GY-QCDXY200P
Laser Cleaning System
User Manual

Scope of application (support customization)

QCS connector：17mm、20mm

1Preface

1.1Welcome

Thank you for choosing My Company GY-QCDXY200P laser cleaning system. This user manual provides you with important safety, operation, maintenance and other precautions. Therefore, before using this product, please read this user manual carefully and keep it properly. To ensure safe operation and optimum product condition, please observe the following cautions and warnings.

This user manual is not a quality guarantee. The correction of printing errors, the modification of the described information, and the improvement of the product are all explained by My Company at any time without prior notice, and the revised content will be incorporated into the reprinted user manual.

2Product description

Laser cleaning is a new technology based on the interaction of laser and matter, which can achieve the effect of removing contamination and attachments on the surface of objects. Compared with traditional cleaning methods, laser cleaning has the advantages of non-contact, no damage to the substrate, precise cleaning, "green" environmental protection and online availability, and is especially suitable for high-speed online cleaning in designated areas.

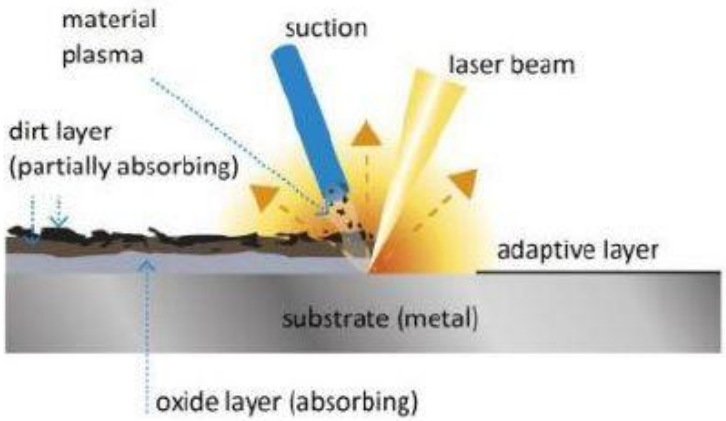


Figure 2.1 Schematic diagram of laser cleaning

The laser cleaning equipment produced by My Company is a new generation of high-tech surface treatment products, which are easy to install, operate and automate. Simple operation, turn on the power and turn on the equipment, you can clean without chemical reagents, medium, dust and water. It can be cleaned according to the curved surface, and the cleaning surface has high cleanliness. Stains, dirt, rust, coatings, coatings and oxide layers, and are widely used in industries including marine, auto repair, rubber molds, high-end machine tools, rails, and environmental protection.

2.1Characteristics and implementation standards of laser cleaning

（1）Laser Cleaning Features

◎Non-contact cleaning, does not damage the parts matrix;

◎Precise cleaning, which can realize selective cleaning of precise position and precise size;

◎ No need for any chemical cleaning solution, no consumables, safety and environmental protection;

◎ Easy to operate, can be hand-held or cooperated with manipulator to realize automatic cleaning;

◎Ergonomic design, the labor intensity of operation is greatly reduced;

◎The laser cleaning system is stable and requires almost no maintenance;

（2）Product performance standards

My Company has passed the ISO 9001 international quality management system certification, and has formed a quality assurance system for the design, production and service of small and medium power laser processing equipment.

My Company has formulated detailed standards for the working environment and working conditions, basic technical requirements, cooling requirements, laser radiation safety, electrical safety, test methods, inspection and acceptance, packaging and transportation in the production process. National standards are:

GB10320 Electrical Safety of Laser Equipment and Facilities

GB7247 Radiation Safety, Equipment Classification, Requirements and User Guide for Laser Products

GB2421 Basic environmental test procedures for electronic products

GB/TB360 Specification for Laser Power Energy Test Instrument

GB/T13740 Test method for divergence angle of laser radiation

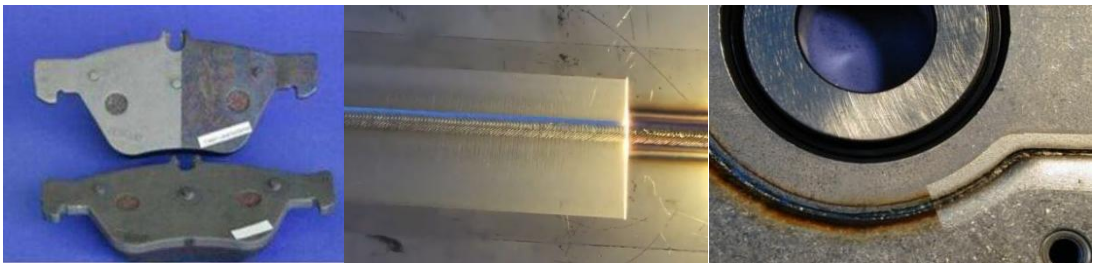
GB/T13741 Test method for beam diameter of laser radiation

GB/T13862-92 Test method for laser radiation power

GB2828-2829-87 Batch-by-batch periodic inspection and counting sampling procedure and sampling table

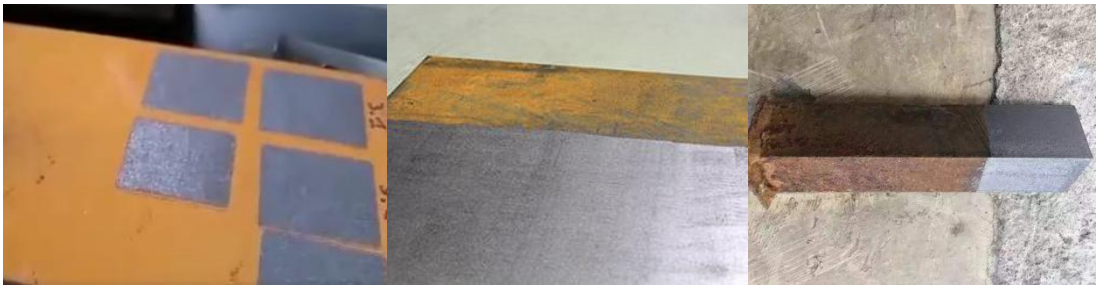
2.2Laser cleaning product application

a Laser cleaning of aluminum alloys before and after welding



b metal surface oxide laser cleaning

c Laser cleaning of oil and paint



d laser rust removal

Figure 2.2 Typical laser cleaning application

2.3Product technical features

The laser cleaning system independently developed by our company has the following characteristics:

（1）**Self-developed low-level control system and application software for laser cleaning**

- Perfectly adapt to most of the laser cleaning light sources on the market;
- The interface of the special software is clear, concise and easy to operate;
- Built-in database system, which can save and edit 50 sets of process data;
- Laser parameters such as laser power and laser repetition frequency can be adjusted freely;
- With the function of online pulse width adjustment (if supported by the laser), the process parameters can be optimized according to the specific situation of the site;
- The galvanometer control optimization and positive sine wave signal control can effectively reduce the heat generation of the galvanometer and improve the service life of the galvanometer;
- The dual-axis version provides 9 cleaning modes:Linear Mode, Rectangular 1 Mode, Rectangular 2 Mode, Circular Mode, Sine Mode, Helix Mode, Free Mode ,Ring and rotate to meet the needs of various application scenarios;
- Adjustable scanning speed, up to 30m/s;

（2）**Professional laser cleaning optical design**

- High damage threshold galvanometer lens, high light rate and large focal depth field lens, which can meet the long-term operation of high-power laser cleaning;
- High-performance laser galvanometer, fast scanning speed and high precision, combined with professional control software system to meet the application needs of various laser cleaning;

（3）Lightweight cleaning head structure design

- **Portable design:** The cleaning head is small and portable, the handle is moderate, and it is comfortable to use;
- **Lightweight design:** the weight of the cleaning head is less than 0.75Kg, which is more conducive to long-term handheld operation;

- **Dustproof sealing design:** The outer optical path is sealed and dustproof, which can effectively prevent dust and other pollutants generated by cleaning from entering the optical path and cleaning head and causing performance damage or damage;
- **The design of the dust blowing air curtain at the front of the field lens** effectively protects the field lens from dust or oil in the air from contaminating the field lens;
- **Removable suction port bracket (optional):** independent suction port design with flexible and adjustable height and angle, good cleaning effect;
- **Anti-interference design:** Improve the anti-interference ability of the cleaning head through measures such as signal strengthening, signal line shielding layer, galvanometer encapsulation and metal shielding shell design. Ensure that the stability of light output will not be disturbed when robots and vacuum cleaners are integrated;

2.4Cleaning head structure and dimension drawing

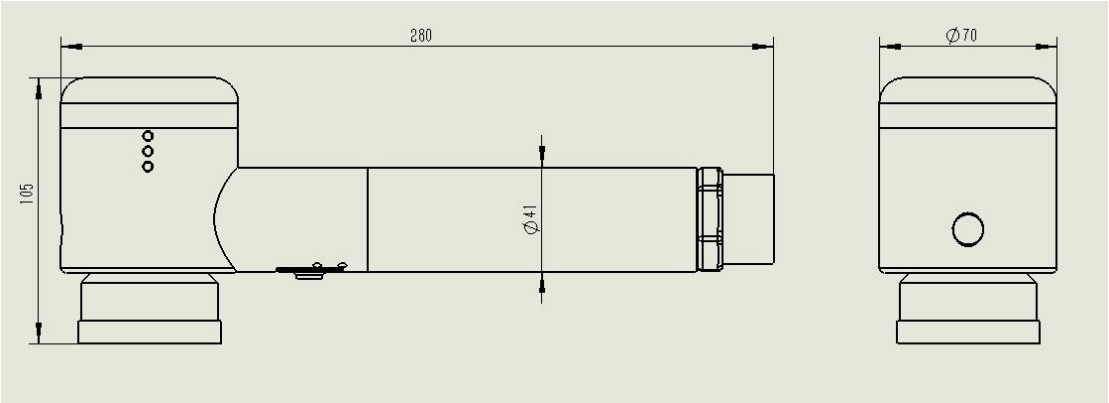


Figure2.2 GY-QCDXY200P

2.5Main technical parameters of the product

Operating environment	
Content	Parameter
Supply voltage	Single-phase 220V±10%, 50/60Hz AC
System power consumption	Less than 100W
Working temperature	-10℃～40℃
Working environment humidity	≤80%
Optical parameters	
Withstands average laser power	⩽200W
light transmittance	≥98%
Laser power adjustment	10%-100% continuous gradient adjustable
Laser pulse frequency adjustment	1kHz-4000kHz continuous gradient adjustable (support customization)
Laser pulse width adjustment function	support
Focal length	Standard 160mm (210mm/254mm/330mm/420mm optional)
Incident spot diameter	⩽10mm

Cleaning head, galvanometer, field lens parameters	
Cleaning head size	As shown in Figure 2.1、2.2, the special QCS connector supports customization
Cleaning head weight	Less than 0.75Kg
Scan width	0mm-100mm optional
Scanning frequency	Maximum not less than 300Hz
Maximum scan line speed	About 30m/s
Vibration lens material	Quartz
Mirror material	Quartz
Other parameters	
Screen size	Standard 4.3 inches (optional 7 inches)
Cable length	Standard 10 meters
Operation method	Handheld/Automated

2.6Configuration list

Name	Model Specifications	Unit	Quantity	Remark
Laser cleaning head	GY-QCDXY200P	piece	1	
Control card/box	GY-FLCS	set	1	Including galvanometer system, etc.
Touch screen	4.3 inches	piece	1	
Process database	Built-in	set	1	
Field lens	Standard F160 field lens	piece	1	210mm-420mm optional
Protective lens	43*2	sheet	2	

3Introduction to Laser Cleaning System

Precautions before use:

- Check whether the appearance of the product is abnormal and whether the output cable is damaged;
- Please correctly insert the quick plug according to the label of the control box;
- Please correctly intervene in the power supply to ensure that the power supply wiring is in good contact;
- Check and ensure that the cleaning head protects the lens inside and outside without dust;

3.1Boot interface

Boot into the boot waiting interface as shown in Figure 3.1. Displaying this interface means that the screen and the control board are being connected. If the connection is normal (the process lasts about 10 seconds), it will jump to the operation interface. If it does not jump for a long time, the screen and control may be The board connection is not normal, please power off to check whether the connector is correctly and firmly connected.

