User Manual

200W desktop jewelry laser welding machine

CONTENTS

General information

Thank you for choosing our 200W desktop jewelry laser welding machine. 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.

This machine mainly used to weld gold, silver, platinum, stainless steel material, and other all kinds of jewelries. Also can be used to weld glasses, repair artifical tooth, etc.

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

This machine 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, jewelry welding applications. Every work piece is an individual part, the processes cannot be automated. The work piece 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 cross-hair or in the laser
- beam! Look through the stereo microscope and position the work piece that the welding point appears sharp within the cross-hair!
- 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 foot pedal
- switch! Always look through the stereo microscope and control the position of you hands and the position of the work piece!

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 wavelength range of this radiation is strongly limited to 1064nm. Due to the strong directional dependence and the narrow wave length range the extreme concentration of the laser energy on the work piece 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 work piece in the focal area beyond the melting temperature and liquefying the materials that are to be connected. After a relatively short laser exposure time (0.5ms to 15ms) the melted materials solidify again and 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.

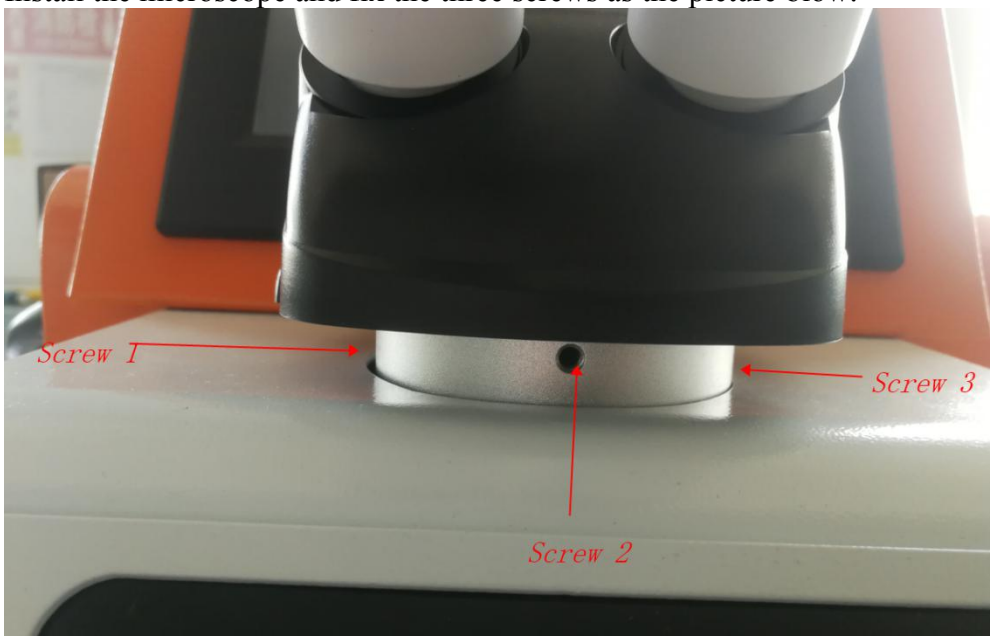
Technical description of the unit

Machine model	**Hi Tech + LS200**
Laser Wavelength	1064nm
Laser type	YAG
Cavity	Ceramic cavity
Maximum laser power	200W
Laser energy	160J
Adjusting scope of light spot	0.3-3mm
Aim Operation	Red point
Cooling System	Water chiller
Machine total power	3KW
Power Supply	230V-10+5% 50/60Hz
Flash lamp lifetime	3,000,000 times
Machine net weight	85Kg

How to install the machine

1. Microscope installation

Install the microscope and fix the three screws as the picture blow.



2.Install the black plug

Install the black plug on the outlet of water chiller.

