



Type III
Fiber Laser Marking Machine
User Manual

用户手册

光纤激光打标机



深圳市威斯利激光设备有限公司
SHENZHEN WISELY LASER MACHINERY CO., LIMITED
NO. 7 BUILDING, NO. 5 INDUSTRY ZONE SHUTIANPU,
MATIAN, GUANGMING DISTRICT, SHENZHEN 518106 CHINA
T: +86-755-32998419 E: sales@wwlaser.com W: www.wiselylaser.com
智•信•銳意•敢擔當——威斯利激光

Thanks

感谢

It is our honor to be one business partner of yours, our aim is to offer high-quality, easy-operation laser marking solution to each customer.

很荣幸成为您的商业合作伙伴，我们的目标是给每一个客户提供高质量、易操作的激光打标方案。

Wisely Laser Machines brings you new concepts of industrial fiber laser marking system-proudly designed and built right here in China.

威斯利激光设备将会带给您全新的工业光纤激光打标概念。

Before using the machine, we kindly advise you to read the user manual carefully.

在使用机器之前，我们温馨地提示您仔细阅读这本用户手册。



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Chapter 1 Brief Introduction and Applications

第一节 机器简要介绍和应用

1.1 Brief Introduction 机器的简要介绍

Wisely fiber laser marking adopts world's most advanced technology, it is the third-generation laser marking system. It adopts fiber laser source to achieve marking function by ultra-high-speed scanning system. The fiber laser marking conversion is efficient, longer lifespan and energy-saving.

威斯利光纤激光打标机采用世界最先进的技术，第三代激光打标系统。它采用光纤激光器，通过超高速扫描振镜实现打标功能。光纤激光打标机电光转化效率高、使用寿命长和环保节能。

It can carve metal materials and some non-metallic materials, such as gold, silver, copper, brass, aluminum, stainless steel, silicon steel, carbon steel, chrome steel, cast iron, titanium, molybdenum, multi-coated metals, painted metals, ABS, carbon fiber, coated non-metallic material, PVC, PET, painted non-metallic materials and so on.

打标机可在大部分金属材料和一些非金属材料表面进行雕刻和切割，例如金、银、铜、黄铜、铝、不锈钢、硅钢、碳钢、铬钢、铸铁、钛、钼、镀层金属、涂漆金属、ABS、碳纤维、涂层非金属材料、涂漆非金属材料和PVC等。

1.2 Application 应用领域

Application in promotional gifts, Apple Products, watches & jewelry, auto parts, mechanical engineering, medical technology, security & ID, Lighting & house electronics, kitchen ware, bathroom parts, electronics&semiconductors, machine tools and mold making, precision bearings, food packaging and so on.

应用于促销礼品、苹果公司的产品、手表和珠宝、汽车零件、机械工程、医疗技术、身份证、照明和家用电子产品、厨具、浴室零件、电子和半导体、机床和模具制造、精密轴承和食品包装等。

1.3 Introduction of Fiber Laser Source 光纤激光器介绍

Wisely Machine adopts the fiber lasers with feature high peak power, high pulse energy and optional output beam size. They are widely used in marking, precision drilling and engraving on non-metal and high reflection metals. The key components of the lasers are developed and manufactured in house to ensure the lasers' reliability and uniformity.

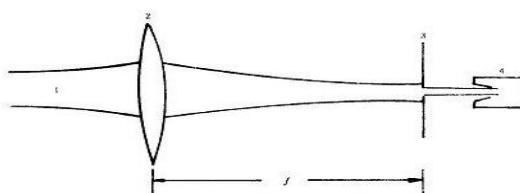
威斯利激光打标机使用的激光器具有高峰值功率和高脉冲能量输出等特征。广泛用于在非金属和高反射金属上打标，精密钻孔和雕刻。激光器的重要组件是在内部开发和制造的，以确保激光器的可靠性和均匀性。

Specification 规格：

Nominal Output Power 输出功率	20W	Fiber Cable Length 光纤长度	2-5m
Output Power Tenability 功率调节范围	10-100	Power Supply 供给电压	DC 24V
Wavelength 波长	1064nm	Max.Power Consumption 最大功耗	200W
Pulse Width 脉冲宽度	120-200ns	Operating Temperature 工作温度范围	0-45°C
Single Pulse Energy 脉冲能量	1-1.25mj	NOHD	4500cm
Output Power Stability 功率稳定性	<3%	Polarization State	Random
Beam Quality 光束质量	<1.5	Divergence Angle 发散角	0.5mrad

More information: The below image shows that the divergence angle of laser is around 0.5mrad.

更多信息：下图显示激光的发散角约为 0.5mrad。



Chapter 2 Safety Instruction

第二节 安全须知

2.1 Safety Classification (laser /electricity) 安全分级

2.1.1 Only 4-level safety engineers are allowed to operate and maintain laser machine

仅允许 4 级安全工程师操作和维护激光机

Four-lever laser will produce dangerous and invisible radiation while the laser machine is working, the radiation will be harmful to worker's eyes and skin. Radiation of Sub-shot and reflection is also harmful to people.

激光机器工作时，会产生安全等级为4级的不可见激光辐射，反射或漫射，都会对人的眼睛和皮肤有害。



When the red radiation produces refraction to eyes, it will focus on the retina, eyes will be hurt easily. In a word, you should always wear protective glasses during the machine operation or maintenance.

当红外辐射入射眼睛时，它将聚焦在视网膜上，很容易伤害到眼睛。简而言之，在操作或维护机器期间，应始终配戴防护眼镜。

2.1.2 Avoid Red Light Pointer (Class 3B) 避开红光指示器（3B 类）

The wavelength of aiming beam is 650nm, and its max power is 5mw, we strongly advise the operator to avoid eye or skin exposure to direct or scattered radiation. After you find the focus length for marking subject, then you can power off the laser light pointer by pressing the button named “Red Light Pointer” or “Red Dot Pointer” on the machine!

用于定位的红色激光波长为650nm，最大功率为5mW，我们强烈建议操作员避免眼睛或皮肤暴露于直接或散射的辐射下。找到焦距后，要想关闭红光指示器，只需通过按压机器上名为“ Red Light Pointer” 或 “ Red Dot Pointer”的按钮即可。



2.2 Safety precautions 安全须知

2.2.1 Don't work alone 切勿单人操作

When the operator does service or maintenance for machine, it is better to have an assistant who is familiar with risk and high-voltage laser radiation knowledge besides him. Once an accident occurs, the assistant can help the operator turn off the laser equipment.

