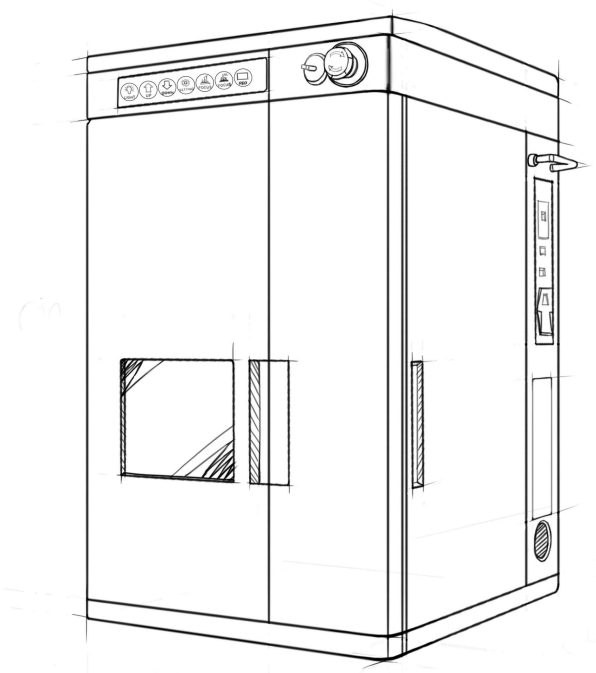


TASTE

TASTE User Manual

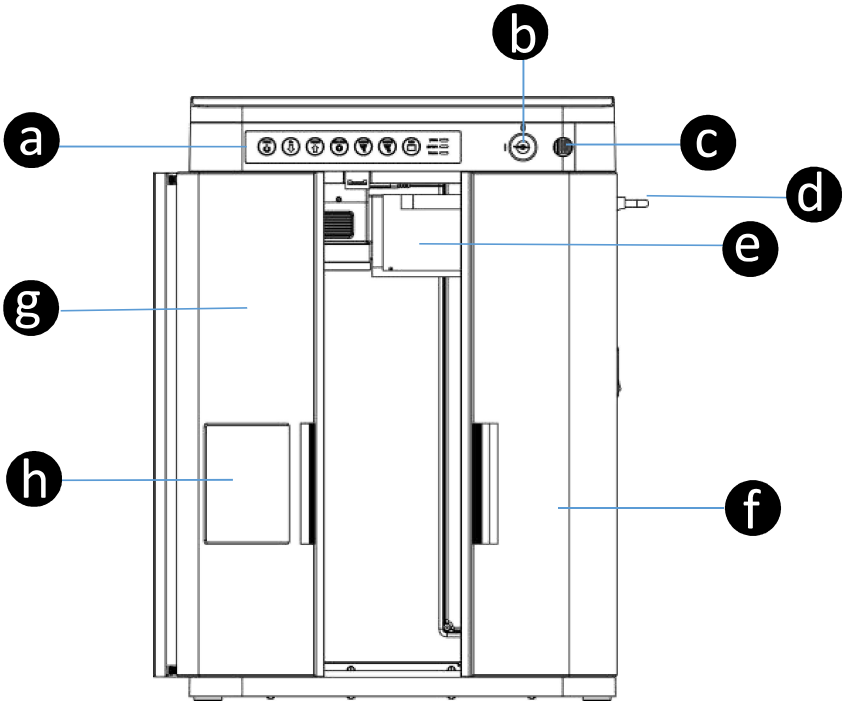
Thank you for cooperating with CKLASER

In order to know TASTE well, please read through this manual !

Contents

1. Production

1.1 Know the product



a Panel	e laser output
b key switch	f right front
c EM switch	g Left front
d handle	h laser protective window

1.2 Safety

1.2.1 Laser safety label

⚠**Laser radiation warning sign：**

Attention to laser radiation, there is the danger of laser radiation, please do a good job of laser protection measures！

⚠**Danger warning sign:**

Class 4 laser radiation to avoid direct or scattered exposure to the eye or skin

1.2.2 Laser safety precautions

To ensure safe operation and optical performance of your product, follow these tips and warnings

1) The use of laser equipment is subject to professional training before operating.
2) Strict compliance with equipment operating instructions, the proper use of laser equipment.
3) Before the laser equipment is powered on, please connect the ground wire and make sure that the input is 220V / 110V AC. Incorrect voltage input may damage the equipment.
4) Please wear laser protection products before using laser equipment , protection products must ensure that provide adequate protection from the 1.064μm wavelength laser radiation. Such as laser protective glasses
5) Laser equipment at work is strictly prohibited to open the safety cover, safety door, and look the laser.
6) Press emergency stop button immediately to ensure personal safety when abnormal circumstances occurred.
7) When processing high reflection material, pay attention to the laser harm reflected from high reflection material.
8) When processing products need to do a good job of waste discharge.
9) Please do not turn on the laser equipment frequently.
10) Please do not exceed the scope of processing, so as to avoid damage to equipment.
11) The use of equipment should be used in accordance with the environmental conditions.

1.2.3 Environmental requirements

Size：	670*530*435mm（No workbench）
Weight：	65KG
Voltage：	single phase 110V/220V　frequency 50Hz/60Hz
Power：	1KW
Working Environment：	Temperature：+10℃—+35℃ humidity：20%—80%（no condensation, no freezing）
Altitude：	Below 2000 meters
Environment for store	Temperature：+10℃—+40℃ Humidity：20%—80%（no condensation, no freezing）
Environmental requirements：	1. Ventilation is good, no dust, no corrosion, no leakage of the site environment. 2. Recommended use in air-conditioned room. 3. No vibration. 1.Altitude below 2000 meters.

1. 3 Packaging and Accessories

1.3.1 Delivery and Packaging

The process of opening the wooden box：

Use a flat-bladed screwdriver to insert the metal buckle, then pry it until the metal buckles are straightened off; then lift cover of the wooden box to open it.

⚠**Note：** just open the buckle around the bottom of the wooden box

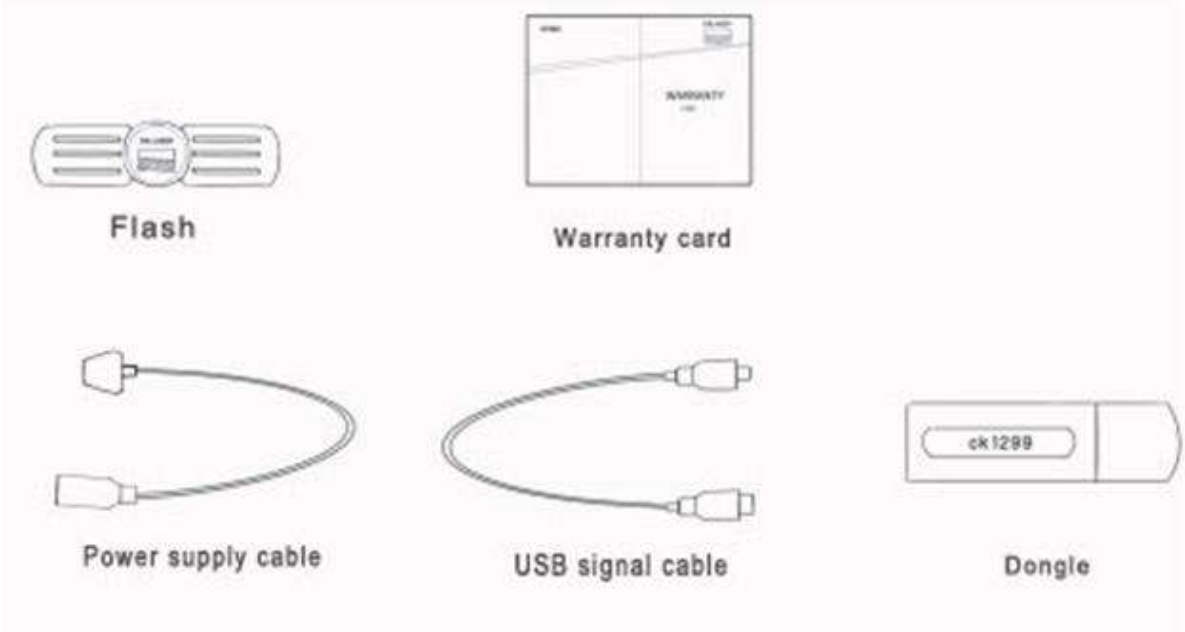
⚠**Transport and Requirements**: Transport by land or air or sea.

⚠**Package disassembled：** Make the front wooden box upwards and can not be dumped. Please check carefully according to the "packing list".

1.3.2 Package list

Parts List（Standard）	Q.t	Remark
Power cable	1pc	For power supply
Signal cable	1cp	Connect computer and equipment
USB Flash	1pc	included 3DLASER genuine software, software manual PDF, user manual PDF
Dongle	1pc	Genuine 3DLASER dongle
Locator	2pcs	Locating objects
Screw	some	
Test report	1pc	
Warranty card	1pc	
TASTE user manual	1pc	

1.3.3 Accessories illustration

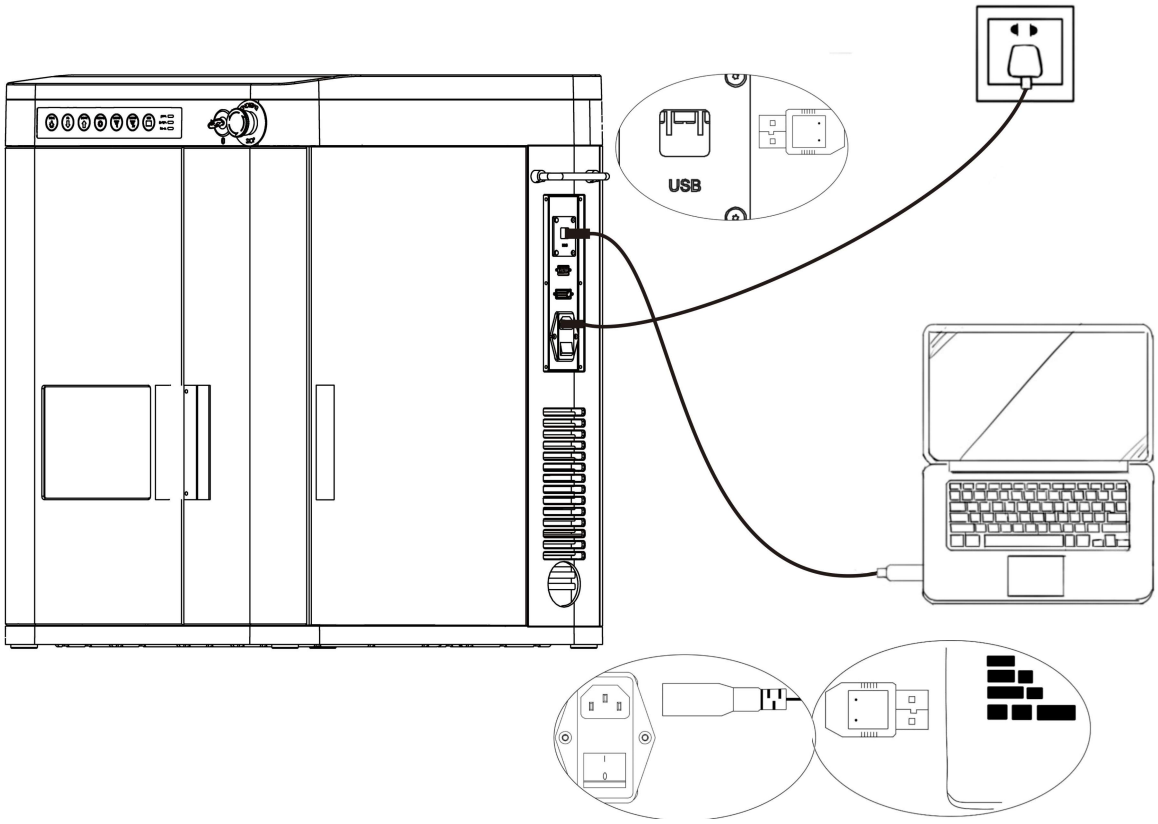


2.Quick start

2.1 Get started

2.1.1 Connection

Step 1. Connecting machine

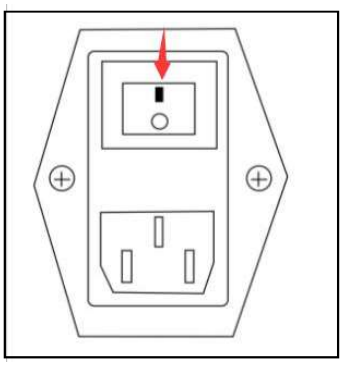


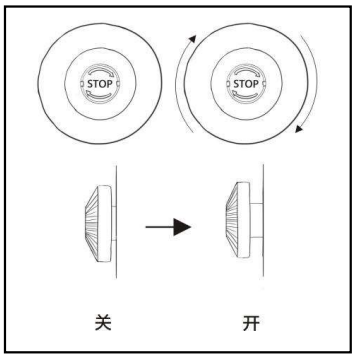
Accessories installation：

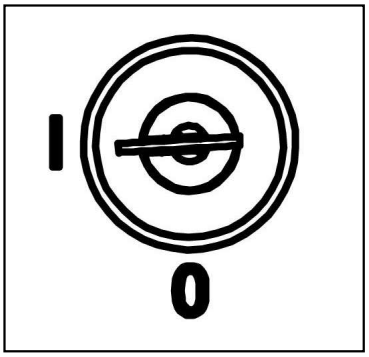
Signal cable： One end of USB cable connect computer,the other end of square head connect the square socket of machine.

Signal cable： Three-pin plug socket, the other end connect the machine.

