MODEL **1062**

TrionMill

A fully automated tabletop argon ion mill that features highly flexible milling parameter adjustment. The instrument offers large-scale milling of planar and cross-section samples. Samples of up to 50 mm diameter are effectively processed with three ion sources, which creates the largest and most uniform flat area achievable by ion milling. Allows the direct transfer of environmentally sensitive materials to a SEM or FIB.

Model 1062 TrionMill specifications	
Ion sources	Three TrueFocus ion sources Variable energy (100 eV to 10.0 keV) operation Beam current density up to 10 mA/cm^2 Milling angle range of 0 to +10° Choice of single, double, or triple ion source operation Motorized ion source angle adjustment Independent ion source energy control Adjustable spot size (300 µm to 5 mm) Faraday cups for the direct measurement of beam current from each ion source; allows optimization and adjustment of the ion source parameters for specific applications Milling rates in excess of 500 µm/hour Low ion source maintenance
Load lock	Front-loading load lock for high sample throughput Pneumatic vacuum gate valve Bayonet sample holder capture with quick release functionality Sample transfer rod folds out of the way when not in use
User interface	Instrument operation controlled via 10-inch, ergonomically adjustable touch screen
Automatic termination	Automatic termination by time or temperature

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Sample stage	Offers both planar and cross-section milling capabilities: • Planar Up to 50 mm diameter x 25 mm height [1.968 x 0.787 in.] • Cross section Maximum: 10 x 10 x 4 mm [0.39 x 0.39 x 0.157 in.] Automatic height detection establishes the milling plane, which yields repeatable results 360˚ sample rotation or rocking motion with variable speed
Sample cooling (optional)	Liquid nitrogen conductive cooling with integral dewar and automatic temperature interlocks Dewar access positioned close to instrument operator Ability to program and maintain a specific temperature between ambient and cryogenic Provides up to 18 hours of cryo conditions Offers cryo protection capability, which automatically stops milling operations if the stage temperature rises above a user-selected temperature threshold
Cross-section station (optional)	Produces pristine cross-section samples Allows precise positioning of the area of interest: x, y, and θ Effective for use with a wide variety of materials, including semiconductor devices, multilayers, ceramics, polymers, and hard/brittle materials Prepared region of interest is flat and free from damage for subsequent SEM imaging and analysis Accommodates a wide range of sample and mask sizes: • Sample and mask align both laterally and angularly • Multiple uses from a single mask
Vacuum/inert gas/cryogenic transfer system (optional)	Allows direct transfer of a sample at vacuum, in inert gas, or at a cryogenic temperature to a SEM or FIB Uses active pumping to maintain high vacuum A collaboration with Quorum Technologies Ltd.

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Sample viewing (optional)	Sample can be monitored in situ in the milling position when using the high-magnification microscope Microscope options: • 525X high-magnification microscope • 1,960X high-magnification microscope Viewing window is protected by a programmable shutter that prevents buildup of sputtered material and preserves the ability to observe the sample in situ
Sample image acquisition (optional)	CMOS (complementary metal oxide semiconductor) camera for image acquisition and display Useful for monitoring the delayering process Image acquisition system includes: • CMOS camera • Secondary monitor • Imaging computer • Keyboard • Mouse Images can be saved to the imaging computer or transferred to another computer
Remote operation (optional)	Enables operation of multiple milling tasks from a remote computer, including: • Recipe programming • Start, pause, stop, and restart • Sample viewing • Sample image acquisition • Operating parameters monitoring • Service diagnostics
Stack light indicator (optional)	Allows the determination of milling operation status from a distance
Sample illumination	Both high-magnification microscopes have light sources that provide top-down, user adjustable, reflected sample illumination

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Process gas	Argon (99.995%) or better; nominal 15 psi delivery pressure required Automatic gas control using three mass flow controllers
Vacuum system	Turbomolecular drag pump and an oil-free, multi-stage diaphragm pump Vacuum sensing with a cold cathode, full-range gauge
Enclosure	Width: 76 cm [29.73 in.] Height: • Touch screen: 66 cm [26 in.] • High-magnification microscope: 88 cm [34.35 in.] Depth: • Sample transfer rod folded: 65 cm [25.25 in.] • Sample transfer rod extended: 98 cm [38.61 in.] Enclosure design offers easy access to internal components
Power	100/120/220/240 VAC, 50/60 Hz, 720 W
Warranty	One year

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