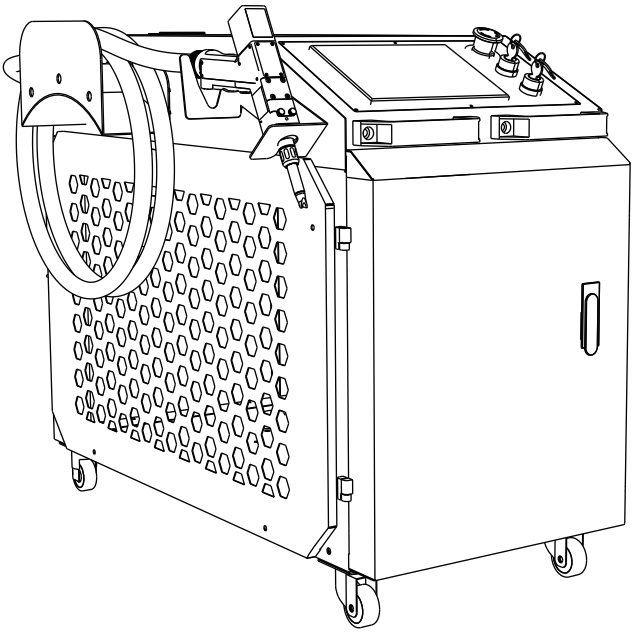
TRM 特尔玛

www.trm-welding.com

Handheld Laser Welding System

(LWH 1500 / LWH 2000)



Version No.: LWH 15+20M-S-TRM

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Ensure you read and understand this guide in its entirety and familiarize yourself with the operating and maintenance instructions before you use the product

The company strongly recommends that all operators of the product read and pay particular attention to all safety information contained herein prior to operating the product.

This user guide should stay with the product to provide you and all future operators, users, and owners of the product with important operating, safety and other information.

For product technical assistance, contact Customer Service of the company.

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Audience

Use of this product should be limited to fully trained industrial, professional or commercial operators who are responsible for welding in industrial and non-industrial installations for commercial purposes.

Note

The language of the original instructions is English.

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Overview

1.1 Introduction

The company introduces a new type of industrial Infrared fiber laser welding system that consists of a handheld optical output head. Its maximum continuous wave power≥1500W(1500w series)，≥2000W(2000W series).

The company fiber laser welding system has been designed and tested with safety in mind. By following this User’ s Guide and applying sound laser safety practices, it can be a safe and reliable device.

Because of its special characteristics, laser light poses safety hazards different than light from other sources. All laser operators and persons in the vicinity of the laser when the laser is in use must be aware of the hazards and wear all recommended personal protective equipment.

In order to ensure the safe operation and optimal performance of the product, please follow all instructions in this guide and adhere to all safety and related warnings.

These safety precautions must be observed during all phases of operation, maintenance, and repair of this instrument.

Operators are urged to adhere to these recommendations and to apply sound laser safety practices at all times. Furthermore, operators should review all safety guidelines and requirements for welding.

1.2 Intended use

The LWH series handheld laser welders are used for industrial and professional use. Product intended use is limited to metals materials processing such as: carbon steel, aluminum and stainless steel.

1.3 Certification

The company certifies that this instrument has been thoroughly tested and inspected. It was found to meet published specifications prior to shipping. Upon receipt of the unit, please inspect the packaging and parts for any damage during shipping. If damage is apparent, please contact our customer service department immediately.

1.4 Models Covered

Laser welding models covered in this document include:

- LWH 1500
- LWH 2000

1.5 Unpacking instructions

If the packaging shows any signs of external damage, inspect the unit for damage and notify the shipping agent immediately.When you take the unit out of the box, take extra care to ensure that the fibers are not broken or damaged.A comprehensive packing list is included with the system documentation. Upon receipt of the laser, please check all items against this checklist, and if any item is missing or the unit is visibly damaged, please contact the company immediately. Do not attempt to install or operate a laser unit under any circumstances if the unit is visibly damaged or suspected of being damaged.

The laser unit is pulled and carried by the base support unit. Use the handle (if applicable to your unit) to help position the product when it is properly supported. Do not lift or place the laser unit through any attached fibers.

Larger and relatively heavy models are packaged in foam-insulated wooden crates. Refer to Section 1.5.2 for unboxing instructions.

1.5.1 Delivery and Shipping

Due to the weight of the product, serious injury may result if the product is not handled properly.

Product delivered in maximum protective packaging. The package is equipped with shock and tilt monitors to warn of any incorrect handling. If the packaging shows signs of external damage, or if the shock and/or tilt monitors are activated (red indicates potential shipping damage), notify the shipping company and your representative at our company immediately.

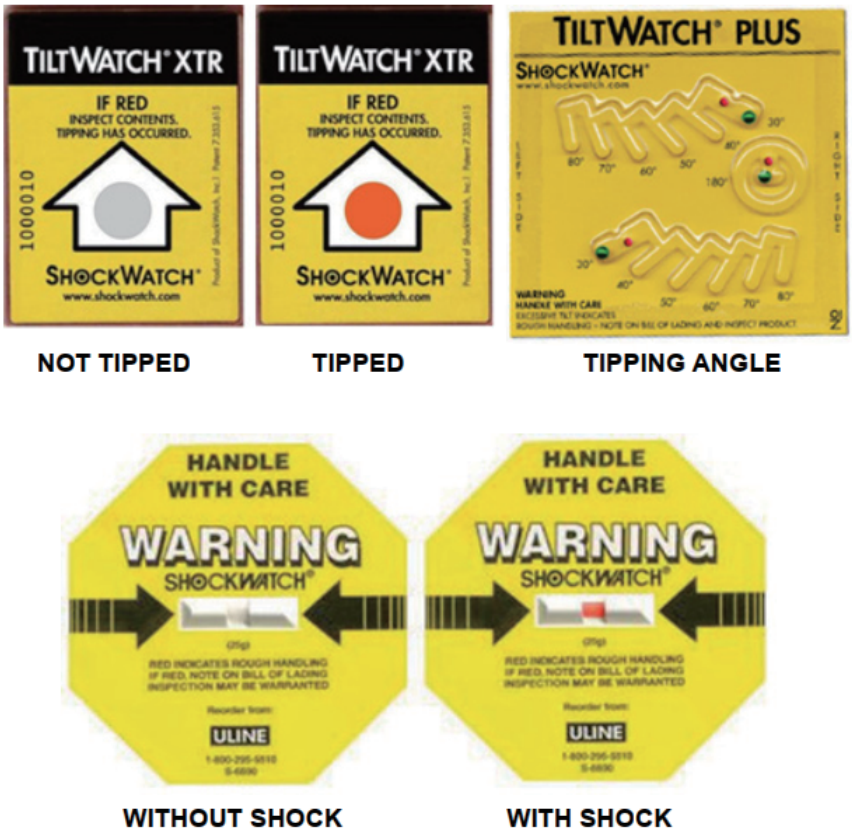


Figure 1-2. Transport Monitoring - Tilt and Shock

This red indicator indicates a possible dange

- Check the laser for damage immediately after delivery.
- If damage occurs, notify the company and the shipping company in writing.

The company recommends the following when unpacking:

- Use only suitable tools and aids
- Follow all steps to ensure safe unpacking of product
- Always wear protective clothing.

Safety and Compliance Information

2.1 Safety Information and Conventions

To ensure the safe operation and optimal performance of the product, follow all warnings in the product User Guide.

Safety precautions must be observed during all phases of operation, maintenance, and service Operators must adhere to these recommendations and apply sound laser safety practices at all times. There are no user serviceable parts, equipment or assemblies associated with this product, except as indicated in Section A. All internal service and maintenance should only be performed by qualified personnel of the company, except as noted in Section A.

Various words and symbols are used in this user guide. It is designed to alert you to any danger or important information.

Refer to Table 2-A for a list of safety practices and their implications.

Table 2-A.Safety Symbols Used in this User Guide

Symbol	Description
 **ELECTRICITY**	Electricity warning symbol indicates a potential personal hazard. It may cause personal injury to you or others if not followed correctly.Stay away from Electricity warning area before understanding the device completely
 **LASER RADIATION**	Laser radiation warning symbol indicates a potential hazard. It may cause personal injury to you or others if not followed correctly. Stay away from Laser radiation area before understanding the device completely
 **CAUTION**	Caution symbol indicates a potential hazard. If not followed correctly, it may cause damage or destruction to the product or component. Stay away from Caution area before understanding the device completely
 **IMPORTANT**	Important symbol indicates information related to the operation of the product. Make sure you don't ignore this information.

2.2 Government Security Requirements and Features

2.2.1 Compliance with regulatory standards

EMC emission:	EN 55011:2009+A1:2010
EMC Immunity:	EN 61000-6-2:2019/EN 61000-6-4:2019
Electrical Safety:	EN 61010-1:2010
Laser Safety:	EN 60825-1:2014

Table 2-B. Regulatory Standards

This unit is designed to meet the regulatory standards listed. It will be verified by self-test in the near future.

2.2.2 Class A Digital Device

This equipment is tested and complies with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules and Canadian ICES-003 when marked as such on the product. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Modifications of this product could result in noncompliance with FCC rules.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this guide, can cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the users are required to correct the interference at their own expense.

2.2.3 Functional Safety

EN ISO 13849-1:2008+A1:2009 Cat.3/PL d。The following safety features are only implemented in hardware:

- Shutdown initiated by safety device: The safety electronics of the laser monitor the feed fiber 1 (fiber interlock). If the laser is firing and the feed fiber is disconnected or damaged from the docking device, the laser is powered off.
- Stop by safety device: Safety electronics of the laser monitor emergency stop/external interlock
- Interlock Input: If the laser is firing and an emergency stop or external interlock is activated, the laser is de-energized.
- Safety Start/Restart Button: Safety electronics for the laser shutdown circuit. A fault was detected in these circuits before laser firing was enabled.
- Release of stored energy: The laser's safety electronics monitor safety-related inputs. If the laser is firing and the guard is activated to shut down, the stored energy of the laser is released.
- Protection against accidental activation: The laser's safety electronics monitor safety-relevant inputs.

