Air-cooled 4 IN 1 Handheld Laser Welding Machine Manual

Shenzhen Scotle Technology Group Limited

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Wesite：www.scotle.com

Contents

Foreword

Welcome to use the handheld laser cleaning products produced by Shenzhen Scotle Technology Group Ltd. For better use and maintain your laser equipment, please read this manual carefully before using this product. All laser operators must use personal protective equipment when using our laser machines. To avoid the hazards caused by lasers, please strictly follow all warnings and safety tips in this manual to prevent unnecessary risks. Our laser machines are safe and reliable by following this manual and applying reliable laser safety measures.

If the user has any comments and suggestions during use, please feel free to give us your advice to help us continue to revise and improve. Thank you again for using the products of Shenzhen Scotle Technology Group Ltd.!

During the operation, maintenance and service of this equipment, in order to ensure the safety of the operator, please do not disassemble the equipment privately. This product has no parts, components and assemblies that the user needs to repair by himself. Our company will not provide warranty service for damage to the equipment or accessories caused by the laser dismantled privately.

Our company certifies that this laser machine has been thoroughly tested and inspected. The inspection before shipment meets the published specifications. When you receive the machine, please check whether the packaging and parts are damaged. If so, it may have occurred during transportation. If the damage is obvious, please keep evidence and contact Shenzhen Scotle Technology Group Ltd.

1. Safety Tips

The laser level of this machine is class 4. To ensure the safety of the user, please read the safety tips carefully before using the machine.

1.1 Safety Instructions

① When using this machine, please use a suitable grounded power supply and corresponding voltage.

② Before operation, please wear special fiber laser protective glasses and gloves; do not look directly at the laser to avoid damage to the eyes or skin.

③ Before emitting the laser, the dust-proof cover of the field lens needs to be removed;

④ Make sure that all optical components are below eye level, and pay special attention to the height of the eyes when sitting on a chair.

⑤ Avoid operating this machine in a dark, humid, hot, and unventilated environment.

⑥Do not turn on the laser without an optical coupling fiber or the optical output connector.

⑦ Make sure to operate the machine only after receiving safety training.

⑧Keep the machine clean, maintain the machine regularly to prevent foreign matter from entering the cavity, otherwise it will cause functional contamination and functional impact of related parts;

For technical support, please contact the corresponding after-sales service department:

eBay after-sales:

AliExpress after-sales:

Amazon after-sales:

B2B and official website after-sales: sales10@scotle.com

1.2 Potential Hazards

① Radiation Hazards

The laser cleaning process will generate visible and invisible radiation. The high-energy laser beam of the pulse laser cleaning machine directly irradiates the human body, especially the eyes and skin, which may cause serious damage on eye includes retinal burns. To prevent these injuries, special laser protection glasses must be worn, the safety barriers and warning signs must be set up in the operating area.

② Skin Hazards

Exposure to infrared and ultraviolet radiation during laser cleaning can hurt the skin. Laser sparks can also cause burns. Laser processing can transfer a lot of energy into the parts to be cleaned, so the parts will be very hot even after cleaning. It is necessary to take precautions to prevent skin damage by wearing protective clothing such as flame-resistant gloves, hats, leather aprons, and other flame-resistant clothing, sleeves and collars should be buttoned too.

③ Fire Hazards

If flammable or combustible materials are close to the laser work area, the heat and sparks generated during the work process may cause a fire or explosion. Laser cleaning work can only be carried out when there are no flammable materials in the area. Fire extinguishers should be located nearby, easily accessible, and have personnel trained in their use.

④ Smoke Hazards

Laser cleaning "fumes" can consist of very fine particles and gases. Fumes and gases come from a combination of laser cleaning materials or shielding gases, paints, coatings, chemical reactions, and air pollutants. These fumes can adversely affect the lungs, heart, kidneys, and central nervous system. So better use this product in a ventilated environment and use a fume extraction system if necessary.

⑤ Machine Damage

Optical accessories relevant to the laser, such as light-sensitive elements that may be damaged from

exposure to the laser light, video cameras,photo multipliers and photo diodes, need related protections.

1.3 Protective Housing and Interlocking System

①The structure and layout of the shield should be designed to ensure that the human body cannot directly enter the dangerous area. Shields should be closed mechanisms, meeting specific safety distance and opening size requirements when a mesh structure is required.

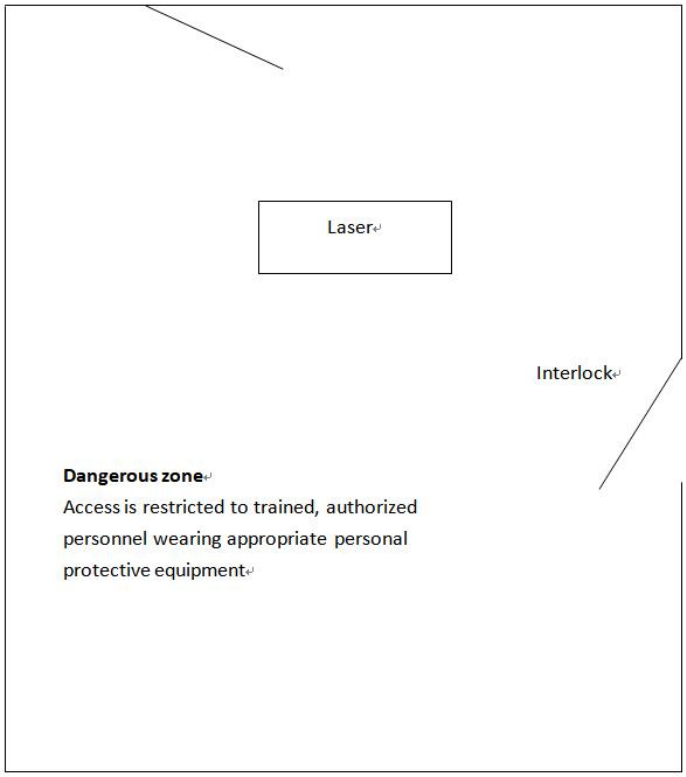
② For the installation of the laser room, should follow the guidance of the professional design, installation team, in accordance with the drawings.

③ The installation of the laser room also includes components such as the house body, internal frame, maintenance door, observation window, safety door, lighting, optical fiber hanging device, monitoring, dust removal, light source room, air conditioning, anti-collision fence.

④ The safety door of the laser room should be connected with the product remote control chain connector. When an external person intervenes and opens the door, the terminal of the connector opens and the laser machine stops launching. Prevent external personnel or unauthorized personnel from exposure to dangerous radiation.

⑤Use of interlocking system:

In the laser control zone, walls and doors can limit the hazard of laser radiation. The interlocking system connected to the door can actually operate to restrict access when a hazard occurs, allowing only trained, authorized and appropriately protective equipment to enter.


Laser
Interlock
Dangerous zone
Access is restricted to trained, authorized personnel wearing appropriate personal protective equipment

1.4 Safety Labels

As shown in the following table, all safety warning signs during the operation of the handheld laser cleaning machine (not limited to the signs on the laser body) include:

		
Warning label – Hazard symbol	Explanatory label (Take 1000W as example)	Alternative label for laser aperture
		
Alternative label for Class 4	Must be grounded	Electrical Hazard

1.5 EU Agency Information

E-CrossStu GmbH
Felix-Dahn-Str 4
Stuttgart 70597
E-CrossStu@web.de +49 71191222069

EC REP

CE

THIS WAY UP

Product name : 4 IN 1 Laser Welding Machine
Model : LWM-YHY
Rated voltage :220V
Rated current : 15A
Manufacturer : Shenzhen Yuhaiyuan Technology Co., Ltd
Address: Longgang District Yayuan Road Chuangyiyuan Y1-2-14 Shenzhen China

Made in China

1.6 Product Nameplate

1.7 Compliance to Standards for CE Marking

This product complies with the European Union Harmonized legislation, only complies with the above directives and standards when installed in accordance with the manufacturer's specifications.

The European Community requirements for product safety in the 2006/42/EC Machinery (MD)

This Directive requires that lasers comply with the standard:

EN ISO 12100:2010

EN 60204-1:2018

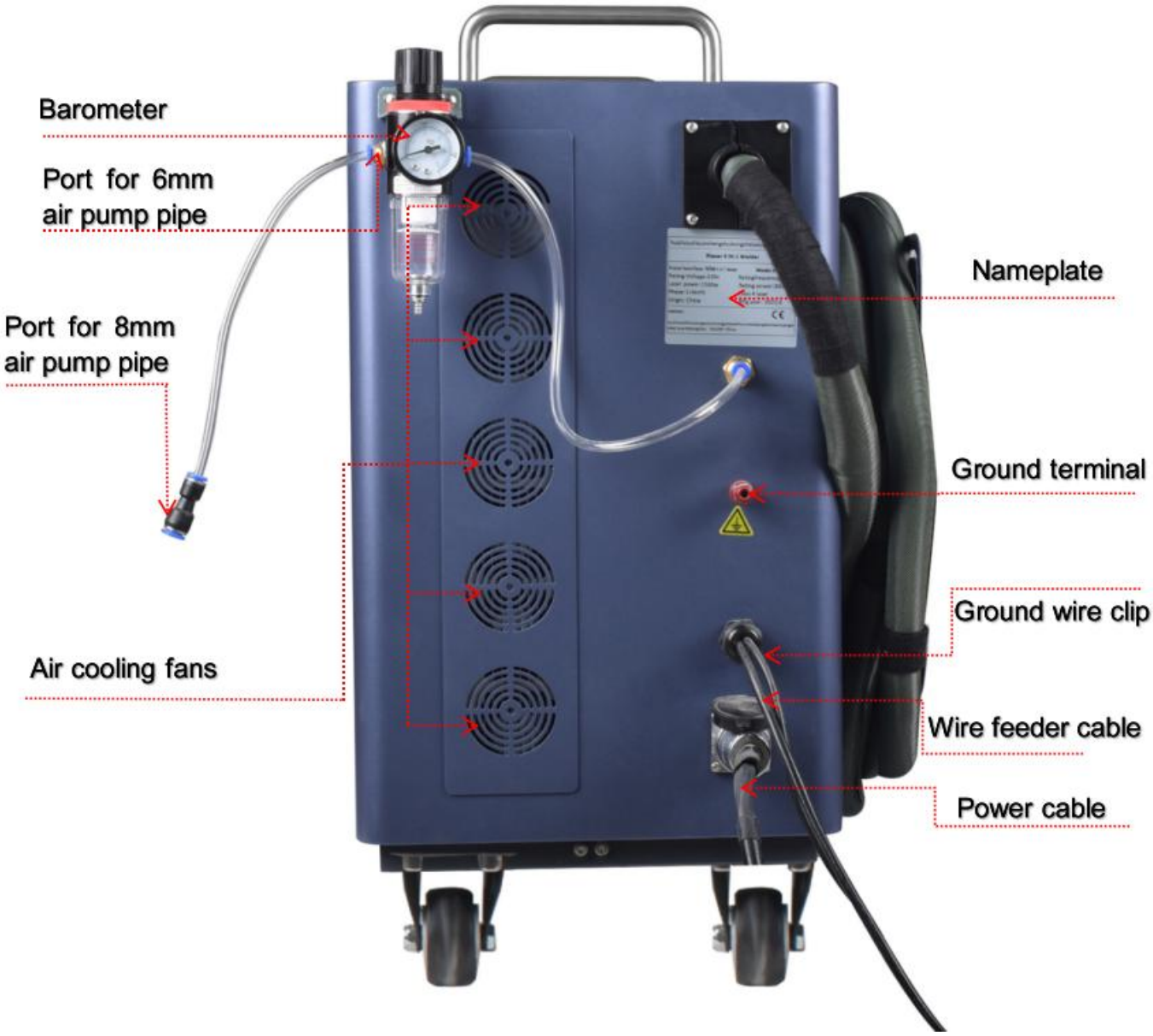
EN ISO 11553-1:2020/A11:2020

EN ISO 11553-2:2008

EN 60825-1:2014/A11:2021

2. Machine Information

2.1 Overall Display



Machine Packing Information:

2.2 Laser Source Introduction

In order to guarantee the fiber laser is operated safely (including personnel safety, equipment safety, production safety), ensure the product remain its best condition for a long time.

We compile this document with important safety, operating, maintaining and other information. Please take time to read and understand this User's Guide and familiarize yourself with the operating and maintenance instructions before using the product.

2.2.1 Laser Source Safety Signs:

SYMBOLS	DESCRIPTION
	**WARNING :** ***Refers to a potential hazard that may leads to a personal injury or death.***
	**CAUTION :** ***Refers to a potential hazard on product, or a potential physical injury on personnel***
NO SYMBOL	**IMPORTANT :** ***Refers to any information regarding the operation of the product. Please do not overlook this information.***

2.2.2 Laser Classification

This series of lasers emit invisible laser radiation around a wavelength of 1080 ± 3nm.

The average power of the products is ranged from 10% to 100% at a maximum power range from 1000W to 4000W, which classifies the series of lasers Class 4 laser instrument.

Direct or indirect exposure of this level of light intensity may cause very serious damage to the eyes or skin.

In view of this, appropriate and approved laser safety protective glasses must be worn all the time while the laser is operating.

At the same time, no directly or reflectively emit on your skin.

	**WARNING :** ***The laser safety protective glasses are selected according to the wavelengths of the output laser. The users must ensure that the laser safety protective glasses covered the entire range of wavelengths of the laser emission.***

2.2.3 Laser Source Operation Conditions

The basic operation conditions are listed in the table followed:

Item	Value
	1200W / 1500W / 1800W
Supply Voltage(V)	220±10% VAC 50/60Hz
Placement	Flat, upright, no vibration and impact
Environment Temperature	5~40℃
Relative Humidity	30%RH~70%RH
Electromagnetic Environment	Avoid too strong electromagnetic interference, which may lead to false alarm of laser

Note:

① It is very easy to be damaged when the QBH getting scaling, and there is no warranty in this case.

② The output of the laser is connected with the cable. Please check the end surface of the quartz head carefully to prevent dust or other pollution. Lens-cleansing paper must be used when cleaning is necessary.

③Never installing the laser output with the processing system when the equipment is power on.

④ The protective glasses should be worn all the time.

CAUTION:

(1)Never make this product work in high humidity（＞95%）,though the product shave an excellent adaptability to the high humidity environment

(2)Never let this product work below the ambient dew point temperature(like the table 2.2)

Maximum Relative humidity (%)	20	30	40	50	60	70	80	90	95
Room Temperature(℃)	Ambient Dew Point (Td-℃)								
10	-11.9	-7	-0.3	0	2.5	4.8	6.7	8.4	9.2
15	-7.9	-2.3	1.5	4.6	7.3	9.6	11.6	13.4	14.2
20	-3.5	2	6	9	12	14.5	16.5	18	19
25	0.5	6	10.5	14	16.5	19	21	23	24
30	4.6	10.5	15	18.5	21.5	24	26	28	29
35	8.5	15	19.5	23	26	28.5	31	33	34
40	13	20	24	27.5	31	33.5	36	38	39
			Temperature range for laser operating						

NO SYMBOL	***IMPORTANT :*** ***The lifetime of the laser will be shortened and the output power will degrade while the cooling system working at a higher temperature for too long time. Please ensure the cooling system is enough and the temperature is suitable.***

2.2.4 Laser Source Parameters

The characteristic parameters of the air-cooled series fiber laser that power ranged from 1200W to 1800W are demonstrated as follow:

① Specification for EVERFOTON FFRC-15H-A 1200W :

Optical Characteristics

Model	FFRC-15H-A
Operating Mode	CW / Modulated
Polarization	Random
Power Range (%)	10 - 100
Beam Quality (M^2)	1.3
Output Power Instability at 25°C (%)	< ±2.5
Central Wavelength (nm)	1080 ± 5
Spectrum Width FWHM (nm)	< 6
Modulation Frequency (kHz)	5
Red Laser Power (μW)	> 200

Output Cable Parameters

Output Mode	QBH
Output Fiber Core Diameter (μm)	20
Cable Length (m)	10
Bending Radius of Cable (mm)	200

Electrical Characteristics

Operating Voltage (VAC)	200 - 240V, 1PH 50 / 60Hz
Rated Power Consumption (kW)	4.5
Control Mode	AD

Other Parameters

Operating Temperature (°C)	0 - 45
Relative Humidity (%)	10 - 70
QBH Cooling Mode	Nitrogen / Argon Cooling
QBH Ventilation Flow (L/min)	5 - 10
Laser Size (W*D*H) (mm)	402 × 432 × 132
Power Supply Size (W*D*H) (mm)	180 × 300 × 49
Laser Weight (kg)	22 ± 2

② Rlaser laser source F12A 1500W /F16 1800W

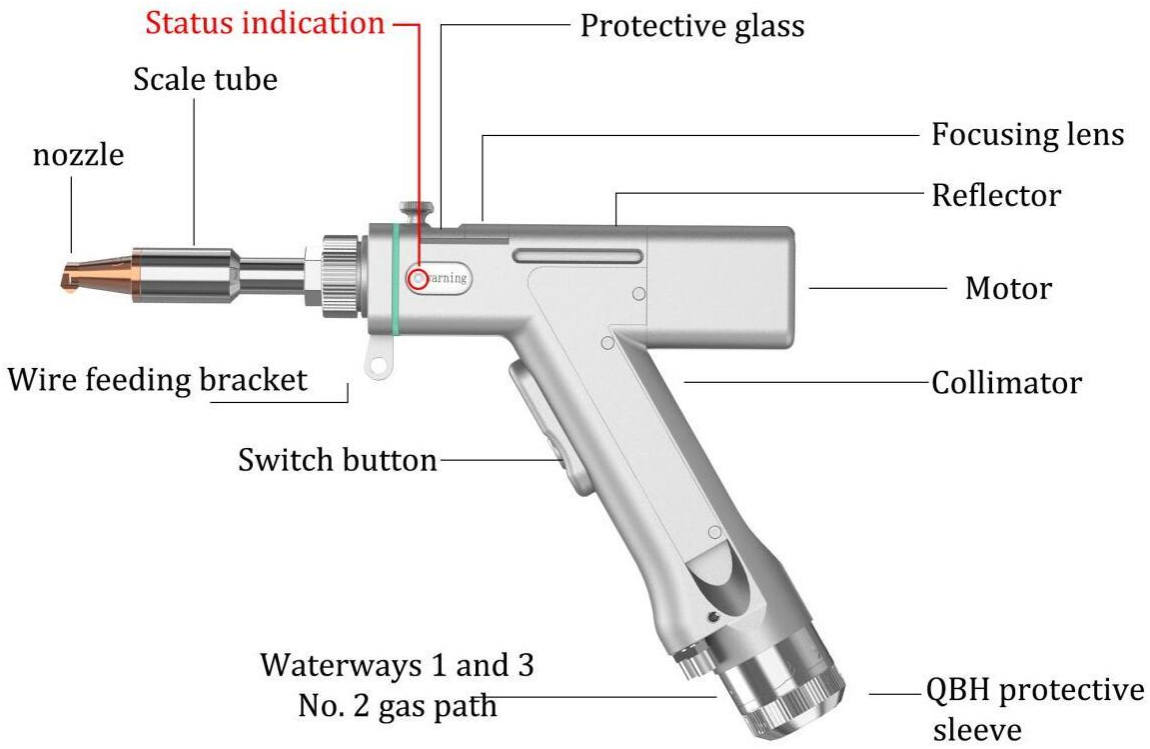
Specification:

Type	F12A	F16
Power(W)	1500W	1800W
Working hours	24 hours non- stop	
Output power adjustment range(%)	10-100	
Output power fluctuation(%)	≤2%	
Cable length(m)	5-10m customizable	
Center wavelength(nm)	1080±10	
Power consumption(W)	≤3500	≤4000
Beam quality(M^2)	1.2	
Output fiber core diameter(μm)	20-25 μm customizable	
Size (L*W*H)mm	434*402*130	434*402*130
Weight (KG)	< 24	< 24
Operating temperature(℃)	-20℃ - 45℃	
Cooling method	Air cooling	
Control mode	DA/Rs232/IoT	
Application scenarios	Handheld welding, platform welding, rust removal machine, obstacle removal device, precision cutting, etc	

2.3 Handheld Gun Introduction

For more information, please check the ”manual for SUP 23T welding gun”.

