OFF-ROAD PULSED LASER CLEANING MACHINE

LC-200

OPERATION MANUAL



LUOYANG XINCHENG PRECISION MACHINERY CO.,LTD.

Notice

Before using this product, please ensure that the following items are in compliance with the product safety operation requirements. Otherwise, it is forbidden to turn on the system and perform cleaning operations.

	It is prohibited to use this product in places with flammable and explosive materials.
	When cleaning highly reflective materials (copper, aluminum, etc.), it is forbidden to have people stand around to avoid damage caused by reflected light.
	It is forbidden to aim the cleaning head at the human body to avoid injury.
	It is forbidden to make the tip of the cleaning head upward. Pay attention to the dustproof of the lens.
	Make sure that the equipment is reliably grounded.
	Clean combustible items carefully and equip with fire-fighting equipment.
	This product is a Class IV radiation laser. Goggles must be worn.
	The minimum bending radius of the integrated cable should be more than 200mm.

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I Scope of application

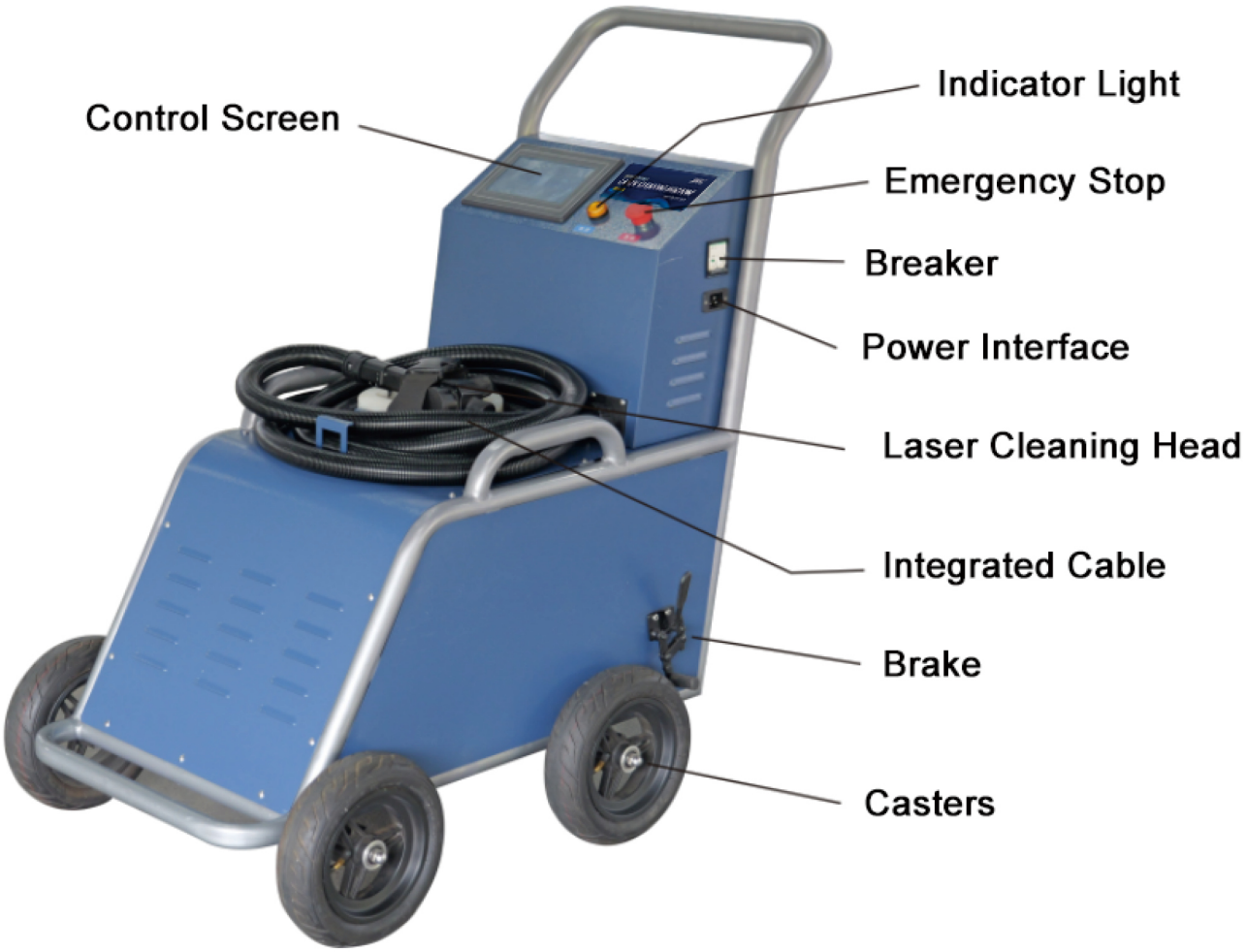
This product can be used to remove attachments or coatings on the surface of objects, including rust, paint, oil stains, coatings, etc. (High-reflective materials need to be tested and verified). It has the advantages of non-contact, no chemical damage, mobility and high efficiency, etc.