Figure 3.1 Software startup interface

Note: The software interface LOGO, equipment model, company information, etc. can be customized, this picture is only for description (the same below)

3.2Set interface

After the system is initialized, it will enter the operation interface. Before using the cleaning equipment, you should first click the "Settings" button in the lower left corner of the operation interface to enter the cleaning system setting interface, as shown in Figure 3.2. The system version and the underlying version number can be displayed in the system setting interface. The galvanometer scanning compensation, laser type, field lens coefficient, etc. can be set.

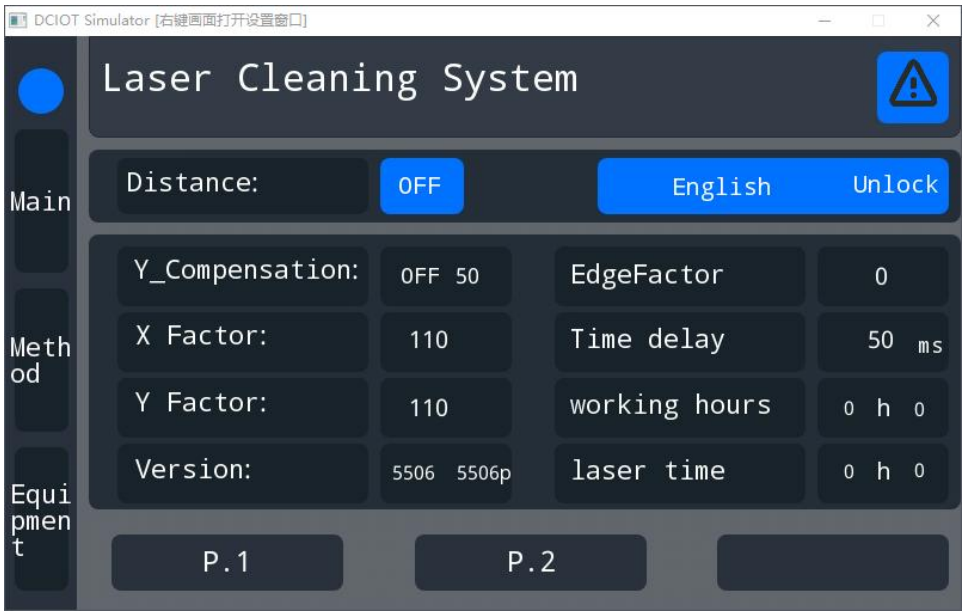


Figure 3.2 System setting interface

- Y-axis compensation: adjust the galvanometer, fine-tune the scanning shape deviation that may be caused by refraction or other reasons, generally do not modify, keep the OFF position;If the parameter is set to 50, change the password: 123;
- X, Y coefficients: field lens/focusing lens settings, different field lens/focusing lens focal lengths or actual working distances are inconsistent, the actual scanning width and height can be corrected by the field lens coefficients;change the password: 123;

Field lens model	X factor	Y coefficient
F100	56	56
F160	84	84
F210	110	110
F254	135	135
F330	150	150
F420	195	195

- Language switch: Set the system language mode, currently supports 16 kinds

including Chinese, Traditional Chinese, English, Russian, Japanese, Spanish, German, Korean, French, etc.;

Chinese	English	Traditional Chinese	Russian	Japanese
中文	English	中文繁体	Русск	日本語
Spanish	German	Korean	French	Polish
Espanol	Deutsch	한국어	En français	Polski
Hungarian	Italian	Finnish	Swedish	Czech /Estonian
Magyar nyelv	Italiano	Suomi	Sverige	Čeština Eesti

- Distance function: off by default;
- Temperature setting: default 100℃;

3.3 Operation interface

The operation interface provides 9 cleaning modes, which can be switched by clicking the scanning mode option on the interface (circular switching): Linear Mode, Rectangular 1 Mode, Rectangular 2 Mode, Circular Mode, Sine Mode, Helix Mode, Free Mode ,Ring and rotate.

The database number can be selected on the operation interface of each mode, and the laser cleaning parameters can be displayed and set, including: laser power, laser frequency, pulse width (valid for pulsed laser) or duty cycle (valid for continuous laser), scanning mode, scanning speed , the number of scans and the scan range (width, height).

（1）Straight line mode

In this mode, the scanning mode is straight line, and the interface is shown in Figure 3.3.

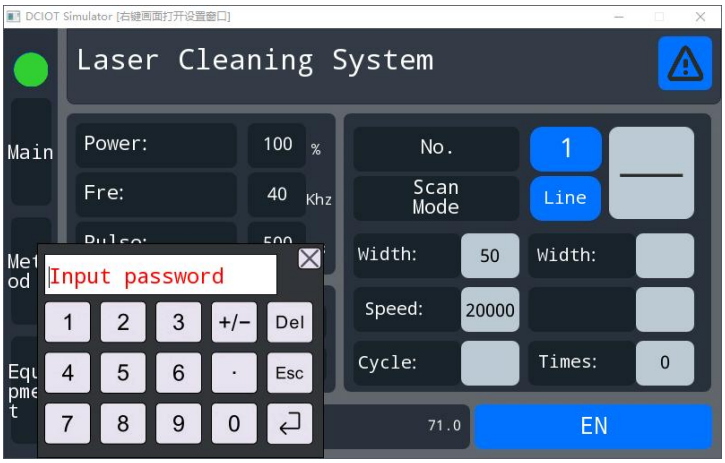


Figure 3.3 Operation interface of linear scan mode

- Serial number: Select the database number and call out the process data stored in the corresponding serial number, the default number is 0;change the password: 123;
- Laser power: setting the average output power of the laser, ranging from 10% to 100%;
- Frequency: laser pulse repetition frequency setting, range 1~4000kHz;
- Scanning speed: the moving speed of the spot where the laser is focused on the surface of the workpiece, and the upper limit of the scanning speed is related to the scanning width;

