Aqu series
Handheld laser welding machine
user manual

Aqu 2000

The original instructions

Jinan Bodor CNC Machine Co.，Ltd.

quotation

Thank you for choosing to use our company's products. We will provide you with perfect after-sales service and solutions, please properly keep this manual and other accessories, so that you can better use it.

This specification gives a detailed introduction to the safe use of the products, including the installation, operation, and maintenance instructions, etc.

If you are using the product for the first time, please read this material carefully before using it.

Due to the constant updating of the product functions, the product you receive may be different from the instructions. The Company reserves the right of final interpretation of this matter.

If you have any questions or better suggestions, please visit our website www.bodor.com to leave a message or call 24 hours for free 400-991-7771 for consultation.

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chapter one Feature description

The unique properties of the laser may cause safety hazards that cannot be considered simply as other light sources and must be noted by all those operating or close to the laser.

Therefore, Bond Laser rAqummends: please strictly abide by all warnings and safety tips in this manual to ensure safe operation and optimal performance. In the process of operation, maintenance and service of the equipment, in order to ensure the safety of the operators and users, do not open the equipment.

chapter two security information

1-Handheld laser welding machine is safe for use

Hand-held laser welding machine is a dangerous, invisible laser radiation laser products. This product emits infrared laser radiation at a wavelength of 1080nm, and the average power radiated by the welding head is greater than 100W, which will cause damage to the eyes and skin directly or indirectly exposed to such light intensity. The infrared radiation is invisible, and the laser beam can cause irreversible damage to the retina or the cornea. Always wear the appropriate and certified 1080nm near-infrared band laser protection glasses before running the handheld laser welding machine.

（1） For the safety of you and others, it is strictly prohibited to point the welding head to yourself or others;

（2） Before use, the handheld laser welding machine must wear appropriate and certified 1080nm near infrared band laser protection glasses (protection complies with EN207:2017) and high temperature prevention gloves;

（3） For the safety of you and others, the crocodile clip must be clamped on the welding workpiece before triggering the laser, and it is strictly prohibited to clamp in other places except the workpiece, so as to avoid potential safety risks caused by abnormal light;

（4） The welding operation of handheld laser welding machine shall be carried out in a separate space with laser protection; non-welding personnel and combustible

and flammable materials shall be more than 10 meters away from the welding operation table, and fire extinguishers shall be placed near the welding area;

（5）Wear a mask when welding the high reverse material;

（6）Ensure that the handheld laser welding machine is grounded normally,

otherwise it may cause the electrification of the product shell and personal injury to the operator; if the grounding is not operated as required, it may cause laser alarm, light, laser instability and other hidden faults;

（7）Do not work in the rainy and direct sunlight environment, otherwise it may

cause high temperature and high humidity alarm or short circuit, affect the normal use of the laser, and even cause safety risks.

2-Intended use and reasonably foreseeable misuse

1. Expected use

This product uses a high energy density laser beam as a heat source, and melts the base material to achieve laser welding and laser cutting functions. This product can realize the same welding of steel, aluminum, copper, stainless steel and other metal materials, and the mutual welding of carbon steel, stainless steel and galvanized plate.

2. Reasonably foreseen misuse

(1) Low melting point material

Such as zinc, lead, tin, etc., the melting point of these materials is low, easy to gasification in the laser welding process, resulting in the inability to form good welded joints.

(2) Oxide materials

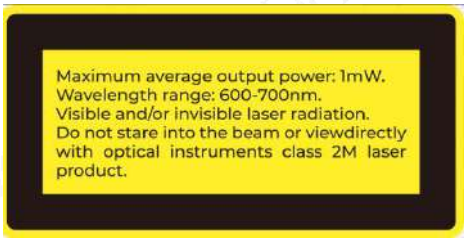
Such as silica, alumina, etc., these materials are easy to react with the oxygen in the air to form an oxide layer, affecting the welding effect.

(3) Apparent material

Such as glass, crystal, etc., these materials have a high laser transmittance, it is difficult to form a good melting pool on the surface of the material, so it is not suitable for using laser welding.

3-safety requirement

As shown in the following table, all safety warning signs during the operation of the handheld laser welding machine include:

safety signs	describe
	warn: There is potential harm to human body; follow certain procedures, otherwise it may cause certain harm to you or others. Do not violate the requirements of the warning sign during the operation to ensure the personal safety of the operator.
	This logo represents laser radiation that we have attached to the laser output of the product.
	warn: Potential hazards to the product; Some procedures must be followed, or you may damage your device or components.
	Class 4 laser products Avoid direct or scattered radiation from the eyes or skin
	Avoid direct or scattered radiation from the eyes or skin

	Wear approved goggles, protective gloves, and a dust mask
	Please read and understand the use manual
No logo	important: Do not ignore important information about product operations.

please note:
◎ The Bond Laser Aqu series handheld laser welding machine, with the wavelength range 1060nm~1100 nm, is not within the visible range, but these beams may cause irreversible damage to the retina and corneas. Bond Laser rAqummends that you wear qualified and safe protective glasses at all times.

4-laser safety

1. Laser protection requirements

Laser safety protection glasses shall be selected to shield the laser within the entire wavelength range emitted by the laser, in accordance with EN 207:2017.

When operating the laser equipment, select safety glasses according to the laser wavelength and ensure wearing the laser at all times.

2. Laser protection equipment manufacturer

Bond Laser rAqummends the following materials or equipment from laser safety equipment suppliers: LaserVision USA, Kentek Corporation, Rochwell Laser Industries, etc.

These supplier information provided by Bond Laser accounts only for the convenience of user use and is not liable for any problems caused by the use of the above supplier's products.

5-Welding features safety

1. radiation hazard

Vvisible and invisible light radiation are generated during welding. The interaction between a high power laser beam and the welded target material may produce a plasma that produces UV radiation and "blue light," which may cause conjunctivitis, retinal photochemical damage, or skin sunburn-like reactions. Welders exposed to invisible UV light without adequate protection may suffer permanent eye damage.

2. Skin harm

Exposure to infrared light and ultraviolet radiation during welding damages the skin. Infrared and ultraviolet light can cause skin burns, increasing the risk of skin cancer for welders and accelerating signs of skin aging. Welding sparks may also cause burns. Laser material processing can transfer a lot of energy to the parts. Even after the cutting process is done, the parts can be very hot. Ensure that appropriate PPE is used to prevent potential burns. Take precaution to prevent skin damage by wearing protective clothing such as fireproof gloves, hats, leather aprons and other fire resistant clothing. The sleeves and collar should be buttoned up.

3. fire hazard

If combustible or flammable materials are near the welding area, the heat and sparks generated during the welding process can cause a fire or explosion. Laser welding can only be performed when there is no combustible material in the area. Do not weld containers containing flammable or combustible materials. If the contents of the container are unknown, they should be assumed to be flammable or combustible. Fire extinguishers should be located nearby, easily accessible and trained to use them.

4. smog injury

Welding "smoke" can be composed of very fine particles and gases. Welding smoke and gas come from the welding material Or any combination of filling materials used, protective gases used, paints, coatings, chemical reactions, and air pollutants. Welding smoke can adversely affect the lungs, heart, kidneys, and the central nervous system.

（1）When welding, keep your head away from the smoke. Always weld in fully ventilated areas to ensure safe air breathing.

（2） Use a smoke exhaust system to remove steam, particles and hazardous debris from the welding processing area.

（3） In confined spaces and in other conditions, ventilators may also be required.

（4） Routine air monitoring shall be conducted to determine the hazardous smoke levels in the welding area.

5. Cylinder safety

If the cylinder is damaged or placed near the welded area, the cylinder may explode. Protective gas cylinders shall be placed in places free from impact or damage. Place them away from heat sources, sparks, or flames. The cylinder must be stored

upright and fixed to a fixed bracket. Need a working adjuster for the required gas and pressure. All hoses and fittings shall also be suitable for application and remain in good working condition.

6-quoted standard

laser safety:

IEC60825-1-2014

Functional Safety:

EN ISO 13849-1:2023 PL d

Mechanical safety:

EN ISO 12100:2010

EN 60204-1:2018

EN ISO11553-1-2020

EN ISO 11553-2:2008

Electromagnetic compatibility and anti-interference performance:

EN 61000-6-4:2007 + A1:2011

EN 61000-6-2:2005 + AC: 2005

EN 61000-3-2:2014

EN 61000-3-3:2013

please note:

◎ The Bond Laser BodoePower Series lasers meet the Low voltage requirements specified in the "LVD Directive" in the European market.

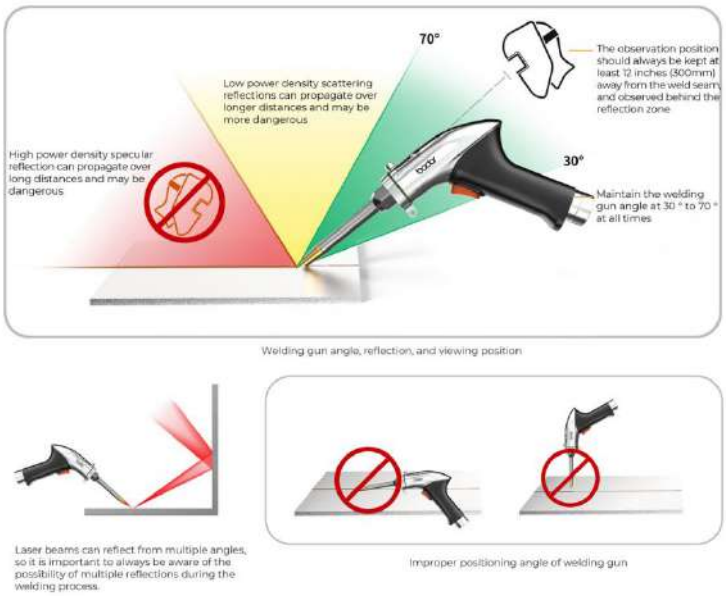
◎ According to the relevant national standards and requirements, the laser must be classified according to the output power and the laser wavelength. According to the national standards, the laser products of Bond laser belong to the Class 4 class of products.

