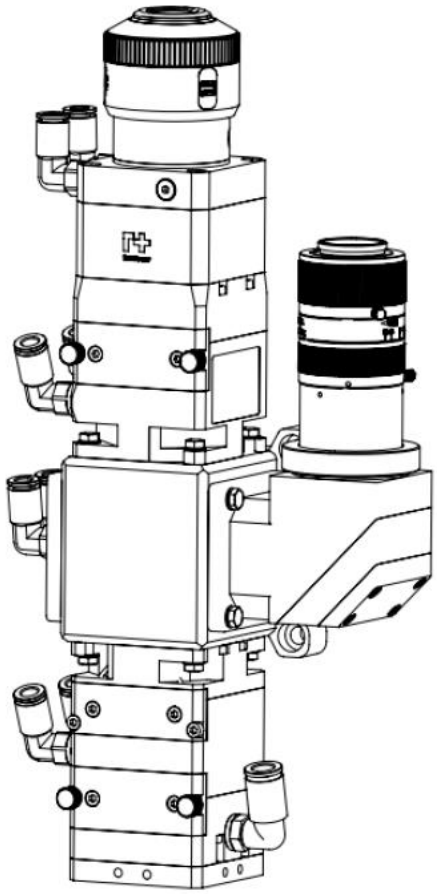
BW06K

6KW Laser Welding Head - User Manual



Document History

Edit date	Version	Topic, revision, action taken
2025/7/1	V1.0	First edition

Thank you for choosing our product!

This manual describes the installation and commissioning of laser welding head in details so that you can use this product quickly. You can consult us directly for more details.

Due to the continuous updating of product functions, the product you receive may differ from the introduction in this manual in some aspects.

If you find any errors in this document, please inform us as soon as possible. The data contained in this manual is only used to describe the product and shall not be regarded as a statement of security interest.

For the benefit of our customers, we will constantly try to ensure that the products we develop comply with the latest technology.

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Disclaimer

- We reserve the right to change the design in order to improve the quality or expand the application or comply to manufacturing workmanship.
- We will not bear any responsibility for losses and accidents caused by wrong operation or improper handling of our products.
- Dismantling of product will lose all warranty claims excluding the normal replacement of worn parts and components required for maintenance or commissioning operations.
- Unauthorized modification of products or use of non-original spare parts will directly lead to the invalidation of warranty and liability exemption.
- It is recommended to only use the spare parts provided by us or submit them to us or the designated professional team for installation.

Use Regulations

- Ensure that the product is used in a dry environment.
- Ensure that the product is used in the environment required by EMC standards.
- The product is only allowed to run within the parameters specified in the technical data.

Personnel Responsibilities

- Be familiar with the basic provisions of work safety & accident prevention and have received equipment operation guidance.
- Read and understand basic safety instructions and operations.
- You must have studied the relevant regulations and safety instructions and understand the possible hazards.
- Comply with relevant regulations and implement corresponding protective measures.

Safety Instructions

Prevent Electric Shock

-  Parts of the laser head such as nozzle, sensor, sensor interface and attached fasteners may not be fully protected by the ground wire due to function fault. These parts may have low voltage. When installing electrical equipment, please pay attention to taking anti electric shock measures for relevant personnel.
-  Note that the equipment shall be grounded as specified.

Guard against Danger

- Never put your hands or other body under the laser head.
- Repair and maintenance work can only be carried out after the power is turned off.
- Do not exceed the specified maximum pressure.
- It must be ensured that the laser head is in normal condition at all times.
- All fasteners such as bolts and nuts must be tightened.

 **Laser Caution**

- Avoid direct laser radiation or scattering to the skin.
- Do not stare at the laser beam even when wearing optical equipment.
- Use special laser protective eyeglasses that meet the requirements of safety standards IEC 60825-1.

Prevent Waterway Corrosion

- In order to avoid corrosion, use the specified coolant and comply with relevant requirements and specified maintenance intervals.

Noise Prevention

- The corresponding measures shall be specified or explained and observed in order to prevent personnel from being harmed by noise when the cutting air pressure is high.

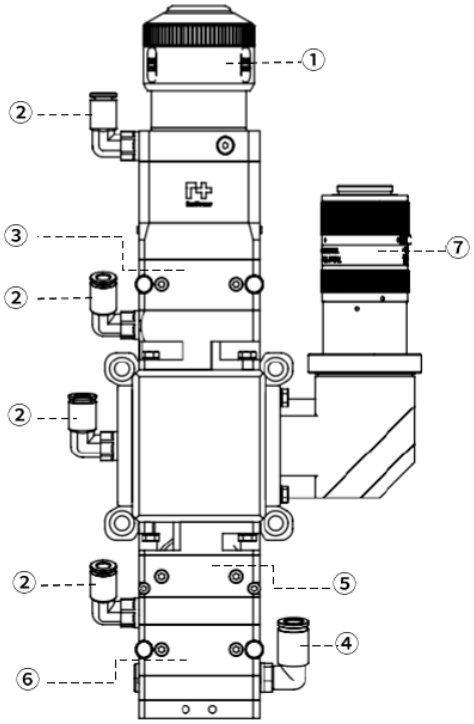
Storage and Transportation

- Observe the storage temperature range allowed by the technical data.
- Take reasonable measures to prevent fire, vibration or impact.
- Do not store in or near the magnetic field.

