WISELASERS

Instruction Manual

WiseLaser 4 in 1 Handheld Fiber Laser Welding, Cutting, Cleaning and Seam Cleaning Machine – Water Cooled

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1 Safety

1.1 Safety

Warning: Safety Information

➢ This symbol indicates potential hazards. Whenever you encounter it in this manual or on your machine, be aware of the risk of personal injury. Follow the accompanying instructions carefully to ensure your safety and avoid danger.

Follow Safety Instructions

➢ Carefully read all safety instructions in this operator manual and the safety labels on the machine.
➢ Ensure you fully understand how to operate both the machine and its controller before use.
➢ Do not allow anyone to operate the machine without proper training and knowledge of its operation.
➢ Maintain the machine in excellent working condition, as unauthorized modifications can compromise safety and reduce its lifespan.

Electric Shock

- Electric shock can cause serious injury or death.
- Avoid contact with any electrically live components.
- Inspect equipment regularly and repair or replace any worn or damaged parts immediately.
- Always disconnect the power source before performing maintenance or repairs.
- Carefully read and follow all instructions provided in the operator manual.

Grounding

- Ensure the power cord's ground wire is securely connected to the grounding point in the disconnect box.
- Tighten all electrical connections to avoid excessive heating

Moving Parts

- Stay clear of all moving parts.
- Only qualified personnel should remove covers, panels, or guards when maintenance is required.
- Ensure all covers, panels, and guards are securely reinstalled after maintenance is complete and before reconnecting the power supply.

Welding Can Cause Fire or Explos

- Hot metal and sparks from the welding arc pose serious risks of burns and fires.
- Clear all flammable materials within 35 feet (10.7 meters) of the welding area.
- Remain alert to any indications of fire and always ensure a fire extinguisher is easily accessible.

1.2 Fiber laser Safety

1.2.1 Security Identifier

◆ **WARNING:** Describes a hazard that resulted in personal injury or death.

◆ **CAUTION:**Describes a hazard that may cause minor personal injury or damage to the product.

1.2.2 Laser Safety Grade

In compliance with European Community standards EN 60825-1, clause 9, this series of lasers is classified as high-power Class 4 devices. These lasers emit invisible radiation at a wavelength of 1080 nm, with a power range of 100-2000W, depending on the machine. Direct or indirect exposure to such high-power laser radiation can result in serious damage to the eyes or skin. Although the radiation is invisible, the laser beam can cause irreversible harm to the retina and cornea. To ensure safety, approved laser goggles must always be worn while the laser device is in operation.

	Users are required to wear appropriate laser goggles when operating this device. The goggles should be chosen based on the wavelength range emitted by the product. It is essential to ensure that the goggles provide full protection across the entire wavelength spectrum of the laser. Additionally, never look directly at the laser output head while the device is in operation.

1.2.3 Optical Safety

Dust on the end of the collimator assembly has the potential to damage the lens.

	**CAUTION:** Do not emit if the protective cover has not been removed, as this may cause damage to the lens or crystal.

1.2.4 Electrical Safety

1. Ensure the product is properly grounded through the PE line of the AC power cord. The grounding connection must be secure and reliable.

	**WARNING:** Any disruption to the protective grounding can electrify the enclosure, potentially causing personal injury.

2. Ensure that the DC power source is set to the appropriate voltage

	**CAUTION:** Incorrect wiring or power supply voltage can cause irreversible damage to the laser device.

The laser device does not require any operator-handled components. Do not attempt to open the laser cover, as this may result in electric shock and will void the warranty.

1.2.5 Other Safety Rules

1. Never look directly at the laser output head while the laser is active. Avoid operating the laser in dimly lit environments.
2. Fiber lasers should not be used in dark settings.
3. Using this device in ways not outlined in this document may compromise its safety features and void the warranty.
4. This product contains no user-serviceable parts or components. All maintenance and repairs must be carried out by Raycus. To prevent electric shock, do not break the seal or remove the protective cover. Failure to follow these instructions will void the warranty.

1.2.6 Warning:

1. Ensure the product is properly grounded before use.
2. The laser output head is connected via a fiber optic cable. Before use, carefully inspect the output head for dust or contamination. If needed, clean it using appropriate lens paper.
3. Failure to follow operating instructions may result in malfunction or damage to the laser.
4. Never install the output head while the laser is in operation.
5. Avoid direct exposure to the output head. Always wear suitable protective eyewear when operating the laser.

	◆ Avoid exposing this product to high humidity levels (above 95%). ◆ Ensure the product does not operate at temperatures below the ambient dew point, as outlined in Table 4.

Table 4

Constant Dew Point Table at Ambient Temperature and Relative Humidity									
Ambient temperature (℃)	**Maximum Relative Humidity**								
	20%	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**95%**
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

1.2.7 Attentions

Ensure the correct voltage is used as specified in Table 3. Connecting an incorrect power supply may result in device damage.

