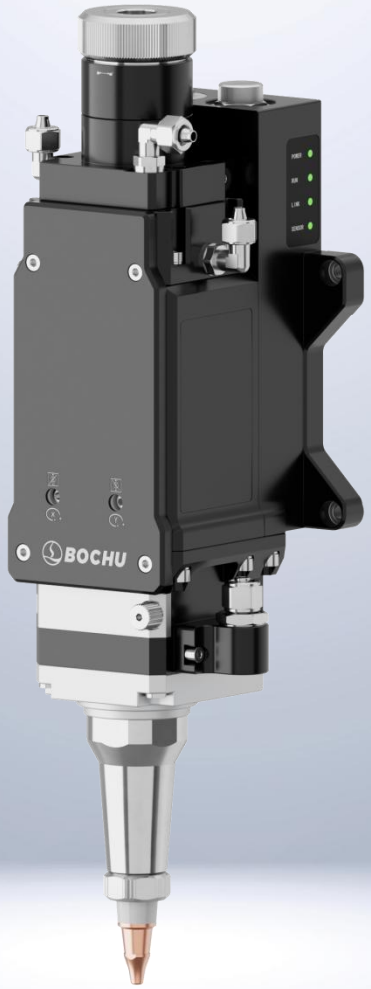
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BLT311T Intelligent Laser Cutting Head Product Manual

Original Version: V1.0.2

www.bochu.com

Legal Information

About This Document

As products and technologies continue to update, the product you are using may differ from the descriptions in this document. The actual product shall prevail. BOCHU strives to ensure the accuracy and applicability of this document, but reserves the right to the final interpretation. Changes resulting from product updates or other causes may be made without prior notice.

About This Product

Do not disassemble or modify this product without prior authorization from BOCHU. Failure to comply will void the product warranty.

Disclaimer

The operating performance and stability of this product are affected by multiple factors, including the installation environment, electrical standards, user-defined parameter settings, wiring methods, and other external conditions. The product shall be installed, commissioned, and configured strictly in accordance with all requirements specified in this document. For products involving electrical wiring, all wiring work shall comply with the applicable specifications.

Failure to comply with the requirements and mandatory safety regulations described in this document during installation, wiring, parameter configuration, or operation may result in signal interference, degraded system performance, equipment damage, or safety hazards. The responsible party shall bear all legal liabilities for any resulting property damage or personal injury.

Some products are equipped with electrical protection and/or fault diagnostic functions. Such functions are intended only as supplementary safeguards and cannot eliminate all risks arising from improper operation. Machine manufacturers and end users shall comply with applicable safety regulations and ensure safe equipment operation.

BOCHU shall not be liable for any direct or indirect loss arising from improper use of this document or this product; failure to comply with safety operating procedures; or force majeure

events, including but not limited to natural disasters.

Equipment in operation may involve inherent risks. Users shall ensure that adequate fault-handling mechanisms and safety protection measures are implemented. BOCHU shall not be liable for any incidental or consequential damages arising therefrom.

Foreword

This document applies to the BLT311T Intelligent Laser Cutting Head (hereinafter referred to as "BLT311T").

Explanation of Symbols

Symbol	Description
 Notice	Indicates supplementary information regarding the use of this product.
 Caution	Indicates that improper operations may result in minor injury or equipment damage.
 Warning	Indicates that improper operations may result in death or serious injury.
 Danger	Indicates that improper operations will result in death or serious injury.

Revision History

Version No.	Date	Description
V1.0.0	2026/04/28	First English Version.
V1.0.1	2026/06/02	Added Section 1.1.
V1.0.2	2026/08/07	● Updated the Max Focusing Adjustment Range in Table1-1. ● Updated Cutting Head Installation and Maintenance.

Safety Instructions

Safety Precautions

- Before storing, installing, wiring, operating, inspecting, or maintaining the product, users must read and follow the important safety instructions below to ensure safe and proper operation.
- The "Caution," "Warning," and "Danger" safety symbols in the manual serve only as supplementary safety information and do not cover all required safety precautions.
- The product should be used in the specified environmental conditions. Failure to comply may cause malfunction. Functional abnormalities or component damage resulting from non-compliance with these specifications are not covered under the warranty.
- BOCHU provides no warranty for products that have been modified by users, and assumes no liability for any injury or loss caused by such modifications.
- BOCHU shall not be liable for personal injury, property losses, or other damages arising from improper operation of the product.

Risks Associated with the Cutting Head

Risk Type	Symbol	Description
General Precautions		1. Before installing or replacing the cutting head, ensure that all components of the laser cutting system (such as the laser source, water chiller, controller, power supply, and computer) are powered off. Verify that the laser wavelength, power rating, and fiber connector are compatible with the cutting head.
		2. If the cutting head has been subjected to an impact, inspect the affected area immediately. Replace any damaged components before resuming operation.
		3. Before machine tool shutdown or maintenance, disable laser emission through the control software and implement appropriate lockout measures and warning signs to prevent accidental operation that could result in personal injury or equipment damage.
Laser Radiation		1. The cutting head itself does not generate laser radiation; it only guides the laser beam emitted by the laser source.
		2. Improper operation (for example, collision of the cutting head) may cause the laser beam to deviate from its intended path, posing a hazard to personnel or nearby equipment.
Do Not Disassemble		Do not modify or disassemble the cutting head without authorization from qualified service personnel.
Do Not Stare into the Laser Beam		Do not stare into the laser beam during commissioning or cutting. Wear appropriate laser safety eyewear when necessary and keep a safe distance from the laser beam to avoid injury caused by laser radiation.
Do Not Touch		After laser emission has stopped, the nozzle may remain hot. Do not touch the nozzle with bare hands to avoid burns.

Risk Type	Symbol	Description
Wear a Protective Mask		Cutting operations generate fumes and airborne particles. Wear appropriate respiratory protection to reduce exposure.

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Chapter 1 Product Introduction

This chapter provides an overview of BLT311T, including its appearance, technical specifications, and the meanings of the LED indicators.

1.1 Product Overview

The BLT311T is designed specifically for laser beams with a wavelength of 1060 nm to 1090 nm and a rated power of 4 kW. It is compatible with both bus and non-bus systems. BLT311T is equipped with water and gas ports. The water port is used to connect to an external water chiller for cooling the cutting head, while the gas port is used to connect cutting gas or other auxiliary gases to meet processing and other functional requirements.

After receiving the product, carefully remove it from the packaging. A nameplate is attached to the cutting head, providing detailed product information, including the model, serial number, and power rating. Carefully check that the nameplate information matches the purchased product. If any discrepancy is found, contact BOCHU personnel immediately.

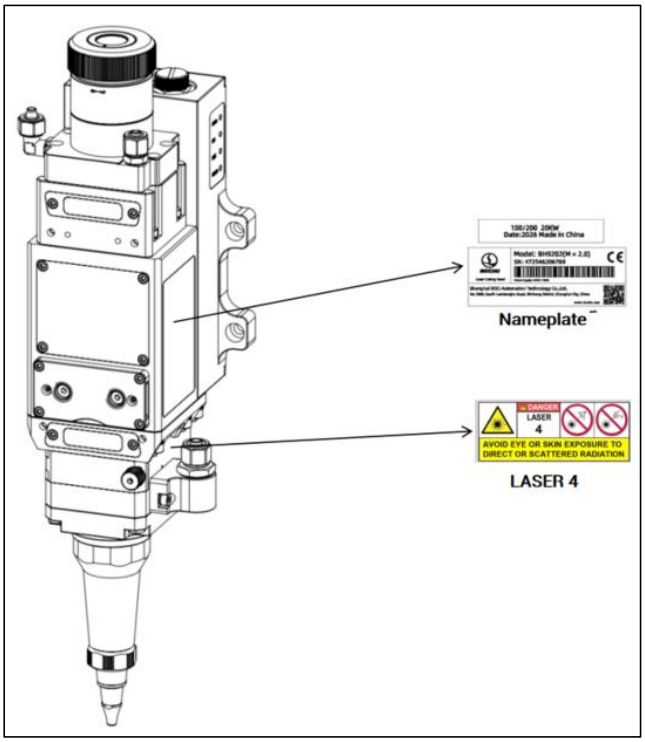


Figure 1-1 Product nameplate

⚠Caution:

1. The packaging box is specifically designed to protect the product during transportation. Retain the original packaging for later use when returning the cutting head for maintenance.

2. A new cutting head is typically shipped with an accessory box containing a list of included items. These items may be needed for operation or basic maintenance. Store the accessory box carefully to avoid losing any components.

3. Handle the cutting head with care during unpacking and transportation. Accidental impacts or collisions may damage the product.

4. Installation, maintenance, and repair of the cutting head shall be performed only by trained and qualified personnel.

1.2 Product View

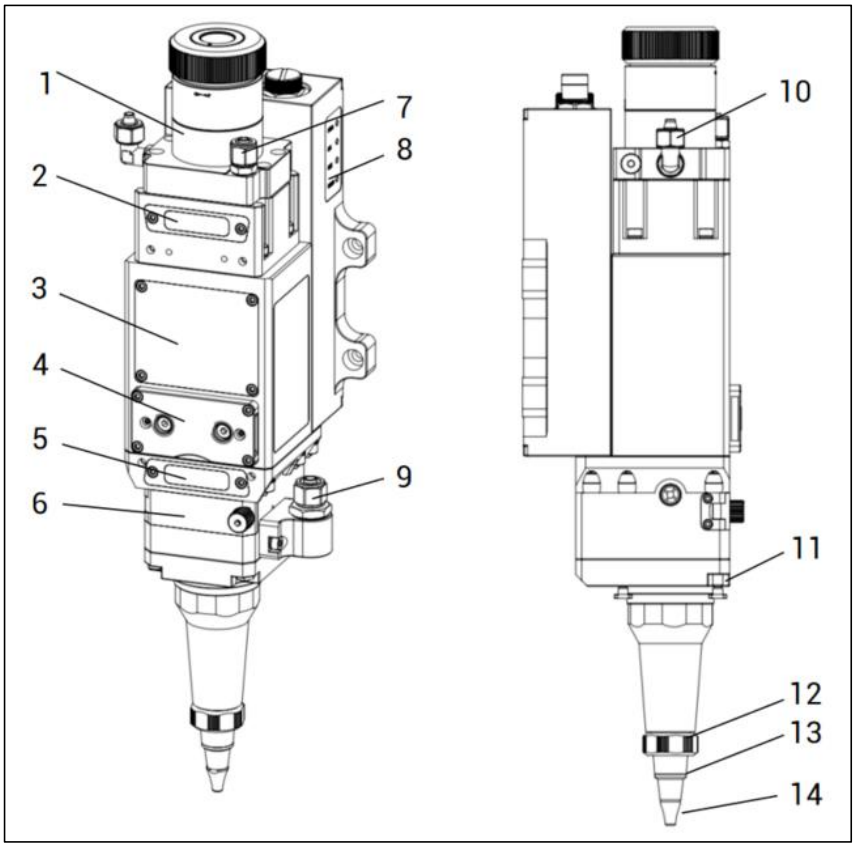


Figure 1-2 Product view

1. Fiber connector;
2. Upper protective window cartridge;
3. Collimating cartridge;
4. Focusing cartridge;
5. 2nd lower protective window cartridge;
6. 1st lower protective window cartridge;
7. Water cooling inlet;
8. LED indicator;
9. Cutting gas port;
10. Water cooling outlet;
11. Protective components;
12. Ceramic locking ring;
13. Ceramic body;
14. Nozzle.

