LASER TECH

LASER AS A TOOL

LET THE LASER BECOME A UNIVERSAL BENEFIT AND UNIVERSAL TOOL

USERS MANUAL

Fiber Laser handheld welding machine



P/N： 11070 XXXX
Model：YLPS-Weld-1500/2000-A
Ver：V3.00
Date： 20241120
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Before using this product, please read the user manual carefully and be familiar with what we have compiled for you. Please place the user guide together with the product to provide operational, security and other important information for you and all other users.

pay attention to:

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Readers of this guide are users responsible for welding in industrial and non-industrial installations.

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security information

safety pact

We will use different words and characters to alert you to various potential hazards and all kinds of important information, including:

WARNING



For various potential personal injuries. This signal reminds you that you need to use it according to the specified methods or steps. If you do not follow the instructions correctly, it may cause personal injury to yourself or others. If you do not fully understand and meet the required conditions, please do not cross the WARNING symbol to the next step.

CAUTION



Suitable for potential product damage. The signal reminds you that you need to use it according to the specified methods or steps. If you do not follow the instructions correctly, it may cause damage to the product or parts. If you do not fully understand and meet the required conditions, please do not cross the CAUTION symbol to the next step.

IMPORTANT



Various information about the use of this product. Please do not ignore this information.

W ARNING



This symbol represents the laser radiation. This symbol appears on the product with a laser output.

Safety guidance

To ensure safe operation and optimize the performance of this product, please strictly follow the following WARNING and CAUTION, and other information contained in this manual.

WARNING:

When using this product, make sure to use the appropriate grounding power supply.

WARNING:

The user of any parts inside the product shall not be opened for repair. If necessary, please contact the light benefit laser technician to provide maintenance services. Any unauthorized changes to this product will void the warranty.

WARNING:

The output joint of this product is connected by optical fiber and cable and hand-held welded joint. Carefully use the handheld weld head.

WARNING:

If this product is not operated according to the use method in this specification. The protection mechanism provided by this product may be affected. This product must and must only be used under conventional conditions.

CAUTION:

When operating the laser welding output joint (for example, installing the optical cable connector, using optical instruments to detect the joint end surface, wire filling, etc.), please be sure to keep the AC power supply off.

WARNING:

Never look directly at the fiber output connector and make sure you wear the laser product to avoid injury.

CAUTION:

Operations or adjustments that are not within the scope specified in this manual may result in radiation damage.

Laser level

According to article 21 CFR 1040.10 and 1040.11 under IEC / EN 60825-1, this product belongs to high power level 4 laser. This product can output up to 2,000 W of non-visible infrared light. This level of laser may lead to eye or skin injuries. Although the output light is invisible, it still causes irreversible corneal damage. This product does not provide a laser safety protective eye mask, but please wear it when using the laser to avoid injury.



WARNING:

Never look directly at the fiber output connector and ensure that you use the laser to avoid injury.

WARNING:

The handheld air-cooled laser welding system is a fourth stage laser product emitting up to 1500W invisible laser with radiation wavelengths between 900nm and 1100nm.

WARNING:

Do not turn on the laser because there are no product parts or accessories for the user. All product maintenance and repair can only be carried out by the light benefit laser authorized service personnel.

CAUTION:

Operations or adjustments that are not within the scope specified in this manual may result in radiation damage.

Use environment and precautions

WARNING:

Please use the appropriate grounding power supply and normal voltage.

CAUTION:

Before starting the laser product, ensure that the ambient temperature and humidity are within the specified range.

CAUTION:

Do not expose the product to a too wet environment.

CAUTION:

The laser is cooled with air. Please ensure that the used ambient air is dry and clean;

CAUTION:

Operation or adjustment beyond the scope specified in this manual may result in hazardous radiation damage.

CAUTION:

Keep the output weld head clean. After each use, please cover with the protective cover. Do not touch the welded lens by hand and do not use any solvent to clean the lens. Be sure to use lens swab for necessary cleaning and maintenance.

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1. summary

1.1、 introduce

YLPS series intelligent laser handheld welding system is a new industrial class handheld infrared fiber laser welding system. Its maximum continuous wave power is 2000W continuous, with an average power of 2000W in pulse mode.

Built into the GW handheld laser welding system, the YLPS series of fiber laser is designed for industrial material processing applications and has the most reliable and efficient proprietary ABR and SPP technologies. Key innovations in the YLPS series of fiber lasers also include proprietary heat treatment, mode filtering technology, and durable and novel fiber laser structures. The YLPS fiber laser includes a powerful optical engine, comprehensive control as well as monitoring electronics. The beam is delivered through a metal-protected QBH fiber cable.

The YLPS series lasers provide up to 2000W continuous wave (CW single-mode) output light with output bands between 1070nm and 1080nm. The YLPS laser provides very efficient, high quality output light. The beam quality M2 output by single mode cable is optimal below 1.8, or high brightness multimode cable output with BPP <1.5. This high beam quality and multimode cable output option make this product ideal for handling a variety of materials, such as fine cutting, precision welding, cutting and welding of different materials with different thicknesses.

The design and testing of the GW intelligent laser handheld welding system both consider safety. By following this user guide and applying the laser safety measures, it can be a safe and reliable device.

To ensure safe operation and optimal performance of the product, follow the use warnings and additional information contained elsewhere in this document. These safety precautions must be observed at all stages of the operation, maintenance, and repair of the instrument.

1.2、 use

The YLPS series intelligent laser handheld welding system is suitable for industrial and professional use. Applications include welding and brazing. Materials include steel, aluminum, copper, stainless steel and other metal materials.

1.3、 Test certification

GW demonstrates that this system has been thoroughly tested and checked. Before packing, after full testing and confirm to meet the shipping standards. When you receive the equipment, check for possible packaging and component damage during transportation. If the damage is obvious, please contact the carrier and GW after-sales personnel immediately.

1.4、 Packaging disassembly instructions

If there is any sign of external damage to the package, check the equipment for damage and notify the carrier and GW after-sales personnel immediately; when you remove the system from the box, take special care to ensure that the fiber optic cable is not broken or damaged; check the attached packing list. Once received the product, check all items with this list and do not attempt to install or operate the laser equipment in any case if there is obvious or suspicious damage to the equipment.

In order to reduce the risk of product damage, GW recommends that you use the following program to open the handheld YLPS series intelligent laser handheld welding system;

1.4.1 Use a powered forklift to move the whole packing box to the unpacking position;

1.4.2 Remove the top honeycomb plate cover and the top EVA (white foam); Note: the welding head is in EVA;

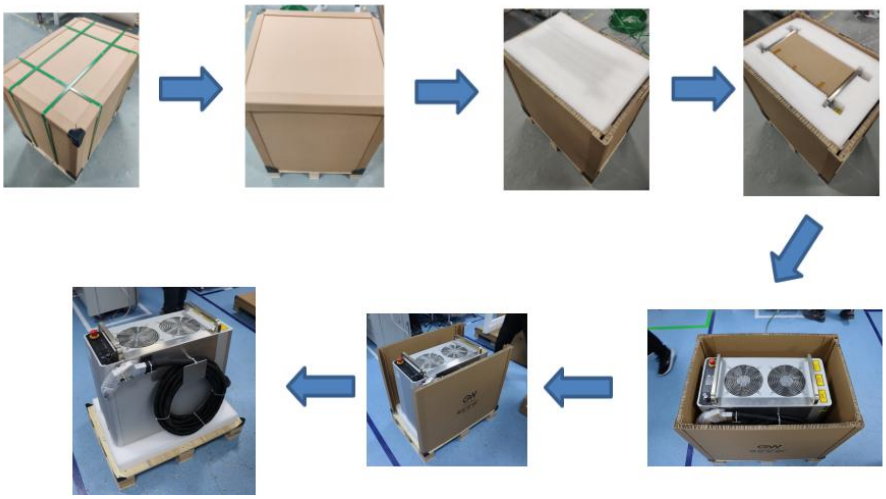
1.4.3 The cable and the outer box shall be fixed with fiber strips. The welding head will also be wrapped up. GW recommends disassembly using a cutting tool;

1.4.4 Place the removed welding der on the top of the equipment, and the cable is not pulled or bent. Do not attempt to use the attached tie-belt or cable lifting equipment;

1.4.5 Remove the side plate from the packing box. Remove the product from the packing box and use the two handles on the top of the product. GW recommends that two people lift the equipment at any time and be careful when operating the tie belt and welding head;

1.4.6 Check the attached details according to the items listed on the packing list;

1.4.7 Keep all packaging for future transportation or storage;



It is forbidden to use product accessories optical cable lifting or positioning equipment. Pay attention to the anti-dumping label, the equipment is not inclined transportation and use.

2. Laser product safety information

2.1 Safety Performance and Convention of laser products

To ensure the safe operation and optimal performance of the product, follow all the warnings in this guide. In the operation, maintenance, and service of the place
Safety precautions must be observed at all stages. The operator must adhere to these recommendations and apply declared laser safety practices at any time and never open the module. There are no accessible parts, equipment or components, and all internal services and maintenance shall be conducted by qualified GW after-sales personnel;

This user guide uses a variety of text and symbols that are designed to alert you to possible dangerous or important information.

2.1.1 Safety performance

function	description
Output power monitoring	Monitor the output power while the laser is operating.
overheat protection	Monitor the internal temperature of the laser to protect the internal device from damage by exceeding the safe operating temperature.
Safety / warning labels	Various labels remind and warn the users to be careful of possible hazards.

2.1.2 Safety Labels

Safety label and label location:

The following illustration shows the label and the location on the product.



Laser output port label

Location: Rear panel / welding head



Certification label

Position: rear panel



Warning signs

Location: Rear panel / welding head



Certification label

Position: rear panel



Warning signs

Location: Rear panel / welding head





警告标示

位置：焊接头



警告标示

位置：焊接头



提醒标示

位置：后面板

2.2 Relevant regulations and standards

2.2.1 Safety of product functions

electrical safety	EN 61010 - 1:2010
laser safety	EN 60825 - 1:2014 CDRH 21 CFR 1040.10

Optical cable protection is disconnected (optical fiber interlock): Optical cable protection interlocks the optical fiber laser and external devices (such as handheld welding heads). The laser welding system will continuously monitor this signal and terminate the external devices (such as welding heads) if the optical fiber connector is not properly connected.

The handheld laser welding system provides the protection signal output according to the cable contained in the fiber optic cable between the laser device and the handheld welding head. If the fiber cable is not inserted or disconnected, the cable safety interlocking loop will open.

Guarantee to stop starting: installation and various electronic sensors inside the system. If abnormal conditions are detected, the monitoring program will alarm, and the system stops and continue to start;

Safe start / restart button (emergency stop): for emergency shutdown and recovery of the laser welding system.

Key switch: turn on / off the main loop power supply of the laser welding system.

2.2.2 Classification of laser products

According to the government and industry standards, all lasers are classified according to their output power or energy and laser wavelength.

According to IEC / EN 60825-1, this product belongs to high power four lasers. This product can output up to 2,000 W of non-visible infrared light. This level of laser may lead to eye or skin injuries. Although the output light is invisible, it still causes irreversible corneal damage. This product does not provide a laser safety protective eye mask, but please be sure to wear the appropriate protective eye mask when using the laser product to avoid injury.

Four types of laser-high power lasers are the most serious of all laser hazards. Take precautions to prevent accidental exposure to direct and reflected light.

Diffuse and specular reflection can cause severe retinal and / or corneal damage, resulting in permanent eye damage. Level IV laser beam is also a potential fire hazard and skin hazard. When operating the equipment, all personnel must wear suitable eye protection. Refer to Section 2.2.3 for information on laser safety eyeglasses.

Using controls, adjusting, or performing procedures not specified in this User Guide may result in exposure to hazardous radiation.

2.2.3 Laser safety glasses

Wear appropriate laser safety glasses when operating the device. The selection of suitable laser safety glasses requires the end user to accurately identify the wavelength range emitted by the product.

Around the laser output aperture, many secondary laser beams with different angles are often generated. These beams are called "mirror reflection", which is generated when the laser shines from the main beam into the surface. Although the power of these secondary beams may be less than the total power emitted by the laser, it is strong enough to cause damage to the eye, skin as well as the material around the laser. If the device is a tunable laser or Raman product, it emits light at other wavelengths. The end user shall confirm that the laser safety glasses used can protect the entire wavelength range of light emitted by the device.

Take care to avoid / reduce mirror reflection. The product emits invisible laser radiation at a wavelength of 10 80nm (infrared). In addition, the product emits visible laser radiation at or around 600-700nm (red).

Check the safety labels on the product to confirm that the personal protective equipment used (such as housing, viewing window, holes, glasses, etc.) is sufficient within the output power and wavelength range. The decision on the safety glasses must also take into account the secondary radiation hazards generated during the welding process

Laser safety glasses must meet international safety standards, including ANSI Z136.1 (USA) and EN207 / EN208 / EN60825 (Europe). The valid provisions will depend on the location of the laser device.

