Quick Prepare & Important!

For Tech Question: email: **x@xinglaser.com**. Please allow 24-48 hrs.
Please use email for help/questions. History message/record will be saved.
For Send Images: either **x@xinglaser.com or (407) 490-4032**
Please read through this Quick Prepare Guide and Tech Manual
Training Videos: Link and Pass-code will be sent to you separately.

Open Wood Box

Crowbar // Hammer // Safety Gloves -- Be careful of the long nails on the wood board.
Check insertion materials before throwing them away. It might have some parts attached to them.
** Tools are not included.

* The machine has wheels

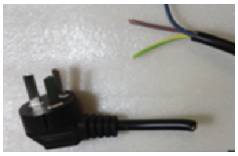
Use a few wood boards, make step ladders so you drag the machine from the box, and move it to the ground.

Step 3: Power Needed for the Machine

220V / 50Amp

Please consult a certified/licensed electrician before connecting to electricity.
The information below is for reference only.

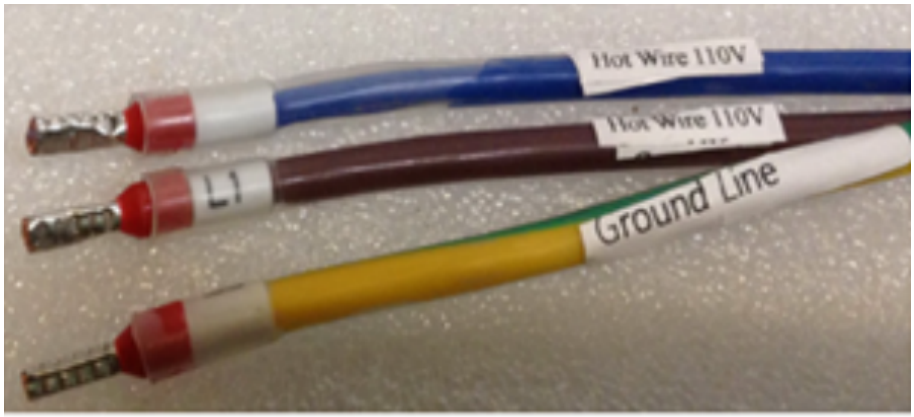
Laser machine default comes with 3 cords: **Blue and Brown are hot wires.**
Yellow with the Green strip is GROUND LINE. **(The machine does not come with an outlet and plugs)**



Wire feeder machine use 110 V power source.

The wire feeder machine comes with a standard factory plug. The plug does not fit the USA standard outlet.
Please check the accessories part.
We may already provide a plug convert inside.
You have to either use a switch plug or cut the head off and use any cord you have available at hand, e.g. computer power cord head to modify the existing machine cord, to connect to the right USA standard plug.

Blue and Brown lines are 110V HOT Wires.
Yellow with the Green strip is GROUND LINE.



Welding Machine Come with Default 3 lines:

To use the outlet with 50A - 240V welding plug or 50A - 240V

3 pole Circuit Breaker, you can arrange according to your personal choice. (those are not included with the machine)

Please consult a certified/licensed electrician before connecting to electricity. We are not responsible for any electricity connections. The information below is for reference only.

Electricity panel has 220V supply source.

Either option below you need a 220V - 50A cord connect to the electricity panel, then make the following connections:

Option 1: NEMA 6-50P, 50 Amp, 250 Volt, 3-Prong Grounded Heavy Duty Angle Plug and Outlet.

***** Plug/Unplug please wear insulated gloves.**

Option 2:

If you are using a circuit breaker, you can use the 3 cords directly connected to the circuit breaker, as well as the wire feeder machine cords. Please use the circuit breaker box for protection. Do not let others touch that breaker. It has high voltage power.

Power On the Machine

Machine switch: on the back panel, turn on. (for some models, the new model might not have those)
Open the main compartment door, no key is needed. Just lift the latch, and turn left till 90 degrees. Do not use force!
The figure below is the machine's main compartment part:
1. Start button: useless, leave alone, no need to touch it.
2. On/Off: it is controlled by master keys. **If on, the machine is locked; if off, the machine is ready to work.**
3. Emergency stop button: for emergency only, push to stop; turn right to connect power. This button stays open; do not push it unless emergency.

Main Operation Panel: Emergency stop button: for emergency only, push to stop; turn right to connect power. This button stays open; do not push it unless emergency.

2023-09 - New Version Machine

Picture below shows the Laser Dehumidify Input Plug (2003-09 new version)

The protective Gas Input Plug Socket
Shielding(protective) gas is input here
(2003-09 new version)

Step 5: Supply Needed for Machine to start

(Those supply parts are not included)

1. Welding Meter Gas Regulator Gauge -see below.
2. Welding Gas Cylinder Tank
3. Argon Gas - for Welding
4. Distilled Water 3-4 Gallon - for cooling the machine and Coolant (for winter cold weather)
5. Welding Wire - 5 lb or more, to fit wire feeder roller
6. *Air Compressors Machine (if your job is mainly for Rust Remove so you do not have to use Argon Gas)*
7. *Air Drying System - connect with Air Compressors to filter out dirty/wet air for job mainly for cleaning*
8. Gas hose convert and/or bold Air Compressor Hose Pipe. (if this machine hose can not connect to your gas regulator gauge). The machine comes with a default blue hose (outer diameter 6 mm; Inner diameter 4 mm).

How to use Union Connector? - Push the front circle inward to loose the pipe. Machine comes with 6 – 6 mm connector and 6 – 8 mm connector. In my case, I use 8mm OD 5mm ID black hose to connect to regulator.

The machine will not run if there is alarm on the operation panel: Gas/Air On, Cooing Water and Safety Clip.





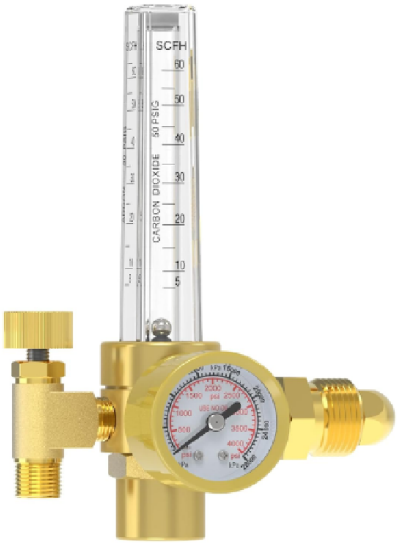
Coolant

If temp is above 0, use pure / distilled water.

If temp is going to be below 0, add some Ethylene Glycol based coolant to the tank.

e.g. some of Valvoline coolant page will say: ethylene glycol-based engine coolant

air pressure and regulator



There are many gas regulators on the market.

For welding, this left side simple gas regular shall satisfy most needs because: **Recommended welding air pressure data is 0.2 - 0.4 MPa**

For cleaning or cutting, **Recommended cleaning air pressure data is 0.5 - 0.9 MPa; for cutting, please ask.**
Recommend the right side gas regulator, with its maximum output pressure 1.6 MPa. (machine default input pressure is 1 MPa)

The left value controls the airflow.
The right side connect to gas tank or air pressure machine is the value of output pressure from tank.

When you start to turn on the gas tank or air pressure machine, please do it slowly. Just turn on a little bit.

Then turn on the gas/air release value to output gas/air

The machine air pressure window will show the same air pressure from the gas regulator initially.

Then you start to adjust both gas tank or air pressure machine control and the gas/air release value. The machine barometer window will show the air pressure value in MPa. Please make sure it is less than 0.9MPa. (Do not adjust any value on the barometer window. It is preset for air alarm).

Once you pull the gun trigger to blow, the air will flow out; at the same time, the air pressure on the machine barometer window will drop too.

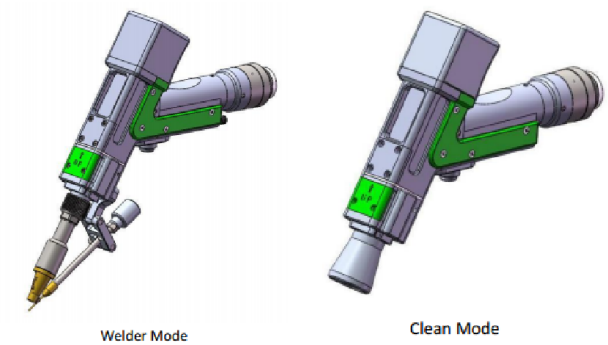
When you use the machine to blow air, the air pressure window number should remain between 0.09 to 0.9 MPa range.

Very Important!!!

Password: if system ask for password, please try one of the those: 666666, 666888, 888888, 888666, 888666.

Change the lens, has to proceed under a dust-free environment. The laser gun will not work properly if: dust gets inside or/and the lens gets dirty.

Please wear medical-type virus-free gloves if needed to proceed with any detachment of the gun parts.



Wobble Enable

Welding: Must to have it ON all the time.
Wobble ON: Laser beam swig from side to side to distribute energy evenly.
Wobble OFF: Laser beam shoot single line with its maximum energy can easily burn through any objects!

Air Pressure Barometer Window 1 MPa = 145 Psi

Factory default setup is 0.09 - 0.9 Mpa which fits most of the welding and cleaning needs.
Recommended welding air pressure data is 0.2 - 0.4 MPa
Recommended cleaning air pressure data is 0.5 - 0.9 MPa
Cutting: please ask tech support.

** For cutting, to achieve maximum air pressure, if needed to be more than 1 Mpa, please consult us before adjusting any air pressure window otherwise, the machine will sound an alarm and the data value on the barometer window will be all ****.

Lock On and Safety Clip

Lock On for Welding: This has to be **ON** all the time. The Safety Clip has to clip the object for security reasons and the laser will do the wobbling to operate normally.

Without Lock On and Safety Clip: the laser beam will swing for a few seconds and then stop wobbling, then shoot out a single laser beam line carry with maximum energy to mess up the object.

Barometer Window Display

If you have a barometer on the machine, the default setup is 0.09 - 0.9 MPa
Please do not change it. Air pressure too high will damage the machine;
too low means no shield gas for welding.

For Welding Properly to Work

Do we have to use Gas for Welding, Cutting or Cleaning?

1. Large and Long Time Cleaning: clean and dry air save money, no gas needed
2. Welding: Has to use 100% argon or nitrogen gas for better welding effect.
3. Cutting: You can cut with dry and clean air.

Wire Selections

Generally, the welding wire used for the laser machine is the same as the MIG welding machine. So please use solid wire, not the wire with flux core.

Stainless steel uses stainless steel welding wire.
Carbon steel uses carbon steel wire.
Aluminum alloy uses a 5 series aluminum-magnesium alloy welding wire. This type of welding wire is labeled 5xxx. This series of welding wires has high hardness which is more suitable for the wire feeder of the laser welding machine.

Welding wire diameters that can be used are 0.8 mm 1.0 mm 1.2 mm 1.6 mm. (1 mm = 0.0394 inch). The selection of the diameter of the welding wire is directly related to the thickness of the welding work-pieces and the desired welding effect.

For plates less than 1 mm, we recommend using 0.8 mm or not using welding wire.

For 1 mm-1.5 mm plates, we recommend using 0.8 mm welding wire
For 2.0 mm-2.5 mm plates, we recommend using 0.8-1.0 mm welding wire
For 3.0 mm-3.5 mm plates, we recommend using 1.0-1.2m welding wire
For 4.0 mm-4.5 mm plates, we recommend using 1.0-1.6m welding wire

Common Alarms

Laser alam: if temp lower than 23 degree. Wait and warm up till 23 degree, it will disappear
Temp xxx alarm: electromagnetic interference. Just shut down the machine, then turn on again.
Temp with number alarm: need to change protective lens

*** Statement and Fact***

The quick guide was written based on past customer problems and questions from all level users. From beginner to senior level, this guide will help you quickly set up and begin to use the laser machine. As machine models change every year, some information might be out of date; and some information might be wrong. Please use your best caution and reason ground. For any suggestions, please reach x@xinglaser.com

XING Laser 3 in 1 Handheld Laser Welder

Instruction Manual

www.xinglaser.com

Tech Support: Max

Email: x@xinglaser.com // Text: (407) 490-4032

1225 Bennett Dr # 148, Longwood, FL 32750

XING Laser, LLC

PREFACE

Thank you for choosing the XING Laser 3 in 1 handheld laser welding machine.
XING Laser adopts RAYCUS/Maxphotonics laser with excellent and stable performance.
XING Laser adopts water cooling system and is optimized in structural design and integration.
XING Laser can be widely used for welding operations on a variety of medium and thin metal materials, such as stainless steel, steel, iron, aluminum, alloy, titanium,etc.
XING Laser is equipped with intelligent wire feeder, which reduces the requirement of welding base material for weld width and makes the welding quality better.
The XING Laser 3 in 1 handheld laser welding machine integrates a rust removal function, which can be achieved by replacing only a few parts of the handheld welding head.
Please read this manual carefully before operating. It covers the details of proper installation, adjustment, maintenance and most importantly - safe operation of your new laser.
All persons involved in the installation, setup, operation, maintenance and repair of this machine should read and understand this manual, especially the safety instructions contained herein. Failure to understand and follow these instructions may result in substandard performance and life, property damage and personal injury.
Handheld laser welders work by emitting a powerful laser beam from a fiber laser source, sending that beam through a fiber optic cable, control the launch direction of the beam by a vibrating mirror, and focusing its energy through focus lens, and using that focused laser beam to melt the base material and welding wire.
If you have any questions after reading these manuals, please contact us and our support department will solve your problem as soon as possible.