1, ◎ According to the relevant EU standards and requirements, this product belongs to Class Class 4 instrument (per EN 60825- 1Terms 9).

7-General safety instructions

1.mirror reflection

The laser output port position may generate a sAqundary laser beam and radiate outward at multiple angles.



This phenomenon of the main beam in the laser is called mirror reflection. Although the energy of the sAqundary laser beam is much less than that of the primary laser beam, this intensity may also cause damage to things such as the human eye, skin or the surface of some material.

warn:

◎ Since the laser radiation light is not visible, you must be extremely careful to avoid or reduce mirror reflection.

2.Safety instructions for accessories

Laser optics can be damaged by laser exposure, such as video cameras, photomultiplier tubes and photoelectric sAqundary tubes.

Attention should be paid to the relevant device protection.

warn:

◎ The output laser is strong enough to cut or weld metal and burn Skin, clothing and paint, ignition of volatile substances such as alcohol, gasoline, ether, etc. Therefore,

during operation, isolate flammable items around the laser.

3. Optical operation instructions

Bodor strongly rAqummends that you read the following operational points before operating the laser:

（1）When the power supply is started, do not view the laser light hole directly;

（2）Avoid the placement of the laser and related optical output devices on the same level as the eyes;

（3）The laser output port shall be equipped with a mounted laser beam housing;

（4）Please ensure that the tail cover of the laser is removed before the laser is opened, otherwise it will cause irreversible damage to the fiber output head of the laser;

（5）According to the output power and wavelength of the laser requirements of safety protection equipment to ensure the safety of operators;

（6）The door for the laser space shall have interlock control and warning signs to limit the safe area of the laser;

（7）Do not use lasers in a dark environment;

（8）Do not open the laser without installing optical coupling fiber or optical output connector;

（9）Ensure that the laser is off or the power is off to install or remove the cut head or collimator;

（10）When debugging calibration and focusing, please carry it under the low power output condition, and then slowly increase to high power after commissioning;

（11）If the equipment is not operated in the manner guided in this document, the protection device and performance of the equipment may be weakened, and Bond Laser will not no warranty.

（12）Prevent internal condensation when using the laser in summer. Once the cooling temperature of the water cooler is lower than the dew point temperature of the

laser's internal environment, the water vapor in the air condenses onto the electrical and optical modules. If no action is taken, the outer surface of the laser will follow the condensation. Therefore, once the laser shell is exposed, the inside of the laser has been exposed. Power must be off immediately, stop working and the working environment of the laser must be improved. To reduce the risk of condensation, it is rAqummended to inject clean, dry compressed air from the CDA of the laser rear panel into the inside of the laser. The pressure of the gas should be controlled at 0.1MPa. The use of compressed gas with water and oil is prohibited

Avoid the laser from working in the red condensation danger area in the integrated environment shown below. The specific control standards are as follows:

Comparison table of ambient temperature, relative humidity and dew point														
Relative Humidity%	30	35	40	45	50	55	60	65	70	75	80	85	90	95
Ambient Temperature (℃)	the dew point Td (℃)													
10	-7.0	-5.0	-3.0	-1.3	0.0	1.5	2.5	3.6	4.8	5.8	6.7	7.6	8.4	9.2
11	-6.5	-4.0	-2.0	-0.5	1.0	2.5	3.5	4.8	5.8	6.7	7.7	8.6	9.4	10.2
12	-5.0	-3.0	-1.0	0.5	2.0	3.3	4.4	5.5	6.7	7.7	8.7	9.5	10.9	11.2
13	-4.5	-2.0	-0.2	1.4	2.8	4.1	5.3	6.6	7.7	8.7	9.6	10.5	11.4	12.2
14	-3.2	-1.0	0.7	2.2	3.5	5.1	6.4	7.5	8.6	9.6	10.6	11.5	12.4	13.2
15	-2.3	-0.3	1.5	3.1	4.6	6.0	7.3	8.4	9.6	10.6	11.6	12.5	13.4	14.2
16	-1.3	0.5	2.4	4.0	5.6	7.0	8.3	9.5	10.6	11.6	12.6	13.4	14.3	15.2
17	-0.5	1.5	3.2	5.0	6.5	8.0	9.2	10.2	11.5	12.5	13.5	14.5	15.3	16.2
18	0.2	2.4	4.0	5.8	7.4	9.0	10.2	11.3	12.5	13.5	14.5	15.4	16.4	17.2
19	1.0	3.2	5.0	7.2	8.4	9.8	11.0	12.2	13.4	14.5	15.4	16.5	17.3	18.2
20	2.0	4.0	6.0	7.8	9.4	10.7	12.0	13.2	14.4	15.4	16.5	17.4	18.3	19.2
21	2.8	5.0	7.0	8.6	10.2	11.0	12.9	14.2	15.3	16.4	17.4	18.4	19.3	20.2
22	3.5	5.8	7.8	9.5	11.0	12.5	13.8	15.2	16.3	17.3	18.4	19.4	20.3	21.2
23	4.4	6.8	8.7	10.4	12.0	13.5	14.8	16.2	17.3	18.4	19.4	20.4	21.3	22.2
24	5.3	7.7	9.7	11.4	13.0	14.5	15.8	17.0	18.2	19.3	20.4	21.4	22.3	23.1
25	6.2	8.6	10.2	12.3	14.0	15.4	16.8	18.0	19.1	20.3	21.3	22.3	23.2	23.9
26	7.0	9.4	11.4	13.2	14.8	16.3	17.7	19.0	20.1	21.2	22.3	23.3	24.2	25.1
27	8.0	10.3	12.2	14.0	15.8	17.3	18.7	19.9	21.1	22.2	23.2	24.2	25.0	26.2
28	8.8	11.2	13.2	15.0	16.7	18.0	19.6	20.9	22.0	23.0	24.0	25.2	26.2	27.1
29	9.7	12.0	14.0	15.9	17.6	19.2	20.5	21.3	23.0	24.1	25.2	26.2	27.2	28.1
30	10.5	12.9	14.9	16.8	18.5	20.0	21.4	22.8	23.9	25.1	26.1	27.2	28.2	29.1
31	11.4	13.8	15.9	17.8	19.4	20.9	22.4	23.0	24.8	26.0	26.9	28.2	29.2	30.1
32	12.2	14.7	16.8	18.9	20.3	21.9	23.3	24.5	25.8	27.0	28.1	29.2	30.1	31.1
33	13.0	15.6	17.6	19.6	21.3	22.9	24.2	25.4	26.8	28.0	29.0	30.1	31.1	32.1
34	13.9	16.5	18.6	20.5	22.2	23.8	25.2	26.5	27.7	29.0	30.5	31.1	32.1	33.1
35	14.9	17.4	19.5	21.4	23.0	24.6	26.2	27.5	28.7	29.9	31.0	32.1	33.1	34.1
36	15.7	18.1	20.3	22.2	24.0	25.0	27.0	28.4	29.0	30.9	32.0	33.1	34.1	35.2
37	16.6	19.2	21.2	23.2	24.9	26.5	27.9	29.5	30.7	31.8	33.0	34.1	35.1	36.2
38	17.5	19.9	22.0	24.0	25.8	27.4	28.9	30.2	31.5	32.0	33.9	35.1	36.0	37.0
39	18.1	20.8	23.0	24.9	26.6	28.3	29.8	31.2	32.5	33.8	34.9	36.2	36.9	38.1
40	19.2	21.6	23.8	25.8	27.6	29.2	30.7	32.1	33.5	34.7	35.8	36.8	38.1	39.1

pay attention to:

◎ In order to ensure a good operating environment of the laser, the probability of failure caused by condensation is reduced.strong It is rAqummended to use the integrated environment to ensure a temperature of 30℃ and a relative humidity of 70%.

◎ The laser path output is emitted by a lens with an antireflective coating if your laser is posterior The optical path has this kind of optical lens. Before using the laser, please strictly check the laser output head lens and the rear stage lens to ensure that there is no dust and any other debris on the lens. Any visible attachment can cause severe damage to the lens, burning the laser or any rear optical path.

◎ Please refer to《Guide to fiber-optic connector inspection and cleaning》Follow the cleaning and inspection procedure for the lenses.

◎ Be careful about the hot phenomenon or molten metal particles that may occur during laser cutting operations.

◎ For laser output debugging and calibration, set the laser to pass through the infrared under low power output conditions Check the output spot quality of the laser, and then gradually increase the output power.

warn:

◎ Select reasonable safety protection equipment according to the output power and wavelength requirements of the laser.

◎ Do not directly view the optical fiber or collimator and ensure that safety glasses are always worn during each operation.

