RF & DC Power

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Spectrum® 2MHz 5.0 kW and 11.0kW RF Generator

Spectrum® RF Plasma Generator

2 MHz MODEL

The B5002 and B11002 Spectrum RF generators provide 5.0kW and 11.0kW of power at 2 MHz. Spectrum generators feature high density, excellent stability, generous power margins and high reliability for lower cost of ownership and improved yield, wafer-to-wafer and run-to-run.

The Spectrum RF Plasma Generator is used in Chemical Vapor Deposition (CVD), Physical Vapor Deposition (PVD), etching and other thin film applications during the manufacture of integrated circuits, flat panel displays, optical media and industrial coatings.

Features & Benefits

High Repeatability for Consistent Process Performance

- Forward Power Accuracy of <±2.0% of set point, tied to and transferable from NIST

Smaller Footprint Reduces Required Tool Space

- Power density increased 2-3 times over previous models
- Integrated auto frequency tuning eliminates the need for a complex matching network

High Reliability Increases Uptime and Lowers CoO

- Improved thermal management and decreased power dissipation through the use of new, high efficiency power amplifier (PA)
- Push-pull resonant circuit topology lowers the voltages across the power transistors
- Ample power margin allows more forward power delivery and more strike voltage potential to bridge sub-optimal conditions with no process interruption

Spectrum® RF Generator Performance

The Spectrum platform combines high performance specifications with a flexible, reliable design. The result is a robust platform for the most demanding thin film applications.

Accuracy

Spectrum generators provide accuracy of <±2.0% of Forward Power tied to and transferable from the National Institute of Standards and Technology. High accuracy ensures tight process control and repeatability for advanced thin film processing.

RF Power Margin

A key indicator of reliability is headroom or RF power margin. Having extra RF power capability ensures high performance, uptime and yield under difficult process conditions. RF power margin allows more forward power delivery into mismatched loads. On hard to ignite chambers, headroom provides more strike voltage potential. During conditions of lower line voltage, RF power margin allows full rated power to be delivered instead of de-rating the generator.

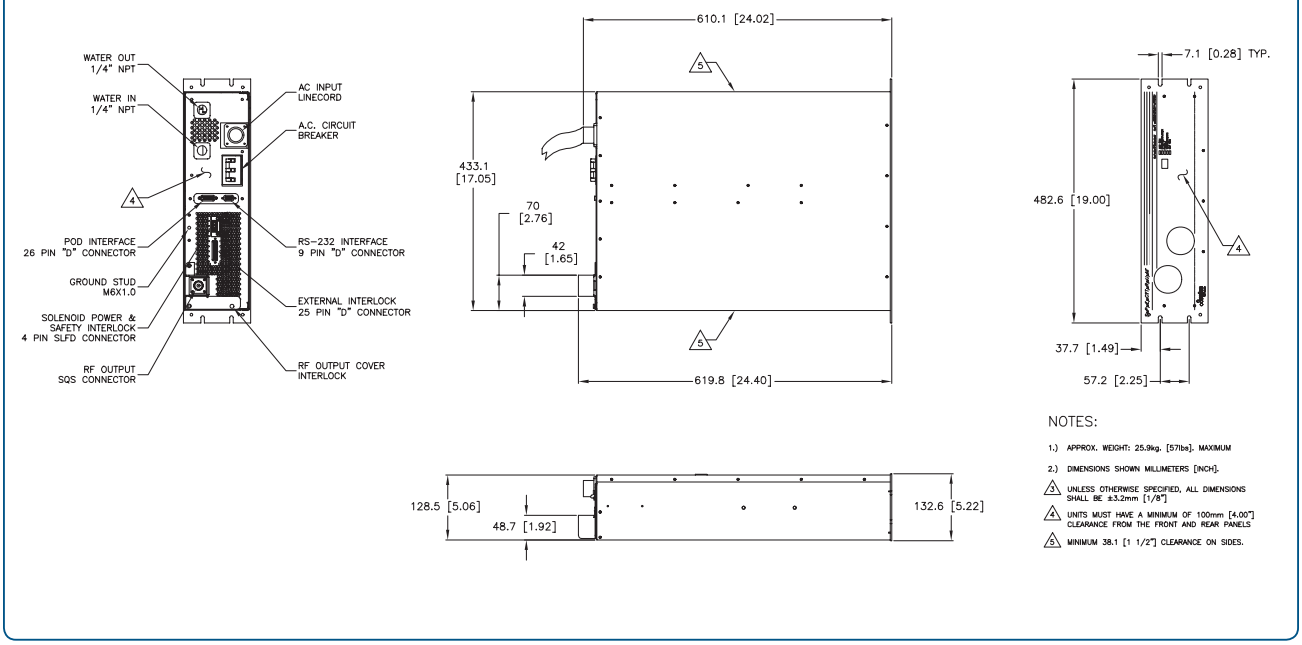
Automatic Frequency Tuning (AFT)

The Spectrum RF plasma generator incorporates automatic frequency tuning-impedance matching which eliminates the need for a complex matching network. AFT automatically locates the best operating frequency for optimal power transfer. Spectrum 2MHz generator is capable of automatic frequency tuning across the full bandwidth of 1.8-2.17 MHz.