Step 2. Turn on the machine







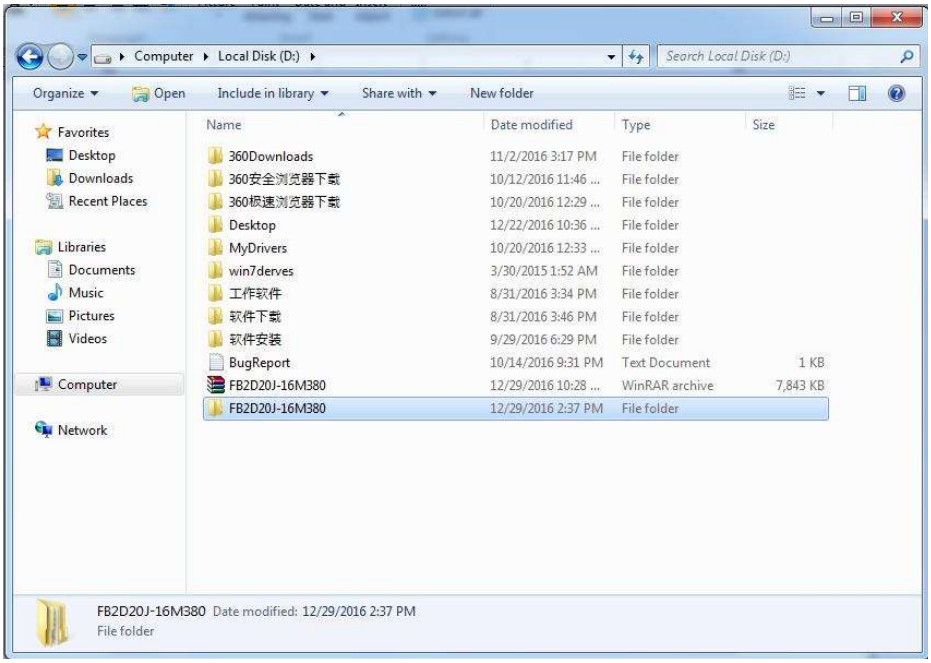
According to the diagram, run the computer first, then turn on the power switch, twist the emergency switch to the right, key switch to **I** (in).

⚠**NOTICE**： After above steps are completed, the power indicator light will be on, indicating that the circuit is successful. If not, please make sure that the socket is properly powered.

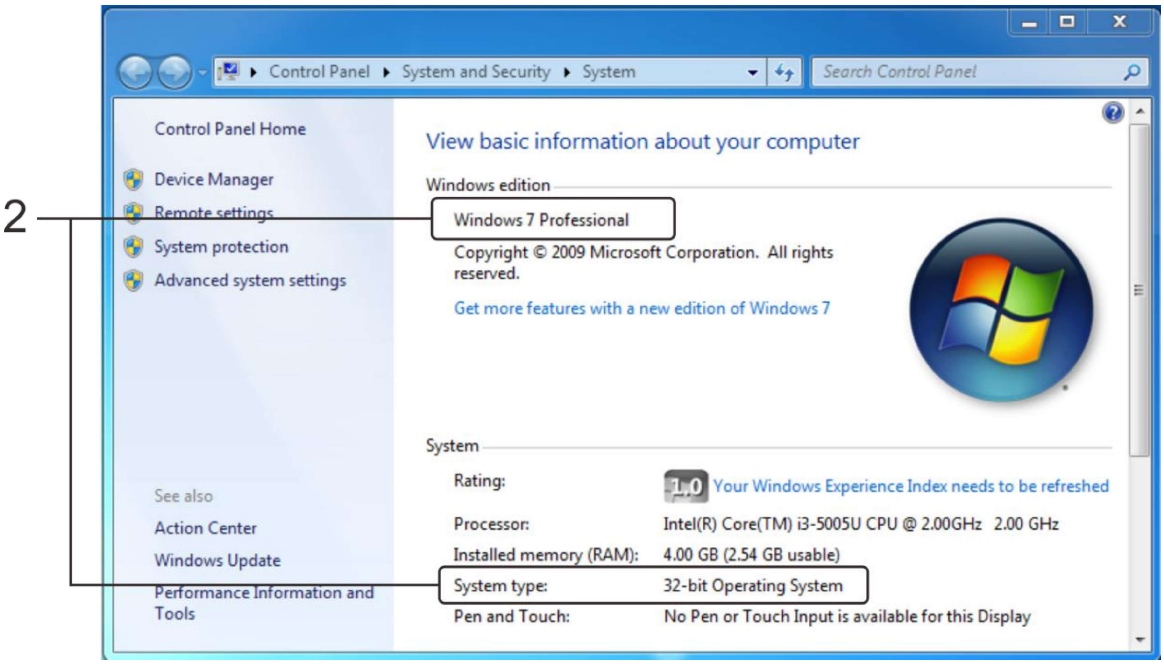
2.1.2 Install software and dongle driver

2.1.2.1 Install software

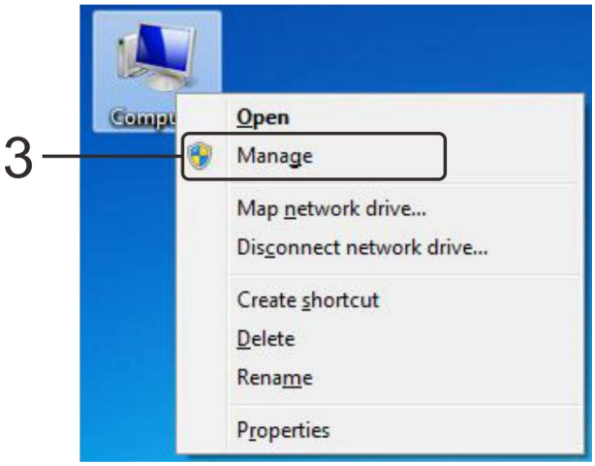
Step 1. Use the computer connected to the machine, the compression package(named by machine number) in USB should be decompression to the D drive;



Step 2. Check the computer system type, select the appropriate type of control card driver;



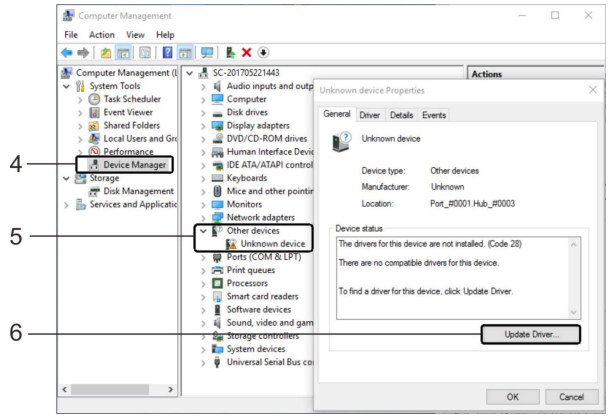
Step 3. Right-click on the [Computer], select [Manage] into the computer management interface;



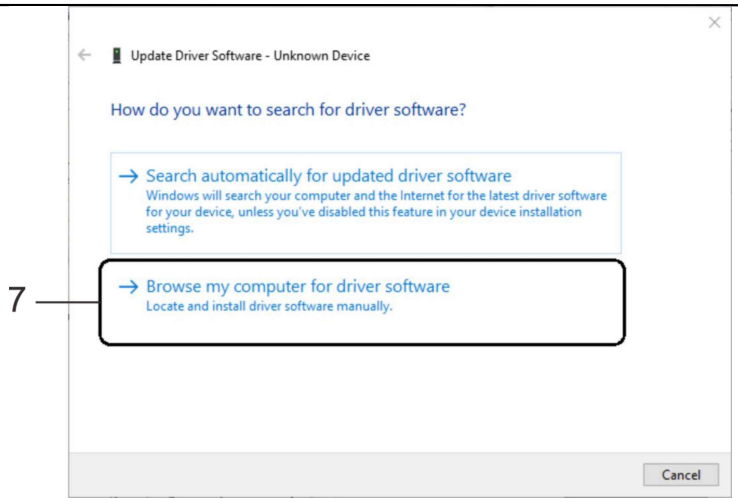
Step 4. Click the [Device Manager] button;

Step 5. Find [Other Device] and double-click the [Unknown Device] button;

Step 6. Click the [Update Driver] button;

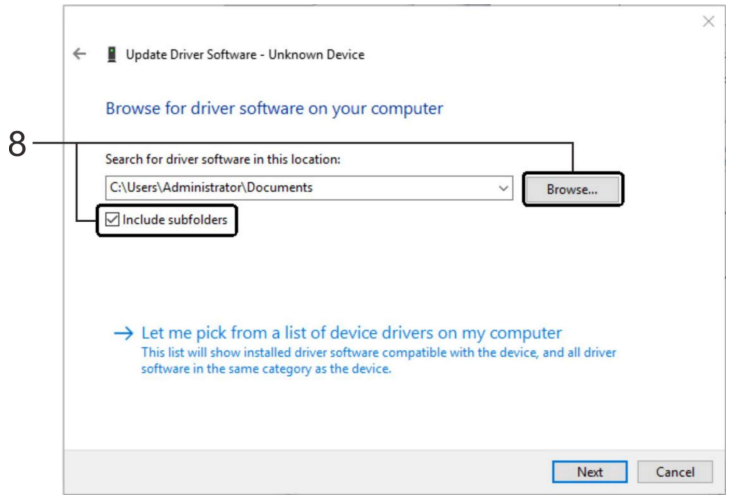


Step 7. Select the [Browse my computer for driver software];

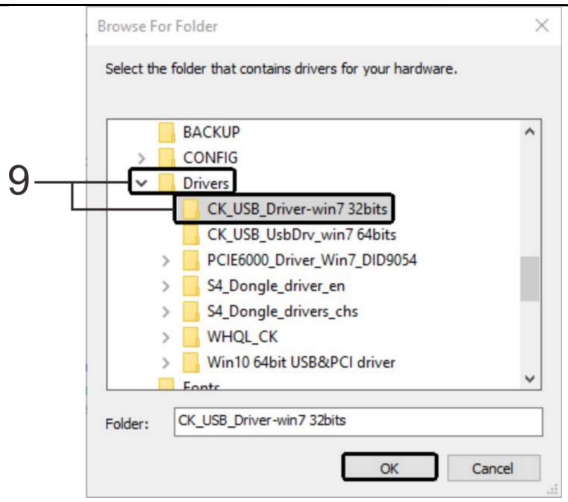


Step 8. Click the [Browse] button to find the path of the driver file stored on your computer.

⚠**NOTICE：** Please check the [Include sub-folders].

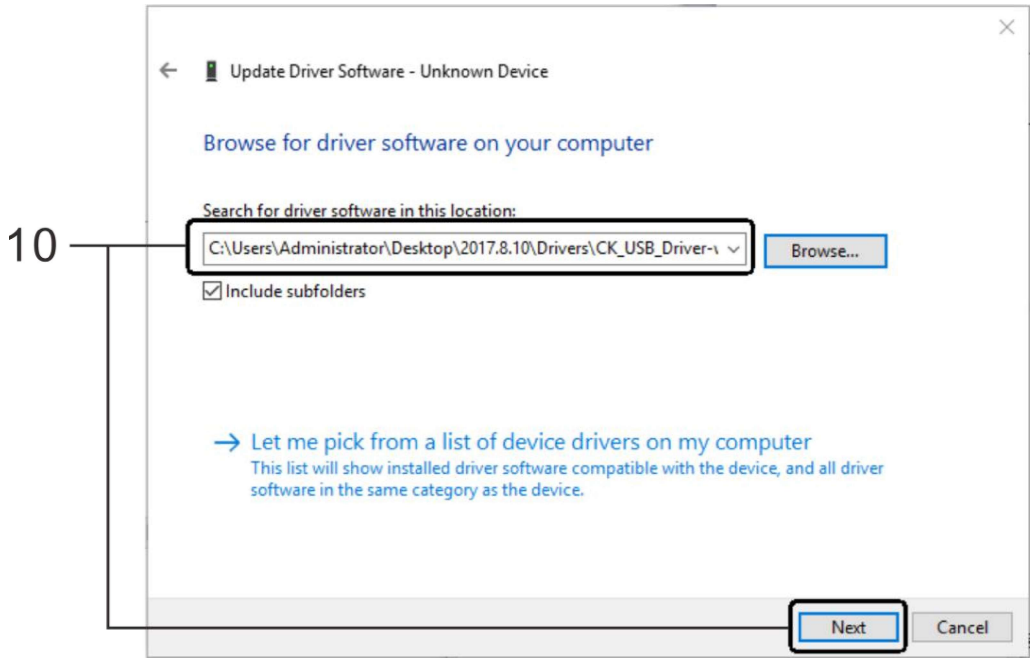


Step 9. Select the control card driver file that matches with the computer system. For example, [CYUSB2_DRV_32bits] should be selected for this installation, and click the [OK] button.



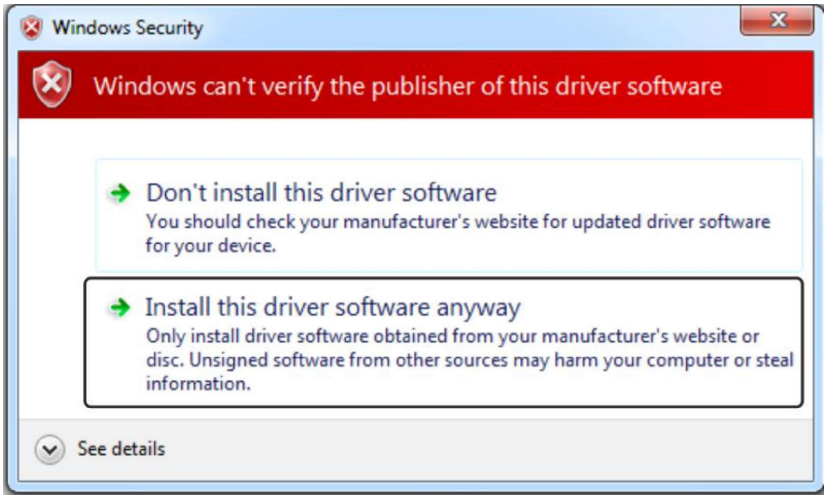
NOTICE： Driver file type and computer system control pairing as shown below.

