

Laserscript

LSW2000i and LSW3000i

Operation & maintenance instructions



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1. DECLARATION OF CONFORMITY



HPC Laser LTD

Declaration of Conformity

Business name and full address of manufacturer:

HPC Laser Ltd., Unit B, Ainley's Industrial Estate, Ainley Bottom, Elland, Halifax, HX5 9JP

Name and address of authorised representative:

Not applicable

Name and address of the person in the community authorised to compile the technical file:

Steve Cockerham. HPC Laser Ltd., Unit B, Ainley's Industrial Estate, Ainley Bottom, Elland, Halifax, HX5 9JP

Description of product (commercial name):

LSWi 2000/3000

Function, model, type, serial number:

Fiber Laser Welding, Cleaning & Cutting Machine

Place and date of declaration:

HPC Laser Ltd, 25th May 2023

Number of EC type examination certificate:

B-S2206A1919, B-S2206A1920, B-2206A1921

Declaration:

I declare that the machinery fulfils all the relevant provisions of the following Directives and Statutory Requirements: -

Electromagnetic Compatibility Directive 2014/30/EU
Low Voltage Directive 2014/35

Electromagnetic Compatibility Regulations 2016
Machinery Directive 2006/42/EC

Test standards:

EN ISO 12100:2010 Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 60825-1:2014+A11 2021 Safety of laser products. Equipment classification and requirements
EN60825-14:2014 Safety of laser products. A users guide.
EN 61000-6-2:2005+AC:2005 Electromagnetic compatibility (EMC) – part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-4:2007+A1:2011 Electromagnetic compatibility (EMC) – part 6-4: Generic standards – Emission standard for industrial environments

Signature:

Steve Cockerham
HPC Laser Ltd, 25th May 2023

2. INTENDED USE

The Laserscript LSW range of machines are 2kW and 3kW Fiber Laser Systems intended for the welding, cleaning and cutting of materials of different thicknesses.

The Laserscript LSW is a Class 4 Fibre Laser Welding machine it uses a laser source wavelength of 1064nm and a maximum output of 2kW (LSW2000i) and 3kW (LSW3000i) to carry out rapid and accurate welding, cleaning and cutting of materials of different thicknesses.

Care should be taken to ensure that only staff who have received proper training are allowed to operate the machine. RETRAINING AVAILABLE OR FOR NEW STAFF MEMBERS – CONTACT HPC

Care should be taken to ensure that the national and regional safety and accident prevention regulations are observed.

If in doubt please consult HPC Laser for advice.

3. MACHINE SAFETY

If the machine is used in an inappropriate manner, outside the recommendations made in this manual or for purposes other than which it is intended, the machine may become unsafe to use as follows:

- Dangers are presented to the safety of the machine operator and personnel in the vicinity of the machine
- Permanent damage to the machine
- Negative functioning of the machine
- Always hold the gun at 45 degrees
- Never point the beam directly back into the gun

Using the machine outside of the control parameters recommended by HPC Laser could produce any or all of these dangers and should be avoided.

The machine must NOT be operated if any of the safety features or functions are disabled, overridden or not functioning correctly, in such circumstances the machine should be switched off and securely electrically isolated until any such matters are properly rectified.

Safety considerations should be taken in accordance to your “Control of Artificial Optical Radiation at Work Regulations 2010” & “PUWER” Risk assessment.

4. LASER SAFETY

The Laserscript LSW Fibre Laser Welding machine is a class 4 laser product, as defined in International Standard EN 60825-1.

The Laserscript LSW Fibre Laser Welding machine comes equipped with outputs/inputs for external Interlocks as per your own requirements. Please Contact HPC for compatible Interlocks

Safety considerations should be taken in accordance to your “Control of Artificial Optical Radiation at Work Regulations 2010” & “PUWER” Risk assessment.

Please consult HPC Laser for the specific characteristics and capabilities of your particular machine. DO NOT allow personnel who have not received the appropriate training to operate the machine. Training of new personnel should include instruction on, but not limited to:

- Inform staff about the possible dangers and safety features
- Ensure staff are aware what protective equipment should be worn
- Define responsibilities for safety, operation, maintenance, setting up work and service
- Require that personnel receive, read and understand a copy of this operation manual

Lasers can cause burns if they are allowed to come into contact with skin. The operator should be protected from direct and reflected laser radiation by wearing suitable protective eyewear, gloves, safety boots and other suitable protective equipment such as suitably rated coveralls.

The Laserscript LSW should be operated in a segregated area to protect others from direct and reflected laser radiation.

Please familiarise yourself with the specific regional and national health and safety requirements applicable to the area of operation.

Please read the manual properly, before installation and operation. Damage to persons and/or materials can result from not following individual points of the Operation Manual!

The symbols below are used for easier understanding of the Operation Manual:



If the Operation manual is not properly observed, this represents a danger for the operator and maintenance personnel



Caution: NEVER look directly at the laser beam.



The machine must only be operated when setup and adjustment has been carried out in accordance with this manual.

	The system must only be operated, maintained and repaired, by a user who has had the training and is experienced with the dangers of the machine.
	Without Safety precautions the following risks exists with exposure to Laser Radiation. Eyes: Burns to Cornea Skin: Burns to exposed areas Clothing: Risk of Fire
	NEVER try to modify or disassemble the laser and do not try to start up a system that had been modified or dissembled
	DANGER RADIATION HAZARD Indicates a danger of exposure to hazardous invisible and visible laser radiation.
	DANGER RADIATION HAZARD Indicates a danger of exposure to hazardous invisible and visible laser radiation.
	DANGER RADIATION HAZARD Operate in a segregated area to protect others from direct and reflected laser radiation.

5. FIRE SAFETY

The high intensity of a laser beam can produce extremely high temperatures as materials are melted and blown away while cutting/welding.

Oxygen and nitrogen are commonly used when laser cutting metals. Sparks are often created during the cutting process. No flammable or combustible items should be left in the workspace to avoid the sparks creating fire.

Ensure that any oil spills or presence of other flammable liquids in the area around the machine are removed quickly as they can increase the fire risk.

Do not attempt to cut materials that are highly flammable, explosive or produce toxic by-products. Be aware that materials that have been laser cut can be HOT,

Always ensure the machine is free of clutter, debris and flammable materials before and after use. Always keep a suitable and properly maintained fire extinguisher nearby.

Ensure Hot Works controls are under taken before, during and after all welding operations.



FIRE HAZARD

Operators must take precautions to avoid causing a fire by igniting flammable material.



GAS CYLINDER HAZARD

The gas cylinder must be protected from high temperatures, sparks, and flames. Cylinder should be secured to prevent it from tipping over.

6. ELECTRICAL SAFETY

The LSW Fibre Laser Welding machine contains potentially dangerous voltages and any enclosures containing electrical cables and parts should not be accessed by unqualified personnel.



Please observe all electrical warning labels placed on the machine. REMEMBER that potentially dangerous voltages may be present

Electrical enclosures must in all cases be opened only by suitably qualified personnel.

If the machine requires any modifications, they must be carried out by a professional laser engineer. Contact HPC Laser to discuss any such requirements.

Do not attempt to access any electrical components until at least 5 minutes after power has been completely disconnected from the machine. High voltage currents are present in power line terminals for a period after switching off

7. PPE

If the machine is used in an inappropriate manner, outside the recommendations made in this manual or for purposes other than which it is intended, the machine may become unsafe to use as follows:

- Dangers are presented to the safety of the machine operator and others.

Consideration should be taken for the use of PPE in accordance to your “Control of Artificial Optical Radiation at Work Regulations 2010” Risk assessment.

Minimal PPE Recommendations

- Full Face protection: 900-1080nm OD 7+, 900-1080nm D LB6 + IR LB& LP S (EN 207 Specification)
- Suitable Coverall Protection and Gloves
- Consideration should be taken into account for UV & IR protection during operations

Please contact HPC for your specific Welding Mask Requirements



8. FUME EXTRACTION

Research shows that exposure to mild steel welding fumes can cause lung cancer and possibly kidney cancer in humans. There has been endorsement and reclassification of mild steel welding fume as a human carcinogen.

Welding activities must be carried out in ventilated areas and if exposure controls are not adequate, suitable respiratory protective equipment (RPE) should be worn to minimise the risk from the residual fume.

To control the risk suitable engineering controls for all welding activities indoors will be required e.g. Local Exhaust Ventilation (LEV). Where (LEV) does not adequately control exposure, adequate and suitable respiratory protective equipment (RPE) should be provided.

Welding should not be undertaken without suitable exposure control measures, as there is no known level of safe exposure. This is applicable to indoors and outdoors.

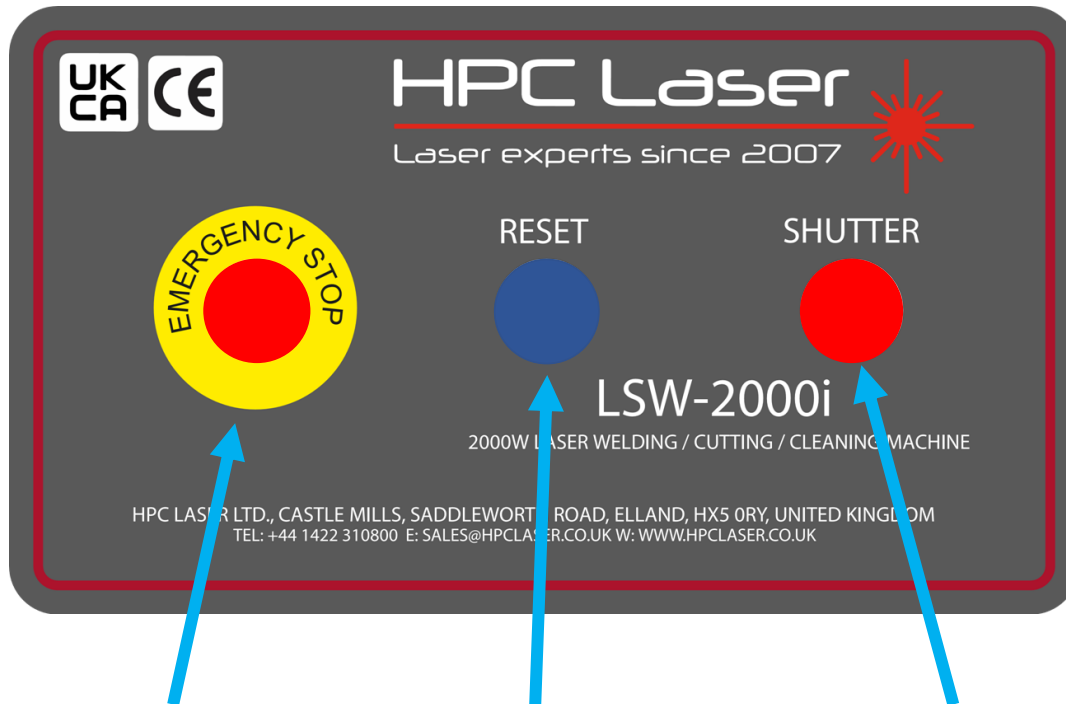
Risk assessments should reflect the change in the expected control measures



FUME HAZARD

Always weld in an area with adequate ventilation and use a fume extraction system to remove vapours, particles, and hazardous debris from the welding processing area.