当操作员对机器进行保养或维护时，最好有一位助手，助手除了要熟知激光泄漏风险和高压激光辐射知识外，还要帮助操作人员。一旦发生事故，助手可及时关闭激光设备。

2.2.2 Allow air circulation appropriately 适当通风

Some materials during the laser processing will produce harmful fume, so the operator might as well install exhaust system / fume purifier.

在激光加工过程中，某些材料会产生有害的烟雾，因此最好安装排气系统或使用烟雾净化器。

2.3 Warning 警告

2.3.1 Wear Protective Glasses / Goggle 穿戴护目镜

Protective glass plays a protective role (for direct radiation, radiation reflected and scattered radiation). However, even if the operator wears the goggle, he can not look directly at the spot very often, intense laser radiation still can damage the protection tool.

激光防护镜可以起到保护作用（用于防护直接辐射，反射辐射和散射辐射）。即使戴上护目镜，操作者也不能经常直接注视打标区域，强烈的激光辐射仍有可能损坏护目镜而对眼睛造成伤害。

Before wearing the glass, please:

穿戴护目镜前，请遵从：

1. Check whether it is damaged or not.

检查护目镜是否完好。

2. Be sure you are wearing the right glass, because the protective glass for CO₂ laser can't protect the laser radiation emitted from fiber laser (CO₂ laser and fiber laser has different wave length).

确保您佩戴正确的护目镜，因为用于CO₂激光的护目镜无法防护来自光纤激光器发出的激光辐射（CO₂激光器和光纤激光器的波长不同）。

2.3.2 Fire 火灾

Although the four-level laser output power is not high, the operator should pay more attention to the fire when the laser is working in high power and low speed.

尽管4级激光的输出功率不高，但当激光器以高功率低速工作时，操作人员应注意防范火灾。

2.3.3 Interlock Machine Door 联锁机门

Each machine has the interlock, the machine door must be closed during operation in case of the laser leak. Once you open the door of machine, the machine will stop working, and there will not be any laser output.

每台机器都有互锁装置，在操作时必须关闭机器门，以防激光泄漏。机门一旦打开，机器将停止工作，并且将不会再输出激光。

If you want to continue to run the machine, you have to close the door of machine, and click "Mark" in the software once again!

如果要继续运行机器，则必须关闭机器门，然后再次单击软件中的“标刻”



2.3.4 Laser Aperture 激光区域

Once you see the below label on the machine, you must avoid eye or skin exposure to direct or scattered radiation, this label tell us where the laser output directly.

如果您在机器上看到以下标签，必须避免眼睛或皮肤暴露于直接或散射的辐射下，此标签告诉我们激光直接在哪里输出。

LASER APERTURE

2.3.5 Training 培训

Any distributor/dealer/agent/end-user who works with Wisely Laser must send his technician to our factory for machine training before the machine sales and operation. The training is of great importance for the laser safety.

威斯利建议合作的分销商/经销商/代理商/终端用户派遣或指定一名技术人员到工厂接受培训，至少要远程学习。对于激光使用的安全培训至关重要。



Remarks: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

备注：在控制或调整或执行程序时，相关部件可能会暴露危险的激光辐射。

Useful Tips

Do not make any change to laser marking system without written authorization from WISELY laser management approval.

未经威斯利激光书面授权，请勿对激光打标系统进行任何更改。

Chapter 3 Machine Introduction

第三节 机器介绍



Chapter 4 Machine Installation

第四节 机器安装

4.1 Unpacking 开箱

- 1) Make sure the machine packaging is good in condition.
确保机器包装完好
- 2) Remove the packing material around the machine.
除去机器四周的包装材料
- 3) Check shipping list carefully, report the shipper any unmatched projects as per PI/contract.
仔细检查发货清单

4.2 Space and environment 空间和环境

- 1) The system should be installed at the place without dust, strong electrical magnetic field, oil and smoke.
机器应安装在无灰尘、无强磁场、无油、无烟的地方。
- 2) It is forbidden to expose the machine in the acid steam or other caustic gas.
禁止将机器暴露在酸性蒸汽或其他腐蚀性气体中。
- 3) To avoid vibrating and shocking, the floor should be flat and hard.
为避免振动和冲击，地板应平坦且坚硬。
- 4) Earth Wiring is necessary (Make sure your wall socket has earth wiring).
必须进行接地（确保墙上的插座已接地）。

4.3 Air-cooling system 风冷系统

Fiber laser adopts air-cooling system built-in, just keep the temperature between 0°C and 45°C.
光纤激光打标机采用集成风冷系统，可以保持温度在 0°C - 45°C 之间。