2.3.1 Handheld Gun Display



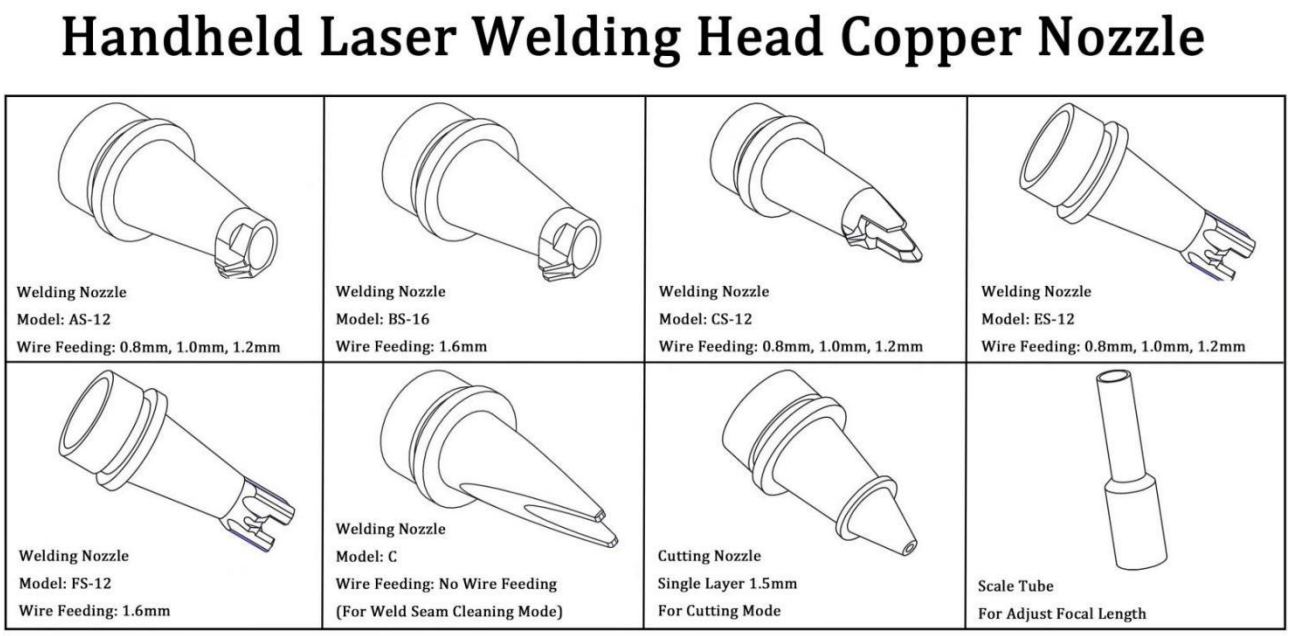
QBH connector	Complete the access and lock of the optical fiber connector
Collimating lens	Collimating lens: Complete the fiber collimation function and collimate the incident laser into a parallel beam.
Galvo-lens module	A component composed of a reflector and a motor is used to vibrate and reflect the collimated parallel laser at a certain angle， changing the direction of the original beam and the shape of the spot.
Focus lens	Focus the reflected beam into a convergent beam with high power density.
Protective glass	The protective glass can protect the focusing lens from the damage of returning slag and prolong the service life of the focus lens.

Copper nozzle/ Scale tube	Guide the focused beam to the work piece, and generate high-speed airflow to protect the molten pool from oxidation to achieve high-quality welding results. You can also adjust the focus distance by adjusting the Scale tube

2.3.2 Configuration Parameter

Parameter name	Technical index
Maximum applicable laser power	3000W
Input voltage	220V±10% AC 50/60Hz
Installation environment	Flat, no vibration and impact
Working environment temperature	10～40℃
Working environment humidity	＜70%
Cooling-down method	Air cooled
Applicable wavelength	1080nm（±10nm）
Welding protective gas	Nitrogen. Argon. Helium
Alignment lens	D16*4.5/F60
Focus lens	D20*4.5/F150
Reflex	30x14xT2
Protection lens specifications	D18*T2
Maximum air pressure support	15Bar
Focus of vertical adjustment range	±10mm
Scan width--welding	0~8mm
Scan Width--cleaning	F150-0~30mm
	F800-0~120mm
The net weight of the welding gun	0.75kg

2.3.3 Welding Head Copper Nozzle



Different copper nozzle applies to different materials welding.

For example, AS-12 copper nozzle mainly used for welding wire 1.0 at inner Angle feed (AS-12 basic universal);

AS-12: The filaments below 1.2mm are generally used for flat Angle, inner Angle and outer Angle welding;

BS-16: The filaments below 1.6mm are generally used for flat Angle, inner Angle and outer Angle welding;

CS-12: The filaments below 1.2mm are generally used for outer Angle welding;

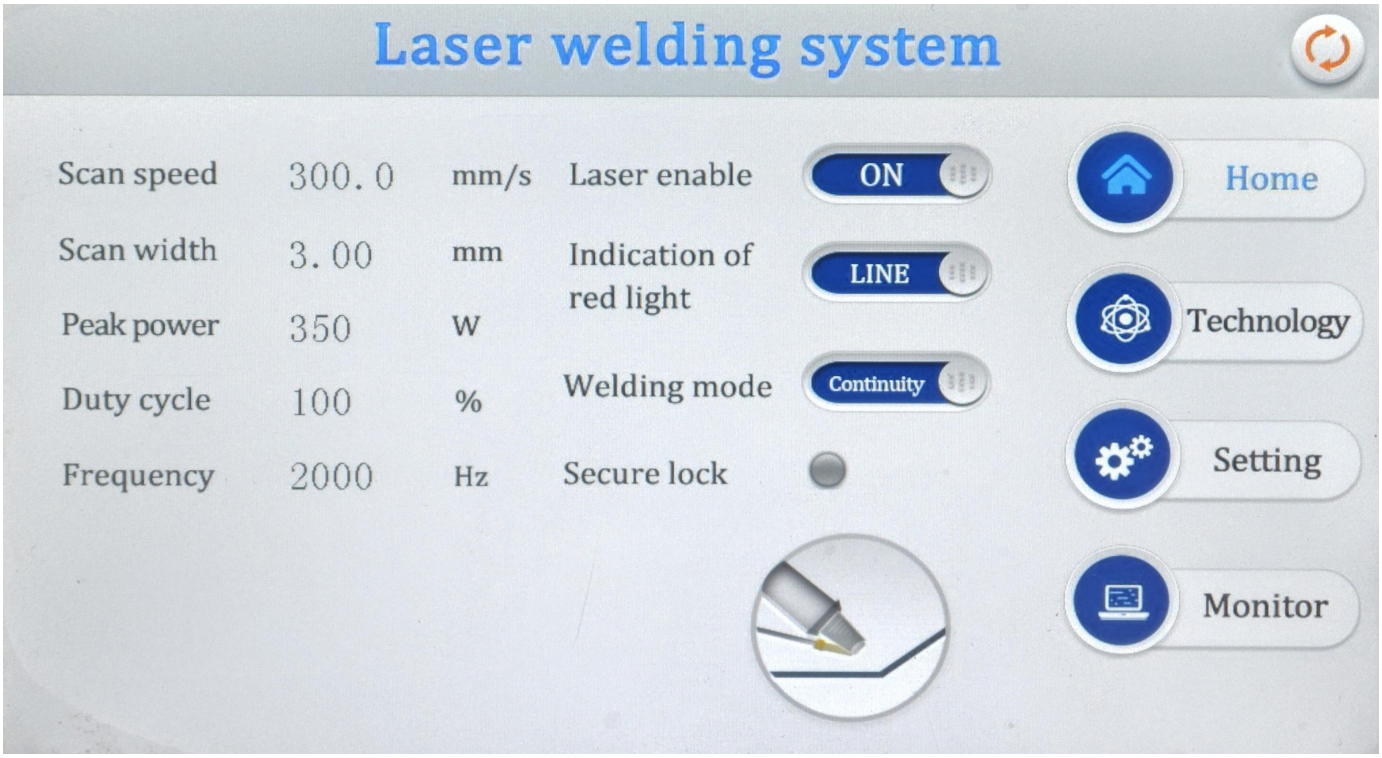
FS-16: The filaments below 1.6mm are generally used for outer Angle welding;

C: For non-wire feeding, used for outer corner welding;

ES-12: Filaments below 1.2mm are commonly used for outer corner sheet welding.

2.4 Screen Control System Introduction

2.4.1 Welding System Homepage



①This interface can see the current process parameters (this page can not be

modified process) and real-time alarm information.

②The default is ON, the red light is LINE by default, and the welding mode is continuous.

When the enabling is turned off, the enabling signal will not be sent to the laser and can be used to test the outlet function. Close the red light indicator, the motor stops swinging, and the red light is a point to adjust the center position. The welding mode is divided into continuous and spot welding. When the spot welding is selected, the spot welding type needs to be set on the setting page.

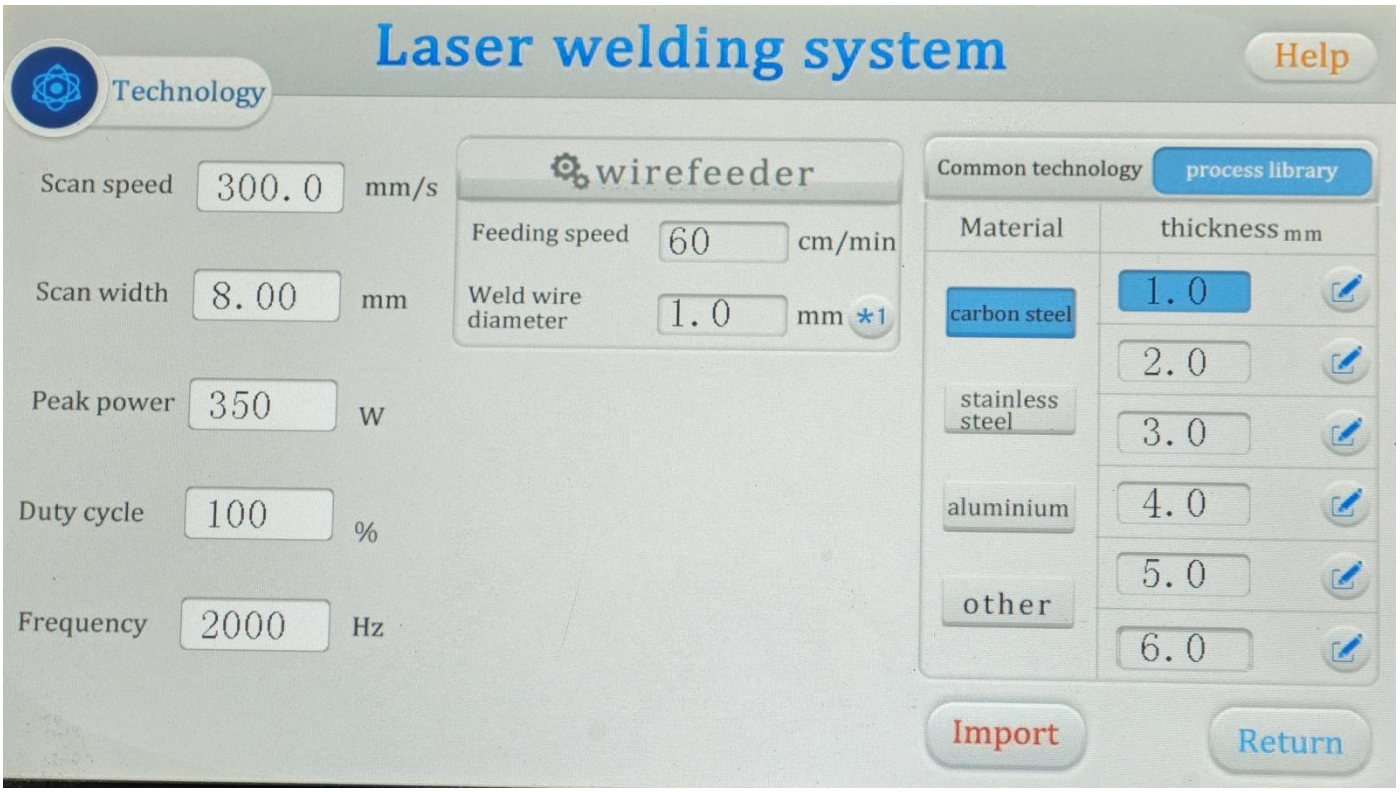
③The safety lock is divided into gray and green. When the metal clip is clamped on the processing piece and the copper nozzle of the gun contacts the processing piece, the 5 and 6 feet of the signal interface 1 are connected, and the

safety lock indicator is displayed as green. At this time, the light can be realized

according to the trigger.

④Click on the upper right corner to switch to the cleaning mode.

2.4.2 Page in “Technology”



①The process interface contains the process parameters of debugging, click the box (red) to modify, click OK, and then save in the quick process, click import (modify-save-import).

② The scan speed range is 2-6000mm / S, and the scan width range is 0 - 6mm. The scan speed is limited by the scan width, which is:

10≤scan speed/(scan width * 2)≤ 1000，

If the limit is exceeded, it automatically becomes the limit value. When the scan width is set to 0, it does not scan (it is a point light source)

(The most commonly used scanning speed: 300mm / S, width of 2.5-4mm).

③The peak power should be less than or equal to the laser power of the parameter page (if the laser power is 1500W, this value is not higher than 1500).

④Duty cycle range 0 to 100 (default 100, usually not changed).

⑤The pulse frequency range is recommended from 5-5000Hz (default 2000, usually no modification).

⑥Click the HELP button on the top right to get more relevant parameter explanations.

⑦After modifying the parameters, you can see whether the import is successful on the home page

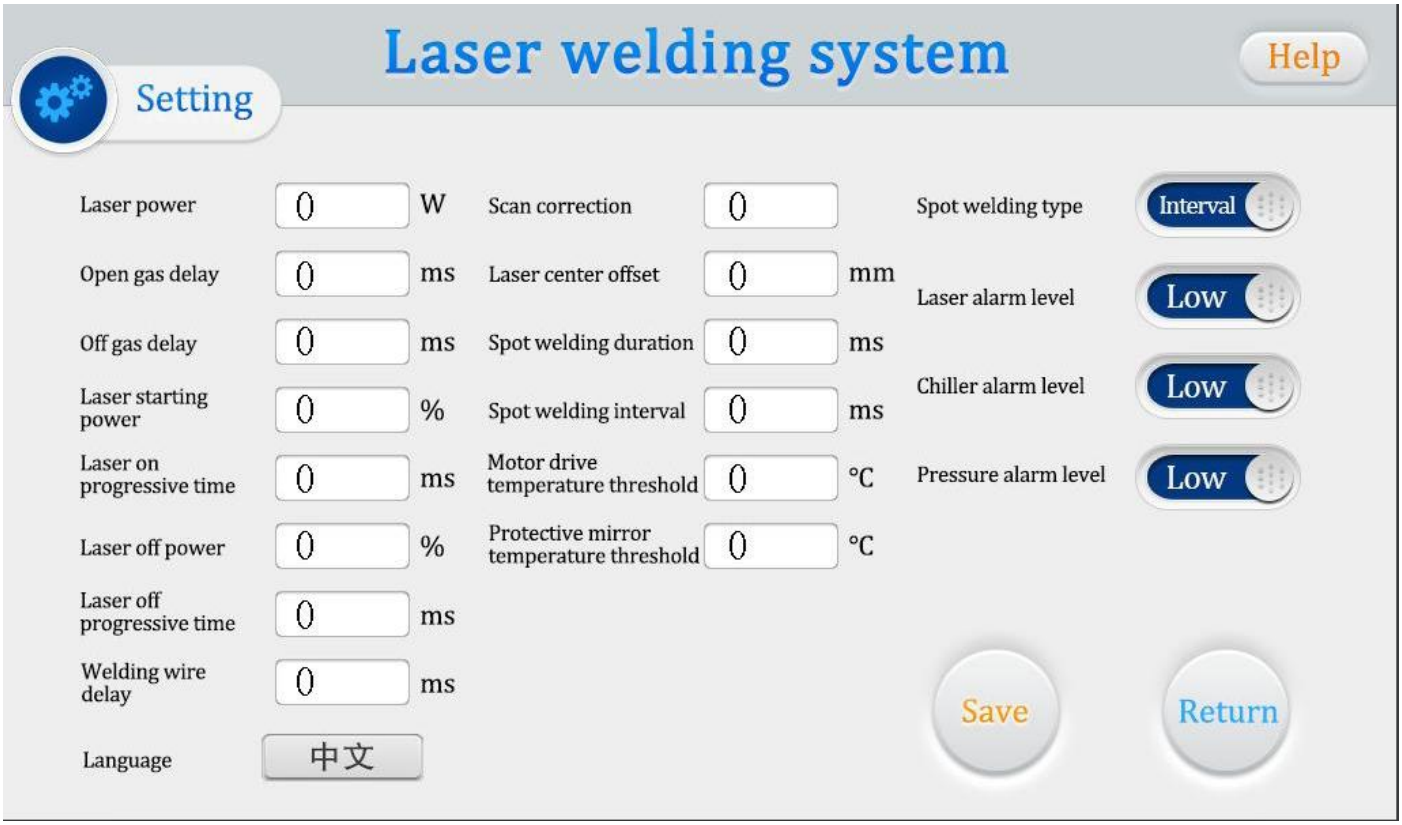
⑧Reference process, can be used in the small program process reference matters need attention:

Some lasers cannot emit light with less than 10% power. When the peak power of the process page is less than 10% of the maximum power of the laser on the set page, all output signals are normal, but they may not emit light.

The duty cycle is 100%, usually does not need to change, when the pulse frequency does not work. If you need to use it, please adjust it according to the actual requirements. Example: Peak power of 300W, duty cycle of 50%, and pulse frequency of 1000Hz. At this time, the light cycle is 1mS,0.5mS to 300W light, 0.5 mS does not light, the cycle, the air at the welding burst, abnormal sound is normal phenomenon. The actual situation is based to the laser parameters.

Click on the Help button at the top right of the screen to get more relevant parameters.

2.4.3 Page in “Setting”



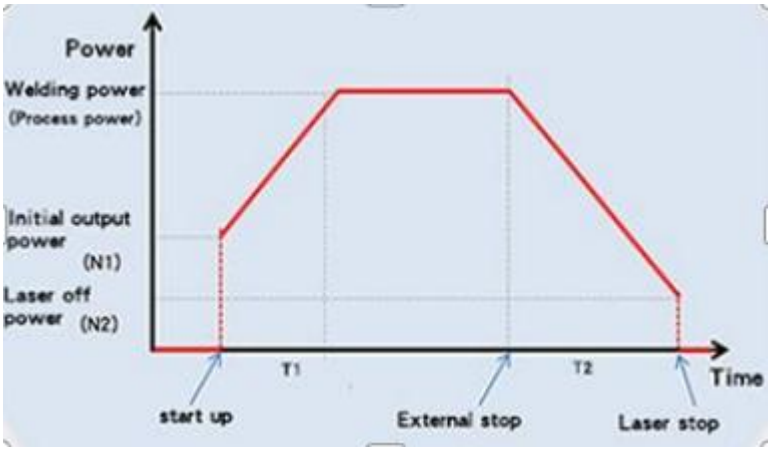
Click "Settings" on the home page, enter the password 123456 on the password input page of the pop-up window, and then enter the Settings page.

①Click “Language”, you can change the language you need, total 19 languages optional.

②The laser power set up to machine power,please fill in correctly.

③The default air delay default 200ms, range 0 ms to 3000 ms.

