LC119-H03 User Manual

Product Description

Shenzhen Ospri Intelligent Technology Co., LTD

Foreword

Dear Users:

Welcome to use LC119-H03 fiber laser manual focusing 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.

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Chapter 1 General Introduction

1.1 Product Parameter

① The product parameters are as shown in Table 1.0.

Name	Precision fiber laser cutting head
Model	LC119 -H03
Connector Type	QBH
Wavelength	1080±10nm
Rated Power	≤2KW
Focus Length	75mm
Collimation Length	100mm/125mm
Nozzle	FSN36 series nozzle
Focus Range	-3mm～+3mm
Centering Range	±1mm
Gas Pressure	≤1.5Mpa
Weight	2KG

Table 1.0

1.2 Cautions

① Please wear specialized laser safety goggles to ensure human safety when running laser cutting head.

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.

④ When processing products with laser, use protective devices to prevent the laser beam from causing injury to human body.

Chapter 2 Structural Features

2.1 Brief Description of Product Structure

Brief description of product structure, as shown in Figure 1.1.

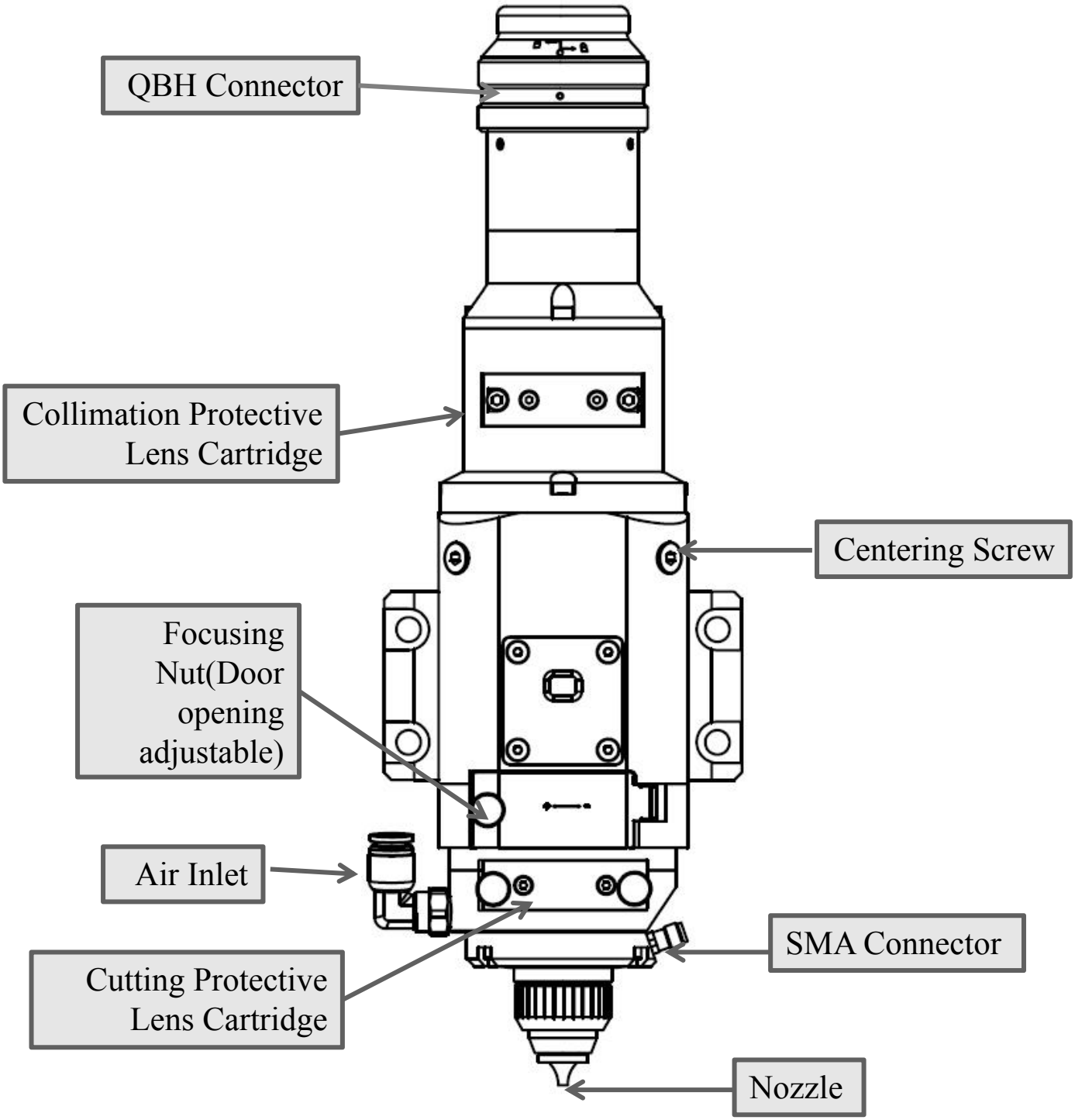
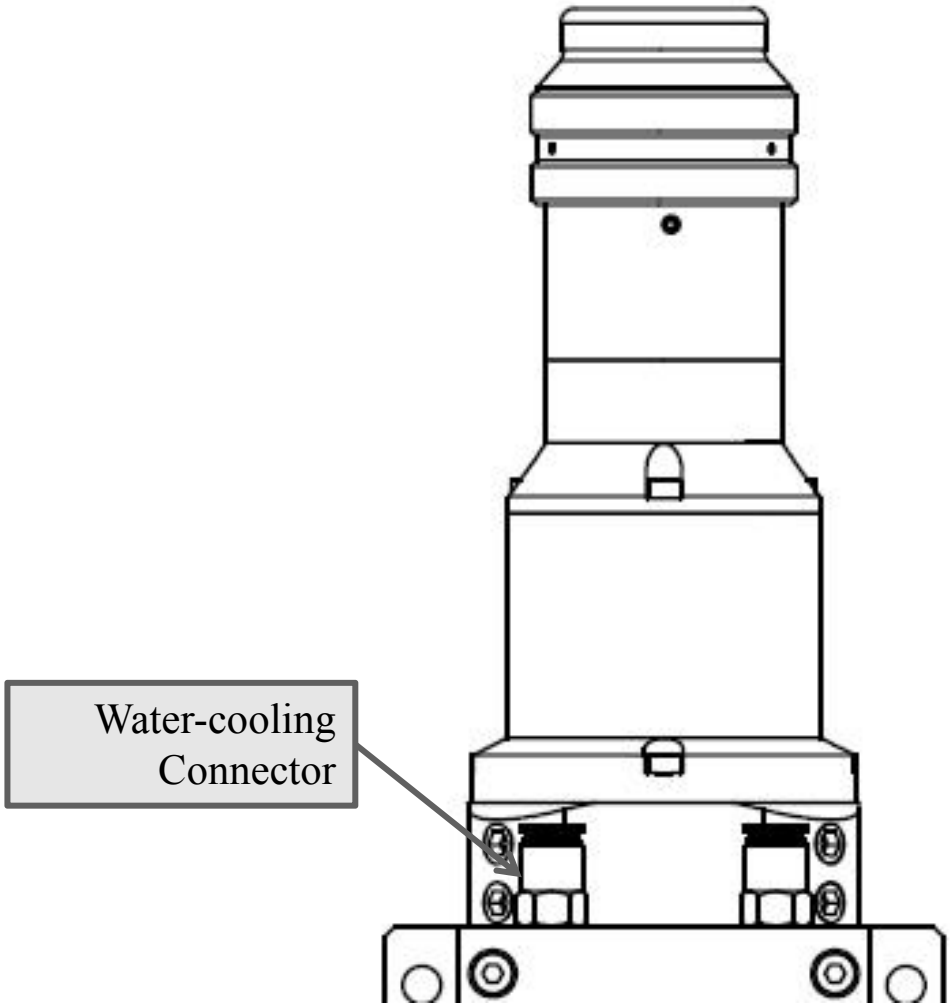


