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Cloudray BM109

Cloudray Raytools BM109 Auto-Focusing Fiber Laser Cutting Head

User Manual

1. INTRODUCTION

This manual provides essential information for the safe and efficient operation, setup, and maintenance of the Cloudray Raytools BM109 Auto-Focusing Fiber Laser Cutting Head. Please read this manual thoroughly before installation and use to ensure optimal performance and safety.

2. PRODUCT OVERVIEW AND KEY FEATURES

The Cloudray Raytools BM109 is an advanced auto-focusing fiber laser cutting head designed for metal cutting applications. It features an optimized optical configuration and efficient airflow design.

Key Features:

- **Auto-Focusing:** Automatic focus range of +8mm to -9mm with an accuracy of 0.05mm.
- **High Power Capacity:** D28 diameter lens set supports a maximum optical input power of 1.5kW.
- **High Speed and Acceleration:** Focusing lens maximum acceleration of 10m/s³ and maximum speed of 6m/min.
- **Lens Protection:** Collimator and focusing lenses are protected by cover glass modules to prevent contamination.
- **Easy Maintenance:** Drawer-type lens mount allows for quick and easy access to the cover glass.

Components and Specifications Overview:

Laser Cutting Head

0~1.5kW BM109

- Auto Focusing
- Max Speed Up to 6m / min
- QBH Interfaces Optional

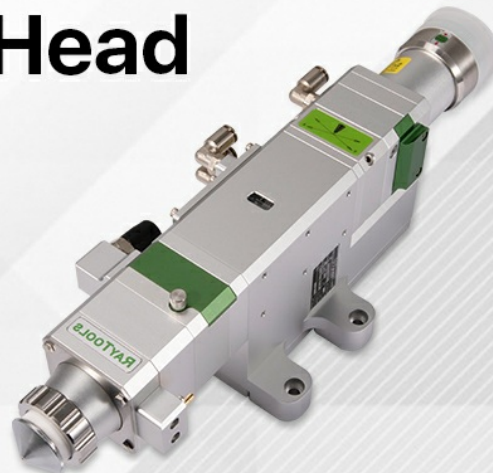


Figure 2.1: Detailed diagram of the BM109 laser cutting head, showing collimation lens focal length options (75mm, 100mm), focusing lens focal length options (125mm, 150mm), nozzle hole diameters (0.8mm to 4.0mm), nozzle types (single layer, double layer, customize), and QBH optical interface.

