User Manual of LCN08A Fiber Laser Cutting Head

Product Description

Shenzhen Ospri Intelligent Technology Co., LTD

Foreword

Dear Users:

Welcome to use LCN08A optical fiber laser cutting head products produced by Shenzhen Ospri Intelligent Technology Co., LTD. We are honored to have your confidence in our products.

In order to make you have an overall view of the product, convenient for your use, we specifically provide the user manual for you, including product characteristics, structural feature, technical feature, direction for use, maintenance, etc. It's an essential guide when you use this product.

Please read the user manual carefully before use. I'm sure it will be helpful for you to use this product. In addition, if you have any questions during use, please contact us, and we will serve you wholeheartedly.

Declaration:

In order to ensure your safety and the product works normally, please read the guide book carefully before using.

Contents

Chapter 5 Maintenance

Chapter I Overview

1.1 Product Parameters

Name	Fiber laser cutting head
Model	LCN08A
Interface type	QBH/G5
Applicable wavelength	1080±10nm
Rated power	6KW/8KW
Focus length	150mm/200mm
Collimation focal length	100mm
Nozzle model	Various models and specifications
Focusing range	-18mm~+18mm -10mm~+10mm
Centering range	±1.5mm
Auxiliary air pressure	≤3Mpa
Weight	3.0KG

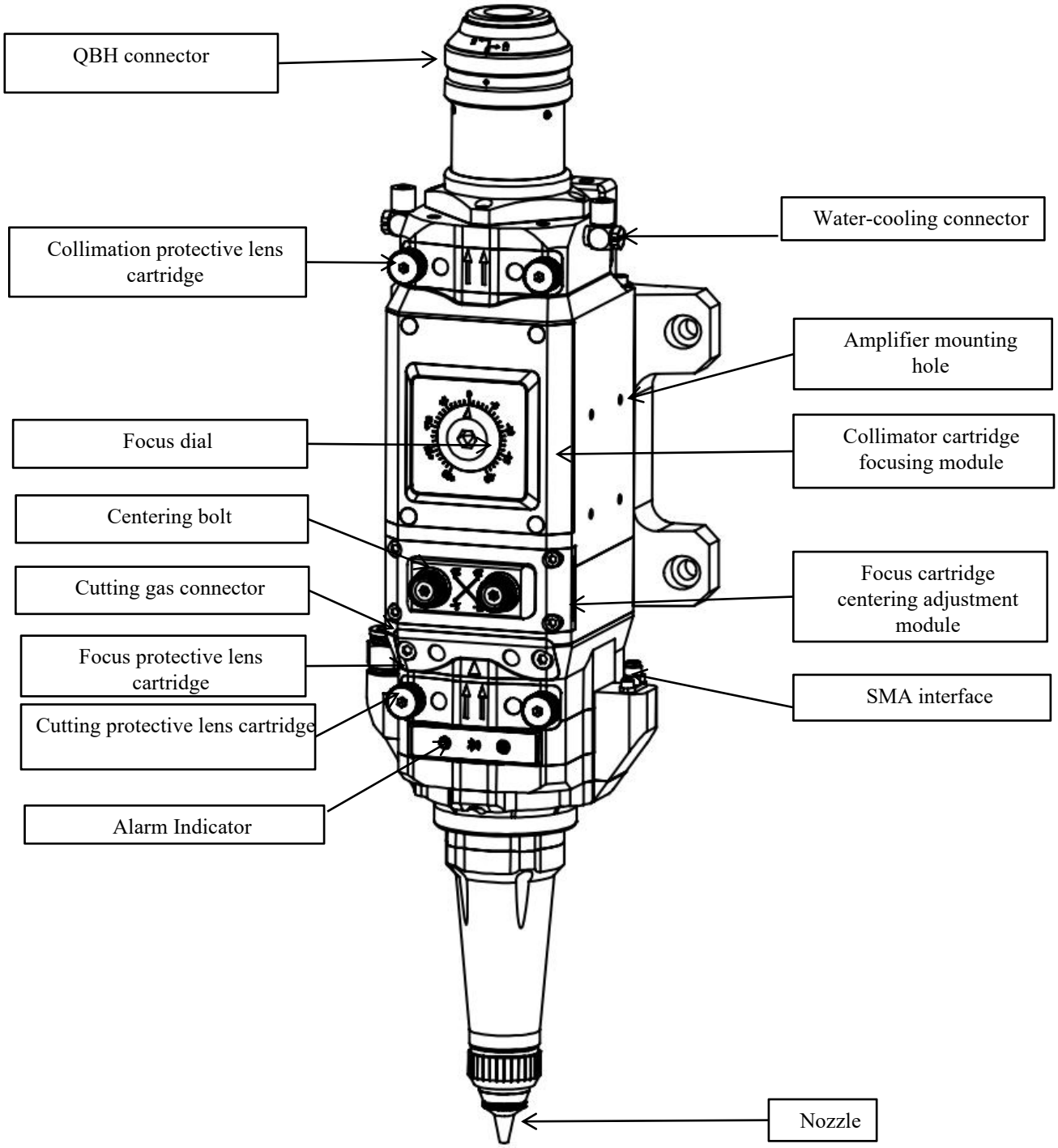
1.2 Cautions

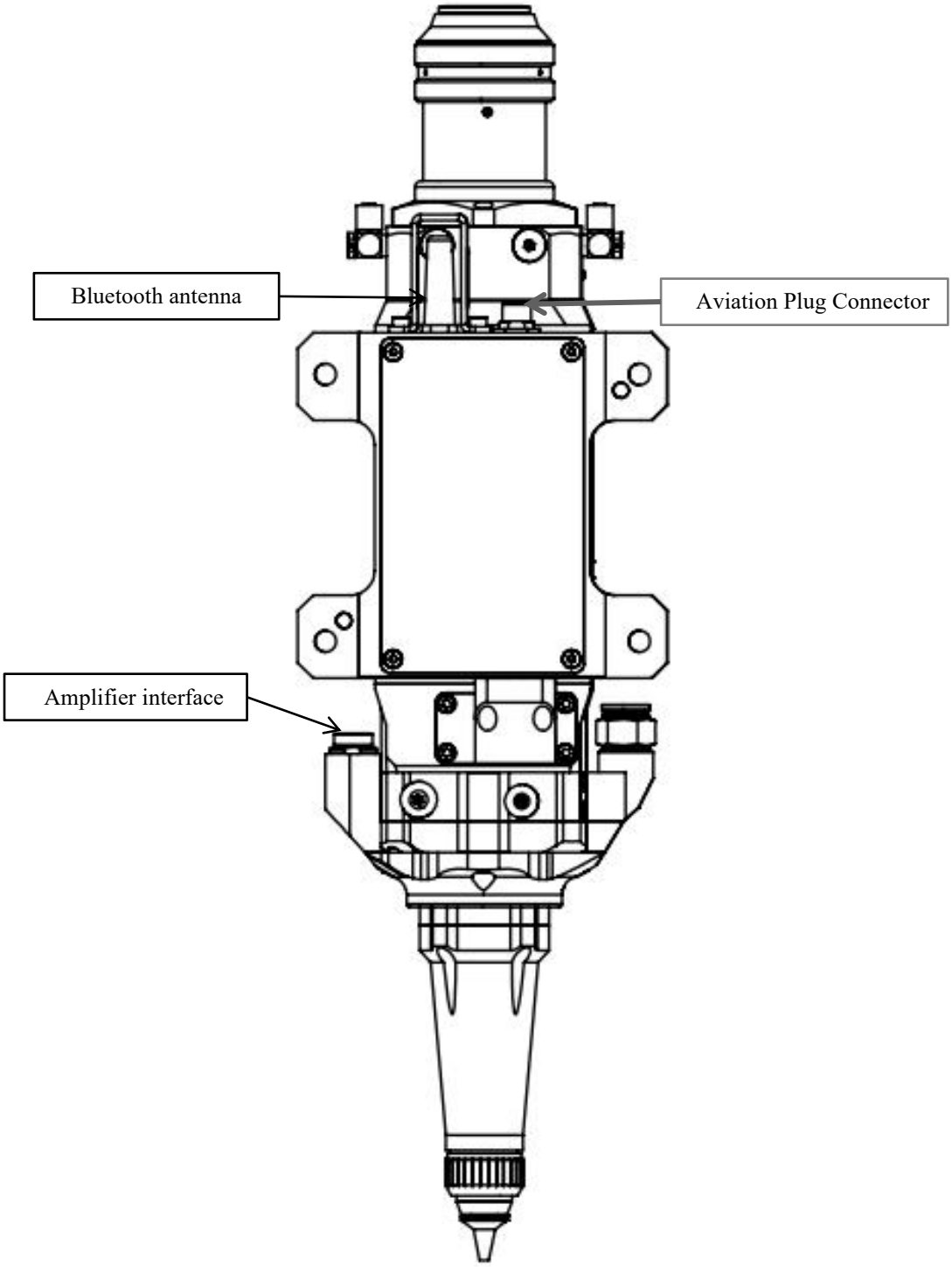
① Please wear specialized laser safety goggles to ensure human safety when running laser cutting machine.
② Precautions and standard operations should be taken to prevent burning of cutting head and laser nozzle due to the deviation of laser beam from central axis.
③ Keep the cutting head clean to prevent coolant, condensate or other foreign matter from entering sensor parts, otherwise it may cause sensor failure.

Warning: When processing products with laser, use the protective devices to prevent the laser beam from causing injury to human body.

Chapter 2 Structural Characteristics

2.1 Brief Description of Structure




Bluetooth antenna
Aviation Plug Connector
Amplifier interface

2.2 Brief Description of Product Parts

1. QBH interface: The interface type is QBH.
2. Collimation protective lens cartridge: Protects the collimation lens when the optical fiber head is plugged in or out.
3. Amplifier installation: install the amplifier, M3 threaded hole, hole distance 3 1mmx36mm.
4. Focus cartridge centering adjustment module: used to adjust the concentricity of the laser and the nozzle.
5. Collimator cartridge focusing module: realize cutting focus adjustment.
6. Focus protection mirror module: protection of the focusing mirror.
7. Cutting gas interface: connected to 10mm gas pipe.
8. Cutting protection mirror module: auxiliary gas sealing, protection of the focusing mirror.
9. Amplifier interface: connected to the height controller line interface.
10. SMA connector: connected to the amplifier.
11. Water cooling interface: connected to 6mm cooling water pipe.
12. Alarm indicator: Show green in normal working state and red in case of alarm.
13. Bluetooth antenna: transmit and receive Bluetooth signals.
14. 4-core aviation plug interface: cutting power access and signal transmission line interface.
15. Amplifier interface: connected to the height controller line interface.

Chapter 3 Product Installation

3.1 Cutting Head Installation

① Focal length of cutting head LCNO8A-F150, installation diagram.

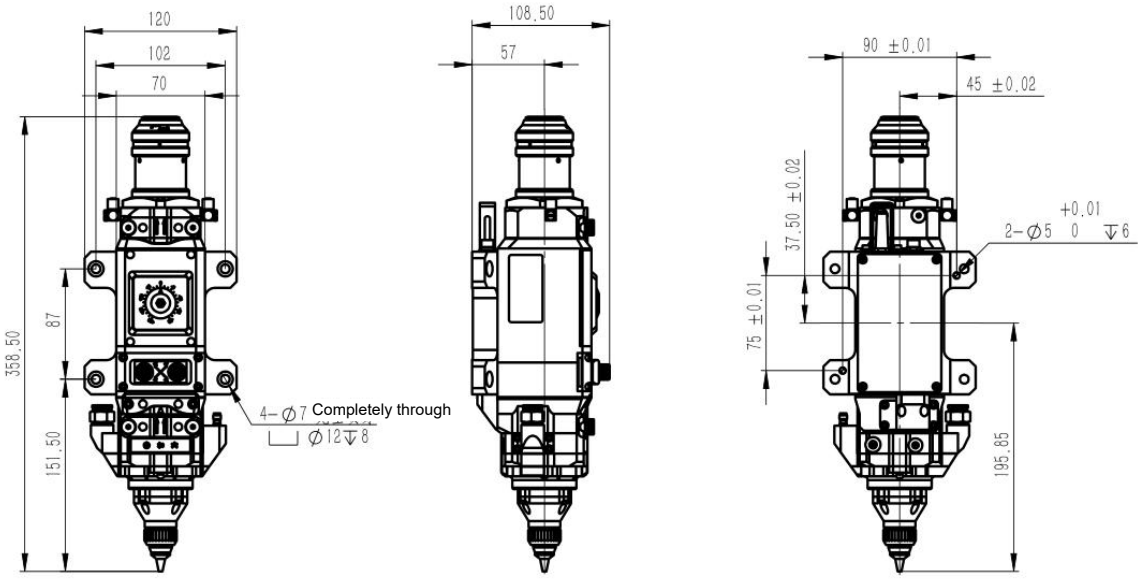


Figure 1 (External amplifier)