1.3 Technical Parameters

Table 1-1 BLT311T Technical Parameters

Parameter	Description
Laser Wavelength	1060 nm to 1090 nm
Laser Power	≤ 4 kW
Fiber Connector	QBH, EOC
Spot Magnification	M = 1.5/2.0/2.5
Max Focus Adjustment Range	● -18 mm to +25 mm (M = 1.5) ● -40 mm to +41 mm (M = 2.0) ● -80 mm to +54 mm (M = 2.5)
NA	Max. 0.13 at Fc100
Alignment Adjustment Range	±1.5 mm
Focusing Acceleration	7.5 m/s²
Cutting Gas Port	ø10, Max. 25 bar (2.5 MPa)
Water Cooling Port	ø8, Max. 5 bar (0.5 MPa), Min. flow 2.0 L/min
Working Temperature	+5℃ to +55℃
Storage Temperature	-25℃ to +55℃
Dimensions	403.5 mm × 125.5 mm × 112 mm (QBH, M = 2.0)
Weight	About 5.1 kg (QBH, M = 2.0)
Power Supply	24 V DC

To avoid damage to the cutting head during storage and transportation, observe the following precautions:

⚠Caution:

1. Store the cutting head within the specified temperature and humidity range.

2. Do not expose the cutting head to magnetic fields, such as permanent magnets or strong alternating fields.

3. Avoid any impact or collision during transportation and operation.

1.4 LED Indicators

Table 1-2 LED Indicator Descriptions

Icon	Status	Indication
POWER 	Green	Power normal.
	Red	Under-voltage alarm due to insufficient electrical power.
	Off	No power (possible power supply failure, wiring fault, or loose connection).
RUN 	Green	System normal.
	Red	Motor fault (overcurrent; mechanical components not operating smoothly).
	Off	No signal (possible wiring fault or loose connection).
LINK 	Green	Communication normal.
	Red	Communication fault.
	Off	No signal (possible wiring fault or loose connection).
SENSOR 	Green	Sensor reading normal.
	Red	Sensor reading fault.
	Off	No signal (possible wiring fault or loose connection).

Chapter 2 Gas Connection

The cutting gas port is shown in the figure below. The cutting gas hose must be tightened with a wrench during installation.

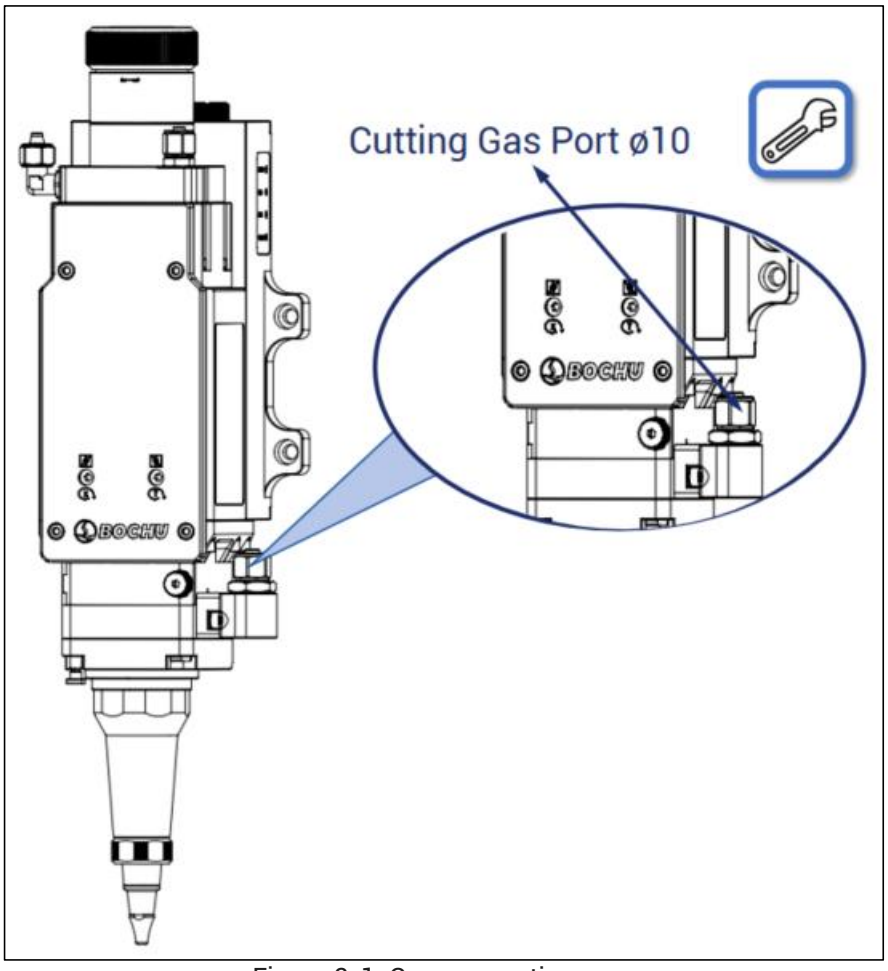


Figure 2-1 Gas connection

⚠Caution:

1. The gas quality shall comply with ISO 8573-1:2010, with solid particles (Class 2), water (Class 4), and oil (Class 3). Higher gas purity helps extend the service life of the system.

2. The maximum pressure of the cutting gas is 25 bar (2.5 MPa).

Chapter 3 Water Connection

The cooling water ports are shown in the figure below:

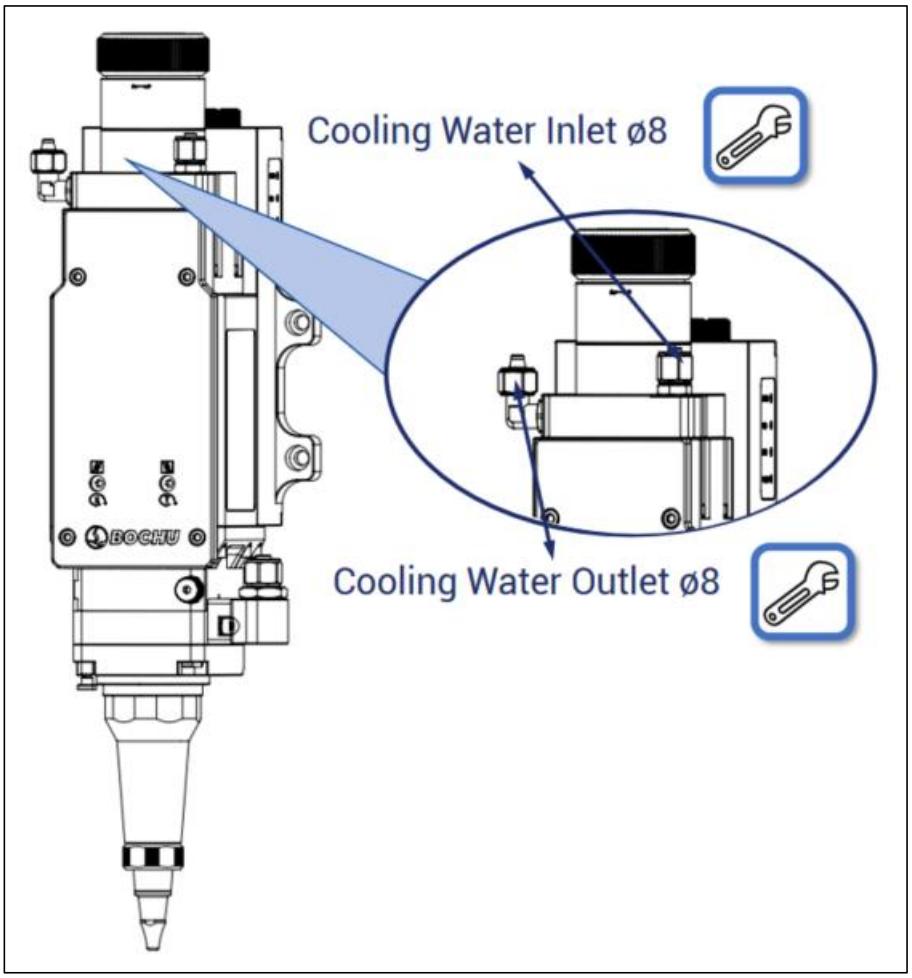


Figure 3-1 Water connection

⚠Caution:

1. Use purified water for the cooling water; purified drinking water is also acceptable.

2. To prevent the pipeline blockage caused by mold growth in the chiller, it is recommended to add alcohol to the purified water to achieve a 10% alcohol concentration.

3. When the ambient temperature is from -10℃ to 0℃, a 30% ethylene glycol solution must be used and replaced every two months.

4. When the ambient temperature is below -10℃, a dual-circuit chiller must be used, and the cooling system must operate continuously.

5. Recommended settings for cooling water: pressure ≤ 5 bar (0.5 MPa); flow rate ≥ 2.0 L/min.

6. Refer to the dew point table when setting the cooling water temperature to prevent condensation on optical components.

Table 3-1 Dew Point Temperature at Different Temperatures and Humidity Levels

Air Temperature °C	Relative Humidity																		
	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10
43	43	42	41	40	39	38	37	35	34	32	31	29	27	24	22	18	16	11	5
41	41	39	38	37	36	35	34	33	32	29	28	27	24	22	19	17	13	8	3
38	38	37	36	35	34	33	32	30	29	27	26	24	22	19	17	14	11	7	0
35	35	34	33	32	31	30	29	27	26	24	23	21	19	17	15	12	9	4	0
32	32	31	31	29	28	27	26	24	23	22	20	18	17	15	12	9	6	2	0
29	29	28	27	27	26	24	23	22	21	19	18	26	14	12	10	7	3	0	
27	27	26	25	24	23	22	21	19	18	17	15	13	12	10	7	4	2	0	
24	24	23	22	21	20	19	18	17	16	14	13	11	9	7	5	2	0		
21	21	20	19	18	17	16	15	14	13	12	10	8	7	4	3	0			
18	18	17	17	16	15	14	13	12	10	9	7	6	4	2	0				
16	16	14	14	13	12	11	10	9	7	6	5	3	2	0					
13	13	12	11	10	9	8	7	6	4	3	2	1	0						
10	10	9	8	7	7	6	4	3	2	1	0								
7	7	6	6	4	4	3	2	1	0										
4	4	4	3	2	1	0													
2	2	1	0																
0	0																		

Chapter 4 Electrical Connection

This chapter describes the electrical connections and wiring installation of the cutting head.

4.1 Connector

4.1.1 PWE Connector

The PWE connector supports 100 Mbps Ethernet communication and provides power and data to the BLT series cutting heads via the PWE cable.

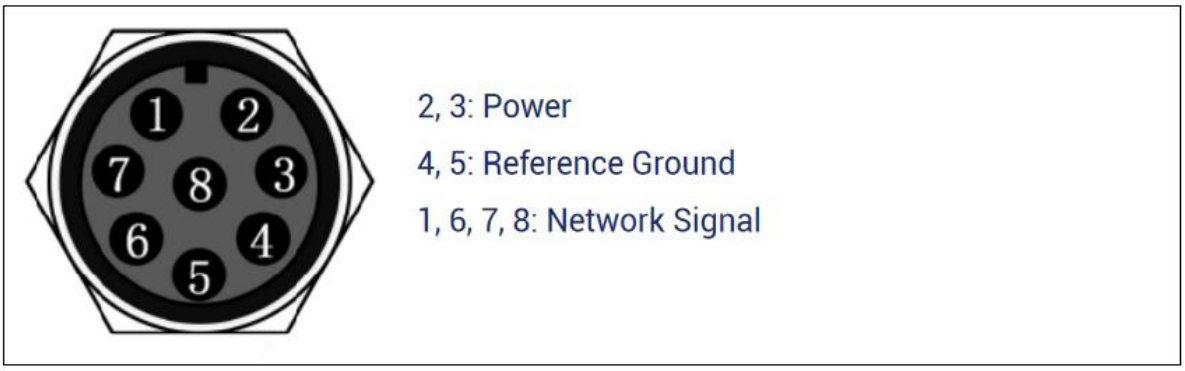


Figure 4-1 PWE connector

⚠Caution:

1. The PWE connector of the cutting head must be connected to the terminal board using the PWE towline cable provided by BOCHU.

