



EF-Hybrid MultiFunction Laser Welder

Owner's Manual



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If any details in this manual is unclear or if you need additional assistance setting up your machine, please feel free to call us at +1 (626) 671-4014 or email at service@gueagle.com.

Introduction

How to Use This Owner's Manual

Thank you for purchasing a GU Eagle EF-Hybrid multifunction laser welder. This machine has been designed to be easy to operate, but you will utilize it to its fullest potential by taking some time to read this owner's manual prior to use. You will be ready to use the machine as soon as you read the first few sections. Then you can refer to topics in the remaining sections, as you work.

Notes Used in This Manual

Look for these kinds of notes to help you find valuable information throughout the text:

NOTE

Helpful notes to keep in mind while running the laser!

IMPORTANT

Important instructions you should always follow.

WARNING

Warnings and cautions to keep in mind while running the laser.

Safety

Laser Safety

Lasers use intense beams of light to create heat and fire as a normal part of their operation, and depending on the laser, the light might not be visible to you. If the proper safety measures are ignored, you could burn or blind yourself or someone else, or start a fire that could damage or destroy the building in which the laser system is housed.

IMPORTANT

ALWAYS wear protecting glasses while doing laser processing.

WARNING

DO NOT aim and fire laser on anything but the workpieces you want to process.

WARNING

DO NOT leave a running laser unattended.

The visible output beam of the Laser Diode Pointer (Red Dot Pointer) is accessible to the operator. While this device employs the same technology as the familiar laser pen-pointers, like them it is potentially hazardous if its beam is directed into the eye.

WARNING

DO NOT view directly into the beam of the Laser Diode Pointer (Red Dot Pointer).

Electrical Safety

The AC input power to the machine is potentially lethal and is fully contained within the cabinet.

WARNING

DO NOT open any of the machine's access panels while the unit is plugged in. Opening a panel may expose the operator to the unit's AC input power.

WARNING

DO NOT make or break any electrical connections to the machine while the unit is turned on.

Installation

Follow the steps below to complete the mechanical installation of the automatic feeder and the other components.

1. [Connect the Automatic Feeder](#)
2. [Connecting the Assist Gas](#)
3. [Filling up the Chiller](#)
4. [Connecting Electrical Power](#)

Connect the Automatic Feeder

1. Open the door, take out the parts.



2. Put the wire guide pipe through the hole on the front side of the feeder, and fix it in the holder.



3. Take out the wire spool locking ring, set the wire spool, and then put the ring back on.



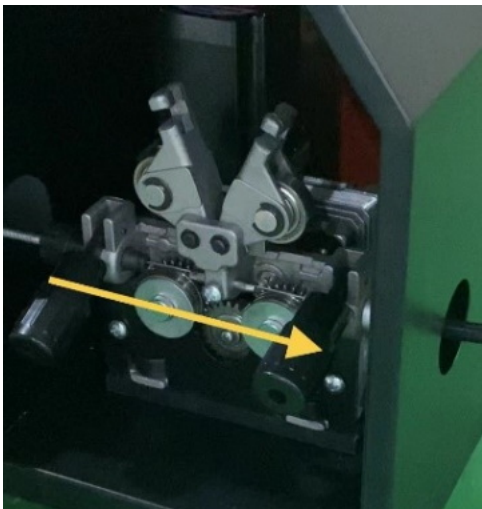
4. Remove the tip of the wire.



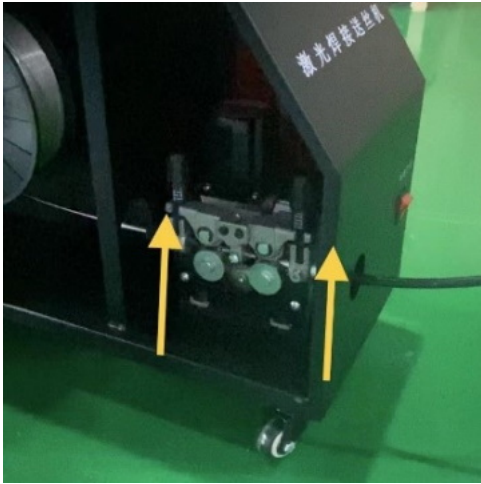
5. Release the feeder.



6. Put the wire through the feeder.



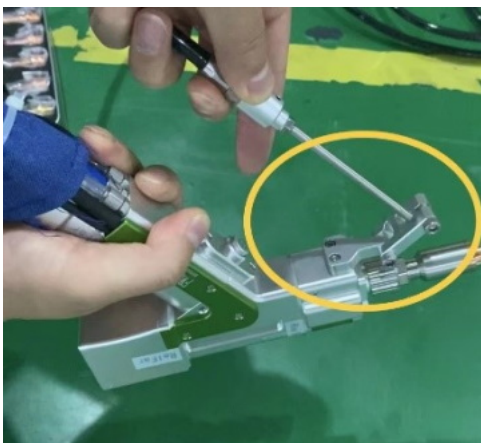
7. Lock the feeder.



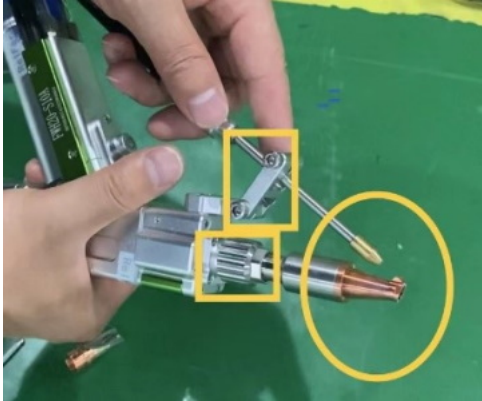
8. Connect the guider with the wire guide pipe.



9. Put the guider through the guide block, and then connect the tip.



10. Adjust the guider's position, allow the wire to go with the nozzle.



11. Connect the control signal and the power cord.



Connecting the Assist Gas

Connect the assist gas to the interface on the backside of the machine.



Filling up the Chiller

Only purified or distilled water is allowed. The chiller should be filled up to the green range of the water gauge, shown as below.

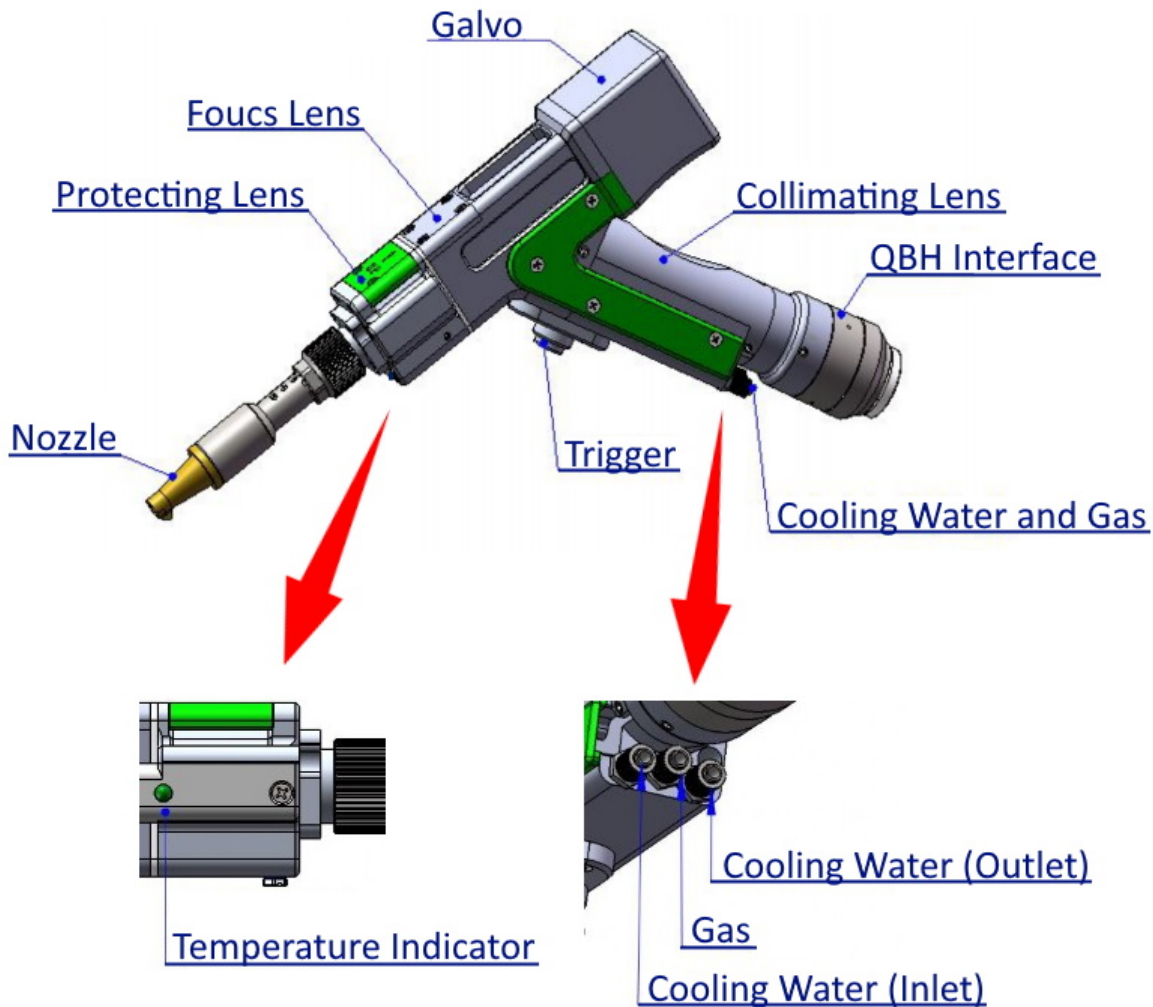


Connecting Electrical Power

We supply the appropriate power cord for the system you ordered. The EF-Hybrid laser welder requires 220-volt electrical power, and will not operate on 110-volt power. It is recommended that a dedicated 30-amp circuit be used if available, but it is not required.

Welding Gun

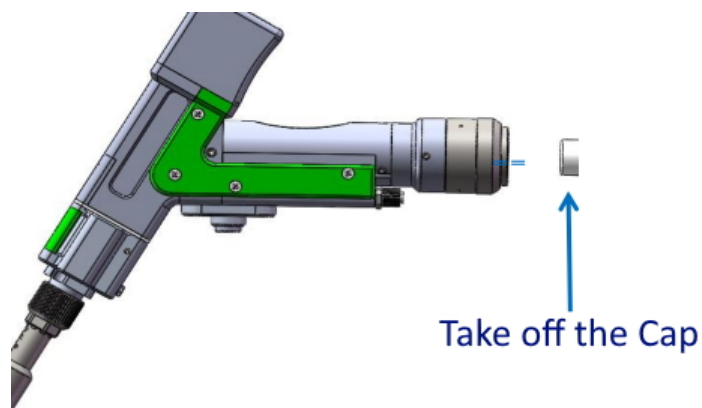
The structure of the welding gun is shown as below. The fiber is connected to the welding gun through the QBH interface. The assist gas and the cooling water are connected to the dedicated interfaces. Laser goes all the way through the collimating lens, the galvo, the focus lens, the protecting lens and hit on the workpiece when users pull the trigger.



