Scotle Raycus 3000W Handheld Fiber Laser Cleaning Machine Manual

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Contents

1.Product Description

1.1 Overall display

Overview of Laser Cleaning Machine:

Laser cleaning machine is a device that uses laser technology to remove surface pollutants. By irradiating the surface of the workpiece with a high-energy laser beam, dirt, rust, or coating can be instantly vaporized or peeled off, achieving a cleaning effect. Compared with traditional cleaning methods, laser cleaning machines have the characteristics of easy operation, easy automation, no need for chemical reagents, adaptability to surface cleaning, high cleanliness, high precision, and are efficient, environmentally friendly, safe and reliable, with minimal damage to the substrate surface.

Product Details

1.2 Packing list

2.Safety Instructions

2.1 precautions

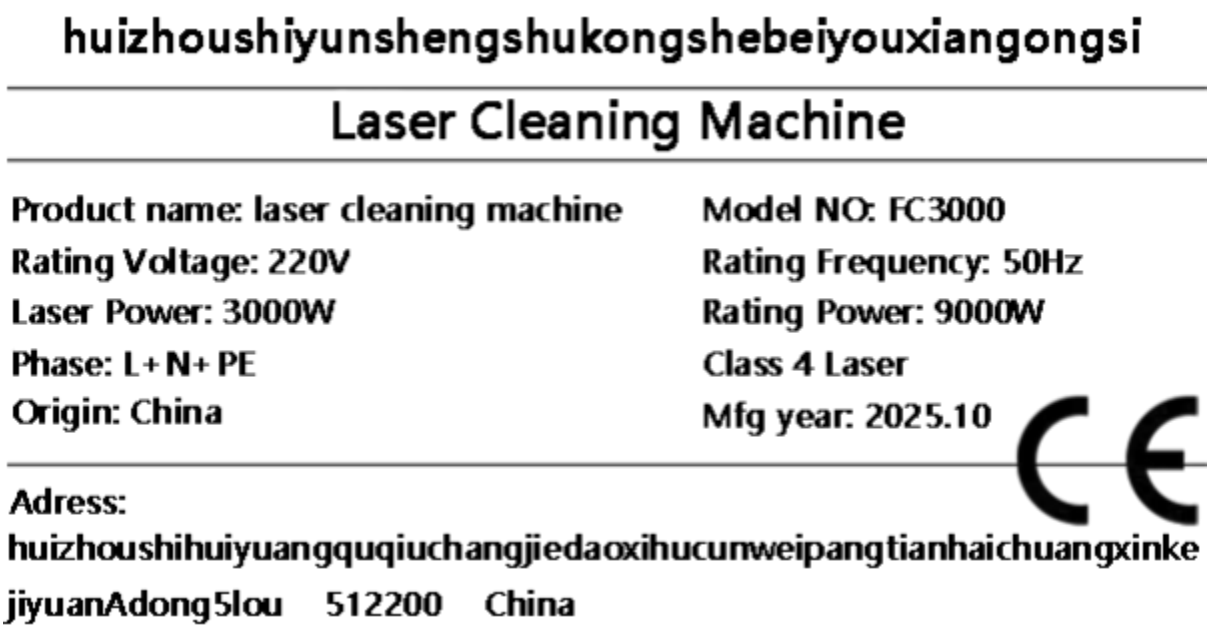
When using a laser cleaning machine, in order to ensure the safety of operators and equipment, the following safety precautions must be strictly followed:

1. Equip with protective equipment: Operators must wear complete protective equipment, including dust masks, laser protective goggles, laser protective face shields, laser protective clothing, and safety shoes, to ensure that their skin is not directly exposed.
2. Avoid direct viewing of the laser: During operation, it is strictly prohibited to directly view the laser beam to prevent permanent damage to the eyes.
3. Set up laser protection measures: The laser cleaning operation area should be isolated using laser protective curtains or partitions, and laser radiation warning signs should be posted. Personnel who are not wearing protective equipment are prohibited from entering the area.
4. Keep the work environment clean: Flammable and combustible materials are strictly prohibited from being placed in the cleaning area to prevent laser fires. At the same time, keep the site clean and avoid debris affecting the cleaning operation.
5. Follow the on/off sequence: When starting up, start the water pump (water cooler) first, then turn on the power switch, and finally turn on the laser switch. When shutting down, first turn off the laser switch, then turn off the power switch, and finally turn off the water pump (water cooler).
6. Maintain appropriate cleaning distance: The optimal cleaning distance should be maintained between the cleaning gun and the workpiece to ensure that the laser beam accurately illuminates the area to be cleaned, while preventing accidental injury to the operator.
7. Emergency stop button: The laser cleaning machine is equipped with an emergency stop button to quickly cut off the power in case of an emergency and prevent the accident from escalating.
8. Regular maintenance: The laser cleaning machine needs to be regularly maintained and serviced, including cleaning dirt, replacing consumables, etc., to ensure the normal operation of the equipment and extend its service life.

