



*KEINOS™ 2MHz Series
5kW, 11kW and 13kW
Mid-frequency RF
Plasma Generators*

KEINOS™

RF PLASMA GENERATORS - 2 MHz SERIES

The new KEINOS™ 2MHz plasma generator is the latest product from the industry leading 2MHz product suite. Building on the solid, reliable attributes of the existing 2MHz design, KEINOS incorporates the latest technology from MKS to enable demanding applications of pulsing, fast impedance changes and shorter process steps. KEINOS can deliver up to 13kW of power, pulsing up to 50KHz, multiple set point pulsing, pulse shaping and frequency tuning. KEINOS uses an integrated VI sensor for power accuracy and digital based control for fast response times. KEINOS is the selection of choice by industry leaders for dielectric etch, conductor etch, CVD and sputtering applications.

Performance of the KEINOS plasma generator can be enhanced with the addition of the newly released and patented Dynamic Frequency Tuning option. DFT is a significant enhancement over traditional AFT which uses guided search algorithms. Conventional frequency tuning schemes require more than 500 µsec of coarse and fine steps to search for the minima in reflected power. With DFT, measurement of power distortion is used to quickly and accurately adjust frequency achieving minima in reflected power in less than 100 µsec.

Features & Benefits

Advanced Pulsing to Achieve Superior Performance

- On-off, level to level and pulse shaping for maximum process flexibility
- Pulse energy control for process repeatability
- Pulse synchronization for pulse control in multi-frequency applications
- Up to 50KHz pulse frequency to meet the demands of advanced process requirements

Repeatability and Accuracy for Consistent Performance

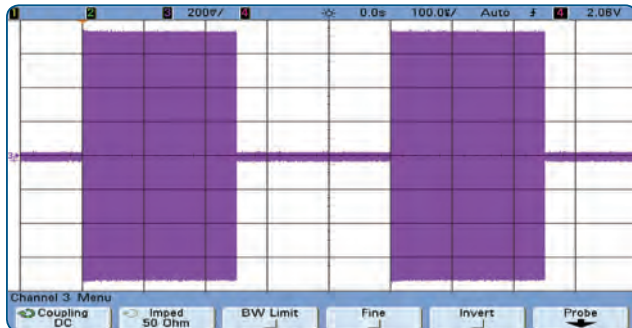
- Forward power accuracy of $<\pm 1.0\%$ of set point
- Pulse energy repeatability for process stability
- Integrated VI Probe sensor for real time impedance measurements
- Dynamic frequency tuning for impedance matching in 100 µsec



Pulsing Performance

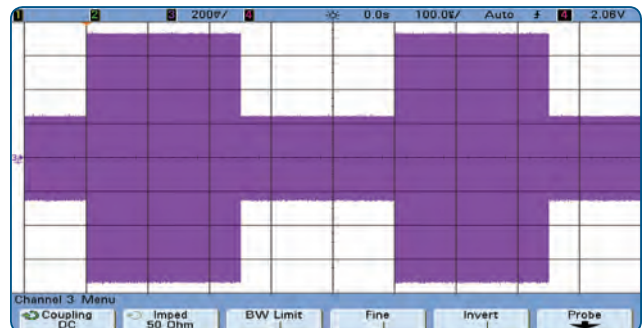
On/Off Pulsing

- Sharp rectangular pulses with zero watts off state
- Used when fast rise times are needed



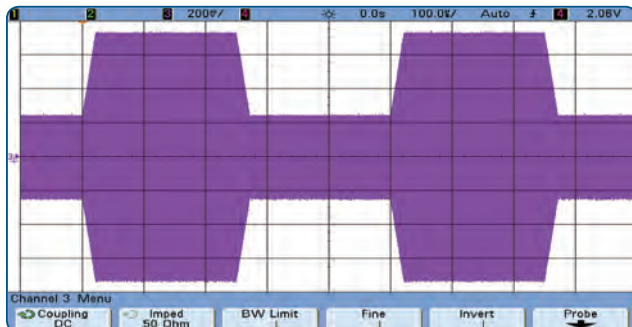
Multiple Level Pulsing

- Sharp rectangular pulses with non zero off state
- Used for minimizing plasma impedance shifts