④From N1% of process power to 100%; from 100% of process power to N2; (as shown in the figure below):



Generally preset switch light power 20%, switch light step time 200ms;

⑤Silk delay compensation is the advance time relative to the light signal, which can be used with the withdrawal function, not set by default;

⑥ The maximum value of the three temperature alarm valves is 70℃. When the value is set to 0, the temperature is not detected, and the buzzer alarms when the measured temperature is greater than the set value;

⑦Scan correction coefficient = target line width / measured line width, range from 0.01

to 4. Generally set to 1;

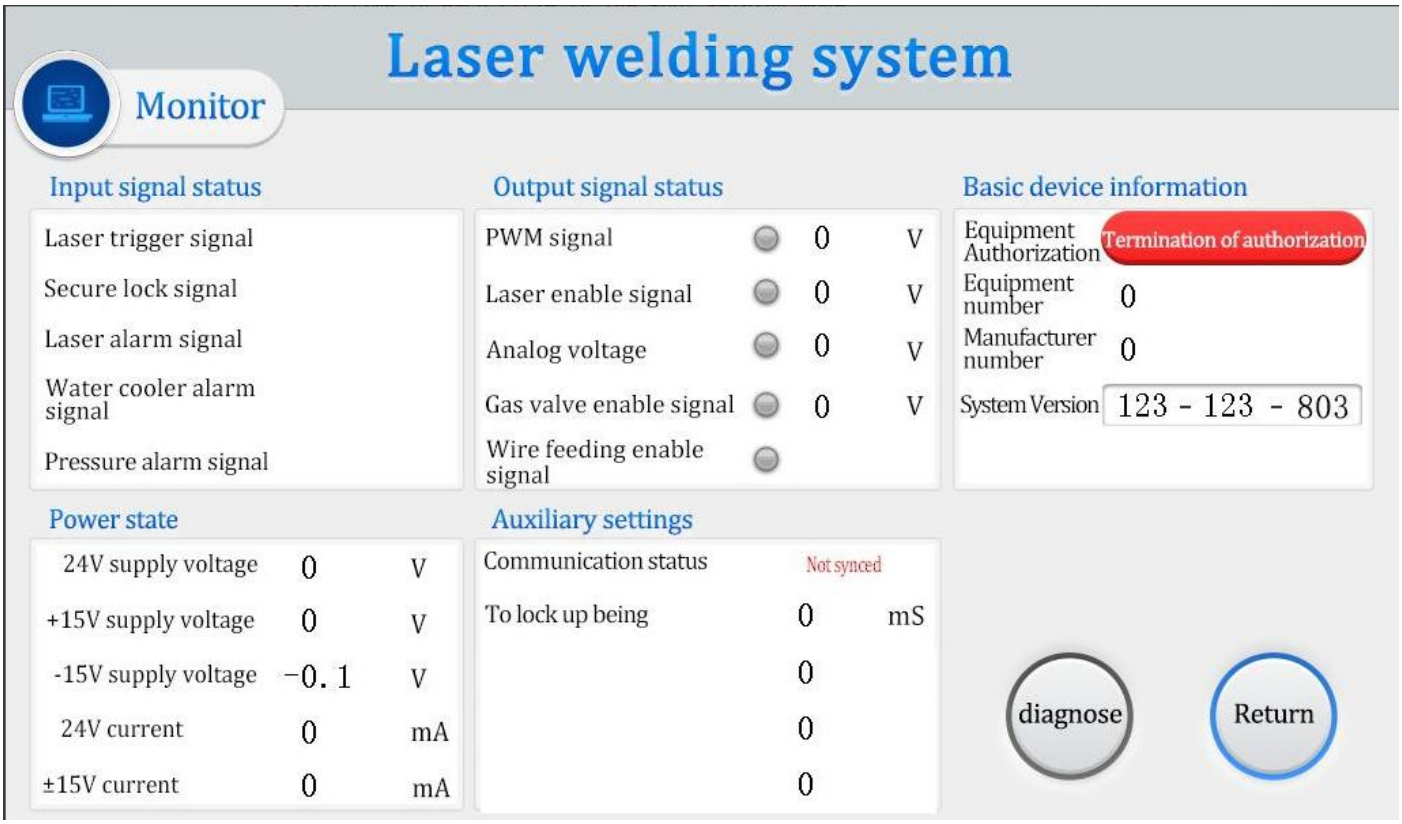
⑧Laser center offset-3~3mm, decrease to the left, increase to the right, applied to adjust the red axis light center;

⑨Air pressure / water cooler / laser alarm level signal is low level, and when this alarm signal is used, the alarm level here should be set to the same with the alarm level of external equipment;

⑩The spot welding duration is the light output time in each cycle in the spot welding mode, and the spot welding interval time is the light stop time in each cycle in the spot welding mode;

⑪Click on the Help button at the top right to get more relevant parameter explanations.

2.4.4 Page in “Monitor”



This page displays the status of each signal and the equipment information.

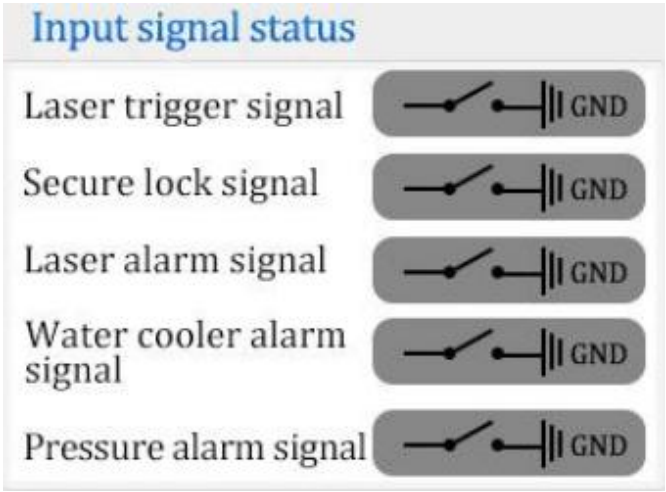
① Input signal status

Laser trigger signal: when the user externally controls the 7 and 8 feet of the signal interface 1, this state is changed from gray to green.

Safety lock signal: normal short contact, this state changes from gray to green.

Laser / air pressure alarm signal: monitor the real-time level status of these interfaces.

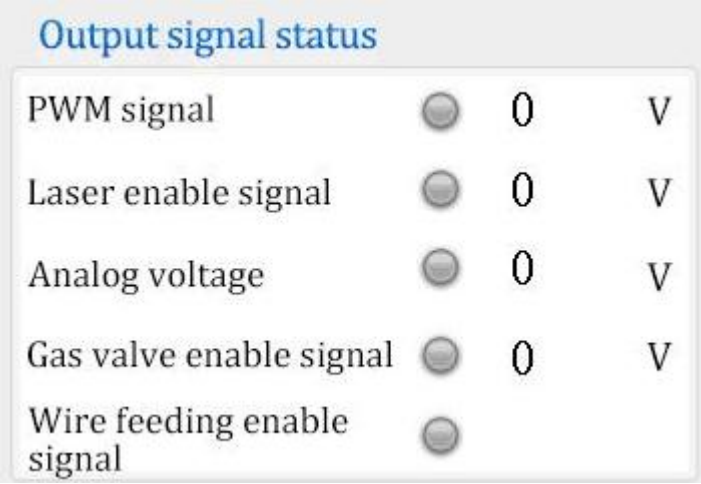
Water cooler alarm signal is invalid for an air cooled laser welding machine



② Output signal status

When the signal is output,the signal in this area changes immediately and can be directly visualized.

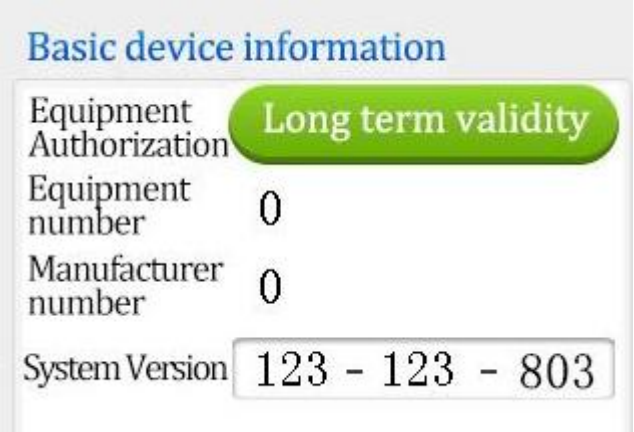
The monitoring signal is the circuit signal detected in real time,which will fluctuate in a certain range and have an error of less than 0.3V with the final output signal.



③ Basic information of the equipment

Equipment authorization: click to encrypt the use time of the equipment, When the equipment is used for more than the set time, the authorization will be terminated and the system will stop working. Factory default is long term effective, if you need encryption and decryption,please contact us for inquiry.

System version: three sets of numbers, the first group is the hardware version, the second group is the micro controller program version, the third group is the touch screen version.



④ Power status

The real-time power supply voltage and current of the device are shown.Due to the update of the algorithm, the data accuracy continues to indicate that there will be some differences in different versions of different versions,

which is a normal phenomenon. Mainly through the power supply voltage to help after sales power supply troubleshooting.

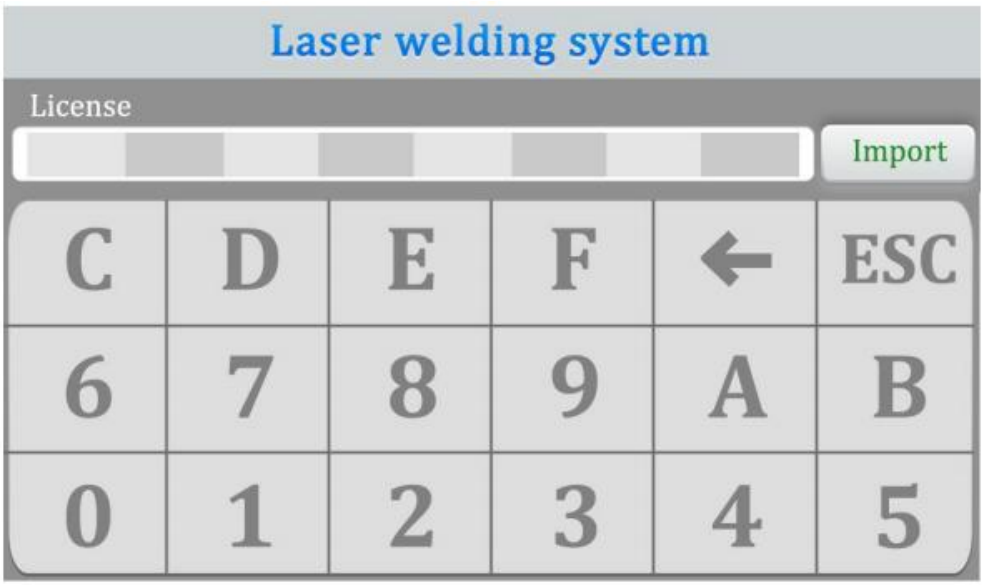
24V supply voltage	0	V
+15V supply voltage	0	V
-15V supply voltage	−0.1	V
24V current	0	mA
±15V current	0	mA

⑤ Communication status

Communication status" indicates the communication between the touch screen and the motherboard, If not synchronized, check the screen cable.

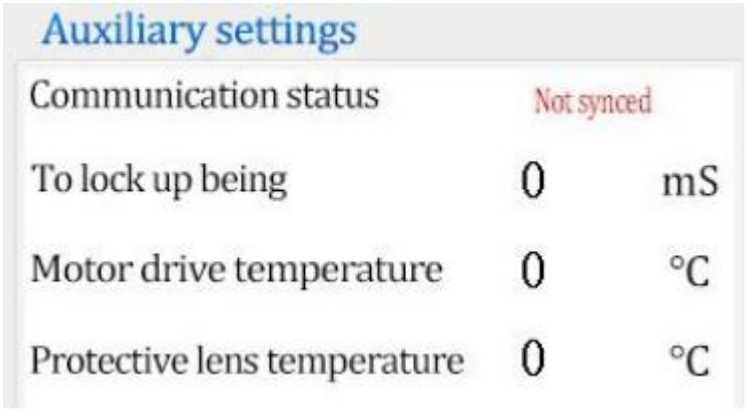
"Anti shake" is used to deal with poor contact with safe locks,which range from 0 to 300 ms. Click "Device authorization box" to set the parameter range on the password page.

The password is "ffffffaa300" where "ffffffaa" indicates the lock anti-shake parameter and cannot be changed. "300" means 300ms. The effect is that when the trigger signal is normal and the disconnection time of the safety lock signal is <300ms. Material welding used to deal with poor surface performance and unstable conductivity (e. g. rust)is usually set to 0. disconnection time of the safety lock signal is <300ms, Material welding used to deal with poor surface performance and unstable conductivity(e. g. rust) is usually set to 0.



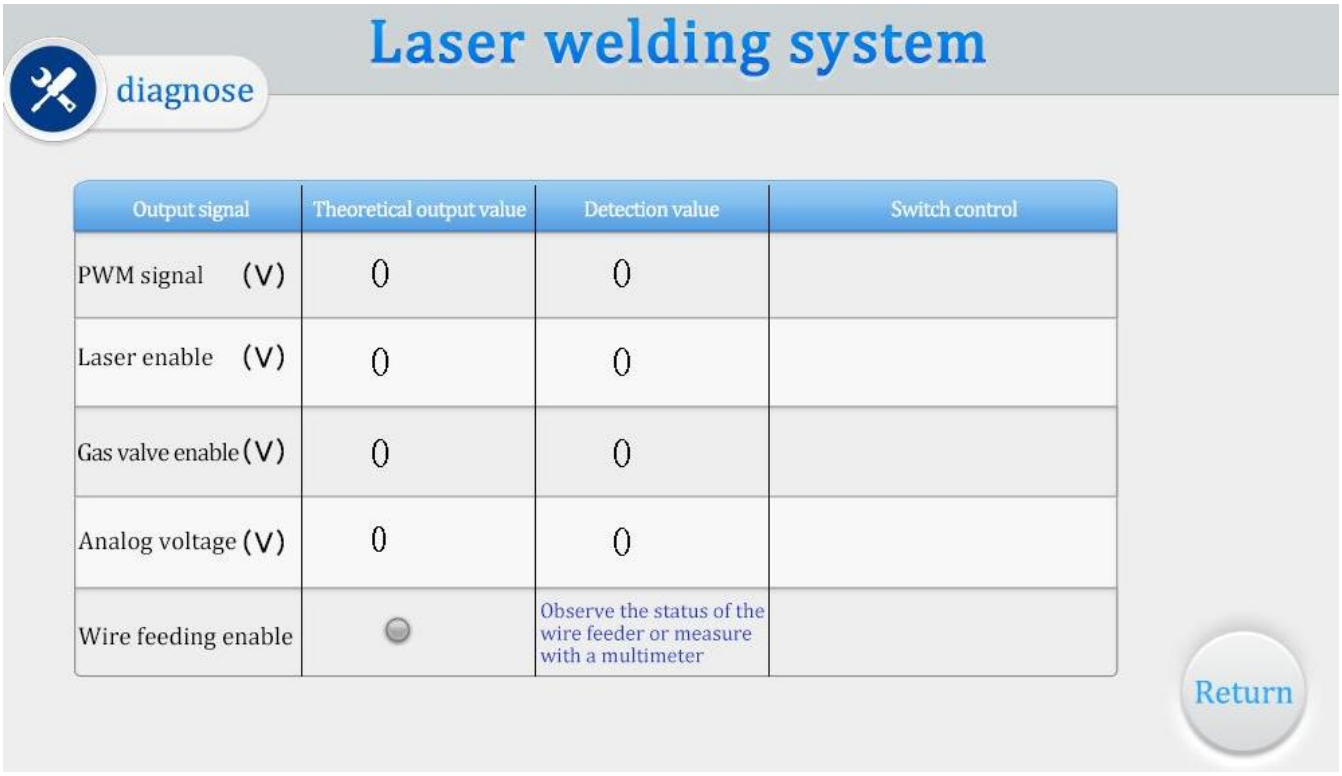
“Motor driver temperature" and "protective mirror temperature" represent the measured real-time temperature of the two parts.

"Motor driver temperature" affects the motor swing performance of the environment. If the environment is poor, it will lead to the abnormal temperature increase, affect the laser scanning speed, and then lead to the decrease of weld quality, The lens temperature reflects the working state of the lens to help determine whether the lens is damaged.

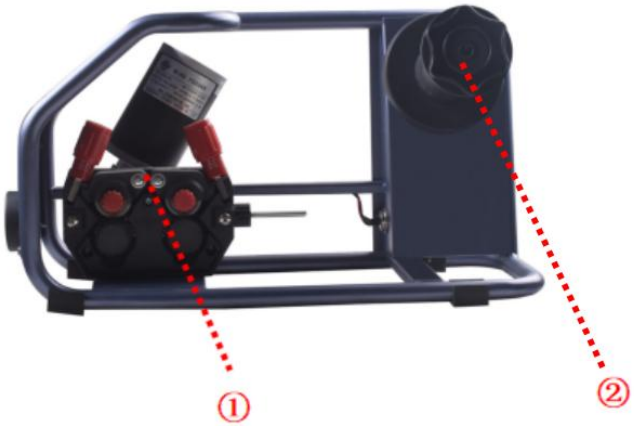


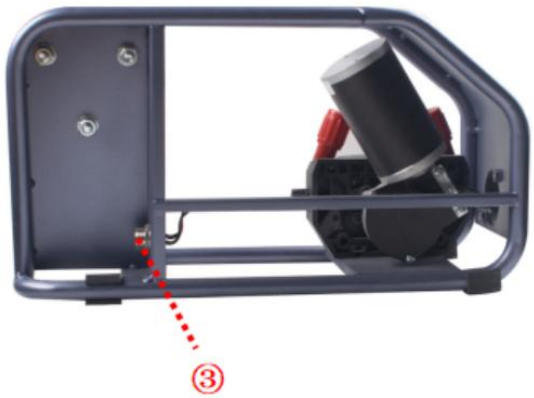
⑥ Diagnose

Click the diagnostic button to enter the diagnostic interface. Use to measure whether the signal port has an actual output, usually the output value is consistent with the detection value, When inconsistent, the load is abnormal, such as when the laser does not light, through the single port with the laser monitoring software or multi meter measurement, the real reaction signal is emitted



2.5 Wire Feeder Introduction



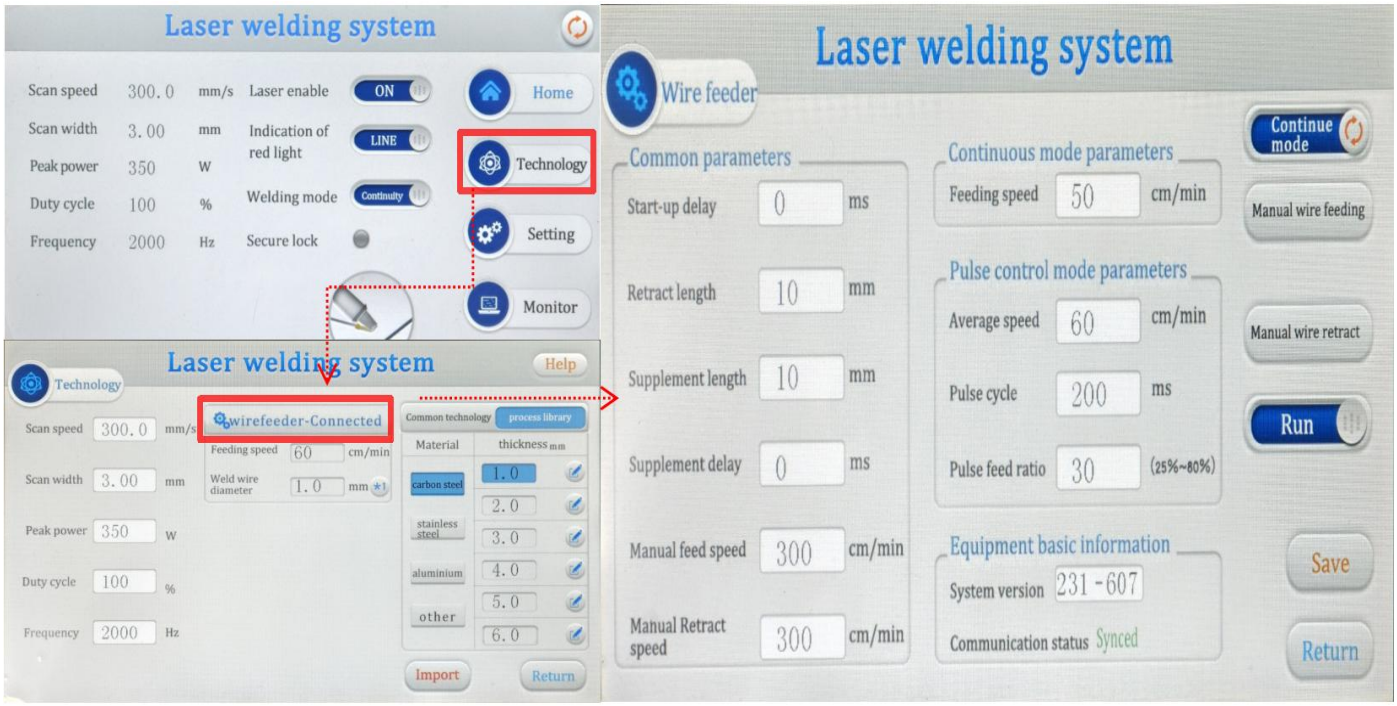


No.	Name	Remark
①	Motor	
②	Damping shaft	
③	Two-core aviation socket	Control signal interface

2.5.1 Technical Parameters

Model	SUP-AMF-C(V1.0)
Rated input	24V±10% AC 50/60Hz
Maximum power and current	50W/2.5A
Rated wire feed speed	15~600cm/min
Applicable welding wire	0.8/1.0/1.2/1.6mm
Suitable for welding wire disc	Shaft diameter: MIN50mm
	Outside diameter: MAX300mm
	Width:MAX105mm
	Weight :<20kg
Net weight	13kg
size	420mm*180mm*230mm

2.5.2 Wire Feeder Set Up



The wire feeder is used with the welding machine and shares a 7-inch touch screen with the welding system with a resolution of 1024×600. Get into the “Technology”page, you will see ”wirefeeder-Connected” after connected

wirefeeder to the machine, click"wirefeeder-Connected" to get into Wire feeder page, so you can modify the wire feeder parameters.