4. Electrical operation instructions

The bodor strongly rAqummends that you read the following operational points before operating the laser:

（1） Ensure that the equipment shell is well grounded and any point in the grounding circuit may lead to personal injury;

（2） For the power supply connected to the equipment, please confirm that the protection area is connected before use;

（3） In order to reduce the danger of fire, if necessary to replace the line fuse can only be the same type, the same grade, and other fuses or materials cannot be used to replace;

（4） Ensure that the input AC voltage of the laser is normal AC city voltage (single phase voltage 220V), and the wiring is correct, any wrong wiring mode, may cause personal or equipment injury;

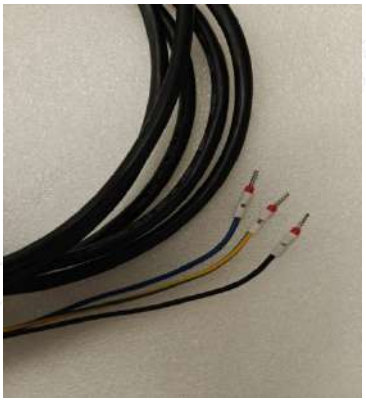
（5） Except for vulnerable parts, there are no parts, parts or components to be repaired by users, and all maintenance operations should be completed by bodor professionals;

（6）Do not remove the casing, remove the laser and destroy the relevant labels, there will be a risk of electric shock or burn;

（7） Any unauthorized disassembly of the products will no longer enjoy the warranty rights.

warn:

◎ The input voltage of the laser is single-phase AC (220VAC), and there is a danger of electric shock. All associated cables and cables have potential hazards.



The input voltage of the laser is single-phase AC (220VAC), and there is a danger of electric shock. All associated cables and cables have potential hazards.

L--live wire

N--null line

PE--earth wire

5. Laser operating environment requirements

To ensure the safety of the laser work area, a suitable enclosure should be used. This includes but is not limited to risk prevention work such as laser safety signs and interlocks. The interaction between the laser and the working surface, generating gas, sparks and debris due to high temperature, may pose additional safety hazards. The corresponding operators should undergo certain assessment and training, and be familiar with and master the routine safety specifications of laser operation.

Note that the output component must not be installed at the same level as the eye. Due to the interaction of the laser and the metal material, which produces intense ultraviolet or visible radiation, make sure the laser has a protective cover to avoid

radiation damage to the eye or other parts of the body.

Bodor rAqummends following the following measures to extend the service life of the laser:

（1）Please ensure that the working area is properly ventilated and that the laser is placed in the cabinet with temperature and humidity control and dust control function. Do not expose the laser to high temperature and humidity environment.

（2）Running the equipment at high temperatures will accelerate the aging, increase the current threshold, and reduce the laser sensitivity and conversion efficiency. If the equipment is overheated, please stop using it and ask the bodor for help.

pay attention to:

◎ Please operate the equipment carefully to avoid causing accidental damage to the equipment.

◎ If the laser is placed below 0℃ environment, be sure to add the corresponding antifreeze in the chiller sink. If the machine is not used for a long time, be sure to clean the water from the inlet and exit channel (it is rAqummended to use a high pressure air gun) to prevent the residual water from freezing and damaging the water device. If the ice pipe breaks, there will be a risk of leakage during the process of water and electricity, or even more serious will lead to personal injury.

8-The source of danger

Equipment hazard sources include laser and refrigerant.

9-More security information

If you need more information on laser safety, please refer to:

If you need more information on laser safety, please refer to:

Laser Institute of America(LIA)

13501 Erenuity Drive, Suite 128

Orlando,Florida 32826

Phone:407 380 1553,Fax: 407 380 5588

Toll Free:1 800 34 LASER

American National Standards Institute

ANSI Z136.1, American National Standard for the Safe Use of Lasers

(Available through LIA)

International Electro-technical Commission

IEC 60825-1,Edition 1.2

Center for Devices and Radiological Health

21 CFR 1040.10 - Performance Standards for Light-Emitter ducts

US Department of Labor - OSHA

Publication 8-1.7 - Guidelines for Laser Safety and Hazard Assessment.

Laser Safety Equipment

Laurin Publisher

Laser safety equipment and Buyer's Guides

Chapter III: Product Description

1-Features profile

The handheld laser welding machine integrates the laser, the handheld welding gun head and the control system together. Compared with the traditional handheld welding equipment, it has the characteristics of simple configuration, high integration, small volume, simple operation and high degree of intelligence.

key property:

（1）High beam quality

（2）High power, high efficiency

（3）High reliability, and long-life span

（4）Compact, rugged packaging

（5）It can adapt to high and low temperature environment for long time light

application area:

（1）Industrial application

（2）research-on-research

（3）medical apparatus and instruments

（4）advertising industry

（5）Kitchen and bathroom industry

2-Water principle

The water cooler passes the normal temperature water through the plate heat exchanger in the water cooler. The cooled water enters the laser all the way, taking away the heat generated by the laser itself, and enters the welding torch all the way, taking away the heat generated by the welding torch itself

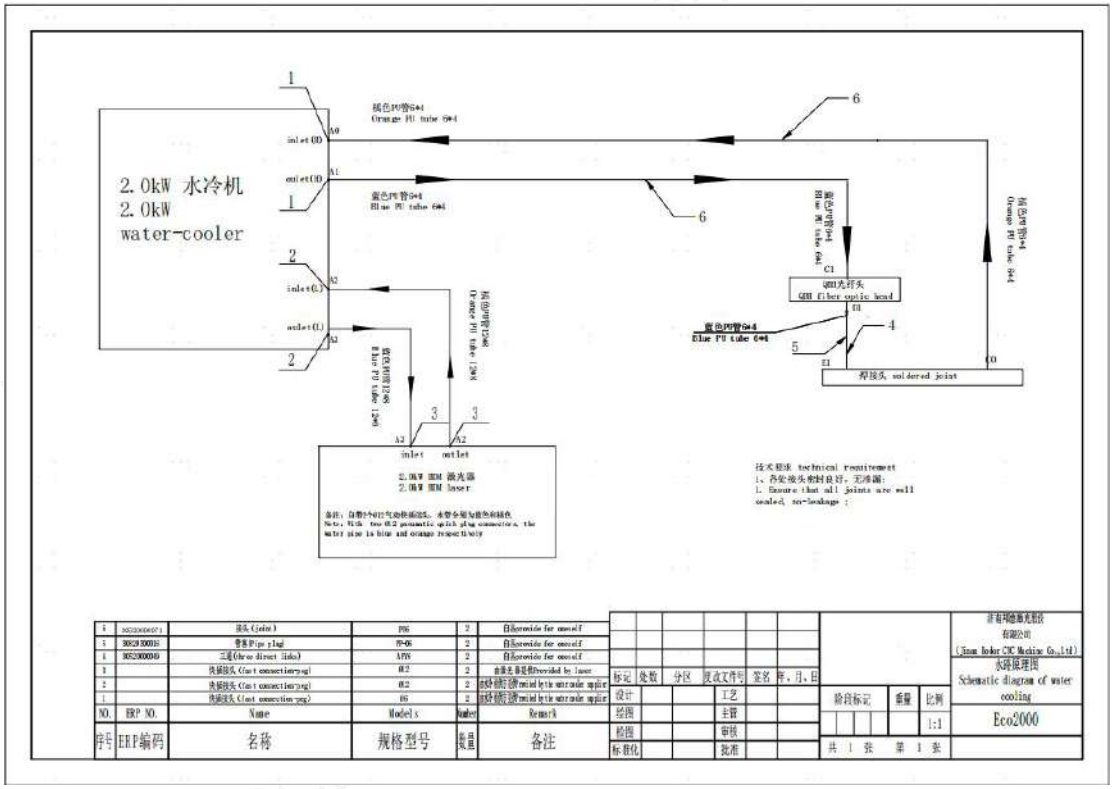


Figure 1. Schematic diagram of the waterway

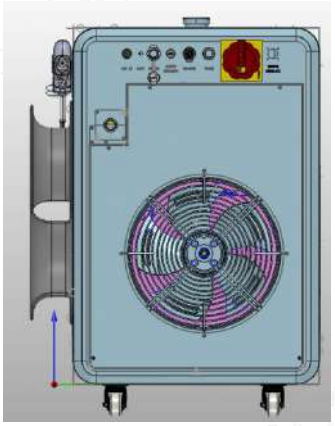
3-Model description of the laser welding machine

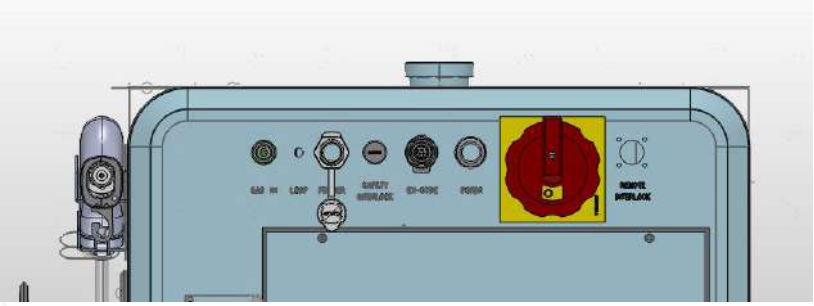
Model named	Model meaning
Aqu 2000	Represents the bodor2000W welding machine

4-certificate

The bodor guarantees that the product has been fully tested and inspected and meets the published specifications prior to shipment. After receiving the product, please check for damage to the packaging and accessories during transportation. For obvious damage, please contact bodor immediately.

5-Description of the rear panel





apellation	function declaration
GAS IN	Protect the air intake interface
LOOP	ground protection
FEEDER	Wire feeder interface
SAFETY INTERLOCK	External emergency stop interface
EX-CTRE	Reserve interfaces
POWER	220V AC power input
REMOTE INTERLOCK	Remote interlocking

6-Optical output terminal

The optical fiber head is used corresponding to the protection window, and can be replaced after damage. Make sure to remove the QBH head and tail cap prior to use, which is usually placed with the laser.