9. MACHINE SAFETY CONTROLS



Emergency Stop

Emergency Stop Reset

Safety Shutter Control

10. MACHINE SAFETY CONTROLS (EXTERNAL INTERLOCKS)



Pin 1 Interlock1

Pin 2 Channel 1

Pin 3 Interlock 1

Pin 4 Channel 2

Pin 5 Interlock 2

Pin 6 Channel 1

Pin 7 Interlock 2

Pin 8 Channel 2

Pin 9 Interlock 3

Pin 10 Channel 1

Pin 11 Interlock 3

Pin 12 Channel 2

Pin 13 24v DC

Pin 14 0v DC

Pin 15 GRND

Pin 16 Beacon

11. WARNING LABELS



11. WARNING LABELS



12. WATER COOLING

The LSW laser machine must only be operated when a constant flow of cooling water is available to cool the laser source. We strongly recommend only using the water chiller that was installed with the machine. Deionised water is preferred for filling the water chiller, tap water should be avoided.

If water temperature cannot be maintained above 5°C please use a Laserscript approved antifreeze in the water-cooling system (see the Laserscript website or contact your local distributor for more details)

WE RECOMMEND THAT ONLY LASERSCRIPT APPROVED ANTIFREEZE, AVAILABLE TO ORDER FROM YOUR LOCAL DISTRIBUTOR IS USED IN THE LASER WATER COOLING CIRCUIT. OTHER PRODUCTS, INCLUDING COLOURED AND AUTOMOTIVE ANTIFREEZE MAY DAMAGE HOSES AND SEALS AND MAY INVALIDATE YOUR WARRANTY.

13. MACHINE AUTHORITY AND ACCESS

The LSW machine is supplied with several sets of access keys for personnel with varying levels of authority as follows:

- Main on/off key for the control panel – for site approved operators
- Cabinet keys for access to machine control devices

ONLY allow properly trained and qualified personnel to operate the machine.

14. MOVING, LIFTING AND HANDLING

In most circumstances, the delivery, unloading and installation will be supervised by a qualified HPC Laser engineer.

The LSW is an extremely heavy machine (please request exact weight of your machine configuration from HPC Laser if required), and attempts to lift or move the machine without substantial mechanical assistance should not be made.

DO NOT lift the machine any higher than is necessary for the intended operation and ensure that all local safe lifting regulations are adhered to.

Ensure that any lifting equipment used is suitably rated for the weight involved and any inspection requirements for lifting equipment are in place before proceeding.

NEVER walk under a suspended load

OBSERVE local safety regulations for the handling of heavy loads

Unload the machine from the delivery vehicle either using a suitably rated fork lift truck with a sufficient fork length or a delivery vehicle with a suitably rated crane function.

Move the machine from the delivery point to its permanent location using suitable mechanical handling devices such as jacks, skates and rollers.

15. UNPACKING, LOCATING & SECURING MACHINE

The LSW is suitable only for use indoors and should not be used outdoors under any circumstances. The machine must be installed in a clean, dry and warm environment between 5°C and 25°C, with good air circulation, away from direct sunlight, free from excessive humidity (maximum 70%) with minimal vibration and no risk of mechanical shocks.

In most cases, HPC Laser will supervise the machine installation and no special considerations to unpacking are required on the user's part.

- The machine should be located on a flat surface, in an area with level flooring and suitable access around the machine for ventilation and access to cabinet doors when required.
- Open the machine packaging, wearing protective gloves and eye protection where appropriate.
- If possible, retain all packaging in case the machine ever needs to be relocated or shipped elsewhere. Otherwise, environmentally dispose of all packaging safely and responsibly according to local regulations.
- Ensure the machine is positively secured and will not move during operation.
- Remove all remaining transit packaging and protection.
- Note: The extraction fan and water chiller are typically hard-wired into the electrical supply from the main machine panel.
- Familiarise yourself with the keys supplied with the machine and their corresponding locks.
- Insert the appropriate key into the on / off key switch.

16. STORAGE

In cases of the laser machine needing to be placed temporarily into storage, it should be located in a warm, dry and clean environment, free from dust and vibration.

In cases of long-term storage, it should be packed into a protective timber crate with a desiccant placed into the crate and then stored in a warm, dry and clean environment, free from dust, excessive humidity and vibration.

Further details regarding specific storage requirements can be obtained from HPC Laser.

17. MACHINE MAINTENANCE



Before any cleaning and maintenance work commences, please ensure the machine is switched off and remove the mains plug from the electrical supply



You should always check at least once a day, whether dust has accumulated in the laser system. In case of soiling the machine must be cleaned. The cleaning interval strongly depends on the type of metal that is being used. Please bear in mind that only a clean machine guarantees optimal performance and reduces the service recommendation.



CAUTION – Always keep the system clean, as flammable parts in the working area raise the fire hazard.



The system must only be operated, maintained and repaired, by a user who has had the training and is experienced with the dangers of the machine.

Laser head consumables:

The laser cutting head incorporates several consumable items which should be cleaned regularly and replaced periodically.

General Cleaning:

1. Move the laser head so it is easier to access the work area to clean it, and also to the place where you need to clean.
2. Make sure the machine is switched off and isolated from the electrical supply before starting work

18. DISPOSAL



Do not dispose of the LSW machine with general industrial, household or domestic waste!

Electrical and electronic devices must be disposed of in accordance with local regulations for electrical and electronics disposal and recycling. We recommend the use of a large machine decommissioning contractor to assist with machine disassembly and disposal.

Please contact your local authority or HPC Laser for further assistance

19. MACHINE OPERATIONS: Wire Feeding



Connect the two cables to the rear of the wire feeder



Select the appropriate size feed rollers



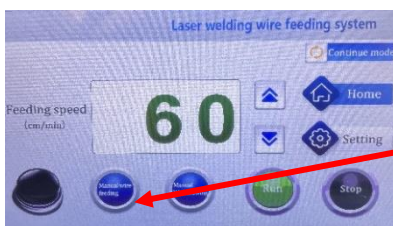
Open wire feeder by lowering the red handles



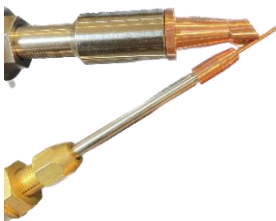
Hand feed the wire into the feeder



Feed the wire manually through rollers and close the wire feeder



Manually feed wire through the machine to the nozzle using the display screen on the wire feed unit

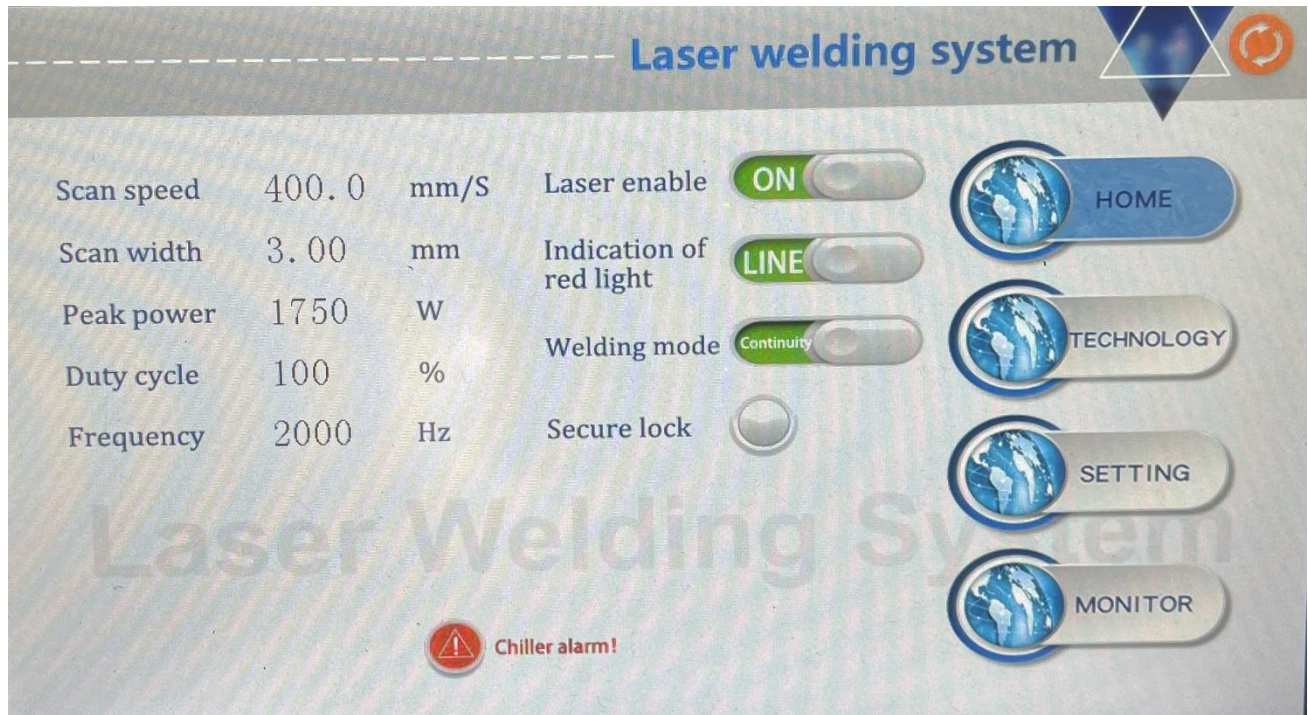


The filler wire is now ready to use during welding operations if required

20. MACHINE OPERATIONS: Laser Welding System - Machine Display

- Scan speed 400mm/s recommended
- Scan width altered to required weld width
- Peak power guide: 400W per/mm of material thickness
- Duty cycle 100% recommended
- Frequency 2000Hz recommended