Scan width（mm）	Scanning speed mm/s （upper limit）
Over 50	30000
40-49	18000
30-39	14000
20-29	12000
10-19	6000
5-9	3000
3-5	2000
1-3	1000

- Scanning width: set the linear scanning width, the range is 5mm~Mx (the

value of Mx is related to the size of the field lens/focusing lens);

Field lens type	Scanning range Mx(mm)
F160	105
F210	140
F254	160
F330	185
F420	300

- Scanning times: used in special circumstances, you can set a specified number of scanning times, stop light after reaching the number of times, and always emit light by default 0;
- Enable: After the parameter setting is completed, click the enable button, the system and the laser are in the light-emitting ready state;
- Pulse width: set according to the actual needs of the site, the range is 1~1000ns;
- Edge coefficient: edge extinction, eliminating the strong points at both ends of the laser, the default is 0, the maximum can be set to 2000, it can be set appropriately according to the actual needs of the site, it is recommended to set 500 when using this function;change the password: 123;
- Extinction delay: cooperate with the edge coefficient to effectively eliminate the strong points on both sides, the default is 0, it is recommended to set 0.5 when using this function;change the password: 123;

（2）Rectangle one pattern(single axis cleaning system does not have this mode)

In this mode, the scan mode is a rectangle, and the interface is shown in Figure 3.4. The definitions of power, frequency, pulse width (duty cycle), scan speed, scan width, and scan times are the same as the range and linear mode, and will not be repeated here (the same below) .

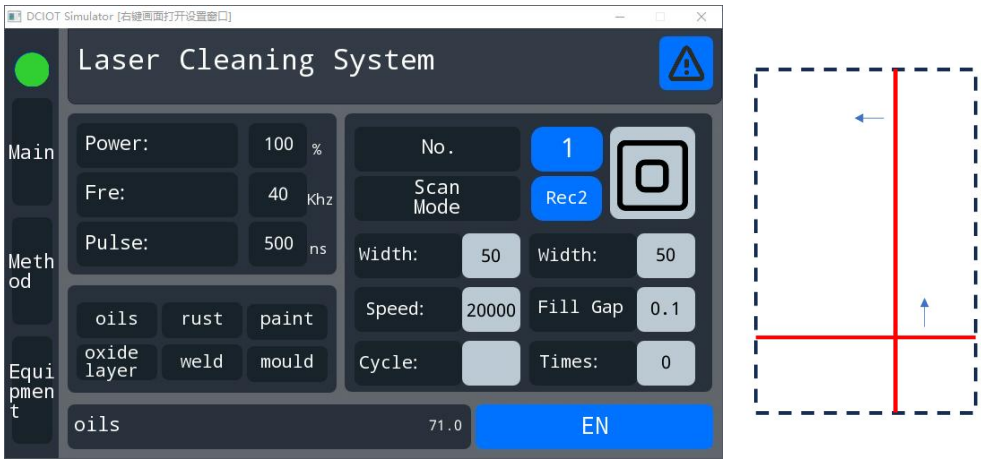
Figure 3.4 Rectangular scan mode operation interface

- Filling distance: Set the laser filling distance in the rectangle, the range is 0.01~1mm, which affects the spot overlap rate in the Y-axis direction, and the default is 0.1;
- Scanning height: Set the scanning height of the rectangle, the range is 1mm~My (the Mx value is related to the field lens coefficient);

Field lens type	Scanning range Mx(mm)
F160	105
F210	140
F254	160
F330	185
F420	300

（3）Rectangular two pattern(single axis cleaning system does not have this mode)

The rectangle 2 mode is roughly the same as the rectangle 1, that is, the horizontal cleaning mode is added on the basis of the vertical cleaning of the rectangle 1.



（4）Circular mode(single axis cleaning system does not have this mode)

In this mode, the scan shape is a circle (as shown in Figure 3.5), and the scan range is only set to the circle diameter and filling spacing;

Figure 3.5 Circular scan mode operation interface

（5）Sine mode(single axis cleaning system does not have this mode)

In sine mode, the sweep waveform is a sine curve, and the operation interface is shown in Figure 3.6. In the sine mode, the sine cycle needs to be set: the cycle of the sine waveform in the X-axis direction, the smaller the number, the greater the waveform fluctuation frequency, the range is 1mm-100mm;

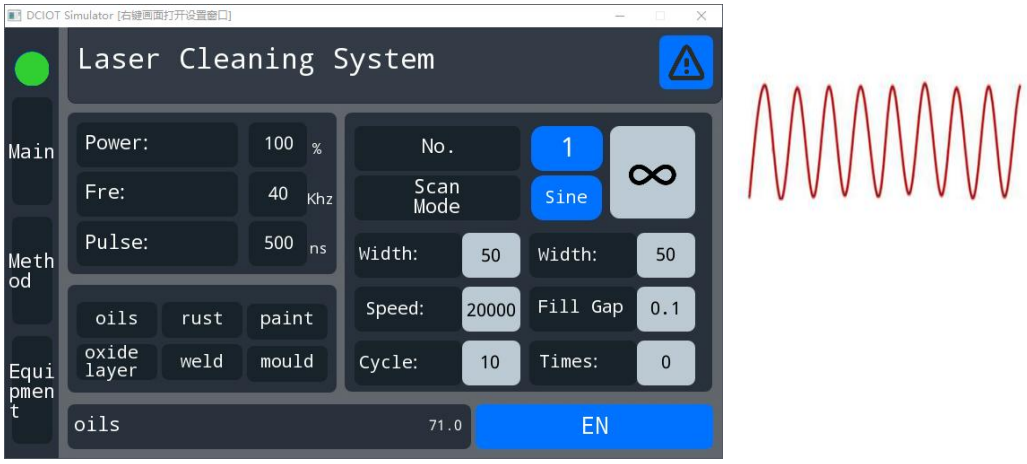


Figure 3.6 Sine sweep mode operation interface

（6）Helix pattern(single axis cleaning system does not have this mode)

In helix mode, the scanning waveform is a double helix curve, and the operation interface is shown in Figure 3.7. The parameter setting is consistent with the sine mode.