A start or restart cannot occur after the safeguard has been activated until the safeguard is re-established and a separate intentional act occurs.

2.2.4 Laser Classification

Governmental standards require that all lasers be classified according to their output power or energy and the laser wavelength.

This product emits invisible laser radiation at or around a wavelength of 1080 nm. The total light power radiated from the optical output is greater than 1500 W average and greater than 2500 W peak per optical output port, depending on the model. Please refer to the product specification for the specific performance characteristics of your device.

This level of light may cause severe damage to the eyes and skin. Due to these risks a qualified laser safety officer should be present to ensure a safe working environment. Appropriate laser safety protection, guards and procedures shall be in place at all times while the laser is operational.

This product also contains a guide laser that is Class 2M per IEC 60825-1 and Class 2 per 21CFR 1040.10(g). The guide laser emits visible laser radiation at or around a wavelength range of 600 to 700 nm and is capable of producing a peak power of 1mW. Eye exposure should be avoided. Do not stare into the beam or view directly with optical instruments.

Please refer to the laser safety warning labels in section 2.2.8.

Class 4 high power lasers present the most serious of all laser hazards.Take precautions to prevent accidental exposure to both direct and reflected beams.
Severe and permanent eye damage from reflected or scattered laser radiation.
Class 4 laser beams are also a potential skin hazard and fire hazard as well.
Protective laser eyewear must be worn by all personnel working inside the Laser Controlled Area if the system can be active. For information on laser safety glasses, please refer to Section 2.2.7.
Use of controls, adjustments or performance of procedures other than those set forth in this User Guide may result in exposure to hazardous radiation.

Please wear suitable laser safety glasses when operating this device.The selection of appropriate laser safety eyewear requires the end user to accurately identify the range of wavelengths emitted from this product.

If the device is a tunable laser or Raman product, it emits light in a range of wavelengths. End users should verify that the laser safety glasses used are capable of blocking light emitted by the device over its entire wavelength range.

Please review the safety labeling on the product and verify that the personal protective equipment (i.e. eyewear, enclosures, viewing windows, or viewports, etc.) being utilized is adequate for the output power and wavelength ranges.Decisions on safety eyewear must also take into account any secondary radiation hazards due to the welding process (see section 2.3.4).

Whether the laser is used in a new installation or to retrofit an existing system, the end user is solely responsible for determining the suitability of all personal protective equipment

There are several laser safety equipment suppliers that offer materials or equipment. These include LaserVision USA, Kentek Corporation and Rockwell Laser Industries. The company provides the names of these providers solely as a convenience and does not endorse or recommend any of them, or their products or services. The company assumes no liability for their recommendations, products or services.

Laser safety eyewear must conform to China and international safety standards, including 9 CFR 1926.102(b)(2), ANSI Z136.1 (US) and EN207/EN208 (Europe). The regulations in force will depend on the location of the laser installation.

2.2.5 Device Safety Label Locations

The safety label banner which is affixed on the device, provides information on the laser radiation hazards that are present in your particular device.

The company safety label and the information listed on the safety label will vary based on the output power(s), wavelength(s), and other performance characteristics. It is important to review the labels affixed to the product for specific information about your laser device.

This product has the required safety labels located on the outside of the device enclosure at various locations. These include warning labels indicating removable or displaceable protective housings, apertures through which laser radiation is emitted and labels of certification and identification.

Refer to Table 2-C for a description of all safety labels and their placement on the product.

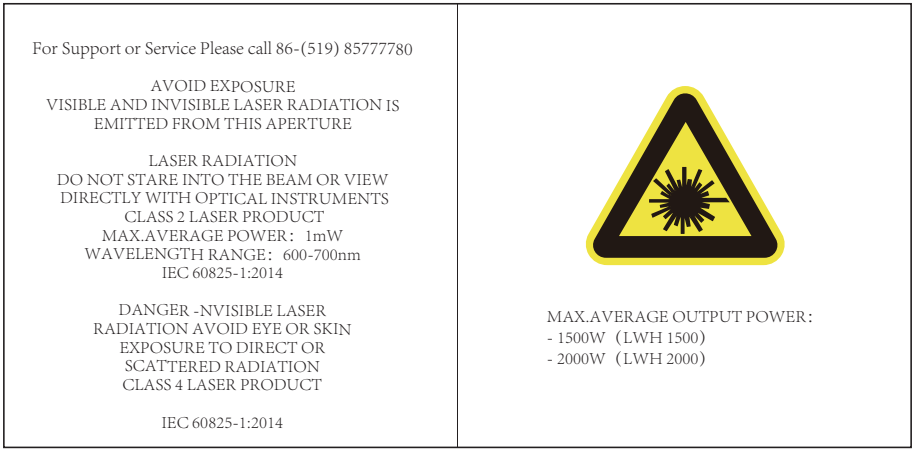
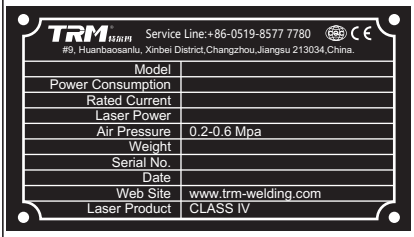


Figure 2-1. Laser Safety Banner Label

Table 2-C. Safety Label Description and Location

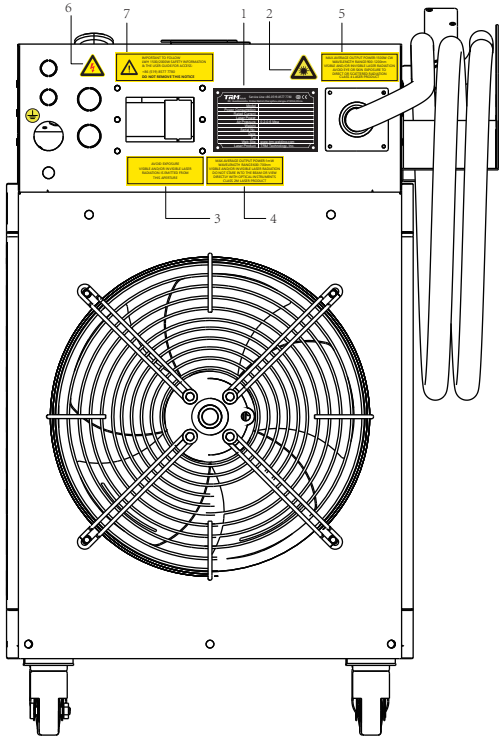
<table>
<tr>
<td>1. Identification Plate Label
 

Real panel of the device（Product made in China）See Fgure 2-2。</td>
<td>2. Laser Radiation Hazard Label
 
Located near output aperture or exit point from the enclosure: (1) rear panel of the device, (2) top and sides of weld head, (3) base of fiber cable output connector.
See Figure 2-2 and Figure 2-3.</td>
</tr>
</table>

3. Aperture Exposure Label - Device	4. Laser Information Label - Class 4 IR Laser	5. Warning Label - Class 4 IR Laser
AVOID EXPOSURE VISIBLE AND INVISIBLE LASER RADIATION IS EMITTED FROM THIS DEVICE Located near output aperture on rear panel of the device. See Figure 2-2.	MAX AVERAGE OUTPUT POWER： - 1500W（LWH 1500） - 2000W（LWH 2000） Identifies the output power, peak power, pulse duration, pulse repetition rate and wavelength range. Located on rear panel of the device. See Figure 2-2.	DANGER -NVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT IEC 60825-1:2014 Identifies Laser Classification. Located on rear panel of the device. See Figure 2-2。

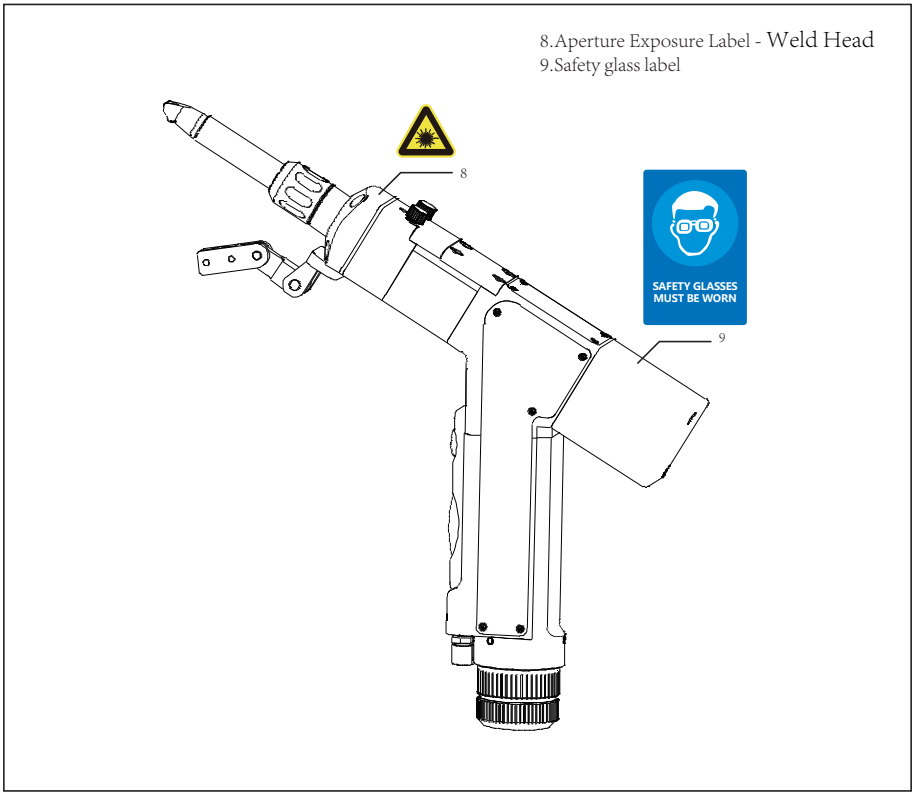
6. Class 2M Red Guide Laser	7. Panel Label	8 Aperture Exposure Label - Weld Head
LASER RADIATION DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS CLASS 2M LASER PRODUCT MAX.AVERAGE POWER：1mW WAVELENGTH RANGE： 600-700nm IEC 60825-1:2014 Combination label for guide laser. This label identifies the output power and wavelength range. It also specifies the classification and warning. Located on rear panel of the device. See Figure 2-2.	DANGER -NVISIBLE LASER RADIATION AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION CLASS 4 LASER PRODUCT Located on device side panels near bottom. See Figure 2-2.	AVOID EXPOSURE VISIBLE AND INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE AVOID EXPOSURE VISIBLE AND INVISIBLE LASER RADIATION IS EMITTED FROM THIS APERTURE Located near output aperture: (1) Left and Right side of the weld head, (2) bottom label is also placed at the base of fiber cable output connector. See Figure 2-3.
9 Protective Conductor Terminal	**10. Electric Hazard Label**	**11. Caution Label**
 This symbol is specifically reserved for the PROTECTIVE CONDUCTOR TERMINAL and no other. This is placed at the device earthing point and is mandatory for all grounded equipment. Located on rear panel near AC receptacle. See Figure 2-2.	 Located on rear panel near AC receptacle. See Figure 2-2.	 Consult accompanying documentation. Located on rear panel near AC receptacle. See Figure 2-2.