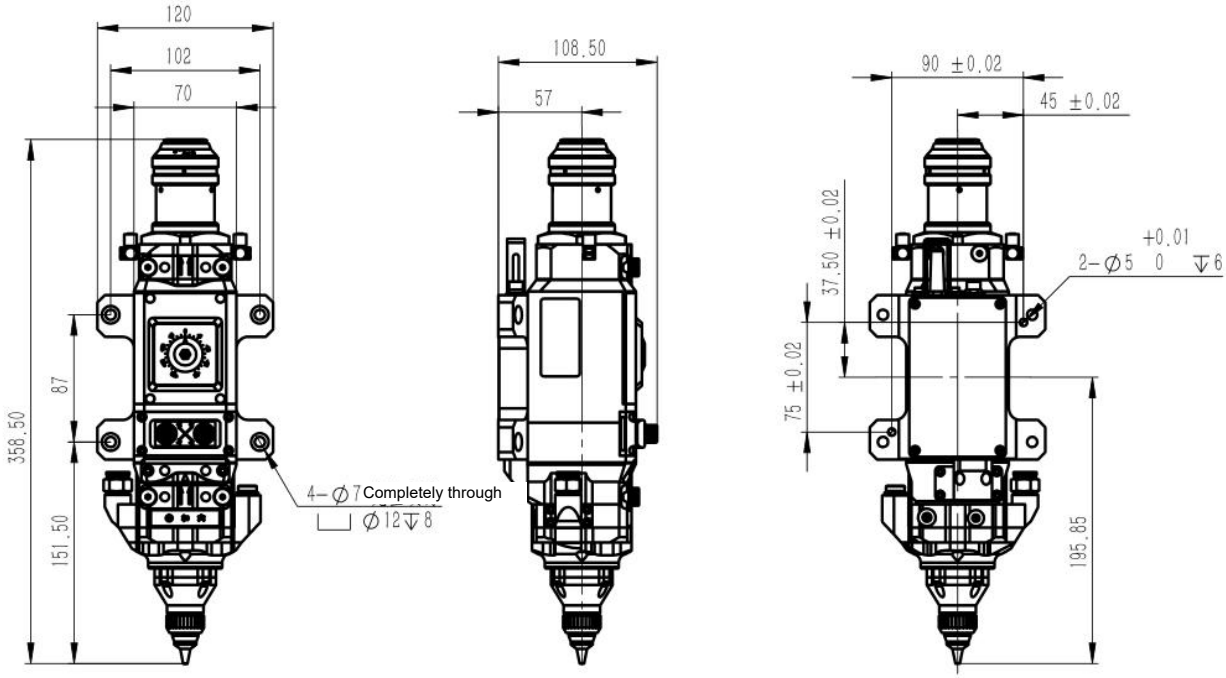


Figure 2 (Built-in amplifier)

② Focal length of cutting head LCN08A-F200, installation

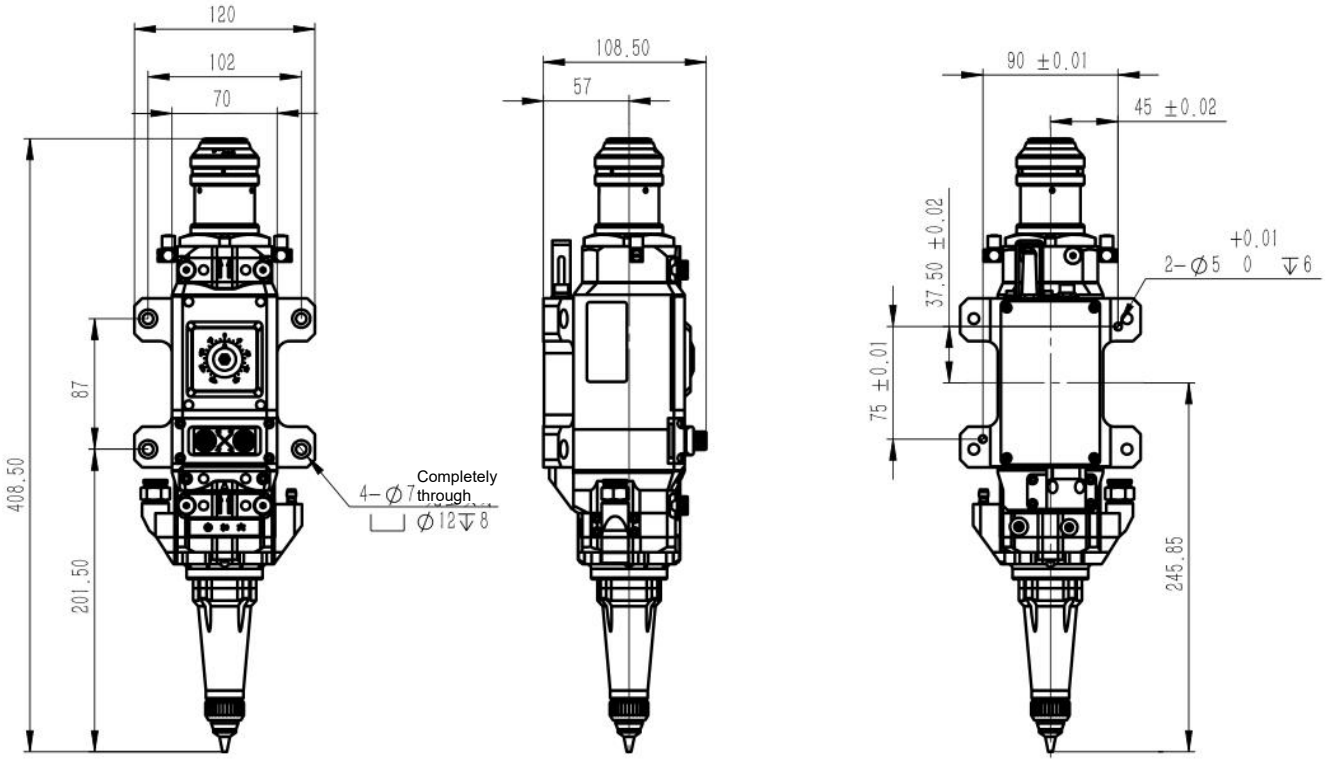


Figure 1 (External amplifier)

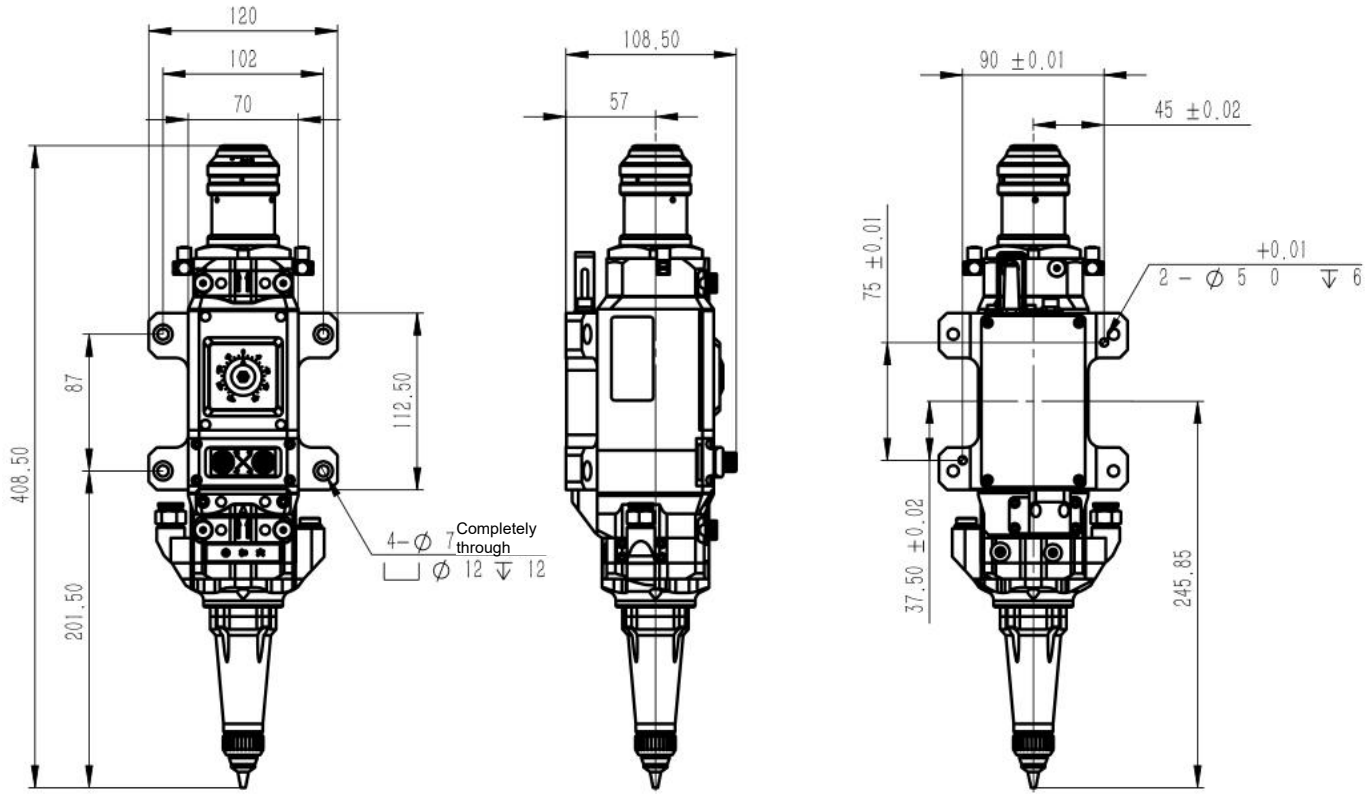
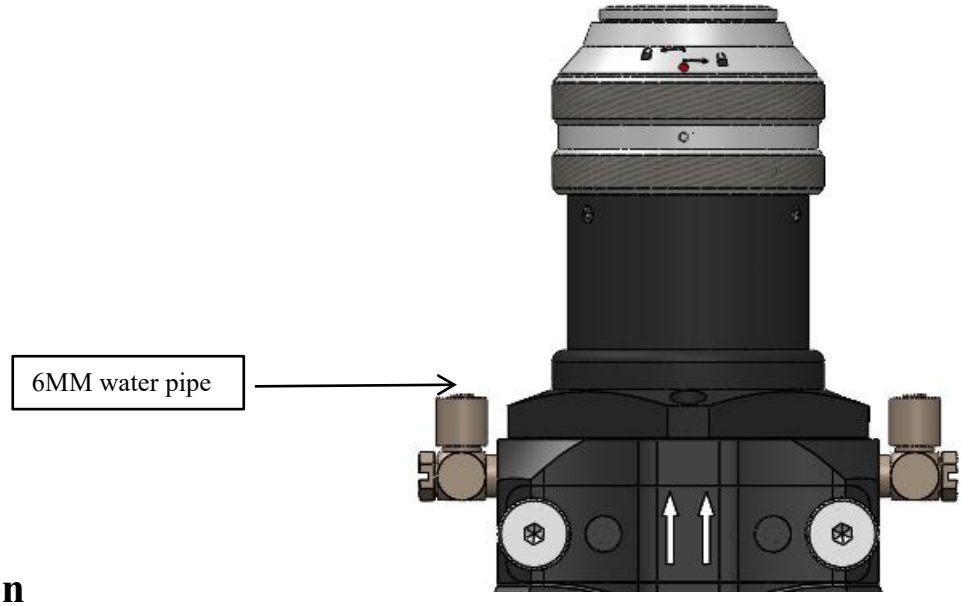


Figure 2 (Built-in amplifier)

3.2 Welding Head Connection

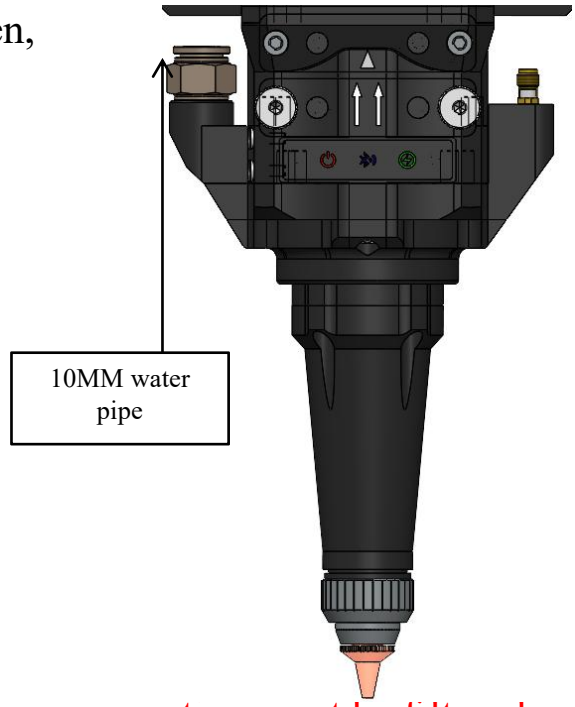
3.2.1 Cooling Water Connection

Used for cooling of cutting head, 1 in 1 out cooling pipeline.