Figure 3.7 Operation interface of double helical scan mode

Series: Number of waveforms in spiral mode, ranging from 1 to 16;

（7）Free mode(single axis cleaning system does not have this mode)

In free mode, the width and frequency of the X-axis and Y-axis motors can be freely set within the range. In this mode, the scanning speed is not constant or even cannot be calculated accurately. There are many possibilities for the scanning waveform, which can be used as a supplement to the above five modes to adapt to more application scenarios.

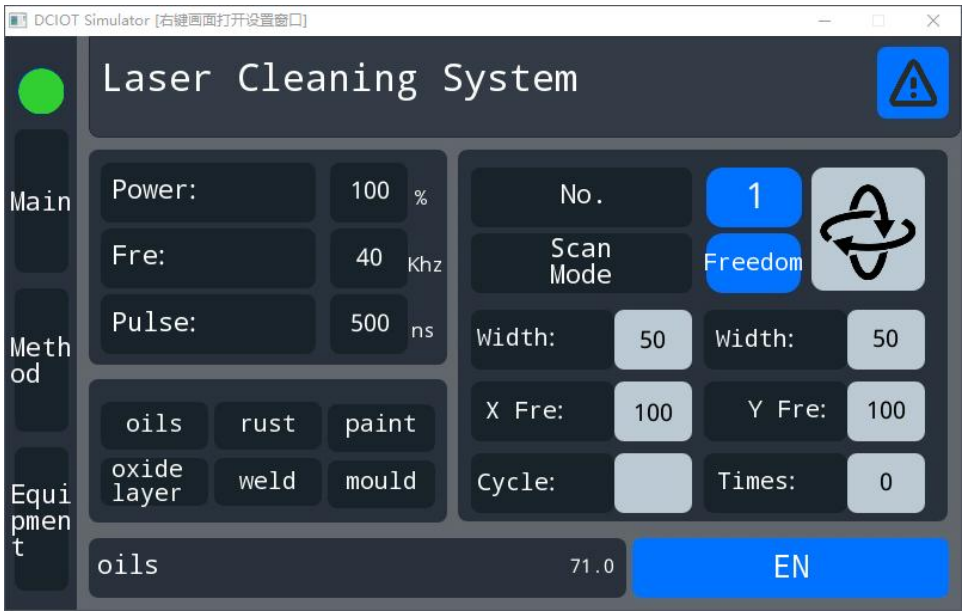


Figure 3.8 Free Scan Mode Operation Interface

- X\Y frequency: less than 300Hz;
- Scanning height: set the scanning height of free mode, the range is 1mm~50mm;

（8）Ring(single axis cleaning system does not have this mode)

This mode is a mode in which the ring gradually shrinks inward, as shown in Figure 3.9, where the filling distance is the speed at which the ring shrinks.

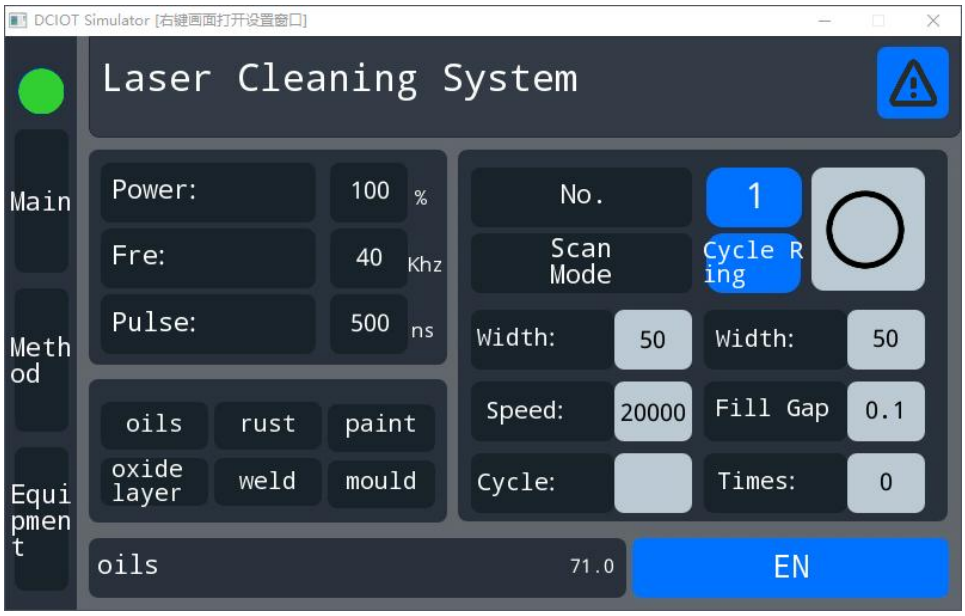
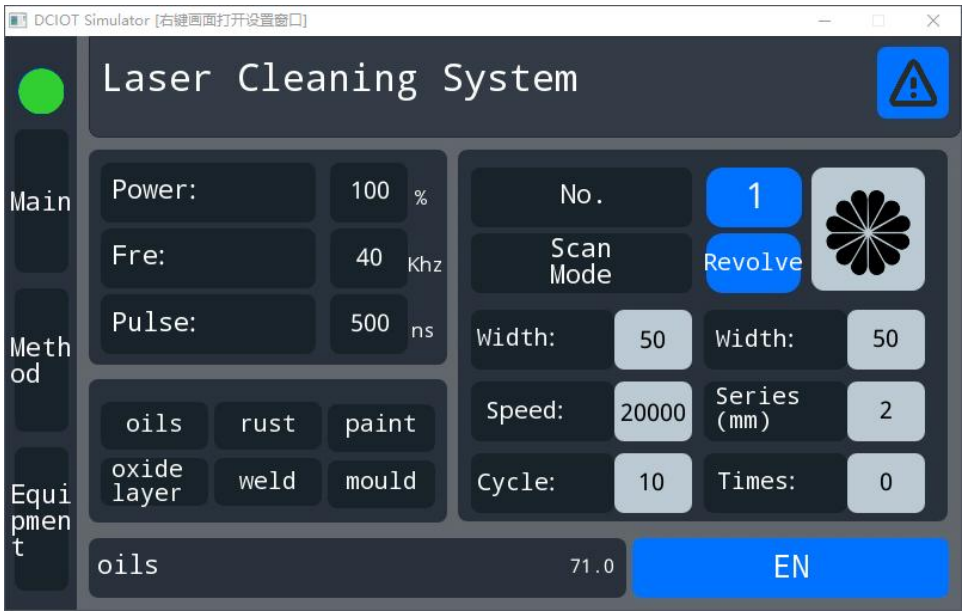


