

Automated Diamond Slicing & Precision Cutting System

AP-DC-08G — High-Yield, Unattended 24/7 Processing for CVD and Natural Diamond Applications

Introduction:

The AP-DC-08G is an automated diamond slicing and precision cutting system designed for high-yield, repeatable processing of CVD, lab-grown, and natural diamond materials. The system combines precision laser processing, vision alignment, stable motion control, and **automated pick-and-place handling to enable unattended 24/7 production** with minimal operator involvement.

The AP-DC-08G is built around the results that matter most to diamond manufacturers: usable output, kerf control, edge quality, throughput, repeatability, and reduced dependence on skilled manual labor. Rather than selling laser specifications alone, the system is focused on producing consistent, high-value diamond parts with lower material loss and lower operating cost.



Typical applications include single-crystal and polycrystalline CVD diamond, diamond wafers, optical windows, heat spreaders, semiconductor diamond substrates, cutting tools, jewelry components, and other high-value diamond materials.

Key Features:

- **Automated pick-and-place capability** for hands-free loading, unloading, and continuous operation.
- **Supports 24/7 unattended production** with minimal operator involvement, reducing labor cost and operator variability.
- **High-yield diamond slicing and cutting** designed to reduce material loss and improve usable output.
- **Precision vision alignment** for repeatable positioning and consistent processing results.
- **Narrow kerf and controlled cut geometry** to maximize material utilization, especially for high-value CVD diamond.
- **Smooth cut quality** with post-cut surface roughness Ra <200 nm for precision diamond processing.
- **Stable marble-platform machine structure** for improved process stability and repeatability.
- **Class 1 laser safety enclosure** for industrial production environments.
- **Industrial exhaust and filtration system** for safe and clean operation.
- **Suitable for both lab-grown and natural diamond applications**, including wafers, windows, heat spreaders, tools, jewelry, and semiconductor-related parts.

Specifications subject to change without notice

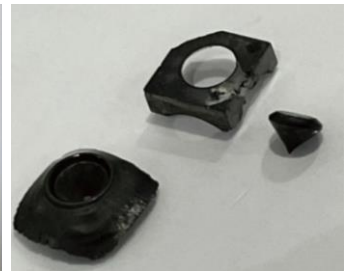
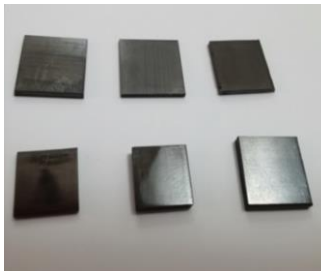
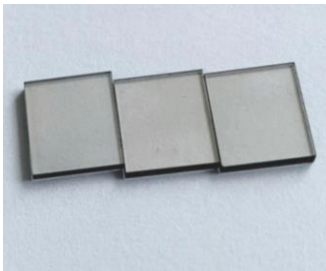
Main Specifications:

Parameter	Specification
System Type	Automated diamond slicing and precision cutting system
Model	AP-DC-08G
Machine Structure	Granite / marble-based precision platform with enclosed Class 1 laser safety protection
Working Area	200 mm × 200 mm
Automation	Automated pick-and-place loading/unloading; designed for unattended production
Operation Mode	Manual, semi-automatic, and fully automated 24/7 operation
Positioning Accuracy	≤ ±10 µm (Option: ≤ ±5 µm)
Repeatability	≤ ±10 µm (Option: ≤ ±3 µm)
Vision System	Vision-assisted alignment and positioning
Supported Materials	Single-crystal CVD diamond, polycrystalline CVD diamond, natural diamond, diamond wafers, heat spreaders, optical windows, cutting-tool blanks, semiconductor diamond substrates
Supported Thickness Range	0.1 mm to 30 mm
Kerf Width	≤ 30 µm for material thickness <1 mm; typical 0.22 mm for a 10 mm × 10 mm substrate
Typical Slicing Speed	36 minutes to slice a 10 mm × 10 mm substrate
Edge Quality / Roughness	Smooth cut edge; post-cut surface roughness Ra <200 nm
Vacuum / Exhaust	Industrial-grade exhaust and filtration system
Software	Recipe-based process control and support CAD/DXF file format
Power Requirements	220V / 208V, 4 kW
Environmental Conditions	15–30°C, 20–80% relative humidity, non-condensing; cleanroom or controlled environment recommended
Product Dimensions	1050 mm × 1200 mm × 1772 mm
Laser Configuration	Application-optimized IR / green / UV laser configuration depending on process requirements

Applications:

- CVD diamond wafer slicing and dicing
- Single-crystal and polycrystalline diamond cutting
- Diamond heat spreaders and thermal-management components
- Diamond optical windows
- Semiconductor diamond substrates
- Diamond cutting-tool blanks
- Jewelry and precision-shaped diamond components
- Abrasives and wear-resistant diamond parts
- R&D and pilot production for advanced diamond materials

Samples:



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