Chapter 5 Software Installation

第五节 软件安装

5.1 Find one laptop or PC for the Portable laser marking machine 为便携式机器配备一台电脑



5.2 Find the CD Disk or USB in the tool box with machine

在机器工具箱中找到 CD 光盘或 USB

-  Driver
-  Ezcad2.14.10
-  Marking files
-  Parameter Settings

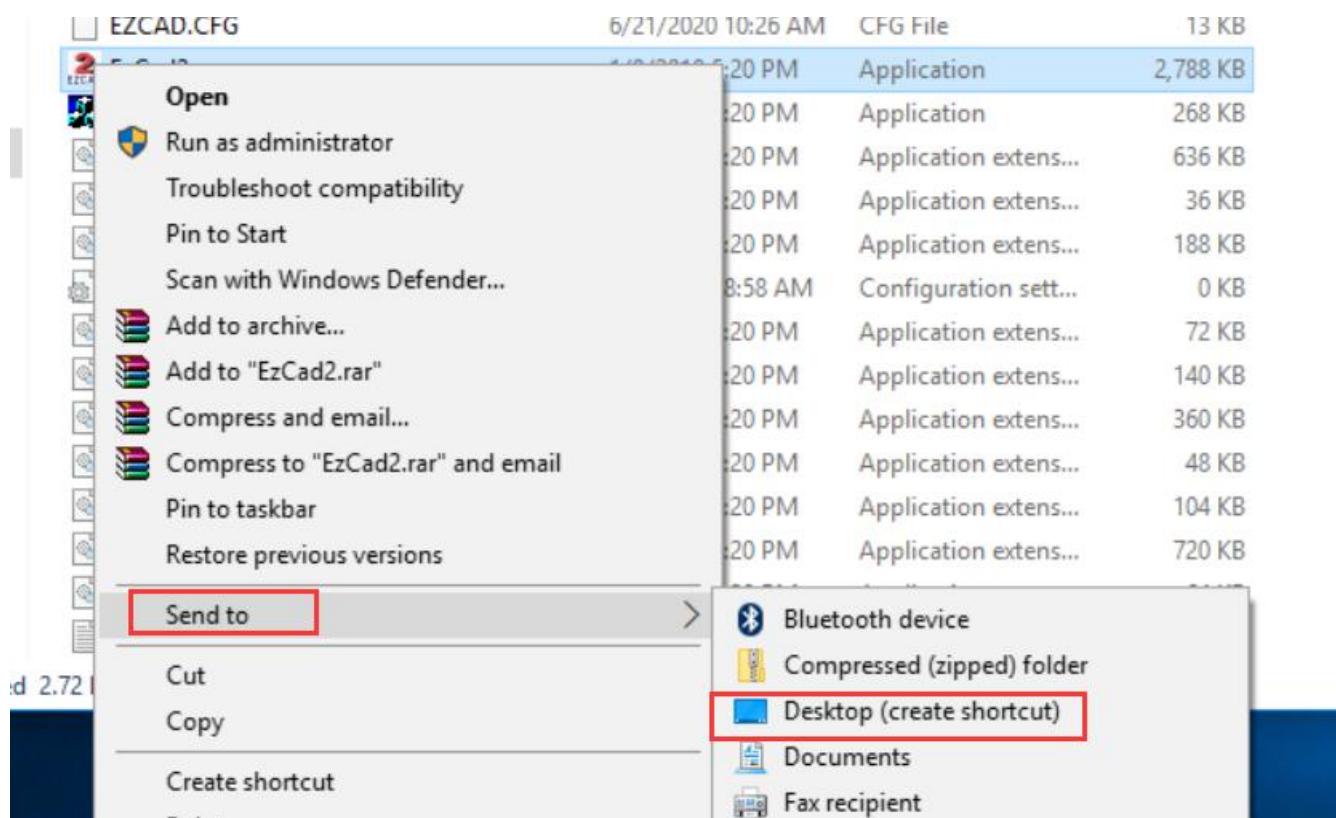
5.3 Copy the software to your laptop or PC

复制软件到你的电脑

5.4 Do the software installation 软件安装

FIRST STEP: Open the folder “EzC2.14.10”, find the icon “ EzCad2 ”, then send the shortcut to desktop of computer, as shown in the figure.

第一步：打开“EzCad2.14.10”，找到图标“ EzCad2 ”，然后将快捷方式发送到计算机的桌面，如图所示。





You can see the icon of “EzCad” is on the desktop of your computer
你可以看到“EzCad”的图标显示在你的电脑桌面。



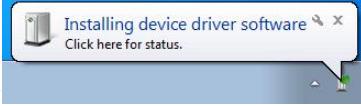
SECOND STEP: Find the electric power for the machine, the input should be AC220V/50HZ/1PH or 110V/60HZ/1PH (that depends on your local electric power supply), NO 380V!

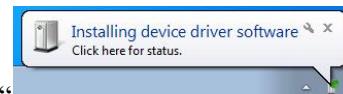
第二步：找到机器的电源，输入电压应为 AC220V / 50HZ / 1PH 或 110V / 60HZ / 1PH (取决于您当地的电源供应)，切勿输入 380V 电压！

THIRD STEP: Power on the machine

第三步：打开机器

FORTH STEP: Connect the machine with laptop or PC via USB cable, then the computer will show

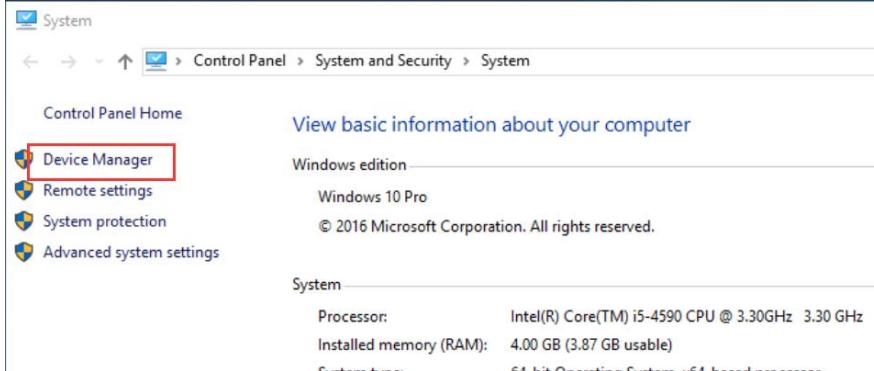
 “”。通常，你需要在安装驱动程序（如果驱动程序无法自动安装）。



第四步：通过 USB 线连接电脑和机器，然后电脑会显示“”，通常，在第一次使用时，您需要在安装驱动程序（如果驱动程序无法自动安装）。

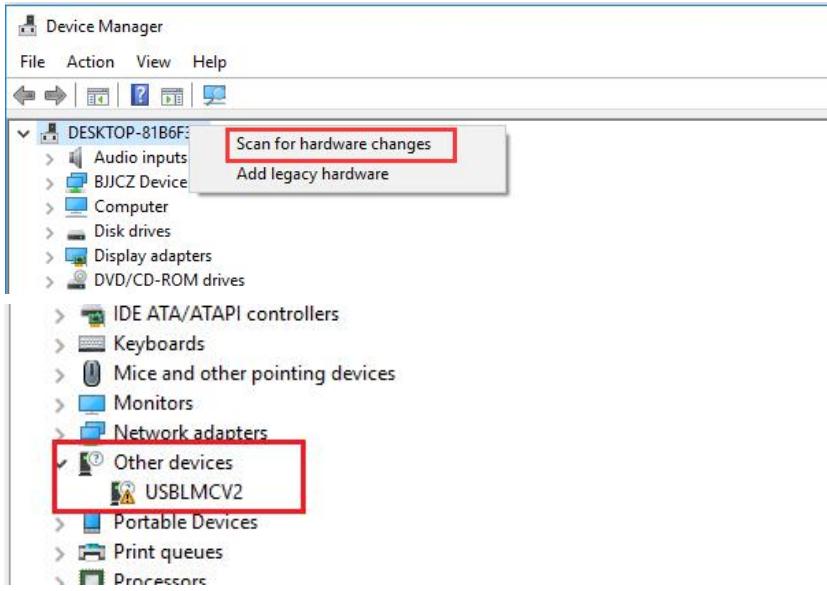
FIFTH STEP: Find “My Computer”, right-click to choose “Properties” and “Device Manager”, as shown in the figure.

