QA-LC500
Fiber Laser Cleaning Machine
User Manual

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§1.Caution for the operation safety

Please completely read and clearly understand the information contained in this manual before any attempt is made to operate this system. There is very important operation and safety information in this operator's manual.

Notice:

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- We have the registered trademark of Questt Asia.

- The QA-LC500 is Class IV laser product.

- The laser output power is W with the wavelength of 1060nm.

- Avoid touching the laser beam or the laser radiation directly. The human body is vulnerable to the output of certain lasers, and under certain circumstances, exposure can result in damage to the eye and skin.

- The system can be only opened for the maintenance in Questt Asia.

§2.Laser Safety information

2.1. Safety Standards

Throughout this manual, special warnings and cautions are given as needed. Important information and special hazards are also identified with symbols (icons) as shown below:

a. Warning

Whenever this "Warning" symbol appears, a hazard may exist that could result in death or serious injury. A description of the potential hazard is supplied for the users' information. It is the users' responsibility to take all necessary steps to prevent injury to themselves or other personnel.

b. Caution

Whenever this "caution" symbol appears, a description of potential damage to the Laser is supplied. It is the user's responsibility to understand this information and use it to prevent any damage to the machinery. If a user does not understand the information or is not sure how to proceed, immediately call the Questt Asia for further instruction.

2.2.General safety instruction

Users should follow the information included in this manual to ensure the safety and performance of the system.

Warning：The power supply must be attached with the ground wire.

Caution：The maintenance should be operated by the qualified professional person form Questt Asia. Don't open the laser enclosure or destroy the label on the machine. Otherwise, the machine will not be warranted.

Caution：The laser head of the QA-LC500 laser is connected to the fiber-optic. It should be handled carefully during the operating to prevent from the dust and contamination. The lens should be cleaned by the special lens paper

Caution: The system should be operated under the required environment. Otherwise the safety function will be loss.

§3. Laser Class

This laser is manufactured according to the standard of 21 CFR 1040.10（or IEC60825），belongs to the class IV laser product. It can emit Watts of laser at the wavelength of 1060nm. It is harmful to the human eyes and skin. Although the laser beam is invisible, it will cause the injury to the retinal and the corneal. It is necessary to wear a protect glass when the user operates the system. It is the user's responsibility to prepare all the safety glass.

Caution: Don't install the output collimator when the laser is running.

Caution: At the Back of theQA-LC500 laser, there are two fans for the cooling purpose, in order to have sufficient air flow.

Warning: Don't watch the laser output head directly. Wear the protect glass when you operate the laser.
Caution: Don't operate the laser at the frequency less than KHz, the high energy density is harmful to the laser.

Caution: Don't process the metal with high reflectivity, in case the laser will be damaged.

Caution: Use the uninterruptable Power Supply to operate the laser, the break off of the laser power supply will be seriously damage the laser.

Warning: The improper operation of the controller or the regulator may cause the harmful radiation.

§4. The symbol (icon) and the location of the warning and caution

Label of warning

Location: at the cover or the front panel of the laser

Information about the operation.

This symbol means the laser radiation and is marked on the product.

§4. Machine Description

QA-LC500 Fiber Laser cleaning machine system is one of the advanced products developed by Questt Asia Technology Co., Ltd. It uses the laser's high energy advantage working on the surface of the work piece, to clean the rust , paint, oil , glue on it.

Laser cleaning technology is a new technology that developed in recent decades, related research started in the middle of 80s, but until the early 90s began by researchers attention and rapid development, its emergence has opened a new field of laser technology application in industry, and became a new member of the big family of laser processing in. Laser cleaning technology as a new cleaning technology, has become the supplement and extension of traditional cleaning methods, and has been applied in the field of microelectronics, construction, nuclear power, aerospace, automotive, medical, cultural relic protection.

