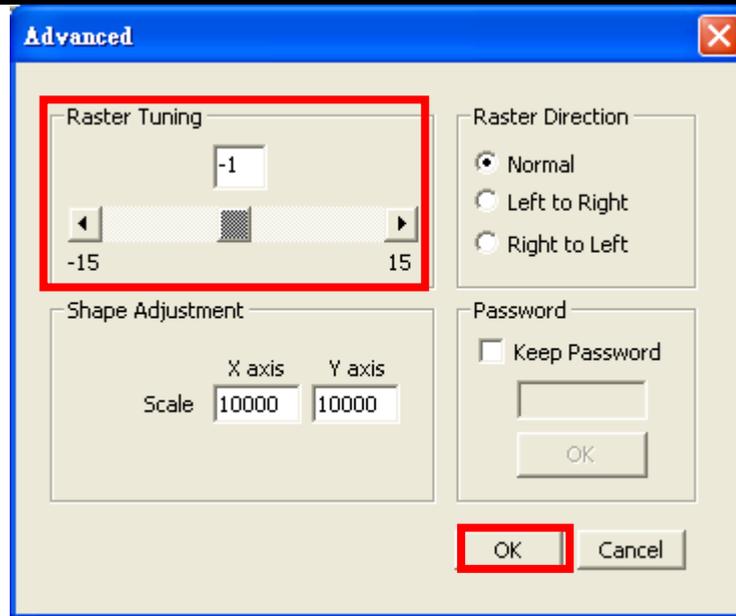


5. The iLaserTuning.prn file is a Temporary Reference Point file. The reference point is set to Middle of the figure. Before you execute this job, please move the carriage to the middle of material.
6. The default Power and Speed of this job are both set to 100%. Modify the estimated power and speed setting by panel for engraving on this material. We suggest using 100% speed and find an appropriate power value.
7. Turn on the exhaust system.
8. Execute this job.
9. After the files completes, remove the material and examine it closely or with a magnifying glass. Choose the appropriate number that is the thinnest appearing line.



In this case, the "-1" corresponds the thinnest line. You can also try to set the Tuning to 0 and -2, engrave small text and then compare those three results.

10. Go to Advanced function in the i.Laser driver, set the Raster Tuning bar to the number that corresponds to the thinnest line and press OK to save your settings.



11. The Raster Tuning settings for that material are now complete. If you feel that you can tweak it a little more, use the Tuning setting you just set and the near two Tuning values (the tuning setting+1 and the tuning setting-1) to engrave small text. Compare each one to the other and find the one that is the sharpest and clearest. Go back and set the TUNING value to the appropriate number and SAVE your settings once again.

NOTE: If your system has a many hours or years of operation and your motion system components are extremely worn, the tuning test sample may not show any lines that are thin. If this is the case, mechanical component replacement may be required. Please contact our Customer Service Department for assistance.

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 than the Normal option.

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.

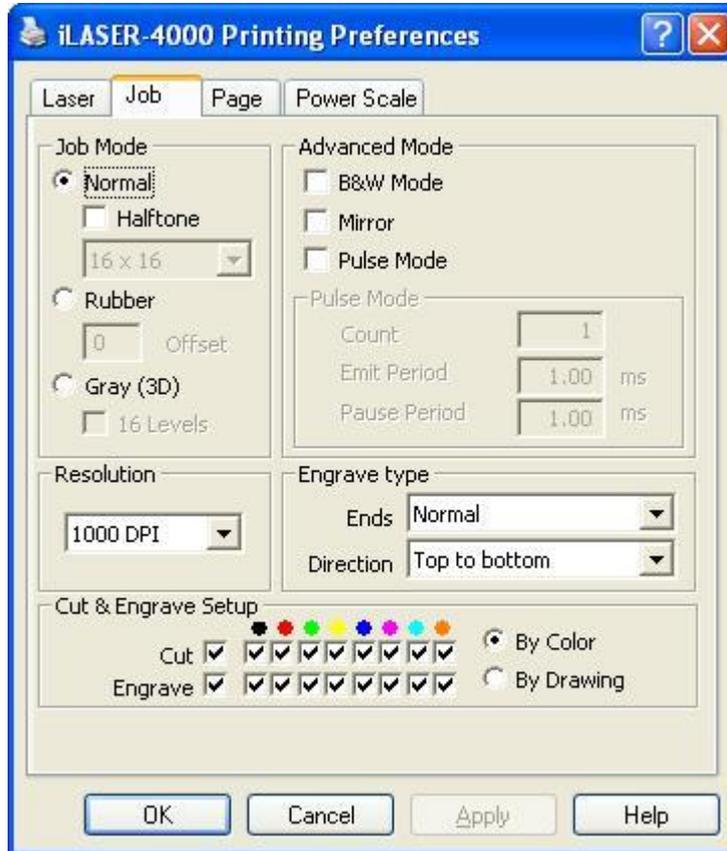
12. Custom Lang.

Clicking this button will pop up a **[CUSTOM LANGUAGE]** window that can allow user to modify or create custom language.



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 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 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 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.

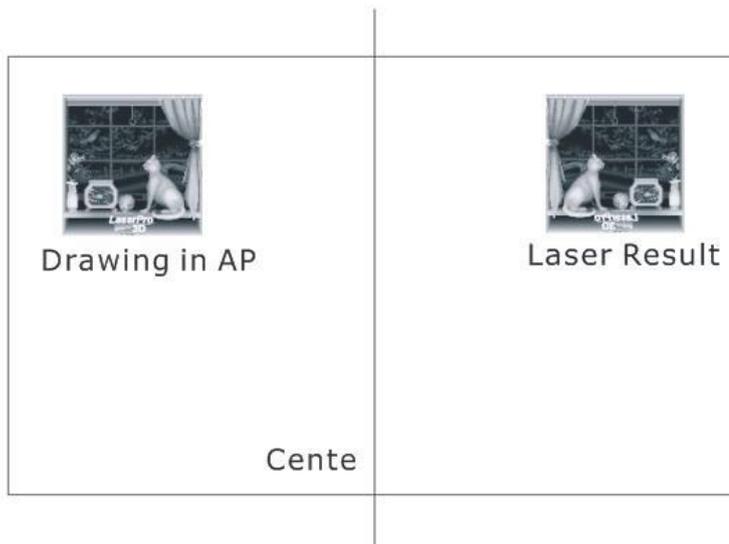
2. Advanced Mode

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.

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

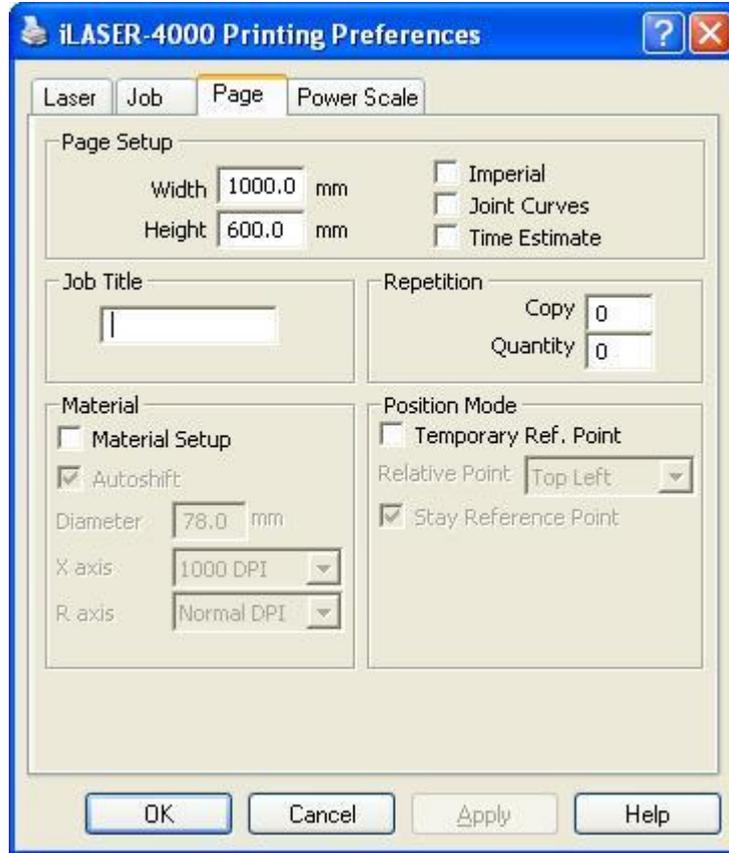
When **[By Color]** is selected vector are cut according to the predefined color order. And vectors of the same color are cut in the sequence they have been drawn. Engraving objects' orders are according to color only. Raster lines of the same color are engraving by **[Direction]** setting

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**.

Imperial

Checking this box to switch the driver between the metric and imperial systems of measurement.

Joint Curves

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

Time Estimate

The Time Estimate function will show up the estimate total engraving time for reference. A message box which includes the Estimate Engrave Time information will pop up while sending a file to machine. The file will transfer to machine at the same time.



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 [3.3.2](#))

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.

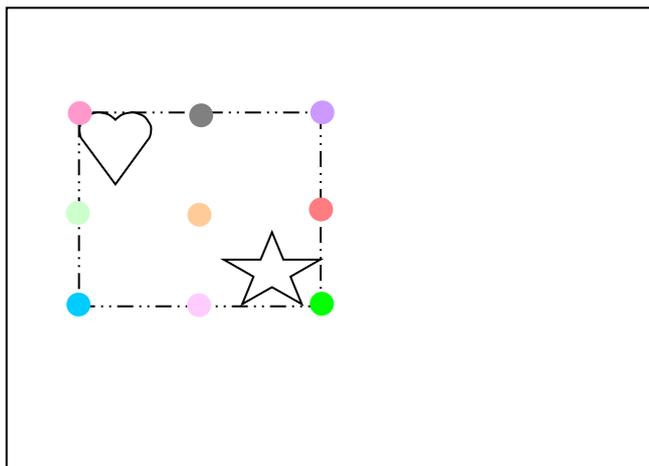
5. Position Mode

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.



