

Semion 800™

Plasma Surface Ion Energy Analyser



**Multi-Grid Retarding Field Energy Analyser
Substrate Mounted RFEA
Placed on a Grounded or Biased Surface**



The **Semion 800™** is a precision plasma measurement instrument used in a large number of plasma laboratory applications. The **Semion 800™** is the key instrument used by scientists to measure the ion energy and flux arriving at a surface in a plasma process chamber.

The **Semion 800™** can be placed on a biased or grounded surface. Among the key parameters measured are Ion Energy, Ion Flux, Electron Energy, Plasma Potential and Floating Potential. The **Semion 800™** provides plasma parameter measurement in DC, RF, Microwave, Continuous and Pulsed plasma. The **Semion 800™** is the most advanced and trusted, fully automated retarding field energy analyser on the market.

The **Semion 800™** helps the user to understand ion surface interactions and the ions impact on surface treatment. The **Semion 800™** is an essential plasma process diagnostic to understand the correlation between plasma inputs and the plasma state. The **Semion 800™** reduces process and tool development time, as well as the time to market for new plasma products. Pulsed plasmas are used to tailor the electron or ion energy and The **Semion 800™** is an integral part of such process development.



Key Indicators

Substrate mounted Retarding Field Energy Analyser Probe

- In-situ measurement of:
 - Ion Energy Distribution
 - Ion Flux
 - Ion Current
 - Electron Flux and Energy
- Measurement of Ion Energies up to 800eV at pressures up to 300mT
- Easy to install, no chamber retrofit required
- Portable system allowing analysis in multiple chambers using single system

Benefits

- Robust and Easy to Install
- Easy to Use Software
- Real Time Measurements
- Replaceable Sensors
- Sensor holder sits on a bias or grounded surface
- Fully automated software analysis
- Custom holder materials available



Specifications

| Semion 800 | |
|------------------|----------------------------|
| Ion Energy Range | 0 to 800eV* |
| Ion Current | 2mA DC max |
| Ion Flux | 0.1 - 20mA/cm ² |
| IEDF Resolution | ± 1eV nominal |

*dependant on DC bias

| RFEA Probe | |
|---------------------------|--|
| Probe Configuration | 3-grid |
| Button Probe Diameter | 33mm |
| Holder Diameter | 70mm, 100mm (4"), 300mm (12") as standard |
| Holder Thickness | 5mm |
| Max Operating Temperature | 200°C |
| Mounting | RFEA Probe holder mounted on electrode |
| Probe Enclosure Material | Aluminium, anodized, stainless steel & Al ₂ O ₃ |
| Probe Holder Material | Aluminium, anodized aluminium, stainless steel, Al ₂ O ₃ |
| RFEA Probe Cable Length | 650mm standard (custom available) |

| Feed-through Assembly | |
|-----------------------|---------------------|
| Flange type | KF40 standard, CF40 |

| Control Unit Electronics | |
|--------------------------|--|
| Voltage Range | -600V to +600V (suppression voltage), -420V to +420V (grid voltages), |
| Current range | 100pA to 2.4mA |
| Connectivity | USB 2.0 |

| Application Software | |
|----------------------|--|
| Operating System | Windows 2000/XP/Vista/Windows 7 Compatible |