Fiber-optic output head (QBH head)

7-Instructions for the knob screen

Knob screen operating guide

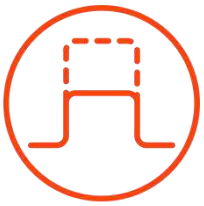
(1) Knob icon description

Laser power: adjust the welding machine power output

Laser frequency: the number of laser vibrations per unit time

Prothe swing amplitude of the welding head

Mirror swing frequency: mirror swing frequency of welding head



Laser duty cycle: the proportion of the frequency period of the laser output time

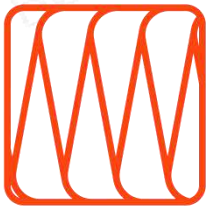
Light off delay: the time to continue light after releasing the welding trigger or disconnecting the ground clamp

Power slow rise time: the power rise time of the welding machine

Slow power reduction time: the power reduction time of the welding machine

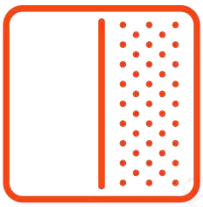
Vibration mirror adjustment: center position adjustment of laser focus

Light delay: enter the global parameter, find the function by rotating the knob screen, and press the screen to adjust the parameters. Pull the trigger to start blowing time to shine



Fish scale welding: after boot, enter the function selection interface, rotate the screen clockwise to the fish scale welding parameter function, short press the screen to enter, select the corresponding plate and thickness to start the welding work.

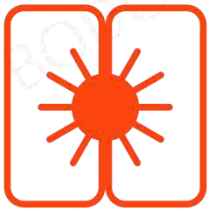
Cutting mode: After entering the function selection interface, start the screen, rotate the screen clockwise to the parameters of cutting mode, press the screen to enter, and select the corresponding plate and thickness to start cutting



Cleaning mode: choose to directly enter the power swing frequency display interface, press the parameter setting interface again, and set the power and swing width set to 120mm. Note that when the swing width is set over 5mm, replace the cleaning mirror set; the swing frequency is fixed at 100Hz;

Note: Remove the scale pipe and locking parts if the swing range is greater than 5mm, otherwise there will be the risk of burning out the welding head.

Prompt The rear short press enables normal operation.



General welding mode: short press for material selection, short press again for thickness selection, short press again to the preset process parameters, counterclockwise rotation of process parameters, any parameter saving interface; process parameters include laser power, swing, swing frequency, laser frequency, laser duty cycle, modify all parameters, save the modified parameters for clockwise rotation selection parameters to return to process display interface after selection.

Global parameter: the global parameter setting includes the parameters that all processes will take effect, press the parameter setting interface, and enter the interface includes the light delay (minimum 400ms, low fixed 400), light off delay (default 200ms), power rise (default 100), power drop (default 0), gas off delay (default 400ms, minimum only 400ms, and low fixed to 400)

Device activation: The device has completed the activation.

Equipment information: equipment delivery related information.

Air pressure: the gas pressure display

Boot / screen saver: open machine interface and screen saver interface.

Preheat: When the ring temperature is 5℃ lower than the ring temperature, the machine preferentially starts the preheating function

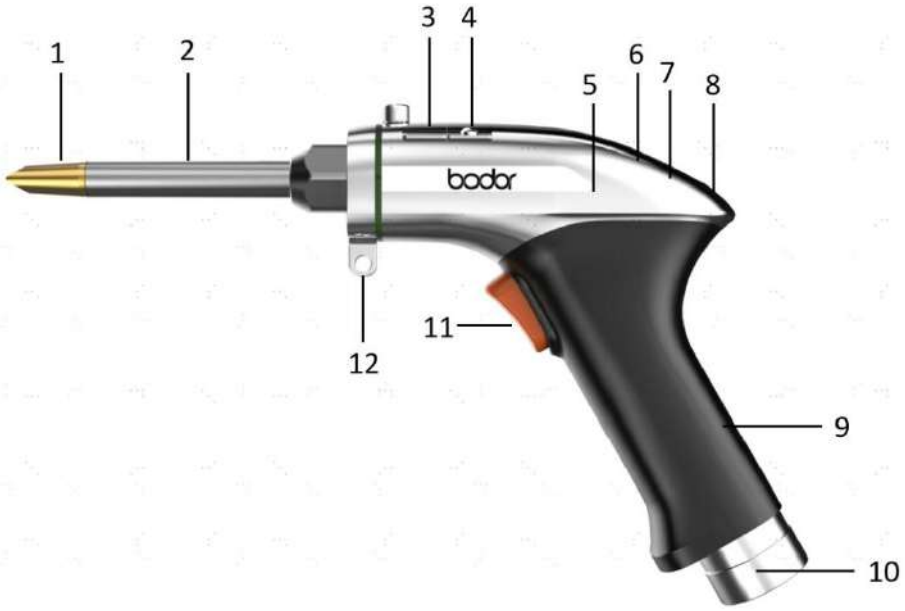
（2） In the vibration mirror

Knob screen main interface find global Settings interface, long press knob screen, then can enter the setting interface, short press the number yellow, can adjust the light center position, again short press can adjust the rotating step value, after adjustment, long press exit light center adjustment, value to white, again short button screen exit and save light center position;

（3） Device information query

Press short in the Settings interface of the knob screen to view the information of the device.

8-Description of welding head



1. Copper mouthpiece
2. Scales tube
3. protective glass
4. Focus mirror
5. speculum
6. pilot lamp
7. Send wire switch
8. electrical machinery
9. collimating mirror
10. QBH shrink ring
11. switch
12. Send wire bracket

Note: Yellow light flashing: no light; green light always on: light; red light flashing: stop light

9-Ming plate instructions

1.Main Document Number: Aqu 2000-CE-A-DQ-V1.1
2.Model: Aqu 2000
3. Full-Load-Current: 41A (220V)
4. Short Circuit Current Rating: 5kA
5. Rated Voltage: AC 220V
6. Frequency: 50 Hz
7. Rated Power: 9000W
8. Laser Power: 2000W
9. Weight : 120KG
10. Serial No. :
11. ERP No. :
12.Manufacturing Date :

Chapter 4: Detailed Specifications

1- Optical characteristic parameter table

order number	natural parameter	test condition	least value	representative value	crest value	unit
1	work pattern	Continuous / modulation				
2	polarization state	random				
3	output power	100% Continuous	≥2000	2000		W
4	Power regulation range		10%		100%	
5	The central wavelength	100% Continuous	1070	1080	1090	nm
6	spectral bandwidth			4	6	nm
7	Short-time power stability	100% continuously for> 1h		±1%	±2%	
8	Long-time power stability	100% continuously for> 24h		±3%	±5%	
9	Fiber cable length			10		m
10	Output fiber core diameter			20		u m
11	Fiber-optic cable bending radius			200		mm

12	Output method	QBH

2- General characteristic parameter table

Optical performance parameters	
output power W)	2000W
work pattern	Continuous / pulse
Output power adjustment range is (%)	10-100%
Output laser wavelength (nanometer)	1080±10
power stability	< 5%
Maximum modulation frequency	20k HZ
Indicating laser wavelength (nano)	660±10
Indicate laser power adjustable range (mW)	0.4～1
Laser conduction system parameters	
interface type	Silk wire type held welding head
Collar focal length	60mm
Focus focal length	150mm
Transmission length	Standard length of 10m±0.5m
job requirement	
Cooling and protecting the gases	inert gases
Working environment temperature range	-20~40℃
Range of working environment humidity	≤90%
input voltage	220 V
The power of the machine	9000W
Welding machine parameters	
The weight of the machine	120kg

outline dimension	625X885X960
Laser swing	0-5mm
Water cooling conditions	
cooling-down method	hydrocooling
Chiller to set the temperature	24℃ in summer, 20℃ in winter, add antifreeze conditions, water cooling temperature of 20℃

pay attention to:

1、The cooling water shall use purified water, purified water, highly purified water, oily water, liquid containing solid particles, corrosive liquid and tap water; the cooling water and filter element need to be replaced once every three months;

2、Ambient temperature is lower than 2°C and water storage, chiller water tank need to add antifreeze, it is rAqummended to add ethylene glycol, propylene glycol type concentration does not exceed 30% antifreeze (such as brand line), and change every three months, it is forbidden to add excessive, antifreeze thermal conductivity is low, excessive add easily cause poor heat dissipation. After the end of winter, the antifreeze should be replaced with the distilled water and the filter element, let the chiller run for 30 minutes to remove the residual antifreeze, and then the new circulating water should be added for use after emptying.

3- Install environmental requirements

1、There shall be no shelter within 1 meter of the inlet and outlet, so as not to affect the refrigeration effect of the equipment.

2、There shall be no shelter within 1 meter of the inlet and outlet, so as not to affect the refrigeration effect of the equipment.