第五步：找到“我的电脑”，鼠标右击选择“属性”和“设备管理器”，如图所示。

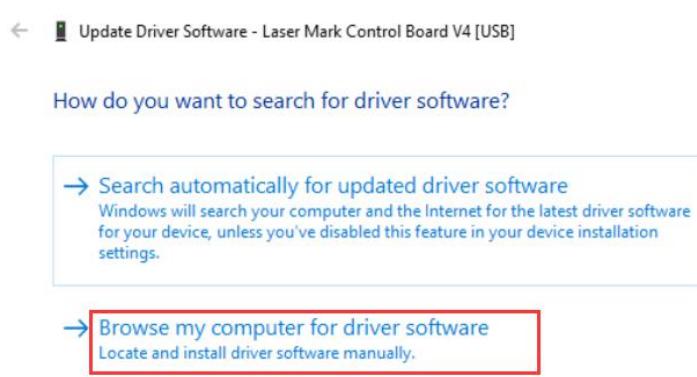


SIXTH STEP: Click “Device Manager”, then right-click to choose “Scan for hardware changes”, you will see “USBLMCV2”, right-click to choose “Update Driver Software USBLMCV2”, as shown in the figure.

第六步：点击“设备管理器”，然后右击选择“扫描检测硬件改动”，你将会看到“USBLMCV2”，右击选择“Update Driver Software USBLMCV2”，如图所示。

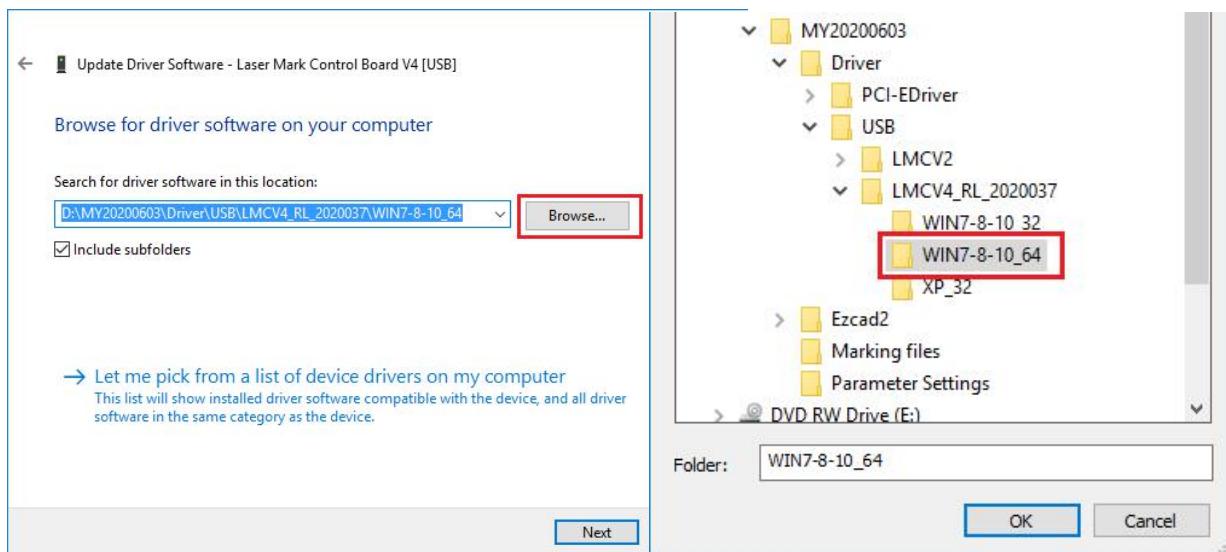


SEVENTH STEP: Choose the path of Driver (remember where you put the driver), as shown in the figure
 第七步：选择驱动程序的路径（记住放置驱动程序的位置），如图所示



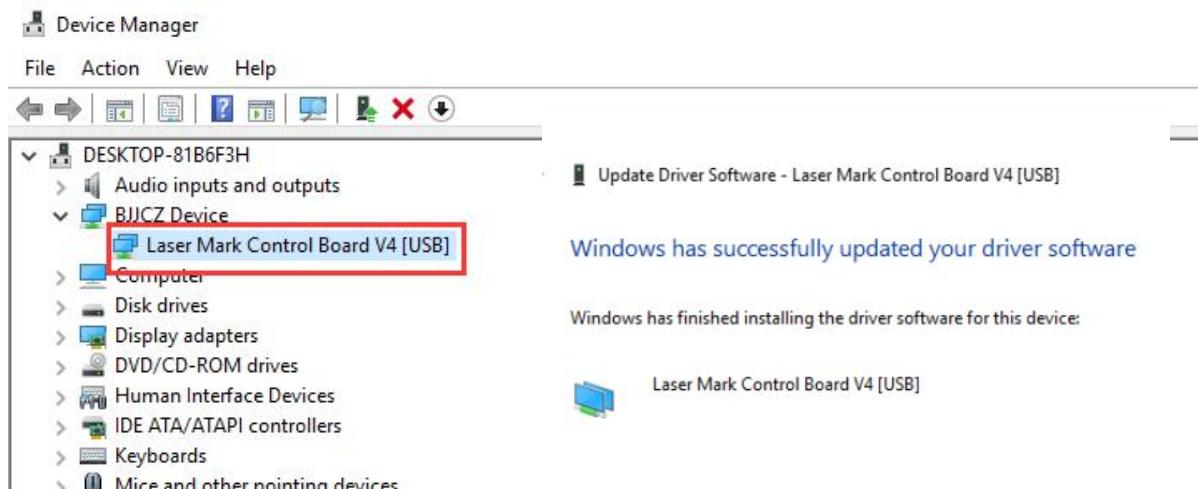
EIGHTH STEP: Check the OS of your laptop or PC, then choose the right driver. There are two drivers for the software, one is for **Windows 7 / 8 / 10 with 64 bits**, the other one is for **Windows XP / 7 / 8 / 10 with 32 bits**. For example, our computer has Windows 8/64bits, then we choose the driver **“WIN7-8-10_64”** to install, as shown in the figure

第八步：检查笔记本电脑或 PC 的操作系统，然后选择正确的驱动程序。该软件有两种驱动程序，一种用于 **Windows 7/8/10 (64 位)**，另一种用于 **Windows XP / 7/8/8 (32 位)**。例如，我们的计算机具有 Windows 8/64 位，则选择驱动程序 **“WIN7-8-10_64”** 进行安装，如图所示



NINTH STEP: After finishing the driver installation, you will see “Laser Mark Control Board V4 [USB]” on “Device Manager”, as shown in the figure.

