Laser Tools & Technics Corp.

User Manual

Q Laser Series

Introduction

Technical Support

Thank you for buying the LTT laser engraving and cutting machine. This product is guaranteed to be free from any manufacturing defects for a period of two years starting from the purchase date. If you are unable to find a solution for your specific use or if you require further technical assistance for any reason, our technical support team is ready to help you. Please use the following methods to reach out to us and get answers to your questions:

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

Fax: +886-3-5728898

Email: service@lttcorp.com

http://www.lttcorp.com

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

Disclaimer

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Special Symbols

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

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

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

Contents

Chapter 1   Safety

1.1   Safety Regulation

The LTT laser engraving and cutting machine utilizes a CO_2 laser as its source of laser energy. The CO_2 laser falls under the category of a class IV laser, while the red light laser is classified as a class 3R laser. As per the guidelines set by IEC 60825-1, the LTT laser engraving and cutting machine is classified as a laser class 3R.

Wavelength : 10.6μm

Maximum output power : 30 ~ 100W

Visibility : Invisible

When using the LTT laser engraving and cutting machine, it is important to adhere to the following safety regulations:

- Do not attempt to modify or take apart any part of the machine without assistance from LTT technical support.
- Avoid opening the chassis doors or accessing the laser tube and electronic components, especially when the machine is powered on.
- Make sure to connect the machine to a grounded outlet and verify that the outlet voltage is suitable for the machine.
- Do not disable the interlocks located on the top, front, and left doors (the presence of a yellow background label on the door indicates their presence, depending on the model).
- Exercise caution to prevent exposure to the invisible laser beam path depicted in the illustration, as it can cause injury to the eyes or skin.
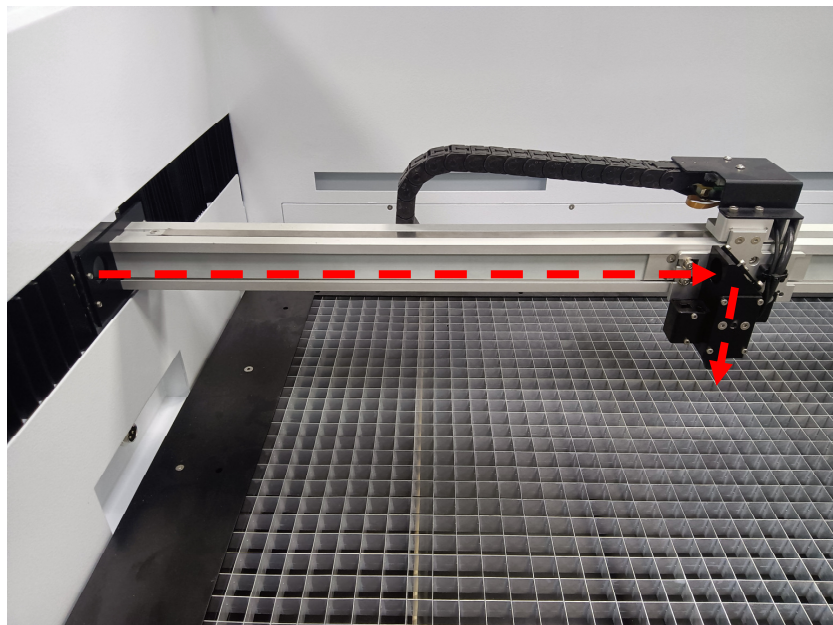
- Avoid looking directly at the laser beam while it is in operation, as the intense light generated during the process can harm your eyes.

- The side and rear doors are securely fastened with screws to ensure safety. Opening these doors will transform this machine into a Class 4 laser device. For your own protection, please wear protective goggles.
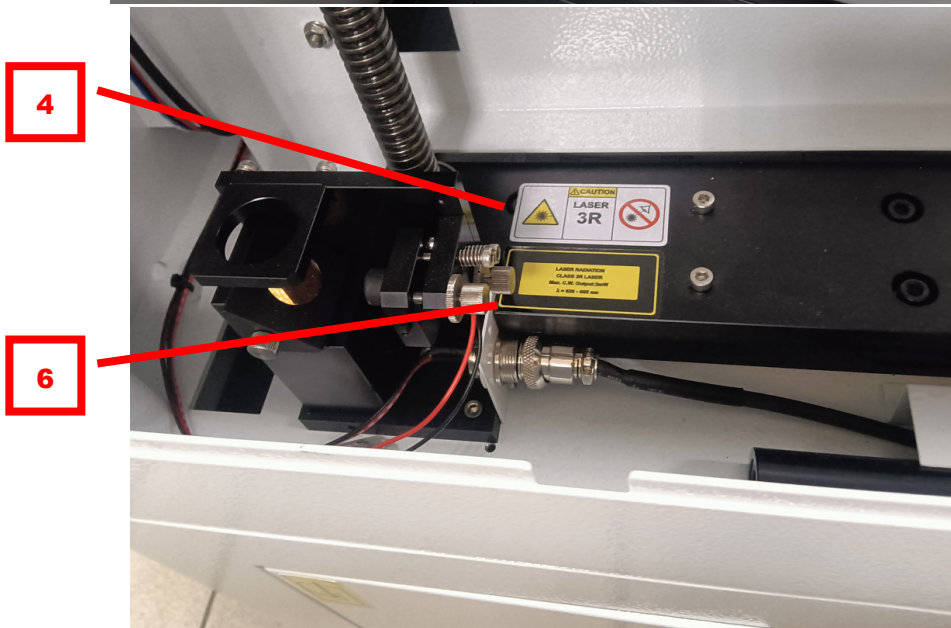
- The laser beam has the potential to start a fire. Never leave the machine unattended, and always keep a fire extinguisher nearby.

- When cutting or engraving, blowing materials with air from the nozzle can prevent fires and enhance the quality of the results.

- Make sure that the materials used in the engraver are suitable for laser processing. Never engrave or cut substrates that contain **PVC** or **Teflon**.

- A properly functioning exhaust system is crucial to prevent inhaling dust, debris, or toxic gases.

- To ensure optimal performance, please adhere to the maintenance schedule outlined in Chapter 4 for this machine.

- Prior to utilizing the auto-focusing function, verify that there are no obstructions that could cause collisions between the motion system and other objects. For safety purposes, it is not advisable to use the auto-focusing function on uneven materials.

- Caution-use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

1.2　Name Plate and Warning Labels

Do not remove the labels attached to the machine under any circumstances. If they get damaged or tampered with, please seek immediate help from LTT to have them replaced.

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Laser Tools & Technics Corporation
Model No : Q35
Serial No : 20230019
Specification : Ti60, 220V
Manufacture Date : 2023.02
www.1ttcorp.com
MADE IN TAIWAN
CE

Complies with 21 CFR 1040,10and
1040.11 except for conformance with
IEC 60825-1 Ed.3., as described in
Laser Notice No.56, dated May 8, 2019

2

⚠ CAUTION
LASER
3R

3

DANGER – CLASS 4 INVISIBLE LASER RADIATION
WHEN OPEN AND INTERLOCKS DEFEATED
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

4

⚠ CAUTION
LASER
3R

5

LASER
APERTURE

6

LASER RADIATION
CLASS 3R LASER
Max. C.W. Output: 3mW
λ = 630 – 665 nm

7	DANGER - INVISIBLE LASER RADIATION. AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION. CLASS 4 LASER PRODUCT. EN 60825-1, 2014
8	75 WATTS MAX 10200-10800 nm
9	**WARNING** — **Moving Parts Present** Can result in serious injury to hands or fingers. Keep hands away from moving parts. Disconnect and lockout power before servicing.
10	**WARNING** — **HAZARDOUS VOLTAGE.** Contact may cause electric shock or burn. Turn off and lock out system power before servicing.

1.3 Safety Protection Device

■ Interlock

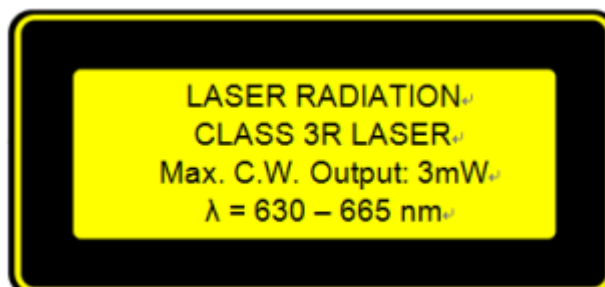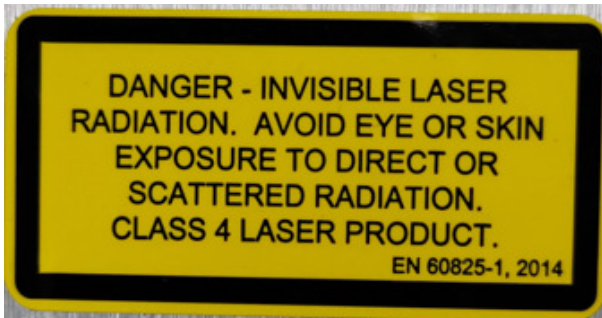If you open any of the **top**, **front, left** door, the machine will have different response to keep user's safety. Here are reactions for laser control, motion system control, and file running control.

- **LASER CONTROL**

When any door is opened, the laser beam will not be emitted, and the "**DOOR**" LED indicator on the control panel will turn off.

- **MOTION SYSTEM CONTROL**

The motion system can still move, but at a slower speed, whenever any door is opened.

- **FILE RUNNING CONTROL**

The file cannot be executed if any door is opened. If the file is running and a door is opened, it will be stopped.
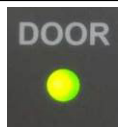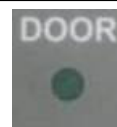
All doors close   Any door opens

■ **Emergency Stop Switch**

When an emergency situation arises, you can quickly deactivate the main power of the system by pressing the red push button. To restore power, simply turn the red push button in a clockwise direction. However, before restoring power, please ensure that any issues with the machine are resolved.

■ **ON**   ■ **OFF**

Chapter 2   Installation

2.1   Unpack and Locate Machine

This section explains how to unpack and locate machine.

1. Remove the strings.

2. Remove the protective bag.

3. Remove the top cover.

4. Remove the side cover and foam.

5. Remove the protective bag.(If it is shipped by sea freight.)
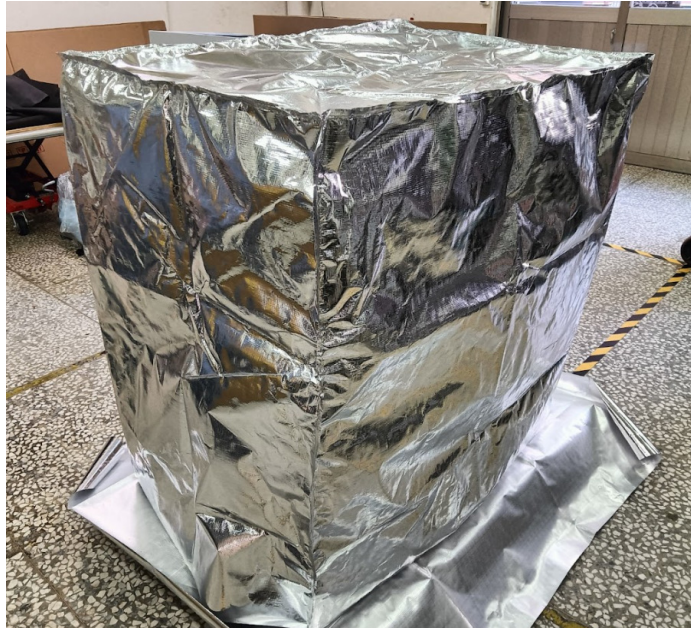
6. Remove the foam at bottom.

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

Unit: mm
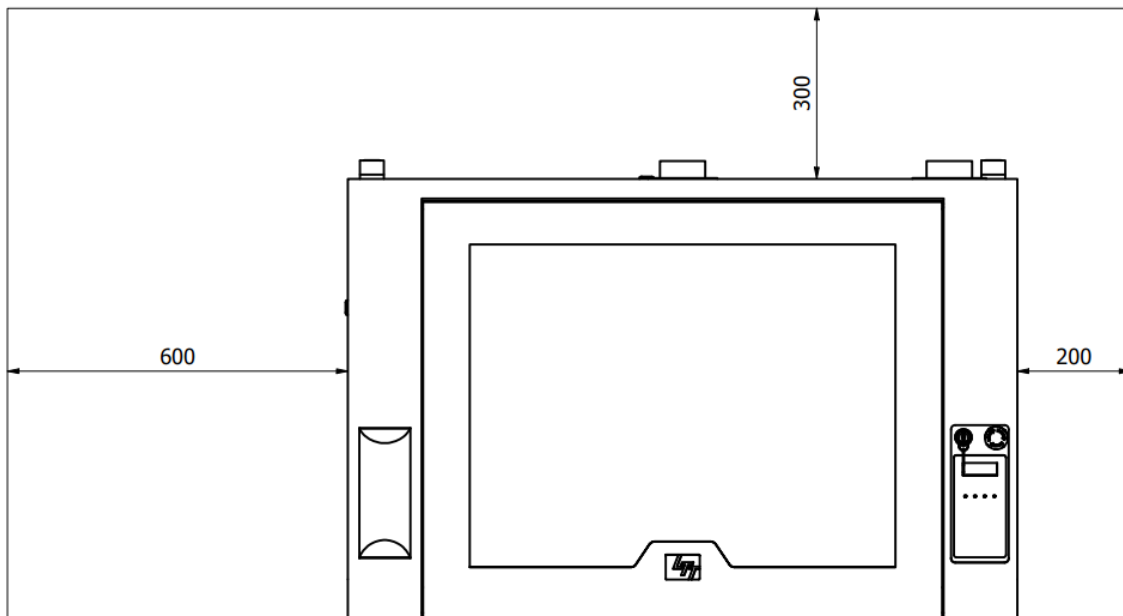
8. Lock the wheels to locate the machine.
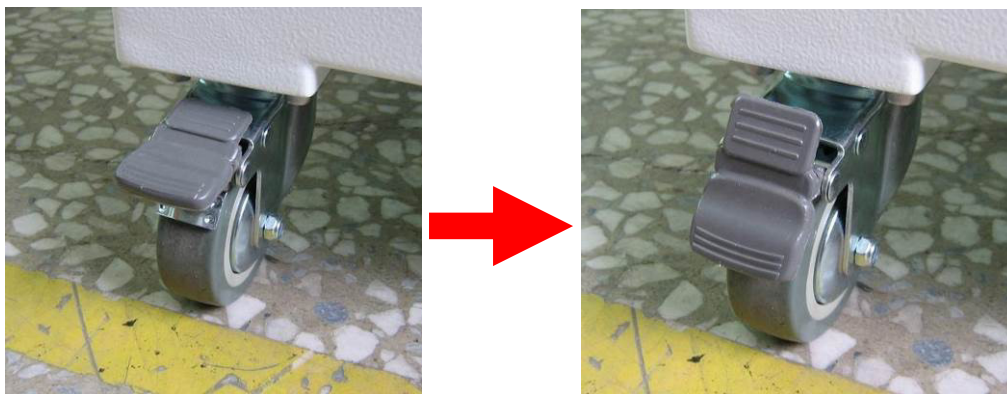
2.2   Package Contents List

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

1	**Box**	**7**	**USB Cable (male to male)**（**depends on models**）
2	**Alcohol swab**	**8**	**Power Cable**
3	**AutoFocus - Pin**（**depends on models**）	**9**	**Manual focus fixture**
4	**Allen Wrench**	**10**	**Open end wrench for adjust the belt of Z axis**
5	**USB Flash Drive**（**Software**）	**11**	**USB Cable (type A male to type B male)**（**depends on models**）
6	**Keys for door of chassis**		

2.3 Part Names and Functions

This section explains the main part names and functions of the QLaser series.

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 (Left)

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

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. Side Door of Chassis

This side door is primarily used for maintenance purposes. Do **NOT** open this door unless it is necessary, especially when the machine power is on.

6. Exhaust Port

This port is used to extract the smoke on working table.(Outside diameter is 80mm.)

7. Rear Door

You can open this door to check the condition of the motor of Y axis.

8. Fans

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

9. Suction port of working table

When you connect it to an exhaust, it can help to suck the material on the table. It will also help to suck some cutting smoke. (Outside diameter is 80mm.)
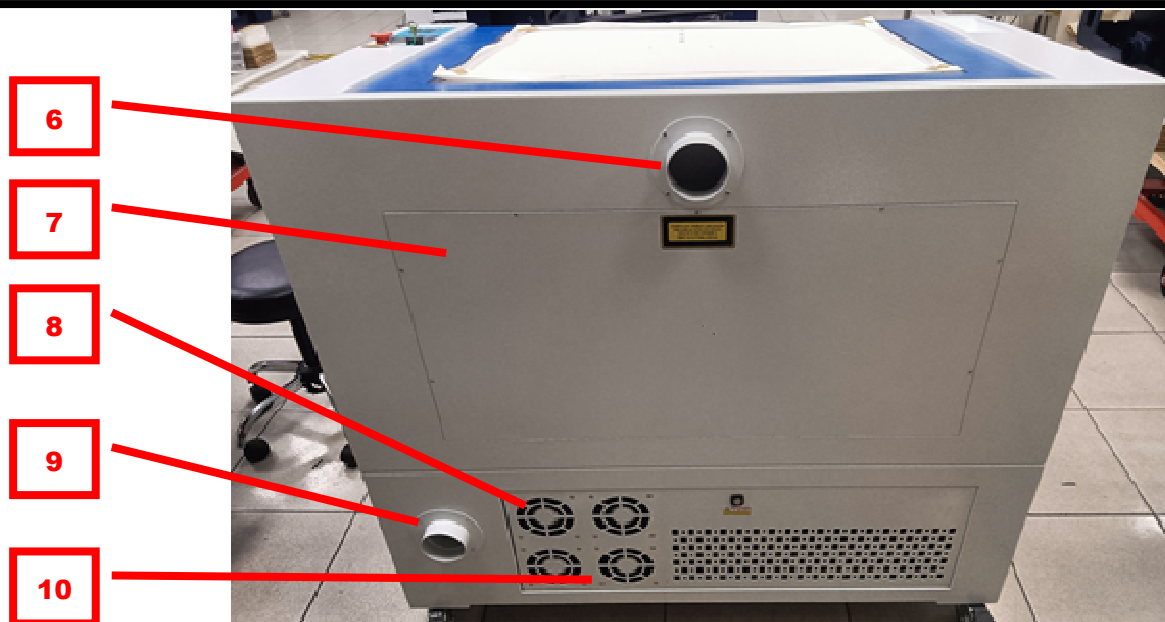
10. Rear Door of Chassis

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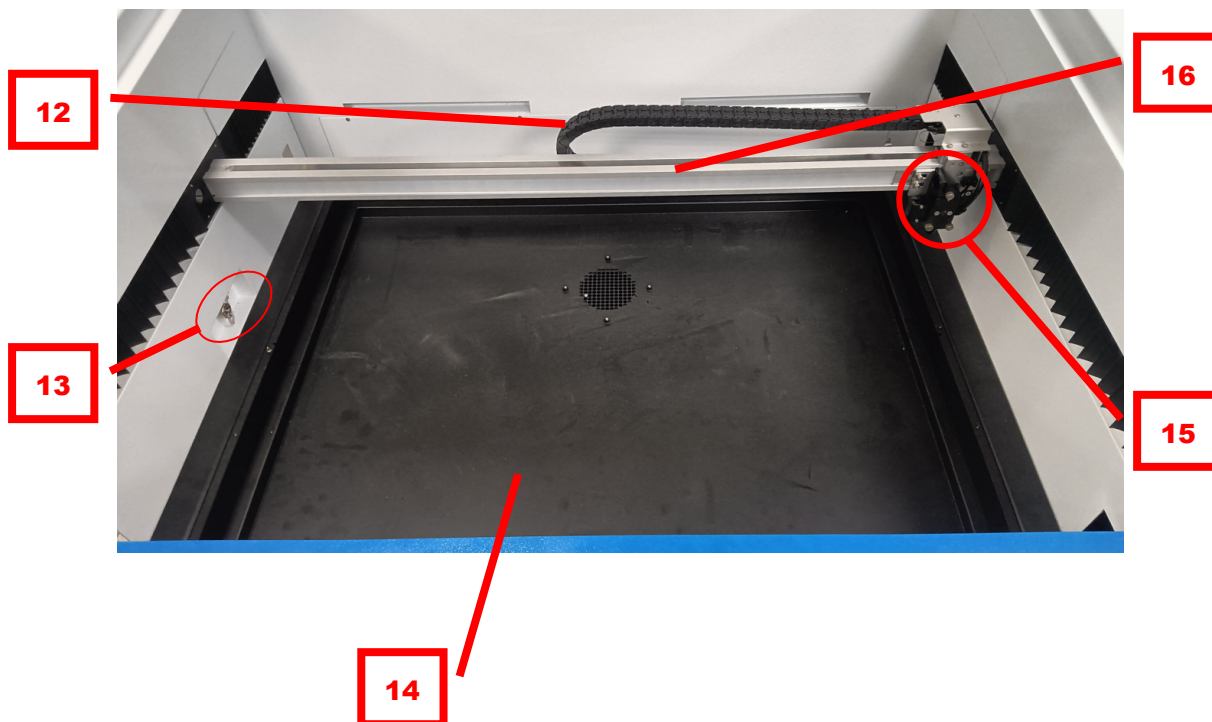
12. X axis Cable Chain

This part protect all the cables which connect to the carriage.