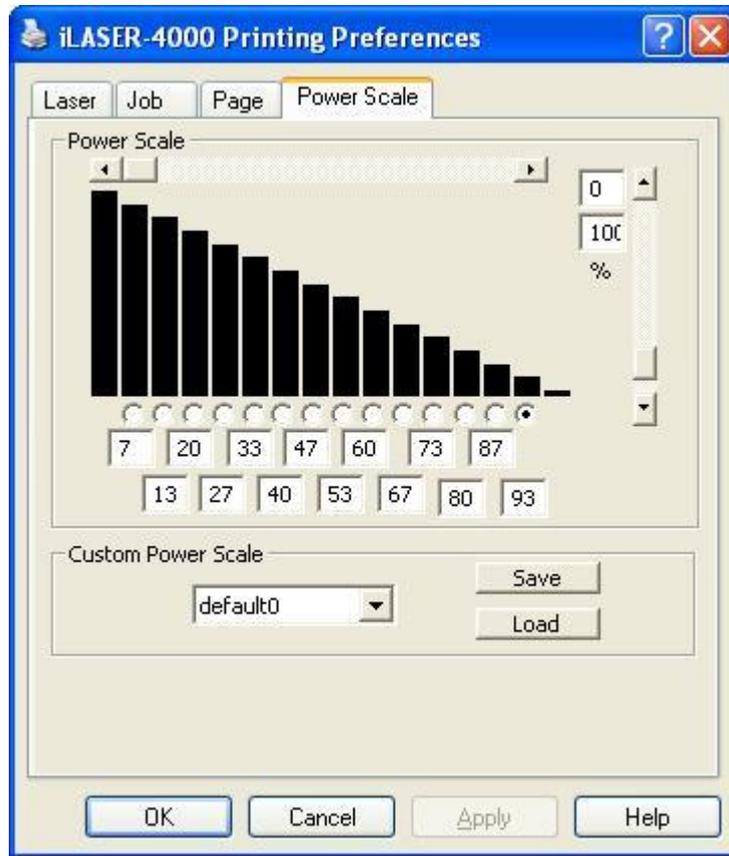
-  **Top Left**
-  **Top Middle**
-  **Top Right**
-  **Middle Left**
-  **Center**
-  **Middle Right**
-  **Bottom Left**
-  **Bottom Middle**
-  **Bottom Right**
-  **Pattern**
-  **Boundary**

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.

3.5 LTT Product Tools

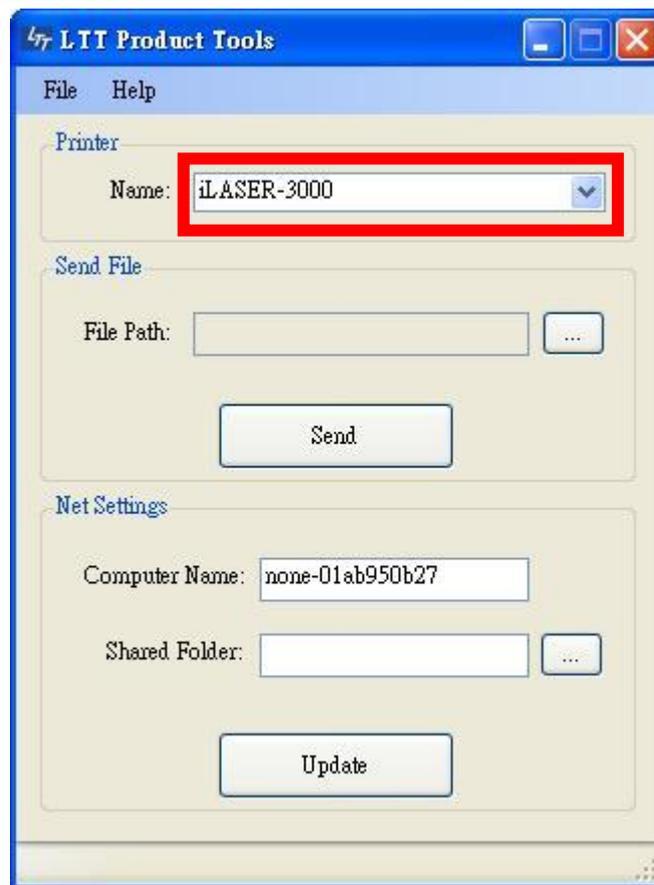
3.5.1 System Upgrade

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.

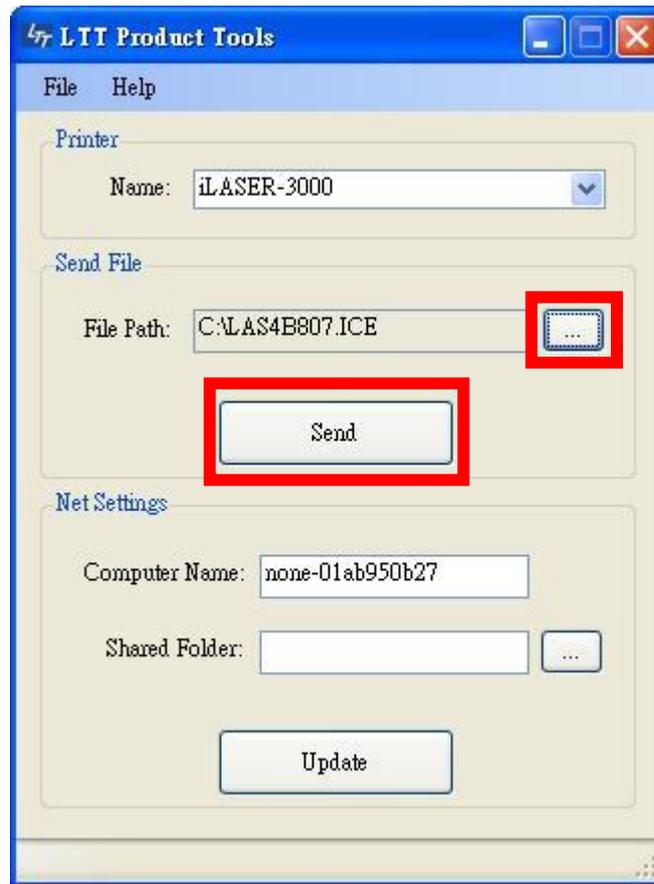
1. Turn off the i.LASER, and check that the i.LASER is connected with PC through USB cable.
2. Turn on the i.LASER and computer. Press and hold  on the control panel right after turning on i.LASER until the following screen appears.

ILS-IIIa
firmware upgrade
V3.01
READY!!!

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.

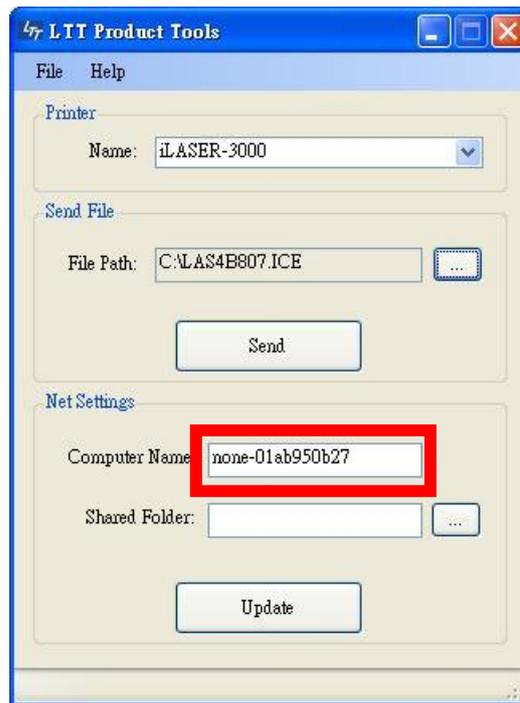
firmware upgrade
complete !

6. Press  on the Control Panel and you will hear a beep after which i.LASER returns to main menu.

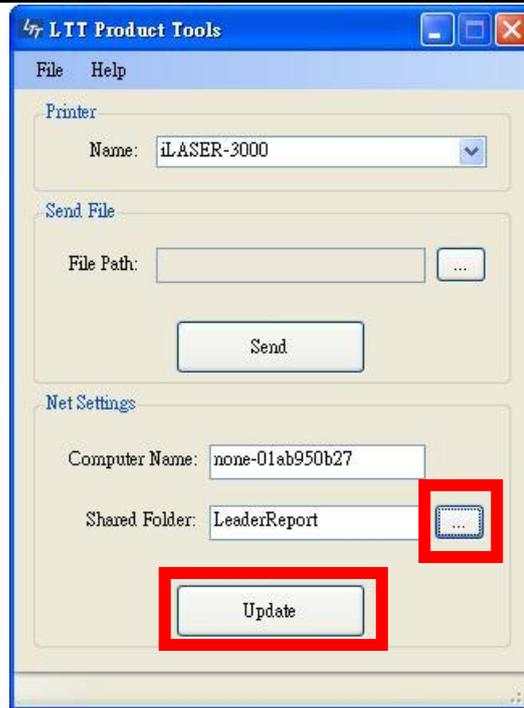
7. Check the firmware version in the 4th line of the **[ABOUT]** submenu (See section [3.3.2](#)).

3.5.2 Ethernet Settings Upgrade

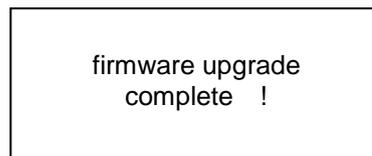
1. Please repeat the steps (1) ~ (3) in [section 3.5.1](#).
2. The computer name will be obtained automatically, and make sure that it is composed of English and number. If you want to modify for another computer, you can change the computer name manually



3. Then select the shared folder by the [...] key, make sure that the folder has been set to shared. Press **[Update]** key to change Ethernet settings.



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 Ethernet setting which is shown in the submenu of **[FILE MANAGER]** on control panel. (See section [3.3.2](#)).

3.6 Basic Operation Flow of CCD

3.6.1 Setting Flow

This section explains the steps before operate i.LASER with CCD. If you want to obtain more detail about operation, please see section 3.7 and 3.8. Before executing 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 switch.

Wait for system start and homing process finishing.

2. Cables connection between machine and PC/NB

You have to connect [AISYS USB], [RS-232 USB], [LPT port USB] between machine and PC/NB.