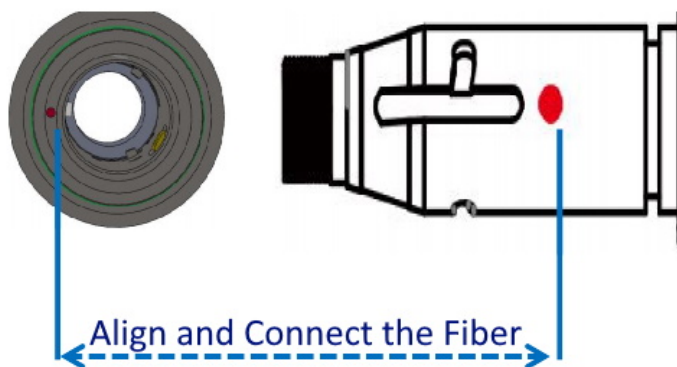
- Connecting the Fiber
- Connecting the Assist Gas and the Cooling Water
- Lens Components
- Switch the Handheld Gun to the Cleaning Mode

Connecting the Fiber

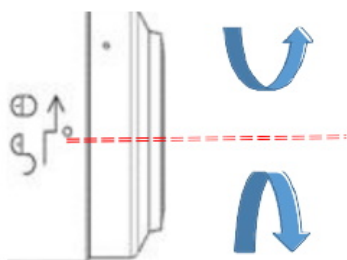
1. Take off the dustproof caps of the QBH interfaces on both the welding gun and the fiber.



2. Align the fiber with the welding gun by the red dots on both of them, and set it straight into the QBH interface, shown as below.

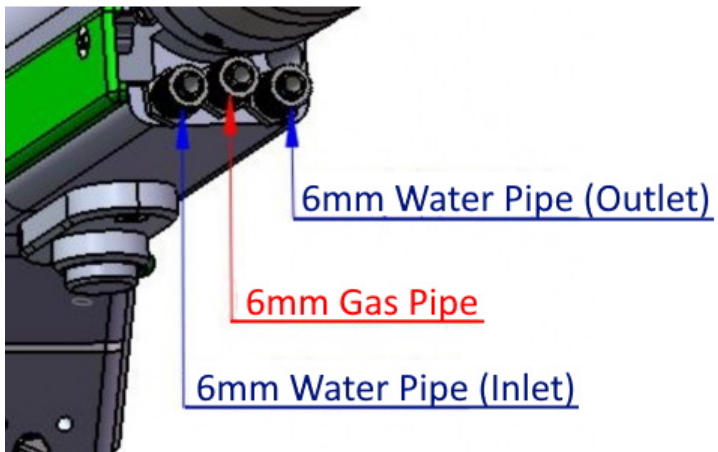


3. Lock the QBH interface.



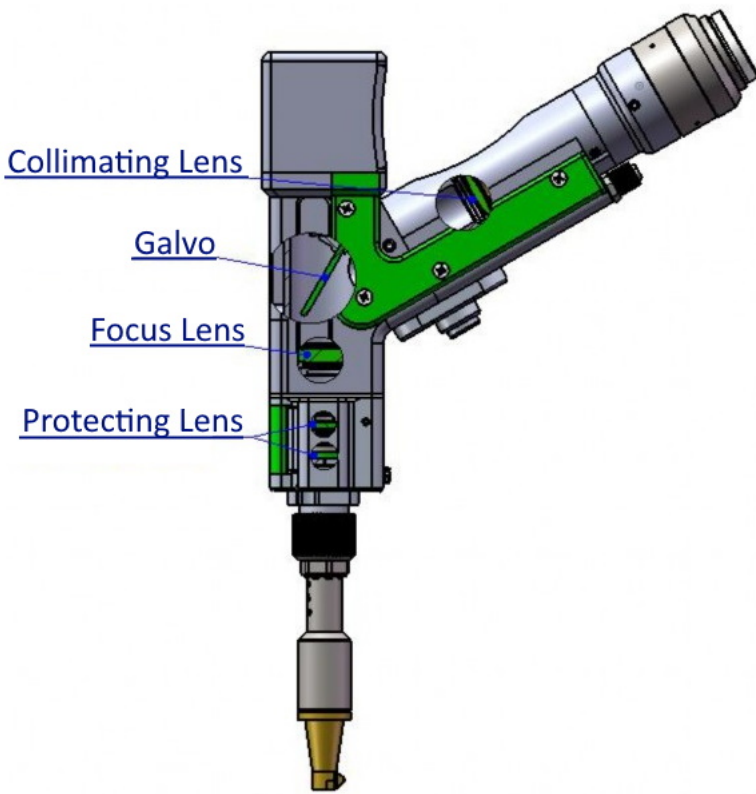
Connecting the Assist Gas and the Cooling Water

Connect the assist gas and the cooling water to the dedicated interfaces, shown as below.



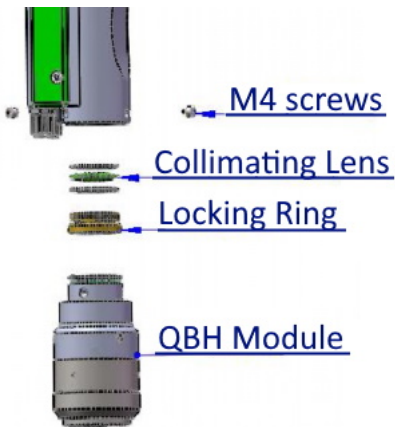
Lens Components

There are several lens components in the welding gun, shown as below.



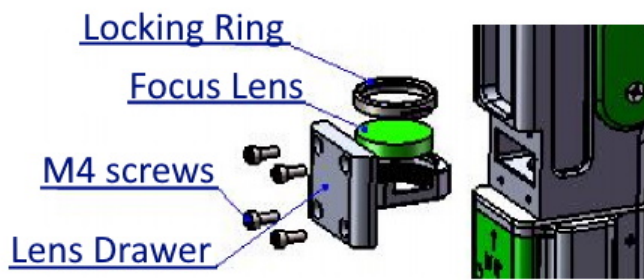
The Collimating Lens

The collimating lens expands the laser beam a little bit thicker, helps improve the power density on the focal point.



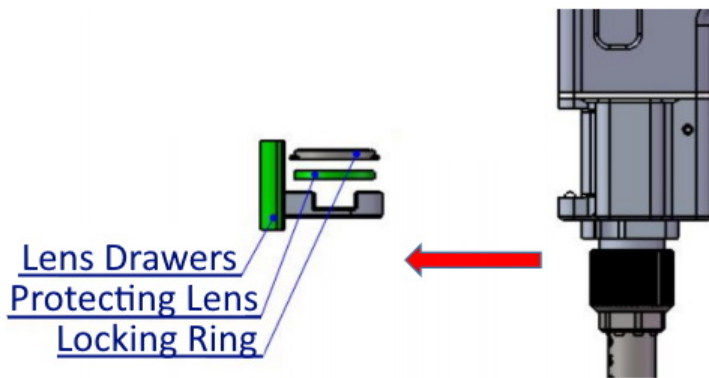
The Focus Lens

The focus lens gets laser converging at the focal point.



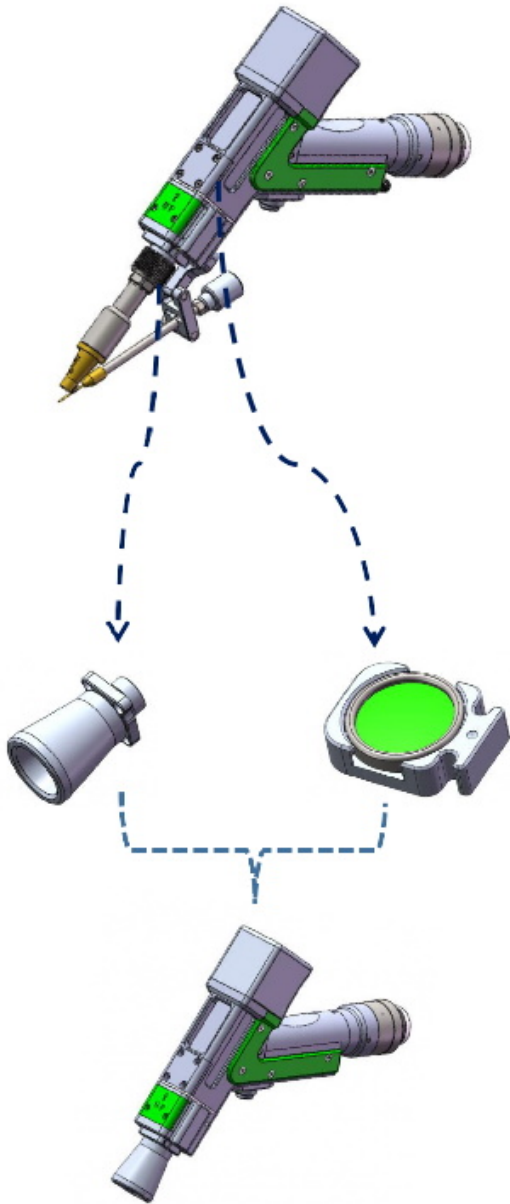
The Protecting Lens

The protecting lens keeps the focus lens from dust and debris.



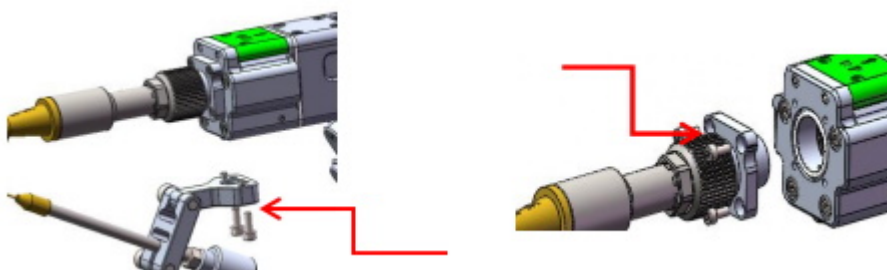
Switch the Handheld Gun to the Cleaning Mode

The machine needs different setup of the handheld gun for welding and cleaning, you need to switch the handheld gun to the proper setup according to the job.

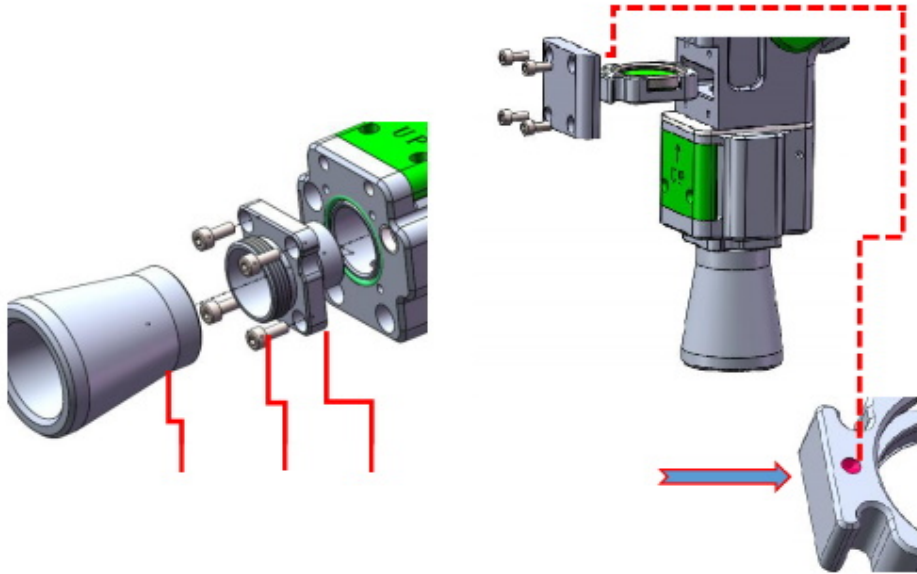


Handheld Gun Setup for Cleaning

1. Remove the wire guide block and the welding head.



2. Install the cleaning head, and replace the focus lens for cleaning.



Basics

- [Turn on the Machine](#)
- [Turn off the Machine](#)
- [Control System User Interface](#)
- [Function Tests](#)
- [Switch the Control System to the Cleaning Mode](#)

Turn on the Machine

1. Connect electrical power.
2. Turn on the protecting switch on the backside of the machine.



3. Release the emergency button.



4. Turn on the main switch.
5. Turn on the chiller.

IMPORTANT

The laser can **NOT** work if the water temperature is below 68 F (20 C). Please turn on the machine in advance to warm up if ambient temperature is low.

