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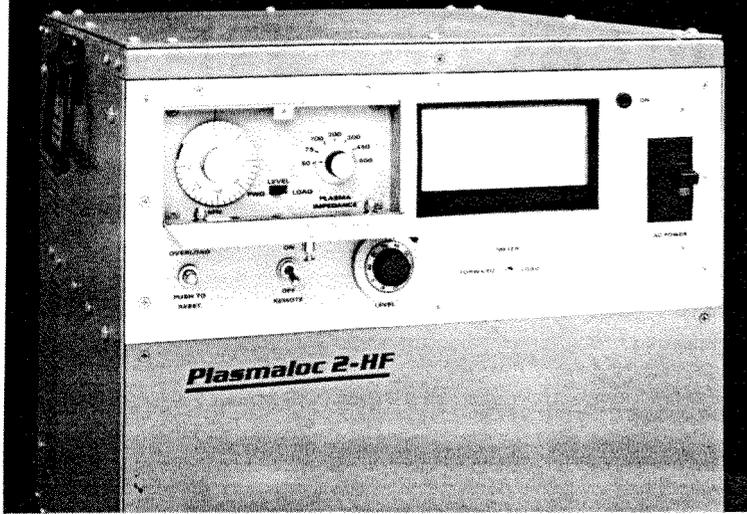


Plasmaloc RF Generators



Versatile,
Low-Frequency
R F Power
Sources For
Plasma
Applications

- 25-125kHz or 90-460kHz Frequency Range
- Forward & Load Power Leveling
- Forced-Air Cooling
- Solid State Reliability
- Variable Frequency Control
- Built-In Matching Transformer



Specifici

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

POWER LEVELING: Forward or Load (Plasma), Switch Selectable

PLASMA MATCHING: Built-in variable 7-position step transformer for plasma impedances between 50 and 600 ohms.

THERMAL PROTECTION: Provides automatic shutdown if transistors overheat due to mismatch or cooling system failure.

CONTROL INTERFACE: Type D, 9-pin connector

RF OUTPUT IMPEDANCE: 50-600 ohms

The Plasmaloc Series of RF Generators is designed to provide dependable RF power for low-frequency plasma applications. Featuring forward and load power leveling, variable frequency control, thermal and mismatch protection, forced-air cooling, and fail-soft capability, the Plasmaloc Series has set the standard for solid state quality, versatility; and reliability.

Versatile Operation

The Plasmaloc Series consists of six generators: three PL models which cover the frequency range of 25-125kHz; and three PL-HF models which cover the range of 90-460kHz. The optimum frequency for a specific plasma reaction is easily selected with the front panel variable frequency control. Maximum forward power output ranges from 750 to 3,200 Watts, depending on the model. The front panel power meter displays either the forward power leaving the generator or the load power absorbed by the plasma.

Precise Power Control

Precise power control is provided by a sampling of the output power, using a directional coupler. Both forward and load power leveling are provided and may be set from either 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.

To eliminate the need for an external impedance matching network, each Plasmaloc generator includes an internal variable seven-position step transformer, designed for plasma impedances between 50 and 600 ohms. By adjusting the front panel plasma impedance control knob and observing the increase in load power, an optimum match can easily be achieved.

A high degree of operational reliability is assured through the use of conservatively rated solid state components. ENI's hybrid combining of power amplifier modules couples the output of a number of transistors to achieve the total generator

	PL-1	PL-2	PL-3
FREQUENCY RANGE	25-125kHz		
MAXIMUM POWER OUTPUT	800W	1600W	
AC POWER LINE	115VAC $\pm 8\%$ 20 Amps 50-60Hz	115VAC $\pm 8\%$ 35 Amps 60Hz	230V 40 50
POWER METER SCALE	0-1000W	0-2000W	0-
MISMATCH PROTECTION	Unit will tolerate up to 200W of reflected power before shutdown	Unit will tolerate up to 400W of reflected power before shutdown	Unit will tolerate up to 200W of reflected power before shutdown
SIZE	8.75x17x20.3" (22.2x43.1x51.6cm)	17.5x17x25.6" (44.4x43.2x65cm)	26.5x (67.3x44.4)
WEIGHT	46 lbs (20.9 kg)	87 lbs (39.5 kg)	150 lbs

Quality... Rehab

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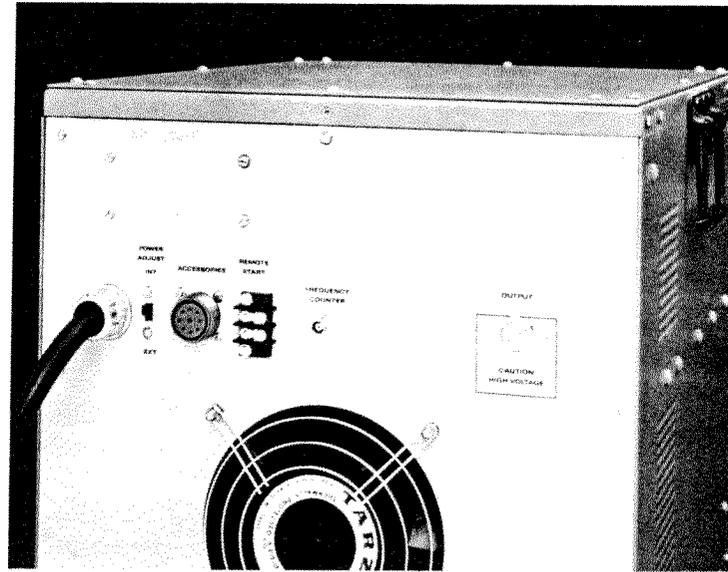
RF OUTPUT CONNECTOR: Type C

RACK MOUNTING: 19" adaptors provided; PL2-01/PL3-01 rack mount slide kits optional.