Operate the laser strictly in accordance with the control and adjustment methods outlined in this manual to avoid potential damage.

The output laser is collimated by a precision collimating lens. Maintaining the cleanliness of this lens is crucial, as contamination could harm the device.

Always cap the output head when not in use and avoid touching the output lens. If cleaning is necessary, use appropriate lens paper to prevent damage.

Failure to follow these instructions may lead to laser power loss, which is not covered under warranty.

1.2.8 MARK

Rules for Demonstration and Operation
To prioritize safety, all individuals in the room must wear laser safety glasses specifically approved for Class 4 laser protection. A protective screen must also be installed at the entrance, prominently displaying the warning: *"Enter at your own risk. Portable laser welding in progress."* Children and pets are strictly prohibited from entering the room during welding operations.

The laser device operator must be thoroughly trained in advance, gaining a clear understanding of both the risks and benefits associated with the equipment.

Warning: Significant Risks of Class 4 Lasers
Class 4 laser beams, along with their reflections, pose serious threats to both eyes and skin. Additionally, when certain materials are exposed to these beams, they may ignite or release harmful substances.

Safety Guidelines

- Class 3B and Class 4 lasers should be fully enclosed and operated as Class 1 lasers whenever possible to reduce risks. If full enclosure isn't practical, these lasers must only be used in a controlled and monitored environment to prevent unauthorized exposure.
- No one should ever be exposed to hazardous laser radiation.
- Safety measures must be in place, and all employees using the equipment should receive proper training or clear instructions.
- Employers are responsible for enforcing strict safety protocols, and employees must follow them to prevent accidents and reduce workplace hazards.

For further details, refer to our dedicated guide: ***Caution: Laser Beam***

Responsibility Disclaimer
Upon the purchase of the laser system, all responsibility for its use and any associated risks is transferred to the buyer.

1.3 Safety & Equipment environment requirements

The operating environment of the equipment should meet the following conditions

1) Laser operating environment:

No.	Object	Conditions / requirements	Remarks
1	Area	1. The ground is flat, with no shock source around it	
2	Environment	2. Clean, anti-corrosion, no high concentration of volatile gas; 3. Temperature range is 10°C-40°C and humidity is less than 70%	
3	Power Supply	4. Single-phase 220VAC ± 10V, 50Hz 5. Single-phase 220VAC ± 10V, 50Hz	2000W
4		6. Single-phase 220VAC ± 10V, 50Hz	1000W / 1500W is only 220V
5	Fibre-Optical	7. Bending radius:≥ 0.2m	

2) Auxiliary gas

Protective Gas: Use argon or nitrogen with a purity of at least 99.99%.

- Begin by verifying that the nameplate on the welding cylinder matches the required specifications for gas use, including purity and pressure.
- Next, ensure the gas is properly introduced from the cylinder to the gas inlet using the correct procedure.

Gas Flow Requirement: Maintain a flow rate of 15 L/min or higher.

3) Requirements for power supply

a. 2000W Model: Power supply for Laser source is 220V ± 10V, 50Hz

   Power Supply for Chiller & Wire Feeder: 220V ± 10V, 50Hz

   The general supply includes 3 L cables, 1 N cable, and 1 PE cable. Simply ensure the cables are connected correctly, and the machine will deliver the appropriate power as needed.

   1000W/1500W model is all 220V ± 10V, 50Hz for Laser source, Chiller & Wire Feeder.

b. The equipment must be grounded as required.
c. Power supply quality: the line voltage fluctuation is <10%.

Section 2: Technical Parameters

2.1 Technical Parameters

Model	EVO-1000W	EVO-1500W	EVO-2000W	EVO-3000W
Laser type	Continuous fiber laser			
Output rating power	1000W	1500W	2000W	3000W
Current	＜27A	＜36A	＜26A	＜45A
Voltage	220V±10V	220v±10V	220V±10V	380± 1 0V
Welding thickness	0.3mm-3mm	0.3mm-4.5mm	0.3mm-6.5mm	0.3-8mm
Power regulation range	0%～100%			
Laser central wavelength	1080±5nm			
Output mode	Continuous/modulation			
Modulation frequency	50-20000HZ			
Power instability	±1.5%			
Optical fiber output interface	QBH			
Indicating system	Red Laser			
Optical fiber core	20μm	30μm	50μm	50μm
Optical fiber length	10mm			
Welding torch cable length	10m			
Type of welding gun	Left and right oscillating galvanometer welding head			
Collimating focal distance	60mm			
Focused focal distance	150mm/200mm			
Wire feeding diameter	0.8、1.0、1.2、1.6、2.0			
Welding torch weight	1.1kg			0.8kg
Protective gas mode	Coaxial protection			
Adjustable width of weld seam	0～8 mm			
Water flow	>12L/min	>15L/min	>25L/min	>25L/min
Product mix	Integrated		Integrated	Integrated
Product size L*D*H	980*600*1150mm		1200*600*1230mm	1250*510*1170mm
Product weight	208KGS		288KG	320kg
Operating ambient temperature	-10～40℃			