2. When using BCL4568E, select an appropriate 24 V power supply based on the power consumption of the cutting head and other devices on the board.

3. During installation, the PWE cable must not be twisted in enclosed spaces. Separate high-voltage and low-voltage electrical cables during wiring. It is recommended to use separators to isolate cables, maintaining a minimum spacing of 10% of the cable diameter between adjacent cables.

4. Before connecting the cutting head to the terminal board, ensure that the terminal board is powered off.

⚠Waterproof cautions for PWE connector:

1. The PWE connector is equipped with a dust plug before shipment. The cutting head meets the IP64 rating when the dust plug is securely installed or when the PWE cable is properly connected.

2. Once the dust plug is removed, the IP64 rating cannot be guaranteed. Exposure to water spray may result in water ingress, affecting normal operation.

3. Ensure that the water hoses are properly connected and the fittings are tightened before removing the dust plug. This prevents accidental hose loosening, which may cause water to enter the PWE connector and damage the product.

4. During machine commissioning wiring, remove the dust plug before connecting the cable and keep the dust plug properly. Install the dust plug immediately after disconnecting the cable to prevent accidental water ingress during transportation, water hose connection, or other operations.

4.1.2 HC Connector

The aviation connector is connected to the BCS Height Controller via the HC aviation cable.

4.2 Electrical Connection

4.2.1 Bus System

The electrical connections of the cutting head are shown in the figure below:

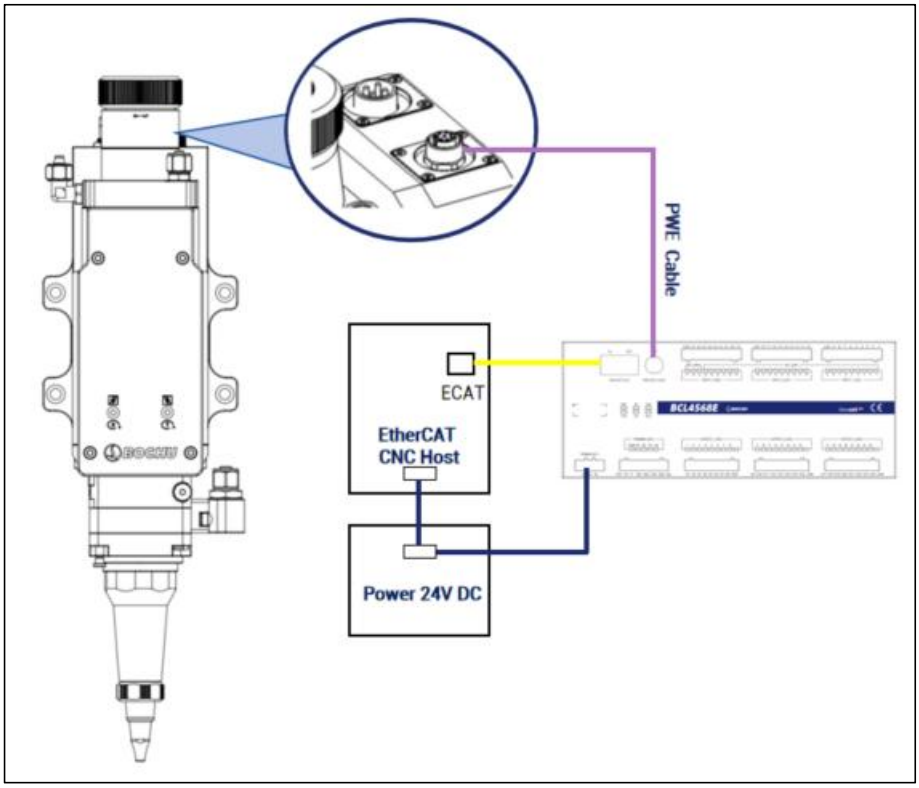


Figure 4-2 Bus system electrical connections

4.2.2 Non-Bus System

The electrical connections of the cutting head are shown in the figure below:

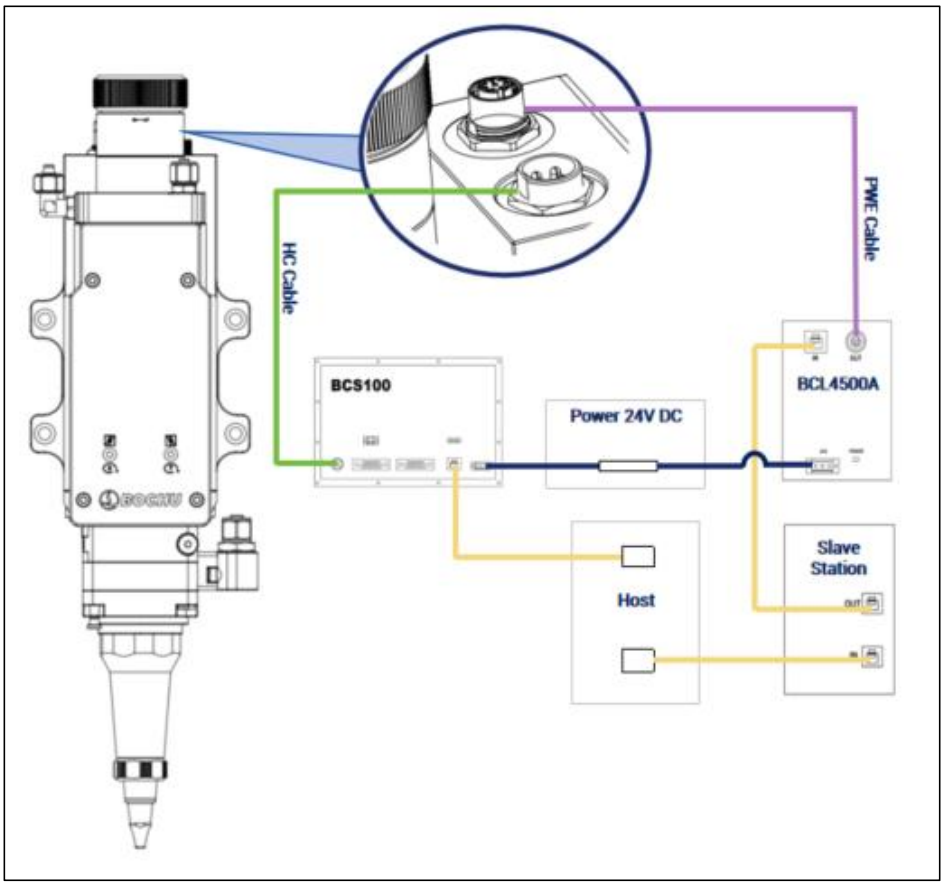


Figure 4-3 Non-bus system electrical connections

Chapter 5 Cutting Head Installation

During installation, dust or contaminants may enter the cutting head and contaminate the optical components, affecting normal operation. Follow the instructions below to prevent contamination.

5.1 Connect the Cutting Head to the Laser

5.1.1 Preparations before Installation

Prepare the items listed below:

- Cutting head.
- Clean workbench (Type of clean workbench: vertical laminar flow; cleanliness: ISO Class 5 (Class 100); average airflow velocity ≥ 0.4 m/s).
- Clean kit: high-intensity flashlight, anhydrous ethanol (or IPA), cotton swab, cleanroom wiper, and compressed air dust removal can (or dust blower).

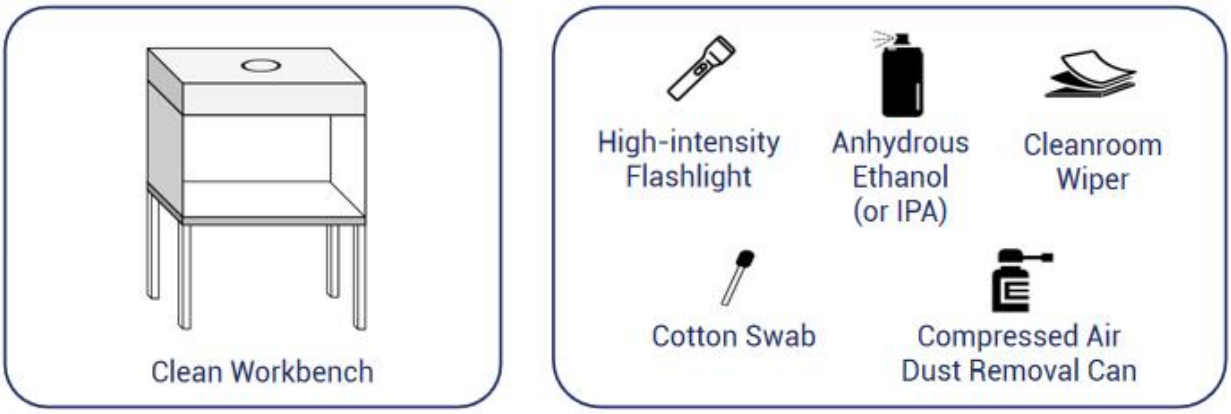


Figure 5-1 Preparation tools for the cutting head installation

⚠Caution:

1. Only trained personnel with the required expertise are permitted to perform these operations.

2. To ensure proper operation of the laser equipment and the safety of the operators, follow the relevant operating instructions.

5.1.2 Specific Procedures

Step 1 Prepare the clean workbench.

1. Check the cleanliness of the workbench using a particle counter. The results shall meet ISO Class 5 (Class 100).
2. Confirm that the FFU (Fan Filter Unit) is within its service life, and measure the average airflow velocity in the working area. When the airflow velocity falls below 0.4 m/s, the FFU shall be replaced immediately. After replacement, the airflow velocity shall be re-measured and verified to meet the requirement before the unit can be returned to service.
3. Check that all switches are functioning properly and verify that the fan operates normally.

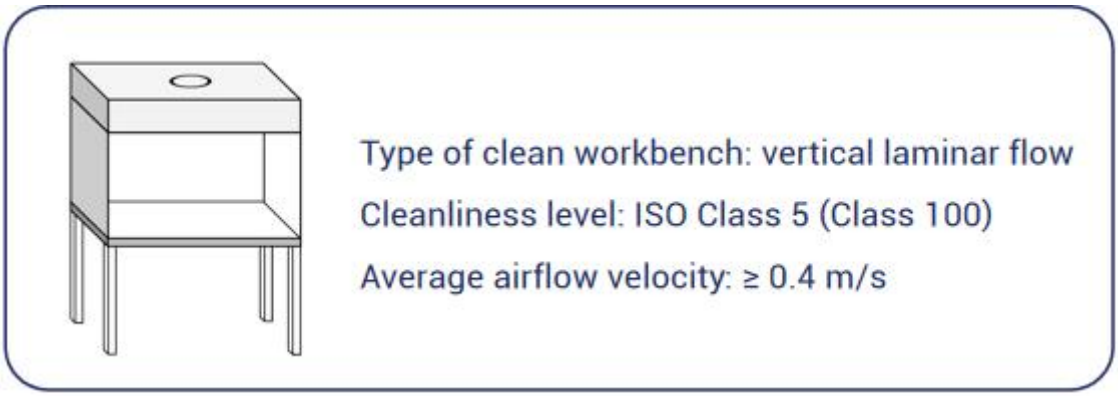


Figure 5-2 Clean workbench

⚠Notice:

1. Remove any unnecessary items from the clean workbench to prevent obstruction of the airflow.

2. For newly installed or long-unused clean workbenches, clean the surface with a cleanroom wiper and anhydrous ethanol before use.