Figure 2-2 Label Placement — Device Rear and Side Panels



1. Identification Plate Label
2. Laser Radiation Hazard Label-Device
3.Aperture Exposure Label - Device
4. Laser Information Label - Class 4 IR Laser
5.Warning Label - Class 4 IR Laser
6.Electric Hazard Label
7.Caution Label

Figure 2-3 Label Placement – Output Weld Head



Important Welding Specific Safety Information

2.3.1 Secondary Radiation Hazard

Visible and Invisible Light Radiation Produced During Welding.The interaction between high power laser beams and target materials being welded may create plasmas that produce UV emissions and “blue light” which may cause conjunctivitis, photochemical damage to the retina and/or sunburn-like reaction to the skin.

Welders who are exposed to invisible UV light without proper protection can suffer permanent eye damage. Even brief exposure to invisible UV light during welding can cause blurred vision, burning, tearing, eye pain and irritation (feeling of sand in your eye).

2.3.2 Protective Eyewear for Welding

You need to wear goggles to protect your eyes against risk of permanent eye damage and vision impairment from invisible reflected and scattered Class 4 laser beams and risk of eye damage as a result of exposure to UV light, heat and sparks produced during the welding process.For laser welding, it is not sufficient to wear PPE that only protects against the laser’s IR wavelength. The selection of PPE should also take into account the secondary radiation hazards discussed in section 2.3.1 as well.

The combination of (1) the specified laser safety glasses, and (2) welding helmet with appropriate filters and face shield will offer the best protection during laser welding.

For example, an additional welding mask (with appropriate filter lenses) should also be worn over laser safety goggles to protect the wearer from UV and visible radiation.

A welding helmet can also protect the welder from being injured due to hot splatter, metal particulates and sparks.All personnel working near the laser welding area must wear PPE.

2.3.3 Skin Hazard

Damage to eyes or skin from exposure to UV-radiation produced by the welding process.

Depending on the intensity of the IR light, skin injuries may include thermal burns or excessive dry skin.Exposure to UV light may cause skin burns that are similar sunburns and will increase a welder’s risk of skin cancer and accelerated signs of skin aging.Welding sparks may also cause burns. Laser material processing can transfer a significant amount of energy into a part.

Parts may be extremely hot even after the welding process is complete. Parts of the weld head can become hot during use. Ensure that the proper PPE is used to protect against potential burns.

Take precautions to prevent skin damage by wearing protective clothing such as laserresistant and heat-resistant gloves, caps, leather apron and other laser-resistant and heat-resistant clothing. Sleeves and collars should be buttoned.

2.3.4 Fire Hazard

The heat and sparks produced during welding are capable of starting a fire or causing an explosion.

Laser welding should only be performed if the area is free of combustible materials

Never weld on containers that have flammable or combustible material.

If the container contents are unknown, you should assume they are flammable or combustible.

Fire extinguishers should be nearby and accessible and personnel should be trained in their usage.

2.3.5 Fume Hazards

Welding "smoke" can be comprised of very fine particles and gases. Welding fumes and gases come from a combination of the material being welded or any filler material used, shielding gases used, paints, coatings, chemical reactions, and air contaminants. Welding smoke can adversely affect the lungs, heart, kidneys and central nervous system.

When the laser interacts with target materials such as plastics, metals, composites, the target material may start to vaporize. Often the fumes and mists cannot be seen, but are very toxic and pose a serious health hazard.Welding in a poorly ventilated confined space is extremely dangerous. Dangerous concentrations of toxic fumes and gases can build up very quickly causing unconsciousness or death from suffocation.

UV emissions given off during the welding process can react with the oxygen and nitrogen in the air to form ozone and nitrogen oxides which at high concentrations can be deadly. Shielding gases used during welding can displace the air and cause injury or death.

· During welding keep your head away from the fumes.

· Always weld in an area with adequate ventilation.

· Hazardous fumes, vapors and particles need to be captured and exhausted from the welding processing area (refer to section 2..6.3).Use a fume extraction system to remove vapors, particulates and hazardous debris from the welding work area.

· read and obey the safety data sheets and warning labels for all welding materials used;

· Respirators may also be required in confined spaces and other situations.

· Routine air monitoring should be performed to determine the level of harmful fumes in the welding area.

2.3.6 Gas Cylinder Safety

⚠ Gas cylinders may explode if damaged or placed nearby to the welding area causing injury and property damage.

Gas cylinders should be shielded and located in areas where they cannot be struck or damaged.Place them away from sources of heat, sparks or flame, as well as deflection from laser beam.

Cylinder must be stored upright and secured to a fixed support.Need to have working regulators that are suitable for the gas and pressure required. All hoses and fittings should also be suitable for the application and maintained in good working condition.

2.3.7 Welding-related safety resources

OSHA Standards for Welding, Cutting and Brazing:

https://www.osha.gov/SLTC/weldingcuttingbrazing/standards.html

NFPA 51B, "Standard for Fire Protection During Welding, Cutting, and Other Hot Work," available from:

NFPA, 1 Batterymarch Park, Quincy MA 02169

CGA Publication P-I, "Considerations for Safe Handling of Compressed Gas in Cylinders," available from:

Compressed Gas Association, 1401 George Carter Way, Chantilly, VA 20151

For laser safety resources, please refer to Section 2.7.

2.4 General Safety Instructions

If this device is used in a manner not specified in this document, the protection provided by the device may be impaired and the warranty will be voided.

2.4.1 Specular Reflections

Often there can be numerous secondary laser beams produced at various angles near the laser output aperture. These beams are called "Specular Reflections" and are produced when the laser light reflects off a surface where the primary beam is incident.Although these secondary beams can be less powerful than the total power emitted from the laser, the intensity can be great enough to cause damage to the eyes and skin as well as materials surrounding the laser.

Exercise caution to avoid / minimize specular reflections.
This product emits invisible laser radiation at or around a wavelength of 1080nm (infrared).
In addition, this product also emits visible laser radiation at or around a wavelength of 600-700 nm (red).

2.4.2 Establish a Laser Controlled Area

For more information on setting up a laser controlled area, the site Laser Safety Officer or safety officer should refer to the most recent revision of:
American National Standards Institute publication ANSI Z136.1 (US) or IEC 60825-4 Safety of Laser Products - Part 4: Laser Guards (Europe).

· In many jurisdictions, laser safety regulations require the appointment of a site Laser Safety Officer (LSO). Work with your site LSO to establish a laser controlled area (LCA) to protect all personnel working in the area from being directly or indirectly exposed to the laser beam. The LSO is responsible for conformance and enforcement of laser safety regulations. In addition, the LSO ensures that laser protective eyewear, clothing and shields are available and being used.
· Ensure that all personal protective equipment (PPE) is suitable for the output power and wavelength range listed on the laser safety labels affixed to the product. Any PPE must also be suitable for any secondary radiation.
· Use the laser only in a laser controlled area with access controlled by door interlocks.
· Provide suitable barriers to secure a laser safe work area and to prevent the beam from escaping the area. Any barriers used in the LCA should be made of a laser-safe material that can withstand direct and diffusely scattered beams.
· Post warning signs outside the LCA when the laser is in use. Appropriate warning signs should be posted throughout the controlled area, especially at any entrances to and from the area. For example, a sign warning of potential eye hazard should be placed outside the entrance to the enclosed controlled area.
· Restrict access in the LCA to only those individuals who are trained in laser safety while operating the laser. Post a sign with the names of all persons authorized to work within the laser work area.

2.4.3 Optical Safety

The laser output is delivered through a window or circularizer with any anti-reflection coating. Make sure that the window is clean and of good quality.

Any dust on the end of the head assembly can burn the window and damage the laser.

Check the quality of the spot emitted from the laser output at low power levels and then gradually increase the output power.

NEVER look directly into a laser aperture (such as the output fiber, or weld head) while the unit is powered.

Wear the specified laser safety glasses when operating the product.

Ensure that all personal protective equipment (PPE) is suitable for the output power and wavelength range listed on the laser safety labels that are affixed to the product.

- NEVER look directly into the output port when power is supplied to the laser.
- Avoid positioning the laser and all optical components at eye level.
- Avoid using the laser in a darkened environment.
- Provide enclosures for the laser beam.
- Always turn the key to the OFF position when working with the output (i.e. mounting the laser head into a fixture, etc.).
- As an added precaution, remove the key from the key switch during such work.
- If necessary, adjust the output at low output power, then gradually increase the output power.

Do not install or terminate the laser head when laser is active.

2.4.4 Equipment and Solvents

Light-sensitive elements in equipment, such as video or still cameras can also be damaged from exposure to the laser light.

Laser light is strong enough to burn skin, clothing, and paint. The laser can cut and weld metal.

Laser light can ignite volatile substances such as alcohol, gasoline, ether and other solvents.

Exposure to solvents and other flammable materials and gases must be avoided and considered when installing and using this device.

2.5 Electrical Safety

The input voltage to the laser weld unit is potentially lethal!All electrical cables and connections should be treated as if they were at a harmful level.