3.2.2 Gas Connection

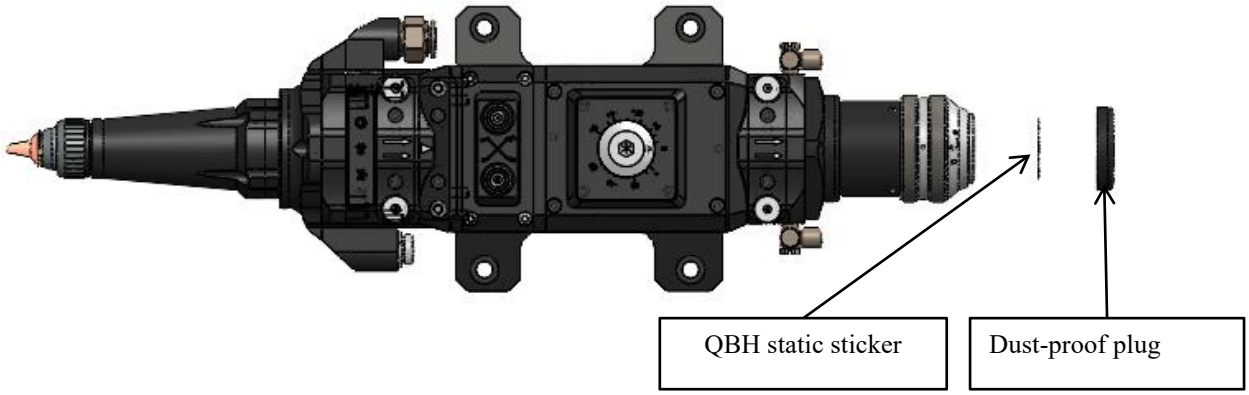
The input port is connected to a 10mm gas pipe for connecting cutting gas Input pressure: ≤3.0Mpa Commonly used gases: oxygen, nitrogen, compressed air.



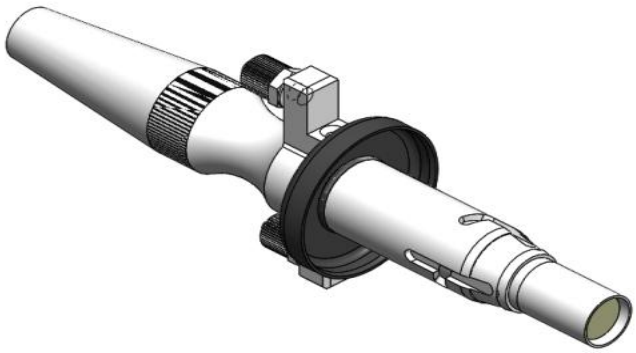
Attention: The gas entering the gas connection must be filtered and dried, otherwise it will contaminate the protective lens and cause damage to it.

3.3 QBH Fiber Connection

① Place the cutting head horizontally, remove the dust cover, and tear off the QBH dust sticker, as shown in the figure below.



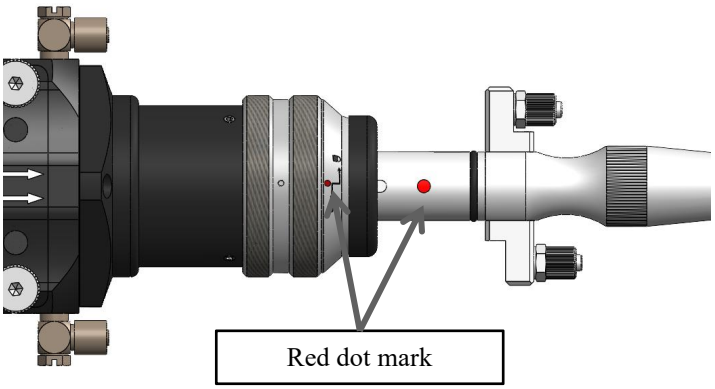
② Put the dust cover in the accessory box on the fiber head, as shown in the figure below.



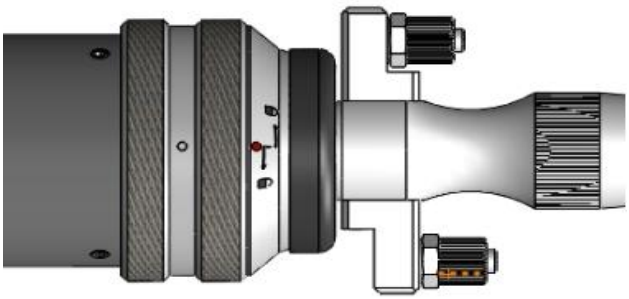
Attention: In case the fiber head is with original dust-proof gasket, users can choose whether install dust-proof cover or not.

③ Screw the QBH connector to the open state: turn it counterclockwise to the limit position (you can feel a "click"). Do not twist it vigorously, or it may damage the internal structure.

④ Align the red dot on the fiber head with the red dot of the QBH connector, and slowly insert the fiber head into the QBH connector.

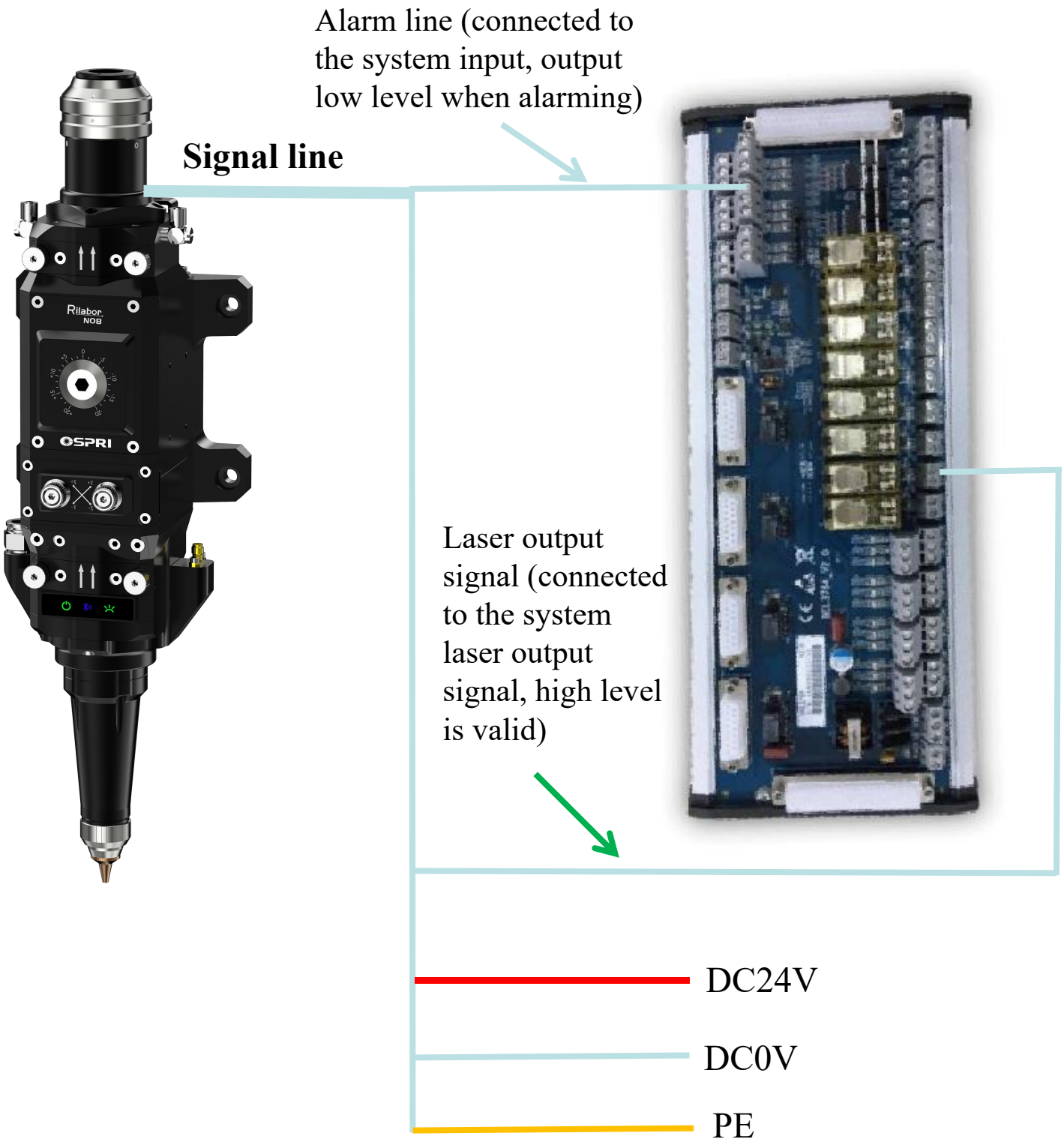


⑤ Tighten the QBH connector to the locked state: turn it clockwise to the limit position (you can feel a "click"), lift the rotating nut upwards, and turn the nut clockwise again until the fiber head is tightened. (Do not twist with great force, otherwise the internal structure of the QBH may be damaged)



Note that after inserting the optical fiber, you can wrap it with masking tape for a few turns!! !

3.4 LCN08A Wiring Summary

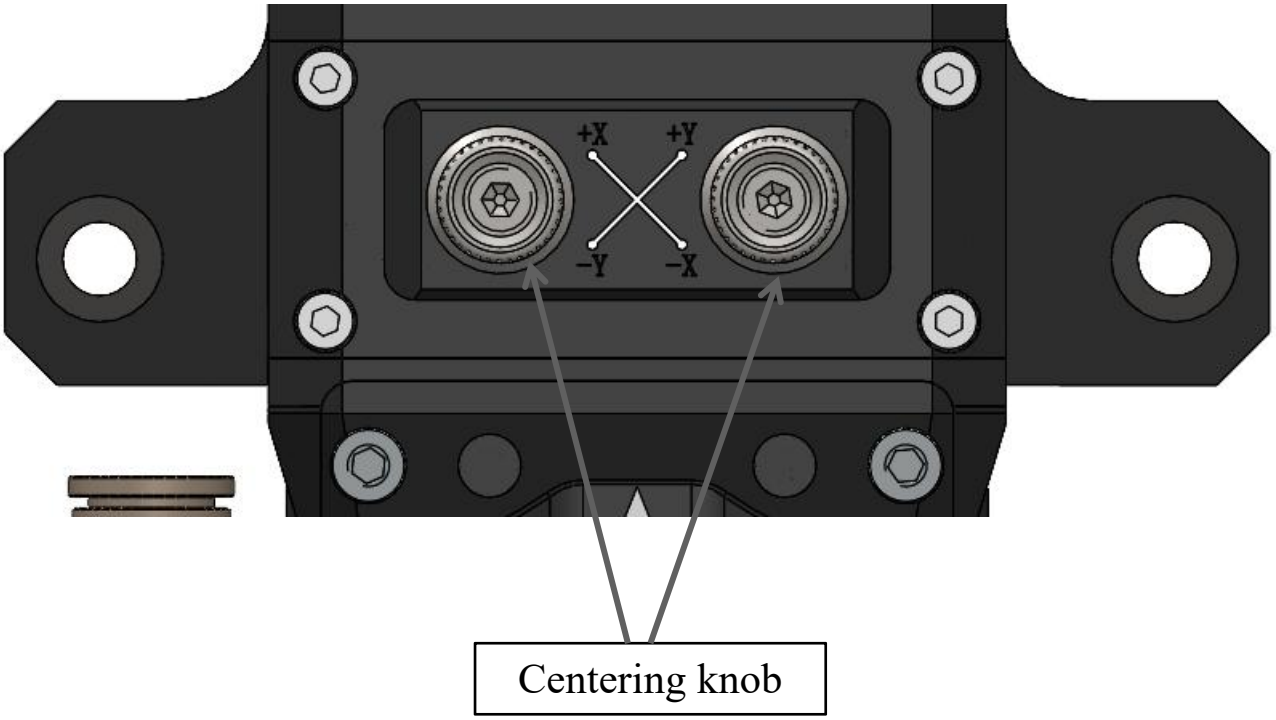


Chapter 4 Product Debugging

4.1 Focusing Instruction

4.1.1 Beam centering

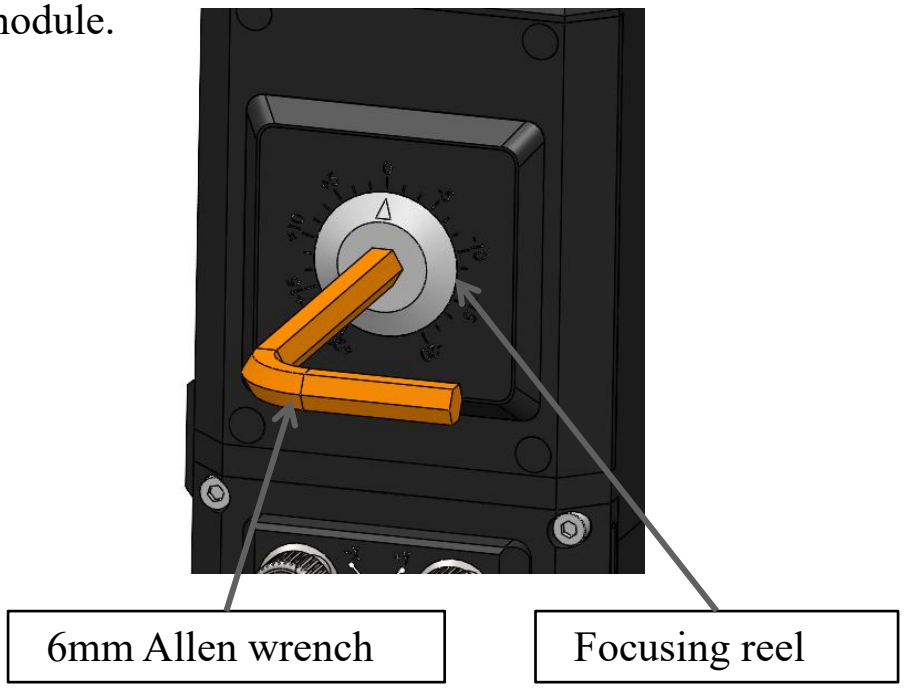
In order to achieve a good slitting effect, the laser beam must be kept in the center of the nozzle. When it deviates from the center, it needs to be centered through the beam centering module.



