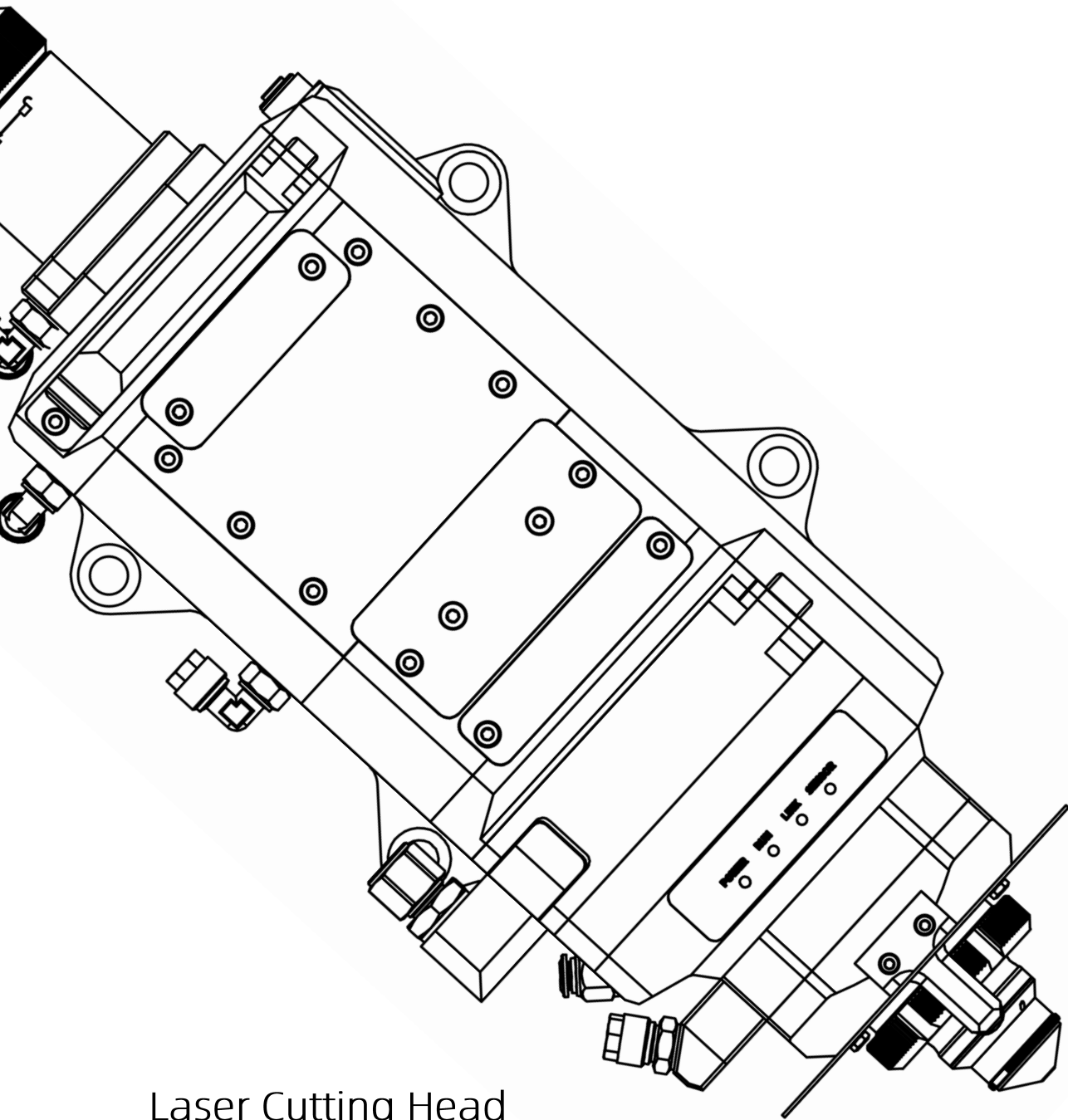


Installation Instructions



Laser Cutting Head

BLT 640-QBH/QD/Q+

BLT 641-QBH/QD/Q+

BOCI

Best Optical Cutting Instrument

Shanghai BOCI Automation Technology Co., Ltd.

Revision Directory

Revision No.	Revision Date	Notes
01	04/07/2020	First Edition



Caution

To ensure the correct and safe use of the product, be sure to read the user's manual carefully prior to operation.

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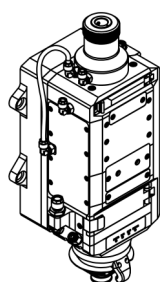
Read this manual carefully to obtain a thorough knowledge of the laser cutting head operation. Be sure to follow the instruction to ensure proper procedures and prevent injuries. Do not operate the cutting head by guesswork. Keep the manual at hand and refer to it whenever you are not sure of how to perform any of the procedures.



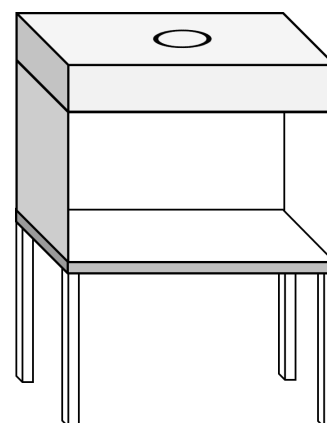
Preparations :

Before your operation, some things are needed :

- A. Laser cutting head;
- B. Laminar Flow Box (Type : Vertical Laminar Flow; Cleanliness class : ISO Class 5 or Class 100 ; Airflow Velocity: : $\geq 0.4\text{m/s}$) ;
- C. Cleaning Kit: flashlight, absolute ethyl alcohol (or IPA), cleanroom swab, cleanroom wiper, compressed air.



Laser cutting head



Laminar Flow Box



Flashlight



Ethyl alcohol



Cleanroom swab



Cleanroom wiper



Compressed air

Cleaning Kit



Attention:

Any repair work and any work relating to troubleshooting require special knowledge and must only be carried out by trained specialist staff.

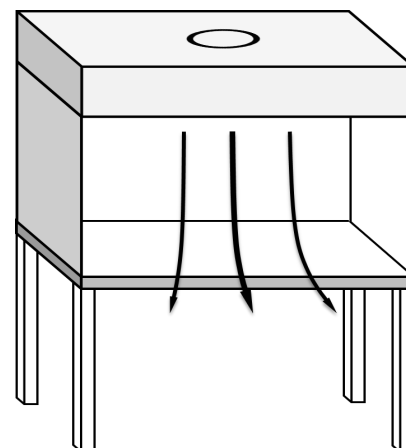
Specialist staff must be instructed in accordance with the regulations and safety notes and informed of potentially hazardous situations.

Installation

1. Laminar Flow Box Preparation

Before you beginning your work , the laminar flow box work surface should be cleaned.

**Type : Vertical Laminar Flow;
Cleanliness class : ISO Class 5
or Class 100 ; Airflow Velocity:
: $\geq 0.4\text{m/s}$.**



Calibration :

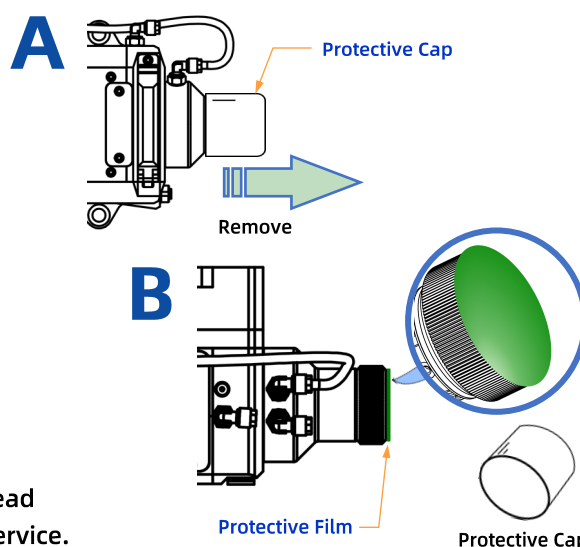
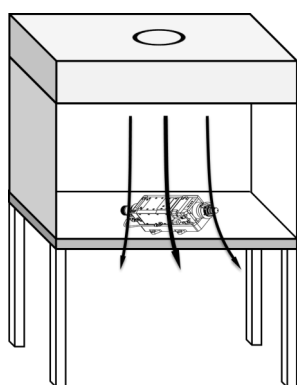
Once in 6 months , get the laminar airflow calibrated by an external agency.

Operation procedure:

- A. Press the POWER switch to turn ON the power , the press the air FLOW switch to turn ON the blower.
- B. Once is blower is turn ON then wait for about 30minutes before starting the work. This practices makes sure that the particles in the operating space are swept away and maintains the working space as per the ISO 5 requirements.
- C. Press the LIGHT switch to turn ON, then to start work .

2. Cutting Head Preparation

To prevent any dust or dirt getting into the fiber socket accidentally, the cutting head needs or be putted into laminar flow box in a horizontal position. Then, remove the protective cap from the cutting head.

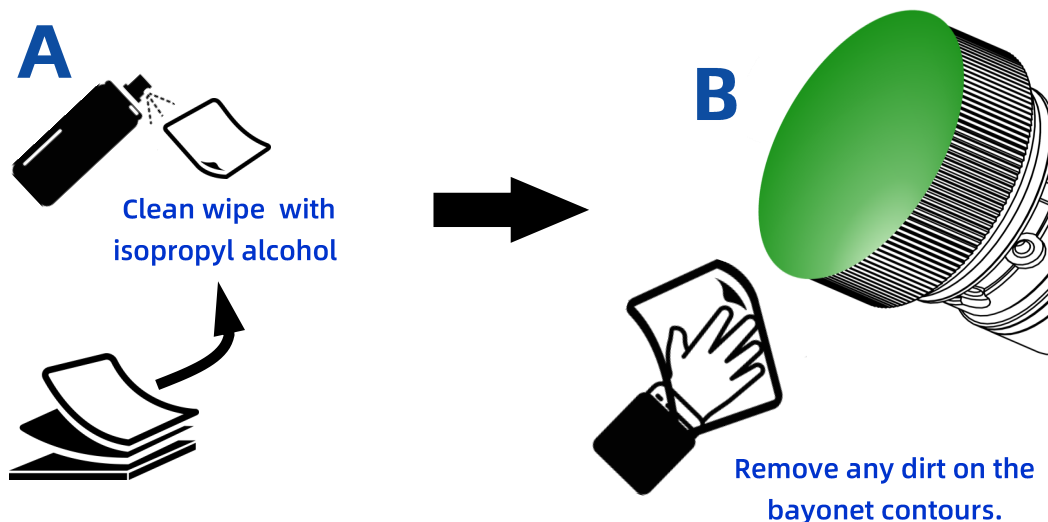


Attention:

Recommend to clean the cutting head carefully before carrying out any service.