13. Rotary connector

It connects with rotary attachment.

14. Vacuum 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)

You can choose to assemble grid table(Standard), flat table (option), or blade table (option).

15. Carriage

This part includes last 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)

16. X axis Rail

This part is for carriage moving.
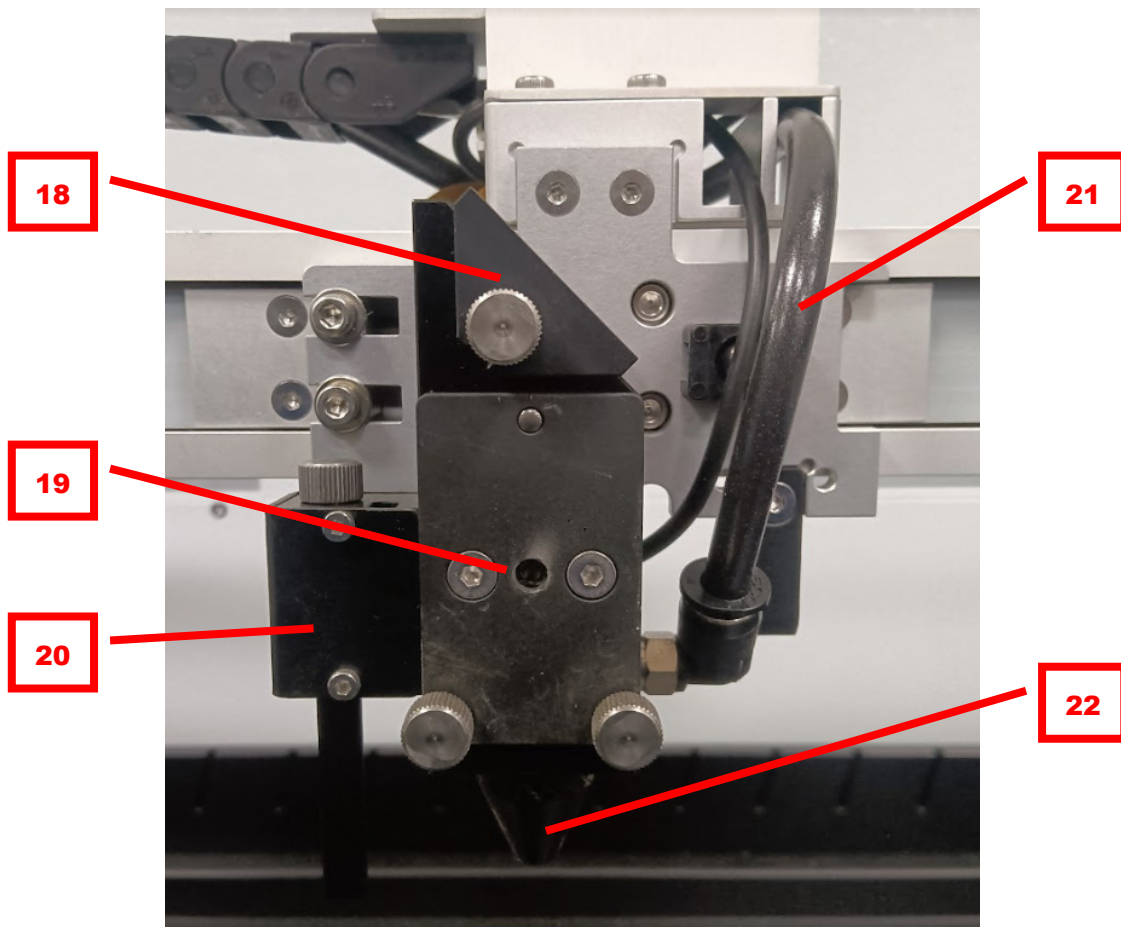
18. Last Mirror

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

19. Focal Lens

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

20. Auto Focal Sensor

It is a pin type sensor for auto-focus.

21. Air Pipe

This part keep sending air to the nozzle.

22. Nozzle

This part can provide a air assistance to protect focal lens against dusts or debris.
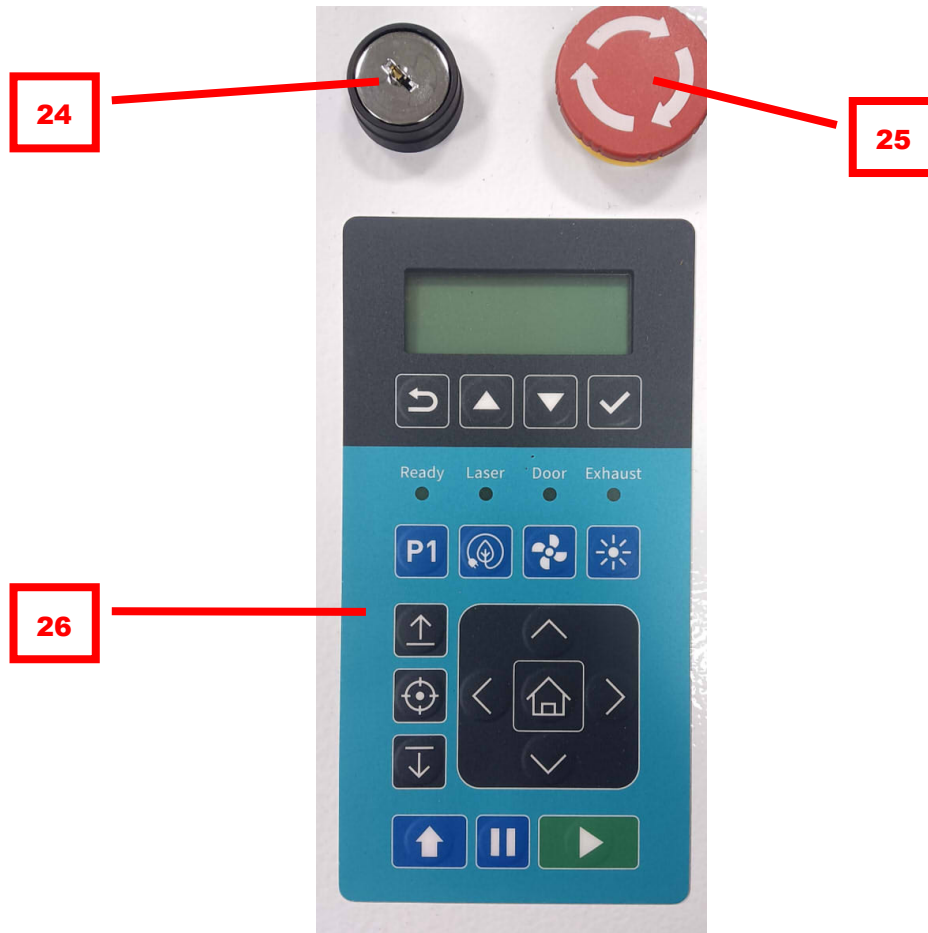
24. Main Power Key Switch

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

■   **ON**   ■   **OFF**

25. Emergency Stop

Please see section 1.3

26. Control Panel

The control panel provides the keys to operate machine. If you want to obtain more detail about operating details, please see section 3.3
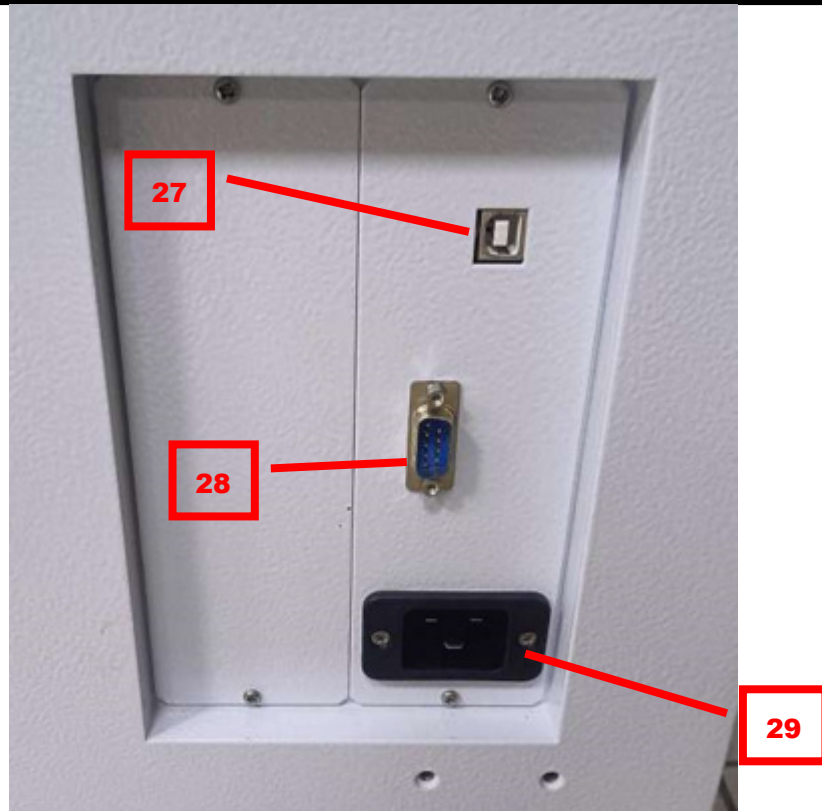
27. USB Port (Type B USB)

This part provides sending file.

28. Serials Port (DB-9)

This part provides extra I/O communication to expand functions of system.(For example, it can remotely control the exhaust system on and off.)

29. Power Inlet

This power socket can connect a power cable to the wall.

2.4   Hardware Installation

This section explains the installation steps with other hardware.

1. Check environment

- **Power supply**

Power supply : 220 VAC

- **Environment**

Temperature: 15 ~ 30 ℃, No freezing

Humidity : 40 ~ 70 %, not condensing

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

2. Connect AC power cable.

3. Connect USB cable from the machine to the computer.

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4. Connect pipes from exhaust port to blower

2.5   Driver Installation

This section explains how to install and uninstall the printer driver of the laser engraving and cutting machine. It is a one click installation and un-installation program.

2.5.1   Install Driver

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

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

📁 iLASER-3000_Sv6.0-20161006
🔧 DriverInstaller_x64.exe
🔧 DriverInstaller_x86.exe
📄 LTT.cer
📄 MahApps.Metro.dll
📄 S0231-Driverinstaller user guide.pdf
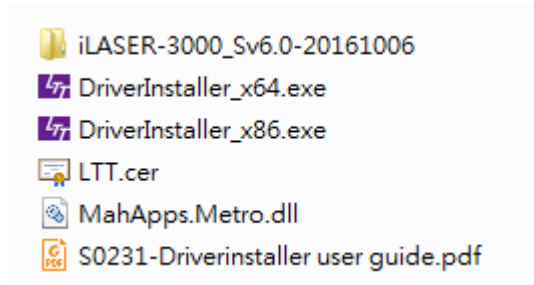
Driverinstaller_x64.exe is for 64 bits Windows

Driverinstaller_x86.exe is for 32 bits Windows

LTT.cer is for installation reference.

MahApps.Metro.dll is for installation reference.
<iLaser-3000_Sv6.0-20161006> is the printer driver(Sample).

Please execute the DriverInstaller program based on your Windows version (64-bit or 32-bit). **Ensure that you have Administrator privileges on this computer before proceeding.**

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

Program function descriptions:
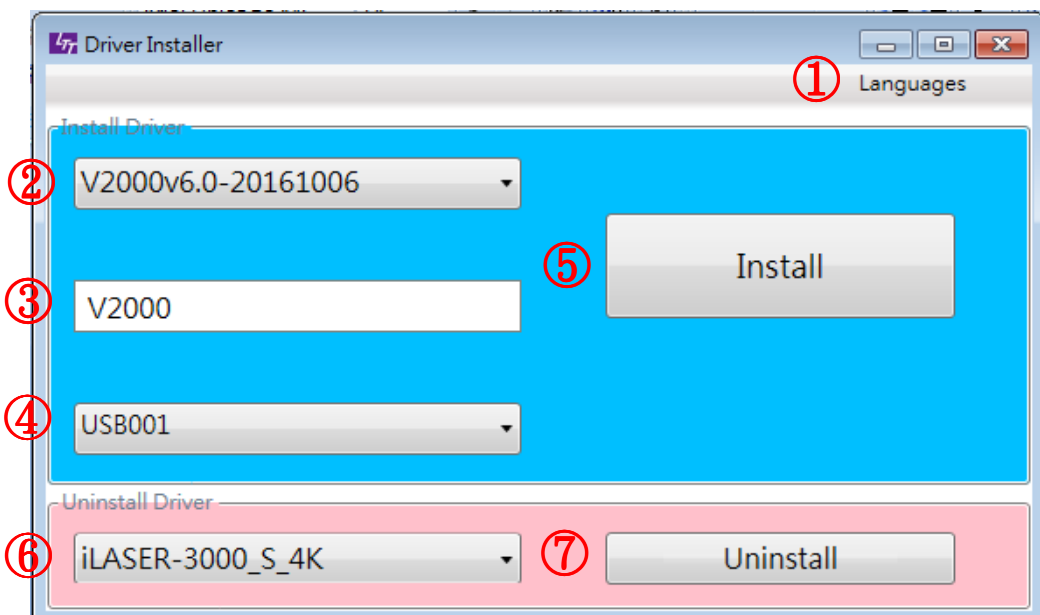
① ：Choose language.

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

③：Name of machine model (Printer Name).

④：Printer port setting.

⑤：Click to install the driver showed in drop down list ②.

⑥ ：Installed driver list in Windows.

⑦ ：Click to uninstall the driver showed in drop down list ⑥.

When the USB cable one end is connected with LTT laser machine, you plug or unplug the other end of USB cable from computer's USB port, the DriverInstaller will show the USB port number.
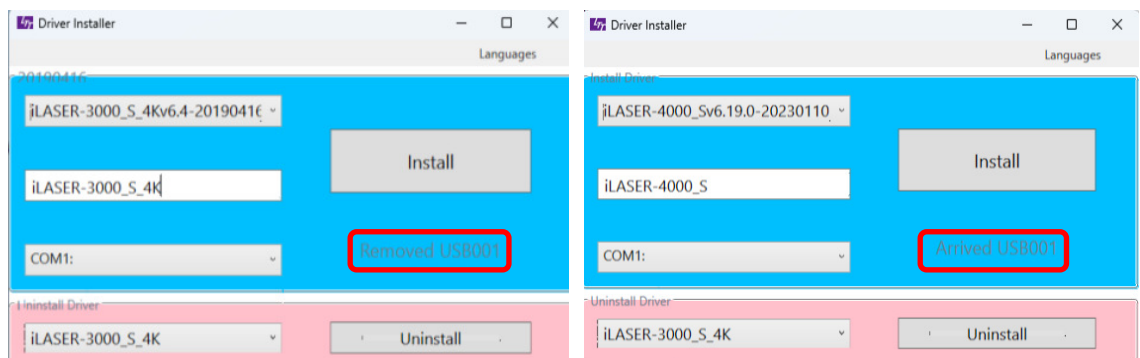
※**You have to run DriverInstaller first, and then plug or unplug the USB cable; It will show the port number information. After you get the port number, you can modify ④ the printing port setting, choose the printer driver in ② the driver folder list, then press < Install>.**

NOTE:

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

Some version shows <Children>

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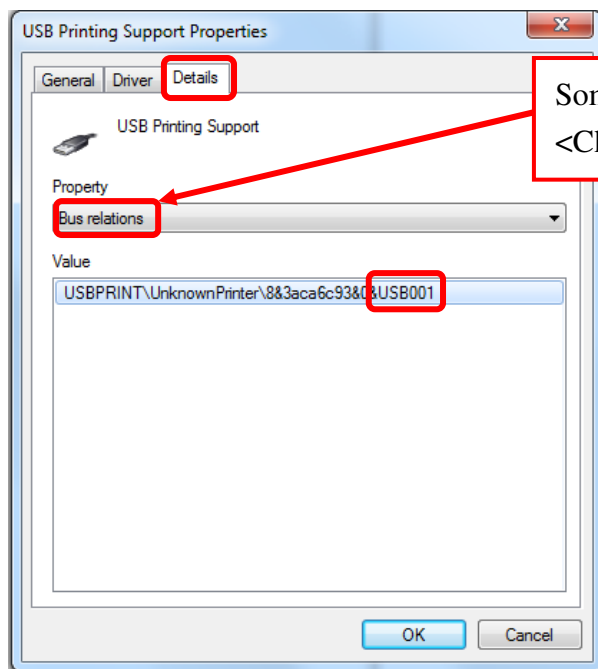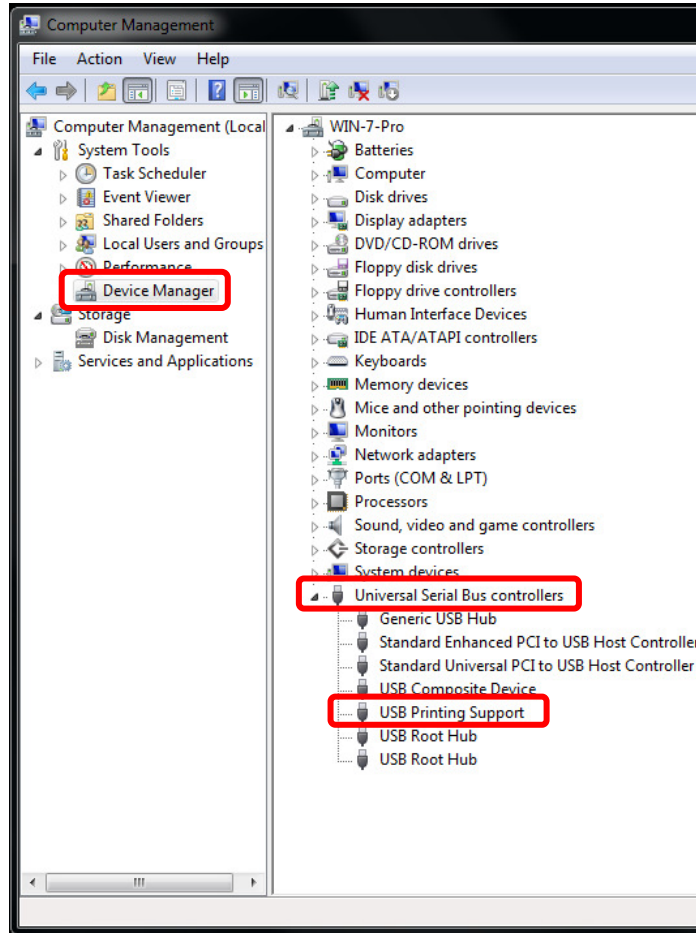
2.5.2 Uninstall Driver

