深圳市三角铁科技有限公司

SHENZHEN M-TRIANGEL TECHNOLOGY CO,.LTD

PG oneS Laser Marking Machine

Brief Introduction of Laser Marking machine

Please read these instructions carefully before installing and using the product.

Dear user：

Before using this product, please take the time to read and understand this manual. Please familiarize yourself with the information provided in this manual. It will provide you with important operational information such as safety and other aspects.

Within the scope of the specified support warranty, the company will not be covered by the warranty service if it fulfills the promised warranty service beyond the scope of the warranty provided. The company does not assume any responsibility for the losses that may occur during the use of this product. In the event of any dispute, it shall be resolved in accordance with the relevant laws of the People's Republic of China.

The company may update the contents of the instruction manual at any time due to software or hardware upgrades, all of which will be included in the new version of the instruction manual without prior notice.
The company is not responsible for any losses caused by the operation in this manual.
All patents and intellectual property rights included in this manual are shared free of charge.

The marking software is powerful and compatible with CorelDRAW, AutoCAD, Photoshop and other software files; supports PLT, DXF, BMP, JPGET, etc., can directly use SHX, TTF fonts; supports automatic encoding, printing serial number, batch number, date, barcode, QR code, automatic jump number, etc.

Chapter 1 Overview

1.1 Principle of laser marking

The laser has high brightness, high accuracy, high monochromaticity and high coherence, which is unmatched by ordinary illumination sources. When the laser beam is focused, it can produce thousands of degrees or even tens of thousands of degrees of high temperature at the focus, making it possible to process almost all materials.

Laser marking is the use of a laser beam to inscribe permanent markings on the surface of various materials. The effect of marking is to expose the deep material by evaporation of the surface material, or to "etch" the trace by the chemical and physical changes of the surface material caused by the action of light energy, showing the pattern and text of the desired etching.

1.2 Laser marking features

a) It can process a variety of metal and non-metal materials, especially for marking high hardness, high melting point and brittle materials.

B) It belongs to non-contact processing, does not damage the product, has no tool wear, and has good marking quality.

c) The laser beam is thin, the processing material consumption is small, and the processing heat affected zone is small.

d) High processing efficiency, computer controlled, easy to automate.

1.3 Product Overview

Fiber laser marking machine is a high-tech product integrating laser, computer, automatic control and precision mechanical technology.

The marking machine adopts high-performance digital galvanometer scanning system, which is fast, high precision and can work for a long time. It can be used in most metal materials and some non-metallic materials such as silicon, rubber, epoxy, ceramics, marble, etc. to write or make permanent anti-counterfeit marks that are difficult to copy.

Fiber laser marking machine has good laser optical mode (M2 < 2), small size, stable and reliable operation, no maintenance, no water cooling system, high electro-optical conversion efficiency, low energy consumption; good marking quality; laser power and frequency computer control Easy to implement tag automation.

The company provides dedicated marking software based on the Windows platform. Real-time control of laser power and pulse frequency. The marked content can be text, graphics, pictures, serial number, barcode and their combination, and can be directly input and edited in the special marking software, or edited by graphic

software such as AutoCAD or CorelDraw, and the input and output can be controlled by the computer.

The fiber laser marking machine is designed to meet international safety and operational standards.

Chapter 2 Equipment Operation Security Protection

2.1 General Safety Instructions

Fiber laser marking machines are specifically designed to reduce accidents that are exposed to hazardous radiation.
To ensure safe operation and optical performance of the product, please follow the tips and warnings below.

WARNING: When using this laser device, be sure to ensure a secure ground connection.

CAUTION: Before powering the laser unit, make sure that the input is 220V AC. The wrong voltage input may cause damage to the equipment.

Warning: In order to prevent electric shock, please do not open the cover, otherwise the company will refuse to provide the promised quality assurance if there is any problem.

WARNING: If you do not follow the instructions in this manual, the protective measures of this device will not function as expected. In addition, the instrument can only be used in normal working conditions.

WARNING: Direct viewing of the laser output is prohibited, and protective eyes must be worn at all times when operating the instrument.

