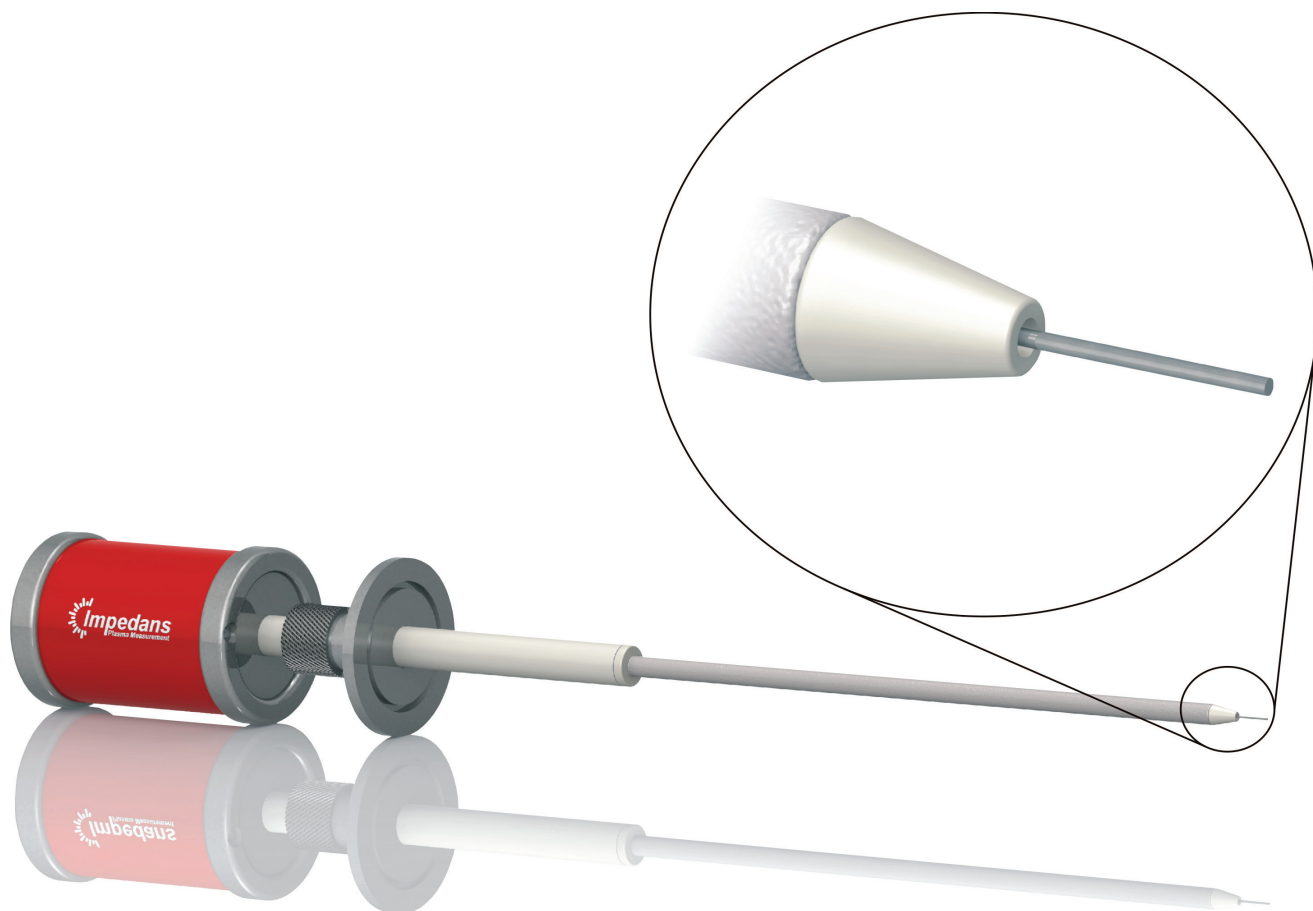


# Langmuir SingleProbe™

## Single Langmuir Probe System

Automated Plasma Parameter Measurement System



Floating Potential  
Plasma Potential  
Plasma Density

Ion Current Density  
Electron Temperature  
Electron Energy Distribution Function



The **SingleProbe™** is a precision plasma measurement instrument used in a wide range of plasma laboratory applications. The **SingleProbe™** is the key instrument used by scientists to measure the internal parameters of the bulk of the plasma. Among the key parameters measured are electron density, ion density, electron temperature, plasma potential, floating potential and the electron energy distribution function (EEDF). The **SingleProbe™** provides plasma parameter measurement in DC, RF, Microwave, Continuous and Pulsed plasma.

The **SingleProbe™** has the most advanced technology on the market and analyses ion and electron trajectories to obtain accurate measurements of the real plasma parameters in a wide range of plasma applications. The **SingleProbe™** is the fastest and most reliable Langmuir probe in the world (time resolution 12.5ns). In addition to speed and reliability The **SingleProbe™** provides the most advanced and trusted, fully automated data analysis in real time.

The **SingleProbe™** is used to establish plasma process repeatability. It helps the user to understand plasma changes and the impact on surface treatment. The **SingleProbe™** is an essential plasma process diagnostic to understand the correlation between plasma inputs and the plasma state. The **SingleProbe™** 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 **SingleProbe™** is an integral part of pulsed process development.