3.Install water pipe

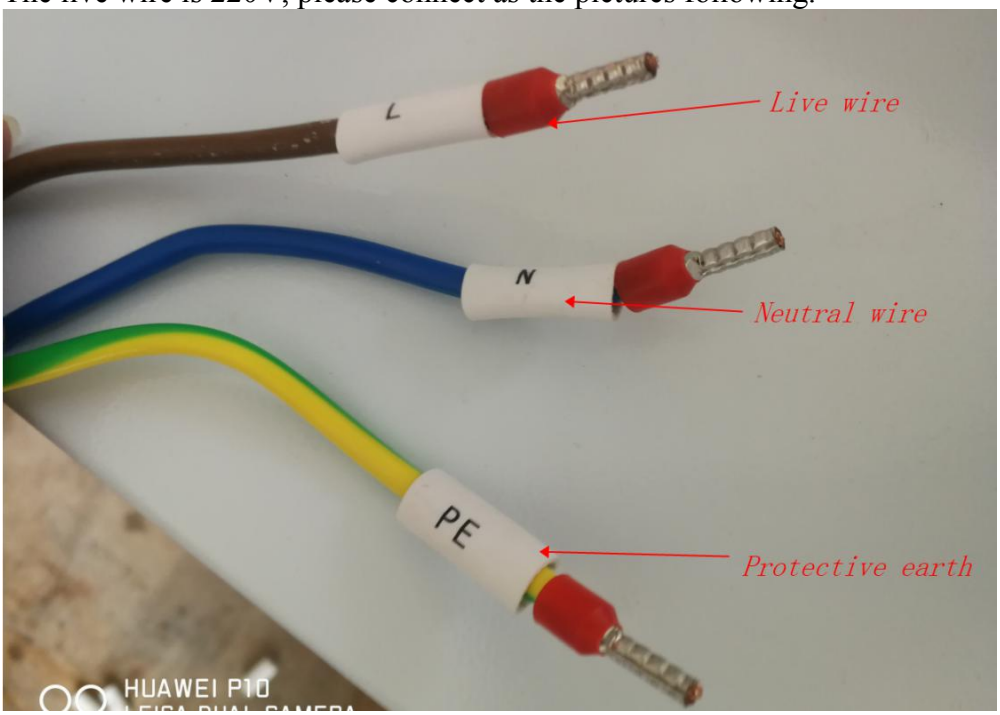
Install water pipe on the inlet of water chiller.

4.Install foot switch

5.Install power cables

L-Live wire, N-Neutral wire, PE-Protective earth.

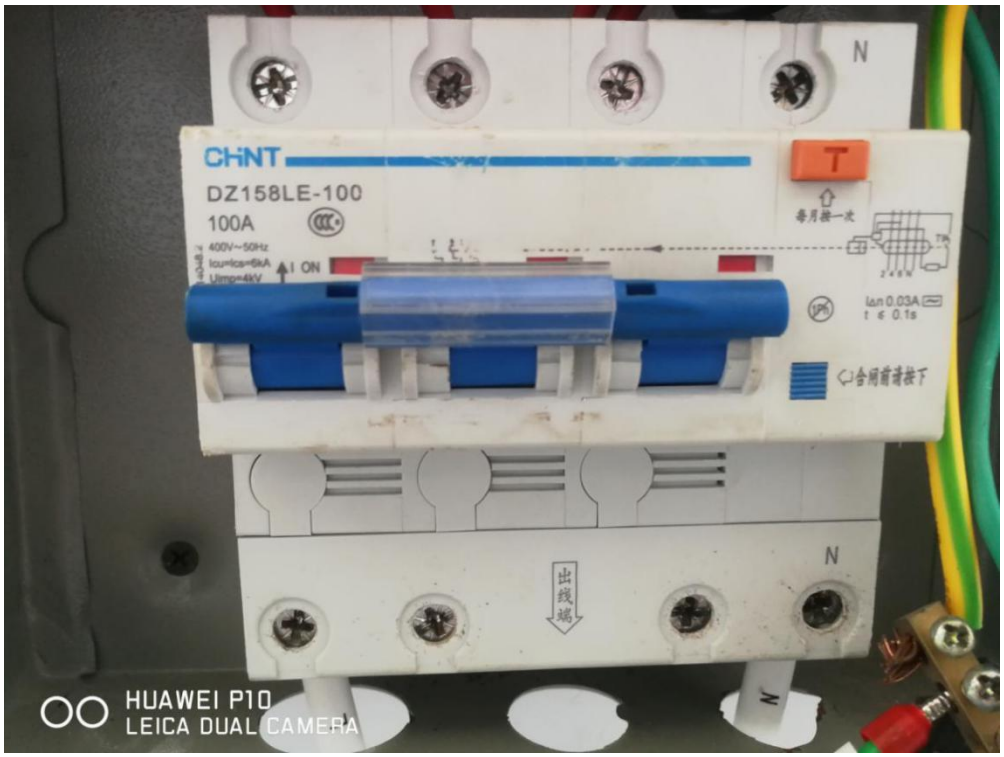
The live wire is 220V, please connect as the pictures following.



