



AUTOMATION SYSTEMS
GROUP

Razor™

Atmospheric Robotics

TOOL AUTOMATION



Features

- Fifth-generation direct drive technology
- 2 and 3 FOUP trackless 2 link arm solutions
- End-of-line configurable common module robot arms and end effectors
- Compatibility with Equipe and Reliance
- Optional kinematic mounting system
- Powered by Fusion™ Controls

Benefits

- Fast, clean, and repeatable performance
- Reduced production cycle time and lead times
- Superior operational efficiency
- Optimal reliability and throughput
- Accelerated time-to-market
- Maximum tool uptime

Brooks Automation's Razor™ family of high-performance atmospheric robots, aligners, and tracks provides superior throughput, repeatability, and cleanliness to meet the stringent requirements of advanced semiconductor manufacturing.

The New Standard in Equipment Automation

Leveraging multiple generations of automation standards established by Equipe and MagnaTran®, the Razor™ Atmospheric Transfer Robot provides a high-performance, low-risk hardware foundation for meeting the increasingly stringent automation requirements of today's world-class semiconductor manufacturers. Optimized to meet the cleanliness standards of advanced semiconductor manufacturing, Razor features patented direct drive technology to deliver superior reliability and smooth motion control for the lowest possible vibration and particle contamination. Brooks Automation's motion control expertise enables Razor robots to transfer wafers using edge contact—not grip—with maximum cleanliness and wafer protection, while maintaining the highest levels of throughput and repeatability.

Designed for manufacturability and end-of-line configurability, Razor modules provide high quality out of the box and support fast product installation and reduced lead times. Razor products take advantage of the highly configurable Fusion™ Controls automation control solution to meet a wide variety of tool application requirements. What's more, the modular Razor design supports the ability to seamlessly change tool configurations as application needs evolve or tool shipment designations change.

Product Description

The Razor Atmospheric Robot combines leading-edge hardware and software. Its open architecture and modular platform enable tools to meet emerging automation needs while reducing the need for revalidation. Razor supports fast, easy set-up and installation, and eliminates the need to design a new automation solution for each tool release, thereby dramatically reducing lead times.

Razor products are designed to maximize operational efficiency by minimizing handling, set-up, and redundant operation steps. 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.



Razor ATR522

The Razor product family leverages Brook's innovative Fusion™ Controls automation control solution for configuring, customizing, and optimizing motion control behavior within a tool. By leveraging the power and flexibility of Fusion Controls, a single controller can manage the robot, aligner, and track, as well as all other tool automation needs. Fusion Controls' pre-packaged templates allow for fast tool configuration. Visualization and emulation capabilities enable diagnostics and troubleshooting—even remotely. These Fusion Controls features—and more—combine to deliver optimal efficiency at all phases of the tool lifecycle.

Product Specifications

		Razor™ ATR	Razor™ ATK	Razor™ AWA
Configuration	Wafer Size	300mm	n/a	300mm
	Mounting Configurations	Side ~ Bottom ~ Top	Side	Bottom
	Arm Configuration	2 Link Scara Style, 2FOUP (x14) & 3FOUP (x22) Trackless Armsets	n/a	n/a
	Wafer Handling End Effectors (EE)	Passive Edge Contact (PEC) Active Edge Grip (AEG) Vacuum Grip (VAC)	n/a	Edge Contact (PEC)
	Mapping	Through Beam at EE tips	n/a	n/a
Physical Properties	Size* Dia. / Length	273mm D	T1: 1040mm • T2: 1550mm	362mm D
	Height	826mm	318mm	305mm
	Depth	n/a	188mm	n/a
	Weight	40kg (414) – 45kg (522)	30kg (T1) – 70kg (T3)	6 kg
	Axes & Range of Motion (each axis is independent of each other)	R (Radial) θ (Rotational) Z (Vertical) W1 (4-axis) W2 (5-axis)	358mm (Model x14) 554mm (Model x 14) continuous 448mm continuous continuous	1-axis S - 505mm (T1) S - 1010mm (T2) S - 1515mm (T3)
Controller Interfaces	Control Interface	Serial, Ethernet	robot network	robot network
	Input Voltage/Current (FCC)	90-240 V VAC @ 10 amp (fused)	n/a	n/a
Additional I/O	High Current Digital Outputs	2 Outputs, 0-24VDC, <1A, High-side (PNP), Optically Isolated		n/a
	Digital Inputs (Total/Configurable for High Speed)	4/2 Inputs, 0-30VDC, >3V for Logic High, High-side (PNP), Optically Isolated, 2 inputs can be configured for high speed position capture (5 μ s)		n/a
	Analog Inputs	2 Inputs, 0-5VDC single ended, 12 bit Resolution, Low Pass Filter <1kHz		n/a
	24VDC Outputs	1 Output, 500mA, Fused		n/a
Facilities	Vacuum Requirement	VAC/AEG EE only: >510mm Hg (20 in.) at 50 cc/sec	n/a	n/a
	Pneumatic Connections	6mm	n/a	n/a
Performance	Load Capacity (EE and substrate @ wrist)	Dynamic Payload: 0.5 kg Static Payload: 1.0 kg	Razor 5axis	300 mm wafer (x2)
	Repeatability	X/Y: 0.2mm TIR	X/Y: additional 0.05mm TIR	X/Y: 0.1mm TIR, 0.1° TIR
	Reliability (per SEMI E10)	15M MCBF	10M MCBF	10M MCBF
Environment	Cleanliness	ISO Class 1 compatible		
	Wafer Contact Materials	Igus, Vespal CR 4638EX, Kalrez	n/a	Igus, Kalrez
	Close Proximity Materials	AlSiC, Anodized Al, 316 SST	n/a	Nickel plated & cast Al
	Exposed Materials and Coating	Baked powder coat & wet polyurethane, Nickel plated & cast Aluminum	Cast Aluminum	Wet polyurethane, 316 SST
	Operating Temperature	10°C to 40°C		
Storage Temperature	5°C to 50°C (70°C w/o end effector)			

* See Razor Users Manual or configuration specific interface drawings for additional information

For more information, please contact your local Brooks Automation sales representative or visit www.brooks.com.

