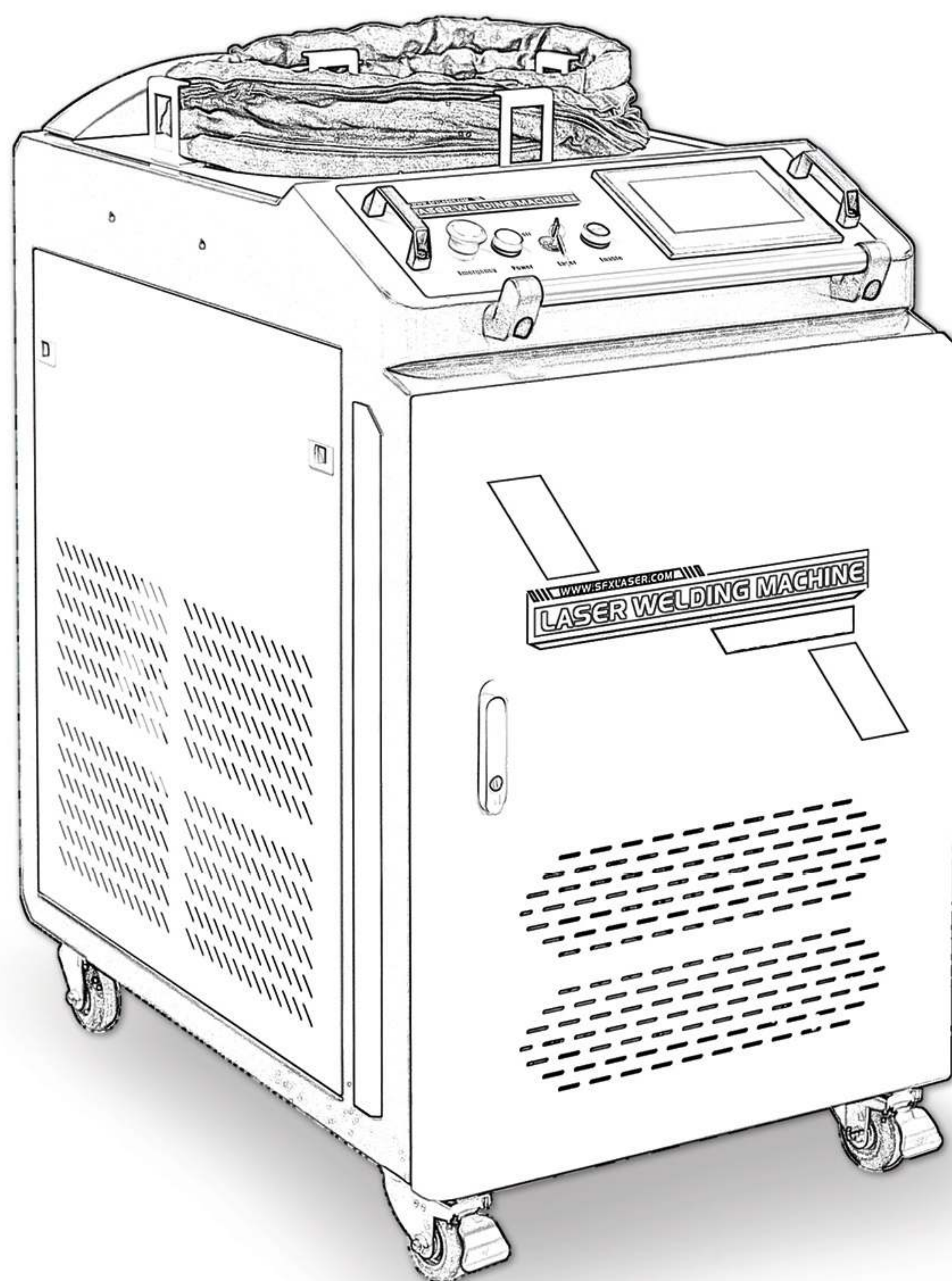




LASER WELDING MACHINE

LW SERIES



OPERATION MANUAL



LUOYANG XINCHENG PRECISION MACHINERY CO., LTD.

