

# PLASMALOC SERIES

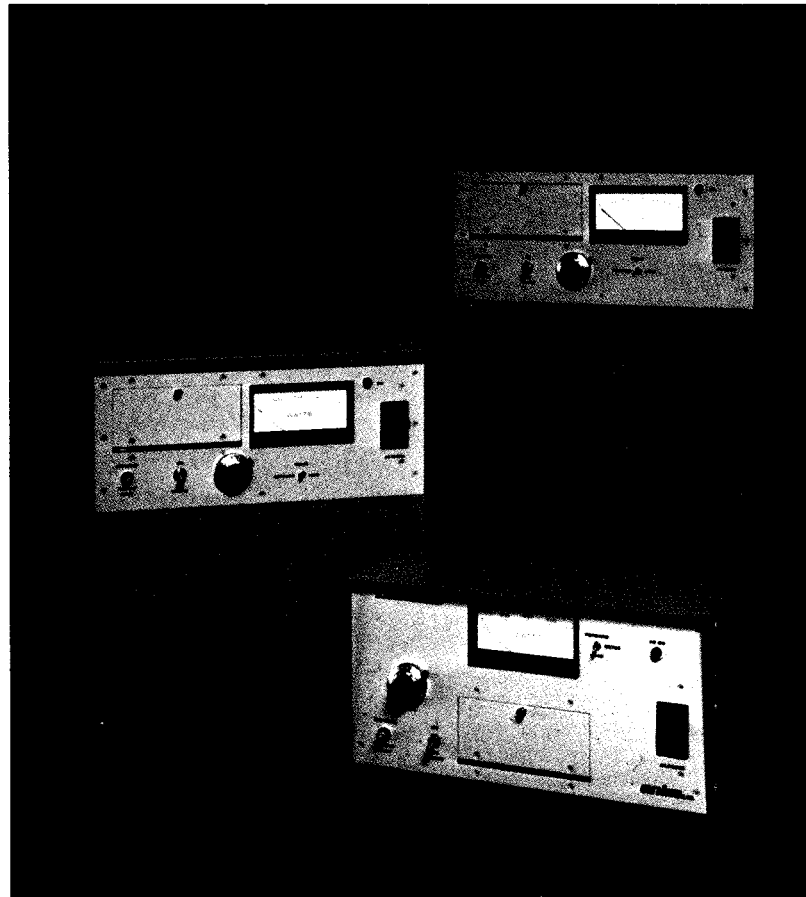
The Plasmaloc Series Generators are extremely versatile sources of high frequency energy expressly designed for modern gas plasma applications. This series consists of six generators that provide power outputs from 750 to 3,200 watts and cover the frequency range of 25 to 460 kHz. Designed specifically with the requirements of semiconductor equipment manufacturers and users in mind, each generator incorporates many of the functions normally achieved through a multiplicity of units.

**VERSATILITY** These highly versatile generators include a variety of features designed to simplify generator operation. Each includes a wide-band variable tap matching transformer to eliminate the need for an external impedance matching network between the generator and the plasma reactor. The generator output is connected directly by coaxial cable to the reactor electrodes thereby simplifying system integration. The variable frequency control allows for easy selection of the optimum frequency for proper plasma reaction. The correct plasma power level can be established with the unique watt-meter provided. This true average power meter measures the power leaving the generator as well as the power absorbed by the plasma. Excellent meter accuracy is provided by a patented analog multiplier and directional coupler circuit. By adjusting the plasma impedance control and observing the increase in load power, an optimum match is easily achieved. Power lock is provided and may be set either from the front panel or by a process computer through the accessory input. Setability of the plasma power is better than  $\pm 0.4\%$  of the maximum rated power and absolute accuracy is better than  $\pm 1.5\%$  of the maximum rated power. This facilitates accurate calibration of etch rates versus plasma power level.

**RELIABILITY** The reliability of a plasma generator is directly dependent on the forethought given to its design. The generator should be protected from damage due to any external load impedance from an open circuit to a short circuit. It should also be protected from excessive internal voltage or current conditions as well as overheating due to high ambient temperature or failure of the cooling system. In addition to these more obvious requirements, a highly reliable generator should also incorporate design redundancy to provide a "fail soft" capability. By this we mean that failure of any one power transistor (a remote possibility) should not impair the ability of the other power transistors to continue to supply power. In the Plasmaloc Series this is accomplished by our hybrid coupling technique. Failure of any one transistor power stage results only in a proportional decrease in output and not a total loss of power.