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Chapter 1 Safety Precautions

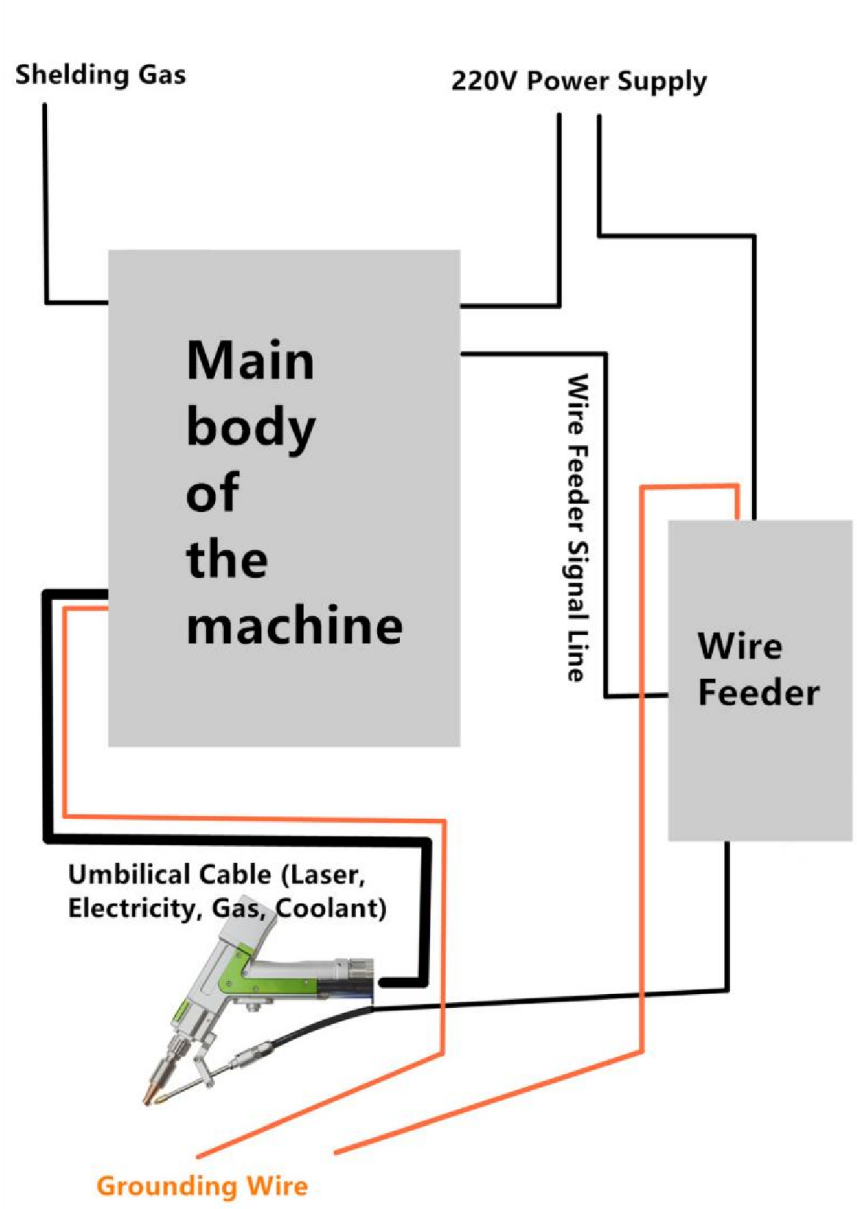
1. Before operating this machine, users must read this manual and related operation manuals carefully and strictly follow the operation procedures.
2. This welder uses a class 4 laser (strong laser radiation) and the laser radiation may cause the following accidents：
   - Ignite flammable materials around
   - Radiation and harmful gases may be generated due to different processing objects
   - Direct exposure to laser radiation can cause **terrible human injury.**

   Therefore, the place of operation of this machine must be equipped with fire-fighting equipment. It is strictly forbidden to pile flammable and explosive items around the work surface and equipment. The operation place should be well ventilated. Operators should be equipped with protective equipment when using it (include laser protective glasses/mask, dust masks and welding gloves)
3. Non-professional personnel are strictly prohibited to approach and operate the equipment
4. Processing objects and emissions should comply with the requirements of local laws and regulations.
5. Laser processing has risks, users should carefully examine whether the material is suitable for laser processing.
6. High pressure or other potential hazards exist inside the welding machine. Disassembly by non-manufacturer professionals or under the direction of non-professional personnel is strictly prohibited.
7. All power must be disconnected before the operator leaves.
8. It is strictly forbidden to open any housing cover while the welder and related equipment are working and energized.
9. The welding machine and related equipment must be safely grounded before operation.
10. In the event of abnormal conditions during the operation of the welding machine and related equipment, the operator must cut off all power sources and take appropriate measures.
11. **It is strictly forbidden to place any extraneous reflective objects in the laser to prevent the laser from reflecting onto the human body or flammable objects. When welding high reflectivity materials, such as aluminum alloy, copper, etc., the welding head gun must not be operated perpendicular to the surface of the workpiece, because the laser may reflect back into the welding head gun and burning more lenses, and even the lens in the laser generator.**
12. The operating and storage environment of the welding machine and related equipment should be dry and free from vibration, strong electricity, strong magnetic interference, etc. Storage temperature -15-55℃ (5-131℉). Operating temperature 5-35℃ (41-95℉). Humidity 5-85% (no condensation).
13. Before using the machine, the machine must be pre-filled with coolant (Pure water recommended)
14. If the machine needs to be transported long distances, the coolant must be drained from the machine. (Coolant shaking may broken the water tank)
15. When the welder is stored below 0℃(95℉), the coolant must be drained or replaced with

antifreeze coolant that will not solidify in the storage environment. (Please check the information about coolant choosing in the instruction manual)

16. The welder may cause electromagnetic interference to some nearby equipment.
17. The rated input voltage of the welding machine and related equipment is 220V. If a transformer is required, please make sure to use a transformer rated power higher than 4-5 times the peak power consumption.
18. Protective gas must be used. If protective gas is not used, heat will quickly build up in the welding head gun and burn out the lens.
19. The laser welding head is a precision instrument. It should be secured when placed or working and should not be dropped or bumped. (Some damping materials, such as rubber tape or sponge, can be wound around the body of the welding head gun to prevent accidental bumps) **More than 90% of damage to the internal components of laser guns is caused by drops and violent bumps.**
20. The manufacturer is not responsible for damages caused by improper use or violation of the above safety rules.

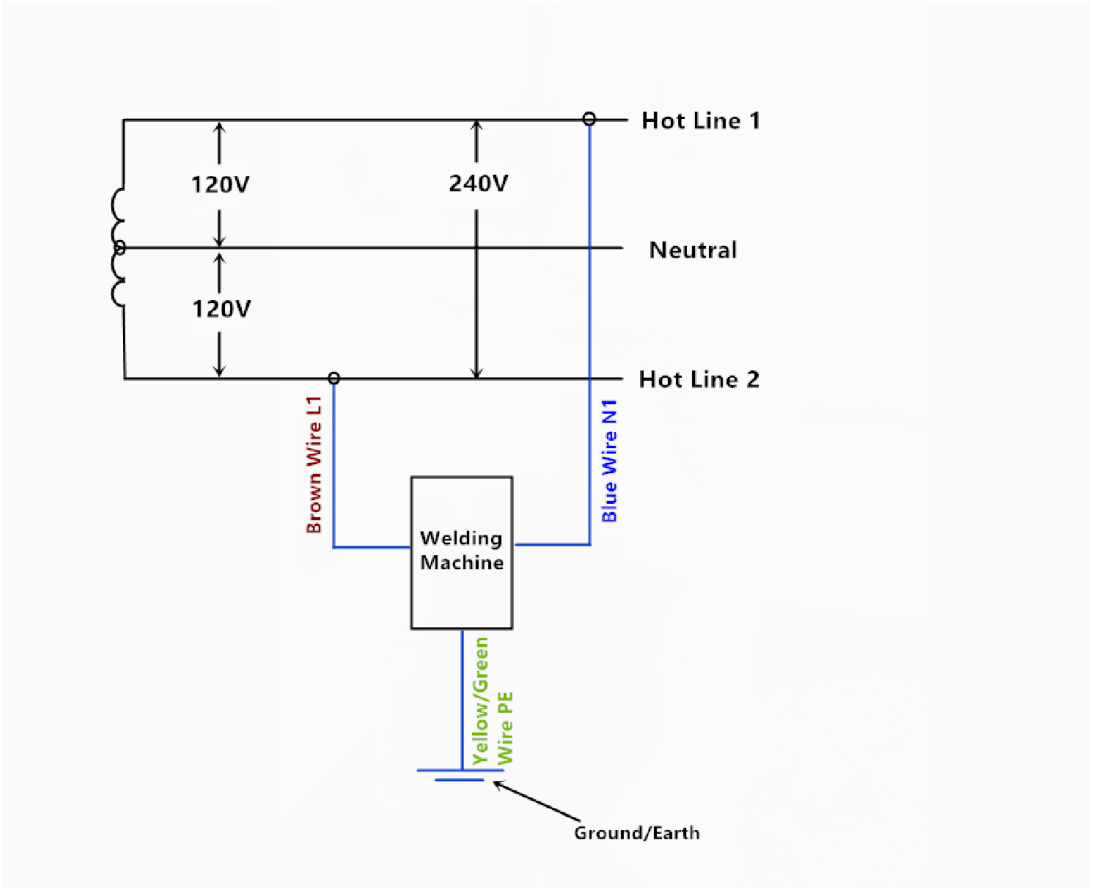
Chapter 2 Overview Of Connection Lines



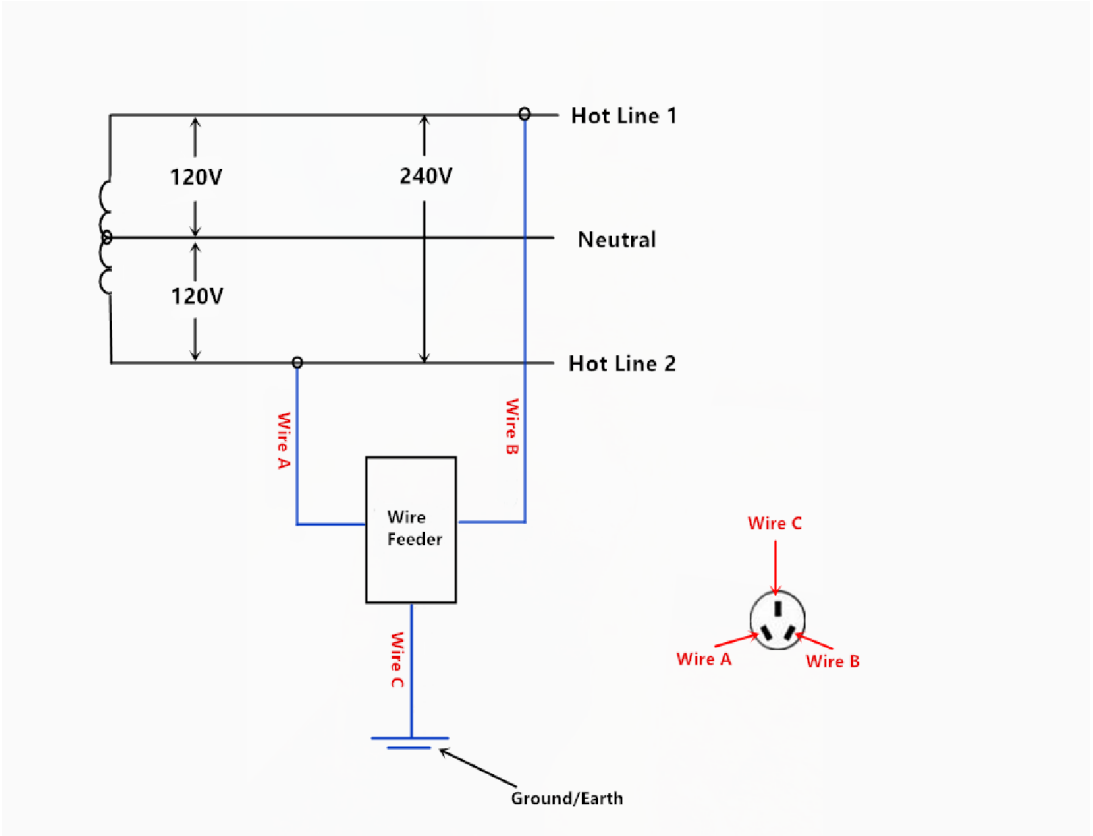
Note 1: Pure compressed air can be used as protective gas when cleaning.
If an air compressor is used to obtain compressed air, the compressed air must be sufficiently filtered.
The air should be dry ((pressure dew point between 0° C and 5° C)) and the oil residue ≤ 0.003 mg/m3 so that the lens and air pipeline will not be contaminated during use.