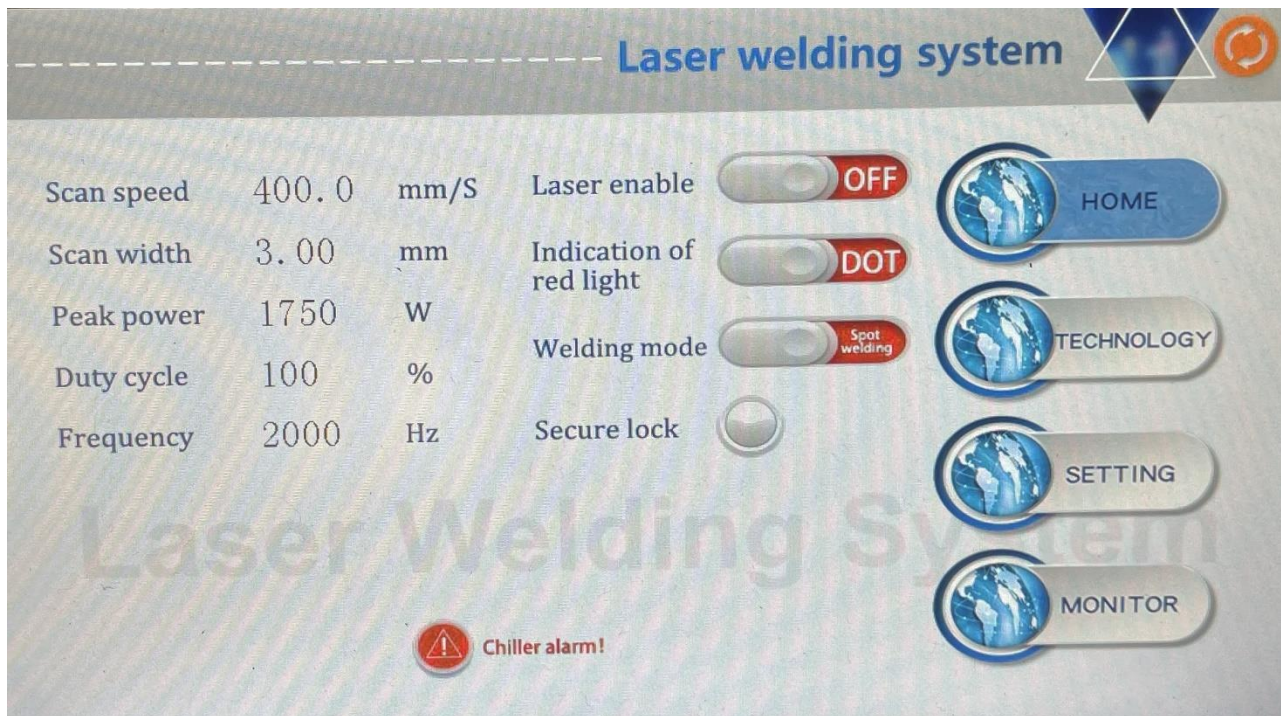
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



20. MACHINE OPERATIONS: Laser Welding System - Machine Display

- Laser enable disables the welding output
- Indication of red light disables the red dot indicator
- Welding mode enables the spot-welding mode

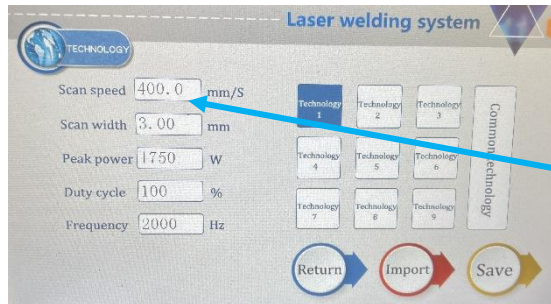
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



21. MACHINE OPERATIONS: Laser Welding System - Machine Settings



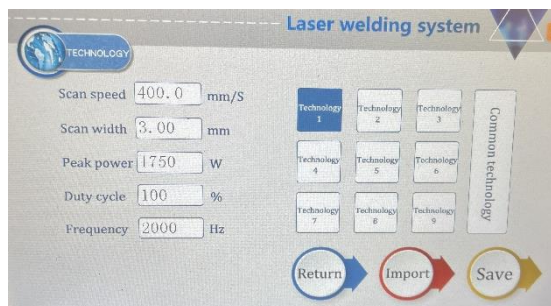
To alter any machine settings
Press The Technology tab



The laser welding adjustment screen is found here
Press the setting you needed to adjust



Adjust to required setting using the keypad
Then press OK



Then press
Save
Import
Return this will return you to the home screen

22. MACHINE OPERATIONS: Laser Welding System - Machine Start-up



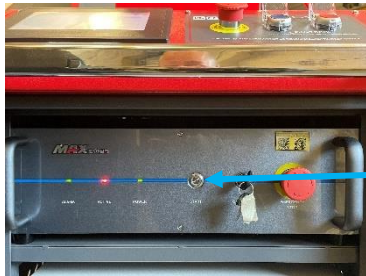
Connect the machine to power source
Turn Emergency Stop Clockwise to dis-engage



Press the Blue button to reset the safety circuit
The light should go off



Turn the Production Key to the "On position"



Press the Start button and the active light will go Red



Press the Start button again and this will show Red



Depress the Red Shutter button
The welder is now operational

23. MACHINE OPERATIONS: Laser Welding System – Welding Operation



Set appropriate feed rate if using filler wire
Ensure Run is green

NOZZLE SELECTION				
Butt joint	Corner joint	Tee joint	Lap joint	Edge joint

Select the appropriate nozzle for your weld

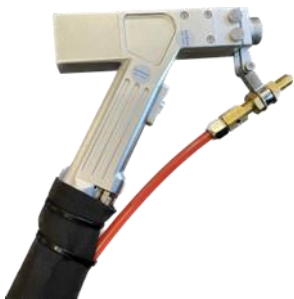


Connect the earth signal to material to be welded



Contact the nozzle with the Material and squeeze the trigger to weld

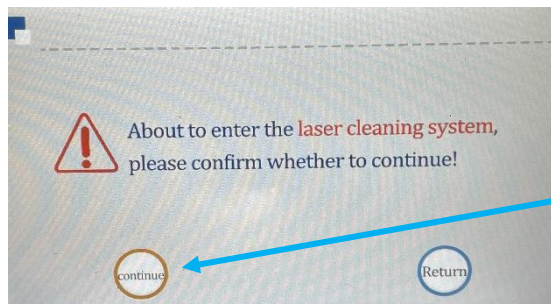
24. MACHINE OPERATIONS: Laser Cleaning System – Set-up



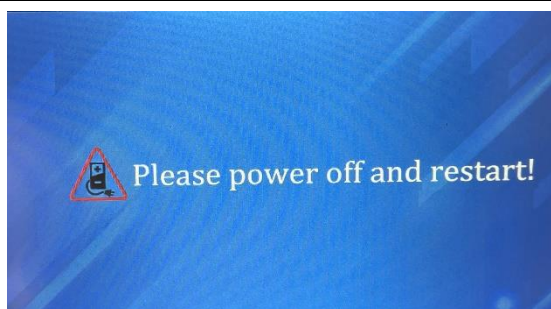
First remove the nozzle assembly and wire feed from the welding gun



Press the orange button on the screen to enter the laser cleaning mode



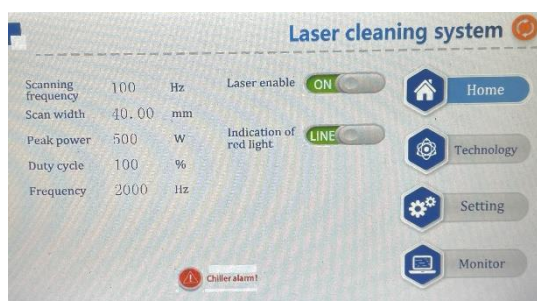
Press Continue



You will now be instructed to power off the machine



Reset the machine with the RCD at the rear of the machine

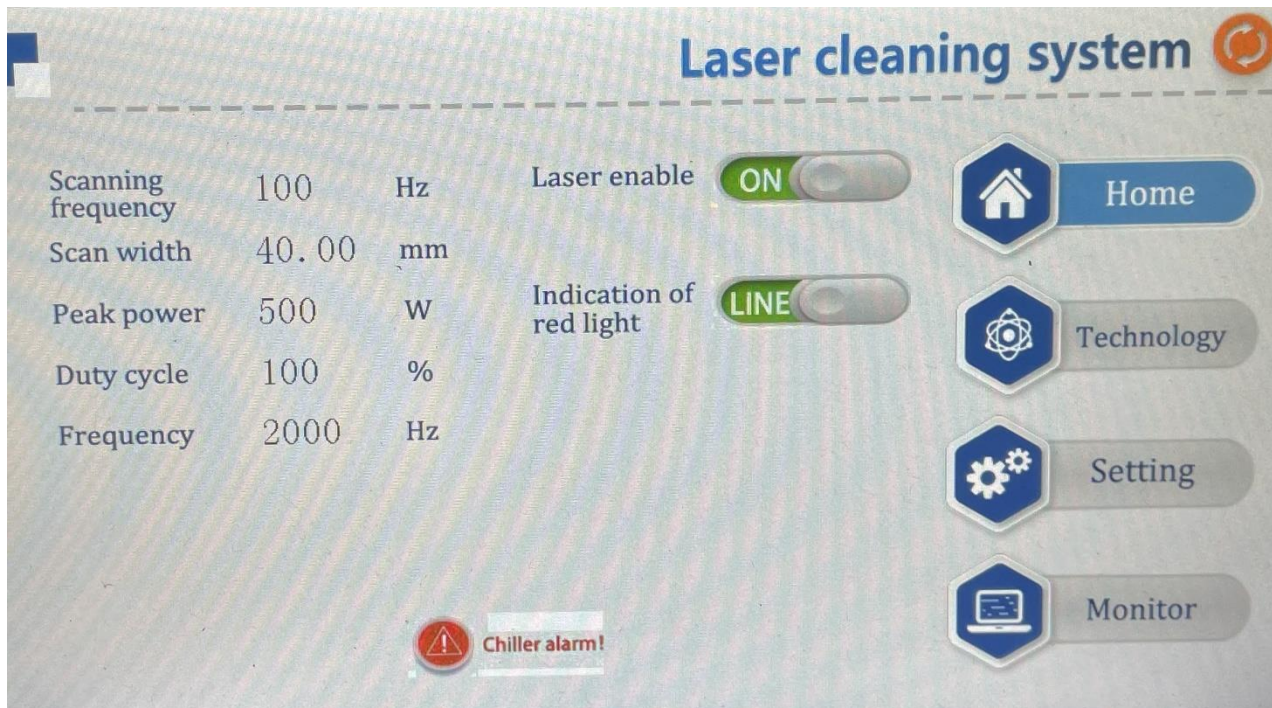


The Laser cleaning system is now operational

25. MACHINE OPERATIONS: Laser Cleaning System – Machine Display

- Scanning frequency 100Hz recommended
- Scan with altered to required cleaning width
- Peak power 500w recommended maximum output
- Duty cycle 100% recommended
- Frequency 2000Hz recommended