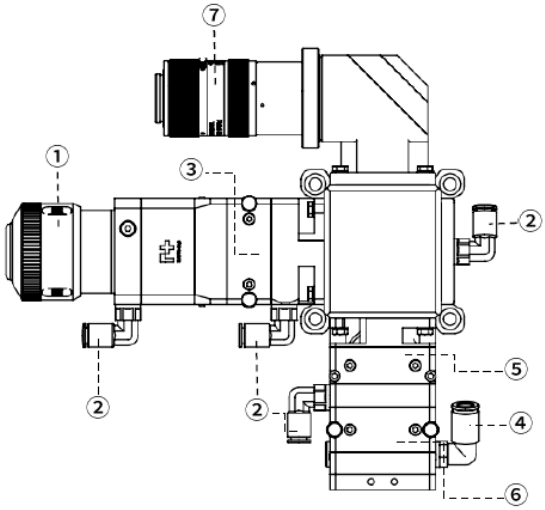
Contents

1 Product Summary

1.1 Structure (with QBH Interface)



0°



90°

1 Fiber Interface

2 Water Cooling Interface

3 Top Cover Glass Holder

4 Assist Gas Interface

5 Focus Lens Holder

6 Bottom Cover Glass Holder

7 CCD

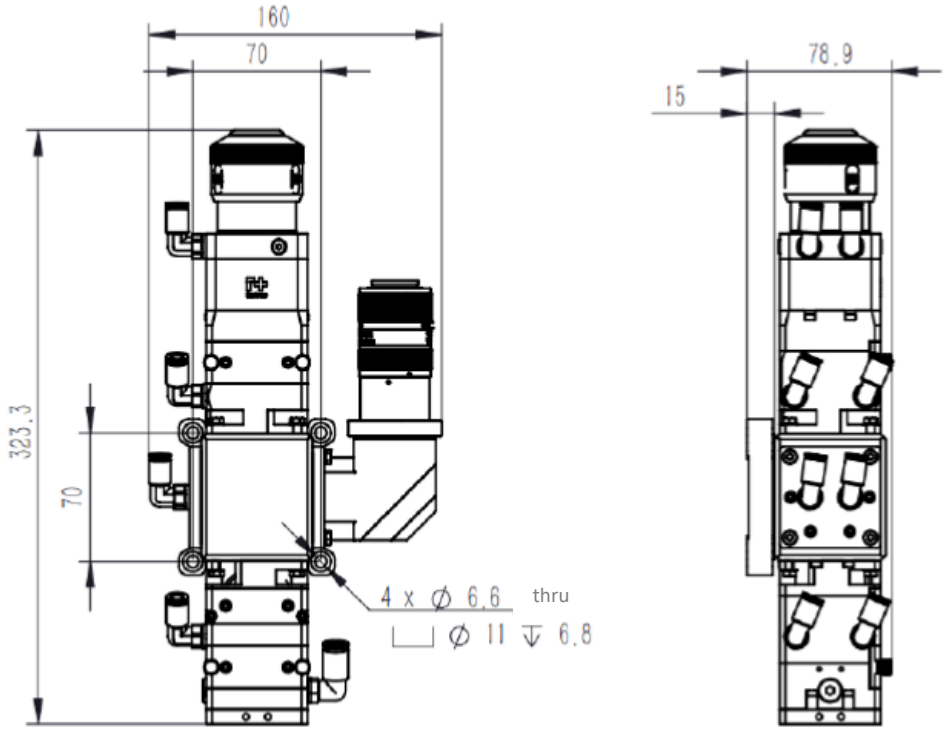
1.2 Technical Datasheet

Model	BW06K
Wavelength	1064nm
Power Rating	≤6KW
Fiber Interface	QBH (standard) / QD (optional)
Clear Aperture	34mm
Collimation Length (fC)	100mm/125mm/150mm
Focusing Length (fF)	150mm/200mm/250mm/300mm
Cover Glass Specification	D37X5
CCD Module	C/CS interface
Water Cooling	Ø6mm
Assist Gas	Ø8mm
Size	323.3*160mm (F100, 0°)
Weight	~3kg
Extensible Function	temperature detection of lens

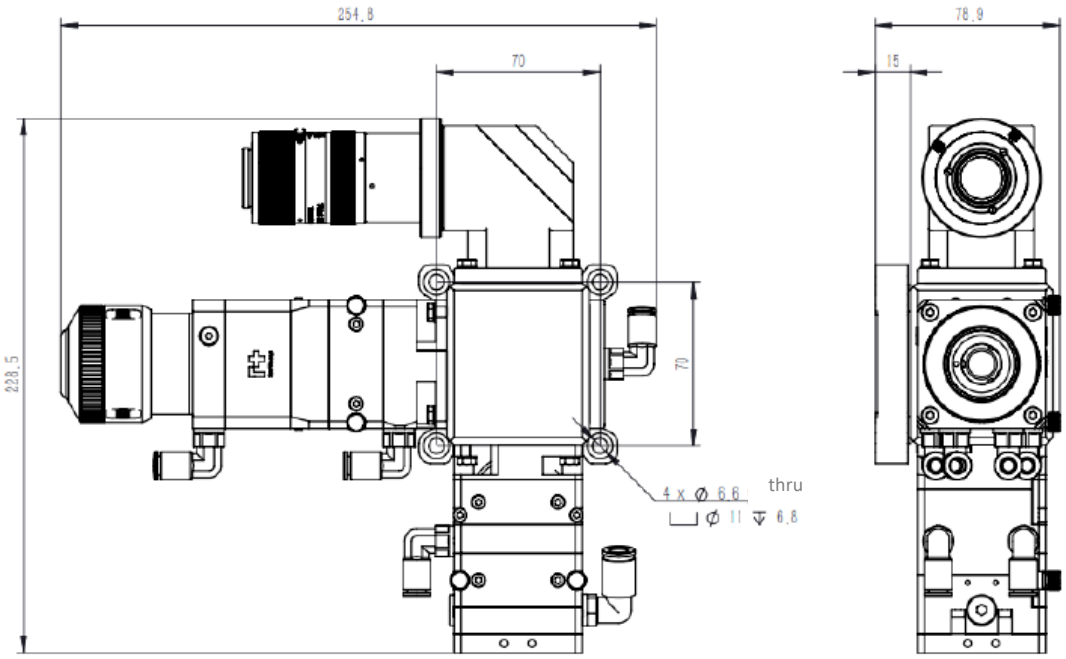
1.3 Mechanical Size

Collimation F100 (0°):

(Other specifications refer to appendix)

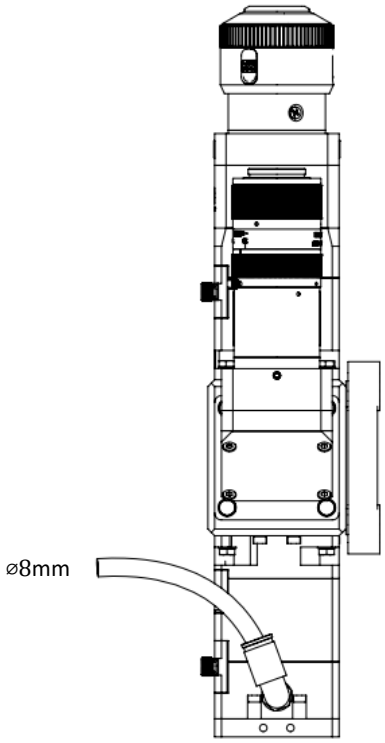


Collimation F100 (90°):