3. Language setting

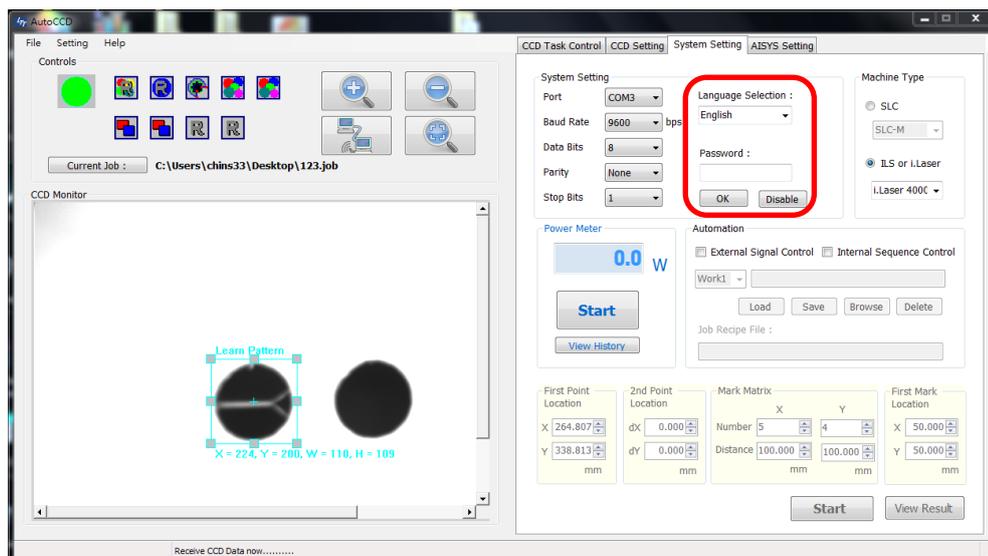
Check the connection between PC and machine

Turn on the PC

Execute AutoCCD

Go to [System Setting] and type the password [Itt].

Select the language: English, Traditional Chinese, Simplified Chinese, Korean.



4. Type of CCD setting

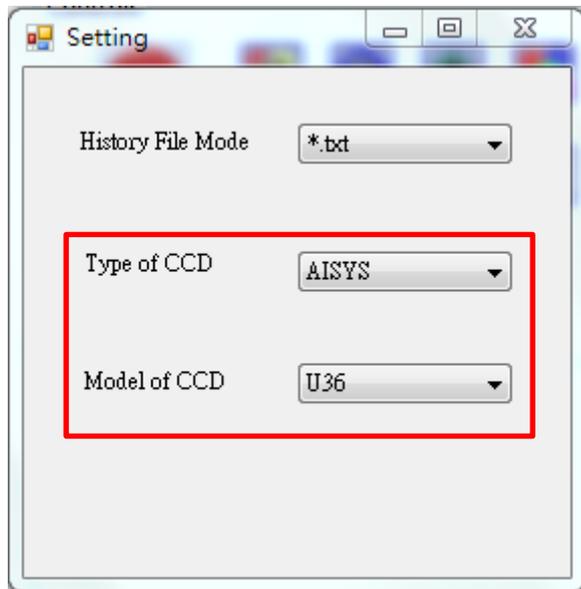
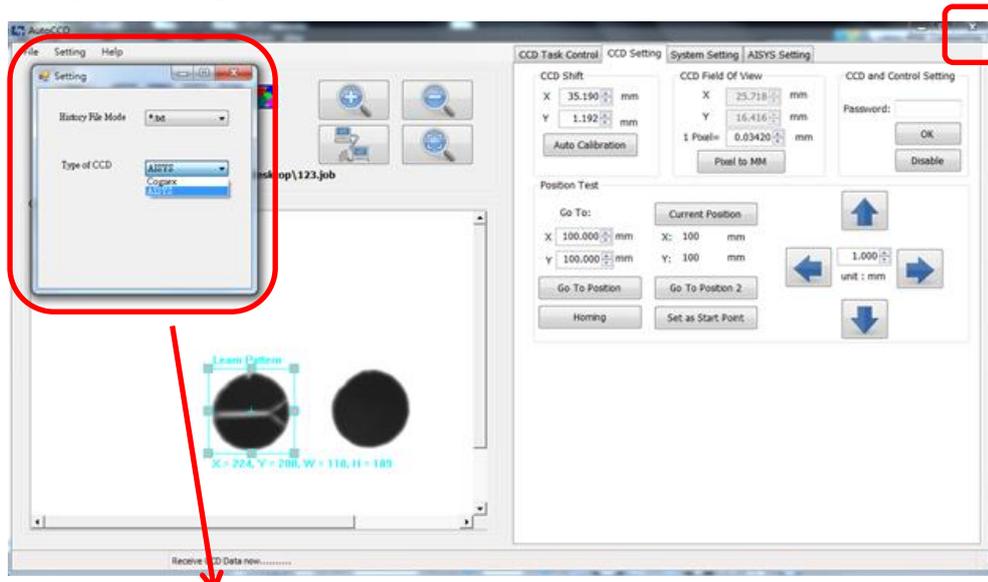
Go to [Setting] and type the password [Itt].

Select type of CCD [AISYS], and set Model of CCD [U36]

Chapter 3 Operation

Press  to close **[Setting]** and press  to close AutoCCD

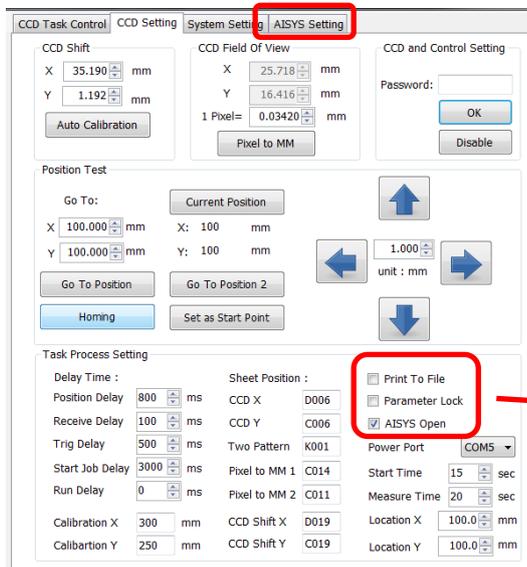
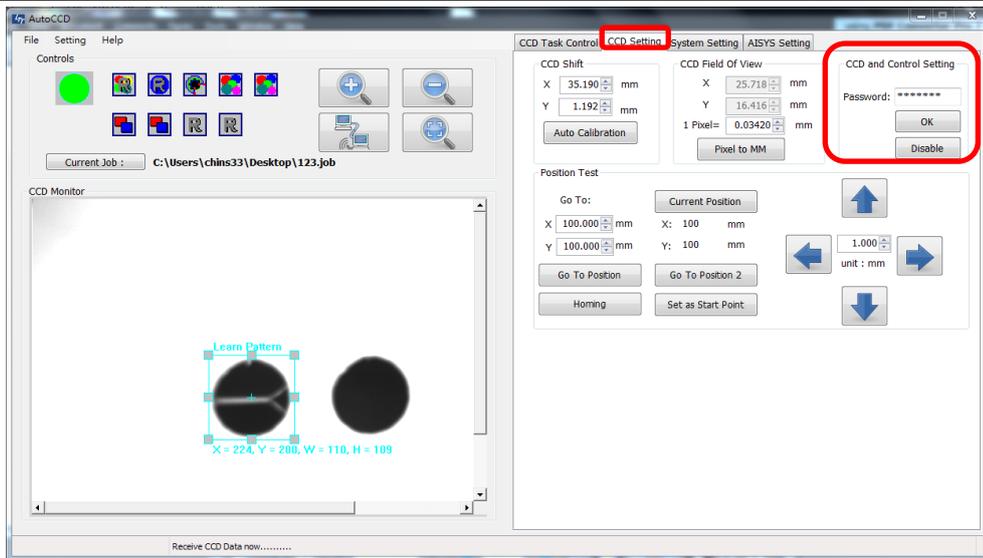
Restart AutoCCD



5. Display AISYS setting

Go to **[CCD setting]**, type the password **[advance]** and press **[OK]**

At **[Task Process Setting]** table, please select **[AISYS Open]** to display **[AISYS Setting]** and press **[Disable]**



- Print To File
- Parameter Lock
- AISYS Open

3.6.2 Calibration Flow

This section explains the steps before operate i.LASER with CCD. If you want to obtain more detail about operation, please see section 3.7 and 3.8. Before executing 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 switch.

Wait for system start and homing process finishing.

2. Cables connection between machine and PC/NB

You have to connect [AISYS USB], [RS-232 USB], [LPT port USB] between machine and PC/NB.

3. Get PC ready

Check the connection between PC and machine.

Turn on the PC
Execute AutoCCD
Let the AutoCCD connects with CCD

4. Adjust focal height of system (if necessary)

Put the material on the table.
Move the carriage above the material.

Press  and select **[YES]**.

5. Adjust the right focus of the CCD (if necessary)

Move the CCD to see any pattern.
Adjust the working distance until image in CCD monitor is clear.

6. Preparation steps for CCD calibration

Put a A4 paper at the center of the working area. Make sure the paper will not be moved during the whole calibration.

Turn on the laser power switch

7. Press [Pixel to MM] to calibrate

Go to **[CCD setting]** and type of the password **[1tt]**.