Note 2: The neutral wire does not need to be connected to the machine, and the machine must be grounded.

Picture below shows the wiring schematics for welding machine



Picture below shows the wiring schematics for wire feeder

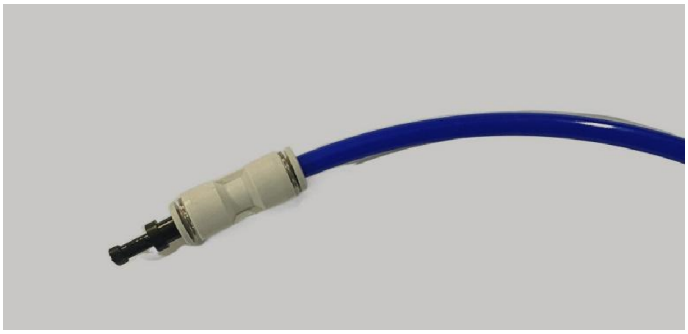


Picture below shows the power cable of wire feeder

Picture below shows the wire feeder signal line

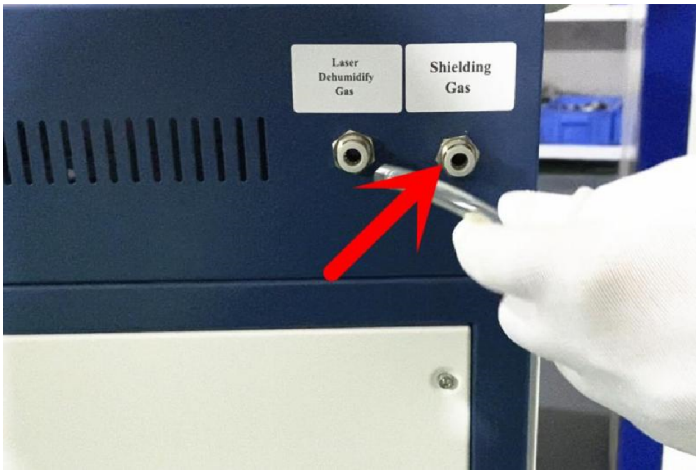
Picture below shows the Shielding Gas Tube（old version)

Shielding(protective) gas is input here

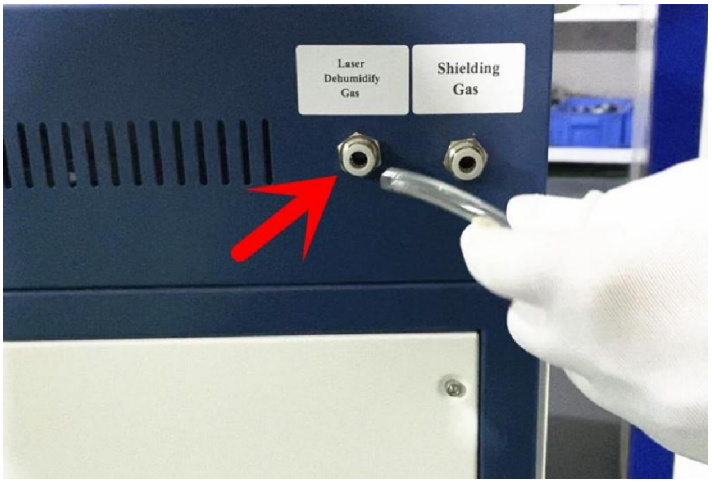


Picture below shows the protective Gas Input Plug Socket （new version)

Shielding(protective) gas is input here

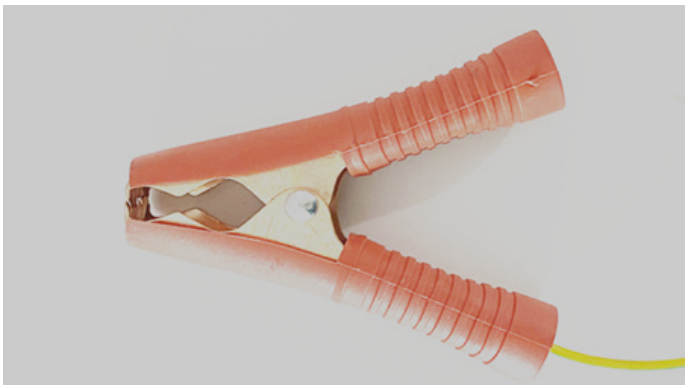


Picture below shows the Laser Dehumidify Input Plug （new version)



The new version machine has a dehumidifying function for the laser. In some humid environments, when the humidity inside the laser is too high, the laser will give an alarm and stop working to prevent internal condensation.
At this time, we need to input argon, nitrogen or dry compressed air from here. The laser alarm will be cleared quickly.
Normally, we can plug this socket with the supplied plug.

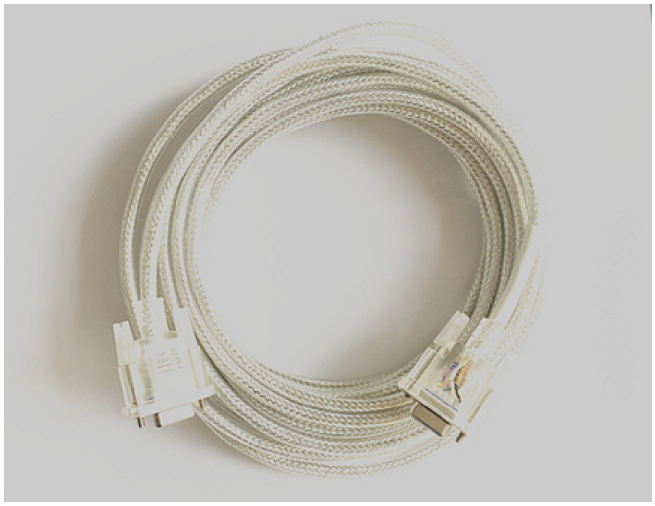
Picture below shows the Safty Clamp



The safety clamp is not directly connected to the ground wire, it is connected to a control box inside the machine. This control box is also connected to the welding head gun.
If we set the state to "Lock on", then the ground clamp-workpiece- welding head gun and the control box inside the machine need to form a complete circuit, and the welding head gun will be able to shoot laser when we press the button.
If we set the state to "Lock off", then in this case, the ground clamp loses its function, no matter whether it is connected to the workpiece, the welding head gun will shoot laser when we press the button (this is dangerous, because if the welding torch is not aimed at the workpiece, but accidentally at people or other objects, and we accidentally press the button of the welding torch, it may cause greater damage)

However, regardless of whether the status is "Lock on" or "Lock off", we should not point the welding head gun at people or other valuable items when the machine is powered on under any circumstances,Even the one in a million chance that we forget to turn off a switch, or that a switch in a machine is not fully closed, can cause immeasurable damage.
Just like a gun.

Picture below shows debug signal cable



The debug signal cable may be in different models and colors because of the different models of laser generators. Its function is to connect the laser generator to the computer.
When the laser generator fails, the laser generator needs to be connected to a software with the debug signal cable. This software will assist in debugging or detecting laser generator faults.
At that time, our after-sales service department will be required to assist.
Usually, the laser generator will not be broken, therefore we may not need to use it for a long time.

Chapter 3 Installation

1. Location Selection

Before installing laser welding, select a suitable location to use it. Make sure it meets all of the requirements discussed in the safety information above. The location should be stable, flat, dry and climate-controlled to ensure that the specified ambient temperature and humidity are obtained.

In addition, avoid exposure to potential additional heat from direct sunlight. The location should be free of dust and other airborne contaminants, well ventilated and sufficient to handle any fumes generated during the welding process, in compliance with all applicable laws and regulations.

Depending on the material to be handled, this may require the construction of a special ventilation system.

It should be away from children; combustible, flammable, explosive or corrosive materials; and sensitive EMI equipment.

Power lines should lead to a grounded, compatible and stable power source.

Firefighting equipment should be nearby and the local fire department's phone number should be clearly displayed.

It is highly recommended that an additional work bench be located nearby to avoid placing items on or directly adjacent to the machine, which could cause a fire or laser hazard.

2. Electrical grounding

This device uses a Class 4 laser. As discussed in the safety information above, it is extremely high voltage and potentially dangerous, so it must be safely grounded by the user. You must use a grounding cable and make sure it is properly connected. The resistance along the wire should be no greater than 5 Ω. Poor grounding may cause equipment failure and create a serious shock hazard.

3. Chiller

Note: (Very Important)

Avoid Condensation

In summer and high humidity areas, we need to be careful to avoid condensation.

Although fiber lasers can be used in harsh environments, condensation must be prevented in environments with high air temperatures and high humidity. Condensation may cause damage and failure of the electrical and optical components of the laser machine.

The operating air temperature for laser machines is 5-35℃ and, air humidity is 5%-85% . This is a very wide operating range.

We have another parameter, which is the machine temperature (approximating the water temperature setting of the chiller).

When the air humidity and the temperature is high, the water vapor in the air may condense into water droplets when it encounters the relatively cold machine components. We need to avoid

this.

The following are recommended chiller settings under different usage environments.

- When the ambient temperature is lower than 20℃, the ambient humidity should be lower than 85%. In this case, the low temperature water is set to 22℃, the [*normal temperature water temperature difference*] is set to 4℃. The normal temperature water corresponds set to 22 + 4 = 26℃
- In the ambient temperature between 20-35℃, the ambient humidity should be lower than 60%. In this case, the low temperature water is set to 26℃ and the [*normal temperature water temperature difference*] is set to 4℃. The normal temperature water corresponds set to 26+4=30℃

Coolant Choosing/Avoid Freezing

When the temperature is higher than 0℃, we should use deionized water or pure water as coolant. And the coolant should be replaced for the machine once a month.

When the temperature is below 0℃, the liquid water will condense into ice, which may "break" the pipes, joints and parts in the laser water cooling system. So we need to use antifreeze that will not condense.

Alcohol is readily available and the freezing point of an aqueous solution of 30% alcohol is around -15℃, so if the minimum temperature in the area where your machine is located is not below -10℃, then using a 30% alcohol solution is fine. (Please Note: aqueous solution of 30% alcohol is not flammable, but high concentrations of alcohol and pure alcohol are very flammable. When mixing alcohol solutions, it is important to pay attention to safety and not to debug alcohol in places where there is an open flame or where it is easy to produce an open flame. Do not mix alcohol solution in a confined space, because alcohol is very volatile, if the alcohol in the air reaches a certain level, after encountering an open flame, it is very likely to cause an explosion)

If the winter temperature in your area may be lower than -10℃, then the ethylene-glycol based antifreeze is the best solution.

Not all automotive antifreeze is suitable for laser machines. This is because some antifreezes are propylene-glycol based, which has a higher viscosity.

No antifreeze can completely replace deionized or pure water and cannot be used year round.

Then the temperature is higher than 0℃, the pipes need to be cleaned with deionized or purified water and reused as a coolant with deionized or purified water.

Please note:

If you need to store the machine in the environment below 0℃, please add antifreeze to the machine and let the machine run for a while before draining it. Because there are places inside the machine where the antifreeze can not be drained completely, it may still freeze.

Setting: (Usually, we don't need to make changes to the chiller settings)

Operating system A

Operating system B

Note:

<Depending on the production batch, the appearance style may vary, the functional logic is the same>

Low temperature water is used for cooling the laser generator.

High temperature water is used for cooling the welding head gun.

The chiller will alarm if the low temperature water is lower than 2 ℃ or higher than 35 ℃ .

Digital tube	**Usage**
Display window	● Display measuring temperature (low temperature water L.xx.x /normal-temperature water H.xx.x). The measuring unit is ℃. ● Setting temperature display (low temperature water L.xx.x /normal-temperature water difference d.xx.x). The measuring unit is ℃. ● Alarm code (Exx). ● Parameter code (Fxx).
Indicator light	**Usage**
Compressor (Cooling)	Light on：compressor works； Flicker：there is a demand for refrigeration

	Light off：compressor is off.
Low temperature water heating (Heating1)	Light on：low temperature water heating works； Light off：low temperature
Normal temperature water heating (Heating2）	Light on：normal temperature water heating works； Light off：normal temperature water heating is off.
（Alarm）	Flicker：there is an alarm Light off：no alarm
Keys	**Usage**
(On/Off)	Press <On/Off> to return, or press the < On/Off > key for 3 seconds to power On or Off
(Set)	In non-fault state, press <Set> key to enter/exit setting temperature, or press <Set> key to confirm the value already set
(▲) (▼)	Modify parameter values during parameter setting.