2. 3 Laser welding protection

Laser welding requires eye protection to protect your eyes from any reflected or scattered Class 4 laser beams and also to protect welding glare, ultraviolet light, heat and sparks.

For laser welding, it is not enough to wear only PPE with anti-laser infrared wavelength. A combination of masks, helmets, and / or goggles will provide the best protection during laser welding. For example, an additional welding helmet (with appropriate filters) should be worn on laser safety glasses to protect the wearer from ultraviolet and visible radiation. Welding helmets also protect welders from hot splashes, metal particles and sparks. So people working near the laser welding area must wear personal protective equipment.

Exposure to infrared and ultraviolet radiation during welding can damage the skin. Depending on the intensity of the infrared light, skin lesions may include heat burns or excessively dry skin. Exposure to UV light can cause skin similar to sun burns and increase the welders risk of skin cancer, accelerating signs of skin aging, and welding sparks can also cause burns.

Laser material processing can transfer large amounts of energy to the spare parts. Parts or even after the cutting or welding process is complete. Ensure that appropriate PPE is used to prevent potential burns. Wear fireproof gloves, fire caps, leather aprons and other protective clothing to prevent skin damage. Button up the sleeves and collars!

2. 4 Welding safety and hidden dangers

2. 4.1 Fire hazard

If combustible or flammable materials are present near the welding area, the heat and sparks generated during the welding process may cause a fire or explosion. Laser welding can only be performed in areas free of combustible materials.

Never weld on containers with flammable or combustible materials. If the contents of a container are unknown, you should assume that they are flammable or combustible. Fire extinguishers should be nearby and easily accessible, and personnel should have been trained to use fire extinguishers.

2. 4.2 Hidden dangers of smoke

Welding "smoke" can be composed of very fine particles and gases. Welding smoke and gases come from the welding material or any filling material used, protective gases used, paints, coatings, chemical reactions, and air pollutants. Welding smoke can have adverse effects on the lungs, heart, kidneys, and central nervous system.

When the laser interacts with the target material (e. g., plastic, metal, composite material), the target material may begin to evaporate. These fumes and particles are usually invisible, but are very toxic and cause a serious health hazard.

Welding in poorly ventilated confined spaces is very dangerous. The risk of toxic fumes and gases can rapidly increase, leading to a coma or asphyxiated death.

The ultraviolet light emitted during welding can react with oxygen and nitrogen in the air to form ozone and nitrogen oxides, which can cause death at high concentrations.

Protective gases used during welding can replace the air, causing personal injury or death.

When welding, do not let your head touch the gas. Be sure to weld in a well ventilated place to ensure the air is safe. Use a flue gas extraction system to remove steam, particles and hazardous debris from the welding processing area. Read and observe the safety data sheets and warning labels for all welding materials. Breaapparatus may also be required in confined spaces and in other situations. Routine air monitoring shall be conducted to determine the hazardous smoke levels in the welding area.

2. 4.3 Gas safety

The cylinders may explode if damaged or placed in the area near the weld. The protective cylinders shall be placed where they cannot be hit or damaged. Place them away from heat sources, sparks, or flames. The cylinder must be stored upright and fixed on a fixed bracket. Need a working regulator for the required gas and pressure. All hoses and fittings should also be suitable for application and remain in good working condition.

2. 4.4 Optical safety

The laser output is delivered through a window sheet or an optional device with an anti-reflective coating. Ensure clean windows and good quality. Any dust at the end of the head assembly can burn the window and damage the laser. Check the quality of the spot emitted at low power and then gradually increase the output power.

Never directly observe the laser aperture (e. g., optical fiber, collimator, or scan head) when the start button or remote start circuit is activated. Always wear suitable laser safety glasses when operating the product. All PPE must be compatible to the output power and wavelength range listed on the laser safety label on the product.

When supplying power to the laser product, do not directly see the output port; avoid placing the laser and all optical components in the eye level; avoid using the laser in the dark environment; when using the output (such as the laser head is installed in the medium fixture), turn the key to the OFF position; as a preventive measure, gradually increase the output power during the work of the product;

Do not install the laser head when the laser is active;

Optical components in the device, such as cameras, photomultiplier, and photodiodes, can also be damaged by exposure to the laser. The laser is strong enough to burn the skin, clothing, and paint. Lasers can cut and weld the metal. Lasers can ignite volatile substances such as alcohol, gasoline, ether, and other solvents. For installation and use, contact with solvents or other flammable materials and gases.

2. 5 Electrical safety

The input voltage of the laser can be lethal. All cables and connections shall be deemed at a hazardous level. All parts of the cable, connectors or the equipment enclosure shall be considered dangerous. Before powering the equipment, all wiring harness must be checked for breakage and the welding protection gas is on. Furthermore, where applicable, all connections must be secured with screws to ensure proper function.

Ensure that the equipment is grounded through the protective conductor of the AC power cable. Any disconnection of the protective ground conductor from the protective ground terminal may cause personal injury. In order to continuously prevent fire hazards, only replace the same type and rated line fuse (if applicable); prohibit use of other fuses or other materials; confirm the correct AC supply voltage before supplying equipment; cause equipment damage; refer to the marking on specific model for correct power connection; no operator can repair parts inside; give all repair work to qualified GW after-sale personnel; do not remove the cover to prevent electric shock; any product

change makes invalid warranty. Besides the mains connection, the external connection between this product and other external equipment is a PELV (protection ultra-low voltage) defined by the IEC 61140. The non-mains output of other equipment connected to the product should also be PELV or SELV (safe-low voltage).

2. 6 Environmental safety

Do not discard this product together with the household waste. Electronic equipment must be disposed of in accordance with regional instructions related to electronic and power waste disposal. Note that all PPE must match the output power and wavelength range listed on the laser safety label attached to the laser equipment. Be careful, or the laser may damage the device.

This equipment is suitable for: (1) indoor use; (2) use below 2000 m; (3) overvoltage class II; (4) dry site.

This device is not suitable for use where the child may be present. Stay away from the impact or vibration source. Appropriate enclosure should be used to ensure the laser safe work area. This includes but is not limited to laser safety signs, appropriate warning devices and training / safety procedures. Do not operate the output weld head at the eye level. Ensure the laser hood is in place to protect the eyes of those working in the area from injury.

2. 6.1 Humidity

Do not expose the equipment to a high humidity environment with> 85% humidity.(See 3.1 Performance parameters for details)

2. 6.2 Cooling and temperature

Handheld laser welding system is air-cooled. Running at higher temperatures accelerates the aging, increasing the threshold current and decreasing the slope efficiency. If the equipment is overheated, do not use it, please call 400 to ask the after-sales personnel for help. When the ambient temperature exceeds 50℃, the device will automatically alarm and limit the device operation.

3. Description of handheld laser welding equipment

3.1 Performance parameters of the handheld laser welding system

Optical performance parameters		
Output power (watts)	1500W	2000W
work pattern	Continuous / modulation / pulse / array / timing	
Output power adjustment range is (%)	1-100%	
Output laser wavelength (nanometer)	1070 ± 10 nm	
power stability	**±3%**	
Maximum modulation frequency	50kHz	
Laser response time	< 10us	
Indicating laser wavelength (nano)	650	
Indicate optical power adjustable range (milliwatt)	<1mW	
Laser conduction system parameters		
interface type	Silk wire type held welding head	
Collar focal length	50mm	
Focus focal length	150mm	
Transmission length	Standard length: 5±0.5m (optional 10m)	
job requirement		
Cooling and protecting the gases	Inert gas (nitrogen, argon)	
Working environment temperature range	-15°C ~ 45°C	
Range of working environment humidity	≤90 degree	
input voltage	220VAC/50Hz	
The power of the machine	≤ 4.8 kW	≤ 6.3 kW

3.2 Accessories

standard fitting			
project	part number	quan	For Your Attention
Hand Laser Welding System Users Guide	N/A	1	Current document
power line	N/A	1	For switching power supply
Hand-held welding head	N/A	1	
welding tip (s)	N/A	1	Five types of nozzles
Ground protection cable (selection of	N/A	1	5 m cable length or 10 m cable
Other accessories are available for purchase			
Welding helmet	N/A	1	Welding of a protective helmet.

Send wire device unit	N/A	1	Third party supply

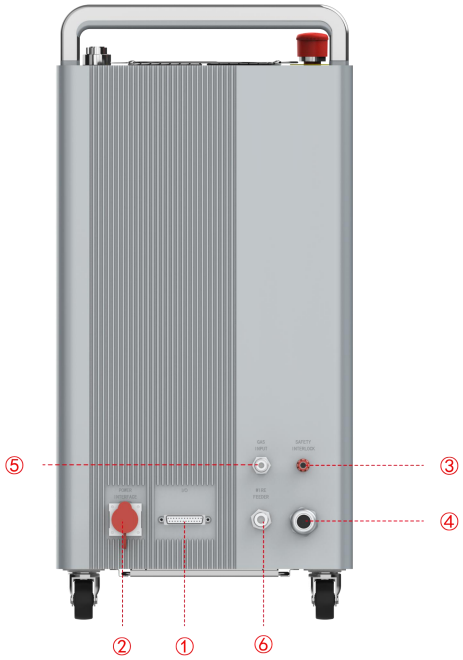
3.3 Front drawing of Air-series welding unit



order number	name	description
1	Power key switch	Turn the key knob clockwise to (ON) turn on the power, turn the key knob counterclockwise to (OFF) close the device. Key key is key when the knob is (in the ON) state.
2	emergency stop switch	In case of emergency, press the emergency stop button to quickly cut off the main circuit power of the equipment. When the stop button is pressed, the emergency stop button can be reset by rotating it clockwise.
3	radiator fan	When the equipment is running, the cooling fan will start or close according to the system instructions. No occlusion and foreign body drop not allowed at the fan outlet position during operation
4	Stainless steel handle	Operation used for equipment movement and handling
5	Status indicator light	Used to represent the current equipment operating status: color light: system preparation; green: ready; yellow: meet safety interlocked loop, laser ready / light state; red: fault alarm; white: main power supply is not ready; blue: system communication abnormal
6	LOGO	Product brand logo

7	airstrainer	Used to filter large particle dust in the operating environment, requiring regular cleaning

3.4 Schematic diagram of the product appearance interface



order number	name	description
1	User interface (DB25)	Use to connect the input and output of the external security lock and the linkage control signal.
2	Device power supply input port	AC input socket: AC220V, 50 / 60Hz, 2 3 A
3	Security lock interface	Connect the workpiece safety clamp cable to the interface. When the handheld welding head nozzle is connected to the workpiece to be welded, the safety interlocking loop between the safety clip will be connected, and the laser emission is allowed.
4	Handheld welding head interface	The welding head signal is connected to this interface through cable and is protected by self-coil preparation net.
5	gas feed	Protect and cool the gas inlet and connect through the 8mm trachea.
6	Silk delivery machine interface	Data connection with the wire feeder.

3.5 Structural diagram of the handheld welding head

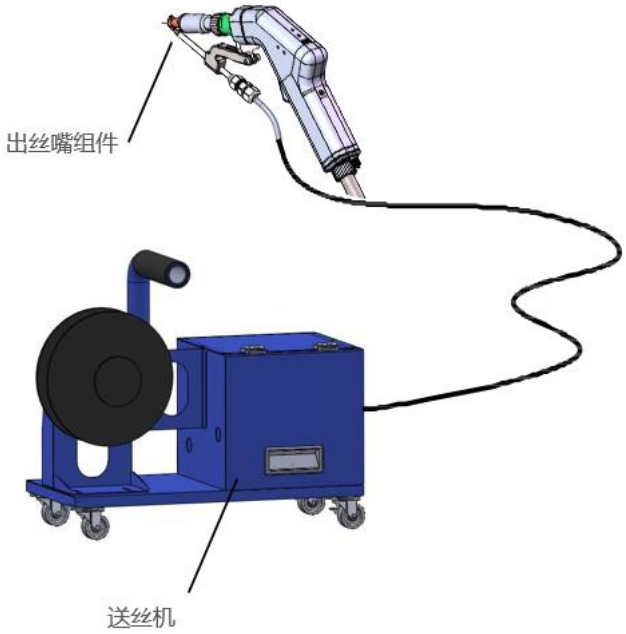


orde	Functional project	description
1	trigger button	Start the protection / cooling gas flow and start the laser emission, hold the trigger to protect the gas flow, and start the laser output according to the output delay set by the system; it must be pressed during the whole welding process. When the workpiece safety clip and the welding head nozzle do
2	Temperature monitoring module	Monitor the welding head temperature
3	spray nozzle	A standard equipment using four spare nozzle heads;
4	slip pipe	The tip of the nozzle is threaded through the tube.