2.2 Laser type

The fiber laser marking machine uses lasers belonging to Class 4 lasers. If improper use can cause harm to the human body, users should take protective measures according to the requirements of this manual.
The laser used in the laser marking machine has an invisible laser with a laser wavelength of 1064 nm, which avoids direct exposure of the eyes or skin to the laser radiation.
Do not attempt to open the device. Any maintenance and service can only be done by a technician authorized by the company.

2.3 Laser hazards

The laser output from the laser is invisible infrared light, which can cause tertiary

burns even in the case of deviation from the focal length.
The beam output by the device contains visible and invisible radiation. Harmful to the human eye. It is forbidden to look directly at the laser beam. To prevent accidental exposure of the human eye to the output beam or its reflected beam, all personnel around the device must use special safety glasses. Even if you wear protective glasses, it is forbidden to look directly at the laser beam.

2.4 Safety goggles
All personnel around the laser system must use special safety glasses and must ensure that the safety glasses provide sufficient protection for the radiant energy of the 1064 nm laser.

2.5 Explosion and fire
Fiber laser marking machines are not suitable for use in flammable or explosive applications. Also do not use in the presence of volatile solvents such as alcohol, gasoline, etc.

2.6 Electrical safety
The fiber laser marking machine should not be disassembled at will, and there is high pressure inside, which is easy to cause damage to the human body. In the event of a malfunction, only a professional technician can open the machine.

2.7 Workplace Marking and Labeling
In the conspicuous position of the installation of the fiber laser marking machine, you should watch up for the words "Beware of Laser".

Chapter 3 Equipment Technical Parameters and Applicable Environment

3.1 Equipment technical parameters

1:
The fiber laser marking machine adopts fully enclosed, maintenance-free, high-performance galvanometer scanning system and focusing system, fan cooling mode, and red light indicating positioning function.

Power demand: 220V/50Hz/2.5A
Grid fluctuations: <±5%
Grid ground: in line with the international requirements of the equipment room
Power consumption of the whole machine: 800W
Working environment: Temperature: 15 ~ 35 ° C Humidity: 45 ~ 75%

2:

1. Field lens focal length (optional): F=254mm Effective focus scanning range: 180 mmX180mm
2. Marking depth: 0.015-0.5mm (depending on the material); line width: 0.05-0.01mm;
3. Marking speed: ≦10000mm/s;
4. Repeatability: ≤ 0.001mm;
5. Marking accuracy: ≤ 0.001mm;
6 output mode: acousto-optic Q-switched laser; indicating laser: fiber laser;
7. Marking function: flat, curved curved surface; fillable mark;
8. Marked content: English, numbers, punctuation, Chinese, arbitrary graphics, barcodes, etc.;
9. Laser power: 20W;
Dimensions: length 400 mm × width 520 mm × height 635 mm;

3.2 Equipment applicable environment

The fiber laser marking machine should be installed in a dust-free, oil-free, non-corrosive gas working room, with an ambient temperature of 15 to 35 ° C and a humidity of 45 to 75%.

Chapter 4 Introduction to Laser Marking Principle

4.1 Overview of laser theory

When certain materials are excited, their atoms (or molecules) are distributed at higher energy levels than at lower energy levels, and the material is able to amplify the radiation at a frequency corresponding to the energy level difference. English "laser" - laser is an abbreviation for Light amplification by DHimulated of radiation.

The laser consists of a working medium and a pump source enclosed in a pumping chamber. The pump source "pumps" the working medium from the energy ground state to the excited state. If "particle number inversion" is achieved between the two excitation levels, stimulated radiation (ie, photons) can be generated, amplified by resonance (back and forth reflection) in the optical cavity, and a part of the amplified electromagnetic radiation is output. laser. Compared with other light sources, lasers have good monochromaticity, good coherence, good directionality and high brightness.

a) Good monochromaticity.

The light emitted by ordinary light sources contains a wide range of wavelengths, that is, the width of the line is wide. For example, sunlight contains all visible wavelengths, and the laser is a single wavelength. The line width is extremely narrow, usually in the range of hundreds of nanometers to several micrometers. Compared to ordinary light sources, the spectral line width is several orders of magnitude narrower.

b) Good coherence.

The laser beams are superimposed and their amplitude is stable. For a long time, the phase relationship before and after the light wave can be kept unchanged, which is impossible for any other light source.

c) Good directionality.