All parts of the electrical cable, connector or device housing should be considered dangerous.

All electrical and weld gas connections must be connected prior to applying power to the unit.

In addition and where applicable, all connections must be secured with screws to ensure proper functionality.

To ensure electrical safety:

· Make sure the device is properly grounded through the protective conductor of the AC power cable. Any interruption of the protective grounding conductor from the protective earth terminal can result in personal injury.

· For continued fire protection, replace only line fuses (if applicable) with the same type and rating. Other fuses or materials are prohibited.

· Before supplying the power to the device, ensure that the correct voltage of the AC power source is used. Failure to use the correct voltage can cause damage to the device. Refer to the markings on your specific model for proper electrical supply connection.

· No operator serviceable parts inside. Consult qualified personnel of the company for all repairs. To prevent electric shock, do not remove the cover. Any tampering with the product will void the warranty.

· Connections to external circuits except for Mains connections: the external connections between this product and other external devices are PELV (Protected Extra-Low Voltage) as defined by IEC 61140. Non-Mains outputs of other devices connected to this product should also be PELV or SELV (Safety Extra-Low Voltage).

2.6 Environmental Safety

The product must not be disposed of with household waste. Electronic equipment must be disposed of in accordance with departmental directives on the disposal of electronic and electrical waste.

Ensure that all personal protective equipment (PPE) is suitable for the output power and wavelength range listed on the laser safety labels that are affixed to the laser.

Damage to the laser is possible, unless caution is employed when operating the device.

The equipment is designed for: (1) Indoor Use (non-residential), (2) Operation at less than 2000 meters altitude, (3) Over Voltage Category II, (4) Pollution Degree 2 Environment, (5) Dry Locations, (6) ambient air temperature of 5-35° C, and (7) relative humidity of 10-90%. Refer to product specifications for additional information.

This equipment is not suitable for use in locations where unprotected persons or children may be present. Keep away from sources of shock or vibration.

Proper enclosures should be used to secure a laser safe work area. This includes but is not limited to laser safety signs, interlocks, appropriate warning devices and training/safety procedures. Do not operate with the output weld head at eye level.

2.6.1 Humidity

Do not expose the device to a high-moisture environment (>90% humidity).

2.6.2 Process By-Product

Ensure that the work surface is properly vented. When a laser beam reacts with any material, it can generate vapors, fumes, sparks and particulate debris. By products from the laser process are often toxic and can pose additional safety hazards.
These fumes must be evacuated from the work area by means of an extraction system.

It is the responsibility of the end user to ensure proper disposal of waste debris and other by-products. Any extraction system must comply with local and health and safety regulations.

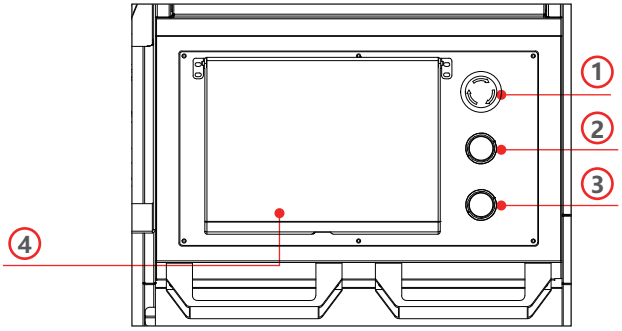
3.Laser Welder Device Description

3.1 Accessory

As shown in Table 3-A, your laser welder setup includes the following accessories.

Item	Order Number	Quantity	Remark
Standard Accessories			
Manual Laser Welding System User Guide	LWH 15+20M-S-TRM	1PCS	
Handheld Welding Head	LWH2K-A	1PCS	
Welding Nozzle	LWH2K-WJPZ-A	1PCS	
Goggles	SD-4 OD6	1PCS	
Wire Feeder		1PCS	

3.2 Weld unit front view



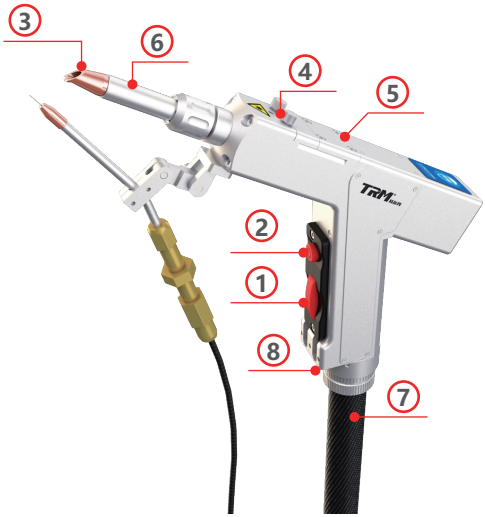
Item	Function	Description
1	Emergency stop button	Temporarily interrupt the power supply to the welding unit. When pressed, the main DC power supply will be disabled. Once pressed, it can be reset by turning the emergency stop knob clockwise, after resetting it is necessary to press the 2/3 button again.
2	Cooling-Water Machine Start	After pressing, the cooling-water machine and the control interface start.
3	Laser Start	Laser starts after pressing
4	LCD touch screen	Selection and setting of process parameters

3.3 Weld unit rear view

The rear panel of the laser equipment has access holes for lasers, control lines and power lines, and includes a temperature control module that can be set and monitored, as follows:

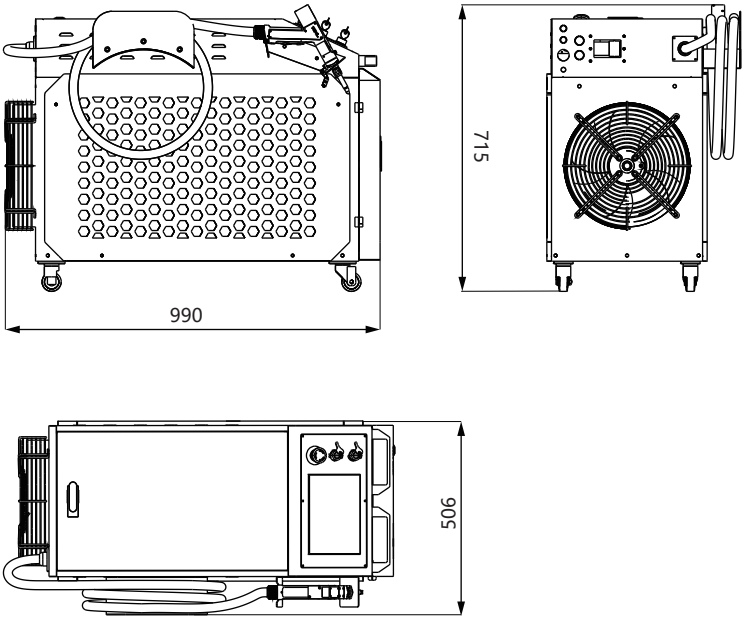
Item	Function	Description
1	Laser output fiber	The laser output (fiber) is transmitted through this location and connected to the welding torch(QBH output terminal). Infrared radiation is delivered to the welding torch through this fiber. Optical fibers are transmitted through umbilical cable.
2	AC line input	AC input socket:230V~, 50/60Hz, 40A (LWH 1500) 230V~, 50/60Hz, 45A (LWH 2000)

3.4 Laser welding torch



Item	Function	Description
1	Trigger 1 - Start Gas Flow	Press and hold Trigger 1 to begin shielding gas flow. This must remain pressed throughout the welding process. Trigger 1 should only be released once Trigger 2 is no longer being pressed
2	Trigger 2 - Start Laser Emission	Under safety conditions， trigger 2 functions： 1. Laser output（click or long press） 2. Wire retraction (double click)
3	Nozzle Tip for Welding	Laser output, gas flow， Contact with the workpiece to form a ground lock circuit.
4	Protective lens 1	Protect focusing lenses from splash contamination
5	Focusing lens	
6	Extension Tube	Connect nozzle and weld gun, and adjust the relative position of the laser focus and the nozzle by moving back and forth.
7	QBH Fiber Cable	The unit will arrive with the fiber cable already inserted and connected to weld head.
8	Other lines	Protective gas, cooling circuit, control line.

3.5 Layout and dimensions(cm)



3.6 Fiber cable output connection

The input voltage to the laser can be lethal. All fibers and connections should be considered at hazardous levels. All parts of fiber optics, connectors, or device enclosures should be considered hazards.

Every time the fiber is disconnected from the welding head, the fiber termination must be inspected for dust, dirt, or damage.

4 Conditions of use

4.1.1 Environmental requirements

- Ambient temperature: 0 ~ 45℃;
- Relative humidity: ≤90%;
- Altitude: ≤3000m;
- The relationship between the temperature of the cooling medium and the ambient temperature is shown in Figure 2.

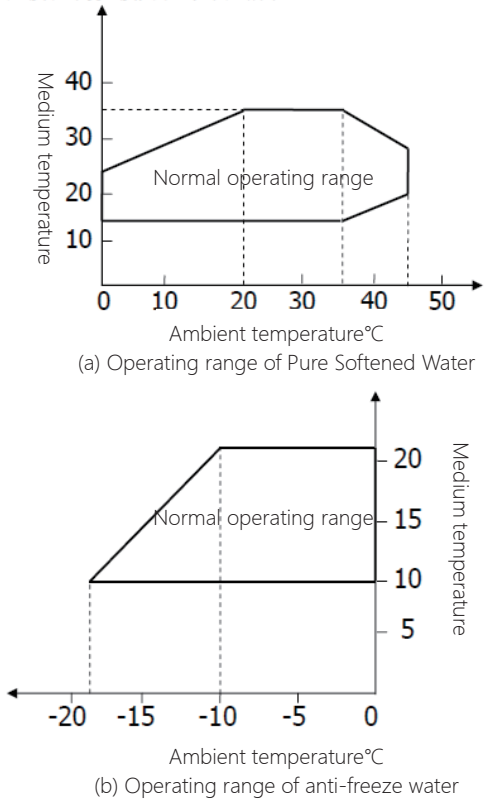


Figure 2 Equipment operation range

Note: The above operating range is obtained in the laboratory according to the standard product test, for reference only. The operating range of each specific type of product may be slightly different. Please contact the manufacturer for details.