第九步：完成驱动程序安装后，您将在“设备管理器”上看到“Laser Mark 控制板 V4 [USB]”，如图所示。

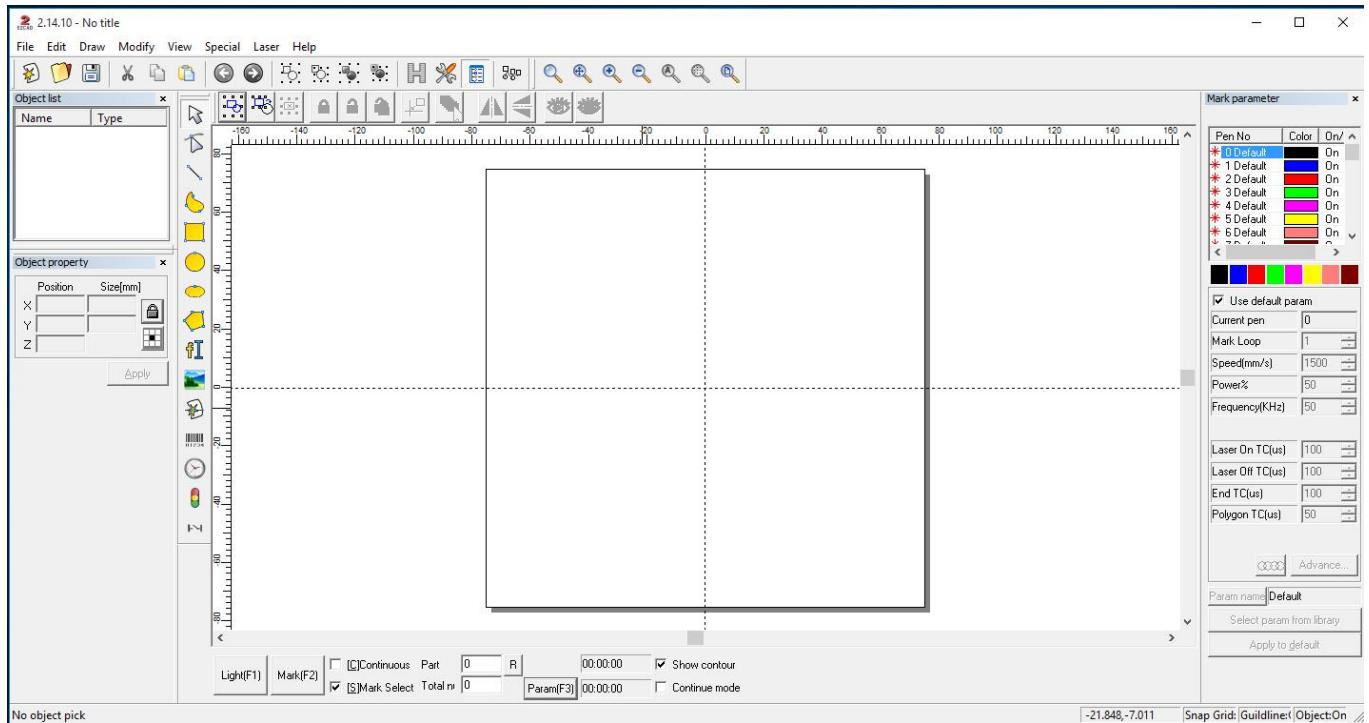


Now you see the driver “**Laser Mark Control Board V4 [USB]**” was installed successfully.

现在，您已经看到驱动程序“Laser Mark Control Board V4 [USB]”已成功安装。

TENTH STEP: Click the icon  to run the software “EzCad”, as shown in the figure

第十步：你可以点击图标  运行“EzCad”软件，如图所示。



Chapter 6 Find the correct Focal Length

第六节 寻找正确焦距

FIRST STEP: To know what the focal length is

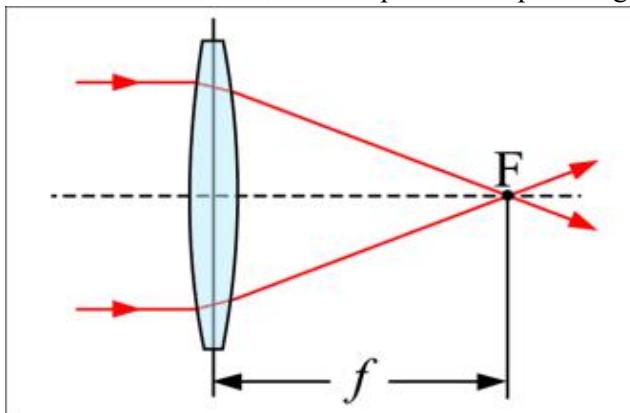
第一步：要知道焦距是多少

Definition: The focal length of an optical system is a measure of how strongly the system converges or diverges light. For an optical system in air, it is the distance over which initially collimated (parallel) rays are brought to a focus. A system with a shorter focal length has greater optical power than one with a long focal length; that is, it bends the rays more sharply, bringing them to a focus in a shorter distance.

Check by visiting: https://en.wikipedia.org/wiki/Focal_length

定义：光学系统的焦距是对系统会聚或发散光的强度的度量。对于空气中的光学系统，它是最初经过准直（平行）的光线聚焦的距离。焦距较短的系统比焦距较长的系统具有更大的光焦度。也就是说，它使光线弯曲得更厉害，使它们在较短距离内聚焦。

请访问以下网址进行检查：https://en.wikipedia.org/wiki/Focal_length

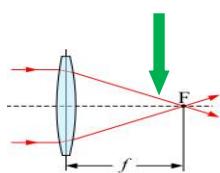


Briefly speaking, the further distance the marking object from the FL we choose, the weaker laser we get.

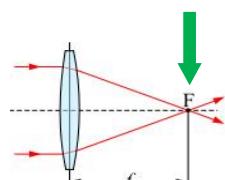
简而言之，标记物体与我们选择的焦距距离越远，我们得到的激光越弱。

SECOND STEP: What difference on the marking object if we choose different focal length

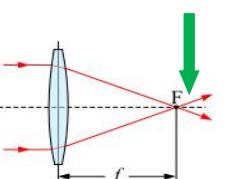
第二步：如果选择不同的焦距，标记对象会有什么不同



Less than the correct FL (比正确焦距短)



Correct FL (正确焦距)



More than correct FL (比正确焦距长)

After checking the above pictures, we will see: when we use the wrong FL for marking object, then we can not get the strongest laser power.

