

# MATERIALS SCIENCE, INC.

Vacuum & Thin Film Technology



## 300 Series Research RF Sputtering Packages



Shown with 3" Polaris™ Adjustable Position Source with Tilt and Shutter

- ▶ **300 Watt Low Cost Packages for Those With Limited Budgets Desiring Full Capability**
- ▶ **13.56 MHz RF Power Generator Allows All Materials to be Sputtered**
- ▶ **Automatic and Manual Impedance Matching Networks Available**
- ▶ **19" 1/2 Rack Mount Power Generator, Separate Matching Network**
- ▶ **2" & 3" Sputtering Sources**
- ▶ **Complete - All Cables, Vacuum Hardware and RF Feedthrough Included**

### Description

The Polaris™ 300 packages are intended for those wishing to spend the least amount of money possible for the maximum possible performance and flexibility. The user simply selects the desired sputtering source configuration, automatic vs. manual impedance matching and from a limited number of options (RS-232 interface and common exciter if two or more sources will be run simultaneously with RF power). Common, typical packages are listed and can be found by clicking [here](#). An RF power blocking/DC power pass filter will be required if two or more



sources are two be run by DC and RF power to protect the DC power supply from damage.

Everything required to install the Polaris™ internally mounted sputtering source into the users system and connect it with the power generation system is supplied.

Included is one of a series of standard feedthrough or flange mounted assemblies, all necessary electrical, water, gas and vacuum hardware and a 3' long shielded cable between the feedthrough assembly and the power supply/matching network. A comprehensive documentation package is provided. Other feedthrough arrangements and cable lengths are possible - please consult the factory.

A 300 watt 13.56 MHz power generator packaged in a 19" 1/2 rack configuration and a separate impedance matching network are provided. This allows the matching network to be located as close to the sputtering source as possible. This is highly desirable and minimizes many problems like high reflected power, power cable overheating and burn-throughs and other unsafe conditions. Short cables are good. The impedance matching network provides the user with a broad tuning range. The impedance matching network is configured to enable it to match a wide range of impedances. The RF generator allows precise control from the front panel or via a rear panel analog or optional RS-232 interface. Power and tuning (capacitor) adjustment are accomplished either through knobs on the manual tuning network (forward and reflected power are read on the power generator front panel) or adjusted and read on the automatic matching network controller front panel or on the users sytem controls through the analog or optional RS-232 interface.


A Set-point potentiometer allows the operator to set and vary Forward/Incident RF Power. Digital meters display Forward and Reflected/Reflectant Power developed on the source. The external control interface on the back of the unit allows the power generator to be controlled by the user's programmable controller or computer. LED indicators provide visual indications of the status of safety and functional interlocks. The power generation system incorporates high efficiency switch mode power supplies and solid-state technology. They are very robust and can accept 30% reflected power before they operate in fold-back mode.



### Typical Polaris™ Sputtering Source Configurations




Fixed position, adjustable position, tilt, shutters and flange mounted assemblies are among the various configuration possibilities

## Specifications

<b>Sputtering Source</b>	Polaris™ GEN II Sputtering Source or Assembly
Target Size	2" or 3" Diameter
<b>Feedthroughs &amp; Mounting Flanges</b>	Refer to <a href="#">Polaris™ Interface Control Drawings</a>
<b>Power Supply</b>	
AC Mains Input	110-240 VAC, Single Phase, 50/60 Hz, 5.5A (550 watts) maximum
AC Mains Input Connector	IEC-320C-14 EMI filtered
RF Output Power	0-300 watts into a 50 ohm load
Output Frequency	13.56 MHz ± .005%
Output Impedance	50 Ω resistive
Reflected Power Limit	30 watts maximum
Output Connector	Female N to Matching Network (8 foot long RG-213 cable supplied)
Output Power Stability	± .5% of set point
Remote Analog Control Signal	0-5 VDC
Analog Interface Connector	15 pin female D type EMI/RFI filtered
RS-232 Serial Control Connector (Optional)	9 pin D type
Common Exciter (Optional)	Allows multiple generators to be run simultaneously
Common Exciter Input/Output Connector	BNC
Cooling	Forced air via a 145 cfm fan
Operating Environment	Maximum 90% relative humidity. 15-40° C (59-104° F) ambient temperature
Size – Rack Mount Power Supply	9.5" wide (with supplied rack mounting ears) x 5.5" high 1/2 Rack Mount Panel x 16" Deep (14.0 cm x 19.1 cm x 39.4 cm)
Weight	Nominal 14 pounds (6.4 kg)

<b>Automatic Impedance Matching Network</b>	
Power Rating	500 watts
RF Output Connector	Female HN Coaxial Cable Connector
RF Input Connector	Female N Connector from Power Supply (8' long RG-213 cable supplied)
Network Controller Connector	15 pin female D type EMI/RFI filtered
Circuit Topology	"L" network configuration using an air variable load capacitor and vacuum capacitor
Output Impedance	Wide range. Will match sputtering source over entire normal pressure range of operation.
Output Cable Supplied	36" long RG-393 cable with Male HN Coaxial Connectors both ends supplied as standard. Cables longer than 72" should not be used to minimize reflected power and cable heating.
Size	8.75" wide x 5.00" high x 15.00" deep (22.23 cm x 12.7 cm x 38.1 cm)
Weight	Nominal 10 pounds (4.5 kg)
<b>Automatic Impedance Matching Network Controller-Power Supply</b>	
AC Mains Input	100-240 VAC, Single Phase, 50/60 Hz, 2A maximum
AC Mains Input Connector	IEC-320C-14 EMI filtered
Size	9.50" wide (with supplied rack mounting ears) x 1.75" high x 9.75" deep (4.45 cm x 21.59 cm x 24.77 cm)
Matching Network Connector	15 pin female D type EMI/RFI filtered (10' signal control cable with male connectors on both ends supplied)
Load and Tune Control	Manual or automatic via the front panel or remote control
Remote Analog Control Connector	25 pin D type EMI/RFI filtered
Weight	Nominal 2 pounds (.91 kg)

<b>Manual Impedance Matching Network</b>	
<b>Power Rating</b>	500 watts
<b>RF Output Connector</b>	Female HN Coaxial Cable Connector
<b>RF Input Connector</b>	Female N Connector from Power Supply (8' long RG-213 cable supplied)
<b>Circuit Topology</b>	"L" network configuration using an air variable load capacitor and vacuum capacitor
<b>Output Impedance</b>	Wide range. Will match sputtering source over entire normal pressure range of operation.
<b>Output Cable Supplied</b>	36" long RG-393 cable with Male HN Coaxial Connectors both ends supplied as standard. Cables longer than 72" should not be used to minimize reflected power and cable heating.
<b>Size</b>	8.00" wide x 5.50" high x 11.75" deep (20.32 cm x 13.97 cm x 29.85 cm)
<b>Weight</b>	Nominal 5 pounds (2.3 kg)
<b>Ordering Information</b>	Contact factory or refer to <a href="#">Polaris™ Ordering Information</a> for a complete list of possible packages.

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