The 500 Watt 20kHz Ultrasonic Process System

EQUIPMENT SPECIFICATION

Model L500/5 – 20

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1.0 GENERAL

The high intensity ultrasonic liquid processing system Model L500/5-20 has been specifically designed for both research and production work in the treatment of liquids and gasses by ultrasound. It has the advantage that acoustic as well as electrical parameters may be monitored thereby giving the user full process information.

Acoustic energy is coupled to the treatment sample by means of titanium horns and can be controlled by an adjustment of electrical power to the transducer and/or by selecting particular horn geometry.

Vibrational amplitude at the working face of the horn, electrical power to the transducer, acoustic power transmitted to the test sample and operational frequencies are all continually monitored.

Transducer resonance is maintained by means of a true motional feedback network and the transducer amplitude is displayed on a digital meter situated on the front panel. The operational frequency is also monitored and displayed.

A wattmeter measures the ultrasonic power to the transducer and it is also possible to measure the acoustic power transmitted to the treatment sample. Power is displayed on a digital meter. The electronic system comprises a main chassis which houses the ultrasonic generator and monitoring facilities.

The system can also be controlled and monitored from a remote station using RS232 serial data communication.

2.0 CONTROLS

2.1. Mains On/off	By means of a single-pole rocker switch located on the rear panel.
2.2. Sonics On/off	Switch - Green LED indicates sonics on
2.3. Amplitude Set	Variable control on front panel Generator.
2.4. Local/Remote Set	Switch - LEDs indicate Mode.

3.0 REMOTE OPERATION

3.1. RS232 Interface

A 9-Way D socket is provided on the rear panel to enable communication between a PC and the L500-20. With the RS232 interface it is possible to remotely operate the L500-20. The 'Sonics' can be remotely switched on/off and the amplitude level adjusted. The amplitude and resulting acoustic power can be monitored and recorded.

4.0 CONTROLS & INDICATORS - REMOTE

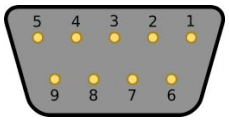
4.1. Sonics On/off via RS232

4.2. Amplitude Set via RS232

4.3. Amplitude Monitor via RS232

4.3. Watts Monitor via RS232

A 9 way 'D' socket is provided on the rear panel to enable connection of RS232 remote control & monitoring signals.



Pin No.	Signal Description
2	Receive Data (RD)
3	Transmit Data (TD)
5	Signal Ground (Gnd)

Communication protocols can be integrated with existing process control software.

5.0 INDICATORS

5.1. Red LED Sonics on Standby

5.2. Green LED Sonics On

6.0 MONITORS

6.1. Amplitude

Digital meter calibrated in microns peak-peak and measuring transducer displacement. This is presented as a numerical value & bar graph.

Numeric : Microns
Bar : 0-100 %

6.2. Frequency

Digital display measuring operational frequency and Calibrated in Hertz

6.3. Power

Digital meter on front panel measuring Ultrasonic power to the transducer. This is presented as a numerical value & bar graph.

Numeric : Watts
Bar : 0-100 %

7.0 ACOUSTIC SYSTEM

7.1. Transducer

A 20kHz half wavelength Piezo-electric sandwich transducer constructed from Titanium alloy. This is mounted in a fan cooled housing which enables continuous reliable operation.

7.2. Frequency

20kHz nominal

7.3. Transducer Displacement

The maximum vibrational amplitude at the transducer radiating face is 12 +/- 1 microns peak to peak.

7.4. Process Horn

Titanium horns can be supplied for use with each system, giving a variety of displacements and total power output characteristics

8.0 ACOUSTIC POWER TRANSFER

There are a range of standard acoustic horn configurations available however coupling high powers into liquid loads can be complex, and an understanding of the acoustic parameters of the load will enable the system performance to be maximised. Sonic Systems can design and manufacture horns and inter-stages for specific application Requirements.

Please refer to our website for reference on considered design :

http://sonicsystems.co.uk/page/power-ultrasonics-a-guide

9.0 ELECTRICAL

9.1. Mains Supply	230 volts +/-7%, 50 - 60 Hz Single Phase.
9.2. Classification	Class 1. Must be earthed.
9.3. Power Consumption	720VA Maximum
9.4. Mains connector	IEC Inlet mounted on rear panel. Contains integral rocker switch & 20mm fuse.
9.5. Fuse	5 Amp. 20mm Ceramic body.
9.6. Operational Frequency	20kHz nominal

9.7. Frequency Control

Automatic. A feedback network senses the motion of the transducer and maintains the system at its optimum operating frequency.

9.8. Power Output

The generator is designed for a potential maximum output of 500 Watts.

This is a power by demand system where the required transducer displacement can be pre-set and the generator automatically delivers the necessary power to maintain this displacement under varying load conditions.

9.9. Duty cycle

Continuous. Capable of 24 hour operation at the approved system power output level

10.0 MECHANICAL

The Generators can be easily adapted for 19" rack mounting if required.

10.1. Generator Dimensions

Width 444mm
Depth 350mm
Height 187mm

10.2. Colour

Frame RAL 7030 Grey
Covers RAL 7035 Light Grey

10.3. Transducer Enclosure

Diameter: 65mm (housing)
Length including connections: approx. 162mm

10.4. Weight

Generator Assembly : 13kg
Transducer Assembly: 925g

11.0 DESIGN STANDARDS

CE

IEC 1010-1
Title: Safety requirements for electrical equipment for measurement, control, and laboratory use-Part 1
BS.EN 60204-1:1993
Title: Safety of machinery. Electrical equipment of machines. Specification for general requirements.

73/23/EEC Amended 93/68/EEC
Title: Low Voltage Directive

12.0 EMC

Emissions: BSEN61000-6-4 :2001
Immunity: BSEN61000-6-2: 2005

13.0 Environmental

13.1. Generator Cabinet	IP20
13.2. Transducer assembly	IP20
13.3. Treated Liquid Temperature	Max 75 °C
13.4. Ambient Temperature	Rated range of use +5°C to+ 35°C
13.5. Storage and transport	-40°C to +70 °C

Please Note:

The contents of this equipment specification are believed to be correct at the time of printing. The manufacturers, however, reserve the right to change the content, product specification, and performance criteria, without notice.