

# Scotle BWT 5 IN 1 Handheld Laser Welding Machine Manual



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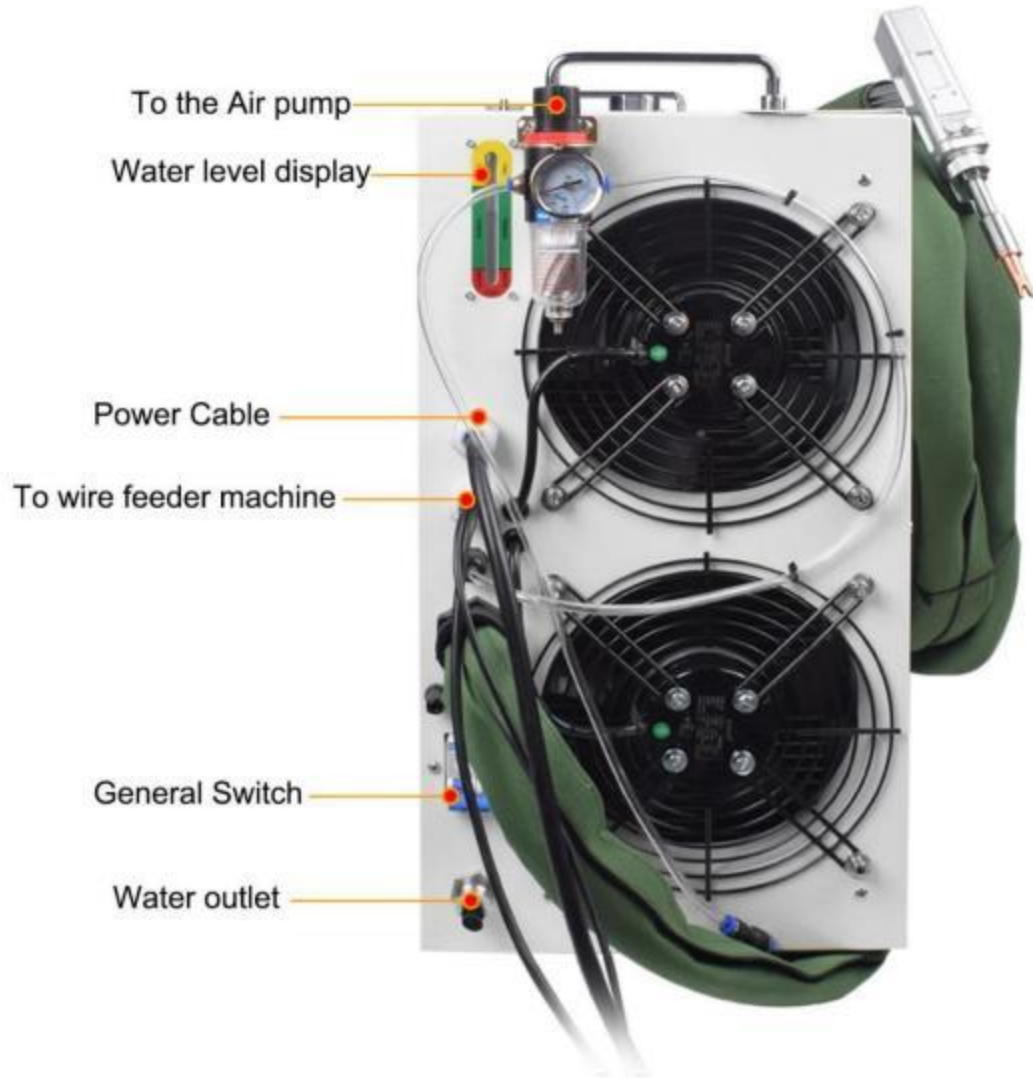
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# 1. Machine display

## 1.1 Overall display





## **1.2 Safety specification**

### **1.2.1 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

### **1.2.2 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

### 1.2.3 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 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>

## 1.5 EU Agency Information

E-CrossStu GmbH

Felix-Dahn-Str 4

Stuttgart 70597

E-CrossStu@web.de +49 71191222069



Product name : 5 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

<b>huizhoushiyunshengshukongshebeiyouxiangongsi</b>	
<b>BWT 5 IN 1 Welder</b>	
<b>Product Name: BWT 1500W 5 in 1 Welder</b>	<b>Model NO: BFL-CW15</b>
<b>Rating Voltage : 220V</b>	<b>Rating Frequency: 50Hz</b>
<b>Laser Power:1500W</b>	<b>Rating Power: 4000W</b>
<b>Phase:L+N+PE</b>	<b>Class 4 Laser</b>
<b>Origin:China</b>	<b>Mfg year : 2024 . 9</b>
<b>Address :</b> <b>huizhoushihuiyangquqiuchangjiedaoxihucunweipangtianhaichuangxinke jiyuanAdong5lou 512200 China</b>	



## 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. 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><b>WARNING :</b></p> <p><i>Refers to a potential hazard that may leads to a personal injury or death.</i></p>
	<p><b>CAUTION :</b></p> <p><i>Refers to a potential hazard on product, or a potential physical injury on personnel</i></p>
<p><b>NO</b></p>	<p><b>IMPORTANT :</b></p> <p><i>Refers to any information regarding the operation of the</i></p>

SYMBOL	<i>product. Please do not overlook this information.</i>
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### 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><b>WARNING :</b></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 Operation Conditions

The basic operation conditions are listed in the table followed:

Item	Value
	BFL-CW1500 / BFL-CW2000
Supply Voltage(V)	220±10% VAC 50/60Hz
Placement	Flat, upright, no vibration and impact
Environment Temperature	5~40°C
Relative Humidity	30%RH~70%RH
Electromagnetic Environment	Avoid too strong electromagnetic interference, which may lead to false alarm of laser
Cooling water quality	QBH and even the whole machine need deionized water to prevent scaling. At the absence of deionized water, pure water for Drinking can be used. When the ambient temperature is lower than 0°C, antifreeze (30% volume ratio for alcohol) needs to be added to the cooling water.

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 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(°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><b><i>IMPORTANT :</i></b></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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## 2.1.4 Characteristic Parameters

The characteristic parameters of the single module series fiber laser which the power is ranged from 1500W and 2000W are demonstrated in the table.

### Parameters of the single module series laser:

# BWT Laser Source

## 1500W / 2000W



### Optical Character

Power	1500W	2000W
Wavelength	1080±10 nm	
Output Fiber Core Diameter	34μm, 50μm or customized	
Output Cable Length	12m, 15m or customized	
Output Cable Connector	QBH	
Aiming Beam	Red	
Operation Mode	CW or modulation	
Polarization	Random	
Power Stability (25°C)	< ±1.5% (2h)	
Power Adjustment Scope	10%-100%	
Max Modulation Frequency	5kHz	

### Size and Weight

Physical Size (H×W×D)	80mm*402mm*296mm	80mm*402mm*346mm
Weight	15kg	17 kg

### Electronic Character

Power Supply	220±20 V, AC, PE, 50/60 Hz	
Power Consumption	4.5 kW	6.0 kW
Control Interface	RS232/AD	

### Water Cooling Parameters

Minimum Water Cooling Capacity	3.0 kW	4.5 kW
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Temperature Settings	22°C (Laser Module), 30°C (QBH)	25°C (Laser Module), 30°C (QBH)
Cooling Tubes Size	O.D. $\Phi$ 12 mm	
Cooling Water Flow Rate (Laser)	>15 L/min	>18 L/min
Cooling Water Flow Rate (QBH)	1.5~2.0L/min	

## 2.2 Handheld gun introduction

For more information, please check the "Manual for FWH30-DS10E welding gun".

## 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.
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.
Welding 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

### 2.2.2 Configuration parameter

Name	Intelligent double pendulum
Model	FWH30-DS10
Fiber interface	QBH
Wavelength scope	1070±20nm
Rated power	≅ 3,000W
Collimation focal length	50mm
Focus focal length	150mm
Regulating scope of focal point	-10mm~+10mm
Regulating scope of light spot	0~5mm

Auxiliary pressure	≤1Mpa
The net weight of the welding gun	1.0Kg

### 2.2.3 Welding head copper nozzle

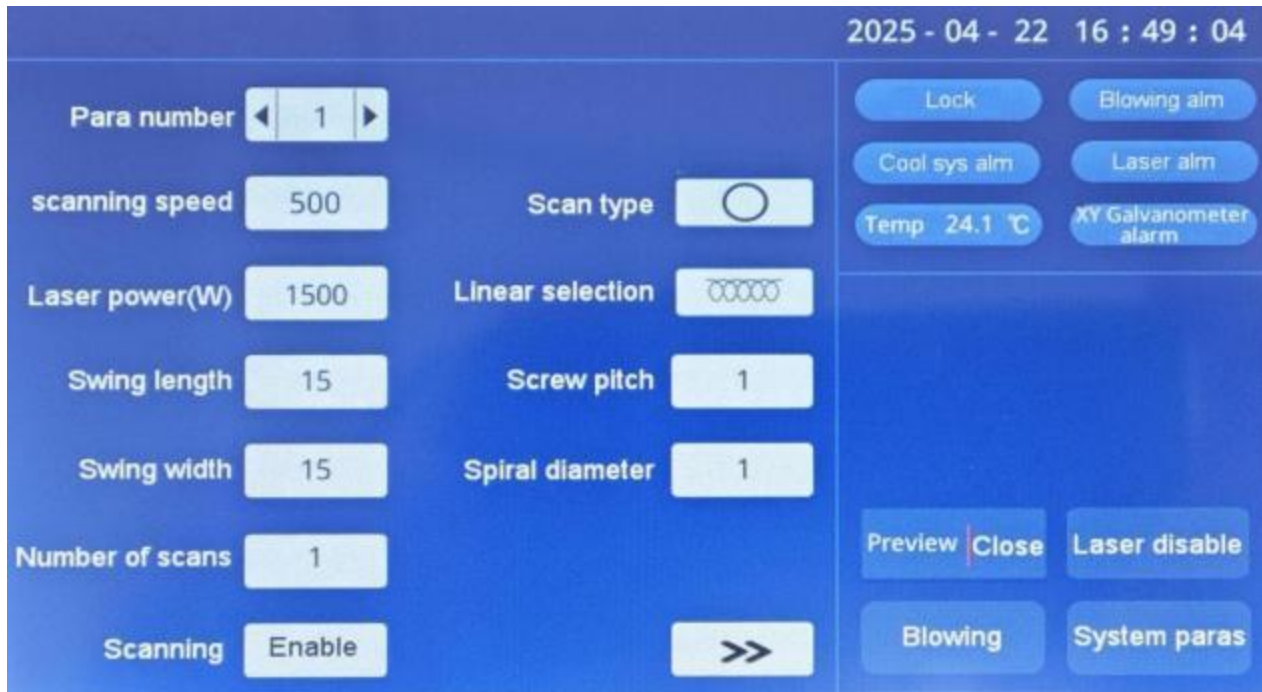
Different copper nozzle applies to different materials welding.  
For example, FAS-12 copper nozzle mainly used for welding wire 1.2mm

- FAS-08: The filaments below 0.8mm.
- FAS-10: The filaments below 1.0mm.
- FAS-12: The filaments below 1.2mm
- FAS-16: The filaments below 1.6mm.
- FC-20: The cutting nozzle.



## 2.3 Screen control system introduction

### 2.3.1 Page in “Energy welding system homepage”

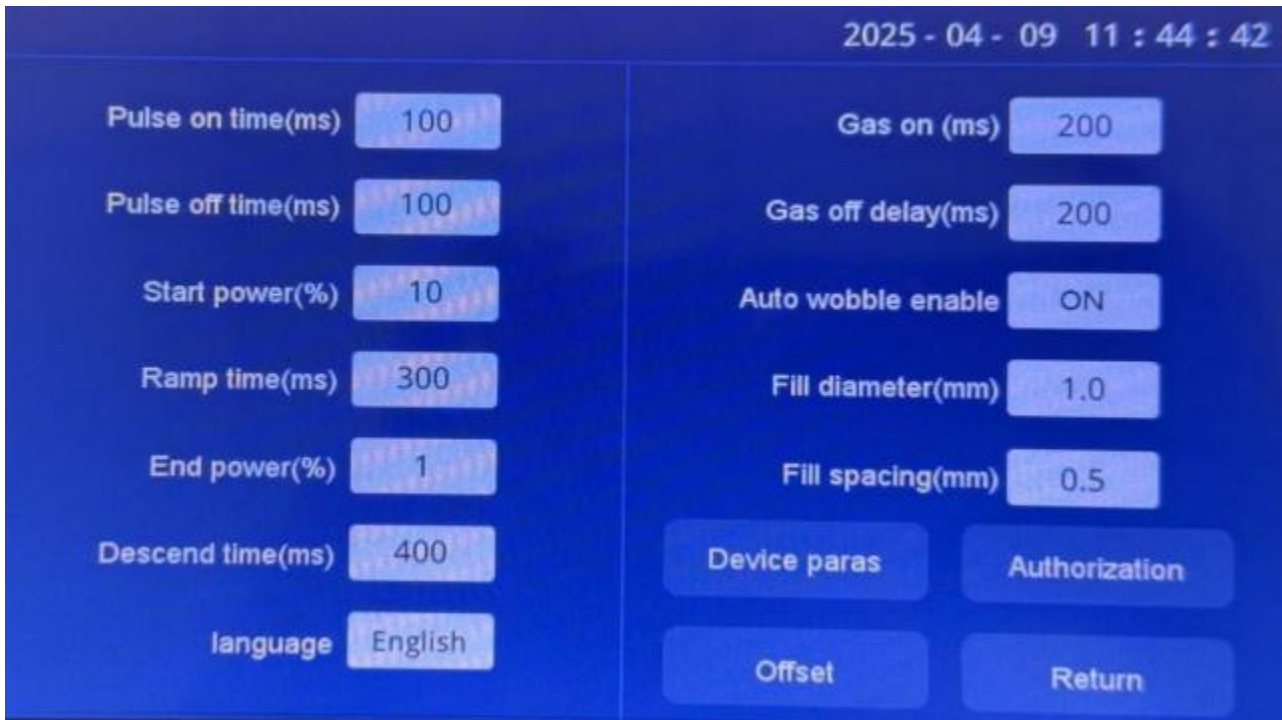


- (1) Parameter number: The system supports nine groups of parameter stores.
- (2) Scanning speed: Used to set the scanning speed of galvanometer.
- (3) Laser power: Set the optical output power during welding.
- (4) Swing length: It is used to set the length of the motor swing.
- (5) Swing width: It is used to set the width of the motor swing.
- (6) Number of scans: Continue to press the start button when the light out of the maximum number of scanning times to stop the light,  $\infty$  times the infinite cycle until the start button is released.
- (7) Scan Enable: Set whether the 'scan type' parameter is differentiated based on the 'linear selection' parameter. By enabling alienation, scanning types, and linear selection, 12 types of scanning wave forms can be combined.
- (8) Scan type: Set scan type.
- (9) Linear selection: Set the linear type.
- (10) Screw Pitch: Set linear to spiral pitch, linear is a special parameter for spiral

mode.

- (11) Spiral diameter: Set linear to spiral diameter, linear is a special parameter for spiral mode.
- (12) Alarm Status Area: After the alarm signal is enabled, real-time display of protective gas under voltage alarm, cold water flow alarm, laser alarm and temperature alarm, and galvanometer status will be displayed.  
If the safety lock is enabled, the safety lock status will be displayed in real time;  
When the alarm signal is not triggered, the corresponding alarm status is highlighted in blue before it;  
When an alarm is generated, the corresponding alarm icon will flash alternately in red and blue.
- (13) Preview | Close: The red light switch can control the switch for laser red light indication.
- (14) Laser enable: This button allows or prohibits laser output. When light output is allowed, pressing the start light button will emit laser for welding; When the light is prohibited, pressing the start light button will not cause laser welding.
- (15) Manual blowing : Click on the manual blowing area to continue blowing, and click on the manual blowing area again to turn off blowing.
- (16) System Parameters : Click to enter the system settings page and modify the system functional parameters.