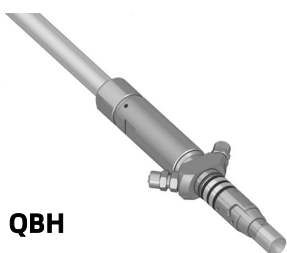
3. Clean Fiber Connector

Use the clean wipe to remove any dirt on the bayonet contours.

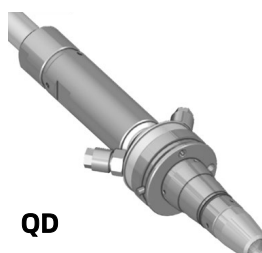


4. Inspect the End Face Surface

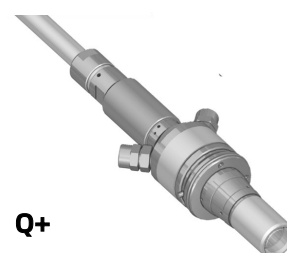
Remove protective cap from the fiber socket. Use a light source to illuminate the face of the fiber connector. Inspect the end face surface carefully. If contamination is visible on the end face, cleaning is necessary.



Compatible interface :
Trumpf LLK-Q, IPG HLC-8/LC-8



Compatible interface :
Trumpf LLK-D, HIGHYAG LLK-Auto, IPG LCA



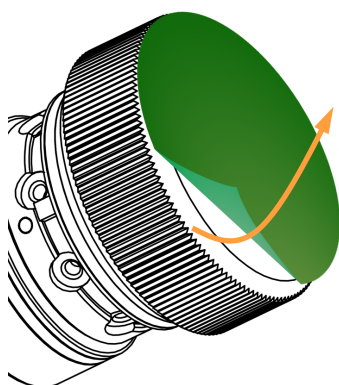
Compatible interface :
IPG HLC-16



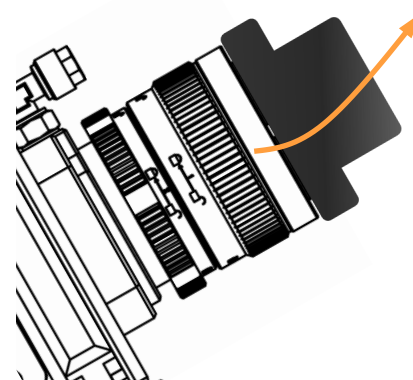
Inspect the end face surface carefully

5. Remove the Protective Film /Pull the Plug

Remove the protective from the fiber socket.



Remove the protective film

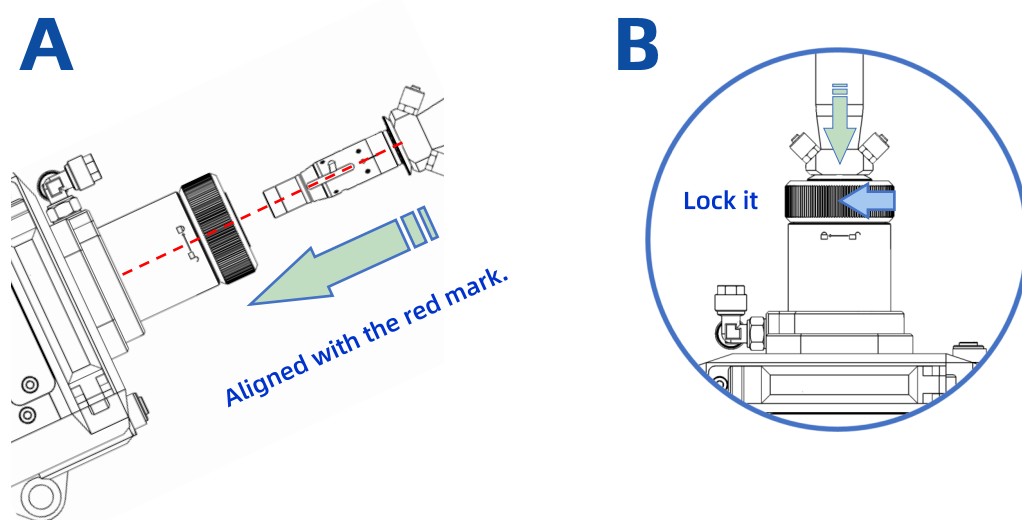


Pull the Plug

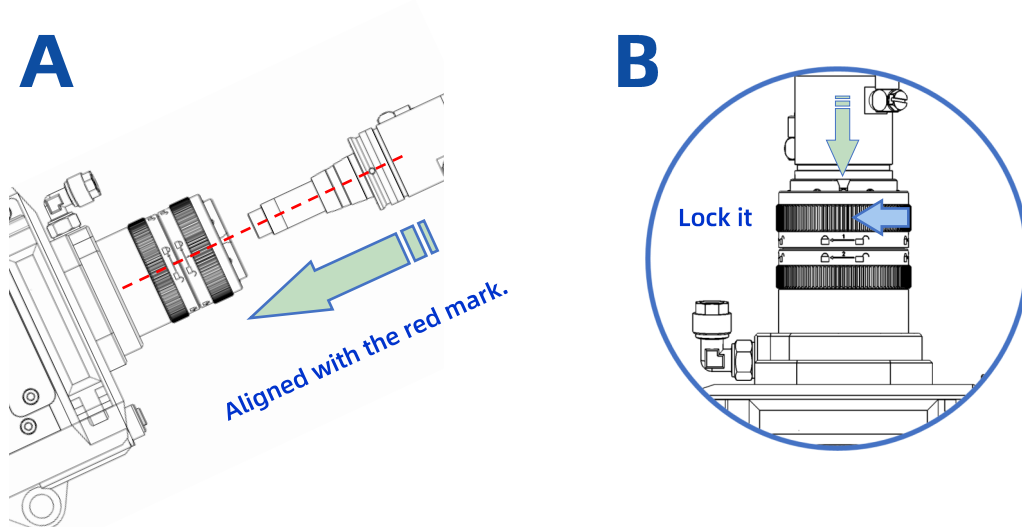
6. Connecting the Laser Fiber to the Laser Cutting Head

Insert the fiber plug into the unlocked fiber socket up to the stop, then lock it until you cannot turn any farther.

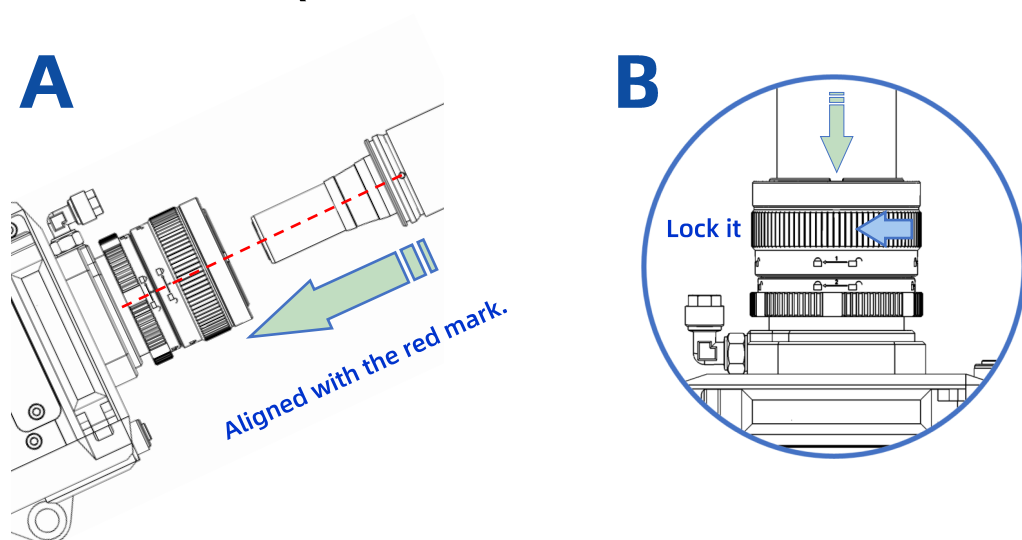
6.1 Fiber socket QBH



6.2 Fiber socket QD

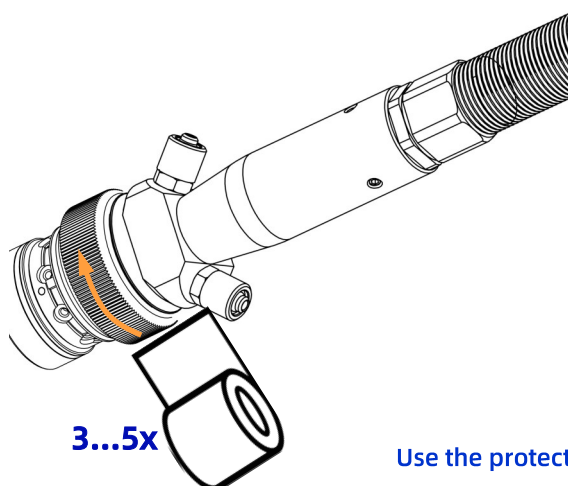


6.3 Fiber socket Q+



7. Wind the Tape

The protection tape is used to seal the connector plugs.

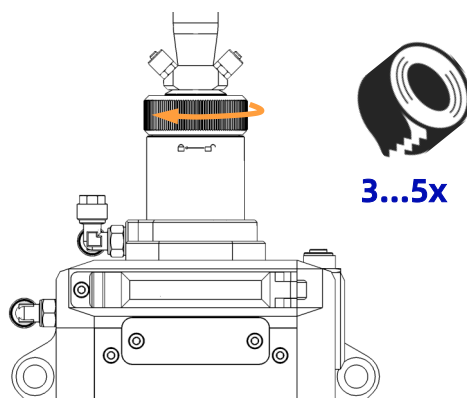


Use the protection tape (e.g. QBH)

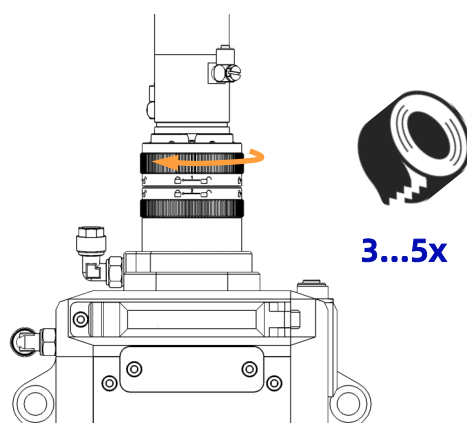


Attention :

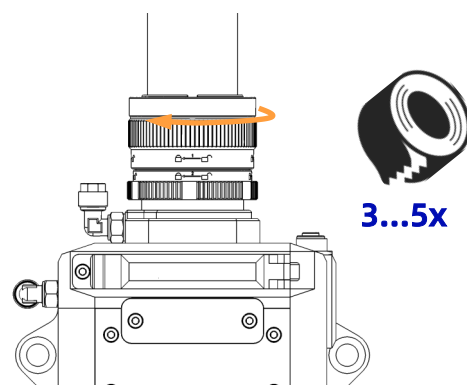
Wind the tape around at least three times to keep the sealing effect.