II Product description

1.1.Main technical parameters

Model	LC-200
Laser Power	200W
Laser Wavelength	1064nm
Output Method	Pulsed
Pulse Duration	2-500ns
Modulation Frequency	1-4000KHz
Integrated Cable Length	5m
Adjustable Width	0-130mm
Voltage	AC220V±10%
Input Power	1KW
Cooling Method	Air Cooling
Dimensions of machine	1170*660*1100mm
Ambient Temperature Range	0℃～35℃
Ambient Humidity Range	40%-80%
Net Weight	82kg
Gross Weight	120kg

2.Equipment structure diagram



Ⅲ Use instruction

1.Installation and use requirements

1.1 This machine uses a 220V AC power supply. If this requirement is not met, please use the machine with a transformer.

1.2 The minimum bending radius of the integrated cable is 200mm.

1.3 Please keep at least 60cm of space around the machine to ensure good ventilation and to avoid affecting performance due to poor heat dissipation.

1.4 The operating environment temperature range of the laser cleaning machine is 0 to 35°C. If it exceeds this range, it may cause the system to alarm.

2. Operation precautions

2.1 Please check and ensure that the equipment is powered off before installing/removing laser cleaning components and other operations.

2.2 It is recommended to dedust the lens and the cleaning head with clean air or wipe it with a lens cloth after each use to prevent dust or other pollution. Please cover the lens with a protective cover when the cleaning head is not working.

2.3 When transporting or handling, avoid knocking and overturning.

2.4 If the equipment is abnormal, check and troubleshoot in time or contact the after-sales service. Do not operate the machine to avoid unnecessary losses.

Ⅳ Operation process

1. Connect one end of the power cord to the power port of the machine, and the other end to the AC power supply.
2. Turn on the emergency stop to start the machine.
3. Set the swing and laser parameters according to the target.
4. Click "Sway" and "Laser" to enter the cleaning preparation state.
5. Double-click the cleaning head button and keep pressing to start cleaning.
6. After cleaning, release the button to stop working.

Note: Different function combinations can be achieved by pressing the button multiple times: (this function needs to be set in the system)

Press the button twice and hold: laser on + power unchanged.

Press the button 3 times and hold: laser on + power increase (release and the power is updated).

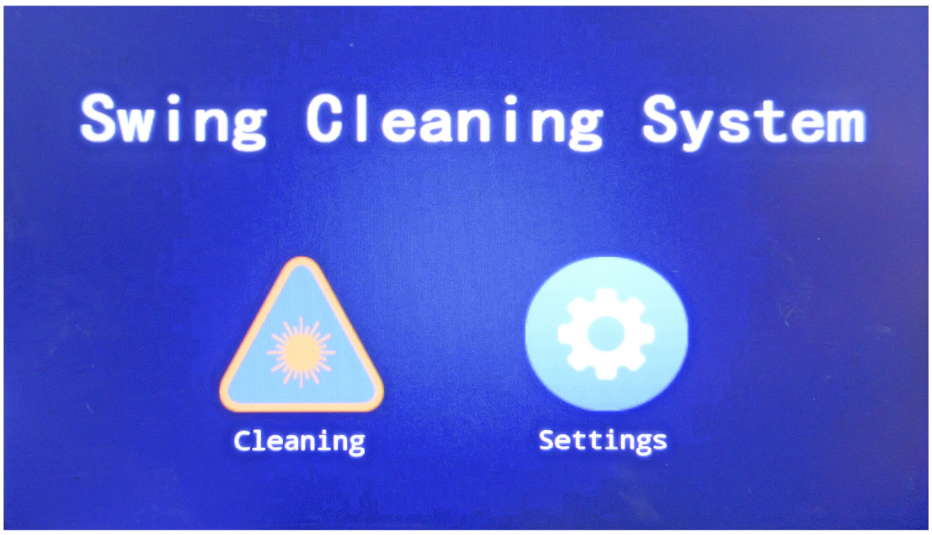
Press the button 4 times and hold: laser on + power decrease (release and the power is updated).