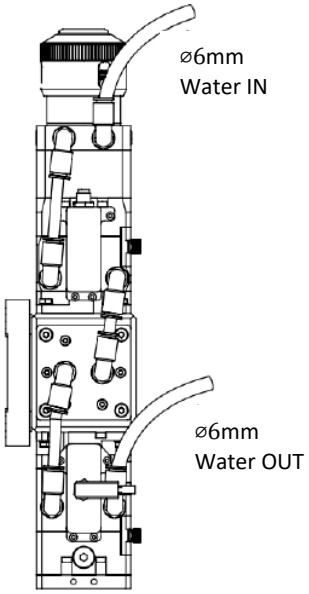


1.4 Connection of Assist Gas

Gas requirements:
Compressed air pressure: 0.4-0.6MPa
Nitrogen/Argon gas flow: 8-25L/min



1.5 Connection of Cooling Water



The coolant must be softened water, such as purified water, distilled water, or high-purity water.

Improper use of water may cause the following results:

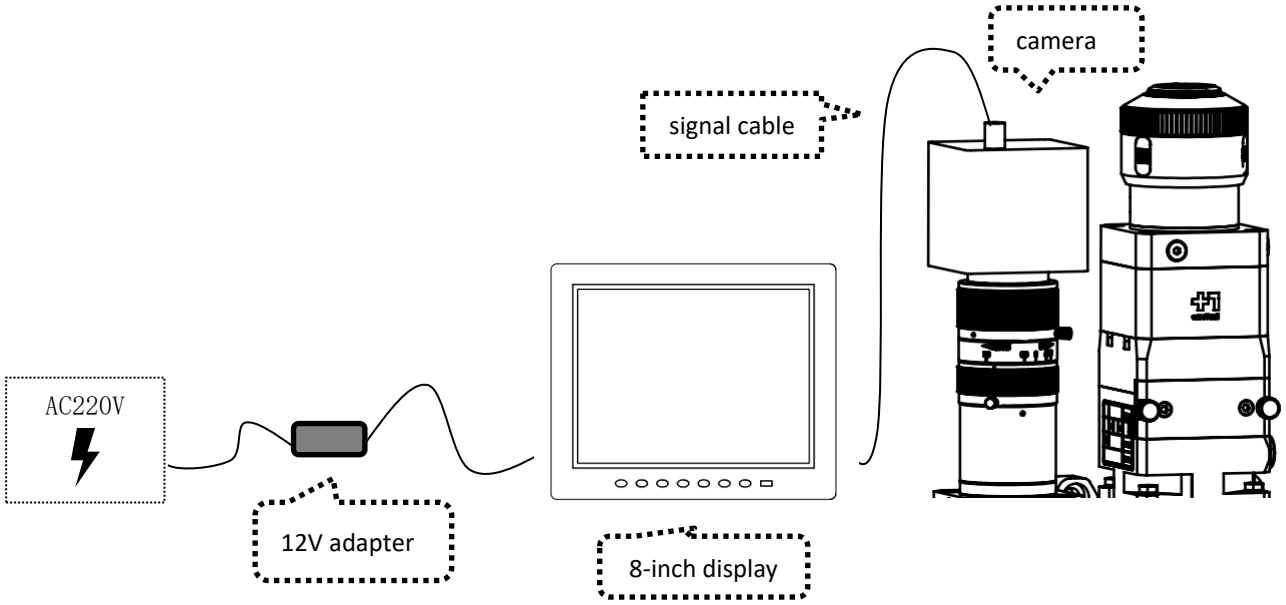
1. Scale formed by heating tap water or impure water at high temperatures will contaminate the laser head's internal structure and may cause damage.
2. Improper water can promote microbial growth in the water tank. These microbes can adhere to heat exchangers and lasers, reducing heat dissipation efficiency, causing block, and triggering high-temperature alarm.
3. If the water is too acidic or alkaline, it may corrode the cooling plates inside the laser.
   The resulting solid oxides may clog internal channel of the heat exchanger, leading to increased system pressure, potential leakage, and severe cooling capacity loss, even causing the laser to malfunction or shut down.

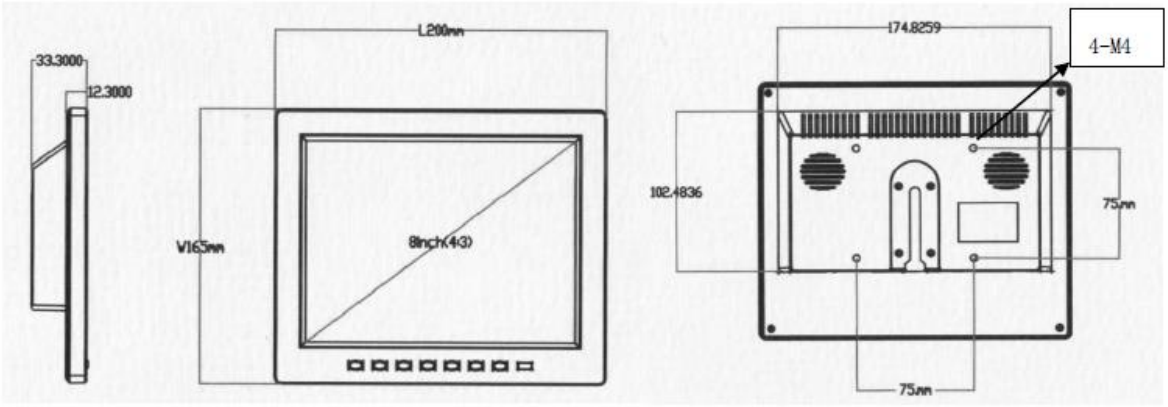
Outer diameter of water hose	⌀6mm	
Cooling Method	Water Cooling	
Chillier Temp	Low-temperature water: Summer: 24℃-26℃	Winter: 20℃-22℃
	Normal-temperature water: Summer: 28℃-30℃	Winter: 24℃-26℃
	Add Antifreeze: cooling water temperature is 20°C.	
Water Pressure	2-6 bar	
Water Flow	2-4 L/min	
PH range	7.2 – 8.1	
Resistivity	⩾ 1 MΩ·cm (deionized water)	
Chloride ion	< 50 mg/L	

To prevent condensation, please adjust the temperature of the cooling water to room temperature.
Low-temperature cooling water is not allowed to cool the laser head!