4.1.2 Medium requirements

The cooling medium must be softened water, such as pure water, distilled water, high pure water, etc., the volume ratio ⩽30% ethylene glycol, or the volume ratio ⩽20% ethanol, and the preservatives and bacteria removers approved by the manufacturer are allowed to be added.

It is strictly prohibited to use antifreeze with the volume ratio of > 30%, oil and oil-based liquids, inflammable and explosive liquids, liquids with solid particles, especially liquids corrosive to aluminum and stainless steel.

4.2 Add water and exhaust

4.2.1 Water

Add softened water through the water inlet of the equipment to the standard liquid level area (green area), as shown in Figure 3.

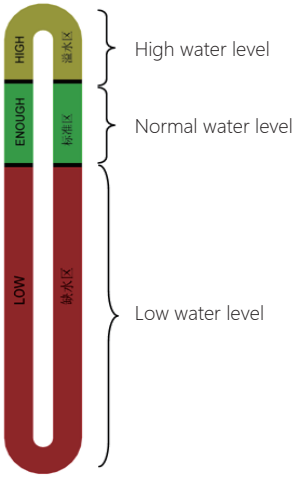


Figure 3 Liquid level identification

4.2.2 Exhaust and drainage

After the first addition of water and replacement of new water, exhaust the air in the pump to start the use, otherwise it will damage the equipment. Exhaust method: slowly loosen the air-exhaust screw plug of the pump (do not screw off), discharge air until water flows out, and then tighten the air-exhaust screw plug (see Figure 4, in which only the exhaust positions of vertical pump and horizontal pump are shown. According to customer requirements and specific type, the pump will be different, exhaust location will also be different, and details can be seen in the pump external indicator). Note: When the liquid in the equipment needs to be drained in winter, loosen the water-exhaust screw plug below to drain the liquid.

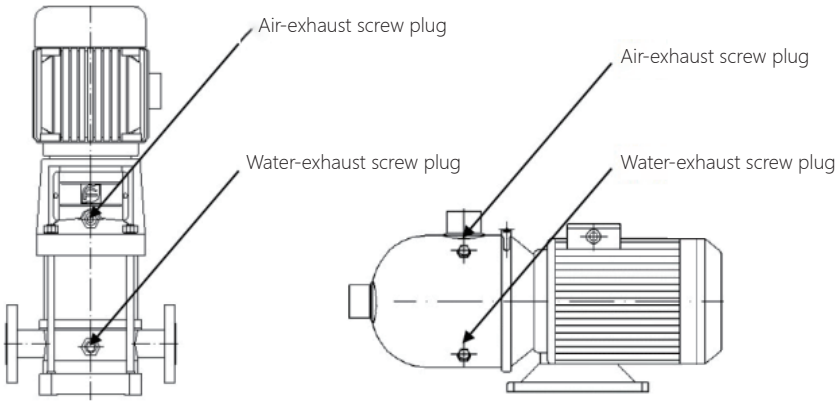


FIG. 4 Water pump exhaust and drainage

4.3 Product use

4.3.1 Inspection before commissioning

◆ Check whether the inlet and outlet water ball valve is open and whether the blowdown valve is closed;

◆ Check whether the waterway connection is correct or loose, be sure there is no bubble leakage;

◆ Check whether the level of the water tank is in the standard area;

◆ Check whether the power form is consistent with the product nameplate. The 380V power cord is three-phase five-wire system, and the 220V power cord is single-phase three-wire system.

◆ Check whether the equipment is grounded;

◆ Check that electrical wiring between devices is connected correctly.

4.3.2 Controller Panel Introduction

Figure 5 Split controller panel

Digital tube	Use
Display window	Display measuring temperature (low temperature water L.xx.x/normal-temperature water H.xx.x) ,setting temperature display (low temperature water S.xx.x/normal-temperature water difference d.xx.x) ,alarm code (Exx), parameter code (Fxx).
Indicator light	**Use**
Run	Light up: unit operation; Kill: The unit stops.
Alarm	Flicker: Faulty; Out: Fault-free
The keys	**Use**
Upper key (▲)	Set parameters and fault reset
Next key (▼)	Switch display

4.3.3 Boot display

After the integrated controller device is powered on, PV and SV regions display the software version information, and enter the temperature display state about 7 seconds later.

After the split controller device is powered on, the display window displays the software version information (Fxx/ v100 /A00), and enters the temperature display state about 7 seconds later.

4.3.4 Controller Temperature Display

By default, the display window displays the temperature of the low temperature water measurement (L.xx.x).

When the temperature is displayed, press the <▼> key to carry out the display switching of the normal temperature water measurement temperature(H.xx.x), the low temperature water setting temperature (S.xx.x), the normal temperature water setting temperature difference (d.xx.x).30 s no switching operation automatically returns to the low temperature water interface.

[Note] : L./H./S./ D. is the temperature code, and xx.x is the temperature value.

4.3.5 Controller Parameter Setting

Under fault-free state, press<▲>+< ▼> button at the same time to enter the interface of setting temperature for low temperature water, set temperature xx.x of flashing, at this time, you can change the setting temperature by pressing <▲> or <▼> button.

If no keystroke operation in 5s, the system will automatically save the set value and exit the set state.

Setting temperature of normal temperature water = [setting temperature of low temperature water] + [F01 temperature difference of normal temperature water], To change the setting temperature of normal temperature water, modify [F01 temperature difference of normal temperature water].

At the temperature display interface, press <▼ >+< ▼> button 5s to enter the manufacturer's parameter setting state. There is no adjustment in the factory setting parameters generally, if you need to adjust, please ask the chiller manufacturer for approval.

In the process of selecting the manufacturer's parameters, select the parameters according to the <▼>, press the <▲> to enter the parameter setting, and exit the manufacturer's parameter setting after 15s without keystroke operation (display window display parameter item).

When setting parameter is set, the parameter value can be modified by <▲> or <▲>, no key operation for 5 seconds or press the <▲><▲> key to return the parameter item selection and save (display window flicker display parameter value).

4.5 Maintenance

The machine must be stopped and the power must be cut off for 3 minutes before equipment maintenance, otherwise there will be electric shock risk. When the ambient temperature is lower than 2℃, the internal water must be drained when the machine stops for a long time.

4.5.1 Dustproof in summer

In summer, please clean the condenser and dust screen of the equipment in about 15 days, as shown in Figure 6.

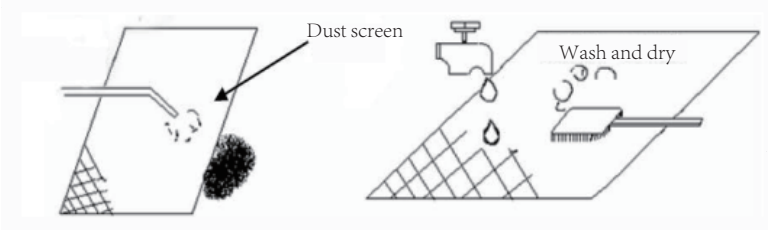


FIG. 6 Dust removal process of dustproof net

4.5.2 Anti-freeze in winter

FIG. 7 Anti-freeze maintenance in winter

When the equipment is transported or not in use for a long time, the water in the water tank shall be drained through the sewage valve, and the drain screw under the pump shall be unscrewed to plug and drain away the remaining water in the pump, as shown in Figure 12.

If the ambient temperature at night is less than 2℃, it is recommended that the customer do not stop or add anti-freeze. The volume ratio of ethylene glycol is selected according to Table 1, and the freezing point is equal to the ambient temperature of the equipment minus about 5℃. If the average temperature is higher than 5℃, replace the water containing anti-freeze by softened water.

Table 1 Correlation between different volume ratios of ethylene glycol and freezing point

Volume / %	Freezing point / ℃	Volume / %	Freezing point / ℃	Volume / %	Freezing point / ℃
1.8	0.6	26.0	13.0	51.9	41.0
3.6	1.3	28.0	15.0	53.9	44.0
5.4	2.0	29.9	17.0	56.0	48.0
7.2	2.7	31.9	18.0	78.9	47.0
9.1	3.5	33.8	20.0	81.0	43.0
10.9	4.4	35.8	22.0	83.1	40.0
12.8	5.3	37.8	24.0	85.2	36.0
14.6	6.3	39.8	26.0	87.3	33.0
16.5	7.3	41.8	28.0	89.4	29.0
18.4	8.0	43.8	31.0	91.5	26.0
20.3	9.0	45.8	33.0	93.6	23.0
22.2	11.0	47.8	36.0	95.8	19.0
24.1	12.0	49.8	38.0	100	13.0

4.6 Routine maintenance

The working scene of the Fiber Laser Chiller is very bad. In order to ensure the good performance of the equipment and extend its service life, the equipment needs to be maintained once a week. The maintenance work includes but is not limited to the following aspects.

◆ Check the condenser and air duct for foreign matter blockage, and check whether the air inlet and outlet around the equipment is unobstructed;

◆ Clean the condenser, clean the dust screen;

◆ Check whether there are foreign bodies in the cooling medium, whether there are microorganism breeding, etc. Generally, replace the cooling medium within 15 to 20 days, but the cold medium must be pure water, distilled water or high pure water.

◆ Check whether the water connection is loose and the water pump is leaking;

◆ Check the water tank and clean the dirt deposited inside the tank;

◆ Regular cleaning filters in the waterway of equipment within 7~10 days generally. The company commonly used two filters as shown in figure 8. The Y filter is placed in the water pump or equipment outlet, built-in stainless steel filter placed in the water tank;

◆ Test insulation resistance, insulation resistance $\geqslant 5\ M\Omega$;

◆ Check grounding resistance $\leqslant 4\ \Omega$;

◆ Test the capacitance of compressor and fan. The capacitance should be replaced if the attenuation of capacitance is more than 10%.