Button name	Function	Remark
Pulse mode / Continue mode	Click to switch to another mode	Pulse mode for fish scale welding
Run/Stop	Click to switch to the corresponding state	The two are mutually exclusive, and the motor does not rotate when shows [Stop]
Manual wire feeding /manual wire retract	Click the motor forward / reverse	Manual wire feeding speed ≠ wire feeding speed
Feeding speed	Adjust the wire feeding speed during welding, the range is 15 ~ 600 cm/min.	Valid in continuous mode
Average speed		Valid in pulse mode
Pulse cycle	Adjust the length of a single fish scale pattern	
Pulse feed ratio	Adjust the degree of fish scales, the smaller the scales, the more obvious they are.	
Start-up delay	Set up the time delay of wire feeder after the gun trigger is pressed. Range 0 ~ 2000 ms, usually set to 0.	Overall effective
Retract length	When the wire is broken, the motor reverses to assist in breaking the wire. The range is 0 ~ 100mm, usually set to 10.	
Supplement length	After the retraction, the motor rotates forward to balance the retraction.The range is 0 ~ 100mm.	
Supplement delay	The interval between wire filling and retraction can avoid wire sticking due to wire filling too quickly.Range 0 ~ 2000 ms. Usually set to 0.	
Manual feed speed	Wire feeding speed when the motor rotates forward, used for manual debugging.Range 15 ~ 600 cm/min. Usually set to 300 cm/min.	

Manual retract speed	Retraction speed of motor reversal, for manual debugging.Range 15 ~ 600 cm/min. Usually set to 300 cm/min.	
System version	Display the main control board version and system version	Avoid mixing the main control board and the screen

3. Machine Installation Guide

3.1 Unbox

Machines are packaged in wooden boxes, while wire feeders are packaged in cardboard boxes. If there are any signs of external damage to the packaging, please check if the unit is damaged and immediately notify the shipping agent Reason. When you remove the unit from the packaging box, please be particularly careful to ensure that the optical fiber is not broken or damaged. The system documentation includes a comprehensive packing list. After receiving the product, please check all items against this list.

If any items are lost or the unit is significantly damaged, please contact us immediately. If there is obvious damage or suspicion to the crew Seemingly damaged, do not attempt to install or operate the laser device under any circumstances.

Laser is a precision and valuable item. please follow the following steps to disassemble and assemble the packaging box:

(1) Place the equipment of this product on a flat surface according to the packaging box label.

(2) The top cover packing box shall be removed step by step according to the identification of the top cover packing box. After removal, the top foam baffle shall be removed.

(3) The laser is connected to the fiber optic cable of the gun head, please be careful to remove it and ensure the bending radius of the fiber optic cable armor >175mm.

(4) Remove the foam shield and take out the supporting items.

(5) Please check the accessories against the packing list.

(6) Please keep all items unpacked properly to prevent future transportation or storage needs.

Machine wooden box

Wire feeder carton box

3.2 Package List

3.3 Preparation Work Before Startup

(1) Connecting the Argon gas / Nitrogen gas, The flow rate of the gas needs to reach 15L/min)

(2) (Noticed: When using welding and cutting function, need to use with protective gas such as Argon / Nitrogen. But the gas can not be shipped with machine, so customer need to prepare themselves. Recommend use above 99.9% pure Argon 4.6, it will influence welding effect.)

(3) After connected air pump or protective gas, the pressure index of the pressure reducing valve will run to 0.2Mpa automatically.

3.4 Wire Feeder Connection

The wire feeder and the welding system share the same 24V power supply built in the machine. The wire feeder parameters effective when the wire feeder connect to the welding system (machine) through the two-core aviation plug interface on the back of the wire feeder.

3.4.1 Selection of Wire Feeding Tube and Wire Feeding Wheel

Please select the corresponding wire feed wheel and wire feed tube according to the welding wire material and diameter, and avoid bending the wire feed tube during use.

Wire feeding wheel model	Materials		Carbon steel, stainless steel
	Wire feeding wheel - V shaped	standard	Φ 0.8/1.0mm Φ 1.2/1.6mm
		customized	Φ 1.6/2.0mm
	Materials		aluminum
	Wire feeding wheel - U shaped	customized	Φ 0.8/1.0mm Φ 1.2/1.6mm Φ 1.6/2.0mm

Machine standard with two pcs of φ0.8/1.0mm and two pcs of φ1.2/1.6mm V-shaped wire feeding wheels, which are used for carbon steel welding. If need for wider weld seam, then need φ2.0/2.5mm customized wire feeding wheels.

Schematic diagram of **wire feeding tube** and **wire feeding wheel**

If use for aluminum welding wire, need to replace the U-shaped wire feeding wheels and the matching black graphite wire feeding tube. These customized parts need to buy additionally.

3.4.2 Wire Reel / Wire Feeding Wheel Installation

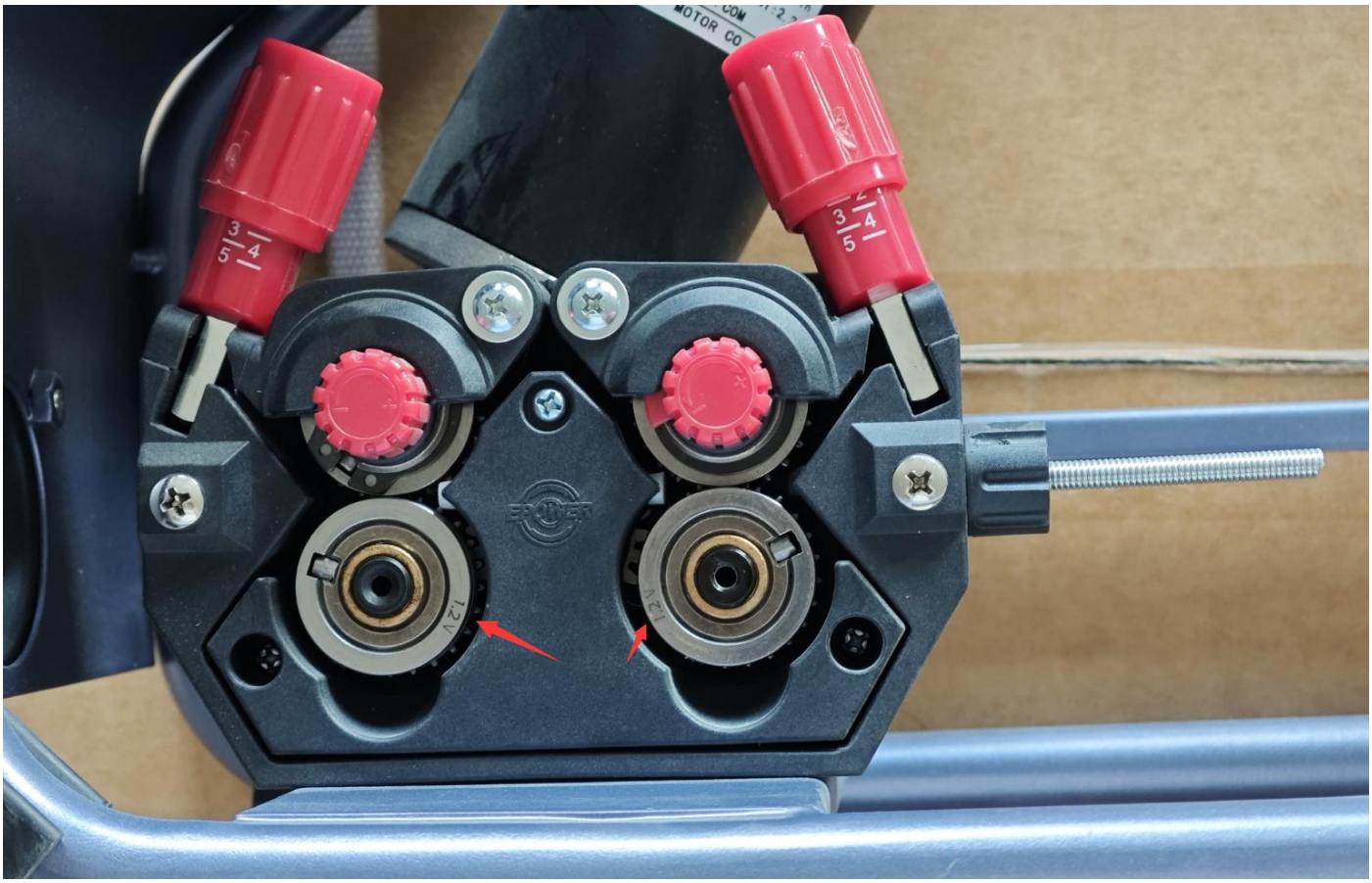
No.	Name	Remark
1	Damping shaft	Maximum load: 20kg
2	Locating pins	Wire reel positioning

When installing the wire reel, should pay attention to:

①Select the welding wire according to the welding material;

②The welding wire passes through the center of the groove;

③Use the wire feeding wheel that matches the welding wire. For example, if use the V-shaped φ1.2 stainless steel welding wire, the side of the wire feeding wheel marked [V1.2] should face outward;



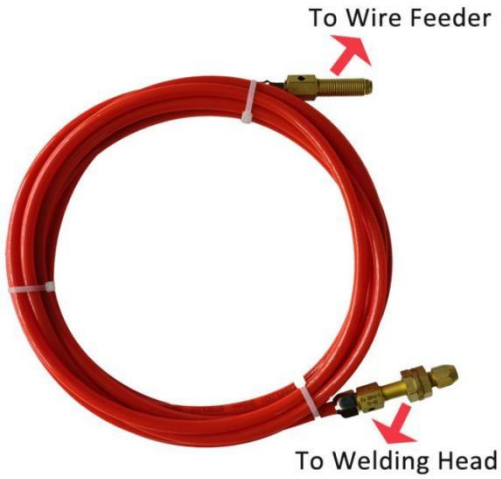
④The positioning hole of the wire reel should be aligned with the positioning pin of the damping shaft, so that the wire reel and the damping shaft can rotate smoothly to avoid friction between the wire reel and the damping shaft which may cause unstable of wire feeding.

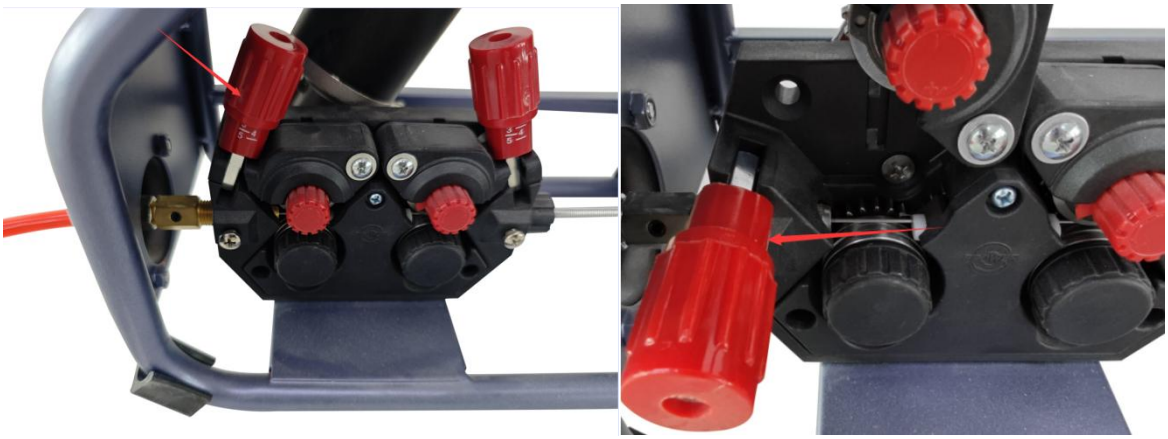
3.4.3 Wire Feeding Tube Installation

When installing the wire feeding tube, should pay attention to:

①Loosen the locking screw and insert the wire feed tube till the wire feed tube does not rub against the wire feed wheel and the welding wire can be easily inserted;

②After inserting it into the appropriate position, tighten the screw till the wire feed tube does not shake when it is manually cranked.





3.4.4 Connect Wire Feeding Tube to Welding Head

When connecting the wire feeding tube to welding head, should pay attention to:

①Select the corresponding connection block according to the welding head model;

②Make sure that the welding wire is stuck in the copper nozzle slot before tightening the hexagon socket screw;

③Select the wire guide nozzle according to the wire diameter;

④Adjust the length of the wire guide tube according to the actual focal length of the welding head.

3.5 Safe Clip

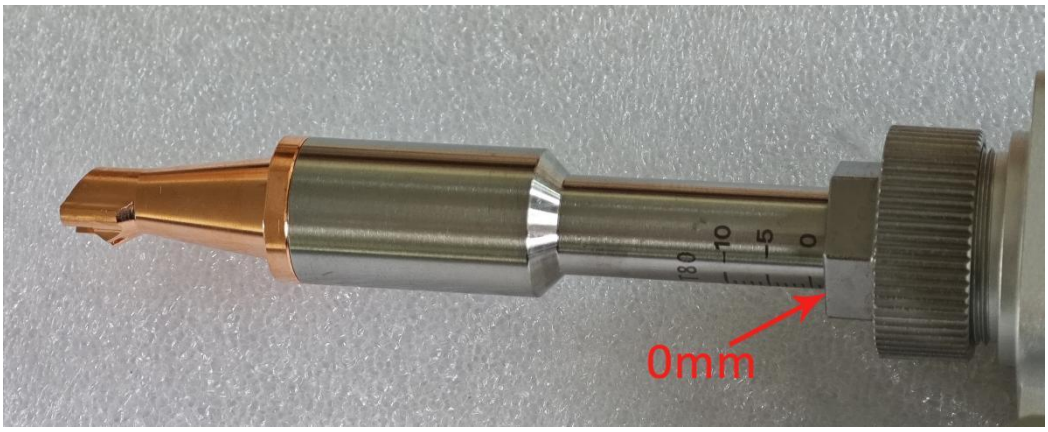
Before turning on the laser, the safety clip must be clamped in the correct position (workpiece) to ensure that it forms a circuit with the welding head, or there will be no laser out.

In welding mode, the safety clip is clamped on the welded work piece.

In cleaning and cutting mode, the safety clip is clamped on the welding gun.

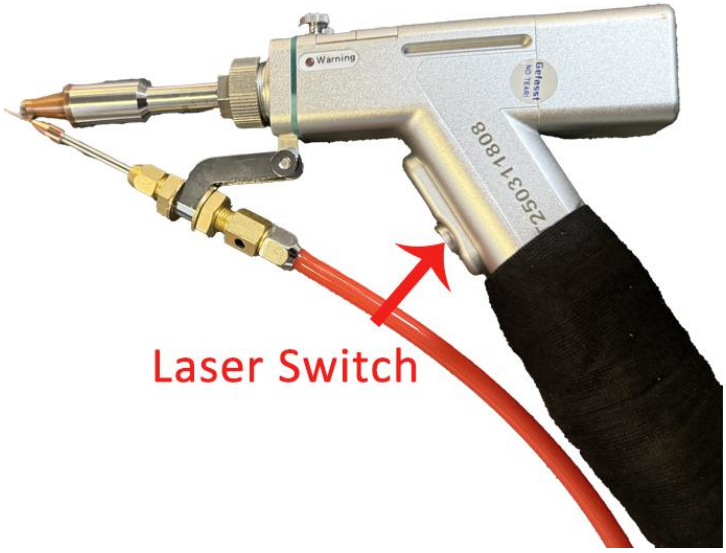
3.6 Start Up Machine

(1) Adjust the scale tube with 0mm, which is the best focal length.

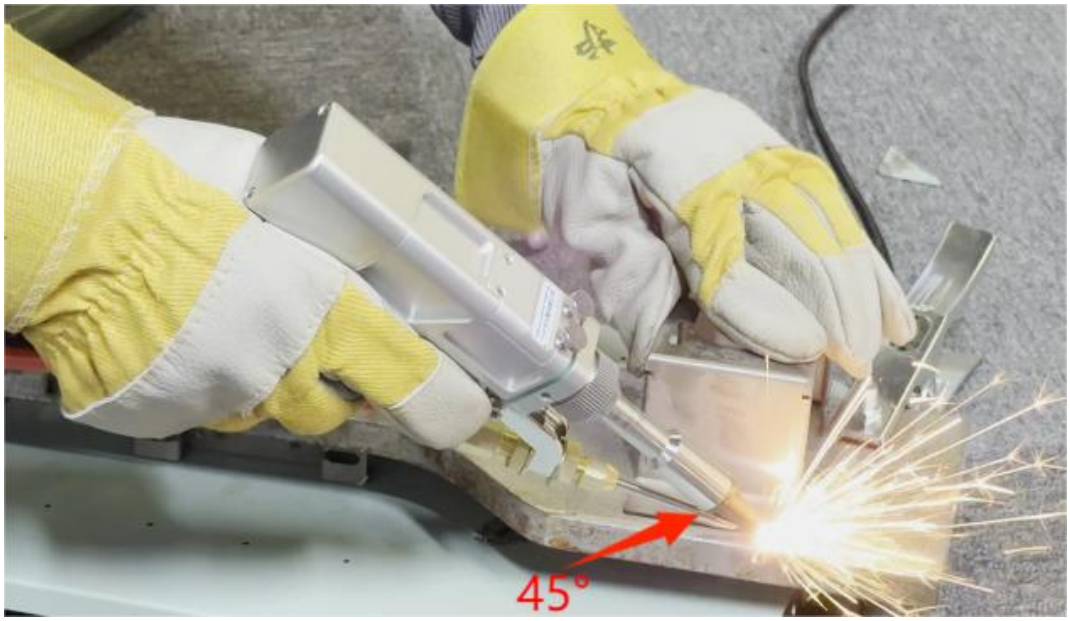


(2) Power on: Insert the key and rotate right to power on the machine.

(3) Press the switch button to emit laser light, and release it to stop emitting light



(4) When welding, keep the welding head at a 45 ° with work piece you welding.



4. User Guide

Overview of 4 in 1 Laser Welding Machine:

Laser welding: Supports the welding of various materials such as metal, carbon steel, stainless steel, aluminum alloy, etc. It adopts laser beam fusion technology, with high precision and small heat affected zone, and the weld seam is firm and beautiful.

Laser cleaning: Quickly removes rust, oil stains, oxides and other pollutants from metal surfaces without touching the work piece, making it environmentally friendly and efficient.

Laser cutting: Suitable for cutting metal sheets, with flexible operation and widely used in fields such as hardware and sheet metal manufacturing.

Weld cleaning: After welding, rust removal and oxidation layer removal should be carried out on the weld to improve welding quality.