查看完上述图片后，我们将看到：当使用错误的焦距标记物体时，我们将无法获得最强的激光功率。

THIRD STEP: To know how to measure the focal length

第三步：知道怎么测量焦距

- 1) Run the software

运行软件

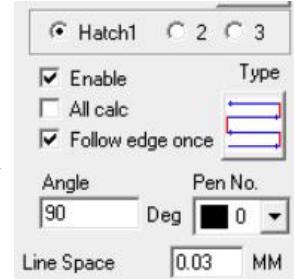
- 2) Draw a box - 10*10mm size,
画一个 10*10mm 的框



then click “Apply”
然后点击“应用”

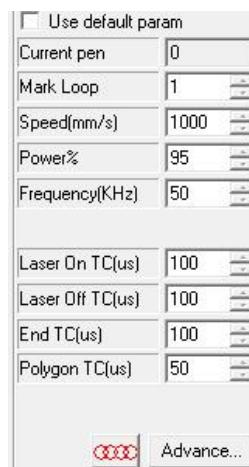


- 3) Set “Hatch” - Angle 90 - Line Space 0.03mm - Hatch 1
设置“填充”-角度 90-线间距 0.03mm - 填充 1



then click
然后点击 

- 4) Set “Speed”, “Power”, “Frequency”,
设置“速度”“功率”“频率”



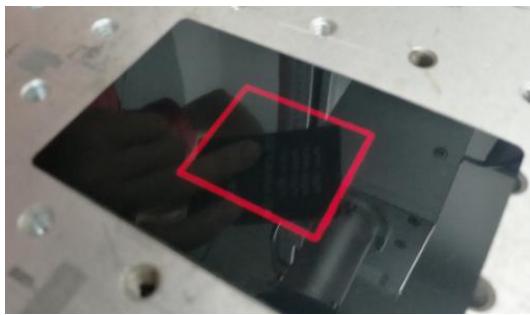
then click
然后点击 

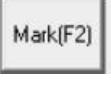
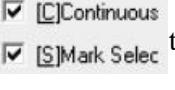
- 5) Press F1  on keyboard or click 

to preview the position, then put the marking object to the

correct position.

在键盘上按下 F1 或点击“红光 (F1) 预览定位，然后将标记对象放到正确的位置。



Select “Mark Selec” and “Continuous”, then Press F2  on keyboard or click   to mark.

选择“选择加工”和“连续加工”，在键盘上按下 F2，或者点击标刻（F2）进行打标。

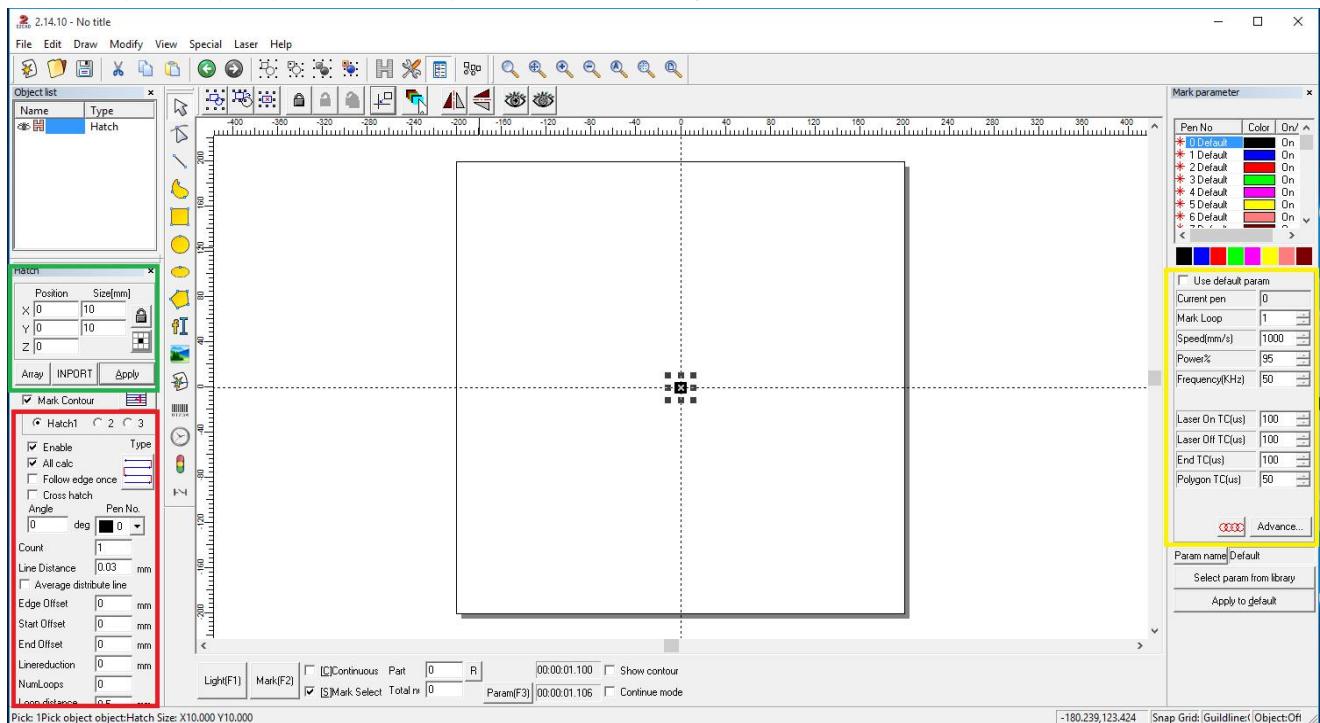
- 7) Raise or fall the Z axis manually, try to find the strongest laser firing. When you found the strongest laser, then you find the Focal Length. We will give the value for the FL to clients after testing the machine.

手动升高或降低 Z 轴，尝试找到最强的激光光焰。当您找到最强的激光光焰时，便会得到焦距。我们将会在测试机器之后将正确得焦距提供给客户。



In order to help the operator get more experience, we have one picture for reference.