Lastly, all Plasmaloc generators are completely solid state and conservatively designed to provide extremely reliable operation under continuous service conditions.

**ADDITIONAL FEATURES** While these generators are extremely reliable, they are also designed for ease of service and maintenance. The use of an all solid state design provides for compact and lightweight construction. The use of low voltage transistors



and extensive safety features protect maintenance personnel from contact with hazardous potentials normally present in units utilizing vacuum tubes. Plug-in modules, 100% socketed transistors and integrated circuits facilitate easy maintenance or repair.

The possibility of radio frequency interference problems has been minimized in the design of these generators. Extensive use of RFI/EMI filtering and shielding, plus the relatively low operating frequencies of the generators eliminates the possibility of RF interference problems associated with plasma reactor pressure measuring, flow controller or computer circuits. High voltage regulators eliminate spikes and hash present on industrial power lines and prevent interference from reaching the AC line.

All Plasmaloc generators may be rack mounted in a standard 19 inch relay rack or used as freestanding units. An optional rack mount slide kit is available for the larger generator models.

- All solid state.
- Variable frequency.
- Impedance matching transformer.
- Air-cooled.

MODEL	PLASMALOC 1	PLASMALOC 2	PLASMALOC 3	PLASMALOC 1-HF	PLASMALOC 2-HF	PLASMALOC 3-HF
Frequency	25 to 125 kHz			90 to 460 kHz		
Max. power output (watts)	800	1,600	3,200	750	1,400	2,800
RF output impedance (ohms)	50 to 600	50 to 600	50 to 600	50 to 600	50 to 600	50 to 600
Power meter scale (watts) <sup>(1)</sup>	0-1,000	0-2,000	0-3,500	0-1,000	0-2,000	0-3,500
Max. reflected power (watts) <sup>(2)</sup>	200	400	700	200	400	700
Power requirements (50 - 60 Hz)	115Vac ± 8% 20 amps max.	115Vac ± 8% 35 amps max.	230Vac ± 8% 40 amps max.	115Vac ± 8% 20 amps max.	115Vac ± 8% 35 amps max.	230Vac ± 8% 40 amps max.
Size (H x W x D inches)	8.8 x 17 x 20.3	17.5 x 17 x 25.6	26.5 x 17 x 22.5	8.8 x 17 x 20.3	17.5 x 17 x 25.6	26.5 x 22.5 x 22.5
Weight (lbs.)	46	87	150	46	87	150
RF power connector	Type "C"	Type "C"	Type "C"	Type "C"	Type "C"	Type "C"
19" Rack mounting ears	Included	Included	Included	Included	Included	Included

NOTES: (1) Meter accuracy ± 1% of full scale. Rear panel has calibrated output of 1.00 volt per kilowatt suitable for digital display.  
(2) The generator will tolerate the amount of reflected power shown before automatic shutdown.

**MISMATCH PROTECTION:** Cannot be damaged by any external load impedance from an open to a short circuit.

**PLASMA MATCHING:** Built-in, variable, 7 position step transformer for plasma impedance matching between 50 and 600 ohms.