§5. System Description

Equipment Performance

The machine adopts originally fiber laser and high speedy galvo scanning system. High quality of light beam, long using time, stable equipment performance exempts maintenance. It is speedy, and precious. Cleaning has non-touched process, permanent effect, humanized operation, and stable running.

Applicable fields

The machine is widely applied in microelectronics, construction, nuclear power, aerospace, automotive, medical, cultural relic protection.

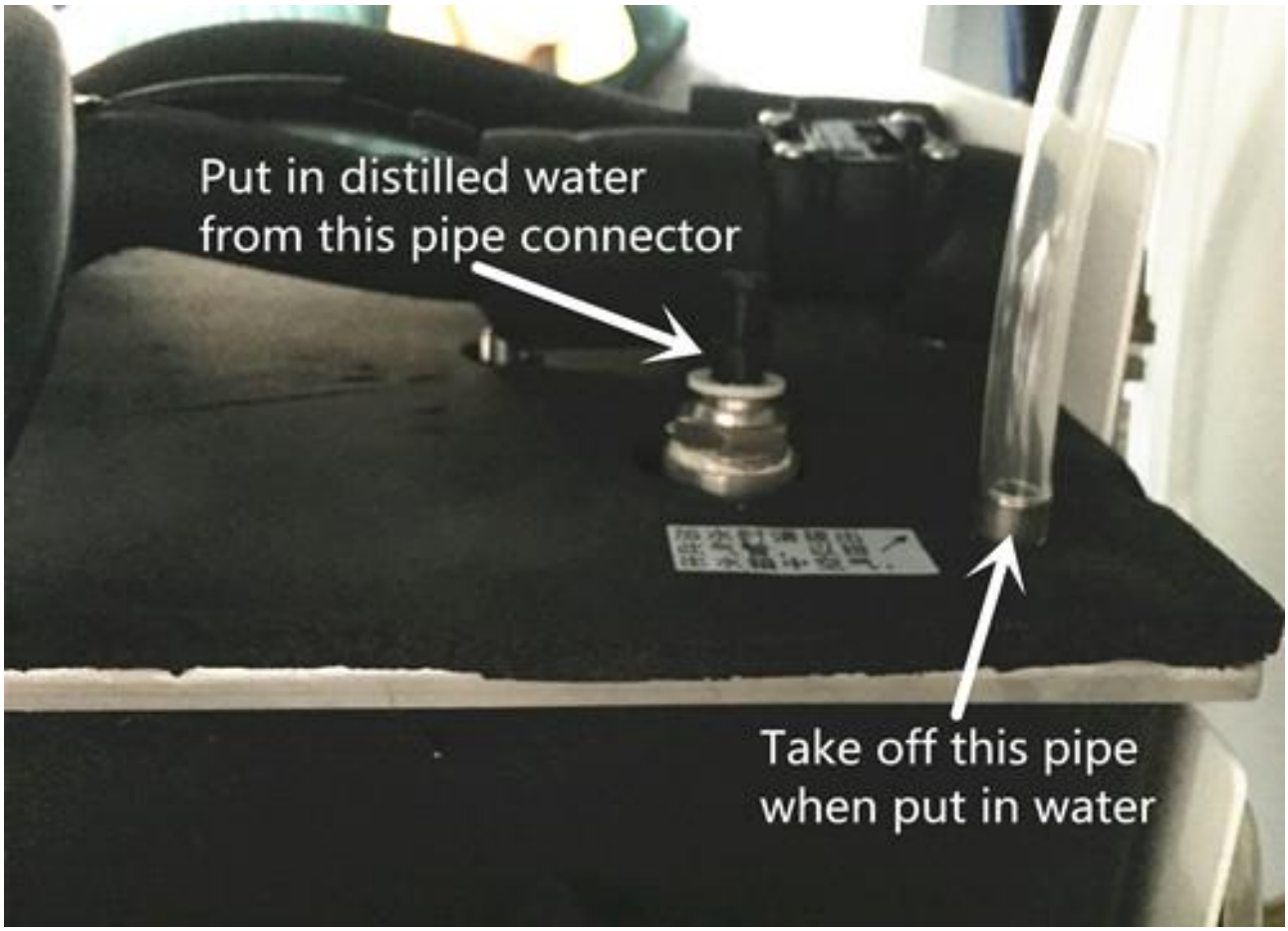
The main of technical parameters

Model	QA-LC500
Laser source	IPG Fiber laser
Laser Power	500W
Fiber Cable Length	15 Meters
Laser Wavelength	1060nm
Pulse Energy	100 mJ
Pulse frequency	2-50KHz
Work speed	0-7000mm/s
Cooling	Water cooling
Dimension	1120*600*1080 mm
Weight	240Kg
Beam width	10-170mm
Optional	Manual
Temperature	5-40 ℃

§6. Installation

Install the dust suction machine, connect the connect the dust pipe on the laser gun, Connect the Main power wire cable on your Electricity plug. The voltage needed is Single Phase, 220V, 50/60HZ 16A

Put Distilled water into the water chiller from below Water In connector. When put in water, pleaase take off the pipe beside to let air go outside. See below photo.