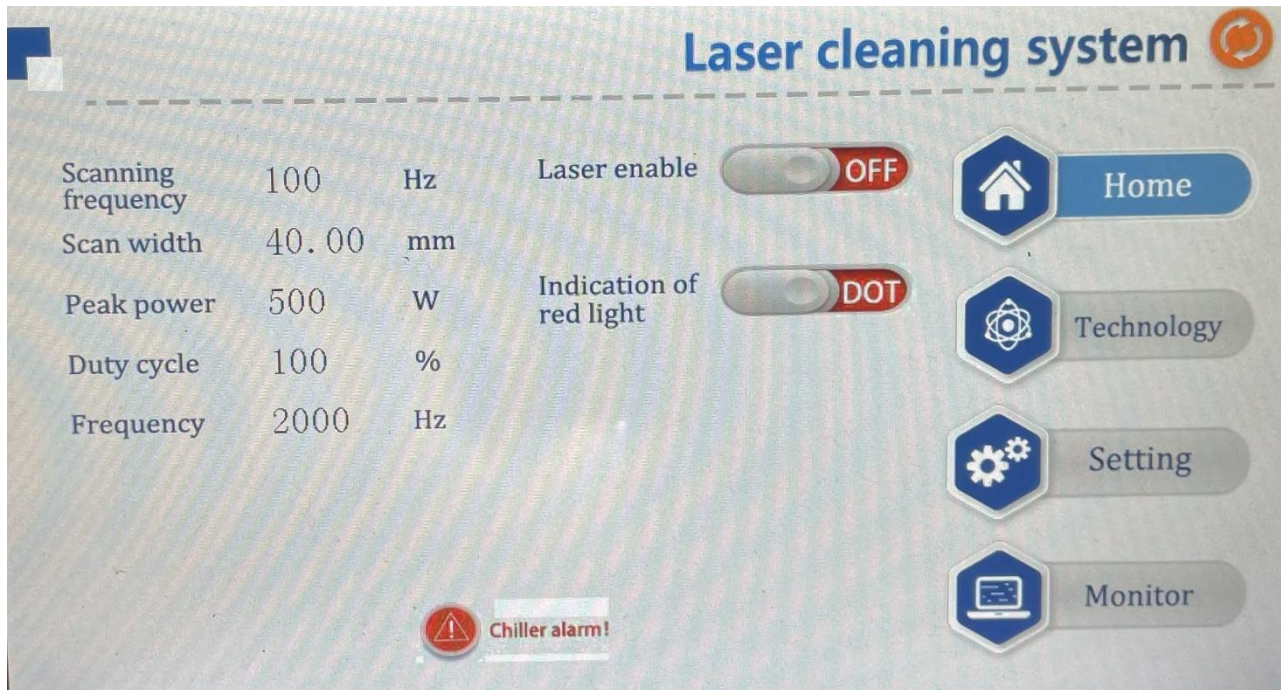
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



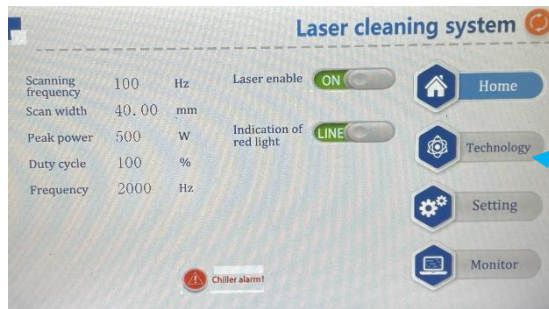
25. MACHINE OPERATIONS: Laser Cleaning System – Machine Display

- Laser enable disables the cleaning output
- Indication of red light disables the red dot indicator

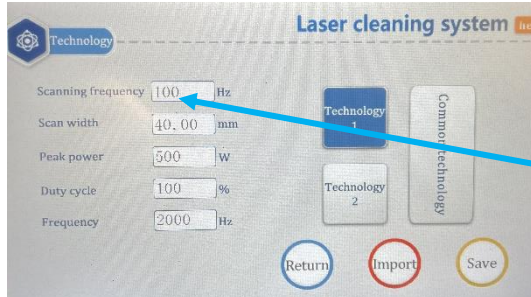
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



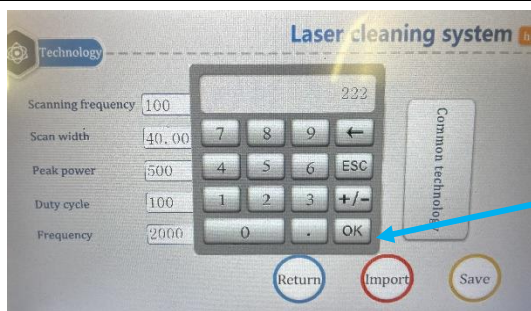
26. MACHINE OPERATIONS: Laser Cleaning System - Machine Settings



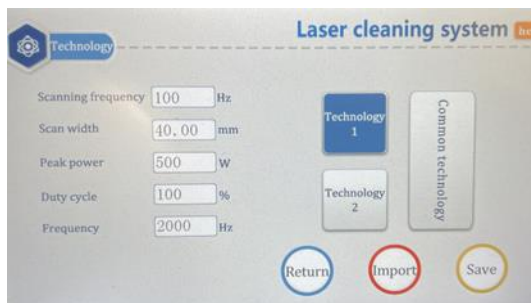
To alter any machine settings
Press The Technology tab



The laser cleaning adjustment screen is found here
Press the setting you needed to adjust



Adjust to required setting using the keypad
Then press OK



Then press
Save
Import
Return this will return you to the home screen

27. MACHINE OPERATIONS: Laser Cleaning System - Machine Start-up



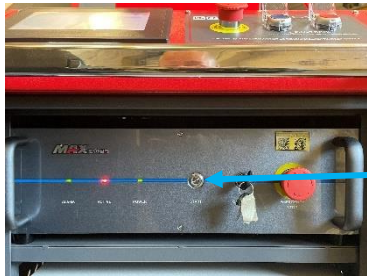
Connect the machine to power source
Turn Emergency Stop Clockwise to dis-engage



Press the Blue button to reset the safety circuit
The light should go off



Turn the Production Key to the "On position"



Press the Start button and the active light will go Red



Press the Start button again and this will show Red

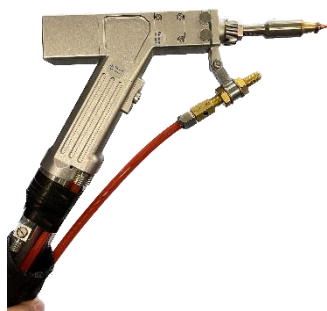


Depress the Red Shutter button
The Cleaning System is now operational

28. MACHINE OPERATIONS: Laser Cleaning System - Machine Operations

Cleaning Operations will begin by depressing the trigger on the welding gun

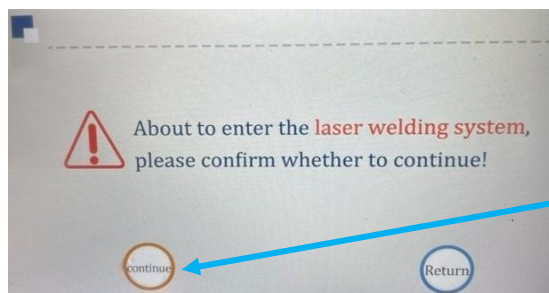
29. MACHINE OPERATIONS: Laser Cutting System – Set-up



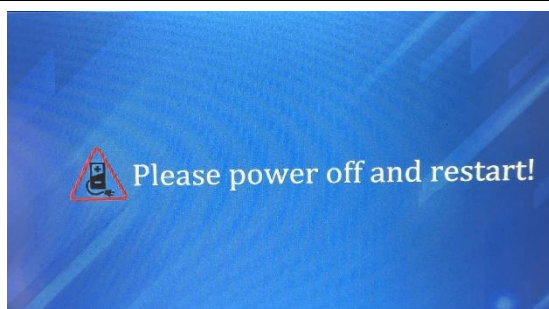
First remove the head and wire feed from the welding gun