The relationship between the beam position and the adjustment knob:
① There are 2 centering knobs.
② Adjustment method: Forward and backward.
③ The beam movement position is consistent with the knob movement.

4.1.2 Focus Adjustment

In order to achieve a good cutting effect for different materials and thicknesses, it is necessary to match the focus through the focus adjustment module.



Relationship between focus position and adjustment knob

① The rotation angle of adjustment knob is 0-300 degrees.

② The adjustment stroke of focus position is 30mm.

③ The minimum scale change is 0mm, and the focus is at the nozzle end plane when the scale number is 0.

④ When the scale is adjusted clockwise to +15, the focus is at the top (15mm inside the nozzle plane).

⑤ When the scale is adjusted counterclockwise to -15, the focus is at the bottom (15mm outside the nozzle plane).

4.2 Mobile APP Operation Instructions

4.2.1 Mobile APP Software Installation.

① After downloading, it will be shown in Figure 2.5 below, then continue to install. Figure 2.6 below is the icon after the installation is completed. This APP currently only supports installation on Android mobile phone.

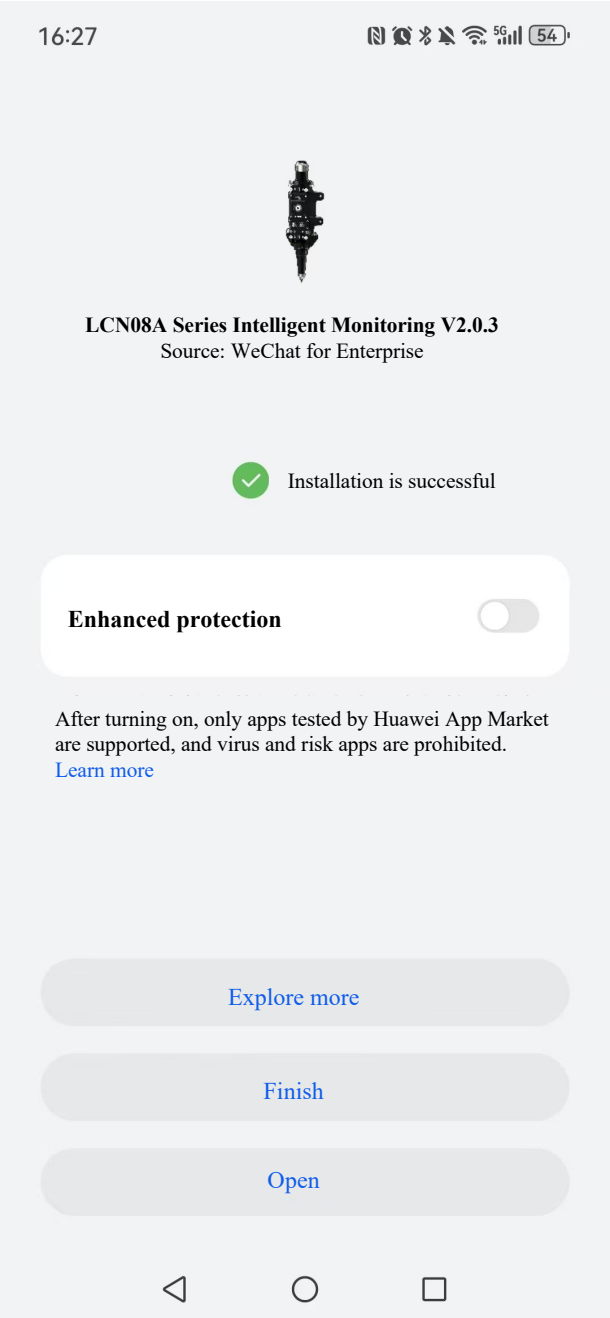
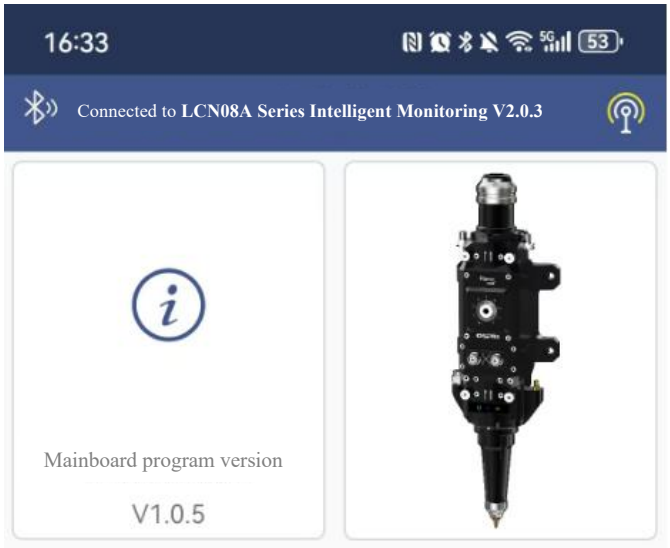


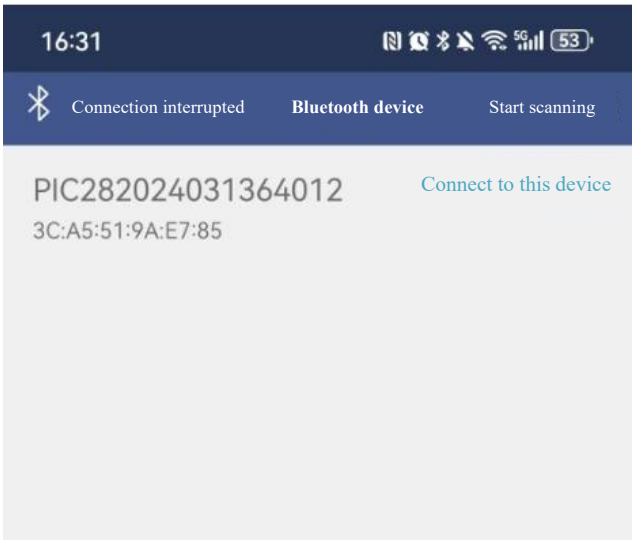
Figure 2.5

Figure 2.6

Icon is displayed after installation

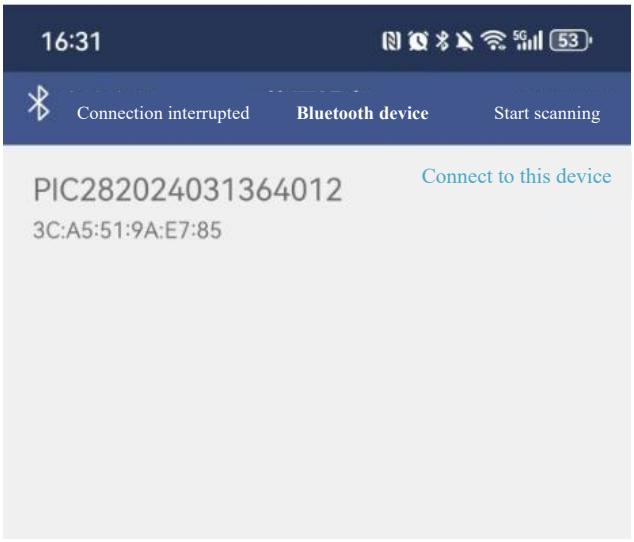
4.2.2 APP Software Connection





① Click the Bluetooth icon to open the Bluetooth connection interface, as shown in the figure above.

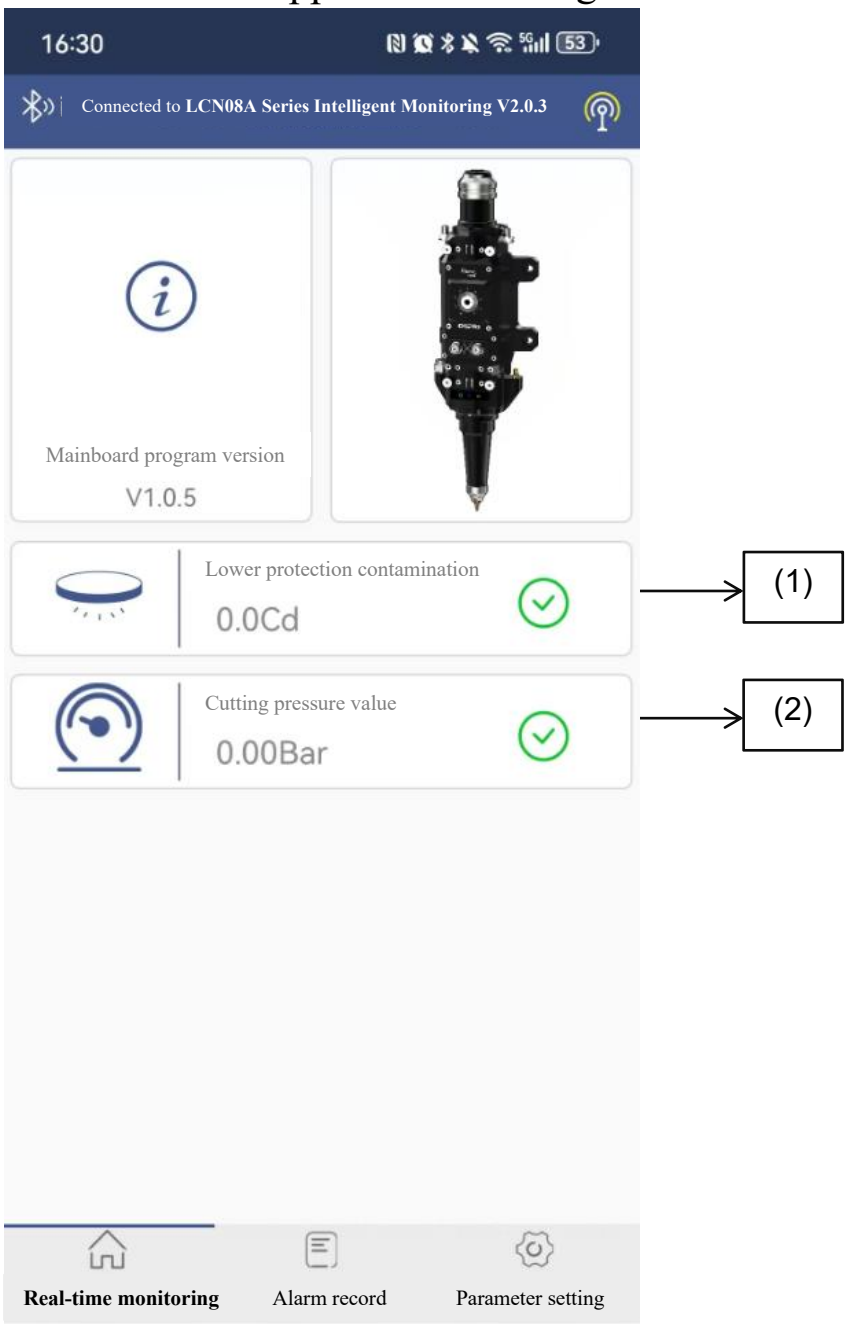
② Click "Start Scan". If nothing is displayed, click several times, as shown in the figure above.



③ After the device is scanned, select the device to connect and click the [Connect This Device] button. The mobile phone can communicate with the device in real time, as shown in the figure above.

4.2.3 Software Introduction

① After running the LCN08A APP app, the color of the progress bar on the main interface will change according to the actual temperature value monitored, as shown in the figure below.
Green: The lens temperature is monitored to be normal and the software can be used normally.
Yellow: The lens temperature is too high, and attention should be paid to check if the lens is contaminated.
Red: The lens temperature is too high and the software cannot continue to be used. The machine must be stopped for checking.