1.6 Wiring

1.6.1 Connection of Display and Camera

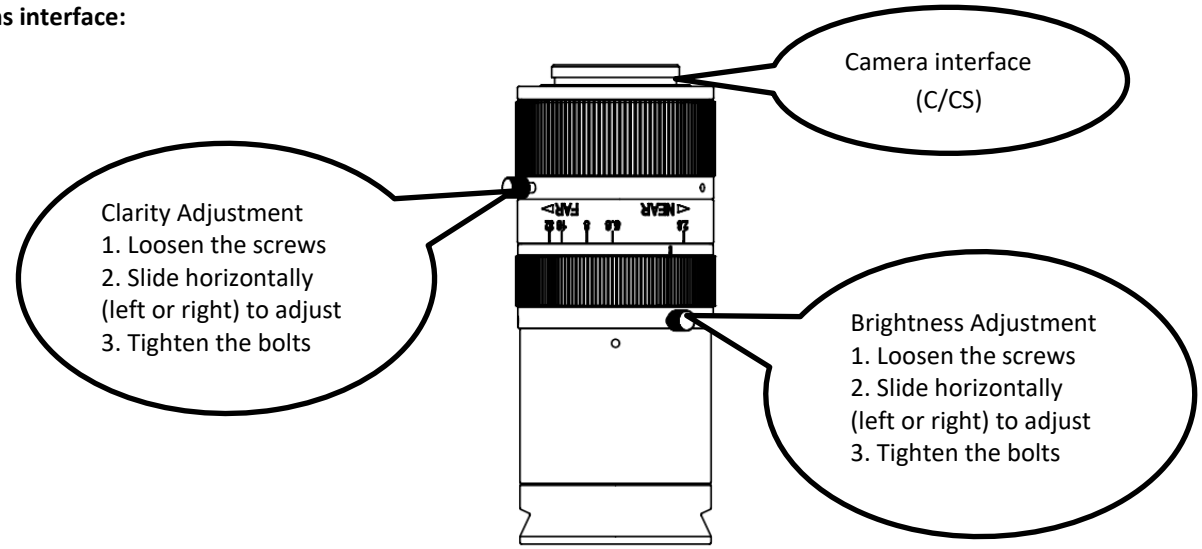




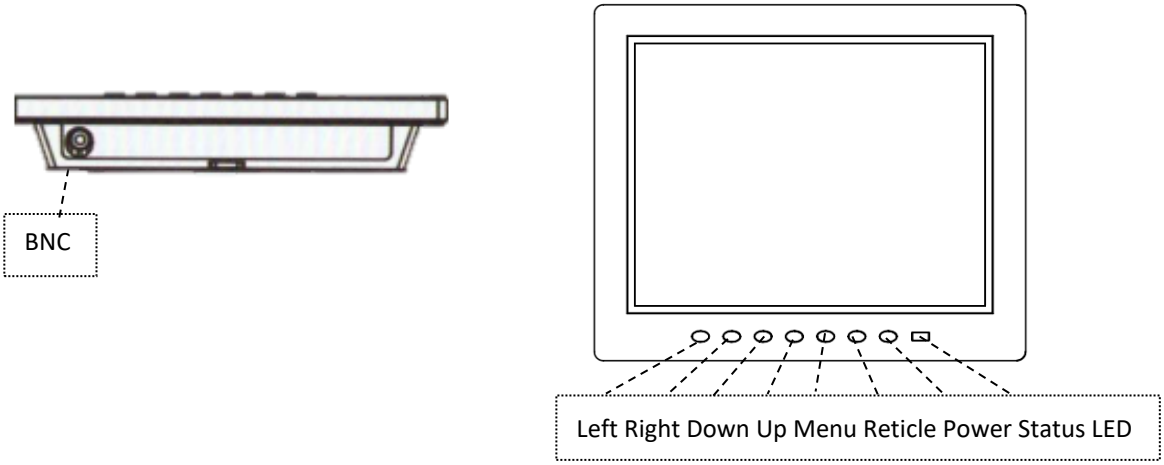
Display Size

1.7 HMI Panel and Camera Interface

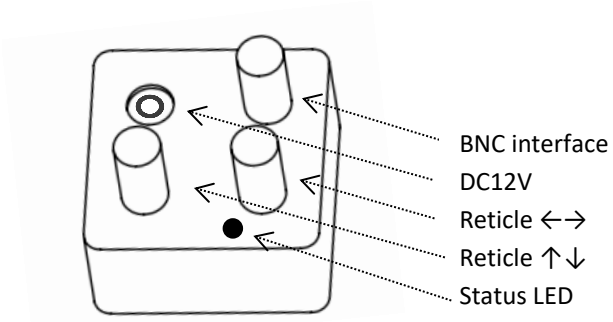
Lens interface:



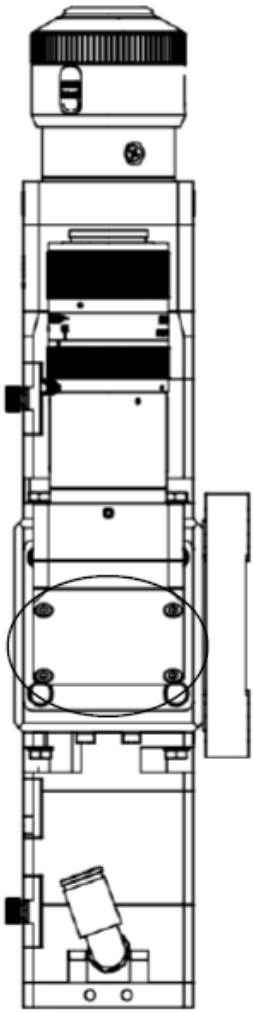
Front and rear interface of display:

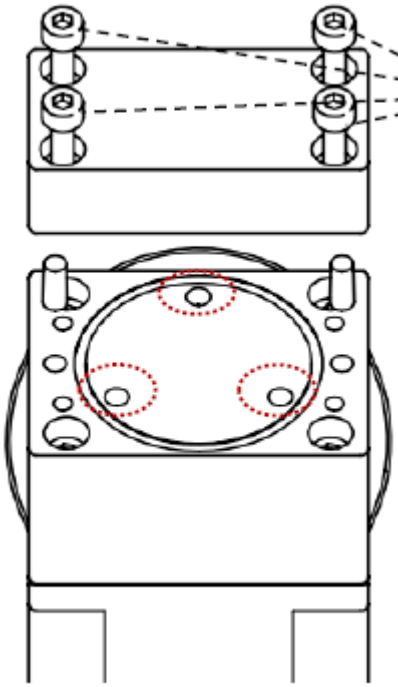


Camera interface:



1.8 Field Center

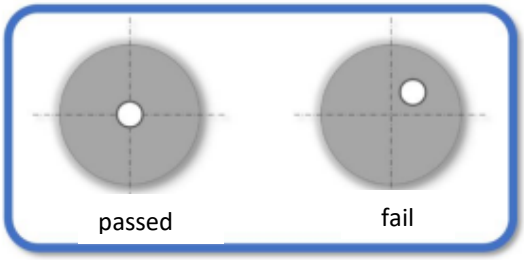




Remove 4 bolts and cover panel

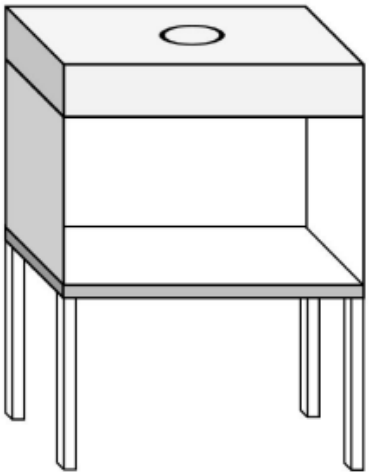
Adjust 3 mechanical positions (red area) to center

Center effect:



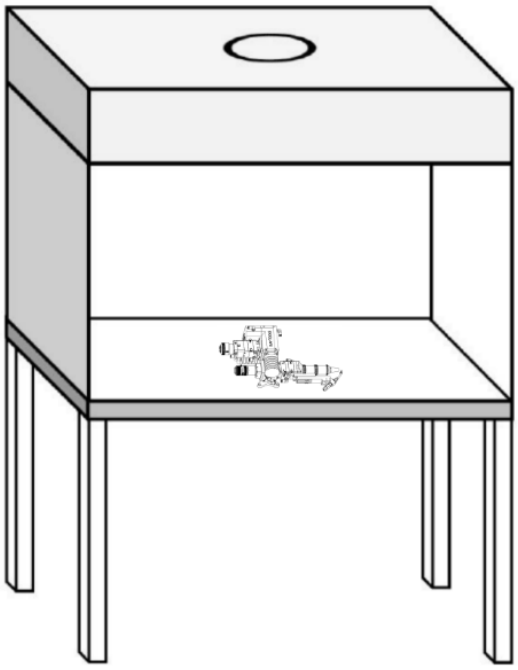
2 Mechanical Installation

1. Prepare the clean bench:
- Turn on the clean bench.
- Clean the surface of the clean bench.
- Lower the glass door, leaving a 10 cm gap.
- Run the device for 30 minutes

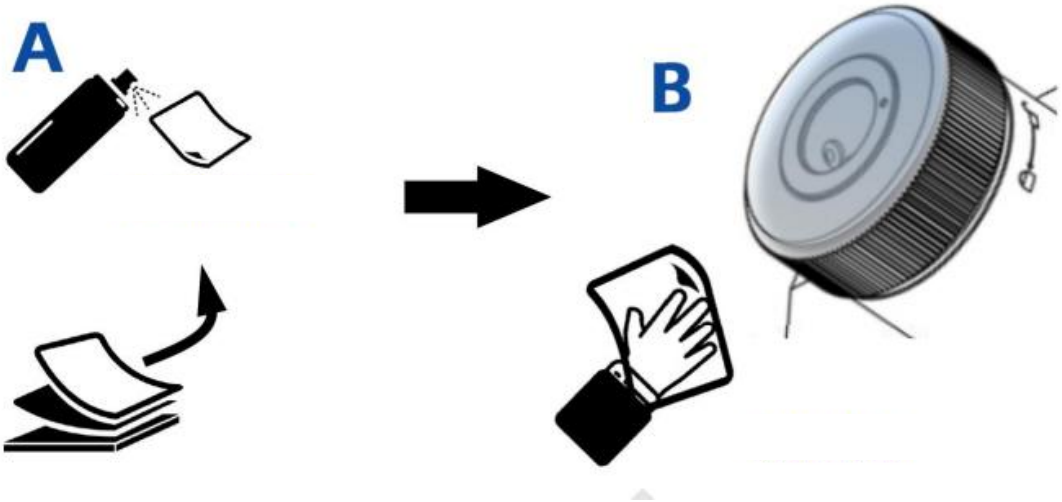


Type: Vertical Laminar Flow
Cleanliness Class: ISO Class 5 / Class 100
Average Air Velocity: ⩾ 0.4 m/s

2. Place the laser head on the clean bench horizontally.



3. Wipe with a dust-free cloth moistened with absolute ethanol.



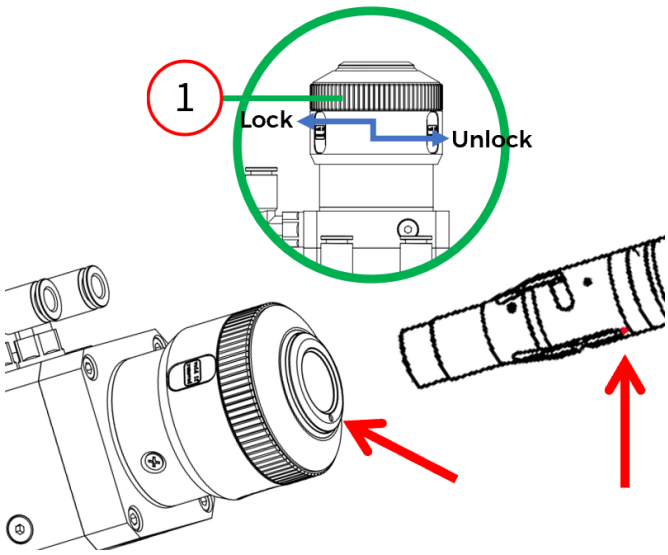
4. Check the cleanliness of the fiber.

