USER'S MANUAL

Instructions for use

CONTENTS

General information

Thank you for choosing the OPTIC TECH laser welding unit. In order for you to enjoy your laser welding unit in the future, please take time to observe all the information in these operating instructions. OPTIC TECH a professional laser equipment manufacturer in China since 2004,OPTIC TECH specialized in laser welding machine, fiber laser marking machine, fiber laser cutting machine and co2 engrave machine.

According to the EC guidelines, the OPTIC TECH laser welding unit is a piece of working equipment specifically designed for use in the dental laboratory Unit identification Product: Laser welding unit (Nd: YAG laser wave length 1064 nm) Type: OPT-GY1-150, OPT-GY1-200 China the parts to be welded are manually arranged, positioned and laser welded in the welding chamber using the stereo microscope. The required inert gas and the laser pulse are switched on or activated via a two stage pedal switch. During and after the processing the welding vapors is automatically extracted.

Caution: The unit must be installed and put into operation by authorized, qualified personnel or OPTIC TECH service technicians. Before switching on the unit you must have read and understood the user's instructions! Switch on the device only after having done this! Before using the unit for the first time, the relevant authorities must be informed

Safety information

Danger symbols and information

The following symbols indicating danger are used in these operating instructions:

Warning: Notes on possible threat to life and health of personnel. Failure to heed this can cause serious damage to health and even dangerous injuries. Caution: Note on a possibly dangerous situation. Failure to heed this can cause minor injuries or damage to property.

Correct Usage

The OPTIC TECH is designed exclusively for welding metals. To use it for any other purpose or for anything beyond this is to use it improperly. OPTIC TECH is not liable for damages caused by this. Proper use also includes heeding all information of this manual and regular inspections and maintenance work.

Caution:

Processing non-metallic materials, especially plastics, constitutes improper use.

Warranty and Liability

Our general terms and conditions of sale and delivery apply. Warranty and liability claims in the event of physical injury or damage to persons and property are invalid if they are caused by one or more of the following:

• Improper putting into operation, operating, mounting and maintenance of the laser welder
• Improper use of the laser welder
• Operating the laser with safety facilities that are defective or improperly installed or with inoperative safety and protective precautions
• Failure to heed the notes and information in this manual concerning the transport, storage, installation, operation and maintenance of this laser
• Lacking supervision of wearing parts
• Unauthorized structural modifications to the laser, especially the safety precautions
• Improperly performed repairs

Laser safety officers

Using a class 4 laser, a competent laser safety officer must be appointed in writing by the employer. The specialist should have training and experience in the field of laser radiation. The laser safety officer should fully understand the safety procedures and equipment used. He is responsible for the safe operation and safety measures of the unit. The laser safety officer will receive appropriate training by the relevant trade associations or by OPTIC TECH

Protection of the eyes against laser radiation

The unit is equipped to protect the eyes of the operator and other personnel around the unit.

(1)Safety shutter

The safety shutter prevents generation of laser pulses or the unintended emission of laser radiation from the laser source and is closed,

- if the arm sleeves are open.
- if the openings of the arm sleeves are not closed.
- if the laser parameters are changed.
- if there is no control voltage at the safety shutter.

(2) The laser pulse is only operational

- both arm sleeves are closed
- both forearms of the operator are in the welding chamber
- no laser parameters are set
- the charging of the energy reservoir has been finished
- the pedal switch has been pressed down

(3) Other devices for eye protection

- The unit is equipped with a large observation window out of laser protective glass for a safe direct observation of the welding process.
- The unit is equipped with an automatic glare protection within the optical path of the stereo microscope that is activated during welding.
- The complete laser beam path is optically sealed

Protection of the skin against laser radiation

The unit has been developed for dental applications. Every workpiece is an individual part, the processes cannot be automated. The dental workpiece must be held with the hands as a large number of various materials with different measurements, appearances, surface compositions and fitting tolerances are connected together in various combinations or have to be processed at their surfaces. At the moment protective gloves against laser radiation technically cannot be realized and would hinder or even make impossible to work on the very small parts. The same problem exists for the use of holders, tweezers etc. Therefore this laser has to be classified as work equipment for the dental laboratory that bears the threat of minor injuries. Due to the design of the unit the area of danger is reduced

to the hands and arms of the operator. In case of false operation the tissue of the skin can slightly be burnt by laser influence. In case of severe burns the operator should seek medical treatment.