4.2.3 Software Introduction

Explanation of each function of the Bluetooth APP:

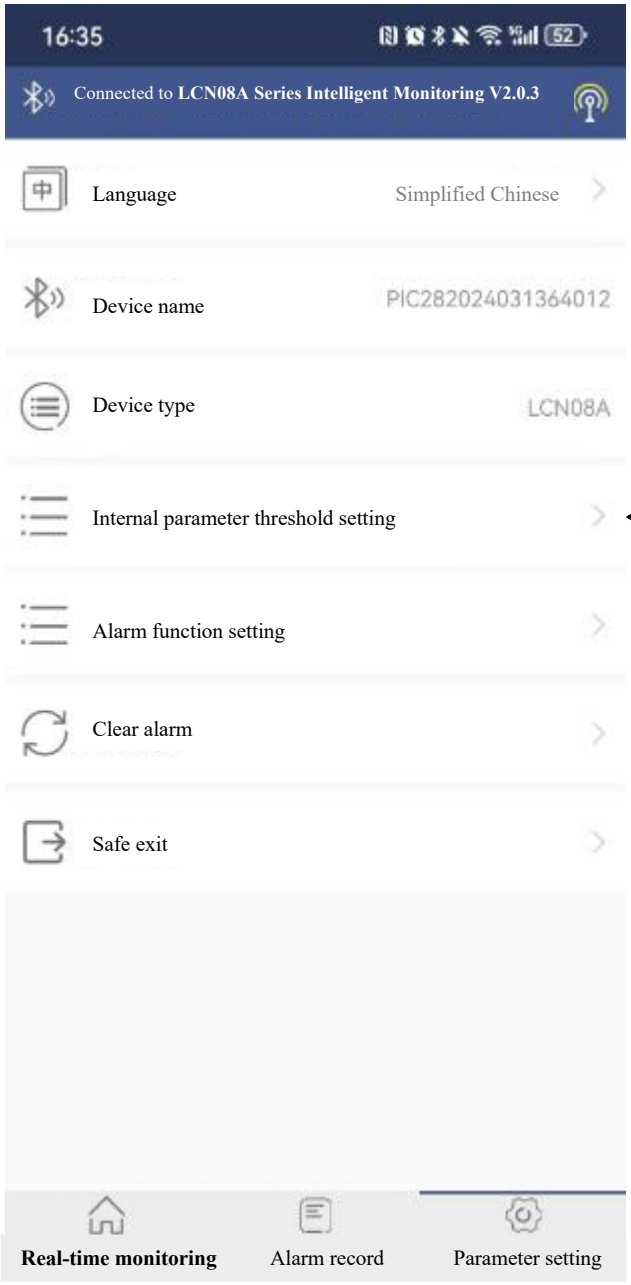
(1) Lower protection contamination: Detect the contamination value of the lower protective lens. If the astigmatism of the lower protective lens appears yellow or red, first check whether the cutting protective lens is contaminated. If there is no abnormality, then check whether the focusing protective lens is polluted.

(2) Cutting gas pressure value: Real-time monitoring of the cutting gas pressure can be fed back to the system to make a closed loop of the gas circuit.

4.2.4 Temperature Parameter Setting and Modification of Equipment Name

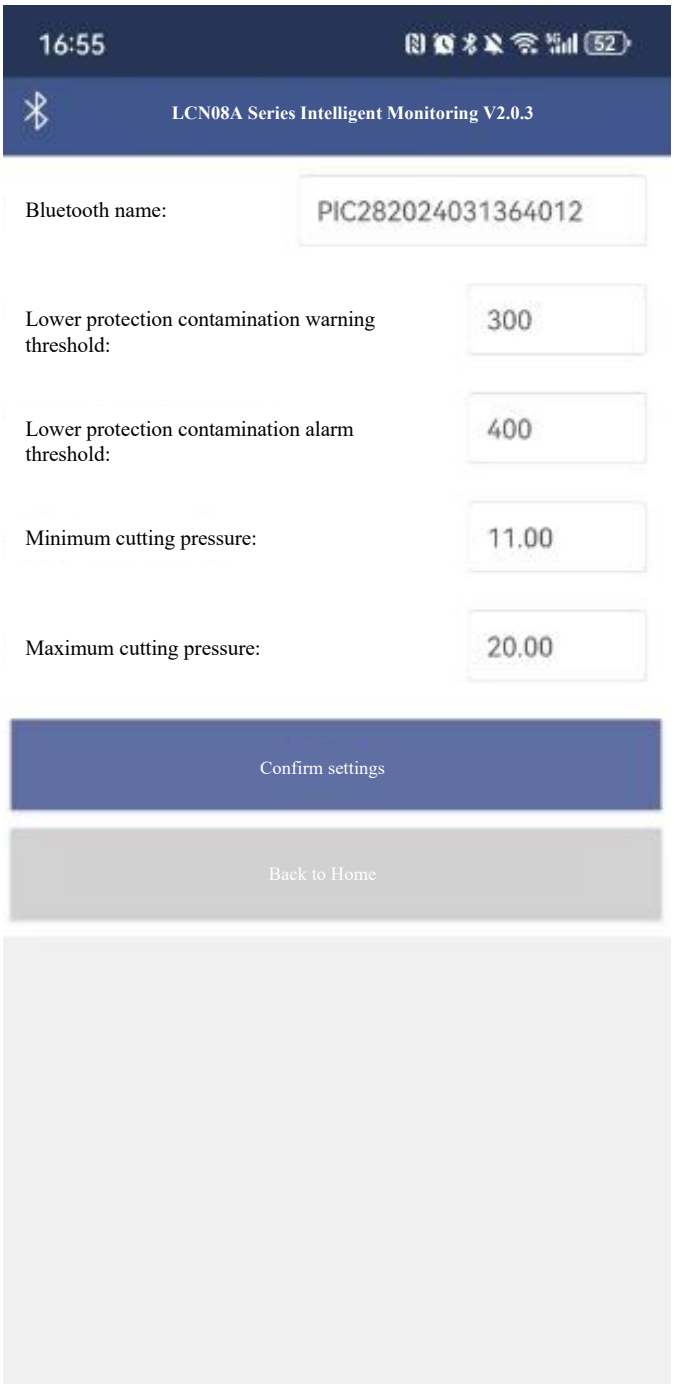
① This APP has a temperature setting function, and different temperature thresholds can be set according to actual applications. Click the manufacturer setting option (password: 85225225) to enter the temperature setting interface, as shown in the figure below.

② The software can also detect the lower protection pollution and whether the cutting gas pressure is leaking in real time.

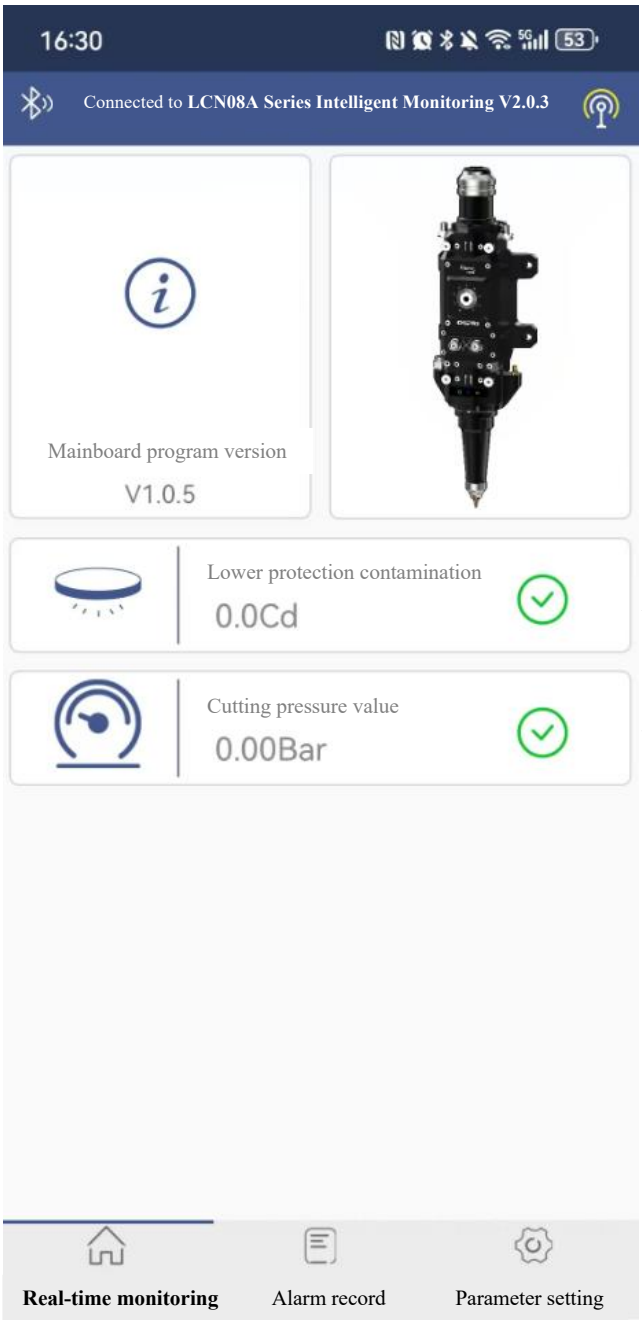


Click "Parameter Setting" and input password "85225225"

② Enter the temperature setting interface, you can set the temperature according to the actual situation, the warning value must be lower than the alarm value, and click the OK button after the setting is completed, as shown in the figure below:



Enter the threshold of each parameter and click OK to save

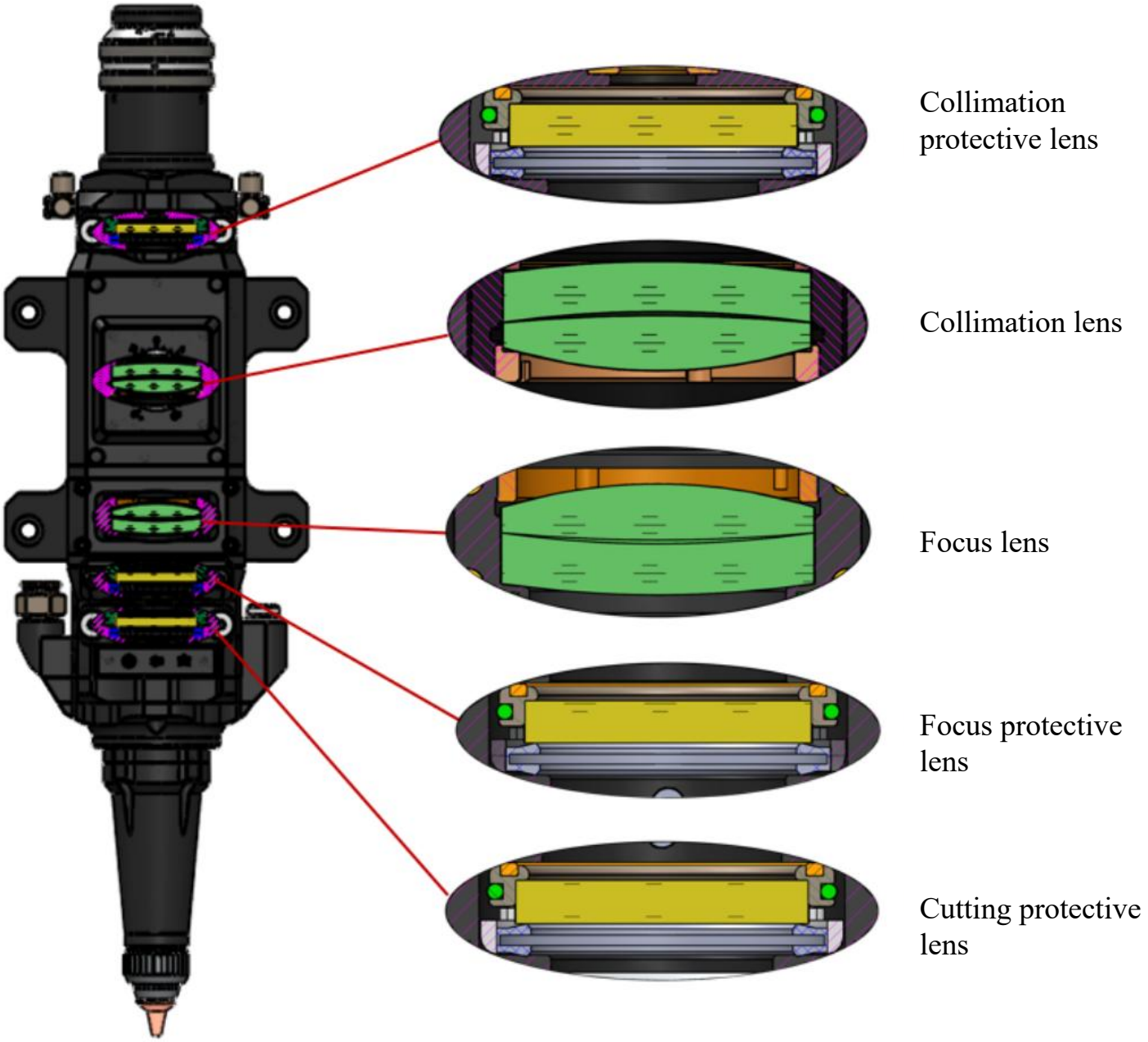


Green light: normal
Yellow light: warning
Red light: alarm

Chapter 5 Maintenance

5.1 Lens Structure

All cutting head parts of the company are assembled in the dust-free workshop. Except for the protective lens cartridge, which can be freely disassembled and assembled, other modules are prohibited from being disassembled in principle. In case it is necessary to check the collimation lens and focus lens, please move the cutting head into a dust-free environment firstly.

