

1500W/2000W/3000W 4-in-1 Handheld Laser Welder Manual



Shenzhen Scotle Technology Group Limited

No.14, 2F, Building Y1, Bantian Street Creative Park, Longgang District, Shenzhen,
Guangdong, 518129 China

www.scotle.com

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1. Machine display

1.1 Overall display

Product Details



1.2 Safety specification

1.3.1 Safety Instructions for Optical Operation

We strongly recommend that you read the following procedures before operating the fiber laser:

Never look directly into the optical output when Electrical switch is on.

Make sure that a pair of appropriate and approved laser safety protective glasses is worn all the time while the laser is operating.

No eyes are on the path of the laser beam (direct or reflected light, scatter light from high reflective material, etc.), at the same time, the direction of laser output must be Shelter by reliable objects.

Caution: Failure TO USE control or adjustment DEVICES or perform STEPS as described herein may result in HARMFUL radiation exposure

1.3.2 Safety Instructions for Electrical Operation

We strongly recommend that you read the following procedures before operating the fiber laser:

Make sure the power source connected to the equipment is properly grounded with PE wire. At the same time the shell of this equipment must be properly grounded. Any interruption of the ground loop may result in personal injury.

Make sure that the input AC voltage and capacity meet the requirements of the very series of lasers.

If the air switch shut down frequently, please contact as soon manufacturer

1.3.3 Other Safety Instructions

(1) There are often numerous secondary laser beams produced at various angles in the output port of the laser. These divergent beams are produced when the primary beam of laser reflects off a smooth surface, and they are called secular reflections. Although these secondary beams may be less powerful than the total power emitted from the primary beam, the intensity may be great enough to cause damage to the eyes and skin as well as surface of materials.

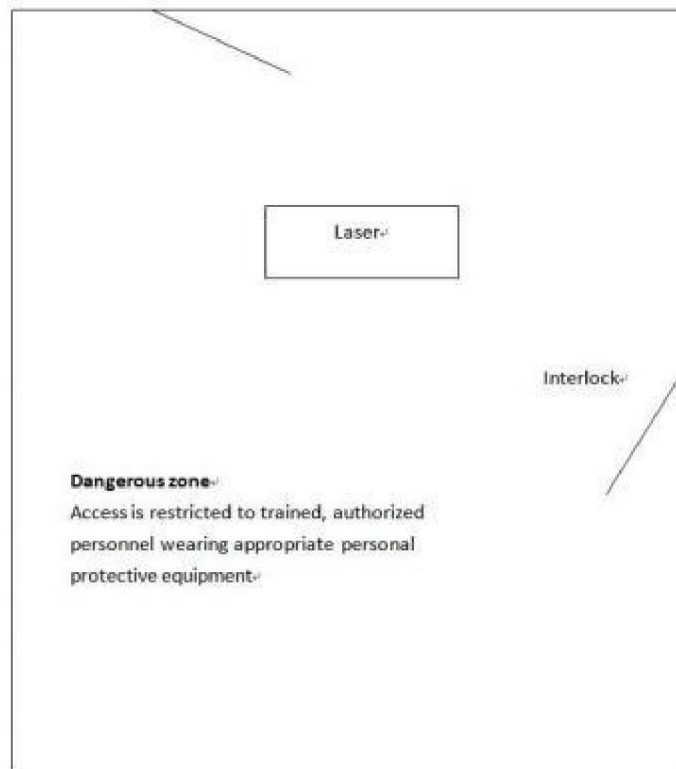
(2) Optical accessories relevant to the laser, such as light-sensitive elements that may be damaged from exposure to the laser light, video cameras, photo multipliers and photo diodes, need related protections.

(3) Please do not operate laser in darkened environments.

(4) Do not turn on the laser without an optical coupling fiber or the optical output connector.

1.3 Protective housing and interlocking system

1. The 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.
5. Use 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.



1.4 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

1.5 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:

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

E-CrossStu GmbH
Felix-Dahn-Str 4
Stuttgart 70597



E-CrossStu@web.de +49 71191222069



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


2. Main configuration introduction

2.1 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.




2.1.1 Safety Conventions used in the User Guide:



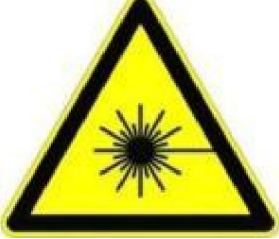



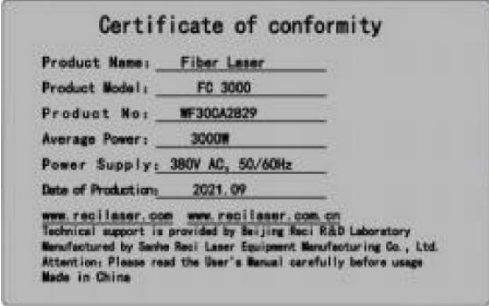

SYMBOLS	DESCRIPTION
	<p>WARNING :</p> <p><i>Refers to a potential hazard that may lead to a personal injury or death.</i></p>
	<p>CAUTION :</p> <p><i>Refers to a potential hazard on product, or a potential physical injury on personnel</i></p>
<p>NO SYMBOL</p>	<p>IMPORTANT :</p> <p><i>Refers to any information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

2.1.2 Laser Classification

This series of lasers emit invisible laser radiation around a wavelength of $1080 \pm 3\text{nm}$. 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.

	<p>WARNING :</p> <p><i>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.</i></p>
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2.1.3 Labels on the Product

 <p>MAX. AVERAGE OUTPUT POWER: 1mW WAVELENGTH RANGE: 600-700nm VISIBLE LASER RADIATION DO NOT STARE INTO THE BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2 LASER PRODUCT</p>	 <p>MAX. AVERAGE OUTPUT POWER: 3000 W WAVELENGTH RANGE: 900-1200 nm INVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT</p>
<p>1: Class 2M Laser Product Label for Guide Laser</p>	<p>2: Class 4 Laser Product (take 3000W as example)</p>
	
<p>3: Laser Radiation Hazard Label</p>	<p>4: Electrical Hazard</p>
	 <p>环境温度低于 0°C 运行时 须加防冻液; 不运行时须 排干水, 否则会损坏设备! When the ambient temperature is lower than 0°C, antifreeze shall be added; when not running, the water must be drained, otherwise the equipment will be damaged!</p>
<p>5: Must be grounded</p>	<p>6: Frost Hazard</p>
 <p>Certificate of conformity</p> <p>Product Name: Fiber Laser Product Model: FC 3000 Product No: WF300A2829 Average Power: 3000W Power Supply: 380V AC, 50/60Hz Date of Production: 2021.09</p> <p>www.reclaser.com www.reclaser.com.cn Technical support is provided by Beijing Recl R&D Laboratory Manufactured by Sanhe Recl Laser Equipment Manufacturing Co., Ltd. Attention: Please read the User's Manual carefully before usage Made in China</p>	
<p>7: Identification Plate of the device</p>	<p>8: Mark of CE Certification</p>

Note:

(1) Never use the tap water or other cooling water with high ion concentration.

- (2) The cooling water shall be replaced timely to prevent microorganism and ions growth.
- (3) It is very easy to be damaged when the QBH getting scaling, and there is no warranty in this case.
- (4) 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.
- (5) Never installing the laser output with the processing system when the equipment is power on.
- (6) The protective glasses should be worn all the time.