How to operate the machine

1. Power on

Turn on the air switch.



2. Turn on the Red button and turn the left side key to ”ON” direction.

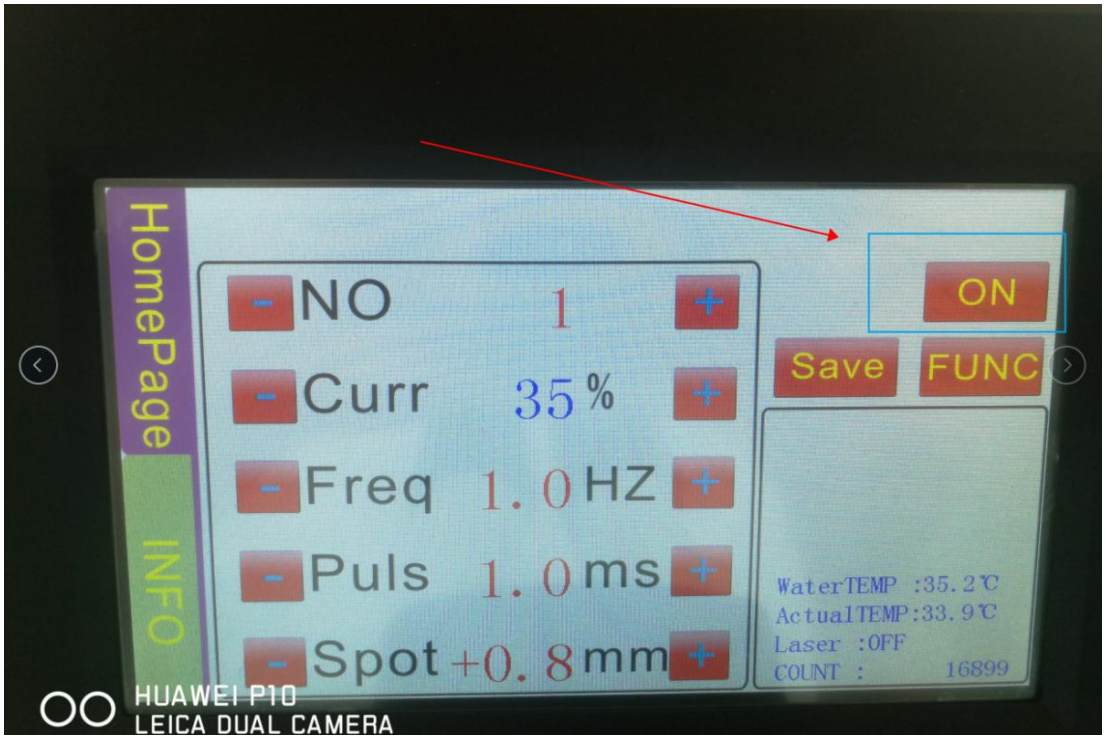
Rotate button clockwise and turn the key to “ON” direction.