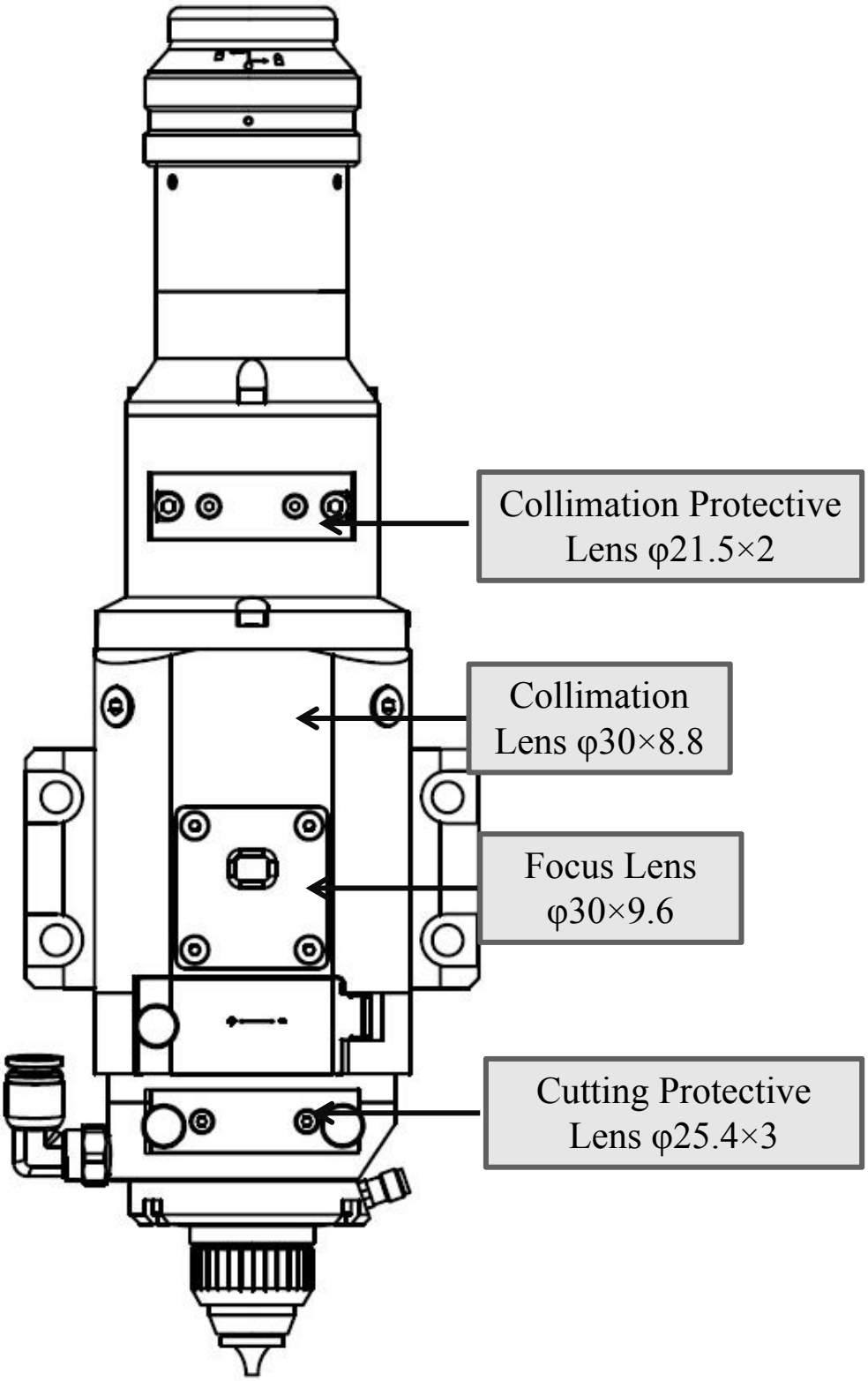
Figure 1.1

2.2 Brief Description of Product Parts

1. Water cooling connector: Cooling for cutting head.
2. Collimation protective lens module: It can avoid the dust from falling down inside the cutting head, for protecting the collimation lenses when plug or remove the fiber laser tip.
3. Focusing nut: Adjust the cutting head focus up and down.
4. Cutting protective lens cartridge: Seal the cutting gas and protect the focus lens.
5. Cutting gas inlet: φ6mm gas connector for inputting cutting gas.
6. Centering knob: Adjust the center of the light path so that the light beam passes through the center of the nozzle.
7. SMA connector: Connect to following amplifier.



2.2.1 Brief Description of Product Parts (Lens Size)



Chapter 3 Product Installation

3.1 Cutting Head Installation

Dimension drawing of cutting head (collimation F100/focus F75) is as shown in Figure 1.2 below.