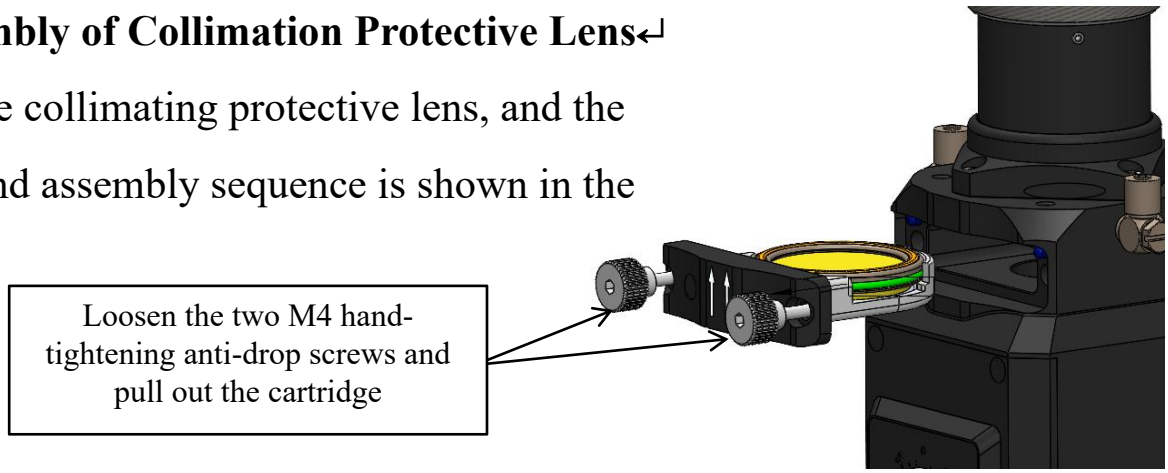


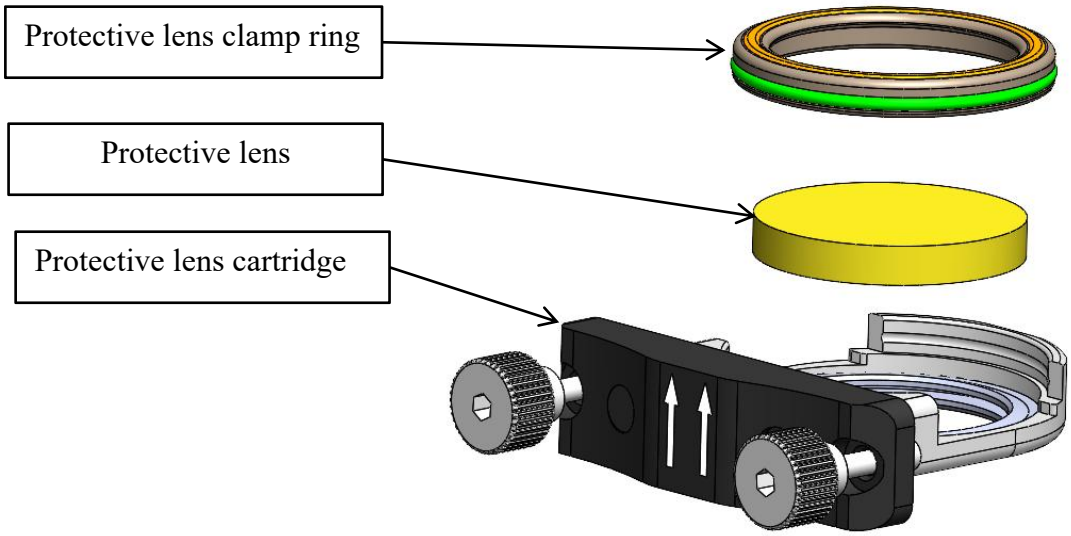
5.2 Maintenance of Protective Lens

When the cutting effect is not ideal, but the cutting protective lens is normal, and the optometry film detects burn points, the collimation protective lens or focus protective lens possibly is polluted or damaged. In this condition, please pull out the protective lens drawer to check the lens. Before checking, use a clean cloth dampened with alcohol to wipe the exterior clean.

5.2.1 Disassembly of Collimation Protective Lens↵

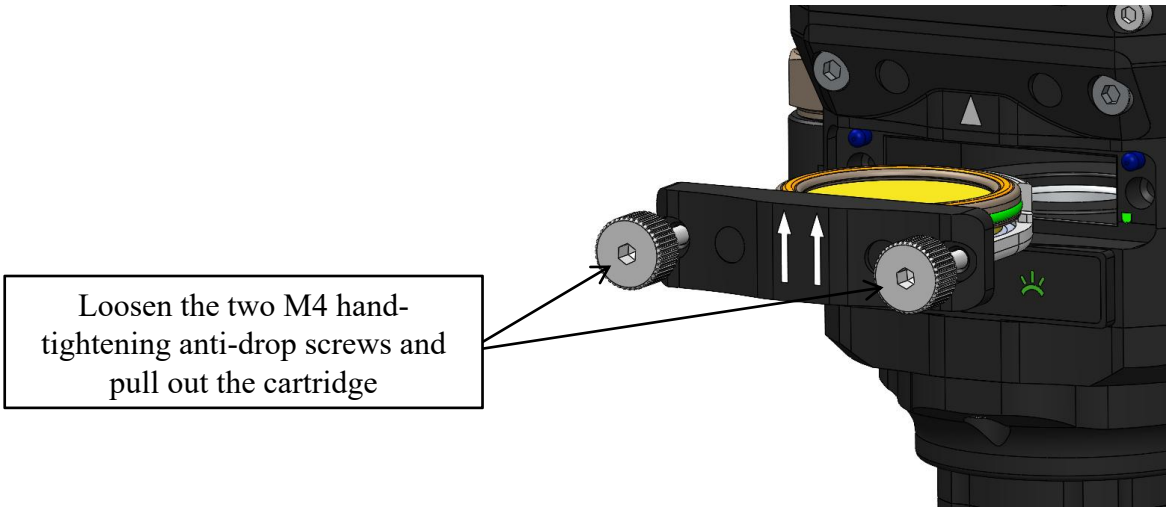
Replace the collimating protective lens, and the disassembly and assembly sequence is shown in the figure below:

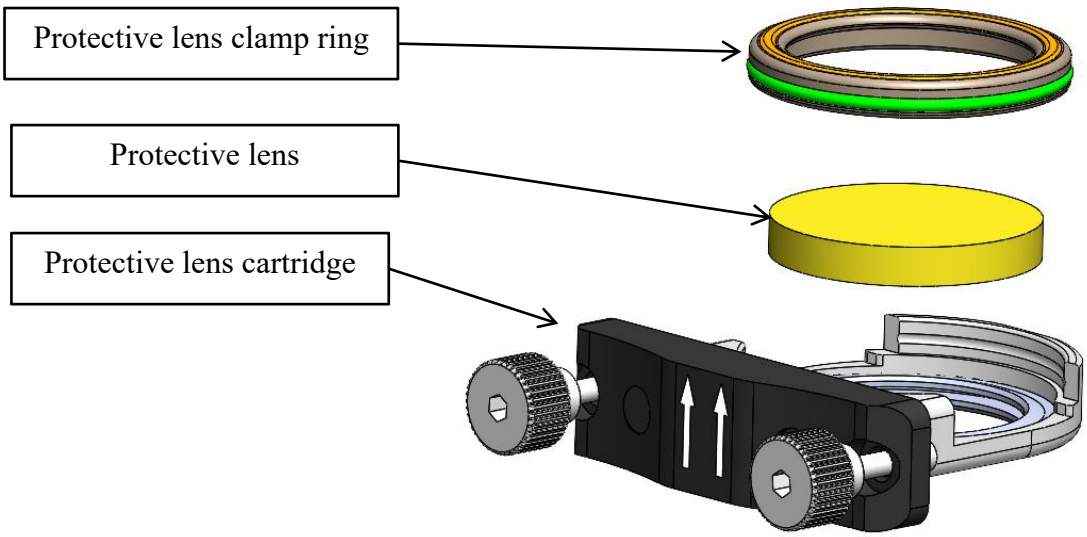




5.2.3 Disassembly and Assembly of Cutting Protective Lens

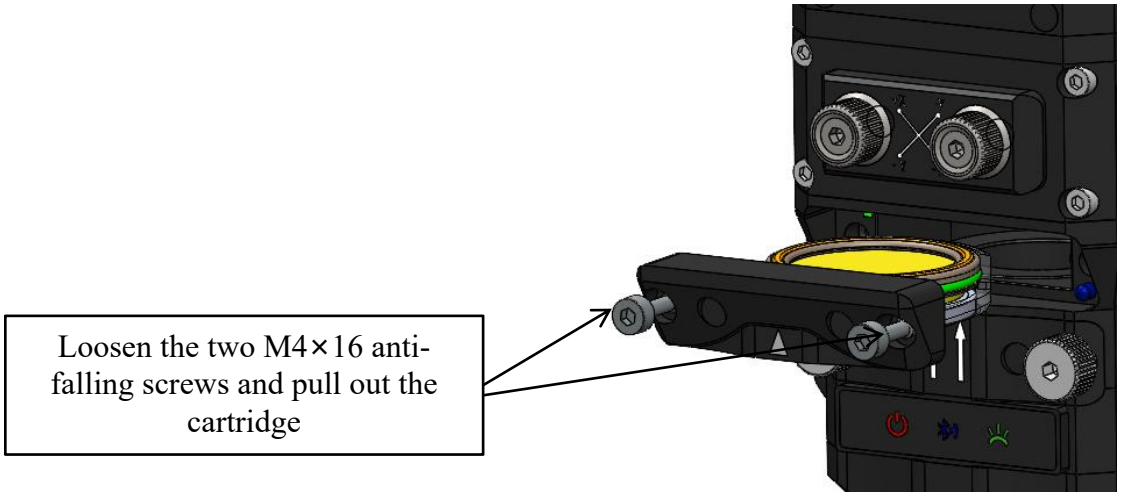
Replace the cutting protective lens, and the disassembly and assembly sequence is shown in the figure below:

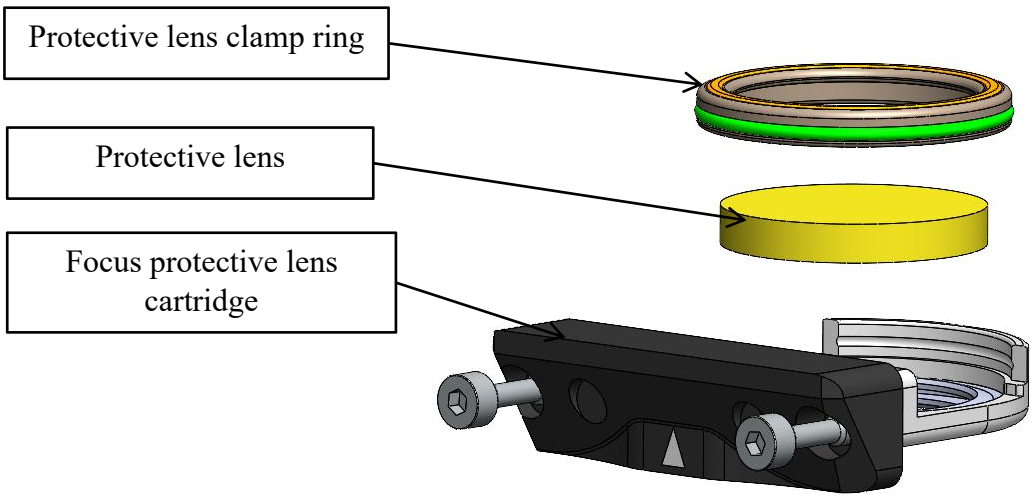




5.2.2 Disassembly and Assembly of Focus Protective Lens

Replace the focusing protective lens, and the assembly sequence is shown in the figure below:

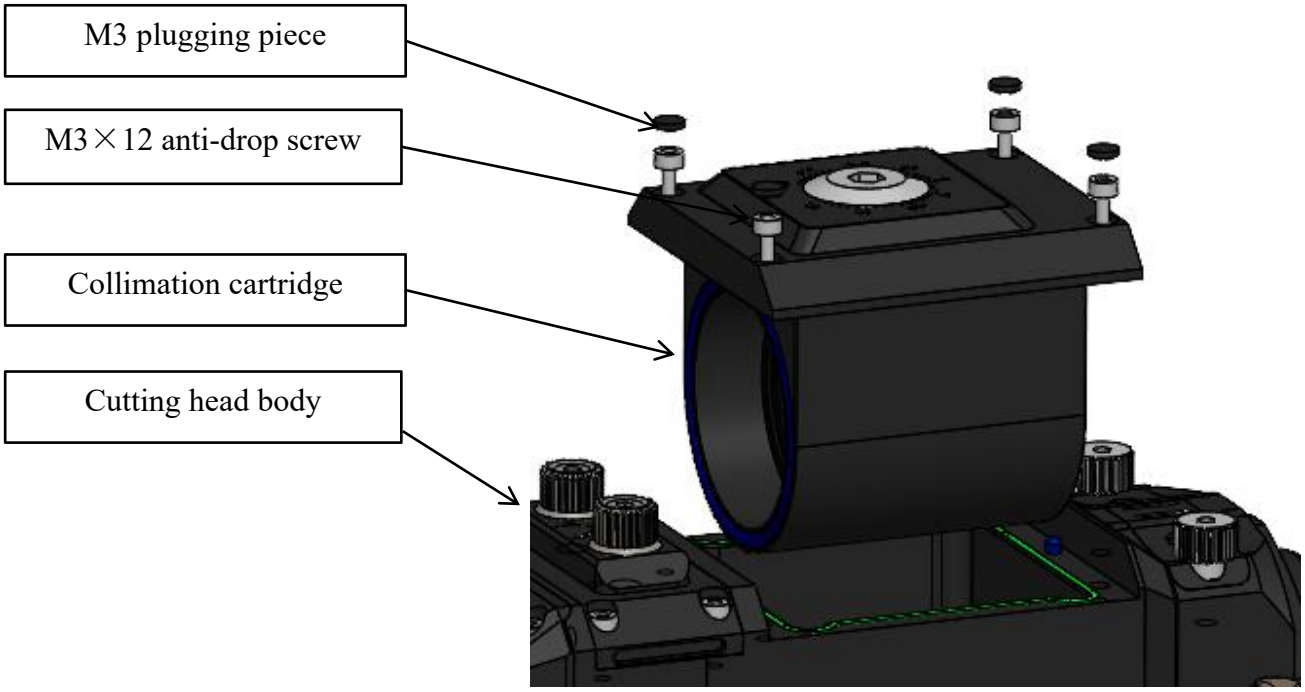




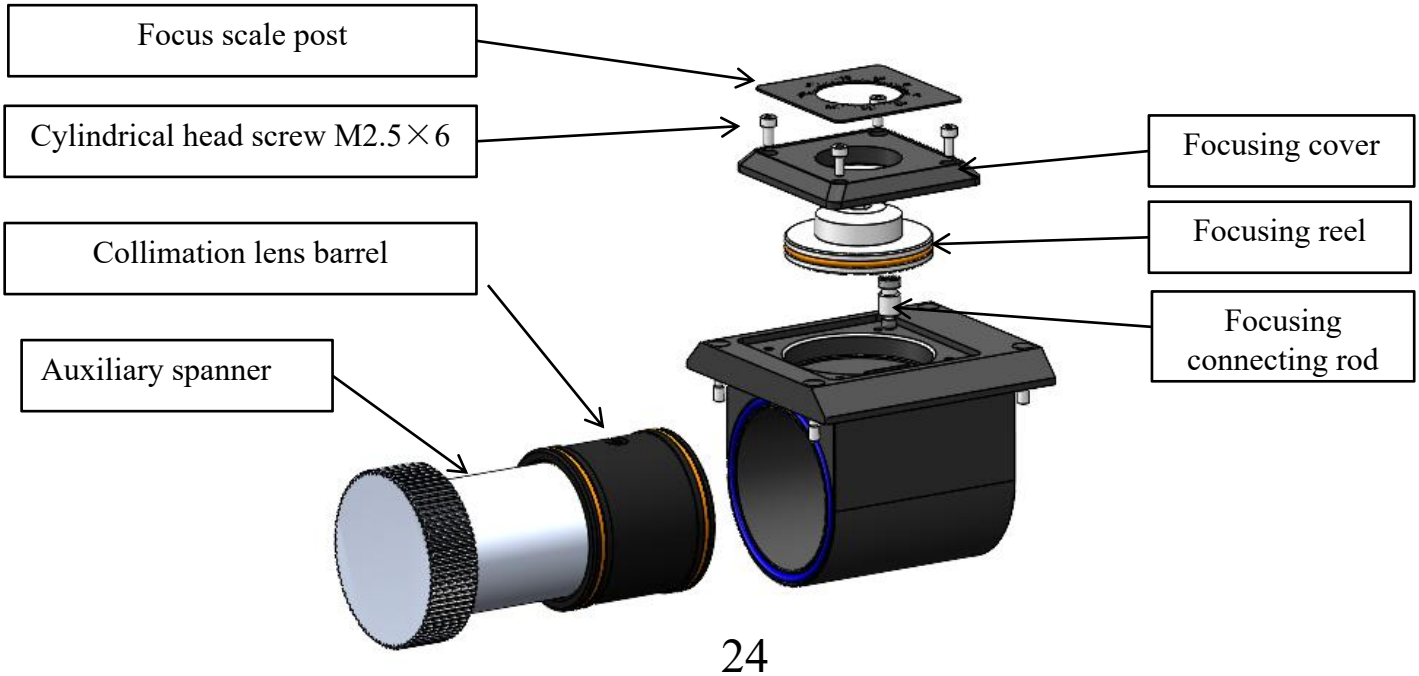
5.3 Maintenance of Collimation Lens

5.3.1 Disassembly of Collimation Lens

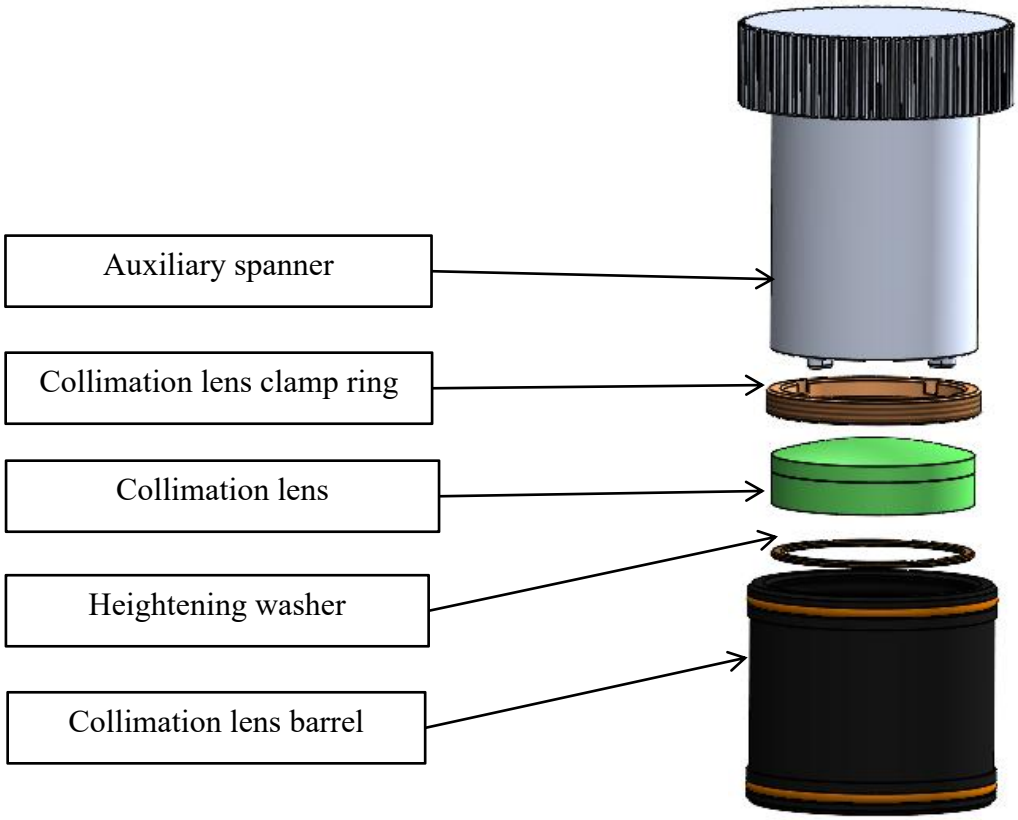
① First pry out the 4-M3 plugging piece and loosen the 4-M3×12 anti-drop screws, and then pull the collimation lens cartridge out of the cutting head body, as shown in the figure below.



② Remove the focus scale post and loosen the 4-M2.5×6 cylindrical head screws, then remove the focusing cover, focusing reel and focusing connecting rod, and then use an auxiliary spanner to pull out the collimation lens barrel, as shown in the figure below.



③ Assemble the lens, as shown in the following figure:



5.3.2 Cleaning of Collimation Lens

① Tools used: dust-free wiping cotton swab, isopropyl alcohol, and dry and pure compressed air.

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the lens with the left thumb and index finger.

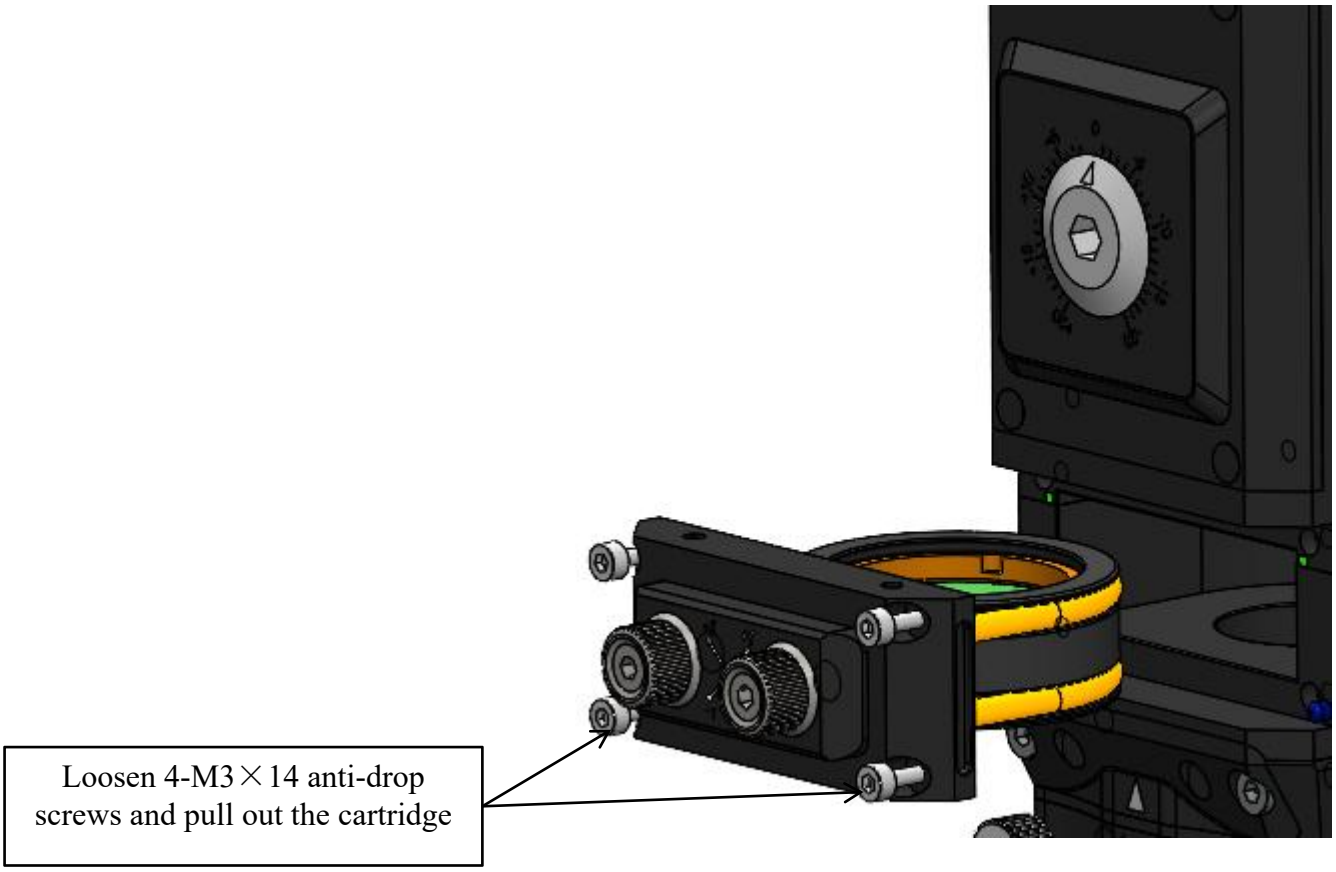
④ Hold the dust-free wiping cotton swab in your right hand, and gently wipe the front and back of the lens from bottom to top or from left to right in a single direction, and blow the surface of the lens with dry and pure compressed air to confirm that there is no foreign matter on the surface of the lens after cleaning.

⑤ The cleaned collimation lens must be installed in the collimation lens holder and inserted into the cutting head body as soon as possible, or stored in other clean and sealed containers.