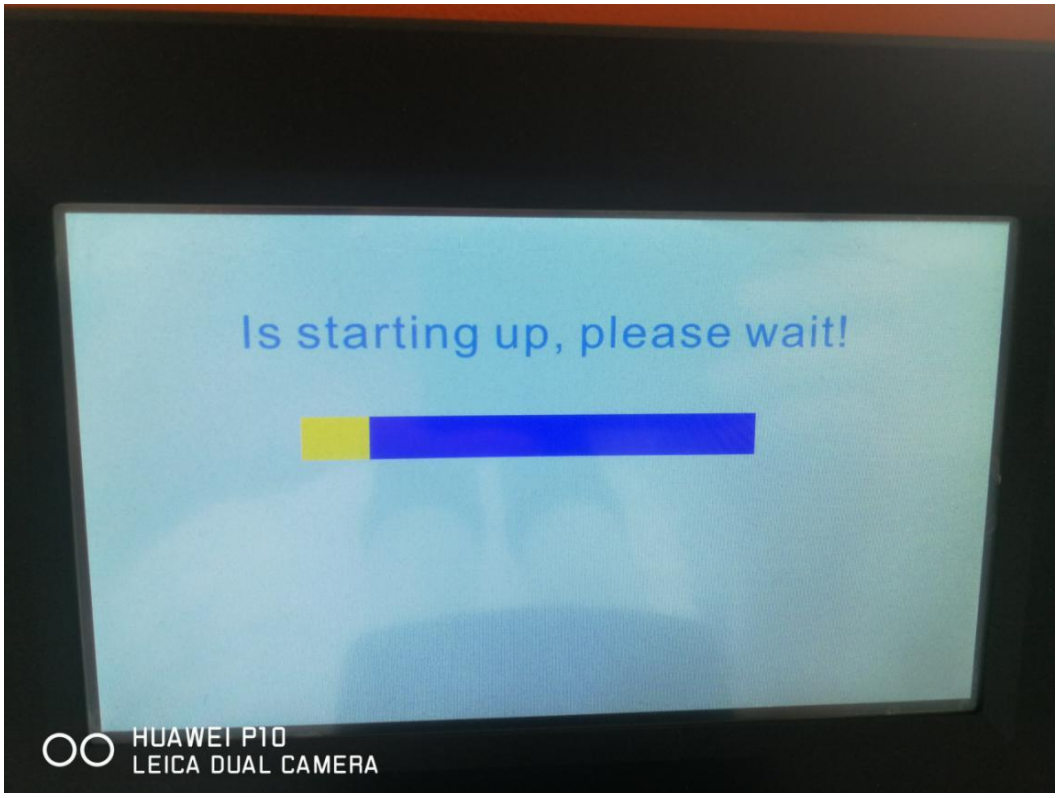
3.Add water

Prepare 4L water and put the pipe in your water container.Then press the below red remarked “Water pump” button continuously to add water. When the water stop goes into the machine that means the water chiller is full. (Usually the water filling process takes about 3 minutes to finish.)

4. Press “on” in touch screen.

Press “on’ in touch screen and wait about 30 seconds.