4.1.Welding Mode

4.1.1:Select The Correct Cooper Nozzle

4.1.2: Wire Selection

(1) According to the width of the weld seam choose the diameter of the welding wire.

●Width of weld seam ＜1.2mm, Recommend 0.8mm welding wire

●Width of weld seam ＜1.5mm, Recommend 1.0mm welding wire

●Width of weld seam ＜2.0mm, Recommend 1.2mm welding wire

●Width of weld seam ＜3.0mm, Recommend 1.6mm welding wire

(2) According to the different welding plates, we need to use different welding wires (gas protected solid core

wire).

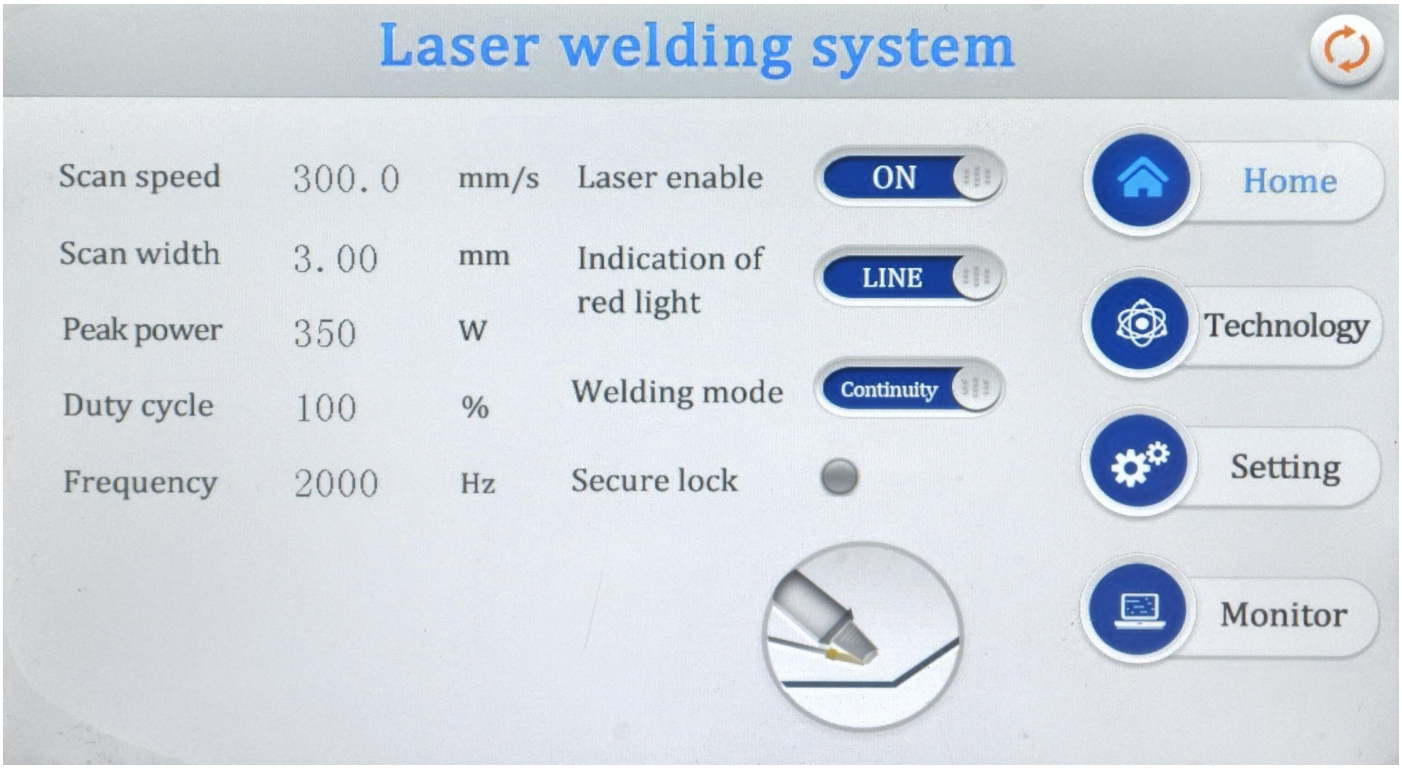
●Stainless steel = ER304 Stainless steel welding wire

●Carbon steel / Galvanized sheet = Iron wire

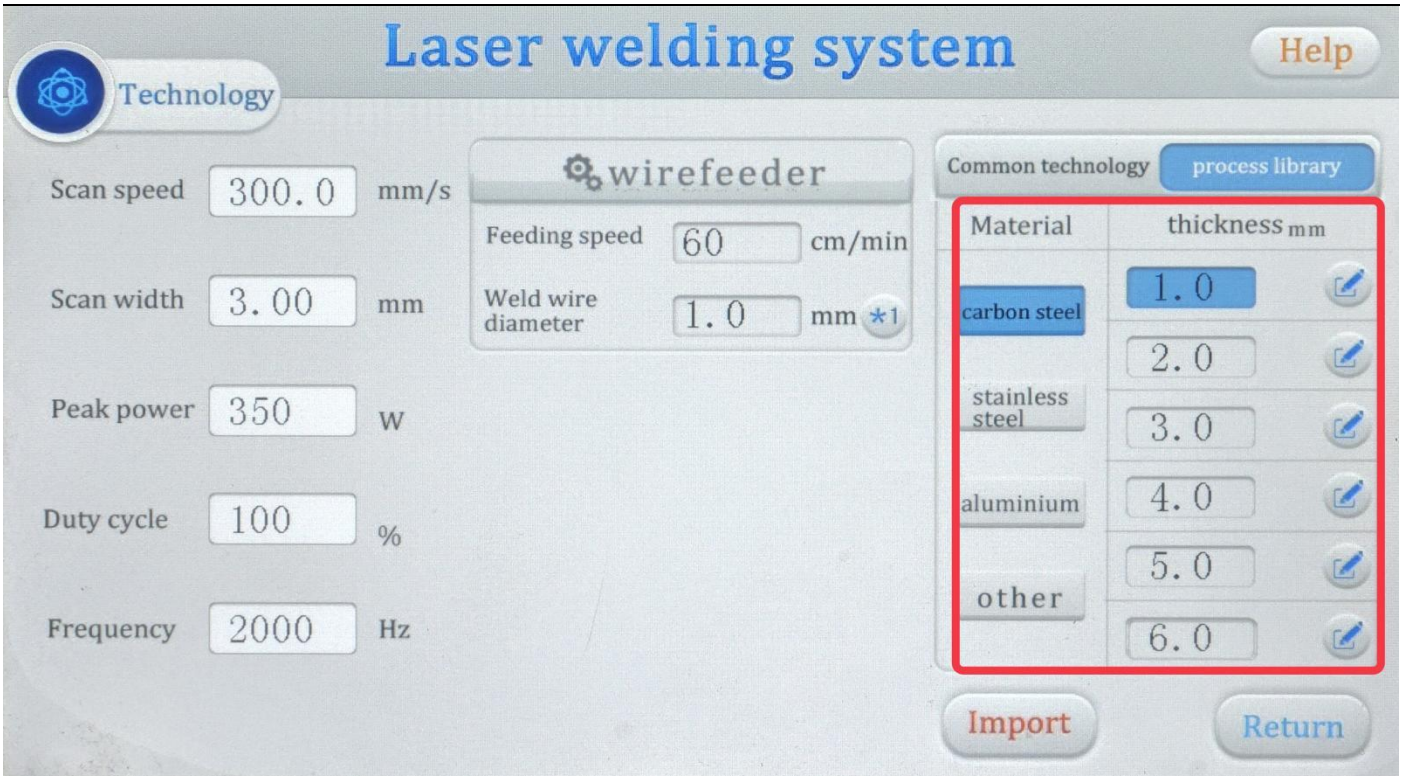
● Aluminum = Aluminum wire (Aluminum welding wire is recommended to use alloy aluminum of 5 series or above, which has high hardness and is not easy to get stuck)

4.1.3: Setting Welding Parameter In Control Screen

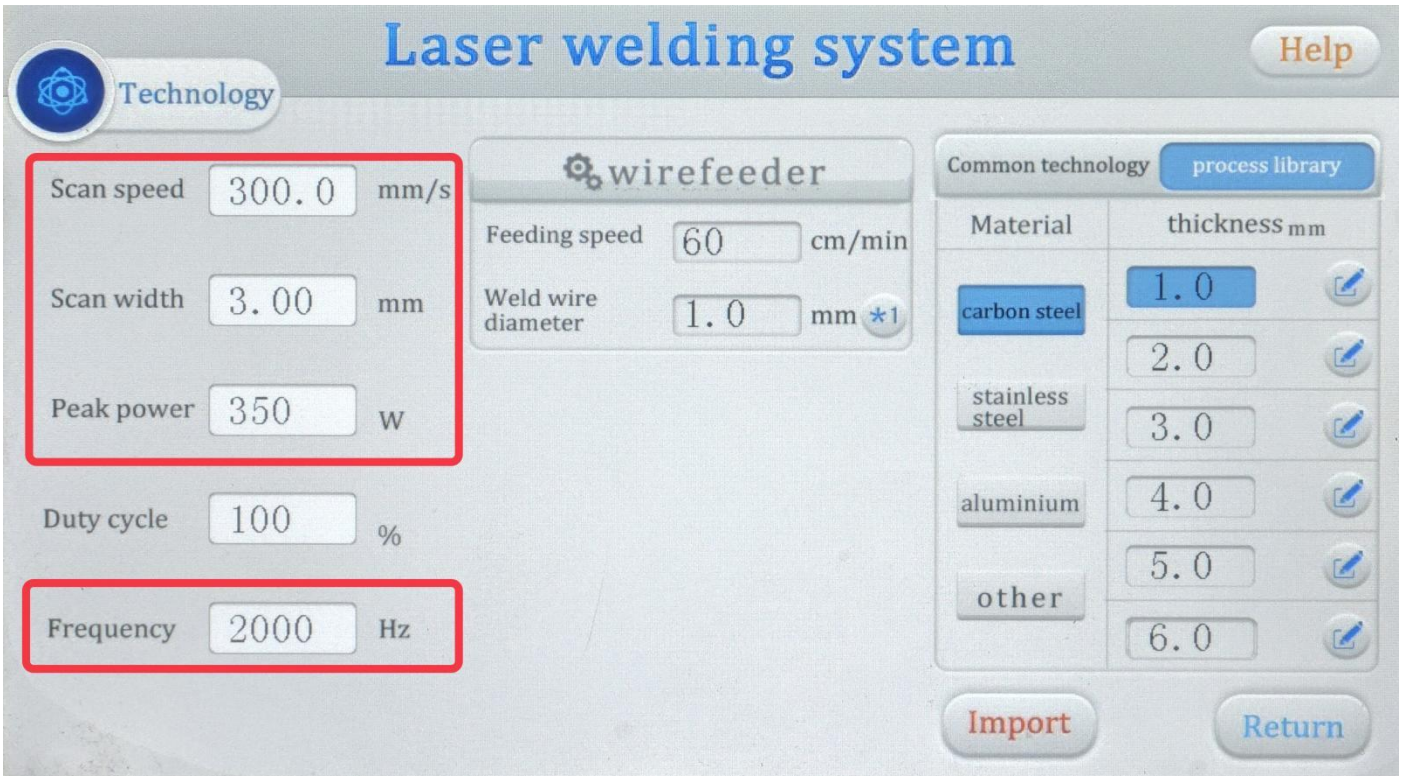
- Click “technology” , set up welding parameters



- According to your requirement to choose the parameters in process library



- If your needs are not met, you can adjust the “Scan speed” “Scan width” “Peak power” as your requirement.



4.1.4 Welding Parameters

Laser Welding Parameter (reference)								
Materials	Thickness /mm	Scan Speed mm/s	Scan width/mm	Peak power/W	Duty cycle	Frequency/ Hz	Wire feed speed cm/s	Welding wire
Carbon steel	1	300	3	350	100	2000	60	1
	2	300	3	700	100	2000	60	1.2
	3	300	3	1100	100	2000	60	1.2
	4	300	3	1500	100	2000	60	1.6
	5	220	3	1800	100	2000	50	1.6
	6	220	3	2200	100	2000	50	1.6
	8	220	3	3000	100	2000	40	2
Aluminum	1	300	3	500	100	2000	60	ER5356 1.0
	2	300	3	800	100	2000	60	ER5356 1.2
	3	300	3	1400	100	2000	60	ER5356 1.2
	4	300	3	1800	100	2000	60	ER5356 1.6
	5	220	3	2000	100	2000	50	ER5356 1.6
Stainless steel	0.5	300	3	260	100	2000	80	ER304 0.8
	0.8	300	3	300	100	2000	80	ER304 0.8
	1	300	3	350	100	2000	60	ER304 1.0
	2	300	3	700	100	2000	60	ER304 1.0
	3	300	3	1100	100	2000	60	ER304 1.2
	4	300	3	1500	100	2000	60	ER304 1.2
	5	220	3	1800	100	2000	50	ER304 1.6
	6	220	3	2200	100	2000	50	ER304 1.6
	8	220	3	3000	100	2000	40	ER304 2.0

The following is laboratory data on welding and cutting, for reference only. Please refer to the actual situation for details		
Air cooled Laser	1200W	1500W

Welding thickness of carbon steel and stainless steel	0.5-4mm（MAX 4.5mm）	0.5-4.5mm(MAX 5mm)
Welding thickness of Aluminum	2.5mm（MAX 3mm）	3mm（MAX 3.5mm）

4.2 Cutting Mode

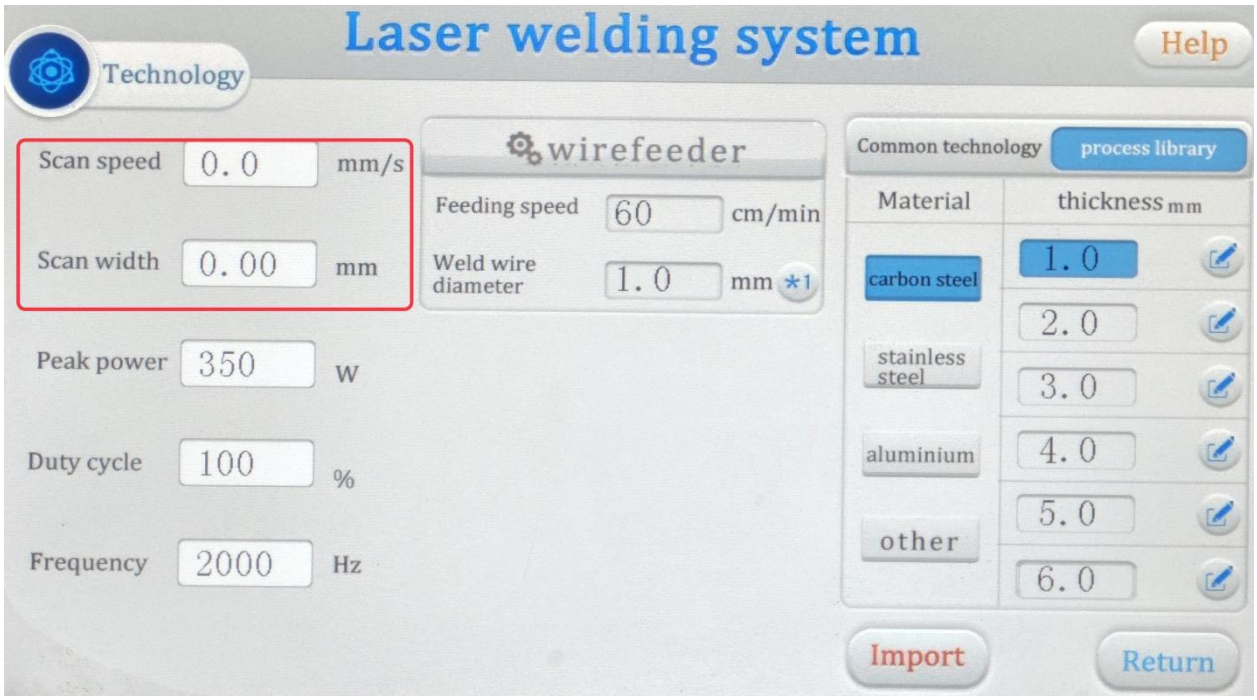
4.2.1 Change The Cutting Nozzle

- Please replace the cutting copper nozzle

4.2.2 Parameter setting

- Set “Scan speed” and “Scan width” as 0mm, “Peak power”as your need, the max is the machine power.

For example,if your machine is 1500W, the max peak power is 1500W.



The following is laboratory data on welding and cutting, for reference only. Please refer to the actual situation for details		
Air cooled Laser	1200W	1500W
Cutting thickness of carbon steel and stainless steel	0-5mm（MAX 8mm）	0-5.5mm(MAX 8.5mm)
Cutting thickness of Aluminum	0-2mm（MAX 2.5mm）	0-2.3mm(MAX 2.8mm)

4.2.3 Start Cutting

- Clamp the safety clip onto the welding gun

- Double click laser switch on welding gun and keep click the button, start cutting

4.3 Welding Seam Cleaning Mode

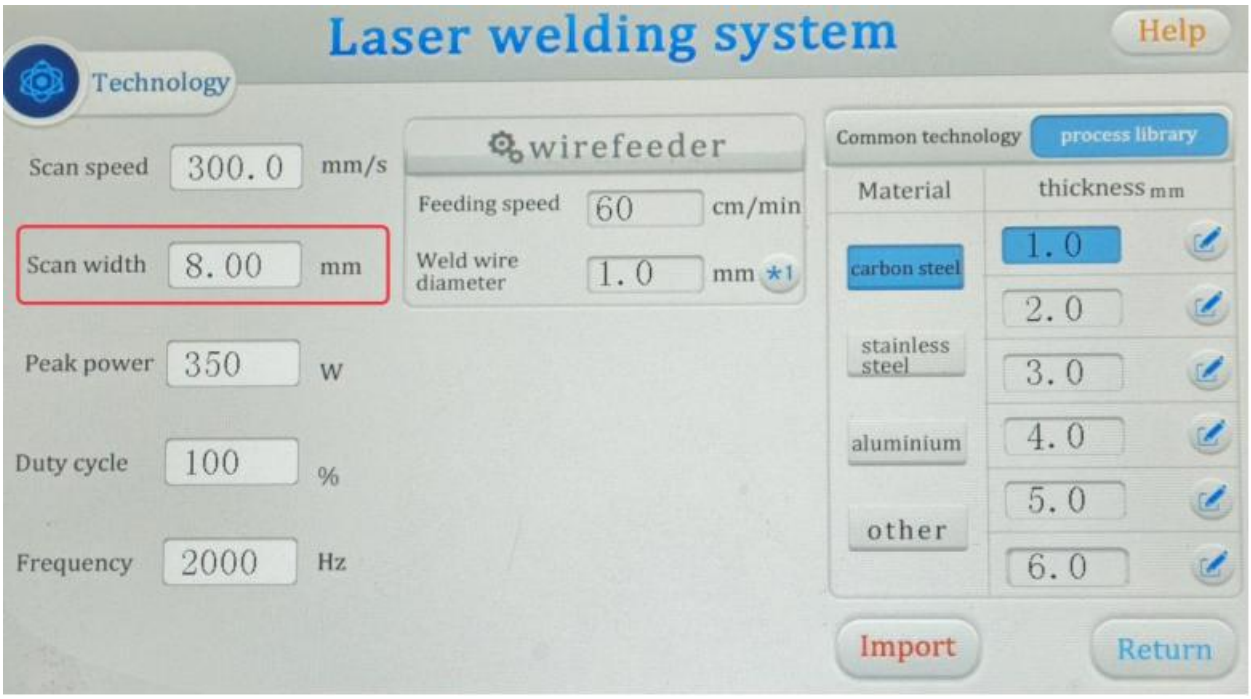
4.3.1 Change the Welding Seam Cleaning Nozzle

Please replace the welding seam cleaning nozzle, Nozzle model:C

4.3.2 Parameter Setting

- Set “Scan width” according to the width of the weld seam that is oxidized or burnt during welding

  Max “Scan width” should be 8mm.



4.3.3 Start Weld Seam Cleaning

- Clamp the safety clip onto the welding gun.
- Double click laser switch on welding gun and keep click the button, start weld seam cleaning.

