

# QA-LC200

## Fiber Laser Cleaning Machine

## User Manual



**Wuhan Questt Asia Technology CO., Ltd**

**Address:** A7-101, Hangyu building, Wuhan University Sci & Tech Park, East Lake High-tech Dev. Zone, Wuhan, Hubei, China  
**Tel/Fax:** 00862787611146 <http://www.questtlaser.com> email: [info@questt.com.cn](mailto:info@questt.com.cn)

## §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:

- Every attempt has been made to ensure that all information in this manual is accurate. The information included in this manual is correct and subject to be changed without notice. Questt Asia makes no representations or warranties of any kind regarding this information, including but not limited to, implied warranties of merchantability and fitness for a particular purpose. Questt Asia shall not be held responsible for errors contained herein or any omissions from this information.
- This document contains proprietary information which is protected by copyright and all rights are reserved by Questt Asia. No part of this document may be reproduced, copied, translated or incorporated in any other material, graphic, electronic, mechanical or otherwise, or given out to any third party, without the prior written consent of Questt Asia.
- We have the registered trademark of Questt Asia.



- The QA-LC200 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-LC200 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 the QA-LC200 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-LC200 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.

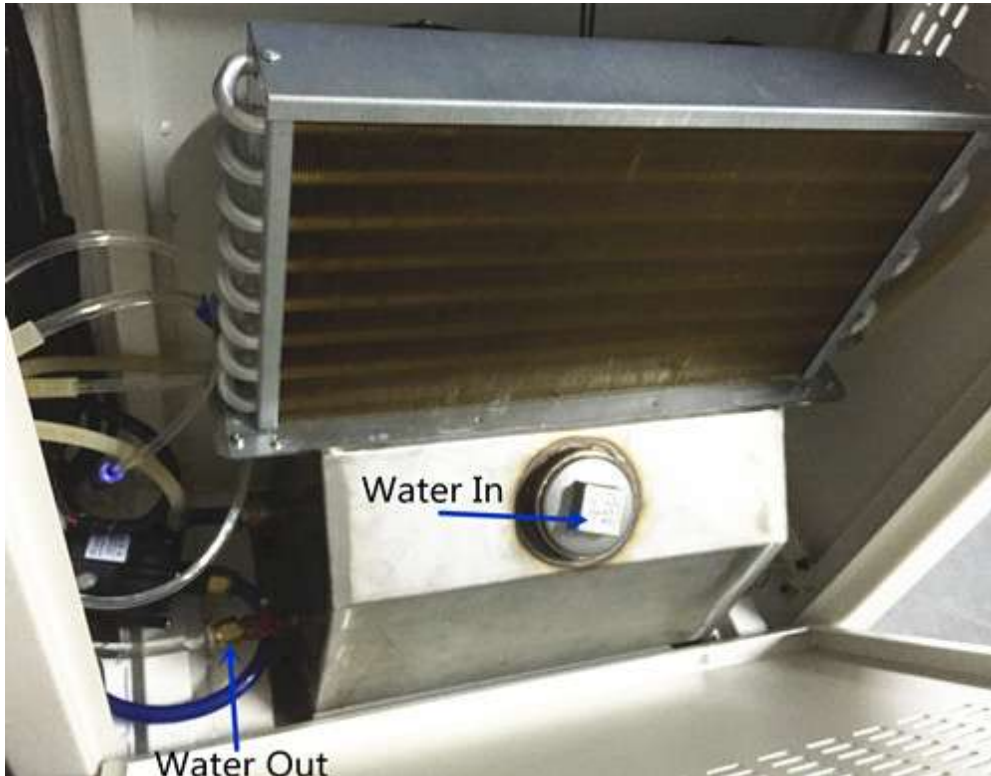
### The main of technical parameters

|                    |                 |
|--------------------|-----------------|
| Model              | QA-LC200        |
| Laser source       | Fiber           |
| Laser Power        | 200W            |
| Fiber Cable Length | 5 Meters        |
| Laser Wavelength   | 1060nm          |
| Pulse Energy       | 2 mJ            |
| Pulse frequency    | 1-3000KHz       |
| Work speed         | 0-7000mm/s      |
| Cooling            | Air cooling     |
| Dimension          | 800*450*1100 mm |
| Weight             | 90Kg            |
| Beam width         | 10-110mm        |
| Optional           | Manual          |
| Temperature        | 5-40 °C         |