COOLING SYSTEM: Forced air; operating temperature range of 0-45°C.

REAR PANEL CONTROLS & INDICATORS: RF Output (Type C), Remote Start, Control Interface Connector, Internal/External Power Adjust, Frequency Counter (Type BNC)

FRONT PANEL CONTROLS & INDICATORS: AC On, Power Meter, Forward/Load Meter Switch, Power Level, Remote On/Off, Overload/Push to Reset



output, and effectively prevents a total loss of power. In the event that any individual transistor should fail to operate, the generator will continue to function at reduced power.

Advanced Protection

ENI Plasmaloc Generators are protected from damage due to any external load impedance, from an open to a short circuit. Protection is also provided from excessive internal voltage and current conditions, as well as overheating due to high ambient temperatures or lack of air cooling. Maintenance and service are facilitated by the use of plug-in modules, full socketed transistors, and integrated circuits. The hazardous potentials normally associated with vacuum tube design have been completely eliminated. Both the integral power supply and forced-air cooling system are conservatively rated to permit operation over a wide range of temperatures and AC line conditions. ENI Plasmaloc Generators may be mounted on a standard 19-inch relay rack or used as free-standing units.

Extensive use of RFI/EMI filtering and/or shielding, as well as the relatively low operating frequencies of the generators, minimizes the possibility of RF interference problems associated with plasma reactor pressure measuring, flow controller, or computer circuits. High voltage regulators eliminate spikes and noise present on industrial power lines, and prevent interference from reaching the AC line.

Additional Options

Optional Plasmaloc accessories include the PC-1 and PC-2 Plasma Convertors, which permit the simultaneous combination of RF and DC power for maximum flexibility and versatility. The optional LK-I External Transformer, for use with the PL-1 and PL-2, raises the maximum output impedance of the matched plasma load to 135052.

Each PL and PL-HF Generator is backed by ENI's one-year warranty and worldwide network of service and technical support. Plasmaloc Series Generators represent ENI's ongoing commitment to provide versatile, reliable solid state RF solutions for modern plasma applications.

	PL-1HF	PL-2HF	PL-3HF
3			
	90-460kHz		
V	750W	1400W	2800W
±8% V s fz	115VAC±8% 20 Amps 50-60Hz	115VAC±8% 35 Amps 60Hz	230VAC±8% 40 Amps 50-60Hz
W	0-1000W	0-2000W	0-3500W
tolerate of power down	Unit will tolerate up to 200W of reflected power before shutdown	Unit will tolerate up to 250W of reflected power before foldback	Unit will tolerate up to 700W of reflected power before shutdown
2.5" 2cm)	8.75x17x20.3" (22.2x43.1x51.6cm)	17.5x17x25.6" (44.4x43.2x65cm)	26.5x17x22.5" (67.3x43.1x57.2cm)
kg)	46 lbs (20.9 kg)	87 lbs (39.5 kg)	150 lbs (68.2 kg)

PL Series 03/90

ity ... Versatility

Plasmaloc Accessories

PC-1/PC-2 Plasma Convertors

The PC-1 and PC-2 Plasma Convertors are add-on networks which, when inserted between the output of any low-frequency ENI plasma generator and any parallel plate plasma reactor, enable the simultaneous combination of radio frequency and DC power for added flexibility. These units prevent the generator's output power from flowing back into the external DC power supply, permitting the use of any laboratory DC power supply and eliminating the possibility of interference with its regulatory circuitry.

	Frequency	RF Connectors	DC Voltage Input at 2.5A	Max Input RF Power	Max Load Impedance	Size	Weight
PC-1	25kHz to 450kHz	Type C	Up to 500VDC	1600W	>600Ω	6.25 x 9 x 8" (15.9 x 24.1 x 20.3 cm)	5.25 lbs (2.4 kg)
PC-2			Up to 1000VDC		800Ω		

The combination of radio frequency and DC voltage in the plasma chamber enhances the plasma sheath for processes such as reactive ion etching. The PC-1 and PC-2 come complete with a five-foot output coaxial cable for direct connection to the plasma chamber.

LK-1 External Transformer

The LK-1 External Transformer raises the maximum output impedance of the matched plasma load to 1350 ohms. For use with difficult-to-ionize gases and/or low pressures; for PL-1 and PL-2 only.

PL-201 Rack Mount Slide Kit

The PL-201 Rack Mount Slide Kit installs into a standard 19-inch rack and provides slide-out capability for the PL-2 and PL-2HF.

PL-301 Rack Mount Slide Kit

The PL-301 Rack Mount Slide Kit installs into a standard 19-inch rack and provides slide-out capability for the PL-3 and PL-3HF.

PL-202 Coaxial Cable

PL-202 RG-8/U Coaxial Cable is cut to length and fitted with Type C male connections between the generator and the plasma reactor.



WORLD HEADQUARTERS

ENI
A Division of Astec America, Inc.
100 Highpower Road, Rochester NY 14623
Tel: (716) 427-8300
Fax: (716) 427-7839

SALES & SERVICE OFFICES

- Santa Clara, CA Tel: (408) 727-0993; Fax: (408) 727-1352
- Welwyn Garden City, UK Tel: (0707) 371558; Fax: (0707) 339286
- Stuttgart, West Germany Tel: 7156-2 10 95; Fax: 7165-4 93 72
- Tokyo, Japan Tel: (81) 0425 229011; Fax: (81) 0425 222636
- Osaka, Japan Tel: (06) 367-0823; Fax: (06) 367-0827