Notice

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

	<p>It is prohibited to use this product in places with flammable and explosive materials.</p>
	<p>When welding highly reflective materials (copper, aluminum, etc.), it is forbidden to have people stand around to avoid damage caused by reflected light.</p>
	<p>It is forbidden to aim the welding head at the human body to avoid injury.</p>
	<p>During the welding process, it is forbidden to weld with the welding head vertical to the seam.</p>
	<p>Make sure that the equipment is reliably grounded.</p>
	<p>When welding, make sure that the safety clip is clamped to the workpiece being welded or the welding table to avoid failure of the protection function.</p>
	<p>When using for the first time, if the red light cannot completely come out of the copper nozzle of the welding head, be sure not to emit laser.</p>
	<p>This product is a Class IV radiation laser. Goggles must be worn.</p>
	<p>Protective gas pressure $\geq 0.15\text{MPa}$</p>
	<p>The minimum bending radius of the integrated cable should be more than 200mm.</p>

Content

Notice	1
I Scope of application	4
II Product Description	4
1.Main technical parameters.....	4
2.Equipment structure diagram.....	5
III Installation and use instructions	6
1.Installation and use requirements.....	6
2.Operation precautions	6
3.Installation steps	7
IV Operation Process	9
V Laser Welding Controller Setting Instructions	10
1.Main operation interface	10
2.Technology interface	11
3.Setting interface.....	13
4.Monitor interface	15
VI Wire Feeder Setting Instructions	16
1.Main operation interface	16
2.Setting interface.....	16
VII Fault analysis and troubleshooting	17
VIII Maintenance	18
IX Transportation and storage	19
X Warranty terms	20

I Scope of application

This product can be used for welding carbon steel, stainless steel, aluminum, copper and other materials. According to different welding process requirements, the copper nozzle of the welding head can be replaced for riveting welding, spot welding, tailor welding, stitch welding, etc.

II Product Description

1.Main technical parameters

Model	LW-1000	LW-1500	LW-2000
Laser Power	1000W	1500W	2000W
Laser Wavelength	1080±1nm		
Operating Mode	Continuous or modulated		
Maximum Modulation Frequency	100KHz		
Scan Width	0-6mm		
Integrated Cable Length	10m (customizable)		
Recommended Maximum Welding Thickness	3mm	4mm	5mm
Input Voltage	AC220V±10%	AC220V±10%	AC220V±10%

Model	LW-1000	LW-1500	LW-2000
Input Power	6KW	8KW	10KW
Cooling Method	Water cooling (distilled water, deionized water or pure water as medium)		
Protective Gas Pressure	≥0.15MPa		
Machine Size	870*560*1050mm		
Net Weight	145kg	165kg	180kg

2. Equipment structure diagram



III Installation and use instructions

1. Installation and use requirements

Item	Requirements
Environment Temperature	0°C ~35°C
Environment Humidity	40%-80%
Power Configuration	Refer to II (1) technical parameters
Protective Gas Pressure	≥0.15MPa
Cooling Medium	Deionized, distilled water or pure water
Grid Ground	Comply with the national standard

1.1 Ensure that the equipment is installed and used steadily to avoid damage caused by falling or tipping.

1.2 Ensure good ventilation and keep at least 60cm of space around the equipment for heat dissipation to avoid affecting performance due to poor heat dissipation.

1.3 Check the protective lens before use. If it is dirty, please clean in time. (Use a cotton swab dipped in special cleaning solution and scrub the protective lens counterclockwise from the center to the edge.) When cleaning, pay attention to lens protection and avoid scratches.

1.4 The hand-held welding head should be handled with care.

2. Operation precautions

2.1 Please refer to the main technical parameter table for the

operating voltage. If not, please use a transformer.

2.2 In the cold environment, please ensure that the cooling medium is not frozen, to avoid the abnormality of the cooling system.

2.3 Protect it from rain and water when outdoor use.

2.4 When the temperature of the water chiller is lower than 22°C, the laser low temperature alarm will occur, and it needs to be preheated. When the temperature reaches 22°C, please turn it off and then turn it on again to clear the alarm.