The light emitted by the ordinary light source is directed to the square, and the beam divergence is large; and the laser divergence angle is small, generally several milliradians.

d) High brightness.

The laser beam can be focused to a small area by an optical system (such as a lens) with high brightness.

4.2 Introduction to the laser

The working medium of the laser can be a gas, a liquid or a solid. The working medium of most gas lasers consists of atoms, molecules or a mixture
of the two. The working medium of a solid laser consists of atoms or ions doped in certain crystals. The working medium of a liquid laser consists of molecules of large molecular weight dissolved in a liquid.
Under certain pumping conditions, all of these working media can achieve "particle count reversal" and produce a laser output of a certain wavelength.

Fiber laser marking machines use the most advanced pulsed fiber lasers in the world today. Fiber lasers have been developed on the basis of fiber amplifiers. The fiber amplifier uses a rare earth doped fiber, and an appropriate feedback mechanism forms a fiber laser. The rare earth doped fiber acts as a gain medium for the fiber laser. In the fiber laser, there is a very fine fiber core. Due to the action of the external pump light, a high power density is easily formed in the fiber, thereby causing a population inversion of the energy level of the laser working substance. A fiber grating is used as a resonant cavity of the fiber laser. A tree-shaped cladding fiber made by a special process, multi-mode pump light is introduced from the fiber port, and a small-mode doped rare earth element (such as germanium) single-mode fiber core pump in the tree-type fiber . When the pump light traverses the core of the single-mode fiber each time, the atom of the rare earth element is pumped to the upper level, and then the self-generated radiation is generated by the transition, and the frequency selection by the fiber grating disposed in the fiber is specified. The spontaneous emission of the wavelength is amplified by oscillation and finally produces a laser output. If the cladding fiber material is doped with different rare earth elements, such as doped with different rare earth elements such as lanthanum, cerium, lanthanum and cerium, the fiber laser has a variety of different laser wavelength outputs.

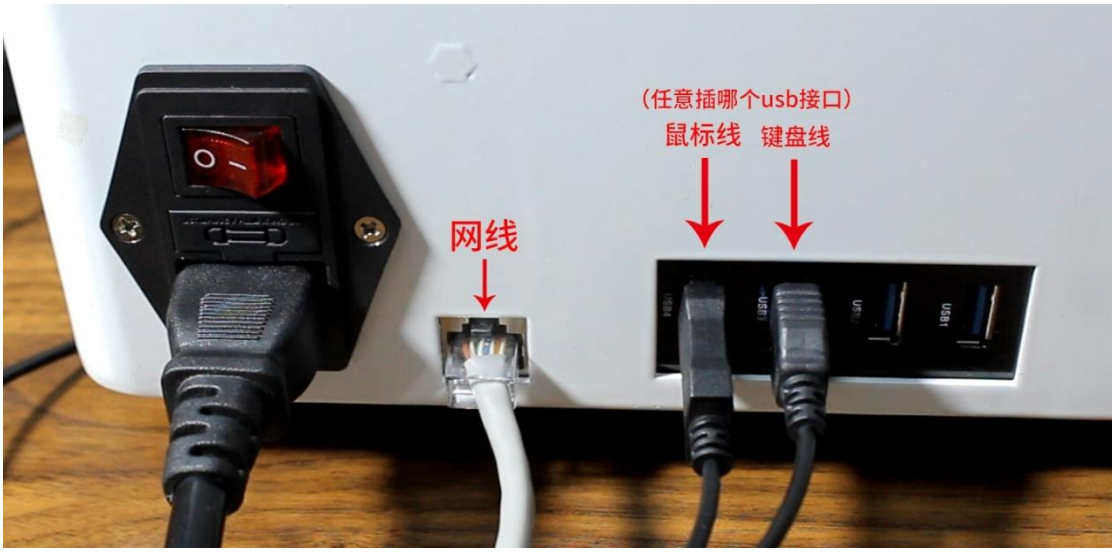
Chapter 5 Operation procedures

5.1 Electrify the machine

1) Connect the power supply cable as shown in the photo

（二）连接电脑与机器的数据线和网线，鼠标、键盘线可连接任意 USB 接口

2) Connect the power source cable and network between the computer and machine, mouse cable and keyboard cable can be connected to any of the USB ports.