Ⅴ Laser controller interface description

After powering it on, the control screen enters the main operation interface of the handheld laser cleaning system.

1.User management

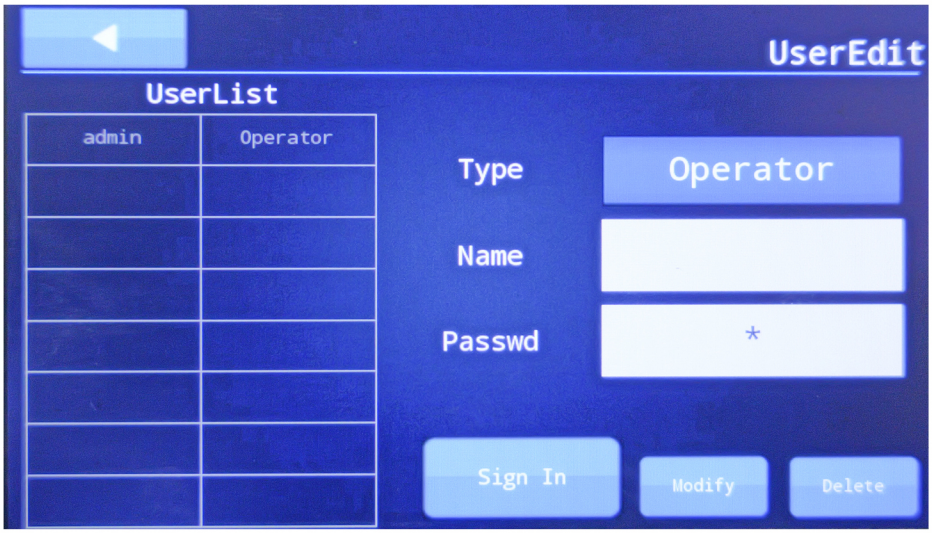
Click "Settings" to enter the system setting interface (default password: 6), click "User Management", and set the user type, user name and password in sequence to complete the user creation (the system has created an account: admin, password: 1).



Main operation interface



System Setting



User Management

2.Cleaning Management

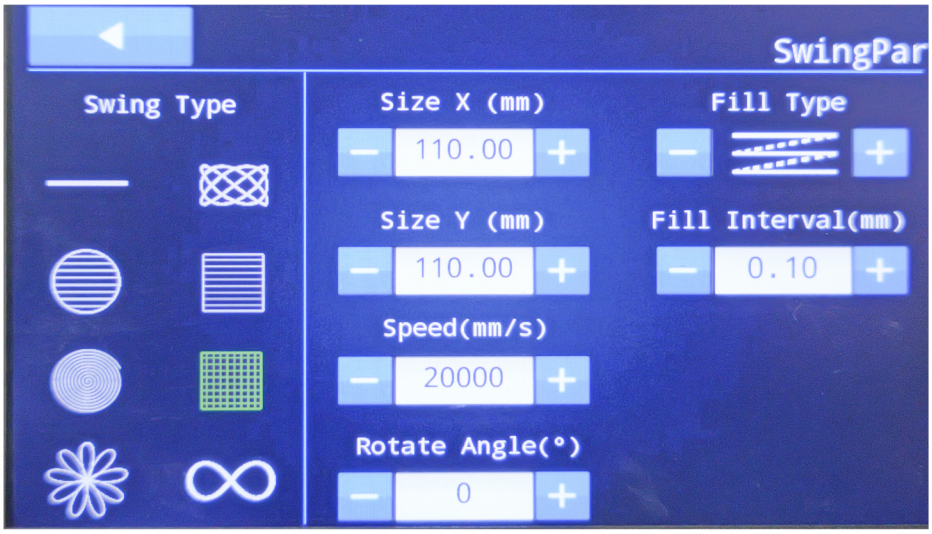
Click “Cleaning”, enter the password to enter the interface. Click “Swing” and “Power” to set the parameters. Please refer to 2.2 and 2.3 for parameter setting.

