

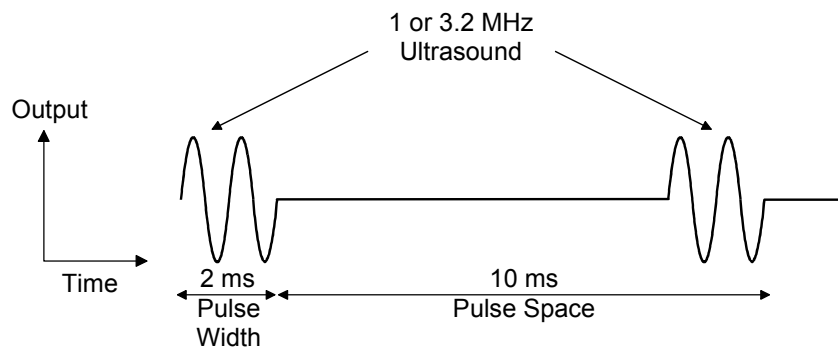
Sonicator[®] Plus 930 Specifications

General Specifications:

Input:	90–240 VAC, 50–60 Hz, 2.3 Amp Nom.
Certification:	The Sonicator Plus 930 complies with the ultrasound performance standards set forth in the Code of Federal Regulations, Title 21 (Food and Drugs), Part 1050.10
ETL and C-ETL Listed:	Model ME 930 (9801427)
Classification:	Protective Class I Equipment Type BF Equipment Enclosed equipment without protection against ingress of water. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with nitrogen oxide
Year 2000 Compliant	Yes
U.S. Patent Numbers:	4,966,131 and 5,095,890
Weight:	8.7 pounds 4.0 kg
Dimensions:	6 in (H) x 12 in (W) x 12 in (D) 15.2 cm (H) x 30.5 cm (W) x 30.5 cm (D)
Operating Temperature:	+50°F to +104°F +10°C to +40°C
Humidity:	Operating, 30% to 75% Relative Humidity at 104°F Nonoperating, 5 to 95% Relative Humidity, non-condensing
Storage Temperature:	-40°F to 167°F -40°C to 75°C
Timer Accuracy:	±0.5 minutes for times less than 5 minutes ±10% for times from 5 to 10 minutes ±1.0 minute for times greater than 10 minutes
Maximum Treatment Time:	60 minutes–electrical stimulation 30 minutes–ultrasound or combination therapy
Treatment Timer:	Treatment time counts down to zero when a time is set, or up to 60 or 30 minutes when no time is set. The digital timer indicates time in minutes and seconds. The timer also indicates the remaining or elapsed treatment time during the “Hold” period.

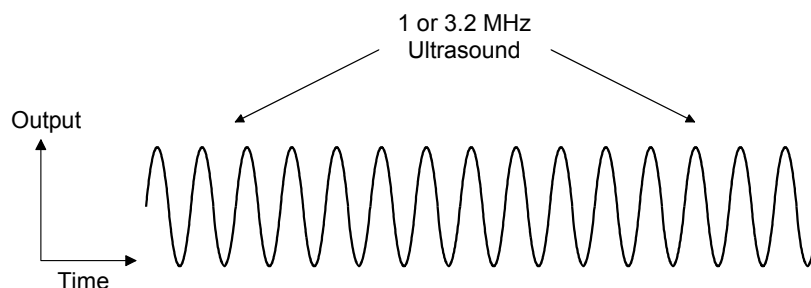
Ultrasonic Generator Specifications:

Frequency:	1.0 MHz \pm 5% 3.2 MHz \pm 5%
Modes:	Continuous Pulsed – 20% duty cycle
Pulse Repetition Rate:	100 Hz \pm 20%
Pulse Duration:	2 msec \pm 20%, 20% duty cycle
Temporal Peak/ average intensity ratio:	5:1 \pm 20%, 20% duty cycle
Maximum output power:	11 W with a 5 cm ² applicator, (ME 7513)
Maximum intensity:	2.2 W/cm ²
Indication accuracy:	\pm 20% (for any level above 10% of maximum)
Output description:	The output waveform is continuous or pulsed as programmed by the membrane panel control. In the pulse mode the 1 or 3.2 MHz sine wave pulses are modulated. The power level is adjusted by varying the pulse amplitude. The pulse waveforms are shown below:



Pulse Waveform – 20% Duty Cycle

In the continuous mode, the power is on at least 95% of the time the timer is running. The continuous mode waveform is shown below:



Continuous Waveform

Ultrasonic Applicator Specifications:

Piezoelectric discs: The output transducer utilizes a barium titanate disc with a specially coated face.

Individual Applicator Specifications:

Applicator Part Number	Frequency	Effective Radiating Area
ME 7513	1 or 3.2 MHz $\pm 5\%$	5 cm ² $\pm 20\%$

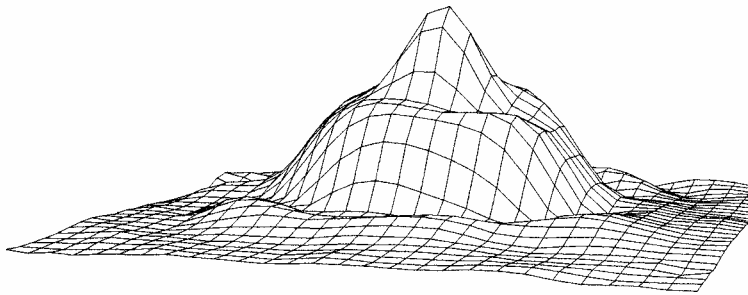
Maximum Beam

Non-Uniformity Ratio: 6:1

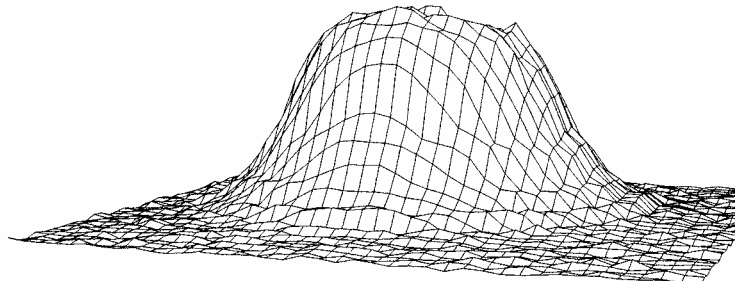
Spatial Pattern:

The applicator produces a collimated (cylindrical) beam with an area of 5 cm², measured 5 mm from the ceramic disc surface when the radiation is emitted into the equivalent of an infinite medium of distilled water at 30° C.

The beam of the applicator is circular in all planes parallel to the applicator face. A few inches from the face, it is a single smooth bell-shaped curve. Nearer the face the pattern varies more due to phase cancellations. Sample curves measured in the far field from the surface are shown in Figures 9.3 and 9.4.



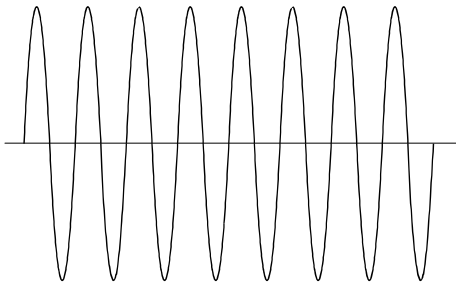
5 cm² Applicator (1 MHz), ME 7513, – Three Dimensional Beam Pattern



5 cm² Applicator (3.2 MHz), ME 7513, – Three Dimensional Beam Pattern

Waveform Specifications:

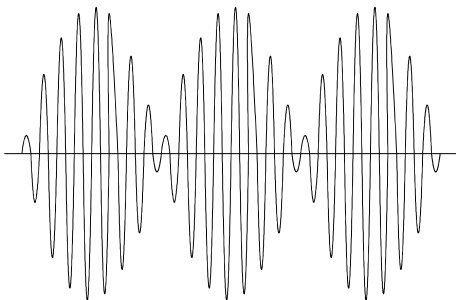
Interferential Mode



Interferential Waveform

Waveform Type:	Sinewave
Polarity:	None
Volts:	0-65 volts RMS, 1 Kohm load
Current:	0-65 mA RMS, 1 Kohm load
Average current at maximum intensity and frequency:	65 mA RMS
Maximum current density under 2" diameter electrode.	3.2 mA/cm ²
Frequency:	Channel 1 = 4000 Hz Channel 2 = 4000 to 4250 Hz variable frequency sine wave
Frequency Modulation:	1-15 Hz 80-150 Hz 1-150 Hz xx-xx Hz, <i>xx=any value from 1 to 250 Hz</i>
Phase Duration:	125 μs
Available Amplitude Modulation Options:	Vector rotation
Available Channels:	Channels 1 & 2

Premodulated Mode



Premodulated Waveform

Waveform Type:	Amplitude modulated sine wave
Polarity:	None
Volts:	0-50 volts RMS, 1 Kohm load
Current:	0-50 mA RMS, 1 Kohm load
Average current at maximum intensity and frequency:	50 mA RMS
Maximum current density under 2" diameter electrode.	2.5 mA/cm ²
Frequency:	4,000 Hz
Frequency Modulation:	1-15 Hz 80-150 Hz 1-150 Hz xx-xx Hz,

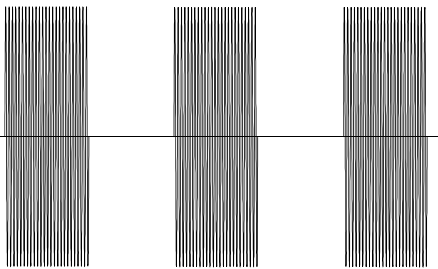
*xx=any value from
1 to 250 Hz*

Phase Duration: 125 μ s internal sine wave
4-1,000 ms beat envelope

Available Amplitude
Modulation Options: Continuous
Surge
Reciprocation

Available Channels: All

Medium Frequency Mode



Medium Frequency (*Russian*)
Waveform

Waveform Type: Burst modulated sine wave

Polarity: None

Volts: 0-50 volts RMS, 1 Kohm load

Current: 0-50 mA RMS, 1 Kohm load

Average current at
maximum intensity
and frequency: 50 mA RMS

Maximum current
density under 2"
diameter electrode. 2.5 mA/cm²

Frequency: 2500 Hz, Burst at
10 ms on and 10 ms off

Frequency Modulation: No

Phase Duration: 200 μ s

Available Amplitude
Modulation Options: Continuous
Surge
Reciprocation

Available Channels: All

Amplitude Modulation Specifications:

Vector rotation:

Interferential Mode Only,

-50% amplitude modulation in
anti phase with an eight second modulation period.

Surge Mode:

Premodulated and Medium Frequency

Up ramp:	3 seconds
Down ramp:	2 seconds
Preset on/off times:	5 seconds on, 5 seconds off
	10 seconds on, 10 seconds off
	10 seconds on, 30 seconds off
	10 seconds on, 50 seconds off

Reciprocation mode:

Premodulated and Medium Frequency

Up and down ramps:	1 second, <i>reciprocation only</i>
Reciprocation time:	2-240 seconds, (On time = off time)