（三）打开激光机总电源开关

3) Turn on the main power of the machine

（四）分别打开激光电源、主机电源开关

4) Turn on the power supply and galvanometer

（五）电脑开机后点击桌面已安装好的三角铁云打标系统

（PGones 的软件和驱动都是提前安装好的）

5) Click the icon of ‘M-T online marking system’ after monitor lights up.(the driver and marking software of this machine are previously installed)

控制开关

Control buttons

1：主机电源（按此按钮，主机上电）

1. Power supply(press this button, the monitor lights up)

2：激光/振镜开关（按此按钮，激光器电源上电）

2.Galvanometer/Laser (press this button, the galvanometer and laser source get switched on)

（六）“云打标系统”操作步骤

6) Operation guide of ‘Metal Triangle online marking system’

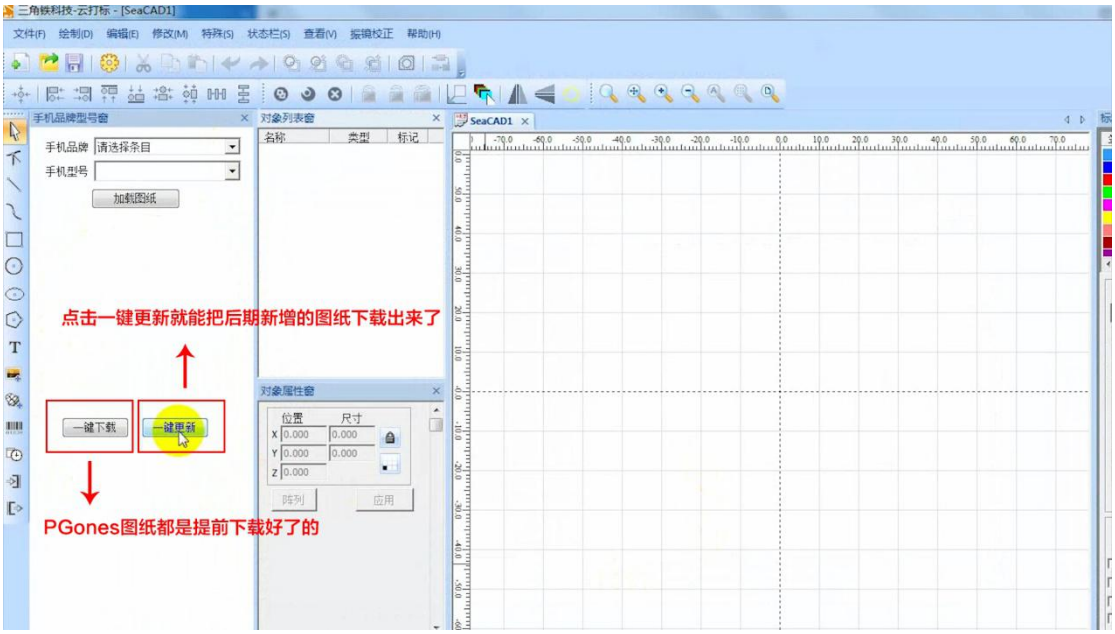
第一步：双击桌面的“云打标系统”

Step one: double click the icon of the software

第二步：PGones 图纸都是提前下载好了所以不必下载

（其它机型第一次安装时要先加载图纸，才会有图纸可供选择）

Step two: All the drawings in PG oneS is previously downloaded, so no downloading is needed. (For other models, downloading drawing is needed before you can choose the drawing.)