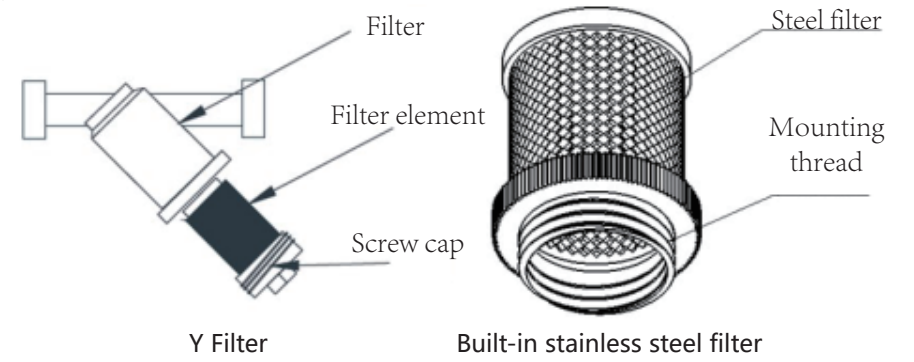


Figure 8. Two filters commonly used in our company

4.7 Circuit diagram

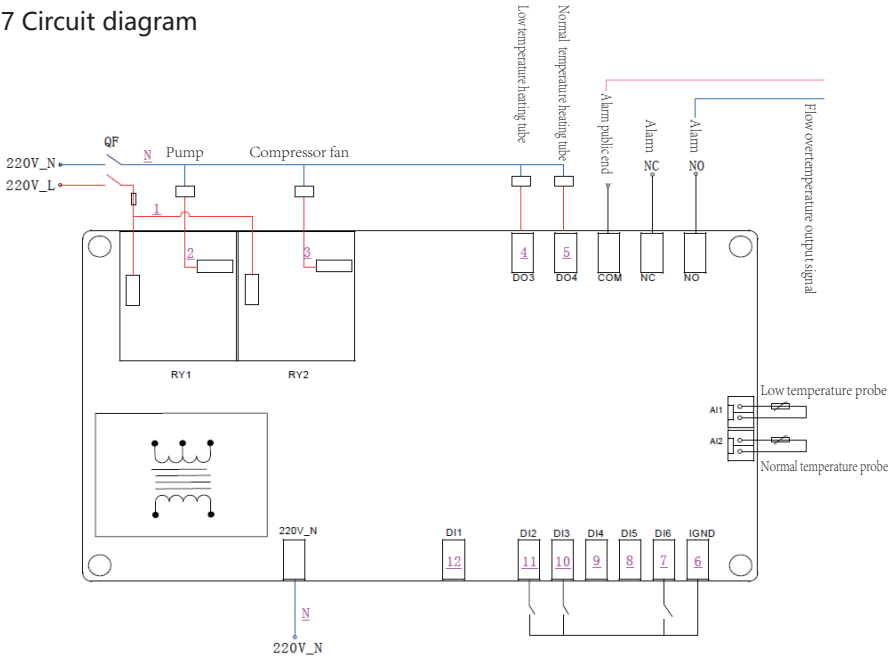


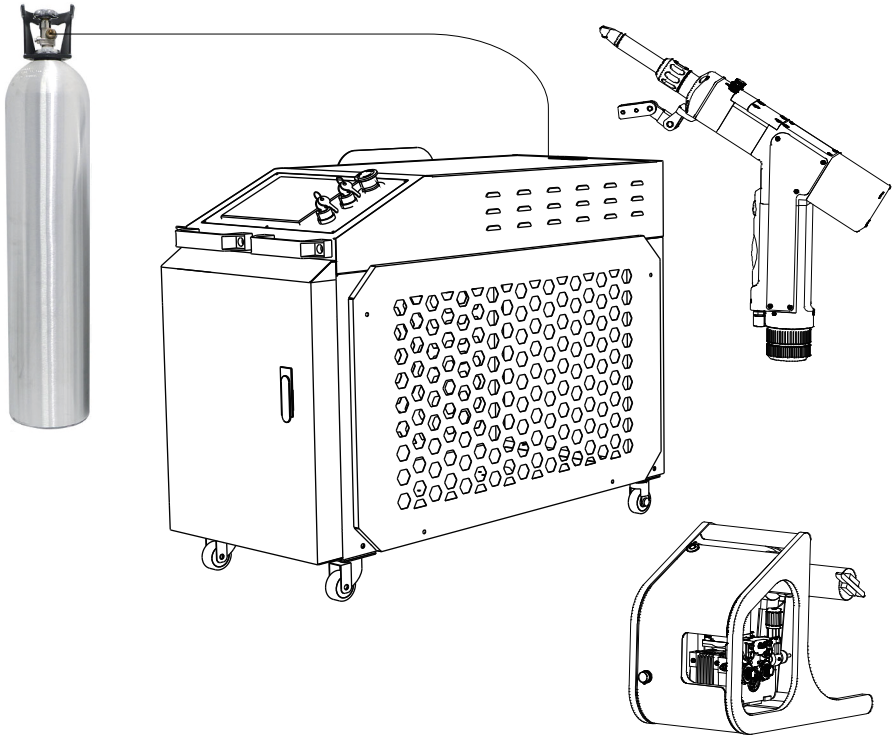
FIG. 9 Circuit diagram of 220V equipment

5. Installation Of Welding Equipment

5.1 Precautions

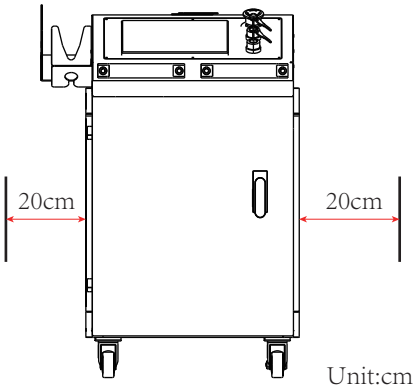
Refer to Specifications for correct power requirements.

Before applying power, ensure that the input voltage is equal to the level stated in the specifications.Operate only in an environment with sufficient air circulation that allows the specified heat load to occur during operation.



5.2 Airflow and Mounting Clearance

The laser welder unit is cooled by liquid circulation. When placing the laser welding machine, leave a gap of about 20cm on the left and right and the rear of the welding machine to facilitate the convection heat dissipation of the radiator.



5.3 Connect welding shielding gas

Feature	Specification
Welding shielding gas	• Argon • Nitrogen
input gas pressure	0.2-0.6MPa
Rear Panel Welding Gas Connections 	Protection trachea input outer diameter 10mm.

5.4 Connect the power supply

For power requirements, please refer to the product specification of the laser welder.

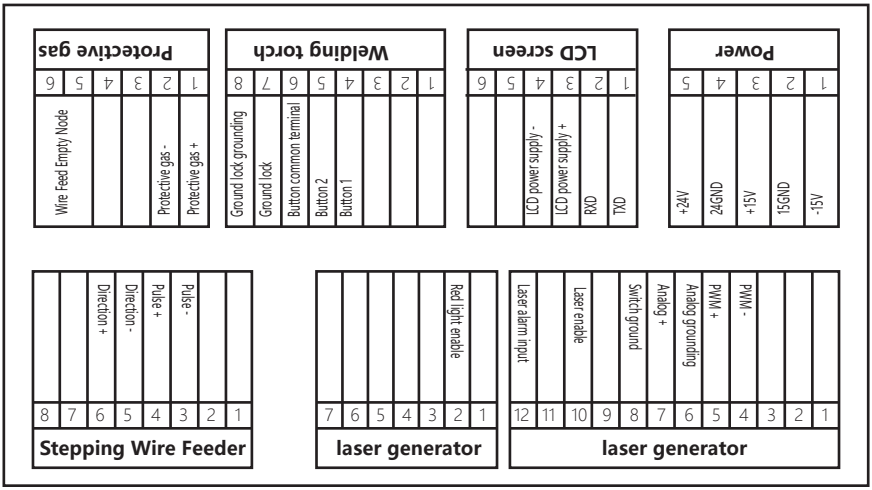
Feature	Specification	
Single-phase input AC	230V~	230V~
full load current	40A	45A
Enter the AC frequency	50/60 Hz	50/60 Hz
AC input socket	Connect the power input to the indicated voltage, phase and frequency. L=Live wire, N=Naught wire, PE=Earth wire	
Cable Specifications	At least 9 AWG wire gauge	At least 11 AWG wire gauge

Note on connecting to the power supply:

1. The electrical connection of the unit must be permanently connected to a dedicated AC power supply with a circuit breaker not exceeding 40A. This must be close to the unit and within easy reach of the operator, marked as the unit's disconnect device. 2. Wiring shall comply with all national and local regulatory requirements. Electrical connections should be performed by personnel familiar with electrical safety practices.

5.5 Control box

The function definition of the connector is shown in the following figure:



5.6 system startup

Before powering the unit, all electrical connections must be checked and the tank water level confirmed. If applicable, all connections must be secured to ensure proper function.

When handling this product, be sure to wear appropriate personal protective equipment. These include welding masks, gloves and laser safety glasses suitable for use at the 1080nm wavelength. Be sure to turn off all power to the laser when handling the delivery fiber. The minimum allowable bending radius is 50mm.

1. Make sure all connections required for a successful installation are complete. a. Electrical Connections b. Alligator clip to connect workpiece c. Air supply connection and air supply on d. Output weld head connection
2. Make sure the emergency stop button is released.
3. Turn the power switch to the ON position.
4. Wait a few seconds for the panel indicators and display to light up.
5. When the unit is powered on for the first time, set and call the process package.

If the manual welding system is not used and the system will be idle for some time, it is recommended to shut down the welding unit.

5.7 system shutdown

When the laser welding machine is turned off, the user prohibits the light-emitting welding, and operates as follows:

1. Release the light-emitting trigger, and the welding head will stop the laser emission.
2. Release the enable trigger, which will stop the gas flow.
3. Turn the power switch to the OFF position.

6. LCD Panel

The control system of LWH2K consists of touch screen and controller. The touch operation interface has 5 pages of welding, process, expert library, wire feeding and setting. The specific use and parameter description are as follows.

1) welding

【welding】is a page for calling and using welding parameters. The left side of the page is the welding process parameter display area, and the right side is the current state display area. The parameters in the process parameter area cannot be edited on this page, and the welding mode and wire feed can be accessed through page button to switch.