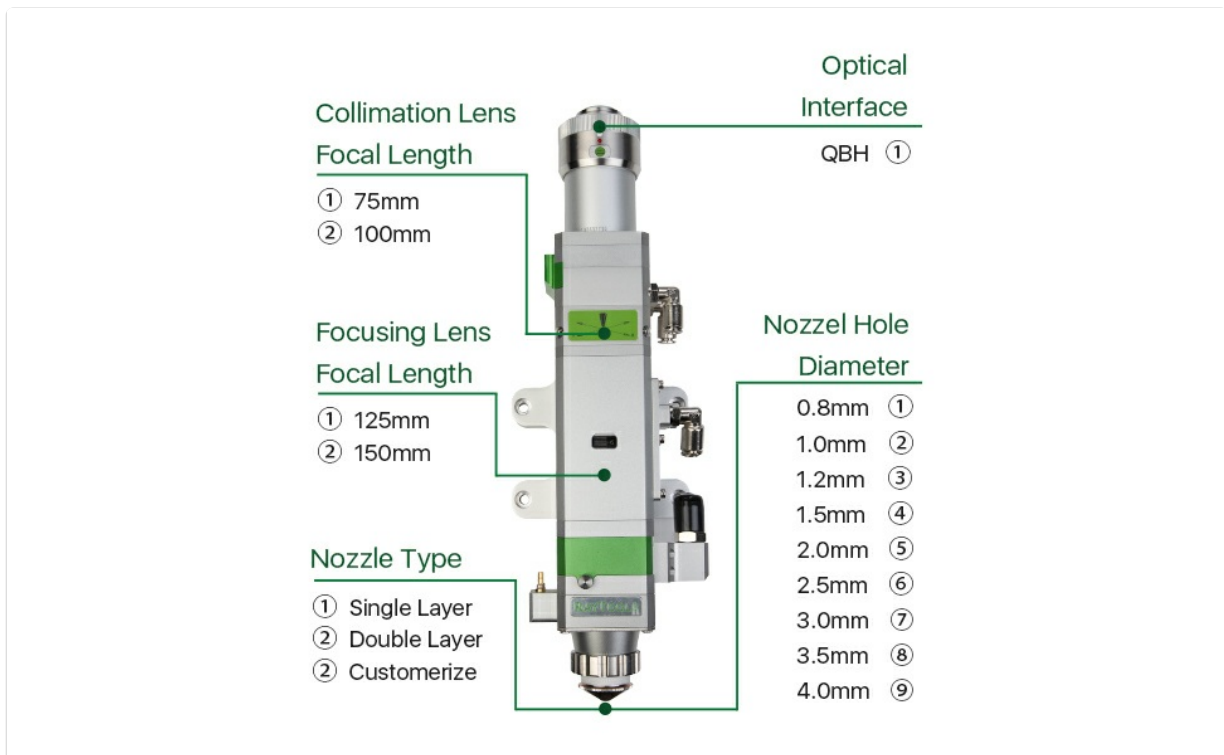


Figure 2.2: Technical specifications table for the BM109, including Power Rating ($\leq 1.5kW$), Clear Aperture (26mm), Top Protect Window Specifications ($\phi 24.9mm \times 1.5mm$), Bottom Protect Window Specifications ($\phi 27.9mm \times 4.1mm$), Assist Gas Pressure ($\leq 25bar$), and Weight ($\sim 3kg$).

Figure 2.3: Overview of the BM109 laser cutting head and associated components, including the control unit and connection cables.

3. SPECIFICATIONS

Parameter	Value
Model Number	BM109
Power Rating	≤1.5kW
Auto-Focus Range	+8mm to -9mm
Auto-Focus Accuracy	0.05mm
Clear Aperture	26mm
Collimation Lens Focal Length Options	75mm, 100mm
Focusing Lens Focal Length Options	125mm, 150mm
Top Protect Window Specifications	φ24.9mm*1.5mm
Bottom Protect Window Specifications	φ27.9mm*4.1mm
Assist Gas Pressure	≤25bar
Maximum Focusing Lens Acceleration	10m/s ³
Maximum Focusing Lens Speed	6m/min
Item Weight	17.64 pounds (~8 kg)
Product Weight	~3kg (as per diagram)

4. SETUP

Proper setup is crucial for the performance and safety of the laser cutting head. Follow these general guidelines:

1. **Mounting:** Securely mount the BM109 laser cutting head to your laser machine's Z-axis. Ensure it is stable and correctly aligned. Refer to the technical drawings for mounting hole dimensions.
2. **Optical Interface (QBH):** Connect the fiber laser output to the QBH interface on the top of the cutting head. Ensure a clean and secure connection to prevent power loss or damage.
3. **Water Cooling:** Connect the water pipes to the designated inlets and outlets for cooling. Ensure proper water flow and temperature regulation as per your laser system's requirements.
4. **Assist Gas:** Connect the assist gas lines (e.g., oxygen, nitrogen, air) to the appropriate ports. The system supports up to 25 bar pressure. Ensure gas purity and pressure are suitable for your cutting application.
5. **Electrical Connections:** Connect the necessary control cables, including the SMB port for the height sensor, to the laser control system. Refer to the wiring diagrams provided with your complete laser system.
6. **X-Y Adjustment:** Perform initial X-Y adjustments as needed to align the laser beam path through the cutting head.



Figure 4.1: Technical drawing illustrating the QBH interface, water pipe connections, and assist gas inlets on the BM109 laser cutting head.