Click "Sway" and "Laser" to enter the cleaning preparation state. Aim the the cleaning head at the target with an interval of about 300mm (F254 field lens), and double-click the button of the cleaning head to start.

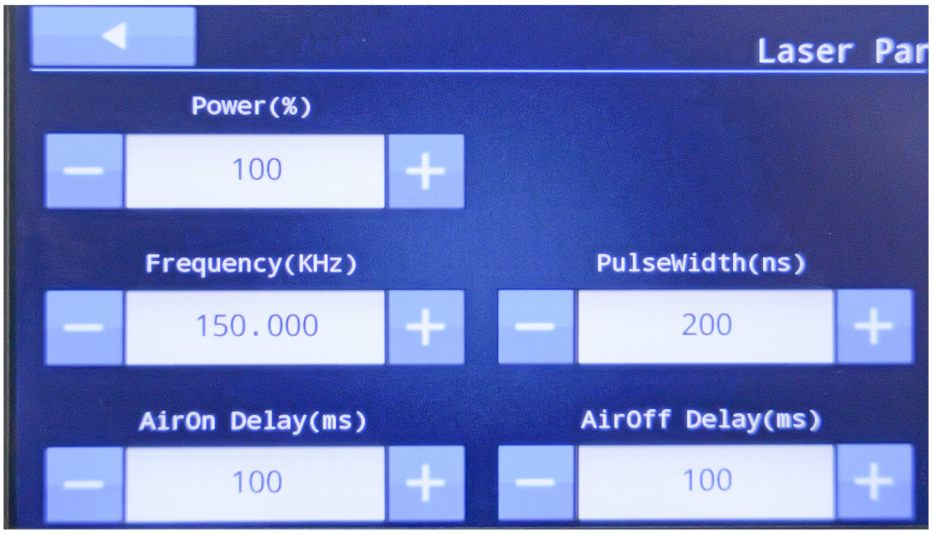
Note: In the process of cleaning, please pay attention to vacuuming. Otherwise the raised smoke and dust will cause damage to the lens!



Cleaning Management



Swing Par.



Laser Par.

2.1 Function description for swing parameter and laser parameter:

Item	Parameter	Function	Note
swing parameter	Size X(mm)	Set the X-direction scan width	0-130mm (Depends on the lens)
	Size Y(mm)	Set the Y-direction scan width	
	Speed(mm/s)	Set the speed of the cleaning head scanning. The speed limit is different for different tracks.	
	Fill type	Types of Ellipse Fill and Rectangle Fill Lines	
	Fill interval	The interval between filling lines. The denser the filling, the better the cleaning effect, but the lower the efficiency.	
	Fill angle	The inclination angle of the fill line. It can be set in conjunction with the "rotate angle" parameter.	
	Rotate angle	The overall rotation angle of the scanned graphics (does not include fill line angle)	
	Phase move	The phase shift speed of the sine line.	
	Sine Num.	Density series of sinusoidal wavy lines	
Laser Parameter	Power（%）	Set laser power percentage	0-100%
	Duty（%）	Sets the duty cycle of the modulation signal period (It is valid for continuous laser sou	0-100%
	Frequency（KHz）	This parameter is set according to 2.4 Laser parameter table.	1-4000
	Pulse Width	Control the pulse width of the laser source	2-500
	AirOn Delay（ms）	Set the air blowing time in advance before cleaning starts	
	AirOff Delay（ms）	Set the time to keep blowing after cleaning	

2.2 Swing parameter table

Scanning Width（mm）	Scanning Speed（mm/s）
20	2500
30	3500
40	5000
50	6000
60	7500
70	8500
80	10000
90	11000
100	12500
110	13500
120	15000
130	16000

Note: The scan width is directly proportional to the scan speed. The narrower the scan width, the corresponding scan speed needs to be reduced.At this time, the cleaning intensity will increase. It is recommended to adjust the scanning width and scanning speed referring to the above table. Otherwise it may cause the galvanometer motor to whistle or even cause damage.

2.3. Laser parameter setting instructions

2.3.1. Control the output energy by adjusting the power. The higher the power is, the higher the output energy is, and vice versa.

2.3.2. The frequency can adjust the speed of the pulsed laser. The higher the frequency, the faster the speed, and vice versa.

2.3.3. The pulse width can adjust the the single output energy. The larger the pulse width, the stronger the energy, and vice versa.

2.3.4. The pulse width and frequency need to be adjusted accordingly. See the laser parameter table for details.

2.4. Laser parameter table

Pulse Width (ns)	Minimum Frequency (KHz)	Maximum Frequency (KHz)
2	4000（＞50W）	4000
4	4000（＞80W）	4000
6	4000（＞120W）	4000
9	4000	4000
13	3000	3000
20	1800	3000
30	1200	3000
45	1000	2000
55	800	2000
60	720	2000
80	630	2000
100	550	1000
150	320	1000
200	250	1000
250	190	900
350	150	600
500	130	500

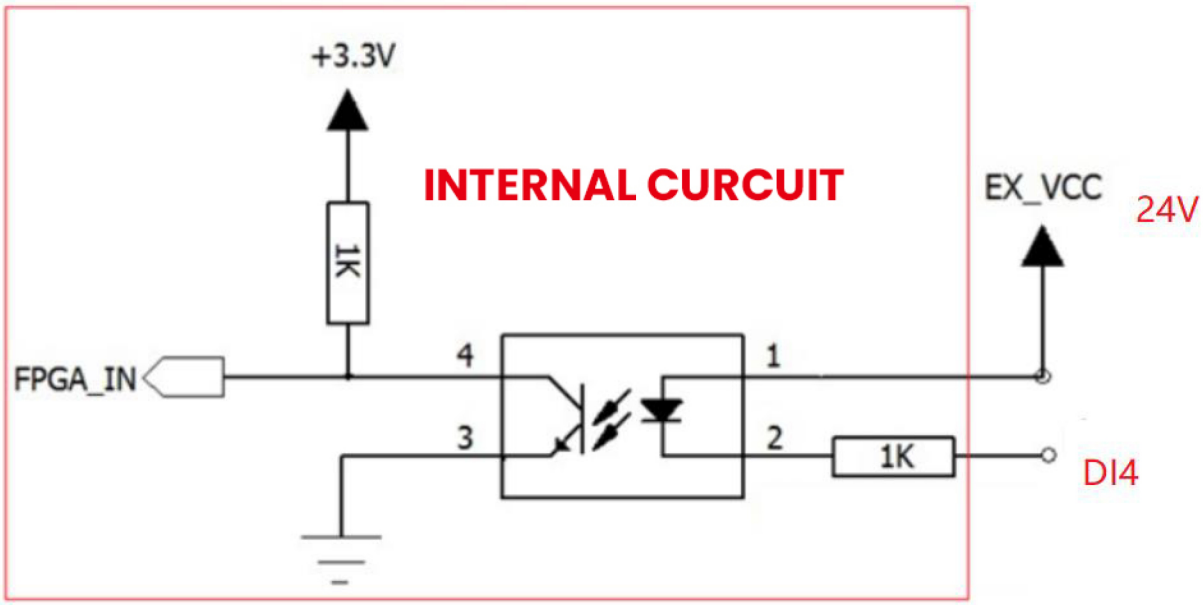
3. External IO triggers control start and stop