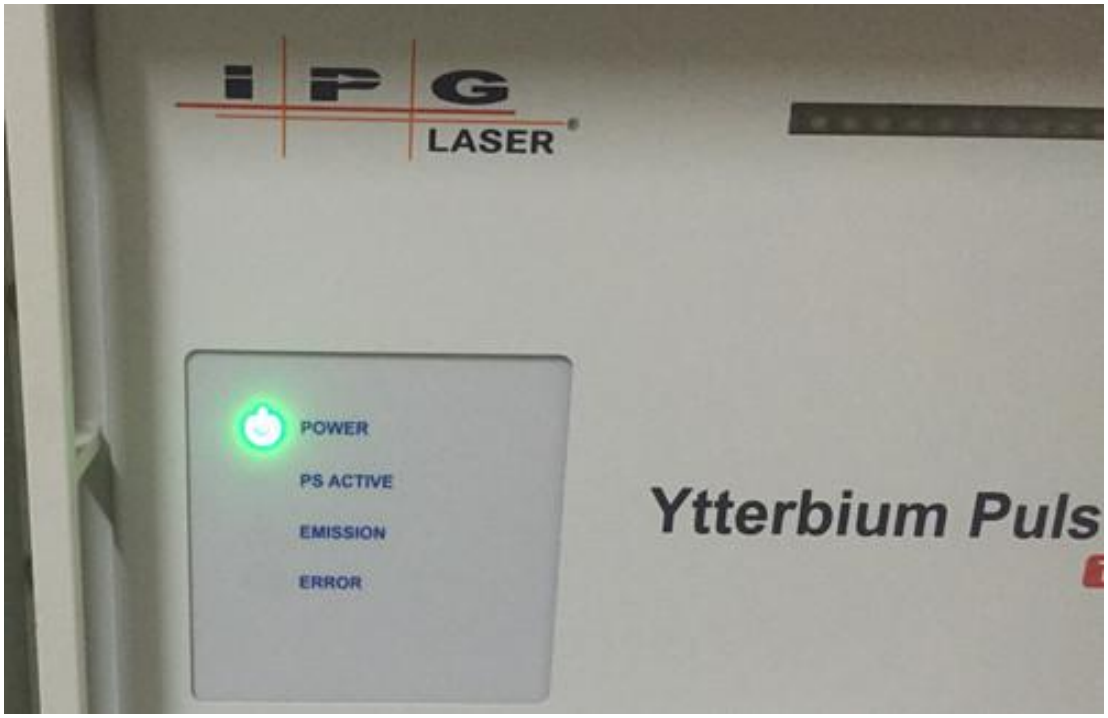


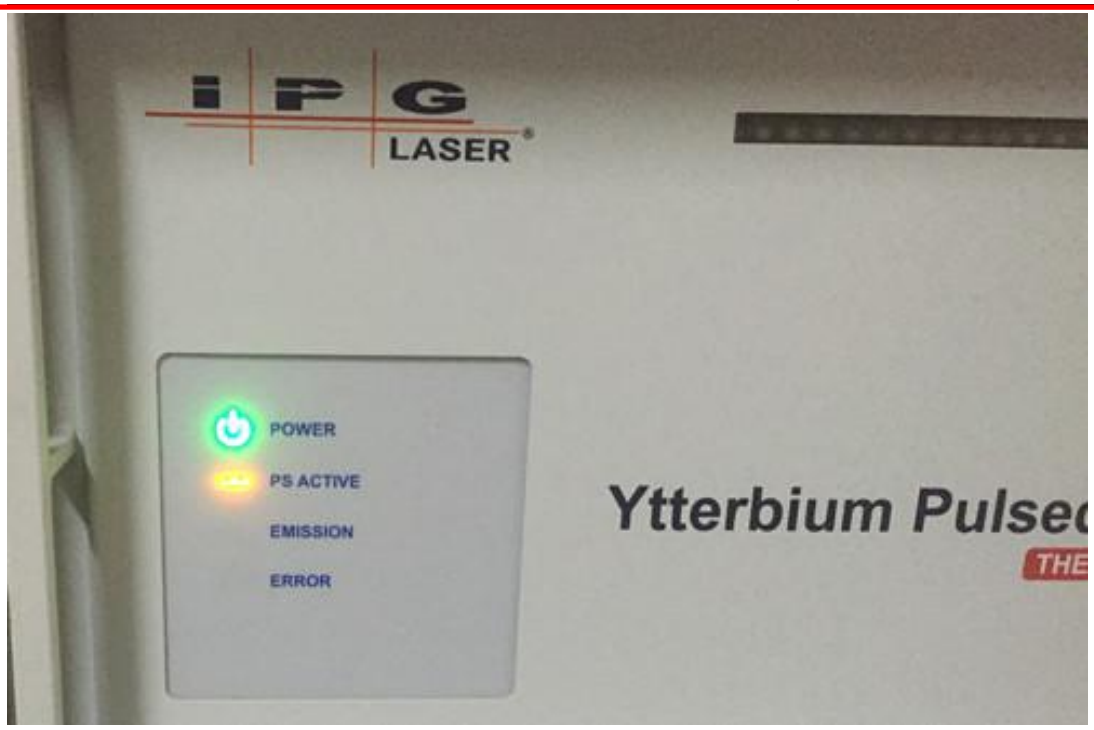
§7. Operation

7.1 Connect the Main Power cable laser and Dust suction machine to your electricity plug, 16A.

7.2 Loose the "STOP", turn right the Key Switch. Waiting the temperature to go and match setting temperature.

7.3 Press “Laser Switch” to charge the laser device, a green light “POWER”will come out on laser monitor, waiting for 20 seconds, press the “Laser ON” on screen, a orange Light “PS ACTIVE”will come out on laser monitor. See below photos.