Parameter setting of Operating system A

- In the non-fault state, press <Set> key to enter the *low temperature water* temperature setting interface， press <▲> or <▼> to change the value. After setting, press <Set> to save the setting value and press <on/off> to exit the setting status. If there is no key operation for 5 seconds after the setting is completed, the system will automatically save the set value and exit the setting state.
- *Normal temperature water* temperature can not be set directly, normal temperature water temperature = [*low temperature water* set temperature] + [F01 *normal temperature water temperature difference*].
- Modify the factory parameter [F01 *normal temperature water temperature difference*]. In the temperature display interface, press the <▲>+<▼> keys at the same time for 5s to enter the factory parameter setting state. The factory setting parameters are generally not adjusted except F01. If you need to adjust, please contact us in advance. In the process of selecting manufacturer parameters, press <▲> or <▼> to select parameter items, and exit manufacturer parameter setting after 15s without key operation (display window displays parameter items). Press <Set> key to enter parameter setting, you can use <▲> or <▼> to modify the parameter value. After setting, press <Set> to save the setting value and press <on/off> key to exit the setting status. If there is no key operation for 5 seconds or longer after the setting is completed, the system will automatically save the set value and exit the setting state.

Parameter setting of Operating system B

- In the non-fault state, press <Set> key to enter the *low temperature water* temperature setting interface， press <▲> or <▼> to change the value. After setting, press <Set> to save the setting value and press <on/off> to exit the setting status. If there is no key operation for 5 seconds after the setting is completed, the system will automatically save the set value

and exit the setting state.

- *Normal temperature water* temperature can not be set directly, normal temperature water temperature = [*low temperature water* set temperature] + [F04 *normal temperature water temperature difference*].
- Modify the factory parameter [F04 *normal temperature water temperature difference*]. In the temperature display interface, press the <▲>+<▼> keys at the same time for 5s to enter the factory parameter setting state. The factory setting parameters are generally not adjusted except F04. If you need to adjust, please contact us in advance. In the process of selecting manufacturer parameters, press <▲> or <▼> to select parameter items, and exit manufacturer parameter setting after 15s without key operation (display window displays parameter items). Press <Set> key to enter parameter setting, you can use <▲> or <▼> to modify the parameter value. After setting, press <Set> to save the setting value and press <on/off> key to exit the setting status. If there is no key operation for 15 seconds after the setting is completed, the system will automatically save the set value and exit the setting state.

4. Air pressure gauge Setting

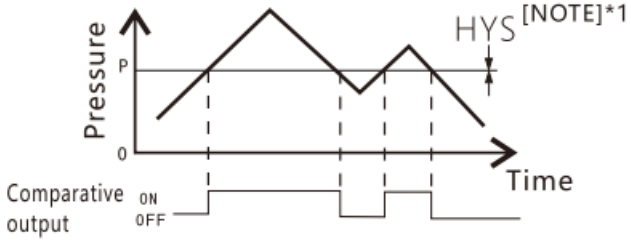
The air pressure gauge is set. The screen displays the current shielding gas pressure value.
When the protective gas pressure is lower than 0.08MPa or higher than 0.9Mpa, alarm will be issued and the machine will stop working.
Customers can adjust the alarm pressure value according to actual needs.

- ***The Output mode***

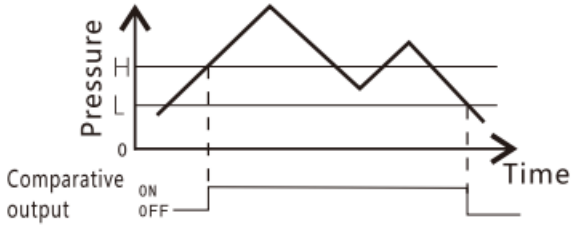
We are using the Window Comparator mode now.

The EASY mode, hysteresis mode or window comparator mode can be selected as the output mode for comparative output 1 and comparative output 2.
Please refer to <I.NORMAL mode> for details.

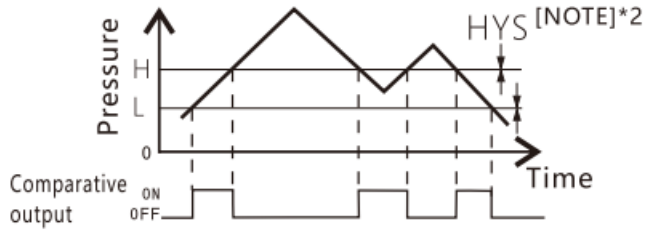
EASY mode



Hysteresis mode



Window comparator mode



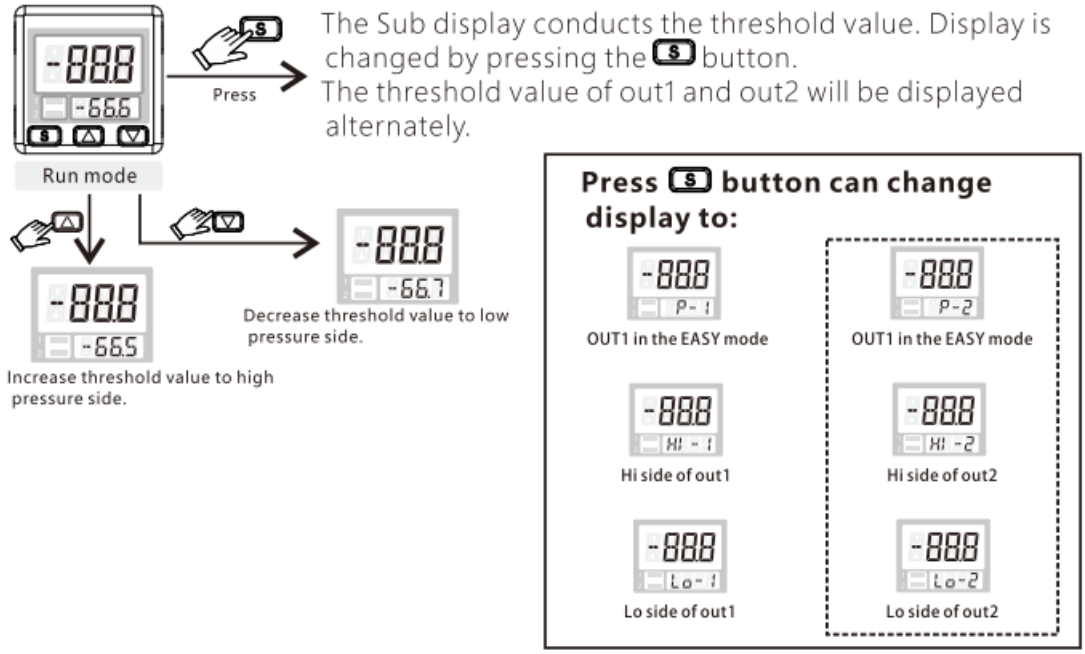
【NOTE】

*1. In the EASY mode, P-1 P-2 is displayed on the sub-display, HI-1 HI-2 Lo-1 Lo-2 is displayed in the other mode.

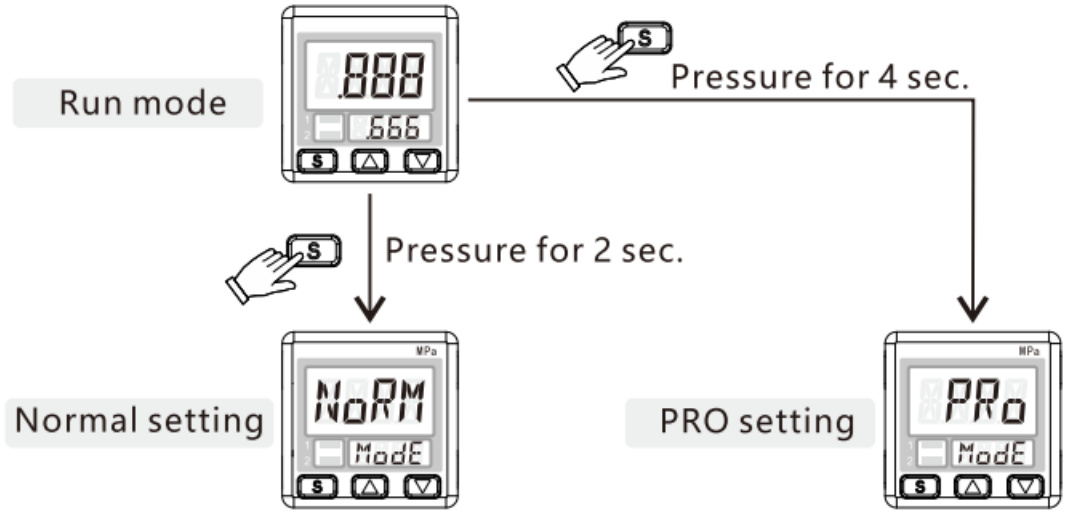
*2.Please refer to <Hysteresis fixed value selection> in<PRO setting> for setting.

In this mode, the ON or OFF state of the comparative output is controlled with a pressure in the set range.

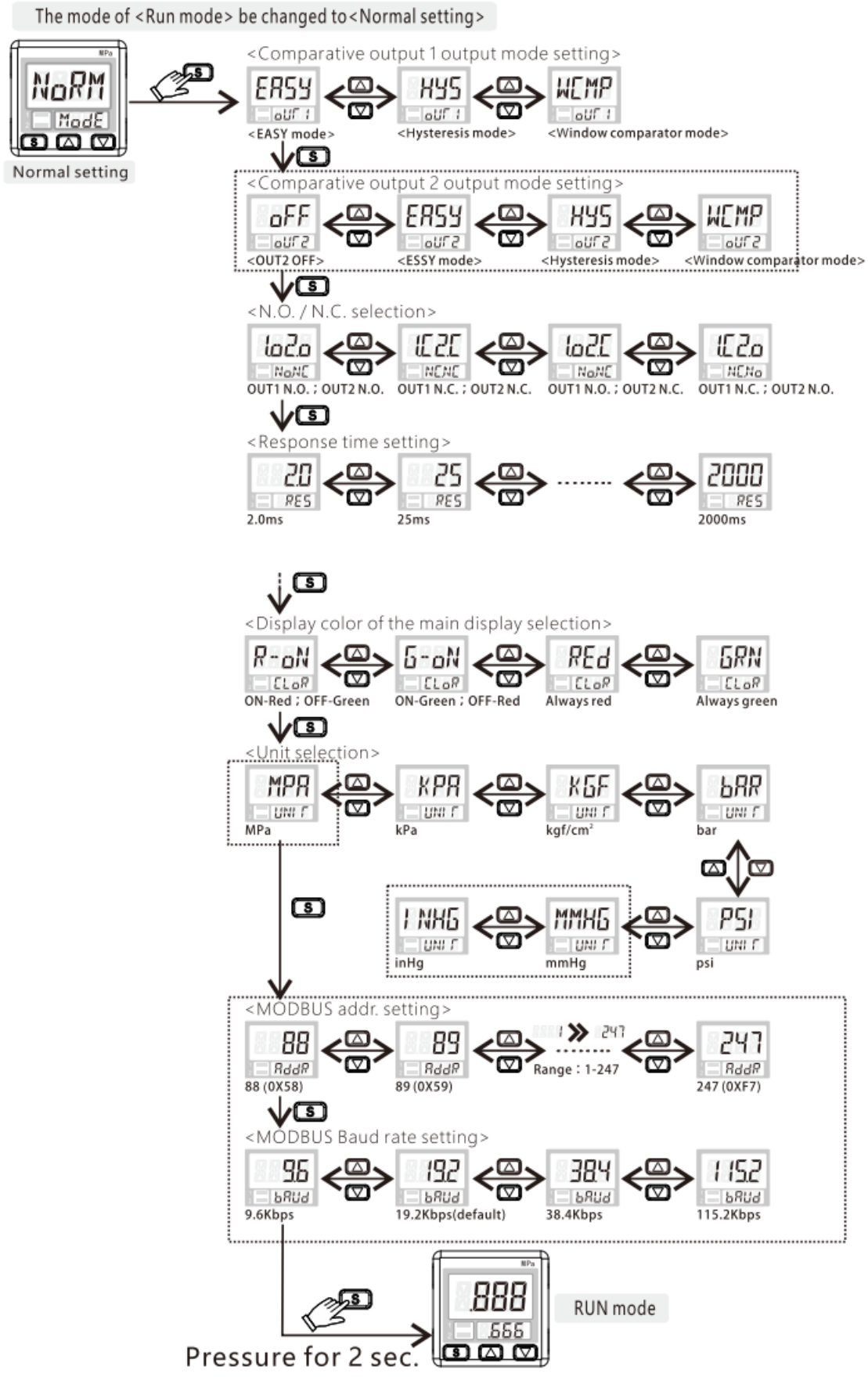
- ***The running mode (default display mode)***



- ***The menue setting mode***



- ***The Normal setting***


The mode of <Run mode> be changed to<Normal setting>
NoRM
Mode
Normal setting
<Comparative output 1 output mode setting>
EASY
HYS
WCMP
oUt 1
<EASY mode>
<Hysteresis mode>
<Window comparator mode>
<Comparative output 2 output mode setting>
oFF
EASY
HYS
WCMP
oUt2
<OUT2 OFF>
<ESSY mode>
<Hysteresis mode>
<Window comparator mode>
<N.O. / N.C. selection>
NoNC
NCNC
NoNC
NCNo
OUT1 N.O. ; OUT2 N.O.
OUT1 N.C. ; OUT2 N.C.
OUT1 N.O. ; OUT2 N.C.
OUT1 N.C. ; OUT2 N.O.
<Response time setting>
20
25
2000
RES
2.0ms
25ms
2000ms
<Display color of the main display selection>
R-oN
G-oN
REd
GRN
CLoR
ON-Red ; OFF-Green
ON-Green ; OFF-Red
Always red
Always green
<Unit selection>
MPA
KPA
KGF
bAR
UNIT
MPa
kPa
kgf/cm²
bar
INHG
MMHG
PSI
inHg
mmHg
psi
<MODBUS addr. setting>
88
89
247
AddR
88 (0X58)
89 (0X59)
Range : 1-247
247 (0XF7)
<MODBUS Baud rate setting>
9.6
19.2
38.4
115.2
bAUd
9.6Kbps
19.2Kbps(default)
38.4Kbps
115.2Kbps
Pressure for 2 sec.
888
666
RUN mode

- ***The PRO setting***

We don't use the PRO setting on this machine, if you enter it by mistake, please press and hold the <S> key for 4 seconds to exit.