2.5 Avoid installation and use in places with a lot of dust, oil mist and high-frequency interference sources.

3. Installation steps



3.1 Connect the laser welding machine host power cord.

3.2 Connect protective gas.

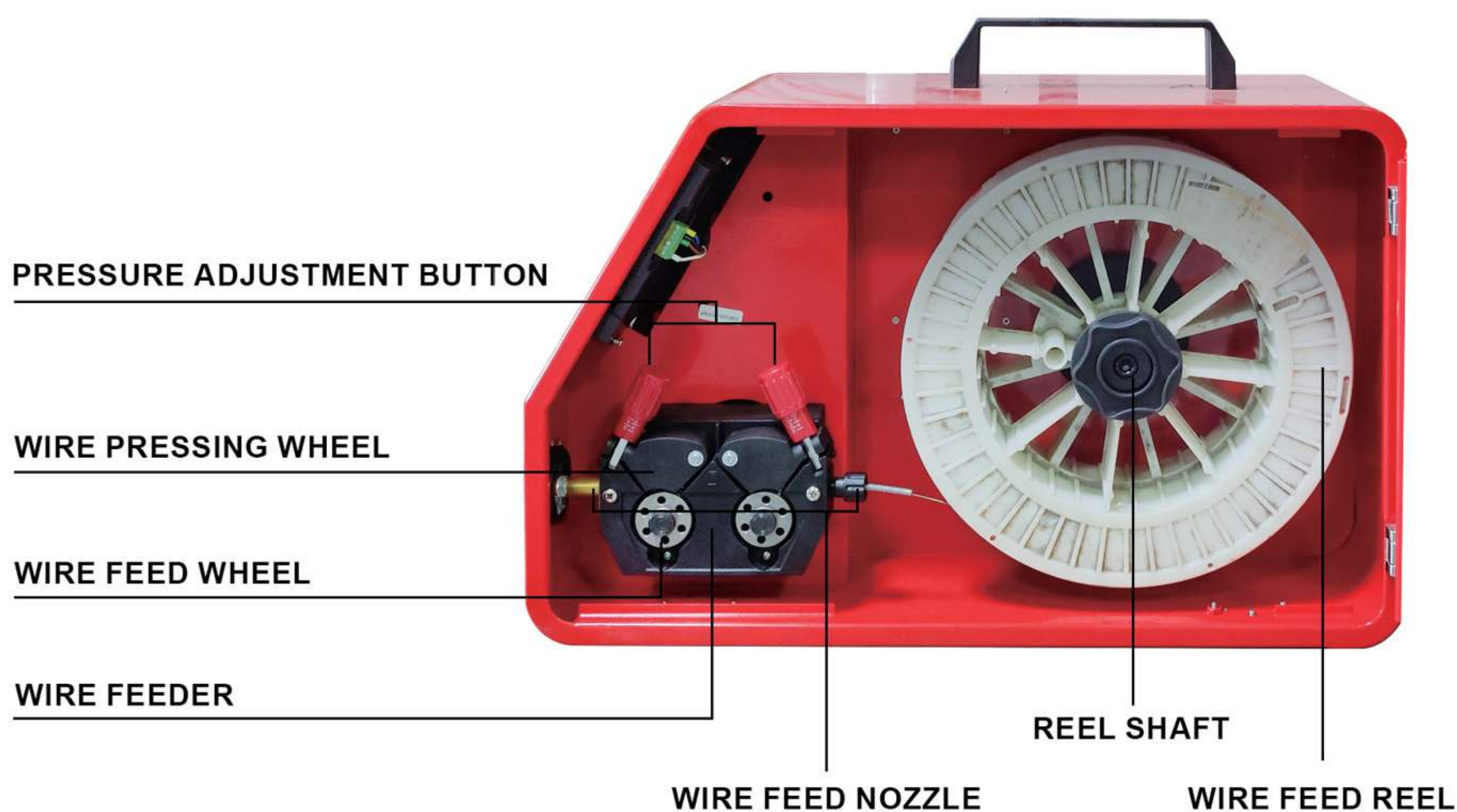
3.3 Connect the control cable between the laser welding machine host and wire feeder.

3.4 Connect the wire guiding tube.

3.5 Install the welding wire.

Put the wire feed reel into the reel shaft. Align the small hole of the wire feed reel with the positioning pin of the reel shaft. Open the pressure adjustment knob outward, open the wire pressing wheel, insert the welding wire from the right side of the wire feed nozzle, and pass through the two wire pressing wheels. Insert the welding wire into the wire guiding tube and ensure that the welding wire is exposed from the wire guiding nozzle of the hand-held welding head. Fasten the wire pressing wheels at both ends. Adjust the pressure adjustment knob to ensure the wire feeding force.

For detailed steps, please watch the video tutorial.