Press the orange button on the screen to enter the laser cleaning mode



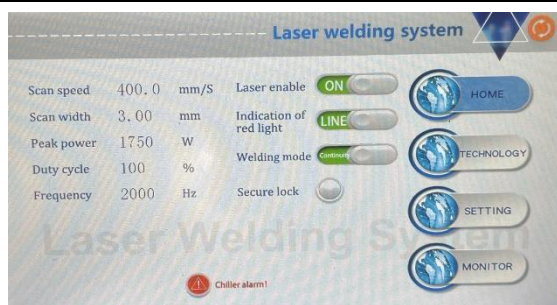
Press Continue



You will now be instructed to power off the machine



Reset the machine with the RCD at the rear of the machine

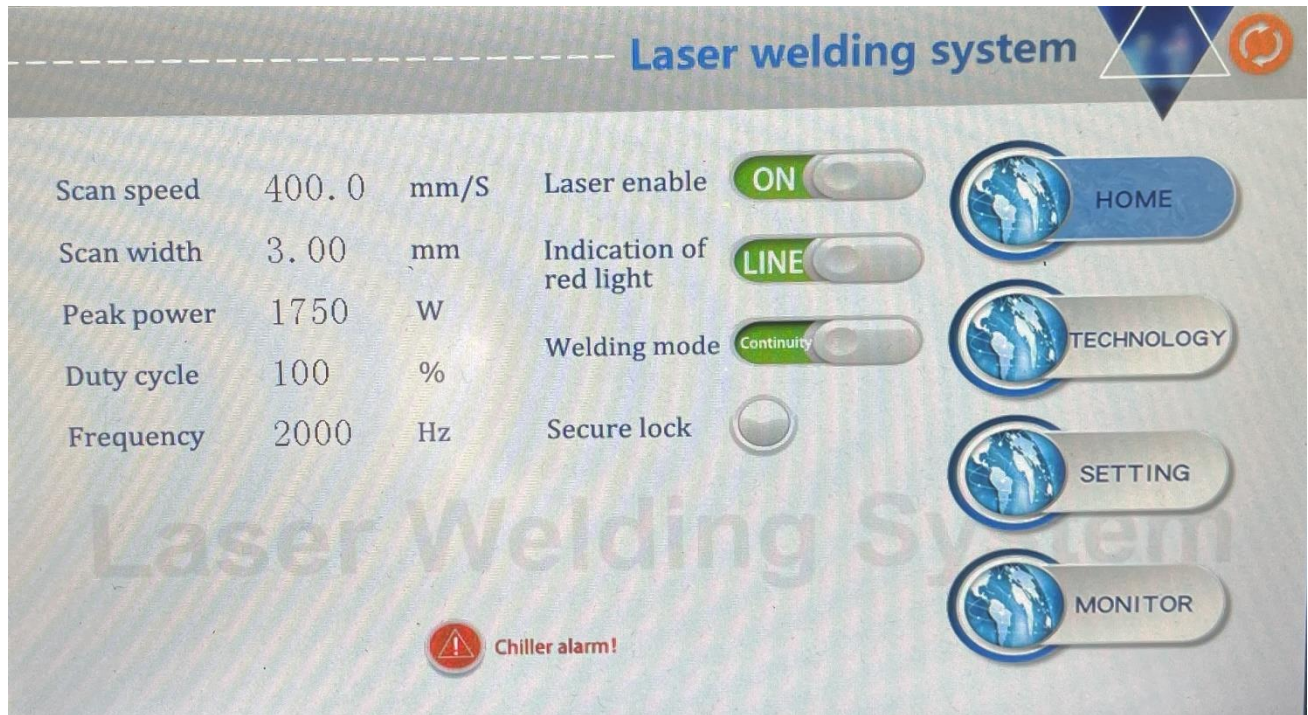


The Laser welding/cutting system is now operational

30. MACHINE OPERATIONS: Laser Cutting System - Machine Display

- Scan speed 400mm/S recommended
- Scan width altered to minimal cutting width
- Peak power 400w per/mm of material thickness
- Duty cycle 100% recommended
- Frequency 2000Hz recommended

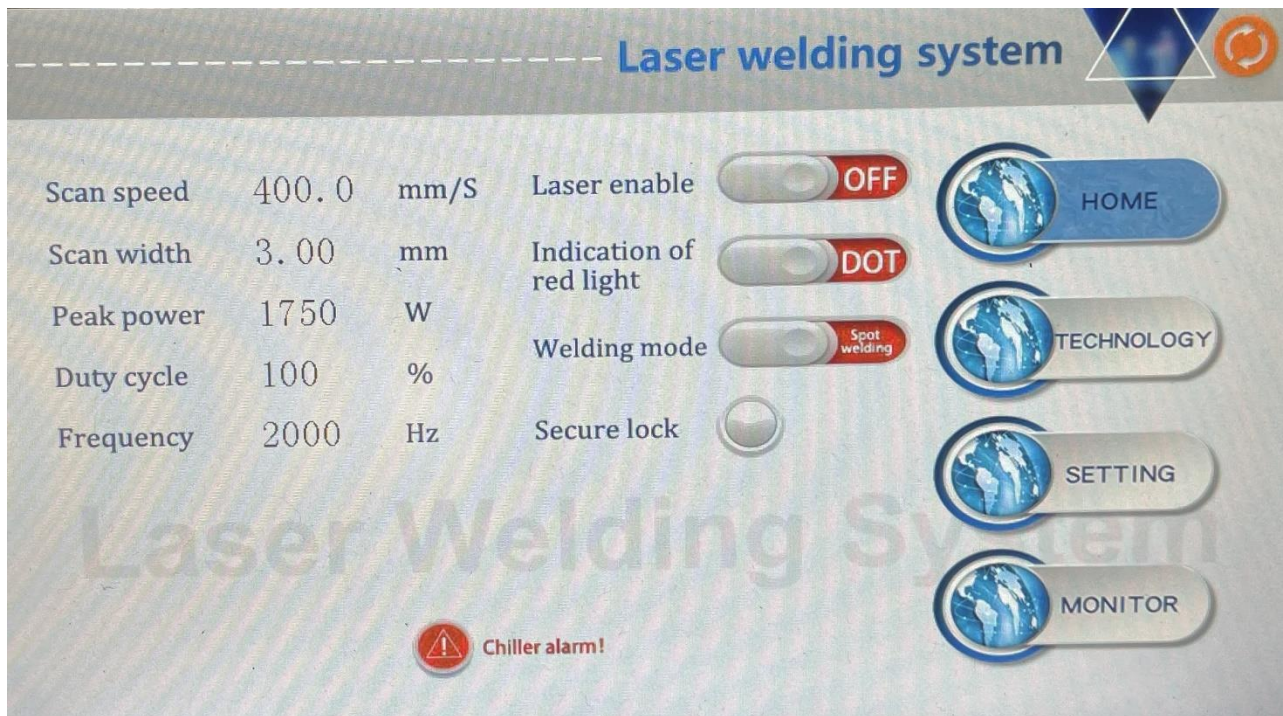
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



30. MACHINE OPERATIONS: Laser Cutting System - Machine Display

- Laser enable disables the welding/Cutting output
- Indication of red light disables the red dot indicator

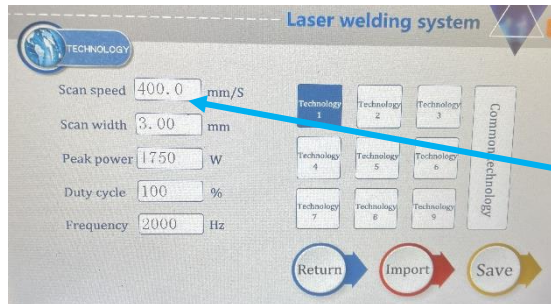
Specific material settings can be adjusted during installation
Please contact HPC for specific material settings



31. MACHINE OPERATIONS: Laser Cutting System - Machine Settings



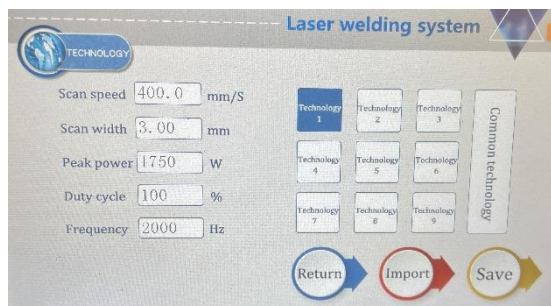
To alter any machine settings
Press The Technology tab



The laser welding/cutting adjustment screen is
found here
Press the setting you needed to adjust



Adjust to required setting using the keypad
Then press OK



Then press
Save
Import
Return this will return you to the home screen

32. MACHINE OPERATIONS: Laser Cutting System - Machine Start-up



Connect the machine to power source
Turn Emergency Stop Clockwise to dis-engage



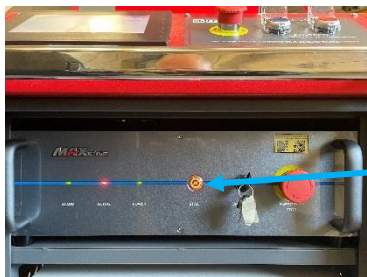
Press the Blue button to reset the safety circuit
The light should go off



Turn the Production Key to the "On position"



Press the Start button and the active light will go Red

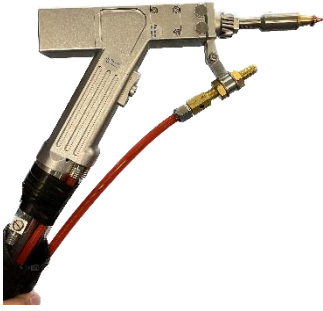


Press the Start button again and this will show Red



Depress the Red Shutter button
The welder is now operational

33. MACHINE OPERATIONS: Laser Cutting System – Cutting Operation



Select the appropriate nozzle for Cutting Operations



Connect the earth signal to material to be welded

Contact the nozzle with the Material and squeeze the trigger to cut

34. Super Weiye Double Pendulum Welding System

This manual covers the basic installation, factory setting, operation and maintenance service of SUP series double pendulum welding head products. The product covers double pendulum platform welding guns and self-developed control systems, and is equipped with multiple safety alarms and active safety power off and light off settings. This product can be adapted to various brands of fiber lasers; the optimized optical and water-cooled design allows the laser head to work stably for a long time under 2000W

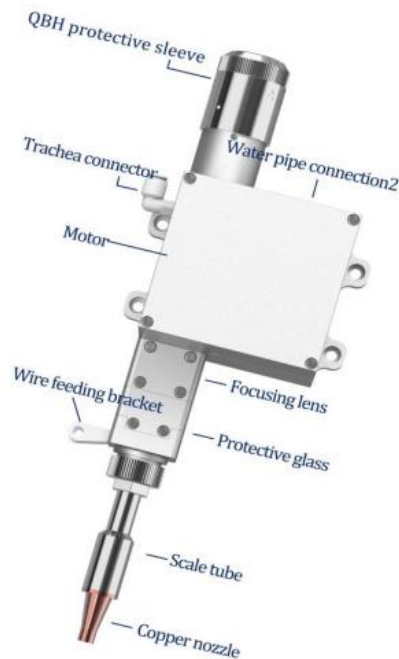


Figure 1.1 Schematic diagram of double pendulum welding head

- Basic features: self-developed control system, with multiple security alarms, smaller size, flexible operation, and easy to use.
- More stable: All parameters are visible, real-time monitoring of the status of the whole machine, to avoid problems in advance, more convenient to troubleshoot and solve problems, to ensure the stable operation of the welding head.
- Process: Process: all parameters are visible, the welding quality is more perfect, the deformation is small, and the penetration is high.
- Stable parameters and high repeatability: the determined nozzle air pressure and lens state, as long as the laser power is stable, the process parameters must be repeatable. Greatly improve efficiency, while also reducing operator requirements.