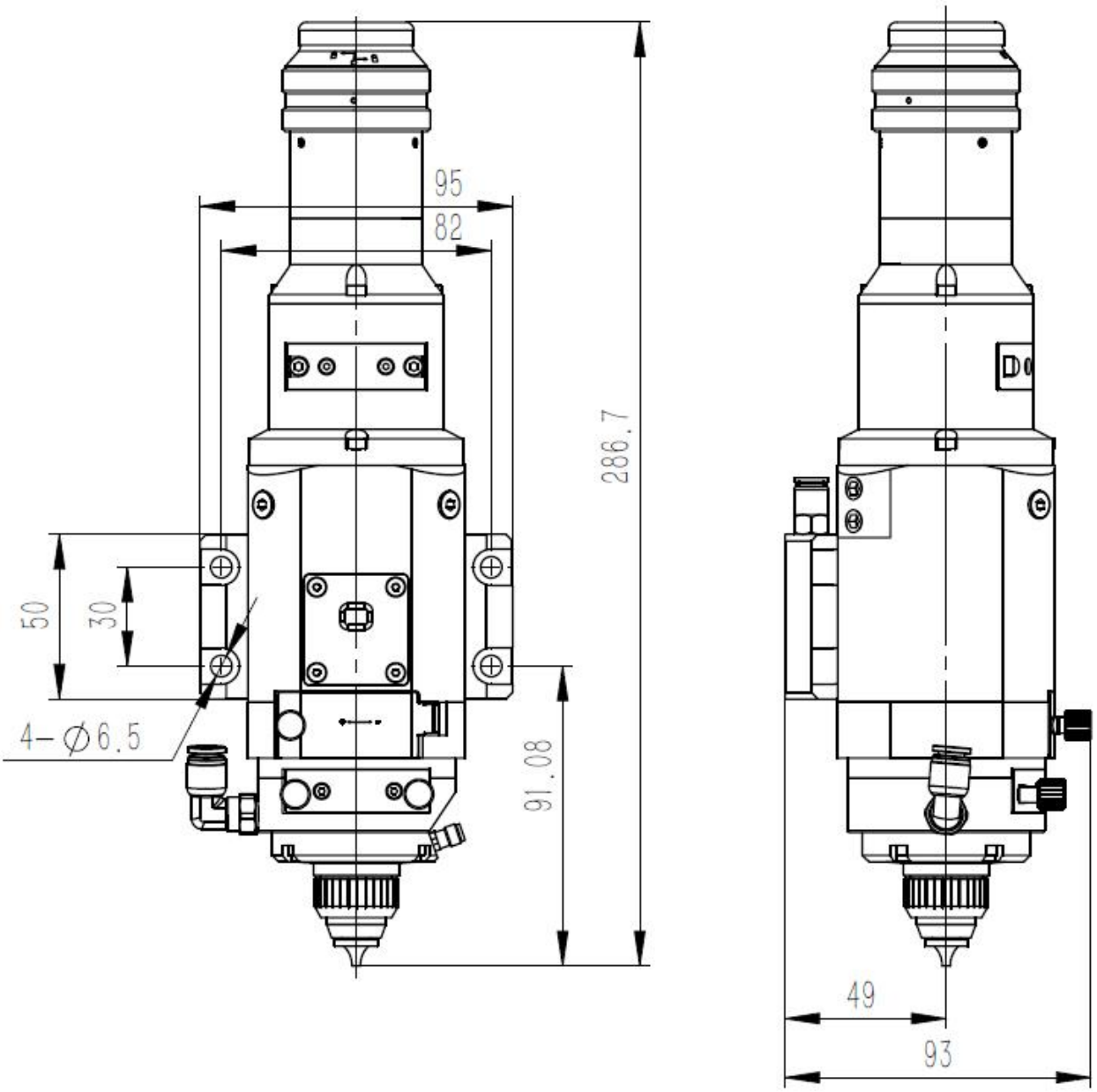


Figure 1.2

3.2 Cutting Head Connection

3.2.1 Cooling Water Connection

① Used for cooling cutting head, one inlet and one outlet, as shown in Figure 1.3 below.