Step 2 Start the clean bench and ensure that it is operating normally.

1. Connect the power supply.
2. Slide the glass door of the clean workbench down to the lowest position, leaving a gap of approximately 10 cm.

3. Start the fan to initiate self-purification. Allow the workbench to operate for at least 30 minutes to achieve proper purification before use.

4. After the workbench is operating normally, turn on the work light.

Step 3 Put the cutting head horizontally inside the clean workbench.

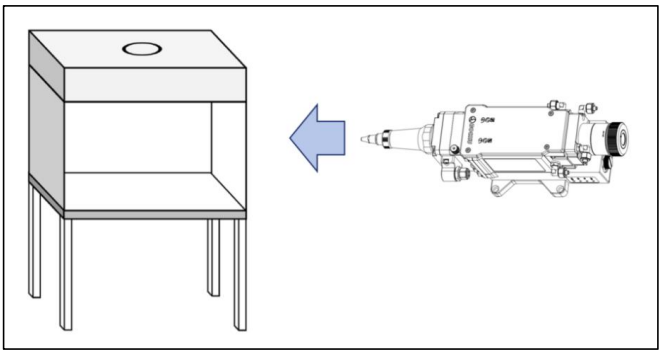


Figure 5-3 Put the cutting head inside the workbench

⚠Caution: To prevent dust from entering the chamber, ensure that the protective film or dust plug on the fiber connector is intact before inserting or removing the fiber connector.

Step 4 Clean the fiber connector with a cleanroom wiper soaked in anhydrous ethanol to ensure it is clean.

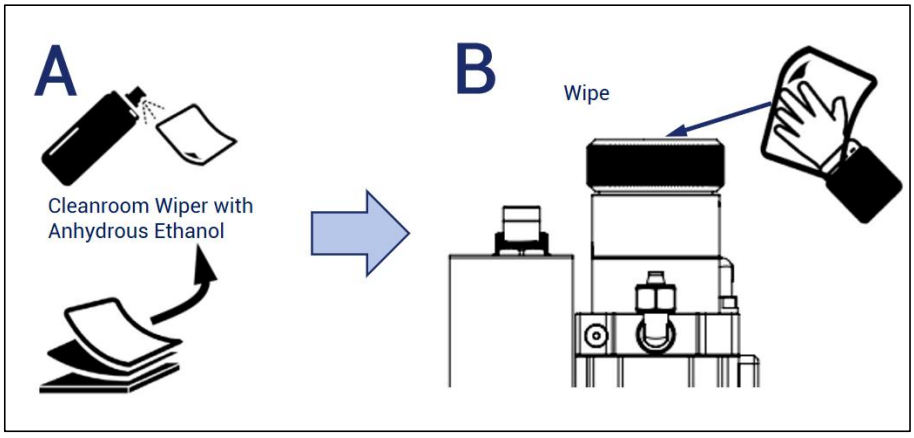


Figure 5-4 Clean the connector

Step 5 Check the laser fiber connector end face.

1. Remove the protective cap from the laser fiber connector.

2. Use the high-intensity flashlight to inspect the fiber end face for contamination. If the end face is clean, insert the fiber directly. If contamination is present, clean the end face using a cotton swab soaked in anhydrous ethanol or IPA.

Step 6 Remove the protective film or cap from the fiber connector on the cutting head.

Step 7 Insert the fiber connector into the cutting head.

1. Align the positioning pin on the fiber plug with the red marker or the notch on the connector, and insert it into the unlocked fiber connector, ensuring it is fully seated.
2. Secure the fiber connector using the corresponding locking method.

- QBH fiber connector: Sequentially tighten locking cap until the fiber is securely locked.
- EOC fiber connector: Tighten the fixing screws until the fiber is securely locked.

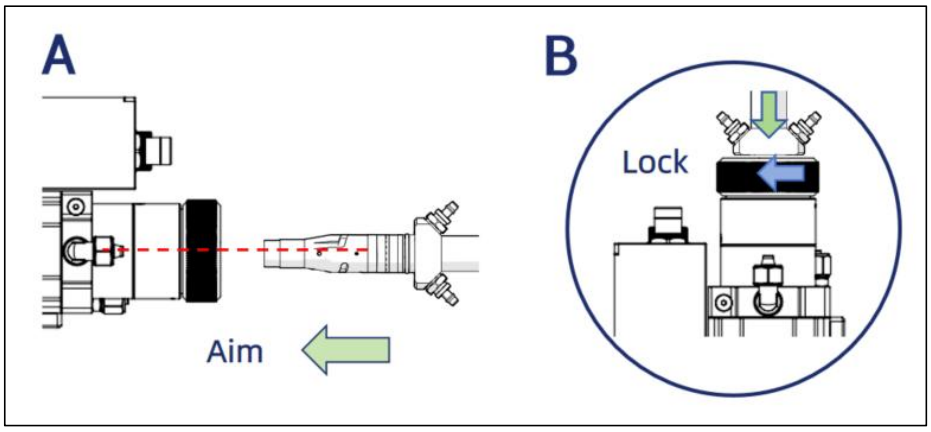


Figure 5-5 Insert the QBH fiber connector

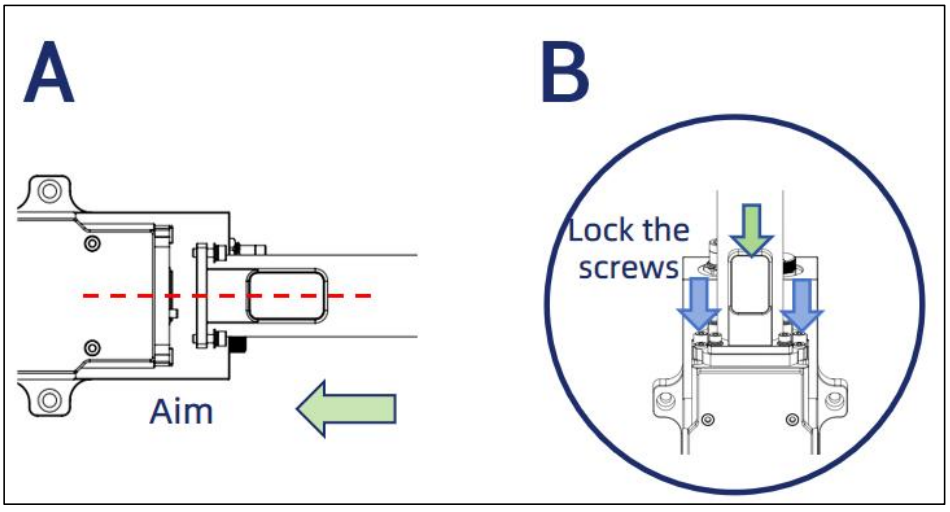


Figure 5-6 Insert the EOC fiber connector

Step 8 Use the insulation waterproof tape to wrap and seal the connection between the fiber and the cutting head connector.

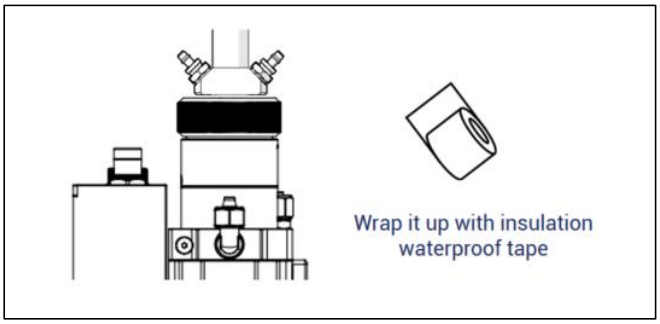


Figure 5-7 Wrap and seal

⚠Caution: To ensure a proper seal, it is recommended to wrap at least three layers of insulation waterproof tape.

5.2 Install the Cutting Head

Mount the cutting head onto the machine tool's Z-axis back plate using four screws: A, B, C, and D. Ensure that the cutting head is securely fastened without looseness or wobble.

The cutting head is grounded via the back plate screws. Prior to installation, the contact surfaces shall be cleaned to ensure that no oxide layer or paint is present; the machine and the back plate screws shall be properly grounded to ensure a reliable grounding circuit.

⚠Caution: Unreliable grounding may introduce electromagnetic interference and affect the normal operation of the cutting head.

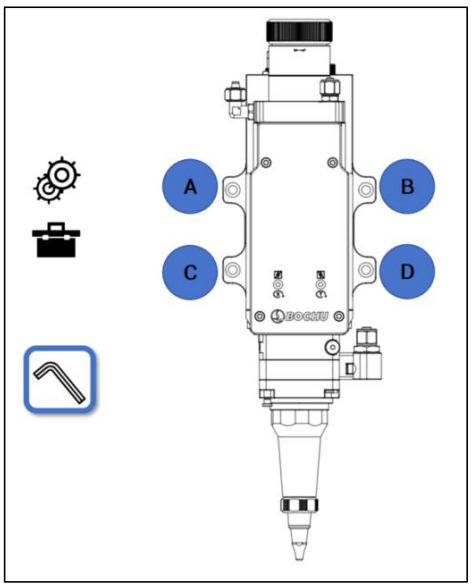


Figure 5-8 Install the cutting head

5.3 Complete the Water, Gas, and Electrical Connections

Refer to the sections on gas connection, water connection, and electrical connection, and complete the water, gas, and electrical connections of the cutting head in accordance with the specified procedures.

5.4 Install the Nozzle

Cutting heads in all series are supplied in one of the following two configurations: some models are shipped with the nozzle pre-installed, while others are supplied with the nozzle included in the accessory kit and require user installation. When installing the nozzle, rotate it clockwise until it is securely tightened.