Fiber socket QBH



Fiber socket QD

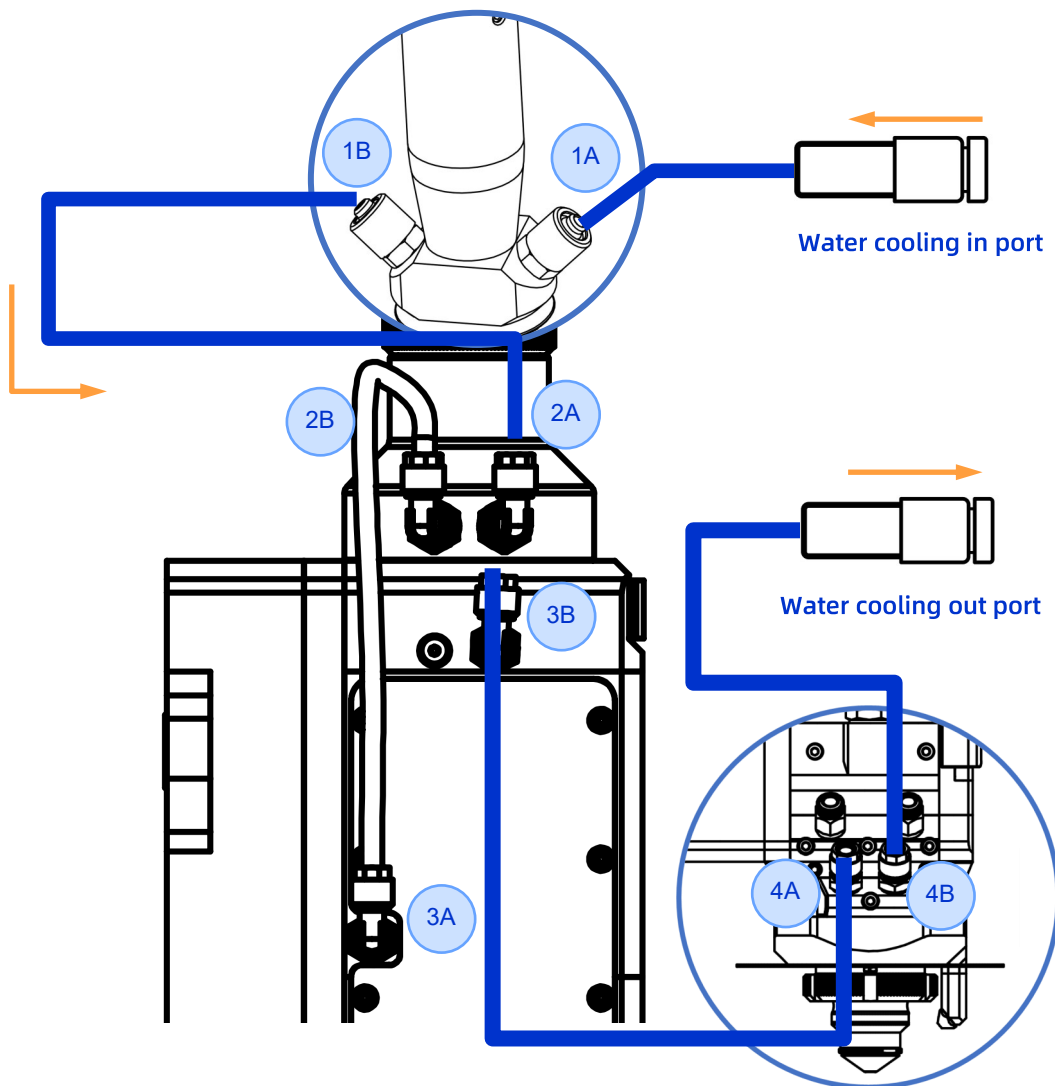


Fiber socket Q+

8. Connecting the cooling water system

Connect the cooling water hoses to the relevant connections (1, 2,3 and 4).

The supply hose is connected to connection (A) and the return hose to connection (B).



Attention :

Only deionized water with a conductivity value prescribed by the laser manufacturer must be used, conductivity < 20 to 50 $\mu\text{S/cm}$.

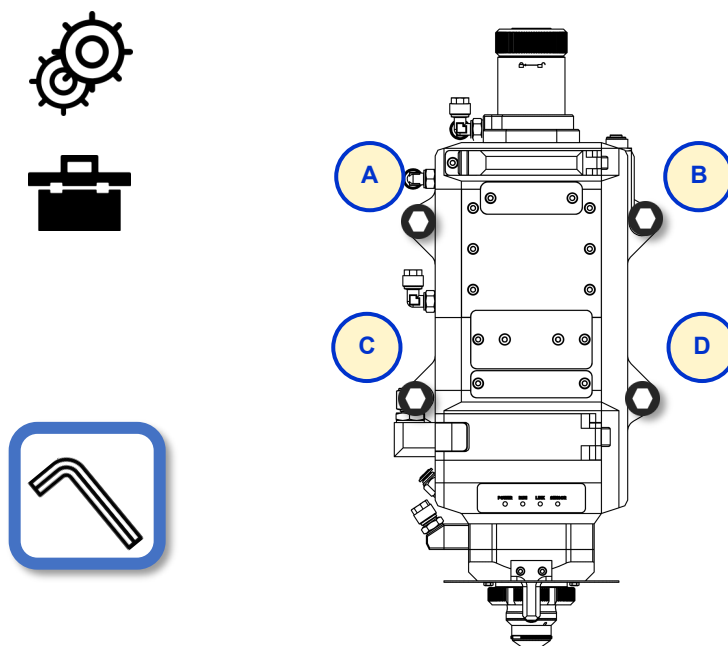
The maximum pressure for the cooling water is 5 bar. A minimum cooling water flow rate of 2.0 l/min must be guaranteed.

Air temp. °C	Dew point 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	16	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	0	
21	21	20	19	18	17	16	15	14	13	12	10	8	7	4	3	0	0	0	
18	18	17	17	16	15	14	13	12	10	9	7	6	4	2	0	0	0	0	
16	16	14	14	13	12	11	10	9	7	6	5	3	2	0	0	0	0	0	
13	13	12	11	10	9	8	7	6	4	3	2	1	0	0	0	0	0	0	
10	10	9	8	7	7	6	4	3	2	1	0	0	0	0	0	0	0	0	
7	7	6	6	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	
4	4	4	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Cooling water - Dew point temperature

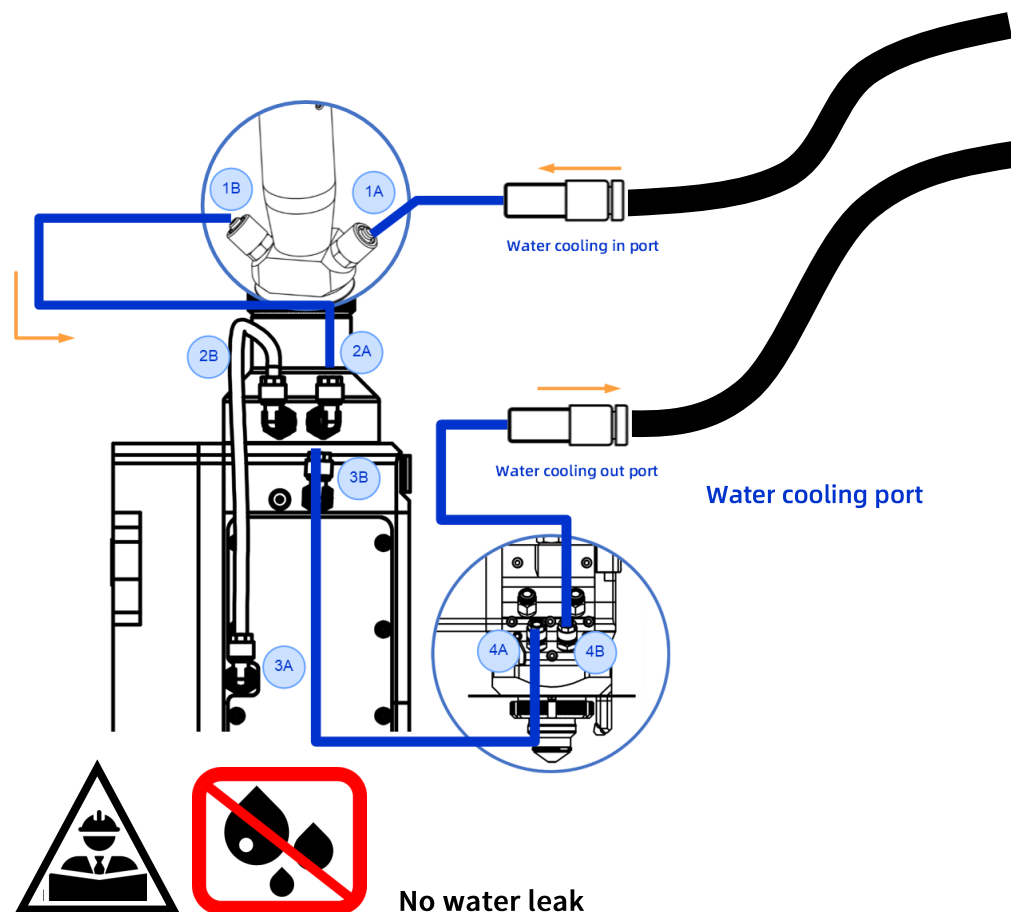
9. Fixing the cutting head to the machine

The laser head is fixed using four bore holes. When fitting the laser head to the machine, the machine manufacturer must take appropriate measures to prevent the laser head from vibrating.



10. Water Cooling Leak Test

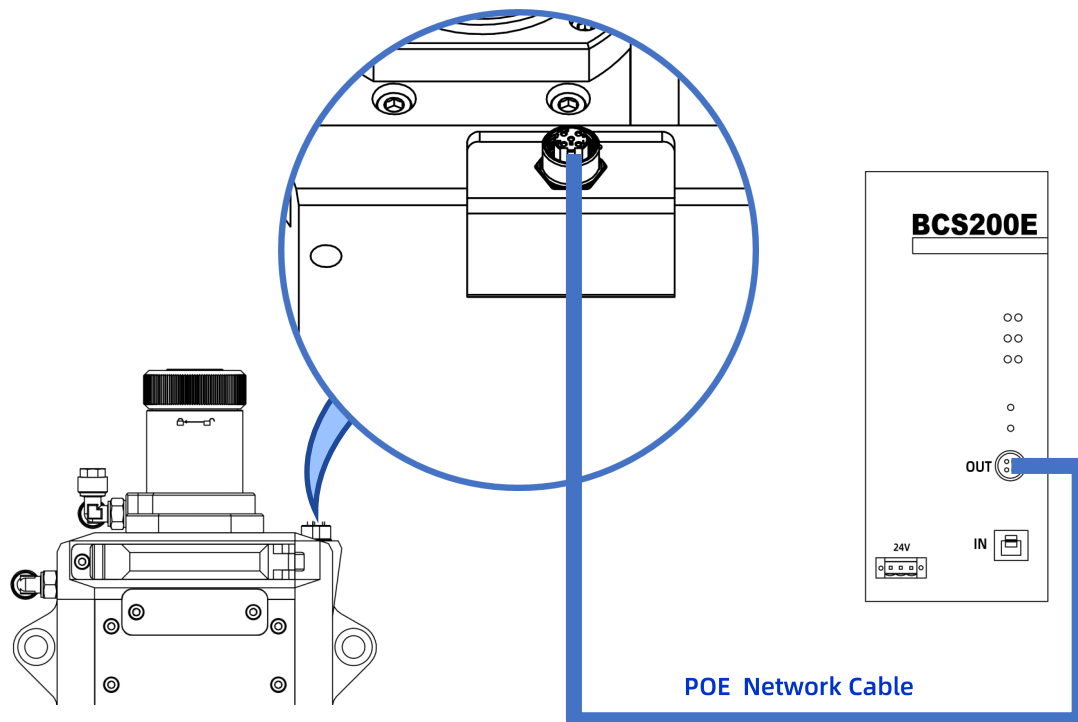
Fill the loop with cooling water to make sure there are no leaks.