3、Requirements for ambient air cleanliness level for optical fiber output head installation: level 1000 or stricter level. It is rAqummended to configure the corresponding standard purification bench;

4、Operating ambient temperature of the laser: -20℃ 40℃;

5、Laser working environment humidity: 10% -90%;

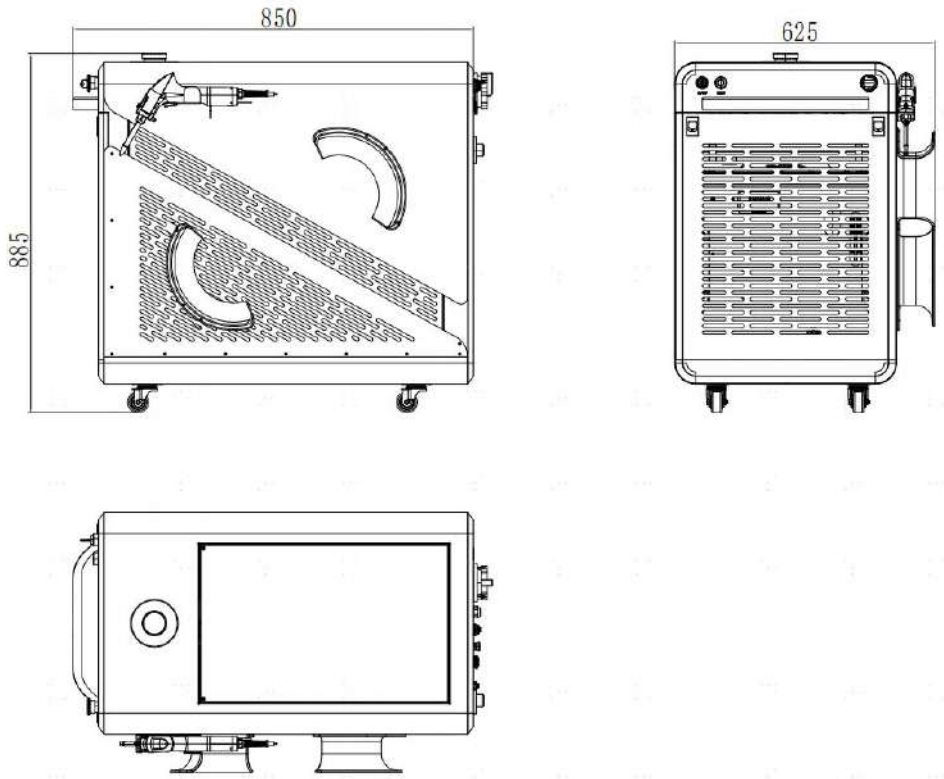
6、Elevation: 2,000 m

7、The indoor lighting condition of the operation room is good, there shall be no strong vibration and strong electromagnetic field interference (no staggered between equipment, wiring harness lap, etc.), and shall not work on the platform with the strong magnetic equipment such as argon arc welding and sAqund welding welding;

8、In order to ensure the clean air of the equipment operation room, the customer shall establish the smoke and exhaust system according to the site situation after the equipment installation and debugging;

4- Structural layout

Three views of welding machine



Chapter V: An Unpacking Guide

1－Out of the box steps

The welding machine is a precision valuables. Bodor rAqummends you to follow the following steps:

（1）Place packing boxes with laser equipment on a horizontal platform, such as a floor or a large table;

（2）Open the main packing box, remove the foam shielding board, and remove the supporting items;

（3）There is a welding torch on the side of the welding machine to connect the optical fiber. Please remove it carefully to ensure that the maximum bending radius of

the optical fiber armored cable is> 175mm. When removing it, it is rAqummended for two people to cooperate and lift the welding machine out.

(4) Please check the accessories according to the packing List.

(5) Please keep all items after unpacking properly in case of future transportation or storage needs.

pay attention to:

◎ If you find any damage to the outer packaging or internal components, please immediately with bodor or local Representative contact.

2 – container loading list

Serial Number	Name	Specifications and Models	Unit	Quantity
1	Water cooling welding machine	Aqu 2000	PC	1
2	Wire feeder (individually packaged)	(Including signal lines, wire tube, wire feed wheel)	PC	1
3	220VAC Power cord (onboard)	5 m	PC	1
4	Ground wire	10 m	PC	1
5	Copper muzzle box	Contains 8 copper nozzle, 1 graduated tube)	PC	1
6	Protective lens	D20×3-3kw-09	PC	5
7	QBH Black protective cap	/	套	1
8	Aqu Welding machine usage guide	210x285mm	PC	1
9	lasering protective eyeglass	ADE-D4T35	PC	1
10	Five core industrial connector head	PKF32F435	PC	1
11	Five-core industrial connector male head	PKX32M435	PC	1
12	External emergency stop harness	XALB01YC+ZB2BY9330C+XB2BS544C	PC	1
13	Fuses	10*8 32A	PC	1
14	netting twine	0.5m	PC	1
15	QBH water pipe sample tube	Φ6x4mm	PC	1
16	Laser water pipe sample tube	Φ12x8mm	PC	1
17	Round-tipped cotton swabs	/	Bags	1
18	Pointed cotton swabs	/	Bags	1

19	Ultra fine dust free cloth (2*2)	/	PC	6
20	Lens protection film	Φ12*28.5mm	PC	6
21	Raw material belt (white)	16mm*0.1mm*5m	PC	1
22	Electronic instruction manual (version number 210923) printed	water cooling unit	PC	1

Chapter VI Guide for the Use of the

1-matters need attention

◎ Before the first arrival of the welding machine, it is necessary to stand 2~4H, because during the transportation process, the welding machine is likely to be affected by turbulence and vibration, resulting in the compressor oil dispersed into other parts of the system, thus affecting the working efficiency and service life of the welding machine.

◎ The welding machine is forbidden to be inclined during use.

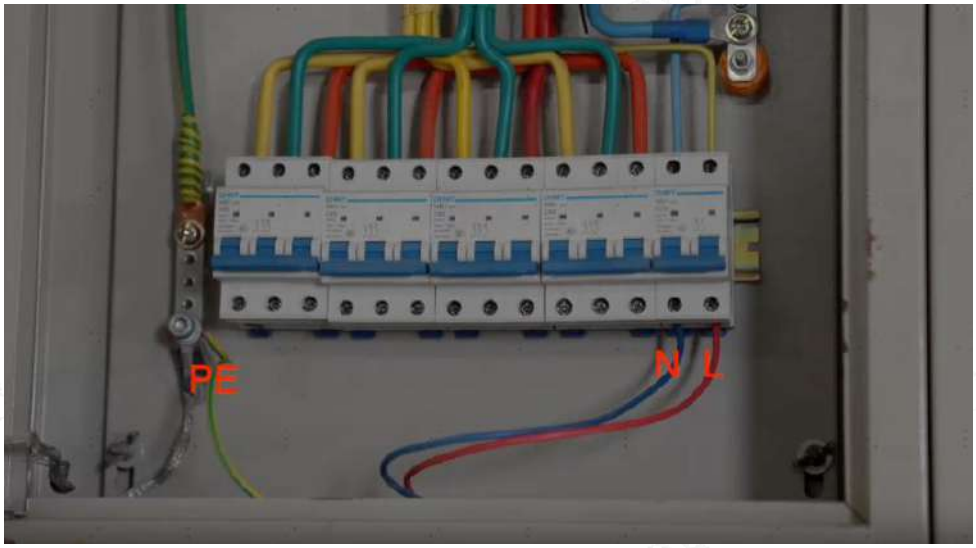
◎ Please refer to the Detailed Specification Table section to select the appropriate power supply.

◎ Check the peripheral working configuration environment of the welding machine with reference to the General Safety Instruction Section.

◎ Power below 10% is not rAqummended.

2-Power connection

The power input line needs to be connected with single phase AC, please make sure that the fire wire, zero line and ground wire are well connected. Poor contact with the ground wire may cause potential damage to the laser. This power supply is close to the power supply unit of the equipment, which can easily disconnect the electrical power supply connection during the operation process.



3-Safety lock connection

Before opening the laser, the safety lock must be connected to the LOOP interface of the laser. When preparing the laser, the other end of the safety lock (crocodile clip) is clamped on the workpiece to ensure that the crocodile clip and the welding head form a loop before the laser can come out.

4-Gas connection

The welding head is cooled by inert gas, ensuring the welding purity and welding pressure. Generally, nitrogen and argon are used as protection gas. The purity of protection gas should meet 99.99%, and the inlet pressure should be greater than 0.3 bar. Connect the trachea to the GAS IN port to ensure the gas flow of 15L / min.

5-Silk delivery machine connection

1、Operating environment and the parameters

service voltage (V)	DC24V
Put the environment	Flat, no vibration and impact
Working environment temperature: (℃)	-20～40
Working environment humidity: (%)	＜70
Maximum support welding wire weight	25KG
Maximum support of wire delivery diameter	1.6mm

Flat, no vibration and impact

1) Ensure reliable grounding before power supply.
2) The wire wheel matches the wire diameter and corresponds to the wire pipe.
3) No winding pipe.

2 Installation of wire pads

2.1.Welding wire is ordinary welding wire, the common 5 KG-25 KG can be installed, but do not use the drug core welding wire;

2.2.Adjust the strength of the roller through the inner hexagon, so that it is not too tight or too loose, send no lag when the silk (usually do not need to adjust);

2.33.Adjust the cover

3.Installation of silk wheel

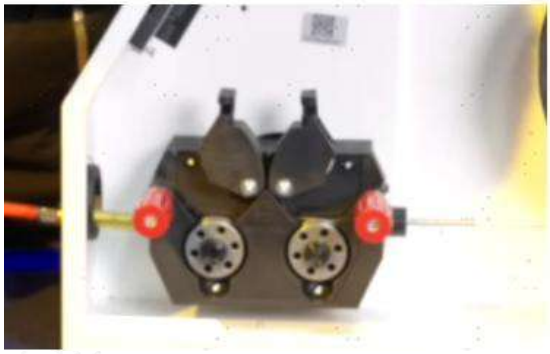
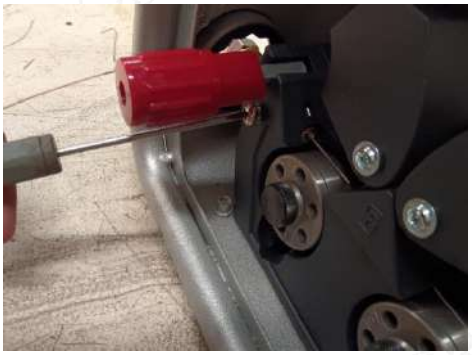
1.There are two wire delivery wheels, two sides are different models, corresponding to different core diameter, please be sure to install, such as installing 1.2 welding wire, the side of the wire wheel logo 1.2 in the outside;