Figure 3.9 Ring Mode Operation Interface

（9）Rotate



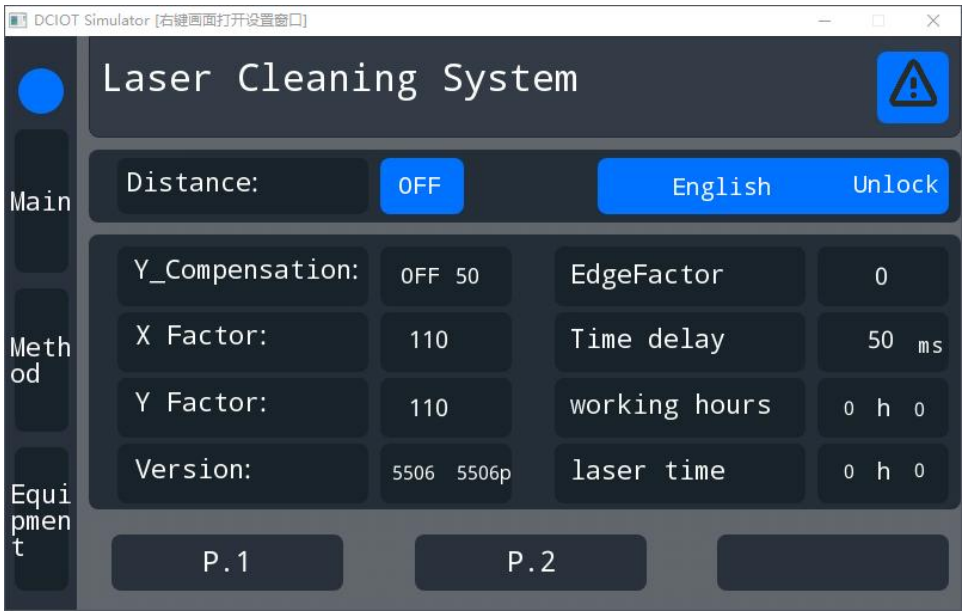
- The graph can be adjusted according to the period, series and other parameters;

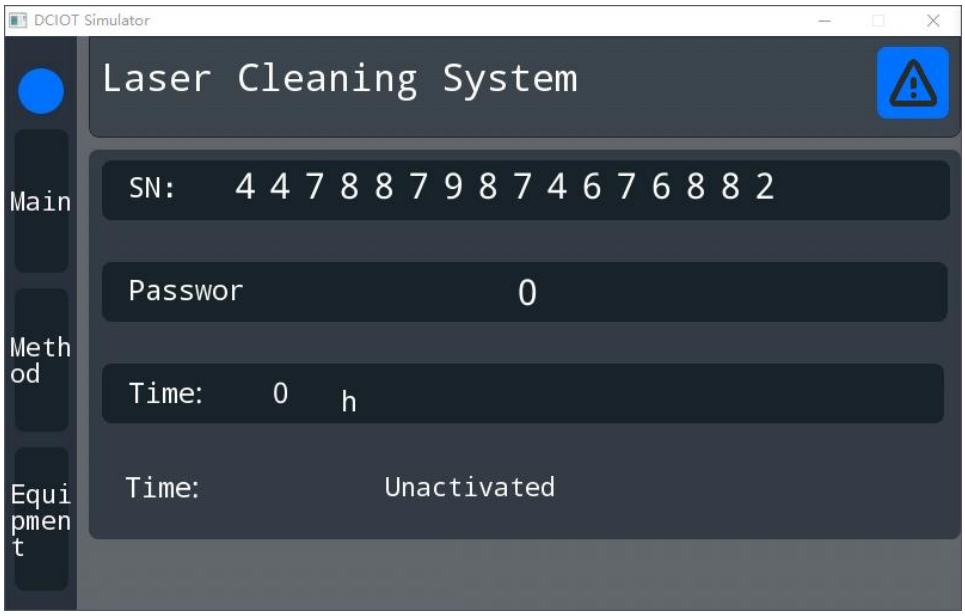
（10）Database

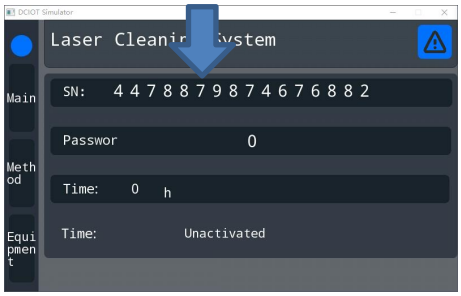
- Database: modification coefficient of the serial number, edge, the edge of extinction, coefficient of X, Y, Y compensation coefficient parameters, such as password, 123, will jump to the "database" interface, related parameters in the interface to modify;
- Slow rise time: after open the laser power from 0 to set data need time;
- Ramp down time: close the laser power from value fell to zero after the time required for;

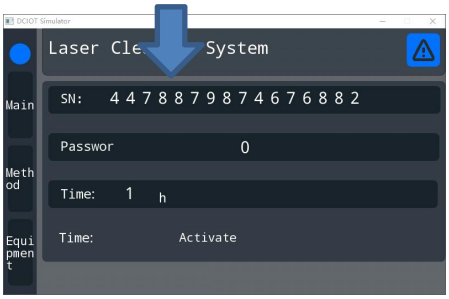
（11）Decrypt and set password

- During the trial process, the words "Please activate" are displayed in the upper right corner, indicating that the trial time has expired and decoding is required.