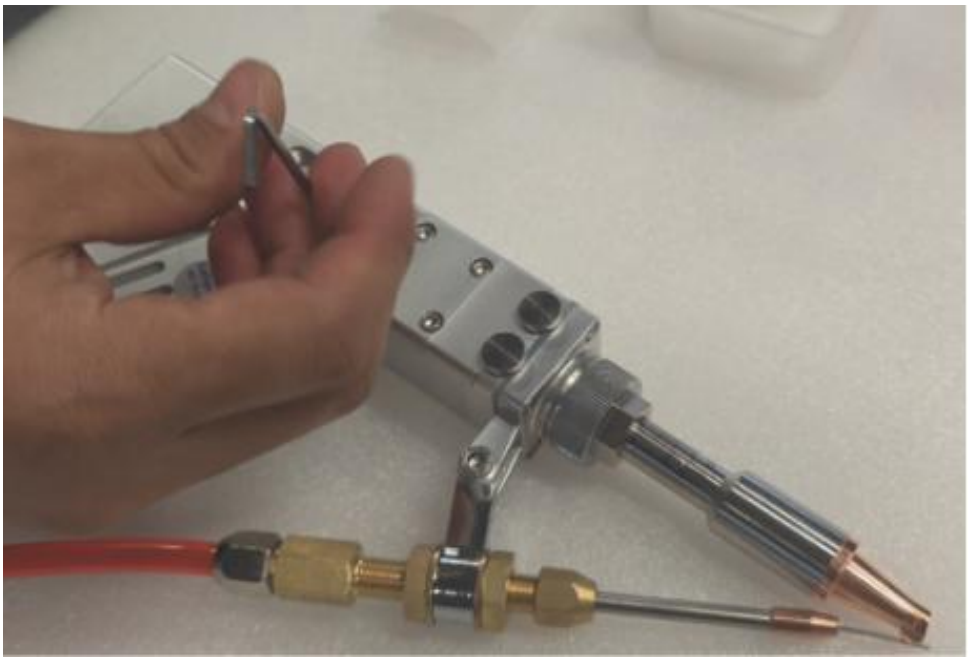
4.4 Cleaning Mode

4.4.1 Remove the Copper Nozzle

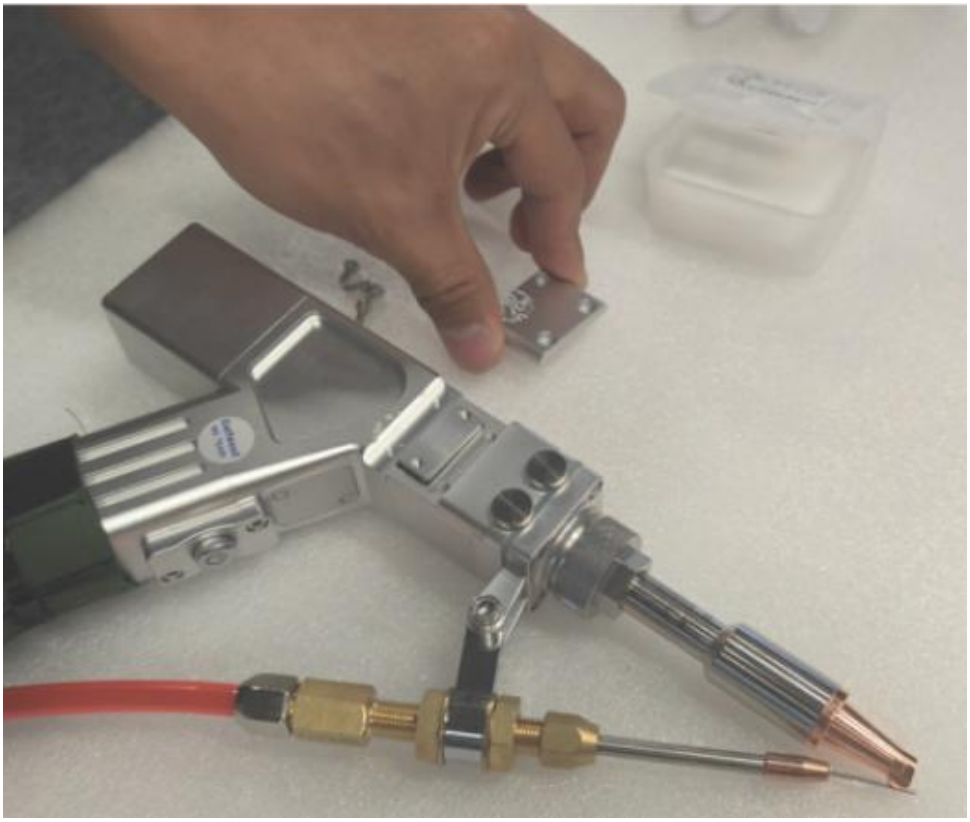
4.4.2 Replace the Cleaning Lens

- If the range of rust/Paint/Oil removal is relatively narrow, and there is no need to replace the lens. Use F150 focus lens directly.
- If the cleaning range is relatively large and more efficient cleaning is needed, please replace F800 focus lens(cleaning lens).
- At the focusing lens F800,the maximum cleaning width is 130mm.
- At the focusing lens F150,the maximum cleaning width is 30mm.

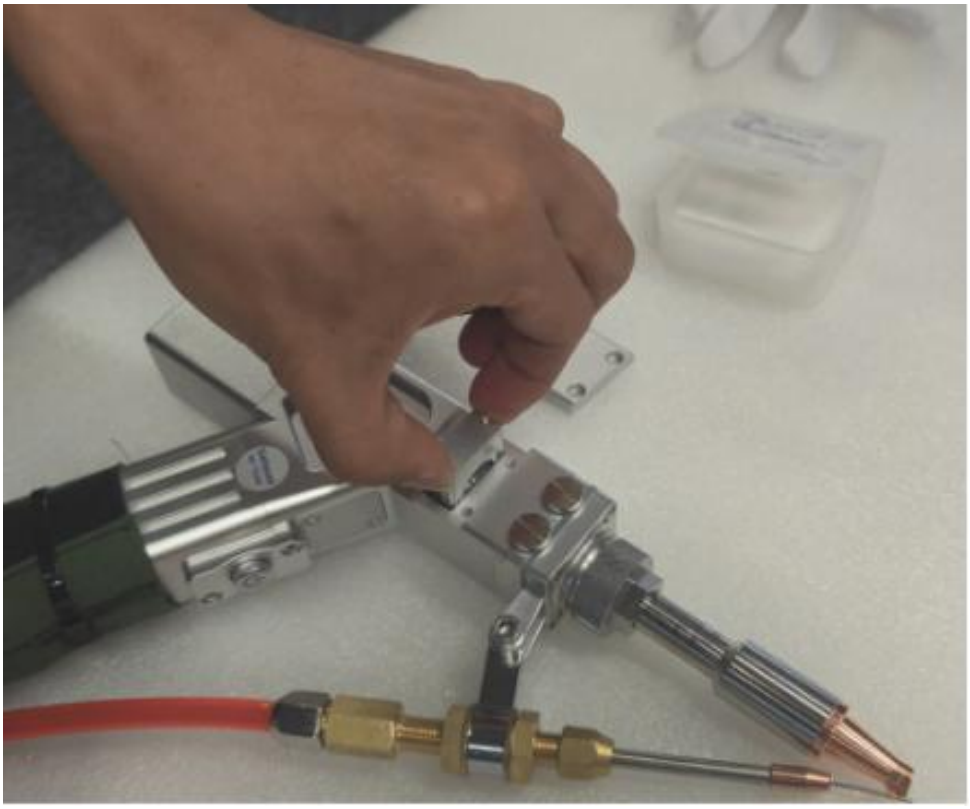
(1) Unscrew four screws



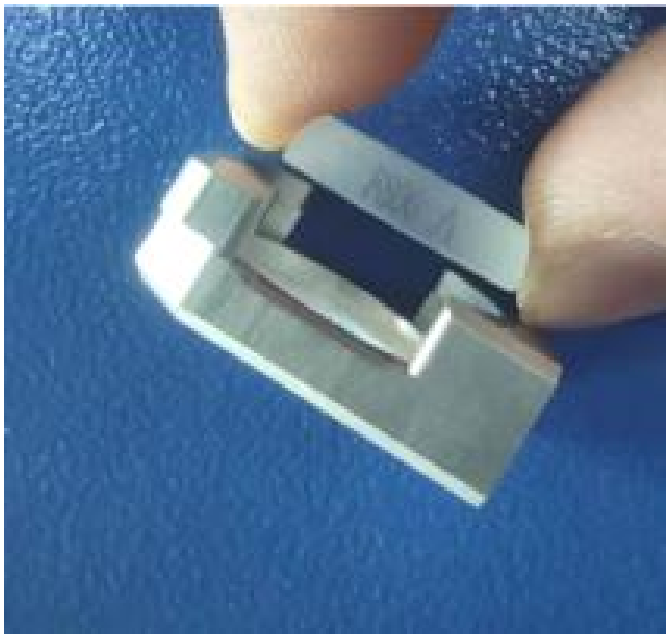
(2) Remove the lid



(3) Take out the lens

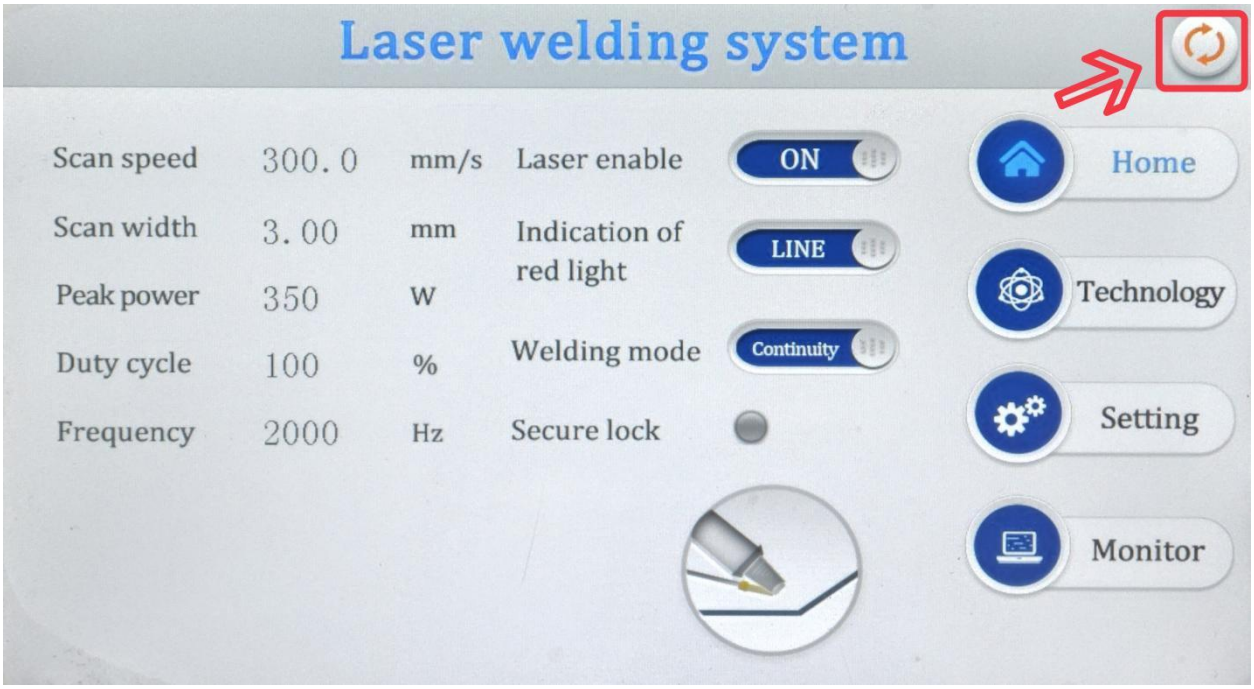


(4) Replace the F800 focus lens,the flat surface of the lens is facing upwards.

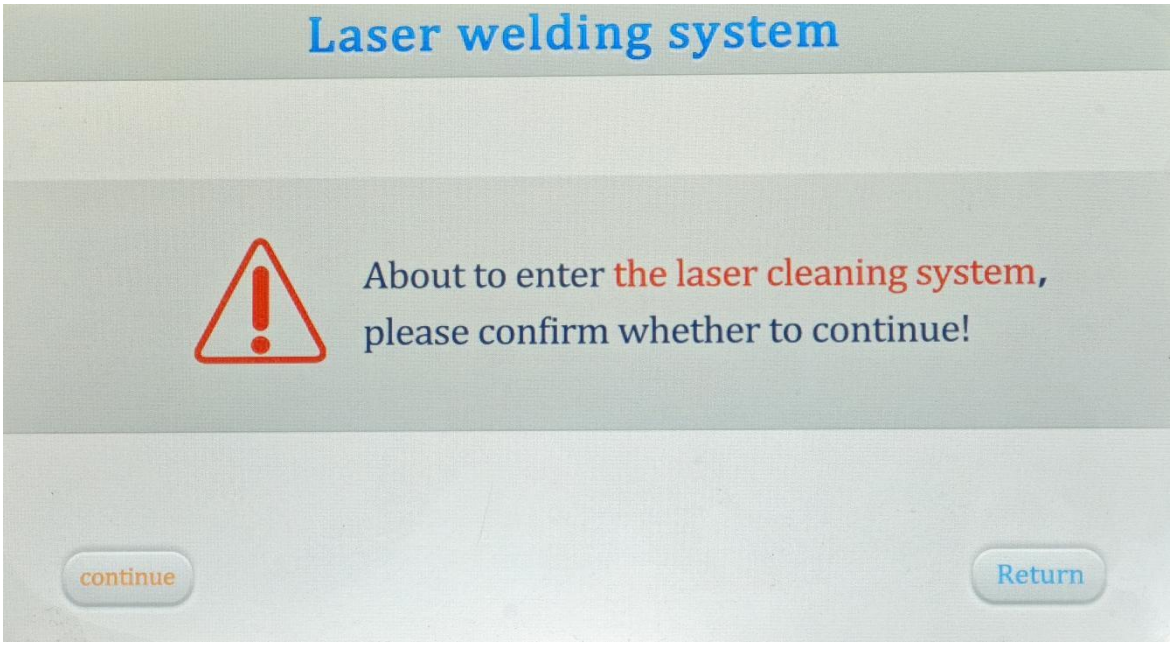


4.4.3 Mode Switch in Software and Parameters Setting

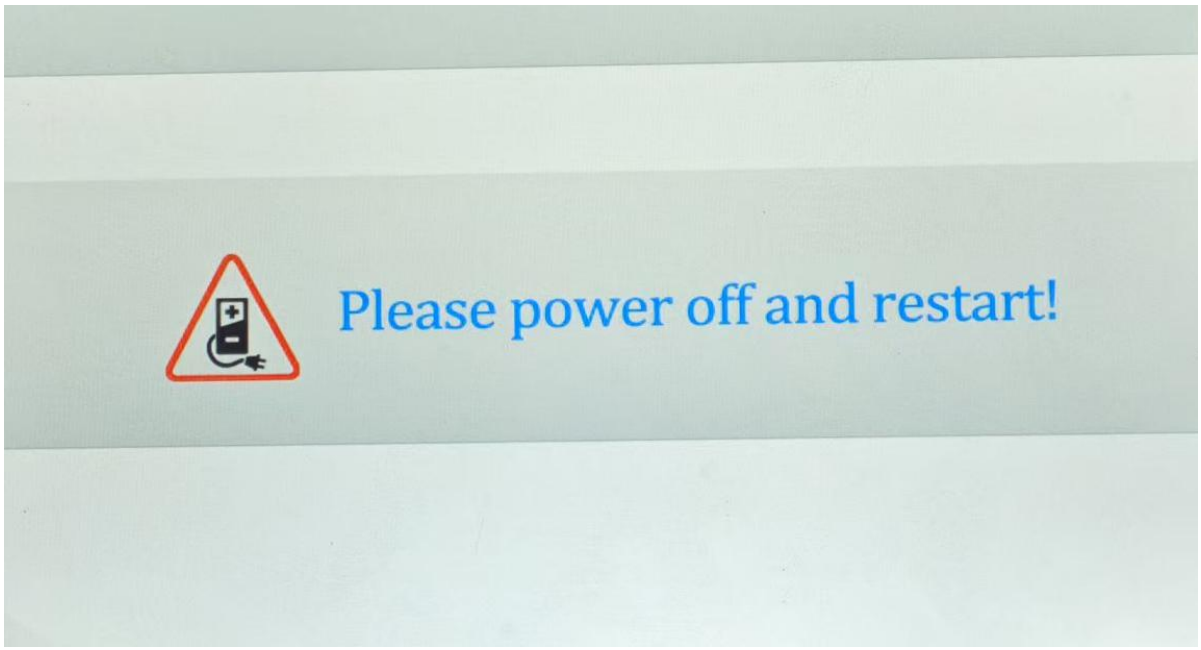
(1) Click switch button  in welding homepage



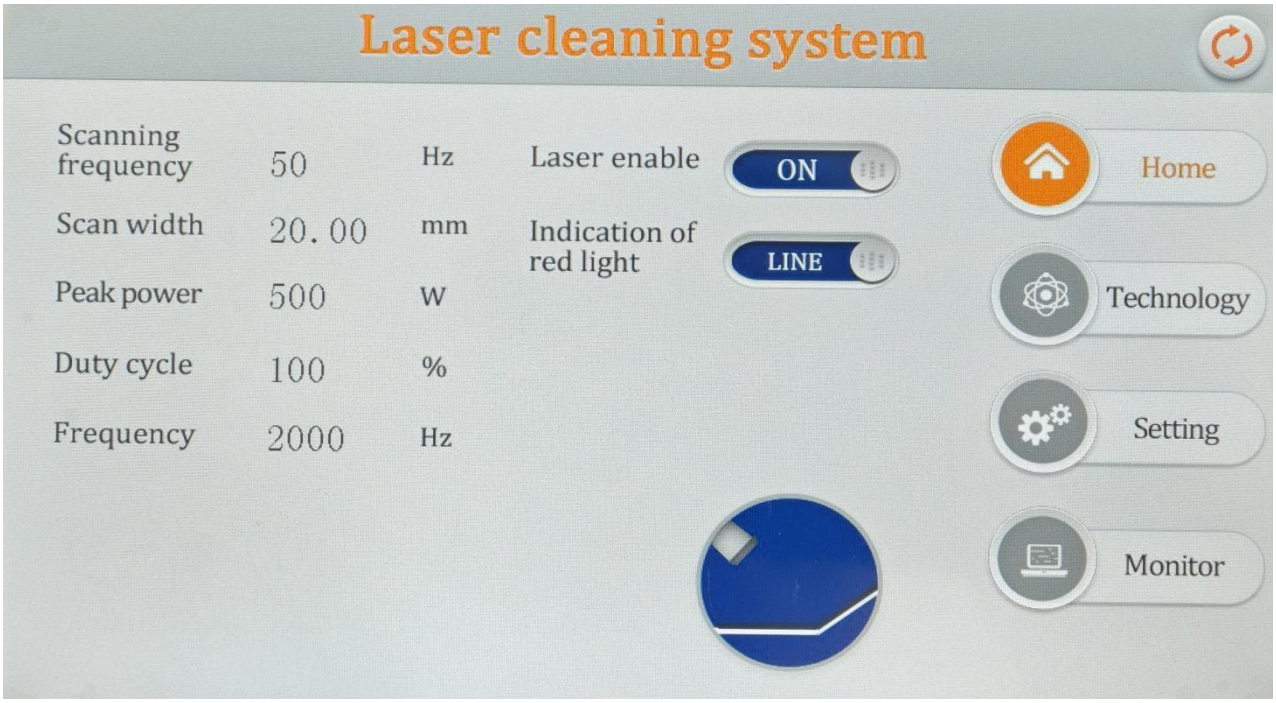
(2) Click "Continue"