1.1 Operating environment and parameters

Supply voltage (V)	220V±10% AC 50/60Hz
Place the environment	Flat, no vibration and shock
Working environment temperature (°C)	10 ~ 40
Working environment humidity (%)	< 70
Cooling method	Water cooling
Applicable wavelength	1064nm (±10nm)
Applicable power	≤2000W
Collimation	D16*4.5/F60
Focus	D20*4.5/F150
Reflection	15.2*15.2 T1.6 15.2*20 T1.6
Protective lens specifications	18*2
Maximum supported air pressure	15Bar
Focus vertical adjustment range	±10mm
Effective clear aperture	12mm
Weight	1.4kg

1.2 Attention information

- (1) Ensure reliable grounding before supplying power.
- (2) The laser output head is connected with the welding head. Please check the laser output head carefully when using it to prevent dust or other pollution. When cleaning the laser output head, please use special lens paper.
- (3) If the equipment is not used in accordance with the methods specified in this manual, it may be in an abnormal working state and cause damage.
- (4) When replacing the protective lens, please make sure to protect it.
- (5) Please note: When using for the first time, when the red light cannot come out of the copper mouth, be sure not to emit light.

2. Installation and connection

2.1 General definition of controller wiring (see below for detailed definition/explanation)

Plug		Definition	Signal type	Detailed explanation
Power supply		-15V	Enter	Connect to V2 of the 15V switch power supply and provide 15V-
		GND	Reference place	Connect to any COM of 15V switch power supply
		+15V	Enter	Connect to V1 of 15V switching power supply, provide 15V+
		GND	Reference place	-V connected to 24V switching power supply
		+24V	Enter	+V connected to 24V switching power supply Power ground
LCD screen		G	Reference place	Power ground
		R	Sender	Data direction: controller → LCD screen
		T	Receiver	Data direction: LCD screen → controller
		V	Output	Provide 24V power supply for LCD screen
Signal		GND	Ref	Signal ground

interface 1			reference place	
		Air pressure alarm signal	Enter	The polarity of the alarm signal can be set on the setting page, and set to low level alarm when not in use
		GND	Reference place	Signal ground
		Water cooler alarm signal	Enter	The polarity of the alarm signal can be set on the setting page, and set to low level alarm when not in use
		Securely lock the reference ground	In isolation	The double pendulum welding system needs to short the 5 and 6 pins.
		Safely lock	Enter	
		Welding head light switch 1	Reference place	Controlled by the user. Normally open circuit, signal interface 2 and 3 output when pins 7 and 8 are on.
		Welding head light switch 2	Enter	
信号接口 2		Reserved input	Enter	Reserved
		Reserved output	Output	Reserved (synchronized with 4 foot air valve signal)
		Protection valve-	Reference place	Signal ground (reference ground of pin 2/4)
		Protection valve+	Output	Air valve open: output 24V; Air valve closed: output 0V.
		Wire feed-		Wire feeder switch signal, 5/6 pins are shorted when feeding wire
		Wire feed+		
		Laser abnormal signal	Enter	Laser alarm signal

		Laser light enable	Out put	Enable signal of laser
		24V output	Out put	24V output, directly output 24V voltage after power on.
		GND	Ref erence place	Reference ground (reference ground for pin 1/2/3/5)
		0 ~ 10V analog quantity	Out put	Connect to the analog quantity of the laser DA+
		RF-(PWM-)	Out put	Laser pulse width modulation signal-
		RF+ (PWM+)	Out put	Laser pulse width modulation signal+

2.1.1 Controller power supply terminal

The power supply terminal uses a 5P interface, and the supplied 24V switching power supply and 15V switching power supply are used for power supply.

Please note that the 15V switching power supply distinguishes the positive and negative poles, V1 is connected to 15V+, V2 is connected to 15V-, and any COM on the 15V switching power supply is connected to pin 2 GND!

Please note that the switching power supply must be grounded!

2.1.2 Controller LCD screen

The LCD screen wiring is included with the machine, just connect directly, the specific definition is shown in the figure above

2.1.3 Controller signal interface 1

Signal interface 1 end uses 8P interface, ready for signal related

- ①/②Pin is the air pressure alarm signal input, if you need to enable (wiring required), please set the air pressure alarm level to high in the background, otherwise it is low
- ③/④Pin is the water tank alarm signal input, if you need to enable (wiring required), please set the water tank alarm level to high in the background, otherwise it is low
- ⑤The number pin is the reference ground for the safety ground lock
- ⑥The No. pin is a safety ground lock of the welding head, and it is shorted to the No. 5 corner
- ⑦The No. pin is the switch of the welding head
- ⑧The No. pin is the light switch of the welding head, and the No. 7 corner is controlled by the user platform

Please note that only when there is no alarm, and the signal of the safe lock and trigger button is on, the output signal of the subsequent port will be sent out

2.1.4 Controller signal interface 2

The 2 end of the signal interface uses a 6P interface, and the air valve is related to the wire feeding

- ①Reserved feet
- ②Foot reserved foot③/④ The foot is the valve 24V output, the control board has built-in relay, you can directly connect the valve
- ⑤/⑥The pin is the signal wire of the wire feeder, the signal port of the wire feeder, regardless of positive or negative

2.1.5 Controller signal interface 3

Signal interface 3 uses 7P interface, laser related

- ①Pin is the laser alarm signal input +. If you need to enable it (wiring is required), please set the alarm level to high in the background, otherwise it is low
- ②Pin is enable+, connect to laser enable+
- ③The pin is 24V output, directly output 24V+ after power on
- ④Pin No. is a common ground (reference ground for No. 1/2/3/5)
- ⑤The number pin is analog quantity + output, the analog quantity is given
- ⑥Pin is PWM-modulation signal
- ⑦The number pin is PWM+ modulation signal

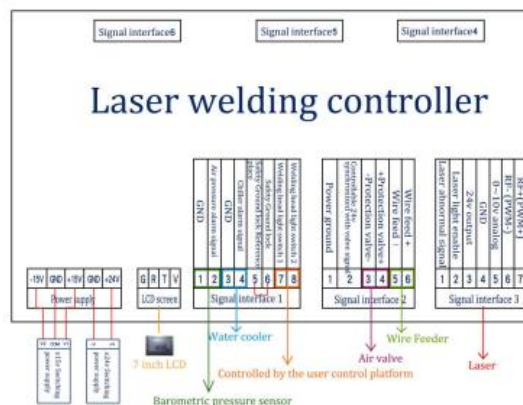


Figure 2.1 Controller wiring block diagram

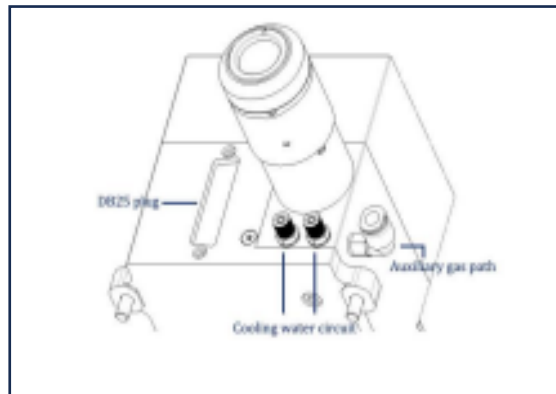
Note: The COM terminal of the +15V switching power supply and the -V (0V) terminal of the +24V switching power supply must be connected to GND. The shell of the switching power supply must be connected to the ground, otherwise abnormalities such as no light may occur.

2.3 Optical input interface

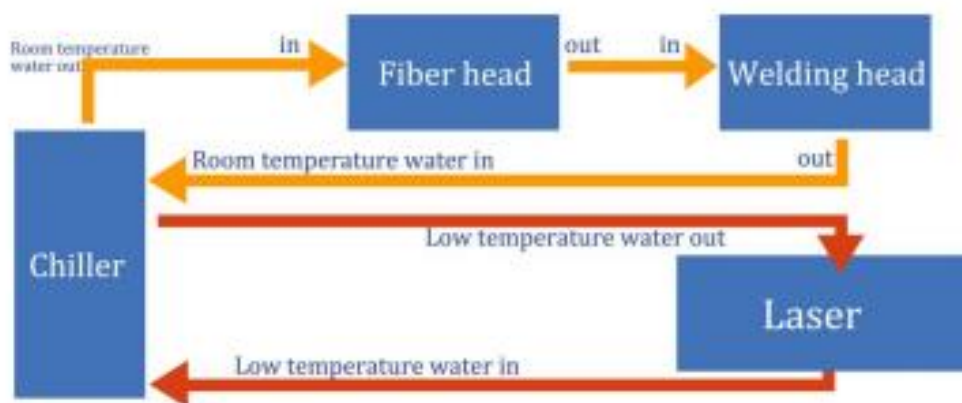
SUP welding head is suitable for most industrial laser generators. Commonly used fiber connectors include IPG, Ruike, Chuangxin, Fibo, Tottenham, Jept, Kaplin, etc. The optics must be kept clean, and all dust must be removed before use. The torch head must be placed horizontally when the optical fiber is inserted to prevent dust from falling into the interface.

2.4 Shielding gas and water chiller interface

The water pipe and air pipe interface can be installed with a hose with an outer diameter of 6MM and an inner diameter of 4MM, Water inlet and outlet pipeline (Regardless of the direction of entry and exit) , As shown below :



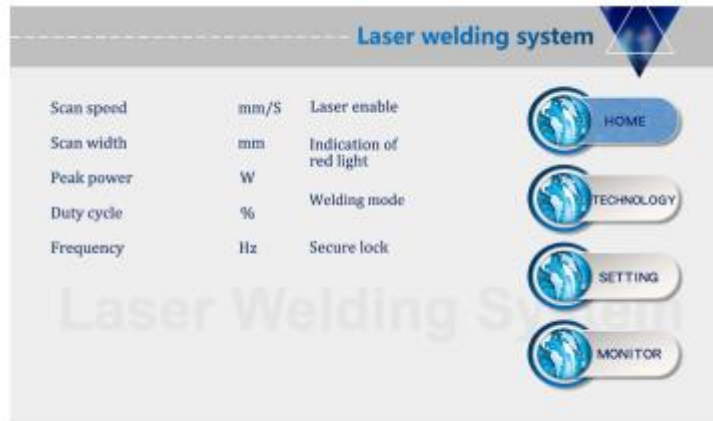
The cooling system is divided into the water circuit part of the welding head and the water circuit part of the optical fiber head, which are connected in series, as shown in the figure below :



2.5 Welding gun and control box connection interface

The double pendulum welding head is connected with the control box through a DB25 connection line. One side of the connecting wire is a male connector, and one side becomes a female connector. The female head is connected with the control box, and the male head is connected with the welding head.