**CAUTION:**

(1) Never make this product work in high humidity (> 95%), though the product have 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(°C)	Ambient Dew Point (Td-°C)								
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	<p><i>IMPORTANT :</i></p> <p><i>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.</i></p>
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2.2 Handheld gun introduction

2.2.1 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.
Wi-remote module	Quickly adjust some using parameters

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/ Nozzle pipe	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 nozzle length

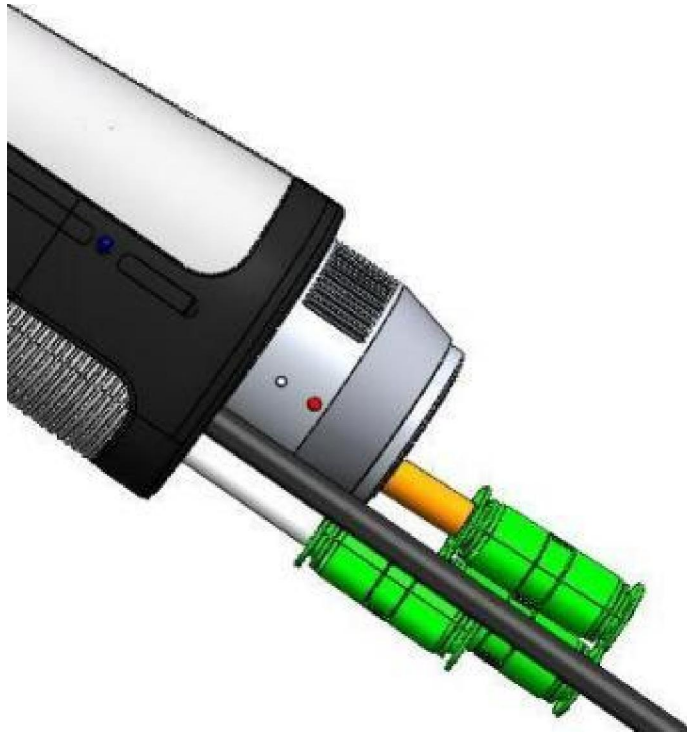
2.2.2 Configuration parameter

Parameter name	Technical index
Maximum applicable laser power	3000W
Optical fiber interface type	QBH
Focus lens specification(welding)	Dia=20mm,F= 15mm
Maximum clear aperture diameter	16mm
Laser wavelength	1064nm
Maximum external size of welding head (width)	42mm
Nozzle size	Outer diameter 12mm tolerance-0.02mm to -0.04mm.length 80mm
Welding gas	Nitrogen. Argon. Helium
Purity	99.99%

2.2.3 Optical fiber interface

HW980 is suitable for most industrial laser generators. It is equipped with a collimator lens assembly.

The connection between the end of the optical fiber and the welding head is called the optical fiber connector. HW980 comes standard with QBH optical fiber connector.

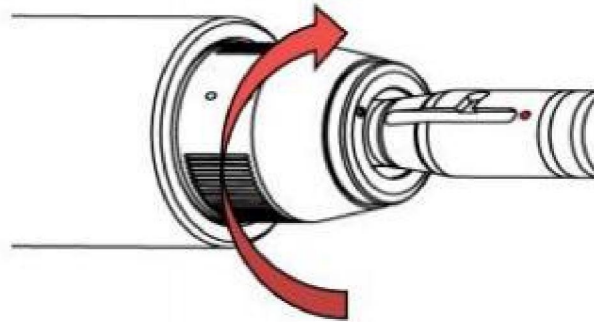


HW980 optical fiber input interface - QBH

Note: The optics must be kept clean, and all dust must be removed before use. If the welding head is to insert the optical fiber vertically, the welding head must be rotated 90 degrees to a horizontal position, and then insert the optical fiber to prevent dust from entering the interface and falling on the surface of the lens. Fix the laser head after inserting the optical fiber

2.2.4 Fiber insertion and locking

First, align the red dots on the end face of the QBH interface with the red dots of the rotating handwheel; then, remove the QBH dust cap, align the red mark of the fiber output end with the QBH red mark, and insert it straight to the bottom; next, rotate the QBH hand wheel clockwise to reach the right position when hearing the "click" sound, then pull the handwheel upwards and turn it clockwise again to the end.

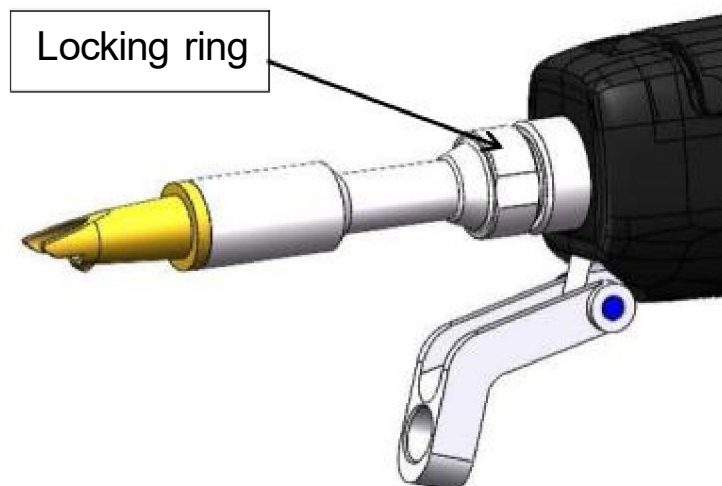


HW980 QBH fiber optic connector insertion and locking diagram

2.2.5 Beam focusing

1.Adjust the focus position:

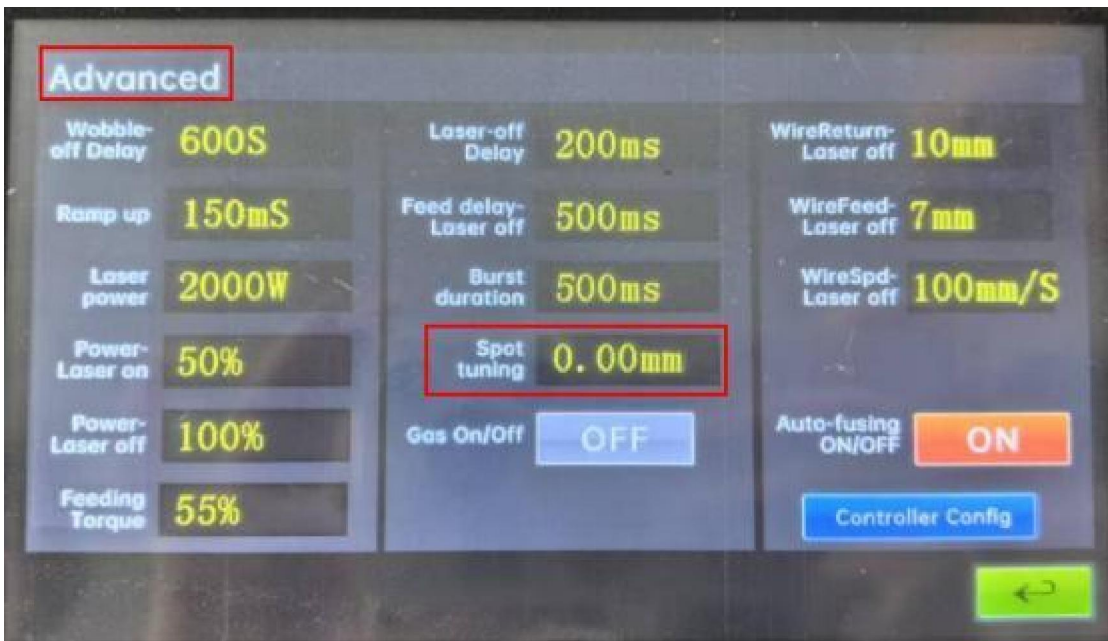
The welding head can adjust the focus position. The adjustment method is to rotate the locking ring counterclockwise. After loosening, adjust the length of the copper nozzle to obtain the required spot energy. After adjusting the position, tighten the locking ring to lock the copper nozzle in the position just adjusted. There is a scale on the copper nozzle, which is convenient and quick to adjust