IV Operation Process

1. Start-up and preparation

- 1.1 Check the water level of the chiller to ensure that the water level is within the standard area.
- 1.2 Connect the power cord (pay attention to grounding).
- 1.3 Turn on the main power, turn off the emergency stop, and turn on the laser switch.
- 1.4 Open the protective gas and adjust the air pressure to $\geq 0.15\text{MPa}$.
- 1.5 Turn on the wire feeder and set the wire feeding parameters.
- 1.6 Clamp the safety clip to the welding workpiece or welding table.
- 1.7 Turn on the enable. Take out the hand-held welding head gun and ensure that the bending radius of the integrated cable shall not be less than 200mm.

2. Manual focus is required when using the device for the first time.

- 2.1 Loosen the fixing screws of the front and rear telescopic tubes of the handheld welding head, and insert all the telescopic tubes into the gun head until they cannot be inserted. Adjust the laser power to 30%.
- 2.2 Clamp the safety clip on the handheld welding head and stop the wire feeder. Trigger the laser against the iron plate or stainless-steel plate, find the point with the largest laser energy from far to near, where the sparks are scattered, which is the focus of the laser.
- 2.3 After finding the focus, pull the telescopic tube out to make the distance between the focus and the telescopic tube about 4mm, and lock the telescopic tube.

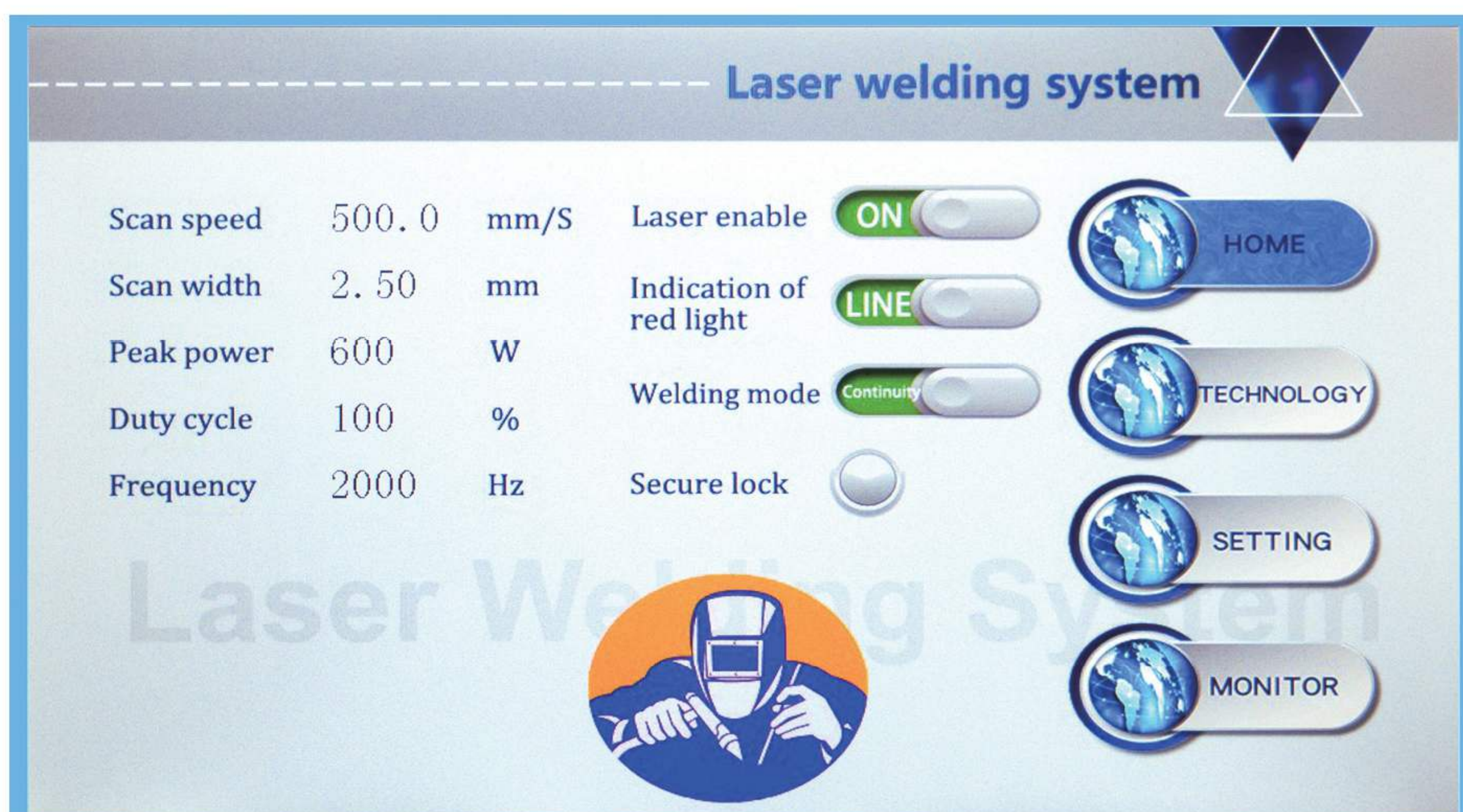
3. Adjust the wire feed nozzle to fit the copper nozzle so that the welding wire is in the middle of the copper nozzle.