### 2.3.2 Page in “Energy welding system parameter”



- (1) Pulse on time: Time of laser emission under the pulse mode.
- (2) Pulse off time: Pulse disabling time under the pulse mode.
- (3) Start power: Used to set the laser initial power, it is the percentage of the welding power.
- (4) Ramp time: Control the time taken for the laser emission of the laser to slowly rise to the set power.
- (5) End power: Used to set the laser turn off power, it is the percentage of the welding power.
- (6) Descend time: Control the time taken by the laser disabling power of laser to slowly lower
- (7) Language: Used for language switch.
- (8) Gas on: Time for turn on gas in advance. Delay in turn on gas can be set when processing is enabled. The emission of laser will start after blowing is delayed for a period of time by pressing the external start button.
- (9) Gas off delay: Time for delay in turn off gas. Delay in turn off gas can be set when

processing is turn off. Stop blowing after stopping laser emission, and then delaying for a period of time when processing is stopped.

(10) Device Parameters : Used to switch to the device parameters page, and a password of 666888 needs to be entered. **Used to set the basic parameters of the equipment, configured by the manufacturer generally.**

(11) Authorization: Perform authorization code reading and decryption operations, as well as display information related to the panel and motherboard version number.

**Used for switch different mode(Energy welding mode, welding mode, cleaning mode).**

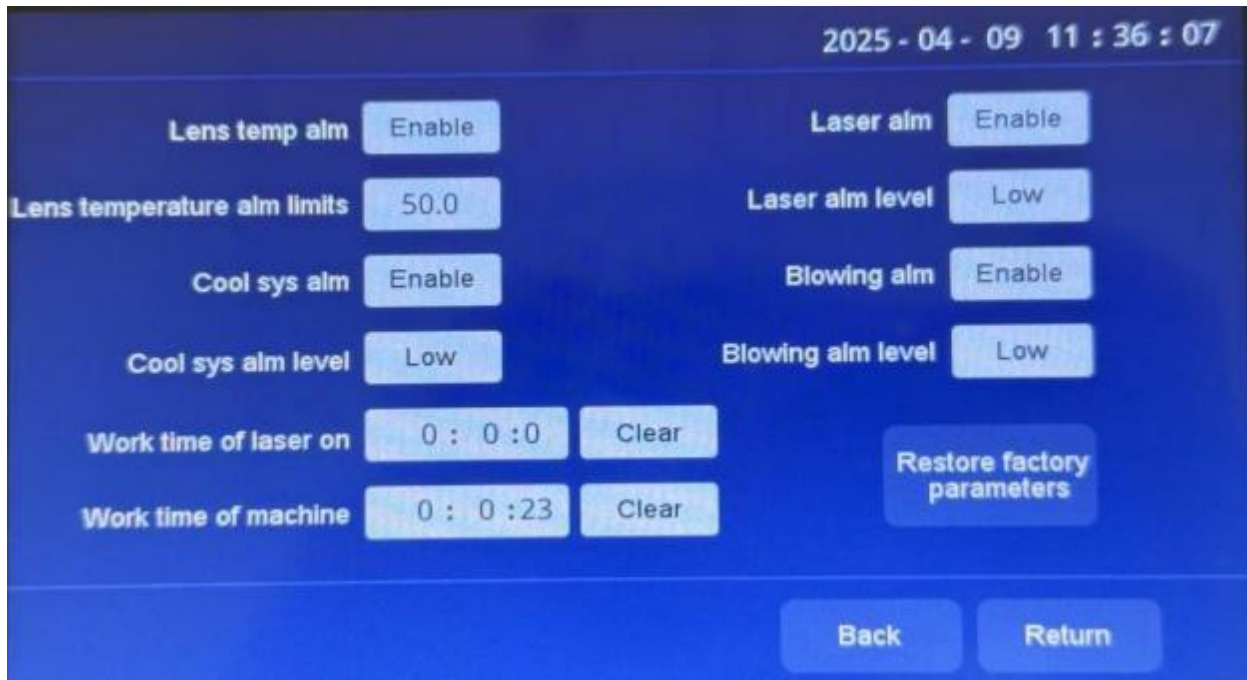
(12) Center offset : Used to set the center offset of red light.

### **2.3.3 Page in “Device parameter”**

Device parameter: used to set the basic parameters of device.

**Generally, the setting is performed by manufacturers, no need to set. Before entering the page, users need to enter password.**

**System password: 666888**



- (1) Lens temperature alarm enabling: It enables the lens temperature alarm. When the temperature exceeds the limit value, an alarm signal will be generated.
- (2) Lens temperature alarm limit: Lens temperature limit value. **It is suggested to set the set value of lens temperature to 50.** After the lens temperature exceeds the set value, the alarm caution will arise on the home page and the display light on the side of the handheld plumb joint will turn to red.
- (3) Cool system alarm enabling: Enable the cooling-water machine alarm. When the cooling-water machine gives an alarm, an cooling-water machine signal will be produced.
- (4) Cool system alarm level: Cooling-water machine alarm logic level.
- (5) Laser alarm enabling: Enable the laser alarm. When the laser gives an alarm, an alarm signal will be produced.
- (6) Laser alarm level: Laser alarm logic level.
- (7) Blowing alarm enabling: Enable the gas alarm. When an alarm is given due to the gas under pressure, an alarm signal will arise.
- (8) Under pressure alarm level: Under pressure alarm logic level

### 2.3.4 Page in “Welding system homepage”



- (1) Swing off: to set galvanometer motor swing on or off
- (2) Safety lock: to start or close the safety lock. When the lock is started, during the welding, the laser will stop when the welding head does not touch the welding material.
- (3) Automatic wire feeding off: to control whether to start automatic wire feeding during welding. It will start automatic wire feeding only when laser emits light.
- (4) Laser off: to start emitting laser or stopping emitting laser
- (5) Alarm status area: when alarm signal enables, protective gas low pressure, cool water flow alarm, laser alarm and temperature alarm status will be displayed in real time. When the safety lock is started, its status will be displayed in real time. When the alarm signal is not triggered, the alarm icon is blue; when it is triggered, the alarm icon is blue and red alternately.
- (6) Homepage/ Wire feeding parameter/ Diagnosis/ System parameter: to display the type of parameter on the current page. Click an icon to enter the switch of the corresponding parameter page. For instance, if the icon on the homepage turns on, the parameter in the current display area is the parameter of the homepage. When it needs to switch to wire feeding parameter, just click the position of wire feeding, and the icon of this

parameter will turn on.

- (7) Blowing manually/ Wire feeder: for manual blowing test and the wire feeding and wire withdrawing tests of wire feeder. For example, long press manual blowing key, and it will blow all the time; loosen this key, and it will stop blowing. For manual wire feeding and wire withdrawing, long press the corresponding small triangle area.
- (8) Process library: click the white box area in process library. The set process library parameter can be selected.
- (9) Welding mode: to set welding mode, continuous and pulse modes.
- (10) Laser Power: to set the peak power of laser when welding, the max power should be the power of machine.
- (11) Laser frequency: used to set the frequency of laser PWM modulating signal.
- (12) Laser duty : used to set duty cycle of PWM signal with the range from 1% to 100%
- (13) Wobble frequency: used to set motor swing frequency
- (14) Wobble length: used to set motor swing length
- (15) Feeding speed: used to set system parameter, including wire feeding, slow rise and fall parameters
- (16) Weld beam cleaning: Switch to welding seam cleaning mode to set parameter.
- (17) Spot welding: to set spot welding mode.

### 2.3.5 Page in “Welding system feeding parameter”

Please set parameters of wire feeder in machine control screen.

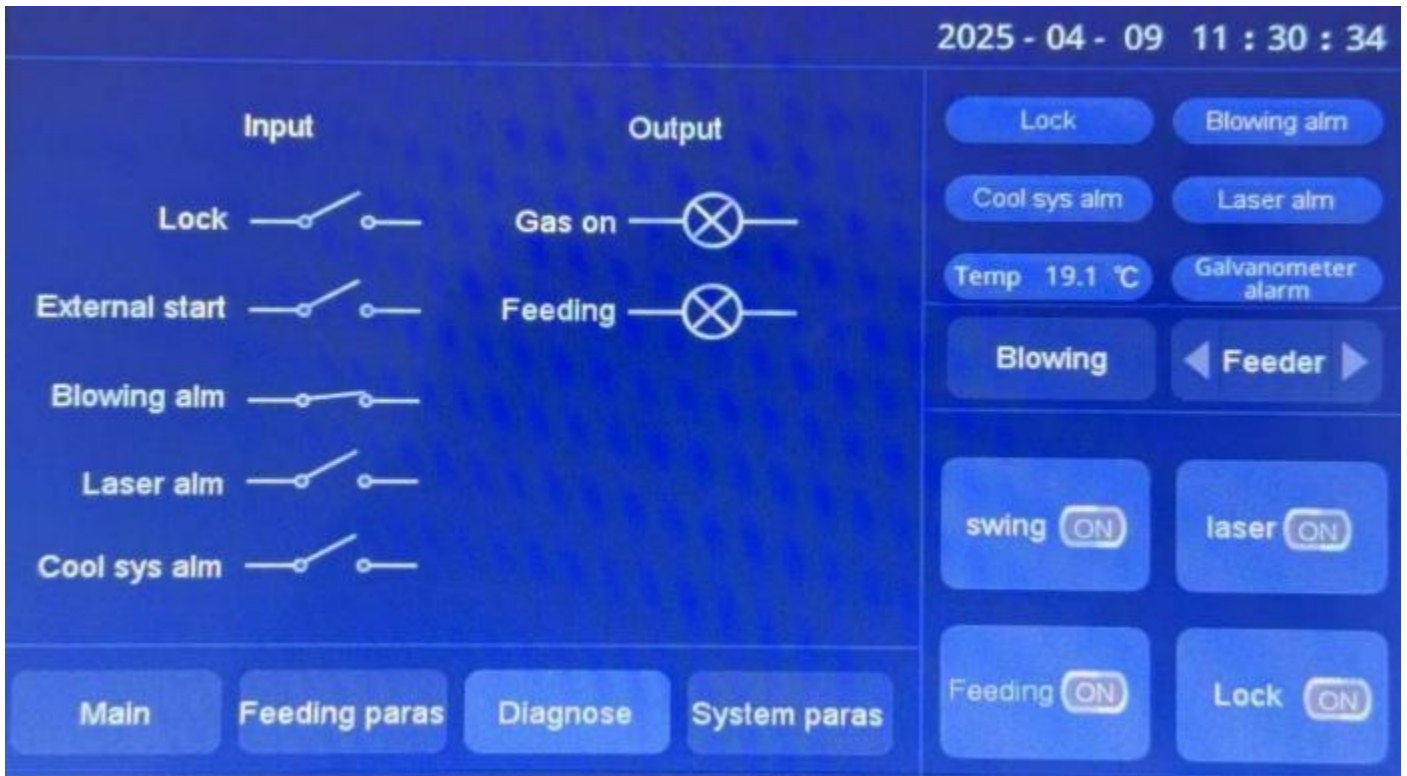
Click “Feeding parameters”

Wire feeding parameter: used to set parameters related to wire feeding, wire supplement and withdrawal.




- (1) First extracting time: the time for motor wire withdrawal.
- (2) First extracting speed: the wire withdrawal speed of motor when the start button is loosened.
- (3) Second feeding time: the time for motor wire supplement.
- (4) Second feeding speed: the speed of motor wire supplement.
- (5) Feeding delay time: wire feeding after light delay for a period, generally it's 0.
- (6) Continuous feed: used to change wire for the wire feeder. Click once for continuous wire feeding, click again to stop it.
- (7) Continuous extract: used to change wire for the wire feeder. Click once for continuous wire withdrawal, click again to stop it.

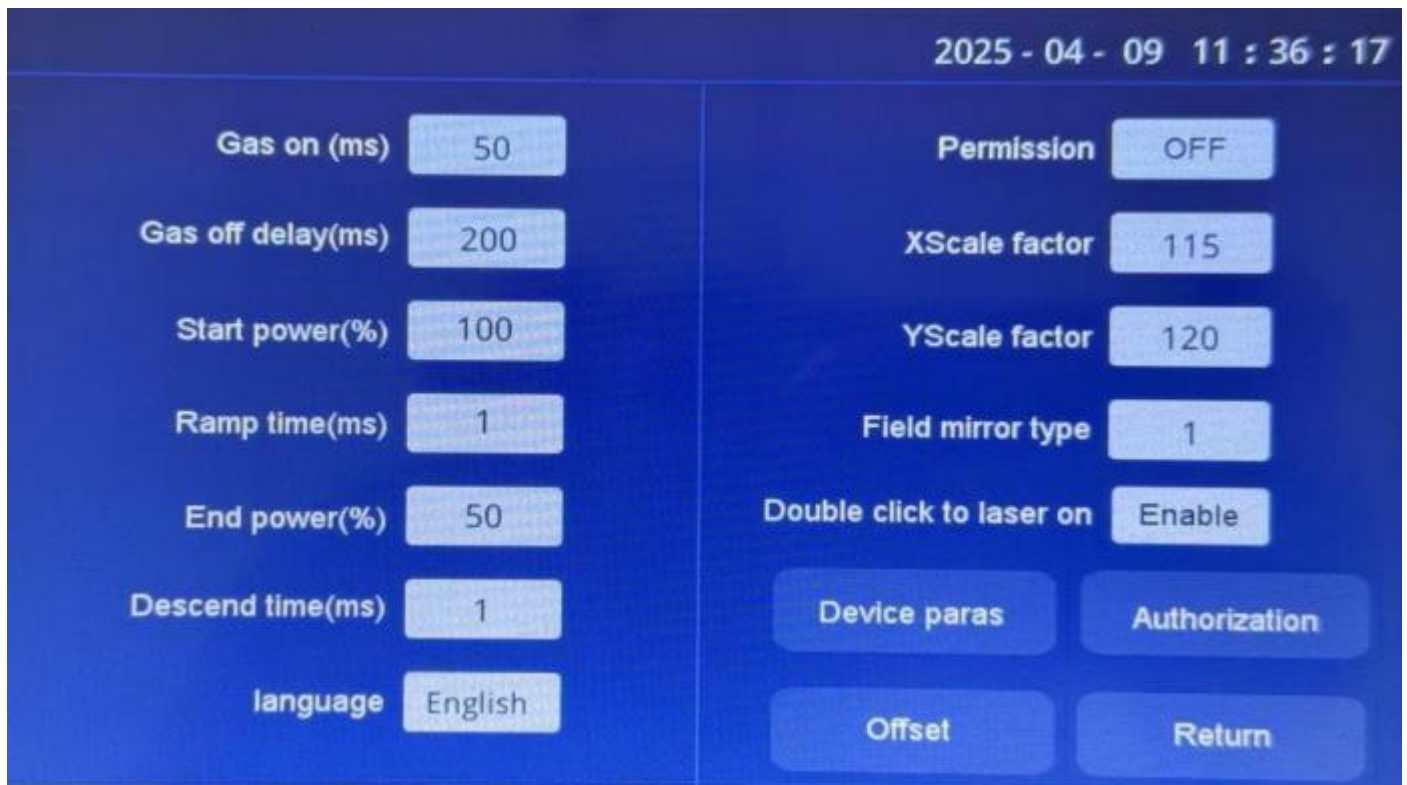
### 2.3.6 Page in “Welding system diagnose”



When status is , it is normal.