(3) Restart the machine

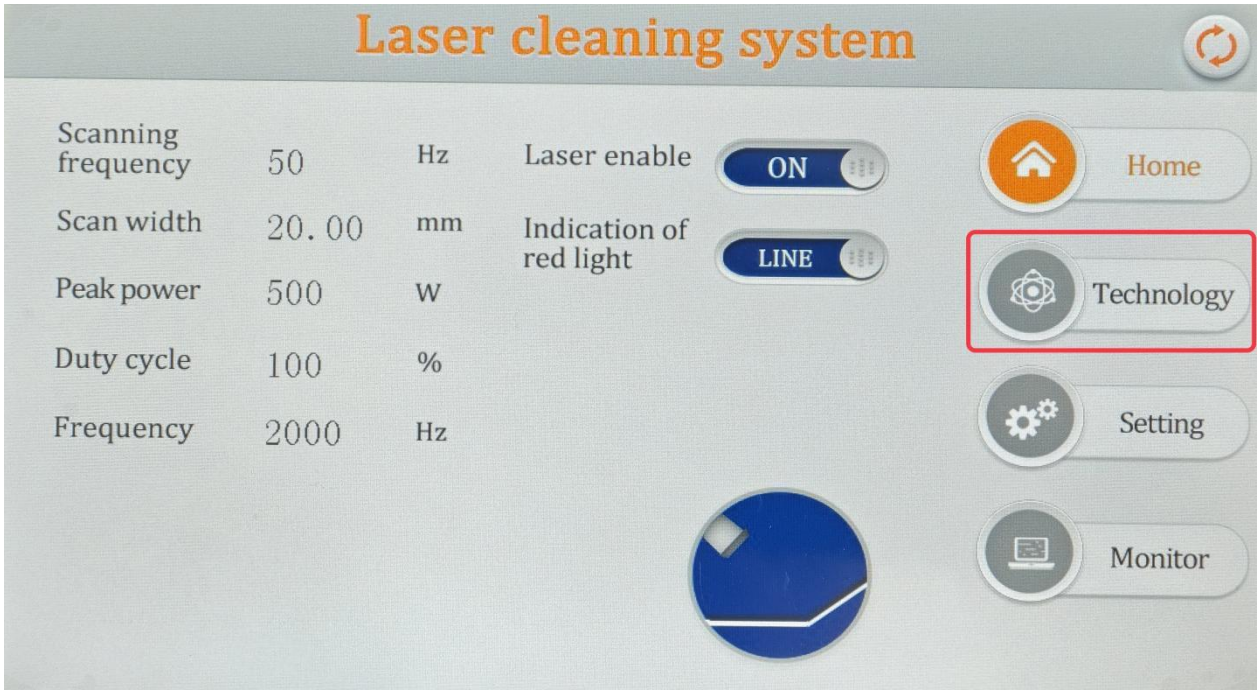


(4) Go to he cleaning mode homepage

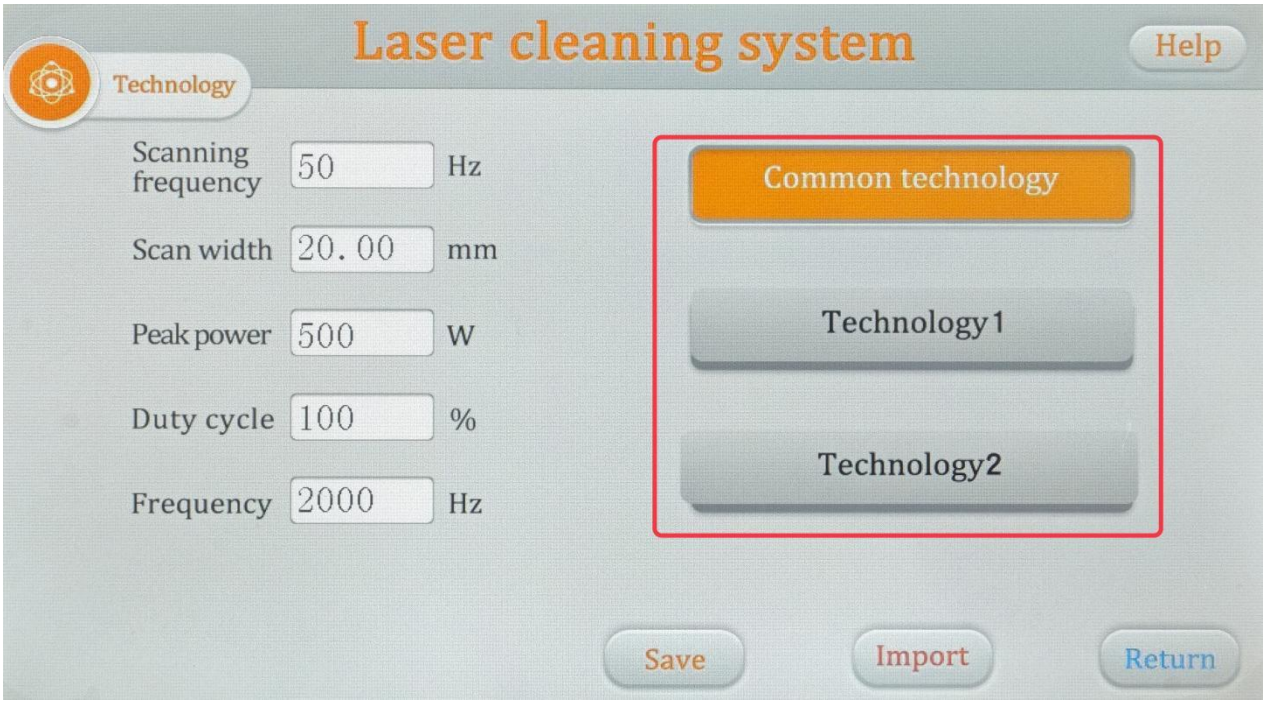


When back to welding mode, it is the same operation as above.

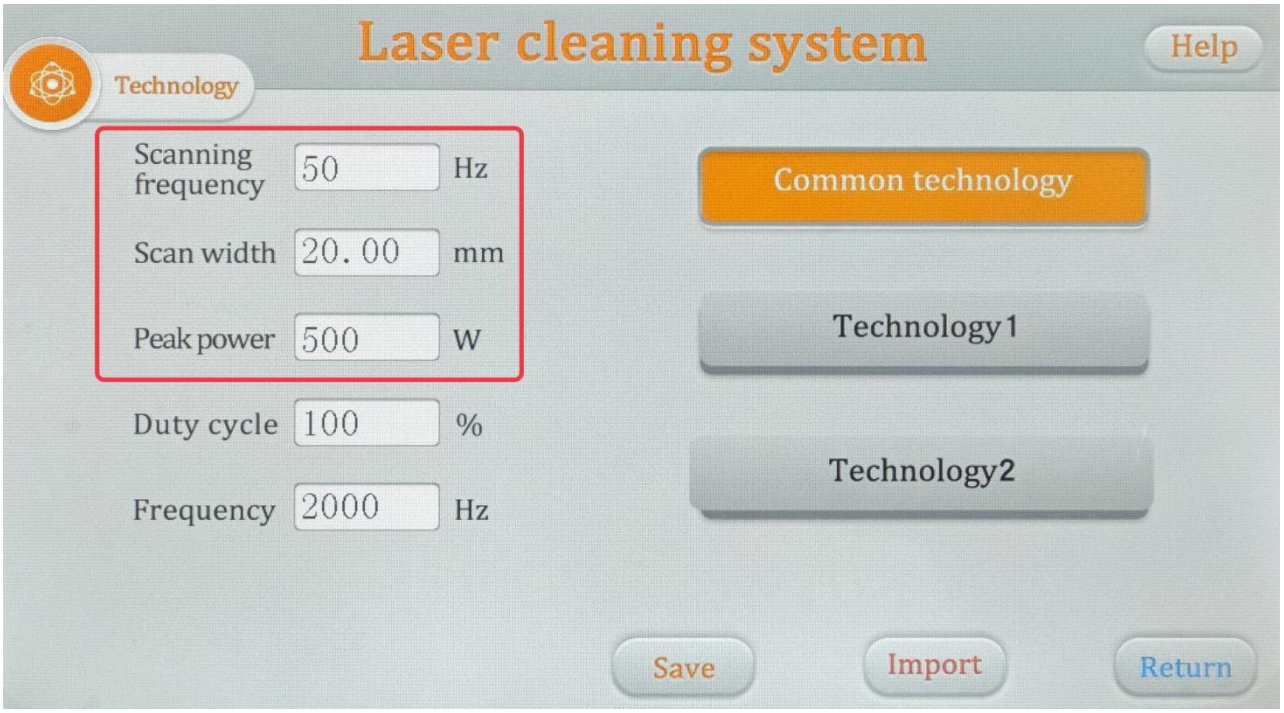
(5) Click technology



(6) Test with parameters from the database



(7) If your needs are not met, you can adjust the “Scanning frequency” “Scan width” “Peak power” as your requirement.

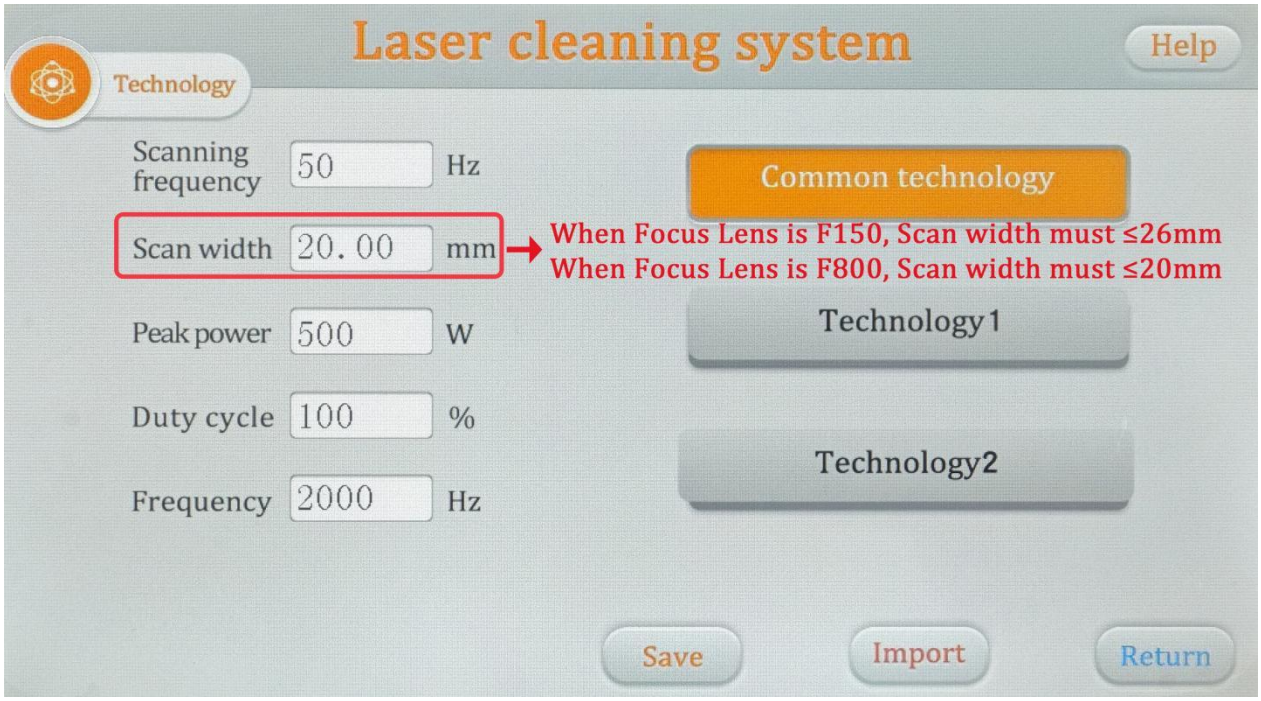


When use F150 focus lens, Scan width must ≤ 26mm.(It is important！！！)

When use F800 focus lens, Scan width must ≤ 20mm.

If the parameters are not set according to this, it will burn the welding head.

When use cleaning function, peak power no more than 1200W.



4.4.4 Start Cleaning

- Clamp the safety clip onto the welding gun.
- Double click laser switch on welding gun and keep click the button, start cleaning.
- Focus adjustment: Move the welding gun up and down, and when the laser is strongest, it is the optimal focal length.

5. Machine Maintenance and Upkeep

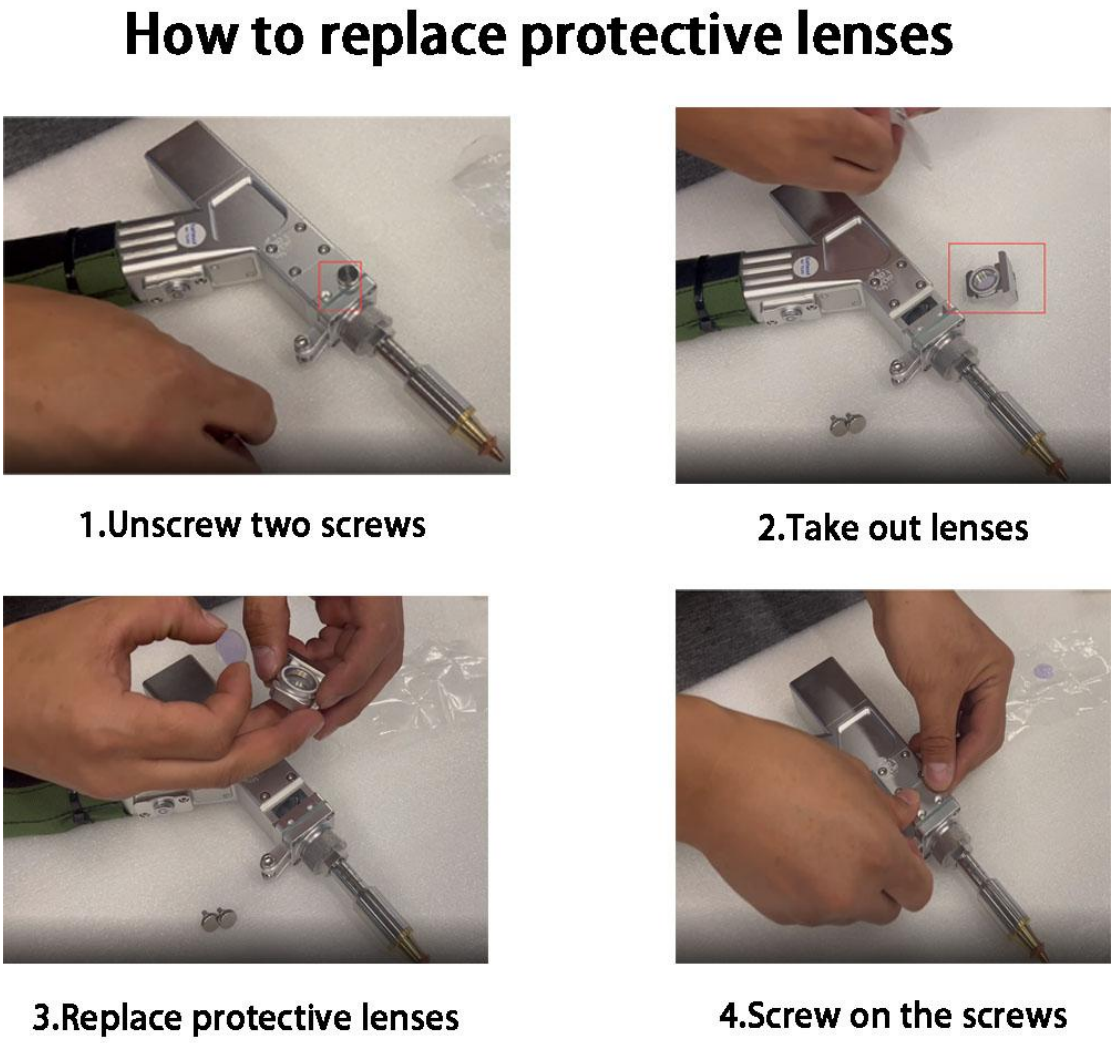
5.1 Maintenance for Protective Lens

5.1.1 When the Protective Lenses Should be Replaced?

- Check the protective lens. If there is obvious burning on the surface of the protective lens, replace it directly.
- Check the white accumulating sealing ring under the protective lens. (If there is any scratch or deformation of the accumulating seal ring, it cannot be used and must be replaced immediately.

5.1.2 How to Replace Protective Lenses:

- Before operation, please clean your hands and wipe them dry, and then wipe your hands again with cotton dipped in alcohol.
- Remove the screws of the protective lens compartment cover in a relatively dust-free place, pull out the protective lens bracket, and protect it (covered by masking paper).
- Wipe the compartment opening and the inside of the compartment cover with a cotton ball dipped in alcohol, quickly insert the protective lens holder into the protective lens compartment, and tighten the screws.



5.2 Regular Cleaning of Machine

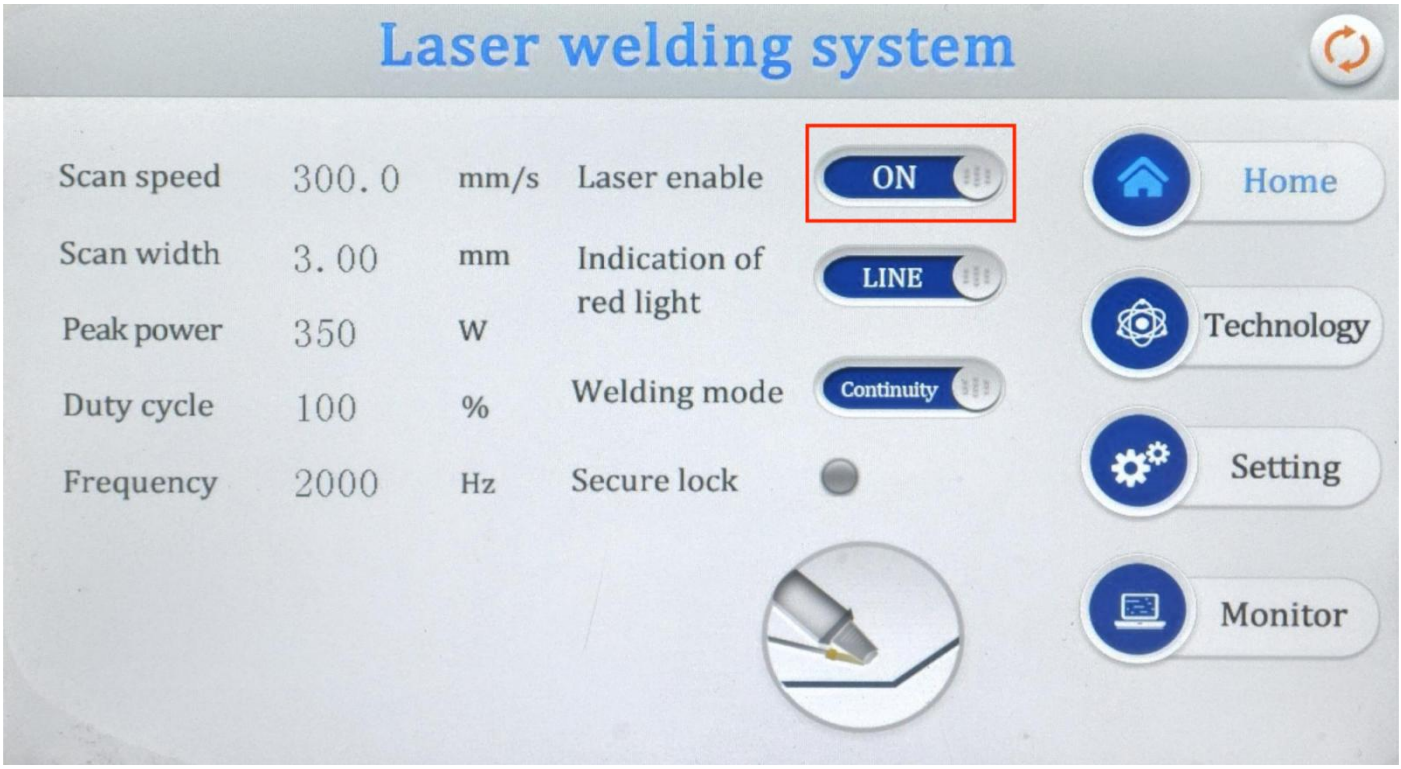
Keep the surface of the device clean to prevent dust accumulation if do not use machine for a long time.

6. Q&A

6.1 No Laser Emission

(1) Check if gas supply is connected, and set pressure reducing valve reaches 0.2Mpa.

(2) Check if Laser enable is not turned on.