1   Open [Driver Installer]
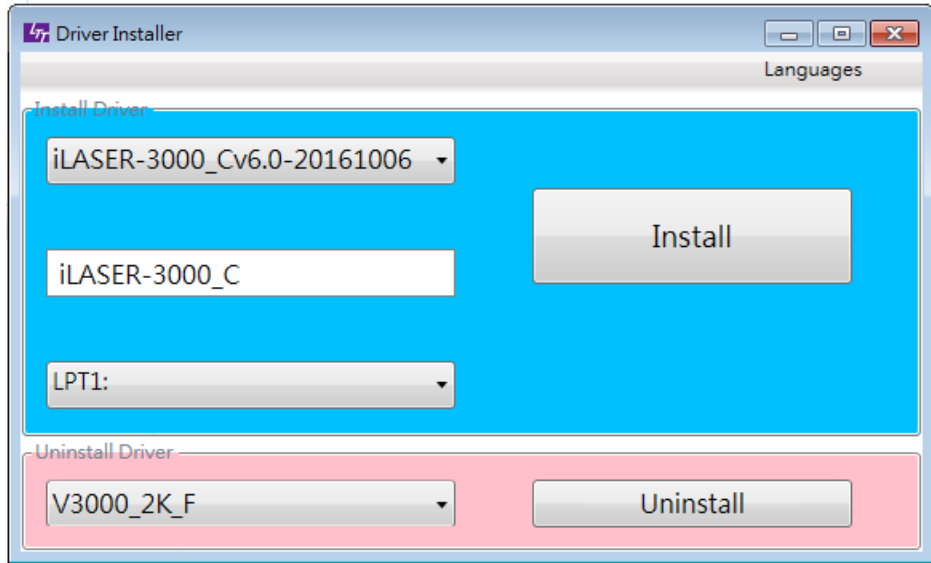
2   Select the Printer you want to uninstall and then press [Uninstall] button.
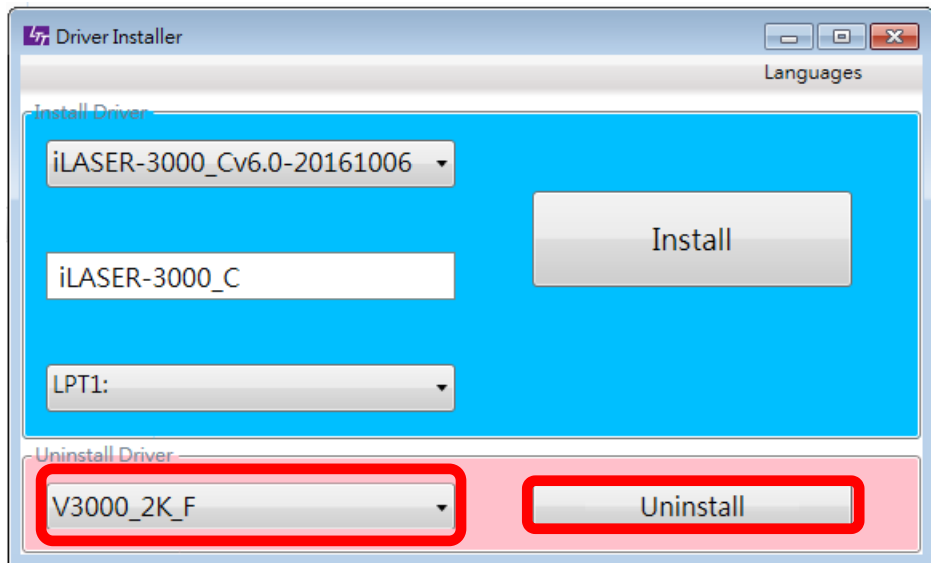
3   Press the [Yes] button and reboot the computer.
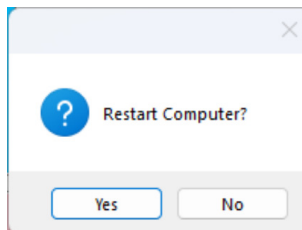
4   Go to C:\LTT, delete the related ini files.

2.5.3 Change USB Cable to Another Port

This section explains the steps to follow when changing the USB port.

Once you connect the USB cable to the computer, we strongly suggest that you do not change it to another USB port. If you must connect the USB cable to another port, you will also need to change the printer settings of LTT laser system. If this is the case, please follow the steps below:

1. Ensure that the USB cable is properly connected to another USB port with LTT laser system.

2. Open the **[Devices and Printer]** window
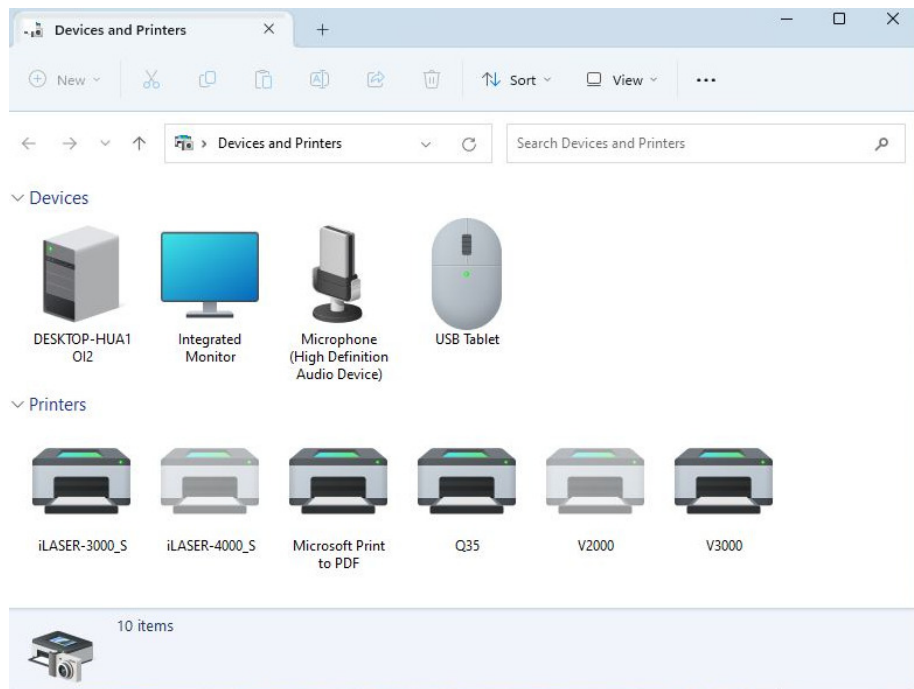
3. Right click LTT laser system printer and select **[Properties]**
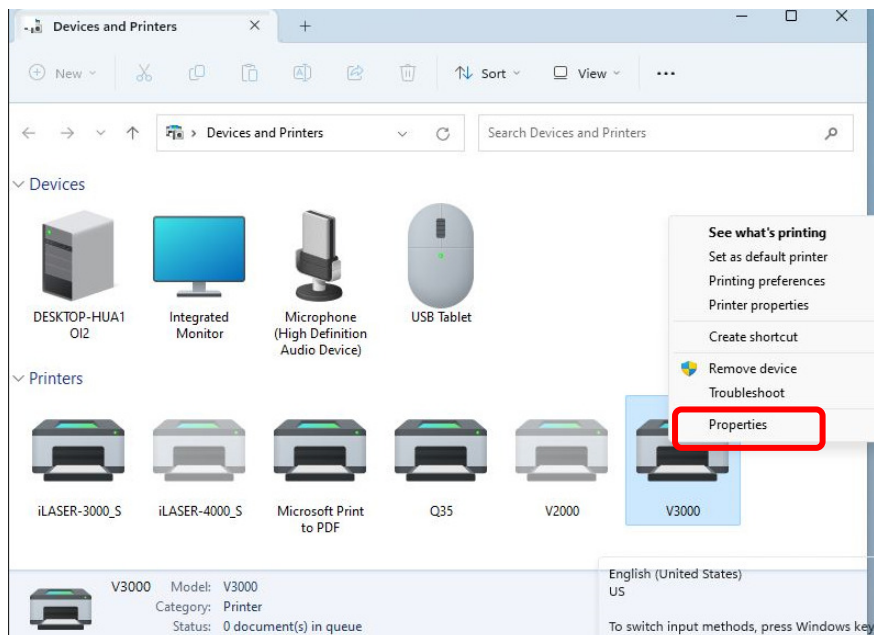
4. Switch to **[Ports]** label. Switch the **[USB00*]** which is belong to the new port and click **[OK]**.
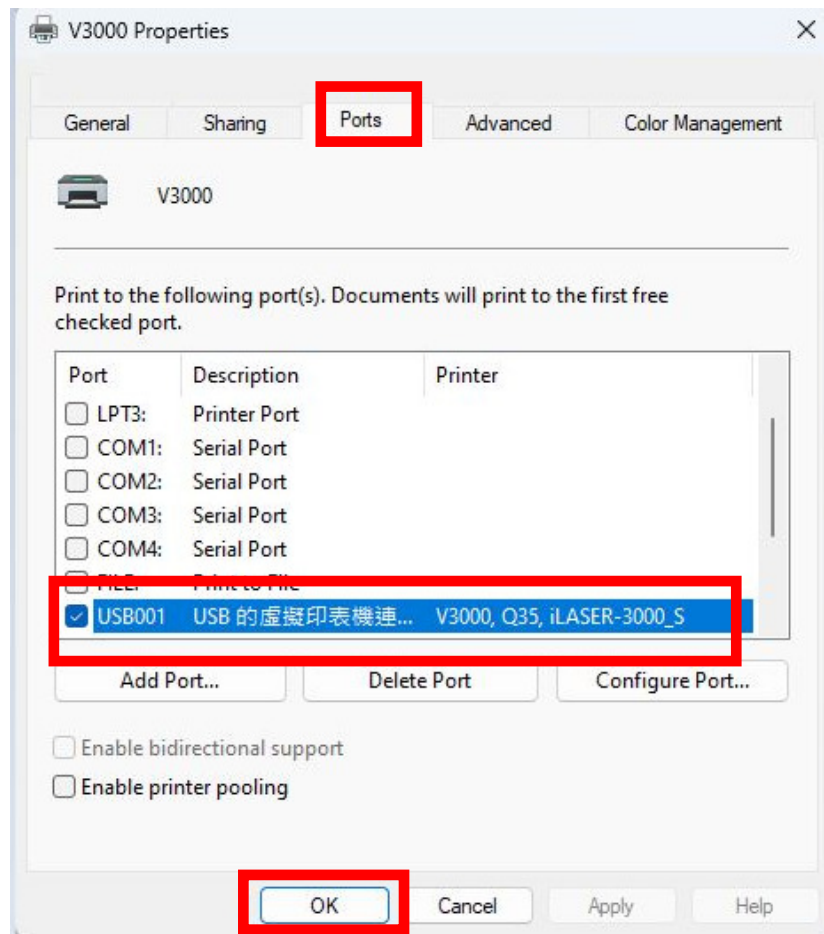
5. Done.

2.6   LTT Product Tools

2.6.1   Install Procedure

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

1. Double click **[setup.exe]**
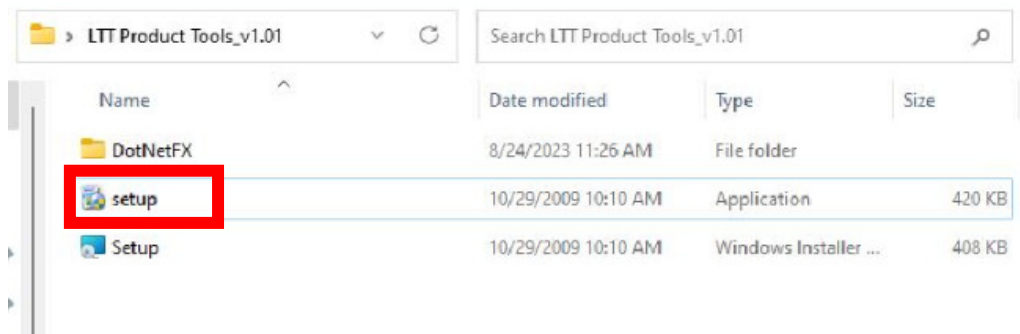
2. If you haven't installed the Framework, this window will appear. Please select **[Yes]** and return to **step 1** after installation is complete. If it's already installed, you will directly proceed to **step 5**.
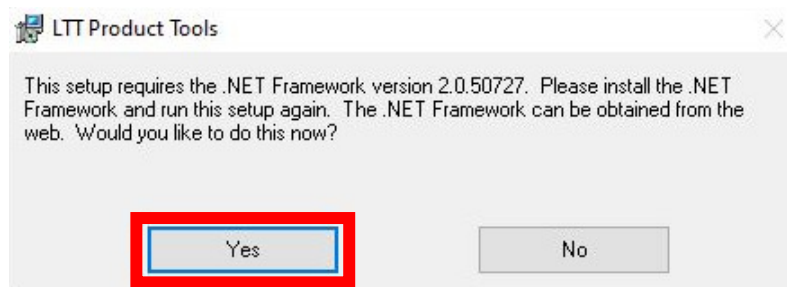
3. Double click **[dotnetfx]**
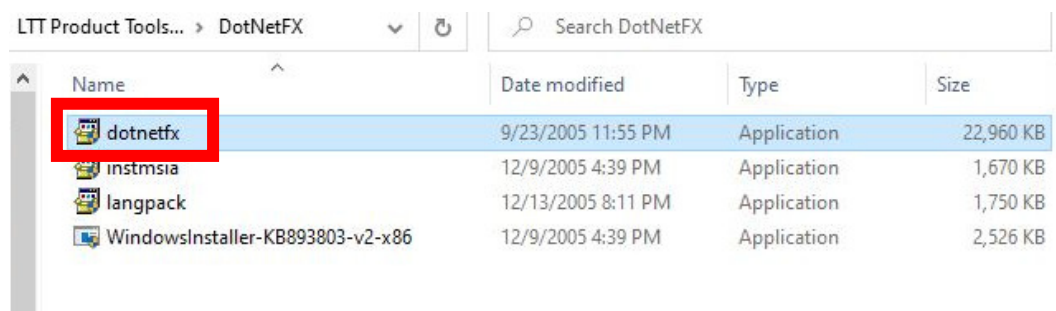
4. Download and install Framework.
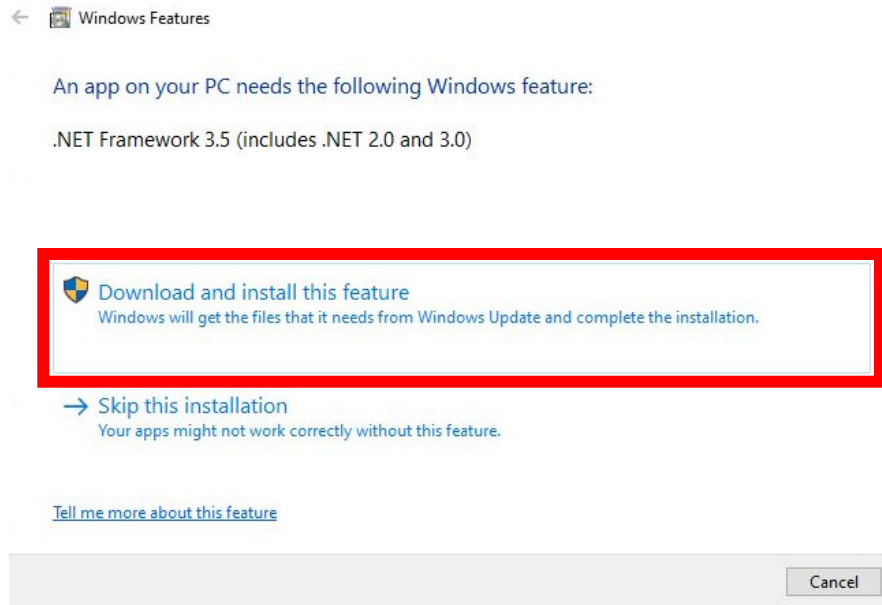
5. When you see the diagram below, please press the **[Next]** key to go on.
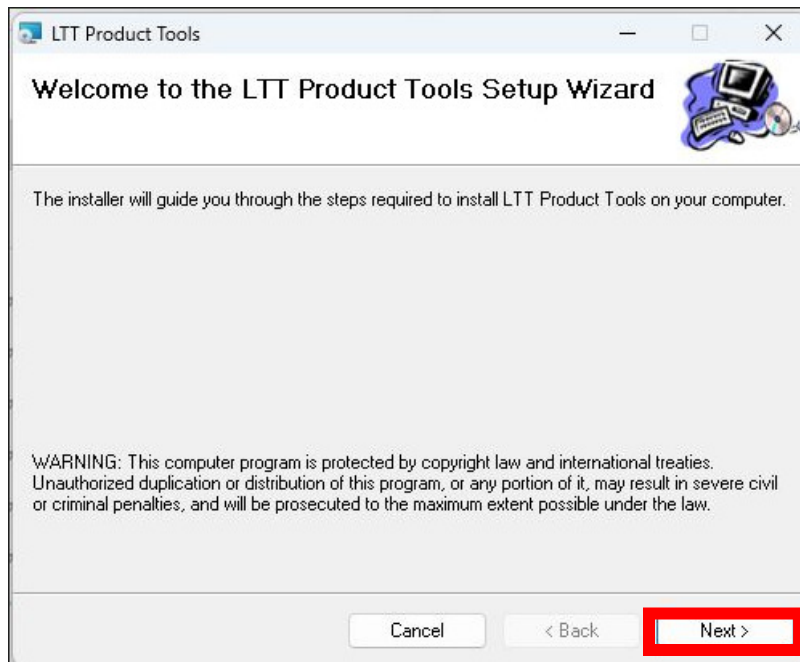
6. When you see the diagram below, please choose a position to install the software and press **[Next]** key to go on.
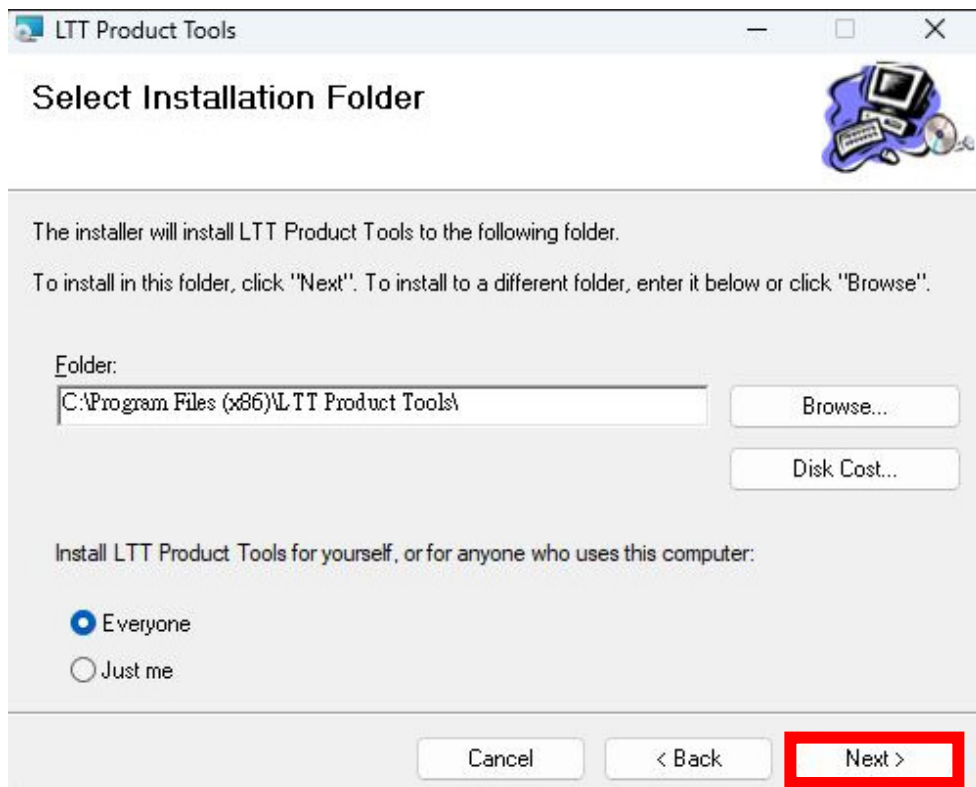
7. Press **[Next]** key to go on.
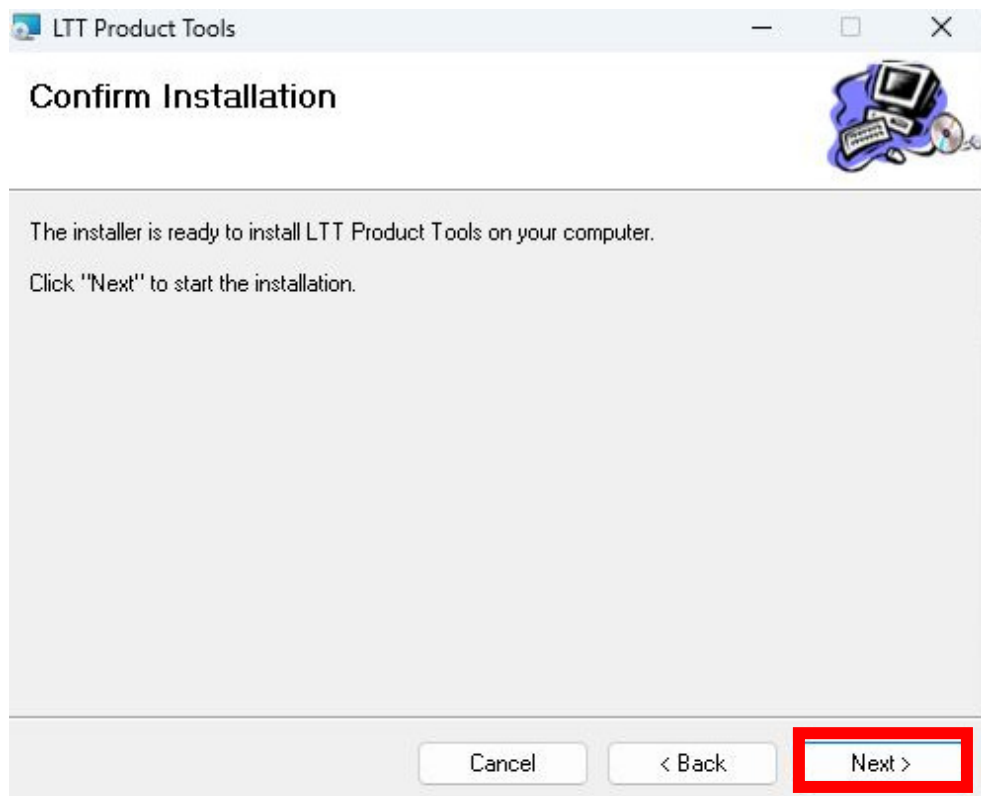
8. When you see the diagram below, please wait for some minutes.
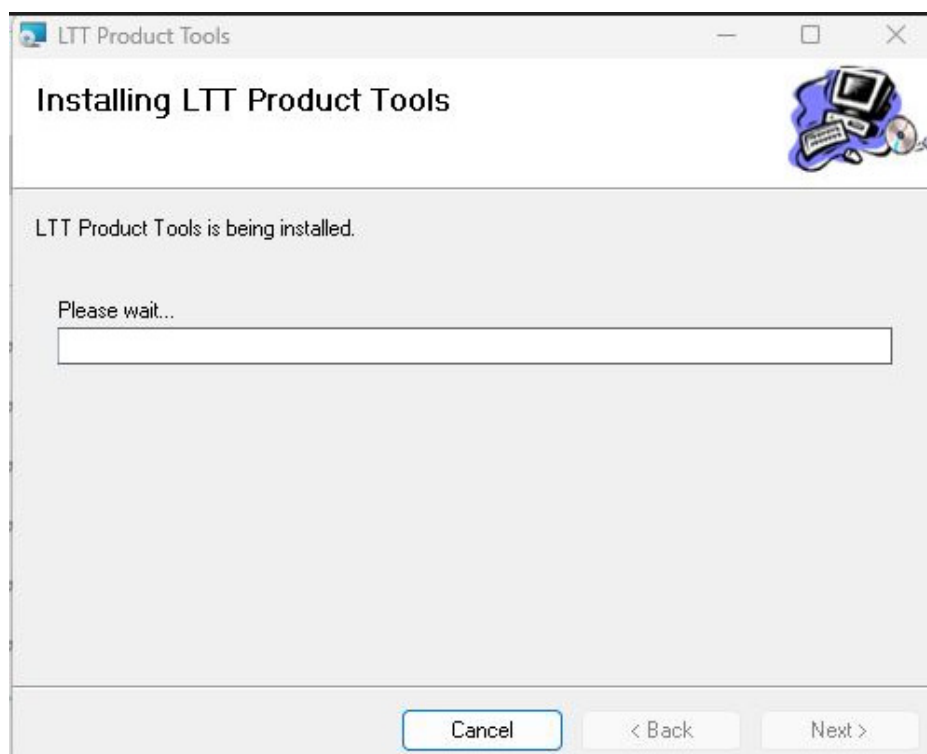
9. Press **[Close]** key to finish the setup procedure.