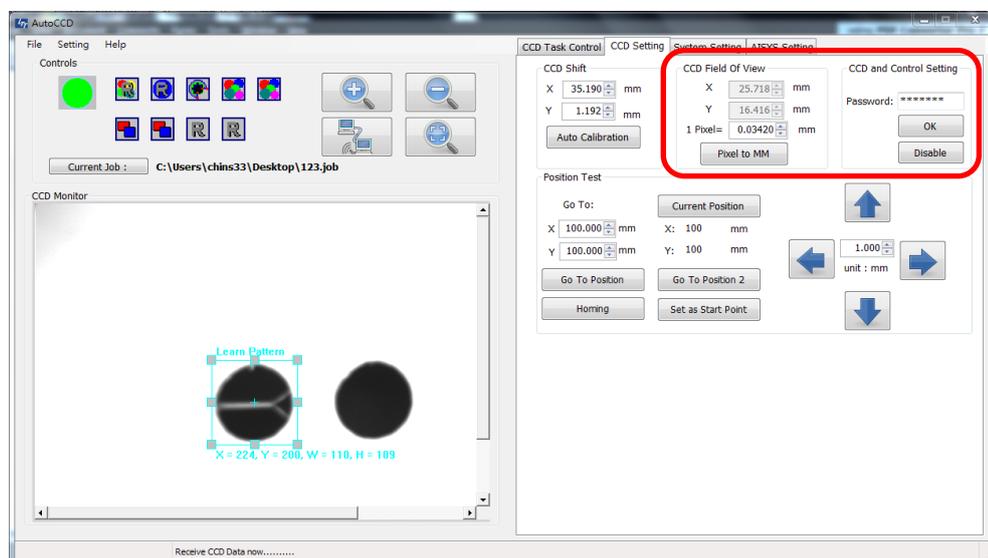
At **[CCD Field of View]** table, please press **[Pixel to MM]**

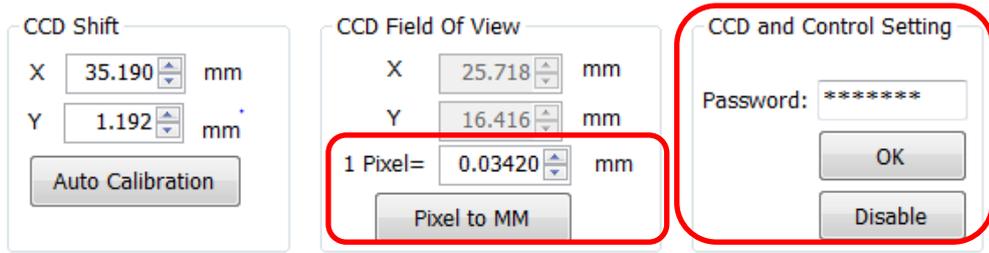
The AutoCCD will automatically send a "P2MM.prn" file to the machine and marks two circles on the A4 paper.

AutoCCD will automatically move the CCD to get the image, and calculate the pixel to millimeter transform constant.

Finally you will see the number of **[1 Pixel= mm]** will be updated by AutoCCD.

You can do it again. Please don't move the marked paper, and turn off the laser power switch, then press **[Pixel to MM]** again. It will do the above processes all over, you can see the number at **[CCD Field of View]** table.





8. Press [Auto Calibration] to calibrate

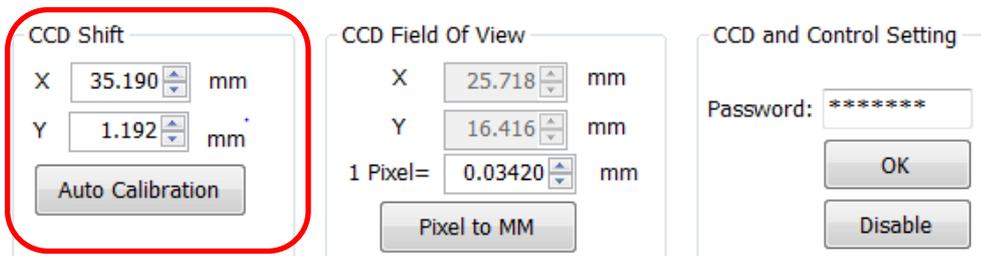
At [CCD Shift] table, please press [Auto Calibration]

The i.LASER will automatically send a "Shift.prn" file to the machine and then marks a circle on the A4 paper.

AutoCCD will automatically move the CCD and catch the image, then calculate the shift parameters constant.

Finally you will see the number of [CCD Shift: X= mm, Y= mm] will be updated by AutoCCD.

You can do it again. Please don't move the marked paper, and turn off the laser power switch, then press [Auto calibration] button again. It will do the above processes all over again, you can see the number at [CCD Shift] table.



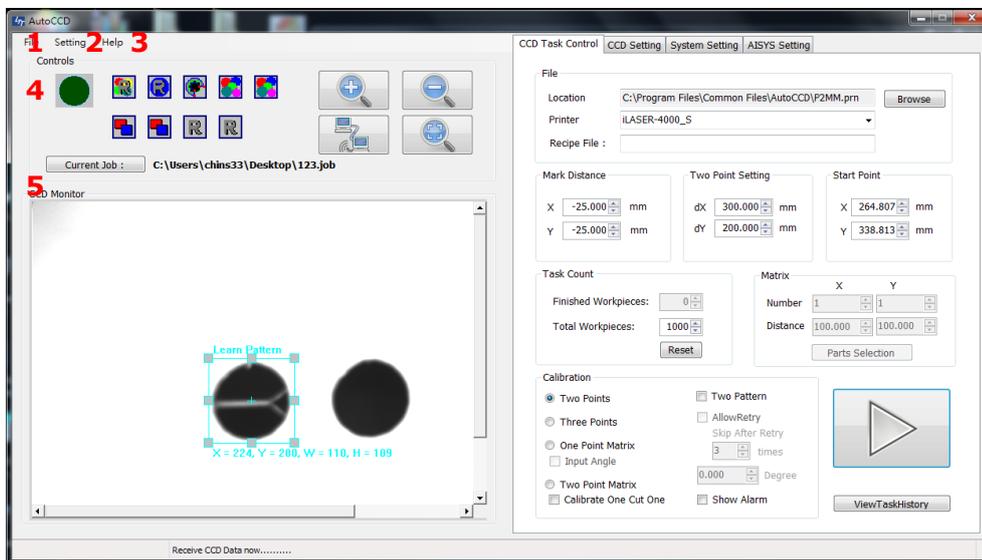
3.7 AutoCCD Operation

AutoCCD is the main control program for cutting with CCD. It is to find reference marks of work piece, then re-calculate offset and rotation of the drawing to fit the new location of work piece.

This section explains functions of AutoCCD and how to use them.

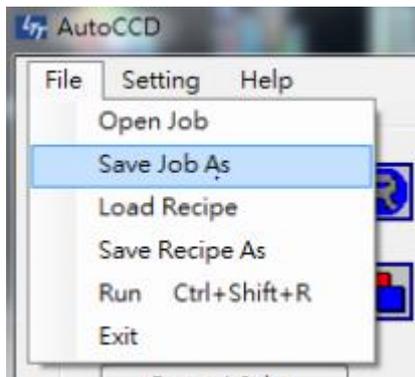
3.7.1 Function Description

This area is the main setting to control CCD move to fit the working piece marks in the working table



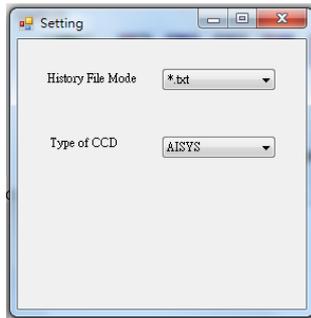
1. File :

- Open Job : After connect with CCD, you can open a job saved in the CCD.
- Save Job As : For<admin> user, you can save job in the CCD.
- Load Recipe : Load work recipe for different application.
- Save Recipe As : Save work recipe as a **[*.rcp]** file.
- Run : Start the procedure of CCD function and working.



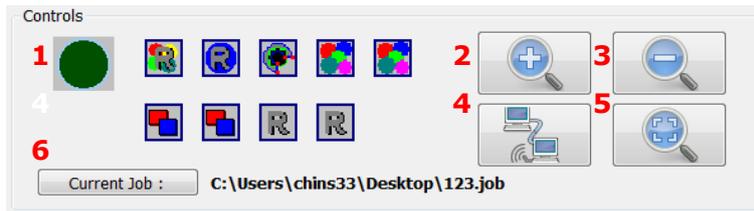
2. Setting : You can key the type of password **[litt]** to change **[History File Mode]** and **[Type of CCD]**.

History File Mode : This block have to setting [* .txt] (If user’s PC without setting Microsoft Excel).



3. Help : It is the version tab.

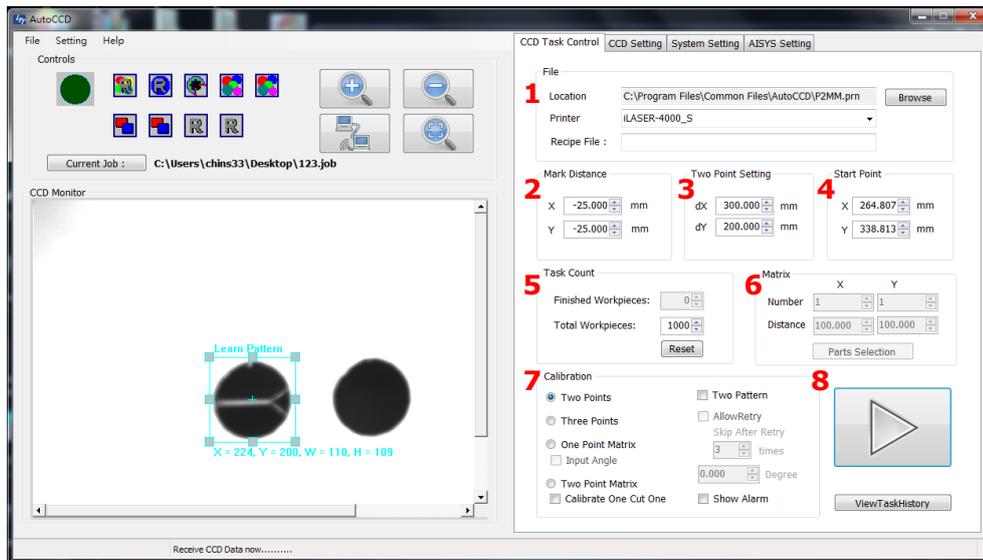
4. Controls :



1. Lamp : Show the CCD function working or not.
2. Zoom In : Zoom in the CCD image in CCD monitor.
3. Zoom out : Zoom out the CCD image in CCD monitor.
4. Connect : Connect to the CCD device. Before connection, please check the setting of CCD and user account
5. Zoom to Fit : Zoom In/Zoom Out the image to fit the vision zone of the CCD Monitor.
6. Current Job : Press this button to show the current job is loaded in the CCD.

5. CCD Monitor : This table shows the real time or last time image from CCD. You can fine tune the job loaded in the CCD. For example, you can train a pattern here.