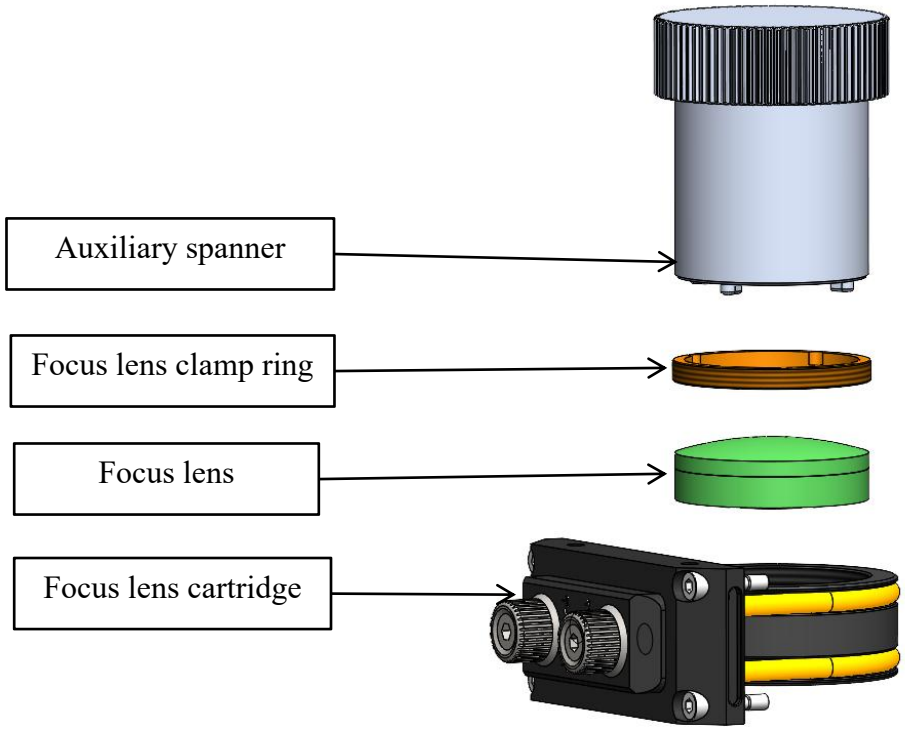
5.4 Maintenance of Focus Lens

5.4.1 Disassembly of Focus Lens

① Loosen the 4-M3×14 anti-drop screws and pull out the focus lens cartridge, as shown in the figure below.



② Assemble the lens, as shown in the following figure:



5.4.2 Cleaning of Focus Lens

① Tools: dust-free wiping cotton swabs, isopropyl alcohol, and dry and pure compressed air.

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the lens with the left thumb and index finger.

④ Hold the dust-free wiping cotton swab in your right hand, and gently wipe the front and back of the lens from bottom to top or from left to right in a single direction, and blow the surface of the lens with dry and pure compressed air to confirm that there is no foreign matter on the surface of the lens after cleaning.

⑤ The cleaned collimation lens must be installed in the collimation lens holder and inserted into the cutting head body as soon as possible, or stored in other clean and sealed containers.

In principle, it is forbidden to disassemble and assemble the focus lens and collimation lens. If you feel that the lens is dirty, first check with the optometry film. If necessary, you can contact the company's technical staff! ! !

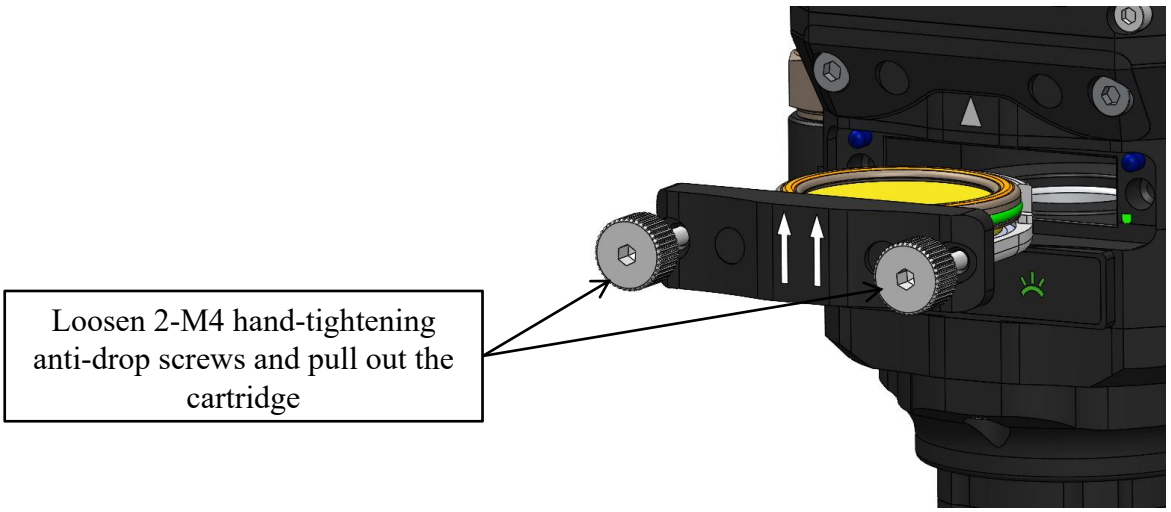
5.5 Maintenance of Cutting Protective Lens

When the protective lens is attached with impurities or foreign matter, the impurities or foreign matter will absorb the laser heat and cause damage to the protective lens. Therefore, the protective lens needs to be cleaned regularly. The recommended cleaning cycle is one week. Besides, the protective lens is a wearing part and shall be replaced if damaged.

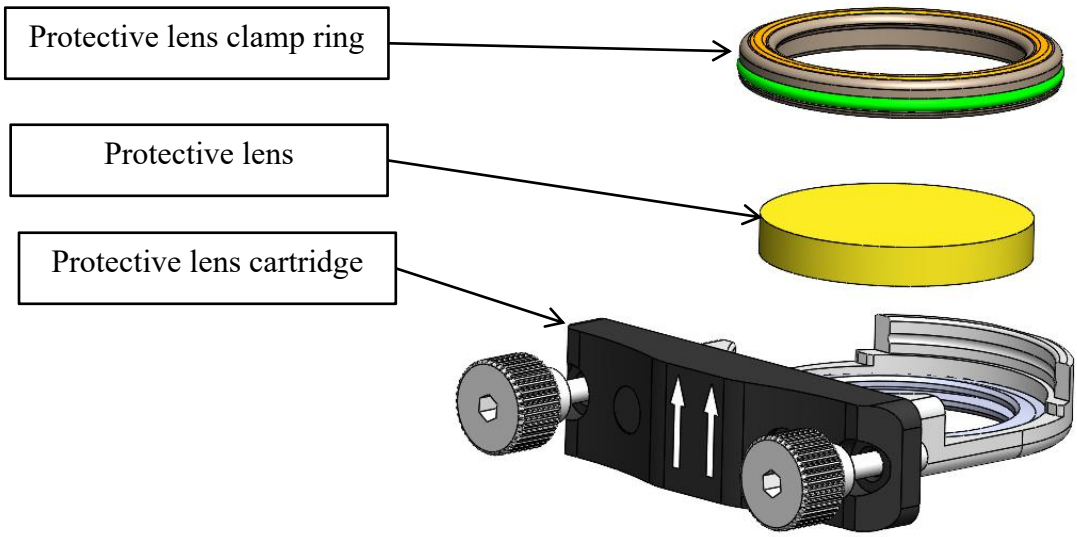
When cleaning and replacing the protective lens, avoid the grease on hands or dust in the environment from contaminating the protective lens.

5.5.1 Removal of Cutting Protective Lens

① Loosen 2-M4 hand-tightening anti-drop screws, then hold the hand-tightening screws with both hands and slowly and steadily pull out the protective lens holder , and move it to a clean and dust-free environment, as shown in the figure below.



② The assembly sequence is as shown in the following figure:



5.5.2 Cleaning of Protective Lens

① Tools: dust-free wiping cotton swabs, isopropyl alcohol, rubber air blower

② Spray isopropyl alcohol onto the dust-free wiping swabs.

③ Gently pinch the both sides of the protective lens with the left thumb and index finger.

④ Hold the dust-free wiping cotton swab in your right hand, gently wipe the front and back sides of the lens from bottom to top or from left to right in a single direction, and blow the lens surface with a rubber air blower to confirm that there is no foreign matter on the lens surface after cleaning.

⑤ The cleaned protective lens must be installed in the protective lens holder as soon as possible and inserted into the cutting head.

5.6 Maintenance of Sensor Parts

The ceramic body is a consumable part and can be replaced after damage. It shall be aligned with the two locating columns of the body in the process of installation. Otherwise, the ceramic body cannot be properly installed in place, thus causing operating failure of the sensor component. When locking the ceramic, tighten it with the locking nut. The different degree of tightness on locking nuts would directly affect the operating parameters of the sensor parts. The laser nozzle is the sensitive element of the sensing part. It is a wearing part. After it has worked for a period of time, it is necessary to remove the bonded slag and replace it in time when the burning loss is serious.

After assembling the ceramics, tighten the locking nut and expose the ceramic evenly about 2-3mm.

During use, the following matters should be noted:

① Dry and pure auxiliary gas should be used during cutting. If there is water, oil and other impurities in the gas, mutations may occur at working clearance, and even cause work disorder of the sensor. It is suggested to use high purity oxygen and configure the gas dryer, oil-water separator and other devices.

② The sensor should be cleaned after being defaced, with clean and dry cotton wipers. Do not use liquid to clean the cutting head and ceramic, and then connect and assemble it properly after cleaning.

③ The ceramic body can be replaced after being damaged. After ceramic body is replaced, an initialization of electrical system together with the amplifier should be conducted through a reset operation.

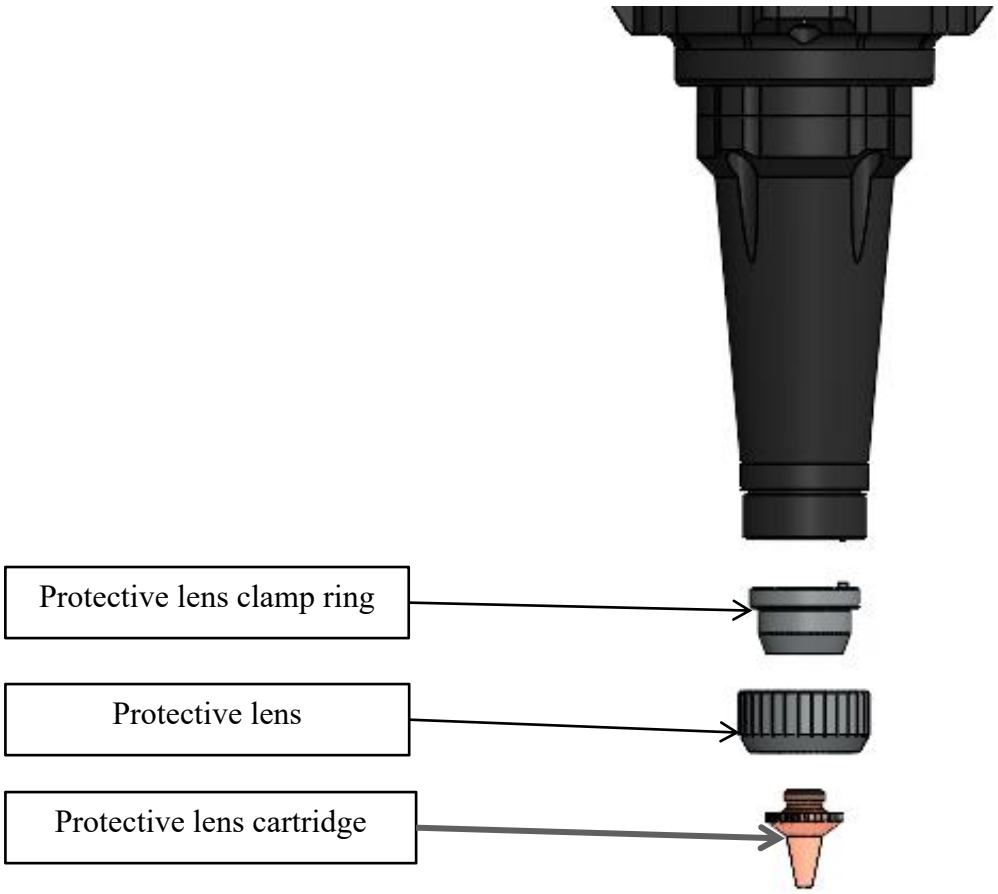
④ Prescriptive cutting nozzle should be used because the shape and size of it would directly affect the characteristics of the sensor. Therefore, specified cutting nozzle must be used.

5.6.1 Replacement of Nozzle and Ceramic Body

① Unscrew the nozzle counterclockwise;

② Unscrew the ceramic clamp ring counterclockwise;

③ Remove the ceramic body vertically downward.



5.6.2 Cleaning of Ceramic Ring

The surface cleanliness of the ceramic is directly related to the performance of the follow-up system. When there is dirt on the ceramic surface, it needs to be cleaned in time to ensure the working performance of the system.

① Take out the ceramic and clean it with anhydrous alcohol or isopropyl alcohol.

② Ensure that the ceramic surface is clean and dry without moisture before installation.

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