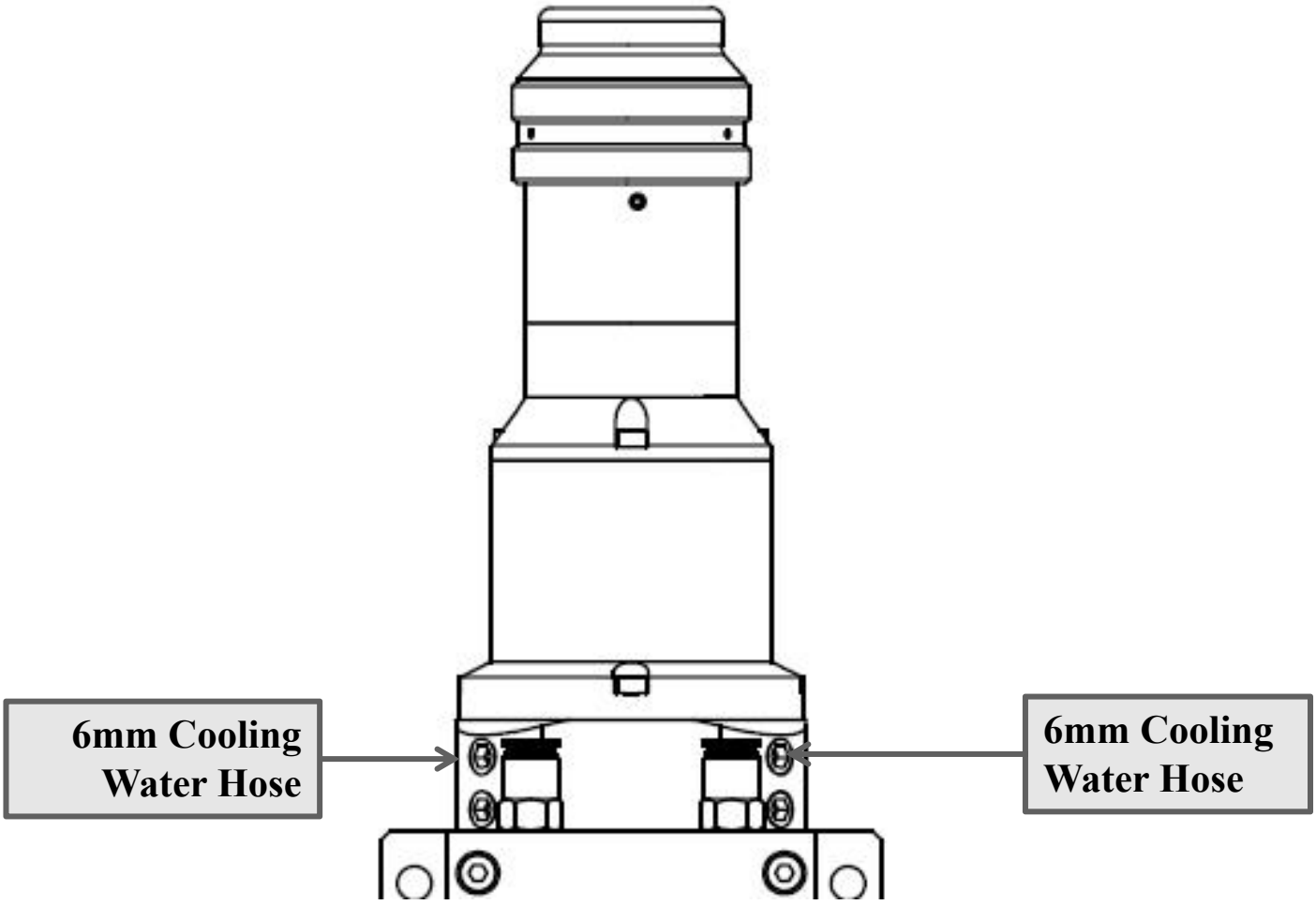


Figure 1.3

3.2.2 Gas Connection

① The inlet is connected to φ6mm gas hose, as shown in the Figure 1.4 below, used to connect with the cutting had, with the input pressure <1.5Mpa. Common gas: Oxygen, nitrogen and compressed air.

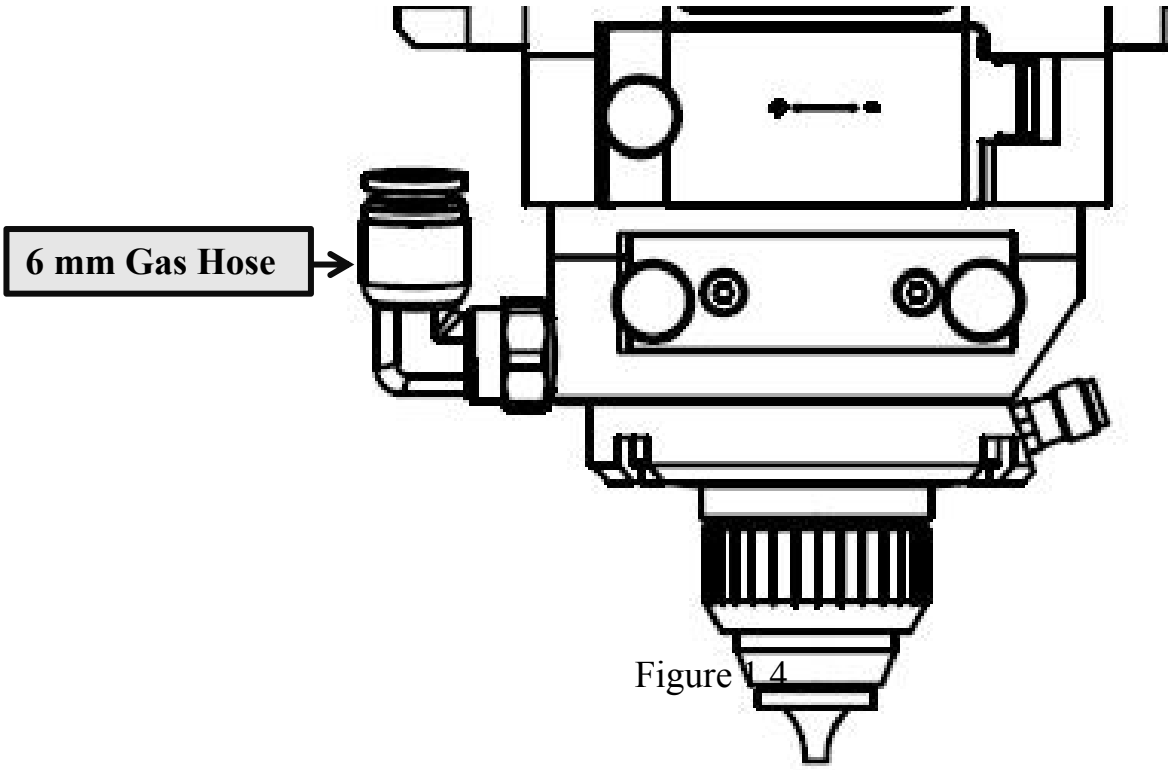


Figure 1.4

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 Put the cutting head horizontally, remove the white cover and static sticker, and then take out the dust-proof plug and dust-proof cover, as shown in Figure 1.5.

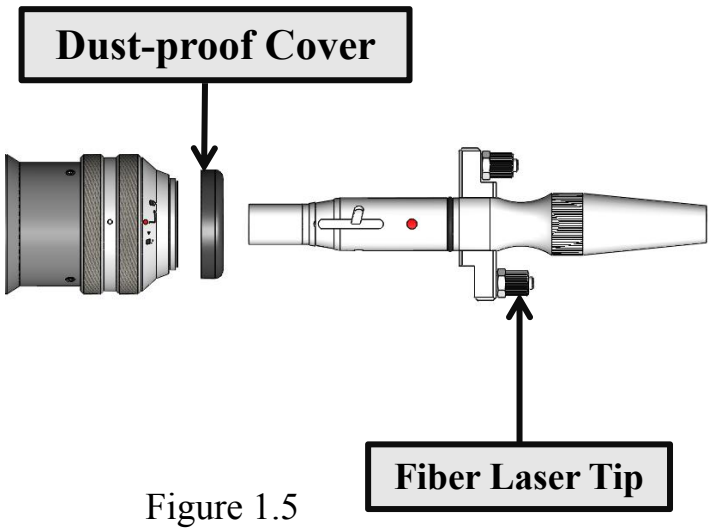


Figure 1.5

② Cover the dust-proof cover which is in the white accessory box, onto the fiber laser tip, as shown in Figure 1.6:

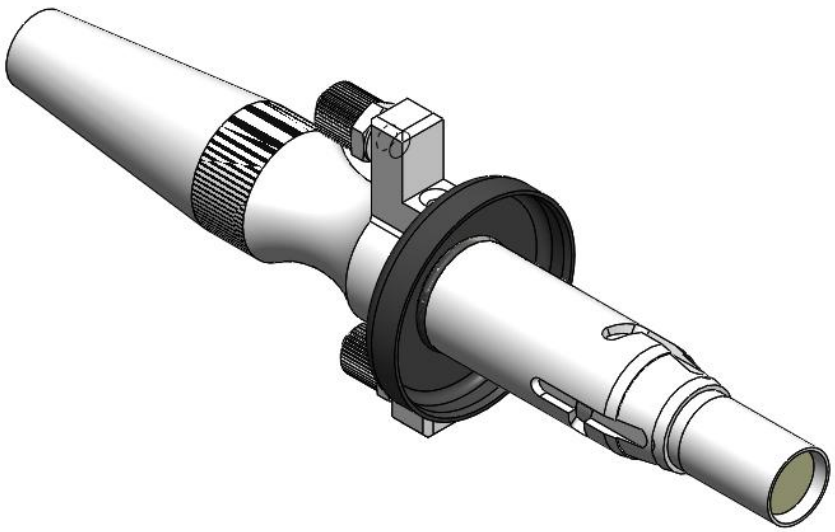


Figure 1.6

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

③ Turn the QBH connector into the open state, that is, screw it to the limit position counterclockwise (a "thud" sound can be heard). Do not twist with great force, otherwise the internal structure of the QBH may be damaged, as shown in Figure 1.7.