Parameter Description:

Power (W)—the power used by the current welding workpiece;

Pulse frequency (HZ)—the frequency used by the current welding workpiece;

Pulse duty(%)—the range used by the current welding workpiece;

Wobble length (mm)—the current width used by the welding workpiece;

Scanning Speed - the deflection speed of the galvanometer used for the current welding workpiece;

welding (button control)—continuous welding is continuous welding, and spot welding is to modify the "spot welding time" in the [Settings] interface as required;

No Wire Feeding (button control)—press to switch between "no wire feeding/continuous wire feeding/pulse wire feeding" mode;

Laser Enable—laser generator enable state (working: green, not working: gray)

Enable trigger (welding gun)—welding gun enable switch button Status (when pressed: green, when not pressed: gray)

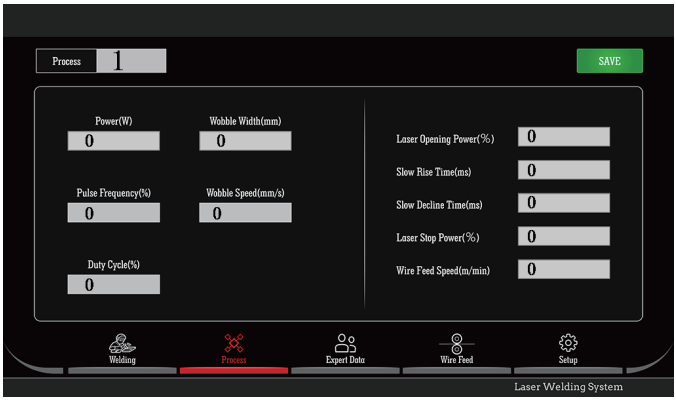
Emission trigger (welding gun)—button status of the light switch of the welding torch (when pressed: green, when not pressed: gray)

Safety connection—safe lock connection status (when connected: green, not connected: gray)

Laser status—the current working status of the laser generator (normal working: green, abnormal working: red)

Cooling status—the current working status of the water-cooling machine (normal working: green, abnormal work: red)

2) Parameters



【Parameter】is the interface for adjusting and modifying welding parameters. By entering the process package number in the process name, the process parameters corresponding to the name can be called up; after adjusting the process, you need to click the save button, and the process parameters will be automatically saved to the internal memory, after switching to the [Welding] page, the modified process will be called automatically.

Parameter Description:

Power (W)—The power used by the current welding workpiece should be less than or equal to the laser power on the [Settings] page (if the laser power is 1000W, the value should not be higher than 1000); Pulse frequency (Hz) - recommended range is 2-4000Hz

Pulse duty (%) —range 0~100 (default 100, usually do not need to be changed).

Swing Width (mm) - Laser Scanning 0-5mm;

Swing Speed (mm/s) - The range is 100-600mm/s, and 300mm/s is recommended;

Initial power (%) — the percentage of the power at the initial output to the process setting power

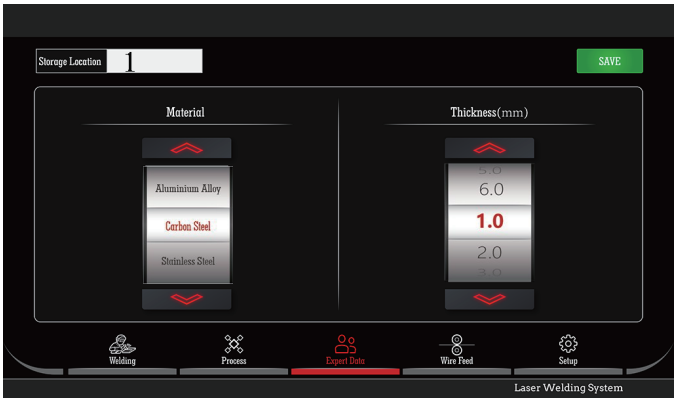
Ram-up time (ms) —The time length from the initial light output power to the process setting power

Ramp-down time (ms) —The length of time from the process setting power to the end of the light output power

End power (%) - The percentage of the power at the end of the light output to the process setting power

Wire speed (m/min) —After the wire feeding function is turned on, the wire feeding speed is constant and stable. This speed is only valid when the stepping motor is used for wire feeding.

3) Expert presets



【Expert presets】 stores welding process parameters of different materials and plate thicknesses, which are stored in the default storage area. This parameter can effectively improve the debugging efficiency. This parameter needs to be exported and saved in the selected process package before it can be used or modified.

4) Wire feeding

The 【Wire Feeding】 page is used to set the wire feeder whose speed is controlled by pulse. The parameters that a ect the wire feeding speed include the diameter of the wire feeding wheel, the reduction ratio of the reduction box, and the number of pulses per revolution. By setting the above parameters, di erent models can be Matching of wire feeders.

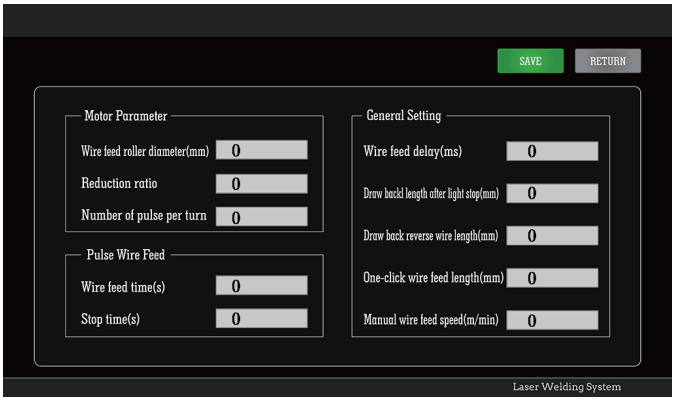
Parameter Description:

Wire Feeding - Manual Wire Feeding

Wire Retracting-Manual Wire Retracting

One-Button Wire Feeding—specified length of wire feeding after pressing
Stop - the wire feeder stops when pressed
L-- Press To Switch L/M/H to adjust the wire feeding speed
Wire Feeding Setting--press to enter the wire feeding interface

5) Wire Settings



The parameters in the【Settings】page are global variables related to welding. By changing the parameters of this page, the changes and applications of the variables in the entire system can be realized.

Parameter Description:

Motor Parameters

Wire Feed Wheel Diameter (mm) - default 30, modify according to wire feeder parameters;
Reduction Ratio - the default is 5:1, and it can be modified according to the parameters of the wire feeder;
The number of Pulses Per Turn - the default is 800, and it can be modified according to the parameters of the wire feeder;

Pulse Wire Feeding

Wire Feeding Time (s)——Valid in pulse wire feeding mode, wire feeding time (0.01~99s);
Stop Time (s) - valid in pulse wire feeding mode, stop time (0.01~99s)

General Settings

Wire Feed Delay (ms)——Wire feed delay time (0~1000ms);
Length of Retraction when light is stopped (mm)——the length of wire retracted after stopping wire feeding;
Length of Reversed Wire with Retraction (mm)——the length of wire feeding again after retraction;
One-Key Wire Feeding Length (mm) - Set the required length of one-key wire feeding;
Manual Wire Feeding Speed (m/min)——speed during manual wire feeding

6）Settings

The parameters in the【Settings】page are global variables related to welding. By changing the parameters of this page, the changes and applications of the variables in the entire system can be realized.

Parameter Description:

Laser nominal power (W)—The rated power of the laser generator

Pulse welding time (ms)—The time from when the light is triggered to the light is automatically turned o (the light is emitted again, and the light needs to be manually triggered again)

Wire feeding compensation (ms)—The wire feeding time compensate Laser center (mm) - laser center point o set adjustment

Sway width compensation - laser center point swing width compensation.

7. Operate Laser Welding Machine

7.1 Important Safety Functions

7.1.1 Fiber optic connection

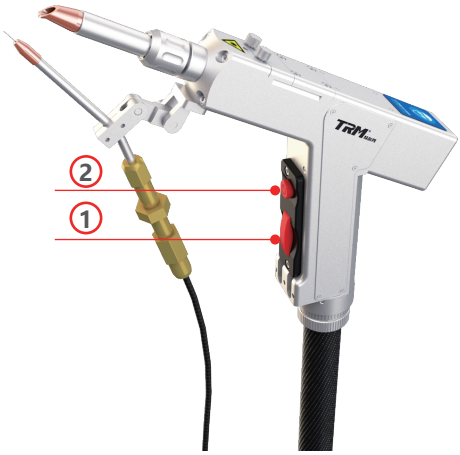
The connection between the laser QBH connector and the manual welding head provides a normally closed signal output. If the fiber connected to the welding head is unplugged or disconnected, the internal laser will turn off the light.

7.1.2 Torch nozzle and workpiece clamp interlock

The connector of the safety device can only be activated when the control device is in contact with the drive. The staff will be responsible for receiving the normal condition of the barrel above the receiver. Selected closings become the performance of the system during the welding process. If accessible from above, the interlock will automatically close if it will open.

7.1.3 Welding torch two-stage triggers

There are two independent trigger switches built into the head of the welding torch, including the enabling trigger and the triggering trigger. The triggering trigger needs to be activated when the enabling trigger is pressed.

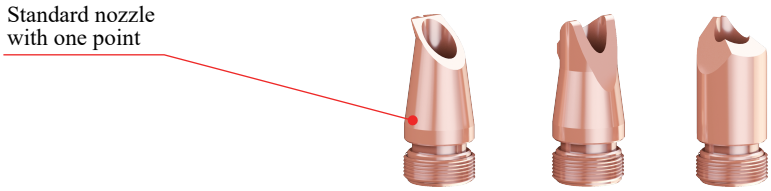


- Pressing trigger 1 on the welding head will turn on the shielding gas.
- Press trigger 2 on the welding head to activate the laser. While welding, the switch must remain closed so that the laser emission remains on. Releasing trigger 2 will stop the laser firing.