11. Connecting POE Network Cable

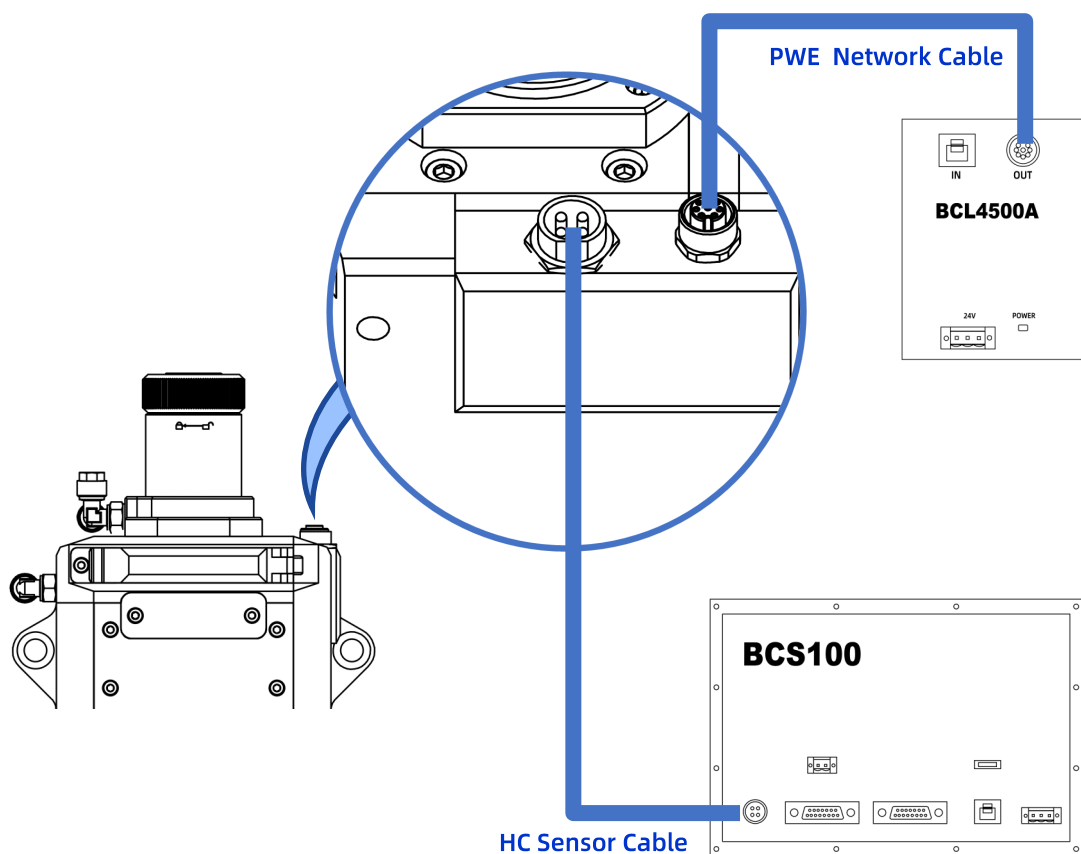
11.1 BLT 640 version

Connect the laser cutting head and the BCS200E intelligent cutting head controller using the POE network cable.



11.2 BLT 641 version

Connect the laser cutting head and the BCS100E using the HC sensor cable. Then, connect the laser cutting head and the BCL4500A using the PWE network cable.



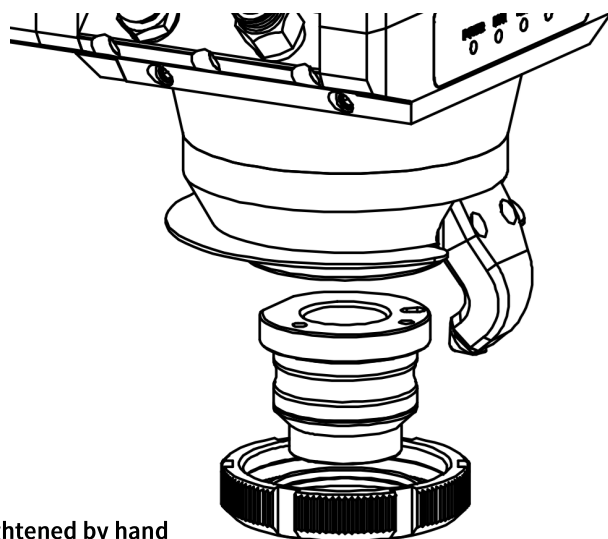
12. Fitting the Ceramic Part and Nozzle

Insert the ceramic part into the sensor insert. Screw the ceramic part to the sensor insert hand-tight using the union nut. Screw the nozzle into the ceramic part hand-tight.



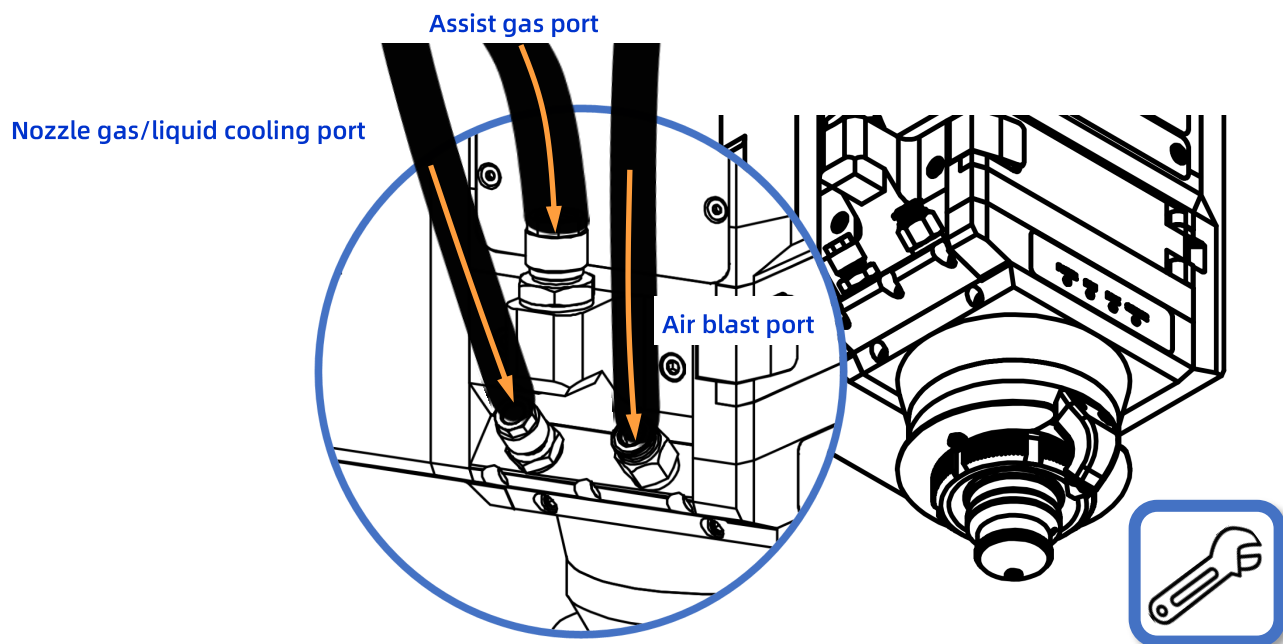
The nozzle and the nut must only be tightened by hand (do not use any tools).

Otherwise the ceramic part could be damaged. In addition to this, make sure that the contact surfaces on these parts are clean.



13. Connecting the Gas

Connect the gas hose to the connection gas port .

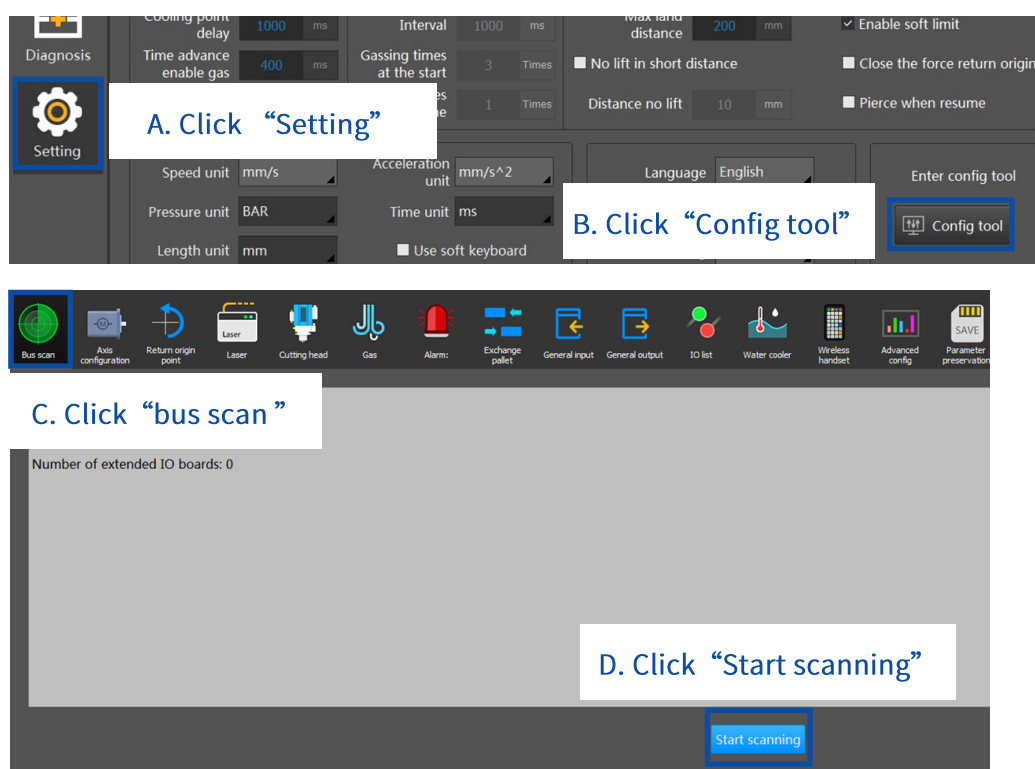


14. Function Operation

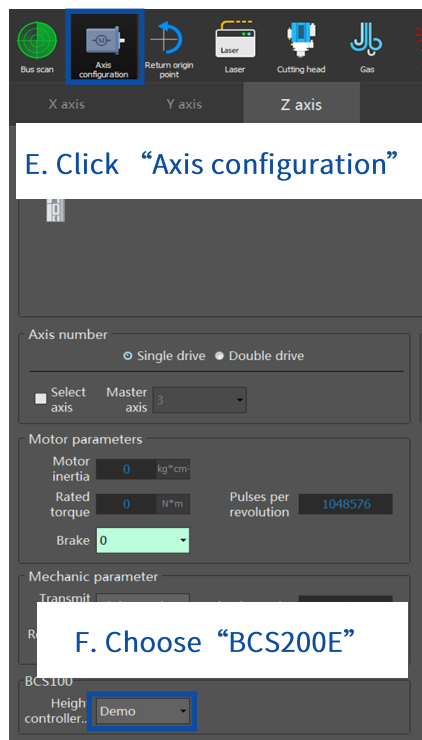
Customer control systems can monitor the laser head's operating status .