6. Turn on the laser.

7. Turn on the automatic feeder.



Turn on the automatic feeder

8. Open the assist gas.



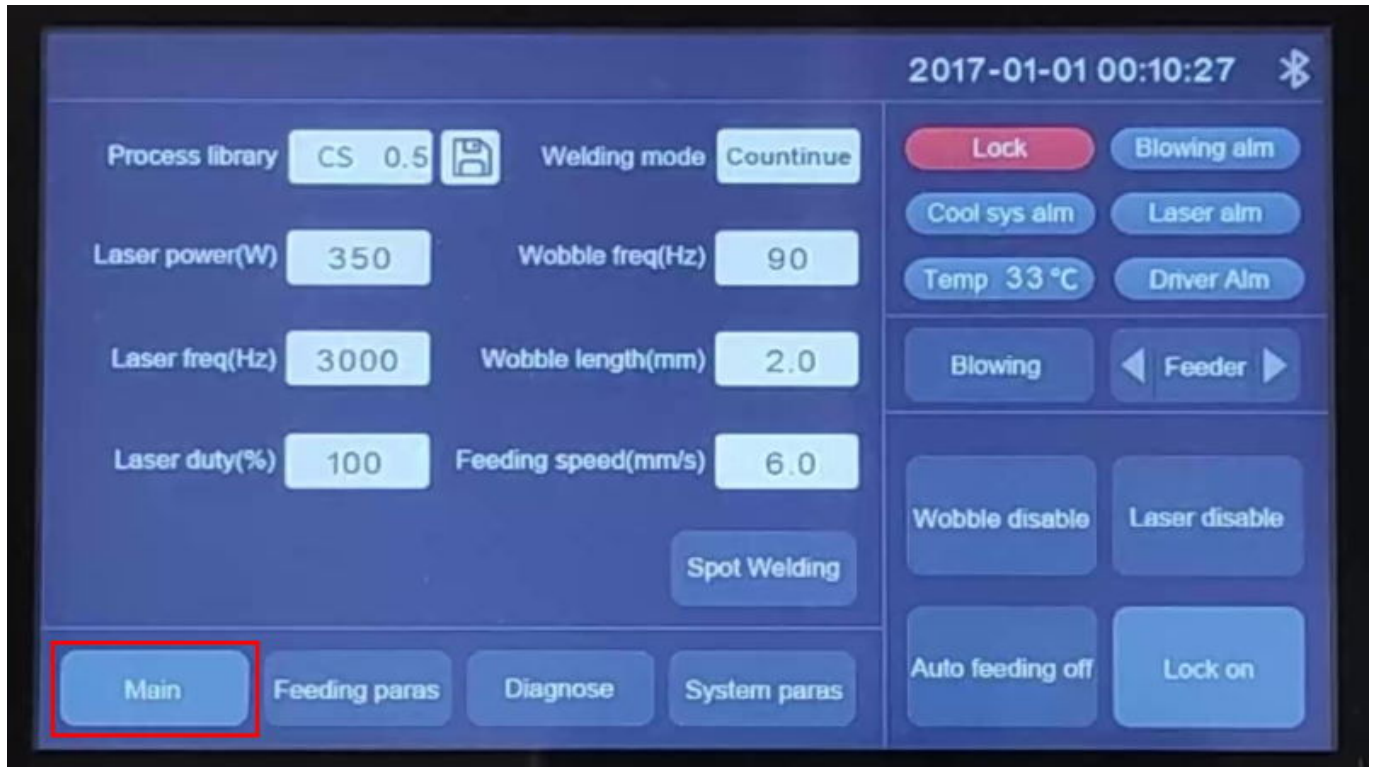
Turn off the Machine

1. Close the assist gas.
2. Turn off the automatic feeder.
3. Turn off the laser.
4. Turn off the chiller.
5. Turn off the main switch.
6. Turn off the protecting switch on the backside of the machine.
7. Disconnect electrical power.

Control System User Interface

The machine is equipped with a 7" touch screen panel which provides you a user friendly interface. You can set processing parameters, control welding and cleaning, check machine status, do function tests, switch processing mode, and control almost all aspects of the machine through the UI.

The picture below shows the main UI of the welding mode.



You can see the main welding parameters on the left side, including the laser parameters, the galvo parameters and the feeding speed. And you can see the status information of the machine on the top right corner, such as chiller, laser, etc. The buttons on the bottom right corner are for setting the machine to the *READY* state to start welding.

Refer to the list below for more details.

- Process library
To open the welding parameters library UI.
The control system provides you a set of predefined welding parameters for different materials. For convenience, you can just pick one to use according to the workpiece, and then make some adjustments if the welding result is not as good as expected.
- Welding mode
To set laser output to continuous or pulse mode.
- Laser power
To set the laser power for welding.
- Laser freq
To set the signal frequency for laser modulation.

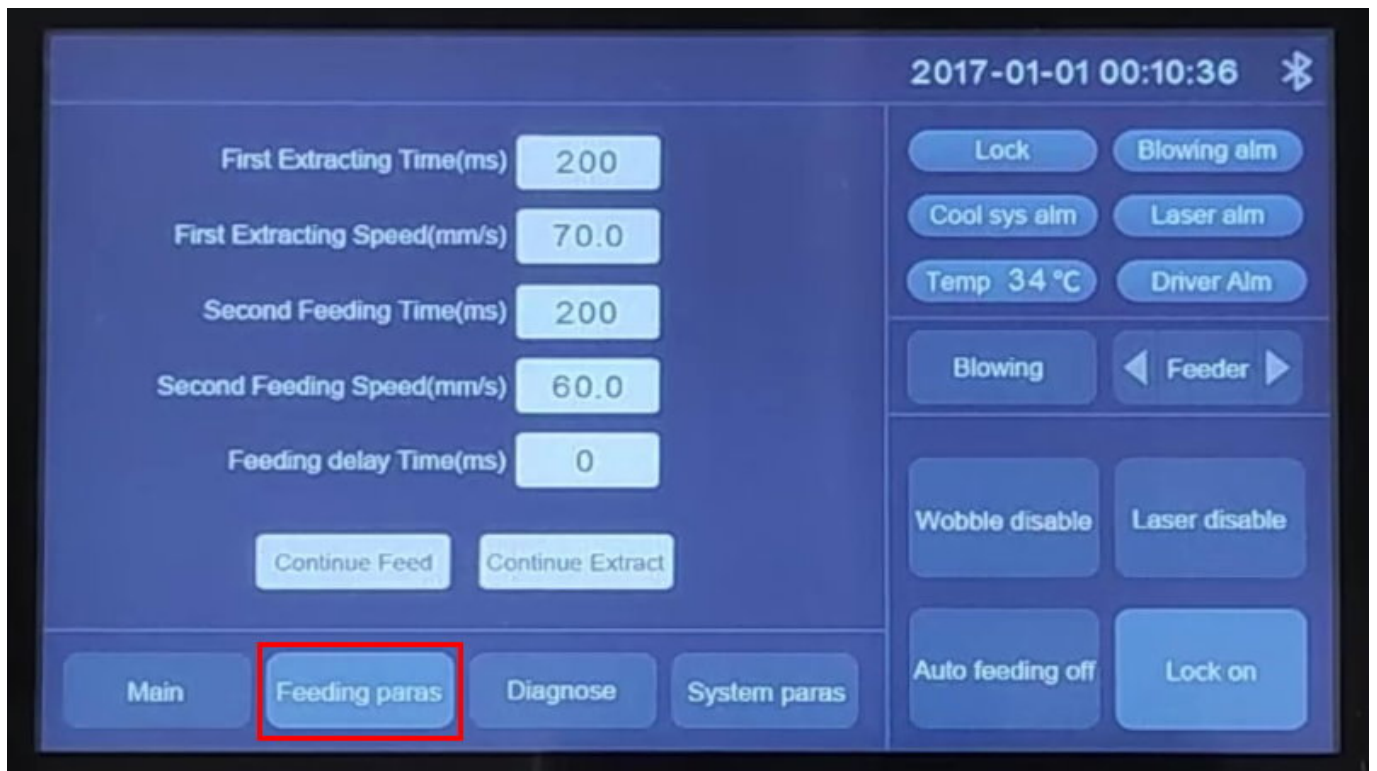
- Laser duty
To set the signal duty cycle for laser modulation.
- Wobble freq
To set the swing frequency of galvo.
- Wobble length
To set the sweep width on the workpiece.
- Feeding speed
To set the wire feeding speed for welding.

Click on the **Process library** button, you'll see the welding parameters library UI, shown as below.



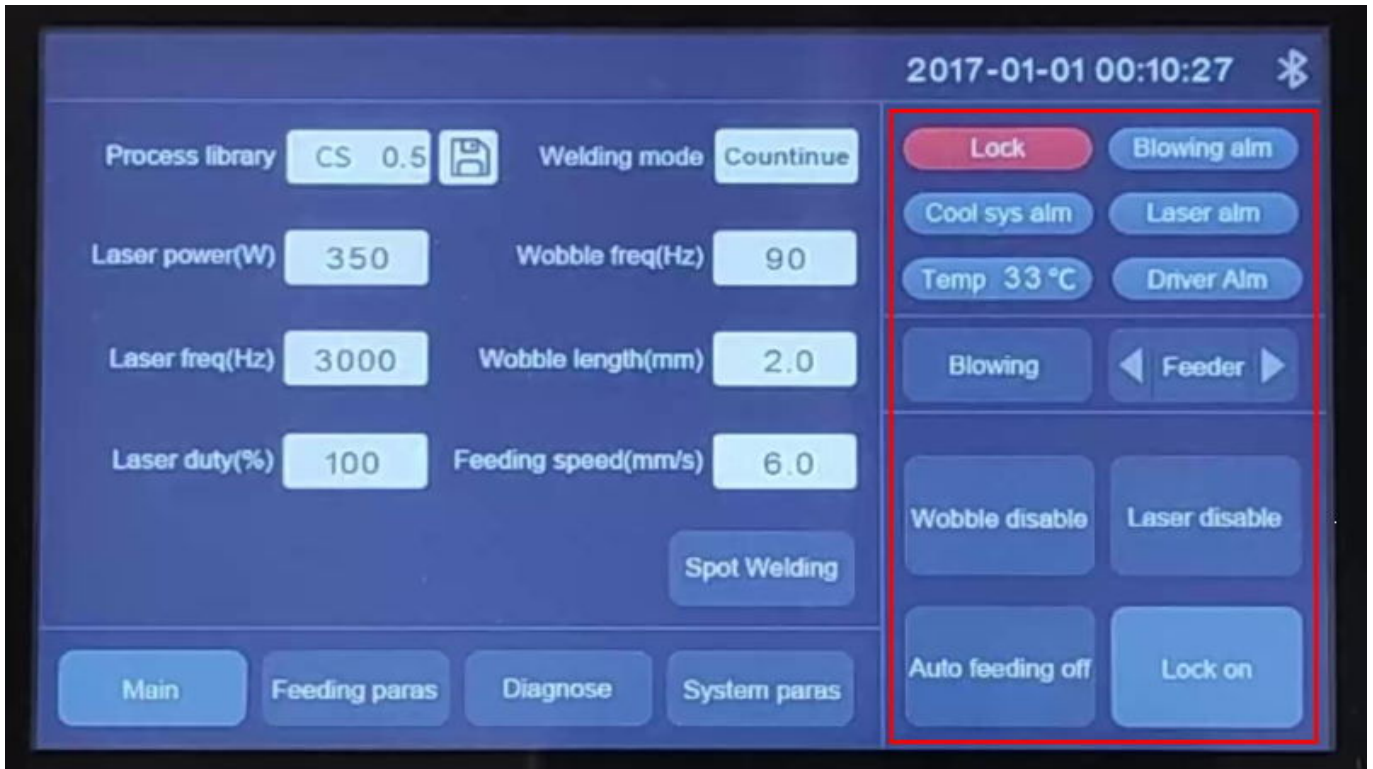
You can choose material type on the left list, choose material thickness on the right table, and then click **Export** to confirm the selection.