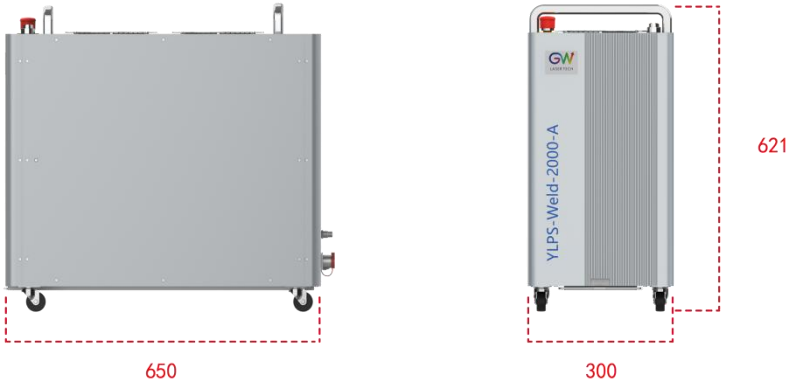
5	Protect the cooling gas connection	Connect the protection and cooling gas
6	The QBH optical cable connection	The optical cable has been inserted and connected to the weld

3. 5.1 Automatic wire wire system (accessories)

The outgoing nozzle bracket part can be adjusted according to the use scenario, as shown in the figure below. The wire angle is 40°

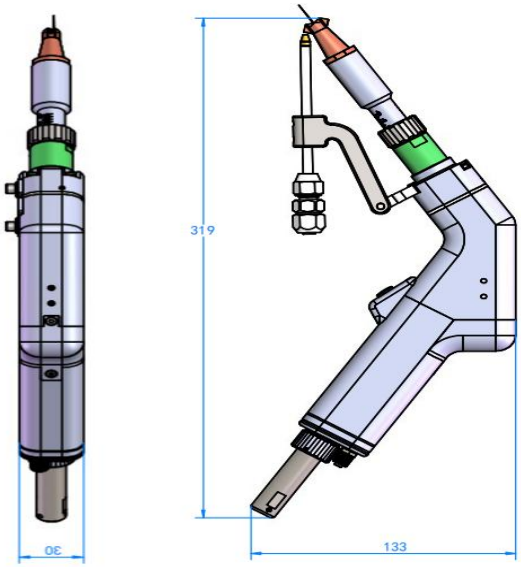


3.6 Product Layout and size





size	650 x 300x 621 [mm] (L×W×H)
weight	Less than 60 [kg]



Size unit: mm

3.7 Optical fiber output connection

When the product is delivered to the user, the fiber optic cable has been inserted and connected to the weld head. Although this is not a typical case, if necessary to disconnect and reconnect the fiber (e. g., weld replacement).

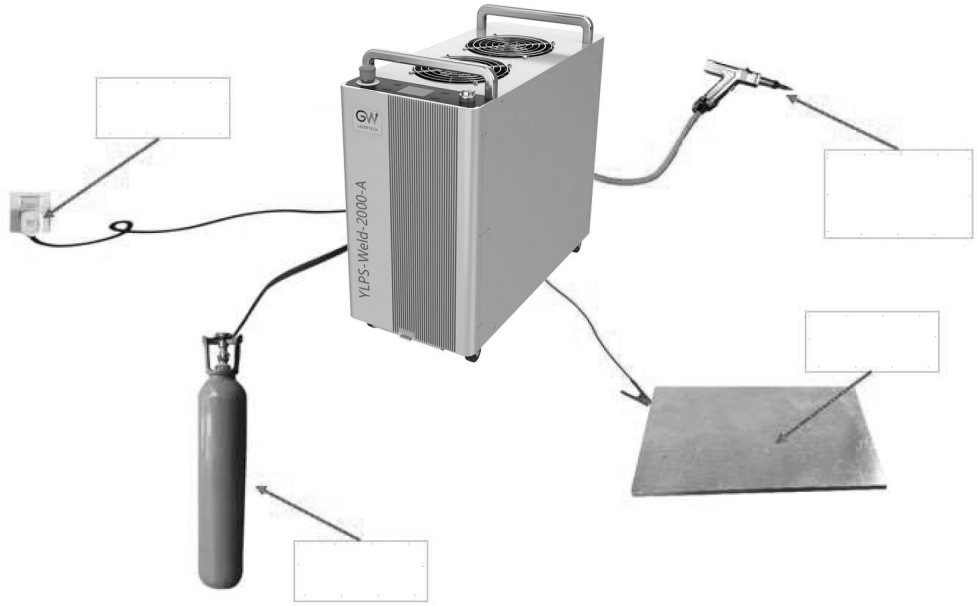
The fiber end connector uses a protective cap to protect the fiber surface and electrical contacts when not in use. Remove the protective cap and casing from the connector immediately before optical cleaning and connection to the output weld head. Each time the fiber cable is disconnected from the welding head, the fiber terminal must be checked for dust, dirt or damage.



4. Install the welding equipment

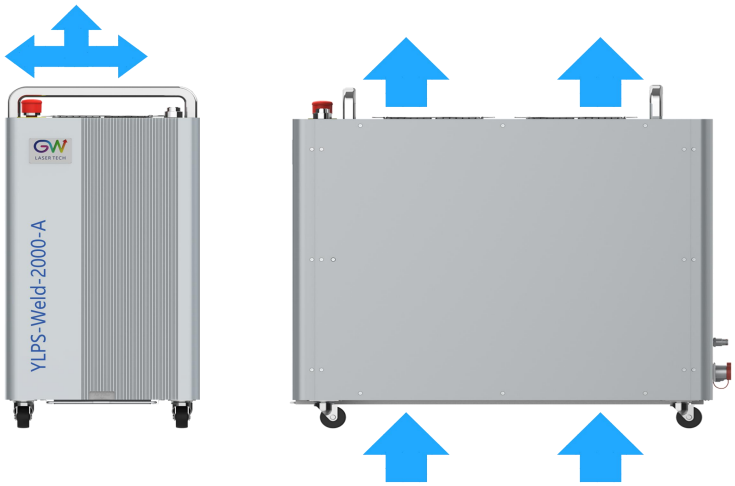
4.1 Preparation before installation

Refer to the power requirements in section 3.1, and make sure that the standards specified in the input voltage specification match before turning the power on. The equipment must be connected to the auxiliary gas of sufficient gas to operate to meet the heat dissipation of the heat load during operation, and to protect the damage caused by the splash during the work. If the gas is not connected to operation, the equipment will automatically alarm and prohibit operation.



4.2 Air flow and installation clearance

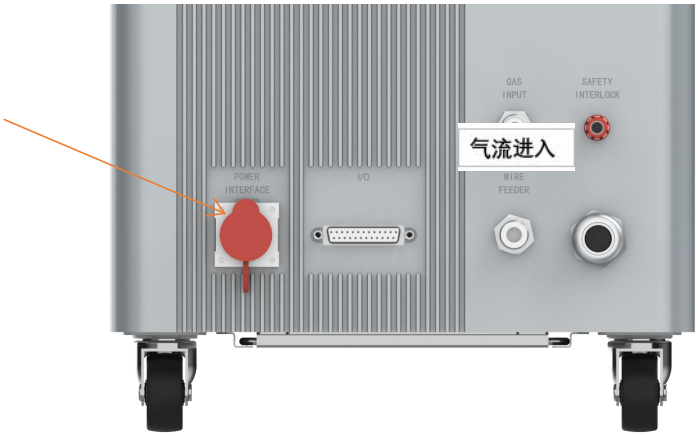
The handheld laser welding system adopts air cooling mode. When selecting the placement position, please operate in good air circulation conditions and in an unconfined space. Do not place any object that may block the exhaust on the top of the machine. The airflow direction is shown in the figure below:



4.3 Power supply connection

10厘米间隙　　气流排出

Before connecting the power supply, ensure that the power supply capacity meets the specification requirements described in Section 3.1. A RVV 3 x 4mm is attached with the equipment^{2}Connect the cable, follow the following steps according to the cable harness identification:



Main power supply interface: 3-Pin			
Pin#	function	Wiring color	voltage
1	Phase line voltage	Red (L 1)	220V AC
2	Zero line voltage	Black (L 2 / N)	0V AC
3	landing	Green / Yellow (PE)	PE

1. Connect the power input cable to the indicated voltage and phase, frequency 50 / 60 Hz. L1= phase line voltage, L2 / N= zero line voltage, PE= ground,

2. The power input cable connection of the equipment must be connected to the special AC mains by connecting to a circuit breaker of no more than 30 amps. Mark the area easy to the operator and identify the disconnection device that supplies power to the equipment;

3. The wiring shall comply with all national and local specification requirements, and the electrical connection shall be conducted by professional electrical safety operators.

4.4 Connect the welding auxiliary gas

The welding gas inlet can only be connected with 8mm trachea. As shown in the figure below, insert the trachea into the quick joint of the gas inlet. Once connected, the external gas valve can be opened. In the welding work, the use of inert gas is recommended to protect the quality of the weld during the welding process. The input gas pressure shall be greater than 0.3b a r and less than 6.0bar. The output pipe must be connected to the handheld welding head to work, and the outside of the output pipe is protected by self-rolling preparation net.



project	standard
Standard auxiliary gas	Mixed of on, nitrogen, argon and carbon dioxide
Input gas pressure	Minimum 0.3 bar, maximum 6.0 bar

4.5 User interface

The user interface includes a DB 25 computer interface (DB25 fully defined) for connecting to the external control signals, and a WI-FI transmission interface. The user can realize the security interlocking control through the computer interface of the DB 25 and the external device, obtain the device status and alarm information, and control the execution of the external device. The Wi-Fi transmission interface is used to connect wireless hotspots, connect to SMATCloud cloud services to obtain remote firmware upgrade and obtain remote services.



User Interface (DB 25Pin)				
Pin#	definition	description	IN/ OUT	explanatory note
1	GNDB	Communication to		0V
14	TXD	presentation of information		-10V—10V
2	RXD	data-in		-10V—10V
15	BOOTW	BOOTW		
3	G1	Send wire signal-		Dry node signal
16	G2	Filming Signal-		Dry node signal
4	S-LAS	Laser start state	OUT	Output laser start signal (24V)
17	24V	Ext 24V	OUT	24VDC output
5	S-ERR	system mistake	OUT	System Error output (24V)
18	S-WAR	Send wire signal +	OUT	

6	S-RDY	Filming signal +	OUT	
19	NC			
7	NC			
20	NC			
8	X-STOP	safety interlock +	IN	
21	SN3	enable		Low level is effective, combined with 12 feet
9	X-KEY	Out-light switch +	IN	
22	X-WAT	Air valve switch input	IN	Starting signal of air valve (24V)
10	NC			
23	NC			
11	FAN	Air valve opening-	OUT	Open the gas valve
24	NC			N/A
12	0V	0V	IN	Digital signal reference potential

25	NC			
13	NC			

4.6 Start-up and close of the system

All electrical connections must be connected to the equipment. Where applicable, all connections must be secured with screws or clips to ensure proper function. Ensure that you wear the appropriate PPE when operating this product. These include welding helmets, flame retardant protective gloves and laser safety glasses suitable for use at 1070nm.

WARNING



When maintaining the output optical cable, please ensure to disconnect the main power supply of the equipment and unplug the input cable interface. The minimum allowable bending radius of the optical cable is 50mm;

system start-up:

1.Ensure that all connections required for normal operation are completed, including restrictions for external safety protection devices. At the same time, check that the security protection loop is connected normally, and the external security interlock loop is closed.

2. Make sure that the emergency stop button is not pressed. If pressed, rotate clockwise to reset the emergency stop button.



3. Turn the key switch clockwise to the (ON) position;



5、The rear panel indicator and the display will be lit. During the startup, the indicator is in the color flow state. Then the system startup will be converted to the green light, and the device can enter the working state.

** If other status is displayed, please consult section 3.3 description information or section 7.1 for error information. If not excluded, please contact the service personnel.*

System shutdown:

To close the laser welding system, the user must stop the laser after welding; 1. Release the trigger of the handheld head when the system will stop the laser and stop the gas flow (if the gas extension closing parameter is set, it will stop after the set time). Turn the key switch counterclockwise to the (OFF) position and remove the key from the product to prevent unauthorized use.

5、Operating the laser welding system

5.1 Operation of the control panel

There are four touch buttons on the equipment operation panel, and an LCD screen is used to view the equipment status, equipment information and adjustment of system operation parameters.



a、Introduction to the push-button function:

Button legend	functional description
 menu key	In the case of a non-state user interface page, used to return to the superior menu of the current display page, the continuous point press will eventually return to the state page.
 Confirm the key	Used for user interface menu, confirmation after parameter selection, entering advanced parameter setting interface, and parameter modification.
 Up key	Select the menu of the user interface and add the parameters. Long press on the parameter selection and parameter adjustment page will increase in x 10 increment.
 Down the key	Select the menu of the user interface and reduce the parameters, and press the parameter selection and parameter adjustment page will reduce the operation in x 10 increment.

B. Introduction to the user interface:



Menu



Content

The user operation interface is mainly divided into menu navigation area and content display area. The display content will change according to the user operation. After the device is started, it will be displayed on the status page by default to display the current operation information of the device. Switch between different menu pages through the up and down key buttons on the panel.