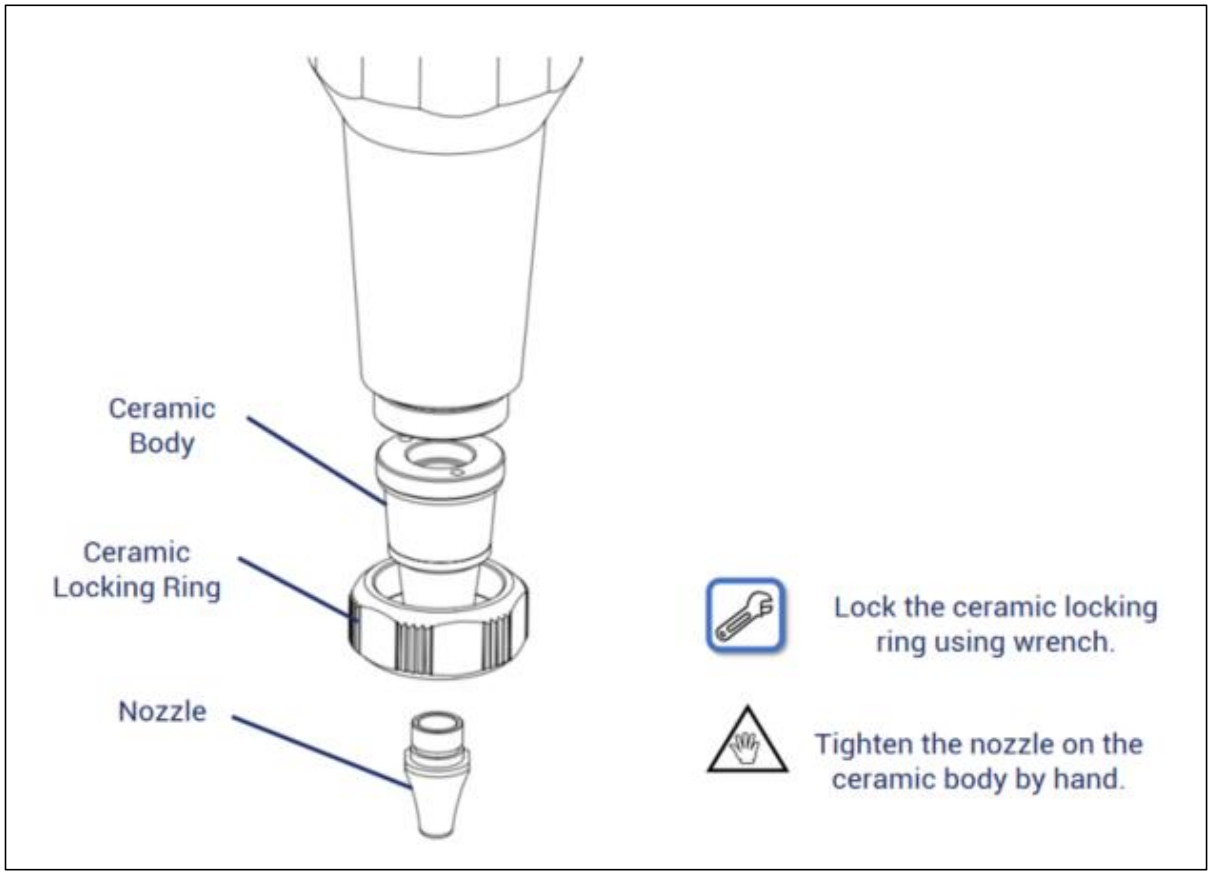


Figure 5-9 Install the nozzle

5.5 Laser Beam Centering

Adjust the X-Y alignment knobs using a low-power burst to ensure the focus is at the center of the nozzle.

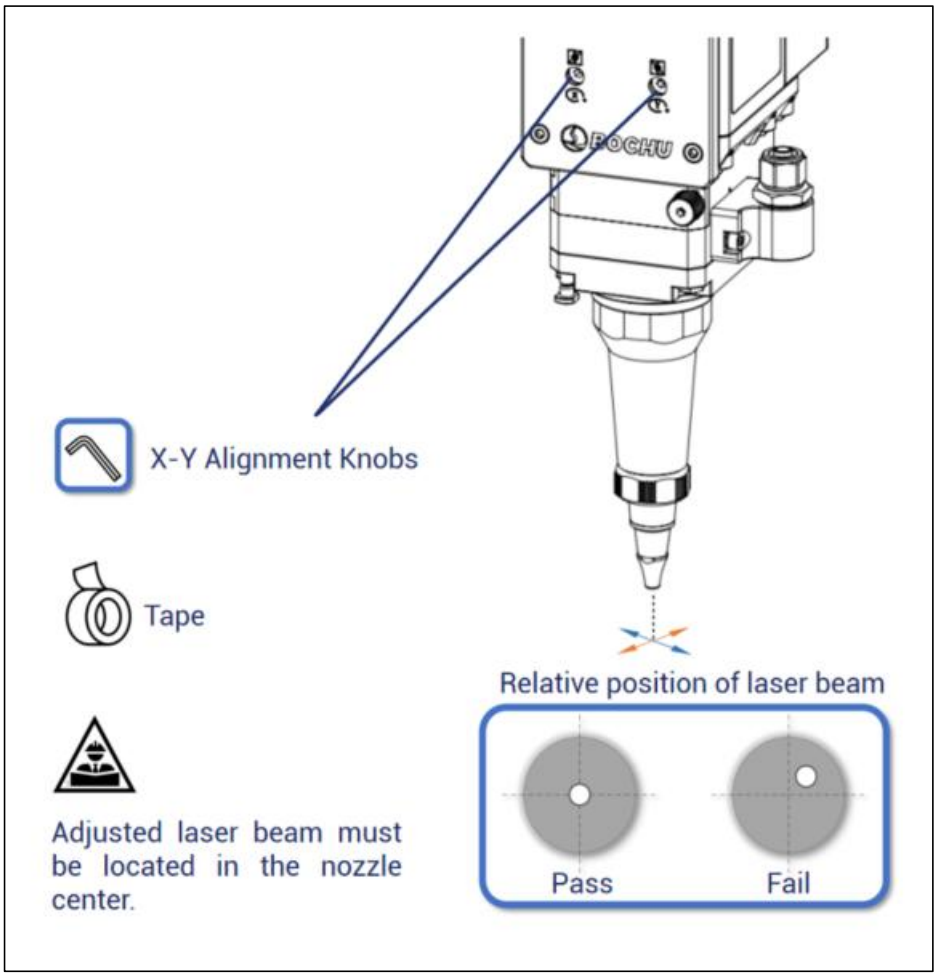


Figure 5-10 Laser beam centering

Operations for laser beam centering:

Step 1 Confirm that the laser beam is turned off.

Step 2 Place the tape below the nozzle.

Step 3 Click to trigger a low-power laser burst and assess the position of the laser beam relative to the nozzle by observing the tape.

Step 4 Adjust the X-Y alignment knobs to position the laser beam at the center of the nozzle.

Chapter 6 Maintenance

Any maintenance and servicing operations described in this chapter require professional knowledge and shall be performed only by trained personnel. Personnel performing the operations must comply with all safety requirements and be fully aware of all potential hazardous operating conditions. BOCHU shall not assume any liability for any equipment damage caused by failure to comply with these requirements.

6.1 Product Structure Diagram

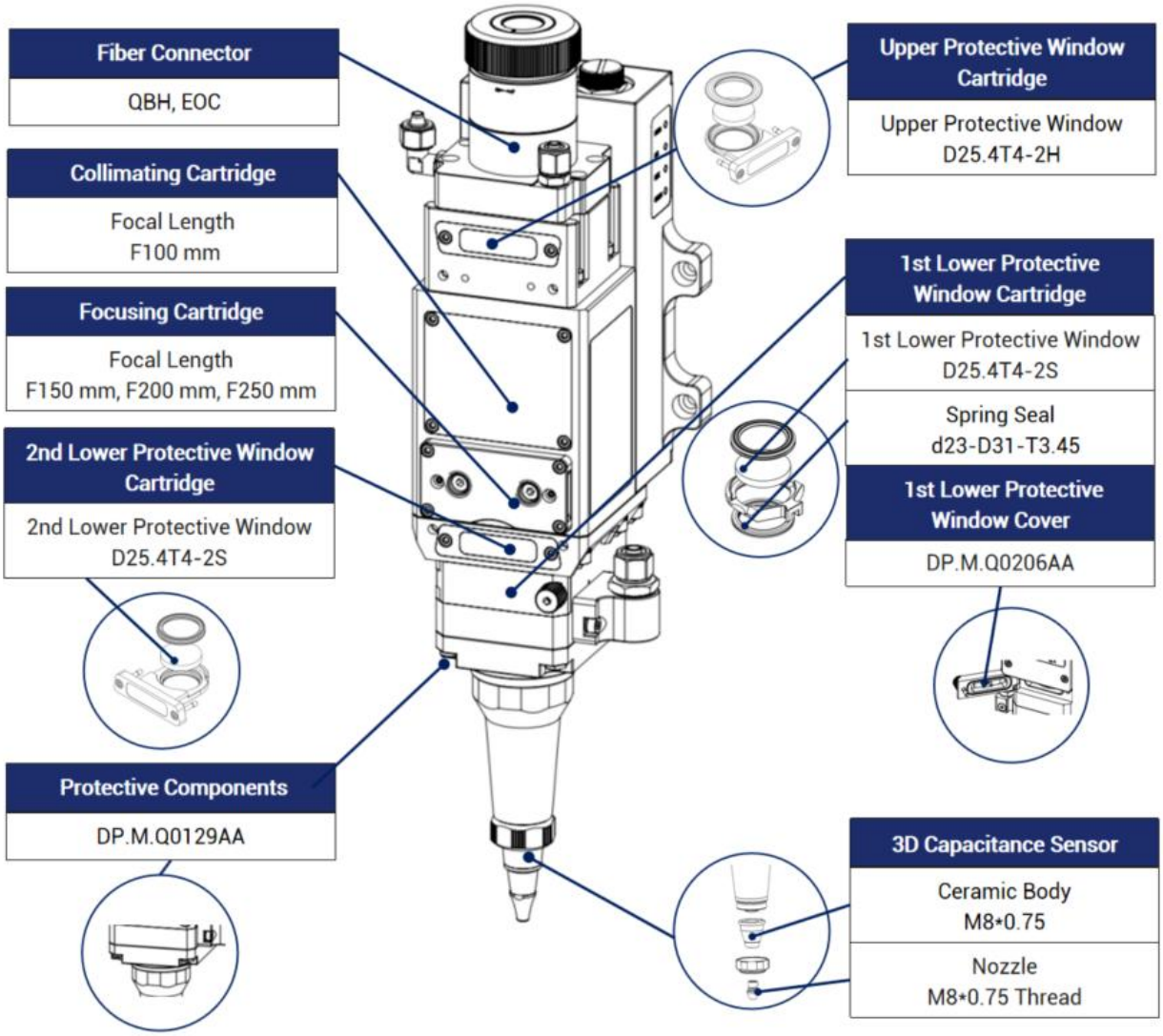


Figure 6-1 Product structure diagram

6.2 Daily Inspection

The daily inspection details are as follows:

Table 6-1 Daily Inspection Checklist

Subject	Frequency
Clean the cutting head to remove rust, impurities, etc.	Every week
Check the DC motor	Every 2 years
Check the optical parameters	Every 2 years

⚠Caution: When performing inspection and maintenance, always ensure that the cutting head and other related electromechanical equipment are powered off.

6.3 Replace the Upper Protective Window

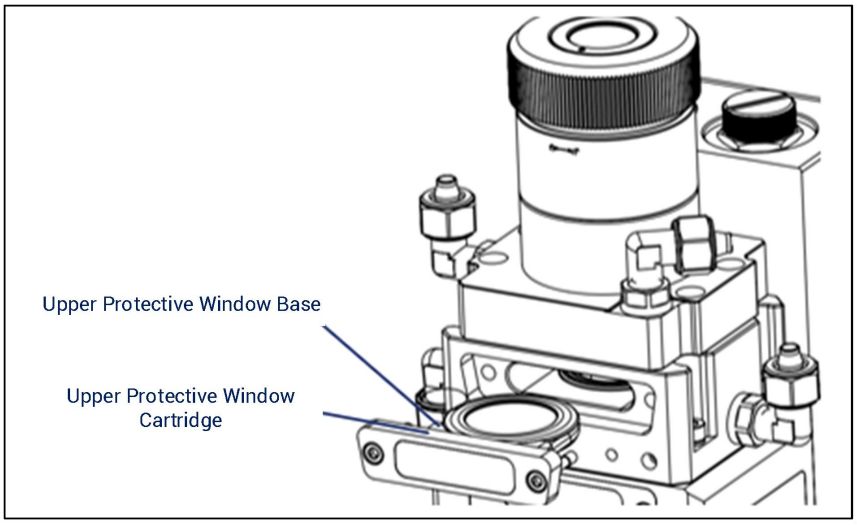


Figure 6-2 Pull out the upper protective window cartridge

Follow the procedures below to replace the upper protective window:

⚠Caution: All operations shall be performed inside a clean workbench. Failure to do so will cause window contamination and affect the normal operation of the cutting head.