Back to the main UI, click on the **Feeding paras** button, you'll see the full parameters list of automatic feeding, shown as below.



Function Tests

In the main UI of the welding mode, you can do some basic function tests.



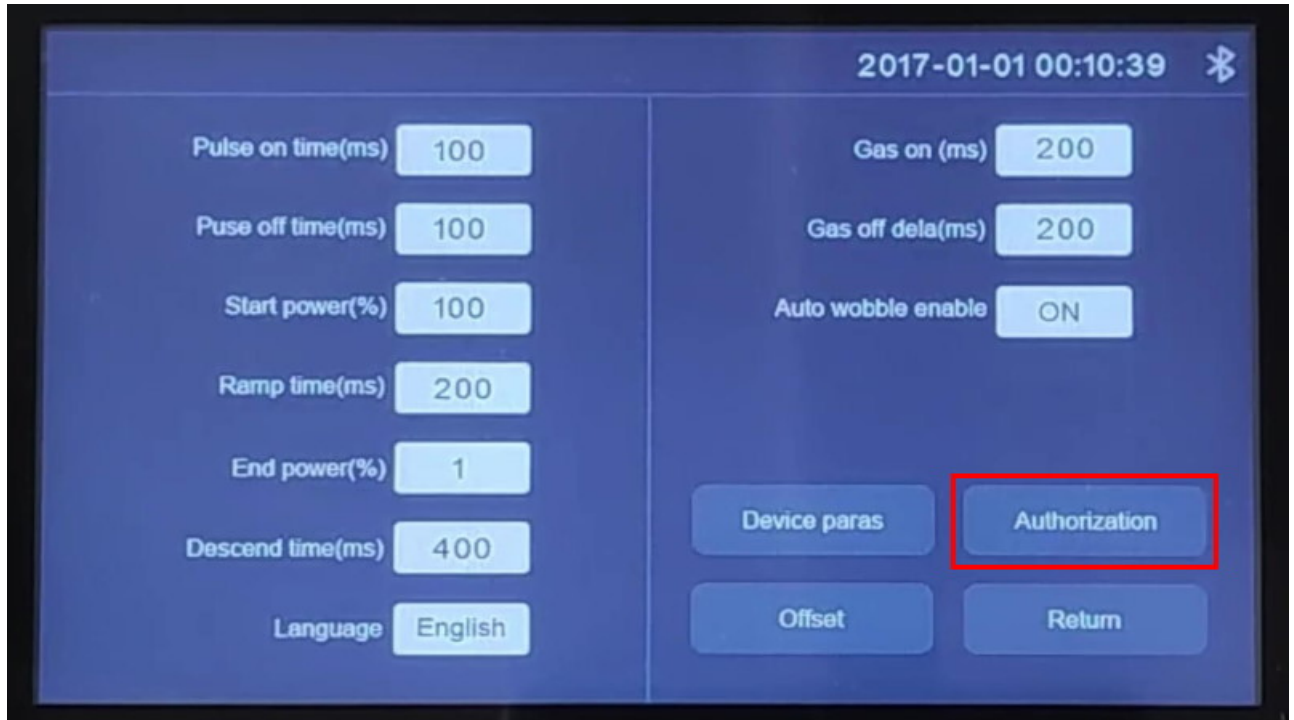
- Assist gas test
After the assist gas been turned on, you can click on the **Blowing** button to check whether the assist gas works properly.
- Wire feeding test
After the automatic feeder been turned on, you can click on the left or right arrow of the **Feeder** button to check whether the feeder works properly.
- Chiller test
After the chiller been turned on, you can check if there's any alarm on it. If the water temperature is below 68 F (20 C), you should wait for the water to get warmer enough to enable the laser.
- Laser test
After the laser been turned on, you can check whether the laser works properly. First, click on the **Wobble** button to enable the galvo. Second, click on the **Laser** button to enable the laser. Third, click on the **Lock** button to set the machine to the *READY* state. Fourth, set the safety clip on the workpiece. Finally, aim the welding gun on the workpiece, press the trigger, and check if there's laser firing on the workpiece.

Switch the Control System to the Cleaning Mode

Before doing cleaning, you need to switch the handheld gun (refer to [Handheld Gun Setup for Cleaning](#) for more information) and the control system to the cleaning mode.

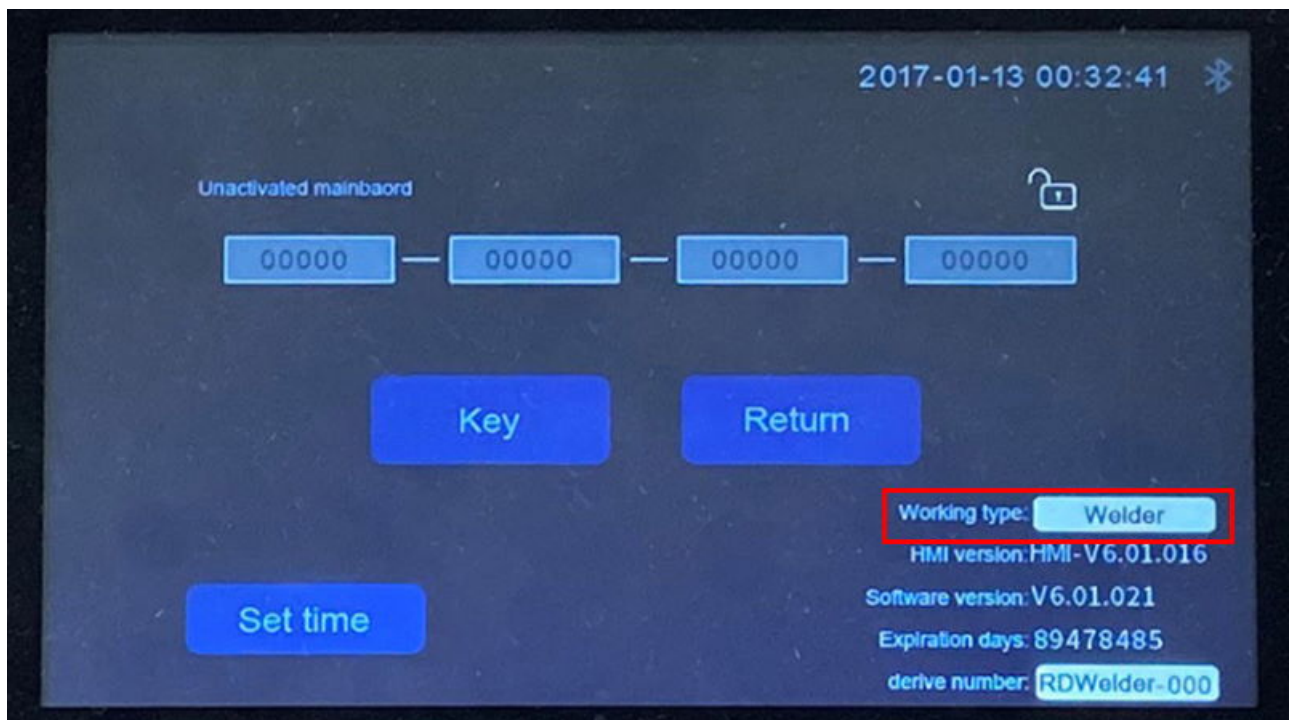
1. Open the system parameters UI.

In the main UI of the welding mode, click on the **System paras** button, you'll see the system parameters UI, shown as below.



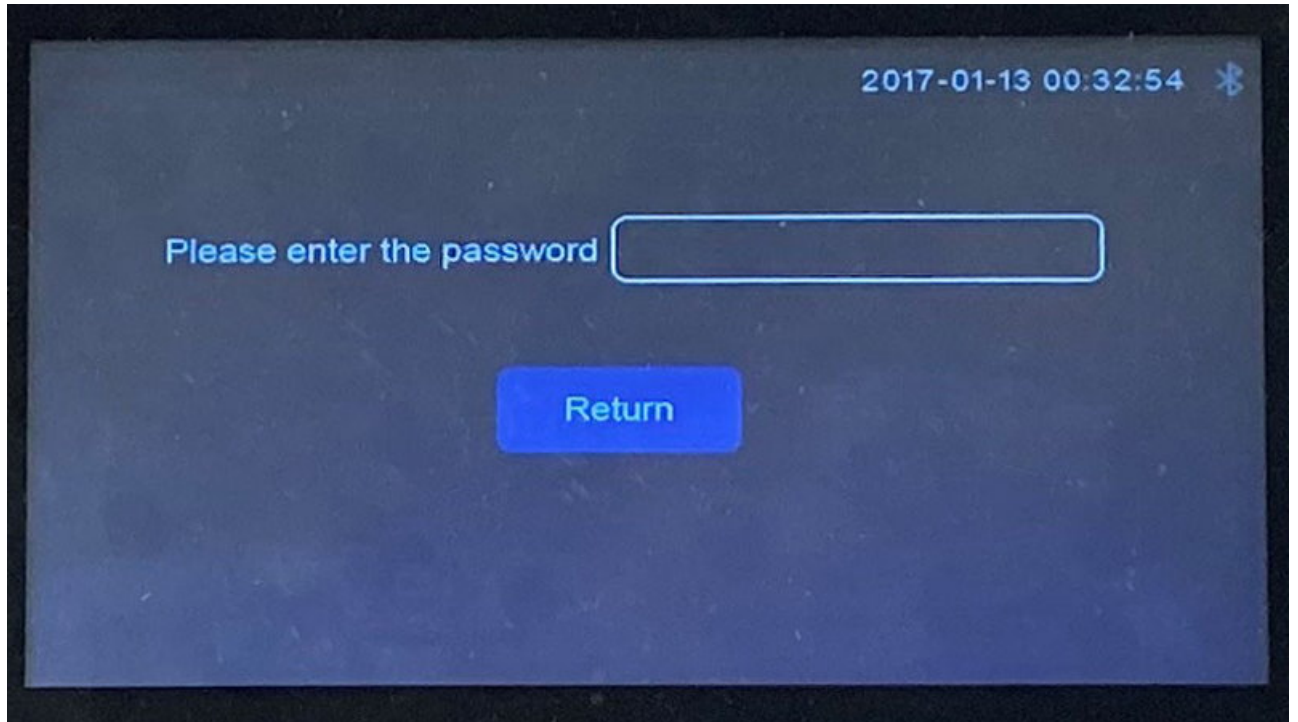
2. Open the authorization UI.