4. Remove the safety clip and clamp it to the welding workpiece or welding table.
5. Set the welding parameters according to the requirements of the workpiece to be welded.
6. When the handheld welding head touches the surface of the workpiece, press the switch button of the handheld welding head to start welding.
7. Shutdown: Turn off the wire feeder, turn off the enable, the laser switch, press the emergency stop, and shut the main power supply. For detailed steps, please watch the video tutorial.

V Laser Welding Controller Setting Instructions

After the power is turned on, the welding control screen of the laser welding controller will enter the main operation interface.

1. Main operation interface



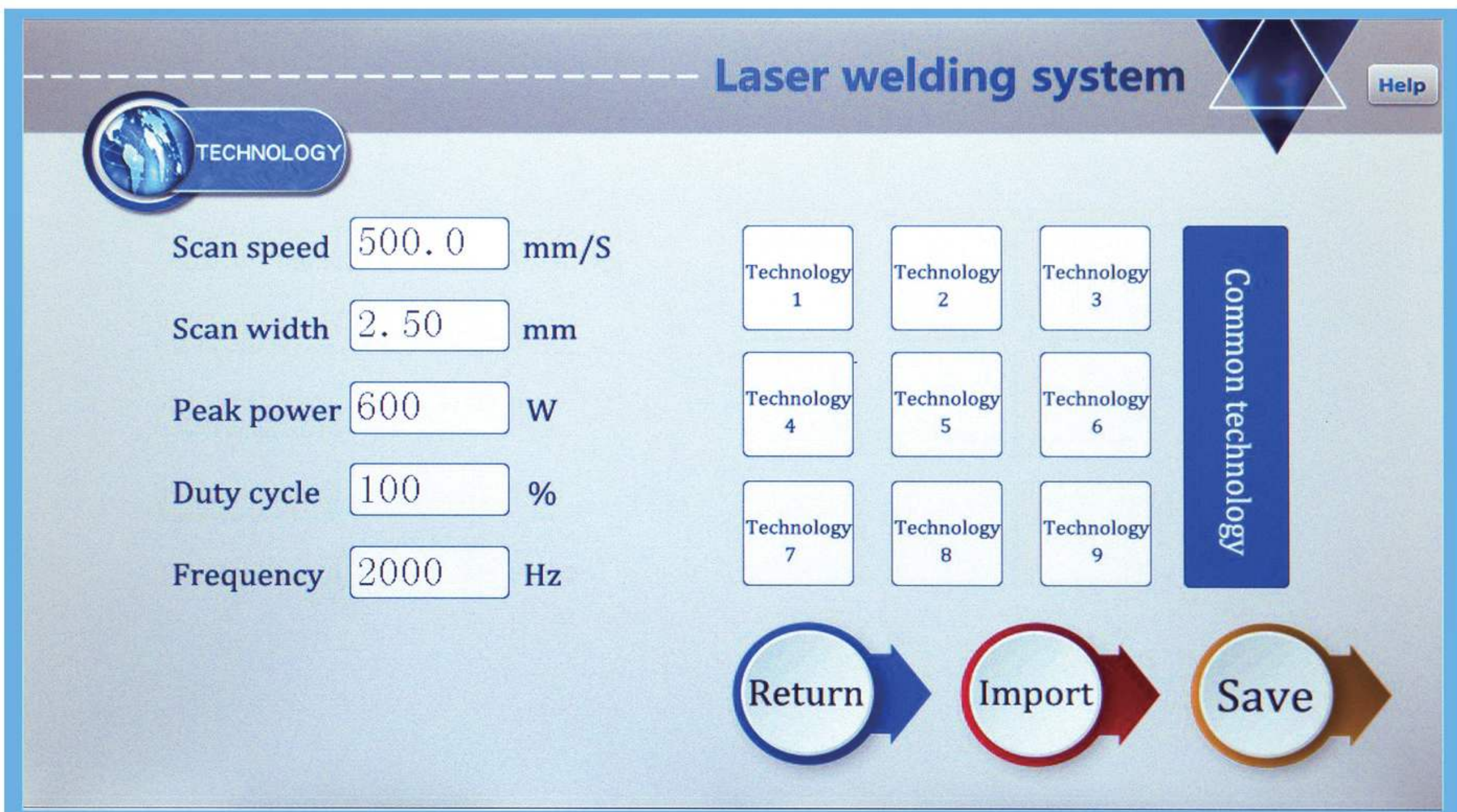
1.1 The current process parameters can be seen on this interface.