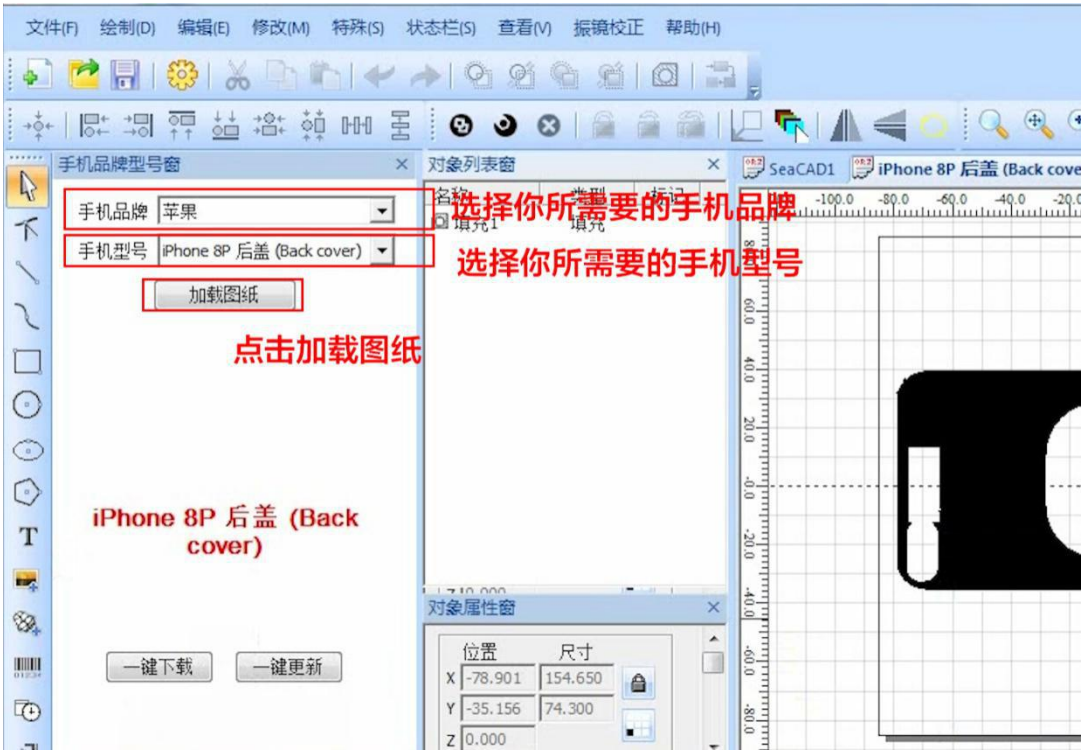


- 注： 一键更新 （后期若有新的图纸上传到云端，可以点击一键更新加载，不会覆盖之前的图纸）

Remarks: one click downloading(You can click ‘one click update when there is any update of the drawings, and it will not cover the drawings downloaded before)

第三步：选择所需要的图纸型号，加载图纸

Step three: choose the needed drawing model, click’ load the drawing’

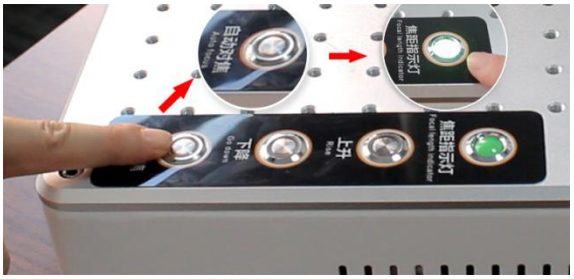


第四步：把手机放在定位台上

Step four: put the phone at the location position

第五步：按下自动对焦测距，焦距指示灯亮便对焦完成

Step five: Click ‘auto foucs’.The focus indication light turns green when focusing completed.