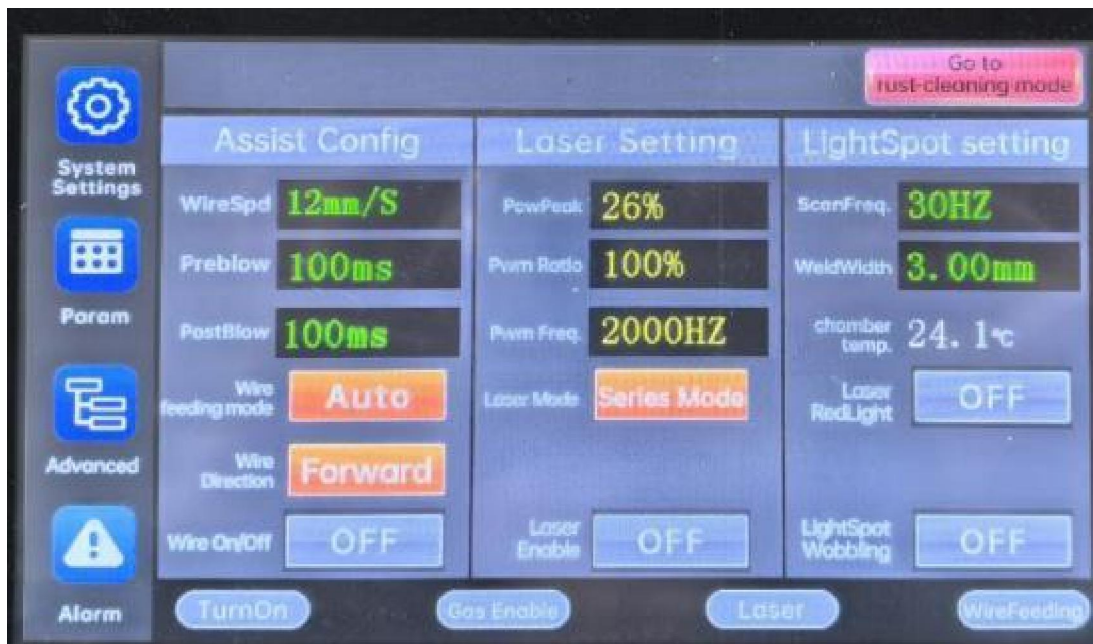
2. Spot centering adjustment:

Adjust the light spot to the horizontal center position of the nozzle.

Adjustment method: power on the HWS980 galvanometer handheld welding system and then set the "Width" to 0mm on touch screen → click "advanced parameters" → enter the password "2000" → click "ENTER" → set the "optical core offset" parameter. When the "optical core offset" parameter is set to be small, the optical core is shifted to the right; when the "optical core offset" parameter is set to be large, the optical core is shifted to the left; set appropriate parameters so that the optical core is in the center