Click on the **Authorization** button, you'll see the authorization UI, shown as below.



3. Open the working type UI.

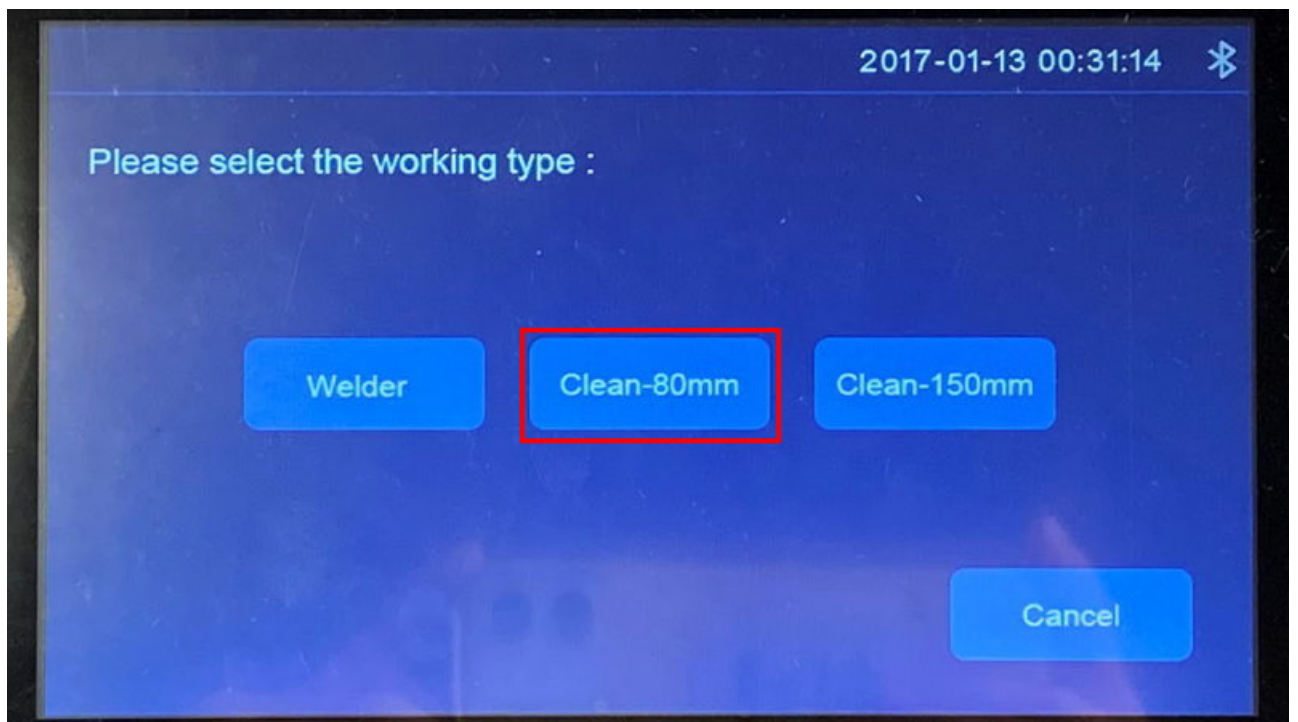
Click on the **Working type** button, you'll be prompted with a password UI, shown as below.



4. Input '666666' as password.

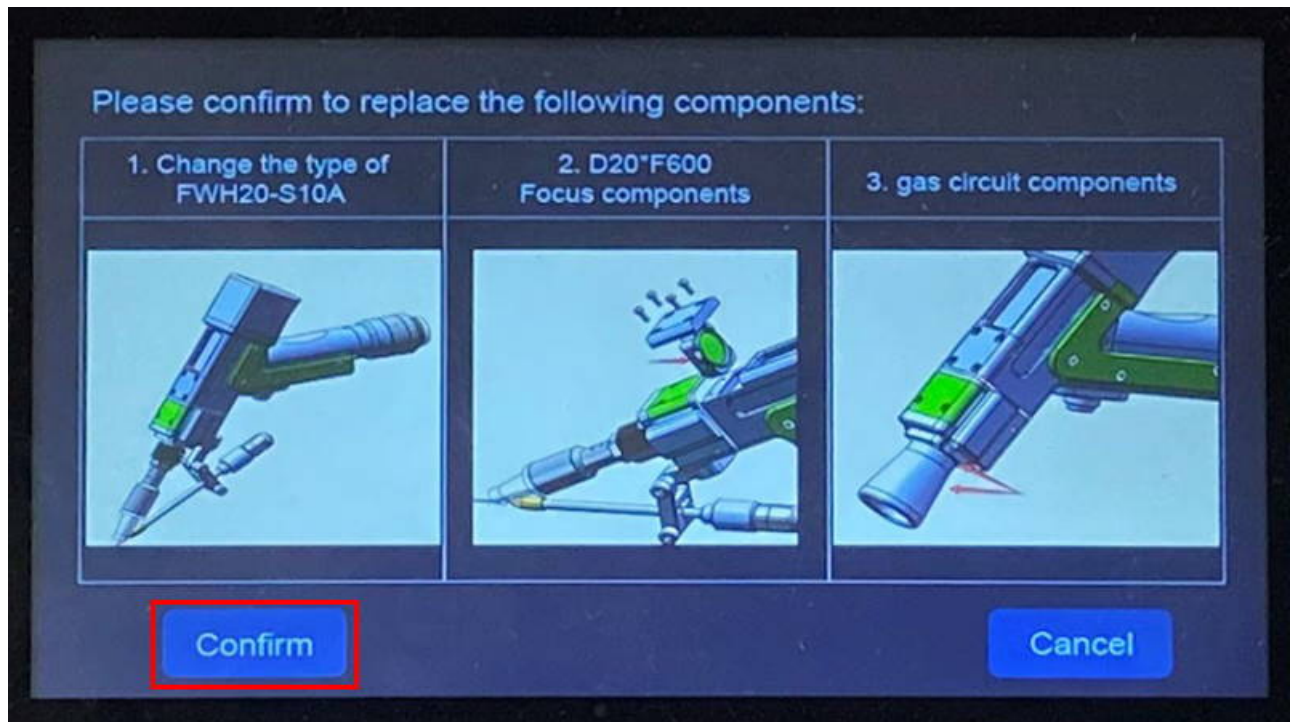
5. Switch to the cleaning mode.

Click on the **Clean-80mm** button to switch to the cleaning mode.



6. Confirm the handheld gun setup.

Switch the handheld gun to the cleaning mode, refer to [Handheld Gun Setup for Cleaning](#) for more information. And then click on the **Confirm** button.



7. Restart the machine, finish the switching.

After restarting the machine, the system will prompt you again with the handheld gun setup confirmation UI. The system will complete switching and be in the cleaning mode after clicking on the **Confirm** button.

The picture below shows the UI of the cleaning mode.



You can see the cleaning parameters on the left side, including the laser parameters and the scanning parameters. And you can see the status information of the machine on the top right corner, such as chiller, laser, etc. The button on the bottom right corner are for setting the machine to the *READY* state to start cleaning.

Refer to the list below for more details.

- Para number
The control system provides you a set of predefined cleaning parameters. For convenience, you can just pick one to use according to the workpiece, and then make some adjustments if the cleaning result is not as good as expected.
- Laser power
To set the laser power for cleaning.
- Laser freq
To set the signal frequency for laser modulation.
- Laser duty
To set the signal duty cycle for laser modulation.
- Scan speed
To set the sweep speed on the workpiece.
- Scan length
To set the sweep width on the workpiece.

Welding

Please follow the steps below to do welding.

1. Turn on the machine.

Refer to [Turn on the Machine](#) for more information.

2. Prepare and fix the workpieces.

Set the safety clip on the workpiece or the working table which must be electrically conducted with the workpieces.

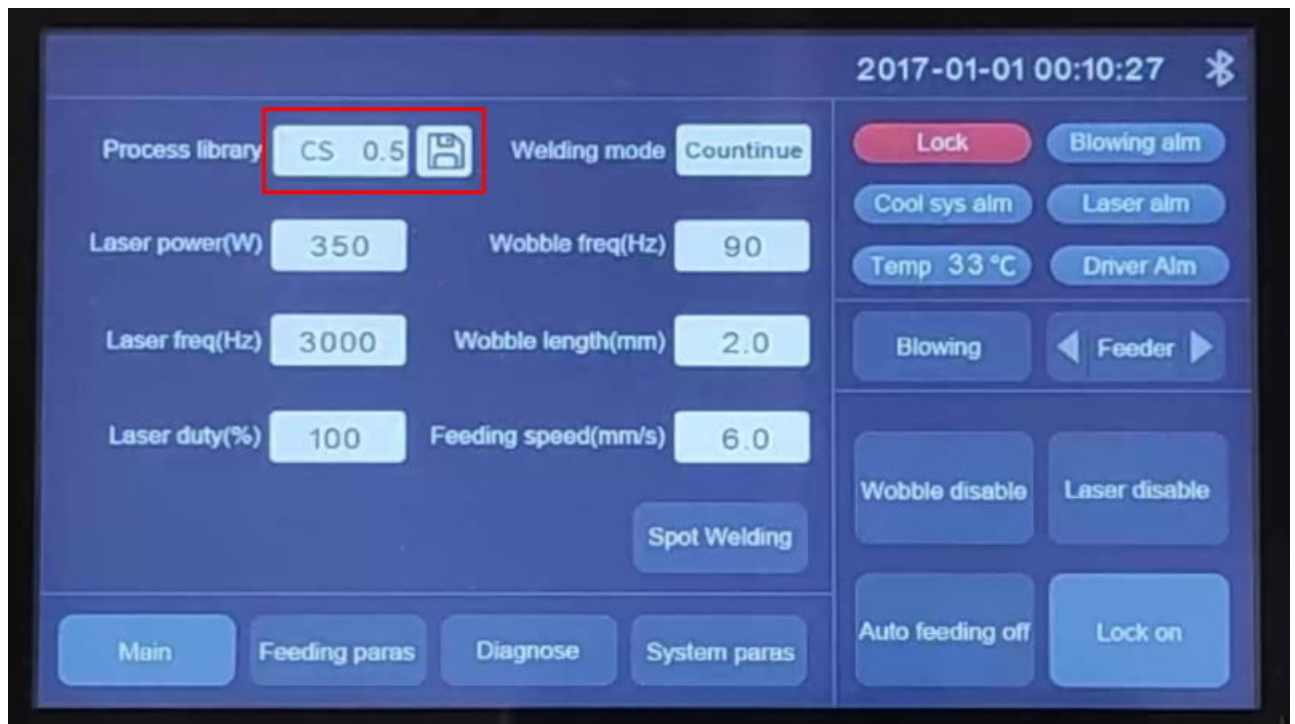
IMPORTANT

The safety clip must be electrically conducted with the workpieces, otherwise, the laser would **NOT** be fired.