2.2 Product safety warning label

		
Warning label – Hazard symbol	Explanatory label	Alternative label for laser aperture
		
Alternative label for Class 4	Must be grounded	Electrical Hazard

2.3 Product nameplate



2.4 European Union Agent Information

2.5 Compliance to Standards for CE Marking

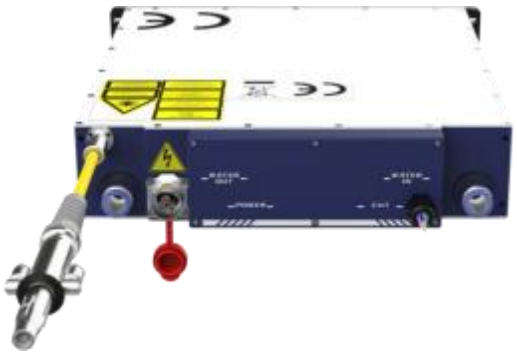
This product complies with the European Union Harmonized legislation, only complies with the above directives and standards when installed in accordance with the manufacturer's specifications.
The European Community requirements for product safety in the 2006/42/EC Machinery (MD)
This Directive requires that lasers comply with the standard:
EN ISO 12100:2010
EN 60204-1:2018
EN ISO 11553-1:2020/A11:2020
EN ISO 11553-2:2008
EN 60825-1:2014/A11:2021

3.Technical parameters

3.1 Machine parameter details

Laser cleaning machine	
laser power（W）	3000
scanning speed（mm/s）	20000
Laser Frequency（Hz）	5000
Duty cycle%	100
scan length（MM）	300
scan width（MM）	300
Focal length between handheld gun and material（MM）	800
Fiber Length	10M
way of working	Continuous
Wavelength	1080nm
Water cooler	Dual temperature and dual control constant temperature water tank
Cooling medium	Distilled water or deionized water [antifreeze needs to be added below zero]
Working environment	Support ambient temperature of -20 to 40 degrees Celsius, machine operating temperature of 10-40 ℃ [adjusted to this temperature through dual temperature and dual control] humidity of 10% -90% without frost
working voltage	220V 50/60Hz
Water tank capacity	16L
Maximum current	35A
Total Power	9KW

3.2 Laser source parameter details

3000W Laser Source	
Optical Character	
Power	3000W
Wavelength	1080± 10 nm
Output Fiber Core Diameter	50μm or customized
Output Cable Length	10m
Output Cable Connector	QBH
Aiming Beam	Red
Operation Mode	CW or modulation
Polarization	Random
Power Stability (25℃)	< ±1.5% (2h)
Power Adjustment Scope	10%-100%
Max Modulation Frequency	5kHz
Size and Weight	
Physical Size (H×W×D)	80mm*340mm*390mm
Weight	26kg
Electronic Character	
Power Supply	220±20 V, AC, PE, 50/60 Hz
Power Consumption	6.5.0Kw
Control Interface	RS232/AD
Water Cooling Parameters	
Minimum Water Cooling Capacity	6.5Kw
Temperature Settings	25℃ (Laser Module), 30℃ (QBH)
Cooling Tubes Size	O.D. Φ19 mm
Cooling Water Flow Rate (Laser)	>27 L/min
Cooling Water Flow Rate (QBH)	1.5~2.0L/min

3.3 Cleaning efficiency

The following is laboratory data on rust removal and cleaning efficiency, for reference only. Please refer to the actual situation for details.		
Continuous Laser	Single time Cleaning thickness	Cleaning efficiency
1500W	1-2MM	15-20 ㎡/hour
2000W	2-2.5MM	20-25 ㎡/hour
3000W	3-4MM	35-40 ㎡/hour

