

QA-LC50

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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- The QA-LC50 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 from 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-LC50 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-LC50 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-LC50 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-LC50
Laser source	Fiber
Laser Power	50W
Fiber Cable Length	3.5 Meters
Laser Wavelength	1064nm
Pulse Energy	1 mJ
Pulse frequency	1-2000KHz
Work speed	0-7000mm/s
Cooling	Air cooling
Dimension	650*350*560 mm
Weight	36Kg
Beam width	10-110mm
Optional	Manual
Temperature	5-40 °C

§6. Installation

Connect the Main power wire cable on your Electricity plug. The voltage needed is Single Phase, 220V 50HZ (110V 60HZ is also OK).

§7. Operation

- 7.1 Connect the Main Power cable to your electricity plug, connect the foot switch cable.
- 7.2 Loose the "STOP"
- 7.3 Turn right the Key Switch. Waiting about 15 seconds to start cleaning.
- 7.4 Press the trigger button laser gun head, the laser will come out for cleaning. Loose the trigger button to stop the laser. You can also connect the laser with your robot system by this connector for automatic cleaing, let the robot to control the laser ON and OFF.
- 7.5 If need to change parameters, just press on the touch screen Panel.

First, press the “Setting” on left top corner, when button turn grey, you can choose the parameters you need to change, press grey buton when the number turn red, it will come out a number keyboard, you can write the number you need, “←”for delete, “C” for clear, “=” for enter.



Second, after changed, press “Saving” on middle top.

Third, for language, we have English and others, press “setting”, after turn grey, press “EN” or “IT” to exchange. See below photo.



PS: Before press buttons to change parameters, remember to press "Setting" and turn gray color.

A: Scan Width. Laser beam width, setting from 0%-100%, bigger number, the laser beam width is wider, ***Suggest 40%*** . (longest beam width settings: Scan Width 100%, Clean Speed 50HZ)

B: Laser Power. Laser power percentage, choose from 10%-100%. ***Suggest 90%***.

C: Clean Speed. Scanner vibrating speed, setting from 50-500HZ, smaller number, the laser beam width is longer, ***Suggest 300HZ*** .

D: Laser Freq. The frequency of the laser source under highest power, for 50W, set 50KHZ. If pulse width changed, also need to change Laser Freq as below table.

E: Pulse Width. Setting from 2-350ns. The bigger number, the higher laser power. If need to clean fast with strong power, set 350ns. If need to make precision cleaning, lower Pulse Width is better. If changed pulse width, pls also change the Laser Freq as below table to match highest laser power. ***Suggest 350ns*** .

7.6 After finished working, Turn off the Key Switch, press the Emergency Stop. Turn off air switch on back.

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

Pulse width and Frequency setting table:




Models	Pulse width	Full power Frequency	Max power	Max Pulse Energy
	(ns)	(KHz)	W	(mJ)
8	350	50	50	1.000
9	300	52	50	0.962
10	250	54	50	0.926
11	200	56	50	0.893
12	190	58	50	0.862
13	180	60	50	0.833
14	170	62	50	0.806
15	160	64	50	0.781
16	150	66	50	0.758
17	140	68	50	0.735
18	130	70	50	0.714
19	120	72	50	0.694
20	110	74	50	0.676
21	100	76	50	0.658
22	90	78	50	0.641
23	80	80	50	0.625
24	70	85	50	0.588
25	60	90	50	0.556
26	50	95	50	0.526
27	40	100	50	0.500
28	30	105	50	0.476
29	20	110	50	0.455
30	15	140	50	0.357
31	10	200	50	0.250
32	6	330	50	0.152
33	4	500	50	0.100
34	2	1000	50	0.050





50W Laser Cleaning Machine Parameter Settings





For different materials

NO.	Cleaning condition	Scanning Width %	Laser Power %	Cleaning Speed HZ	Laser Frequency KHZ	Pulse Width ns
1	Heavy Rust on iron	50	100	100	50	350
2	Light Rust on iron	100	80	300	56	200
3	Rust on copper	80	100	300	76	100
4	Rust on Stainless steel	100	100	500	110	20
5	Dust on stone	100	60	400	200	10
6	Paint on iron	100	100	100	50	350
7	Paint on Stainless steel	100	100	500	50/200	350/10
8	Paint on other metals	100	100	400	76	100
9	Paint on wood	80	80	50	1000	2
10	Paint on wall/Graffiti	100	100	200	56	200
11	Other coating	100	100	300	50	350
12	Oil on metal	80	100	200	50	350
13	Glue on metal	80	100	100	56	200
14	Plastic on metal	80	100	100	56	200
15	Oxide on metal	100	100	500	200	10
16	Welding seam cleaning	100	100	500	500	4
17	Glass cleaning	100	30	400	500	4
18	Ceramic cleaning	100	50	400	200	10
19	Shiny mold cleaning	100	100	500	1000	2

Parts description and photos: /

1.	Connect the Main Power cable to your electricity power. Pull up the air switch.	 <p>A close-up photo of a black power cable being plugged into a metal outlet labeled 'Main Power'.</p>
2.	Loose the Emergency stop.	 <p>A close-up photo of a large red circular emergency stop button with a 'Stop' label and a circular arrow indicating it can be rotated.</p>
3.	Turn on the Keyswitch	 <p>A close-up photo of a key switch labeled 'Key Switch' with a key inserted into the slot.</p>

4.	Working light	
5.	Touch Screen Panel	
6.	Machine holder	
7.	Moving wheels with brakes	

8.	Laser head trigger	
9.	Laser Gun	
10.	<p>Lens</p> <p><i>(the suggest lens is F100, focus distance is about 100mm, max beam width is 70mm, shorter focus distance, stronger laser power! We offer F160 lens for spare part)</i></p> <p>Every week, use alcohol to clean the lens if too much rust on surface.</p>	
11.	Eye protection glasses	

§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 $\leq 80\%$, temperature $5^{\circ}\text{C} \sim 40^{\circ}\text{C}$.
- 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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