- A. Check the motor operating status
- B. Check the sensor operating status
- C. Check the capacitive distance controller sensor system operating status
- D. Check the cutting gas quality

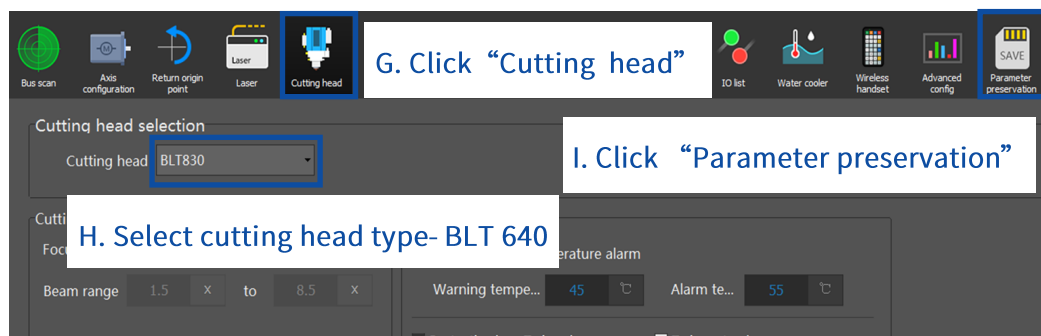
Before checking the laser cutting head status, it must be operated the bus scan function . Please start the HypCut Laser Cutting System on your computer. Se-



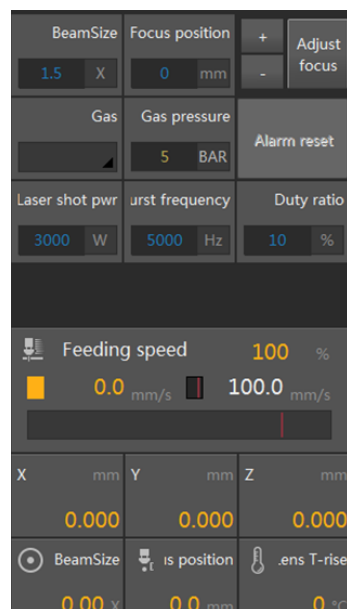
Here, select Axis configuration, then choose distance controller sensor type **Axis configuration >> Distance** .



Open the dialogue window Cutting head >> Cutting head selections and make the following setting: Cutting head –BLT 640. Then, click on the “Parameter preservation” button.

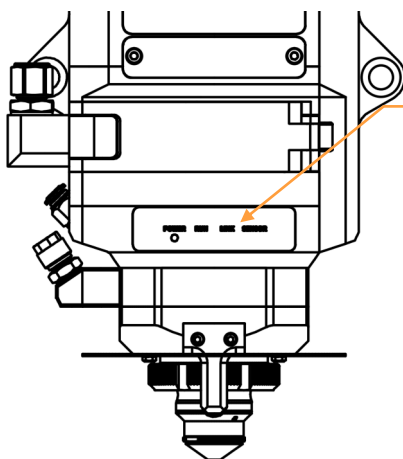


A. Check the motor operating status



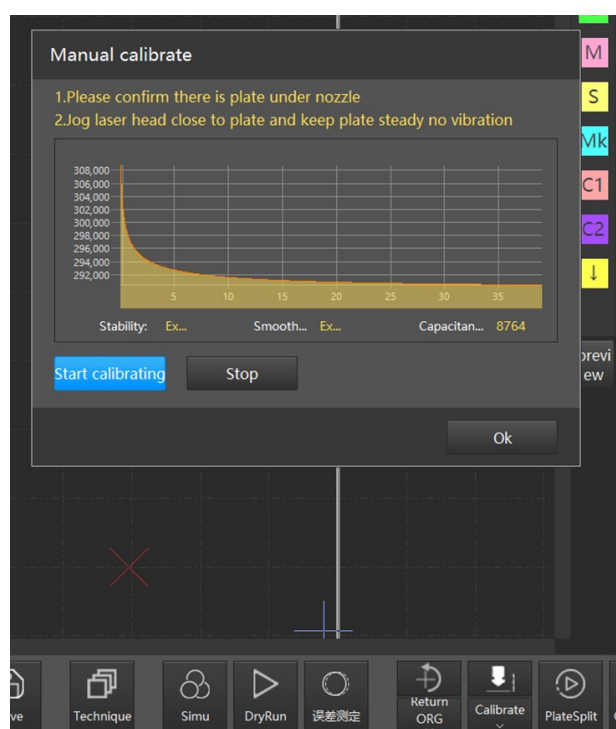
A. Set Beam Size 1.5 and Focus Position 0.0, then click “Adjust Focus” to check motor operating status .

B. Check the sensor operating status



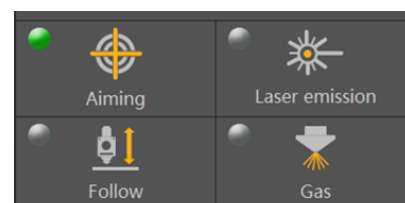
A. LED Status Indicator in normal operation

C. Check the capacitive distance controller sensor system operating status



A. Calibrate in normal operation, and calibrate result should be: Excellent, Excellent, Capacitance \geq 6000;

B. Click Follow button, the cutting head follow function checks should be carried out in normal operation.



D. Check the cutting gas quality

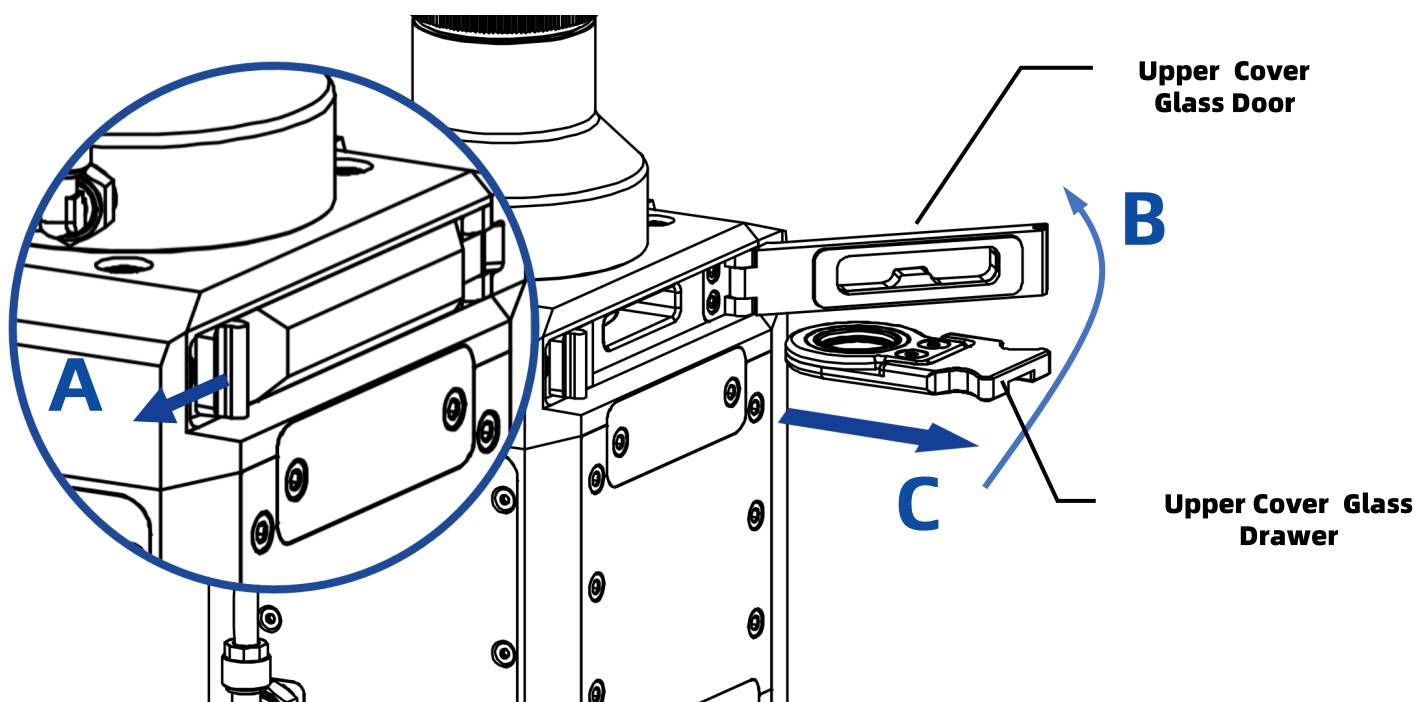
**Attention :**

The cutting gas quality can be checked by the following ways:

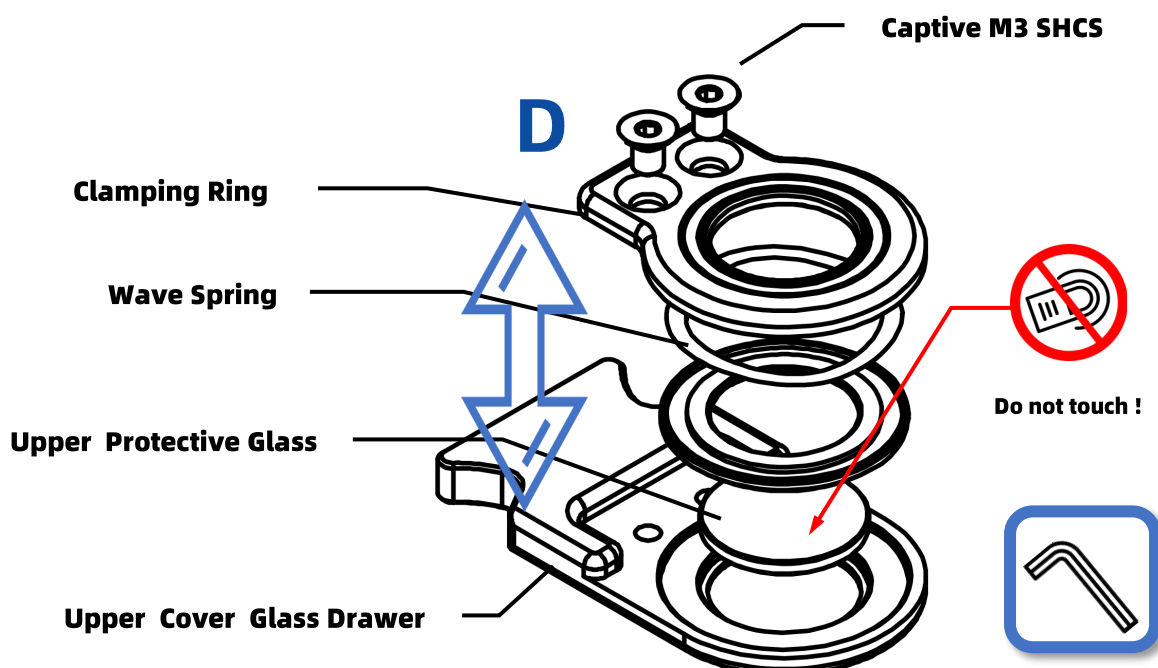
1. Open cutting gas separately : nitrogen, oxygen or compressed air ;
2. The cutting gas pressure on the laser head is 2 bar for about 10 minutes ;
3. After turning off the air supply, check the protective window's cleanness to determine if the cutting gas quality meets the requirements.

Appendix A – Maintenance

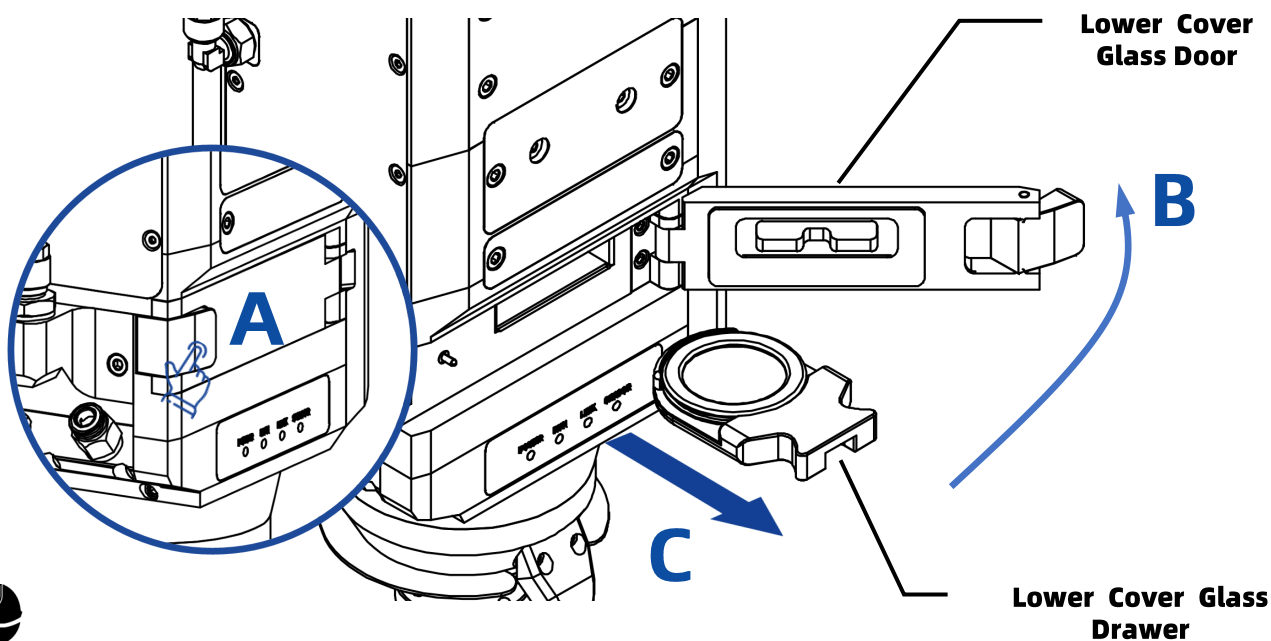
1. Replace Upper Protective Glass



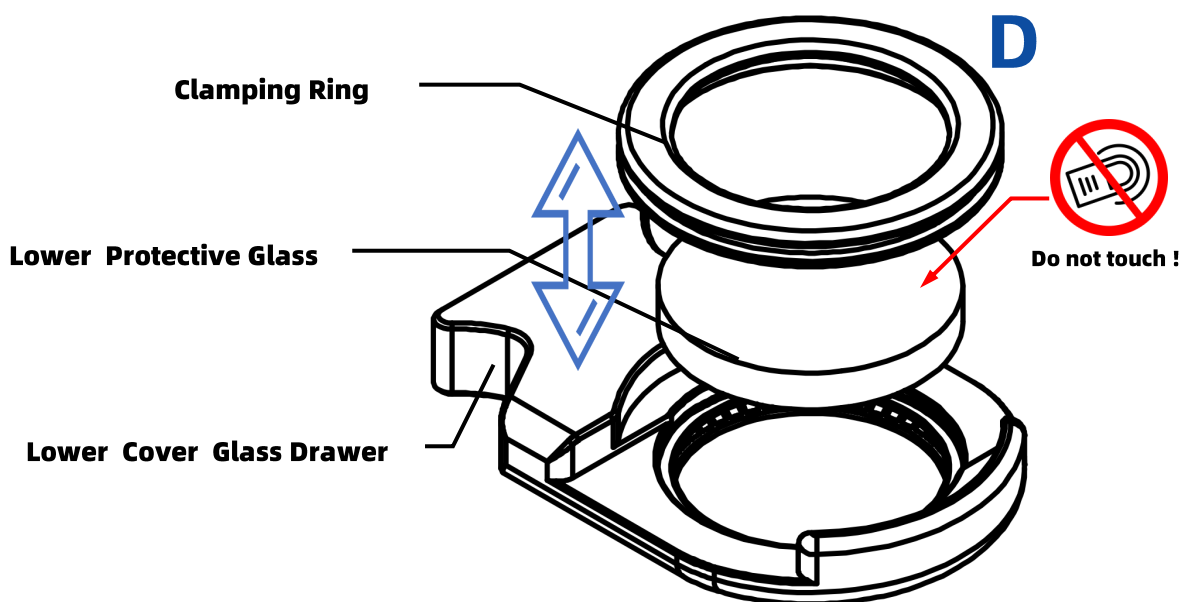
1. Release the cover glass door .
2. Pull fixed cover glass holder out of the head.
3. Remove the manifold seal ring and the cover glass from the fixed cover glass holder .
4. Close the sealed cover glass door during service to keep contaminants out .
5. Place the upper protective glass into the drawer.



2. Replace Lower Protective Glass

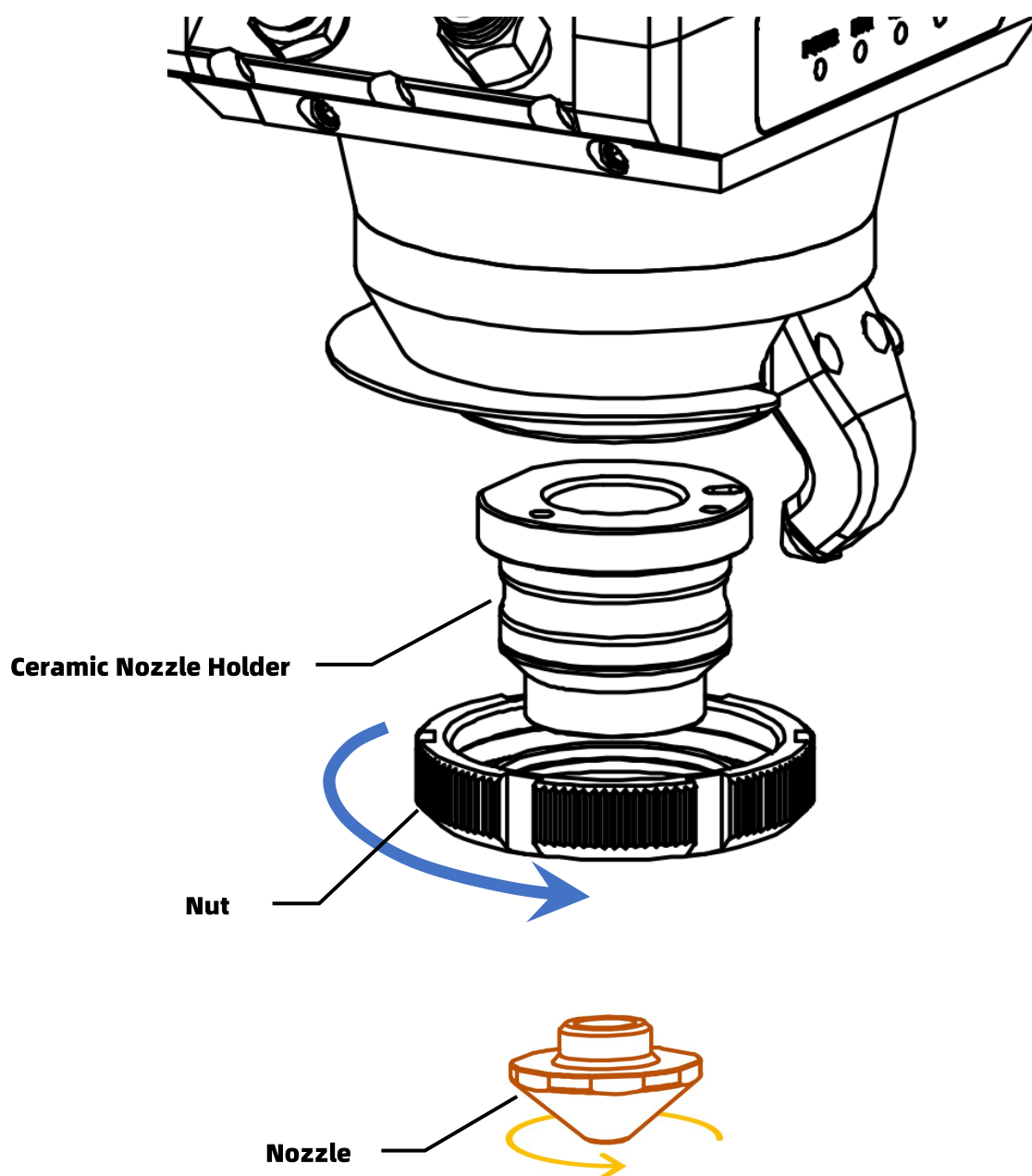


1. Release the cover glass door by pushing the door latch.
2. Swing the cover glass door open.
3. Grasp the handle on the cover glass drawer and pull straight out to remove it from the head.
4. Close the sealed cover glass door during service to keep contaminants out .
5. Place the lower protective glass into the drawer.