为了帮助操作员获得信息，我们提供一张图片作为参考。

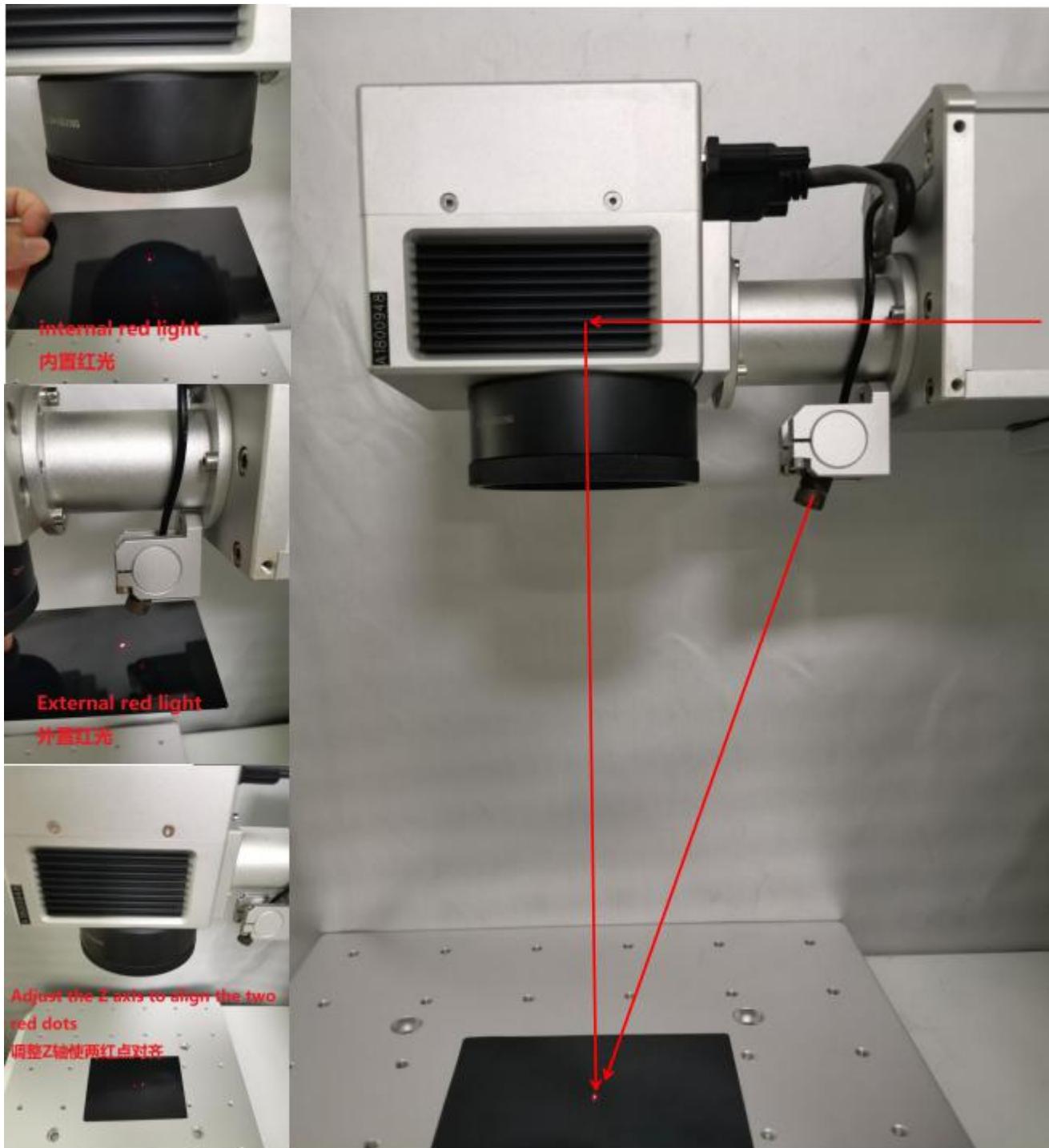


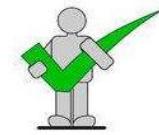
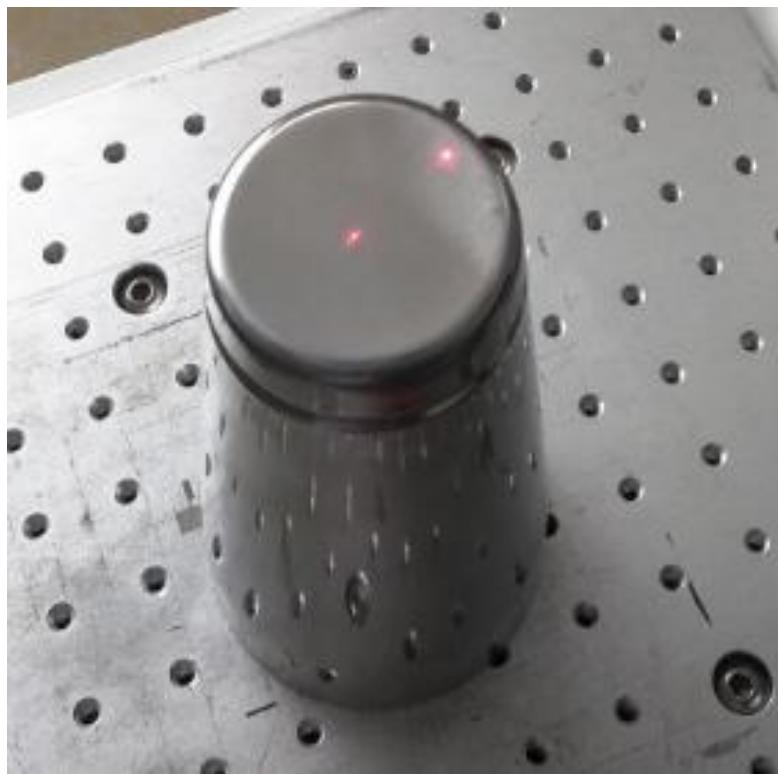
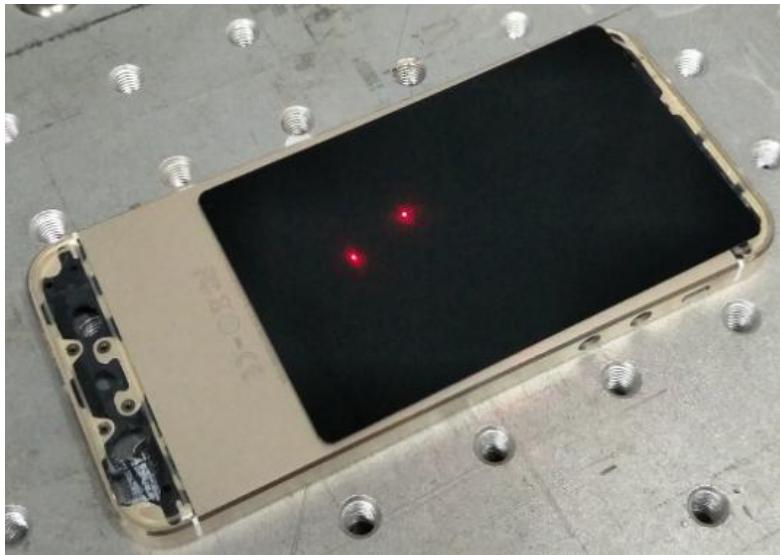
Another way to find the correct Focal Length