Figure 1.7

④ Align the red dot on the fiber laser tip with the red dot on the QBH connector, and slowly insert the fiber tip into the QBH connector, as shown in Figure 1.8.

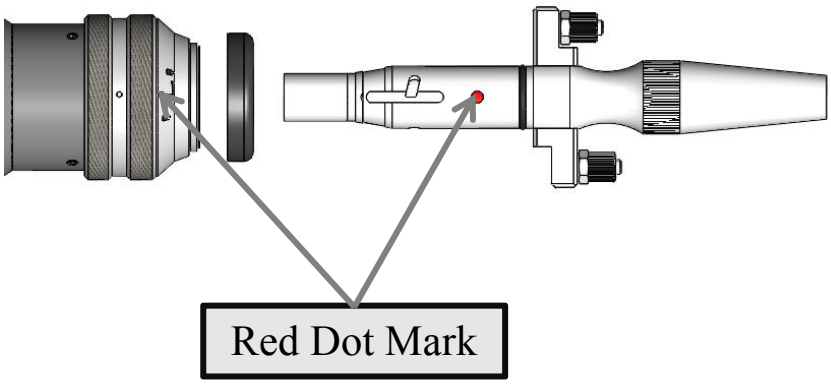


Figure 1.8

⑤ Turn the QBH connector to the locked state, that is, screw it toward the limit position clockwise (a "thud" sound can be heard). Then lift the swivel nut up and screw the nut clockwise again until the fiber tip is compressed tightly. (Clockwise: toward the direction of the "locked" icon). Do not twist with great force, otherwise the internal structure of the QBH may be damaged, as shown in Figure 1.9.

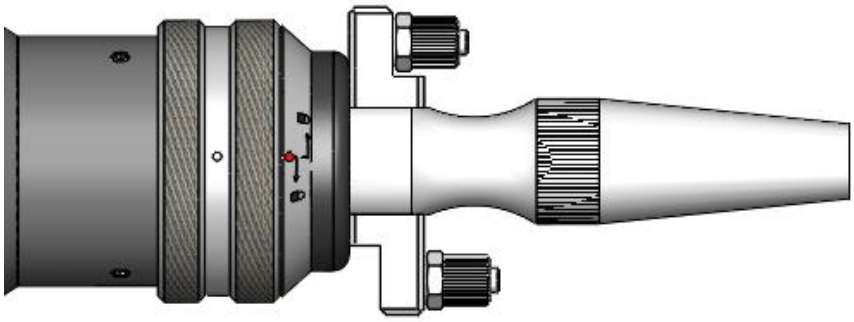


Figure 1.9

Attention: Wrap with masking tape after plugging fiber tip to better protect the laser head from dust.

Chapter 4 Product Debugging

4.1 Focusing Instruction

4.1.1 Beam Centering

To achieve good joint-cutting effect, the laser beam must be kept in the center of the nozzle. When it deviates from the center of the nozzle, it needs to be adjusted through the beam centering module.

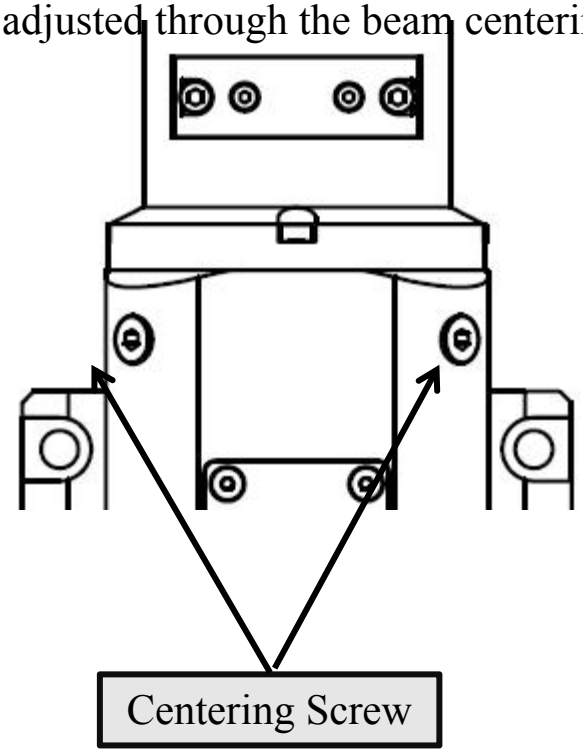


Figure 2.0

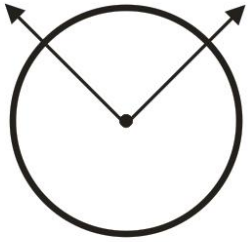


Figure 2.1

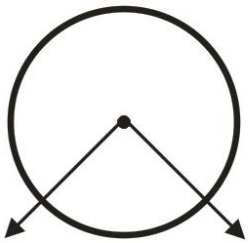


Figure 2.2

Relationship between beam position and adjustment knob, as shown in Figure 2.0:
① Adjust the two centering knobs.
② Adjustment method: Forward and backward.
③ The beam movement position is consistent with the knob movement.

When the knobs turn clockwise, the center of the lens direction move as shown in Figure 2.1; when the knobs turn counterclockwise, the center direction move as shown in Figure 2.2.

4.1.2 Focus Adjustment

To reach good cutting effect of different materials and thickness, the focus should be adjusted by using the focusing module, as shown in Figure 2.3.