6. Press the seal ring into the drawer to retain the protective glass.
7. Open the cover glass door.
8. Reinsert the cover glass drawer into the head.
9. Close the cover glass door.
10. keep contaminants out.

3. Replace Ceramic Nozzle Holder and Nozzle



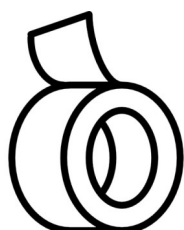
Hand tighten the nut and the nozzle .
Do not use a wrench. Otherwise the
ceramic part could be damaged.

4. Beam Centering



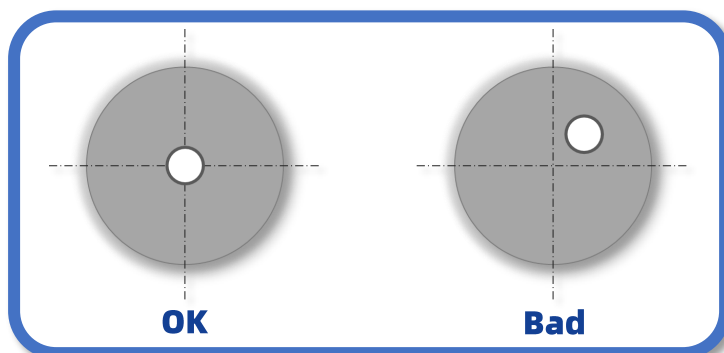
Verify all screws are tight after adjustment is complete.

X/Y Adjustment Screws



Translucent Tape

Laser Beam Position

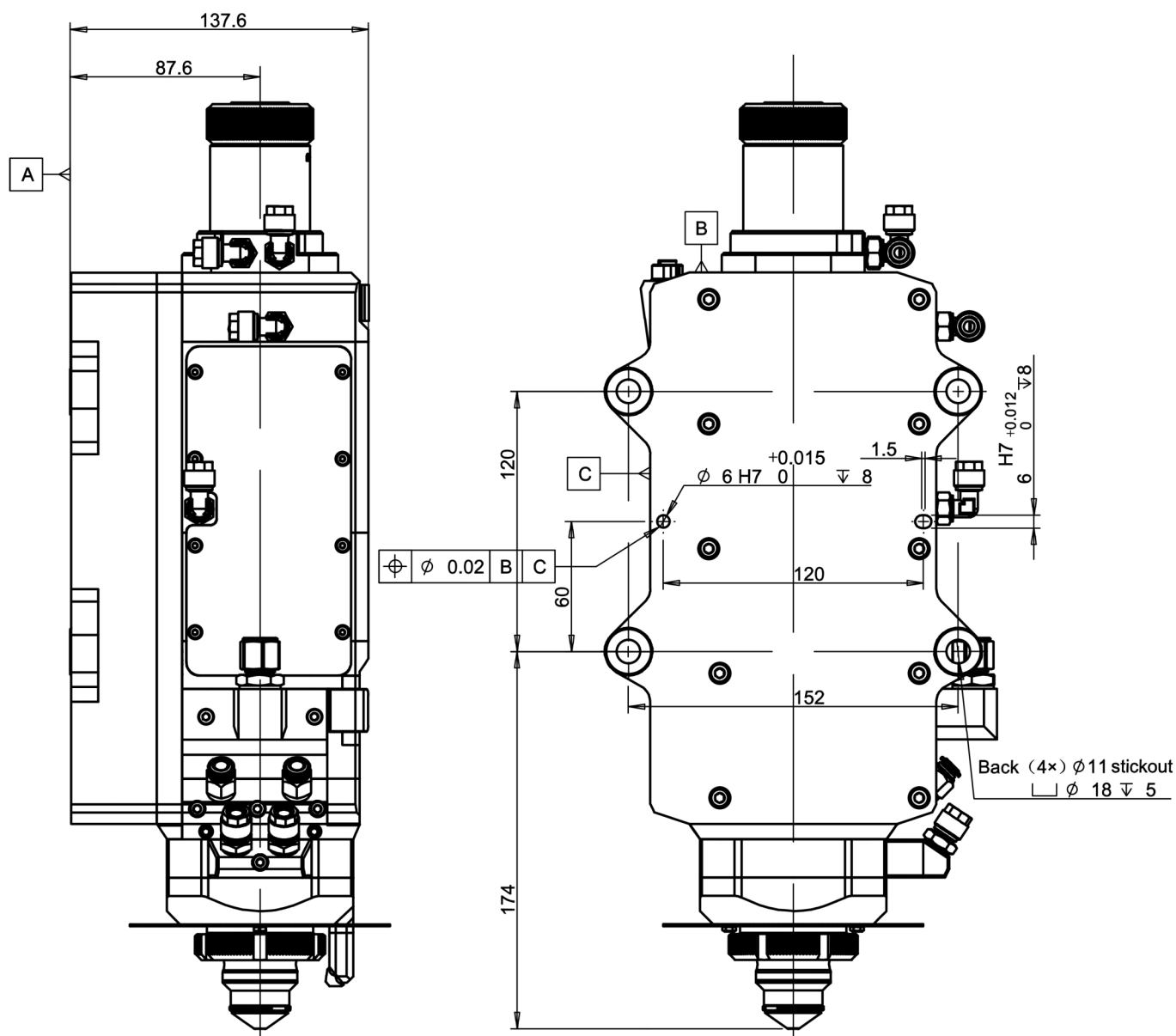


To manually center the beam in the nozzle tip:

1. Verify that the high power beam is disabled.
2. Put a piece of translucent tape on the end of the nozzle tip.
3. Turn on the red aiming beam from the fiber laser and observe the position of the beam on the tape
4. Adjust the opposing XY adjustment screws , so the beam is centered in the nozzle orifice.

Appendix B – Mechanical dimensions

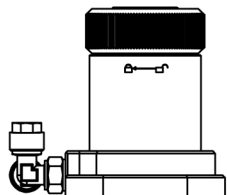
1. Fixing the cutting head to the machine



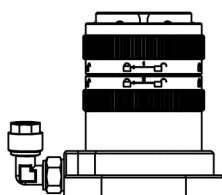
Mechanical dimensions (e.g. QBH version)

2. BLT 640 QBH /QD/Q+ version

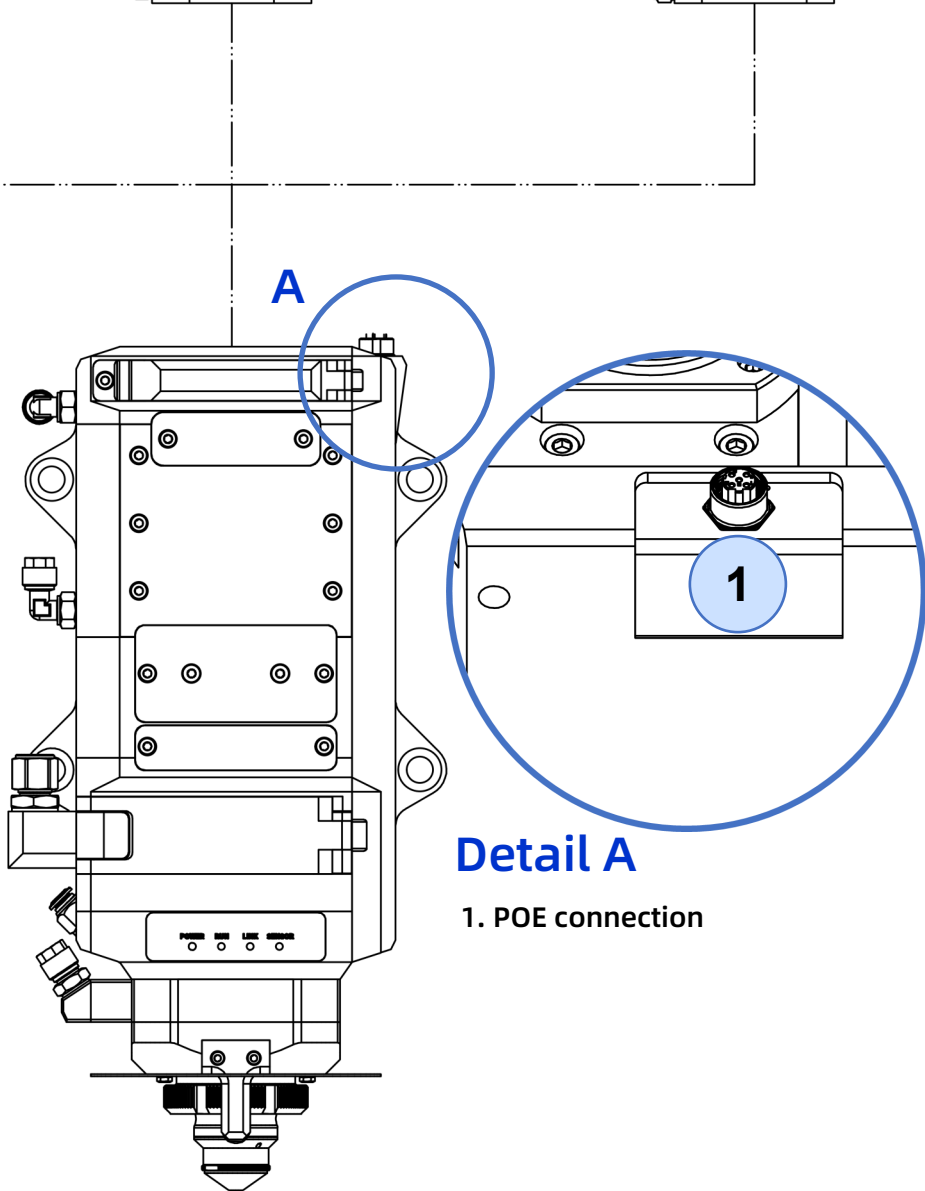
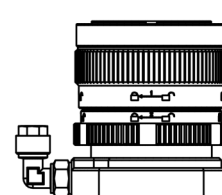
QBH fiber interface adapter