3.Control panel operation guide



① In this interface, you can see the current process parameters (the process cannot be modified on this page) and instant alarm information.

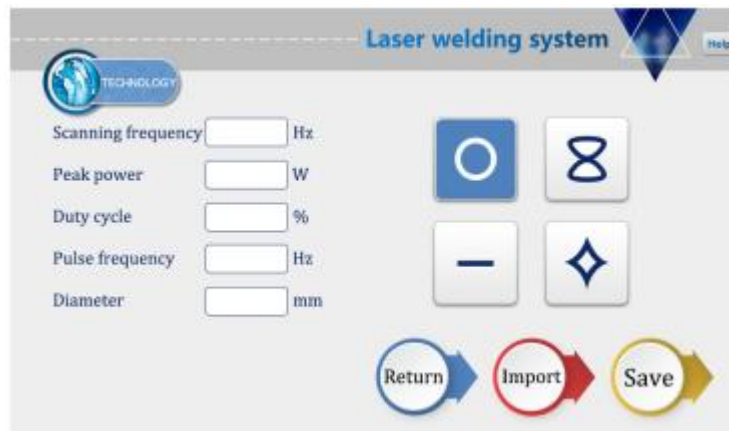
② When powered on Enable is ON by default, indicating that the red light is LINE by default, and the welding mode is continuous

When the enable is turned off, the enable signal will not be sent to the laser, which can be used to try out the gas function

Turn off the red light indicator, no power will be supplied to the motor. At this time, the red light is a point used to adjust the center

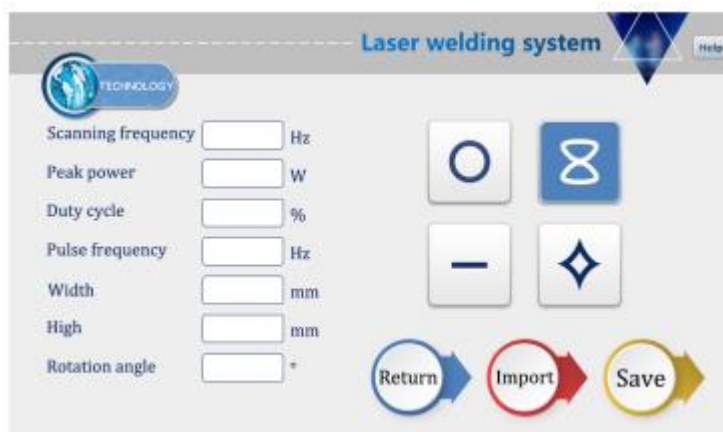
The welding mode is divided into continuous and spot welding. When spot welding is selected, the spot welding type needs to be set on the setting page

③ The safety lock is divided into gray and green. When the 5 and 6 pins of the signal interface 1 are short-circuited, the display is green. At this time, the light can be emitted by controlling the signal pin "welding head light switch 1, 2".



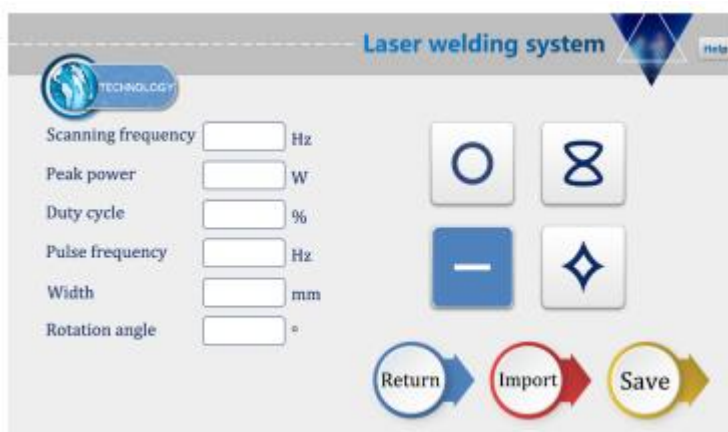
Round:

Scanning frequency range: 30~200Hz;
 Peak power range: 1W~laser power set on the setting page;
 Duty cycle range: 0~100%, the default setting is 100%, usually no need to change;
 Pulse frequency range: 5~100000Hz, 5~5000Hz is recommended;
 Diameter: 0.01~6mm.



8 Font:

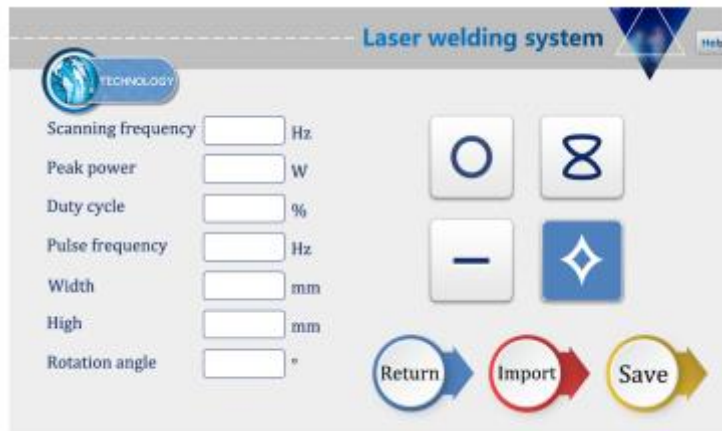
Scanning frequency range: 30~200Hz;
 Peak power range: 1W~laser power set on the setting page;
 Duty ratio range: 0~100%, 100% is recommended;
 Pulse frequency range: 5~100000Hz, 5~5000Hz is recommended;
 Left and right width: 0.01~6mm;
 Vertical height: 0.01~6mm;
 Rotation angle: 0~360°.



Font :

The scanning frequency range is 30~200Hz;

Peak power range: 1W~laser power set on the setting page;
Duty ratio range: 0~100%, 100% is recommended;
Pulse frequency range: 5~100000Hz, 5~5000Hz is recommended;
Width: 0.01~6mm;
Rotation angle: 0~360°.



Star shape:

Scanning frequency range: 40~200Hz;
Peak power range: 1W~laser power set on the setting page;
Duty ratio range: 0~100%, 100% is recommended;
Pulse frequency range: 5~100000Hz, 5~5000Hz is recommended;
Left and right width: 0.01~6mm;
Vertical height: 0.01~6mm;
Rotation angle: 0~360°.

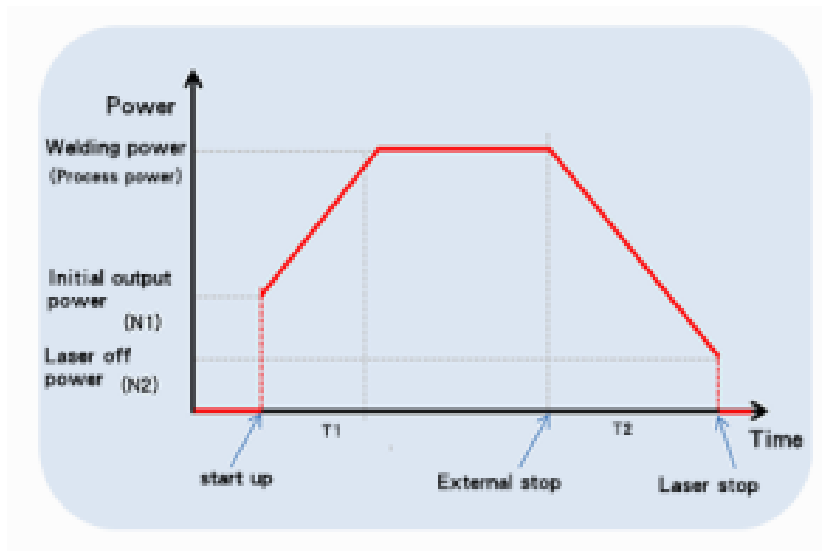
Precautions:

- ① The process interface contains the process parameters for debugging. This version has a total of four graphics. Click the graphics to adjust the size and angle of the corresponding scan shape.
- ② The parameters of the craft page can be modified, click the input box to modify, click OK after modification, then save, and click import when using it (modify-save-import).
- ③ Some lasers cannot emit light with a power lower than 10%. When the peak power of the craft page is less than 10% of the maximum power of the laser on the setting page, all output signals are normal, but light may not be emitted.
- ④ The duty cycle is 100% by default, and usually does not need to be changed. At this time, the pulse frequency does not work. If you need to use it, please adjust it according to actual needs. Example: 300W peak power, 50% duty cycle, and 1000Hz pulse frequency. At this time, the light emission period is 1mS, 0.5mS emits light at 300W, 0.5mS does not emit light, and cyclically reciprocates. At this time, the air blasts at the welding place and abnormal noise is normal. The actual situation is subject to the laser parameters.
- ⑤ Click the Help button at the top right of the screen to get more related parameter explanations.
- ⑥ More reference crafts can be viewed in the craftsmanship of the WeChat applet.



Password 123456, you need to click save after each setting

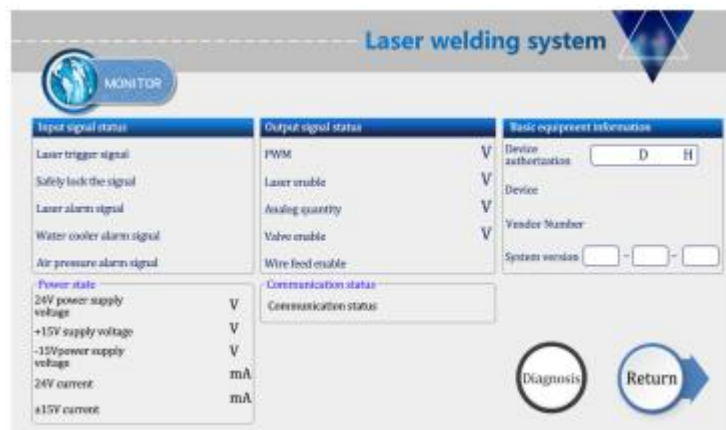
- ① The laser power is the power of the laser used, please fill it in correctly.
- ② The switch air delay defaults to 200ms, and the range is 0ms-3000ms.
- ③ When the light is turned on, it gradually progresses from N1% of the process power to 100%; when the light is turned off, it gradually progresses to N2 from 100% of the process power; (as shown in the figure below)



Generally, the preset switching optical power is 20%, and the switching optical progressive time is 200ms.