Step 10. Click [Next];

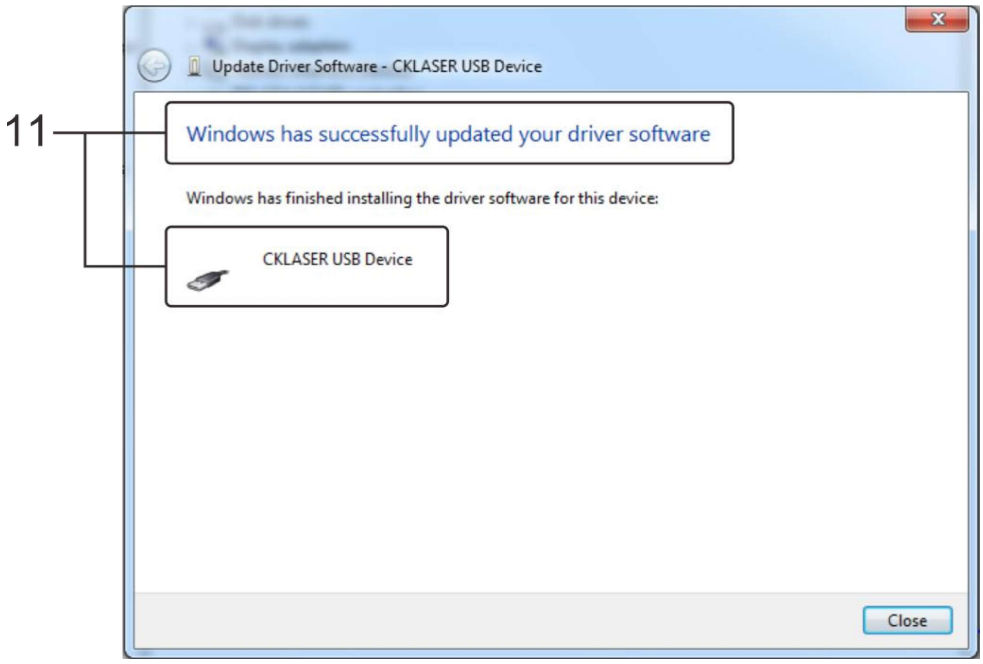


Note: The "Windows Security" dialog box pops up during the installation. Please select the

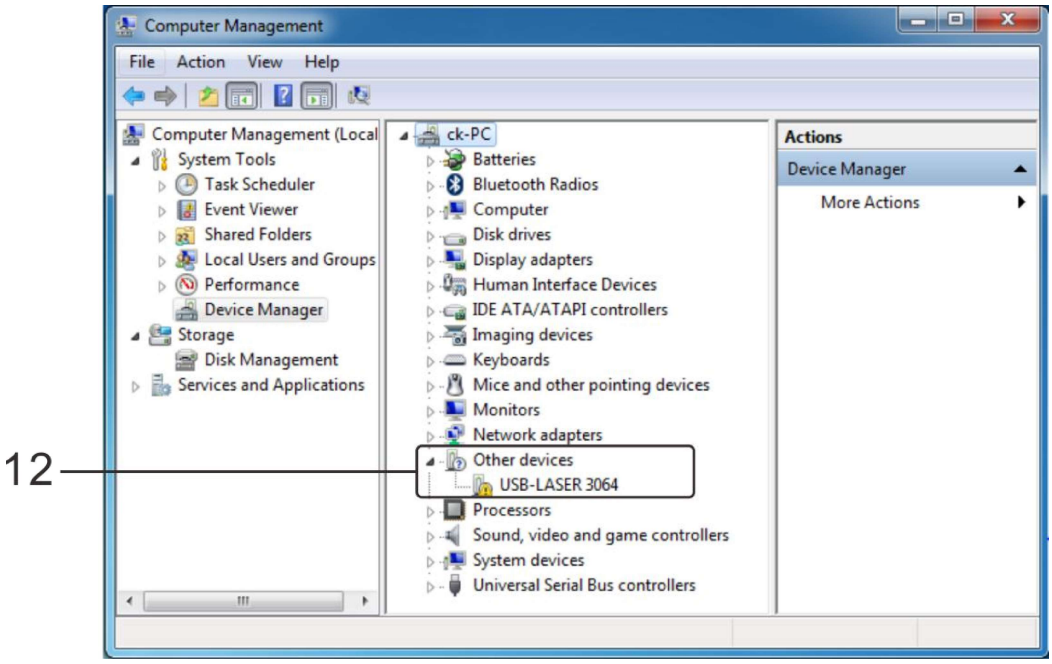
"Always install this driver software" option.



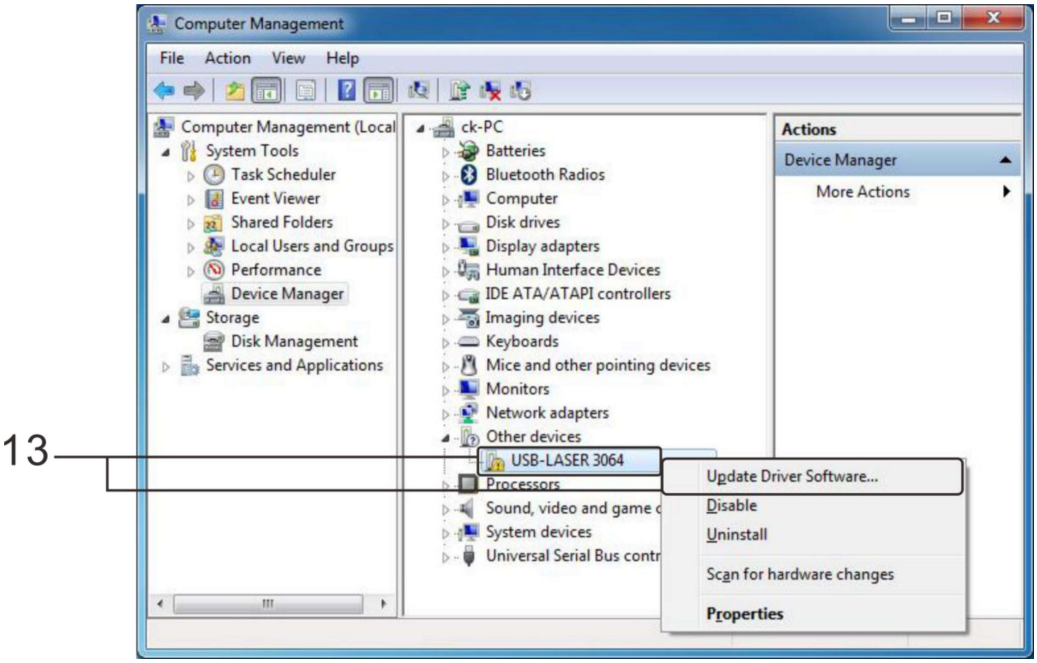
Step 11. When the message "Windows has successfully updated the driver file" pops up, the software control card has not been installed yet, and the USB control card needs to be installed twice. Close this interface, re-enter the computer management for a second installation.



Step 12. Back to the computer management to find the [Other devices], you may see the model "USB-LASER 3064" control card gets a yellow warning signal, it means the installation is not completed, you need to click it and re-install;

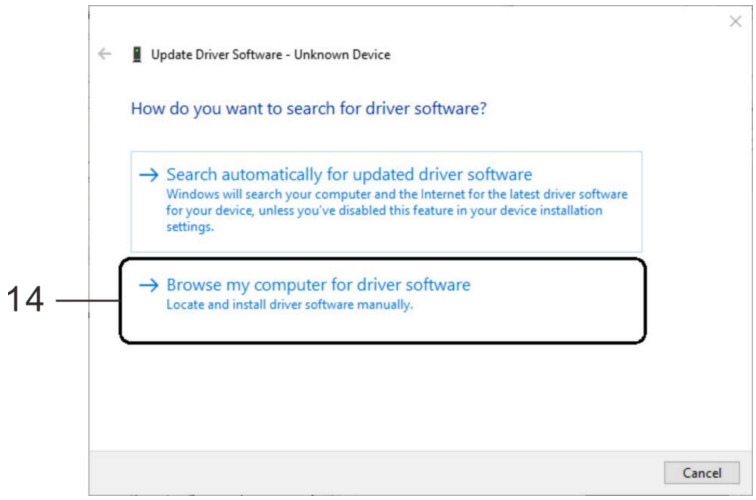


Step 13. Right-click "USB-LASER 3064", select [Update driver software];

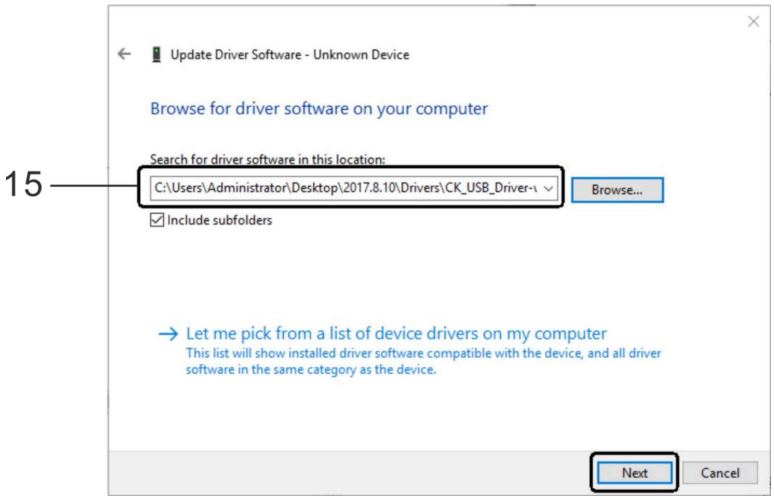


Or double-click "USB-LASER 3064", select "Update Driver ..." option.

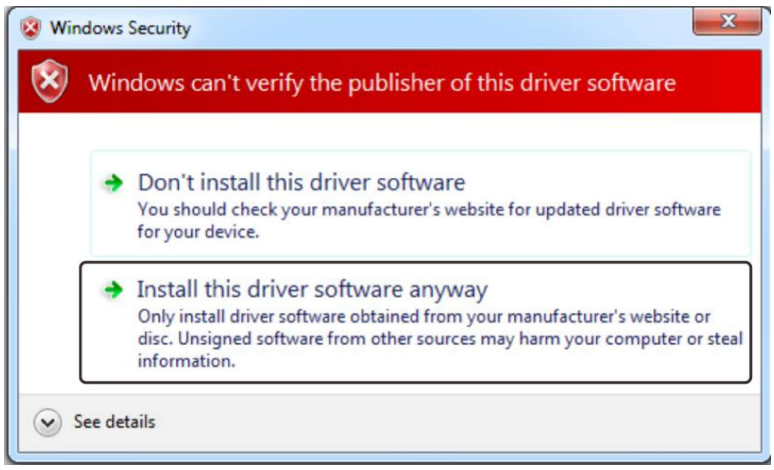
Step 14. "Browse my computer for driver software".



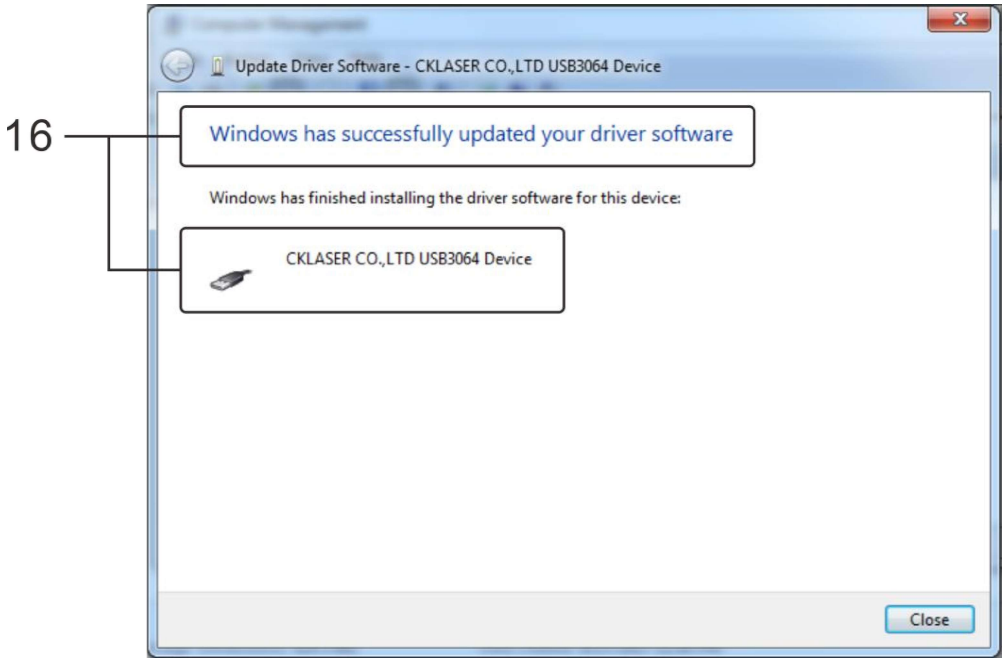
Step 15. The driver is saved after the first installation, so no need to re-find the driver file, click the [Next] button.



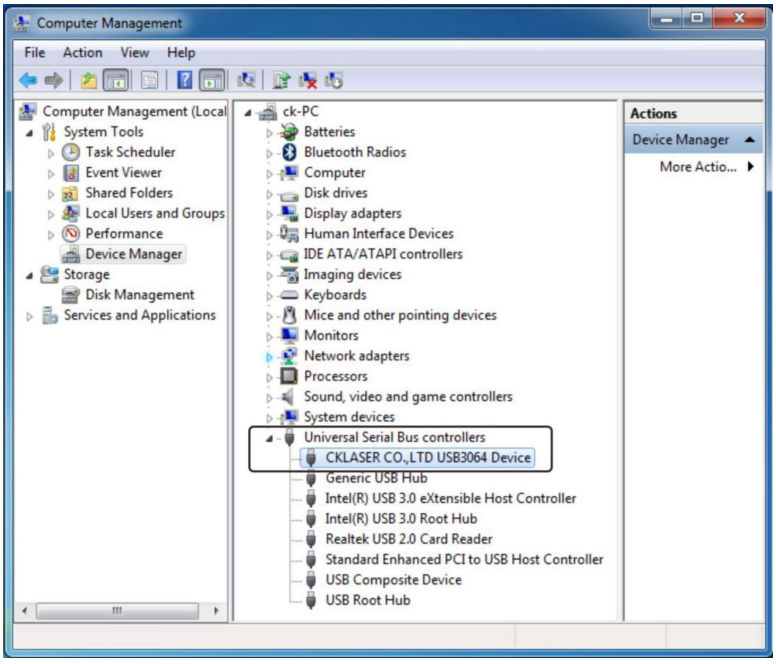
⚠Note: When the "Windows Security" dialog box pops up during installation, please select the option of "Always install this driver software".



Step 16. completed installation. If you see the installed USB driver shows CKLASER and the model of control card, that means the installation is successful, then click 【Close】 to exit the page.