QD fiber interface adapter



Q+ fiber interface adapter

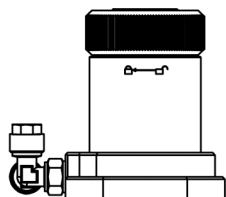


Detail A

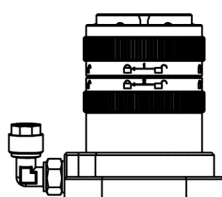
1. POE connection

3. BLT 641 QBH /QD/Q+ version

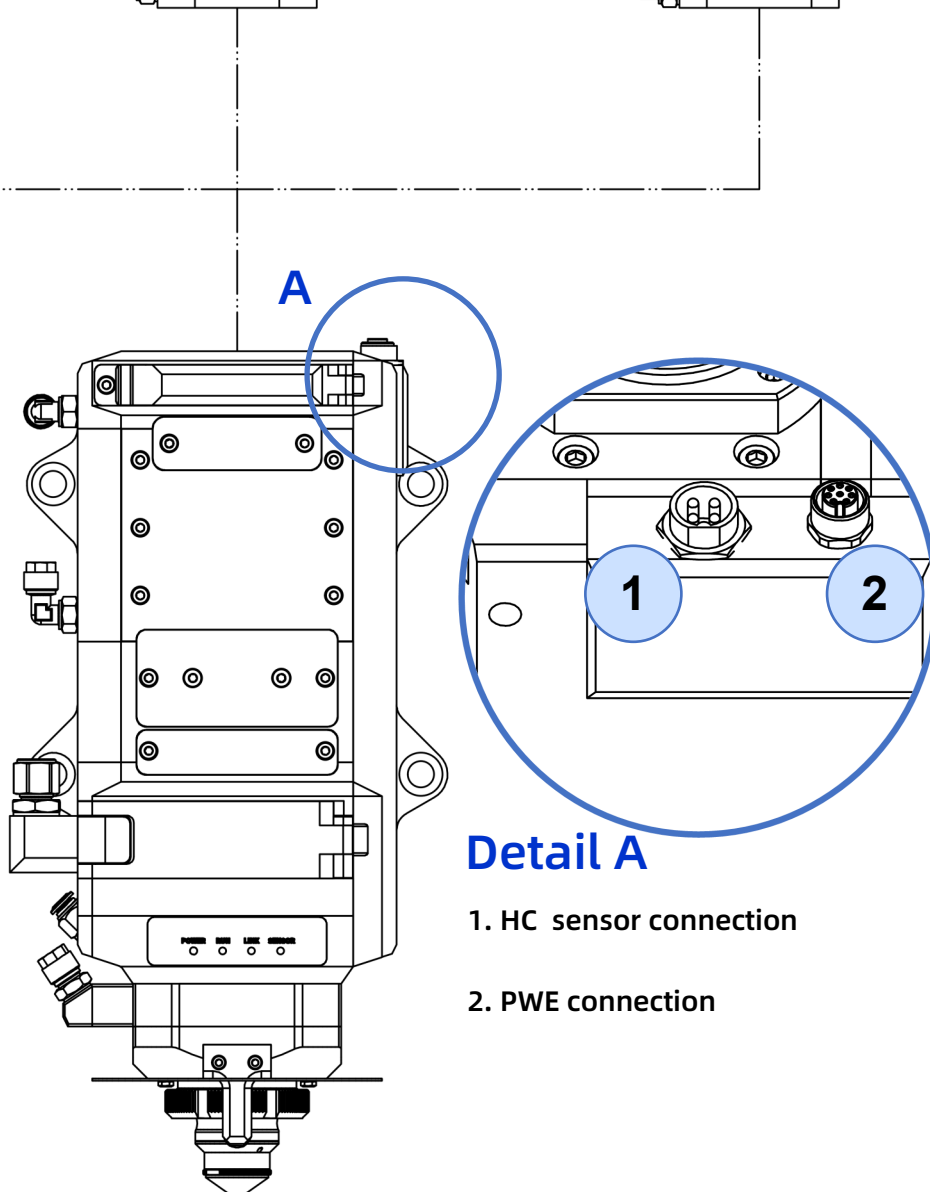
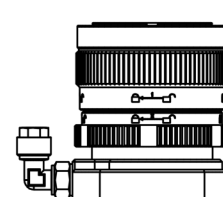
QBH fiber interface adapter



QD fiber interface adapter



Q+ fiber interface adapter



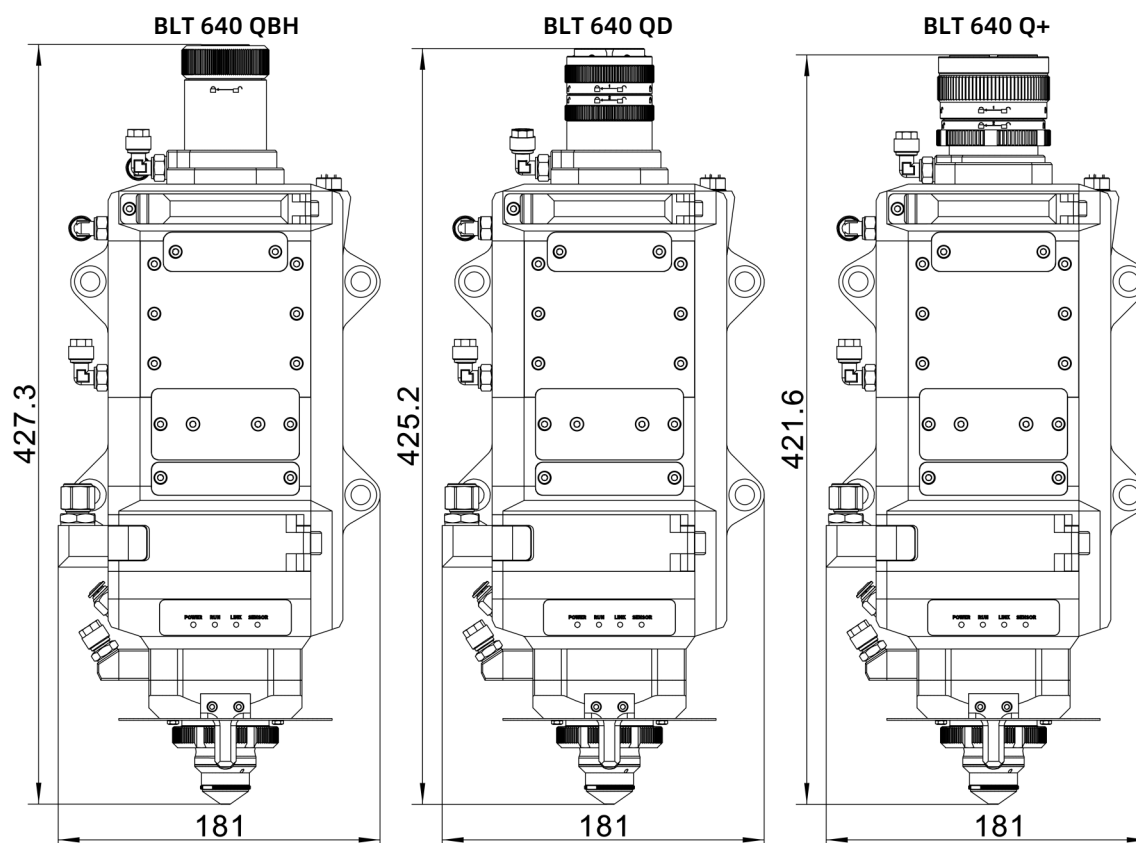
Detail A

1. HC sensor connection

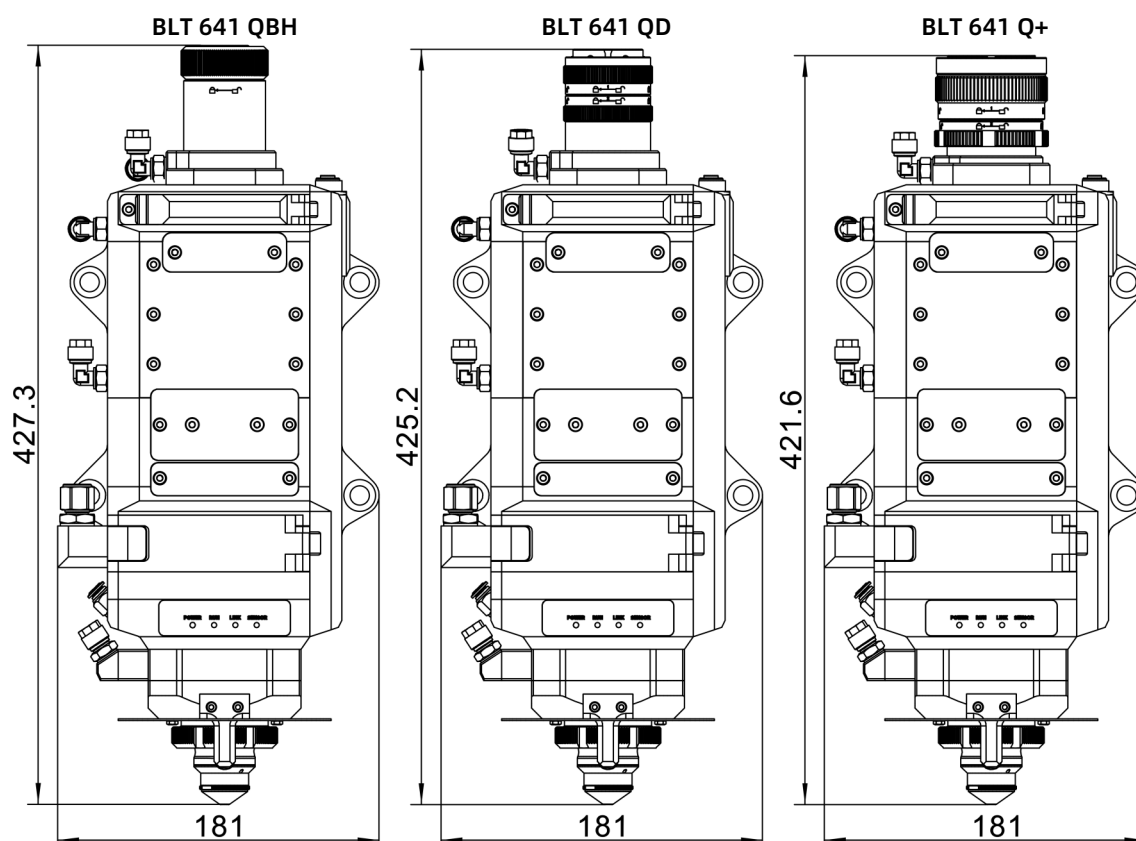
2. PWE connection

4. Mechanical dimensions (BLT 640 and BLT 641 QBH /QD/Q+ version)

4.1 BLT 640 QBH /QD/Q+ version



4.2 BLT 641 QBH /QD/Q+ version



Appendix C – Noise

Noise levels - Test certificate for BLT 640-QBH/QD/Q+

During the laser cutting process , the noise level is < 80 dB(A) .



Attention :

Noise emitted by the cutting gas depends on the operating conditions.

To ensure that individuals are not harmed by noise, the manufacturer of the system / machine must implement or provide written information on relevant safety measures which must be observed by the operator.

Appendix D – Declaration

Declaration of Incorporation

Specifications and designs are subject to change without any notice or obligation on the part of the manufacturer.

January 2020 © BOCI CORPORATION



Best Optical Cutting Instrument

Shanghai BOCI Automation Technology Co., Ltd.