Caution: Invisible laser radiation!

You can avoid direct laser radiation to your hands:

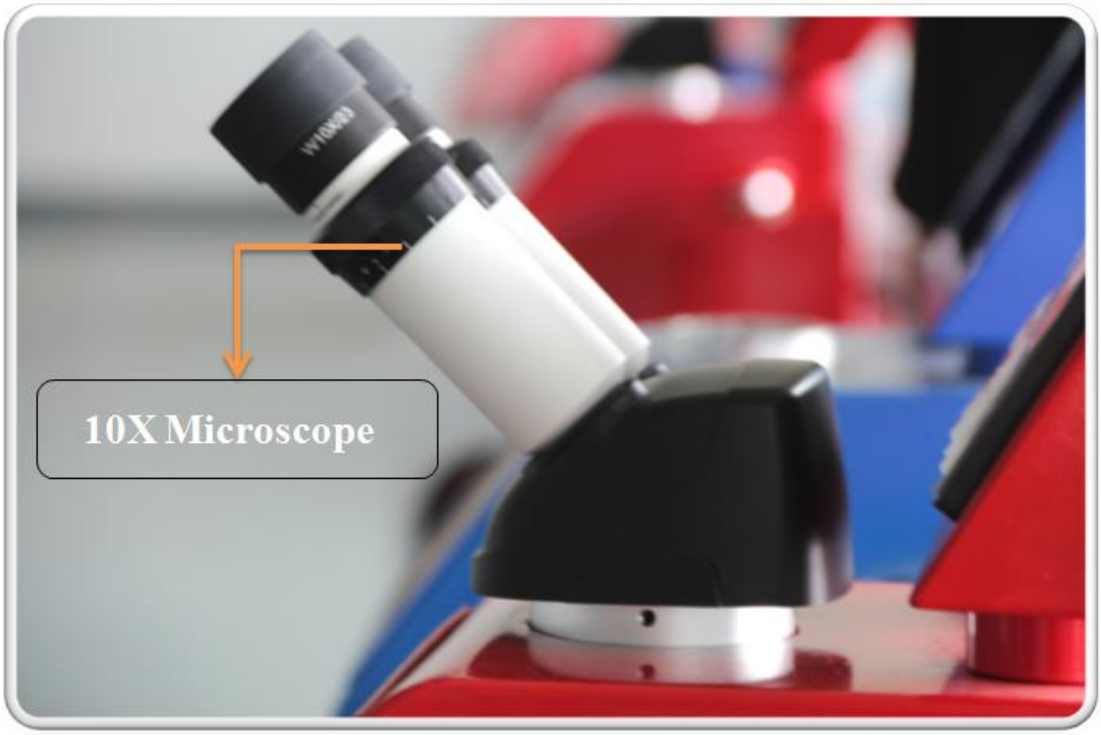
- Do not position your hands directly under the crosshair or in the laser beam!
- Look through the stereo microscope and position the workpiece that the welding point appears sharp within the crosshair!
- Take care that the hands do not appear - if possible - in the field of view of the stereo microscope!
- Keep your hands calm while releasing the laser pulse with the footpedal switch!
- Always look through the stereo microscope and control the position of you hands and the position of the workpiece!