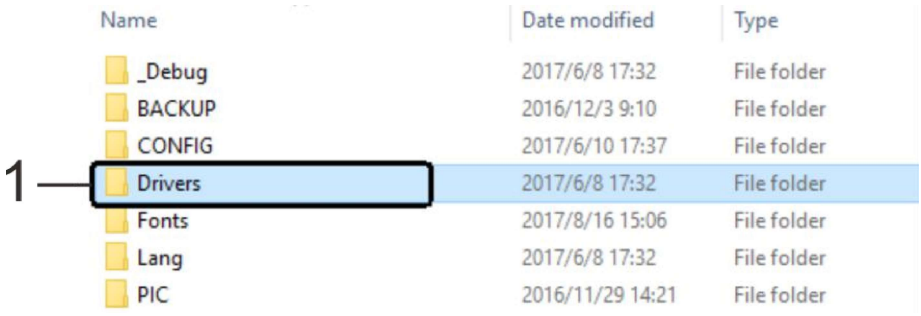


You also can enter into the computer management to see if the installation is successful, the following interface means that the installation was successful.

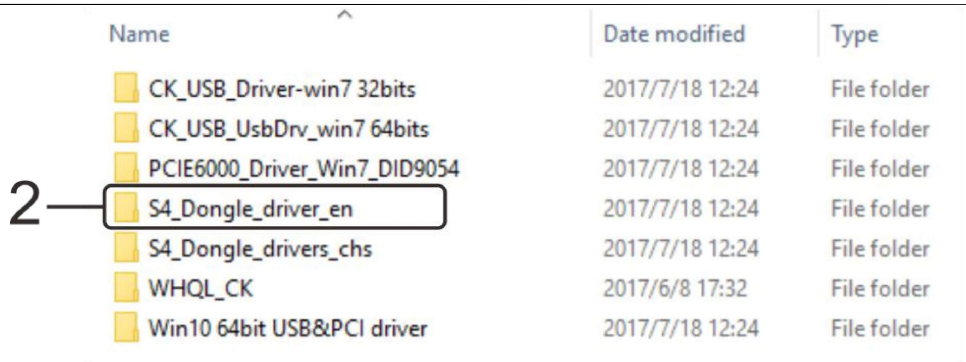


2.1.2.2 Install dongle driver

Step1. Plug dongle in PC, Open the “Driver” folder in the software

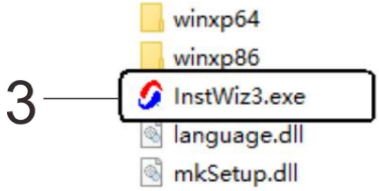


Step2. Select the language that corresponds to the computer to install.For example，If the system has been installed is Chinese, then select the folder of “S4_Dongle_driver_chs”



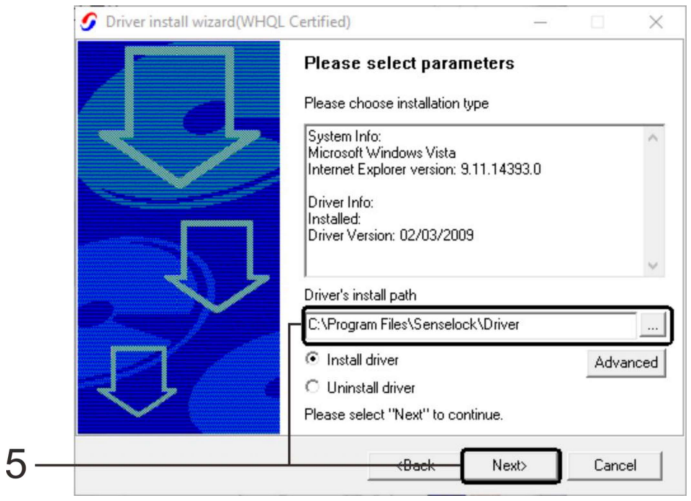
Dongle installation options

Step3. Double click “ InstWiz3 ” .

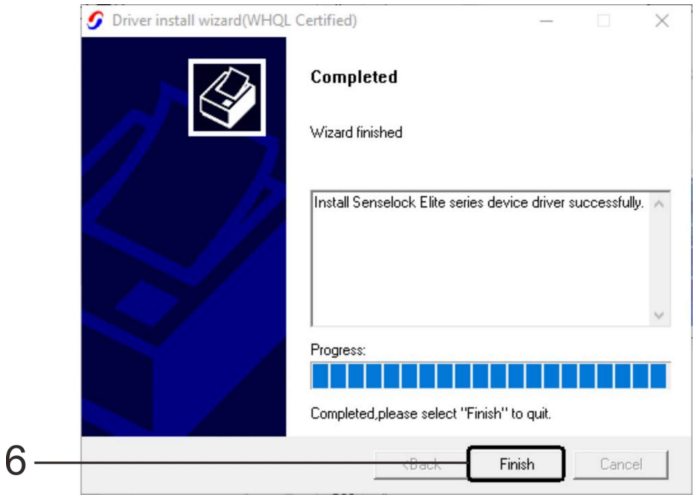


Step4. Click [Next]

Step5. Driver installation path is changeable, continue to click the button[Next]



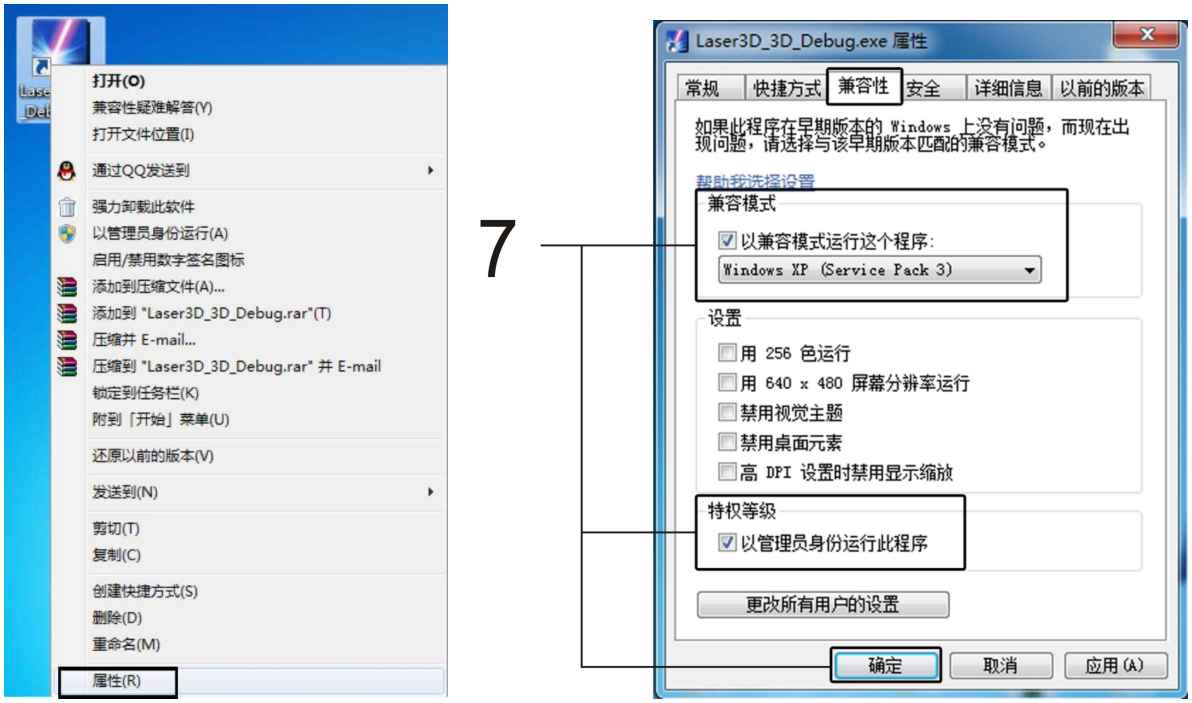
Step6. installation succeeded, click[Finish],close the page.



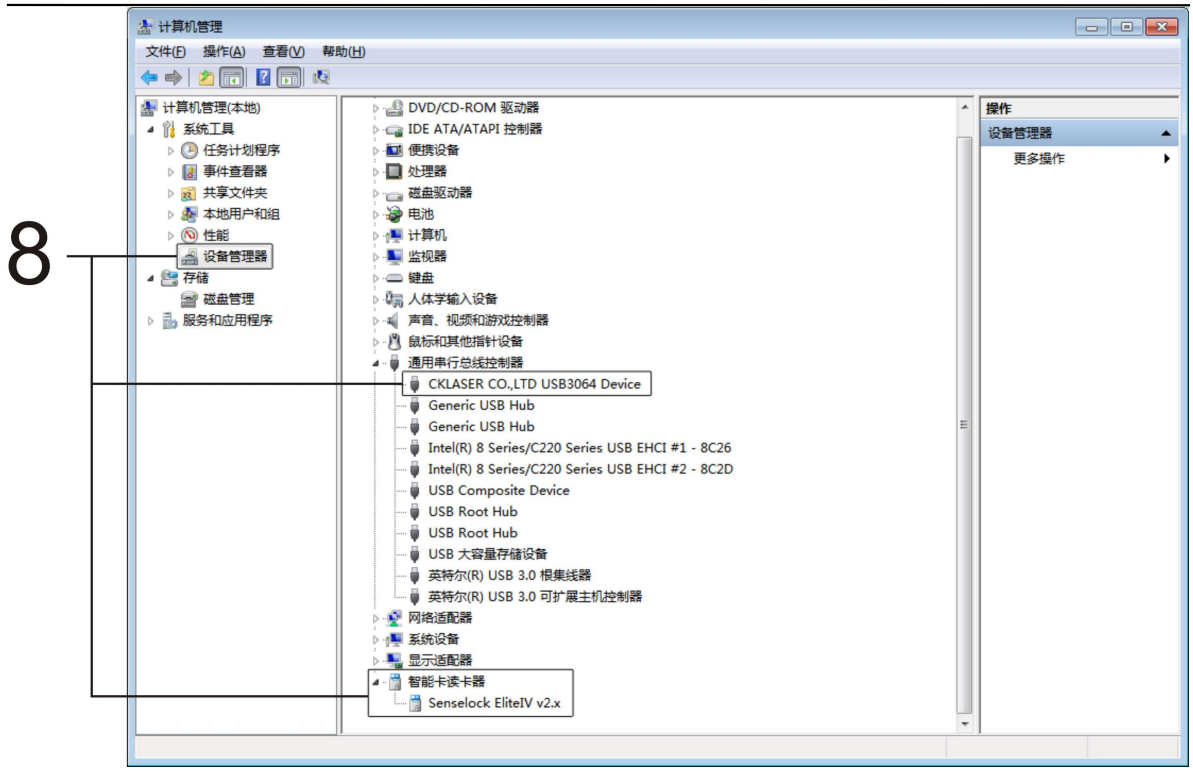
Step7. If the system is 64 bits of win10 or win7, the compatibility of software properties need to be modified.

Operation:Right click the software icon, select Properties to enter into the software properties;
In the ‘’compatibility’’ property, check "Run this program in compatibility mode", and choose “Windows XP(Service Pack 3)”
In the privilege level, check ‘’run this program as an administrator’’, then click[confirm]

⚠Note:This setting only needs to be set before the first open



Step8. After control card driver and Dongle be installed successful, connect Dongle with PC, open “Device Manager " to check ifr software driver and software dongle have been installed. After completing the installation,3DLaser software can be opened and run.



2.2 Description of auto focus function.

Auto-focus is implemented by exclusive focus control card and Original control algorithm equipped with high-precision CMOS sensor, with the advantages of pressing one-key to realize auto focus,high auto focus speed and precision, Operational safety protection,operation success or failure remain, easy to use and maintain,etc.

1. **One-button autofocus：** Pressing the focus button to find the current marking focus position;

Especially for the situation that need to find focus frequently and some focus can not be found manually has a very unique advantage.(for example:Uneven surfaces, irregular surfaces, small deep holes, small top surfaces and some inaccessible surfaces)

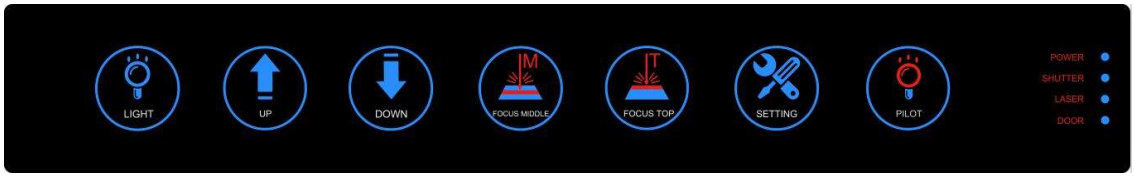
2.High speed and precision auto focus： Automatic focusing can quickly find the most accurate focus in the shortest time,while the manual focus need to find the focus by

ruler,.The accuracy of the focus depends on the accuracy of the ruler and the verticality of the measurement.

3. Operational safety protection, success or failure reminder： In the execution of auto focus or other motion,if there are the risk like the high objects enter into the focus area or it collide to scan head(lens), the motor movement or marking will stop;Besides.if press any key on the membrane panel can stop the current movement too; When performing any action (autofocus, self-test, etc.),The buzzer on the control board will be short beep, the buzzer beeps for three times means success while one long beep means fail.

4.Easy to use, easy to maintain： All the components of the auto focus system are interconnected, which part has a problem that can be replaced in the shortest time.

2.3 Panel features introduced



Light up down focus middle focus top setting pilot

2.3.1 lighting：

LIGHT： Press the button is on, press again is off.

2.3.2 Operation and instructions of auto focus

2.3.2.1 effect：

1） FOCUS MIDDLE： It is base focus(the middle surface of 3D marking or 2D marking surface)；

2）FOCUS TOP：It is focus for the highest surface, it can also used for focusing for 2D machine with different lens.

2.3.2.2 Operation of auto focus：

1）**auto focus：**press focus middle/focus top, focusing red light appears,press focus middle/focus top again,The moving axis automatically moves to the center of the laser to focus on the base or the top surface That is, through the moving axis to the paraxial focus into coaxial focus,The buzzer automatically looks for the focus point of workpiece after the buzzer is shorted beep while performing the focusing; after performing the focusing ,if you hear three beeps, it means focus successfully.if you only hear one beep, that means focus failure.