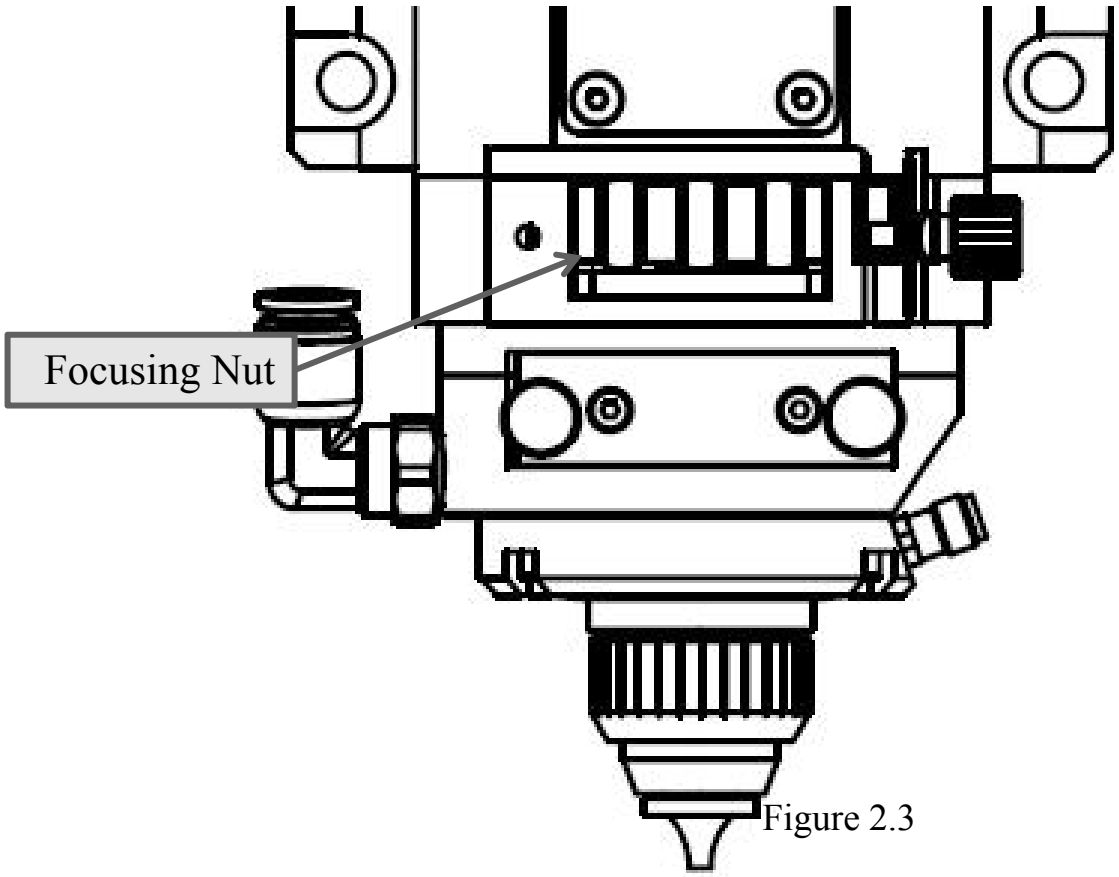


Figure 2.3

The relationship between the focus position and adjustment knob is as shown in Figure 2.3:

① The adjustment stroke of focus position 6mm.

② The focus changes 1mm per turn of rotation.

③ The minimum scale change is 0.1mm, and the focus is at the nozzle end plane when the scale number is 0.

④ When the scale is adjusted clockwise to +3, the focus is at the top (3mm inside the nozzle plane).

⑤ When the scale is adjusted counterclockwise to -3, the focus is at the bottom (3mm outside the nozzle plane).

Chapter 5 Product Maintenance

5.1 Lens Structure

All our spare parts of the cutting head are assembled in dust-free room. Therefore, only the protective lens cartridge can be dissembled by the users while other modules are forbidden to be dismantled generally. In case it is necessary to check the collimation lens and focus lens, please move the cutting head into a dust-free environment firstly.

The lens structure diagram is as shown in Figure 2.5:

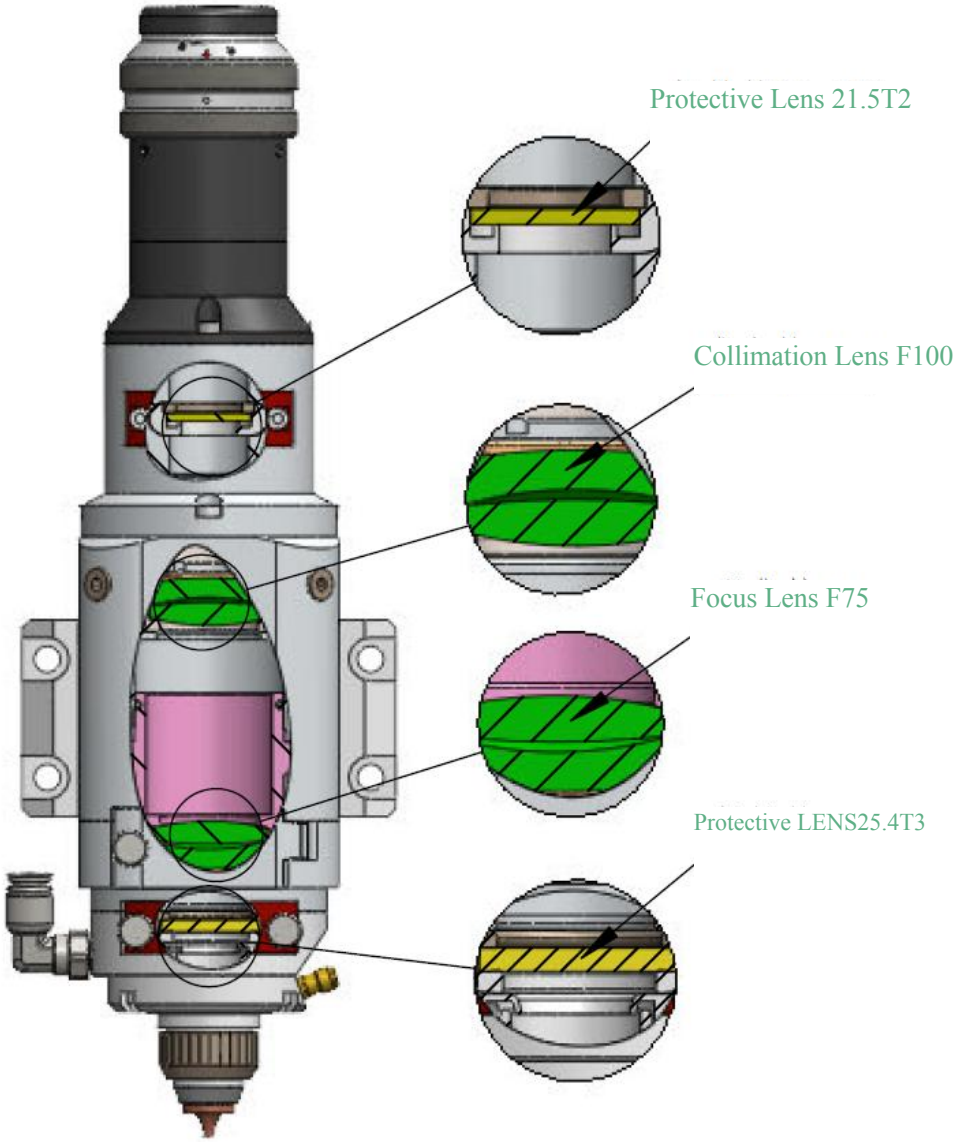


Figure 2.5

5.2 Maintenance of Collimation Protective Lens

In case poor welding performance occurs while cutting protective lens is normal, but burning points on the ceramic piece, the collimation protective lens or focus protective lens possibly is polluted or damaged. In this condition, please pull out the protective lens cartridge to check the lens. Before checking, use a clean cloth dampened with alcohol to wipe the exterior clean.