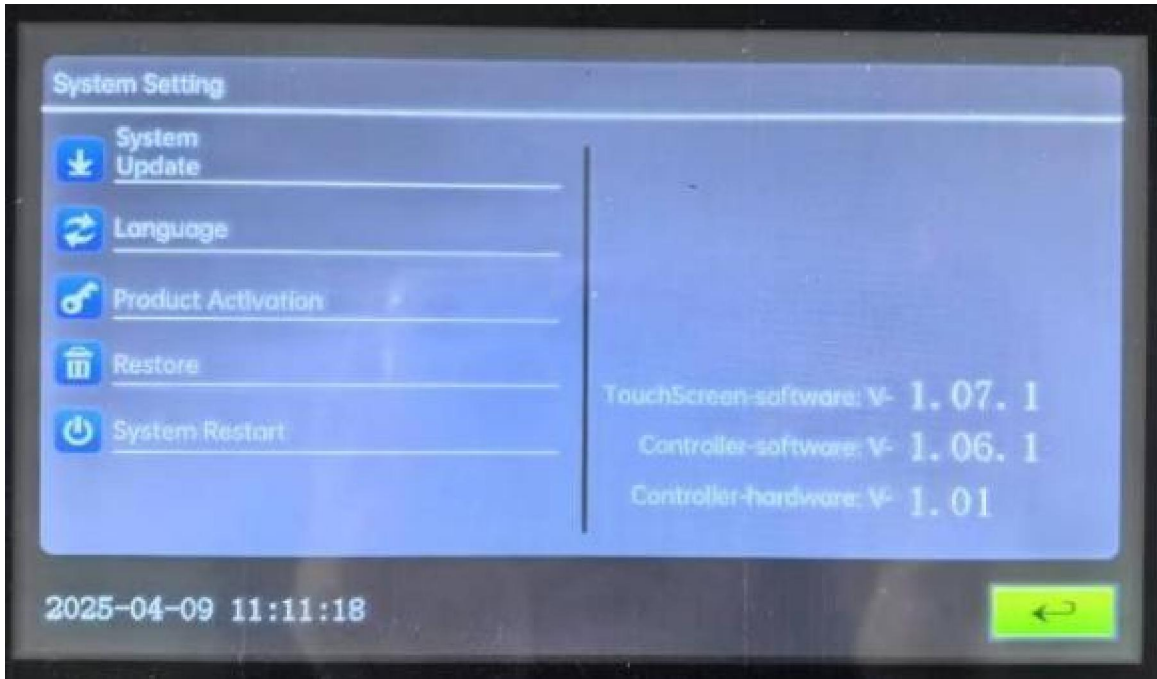


2.3 Screen control system introduction



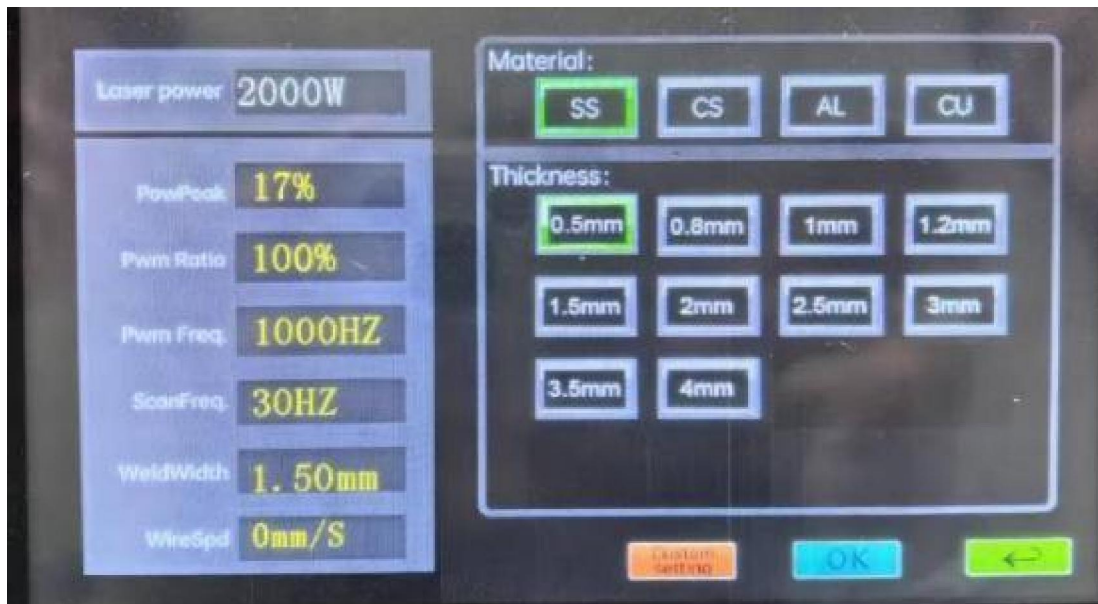
Scan Freq	The larger the parameter setting, the faster the spot swing frequency.
Weld Width	The larger the parameter setting, the greater the swing amplitude of the spot.
Light Spot Wobbling	the light spot swings according to the " Wobble Freq" and "Wobble Width". Turn off the "Light Spot Wobbling" and the spot stops swinging.
Laser enable	turn on/off the laser enable, only the laser enable is turned on can light be emitted.
Laser Mode	“Series Mode”, “Spot Mode” can be selected.

2.3.1 System setting:



System update	Please refer to the program update part for details
Language	This system supports multiple-language. After clicking Language Switch, click the required language, and the language will be displayed on all system interfaces
Product Activation	This is to set up for the manufacturer , buyer do not need to use this key
Restore	The device is restored to the factory state
System restart	Restart the device
Version Information	Display the current system's touch screen version, controller software version, and controller hardware version.

2.3.2 Param page:



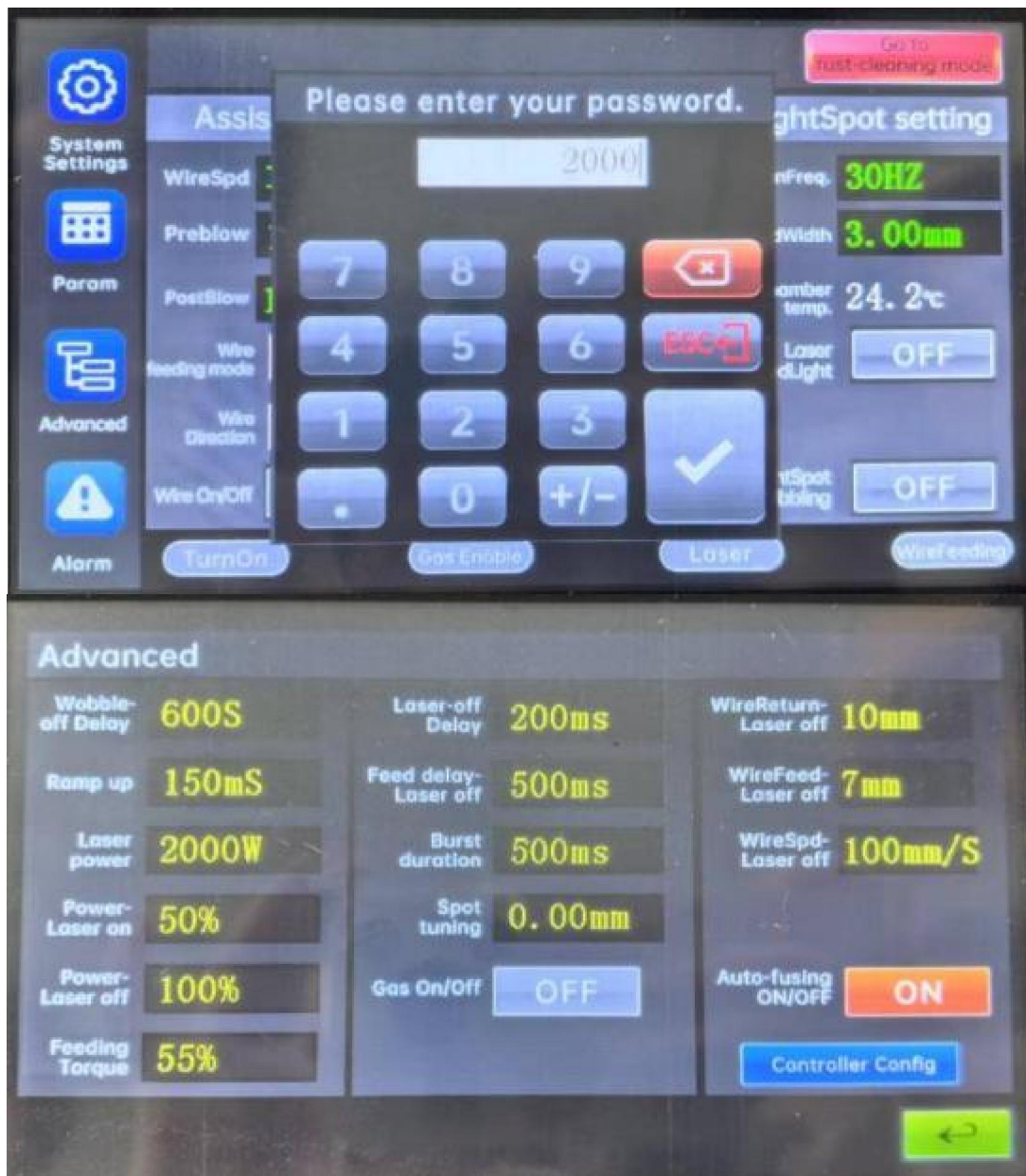
Click the "Custom setting" button under the common process interface to enter the process selection interface.

The customized process interface can store 9 groups of parameter setting. After selecting a certain group of processes, click "Apply" to directly export the process parameters of this group to the welding work interface. Click "Import" to store the parameters of the welding interface

Into this group of processes. The process parameters in the process interface can be permanently saved even in the power failure situation. Users can input the process name to identify different process parameters.

