



Downstream Source Model AX7610 available with either sapphire or quartz tubes for etch applications with fluorine or non-fluorine chemistries

Plasma &

Reactive Gas Solutions
WWW.MKSINSTITUTE.COM

Downstream Plasma Source

TYPE AX7610

The AX7610 is a microwave plasma source for remote plasma applications. With replaceable quartz or sapphire plasma tubes, the AX7610 downstream source offers configuration flexibility to meet the most demanding application process parameters. The quartz tube version is ideally suited for production of atomic oxygen, hydrogen or nitrogen. The sapphire tube version is compatible with much more severe CF_4 and NF_3 chemistries.

The patented conductively-cooled design of the plasma tube supports high throughput and high power (up to 3kW) operation. The wide process window allows for AX7610 use in multiple applications, ranging from fast PR and polymer removal from 300mm wafers to fine-control low-k or atomic layer CVD processes.

Features & Benefits

- Wide application range
 - Strip and passivation
 - Chamber cleaning
 - Surface modification
 - Reactive gas chemistry
- Easy integration
- Sapphire or quartz discharge tube
 - Fluorine and non-fluorine chemistries
- Patented conductively-cooled design
 - High power
 - High throughput



Description

The AX7610 Source is designed to be used as a part of MKS microwave plasma system, including microwave power generator, waveguide components, and the advanced SmartMatch® intelligent matching unit.

The AX7610 can be offered in custom configurations, including different vacuum and waveguide interfaces, allowing for easy integration on customer chambers and application-specific performance optimization. MKS engineering and applications group will work with the customer to determine the optimum configuration.

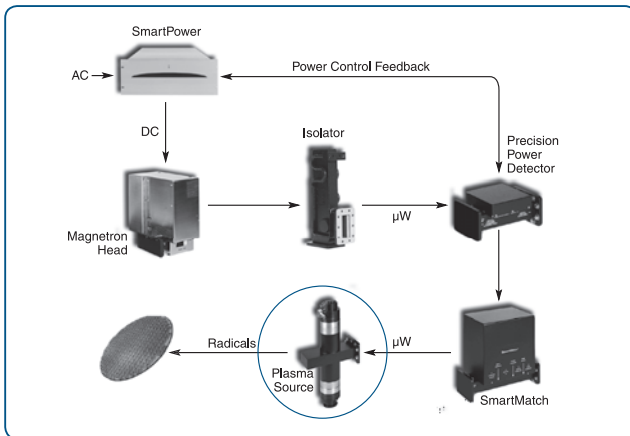


Figure 1 — Microwave Plasma Subsystem
Block Diagram of typical Microwave Plasma Subsystem

Performance

The AX7610 has a wide operating range in terms of both pressure and power, making it suitable for a wide variety of reactive gas applications including strip and passivation, chamber cleaning, and surface modification applications.

The AX7610 has been tested with a wide spectrum of process gases including O_2 , N_2 , H_2 , NH_3 , NF_3 , CF_4 , H_2O , He, and Ar. The unit includes a plasma detection unit to interface with tool I/O and is fitted with a UV lamp for reliable plasma ignition. With an installed base of over 1000 units, MTBF exceeds 100,000 hours*.

The AX7610 performance in customer-specific applications can be verified in the MKS state-of-the-art plasma lab.

**Dependent on process gas, pressure, and flow rate (operation outside typical conditions is possible, but advance consultation with MKS is recommended).*

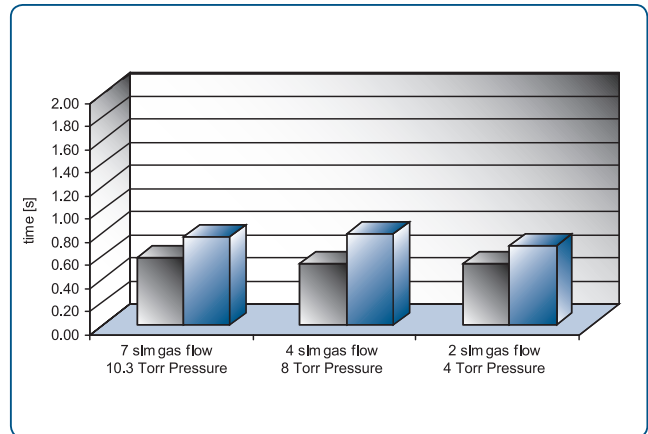


Figure 2 — SmartPower™ System Performance

Smartpower system performance with 50% NH_3 / 50% N_2 plasma at 3kW

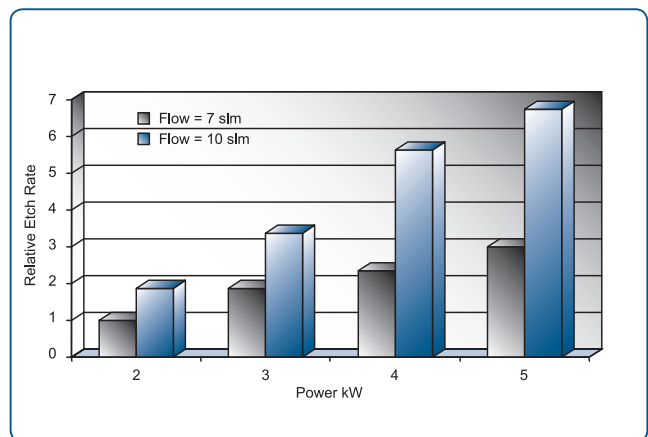


Figure 3 — Relative Strip Rates

Relative strip rates for quartz applicator with oxygen plasma, compared to 7slm flow @ 2 kW.