The disassembly of collimation protective lens is as shown in Figures 2.6 and 2.7.

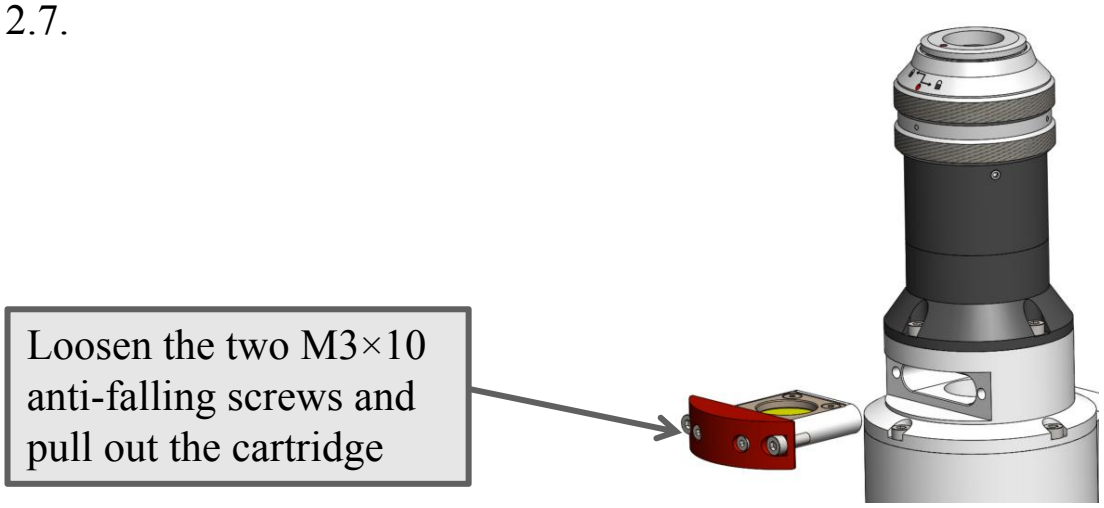


Figure 2.6

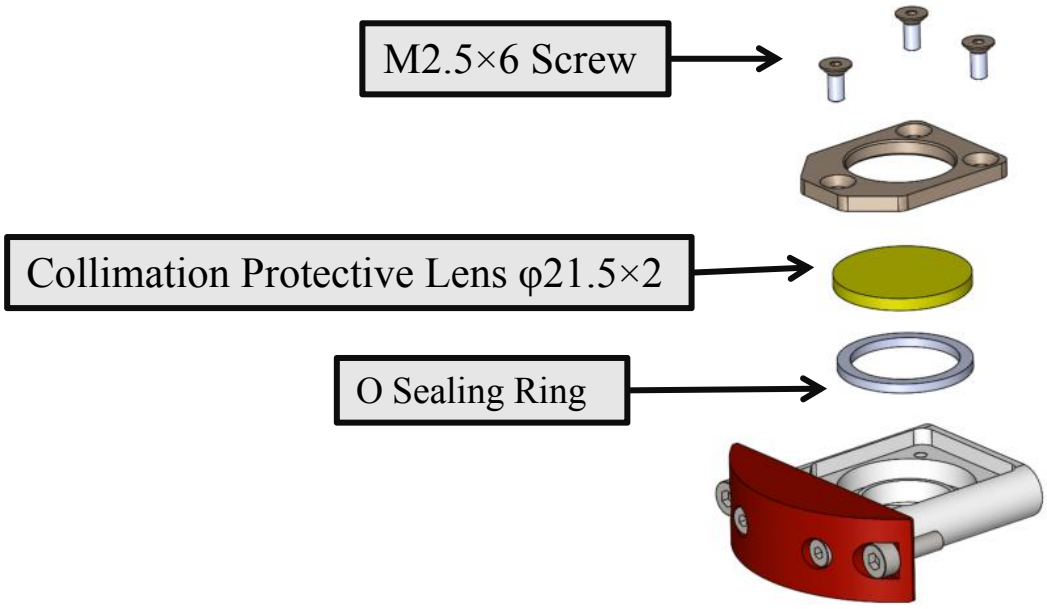


Figure 2.7

5.3 Maintenance of Cutting Protective Lens

When the protective lens has impurities or foreign matters, they will absorb laser and heat up, resulting in damaged protective lens. Therefore, it is recommended to clean the protective lens once a week. Besides, the protective lens is a wearing part and shall be replaced if damaged.

5.3.1 Disassembly of Protective Lens

Loosen the thumb screws with hand, hold the screws and slowly pull out the focus protective lens assembly, and move it to a clean and dust-free environment. The detailed diagram of replacing lens is as shown in Figure 3.8.