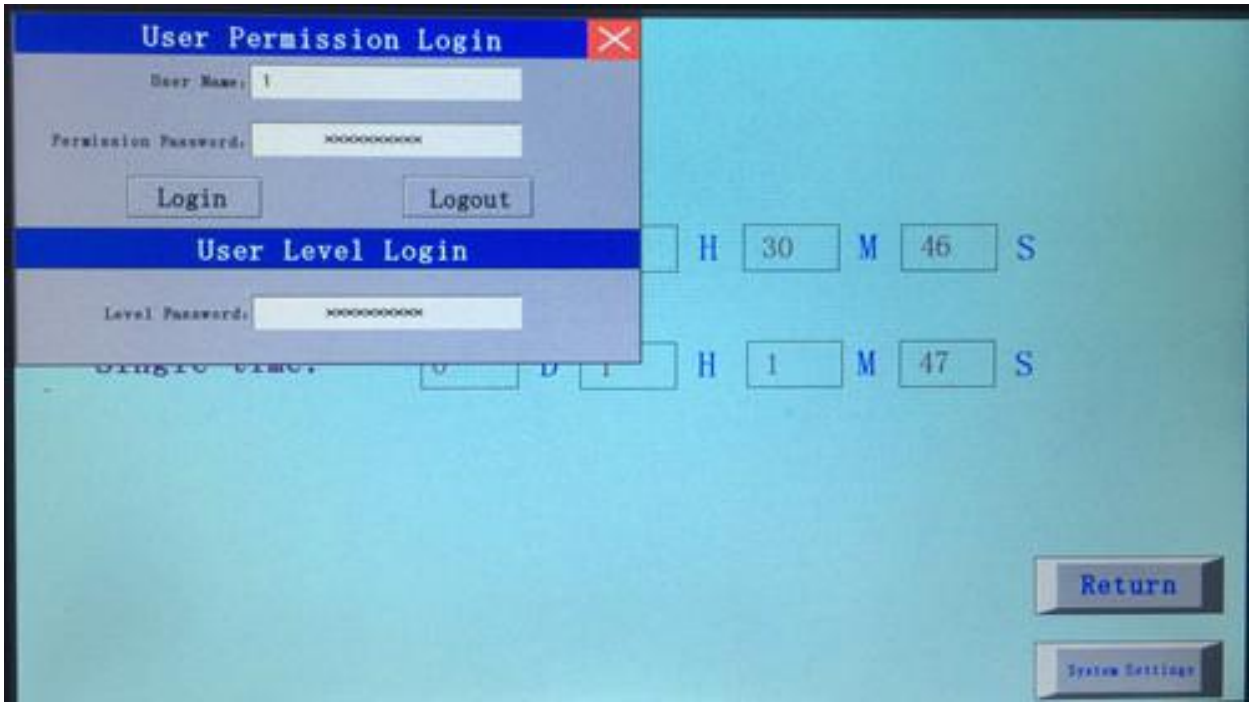


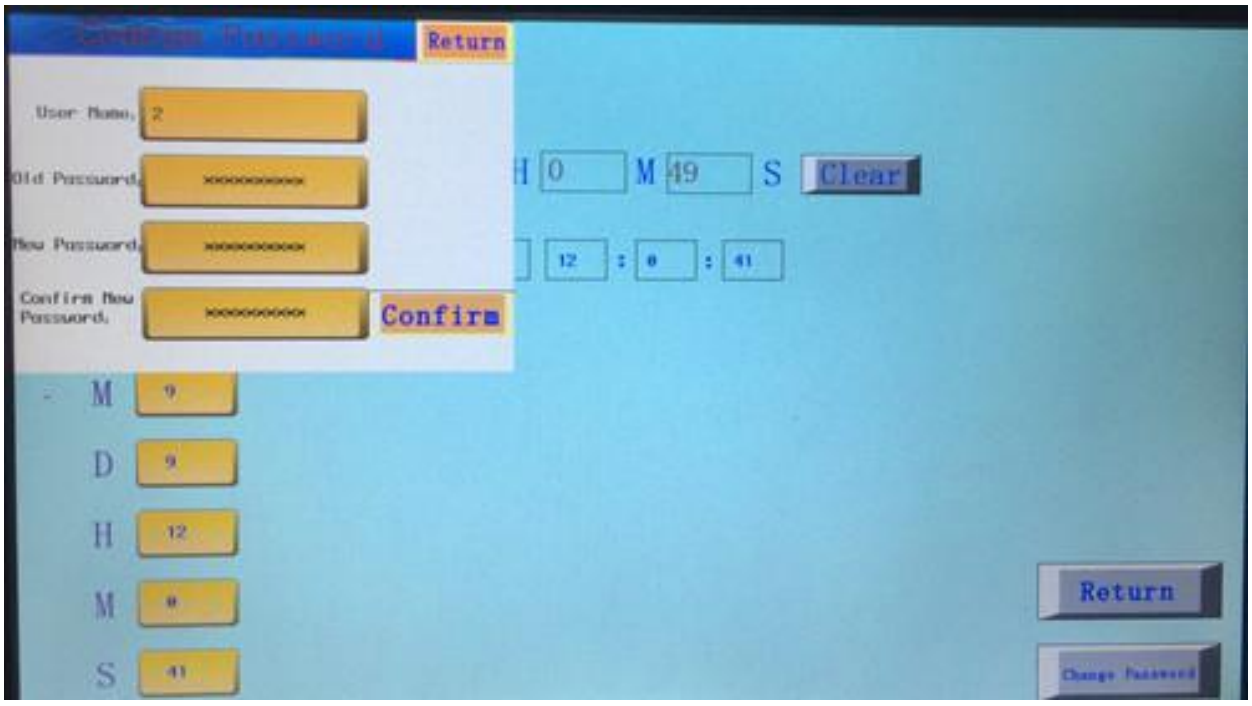


7.4 Now laser is ready to work. Press the trigger button on laser gun, the laser will come out for cleaning continuously. After finished cleaning, loose the trigger button from your finger to stop the laser. During working time, the "EMISSION" light and long yellow working light will come out on laser monitor. See below photo.

7.5 If need to change parameters for different work pieces, just operate on the touch screen panel.

First, for language, we have Hebrew and English, press “EN” or “HE” to exchange.
Second, press the orange buttons, enter the numbers you want, press “ENTER”, then press “Save”. If write wrong numbers, press “C” to clear it.
Third, press “Use timing”, then choose “System settings” you can login with different level. User name:1, password:123456, you can change the date, time and clear the Single times. User name:2, password:888888, if click “Change Password”, you can change the passwords of both lever 1 and 2.





PS: After change parameters, remember to press ”Save” .

A: Laser Power. Laser power percentage, range choose from 1%-100%. ***Suggest 80%***

B: Scanning Width. Laser beam width, setting from 1%-100%, bigger number, the laser beam width is wider, ***Suggest 30% .***

C: Scanning Speed. Scanner motor vibrating speed, setting from 10-500HZ, ***Suggest 50HZ .***