## Key Indicators

Time Resolution	12.5ns
Plasma Power Source	DC, RF, Microwave, Continuous, Pulsed Plasma
Floating Potential	-145V to 145V
Plasma Potential	-100V to 145V
Plasma Density	$10^6$ to $3 \times 10^{13} \text{cm}^{-3}$
Ion Current Density	$1 \mu\text{A}/\text{cm}^2$ to $300 \text{mA}/\text{cm}^2$
Electron Temperature	0.1 to 15 eV
EEDF	0 to 100 eV

## Benefits

- Robust and Easy to Install
- Easy to Use Software
- Real Time Measurements
- Automatic Tip Cleaning
- Easy to Replace Probe Tips
- Fastest Langmuir Probe in the World (12.5nS)
- Custom Probe Shafts Available
- High Degree of Accuracy
- Key Instrument for Measuring Plasma Parameters
- Pulsed Power Compatible
- Broadband RF



## Specifications

Plasma Parameters	
Floating Potential	-145V to 145V
Plasma Potential	-100V to 145V
Plasma Density	$10^6$ to $3 \times 10^{13} \text{cm}^{-3}$
Ion Current Density	$1 \mu\text{A}/\text{cm}^2$ to $300 \text{mA}/\text{cm}^2$
Electron Temperature	0.1 to 15 eV
Electron Energy Distribution Function	0 to 100 eV

Langmuir Probe	
Plasma Power Source	DC, RF, Microwave, Continuous, Pulsed Plasma
RF Plasma	Broadband Probe 2MHz to 100MHz
Probe Length	300mm to 1400mm (Custom Available)
Probe Diameter	6.5mm (Custom Available)
Probe Tip Length	10mm (Custom Available)
Probe Tip Diameter	0.4mm (Custom Available)
Probe Tip Material	W, Ta, Ni, Pt. (Custom Available)
Probe Customisation	90°, 45° Bend (Custom Available)
Maximum Operating Temperature	230°C (Custom up to 1200°C)

Electronics Control Unit	
Probe Voltage Scan Range	-150V to +150V
Current Range	15nA to 1A
Communication	USB 2.0
Sampling Rate	80 MSPS (V,I)
Data Acquisition Resolution	4.5mV, 4.5nA
Time Resolved Step Resolution	12.5nS
External Trigger	TTL Compatible 10Hz to 1 MHz

Application Software	
Operating System	Windows 2000, XP, Vista, Windows 7



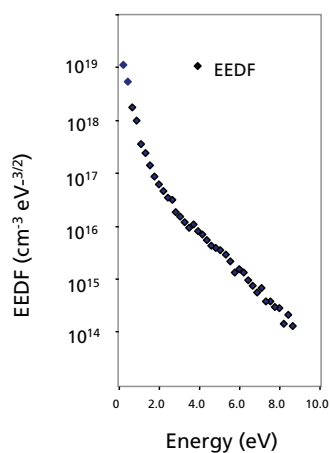
# Product Operating Parameter Table

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

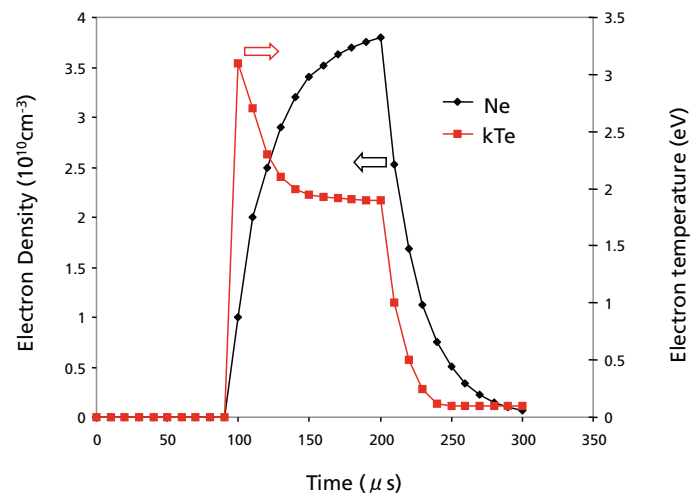
System Operating Parameters  Beyond Operating Parameters

## Graphical Data

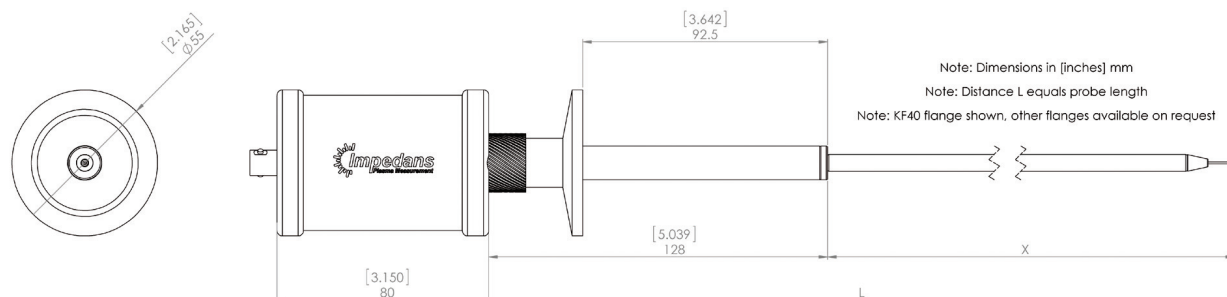
### Electron Energy Distribution Function



### Plasma Parameters as a Function of Time in a Pulsed Plasma



## Product Dimensions





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