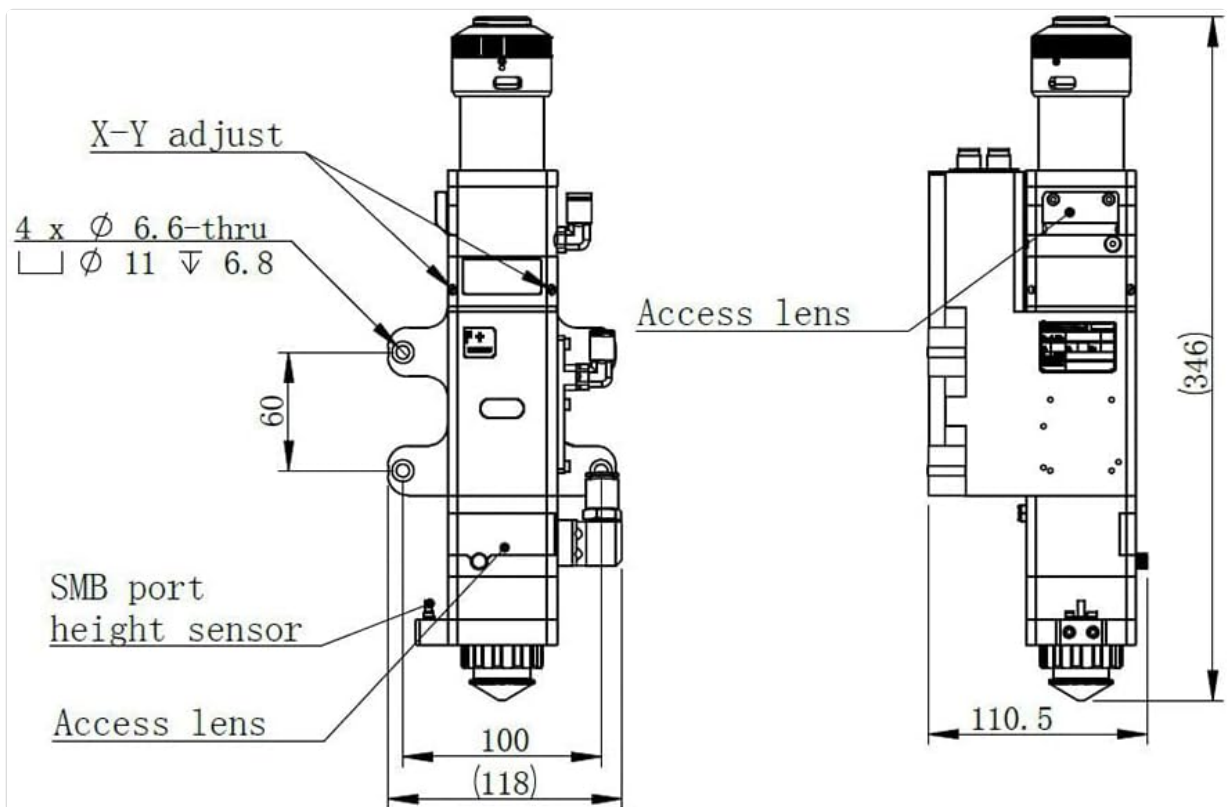


Figure 4.2: Technical drawing showing dimensions and key features such as X-Y adjustment points, SMB port for height sensing, and access points for lenses.

5. OPERATING INSTRUCTIONS

The BM109 features auto-focusing capabilities to simplify operation. Ensure all safety protocols for laser operation are strictly followed.

1. **Power On:** Activate the laser system and ensure all cooling and gas supplies are operational and stable.
2. **Material Placement:** Place the material to be cut on the machine's workbed, ensuring it is flat and properly secured.
3. **Parameter Setting:** Input the cutting parameters (power, speed, assist gas type and pressure, nozzle type, focal position) into your laser control software. The auto-focusing feature will adjust the focal position within its range based on the set parameters and material thickness.
4. **Auto-Focus Activation:** The BM109's auto-focus system will automatically adjust the focal lens position to achieve the desired focal point on the material surface or within the material.
5. **Start Cutting:** Initiate the cutting process from your laser control software. Monitor the cutting process for any anomalies.
6. **Emergency Stop:** Be familiar with the emergency stop procedures for your laser system in case of any malfunction or unsafe condition.

6. MAINTENANCE

Regular maintenance ensures the longevity and consistent performance of your laser cutting head.

1. **Cover Glass Inspection and Cleaning:** Regularly inspect the protective cover glasses for dust, debris, or damage. The drawer-type lens mount allows for quick and easy access. Clean with appropriate optical cleaning solutions and lint-free wipes. Replace if scratched or damaged.
2. **Lens Inspection:** Periodically inspect the collimator and focusing lenses for cleanliness and damage. These are protected by cover glass modules, but direct inspection may be necessary during deeper maintenance.
3. **Nozzle Inspection and Replacement:** Check the nozzle for wear, blockages, or deformation. Replace worn nozzles to maintain cutting quality.
4. **Cooling System Check:** Ensure the water cooling system is functioning correctly, with adequate flow and temperature. Prevent algae growth or contamination in the coolant.
5. **Gas System Check:** Verify that assist gas lines are free of leaks and that gas purity is maintained.
6. **General Cleaning:** Keep the exterior of the cutting head clean and free from cutting residue.