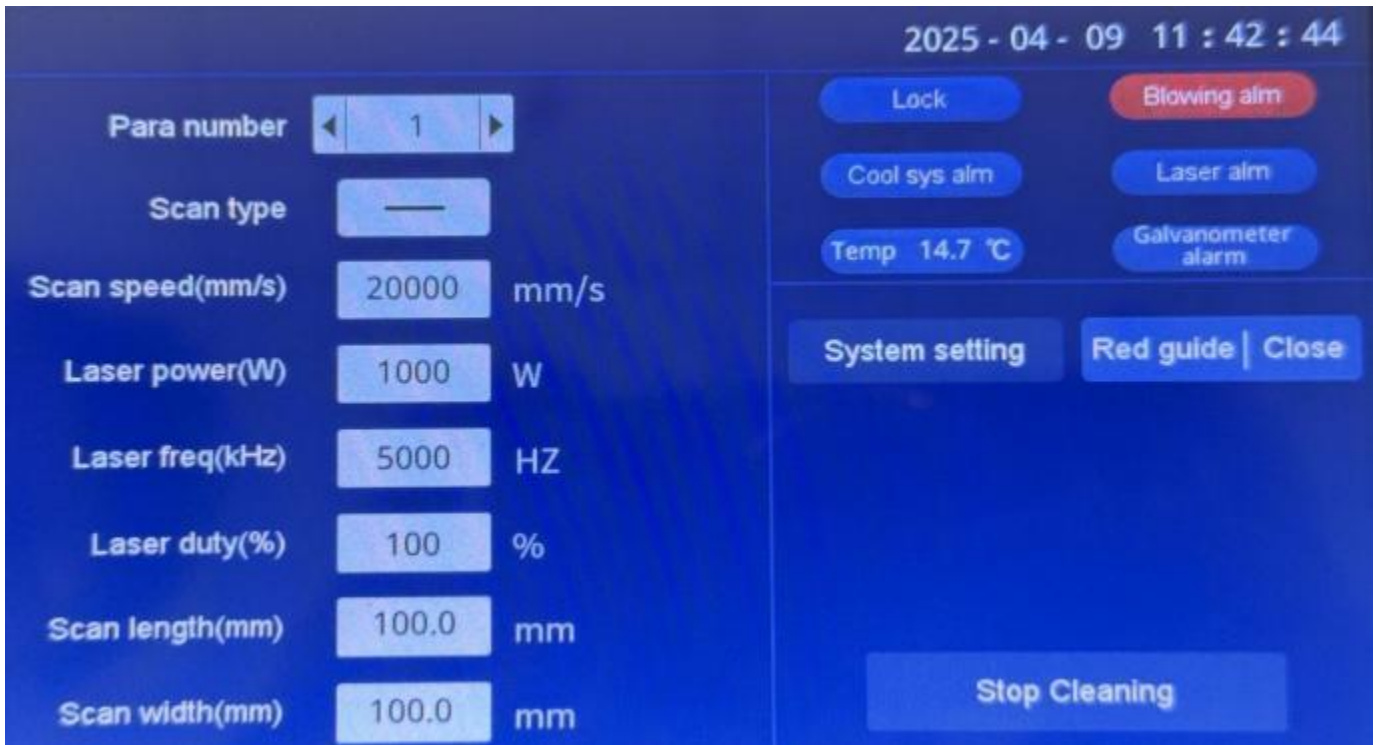
When status is , please check the problem of alarm

### 2.3.7 Page in “Welding system parameter”



- (1) Pulse on time: Time of laser emission under the pulse mode.
- (2) Pulse off time: Pulse disabling time under the pulse mode.
- (3) Start power: Used to set the laser initial power, it is the percentage of the welding power.
- (4) Ramp time: Control the time taken for the laser emission of the laser to slowly rise to the set power.
- (5) End power: Used to set the laser turn off power, it is the percentage of the welding power.
- (6) Descend time: Control the time taken by the laser disabling power of laser to slowly lower
- (7) Language: Used for language switch.

### 2.3.8 Page in “Cleaning system homepage”



- (1) Parameter number: The system supports nine groups of parameter stores.
- (2) Scan type: Set scan type.
- (3) Scan speed: Used to set the scanning speed of galvanometer.
- (4) Laser power: Set the optical output power during welding.
- (5) Laser frequency: It is used to set the PWM frequency of the laser
- (6) Laser duty : It is used to set PWM signal duty ratio of continuous laser.
- (7) Scan length: It is used to set the length of the laser scan.
- (8) Scan width: It is used to set the width of the laser scan.
- (9) Stop cleaning: click once to start cleaning.

## 2.4 Wire feeder introduction



### 2.4.1 Technical Parameters:

Model	FWS-01A
Rated input	220V $\pm$ 5% 50/60hz
Maximum power and current	60W/2.5A
Applicable welding wire	Diameter $\leq$ 2.0mm
Suitable for welding wire disc	Shaft diameter: MIN50mm
	Outside diameter: MAX300mm
	Width:MAX105mm
	Weight :<25kg
Net weight	13.2kg
size	560mm*250mm*350mm

## 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



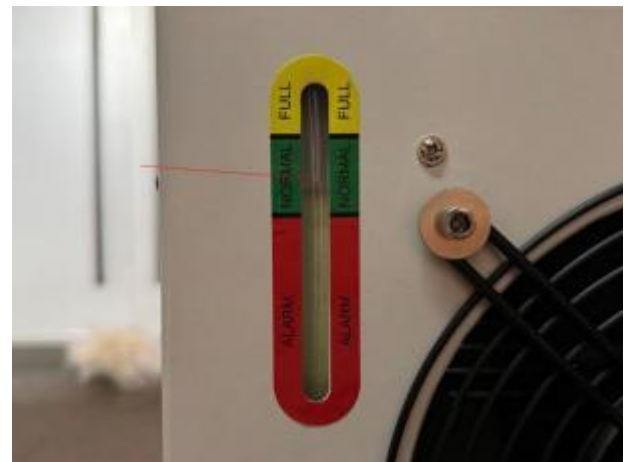
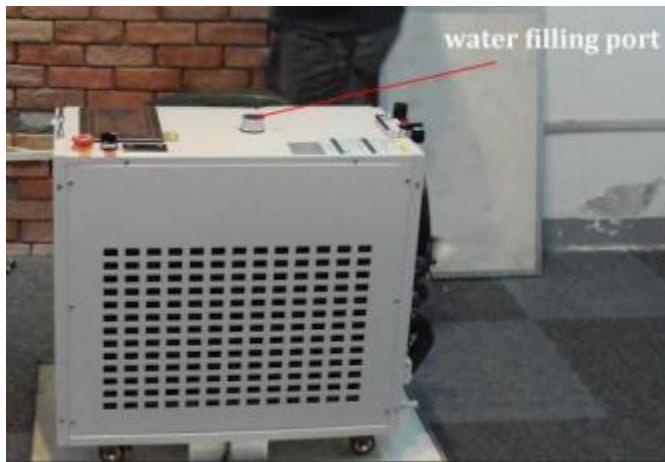
Wire feeder carton box

### 3.1.1 Package list :

<h1>Packing List</h1>			
			
Machine	Swing arm	1X Wire Feeding Machine	BWT Laser Source
			
Relfar Display	5 in 1 Laser Welding Gun	1 x Protective Glasses	Five brass nozzles and four wire feed nozzles
			
1*Protective lenses	1Pc Cleaning lens	1 X Protective Gloves	2 battery welding nozzle
			
Aser Souce1XPower Cable	ER304 Steel Welding Wire	Cleaning Sleeve	1bag Cotton Swabs

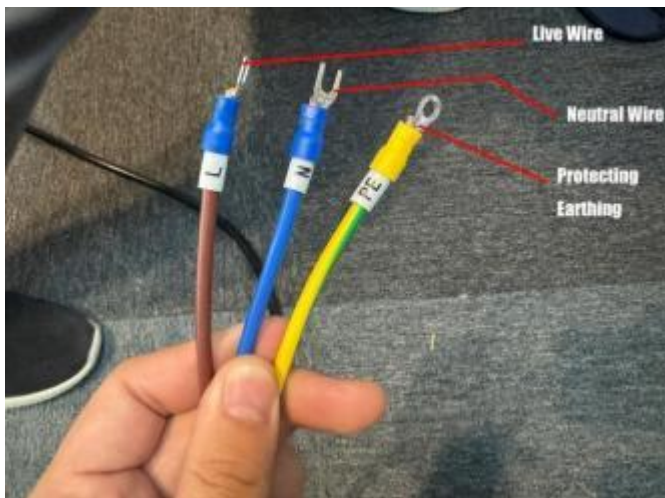
### 3.1.2 Preparation work before startup

- (1) Fill the water tank with pure water until the water level gauge on the back of the machine reaches the green mark.



(2) 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



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

(Noticed: When using welding and cutting function, need to use with air pump. The air pump contains argon which 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.)



(4) Turn the knob on the air pressure gauge on the back of the machine so that the pressure index of the pressure reducing valve reaches 0.2Mpa.



### 3.1.3 Wire feeder connection:

#### (1) Installation of the welding wire disc

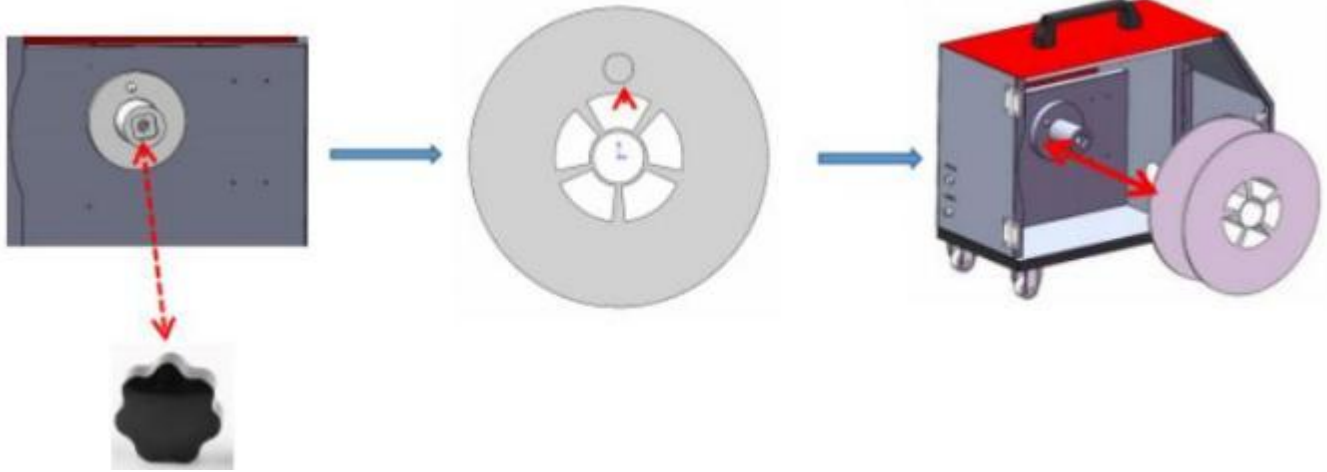
- It is forbidden to use flux-cored wire, and the selection of welding wire shall be consistent with the material to be welded.

Step 1: Rotate counterclockwise to loosen the nut.

Step 2: Install the wire feeding disc. There is a small hole in the middle that aligns with the blocking wheel during installation. Pay attention to the orientation of the wire during

installation. The wire rotates counterclockwise and is connected to the wire feeding wheel in a horizontal straight line.

Step 3: Tighten the screw feeding disc with the nut.



## (2) Select wire feeding wheel specifications

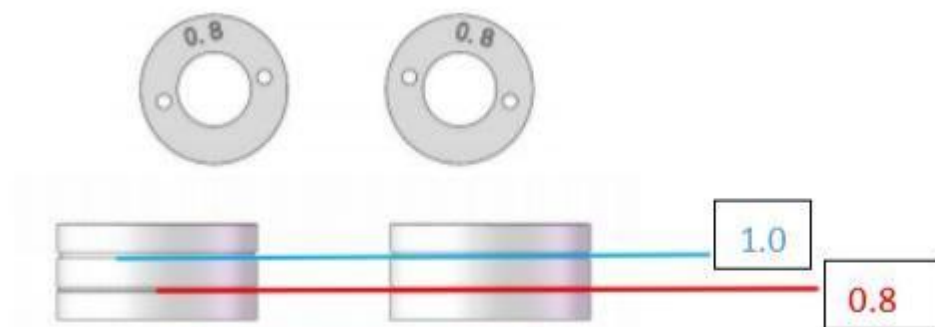
2 wire feeding wheels for 1 set.

There are two small grooves on the wire feeding wheel, which need to be matched one by one during installation.

Users can adjust the groove width of the wire feeding wheel to 1:1 according to the diameter of the wire core used.

Usually, the wire feeding wheel has two small grooves of different specifications, which can be used for both purposes as shown in the figure below.

During installation, the two small grooves should correspond to the same horizontal line.

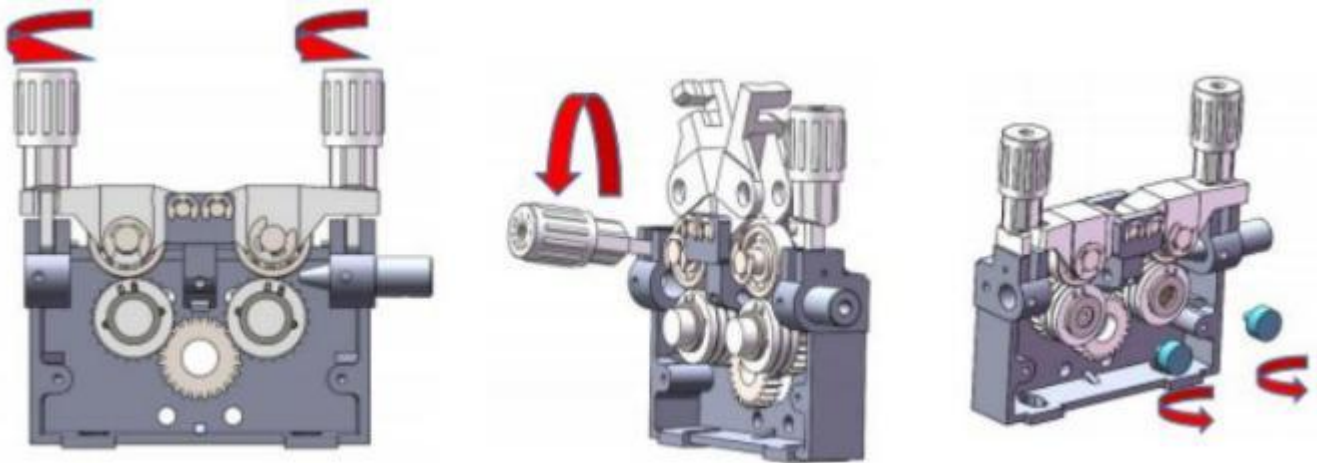


## (3) Replace the wire feeding wheel

Step 1: Rotate and release the left and right locking screw handles.

Step 2: Swing forward 90 degrees and release downwards.