Mount the fiber connector onto the microscope

Use a clean cotton swab to wipe the cover glass

2.1 QBH Fiber Insertion

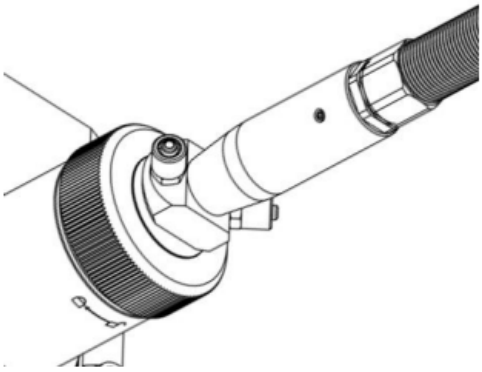
WARNING: The optical components must be dust free and all dusts must be cleaned before use. The fiber shall be horizontally inserted into fiber interface to prevent dust from entering the interface and falling on the surface of the lens. Upper limit in the fiber before fixing the laser head.



- Rotate QBH locking ring (1) in the direction of the arrow to unlock (Rotate counterclockwise 45°, press down the locking ring, then rotate 45° counterclockwise again.).
- Make sure that the fiber is dust free.
- Align the red mark of male fiber end to red mark on female QBH of laser head when you insert the fiber end straightly to bottom of QBH interface of laser head.
- Turn the QBH handwheel clockwise. It is in place when you hear the "Da" voice, then pull the handwheel up and turn clockwise to end.

2.2 Wrap with Protective Film

To ensure effective sealing, it is recommended to wrap the tape around at least three full turns.



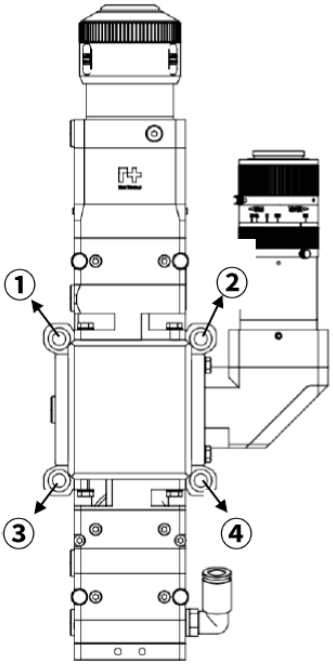
2.3 Mounting of Laser Welding Head

Mount the laser head using 4× M6×16 bolts (1-4) on the machine base or robot back panel. Ensure that the head is firmly locked in place with no vibration before use.

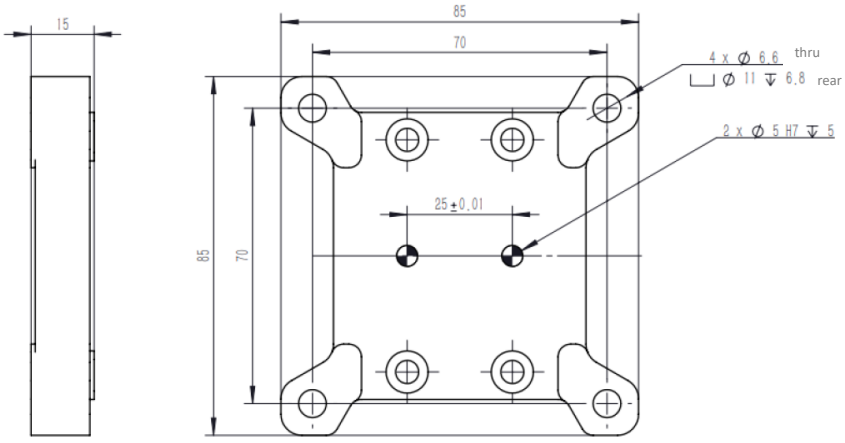
Make sure there is good electrical insulation between the machine and the laser head, to prevent electrical interference, short circuits, or signal transmission issues.

Insulating pad/washer
Use insulating pads made of high-temperature and corrosion-resistant materials such as ceramics, PTFE (Teflon), mica, or special engineering plastics, placed between the contact surfaces of the laser head and the machine.

Insulating sleeve
Install insulating sleeves (made of nylon or ceramic) over the bolts to prevent direct metal contact between the bolts and the laser head.



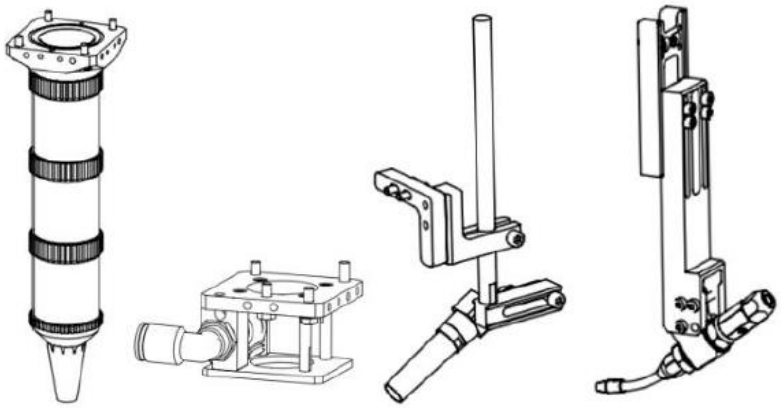
Front View



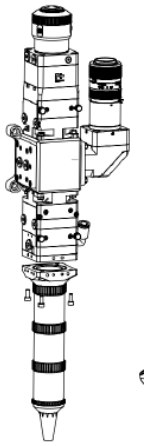
2.4 Mounting of Tip Assembly (Optional)

Before installation, confirm that coaxial air-blow assembly, side-blow assembly and wire feeding assembly are complete.

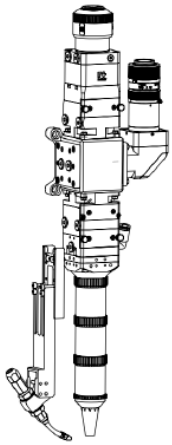
From left to right: F300 coaxial air-blow assembly, air knife assembly, side-blow assembly and wire feeding assembly.