找到正确的焦距的另一种方法

In order to find the right focal length on our machine easily, we add two red light pointers in our machine. One was installed inside the machine, and the other one is outside the machine. You can raise or fall the Z axis of the machine in order to let the two red light pointers meet together, then you find the right FL, as shown in the figure.

为方便寻找焦距，我们在机器上设置了两个红光指示器。一个内置，另一个外置。您可以调节机器的 Z 轴的升降，使两个红色斑点重合在一起，即找到焦距，如图所示。





Chapter 7 Basic Operation

第七节 簡要操作

Turn ON

1. Connect the main power.
2. Turn on the laser power with the key.
3. Press the button named “Scan Head” to turn on the power of scanner.
4. Press the button named “Red Light Pointer” to turn on the Red Dot Pointer.
5. Power on your PC or laptop.
6. Connect the machine with software via USB cable.
7. Run software “EzCad”.
8. Load the material and put it in right position under the lens.
9. Close the door and adjust the right Focal Length by pulling the Z axis up and down.
10. Make or load a file which you want to mark in the software.
11. Set the marking parameter for the marking jobs.
12. Prepare to mark.

打开机器

1. 连接电源。
2. 打开激光电源的钥匙开关。
3. 按“Scan Head”按钮打开振镜的电源。
4. 按“Red Light Pointer”按钮打开红光指示器电源。
5. 打开台式电脑或笔记本电脑。
6. 通过USB线将机器与软件连通。
7. 运行“EzCad”软件。
8. 将材料放到振镜下方的聚焦位置。
9. 关闭防护门，可通过上下移动Z轴立柱来找到正确的焦距。
10. 在软件中制作或加载要打标的文件。
11. 设置打标加工的参数。
12. 准备标记。

Turn OFF

1. Save files (Or you do not need to save any files).
2. Close the software.
3. Shut down your PC or laptop.
4. Power off the laser source by key, scanner and red light pointer by pressing the buttons.
5. Disconnect the main power.
6. Cover the lens with lens cover.

关闭机器

1. 保存文件（或不保存文件）。
2. 关闭软件。
3. 关闭电脑。
4. 关闭钥匙开关，振镜和红光指示器的按钮。
5. 切断电源。
6. 用场镜盖盖住场镜。
- 7.

Chapter 8 Regular Marking Effect Guide

第八节 常规标记效果指南

In order to help new customers get the regular marking effect quickly, Wisely has some parameter settings for reference.
 为了帮助新客户快速获得常规打标效果，威斯利激光提供了一些参数设置以供参考。

1. Raw Aluminum + White Marking Effect 原生铝+白色打标效果

Hatch 1:	0.04-0.06
Speed:	1000-1300
Power:	70-90
Frequency:	35-45

填充 1:	0.04-0.06
速度:	1000-1300
功率:	70-90
频率:	35-45

2. Anodized Aluminum + Black Marking Effect 阳极氧化铝 + 黑色打标效果

There is not parameter settings for reference, because the machine can not do such marking effect at all.
 这里没有以供参考的参数，因为这台机器不能做这样的打标效果。

3. Stainless Steel + White Marking Effect 不锈钢+白色打标效果

Hatch 1:	0.04-0.06
Speed:	900-1100
Power:	70-80
Frequency:	35-45

填充 1:	0.04-0.06
速度:	900-1100
功率:	70-80
频率:	35-45

4. Stainless Steel + Black Marking Effect + No Depth 不锈钢+黑色打标效果+无深度

Hatch 1:	0.008-0.01
Speed:	100-200
Power:	80-90
Frequency:	20-30

填充 1:	0.008-0.01
速度:	100-200
功率:	80-90
频率:	20-30

5. Stainless Steel + Black Marking Effect + A little Depth 不锈钢+黑色打标效果+轻微深度

Hatch 1:	0.01-0.02
Speed:	200-300
Power:	85-95
Frequency:	20-30

填充 1:	0.01-0.02
速度:	200-300
功率:	85-95
频率:	20-30

6. For other plastic marking + Black/White Marking Effect + No Depth

其他塑料打标+黑/白打标效果+无深度

Hatch 1:	0.05-0.06
Hatch 2:	That depends
Speed:	700-800
Power:	20↑
Frequency:	40-50

填充 1:	0.05-0.06
填充 2:	That depends
速度:	700-800
功率:	20↑
频率:	40-50

Tip: The above parameter settings are just for reference, the customer might need fine adjustment.

提示：以上参数设置仅供参考，具体效果可能需要微调。



Chapter 9 Daily Maintenance

第九节 日常维护

After a few times, you should do some daily maintenance as follows:

一段时间后，需要做一些日常维护，如下：

- 1) Electrical control system works well - connection checking
电控系统是否运行良好-连接检查
- 2) Computer system works well - virus checking
计算机系统是否运行良好-病毒检查
- 3) Marking software works well - parameter settings checking
打标软件是否运行良好-参数设置检查
- 4) Elevating platform does not loose, screw does not loose and drop
升降平台是否松动，螺丝是否松动掉落
- 5) Air cooling system for fiber laser source works well - cooling check
光纤激光器的风冷系统运行良好-冷却检查
- 6) Do not squeeze fiber, be sure the protecting cover is good
请勿挤压光纤线，请确保保护套良好
- 7) Keep lens clean
保持镜头清洁
- 8) Keep equipment clean
保持设备清洁

Actually, you can do the checking once per week, it is not necessary to do the checking job every day.
实际上，您每周可以进行一次检查，而不必每天一次。

THANK YOU VERY MUCH!