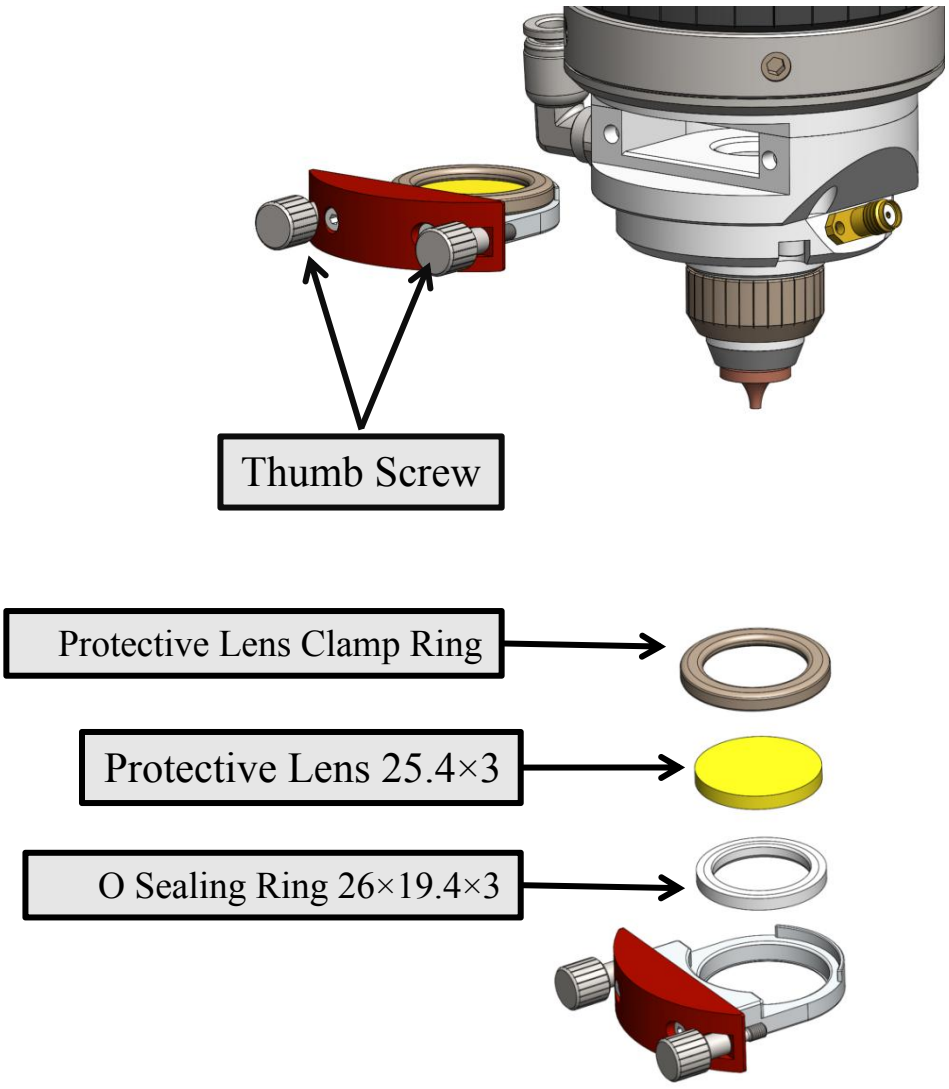


Figure 3.8

The assembly sequence is as shown in the figure above

5.3.2 Cleaning of Protective Lens

Figure 3.9

Figure 4.0

① Tools: Dust-free wiping swabs, isopropyl alcohol, 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, and hold the wiping swabs with right hand to gently wipe both sides of the lens in a single direction from bottom to top or from left to right, as shown in Figure 3.9.

④ After wiping, blow the lens surface again with filled dry and pure compressed air to ensure that the cleaned lens surface is free of any foreign matter, as shown in Figure 4.0.

⑤ The cleansed lens must be installed into the cutting head's body as soon as possible or stored in other clean and sealed container.

Attention: When cleaning and replacing the protective lens, avoid the grease on hands or dust in the environment from contaminating the protective lens. The focus lens, collimation lens and cutting lens are generally forbidden to be disassembled. If lenses may be contaminated, users can first test the lenses with ceramic piece, or contact with our technical staff if necessary.

5.4 Maintenance of Sensor Parts

Ceramic body is a vulnerable part but can be replaced after damage. It shall be aligned with the two locating pins 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 sensor part. It is a vulnerable part through the connection of the thread and the body. After working for a period of time, it is necessary to remove the bonded slag in time and replace it in time when the burning loss is serious.

After assembling the ceramics, the locking nut should be tightened and the evenly exposed ceramic is about 2-3mm.

The following cautions should be taken in the operation:

① Dry and clean auxiliary gas should be used when cutting. If there is water, oil and other impurities in the gas, the mutations may occur at working clearance, even causing 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 to the proper assembly after cleaning.

③ The ceramic body can be replaced after being damaged. 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 affects the characteristics of the sensor.

5.4.1 Replacement of Nozzle and Ceramic Body

① Remove the nozzle counterclockwise, as shown in Figure 4.1.

② Remove the ceramic clamp ring counterclockwise, as shown in Figure 4.1.

③ Remove the ceramic body vertically downward, as shown in Figure 4.1.

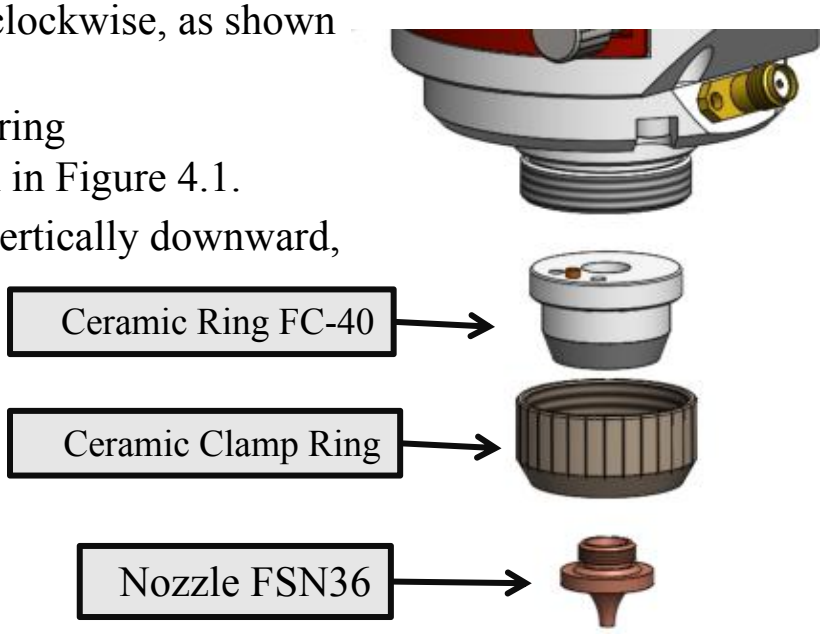


Figure 4.1

5.4.2 Cleaning of Ceramic Ring

① Take out the ceramic and clean it with anhydrous alcohol or isopropyl alcohol, as shown in Figure 4.2.

② Spray isopropyl alcohol onto the dust-free swab, remove the ceramic ring and clean it with the swab, as shown in Figure 4.3.

③ After wiping, blow the ceramic ring with filled dry and pure compressed air to clean it and ensure that the ceramic surface is clean and dry without moisture before installation, as shown in Figure 4.4.

Figure 4.2

Figure 4.3

Figure 4.4

Attention: Cleanliness of ceramic surface is directly related to the operating performance of the following system.
It is necessary to clean timely the dirt on the ceramic surface in order to ensure the working performance of the system.

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