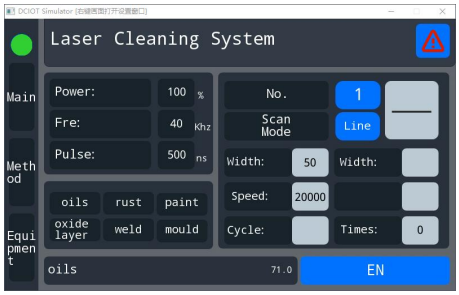




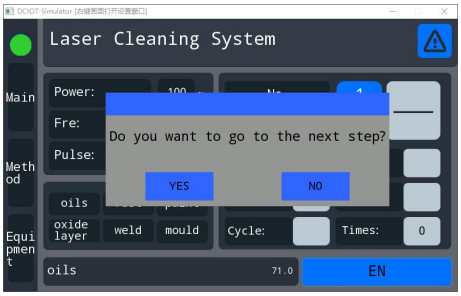
Permanent (active) **1 hour (inactive)**

- The user can set the trial time or permanently decrypt it according to the on-site situation.

（12）Others (light-emitting steps)



Main interface



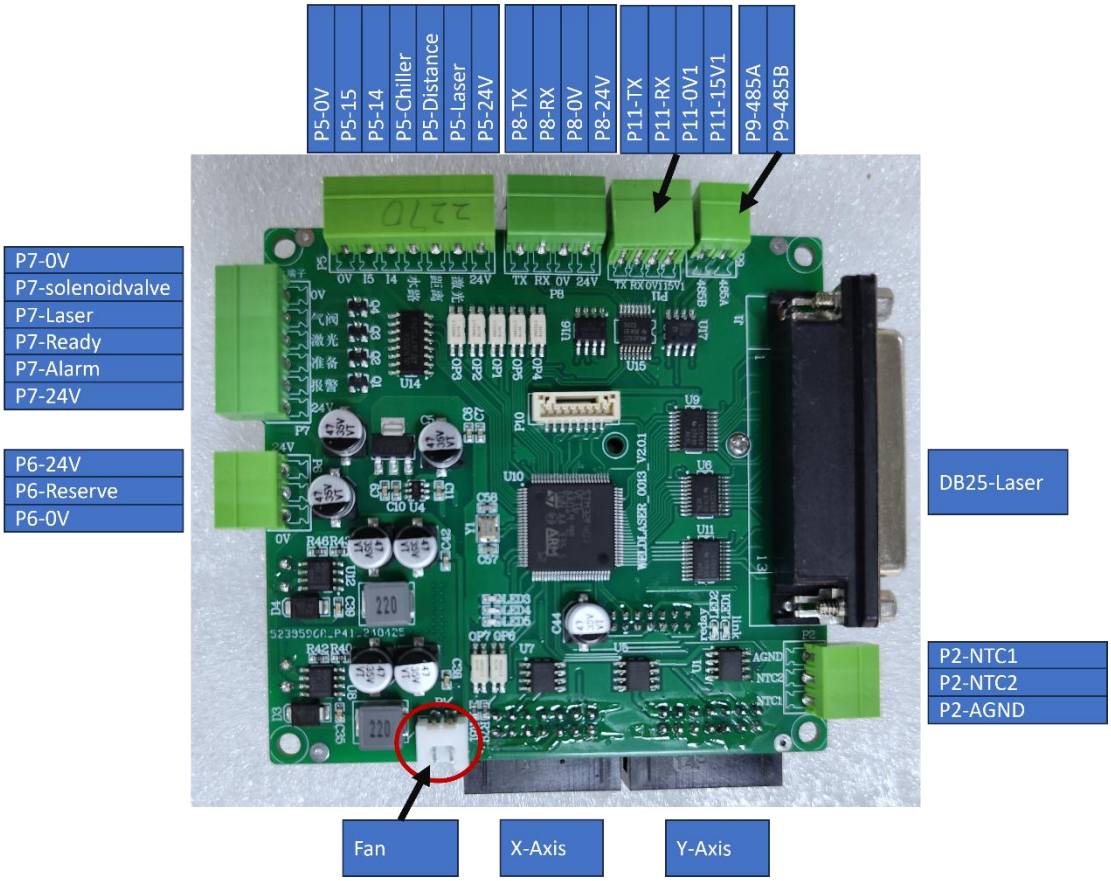
Enable OK

In light

After Enable

4Wiring and installation instructions

4.1Cleaning Card Wiring Instructions



P6:Power interface

Serial number	Input/Output	Voltage	Remark
1	Input	24V	+24V Power input
2			
3	Input	0V	GND

P2:Temperature sensor interface

Serial number	Input/Output		Remark
1	Input	AGND	Temperature sensor AGND
2	Input	NTC2	Temperature sensor 2 (spare)
3	Input	NTC1	Temperature sensor 1

P8:Touch screen interface

Serial number	Input/Output	Voltage	Remark
1	Output	24V	+24V Power Output
2	Output	0V	GND
3			RX
4			TX

P11: Touchscreen interface

Regardless of the master and slave, the parameters can be modified at the same time, and the screen will be updated synchronously.