Basics of the laser and the welding process

LASER = **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation

It is a light amplification caused by stimulated emission of radiation. The light amplifier of the laser is a rod shaped crystal of neodymium-doped yttrium aluminum garnet (Nd:YAG) stimulated by a light pulse from an external rod shaped flash bulb. A suitable high-performance reflector guarantees a high efficiency and coupling-in rate of the lamp light into the laser crystal. In order to send out amplified and directive laser light two mirrors are arranged outside the crystal that way that the light coming from the crystal is reflected in itself and back to the crystal (resonator). One of the mirrors is semi-reflecting and releases a strongly directive laser radiation from the resonator. The wave length range of this radiation is strongly limited to 1064 nm. Due to the strong directional dependence and the narrow wave length range the extreme concentration of the laser energy on the workpiece is possible (focusing via a suitable lens). This energy concentration exceeds the concentration of usual light sources many times. The laser pulse facilitates welding by heating the workpiece in the focal area beyond the melting temperature and liquefying the materials that are to be connected. After a relatively short laser exposure time (0,5 ms to 15 ms) the melted materials solidify again and are tightly connected together. By the high and short time concentration of the laser energy to a limited volume heat is only produced where it is needed. This feature makes the laser an excellent tool for the dental laboratory.

Technical description of the device



Adjusting the microscope:

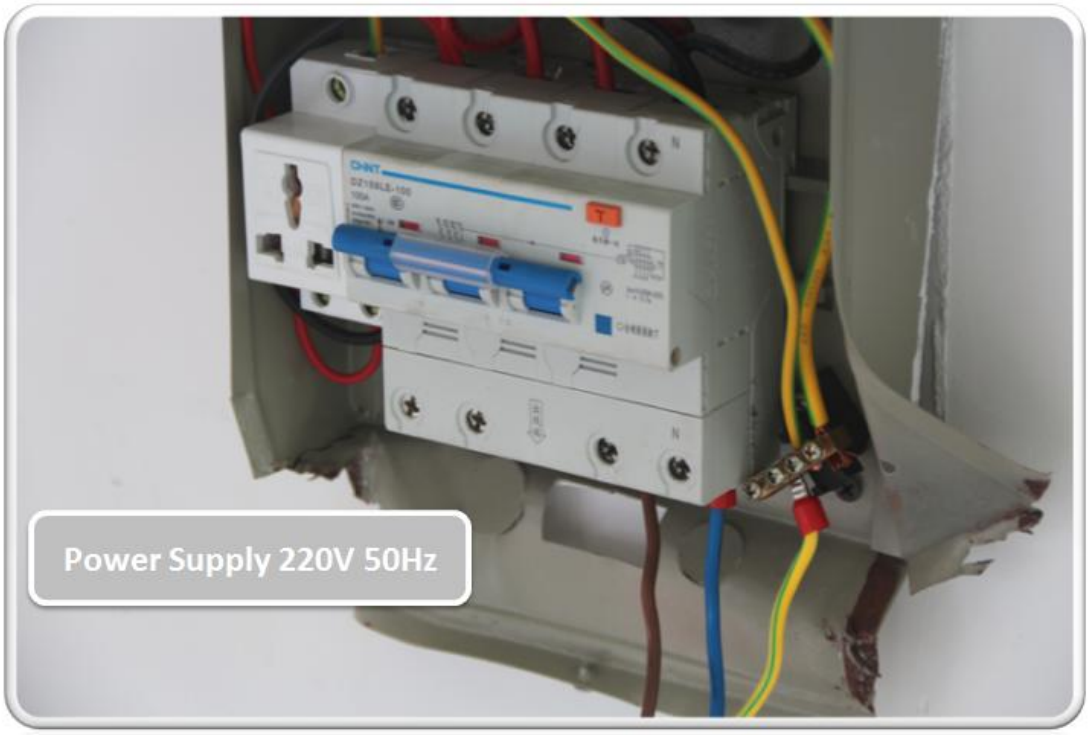
- **Setting of the eye distance:**
  The eye distance is correct, if you can see with both eyes one single round image. Look into the eyepieces and move both tubes with both hands together or apart.