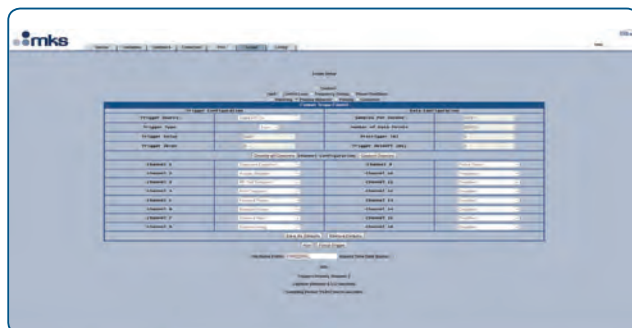
Pulse Shaping

- Controlled ramping or controlled rise and fall time
- Used for reducing pulse overshoot and plasma instabilities



Internal Scope

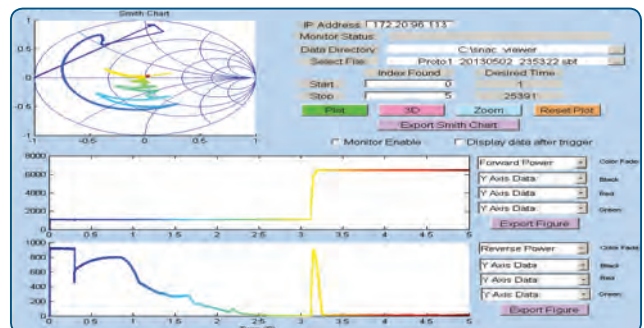
- High speed data collection with large memory buffer
- Real time statistics for field diagnosis
- Integrated high speed scope application to observe internal variables



Scope Setup —

Listing of customer selectable parameters

- Customized presets for rapid customer setups and consistent data mining
- Control via Ethernet