1.2 When the power is turned on, the laser enable is ON, and the red light indicates LINE.

1.3 The safety lock is gray by default, and it turns green when the welding head touches the workpiece.

1.4 The welding mode defaults to continuous. When it is set to spot welding, the laser can be intermittently emitted for spot welding operations.

2. Technology interface



The technology interface contains the set process parameters, which can be modified as needed. They can be saved in the quick process and clicked to import when using (modify-save-import).

Item	Function	Explanation
Scan speed(mm/s)	Set the laser scanning speed during welding	2-6000
Scan width(mm)	Set laser swing width during welding	0-6
Peak power(W)	Maximum power during operation, less than or equal to laser power	
Duty cycle(%)	Set the duty cycle of the modulation signal period, and the default is 100%.	0-100
Frequency(Hz)	Set the frequency of the modulating signal, and the default is 2000 Hz.	5-5000

2.1 The most commonly used scanning speed is 300mm/s and the width is 2.5mm. The scanning speed is limited by the scanning width: $10 \leq \text{scanning speed} / (\text{scanning width} * 2) \leq 1000$. If it exceeds the limit, it will automatically become the limit value. When the scan width is set to 0, it will not scan (ie point laser).

2.2 The peak power should be less than or equal to the laser power (if the laser power is 1000W, the value should not be higher than 1000).

2.3 Process reference value (subject to actual conditions)

Material	Material Thickness mm	Wire Feeding Speed mm/s	Scanning Speed mm/s	Scanning Width mm	Power W	Welding Wire mm	Recommended Protective Gas
Stainless Steel	1	90	300	2.5	400	1.0	Argon
Stainless Steel	2	75	300	3	700	1.2	
Stainless Steel	3	60	300	3.5	900	1.6	
Carbon Steel	1	90	300	2.5	400	1.0	Argon Helium
Carbon Steel	2	75	300	3	650	1.2	
Carbon Steel	3	60	300	3.5	900	1.6	
Aluminum	2	60	300	2.5	700	1.0	
Aluminum	3	60	300	3	900	1.2	

3. Setting Interface

Laser welding system Help

SETTING

Laser power W Scan correction Spot welding type Fish Scale

Open gas delay mS Laser center offset mm Laser alarm level Low

Off gas delay mS Spot welding duration mS Chiller alarm level Low

Laser starting power % Spot welding interval mS Pressure alarm level Low

Laser on progressive time mS Temperature alarm threshold °C

Laser off power %

Laser off progressive time mS

welding wire delay mS

Language

Save **Return**

3.1 The default password is 123456.

3.2 The laser power is the maximum power of the laser used.

3.3 Click the help at the top right, and long press "Restore Factory Settings" to restore the factory settings.

Item	Function	Explanation
Laser power (W)	The power of the laser used	
Open gas delay (ms)	Set the air blowing time in advance before welding starts	200-3000
Off gas delay (ms)	Set the time to keep blowing air after welding	200-3000
Laser starting power (%)	Laser power when laser is emitted	0-100
Laser on progressive time (ms)	The time required for the initial power to gradually increase to 100% when the light is emitted	
Laser off power (%)	Laser power when the light is off	
Laser off progressive time (ms)	Time required for gradual transition from 100% power to off optical power	
Welding wire delay (ms)	Wire feed advance time relative to the light signal	
Scan correction	Set scan correction for target line width/measure line width	0.01-4

Item	Function	Explanation
Laser center offset (mm)	Set the center offset, decrease to move left, increase to move right	-3~3
Spot welding duration (ms)	Light emission time after pressing the welding head switch button	
Spot welding interval (ms)	Downtime between spot welds	
Temperature alarm threshold (°C)	Set the temperature alarm value, and when it is 0, no temperature alarm will be detected.	0~70

4. Monitor Interface

This interface displays the status and device information of each detection signal.