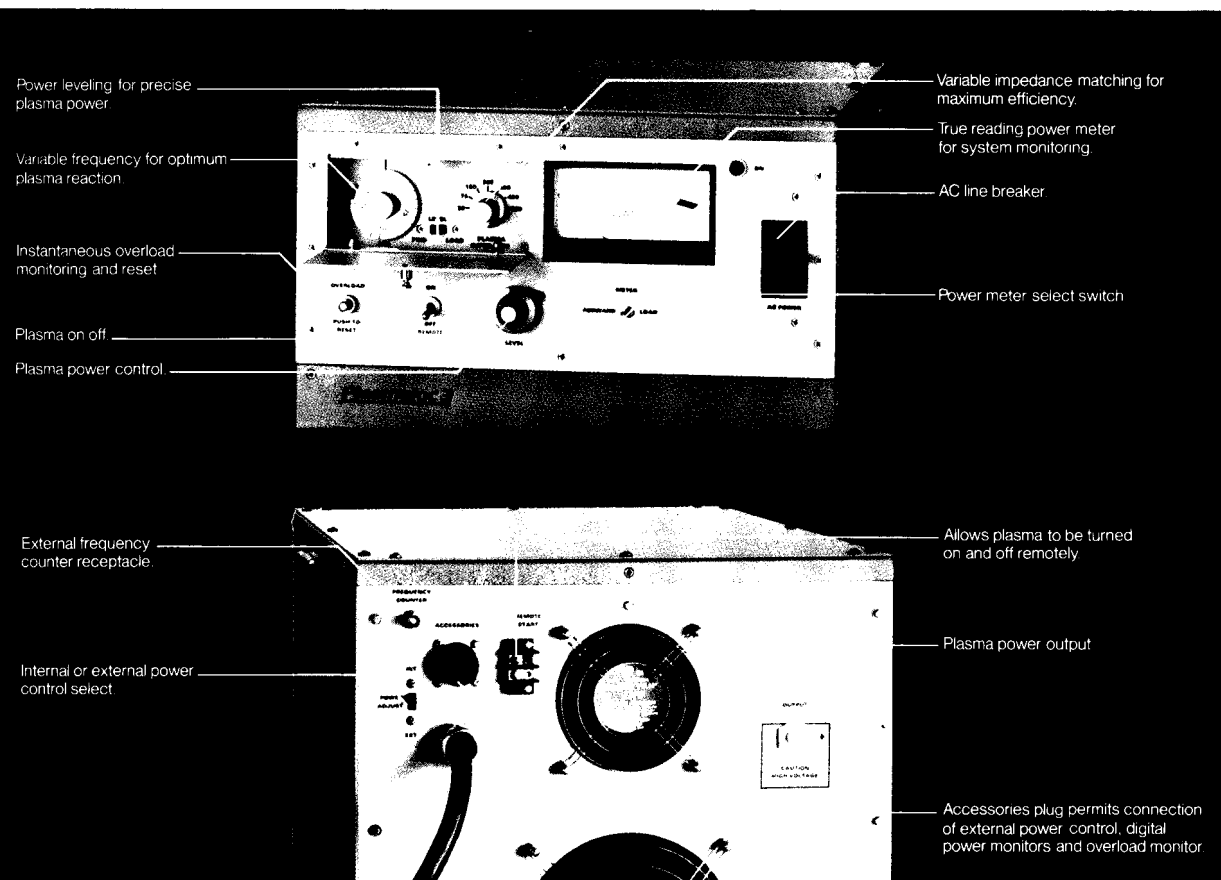
**FREQUENCY STABILITY:** Better than 0.1% frequency stability from 0 - 45°C ambient temperature after 5 minute warm-up.

**POWER LEVELING:** Switch selectable for forward or load (plasma) power leveling.

**POWER CONTROL:** Front panel or external power control (programmed 0-10 volts).

**THERMAL PROTECTION:** Thermostatic protection provides automatic shut down if transistors overheat due to mismatch or cooling system failure.

**OPERATING TEMPERATURE:** 0 to 45°C.



**ACCESSORIES: PC-1** — The PC-1 Plasma Converter is an add-on network which when inserted between the output of a Plasmaloc Generator\* and a parallel plate plasma reactor, enables the simultaneous combination of radio frequency and dc power to generate the plasma discharge.

**LK-1** External transformer to raise the maximum output impedance of matched plasma load to 1350 ohms. For use with difficult to ionize gases and/or low pressures (for use with PL-1 and PL-2 only).

**PL2-01** Rack mount slide kit for installation into 19 inch rack with slide out capability (for use with PL-2 and PL-2HF).

**PL2-02** RG-8/U coaxial cable fitted with type "C" male connectors for connections between the generator and plasma reactor; cut to length.

**PL3-01** Rack mount slide kit for installation into 19 inch rack with slide out capability (for use with PL-3 and PL-3HF).

\*The PC-1 may be used with the Plasmaloc 1, Plasmaloc 2, Plasmaloc 1-HF and Plasmaloc 2-HF. Not for use with Plasmaloc 3 or Plasmaloc 3-HF.