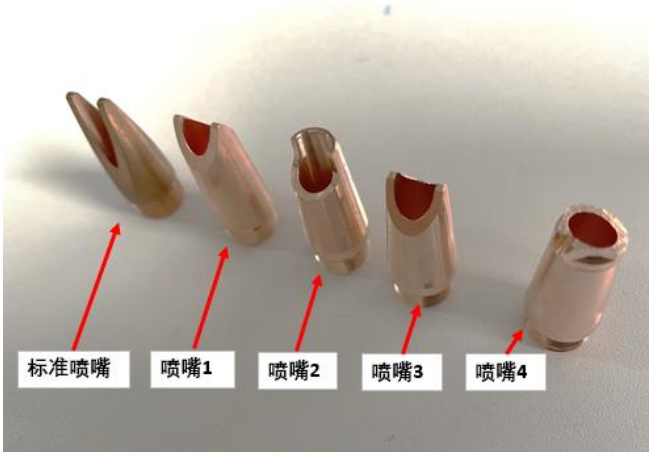
5.2 Operation of welding head

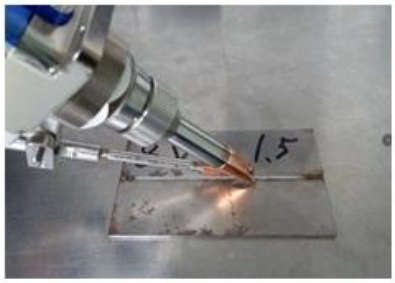
5. 2.1 Install the spray nozzle

Before replacing the nozzle tip, close the equipment nozzle tip to connect the thread to the extension pipe of the welding head.



There are five types of nozzles, as shown below:





喷嘴1（用于平面焊接）



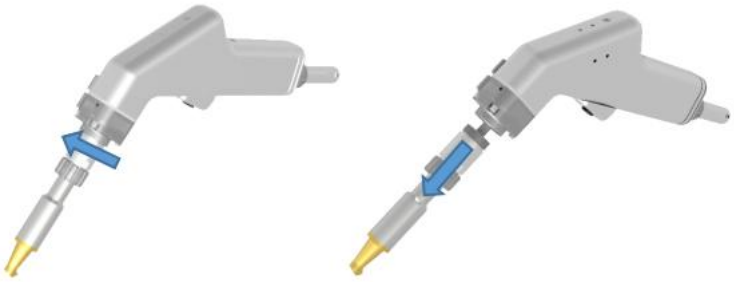
喷嘴2（用于内角焊接）



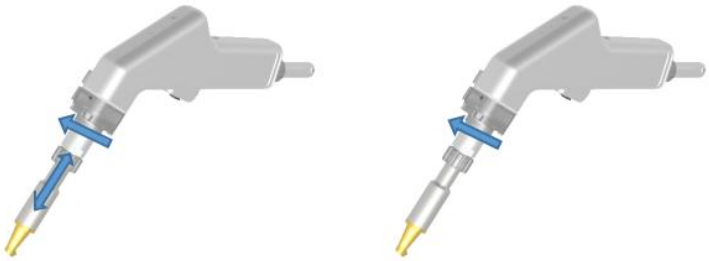
喷嘴3（用于外角焊接）

5. 2.2 Adjust the nozzle tube

Use the key switch button to close the machine before adjusting the nozzle tube. When adjusting the nozzle tube, loosen the nut first, as shown in the figure.



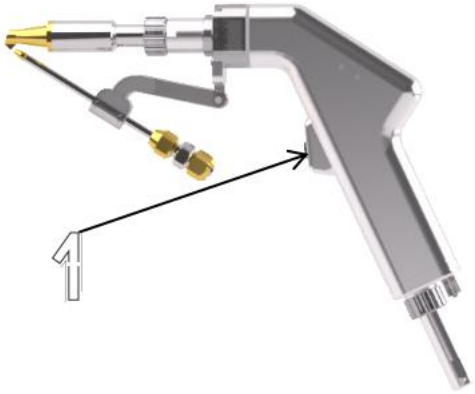
Once positioned correctly, tighten the nut and lock the nozzle tube in place, as shown. Please pull it tight with your hands!



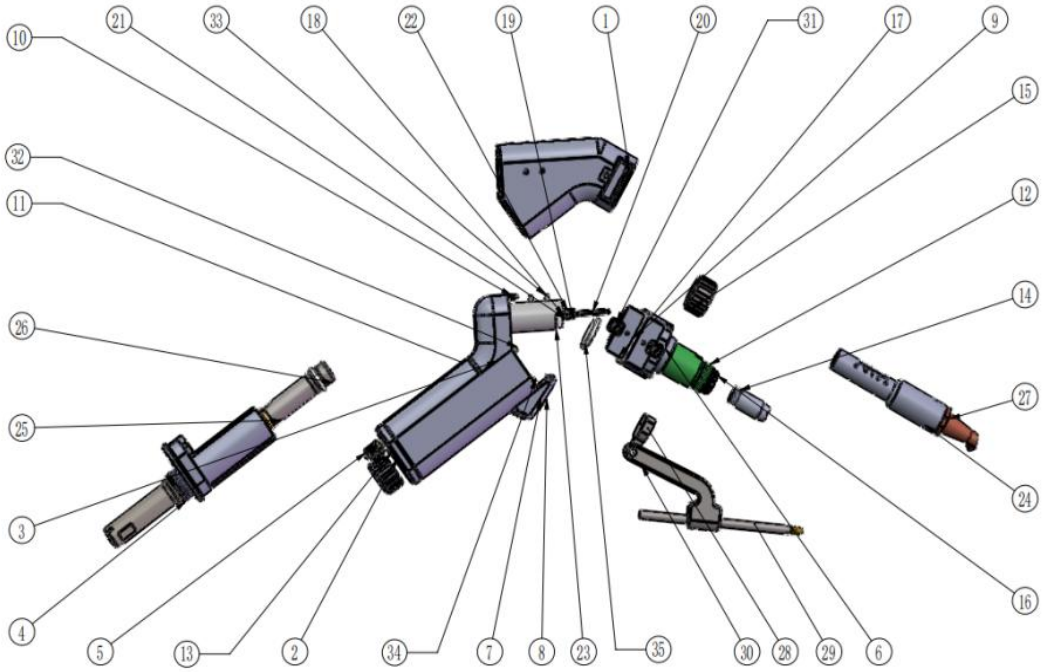
5.2.3 Operthe held welding ds



Laser emission warning!



5.2.4 Hand-held welding head explosion diagram



Item	Part Number	Part Name
1	310101388	Body front segment
2	310101389	Body rear segment
3	310101393	Motor tail cover
4	310101392	tailstock
5	340803037	Quick screw joint
6	310101385	Output holder
7	310101394	Button holder
8	340404002	key
9	310101386	Lens holder
10	340101032	Flat head hex socket screws
11	340101017	Flat head hex socket screws

12	310101384	Connecting screw
13	340102045	Capital hex socket screws
14	310101395	Check ring
15	310103062	Lock nut
16	310103063	Gripping jaw
17	340703007	Insulating pad
18	330102023	Galvanometer motor
19	310107026	Vibration eye holder
20	450101138	galvanoscope
21	310107027	Galvanometer pressure plate
22	340102077	Column head hex socket bolt
23	310103065	Fixed ring - limit
24	310103076	Copper tip connecting rod
25	310107028	Collimator fixing cap
26	310107029	Collimator press ring
27	310102147	Welding tip
28	310103109	Wire feed fixing frame
29	310103082	godet
30	310103108	Rotary support for wire feeding
31	340114003	Anti-trip screw
32	340102020	Capital hex socket screws
33	340106018	Set screw M3X5
34	340102007	Capital hex socket screws

35	450101088	Focusing mirror

Pressing the trigger 8 on the welding head will turn on the protective gas. The protection gas will be maintained for 2 seconds (the gas delay time can be configured through the "air delay parameters"). The prerequisite for laser emission is to start when all safety interlocking control conditions are met and the set gas discharge delay is completed. The operator must keep the switch press during the welding to maintain laser emission. The laser emission will be stopped when the release trigger 1 or the safety interlock loop fails.

5.3 Installation of the wire feeding machine

5.3.1 Definition of circuit wiring

The tail of the whole machine provides two plugs, according to the different models, defined as follows, directly connected to the control box

2.1.1 Wiring of the conventional wire feeder

接口	定义	备注	备注
两芯插头	1.送丝机信号线（start）	短接即送丝，接控制盒送丝接口二的 5/6 脚	常规送丝机
	2.送丝机信号线（GND）		
三芯插头	1.送丝机供电火线（L）	电源线，220V 输入	
	2.送丝机供电零线（N）		
	3.送丝机供电地线（PE）		

2.1.2 Wiring of process warehouse

接口	定义	备注	备注
三芯插头	1.送丝机供电火线（L）	电源线，220V 输入	工艺送丝机
	2.送丝机供电零线（N）		
	3.送丝机供电地线（PE）		
六芯线插头	1.送丝机信号线（start）	短接即送丝，接控制盒送丝接口二的 5/6 脚	
	2.送丝机信号线（GND）		
	3.接地线（PE）	接大地	
	4.485GND	485 信号线，接控制盒的信号接口四	
	5.485TXD		
	6.485RXD		

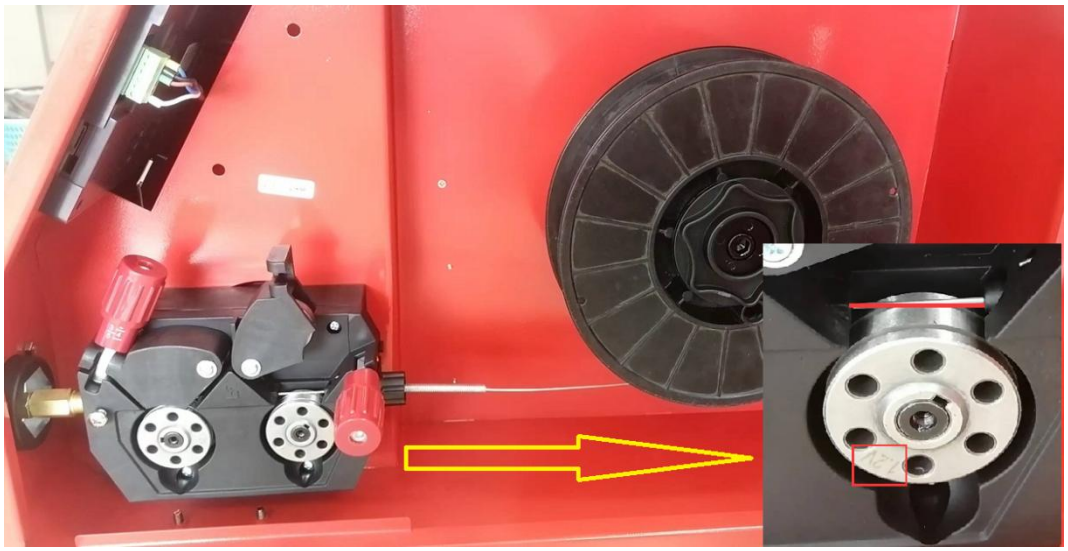
Except for customized models, all models have the same power supply, 220V input (support 110v input, need to replace the switch power supply), and the wire signal is passive guide communication signal. Please note that the main control board of individual models distinguishes the signal of the wire feeder from ±, please connect according to the line standard

5.3. 2 Installation of welding wire tray / wire delivery wheel

① It is forbidden to use the drug core welding wire, and the selection of the welding wire is consistent with the material to be welded

② There are two wire wheels, two sides are different models, corresponding to different core diameter, please be sure to install accordingly. If the 1.2 welding wire is installed, the side of the wire wheel mark 1.2 is on the outside

③ When installing, the welding wire must be stuck in the card slot and then clamped again



5.3.3. Installation of wire pipe

Release the locking screw of the wire pipe and lock it after inserting in the appropriate position



5.4. Software operation



Figure 1-1 Continuous mode- -on the front page

1. "Continuous mode" means that the wire is currently "continuous mode". Click the button in the upper right corner to switch to "Pulse mode".

2. "Silk supply speed" controls the wire delivery speed during welding. The range is 15~600cm / min, you can click the "number" directly input by the keyboard, or can be quickly adjusted through the "arrow". Note: wire speed is not equal to manual wire speed.

3. "Manual wire delivery" controls the motor speed of manual wire delivery, which is usually used for daily debugging of equipment. The range is 15~600cm / min, continuously press the "manual wire" from blue to green, the motor continues to "manual wire speed", and stop the wire after releasing the button.

4. "Manual withdrawal" controls the speed of the motor during manual withdrawal, which is usually used for daily debugging of the equipment. The range is 15~600cm / min, continuously press "manual pump" from blue to green, the motor continues to pump with "manual pump speed", and release the button to stop pumping.