3. Set welding parameters.

Click on the **Process library** button on the main UI of the welding mode.

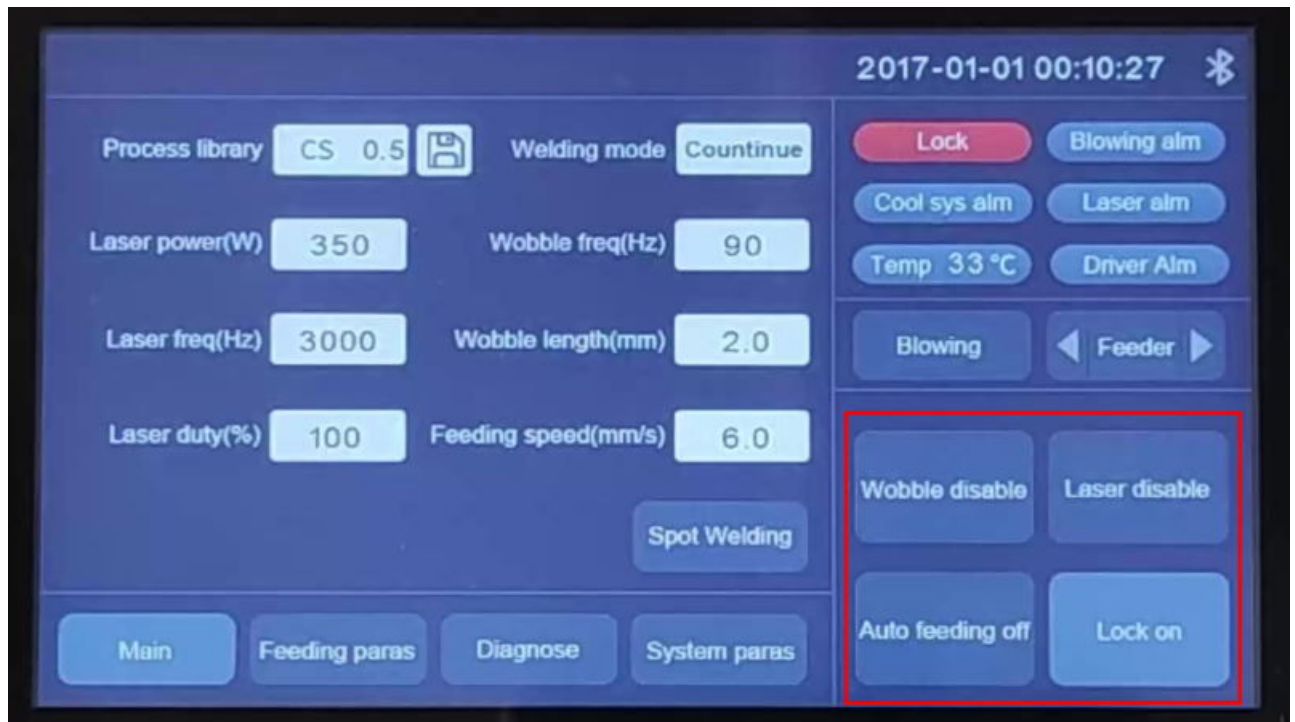


In the welding parameters library UI, set material type and thickness, and then click on the **Export** button to confirm the selection.



4. Set the machine to the *READY* state.

Click on the **Auto feeding** button, click on the **Wobble** button, click on the **Laser** button, and then click on the **Lock** button, to set the machine to the *READY* state.



5. Put on the protecting glasses.

WARNING

The protecting glasses **MUST** be worn properly to avoid eyes hurting.



6. Aim the welding gun to the start position of welding.



7. Press and hold the trigger, and then move the welding gun smoothly along the welding path.



8. Release the trigger while the welding gun is moved across the end position of welding.

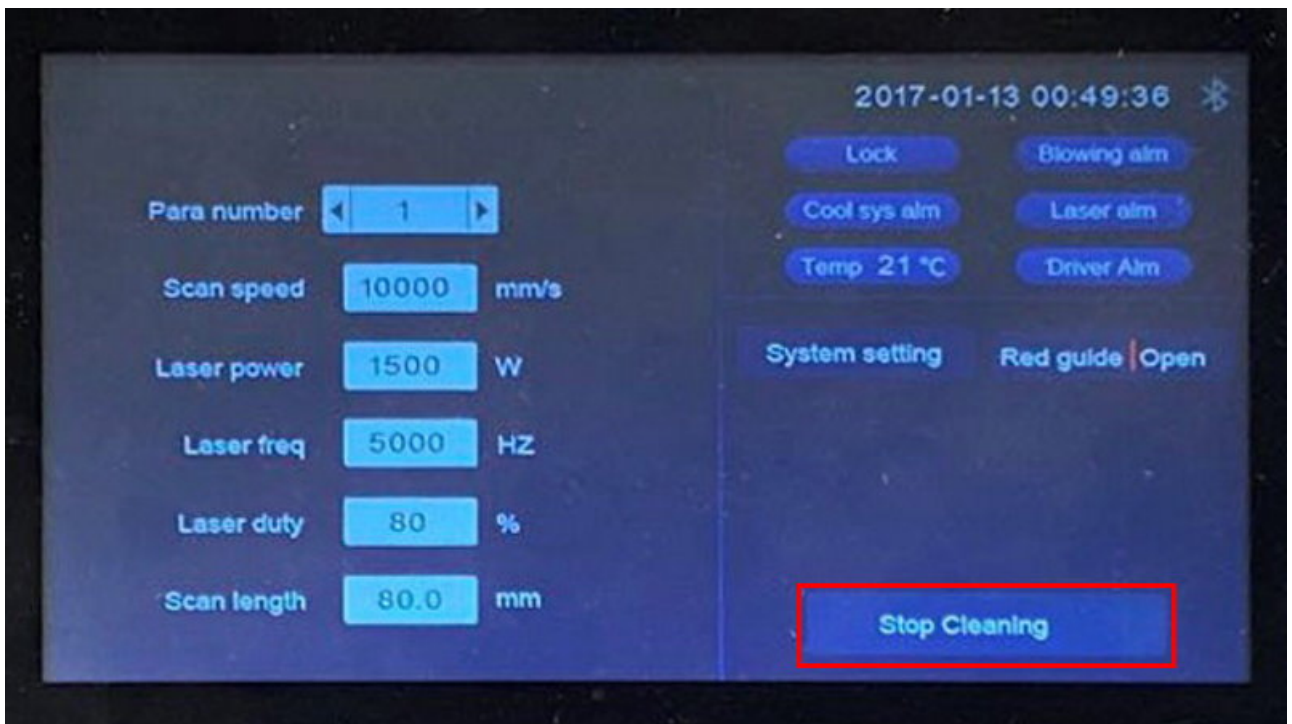
9. Set the machine to the *IDLE* state.

Click on the **Lock** button, click on the **Laser** button, click on the **Wobble** button, and then click on the **Auto feeding** button, to set the machine to the *IDLE* state.

Cleaning

Please follow the steps below to do cleaning.

1. Switch the machine to the cleaning mode.
Refer to [Switch the Control System to the Cleaning Mode](#) for more information.
2. Turn on the machine.
Refer to [Turn on the Machine](#) for more information.
3. Prepare the workpiece.
4. Set cleaning parameters.



5. Set the machine to the *READY* state.
Click on the **Cleaning** button to set the machine to the *READY* state.

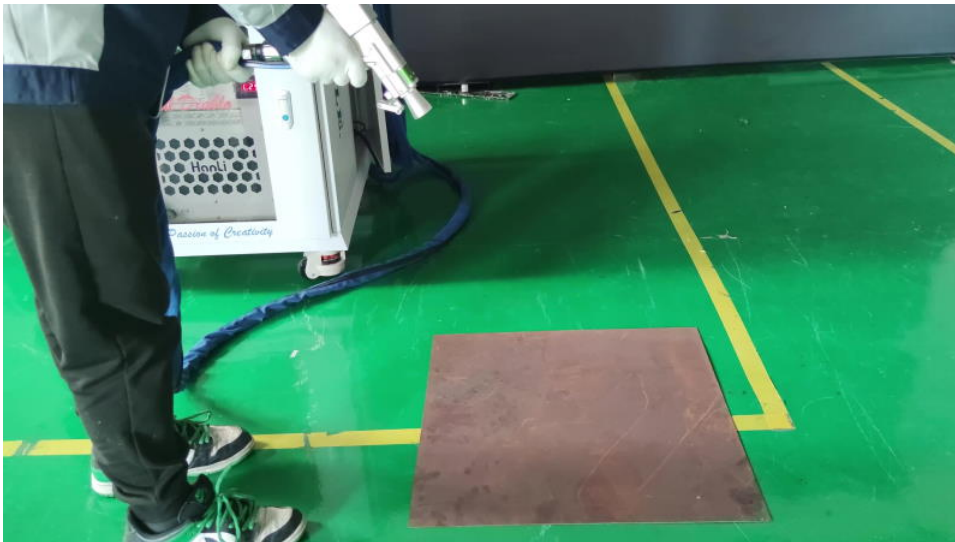
6. Put on the protecting glasses.

WARNING

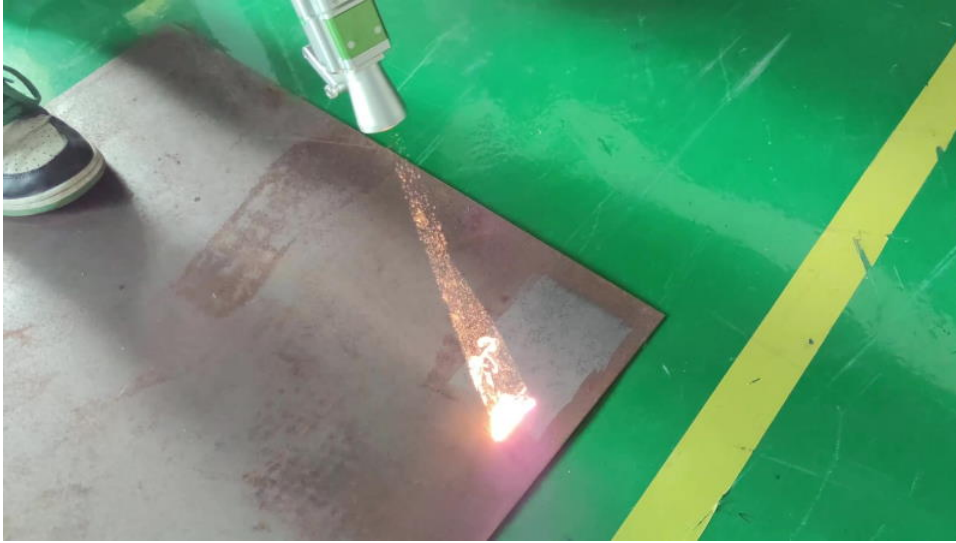
The protecting glasses **MUST** be worn properly to avoid eyes hurting.



7. Aim the handheld gun to the workpiece.



8. Press and hold the trigger, adjust the distance between the handheld gun and the workpiece to get the most powerful cleaning effect, and then swing the handheld gun smoothly along the workpiece to do cleaning.