2.3.3 Advanced page:

Enter Advanced page and the password is : 2000



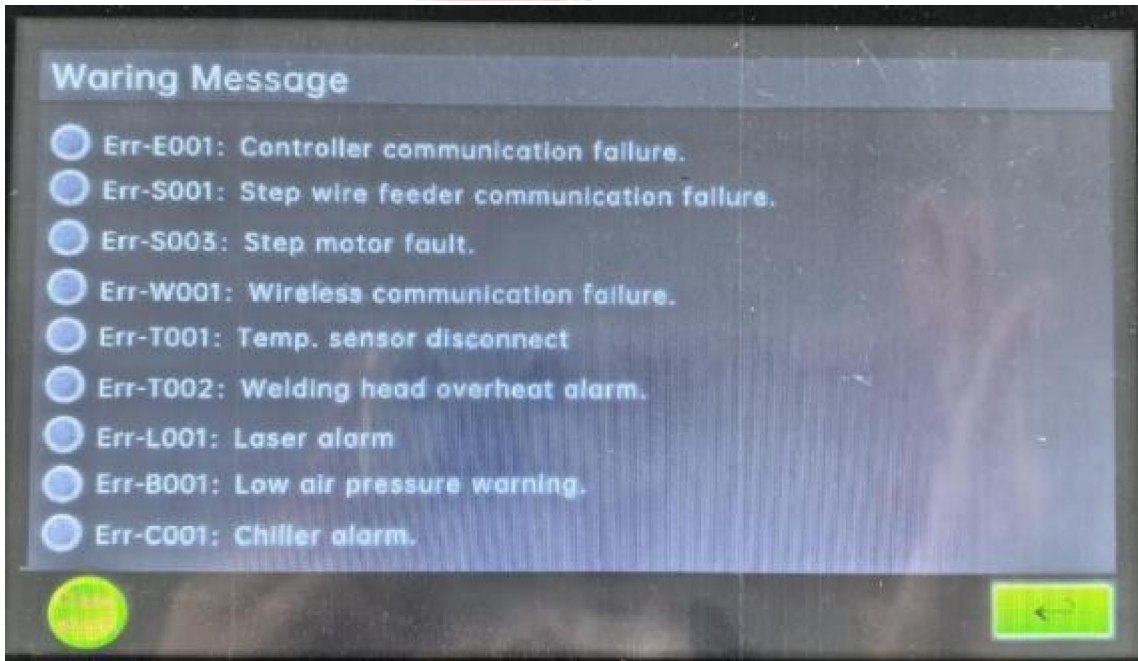
Wobble-off delay	When the laser enable is turned on, after stopping the light, the motor stops rotating after this period of delay. The maximum stop delay is 999s.
Ramp up	Set the power ramp-up delay (the time required for the output power to rise from the starting power to the peak power);
Spot tuning	Adjust the lateral offset of the optical core

2.3.4 Alarm Page:

If the alarm is not cleared, the indicator light will flash. The red indicator light will only disappear after all alarms are cleared (currently no alarms), as shown in the following figure:



Alarm not cleared

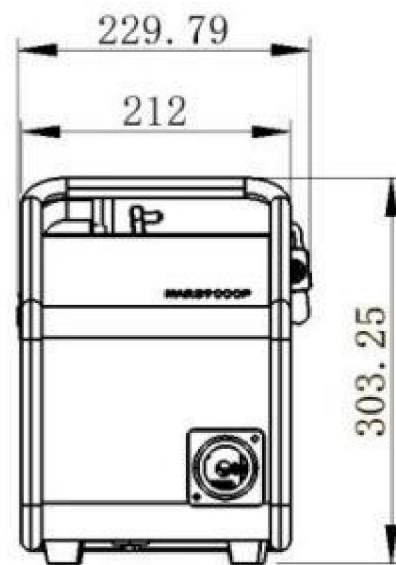
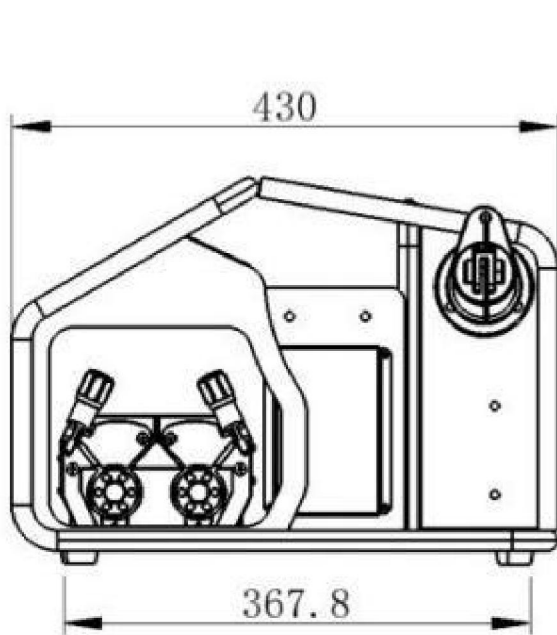


Solutions to the warning:

Once the equipment is alarmed, the user must stop using the handheld laser welding equipment immediately and troubleshoot the fault. Use it only after the fault is solved. Users can refer to the alarm information in the alarm window to troubleshoot faults. The alarm information and solutions are shown in the following table:

NO.	Warning message	Solution	Remark
1.	AlarmErr-E001: The controller is not connected!	Check whether the RS485 communication line between the touch screen and the controller is properly connected, and check whether the controller is normally powered on and started.	
2.	Alarm Err-B001: The air pressure is too low!	Check whether the air pressure is normal.	
3.	Alarm Err-L001: Laser failure!	Check whether the laser is working properly.	
4.	Alarm Err-W001 : Welding head communication failure!	Check whether the connection between the welding head and the controller is correct and the welding head screen has a picture.	
5.	Alarm Err-S001: Wire feeder communication failure!	Check the communication line between the controller and the stepping wire feeder, and plug the communication interface again after power off.	This alarm is only for the optional stepping wire feeder.
6.	AlertErr-S002: Stepping wire feeder driver alarm	Check the line connection between the motor and the drive, check whether the power supply voltage is at 24V.	This alarm is only for the optional stepping wire feeder.
7.	Alarm Err-S003: Motor shaft lock failure!	After the power is off, check the line connection between the motor interface of the stepping wire feeder and the motor driver, and re-plug and unplug the motor terminal of the driver.	This alarm is only for the optional stepping wire feeder.
8.	Alarm Err-C001: Chiller alarm!	Check whether the water cooler works normally	
9.	Alarm Err-All: There are many faults at present, please check detailed fault information!	There are many current faults, please troubleshoot them one by one.	
10.	There is no alarm when the equipment is running normally!	The current device is operating normally.	

2.4 Wire feeder introduction



2.4.1 Technical Parameters :

Machine model: Laser welding automatic wire feeder

Supply voltage: DC 24V

Power: 72W

Wire feeding speed range: 1mm/S-55mm/S (adjustable) (the upper limit can be increased as needed)

Motor type: DC24V stepper motor, reduction ratio 8

Speed regulation method: digital open loop speed control

Applicable welding wire diameter: 0.8mm, 1.0mm, 1.2mm, 1.6mm,2.0mm

Dimensions: length 520*width 245*height 420

Weight: 13KG

2.4.2 Wire feeder and welding machine connection installation

Steps for using with the welding machine :

- Connect the wire guide tube to the wire guide tube interface of the laser welding automatic wire feeder. Tighten the wire outlet screw of the wire feeder and fix the wire inlet of the wire guide tube.
- Correctly connect the gun switch signal line input to the wire feeder
- Correctly fix the wire guide tube on the laser welding gun and install the straight wire guide Tube

2.4.3 Installation of welding wire

- Connect the laser welding automatic wire feeder to the 24V switching power supply.
- Put the welding wire reel on the inner reel shaft of the wire filling machine.
- Select the groove diameter of the wire feed wheel, loosen the pressure regulator of the wire feeder, pass the welding wire through the wire guide nozzle, and align it with the groove of the wire feed wheel, and tighten the pressure regulator.
- Press the spot wire feed switch on the panel/press the welding gun switch to send the welding wire out of the wire guide tube interface of the wire filling machine, insert it into the inlet end of the wire feed tube, and tighten the nut at the inlet end of the wire feed tube to the wire feeder.
- Disassemble the wire filling nozzle on the wire feeding tube.
- Press the spot wire feed switch on the panel/press the welding gun switch to send the welding wire out from the outlet of the wire filling gun.
- Pass the welding wire through the wire filling nozzle, and reinstall the wire filling nozzle onto the wire filling gun barrel.
- Fix the wire filling gun on the welding gun by connecting the fixed bracket, and adjust the wire feeding angle so that the welding wire is aligned with the position of the molten pool.