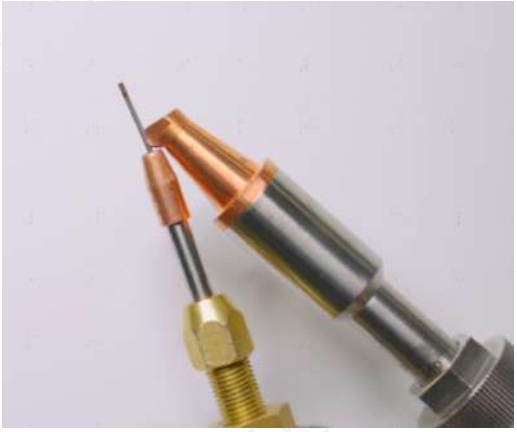
2.When installing, the welding wire must be stuck in the card slot and then clamped again;

3. Installation of silk tubes

3.1、Put the wire into the wire delivery tube, insert it into the appropriate position, too short may lead to the phenomenon of wire jam, and then tighten the screw;

3.2、When installing the wire pipe, take off the copper mouth of the first end, and match the corresponding copper mouth;



5. operation panel

1.The home page value shows the wire speed, adjusted by the upper and lower keys, please keep the running state when using;

2.FS:

Multi-function cycle switch key, can switch several indicators display through cycle mode, select which finger The lamp which group of data is in the adjustable parameter state, at this time can be through the cascade knob Change, under the standby state can be switched;

3.Manual silk delivery： Press to continue the welding wire, release to stop the

wire, the speed runs according to the setting;

4.Tap back: press the drawing wire, release the drawing wire, the speed runs according to the setting

5.Stepless knob: In standby mode, you can use this knob to +/-each function parameter In working state: the wire feeding speed parameter can be modified in real time through this knob, which is simple and fast

6.Three digital tube: three with decimal point green highlight digital tube, according to the function switch button selection, to display each function parameters, fixed display the speed of wire transmission in the working state.

7.Delay Feeding (Silk delay) indicator lamp: used to set the delay time of the gun switch to start start

8.Feeding Speed (Feed speed) indicator: light on in working state or selected by the function switch key to adjust the wire speed through the stepless knob

9.Retract Speed (Return speed) indicator: selected by the function selection key to show the return wire speed

10.Retract Distance (Return distance) indicator light: after selected by the function selection key, the length of the welding wire can be adjusted through the pless knob

11.Delay Filling (Compensation for wire delay) indicator light: when selected, the delay time from the end of the wire withdrawal can be adjusted again

12.Filling Distance (Compensation wire delivery distance indicator light: when selected, you can adjust the compensation wire delivery length again, and the compensation wire delivery speed is equal to the withdrawal speed

13.ALARM (Alarm) indicator light: fault light, motor blocking, overcurrent alarm.

14.POWER (power supply) indicator: on is on

6-Cold water machine start

6.1、 Equipment installation conditions and requirements

（1） Must be installed horizontally and is not tilted. Should not be installed in corrosive, combustible gas, dust, oil mist, conductive dust, high temperature and humidity, strong magnetic field, direct sun and other harsh environment.

（2） Environmental requirements

ambient temperature	ambient humidity	height
0~40℃	≤90%RH	≤3000m

（3） Media requirements

The cooling medium allowed by the chiller: pure water, distilled water, high purity water and other softening water. The use of oily liquids, liquids containing solid particles, and corrosive liquids is prohibited. Clean the filter element and replace the cooling water to ensure the normal operation of the chiller. When the ambient temperature is lower than 2℃ and stored with water, antifreeze should be added to the water tank. It is recommended to add the concentration of ethylene glycol and propylene glycol not exceeding 30% antifreeze. After the temperature warms up, replace the pure water, distilled water and other media, let The chiller runs for 30 minutes to remove the residual antifreeze, emptying and then add new circulating water for use.

（4） This model is a side air-in water chiller. In order to ensure the operation performance, it is suggested that the left and right air outlet of the supporting cabinet should not be blocked by objects, and the rear side air outlet is smooth.

（5） Determine the layout direction of the pipeline according to the import and export mark of the equipment to ensure that the waterway pipeline is clean and free of impurities, so as to avoid blockage or pump failure in the waterway.

（6）Plug in the power cord and turn on the power switch (never start up without water).

◎ When the power switch is turned on, the chiller circulation pump begins to work. When the new machine is started for the first time, there will be more bubbles in the pipeline, which will cause the machine to occasionally alarm the flow, and it will return to normal after a few minutes of operation.

◎ After the first time, you must immediately check the water pipe for water leakage.

◎After turning on the power supply, if the water temperature is lower than the set temperature, it is normal that the fan and other devices of the machine do not work. The thermostat will automatically control the working state of the compressor, solenoid valve, fan and other devices according to the set control parameters.

6.2、Electrical connection

The supply voltage can fluctuation less than ± 10%, frequency fluctuation less than ± 1Hz and away from the electromagnetic interference source.

6.3、Add water exhaust.

（1） watering

Open the front cover of the machine, you can see the chiller. At the same time, open the knob cover of the right water injection port, inject water from the right side port, and fill the water level to the green mark. After the new machine is started, the air in the water pipe is emptied, and the water level of the water tank will drop slightly. In order to keep the water level in the green area, the right amount of water can be added again. Observe and write down the current water level, and observe the water level gauge again after the chiller runs for a period of time. If the water level drops obviously, check the water pipe line again if there is no leakage.水位过高

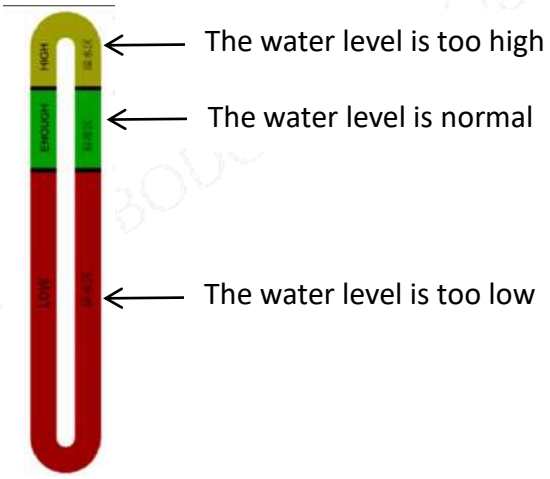


Figure 6.3.1 Water level meter

（2） exhaust

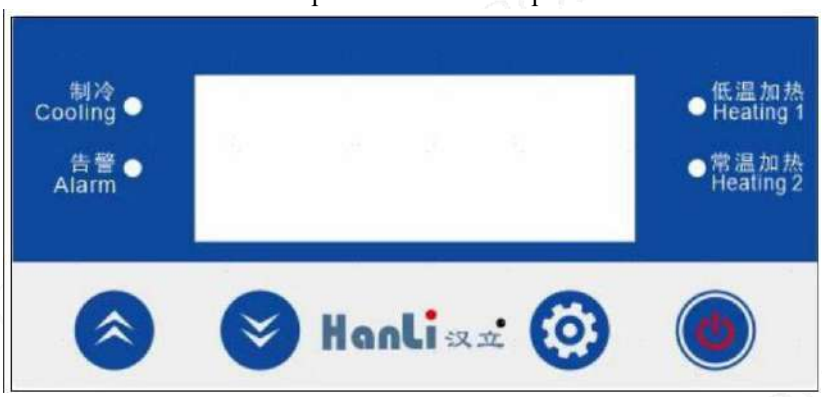
After adding water and replacing new water for the first time, the air in the pump can be started, otherwise the equipment will be damaged. The exhaust method is as follows:

Method 1: In the case of shutdown, add water, remove the water outlet to connect the water pipe, drain for 2 minutes, and then install it firmly.

Method two: open the water injection mouth, after the boot (water flow), repeatedly fold a few water pipes, can exhaust the air inside the pipeline.

6.4、Introduction to the operation panel

1. Introduction to the temperature controller panel



2.Temperature controller working status indicator light

Refrigeration (Cooling): On: compressor working, off: compressor closed, flashing: refrigeration demand

Low temperature heating (Heating1): Light up: low temperature water heating works, off:

low temperature water heating is closed

Heating at room temperature (Heating2): Light up: heating water at room temperature, turn off: heating water at room temperature

Alarm (Alarm): Flashing: fault, off: no fault

Display window Display the measured temperature low temperature water (L.xx.x/ normal temperature water H.xx.x), set temperature display (low temperature water S.xx.x/ Constant temperature water temperature difference d.xx.x), alarm code (Exx), parameter code (Fxx0).

Open key (On/Off) Press the <On/Off> key for 3 seconds to turn on or off

Set key (Set) In non-fault condition, press the Set key to enter/exit the set temperature.

Up/down key (▲ ▼) to modify parameter values during parameter setting.

3. Start-up display

After the device is powered on, the display window shows the software version information (Fxx/v100 /A00), about 7 After a second, enter the temperature display state.

4. Temperature display

The display window displays the measured water temperature of low temperature water (L.xx.x) by default. When displaying the temperature, press the <▼> key to continue Warm water measures water temperature (H.xx.x), low temperature water sets water temperature (S.xx.x), and normal temperature water sets temperature difference (d.xx.x) The display switches, and automatically returns to the low-temperature water interface after 30s without switching operation.

[Remarks]: L./H./S./d is the temperature code, xx.x is the temperature value

5. Parameter Settings

In the non-fault state, press the SET key to enter the low temperature water set temperature setting interface, and the set temperature "S.xx.x" flashes

It shows that the set temperature can be modified by pressing ▲ or ▼ at this time. After setting, short press SET key or no button operation for 5 seconds, the system will save the set value and exit the set state.

The set temperature of normal water = [set temperature of low temperature water] + [F01 temperature difference of normal water]. To change it, you need to modify the set parameter [F01 temperature difference of normal water] in the manufacturer's parameters.