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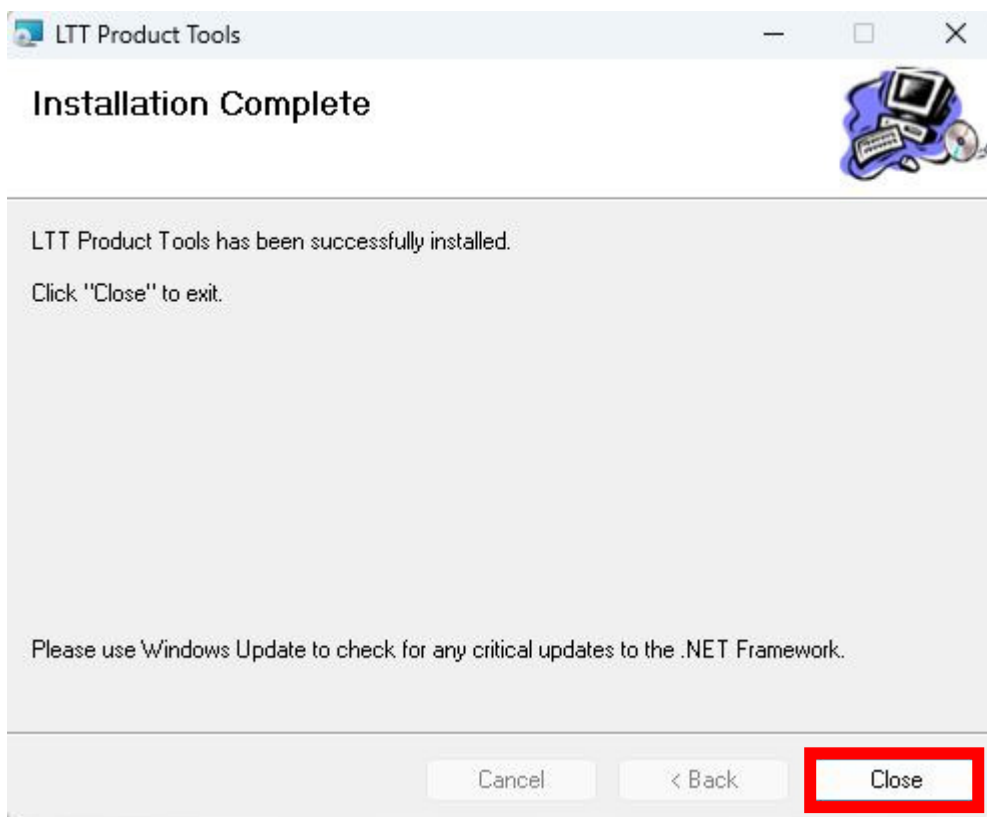
10.   After the setup procedure, you can open the software from two shortcuts. The first one locates on the **[Desktop]**, and the second one is placed in the **[Start Manu]**.
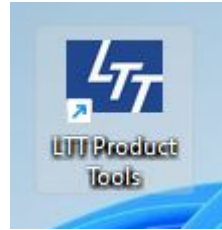
2.6.2   Uninstall Procedure

1st uninstallation method:

Open the 'programs and features' window, locate 'LTT product tool', and proceed with the uninstallation process.
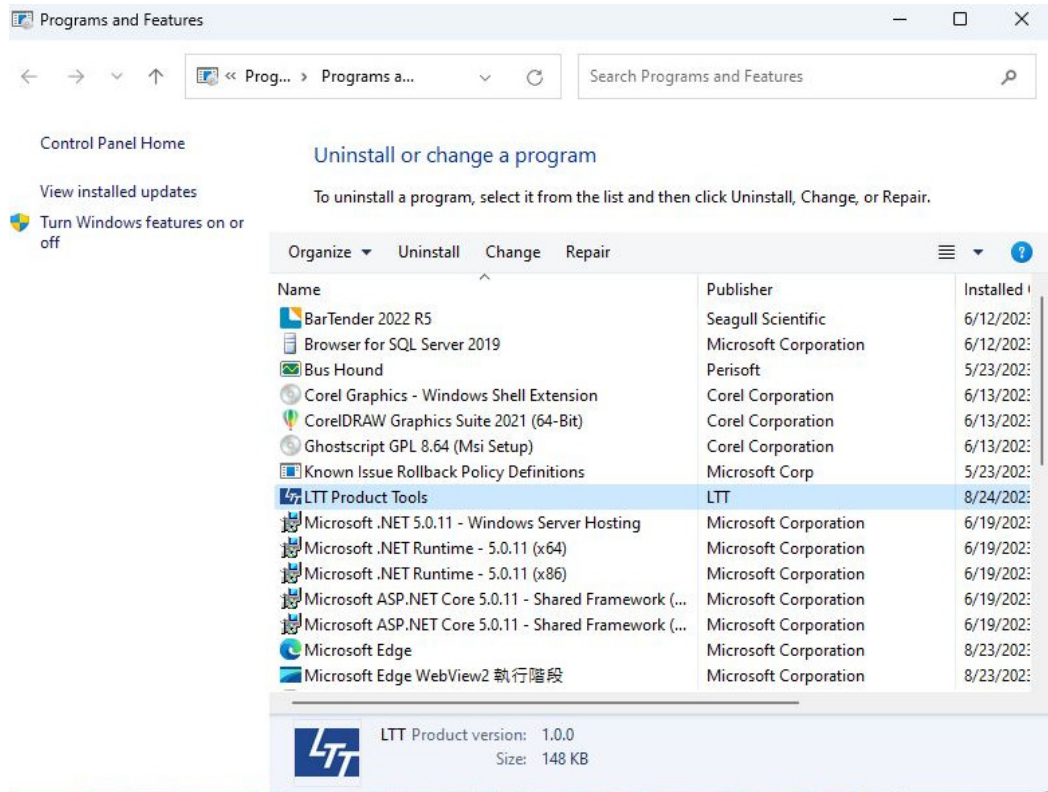
2nd uninstallation method:

In the search bar, search for programs starting with the letter 'L'. Find 'LTT product tool', right-click on it, and select the uninstall option.
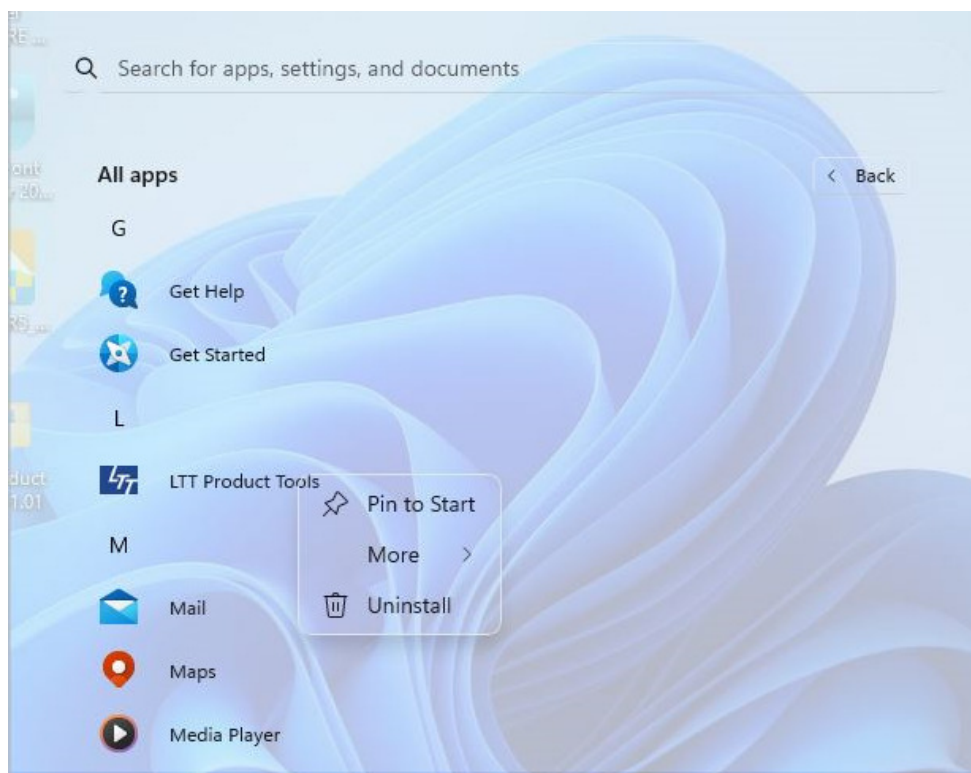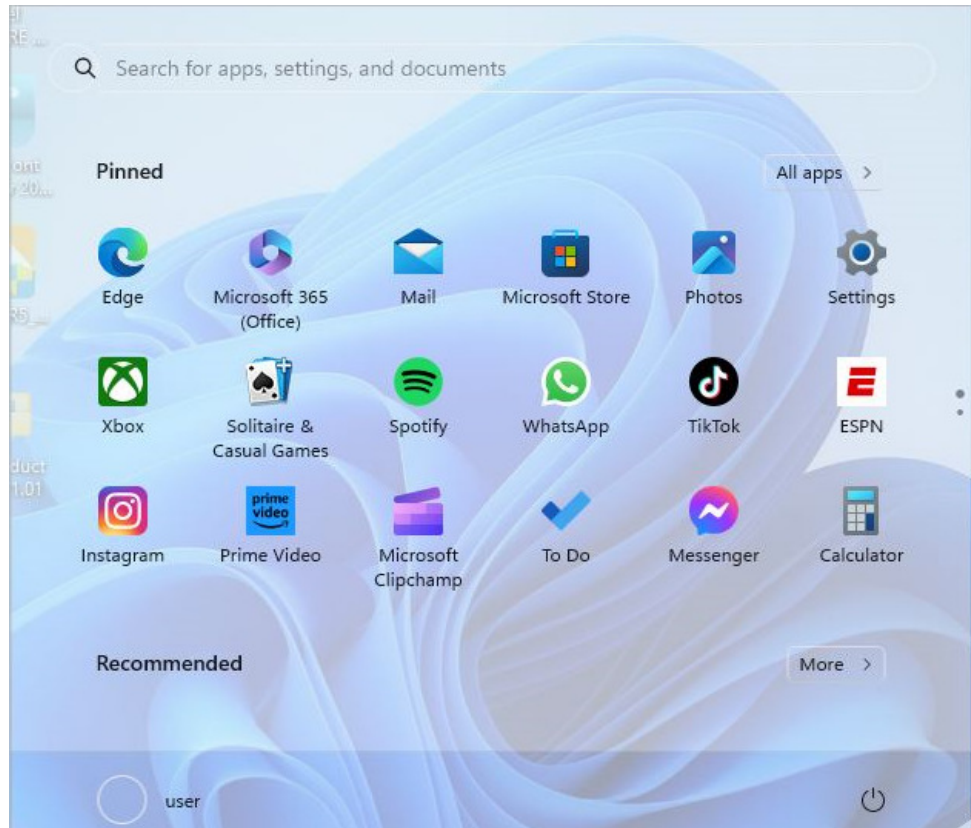
Chapter 3   Operation

3.1   Operator Position

This section shows the position when you operate machine.
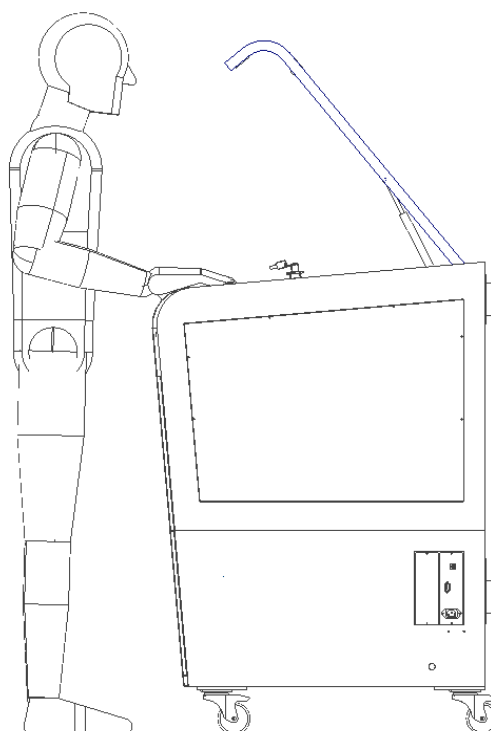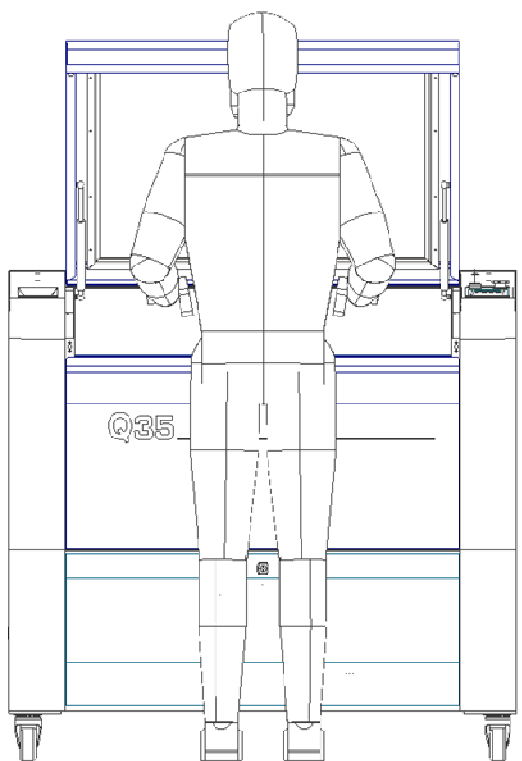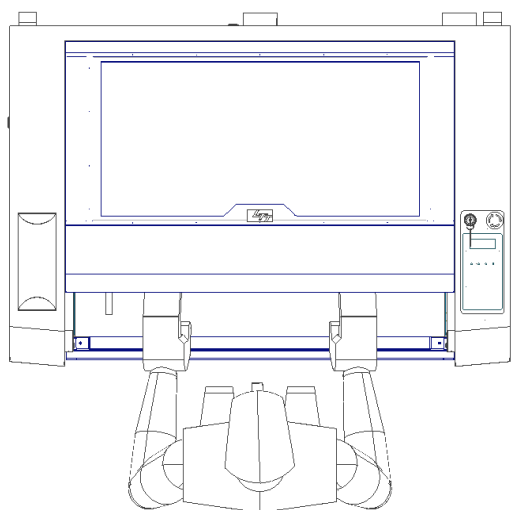
3.2   Basic Operation Flow

This section explains the basic and common steps to operate the LTT laser system. If you require more detailed information about the operation, please refer to section 3.3.