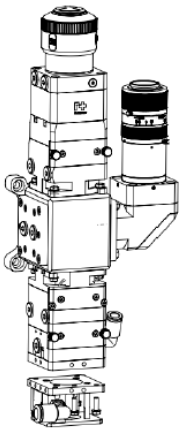
Installation method:



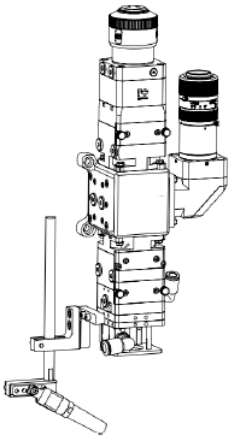
F300 coaxial air-blow assembly



F300 coaxial air-blow
+wire feeding assembly



air knife assembly



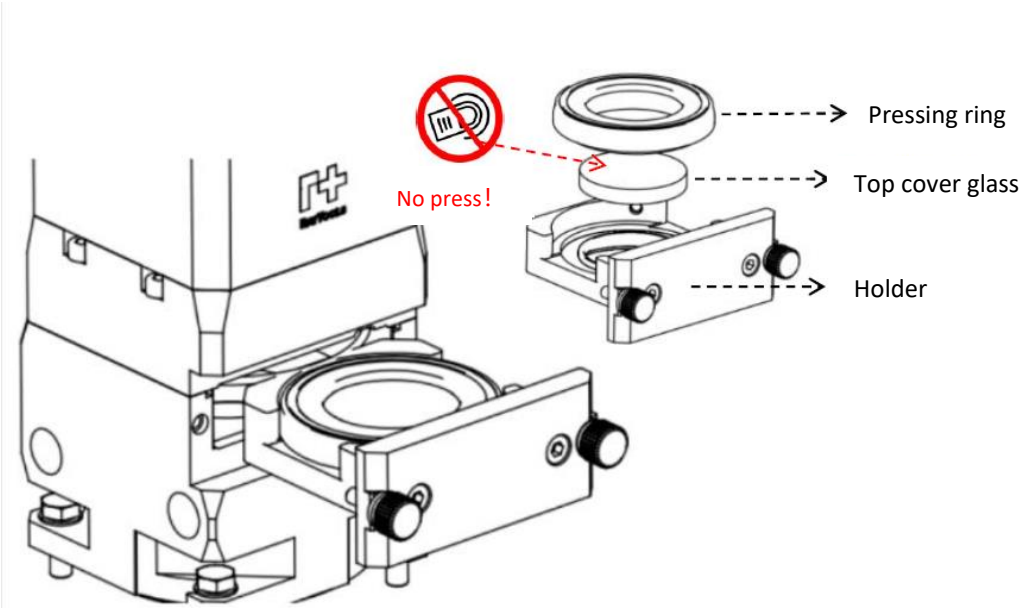
air knife + side-blow assembly

3 Maintenance

3.1 Removal and Installation of Lenses

The whole process needs to be completed in a dust free room. Wear dust-proof gloves or fingertips when removing or installing the lenses.

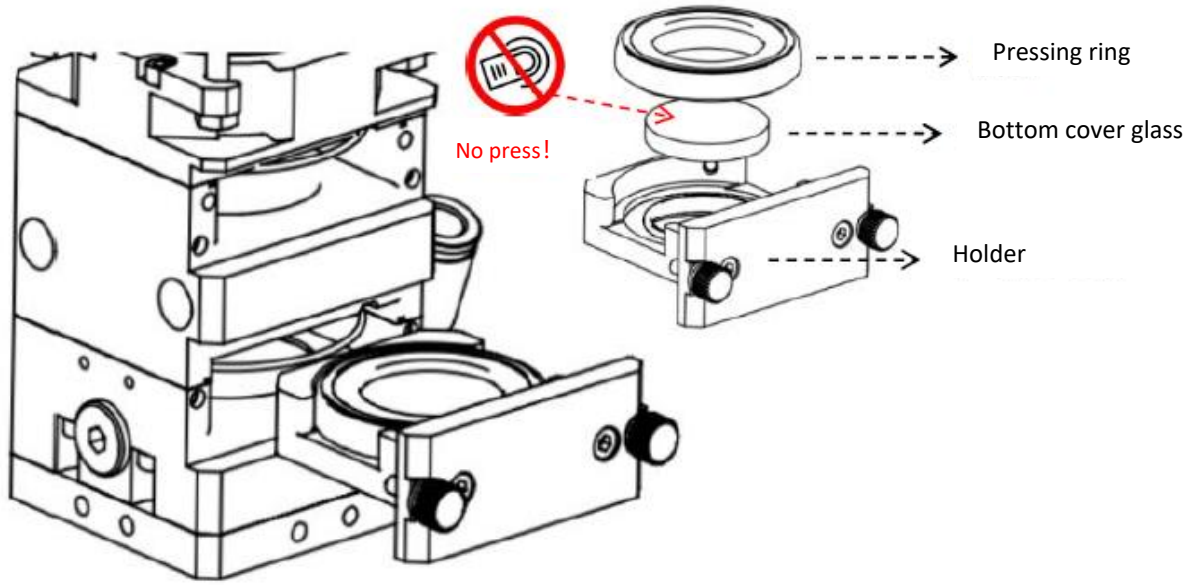
3.2 Removal and Installation of Top Cover Glass/Protection Glass



- As shown above, loose the bolts to pull out cover glass holder by pinching 2 edges of drawer type holder.
- Seal the mounting openings by textured tape immediately.
- Remove the pressing ring and cover glass after wearing fingertips
- Clean the cover glass holder.
- Install the cleaned or new cover glass (regardless of the front or back surface) into the holder of cover glass.
- Install the pressing ring.
- Insert the cover glass holder back to the laser head and tighten the bolts.

It is not allowed to pull out the edge of seal ring directly as it is very easy to damage the seal ring.
Please wear the clean gloves or fingertips.

3.2.1 emoval and Installation of Bottom Cover Glass/Protection Glass



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- Seal the mounting openings by textured tape immediately.
- Remove the pressing ring and cover glass after wearing fingertips
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- Install the pressing ring.
- Insert the cover glass holder back to the laser head and tighten the bolts.