D: Laser Frequency. The frequency of the laser source range from 2-50KHZ, if laser frequency changed, also need to change Laser pulse width to match full energy. ***Suggest 7KHZ***

E: Laser Pulse Width. We have only 4 gear position, 25ns, 50ns, 70ns 100ns. The bigger number, the higher laser power. If need to clean fast with strong power, set 100ns. If changed pulse width, please also change the Laser Frequency to match highest laser energy. ***Suggest 50ns .***

PS: Full energy setting

1: Pulse energy:100mJ, Laser frequency:5KHZ, Laser pulse width:100ns

2: Pulse energy:100mJ, Laser frequency:5KHZ, Laser pulse width:70ns

3: Pulse energy:71mJ, Laser frequency:7KHZ, Laser pulse width:50ns

4: Pulse energy:33mJ, Laser frequency:15KHZ, Laser pulse width:25ns

7.6 We have two screws on laser gun, left one can adjust laser beam width, right one can adjust laser power. We have numbers around the screw, you can choose the percentage you want. When you turn screws on laser gun, the numbers on touch screen will change at same time.

7.7 If the temperature of the laser inside is lower then Dew point, Error light will come out, see below photo. Increase the setting temperature 1 degree on panel . The set temperature should be under 30 degrees for safety using.

7.8 After finished working, firstly, press “Laser OFF” on touch screen, then press “Laser Switch”, wait for about 5 minutes, Turn left the Key Switch, press the Emergency Stop button.