3. Laser installation guide

3.1 Remove the wood box :

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 $>175\text{mm}$.
- (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 paper box

3.1.1 Package list :

Packing list

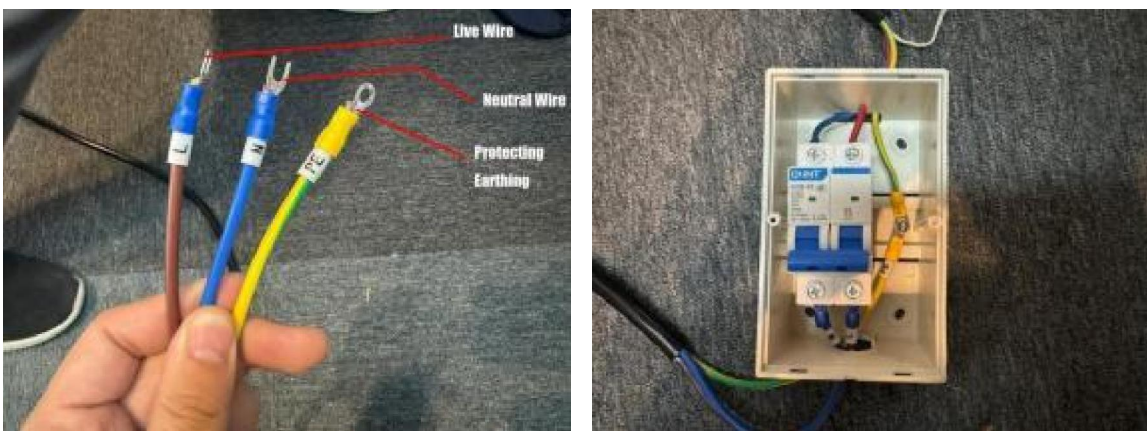
 <p>Machine case</p>	 <p>6 Pcs Welding Nozzle</p>	 <p>4 in 1 Laser Welding Gun</p>	 <p>LED smart display</p>
 <p>1X Wire Feeder Machine</p>	 <p>1 X Protective Mask</p>	 <p>1 x Protective glasses</p>	 <p>ER304 Steel Welding Wire</p>
 <p>Raycus Laser Source</p>	 <p>A pair of gloves</p>	 <p>5 Pcs Protective lenses</p>	 <p>HW980 GUN Cleaning Kit</p>
	 <p>4 Pcs Wire Nozzle</p>	 <p>Safe Clip</p>	 <p>U disk(machine manual)</p>
		 <p>Wrench</p>	

3.2 Preparation work before startup

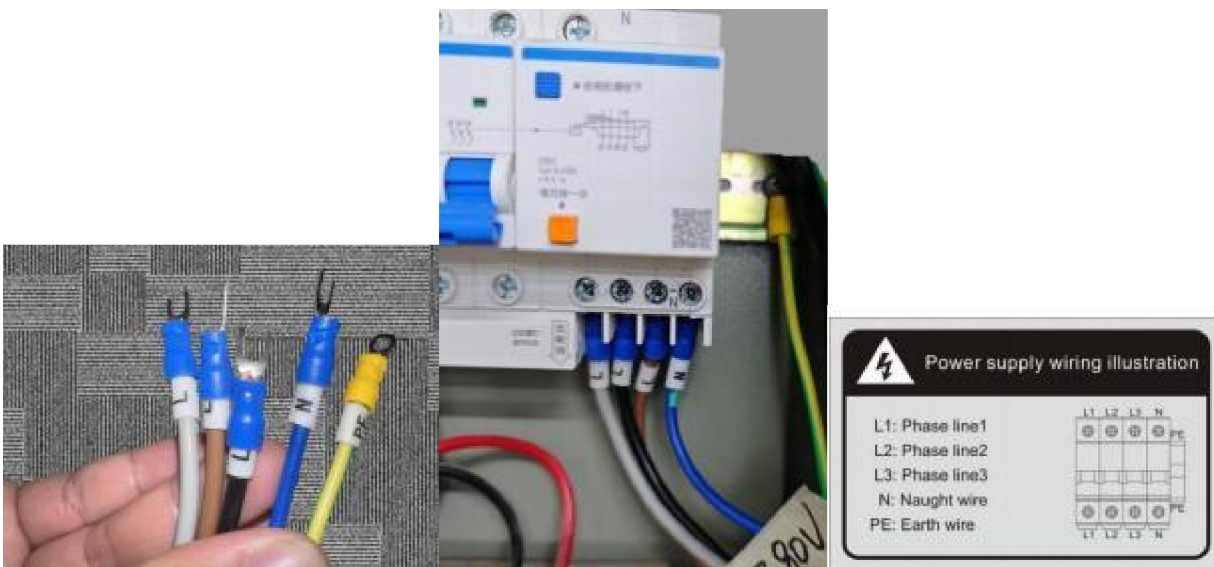
3.2.1 wire connection:

- **Power cable:** machine is 220V 50Hz Connect the power cord to the electrical box. If you need to run it at 110V , please prepare a transformer.

Connect the power cord to the specified voltage and phase, L=220VAC, N=0VAC, PE=ground. Ensure proper wiring (**For 1500W/2000W Laser**)



Note: if your machine is 3000W 380V Laser, power cable please follow this step: Connect the power cord to the electrical box(Voltage needs to be 380V)



- **Gas connection:** The welding joint is cooled using inert gas, ensuring gas purity and pressure. Generally, nitrogen and argon are used as protective gases, with a purity of 99.99%. **Welding gas pressure: 0.2-0.3Mpa , 15L/min.**



- **Safe clip :** Before turning on the laser, the safety clip must be clamped in the correct position to ensure that it forms a circuit with the welding head.
In welding mode, the safety clip is clamped on the welded work piece, and in cleaning and cutting mode, the safety clip is clamped on the welding gun.

- **Wire feeder connection:**

Select the appropriate wire feeding wheel based on the diameter of the welding wire 1.
Release the two adjustable pretension pressure rods

2. Unscrew the nut of the wire feeding wheel and remove it (wire feeding wheel models include V_0.8, V-1.0, V-1.2, V-1.6 **our welding wire Dia is 1.2mm, so use the V-1.2**)

3. Replace the appropriate wire feeding wheel, turn the side of the wire feeding groove corresponding to the specification and model inward, and then tighten the nut.