Enter the manufacturer parameter setting: In the temperature display interface, press ▲ + ▼ keys for 5s to enter the manufacturer parameter setting The status is set. The factory setting parameters are generally not adjusted. If you need to adjust, please ask for the consent of the chiller manufacturer.

Select manufacturer parameters: In the process of selecting manufacturer parameters, press ▲ or ▼ to select parameters, short press SET to enter parameter setting, no button operation 15s or short press SET again to exit manufacturer parameter setting (parameter items are displayed in the display window).

Set parameters: When setting parameters, you can modify the parameter value through ▲ or

▼ key. After 5s without button operation, press SET key to return to parameter selection and save (the display window flashes the parameter value).

6、Fault analysis and troubleshooting

When the machine detects a fault, the display alternates between temperature and fault code "Exx". If there are multiple faults To view different faults, you can press Up or Down to switch between them. After pressing Up or Down keys, the fault will be displayed fixedly The code alternates between temperature and fault codes after 5 seconds. The fault codes and descriptions are shown in the following table:

hitch code	Name of the fault	fault analysis	fault phenomenon	Elimination method
E01	low Probe fault	A: Low temperature water probe short circuit / broken wire B: The low temperature water probe is damaged	Stop the pump and stop all other outputs	A: Check whether the probe wire is loose B: Replace the probe
E02	low High temperature alarm	A: Insufficient water flow B: Poor ventilation C: Too much dust	Only stop the low temperature water and electric heating	A: Check the water supply line B: Clear the debris around C: Clean the dust on the condenser
E03	Low voltage alarm	A: The throttle tube is blocked B: Refrigerant leakage C: Pressure switch is damaged	Stop the compressor, but do not stop the pump	A: Tap the throttle tube B: Check for leaks C: Check whether the pressure switch and wiring are loose or short circuit
E04	Phase sequence alarm	A: Power phase loss B: Phase sequence error C: Three-phase imbalance D: Phase sequence protector damaged	Stop the machine	A: Check the power supply circuit B: Arbitrarily switch the two phase lines C: Check the power supply circuit D: Replace the phase sequence protector
E05	low Traffic alert	A: The low temperature water pipe is blocked or the pipe is broken B: The inlet and outlet ports are connected in reverse C: The suction pipe is leaking D: The flow switch is damaged	Stop the pump and stop all other outputs	A: Clean and check the pipeline B: Check the inlet and outlet water pipes C: Check the suction pipe and tighten it D: Check the flow switch and replace it
E06	Water pump current Overload alarm	A: The pump is stuck B: Impurity blockage C: Pump phase loss D: voltage below level	Stop the pump	A: Check whether the pump is running B: Whether the tail fan rotates C: Check the power supply of the pump D: Check the voltage of the pump
E07	High voltage alarm	A: The condenser is dirty and blocked B: In and out air ports are blocked	Stop the compressor, but do not stop the pump	A: Clean the dust B: Clear debris around the equipment C: The equipment is

		C: The ambient temperature is too high D: The fan is not turning E: Plate change dirty block F: The throttle tube is blocked G: Pressure switch damaged		placed in good ventilation D: Check if the fan is rotating E: Plate change cleaning F: Tap the throttle tube G: Check whether the pressure switch and wiring are loose or short circuit
E08	low Low temperature alarm	A: The outlet water temperature of the equipment is too low	Stop the compressor, but do not stop the pump	A: Check whether the relay is stuck
E09	normal temperature water Probe fault	A: Short circuit/disconnection of the normal temperature water probe B: The water probe at room temperature is damaged	Stop the pump and stop all other outputs	A: Check the probe terminal and wiring B: Replace the probe
E10	normal temperature water High temperature alarm	A: Insufficient water flow B: Poor ventilation	Only normal temperature water and electricity heating	A: Check whether there is water return at room temperature and whether the water line is blocked B: Clear the debris around
E11	normal temperature water Low temperature alarm	A: The outlet water temperature of the equipment is too low	Stop the compressor, but do not stop the pump	A: Check whether the relay is stuck
E12	normal temperature water Flow alert	A: The water pipe is blocked at room temperature B: The inlet and outlet ports are connected in reverse C: Leaking water pipe at room temperature D: The flow switch is damaged	Heated by water and electricity at room temperature	A: Check if there is water back in the cutting head B: Check the inlet and outlet water pipes C: Check and tighten the pipe joint D: Replace the flow switch

7-Start steps

Warn

◎ Ensure that all electrical connections are connected before use. Under normal conditions, all connections must be tightened and fixed with screws.

◎ When operating the laser, do not directly output optical fiber, and wear safety glasses. When wiring, turn off all the power switches of the laser.

◎ If the ring temperature is lower than 5℃, the chiller shall be energized to heat the internal water temperature of the chiller, otherwise the low

temperature alarm of the laser is likely to occur.

◎Check before test: check whether the outlet is closed and check the liquid level of the water tank

◎ The equipment must be grounded.

The startup process is shown as follows:

（1） Connect the power supply to the corresponding distribution cabinet to ensure the voltage, frequency and phase of the equipment;

（2） Connect the safety lock to the loop interface, connect the wire feeder power line, wire feeder signal line connected to FEEDER;

（3）Connect the protective air pipe (10mm) to the GAS IN interface and open the air valve;

（4）Close the equipment open, dial the key switch position ON and press the reset button;

（5） Press the knob screen, enter the software interface, and adjust the corresponding parameters (laser power, swing range, swing frequency, air blowing and closing delay, power slow rise and slow fall, light out mode and other parameters);

（6）The crocodile clip is clamped on the workpiece that needs to be welded;

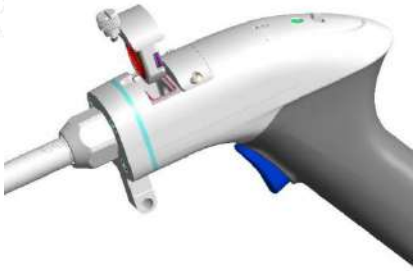
（7）Hold the head of the gun, and then pull the trigger of the gun, to complete the light action;

8-Protective mirror replacement

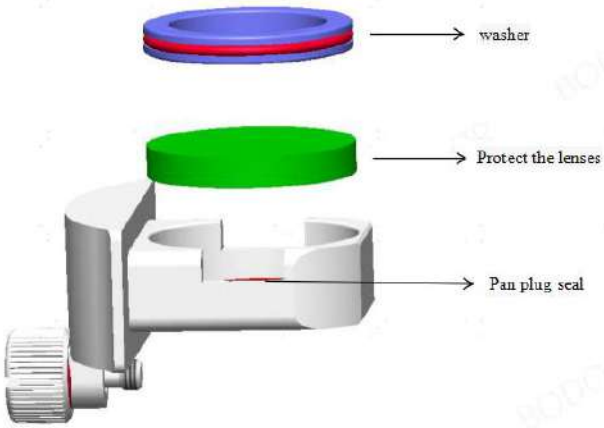
1、Before operation, please clean your hands and dry, and then dip them with cotton and alcohol to wipe your hands again;

2、Open the mirror compartment cover in a clean and clean place, clean the dust around the compartment cover, pull out the lens bracket, do a good job of protection

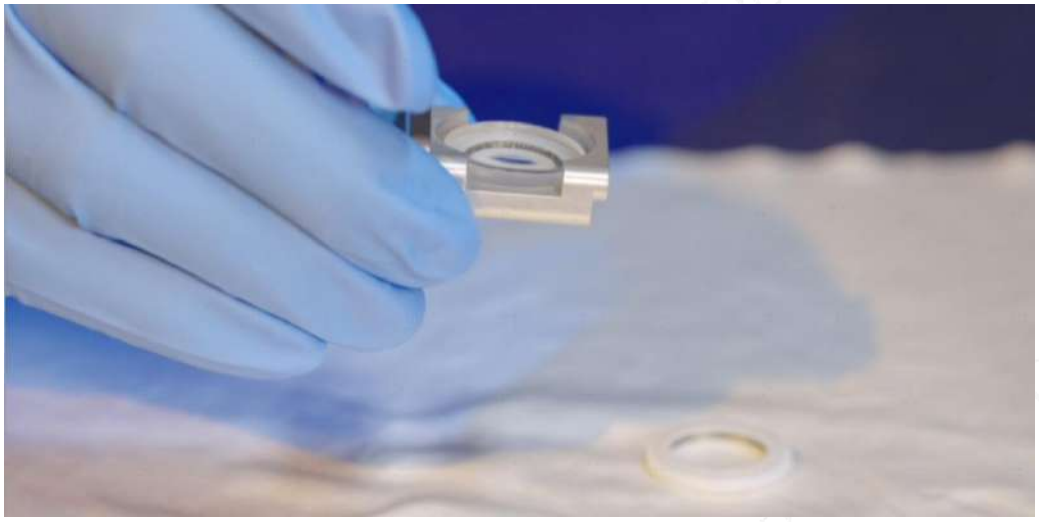
(beautiful paper cover), check the protective lens, if there is an obvious burning point on the lens surface, should be directly replaced;



3、Then check the pan-plug seal under the lens. If the panpanplug seal has any scratch or deformation can not be used, it must be replaced immediately;



4、When replacing the lens, please remove the pan plug seal, pour the burned protective mirror out slowly, then carefully wipe the protective mirror bracket and the pan plug seal with alcohol cotton, and use clean compressed air to blow dry, and finally put the new protective mirror slowly into the groove of the protective mirror bracket to install the pan plug seal;



5、Wipe the opening and the inside of the cover with a cotton ball dipped in alcohol, quickly insert the side of the lens holder into the cover toward the muzzle, and close the cover.