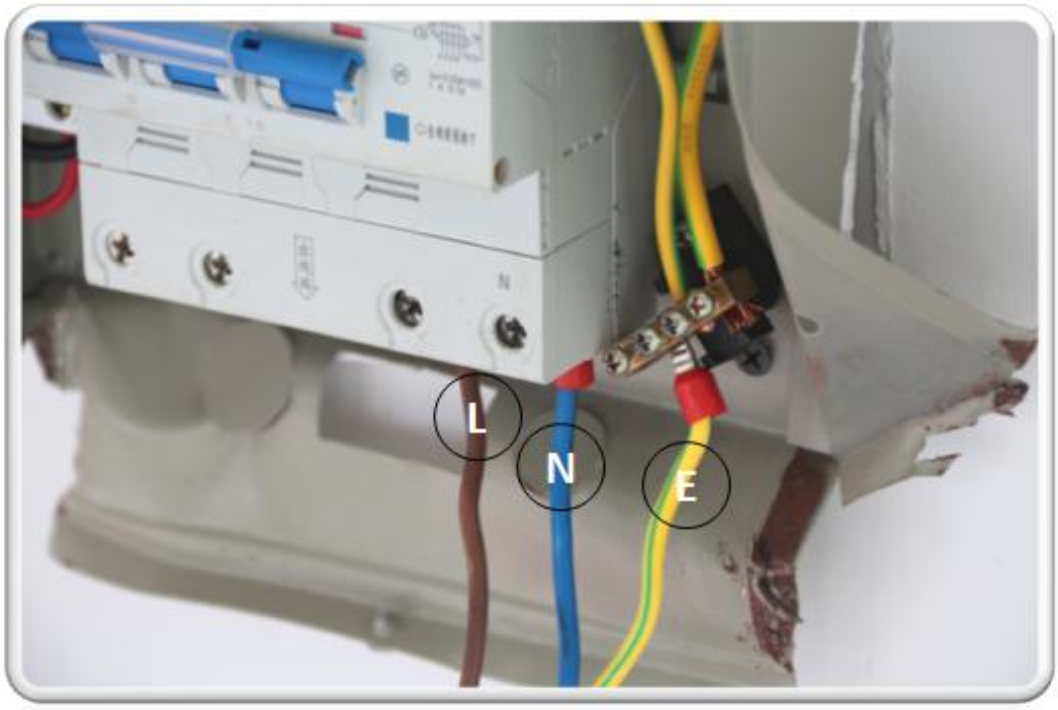
- **Setting of the exit pupil:**
  The distance between the eye and the eyepiece is about 22 mm. You have got the correct distance if you see the complete image area without shadings. Slowly move the eyes towards the eyepieces.

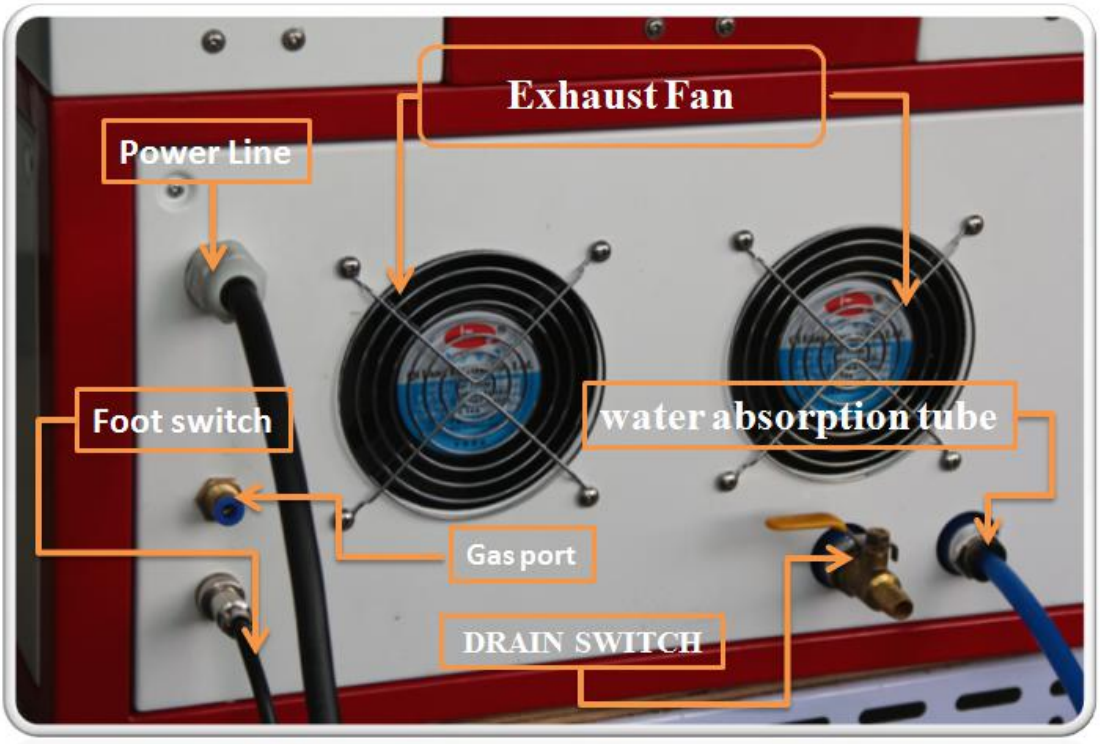
- **Set the eye shells of the microscope:**
  If you do not wear goggles and wish to have close contact with the eyepieces:
  Hold the dioptric ring and turn the eye shell anti-clockwise until it is released. Lift up the eye shell. Hold the dioptric ring and tighten the eye shell clockwise. If you wear goggles move the eyeshell to the lowest position