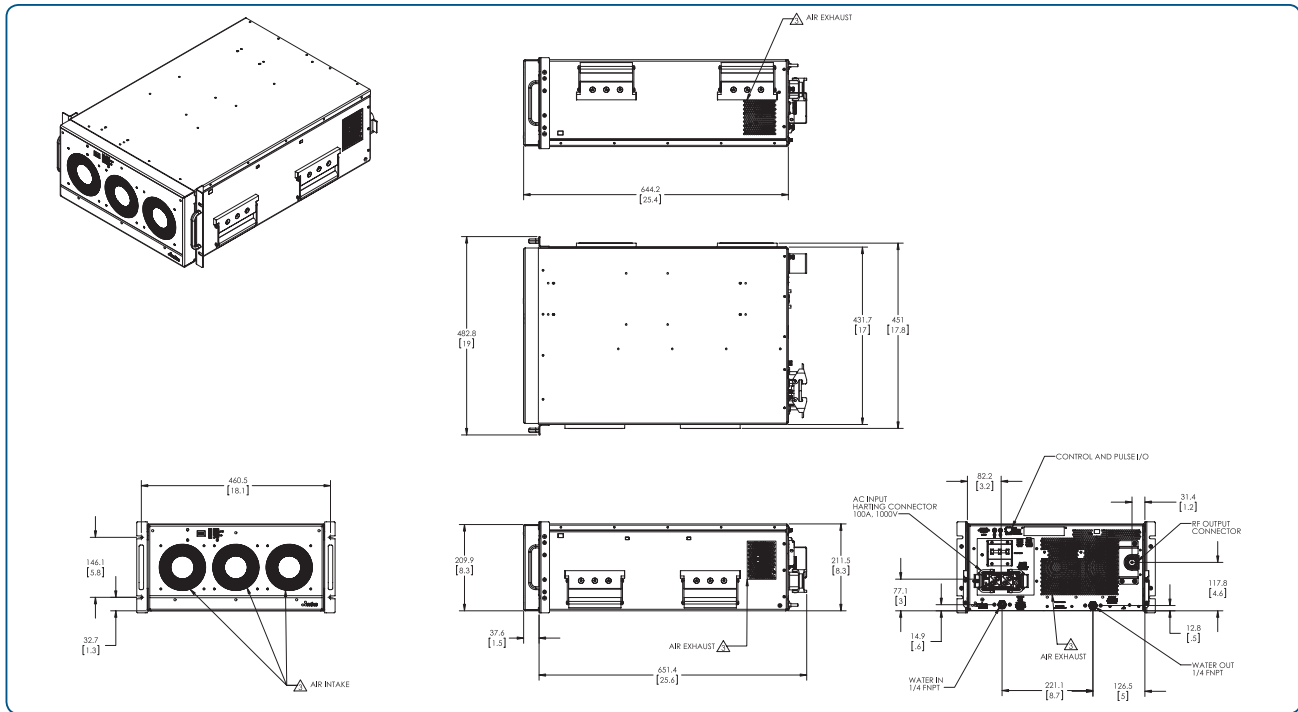


Output —

View of Smith chart and corresponding time sequence

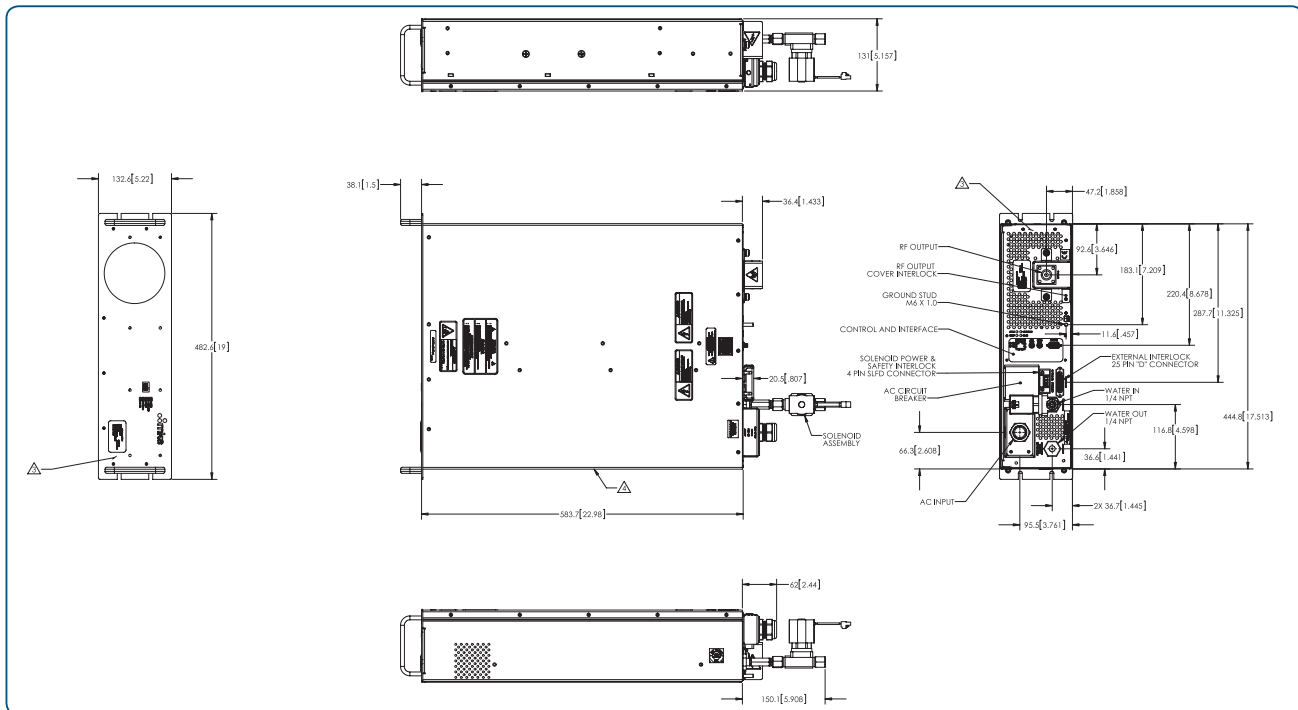


Dimensional Drawings



Dimensional Drawing — KEINOS C11002

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



Dimensional Drawing — KEINOS C5002

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



Specifications and Ordering Information

Specifications

Frequency

Center	1.985MHz
Tuning Range	±10%

Power

Available Power Levels	5kW, 11kW, 13kW
Accuracy	±5W up to 500W ±1% from 501W to max power
Load Impedance Range	Unlimited

Pulse

Pulse Frequency	Up to 50KHz
Pulse Rise Time	<5usec
Pulse Fall Time	<5usec
Minimum Pulse Width	10usec
Pulse Energy Repeatability	<3%
“Hot Swap” or Pulse on the Fly	Available
Pulse Between Two Set Points	Available
Pulse Enabled	Via internal or external TTL trigger, SMA
Pulse Mode	Master or slave operation

Physical Dimensions

Size 5kW, H x W x D	5.25" x 17.5" x 24.5"
Size 11kW, 13kW H x W x D	8.30" x 17.8" x 25.5"

Facility Requirements

Input AC Power	200/208VAC ±10%, 3 Phase, 50/60 Hz
Rated Current	25 amps max (5kW), 55 amps max (13kW)
RF Connector	SQS standard (QC output)

Interface

Ethernet, RS232

Compliance

CE, SEMI S2, SEMI S7, SEMI S14, SEMI F47, CAN/CSA-C22.2 No. 61010-1

Ordering Information

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



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