Before proceeding with the steps in this section, please ensure that you have completed all the steps outlined 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 "Ready", "Laser", "Door" LED indicators on control panel are on. (If not, see chapter 5)
- Press to run the file.

3.3 Machine Operation

This section explains the detail about how to operate the LTT laser engraving and cutting system.

3.3.1 Control Panel

This section explains the detail about how to operate QLaser.
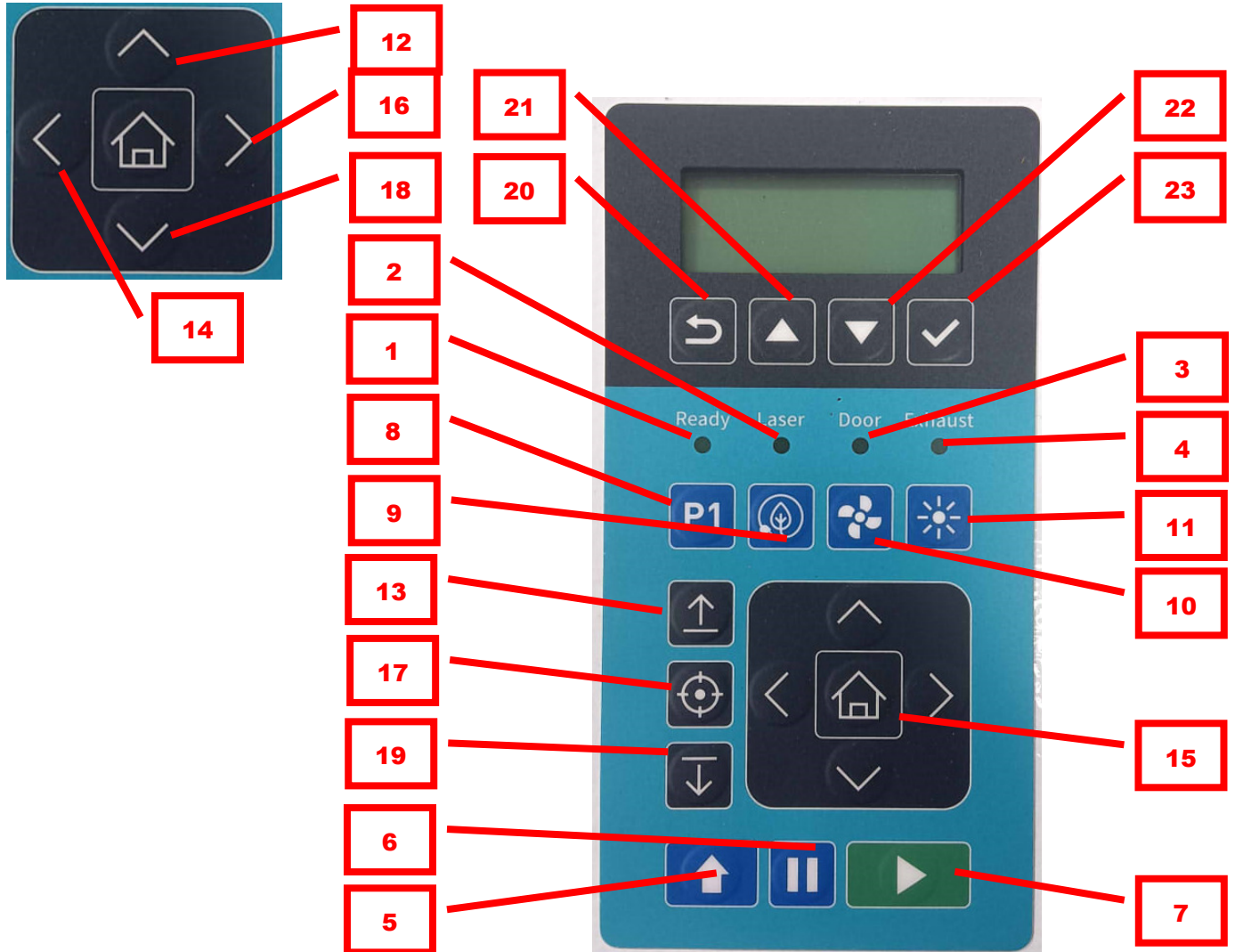
1. Ready (indicator)	13. Table up
2. Laser (indicator)	14. X left
3. Door (indicator)	15. Homing
4. Exhaust (indicator)	16. X right
5. Shift	17. AutoFocus
6. Pause/Stop	18. Y down
7. Run	19. Table down
8. P1	20. Escape
9. Energy saving	21. Cursor Up / Increase Values
10. Exhaust	22. Cursor Down / Decrease Values
11. Red pointer/Lase	23. Enter
12. Y up	

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1. Ready (indicator)

Always on : when machine power on and ready.

Low frequency on (every 3 seconds) : Energy saving mode.

Flash-on (once every 0.5 seconds) : File is running or pause status.

Quick flash-on (4 times every second) : Machine is in laser alignment mode.

2. Laser (indicator)

This indicator will be on when laser tube is power on.

3. Door (indicator)

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

4. Exhaust (indicator)

This indicator will be on when exhaust is activated.

5. Shift

Combine with other button to activate another function

Keep pressing Shift button first, and then press the second button.

6. Pause/Stop

Pause the file when it is running.

Shift+ Pause can stop the file.

7. Run

Run the file when machine is ready or in pause mode.

8. P1

Move the carriage to the location of P1.

Shift + P1, Move the carriage to the location of P2.

9. Energy Saving (on/off)

This button will turn on/off machine illumination, CCD LED, machine fans, Laser, Servo motors (X/Y). When servo motors are off, user can freely move carriage to anywhere by hands.

When the machine is powered on and get into ready status, it will change ready status to Energy Saving mode. User can press this button to wake it up.

In Energy Saving mode, machine still can receive the file.

During Energy Saving mode, you can press Run or any direction buttons to wake it up.

10. Exhaust (on/off)

This button can turn on/off exhaust.

Shift + Exhaust, will turn on/off the embedded air pump.

11. Red pointer / Lase

Turn on/off the red pointer in normal mode.

When the machine is in **Alignment mode**, this button will change to emit the laser beam for alignment.

User can use a remote alignment cable to connect to remote alignment socket. It is at the left side cabinet. In alignment mode, user can press the physical button to emit the laser.
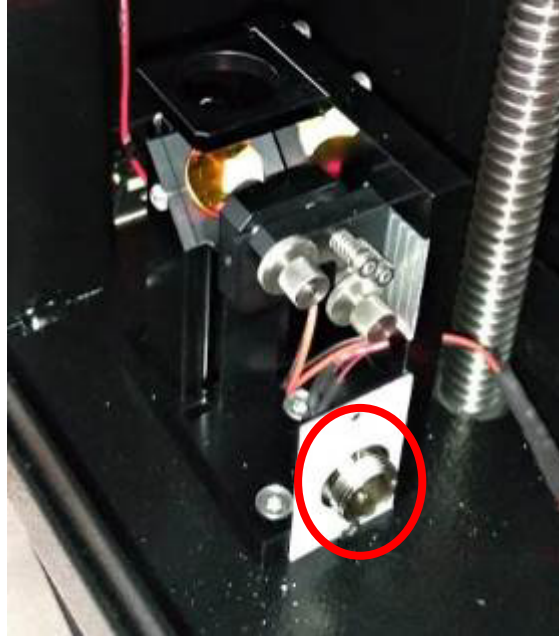
12. Y up

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

Shift + Y up, move the carriage in Y direction to half or end of Y axis.

13. Table Up

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

14. X left

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

Shift + X left, move the carriage in X direction to half or end of X axis.

15. Homing

Shift + Homing, Machine will move the carriage to home and reset the position of home.

If you only press this button, it will have no function.

16. X right

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

Shift + X right, move the carriage in X direction to half or end of X axis.

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17. Auto Focusing

Shift + AutoFocus, it will automatically adjust the distance of lens and material to focus position.

If you only press this button, it will have no function.

18. Y down

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

Shift + Y up, move the carriage in Y direction to half or end of Y axis.

19. Table Down

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

Shift + Table down, move the table in Z direction to end of Z axis.

20. Escape

Escape from sub-menu or sub-selection.

21. Cursor Up / Increase Values

Move the cursor up or increase values.

21. Cursor Down / Decrease Values

Move the cursor down or decrease values.

22. Enter

Enter into sub-menu or confirm the selection.

Shift + Enter(LCD) to turn on/off the LED light.

3.3.2 Operating Menu

1. Work Display

```
■1.WORK DISPLAY
  2.FILE MANAGER
  3.LASER PARAMETER
  4.SYSTEM SETUP
```

```
■1/11*        PICTURE-2
  QTY    2/5    COPY 3
  Time    0:29 /     0:00
  Free   63.15MB   dpi 0
```

```
  1/11*        PICTURE-2
■QTY    2/5    COPY 3
  Time    0:29 /     0:00
  Free   63.15MB   dpi 0
```
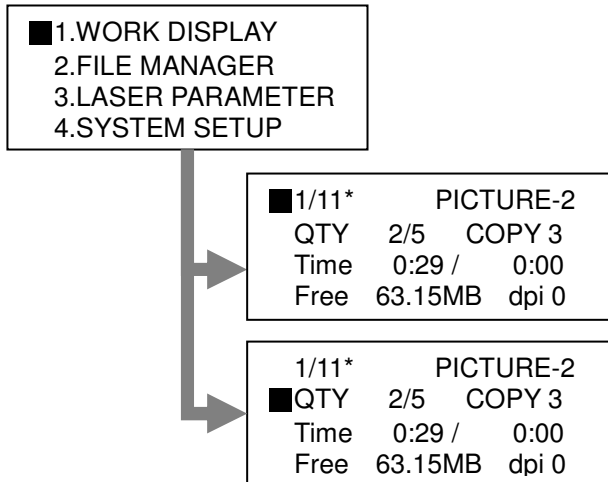
■   **1 /11***

Indicate that there are totally 11 files in memory, and the first file is selected at present. You can press ▲ and ▼ to select files.

■   **PICTURE-2:**

Indicates that the first file is named "PICTURE-2".You can name file on the tab "Page" of driver. (See section 3.4.3)

■   **QTY   2/5:**

Indicates that the file is limited to be executed 5 times at most, and system has finished 2 times. It will be invalid to press ▶ before system has finished 5 times. The way to modify this setting is described in section 3.4.3.

■   **COPY 3:**

Indicates that the file will repeat 3 times automatically if you press ▶ one time. The way to modify this setting is described in section 3.4.3.

■   **Time 0:29 / 0:00**

The first timer records the pass time at present when a file is executed. The second timer will record the total time if the file has ever finished at one time.

■   **Free 63.15 MB   dpi 0**

If no file is executed, this line will display available memory. If a file is being executed, it will display the current power and speed settings.

2. FILE MANAGER

```
┌─────────────────────────┐
│  1.WORK DISPLAY         │
│ ■2.FILE MANAGER         │
│  3.LASER PARAMETER      │
│  4.SYSTEM SETUP         │
└─────────────────────────┘
```

```
┌─────────────────────────────┐
│ ■1/11*        PICTURE-2     │
│  Del. the file       134B   │
│  Delete all files           │
│  Auto delete         off    │
└─────────────────────────────┘
```

```
┌─────────────────────────────┐
│  1/11*        PICTURE-2     │
│ ■Del. the file       134B   │
│  Delete all files           │
│  Single file         off    │
└─────────────────────────────┘
```

```
┌─────────────────────────┐
│  You Sure?              │
│ ■Yes                    │
│  No                     │
└─────────────────────────┘
```

```
┌─────────────────────────────┐
│  1/11*        PICTURE-2     │
│  Del. the file       134B   │
│ ■Delete all files           │
│  Single file         off    │
└─────────────────────────────┘
```

```
┌─────────────────────────┐
│  You Sure?              │
│ ■Yes                    │
│  No                     │
└─────────────────────────┘
```

```
┌─────────────────────────────┐
│  1/11*        PICTURE-2     │
│  Del. the file       134B   │
│  Delete all files           │
│ ■Single file         off    │
└─────────────────────────────┘
```
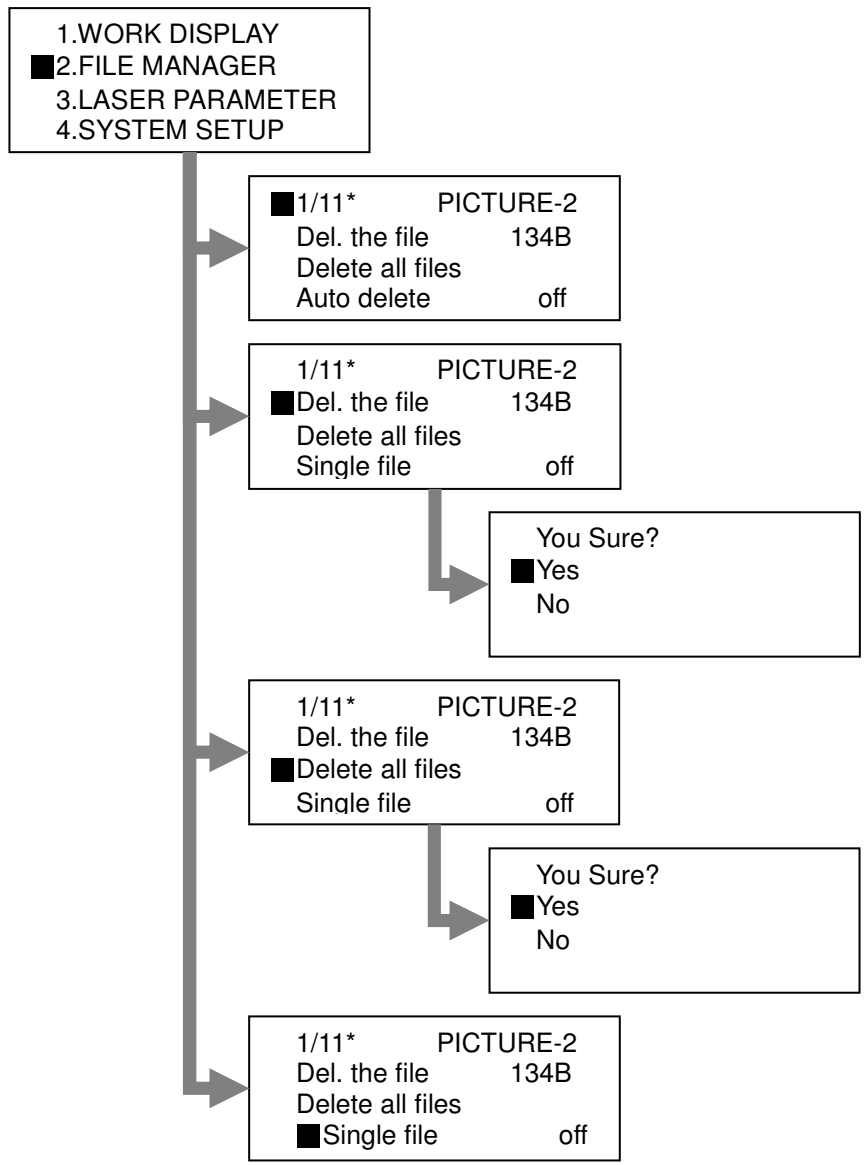
- **1 /11*PICTURE-2**

  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 option allows you to delete the currently selected file.

- **Delete all files:**

  This option allows you to delete all files stored in memory.

- **Single file**

  When turned on, it will always keep only one file in the memory, the new file will overwrite the old one.

  When turned off, you can save up to 99 files in the memory.

3. Laser Parameter

```
1.WORK DISPLAY
2.FILE MANAGER
■3.LASER PARAMETER
4.SYSTEM SETUP
```

```
■Color setup
 Color control
 Laser tickle setup
 Alignment mode
```

```
■Setting Pen    1 Blac
 Power          50%
 Speed          100%
 PPI            1000
```

```
 Color setup
■Color control
 Laser tickle setup
 Alignment mode
```

```
 Color Control
 by file
```

```
 Color setup
 Color control
■Laser tickle setup
 Alignment mode
```

```
 Laser tickle setup
■Rate           5 khz
 Idle width     1 usec
 Live width     1 usec
```

```
 Color setup
 Color control
 Laser tickle setup
■Alignment mode
```

```
 Alignment mode
■Tickle output      1%
 Continuous        off
 Fast move         off
```

■ **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. Here are the options: 166, 200, 250, 333, 400, 500, 666, 800, 1000, 1333, 2000 and 4000.

■ **Color Control**

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

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

■ **Laser Tickle Setup**

The laser tickle pre-ionizes the gas into a plasma state so that it is just below the lasing threshold. Increasing tickle width beyond 1µs will add enough energy to the plasma to cause laser emission. By applying a laser tickle, the laser will respond predictably to the laser signal even when there is considerable "off" time between applied pulses.

● **Tickle Rate**

The frequency of Tickle pulse. (unit : kHz)

● **Idle width**

The pulse while the machine is free run without the laser, it maintains the energy of the laser to ensure it can work at the right time. If this setting is too high, it will cause the laser leaking.

● **Live width**

The pulse adds on working power, to improve the laser power output in the low-speed area while the whole working process.

■ **Alignment Mode**

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

● **Tickle output**

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

● **Continuous**

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

● **Fast move**

On the Alignment Mode page, you can perform fast movements using a combination of two buttons, regardless of whether Fast move is on or off. When you simultaneously press **the shift key** and **the direction keys** for the X/Y axis, it will move in a 3x3 pattern, which means you can quickly move it to nine evenly spaced points on the working area using this method.

However, if you perform this operation outside of the Alignment Mode page, it will move quickly to the extreme position.