Put down the pressure rod



Wire feeding wheel V-shaped v1.2

● **Add water :**

- ① Fill the water tank with pure water until the water level gauge reaches the two-thirds location.
- ② **Water chiller temperature can not be lower than 20 °C , if lower than 20 °C , wait for the machine to warm up to reach more than 20 °C before operation.**
- ③ If the local temperature is below 0 degrees, please pay attention to adding antifreeze. For the standard of antifreeze usage, please contact us for relevant information.



● **Air switch :**

Toggle the air switch on the back of the machine up, then flip the switch on the machine's control panel, the screen lights up, and the machine starts to run.



4. User Guide

4.1 Welding mode:

4.1.1 Wire feeder and handheld welding connection









- Select the cooper nozzle and wire feeding nozzle

Choose the appropriate wire feeding nozzle and welding copper nozzle, pay attention to **adjusting the scale tube to 0**, which is the best focal length



Welding Copper Nozzle Model

 Model AS-12 Wire feed: 0.8/1.0/1.2mm	 Model BS-16 Wire feed: 1.6mm	 Model CS-12 Wire feed: 0.8/1.0/1.2mm
 Model FS-16 Wire feed: 1.6mm	 Model C Non-wire feed (or no gap)	 Model ES-12 Wire feed: 0.8/1.0/1.2mm

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, outer corner welding;

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

- Welding parameter setting :

1. Make sure 'laser enable' is on. Like the picture shown.



- The safety clip is clamp on the workpiece:



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	

4.1.2 Laser startup steps

- **Warning:**

Before use, ensure that all electrical connections (including protective gas and grounding wires) are connected. If conditions permit, all connectors must be tightened. Do not directly look at the laser output port when operating the laser, and strictly wear safety goggles

When performing wiring operations, please turn off all power switches of the laser first. The startup process is as follows:

- (1) Connect the power input to the indicated voltage, phase, and frequency;

- (2) Connect the wire feeding power cord to the FEEDER interface;
- (3) Connect the protective gas pipe to the gas in interface and open the gas valve;
- (4) Water chiller temperature can not be lower than 20 °C , if lower than 20 °C , wait for the machine to warm up to reach more than 20 °C before operation.
- (4) Turn on the power switch on the back panel of the laser; Release the emergency stop switch on the front panel of the laser;
- (6) Click on the touch screen to enter the software interface and adjust the corresponding parameters (laser power, swing amplitude, swing frequency)
- (7) Adjust the air valve mode to normally open and adjust the protective gas flow rate to 15L/min;
- (8) Clamp the safety clip onto the work piece that needs to be welded;
- (9) Turn on the laser start button and laser enable switch;
- (10) Press and hold the gun head switch to emit light.

4.2 Cutting mode

4.2.1 Install cutting copper nozzle:



- The safety clip is clamp to the metal part of the gun head (Turn the scale tube to 0)



- Enter the welding interface, Adjust “ Weld with” to 0, and make sure the Laser enable is on.(Importance)



4.3 Cleaning mode

4.3.1 Install with cleaning lens

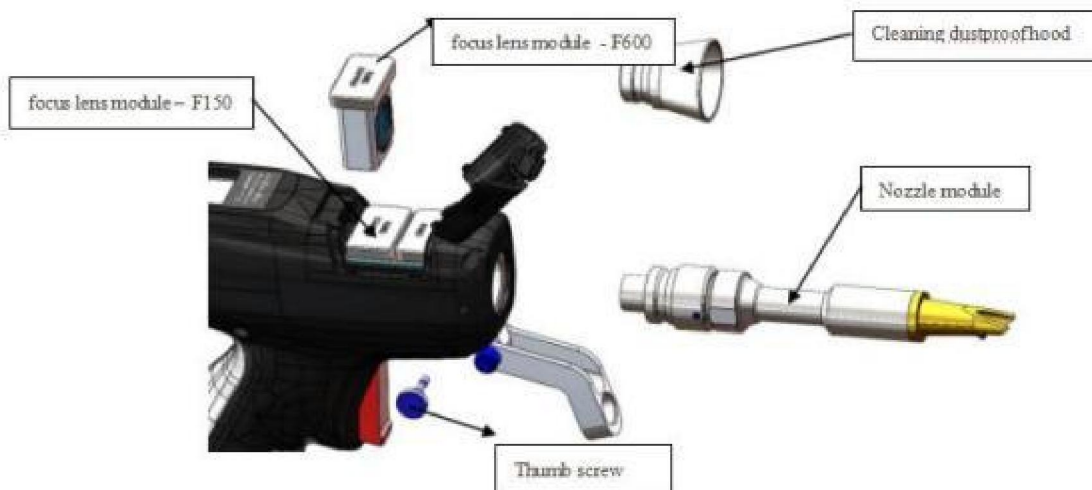
Note: If the range of rust/Paint/Oil removal is relatively narrow, and there is no need to replace the cleaning lens. Use F150 focus lens directly.

If the cleaning range is relatively large and more efficient cleaning is needed, please replace F600 focus lens(cleaning lens).

At the focusing lens F600,the maximum cleaning width is120mm.

At the focusing lens F150,the maximum cleaning width is 30mm.

Loosen the thumb screw, then replace the nozzle module with a cleaning dust proof hood. Replace the focusing lens assembly (D20-F150) with the focusing lens assembly (D20*4.75-F600)