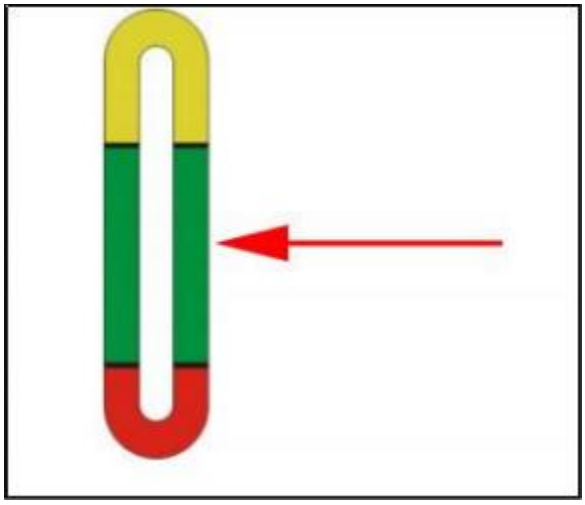
4.Installation & Operation

4.1 Installation

(1)After removing the wooden box, check the appearance of the machine for deformation.

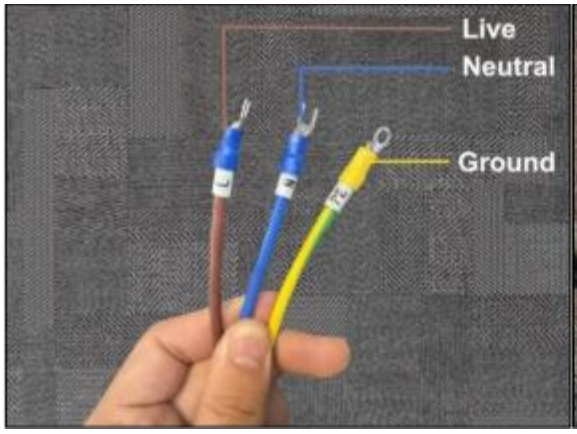
(2)Open the front panel of the machine, then Fill the water tank with pure water until the water level gauge on the back of the machine reaches the green mark. (see ①, ②)

①



②

(3)Connect the power cord to the electrical box(under 220V, 50/60Hz) (see ③, ④)



③

④

(4)Connecting the air compressor, The flow rate of the air compressor needs to reach 15L/min (see⑤,⑥)

⑤

⑥

(5)Turn the knob on the air pressure gauge on the back of the machine so that the pressure index of the pressure reducing valve reaches 0.2-0.3Mpa.(see ⑦, ⑧)

⑦

⑧

(6)Toggle the air switch on the back of the machine up, then flip the power switch and laser switch on the machine's control panel, the screen lights up, and the machine starts to run.(see ⑨, ⑩)

⑨

⑩

4.2 Operation

4.2.1 Operation steps:

1: After powering on, wait for the water tank temperature to rise above 20 ℃.

2: Wear protective equipment such as eye protection and gloves.

3: Select the appropriate parameters on the screen.

4: rotate the safety lock of the cleaning head, opens the protective cover.

5: Select indicator red light. (circular or square)

6: Turn on the laser enable.

7: Turn on manual blowing (on represents continuous blowing, off represents venting after pressing the laser trigger)

8: Aim the laser nozzle at the object to be cleaned and adjust the focal length (if an F800 lens is installed, the focal length should be 800mm).

9: Press the laser trigger on the gun head, the laser will shoot out and start cleaning

4.2.2 After cleaning is completed:

1: Turn off laser enable
2: The safety lock of the rotating gun head will close the protective cover
3: Turn on the laser switch in sequence; Turn off the power switch and turn off the air switch on the back of the machine

5 System interface

5.1 System interface description

Figure 5.1 Home Page

① [Laser Enable - ON/OFF] : Controls, indicates whether to output [Laser output enable signal].

② [Indicator red light - point/line] : Controls, indicates whether the galvanometer motor swings, adjusts the red light to [●] or[▬] without affecting the presence or absence of the red light.

③ [Manual Air Blowing] : Control, indicating whether the air valve is opened.

④ [/] : Indicates whether the gun body [safety lock] is open.

⑤ [/] : Indicates whether the [Switch button] of the gun body is open.

5.2 Process Page

Figure 5.2 Process Page

① [Peak power] : The maximum power output, or processing power, cleaning power.

② [Scanning frequency]: The number of periods the focused spot scans back and forth within one second, which affects the precision or fineness of the cleaned surface. It is usually set at 30 to 100Hz.

③ [Scan Width] : The theoretical width corresponding to the spot, controlling the spot size. Adjust according to the size of the weld.