3.7.2 CCD Task Control



1. **File** : -Location : Load the drawing file. (See [3.7.3](#) for more detail)
 -Printer : Select the working machine printer driver like i.LASER.
 -Recipe File : The recipe which loaded by the permissions [admin] of all setting include the parameters and drawing selection.
 2. **Mark Distance** : The distance between reference mark and working picture. (See [3.7.3](#) for more detail)
 3. **Two Point Setting** : The distance between two reference marks. (See [3.7.3](#) for more detail)
 4. **Start Point** : The position to search the first reference mark. You can use functions of [**Position Test**] to find it.
 5. **Task Count** : Count the work-piece and limit the total work-pieces. (The counter only counts a successful).
 6. **Matrix** : For matrix marks calibration, here are parameters for matrix marks settings.
 7. **Calibration** : Select calibration function: Two Points, Three Points, One Point Matrix, Two Point Matrix, Two Pattern, Allow Retry, Show Alarm.
- Run** : Start the procedure of CCD function and working.

3.7.3 Setting Definition

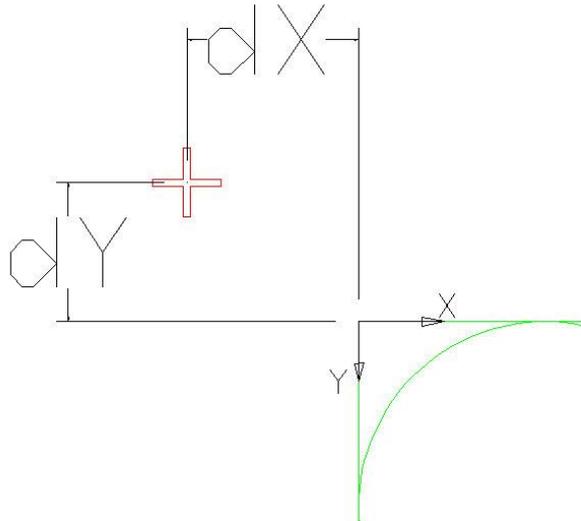
File :

Drawing file is only contained drawing for cutting. Any other reference drawing will make wrong cutting position. Drawing file should be the format in plt or prn. When print, please select [**Print to file**] to save the prn or plt file in your computer. Please pay attention before printing, in the driver [Page] tab, the [Position Mode] must leave empty checks in [Temporary ref. Point] and [Stay Reference Point]

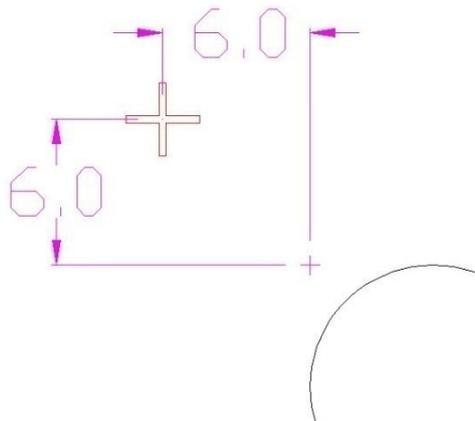
Chapter 3 Operation

Mark Distance:

Mark Distance means the distance between reference mark and the top left of the drawing. If the top left of the drawing is a curve, the distance is showed below. The values of dX and dY are minus in below drawing.



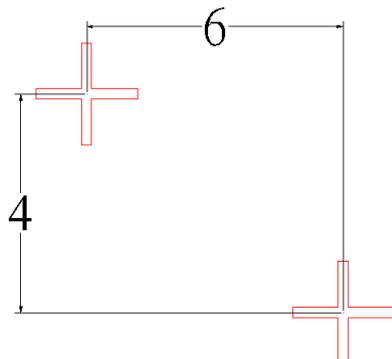
For example, the values of dX and dY in below drawing are -6 and -6



Two Point Setting:

Two Point Setting is the distance between two reference marks. If the top left one is the origin of the coordinates, the coordinate of the bottom right one is the setting.

For example, two point setting of above picture is dX= 6 , dY= 4



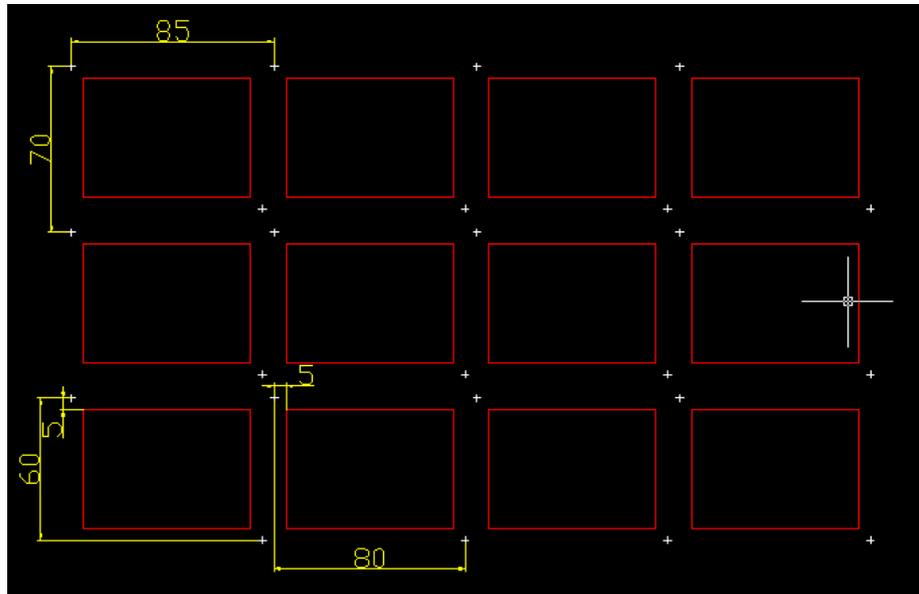
Chapter 3 Operation

Matrix:

In the following example, each cell has two cross at top-left and down-right.

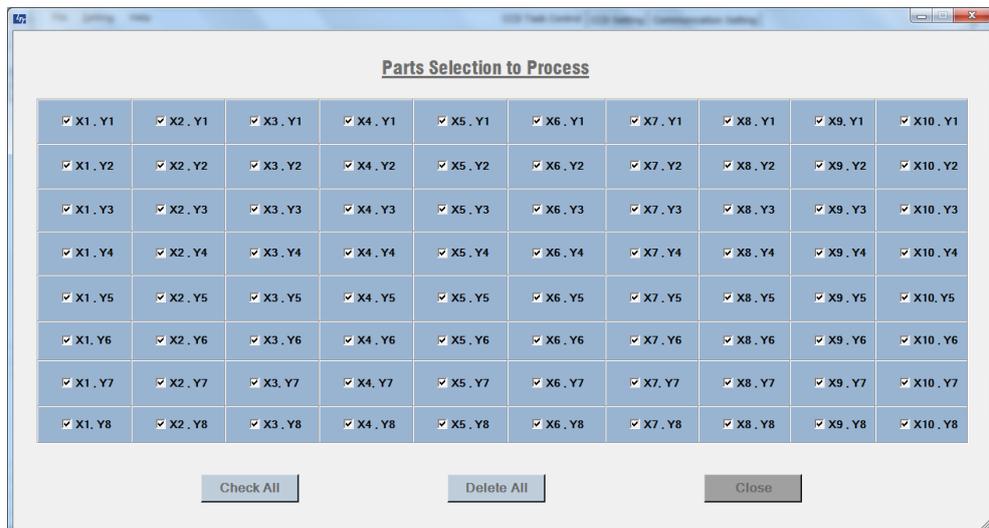
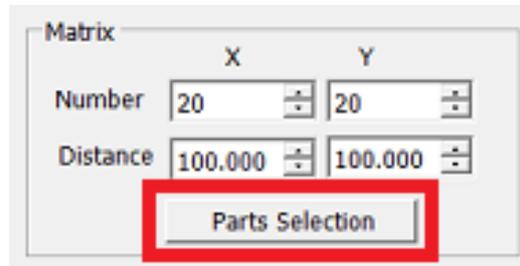
Number for x, y are 4, 3.

Distance for x, y are 85, 70.



Parts Selection:

Under this function, you can choose the pieces you want to do or by pass.



One Point Matrix:

Under this function, AutoCCD will take only one point for calibration for every

piece.

With its sub-function [Input Angel], then enter the angel in [Degree] to specify the default rotation angle.

With its sub-function [Allow Retry] to retry calibration or bypass the fail piece.

Under the calibrate function, you will get the shorter working time.

Two Points Matrix:

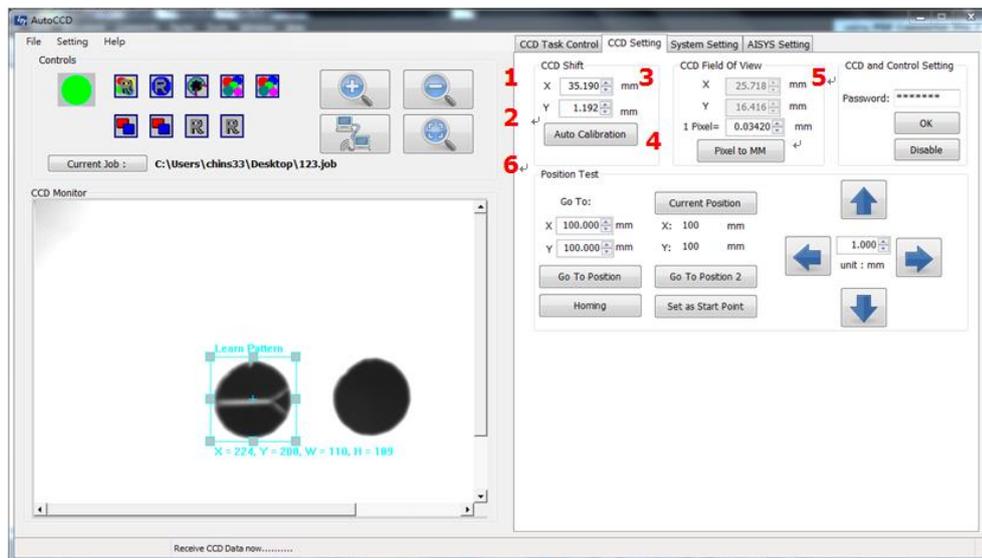
Under this function, AutoCCD will take two points for calibration for every piece.

With its sub-function [Calibrate One Cut One], will let machine cut one piece after done one calibrate, till all pieces are done.