Chapter 4 Parameters Form

Models	LM-1000W/LM-1500W/LM-2000W
Laser Output Power	1000W/1500W/2000W
Laser Wavelength	1080±5 nm
Umbilical Cable	From Base Unit to Head : 9 m (27 ft) The minimum bending radius of the Fiber optic cable should not be less than 20 cm*
Welding Speed	0 - 40 mm/s
Cooling system	Water Cooling
Operating Environment	Storage temperature 5-131 ℉/ -15-55 ℃ Operating temperature 45-95 ℉ / 5-35 ℃ Humidity 5-85% (no condensation)
Welding Head Gun	Handheld Wobble Welding Gun Weight 1.6 lb User-changeable nozzles
Wobble Length	Spot adjustment range 0.2～5mm Recommended Welding Gap Width 0～2.0mm
Cleaning Scan Width	10-80 mm
Fiber interface	QBH
Shielding Gas	Argon, Nitrogen, and other shielding gases used for welding PS: Pure compressed air could be used for cleaning function. If an air compressor is used to obtain compressed air, the compressor must have drying and purification capability, produce compressed air with Oil Stains residues ≤ 0.003 mg/m3 and be sufficiently dry (pressure dew point between 0 ℃ - 5 ℃) to ensure that no condensation mist is generated on the lens during use.
Working Pressure	Welding: 0.2-0.4 MPa Cleaning/: 0.5-0.9 MPa Cutting: 0.5-0.9 MPa
Power In & Consumption	1500W: ≤7.5KW 2000W: ≤9.0KW
Welding Wire	1.0-1.5 mm parent material - 0.8mm diameter welding wire 2.0-2.5 mm parent material - 0.8-1.0mm diameter welding wire 3.0-3.5 mm parent material - 0.8-1.2mm diameter welding wire 4.0-5.0 mm parent material - 0.8-1.6mm diameter welding wire Welding Wire Weight ≤ 25kg
Coolant	Pure Water, Professional Anti-freeze Coolant
Safety	Class 4 Laser Device. Customer responsible for standard ANSI Z136.1 safety precautions.

Facilities Requirements	Electrical: 220 V, 1 Ph, 60 Hz

Chapter 5 Accessory List

Protective Lens D20-T2 x5 (10 more protective lenses are additional complimentary items)
Cleaning Function Protective Cover x1
Cleaning Funtion Focus Component F600 （Lens included) x1
Welding Head Gun Nozzles x5 (2 more Head Nozzles are additional complimentary items)
Wire Feeding Head Pipe x1
Wire Feeding Pipe Head Nozzles x4
Laser Safety Glasses x1
Shielding Gas Pipe x1
Wire Feeding Roller x2 (There are four feeding wheels, two of which are mounted on the wire feeder)
Wire Feeder Power cable x1
Wire Feeder Signal Cable x1

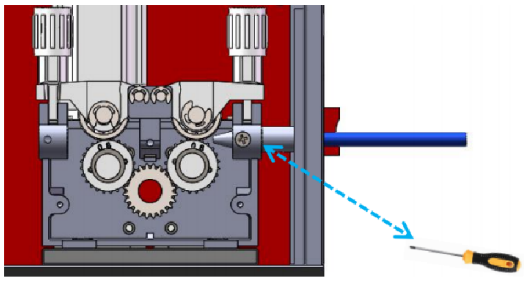
Chapter 6 Wire Feeder Installation

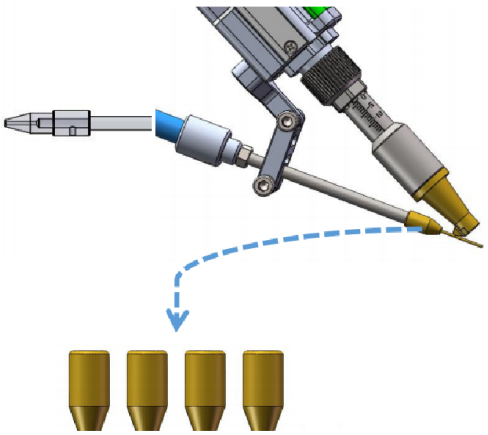
1. Electrical installation

- Plug in the power cord three-prong plug to provide 200V-240V power for the wire feeder.
- Plug in the signal control cable four-prong plug to connect the welding system and the wire feeder

2. Installation of wire feeding pipe and head nozzles

- Align the wire feeding pipe with the wire outlet, insert it, and fasten it with screws.

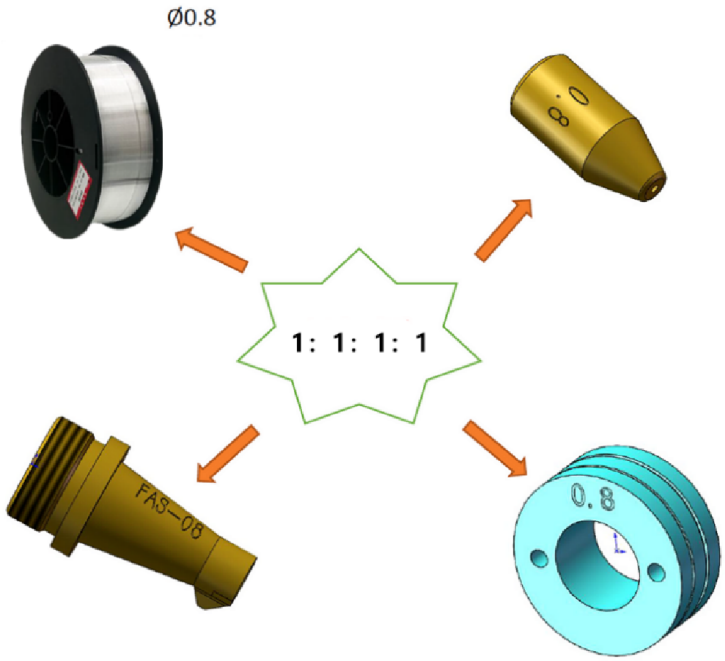




0.8 / 1.0 /1.2/ 1.6

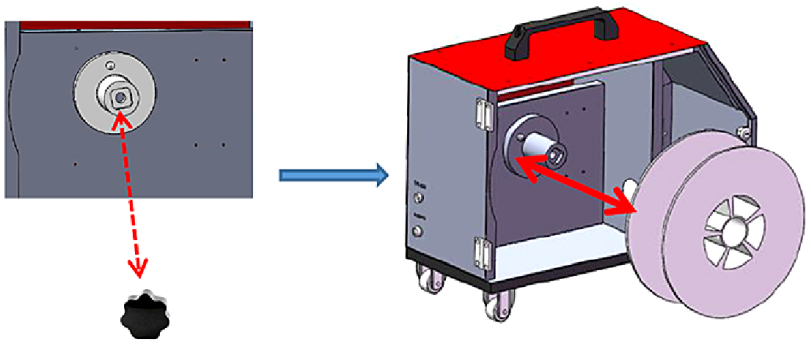
- The size of the wire feeding pipe head nozzle is selected according to the diameter of the welding wire selected.

- The < diameter of the welding wire><wire feeding roller groove>< wire feeding pipe head nozzle><welding head gun nozzle> should be kept exactly the same size, in accordance with 1:1:1:1.



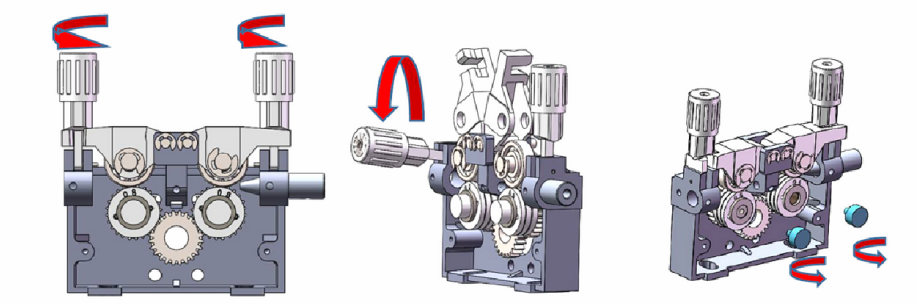
3. Installation of the welding wire reel

- Step 1, loosen the screw cap of the welding wire reel fixing shaft by rotating it counterclockwise.
- Step 2, install the welding wire reel. When installing, pay attention to the direction of the welding wire, the wire feeder spits out wire when the wire reel rotates counterclockwise.
- Step 3, lock the welding wire reel with the screw cap.

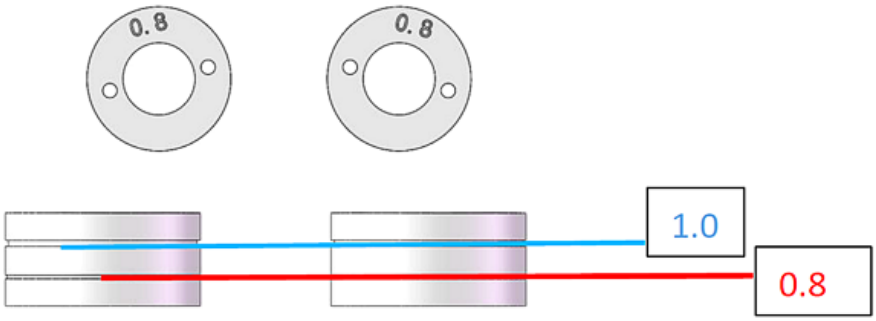


4. Installation of the wire feeding rollers

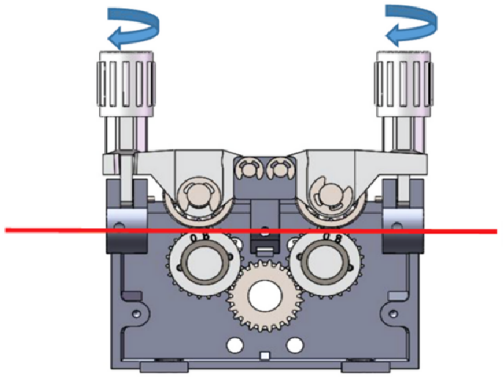
- Rotate to loosen two pressing handles, swing forward 90 ° down to loosen, rotate to loosen the nuts of the Wire Feeding Rollers, then the Wire Feeding Rollers could be taken out. As shown in the figure below:



- Each set has 2 same Wire Feeding Rollers, there are two grooves on each Wire Feeding Roller. Grooves of the same size should be installed on the same level. As shown in the figure below:

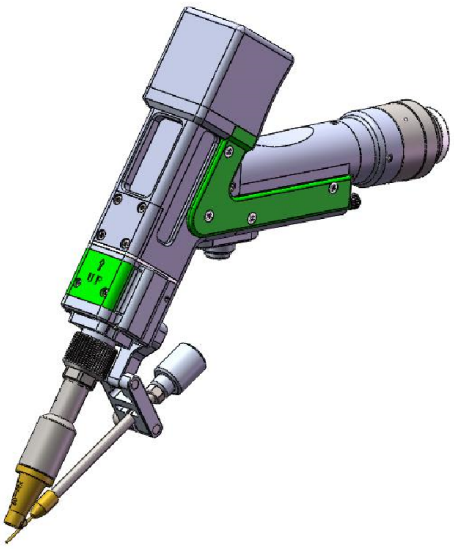


- By rotating the pressing handles, the welding wire fits closely to the groove of the Wire Feeding Rollers, create the proper friction for smooth wire feeding.