- When the laser head is focused at 800, the maximum Scan width is 300mm;
- When the scanning frequency is 0 to 100Hz, the maximum scanning width is 300mm;
- At a scanning frequency of 150Hz, the maximum scanning width is around 200mm;
- When the correction factor is greater than 1.0 and the center offset is not equal to 0, the system will intelligently adjust the scanning width to ensure that the laser work trajectory does not exceed the laser head's light outlet in any case.

④ [Duty Cycle, pulse Frequency] : Typically set [duty cycle 100%][pulse frequency 2000]. The equivalent processing power can be changed by adjusting the duty cycle and pulse frequency according to the characteristics of the laser, but usually no adjustment is made.

⑤ [Endpoint point optimization] : Range -30 to 30 can eliminate the uneven light output at both ends of the cleaning trajectory, with different scanning frequencies corresponding to different optimal parameters. The default is 0. Adjust to the ideal

state according to the actual situation.

5.3 Settings Page

Figure 5.3 Settings Page

The page shown in Figure 5.3 is used to set factory parameters, including the product's power and alarm level, etc.

① [Laser Power] : Based on the actual laser.

② [Temperature alarm threshold] : Maximum temperature ofthe lens group 100 ° C, maximum temperature of the driver and motor 80 ° C. When this value is set to 0, no temperature alarm is detected.

③ [Alarm Level - High/Low] : Set to low when not in use, depending on the external product Settings.

④ [Trigger Settings - Click on/Double-click] : In clean mode, control the trigger mode. It is usually set to [Double-click].

⑤ [Open gas delay] : Release air in advance before turning offthe light.

⑥ [Off gas delay] : After turning offthe light, postpone turning offthe air.

⑦ [Center Offset] : [-] indicates a left shift of the light spot, and [+] indicates a right shift of the light spot. Used to adjust the light spot to be centered. At 800mm focus, the range is -15mm to 15mm.

⑧ [Scan Correction] : Range 0.01 to 1.50.

⑨ [Maximum Width] : Switch the maximum scanning width when using different focusing lenses.

⑩ [Laser starting /Laser off Power][Laser on /Laser off progressive time]: As shown in Figure 5.4, [Laser on progressive time] represents the time it takes to increase from [Laser starting power] to [peak power], and [Laser off progressive time] represents the time it takes to decrease from [peak power] to [Laser off power]

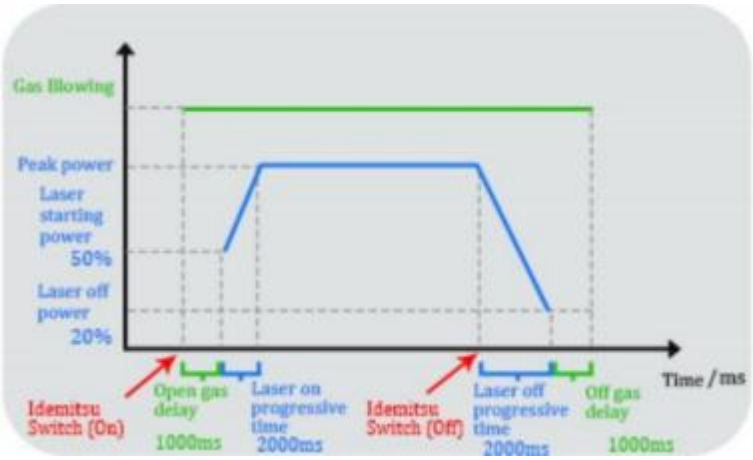


Figure 5.4 Power-to-time relationship

5.4 Monitoring Page

Figure 5.5 Monitoring Page

The page shown in Figure 5.5 shows the actual machine information monitored.

① Among them, [Input] [Output] [power supply] are real-time monitoring signals used to determine whether the product is working properly.

② [Equipment] :

- "Device Authorization" can be clicked to perform the operation and is used for product encryption.
- [Equipment number][Manufacturer ID][System version][Driver ID][driver version] are simply displayed information to be provided to technicians in after-sales work.
- [Light Time] is the cumulative luminous time of the product.

③ [Temperature] :

- [Temperature] is the measured temperature. The system alarms when it exceeds the [Temperature Alarm Threshold] corresponding to the Settings page.

5.5 Diagnostic Page

Figure 5.6 Diagnostic Page

The page shown in Figure 5.6 is the diagnostic page for the laser cleaning system. Enter the diagnostic page from the monitoring page.

This mode only shows the detection value of the output signal, which is used to determine whether the output signals of the main control board are normal in a safe situation. No light is emitted in this mode.