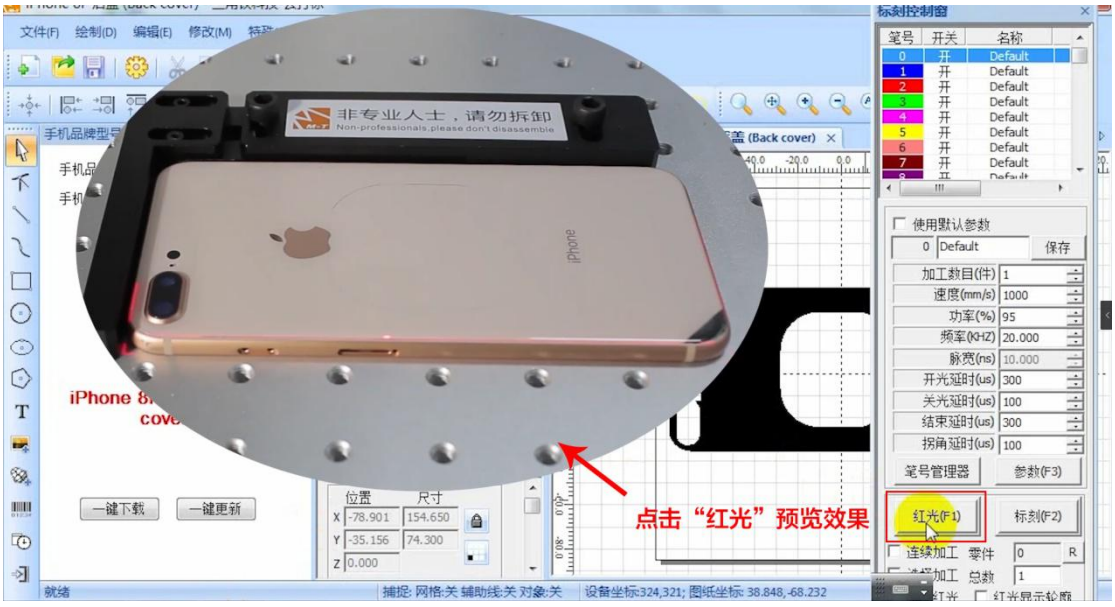


第六步：把手机放入夹具中

Step six: put the phone in the device

第七步：红光预览（勾选选择加工）

Step seven：red point preview（tick ‘mark sel’）

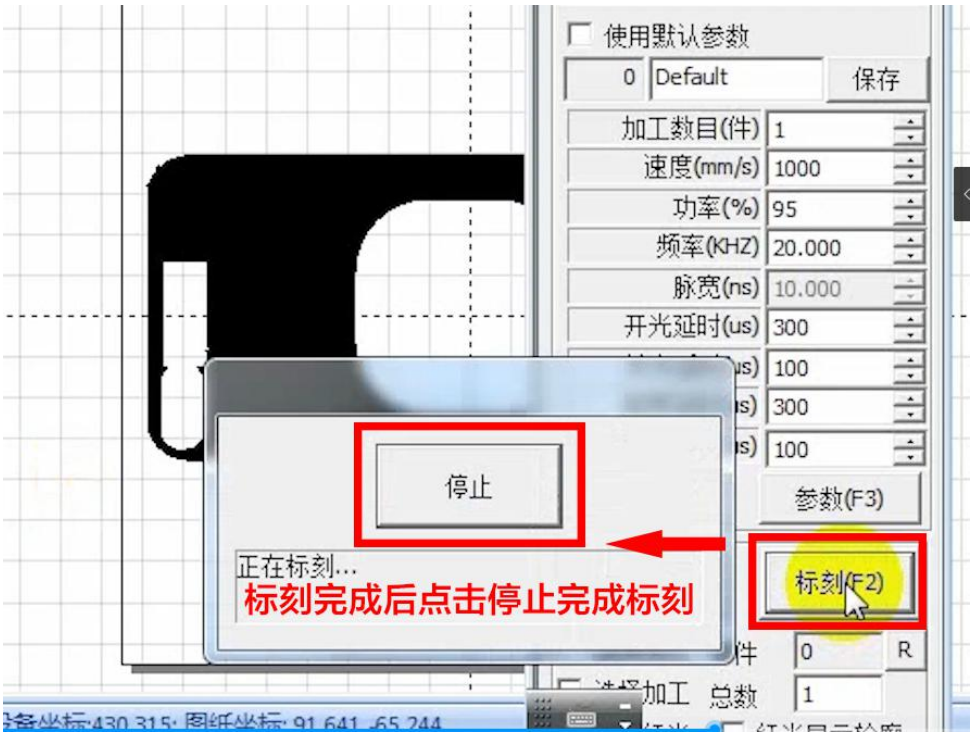


第八步：红光对好位置后，点击停止，选择标刻就可以了

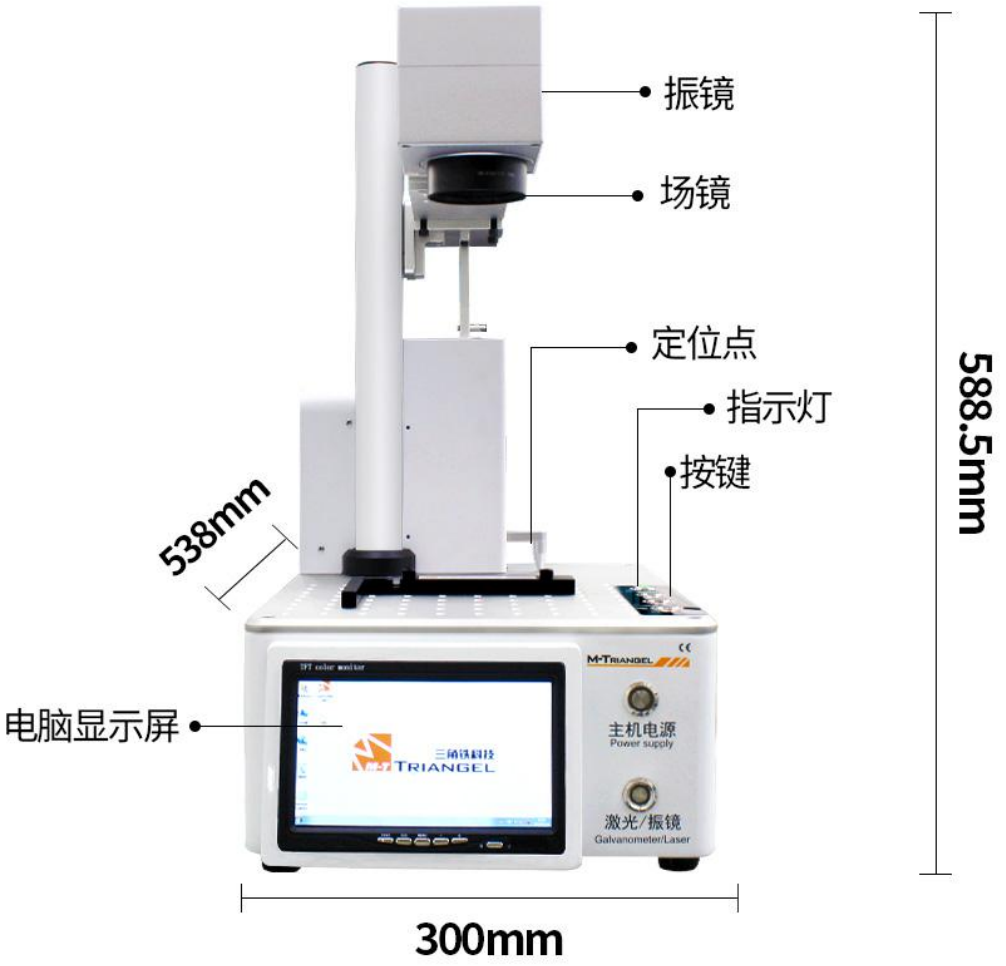
Step eight： Click ‘stop’ when red pointer preview is okay,and then click ‘mark’.

最后一步：标刻完成后点击停止即完成标刻

Last Step: Click ‘Stop’ when marking completed.



PG oneS | 产品信息
PRODUCT INFORMATION



激光功率：20W	电　　源：220V±10%, 50Hz±5%
整机功率：不大于800W	环境温度：-10°c~65°c
打标精度：≤0.001mm	重复精度：≤0.001mm
打标速度：≤10000mm/s	打标深度：0.015-0.5mm
冷却方式：内置风冷	打标幅面：175mmx175mm
激光波长：1.06μm	打标线宽：0.05-0.01mm
设备尺寸：300x538x588.5mm	设备重量：21.2KG
装箱重量：32KG	

机器侧面示意图 Side view

机器斜面示意图 Bevel view

Back view

机器电脑显示屏示意图 Monitor

5.2 关闭设备

（一）关闭打标软件，按正常程序退出系统并关闭计算机、显示器电源
（二）关闭振镜电源开关
（三）关闭激光电源开关
（四）关闭总电源开关

5.2 Switch off the device

(1) Turn off the marking software, exit the system according to the normal program and turn off the power of the computer and monitor.
(2) Turn off the galvanometer power switch
(3) Turn off the laser power switch
(4) Turn off the main power switch