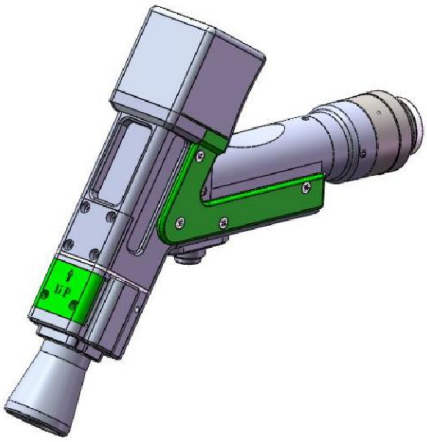


Chapter 7 Welding Head Gun Structure

1. Welder mode and clean Mode

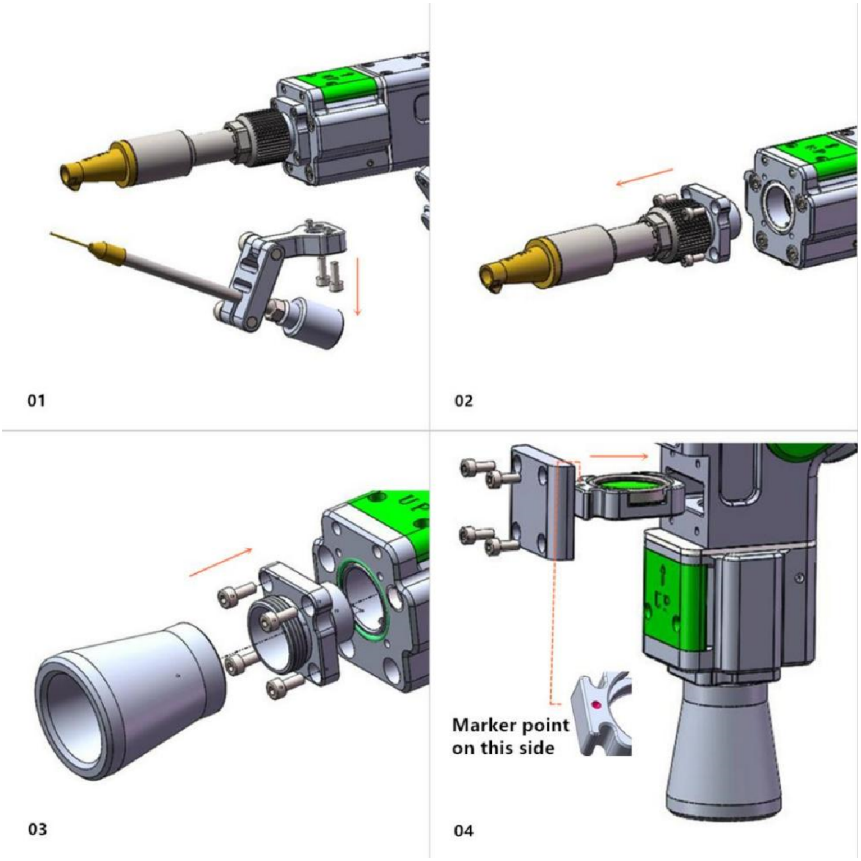


Welder Mode



Clean Mode

2. Switching between clean mode and weld mode **(System setting need to be switched synchronously)**

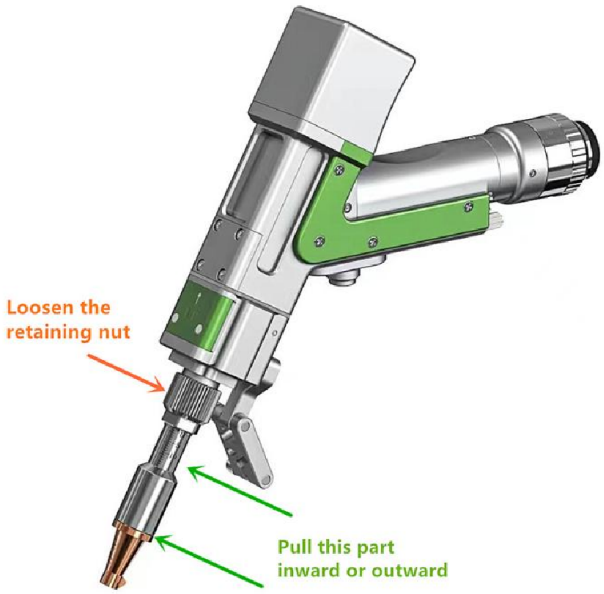


3. Welding head focusing

The laser beam shoots out from the welding head gun nozzle is a beam with a focal point. Focusing is done so that the focal point of the laser beam, when welding/working, is as close to the surface of the object being processed as possible to produce the highest utility. The adjustment method is as follows:

- Set Laser power 300-500 W, Laser freq at 5-10 Hz, Laser duty at 1%

- Tilt the welding head gun to the surface of the welded product, the same distance from the product surface as in normal welding. Press the working button on the weld head gun, this is to see the laser hit the product surface to produce sparks.



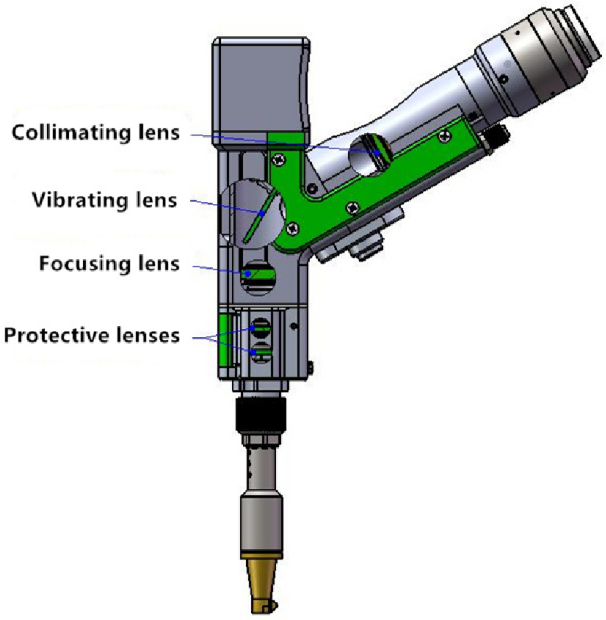
- Loosen the retaining nut and pull the nozzle fixing barrel inward or outward so that when the laser sparks are strongest on the product surface, the focus is closest to the surface of the welded product. Then tighten the retaining nut of the nozzle fixing barrel. The focus adjustment is complete. Note：

① When adjusting the focus, turn off the shielding gas to prevent affecting the observation.

② If the welding head gun is aimed vertically at the surface of the welded object, the small particles bursting out when welding may damage the protective lens, so please tilt the welding head gun to the surface of the welded product whether during focusing or welding.

4. Lens replacement

Please contact customer service for more instructions on how to replace the Vibrating lens and Collimating lens.

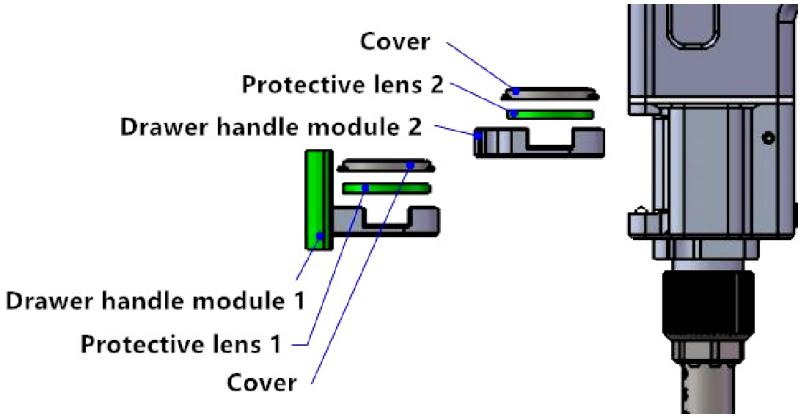


- At the front of the welding head gun, there are two identical protective lens D20-T2. Their function is to prevent the particles bursting out when welding from damaging the focusing lens, and they are low-cost wear and tear items. If the protective lens are damaged, they should be replaced immediately. The instruction of replace protective lens:

  ① Pull out the green drawer handle module 1, rotate the cover by gently pressing it down, release it when the lugs are in line with the slot, remove the cover and replace protective lens 01.

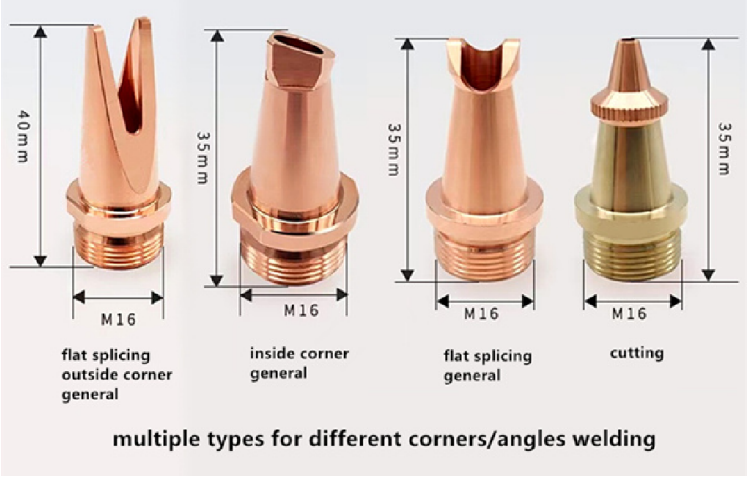
  ② After pulling out the green drawer handle module 1, pull out the drawer handle module 2, and replace protective lens 02 in the same way.

  ③ Protective lens 01 and protective lens 02 are the same lens, only replace one (both) of them when damaged.



④ Here is a picture of a damaged protective lens.

5. Welding head gun nozzles



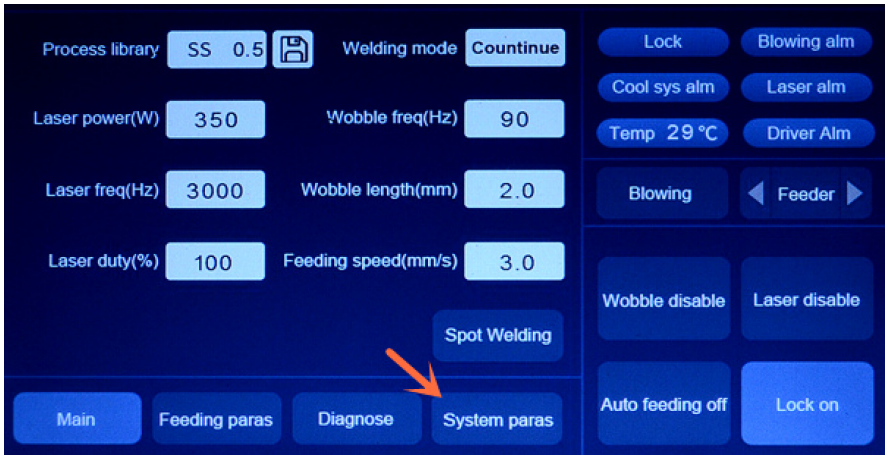
Chapter 8 System Setup

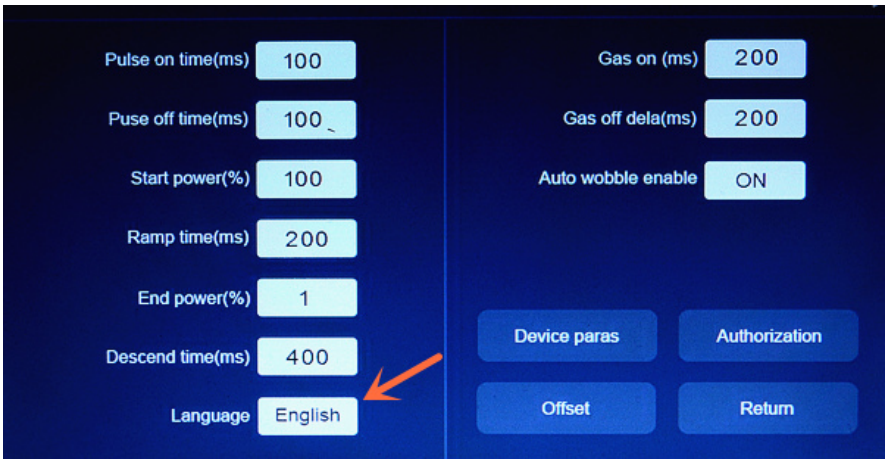
❖ Welding

1. Language Settings

Each machine is field tested before it is shipped. If the operating system is not in the language you need, you can set the system to English by following these steps Example.

1. Click "System paras" or button in other language in the same positon.
2. Click Language select box, select the language you want.





2. Status area

<Bluetooth logo>: To show whether this device is connected with bluetooth.
<Lock>: Status of the safety lock. Red flashing when the setting is <Lock on> but the **Safty Clamp** is not connected to the welding head gun (directly or via conductors)
<Blowing alm>: Red flashing when shieling gas low pressure.
<Cool sys alm>: Red flashing when cooling system abnormalities.
<laser alm>: Red flashing when laser system abnormalities.
<Temp *>: Real-time temperature inside the welding head gun, red flashing when the temperature too high or too low. At the same time the green light on the welding head gun will change to red color.
<Driver alm>: Red flashing when abnormalities in vibrating lens.