5.6 Alarm Prompt Page

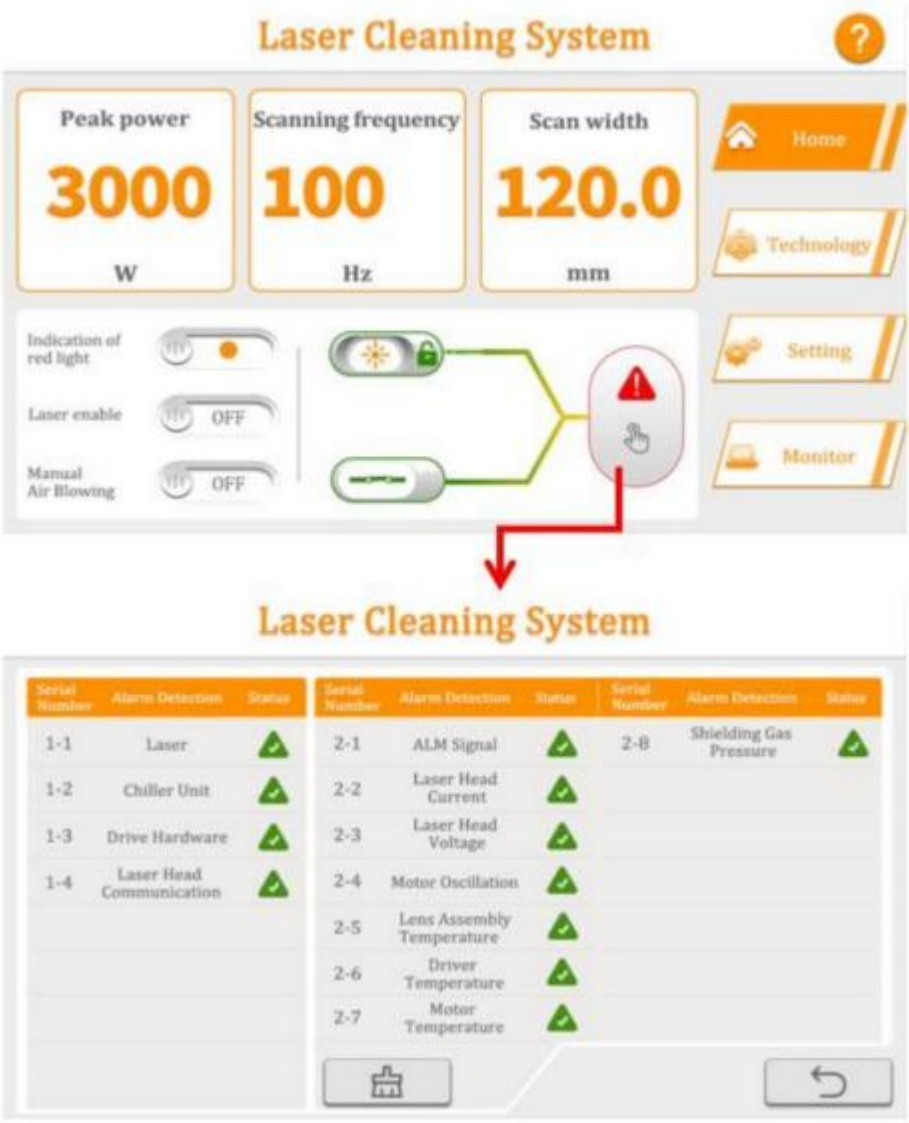


Figure 4 .7 Alarm Page

Figure 4.7 shows the alarm display interface.

Enter the alarm details page through the alarm prompt icon on the Home.

When the system malfunctions, a dynamic alarm prompt will appear on the Home. Click the icon to enter the alarm display page to view the anomaly.

- [1-1 to 1-4] When an alarm detects an anomaly, the status icon is [ ]. When the alarm status is cleared, the icon automatically changes to [ ].

- [2-1 to 2-8] When an alarm detects an anomaly, the status icon changes to [ ]. After the alarm status is cleared, the icon does not change color automatically. You

need to click the delete button below to clear the alarm.