Is starting up, please wait!
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HomePage
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Freq 1.0 HZ
Puls 1.0 ms
Spot +0.8 mm
OFF
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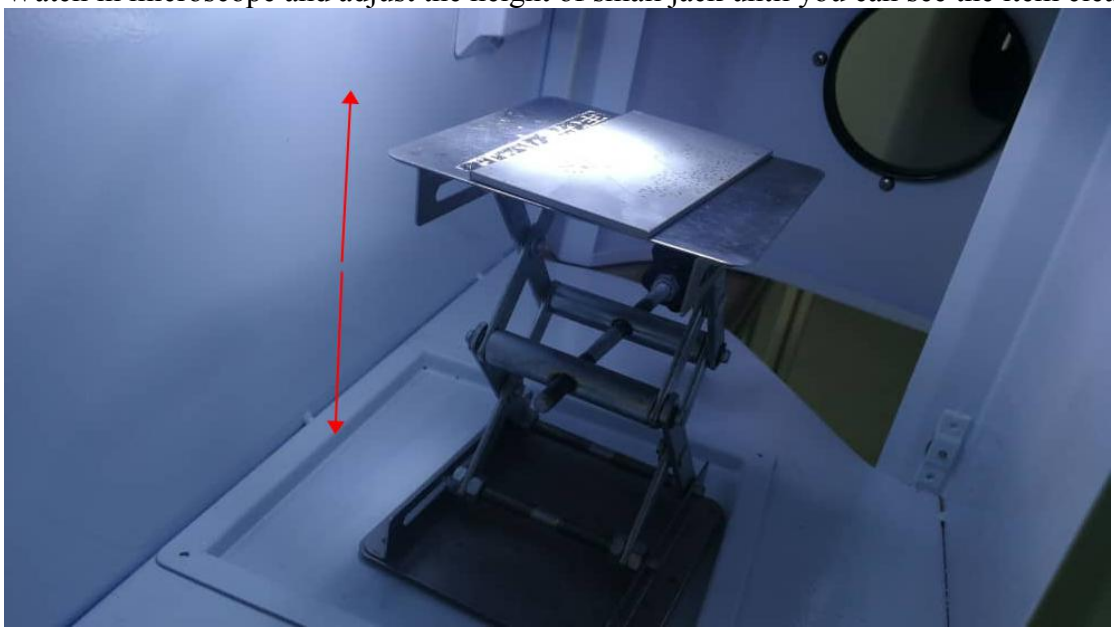
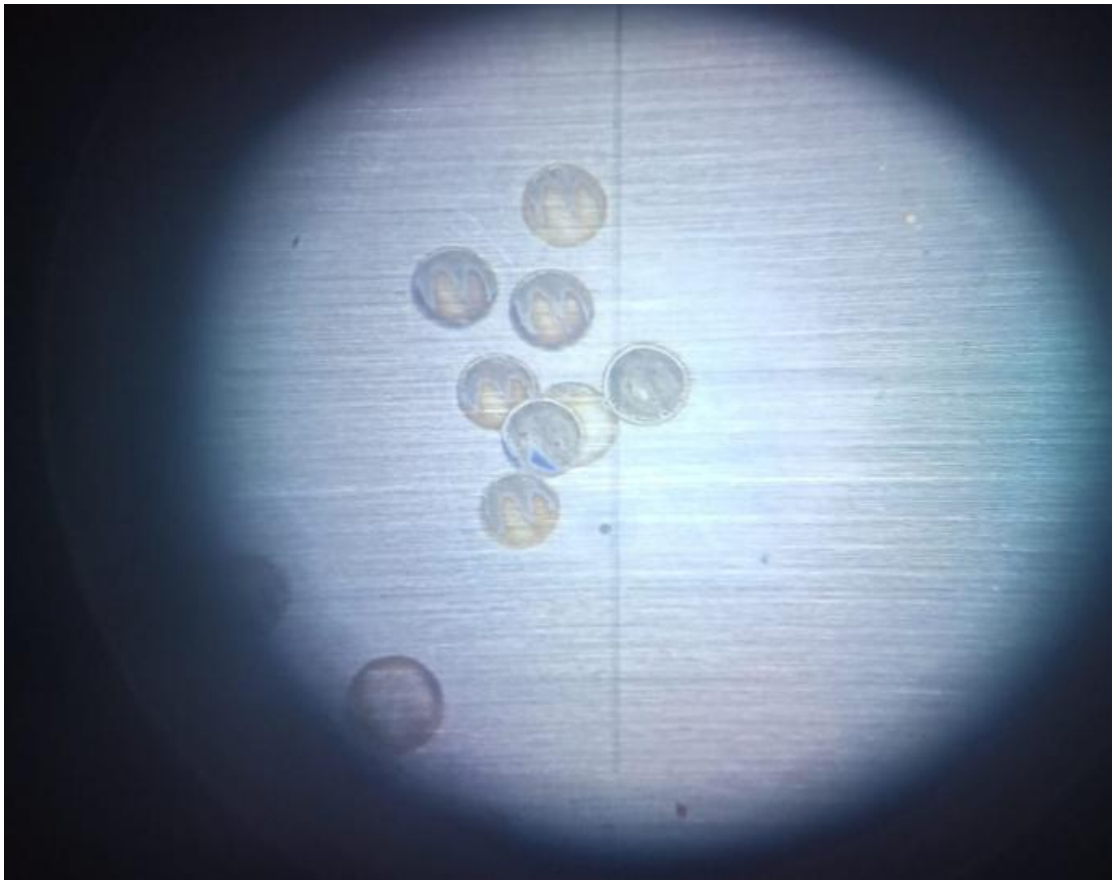
WaterTEMP :36.6℃
ActualTEMP:34.8℃
Laser :OFF
COUNT : 16899
HUAWEI P10
LEICA DUAL CAMERA

5. Find the right focal distance.

Watch in microscope and adjust the height of small jack until you can see the item clearly.





6.Welding
Press foot switch with foot,laser will be going out.

7.Parameters
No-NO.1 No2 means different sets of parameters.
Current-Laser power
Frequency-Frequency set larger,laser go out more times in a certain time
Pulse-Pulse set larger,welding going deeper.
Spot-Welding spot size

8.Turn off the machine
Press “OFF” in touch screen to turn off the machine.

9. Press red button.
10.Turn the key to “OFF” direction.
11.Turn off air switch

Precautions

1. **Electricity.**
Standard machine should be connected with 220V 1ph 50HZ/60HZ.You need a transformer if your electricity is different.

2. **Change water.**
We advise you change water once a month at least. The water should be distilled water or purified water.

3. Keep the environment clean
Please make sure the machine in a environment with less dust because circuit problem could happen when dust go into the machine through the holes of the machine's cabinet. You can also cover the machine when you don't use it.

4. Add antifreeze
Please add antifreeze to the cooling water if the temperature around laser welder less than 0℃。