3. Function Setting

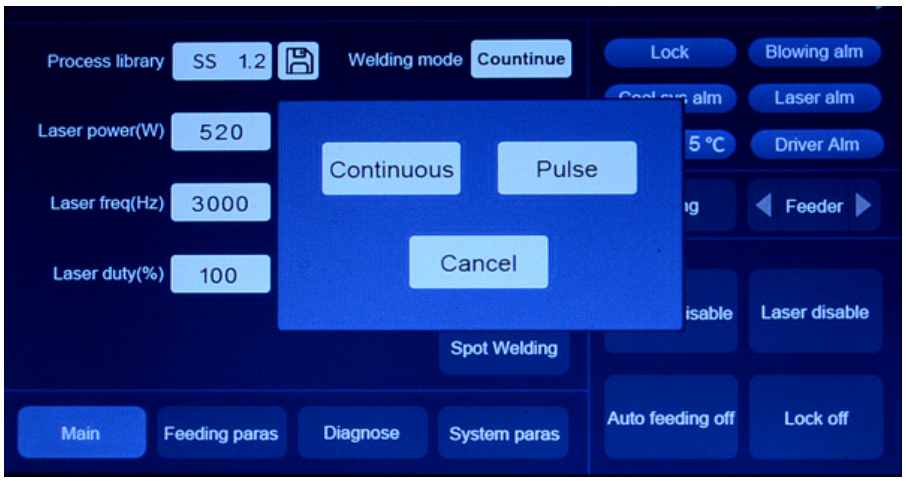
<Blowing>: Press this button, shielding gas will squirt out from the welding head gun manually.
<Feeder>: Press the triangle on the left, welding wire will retracted inside. Press the triangle on the right, welding wire will feed outside.
<Wobble disable>/<Wobble enable>: The button turns the oscillating mirror motor on and off. Generally set to wobble enable when welding.
<Laser disable>/<Laser enable>: This button allows or disables the laser from the welding head gun.
<Auto feeding off>/<Auto feeding on>: This button controls whether or not automatic wire feeding is performed during welding. Generally set Auto feeding on when welding if we use the wire feeder.
<Lock off>/<Lock on>: This is the safety lock switch button. When **Lock on**, the laser will stop when the welding head gun is not connected to the **Safty Clamp** (directly or via conductors)

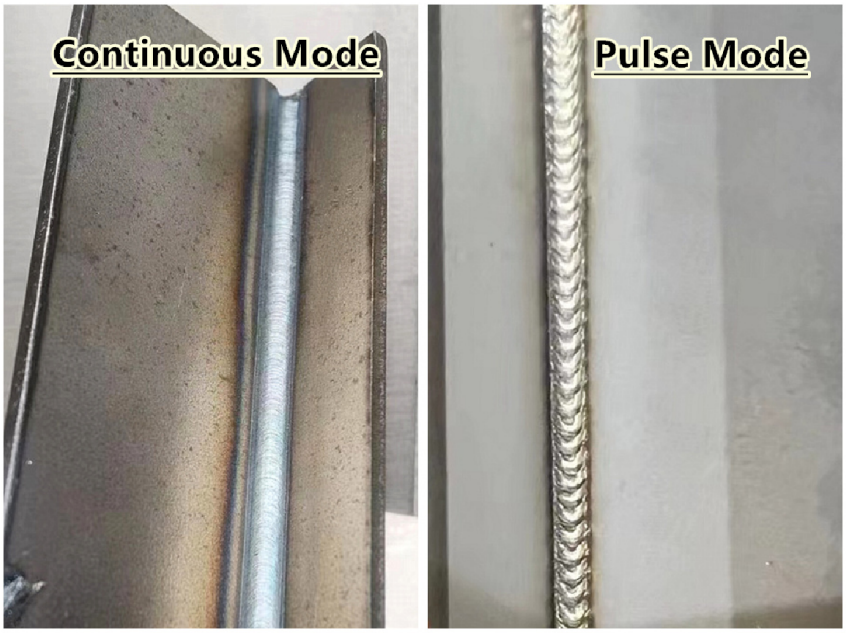
4. Parameter Setting

Parameter Setting is one of the most influential factors on welding results, We may need to do a lot of tests and adjustments to make the machine parameters perfectly match our welding materials and working environment.
<Main> : Used to set parameters related to laser and process library during welding.

- **<Process library>** The process library comes with suggestions for setting parameters for different materials and thicknesses of the weld material. Please note: **We are not obliged to work with the parameters that come with the process library, we can also edit the process library to suit our needs.**

- **<Welding Mode>** There are two welding mode, Continuous and Pulse.





- **<Laser power>** Output power when welding. (It is the laser power when we set the laser duty at 100%)
- **<Laser freq>** Set the frequency of the simulated pulses of the laser. When the laser duty cycle is 100%, this setting will not change the laser output effect. Because the laser is emitted continuously.
- **<Laser duty>** The percetage of the laser firing time of each simulated pulse (i.e. the sum of laser on time and laser off time).
- **<Wobble freq>** Wobble frequency of laser beam, wobble freq effect Melting depth, and Porosity.
- **<Wobble lenght>** Oscillation of laser beam. (Set it to 0.1mm when using the cutting function)
- **<Feeding speed>** Welding wire feeding speed.
- **<Spot welding>** Click to enter spot welding laser output mode.
- **<Pulse time>** Laser output time for every “spot” welding under the Spot welding mode.

If you are new to laser welding machine, you can set the Parameters of **Laser power,Laser freq,Laser duty,Wobble freq,Wobble lenght,Pulse time** at very low value, and increase the those values gradually, then you will have more intuitive feelings about those parameters.

<Feeding paras> Used to set parameters related to welding wire feeding

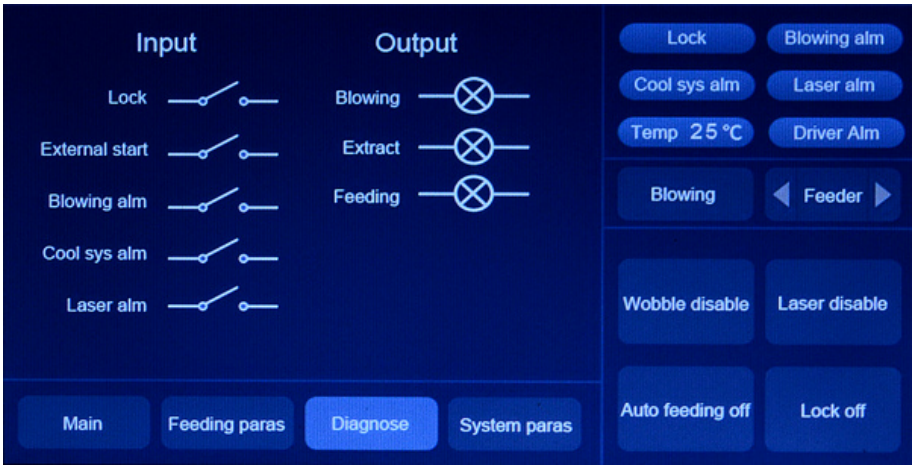
- **<First Extracting Time>** Time to retract the welding wire (after releasing the switch button).
- **<First Extracting Speed>** Speed to retract the welding wire.
- **<Second Feeding Time>** Time to supplement the welding wire (after releasing the switch button).
- **<Second Feeding Speed>** Speed to supplement the welding wire.

Notes:

After releasing the switch button of the welding head gun, the wire feeder will retract the welding wire for a short time and send it out again to realize the separation of the welding wire from the molten pool. We can gradually adjust these parameters according to our usage habits.

- **<Feeding Delay Time>** Time delay after the laser beam comes out before feeding the wire, usually set at 0.
- **<Continue Feed>** Click to make the wire feeder keep feeding the wire
- **<Continue Extract>** Click to make the wire feeder keep retracting the wire

<Diagnose> To monitor the current IO status of the system.



<System Paras>

- **<Pulse on time>** Under the pulse welding mode, laser output time in every cycle.
- **<Pulse off time>**Under the pulse welding mode, laser shut time in every cycle.

- **<Start power>** Set the starting power of the laser as a percentage of the current **Laser power**.
- **<Ramp time>** The time of the laser from **Start power** to the current **Laser power.**
- **<End power>**Set the ending power of the laser as a percentage of the current **Laser power**.
- **<Descend time>** The time of the laser from current **Laser power** to **<End power>**
- **<Gas on>** The time of blowing the shielding gas before the laser output
- **<Gas off dele>** The time of blowing the shelding gas after the laser shut.
- **<Auto wobble enable>** Wabble enable

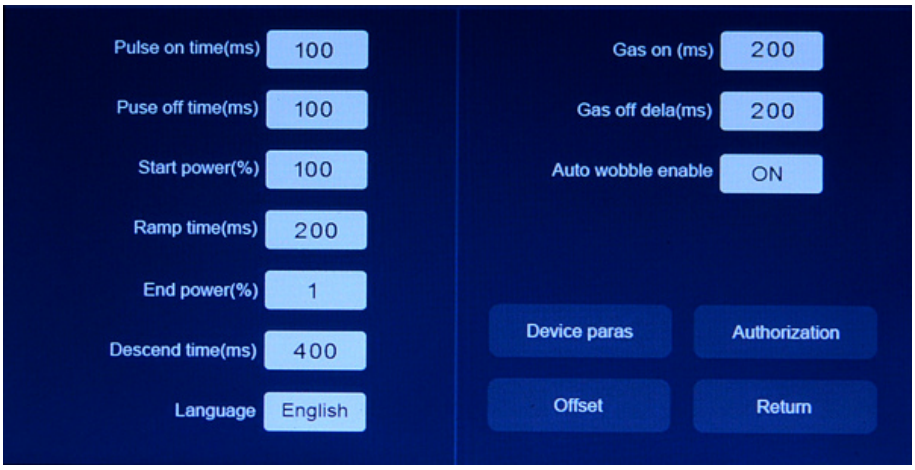
<Offset>

Setting of the offset in middle of red light.

<Authorization>

For authorization management of the mainboard. The mainboard already be activate on the hardware by supplier. **User do not need to input any secret key here**.

This interface is for time setting and working mode changing.

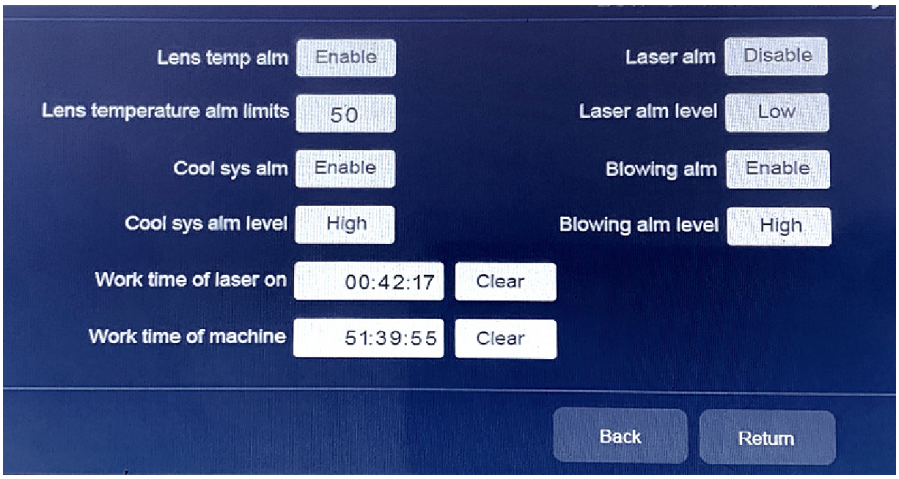


<Device Paras> PIN is **666888.**

It is used to set the basic parameters of the device and is generally configured by the manufacturer.We do not recommend the user to modify any of those parameters.

- **<Advanced>** is for setting the Max.wobble length and Feeder type. It shouldn't be changed without confirm with our technical services. PIN is **260666**

- **<Laser Rated Power>:** The maximum power value of the laser generator, this value matches the laser generator. Do not adjust it.
- **<Max.Laser freg>:** The limit of **Laser freg** in Parameter Setting, this value matches the cleaning head gun, do not adjust it without communicating with the technical customer service.
- **<Max.Laser angle>:** This value matches the welding head gun, do not adjust it without communicating with the technical customer service.
- **<Max.wobble lenght>:** This value matches the welding head gun, do not adjust it without communicating with the technical customer service.
- **<Feeding step length>:** This value matches the wire feeder, do not adjust it without communicating with the technical customer service.
- **<Feeding direction>:** This value matches the wire feeder, do not adjust it without communicating with the technical customer service.
- **<X callbration factor>:** This value matches the welding head gun, do not adjust it without communicating with the technical customer service.
- **<Feeder type>:** This value matches the wire feeder, do not adjust it without communicating with the technical customer service.



- **<Lens temp alm>** Please set this to **Enable**, then when the temperature of the protective lens is higher than the value of **<Lens temperature alm limits>**, the system will alarm.
- **<Cool sys alm>** Please set this to **Enable**, then when the chiller sends an alarm signal, the system will alarm.
- **<Cool sys alm level>** Set this to high if the **<Cool sys alm>** is Enable
- **<Laser alm>**Please set this to **Enable**, then when the laser generator sends an alarm signal, the system will alarm.
- **<Laser alm level>** Set this to Low
- **<Blowing alm>** Please set this to **Enable**, then When the protective gas pressure is not sufficient, the system will alarm.
- **<Blowing alm level>** Please set this to high

Alarm Logic

- The chiller will alarm when the coolant is lower than 2° C or higher than 35° C. And heating or cooling the coolant at the same time.