5. "Run" and "Stop" control the switching working state of the wire feeder. Click "Run" to change from black to green, while "Stop" changes to black. This is the "running" state, the motor can be normal wire. Click "Stop" from black to red while "Run" to black. At this time is the "stop" state, the motor stop action, can not do any wire or pull back.

6. The "wire supply indicator light" shows the wire supply status during welding. When pressing the torch trigger for the wire feeding machine, the "indicator light" changes from black to green, indicating that the wire feeding machine is running normally. Note: Only the "indicator light" will show green when welding, and the "manual wire supply" and "manual back drawing" will not change the "indicator light" state.

7. The current screen of "home page" shows the home page of the silk delivery machine system, and the click is invalid.

8. Click on the Settings page to switch to the Continuous Mode Settings Page.



Figure 1-2 Continuous Mode-Settings

1. "Continuous Mode Settings" indicates that the current screen displays as the continuous mode setting page of the wire feeder system. The click is invalid.

2. "Silk speed" is the same as "silk speed" on the home page. Control the wire speed during welding. The range is 15~600cm / min, you can click the "number" directly input by the keyboard, or can be quickly adjusted through the "arrow". Note: All parameters on this page can be adjusted by clicking the value or clicking "arrow", the same below.

3. "Start delay" controls the delay start time of the wire delivery machine after pressing the torch trigger. Range 0 to 2000 ms, usually set to 0. Example: When the start delay is set to 1000ms, press the torch trigger and wait for 1s.

4. "Check length" controls the length of the wire in the wire machine to help with the wire breaking. The range of 0~100mm, usually set to 10, can be appropriately increased according to the thickness of the field welding wire and the length of the wire delivery pipe.

5. "Repair length" controls the length of the wire, which is used to compensate the influence of "drawing length" and maintain the consistency of the joint during the next welding. The range is 0~100mm, which is in principle consistent with the "withdrawal length". If the resistance of the field wire delivery pipe is large, it can be appropriately greater than the "withdrawal length".

6. "Repair delay" controls the length of the interval between the compensating wire and the return wire, which is used to prevent the second wire adhesion to the weld due to the premature compensating wire, so as to improve the wire breaking effect. Range from 0 to 2,000 ms. It is usually set to 0.

7. Language displays the language of the current system. Click to switch to another language in the Language Bar. Note: The standard language is simplified Chinese, Traditional Chinese, English,

Korean, Japanese, Russian, German, French and Latin. If you have other language needs, please contact us.

8. "Manual wire speed" controls the speed of "Manual wire speed" on the home page for daily equipment debugging. Range ranged from 15 to 600 cm / min. Usually set at 300cm / min.

9. "Manual back speed" controls the speed size of "manual back" on the home page for daily equipment debugging. Range ranged from 15 to 600 cm / min. Usually set at 300cm / min.

10. The "System Version" displays the control system version number of the wire feeder., Where "220" represents the system hardware partial version, "601" means the system software partial version, and "410" represents the partial version of the system screen. Note: The parts of the version should correspond one by one, and the versions should be consistent after the after-sales maintenance process, otherwise the phenomenon of abnormal display or some invalid functions may appear.

11. "Save" controls the storage action of the wire feeder system parameters, including all parameters except "Language" on the "Home page" and "Settings page". Click "Hold" to change from yellow to green to indicate hold success. Note ①: The "language" of the system is automatically saving; Note ②: the system displays as the last saved data after the power off restart, so please use the saving function to avoid the loss of process data.

12. The "Return" controls the wire feeder system to switch back to the "home page".

13. The Help control system displays the Parameter Description. Click to view the "Parameter Description".



Figure 1-3 Pulse mode-front page

1. "Pulse mode" means that the wire is currently "pulse mode", and click the button to switch to "continuous mode".

2. "Pulse period" and "smoothness" show the current parameter value and cannot be adjusted. See the setup page for details.

3. The "Average speed" controls the overall wire delivery speed of the "pulse mode", and the "average speed" is not affected by the "pulse period" and "smoothness". The range is from 15 to 300 cm / min, usually set to 60cm / min. You can click on the "number" directly input by the keyboard, or it can be quickly adjusted through the "arrow". Note: This Average speed is not equal to Manual wire speed.

4. Other keys and parameters are the same as "continuous mode".



Figure 1-4 Pulse mode-setting

1. "Average speed" controls the overall silk speed, as with the "average speed" on the home page.

2. "Pulse cycle" controls the size of a single scale, the larger the cycle, the larger the single scale. Range from 50 to 1000 ms, usually set to 500ms.

3. "smoothness" controls the fluctuation between two scales, and the smaller the value, the more obvious the overall effect. Range from 10 to 80, usually set to 30.

4. Other keys and parameters of the setting page are consistent with the continuous mode.

5. In summary, "pulse mode" mainly serves for fishscale welding, and the above parameters are reference values. In actual use, it should be adjusted according to the wire material, wire model, laser power and weld width, so as to get the ideal effect. Other keys and parameters are consistent with the continuous mode.

5.5. Treatment plan for not sending wire

Operation logic: the wire feeding machine receives the 5 / 6 feet of the signal interface of the second two of the control box. When the system runs, the built-in relay of the control box closes the 5 / 6, and the wire feeding machine begins to work

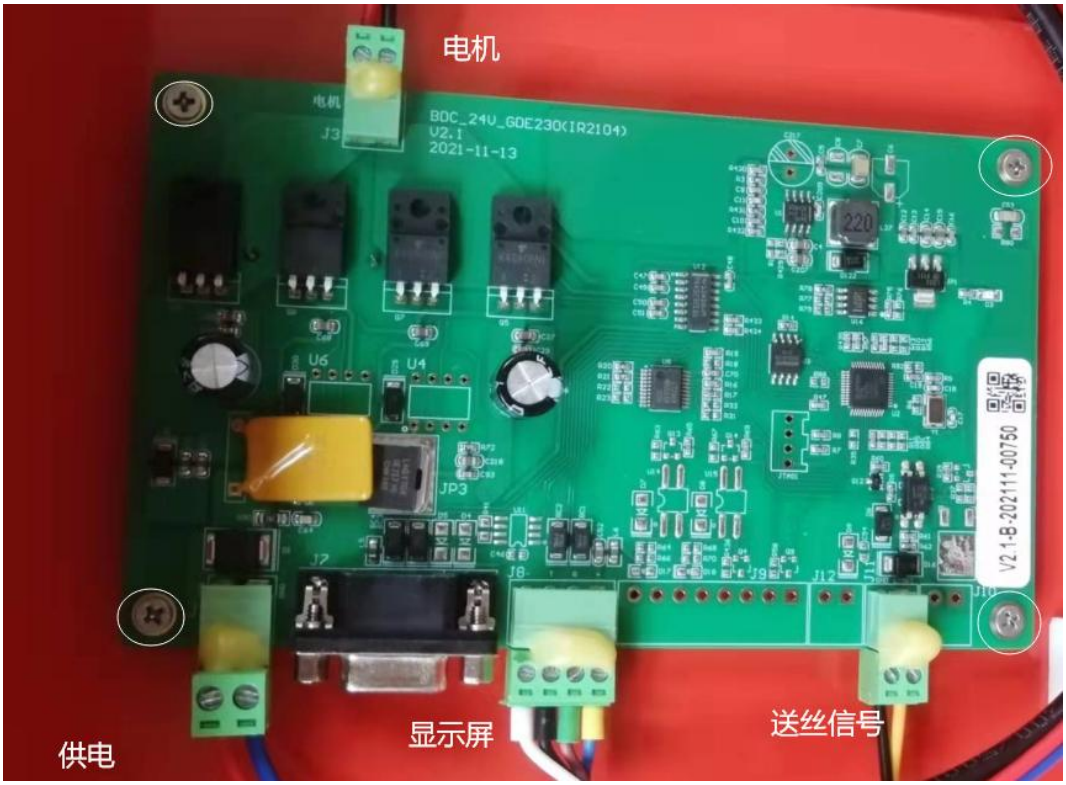
When there is light but not wire:

First of all, look at the setting of the wire feeder, whether the pulse parameters are normal. The data in the red box is 0 according to the figure (some versions have no pulse function, so you can not set it)



After there is no problem above, we first determine whether there is a problem in the control of the wire delivery machine, and click the front panel of the wire delivery machine [manual wire delivery] to observe whether the wire delivery wheel is in operation

① If the wire machine does not operate, there is a problem with the wire machine itself, open the side cover of the control box, press the [manual wire] at the same time, measure the voltage of the motor end of the circuit board, voltage for the motor, no voltage for the main control board



② If the wire feeding machine is running, continue to follow the following operation: use a wire short shuttle wire signal port, if the wire feeding machine does not operate, you can determine that the main board of the wire feeding machine has a problem, and the main board of the wire feeding machine needs to be replaced

If the wire feeder is running, you can determine that the wire feeder is no problem, and check the motherboard and signal line of the system motherboard

Unplug the signal line of the feeder (5 / 6 of the signal interface 2) from the control box, and measure the 5 / 6 open break under the welding state (IO can be opened for the diagnostic function)

If this is the pathway state, the system master panel problem is excluded, generally the signal line break, can be reconfirmed using the multimeter

If the welding state is still in the open circuit state, it means that the motherboard has a problem, contact the after-sales treatment

When there is a problem with the main control board, the signal line of the wire feeder can be controlled by the 3 / 4 pin of the signal interface 2 for temporary use. The wiring is defined as follows (the two-core signal of the wire feeder uses the regular open foot of the relay)

5.6 Important safety functions

5.6.1 Optical cable connection and interlocking

Optical fiber connection interlock is a safety protection loop between the handheld welding head and the equipment optical cable interface. It is used to limit the laser emission of the equipment without connecting the external optical device. It is a method to ensure the interlock protection between the optical cable output interface and the handheld welding head. If the output cable of the equipment is not properly connected to the welding head, the laser emission is prohibited, and the system displays the interlocking state of the output signal on the user interface to inform the user whether the current loop is normal.

5.6. 2 External security interlocked loop

The laser welding system includes an external safety interlock loop, and the user operators connect the safety grating, safety door and other safety protection equipment. External interlock needs to be connected through an external user interface, and keep the security loop closed at all times (see Section 4.6. If the dry contact signal is used, on the DB25 pin connector: pin 8 and pin 17 connection), otherwise the laser will be prohibited, the welding system will output the alarm information, the panel status light shows red, and the user interface will inform the user through the alarm code.

5.6.3 Safety protection circuit between workpiece safety clamp and hand-held welding head

This safety loop is to ensure that the laser is allowed only when the nozzle is connected (in contact) with the workpiece. The operator must fix the workpiece safety fixation to the metal workpiece to be processed, and the loop of the nozzle nozzle with the workpiece safety clip will work

on when the nozzle contacts the workpiece. If the operator removes the nozzle from the processed workpiece, this safety interlock loop will be disconnected, the laser will automatically close and the laser will be prohibited.

5.6.4 Button function limitation of the handheld head

When the trigger button of the handheld laser welding head is opened in the above safety interlocking loop, if the user presses the trigger button, only the auxiliary gas valve is allowed to open, allowing the air flow through the welding head nozzle, and will not allow the laser emission and execute the set operating procedure. If the above safety interlocking conditions are met, the trigger button will be used as the trigger device for the program operation. When the user presses the trigger button, the set air delay program will be executed first, the air delay time will be executed according to the parameters set by the user, and the laser will be fired after the air delay execution. In order to complete the welding work, the operator must keep the trigger button pressed to keep the laser emission open.

5.6.5 Operation status of user and system

Assuming that all the above security protection interlocking are closed, the user operation and system operation status are shown below:

order number	User operation (Security interlocked loop is closed)		laser	Indicate light	The beam swing	auxiliary gas
1	Workpiece safety clip trigger button	break loosen	close	open	close	close
2	Workpiece safety clip trigger button	break press down	close	open	close	open
3	Workpiece safety clip trigger button	breakover loosen	close	open	open[1]	close
4	Workpiece safety clip trigger button	breakover press down	Open 2	open	Open 1	open

Note 1 *The beam will swing against the set value only if the user has set the swing width, otherwise it will remain fixed.*

pour2 *If the program sets the air discharge delay will turn off the air delay, the laser will not be fired immediately when the trigger is pressed, and the laser will be fired after the end of the set air discharge delay, which is the normal operation state.*

5.7 Start of welding

ll personnel in the welding area must wear PPE to prevent the invisible infrared laser and any secondary visible and invisible radiation generated during the welding process. Wear a suitable laser safety glasses and a welding helmet with a suitable filter. Safety equipment also includes welding helmets and fire protective clothing and gloves.

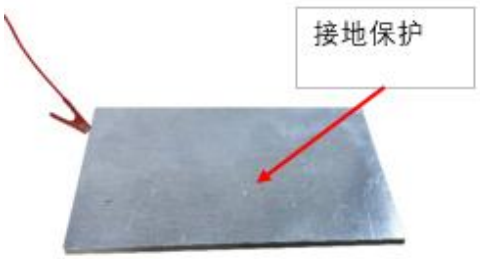
1.Check whether the safety loop is working normally. If the safety loop is not normal, the panel indicator will display the red alarm and the corresponding alarm code. When the safety loop is normal, the alarm will be cleared, and the equipment indicator shows green, indicating the ready state;

2.Select the appropriate welding nozzle and install the nozzle on the welding head extension pipe;

3.1mm thick aluminum plate through user preset parameters (see section) S.01 in continuous laser mode.