- ④ Wire feeding delay compensation is the wire feeding advance time relative to the light signal, which can be used in conjunction with the withdrawal function, and it is not set by default
- ⑤ The maximum temperature alarm threshold is 65°C. When the value is set to 0, the temperature alarm will not be detected.
- ⑥ Scan correction coefficient range 0.01~4, coefficient target line width/measurement line width: generally 1.

- ⑦Laser center offset -3~3mm, reduce it and move it to the left, increase it and move it to the right, used to adjust the axis of the red light center
- ⑧The air pressure/water cooler/laser alarm level signal defaults to low level. When this alarm signal is used, if an external air pressure alarm is installed, change it to high level to be effective, otherwise an abnormal alarm will occur, other alarm signals The same is true.
- ⑨Spot welding duration is the light emitting time when the trigger is pulled, even if the button is released, the light will still be emitted according to the elapsed time (spot welding function)
- ⑩Spot welding interval time is the stop light time between two spot welding after pulling the trigger button (spot welding function)
- ⑪Click the HELP button on the upper right to get more related parameter explanation.



This page displays the status of each signal and device information. Please note that this monitoring interface will only be displayed when the setting interface is in Chinese, otherwise it will be the monitoring of other old versions

①Input signal status

Laser trigger signal: Press the hand-held welding trigger, the 7 and 8 pins of the signal interface 1 are turned on, and the status changes from gray to green to take effect.

Safely lock signal: safely clamp on the workpiece. When the copper nozzle of the gun head touches the workpiece, the status will change from gray to green to take effect.

Laser/water cooler/air pressure alarm signal: monitor the real-time level status input from these interfaces.



②Output signal status

When the signal is output, the signal in this area changes immediately and can be directly visualized. The monitoring signal is a real-time detection circuit signal, which fluctuates within a certain range and has an error of less than 0.3V from the final output signal.

Output signal status	
PWM	V
Laser enable	V
Analog quantity	V
Valve enable	V
Wire feed enable	

③Basic equipment information

Device authorization: The device can be authorized for the duration of use. When the device is used for more than the set time, the authorization is displayed as terminated. The factory default authorization is valid for a long time. If you need encryption and decryption, please contact our company for inquiries.

System version: three groups of numbers, the first group is the hardware version, the second group is the program version of the microcontroller, and the third group is the touch screen version.

Basic equipment information	
Device authorization	D H
Device	
Vendor Number	
System version	- -

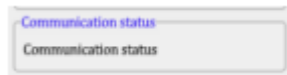
④Power state

Shows the real-time power supply voltage and current of the device.

Power state	
24V power supply voltage	V
+15V supply voltage	V
-15V power supply voltage	V
24V current	mA
±15V current	mA

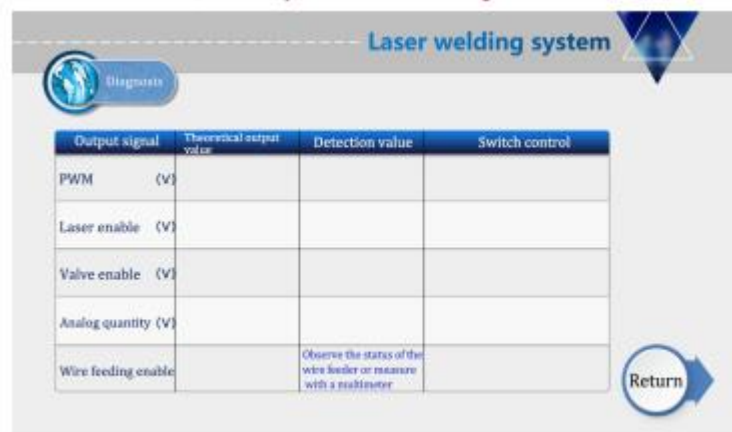
⑤ Communication status

The communication between the touch screen and the main board is displayed.
If there is no synchronization, check the screen connection line.



⑥ Diagnosis

On the monitoring interface, click the "Diagnosis" button to enter the diagnosis interface. No light will be emitted at this time, and it is used to measure whether each signal port has an actual output, usually the output value is consistent with the detection value. When it is inconsistent, the load is abnormal, such as when the laser does not emit light, by switching a single port and using the laser monitoring software or multimeter to measure, it can truly reflect whether the signal is sent out.



4.Maintenance

How to maintain and replace protective lenses:

- ① Before operation, please clean your hands and wipe them dry, and then wipe your hands again with cotton dipped in alcohol.
- ② Remove the screws of the protective lens compartment cover in a relatively dust-free place, pull out the protective lens bracket, and protect it (covered by masking paper). Check the protective lens. If there is obvious burning on the surface of the protective lens, replace it directly.
- ③ Then check the white accumulating sealing ring under the protective lens. (If there is any scratch or deformation of the accumulating seal ring, it cannot be used and must be replaced immediately.
- ④ Wipe the compartment opening and the inside of the compartment cover with a cotton ball dipped in alcohol, quickly insert the protective lens holder into the protective lens compartment, and tighten the screws.

5. Common exception handling

5.1 Prompt laser/water cooler/air pressure alarm

- ① If the above alarm occurs without using the alarm signal, please change the alarm level on the screen setting page.
- ② If the above alarm occurs when the alarm signal is used, check whether the alarm of the corresponding equipment or the high and low levels of the alarm signal are set incorrectly.

5.2 The screen does not light up/click no response

- ① The screen does not light up, if the controller is powered on (the fan is rotating), check whether the four-core wire between the controller and the screen is correctly wired, and whether the 24V voltage of pin 1 and pin 4 is normal
- ② If the click does not work during normal use, check whether the temperature of the whole machine is too high.
- ③ Tap to fail to input, check whether the four-core wire between the controller and the screen is correctly wired, and whether the second and third pins are normal. For details, see 2.1.2 Controller LCD screen end
- ④ If the newly installed device clicks and there is no response, it may be that the system version does not match, just re-swipe the program. Please ask our company for the SD card.

5.3 No light

Normally, the failure of the air to feed the wire is due to the laser failure or the wiring problem. If the air is not fed and the wire is not fed, it may be a signal preparation problem. For details, see: 2.1.3 Controller signal interface 1

5.4 Suddenly stop emitting light during processing

The monitoring interface checks whether the safety lock and other alarms are normal, and at the same time checks whether the temperature exceeds the temperature alarm threshold

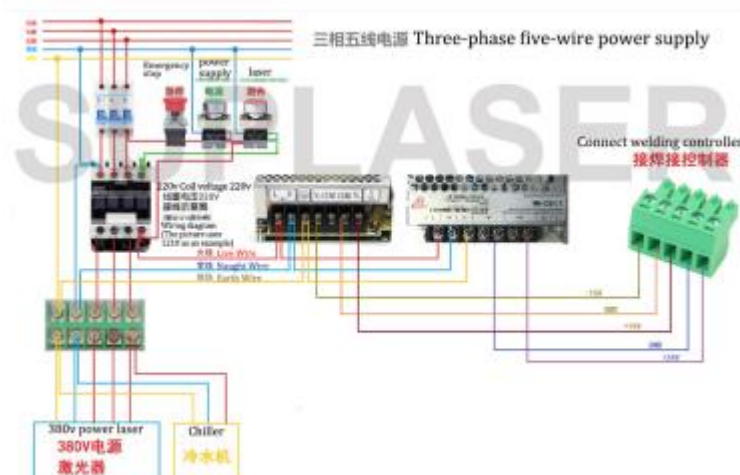
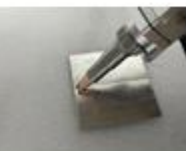


Image	Nozzle	Application			
	AS-12	0.8-1.2 Butt joint welding / inner/external welding	  		
	BS-16	1.6 Butt joint welding / inner/external welding	  		
	CS-12	0.8-1.2 external welding			
	FS-16	1.6 external welding			
	Cutting-2.0	For cutting			
	No wire	Butt joint welding / inner/external welding	  		

Material	Thickness	Scanning Speed	Scanning Width	Power	Welding Angle	Wire size	Wire feed rate
Carbon Steel	1	400	2.5	400	Flat welding	1	80
	1				Internal fillet	1	80
	1				External fillet	1	90
	0.5			200	Flat welding	0.8	100
	0.5				Internal fillet	0.8	100
	0.5				External fillet	0.8	100
	2		3	800	Flat welding	1.2	70
	2				Internal fillet	1.2	70
	2				External fillet	1.2	60
	3			1200	Flat welding	1.2	65
	3				Internal fillet	1.2	75
	3				External fillet	1.2	60
	4		3.5	1600	Flat welding	1.6	60
	4				Internal fillet	1.6	60
	4				External fillet	1.6	60
	5			2000	Flat welding	1.6	60
	5				Internal fillet	1.6	60
	5				External fillet	1.6	60
	6		4	2400	Flat welding	1.6	60
	6				Internal fillet	1.6	60
	6				External fillet	1.6	60
	7		3	2800	Flat welding	1.6	50
	7				Internal fillet	1.6	50
	8			3200	Flat welding	1.6	45
	8				Internal fillet	1.6	45

Material	Thickness	Scanning Speed	Scanning Width	Power	Welding Angle	Generally as carbon steel	
Stainless Steel	1	400	2.5	200			
	1			320			
	1			350			
	2			600			
	2			450	Flat welding		
	2			260	Internal fillet		
	3		3	550	Flat welding		
	3			700	Internal fillet		
	3			800	Flat welding		
	4			1000	Flat welding		
	4			1200	Internal fillet		
	4			1500	Flat welding		
	5				Internal fillet		
	5				Flat welding		
	5			1700	External fillet		
	6			1500	Flat welding		
	6			4	1700		External fillet
	6			5	1900		Internal fillet
	7			3	2600		Flat welding
	7				2800		Internal fillet
	8		3000		Flat welding		
	8				Internal fillet		
Aluminum	Based on the parameters of stainless steel, the power is increased by 20%-30%						