Working environment humidity	<70%			
Operating voltage	Single phase 220VAC		Single phase 220VAC	Three phases 380VAC
Whole machine power	<6kw	<8kw	<10kw	<17kw

2.2 Max Welding Thickness

Metal Material	1000W	1500W	2000W	3000W
Stainless Steel	3mm	4.5mm	6.5mm	8mm
Mild Steel	3mm	4.5mm	6.5mm	8mm
Aluminium Alloy	2.7mm	4mm	5.5mm	6mm
Aluminium	2mm	3mm	4.5mm	5mm
Galvanized sheet	2.5mm	3.8mm	5mm	5.5mm
Brass	1mm	1.5mm	2.5mm	3.5mm
Red Copper	0.8mm	1.2mm	2mm	3mm

Please note: The maximum thickness mentioned above includes the use of filler wire. For gaps or seams smaller than 0.3mm, welding can be performed without filler wire. In such cases, the maximum thickness increases by 1mm with each increment.

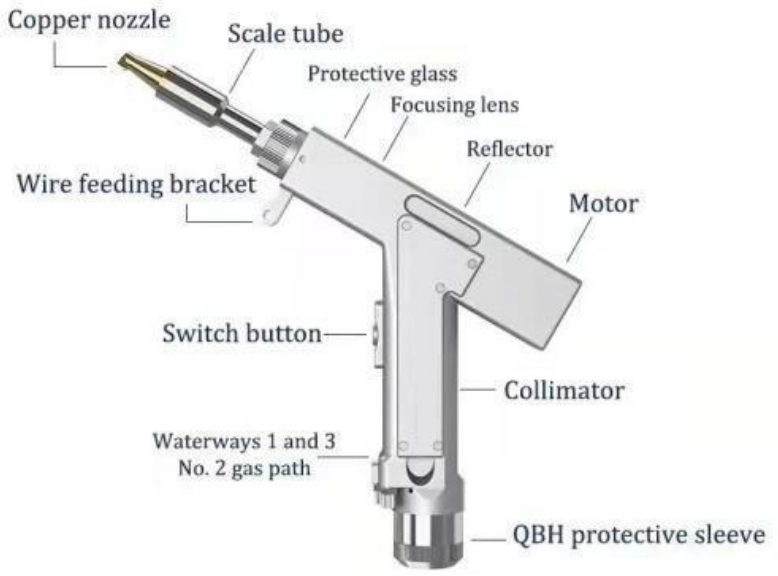
Section 3: Machine components

3.1. Overall appearance of the equipment

- Equipment split components

1000W/1500W/2000W SUP20S Welding Head

3000W SUP21S Welding Head



Note: The images shown are for reference only; the equipment provided will match the actual products.

Section 4: Operation

4.1 Check before use

(1) Ensure the equipment power cable is connected correctly: L for live wire, N for neutral wire, and PE for ground wire (1000W/1500W 220V/50Hz, or 2000W 220V/50Hz).

(2) Check that the inert gas supply is sufficient, the gas pipeline is intact, and the gas supply valve is open. Use 100% nitrogen or argon with an air pressure of 0.1-0.3MPa. Failure to connect properly can damage the lens and welding gun.

(3) Verify that the water pipeline is in good condition.

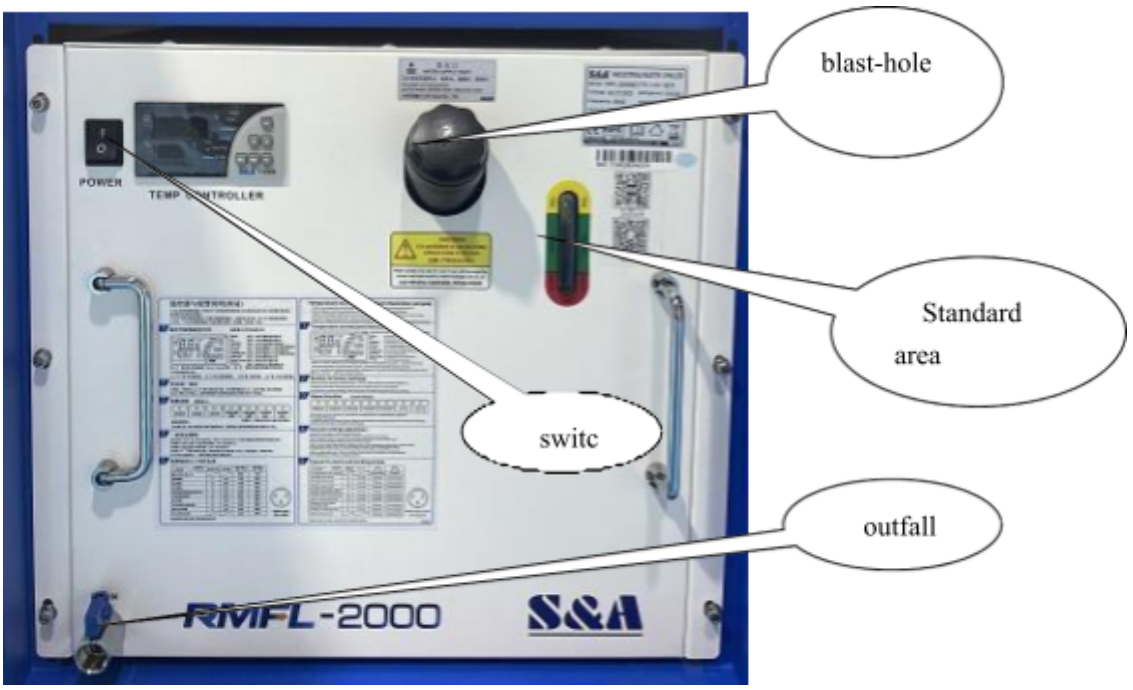
(4) Ensure the laser button or circuit breaker is switched on.