◎ The replacement of the protection mirror and the focus mirror must be conducted in a clean confined space

9-Welding process parameters

Welding process library							
board	thickness	power	frequency	amplitude of fluctuation	wire feed rate	Weld diameter	gas-flow rate
	mm	%	Hz	mm	cm/min	mm	L/min
SS	1	25	8	3	10	1	15
	2	30	9	3	60	1	15
	3	40	10	3	60	1	15
	4	50	10	3	50	1	15
	5	70	8	3	50	1.2	15
	6	90	8	3	50	1.2	15
CS	1	25	8	3	60	1	15
	2	35	9	3	60	1	15
	3	45	10	3	60	1	15
	4	55	10	3	60	1	15
	5	70	8	3	50	1.2	15
	6	90	8	3	50	1.2	15

AL	1	35	8	3	70	1	15
	2	45	6	3	60	1	15
	3	60	6	3	60	1	15
	4	70	6	3	60	1.2	15
	5	90	6	3	60	1.2	15
CU	1	40	9	2	70	1	15
	2	50	8	2	60	1	15
	3	70	8	2	60	1	15
remarks	1. The welding head ratio is 50:160, and the optical fiber core diameter of the 2000W welding machine is 30 μ m; 2, high carbon steel welding is not rAqummended to use nitrogen protection; 3. Power percentage (1200w) 10-100%, swing amplitude 0-5000 μ m (rAqummended 2000-3000 μ m), swing frequency 0-200 hz (rAqummended manual welding frequency 40-70 hz, gas flow not less than 15l / min), other parameters remain unchanged, the swing amplitude or wire transmission speed increases, the laser power should be increased accordingly; 4. The wire delivery machine needs to adjust the wire delivery speed. By adjusting the pressure of the wire delivery wheel, in the automatic mode, the wire delivery speed is uniform, smooth and no lag; 5. Due to the differences in equipment configuration (wire machine differences) and welding methods (wire speed, air pressure, focal focus degree, welding Angle) used by different customers, this data is for reference only; 6. Graphite wire delivery pipe is rAqummended for aluminum welding						

10-Failure list

The fault alarm points of the laser are as follows:

order number	Alarm code	Fault name	failure cause	remarks
1	ER-001	Humidity alarm	The internal humidity is too high	Excessive the internal humidity of the laser and check whether the environmental humidity is too high
2	ER-005	Urgent stop alarm	The emergency stop button is pressed	The emergency stop button is pressed
3	ER-006	Air pressure alarm	The welding pressure is too low	The welding air pressure should be> 0.3bar, otherwise the air pressure alarm will be triggered
4	ER-008	Weld gun head temperature	Dirty lenses or excessive ambient temperature	Check the status of the torch lens or suspend the cooling

		alarm		torch properly after long welding
5	ER-010	Laser alarm	1 Forward light alarm 2 Water inlet temperature alarm 3 Urgent stop alarm 4 Pump source temperature alarm 5 Overflow alarm 6 QBH to provide the installation alarm 7 Encryption alarm	
6	ER-011	Water cooler alarm	E01：Low temperature water probe fault: E02；Low temperature and high temperature alarm: E03；Low voltage alarm; E04；Phase sequence alarm; E05；Low water flow alarm; E06；Water pump current Overload alarm E07；High voltage alarm E08；Low temperature water low temperature alarm; E09：The water probe at room temperature is faulty; E10；Normal temperature water high temperature alarm; E11；Normal temperature water low temperature alarm; E12：Normal temperature water flow alarm;	

1、The fault alarm points of the laser are as follows:

order number	Fault name	failure cause	remarks
1	Forward light alarm	Check the light path inside the optical barrier	The causes of this failure are: low modulation frequency, low peak power, low cutting power, and other operations that may cause a low output power of the laser.
2	Intake temperature	Intake temperature failure	Water inlet temperature failure, please check whether the set temperature of your chiller

	alarm		meets the requirements.
3	Urgent stop alarm	External control emergency stop is not short connect	Confirm whether the emergency stop input of external control is intact; if the emergency stop is good, restart the laser again.
4	Pump source temperature alarm	Internal cooling water pipe machine or old barrier light device	Please check the pressure of the chiller; check whether the inlet and outlet pipe is reversed; check the water pipe or use air gun to empty the debris in the pipe.
5	Overflow alarm	Laser overcurrent fault	Overcurrent fault inside the laser; if the working current of the product exceeds the limit standard, check whether the working current is normal.
6	The QBH installation alarm	QBH, not inserted	If the QBH head is not inserted into the cutting head interior or the QBH head contact has a poor contact with the cutting head contact, please check whether the QBH head is inserted.
7	Encryption alarm	Laser encryption expires	The rear panel indicator light is always on the red light. To continue the normal use, please contact the Bond customer service staff.

pay attention to:

◎ All laser alarm information will be displayed on the monitoring software; please pay attention! If you have any questions, please contact our customer service staff.

11-Software installation and use instructions

Scan the QR code below:

Tip: Software installation and use instructions details, official website software instruction manual.

12-Instructions for nozzle

No.	AS-12	BS-16	C	CS-12
Welding Wire Dia. 送丝(mm)	0.8/1.0/1.2	1.6	\	0.8/1.0/1.2
Welding Technology 工艺	Flat weld Inside corner Outside corner 平角/内角/外角	Flat weld Inside corner Outside corner 平角/内角/外角	Outside corner 外角	Outside corner 外角
No.	ES-12	FS-16	Cutting nozzle 切割嘴	AS-20D
Welding Wire Dia. 送丝(mm)	0.8/1.0/1.2	1.6	\	2.0
Welding Technology 工艺	Outside corner 外角	Outside corner 外角	Cutting 切割	Weld cleaning 焊缝清洗

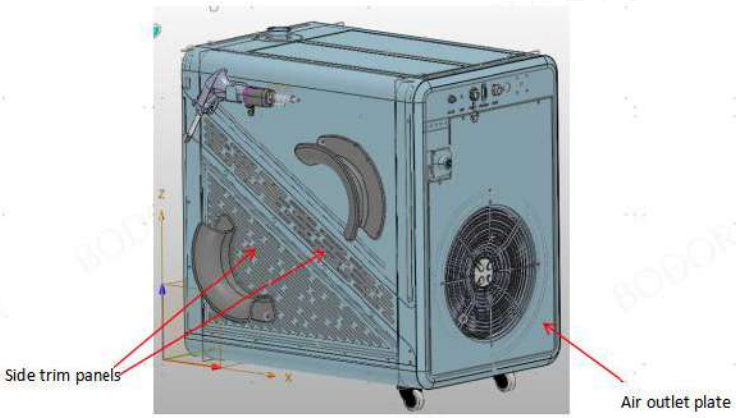
◎ For details, please refer to the official website video

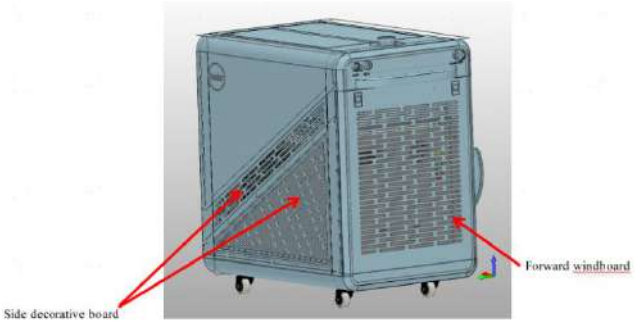
Chapter VII Repair and Maintenance

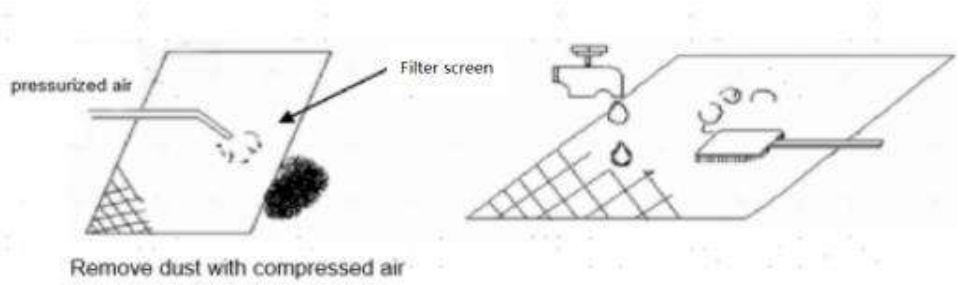
Equipment maintenance must be shut down first, cut off the power supply, 5 minutes before the operation, otherwise there will be a risk of electric shock.

Weekly patrol inspection is the main content of the daily maintenance of the welding machine. For daily maintenance, the equipment should analyze its operation status, vibration, noise and operation data and find the problems in advance. It mainly includes the following contents:

Check the filter screen and clean up the dust and foreign matter above,







The specific operation steps are described as follows:

1、Disassemble the front and back air board of the whole machine, remove the side dAqurative board;

2、Remove the dust filter for cleaning;

3、Check whether the condenser has accumulated dust and foreign matter, and simply clean it with compressed air;

4. Put the clean dust filter on the side dAqurative board, and install the side dAqurative board in reverse according to the removal steps;

Chapter VIII: Transportation and Storage

1-Transportation requirements

1.When handling equipment, do not bump or tilt, and pay attention to the anti-dumping label to avoid bumping and impact.

2. No water loading and transportation

2-Storage requirements

1. Please place the machine far away from the dust;

2. Please wipe the surface of the body clean, use the internal air pump to blow away the dust, wipe away the oil;

3. Cover the outside of the equipment to prevent dust and moisture attachment;

4. Store the machine in flat ground, dry ventilation and rain shelter, to avoid direct sunlight;

5. If the equipment is equipped with casters, please ensure that the caster is fixed or locked to avoid damage caused by the caster sliding;

Chapter IX Company Information

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