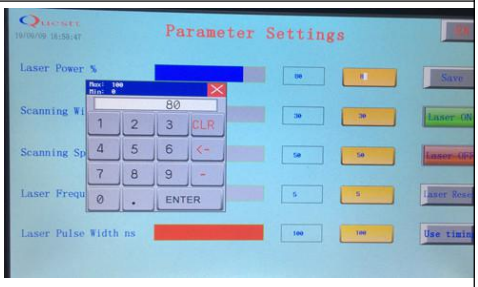
7.9 Roll the black pipe on the back handle, remember do not bend the black pipe. Open the laser gun box, Put the laser gun into foam of right position. If you use the focus holder on top of laser gun, please take off the holder before put in the gun. See below photo.

7.7 **Every week, use Alcohol to clean the big protection mirror on Laser head.(if too much rust on mirror, the laser power will be weak.)**

Parameter Settings for different materials

500W IPG Fiber Laser Cleaning Machine Parameter Settings						
NO.	Cleaning condition	Laser Power %	Scanning Widht %	Scanning Speed HZ	Laser Frequency KHZ	Laser Pulse Width ns
1	Heavy Rust on iron	100	40	50	5	100
2	Light Rust on iron	80	60	50	50	25
3	Rust on copper	100	40	50	7	50
4	Rust on Stainless steel	100	40	50	7	50
5	Dust on stone	80	60	50	7	50
6	Paint on iron	80	30	50	7	50
7	Paint on Stainles steel	100	30	50	7	50
8	Paint on other metals	80	30	50	7	50
9	Paint on wood	30	60	50	5	100
10	Paint on wall/Graffiti	80	40	50	5	70
11	Other coating	100	30	50	5	70
12	Oil on metal	100	30	50	5	100
13	Glue on metal	100	30	50	5	100
14	Plastic on metal	100	30	50	5	100
15	Oxide on metal	100	40	50	7	50
16	Welding seam cleaning	100	10	50	7	50
17	Glass cleaning	20	30	50	50	25
18	Ceramic cleaning	50	40	50	7	50
19	Shinny mold clean	60	30	50	5	70
20	Letters on Paper	20	30	50	5	100

Parts description and photos:

1.	Connect the dust pipe on your laser gun, install the dust suction machine	
2.	Switches Loose the Emergency stop. Turn on the Key Switch, the Working light will turn white.	
3.	Water cooling system for laser gun. Water in and water out connector	
4.	Touch Screen Panel	

5.	**Adjustable screws on laser gun.** **Left one :laser beam width** **Right one: laser power**	
6.	**Machine holder**	
7.	**Moving wheels with brakes**	
8.	**Laser head trigger**	

9.	**500W air cooled fiber laser source**	
10.	**Lens** ***(the suggest lens is F160, focus distance is about 160mm, max beam width is 110mm, shorter focus distance, stronger laser power!)*** ***Every Week, use alcohol to clean the protection glass if too much rust on surface.***	
11	**Eye protection glasses**	
12	**Laser Gun**	

§8. Attentions

8.1 Forbids in the refrigeration ventilator anomaly condition, start laser power source and oscillating mirror power source.

8.2 Do not allow the equipment work in the situation that the power and the voltage are not stably, when necessity needs the manostat to keep constant voltage.

8.3 Presents the abnormal phenomenon, first closes the total power switch and then to inspect .

8.4 When the equipment works, all circuit protection device (for example: Laser power and oscillation mirror power) and Optical devices (for example: The Fiber Optic Laser, oscillating mirror and the f - Theta focusing lens) needs the good abstraction of heat, therefore should insure that the working conditions ventilation.

8.5 The use environment should the clean and no dust, otherwise will pollute the optical device and affect the laser power's output, seriously ever damage the optical device!!!

8.6 Environment relative humidity ≤80%, temperature 5℃~40℃.

8.7 The complete machine earths reliably, if not observe this stipulation possibly to cause electric shock or the equipment work is not normal!

8.8 It must after cut-off power source at least 10 minutes later, only then can carry the machine, earthing and inspect the machine .

§9. Service

If the above steps do not correct the malfunction, do not disassemble without our instruction. Do not hesitate to contact us by the following info:

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§10. Electric Circuit Diagram