Safety and Performance

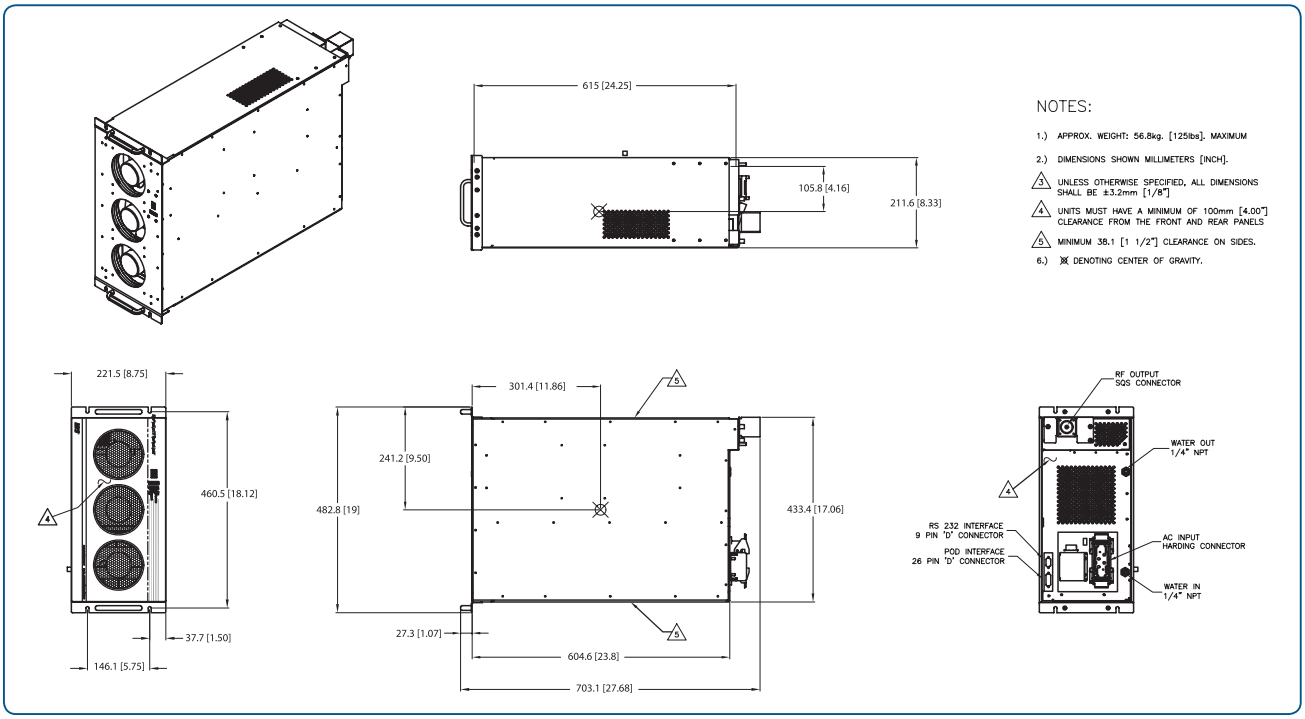
The Spectrum generator will shut down with a fault indication under the following conditions: Internal Temperature, Heatsink Temperature, Interlock Interrupt, or if any monitored circuit parameters reach a hazardous level. A warning indicator is provided to communicate a condition approaching the fault levels, as listed above, or conditions of line voltage out of range, high humidity, or condensation. This allows action to be taken before a fault would occur. Water flow is controlled to prevent condensation and is based on heatsink temperature and relative humidity.

Dimensional Drawings



Dimensional Drawing — Spectrum B5002

Note: Unless otherwise specified, dimensions are nominal value in millimeters (inches referenced).



Dimensional Drawing — Spectrum B11002

Note: Unless otherwise specified, dimensions are nominal value in millimeters (inches referenced).

Specifications and Ordering Information

Parameter	Model B5002	Model B11002
Frequency		
Center (MHz)	2.00	2.00
Dynamic Power Range	50 - 5000W	100 - 11,000W
Load Regulation (worst phase forward power)		
W nominal into 1.1:1 VSWR	5000W	11,000W
W nominal into 1.5:1 VSWR	4278W	8500W
W nominal into 2.0:1 VSWR	3465W	6800W
W nominal into 3.0:1 VSWR	2738W	5100W
W nominal into ∞:1 VSWR	1000W	2000W
Load Impedance Range	Unlimited	Unlimited
RF Stability		
Spurious Output	Unconditionally stable for any load within operational limits < 40dBc into 50 ohm load	
Harmonic Output/Distortion (at max power)	<45dBc, Maximum (50 ohm load)	<30dBc, Maximum (50 ohm load)
Software Pulsing Parameters		
Frequency	0-1kHz	0-1kHz
Minimum Pulse Width	100µsec	100µsec
RF Rise/Fall Time	100µsec	100µsec
Power Control Accuracy[1]	±10W or 2% above 500W	±20W or 2% above 1000W
Interface		
Standard	RS232, subminiature 9-pin Type DB9F	RS232, subminiature 9-pin Type DB9F
Optional	External: 25 pin Analog, or DeviceNet™	External: 25 pin Analog, or DeviceNet™
Generator Dimensions[2]		
H x W x D inches	5.25 x 17 x 24	8.75 x 17 x 22
H x W x D millimeters (mm)	133 x 432 x 610	222 x 432 x 559
Generator Weight (maximum)	57 lbs	130 lbs
Facility Requirements		
Primary AC Power Source	200/208 VAC ±10% 3 Phase	200/208 VAC ±10% 3 Phase
Rated Current	<25A/phase	<50A/phase
Ambient Temperature	+5 to +35°C, non condensing	+5 to +35°C, non condensing
Cooling Water (minimum)	2.0 gpm	2.0 gpm
Compliance	CE to EMC 89/336/EEC and LVD 72/23/EEC; NRTL Listed	
RF Output Connector[3] **Type**	HN	SQS (F)

[1] Subject to limits of Forward and Reverse Power, Current and Voltage
[2] Excludes handles and connectors
[3] Standard, others available, user configurable

Ordering Options

- **Automatic Frequency Tuning**
  (1.8 – 2.17 MHz)
- **Leveling Types**
  — Forward Power
  — Load Power

Please contact your local MKS office for price and availability information.

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