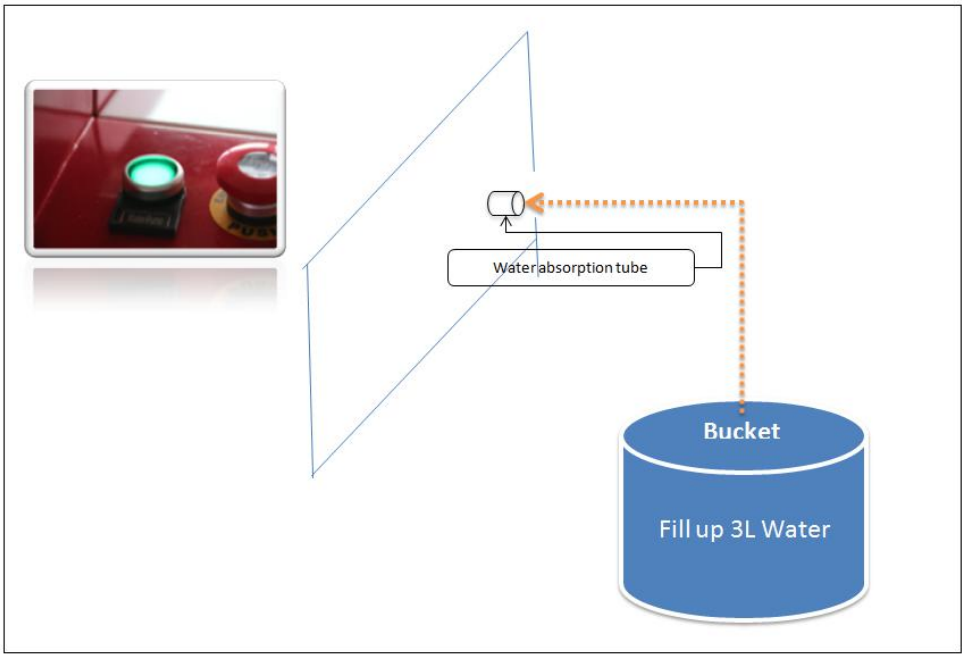
- **Adjust the eyepiece to the individual visual acuity.**
  Set the diopter on both eyepieces to “0”. Turn the right diopter until the cross in the in the right hand ocular is sharp. Use a flat test piece (eg. a piece of metal), place under the laser lens using a titanium holder until it can be seen sharply with the right eye. Turn the left diopter in the left ocular until the test piece can be seen sharply. Do not move the test piece.