The screenshot shows the 'Laser welding system' monitor interface. It features a 'MONITOR' button with a globe icon. The interface is divided into several sections:

- Signal Status:**
 - Laser trigger signal:
 - Laser alarm signal:
 - Secure lock signal:
 - Water cooler alarm signal:
 - Pressure alarm signal:
 - PWM signal:
 - Laser enable signal:
 - Wire feeding enable signal:
 - Gas valve enable signal:
 - Analog voltage: 0 mV
- System Information:**
 - Equipment Authorization: Long term validity
 - Equipment number: 22142122
 - Manufacturer number: 0
 - System Version: 522 - 544 - 518
- Operational Data:**
 - Fan current: 76 mA
 - Motor temperature: 20.7 °C
 - Cooling Fan: NORAML

A 'Return' button with a right-pointing arrow is located at the bottom right of the interface.

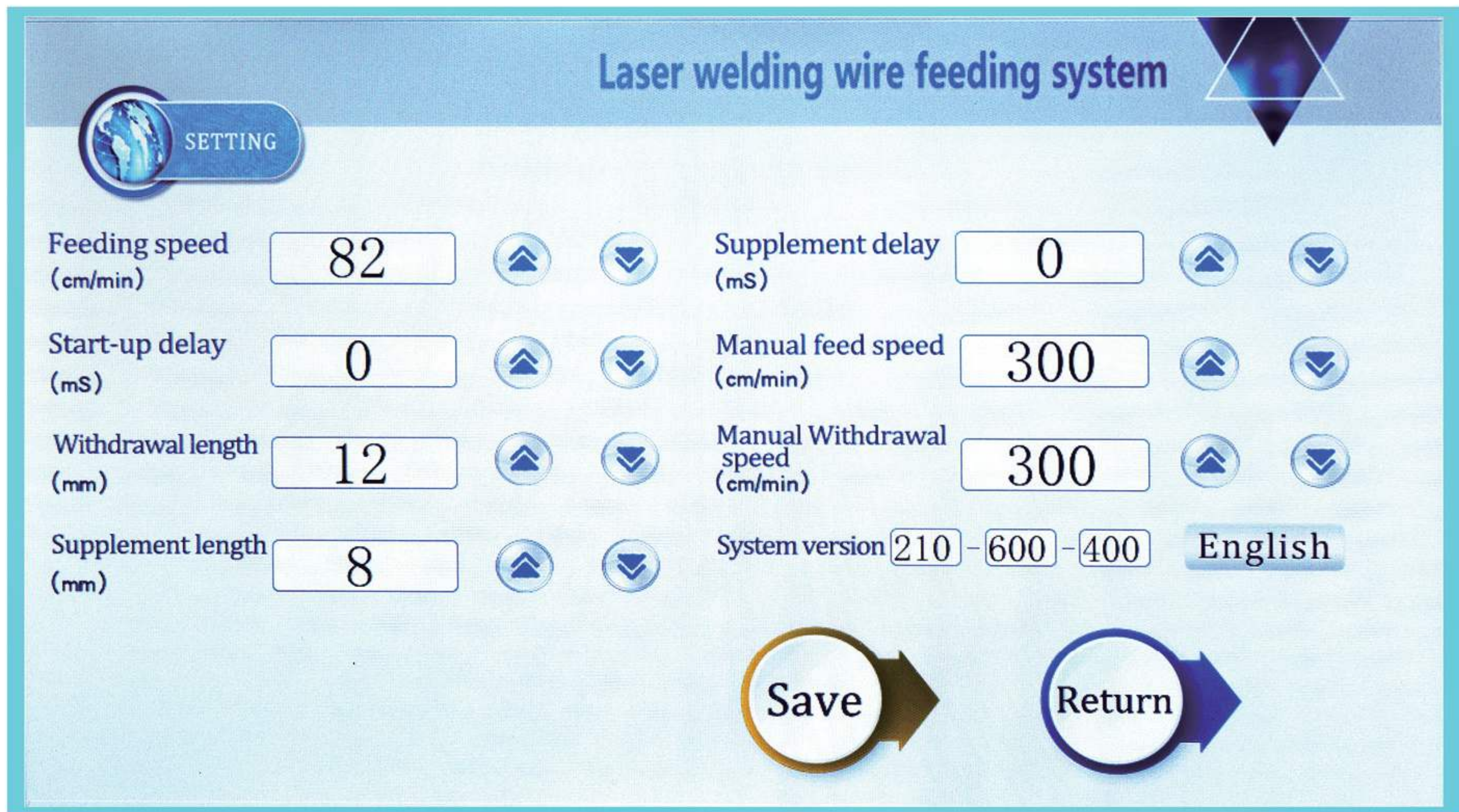
VI Wire feeder setting instructions

1. Main operation interface: The control screen of the wire feeding will enter the main operation interface after turning on the power.



Item	Function
Feeding speed(cm/min)	It shows the wire feeding speed, and it can be adjustable by pressing the up and down button.
Manual wire feeding	Press them and wire feeding will begin feeding or drawing, and the speed of feeding or drawing depends on the background setting.
Manual withdrawing	

2. Setting interface: Click the Setting of the main operation interface.



2.1 The feeding speed is the default speed, and the default value will be restored after restarting.

2.2 The Start-up delay is not set by default.

2.3 Set the Withdrawal length and Supplement length as required.

2.4 When the wire feeding is stopped, the system will first withdraw a certain distance and then feed the wire for a certain distance. This function is mainly used for broken wires. When the wire is still outside at the beginning of each welding, please set the “withdrawal length” greater than “supplement length”.

VII Fault analysis and troubleshooting

Fault phenomenon	Cause Analysis	Troubleshooting method
The spot does not swing	1. The two-core wire connector of the welding head is loose. 2. The motor or the control card is damaged.	1. Tighten loose joints. 2. Contact us for after-sales service.

Fault phenomenon	Cause Analysis	Troubleshooting method
Sudden loss of energy during welding	1. There are foreign objects or damage to the optical lens. 2. The laser source is faulty.	1. If it is due to the protective lens, clean or replace it, and for other lenses, please contact us. 2. Contact us for after-sales service.
The welding head is hot	1. The optical lens are dirty or damaged. 2. Optical path deflection.	1. If it is due to the protective lens, clean or replace it, and for other lenses, please contact us. 2. Check whether the connection between the optical fiber and the welding head is loose.