Operation：

FOCUS MIDDLE :press 

, press again 

FOCUS TOP： press 

,press again 

2)When auto focus is working,if you press any button in panel,it will stop working,The buzzer beep one time means focus failed, if the buzzer beep three time means focus successfully.

3） In focusing, all the light sources that affect the focus precision will automatically be turn off, after that all of them will be turned on automatically.

4）Setting auto focus：

a）setting middle focus：Press “setting”,then double press “focus middle” in 1 second.we can set the distance from lens to work area as focus distance .In focusing or setting auto focus, all the light sources that affect the focus precision will automatically be turn off, after that all of them will be turned on automatically.

Operation：

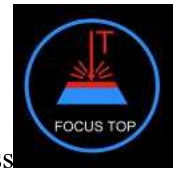
Focus middle setting： press 

+double press 

b）Focus top setting：Press “setting”,then double press “focus top” in 1 second.,we can set the distance from lens to work area as focus distance .In focusing or setting auto focus, all the light sources that affect the focus precision will automatically be turn off, after that all of them will be turned on automatically.

Operation：

Focus top setting： press 

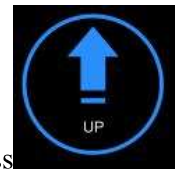
+double press 

2.3.2.3 Set the laser marking and focusing position：

1）Laser position setting: press focus middle + double click up,The current position of the moving axis will be set as laser marking position

Operation：

Laser position setting ： **press** 

+double press 

2）Focus position setting: press “FOCUS MIDDLE” + double press“DOWN”,it will set current position of moving axis as focus position.

Operation：

Focus position setting： 

+Double press 

Noted: When setting the focus, you must set the focus position to the marking position, and must ensure that the machine and the work area must be absolutely stationary for three seconds, otherwise it will affect the follow-up focusing accuracy or failed to set the focus.

2.3.3 Locating red light

Press "PILOT" to turn on double red pointers, press again to turn off them, long press for three seconds to turn on inner red light, long press for three seconds again to turn off it.

2.3.4 switch moving axis.

2.3.4.1 Switch Y axis and Z axis. Switch it by pressing "SETTING" + then press "SETTING" for 5 seconds.

Operation：

switch： press 

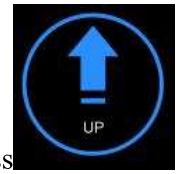
+press for 5 seconds 

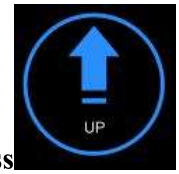
2.3.4.2 Y axis mode: by short-pressing "SETTING" + long press"SETTING" for 5 seconds, the buzzer will beep for a short time and switch Y axis to the jog mode.

In Y axis mode：

1）Press “UP” , the Y moving axis slowly move inside, if you want to move quickly, hold “UP” and add “SETING” to accelerate to move inside；

Operation：

Move inside slowly： press 

； accelerate：**press** 

+press 

2）Press “DOWN” , the Y moving axis slowly move outside, if you want to move quickly, hold “DOWN” and add “SETING” to accelerate to move outside；

Operation：

Move outside slowly： press 

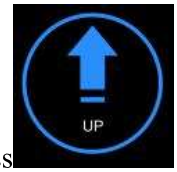
； accelerate：press 

+press 

3）Auto focus position:press SETTING+double click UP, Z axis will move to position of auto focus.

Operation：

Auto focus position： press 

+double press 

Noted： If you do not operate the moving axis within 30 seconds, it will automatically exit the moving axis mode.

2.3.4.3 Z axis mode： by short-pressing "SETTING" + long press"SETTING" for 5 seconds, the buzzer will beep for a short time and switch Z axis to the jog mode(that is,exit Y axis mode,the default is lifting axis jog mode).

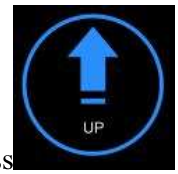
In Z axis mode：

1）Press “UP” , the Z moving axis slowly rise, if you want to move quickly, hold “UP” and add “SETING” to accelerate to rise.

Operation：

rise： 

； accelerate：press 

+press 

2）Press “DOWN” , the Z moving axis go down slowly , if you want to move quickly, hold “DOWN” and add “SETING” to accelerate to go down；

Operation：

Go down： 

；accelerate：press 

+press 

3）Self-checking:press “SETTING”,Double press “UP” in 1 second,it is for Z-axis self-checking

Operation：

Self-checking： press 

+double press 

Note:self checking has been completed before shipping, normally no need self checking .

2.3.5 Reset function

Press “SETTING”,double press “DOWN” in 1 second,press it for 2 times, Y-axis will move to laser marking position

Operation：

Reset： press 

+press 

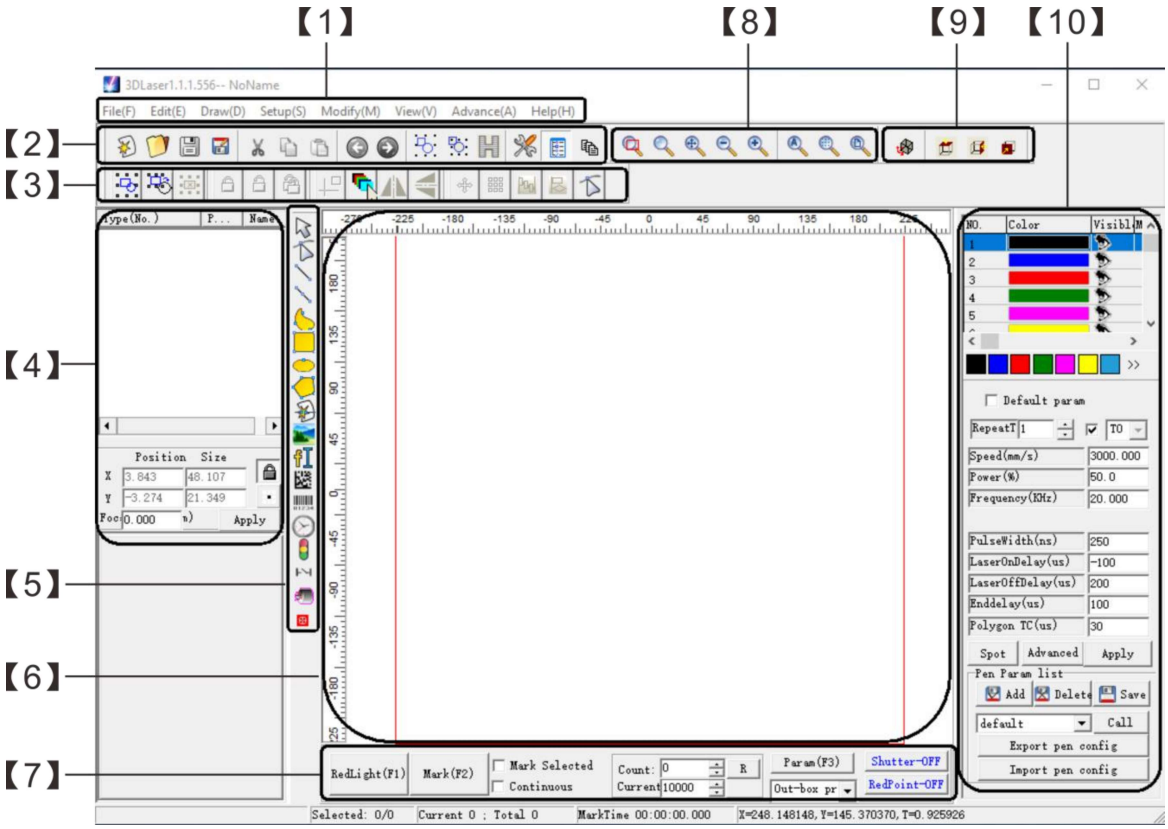
2.3.6 Emergency stop

Emergency switch button STOP：If there is an accident, press the button to stop the machine working; turn the button clockwise to release.

Note: Auto focus setting ,self checking ,They have been set up after the machine completed, please suggest customer don`t change it by themself.

2.4 Software introduction

2.4.1 Operation interface



【1】menu bar

Function can be selected from menu bar.

【2】System Toolbar

The frequently used functions can be operated from the standard toolbar.

【3】Modify toolbar

Modify the objects that have been drawn or edited

【4】Object property toolbar

Display the object's properties, but also can edit the properties.

【5】Draw toolbar

You can draw or edit objects.

【6】Preview area

It can display the object of editing, but can also do some simple operations directly

【7】Marking icon bar

Red light and manual marking can be controlled, as well as marking methods set.

【8】View toolbar

Adjust the preview area.

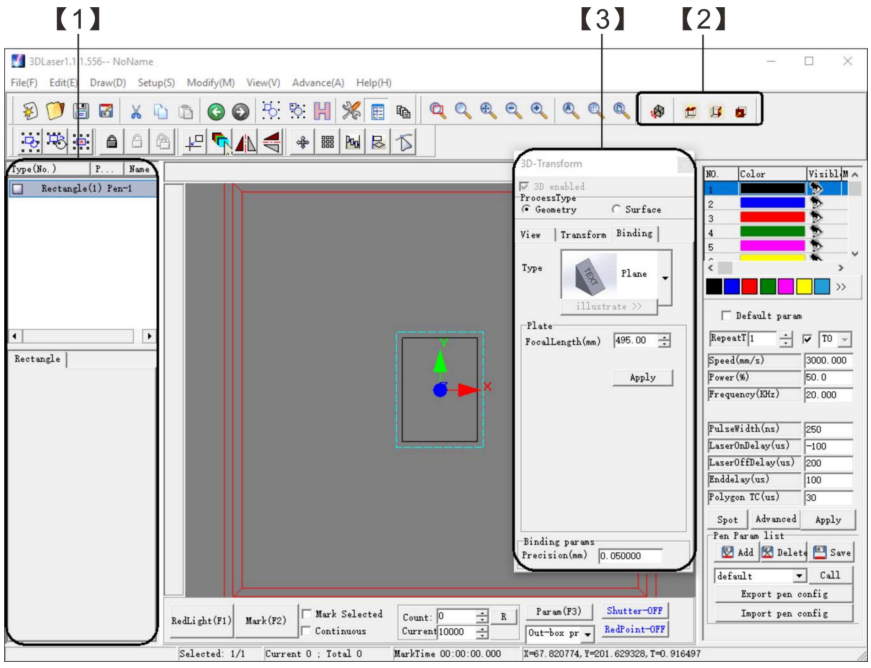
【9】3D View area

Perform conversion between 2D and 3D, as well as view conversion.

【10】Marking parameters bar

You can set the pen number and parameters.

2.4.2 3D Operation interface



3D Edit window

【1】Object property bar

The properties of the edited object are displayed, and the property can not be changed.

⚠Note: The 3D object's property bar is different from 2D and can not be changed.

【2】3D View area

Click into the 3D view, but also the button to switch between 2D and 3D, as well as perspective conversion.

【3】3D Change bar

Transform types, transformation coordinates, transformation angles, and views can be set.

3D transform dialog can be moved.

⚠Note:Please refer to the software manual for details

2.4.3 Tool Introduction

Import and export files, vector graphics, pictures, draw graphics, draw text and bar codes, marking parameters and pen settings, fill settings, etc.

1）open a file： Click the icon  Open the saved * ezm file directly,Or click "File" → "Open" in the menu bar to open * ezm file.

2）Import graphics:

① Import vector illustration： Click the icon  Import vector illustration,Or click "File" → "Import Vector File" in the menu bar to import vector image.

② Import bitmap (picture): Click the icon  Import bitmap,Or click "File" → "Import Image File" in the menu bar to import the bitmap.

3） Draw graphics: Click the icon in the toolbar  Can draw graphics.

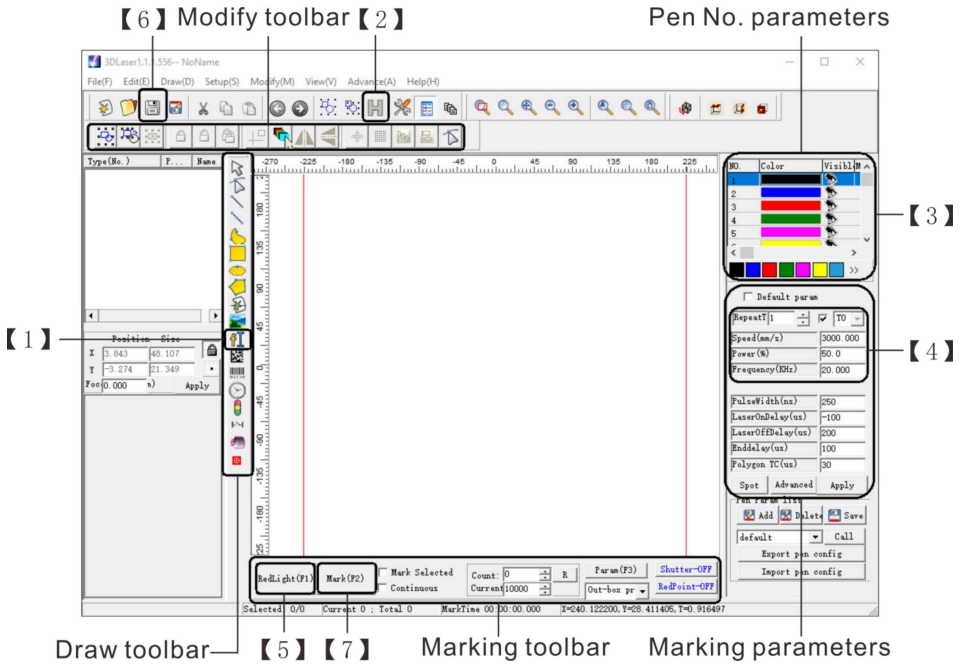
4）Draw text： Click the icon  to draw the text.

5）Draw a barcode:

① Draw two-dimensional code: Click the icon  to draw a 2D barcode.

②Draw a one-dimensional bar code: Click on the icon  to draw a 1D barcode.

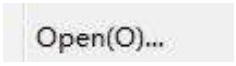
2.4.4 Basic operation flow



Software basic operation process：

Step 1: using the drawing tool in the drawing tool to draw in the preview area or 【import target graphics】,Select menu bar〖File - Import〗option, the dialog box appears,You can also click the

button  in the drawing toolbar. select the PLT file to be imported in the pop-up dialog box,

Press the button 

to import the image.