Step 1 Loosen the screws to open the upper protective window cartridge.

Step 2 Pull out the upper protective window cartridge.

Step 3 Cover the chamber with masking tape to prevent dust from entering.

Step 4 Remove the pressing ring from the protective window.

Step 5 Replace the upper protective window with the pressing ring installed.

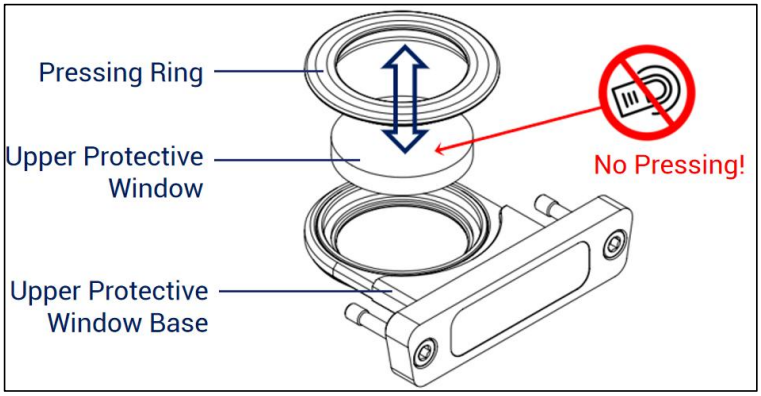


Figure 6-3 Replace the upper protective window

Step 6 Tear off the tape.

Step 7 Insert the upper protective window cartridge with the window into the cutting head.

Step 8 Tighten the screws.

6.4 Replace the Lower Protective Window

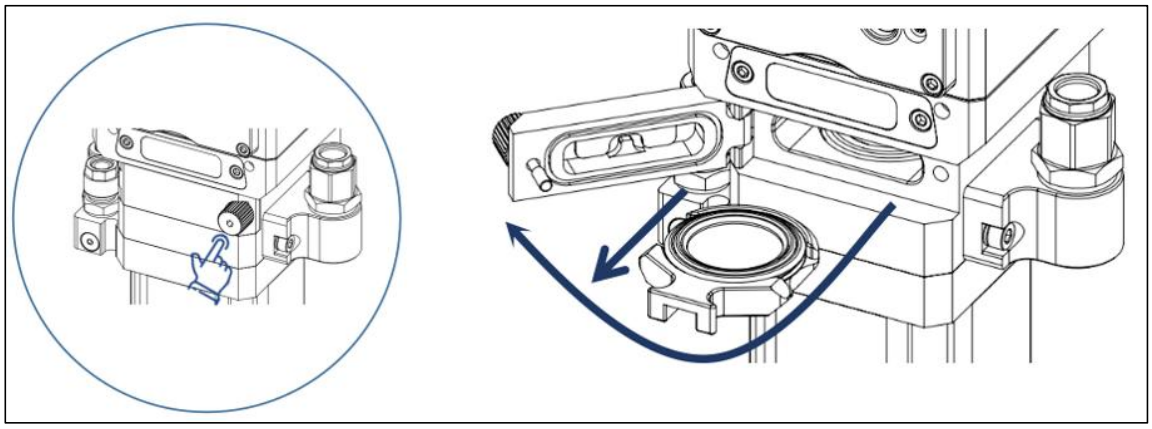


Figure 6-4 Pull out the lower protective window cartridge

Follow the procedures below to replace the lower protective window:

⚠Caution:

1. Before operation, close the gas supply. Failure to do so may lead to lens contamination and affect the normal operation of the cutting head.

2. Maintain minimal air movements in the operating area. It is strictly forbidden to run fans, air conditioners with direct airflow, or any other equipment that generates forced convection, as such actions may cause lens contamination and impair the normal function of the cutting head.

Step 1 Loosen the screw to open the lower protective window cover.

Step 2 Pull out the lower protective window cartridge.

Step 3 Close the lower protective window cover to prevent dust from entering.

Step 4 Remove the pressing ring from the protective window.

Step 5 Replace the lower protective window with the pressing ring installed.

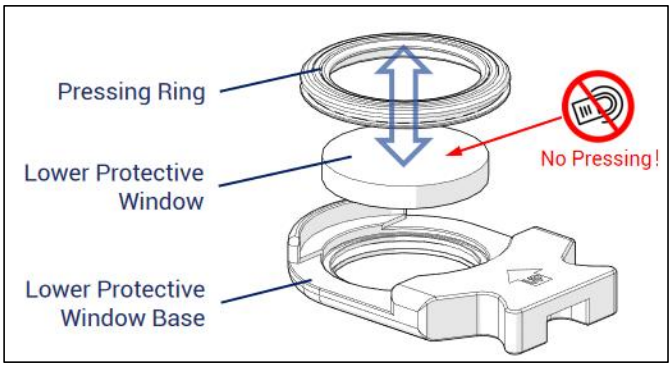


Figure 6-5 Replace the lower protective window

Step 6 (Optional) If the spring seal is damaged, remove the old seal, and install a new one into the base. Ensure that the inner edge of the spring seal is free from indentations and damage, and that the dust skirt exhibits no significant deformation.

Step 7 Open the lower protective window cover.

Step 8 Insert the lower protective window cartridge with the window into the cutting head.

Step 9 Close the lower protective window cover.

Step 10 Tighten the screw.

6.5 Replace the Protective Components

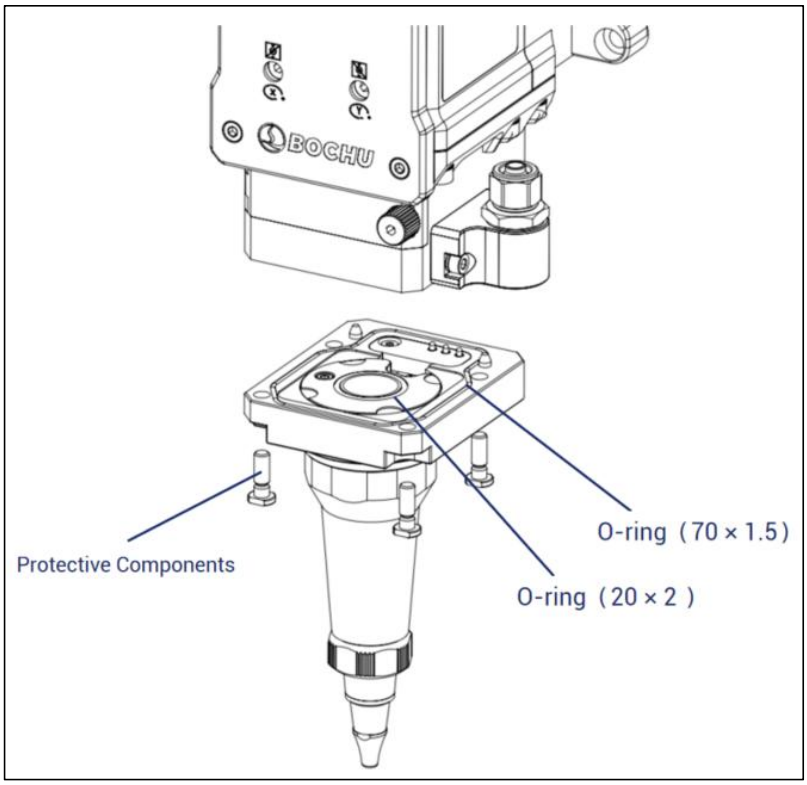


Figure 6-6 Replace the protective components

Notice: O-ring dimension specification format: ID × CS (Inner Diameter × Cross Section). Unit: mm. Fluororubber is recommended as the material.

Follow the procedures below to replace the protective components:

Step 1 Use a 2.5 mm hexagon wrench to remove the sheared-off remnants of the protective components from the sensor module base.

Step 2 Check whether the O-ring on the capacitance sensor module is missing. If missing, purchase O-rings measuring 20 × 2 and 70 × 1.5 and install them in the correct position.

Step 3 Align the capacitance sensor module with the pin holes on the sensor module base. Take new protective components (DP.M.Q0129AA) and, working from below, use a 3 mm hexagon wrench to tighten the assembly.

6.6 Replace the Ceramic Body and Nozzle

Before replacing the ceramic body or nozzle, shut off the gas supply.

6.6.1 Replace the Nozzle

During operation, the nozzle may be damaged due to laser exposure or collision. Inspect the nozzle regularly and replace it when necessary. When replacement is required, remove the nozzle by hand, install a new nozzle, and tighten it.

6.6.2 Replace the Ceramic Body

If the ceramic body is damaged due to impact or other factors, it can be replaced by following the procedures below:

Step 1 Unscrew the nozzle by hand.

Step 2 Use a wrench to remove the ceramic locking ring, and then take out the damaged ceramic body.

Step 3 Align the new ceramic body with the locating pin hole, press it by hand, and then tighten the ceramic locking ring with a wrench.

Step 4 Reinstall the nozzle.

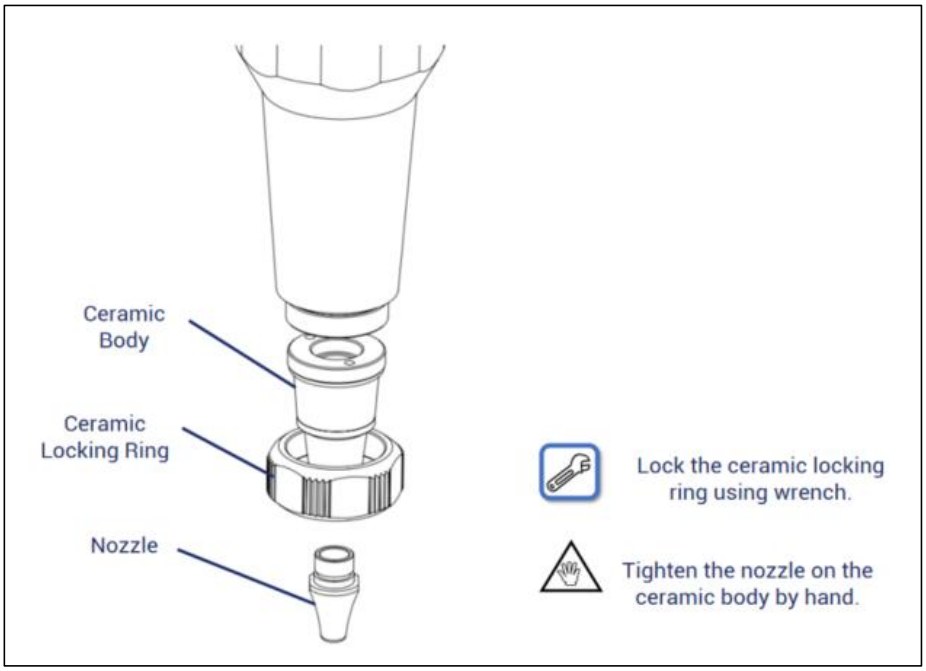


Figure 6-7 Replacement of the ceramic body and nozzle

6.7 Install the Pressure Relief Valve

The location of the pressure relief valve on the cutting head is shown below:

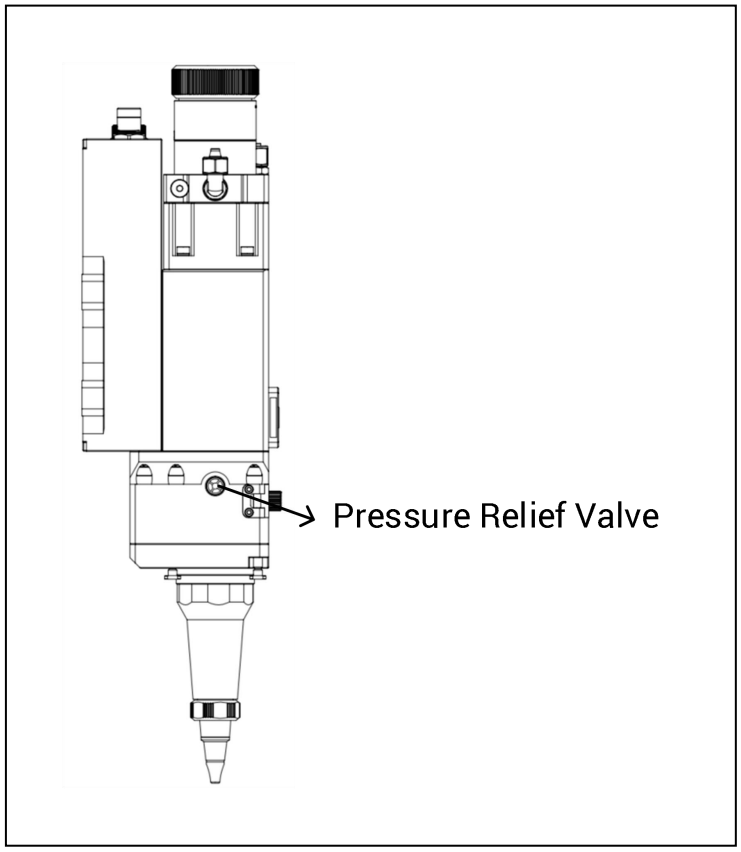


Figure 6-8 Pressure relief valve

If the pressure relief valve on the cutting head is found to be detached, it indicates that the spring seal of the 2nd lower protective window has failed, resulting in abnormal air pressure inside the protective window chamber. In this case, replace the spring seal promptly (refer to the section on Replace the Lower Protective Window). After replacement, reinstall the pressure relief valve onto the cutting head.

The blue sealing ring at the end of the valve body is the insertion end and must be fully inserted.

⚠Caution: If it is not installed or not fully seated, the seal at that location will fail, causing external dust and moisture to enter the protective window chamber. This will contaminate the 1st lower protective window and the 2nd lower protective window, thereby affecting the normal operation of the cutting head.

Chapter 7 Mechanical Dimensions

This chapter describes the dimensions of various cutting head models and specifies the fiber connector and compatibility of the cutting head.