4. System Setup

```
   1.WORK DISPLAY
   2.FILE MANAGER
   3.LASER PARAMETER
■ 4.SYSTEM SETUP
```

```
■ Configuration
   Position setup
   Status
   About Q35
```

```
■ Rule unit:        mm
   Sleep mode:    10 min
   Auto run:          off
   Arc comp:          off
```

```
   Configuration
■ Position setup
   Status
   About Q35
```

```
■ Adjust X-Y axis
   Single Ref-point
   Auto Focusing
   X-Y homing
```

```
   X loc.      720.000mm
   Y loc.      600.000mm
■ Set as P1
   Set as P2
```

```
   Adjust X-Y axis
■ Single Ref-point
   Auto Focusing
   X-Y homing
```

```
   Adjust X-Y axis
   Single Ref-point ■ Details ➜ P.51
   Auto Focusing
   X-Y homing
```

```
   Adjust X-Y axis
   Single Ref-point
■ Auto Focusing
   X-Y homing
```

```
   You Sure?
■ Yes
   No
```

```
   Adjust X-Y axis
   Single Ref-point
   Auto Focusing
■ X-Y homing
```

```
■ X-Y homing

   Adjust Rotary temp
```

```
        ┌─────────────────────────┐
        │ Configuration           │
        │ Position setup          │
        │ ■Status                 │
        │ About Q35               │
        └─────────────────────────┘
                    ┌─────────────────────────────┐
                    │ ■X loc.        720.000mm     │
                    │  Y loc.        600.000mm     │
                    │  Z loc.          0.000mm     │
                    │ data is OK!                  │
                    └─────────────────────────────┘
        ┌─────────────────────────┐
        │ Configuration           │
        │ Position setup          │
        │ Status                  │
        │ ■About Q35              │
        └─────────────────────────┘
                    ┌─────────────────────────────┐
                    │      Laser Tools &           │
                    │      Technics Corp.          │
                    │      20220114                │
                    │      2022/03/29 VQD 1.00     │
                    └─────────────────────────────┘
```

■ **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**

  In Q series model, it is no function.

  You can press [icon] to power off the XY motors and the laser power, it can save energy. Press it again or send a file to the machine, will wake it up.

- **Auto run**

  This item has been deactivated.

- **Arc comp**

  Compensates laser output power while cutting an arc.

■ **Position setup**

1. **Adjust X-Y axis**

   This function allows the user to set the position of **[P1]** and **[P2]**. To set the position for **[P1]** or **[P2]**, move the carriage to the desired location, then press **[Enter]** when the cursor is on the right side of **[Set as P1]** or **[Set as P2]**.

2. **Ref-point**

   There are 2 modes.

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

   [Dual Ref-point]: The user can set two reference points using the machine, and the starting position will be the center of these two points. If the user needs to engrave graphics in the center of the material, we recommend selecting this function.

```
┌─────────────────────────┐      ┌─────────────────────────┐
│ Adjust X-Y axis         │      │ Adjust X-Y axis         │
│ Single Ref-point■       │ ───► │ Dual Ref-point■         │
│ Auto Focusing           │      │ Auto Focusing           │
│ X-Y homing              │      │ X-Y homing              │
└─────────────────────────┘      └─────────────────────────┘
                                              │
                                              ▼
                                 ┌─────────────────────────┐
                                 │ X   loc.   660.000 mm   │
                                 │ Y   loc.     0.000 mm   │
                                 │ ■Set as CP1             │
                                 │   Set as CP2            │
                                 └─────────────────────────┘
                                              │
                                              ▼
                                 ┌─────────────────────────┐
                                 │ X   loc.   660.000 mm   │
                                 │ Y   loc.     0.000 mm   │
                                 │ Set as CP1        ■     │
                                 │ Set as CP2              │
                                 └─────────────────────────┘
```
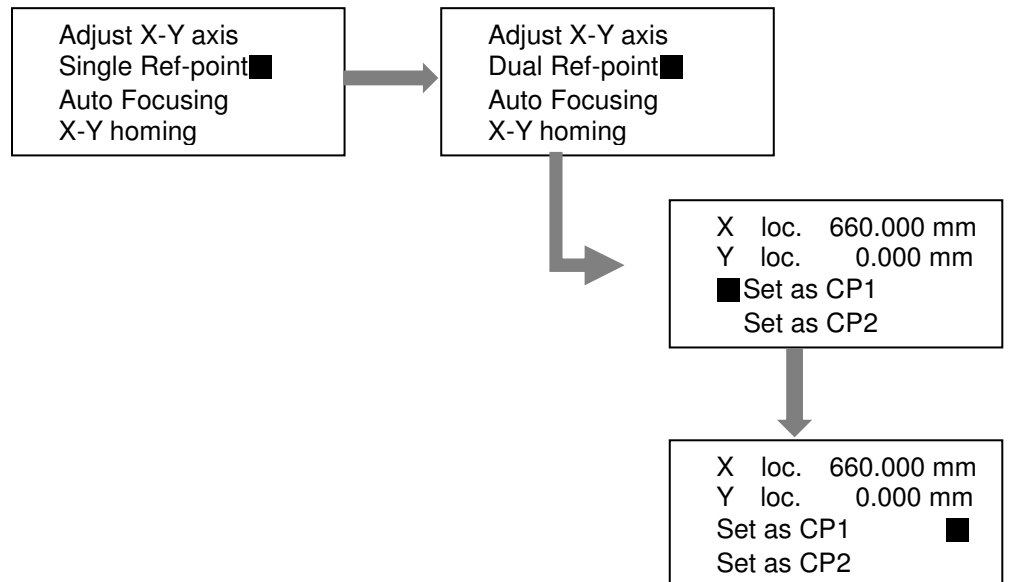
To switch between [single ref-point] and [dual ref-point], press [▲][▼].

For [dual ref-point], select the opposite corners of the material and press [Set as CP1]. Move the X-axis and Y-axis until the red light spot stops at the desired position of the material, then press escape to exit selection mode. Repeat these steps to set up CP2. After completing the above steps, you can engrave with the center point of the material as the reference.

3.   Auto Focusing

Focusing the laser automatically. This function is the same with Shift + [⊕] .

4.   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 Shift+ [⌂] .

5.   Adjust Rotary temp

The Ref-point for rotary axis device. Please check the details on Ch. 3.5

■ **Status**

This function can show the position of carriage and table.

■ **About Q35**

This function displays the firmware version and the machine's serial number. If you encounter any issues with your machine, please provide the serial number to your agent or LTT for further assistance.

3.4   Print Driver Operation

Because the LTT laser system is controlled by a standard Windows printer driver, you can create the drawing on your favorite graphics software based on the Windows system. When you want to send files to the LTT laser system, you can easily modify the driver settings just like using a desktop printer. There are four tabs in the printer driver : **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 users to save and load configuration files of driver settings, check driver information, and tune the machine.
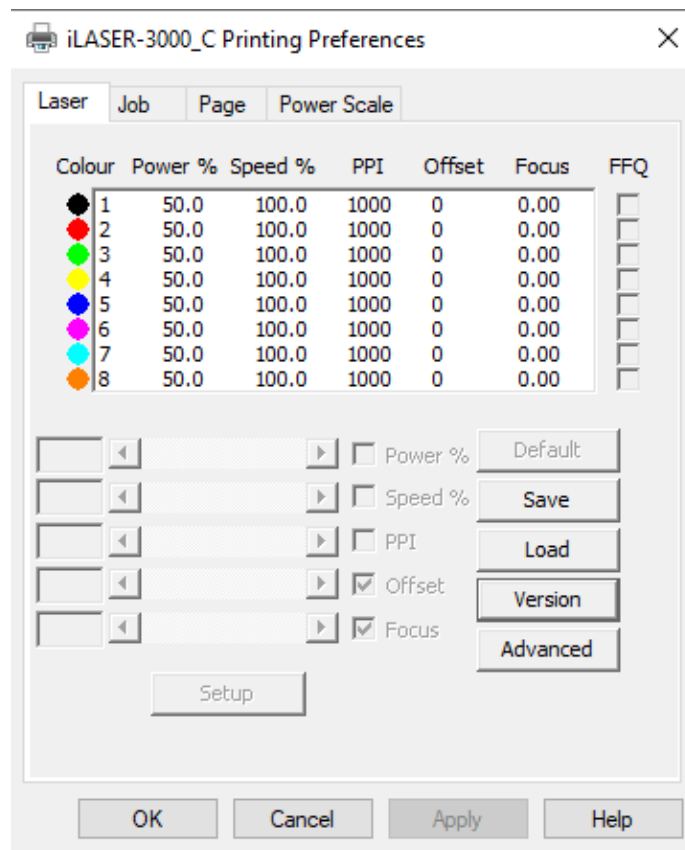
1.   Color

The LTT Laser system can cut or engrave using eight predefined groups of power, speed, and PPI settings based on the color in the drawing. If a color in the drawing does not match any of these eight predefined colors, the driver will select the closest match based on its RGB values.

	1	2	3	4	5	6	7	8
	Black	**Red**	**Green**	**Yellow**	**Blue**	**Magenta**	**Cyan**	**orange**
R	0	255	0	255	0	255	0	255
G	0	0	255	255	0	0	255	128
B	0	0	0	0	255	255	255	0

2. Power

This item enables users to control the output power by setting the percentage of the maximum power. For instance, if the laser generator's maximum power is 30 Watts, setting the power to 50% will produce approximately 15 Watts of output power.

3. Speed

This setting controls the speed of the engraving by setting the percentage of the maximum speed. For instance, if the maximum speed of engraving is 60 inches per second, then setting 50% speed will produce a max. engraving speed of around 30 inches per second.

4. PPI

PPI stands for "Pulses Per Inch." This setting controls the number of laser pulses in one inch. It only affects vector cutting. It is recommended to decrease PPI for dull materials like wood and increase it for polished materials like acrylic.

The maximum value our software can provide is 4000 PPI.(It depends on models.)

5. Offset

This function is only applicable to a closed vector path like circles and polygons. It can output an offset value to the original drawing. A positive value will make the drawing bigger, and a negative value will make it smaller. The unit is 1 micrometer, and the range is -999 to 1000.

6. Focus

Setting range is -4 ~ 100, the unit is mm.

Positive value means the material goes away from focus lens. So the working table will go down in all LTT laser system models.

Negative value means the material goes close to focus lens. So the working table will go up in all LTT laser system models.

Positive value will let the working table go down. max value is 100 mm.

Negative value will let the working table go up. max value is -4 mm

Our z offset setting is all relative to the focus position.

So before you run the file, you have to do autofocus on your material.
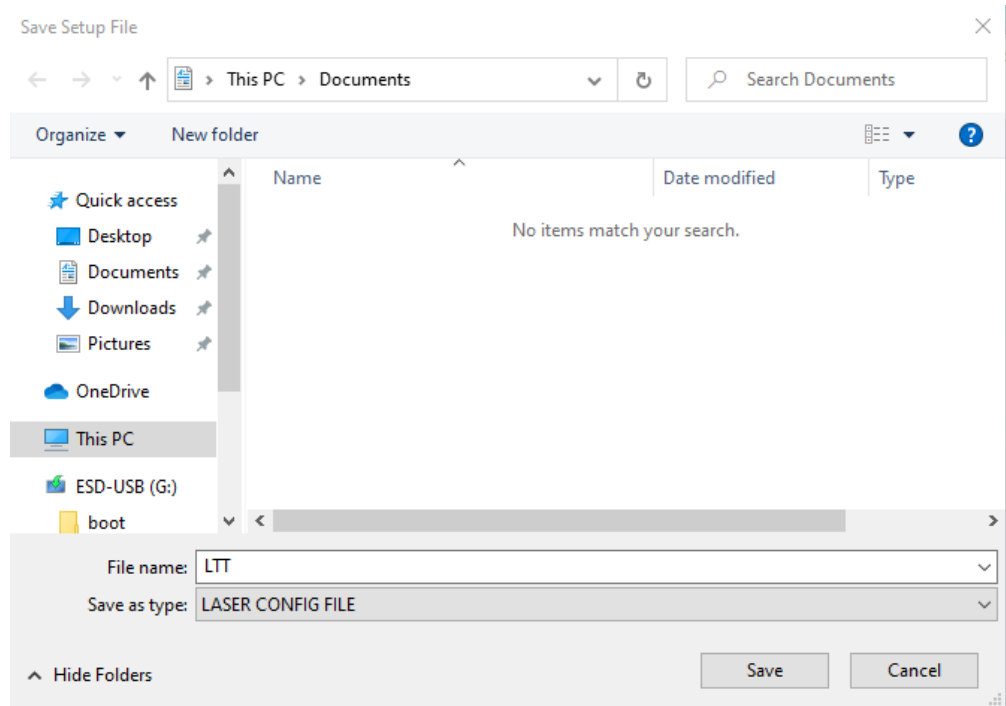
7. Setup

The settings of power, speed, and PPI can be modified by editing the text boxes or dragging the sliders. After modifying the values in the text boxes and dragging the sliders, click the setup button to save the new values for each setting. If you don't press this button, all the modifications will not be activated.

8. Default

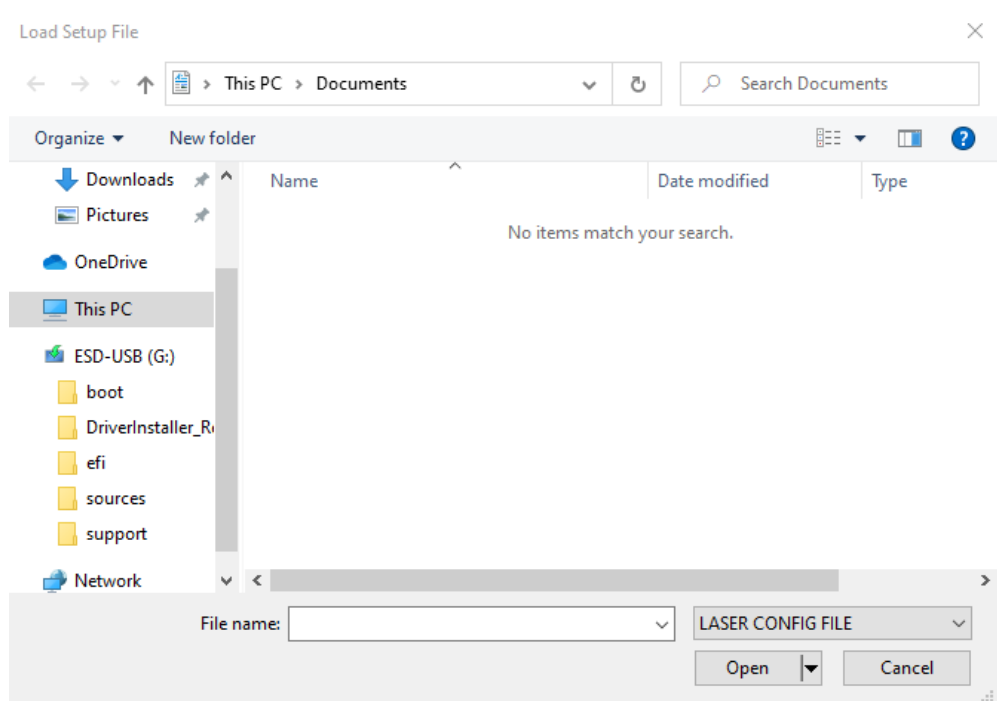Clicking this button will reset all driver settings to their default values.

9. Save

Clicking this button will display a **[Save Setup File]** dialog box, allowing users to save all settings in a configuration file (*.lcf). It works like saving a recipe for different applications or materials.

10. Load

Clicking this button will open the [Load Setup File] window, allowing the user to load all settings from a configuration file (*.lcf).
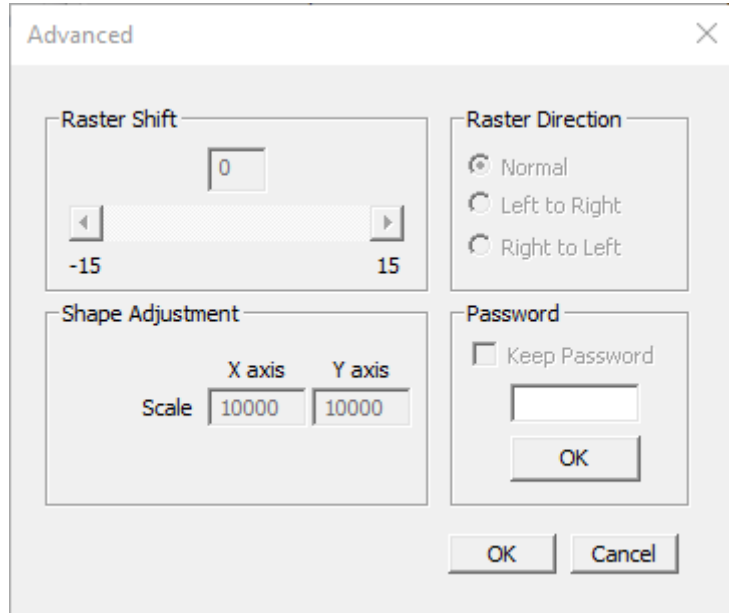

11. Version

Clicking this button will show the version of driver.

12. Advanced

Clicking this button will open the **[Advanced]** window, which is protected by a password. If you require a password to modify these settings, please contact LTT. It is recommended that you **do not** change the settings unless instructed to do so by an LTT technician.

Raster Shift

  This function only works for servo motor machine model.

Shape Adjustment

The range is from 9500 to 10500. The default setting of 10000 means the vector scales remain the original size without any scaling. When the X-axis's scale sets 10500, it means the 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 original setting value: X axis=10000, Y axis=10000 automatically. The Shape Adjustment only works with vector (cutting) drawings.

Raster Direction

You can choose the raster quality by changing the Raster Direction. If you choose Normal, the laser will engrave in both directions, from left to right and from right to left. However, if you choose Left to Right or Right to Left, the laser will engrave only in the single direction you choose. All three options will produce correct engraving results as you set them, but the quality of the single-direction option will be better than the Normal option. It also take twice of working time.
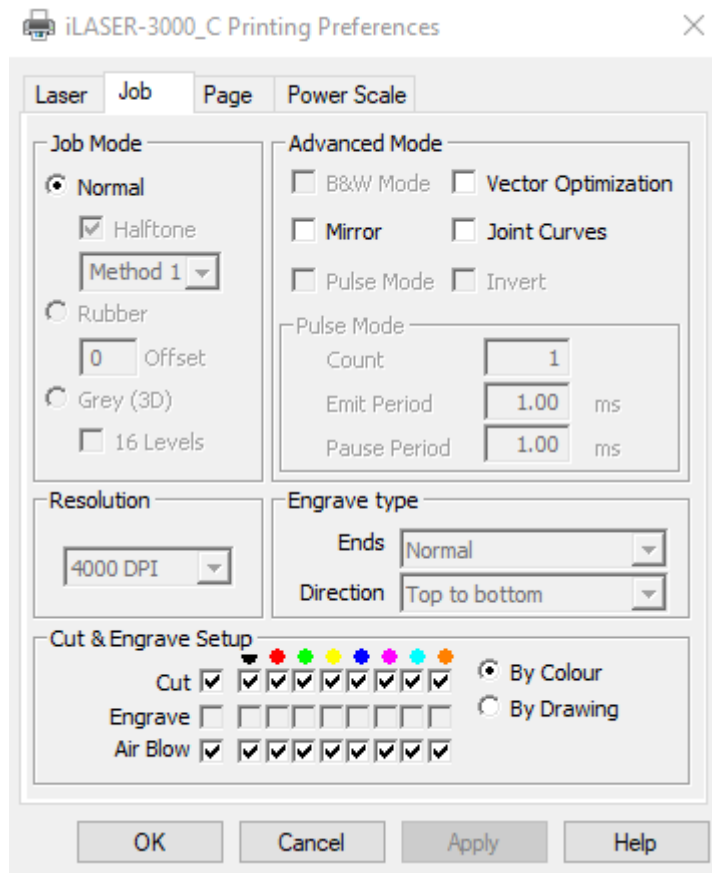
Password

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

3.4.2 Job Tab

The Job tab is divided into 5 sections: **Job Mode**, **Resolution**, **Advanced Mode**, **Engrave Type**, and **Cut & Engrave Setup**.