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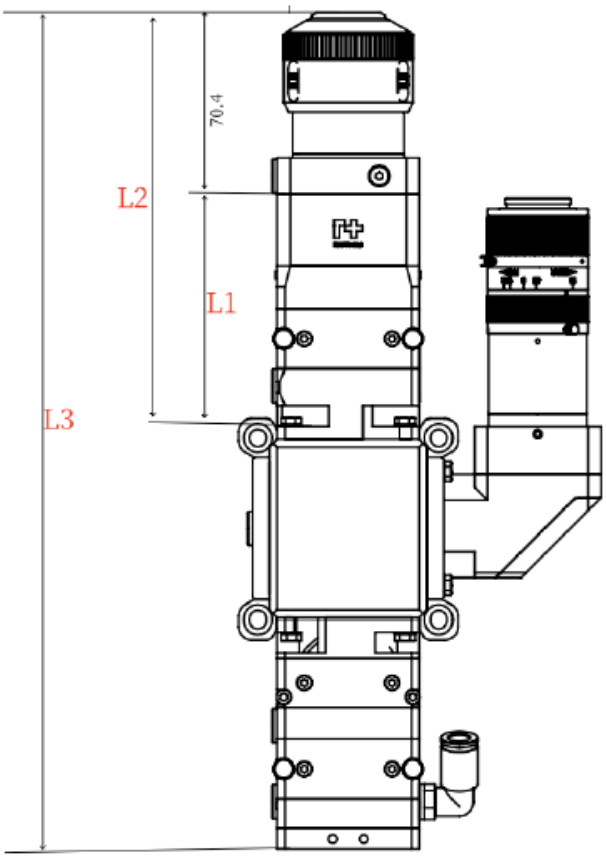
4 Appendix

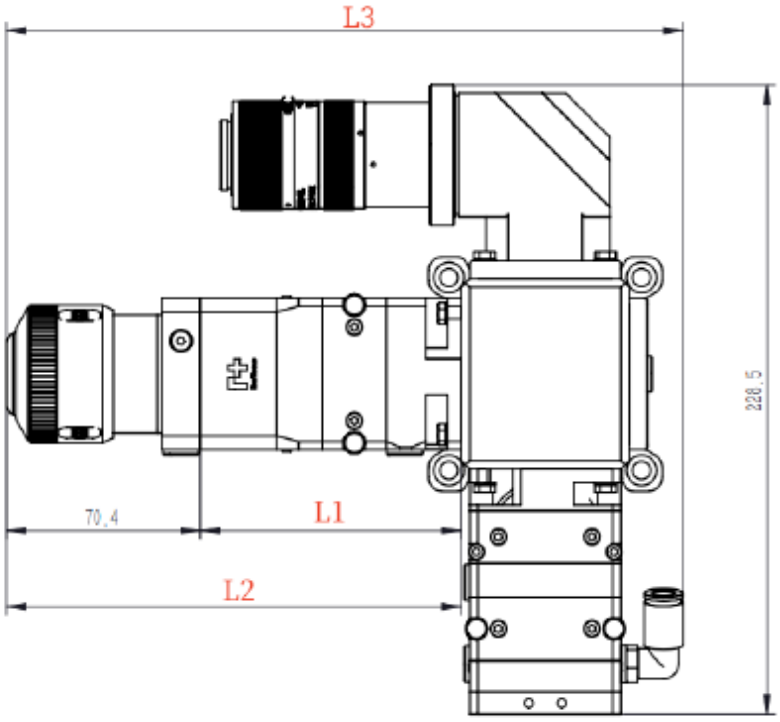
4.1 Mechanical Size

QBH with vision (0°):



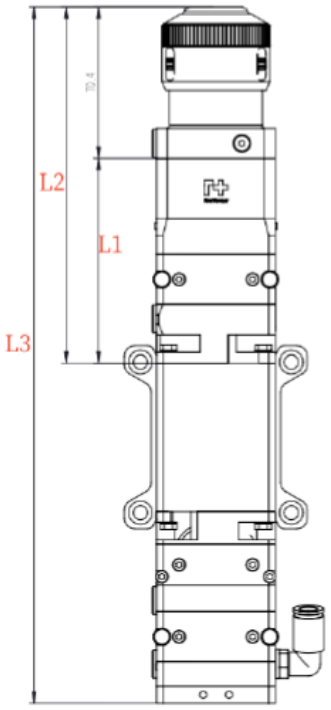
Collimation Length (fC)	L1(mm)	L2(mm)	L3(mm)
F100	94.9	165.3	323.3
F125	119.4	189.8	341.9
F150	145.6	216	374

QBH with vision (90°):



Collimation Length (fC)	L1(mm)	L2(mm)	L3(mm)
F100	94.9	165.3	254.8
F125	119.4	189.8	279.3
F150	145.6	216	305.5

QBH excluding vision (0°):



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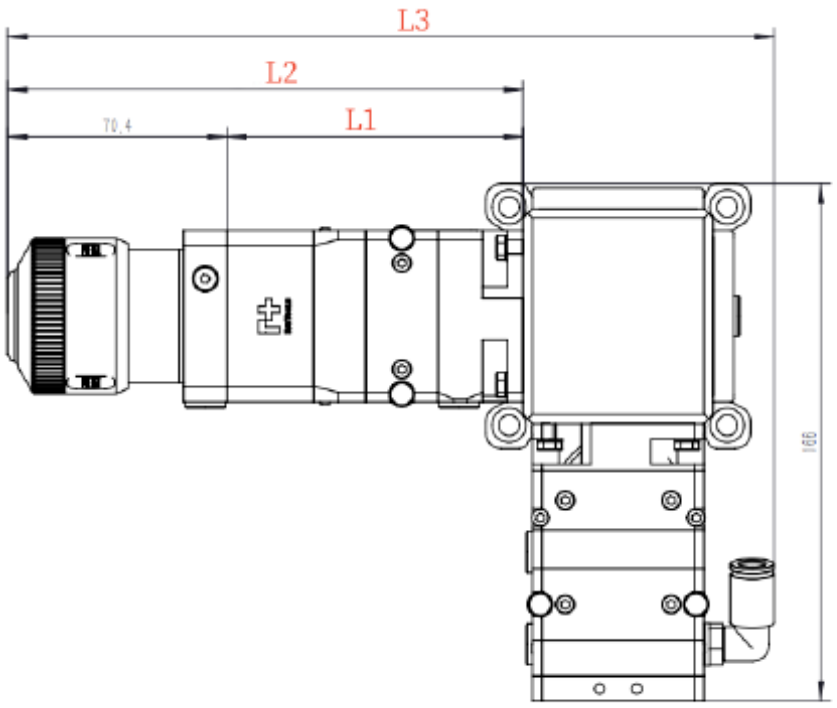

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F125	119.4	189.8	279.3
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