



RAZOR 9

Atmospheric
Transfer Robotics

*Cutting-edge robotic solutions
for today's advanced
semiconductor manufacturers*



Brooks' Motion Control Advantage

Brooks Automation is the leading automation supplier with the patented motion control expertise to consistently meet the throughput demands of today's advanced semiconductor manufacturers. Brooks' motion control advantage stems from:

- *Support for a variety of Wafer Handling Technologies*—Razor™ delivers high wafer throughput using Passive Edge Contact, as well as the more traditional vacuum backside grip and active edge grip.
- *Time Optimized Trajectory™ (TOT) and Time Optimal Path™ (TOP)*—Part of the Fusion™ Controls automation control platform, TOT and TOP are proprietary motion control algorithms that significantly reduce vibration to enable Passive Edge Contact wafer handling with maximum throughput.
- *Drag-and-Drop Sequence Editor*—Fusion Controls includes a user-friendly Sequence Editor that supports customization of motion and I/O sequences to maximize throughput and simplify teaching.

Thanks to Fusion Controls' superior motion control capabilities, Razor modules are the most precise, highest throughput atmospheric robots available on the market today.

Razor provides the superior performance, repeatability, and ultra-cleanliness that today's advanced semiconductor manufacturers demand.

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BROOKS AUTOMATION

Brooks Automation's Razor family of high-performance atmospheric wafer transfer robots, aligners, and tracks enables new levels of tool precision and uptime, while accelerating installation and set-up for each tool shipment. Leveraging multiple generations of automation standards established by Equipe and MagnaTran®, Razor robotics provide the optimized mix of throughput repeatability, and cleanliness that today's advanced semiconductor manufacturers expect and demand. Providing the component foundation for Brooks' Jet™ Engine automation subsystem, Razor features an open architecture and modular platform that eliminates the need to design and validate a new automation solution for each new tool configuration or shipment designation.

Razor uses common modules across the product family for dramatically shorter lead times. Fully qualified and tested, Razor modules are designed for optimal manufacturability. They provide superior quality right out of the box and support end-of-line configurability for reduced cycle times. Leveraging Brooks' patented motion control technology, reliable direct drive robotics, and advanced kinematic mounting system, Razor delivers fast set-up, high throughput and repeatability, and maximum uptime. Plus, because Razor products are powered by Brooks' Fusion™ Controls platform, they support simplified configuration and flexible customization to meet a wide variety of tool applications and fab-specific requirements.

Thanks to Brooks' patented motion control expertise, Razor is the only atmospheric robotic solution to transfer wafers using edge contact—while maintaining the highest available throughput. If you're looking for an atmospheric robotic solution that provides the superior performance, repeatability, and ultra-cleanliness required for today's advanced semiconductor manufacturing, stay on the cutting edge with Razor.



The Razor™ Solution

The Razor family of atmospheric robotic products meets the stringent performance, cleanliness, and cycle time requirements of today's advanced semiconductor manufactures with features such as:

- *High throughput passive edge contact support*
- *Patented motion control expertise*
- *Fifth-generation direct drive robotics*
- *Optional kinematic mounting system*
- *Common modules used across product family*
- *Compatibility with Equipe and Reliance*



Razor ATR522



Razor ATR514



Razor AWA

A Flexible Solution for Any Fab Environment

Razor™ robotics take advantage of Brooks' unparalleled motion control expertise and long tradition of delivering precision hardware products for semiconductor manufacturing. Single and dual wrist articulation supports 2- and 3-FOUP trackless arms. Optional tracks and aligners are available, enabling customers to configure the best robotics solution for any given tool application. For optimal flexibility, Razor supports a choice of wafer handling technologies, including passive edge contact, active edge grip, or vacuum grip.

The Razor product is powered by Fusion Controls, Brooks' innovative automation control solution for configuring, customizing, and optimizing motion control behavior within a tool. With Fusion Controls, a single controller can be used to manage the Razor robot, aligner, and track, as well as all other tool automation needs. Fusion Controls' patented Time Optimal Trajectory™ and Time Optimal Path™ algorithms enhance precision and reduce vibration, setting Razor robotics apart in their ability to support edge contact wafer handling with maximum throughput and yield.

Simplified Installation and Set-Up

Thanks to an open architecture and modular design, Razor hardware is up and running with unprecedented speed and ease. Qualified, tested common modules can be used across the product family—with no revalidation required—eliminating the need to design a new solution for each product. End-of-line configurable robot mounting and end effector options significantly

reduce product cycle times. What's more, Fusion Controls' pre-packaged templates enable rapid tool configuration, while Brooks' leading-edge kinematic mounting system with one-time height and level adjustment streamlines set-up for new tool shipments.

Maximum Tool Uptime

Razor robotics take advantage of Brooks' latest generation of direct drive technology. Compared to belt and gear drive technology, direct drives reduce part count and minimize the need for adjustments and alignments, thereby increasing tool reliability and uptime. Razor features a simplified, highly efficient arm architecture with two links instead of three for a 3-FOUP trackless robot that delivers consistently reliable performance—even in high-volume, around-the-clock production environments.

Fusion Controls' powerful visualization and emulation capabilities enable problem diagnosis and troubleshooting—even remotely. In addition, Razor's modular design allows customers to customize their field-replaceable unit (FRU) package to align with their mean-time-to-repair (MTTR) strategy and keep unscheduled downtime to a minimum.

POWERED BY
Fusion™

Brooks Automation: *Creating Manufacturing Efficiency. Accelerating Your Profit.*[™]

As semiconductor manufacturers and OEM tool suppliers work to manage rapid change and growing complexity, they rely on Brooks Automation for innovative products and world-class services to help them realize maximum return on their automation investment. Since our inception, Brooks has made quality and innovation top priorities. We leverage the latest enabling technology—from web-based spare-parts management and e-diagnostics to online knowledge management systems—to keep our solutions operating at peak performance. Brooks is ISO 9001 certified to ensure the highest levels of product quality and value.

Leveraging our global service network, Brooks is ready and able to respond to customer needs, ensuring maximum tool uptime. We offer hardware installation and implementation services—from stand-alone equipment installation and qualification to implementation of complex automated systems containing multiple Brooks products—as well as comprehensive technical support, field service, and systems integration. Brooks' GUTS[®] (Guaranteed Up-Time Support) rapid response program is broadly recognized for delivering unsurpassed responsiveness to customer problems whenever and wherever they may occur. Every call to our GUTS line is answered by a capable, empowered Brooks Service professional trained to diagnose and coordinate a response from first call to action plan within 59 minutes or less—guaranteed.

To anticipate customer needs, Brooks is actively involved in the definition and ongoing development of industry standards through its work on SEMI, SEMATECH, and 300mm standards committees. At the same time, we continue to build new levels of innovation and reliability into our products and invest in our global service infrastructure to make sure that we consistently exceed customer expectations for excellence and value.



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