## §6. Installation

Connect the Main power wire cable on your Electricity plug. Put pure water into the water tank from Water In connector. See below photo.

Change water every 3 months, flow out water from Water Out first, then put in pure water again from Water In.



## §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 laser source under highest power, for 200W, set 100KHZ. If pulse width changed, also need to change Laser Freq as below table.

E: Pulse Width. Setting from 10-400ns. The bigger number, the higher laser power. If need to clean fast with strong power, set 400ns. 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 400ns** .

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<br>Frequency | Max power | Max Pulse Energy |
|--------|-------------|-------------------------|-----------|------------------|
|        | (ns)        | (KHz)                   | W         | (mJ)             |
| 7      | 400         | 100                     | 200       | 2.000            |
| 8      | 350         | 108                     | 200       | 1.852            |
| 9      | 300         | 116                     | 200       | 1.724            |
| 10     | 250         | 124                     | 200       | 1.613            |
| 11     | 200         | 132                     | 200       | 1.515            |
| 12     | 190         | 140                     | 200       | 1.429            |
| 13     | 180         | 148                     | 200       | 1.351            |
| 14     | 170         | 156                     | 200       | 1.282            |
| 15     | 160         | 164                     | 200       | 1.220            |
| 16     | 150         | 172                     | 200       | 1.163            |
| 17     | 140         | 180                     | 200       | 1.111            |
| 18     | 130         | 188                     | 200       | 1.064            |
| 19     | 120         | 196                     | 200       | 1.020            |
| 20     | 110         | 204                     | 200       | 0.980            |
| 21     | 100         | 220                     | 200       | 0.909            |
| 22     | 90          | 240                     | 200       | 0.833            |
| 23     | 80          | 260                     | 200       | 0.769            |
| 24     | 70          | 280                     | 200       | 0.714            |
| 25     | 60          | 320                     | 200       | 0.625            |
| 26     | 50          | 400                     | 200       | 0.500            |
| 27     | 40          | 500                     | 200       | 0.400            |
| 28     | 30          | 600                     | 200       | 0.333            |
| 29     | 20          | 800                     | 200       | 0.250            |
| 30     | 10          | 1200                    | 200       | 0.167            |