6.Maintenance and upkeep

6.1 Regular cleaning

- **Keep the surface of the equipment clean to prevent dust accumulation**

6.2 Cooling system inspection

- **Regularly check the coolant level and the operation of the cooling system**

Cooling system water temperature setting:

Water cooler 25 ± 1 ℃ (no need to change in summer)

Coolant requirements:

- Purified water is used as cooling water, and it is recommended to use purified drinking water and replaced every month.
- To prevent mold growth in the water in the chiller from causing pipe blockage, it is recommended to add ethanol with a volume ratio of 10% when adding purified water.
- When the ambient temperature of the equipment is between - 10 ℃ and 0 ℃, the ethanol solution with a volume ratio of 30% must be used and replaced every two months.
- When the ambient temperature of the equipment is lower than - 10 ℃, the dual-system (with heating function at the same time) water chiller must be used, and the uninterrupted operation of the cooling system must be guaranteed.

Other requirements for the cooling system:

- When starting the cooling system for the first time, check the entire water system

and connections for water leaks. The external water pipes must be installed and connected according to the water inlet (IN) and water outlet (OUT) marked by the laser.Otherwise, the laser may not work properly.

- If the laser is not used for a long time, the cooling water inside the cooling system and the laser should be drained, otherwise the laser will be irrecoverable damaged.

Warning

- Set the water temperature of the cooling system correctly according to the ambient temperature.
- If the water temperature is set too high, the laser will not work properly.
- If the water temperature is set too low,condensed water will be generated inside the laser or in the laser output optical cable, which will cause irreparable damage to the laser.
- Before turning on the laser, it is necessary to ensure that the cooling system operates normally and that the water temperature reaches a suitable temperature.

6.3 Maintenance of optical components

SUP 32C focusing lens replacement：
https://youtube.com/shorts/PbjHl8ez5RI

SUP 32C protective lens replacement:

https://youtube.com/shorts/OiACfZ0mOEc

SUP 32C reflective lens replacement:

https://youtube.com/shorts/EQdPiWVfaDc

SUP 32C collimating lens replacement:

https://youtube.com/shorts/HGU10trrJLM

6.4 Lubrication and Maintenance

- **Regularly lubricate moving parts to ensure smooth operation of the equipment.**

7.Fault resolution

Problem items	Phenomena	Solutions
Temperature alarm, indicating that all kinds of temperatures are too high	The Home prompts that the temperature ofXXX is too high	For general lens temperature alerts, usually first check ifthe lens is damaged and replace the damaged one. Ifthe lens is normal, you need to directly block this alarm on the Settings page. Set the corresponding lens temperature alarm threshold to 0 on the Settings page and save it.
Chiller/laser/air pressure alarm	The alarm page shows the chiller/laser/air pressure alarm	Level alarm logic: The system will compare the wiring method ofthe corresponding product with the set level on the Settings page and alarm ifthey are different. Usually, alarms occur due to incorrect alarm level Settings. Simply change the corresponding alarm level. If an alarm occurs when an alarm signal is connected and the alarm is triggered regardless ofhow it is set, unplug the alarm signal line and set it to low level.
Screen issue	The screen doesn't light up/the screen doesn't Respond when clicked	Ifthe screen does not light up, make sure the controller is powered on. Check whether the four-core wires ofthe controller and the screen are connected correctly and whether the 24V voltage at 1 and pin 4 is normal. If clicking doesn't work during normal use, check ifthe whole machine is overheating. If clicking fails to input, check ifthe four-core wires ofthe controller and the screen are properly connected, and ifpins 2 and 3 are functioning properly. See 3.2.2 Control box display end. If a new device has no response when clicked, it may be a system version mismatch. Re-flash the program using the SD card. For the specific version, please inquire with our company.
Light output	No light output	Check ifthere are any alarm prompts on the Home and whether the laser enable is on. Check ifthe trigger signal and safety lock signal on the monitoring page are displayed in green; Check ifthe monitoring page's PWM, laser enable, and analog output are functioning properly. If all ofthe above states are normal, check the laser for abnormal alarms.
	Suddenly stop emitting light while working	Check ifthe safety lock and other alarms on the monitoring interface are functioning properly.

8.Q&A

1. Q: Why does the laser stop after a few seconds of cleaning after pressing the laser switch?

A: Check that your supply voltage is stable, and if you're using a generator, check to see if you have a voltage regulator.

2. Can this machine clean wood materials?

A: This machine is a continuous laser cleaner, and if it is used to clean wood, the base material will be harmed during cleaning, So it's not recommended for cleaning wood.

3. What do I do when the temperature on the screen flashes a red alarm and the laser stops?

A: Remove the protective lens from the cleaning head, Check for melted dust on protective lenses. If there is dust adhering to the protective lens, replace it with a new lens. If you still can't solve the problem, please contact us.