7.2 Nozzles and Nozzle Tubes on welding torch

7.2.1 Nozzle types

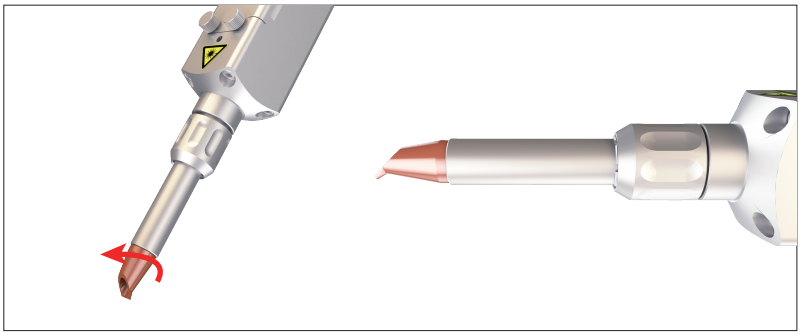
3 types of nozzles for choice



7.2.2 Nozzle installation

Before replacing the nozzle, use the key switch to turn off the unit.

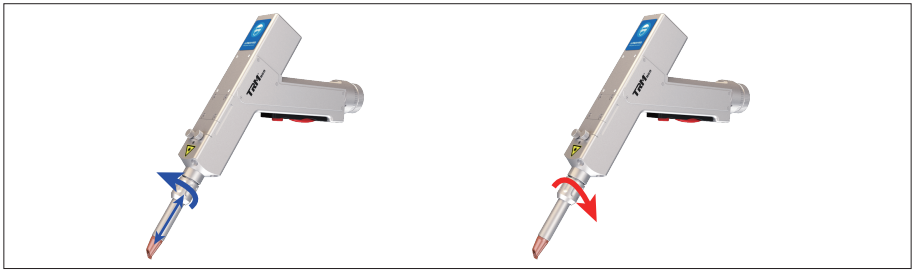
The nozzle will pass through the extension tube of the welding head.



7.2.3 Adjust the nozzle tube

Use the key switch to turn off the unit before adjusting the extension tube.

1. To adjust the extension tube, first loosen the nut as shown on the left 2. Once the extension tube is properly positioned, tighten the nut to lock the nozzle tube in place as shown on the right.



7.3 Start welding quickly with preset programs

Everyone in the welding area must wear personal protective equipment to protect against invisible infrared lasers and any secondary visible and invisible radiation generated during the welding process. Appropriate laser safety glasses and a welding mask with appropriate filters are required.

1. Turn on the machine and confirm that the welding machine has entered a normal state, and there is no abnormal alarm.
2. Select the nozzle according to the workpiece to be welded and install it on the welding head extension tube.
3. Secure the parts to be welded. In laser welding, it is desirable to secure parts with the smallest possible gaps and tight contact.
4. Make sure the workholding is attached to the part or the conductive soldering station on which the part is placed.
5. Press trigger 1 on the welding head to turn on the shielding gas.
6. Contact the nozzle with the workpiece, at this time the ground lock signal is received by the welding machine, and the laser enters the ready-to-launch state. Since the infrared laser beam is not visible, the red guide beam positions the nozzle correctly on the part.
7. Press trigger 2 on the welding head to activate the laser and start welding.

8. Maintenance

The input voltage of the laser welding unit can be lethal. All fibers and connections should be considered at hazardous levels. All parts of fiber optics, connectors, or device enclosures should be considered hazardous.

The device is classified as a high power Class IV laser instrument. This product emits invisible radiation with a wavelength of 1080nm. from light The total optical power radiated depends on the model. This level of light can cause damage to the eyes and skin. The beam may cause permanent damage to the retina and/or cornea. The product also contains a Class 2M guided laser with visible laser radiation in the wavelength range of approximately 600 to 700 nm It can generate 1mW peak power. Exposure to eyes or skin should be avoided.

8.1 Welding torch maintenance

Item	Frequency	Maintenance
Safety glasses	Every day	Check the protective glass regularly for contamination and replace it if it is.
QBH connection	Every 3 days	Periodically check for loose QBH connectors. If it is loose, re-tighten it according to the locking requirements.

8.2 Replacement of protective lenses

The welder should be switched off and the AC power connection unplugged before any maintenance is performed on the welding torch.

8.3 connect/disconnect fiber output

The following procedure is necessary to disconnect and connect the fiber output to the weld head only when replacing the output weld head. During normal operation, this action is not required. A cleaning procedure must also be performed before reconnecting the fiber to the weld head.

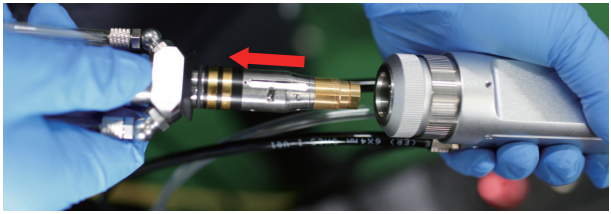
8.4 Disconnect fiber output

The welder should be switched off and the AC power connection unplugged before any maintenance is performed on the weld head.

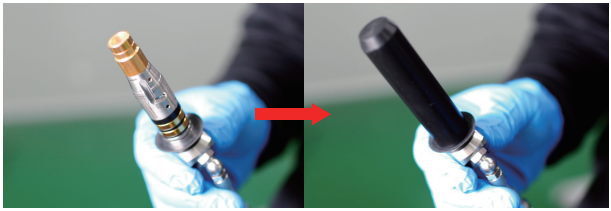
Care should be taken when disassembling and assembling the QBH connector to avoid damage to the quartz block and to ensure that the surface of the quartz block is clean. Any contamination can cause severe damage to the fiber. When arranging and cabling optical fibers, pay attention to the bending radius of optical fibers should be greater than 50mm.

1. Rotate the receiver nut so the red dots are aligned as shown in the image below.

2. Carefully pull out the fiber optic connector.



3. Fibers should be covered with ferrules. Do not touch the quartz block.



8.5 QBH Quartz Block Cleaning Procedure

Every time the fiber output connected to the welding head is disconnected, the fiber QBH quartz block end face must be checked for dust , dirt or damage, it is recommended to clean according to the following items:

- Powder-free rubber gloves or finger cots
- Optical cleaning wipes and/or swabs
- Lens tissue
- Isopropyl Alcohol (anhydrous)
- Acetone (optical grade, anhydrous)
- Compressed air (no oil, no water)
- Microscope
- Light source

Always wear powder-free rubber gloves during cleaning!

Perform the following steps to clean the fiber output:

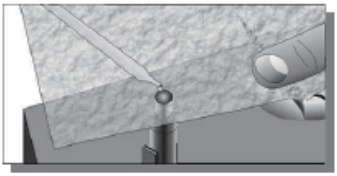
4. Turn off the power to the welder unit.
5. Spray the ends of the quartz block with isopropyl alcohol. Wipe with a new lens tissue and blow the surface with clean compressed air.
6. Inspect the end face with a microscope.
7. Illuminate the end face of the fiber optic terminal with a light source so that the light reflects off the surface.

Always observe surfaces at a slight angle for better visibility.

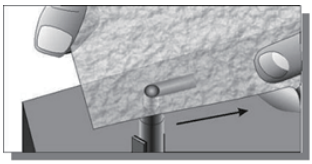
8. Carefully inspect the surface. Cleaning is necessary if contamination is visible on the quartz block. Contamination can cause dark spots on the surface.
9. Try blowing the dust off the sides with compressed air.

Never blow air directly at the surface, as contaminants may be embedded in the surface. Always blow onto the surface being cleaned!

10. Place a new lens tissue on the surface of the quartz block as shown below. Put a drop of isopropyl alcohol on the lens tissue and wipe the wet spot on the surface sideways until dry.



Wipe the surface horizontally



Wipe the surface horizontally

Do not let the area where your fingers touch the lens tissue touch the surface being cleaned.

1. Recheck the surface
2. If the acetone is still contaminated, repeat step 7.
3. If necessary, you should place a drop of acetone on the cleaning swab and use a circular motion to remove contamination, never scratching the surface.

Never touch the tip of the cleaning swab with your fingers.
To prevent contamination, each swab should only be used once.

1. Repeat the above cleaning steps until all contamination is removed. If good results have been achieved, the cleaning procedure can be stopped at any time.

It is hereby stated that damage to fiber optic terminations may be the result of improper handling; cleaning with incorrect cleaning procedures or chemicals is not covered under warranty.

Program ends

9. Common Abnormity Handling

9.1 The screen does not light up/click does not respond

The screen does not light up, if the controller is powered on (the fan is running), check whether the four-core wire between the controller and the screen is connected correctly.

9.2 No light

The monitoring interface can exclude other alarms. When the welding head touches the workpiece to be processed, the safety lock is displayed in green, and processing is possible at this time. If it is gray, check whether the connection of the safety lock is normal.

That is, check whether all the ready signals are normal.

9.3 Sudden stop of light output during processing

The monitoring interface checks whether the safety lock and other alarms are normal, and also checks whether the temperature exceeds the temperature alarm threshold.

9.4 Red light polarization

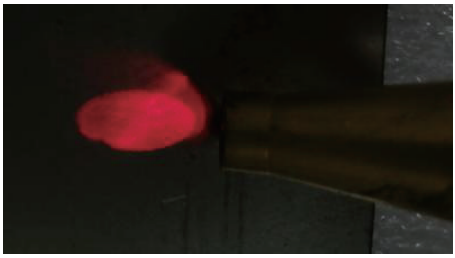
When the red light cannot come out of the copper nozzle completely, it needs to be adjusted manually at this time to prevent the copper nozzle from being burned out. Please note: When the red light cannot come out of the copper nozzle for the first time, be sure not to emit light.

① as shown in the figure below, at this time, the red light cannot be seen completely coming out of the copper mouth;

② We need to remove the back cover. You can see six adjustment screws, adjust the center according to the video;

③ Finally, to achieve this effect;

④ The slight left and right deviation can be set by setting the laser center offset of the panel .



10. Service and Support

When the customer uses parts that are not serviceable in the field, please consult the after-sales personnel for maintenance matters. Questions about the safety, setup, operation, and maintenance of the product can be resolved by reading this user guide carefully. If you have any questions about the safety, setup, operation or maintenance of the product, please contact customer after-sales personnel.

Wechat ID

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