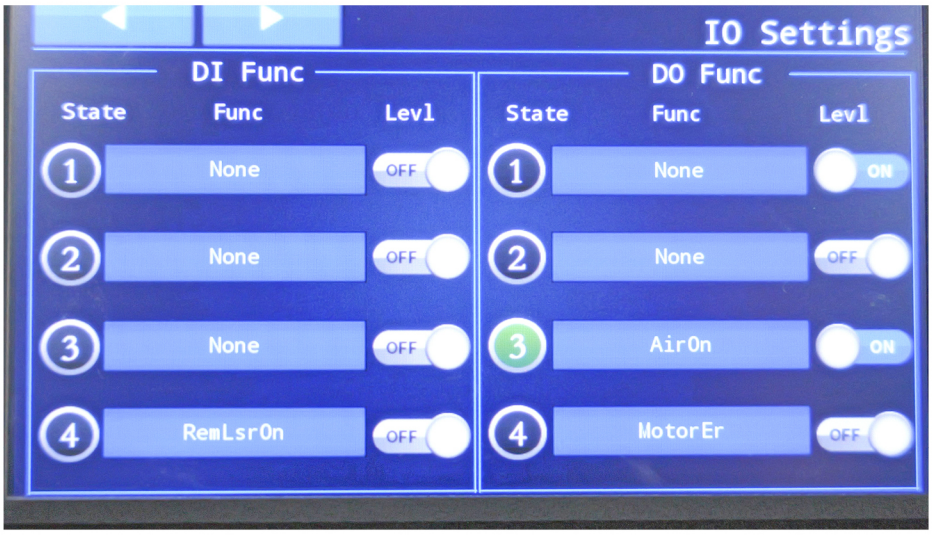
3.1. Connect the external control signal to DI4 (valid when low level)

3.2. Go to System Settings -> IO Settings, assign terminal DI4 function as "remote laser on" as shown in the figure below.

3.3. Return to the cleaning management page. After activating the sway and laser buttons, the cleaning head will be controlled to switch on and off through external signals.

3.4. Note: Before emitting laser, make sure that the cleaning head is firmly fixed to prevent it from falling off. The button of the cleaning head and the external control signal cannot be used at the same time.





Ⅵ Fault analysis and troubleshooting

Fault phenomenon	Cause Analysis	Troubleshooting method
The spot does not swing	1. The control cable connector of the cleaning head is loose. 2. The motor or control card is damaged.	1. Tighten loose joints 2. Please contact us
Sudden loss of energy during cleaning	1. There are foreign objects or damage to the optical lens. 2. Laser failure or abnormality	1. If it is due to the protective lens, clean or replace it, and for other lenses please contact us. 2. Please contact us.
The cleaning head is hot	1. The optical lens is dirty or damaged 2. Optical path deflection	1. Clean or replace protective lenses. For other lenses, please contact us. 2. Check whether the connection between the optical fiber and the cleaning head is loose.
The cleaning effect before and after is inconsistent in the same condition	1. Power attenuation 2. The integrated cable is seriously bent	1. It is normal that the power attenuation is in the normal range. 2.The minimum bending radius of the integrated cable should be more than 200mm.

Ⅶ Maintenance

Note: In order to avoid personal injury and man-made damage, the maintenance of the handheld laser cleaning machine must be carried out by professionals.

1.Handheld cleaning head

1.1 Daily inspection: Check the protective lens. If there is foreign matter, use a special dust-free cotton swab dipped in industrial alcohol to clean it. If there is coating damage or lens damage, please replace

the protective lens in time to avoid other optical lenses being burned.

1.2 Regular inspection: When the machine is used or not used for some time(One week is recommended), first check the laser module, and make sure that each optical component is free from dust pollution, mildew, and other abnormal phenomena before turning it on.

1.3 Observing the light spot: The operator can check the laser output light spot with black image paper. Once the spot is found to be uneven or skewed, it should be repaired in time.

Ⅷ Warranty terms

1.The warranty period of this product is one year for the whole machine, and the warranty period for the laser source is two years:

1.1 From the date of purchasing this product, our company provides free warranty within one year. If the machine need to be returned to the factory for repair, the user only needs to bear the cost of two-way transportation.

1.2 This product is repaired free of charge for life, and the user only needs to bear the cost of spare parts and two-way transportation.

2.The following scopes are not covered by warranty:

2.1 Damage caused by improper use such as violent bumping, bending, etc.

2.2 Human-caused damage.

2.3 Laser accessories and consumables are not guaranteed (galvanometers, field mirrors and other optical parts, Integrated cables, etc. are not covered by the warranty).

※The relevant technical parameters listed in this manual are for reference only. The relevant product information is subject to change without prior notice. All technical parameters and agreements are subject to the terms of the sales contract.

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