Sudden stop of light emission during processing	1. The alarm was triggered. 2. The safety lock has poor contact.	1. Check if the temperature exceeds the temperature alarm threshold. 2. Check for the safety lock and other alarms on the monitoring interface.

VIII Maintenance

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

1. Handheld welding head

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

1.2 Regular inspection: When the machine is used or not used for

some time, first check the laser module, and make sure that each optical component is free from dust pollution, mildew, and other abnormal phenomena before turning it on.

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

2. Water chiller

2.1 The dust on the condenser and the dust filter needs to be cleaned regularly.

2.2 When the machine is transported or not used for a long time, the coolant should be drained.

2.3 When the temperature is lower than 2°C, please check and ensure that the chiller is working properly before using the machine to avoid damaging the laser tube, output head, and water chiller due to the solidification of the coolant.

2.4 The coolant must be replaced in the following cases

2.4.1 The filter element has been replaced.

2.4.2 After 3 months of use.

2.4.3 Use again after long-term non-use

IX Transportation and storage

1. Before moving the equipment, please remove the power cord and drain the coolant inside the system. Do not move or transport it with liquid inside.

2. When transporting or handling the equipment, please do not bump it up and down or excessively tilt it (not more than 45°) to avoid bumping, impacting and overturning.

3. During storage, drain the water in the water tank through the sewage outlet, and at the same time loosen the drain plug under the water pump to drain the remaining water in the water pump, and place it in a cool and ventilated place.

X Warranty terms

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

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

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

2. The following scopes are not covered by warranty:

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

2.2. Human-caused damage.

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

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

MAX

M0521ZCJ



LUOYANG XINCHENG PRECISION MACHINERY CO.,LTD.

ADD: No.256 East Tanggong Road, Luoyang, Henan, China, 471000

WEB: www.sfxlaser.com

TEL: +1 (240) 560-8967

EMAIL: support@sfxlaser.com