With its sub-function [Allow Retry] to retry calibration or bypass the failed piece.

Under this calibrate function, you will get a better calibrate/cutting quality.

3.7.4 CCD Setting



1. **CCD shift:** The CCD shift is the distance between laser focus and the center of CCD camera. (See [3.7.4.1](#) for more detail)
2. **Auto Calibration:** Do auto calibration to update CCD shift values.
3. **CCD Field Of View:** It shows the field size of CCD View in mm. (See [3.7.4.1](#) for more detail)
4. **Pixel to MM:** Do auto calibration to update 1 Pixel to mm transform constant.
5. **CCD and Control Setting:** Before change the CCD IP address, user, CCD shift and CCD Field of View, you need to enter the password. When enter the password, you need to click **[OK]** to make it work. After change those settings, you can click **[Disable]** to prevent any other one from changing settings.
6. **Position Test:** You can move the carriage by using this function. You can find the start position by using this function too. (See [3.7.4.2](#) for more detail)

3.7.4.1 CCD Shift and CCD Field of View

This section will show you how to do the auto calibration of CCD Shift and CCD Field Of View. It is very important for i.LASER cutting with CCD. It is a very basic setting for CCD. If the number of CCD Shift and CCD Field Of View are not right, you cannot get an accuracy cutting with CCD.

Please do the **[Pixel to MM]** first and then **[Auto Calibration]**

1. Preparation steps for CCD calibration.

Put an A4 paper at the center of the working area. Make sure the paper will not be moved during the whole calibration.

Turn on the laser power switch.

Press the Connection button and let the AutoCCD connects with CCD.

Go to AutoCCD / File / Open Job. Open [Calibration_Circle_200.job]

Go to AutoCCD / CCD Setting tab. Key in the Password with **[Itt]**.

2. Do the [Pixel to MM] calibration.

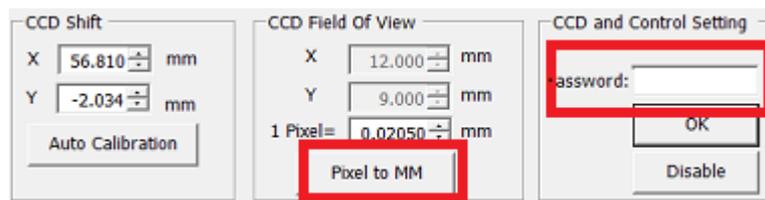
Press [Pixel to MM]

The AutoCCD will automatically send a P2MM.prn file to the machine and then marks two circles on the A4 paper.

AutoCCD will automatically move the CCD to get the image, then to calculate the pixel to millimeter transform constant.

Finally you will see the number of **[1 Pixel = mm]** will be updated by AutoCCD.

You can do it again. Please don't move the marked paper, and turn off the laser power switch. Then press [Pixel to MM] again. It will do the above processes all over again.



3. Do the [Auto Calibration] calibration.

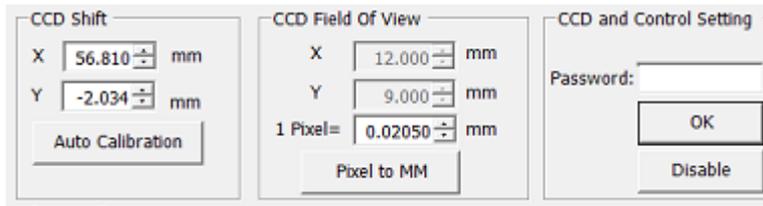
Press [Auto calibration]

The i.LASER will automatically send a Shift.prn file to the machine and then marks a circle on the A4 paper.

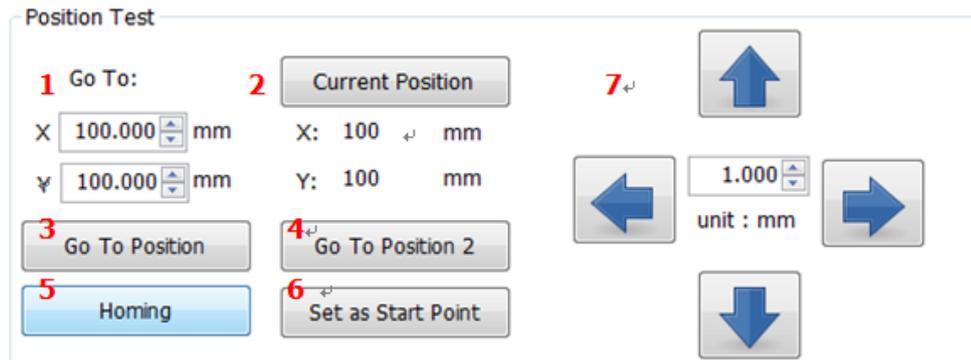
AutoCCD will automatically move the CCD and get the image, then calculate the shift parameters constant.

Finally you will see the number of **[CCD Shift: X= mm, Y= mm]** will be updated by AutoCCD.

You can do it again. Please don't move the marked paper, and turn off the laser power switch. Then press [Auto calibration] again. It will do the above processes all over again.

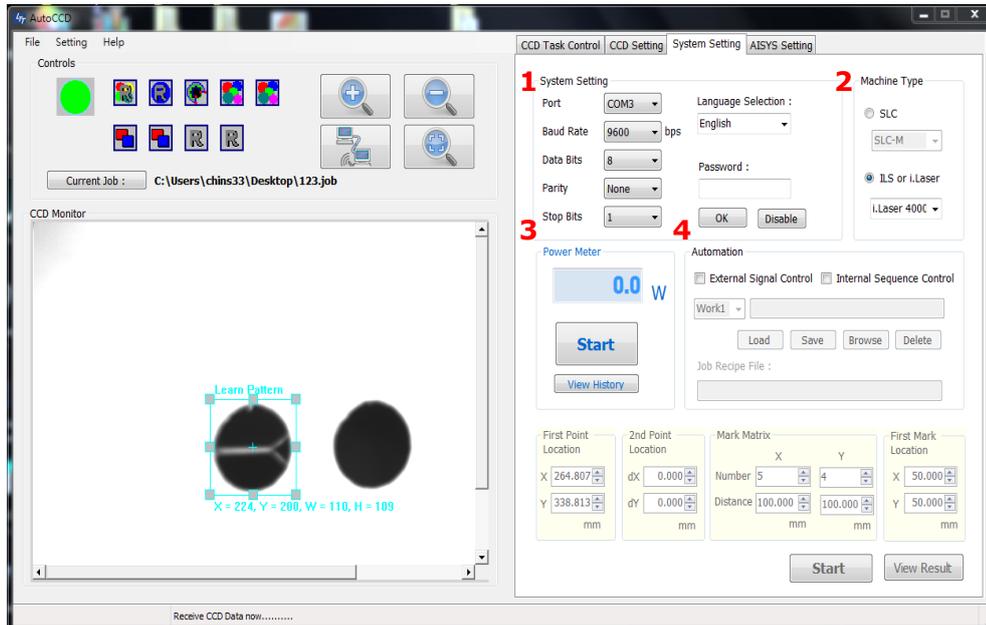


3.7.4.2 Position Test



- 1. Go To:** Set up the position to move.
- 2. Current Position:** Show the present coordinate of the carriage.
- 3. Go To Position:** Move the carriage to the position which is setting in #1
- 4. Go To Position 2:** Move the carriage to the position 2 which calculates from #1 and two point setting.
- 5. Homing:** Move the carriage to home and reset the position of home if the carriage loses its position.
- 6. Set as Start Point:** After finding the start position, you can set the coordinate in #1 to be the start point by click this button.
- 7. Moving :** You can move the carriage toward four directions by the distance in the middle blank.

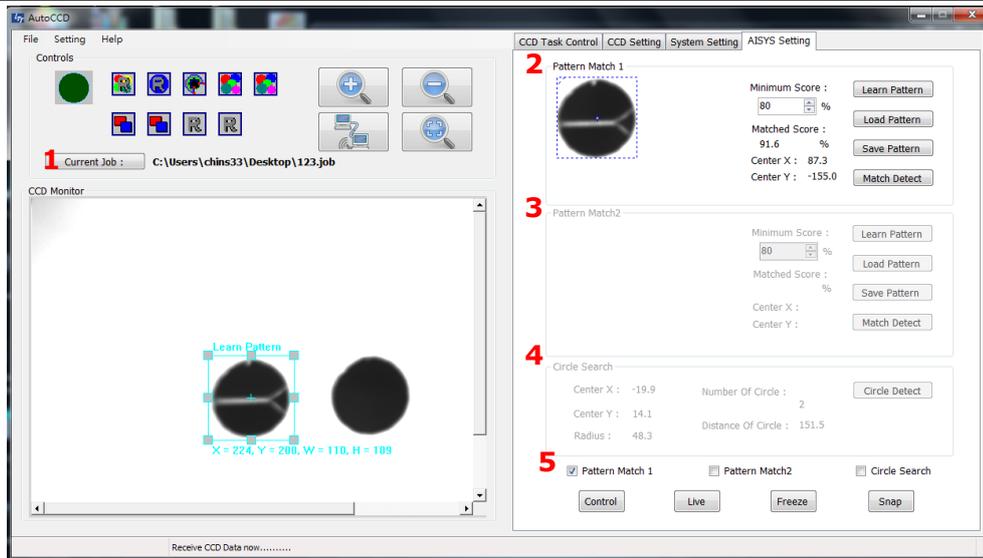
3.7.5 System Setting



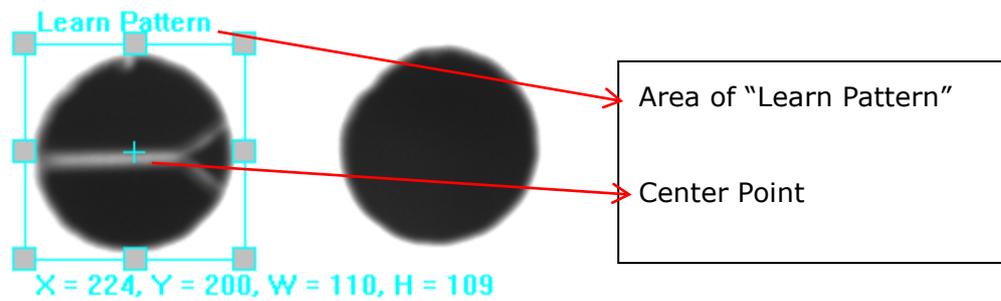
1. **System Setting** : This table can set Port, Baud Rate Data Bits, Parity, Stop Bits Language Selection.
2. **Machine Type** : This table can set Machine Type.
3. **Power Meter** : This table can show the power of laser from Power Meter (If necessary user can selectively set up).
4. **Automation** : This table can set External Signal Control, Internal Sequence Control. These two kinds of signal control can set different works and recipe which loaded by the user.
 - External Signal Control : This function can select different works by external button.
 - Internal Sequence Control : This function can select different works by internal setting.