Step 3: Rotate and loosen the fastening screw nut of the wire feeding wheel, then remove and replace it

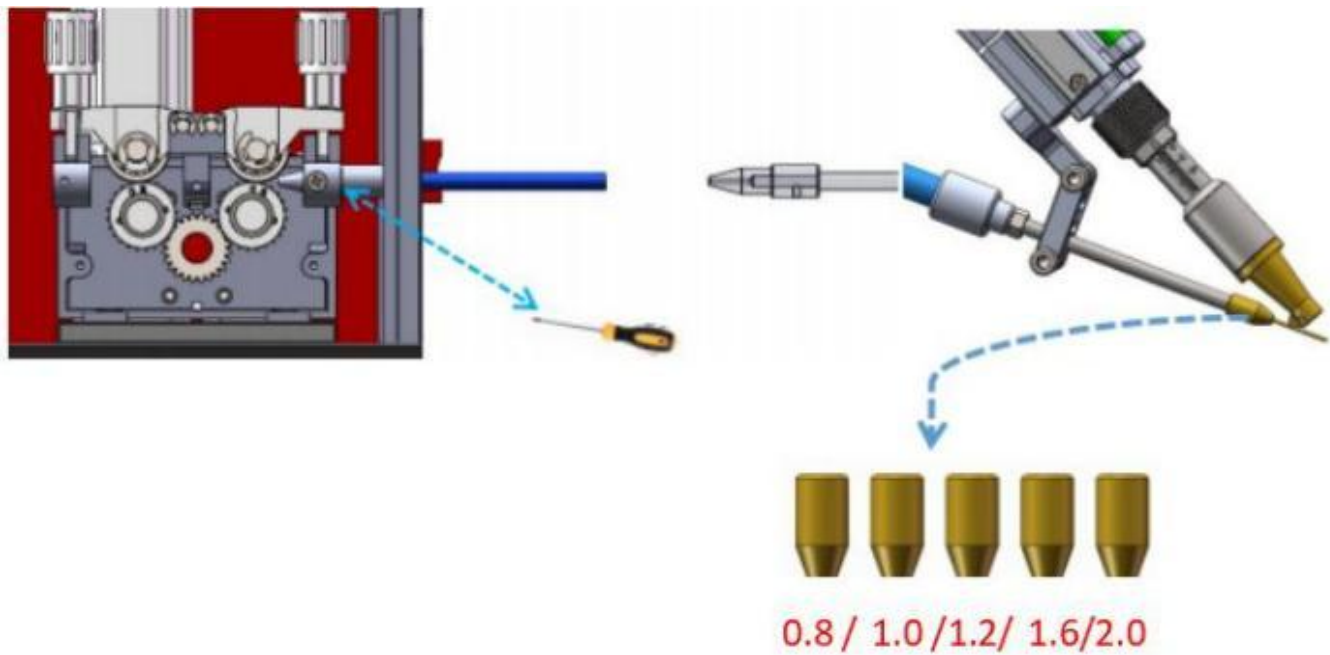


#### (4) Installation of wire feed pipe

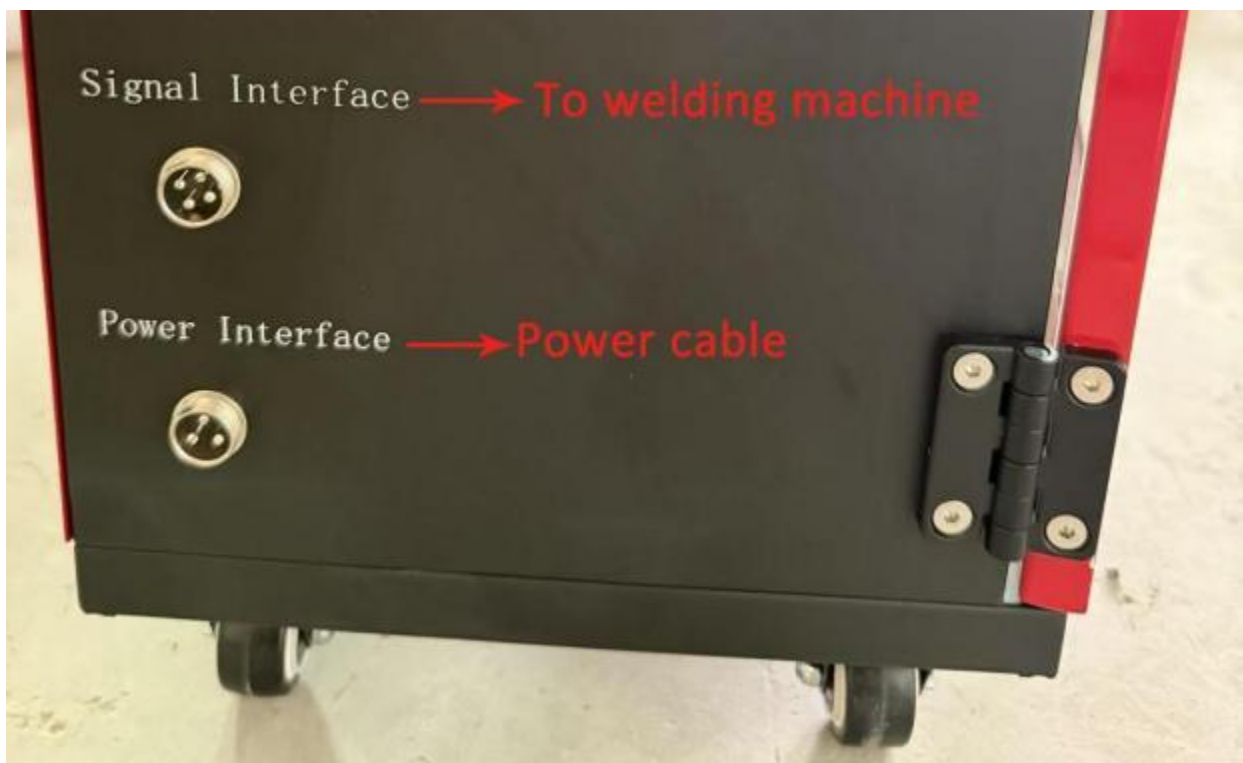
Align the wire tube directly with the wire outlet for installation, and tighten the screws to fix it.

The wire nozzle is matched with a copper nozzle at a ratio of 1:1 based on the diameter of the wire core selected by the customer.





(5) Connect the wire feeder to welding machine



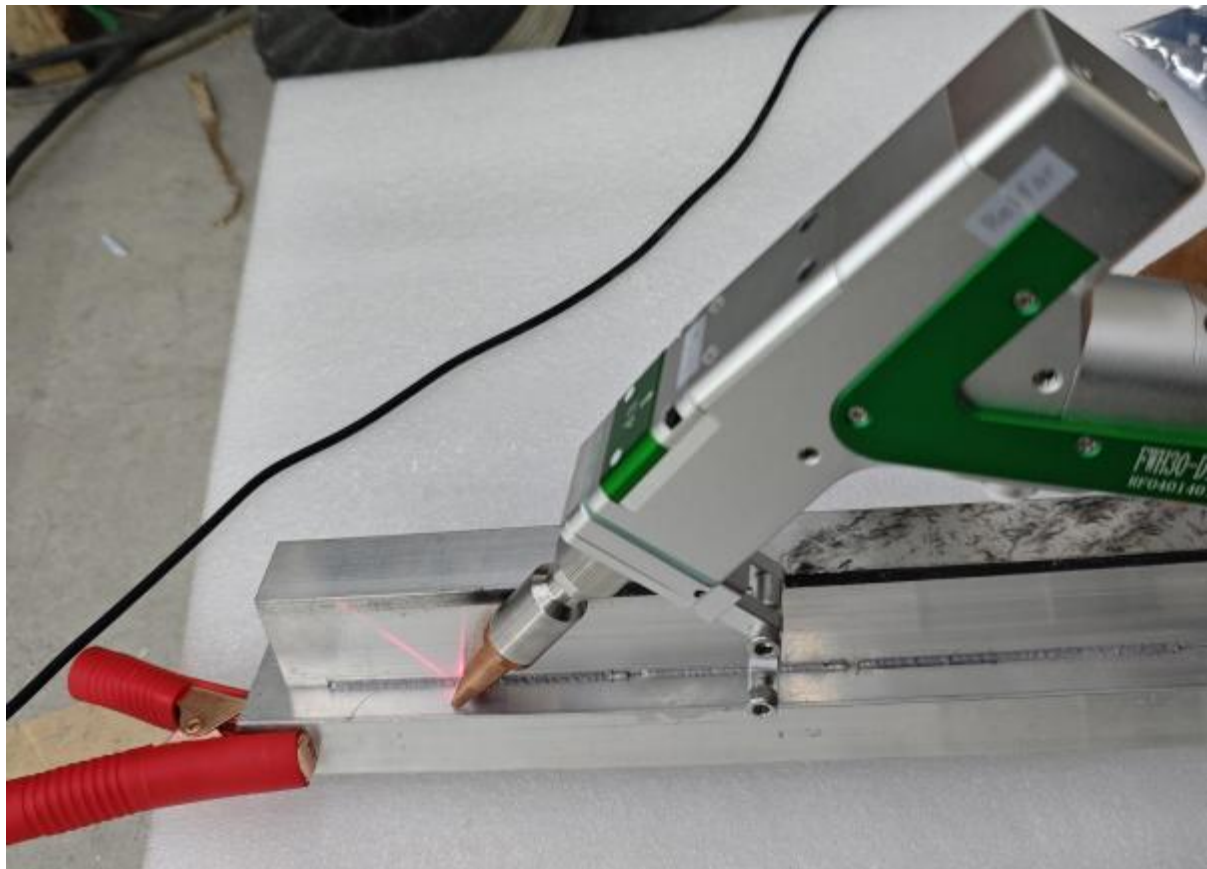
### 3.1.4 Power on

(1) 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.



(2) **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.



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



## 4. User Guide

### Overview of 5 in 1 Laser Welding Machine:

- 1. Energy storage welding:** Using a high-energy laser beam to focus on the welding area, the material quickly melts and forms a high-quality weld seam. Fast welding speed, high precision, small heat affected zone, suitable for power battery PACK module, battery cell ear welding, etc.
- 2. 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.
- 3. 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.
- 4. Laser cutting:** Suitable for cutting metal sheets, with flexible operation and widely used in fields such as hardware and sheet metal manufacturing.
- 5. Weld seam cleaning:** After welding, rust removal and oxidation layer removal should be carried out on the weld to improve welding quality.

### 4.1. Energy Welding Mode

The energy welding system does not require connection to a wire feeder.

### 4.1.1: Select the cooper nozzle

Choose one copper nozzle for energy welding you need, square and circular



### 4.1.2 Install the swing arm

(1) If you needn't weld with swing arm, you can handheld the welding gun to weld directly.

(2) if you want to weld with swing arm, please install swing arm.

- Please take out the swing arm from the carton box.



- Install part 1 with screw 1, tighten the screws.



- Install part 2 with screw 2, tighten the screw.



- Install part 3 with screw 3, tighten the screw.

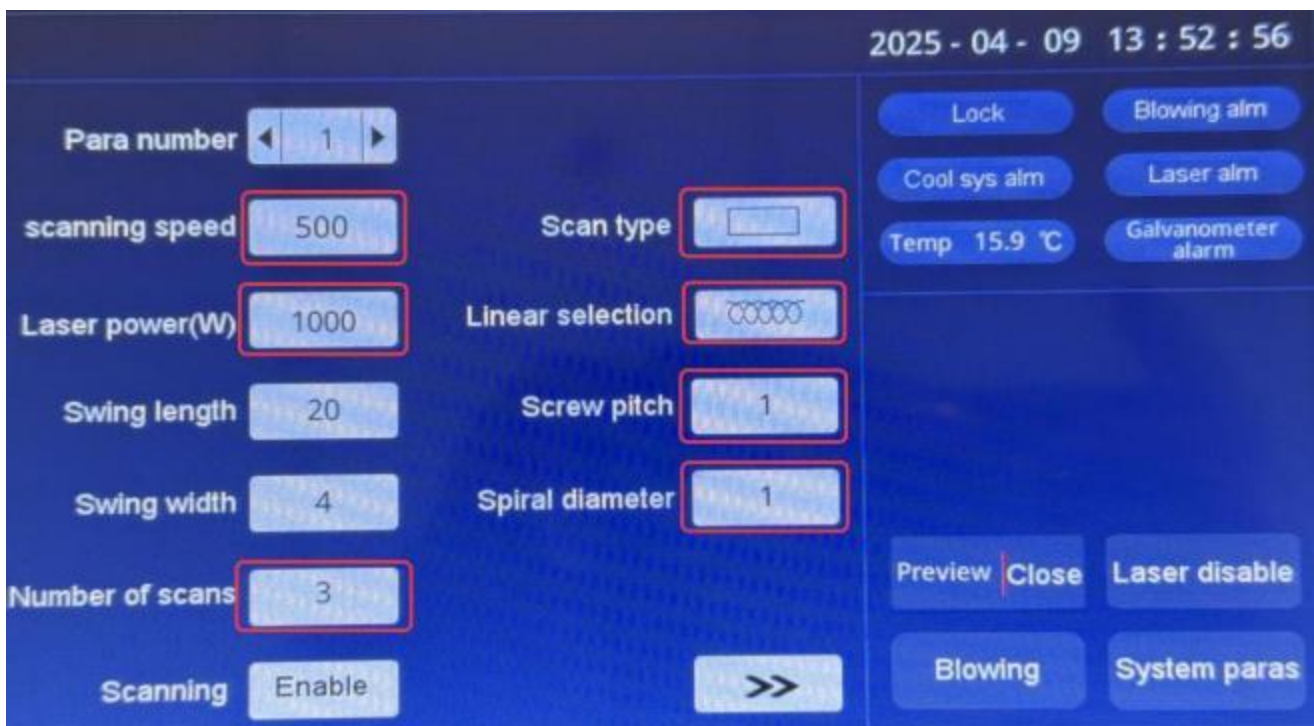


- Install the welding gun to the swing arm

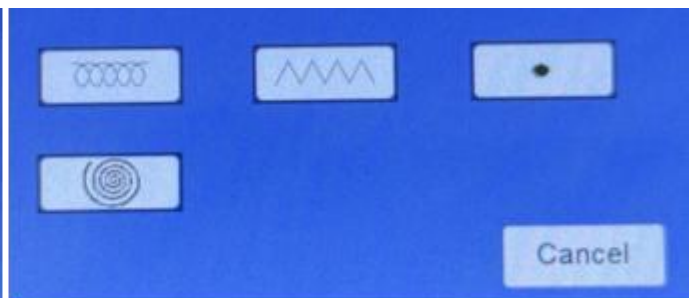


#### 4.1.2: Setting welding parameter in control board

(1) you can set Scanning speed, Laser power, Number of scans, Scan type, Linear selection, Screw pitch, Spiral diameter as you need.



**5 Kinds of Scan type**



**4 kinds of Linear selection**

(2) You can save 9 group parameters.