7.1 Cutting Head Dimensions

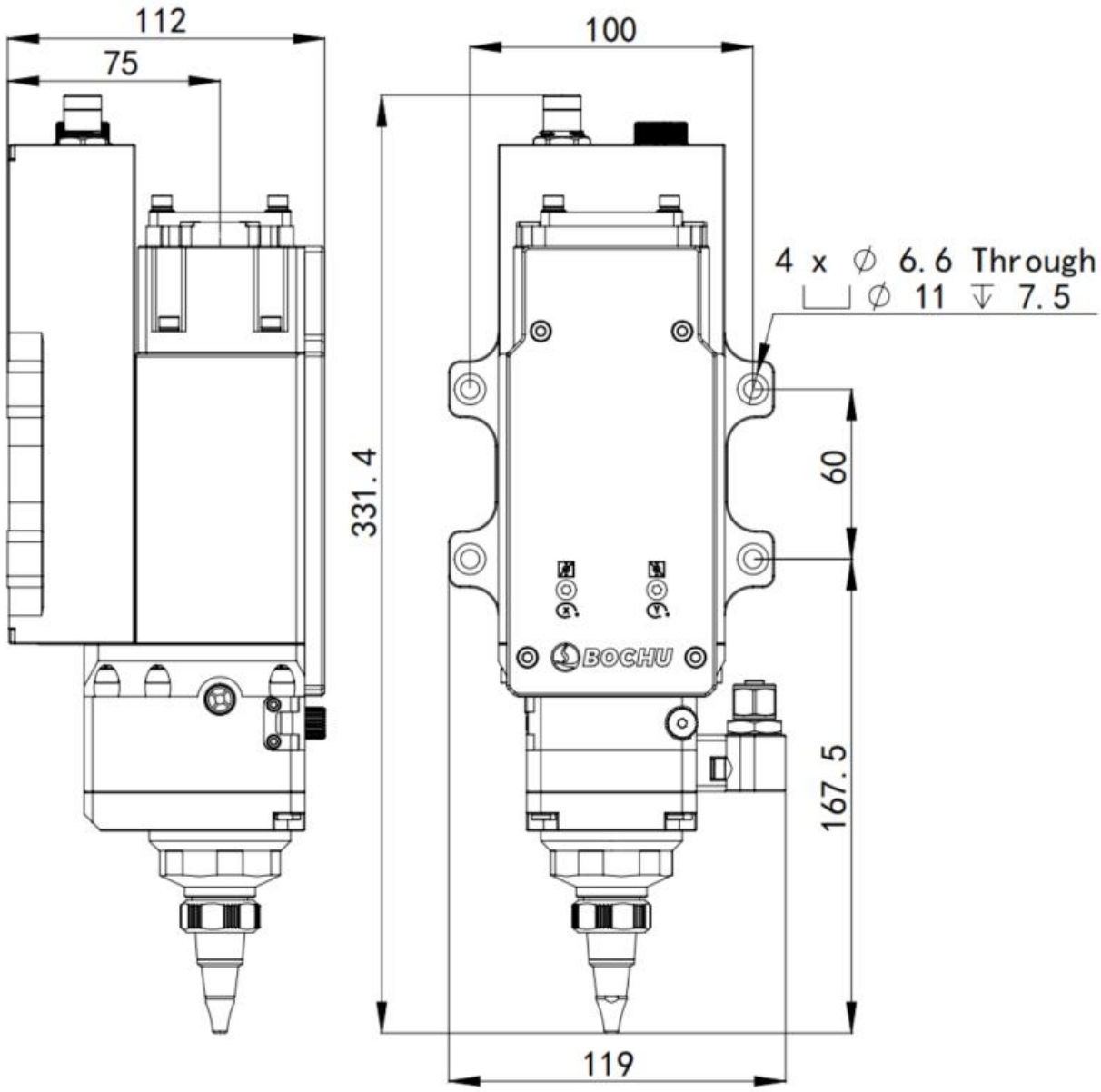


Figure 7-1 BLT311T-EOC-150G

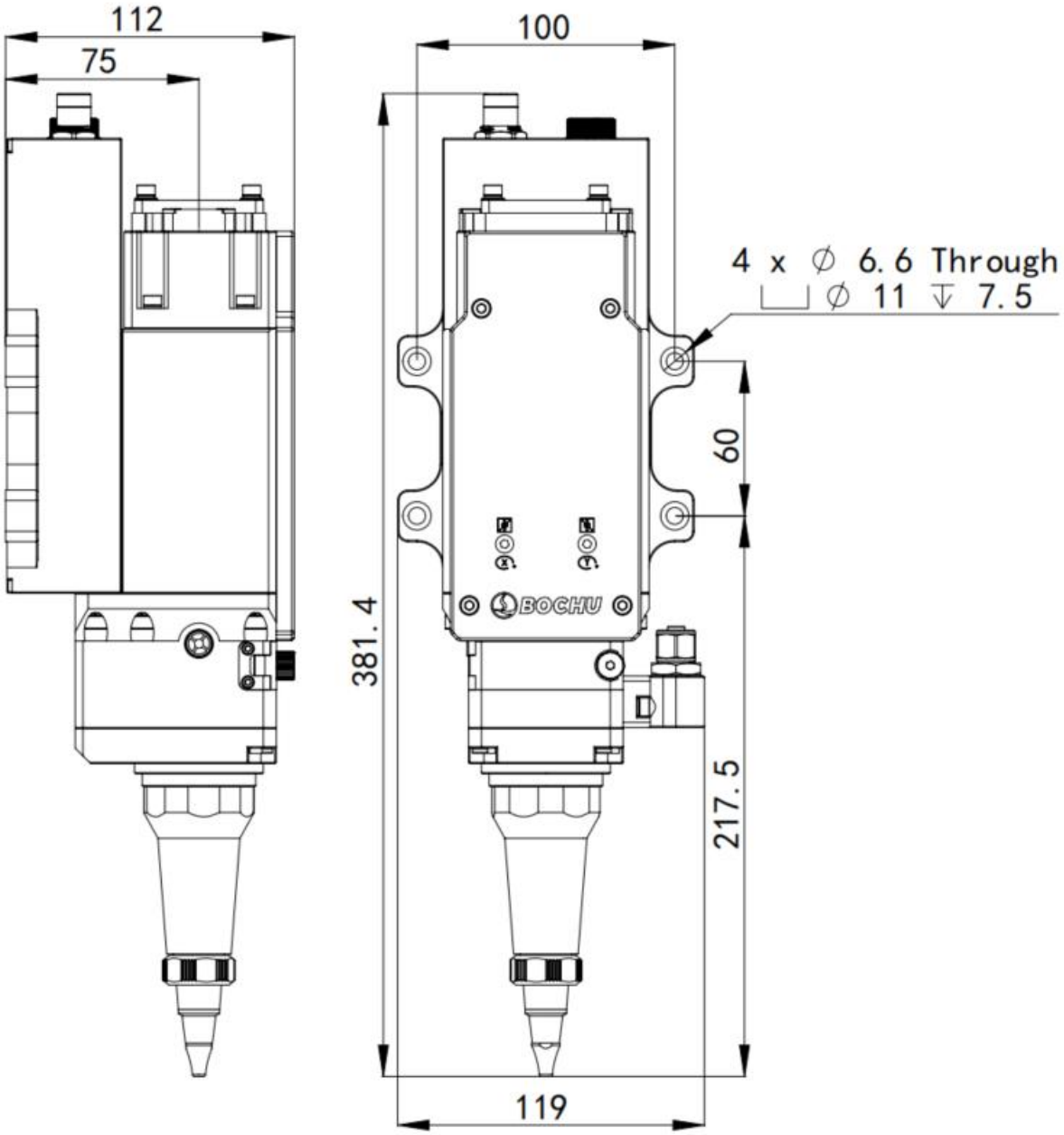


Figure 7-2 BLT311T-EOC-200

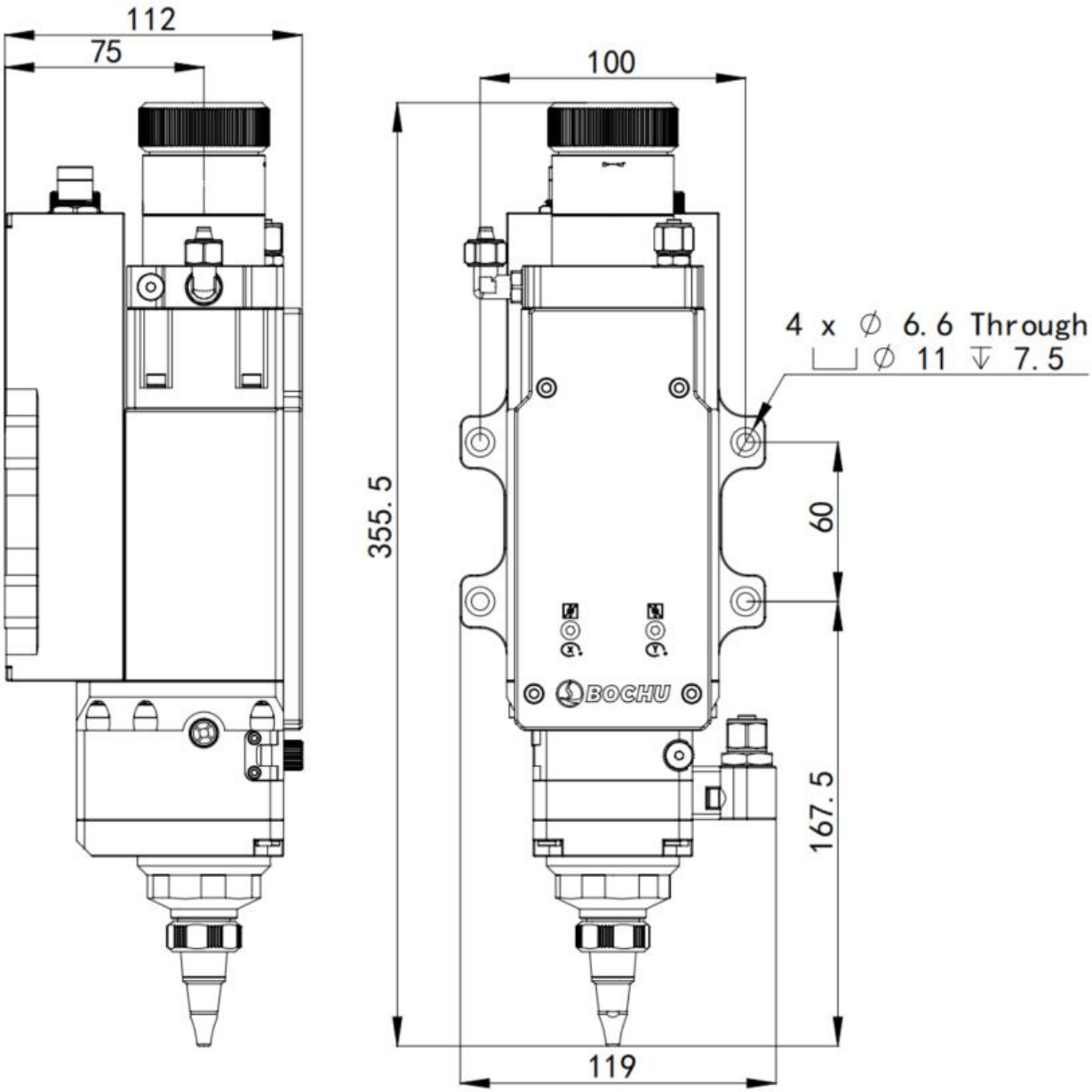


Figure 7-3 BLT311T-QBH-150G

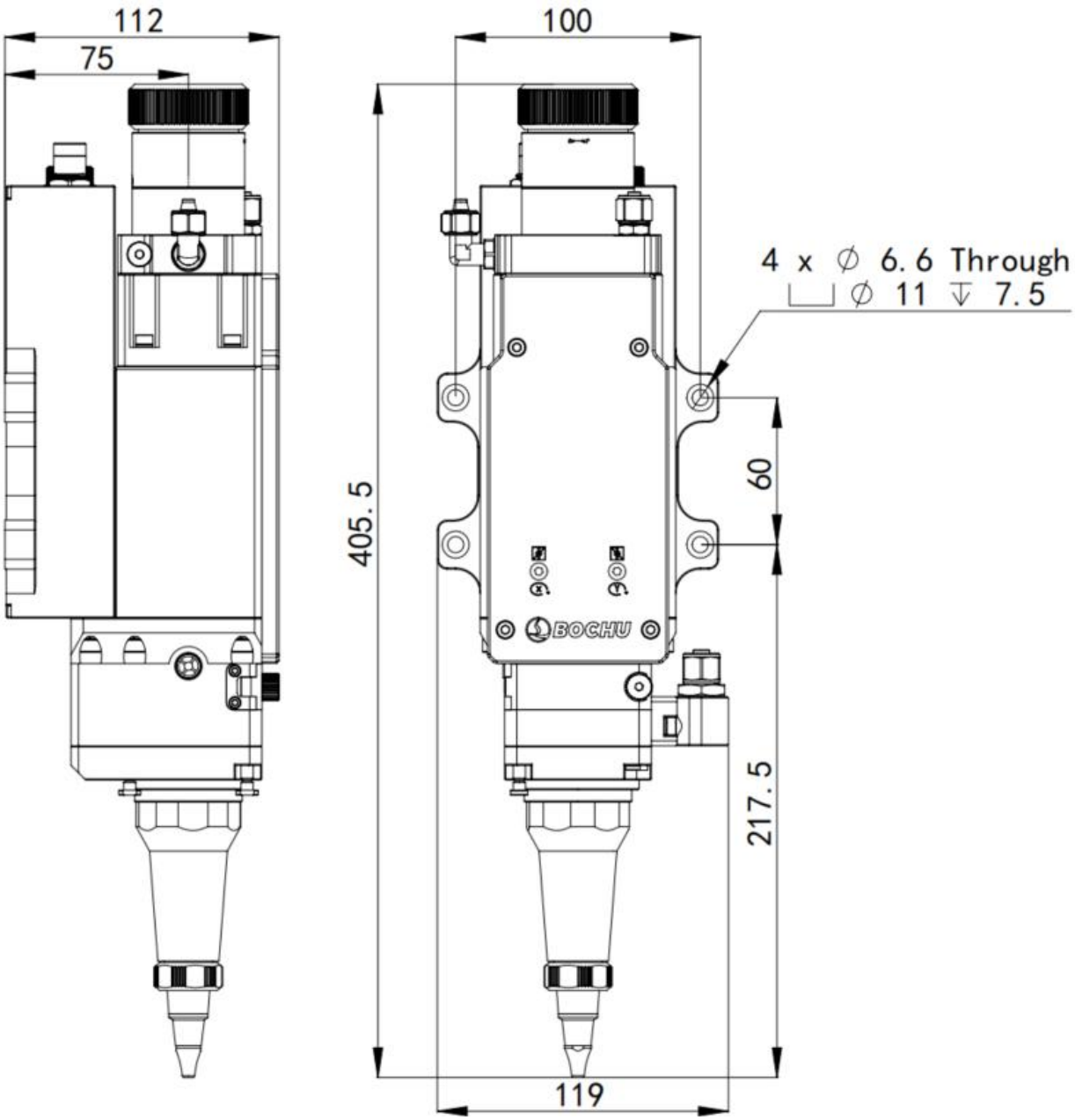


Figure 7-4 BLT311T-QBH-200

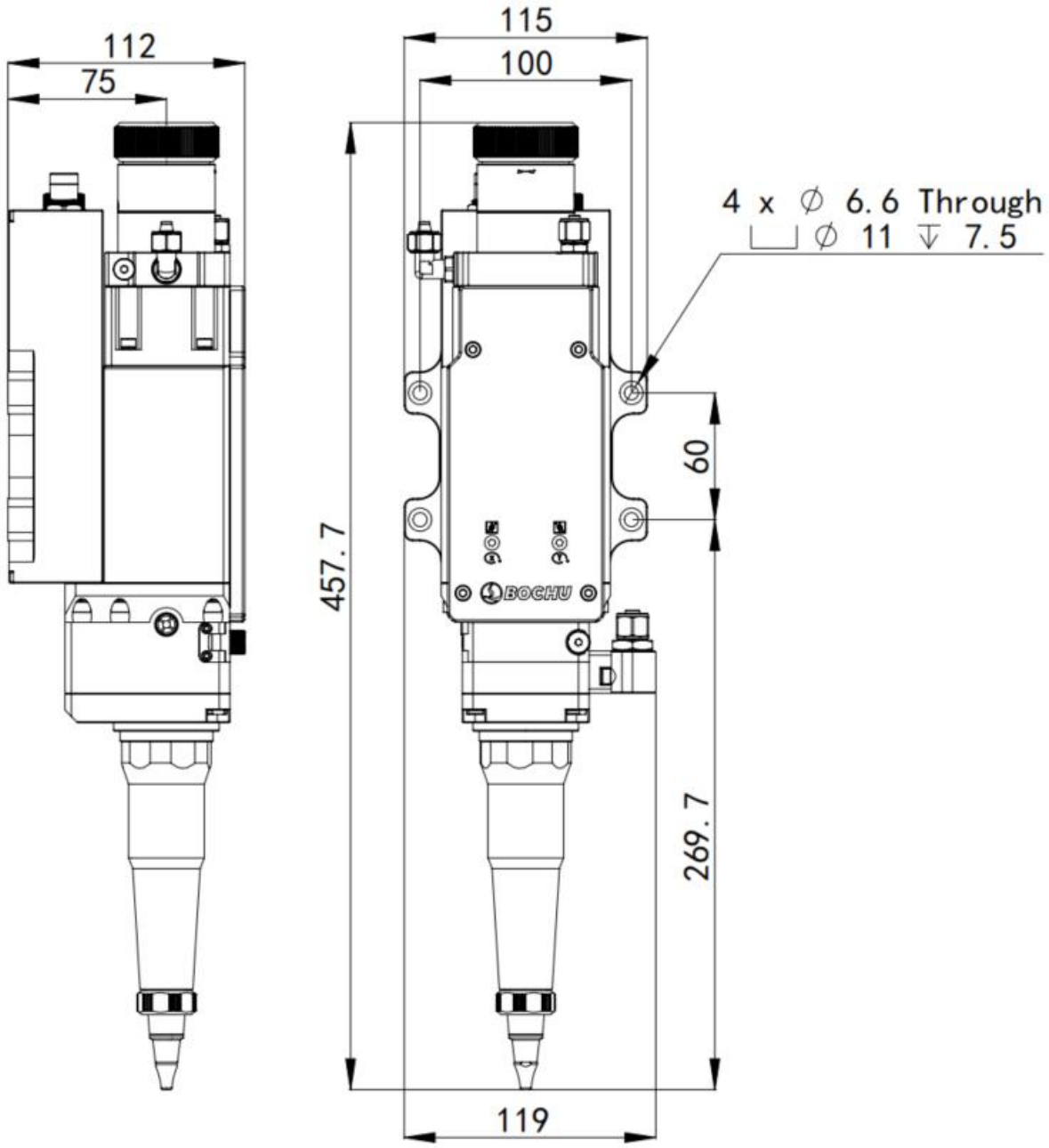


Figure 7-5 BLT311T-QBH-250

7.2 Fiber Connector Specifications and Compatibility

Table 7-1 Fiber Connector Specifications and Compatibility

General Type	Image	Other Compatible Connector Types
QBH		• Trumpf LLK-Q • IPG HLC-8/LC-8
EOC		• Maxphotonics G5

Chapter 8 Noise Test

The cutting head noise level is as follows:

During use, noise level is < 70 dB (A).

⚠Caution: The noise level produced by the cutting gas depends on the operating conditions. To prevent harm from noise, the system/machine manufacturer must implement safety measures and provide the operator with written instructions.

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