Power Supply






Exhaust Fan
Power Line
Foot switch
water absorption tube
Gas port
DRAIN SWITCH


Water absorption tube
Bucket
Fill up 3L Water

How to fill in water for the machine water chiller

Press the button of water pump, turn on the emergency push button, using water absorption tube suck water from bucket till the tube stop suck water.

Inert gas connection:

Please note the following:

Use argon 4.6 a inert gas (in case titan is processed argon 5.0 is recommended)

Use a gas cylinder with a volume of a maximum of 200 l.

Standing bottles have to be properly mounted to the walls with chains

The flow regulation valve for argon should be set to a flow of 8 l/min.

The gas hose diameter is 6 mm.

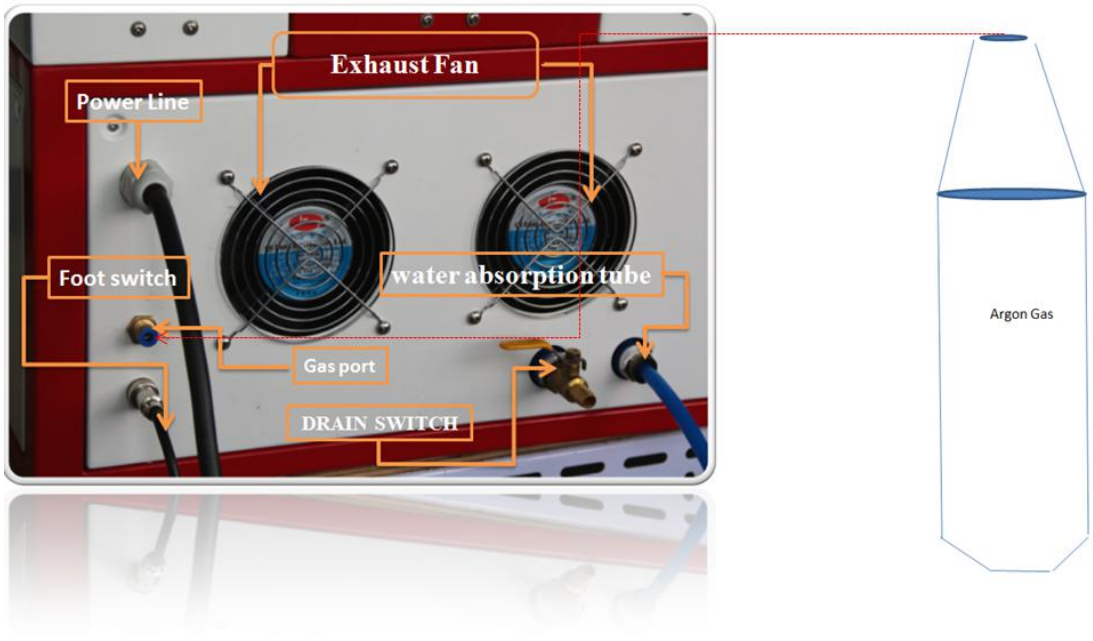
The gas hose is directly plugged in at the laser housing beside the mains connection

Never forget: Close the valve of the gas cylinder after having finished working.

Attention: Gas cylinders always must be properly secured for storing and during operation.

Connection of the integrated cooling gas port

Connect the transparent fabric hose beside the mains cable and the inert gas connection to the cleaned compressed air. Max. pressure: 3 bar



How to set up parameter of the machine

The machine basic information:

Model Number	OPT-GY-150/200
Laser Wavelength	1064nm
Spotlight Cavity Reflector	Metal Cavity
Max. Laser Power	150/200W
Pulse Width	0.1-20ms
Laser Frequency	1-50HZ
Adjusting scope of light spot	0.6-3.0mm
Aim Operation	Round Point Cursor
Cooling System	Built-in
Rated Power	5.5KW
Lifetime	3,000,000 times
Power Supply	220V 50HZ
Dimension	1030*620*820mm
N.W.	100kg
G.W	120kg

Adjustable parameters

Current	*50-350 A*
Frequency	*0-10Hz*
Pulse duration	*0-20ms*
Focal	*100-160mm*
Facula	*0.6-3.0mm*