2025 - 04 - 22 16 : 49 : 04

Para number	◀ 1 ▶	Lock	Blowing alm
scanning speed	500	Cool sys alm	Laser alm
Laser power(W)	1500	Temp 24.1 °C	XY Galvanometer alarm
Swing length	15		
Swing width	15		
Number of scans	1	Preview   Close	Laser disable
Scanning	Enable	Blowing	System paras

Scan type:  (Circle icon)














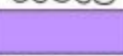















Linear selection:  (Spiral icon)

Screw pitch: 1

Spiral diameter: 1

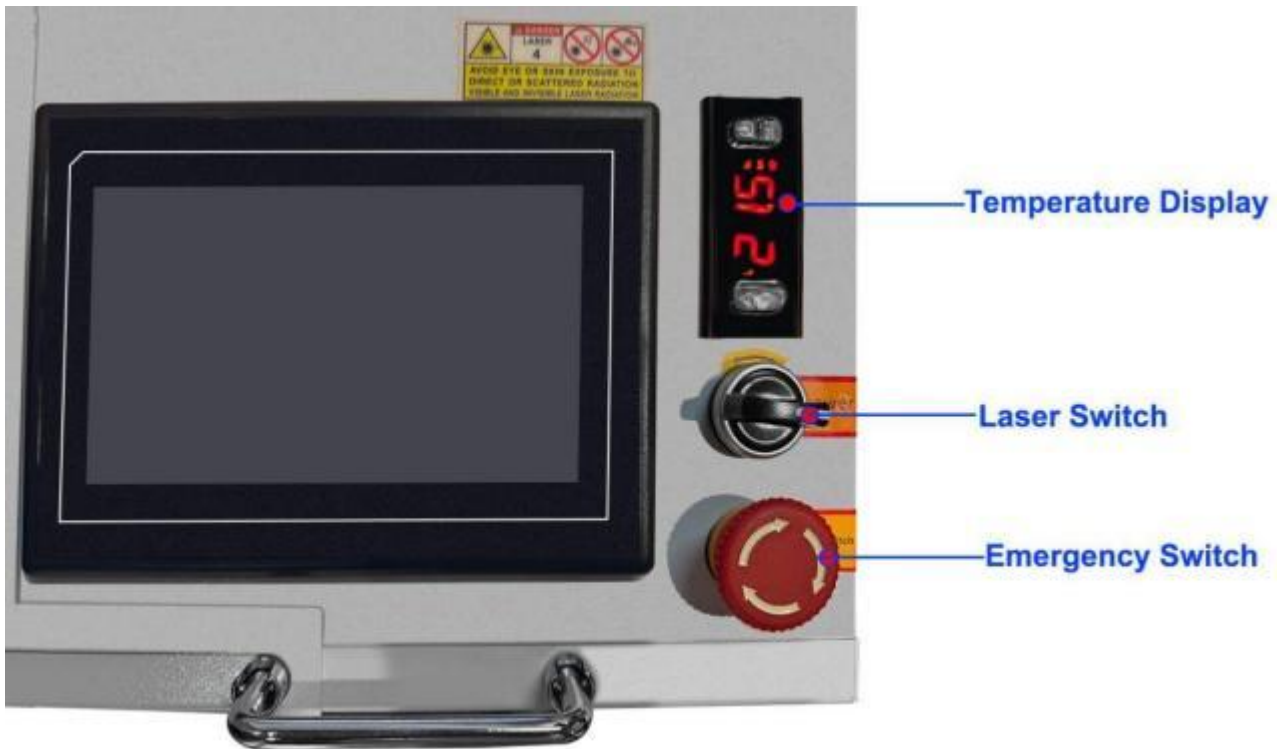
>>

### 4.1.3 Welding Parameters

<b>Specialized Capacitor Storage Welding - F150 (1)</b>							
<b>Material and Thickness</b>	<b>Scanning speed</b>	<b>Laser Power</b>	<b>Scan Type</b>	<b>Number of scans</b>	<b>Linear Selection</b>	<b>Pitch</b>	<b>Spiral Diameter</b>
Copper-aluminum composite 1.0*aluminum 1.0	300	1000W		1		0.5	0.8
Copper-aluminum composite 2.0*aluminum 2.0	300	1300W		1		0.5	0.8
Copper-aluminum composite 3.0*aluminum 3.0	150	1500W		1		0.3	0.8
Aluminum 1.0*Aluminum 1.0	300	900		1		0.5	0.8
Aluminum 1.5*Aluminum 1.5	300	1100		1		0.5	0.8
Aluminum 2.0*Aluminum 2.0	300	1300		1		0.5	0.8
Aluminum 3.0*Aluminum 3.0	150	1500		1		0.5	0.8
Stainless steel 1.0*stainless steel 1.0	300	650		1		0.5	0.8
Stainless steel 1.5*stainless steel 1.5	300	750		1		0.5	0.8
Stainless steel 2.0*stainless steel 2.0	300	900		1		0.5	0.8
Stainless steel 3.0*stainless steel 3.0	200	1500		1		0.5	0.8
Stainless steel 1.0*stainless steel 1.0	300	650		1		0.5	0.8
Stainless steel 1.5*stainless steel 1.5	300	750		1		0.5	0.8
Stainless steel 2.0*stainless steel 2.0	300	900		1		0.5	0.8
Stainless steel 3.0*stainless steel 3.0	200	1500		1		0.5	1.2

### 4.1.4: Start welding

- (1) Turn on the “Laser Switch---Emergency switch(Keep the switch in a pop-up state)”.  
When you turn off the machine, “Emergency switch--Laser Switch”



(2) Click “Laser enable” on screen



(3) Double click laser switch on welding gun and keep click the button, start welding.



## 4.2 Welding Mode

If you install the welding gun to swing arm, please uninstall the welding gun from swing arm.

### 4.2.1: Change the welding head mode



### 4.2.2 Select the cooper nozzle

Different cooper nozzle applies to different materials welding.  
For example, FAS-12 cooper nozzle mainly used for welding wire 1.2mm

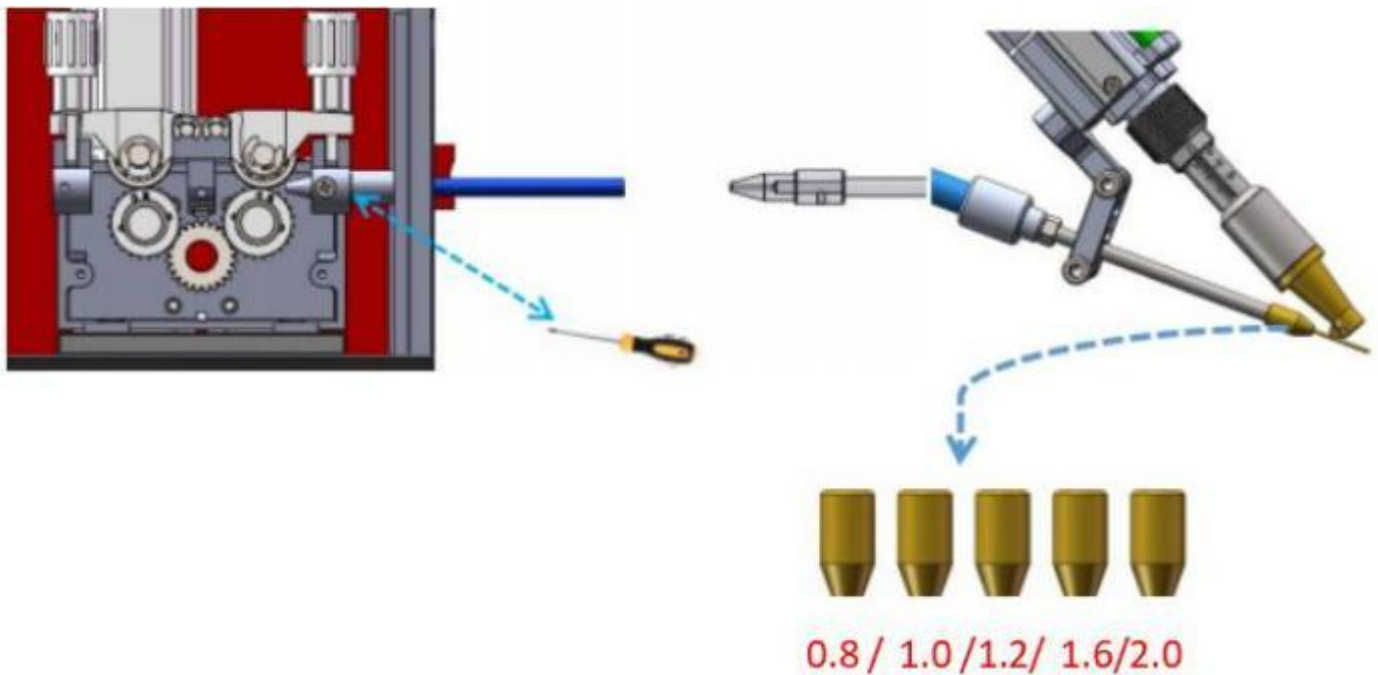
- FAS-08: The filaments below 0.8mm.
- FAS-10: The filaments below 1.0mm.
- FAS-12: The filaments below 1.2mm
- FAS-16: The filaments below 1.6mm.
- FC-20: The cutting nozzle.



### 4.2.3: Wire selection

- (1) According to the width of the weld seam choose the diameter of the welding wire.
  - Width of weld seam  $< 1.2\text{mm}$ , Recommend 0.8mm welding wire
  - Width of weld seam  $< 1.5\text{mm}$ , Recommend 1.0mm welding wire
  - Width of weld seam  $< 2.0\text{mm}$ , Recommend 1.2mm welding wire
  - Width of weld seam  $< 3.0\text{mm}$ , 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)

#### 4.2.4 Welding wire connect to welding head

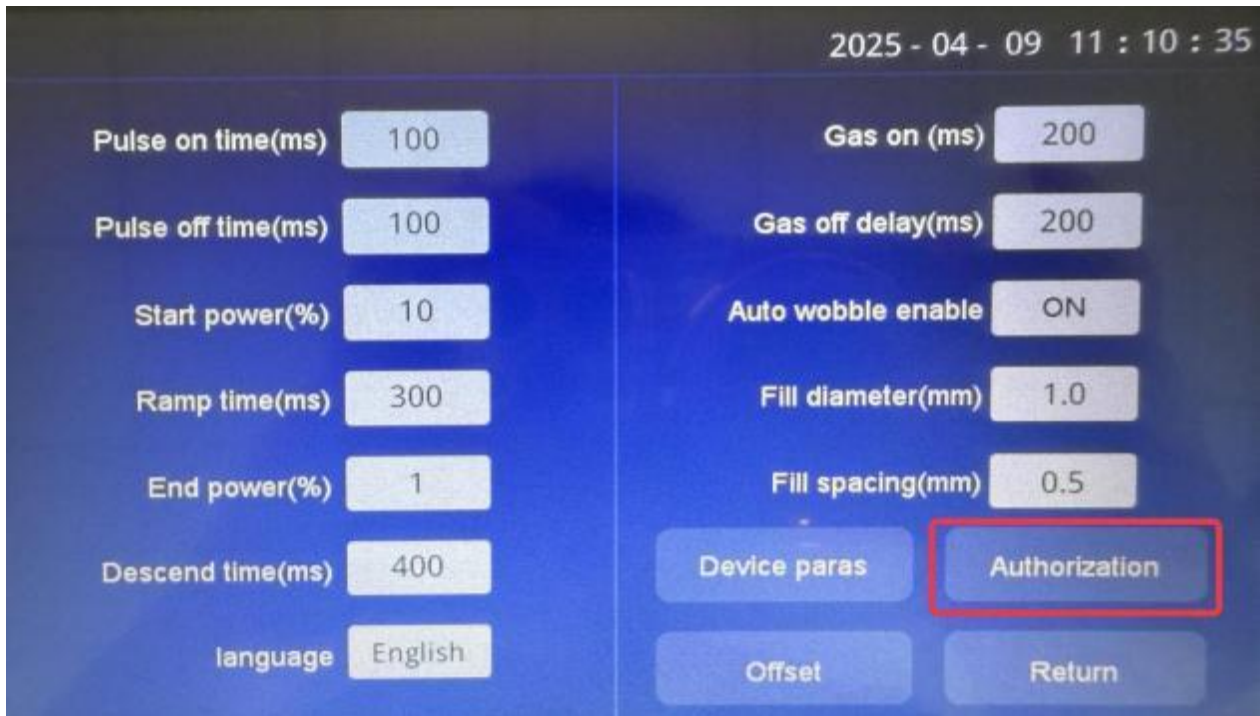


#### 4.2.5: System switch and Setting welding parameter in control screen

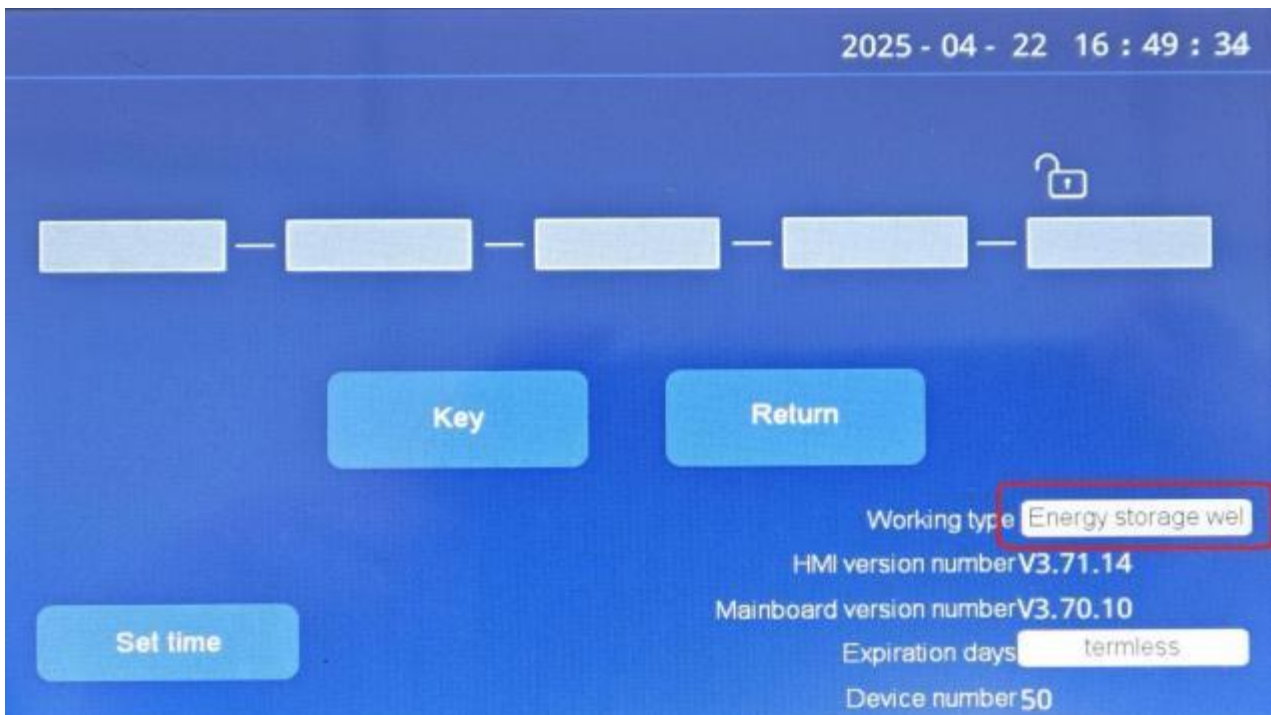
(1) Click “System parameter”



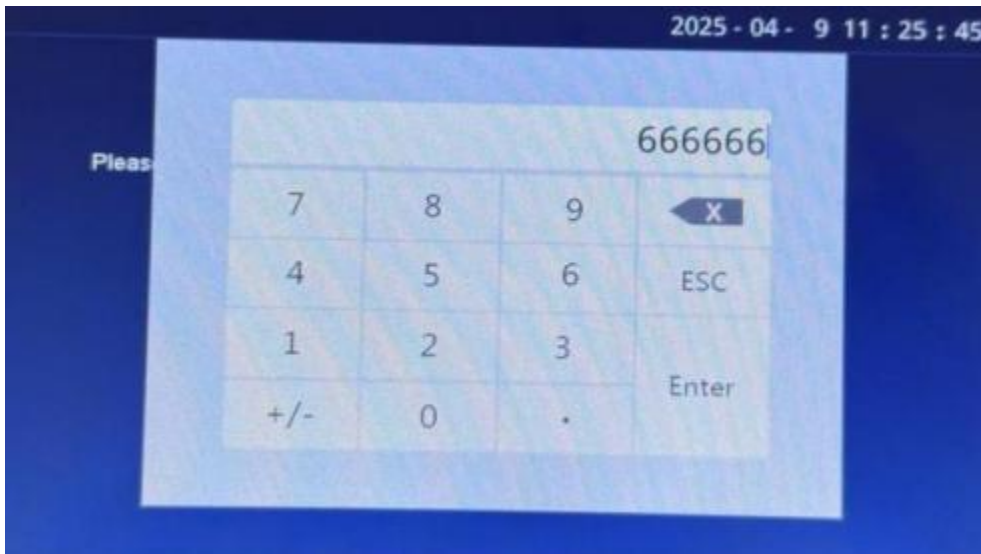
(2) Click “Authorization”