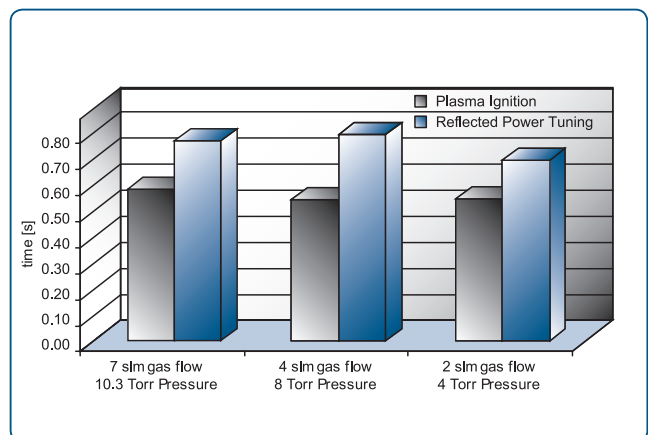


Figure 4 — Ignition and Tuning Performance

Ignition and tuning performance at various pressures and flows using a 3kW SmartPower™ generator



Specifications

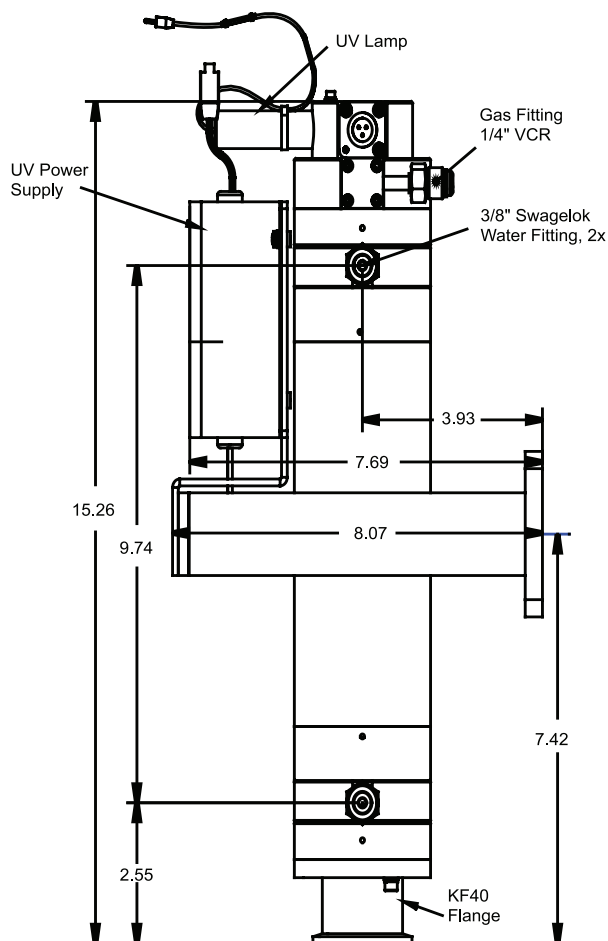
Maximum Power Output	3.0 kW
Cooling	Water (3/8 in. Swagelok® fitting) 0.35 gpm, 30°C Max at 30psid min
Inlet Gas Fitting	1/4 in. or 3/8 in. VCR
Output Flange	KF40, KF50 or custom
Overall Length	15.3 in (388 mm)
Plasma Tube Diameter	1.0 in. (25mm)
Weight	10 lb. (4.5 kg)
Electrical Requirements for UV Lamp	24 VDC, 1.0 amp
Process Gas Compatibility	
Quartz Tube	O ₂ , N ₂ , H ₂ O, Ar, non-fluorine based gases Operating pressure* 1-8 Torr typical
Sapphire Tube	O ₂ , N ₂ , H ₂ O, Ar, NF ₃ , CF ₄ , C ₂ F ₆ , and other Fluorine based gases Operating pressure* 2 to 8 Torr typical
Options	
Q Quartz Tube	AX7610
S Sapphire Tube	AX7610
Component Replacement Kits	
Spare Quartz Tube Assembly	SA7610QTZ4
Spare Sapphire Tube Assembly	SA7610SAPP4



Ordering Information

Microwave Downstream Plasma Source - Type AX7610

Specify Model AX7610-Q (quartz tube) or AX7610-S sapphire tube, or contact MKS representative to discuss optimum configuration. For component replacement kit, specify as shown above or contact your MKS representative.



Dimensional Drawing —

Note: Unless otherwise specified, dimensions are nominal values in inches.



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