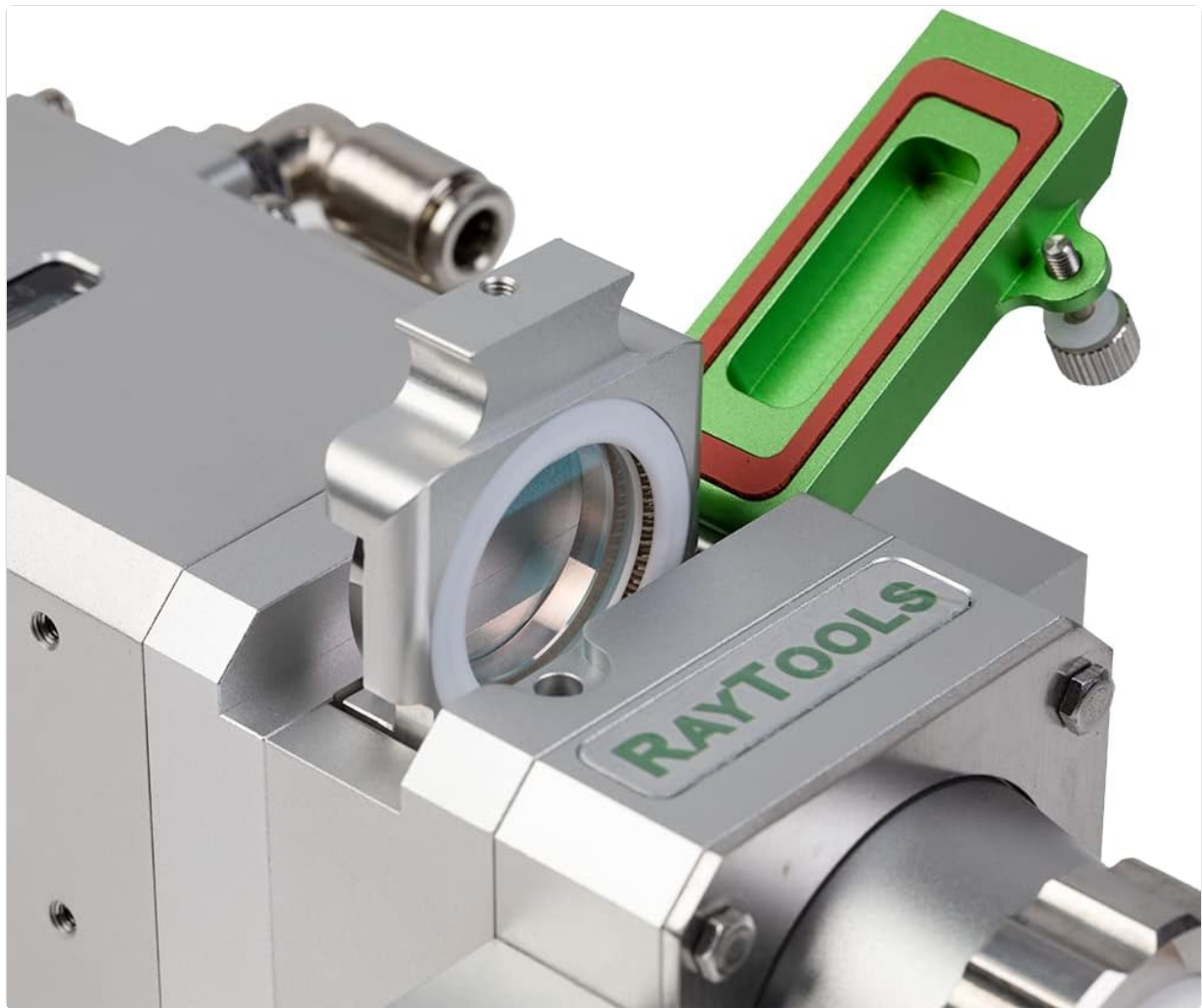


Figure 6.1: Close-up of the drawer-type lens mount, highlighting the ease of access for cover glass inspection and replacement.