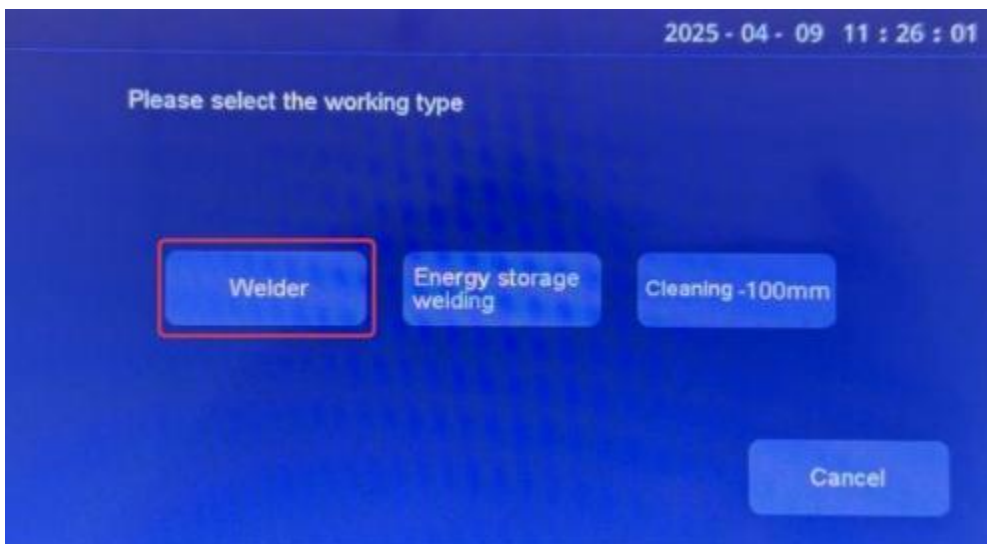
(3) Click “Working type”



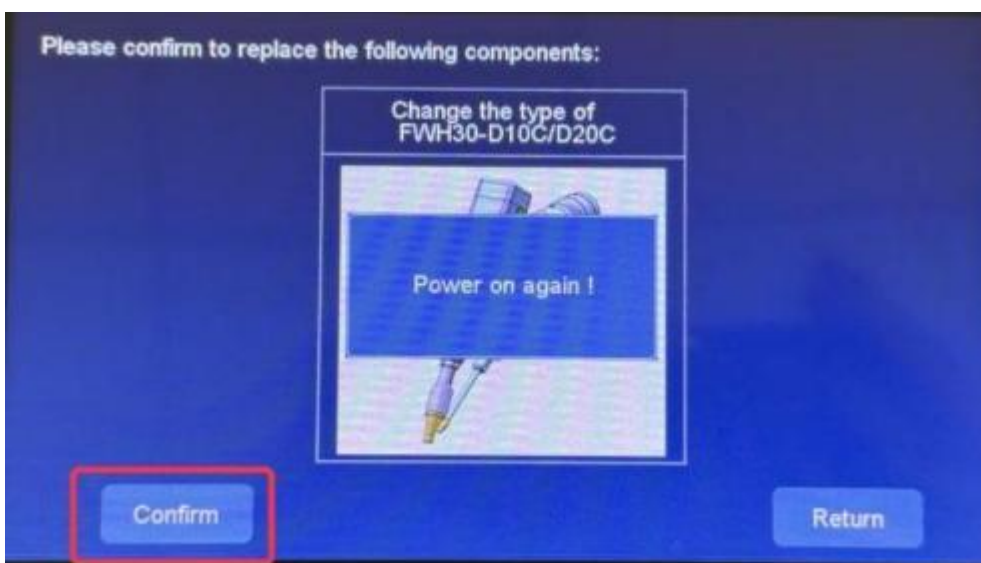
(4) Enter Password: 666666



(5) Click “Working type”



(6) Click “Confirm”



(7) Restart machine, then go to the welding homepage.



When switch to cleaning mode or back to energy welding mode, it is the same operation as above.

(8) Click “Process library”



(9) Choose the parameter as you need.



#### 4.2.6 Start welding

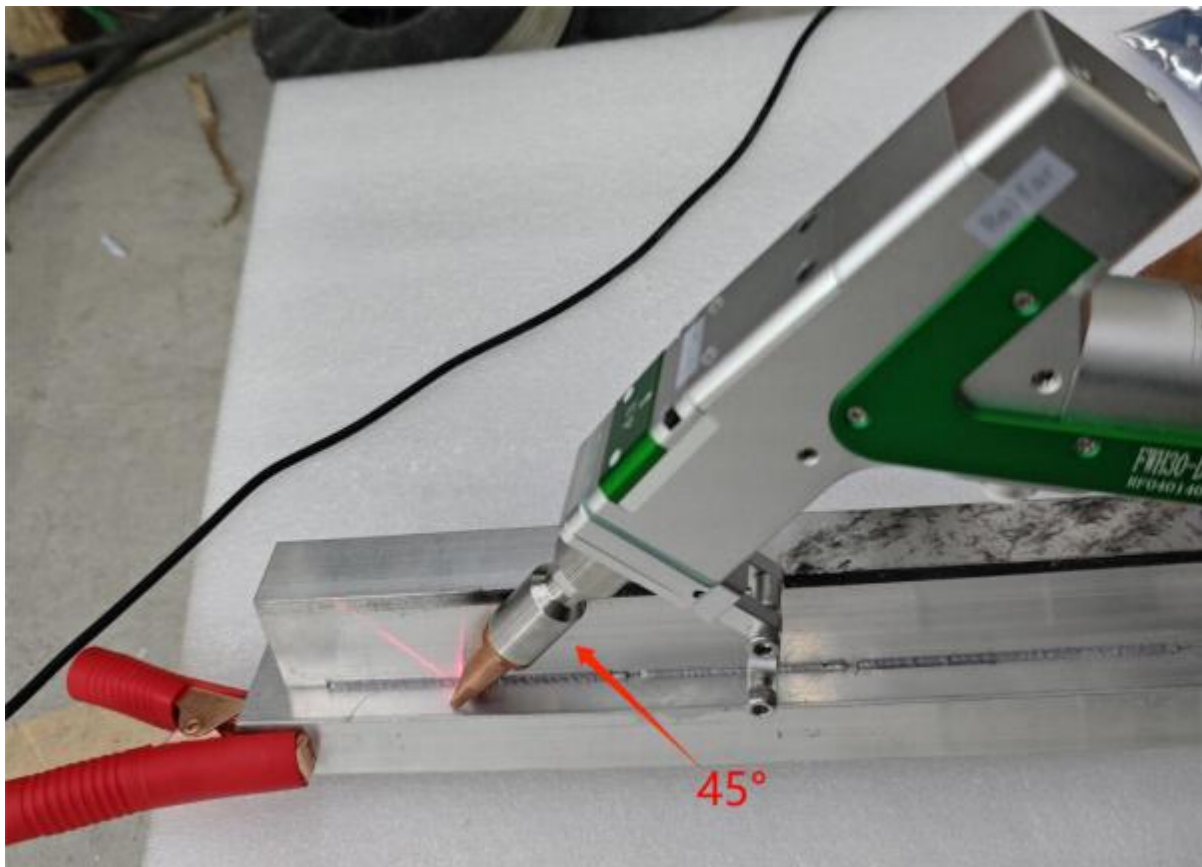
(1) Adjust the scale tube with 0mm, which is the best focal length.



(2) Keep the "Laser on"



- (3) Double click laser switch on welding gun and keep click the button, start welding, and safety clip is clamp on the work piece.
- (4) When welding, keep the welding head at a 45 ° with work piece you welding.



## 4.3 Cutting Mode

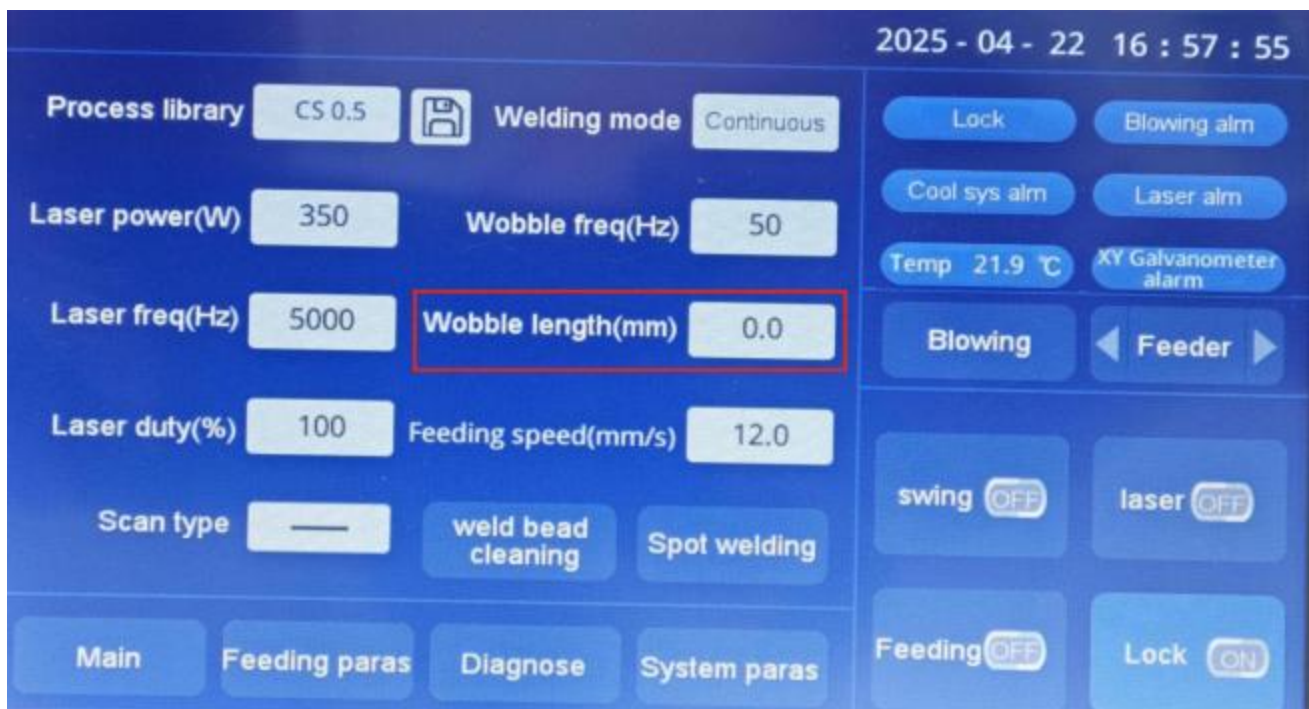
### 4.3.1 Change the cutting nozzle

- Please replace the cutting copper nozzle



### 4.3.2 Parameter setting

- Set “Wobble length” as 0mm, “Peak power” as your need, the max is the machine power.



The following is laboratory data on welding and cutting, for reference only. Please refer to the actual situation for details

Continuous Laser	1500W	2000W
Cutting thickness of carbon steel and stainless steel	0-5mm(MAX 8mm)	0-6.5mm (MAX 10mm)
Cutting thickness of Aluminum	0-2mm(MAX 2.5mm)	0-2.5mm(MAX 3mm)

### 4.3.3 Start Cutting

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



## 4.4 Welding seam cleaning mode

### 4.4.1 Change the welding seam cleaning nozzle



### 4.4.2 Parameter setting

(1) Click “weld bead cleaning”



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

Max “Scan width” is 12mm, the power needn’t set too high, usually is 300W.

### 4.4.3 Start weld seam cleaning

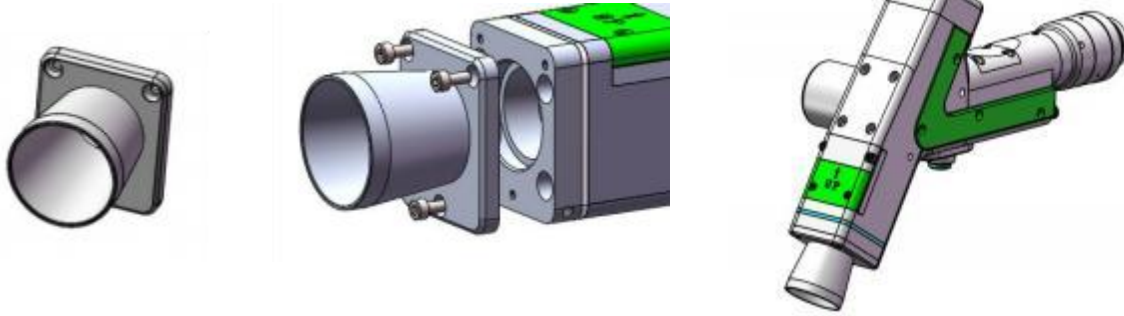
- Clamp the safety clip onto the welding gun
- Double click laser switch on welding gun and keep click the button, start weld seam cleaning.



## 4.5 Cleaning mode

### 4.5.1 Remove the copper nozzle, install the cleaning module





#### 4.5.2 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 is130mm.
- At the focusing lens F150,the maximum cleaning width is 30mm.

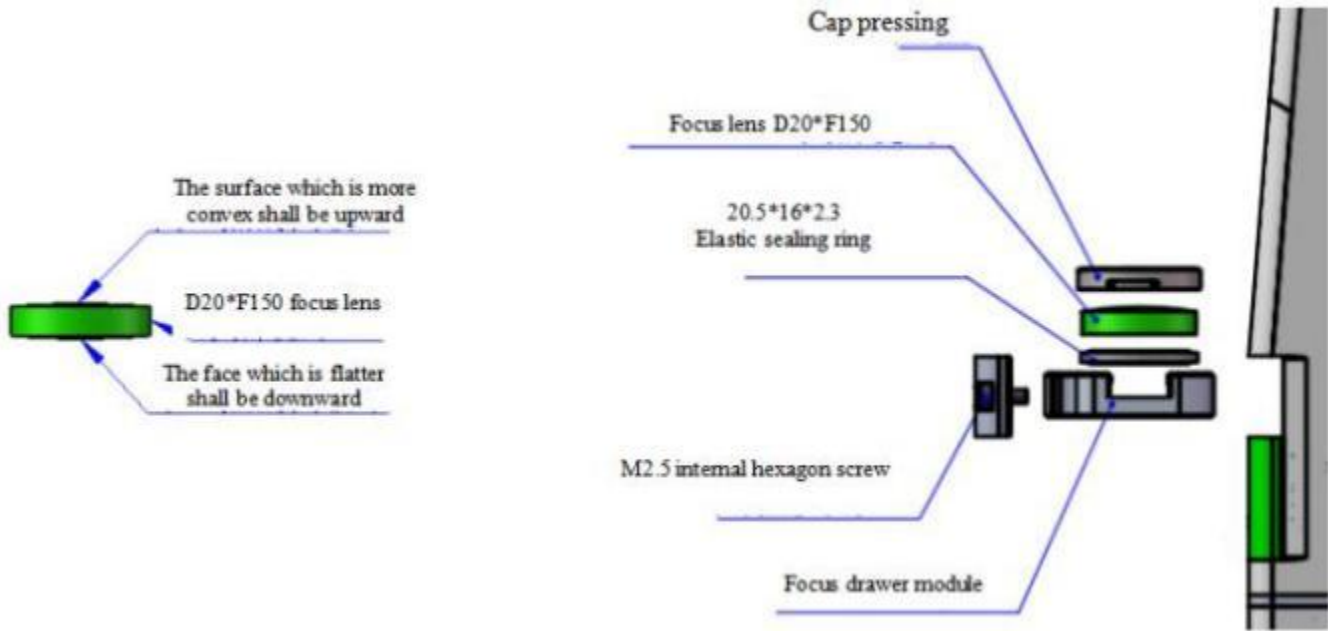
Step 1: Loosen the M2.5 hex socket head cap screw in the figure by hand with a 2mm hex wrench.