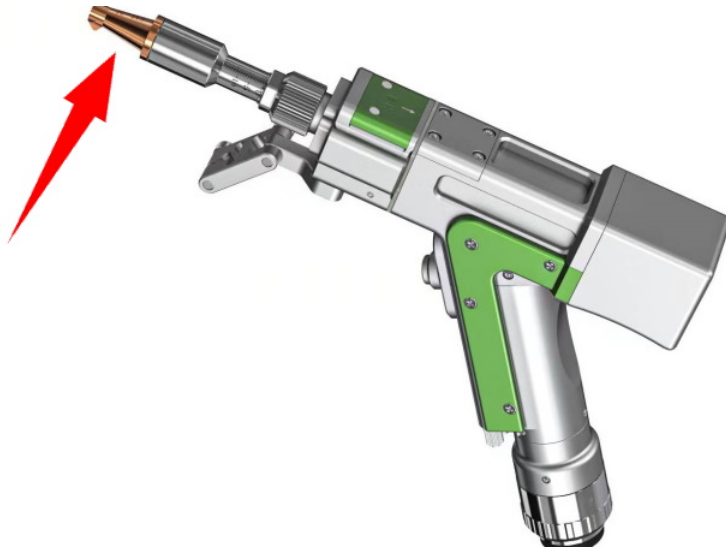
9. Release the trigger to stop cleaning.
10. Set the machine to the *IDLE* state.
Click on the **Cleaning** button to set the machine to the *IDLE* state.

Maintenance

- [Cleaning and Replacing the Nozzle](#)
- [Clean and Replace the Protecting Lens](#)
- [Clean and Replace the Focus Lens](#)
- [Replacing the Cooling Water](#)
- [Cleaning the Dustproof Filter of the Chiller](#)

Cleaning and Replacing the Nozzle

You should check whether the nozzle of the welding gun is clean from time to time. If the nozzle is getting dirty, please clean it with a stiff brush. If the nozzle is too dirty to clean up, or scratched too much, please replace it with a new one.



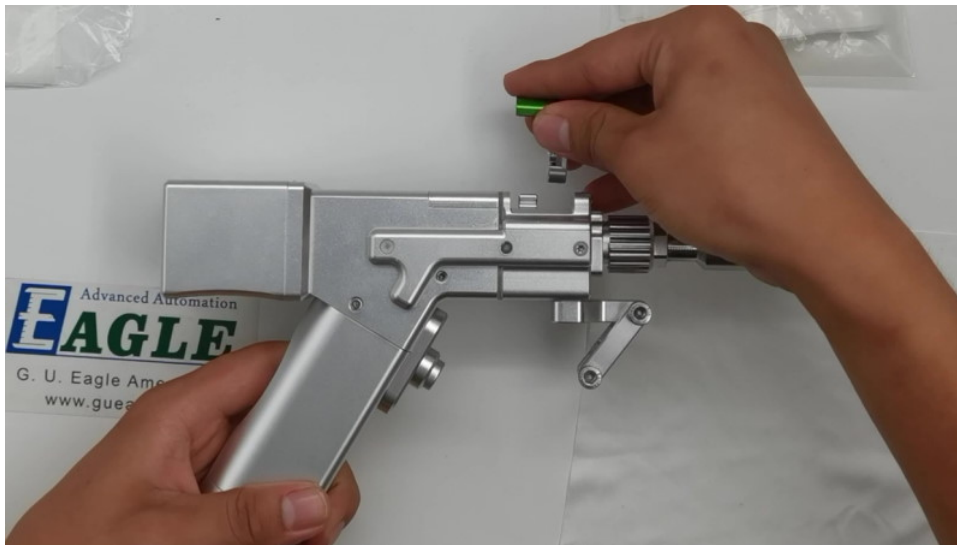
Clean and Replace the Protecting Lens

You should check whether the protecting lens is clean every day or at least every week, depends on how often you use the machine.

If the protecting lens is getting dirty, please clean it immediately, otherwise, the laser firing on workpieces will be getting weak, and the protecting lens itself will be easy to be scratched or even cracked.

Follow the steps below to clean the protecting lens.

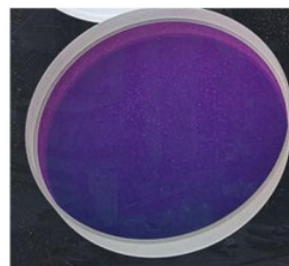
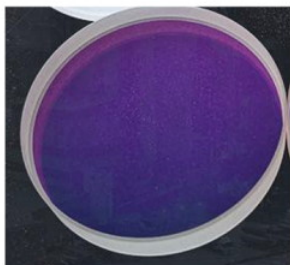
1. Turn off the machine.
Refer to [Turn off the Machine](#) for more information.
2. Pull out the protecting lens module.



3. Clean the protecting lens with a rubber dust blower and then a cotton swab dipped with alcohol.

NOTE

Please wipe the lens in just **ONE** direction, for example, from left to right, or from top to bottom.



4. Push the protecting lens module back in the welding gun.

If the protecting lens is too dirty to clean up, or it has been scratched too much or cracked, please replace it with a new one.

Follow the steps below to replace the protecting lens.

1. Turn off the machine.
Refer to [Turn off the Machine](#) for more information.
2. Pull out the protecting lens module.
3. Remove the locking ring.



4. Take out the old lens.



5. Put a new lens back in.
6. Tighten the locking ring.
7. Push the protecting lens module back in the welding gun.

Clean and Replace the Focus Lens

You should check whether the focus lens is clean every week or at least every month, depends on how often you use the machine.

If the focus lens is getting dirty, please clean it immediately, otherwise, the laser firing on workpieces will be getting weak, and the focus lens itself will be easy to be scratched or even cracked.

Follow the steps below to clean the focus lens.

1. Turn off the machine.

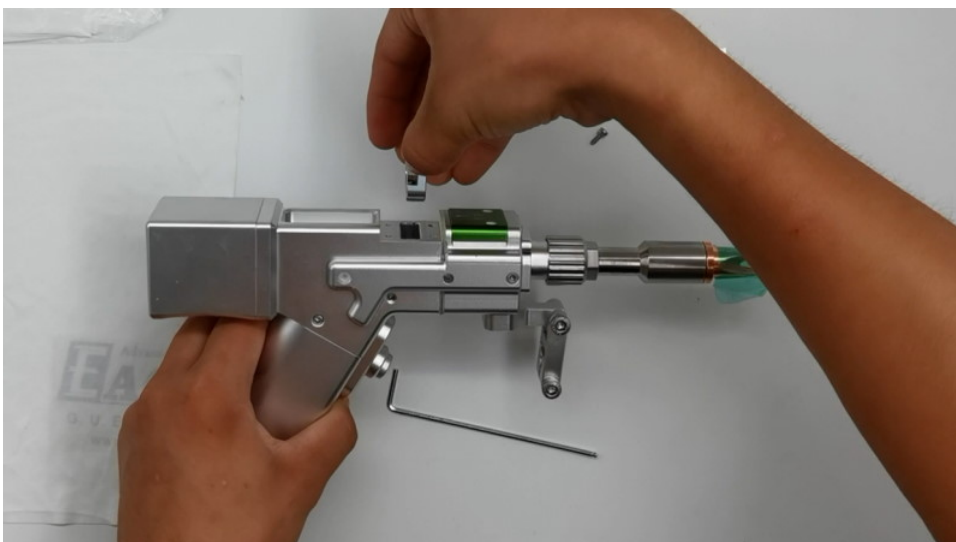
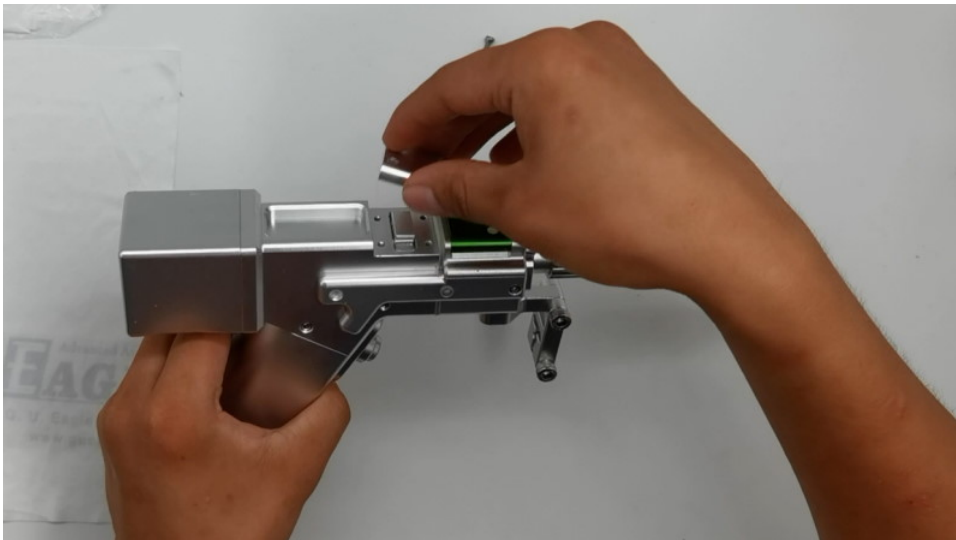
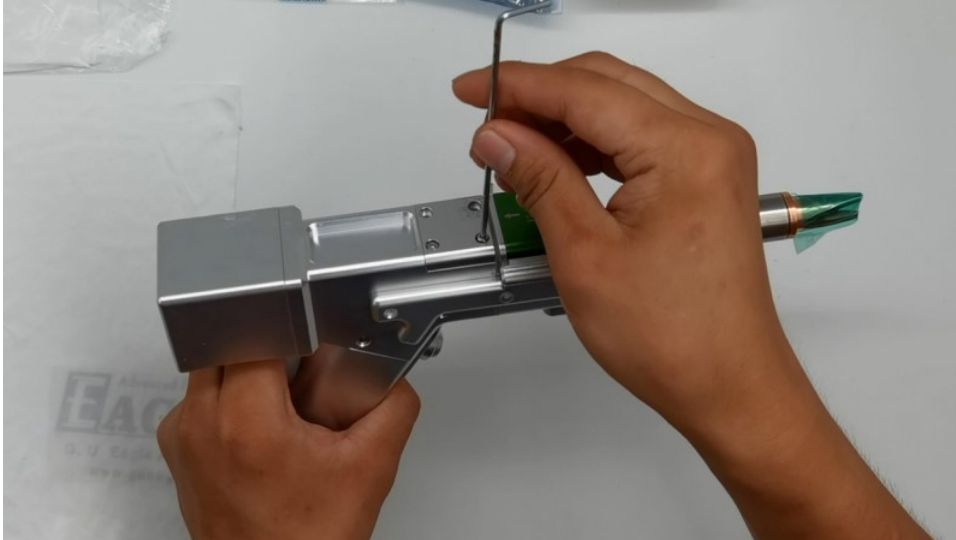
Refer to [Turn off the Machine](#) for more information.

2. Take out the focus lens module.

Remove the screws first, remove the cover, and then pull out the module.

IMPORTANT

Please keep an eye on **DIFFERENT** curvature of the two sides of the lens. The lens must be put back in the same way, otherwise, the laser beam would not be converged properly.



3. Clean the focus lens with a rubber dust blower and then a cotton swab dipped with alcohol.

NOTE

Please wipe the lens in just **ONE** direction, for example, from left to right, or from top to bottom.

4. Put the focus lens module back in the welding gun.

Push the module back in, set the cover back, and then tighten the screws.