3.7.6 AISYS setting

This area display information about learn pattern

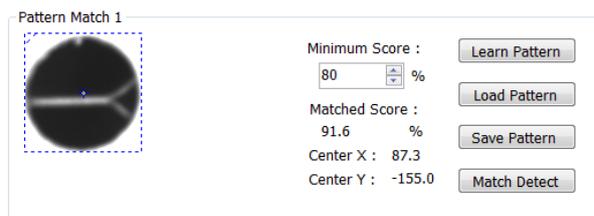


1. CCD Monitor : This table shows the real time or last time image from CCD. You can fine tune the job loaded in the CCD. For example, you can train a pattern here.



You can set the area of pattern, then move + at center position of pattern

2. Pattern Match 1 :



Learn Pattern : Press [Learn Pattern], it can capture the area of Learn Pattern at CCD Monitor, then it will show at Pattern Match 1.

Load Pattern : Press [Load Pattern], it can load the pattern by file.

Save Pattern : Save the pattern by [*.bmp].

Match Detect : Press [Match Detect], it can display the number of Matched Scored at Pattern Match 1.

Minimum Score : Set the minimum score of match score.

Center X/Y : The position of center position

3. Pattern Match 2 :

Learn Pattern : Press [Learn Pattern], it can capture the area of Learn Pattern at CCD Monitor, then it will show at Pattern Match 2.

Load Pattern : Press [Load Pattern], it can load the pattern by file.

Save Pattern : Save the pattern by [*.bmp].

Match Detect : Press [Match Detect], it can display the number of Matched Scored at Pattern Match 2.

Minimum Score : Set the minimum score of match score.

Center X/Y : The position of center position

4. Circle Search : Press [Circle Detect], It can capture the circle at CCD Monitor

5. Block function : This table can select three kinds type of learning pattern and different kinds of the CCD Monitor status.

3.7.7 Tips of AutoCCD

The AutoCCD has a hot key function. When all parameters are setting. When the tap is on [**CCD Task Control**], you can press [**Enter**] to start the CCD task. When quantity production. You can connect a mini number keyboard. Setup parameters first. Then, you can just load/unload work-pieces and press [**Enter**].

Other Hot Keys :

Controls:

Connect = **Alt** + **C**

CCD Task Control:

Browse = **Alt** + **B**

Run = **Enter**

CCD Setting:

Go To Position = **Alt** + **G**

Go To Position 2 = **Alt** + **2**

Homing = **Alt** + **H**

Set as Start Point = **Alt** + **S**

Up = **Alt** + **U**

Down = **Alt** + **D**

Left = **Alt** + **L**

Right = **Alt** + **R**

Ok = **Alt** + **O**

Communication Setting:

Ok = **Alt** + **O**

3.8 CCD Job Description

There are four types of job for you to use for i.LASER cutting with CCD. These jobs are special design for AutoCCD. Please note the version compatibility between jobs and AutoCCD.

Job	Function
LTT_Pattern-1-200.job	It works for single pattern. CCD will find the matched pattern in the field of view. It will output the defined position if the matched pattern is over than thresh.
LTT_Pattern-2-200.job	It works for both single pattern and two different patterns.
LTT_Circle-1-200.job	It works only for single circle pattern.
Calibration_Circle_200.job	It works for CCD calibration about FOV and CCD Shift.

3.8.1 Single Pattern Job

AutoCCD use CCD to find reference marks in the material and calculate the position difference and rotate angle. If these reference marks are the same, then you can use this job. It works for single pattern. CCD will find the matched pattern in the field of view. It will output the defined position if the matched pattern is over than thresh.

Job Name : LTT_Pattern-1-200.job

3.8.2 Two Pattern Job

AutoCCD use CCD to find two marks in the material and calculate the position difference and rotate angle. If these two marks are not the same, then you can use this job. It works for two different patterns. This job can also work for the single pattern.

Job Name : LTT_Pattern-2-200.job

3.8.3 Circle Pattern Job

It works for single circle pattern. This job has two steps to find the circle center. 1st step, it finds the pattern that matched. 2nd step, it will find the circle in the matched pattern and output the center position. It will find the circle between inner radius and outer radius

Job Name : LTT_Circle-1-200.job

3.8.4 Calibration Job

It only works for CCD calibration about FOV and Shift.

When you want to calibrate the <Pixel to MM> and <Auto Calibration>, you have to load this job.

Run <Pixel to MM>, the AutoCCD will send a P2MM.prn file to machine. It will mark two circles at the center of the working area. AutoCCD will move the CCD to the position and find these two circle center and calculate the pixel to mm transform constant.

Run <Auto Calibration>, the AutoCCD will send a shift.prn file to machine. It will mark one circle at the center of the working area. AutoCCD will move the CCD to the position and find the circle center and calculate the CCD shift constants.

Job Name : Calibration_Circle_200.job

Chapter 4 Maintenance

4.1 Daily Cleaning

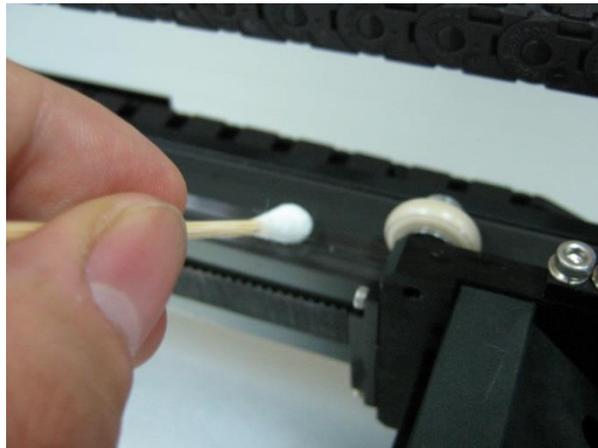


1. Preparation

- 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.

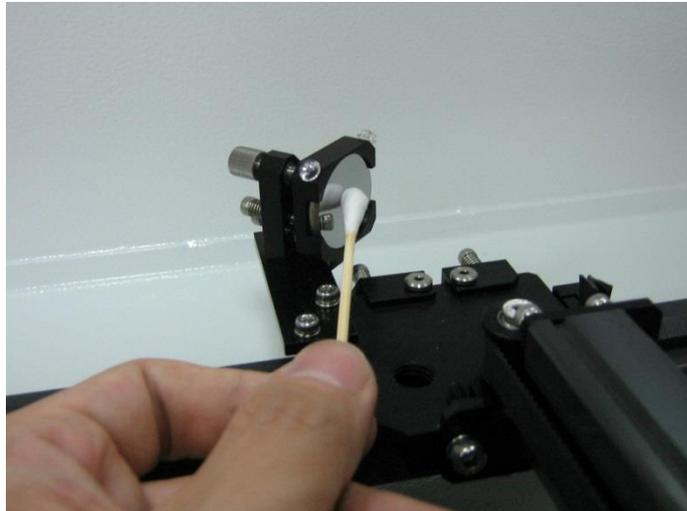


3. Clean lens and mirror

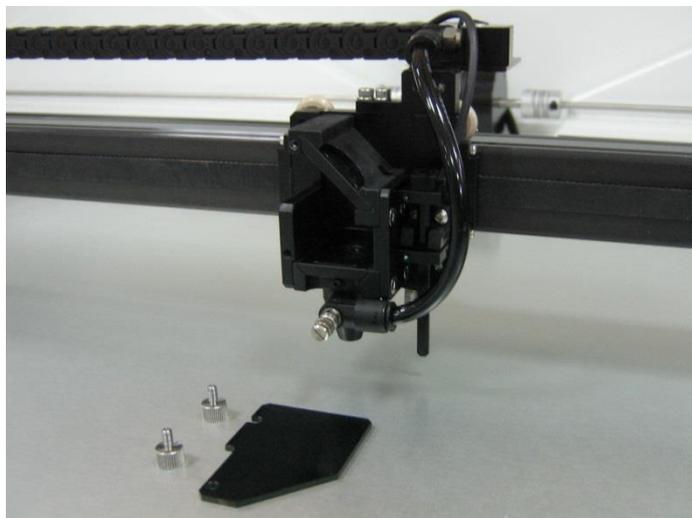
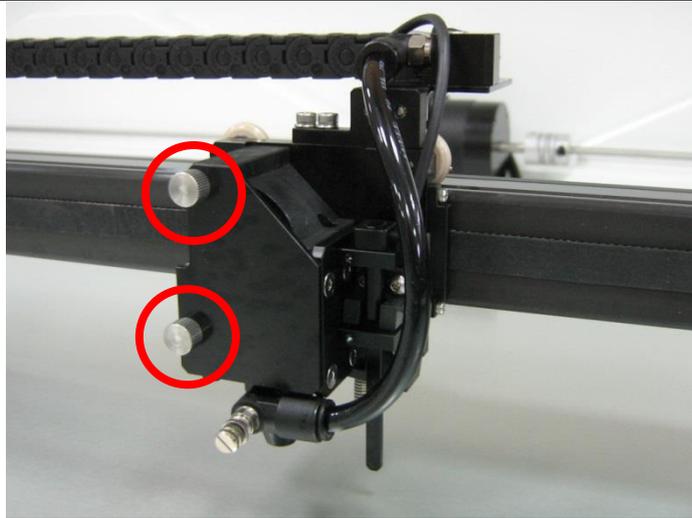
- Clean the window lens with cotton swab and alcohol.