Step 2: Take out the focus drawer module by direct drawing/pulling in the horizontal direction.

Step 3: Seal the port with textured paper to prevent the dust from entering the cavity, resulting in pollution.

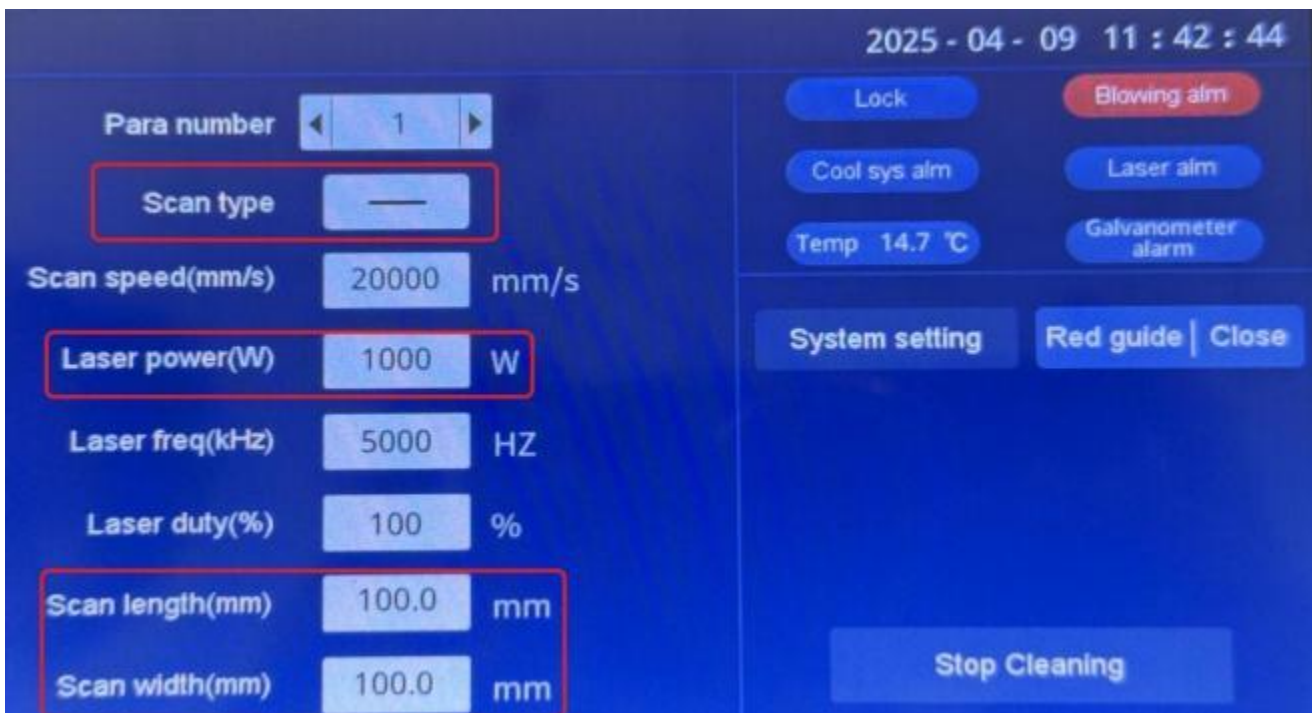
Step 4: Rotate the gland for 90° after pressing it downward gently and take out the gland by two bosses aligning to left/right opening to replace the focus lens.

(Note: orientation of installed lens in the concave and convex direction)



### 4.5.3 Parameters setting

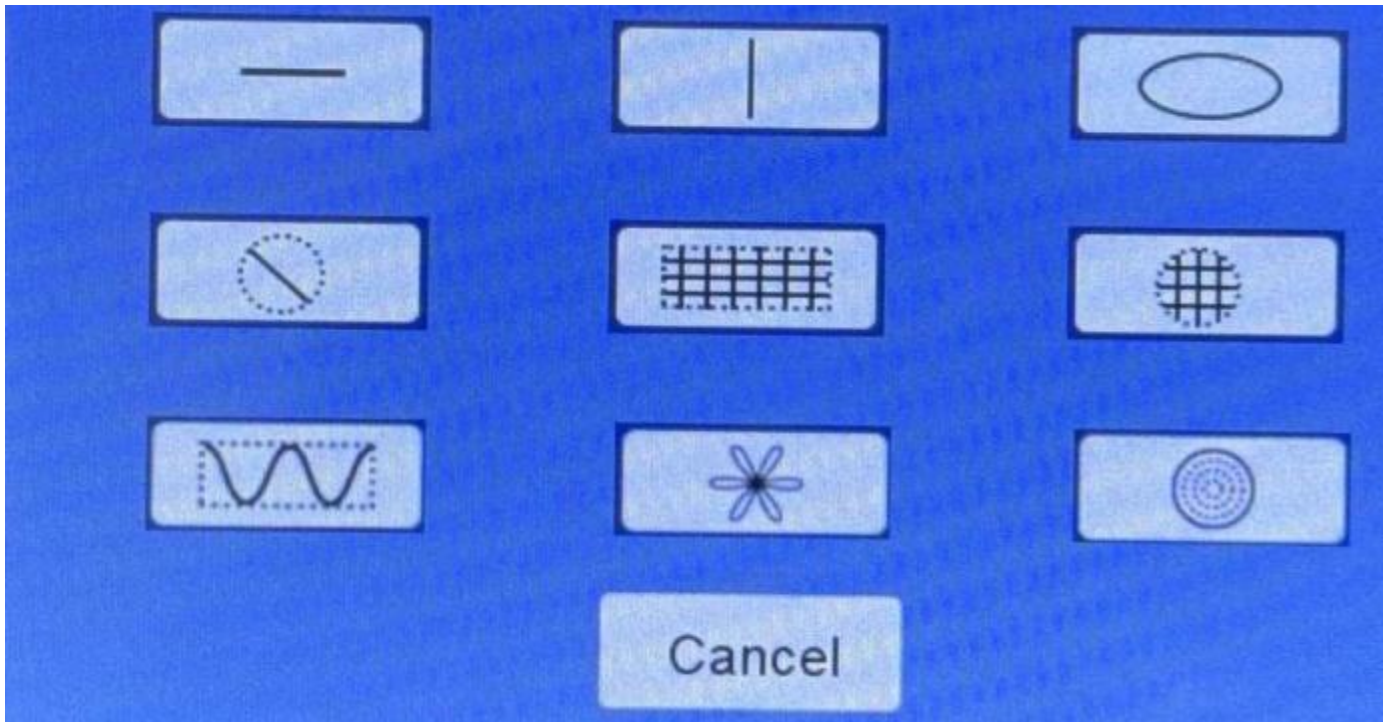
Switch to cleaning system and go to cleaning mode homepage.



Adjust the “Scan type” “Laser power” “Scan length” “Scan width” as your requirement.

Scan width must  $\leq 100\text{mm}$ , If not, it will burn your welding head.

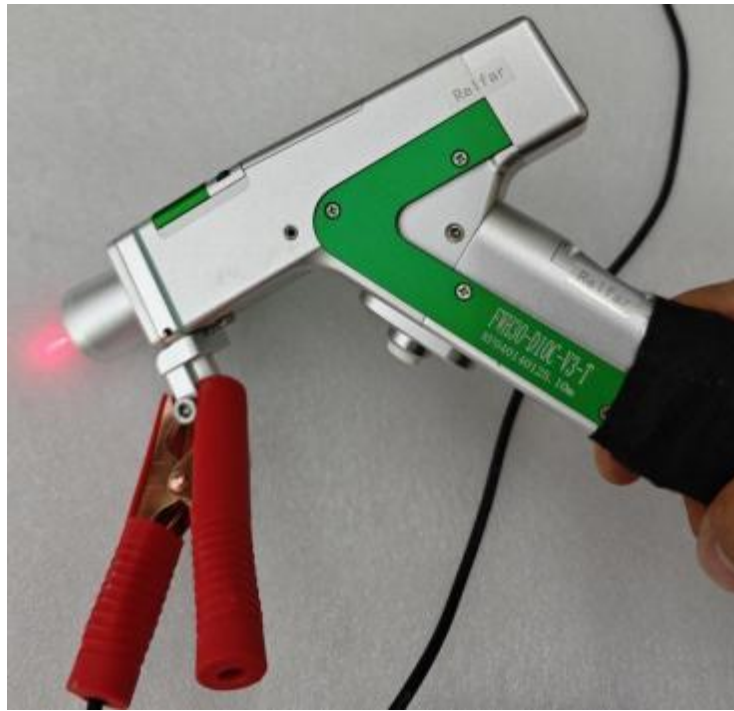
When use cleaning function, peak power no more than 1200W.



9 kind of scan types for cleaning mode

#### 4.5.4 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 need replace protective lenses:

- (1) Check the protective lens. If there is obvious burning on the surface of the protective lens, replace it directly.
- (2) 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:

The disassembly and assembly shall be completed in a clean place. When the lens are dismantled, the dust-free gloves or dust-free fingerstall.

#### (1) Replace the protective glass 01

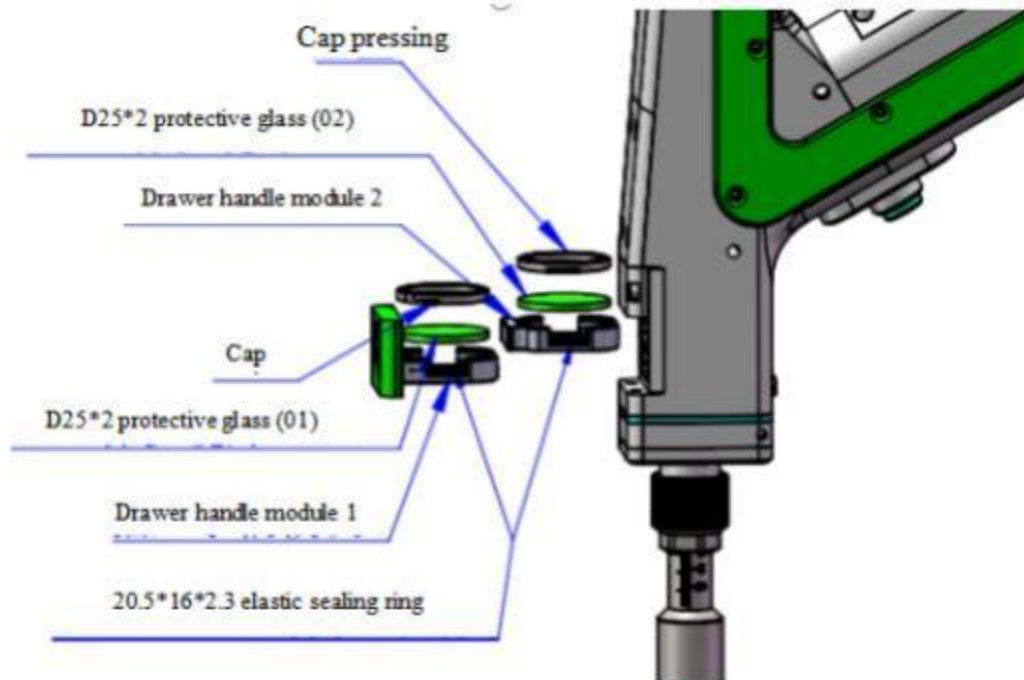
Step 1: hold both sides of the handle of the green drawer module 1 with hands to draw out the protective glass in the horizontal direction. Pay attention to dust prevention and seal the exposed window on the cavity with textured paper to prevent the dust from entering the cavity, resulting in pollution, and then replace the protective glass.

Step 2: Gently press the gland down for 90° rotation, and loosen it when two lugs align to two notches to take out the gland to replace the protective glass.

#### (2) Replace the protective glass 02

Step 1: Take out the green drawer handle module 1 to take out the handle module 2 in the horizontal direction. Pay attention to dust prevention and seal the exposed window on the cavity with textured paper to prevent the dust from entering the cavity, resulting in pollution, and then replace the protective glass.

Step 2:Gently press the gland down for 90° rotation, and loosen it when two lugs align to two notches to take out the gland to replace the protective glass.



## 5.2 When need add antifreeze

### Cooling system water temperature setting:

Water cooler  $25 \pm 1$  °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  $-10\text{ }^{\circ}\text{C}$ , 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.