If the focus lens is too dirty to clean up, or it has been scratched too much or cracked, please replace it with a new one.

Follow the steps below to replace the focus lens.

1. Turn off the machine.

Refer to [Turn off the Machine](#) for more information.

2. Take out the old focus lens module.

Remove the screws first, remove the cover, and then pull out the old module.

IMPORTANT

Please keep an eye on **DIFFERENT** curvature of the two sides of the lens. The new lens must be put back in the same way, otherwise, the laser beam would not be converged properly.

3. Put a new focus lens module back in the welding gun.

Push a new module back in, set the cover back, and then tighten the screws.



Replacing the Cooling Water

The cooling water will be getting dirty after looping in the chiller and the laser for 2 or 3 month. Follow the steps below to replace the cooling water.

1. Turn off the machine.
Refer to [Turn off the Machine](#) for more information.
2. Drain the chiller.
Move the machine to a floor drain, and then remove the drain cap of the chiller.



3. Re-fill up the chiller.
Refer to [Filling up the Chiller](#) for more information.

Cleaning the Dustproof Filter of the Chiller

The chiller's dustproof filter will be getting dirty after the machine running for 2 or 3 month. Follow the steps below to clean it up.

1. Turn off the machine.
Refer to [Turn off the Machine](#) for more information.
2. Remove the filter cover.



3. Clean the dustproof filter.
4. Put the filter cover back.

Frequently Asked Questions

There's no laser coming out while pressing the trigger

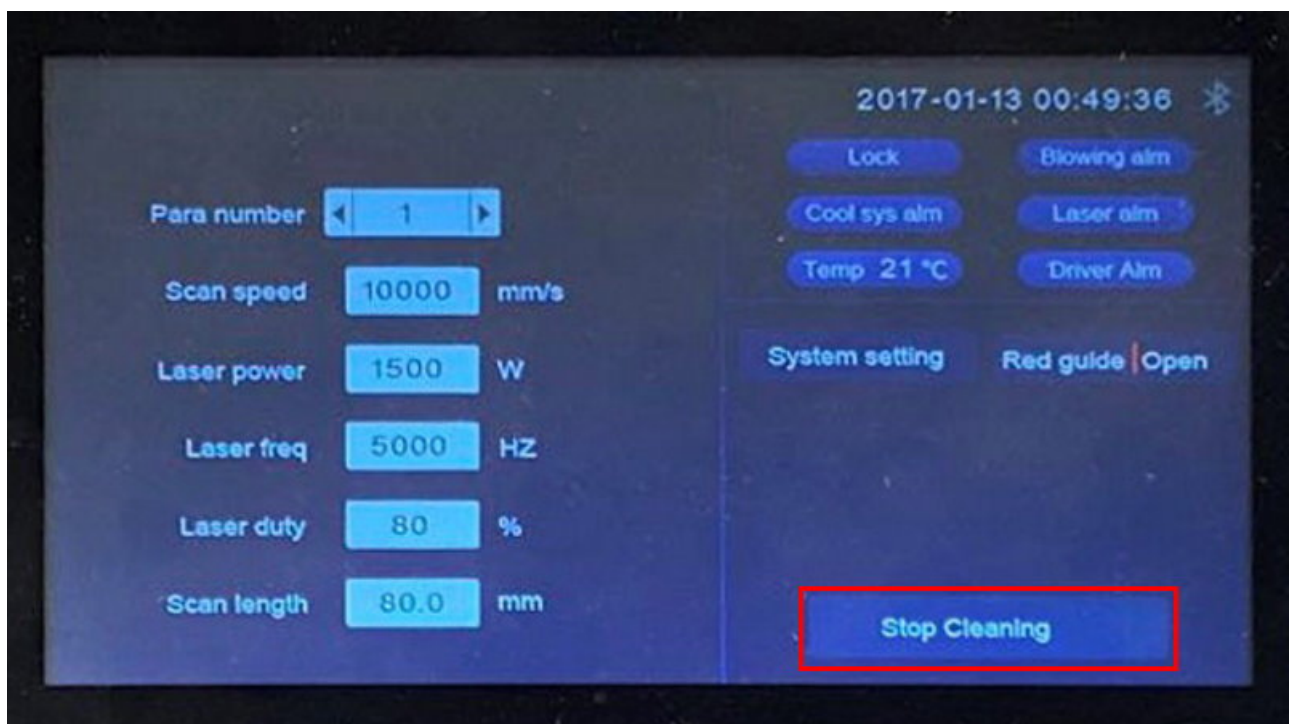
1. Check whether the chiller and the laser are turned on.



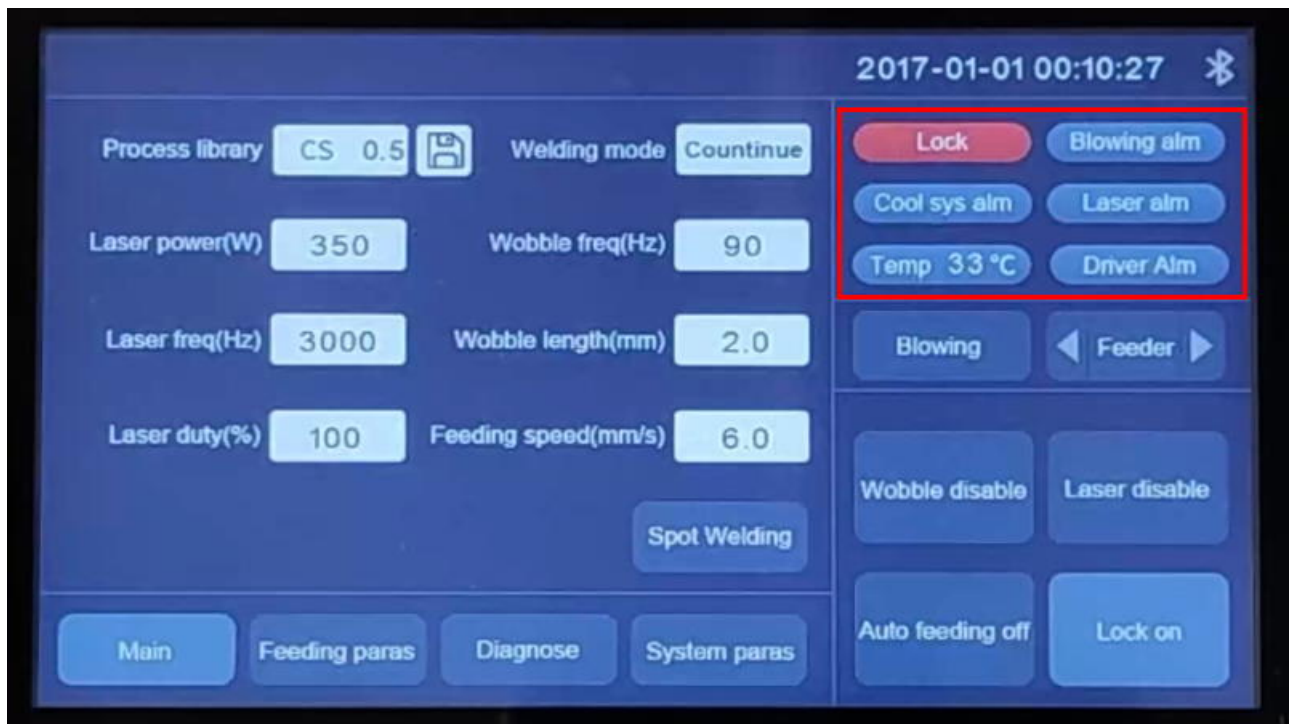
2. Check whether the laser is enabled in the control system.
Check whether the laser is enabled in the welding mode.



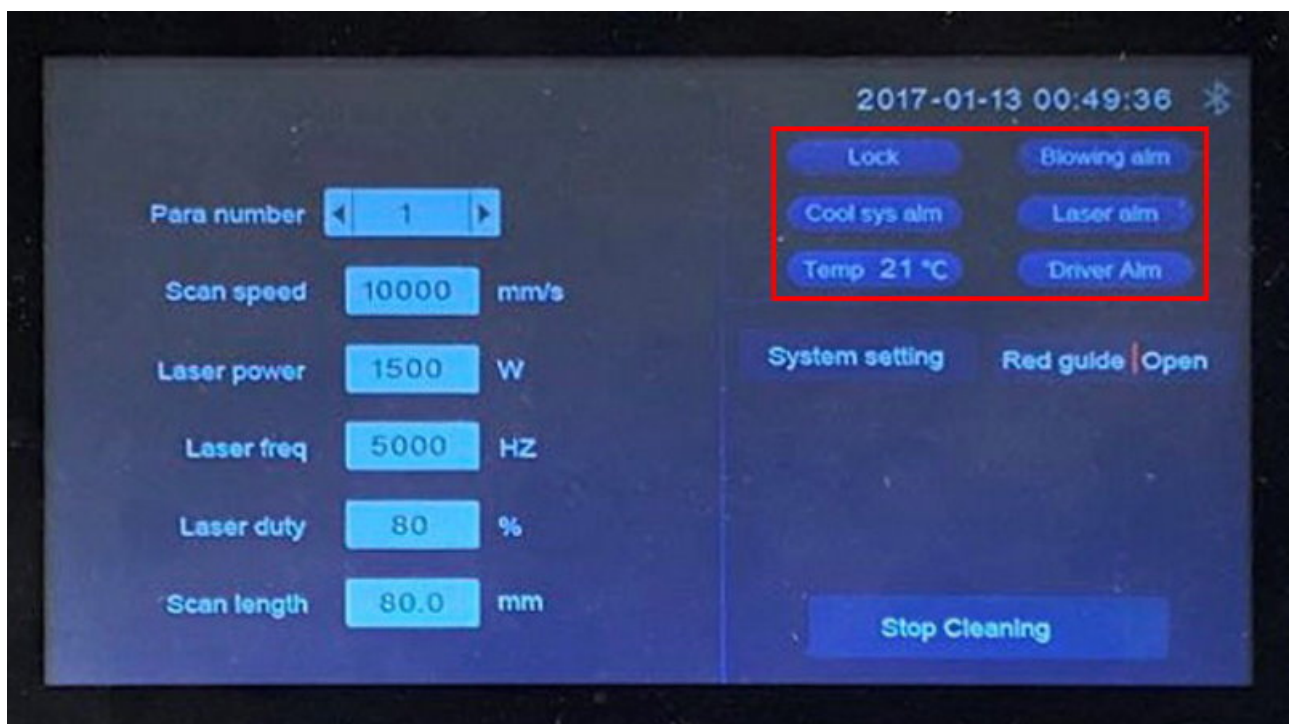
Check whether the laser is enabled in the cleaning mode.



3. Check if there's any alarm in the control system.
Check if there's any alarm in the welding mode.



Check if there's any alarm in the cleaning mode.



4. Check whether the safety clip is properly set on the workpiece while doing welding.



There's an alarm on the chiller

Please check the water level and the temperature.

Laser is getting weak

Please check whether the protecting lens is clean and clear, refer to [Clean and Replace the Protecting Lens](#) for more information.

The welding wire can not be fed automatically

Please check whether the feeder is stuck or released, refer to [Connect the Automatic Feeder](#) for more information.

There's no assist gas while doing welding

Please check whether the assist gas is opened and the pressure is high enough, refer to [Connecting the Assist Gas](#) for more information.