- The laser generator will alarm and not working if the coolant is lower than 20 °C or higher than 32°C this is the laser generator's self-protection mechanism. If the laser generator alarm because of the coolant temperature is too low or too high, we need to turn off the laser, after the temperature is heated to 20 °C or cooled to 31 °C. Then turn on the laser generator, it will stop the alarm.
- The chiller will also alarm if it has other faults, please contact us for after-sales in this case.
- The laser generator will also alarm if it has other faults, please contact us for after-sales in this case.

5. Switch to clean mode **(Cleaning function components on the welding head gun need to be switched synchronously)**

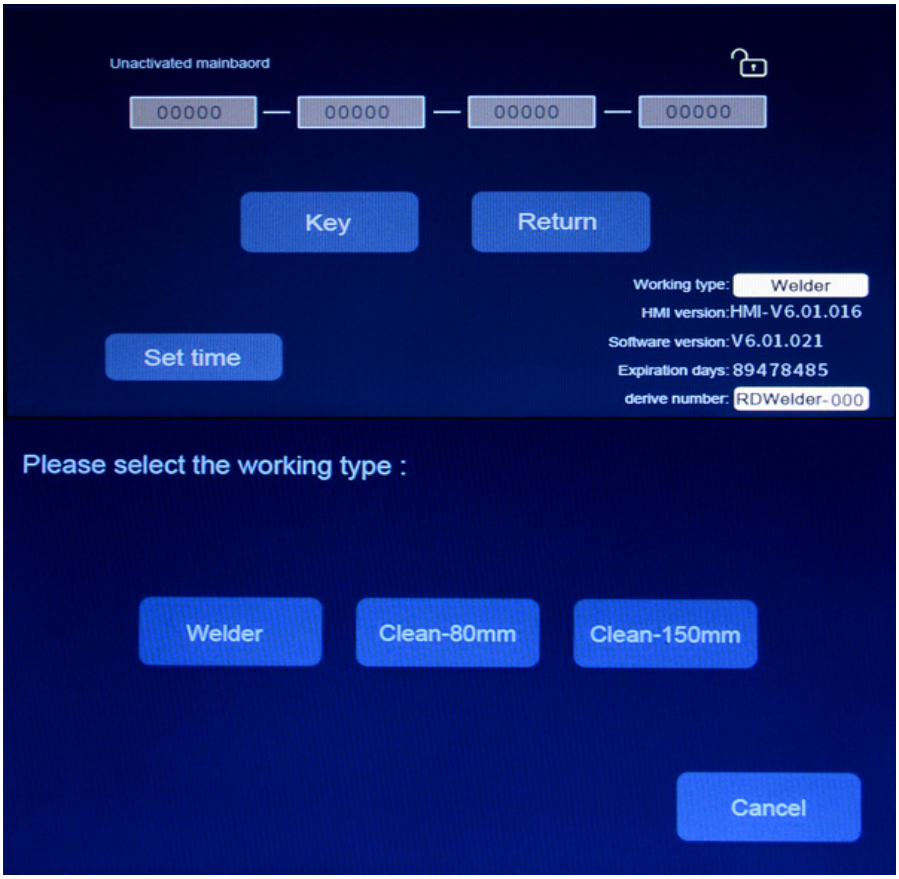
Click those buttons setp by step, PIN is **666666**:

<System Paras> ⟶ **<Authorization>** ⟶ **<Working type: Welder>**

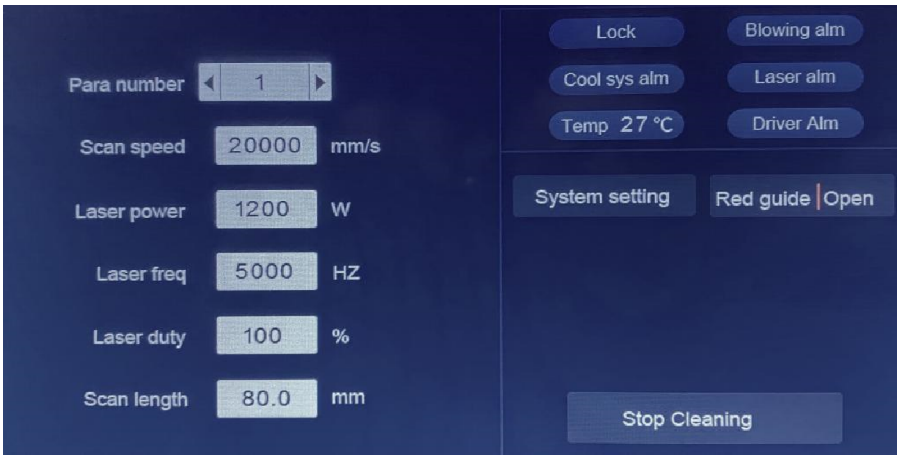
Select <clean-80mm>, Then <Confirm>.

When the note: “Power on again” appears on the screen, turn off the power of the machine, and then turn it on again. The machine will work under clean mode.

You can switch the clean mode back to welder mode by the same steps.



❖ Cleaning



1. Status area

- **<Bluetooth logo>**: To show whether this device is connected with bluetooth.
- **<Lock>**: Status of the safety lock. The safety lock Permission is not needed on the cleaning machine, so it is set to <OFF> in the <Systerm setting>
- **<Blowing alm>**: Red flashing when shieling gas low pressure.
- **<Cool sys alm>**: Red flashing when cooling system abnormalities.
- **<laser alm>**: Red flashing when laser system abnormalities.
- **<Temp *>**: Temperature of the protective lens, red flashing when the temperature too high or too low. At the same time the green light on the welding head gun will change to red color.
- **<Driver alm>**: Red flashing when abnormalities in vibrating lens.

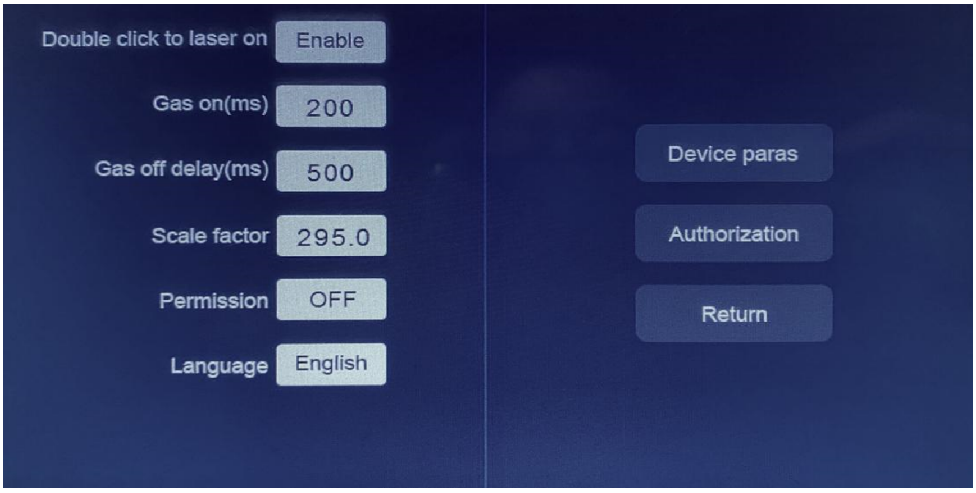
2. Parameter Setting

Parameter Setting is one of the most influential factors on cleaning results, We may need to do a lot of tests and adjustments to make the machine parameters perfectly match the materials and working environment.

- **<Para number> :** Each device can have 9 groups of parameter settings. When switching to other Para numbers, the system will automatically save the current parameter settings for this Para number.
- **<Scan Speed>:** At each instant, when the laser beam hits the surface of the workpiece, it is a point. Through the high-speed swing lens (vibrating lens) in the cleaning gun, the point moves along a certain trajectory, making our naked eyes mistakenly believe that the laser beam is projected on the surface of the workpiece in a certain shape. The **Scan Speed** is the speed at which the leaser point moves on on its focal plane.
- **<Laser freg>:** Set the frequency of the simulated pulses of the laser. When the laser duty cycle is 100%, this setting will not change the laser output effect. Because the laser is emitted continuously.
- **<Laser duty>:** The percetage of the laser firing time of each simulated pulse (i.e. the sum of laser on time and laser off time).
- **<Scan Lengh>:** The scan lenght.

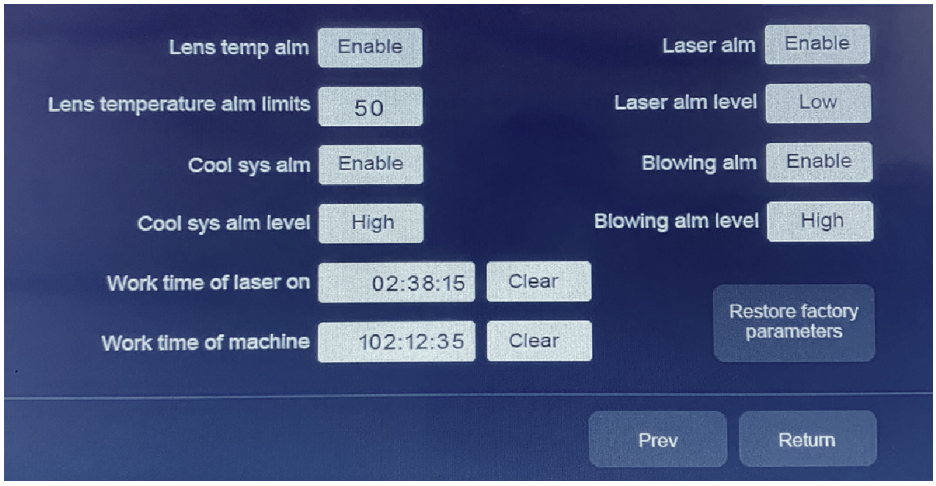
3. System Setting

After turning on the system, click <System setting> to enter the interface below.



- **<Double click to laser on>:** If set to **Enable**, we need to double click the button on the cleaning gun and keep press it to fire the laser. If set to **Disabled,** the cleaning gun will fire the laser by press the button. It is recommended to set it to **Enable** to prevent accidental touches.
- **<Gas on delay>:** Protective Gas blowing time before firing(turning on) the laser
- **<Gas off delay>:** Protective Gas blowing time after turning off the laser
- **<Scale Factor>:** The scale factor of the length in the system. Adjustments are only required when changing to different hardware. Therefore, please do not adjust this value without confirming with the technical customer service
- **<Permission>:** Permission for of the safety lock. The safety lock Permission is not needed on the cleaning machine, so it is set to <OFF> in the <Systerm setting>
- **<Language>:** language

4. Device Paras PIN is **666888**



- **<Max.Scan speed>/<Min.Scan speed>:** The limit of **Scan Speed** in Parameter Setting, this value matches the cleaning head gun, do not adjust it without communicating with our technical customer service.
- **<Max.Scan length>/<Min.Scan length>:** The limit of **Scan length** in Parameter Setting, this value matches thecleaning head gun, do not adjust it without communicating with the technical customer service.
- **<Rated Power>:** The maximum power value of the laser generator, this value matches the laser generator. Do not adjust it.
- **<Max.Laser freg>/<Min.Laser freg>:** The limit of **Laser freg** in Parameter Setting, this value matches the cleaning head gun, do not adjust it without communicating with the technical customer service.
- **<Lens temp alm>** Please set this to **Enable**, then when the temperature of the protective lens is higher than the value of **<Lens temperature alm limits>**, the system will alarm.
- **<Cool sys alm>** Please set this to **Enable**, then when the chiller sends an alarm signal, thesystem will alarm.
- **<Cool sys alm level>** Set this to High
- **<Laser alm>** Please set this to **Enable**, then when the laser generator sends an alarm signal, the system will alarm.
- **<Laser alm level>** Set this to Low
- **<Blowing alm>** Please set this to **Enable**, then When the protective gas pressure is not sufficient, the system will alarm
- **<Blowing alm level>** Set this to High

5. Authorization

Same function as in welding mode. For time setting and working mode changing.

Chapter 9 Important Notes

1. The lens replacement must be operated in a dust-free environment. The opening should be

sealed with paper tape immediately after removing the lens to prevent dust from entering the welding head gun.
2. Although the laser welding machine emits much less UV light than TIG welding, the scattered infrared light during prolonged use can still cause skin injuries, so professional helmet to protect the skin of the face and gloves to protect the skin of the hands is necessary.
3. In cold or hot places, turn on the chiller first, the chiller will heat or cool the coolant, after the temperature heated to 20 °C or cooled to 31 °C. Then turn on the laser generator.

Chapter 10 Disposal instructions

Electrical products should not be disposed of with household products. In the EU and UK, according to the European Directive 2012/19/EU for the disposal of electrical and electronic equipment and its implementa- tion in national laws, used electrical products must be collected separately and disposed of at the collection points provided for this purpose. Locations in Canada and the US may have similar regulations. Contact your local authorities or dealer for disposal and recycling advice.