1. Job Mode

Normal

This mode uses the eight color settings to raster engrave and vector cut graphics drawn in the graphic software. You can use the **Halftone** function if you want to simulate the Bitmap image through the use of equally spaced dots of different sizes.

Halftone

You can choose from 7 different methods to engrave in 7 distinct styles. If you don't select "Halftone", it will engrave using default settings. Below is the sample image for demonstration.
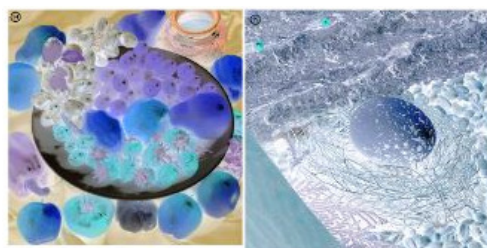
Below are the results from engraving using Method.1 through Method.7.

56
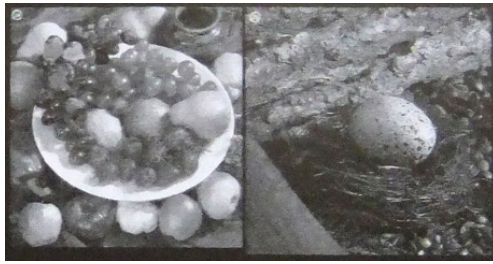
Method.1 *(Jarvis)*

Method.2 *(Stevenson)*
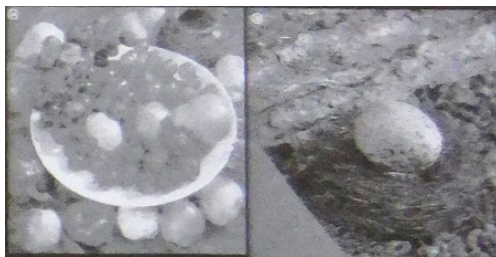

Method.3 *(Stucki)*

Method.4 *(Floyd)*

Method.5 *(Sierra)*

Method.6 *(Burkes)*

 Method.7 *(Ordered Dithering 8X8)*

You can choose from the seven different unique styles above based on your personal preference.

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 tiny engraving. The primary benefit of the offset feature is the improved quality of tiny text.

Gray(3D)

This mode is used to engrave three-dimensional images. The driver uses 256 shades of gray to control the power output of the laser generator. Darker shades of gray correspond to higher power output, while lighter shades of gray correspond to lower power output. If the 16 Levels option is enabled, the driver will convert the image into 16 shades of gray, and the Power Scale tab can be used to adjust the power for each shade of gray.

1. 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.

Drawing in AP   Laser Result

Cente
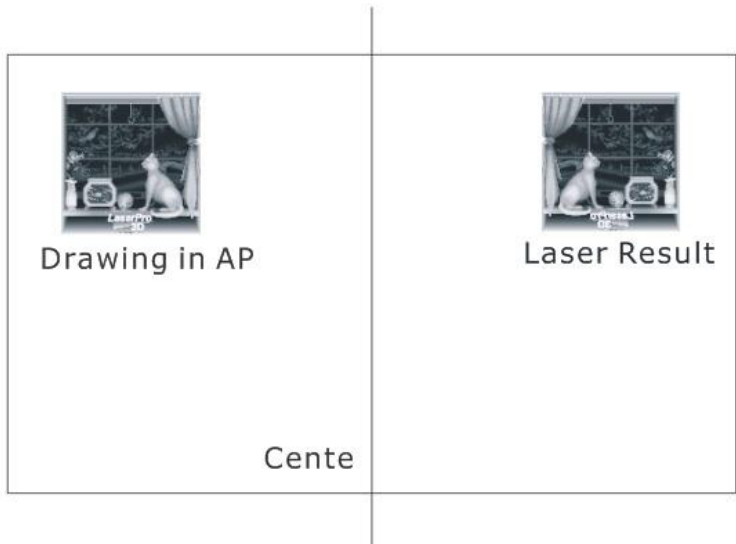
Pulse Mode

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

Vector Optimization

This mode modifies the working path based on the positions of vectors in the drawing, and can reduce working time.

Joint Curves

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

2. 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

3. 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.

4. Cut & Engrave Setup

The Cut & Engrave Setup section provides the user with the ability to enable or disable specific functions of the engraver. If the box next to Cut is unchecked, the engraver will ignore any sections of the graphic 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 typically be raster engraved. For more precise control, the boxes located below each color allow the user to disable the cut or engrave options separately for each color. Similarly, users can choose whether or not to use air blow during these operations by checking or unchecking the corresponding option.

By Color

When **[By Color]** is selected, vectors are cut according to the predefined color order, with vectors of the same color cut in the sequence they were drawn. Engraving objects are ordered only by color. Raster lines of the same color are engraved according to the **[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. However, engraving objects do not follow this sequence and are instead ordered by color.

3.4.3 Page Tab

The Page Tab is divided into four sections: **Page Setup**, **Job Title**, **Rotary Attachment**, and **User Positioning**.
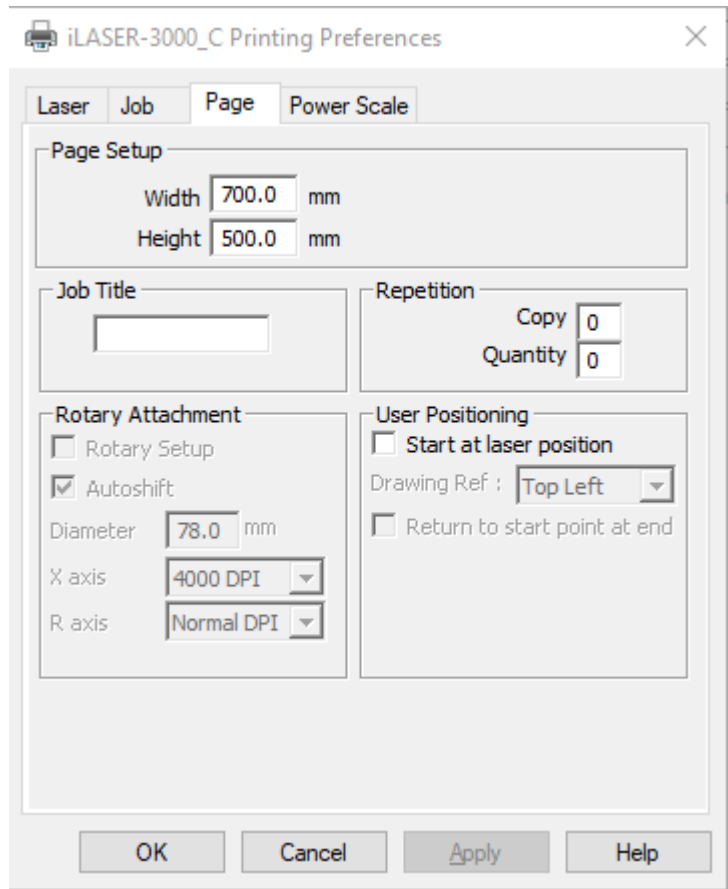
1. **Page Setup**

    The Page Setup section displays the width and height of the machine.

2. **Job Title**

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

3. **Repetition**

    The Repetition section allows the user to modify the **[Copy]** and **[Quantity]** settings that are displayed on the panel or can be adjusted directly on the machine.

4. **Rotary Attachment**

The Rotary attachment section is used to configure the driver for the rotary attachment. When the [Rotary setup] checkbox is selected, the Rotary Attachment section becomes available. The Diameter input box allows the user to enter the diameter of the object placed in the rotary attachment. When the **[Autoshift]** checkbox is selected, the driver ignores the vertical blank portion of the graphic on the page, enabling the engraver to start engraving without rotating the object first. This feature simplifies the alignment of graphics on items with handles. The X-axis dropdown box is used to set the DPI when using the rotary attachment. The R axis dropdown box options no longer affect the engraver's functions.

The rotary attachment can work with <User Positioning> function, please check the details on chapter 3.5

5. **User Positioning**

Start at laser position

When this box is checked, the file will not execute in the position specified by the application software. Instead, it will execute in the position determined by the user on the machine. If the box is unchecked, the file will execute in the position specified by the application software.

Drawing Ref.

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.
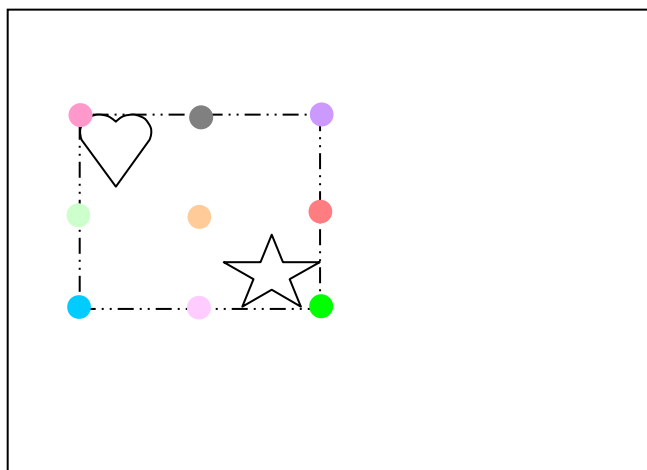
- ● **Top Left**
- ● **Top Middle**
- ● **Top Right**
- ● **Middle Left**
- ● **Center**
- ● **Middle Right**
- ● **Bottom Left**
- ● **Bottom Middle**
- ● **Bottom Right**
- ♡☆ **Pattern**
- ⌐¬ **Boundary**

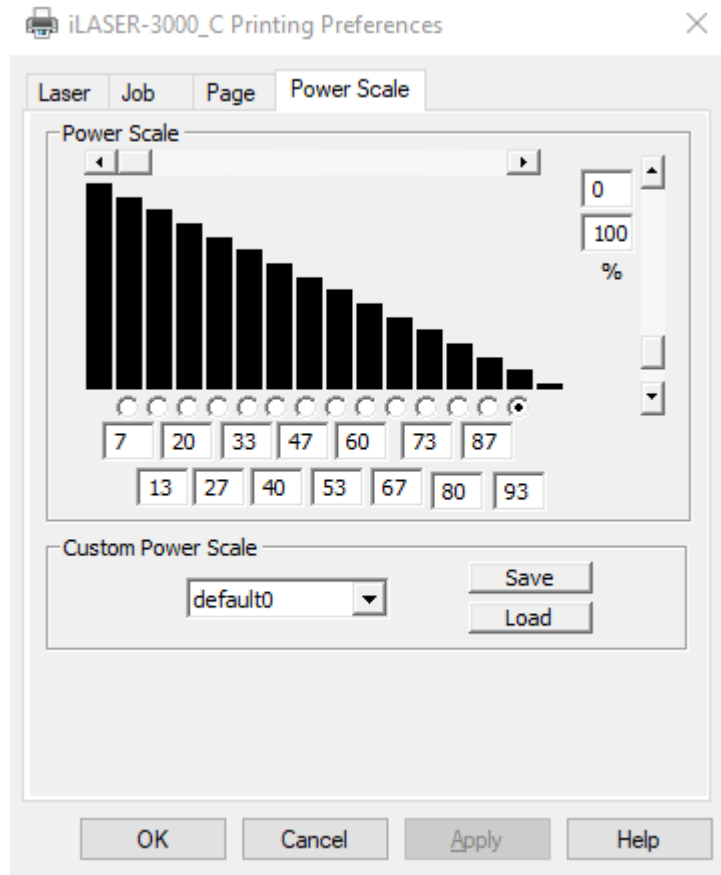**Return to start point at end**

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

PS. This function will not work on the rotary mode.

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 the 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   Rotary Ref-point introduction
3.5.1   What is Rotary Ref-point

You can use this function to work on cylinder surface.

It is similar to the **Single Ref-point** function.
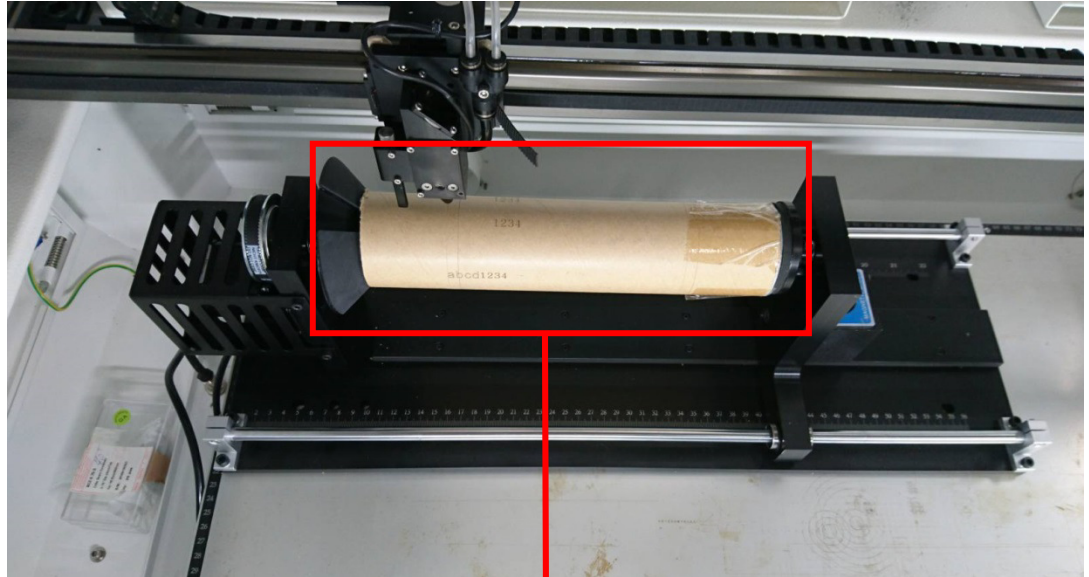
You can put the material on rotary attachment.

3.5.2 How to set up Rotary Ref-point

At first, turn on the power of machine.
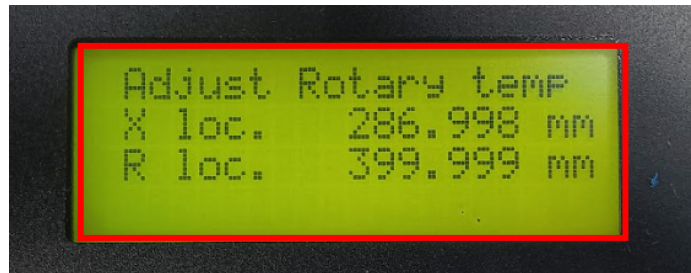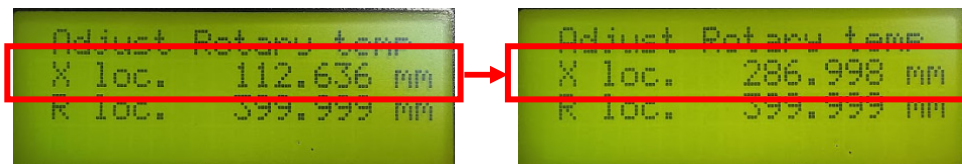
01. Go to **4.SYSTEM SETUP\Position setup\X-Y homing**
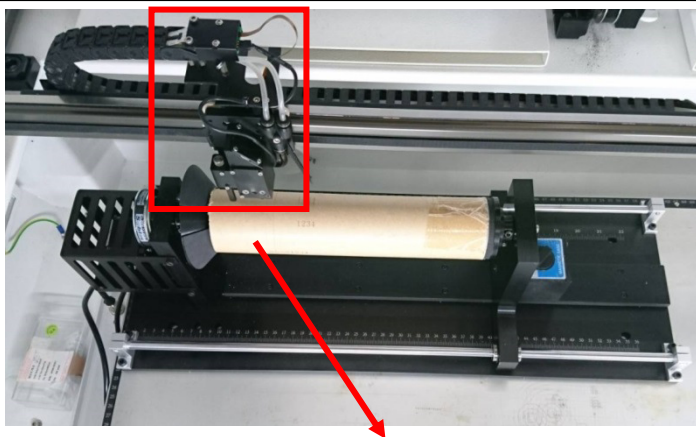
02. Select **Adjust Rotary temp** on the LCD.

03. Press to enter next menu.

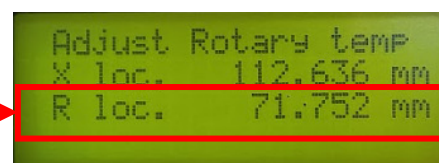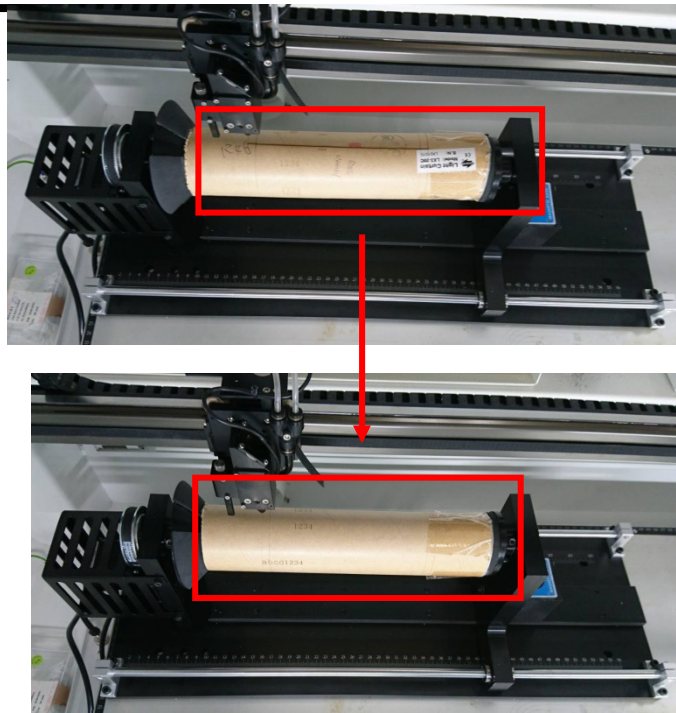04. You can see the coordinate of X and R on the LCD.

05. Press or to change X-axis position.


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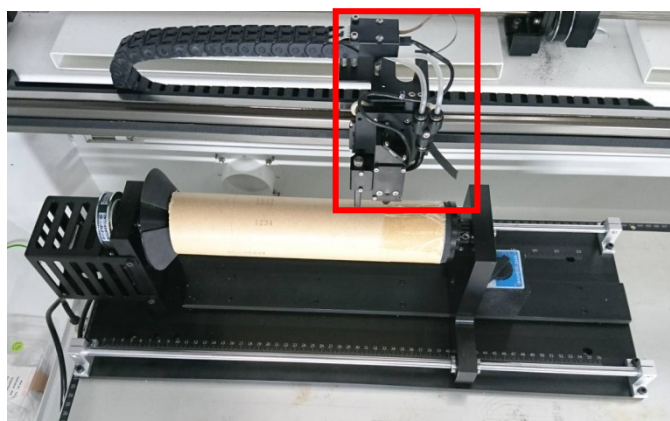
06. Press or to change R-axis position.

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

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3.5.3 Notice for Rotary Ref-point

01. When you reboot the machine, your rotary ref-point will be restored to the initial value.

02. If you have finished rotary ref-point settings in LCD menu, please return to the main menu. Else you press run button, the machine will not run.