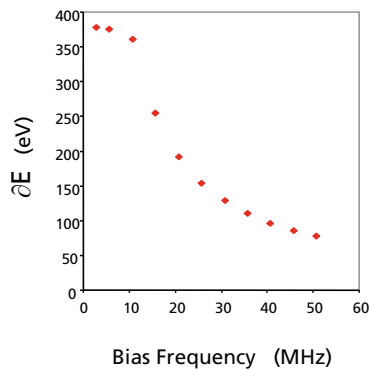
Product Operating Parameter Table

| | | | | | | | |
|--------|-----------------------------|-----------------|-----------------|--|------------------------------------|----------------------------|------------------|
| High | > 10 ⁵ Pa | >760 Torr | > 5000° | > 10 ¹⁴ cm ⁻³ | SiH ₄ | Microwave (3 GHz - 20 GHz) | > 100 KeV |
| | 1000Pa - 10 ⁵ Pa | 10 - 760 Torr | 5000° | 10 ¹² - 10 ¹⁴ cm ⁻³ | C4F ₈ , SF ₆ | Microwave (1 GHz - 3 GHz) | 10 - 100 KeV |
| | 100Pa - 1000Pa | 1 - 10 Torr | 1000° | 10 ¹⁰ - 10 ¹² cm ⁻³ | CHF ₃ | UHF (100 MHz - 1 GHz) | 2500 - 10,000 eV |
| Medium | 10Pa - 100Pa | 0.1 - 1 Torr | 500° | 10 ⁸ - 10 ¹⁰ cm ⁻³ | Cl | RF (1 MHz - 100 MHz) | 800 - 2,500 eV |
| | 1Pa - 10Pa | 10 - 100 mTorr | 200° | 10 ⁶ - 10 ⁸ cm ⁻³ | O ₂ | MF (0 - 1 MHz) | 400 - 800 eV |
| | 0.1Pa - 1Pa | 1 - 10 mTorr | 100° | 10 ⁴ - 10 ⁶ cm ⁻³ | N ₂ | pDC (0 - 350 kHz) | 100 - 400 eV |
| Low | < 0.1 Pa | < 1 mTorr | 20° | < 10 ⁴ cm ⁻³ | Ar, He | DC (0 kHz) | 0 - 100 eV |
| | Pressure (Pascal) | Pressure (Torr) | Gas Temperature | Density | Gas Reactivity | Power Frequency | Ion Energy |

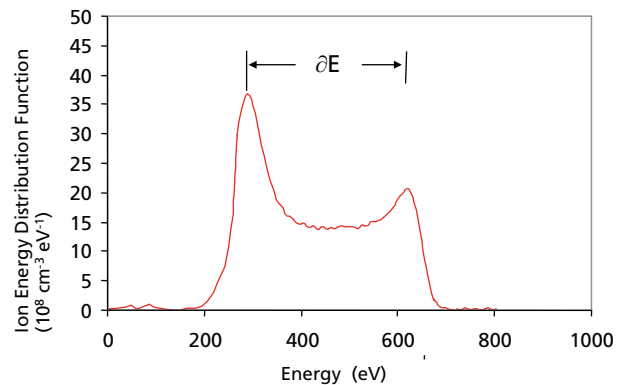
System Operating Parameters Beyond Operating Parameters

Graphical Data

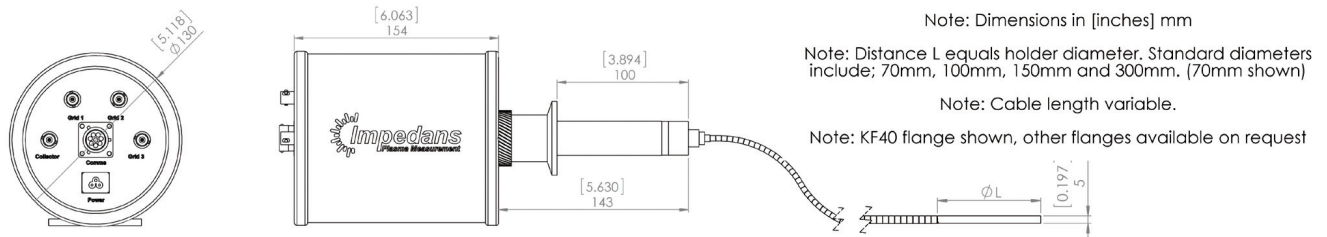
Measurement of ∂E as function of bias frequency



Ion Energy Distribution Function on a RF Biased Substrate using Semion 800



Product Dimensions





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