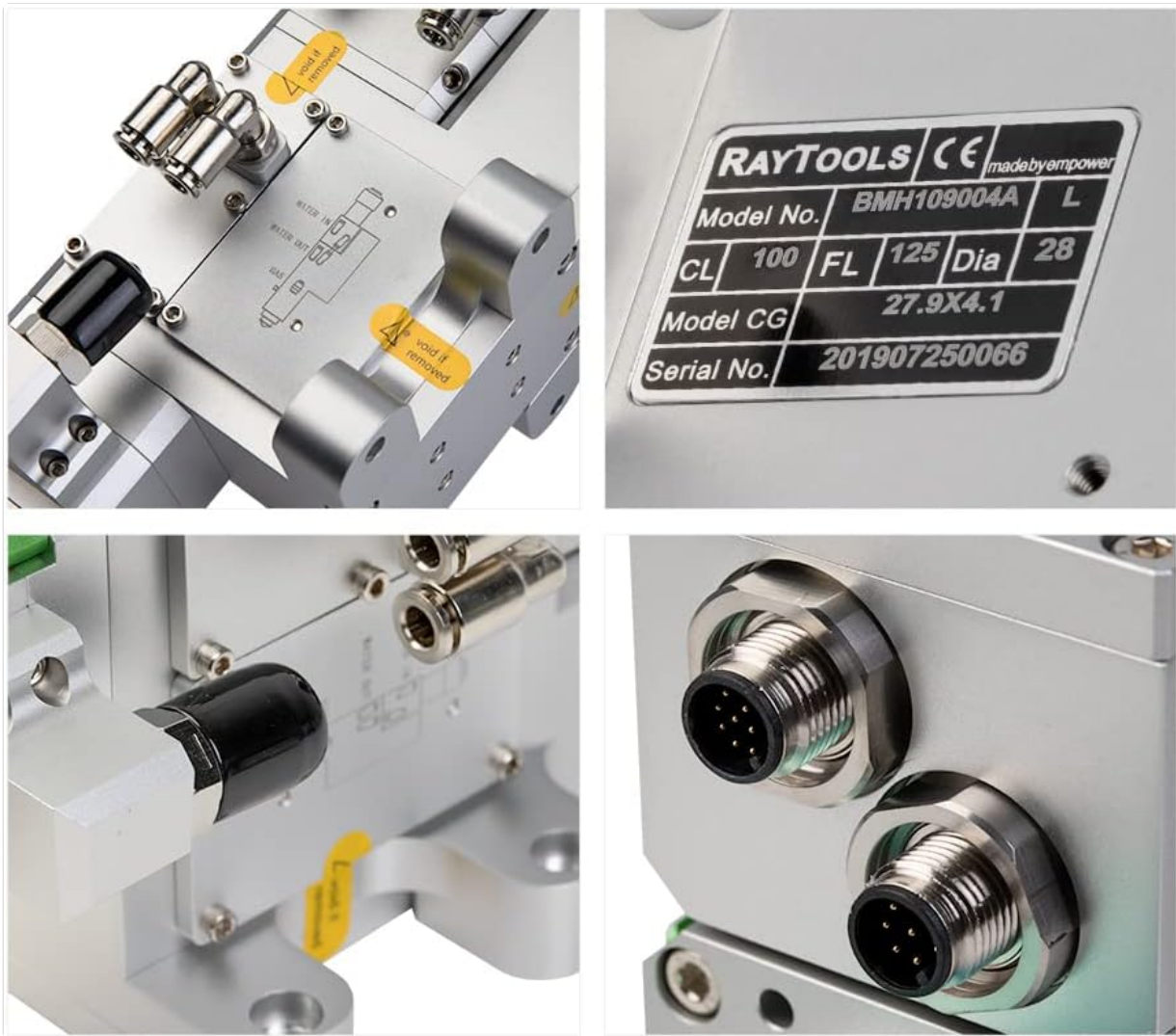


Figure 6.2: Detailed views of the BM109, showing connection points, warning labels, and the product identification plate with model number BM109004A.

7. TROUBLESHOOTING

This section provides general guidance for common issues. For complex problems, contact technical support.

- **Poor Cutting Quality:**

- Check nozzle condition and alignment.
- Inspect cover glasses and lenses for contamination or damage.
- Verify assist gas pressure and purity.
- Ensure correct focal position settings.

- **Laser Power Loss:**

- Check fiber optic cable connection to the QBH interface.
- Inspect internal optics for damage or contamination.
- Verify laser source output.

- **Auto-Focus Malfunction:**

- Check electrical connections to the auto-focus module.
- Ensure no physical obstructions to the focusing lens movement.

- Consult your laser system's control software for error messages.

- **Overheating:**

- Verify water cooling system flow rate and temperature.
- Clean heat sinks if accessible.

8. WARRANTY AND SUPPORT

For warranty information, please refer to the documentation provided with your purchase or contact Cloudray customer service. For technical support, installation assistance, or spare parts, please reach out to your authorized Cloudray dealer or visit the official Cloudray website.

Contact Information:

- **Brand:** Cloudray
- **Model:** BM109
- **Website:** [Visit the Cloudray Store on Amazon](#)