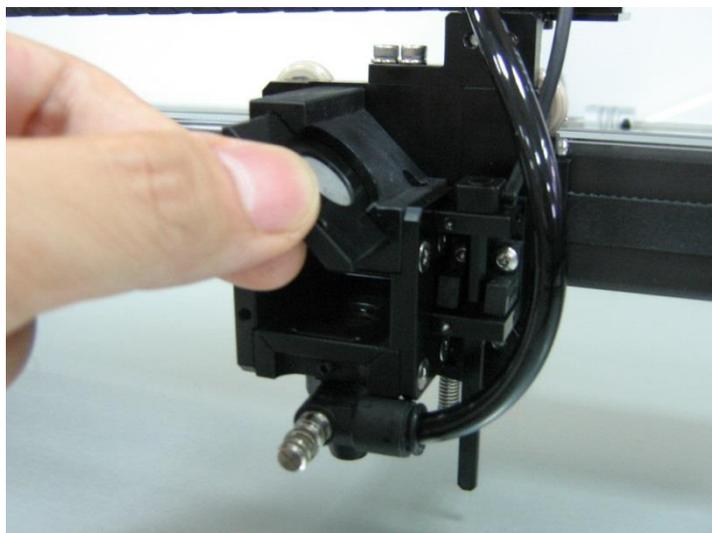
- **Clean 4th mirror with cotton swab and alcohol.**



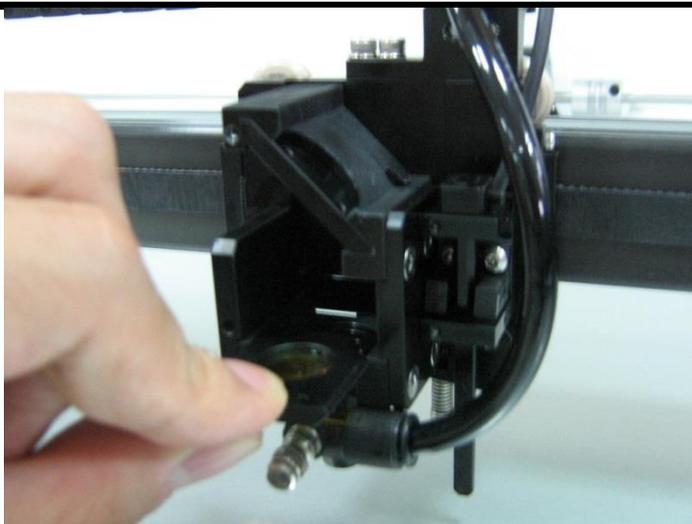
- **Clean 5th mirror and focal lens with cotton swab and alcohol.**
Loosen the two screws by hand, and take off the cover.



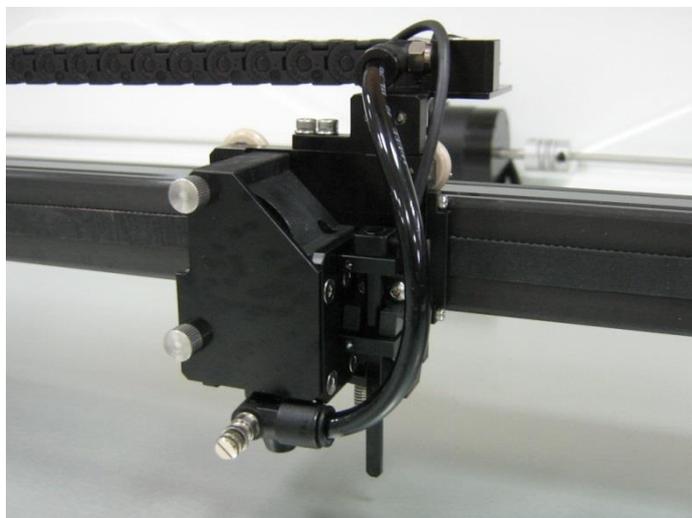
Pull out the 5th mirror, clean it, and push it in back.



Pull out the focal lens, clean it (both sides of lens), and push it in 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 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 generates or 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.

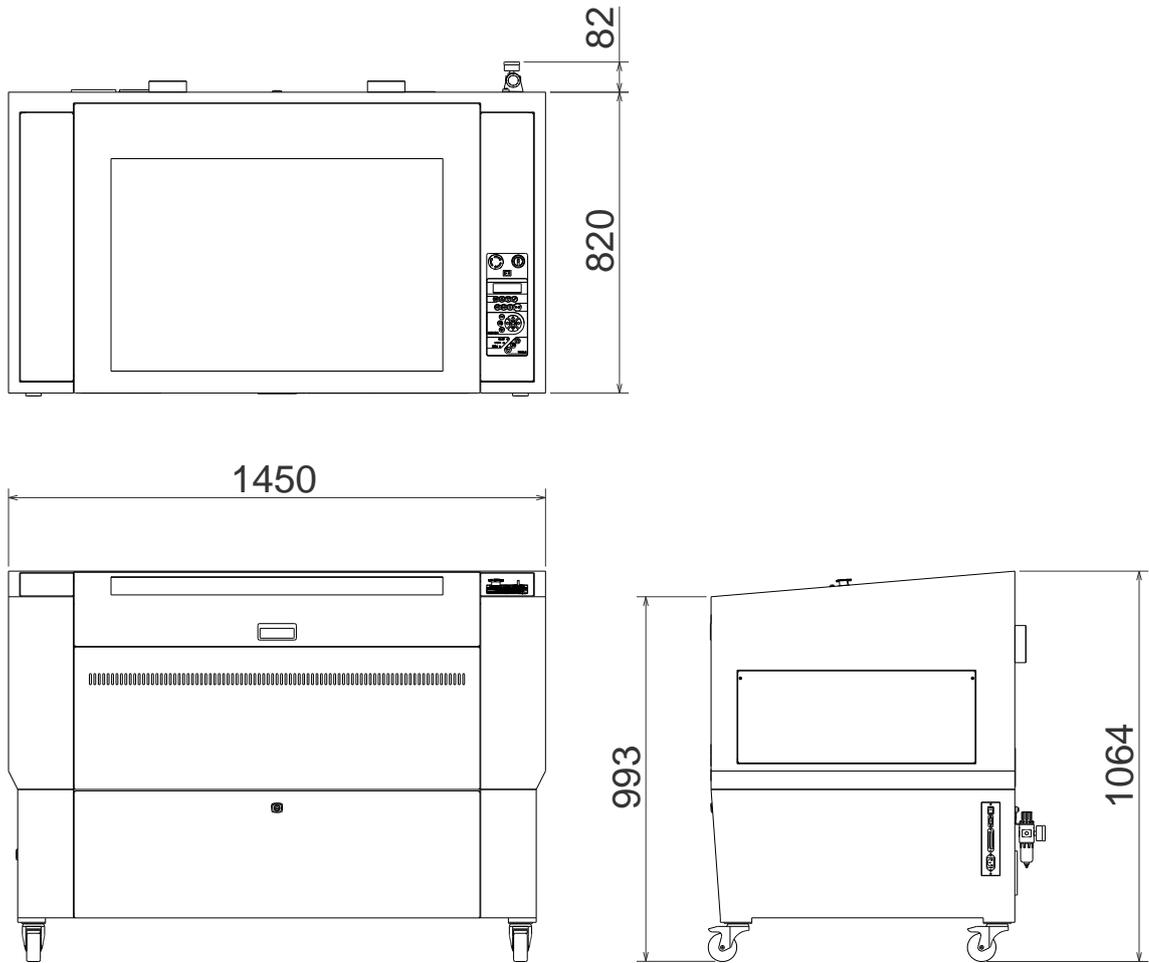
Model	3000 series	4000 series
Work area	700 (L) × 500 (W) mm	1000 (L) × 600 (W) mm
Table Movement	230 (H) mm	
Max. speed	1524mm/sec (60"/sec)	
Resolution(DPI)	1000, 500, 333, 250, 200, 160	
Memory Buffer	64MB	
Interface	USB port	
Laser generator	30W / 60W /100W (air-cooled CO2 laser)	30W / 60W /100W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

Appendix 2 Dimensions

This section describes the dimensions of i.LASER series.

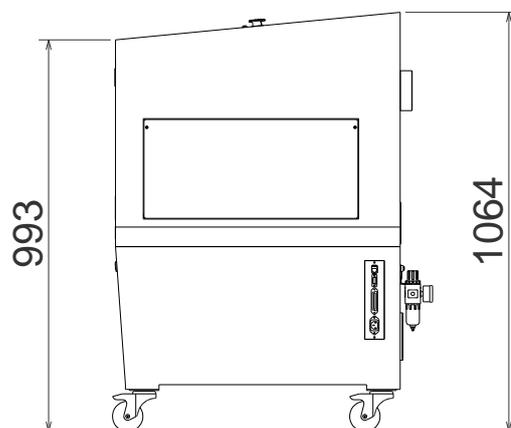
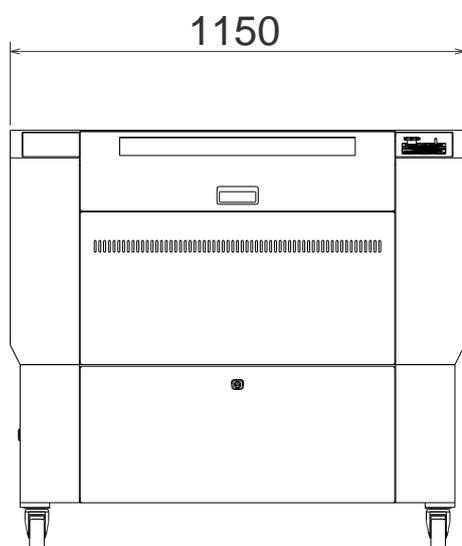
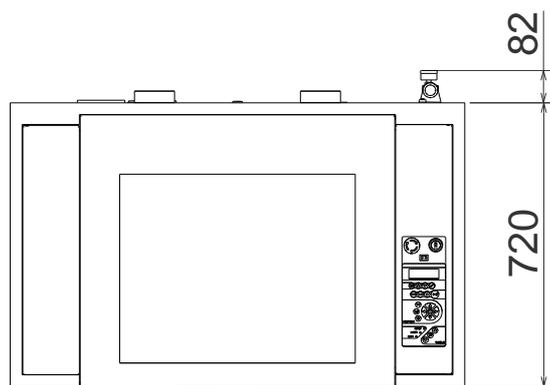
■ i.LASER 4000 series

Unit: mm



■ i.LASER3000 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	