(3) Check if grounding clamp properly attached(During welding, clamp to the work piece, during cleaning and cutting, clamp to the metal part of the gun.).

(4) Laser Malfunction

(Green light = normal; Red/Yellow light = fault) contact us to get the app to check the error code.

❖ How to Download APP

For **Everfoton laser source**:

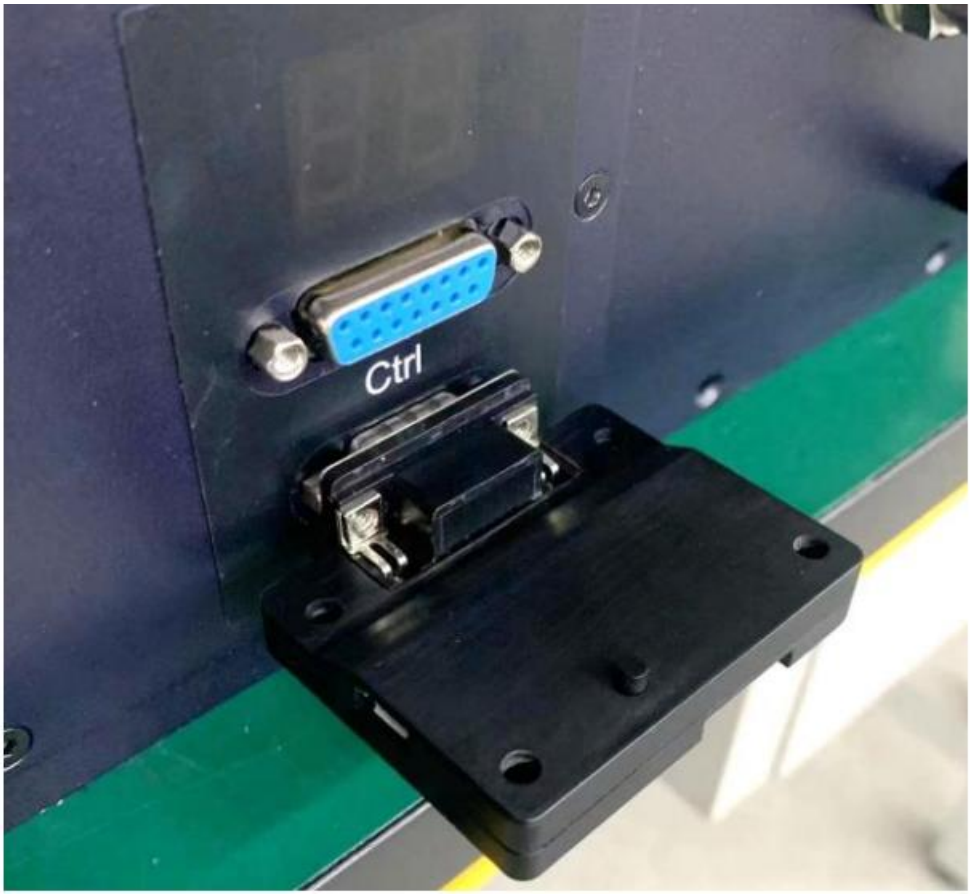
1) . Download and install the APP from following website: Click “Support”, then choose “Common tools”,you can download PC version or Mobile version(only for Android system). Or you can ask the seller to send to you directly. Download website: https://en.everfoton.com/list/24.html

2) . Hardware connection:

①Insert the Bluetooth module into the RS232 serial port of the 2U model source.

②Turn on the laser power. After about 10 seconds, the yellow light on the left side of the module flashes, indicating that the Bluetooth hardware is ready.

③At this time, you can click on the Laser Assistant App on your phone (you need to turn on the Bluetooth function of your phone)



3) . Mobile APP-Bluetooth connection steps:

①When you open the app, a blank page of Find Devices will appear. There is a Scan button on the lower right to search for laser devices equipped with BLE modules.

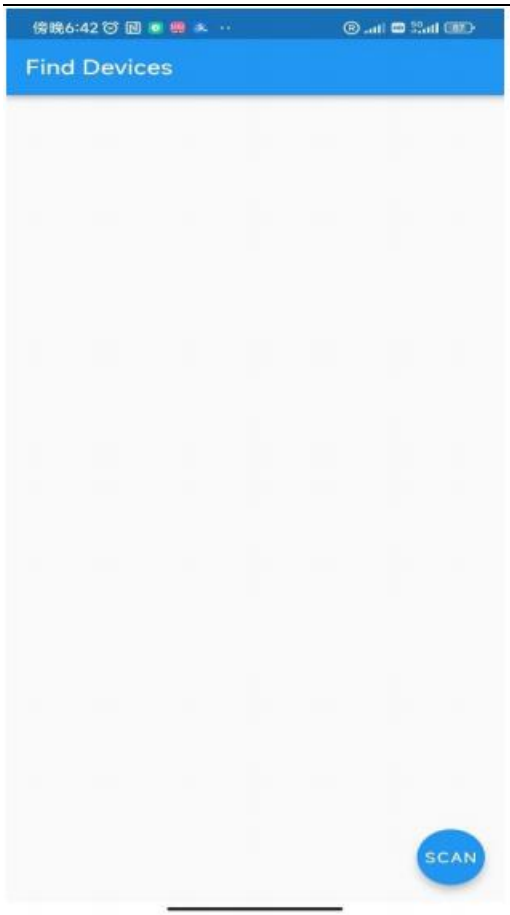
②If the phone detects a laser, it will display the device serial number.

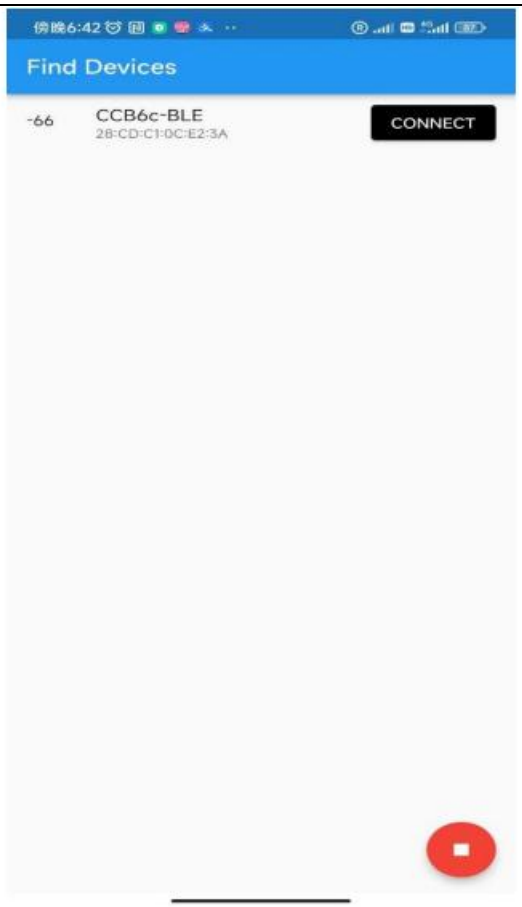
③If you can't find the serial number, please check whether the Bluetooth module is plugged in.

④Press the Scan button again to search for the laser again.

⑤There may be multiple lasers in the same area.

⑥Please click the “Connect” button of the laser you want to connect to.





4) . Status display.

①The status display page will appear after the laser is successfully connected.

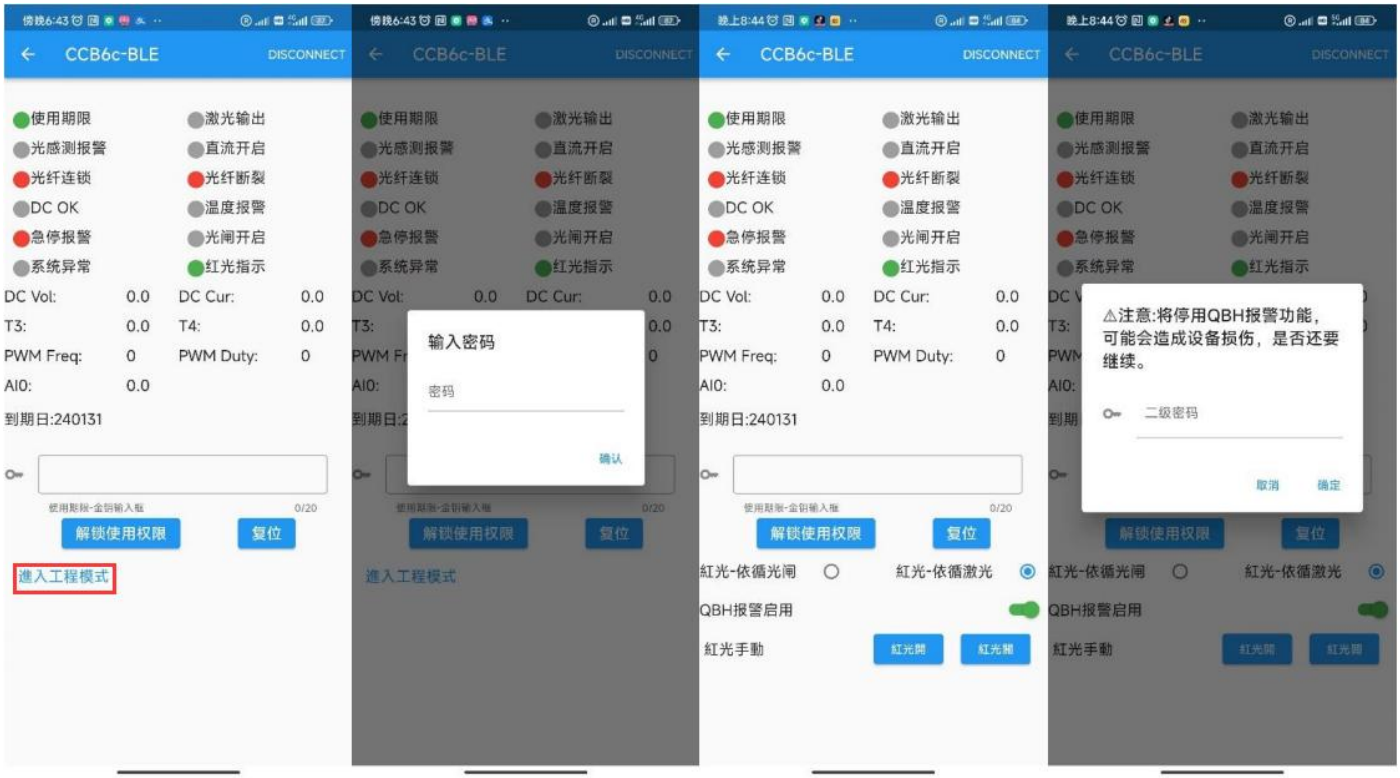
②Status update takes time (~15Sec).

③This page is what we want to see to check the laser conditions.

5) . Mobile APP-Engineering Mode:

①There is an engineering mode option at the bottom of the status display page.

②To set and unlock the red light, you need to enter the engineering password and secondary password.



For **Rlaser laser source**:

Install the Monitoring software we provided with machine (USB driver) on PC and check machine alarms:

①: Open ndp461-devpack-kb3105179-enu.exe to install the software driver environment software.

②: Copy all files in the U disk with the laser to the non-C drive of the computer.

③: Confirm that all the cables of the laser are connected normally, and the USB to 232 serial port cable has been connected to the computer and the laser. CH340SER.EXE is the driver of serial port cable.

④: Open the upper_soft Vxxx.exe application in the “XXX 上位机软件” folder. Select the serial port number and click login to enter the control interface.

View the communication port in Computer Management > Device Manager > Port

Sunflower_15.6.9.16287_x64.exe is the remote control terminal. If you need our company's remote support, you need to install this software and connect to the network, and provide the identification number and verification code of the computer connected to the laser.

After selecting the appropriate serial port on the login interface, click Login prompt: If shows {Serial port opening

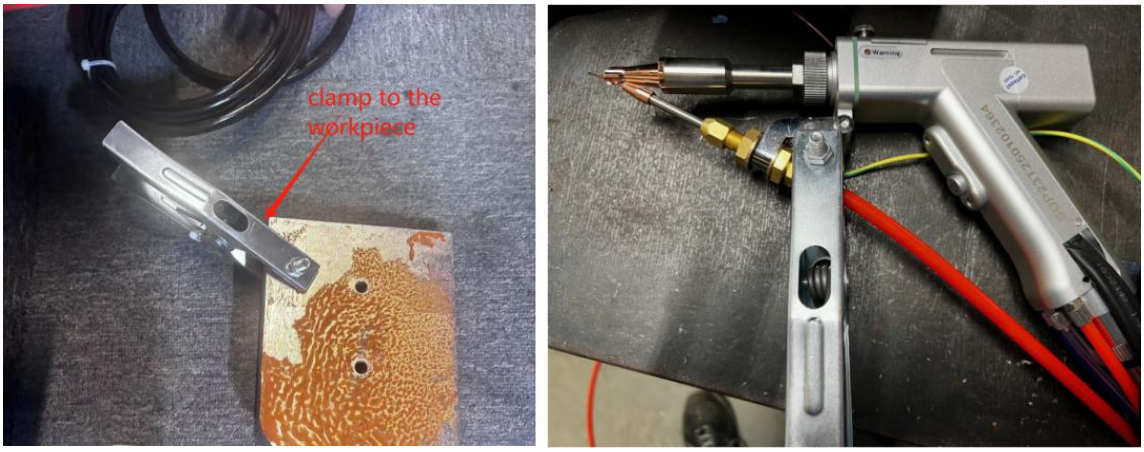
error, please check the connection! }, view the communication port from Computer Management > Device Manager > Ports, right-click and select Update Driver, then select Browse my computer for a driver, select from a list of available drivers on my computer, select Version: 3.5.2019.1[2019-01-30] and click Next, then log in to the host computer software again.

名称	压缩前	压缩后	类型	修改日期
.. (上级目录)			文件夹	
锐莱伯单模风冷机型上位机软件V2.05			文件夹	2025-06-27 10:15
360zip_setup_4.0.0.1200.exe	11.3 MB	11.0 MB	应用程序	2019-10-22 14:38
CH340SER.EXE	276.8 KB	229.3 KB	应用程序	2019-07-01 08:59
ndp461-devpack-kb3105179-enu.exe	88.2 MB	88.1 MB	应用程序	2023-03-23 11:48
软件安装注意事项.txt	1 KB	1 KB	文本文档	2020-05-02 16:57
向日葵远程控制_13.0.0.48688.exe	32.3 MB	31.6 MB	应用程序	2022-11-21 08:14

6.2 The Welding Machine Can Not Continuously Welding

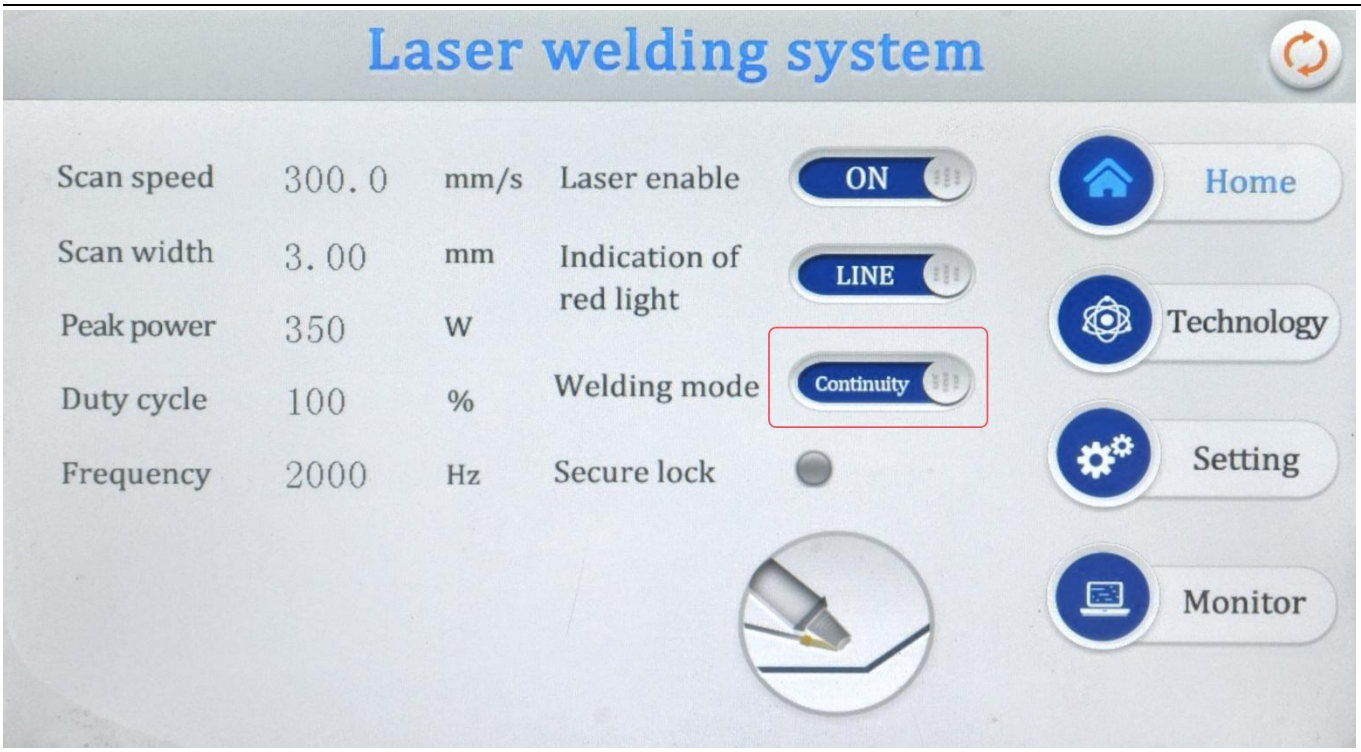
(1) The welding material does not conduct electricity well:

Solution: Clamp the safety clip to the metal position of the gun head to test whether the light can be emitted normally



(2) See if the system set to “spot welding” mode.

Solution: Change the welding mode to :Continuity



6.3 The Welding Is Not Firm or With Ugly Result.

(1) Check whether the gas is connected.

(2) Check whether the parameter settings are incorrect. If the welding is weak, then increase the power or slow down the speed.

(3) Check whether the welding material is selected correctly, such as welding object is steel 304, then choose the steel 304 welding wire.

(4) Check whether the focal length is incorrect.

(5) Check whether the protective lens is damaged.

You can also contact the corresponding after-sales service personnel directly for related questions.

7. After-sales Statement

Warranty period: The machine with a warranty of 12 months from the date of purchasement.

Technical support: We provide free technical support whole lifetime. Any questions please contact the corresponding after-sales service department.

Repair service: Free repair during the warranty period, and appropriate fees will be charged out of the warranty.

Warranty range: We provide warranty services for products with defects caused by materials or production processes during the warranty period, and guarantee that the products meet the relevant quality and specification requirements mentioned in the document under normal use.

We provide repair or replacement services for the machines that fail due to materials or production processes during the warranty period. After repair or replacement , the machine still hold the remaining warranty period.

We do not provide warranty for following situations:

(1) Any tampering, opening, disassembly or modification on machines by personnel without the permission of our company;

(2) Damages caused by improper use, negligence or accident;

(3) Operation beyond the scope of machine specifications and technical requirements;

(4) Indirect damage to the laser source due to failure of user’s software or interface;

(5) Use due to improper installation, maintenance or other abnormal operating conditions not included in this manual;

(6) Consumables are not covered by the warranty.

Customers are responsible for understanding the above information and operating in accordance with the user manual, otherwise the failure caused will not be covered by the warranty.

Important:

◎ Within warranty, customers must provide feedback within 30 days of discovering the fault.

◎ Shenzhen Scotle Technology Group Ltd. does not grant any third party or individual the right to repair or replace our products.

◎ To protect your rights, please be sure to contact the relevant after-sales department of our company as soon as possible after discovering the fault and apply for product repair or replacement service. If you need to return the product, please pack it in matching packages after authorization by our company and then return it to the place designated by our company.

◎ When any damage is found after receiving the product, you must keep the proof document so that we can claim rights from the transporter.

◎ Please do not send any product back to our company or any warehouse address without communication and confirmation.

◎ If the product is not within the warranty period or warranty scope, users need to pay the product repair costs.