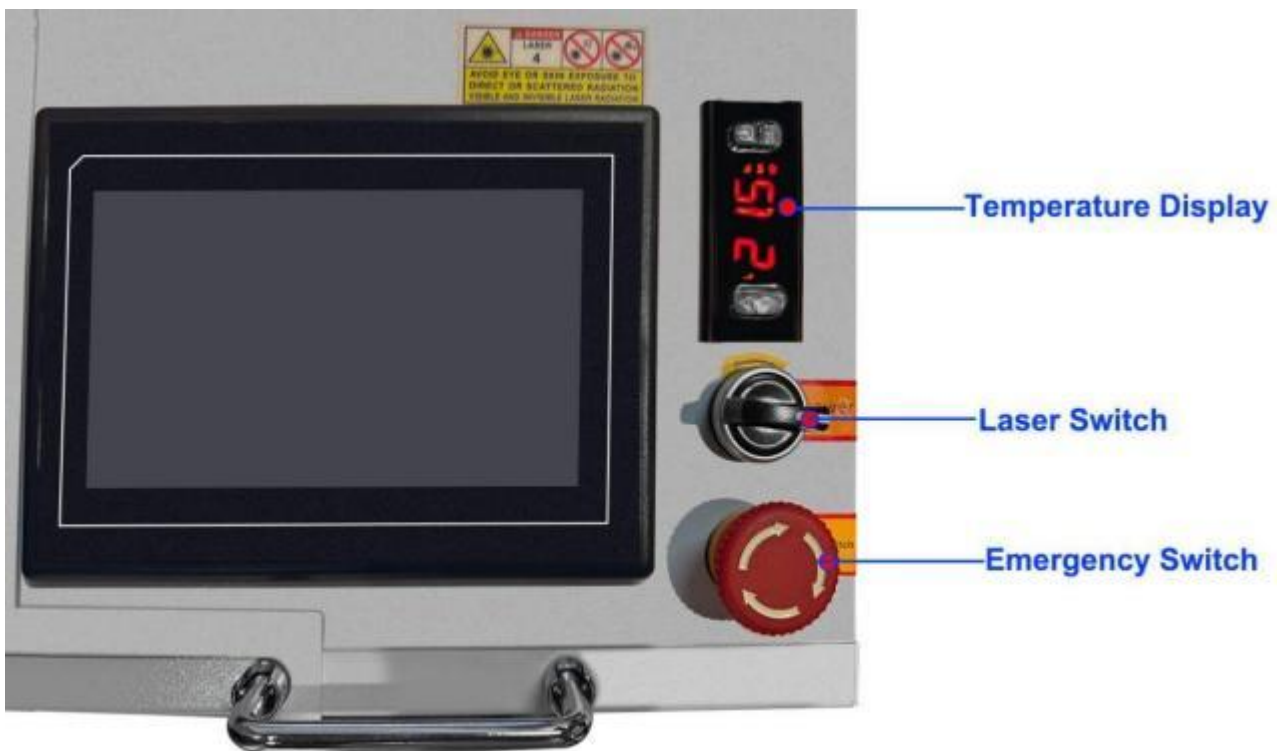
## 6. Q&A

### 6.1 No laser come out

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



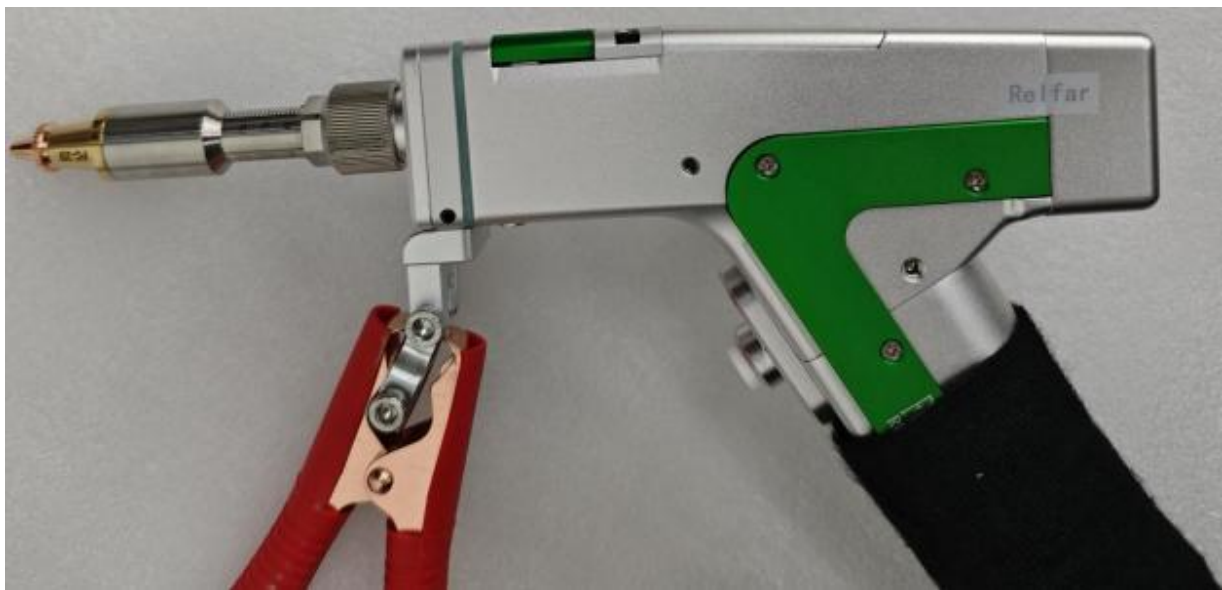
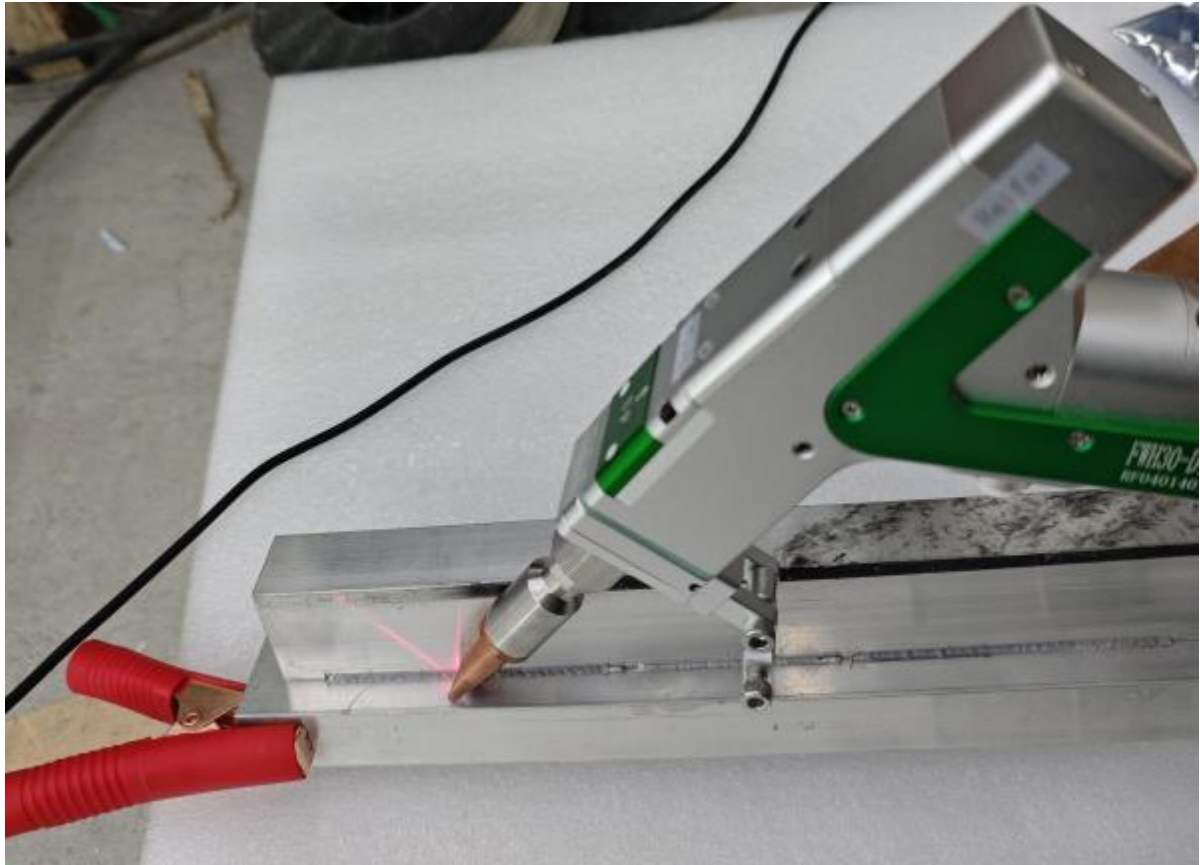
- (2) Check if water temperature reaches 20°C via the temperature display



(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

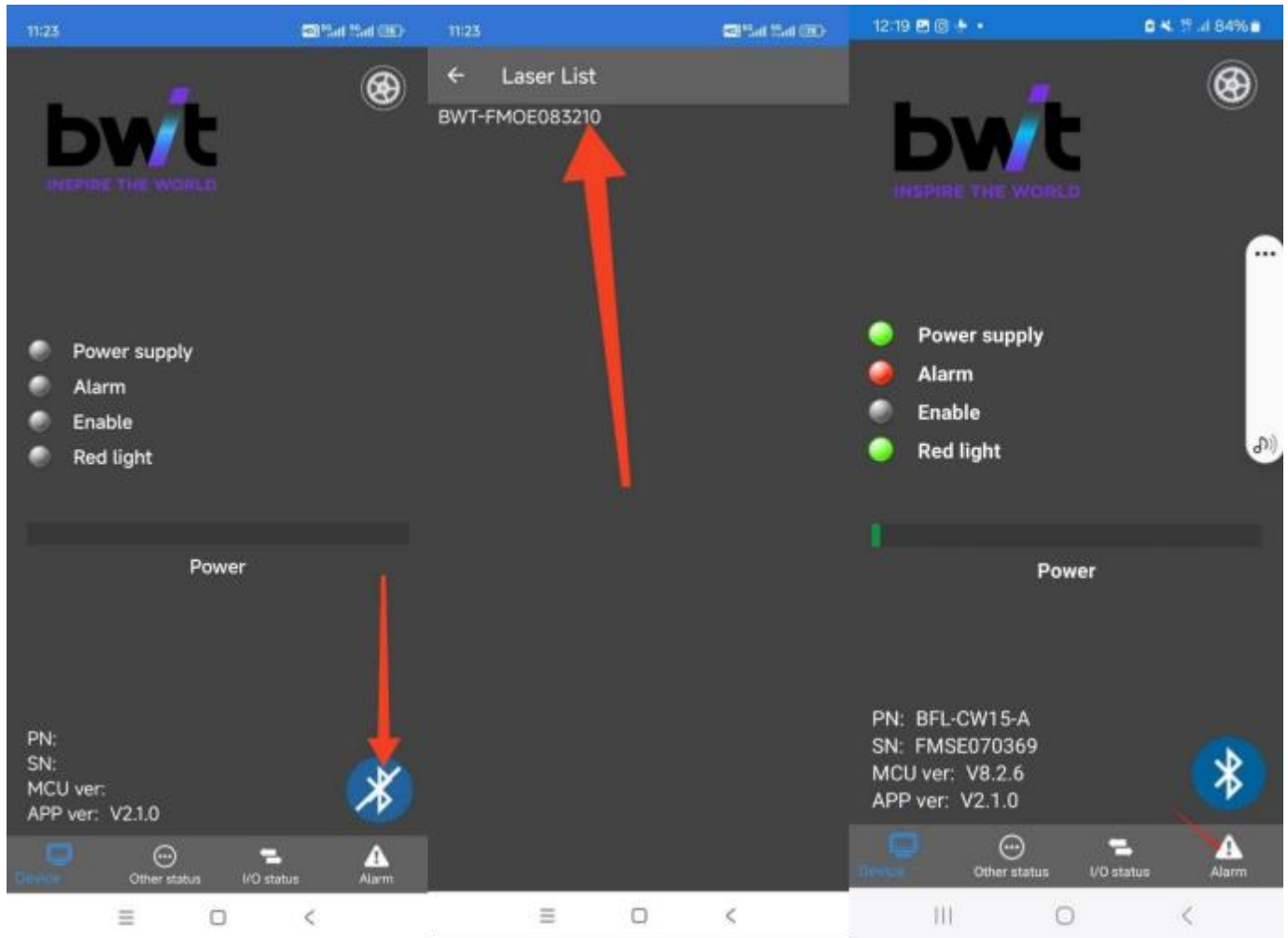


### ❖ How to download APP

(1) Scan the QR code with a browser, choose download Android version or IOS version.



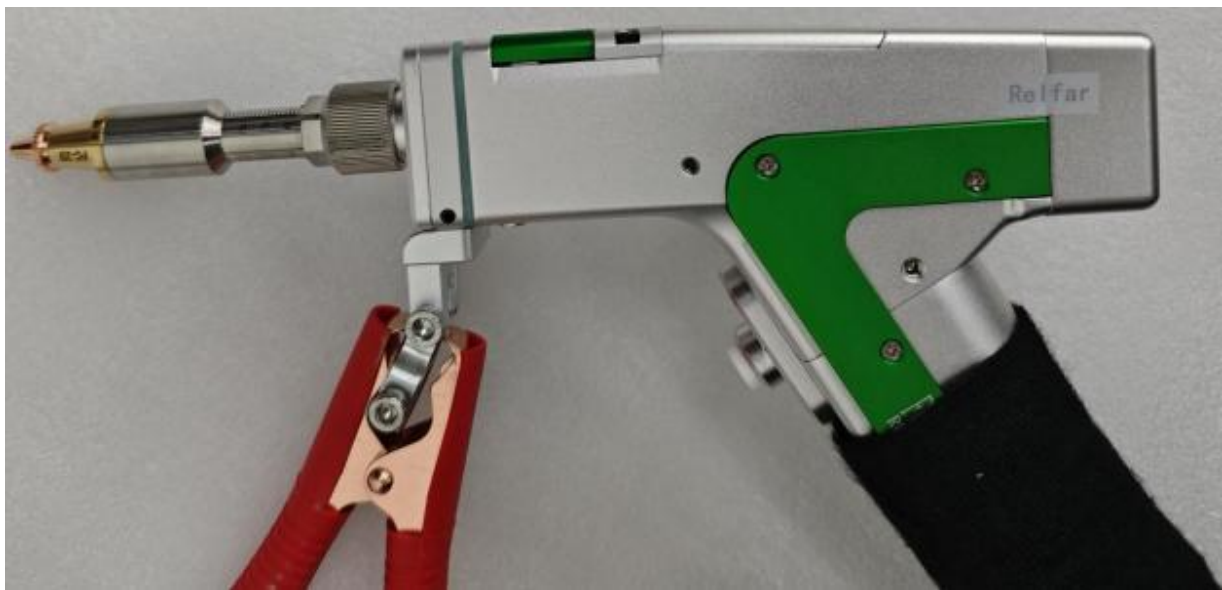
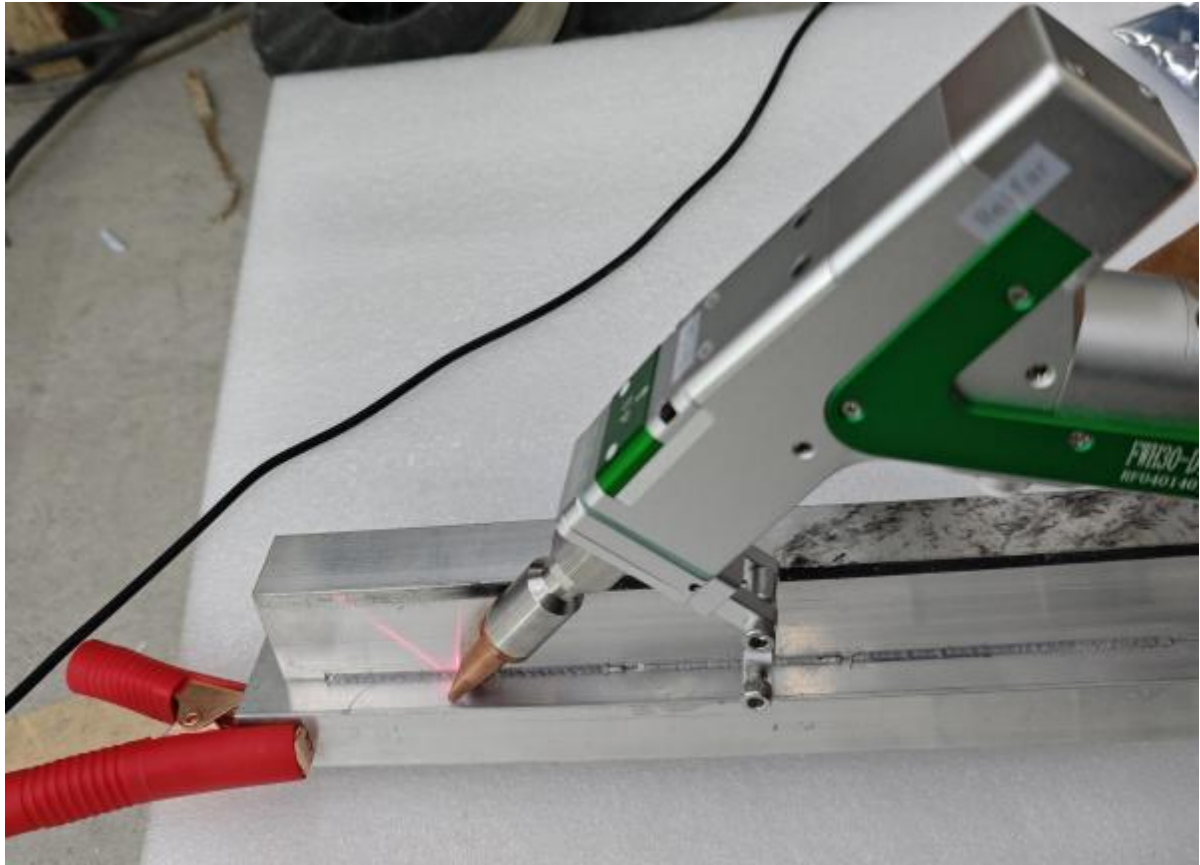
(2) Connect the Bluetooth for laser source, connect Bluetooth. Click the alarm to check error code, then send result to us.



## 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.