

Model 1402W Low Energy Ion Gun with Integrated Wien Filter



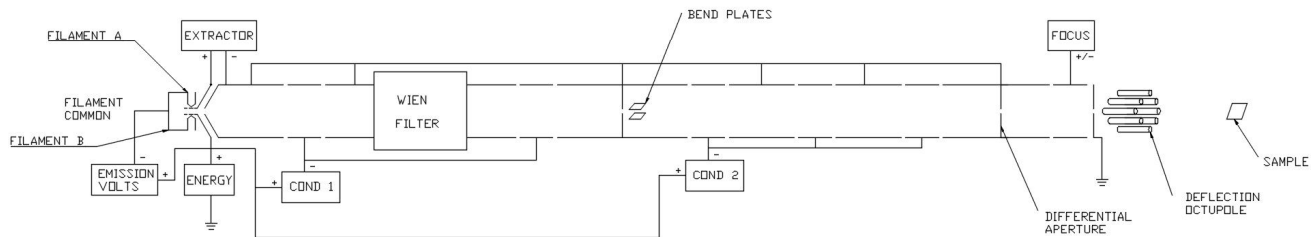
Design Features

- Focusing column optimized for low energy throughput
- High brightness electron impact source for maximum bulk material removal
- Emission regulated bombardment provides stable ion current with front panel adjustable dynamic range x300
- Continuously variable beam energy up to 5keV
- Replaceable beam trimming aperture with typical life-time of > 500 hours
- Dual filaments provide operational backup with typical filament life-time > 500 hours
- All UHV compatible and etch resistant materials used in fabrication
- Operates over the range of inert gas species, Oxygen with optional Thoria filament
- 3 Degree Bend in Column for Neutral Suppression
- 2 Stage Differential Pumping for Operation with very low Chamber Pressure

Ion Current for various Ion Species

H₂⁺	8uA
H⁺	1uA
He⁺	3uA
He⁺²	70nA
Ne²⁰⁺	1uA
Ne²²⁺	100nA
Ar⁺	5uA
Ar⁺²	100nA

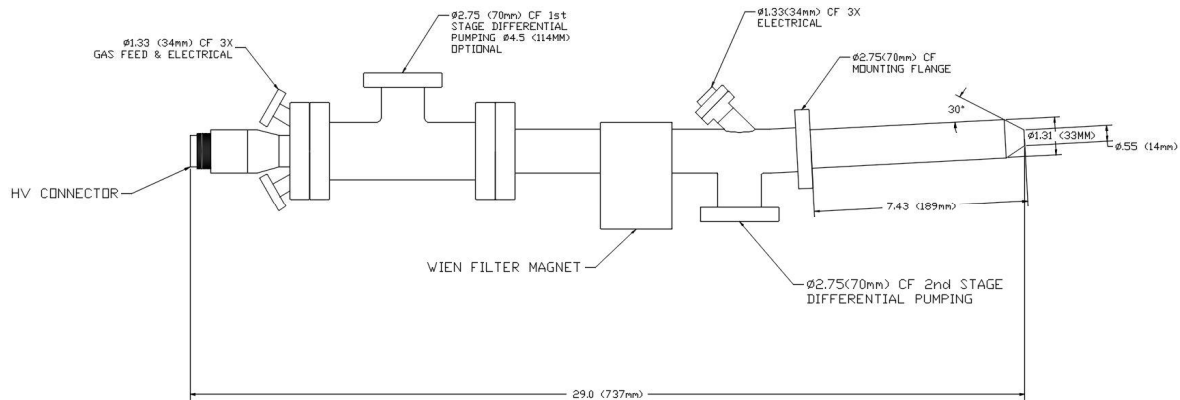
Model 1402W Ion Gun Schematic



Engineering Specification

Working Distance:	20 mm
Beam energy:	10eV to 5keV continuously variable
Raster Size:	7 x 7 mm (minimum)
Mounting Flange:	70 mm (2.75in) O.D. CF
Differential Pumping:	70 mm (2.75 in) O.D. CF
Supply Gas Inlet:	34 mm (1.33 in) O.D. CF
Source gases:	H ₂ , He, N ₂ , Ne, Ar, Kr, Xe
Bake-out Temperature:	100 °C maximum

System Integration Details



1402WA Controller Features

- Precise and stable lens voltages
- Emission regulated electron impact supply
- Front panel raster controls with external programmability
- Power interlocks for safety and equipment protection
- Remote On/Off control for automated operation from external equipment
- Raster compensation electronics to correct for changes in sample geometry and working distance
- Comprehensive front panel system parameter monitoring
- Wien filter voltages

Controller Specification

Input Power:	115/230VAC 50/60Hz auto-select operation. Fused at 5.0/3.0A.
Beam Energy:	0 - 5000V, 1mA switch mode supply continuously variable. Output capacitance: 0.0047 μ F.
Condenser Focus:	0 - 1500V, 1mA switch mode supplies independently and continuously variable through front panel three position rotary switches and trim-pots. Output voltages scale with energy. Output capacitance: 0.0047 μ F
Objective Focus:	0 - 5000V, 1mA switch mode supply continuously variable. Output voltage scales with energy. Output capacitance: 0.0047 μ F
Filament Power:	Emission regulated supply with front panel selectable filaments providing 5V @ 5A max.
Electron Bombardment	Electron accelerating voltage programmable to 200V. Electron emission current selectable from front panel rotary switch.
Ion Extraction:	Internally adjustable to 1500V.
Deflection:	Variable bi-polar 350VDC supply for +X, -X, +Y and -Y deflection. Remaining octupole elements are supplied from a resistive divider network.

Interlocks: HV cable disconnection turns off HV supplies.
System and Auxiliary interlocks provide total shutdown in the event of system or auxiliary equipment failure.

Ion Gun Parameter Program/Monitor: USB with Graphic User Interface for programming and monitoring of all critical parameters including lens voltages, filament current and voltage, emission current and Wien filter voltages.

Chassis Dimensions: 483(W)x266(H)x435.4(D) mm. 19 inch rack-mountable desktop case 6U high.