5.3 软件调节简要说明

一般在使用设备时，用户只需调整激光参数栏中的“速度”/“功率”/“频率”/“脉冲宽度”。
标刻速度：XXXX——用户需要的速度；
功率：通过激光软件设置本激光设备的百分比功率 1%--100%可调
频率：通过激光软件设置本激光设备的激光出光频率 1---1000KHZ 调节
脉冲宽度：根据激光器类型，打标效果需求，设置不同的脉冲宽度

软件其他参数的具体操作使用说明请详阅激光软件说明。

5.3 Brief description of software adjustment

Generally, when using the device, the user only needs to adjust "speed" / "power" / "frequency" / "pulse width" in the laser parameter column.
Marking speed: XXXX - the speed the user needs;
Power: set the laser's percentage power by laser software 1% - 100% adjustable
Frequency: Set the laser light output frequency of the laser device by laser software. 1---1000KHZ adjustment
Pulse width: according to the laser type, marking effect requirements, set different pulse width

For details on the operation of other parameters of the software, please read the laser software instructions.

第六章 维护及保养

光纤激光打标机主要由电子器件、精密仪器、光学器件组成，对使用环境及日常维护有较高的要求。

Chapter 6 The Maintenance

The fiber laser marking machine is mainly composed of electronic components, precision instruments and optical components, and has high requirements for the

use environment and daily maintenance.

6.1 本机维护时注意事项

1）本机不工作时，应切断打标机和计算机电源。
2）本机不工作时，将场镜镜头盖盖好，防止灰尘污染光学镜片。
3）本机工作时电路呈高压状态，非专业人员，切勿在开机时检修，以免发生触电事故。
4）本机出现任何故障应立刻切断电源。
5）设备长时间使用，空气中的灰尘将吸附在聚焦镜下端表面上，轻者会降低激光器的功率，影响打标效果；重者造成光学镜片吸热过温以致炸裂。当打标效果不佳时，应仔细检查聚焦镜表面是否被污染。
如果是聚焦镜表面被污染，应卸下聚焦镜清洗其下端表面。
卸下聚焦镜应特别小心，注意不要碰坏或摔伤；同时，也不要用手或其他物品触及聚焦镜镜面。
清洗的方法是将无水乙醇（分析纯）与乙醚（分析纯）按 3:1 的比例混合，用长纤维棉签或镜头纸侵入混合液，轻轻擦洗聚焦镜下端表面，每擦试一面，须更换一次棉签或镜头纸。
6）在打标机工作过程中，不得挪动打标机，以免损坏机器。
7）打标机上不要覆盖堆或放其他物品，以免影响机器散热效果。

6.1 Precautions for maintenance of the machine

1) When the unit is not working, turn off the marking machine and computer power.
2) When the unit is not working, cover the field lens lens to prevent dust from contaminating the optical lens.
3) When the machine is working, the circuit is in a high voltage state. If it is not a professional, do not overhaul it during start up to avoid electric shock.
4) If there is any malfunction of the unit, the power should be turned off immediately.
5) When the equipment is used for a long time, the dust in the air will be adsorbed on the lower surface of the focusing mirror. The lighter will reduce the power of the laser and affect the marking effect; if the lighter causes the optical lens to absorb heat and overheat, it will burst. When the marking effect is not good, you should carefully check the surface of the focusing mirror for contamination.
If the surface of the focusing mirror is contaminated, the focusing mirror should be removed to clean the lower surface.
Care should be taken when removing the focusing mirror, taking care not to damage or fall; at the same time, do not touch the focusing mirror with your hand or other objects.
The cleaning method is to mix anhydrous ethanol (analytical grade) and Ether (analytical grade) in a ratio of 3:1, infiltrate the mixture with a long fiber cotton swab or lens paper, and gently scrub the lower end surface of the focusing mirror. A cotton swab or lens paper must be replaced.
6) During the working of the marking machine, the marking machine must not be moved to avoid damage to the machine.
7) Do not cover the pile or put other items on the marking machine, so as not to

affect the heat dissipation effect of the machine.

光纤激光打标机采用单元模块部件组装而成，各模块部件性能稳定，如若出现故障，根据现象不能判断故障原因，请与我公司售后服务部门联系。
The fiber laser marking machine is assembled by unit module components. The performance of each module component is stable. If there is a fault, the fault cannot be judged according to the phenomenon. Please contact our after-sales service department.