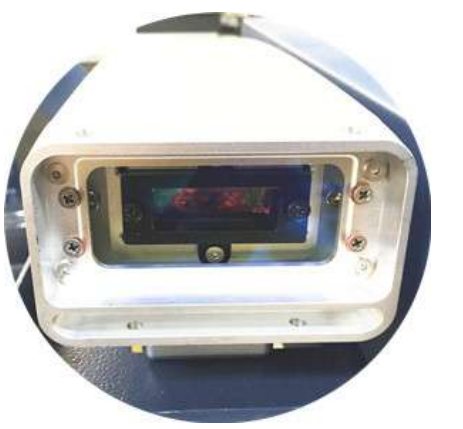


# Parameter Settings for different materials

| 200W Laser Cleaning Machine Parameter Settings<br>for differnt marerials |                            |                     |                  |                      |                        |                   |
|--|----------------------------|---------------------|------------------|----------------------|------------------------|-------------------|
| NO.  | Cleaning<br>condition      | Scanning<br>Widht % | Laser<br>Power % | Cleaning<br>Speed HZ | Laser<br>Frequency KHZ | Pulse<br>Width ns |
| 1  | Heavy Rust on<br>iron      | 50                  | 100              | 100                  | 100                    | 400               |
| 2  | Light Rust on<br>iron      | 100                 | 80               | 300                  | 132                    | 200               |
| 3  | Rust on copper             | 80                  | 100              | 300                  | 220                    | 100               |
| 4  | Rust on<br>Stainless steel | 100                 | 100              | 500                  | 800                    | 20                |
| 5  | Dust on stone              | 100                 | 60               | 400                  | 1200                   | 10                |
| 6  | Paint on iron              | 100                 | 100              | 100                  | 100                    | 400               |
| 7  | Paint on<br>Stainles steel | 100                 | 100              | 500                  | 100/1200               | 400/10            |
| 8  | Paint on other<br>metals   | 100                 | 100              | 400                  | 220                    | 100               |
| 9  | Paint on wood              | 80                  | 80               | 50                   | 1200                   | 10                |
| 10   | Paint on<br>wall/Graffiti  | 100                 | 100              | 200                  | 132                    | 200               |
| 11   | Other coating              | 100                 | 100              | 300                  | 100                    | 400               |
| 12   | Oil on metal               | 80                  | 100              | 200                  | 100                    | 400               |
| 13   | Glue on metal              | 80                  | 100              | 100                  | 132                    | 200               |
| 14   | Plastic on metal           | 80                  | 100              | 100                  | 132                    | 200               |
| 15   | Oxide on metal             | 100                 | 100              | 500                  | 800                    | 210               |
| 16   | Welding seam<br>cleaning   | 100                 | 100              | 500                  | 1200                   | 10                |
| 17   | Glass cleaning             | 100                 | 30               | 400                  | 1200                   | 10                |
| 18   | Ceramic cleaning           | 100                 | 50               | 400                  | 800                    | 20                |
| 19   | Shinny mold<br>cleaning    | 100                 | 100              | 500                  | 1200                   | 10                |

## Parts description and photos:

|    |  |  |
|----|--|--|
| 1. | <p>Main power cable</p>  |    |
| 2. | <p>Switches</p> <p>Loose the Emergency stop.</p> <p>Turn on the Key Switch, the Working light will turn white.</p> |   |
| 3. | <p>Water cooling system for laser gun.</p> <p>Water in and water out connector</p>                                 |  |
| 4. | <p>Touch Screen Panel</p>  |  |

|    |   |  |
|----|---|--|
| 5. | <p>Adjustable screws on laser gun.</p> <p>Up one :laser beam width</p> <p>Bottom one: laser power</p> |    |
| 6. | Machine holder  |   |
| 7. | Moving wheels with brakes   |  |
| 8. | Laser head trigger  |  |

|     |   |  |
|-----|---|--|
| 9.  | 100W air cooled fiber laser source  |    |
| 10. | <p>Lens</p> <p><i>(the suggest lens is F160, focus distance is about 160mm, max beam width is 110mm, shorter focus distance, stronger laser power!)</i></p> <p><b>Every Month, use alcohol to clean the protection glass if too much rust on surface.</b></p> |   |
| 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  $\leq 80\%$ , 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:**

Wuhan QUESTT ASIA Technology Co., Ltd

Address: A7-101, Hangyu building, Wuhan University Sci & Tech Park, East Lake High-tech Dev. Zone, Wuhan, Hubei, China Zip: 430223

Tel: 0086 13908624127 / 0086 27 87611146 Fax: 0086 27 59908808

Email: [info@questtlaser.com](mailto:info@questtlaser.com)

Mobile: 0086 13294168619

QQ: 2696898824

<http://www.questt.com.cn> [Http://www.questtlaser.com](http://www.questtlaser.com)

**Address:** A7-101, Hangyu building, Wuhan University Sci & Tech Park, East Lake High-tech Dev. Zone, Wuhan, Hubei, China

**Tel/Fax:** 00862787611146 <http://www.questtlaser.com> email:[info@questt.com.cn](mailto:info@questt.com.cn)

## §10. Electric Circuit Diagram