4.Place the workpiece to be welded on the welding table and clip it. In the laser welding work, need to ensure that there is a minimum gap between the parts and as close as possible.

5.Ensure that the Workpiece Safety Clamp is connected to the conductive welding table where the part is placed. As shown in the figure below



6.Contact the tip of the nozzle to the part being welded. This closes the safety interlocking loop between the workpiece safety clip and the equipment is in preparation and the equipment indicator appears in orange.

7.Press the trigger button on the handheld welding head to open the protective gas and wait for the laser to start,

8.When the laser emission, slowly move the welding head, you can complete the welding operation. The trigger button of the welding head should be kept during welding, otherwise the welding procedure will be interrupted, the laser will be stopped, and the equipment indicator will always appear orange during work.

9.Since the infrared laser beam is invisible, a red guide beam is used to properly position the nozzle to the part. The picture below shows the appropriate angle to maintain the welded head when positioning the nozzle to the part being welded.



To further improve the process, the operator can use the buttons on the LCD panel to adjust some process settings by increasing or reducing the parameters such as laser power, swing frequency, swing width and so on.

6. Introduction of user interface functions and the setting of process parameters

6.1 Introduction of the user interface menu structure

The user interface is mainly composed of status page, control page and device page. The following table briefly describes the hierarchy structure and function description:

home page main page	secondary pages ubordinate page	Interface preview	functional description
state			It is used to centrally display information such as the operating parameters of the current device, and this interface is displayed by default after the device is started.
control			Users can enter the process parameters through the control page, which contains the menu entrance of user parameters, preset parameters, air discharge delay and gas off delay. When there is a "" mark in the upper right corner, the single confirmation button activates the current selection, long press the confirmation button to enter the parameter editing page, and the single confirmation button for other parameters can enter the modification.≡
	User parameters		On the user parameter selection page, the user can select the parameter serial number through the upper and lower buttons of the operation panel, and the single point confirmation button can save the current serial number. If you need to adjust other Settings in the selected parameters, long

			press the confirmation button to enter the detailed setting interface. You can refer to the function introduction in Section 6.3.1
	preset parameter		On the user parameter selection page, the user can select the parameter serial number through the upper and lower buttons of the operation panel, the single confirmation button can save the current serial number, and long press the confirmation button to enter the detailed setting interface. The preset parameters are the default parameters of the system, and only part of the setting options are open to the user. Refer to the functional description in Section 6.3.2
	Gas delay		In this interface, the air discharge delay before emitting the laser can be set to release the auxiliary gas in advance. When the welding head trigger button is pressed, the laser will be released according to the set time.
	Turn off the gas delay		In this interface, the gas turn-off delay after stopping the laser emission can be set to continuously release the auxiliary gas. When the welding head trigger button is released, the gas will be released according to the setting time and then end the program. During the execution, the laser is in the closed state.
equipment			The device page mainly provides the entrance for the user to view the device information
	Service code		This interface will display the unique service code of the device, mainly for the feature identification of the device services
	information		This page displays device operation information, including software version information, environment information and hardware information.

The specific functional use and introduction of each interface will be introduced in detail in the subsequent sections.

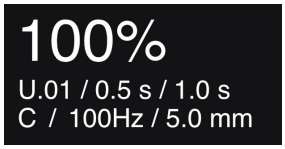
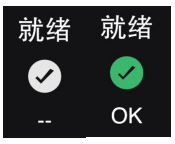
6.2 Use of the user interface status page

The user page is displayed by default after the device is started. When the other page is in, you can return to the state page by clicking the menu key.

a、 b、



A Unactivated status shown b activated status shown

Display content (Unactivated, activated state)	**description**
	This area displays the setting content of the current device operation parameters, the first line of the percentage shows the power ratio of the current device used, the second line uses "/" to separation, respectively displays the program number / air out delay / gas off delay selected by the user. The third line of content is separated with "/" and displays different content and definitions in different operating modes (see table below):
	When the laser is in the state to launch and emitted, the icon will appear as a yellow background, otherwise, the laser is in the state to be emitted or emitted.
	After the system is started, the cooling system is normal, the gas input is normal, the communication is normal, the security interlocking loop is closed, and the ready icon will be activated when there is no other alarm state
	The icon is activated when the laser is in the waiting condition, and the operator and the surrounding user should provide safety protection, as described in Section 5.4

running mode	Pattern code	Display parameter 1	Display parameter 2
Continuous mode	C	hunting frequency	Wobble width
Modulation mode	M	hunting frequency	Wobble width
Pulse mode	P	pulse length	Wobble width
Line array mode	S	Open light time	Guan light time
Timed mode	T	duration	Wobble width

	The icon will be activated when all security loops are closed
	After the system is powered, it takes a certain time to cool the system to start ready. Generally, the start time is within 30 seconds. When the cooling system is started, this icon will be activated
	After the external auxiliary gas is connected to the device, if the access air pressure meets the system requirements (see Section 4.4), the icon will be activated, and the input gas pressure shall be greater than 0.3b a r and less than 6.0bar
	This icon is only used for the communication state of the system internal control signal, and it will be active when the communication of the system internal signal is normal
	When the system operation has a fault or an alarm, this icon will be activated. All fault codes will be displayed by scrolling below the icon. Users can record the fault codes and consult the contents described in Section 7.1 for information comparison.

6.3 Use of the user interface control page

The control page contains 4 options, which are user parameters, preset parameters, gas discharge delay and gas shutdown delay. After entering this page, the user enters the parameter selection state through the "confirm" button of the single point operation panel. The up button or the down button can be selected through the up button of the operation panel. When the parameter is selected, the background color will be displayed in blue. After the selection, pass the single point or long press[1]"Confirm button" enter the parameter settings interface.



pour[1] When there is a "" flag in the upper right corner, the confirmation button of the single operation panel is used to activate the current selection, and long press the confirmation button of the operation panel to enter the parameter editing page≡

6.3.1 Setting of the user parameters

The system provides the user with a running program with customizable parameters, numbered U.0 to U.19, for 20 groups. The operator can choose a set of programs to modify until the work requirements are met, and the parameters set by the user will be saved in the system by default for the next reuse.

Specific steps to enter the parameters:

Select the user parameters on the control page, long press the confirmation button in the operation panel, and wait for 0.5 seconds to enter the program selection page.



In the user parameter program number selection page, the current program number can be increased or decreased by the operation panel button, when the upward button is continuously pressed, the program number increases to U.19 will stop, when the downward button is continuously pressed, the program number will stop to U.00, when adjusted to the required program number, the confirmation button of the operation panel can activate the current program number selection, while the green icon is displayed in the upper right corner, indicating the activation state.



To modify the selected program number, long press the confirmation button of the operation panel for more than 0.5 seconds to enter the detailed parameter equipment page.



In user program mode, the current operation mode should be confirmed before entering the parameter setting, and the system provides 5 operation modes for selection.

- Continuous mode-for continuous welding of most sheet metal (see Section 6.3.1.1)
- Modulation mode-for welding of metal sheets (see section 6.3.1.1)
- Array mode-for segment welding (see Section 6.3.1.1)
- Pulse mode-for welding of highly reflective materials (see Section 6.3.1.1)
- Timing mode-for spot-moving welding (see Section 6.3.1.1)

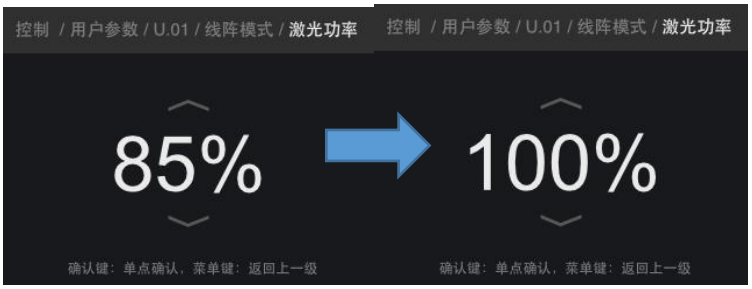
Here, we take the line array mode as an example to detail the parameter setting method. According to the operation method described above, select the line array single point confirmation button to activate the line array mode, and the green icon will be displayed in the upper right corner. Long press the "confirmation button of the operation panel" 0.5 seconds to enter the parameter setting page of "line array mode".



After entering the parameter selection page, the single confirmation button will enter the parameter adjustment operation. The adjustment range of each parameter will be different. Take the "laser power" as an example, and the laser power will be adjusted from 85% to 100%, and the single confirmation button will enter the parameter adjustment interface



Through the upward button of the operation panel, adjust the setting value to 100%. After the adjustment, the single confirmation button is saved.



Click the menu key and return to the previous page. You can see that the laser power setting value is displayed as the modified 100%, and then the modification result has taken effect.



As described above, the user can continue to complete the modification of all the parameters in the current procedure. If you need to keep the modified program in the system for use after the next boot, you need to click the menu key to return the page to the page of the program number selection page. All the modified parameters in the current program will be automatically saved in the system for the next call. If the device power is turned off on the parameter modification page, all changes in the program will not be saved.

6.3.1.1 Description of the operation mode in the program

The system provides five operating modes for selection.

- Continuous mode-for continuous welding of most sheet metal

order number	parameter name	unit	least value	crest value	adjusted dose	Windows default	description
1	laser power	%	0	100	1	100	
2	hunting frequency	Hz	0	300	1	0	
3	Wobble width	mm	0	5	0 . 1	0	
4	Slow rise time	ms	0	2000	1	500	
5	Slow down time	ms	0	9999	1	500	

Parameters are defined as described in the glossary in section 6.3.1.2

- Modulation mode-for welding of metal sheets

order number	parameter name	unit	least value	crest value	adjusted dose	Windows default	description
1	laser power	%	0	100	1	100	
2	hunting frequency	Hz	0	300	1	0	
3	Wobble width	mm	0	5	0 . 1	0	
4	impulse frequency	Hz	1	50000	1	500	

5	pulse length	%	10	100	1	50	
6	impulse shape	#	0	19	1	0	0 Representative infinite

Parameters are defined as described in the glossary in section 6.3.1.2

- Array pattern-for segment-type welding

order number	parameter name	unit	least value	crest value	adjusted dose	Windows default	description
1	laser power	%	0	100	1	100	
2	hunting frequency	Hz	0	300	1	0	
3	Wobble width	mm	0	5	0 . 1	0	
4	Slow rise time	ms	0	2000	1	500	
5	Slow down time	ms	0	9999	1	500	
6	switching time	ms	0	3500	1	500	
7	Guan light time	ms	0	3500	1	500	
8	number of replication	#	1	9999	1	0	

Parameters are defined as described in the glossary in section 6.3.1.2

- Pulse mode-for welding of highly reflective materials

order number	parameter name	unit	least value	crest value	adjusted dose	Windows default	description
1	laser power	%	0	100	1	100	Less than 2 times the standard power
2	hunting frequency	Hz	0	300	1	0	
3	Wobble width	mm	0	5	0 . 1	0	
4	impulse frequency	Hz	0	50000	1	500	The QCW operating restrictions are met
5	pulse length	%	10	100	1	50	The QCW operating restrictions are met
6	impulse shape	#	0	19	1	0	0 Representative infinite

Parameters are defined as described in the glossary in section 6.3.1.2

- Timing mode-for spot-moving welding

order number	parameter name	unit	least value	crest value	adjusted dose	Windows default	description
1	laser power	%	0	100	1	100	
2	hunting frequency	Hz	0	300	1	0	
3	Wobble width	mm	0	5	0 . 1	0	
4	Slow rise time	ms	0	2000	1	500	
5	Slow down time	ms	0	9999	1	500	
6	switching time	ms	0	3500	1	500	
7	Guan light time	ms	0	3500	1	500	

Parameters are defined as described in the glossary in section 6.3.1.2

6.3.1.2 Glossary of parameters of operation mode

order number	**The parameter name**	**unit**	**parameter definition**
1	preset parameter		For the default process parameters of the system, some parameters within the program allow the user to make modifications, or the latest process parameter group can be updated through the remote service.
2	Program number		Refers to the process parameters selected by the current user, including 20 sets of customizable procedures, and the preset mode includes 55 sets of process parameters
3	running mode		The current device operation mode that specifies the parameter group that the user will use in the program
4	laser power	%	Set the maximum output power of the system, in noncontinuous mode to set the amplitude of the maximum output power of the device.
5	hunting frequency	Hz	Set the scanning frequency of the beam deflection mirror in the handheld welding head, the equipment frequency is output in the form of triangular wave, the higher the set frequency, the faster the scanning speed, and the smaller the vice versa.
6	Wobble width	mm	Set the angle value of the deflection mirror in the handheld welding head to limit the width of the beam movement, the maximum swing width is set to 5 mm, and the deflection mirror will not move when set to 0.