03. We strongly recommend users setup as the followings. Please check **Rotary Setup** and **Start at laser position**.
（**Return to start point at end**, it is no function in rotary mode.）
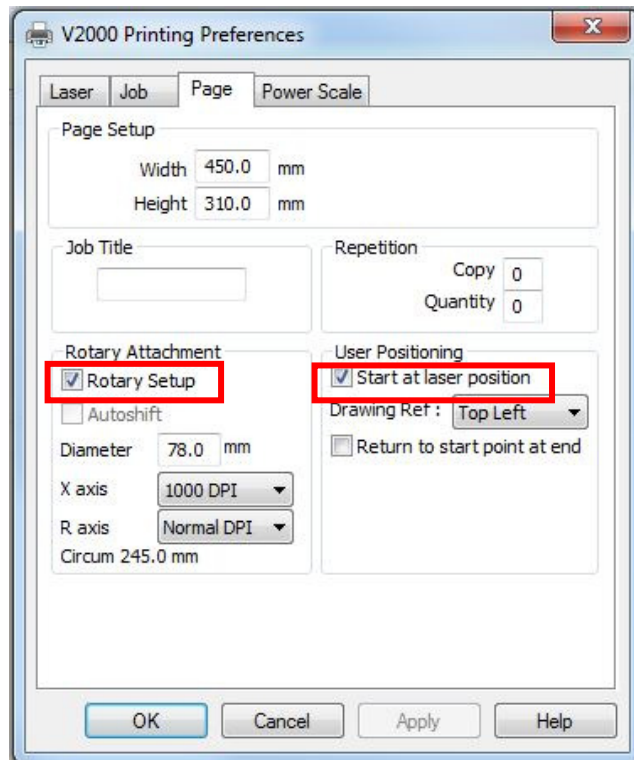
After it finishes the first running, you still can press run again before you take off the material. It will engrave on the same position.

04. Please check **Rotary Setup**, or you can't use the function of the rotary attachment.

05. Please setup the diameter of your material

06. Please setup the DPI of the X-axis.

07. Please setup the resolution of the Rotary-axis.
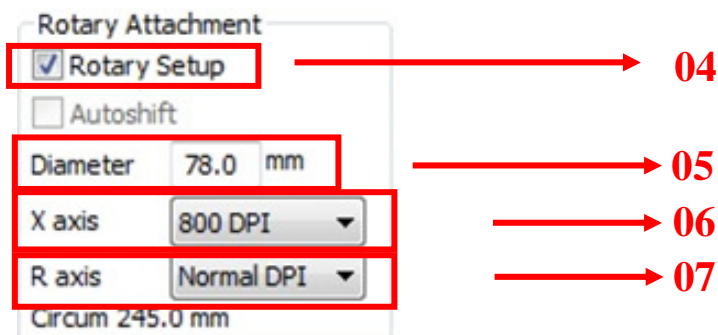
08. When you adjust the rotary ref-point, please be careful about the position of your focus module (laser head). If the focus module (laser head) is too close to the left, the focus module (laser head) may hit with chuck.
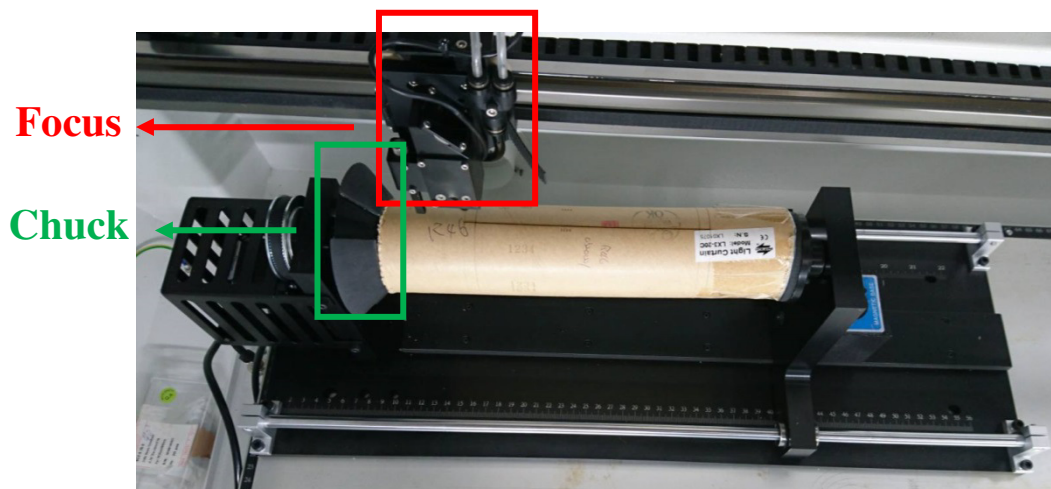
Chapter 4   Maintenance

4.1   Daily Cleaning

1. Preparation

6.   Ensure that the system is turned off and the **AC power cable** is unplugged.

7.   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.
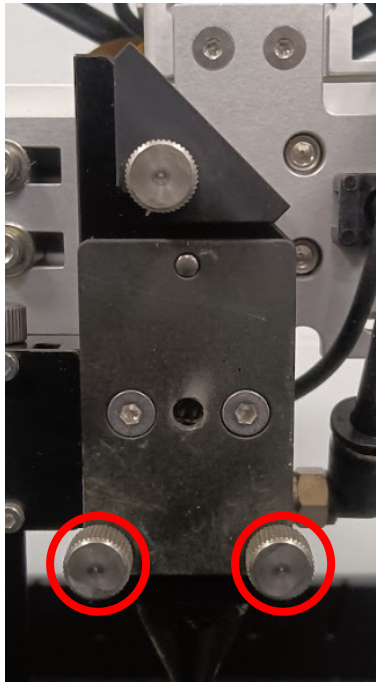- Clean all of the rails of the motion system with cotton swab and alcohol.

3. Clean lens and mirror

- Clean 4th mirror and focal lens with cotton swab and alcohol.

Loosen ① screw, take ② away and clean the mirror, then put them back.

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

Pull out the focal lens, clean it (both sides of lens), and put it back.

Assemble the cover and screws back.

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4.2   Weekly Cleaning

1. Preparation

8.   Ensure that the system is turned off and the **AC power cable** is unplugged.

9.   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.**

  Take over the side cover (left) and clean the mirror.
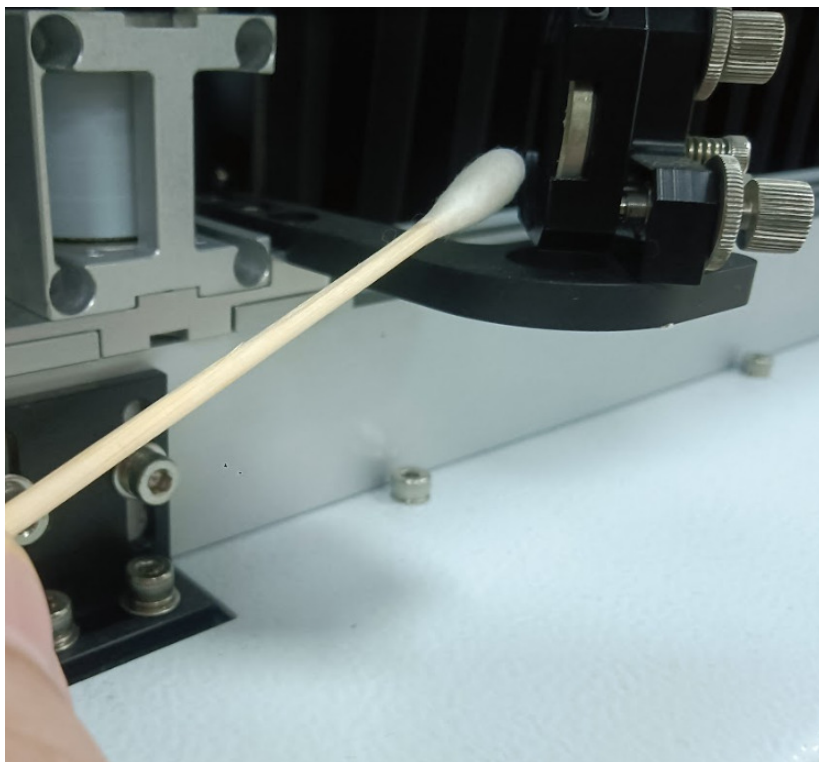
- **Clean 2nd mirror with cotton swab and alcohol.**
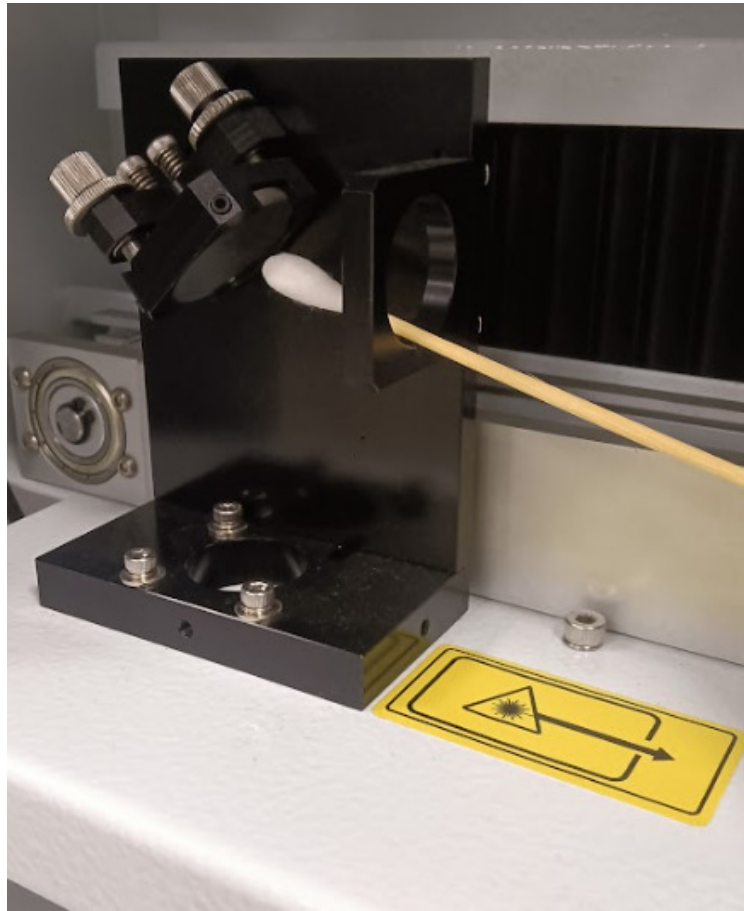
- **Clean 1^{strd} mirror with cotton swab and alcohol.**

Open side door of chassis.

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Loosen the 4 screws around box by hand, and take off the cover.

Clean the mirror.
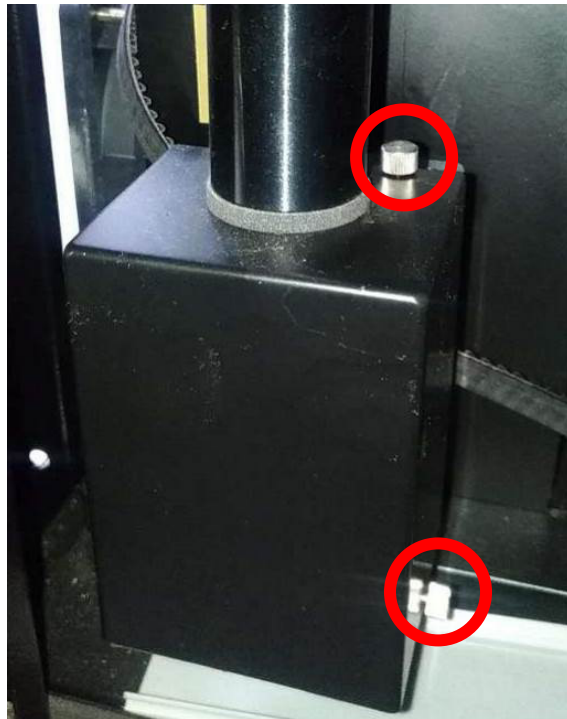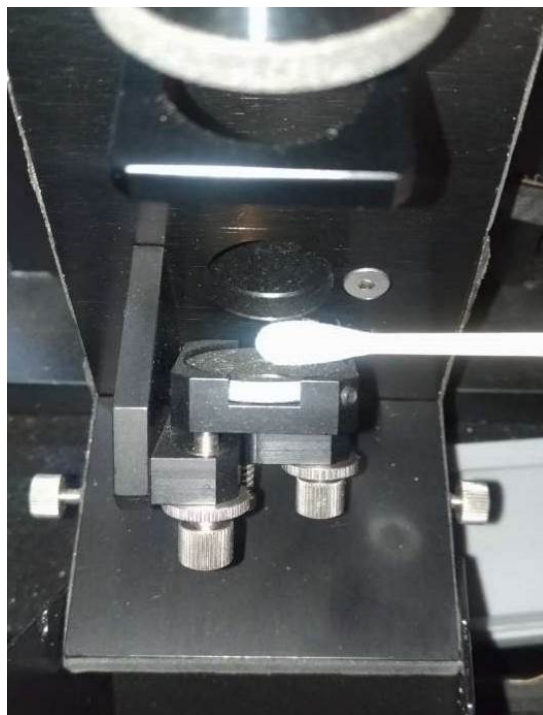

Assemble the cover and screws back.

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- **Clean the Beam Combiner with cotton swab and alcohol.**

  Open the side door(Left), and clean the mirror.

Chapter 5   Trouble Shooting

This chapter provides suggestions to check and solve some common problems. If you cannot find an answer in this chapter, please refer to the introduction for technical support.

Problem	Cause	Remedy and reference
Power is not turned on.	AC power cable is not connected properly.	Check Hardware Installation. (See section 2.4.)
	Emergency stop is pressed down.	Turn right the pushbutton. (See section 1.3.)
Laser beam is not emitted.	Doors with interlocks are not closed. (If "Door" indicator is dark.)	Close all doors with interlocks. (See section 1.3.)
	The temperature of laser generator is too high.	Stop job for a certain time to cool laser generator.
	Laser beam is misalignment.	Realign by adjusting mirrors.
	The setting of laser power is too low.	Increase the setting. (See section 3.4.1.)
	Laser generator has breakdown.	Please contact LTT. (See Introduction)
	Focal length is not suitable.	Adjust focal length. (See section 3.3)
Cutting or engraving quality is bad.	Lens and mirrors are dirty.	Clean the lens and mirrors. (See section 4.1 and 4.2)
	Lens and mirrors are broken.	Please contact LTT. (See Introduction)
	The settings of laser power are not suitable.	Modify the setting. (See section 3.4.1)

Appendices

Appendix 1   Specifications

| Spec.	QLaser 60	QLaser 35
Dimension (L) X (W) X (H) mm	1480 X 900 X 1140	1180 X 800 X 1142
Working area	1000 x 610 mm	700 x 510 mm
Max. height of workpiece	240 mm	240 mm
Max. processing speed	3.0 m/sec	3.0 m/sec
Max. processing acceleration	6g	6g
Laser power(CO2)	60/80/100 watts	30/60/80/100 watts
Pass-Through Option	N	N
Sonar Technology™	N	N
Motor (for X-Y motion)	Servo motors	Servo motors
Motor (for table height control)	Stepper Motors	Stepper Motors
Air assist control by color	Y	Y
Encoder readhead and scale	Y	Y
Exchangeable focus lens module	Y	Y
Exhaust pipe dimension	Dia.80mm	Dia.80mm
Table Suction pipe dimension	Dia.80mm	Dia.80mm
Memory buffer	128 MB	128 MB
Resolution (for engraving)	1000 DPI	1000 DPI
Resolution (for cutting)	4000 PPI	4000 PPI
Regulation Compliance	CDRH Class 3R /CE/ROHS	CDRH Class 3R /CE/ROHS
Options	Rotary Device	Rotary Device
Operation temperature	15-35 °C (58-86 °F)	15-35 °C (58-86 °F)

Appendix 2   Suggested Parameter of Material

The following settings are intended as starting points only. Actual settings may vary depending on various factors such as different manufacturers with different formulations, variations in laser tube power output, natural material differences, and user preferences for desired results.

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	

Appendix 3 Laser Power Test Scale

Before using the Laser Power Test Scale, please select "Grey(3D)" but do not check "16 Levels".
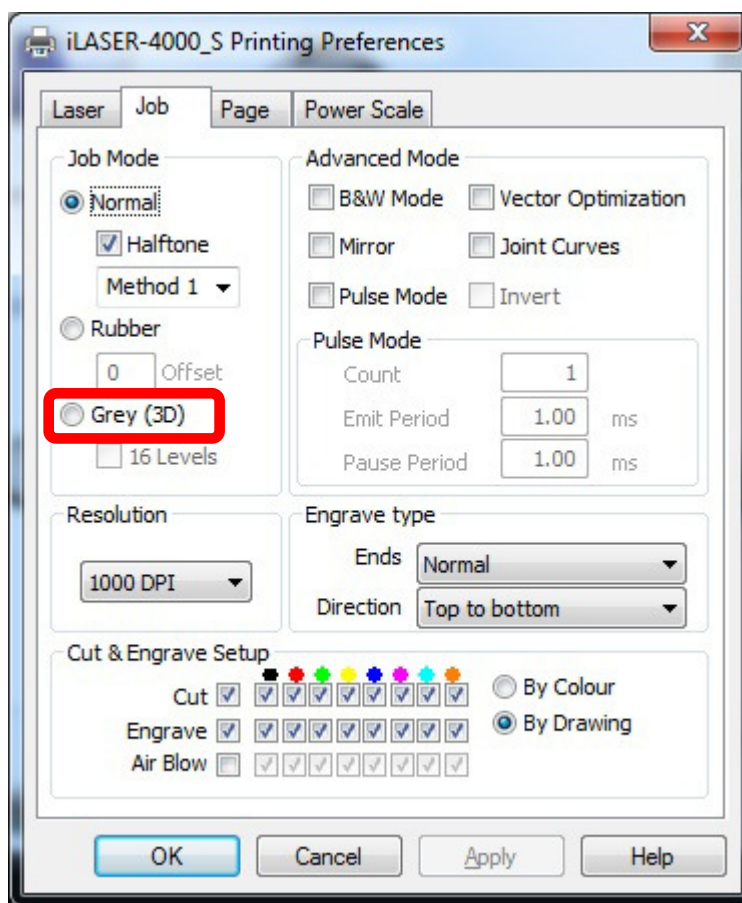
To measure the laser power during engraving, you need a reference standard. You can use the following gradient chart as a laser power gauge. Send this drawing into the machine, and proceed with the laser engraving (normally use the power 100%, the speed can be depended on your requirement).
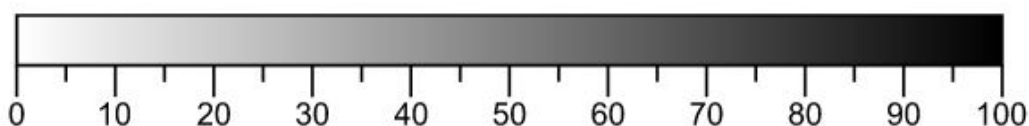
Below is the result of engraving the aforementioned chart onto an anodized black aluminum plate.

You'll notice that the area on the left with 0% power appears black, as the lower laser power during engraving retains the material's original color. On the right, the 100% power region displays a burnt sienna due to the higher laser power causing the material to char. With around 25% power, it exhibits a bright white hue. You can use

this method to evaluate the appropriate laser power to achieve optimal engraving results.