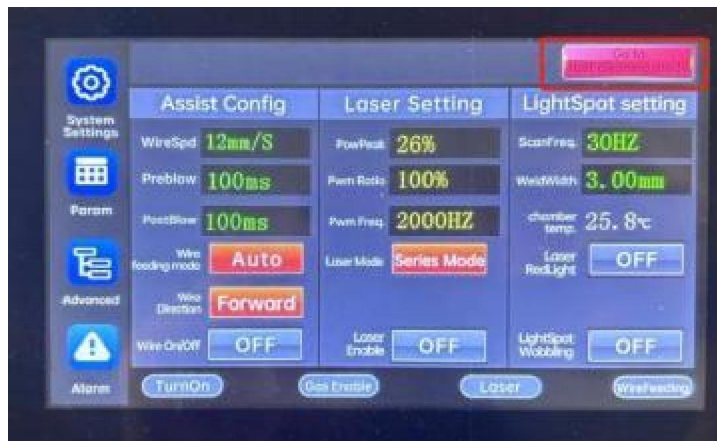


- The safety clip is clamp to the metal part of the gun head

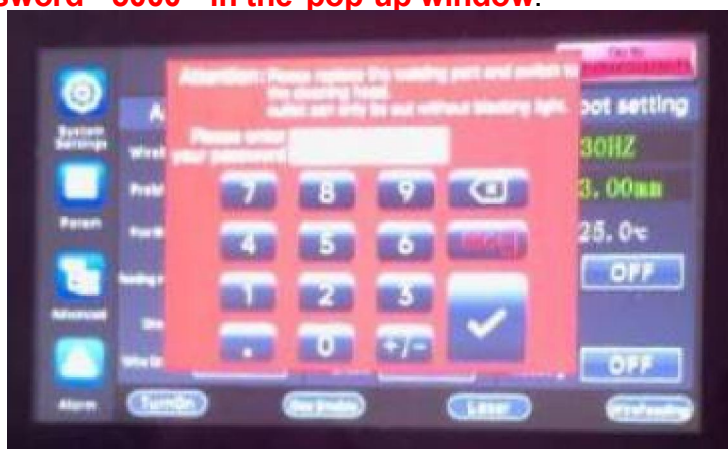


- Enable the cleaning mode on the touch screen

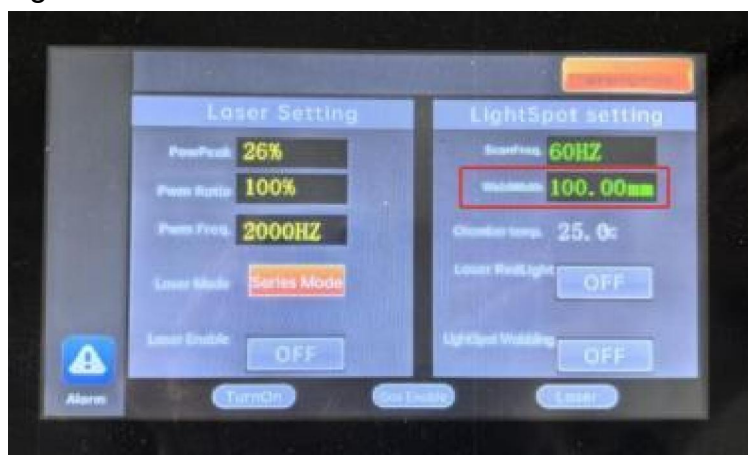
1. Click the red button "Switch to cleaning mode" on the upper right of the welding interface



2. Enter the password "5000" in the pop-up window.



3. Enter the cleaning interface



Note: Max. laser spot size (Weld with): 120mm

4.4 Welding seam cleaning mode

- **Change the welding seam cleaning nozzle**

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



- **Parameter setting**

Set "Scan width" according to the width of the weld seam that is oxidized or burnt during welding, we will suggest you set the "Scan width" as 5-8mm

Max "Scan width" should be 8mm.



5. Machine maintenance and upkeep

5.1 When need add antifreeze

Cooling system water temperature setting:

Water cooler 25 ± 1 °C (no need to change in summer)

Coolant requirements:

Purified water is used as cooling water, and it is recommended to use purified drinking water and replaced every month.

To prevent mold growth in the water in the chiller from causing pipe blockage, it is recommended to add ethanol with a volume ratio of 10% when adding purified water.

When the ambient temperature of the equipment is between - 10 °C and 0 °C, the ethanol solution with a volume ratio of 30% must be used and replaced every two months.

When the ambient temperature of the equipment is lower than - 10 °C, the dual-system (with heating function at the same time) water chiller must be used, and the uninterrupted operation of the cooling system must be guaranteed.

Other requirements for the cooling system:

When starting the cooling system for the first time, check the entire water system and connections for water leaks. The external water pipes must be installed and connected according to the water inlet (IN) and water outlet (OUT) marked by the laser. Otherwise, the laser may not work properly.

If the laser is not used for a long time, the cooling water inside the cooling system and the laser should be drained, otherwise the laser will be irrecoverable damaged.

Warning

Set the water temperature of the cooling system correctly according to the ambient temperature.

If the water temperature is set too high, the laser will not work properly.

If the water temperature is set too low, condensed water will be generated inside the

laser or in the laser output optical cable, which will cause irreparable damage to the laser.

Before turning on the laser, it is necessary to ensure that the cooling system operates normally and that the water temperature reaches a suitable temperature.

5.2 How to clean the lens

There is a protective lens at the front of the welding head to protect the focusing lens. When impurities or foreign matters are attached to the protective lens, the lens will be damaged. Therefore, the lens needs to be maintained regularly. It is recommended to check it before each use. Please refer to Figure for lens structure.



- Lens cleaning tools:

Dust-proof gloves or finger cots, polyester cotton swabs, absolute ethanol, rubber air blower (clean compressed air), etc.

- Lens cleaning method and Precautions:

- (1) Wear finger cots on the thumb and index finger of the left hand;

- (2) Spray ethanol on the polyester cotton swab

- (3) Gently pinch the side edge of the lens with the thumb and index finger of the left hand.

(Note that the finger cot cannot touch the surface of the lens to avoid leaving traces);

- (4) With the lens facing both eyes, hold the polyester cotton swab in your right hand, gently wipe the lens from bottom to top or from left to right in a single direction (do not wipe back and forth to avoid secondary pollution of the lens), and use rubber air blower (clean compressed air) blows the surface of the lens. Both sides should be cleaned. After cleaning, reconfirm that

there are no residues of the following: detergent, floating dust, foreign matter, and impurities.

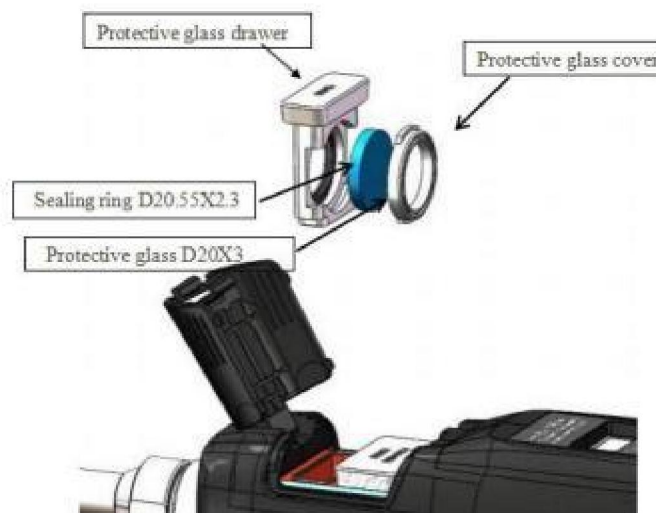
5.3 Removal and installation of lens

The entire process must be completed in a clean place, and dust-proof gloves or finger cots must be worn when removing and installing the lenses.

- Disassembly and assembly of the lower protective glass:

Protective glass is a vulnerable part and needs to be replaced after damaged.

- (1) As shown in below Figure, pinch both sides of the drawer-type glass holder and slowly pull out the protective glass drawer;
- (2) Rotate the protective glass cover 90° to remove the protective glass cover; take out the protective glass;
- (3) Clean the lens, protective lens drawer and sealing ring. If the sealing ring is damaged, replace it with a new one;
- (4) Install the cleaned (or replaced) lens (regardless of the front and back) to the protective glass drawer;
- (5) Reinstall the protective glass cover;
- (6) Reinsert the protective glass holder back into the welding head.



- Direction of protective glass drawer and focusing lens drawer:



6.Q&A

6.1 No laser come out

- (1) Check if gas supply is connected, and set pressure reducing valve reaches 0.2Mpa.
- (2) Check if water temperature reaches 20°C via the temperature display
- (3) Check if Laser enable is not turned on.
- (4) 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.)
- (5) Laser malfunction (Green light = normal; Red/Yellow light = fault) – contact us to get the app to check the error code

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.

Shenzhen Scotle Technology Group Limited

Address: No.14, 2F, Building Y1,Bantian Street Creative Park, Longgang District, Shenzhen, Guangdong,518129 China

Website: www.scotle.com