Serial number	Input/Output	Voltage	Remark
1	Output	15V	+15V Power Output
2	Output	0V	GND
3			RX
4			TX

J1:Galvanometer interface

Serial number	Input/Output	Voltage	Remark
2	Output		Y axis ±5V
3	Output		GND
15	Output		X axis ±5V
16	Output		GND
9.10.22	Output		+15V
11.23.24	Output		GND
12.13.25	Output		-15V

J2:Pulse laser interface (25-pin DB header and laser plug)

Pin	Input/Output	Level	Function
1-8			Power control pins, of which pins 2 and 3 have pulse width serial signals
9			Latch signal
10.14			0V
17			+5V
18			MO Switch signal
19			Laser turn-on signal AP
20			Frequency modulated signal
22			Red light enable, pulse width adjustment ENABLE
23			ESTOP

P5:External control interface

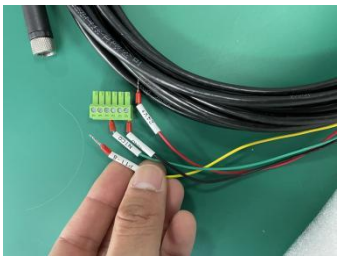
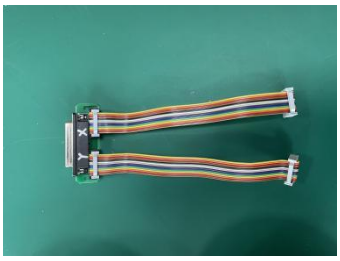
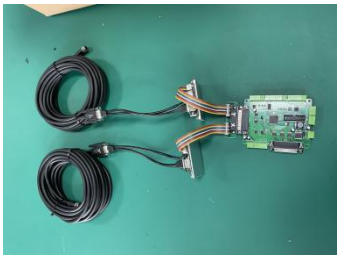
Pin	Input/Output	Level	Function
1	Output		24V
2			Laser switch, short-circuit light with pin 1 (24V), disconnect and stop light
3	Input	24V	Position switch alarm input (distance sensor)
4	Input	24V	Chiller alarm signal input (if not connected, please short-circuit P5-1 and P5-4)
5			
6			
7		0V	

P7:Signal output interface

Pin	Input/Output	Level	Function
1	Output	0V	GND
2	Output	24V	Air valve output, output 24V
3	Output	24V	Laser output
4	Output	24V	Ready for output
5	Output	24V	Alarm Output
6	Output	24V	24V Output (chiller, laser alarm signal source)

4.2System Installation

- Inlet pipe: Enter compressed air for cooling the gun head and blowing air in front.
- Four-core aerial plug: button switch and front small fan power supply.
- X, Y-axis galvanometer: galvanometer cable connector.

Accessories pictures	Model and Definition	Remark	Wiring
	X, Y axis galvanometer cable, 6 cores.	There is only one single axis system, please pay attention to the X and Y marks marked on the line when inserting, and insert them accordingly.	Plug directly into the cleaning head
	Button switch and front small fan power signal cable, 4-core cable	Red (or brown) is the front small fan power +24V, black is the fan 0V, yellow button switch OFF1, green (or gray) is button switch OFF2	GX4-1-Red (or brown)---24V+ GX4-2-Black---24V- GX4-3-Yellow---P11-1 GX4-4-green (or gray)---P11-2
	Signal output cable	Divided into X, Y axis	See below
		System connection diagram	

5Pre-sale and after-sale service

5.1 Pledge

My Company. adheres to customer-centricity, fully understands customer cleaning needs, and provides customers with complete and personalized pre-sales and after-sales services such as installation, commissioning, training, and maintenance.

（1）Pre-sale service

Before signing the contract, the company provides customers with various production process solutions, and provides services such as technical consultation, sample samples, and equipment selection of laser cleaning equipment.

（2）Installation and debugging

According to the contract, our company will safely transport the equipment to the installation location designated by the user within the specified time free of charge, and send technical service engineers to install it on site. Under the condition that the user's installation and debugging spare parts are basically available, the technical service engineer will complete the installation and debugging of the machine within 2 working days for the user to use, to ensure that the installation and debugging site environment is neat, clean and orderly.

（3）After-sales training

The company provides free technical training. After installation and debugging, the buyer's operators will be trained at the buyer's site or at the seller's domestic training and maintenance center until the operators can basically use the equipment normally.

（4）After-sales commitment

- One year free warranty for equipment (excluding man-made damage and lens damage);
- Free technical consultation, process and software upgrade services;
- The response time of customer service is within 8 hours;
- Provide maintenance services for life, and only charge the cost for accessories;
- Provides a wide range of hardware and software support for life.

5.2 Limited Warranty

Damage to the product and its components caused by tampering, opening, disassembly, misassembly and modification by non-My Company personnel; or damage caused by misuse, neglect, or accident; or out of specification Use within the scope, abnormal installation and maintenance, abuse or damage caused by use not in accordance with the information and warnings in the user manual are not covered by the warranty. It is the customer's responsibility to understand and operate in accordance with the user manual and the operation instructions on the operating range, and the damage caused by wrong operation is not guaranteed. Parts such as accessories are not covered by the warranty.

Within the scope of the warranty, if the buyer finds a problem, he must make a written request within 30 days from the date of discovery. The warranty does not involve third parties (including the specified buyer, end user or customer), nor does it include parts not produced by My Company , equipment or other products.

5.3 Technical support and product maintenance

This product has no other built-in accessories that can be maintained by users. Therefore, repairs other than the accessories provided should be carried out by My

Company technicians.

If there is any fault during the use of the product, please notify the technical personnel of My Company in time, and solve the problem.

All repaired and replaced products must be placed in the original packaging box provided by My Company, otherwise, My Company will have the right not to repair free of charge for any product damage caused thereby.

When you receive My Company products, please check whether the products are intact and whether the accessories are complete. If there is any abnormality, please contact the carrier and My Company in time.

My Company will continue to develop new products. Product information listed in this manual is subject to change without notice. All technical parameters are subject to the terms of the contract.

The above product warranty and service terms of My Company are only for the user's reference, and the official service and warranty content is subject to the terms of the contract.