If you weld gold ring or bracelet parameter

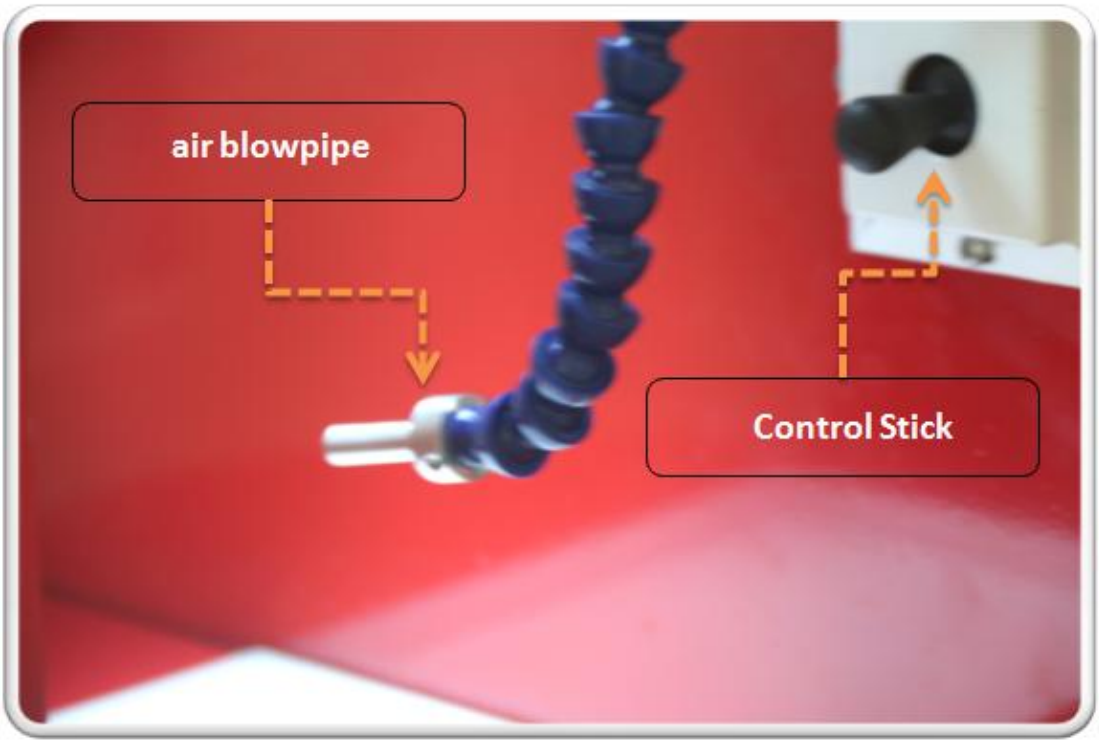
Current	*200A*
Frequency	*0-5HZ*
Pulse duration	*1.5-2.0ms*
Focal	*100-160mm*
Facula	*1.2mm*

If you weld silver ring or bracelet parameter

Current	*260A*
Frequency	*0-3Hz*
Pulse duration	*6-8.0ms*
Focal	*100-160mm*
Facula	*1.2mm*

If you weld stainless steel parts parameter

Current	*150A*
Frequency	*0-5Hz*
Pulse duration	*1.5-2.0ms*
Focal	*100-160mm*
Facula	*1.2-1.5mm*



Air blowpipe
The air blowpipe device protect welding effect and prevent oxidation of product. So that when welder gold silver and stainless steel material which keep on prefect welding effect.

Control stick
The control stick device control all parameter, such as Current, Frequency, Pulse duration, Facula and so on.

How to Maintenance of the machine

Xenon lamp

The xenon lamp have to replace after one year, the lifetime according to the actual usage and environment.

Replacement the water for water tank of the machine

The water tank of the machine need to change per once a month.

How to do if the machine parts broken down

If the machine parts goes wrong when the machine warranty is valid, we will ship you a New one by express and freight cost is on us. If the machine warranty pass which the Machine part need to pay at the actual price.

No matter anytime you can call us if the machine have problem.