4.2 Startup

(1) Check everything before use, then turn on the power master switch.

(2) Rotate the emergency stop button clockwise to activate the bounce function.

(3) Press the chiller start button to activate both the chiller and the system card simultaneously. The display screen will turn on. For first-time use, add coolant and pure water to the water inlet until it reaches the standard level.



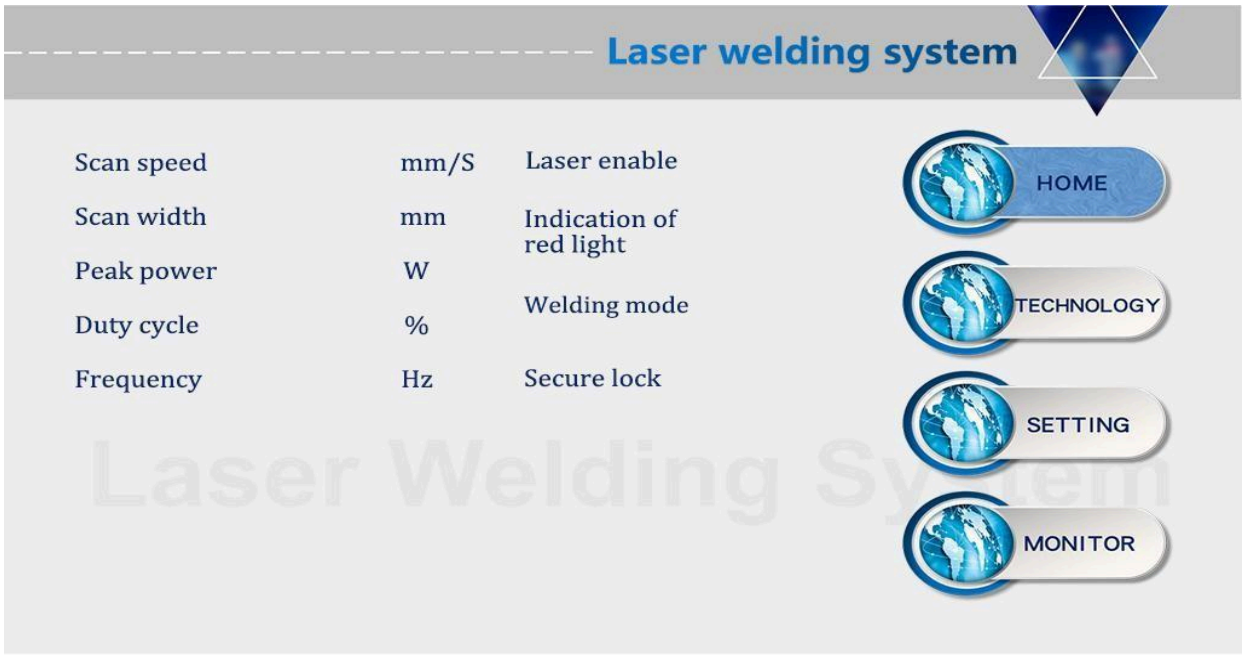
4) Press the laser start button when the water cooler temperature reaches above 19.5℃

(5) Secure the safe wire clip to the welding plate to ensure proper contact if connectivity is poor.

(6) Adjustment parameters can be seamlessly applied based on the plate thickness.

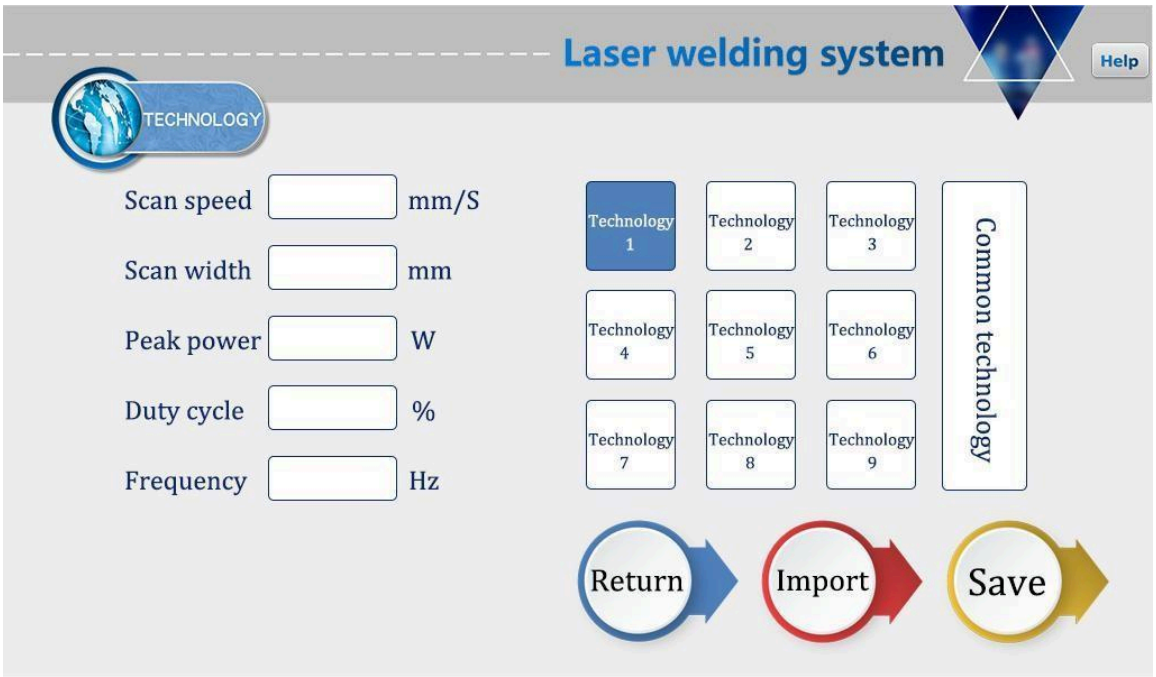
4.3 Operation and Description of the Touch Scree

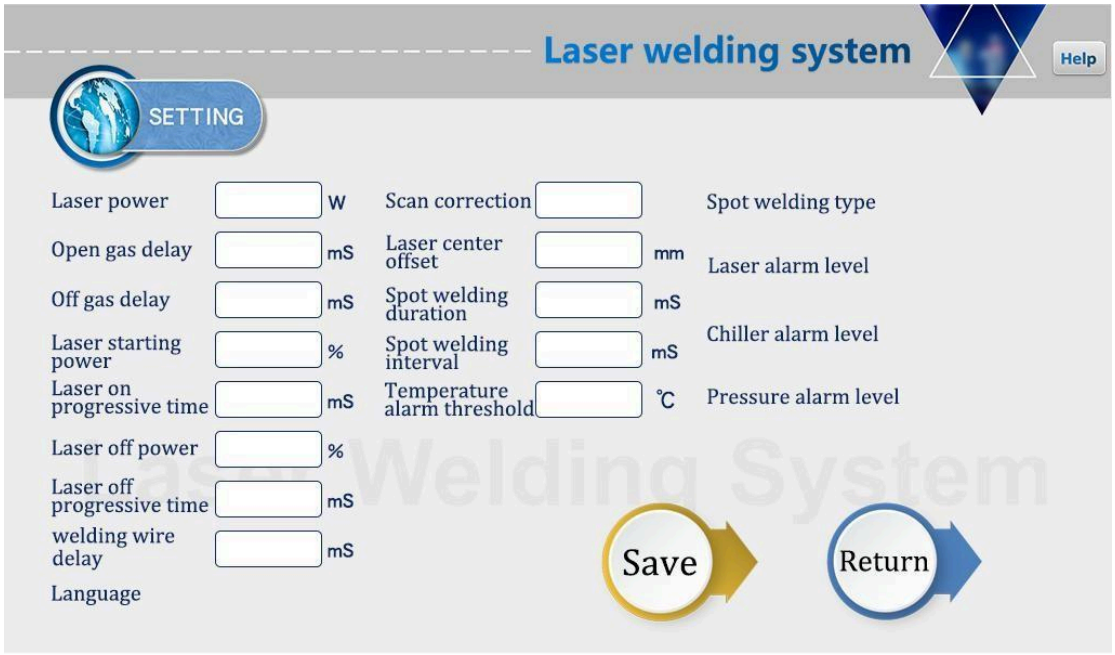
1. Home



1. Scan speed: it is the left and right swing speed of red light (0-6000 mm/s, normally set it at around 300mm/s)
2. Scan width: the left and right swing width of red light (0-6mm 2mm-5mm)
3. Peak Power: The laser's output power, adjustable based on the thickness of the material.
4. Duty Cycle: Represents the ratio of the time the signal remains at a high level during a complete pulse cycle. (No changes needed)
5. Pulse Frequency: Refers to the rate at which the signal transitions from high to low and back to high per second. (No changes needed)
6. Laser Activation: Indicates red when in welding mode. (No changes needed)
7. Safety Lock: Displays green when the safety ground clip is properly connected to the gun head.

2. Process

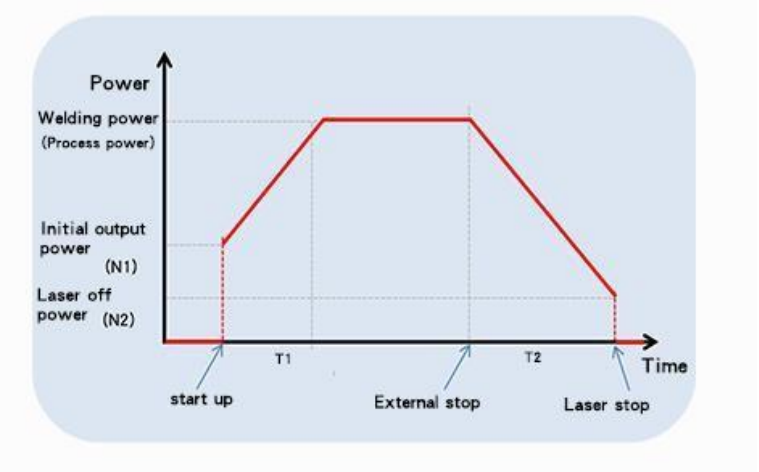




1. Adjusts the scan speed / scan width / peak power according to the plate thickness.
2. Adjust parameters by Import -- Save -- Return.Password 123456, you need to click to save after each set.
3. Allows easy integration of common parameters into the process library.

4.4 Working Principle

1. The laser power refers to the output of the laser source. Please ensure this is entered accurately.
2. The default gas switch delay time is set to 200ms, with an adjustable range of 200ms to 3000ms.
3. Upon powering on, the laser power increases from N1% to 100%. When powering off, it decreases from 100% of the process power to N2%, as illustrated in the diagram below.



The default power setting for the switch light is 20%, with a delay time of 200ms.

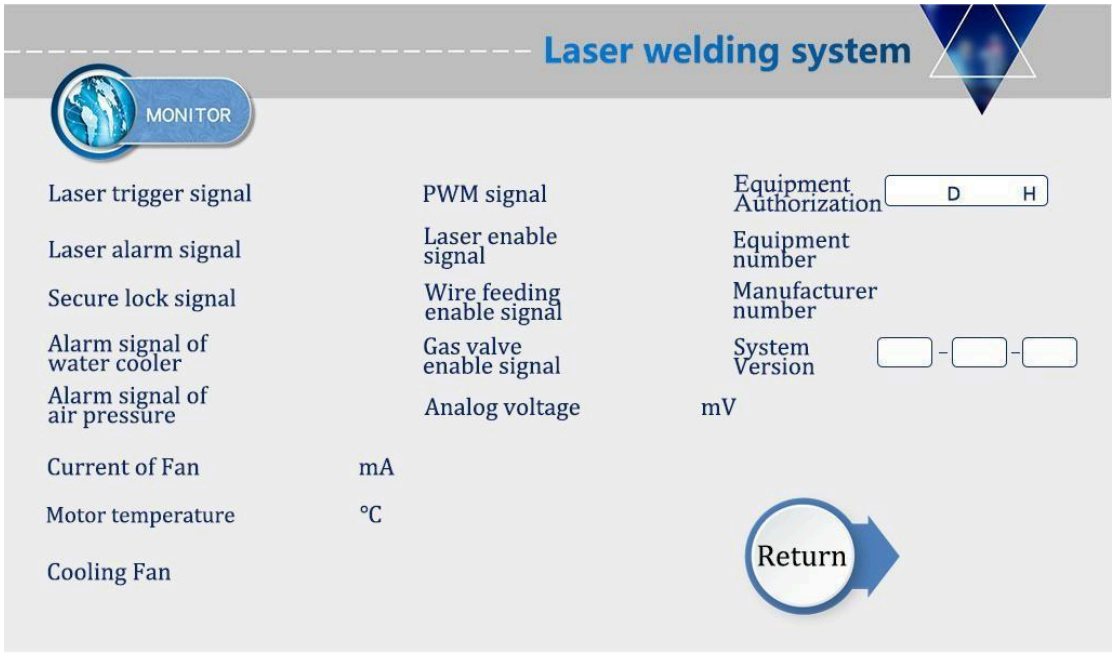
4. Wire delivery delay compensation adjusts the advance timing of the light-out wire delivery signal. This can

be used alongside the withdrawal function and does not require manual configuration.

5. The maximum temperature alarm threshold is set to 65℃ by default. If the value is set to 0, the temperature alarm function will be disabled.
6. The scan correction coefficient ranges from 0.01 to 4. Typically, the coefficient is calculated as the target line width divided by the measurement line width, with a standard value of 1.25.
7. The red laser center range is adjustable between -3mm and 3mm. Move left to decrease the value and right to increase it.
8. For the spot welding function, the duration represents the light-out time after the trigger is pulled. The light will remain on even if the button is released.
9. The spot welding interval refers to the light-off time between two consecutive welds after the trigger button is engaged.

For detailed explanations of these parameters, click the HELP button in the top-right corner.

4.5 Monitor



1. Input signal status

   Laser Trigger Signal: Indicates status by changing from gray to green when the trigger is activated.

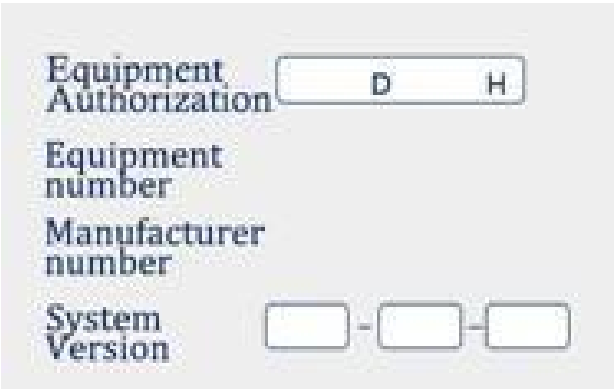
   Safety Lock Signal: Changes from gray to green when the gun head engages with the safety lock. Laser, Water Cooler, and Air Pressure Alarm Signals: Continuously monitor and display whether the levels are high or low.

2. Output signal status

When the signal is output, the corresponding area undergoes a change that can be observed directly.

3. Device Basic Information

Equipment Authorization: You can set a specific time limit for equipment authorization. The authorization will automatically expire once the allotted time has passed.



4. Power Status

Show the input voltage and current status clearly and accurately.

5. Communication Status

Show the communication status between the touch screen and the main board. If synchronization fails, check the connection cable.

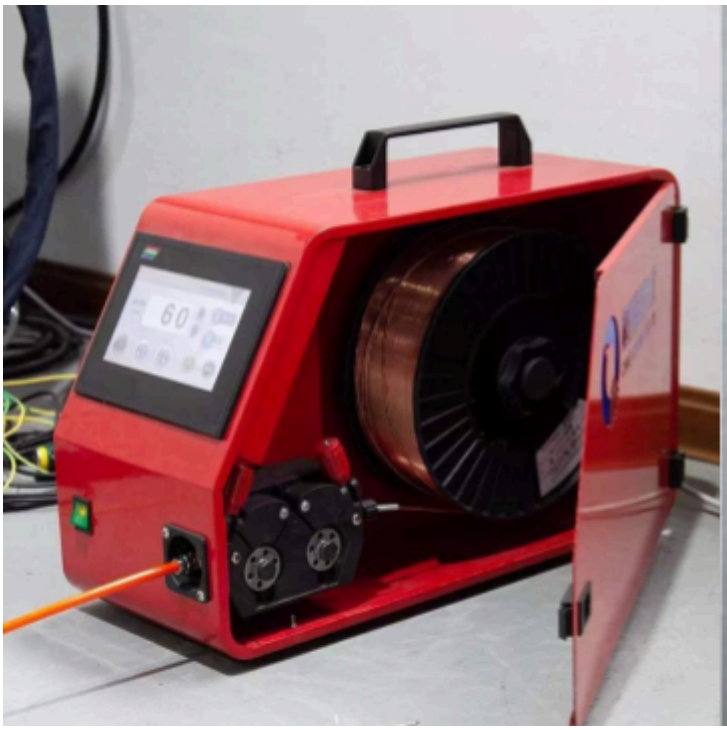
6. Diagnose

It can evaluate whether each signal port is producing an actual output. Typically, the output value aligns with the detected value. However, if there is a discrepancy, it indicates an abnormal load. For instance, if the laser fails to emit light, you can verify whether a signal is being transmitted by checking the single laser monitoring port or using a multimeter.

4.6 Switching Off

To reverse the startup process.

Section 5: Wire Feeder System



The wire delivery system consists of three main components: the wire delivery mechanism, the wire feeding hose, and the wire feeding center. It is designed to handle various types of welding wire, including aluminum, carbon

steel, and stainless steel.

1. Standard wire specifications: 0.8,1.0,1.2,1.6,2.0
2. We have a detailed installation video available. Please reach out to your sales representative to request it.

Section 6: Trouble-shooting

6.1 Standard Troubleshooting

6. 1.1 The intensity of light transitions from strong to weak:

- The protective lens is damaged and should be replaced promptly to prevent harm to the joint focus, collimator, or mirror components.

6.1.2 Safety lock signal not detected:

- Ensure the ground clamp is securely connected to the workpiece. Verify that the 5/6 horn safety lock in the system card is properly in place and has not become dislodged.
- Inspect the gray signal line aviation plug located 50cm behind the gun head to ensure it is securely connected and has not detached.

6.1.3 No trigger signal:

- Check whether the gray signal line aviation plug at 50cm behind the gun head is off Check whether the button is open circuit
- Check whether system card 7 / 8 horn is off

6.1.4 No light output:

- Check whether the laser source is open
- Check whether the water cooler temperature reaches above 19.5℃
- Check whether the connector of the system card signal interface 3 is falling off

6.1.5 Protection lens is easy to damage:

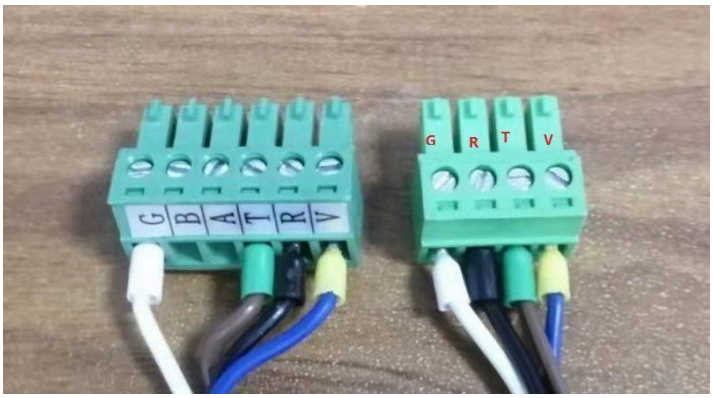
- Adjust the focal length
- Check whether the inert gas is normal (100% pure argon or pure nitrogen) Check whether blowing air is normalCheck whether the focus lens damaged

6.1.6 Light intermittent

- The safety lock and the workpiece need in good connection Check whether the trigger button has good contact
- Check whether the 5.6.7.8 horn of the system card signal interface 2 is in good contact

6.1.7 Display abnormal:

- Check whether any connector is off
- Check whether the power supply is normal

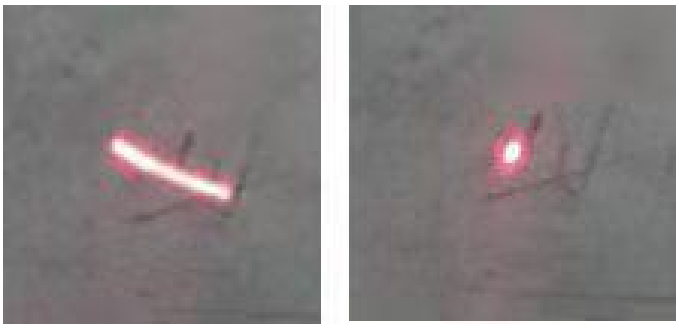


6.1.8 Burning Nozzles mouth:

- Red light needs adjust to center Adjust the focal spot
- Adjust welding angle
- Check whether lens is damaged

6.1.9 Abnormal red light swing:

- Check whether the 15V power supply is normal
- Check whether the gun head and click the plug is fall off



6.1.10 Red light deviation

- Handle the gun head with care, placing it gently and securely. Adjust the laser center deviation in the settings for optimal performance.

6.1.11 No Wire Feeding / Stuck Wire:

- Check the signal plug is securely connected.
- Check that the signal wire connector on the system board is properly attached.
- Replace the roller with the correct one that is compatible with the welding wire. Section 7: Maintenance

 **Daily**	- Clean the machine and remove any dust once you have completed your work. - Make sure the power is switched off and all gas supply valves are securely closed after use.
 **Weekly**	- Ensure the gun head is securely assembled: - Confirm the gun head is firmly fixed in place. - Conduct a thorough cleaning of the welding machine.

 **Monthly**	- Ensure all cables are functioning correctly and without issues. - Check that all pipe connectors are securely tightened, and re-torque them if needed. - Inspect gas pipes and hoses for cracks or damage, and replace them immediately if any defects are found. - Test all buttons and switches on the command panel to confirm they are operating properly. - Examine the connectors on the electrical rear panel for any signs of wear or damage. If replacement is required, contact online support for spare parts and detailed instructions. - Inspect all electrical cables for damage or cuts in the insulation. Replace them promptly if necessary to ensure safe operation.