You can also open the file directly, click the button  in the toolbar. select the document you want to open in the dialog box, press the button  .

If you want to set the marking parameters of the various parts of the marking parameters are different, you need to select corresponding pen number before drawing, or select the part you want to change after drawing, double-click the mouse.

[Pen number parameter column]squares represent corresponding pen number.

Step 2: Click the selected drawing, use the tools in the draw toolbar [Modify Toolbar] to set the position , rotation, scale, size, tilt, of the target graph, etc.

Step 3: set the marking parameters of corresponding pen number and apply.

Step 4: Do the operations of red light preview ,setting marking ways and marking in the marking toolbar.

2.5 Quick start-fit design on 3D any surface

2.5.1 Import graphics:

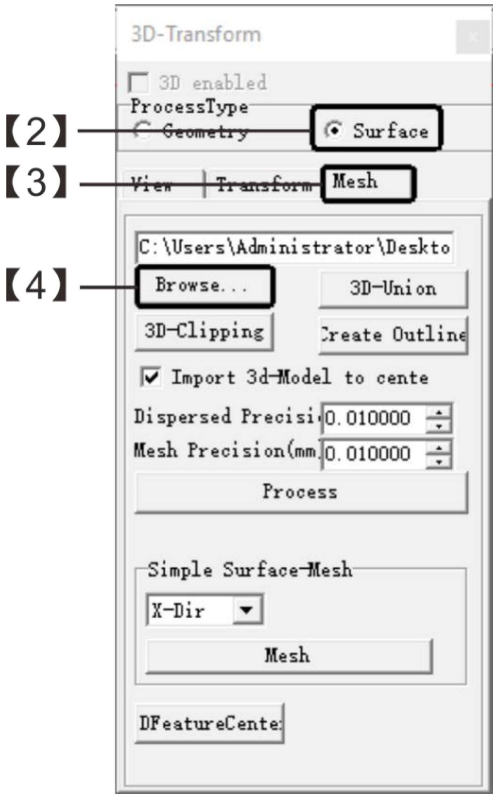
【1】Click the icon  to enter the 3D view interface.

【2】Click "freeform surface"(?)

【3】Click the [Z Mesh] button.

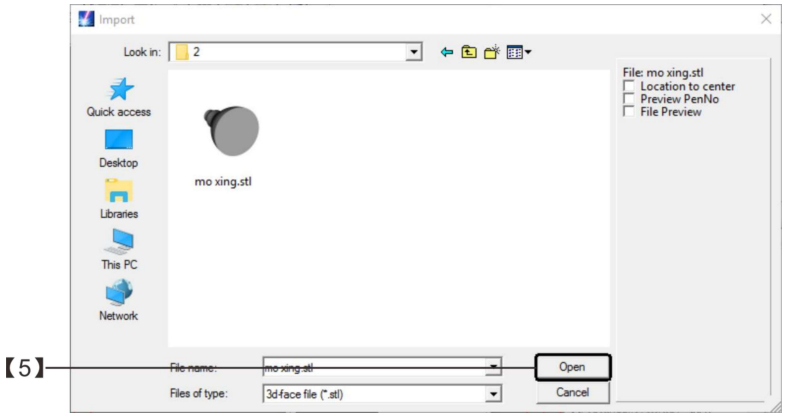
【4】Click on [Import…] button.

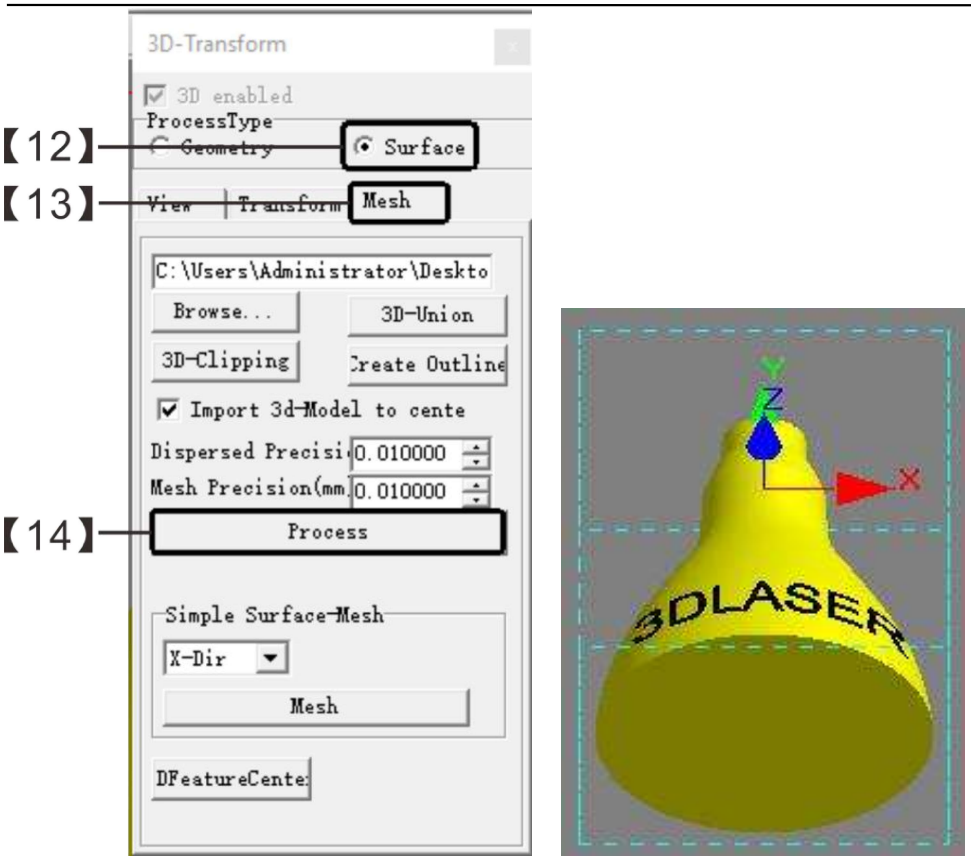
【5】Look for the path of storing model diagram, click on [Open button and import STL model diagram.



【14】Click[Apply]button，successful binding.

The diagram is bound, the figure as below.





(3) Click the icon to exit 3d view then back to 2d view, set the marking parameters (pen number, number, speed, frequency, power, energy), red light positioning and performing the marking.

2.5.3 Set the marking parameters

（1）Click the icon  to exit 3d view then back to 2d view

（2）Set the marking parameters (pen number, number, speed, frequency, power, energy)

（3）Marking step（red light positioning and performing the marking）

三、Application

3.1 Common sample parameters

3.1.1 Aluminium cans 2 - bar code black marking

Technological requirements

Certain gray value, bar code readable, engraving depth requirements, bar code size 5.5 mm × 5.5 mm, time control in the 6s

Technological parameters	
Machine	M1+
Lens	f=163 mm
Power	8~12W
Pulse	10ns
Frequency	150kHz
Speed	280mm/s
Fill	0.01mm

Effect analysis：

When use small pulse width action ,the single pulse energy is small, can achieve the edge neatly, will not have the residue, the depth is shallow, the mobile phone bar code can be identified, marking time is 5.6s.

3.1.2 Color marking

Color	Blue	Purple red	White	Yellow	Purple	Black	Green
Speed (mm/s)	600	500	800	600	500	300	800
Frequency (Khz)	370	500	50	500	500	200	380
Power (%)	30	31	60	35	32	40	33
Pulse	8	4	200	4	4	20	9
Mark times	1	1	1	1	1	1	1
Fill angle	0	0	Cross	0	0	0	0
Fill space (mm)	0.002	0.003	0.11	0.005	0.002	0.002	0.001
⚠ Note: the laser is MOPA laser, and the marking object is 304 mirror steel plate; Because the color marking is sensitive to the material, this parameter is for reference only.							

Samples:

Note: the color engraving function is limited to the laser source.

3.1.3 Relief

Marking parameters							
Material	Copper	Machine	60W JPT	Focus	280	Lens	210G
Accuracy	0.008	Type	Positive	Fill	Filll&fill2	Fill type/angle	Single direction 0° /90°
Fill space	0.03	Speed	3000mm/s	Power	90%	Frequency	60KHZ
Size	75*75mm	Out line	78*78mm	Real depth	3.4mm	Time	23h
Cleaning parameters							
Speed	5000mm/s	Power	35%	Frequency	80KHZ	Cleaning times	3
.Stl figure: 				Result: 			

Marking parameters							
Material	Copper	Machine	60W JPT	Focus	280	Lens	210G
Accuracy	0.004	Type	Positive	Fill	Fill1&Fi112	Fill type/angle	Single direction 0°/90°
Fill space	0.03	Speed	3000mm/s	Power	90%	Frequency	60KHZ
Size	75*75mm	Out line	78*78mm	Real depth	7.2mm	Time	52h
Cleaning parameters							
Speed	5000mm/s	Power	35%	Frequency	80KHZ	Clean time	3
.Stl: 				Result: 			

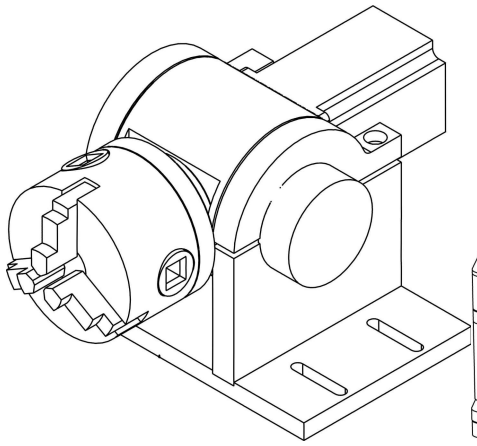
⚠**Note: this function needs to have relief software**

3.2 Expanding function

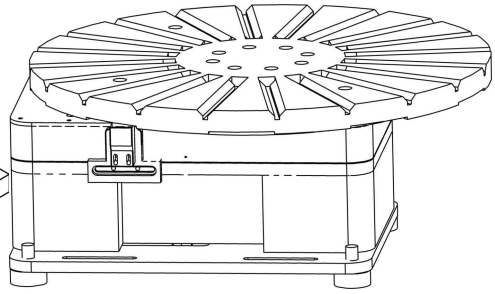
3.2.1 Accessories introduction

Accessories equipment : expanding axis(rotate, disc, linear table, drive box, signal cable, power cable

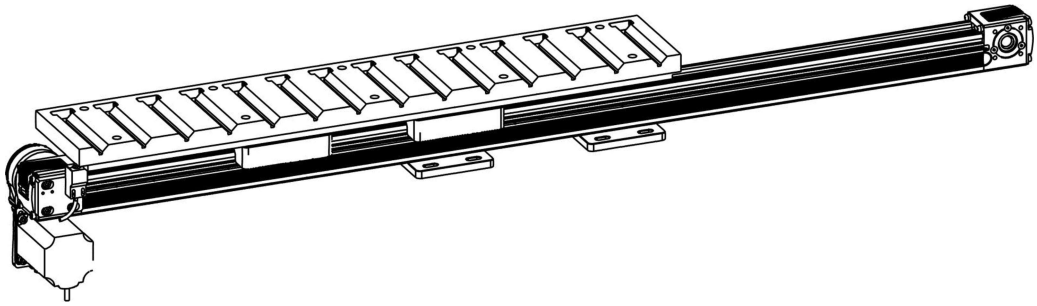
Expanding axis:



Rotate

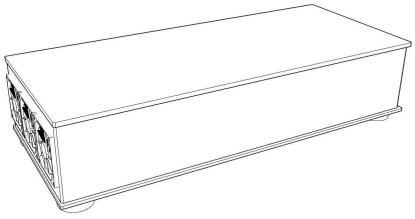


Disk



Linear table

Others：



Driver box

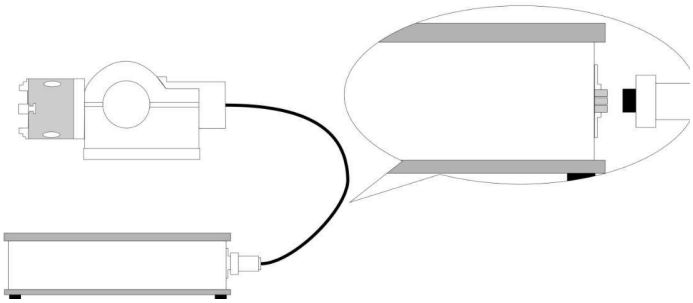
Signal cable

Power cable

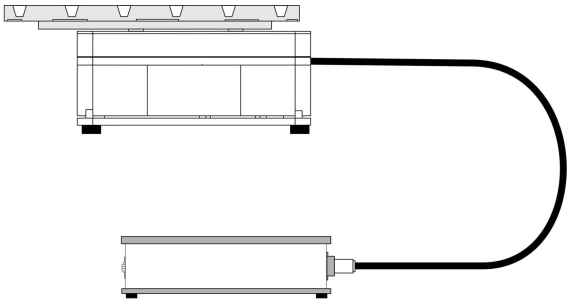
3.2.2 Installation

Step 1. First connect the 5pins plug to driver box ；

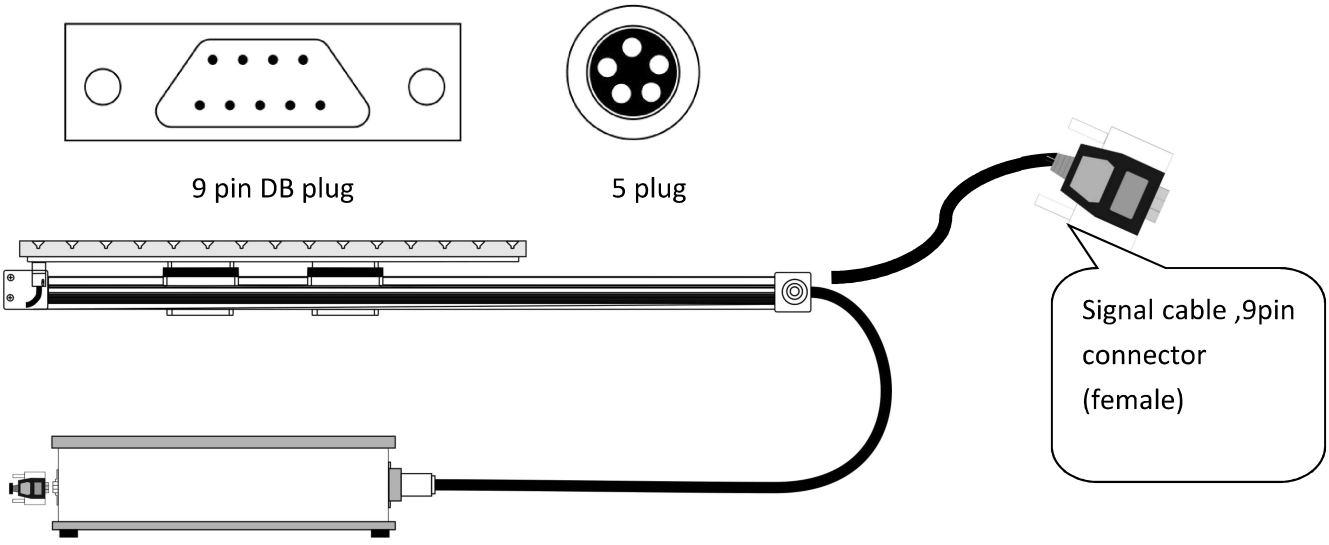
Rotate：



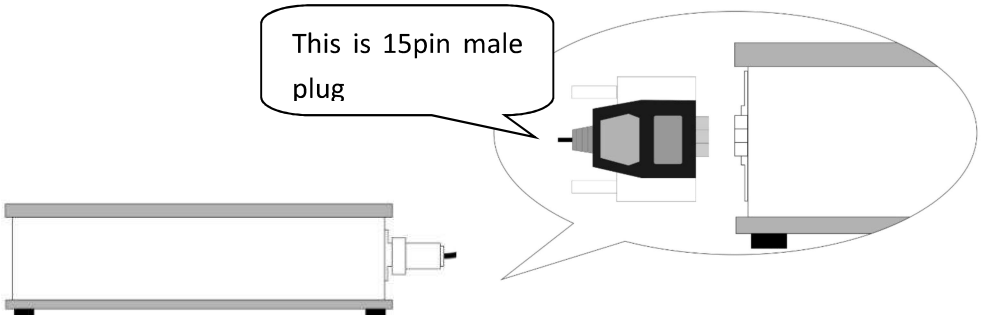
Disc：



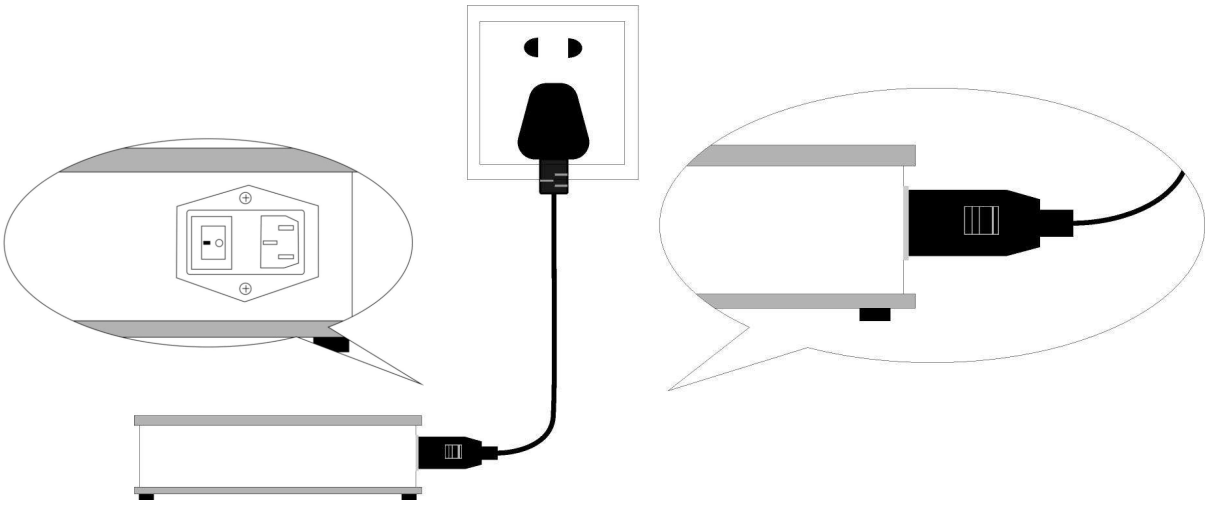
Linear table： it has two plugs ， 5pin plug and 9 pin DB female plug ； 5pin plug which connect to driver box ， connect the DB and tight bolts； 9pin male DB plug is for signal cable；



Step 2.signal cable： connect to “Taste” and driver box；



Step3.connect power cable ,switch on



3.3 Common problem

3.3.1 Laser marking machine is dangerous?

The chart below lists the various levels of laser by grade and what user should be aware of when using each type:

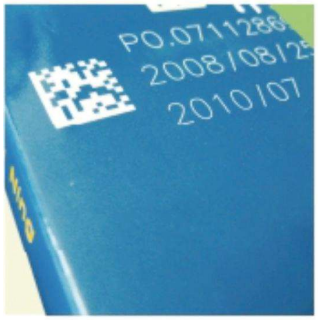
IEC standard

Laser level	Level definition
Class 1	Under modest and predictable operating conditions, including the use of optical instruments for internal beam, safe laser.
Class 1M	The lasers emit laser light at wavelengths between 302.5 nm and 4000 nm, which are safe under moderately predictable operating conditions, but may be dangerous if the user is using optical equipment within the beam.
Class 2	Emitted visible radiation, the wavelength between 400nm to 700nm, usually produce eye-protection mechanism of the toning reaction, including the instantaneous reflection of the laser. This reaction can be expected to provide adequate protection under moderately predictable operating conditions, including when using optical instruments for endoscopy.
Class 2M	Emitted visible radiation, the wavelength between 400nm to 700nm, usually produce eye-protection mechanism of the toning reaction, including the instantaneous reflection of laser. However, looking at the output laser may be more dangerous if the user is using optical equipment in the beam.
Class 3R	The wavelength of the emitted laser beam is between 302.5nm and 106nm. The potential of the direct beam is potentially dangerous, but the risk is lower than that of the 3B laser. The user's manufacturing requirements and controls are lower than those for Class 3B lasers. Achievable emission limits are within five times of Class 2 AELs between 400 nm and 700 nm and within five times of Class 1 AELs of other wavelength ranges.
Class 3B	There is usually a dangerous laser when exposed to light. (that is NOHD (rated visual hazard distance)). It is usually safe to watch diffusely.
Class 4	Can produce harmful diffuse laser meanwhile. It can cause skin burns and can cause a fire. Shall be more careful when using it.

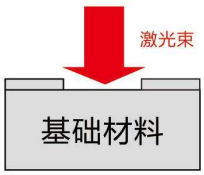
FB laser marking machine is classified as Class 4 laser.

3.3.2 Is the laser marking machine producing color contrast on the part being engraved?

Depending on type of menu, color contrast can be achieved. FB lasers have advantages than CO2 lasers in color, albeit with resin material compatibility.



Mobile phone shell



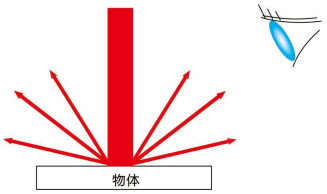
剥离印刷表面
剥离目标表面上的一部分图层/印刷在基础材料和涂层/印刷表面之间形成对比。

剥离表面层
在雕刻件上的目标表面层铭刻

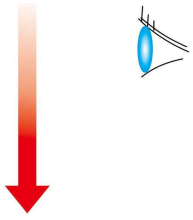
上色
目标自己会发生色彩对比

3.3.3 Is the laser visible light ?

The laser itself is not visible. Due to the laser's unique high directivity, we can not see the beam path. Normally we can only see the diffuse and reflected laser light on any object. In misty or airy environments, we have just seen the light beam's path because light is diffused and reflected by the particles.



从物体反射的光能看见



激光不进入眼睛-不可见

3.3.4 Laser engraving is how to produce color contrast ?

Color engraving principle is divided into four types:

1）Blistering marking

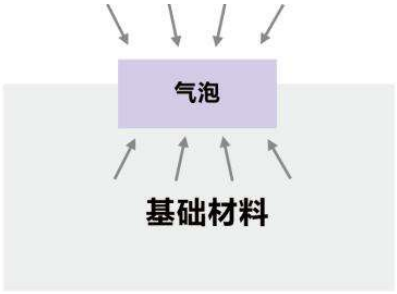
2）Condensation marking（Need additives）

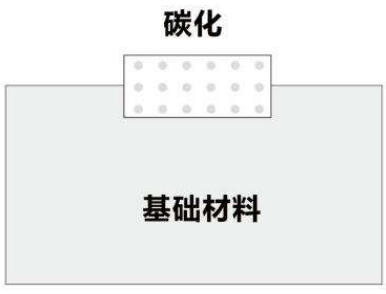
3）Carbonized engraving（Need additives）

4）Engraved by chemical effect

3.3.5 How the laser engraving to produce color contrast ?

<table>
<tr>
<td>a. Blistering
 

When laser light is emitted, bubbles are generated in the base material by heating. After the bubbles are vaporized, the gas is sealed on the surface layer of the base material, and is white as it expands. The darker base color changes significantly to a lighter base color, so the visibility is high.
Example: red to pink.</td>
<td>b. Condensation
 

When the dye component contained in the base material absorbs the energy of the laser, the molecular density of the dye increases due to the heat and the dye thus condenses to a dark color.</td>
</tr>
<tr>
<td>c. Carbonize
 

By sustained release of high energy, the</td>
<td>d. Chemical effect
 

The basic material dye components
always contain metal ions, because the crystal</td>
</tr>
</table>

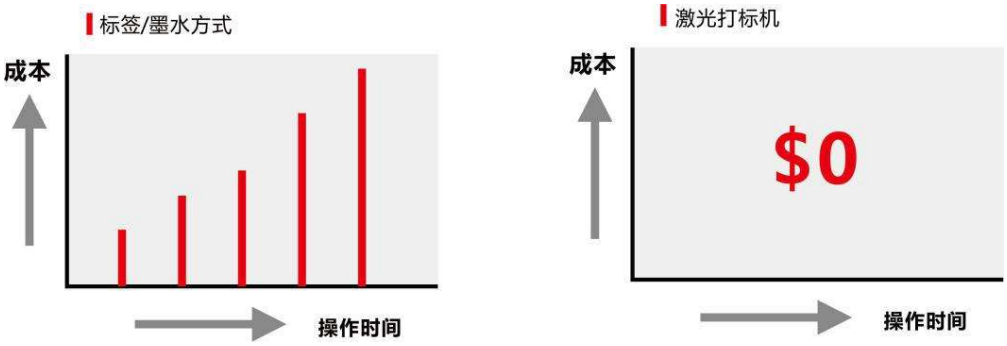
polymer material around the dye is carbonized and darkens.	structure of metal ions and crystal water content is laser to change, the chemical composition of the chemical changes, increasing the concentration of the dye, which can be colored.

3.3.6 What is the running cost?

Zero cost

In principle, there is no cost other than the daily cost of electricity. Laser marking machine has a "no consumables" and "long-term life" two major features. Laser marking machines significantly reduce the number of material management steps without the cost of inks and labels.

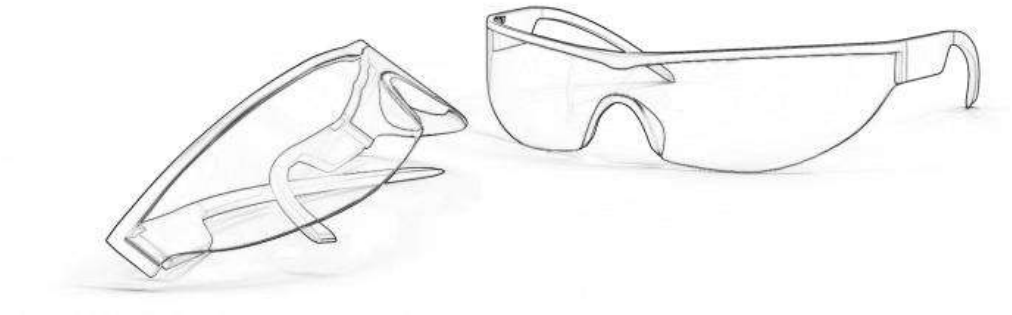
Compare running costs



3.3.7 Can we look into the laser ?

Do not look directly at the laser, specularly reflected laser, or diffusely reflected laser. If the eye is exposed to direct laser light, it may cause blindness.

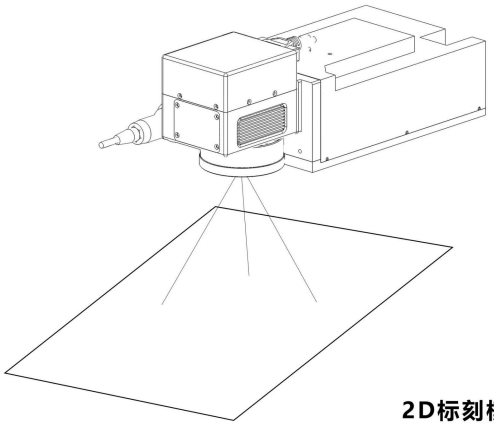
When using laser equipment, the operator must wear special protective goggles to protect the eyes.



3.3.8 What does "marking space" mean ?

The term "engraving space" for three-axis controlled laser marking machines refers to the term "marking area" used for conventional laser marking machines that can only be 2D engraved, ie "area." On the other hand, the three-axis control laser marking machine provides a concept of volume or "space" because the focus is constantly changing so the three-axis control laser marking machine should be expressed in "space" instead of "area" .