7	Slow rise time	ms	It is effective in the operation mode of "continuous mode", "line array mode" and "timing mode". It is used to set the slow rise interval of the power from 0% to the set power value after the laser emission takes effect. The performance result is the change time when the laser output intensity becomes weak and strong.
8	Slow down time	ms	It is effective in the operation mode of "continuous mode", "line array mode" and "timing mode". It is used to set the slow decline interval from the set power value to the complete closing after the closing laser emission. The performance result is the change time of the laser output intensity being strong and weak.
9	impulse frequency	Hz	In the modulation mode and the pulse mode, set the pulse operation period of the laser output
10	pulse length	%	In modulation mode and pulse mode, setting the effective output interval in each pulse running cycle when the pulse width is set to 100% is equivalent to continuous mode. In the pulse mode, the maximum value of the pulse width limits the power set value.
11	Open light time	ms	In the online array mode, determine the time when the laser remains firing after the on time.
12	Guan light time	ms	In online array mode and timing mode, determine the time when the laser keeps emission after opening time.
13	duration		In the timing mode, determine the time when the laser remains firing after the on time.
14	number of replication		In the online array mode, the number of repeated runs of the entire program cycle is set, and the program execution will be stopped after the set number is run
15	wave form		In the modulation mode and pulse mode, the user can choose different pulse waveforms to adjust the transmitting mode of the pulse. The default waveform 0 is no change. After selecting the other waveforms, the maximum output power will be adjusted with the preset waveform curve.

6.3.2 Setting of the preset parameters

There are 55 sets of preset parameters within the system, numbered S.0 0 to S.54. The program in the preset parameters is the system default program, the user can choose a group of programs to modify, but compared with the user parameters, the operator can only modify specific parameters in the operation mode set by the system program, fine-tune the parameters, the parameters set by the user will be saved in the system by default for the next reuse.

Specific steps to enter the parameters:

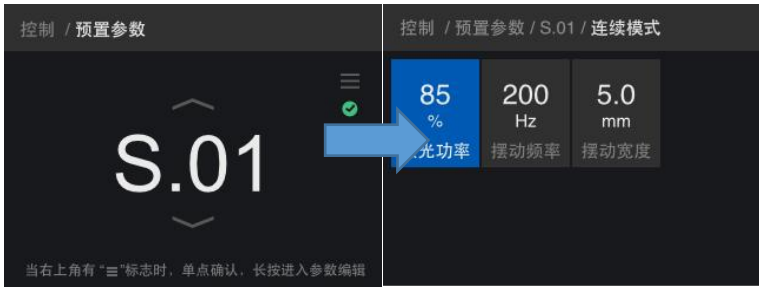
Select the preset parameters on the control page, long press the confirmation button in the operation panel, and wait for 0.5 seconds to enter the program selection page.



On the selection page of the preset parameter program number, the current program number can be increased or reduced by the upper number of the operation panel, the program number will increase to S.54 will stop, and the program number of the downward button will be reduced to S.00 when the confirmation button of the operation panel will be stopped, and the green icon "" will be displayed in the upper right corner, which indicates the active state.



To modify the selected program number, long press the confirmation button of the operation panel for more than 0.5 seconds to enter the detailed parameter equipment page. In the preset program mode, the parameter setting page will be entered directly according to the operation mode set by the system by default.



The parameters that can be set in different operating modes will be different. As shown in the figure above, the default operating mode of S.01 is continuous mode, and the parameters that can be set in continuous mode are only laser power, swing frequency and swing width.

For the system program is shown in the following table:

running mode	Continuous mode	Modulation mode	Pulse mode	Line array mode	Timed mode
Adjustable parameters	power	power	power	power	power
	hunting frequency	impulse frequency	pulse length	switching time	Slow down time

	Wobble width	Wobble width	Wobble width	Guan light time	duration

When entering the parameter selection page, a single confirmation button can enter the parameter adjustment operation. The adjustment range of each parameter will be different. The parameter adjustment method is consistent with the user parameter method. Please refer to the description of the parameter adjustment content in Section 6.2.

Referring to the following table to quickly select the welding application range of the system preset parameters, and the user parameters

The set parameters apply the quick query table						
Materials and working mode		0 . 5 mm	1mm	2mm	3mm	4mm
stainless steel	Continuous mode	S.38	S.00	S.02	S.04	S.06
	Modulation mode	S.07	S.01	S.03	S.05	
	filler rod			S.28	S.2 9	S.30
	spot welding	S.52	S.55	S.54	S.53	
carbon steel	Continuous mode	S.39	S.08	S.10	S.12	S.14
	Modulation mode	S.15	S.09	S.11	S.13	
	filler rod			S.31	S.32	S.33
	spot welding	S.48	S.51	S.50	S.49	
aluminium	Continuous mode	S.40	S.16	S.18	S.20	
	Pulse mode	S.21	S.17	S.19		
	filler rod			S.34	S.35	
	spot welding	S.45	S.47	S.46		
yellow metal	Continuous mode	S.41	S.22	S.24	S.26	
	Pulse mode	S.27	S.23	S.25		
	filler rod			S.36		
	spot welding	S.42	S.44	S.43	S.37	

6.3.3 Setting of air discharge delay and gas closing delay

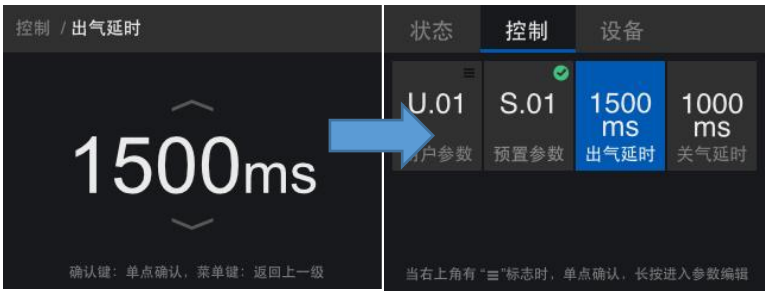
Air discharge delay and gas shutdown delay are the global parameters of the system. After the user changes, all user programs and preset programs will be executed according to the modified settings. The setting range of air outlet delay and gas closing delay is 0-3000 ms. The setting method of the two parameters is consistent. Here, the setting method is taken as an example

Specific steps for setting the parameters:

Use the up or down button of the operation panel to switch the page to the control page, click the confirmation button to enter the parameter selection state, select the parameter item of "air discharge delay" through the up button or down button, and click the single confirmation button to enter the parameter adjustment page



Adjust the air discharge delay to 1500 ms, if you do not save, click the menu key to return to the previous page, if you need to save the modified parameters, click the single confirmation button to save, after saving the parameters, the air output delay parameter value in the control page will be displayed as the modified content.

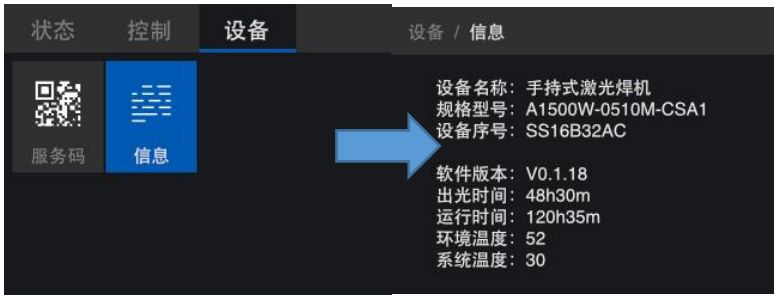


6.4 Information view of the device page

The device page contains two options, namely, Service Code and Device Information. After entering this page, entering the parameter selection state through the "confirm" button of the single point operation panel can be selected in the parameters. When the parameter is selected, the background color will be displayed in blue. After selection, selected by single point or long press "confirm button" to enter the setting interface.



After entering the device page, select "Service Code" and click the confirmation button to enter the view



After entering the device page, select "Information" and click the confirmation button to enter the view

6. 5 Suggestions for user parameter setting

Laser generally uses continuous mode, power slow rise / slow drop time is set to 500ms, can ensure the beginning of a better forming effect.

The larger the swing of the welding head, the better the gap adaptability, but also weakens the energy distribution; similarly, the higher the swing frequency, the lower the energy density. The recommended swing size range is 2 to 3 mm and the frequency range is 50 to 250 HZ.

Welding plates of 1mm thickness is recommended, and defocus-1mm is recommended when welding plates of 2 and 3mm thickness.

Protection gas Use inert gas, argon or nitrogen is recommended, argon is better. The pressure is roughly 0.2MPa, the pressure will blow away the melt pool, increase the splash, too small to play a protective effect. The vent / off delay is set to 500ms to better protect the weld and welding head lenses.

Suitable welding speed is from 1 to 6 cm/s. Too low speed leads to too wide melting width and excessive thermal influence area, which reduces the performance of welding joints; too fast speed is not easy to control.

It is recommended that the welded steel thickness be 0~3mm, and aluminum and copper thickness be 0~2mm. Welding of materials beyond this thickness, the weld morphology and joint performance will be worse.

laser	power	0-1500 W
	Fiber core diameter	25 μm
soldered joint	Collimine lens focal length	50 mm
	Focus lens focal length	150 mm
essential parameter	Swing size	0-5 mm
	hunting frequency	0-300 HZ
	Welding thickness recommendations	Steel 3 mm; aluminum, copper 2mm
	Welding gap requirements	< 0.5 mm
	Welding speed recommendations	< 10cm/s
	Wobble parameter recommendations	2~3mm，50~250HZ
	Gas pressure is recommended	≈0.2MPa

6. 6 Suggestions on welding parameters of common materials

material	thickness	attended mode	laser power	Swing size and frequency	defocusing amount	velocity
stainless steel	1mm	Spell welding	60%	2mm，120Hz	0	4cm/s
stainless steel	1mm	stitch welding	80%	1mm，100Hz	-1	4cm/s
stainless steel	1mm	vertical position welding	70%	2mm，120Hz	-1	4cm/s
stainless steel	2mm	Spell welding	90%	2mm，90 Hz	-1	3cm/s
stainless steel	2mm	vertical position welding	100%	2mm，90Hz	-1	3cm/s
stainless steel	3mm	Spell welding	100%	2mm，60Hz	-1	2cm/s
stainless steel	3mm	vertical position welding	100%	2mm，60Hz	-1	2cm/s
alufer	1mm	Spell welding	80%	2mm，120Hz	0	4cm/s
alufer	1mm	vertical position welding	90%	2mm，120Hz	0	4cm/s

alufer	2mm	Spell welding	100%	2mm， 9 0Hz	-1	2cm/s
alufer	2mm	vertical position welding	100%	2mm， 9 0Hz	-1	2cm/s
yellow metal	1mm	Spell welding	90%	2mm，120Hz	0	4cm/s
yellow metal	1mm	vertical position welding	90%	2mm，120Hz	0	3cm/s
yellow metal	2mm	Spell welding	100%	2mm，90Hz	-1	1cm/s
yellow metal	2mm	vertical position welding	100%	2mm， 9 0Hz	-1	1cm/s

7. Troubleshoot / maintenance

If an alarm occurs, the Error status indicator on the device panel lights up red. There are 44 possible alerts available. To determine which alarm bit caused a specific error:

1. Check the laser power display on the front panel. The error code will appear on the LCD panel and will begin with the letter "E" followed by three digits (for example, E003 for a 3-bit alarm). Many alarms can be eliminated in one of two ways.

2. Reststarting the welding system after a power outage, the first thing it will do is to try to clear any alarms automatically. As long as the condition leading to the error is resolved, the error should be cleared.

3. Connect through the computer serial port and clear the alarm using the HMI software provided by GW.

Using Restboot: A small portion of these alarms can only be cleared by restart the unit. If the conditions that cause it are not resolved, the alert may occur again. If this is the case, please contact the GW after-sales staff for help!

For the front panel error display, the severity of the warning increased as the number of errors increased. E027 is more severe than E001. If multiple alarms occur, a higher level warning number is displayed on the front panel.