2D Marking mode：

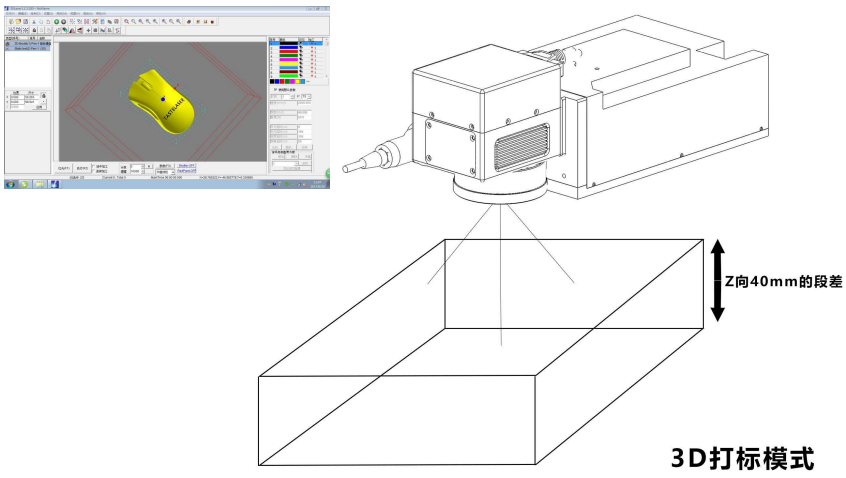


2D标刻模式

Traditional (2D Control) Laser Marking Machine - Engraving Area: 120 * 120mm (Example)

Focus adjustment can only be carried out on a flat basis, namely 2D.

3D marking mode:



Three-axis control laser marking machine
- Engraving space: 120 * 120 * 40mm (example)
The focus can be freely adjusted on the basis of space, namely 3D.

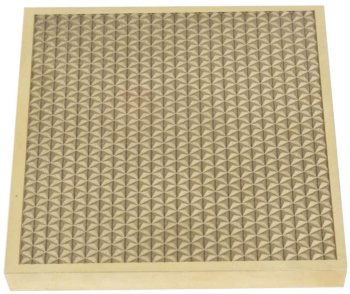
3.3.9 Which industries will use laser engraving machine

The laser marking machine is traditionally used in electrical products, electronic components and metal components.

Today, their uses have been extended to medicine, cars, food and medicine, as well as many other consumer industries.

Metal Tools

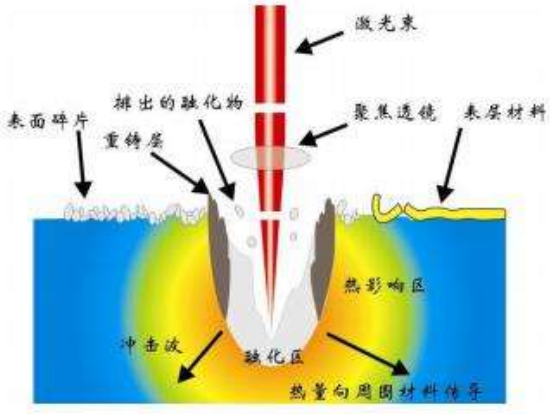
LED light



Mould

3.3.10 Is the printing of a laser marking will be permanent?

One of the most important features of the laser marking machine is that it can print semi -permanent print images. Please note that as the laser marking machine is to process the surface of the target, the printed image can not be removed as easily as the ink printed image. This feature makes the laser marking machine in the security application (preventing forgery), in recent years is becoming more and more popular.



激光加工示意图

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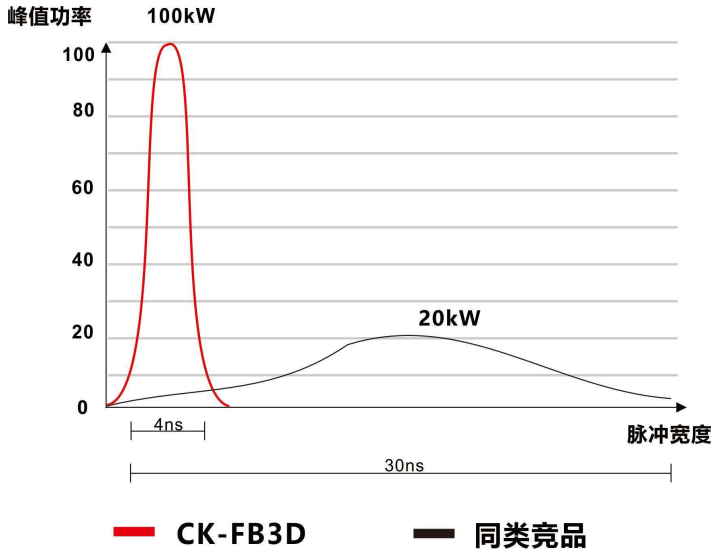
3.3.11 “Peak power” what is the meaning?

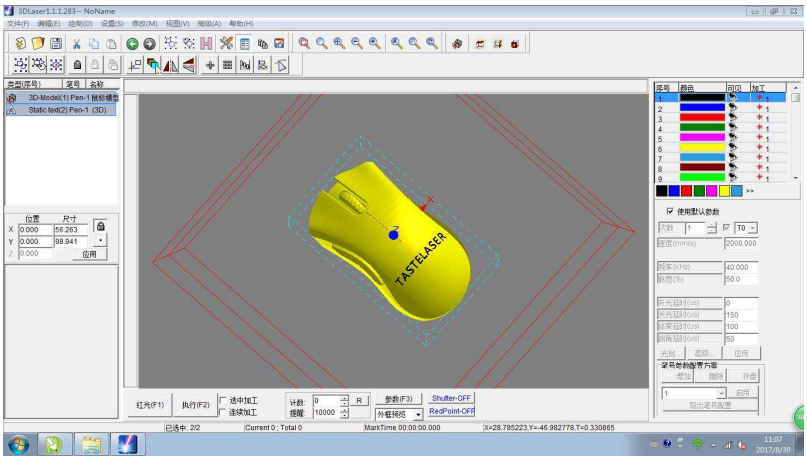
The peak power is the value of the pulse energy divided by the pulse width of the laser. Watt (W).

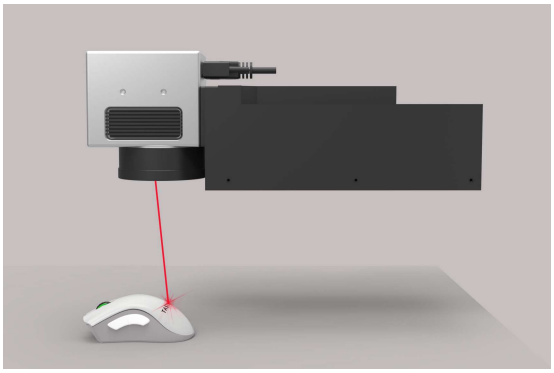


峰值功率大（非常适合铭刻金属或树脂着色）
脉冲宽度小（在目标物体上的热应力小）

3.3.12 What is the three axis control laser?

That is meaning ,the 3 axis control laser can print a clear image of a 3 dimensional shape on the target object. The conventional laser marking machine can only control the X axis and the Y axis, so they can only print on the plane (2 dimensions). The laser marking machine with 3 axis control operates on the X axis and the Y axis and the Z axis. Such 3 - axis control can be printed in almost all shapes, including cylindrical, conical, and tilted surfaces. Even a highly uneven surface.





3.3.13 What is the three axis control laser?

The three axis dynamic focusing system is designed with the optical design of the front focusing mode and the vibrating mirror and software.Compared with the post focusing method,

the laser output spot is focused by a dynamic focusing mirror.According to the distance between each point of the work area plane and the focusing mirror, the focal length of the focusing mirror is changed by software algorithm, so that all the beam spots after focusing can be gathered into the plane of the work area. In this optical design, the speed of marking is up to 15000mm/s, and the speed is up to 40~50% compared to the marking machine using the post focusing mode on the market.

A schematic diagram of the structure of three axis laser marking machine

3.3.14 What is the three axis control laser?

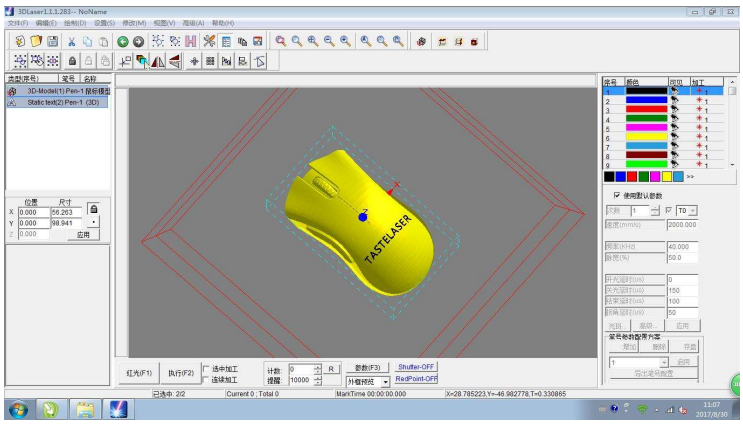
Precision three axis engraving

The 3D marking solves the traditional marking problem of laser marking on the ladder surface, slope, cylinder, cone and other targets, and makes the font distortion and deformation become the past tense.

3.3.15 What is the three axis control laser?

Professional software

The humanized operation interface of the 3DLASER supporting software is flexible and easy to operate, which provides the feasibility for the efficient flexible processing.

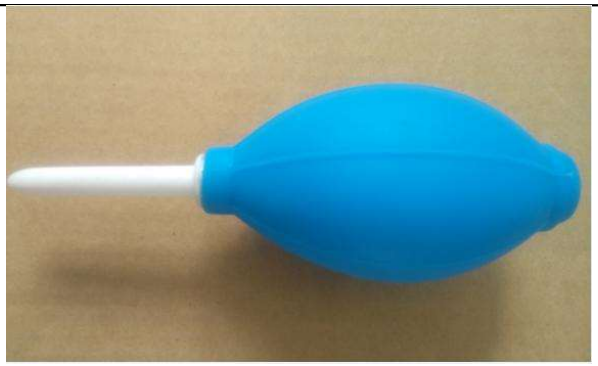


4. Maintenance

4.1 Equipment Maintenance

4.1.1 Tools

Wipe paper: for wiping equipment optical lens ,usually need industrial spirit



Balloon: for blowing the dust and impurity on lens.

Blowing gun: for blowing away dust and impurity in cabinet of equipment.

Static electricity brush: for sweeping dust and impurity in the cabinet (anti-static usage)

⚠Note: NOTE：NOTE：Recommend maintain equipment through above tools, please buy the tools by yourself, CK do not provide maintain equipment.

4.1.2 Equipment maintenance--introduction

① 1.Ambient environment: tempreture15~35℃,humidity30~80%

② 2.Doing simple clean after daily working.

③ 3.Blowing dusty on the lens after daily working in dry way.

④ 4.Cleaning the dusty in the side of equipment monthly.

⑤ 5.NOTE: All maintenance works should be done after equipment power-off.

4.1.3 Equipment maintenance—Lens

Effect of blowing dust by Balloon effect of wiping by spirit

① Daily maintenance: blowing dust on lens through balloon.

② Professional maintenance: need take off lens and wipe it by spirit, once the impurity can not be blown by balloon.

③ Wiping method: folding the wiping paper dipping in spirit and wiping the dirty, wiping one time in one way, then fold again. Rewiping it till it's clean, then using clean wiping paper dry the lens.

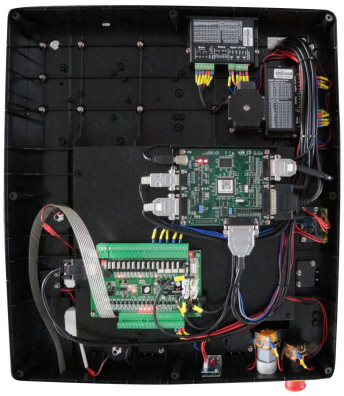
4.1.4 Equipment maintenance dusting

① Using brush cleans dust on air filter and equipment parts.

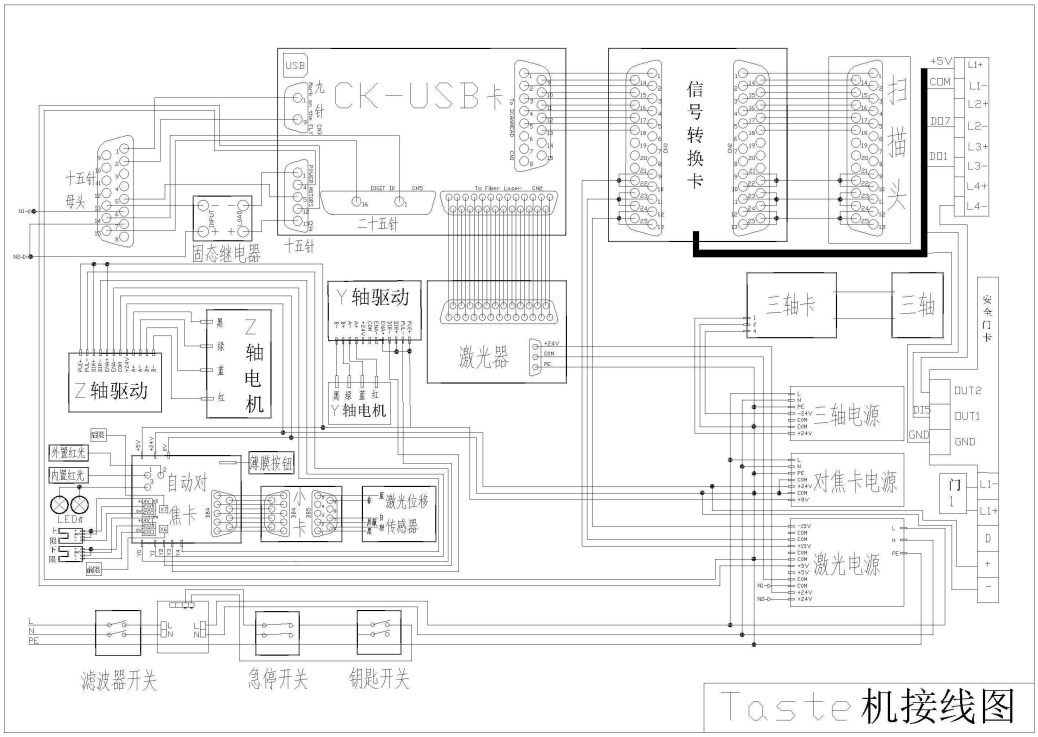
② Using blowing gun blows dust and impurity.

③ Way: from top down, from inside to outside.

⚠ Note: all maintenance operation need to be done after cutting the power.



4.2 Circuit diagram



4.3 Quick maintenance

4.3.1 Trouble analyze: open software and can not read control card.

Reason 1: Is USB control card driver installed well or not?

Solution: If the driver is disappear, it need be installed.