7.1 Error messages and troubleshooting

Handheld laser welding system fault alarm code

code	Code interpretation	Fault reproduction method	process mode
S028	Laser lock	Over the shelf life	1: Need to contact GW for decryption
E001	Number 1 drive board communication failure	Unplug the module communication cable	1: Communication problems between the optical module and the system, check the connection between the optical module and the network cable, and check the network cable between the main control board and the

			module
E002	No.2 drive board communication failure	Enter the single module interface to cancel the fault alarm, such as optical cable detection	1: Communication problems between the optical module and the system, check the connection between the optical module and the network cable, and check the network cable between the main control board and the module
E005	The AD board communication failure	There is no simple way to reproduce, to reproduce may damage the device	1: The damaged board in the module
E006	Secondary body module hypertemperature	Unplug the diode temperature probe and shorten the probe interface pin	1: Check whether the diode installation is closely attached to the cooling plate and use the thermal conductivity material according to the specification
E007	The drive module is ultra-warm	Unplug the drive module temperature probe and short-connect the probe interface pin	1: The temperature of the module MOS tube is high
E008	The water temperature is too warm	Change down the corresponding temperature alarm value	1: The refrigerant leaks or the refrigerant is too blocked. Under the debugging interface, the temperature difference between intake and exhaust exhaust, and the normal temperature difference is greater than 9℃. 2: refrigerant leakage, check the

			leakage point; when the temperature difference of the fan speed, the condenser is too large (you can feel the heat taken by the two fans by hand, and the cooler is too cold;)
E009	The optical fiber temperature is too warm	Change down the corresponding temperature alarm value	1: The internal device temperature is too high and requires professional analysis
E010	Laser reflection energy exceeds the line	Use a flashlight on the corresponding sensor	1: The reflected light of the welding high reverse material exceeds the threshold value, and it is necessary to form an Angle between the welding head and the welding material when the welding application is used to reduce the reflected light;
E011	Laser reflection energy exceeds offline	Change the corresponding threshold value	1: the power supply is not started or damaged, 2: light circuit break, no red light, no laser output
E012	Secondary body short-circuit fault	There is no simple way to reproduce, to reproduce may damage the device	1: The welding circuit of the secondary body is broken, and the welding of the secondary body needs to be checked
E013	Output optical cable protection alarm	QBH pulls the gun	1: Check whether the QBH and welding torch are well assembled, 2: Check whether the QBH signal line is inserted, 3: two metal

			pieces of short quartz head to observe whether the alarm contact
E016	jerk	Cancel the external or internal emergency stop virtual short contact and emergency stop alarm shielding	1: The emergency stop switch wiring harness wiring is incorrect or the emergency stop switch fails, 2: the emergency stop switch is pressed down
E017	Pressure failure	Disconnect the gas	1: no gas source access, 2: small air pressure, not reaching the threshold value of air pressure valve, 3: pressure switch or line problem
E018	narrow pulse	External pulse signal given the 1us pulse width	1: External pulse signal over 50 KHz, pulse width of 20, shielding narrow pulse
E019	The drive plate is overpressed	The drive plate overvoltage value is lower than the current power supply voltage value	1: The pressure difference of the optical module drive plate does not match, so replace the secondary body
E022	Troubleshooting	Manufacturing energy beyond the lower limit	1: Protection mechanism, confirm and judge the external environment, such as light path, voltage, ambient temperature to meet the use conditions after the unlock.
E023	The radiator is not started	Unplug the communication line between the temperature control board and the compressor drive board	1: Lack of refrigerant. Under the debugging interface, the temperature difference between intake and exhaust exhaust, and the normal temperature difference is about 5℃.

			2: The compressor is not start, check whether the compressor works normally, the compressor is directly connected to mains. The machine will not start if the compressor is not start; if the compressor has not regular regularly, check the compressor power cable.
C000	Communication fault between the main control board and the temperature control board	Unplug the communication line between the temperature control board and the main control board	1: Temperature controller RS485 terminal loose or broken: 2: master control board C102 terminal loose or broken, 3: master control board Z301 terminal loose or broken, 4: master control board P205 terminal loose or broken, 5: master control board program lost
C001	Communication fault between the display screen and the refrigeration system	Unplug the communication line between the temperature control board and the compressor drive board	1: Temperature control board J5 terminal is loose or broken, and compressor drive board CN485 terminal is loose or broken
E901	Radiator overflow	There is no simple way to reproduce, to reproduce may damage the device	1: Compressor alarm, check the external voltage, whether the current is abnormal
E902	Radiator lost step	There is no simple way to reproduce, to reproduce may damage the device	1: Compressor alarm, check the external voltage, whether the current is abnormal
E904	The radiator is short of phase	Unplug the motor cable of one of the compressors	1: Compressor alarm, check the external voltage, whether

			the current is abnormal
E905	DC voltage below level	The voltage regulator is required to reduce the 220V voltage	1: The power output to the optical module is too low, check the power output 48V
E906	The DC voltage is too high	The voltage regulator is required to raise the 220V voltage	1: The power output to the optical module voltage is too high, check the power output 48V
E908	Abnormal temperature sensor	There is no simple way to reproduce, to reproduce may damage the device	Check whether the temperature sensing line is disconnected, check the temperature display in the panel status interface, if the temperature is 0 and the room temperature is not 0, the sensor line is faulty, remove the machine to check
E909	The communication is abnormal	There is no simple way to reproduce, to reproduce may damage the device	1: Temperature control board J11 terminal loose or broken, check the communication status between the temperature control board and the frequency converter
E910	AC underphase or CT short lines	There is no simple way to reproduce, to reproduce may damage the device	1: Check whether the pressing current of the external environment meets the requirements
E911	AC current overflow	There is no simple way to reproduce, to reproduce may damage the device	
E912	The AC input voltage is too low	The voltage regulator is required to reduce the 220V voltage	

E913	The high voltage switch is abnormal	There is no simple way to reproduce, to reproduce may damage the device	
E914	The IPM is over-temperature protection	Heat up the IPM module	
E915	The PFC module has an overtemperature protection	Heat up the PFC module	
E917	Secondary body temperature sensor fault	Short-circuit diode temperature sensor interface	1: Temperature control board J10 terminal loose or sensor is damaged, check the secondary body temperature display in the panel status interface
E918	Environmental temperature failure	Short-circuit ambient temperature sensor interface	1: Temperature control board J12 terminal loose or sensor is damaged, check the ambient temperature display in the panel status interface
E919	Failure of the radiator inlet temperature	Short-circuit compressor inlet temperature sensor interface	1: Temperature control board J13 terminal loose or sensor is damaged, check the inlet temperature display in the panel status interface
E920	Radiator outlet temperature failure	Short-circuit compressor outlet temperature sensor connector	1: Temperature control board J14 terminal loose or sensor is damaged, check the outlet temperature display in the panel status interface
E921	The second-level body	Short-circuit exhaust temperature sensor interface	1: Temperature control board J15 terminal loose or sensor

	temperature is just too low		is damaged, check the secondary body temperature display in the panel status interface
E922	The radiator is short of night	The difference between the inlet and outlet temperature is 20 degrees during the operation	1: The compressor has abnormal sound, need to add compressor oil
E923	The temperature-sensing line is abnormal		1: Check whether the temperature sensing line is disconnected, check the temperature display in the panel status interface, If the temperature is 0 and the room temperature is not 0, judge that the sensor line is faulty, remove and check

Simple troubleshooting method of handheld welding faults

fault phenomenon	Possible cause	Judgment and solutions	processing method
The display panel shows that the warming rate does not increase	Compressor master program error	The compressor master board re-into the program	
The welding torch motor does not start up	± 15V power supply is abnormal, and the bare plate power supply may be damp and lead to	The power supply is ± 15 volt, whether the multimeter measurement voltage range is correct;	With multimeter 15V power supply output

	insufficient power supply.		
	12 core plug motor power wire dewelding;	Check whether the 12-core harness harness is loose	Interconnect with multimeter volume
The temperature difference between the actual temperature of the cooling plate and the setting temperature is too large	Too much / little media	Unscrew the air valve to remove a part of the refrigerant	
Set 10% actual light 100%	Linear calibration error	Re-perform the linear calibration.(Hand welding factory without linear calibration)	Return to the factory for repair or replacement
Red light weak	YDF photonic darkming	renewal YDF	Return to the factory for repair or replacement
	Red-light diode power decay	Replace the red-light diode	
The welding torch does not shine normally	Communication failure	Check the swing control board harness for loose or detached loss	
Red light offset is not in the center	Wrong host parameter	Adjust energy signal output zero bias (No.50 ID19)	Connect to the upper computer to adjust the parameters

	The lens swings the small plate with interference	Observe the amount of red light offset, if the red light offset to the barrel, the high probability can not be adjusted with software. Judge whether the motor has any abnormal noise or any loud noise.	
The scope width does not match the setting	Wrong host parameter	Adjust the energy signal output gain (No.49 ID18)	Connect to the upper position computer to adjust the corresponding parameters
The welding torch automatically glows out when it contacts the body shell	Safety lock does not work	Check that the safety lock is connected to the shell	
The red light offset cannot be adjusted	Communication failure	Check whether the ± 5V transfer plate (lens swing) plug is in good contact	Remove machine and check whether the plug is inserted
	Failure interference	Check whether the upper computer shows a fault alarm	Even on the computer to check
	The welding parameters are not set	Check whether the welding parameters are normal	Check if the swing parameter is set
The laser will	Upper computer	Check that the screen	Connect to the upper

not alarm when the protective gas is not connected	parameter is not set correctly	check code is checked correctly	position computer to check the corresponding parameters
The protective gas cannot be closed after the laser is turned off	Upper computer parameter is not set correctly	Check for cold water interlock shielding	Connect to the upper position computer to check the corresponding parameters
	Air valve / relay fault	Replace the air valve or use a multimeter to check the signal between the relay and the master panel.	Open the cabinet and check whether the solenoid valve is working. If not, check the signal line or replace the solenoid valve
	Master control panel failure (very low probability)	Replace the main control board, replace the multimeter after checking and confirmation;	
Display panel has no light band and no light band	Poor power supply	Check that the Huawei power supply is working properly	
		Check that the 24V power supply is working properly	Whether the input and output of the 24V multimeter power supply are normal
Always send silk or do not send silk	The wire signal is wrong (the first generation of wire signal line is a triode supply signal, easy to be	With the light meter SS1 and SS2, the supply wire is damaged; if not open, the supply wire failure;	Replace the wire

	disturbed and breakdown)		
	The wire signal of the main control panel is not given	Replace the master panel or the latest specification	Replace the main control board
Red light partial after the adjustment and then open the machine red light or partial	Swing small plate fault	The external voltage exceeds 10% of the threshold and is unstable, causing the swing plate failure. Continuous high pressure state plate chip will be damaged, red light does not swing or deflection, physical and mechanical adjustment is not able to swing	Change the swing plate
	The vibration mirror motor fails	In the process of use, experienced strong vibration such as work platform drop and other conditions. Replace the handheld head, the same brand can not replace the lens drive;	Change the hand-held gun

8. The warranty

8.1 General warranty

a. Guanghui (Shanghai) Laser Technology Co., Ltd. warrants that after the delivery of the products, Guanghui (Shanghai) Laser Technology Co., Ltd. does not have any lien and right burden on the products.

b. Unless otherwise specified by Guanghui (Shanghai) Laser Technology Co., Ltd., Guanghui (Shanghai) Laser Technology Co., Ltd. provides a 24-month warranty (from material defects and quality issues) for all products. According to the tenth paragraph of the sales clause of Guanghui (Shanghai) Laser Technology Co., LTD., Guanghui (Shanghai) Laser Technology Co., Ltd. will choose to confirm the defects of the products still within the warranty period 1) maintenance 2) replacement 3) refund. All the repaired or replaced products shall follow the initial warranty period of the original repair products, that is, only the repair report can be free within the remaining warranty period of the original repair products. The buyer must make written repair within 30 days after finding product quality problems. All repair reports must be directly submitted by the buyer, and Guanghui (Shanghai) Laser Technology Co., Ltd. will not accept any third party repair requirements.

c. The above repair does not apply to the product problems caused by the following conditions: 1) incorrect or improper maintenance or calibration conducted by personnel of Guanghui (Shanghai) Laser Technology Co., Ltd.; 2) software, interface or power supply provided by customer or third party 3) unauthorized modification; incorrect operation outside the limits of product parameters; 4) abuse, negligence, accident, loss or damage during transportation; or 5) unauthorized maintenance or repair.

d. The above warranty regulations are unique, in addition, Guanghui (Shanghai) Laser Technology Co., Ltd. will not assume any form of (whether express or default) in written or oral maintenance responsibility and provisions proposed by regulations or laws. Guanghui (Shanghai) Laser Technology Co., Ltd. expressly waives the liability and terms of maintenance, including (but not limited to) the implied warranty of merchantability and applicability.

E) The technical guidance and services provided by Guanghui (Shanghai) Laser Technology Co., Ltd. to the customers will not affect the warranty terms provided by Guanghui (Shanghai) Laser Technology Co., Ltd.

8.2 Service and maintenance

CAUTION：

There are no built-in parts available for user maintenance. All maintenance shall be carried out by the personnel of Guanghui (Shanghai) Laser Technology Co., Ltd. Therefore, the repair or replacement requirements must be notified to the company or the service representative in your area as soon as possible. Permitted returned products must be placed in a suitable box. Upon damage to the goods, it shall be submitted to the carrier in writing.

IMPORTANT:

Do not return the product to GH without the return authorization (RMA) letter. If the warranty period of the product has expired, or the product is no longer within the scope of maintenance, the buyer will bear the maintenance costs.

8.3 Change

We reserve the right to change the design and structure of the product, and we will not assume any responsibility for the modification of the same model that has been sold.

MEMO: